

National Regulations concerning Driver's field of vision of immediate frontward and sideward

Transmitted by the expert from JAPAN

1. Scope

These technical Regulations apply to the mirror and other devices pursuant paragraph 5 of Article 44 of the Safety Regulations.

2. Definitions:

- 2.1. "Seating Reference Point" means point H (a hip joint of the dummy) of 3DH machine seated on the vehicle seat in accordance with the seating arrangement set forth in ISO-6549-1980 or seated in the design standard equivalent to ISO. In the case where seats have an adjustment mechanism to move them in a front/back or up/down direction, to tilt a backrest or for other adjustment, the seats should be placed at the design standard position.
- 2.2. "The driver's ocular points" mean driver's ordinary eye points in an usual driving condition that passes a point vertically 635mm above the Seating Reference Point (hereinafter referred to as a "Midpoint of reference eye point"), and are also points that lie on a straight line perpendicular to a center plane of a vehicle, and are symmetrically located 65mm to the right and left from the Midpoint of reference eye point (binocular). In this case, the Midpoint of reference eye points is adjusted in Longitudinal or vertical directions by the distance corresponding to the "back angle" of the test vehicle shown in Table 1.
- 2.3. "Back angle" means the backward-tilted angle of the body base line of a seated person that corresponds to either the torso angle measured using a 3 DH machine defined in ISO-6549-1980 or corresponding to a design standard angle equivalent to the said torso angle.

Table 1: Compensation of midpoint of reference eye points

Back angles (degrees)	Compensation Distance		Back angles (degrees)	Compensation Distance	
	Longitudinal Direction mm	Vertical Direction mm		Longitudinal Direction mm	Vertical Direction mm
5	-186	28	23	-18	5
6	-177	27	24	-9	3
7	-167	27	25	0	0
8	-157	27	26	9	-3
9	-147	26	27	17	-5
10	-137	25	28	26	-8
11	-128	24	29	34	-11
12	-118	23	30	43	-14
13	-109	22	31	51	-18
14	-99	21	32	59	-21
15	-90	20	33	67	-24
16	-81	18	34	76	-28
17	-72	17	35	84	-32
18	-62	15	36	92	-35
19	-53	13	37	100	-39
20	-44	11	38	108	-43
21	-35	9	39	115	-48
22	-26	7	40	123	-52

Note: (Symbols in the above table) Longitudinal Direction ("-" :frontward, "+" : rearward)
Vertical Direction ("-" :downward, "+" : upward)

- 2.4. An “Obstacle” means a pole with a round cross-section with a 0.3m diameter and 1m height.
- 2.5. “The Mirror and other Devices” means the mirror and other devices described in paragraph 5 of Article 44 of the Safety Regulations such as mirrors (including a direct left view mirror), cameras, visual display devices and other devices that driver’s field of vision of immediate frontward and sideward.
- 2.6. “Cab-Over-Type Heavy Duty Trucks and So Forth” mean regular vehicles of which whose gross weight is not less than 8 tons or maximum loading capacity is not less than 5 tons, and whose engines substantial part is installed in or under the driver/passenger’ s cabin (excluding the vehicles whose passenger capacity is not less than 11 or whose shapes resemble the vehicles carrying at least 11 passengers). “Cab-Over-Type Heavy Duty Trucks and So Forth” do not include one-side cab vehicles of which engines are installed beside the driver’ s cabin, and truck cranes of which engines are installed in/behind the driver/passenger’ s cabin.
- 2.7. “Test vehicle state” means the vehicles that is parked on a flat surface under empty conditions (fuels, lubricants and coolants must be filled in engines and fueling devices, and the vehicle must be equipped with fixed equipment for the normally required operation), accommodating a driver (55 kg) and a passenger (55 kg) on the seat next to the driver and on the side of the vehicle, or the vehicle in the equivalent state. The test vehicles must be in the state of driving straight forward. The ground clearance must be adjusted to the design standard value if the vehicles have a height adjustment mechanism.
- 2.8. A “Camera” means a device that takes photographs and visually display them whenever necessary for a driver to see immediate frontward and sideward.
- 2.9. A “Visual Display Device” means a device which provides an image of direct front/left areas of the vehicle through the camera.
3. General Requirements:

- 3.1. A mirror and other devices must meet the requirements set forth in 5.1. or 5.2. when tested with test procedures defined in 4..
- 3.2. If the lowest point of parts extruding out of the external parts near the end of the vehicle 1.8 m or less above the ground, such part must be designed to reduce impacts on pedestrians who may contact it, and meet the requirements of the attached 64 “Technical Standard of Impact Reduction of inside Rearview Mirror”.
- 3.3. A mirror and other devices installed outside the vehicle must not extrude out of the vehicle more than 250 mm (if such vehicle tows other vehicles that is wider than the towing vehicle, the length of the extrusion out of the towed vehicle must be 250 mm or less).
- 3.4. In case that the camera and visual display devices are used to meet the requirements of the technical Regulations, the camera and visual display devices must comply with the following requirements:
 - 3.4.1. A visual display device must enable a driver at the driver’ s seat to easily obtain images through the camera when an engine is operated and gears are in a neutral, drive or reverse position.
 - 3.4.2. A visual display device that cannot display simultaneously entire vision that is not seen directly by the driver or not reflected on a mirror should enable a driver to see such areas by adjusting the camera or visual display device.
 - 3.4.3. As far as a visual display device complies with 3.5.1. and 3.5.2., displayed images may be changed without driver’ s operation.
- 3.5. A mirror and other devices of cab-over-type heavy duty trucks and so forth must meet the following Regulations or other Regulations equivalent to them:
 - 3.5.1. The curvature radius of the mirror identifying the obstacle in the front area of the vehicle must be more 100 mm or longer.
 - 3.5.2. The curvature radius of the mirror identifying the obstacle in the front/left areas of the vehicle must be 300 mm or longer.
 - 3.5.3. The curvature radius of the mirror identifying the obstacle in the back/left areas of the vehicle must be 600 mm or longer.
4. Test Procedures:
 - 4.1. A compact car, a light car and a regular car (excluding a cab-over-type heavy duty truck, a motorcycle, a motorcycle with a sidecar, a tricar and a light car with caterpillars or sleds):

The device must recognize an obstacle (Figure1) located between the vehicle and vertical surface 0.3 m away from an front and left-sides (for left-hand drive vehicles, on the right-side of the vehicle) of the test vehicle directly from the reference eyepoints or from the midpoints of reference eye points with a rearview mirror or with a mirror and other devices set forth in paragraph 5 of Article 44 of the Safety Standard. In this case, the reference eye points or the midpoint of the reference eye points can be adjusted in accordance with 4.3..
 - 4.2. Cab-over-type heavy duty trucks and so forth:

The device must recognize an obstacle (Figure2) located between the vehicle and vertical planes 2 m away from front and 3 m away from the left-side (for left-hand drive vehicles, from the right-side of the vehicle) of the test vehicle directly from the reference eye points or the midpoint of reference eye points with a rearview mirror or a mirror and other devices set forth in paragraph 5 of Article 44 of the Safety Regulations. In this case, the reference eye points or the midpoint of reference eye points can be adjusted in accordance with 4.3..

4.3.Compensation of displaced eye points

For the tests in accordance with 4.1. and 4.2. when a driver looks around the vehicle with movements in longitudinal direction or vertical directions, the eye points (binocular) may be adjusted in longitudinal direction or vertical directions from the midpoint of reference eye points as a measuring base point within the range shown in the table 2.

Table 2: A Range of compensation of midpoints of Displaced Eye Points

	Range of compention of Longitudinal (+:rearward -:frontward)	Range of compention of Lateral (+:right -:left)	Range of compention of Vertical (+:upward -:downward)
reference Eye Point	0	0	0
Upward displaced eye points	0	-10	40
Frontward displaced eye points	-140	-15	10
Sideward displaced eye points	30	-110	15

Note: In the above table, for left-hand drive vehicles,
“Right” should read “Left” and “Left” should read “Right”.

Figure 1

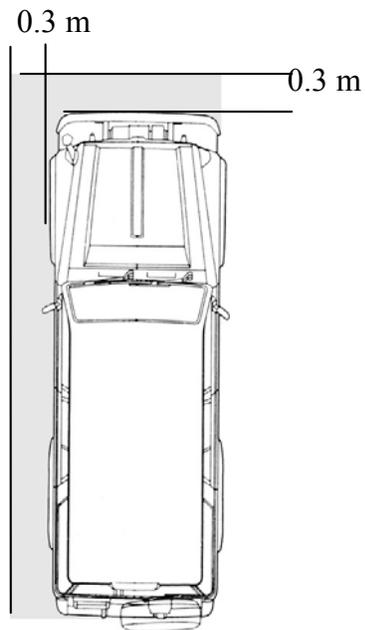
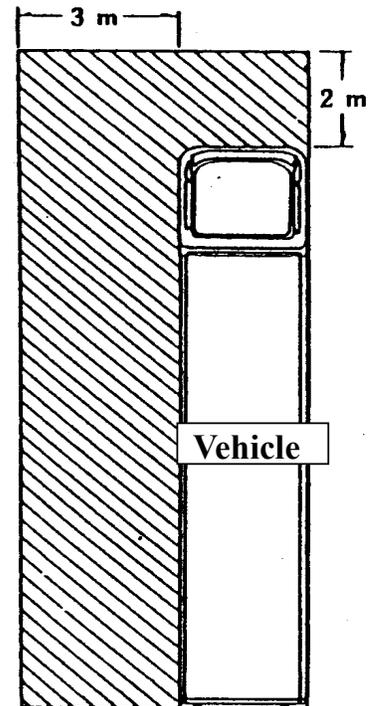


Figure 2



5. Criteria:

5.1. Criteria of the judgment for compact cars, light cars and regular cars (excluding cab-over-type heavy duty trucks):

For test 4.1., at least a part of the obstacle defined in 4.1. must be recognized. An exceptional criterion is permitted when the recognition is hindered by the followings:

5.1.1. Windshield wipers

5.1.2. A steering wheel

5.1.3. A -pillar or a part of an outside rearview mirror defined in Attachment 1

5.2. Criteria of the judgment for cab-over-type heavy duty trucks:

For test 4.2., at least a part of the obstacle defined in 4.2. must be recognized. The provision of 5.1. is also applied in this case.

Annex 1

Range of Blind Spots Caused by A-Pillar or Outside Rearview Mirror

1. Definition:

- 1.1. The “Blind Spot by the Outside Rearview Mirror” means a blind spot caused by an outside rearview mirror or by structures holding or protecting the said mirror.
- 1.2. A “Blind Spot by A-Pillar” means a blind spot caused by structures, lying above a plane parallel to the center line of the vehicle and ahead of the reference eye points, that pass the midpoint of reference eye points and the lowest point (point a) of the transparent side window in which a driver can recognize the ground through the side window when checking the left side of the vehicle from the center of the standard eye points (Figure3). However, the window partially placed in the lower part of the door is not considered as a side window. For left-hand drive vehicles, “Left” should read “Right”.

2. Range of Blind Spot by A-Pillar or Outside Rearview Mirror

The range of blind spot by A-pillar or the outside rearview mirror defined in 5.1.3. must satisfy the following condition: When there are several blind spots, each of them must meet the above condition.

$$X \leq 0.292L \leq 0.203$$

X (m): The boundary of the area thus excluded. The distance between the centers of the columns tangent to the front end and the rear end of the blind spot.

L (m): The distance between the rear end of the column standing in a blind spot created by a A-pillar or rearview mirror and tangent to the rear end of such blind spot and the front end of the rear wheel.

Figure 3

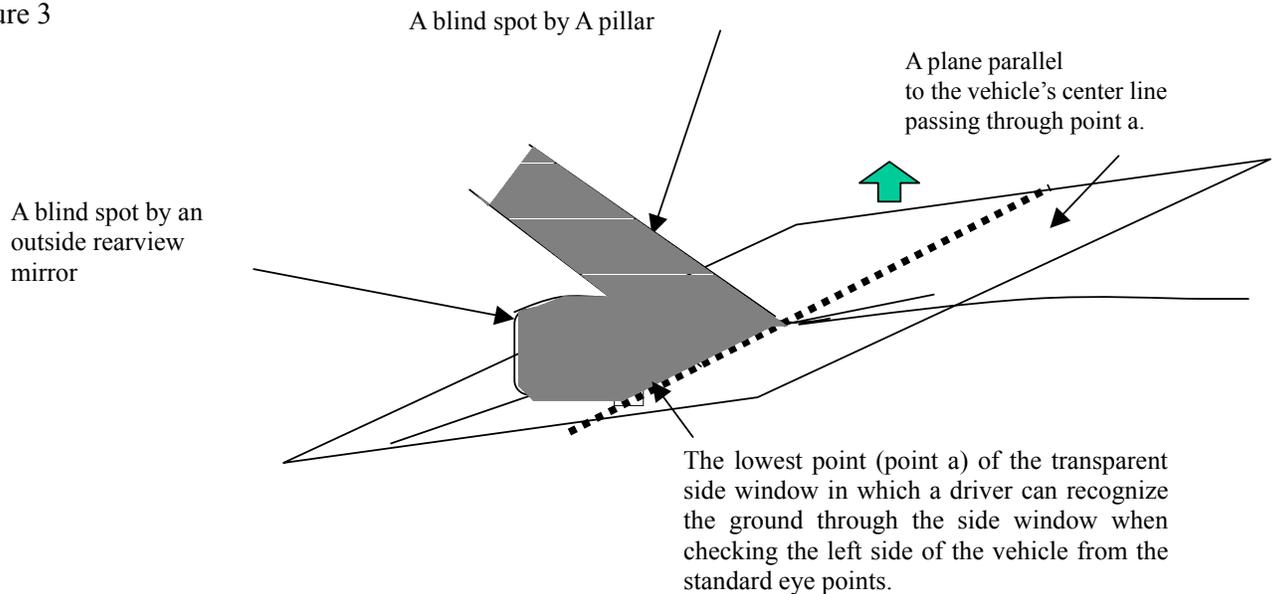


Figure 4

