This is a translation to English for reference purpose of JNCAP test method which is originally prescribed in Japanese language.
Please be sure to refer to the Japanese test method if you need to be precisely correct.

PEDESTRIAN HEAD PROTECTION PERFORMANCE TEST PROCEDURE

Created: April 1, 2003
Revised: April 25, 2023
March 15, 2019
March 26, 2018

1. Effective Dates

This test procedure went into effect on April 1, 2003. However, the changes made on April 25, 2023 went into effect on April 25, 2023.

2. Scope of Application

This test procedure applies to the "Pedestrian Head Protection Performance Test" of passenger vehicles with 9 occupants or less and commercial vehicles with a gross vehicle mass of 2.8 tons or less, conducted by the National Agency for Automotive Safety and Victims' Aid (NASVA).

3. Definition of Terms

The terms used in this test procedure are defined as follows:

(1) **Ground Reference Plane**: A horizontal surface that the all the vehicle's tire contact points run along.

(2) **A-Pillars**: The supporting sections on the right and left sides of the vehicle's front window.

(3) **Head Impactor**: A model head which simulates a human head (see Attachment 1.)

(4) **Wraparound Distance (WAD)**: The shortest line of the lines that connects the reference plane with any point on the vehicle, which passes through the vehicle's front and front's upper-surface within the vertical plane that includes the vehicle's fore-aft axis.

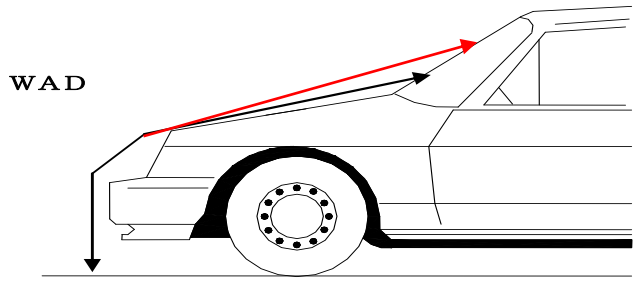


Figure 2.1: Wraparound Distance (WAD)

(5) **Grid Points**: Indicates the point of intersection of the lines made by a 100mm pitch from the WAD1000 in the lateral direction or fore-aft direction above the vehicle's center line.

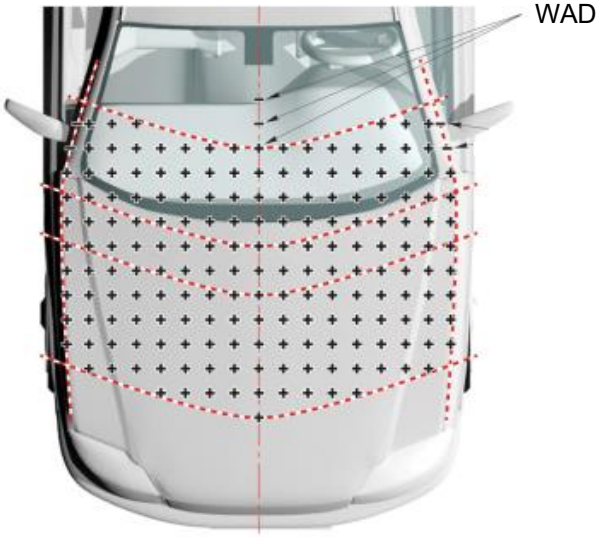


Figure 2.2: Grid Points

(6) **HIC (Head Injury Criterion)**: A numbered value that indicates the degree of damage inflicted on a head impactor.

(7) **Window Frame Parts**: Indicates the parts of the joins in the upper and lower windshield that have been greatly warped from impact, comparatively.

4. Testing Requirements

4.1 Conditions of Test Vehicle

4.1.1 Data Submitted from Vehicle Manufacturer

The vehicle manufacturer shall provide NASVA with the following data necessary for preparing the test vehicle properly:

(1) Appendixes 1-1~1-4-2, 7

(2) Special confirmation items relating to preparation of the test.

4.1.2 Mass of Test Vehicle

The mass of the test vehicle shall be adjusted between 100% and 101% of the mass at vehicle delivery* without installing the mass on the driver's seat and the front passenger's seat (seat parallel to the driver's seat and situated adjacent to the side face of the vehicle; hereinafter the same). However, this shall not apply if the mass of the vehicle cannot be adjusted to this range after removing parts that will not affect the test. When the vehicle is equipped with a spare tire and tools, it is permissible to test the vehicle as it is.

* Mass at vehicle delivery: The test institute shall measure the mass of the vehicle received after filling with every liquid except fuel to the maximum within a specified range and filling with the fuel to 100% of the fuel tank capacity. The presence of tools and spare tires and the absence of extraneous items shall also be confirmed before the vehicle is weighed. This mass is referred to as the mass at vehicle delivery.

4.1.3 Vehicle Posture

Vehicle posture is specified as follows:

(1) The posture of the test vehicle shall be the condition the vehicle when brought in, however test vehicles equipped with a height adjusting device shall be adjusted to the position specified for the traveling speed of 40 km/h. If the vehicle is equipped with a manual height adjusting device, the vehicle shall be set to the standard position.

(2) If the vehicle is equipped with an impact force reduction device for pedestrian protection which works upon car impact with a pedestrian (hereinafter referred to as, "protection device"), the vehicle manufacturer shall provide technical documents which explain the influence of the protection device regarding pedestrian head injuries and activate the protection device during the test.

(3) A mass the same as the Hybrid III dummy having the mass equivalent to 50th percentile adult male (75 kg) shall be installed on the center surface of the driver's and front passenger's seats. The dummy shall comply with the stipulations provided in Title 49, Part 572, Subpart E of CFR (Code of US Federal Regulations) as amended in the Federal Register No. 63 dated February 4, 1998.

(4) The front wheels shall be set to the straight-traveling state. The direction of the vertical cross section of the vehicle must be within ±2° with respect to the direction of projection of the impactor.

(5) Vehicles that have undergone steps (1) through (4) shall be deemed in "normal riding posture." The vehicle manufacturer shall submit the wheel arch height measurements of the vehicle in normal riding posture to NASVA beforehand. If the height of the wheel arches is ±25mm higher than the design standard position, that measurement position shall be taken as the normal riding posture wheel arch height and the vehicle measurement positions shall be adjusted (within ±2mm) to conduct the test.

(6) If the test is being conducted by a vehicle that has already undergone the side collision test, it is assumed that adjustments (1) through (4) cannot be carried out adequately. Because of this, the vehicle posture (fore-aft direction and lateral direction) measurements must be carried out before the side collision test, so that the test may be carried out within ±0.1° of the fore-aft and lateral measurements in relation to the vehicle posture.

(7) If the seats have been removed for the rear collision test, when making the markings, the vehicle posture measurements shall also be conducted. Weights and the like shall be installed while the seats are removed, and the test shall be conducted with the vehicle posture as measured when the markings were being made. In this case, the margin of error for the fore-aft direction shall be ±0.1°, and the margin of error for the lateral direction shall be ±0.1°.

4.1.4 Vehicle Fluids

(1) Every liquid except fuel shall be provided to the maximum within the specified range.

(2) Fuel or an alternative fuel having a specific gravity similar to that of the fuel shall be provided to 100% of the fuel tank capacity.

(3) If liquid cannot be filled as specified in (1) and (2) above for a vehicle after the side collision test, filling of (1) and (2) shall be implemented as much as possible.

4.1.5 Seat Adjustments

(1) If the driver's seat and front passenger's seat are adjustable in the fore-and-aft direction, they shall be adjusted to the middle position. If adjustment to the middle position is not available, the seats shall be adjusted to a position behind the middle position but at the nearest adjustable position.

(2) If the driver's seat and front passenger's seat are adjustable only in the vertical direction, they shall be adjusted to the lowest position.

(3) If the driver's seat and front passenger's seat have other than (1) and (2) mentioned adjustable mechanism, they shall be adjusted to the design standard positions.

(4) Seats other than the driver's seat and front passenger's seat shall be adjusted to the design standard positions and angles.

4.1.6 Other Vehicle Conditions

4.1.6.1 Ignition

The engine of the test vehicle shall be stopped and the ignition switch shall be turned off.

4.1.6.2 Side Doors

The doors of the test vehicle shall be closed securely. However, this shall not apply if the doors of the vehicle after the side collision test cannot be closed.

4.1.6.3 Roof

If the vehicle has a removable roof, the respective roof shall be installed.

If the vehicle has a sunroof, the sunroof shall be closed.

If this vehicle is a convertible, the top shall be closed.

4.1.6.4 Tires

Air pressure of the tires shall be kept at the recommended level indicated in the specification table of the user's manual or label on the vehicle body.

4.1.6.5 Securing the Vehicle

The Tires of the test vehicle shall be secured by using appropriate holding means such as parking brake or chocks.

Vehicles with automatic transmissions shall be held in place using the parking brake and keeping on P position or applying chocks.

4.1.6.6 Rearview Mirror, License Plate Bracket, etc.

It is permissible to remove the rearview mirror and auxiliary mirror (provided near the bonnet, wing, or A-pillar) if possible, as well as the license plate and its holder and bracket at the front bumper, provided removal of these items does not negatively affect the test.

4.1.6.7 Other

(1) If effects of the secondary collision of the head impactor could occur for certain areas of the vehicle, it is permissible to protect such areas with a cover or other means as long as the protective measures do not affect the test results.

(2) It is permissible to protect the driver's seat and front passenger's seat from flying pieces of broken windshield glass.

4.1.7 Marking the Test Range, etc.

For stabilization of vehicle posture, the vehicle shall be run to stabilize its posture. After the posture of the test vehicle is stabilized, the following markings shall be made on the vehicle. For

vehicles with an active bonnet and the like, markings shall be carried out so that such devices are not activated.

4.1.7.1 Bonnet Leading Edge Reference Lines

(1) Use a 1000mm straightedge to measure a vertical line parallel to the car's vertical plane, then tilt this line 50° towards the rear of the vehicle. Make the lower edge of this line 600mm tall. If the bonnet's upper-surface slopes 50° and the straightedge touches it in more than 2 places (see Figure 3.1(3)), fix the straightedge's rear tilt angle to 40°.

(2) Mark the points where the straightedge makes contact with the bonnet.

(3) If the lower edge of the straightedge makes contact first (see Figure 3.1(2)), make the marking there.

(4) If the upper edge of the straightedge makes contact first (see Figure 3.1(4)), follow the trajectory of WAD 1000.

(5) Remove the straightedge from the bonnet, running along the bonnet's cross-section, move it within a range of 100mm (with a ±3mm margin of error), have it make contact with the bonnet again and make a marking.

(6) Repeat steps (1) to (5) over the entire bonnet. Use a flexible ruler, etc., to connect the markings on the bonnet into lines. These lines need not be continuous and they can cross over emblems (within 100mm) and the like. These lines will be the Bonnet Leading Edge Reference Lines (hereinafter referred to as, "BLE Reference Lines.")

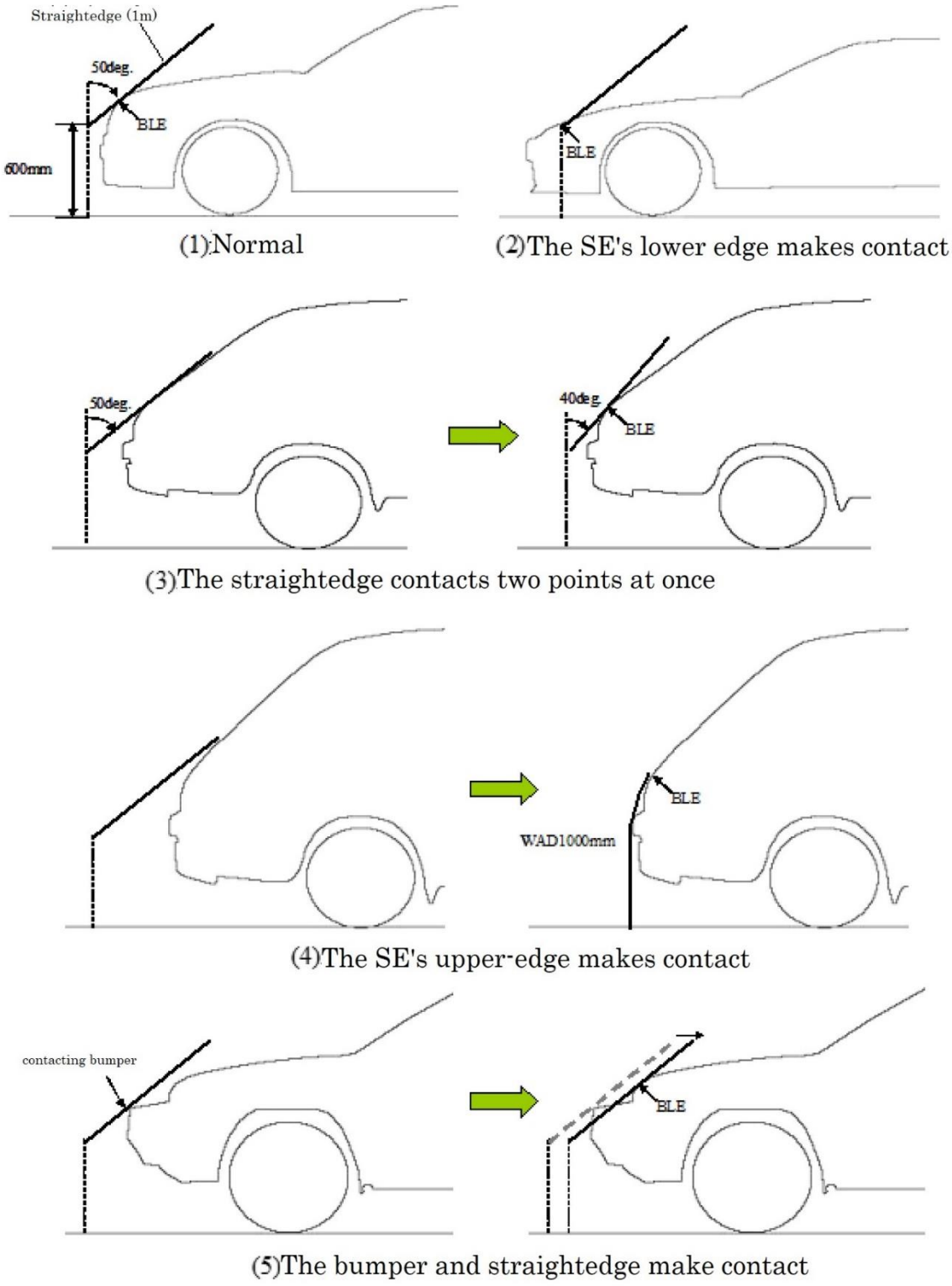


Figure 3-1: Bonnet Leading Edge (BLE) Reference Line

4.1.7.2 The Bonnet Side Edge Reference Lines

(1) Use a 700mm straightedge, fixed at 45° in relation to the reference plane parallel to the transverse vertical plane of the vehicle. Keep the straightedge parallel with the vehicle's cross section while making contact with the bonnet.

(2) Put a marking on the highest point where the straightedge and bonnet make contact.

(3) Remove the straightedge from the bonnet, move it forwards or rearwards within a 100mm

range (with a ±3 mm margin of error), touch it to the bonnet again, and make a marking on the highest point.

(4) Move the straightedge from the bonnet to A Pillar, and the roof (until it arrives at WAD 2100), and repeat steps (1) to (3). Ignore the fender mirror, door mirror, and antenna. Use a flexible ruler to connect the markings on the bonnet into lines. These lines will become the bonnet side edge reference lines. In this case, if the side edge reference lines are broken in the middle and are not consecutive, connect the various edges in the lateral direction of the vehicle.

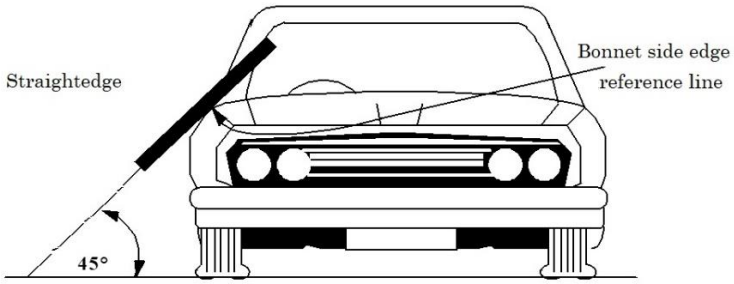


Figure 3.2: Side Edge Reference Line

4.1.7.3 Windshield Rear Reference Lines

(1) Fix a 700mm straightedge vertically at a 75° angle behind the vehicle, parallel to the vehicle's vertical plane. Tilt the straightedge parallel to the vehicle's vertical plane until it makes contact with the roof (or windshield.)

(2) Make a marking on the lowest point where the straightedge contacts the roof.

(3) Remove the straightedge from the roof, and move it along the bonnet's cross section within a range of 100mm (with a ±3mm margin of error), make contact with the bonnet again and make another marking.

(4) Repeat steps (1) to (3) until the entire roof has been covered. The antenna and other such things may be ignored. Use a flexible ruler to connect the markings on the roof into consecutive lines. These lines will be the windshield rear reference lines.

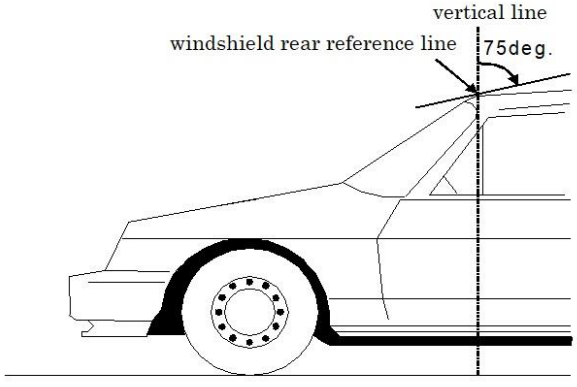


Figure 3.3: Windshield Rear Reference Lines

4.1.7.4 Bonnet Rear Reference Lines

(1) Configure the head impactor (a sphere 165mm in diameter) to that it makes contact with the bonnet (or front panel) and windshield (or A Pillar). The windshield wiper arms and blades may be ignored.

(2) Set the 165mm diameter sphere above the vehicle center line such that the sphere's rearmost point always makes contact above the windshield.

(3) Release the 165mm sphere from the windshield, and move it along the windshield's cross section within a range of 100mm (with a ±3mm margin of error), make contact with the windshield again and make another marking.

(4) Repeat steps (1) to (3) between the lateral bonnet side edge reference lines. Use a flexible ruler to connect the markings into consecutive lines. These lines will be the bonnet rear reference lines.

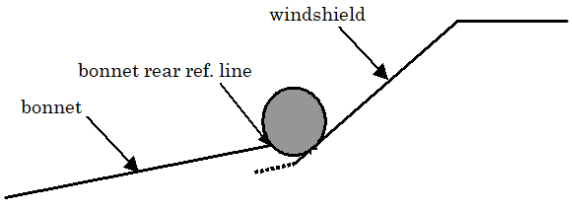


Figure 3.4: Bonnet Rear Reference Line

(5) If the bonnet rear reference line and the side reference line do not intersect, use a semicircle template with a 100mm radius to extend or correct the bonnet rear reference line. The template shall be made of a thin, bendible material so that it will curve easily in either direction. (A thin plastic sheet that can "grip" the vehicle's surface is recommended for such a template.)

(6) As shown in Figure 3.5, the template shall have 4 points, "A" through "D" marked clearly on its surface.

The template shall be set on the vehicle surface, with the corners of points A and B lined up at the side reference lines. Keep these two points on the side reference lines as the template's arc is slid down the back of the vehicle until it makes contact with the bonnet rear reference lines. During all of these steps, make sure that the template is not wrinkled or folded, and keep the template as close to the outer contours o the bonnet as the curved line is drawn. If the template contacts the bonnet rear reference line tangentially, or if the contact point is outside the arc made by points C and D, extend or correct the bonnet rear reference line, and as outlined in Figure 3.5, follow the curve of the template to match it up with the side reference line.

(7) If the template is not making contact with the side reference line via points A or B, and not making tangential contact with the bonnet rear reference line, or if the contact points between the bonnet rear reference line and the template are inside an arc connection Points C and D, increase the template radius 20mm little by little until it fulfills the above requirements.

(8) Once the corrected bonnet rear reference line is defined, it is assumed that all subsequent steps are correct and the original rear reference line will not be used.

(9) After completing the above steps, return the wipers to their original positions.

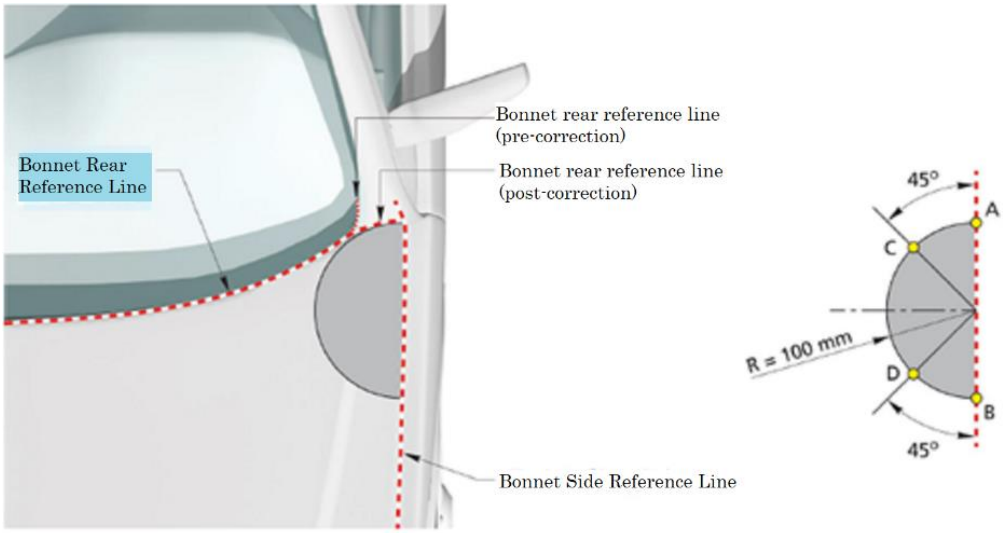


Figure 3.5: Bonnet Rear Reference Line Correction

4.1.7.5 Wraparound Line (area boundary)

(1) Start at the vehicle's center line.

(2) Set one end of a flexible measuring tape or graduated wire, etc., on the reference plane directly under one side of the bumper's front edge.

(3) Wrap the measuring tape (or wire) around the bumper and bonnet, parallel to the vehicle's vertical cross section.

(4) Place 1000mm, 1500mm, 1700mm, and 2100mm WAD markings on the bonnet, windshield, A Pillars, and roof. Wrap the measuring tape around the entire work surface, touching the other end of the tape to the bonnet top, windshield, A Pillar, and roof. (In this case, keep the tape tense.)

Ignore tiny parts like the license plate (including the bracket), wiper arm and blade, and the washer nozzle.

Additionally, if the WAD points are positioned in the space between the bonnet and windshield, refer to Figure 3.7 and attach adhesive tape, etc., on the surface rearward from the bonnet's rear edge, and set up the WAD on this tape.

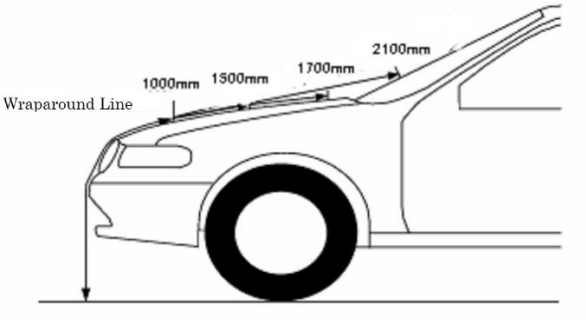


Figure 3.6: Determining the Wraparound Line

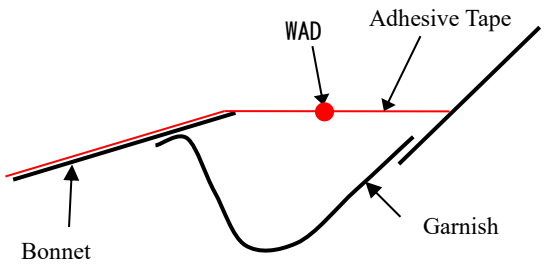


Figure 3.7: Determining the Wraparound Line in the Space Between the Bonnet and Windshield

(5) Remove the tape measure from the vehicle, and move it along the bumper's cross section in a range within 100mm (with a ±3mm margin of error), and reattach one end of the tape measure to the reference plane directly under the front edge of the bumper.

(6) Repeat steps (1) to (4), going right and left between the bonnet side edge reference lines. Using a flexible ruler, etc., place 1000mm, 1500mm, 1700mm, and 2100mm WAD markings along the vehicle width and connect these into lines. These will be the Wraparound Lines.

(7) Evaluate the points between WAD 1000 and WAD 1500 using the child head impactor. Evaluate the points between WAD 1700 and WAD 2100 using the adult head impactor.

(8) If the bonnet rear reference line falls between WAD 1500 and 1700, evaluate the point in front of or above the bonnet rear reference line with the child head impactor. If the bonnet rear reference line is behind WAD 1700, evaluate the lines up to 1700 with the child head impactor. For any points behind the bonnet rear reference lines between WAD 1500 and WAD 1700, evaluate with the adult head impactor.

4.1.7.6 Test Lines for the Front Portion

Use the wraparound line at 1000mm for the test line for the front portion.

4.1.7.7 Test Lines for the Rear Portion

(1) Select either the 2100mm wraparound line, or the windshield rear reference line - whichever is further in front.

(2) Using the vertical cross section of the vehicle's center, measure the height of the reference plane of the selected line. If it measures less than 1900mm, make the selected line the rear reference line.

(3) If it measures greater than 1900mm, make a 1900mm high mark on the windshield or roof, and draw this point out laterally in both directions to create the rear reference line.

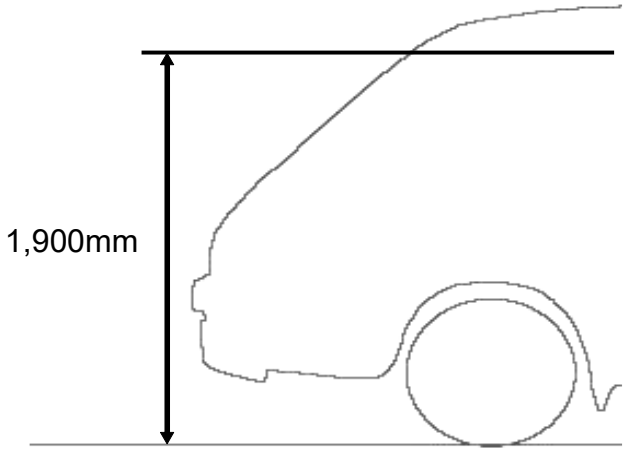


Figure 3.8: Impact Area's Height Limit

4.1.7.8 Test Area

The region surrounded by the front test line, rear test line, and side reference line shall be the test area.

4.1.8 Grid Points

(1) Once the vehicle manufacturer has selected the vehicle, all of the grid point coordinates obtained either through CAE data or actual measurements shall be recorded in the appendix and submitted to NASVA.

(2) In regards to the 2 points (on the grid), the grid point's origin-point C0, 0 and WAD 2100, the testing institute's marked coordinates shall be compared to the coordinates provided in the data from the vehicle manufacturer.

(3) If the testing institute's and the vehicle manufacturer's grid points are within 10mm of each other, the testing institute's marked grid points shall be used.
If there is an increase or decrease in grid size, the testing institute's markings shall be used. The aforementioned default green and default red apply here.

(4) If the two grid points' difference surpasses 10mm, then NASVA, the testing institute, and the vehicle manufacturer shall collaborate to make a decision.

(5) If there is an increase or decrease in grid size, an appendix shall be submitted to NASVA, reflecting this discrepancy.

4.1.8.1 Marking the Grid Points

(1) A vertical center line shall be marked through the bonnet top, windscreen, and roof.

(2) WAD markings shall be made along this vehicle center line every 100mm.
These WAD markings shall begin at 1000 and end at 2100.
If the vehicle's front is V-shaped, WAD 2200 and 2300 need to be added.

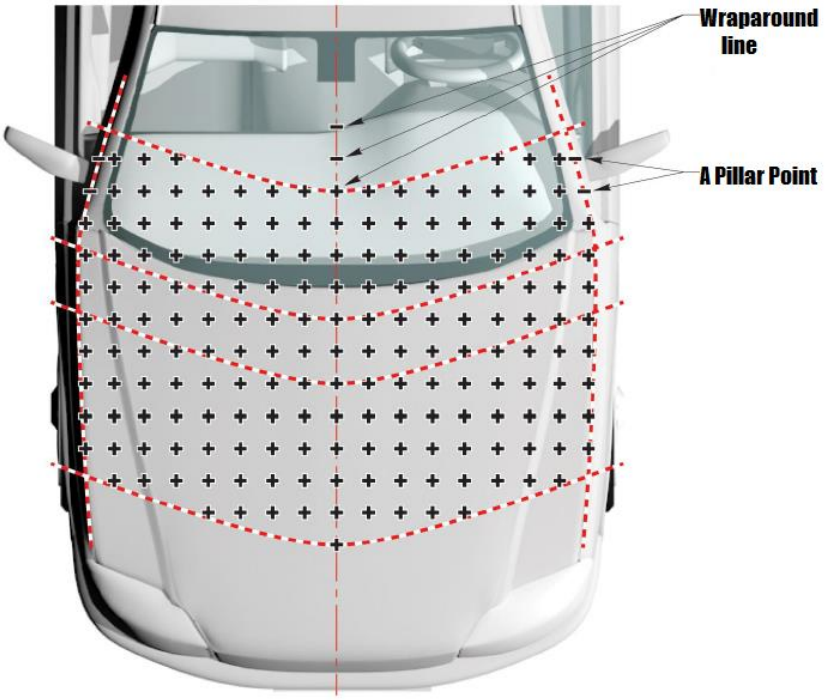


Figure 3.9: Grid Points

(3) Starting with one of the WAD markings on the vehicle center line, make a grid point mark every 100mm in both directions until the side reference line is reached. Each of these 100 markings will cross over the WAD markings on the vehicle center line, measured horizontally on the horizontal vertical plane, and projected vertically on the vehicle's surface.

(4) Repeat steps (1) to (3) for all of the WAD on the vehicle center line, and mark all the points on the grid that fall into the head test area. WAD points 2200, 2300, etc., might need to be utilized, depending on the vehicle's shape (e.g., the front is V-shaped.)

(5) Regarding the A Pillars, make additional grid point markings where each WAD side vertical planes and side reference lines intersect.

(6) If any of the grid markings are below the vehicle's external contours (e.g., inside the gap behind the bonnet), use adhesive tape, etc., to connect the last connection point horizontally rearward, running as close to the external contours as possible. Make grid markings on top of this tape and use in place of the grid markings below.

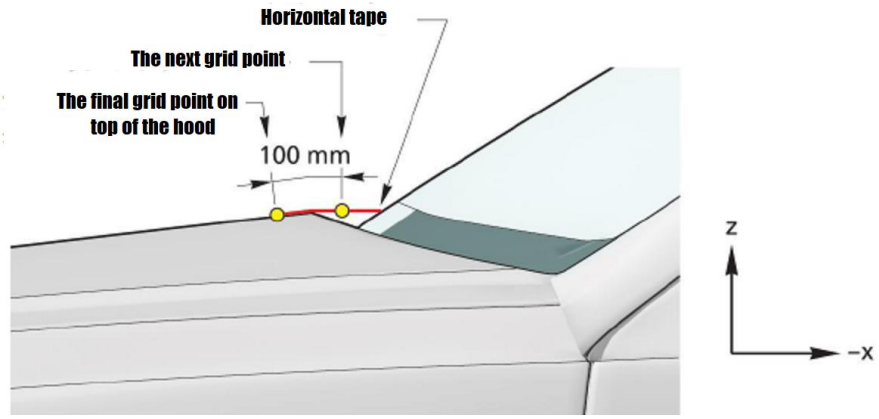


Figure 3.10: Grid Points that fall Beneath the Vehicle's Exterior Contours (example up to the vehicle center line.)

(7) If the wipers are in the way when positioning the tape, ignore the wipers, as long as the grid points are not over the wipers.

(8) When measured on the horizontal Y-axis, erase the grid points that are less than 50mm in distance from the side reference lines.

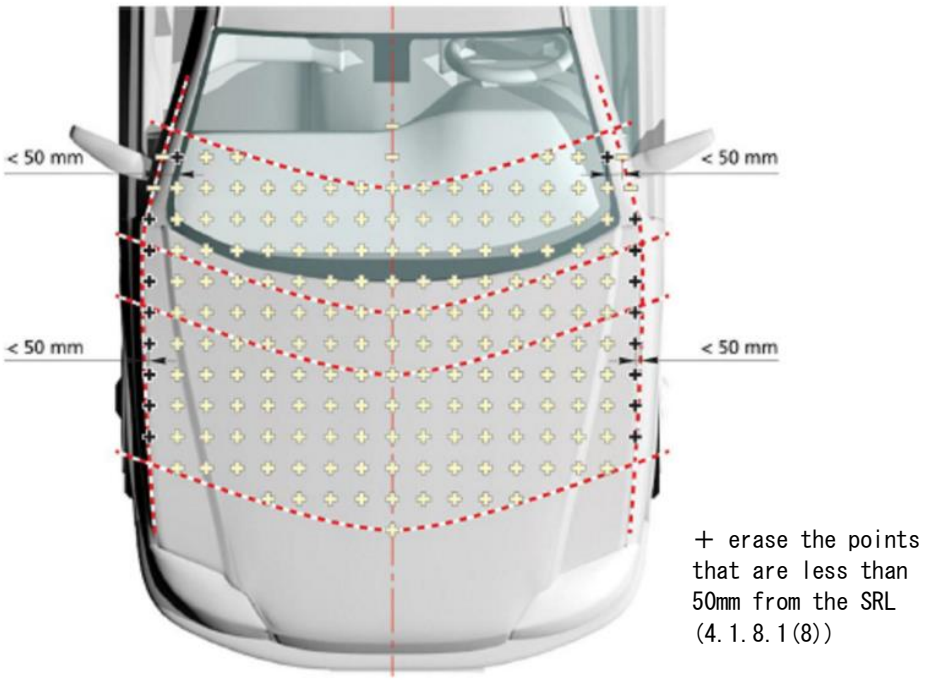


Figure 3.11: Grid Point Erasure

(9) Use the grid points to determine the hitting position of the impact test. In the impact test, the grid points will be the target points.

(10) If the car is equipped with an active bonnet or the like, the grid points that will not activate such devices shall be the hitting points for the impact test.

4.1.8.2 Grid Point Identification

(1) All child head grid points shall be labeled with the prefix "C." All adult head grid points shall be labeled with the prefix "A."

(2) The grid points will be determined depending on row and column. The point of origin shall be the intersection of the vehicle center line and WAD 1000. This point is C0, 0.

(3) The point of origin's row is 0. Mark each of the following rows until the last row is reached.

(4) The vehicle center line is column-0. The first column to the right of this is +1. Each subsequent column is +2, +3..., +8 until the side reference line is reached. The first column to the left is -1. Each subsequent column is -2, -3..., -8 until the side reference line is reached.

(5) All of the grid points shall be identified by the applicable head impactors (A or C), and shall be identified by the next row, then column.

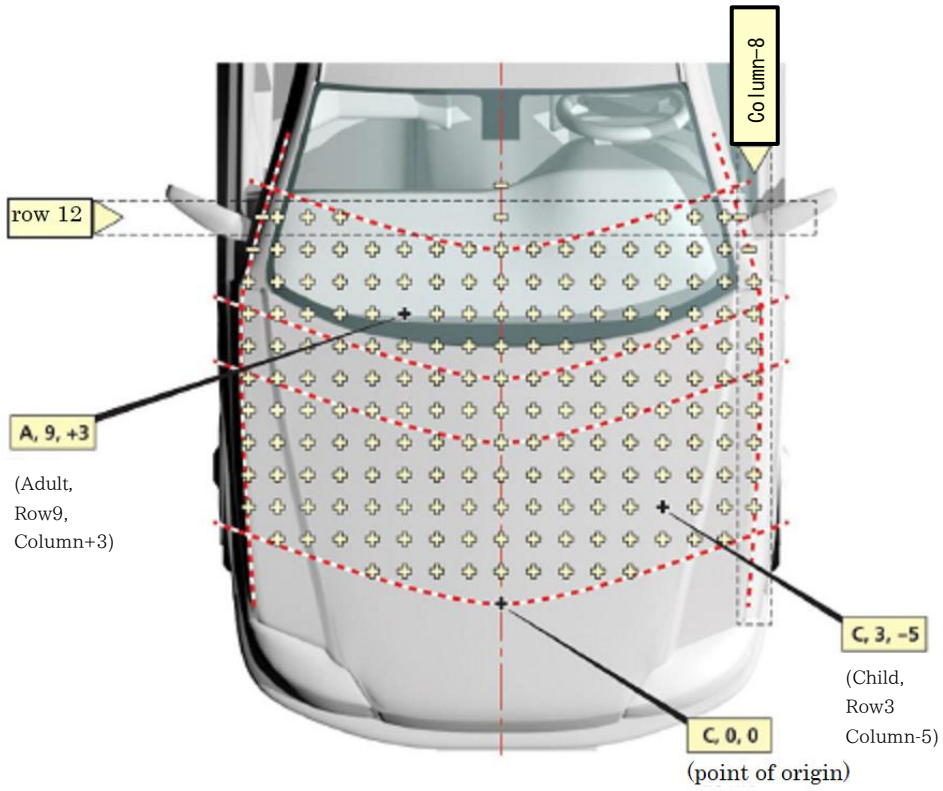


Figure 3.12: Grid Point Display

4.1.9 The Head Impactor

(1) Head impactors (adult head impactor and child head impactor) must meet the requirements specified in Attachment 1.

(2) Three single-axis accelerometers or one 3-axis accelerometer must be attached to the head impactor's center of gravity.

(3) The head impactor's impact properties must meet with the official requirements outlined in Attachment 1.

(4) To prevent breakage, a wire, may be attached to the head impactor as long as it effects the test results to a minimum range.

4.1.10 Temperature Conditions

The test vehicle, testing devices, and head impactor shall have an ambient temperature 20±4℃ at the time of the test. Additionally, the head impactor to be used in the test must be kept in a temperature-controlled environment for at least 4 hours prior to the test.

5. Test Equipment, etc.

5.1 The Impact Generator

The impact generator shall be able to freely propel an adult (4.5 kg) or child (3.5 kg) head impactor at any angle to the test vehicle's front at a speed of 40.0±0.7km/h.

5.2 The Speed Measuring Device

The speed measuring device must be able to read the speed at which the head impactor collides with the test vehicle's front within 0.1 km/h.

5.3 High-Speed Photography Device

The high-speed camera's filming speed must be faster than 1000 frames/sec, with a shutter speed of over 1/5000 sec.

5.4 Temperature and Humidity-Measuring Devices

The thermometer's minimum value shall be 0.1℃, the hygrometer's minimum value 1%.

5.5 Electric Measuring Devices

5.5.1 Precision and Frequency Characteristics

All apparatuses of the measuring instruments (including analytical computer) must be connected from the various configuring apparatuses to the output units (this connected state is referred to as a "measurement channel") in accordance with ISO 6487:2002*1.

(1) The channel class for the head impactor acceleration (the index that specifies the measurement channel's frequency characteristics (the ratio between input and output.)) shall be 1000.

(2) Regarding measurement channels, when analog values are converted into digital values, the number of samples shall exceed 10,000 per second.

(3) The calculation range for the HIC shall be the time interval from the head impactor colliding to 50ms after the collision.

(4) High-frequency component deletion (filtering) shall be conducted before resultant acceleration and HIC calculations.

5.5.2 The Accelerometer

The measurement range of the accelerometer attached to the head impactor shall be -4900m/s^2 (-500G) to +4900m/s^2 (+500G).

5.5.3 Recording and Storing Electric Measurement Results

The head impactor's acceleration measurement results shall be stored in a channel class greater than 1000.

5.6 3-D Measuring Devices

3-D measuring devices to be used in measuring the collision point on the test vehicle, and the like, shall be accurate within 0.5 mm/m.

6. Head Impactor Data Provided from the Vehicle Manufacturer

6.1 Data Submitted by the Vehicle Manufacturer

(1) The vehicle manufacturer is advised to submit to NASVA, via the appendix, the colored data (scores) that show their test procedures for protection performance of head grid impact points, on the entire vehicle.

(2) These data must be recorded and submitted before any markings on the vehicle are made.

(3) The various grid of impact points data shall be colored according to these performance standards.

*1 ISO 6487:2000 is considered as the same requirement

	Color	Score
$HIC_{15} < 650$	Green	1.00
$650 \leqq HIC_{15} < 1000$	Yellow	0.75
$1000 \leqq HIC_{15} < 1350$	Orange	0.50
$1350 \leqq HIC_{15} < 1700$	Brown	0.25
$1700 \leqq HIC_{15}$	Red	0.00

(4) Due to reference line fluctuations due to the vehicles' individual differences, if the grid of impact points has increased, it is advisable that the vehicle manufacturer sends the color data for this grid of impact points to NASVA.

(5) If the blue zone configuration is symmetrical and therefore does not require that both sides be measured, a statement explaining the symmetry must be submitted.

(6) One portion of the grid points shall be default red or default green. It will be specified default by the projected data. Those areas deemed default shall be as follows:

・A Pillar: Default Red (unless data to the contrary is not submitted.)

・Windshield: Default Green (however, if it falls under 6.1.(7)-6.1.(9) it shall be deemed equal to the other points.)

(7) Grid points that fall within 165mm of the black ceramic in the window frame's inner-edge cannot be default green. This 165mm shall be measured on the winds shield outside surface. (See Figure 5.1)

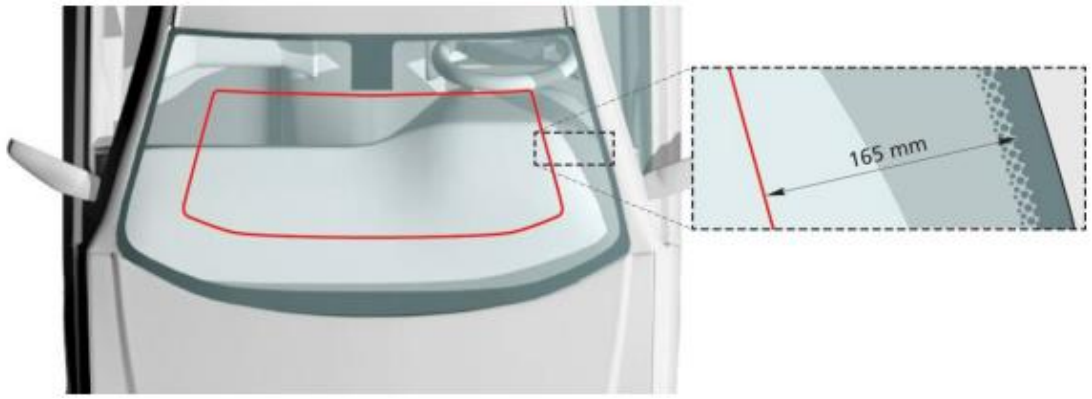


Figure 5.1: Determining the Wind shield Inner-Edge

(8) If there are structures on the windshield such as a sensor system, the grid points above those areas cannot be default green.

(9) Windshield grid points that are within 100mm (determined from the grid points at the applicable head impactor's collision direction) of any fixtures below the windshield's base area cannot be default green.

(10) If the vehicle manufacturer can submit proof that the A Pillars are not default red, those grid points can be deemed equal to the other points.

(11) Grid points that are on the side reference line that is behind the bonnet rear reference line shall be deemed equal to the grid of impact points on the A Pillars.

(12) Default grid of impact points are not included in random selection (see 7.3.2) or correction coefficient calculation carried out by NASVA.

(13) Before the collision point is selected, the testing institute shall verify the default grid of impact points.

6.2 Unforeseeable Grids

(1) Set fixtures whose performance cannot be predicted may be colored blue in the grid point projected data.

(2) Only the fixtures listed below may be set as blue points:

- Automotive trim (garnish) and the like (excluding fixtures that are with the bonnet panel.)
- Windshield wiper arms and the windscreen base
- Headlights
- Isolated fixtures

(3) When setting up blue points, the vehicle manufacturer must run tests to prove projected failed performance of these positions as a basis, or they must submit CAE results.

(4) Blue points must configure the blue zone with single or double dots.

(5) If there are two grid points in a zone, they must touch each other either by length, width, or opposing angles. There can be a maximum of eight blue zones throughout the head area.

7. Testing Method

7.1 The Collision Speed and Angle

Attach the head impactor to the impact generator and follow the collision requirements in Chart 6.1 (head impactor, collision speed as well as collision angle) and collide the head impactor on the test points marked on the test vehicle.

Chart 6.1: Collision Requirements

	Head Impactor	Collision Speed (km/h)	Collision Angle (deg)
①	Adult Impactor	40	65
②	Child Impactor		50
③	Child Impactor		20

(1) If the bonnet rear reference line is in front of WAD 1500, for the collision points between WAD 1000 and WAD 1500 (including WAD 1500), use the collision requirements of ② Child Impactor in Chart 6.1 below.

If the collision point is behind WAD 1500, use the requirements of ① Adult Impactor in Chart 6.1 below.

(2) If the bonnet rear reference line is between WAD 1500 and WAD 1700, for the collision point of the bonnet rear reference line or the collision point in front of the bonnet rear reference line, use the requirements of ② Child Impactor in Chart 6.1.

If the collision point is behind the bonnet rear reference line, use the requirements of ① Adult Impactor in Chart 6.1.

(3) If the bonnet rear reference line is behind WAD 1700, for the collision points between WAD

1000 and WAD 1700 (including WAD 1700), use the collision requirements of ② Child Impactor in Chart 6.1.

If the collision point is behind WAD 1700, use the requirements of ① Adult Impactor in Chart 6.1.

(4) For vehicles where the WAD 1000 is in front of the BLE reference line, use the requirements of ③ Child Impactor in Chart 6.1 for the space between WAD 1000 and the BLE reference line.

(5) The collision speed shall be within a range specified in Chart 6.1, within ±0.7km/h. However, if the collision speed surpasses this range in the test, the injury values shall be the same as the maker-applied color. If it is the color of an even lower injury value, it may be employed in the test data.

(6) The collision angle's range shall be within ±2deg of the collision angles outlined in Chart 6.1.

(7) The impactor propulsive direction's central axis shall correspond to the collision point.

(8) The variation between the set collision point and the collision point at the time of collision shall be within 10mm in the fore-aft and lateral directions of the test vehicle. (If the vehicle has an active bonnet, verify only the lateral direction.) If this is the case, verify by applying grease paint to the tip of the impactor and exclude any slippage from first contact. However, if no grease paint comes off onto the vehicle during collision, reapply the grease paint (at the first contact point, etc.) so that the amount of difference between the collision point and the opposing location can be determined.

(9) When testing with the same skin, let 2 hours pass between tests so that the skin's elasticity may recover.

7.2 Test Omissions

The following parts shall be omitted from the test on principle.

(1) In regards to the windshield collision points. If the collision point is farther than 165mm from the black ceramic of the window frame's inner edge (for further details, see Appendix 7), and, if the vehicle is not equipped with fixtures, such as sensors, that will affect the collision point and a distance of 100mm or more is kept from the collision point to the windshield's lower fixtures, the HIC will not exceed 650. Therefore the test will be omitted and impact point grid shall be colored default green. (See Figure 5.1)

(2) The grid on the side reference line that is located behind the bonnet rear reference line shall be considered the A Pillar. If the HIC surpasses 1700, then the test shall be cut short and the point grid shall be colored default red.

However, if the manufacturer produces proof that it is not red, subsequent grid points shall be deemed equal to the others.

7.3 Impact point

7.3.1 Essentials

(1) The number of grid impact point's shall be 10 grid of impact points, as set by NASVA.

(2) The manufacturer of the test vehicle may request up to 10 additional tests. In this case, the number of additional tests must be disclosed to NASVA.

(3) The spaces in the impact test grid must be at least 200mm (the distance of the straight lines that connect the impact points to each other).

(However, this does not apply to blue points.)

(4) The space between impact points in the lower window frame portion must be at least 400mm. Additionally, the space between impact points in the upper window frame portion must be at least 700mm or more. Window frame specifics are outlined in Appendix 1-3.
(However, this does not apply to blue points.)

(5) The selection grid shall be entered into Appendix 2-3-1.

7.3.2 Impact Point Selection

(1) The default grid points or any all except blue points shall be the target points of impact.

(2) When using NASVA's random selection program, additional test points can be randomly selected from the target impact grid points, depending on the vehicle manufacturer's reported color ratios. However, this does not apply to damages from tests conducted in the vicinity of these impact points that could negatively impact the impact points to be tested.

(3) Enter the set impact points into Appendix 2-3-1.

(4) All of these test results will be used in correction coefficient calculations.

7.3.3 Selecting the Blue Point Impact points

(1) All of the blue zone impact points the test vehicle manufacturer notified NASVA of shall be made the impact point targets.

(2) NASVA will select an impact point for each point in the blue zone.

(3) The test results from the impact points selected for each blue zone point will apply to the results of the other grid points in that blue zone. The rested grid of impact points colors will be changed from blue to a color that reflects an HIC measured value of 15. If the structure is symmetrical, the results may be used for the opposing locations.

(4) The set impact points shall be entered into Appendix 2-3-1.

(5) The blue point test results shall not be used in correction coefficient calculations.

7.4 Exchanging of Parts

Deformed or damaged bonnets (including bonnets equipped with machinery that helps soften damages to bonnet hinges, etc., inflicted during a collision) shall be exchanged before each test, except for parts that meet the conditions listed below. However, if the test vehicle manufacturer provides data explaining the effects, the exchange of parts may not be necessary, even with the below items. The bonnet-related parts to be exchanged are outlined in Attachment 2.

(1) If the clearance between the bonnet and the fixtures below the bonnet is less than 40mm, and, if a point has moved more than 650mm as a result of a previous impact test.

(2) Parts are located farther than 82.5mm away from the bonnet hinges, bonnet striker, or bonnet's outer portion.

8. Recording and Measuring Items

8.1 Recording Prior to the Test

8.1.1 Confirming and Recording Received Vehicle for Test

After the testing institute receives the test vehicle, the following items shall be verified and recorded in Appendix 3-1, as well as verifying the test vehicle specifications indicated by NASVA.

(1) Name, model, and classification number or symbol of the vehicle

(2) Frame number
(3) Shape of body
(4) Engine model
(5) Drive system
(6) Type of transmission
(7) Type of tires
(8) Absence or presence of sunroof
(9) Window glass (front) type

8.1.2 Recording Head Impactor Sanction Results, etc.

(1) The head impactor's characteristics must be compatible with the sanctions outlined in Attachment 1.
(2) The testing institute shall record the head impactor sanction results into Appendix 5-1, and 5-2.
(3) The head impactor's sanctions shall be re-tested no more than 20 times. However, if the head impactor's skin is damaged during these tests, and does not meet the sanctions outlined in Attachment 1, this head impactor shall be switched out with an impactor that meets the sanctions.

8.1.3 Recording of Calibration Results of Measuring Instruments

(1) Results of the calibration conducted prior to the test, on the measuring instruments (various measurement channels, including the transducer) shall be recorded. The calibration remains effective for one year irrespective of how many times the instruments may be used during this period. However, if abnormalities are observed, they must be recalibrated.
(2) To ensure that these damages are accurately calculated, use a calibration signal generator.

8.1.4 Recording Vehicle Size Measurement Results Prior to Test

Measure the distance between the bonnet hinges and record this.

8.1.5 Recording the Vehicle's Final Condition Prior to Test

After conducting the test preparations outlined in Section 3, confirm and record the following items.

(1) The test vehicle's mass
(2) The removed parts and their mass or their adjusted mass
(3) The test vehicle's height (front wheel fenders, rear wheel fenders)
(4) Impact points
(5) Measurement reference positions of impact points

8.1.6 Recording the Testing Room Temperature, etc.

In accordance with the temperature requirements outlined in 4.1.10, record the below items into Appendix 6.

(1) The test room's temperature and humidity
(2) The number of hours the head impactor was left in an environment outlined in 4.1.10

8.2 Recording Data During the Test

8.2.1 Recording the Collision Speed and Impact Points

(1) The head impactor's speed just before colliding with the test vehicle (collision speed) shall be measured with a speedometer and recorded.

(2) If there are flaws with the speedometer mentioned in (1), adopt the time derivative of the head impactor's amount of movement just before the moment of impact as shown in the high-speed photography.

(3) Calculate and record the impact point shift from the adhesion of the chalk or grease paint from the head impactor (applied prior to the test) onto the test vehicle. If the grid falls below the outer-contours (e.g. if there's a gap behind the bonnet), this shall be disregarded. However, this does not apply if the vehicle manufacturer provides a simple and appropriate way of measuring the shift-value.

8.2.2 Recording Electric Measurement Results

Regarding the acceleration measurements below from the head impactor, the electric measurement results shall be recorded more than 50ms after the moment of impact.

(1) The head impactor's fore-aft direction acceleration

(2) The head impactor's lateral direction acceleration

(3) The head impactor's vertical direction acceleration

8.2.3 Recording Injury Values

Take the waveform found in 8.2.2, use the formula below to calculate the injury value, and record this value.

(1) HIC (Head Injury Criterion)

Use the head impactor resultant acceleration in the formula below and use the greatest value.

$$HIC = \left[\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} \frac{a_R}{9.81} dt \right]^{2.5} (t_2 - t_1)$$

Where,

a_R represents the head's fore-aft, lateral, and vertical direction acceleration (a_x, a_y, a_z)'s resultant acceleration (in units of m/s^2)

$$a_R = \sqrt{a_x^2 + a_y^2 + a_z^2}$$

t1 and t2 represent times during the collision (in units of s)

However, $|t_2 - t_1| \leqq 15$msec

8.2.4 High-Speed Photography

As an auxiliary to written recordings, the test shall be filmed with a high-speed VTR, etc.

8.3 Recording After the Test

Immediately after the test, the test vehicle's conditions below shall be filmed.

(1) Damaged locations near the impact point

(2) Damaged internal parts within the impact point (when colliding with the bonnet)

8.4 Management of Measured Values

The measurements shall be handled as follows:

(1) The impact speed's (km/h) value shall be rounded to the first decimal place.

(2) The impact angle's (deg) value shall be rounded to the first decimal place.

(3) The HIC's value shall be rounded to the first decimal place, then to the nearest whole number.

Attachment 1

Head Impactor Specifications

1. Head Impactor Size and Mass

The head impactor shall be a hard 165±1.0mm diameter sphere covered with a soft film with a thickness of 14±0.5mm. The head impactor's center of gravity shall be within a range of ±2mm from the surface's geometric center. Additionally, the accelerometer must be equipped with a device that reduces resonance phenomena, such that the test is not adversely affected.

The head impactor's resonate frequency must be above 5,000Hz.

The mass and inertia moment shall be as follows:

	Adult head impactor	Child head impactor
Mass:	4.5±0.1kg	3.5±0.07kg
Inertia moment around the propulsion axis:	0.0075~0.020kgm^2	0.0075~0.020kgm^2

2. Attaching the Accelerometer

Attach one 3-axis (or three 1-axis) accelerometer to the head impactor. Install one of the accelerometer's axes vertically in relation to Attachment Surface A (see Figure 3.1 and 3.2), with a sensitivity position with a radius of 1mm, and a cylindrical tolerance zone of 20mm in length. The tolerance area's center line shall be vertical in relation to the attachment surface, and its midpoint shall be consistent with the center of the head impactor.

A 2-axis accelerometer's sensitivity axes shall both be vertically aligned with each other and aligned perpendicularly in relation to Attachment Surface A, with a radius in a spherical tolerance range of 10mm. The tolerance area's midpoint shall be consistent with the center of the head impactor.

The instrument response value in relation to the accelerometer shall have its frequency class (CFC) and amplitude range (CAC) set to JIS D1050 1998 (or ISO 6487: 2000), and at 1,000Hz and 5,000m/s^2 respectively.

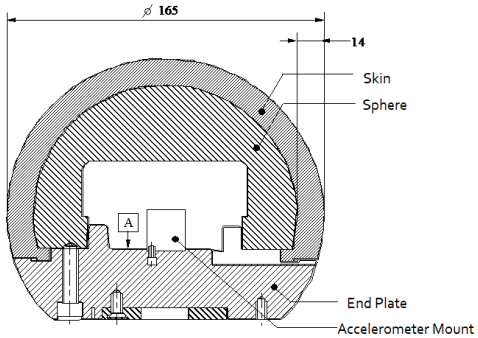


Figure 3.1: Adult Head Impactor

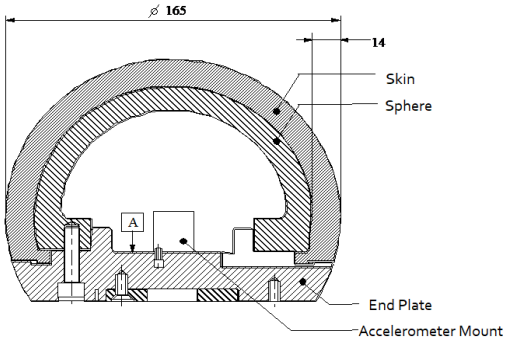


Figure 3.2: Child Head Impactor

3. Head Impactor Licensing

When the head impactors are tested by the order below, the 3-axsis resultant acceleration from the head impactor's center of gravity must be within the following ranges:

- Adult Head Impactor 225 – 275 G (2206 – 2695 m/s^2)
- Child Head Impactor 245 – 300 G (2401 – 2940 m/s^2)

3.1 Measuring Device

Set the instrument response value CFC and CAC (to the accelerometer), as JISD 1050 1998 (ISO 6487 2000), and 1,000 Hz and 5,000 m/s^2, respectively.

3.2 Temperature Conditions

The head impactor shall be soaked in an environment for at least 4 hours that is 20±2°C, with a relative humidity of 10-70%.

3.3 Test Order

(1) The head impactor shall be suspended from a drop rig as shown in Figure 3.3.

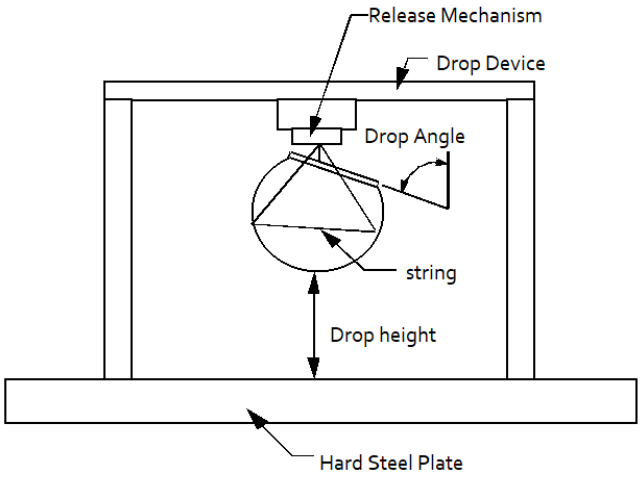


Figure 3.3: Head Impactor Calibration Test Procedure

(2) The head impactor shall be dropped from a height of 376±1mm onto a hard steel plate that is flat, horizontal, clean, dry, and has a surface finish of 0.2 - 2.0 micrometers, a thickness greater than 50mm, and a surface greater than 300mm in all directions.

(3) The head impactor's drop angle shall be 65° for an adult impactor and 50° for a child impactor.

(4) The head impactor's support shall ensure that the impactor does not rotate while falling.

Attachment 2

More Details about Exchanging Parts

1. If Parts Are Not Exchanged

Part Position	Handling
Window glass lower end flange	Since it cannot be exchanged if deformed, use tools to return it to its original shape as much as possible, or use adhesive (ignore the maker's recommendations and use a fast-drying adhesive) to fix it. Give it 24 hours to set.
Vertical Wall	Since it cannot be exchanged if deformed, use tools to return it to its original shape as much as possible.
Other parts	If the parts in question are shock-absorbing, and if it is evident that further collision tests will affect them poorly, return them to their original shape as much as possible.

2. If Parts Are Exchanged

Part Position	If Exchanged	If Not Exchanged
Bonnet	Damaged or warped bonnets may be exchanged before each test.	If the clearance between the bonnet and the fixtures under the bonnet is less than 40mm, and if a spot 650mm away from the last impact point is being tested next.
	If the part in question is shock-absorbing, and if a spot near the part in question is to be hit, and if data indicates that the impact will degrade the part's shock-absorption performance.	If the area to be tested is within 82.5mm of the bonnet hinges, bonnet striker, and any part around the outside of the bonnet.

Part Position	Handling
Wipers	If damaged or warped by a direct collision.
Fender	If the part in question is shock-absorbing and if it has been damaged or warped.
Hinges	If the part in question has been damaged or warped.
	If the part in question is shock-absorbing, and if a spot near the part in question is to be hit, and if data indicates that the impact will degrade the part's shock-absorption performance.
Striker	If the part in question has been damaged or warped.
Window glass	If the part in question has been damaged. The collision point on the exchanged window glass shall be left to set for 24 hours if within 50mm of the bonded part, and 12 hours for other areas.
Other parts	If the parts in question are shock-absorbing, and if it is evident that further collision tests will affect them poorly.

Appendix 1-1: Test Vehicle Specifications Data Sheet

[To be filled in by vehicle manufacturer]

1. Test Vehicle Specifications

Name / Model / Type Classification No. or Class Symbol	
Body Shape	
Engine Type	
Drive System	
Transmission Type	
Tire Type	
Tire Air Pressure	Front: kPa, Rear: kPa
Absence/Presence of Sunroof	
Window (front) type, thickness	Type: , Thickness: mm
Fuel Tank Capacity	L

2. Seat Adjustments

			Driver	Front Passenger	Other	
Seat Adjustments, fore-aft (seat rail)	Adjustments per stage		mm	mm	mm	
	Total Adjustments		mm	mm	mm	
	Mid position	From the frontmost end	mm (stages)	mm (stages)	Design Standard Position	mm (stages)
		From the rearmost end	mm (stages)	mm (stages)		mm (stages)
Seat Lifter	Presence or absence and location		Present / Absent	Present / Absent	Present / Absent	
Seatback Angle Adj.	Design Standard Angle		° (stages)	° (stages)	° (stages)	
Other Adj. Devices	Device Name and Design Standard					

Note: The adjustment stages shall be entered with the first locking position as stage 0.

3. Vehicle position's measurement reference point (the wheel arch height's design value when the vehicle is in normal riding posture.)

(1) Front Wheel Height: L: , R: (Fender / Moudling / Other ( ))

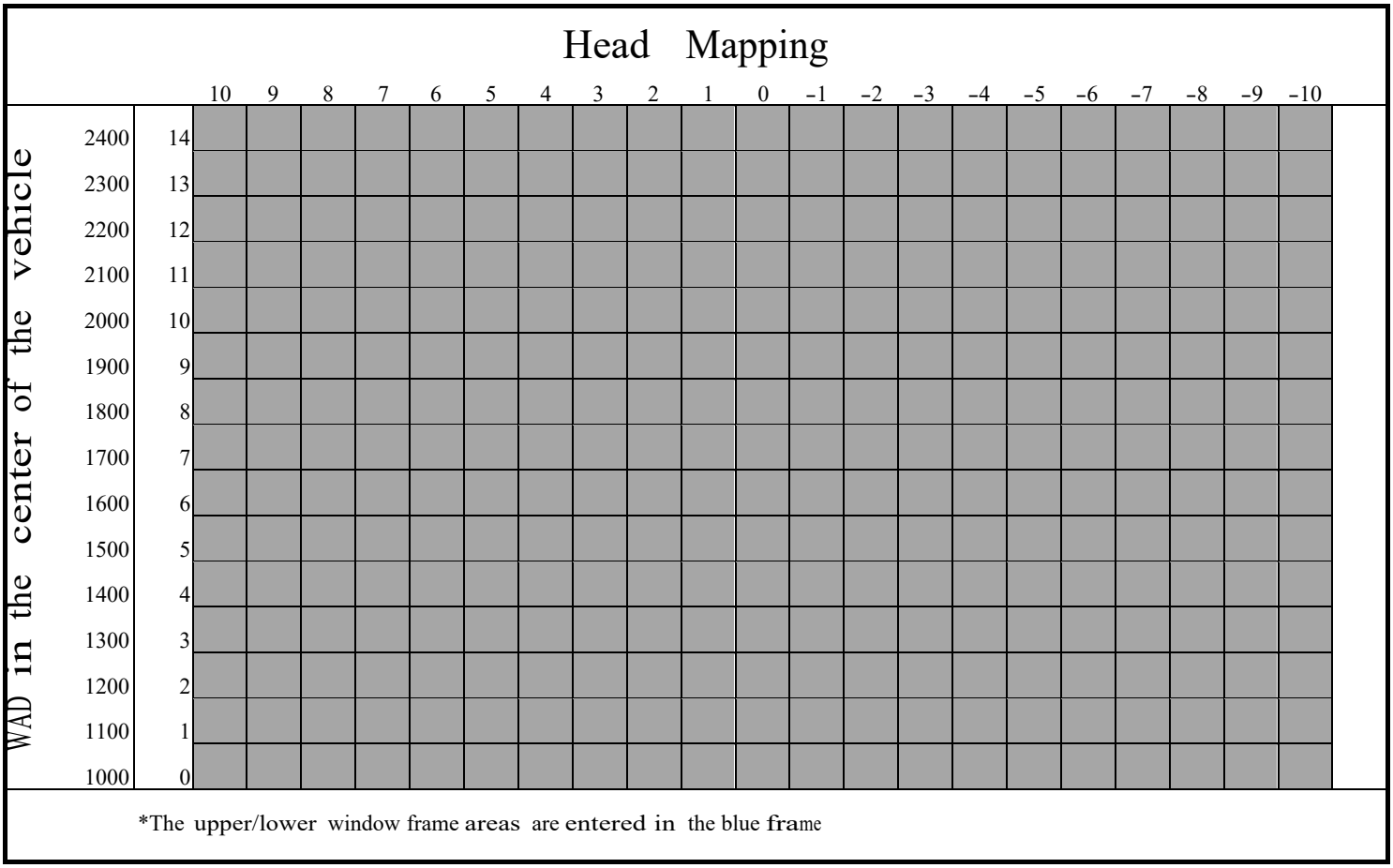
(2) Rear Wheel Height: L: , R: (Fender / Moudling / Other ( ))

4. Notes, Test Vehicle's BLE, etc.

(1) BLE Height: mm

Appendix 1-2: Data Sheet: Predicted Data for Each Grid

[For entry by vehicle manufacturer]



*The upper/lower window frame areas are entered in the blue frame

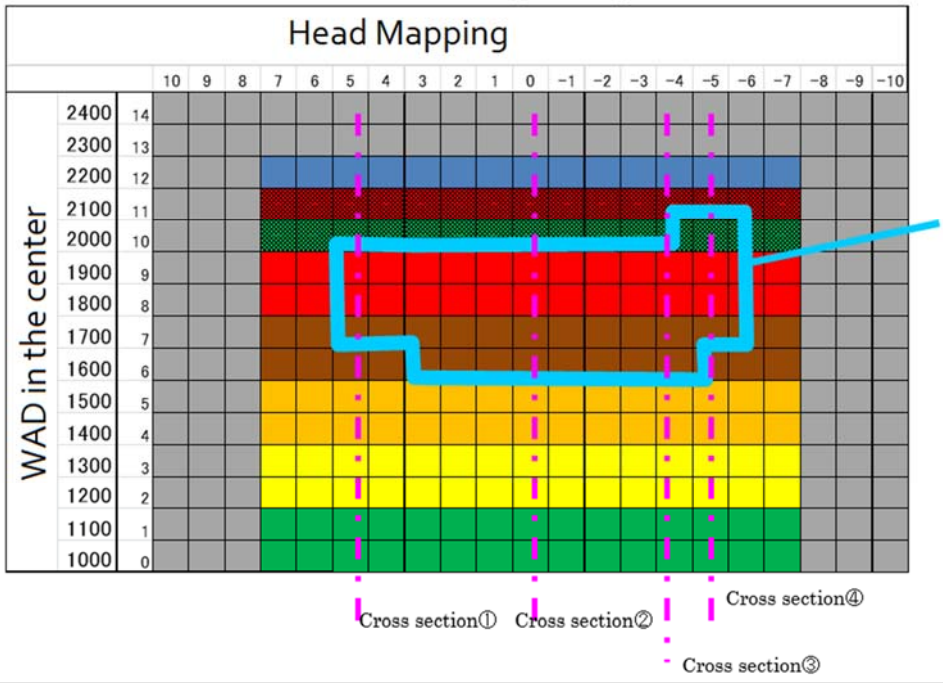
Prediction	Grid #s	Ratio regarding	# of hits	Score
Default Green	0			0
Green	0	#DIV/0!		0
Yellow	0	#DIV/0!		0
Orange	0	#DIV/0!		0
Brown	0	#DIV/0!		0
Red	0	#DIV/0!		0
Default Red	0			0
Blue	0			
Predicted Head Score (excluding Blue)	0	#DIV/0!	0	0

Number of Test Hits	
Standard Test Hits Points	
Number of Manufacturer Report-added Hits	
Number of Manufacturer Report Blue Grid Hits	
Total number of Test Hits	
Number of Standard Test Hits	
Number of Manufacturer Report-added Hits	

Appendix 1-3: Upper/Lower Window Frame Specs Sheet

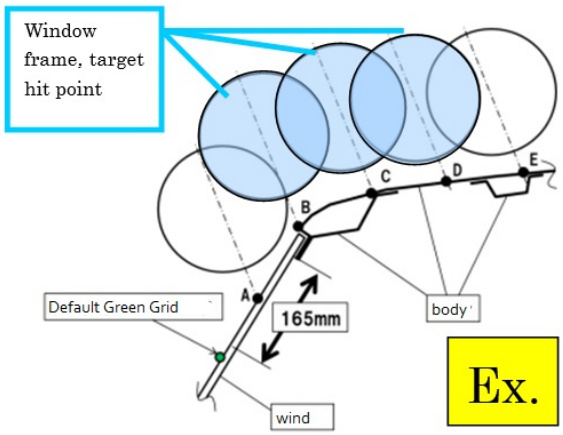
[For entry by vehicle manufacturer]

(Attachment 1-2: Grid Predicted data paste-up)



*Vehicle center, driver's seat, and front passenger's seat center used as basis

Cross section①



Cross section②

Cross section③

Cross section④

Appendix 1-4-1：WAD Coordinate Input Sheet

	[Entered by Vehicle Manufacturer]			[Entered by Testing Institute]		
Grid point	X	Y	Z	X	Y	Z
C,0,0						
A,11,+10						
A,11,+9						
A,11,+8						
A,11,+7						
A,11,+6						
A,11,+5						
A,11,+4						
A,11,+3						
A,11,+2						
A,11,+1						
A,11,0						
A,11,-1						
A,11,-2						
A,11,-3						
A,11,-4						
A,11,-5						
A,11,-6						
A,11,-7						
A,11,-8						
A,11,-9						
A,11,-10						

Reference point (0,0,0) is the upper surface of the rear edge of the hood, center

Appendix 1-4-2: Grid Coordinate Input Sheet

Input x and y coordinates from top view. The reference point (0,0) shall be the rear hood's surface on the vehicle's center plane.
If supplementary instructional materials are needed, add as an attachment.

		Column																							
		+SRL		+10		+9		+8		+7		+6		+5		+4		+3		+2		+1		0	
		X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Row	14																								
	13																								
	12																								
	11																								
	10																								
	9																								
	8																								
	7																								
	6																								
	5																								
	4																								
	3																								
	2																								
	1																								
	0																								

		Column																					
		−1		−2		−3		−4		−5		−6		−7		−8		−9		−10		−SRL	
		X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Row	14																						
	13																						
	12																						
	11																						
	10																						
	9																						
	8																						
	7																						
	6																						
	5																						
	4																						
	3																						
	2																						
	1																						
	0																						

Appendix 2: Test Vehicle Specifications

[For entry by testing institute]

1. Test Vehicle Specifications

Vehicle Name	
Model Name	
Grade	
Model type	
Class	
Main Optional Equipment	
Tire Brand / Size	
Mass at vehicle delivery	

2. Seat Adjustments

			Driver	Front Passenger	Other	
Seat Adjustments, fore-aft (seat rail)	Adjustments per stage		mm	mm	mm	
	Total Adjustments		mm	mm	mm	
	Mid-position	From the frontmost end	mm (stages)	mm (stages)	Design Standard Position	mm (stages)
		From the rearmost end	mm (stages)	mm (stages)		mm (stages)
Seat Adj. fore-aft (other)	Device name and mid. position					
Vertical Adjustment Device (Limited to devices that only move vertically)			Present / Absent	Present / Absent	Present / Absent	
Seatback Angle Adj.	Design Standard Angle		° (stages)	° (stages)	° (stages)	
Other Adj. Devices	Device Name and Design Standard					

3. Accelerometer Specifications, etc.

4. Vehicle Posture (wheel arch height) [mm]

	Design Standard		After Adjustments		Difference	
	Left	Right	Left	Right	Left	Right
Front						
Rear						

Appendix 2-2: Test Vehicle Birdseye View Photograph

Notes:

- Attach the WAD and grid points that were scored onto the test vehicle
- Angle...30 degrees in vehicle's front
- Film with digital camera

Appendix 2-3-1: Test Implementation Plan, Collision Point Information (Vehicle name:)

Lateral Distance from the Vehicle Center Line（×100）

WAD		10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
2400	14																					
2300	13																					
2200	12																					
2100	11																					
2000	10																					
1900	9																					
1800	8																					
1700	7																					
1600	6																					
1500	5																					
1400	4																					
1300	3																					
1200	2																					
1100	1																					
1000	0																					

		Grid	Collision Point Coordinates			Collision Rank	Notes		Test day, time, and exchanged parts
			X	Y	Z		Parts, etc.	Bonnet Exchange	
Collision Point	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								
	20								
Blue Point	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								

※After adjusting vehicle height, adjustments should be within ±2mm of the design standard.

Appendix 2-3-2: Projected Collision Point and Verified Test Results (Vehicle name:)

Predicted	# of Grids	Score	Ratio from Total Score
Default Green			
Green			
Yellow			
Orange			
Brown			
Red			
Default Red			
Blue			
Predicted Head Score (excluding Blue Points)			

Verification Test

Collision Point	Predicted Color	HIC	Score		Collision Point	Predicted Color	HIC	Score
Total					**Total**			

Correlation Coefficient	

Blue Points

Zone	Collision Point	HIC	Score		Zone	Collision Point	HIC	Score
1					5			
2					6			
3					7			
4					8			

Blue Point Total Score	

SUMMARY		
	Predicted Score (excluding blue points)	
	Default Green	
	Blue Point Score	
	Correlation Coefficient	
Total Score		

Head Protection Total Score	

Appendix 2-4: WAD Coordinate Input Sheet

	[Entered by Vehicle Manufacturer]			[Entered by Testing Institute]		
Grid Point	X	Y	Z	X	Y	Z
C,0,0						
A,11,+10						
A,11,+9						
A,11,+8						
A,11,+7						
A,11,+6						
A,11,+5						
A,11,+4						
A,11,+3						
A,11,+2						
A,11,+1						
A,11,0						
A,11,-1						
A,11,-2						
A,11,-3						
A,11,-4						
A,11,-5						
A,11,-6						
A,11,-7						
A,11,-8						
A,11,-9						
A,11,-10						

Appendix 3-1: Test Vehicle Specifications Data Sheet

[For entry by testing institute]

1. Test Vehicle Specifications

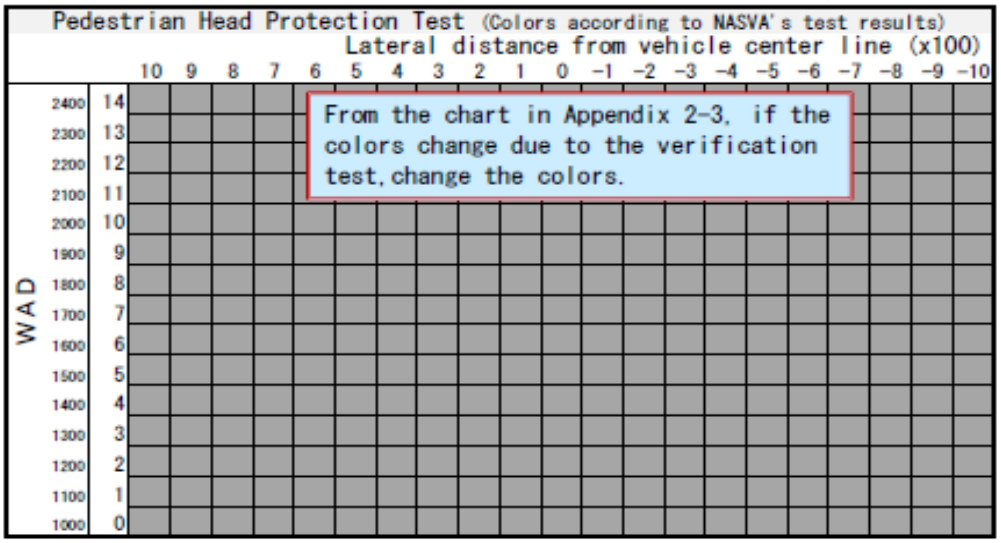
Name / Model / Type Classification No. or Class Symbol			
Chassis Number			
Body Shape			
Engine Type			
Drive System			
Transmission Type			
Tire Type			
Tire Air Pressure			Front right: left: Rear right: left:
Absence/Presence of Sunroof			
Window (front) type			
Steering Mechanism	Handle Shape		
	Airbag		Absent / Present
	Vertical Adjustment		Absent / Present (Electric / Manual)
	Fore-aft Adjustment		Absent / Present (Electric / Manual)
Seats	Fore-aft Adjustment (seat rail)	Driver	Absent / Present (Electric / Manual)
		Front Passenger	Absent / Present (Electric / Manual)
		Other	Absent / Present (Electric / Manual)
	Fore-aft Adjustment (other)	Driver	Device name: Absent / Present (Electric / Manual)
		Front Passenger	Device name: Absent / Present (Electric / Manual)
		Other	Device name: Absent / Present (Electric / Manual)
	Height Adjustment (limited to devices that only move vertically.)	Driver	Absent / Present (Electric / Manual)
		Front Passenger	Absent / Present (Electric / Manual)
		Other	Absent / Present (Electric / Manual)
	Seatback Adjustment	Driver	Absent / Present (Electric / Manual)
		Front Passenger	Absent / Present (Electric / Manual)
		Other	Absent / Present (Electric / Manual)
	Other Adjustment Devices	Driver	Device name: (Electric / Manual)
		Front Passenger	Device name: (Electric / Manual)
		Other	Device name: (Electric / Manual)
Fuel Tank Capacity			L

2. Front/Rear Tires Wheel Arch Height [mm]

	Design Standard		Actual		After Adjustments	
	Left	Right	Left	Right	Left	Right
Front						
Rear						

Appendix 3-2: Head Test Results List (Vehicle Name:)

Pedestrian Head Protection Test (Colors according to NASVA's test results)



		Grid *A:adult, C: child *(row#, column#)	Class *Choose from list	Collision Point	H I C *1st decimal pl. round to next whole #	Color *auto-calculation	Collision Speed (km/h) *1st decimal pl.	Collision Angl (°) *1st decimal pl.	Deviation *F:front, B:back *R:right, L:left	Notes
Collision Point	1									
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
Blue Point	1									
	2									
	3									
	4									
	5									
	6									
	7									
	8									

Supplement: If the color changes after the test, use that color.

Appendix 3-3: Head Test Results Lits (vehicle name:)

Pedestrian Head Protection (Colors from NASVA test results)																					
		10	9	8	7	6	5	4	3	2	1	0	−1	−2	−3	−4	−5	−6	−7	−8	−9	−10
WAD	2400	14																				
	2300	13																				
	2200	12																				
	2100	11																				
	2000	10																				
	1900	9																				
	1800	8																				
	1700	7																				
	1600	6																				
	1500	5																				
	1400	4																				
	1300	3																				
	1200	2																				
	1100	1																				
	1000	0																				

Score Based on Applied Colors	# of Grid	Score	Component Ratio
Default Green			
Green			
Yellow			
Orange			
Brown			
Red			
Default Red			
Blue			
A : Score Based on Applied Colors (Except Blue)			

Verification Test Results (without ±10% tolerance)							
Hit Point	Result Color	HIC	Score	Hit Point	Result Color	HIC	Score
subtotal				subtotal			

Calculated with Correction Coefficient (with ±10% tolerance)							
Hit Point	Predicted Color	HIC	Score	Hit Point	Predicted color	HIC	Score
subtotal				subtotal			

B : Total score of verified hit point's applied value	
C : Total score of verified hit point's test results	
D : Correction Coefficient	

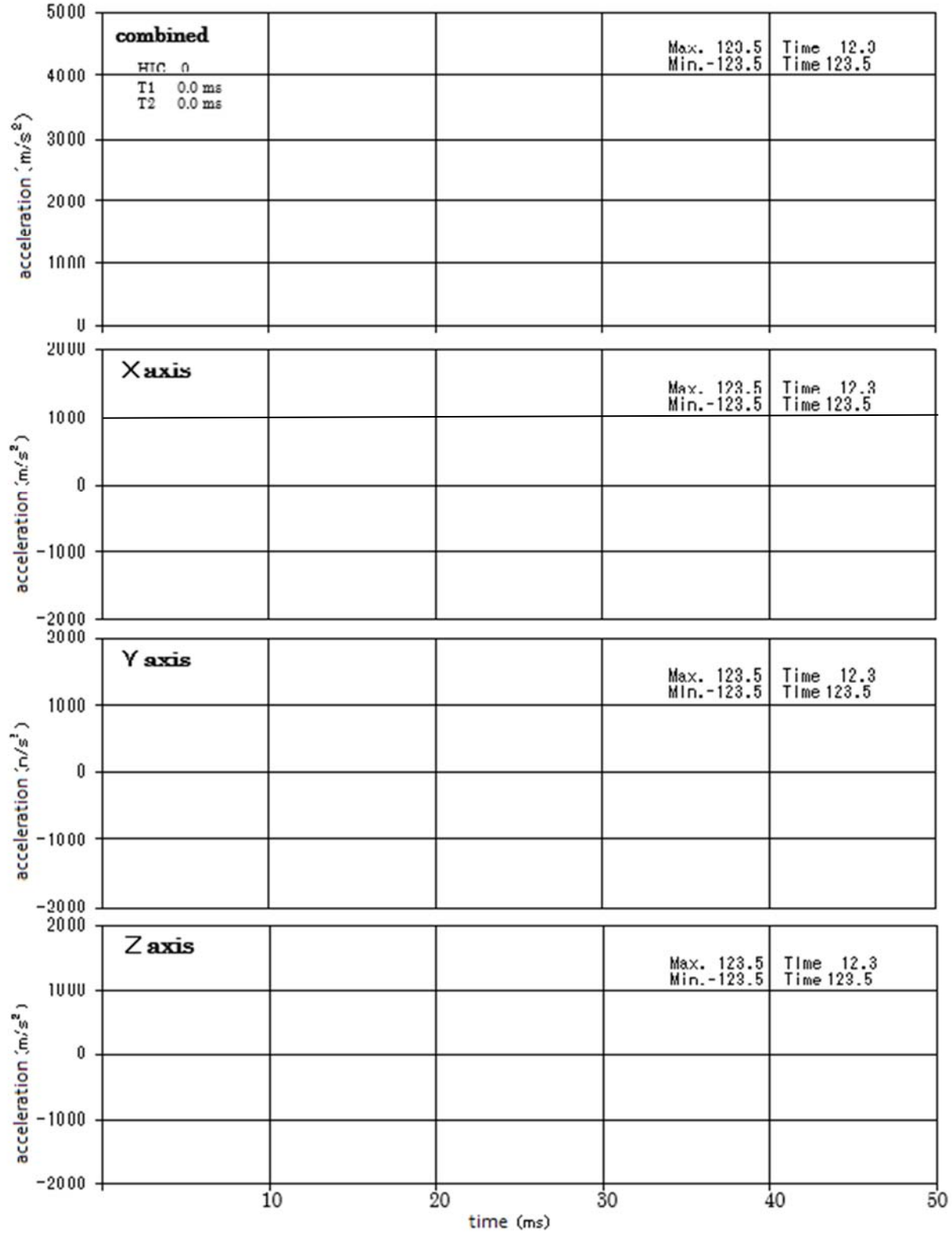
Blue Point Test Results								
Zone	Hit Point	HIC	Score		Zone	Hit Point	HIC	Score
1					5			
2					6			
3					7			
4					8			
E : Blue Point Total Score								

Scoring Results	
A Score Based on Applied Colors (Except Blue)	
a Default Green	
B Total score of verified hit point's applied value	
C Total score of verified hit point's test results	
D orrection Coefficient	
E Blue Point Total Score	
Grand Total (A-a-B)*D+a+C+E	

Pedestrian Head Protection Score	

Supplement: If the colors of the verified test results are different from the vehicle manufacturer data, use the test results colors.
When calculating the correction coefficient, if the permissible range of the vehicle manufacturer's data is within 10%, use that color.

Appendix 4 – Recording electric measurement results (Grid)



Head Impactor Acceleration (NASVA***)

Appendix 5-1: Head Impactor (adult) Calibration Results

Calibration Date (yyyy/mm/dd):

Temperature: °C Humidity: %

Adult Head Impactor (Compliance Range 225-275G) A-Ver.

Falling Angle(°)	Calibrated: Y or N	Angle around the axis of symmetry (°)	Max. 3-axis resultant acceleration (G)
65	Y N	0	
		120	
		240	

Pass or Fail: Pass Fail

Appendix 5-2：Head Impactor (Child) Calibration Results

Calibration Date (yyyy/mm/dd):

Temperature: °C Humidity: %

Child Head Impactor (Compliance Range 245-300G) C-Ver.

Falling Angle(°)	Calibrated: Y or N	Angle around the axis of symmetry (°)	Max. 3-axis resultant acceleration (G)
50	Y N	0	
		120	
		240	

Pass or Fail: Pass Fail

Appendix 6: Recording Temperature and Humidity

Head Impactor Type: Adult, Child

Head Impactor Soak Start Time: __day__month___year ____hr. ____min.

Soak start time temperature: °C, Humidity: %

Head Impactor Temperature at Time of Use

Test No.	Temperature(°C)	Humidity(%)	Test date/time

Appendix 7: Window Glass Full Score Grid Instructions [For entry by Vehicle Manufacturer]

Mark the point 165mm from the window glass ceramic and indicate the grid point in default green.

Instruction Diagram

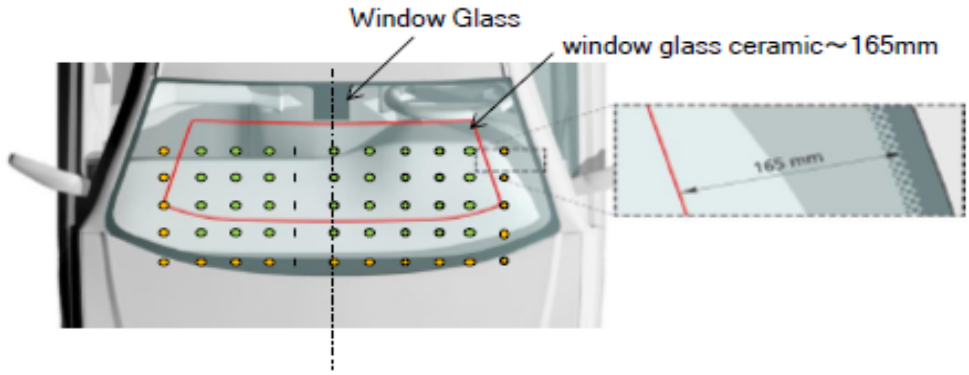
<Full Score Grid Instruction Table>

	Grid *A: adult, C: child, (row, column)		
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

Appendix 7: Window Glass Full Score Grid Instructions [For entry by Vehicle Manufacturer]

Mark the point 165mm from the window glass ceramic and indicate the grid point in default green.

Instruction Diagram



*Indicate if there are fixtures around the windshield base area

<Full Score Grid Instruction Table>

	Grid (※A: adult, C: child, (row, column))		
1	A(6,0)	16	
2	A(6,1)	17	
3	A(6,2)	18	
4	A(6,3)	19	
5	A(6,4)	20	
6	A(6,5)	21	
7	:	22	
8	:	23	
9	:	24	
10	:	25	
11		26	
12		27	
13		28	
14		29	
15		30	