ASEAN NCAP
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TEST PROTOCOL – SIDE IMPACT

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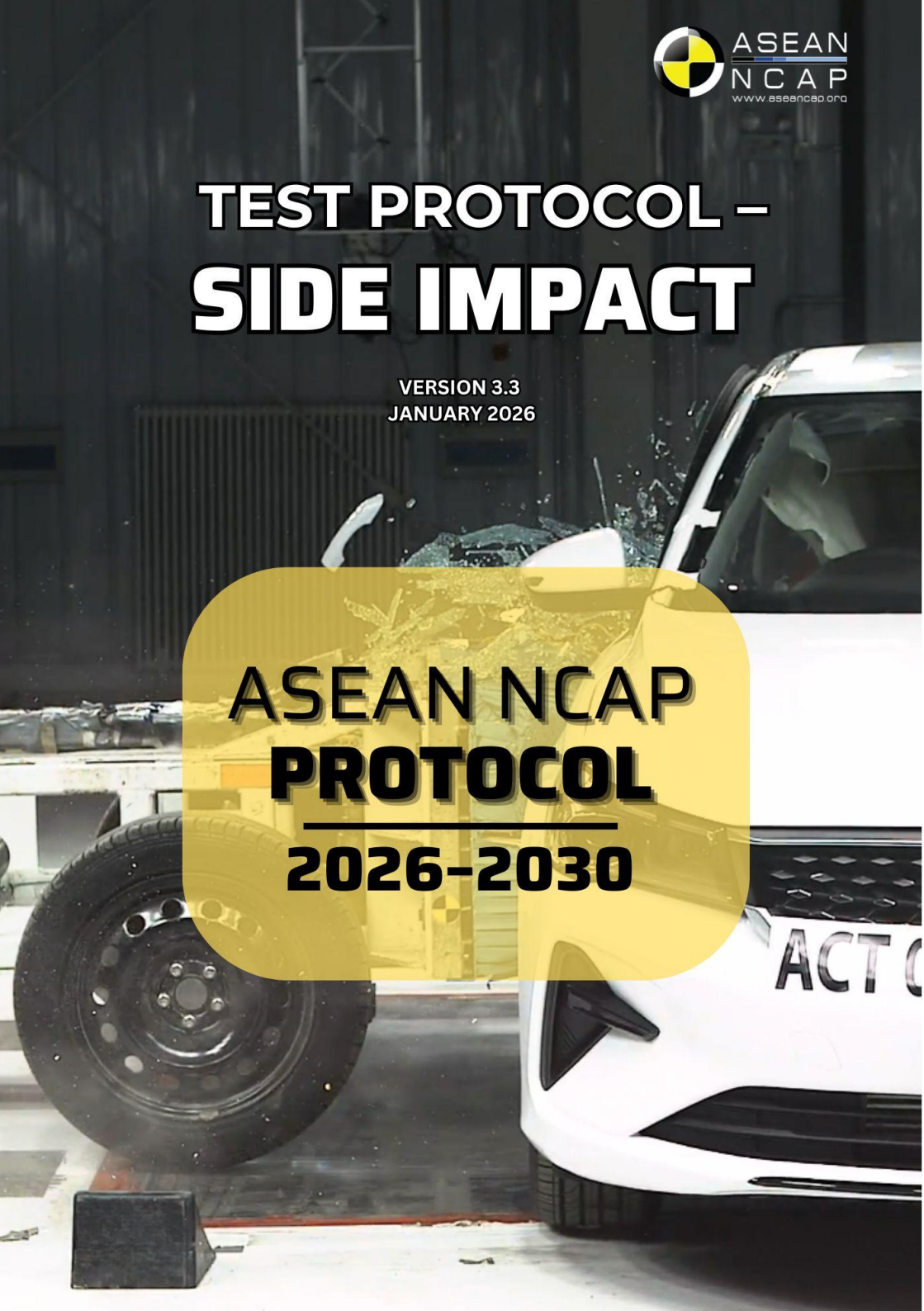

ASEAN NCAP
PROTOCOL
2026-2030

Preface

Where text is contained within square brackets, this denotes that the procedure being discussed is currently being trialled in ASEAN NCAP. Its incorporation in the Test Protocol will be reviewed at a later date.

During the test preparation, vehicle manufacturers are encouraged to liaise with the laboratory and to check that they are satisfied with the way cars are set up for testing. Where a manufacturer feels that a particular item should be altered, they should ask the laboratory staff to make any necessary changes. Manufacturers are forbidden from making changes to any parameter that will influence the test, such as dummy positioning, vehicle setting, laboratory environment etc.

It is the responsibility of the test laboratory to ensure that any requested changes satisfy the requirements of ASEAN NCAP. Where a disagreement exists between the laboratory and manufacturer, the ASEAN NCAP secretariat should be informed immediately to pass final judgement. Where the laboratory staff suspect that a manufacturer has interfered with any of the setup, the manufacturer's representatives should be warned that they are not allowed to do so themselves. They should also be informed that if another incident occurs, they will be asked to leave the test site.

Where there is a recurrence of the problem, the manufacturer’s representatives will be told to leave the test site and the

Secretariat should be immediately informed. Any such incident may be reported by the Secretariat to the manufacturer and the persons concerned may not be allowed to attend further ASEAN NCAP tests.

DISCLAIMER: ASEAN NCAP has taken all reasonable care to ensure that the information published in this protocol is accurate and reflects the technical decisions taken by the organisation. In the unlikely event that this protocol contains a typographical error or any other inaccuracy, ASEAN NCAP reserves the right to make corrections and determine the assessment and subsequent result of the affected requirement(s).

In addition to the settings specified in this protocol, the following information will be required from the manufacturer of the car being tested in order to facilitate the vehicle preparation. A vehicle handbook should be provided to the test laboratory prior to preparation.

TEST PROTOCOL – SIDE IMPACT

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NEW CAR ASSESSMENT PROGRAM FOR SOUTHEAST ASIAN COUNTRIES (ASEAN NCAP)

TEST PROTOCOL – SIDE IMPACT

1 VEHICLE PREPARATION

1.1 Unladen Kerb Mass

Note: EC directive 96/27/EC defines the Unladen Mass of the vehicle as the mass with 90% fuel but all other fluids at maximum capacity.

1.1.1 The capacity of the fuel tank will be specified in the manufacturer's booklet. This volume will be referred to throughout as the "fuel tank capacity".

1.1.2 Syphon most of the fuel from the tank and then run the car until it has run out of fuel.

1.1.3 Refill the tank with fuel, water or other ballast to a weight equivalent to 90% of its fuel tank capacity of fuel.

1.1.4 Check the oil level and top up to its maximum level if necessary. Similarly, top up the levels of all other fluids to their maximum level if necessary.

1.1.5 Ensure that the vehicle has its spare wheel on board along with any tools supplied with the vehicle. Nothing else should be in the car.

1.1.6 Ensure that all tyres are inflated according to the manufacturer's instructions for half load.

1.1.7 Measure the front and rear axle weights and determine the total weight of the vehicle. The total weight is the 'unladen kerb mass' of the vehicle. Record this mass in the test details.

1.1.8 Measure and record the ride heights of the vehicle at all four wheels.

1.2 Reference Loads

1.2.1 Place both front seats in their mid-positions, this may not be the same as the final test position. If there is no notch at this position, set the seat in the nearest notch rearward (this will be done more completely in Section 5).

1.2.2 Place weights equivalent to WorldSID 50th dummies (75 kg) in the front driver's seating position.

1.2.3 Place weights in the luggage compartment of the vehicle until the total vehicle mass (sum of front and rear axle masses) is 100 kg more than the unladen kerb mass (from Section 1.1.7). The normal luggage compartment should be used i.e. rear seats should

not be folded to increase the luggage capacity. Spread the weights as evenly as possible over the base of the luggage compartment. If the weights cannot be evenly distributed, concentrate weights towards the centre of the compartment.

1.2.4 Place weights equivalent to ES2 dummies (80 kg) in the front passenger seating position.

1.2.5 In the child restraints recommended by the manufacturer, place masses equivalent to place masses equivalent to Q10 and Q6 child dummies on the second-row driver's seat and passenger's seats respectively (36kg and 23 kg). If the child restraints are not available at this time, then default masses of 7 kg each should be added to the dummy masses.

1.2.6 For the two-seater vehicles only, the mass of child dummies and child seats shall not be included in the reference load. For vehicles with limited rear space, child seats and dummies shall be included in the reference load.

1.2.7 Roll the vehicle back and forth to 'settle' the tyres and suspension with the extra weight on board. Weight the front and rear axle weights of the vehicle. These loads are the "axle reference loads" and the total weight is the "reference mass" of the vehicle.

1.2.8 Record the axle reference loads and reference mass in the test details.

1.2.9 Measure and record the ride-heights of the vehicle at the point on the wheel arch in the same transverse plane as the wheel centres. Do this for all four wheels.

1.2.10 Remove the weights from the luggage compartment and from the front and rear seats.

1.3 'R' Point

To measure vehicle dimensions and to apply markers, a pointer used to measure coordinates in three dimensions will be used.

1.3.1 The location of the R point relative to some part of the vehicle structure will have been provided by the manufacturer. Determine the position of this point.

1.3.2 Mark a point on the driver's side of the car that has X (longitudinal) coordinate not more than 1 mm different to the theoretical R point location.

1.3.3 Draw a vertical line through the R-Point and mark it clearly 'R'.

1.3.4 Mark points along the side of the vehicle that have the same X coordinates as the 'R' point. Continue these points onto the roof of the vehicle. The points should all lie in the same vertical transverse plane as the 'R' point.

1.3.5 Using a piece of sticky tape in a colour to contrast with the body-colour, join the points with one edge of the tape. Mark clearly on the tape which of its edges aligns with the 'R' point. This edge may be used to assess the alignment of the barrier with the 'R' point.

1.4 Vehicle Preparation

Care should be taken during vehicle preparation that the ignition is not switched on with the battery or airbag disconnected. This will result in an airbag warning light coming on and the airbag system will need to be reset.

1.4.1 Remove the carpeting, spare wheel and any tools or jack from the luggage area. The spare wheel should only be removed if it will not affect the crash performance of the vehicle.

1.4.2 Ensure that the vehicle's battery is connected, if possible, in its standard position. Check that the dashboard light for the airbag circuit functions as normal.

1.4.3 Fit the on-board data acquisition equipment in the boot of the car. Also fit any associated cables, cabling boxes and power sources.

1.4.4 Place weights equivalent to WorldSID 50th male test dummy (75 kg) in the front driver's seat of the car and place weights equivalent to an ES2 dummy (80 kg) in the front

passenger seating position (with the front seats in their mid-positions).

1.4.5 In the child restraints recommended by the manufacturer, place masses equivalent to a Q10 and Q6 child dummies on the second-row driver's seat and passenger's seats respectively (36 kg and 23 kg). If the child restraints are not available at this time, then default masses of 7 kg each should be added to the dummy masses.

1.4.6 Weigh the front and rear axle weights of the vehicle. Compare these weights with those determined in Section 1.2.6

1.4.7 The total vehicle mass shall be within 1% of the reference mass (Section 1.2.6). Each axle load shall be within the smallest of 5% or 20 kg of its respective axle reference load (Section 1.2.6). If the vehicle differs from the requirements given in this paragraph, items may be removed or added to the vehicle which has no influence on its structural crash performance. The level of ballast in the fuel tank (equivalent in mass to 90% capacity of fuel) may also be adjusted to help achieve the desired axle weights. Any items added to increase the vehicle weight should be securely attached to the car.

1.4.8 Repeat Sections 1.4.6 and 1.4.7 until the front and rear axle weights and the total vehicle weight are within the limits set in 1.4.7. Record the final axle weights in the test details.

1.5 Vehicle Markings

1.5.1 ASEAN NCAP markings will be attached to the exterior of the vehicle in the following locations: centre of the bonnet and on the front half of the roof of the vehicle. Refer to Figure 1.1. Areas marked with a dotted box are considered acceptable to place ASEAN NCAP markings within.

1.5.2 Test house logos may be added to the vehicle provided that they do not detract attention from the ASEAN NCAP markings. Suitable locations for such markings would be the middle of the roof and on the bonnet at the base of the windscreen.

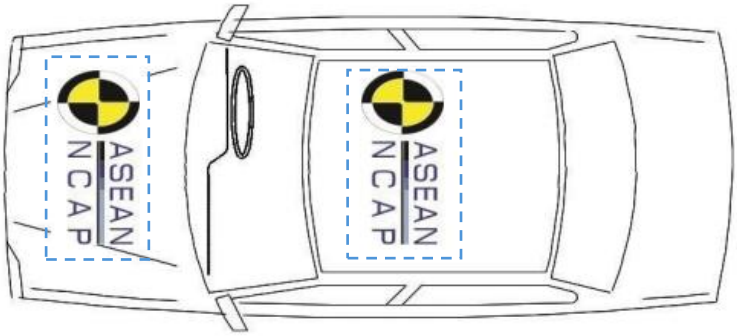


Figure 1.1 ASEAN NCAP markings

2 DUMMY PREPARATION AND CERTIFICATION

2.1 General

2.1.1 A WorldSID 50th percentile male test dummy shall be used in the front driver's position. It shall conform to the specification detailed in ISO 15830, parts 1-5.

2.1.2 A Q6 child dummy, in a high-back booster seat, in the rear passenger side seating position.

2.1.3 A Q10 child dummy, in a high-back booster seat, in the rear driver side seating position.

2.1.4 A non-instrumented ES2 dummy, shall be seated in the front passenger sitting position.

2.2 Certification

Full details of the WorldSID certification requirements are available in the documents mentioned in Section 2.1.1 above. No manufacturer shall have access to any pre-test information regarding any of the test equipment to be used by ASEAN NCAP, or be permitted to influence its selection in any way.

2.2.1 The WorldSID shall be re-certified after every FOUR impact tests.

2.2.2 If an injury criterion reaches or exceeds its normally accepted limit (e.g. HIC of 700) then that part should be re-certified.

2.2.3 If any part of a dummy is broken in a test, then the part shall be replaced with a fully certified component.

2.2.4 Copies of the dummy certification certificates will be provided as part of the full report for a test.

2.2.5 Child dummy certification

a) The Q6 and Q10 child dummies shall be recertified after every TWENTY impact tests (e.g. 10 frontal and 10 side impacts, or any combination of the two test types). Hip shields shall be replaced after every dummy certification, and hip liners shall be replaced after every twenty impact tests.
b) The Q10 dummy shoulder lateral impact certification test is to be performed with the side impact shoulder kit only.
c) If an injury criterion reaches or exceeds its normally accepted limit (e.g. HIC of 700) then that part should be recertified.
d) If any part of a dummy is broken in a test, then the part shall be replaced with a fully certified component.
e) Copies of the dummy certification certificates shall be provided by the laboratory as part of the full report for a test.

2.3 Additions and Modifications to the WorldSID Dummy

2.3.1 The WorldSID dummy shall be equipped with the half arm assembly on both sides.

2.3.2 It is acceptable for the dummy to be equipped with build level E ankle joins.

2.4 Dummy Clothing and Footwear

2.4.1 The WorldSID dummy

2.4.1.1 The dummy shall be clothed in a sleeveless suit or a modified version of the sleeved suit with sleeves removed.

2.5 Dummy Test Condition

2.5.1 Dummy Temperature

2.5.1.1 The dummy shall have a stabilised temperature in the range of 20.6˚C to 22.2˚C.

2.5.1.2 A stabilised temperature shall be obtained by soaking the dummy in temperatures that are within the range specified above for at least 1 hour prior to the test.

2.5.1.3 Measure the temperature of the driver dummy for at least 5 hours before the test at intervals not exceeding 10 minutes.

2.5.1.4 The temperature shall be measured using an onboard sensor located on the blue band of the first thoracic non-struck side rib as far from the spine box as possible.

2.5.1.5 A printout of the temperature readings is to be supplied as part of the standard output of the test.

2.5.2 Dummy Joints

2.5.2.1 Stabilise the dummy temperature by soaking in the required temperature range for at least 5 hours.

2.5.2.2 Set the torque on the shoulder screws to obtain a 1-2g holding force of the arm on its pivot.

2.5.2.3 For adjustable joints in the legs, the tensioning screw or bolt which acts on the constant friction surfaces should be adjusted until the joint can just hold the adjoining limb in the horizontal. When a small downward force is applied and then removed, the limb should continue to fall.

2.5.2.4 The dummy joint stiffness should be set as close as possible to the time of the test and, in any case, not more than 24 hours before the test.

2.5.2.5 Maintain the dummy temperature within the permissible temperature range between the time of setting the limbs and up to a maximum of 5 minutes before the time of the test.

2.5.2.6 After switching on the data acquisition, the air inside the dummy and also the sensors may warm up whereas the dummy itself is still at a lower temperature. Such sudden temperature rises do not reflect the actual dummy temperature and may be ignored as long as they do not exceed a duration of 20 minutes.

2.5.3 Dummy Painting and Marking

2.5.3.1 The dummies should have masking tape placed on the areas to be painted using the size table below. The tape should be completely covered with the following-coloured paints. The paints should be applied close to the time of the test to ensure that the paint will still be wet on impact.

The tape should be completely covered with the coloured paints specified, with the exception of the driver head which should have only the outer edge of the tape painted. Adhesive target markers should be attached to the top/rear of the child dummy's head in order to aid the assessment of the child head containment.

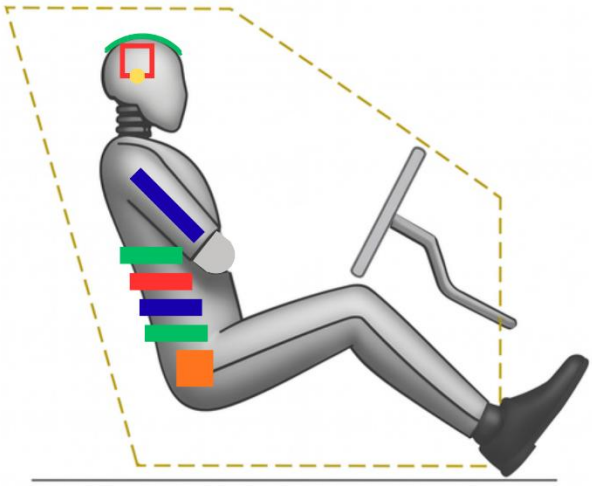
WorldSID – Driver

Location	**Color**	**Tape size**
Head outline	Red	Outline 100 mm square centreline of head with lower edge at CoG.
Head top mid-sagittal	Green	200mm x 20mm strip, head top along midsagittal plane

Arm / Shoulder	Blue	Strip 25×150 mm starting at bottom edge of shoulder fixing hole.
2nd Thorax Rib	Green	Strip 25×150 mm, starting at the rearmost accessible point at seat back.
3rd Thorax Rib	Red	Strip 25×150 mm, starting at the rearmost accessible point at seat back.
1st Abdomen Rib	Blue	Strip 25×150 mm, starting at the rearmost accessible point at seat back.
2nd Abdomen Rib	Green	Strip 25×150 mm, starting at the rearmost accessible point at seat back.
Pelvis	Orange	50×100 mm rectangle. Centered on hip joint point.

Q6 & Q10 dummy

Location	**Color**	**Tape size**
Top of Head	Blue	75 x 75 mm square
Headbands (left to right)	Red, Yellow, Green	25mm wide, widest circumference remaining at eyebrow level at front, extending to the head CoG at each side.



2.6 Post Test Dummy Inspection

2.6.1 The dummy should be visually inspected immediately after the test. Any lacerations of the skin or breakages of the dummy should be noted in the test details. The dummy may have to be recertified in this case. Refer to Section 2.2.

3 INSTRUMENTATIONS

All instrumentation shall be calibrated before the test programme. The Channel Amplitude Class (CAC) for each transducer shall be chosen to cover the Minimum Amplitude listed in the table. In order to retain sensitivity, CACs which are orders of magnitude greater than the Minimum Amplitude should not be used. A

transducer shall be re-calibrated if it reaches its CAC during any test. All instrumentation shall be re-calibrated after one year, regardless of the number of tests for which it has been used. A list of instrumentation along with calibration dates should be supplied as part of the standard results of the test. The transducers are mounted according to procedures laid out in SAE J211. The sign convention used for configuring the transducers is stated in SAE J211 (2007).

3.1 Dummy Instrumentation

3.1.1 The WorldSID dummy to be used shall be instrumented to record the channels listed below.

3.1.2 Where the number of channels in the WorldSID dummy is 45 or more, only in-dummy data acquisition systems may be used. Where there are less than 45 channels, the use of umbilical cables is at the laboratory's discretion.

Location	Parameter	Minimum amplitude	CFC	Channel count
Head	Linear acceleration, Ax Ay Az	250 g	1000	3
Upper neck	Force, Fx Fy Fz	5 kN	1000	6
	Moment, Mx My Mz	300 Nm	600	

Shoulder(s) - Joint	Forces, Fx Fy Fz	8 kN	600	3
Shoulder - Rib	Displacement & rotation	100 mm	180	2
Thorax - Upper rib	Displacement & rotation	100 mm	180	2
Thorax – Mid rib	Displacement & rotation	100 mm	180	2
Thorax - Lower rib	Displacement & rotation	100 mm	180	2
Thoracic temperature[1]	Temperature, see 2.5.1.3	30 ^{0}C		1
Abdomen - Upper rib	Displacement & rotation	100 mm	180	2
Abdomen - Lower rib	Displacement & rotation	100 mm	180	2
Spine - T12	Acceleration, Ax Ay Az	200 g	180	3
Pelvis	Acceleration, Ax Ay Az	200 g	600	3
Pelvis - Pubic	Force	5 kN	600	1
Femoral neck - struck side	Force, Fx Fy Fz	5 kN	600	3
Total Channels			**35**	

ES2

The ES2 dummy to be used shall be non-instrumented for reference only. No instruments installed.

Q6

Location	Parameter		Minimum Amplitude	CFC	No of Channels
Head	Accelerations, A_x A_y Az		200 g	1000	3
Upper Neck (OC)	Forces	Fx Fy	5.0 kN	1000	2
		Fz	6.0 kN		1
	Moments	Mx	90 Nm	600	2
		Mz	45 Nm		1
Chest	Accelerations, A_x A_y Az		200 g	180	3
	Thorax – 1d IR-TRACC		90 mm	180	1
Total Channels					**13**

Q10

Location	Parameter		Minimum Amplitude	CFC	No of Channels
Head	Accelerations, A_x A_y Az		200 g	1000	3
Head Tilt Sensor (static)	Angle		NA		NA
Upper Neck (OC)	Forces	Fx Fy	8.0 kN	1000	2
		Fz	10.0 kN		1
	Moments	Mx My	90 Nm	600	2
		Mz	45 Nm		1
Shoulder (side only)	Forces	Fx Fz	2.0 kN	1000	2
		Fy	4.0 kN		1
T1 (side only)	Accelerations, A_y		200 g	1000	1
Chest (T4)	Accelerations, A_x A_y Az		200 g	180	3
	Displacement & rotation		90 mm 40 deg	180	4
Total Channels				**20**	

3.2 Vehicle Instrumentation

3.2.1 The vehicle is to be fitted with an accelerometer on the unstruck B-post. The accelerometer is to be fitted in the lateral direction (A_y).

3.2.2 Remove carpet and the necessary interior trim to gain access to the sill directly below the B-post.

3.2.3 Securely attach a mounting plate for the accelerometer horizontally on to the sill.

3.2.4 Fix the accelerometer to the mounting plate. Ensure the accelerometer is horizontal to a tolerance of ±5 degrees.

VEHICLE

Location	Parameter	Minimum Amplitude	CFC	No of channels
B-Post (unstruck)	Acceleration, A_y	150 g	60	1
Total Channels per Vehicle				**1**

3.3 Trolley and Barrier Instrumentation

3.3.1 The trolley is to be fitted with an accelerometer at its Centre of Gravity. The accelerometer is to be fitted in the fore/aft direction (A_x). (See Section 7)

TROLLEY

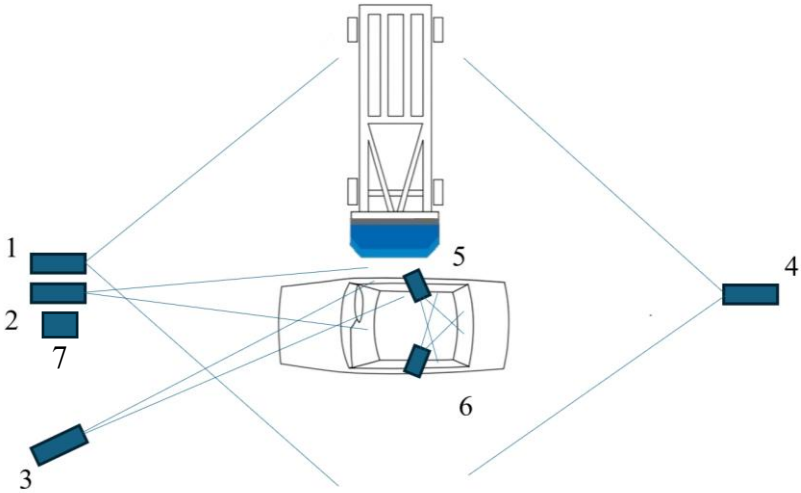
Location	Parameter	Minimum Amplitude	CFC	No of channels
Trolley C of G	Acceleration, Ax	150 g	60 180	1
Total Channels per Trolley				**1**

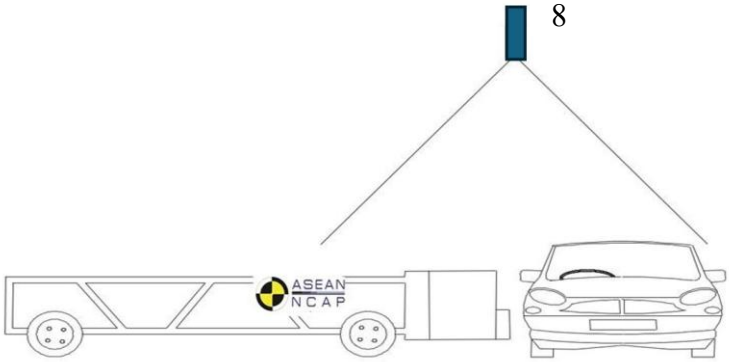
3.4 Total Channels

1x Driver	35
1 x Front passenger	0
1x Q10	20
1x Q6	13
1x Vehicle	1
1x Trolley	1
Total Channels	**70**

4 CAMERA LOCATIONS

Set up high speed film cameras according to the following diagrams.





No.	Camera Type	Shot Content
1	≥ 500 fps high speed	Front view of vehicle and trolley (wide)
2	≥ 500 fps high speed	Front view of driver and impact point, curtain airbag (tight)
3	≥ 500 fps high speed	Top slanting view of driver and side/curtain airbag
4	≥ 500 fps high speed	Rear view of vehicle and trolley (wide)
5	≥ 500 fps high speed	Q6 head containment, onboard
6	≥ 500 fps high speed	Q10 head containment, onboard
7	≥ 500 fps stills camera	Front view of vehicle and trolley (wide)
8	≥ 500 fps high speed	Plan view of car and trolley (tight)

4.1 Lens sizes should be chosen appropriately in order to achieve the required shot content/intention. In order to prevent view distortion, a minimum lens size of 9mm is applicable. Please note for view number 7 the passenger side headrest should be removed if possible.

4.2 For high-back booster seat, cameras 5 and 6 shall be cross-oriented, such that each camera monitors the opposite rear passenger seating position to enable assessment of head containment. The positioning of onboard cameras will be dependent upon the body type and size of the test vehicle.

4.3 When attaching onboard cameras, the vehicle manufacturer should be consulted to ensure that no damage is caused to the vehicle that would influence the impact performance or interfere with any airbags during deployment. Where additional equipment is added, the mass shall be offset when achieving the final test weight.

4.4 If the test vehicle is equipped with a curtain airbag, internal lighting needs to be added if the onboard camera is not able to record sufficient images for the assessment.

5 PASSENGER COMPARTMENT ADJUSTMENTS

5.1 Passenger Compartment Adjustments

Adjustment	Required setting	Note	Methods
Front seat fore/aft	As defined in 5.4		
Front seat cushion tilt	As defined in 5.4		
Front seat height	As defined in 5.4		
Front seat torso angle	Manufacturer's design position	Where no design position is given, set to 23° to vertical, as defined by Torso angle	See Section 6.1

Front seat lumbar support	Fully retracted.		See Section 5.2
Front seat cushion length	Fully retracted.		
Front head restraint height & tilt	Mid locking position (where adjustable)	If there is any interference with the rear of the dummy head, move the HR to the most rearward position.	
Front seat belt anchorage	Manufacturer's 50th percentile design position	If no design position, then set to mid position, or nearest notch upwards. Webbing must not be in contact with the neck.	See Section 6.7
Steering wheel	Highest position and most outward		See Section 5.5
Rear seat facing	Forwards		See Section 5.6
Rear seat lateral position	Most outboard		
Rear seat fore/aft	Manufacturer's design position	Where no details are provided in the handbook, set to mid	See Section 5.6
Rear seat cushion tilt	Manufacturer's design position	Permissible up to mid position, otherwise lowest	

Rear seat height	Manufacturer's design position	Where no design position is given, set to lowest	
Rear seat torso angle	Manufacturer's design position	Where no design position is given, set to 25° to vertical, as defined by torso angle	
Rear seat lumbar support	Fully retracted.		
Rear seat cushion length	Fully retracted.		
Rear head restraint height & tilt	As recommended in vehicle handbook.	Where no details are provided in the handbook, set to mid or next lowest position for height and mid locking position for tilt. Must not interfere with child/CRS installation	
Rear seat belt anchorage	As recommended in vehicle handbook for CRS installation.	If no recommendation then set to mid-position, or nearest notch upwards. MUST be same as ODB	
Arm-rests (Front seats)	Lowered	May be left up if dummy positioning does not allow lowering. Single occupancy test only	

Arm-rests (Rear seats)	Stowed		
Side window glazing	All raised		
Gear change lever	In the neutral position		
Parking brake	Disengaged		
Pedals	Normal position of rest	Adjustable pedals fully forward	See Section 5.2

Adjustment not listed will be set to mid-positions or nearest position rearward, lower or outboard.

5.2 Seat Adjustments

5.2.1 Position the seat's adjustable lumbar supports so that the lumbar supports are in the lowest, retracted or deflated adjustment positions.

5.2.2 Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position.

5.2.3 Position an adjustable seat cushion length to the retracted position.

5.2.4 Position an adjustable leg support system in its rearmost position.

5.2.5 Place adjustable pedals in the full forward position (towards the front of the vehicle).

5.3 Seat Markings

5.3.1 Identify and mark one seat reference point (SRP1) at the rear side of the seat cushion, SRP1.

5.3.2 Where the seat cushion pitch is adjustable, identify and mark a second reference point, SRP2, that is at least 300mm forward of the rear reference point (SRP1) and draw a line through the two reference points.

5.3.3 Locate and mark the longitudinal centreline of the seat cushion. The intersection of the vertical longitudinal plane that passes through the SRP1 and the seat cushion's upper surface determines the longitudinal centreline of a bucket seat cushion.

5.3.4 Where the front seats are bench seats, locate and mark the longitudinal line on the seat cushion that marks the intersection of the vertical longitudinal plane through the centreline of the steering wheel and the seat cushion's upper surface.

5.4 Positioning the Seat

5.4.1 Use the seat control that primarily moves the seat vertically to adjust the rearmost seat reference point, SRP1, defined in 4.3.1 to the upper most vertical location.

5.4.2 Use the seat control that primarily moves the seat fore-aft to adjust the rearmost seat reference point, SRP1, defined in 4.3.1 to the rearmost location.

5.4.3 Determine and record the range of angles of the seat cushion pitch and using only the control(s) that primarily adjust(s) the cushion pitch, set cushion pitch to the mid-angle.

5.4.4 Use the seat control that primarily moves the seat vertically to adjust the rearmost seat reference point defined in 4.3.1, SRP1, to the lowest vertical location. Verify that you are still at the rearmost seat track location. Record the X position of SRP1.

5.4.5 Use the seat control that primarily moves the seat fore-aft to adjust the rearmost seat reference point, SRP1, to the rearmost location. Record the X position of SRP1.

5.4.6 Use the seat control that primarily moves the seat fore-aft to adjust the rearmost seat reference point, SRP1, to the forward most location; Record the X position of SRP1.

5.4.7 Measure and mark an X position 20 mm rearward of the midpoint (MP +20 mm).

5.4.8 Use the seat control that primarily moves the seat fore-aft to adjust the rearmost seat reference point, SRP1, to the X position marked in 5.4.7 or, if this is not possible, to the first X possible position rearward the marked position in 5.4.7. If the seat cannot be placed at exactly 20 mm rearward of the midpoint select the next closest available rearward setting.

5.4.9 For some vehicles this final step may change the cushion pitch as established in 5.4.8, this is acceptable.

5.4.10 Record test seat position using the seat reference point, SRP1.

The settings for the passenger seat should be as near as possible to being the same as that of the driver's seat.

5.5 Setting the Steering Wheel

5.5.1 Set the steering wheel at the geometric highest driving position considering the full range of telescopic and tilt adjustment possibilities, in order to provide clearance for the legs and thorax.

5.6 Setting the rear seat (if adjustable)

5.6.1 If the vehicle's rear seat position is adjustable put it in the same fore/aft position as that used in the frontal impact ODB test with the same seat back angle.

6 DUMMY AND MEASUREMENTS

The following chapter deals with all aspects of seating the dummy in the vehicle to be tested. A general timetable of the complete procedure is set out below: -

Timetable

		When this is done
1	Determine the H-point of the driver's seat	Before test day
2	Dummy installation (on boards)	Before test day
3	Dummy placement	Test day
4	Dummy positioning	Test day
5	Dummy positioning measurements	Test day – after vehicle has been positioned for test

6.1 Determine the H-point of the Driver's Seat

The device to be used is the H-point machine as described in SAE J826.

If the seat is new and has never been sat upon, a person of mass 75 ± 10 kg should sit on the seat for 1 minute twice to flex the cushions. The seat should be at room temperature and unloaded for at least 1 hour prior to any installation of the machine.

6.1.1 Set the seat back so that the torso of the H-point manikin is as close as possible to the manufacturer's recommendations for normal use. In absence of such recommendations, an angle of 23 degrees ±1° towards the rear from vertical will be used.

6.1.2 The driver and passenger seatback angle and seat base shall be set to the same position.

6.1.3 Place a piece of muslin cloth on the seat. Tuck the edge of the cloth into the seat pan/back join but allow plenty of slack.

6.1.4 Place the seat and back assembly of the H-point machine on the seat at the centre line of the seat.

6.1.5 The length of the lower leg and thigh segments of the H-point manikin shall be adjusted to the 50th percentile (418mm) and 10th percentile (408mm) positions respectively.

6.1.6 Attach lower legs to the machine ensuring that the transverse member of the T-bar is parallel to the ground.

6.1.7 Place the right foot on the undepressed accelerator pedal, with the heel as far forwards as allowable. The distance from the centre line of the machine should be noted.

6.1.8 Place left foot at an equal distance from centre line of the machine as the right leg is from centre line. Place the foot flat on the footwell.

6.1.9 Apply lower leg and thigh weights.
6.1.10 Tilt the back pan forwards to the end stop and draw the machine away from the seatback.

6.1.11 Allow the machine to slide back until it is stopped by contacting the seat back.

6.1.12 Apply a 10kg load twice to the back and pan assembly positioned at the intersection of the hip angle intersection to a point just above the thigh bar housing.

6.1.13 Return the machine back to the seat back.

6.1.14 Install the right and left buttock weights.

6.1.15 Apply the torso weights alternately left and right.

6.1.16 Tilt the machine back forwards to a vertical position and, while holding the T-bar, rock the pan by 5 degrees either side of the vertical. The feet are NOT to be restrained during the rocking. Holding the T-bar to prevent the H-Point machine from sliding forward on the seat cushion, return the machine back to the seat back.

6.1.17 Reposition the feet by lifting the leg and then lowering the leg so that the heel contacts the floor and the sole lies on the undepressed accelerator.

6.1.18 Check the lateral spirit level and if necessary, apply a lateral force to the top of the machine back, sufficient to level the seat pan of the machine.

6.1.19 Adjust the seat back angle to the angle determined in 6.1.1, measured using the spirit level and torso angle gauge of the H-point machine. Ensure that the torso always remains in contact

with the seat back. Ensure that the machine pan always remains level.

6.1.20 If the measured angle is not within ±1° of the target, the chest and buttocks weights shall be removed, the seat back readjusted, and the steps to position the H-point manikin shall be repeated, beginning with tilting the back pan forward as in 6.1.10.

6.1.21 Measure and record in the test details the position of the H-point relative to some easily identifiable part of the vehicle structure.

6.2 Dummy Installation

It is the intention that the dummy should not be left to sit directly on the seat for more than 2 hours prior to the test. It is acceptable for the dummy to be left in the vehicle for a longer period, provided that the dummy is not left in overnight or for a similarly lengthy period.

If it is known that the dummy will be in the vehicle for a time longer than 2 hours, then the dummy should be sat on plywood boards placed over the seat. This should eliminate the unrealistic compression of the seat.

6.3 Dummy Placement

If the vehicles only have two side doors, it may be necessary to fit the child restraint system and child dummies (Section 6.4) before setting up the WorldSID dummy in the front seat.

Note:

i. **The H-point of the WorldSID dummy is situated 20mm forward and ES-2 situated 21mm forward of that of the H-point determined by the H-point manikin.**

6.3.1 Using only the controls that move the seat fore-aft, move the test seat to the rearmost position to facilitate placement of the dummy.

6.3.2 Position the dummy in the seat such that the midsagittal plane is coincident with the centreline markings and the upper torso resting against the seat back.

6.3.3 Apply a fore-aft and lateral rocking motion to settle the pelvis rearward in the seat.

6.3.4 To ensure a repeatable and stable pelvis position, ensure that the pelvis is in contact with the seat cushion over the whole length.

6.3.5 To ensure a repeatable placement of the lower abdominal rib, make sure it is inside the pelvis flesh and not on top of it.

6.3.6 Move the seat together with the dummy to the test seat position defined in 4.4.9. If it is not possible to reach the seat test position due to knee contact, shift the targeted test seat position rearwards in the stepwise increments to the closest position where the knee clearance is at least 5mm. Modify the target H-point accordingly.

6.3.7 Verify that the H-point is reasonably close (±10mm) to the target H-point 6.1.21 or as defined in 6.2.3.6 if the target H-point has been modified. If not, repeat step 6.2.3.3. If it is still not possible, record the rearmost seat cushion reference point and the dummy H- point and proceed to the next step.

6.3.8 Extend the right leg without displacing the thigh from the seat cushion. Allow the sole of the foot to settle on the accelerator pedal; the heel of the shoe should be in contact with the floor pan. Where a lack of ankle articulation prevents the foot from sitting flat on the accelerator pedal, keep the foot at a 90 degree angle to the tibia and ensure that the heel is in contact with the floor.

6.3.9 Extend the left leg without lifting the thigh from the seat cushion and allow the sole of the foot to settle on the footrest or floor if no footrest is present. The heel of the shoe should be in contact with the floor. In case of tibia contact, slide the foot rearward toward the seat until a 5mm clearance is obtained. Where a lack of ankle articulation prevents the foot from sitting flat on the floor, keep the foot at a 90 degree angle to the tibia and ensure that the heel is in contact with the floor.
6.3.10 Position the H-point of the dummy to match the WorldSID H-point coordinates recorded following Section 5.1 to within ±10 mm. Prioritise the X coordinate.

6.4 Head and Torso

6.4.1 Adjust the dummy until the thorax tilt sensor coincides with the angle specified by the manufacturer.

6.4.2 If the rib angle is not specified by the manufacturer and the seat back is 23° ± 1°, adjust the dummy until the thorax tilt sensor reads −2° (spine flexion) ± 1°.

6.4.3 If no rib angle is specified and the seat back angle is not 23° ± 1°, no further adjustment of rib angle is required.

6.4.4 Adjust the dummy neck bracket to level the head at the closest position to 0° ± 1°.

6.5 Legs and feet

6.5.1 Proceed to the final foot and leg positioning by repeating Sections 6.1.7 and 6.1.8. Where a lack of ankle articulation prevents the foot from sitting flat on the accelerator pedal/floor, keep the foot at a 90 degree angle to the tibia and ensure that the heel is as far forward as possible and in contact with the floor.

6.5.2 No distance is specified for the knee spacing. However, priority should be given to ensure the following:

6.5.3 There is 5 mm clearance between the knees/legs and the steering shroud and centre console.

6.5.4 There is a stable foot and ankle position.

6.5.5 The legs are as parallel as possible to the sagittal plane.

6.6 Arms

6.6.1 Place both arms at the first detent downward of the most upward detent that corresponds to a differential angle of 32° between rib angle sensor and the arm angle.

6.7 Seat belt

6.7.1 Where possible, initially position the upper seat belt anchorage in the manufacturers 50th percentile design position. If no design position is provided, set the adjustable upper seat belt anchorage to the mid-position or nearest notch upward.

6.7.2 Carefully place the seat belt across the dummy and lock as normal.

6.7.3 Remove the slack from the lap section of the webbing until it is resting gently around the pelvis of the dummy. Only minimal force should be applied to the webbing when removing the slack. The route of the lap belt should be as natural as possible.

6.7.4 Place one finger behind the diagonal section of the webbing at the height of the dummy sternum. Pull the webbing away from the chest horizontally forward and allow it to retract in the direction of the D-loop using only the force provided by the retractor mechanism.
Repeat this step three times, only.

6.7.5 After following the above steps, the seatbelt should lie in a natural position across the dummy sternum and shoulder clavicle. Where this is not the case, for example the belt is close

to or in contact with the neck or the belt is above the shoulder rotation adjustment screw, and the upper belt anchorage is adjustable the anchorage should be lowered and steps 6.7.3 and 6.7.4 repeated.

6.7.6 The upper anchorage should be lowered by a sufficient amount to ensure a natural belt position following the repetition of steps 6.7.3 and 6.7.4. This may require multiple attempts.

6.7.7 Once the belt is positioned, the location of the belt should be marked across the dummy chest to ensure that no further adjustments are made. Mark also the belt at the level of the D-loop to be sure that the initial tension is maintained during test preparation.

6.7.8 Measure the vertical distance between the dummy nose and the diagonal webbing.

6.7.9 Measure the horizontal distance between the diagonal webbing and the door/window.

6.8 After positioning the dummy, measure and record the dummy position according to Section 6.11 and determine the impact location as described in Section 1.3.

6.9 Child Restraint System (CRS) Installation and Child Dummy Positioning and Measurements

Two high-back booster seats are to be fitted on the rear seat, one suitable for a 10 year old child, the other for a six year old child.

Read the relevant sections of the vehicle handbook and the instructions provided with the child restraint. This is to identify any special features of either the vehicle or the child restraint that are intended to improve performance or may influence installation. Instructions on tightening of the adult seat belt around the child restraint should be noted, but the installation itself should follow the procedure below.

The use of additional belt guides, clips or other components that are not an integral part of the high-back booster seat is prohibited. Belt guides that are fitted to the vehicle must be permanently attached and information on their use must be contained in the vehicle handbook, where this is not the case they MUST NOT be used for testing.

6.9.1 General

Before installing the dummies and child restraint systems, ensure that the passenger compartment adjustments for the rear seats is performed.

6.9.2 Marking centrelines

Mark the centreline of both of the rear outboard seating positions (including head restraint centreline if necessary) and on the high-

back booster seat used for test. Markings placed on hard parts of the high-back booster seat, rather than seat fabric, are preferable. If an ISOFIX high-back booster seat is used no markings are needed.

The vehicle manufacturer shall confirm whether or not the centreline of the head restraints aligns with the centreline of the vehicle's rear seat cushion. Where this is not the case the OEM shall supply details of the seat base centreline. Where no information is provided, either the centreline of the head restrains, seat cushion or the ISOFIX anchorages shall be used, whichever is the most appropriate for the high-back booster seat installation.

6.9.3 Q10 Installation

6.9.3.1 Placing the high-back booster seat in the vehicle

a) Place the high-back booster seat on the relevant seating position. Mark the fore–aft position on the side of the high-back booster seat and on the vehicle. Align the high-back booster seat with the markings on the vehicle seat cushion and verify that there is no contact between the high-back booster seat and the side door when closed. If contact occurs, the high-back booster seat may be moved inboard by up to 50 mm.
b) If an ISOFIX high-back booster seat is used, no markings are required. The high-back booster seat shall be aligned with the ISOFIX anchorages and securely engaged with the vehicle.

6.9.3.2 Placing the Q10 dummy in the vehicle

a) Place the Q10 dummy on the high-back booster seat. Ensure that the suit has not moved into the gap between the femur and hip by pulling the suit toward the knees.
b) Align the Q10 dummy and the high-back booster seat with the marked centreline.
c) Buckle the seat belt. If the buckle is not accessible due to interaction with the high-back booster seat, move the high-back booster seat and Q10 dummy outboard by the minimum distance required, up to a maximum of 50 mm, to allow free access to the buckle. Remove slack from the webbing without tightening it.
d) Attempt to realign the high-back booster seat with the markings on the seat cushion. If the high-back booster seat cannot be aligned with the original markings due to the vehicle seat shape or seat belt buckle position, remark the new lateral position relative to the vehicle seat.
e) Ensure that the rear of the high-back booster seat is in contact with the vehicle seat back by pressing it rearward and verifying that the fore–aft markings remain aligned.
f) Where applicable, install the hip shields on the Q10 dummy. Ensure that the distance between the hip shields is not less than 154 mm. If necessary, use the larger gap setting to achieve the best fit.

6.9.3.3 Q10 dummy positioning

a) Ensure that the dummy's lower back is in contact with the high-back booster seat by bending the dummy's back into

an upright position and then rocking the dummy sideways while at the same time pushing the pelvis backwards.

b) Ensure that the high-back booster seat is aligned with the new reference marks.

c) Ensure that the dummy is sat on the centreline of the high-back booster seat and is not rotated about the vertical axis.

d) Where the rear head restraints interfere with the high-back booster seat, they should be repositioned as necessary to avoid this. They may be removed if instructed to do so in the vehicle handbook.

e) Ensure that the dummy is sitting in an upright position and is aligned with the centreline marks
on the head restraint (if applicable) or is parallel to the marks of the centreline.

f) Ensure that the high-back booster seat position did not change relative to the marked position.

6.9.3.4 Legs

a) Position the femurs straight forward with a distance of 130 mm ±5 mm between the centres of the knees. If the high-back booster seat prevents this gap from being achieved, position the knees as close to the target values as possible.

b) Where possible, allow the lower legs to rest naturally. The tibias shall be parallel to the vehicle centreline and the feet shall be separated by the same distance as the knees.

c) Record the pelvic angle using the tilt sensor in the test details.

6.9.3.5 Position of the front seat

a) Reposition the front seat 30 mm forward of its test position. If there is no notch at this position, set the seat in the nearest notch forwards of 30 mm.
b) During repositioning, check for interaction between the Q dummy lower legs, feet and the front seat.
c) With the front seats 30 mm forward, if there is no contact between the front of the dummy toes and the seat in front, it is acceptable for the top of the foot/toes to contact the underside of the front seat, reposition the front seats in their test positions and proceed to belt routing. The interaction between the Q dummy lower legs, feet and the front seat are acceptable. Record the pelvic angle.
d) If there is contact between the dummy and the front seats when they are 30 mm forward of their test position, follow the steps below to limit contact between dummy and the front seat. Note: this is not relevant if there is only contact between the top of the foot/toes and the underside of the front seat.
    i. Try to reposition the feet and tibias by pushing them beneath the front seat or rotating the tibias about the Z axis. If this is not sufficient then:
    ii. Move the pelvis of the dummy forwards, while keeping the high-back booster seat in place, until there is no more contact with the seat in front. It is permitted to change the pelvic angle up to 5 degrees relative to the initial pelvic angle. This should be done in incremental steps until the contact between the toes and front seat is removed.

It is acceptable for the top of the foot/toes to contact the underside of the front seat. Record the final pelvic angle.

e) When the dummy toes remain in contact with the front seat after repositioning the dummy as mentioned above, the vehicle will be treated as limited rear space for that test see Section 6.10. It is acceptable for the top of the foot to contact the underside of the front seat.
f) The front seat must be returned to the test position.

6.9.3.6 Belt routing

a) Follow the high-back booster seat installation instructions when routing the seat belt and ensure that the belt is routed correctly through any necessary belt guides.
b) Remove the slack of the lap belt by pulling on the diagonal belt near the buckle with a force of 150 N.
c) Ensure that the belt is not twisted in the belt guide.
d) The belt shall initially be positioned over the IRTRACC (upper for Q10) if possible, a load of 50 N shall be applied to the diagonal section of the belt in towards the D-loop to achieve a natural and flat position across the chest. The belt may have moved away from the initial position, there is no need for further adjustment.
e) The use of any non-permanent belt guides or clips on either the vehicle or the high-back booster seat is prohibited.
f) There shall be no tape or stickers applied to the diagonal section of the adult belt.

6.9.3.7 Arms

b) The upper arm shall be positioned parallel to the chest. The measurements shall be taken on the neoprene suit along the front surface of the arm (bicep) and between the two IR-TRACCs on the chest.

6.9.3.8 Dummy marking

Once the dummy has been correctly positioned, the two IR-TRACC holes shall be clearly marked on the suit of the dummy.

6.9.4 Q6 Installation

6.9.4.1 Placing the high-back booster seat in the vehicle

a) Place the high-back booster seat on the relevant seating position. Mark the fore–aft position on the side of the high-back booster seat and on the vehicle. Align the high-back booster seat with the markings on the vehicle seat cushion and verify that there is no contact with the side door when it is closed. If contact occurs, the high-back booster seat may be moved inboard by up to 50 mm.

b) If an ISOFIX high-back booster seat is used, no markings are required. The high-back booster seat shall be aligned with the ISOFIX anchorages and engaged with the vehicle.

6.9.4.2 Placing the Q6 dummy in the vehicle

a) Place the dummy in the high-back booster seat. Ensure that the suit has not moved into the gap between the femur and hip by pulling the suit toward the knees.
b) Align the dummy and the high-back booster seat with the marked centreline.
c) Buckle the seat belt. If the buckle is not accessible due to interaction with the high-back booster seat, move the high-back booster seat and dummy outboard by the minimum distance required, up to a maximum of 50 mm, to allow free access to the buckle. Remove slack from the webbing without tightening it.
d) Attempt to realign the high-back booster seat with the markings on the seat cushion. If the high-back booster seat cannot be aligned with the original markings due to the vehicle seat shape or seat belt buckle position, re-mark the new lateral position of the high-back booster seat relative to the vehicle seat.
e) Ensure that the rear of the high-back booster seat is in contact with the seat back by pressing it rearward and verifying that the fore–aft markings remain aligned.
f) Where rear head restraints interfere with the high-back booster seat, reposition them as necessary to avoid interference. They may be removed if permitted by the vehicle handbook.

6.9.4.3 Q6 dummy positioning

a) Ensure that the dummy's upper back is in contact with the back of the high-back booster seat. This is done by bending the dummy's back into an upright position and then rocking the dummy sideways while at the same time pushing the pelvis backwards.
b) Ensure that the high-back booster seat is aligned with the new reference marks.
c) Ensure that the dummy is sat on the centreline of the high-back booster seat and is not rotated about the vertical axis.
d) Push the dummy's shoulders toward the back until the shoulders contact the high-back booster seat.
e) Ensure that the dummy is sitting in an upright position and is aligned with the centreline marks on the head restraint (if applicable) or is parallel to the marks of the centreline.
f) Ensure that the high-back booster seat position did not change relative to the marked position.

6.9.4.4 Legs

a) Position the femurs straight forward with a distance of 150mm ±5mm between the centres of the knees. If the high-back booster seat prevents this gap from being achieved, position the knees as close to the target values as possible.
b) Where possible, allow the lower legs to rest naturally. The tibias shall be parallel to the vehicle centreline

and the feet shall be separated by the same distance as the knees.

6.9.4.5 Position of the front seat

Follow the steps detailed in Section 6.9.3.5 to establish whether or not the vehicle is considered to be of limited rear space for the Q6 see Section 6.10. If this is not the case, proceed with the steps below.

6.9.4.6 Belt routing

a) Ensure that the lap belt is routed through the belt guide of the high-back booster seat.
b) Remove the slack of the lap belt by pulling on the diagonal belt near the buckle with a force of 150 N.
c) Route the diagonal belt through the belt guide of the high-back booster seat. Ensure that the belt is not twisted.
d) The belt shall lie naturally across the chest and be allowed to sit as it falls. A load of 50N shall be applied to the diagonal section of the belt towards the D-loop to achieve a natural and flat belt position across the chest.
e) The use of any non-permanent belt guides or clips on either the vehicle or high-back booster seat is prohibited.
f) There shall be no tape or stickers applied to the diagonal section of the adult belt.

6.9.4.7 Arms

a) The upper arm shall be positioned parallel to the chest. The measurements shall be taken on the neoprene suit along the front surface of the arm (bicep) and along the IR-TRACC on the chest.
b) Position the lower arms parallel to the upper legs resting on the high-back booster seat or armrest as close as possible to the side of the femur. The elbows shall be kept as close as possible to the torso.

6.10 Vehicles with Limited Rear Space

Vehicles will be considered as having limited rear space when the child dummies cannot be installed with the front seats in the full-scale impact test position after adjustment in Section 6.9.3.5 Where this is the case, the test laboratory will confirm that the child dummy cannot be installed without interference from the vehicle.

Where a manufacturer wishes to avoid being awarded zero points for the COP dynamic assessments, the dynamic performance will be based on manufacturers data from test(s) with modified front seating positions. These tests shall be performed using the appropriate CRS with the front seats positioned to one notch forwards of contact with the dummy. The dummy pelvis shall be positioned in the last step after adjustment in Section 6.9.3.5.

The tests must be equivalent to the ASEAN NCAP front impact tests and contain an equivalent level of instrumentation. Adult

dummies are not required but their mass should be compensated for in the final test mass. It is the responsibility of the vehicle manufacturer to ensure that adequate film coverage of the impact, and specifically child head excursion and head containment, is provided.

If the laboratory has established that the vehicle is not able to accommodate the Q10 dummy seated on a high-back booster seat due to interaction between the dummy foot or the dummy toe with front seat, Q10 dummy is allowed to be seated in booster cushion only.

If the laboratory has established that the vehicle is not able to accommodate the Q10 dummy seated on a booster cushion due to interaction between the dummy head and vehicle roof, the Q10 will be seated directly on the rear seat without the use of any booster cushion. If, with the Q10 seated directly on the rear seat, there is still insufficient space between the dummy head and vehicle roof, the vehicle will be assessed in the same way as a two-seater.

6.11 Dummy Positioning Measurements

6.11.1 WorldSID

The following measurements are to be recorded prior to the test after the dummy setting and positioning procedures have been carried out.

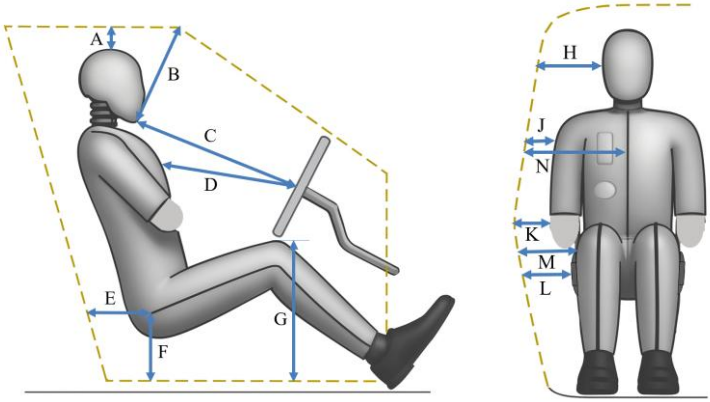


Figure 1: Driver dummy measurements

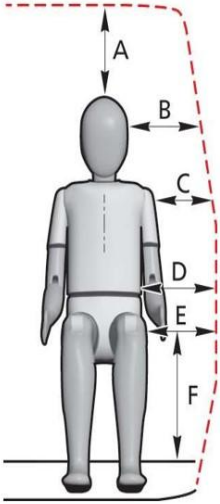
Driver measurements	
A	Head/roof panel
B	Chin/windscreen joint
C	Chin/centre of the steering
D*	Thorax strap/centre of the steering wheel
E	Hip-joint point/inside opening of the door (horizontal)
F	Hip-joint point/inside opening of the door (vertical)

Driver measurements	
G	Knee/floor covering (vertical)
H	Head/side window pane (or padding)
J	Shoulder/window pane (or padding)
K	Elbow/door (or padding)
L	Pelvis/door (or padding)
M	Knee/door (or padding)
N	Belt webbing to door (horizontally)

* Horizontal distance from steering wheel centre

6.11.2 Child Dummy

6.11.2.1 The following measurements are to be carried out prior to test but after positioning procedures have been carried out.



Q10	
A	Top of head to roof (vertically)
B	Head CoG to door/window (horizontal)
C	Shoulder (pivot point) to door/window (horizontal)
D	Lower rib to door (horizontal)
E	Hip joint (femur mounting hole) to door (horizontal)
F	Hip joint (femur mounting hole) to floor (vertical)
α	Head angle (where fitted)
β	Pelvic angle (tilt sensor, where fitted)

7 BARRIER AND TROLLEY

The trolley will be fitted with the Advanced European Mobile Deformable Barrier face (AEMDB).

7.1 Trolley Preparation

7.1.1 The mobile deformable barrier (MDB) includes both an impactor and a trolley.

7.1.2 The total mass shall be 1300 ± 20 kg.

7.1.3 The centre of gravity shall be situated in the longitudinal median vertical plane within 10mm, 1000 ± 30 mm behind the front axle and 500 ± 30 mm above the ground.

7.1.4 The distance between the front face of the impactor and the centre of gravity of the barrier shall be 2000 ± 30 mm.

7.1.5 The height of the barrier shall be such that the uppermost part of the front face of the beam element (the intersection between the upper and lower row of blocks) is 550 mm ± 5 mm above ground level measured statically prior to impact.

7.1.6 The front and rear track width of the trolley shall be 1500 ± 10 mm.

7.1.7 The wheelbase of the trolley shall be 3000 ± 10 mm.

7.1.8 The trolley may be fitted with an emergency abort system. This is optional, the test facility may elect to test without an abort system.

7.1.9 Inflate all tyres of the trolley to the same pressure.

7.1.10 Mark a line along the vertical centreline of the barrier which may be used to check the alignment of the barrier with the impact location of the test vehicle.

7.1.11 Measure the wheelbase of the trolley, left and right.

7.1.12 Determine the average wheelbase from Section 7.1.11 and record in the test details.
7.1.13 Record in the test details the track of the trolley at the front and at the rear.

7.1.14 Ensure that the weight distribution is as even as possible from left to right.

7.1.15 Record in the test details the final weights measured at each of the wheels.

7.2 Trolley Markings

7.2.1 ASEAN NCAP markings will be stuck to the front of the trolley on both sides.

7.2.2 Test house logos may be added to the trolley provided that they do not detract attention from the ASEAN NCAP markings.

8 STILL PHOTOGRAPHY

The following photograph will be taken pre and post-test unless otherwise indicated. Pre-test photographs will be taken with the dummies in their final positions.

No.	View
1	Front view of barrier
2	Side view of barrier
3	Side view of barrier at 45 degrees to front
4	Side view of barrier with vehicle, from front of vehicle
5	Car RHS, with camera centred on B-post waist, showing full car
6	Car RHS, with camera centred on B-post waist, showing the rear passenger compartment.

7 Car RHS, with camera aimed at waist height, showing driver's compartment.
8 Car RHS at 45 degrees to rear
9 Car RHS at 45 degrees to front
10 Front view of car
11 Car LHS, with camera centred on B-Post waist, showing full car
12 Car LHS, with camera centred on B-Post waist, showing the rear passenger compartment
13 *To show position of all door latches and/or open doors
14 Driver & seat through open driver's door to show driver compartment and
position of seat relative to the sill
15 To show area immediately in front of driver
16 To show child dummies and restraints through LHS reardoor
17 To show child dummies and restraints through RHS reardoor
18 *Car and barrier at rest at 45 degrees to front of car
19 *Car and barrier at rest at 45 degrees to rear of car

*Post-test only

After Dummy Removal

20 *View through LHS front door of driver's door & paint marks from dummy ribs

Note: The above photos are for a RHD car, for a LHD car camera location will switch sides

9 TEST PARAMETERS

An on-board data acquisition unit will be used. This equipment will be triggered by a contact plate at the point of first contact (t=0) and will record digital information at a sample rate of 20

kHz (alternatively, a sample rate of 10 kHz may be used). The equipment conforms to SAE (2007).

BEFORE THE TEST, ENSURE THAT THE LIVE BATTERY IS CONNECTED, A SINGLE KEY IS IN THE IGNITION, THE IGNITION IS ON AND THAT THE AIRBAG LIGHT ON THE DASHBOARD ILLUMINATES AS NORMAL (WHERE FITTED)

If the vehicle is fitted with a brake pedal retraction mechanism which requires a vacuum present in the brake system, the engine may be run for a predetermined time, specified by the manufacturer.

9.1 Speed

9.1.1 Measure the speed of the trolley as near as possible to the point of impact.

9.1.2 Record the actual test speed in the test details.
TARGET SPEED = 50 km/h ± 1 km/h

9.2 Post-Impact Braking

A method must be employed to eliminate secondary impacts between the barrier and the car. This may be an emergency braking system on the trolley or other method but should be activated only **after the first impact is complete**. DO NOT start the braking *at* point of initial impact or the trolley will be decelerating during the test.

9.3 Alignment

9.3.1 With the vehicle offered up against the barrier, tape a small rivet at the centreline of the deformable barrier as close as possible to the point of first contact.

9.3.2 This pin should align with the vertical 'R' point line previously marked on the car (Section 1.3).

9.3.3 After the test, if the mark made by the pin is not within the tolerance squared detailed below, film analysis will be used to try to access the alignment. Both the horizontal and vertical alignments shall be noted in the test report.
TARGET ALIGNMENT = CENTRELINE OF BARRIER COINCIDENT WITH PLANE 250 mm REARWARD OF 'R' POINT ± 25 mm
TARGET VERTICAL ALIGNMENT = ± 25 mm

POST TEST

9.4 Door Opening Force

9.4.1 Check that none of the doors have locked during the test.

9.4.2 Try to open each of the doors on the unstruck side (front door followed by rear door) using a spring-full attached to the external handle. The opening force should be applied perpendicular to the door, in a horizontal plane, unless this is not possible. The manufacturer may specify a reasonable variation in the angle of the applied force. Gradually increase the force on the spring-pull, up to a maximum of 500N, until the door unlatches. If the door does not open record this then try to unlatch the door using the internal handle, again attempt to open the door using the spring-pull attached to the external handle. Record the forces required to unlatch the door and to open it to 45˚ in the test details.

9.3.4 If a door does not open with a force of 500N then try the adjacent door on the same side of the vehicle. If this door then opens normally, retry the first door.
If the door still does not open, record in the test details whether the door could be opened using extreme hand force or if tools were needed.

Note:

i. *In the event that sliding doors are fitted, the force required to open the door sufficiently enough for an adult to escape should be recorded in place of the 45˚ opening force.*

ii. *In the case of vehicles equipped with an automatically activated door locking system, the doors shall be locked before the moment of impact and be unlocked after the impact at least on the non-struck side.*

9.5 Dummy Removal

9.5.1 Do not move the driver seat. Try to remove the dummy.

9.5.2 If the dummy cannot be removed with the seats in its original position, recline the seat back and try again.

9.5.3 If the dummy still cannot be removed, try to slide the seat back on its runners.

9.5.4 If the dummy still cannot be removed, the seat can be cut out of the car.

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