

CHILD RESTRAINT EVALUATION PROGRAM

SERIES 7

SCORING PROTOCOLS AND RULES

(Incorporating Amendment No 1 – 23 April 2021)

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Child Restraint Evaluation program

Stage 7

Scoring Protocols and Rules

1. INTRODUCTION

A review has been completed of the Child Restraint Evaluation Program (CREP), with the outcome being a recommendation, accepted by the CREP Partners, to expand the Program to more thoroughly examine the side impact and frontal impact performance of child restraint systems (CRS) generally. This has resulted in the need to review and revise the scoring protocols, the test specifications and the test procedures. This document sets out the revised scoring protocols and specific rules regarding CRS performance.

2. DEFINITIONS

Axes

- Positive x-axis will be directed forward relative to the vehicle.
- Positive y-axis will be directed laterally from left to right.
- Positive z-axis will be directed vertically downward
- Axis definition as per SAE J670

CRS Interfaces –

- The interfaces are any of the following: the two ISOFIX anchorages, seat belt anchorages, top tether anchorage or, in the case of rearward facing CRS with a separate base, any other means of attaching the CRS to the base.

Forward Head Excursion -

- A1 • Maximum horizontal (x-axis) head excursion measured from the *Seat Bight* to the dummy's head centre of gravity, except for Q6 ATD used in Type G CRS where 80mm is added to the measured value.

Impact phase –

- **In frontal test.** *The impact phase* in the frontal impact test is defined by a period of time starting from time zero and ending at the point in time where the head acceleration in the x direction (Head g_x) crosses 0 after the acceleration peak value. See Figure 1
- **In side impact test.** *The impact phase* in the side impact test is defined by a period of time starting from time zero and ending at the point in time where the head acceleration in the y direction (Head g_y) crosses 0 after the acceleration peak value. See Figure 2

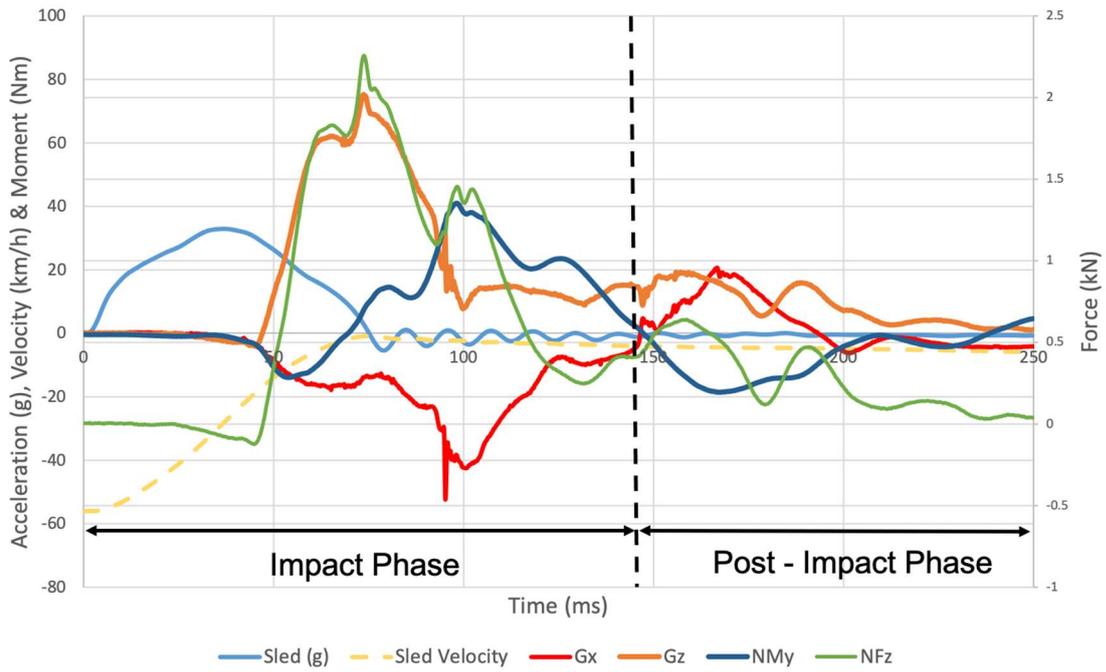


Figure 1: Example of 'Impact Phase' and 'Post-Impact Phase' in frontal impact test

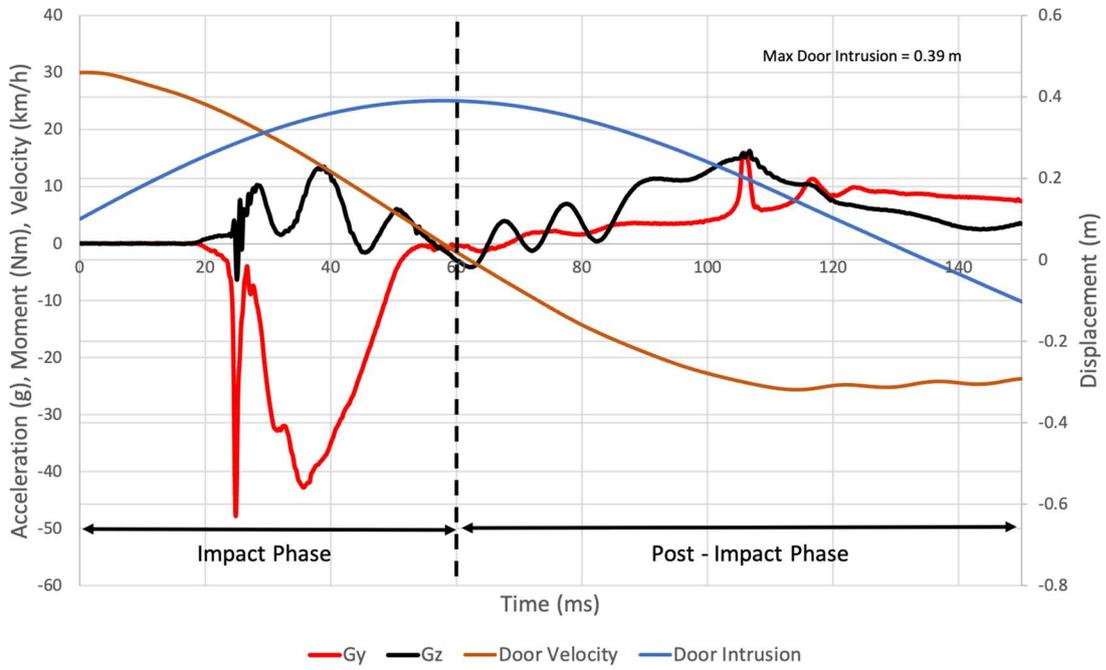


Figure 2: Example of 'Impact Phase' and 'Post-Impact Phase' in side impact test

Internal ATD Upper Neck Loads

- Fx polarity is positive when the ATD head is pushed rearward and/or the chest is pushed forward. +Fx represents a posteriorly directed shear force on the ATD neck.
- Fz polarity is positive when the ATD is pulled upwards or the chest is pushed downward. +Fz represents a tensile load on the ATD's neck.
- Mx polarity is positive when the left ear of the ATD is pushed towards the left shoulder of the ATD. +Mx represents left lateral flexion load on the ATD neck.
- My polarity is positive when the chin of the ATD is pushed towards the sternum. +My represents a forward flexion moment on the ATD neck.
- As per SAE J211.

Post impact phase–

- **In frontal test** The *post impact phase* of the frontal impact test is defined by a period of time starting from the completion of the impact phase in the frontal impact test and ending at the point in time where the head acceleration in the x direction (Head g_x) crosses 0 after the secondary acceleration peak value. See Figure 1
- **In side impact test.** The *post impact phase* of the side impact test is defined by a period of time starting from the completion of the impact phase in the side impact test and ending at the point in time where the head acceleration in the y direction (Head g_y) crosses 0 after the secondary acceleration peak value. See Figure 2

Seat bight -

- The intersection of the seat back cushion and seat base cushion on the test bench.

Submarining

- The dummy moves forward and down during the impact phase of the test so that the seat belt lap strap is repositioned from the dummy's lower pelvic/upper leg region onto the lower abdomen.

Upward Head Excursion -

- Maximum vertical head excursion measured from the *seat bight* to the uppermost part of the head observed from the stationary rear camera.

3. Scoring Protocols – Dynamic Testing

3.1. The overall score of CRS mode

- A1 The overall score of the CRS mode is the average score of the three impact tests (two frontal and one side impact tests). The overall score of Type A1 CRS mode is the average score of the two impact tests (one frontal and one side impact tests)

3.2. Dummy Ejection

If the dummy is ejected from the CRS at any time during the test that CRS is rated zero star for its dynamic performance in front and side impact.

3.3. Restraint retention

If the CRS is partially or wholly unrestrained by any of the interfaces during the test, that CRS is limited to one star rating for its dynamic performance in front and side impact.

3.4. Failure of restraint system components

Failure of the restraint system components will be evaluated at any time throughout both the front and side impacts.

- a) There is any breakage or fracturing of load-bearing parts of the belt system including buckles, webbing and anchorage points.
- b) There is any breakage or fracturing of any tethers, straps, ISOFIX anchorages or any other attachments which are specifically used to anchor the CRS to the vehicle fail.

A CRS experiencing any failure to its restraint system components will be limited to an overall score of one star rating.

3.5. Head contact

a. Head contact with the test rig

If there is head contact with any part of the test rig, including the roof, the simulated front seat and the intruding door, at any time throughout the test, the CRS is awarded zero points for its head performance in that test.

b. Hard head contact with CRS in *Post Impact Phase* of frontal test

A1 During the *Post-Impact Phase*, a hard head contact can occur. Hard head contact with the CRS in *Post-Impact Phase* of frontal test is defined by peak resultant head acceleration greater than 80 g. In the presence of hard head contact with the CRS, the total score of the CRS in that impact test is reduced by 2 (two) points. An example of the presence of this hard contact is shown in a chart in Figure 3 where the hard head contact is evidenced with the increase in the head resultant acceleration above 80g.



Figure 3: An example of hard head contact with CRS in *post impact phase*

3.6. Head Containment in Frontal Test

For rearward facing CRSs:

The dummy's head shall remain wholly contained within the perimeter of that part of the CRS surrounding it (Figure 4), during the *impact phase* of the frontal test (i.e. the top of the head shall not be exposed to the possibility of direct contact with parts of the vehicle).

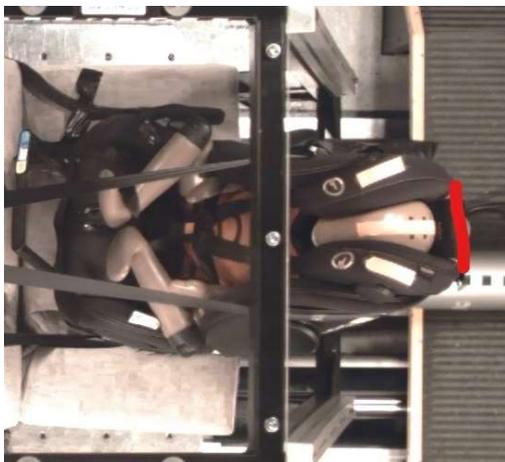


Figure 4: Perimeter surrounding the dummy's head in a rearward facing CRS

For forward facing CRSs:

The dummy's head shall remain wholly contained within the perimeter of that part of the CRS surrounding it (Figure 5) at the completion of the *post Impact phase* of the frontal test.



Figure 5: Perimeter surrounding the dummy's head in a forward facing CRS

3.7. Head Containment in Side Impact Test

The dummy's head shall remain wholly contained within the perimeter of that part of the CRS surrounding it (Figure 6) during the *impact phase* of the side impact test. If the head is not contained, the head containment of the CRS is awarded zero point.

“Contained” requires that some energy absorbing section of the side wing remains between the head and a virtual intruding vertical plane, representing the side structure of the vehicle. There shall be no fracturing of the CRS which might compromise the performance of the side wing of the CRS.

CONCEPT: The CRS side wing must be in a position to provide some energy absorption between the child's head and an intruding vertical plane striking the seat from the struck side.

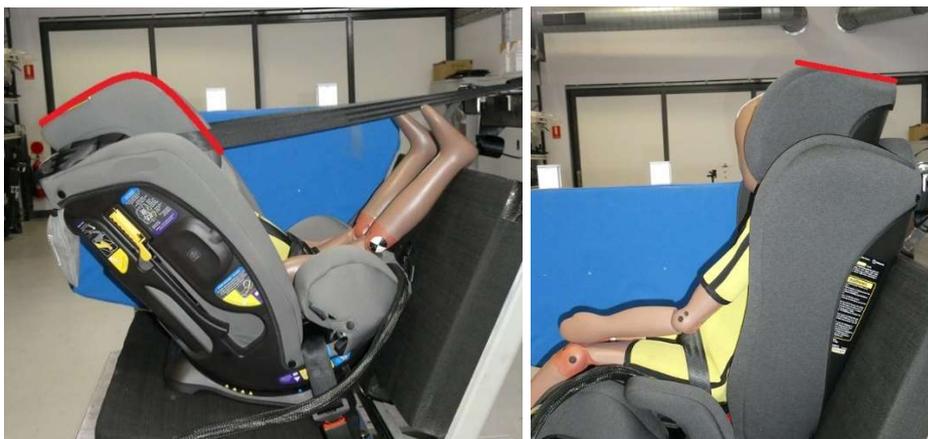


Figure 6: Perimeter surrounding the dummy's head in side impact test

4. Scoring for Rearward Facing Child Restraint Systems - Types A1

A1 a. Frontal Impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head containment		The dummy's head remains wholly contained within the perimeter of that part of the CRS surrounding it, during the <i>impact phase</i> of the test.		The dummy's head is exposed outside the perimeter of that part of the CRS surrounding it, during the <i>impact phase</i> of the test	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Upward head excursion		4 points \leq 650mm from CR point; 0 point \geq 800mm from CR point (sliding scale) 0 point if the dummy's head contacts any part of the test rig or passes through the cushion plane during the rebound phase of the test			2
Head	Resultant 3ms acceleration (g)	Sliding scale: Q0 dummy: 4 points \leq 79; 0 point \geq 97			2
Chest	Resultant 3ms acceleration (g)	Q0 dummy: 4 points \leq 41; 0 point \geq 55			1
Maximum score					32

b. Side impact

A1

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the side wings of the CRS during the <i>impact phase</i> of the test		The head strikes the door or the head is exposed outside the side wings of the CRS during the impact phase of the test	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q0 dummy: 4 points \leq 55; 0 point \geq 75			2
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q0 dummy: 4 points \leq 41; 0 point \geq 67			1
Maximum score					24

5. Scoring for Rearward Facing Child Restraint Systems - Types A2

A1 a. Frontal Impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head containment		The dummy's head remains wholly contained within the perimeter of that part of the CRS surrounding it, during the <i>impact phase</i> of the test.		The dummy's head is exposed outside the perimeter of that part of the CRS surrounding it, during the <i>impact phase</i> of the test	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Upward head excursion		4 points ≤ 650mm from CR point; 0 point ≥ 800mm from CR point (sliding scale) 0 point if the dummy's head contacts any part of the test rig or passes through the cushion plane during the rebound phase of the test			2
Head	Resultant 3ms acceleration (g)	Sliding scale: For Q0 dummy: 4 points ≤ 79; 0 point ≥ 97 For Q1 dummy: 4 points ≤ 67; 0 point ≥ 82			2
Neck	+Fz; Upper neck tension (kN)	Sliding scale: Q0 dummy: N/A. Q1 dummy: 4 points ≤ 0.9; 0 point ≥ 1.2			1
	-My; Upper neck extension moment (Nm)	Sliding scale: Q0 dummy: N/A; Q1 dummy: 4 points ≤ 36; 0 point > 36			0.5
Chest	Resultant 3ms acceleration (g)	For Q0 and Q1 dummies: 4 points ≤ 41; 0 point ≥ 55			1
Maximum score		Frontal test using Q1			38
		Frontal test using Q0			32

b. Side impact

A1

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the side wings of the CRS during the <i>impact phase</i> of the test		The head strikes the door or the head is exposed outside the side wings of the CRS during the <i>impact phase</i> of the test	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q1 dummy: 4 points ≤ 55; 0 point ≥ 75			2
Neck	Upper neck resultant force (kN)	Sliding scale: Q1 dummy: 4 points ≤ 1.3; 0 point ≥ 2.4			1

Chest	Resultant 3ms acceleration (g)	Sliding scale: Q1 dummy: 4 points ≤ 41; 0 point ≥ 67	1
Maximum score			28

6. Scoring for Rearward Facing Child Restraint Systems - Types A4

A1

a. Frontal Impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head containment		The dummy's head remains wholly contained within the perimeter of that part of the CRS surrounding it, during <i>the impact phase</i> of the test.		The dummy's head is exposed outside the perimeter of that part of the CRS surrounding it, during <i>the impact phase</i> of the test	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Upward head excursion		4 points ≤ 650mm from CR point; 0 point ≥ 800mm from CR point (sliding scale) 0 point if the dummy's head contacts any part of the test rig or passes through the cushion plane during the rebound phase of the test			2
Head	Resultant 3ms acceleration (g)	Sliding scale: Q0 dummy: 4 points ≤ 79; 0 point ≥ 97. Q3 dummy: 4 points ≤ 87; 0 point ≥ 100			2
Neck	+Fz; Upper neck tension (kN)	Sliding scale: Q0 dummy: N/A. Q3 dummy: 4 points ≤ 1.3; 0 point ≥ 1.7			1
	-My; Upper neck extension moment (Nm)	Sliding scale: Q0 dummy: N/A. Q3 dummy: 4 points ≤ 36; 0 point > 36			0.5
Chest	Resultant 3ms acceleration (g)	For Q0 and Q3 dummies: 4 points ≤ 41; 0 point ≥ 55			1
Maximum score		Frontal test using Q3 dummy			38
		Frontal test using Q0 dummy			32

b. Side impact

A1

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the side wings of the CRS during the <i>impact phase</i> of the test		The head strikes the door or the head is exposed outside the side wings of the CRS during the <i>impact phase</i> of the test	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q3 dummy: 4 points \leq 60; 0 point \geq 80			2
Neck	Upper neck resultant force (kN)	Sliding scale: Q3 dummy: 4 points \leq 1.3; 0 point \geq 2.4			1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q3 dummies: 4 points \leq 41; 0 point \geq 67			1
Maximum score					28

7. Scoring for Forward Facing Child Restraint Systems - Type B

A1

a. Frontal impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the perimeter of that part of the CRS surrounding it at the completion of the <i>post impact phase</i> .		The dummy's head is exposed outside the perimeter of that part of the CRS surrounding it, at the completion of the <i>post impact phase</i> .	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Forward Head Excursion		Sliding scale: 4 points \leq 450 from CR point; 0 point \geq 550mm from CR point 0 point if the dummy's head contacts any part of the test rig			2
Head	Resultant 3ms acceleration (g)	Sliding scale: Q1 dummy: 4 points \leq 67; 0 point \geq 82. Q3 dummy: 4 points \leq 87; 0 point \geq 100			2
Neck	+Fz; Upper neck tension (kN)	Sliding scale: Q1 dummies: 4 points \leq 0.9; 0 point \geq 1.2. Q3 dummies: 4 points \leq 1.3; 0 point \geq 1.7			1

	+My; Upper neck flexion moment (Nm)	Sliding scale: Q1 dummies: 4 points ≤ 21 ; 0 point ≥ 27 Q3 dummies: 4 points ≤ 31 ; 0 point ≥ 40	1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q1 and Q3 dummies: 4 points ≤ 41; 0 point ≥ 55	1
	Deflection (mm)	Sliding scale: Q1 dummy: 4 points ≤ 42; 0 point ≥ 53mm. Q3 dummy: 4 points ≤ 38; 0 point ≥ 48mm	1
Maximum score			44

A1

b. Side impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the side wings of the CRS during <i>the impact phase</i> of the test		The head strikes the door or the head is exposed outside the side wings of the CRS during <i>the impact phase</i> of the test	2
Torso Retention -		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q3 dummy: 4 points ≤ 60; 0 point ≥ 80			2
Neck	Upper neck resultant force (kN)	Sliding scale: Q3 dummy: 4 points ≤ 1.3; 0 point ≥ 2.4			1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q3 dummy: 4 points ≤ 41; 0 point ≥ 67			1
Maximum score					28

8. Scoring for Forward Facing Child Restraint System - Type E

A1 a. Frontal impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Seat Belt Sash Strap Location		The seat belt does not contact the neck		The seat belt contacts the neck	1
Submarining		The dummy does not <i>Submarine</i>		The dummy <i>Submarines</i>	1
Torso Retention –		The dummy's torso remains wholly restrained by the seat belt sash strap during the <i>impact phase</i> of the test	The seat belt sash strap moves off the shoulder onto the upper arm, during the <i>impact phase</i> of the test.	The dummy's torso comes completely free of the seat belt sash strap during the <i>impact phase</i> of the test.	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q3 dummy: 4 points ≤ 87; 0 point ≥ 100. Q6 dummy: 4 points ≤ 60; 0 point ≥ 80			2
Neck	+Fz; Upper neck tension (kN)	Sliding scale: Q3 dummies: 4 points ≤ 1.3; 0 point ≥ 1.7 Q6 dummies: 4 points ≤ 1.7; 0 point ≥ 2.3			1
	+My; Upper neck flexion moment (Nm)	Sliding scale: Q3 dummies: 4 points ≤ 31; 0 point ≥ 40 Q6 dummies: 4 points ≤ 47; 0 point ≥ 60			1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q3 and Q6 dummies: 4 points ≤ 41; 0 point ≥ 55			1
	Deflection (mm)	Sliding scale: Q3 dummy: 4 points ≤ 38; 0 point > 48. Q6 dummy: 4 points ≤ 35; 0 point ≥ 44			1
Maximum score					36

A1 b. Side impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the side wings of the CRS during the impact phase of the test		The head strikes the door or the head is exposed outside the side wings of the CRS during the impact phase of the test	2
Torso Retention		The dummy's torso remains wholly restrained by the seat belt sash strap during the <i>impact phase</i> of the test	The seat belt sash strap moves off the shoulder onto the upper arm, during the <i>impact phase</i> of the test.	The dummy's torso comes free of the seat belt sash strap during the <i>impact phase</i> of the test	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q6 dummy: 4 points ≤ 60; 0 point ≥ 80			2

Neck	Upper neck resultant force (kN)	Sliding scale: Q6 dummy: 4 points \leq 1.3; 0 point \geq 2.4	1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q6 dummy: 4 points \leq 41; 0 point \geq 67	1
Maximum score			28

9. Scoring for Forward Facing Child Restraint System - Type F

A1 a. Frontal impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Seat Belt Sash Strap Location		The seat belt does not contact the neck		The seat belt contacts the neck	1
Submarining		The dummy does not <i>Submarine</i>		The dummy <i>Submarines</i>	1
Torso Retention		The dummy's torso remains wholly restrained by the seat belt sash strap during the <i>impact phase</i> of the test	The seat belt sash strap moves off the shoulder onto the upper arm, during the <i>impact phase</i> of the test.	The dummy's torso comes completely free of the seat belt sash strap during the <i>impact phase</i> of the test.	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q3 dummy: 4 points \leq 87; 0 point \geq 100. Q10 dummy: 4 points \leq 60; 0 point \geq 80			2
Neck	+Fz; Upper neck tension (kN)	Sliding scale: Q3 dummies: 4 points \leq 1.3; 0 point \geq 1.7 Q10 dummies: 4 points \leq 1.7; 0 point \geq 2.62			1
	+My; Upper neck flexion moment (Nm)	Sliding scale: Q3 dummies: 4 points \leq 31; 0 point \geq 40; Q10 dummy: 4 points \leq 47; 0 point $>$ 60			1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q3 and Q10 dummies: 4 points \leq 41; 0 point \geq 55			1
	Deflection (mm)	Sliding scale: Q3 dummy: 4 points \leq 38; 0 point $>$ 48. Q10 dummy : 4 points \leq 35mm; 0 point \geq 44mm			1
Maximum score					36

A1 b. Side impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	

Head Containment		The dummy's head remains wholly contained within the side wings of the CRS during the <i>impact phase</i> of the test		The head strikes the door or the head is exposed outside the side wings of the CRS during the <i>impact phase</i> of the test	2
Torso Retention		The dummy's torso remains wholly restrained by the seat belt sash strap during the <i>impact phase</i> of the test	The seat belt sash strap moves off the shoulder onto the upper arm, during the <i>impact phase</i> of the test.	The dummy's torso comes free of the seat belt sash strap during the <i>impact phase</i> of the test	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q10 dummy: 4 points ≤ 60 ; 0 point ≥ 80			2
Neck	Upper neck resultant force (kN)	Sliding scale: Q10 dummy: 4 points ≤ 1.3 ; 0 point ≥ 2.2			1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q6 dummy: 4 points ≤ 41 ; 0 point ≥ 67			1
Maximum score					28

10. Scoring for Forward Facing Child Restraint Systems - Type G

A1 a. Frontal impact

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the perimeter of that part of the CRS surrounding it at the completion of the <i>post impact phase</i> .		The dummy's head is exposed outside the perimeter of that part of the CRS surrounding it, at the completion of the <i>post impact phase</i> .	2
Torso Retention		The dummy's torso is wholly restrained by the harness during the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Forward Head Excursion		Sliding scale: 4 points ≤ 450 from CR point; 0 point ≥ 550mm from CR point 0 point if the dummy's head contacts any part of the test rig			2
Head	Resultant 3ms acceleration (g)	Sliding scale: Q1 dummy: 4 points ≤ 67; 0 point ≥ 82. Q6 dummy: 4 points ≤ 60; 0 point ≥ 80			2
Neck	+Fz; Upper neck tension (kN)	Sliding scale: Q1 dummies: 4 points ≤ 0.9; 0 point ≥ 1.2 Q6 dummies: 4 points ≤ 1.7; 0 point ≥ 2.3			1

	+My; Upper neck flexion moment (Nm)	Sliding scale: Q1 dummies: 4 points ≤ 21 ; 0 point ≥ 27 Q6 dummies: 4 points ≤ 47; 0 point ≥ 60	1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q1 and Q6 dummies: 4 points <41; 0 point ≥ 55	1
	Deflection (mm)	Sliding scale: Q1 dummy: 4 points ≤ 42; 0 point ≥ 53mm. Q6 dummy: 4 points ≤ 35; 0 point ≥ 44	1
Maximum score			44

A1 **b. Side impact**

Performance Aspect (PA)		Ranking of Compliance with Performance Aspect			PA Weighting Factor
		4	1	0	
Head Containment		The dummy's head remains wholly contained within the side wings of the CRS during <i>the impact phase</i> of the test		The head strikes the door or the head is exposed outside the side wings of the CRS during the <i>impact phase</i> of the test	2
Torso Retention -		The dummy's torso is wholly restrained by the harness at all times throughout the test	The dummy's torso is only partially restrained by the harness during the test (only one shoulder restrained)	The dummy's torso is substantially unrestrained by the harness during the test (both shoulders unrestrained)	1
Head	Resultant 3ms acceleration (g)	Sliding scale: Q6 dummy: 4 points ≤ 60; 0 point ≥ 80			2
Neck	Upper neck resultant force (kN)	Sliding scale: Q6 dummy: 4 points ≤ 1.3; 0 point ≥ 2.4			1
Chest	Resultant 3ms acceleration (g)	Sliding scale: Q6 dummy: 4 points ≤ 41; 0 point ≥ 67			1
Maximum score					28

11. Star Ratings

Star ratings will be determined according to the table below. An overall score of less than 50% will stand and a 1 star rating awarded.

Overall Score	Star Rating	Numerical Rating
$X \geq 87.5\%$	5	Max score 5.0
$X \geq 75\%$ but $X < 87.5\%$	4	$4 + ((X - 75) * 0.08)$
$X \geq 62.5\%$ but $X < 75\%$	3	$3 + ((X - 62.5) * 0.08)$
$X \geq 50\%$ but $X < 62.5\%$	2	$2 + ((X - 50) * 0.08)$
$X < 50\%$	1	$2 + ((X - 50) * 0.02)$

Where:

X = total % score

0.08 = 12.5/50;

0.02 = 1/50.

X is to be rounded to the nearest whole number, except where rounding results in a score of 50. In this case, the score is to be rounded to 49.9.