REPORT NUMBER: 213-CAL-22-004

SAFETY COMPLIANCE TESTING FOR FMVSS 213 CHILD RESTRAINT SYSTEMS

Baby Trend, Inc.
Hybrid 3-in-1, Model FB49E14A

PREPARED BY:
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Report Date: November 2022

FINAL REPORT

PREPARED FOR:
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
Mail Code : NVS-220, W43-481
1200 New Jersey Avenue, SE
Washington, DC 20590

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Prepared by: _____ Date: **11/2/2022**

Adam Hardbattle, SLED Engineer

Approved by: _____ Date: **11/2/2022**

William Horn, SLED Director

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: Natasha Iwegbu

Acceptance Date: NATASHA IWEGBU Digitally signed by NATASHA IWEGBU Date: 2022.11.04 08:29:59 -04'00'

213-CAL-22-004 HS# 647891

Technical Report Documentation Page

1. Report No. 213-CAL-22-004	*2. Government Accession No.*	*3. Recipient's Catalog No.*
4. Title and Subtitle Final Report of FMVSS 213 Compliance Testing of Manufacturer: Baby Trend, Inc. Name: Hybrid 3-in-1 Model: FB49E14A		*5. Report Date* Date: November 2, 2022 *6. Performing Organization Code* CAL
7. Author(s) Adam Hardbattle, William Horn		*8. Performing Organization Report No.* 213-CAL-22-004
9. Performing Organization Name and Address Calspan Corporation 4455 Genesee St. Buffalo, NY 14225		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-17-D00081
12. Sponsoring Agency Name and Address U. S. DEPARTMENT OF TRANSPORTATION National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance Mail Code : NVS-220, W43-481 1200 New Jersey Avenue, SE Washington, DC 20590		*13. Type of Report and Period Covered* Final Test Report November 2, 2022 *14. Sponsoring Agency Code* NVS-220
15. Supplementary Notes		
16. Abstract Compliance tests were conducted on the Baby Trend, Inc., Hybrid 3-in-1, Model FB49E14A child restraint systems in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-213-10. Test failures identified as follows: • None		
17. Key Words Compliance Testing Safety Engineering FMVSS 213		*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Admin., Technology Info Services, (NPO-411) (Rm E12-100) 1200 New Jersey Avenue, SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833
19. Security Classif. (of this report) Unclassified	*20. Security Classif. (of this page)* Unclassified	*21. No. of Pages* *Page **3** of **153*** 22. Price

Form DOT F1700.7 (8-72)

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SECTION 1
PURPOSE AND TEST PROCEDURE

PURPOSE

The tests performed are part of the safety compliance program for the National Highway Traffic Safety Administration (NHTSA) by Calspan Corporation under Contract No. DTNH22-17-D00081. The purpose of the testing is to determine whether production child restraint systems meet the minimum inspection and dynamic test requirements of TP-213-10, “Child Restraint Systems”.

TEST PROCEDURE

The Calspan Corporation Test Procedure for FMVSS 213, submitted and approved by the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration contains the specific procedures used to conduct this test. This procedure shall not be interpreted to be in conflict with any portion of FMVSS 213 and amendments in effect as noted in the applicable contract.

SECTION 2
INTRODUCTION AND SUMMARY

This report presents all of the FMVSS 213 compliance inspection and test data obtained on the Baby Trend, Inc., Hybrid 3-in-1, FB49E14A child restraint system. The restraint was dynamically tested in the following configurations:

10-YO HYB III	Forward Facing	other	Lap & Shoulder	Tether Free	Upright
CRABI 12	Forward Facing	other	Lower Anchors	Tether Free	Upright
W6-YO HYB III	Forward Facing	other	Lap & Shoulder	Tether Free	Upright
6-YO HYB II	Forward Facing	other	Lower Anchors	Tether Free	Upright
6-YO HYB II	Forward Facing	other	Lap Belt	Top Tether	Upright
3-YO HYB III	Forward Facing	other	Lower Anchors	Tether Free	Upright

Inversion testing was performed in both the forward Y-axis rotation and in the lateral X-axis rotation for the following configurations:

CRABI 12	Forward Facing	other	Lap Belt	Tether Free	Upright
3-YO HYB III	Forward Facing	other	Lap Belt	Tether Free	Upright

The inspection and testing of the Baby Trend, Inc., Hybrid 3-in-1, FB49E14A child restraint met the requirement(s) of FMVSS No. 213 when tested in accordance with TP-213-10 in the configurations and conditions documented in this report.

Restraint system inspection, dynamic sled testing and inversion testing were performed by Calspan Corporation, Buffalo NY. Compliance test data sheets for all tests are found in the Data Sheets and Test Data Sections of this report.

SECTION 3
DATA SHEET 1
CHILD RESTRAINT SYSTEM IDENTIFICATION

Report No. 213-CAL-22-004

Manufacturer:	Baby Trend, Inc.
Place of Manufacture per S5.5.2(d):	China
Model No.	Hybrid 3-in-1, FB49E14A
Group No.	004

1	Item Code	004-FB49E14A-01-TH3FFN3FB
	Date of Manufacture	12/6/2021
	Sled Test No.	FM04-22-076A
2	Item Code	004-FB49E14A-02-12CFFNLFU
	Date of Manufacture	12/6/2021
	Sled Test No.	FM04-22-076B
3	Item Code	004-FB49E14A-03-6W3FFN3FF
	Date of Manufacture	12/6/2021
	Sled Test No.	FM04-22-077A
4	Item Code	004-FB49E14A-04-6H2FFNLFF
	Date of Manufacture	12/6/2021
	Sled Test No.	FM04-22-077B
5	Item Code	004-FB49E14A-05-6H2FFN2TU
	Date of Manufacture	12/6/2021
	Sled Test No.	FM04-22-078A
6	Item Code	004-FB49E14A-06-3H3FFNLFU
	Date of Manufacture	12/6/2021
	Sled Test No.	FM04-22-078B

SECTION 4
DYNAMIC TEST RESULTS DATA SUMMARY

Child Restraint System – Baby Trend, Inc. / Hybrid 3-in-1 / FB49E14A										
Item Code	**Sled Test No.**	**Dummy Selection and Test Mode (see legend below)**	**Lower Anchors Used Y/N**	**Tether Used Y/N**	**HIC (1000 max)**	**Chest g clip (60 g max)**	**Head Excursion (720 mm max, 813 mm max w/o tether)**	**Knee Excursion (915 mm max)**	**Seat Back Angle (70 deg max)**	**Pass/ Fail**
004-FB49E14A-01-TH3FFN3FB	FM04-22-076A	TH3FFB	N	N	N/A	46	526	706	N/A	Pass
004-FB49E14A-02-12CFFNLFU	FM04-22-076B	12CFFU	Y	N	374	52	580	669	N/A	Pass
004-FB49E14A-03-6W3FFN3FF	FM04-22-077A	6W3FFF	N	N	N/A	N/A	567	706	N/A	Pass
004-FB49E14A-04-6H2FFNLFF	FM04-22-077B	6H2FFF	Y	N	196	38	750	865	N/A	Pass
004-FB49E14A-05-6H2FFN2TU	FM04-22-078A	6H2FFU	N	Y	426	38	462	684	N/A	Pass
004-FB49E14A-06-3H3FFNLFU	FM04-22-078B	3H3FFU	Y	N	580	43	653	780	N/A	Pass

Test Mode:

- RF - Rear Facing
- FF - Forward Facing
- SF - Side Facing
- U - Upright mode
- R - Reclined mode
- B – Backless
- F – Fixed Back
- N – Non Applicable

ATD:

- NIN – Newborn Infant
- 12C -12 MO, CRABI
- 3H3 – 3 YO, Hybrid III
- 6H2 – 6YO Hybrid 2
- 6H3 – 6YO Hybrid III
- 6W3 – 6 YO, Weighted Hybrid III
- TH3 – 10YO Hybrid III

SECTION 5
DATA SHEET 2
LABELING
(FMVSS 213, S5.3, S5.5)

Report No.:	213-CAL-22-004		Model No:	Hybrid 3-in-1, FB49E14A
Test Date:	04/25/2022			

Requirement	Pass / Fail
The labels on the subject child restraint system were inspected and compared to the requirements of FMVSS No. 213 S5.3.1(b) and S5.5, as applicable	Pass

The following failures were identified:

- None

Remarks:

- Photographs of the labels are included in section 9.

Recorded by: William S. Horn
William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 3
PRINTED INSTRUCTIONS FOR PROPER USE
(FMVSS 213, S5.6)

Report No.:	213-CAL-22-004		Model No:	Hybrid 3-in-1, FB49E14A
Test Date:	04/25/2022			

Requirement	Pass / Fail
The printed instructions accompanying the subject child restraint system were inspected and compared to the requirements of FMVSS No. 213 S5.6, as applicable	Pass

The following failures were identified:

- None

Remarks:

- Photographs of the labels are included in section 9.

Recorded by: William S. Horn
William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 4
REGISTRATION FORM
(FMVSS 213, S5.8)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Model No:	Hybrid 3-in-1, FB49E14A

Requirement	Pass / Fail
The printed registration form accompanying the subject child restraint system and the electronic registration form were inspected and compared to the requirements of FMVSS No. 213 S5.6, as applicable	Pass

The following failures were identified:

- None

Remarks:

- Photographs of the registration are included in section 9.

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 5
MAXIMUM CHILD WEIGHT FOR LOWER ANCHOR USE
(FMVSS 213, S5.5.2(I)(3))

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Model No:	Hybrid 3-in-1, FB49E14A

For child restraints manufactured on or after February 27, 2015:

Installation Mode	A Max Child weight is Required for this installation mode (Y or N)	Installation Diagram Shown (Y or N)	Max Child Weight Indicated on Installation Diagram (lb.)
Rear Facing	NA	NA	NA
Forward Facing	N	Y	N

CRS Weight (lb.)	Child Weight (CW) Calculation (lb.)	Rounded CW Limit permitted under S5.5.2(I)(3)(A)
13.5 lbs.	Rear Facing 60-CRS Weight = 46.5 lbs.	50 lbs.
	Forward Facing 65-CRS Weight = 51.5 lbs.	55 lbs.

Calculated CW	Rounded CW
15 < CW ≤ 20	20
20 < CW ≤ 25	25
25 < CW ≤ 30	30
30 < CW ≤ 35	35
35 < CW ≤ 40	40
40 < CW ≤ 45	45
45 < CW ≤ 50	50
50 < CW ≤ 55	55
55 < CW ≤ 60	60

Section	Requirement	Pass / Fail
S5.5.2(I)(3)(A)	A maximum child weight is required on an installation diagram when the CRS+child weight is greater than 65 lb. for CRS that are used with the internal harness and installed with lower anchors. The maximum weight on the label conforms to the limits established in S5.5.2(I)(3)(A)	NA
S5.5.2(I)(3)(B)	For CRS that can be used both forward and rear-facing either: (1) separate diagrams are provided and labeled; or (2) only one diagram is applicable, provided, and labeled; or (3) two diagrams are applicable and the diagram shown contains the lesser of the permitted weights	NA

The following failures were identified:

- None

Remarks:

- Forward Facing only, Maximum allowable weight is under rounded limit

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 6
ATTACHMENT TO ANCHORAGE SYSTEM
(FMVSS 213, S5.9)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Model No:	Hybrid 3-in-1, FB49E14A

Section	Requirement	Pass / Fail
S5.9(a)	This add-on child restraint system (excluding car beds, harnesses and belt-positioning seats) has a permanently attached anchorage system having components that enable the restraint to be securely fastened to the lower anchorages.	Pass
	The anchorage system has components which can only be removed with a tool, such as a screwdriver.	Pass
	Note: If this is a rear facing child restraint system with a detachable base, then only the base is required to have the components.	NA
S5.9(b)	This child restraint system has components for attaching the system to a tether anchorage, and those components include a tether hook that conforms to the configuration and geometry specified in Figure 22 of TP-213-10.	Pass
S5.9(c)	This child restraint system has adjustable components for attaching the system to a tether anchorage or to lower anchors to allow the restraint to be tightened to the vehicle.	Pass
S5.9(d)	If the anchorage system on this child restraint has components other than hooks, that enables the restraint to be securely fastened to the lower anchors, it provides either an indication when each attachment to the lower anchorage becomes fully latched or attached or provides a visual indication that all attachments to the lower anchorages are fully latched or attached.	Pass
	Visual indications are visible under normal daylight lighting conditions.	NA

The following failures were identified:

- None

Remarks:

- None

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 7
INSTALLATION
(FMVSS 213, S5.3)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Model No:	Hybrid 3-in-1, FB49E14A

Section	Requirement						Pass / Fail
S5.3.1	Add-on child restraints meet either (a) or (b) as appropriate						Pass
S5.3.1(a)	Except for components designed to attach a child restraint anchorage system, this add-on child restraint does not have any means designed for attaching the system to a vehicle seat cushion or vehicle seta back and any component (except belts) that is designed to be inserted between the vehicle seat cushion and vehicle seat back						Pass
S5.3.1(b)	Harness manufactured for use on school bus seats must meet S5.3.1(a) unless labeled appropriately. Refer to the labeling data sheet for the specific requirements.						NA
S5.3.2	The child restraint system is capable of being installed as required by Table S5.3.2 of FMVSS No. 213. Shaded section indicate installation means required by standard.						Pass
		Lap Belt	*Lap belt & Tether (if needed)*	*Lower Anchors*	*Lap & Shoulder belt*	*Seat back Mount*	
	Harnesses per S5.3.1(b)(1)-(3) & Figure 12						NA
	Other Harnesses						NA
	Car Beds						NA
	Rear-Facing Restraints						NA
	Belt-Positioning Seats				X		Pass
	All other child restraints	X	X	X	X		Pass
S5.3.3	If a car bed, this child restraint system is designed to be installed laterally.						NA

The following failures were identified:

- None

Remarks:

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 8
MINIMUM HEAD SUPPORT SURFACE
(FMVSS 213, S5.2.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Model No:	Hybrid 3-in-1, FB49E14A

Section	Requirement	
S5.2.1.2	The child restraint system is exempt from S5.2.1.1 if it is a forward-facing restraint and the target points on either side of the dummy's head (using the largest test dummy specified in S7, excluding the 6-year old) is below the top of the test seat	
S5.2.1.1(a)	**Maximum Recommended Child Weight**	**Minimum Seat Back Height Required**
	≤ 18 kg (39.7 lb.)	500 mm (19.7 in.)
	> 18 kg (39,7 lb.)	560 mm (22 in.)
S5.2.1.1(b)	**Side Wing Depth**	**Minimum Back Support Width**
	< 102 mm (4.0 in)	**203 mm (8 in.)**
	≥ 102 mm (4.0 in)	**156 mm (6 in.)**

The child restraint system is exempt from S5.2.1.1 **No**

Back Support Height

Manufacturers Recommended Maximum Child Weight kg (lb.)	Measured Height mm (in)	Pass / Fail
45kg (100lbs.)	655mm (25.8in)	Pass

Back Support Width

Measured Side Wing Depth mm (in)	Measured Width mm (in)	Pass / Fail
180mm (7in)	252mm (10in)	Pass

The following failures were identified:

- None

Remarks:

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 9
TORSO IMPACT PROTECTION
(FMVSS 213, S5.2.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Model No:	Hybrid 3-in-1, FB49E14A

Section	Surface Requirement	Contour Requirement	Other Requirement
S5.2.2.1(a)	Back Support Surface	Flat or concave	Continuous surface area of ≥ 85 in²
S5.2.2.1(b)	Side Support Surface	Flat or concave	Continuous surface area of ≥ 24 in² for restraints having a recommended child weight of ≥ 20 lb.
		Flat or concave	Continuous surface area of ≥ 48 in² for restraints having a recommended child weight of < 20 lb.
S5.2.2.1(c)	Horizontal Cross Sections of Surfaces Restraining Torso Forward Movement	Flat or concave	
	Vertical Longitudinal Cross Sections of Surfaces Restraining Torso Forward Movement	Flat or concave	Radius of Curvature ≥ 2 in
S5.2.2.2	Fixed or Moveable Surface Forward of Dummy		Must be used to restrain dummy and allow compliance with injury & excursion data

Support Surface Results

Surface	Contour	Measured Area	Pass / Fail
Back Support	Flat	≥ 85 in²	Pass
Side Support	Flat	≥ 24 in²	Pass

Surfaces Restraining Torso Forward Movement Results

	Contour	Measured Area	Pass / Fail
Horizontal Cross Section	NA	NA	NA
Vertical Cross Section	NA	NA	NA

Fixed or Movable Surfaces Forward of Dummy Results

Yes/No	Pass / Fail
No	Pass

The following failures were identified:

- None

Remarks:

- None

Recorded by: William S. Horn
William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 10
PROTRUSION LIMITATION
(FMVSS 213, S5.2.4)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Model No:	Hybrid 3-in-1, FB49E14A

S5.2.4 Any portion of a rigid structural component within or underlying a contactable surface is subject to the protrusion limitations described below.

Test	Compliance Requirement	Test Result	Pass/Fail
Height	≤ 9.53 mm (3/8 in.)	≤9.53mm (≤3/8in)	Pass
Edge Radius	≥ 6.35 mm (1/4 in.)	≥6.35mm (≥1/4in)	Pass

The following failures were identified:

- None

Remarks:

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 11
DYNAMIC IMPACT TEST CONDITIONS – TEST 1
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076A
Item Code	004-FB49E14A-01-TH3FFN3FB

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	23 C (73 F)
Relative Humidity %	50.9%

Pulse:

Test Configuration (I or II):	1
Velocity (km/h (mph)):	47.8 km/h (29.7 mph)

Dummy:

Dummy Description:	10-YO HYB III SN 023
Dummy Serial Number:	023

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method:	Lap & Shoulder Belt
Tether Usage:	No, Tether Free
Seat Back Position:	No Back Booster
Internal Shoulder Harness Position:	NA
Buckle Harness Position:	NA

Remarks:
Pre and Post Test Photos are presented in Section 9.

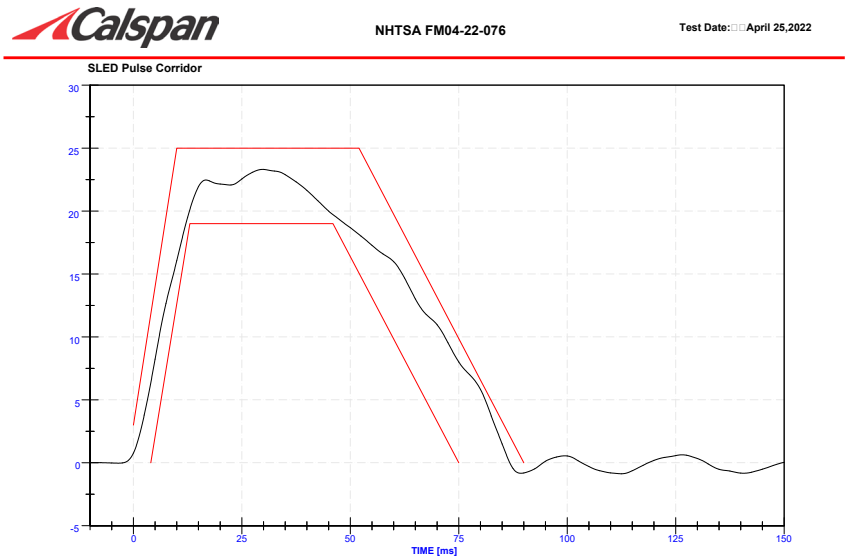
Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

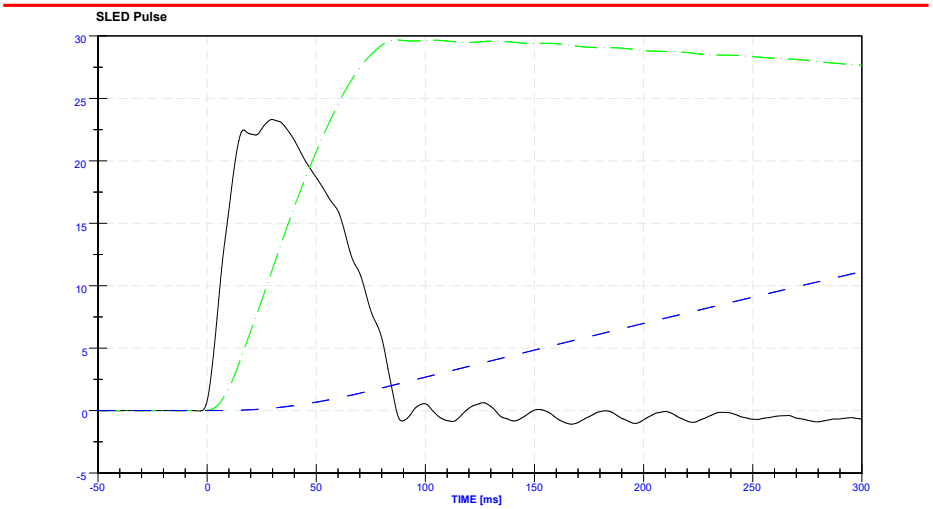
DYNAMIC IMPACT SLED PULSE – TEST 1
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076A
Item Code	004-FB49E14A-01-TH3FFN3FB



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.31	29.8	CFC 60	S0SLED000000ACXD



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.31	167.0	CFC 60	S0SLED000000ACXD
SLED Velocity (mph)	29.69	-29.4	CFC 180	S0SLED000000VAXC
SLED Displacement (ft)	11.12	-8.4	CFC 180	S0SLED000000DVXC

DATA SHEET 12
BELT RESTRAINT – TEST 1
(FMVSS 213, S5.4.3)

Report No.:	213-CAL-22-004		Sled Test No.	FM04-22-076A
Test Date:	04/25/2022		Item Code	004-FB49E14A-01-TH3FFN3FB

Section	Requirement	Pass / Fail
S5.4.3.1	**Snug Fit of Belts.** Belts that are part of the restraint and designed to restrain the child are adjustable to snugly fit any child of height and weight identified by the manufacturer in accordance with the manufacturers installation instructions.	NA

Section	Requirement	Yes / No	Pass / Fail
S5.4.3.2	**Direct Restraint.** Belts impose no loads on the child resulting from mass of the system or the test seat		Pass
	The restraint has one or more belts that contact the dummy for restraint	No	If all are "Yes" Restraint fails S5.4.3.2
	The restraint has a rigid structure behind the dummy	No	
	The restraint could move relative to the belt	Yes	

Section	Requirement	Pass / Fail
S5.4.3.3	**Seating Systems.** Except for harness and infant restraints for children up to 10kg (22lb), each restraint designed for a child in a seated position and having belts shall provide.	NA
S5.4.3.3(a)	Upper torso restraint (either belts or a shield)	NA
S5.4.3.3(b)	Lower torso restraint (either belts or a shield)	NA
S5.4.3.3(c)	Crotch restraint (either a belt attached to the lap belt or a shield)	NA

Section	Requirement	Pass / Fail
S5.4.3.4	**Harnesses.** Each harness shall:	NA
S5.4.3.4(a)	Provide upper torso restraint)	NA
S5.4.3.4(b)	Provide lower torso restraint (lap & crotch)	NA
S5.4.3.4(c)	Prevent Standing	NA

Remarks

- No Back Booster

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 13
BUCKLE RELEASE – TEST 1
(FMVSS 213, S5.4.3.5, S6.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076A
Item Code	004-FB49E14A-01-TH3FFN3FB

Section	Requirement	Measurement	Pass / Fail
S5.4.3.5(a)	**Pre-Impact Release Force** Releases under 40-60 N	NA	NA
S5.4.3.5(b)	**Post-Impact Release Force*** Releases ≤ 71 N	NA	NA
S5.4.3.5(c)	**Minimum Surface Area of Buckle** ≥ 3.9 cm² (0.6 in²)	≥ 3.9 cm²	NA
S5.4.3.5(d)	**Buckle Integrity** Shall not release during testing	No Release	NA

*Not applicable unless determined using the largest test dummy specified in S7 for use in testing the seat.

Remarks

- No Back Booster

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 14
SYSTEM INTEGRITY – TEST 1
(FMVSS 213, S5.1.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076A
Item Code	004-FB49E14A-01-TH3FFN3FB

S5.1.1 When dynamically tested, the child restraint shall:

Section	Requirement	Pass / Fail
S5.1.1(a)	**Structural Integrity –** Exhibit no complete separation of any load bearing structural element	Pass
	Exhibit no partial separation with exposing surfaces with a radius of less than 9.53 mm (3/8 in.)	Pass
	Exhibit no partial separation with exposing surfaces with protrusions greater than 6.35 mm (1/4 in.)	Pass
S5.1.1(b)(1)	**Adjustment Position –** Remain in the same adjustment position during the test that it was immediately before the test	Pass
S5.1.1(b)(2)(ii)	**Exposed Openings –** Have no exposed opening larger than 6.35 mm (1/4 in.) before the test becomes smaller during the testing as a result of the movement of the seating service relative to the restraint system as a whole.	Pass
S5.1.1(c)	**Seating Surface Angle –** Forward facing restraints do not allow the angle between the system's back support surface and seating surface to be less than 45 degrees at the completion of the test	NA

Remarks

- No Back Booster

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 15
INJURY CRITERIA – TEST 1
(FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076A
Item Code	004-FB49E14A-01-TH3FFN3FB

Section	Requirement
S5.1.2.1(a)	**Head Injury Criterion** The maximum calculated head injury criterion for a 36-millisecond time interval (HIC36) shall not exceed 1,000. HIC is not calculated when using the 6-year-old weighted and 10-year-old test dummies.
S5.1.2.1(b)	**Chest Injury Criterion** The chest acceleration shall not exceed 60g for intervals whose cumulative duration is more than 3 milliseconds

Head Injury Criterion Results

Calculated HIC36	Pass / Fail
NA	NA

Chest Injury Criterion Results

Max Acceleration lasting 3ms (g)	Pass / Fail
46	Pass

Remarks

- The H3-10yo ATD has no head injury criteria

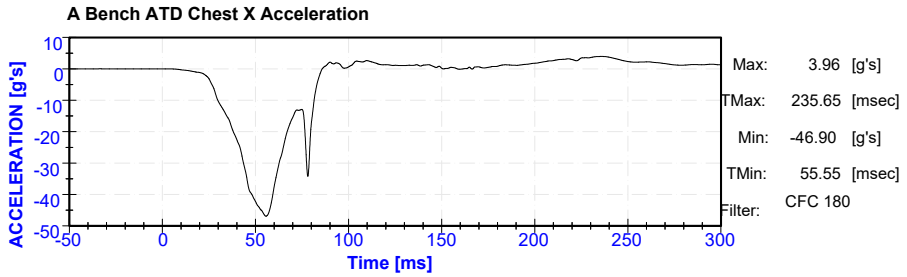
Recorded by: William S. Horn Date: April 29, 2022

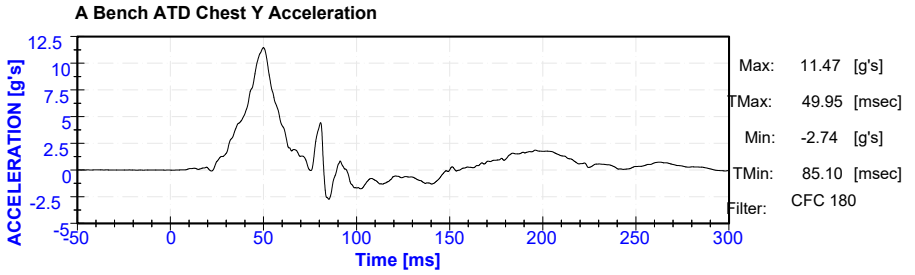
William Horn, SLED Director

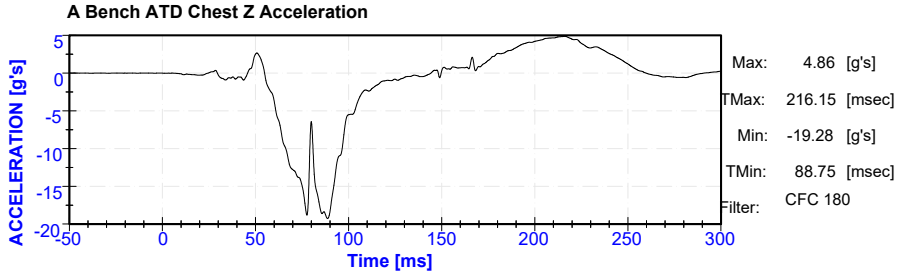
INJURY CRITERIA – CHEST ACCELERATION PLOTS – TEST 1 (FMVSS 213, S5.1.2)

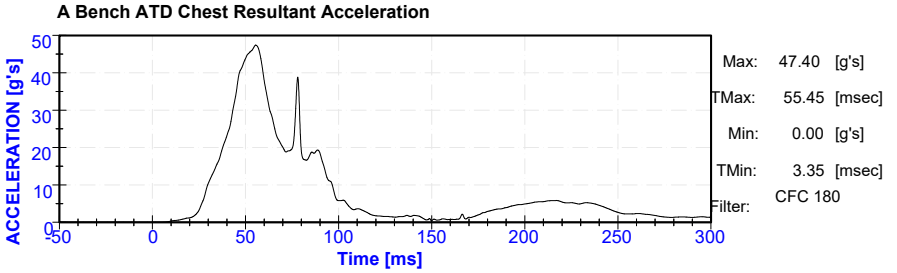
Report No.:	213-CAL-22-004	Sled Test No.	FM04-22-076A
Test Date:	04/25/2022	Item Code	004-FB49E14A-01-TH3FFN3FB
3ms Clip	46 g's	Resultant	47 g's

Calspan NHTSA FM04-22-076 Test Date: April 25,









DATA SHEET 16
OCCUPANT EXCURSION – TEST 1
(FMVSS 213, S5.1.3, S5.1.4, S5.2.1.1(c))

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076A
Item Code	004-FB49E14A-01-TH3FFN3FB

FORWARD-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.1	**Torso Retention –** CRS shall retain the torso within system		Pass
S5.1.3.1(a)(1)	**Head Excursion -** ≤ 720 mm (28.4 in.) with tether ≤ 813 mm (32 in.) No tether	526	Pass
S5.1.3.1(a)(2)	**Knee Excursion -** ≤ 915 mm (36 in.)	706	Pass
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	Pass

REAR-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.2	**Torso Retention –** CRS shall retain the torso within system		NA
S5.1.3.2	**Head Target Excursion –** Not beyond restraint's top and forward edge		NA
S5.1.4	**Back Support Angle -** Angle between the back support surface and vertical ≤ 70 degrees	NA	NA
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 17
OCCUPANT EXCURSION – TEST 1
(FMVSS 213, S5.1.3.3)

CAR BED RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
Head – Torso Retention (FMVSS 213, S5.1.3.3)	Retain within confines of system	NA	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 18
DYNAMIC IMPACT TEST CONDITIONS – TEST 2
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076B
Item Code	004-FB49E14A-02-12CFFNLFU

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	23 C (73 F)
Relative Humidity %	50.9%

Pulse:

Test Configuration (I or II):	1
Velocity (km/h (mph)):	47.8 km/h (29.7 mph)

Dummy:

Dummy Description:	CRABI 12 SN 085
Dummy Serial Number:	085

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method:	Lower Anchors
Tether Usage:	No, Tether Free
Seat Back Position:	Upright
Internal Shoulder Harness Position:	Harness 1, Headrest 1, Counted bottom up
Buckle Harness Position:	Rear

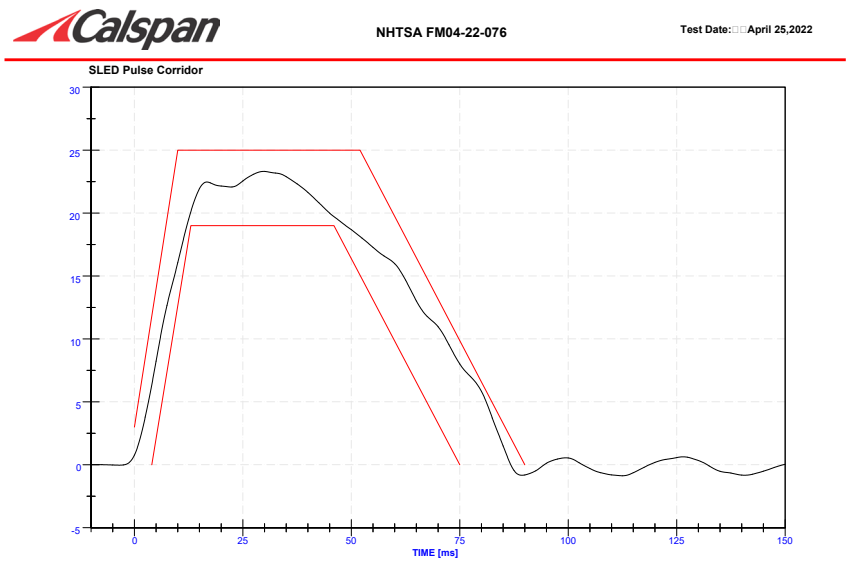
Remarks:
Pre and Post Test Photos are presented in Section 9.

Recorded by: _____ Date: April 29, 2022
Adam Hardbattle, SLED Engineer

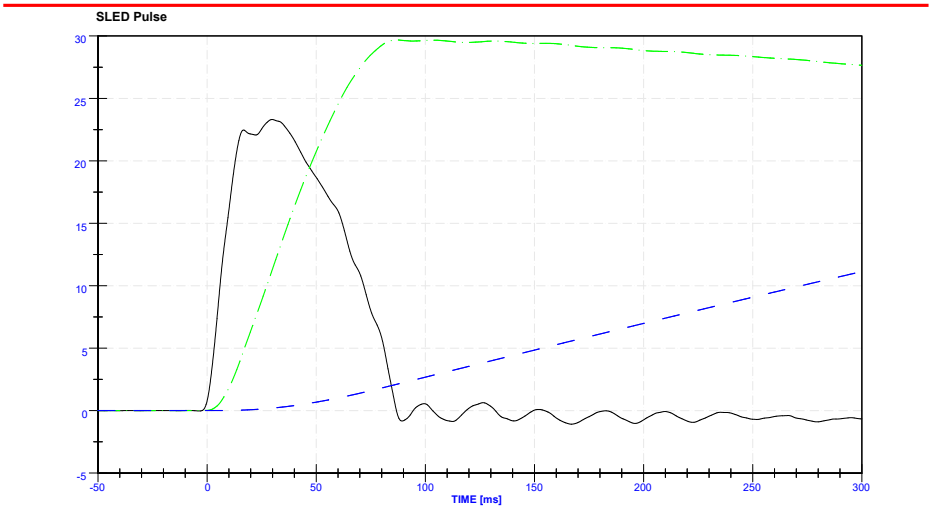
DYNAMIC IMPACT SLED PULSE – TEST 2
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076B
Item Code	004-FB49E14A-02-12CFFNLFU



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.31	29.8	CFC 60	S0SLED000000ACXD



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.31	167.0	CFC 60	S0SLED000000ACXD
SLED Velocity (mph)	29.69	-29.4	CFC 180	S0SLED000000VAXC
SLED Displacement (ft)	11.12	-8.4	CFC 180	S0SLED000000DVXC

DATA SHEET 19
BELT RESTRAINT – TEST 2
(FMVSS 213, S5.4.3)

Report No.:	213-CAL-22-004		Sled Test No.	FM04-22-076B
Test Date:	04/25/2022		Item Code	004-FB49E14A-02-12CFFNLFU

Section	Requirement	Pass / Fail
S5.4.3.1	**Snug Fit of Belts.** Belts that are part of the restraint and designed to restrain the child are adjustable to snugly fit any child of height and weight identified by the manufacturer in accordance with the manufacturers installation instructions.	Pass

Section	Requirement	Yes / No	Pass / Fail
S5.4.3.2	**Direct Restraint.** Belts impose no loads on the child resulting from mass of the system or the test seat		Pass
	The restraint has one or more belts that contact the dummy for restraint	Yes	If all are "Yes" Restraint fails S5.4.3.2
	The restraint has a rigid structure behind the dummy	Yes	
	The restraint could move relative to the belt	No	

Section	Requirement	Pass / Fail
S5.4.3.3	**Seating Systems.** Except for harness and infant restraints for children up to 10kg (22lb), each restraint designed for a child in a seated position and having belts shall provide.	Pass
S5.4.3.3(a)	Upper torso restraint (either belts or a shield)	Pass
S5.4.3.3(b)	Lower torso restraint (either belts or a shield)	Pass
S5.4.3.3(c)	Crotch restraint (either a belt attached to the lap belt or a shield)	Pass

Section	Requirement	Pass / Fail
S5.4.3.4	**Harnesses.** Each harness shall:	NA
S5.4.3.4(a)	Provide upper torso restraint)	NA
S5.4.3.4(b)	Provide lower torso restraint (lap & crotch)	NA
S5.4.3.4(c)	Prevent Standing	NA

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 20
BUCKLE RELEASE – TEST 2
(FMVSS 213, S5.4.3.5, S6.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076B
Item Code	004-FB49E14A-02-12CFFNLFU

Section	Requirement	Measurement	Pass / Fail
S5.4.3.5(a)	**Pre-Impact Release Force** Releases under 40-60 N	48 N	Pass
S5.4.3.5(b)	**Post-Impact Release Force*** Releases ≤ 71 N	51 N	Pass
S5.4.3.5(c)	**Minimum Surface Area of Buckle** ≥ 3.9 cm² (0.6 in²)	≥ 3.9 cm²	Pass
S5.4.3.5(d)	**Buckle Integrity** Shall not release during testing	No Release	Pass

*Not applicable unless determined using the largest test dummy specified in S7 for use in testing the seat.

Remarks

- None

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 21
SYSTEM INTEGRITY – TEST 2
(FMVSS 213, S5.1.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076B
Item Code	004-FB49E14A-02-12CFFNLFU

S5.1.1 When dynamically tested, the child restraint shall:

Section	Requirement	Pass / Fail
S5.1.1(a)	**Structural Integrity –** Exhibit no complete separation of any load bearing structural element	Pass
	Exhibit no partial separation with exposing surfaces with a radius of less than 9.53 mm (3/8 in.)	Pass
	Exhibit no partial separation with exposing surfaces with protrusions greater than 6.35 mm (1/4 in.)	Pass
S5.1.1(b)(1)	**Adjustment Position –** Remain in the same adjustment position during the test that it was immediately before the test	Pass
S5.1.1(b)(2)(ii)	**Exposed Openings –** Have no exposed opening larger than 6.35 mm (1/4 in.) before the test becomes smaller during the testing as a result of the movement of the seating service relative to the restraint system as a whole.	Pass
S5.1.1(c)	**Seating Surface Angle –** Forward facing restraints do not allow the angle between the system's back support surface and seating surface to be less than 45 degrees at the completion of the test	Pass

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 22
INJURY CRITERIA – TEST 2
(FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076B
Item Code	004-FB49E14A-02-12CFFNLFU

Section	Requirement
S5.1.2.1(a)	**Head Injury Criterion** The maximum calculated head injury criterion for a 36-millisecond time interval (HIC36) shall not exceed 1,000. HIC is not calculated when using the 6-year-old weighted and 10-year-old test dummies.
S5.1.2.1(b)	**Chest Injury Criterion** The chest acceleration shall not exceed 60g for intervals whose cumulative duration is more than 3 milliseconds

Head Injury Criterion Results

Calculated HIC36	Pass / Fail
374	Pass

Chest Injury Criterion Results

Max Acceleration lasting 3ms (g)	Pass / Fail
52	Pass

Remarks

- None

Recorded by: William S. Horn

William Horn, SLED Director

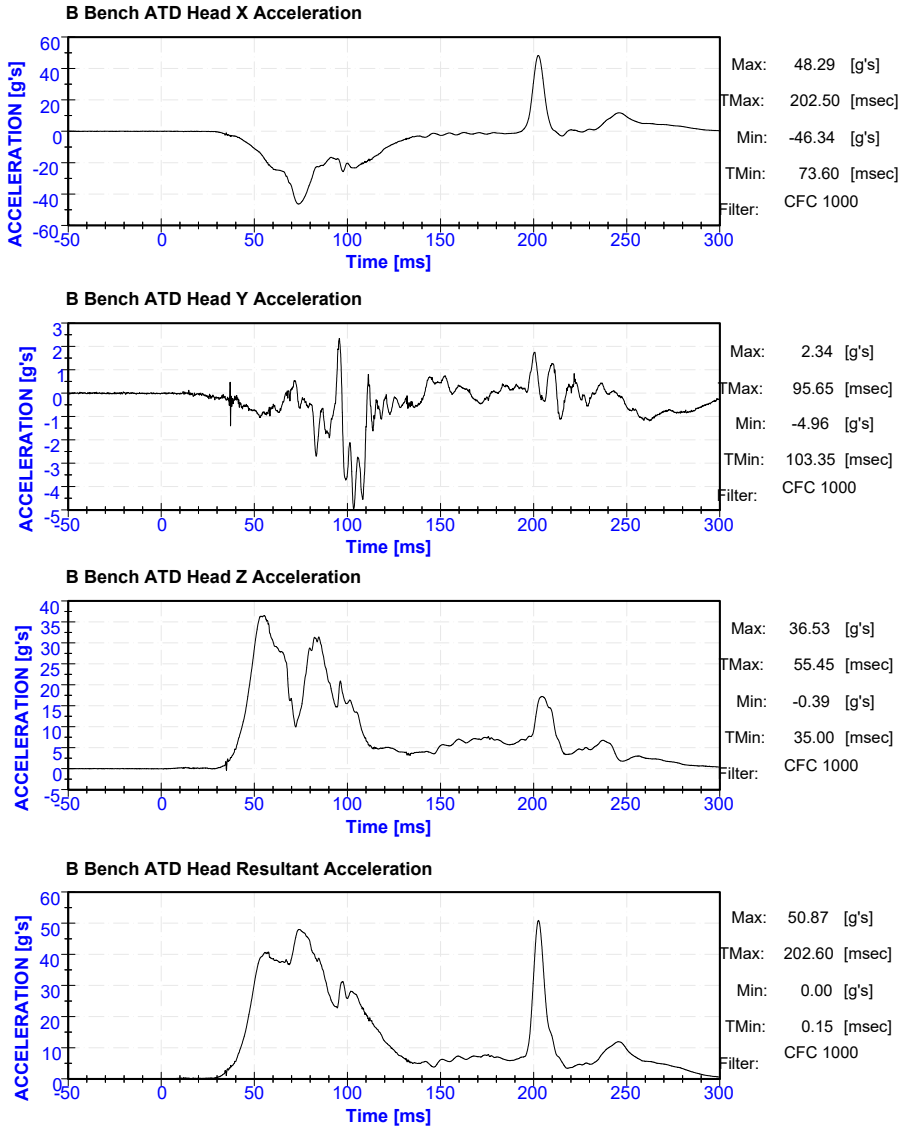
Date: April 29, 2022

INJURY CRITERIA – HEAD ACCELERATION PLOTS – TEST 2 (FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022
HIC 36ms	374

Sled Test No.	FM04-22-076B
Item Code	004-FB49E14A-02-12CFFNLFU
Resultant	49 g's

Calspan NHTSA FM04-22-076 Test Date: April 25,

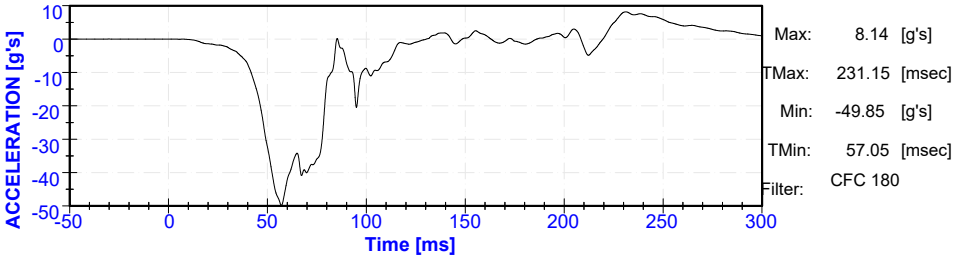


INJURY CRITERIA – CHEST ACCELERATION PLOTS – TEST 2 (FMVSS 213, S5.1.2)

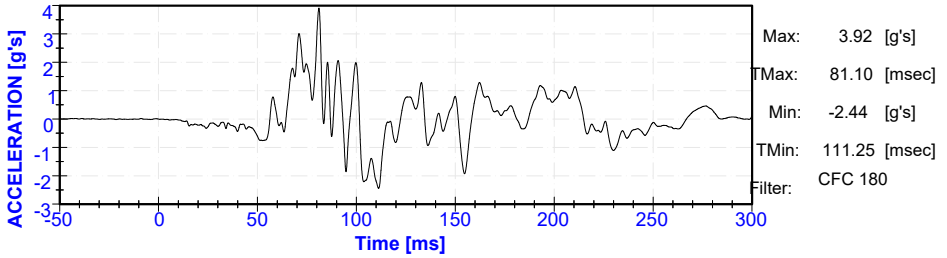
Report No.:	213-CAL-22-004	Sled Test No.	FM04-22-076B
Test Date:	04/25/2022	Item Code	004-FB49E14A-02-12CFFNLFU
3ms Clip	52 g's	Resultant	53 g's

Calspan NHTSA FM04-22-076 Test Date: April 25,

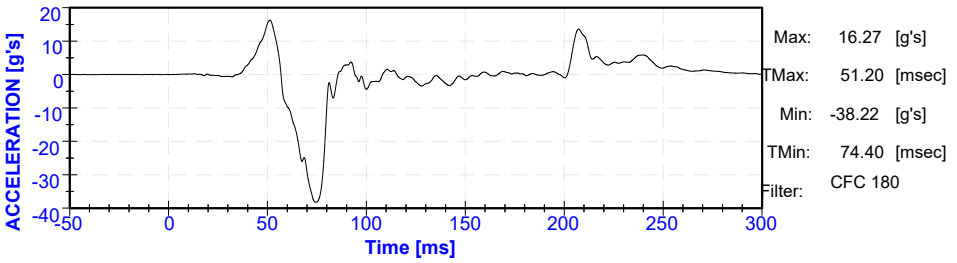
B Bench ATD Chest X Acceleration



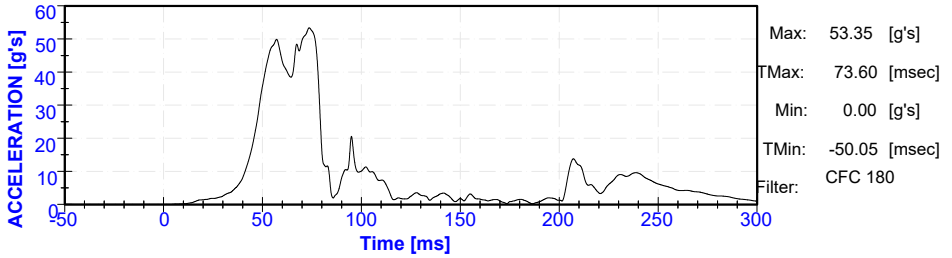
B Bench ATD Chest Y Acceleration



B Bench ATD Chest Z Acceleration



B Bench ATD Chest Resultant Acceleration



DATA SHEET 23
OCCUPANT EXCURSION – TEST 2
(FMVSS 213, S5.1.3, S5.1.4, S5.2.1.1(c))

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-076B
Item Code	004-FB49E14A-02-12CFFNLFU

FORWARD-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.1	**Torso Retention –** CRS shall retain the torso within system		Pass
S5.1.3.1(a)(1)	**Head Excursion -** ≤ 720 mm (28.4 in.) with tether ≤ 813 mm (32 in.) No tether	580	Pass
S5.1.3.1(a)(2)	**Knee Excursion -** ≤ 915 mm (36 in.)	669	Pass
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	Pass

REAR-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.2	**Torso Retention –** CRS shall retain the torso within system		NA
S5.1.3.2	**Head Target Excursion –** Not beyond restraint's top and forward edge		NA
S5.1.4	**Back Support Angle -** Angle between the back support surface and vertical ≤ 70 degrees	NA	NA
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 24
OCCUPANT EXCURSION – TEST 2
(FMVSS 213, S5.1.3.3)

CAR BED RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
Head – Torso Retention (FMVSS 213, S5.1.3.3)	Retain within confines of system	NA	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 25
DYNAMIC IMPACT TEST CONDITIONS – TEST 3
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077A
Item Code	004-FB49E14A-03-6W3FFN3FF

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	23 C (73 F)
Relative Humidity %	51.6%

Pulse:

Test Configuration (I or II):	1
Velocity (km/h (mph)):	47.9 km/h (29.8 mph)

Dummy:

Dummy Description:	W6-YO HYB III SN 163
Dummy Serial Number:	163

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method:	Lap and Shoulder Belt
Tether Usage:	No, Tether Free
Seat Back Position:	Upright
Internal Shoulder Harness Position:	Headrest 5, Counted from bottom up
Buckle Harness Position:	NA

Remarks:
Pre and Post Test Photos are presented in Section 9.

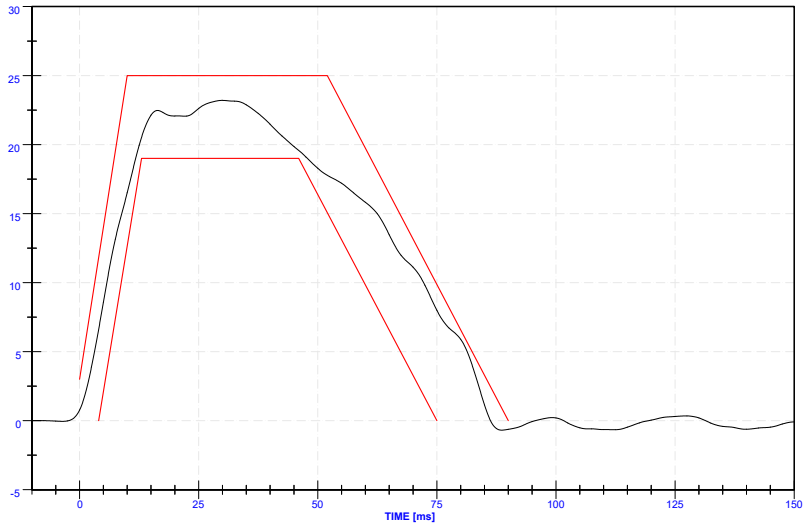
Recorded by: _____ Date: April 29, 2022
Adam Hardbattle, SLED Engineer

DYNAMIC IMPACT SLED PULSE – TEST 3
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004		Sled Test No.	FM04-22-077A
Test Date:	04/25/2022		Item Code	004-FB49E14A-03-6W3FFN3FF

Calspan NHTSA FM04-22-077 Test Date: April 25,2022

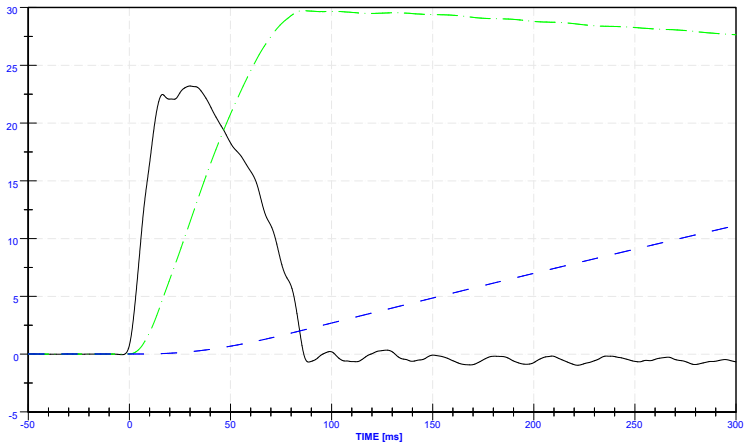
SLED Pulse Corridor



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.20	30.0	CFC 60	S0SLED000000ACXD

Calspan NHTSA FM04-22-077 Test Date: April 25,2022

SLED Pulse



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.20	221.6	CFC 60	S0SLED000000ACXD
SLED Velocity (mph)	29.73	-32.6	CFC 180	S0SLED000000VAXC
SLED Displacement (ft)	11.12	-26.5	CFC 180	S0SLED000000DVXC

DATA SHEET 26
BELT RESTRAINT – TEST 3
(FMVSS 213, S5.4.3)

Report No.:	213-CAL-22-004		Sled Test No.	FM04-22-077A
Test Date:	04/25/2022		Item Code	004-FB49E14A-03-6W3FFN3FF

Section	Requirement	Pass / Fail
S5.4.3.1	**Snug Fit of Belts.** Belts that are part of the restraint and designed to restrain the child are adjustable to snugly fit any child of height and weight identified by the manufacturer in accordance with the manufacturers installation instructions.	NA

Section	Requirement	Yes / No	Pass / Fail
S5.4.3.2	**Direct Restraint.** Belts impose no loads on the child resulting from mass of the system or the test seat		Pass
	The restraint has one or more belts that contact the dummy for restraint	No	If all are "Yes" Restraint fails S5.4.3.2
	The restraint has a rigid structure behind the dummy	Yes	
	The restraint could move relative to the belt	Yes	

Section	Requirement	Pass / Fail
S5.4.3.3	**Seating Systems.** Except for harness and infant restraints for children up to 10kg (22lb), each restraint designed for a child in a seated position and having belts shall provide.	NA
S5.4.3.3(a)	Upper torso restraint (either belts or a shield)	NA
S5.4.3.3(b)	Lower torso restraint (either belts or a shield)	NA
S5.4.3.3(c)	Crotch restraint (either a belt attached to the lap belt or a shield)	NA

Section	Requirement	Pass / Fail
S5.4.3.4	**Harnesses.** Each harness shall:	NA
S5.4.3.4(a)	Provide upper torso restraint)	NA
S5.4.3.4(b)	Provide lower torso restraint (lap & crotch)	NA
S5.4.3.4(c)	Prevent Standing	NA

Remarks

- High Back Booster

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 27
BUCKLE RELEASE – TEST 3
(FMVSS 213, S5.4.3.5, S6.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077A
Item Code	004-FB49E14A-03-6W3FFN3FF

Section	Requirement	Measurement	Pass / Fail
S5.4.3.5(a)	**Pre-Impact Release Force** Releases under 40-60 N	NA	NA
S5.4.3.5(b)	**Post-Impact Release Force*** Releases ≤ 71 N	NA	NA
S5.4.3.5(c)	**Minimum Surface Area of Buckle** ≥ 3.9 cm² (0.6 in²)	≥ 3.9 cm²	NA
S5.4.3.5(d)	**Buckle Integrity** Shall not release during testing	No Release	NA

*Not applicable unless determined using the largest test dummy specified in S7 for use in testing the seat.

Remarks

- High Back Booster

Recorded by: William S. Horn
William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 28
SYSTEM INTEGRITY – TEST 3
(FMVSS 213, S5.1.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077A
Item Code	004-FB49E14A-03-6W3FFN3FF

S5.1.1 When dynamically tested, the child restraint shall:

Section	Requirement	Pass / Fail
S5.1.1(a)	**Structural Integrity –** Exhibit no complete separation of any load bearing structural element	Pass
	Exhibit no partial separation with exposing surfaces with a radius of less than 9.53 mm (3/8 in.)	Pass
	Exhibit no partial separation with exposing surfaces with protrusions greater than 6.35 mm (1/4 in.)	Pass
S5.1.1(b)(1)	**Adjustment Position –** Remain in the same adjustment position during the test that it was immediately before the test	Pass
S5.1.1(b)(2)(ii)	**Exposed Openings –** Have no exposed opening larger than 6.35 mm (1/4 in.) before the test becomes smaller during the testing as a result of the movement of the seating service relative to the restraint system as a whole.	Pass
S5.1.1(c)	**Seating Surface Angle –** Forward facing restraints do not allow the angle between the system's back support surface and seating surface to be less than 45 degrees at the completion of the test	Pass

Remarks

- High Back Booster

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 29
INJURY CRITERIA – TEST 3
(FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077A
Item Code	004-FB49E14A-03-6W3FFN3FF

Section	Requirement
S5.1.2.1(a)	**Head Injury Criterion** The maximum calculated head injury criterion for a 36-millisecond time interval (HIC36) shall not exceed 1,000. HIC is not calculated when using the 6-year-old weighted and 10-year-old test dummies.
S5.1.2.1(b)	**Chest Injury Criterion** The chest acceleration shall not exceed 60g for intervals whose cumulative duration is more than 3 milliseconds

Head Injury Criterion Results

Calculated HIC36	Pass / Fail
NA	NA

Chest Injury Criterion Results

Max Acceleration lasting 3ms (g)	Pass / Fail
NA	NA

Remarks

- The weighted H3-6yo ATD has no injury requirements

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 30
OCCUPANT EXCURSION – TEST 3
(FMVSS 213, S5.1.3, S5.1.4, S5.2.1.1(c))

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077A
Item Code	004-FB49E14A-03-6W3FFN3FF

FORWARD-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.1	**Torso Retention –** CRS shall retain the torso within system		Pass
S5.1.3.1(a)(1)	**Head Excursion -** ≤ 720 mm (28.4 in.) with tether ≤ 813 mm (32 in.) No tether	567	Pass
S5.1.3.1(a)(2)	**Knee Excursion -** ≤ 915 mm (36 in.)	706	Pass
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	Pass

REAR-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.2	**Torso Retention –** CRS shall retain the torso within system		NA
S5.1.3.2	**Head Target Excursion –** Not beyond restraint's top and forward edge		NA
S5.1.4	**Back Support Angle -** Angle between the back support surface and vertical ≤ 70 degrees	NA	NA
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 31
OCCUPANT EXCURSION – TEST 3
(FMVSS 213, S5.1.3.3)

CAR BED RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
Head – Torso Retention (FMVSS 213, S5.1.3.3)	Retain within confines of system	NA	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 32
DYNAMIC IMPACT TEST CONDITIONS – TEST 4
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077B
Item Code	004-FB49E14A-04-6H2FFNLFF

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	23 C (73 F)
Relative Humidity %	51.6%

Pulse:

Test Configuration (I or II):	1
Velocity (km/h (mph)):	47.9 km/h (29.8 mph)

Dummy:

Dummy Description:	6-YO HYB II SN 220
Dummy Serial Number:	220

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method:	Lower Anchors
Tether Usage:	No, Tether Free
Seat Back Position:	Upright
Internal Shoulder Harness Position:	Harness 4, Headrest 4, Counted bottom up
Buckle Harness Position:	Forward

Remarks:
Pre and Post Test Photos are presented in Section 9.

Recorded by: _____ Date: April 29, 2022
Adam Hardbattle, SLED Engineer

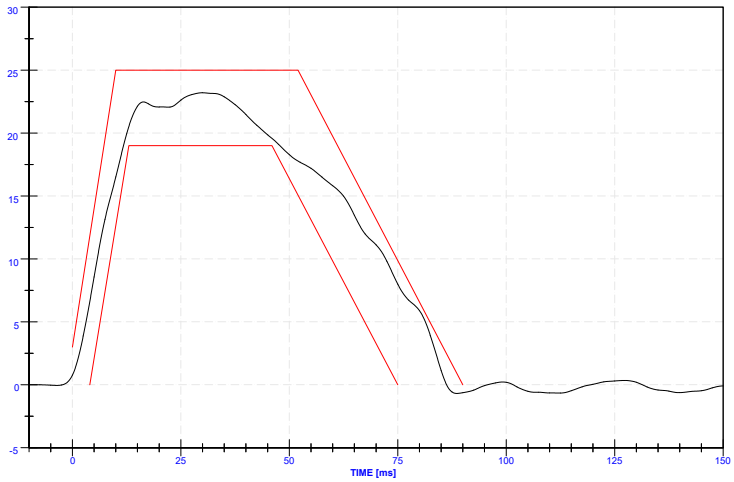
DYNAMIC IMPACT SLED PULSE – TEST 4
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077B
Item Code	004-FB49E14A-04-6H2FFNLFF

Calspan NHTSA FM04-22-077 Test Date: April 25,2022

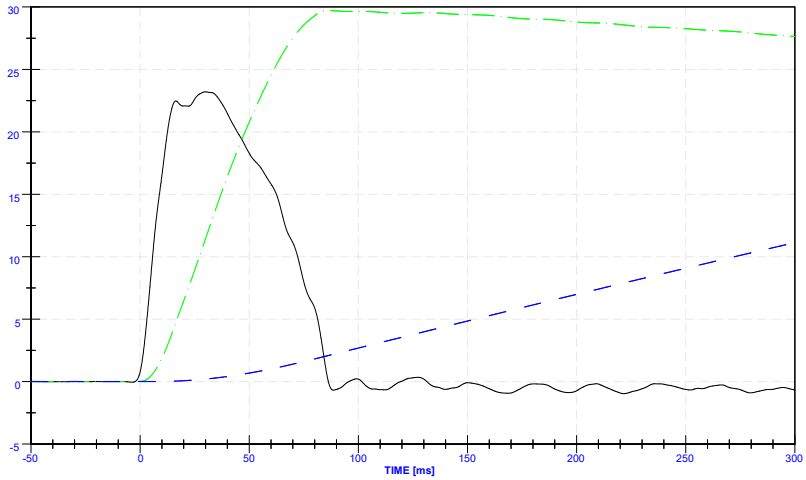
SLED Pulse Corridor



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.20	30.0	CFC 60	S0SLED000000ACXD

Calspan NHTSA FM04-22-077 Test Date: April 25,2022

SLED Pulse



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.20	221.6	CFC 60	S0SLED000000ACXD
SLED Velocity (mph)	29.73	-32.6	CFC 180	S0SLED000000VAXC
SLED Displacement (ft)	11.12	-26.5	CFC 180	S0SLED000000DVXC

DATA SHEET 33
BELT RESTRAINT – TEST 4
(FMVSS 213, S5.4.3)

Report No.:	213-CAL-22-004	Sled Test No.	FM04-22-077B
Test Date:	04/25/2022	Item Code	004-FB49E14A-04-6H2FFNLFF

Section	Requirement	Pass / Fail
S5.4.3.1	**Snug Fit of Belts.** Belts that are part of the restraint and designed to restrain the child are adjustable to snugly fit any child of height and weight identified by the manufacturer in accordance with the manufacturers installation instructions.	Pass

Section	Requirement	Yes / No	Pass / Fail
S5.4.3.2	**Direct Restraint.** Belts impose no loads on the child resulting from mass of the system or the test seat		Pass
	The restraint has one or more belts that contact the dummy for restraint	Yes	If all are "Yes" Restraint fails S5.4.3.2
	The restraint has a rigid structure behind the dummy	Yes	
	The restraint could move relative to the belt	No	

Section	Requirement	Pass / Fail
S5.4.3.3	**Seating Systems.** Except for harness and infant restraints for children up to 10kg (22lb), each restraint designed for a child in a seated position and having belts shall provide.	Pass
S5.4.3.3(a)	Upper torso restraint (either belts or a shield)	Pass
S5.4.3.3(b)	Lower torso restraint (either belts or a shield)	Pass
S5.4.3.3(c)	Crotch restraint (either a belt attached to the lap belt or a shield)	Pass

Section	Requirement	Pass / Fail
S5.4.3.4	**Harnesses.** Each harness shall:	NA
S5.4.3.4(a)	Provide upper torso restraint)	NA
S5.4.3.4(b)	Provide lower torso restraint (lap & crotch)	NA
S5.4.3.4(c)	Prevent Standing	NA

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 34
BUCKLE RELEASE – TEST 4
(FMVSS 213, S5.4.3.5, S6.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077B
Item Code	004-FB49E14A-04-6H2FFNLFF

Section	Requirement	Measurement	Pass / Fail
S5.4.3.5(a)	**Pre-Impact Release Force** Releases under 40-60 N	58 N	Pass
S5.4.3.5(b)	**Post-Impact Release Force*** Releases ≤ 71 N	55 N	Pass
S5.4.3.5(c)	**Minimum Surface Area of Buckle** ≥ 3.9 cm² (0.6 in²)	≥ 3.9 cm²	Pass
S5.4.3.5(d)	**Buckle Integrity** Shall not release during testing	No Release	Pass

*Not applicable unless determined using the largest test dummy specified in S7 for use in testing the seat.

Remarks

- None

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 35
SYSTEM INTEGRITY – TEST 4
(FMVSS 213, S5.1.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077B
Item Code	004-FB49E14A-04-6H2FFNLFF

S5.1.1 When dynamically tested, the child restraint shall:

Section	Requirement	Pass / Fail
S5.1.1(a)	**Structural Integrity –** Exhibit no complete separation of any load bearing structural element	Pass
	Exhibit no partial separation with exposing surfaces with a radius of less than 9.53 mm (3/8 in.)	Pass
	Exhibit no partial separation with exposing surfaces with protrusions greater than 6.35 mm (1/4 in.)	Pass
S5.1.1(b)(1)	**Adjustment Position –** Remain in the same adjustment position during the test that it was immediately before the test	Pass
S5.1.1(b)(2)(ii)	**Exposed Openings –** Have no exposed opening larger than 6.35 mm (1/4 in.) before the test becomes smaller during the testing as a result of the movement of the seating service relative to the restraint system as a whole.	Pass
S5.1.1(c)	**Seating Surface Angle –** Forward facing restraints do not allow the angle between the system's back support surface and seating surface to be less than 45 degrees at the completion of the test	Pass

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 36
INJURY CRITERIA – TEST 4
(FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077B
Item Code	004-FB49E14A-04-6H2FFNLFF

Section	Requirement
S5.1.2.1(a)	**Head Injury Criterion** The maximum calculated head injury criterion for a 36-millisecond time interval (HIC36) shall not exceed 1,000. HIC is not calculated when using the 6-year-old weighted and 10-year-old test dummies.
S5.1.2.1(b)	**Chest Injury Criterion** The chest acceleration shall not exceed 60g for intervals whose cumulative duration is more than 3 milliseconds

Head Injury Criterion Results

Calculated HIC36	Pass / Fail
196	Pass

Chest Injury Criterion Results

Max Acceleration lasting 3ms (g)	Pass / Fail
38	Pass

Remarks

- None

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

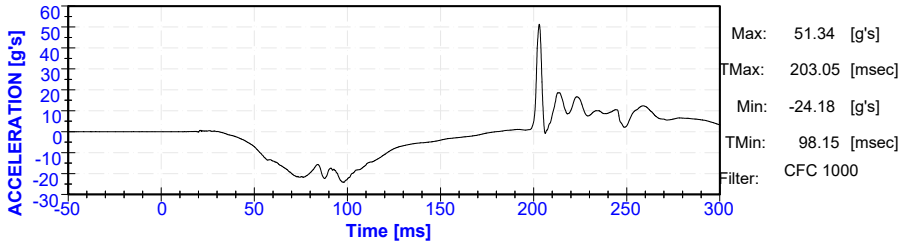
INJURY CRITERIA – HEAD ACCELERATION PLOTS – TEST 4 (FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022
HIC 36ms	196

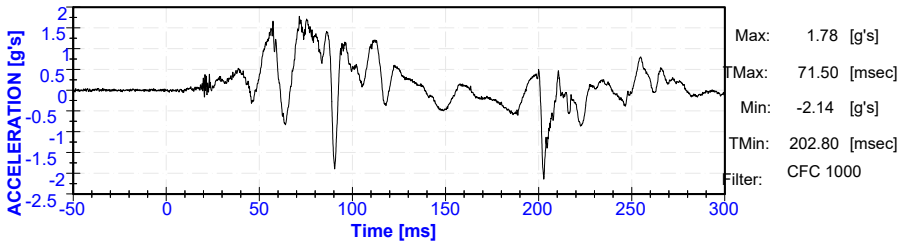
Sled Test No.	FM04-22-077B
Item Code	004-FB49E14A-04-6H2FFNLFF
Resultant	41 g's

Calspan NHTSA FM04-22-077 Test Date: April 25,

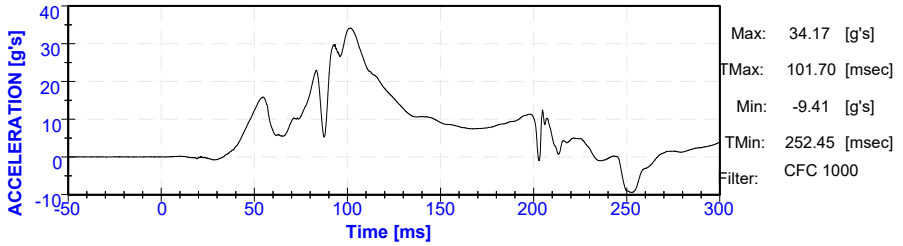
B Bench ATD Head X Acceleration



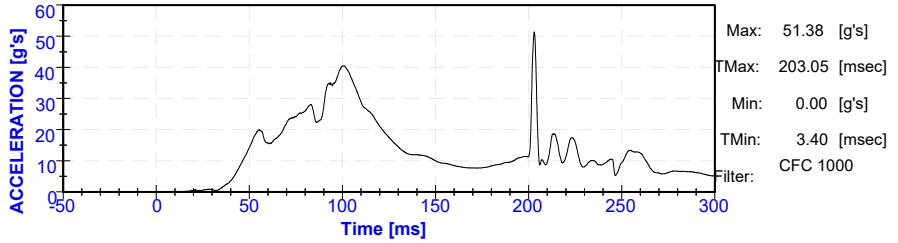
B Bench ATD Head Y Acceleration



B Bench ATD Head Z Acceleration



B Bench ATD Head Resultant Acceleration

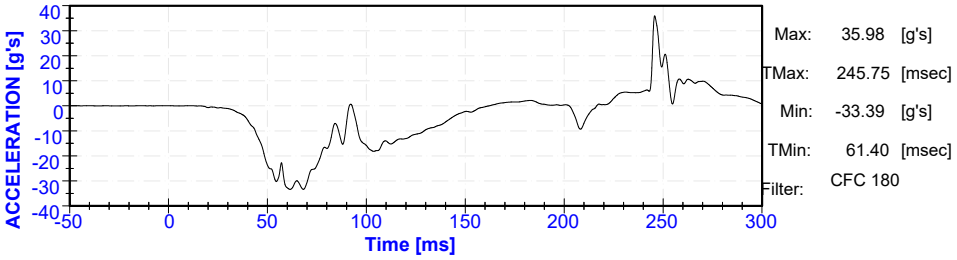


INJURY CRITERIA – CHEST ACCELERATION PLOTS – TEST 4 (FMVSS 213, S5.1.2)

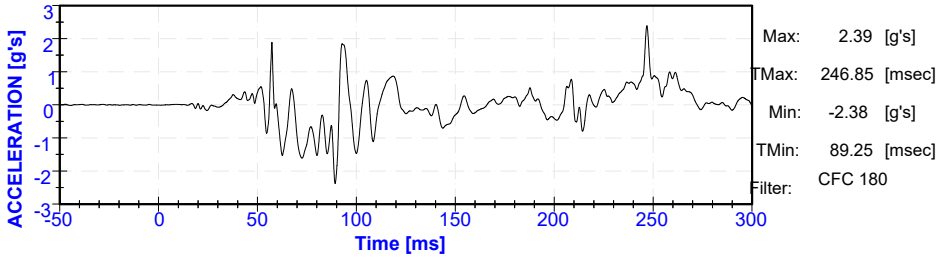
Report No.:	213-CAL-22-004	Sled Test No.	FM04-22-077B
Test Date:	04/25/2022	Item Code	004-FB49E14A-04-6H2FFNLFF
3ms Clip	38 g's	Resultant	39 g's

Calspan NHTSA FM04-22-077 Test Date: April 25,

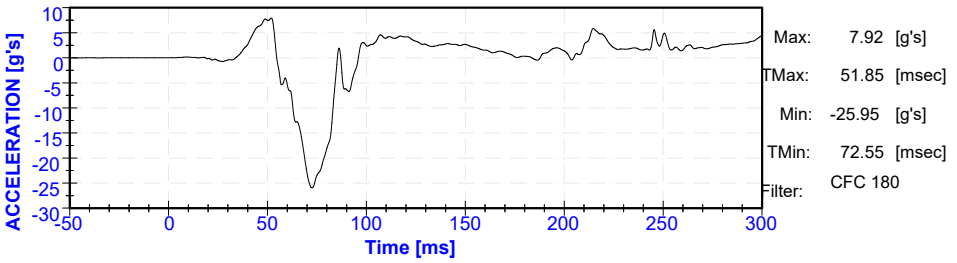
B Bench ATD Chest X Acceleration



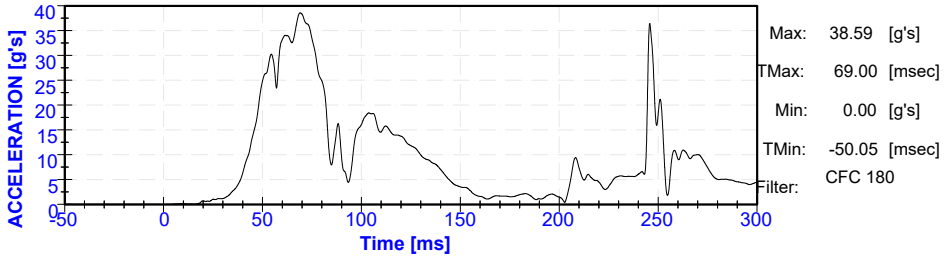
B Bench ATD Chest Y Acceleration



B Bench ATD Chest Z Acceleration



B Bench ATD Chest Resultant Acceleration



DATA SHEET 37
OCCUPANT EXCURSION – TEST 4
(FMVSS 213, S5.1.3, S5.1.4, S5.2.1.1(c))

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-077B
Item Code	004-FB49E14A-04-6H2FFNLFF

FORWARD-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.1	**Torso Retention –** CRS shall retain the torso within system		Pass
S5.1.3.1(a)(1)	**Head Excursion -** ≤ 720 mm (28.4 in.) with tether ≤ 813 mm (32 in.) No tether	750	Pass
S5.1.3.1(a)(2)	**Knee Excursion -** ≤ 915 mm (36 in.)	865	Pass
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	Pass

REAR-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.2	**Torso Retention –** CRS shall retain the torso within system		NA
S5.1.3.2	**Head Target Excursion –** Not beyond restraint's top and forward edge		NA
S5.1.4	**Back Support Angle -** Angle between the back support surface and vertical ≤ 70 degrees	NA	NA
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 38
OCCUPANT EXCURSION – TEST 4
(FMVSS 213, S5.1.3.3)

CAR BED RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
Head – Torso Retention (FMVSS 213, S5.1.3.3)	Retain within confines of system	NA	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 39
DYNAMIC IMPACT TEST CONDITIONS – TEST 5
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078A
Item Code	004-FB49E14A-05-6H2FFN2TU

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	23 C (74 F)
Relative Humidity %	51.5%

Pulse:

Test Configuration (I or II):	1
Velocity (km/h (mph)):	47.8 km/h (29.7 mph)

Dummy:

Dummy Description:	6-YO HYB II SN 220
Dummy Serial Number:	220

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method:	Lap Belt
Tether Usage:	Top Tether
Seat Back Position:	Upright
Internal Shoulder Harness Position:	Harness 4, Headrest 4, Counted bottom up
Buckle Harness Position:	Forward

Remarks:
Pre and Post Test Photos are presented in Section 9.

Recorded by: _____ Date: April 29, 2022
Adam Hardbattle, SLED Engineer

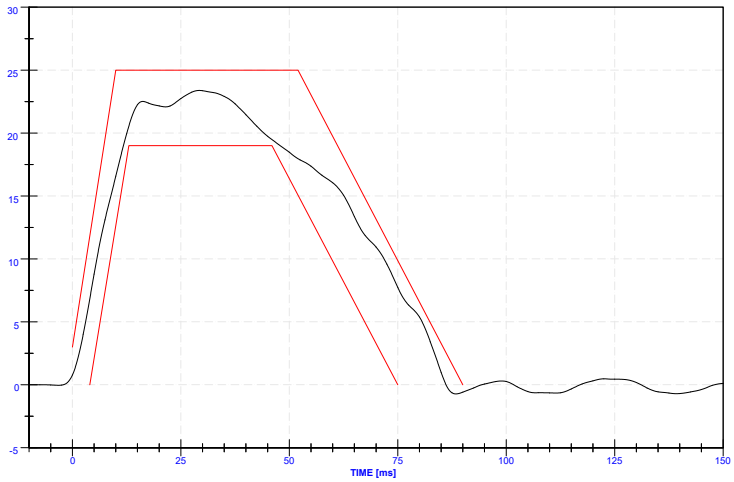
DYNAMIC IMPACT SLED PULSE – TEST 5
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078A
Item Code	004-FB49E14A-05-6H2FFN2TU

Calspan NHTSA FM04-22-078 Test Date: April 25,2022

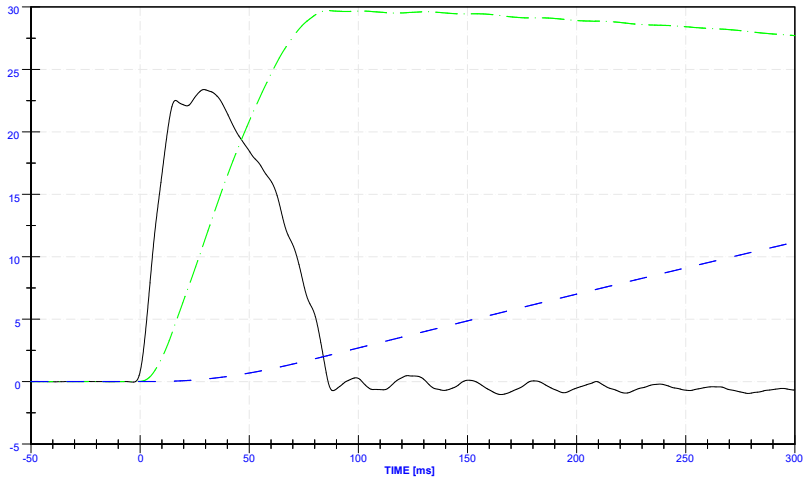
SLED Pulse Corridor



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.38	29.2	CFC 60	S0SLED000000ACXD

Calspan NHTSA FM04-22-078 Test Date: April 25,2022

SLED Pulse



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.38	165.5	CFC 60	S0SLED000000ACXD
SLED Velocity (mph)	29.72	-34.4	CFC 180	S0SLED000000VAXC
SLED Displacement (ft)	11.15	-49.7	CFC 180	S0SLED000000DVXC

DATA SHEET 40
BELT RESTRAINT – TEST 5
(FMVSS 213, S5.4.3)

Report No.:	213-CAL-22-004		Sled Test No.	FM04-22-078A
Test Date:	04/25/2022		Item Code	004-FB49E14A-05-6H2FFN2TU

Section	Requirement	Pass / Fail
S5.4.3.1	**Snug Fit of Belts.** Belts that are part of the restraint and designed to restrain the child are adjustable to snugly fit any child of height and weight identified by the manufacturer in accordance with the manufacturers installation instructions.	Pass

Section	Requirement	Yes / No	Pass / Fail
S5.4.3.2	**Direct Restraint.** Belts impose no loads on the child resulting from mass of the system or the test seat		Pass
	The restraint has one or more belts that contact the dummy for restraint	Yes	If all are "Yes" Restraint fails S5.4.3.2
	The restraint has a rigid structure behind the dummy	Yes	
	The restraint could move relative to the belt	No	

Section	Requirement	Pass / Fail
S5.4.3.3	**Seating Systems.** Except for harness and infant restraints for children up to 10kg (22lb), each restraint designed for a child in a seated position and having belts shall provide.	Pass
S5.4.3.3(a)	Upper torso restraint (either belts or a shield)	Pass
S5.4.3.3(b)	Lower torso restraint (either belts or a shield)	Pass
S5.4.3.3(c)	Crotch restraint (either a belt attached to the lap belt or a shield)	Pass

Section	Requirement	Pass / Fail
S5.4.3.4	**Harnesses.** Each harness shall:	NA
S5.4.3.4(a)	Provide upper torso restraint)	NA
S5.4.3.4(b)	Provide lower torso restraint (lap & crotch)	NA
S5.4.3.4(c)	Prevent Standing	NA

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 41
BUCKLE RELEASE – TEST 5
(FMVSS 213, S5.4.3.5, S6.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078A
Item Code	004-FB49E14A-05-6H2FFN2TU

Section	Requirement	Measurement	Pass / Fail
S5.4.3.5(a)	**Pre-Impact Release Force** Releases under 40-60 N	59 N	Pass
S5.4.3.5(b)	**Post-Impact Release Force*** Releases ≤ 71 N	53 N	Pass
S5.4.3.5(c)	**Minimum Surface Area of Buckle** ≥ 3.9 cm² (0.6 in²)	≥ 3.9 cm²	Pass
S5.4.3.5(d)	**Buckle Integrity** Shall not release during testing	No Release	Pass

*Not applicable unless determined using the largest test dummy specified in S7 for use in testing the seat.

Remarks

- None

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 42
SYSTEM INTEGRITY – TEST 5
(FMVSS 213, S5.1.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078A
Item Code	004-FB49E14A-05-6H2FFN2TU

S5.1.1 When dynamically tested, the child restraint shall:

Section	Requirement	Pass / Fail
S5.1.1(a)	**Structural Integrity –** Exhibit no complete separation of any load bearing structural element	Pass
	Exhibit no partial separation with exposing surfaces with a radius of less than 9.53 mm (3/8 in.)	Pass
	Exhibit no partial separation with exposing surfaces with protrusions greater than 6.35 mm (1/4 in.)	Pass
S5.1.1(b)(1)	**Adjustment Position –** Remain in the same adjustment position during the test that it was immediately before the test	Pass
S5.1.1(b)(2)(ii)	**Exposed Openings –** Have no exposed opening larger than 6.35 mm (1/4 in.) before the test becomes smaller during the testing as a result of the movement of the seating service relative to the restraint system as a whole.	Pass
S5.1.1(c)	**Seating Surface Angle –** Forward facing restraints do not allow the angle between the system's back support surface and seating surface to be less than 45 degrees at the completion of the test	Pass

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 43
INJURY CRITERIA – TEST 5
(FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078A
Item Code	004-FB49E14A-05-6H2FFN2TU

Section	Requirement
S5.1.2.1(a)	**Head Injury Criterion** The maximum calculated head injury criterion for a 36-millisecond time interval (HIC36) shall not exceed 1,000. HIC is not calculated when using the 6-year-old weighted and 10-year-old test dummies.
S5.1.2.1(b)	**Chest Injury Criterion** The chest acceleration shall not exceed 60g for intervals whose cumulative duration is more than 3 milliseconds

Head Injury Criterion Results

Calculated HIC36	Pass / Fail
426	Pass

Chest Injury Criterion Results

Max Acceleration lasting 3ms (g)	Pass / Fail
38	Pass

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

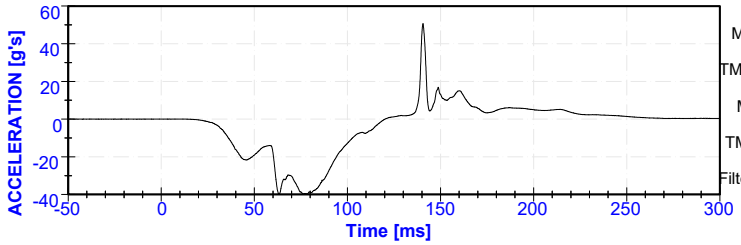
INJURY CRITERIA – HEAD ACCELERATION PLOTS – TEST 5 (FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022
HIC 36ms	426

Sled Test No.	FM04-22-078A
Item Code	004-FB49E14A-05-6H2FFN2TU
Resultant	56 g's

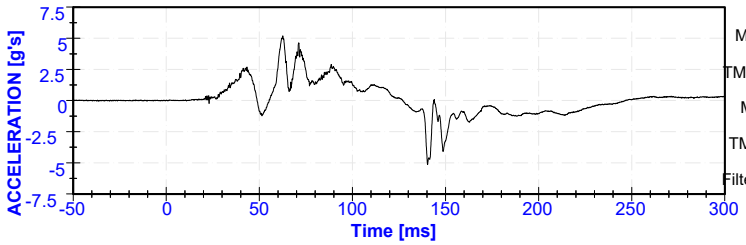
Calspan NHTSA FM04-22-078 Test Date: April 25,

A Bench ATD Head X Acceleration



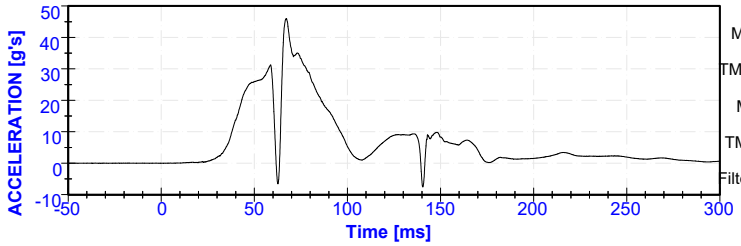
Max: 50.65 [g's]
TMax: 140.55 [msec]
Min: -39.97 [g's]
TMin: 63.15 [msec]
Filter: CFC 1000

A Bench ATD Head Y Acceleration



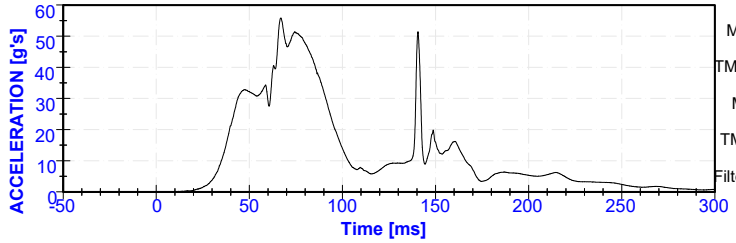
Max: 5.19 [g's]
TMax: 62.60 [msec]
Min: -5.13 [g's]
TMin: 140.35 [msec]
Filter: CFC 1000

A Bench ATD Head Z Acceleration



Max: 45.98 [g's]
TMax: 67.20 [msec]
Min: -7.59 [g's]
TMin: 140.50 [msec]
Filter: CFC 1000

A Bench ATD Head Resultant Acceleration



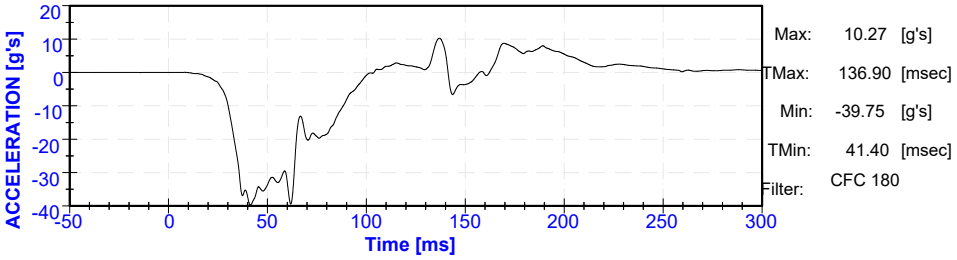
Max: 55.84 [g's]
TMax: 66.90 [msec]
Min: 0.00 [g's]
TMin: 4.35 [msec]
Filter: CFC 1000

INJURY CRITERIA – CHEST ACCELERATION PLOTS – TEST 5 (FMVSS 213, S5.1.2)

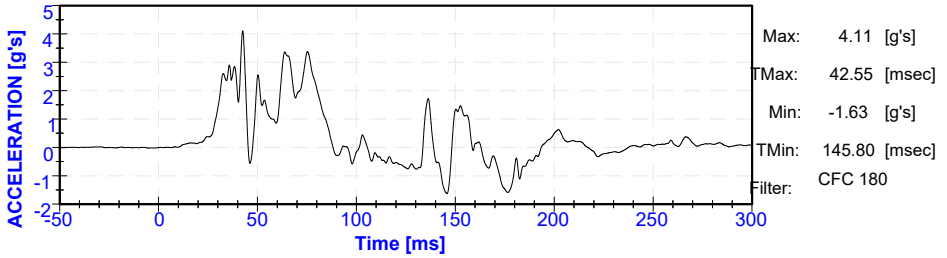
Report No.:	213-CAL-22-004	Sled Test No.	FM04-22-078A
Test Date:	04/25/2022	Item Code	004-FB49E14A-05-6H2FFN2TU
3ms Clip	38 g's	Resultant	40 g's

Calspan NHTSA FM04-22-078 Test Date: April 25,

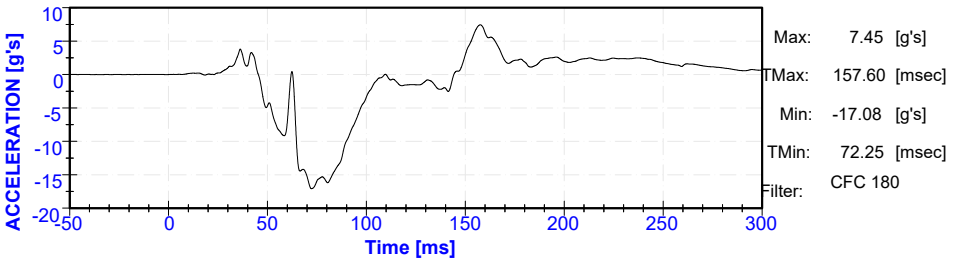
A Bench ATD Chest X Acceleration



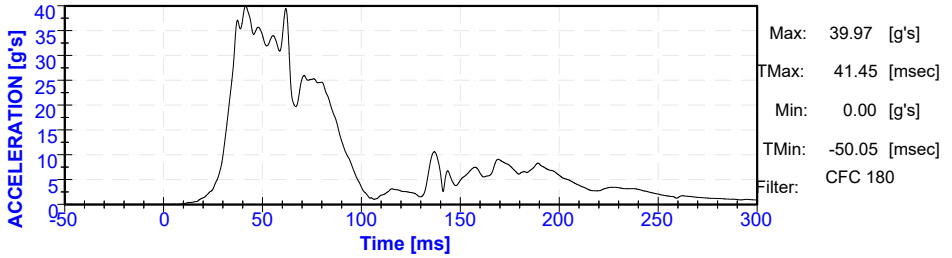
A Bench ATD Chest Y Acceleration



A Bench ATD Chest Z Acceleration



A Bench ATD Chest Resultant Acceleration



DATA SHEET 44
OCCUPANT EXCURSION – TEST 5
(FMVSS 213, S5.1.3, S5.1.4, S5.2.1.1(c))

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078A
Item Code	004-FB49E14A-05-6H2FFN2TU

FORWARD-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.1	**Torso Retention –** CRS shall retain the torso within system		Pass
S5.1.3.1(a)(1)	**Head Excursion -** ≤ 720 mm (28.4 in.) with tether ≤ 813 mm (32 in.) No tether	462	Pass
S5.1.3.1(a)(2)	**Knee Excursion -** ≤ 915 mm (36 in.)	684	Pass
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	Pass

REAR-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.2	**Torso Retention –** CRS shall retain the torso within system		NA
S5.1.3.2	**Head Target Excursion –** Not beyond restraint's top and forward edge		NA
S5.1.4	**Back Support Angle -** Angle between the back support surface and vertical ≤ 70 degrees	NA	NA
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 45
OCCUPANT EXCURSION – TEST 5
(FMVSS 213, S5.1.3.3)

CAR BED RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
Head – Torso Retention (FMVSS 213, S5.1.3.3)	Retain within confines of system	NA	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 46
DYNAMIC IMPACT TEST CONDITIONS – TEST 6
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078B
Item Code	004-FB49E14A-06-3H3FFNLFU

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	23 C (74 F)
Relative Humidity %	51.5%

Pulse:

Test Configuration (I or II):	1
Velocity (km/h (mph)):	47.8 km/h (29.7 mph)

Dummy:

Dummy Description:	3-YO HYB III SN 034
Dummy Serial Number:	034

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method:	Lower Anchors
Tether Usage:	No, Tether Free
Seat Back Position:	Upright
Internal Shoulder Harness Position:	Harness 2, Headrest 1, Counted bottom up
Buckle Harness Position:	Forward

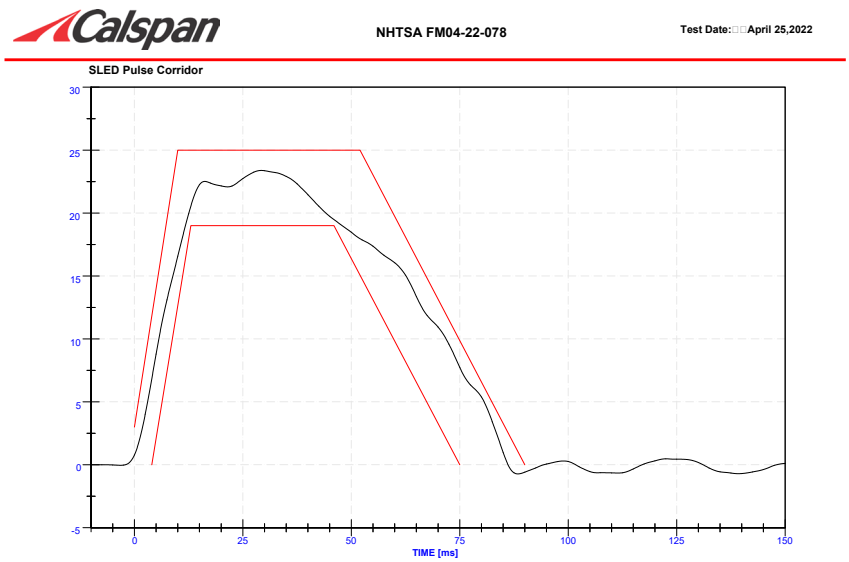
Remarks:
Pre and Post Test Photos are presented in Section 9.

Recorded by: _____ Date: April 29, 2022
Adam Hardbattle, SLED Engineer

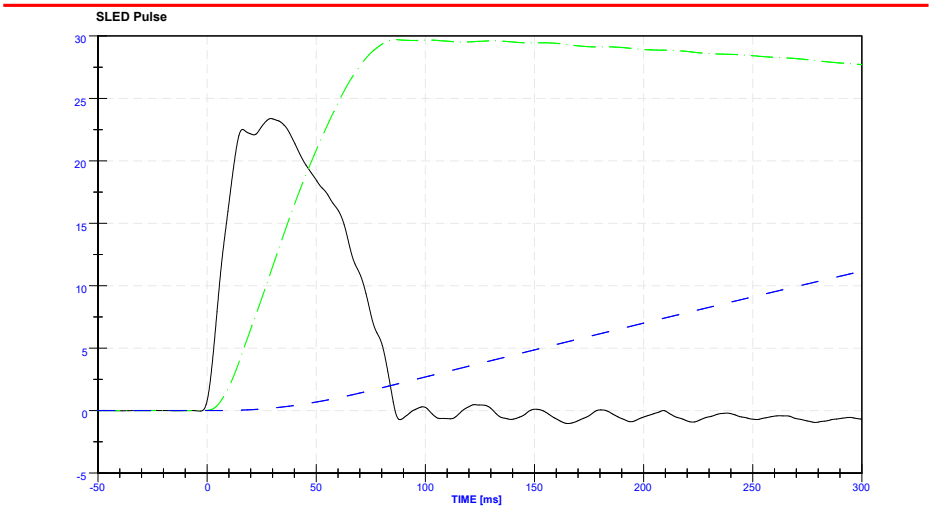
DYNAMIC IMPACT SLED PULSE – TEST 6
(FMVSS 213, S6.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078B
Item Code	004-FB49E14A-06-3H3FFNLFU



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.38	29.2	CFC 60	S0SLED000000ACXD



	Maximum	Time (ms)	Filter Class	Legend
SLED Acceleration (g's)	23.38	165.5	CFC 60	S0SLED000000ACXD
SLED Velocity (mph)	29.72	-34.4	CFC 180	S0SLED000000VAXC
SLED Displacement (ft)	11.15	-49.7	CFC 180	S0SLED000000DVXC

DATA SHEET 47
BELT RESTRAINT – TEST 6
(FMVSS 213, S5.4.3)

Report No.:	213-CAL-22-004		Sled Test No.	FM04-22-078B
Test Date:	04/25/2022		Item Code	004-FB49E14A-06-3H3FFNLFU

Section	Requirement	Pass / Fail
S5.4.3.1	**Snug Fit of Belts.** Belts that are part of the restraint and designed to restrain the child are adjustable to snugly fit any child of height and weight identified by the manufacturer in accordance with the manufacturers installation instructions.	Pass

Section	Requirement	Yes / No	Pass / Fail
S5.4.3.2	**Direct Restraint.** Belts impose no loads on the child resulting from mass of the system or the test seat		Pass
	The restraint has one or more belts that contact the dummy for restraint	Yes	If all are "Yes" Restraint fails S5.4.3.2
	The restraint has a rigid structure behind the dummy	Yes	
	The restraint could move relative to the belt	No	

Section	Requirement	Pass / Fail
S5.4.3.3	**Seating Systems.** Except for harness and infant restraints for children up to 10kg (22lb), each restraint designed for a child in a seated position and having belts shall provide.	Pass
S5.4.3.3(a)	Upper torso restraint (either belts or a shield)	Pass
S5.4.3.3(b)	Lower torso restraint (either belts or a shield)	Pass
S5.4.3.3(c)	Crotch restraint (either a belt attached to the lap belt or a shield)	Pass

Section	Requirement	Pass / Fail
S5.4.3.4	**Harnesses.** Each harness shall:	NA
S5.4.3.4(a)	Provide upper torso restraint)	NA
S5.4.3.4(b)	Provide lower torso restraint (lap & crotch)	NA
S5.4.3.4(c)	Prevent Standing	NA

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 48
BUCKLE RELEASE – TEST 6
(FMVSS 213, S5.4.3.5, S6.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078B
Item Code	004-FB49E14A-06-3H3FFNLFU

Section	Requirement	Measurement	Pass / Fail
S5.4.3.5(a)	**Pre-Impact Release Force** Releases under 40-60 N	58 N	Pass
S5.4.3.5(b)	**Post-Impact Release Force*** Releases ≤ 71 N	54 N	Pass
S5.4.3.5(c)	**Minimum Surface Area of Buckle** ≥ 3.9 cm² (0.6 in²)	≥ 3.9 cm²	Pass
S5.4.3.5(d)	**Buckle Integrity** Shall not release during testing	No Release	Pass

*Not applicable unless determined using the largest test dummy specified in S7 for use in testing the seat.

Remarks

- None

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

DATA SHEET 49
SYSTEM INTEGRITY – TEST 6
(FMVSS 213, S5.1.1)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078B
Item Code	004-FB49E14A-06-3H3FFNLFU

S5.1.1 When dynamically tested, the child restraint shall:

Section	Requirement	Pass / Fail
S5.1.1(a)	**Structural Integrity –** Exhibit no complete separation of any load bearing structural element	Pass
	Exhibit no partial separation with exposing surfaces with a radius of less than 9.53 mm (3/8 in.)	Pass
	Exhibit no partial separation with exposing surfaces with protrusions greater than 6.35 mm (1/4 in.)	Pass
S5.1.1(b)(1)	**Adjustment Position –** Remain in the same adjustment position during the test that it was immediately before the test	Pass
S5.1.1(b)(2)(ii)	**Exposed Openings –** Have no exposed opening larger than 6.35 mm (1/4 in.) before the test becomes smaller during the testing as a result of the movement of the seating service relative to the restraint system as a whole.	Pass
S5.1.1(c)	**Seating Surface Angle –** Forward facing restraints do not allow the angle between the system's back support surface and seating surface to be less than 45 degrees at the completion of the test	Pass

Remarks

- None

Recorded by: William S. Horn Date: April 29, 2022

William Horn, SLED Director

DATA SHEET 50
INJURY CRITERIA – TEST 6
(FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078B
Item Code	004-FB49E14A-06-3H3FFNLFU

Section	Requirement
S5.1.2.1(a)	**Head Injury Criterion** The maximum calculated head injury criterion for a 36-millisecond time interval (HIC36) shall not exceed 1,000. HIC is not calculated when using the 6-year-old weighted and 10-year-old test dummies.
S5.1.2.1(b)	**Chest Injury Criterion** The chest acceleration shall not exceed 60g for intervals whose cumulative duration is more than 3 milliseconds

Head Injury Criterion Results

Calculated HIC36	Pass / Fail
580	Pass

Chest Injury Criterion Results

Max Acceleration lasting 3ms (g)	Pass / Fail
43	Pass

Remarks

- None

Recorded by: William S. Horn

William Horn, SLED Director

Date: April 29, 2022

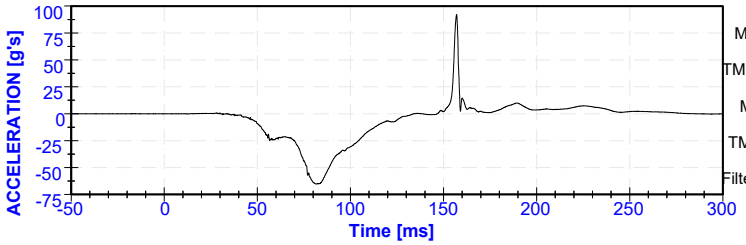
INJURY CRITERIA – HEAD ACCELERATION PLOTS – TEST 6 (FMVSS 213, S5.1.2)

Report No.:	213-CAL-22-004
Test Date:	04/25/2022
HIC 36ms	580

Sled Test No.	FM04-22-078B
Item Code	004-FB49E14A-06-3H3FFNLFU
Resultant	64 g's

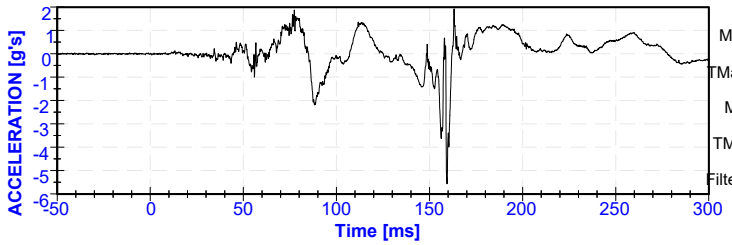
Calspan NHTSA FM04-22-078 Test Date: April 25,

B Bench ATD Head X Acceleration



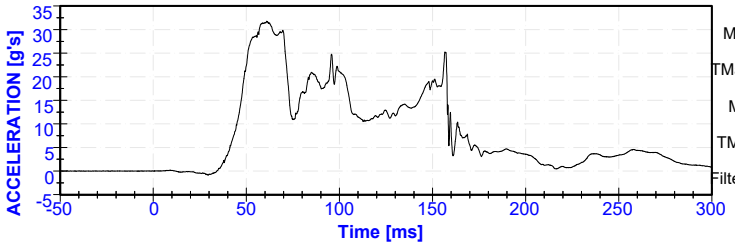
Max: 92.06 [g's]
TMax: 157.00 [msec]
Min: -65.23 [g's]
TMin: 81.90 [msec]
Filter: CFC 1000

B Bench ATD Head Y Acceleration



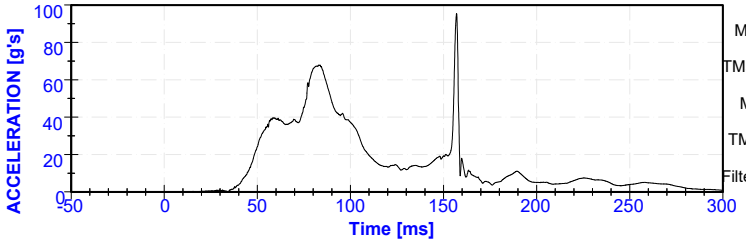
Max: 1.93 [g's]
TMax: 163.20 [msec]
Min: -5.56 [g's]
TMin: 159.40 [msec]
Filter: CFC 1000

B Bench ATD Head Z Acceleration



Max: 31.78 [g's]
TMax: 60.95 [msec]
Min: -0.88 [g's]
TMin: 29.50 [msec]
Filter: CFC 1000

B Bench ATD Head Resultant Acceleration



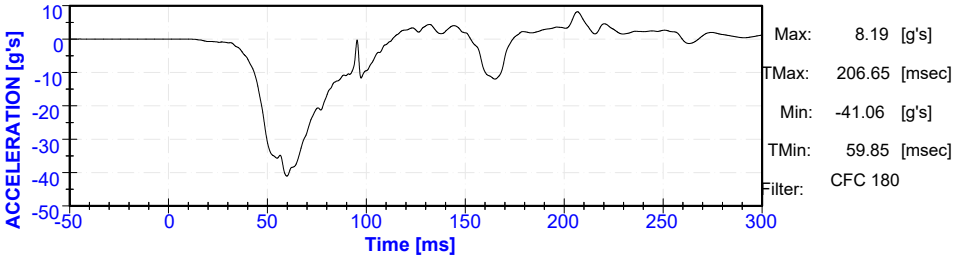
Max: 95.46 [g's]
TMax: 157.00 [msec]
Min: 0.00 [g's]
TMin: 2.55 [msec]
Filter: CFC 1000

INJURY CRITERIA – CHEST ACCELERATION PLOTS – TEST 6 (FMVSS 213, S5.1.2)

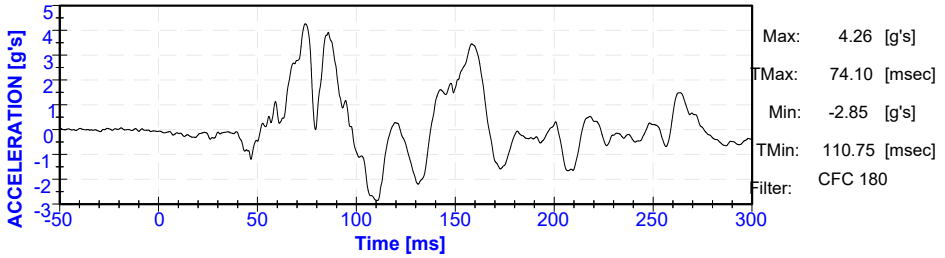
Report No.:	213-CAL-22-004	Sled Test No.	FM04-22-078B
Test Date:	04/25/2022	Item Code	004-FB49E14A-06-3H3FFNLFU
3ms Clip	43 g's	Resultant	44 g's

Calspan NHTSA FM04-22-078 Test Date: April 25,

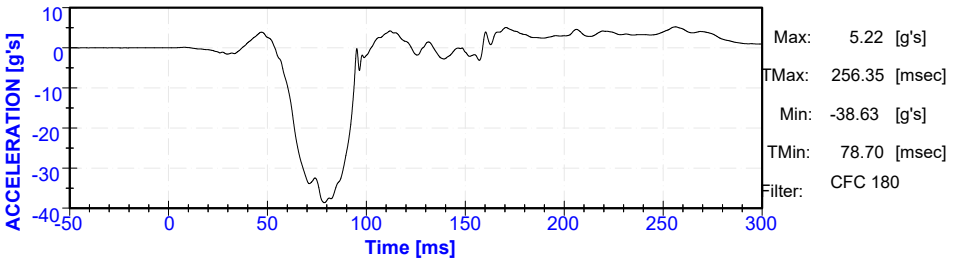
B Bench ATD Chest X Acceleration



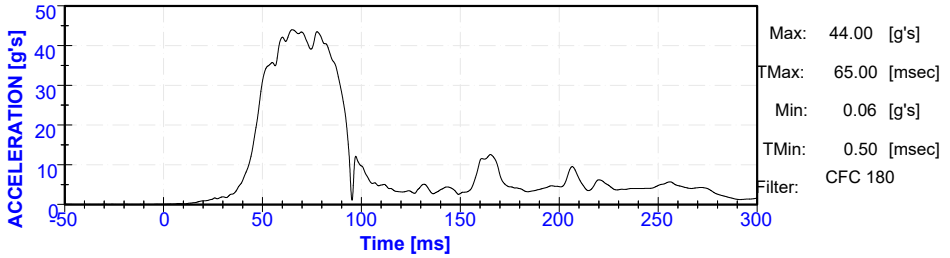
B Bench ATD Chest Y Acceleration



B Bench ATD Chest Z Acceleration



B Bench ATD Chest Resultant Acceleration



DATA SHEET 51
OCCUPANT EXCURSION – TEST 6
(FMVSS 213, S5.1.3, S5.1.4, S5.2.1.1(c))

Report No.:	213-CAL-22-004
Test Date:	04/25/2022

Sled Test No.	FM04-22-078B
Item Code	004-FB49E14A-06-3H3FFNLFU

FORWARD-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.1	**Torso Retention –** CRS shall retain the torso within system		Pass
S5.1.3.1(a)(1)	**Head Excursion -** ≤ 720 mm (28.4 in.) with tether ≤ 813 mm (32 in.) No tether	653	Pass
S5.1.3.1(a)(2)	**Knee Excursion -** ≤ 915 mm (36 in.)	780	Pass
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	Pass

REAR-FACING RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
S5.1.3.2	**Torso Retention –** CRS shall retain the torso within system		NA
S5.1.3.2	**Head Target Excursion –** Not beyond restraint's top and forward edge		NA
S5.1.4	**Back Support Angle -** Angle between the back support surface and vertical ≤ 70 degrees	NA	NA
S5.2.1.1(c)	**Head-Torso Angle -** Rearward change ≤ 45 degrees	≤ 45	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 52
OCCUPANT EXCURSION – TEST 6
(FMVSS 213, S5.1.3.3)

CAR BED RESTRAINTS

Section	Requirement	Measurement	Pass / Fail
Head – Torso Retention (FMVSS 213, S5.1.3.3)	Retain within confines of system	NA	NA

Remarks

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 53
AIRCRAFT PASSENGER SEAT INVERSION – TEST A
(FMVSS 213, S8.2, S8.2.5, S8.2.6)

Report No.:	213-CAL-22-004
Test Date:	4/29/2022

Test No.	FM04-22-082
Item Code	004-FB49E14A-Inv01-12CFFN2FU

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	72.0 C (161.6 F)
Relative Humidity %	44.0%

Dummy:

Dummy Description:	CRABI 12
Dummy Serial Number:	085

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method	Lap Belt
Tether Usage	Tether free
Seat Back Position:	Upright
Internal Harness Shoulder Strap Position:	1, Counted from bottom up
Internal Harness Crotch Strap Position:	Rear

Rotation About Y-Axis (Forward):

Section	Requirement	Pass/Fail
S8.2.5	The test dummy shall be retained within the CRS	Pass
S8.2.5	The CRS shall be restrained within the aircraft seat	Pass

Rotation About X-Axis (Lateral):

Section	Requirement	Pass/Fail
S8.2.6	The test dummy shall be retained within the CRS	Pass
S8.2.6	The CRS shall be restrained within the aircraft seat	Pass

Remarks:

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

DATA SHEET 54
AIRCRAFT PASSENGER SEAT INVERSION – TEST B
(FMVSS 213, S8.2, S8.2.5, S8.2.6)

Report No.:	213-CAL-22-004
Test Date:	4/29/2022

Test No.	FM04-22-083
Item Code	004-FB49E14A-Inv02-3H3FFN2FU

Laboratory Ambient Conditions During Testing:

Temperature Degrees C (F)	72.0 C (161.6 F)
Relative Humidity %	44.0%

Dummy:

Dummy Description:	3-YO HYB III
Dummy Serial Number:	034

Restraint Installation:

Installed Direction:	Forward Facing
Base Usage:	None (N)
Attachment Method	Lap Belt
Tether Usage	Tether free
Seat Back Position:	Upright
Internal Harness Shoulder Strap Position:	2, Counted from bottom up
Internal Harness Crotch Strap Position:	Front

Rotation About Y-Axis (Forward):

Section	Requirement	Pass/Fail
S8.2.5	The test dummy shall be retained within the CRS	Pass
S8.2.5	The CRS shall be restrained within the aircraft seat	Pass

Rotation About X-Axis (Lateral):

Section	Requirement	Pass/Fail
S8.2.6	The test dummy shall be retained within the CRS	Pass
S8.2.6	The CRS shall be restrained within the aircraft seat	Pass

Remarks:

- None

Recorded by: _____ Date: April 29, 2022

Adam Hardbattle, SLED Engineer

SECTION 6

INTERPRETATION AND/OR DEVIATIONS FROM FMVSS 213

- None

SECTION 7
TEST CONFIGURATION CODES

The following table explains the code used to describe the test configurations in this report. For example, the test configuration code 12CFNLFU indicates that the child restraint sled test was conducted using a 12-month old CRABI dummy, installed in the forward facing direction with no optional base, the latch system, no tether, and in the upright position.

Dummy Description	NIN – Newborn Infant
	12C -12 MO, CRABI
	3H3 – 3 YO, Hybrid III
	6H2 – 6YO Hybrid II
	6H3 – 6YO, Hybrid III
	6W3 – 6 YO, Weighted Hybrid III
	TH3 – 10YO, Hybrid III
Installed Direction	RF – Rear Facing
	FF – Forward Facing
	SF – Side facing
Base Usage	B – Optional base used with CRS
	N – All other configurations
Attachment Method	L – Lower anchors
	2 – Lap belt
	3 – Lap & shoulder belt
	M – Seat back mount
Tether Usage	T – Tether
	F – Tether Free
Seat Back Position	U – Upright
	R – Reclined
	B – No Back Booster
	F – Fixed Back Booster
	N – Non Applicable

SECTION 8
INSTRUMENTATION CALIBRATION

Sled and Facility Calibrations

Instrument	*Serial Number*	*Calibration Date*	*Due Date*
DTS Unit #736	ESL 400798	3/8/2022	3/8/2023
DTS Unit #901	ESL 401001	6/24/2021	6/24/2022
Temp and Humidity Recorder Onset HOBO - Lab	ESL 401136	9/22/2021	9/22/2022
Temp and Humidity Recorder Onset HOBO - Foam	ESL 401226	3/2/2022	3/2/2023
Digital Angle Gauge Digi-Pas	ESL 400315	8/12/2021	8/12/2022
Bosch/Kent Moore Belt Tension Gauge	ESL 400415	12/6/2021	6/6/2022
Imada Force Gauge Model ZTS-550	ESL 400768	12/22/2021	12/22/2022
Imada Force Gauge Model DS2-110	ESL 400368	8/10/2021	8/10/2022
Imada Force Gauge Model ZTS-550	ESL 400474	7/14/2021	7/14/2022
Proto Torque Wrench ATD	ESL 400979	8/30/2021	8/30/2022
Sled Primary x Accelerometer MSI 3801A-200	A145297	11/17/2021	12/10/2022
Sled Secondary X SDI 2266-200	1210	12/10/2021	12/10/2022
Steel Tape Measure BMI 8CY67	ESL 401203	11/11/2021	11/11/2022

ATD Calibrations

Instrument	*Serial Number*	*Certification Test*	*Calibration Date*	*Due Date*
NewBorn	032	ATD	NA	NA

Instrument	*Serial Number*	*Certification Test*	*Calibration Date*	*Due Date*
12 Month CRABI	085	ATD	2/07/2022	5/5/2022
Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
Head X Accelerometer Endevco 7264	AC-P63983	ATD	1/31/2022	7/31/2022
Head Y Accelerometer Endevco 7264	AC-P84349	ATD	1/31/2022	7/31/2022
Head Z Accelerometer Endevco 7264	AC-P82321	ATD	1/31/2022	7/31/2022
Chest X Accelerometer Endevco 7264	AC-P74971	ATD	1/31/2022	7/31/2022
Chest Y Accelerometer Endevco 7264	AC-P74780	ATD	1/31/2022	7/31/2022
Chest Z Accelerometer Endevco 7264	AC-P52158	ATD	1/31/2022	7/31/2022

Instrument	*Serial Number*	*Certification Test*	*Calibration Date*	*Due Date*
3 year old Hybrid 3	034	ATD	2/16/2022	5/5/2022
Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
Head X Accelerometer Endevco 7264	AC-P51732	ATD	1/31/2022	7/31/2022
Head Y Accelerometer Endevco 7264	AC-P77601	ATD	1/31/2022	7/31/2022
Head Z Accelerometer Endevco 7264	AC-T28497	ATD	2/15/2022	8/15/2022
Chest X Accelerometer Endevco 7264	AC-P51874	ATD	1/31/2022	7/31/2022
Chest Y Accelerometer MSI 64CM30	AC-MS26658	ATD	1/31/2022	7/31/2022
Chest Z Accelerometer Endevco 7264	AC-P58862	ATD	1/31/2022	7/31/2022

Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
6 year old Hybrid 2	220	ATD	2/11/2022	5/19/2022
Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
Head X Accelerometer Endevco 7264	AC-P80250	ATD	1/31/2022	7/31/2022
Head Y Accelerometer Endevco 7264	AC-P72377	ATD	1/31/2022	7/31/2022
Head Z Accelerometer Endevco 7264	AC-P80269	ATD	1/31/2022	7/31/2022
Chest X Accelerometer Endevco 7264	AC-P50073	ATD	1/31/2022	7/31/2022
Chest Y Accelerometer Endevco 7264	AC-P82751	ATD	1/31/2022	7/31/2022
Chest Z Accelerometer Endevco 7264	AC-P52098	ATD	1/31/2022	7/31/2022

Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
6 year old Hybrid 3	158	ATD	2/08/2022	5/19/2022
Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
Head X Accelerometer Endevco 7264	AC-P52128	ATD	1/31/2022	7/31/2022
Head Y Accelerometer Endevco 7264	AC-P83340	ATD	1/31/2022	7/31/2022
Head Z Accelerometer Endevco 7264	AC-P51684	ATD	1/31/2022	7/31/2022
Chest X Accelerometer Endevco 7264	AC-P51878	ATD	1/31/2022	7/31/2022
Chest Y Accelerometer Endevco 7264	AC-P63954	ATD	1/31/2022	7/31/2022
Chest Z Accelerometer Endevco 7264	AC-P74950	ATD	1/31/2022	7/31/2022

Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
6 year old Weighted Hybrid 3	163	ATD	2/11/2022	5/5/2022

Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
10 year old Hybrid 3	D023	ATD	2/07/2022	5/19/2022
Instrument	***Serial Number***	***Certification Test***	***Calibration Date***	***Due Date***
Chest X Accelerometer Endevco 7264	AC-P52004	ATD	1/31/2022	7/31/2022
Chest Y Accelerometer Endevco 7264	AC-P68051	ATD	1/31/2022	7/31/2022
Chest Z Accelerometer Endevco 7264	AC-P82749	ATD	1/31/2022	7/31/2022

Bench Foam Calibrations

Test #	Calibration	Bottom 2”	Bottom 4”	Back 2”	Back 4”
FM04-22-076A	**Pre**	C570N-2x20 49.9lbs.	T113N-4x20 26.4 lbs.	H321N-2x24 53.5 lbs.	S57N-4x24 26.7 lbs.
	Post	C570N-2x20 49.5 lbs.	T113N-4x20 26.5 lbs.	H321N-2x24 54.0 lbs.	S57N-4x24 26.3 lbs.
FM04-22-076B	**Pre**	C574N-2x20 46.7 lbs.	T112N-4x20 26.8 lbs.	H320N-2x24 53.7 lbs.	S61N-4x24 26.9 lbs.
	Post	C574N-2x20 46.0 lbs.	T112N-4x20 26.1 lbs.	H320N-2x24 53.2 lbs.	S61N-4x24 26.6 lbs.
FM04-22-077A	**Pre**	C571N-2x20 49.3 lbs.	T116N-4x20 26.5 lbs.	H319N-2x24 53.9 lbs.	S59N-4x24 26.9 lbs.
	Post	C571N-2x20 48.6 lbs.	T116N-4x20 26.3 lbs.	H319N-2x24 53.2 lbs.	S59N-4x24 26.2 lbs.
FM04-22-077B	**Pre**	C575N-2x20 50.1 lbs.	T115N-4x20 22.9 lbs.	H317N-2x24 52.9 lbs.	S60N-4x24 26.6 lbs.
	Post	C575N-2x20 49.5 lbs.	T115N-4x20 22.4 lbs.	H317N-2x24 51.8 lbs.	S60N-4x24 26.5 lbs.
FM04-22-078A	**Pre**	C572N-2x20 50.4 lbs.	T114N-4x20 27.0 lbs.	H318N-2x24 53.9 lbs.	S58N-4x24 26.4 lbs.
	Post	C572N-2x20 50.0 lbs.	T114N-4x20 26.7 lbs.	H318N-2x24 53.2 lbs.	S58N-4x24 26.5 lbs.
FM04-22-078B	**Pre**	C573N-2x20 51.5 lbs.	T117N-4x20 26.8 lbs.	H316N-2x24 52.5 lbs.	S56N-4x24 26.7 lbs.
	Post	C573N-2x20 50.5 lbs.	T117N-4x20 26.1 lbs.	H316N-2x24 52.5 lbs.	S56N-4x24 26.7 lbs.

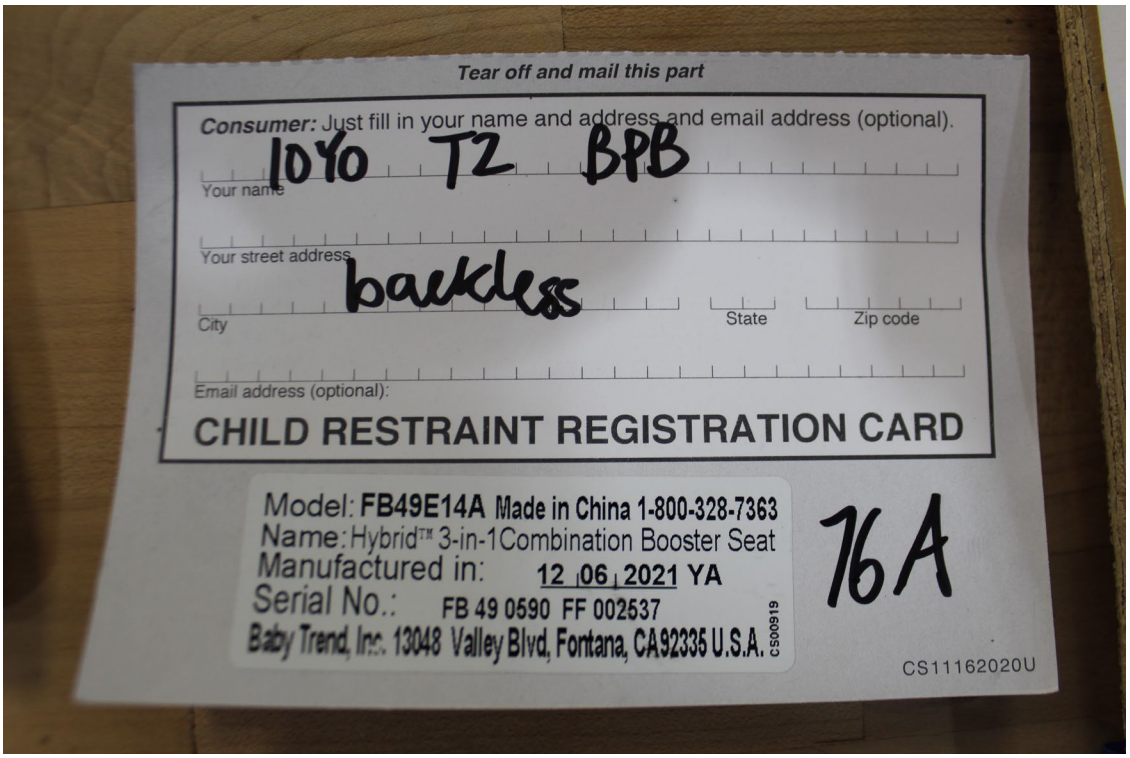
Section 9
PHOTOGRAPHS

Sled Buck – Standard Bench Seat and Configuration
213-CAL-22-004

004-FB49E14A-01-TH3FFN3FB	004-FB49E14A-02-12CFFNLFU
004-FB49E14A-03-6W3FFN3FF	004-FB49E14A-04-6H2FFNLFF
004-FB49E14A-05-6H2FFN2TU	004-FB49E14A-06-3H3FFNLFU

Dynamic Test Photos

004-FB49E14A-01-TH3FFN3FB Pre-Test	213-CAL-22-004 FM04-22-076A



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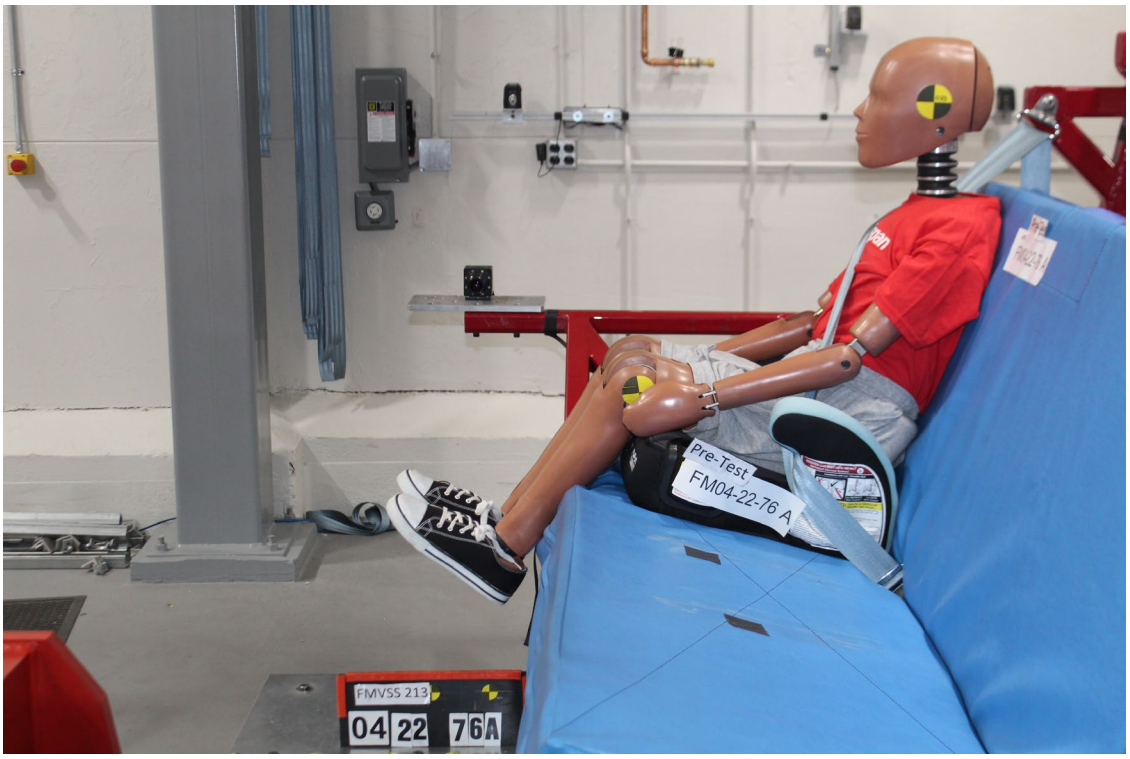
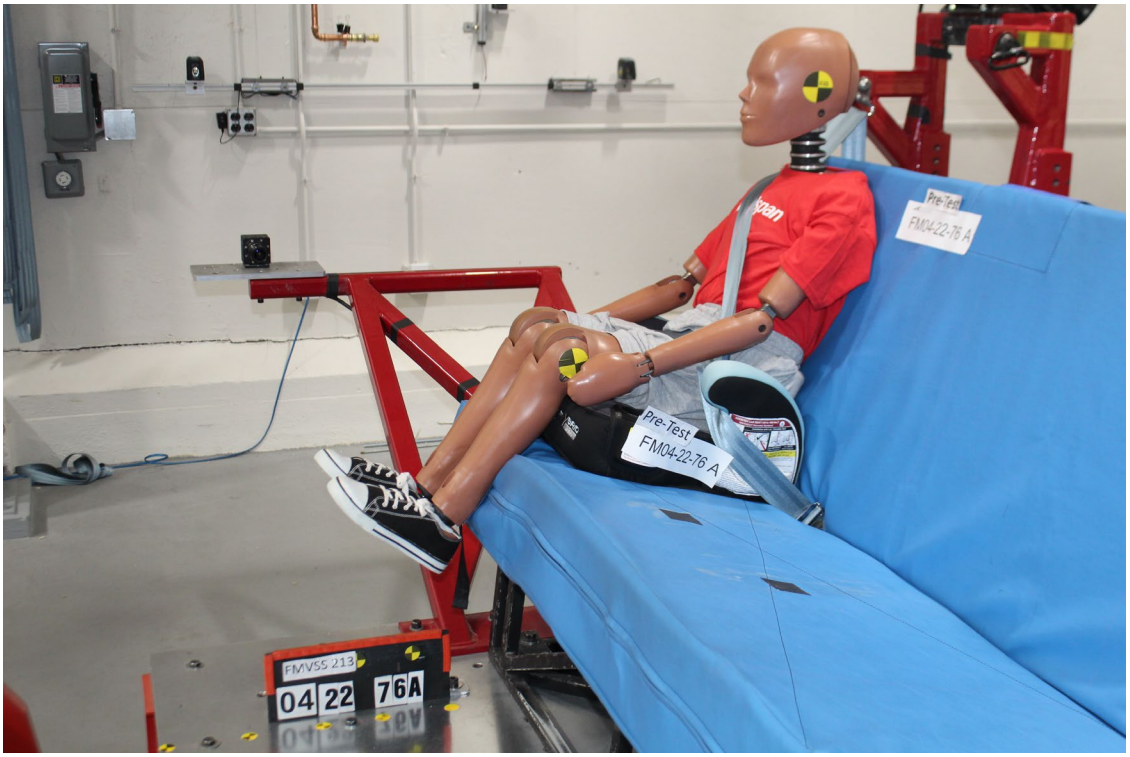
Pre-Test	FM04-22-076A





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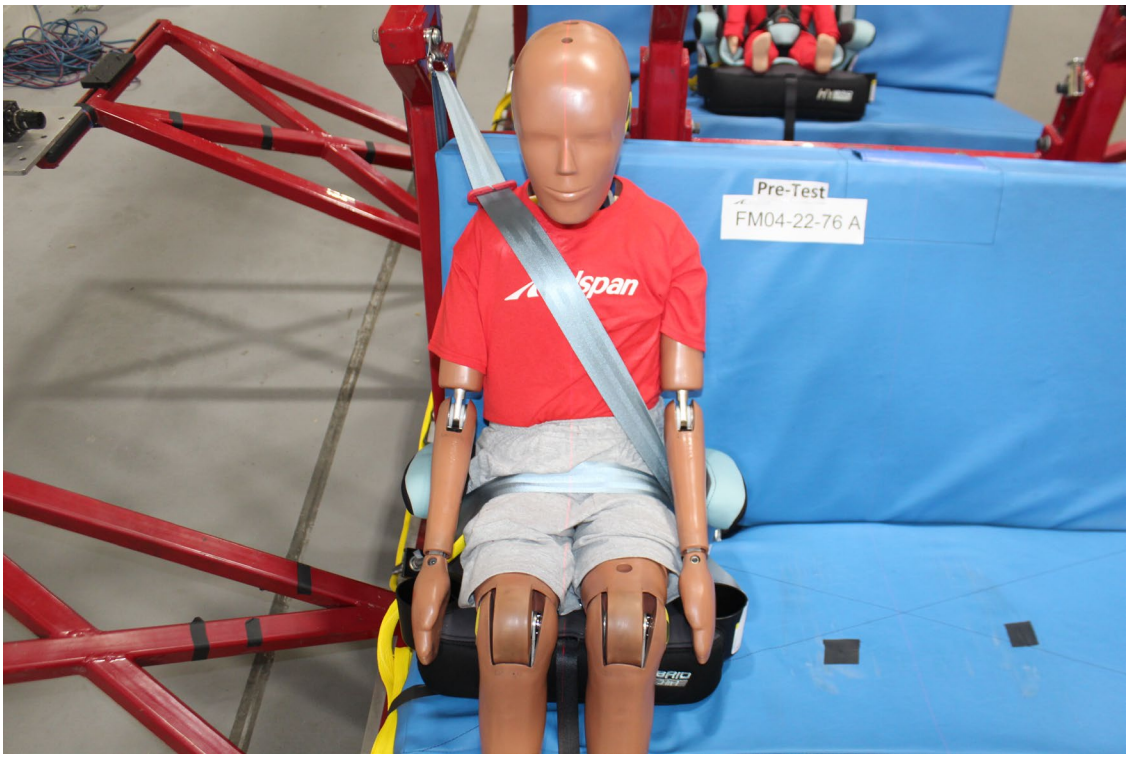

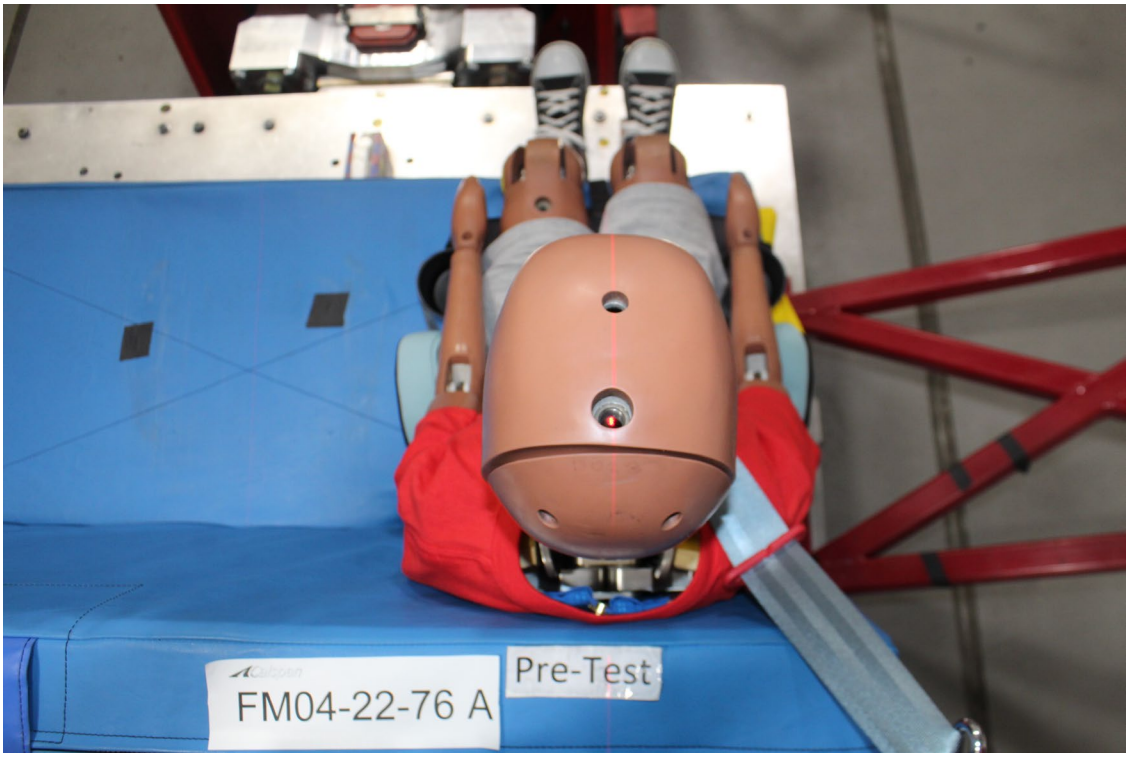

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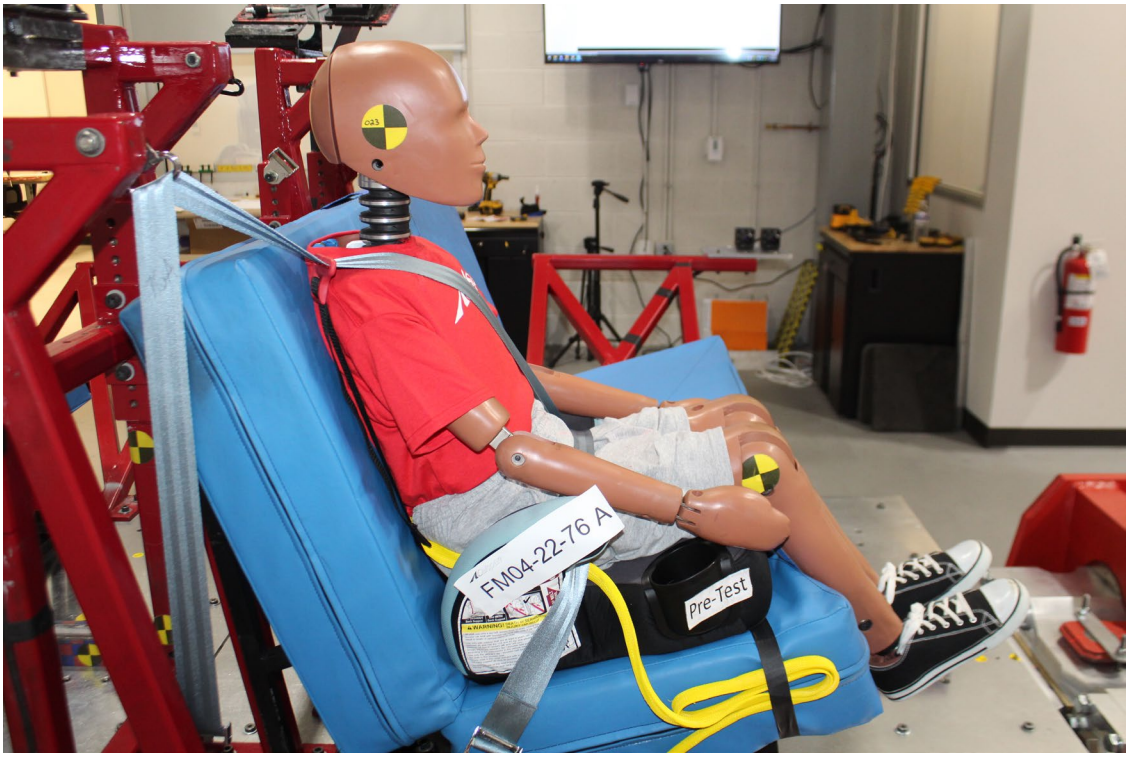

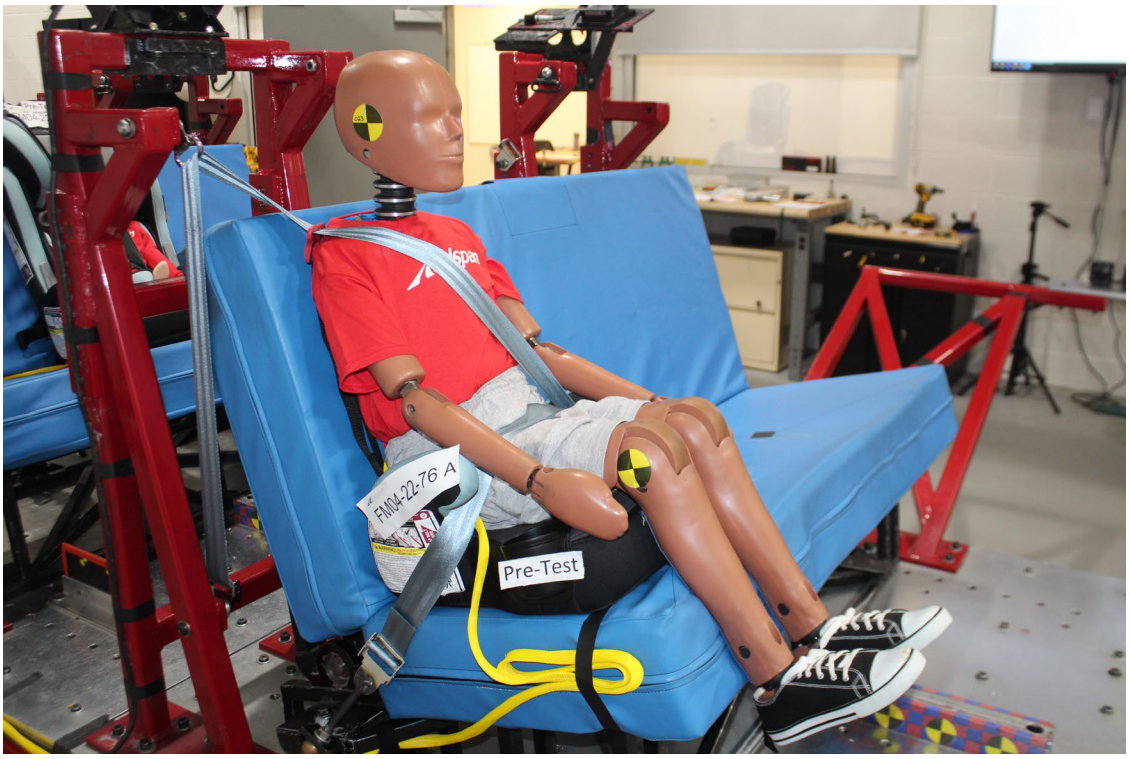

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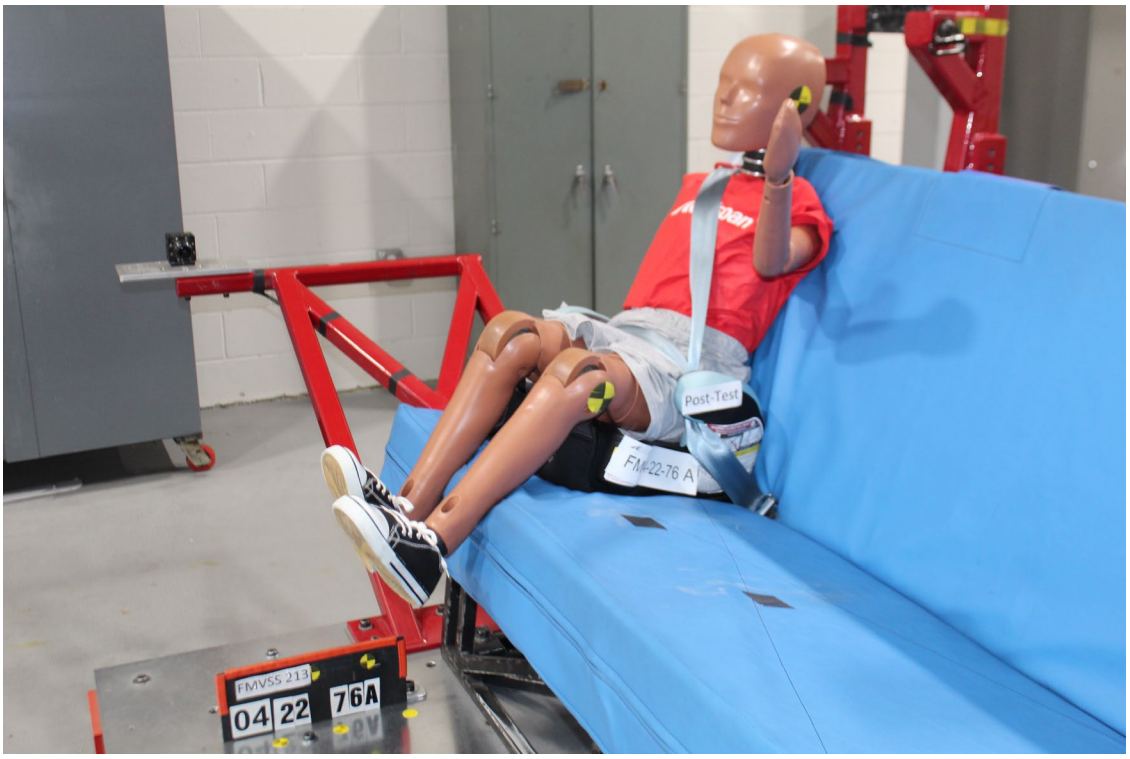

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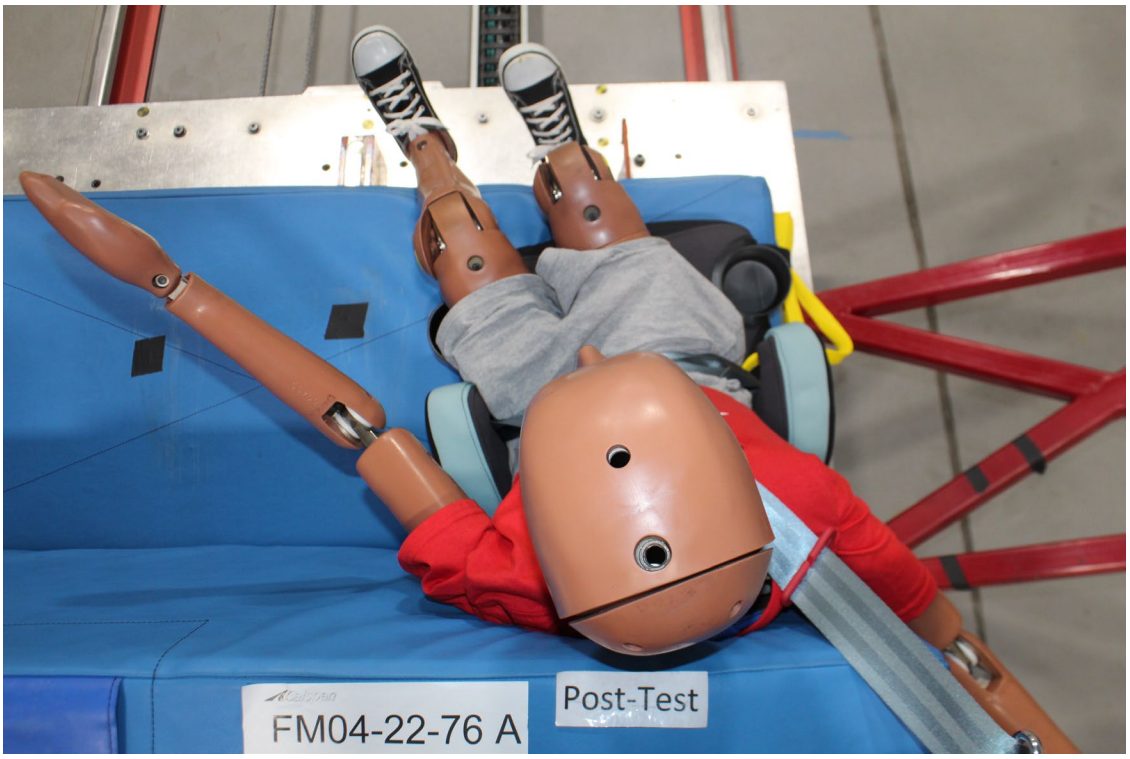
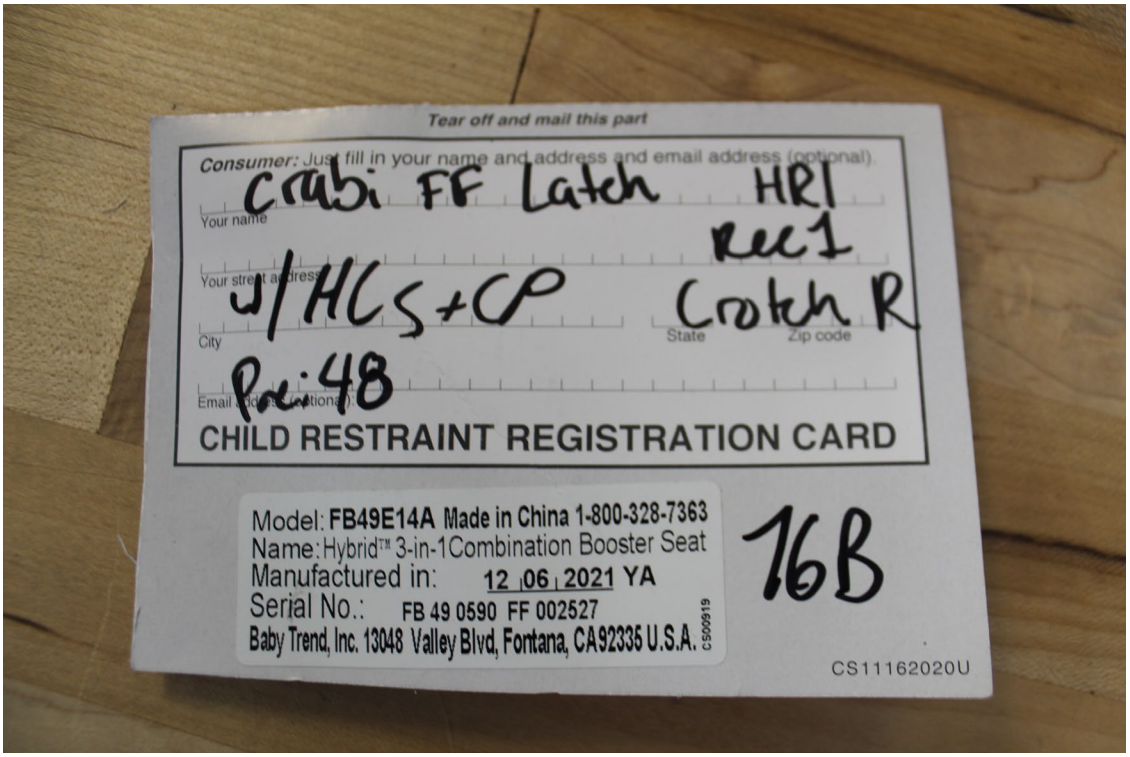
Post Test	FM04-22-076A



004-FB49E14A-01-TH3FFN3FB Post Test	213-CAL-22-004 FM04-22-076A

Dynamic Test Photos

004-FB49E14A-02-12CFFNLFU Pre-Test	213-CAL-22-004 FM04-22-076B



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004-FB49E14A-02-12CFFNLFU Pre-Test	213-CAL-22-004 FM04-22-076B

004-FB49E14A-02-12CFFNLFU Pre-Test	213-CAL-22-004 FM04-22-076B

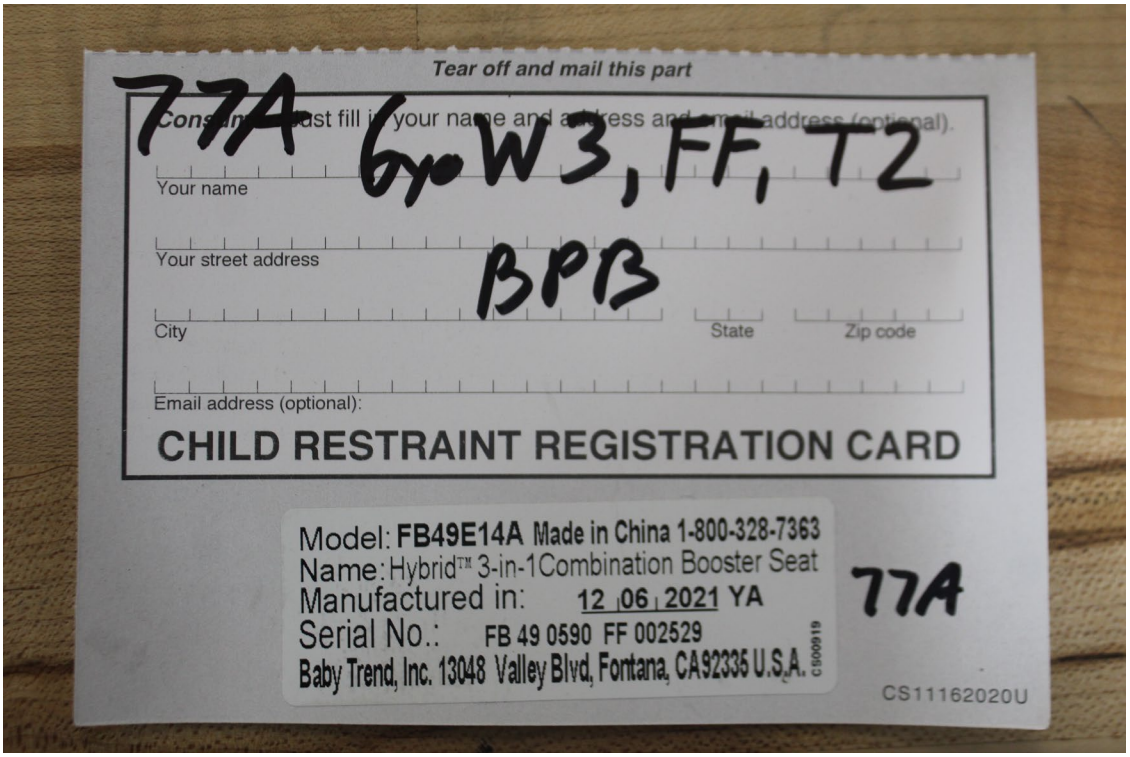
004-FB49E14A-02-12CFFNLFU	213-CAL-22-004
Post Test	FM04-22-076B

004-FB49E14A-02-12CFFNLFU	213-CAL-22-004
Post Test	FM04-22-076B

004-FB49E14A-02-12CFFNLFU Post Test	213-CAL-22-004 FM04-22-076B

Dynamic Test Photos

004-FB49E14A-03-6W3FFN3FF Pre-Test	213-CAL-22-004 FM04-22-077A



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Pre-Test	FM04-22-077A

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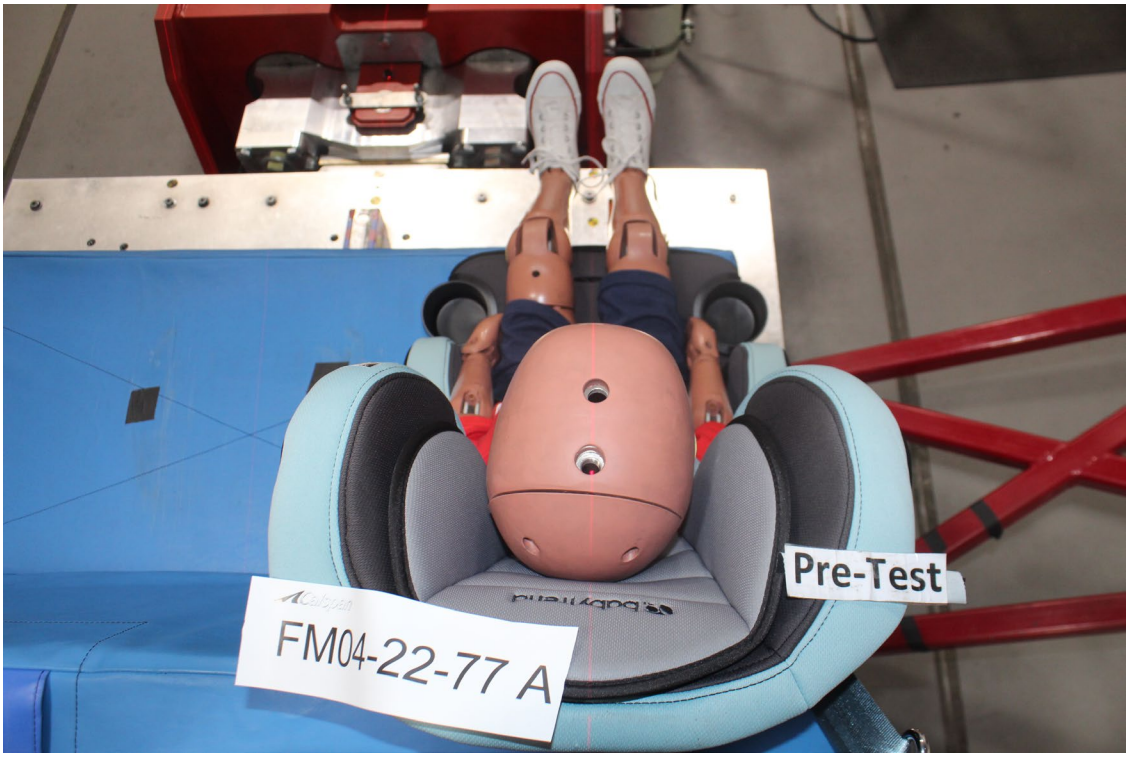

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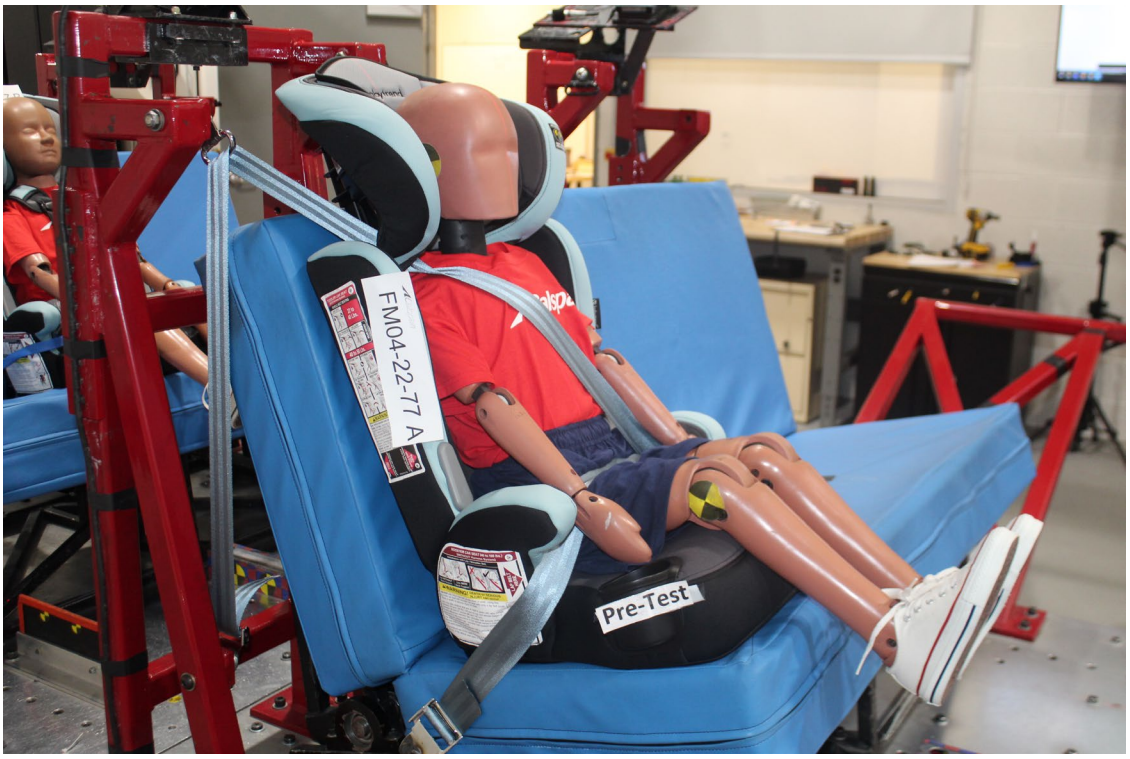

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Post Test	FM04-22-077A

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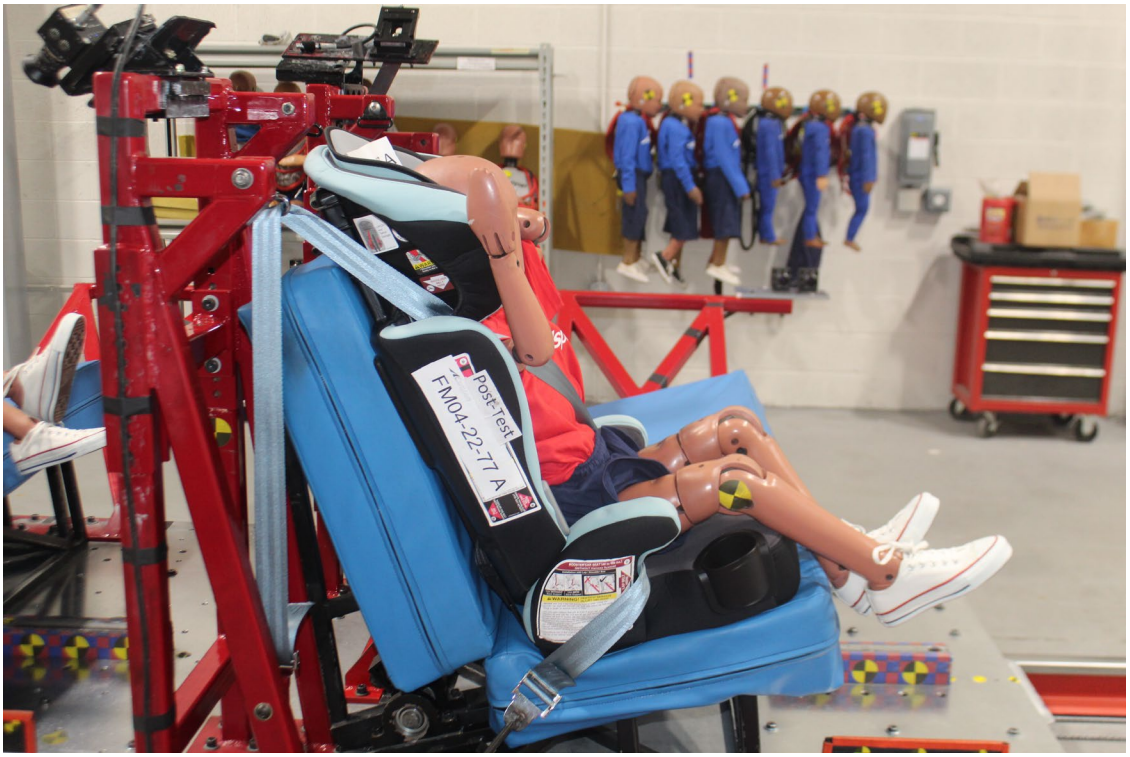
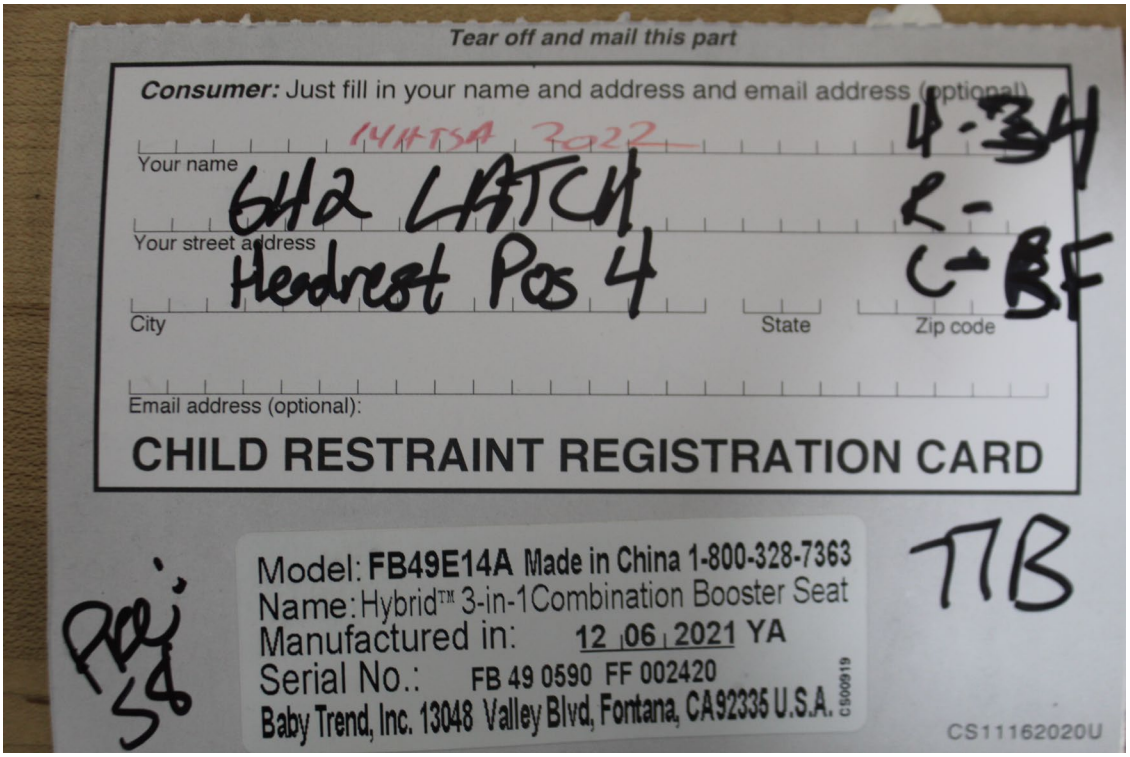
Post Test	FM04-22-077A



Dynamic Test Photos

004-FB49E14A-04-6H2FFNLFF Pre-Test	213-CAL-22-004 FM04-22-077B



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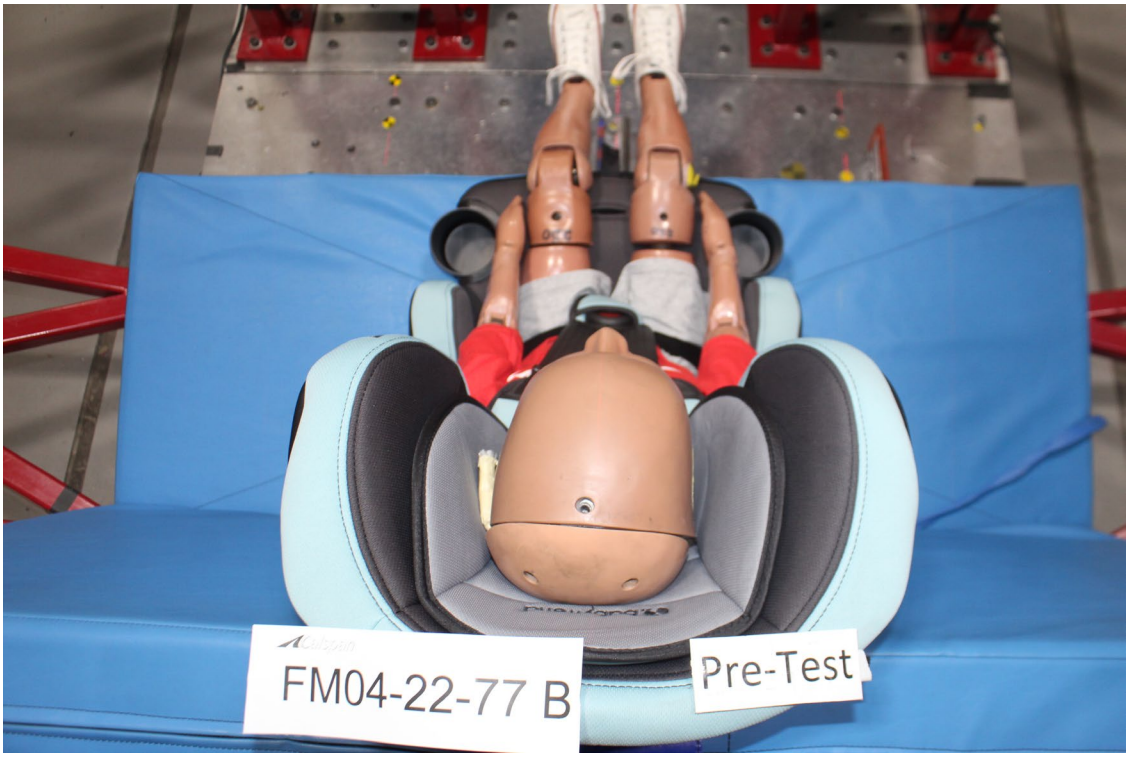
Pre-Test	FM04-22-077B



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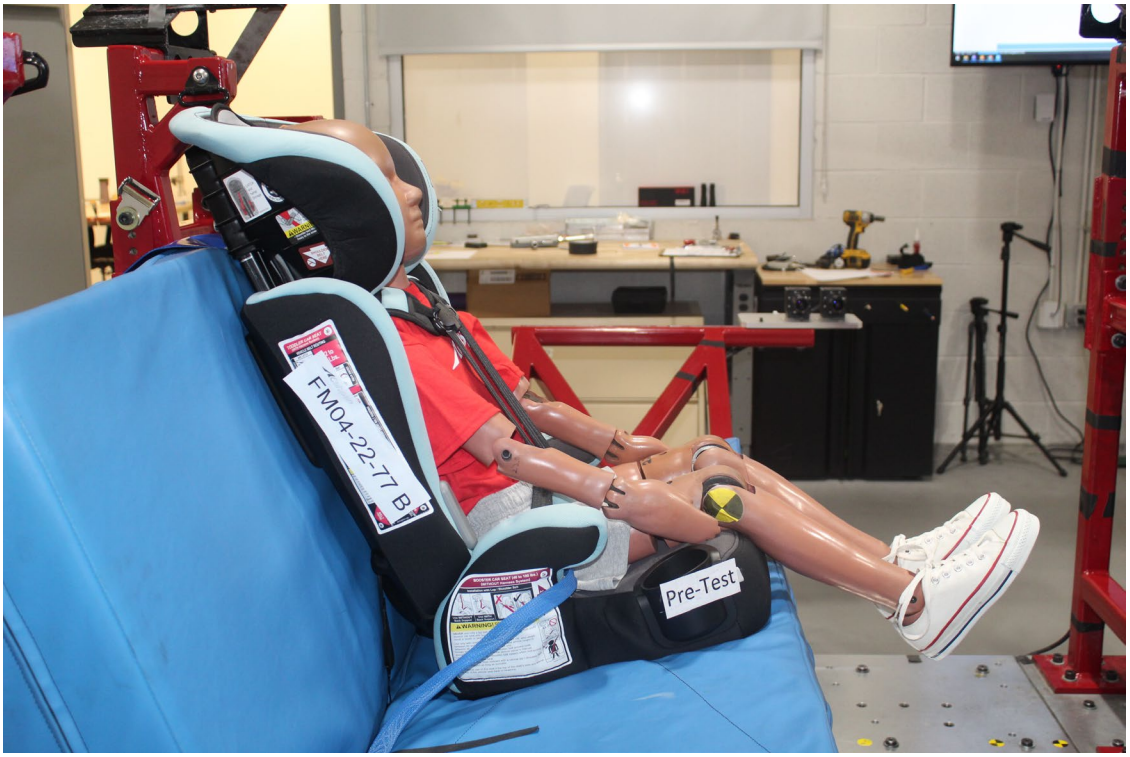
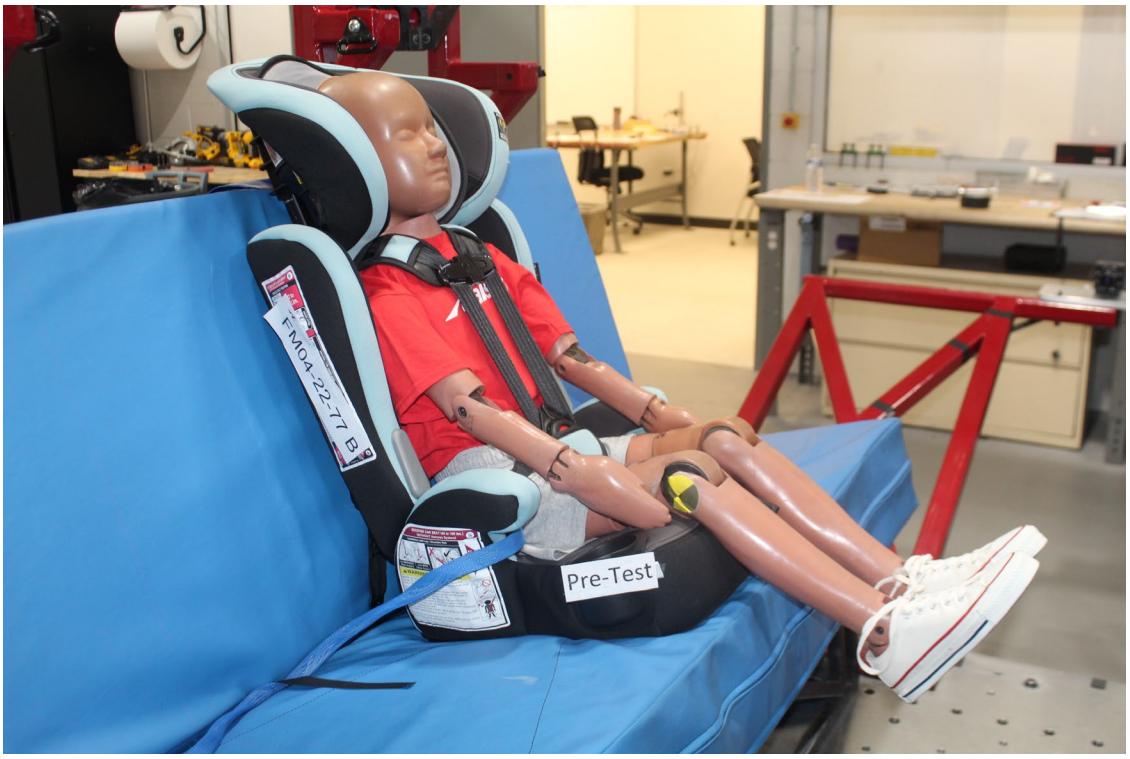
Pre-Test	FM04-22-077B





004-FB49E14A-04-6H2FFNLFF	213-CAL-22-004
Post Test	FM04-22-077B

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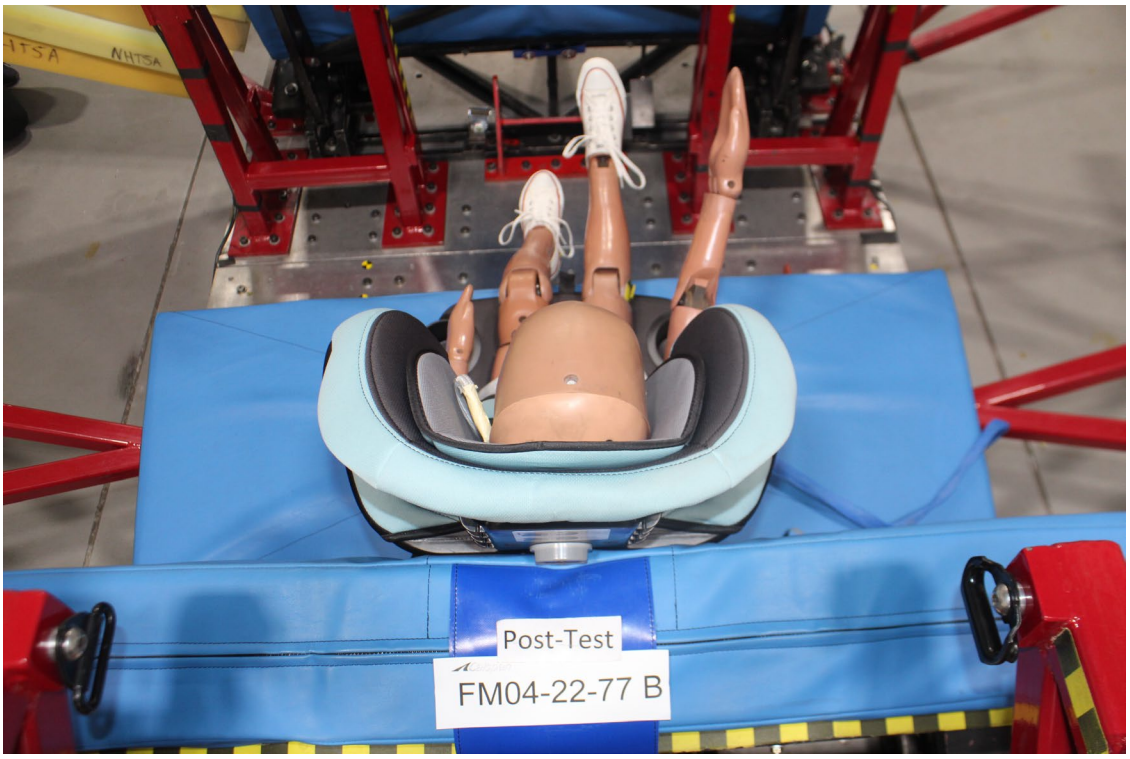
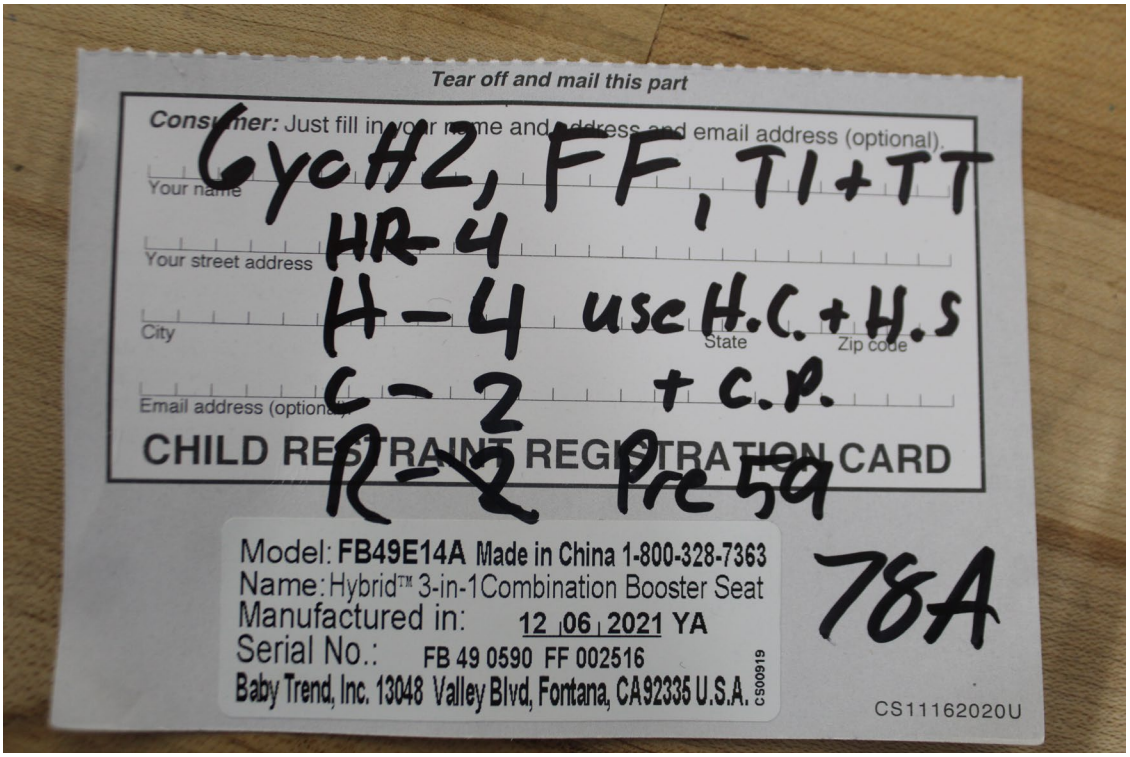
Post Test	FM04-22-077B



004-FB49E14A-04-6H2FFNLFF	213-CAL-22-004
Post Test	FM04-22-077B

Dynamic Test Photos

004-FB49E14A-05-6H2FFN2TU	213-CAL-22-004
Pre-Test	FM04-22-078A



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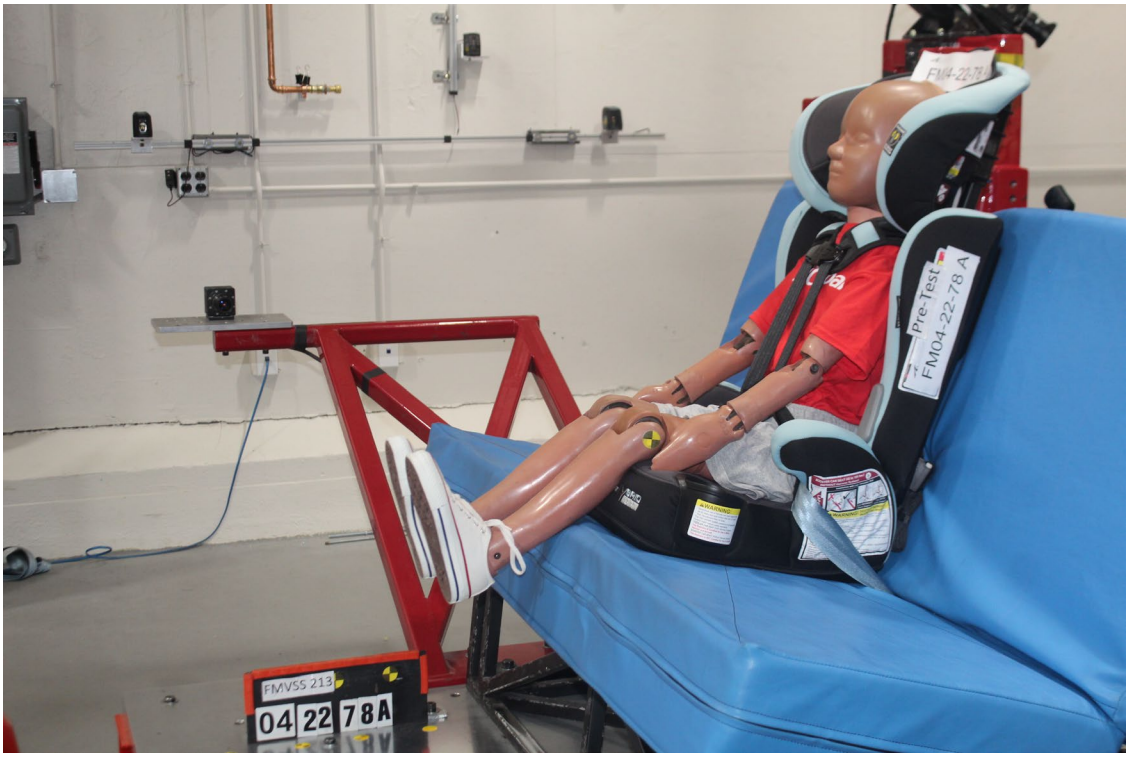

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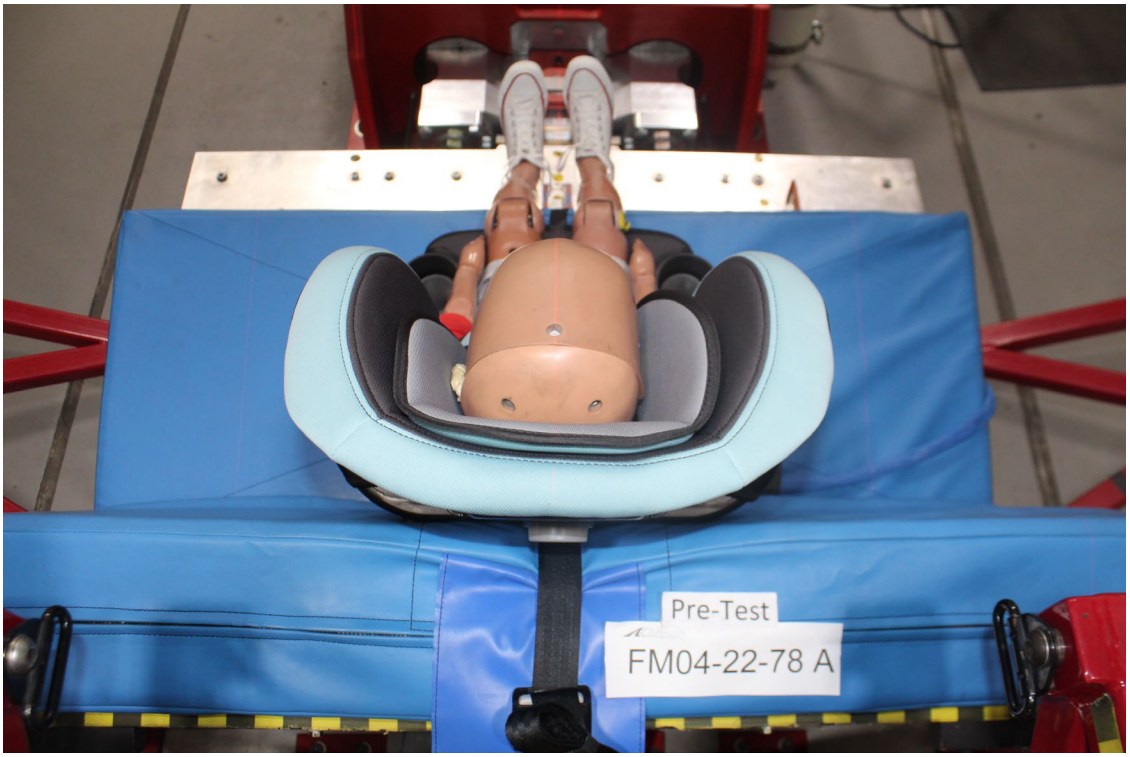
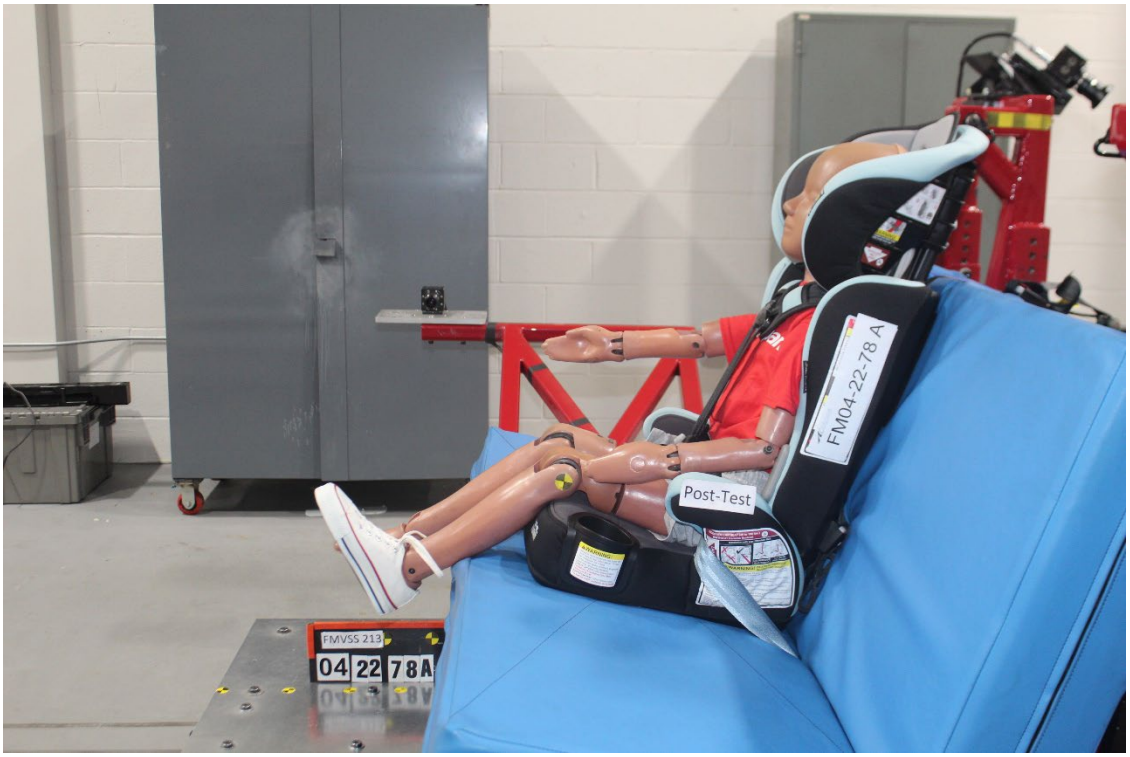
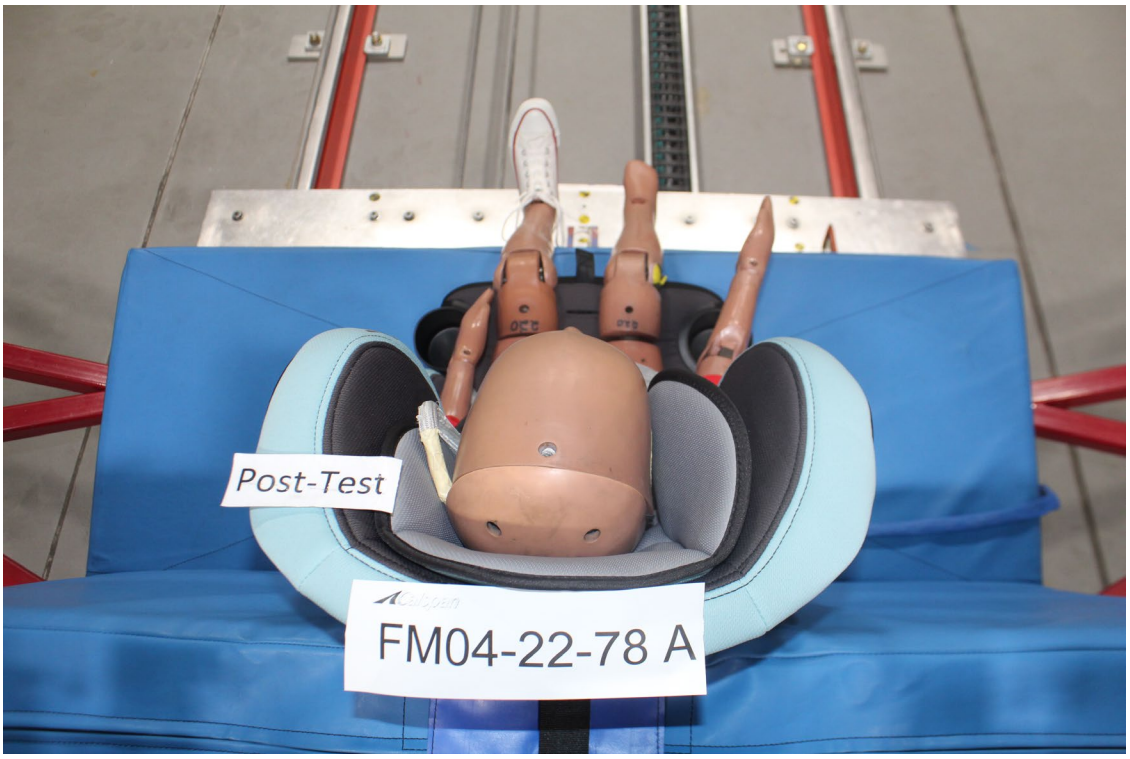


004-FB49E14A-05-6H2FFN2TU Pre-Test	213-CAL-22-004 FM04-22-078A

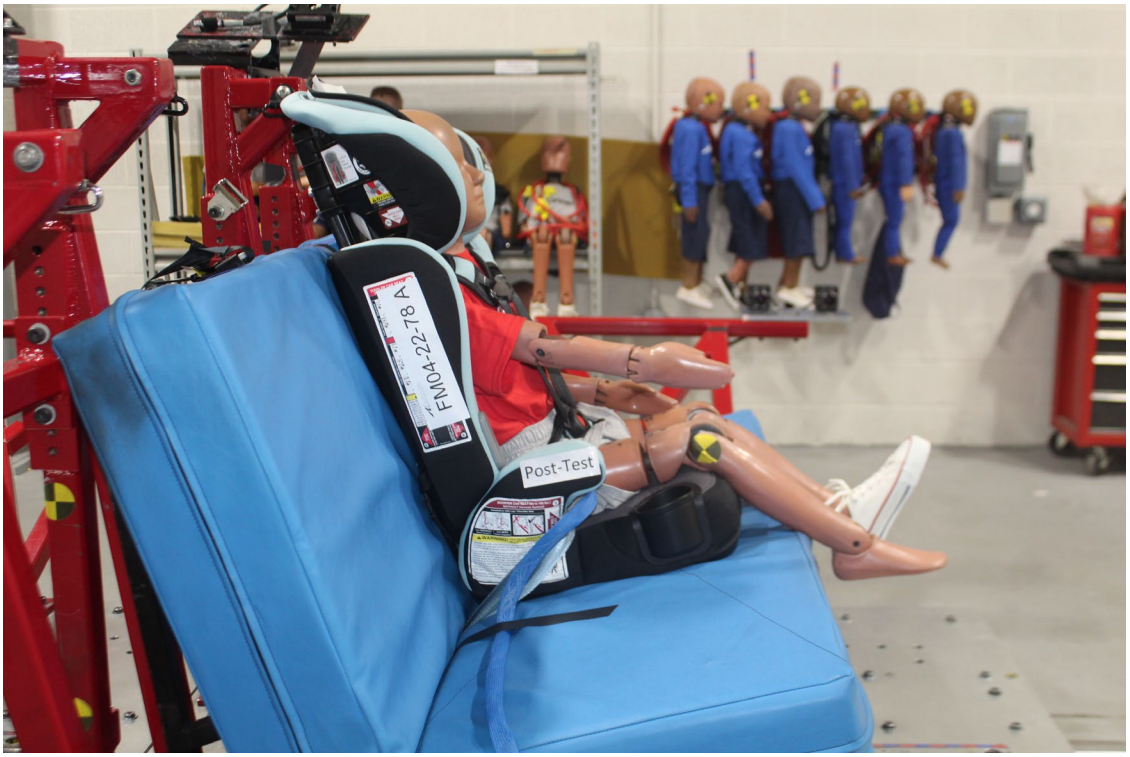
004-FB49E14A-05-6H2FFN2TU Post-Test	213-CAL-22-004 FM04-22-078A



004-FB49E14A-05-6H2FFN2TU Post-Test	213-CAL-22-004 FM04-22-078A

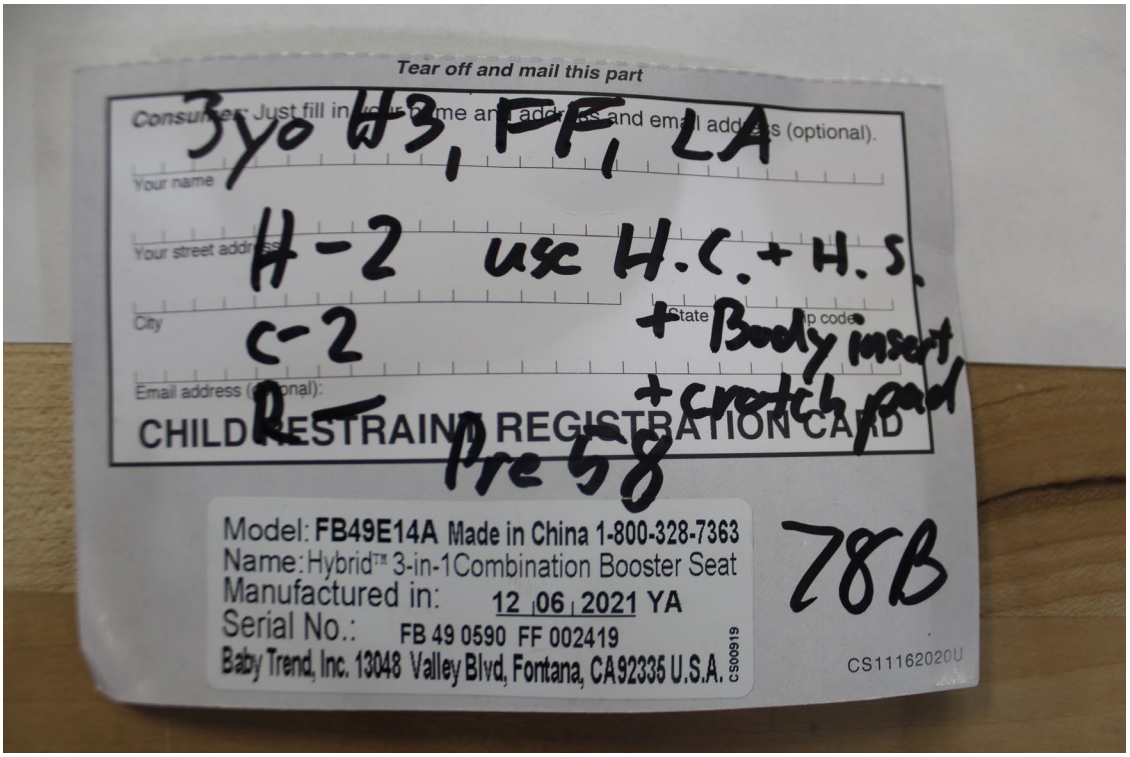


004-FB49E14A-05-6H2FFN2TU Post-Test	213-CAL-22-004 FM04-22-078A



Dynamic Test Photos

004-FB49E14A-06-3H3FFNLFU	213-CAL-22-004
Pre-Test	FM04-22-078B



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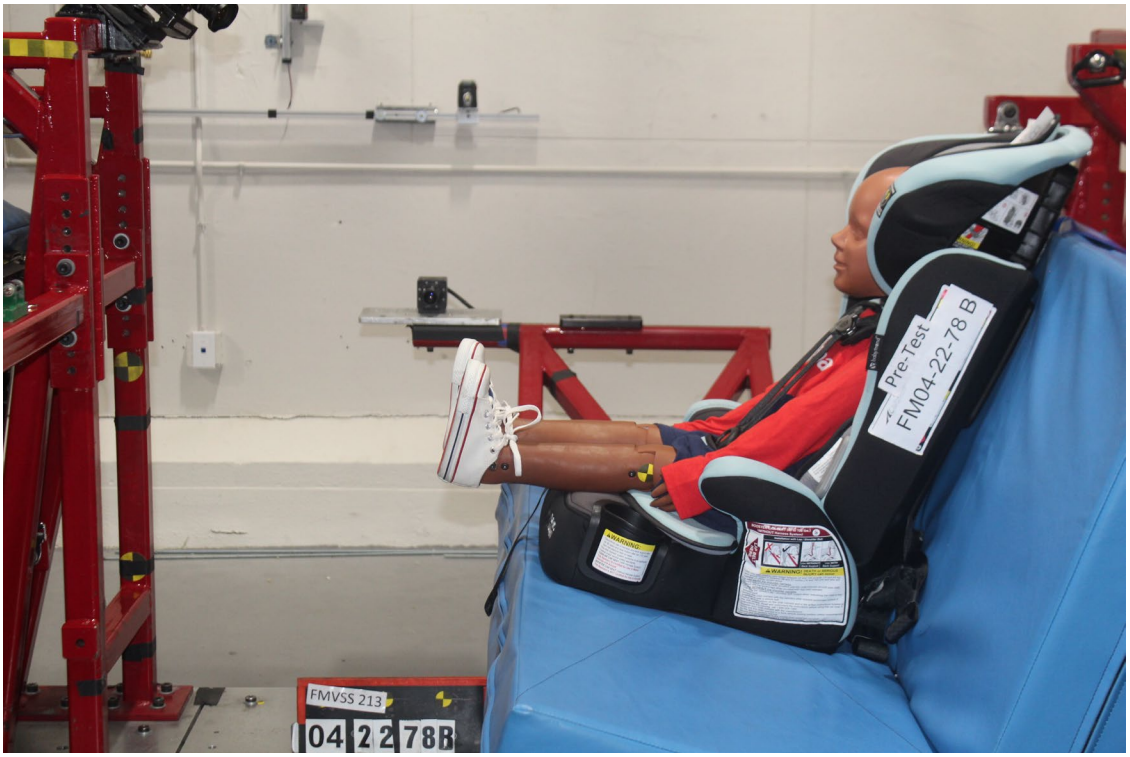

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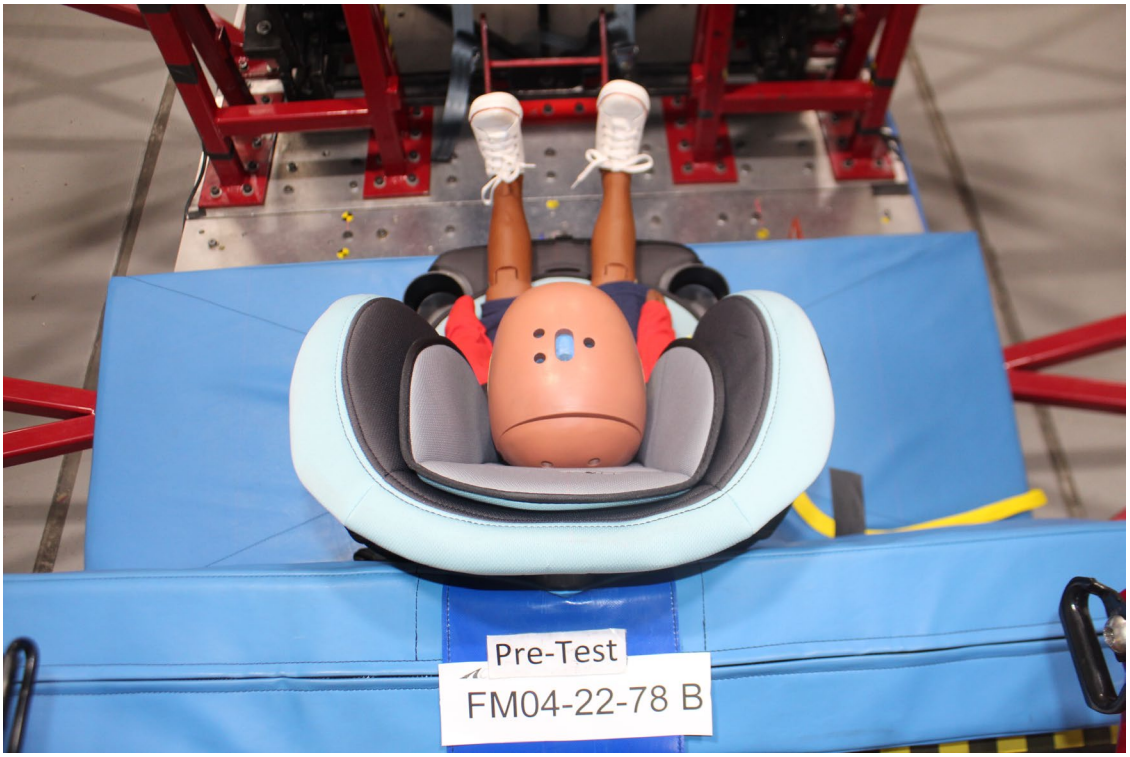
Pre-Test	FM04-22-078B



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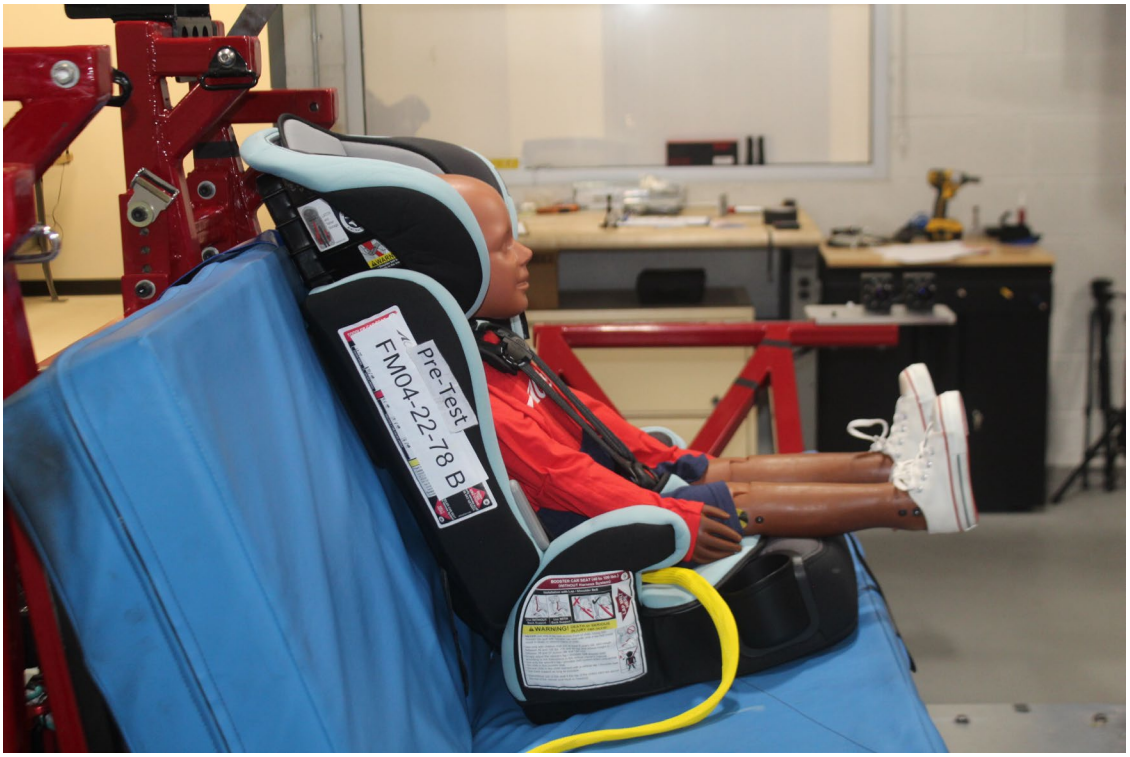
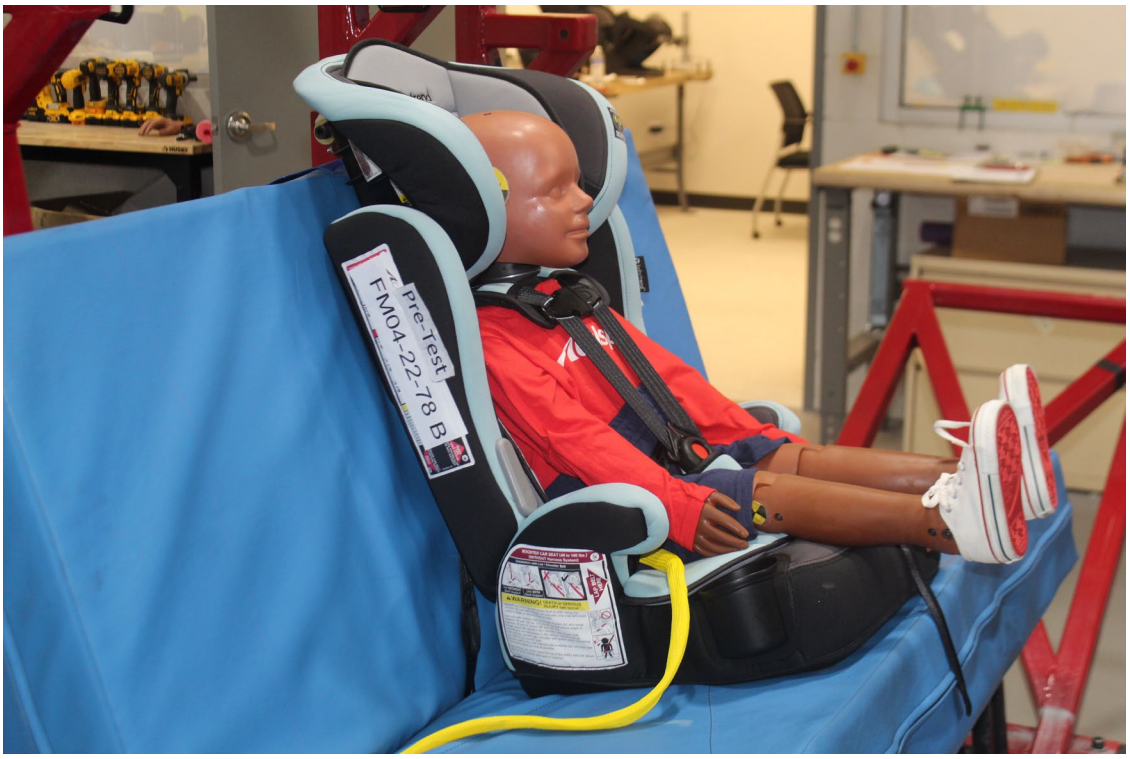
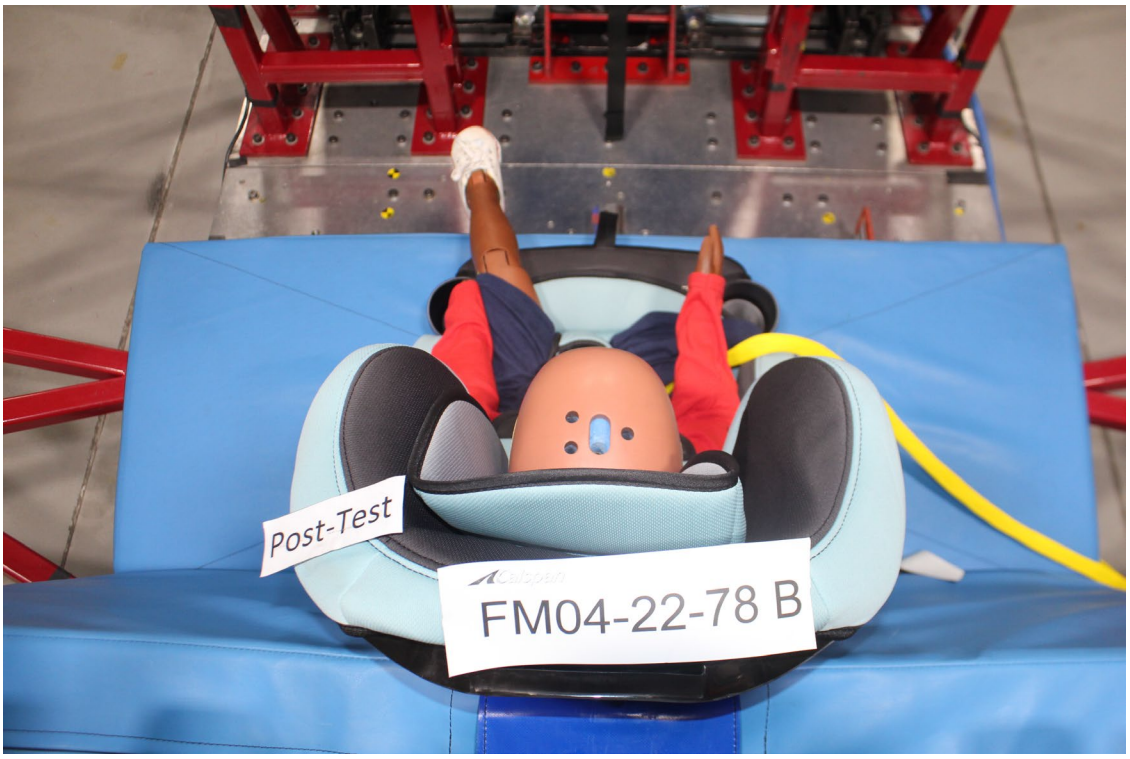


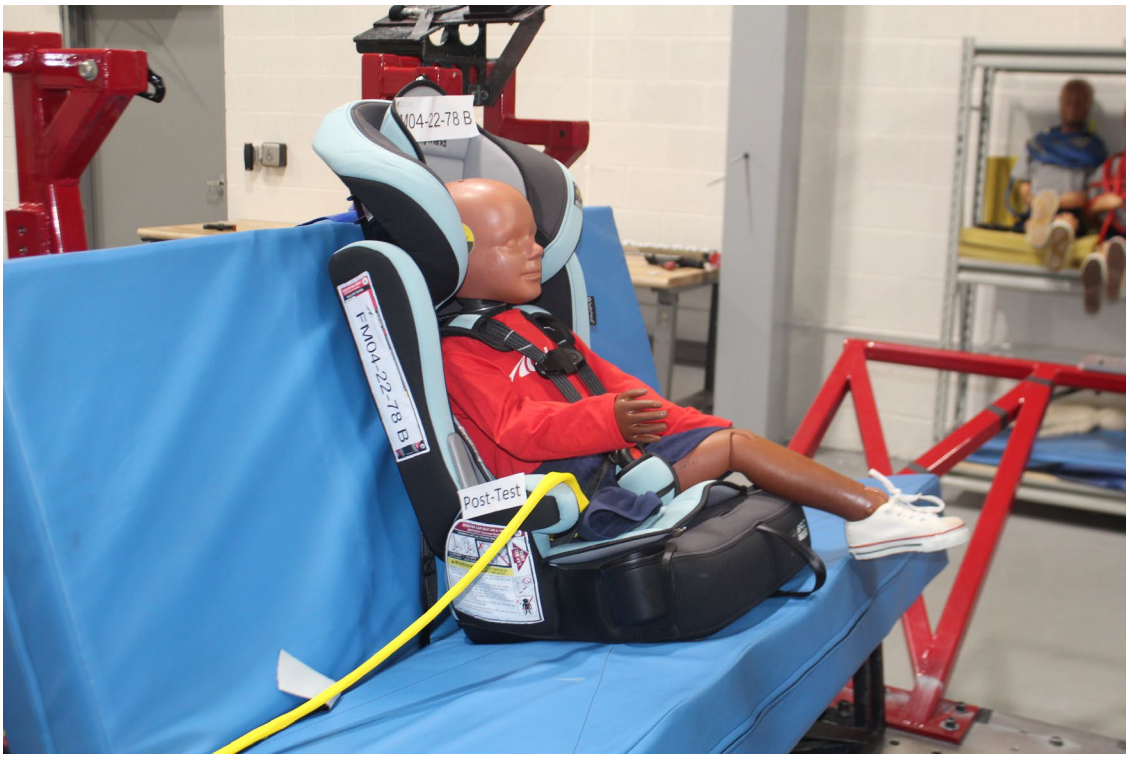


004-FB49E14A-06-3H3FFNLFU	213-CAL-22-004
Post Test	FM04-22-078B

004-FB49E14A-06-3H3FFNLFU	213-CAL-22-004
Post Test	FM04-22-078B



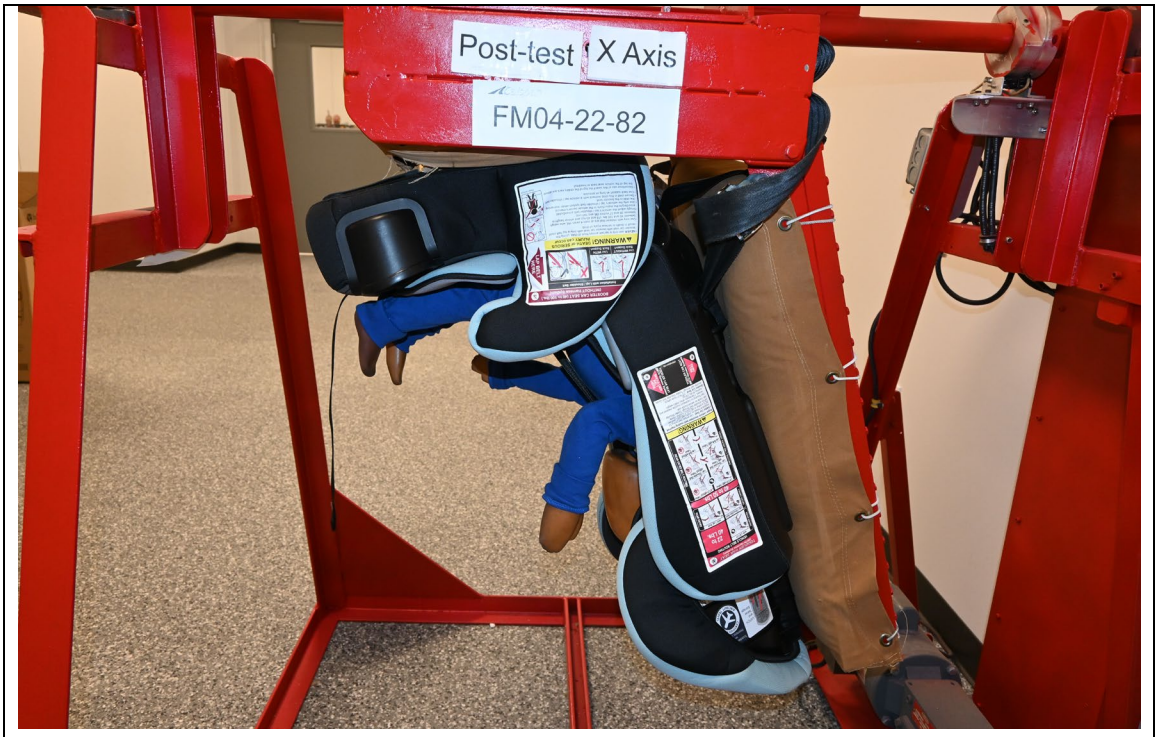
004-FB49E14A-06-3H3FFNLFU	213-CAL-22-004
Post Test	FM04-22-078B



Inversion Test Photos

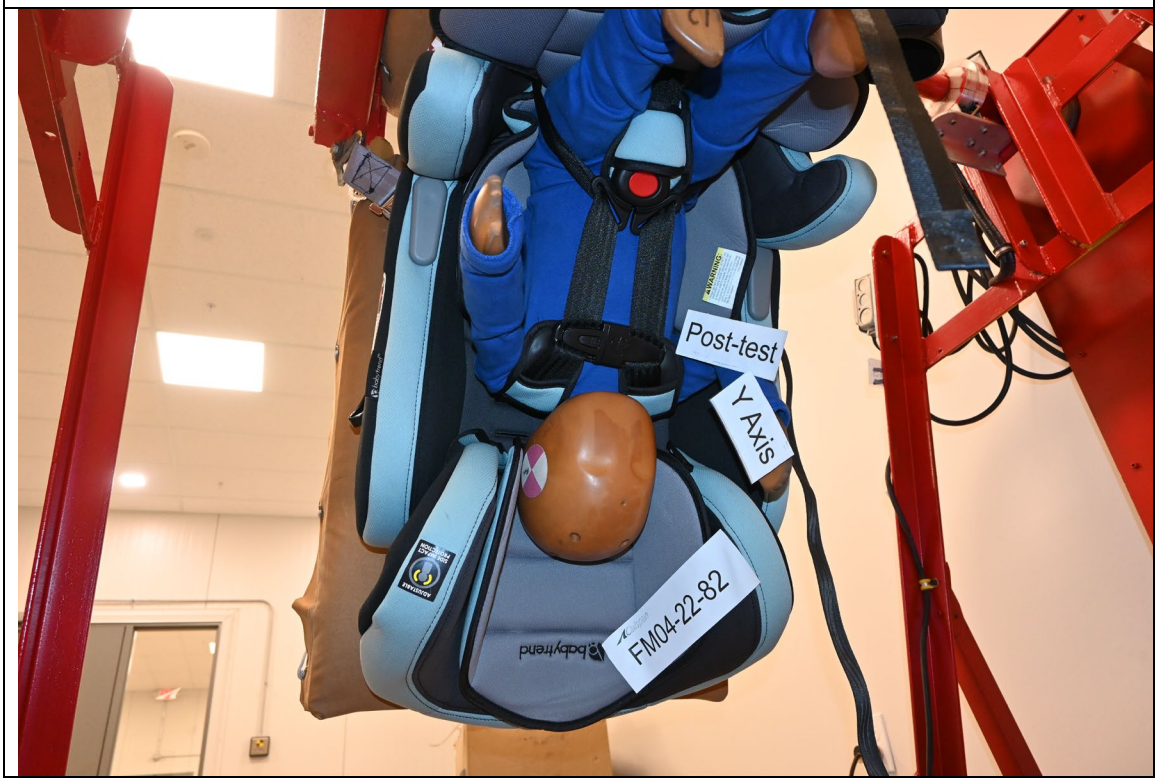
004-FB49E14A-Inv01-12CFFN2FU Pre-Test X-Axis	213-CAL-22-004 FM04-22-082

004-FB49E14A-Inv01-12CFFN2FU 213-CAL-22-004
Post-Test X-Axis FM04-22-082



004-FB49E14A-Inv01-12CFFN2FU	213-CAL-22-004
Pre Test Y-Axis	FM04-22-082

004-FB49E14A-Inv01-12CFFN2FU 213-CAL-22-004
Post Test Y-Axis FM04-22-082



Inversion Test Photos

004-FB49E14A-Inv02-3H3FFN2FU Pre-Test X-Axis	213-CAL-22-004 FM04-22-083

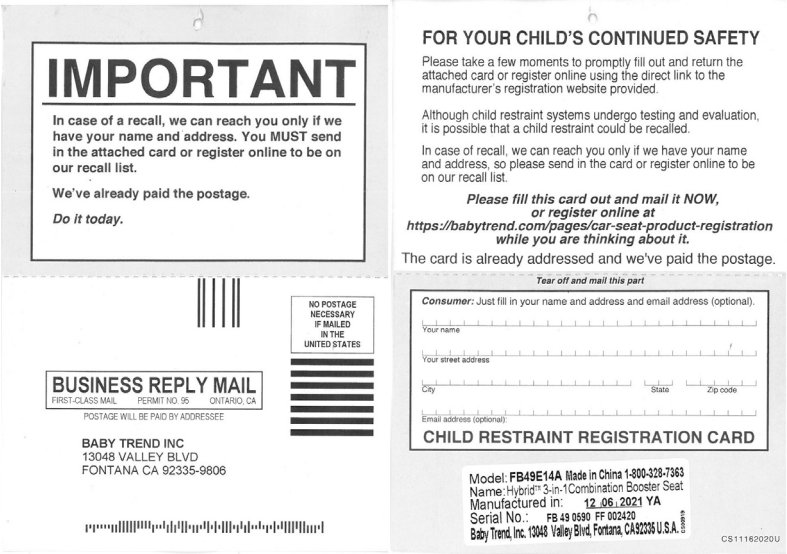
004-FB49E14A-Inv02-3H3FFN2FU 213-CAL-22-004
Post-Test X-Axis FM04-22-083

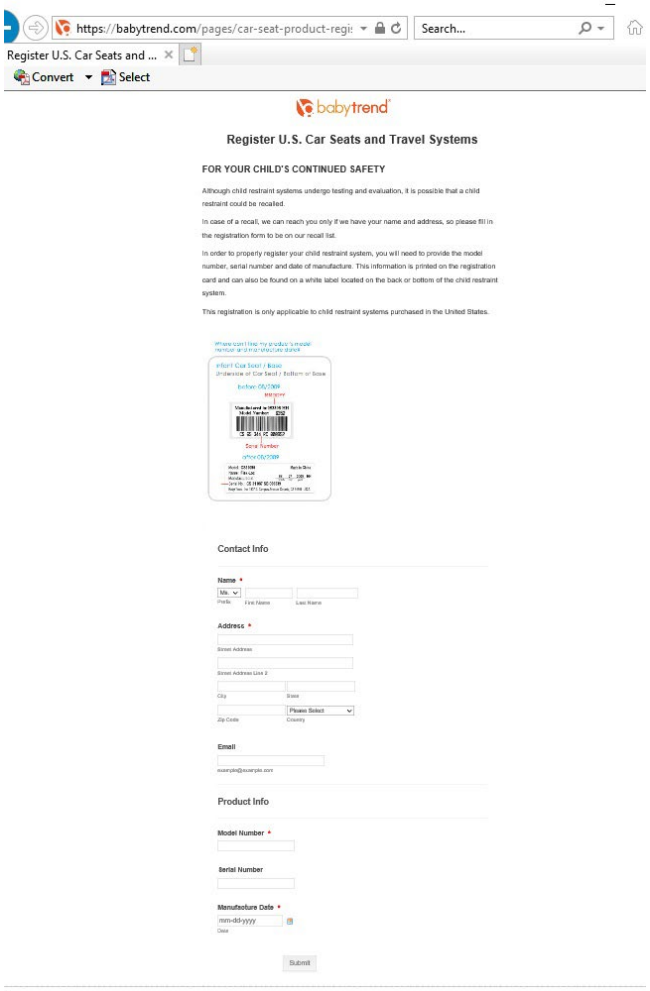
004-FB49E14A-Inv02-3H3FFN2FU	213-CAL-22-004
Pre Test Y-Axis	FM04-22-083

004-FB49E14A-Inv02-3H3FFN2FU	213-CAL-22-004
Post Test Y-Axis	FM04-22-083

Inspection Photos

Registration 213-CAL-22-004	
004-FB49E14A-01-TH3FFN3FB	004-FB49E14A-02-12CFFNLFU
004-FB49E14A-03-6W3FFN3FF	004-FB49E14A-04-6H2FFNLFF
004-FB49E14A-05-6H2FFN2TU	004-FB49E14A-06-3H3FFNLFU





Label Photos

Labels 213-CAL-22-004	
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004-FB49E14A-03-6W3FFN3FF	004-FB49E14A-04-6H2FFNLFF
004-FB49E14A-05-6H2FFN2TU	004-FB49E14A-06-3H3FFNLFU

Label Photos

Labels 213-CAL-22-004	
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004-FB49E14A-03-6W3FFN3FF	004-FB49E14A-04-6H2FFNLFF
004-FB49E14A-05-6H2FFN2TU	004-FB49E14A-06-3H3FFNLFU

Label Photos

Labels 213-CAL-22-004	
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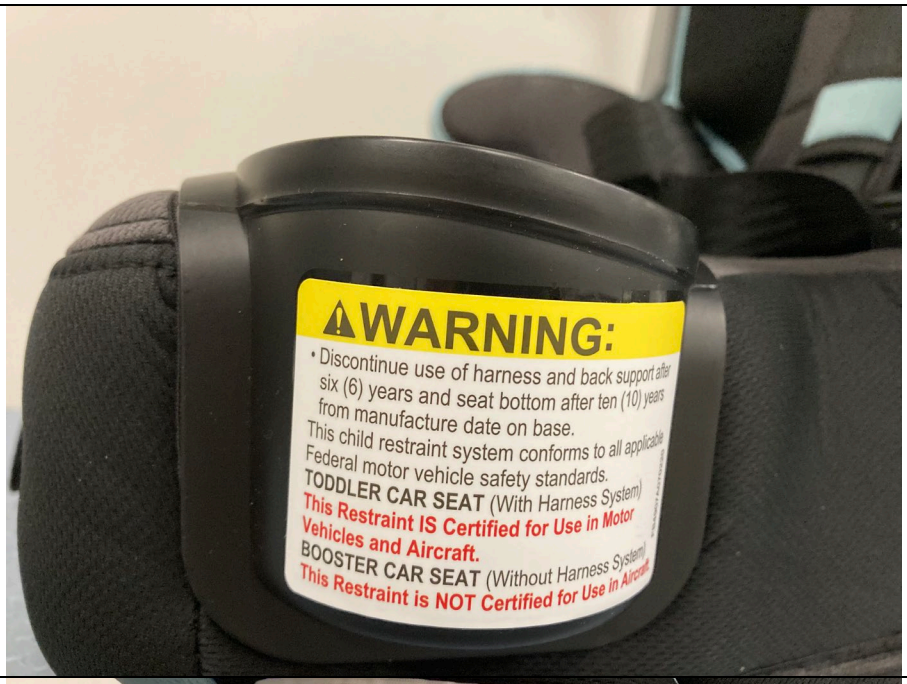

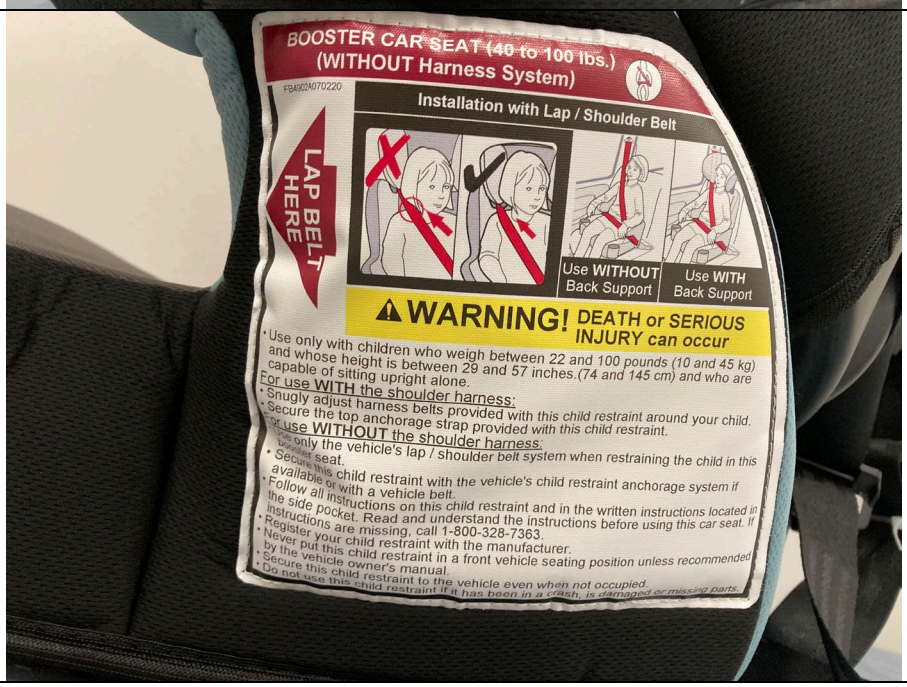

Label Photos

Labels
213-CAL-22-004

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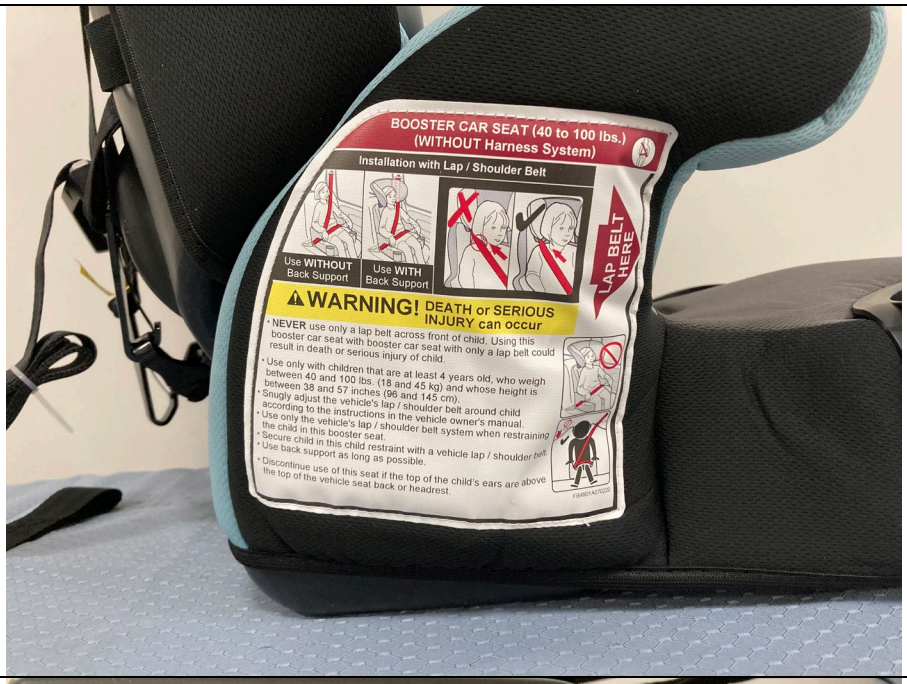

Label Photos

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213-CAL-22-004

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004-FB49E14A-05-6H2FFN2TU	004-FB49E14A-06-3H3FFNLFU

Label Photos

Labels 213-CAL-22-004	
004-FB49E14A-01-TH3FFN3FB	004-FB49E14A-02-12CFFNLFU
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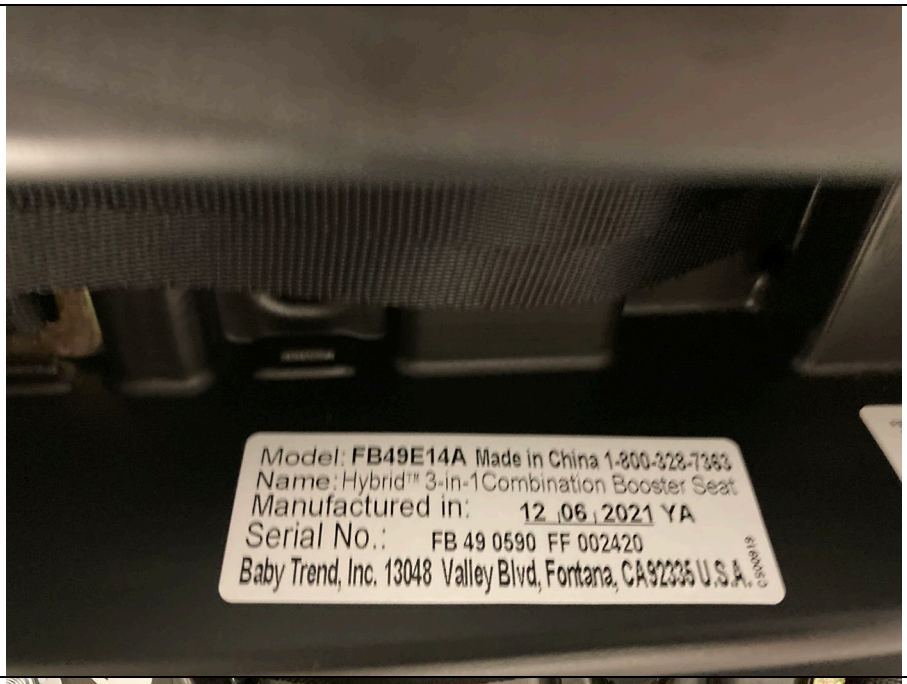

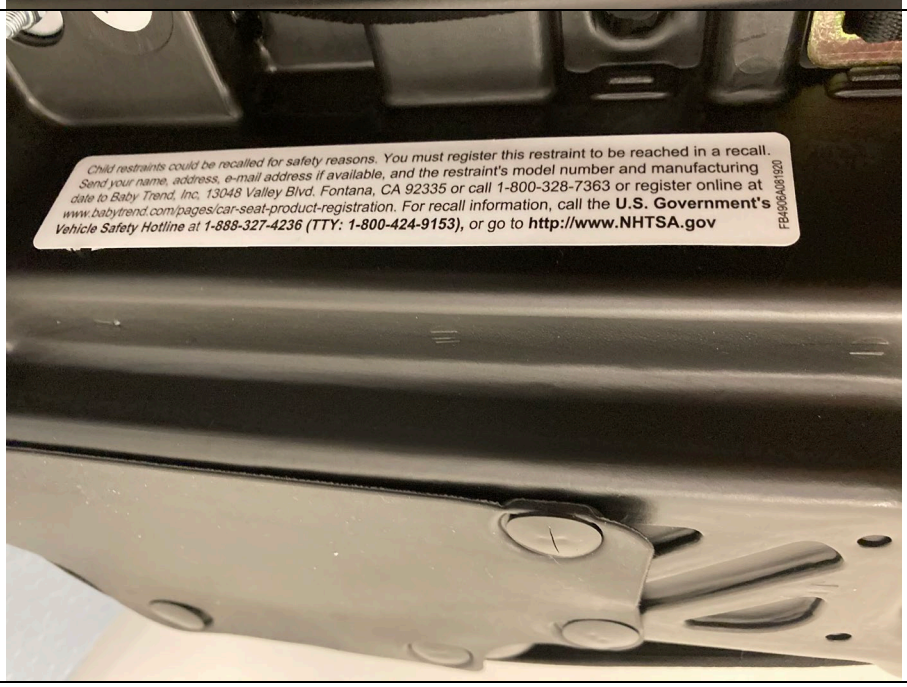

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004-FB49E14A-05-6H2FFN2TU	004-FB49E14A-06-3H3FFNLFU