

**Vehicle Research and Test Center
FMVSS 213 Testing
CRABI 12 Month Old**

**Prepared By:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319**



Summary Report

March – May 2020

**Prepared For
Vehicle Research and Test Center
P. O. Box 37
East Liberty, OH 43319**

SECTION 1
PURPOSE AND SUMMARY FOR 12 MONTH OLD CRABI

The purpose of the testing is: 1) to determine whether test data from the revised FMVSS No. 213 bench is repeatable and reproducible when compared to other test facility results; and, 2) to refine additional test procedure measures to improve R&R.

SUMMARY

A CRABI 12 month old dummy (serial number 094) was secured in the right rear occupant position (position 3 or P3) in a rearward facing child restraint system (CRS) and a forward facing child restraint system (CRS). The CRABI 12 month old was instrumented with head, chest, and pelvic triaxial accelerometers, and upper neck, and lumbar force and moment load cells. During this test series the dummy was restrained with lower anchors only (LA Only).

Section 2 contains the testing performed using a rearward facing infant safety seat. Section 3 contains testing performed using a forward facing CRS. Section 4 contains the dummy certification information.

SECTION 2
REARWARD FACING CRS TEST SUMMARY

TEST DUMMY INFORMATION

Description	Position # 3 CRS
ATD Type/Serial No.	CRABI 12 Month Old/094
Restrain System	LA Only
CRS Direction	Rearward Facing
Foam Cushion	WB11, WB8

CAMERA POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Origin	mm	0.00	0.00	0.00
N1 Passenger Side	mm	370.48	904.19	-393.15
N4 Passenger Head Excursion	mm	819.09	902.81	-459.87

DUMMY POSITIONING

CRS: Evenflo Embrace 35 – Rearward Facing Infant – LA Only

TRC Test Number: S200513-1

VRTC Test Number: FR_RR1_24



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Frame Back	mm	-116.84	-348.84	-683.03
Top of Seat	mm	666.42	-349.20	-633.08
Top of Head	mm	535.09	-351.91	-657.84
Bridge of Nose	mm	448.15	-352.66	-615.32
Head CG Outboard	mm	507.28	-290.73	-593.42
Chest Clip	mm	401.25	-352.81	-486.02
Buckle	mm	296.39	-351.05	-395.06
Base Center	mm	637.40	-351.06	-280.17
Rear Seat Back Middle	mm	609.67	-350.00	-395.70
Center of Top of Base	mm	168.05	-351.80	-317.46
Center of Seat Frame Bottom	mm	617.03	-350.57	-109.41
Target 1 - Seat Side Upper	mm	628.61	-251.88	-496.42
Target 4 - Seat Side Lower	mm	469.54	-174.13	-279.89
Target 2 - Seat Base H-Point	mm	389.45	-164.84	-281.97
Target 3 - Seat Base Side	mm	126.84	-198.69	-253.92
Handle	mm	447.25	-109.36	-351.10

DUMMY INJURY

HIC (36 ms)	566
Chest Clip (3 ms)	53.69 g

DUMMY POSITIONING

CRS: Evenflo Embrace 35 – Rearward Facing Infant – LA Only

TRC Test Number: S200513-2

VRTC Test Number: FR_RR1_26



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Frame Back	mm	-116.90	-348.76	-682.91
Top of Seat	mm	671.85	-348.38	-633.56
Top of Head	mm	538.15	-349.71	-656.27
Bridge of Nose	mm	455.17	-349.47	-613.51
Head CG Outboard	mm	514.49	-287.41	-591.20
Chest Clip	mm	404.34	-349.75	-485.64
Buckle	mm	295.96	-352.08	-397.37
Base Center	mm	643.01	-349.01	-282.80
Rear Seat Back Middle	mm	615.44	-348.08	-397.96
Center of Top of Base	mm	174.04	-351.61	-321.78
Center of Seat Frame Bottom	mm	616.96	-350.61	-110.40
Target 1 - Seat Side Upper	mm	631.64	-246.67	-497.63
Target 4 - Seat Side Lower	mm	469.91	-171.67	-280.97
Target 2 - Seat Base H-Point	mm	395.04	-161.99	-278.19
Target 3 - Seat Base Side	mm	127.45	-202.83	-253.77
Handle	mm	454.68	-105.91	-351.86

DUMMY INJURY

HIC (36 ms)	617
Chest Clip (3 ms)	58.68 g

DUMMY POSITIONING

CRS: Evenflo Embrace 35 – Rearward Facing Infant – LA Only

TRC Test Number: S200514-1

VRTC Test Number: FR_RR1_28



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Frame Back	mm	-117.17	-347.89	-682.82
Top of Seat	mm	668.62	-348.92	-631.97
Top of Head	mm	539.11	-351.84	-659.00
Bridge of Nose	mm	452.47	-351.04	-616.95
Head CG Outboard	mm	511.15	-289.44	-596.09
Chest Clip	mm	406.98	-348.43	-488.61
Buckle	mm	303.54	-349.90	-389.74
Base Center	mm	638.98	-349.24	-278.35
Rear Seat Back Middle	mm	610.65	-349.78	-395.32
Center of Top of Base	mm	167.97	-351.31	-319.14
Center of Seat Frame Bottom	mm	616.81	-350.69	-110.30
Target 1 - Seat Side Upper	mm	633.33	-253.66	-499.67
Target 4 - Seat Side Lower	mm	474.70	-173.33	-281.70
Target 2 - Seat Base H-Point	mm	391.69	-162.42	-280.54
Target 3 - Seat Base Side	mm	131.24	-192.81	-255.96
Handle	mm	452.41	-108.10	-351.36

DUMMY INJURY

HIC (36 ms)	556
Chest Clip (3 ms)	48.60 g

SECTION 3
REARWARD FACING CRS TEST SUMMARY

TEST DUMMY INFORMATION

Description	Position # 3 CRS
ATD Type/Serial No.	CRABI 12 Month Old/094
Restrain System	LA Only
CRS Direction	Forward Facing
Foam Cushion	WB11, WB8

CAMERA POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Origin	mm	0.00	0.00	0.00
N1 Passenger Side	mm	370.77	903.89	-393.47
N4 Passenger Head Excursion	mm	819.55	902.92	-460.62

DUMMY POSITIONING

CRS: Cosco Scenera Next – Forward Facing – LA Only

TRC Test Number: S200514-2

VRTC Test Number: FR_RR1_30



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Frame Back	mm	-117.59	-348.71	-682.35
Top of Seat	mm	-22.04	-351.45	-651.88
Top of Head	mm	146.10	-350.68	-623.43
Bridge of Nose	mm	237.12	-349.63	-592.14
Head CG Outboard	mm	180.54	-288.13	-561.61
Chest Clip	mm	289.85	-349.14	-474.31
Buckle	mm	414.76	-350.83	-379.23
Knee Outboard	Mm	478.36	-270.11	-354.91
Base Center	mm	618.86	-350.23	-336.03
Center of Seat Frame Bottom	mm	616.87	-350.64	-110.65
Target 1 - Seat Side Upper	mm	64.38	-220.27	-570.27
Target 4 - Seat Side Lower	mm	166.97	-223.35	-318.81
Target 2 - Seat Base H-Point	mm	347.78	-199.45	-256.66
Target 3 - Seat Base Side	mm	499.01	-216.93	-268.68

DUMMY INJURY

HIC (36 ms)	288
Chest Clip (3 ms)	33.63 g

DUMMY POSITIONING

CRS: Cosco Scenera Next – Forward Facing – LA Only

TRC Test Number: S200515-1

VRTC Test Number: FR_RR1_32



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Frame Back	mm	-117.16	-349.22	-682.78
Top of Seat	mm	-18.70	-349.69	-655.65
Top of Head	mm	148.95	-351.31	-626.52
Bridge of Nose	mm	238.61	-349.77	-592.33
Head CG Outboard	mm	181.70	-287.94	-563.09
Chest Clip	mm	287.85	-350.89	-477.87
Buckle	mm	417.59	-351.79	-380.45
Knee Outboard	Mm	478.98	-268.94	-356.34
Base Center	mm	612.68	-348.58	-330.12
Center of Seat Frame Bottom	mm	616.78	-350.51	-110.99
Target 1 - Seat Side Upper	mm	69.15	-215.31	-572.38
Target 4 - Seat Side Lower	mm	165.75	-214.67	-319.99
Target 2 - Seat Base H-Point	mm	340.46	-194.37	-262.62
Target 3 - Seat Base Side	mm	496.21	-213.93	-271.79

DUMMY INJURY

HIC (36 ms)	304
Chest Clip (3 ms)	35.96 g

DUMMY POSITIONING

CRS: Cosco Scenera Next – Forward Facing – LA Only

TRC Test Number: S200518-1

VRTC Test Number: FR_RR1_34



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Frame Back	mm	-117.19	-348.33	-682.87
Top of Seat	mm	-18.14	-352.13	-654.45
Top of Head	mm	145.10	-350.84	-625.96
Bridge of Nose	mm	234.81	-351.15	-590.61
Head CG Outboard	mm	180.07	-288.18	-564.28
Chest Clip	mm	288.25	-349.74	-475.73
Buckle	mm	415.55	-349.99	-377.28
Knee Outboard	Mm	475.83	-272.16	-356.36
Base Center	mm	613.74	-349.61	-332.76
Center of Seat Frame Bottom	mm	617.34	-350.61	-109.27
Target 1 - Seat Side Upper	mm	71.32	-215.76	-567.22
Target 4 - Seat Side Lower	mm	165.12	-217.34	-316.62
Target 2 - Seat Base H-Point	mm	340.62	-197.75	-259.64
Target 3 - Seat Base Side	mm	494.99	-218.47	-263.38

DUMMY INJURY

HIC (36 ms)	278
Chest Clip (3 ms)	34.89 g

DUMMY POSITIONING

CRS: Chicco KeyFit – Rearward Facing Infant – LA Only

TRC Test Number: S200519-1

VRTC Test Number: FR_RR1_36



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Frame Back	mm	-116.93	-348.89	-682.75
Top of Seat	mm	687.47	-349.44	-626.03
Top of Head	mm	581.93	-349.19	-636.85
Bridge of Nose	mm	493.56	-349.55	-598.18
Head CG Outboard	mm	552.40	-289.20	-571.94
Chest Clip	mm	446.31	-349.82	-488.11
Buckle	mm	326.34	-350.21	-396.26
Base Center	Mm	621.87	-349.63	-281.15
Rear Seat Back Middle	mm	693.05	-350.86	-431.25
Center of Top of Base	mm	130.66	-349.75	-361.81
Center of Seat Frame Bottom	mm	617.13	-350.47	-109.73
Target 1 - Seat Side Upper	mm	638.79	-224.61	-512.46
Target 4 - Seat Side Lower	mm	487.18	-193.63	-335.23
Target 2 - Seat Base H-Point	mm	384.25	-187.03	-325.52
Target 3 - Seat Base Side	mm	145.90	-170.40	-272.92
Handle	mm	431.70	-135.23	-407.08

DUMMY INJURY

HIC (36 ms)	359
Chest Clip (3 ms)	44.03 g

SECTION 4
DUMMY CALIBRATION DATA

Transportation Research Center Inc.

ATD Certification Report

Customer:

Vehicle Research and Test Center
10820 State Route 347
East Liberty, Ohio 43319

Anthropomorphic Device:

CRABI (12) Month Old
Serial No. 094
Certification No. 21



Transportation Research Center Inc.
P.O. Box B-67
10820 St. Rt. 347
East Liberty, OH 43319-0367

Table of Contents

Introduction	Page 3
Appendix A – Incoming Inspection	Page 4
Findings	Page 5
Photographs	Page 6
Summary of Action Items	Page 7
Appendix B – Test Results	Page 8
Front Head Drop Certification	Page 9
Rear Head Drop Certification	Page 11
Neck Flexion Certification	Page 13
Neck Extension Certification	Page 17
Front Thorax Certification	Page 21
Appendix C – TRC Inc. Quality Assurance	Page 23

Introduction

Customer Name: VRTC
Customer Contact: Bryan Crabtree
Email: Bryan.Crabtree.CTR@dot.gov
Phone: (937) 666-2011
Date Received: February 24, 2020
Date Completed: February 25, 2020

Special Instruction: N/A

This Certification Report meets the requirements set forth by the ANSI National Accreditation Board ISO/IEC 17025:2017 accreditation under the scope of Mechanical Testing for Crash Test Dummy Certification Testing (ANAB Certificate #L2187). **This testing certification shall not be reproduced, except in full, without written approval of TRC Inc.**

The evidence measurements of this Certification Report are traceable by the Serial Number and Certification Number located at the top of the first section for each certification.

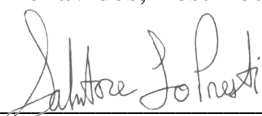
Each certification test was conducted by an authorized Transportation Research Center Inc. (TRC Inc.) employee within the requirements of the ISO/IEC 17025:2017 standards and adheres to CFR Part 572 Subparts B, E, N, O, P, R, T, U, V, SAE J2860, J2856, J2862; depending on ATD type. Any statements of conformity in this report are made using the shared risk method.

Each component of the ATD to be tested was contained in a temperature controlled environment for a period of at least 4 hours before the test. The temperature in the ATD Certification Laboratory was between 20.6°C and 22.2°C (69.08°F – 71.96°F). The relative humidity in the ATD Certification Laboratory was between 10% and 70%.

Date Testing Requested: 02/24/2020

Testing Conducted by: 
Robert Benavides, Test Technician III

Date: 02/25/2020

Testing Approved by: 
Sal LoPresti, Supervisor - Calibration Services

Date: 03/02/2020



Appendix A – Incoming Inspection





TRC ATD Laboratory As Received Inspection Report

Name: Robert Benavides

Date: 2/24/2020

Customer: VRTC

ATD S/N: 094

HEAD / NECK		
No.	Comments	Photo No.
1	None to report.	
2		
3		

THORAX / ABDOMEN		
No.	Comments	Photo No.
4	None to report.	
5		
6		

SHOULDERS / ARMS		
No.	Comments	Photo No.
7	None to report.	
8		
9		

PELVIS / LUMBAR		
No.	Comments	Photo No.
10	None to report.	
11		
12		

FEMUR / KNEES		
No.	Comments	Photo No.
13	None to report.	
14		
15		

LOWER LEGS / FEET		
No.	Comments	Photo No.
16	None to report.	
17		
18		





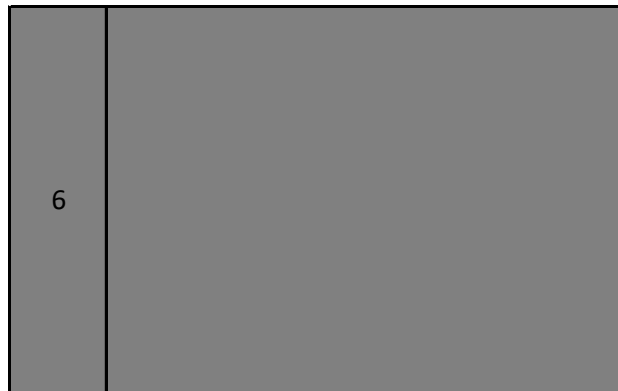
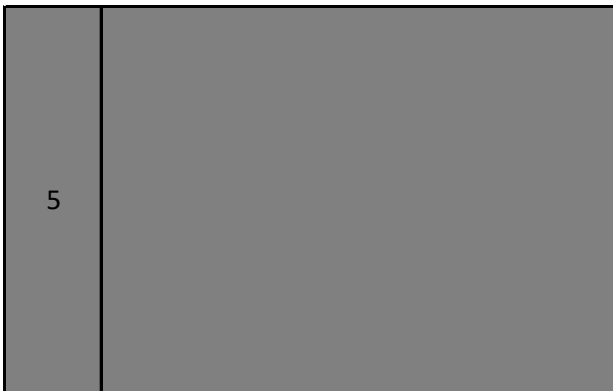
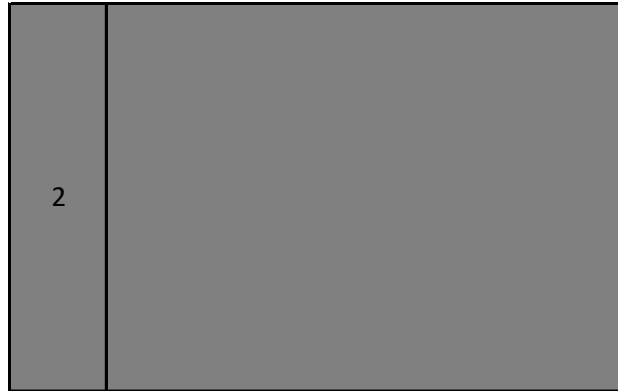
TRC ATD Laboratory As Received Inspection Photos

Name: Robert Benavides

Date: 2/24/2020

Customer: VRTC

ATD S/N: 094





TRC ATD Laboratory Inspection Report Action Items

Name: Robert Benavides

Date: 2/24/2020

Customer: VRTC

ATD S/N: 094

Action #1	None to report.
Resolution #1	
Action #2	
Resolution #2	
Action #3	
Resolution #3	
Comments	



Appendix B – Test Results



Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 094 Certification No. 21-1

Test Date: 2/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Peak Head Resultant Acceleration	100 - 120 g	108.6 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-2.0 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	< 17 %	10.00 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: DN0340

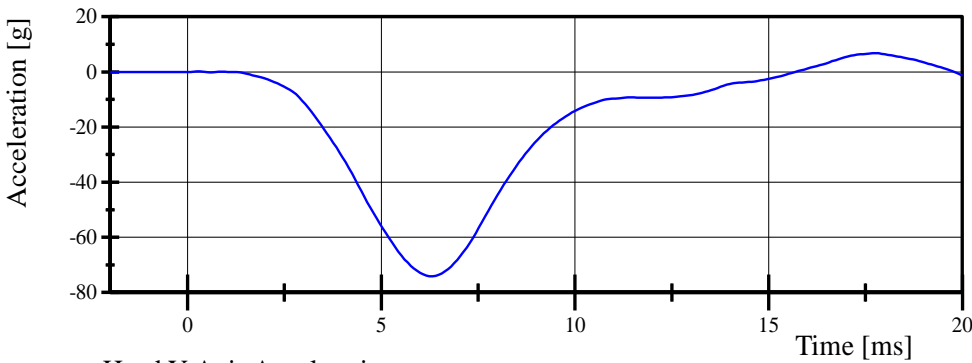
Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 094 Certification No. 21-1

Test Date: 2/25/2020

Head X-Axis Acceleration

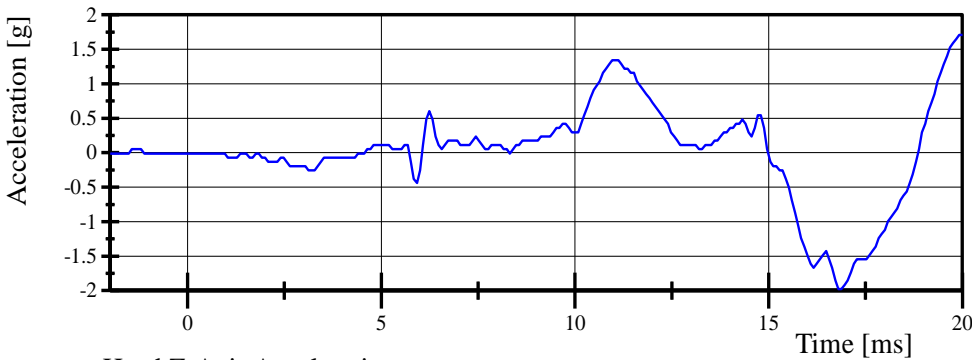


Filter Class: CFC_1000

Max: 6.8 g at 17.8 ms

Min: -74.1 g at 6.2 ms

Head Y-Axis Acceleration

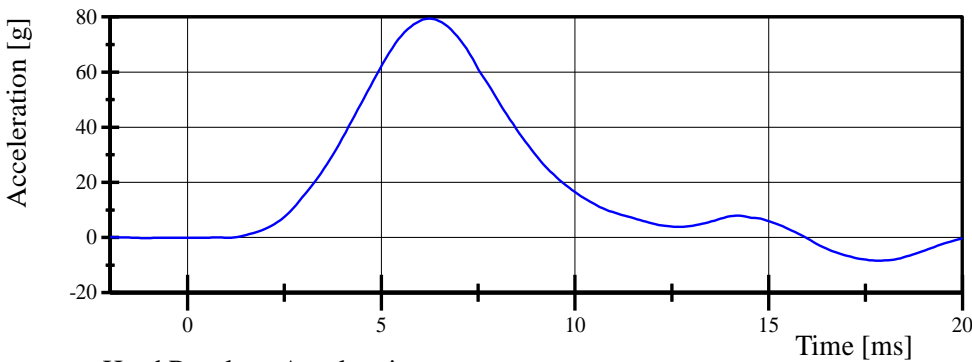


Filter Class: CFC_1000

Max: 1.7 g at 19.9 ms

Min: -2.0 g at 16.8 ms

Head Z-Axis Acceleration

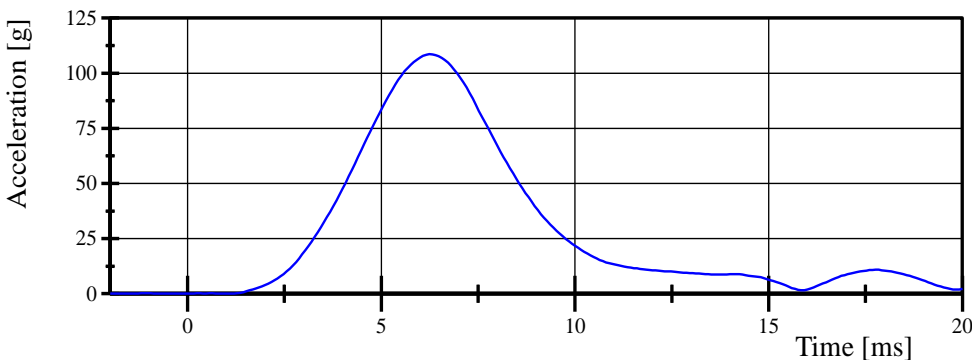


Filter Class: CFC_1000

Max: 79.4 g at 6.2 ms

Min: -8.4 g at 17.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 108.6 g at 6.2 ms

Min: 0.0 g at -1.7 ms

Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 094 Certification No. 21-1

Test Date: 2/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Head Resultant Acceleration	55 - 71 g	67.2 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	2.5 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	< 17 %	16.99 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head Skin S/N: DN0340

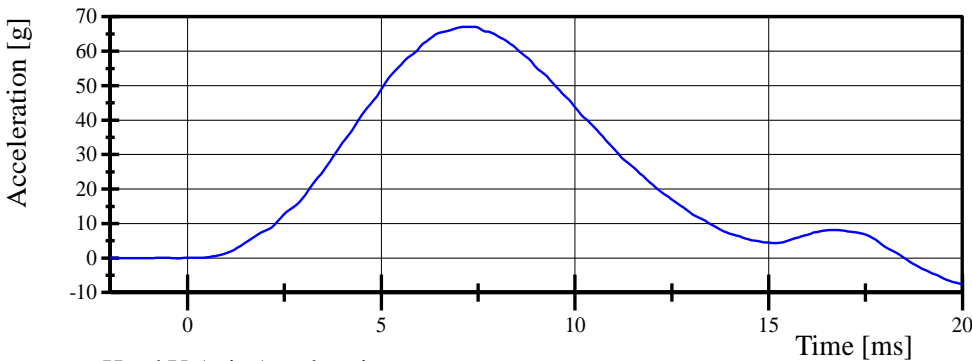
Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 094 Certification No. 21-1

Test Date: 2/25/2020

Head X-Axis Acceleration

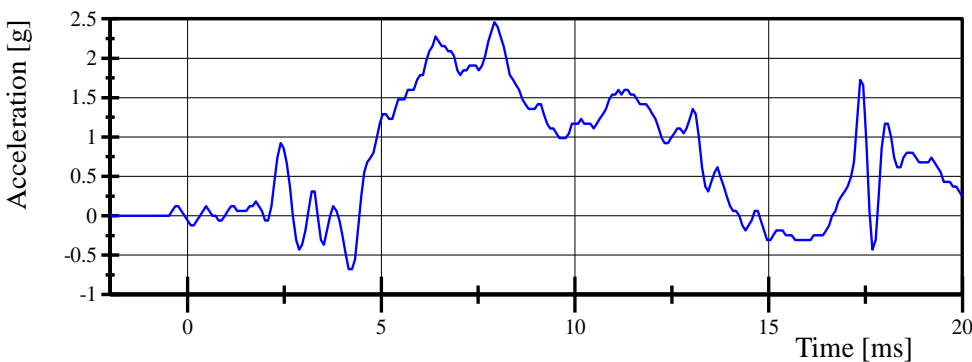


Filter Class: CFC_1000

Max: 67.1 g at 7.1 ms

Min: -7.5 g at 20.0 ms

Head Y-Axis Acceleration

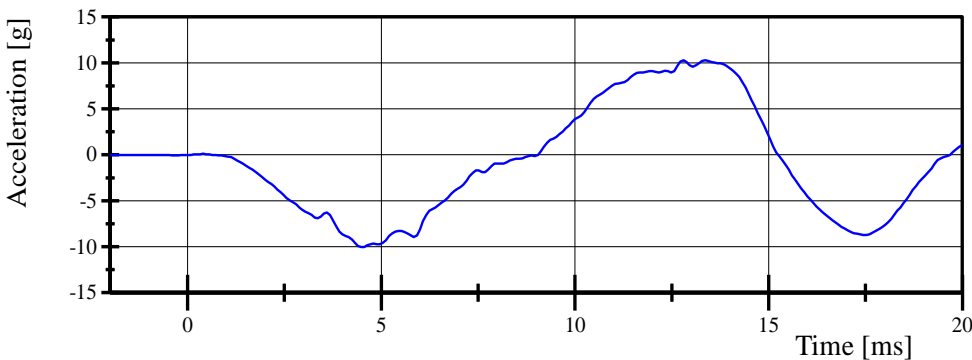


Filter Class: CFC_1000

Max: 2.5 g at 7.9 ms

Min: -0.7 g at 4.2 ms

Head Z-Axis Acceleration

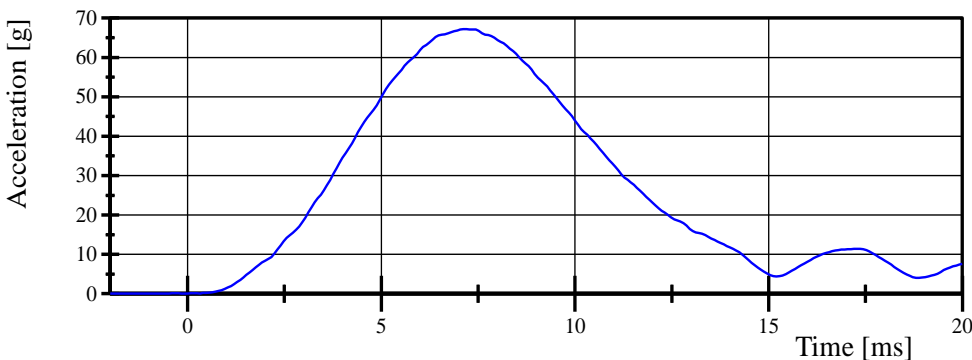


Filter Class: CFC_1000

Max: 10.3 g at 12.8 ms

Min: -10.0 g at 4.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 67.2 g at 7.1 ms

Min: 0.0 g at -1.8 ms

Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 21-3

Test Date: 2/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.30 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-1.6) - (-2.3) m/s	-1.97 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-3.4) - (-4.2) m/s	-3.96 m/s	Yes
Pendulum Integrated Velocity Change at 25ms	(-4.3) - (-5.2) m/s	-4.82 m/s	Yes
Total Head D-Plane Rotation	(-75) - (-86) °	-78.3 °	Yes
Total Neck Occipital Condyles Moment	36 - 45 N·m	40.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 5 Nm	60 - 80 ms	73.4 ms	Yes

Test meets specifications.

Condition: Used

Comments:

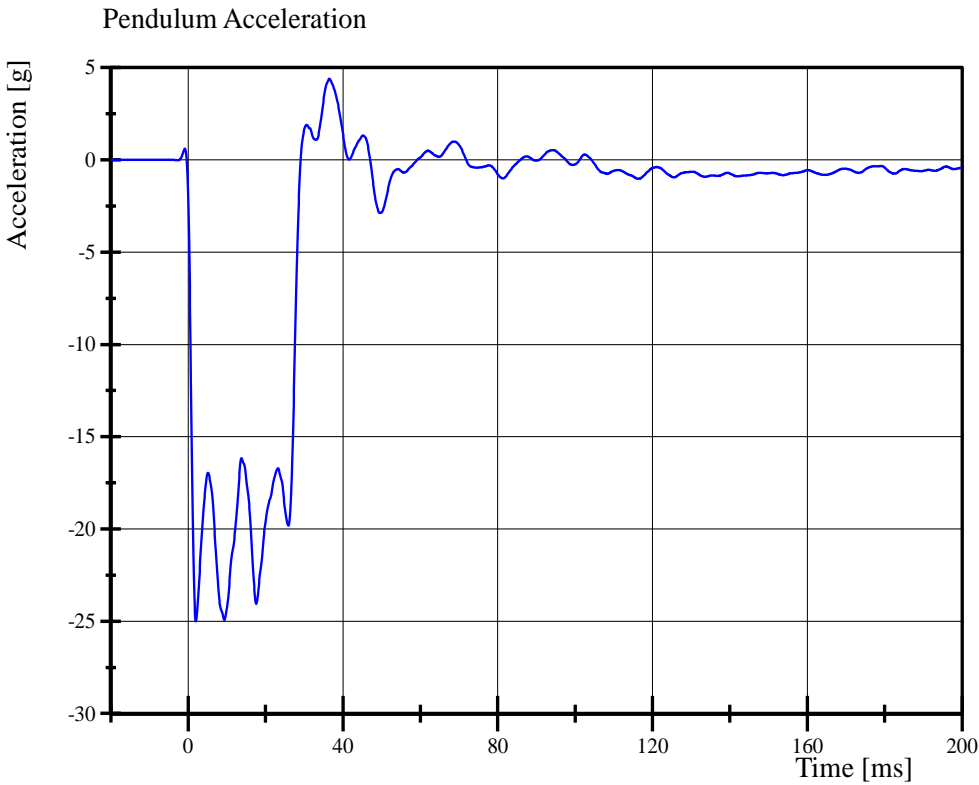
Neck S/N: 307

Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 21-3

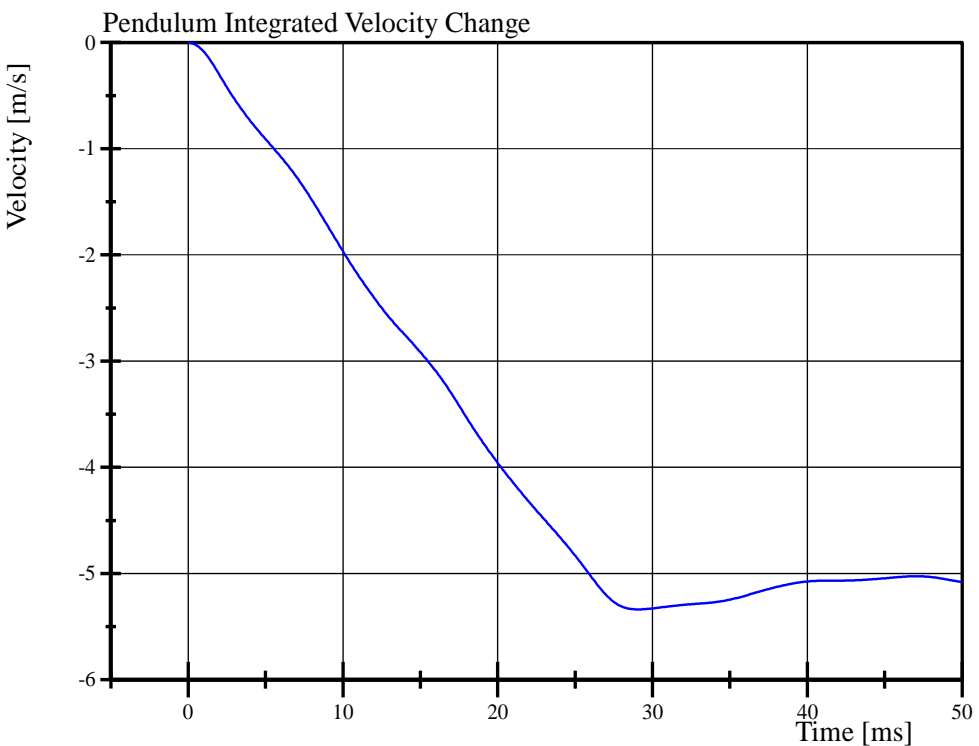
Test Date: 2/25/2020



Filter Class: CFC_180

Max: 4.4 g at 36.5 ms

Min: -25.0 g at 2.0 ms



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -5.3 m/s at 29.0 ms

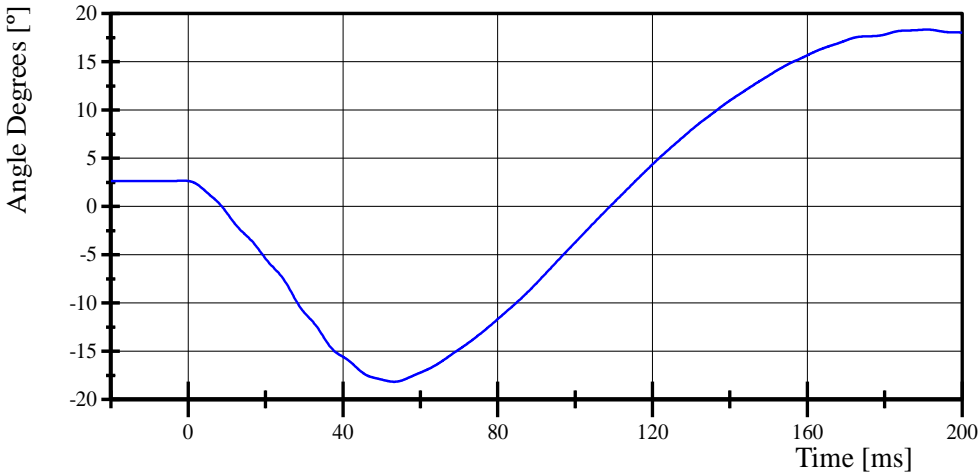
Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 21-3

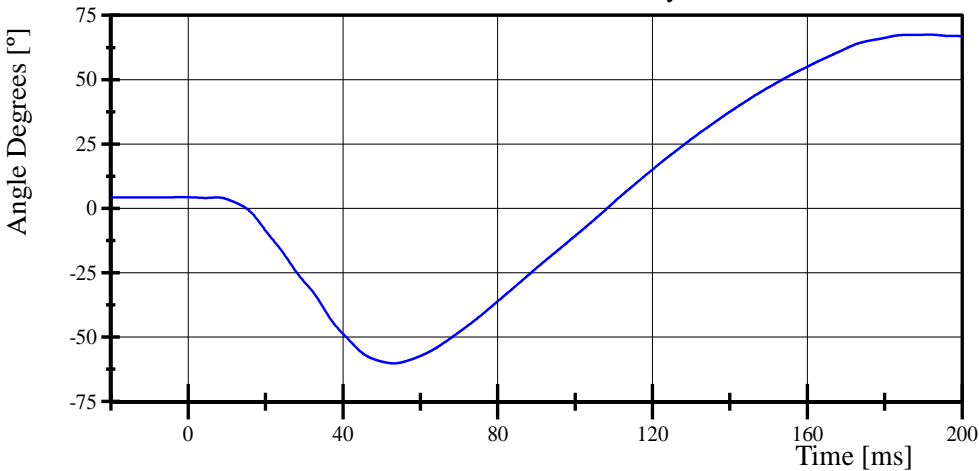
Test Date: 2/25/2020

Forward Pot Rotation at Base of Pendulum



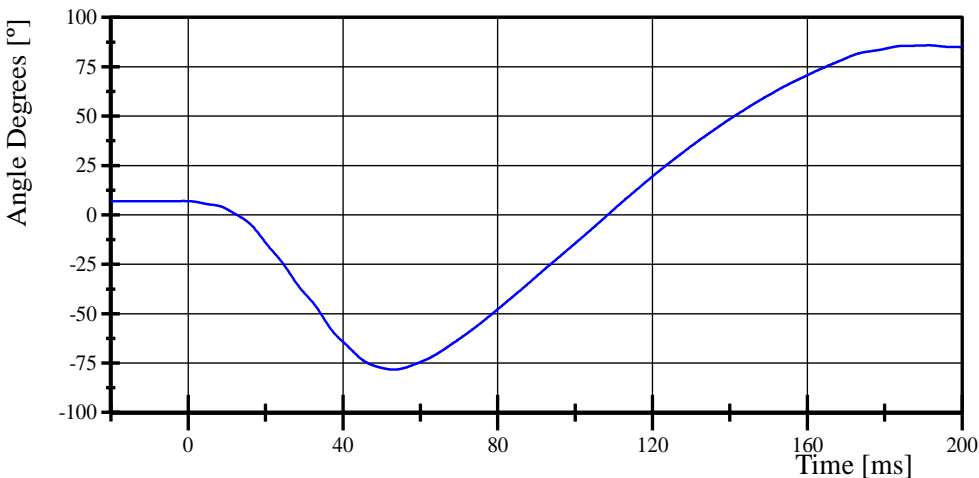
Filter Class: CFC_60
Max: 18.3 ° at 191.0 ms
Min: -18.2 ° at 53.2 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 67.5 ° at 191.6 ms
Min: -60.2 ° at 53.1 ms

Total Head D-Plane Rotation



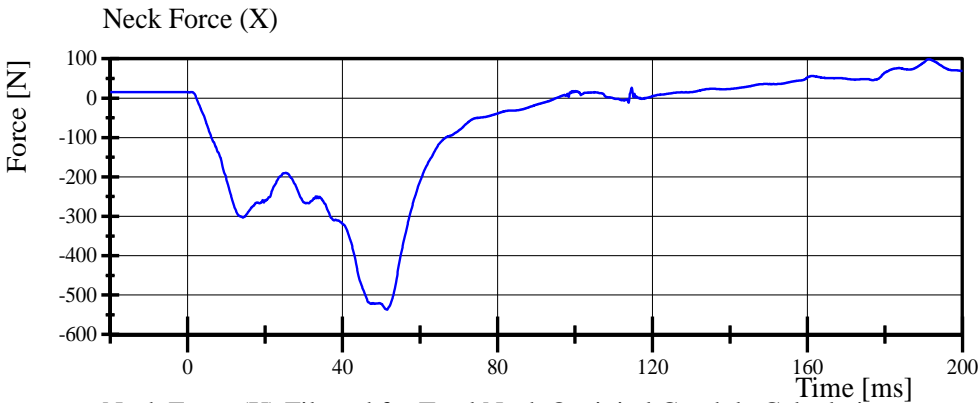
Filter Class: CFC_60
Max: 85.8 ° at 191.4 ms
Min: -78.3 ° at 53.1 ms

Transportation Research Center Inc.

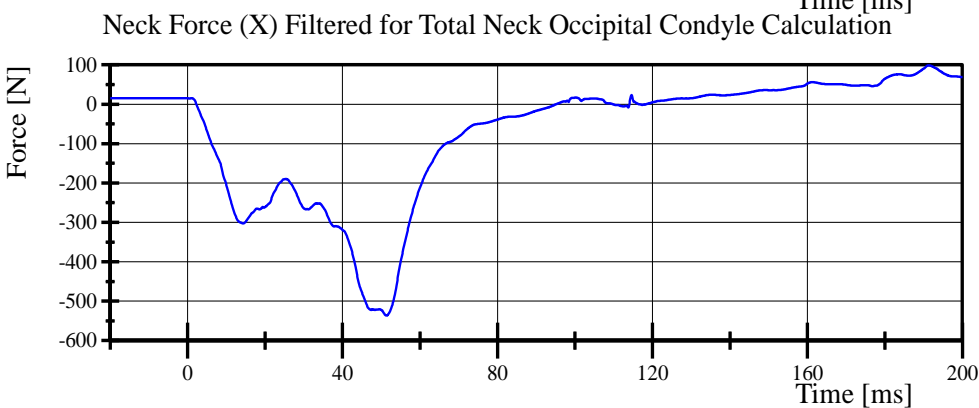
Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 21-3

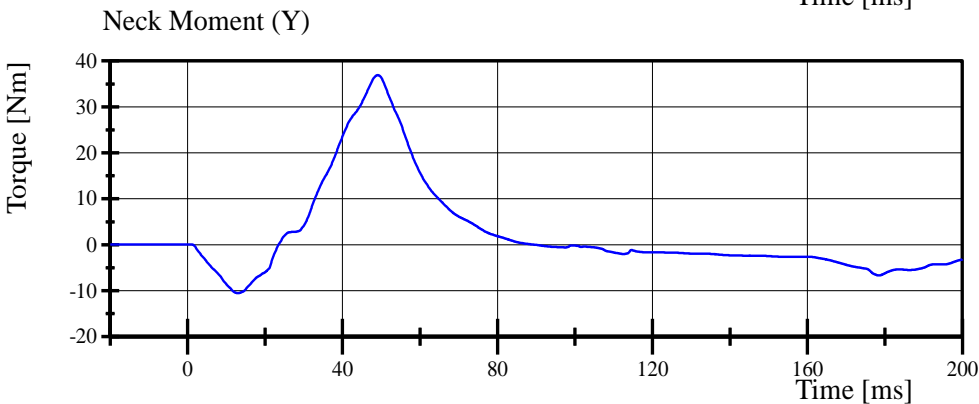
Test Date: 2/25/2020



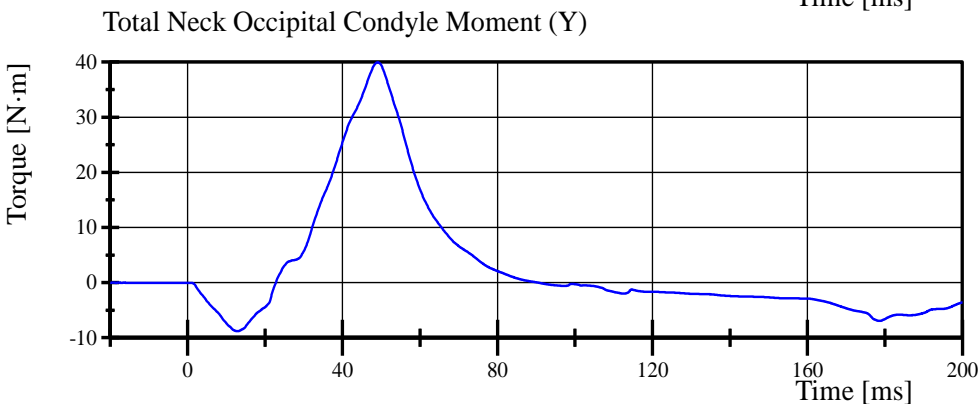
Filter Class: CFC_1000
Max: 98.8 N at 191.2 ms
Min: -536.6 N at 51.5 ms



Filter Class: CFC_600
Max: 98.7 N at 191.4 ms
Min: -536.4 N at 51.4 ms



Filter Class: CFC_600
Max: 36.9 Nm at 49.0 ms
Min: -10.5 Nm at 13.1 ms



Filter Class: Without_(Constar
Max: 40.0 N·m at 49.0 ms
Min: -8.8 N·m at 12.7 ms

Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 21-2

Test Date: 2/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	(-2.4) - (-2.6) m/s	-2.54 m/s	Yes
Pendulum Integrated Velocity Change at 6ms	0.8 - 1.2 m/s	0.93 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 2.1 m/s	1.71 m/s	Yes
Pendulum Integrated Velocity Change at 14ms	2.2 - 2.9 m/s	2.45 m/s	Yes
Total Head D-Plane Rotation	80 - 92 °	84.5 °	Yes
Total Neck Occipital Condyles Moment	(-12) - (-23) N·m	-15.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -5 Nm	76 - 90 ms	84.9 ms	Yes

Test meets specifications.

Condition: Used

Comments:

Neck S/N: 307

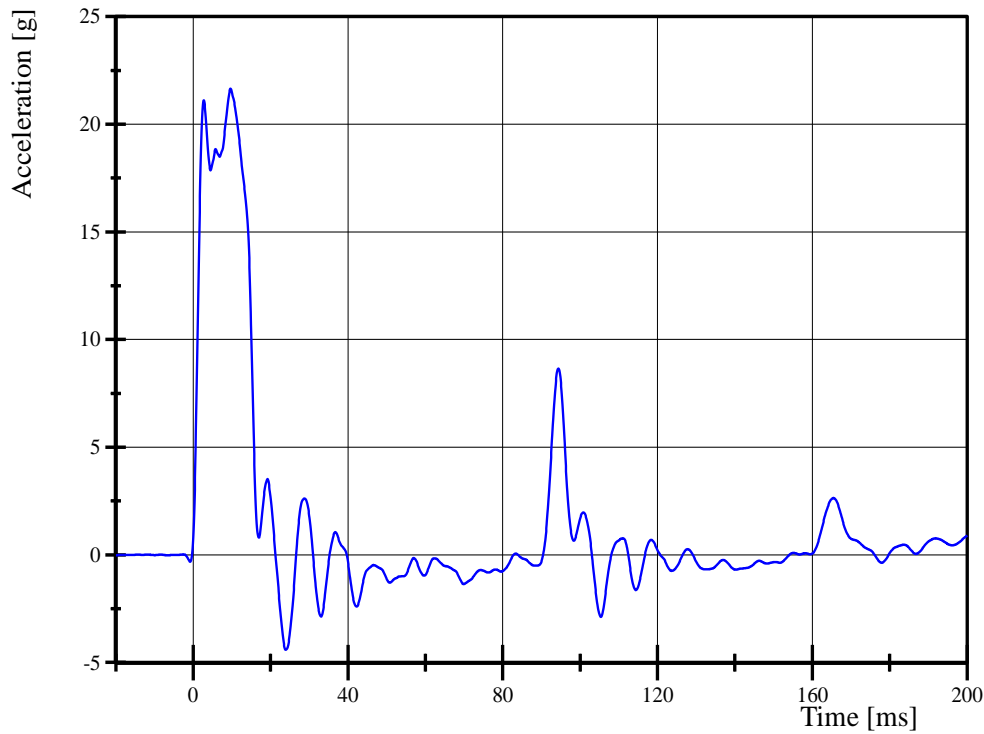
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 21-2

Test Date: 2/25/2020

Pendulum Acceleration

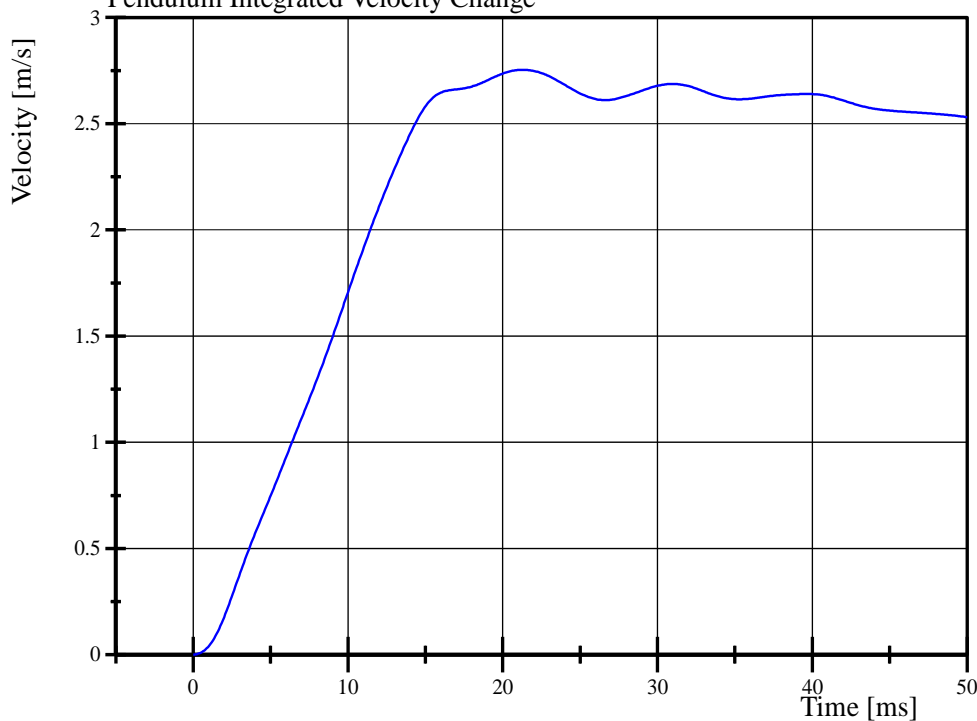


Filter Class: CFC_180

Max: 21.7 g at 9.7 ms

Min: -4.4 g at 23.9 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 2.8 m/s at 21.3 ms

Min: 0.0 m/s at 0.0 ms

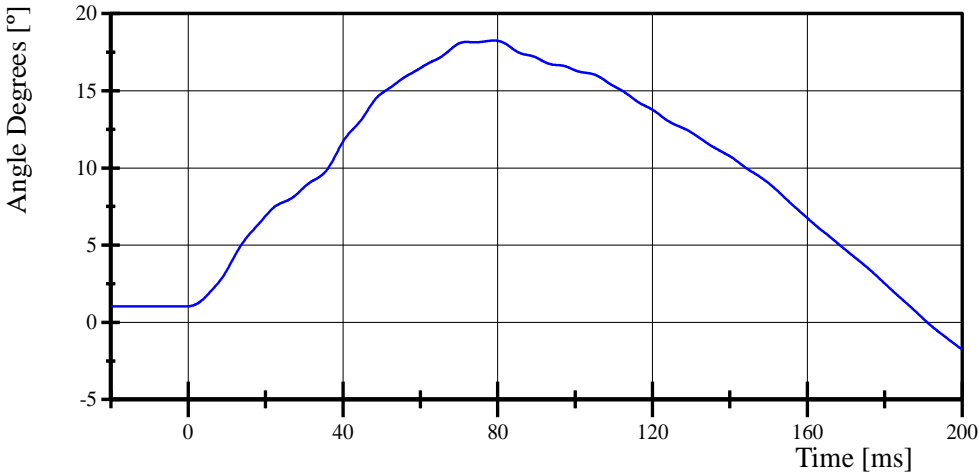
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 21-2

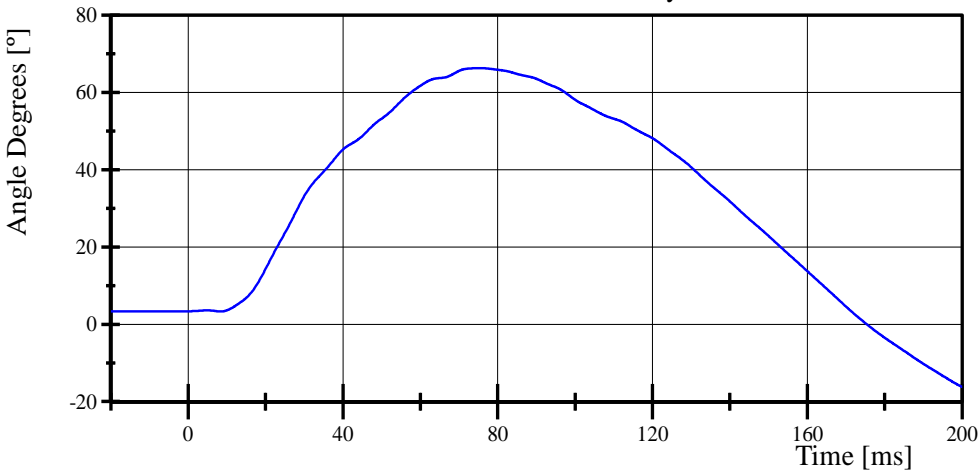
Test Date: 2/25/2020

Forward Pot Rotation at Base of Pendulum



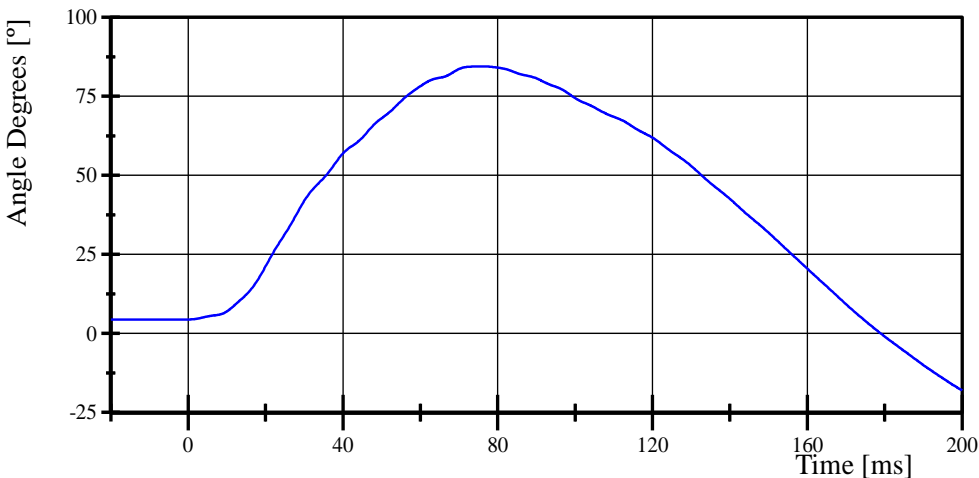
Filter Class: CFC_60
Max: 18.3 ° at 79.0 ms
Min: -1.8 ° at 200.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 66.3 ° at 75.4 ms
Min: -16.3 ° at 200.0 ms

Total Head D-Plane Rotation



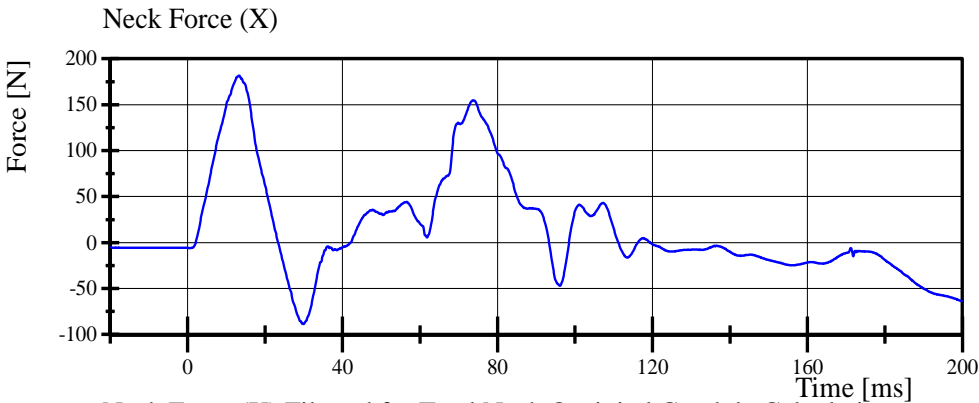
Filter Class: CFC_60
Max: 84.5 ° at 76.0 ms
Min: -18.0 ° at 200.0 ms

Transportation Research Center Inc.

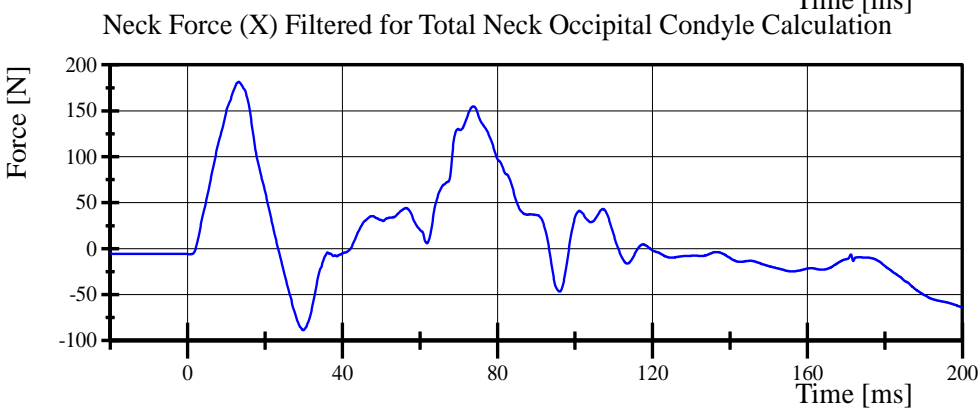
Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 21-2

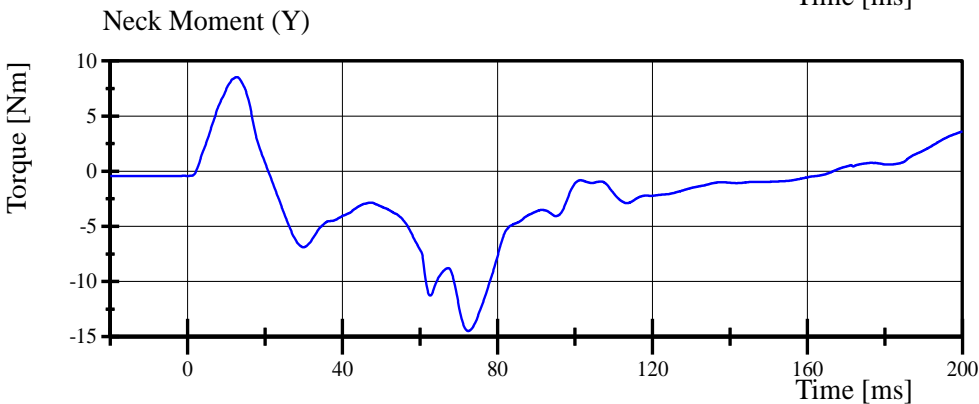
Test Date: 2/25/2020



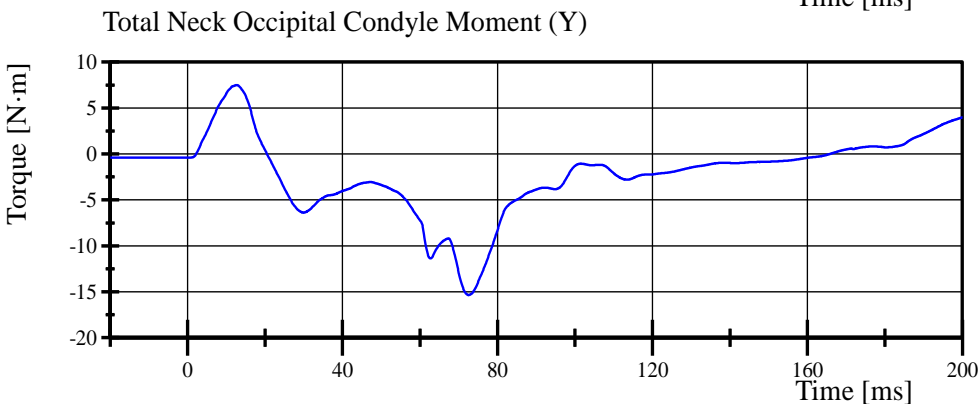
Filter Class: CFC_1000
Max: 181.6 N at 13.3 ms
Min: -88.6 N at 30.0 ms



Filter Class: CFC_600
Max: 181.4 N at 13.3 ms
Min: -88.5 N at 29.9 ms



Filter Class: CFC_600
Max: 8.5 Nm at 12.6 ms
Min: -14.5 Nm at 72.4 ms



Filter Class: Without_(Constar
Max: 7.5 N·m at 12.6 ms
Min: -15.4 N·m at 72.6 ms

Transportation Research Center Inc.

Front Thorax

CRABI 12 MO Serial No. 094 Certification No. 21-2

Test Date: 2/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.9 - 5.1 m/s	4.92 m/s	Yes
Impactor Force	(-1,514) - (-1,796) N	-1,522.9 N	Yes

Test meets specifications.

Condition: Used

Comments:

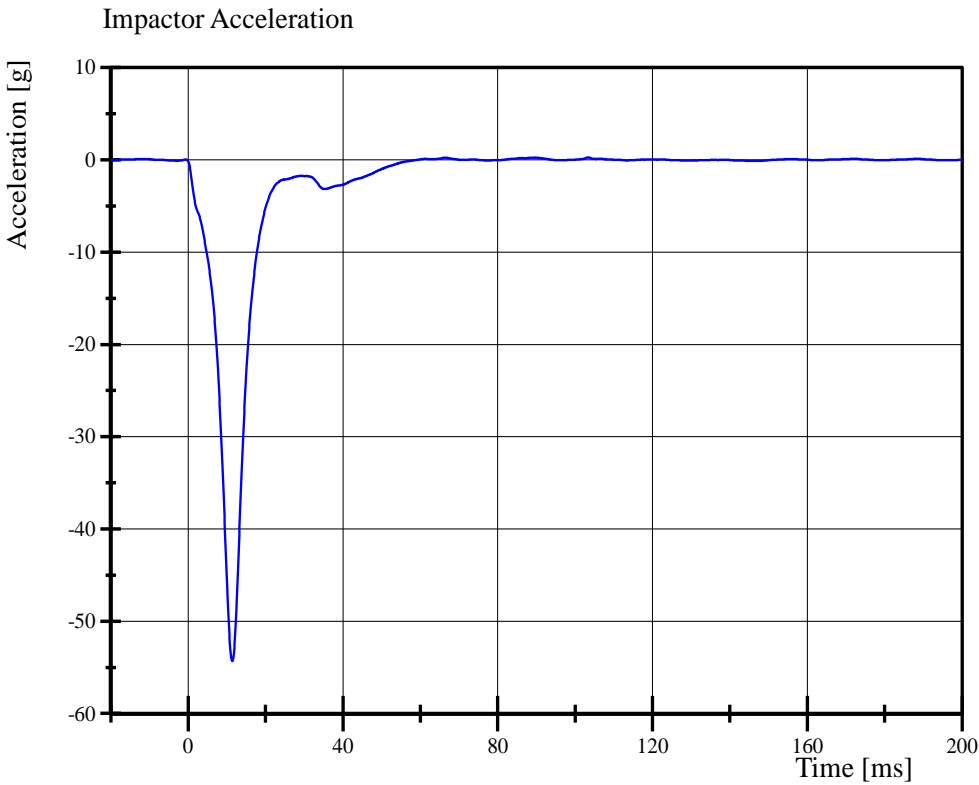
Torso Flesh S/N: N/A

Transportation Research Center Inc.

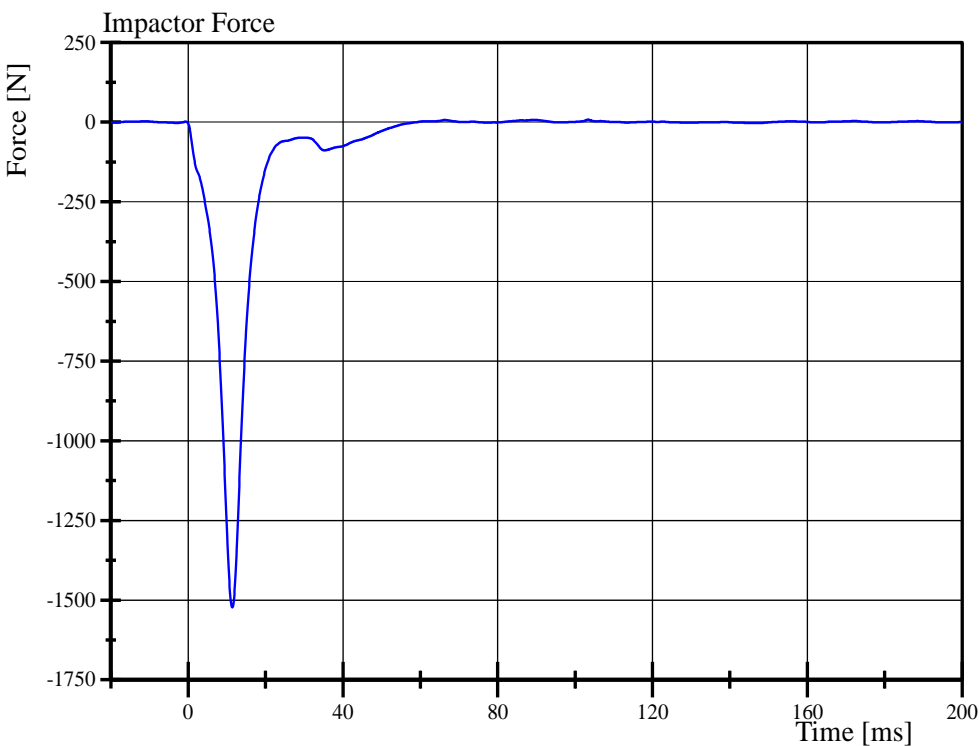
Front Thorax

CRABI 12 MO Serial No. 094 Certification No. 21-2

Test Date: 2/25/2020



Filter Class: CFC_180
Max: 0.3 g at 103.4 ms
Min: -54.3 g at 11.4 ms

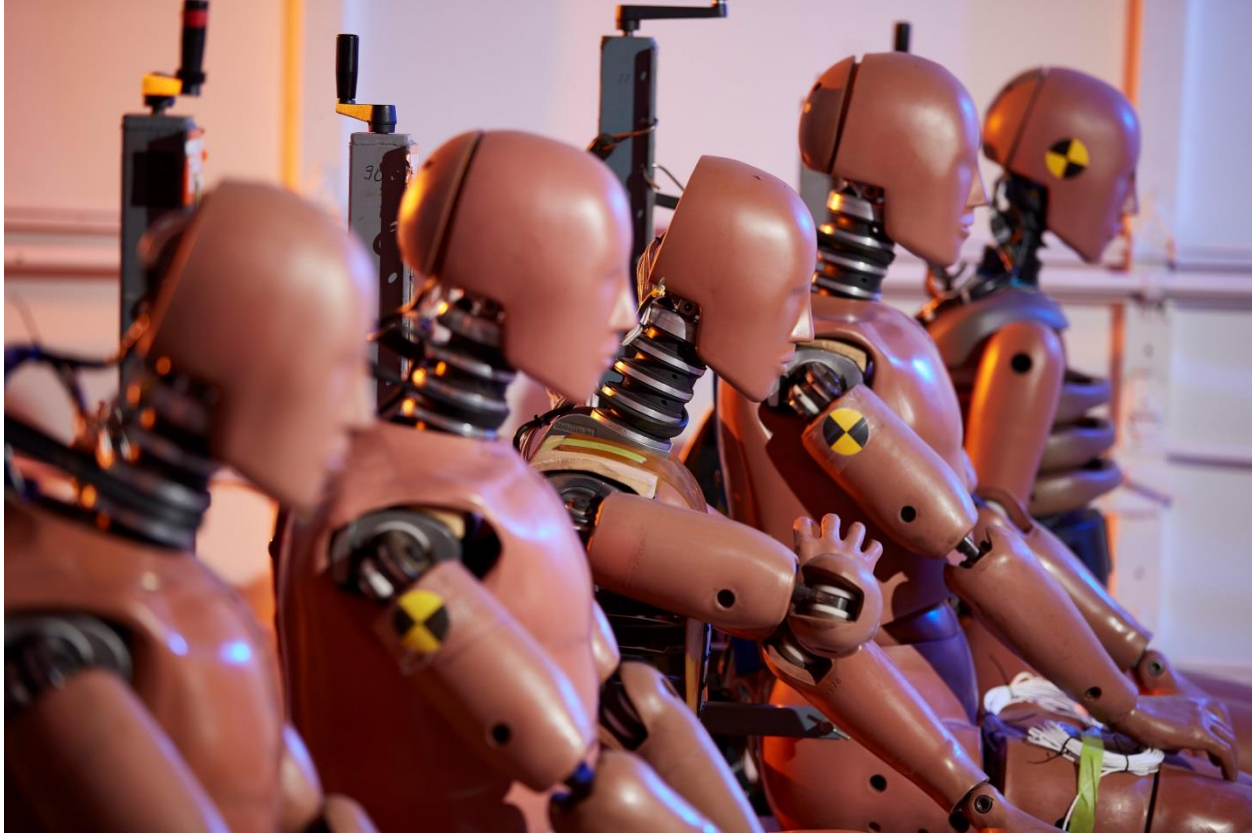


Filter Class: CFC_180
Max: 7.6 N at 103.4 ms
Min: -1,522.9 N at 11.4 ms

Appendix C – Quality Assurance



Quality Assurance



ATD Assembly & Final Inspection

ATD Type: CRABI (12) Month Old

ATD Serial Number: 094

Assembled by: *Dot Benda*

Inspected by: *Ben Lin*

Date Inspected: 02/25/2020