Vehicle Research and Test Center

FMVSS 213 Testing

Hybrid III 6 Year Old

Prepared By:

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Summary Report

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Prepared For

Vehicle Research and Test Center

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SECTION 1

PURPOSE AND SUMMARY FOR HYBRID III 6 YEAR OLD

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 Hybrid III 6 year old dummy (serial number 027) was secured in the left rear occupant position (position 4 or P4) in a forward facing convertible child restraint system (CRS). The Hybrid III 6 year old was instrumented with head, chest, and pelvic triaxial accelerometers, upper neck, and lumbar force and moment load cells, a displacement potentiometer and a rate gyro in the chest. During this test series the dummy was restrained with a 3-point seatbelt (SB3PT), Lower Anchors and Top Tether (LATCH) and Lower Anchors Only (LA Only).

Section 2 contains the testing performed using a forward facing CRS in the right rear seating position. Section 3 contains the dummy certification information.

SECTION 2

FORWARD FACING CRS TEST SUMMARY

TEST DUMMY INFORMATION

Description	Position # 4 CRS
ATD Type/Serial No.	Hybrid III 6 Year Old/027
Restrain System	SB3PT, LATCH, LA Only
CRS Direction	Forward Facing
Foam Cushion	WB7, WB10

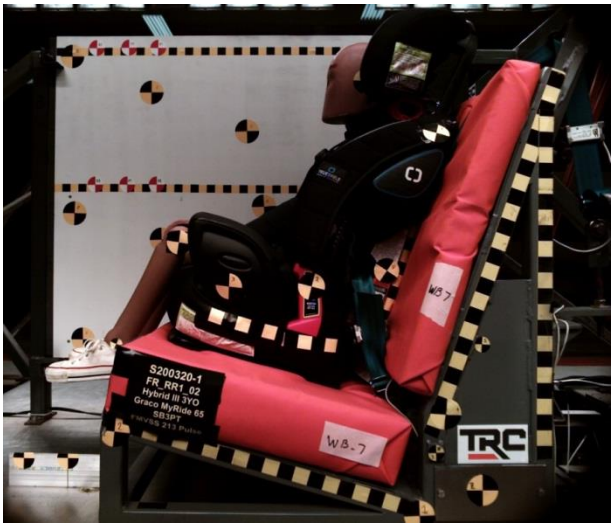
CAMERA POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Origin	mm	0.00	0.00	0.00
N5 Driver Side	mm	325.20	-901.62	-375.86
N3 Driver Head Excursion	mm	812.12	-906.19	-448.12

DUMMY POSITIONING

CRS: Graco Nautilus – Forward Facing – SB3PT

TRC Test Number: S200320-1 VRTC Test Number: FR_RR1_01



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.49	351.85	-683.16
Top of Seat	mm	-13.72	351.63	-657.79
Top of Headrest	mm	-83.21	358.20	-899.37
Top of Head	mm	129.85	347.65	-854.03
Bridge of Nose	mm	223.61	351.36	-764.72
Head CG Outboard	mm	148.92	285.35	-751.75
Neck Center	mm	175.92	351.83	-658.07
Chest Clip	mm	242.02	351.76	-609.28
Buckle	mm	354.24	352.74	-408.03
CRS Base Top	mm	563.11	352.61	-307.51
CRS Base Bottom	mm	560.80	351.64	-226.14
Center of Seat Frame Bottom	mm	619.64	350.44	-103.69
Outboard Knee	mm	537.22	238.86	-403.47
Outboard Ankle	mm	672.48	259.34	-189.96
Target 1 - Seat Side Upper	mm	38.93	137.79	-604.85
Target 4 - Seat Side Lower	mm	116.21	211.23	-347.95
Target 2 - Seat Base H-Point	mm	270.38	136.90	-319.95
Target 3 - Seat Base Side	mm	422.02	118.53	-320.18

DUMMY INJURY

HIC (36 ms)	565
Chest Clip (3 ms)	44.89 g

DUMMY POSITIONING

CRS: Graco Nautilus – Forward Facing – SB3PT

TRC Test Number: S200323-1 VRTC Test Number: FR_RR1_03

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.77	351.84	-682.81
Top of Seat	mm	-11.74	352.78	-657.41
Top of Headrest	mm	-77.60	357.81	-899.79
Top of Head	mm	131.50	353.64	-852.62
Bridge of Nose	mm	224.36	354.60	-764.38
Head CG Outboard	mm	152.48	290.33	-752.34
Neck Center	mm	176.76	352.89	-660.89
Chest Clip	mm	244.20	351.46	-607.46
Buckle	mm	359.78	350.00	-403.53
CRS Base Top	mm	558.87	351.89	-303.18
CRS Base Bottom	mm	562.46	350.22	-223.46
Center of Seat Frame Bottom	mm	619.55	350.38	-103.49
Outboard Knee	mm	542.97	244.29	-406.74
Outboard Ankle	mm	671.34	256.11	-189.71
Target 1 - Seat Side Upper	mm	39.59	153.89	-605.01
Target 4 - Seat Side Lower	mm	117.38	216.48	-347.61
Target 2 - Seat Base H-Point	mm	269.51	140.70	-320.21
Target 3 - Seat Base Side	mm	423.32	119.64	-318.98

DUMMY INJURY

HIC (36 ms)	550
Chest Clip (3 ms)	46.62 g

DUMMY POSITIONING

CRS: Graco Nautilus – Forward Facing – SB3PT

TRC Test Number: S200323-2 VRTC Test Number: FR_RR1_05

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.06	351.78	-683.60
Top of Seat	mm	-19.01	350.68	-654.98
Top of Headrest	mm	-76.43	354.70	-902.25
Top of Head	mm	134.48	351.05	-854.62
Bridge of Nose	mm	229.12	351.45	-765.43
Head CG Outboard	mm	153.80	285.85	-755.32
Neck Center	mm	178.98	350.91	-661.97
Chest Clip	mm	248.06	348.90	-607.41
Buckle	mm	362.32	349.49	-413.26
CRS Base Top	mm	565.04	350.73	-298.16
CRS Base Bottom	mm	562.20	349.34	-224.86
Center of Seat Frame Bottom	mm	619.18	351.04	-105.27
Outboard Knee	mm	540.94	232.13	-409.99
Outboard Ankle	mm	674.16	234.96	-195.47
Target 1 - Seat Side Upper	mm	41.17	152.79	-602.59
Target 4 - Seat Side Lower	mm	117.97	218.58	-347.04
Target 2 - Seat Base H-Point	mm	267.75	141.97	-319.54
Target 3 - Seat Base Side	mm	419.08	120.51	-318.61

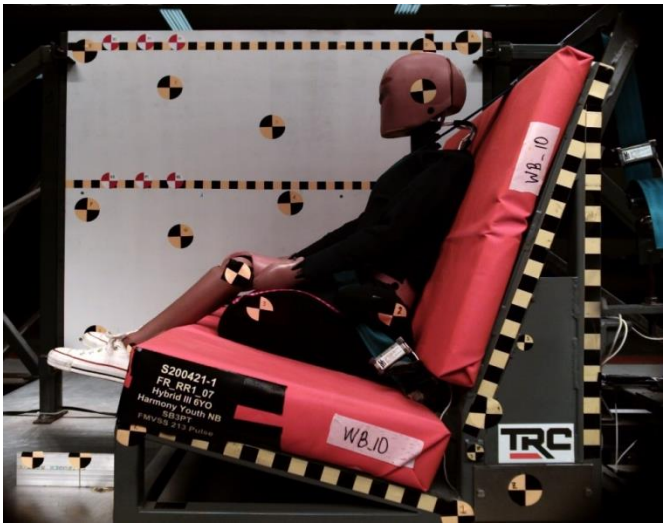
DUMMY INJURY

HIC (36 ms)	574
Chest Clip (3 ms)	45.94 g

DUMMY POSITIONING

CRS: Harmony Youth NB – Belt Positioning Booster – SB3PT

TRC Test Number: S200421-1 VRTC Test Number: FR_RR1_07



DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.60	351.60	-683.12
Top of Head	mm	97.79	349.40	-818.62
Bridge of Nose	mm	175.11	353.74	-720.44
Head CG Outboard	mm	100.37	285.33	-720.10
Neck Center	mm	114.41	349.48	-618.86
Shoulder Belt Upper	mm	162.48	350.91	-558.75
Shoulder Belt Lower	mm	206.48	350.30	-478.63
Lap Belt Upper	mm	248.56	350.52	-364.74
Lap Belt Lower	mm	283.34	350.22	-333.57
Base Center	mm	494.49	349.82	-244.65
Center of Seat Frame Bottom	mm	619.23	350.90	-105.19
Outboard Knee	mm	461.04	233.64	-333.32
Outboard Ankle	mm	661.36	236.29	-179.35
Target 2 - Seat Base H-Point	mm	181.42	136.30	-262.46
Target 3 - Seat Base Side	mm	415.67	192.40	-268.01

DUMMY INJURY

HIC (36 ms)	409
Chest Clip (3 ms)	46.30 g

DUMMY POSITIONING

CRS: Harmony Youth NB – Belt Positioning Booster – SB3PT

TRC Test Number: S200422-1 VRTC Test Number: FR_RR1_09

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.08	351.57	-683.50
Top of Head	mm	98.32	349.34	-818.31
Bridge of Nose	mm	179.27	351.16	-717.62
Head CG Outboard	mm	104.77	283.01	-717.63
Neck Center	mm	116.18	348.02	-616.85
Shoulder Belt Upper	mm	160.40	349.39	-556.47
Shoulder Belt Lower	mm	203.55	350.81	-479.11
Lap Belt Upper	mm	250.67	350.06	-361.89
Lap Belt Lower	mm	289.17	350.69	-342.91
Base Center	mm	492.51	351.38	-245.00
Center of Seat Frame Bottom	mm	619.18	350.94	-105.32
Outboard Knee	mm	458.68	231.01	-332.69
Outboard Ankle	mm	662.54	236.41	-183.93
Target 2 - Seat Base H-Point	mm	183.77	137.65	-261.02
Target 3 - Seat Base Side	mm	415.75	194.82	-267.95

DUMMY INJURY

HIC (36 ms)	476*
Chest Clip (3 ms)	48.66 g

*Truncated to exclude rebound

DUMMY POSITIONING

CRS: Harmony Youth NB – Belt Positioning Booster – SB3PT

TRC Test Number: S200422-2 VRTC Test Number: FR_RR1_11

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.14	351.69	-683.47
Top of Head	mm	95.23	349.37	-816.28
Bridge of Nose	mm	177.23	352.53	-717.53
Head CG Outboard	mm	103.34	286.09	-714.18
Neck Center	mm	116.15	353.04	-615.00
Shoulder Belt Upper	mm	153.19	351.03	-557.43
Shoulder Belt Lower	mm	204.91	351.01	-483.46
Lap Belt Upper	mm	250.58	349.66	-359.58
Lap Belt Lower	mm	291.93	349.98	-327.36
Base Center	mm	494.66	351.09	-242.12
Center of Seat Frame Bottom	mm	619.64	350.29	-103.89
Outboard Knee	mm	460.08	238.46	-334.77
Outboard Ankle	mm	661.83	233.90	-182.44
Target 2 - Seat Base H-Point	mm	183.96	139.95	-261.88
Target 3 - Seat Base Side	mm	414.32	196.28	-270.68

DUMMY INJURY

HIC (36 ms)	489*
Chest Clip (3 ms)	48.41 g

*Truncated to exclude rebound

DUMMY POSITIONING

CRS: Graco Affix – Belt Positioning Booster – SB3PT

TRC Test Number: S200423-1 VRTC Test Number: FR_RR1_13

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.15	351.66	-683.47
Top of Head	mm	102.46	349.61	-815.75
Bridge of Nose	mm	181.86	351.56	-711.76
Head CG Outboard	mm	107.75	285.25	-713.47
Neck Center	mm	117.10	350.29	-612.48
Shoulder Belt Upper	mm	155.07	350.78	-556.61
Shoulder Belt Lower	mm	201.90	350.48	-479.76
Lap Belt Upper	mm	245.94	350.24	-357.21
Lap Belt Lower	mm	287.83	350.93	-346.58
Base Center	mm	507.64	350.91	-262.19
Center of Seat Frame Bottom	mm	619.69	350.26	-103.83
Outboard Knee	mm	448.36	232.42	-346.36
Outboard Ankle	mm	655.46	230.77	-201.41
Target 2 - Seat Base H-Point	mm	186.97	150.68	-308.96
Target 3 - Seat Base Side	mm	375.46	145.83	-227.40

DUMMY INJURY

HIC (36 ms)	485*
Chest Clip (3 ms)	53.94 g

*Truncated to exclude rebound

DUMMY POSITIONING

CRS: Graco Affix – Belt Positioning Booster – SB3PT

TRC Test Number: S200424-1 VRTC Test Number: FR_RR1_15

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.49	350.93	-683.44
Top of Head	mm	103.40	349.46	-815.30
Bridge of Nose	mm	181.90	352.52	-710.78
Head CG Outboard	mm	109.80	284.77	-713.54
Neck Center	mm	117.18	349.37	-611.99
Shoulder Belt Upper	mm	152.69	350.93	-558.58
Shoulder Belt Lower	mm	201.98	350.65	-485.98
Lap Belt Upper	mm	246.59	350.36	-356.68
Lap Belt Lower	mm	289.21	349.52	-344.48
Base Center	mm	505.86	350.17	-262.20
Center of Seat Frame Bottom	mm	618.96	350.69	-105.36
Outboard Knee	mm	452.96	232.90	-345.98
Outboard Ankle	mm	655.45	237.20	-195.25
Target 2 - Seat Base H-Point	mm	187.54	149.36	-309.01
Target 3 - Seat Base Side	mm	371.95	144.83	-224.13

DUMMY INJURY

HIC (36 ms)	458.66*
Chest Clip (3 ms)	52.72 g

*Truncated to exclude rebound

DUMMY POSITIONING

CRS: Graco Affix – Belt Positioning Booster – SB3PT

TRC Test Number: S200424-2 VRTC Test Number: FR_RR1_17

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.74	351.46	-683.25
Top of Head	mm	104.97	350.48	-816.30
Bridge of Nose	mm	182.88	351.14	-711.48
Head CG Outboard	mm	109.47	285.46	-713.63
Neck Center	mm	117.61	350.64	-613.38
Shoulder Belt Upper	mm	154.04	349.65	-558.73
Shoulder Belt Lower	mm	199.96	349.25	-483.26
Lap Belt Upper	mm	246.33	350.87	-358.98
Lap Belt Lower	mm	288.37	350.74	-344.25
Base Center	mm	505.13	350.19	-263.78
Center of Seat Frame Bottom	mm	619.10	350.89	-105.22
Outboard Knee	mm	448.71	231.07	-344.76
Outboard Ankle	mm	657.43	230.69	-203.14
Target 2 - Seat Base H-Point	mm	187.22	158.45	-311.58
Target 3 - Seat Base Side	mm	373.81	151.04	-227.62

DUMMY INJURY

HIC (36 ms)	537*
Chest Clip (3 ms)	53.75

*Truncated to exclude rebound

DUMMY POSITIONING

CRS: Cosco Pronto – Belt Positioning Booster – SB3PT

TRC Test Number: S200511-1 VRTC Test Number: FR_RR1_19

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.45	351.73	-683.13
Top of Headrest	mm	-66.37	351.78	-794.45
Top of Head	mm	116.32	351.11	-829.29
Bridge of Nose	mm	199.73	352.67	-728.07
Head CG Outboard	mm	127.06	285.00	-729.06
Neck Center	mm	138.97	348.29	-626.51
Shoulder Belt Upper	mm	192.95	350.62	-561.04
Shoulder Belt Lower	mm	231.94	350.90	-490.67
Lap Belt Upper	mm	272.71	350.83	-380.52
Lap Belt Lower	mm	311.13	350.36	-356.25
Base Center	mm	508.38	349.28	-267.44
Center of Seat Frame Bottom	mm	619.18	350.94	-105.04
Outboard Knee	mm	486.05	226.34	-357.11
Outboard Ankle	mm	649.06	232.02	-164.17
Target 1 - Seat Side Upper	mm	28.61	208.52	-644.40
Target 4 - Seat Side Lower	mm	105.52	177.18	-346.09
Target 2 - Seat Base H-Point	mm	203.91	152.96	-289.64
Target 3 - Seat Base Side	mm	379.98	123.16	-239.78

DUMMY INJURY

HIC (36 ms)	573
Chest Clip (3 ms)	45.44 g

DUMMY POSITIONING

CRS: Cosco Pronto – Belt Positioning Booster – SB3PT

TRC Test Number: S200512-1 VRTC Test Number: FR_RR1_21

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.11	351.98	-683.44
Top of Headrest	mm	-67.89	349.91	-794.25
Top of Head	mm	113.33	349.51	-826.53
Bridge of Nose	mm	200.28	351.63	-727.21
Head CG Outboard	mm	126.08	284.32	-724.84
Neck Center	mm	140.29	349.62	-625.20
Shoulder Belt Upper	mm	193.12	350.42	-561.07
Shoulder Belt Lower	mm	232.39	350.72	-492.26
Lap Belt Upper	mm	274.89	350.84	-380.24
Lap Belt Lower	mm	313.24	351.91	-353.93
Base Center	mm	507.41	350.27	-271.67
Center of Seat Frame Bottom	mm	619.17	350.88	-105.35
Outboard Knee	mm	487.56	228.48	-362.23
Outboard Ankle	mm	650.93	232.69	-169.29
Target 1 - Seat Side Upper	mm	28.21	206.18	-644.09
Target 4 - Seat Side Lower	mm	104.33	177.26	-348.90
Target 2 - Seat Base H-Point	mm	197.65	155.15	-290.26
Target 3 - Seat Base Side	mm	385.63	124.66	-242.66

DUMMY INJURY

HIC (36 ms)	606
Chest Clip (3 ms)	45.30

DUMMY POSITIONING

CRS: Cosco Pronto – Belt Positioning Booster – SB3PT

TRC Test Number: S200513-1 VRTC Test Number: FR_RR1_23

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.27	351.79	-683.50
Top of Headrest	mm	-64.90	350.99	-792.78
Top of Head	mm	119.54	349.44	-826.69
Bridge of Nose	mm	202.88	349.75	-727.24
Head CG Outboard	mm	126.79	284.93	-724.29
Neck Center	mm	141.24	351.27	-624.59
Shoulder Belt Upper	mm	188.50	351.83	-561.95
Shoulder Belt Lower	mm	231.95	351.06	-495.68
Lap Belt Upper	mm	274.30	350.53	-378.79
Lap Belt Lower	mm	311.57	350.19	-352.68
Base Center	mm	508.09	348.28	-267.69
Center of Seat Frame Bottom	mm	619.22	350.90	-105.15
Outboard Knee	mm	482.13	227.97	-358.18
Outboard Ankle	mm	650.37	238.48	-169.89
Target 1 - Seat Side Upper	mm	33.24	204.84	-642.47
Target 4 - Seat Side Lower	mm	113.20	175.01	-342.76
Target 2 - Seat Base H-Point	mm	200.62	147.14	-293.59
Target 3 - Seat Base Side	mm	388.47	116.45	-242.99

DUMMY INJURY

HIC (36 ms)	566
Chest Clip (3 ms)	46.19 g

DUMMY POSITIONING

CRS: Evenflo Sure Ride – Forward Facing – LATCH

TRC Test Number: S200513-2 VRTC Test Number: FR_RR1_25

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-119.39	350.41	-683.53
Top of CRS	mm	-49.80	350.27	-743.17
Top of Head	mm	108.45	349.39	-805.77
Bridge of Nose	mm	211.76	350.55	-725.45
Head CG Outboard	mm	138.64	284.39	-708.11
Neck Center	mm	173.49	348.38	-611.85
Chest Clip	mm	252.09	350.59	-557.34
Buckle	mm	391.94	349.36	-377.92
Base Center	mm	599.31	351.49	-230.39
Center of Seat Frame Bottom	mm	619.62	350.32	-103.66
Outboard Knee	mm	566.27	223.00	-360.46
Outboard Ankle	mm	717.12	241.48	-158.80
Target 1 - Seat Side Upper	mm	-2.05	218.93	-629.01
Target 4 - Seat Side Lower	mm	95.04	224.32	-375.27
Target 2 - Seat Base H-Point	mm	272.74	183.47	-277.79
Target 3 - Seat Base Side	mm	414.07	168.84	-323.41

DUMMY INJURY

HIC (36 ms)	366
Chest Clip (3 ms)	42.66 g

DUMMY POSITIONING

CRS: Evenflo Sure Ride – Forward Facing – LATCH

TRC Test Number: S200514-1 VRTC Test Number: FR_RR1_27

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-116.47	351.94	-684.55
Top of CRS	mm	-46.86	351.87	-735.96
Top of Head	mm	107.88	351.40	-805.00
Bridge of Nose	mm	212.64	352.40	-726.00
Head CG Outboard	mm	140.19	286.94	-708.17
Neck Center	mm	174.89	349.92	-612.32
Chest Clip	mm	256.78	351.02	-559.15
Buckle	mm	397.55	350.87	-374.96
Base Center	mm	603.72	350.96	-230.28
Center of Seat Frame Bottom	mm	619.09	350.95	-105.06
Outboard Knee	mm	571.71	227.33	-366.87
Outboard Ankle	mm	719.51	240.87	-162.61
Target 1 - Seat Side Upper	mm	5.80	222.16	-634.18
Target 4 - Seat Side Lower	mm	100.36	221.72	-380.29
Target 2 - Seat Base H-Point	mm	279.11	181.88	-283.57
Target 3 - Seat Base Side	mm	421.49	172.32	-329.01

DUMMY INJURY

HIC (36 ms)	334*
Chest Clip (3 ms)	42.63 g

*Truncated to exclude rebound

DUMMY POSITIONING

CRS: Evenflo Sure Ride – Forward Facing – LATCH

TRC Test Number: S200514-2 VRTC Test Number: FR_RR1_29

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-120.85	351.90	-682.92
Top of CRS	mm	-49.01	350.26	-736.31
Top of Head	mm	110.90	350.65	-807.56
Bridge of Nose	mm	213.47	352.13	-725.84
Head CG Outboard	mm	142.74	285.57	-710.58
Neck Center	mm	174.39	349.60	-612.90
Chest Clip	mm	255.88	350.25	-557.45
Buckle	mm	390.65	349.16	-375.52
Base Center	mm	599.46	349.15	-230.76
Center of Seat Frame Bottom	mm	619.00	350.95	-105.02
Outboard Knee	mm	568.97	227.42	-365.12
Outboard Ankle	mm	717.88	245.19	-162.14
Target 1 - Seat Side Upper	mm	3.05	219.55	-633.39
Target 4 - Seat Side Lower	mm	100.14	218.49	-380.44
Target 2 - Seat Base H-Point	mm	273.12	179.54	-279.17
Target 3 - Seat Base Side	mm	418.97	168.05	-329.14

DUMMY INJURY

HIC (36 ms)	359
Chest Clip (3 ms)	42.90 g

DUMMY POSITIONING

CRS: Britax Marathon Clicktight – Forward Facing – LA Only

TRC Test Number: S200515-1 VRTC Test Number: FR_RR1_31

DUMMY POSITIONING FARO MEASUREMENTS

Description	Units	X	Y	Z
Z-Point	mm	0.00	0.00	0.00
Center of Seat Back Frame	mm	-118.47	351.75	-682.89
Top of CRS	mm	-38.80	351.38	-697.83
Top of Headrest	mm	-85.30	354.03	-823.36
Top of Head	mm	114.96	351.94	-840.05
Bridge of Nose	mm	224.96	352.40	-770.34
Head CG Outboard	mm	155.82	286.65	-746.27
Neck Center	mm	199.66	350.04	-653.53
Chest Clip	mm	274.93	351.77	-614.76
Buckle	mm	433.03	351.29	-430.15
Base Center	mm	584.17	351.08	-228.51
Center of Seat Frame Bottom	mm	619.01	351.14	-104.86
Outboard Knee	mm	607.55	230.97	-456.53
Outboard Ankle	mm	715.35	248.46	-228.50
Target 1 - Seat Side Upper	mm	29.68	174.68	-632.47
Target 4 - Seat Side Lower	mm	172.87	167.83	-401.74
Target 2 - Seat Base H-Point	mm	321.64	154.48	-302.73
Target 3 - Seat Base Side	mm	474.35	162.76	-310.56

DUMMY INJURY

HIC (36 ms)	697
Chest Clip (3 ms)	46.74 g

SECTION 3
DUMMY CALIBRATION DATA

Transportation Research Center Inc.
ATD Certification Report

Customer:

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

Anthropomorphic Device:

Hybrid III (6) Year Old
Serial No. 027
Certification No. 25

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

Website: www.trcpg.com
Phone: (937) 666-2011

TRC Inc. Form #QF824.i55, Rev. C, 03/01/18

Serial Number: 027
Certification No. 25

Table of Contents

Serial Number: 027
Certification No. 25

Introduction

Customer Name:	VRTC
Customer Contact:	Bryan Crabtree
Email:	Bryan.Crabtree.CTR@dot.gov
Phone:	(937) 666-4511
Date Received:	February 27, 2020
Date Completed:	March 3, 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: 02/27/2020

Testing Conducted by: _____ Date: 03/03/2020
Robert Benavides, Test Technician III

Testing Approved by: _____ Date: 03/03/2020
Sal LoPresti, Supervisor - Calibration Services

Appendix A – Incoming Inspection

TRC ATD Laboratory As Received Inspection Report

Name: Robert Benavides

Date: 2/27/2020

Customer: VRTC

ATD S/N: 027

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: 2/27/2020

Customer: VRTC

ATD S/N: 027

1	
2	
3	
4	
5	
6	

TRC ATD Laboratory Inspection Report Action Items

Name:	Robert Benavides	Date:	2/27/2020
Customer:	VRTC	ATD S/N:	027

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
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.0 - 22.0 ºC	21.6 ºC	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	245 - 300 g	296.6 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-3.0 g	Yes
Is Acceleration Curve Unimodal	< 10 %	1.44 %	Yes

Test meets specifications.

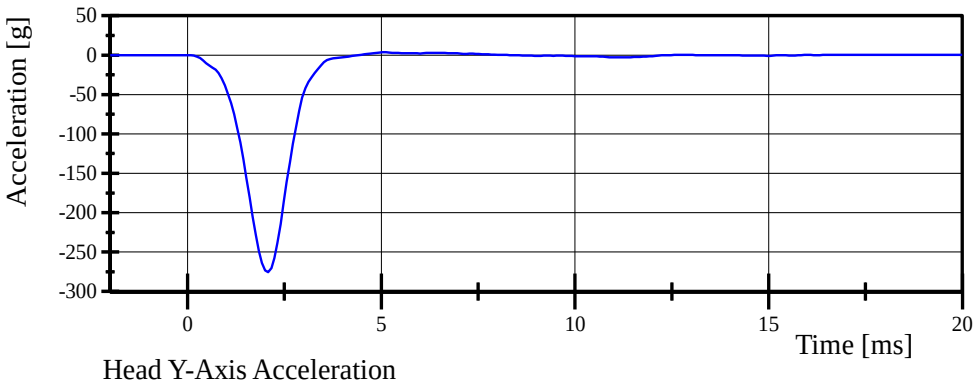
Condition: Used

Comments:
Head Skin S/N: 916

Transportation Research Center Inc.

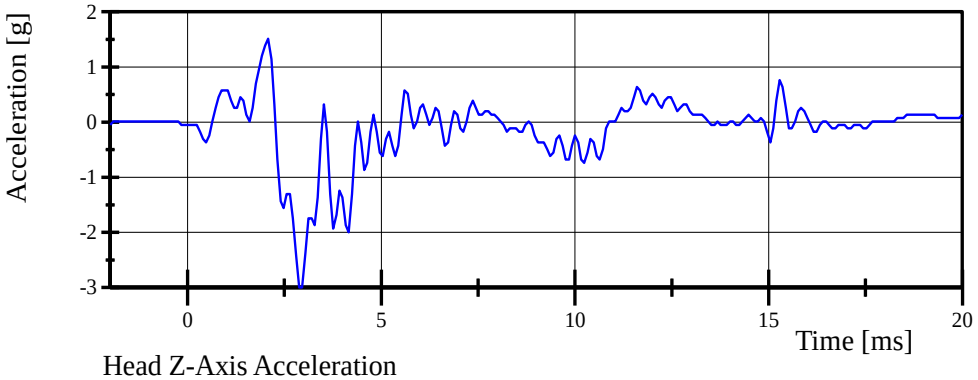
Front Head Drop
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Head X-Axis Acceleration



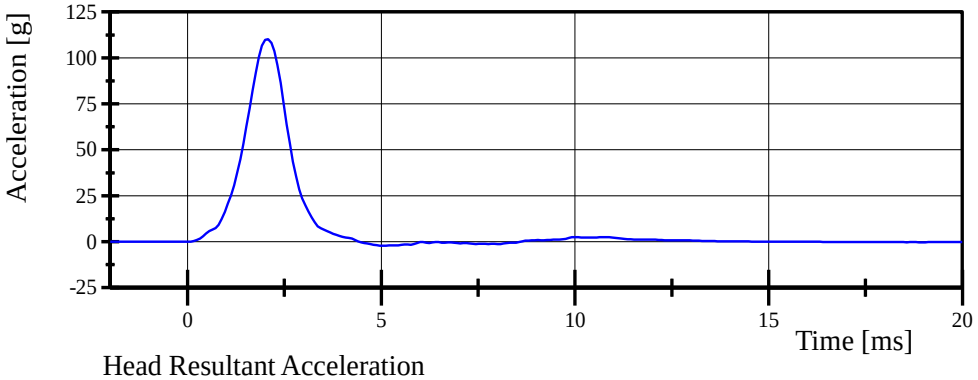
Filter Class: CFC_1000
Max: 3.7 g at 5.1 ms
Min: -275.3 g at 2.1 ms

Head Y-Axis Acceleration



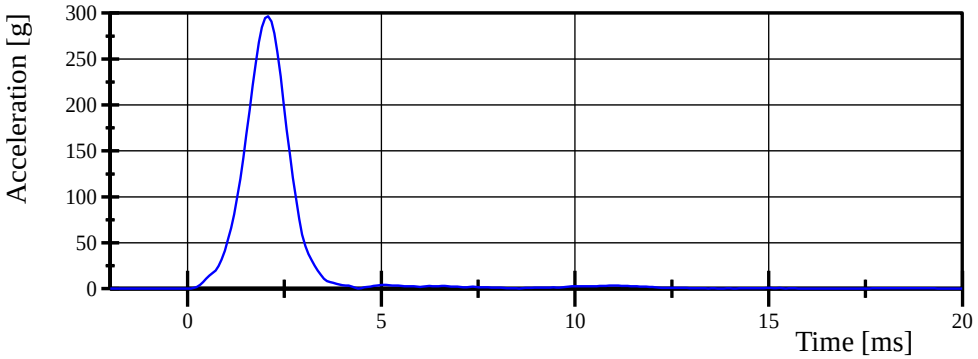
Filter Class: CFC_1000
Max: 1.5 g at 2.1 ms
Min: -3.0 g at 2.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 110.3 g at 2.1 ms
Min: -2.2 g at 5.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 296.6 g at 2.1 ms
Min: 0.0 g at -1.8 ms

Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 14:07:50 577

Transportation Research Center Inc.

Neck Flexion
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ºC	21.2 ºC	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Pendulum Impact Velocity	4.83 - 5.07 m/s	4.907 m/s	Yes
Pendulum Integrated Velocity at 10ms	(-1.2) - (-1.6) m/s	-1.54 m/s	Yes
Pendulum Integrated Velocity at 20ms	(-2.4) - (-3.4) m/s	-3.05 m/s	Yes
Pendulum Integrated Velocity at 30ms	(-3.8) - (-5.0) m/s	-4.33 m/s	Yes
Total Head D-Plane Rotation	(-74) - (-92) º	-78.1 º	Yes
Peak Neck Occipital Condyles Moment Between -74º and -92º Rotation	27 - 33 Nm	31.1 Nm	Yes
Neck Occipital Condyles Moment Decay to 5 Nm	103 - 123 ms	108.8 ms	Yes

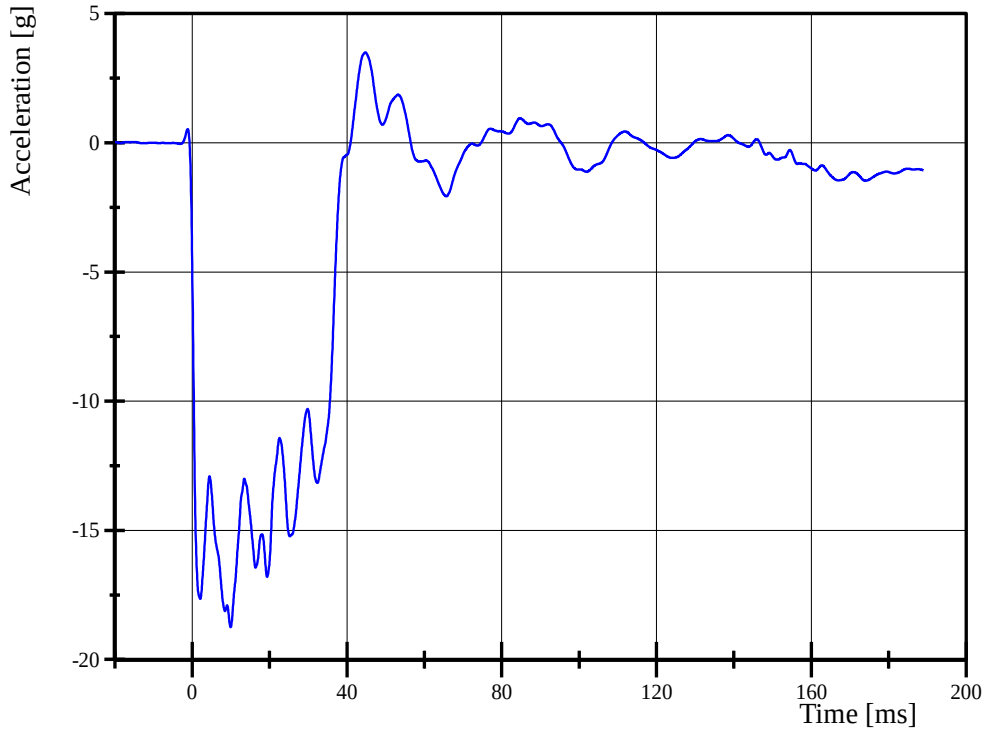
Test meets specifications.

Condition: Used
Comments:
Neck S/N: EK3898

Transportation Research Center Inc.

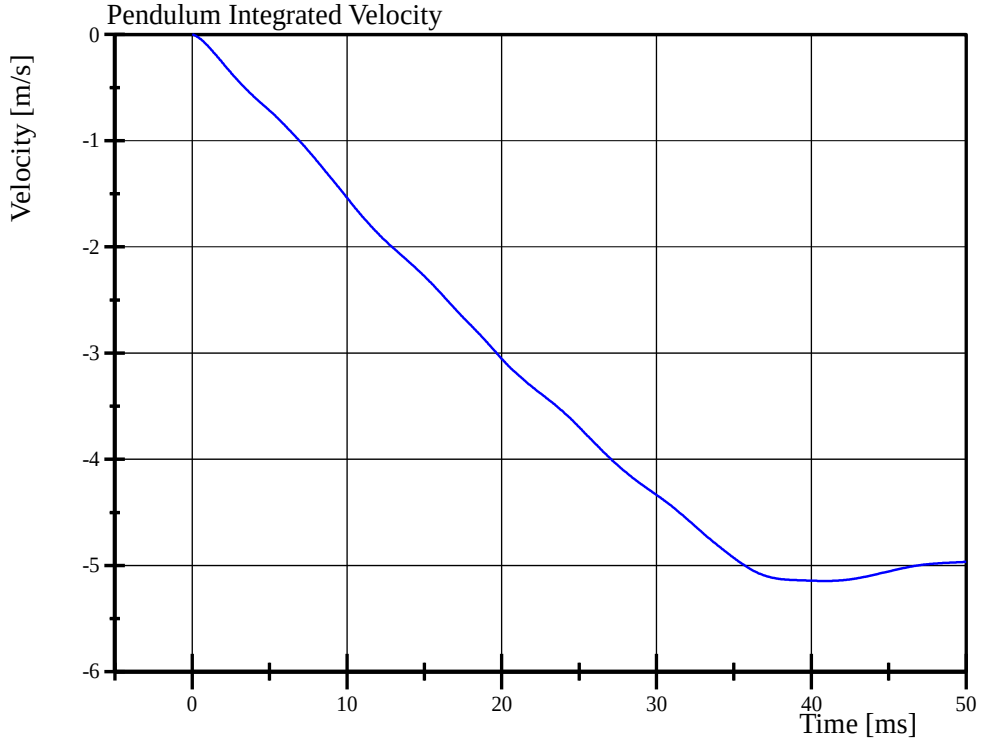
Neck Flexion
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 3.5 g at 44.8 ms
Min: -18.8 g at 9.9 ms

Pendulum Integrated Velocity



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -5.1 m/s at 40.9 ms

Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 15:52:58 2221

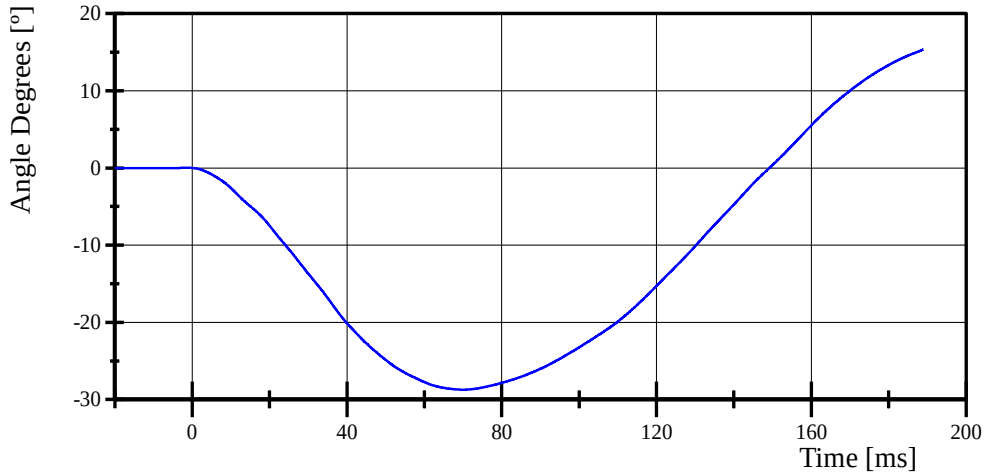
Transportation Research Center Inc.

Neck Flexion

HIII 6YO Serial No. 027 Certification No. 25-1

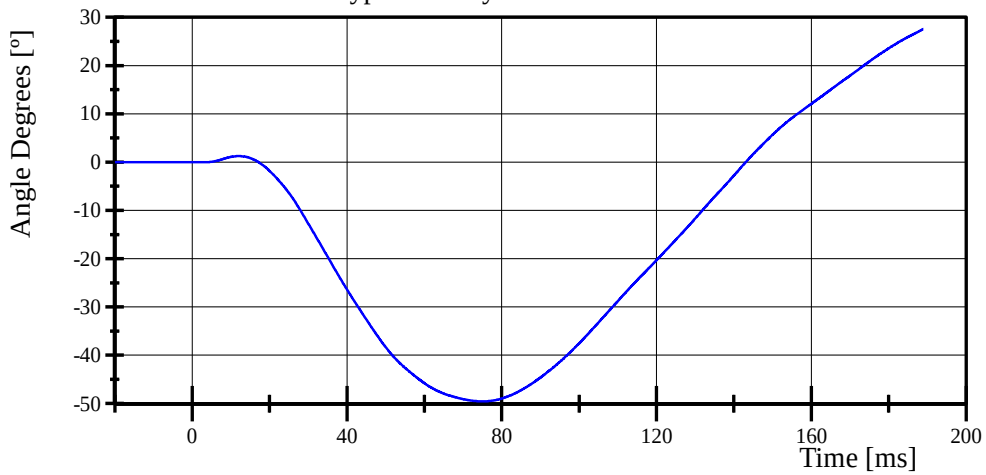
Test Date: 3/2/2020

Pot Rotation at the Base of Neck



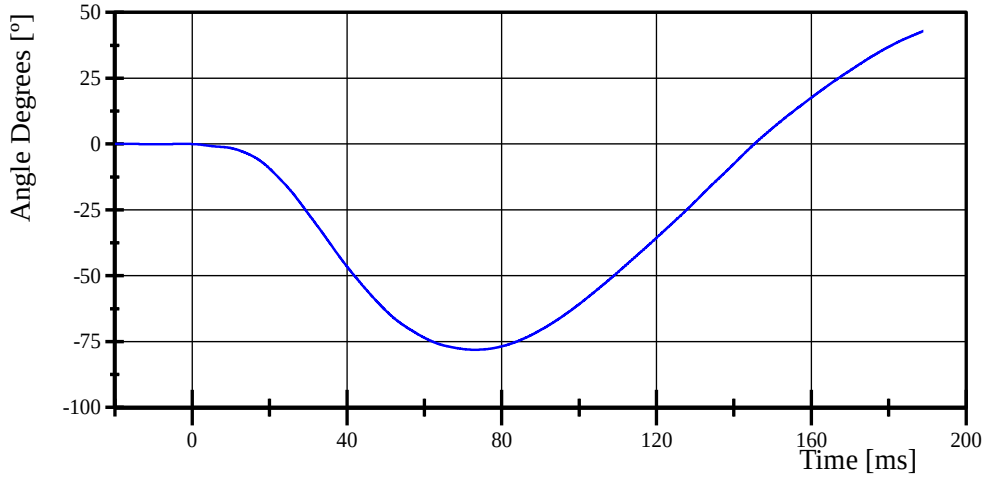
Filter Class: CFC_60
Max: 15.4 ° at 189.0 ms
Min: -28.7 ° at 70.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 27.6 ° at 189.0 ms
Min: -49.5 ° at 75.1 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 42.9 ° at 189.0 ms
Min: -78.1 ° at 73.1 ms

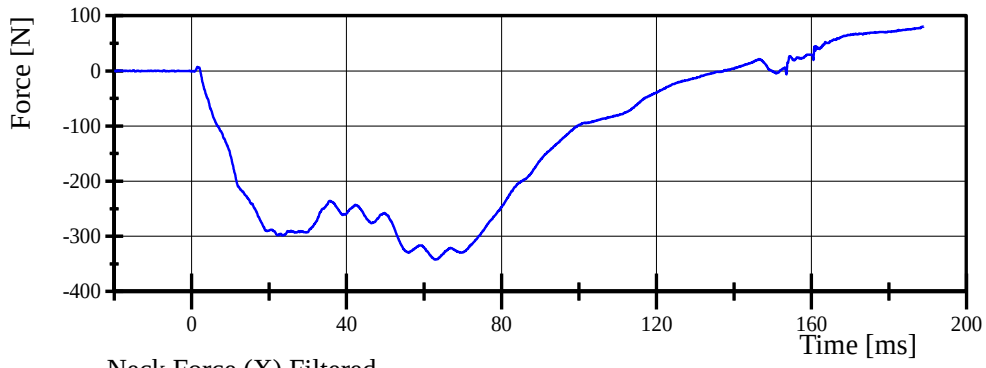
Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 15:52:58 2221

Transportation Research Center Inc.

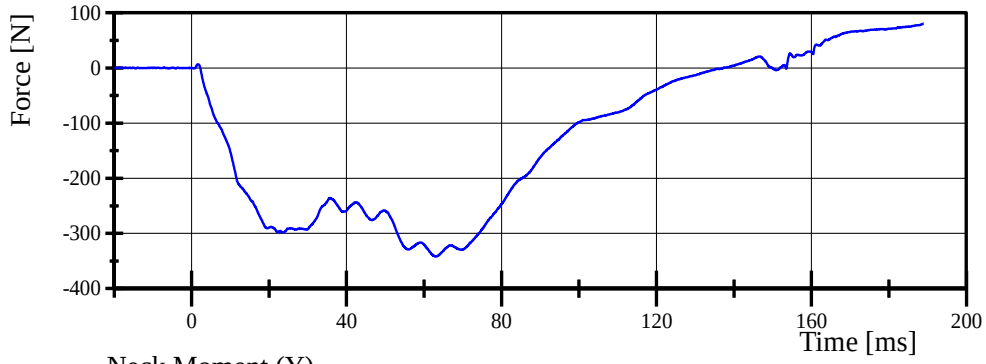
Neck Flexion
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Neck Force (X)



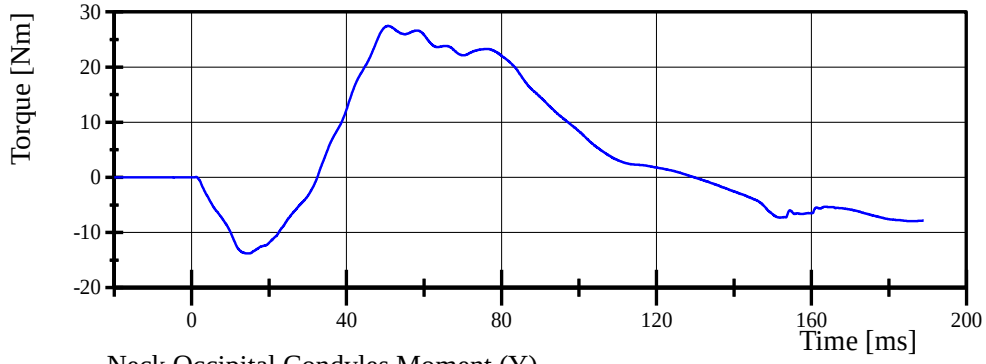
Filter Class: CFC_1000
Max: 80.4 N at 188.9 ms
Min: -341.9 N at 62.8 ms

Neck Force (X) Filtered



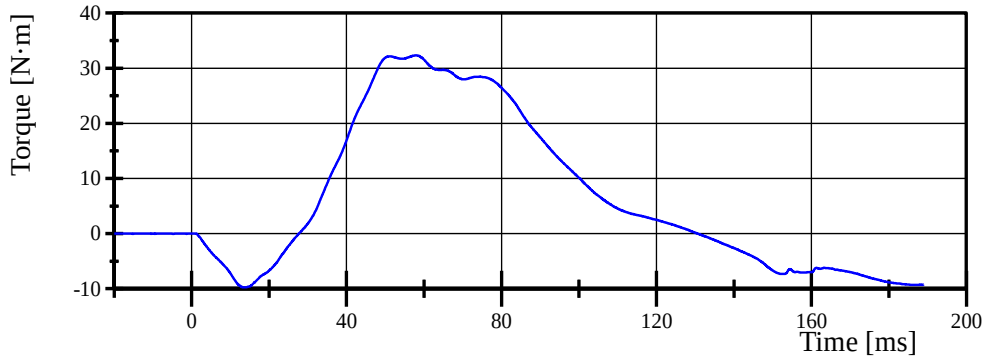
Filter Class: CFC_600
Max: 80.4 N at 189.0 ms
Min: -341.9 N at 63.0 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 27.5 Nm at 50.7 ms
Min: -13.8 Nm at 14.1 ms

Neck Occipital Condyles Moment (Y)



Filter Class: Without_(Constar
Max: 32.3 N·m at 57.9 ms
Min: -9.7 N·m at 14.0 ms

Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 15:52:58 2221

Transportation Research Center Inc.

Neck Extension
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ºC	21.4 ºC	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Pendulum Impact Velocity	4.18 - 4.42 m/s	4.393 m/s	Yes
Pendulum Integrated Velocity at 10ms	(-1.0) - (-1.4) m/s	-1.15 m/s	Yes
Pendulum Integrated Velocity at 20ms	(-2.2) - (-3.0) m/s	-2.21 m/s	Yes
Pendulum Integrated Velocity at 30ms	(-3.2) - (-4.2) m/s	-3.26 m/s	Yes
Total Head D-Plane Rotation	85 - 103 º	95.1 º	Yes
Peak Neck Occipital Condyles Moment Between 85º and 103º Rotation	(-19) - (-24) Nm	-21.0 Nm	Yes
Neck Occipital Condyles Moment Decay to 5 Nm	123 - 147 ms	141.2 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: EK3898

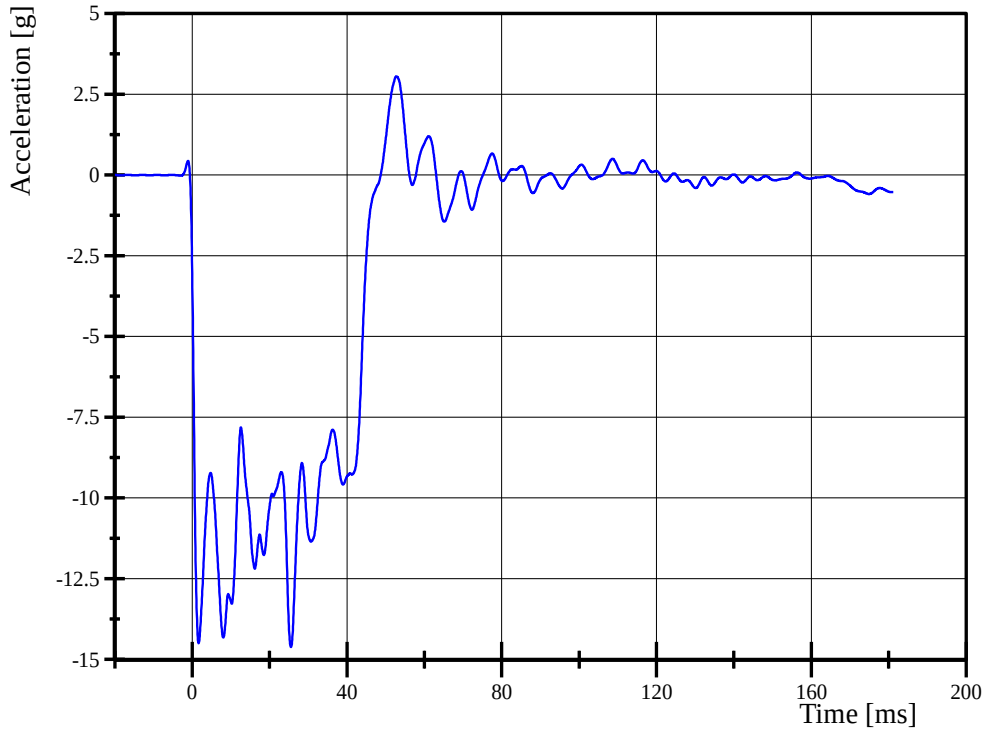
Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 15:39:33 2376

Transportation Research Center Inc.

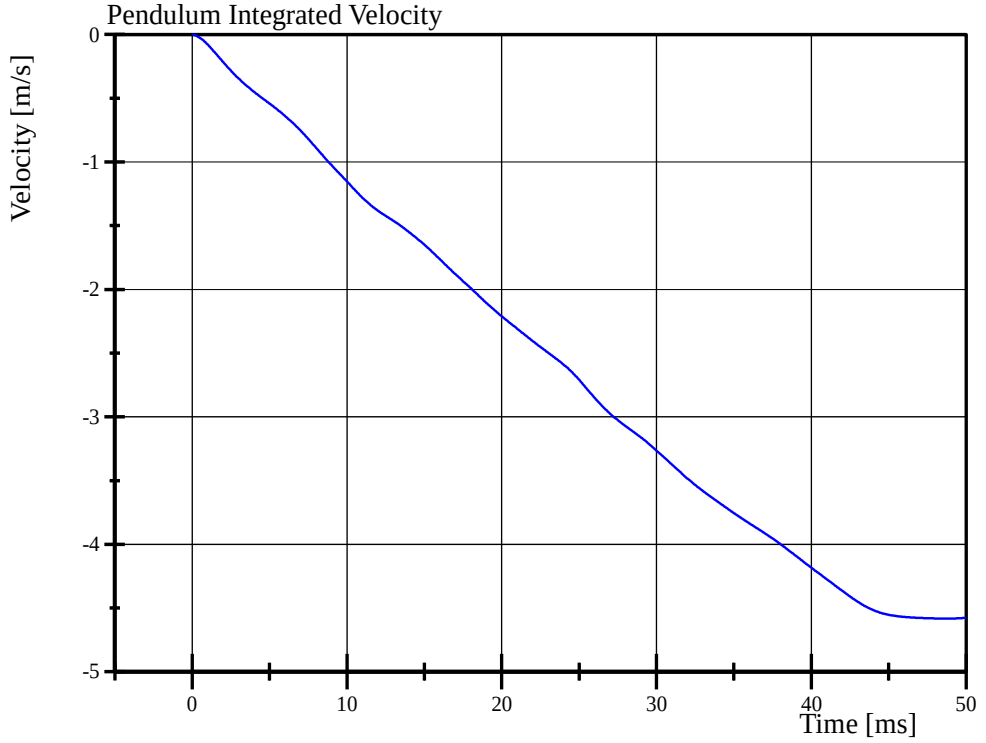
Neck Extension
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 3.1 g at 52.8 ms
Min: -14.6 g at 25.5 ms

Pendulum Integrated Velocity



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -4.6 m/s at 48.7 ms

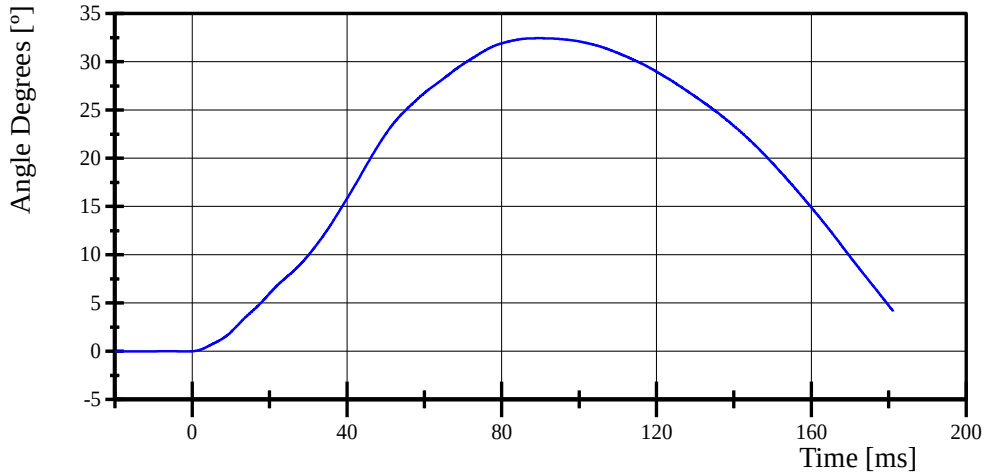
Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 15:51:48 2376

Transportation Research Center Inc.

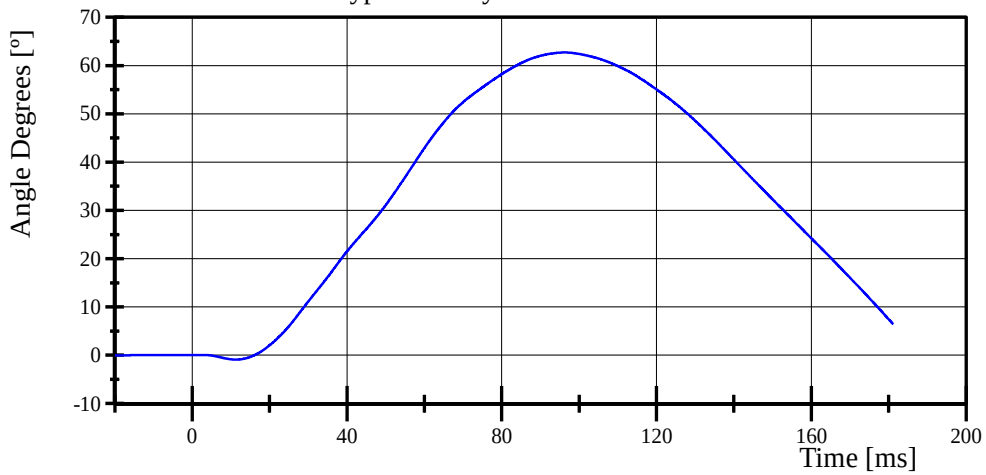
Neck Extension
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Pot Rotation at the Base of Neck



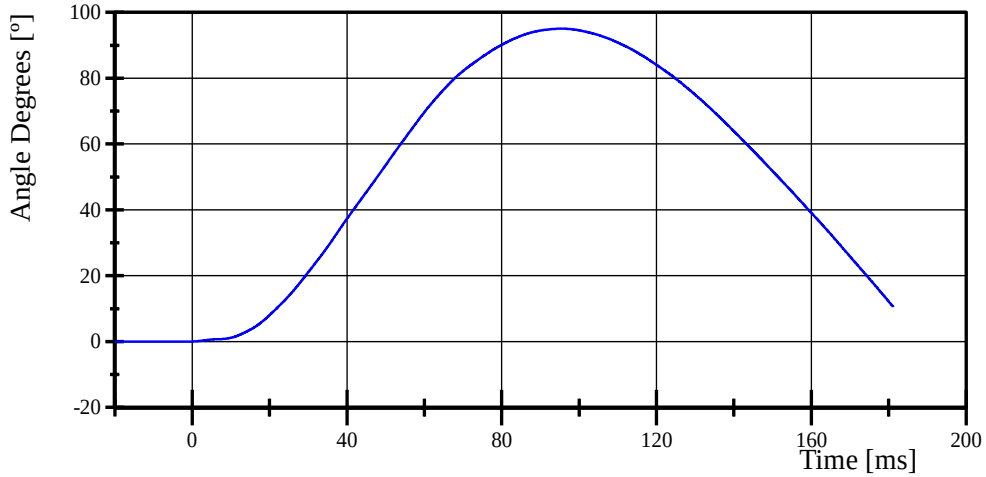
Filter Class: CFC_60
Max: 32.4 º at 89.8 ms
Min: -0.0 º at -1.5 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 62.7 º at 96.3 ms
Min: -0.9 º at 11.3 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 95.1 º at 95.5 ms
Min: -0.0 º at -20.0 ms

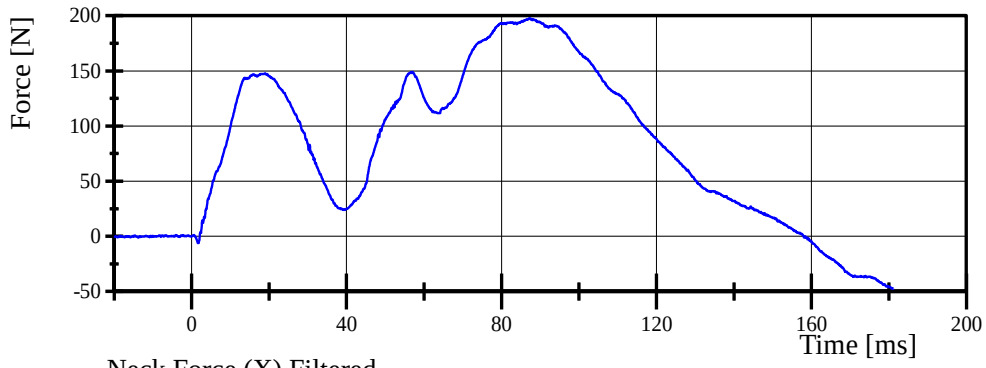
Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 15:51:49 2376

Transportation Research Center Inc.

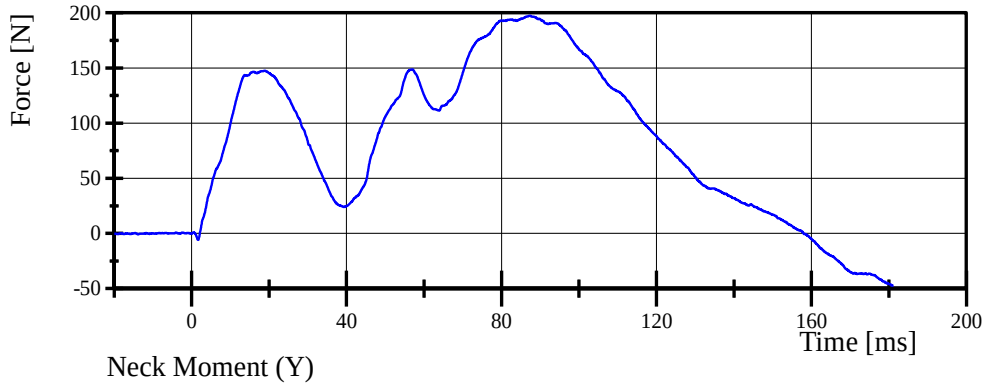
Neck Extension
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Neck Force (X)



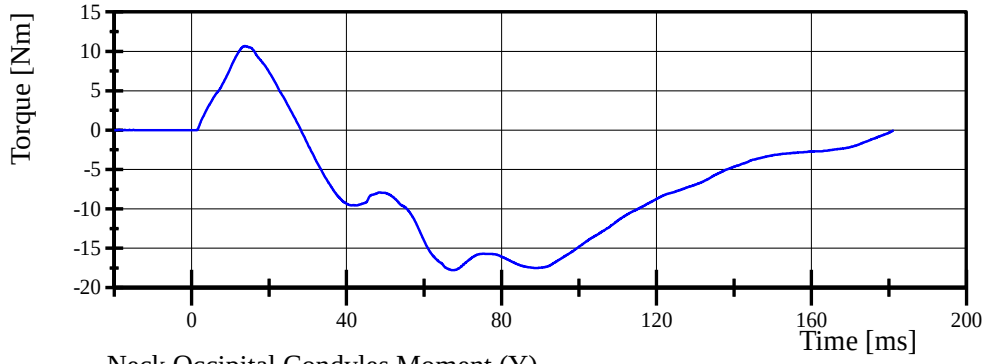
Filter Class: CFC_1000
Max: 197.6 N at 87.2 ms
Min: -47.5 N at 181.0 ms

Neck Force (X) Filtered



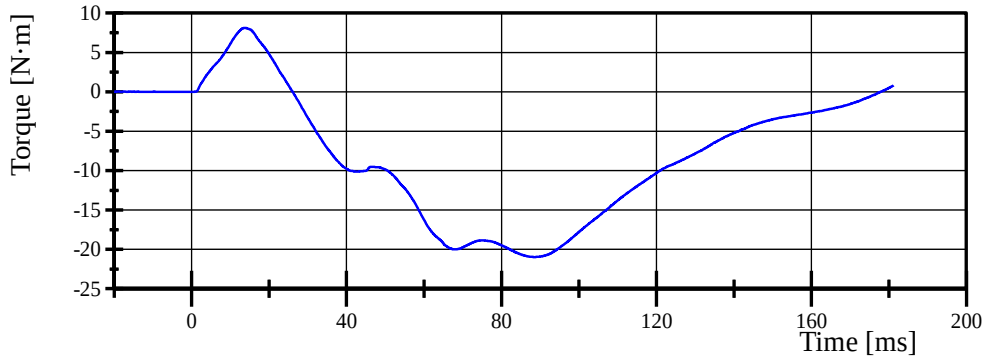
Filter Class: CFC_600
Max: 197.5 N at 87.3 ms
Min: -47.3 N at 181.1 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 10.7 Nm at 13.8 ms
Min: -17.8 Nm at 67.5 ms

Neck Occipital Condyles Moment (Y)



Filter Class: Without_(Constar
Max: 8.1 N·m at 13.8 ms
Min: -21.0 N·m at 88.5 ms

Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 15:51:49 2376

Transportation Research Center Inc.

Front Thorax
HIII 6YO Serial No. 027 Certification No. 25-3
Test Date: 3/3/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ºC	21.3 ºC	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.777 m/s	Yes
Probe Force Peak Between 38.0 mm and 46.0 mm Chest Deflection	(-1,150) - (-1,380) N	-1,328.0 N	Yes
Probe Force Peak Between 12.5 mm and 38.0 mm Chest Deflection	>= (-1,500) N	-1,471.5 N	Yes
Maximum Chest Compression	(-38) - (-46) mm	-39.0 mm	Yes
Internal Hysteresis	65 - 85 %	73.8 %	Yes

Test meets specifications.

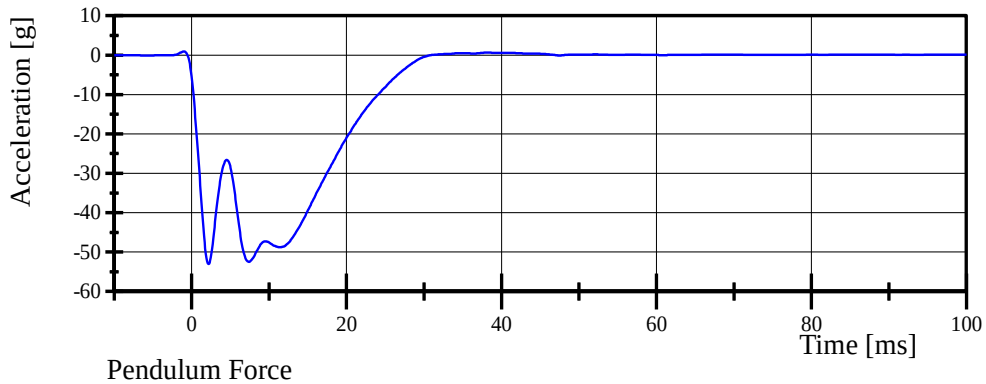
Condition: Used

Comments:
Rib Set S/N: 18031815A

Transportation Research Center Inc.

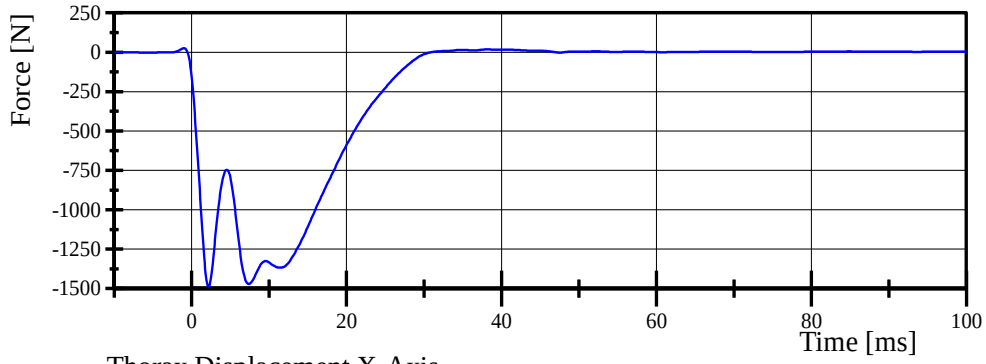
Front Thorax
HIII 6YO Serial No. 027 Certification No. 25-3
Test Date: 3/3/2020

Pendulum Acceleration



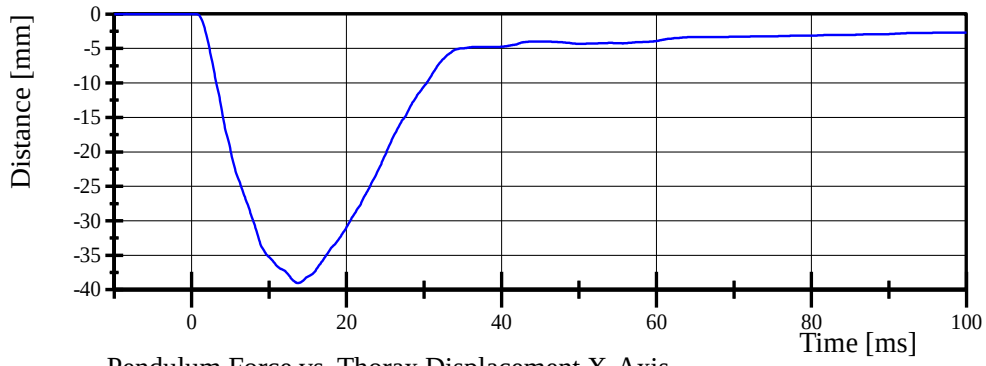
Filter Class: CFC_180
Max: 0.9 g at -1.0 ms
Min: -53.0 g at 2.2 ms

Pendulum Force



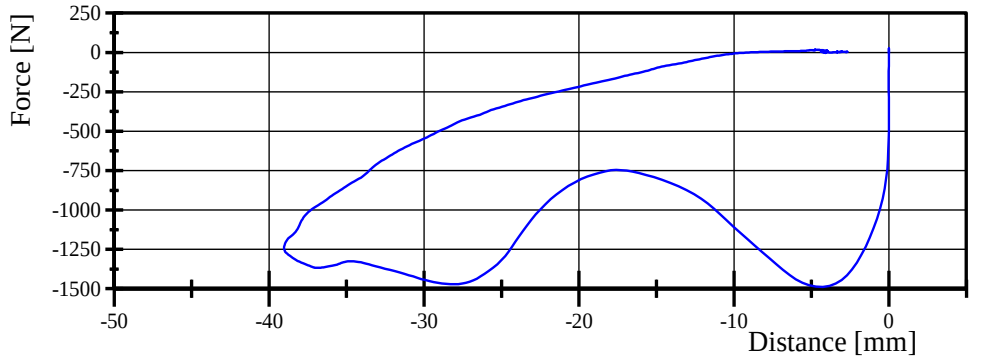
Filter Class: CFC_180
Max: 26.3 N at -1.0 ms
Min: -1,487.2 N at 2.2 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -8.4 ms
Min: -39.0 mm at 13.7 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 26.3 N at -0.0 mm
Min: -1,487.2 N at -4.3 mm

Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

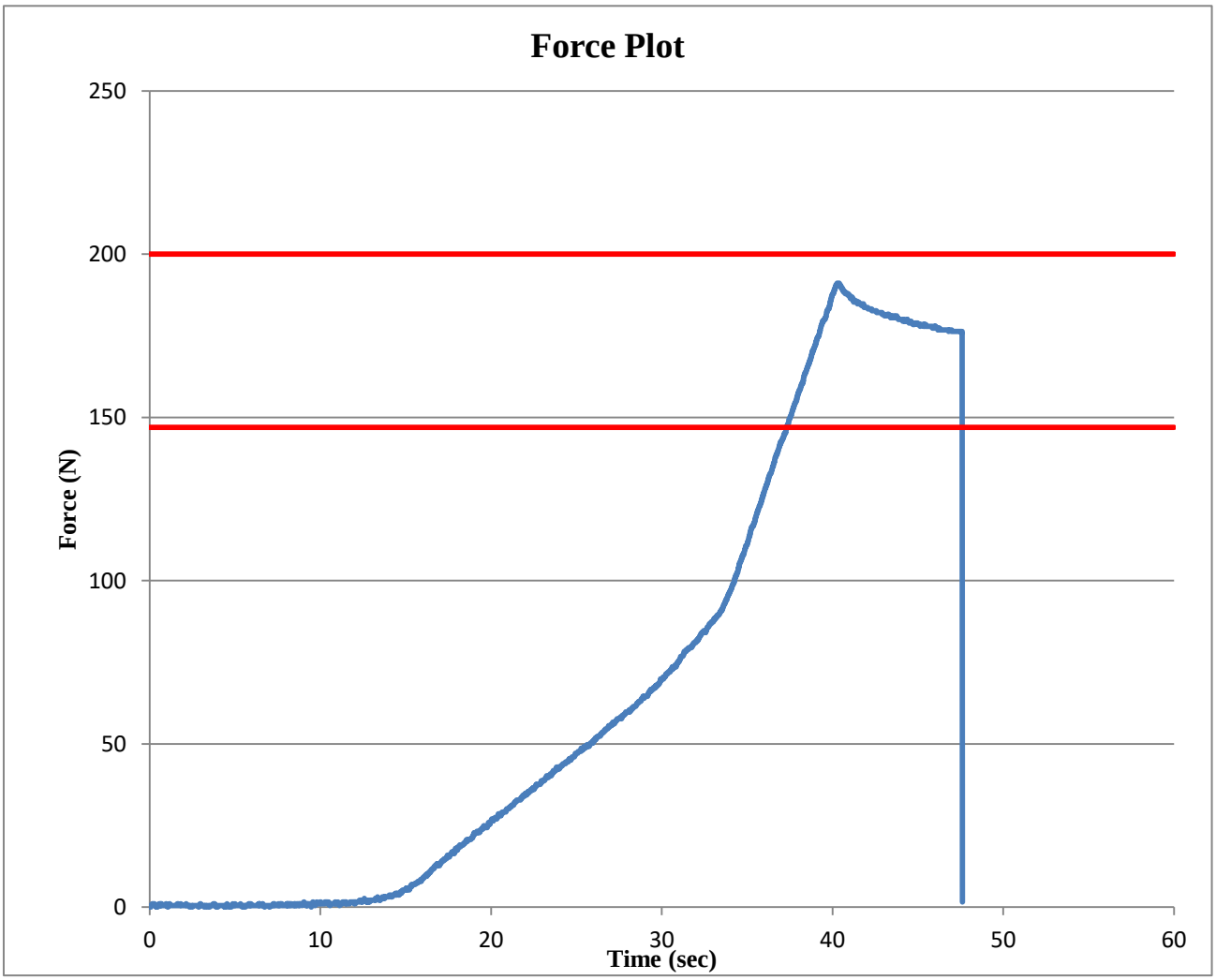
03.03.2020 12:07:06 1548

Transportation Research Center Inc.

Hybrid III Six-Year-Old Child Torso Flexion

Customer:	VRTC		
Serial Number:	027	Date:	3/3/2020
Test Number:	1	Time:	9:15

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.3	°C	Pass
Humidity	10	-	70	42	%	Pass
Average Angular Velocity	0.5	-	1.5	0.94	deg/sec	Pass
Initial Angle	0	-	22	20.4	deg	Pass
Peak Force at 45.29°	147	-	200	191.14	N	Pass
Final Angle	-8	-	8	3.66	deg	Pass



Lumbar S/N: 904
Abdomen S/N: DV2472

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.4 ºC	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.116 m/s	Yes
Peak Femur Force	(-2,000) - (-3,000) N	-2,613.9 N	Yes

Test meets specifications.

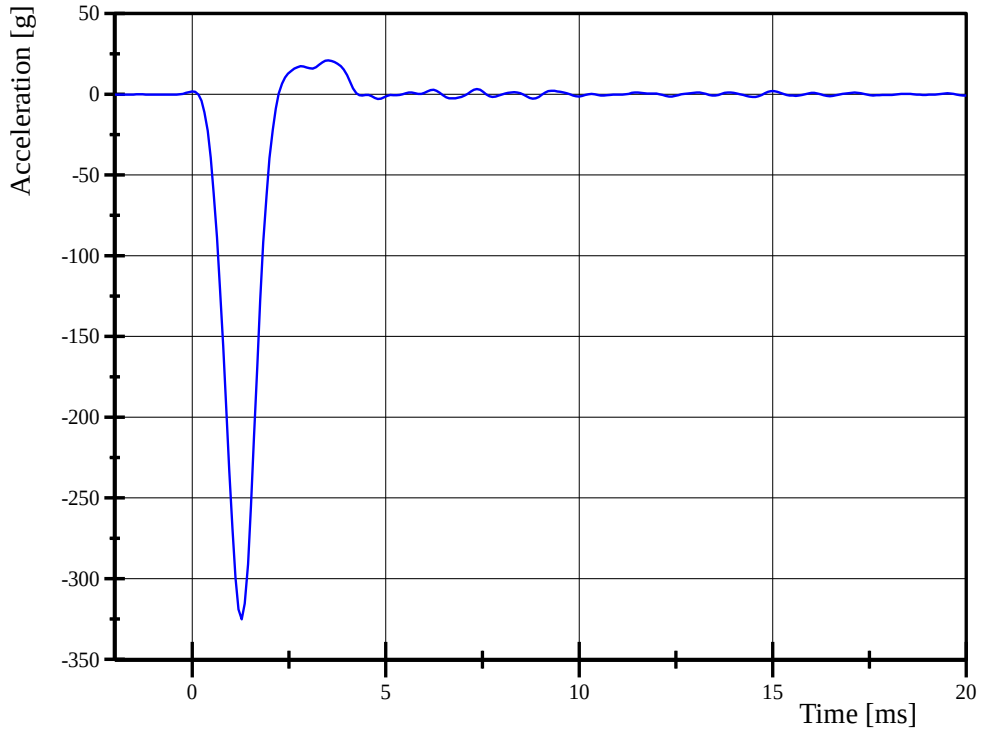
Condition: Used

Comments:
Knee Skni S/N: 640

Transportation Research Center Inc.

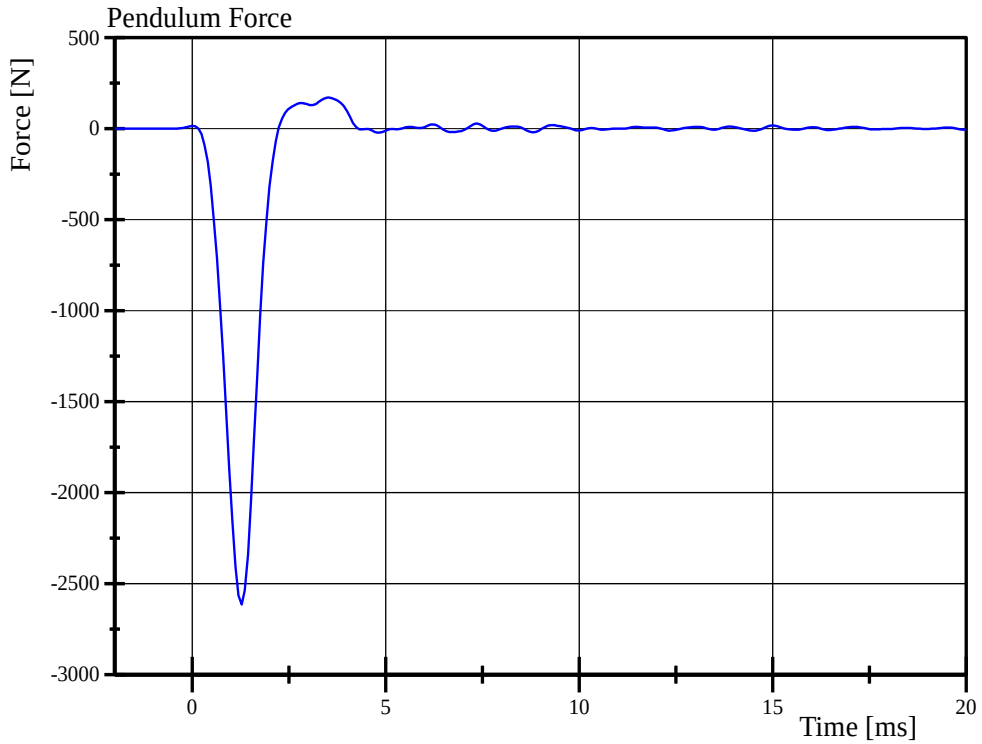
Left Knee Femur Response Test
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 21.1 g at 3.5 ms
Min: -325.1 g at 1.3 ms

Pendulum Force



Filter Class: CFC_600
Max: 169.4 N at 3.5 ms
Min: -2,613.9 N at 1.3 ms

Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 16:13:06 1762

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.3 ºC	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.127 m/s	Yes
Peak Femur Force	(-2,000) - (-3,000) N	-2,781.3 N	Yes

Test meets specifications.

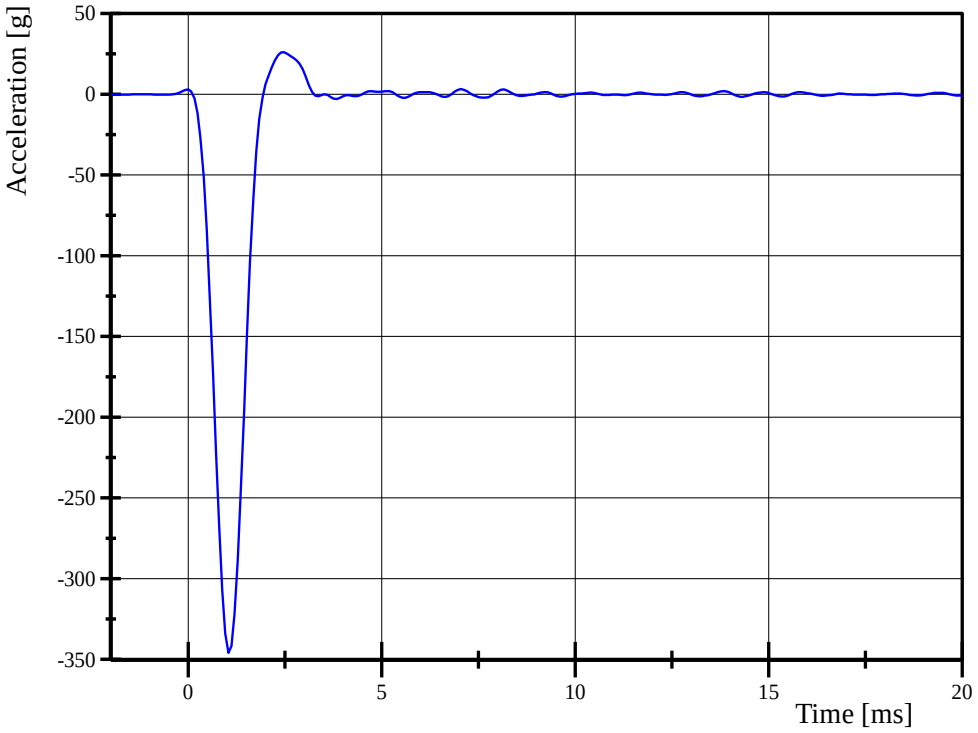
Condition: Used

Comments:
Knee Skin S/N: 643

Transportation Research Center Inc.

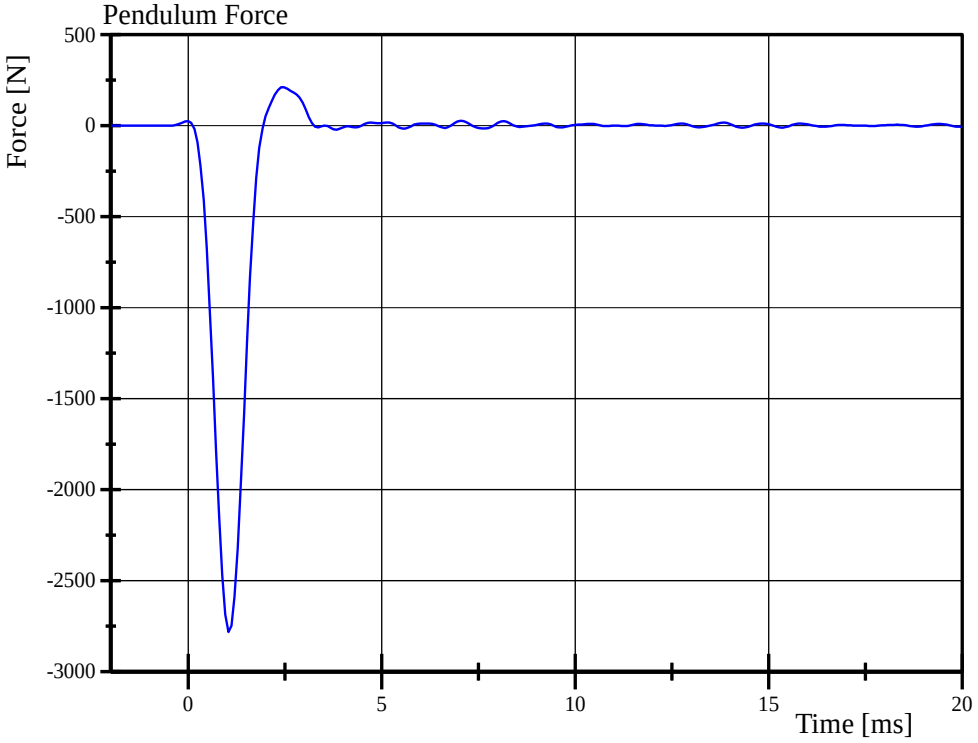
Right Knee Femur Response Test
HIII 6YO Serial No. 027 Certification No. 25-1
Test Date: 3/2/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 26.2 g at 2.5 ms
Min: -345.9 g at 1.0 ms

Pendulum Force



Filter Class: CFC_600
Max: 210.5 N at 2.5 ms
Min: -2,781.3 N at 1.0 ms

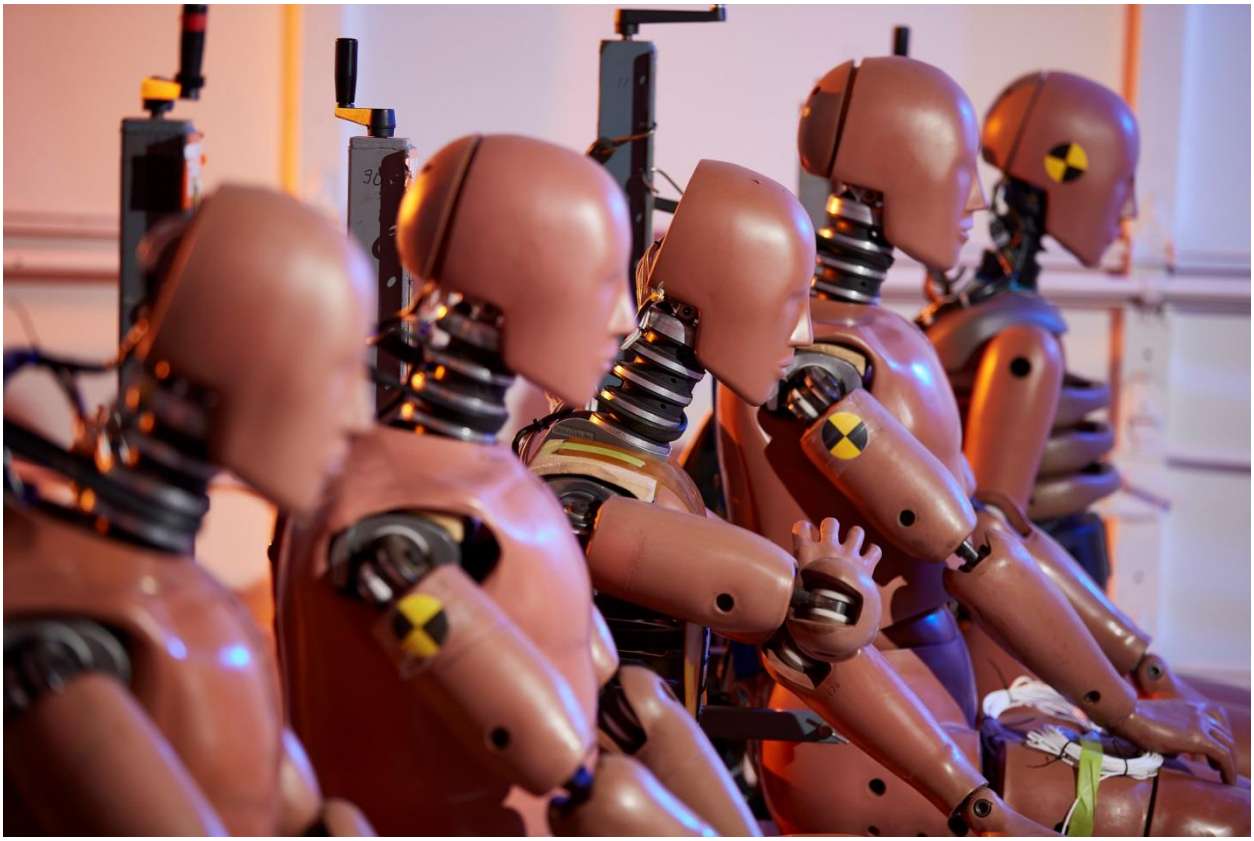
Specification Source: CFR49 Part 572 Subpart N
with Polarity in accordance with J211

03.02.2020 16:27:28 1787

Appendix C – Quality Assurance

Serial Number: 027
Certification No. 25

Quality Assurance



ATD Assembly & Final Inspection

ATD Type:	Hybrid III (6) Year Old
ATD Serial Number:	027
Assembled by:	
Inspected by:	
Date Inspected:	03/03/2020