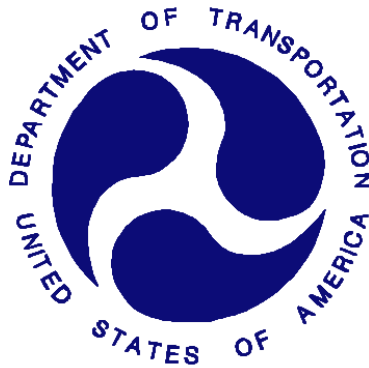


**Final Report Number: NCAP-TRC-14-002**

**New Car Assessment Program (NCAP)  
Frontal Barrier Impact Test**

**Mercedes-Benz  
2014 Mercedes-Benz E350 4-Door Sedan  
NHTSA Number: M20144300**

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



**Report Date: December 19, 2013**

**FINAL REPORT**

**Prepared For:  
U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Office of Crashworthiness Standards  
1200 New Jersey Ave, SE Room W43-410  
Washington, DC 20590**

Notice

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Prepared By: Impact Laboratory Project Operations Group

Approved By: Jeffery W. Sankey

Approval Date: December 19, 2013

FINAL REPORT ACCEPTANCE BY OCWS:

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Division Chief, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date \_\_\_\_\_

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COTR, New Car Assessment Program  
NHTSA, Office of Crashworthiness Standards

Date \_\_\_\_\_

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15. Supplemental Notes																																																																											
16. Abstract  A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2014 Mercedes-Benz E350 4-Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301 and foot well intrusion performance. This test was conducted at the Transportation Research Center Inc. in East Liberty, Ohio on November 12, 2013.  The impact velocity was 57.04 km/h, and the ambient temperature at the barrier face at the time of impact was 21° C. The target vehicle post-test maximum crush was 520 millimeters at vehicle centerline. The test vehicle's performance is as follows:																																																																											
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## **1: PURPOSE AND SUMMARY OF TEST**

### **PURPOSE**

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-12-D-00257. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

This 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Front NCAP Laboratory Test Procedure dated August 2013.

### **SUMMARY**

A load cell barrier consisting of 36 load cells was impacted by a 2014 Mercedes-Benz E350 4-Door Sedan at a velocity of 57.04 km/h. The test was performed at Transportation Research Center, Inc. on November 12, 2013. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E 50<sup>th</sup> percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5<sup>th</sup> percentile female ATD was placed in the right-front passenger position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading.

The driver (position 1) ATD (Serial No. 037), and the right-front passenger (position 2) ATD (Serial No. 426) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 130 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100.0 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 520 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver’s visible contact points were as follows: front airbag, headrest, and knee airbag. The passenger’s visible contact points were as follows: front airbag, headrest, and glove box.

The occupant data is summarized below:

<b>ATD Position</b>	<b>HIC<sub>15</sub></b>	<b>Nij</b>	<b>Neck Tension (N)</b>	<b>Neck Compression (N)</b>	<b>3 ms Chest Clip (Gs)</b>	<b>Chest Disp. (mm)</b>	<b>Left Femur (N)</b>	<b>Right Femur (N)</b>
Driver (50 <sup>th</sup> Male)	193	0.37	997.8	-312.3	48.5	-29.6	-2929.7	-3653.1
Passenger (5 <sup>th</sup> Female)	188	0.38	846.6	-215.4	47.5	-22.5	-2856.0	-3545.8

## **2: OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS**

## DATA SHEET NO. 1

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

#### TEST VEHICLE INFORMATION

NHTSA No.	M20144300
Model Year	2014
Make	Mercedes-Benz
Model	E350
Body Style	4-Door
VIN	WDDHF8JB0EA860763
Body Color	Silver
Odometer Reading (km/mi)	33 mi
Engine Displacement (L)	3.5
Type/No. Cylinders	6
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	7
Overdrive	Yes
Final Drive	AWD
Roof Rack	No
Sunroof/T-Top	Yes
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

#### TEST VEHICLE OPTIONS

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	Yes
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	Yes
Driver Knee Airbag	Yes
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	Yes
Front Pass. Torso/Pelvis Airbag	No
Front Pass. Pelvis Airbag	Yes
Front Pass. Knee Airbag	No
Driver Pretensioner	Yes
Driver Load Limiter	No
Front Pass. Pretensioner	Yes
Front Pass. Load Limiter	No
Other	No

Does owner's manual provide instructions to turn off automatic door locks?

No

#### DATA FROM CERTIFICATION LABEL

Manufactured by	Daimler AG Stuttgart
Date of Manufacture	07/13

GVWR (kg)	2390
GAWR Front (kg)	1165
GAWR Rear (kg)	1250

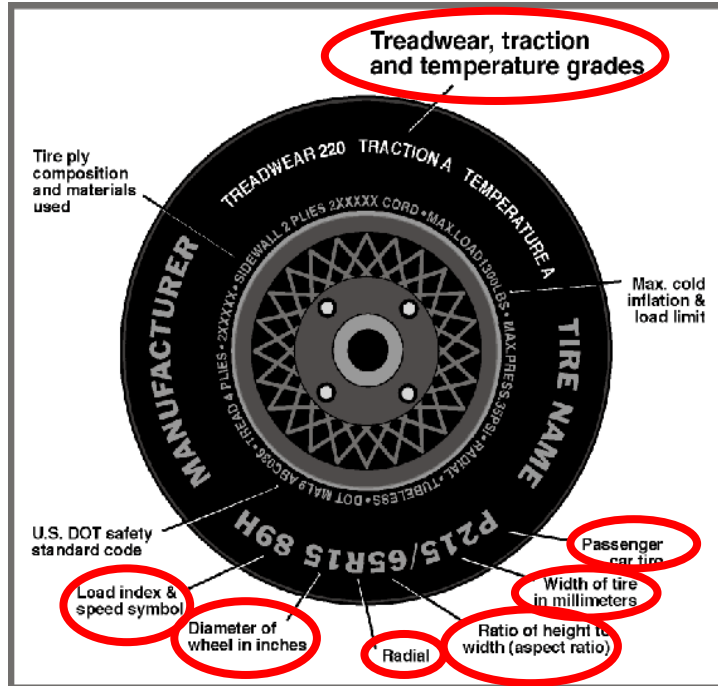
#### VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				375.0
Cargo Wt. (RCLW) (kg)				34.8

## DATA SHEET NO. 1 (CONTINUED)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13



### DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold / Test Pressure (kPa)	250	300
Recommended Tire Size	245/40R18 Extra Load	245/40R18 Extra Load
Tire Size on Vehicle	245/40R18 Extra Load	245/40R18 Extra Load
Tire Manufacturer	Continental	Continental
Tire Model	ContiProContact	ContiProContact
Treadwear	400	400
Traction Grade	AA	AA
Temperature Grade	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	5	5
Load Index/Speed Symbol	97V	97V
Tire Material	Rayon, Steel & Polyamide	Rayon, Steel & Polyamide
DOT Safety Code Right	HW2P N1H6 2613	HW2P N1H6 2413
DOT Safety Code Left	HW2P N1H6 2513	HW2P N1H6 2413

**DATA SHEET NO. 1 (CONTINUED)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	485.4	431.0		527.8	468.2	
Right	kg	507.4	429.8		543.0	483.4	
Ratio	%	53.6	46.4		52.9	47.1	
Totals	kg	992.8	860.8	1853.6	1070.8	951.6	2022.4

**TARGET TEST WEIGHT CALCULATION**

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1853.6
Weight of 1 P572E ATD & 1 P572O ATD	kg	139.3
Rated Cargo/Luggage Weight (RCLW)	kg	34.8
Vehicle Target Weight (TVTW)	kg	2027.7

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	684	680	680	684	1335
As Tested	mm	667	672	669	678	1353
Post Test	mm	663	713	660	689	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2875
Total Vehicle Length at Left Side	mm	4665
Total Vehicle Length at Centerline	mm	4885
Total Vehicle Length at Right Side	mm	4670
Weight of Ballast in Cargo Area	kg	0.0
Weight of Vehicle Components Removed	kg	49.2
Amount of Stoddard Solvent in Fuel Tank	liters	74.4

**LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:**

Rear fascia, mounting brackets, rear bumper beam, trunk lid, hinge covers and liner, tail lights, rear door panels, glass, regulators, motors and speakers, left rear window trim, right rear door weather strip, exhaust heat shield.

## DATA SHEET NO. 1 (CONTINUED)

### GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan NHTSA No.: M20144300  
Test Program: NCAP Frontal Impact Test Date: 11/12/13

### TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4885
2	Total Width	1850
3	Bumper Top Height	493
4	Bumper Bottom Height	418
5	Longitudinal Member Top Height	517
6	Distance Between Longitudinal Members	788
7	Longitudinal Member Width	60
8	Engine Top Height	858
9	Engine Bottom Height	188
10	Engine and Gearbox Width	700
11	Front Bumper-Engine Distance	503
12	Front Shock Absorber Fixing Height	867
13	Bonnet Leading Edge Height	772
14	Front Shock Absorber Fixing Width	1190
15	Front Bumper – Front Axle Distance	855
16	Front Axle – A-Pillar Distance	770
17	A-Pillar – B-Pillar Distance	1000
18	B-Pillar – Rear Axle Distance	1100
19	B-Pillar – C-Pillar Distance	885
20	Roof Sill Bottom Height	1315
21	Roof Sill Top Height	1363
22	Floor Sill Bottom Height	345
23	Floor Sill Top Height	380

## DATA SHEET NO. 2

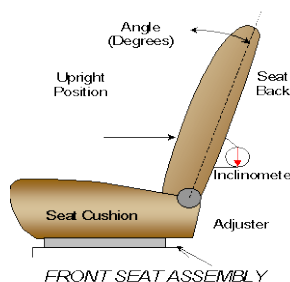
### SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan  
 Test Program: NCAP Frontal Impact

NHTSA No.: M20144300  
 Test Date: 11/12/13

#### NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat back. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable. Inclinometer measurement at the top of the backrest at the seat centerline, according to Form 1 attachment.



	Degree
<b>Driver Seat back angle:</b>	21.0
<b>Passenger Seat back angle:</b>	20.8

#### SEAT FORE/AFT POSITIONS

Describe the method used of determining seat for/aft positions.

Driver: Mid position, Positioned according to Form 1

Passenger: Full forward, Positioned according to Form 1

	Total Fore/Aft Travel	Placed in Position No.
<b>Driver Seat</b>	327	164 mm rearward
<b>Passenger Seat</b>	274	0 (Full Forward)

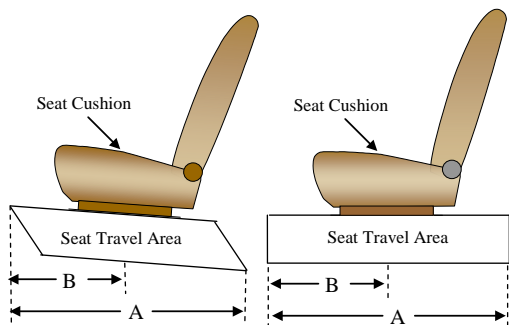
#### SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.

Driver: Uppermost, Positioned according to Form 1

Passenger: Uppermost, Positioned according to Form 1

	Total No. of Positions	Placed in Position No.
<b>Driver Seat</b>	4, numbered 0 to 3	0, Uppermost
<b>Passenger Seat</b>	4, numbered 0 to 3	0, Uppermost



**DATA SHEET NO. 2 (CONTINUED)**

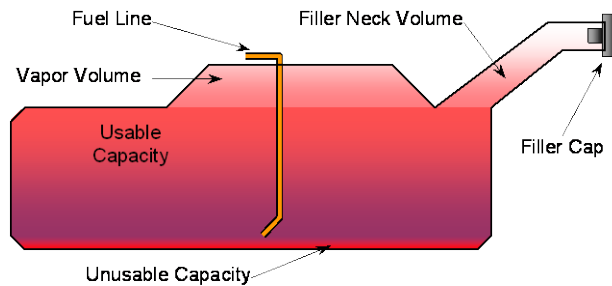
**SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

**FUEL TANK CAPACITY**

	<b>Liters</b>
Usable Capacity of "Standard Tank"	80.0
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	74.4
Actual Amount of Solvent Used	74.4
1/3 of Usable Capacity	26.7

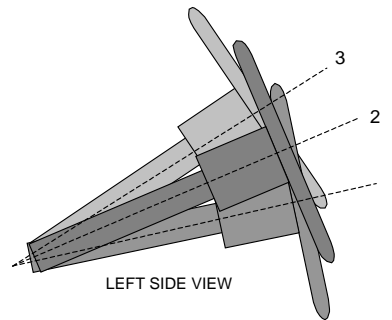
The vehicle is equipped with an electric fuel pump. If ignition key is at "ON" position and engine is not running, the fuel pump operates for 2 seconds. If the engine is running, then the fuel pump will run continuously.



VEHICLE FUEL TANK ASSEMBLY

**STEERING COLUMN ADJUSTMENT**

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. Steel square was placed across the rim of the steering wheel, an inclinometer was placed on the plate and the angle was measured. Telescope travel was measured full in and full out and set at the midpoint.



STEERING COLUMN ASSEMBLY

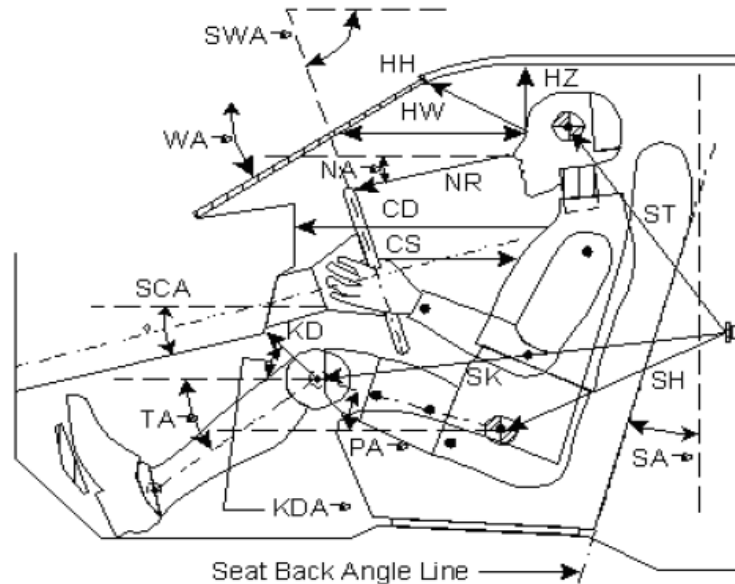
**STEERING COLUMN POSITIONS**

	<b>Degrees</b>	<b>Fore/Aft Position (mm)</b>
<b>Lowermost Position No. 1</b>	69.5	200
<b>Geometric Center Position No. 2</b>	67.35	200
<b>Uppermost Position No. 3</b>	65.2	200
<b>Telescoping Steering Wheel Travel</b>	67.4	200-246
<b>Test Position</b>	67.4	223

### DATA SHEET NO. 3

#### DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                      Test Date: 11/12/13

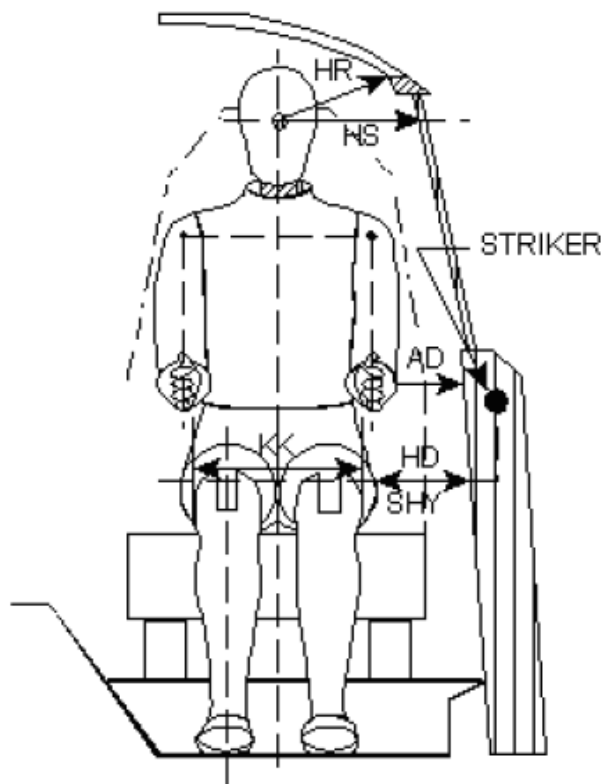


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
<b>WA°</b>	Windshield Angle		29.7		
<b>SWA°</b>	Steering Wheel Angle		67.4		
<b>SCA°</b>	Steering Column Angle		22.6		
<b>SA°</b>	Seat Back Angle (on headrest post)		21		20.8
<b>HZ</b>	Head to Roof (Z)	173	90	182	90
<b>HH</b>	Head to Header	340	29	562	0
<b>HW</b>	Head to Windshield	584	0	582	0
<b>NR</b>	Nose to Rim	393	10		
<b>CD</b>	Chest to Dash	544		412	
<b>CS</b>	Chest to Steering Hub	304	0		
<b>RA</b>	Rim to Abdomen	215	0		
<b>KDL</b>	Left Knee to Dash	186	27	96	60.1
<b>KDR</b>	Right Knee to Dash	158	27	102	61.4
<b>PA°</b>	Pelvic Angle		23.3		21.7
<b>TA°</b>	Tibia Angle		34.2		44.2
<b>SK</b>	Striker to Knee	564	10.8	668	8
<b>ST</b>	Striker to Head	456	80.2	450	69.5
<b>SH</b>	Striker to H-Point	285	53	367	25.7

## DATA SHEET NO. 4

### DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                      Test Date: 11/12/13

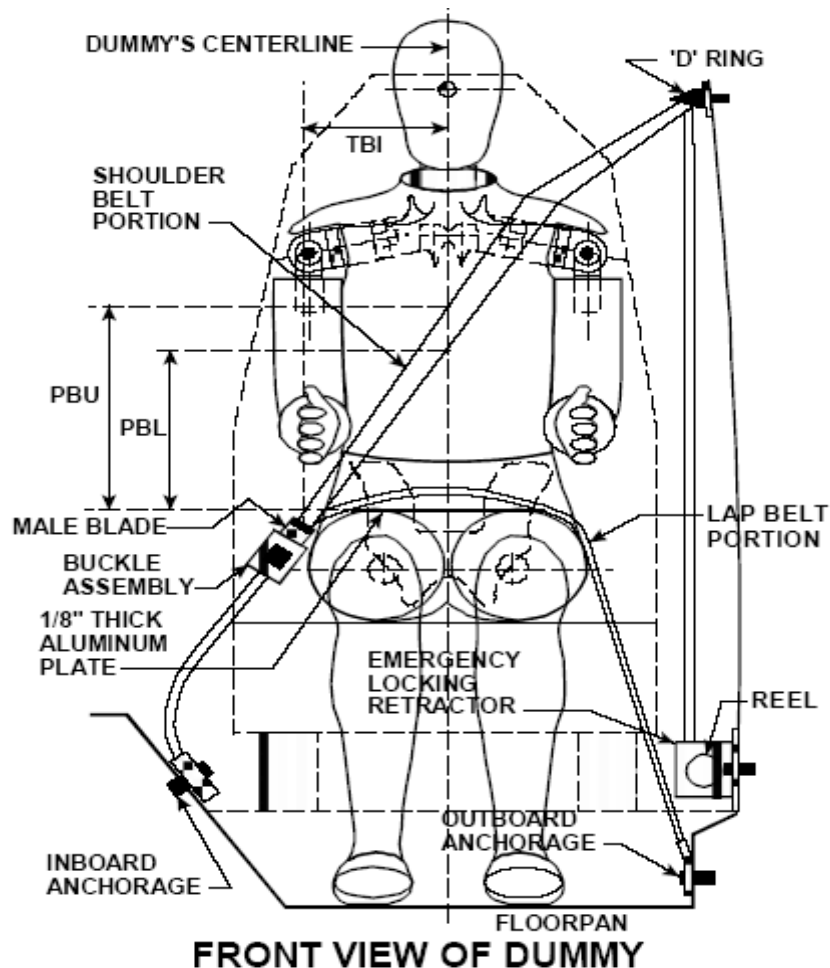


Code	Measurement Description	Driver	Passenger
<b>AD</b>	Arm to Door	123	165
<b>HD</b>	H-Point to Door	145	248
<b>HR</b>	Head to Side Header	208	235
<b>HS</b>	Head to Side Window	352	363
<b>KK</b>	Knee to Knee	328	235
<b>SHY</b>	Striker to H-Point (Y Direction)	232	282
<b>AA</b>	Ankle to Ankle	329	189

## DATA SHEET NO. 5

### SEAT BELT POSITIONING DATA

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                      Test Date: 11/12/13



### SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
<b>PBU</b> – Top surface of reference to belt upper edge	mm	340	280
<b>PBL</b> – Top surface of reference to belt lower edge	mm	256	189

### BELT LENGTH DATA

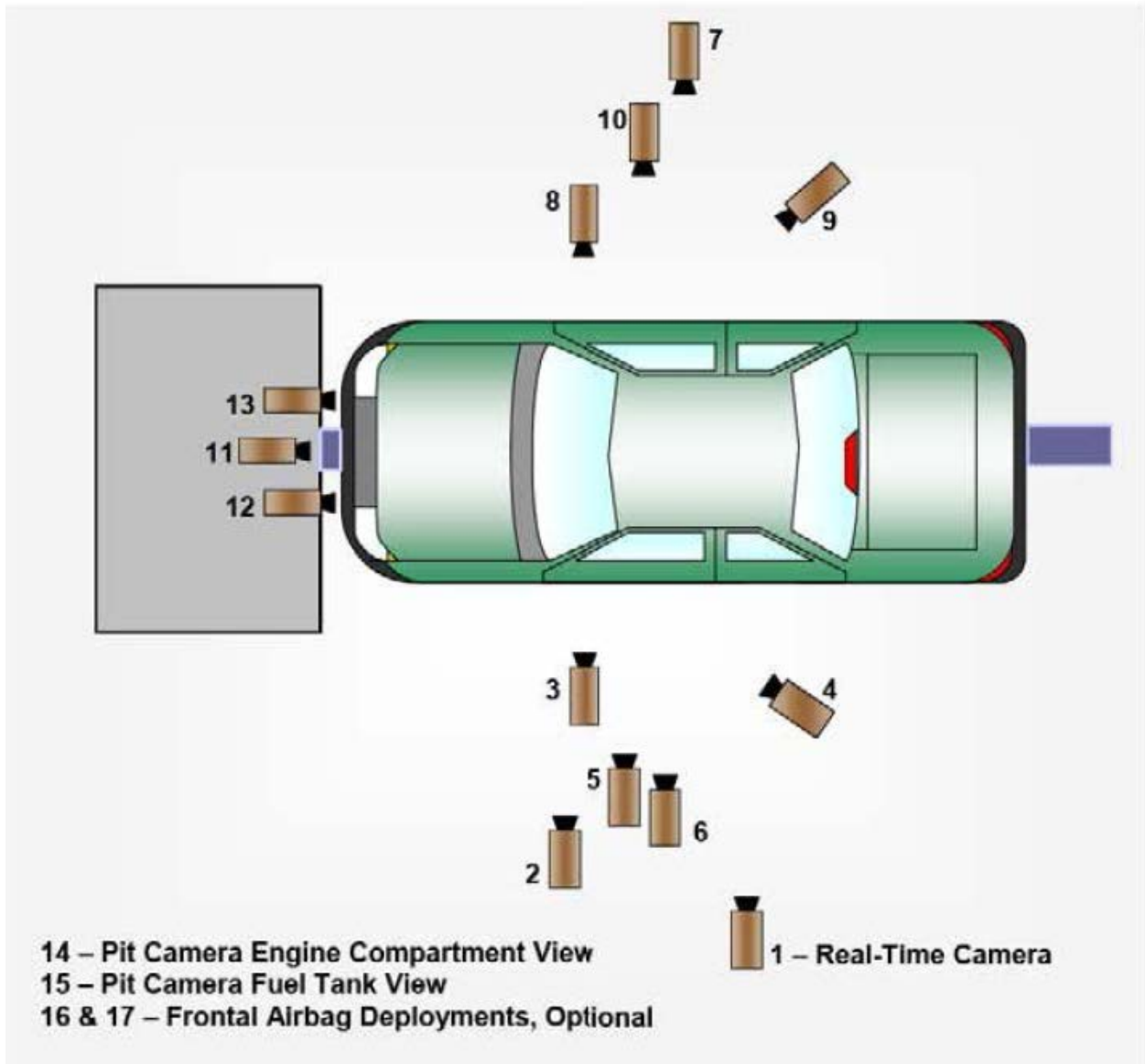
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	906	947
Lap belt length as measured on ATD	mm	590	570
Remainder of belt on reel	mm	1104	1258
Total belt length for continuous webbing systems	mm	2600	2775

**DATA SHEET NO. 6**

**HIGH SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
Test Program: NCAP Frontal Impact                      Test Date: 11/12/13

**CAMERA POSITIONS FOR FRONTAL IMPACTS**



**DATA SHEET NO. 6 (CONTINUED)**

**HIGH SPEED CAMERA LOCATIONS AND DATA**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

**CAMERA LOCATIONS**

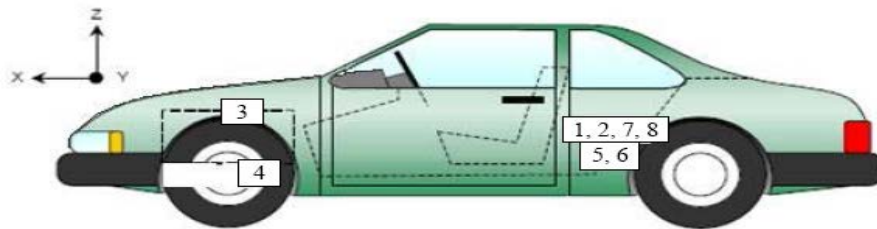
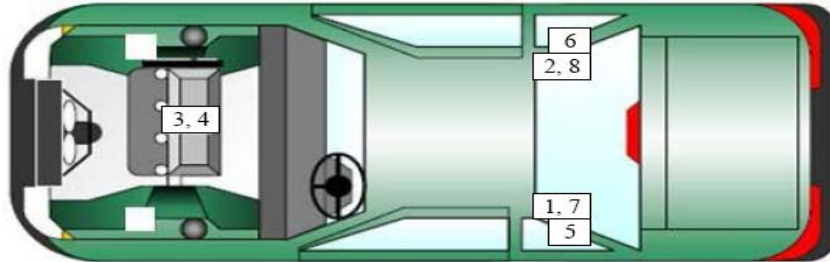
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	N/A	N/A	N/A	Zoom	30
2	Driver Close-Up	-1110	-5217	-1066	Zoom	1000
3	Left Front Half	-2325	-5422	-1278	8.5	1000
4	Left Angle	-4147	-311	-1894	25	1000
5	Steering Column - Top	-2016	-5422	-2249	25	1000
6	Steering Column – Bottom	-2016	-4938	-1610	25	1000
7	Right Overall	-2153	4866	-1136	12.5	1000
8	Passenger Close-Up	-1766	5336	-1326	Zoom	1000
9	Right Front Half	-4149	2907	-2077	25	1000
10	Right Angle	-1229	6173	-1228	25	1000
11	Windshield	-152	0	-2629	8.5	1000
12	Driver Windshield	-103	-300	-2592	16	1000
13	Passenger Windshield	-103	400	-2585	16	1000
14	Pit Front	-1229	0	3011	25	1000
15	Pit Rear	-3121	0	3029	12.5	1000
16	Onboard Driver Airbag (Optional)	N/A	N/A	N/A	8.5	1000
17	Onboard Passenger Airbag (Optional)	N/A	N/A	N/A	8.5	1000

Reference Points: +X – forward of impact plane  
 +Y – right of monorail center  
 +Z – into ground

## DATA SHEET NO. 7

### VEHICLE ACCELEROMETER DATA

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13



### VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Camera View	Location (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2360	-385	350
2	Right Rear Accelerometer – X Direction	2360	420	362
3	Engine Top X	4525	-125	785
4	Engine Bottom X	4395	5	156
5	Left Rear Accelerometer – Z Direction	2360	-385	350
6	Right Rear Accelerometer – Z Direction	2360	420	362
7	Left Rear Accelerometer – X Direction Redundant	2360	-450	350
8	Right Rear Accelerometer- X Direction Redundant	2360	357	362

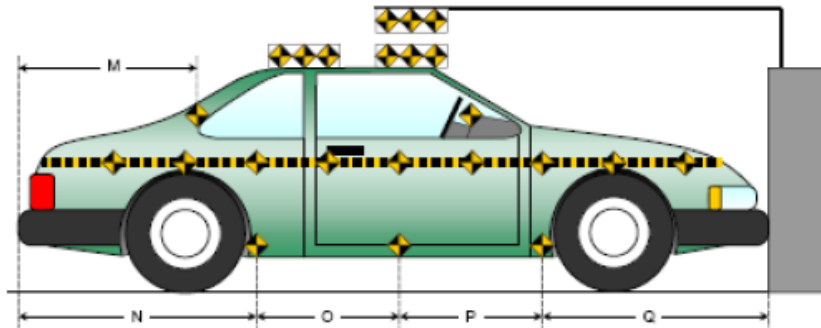
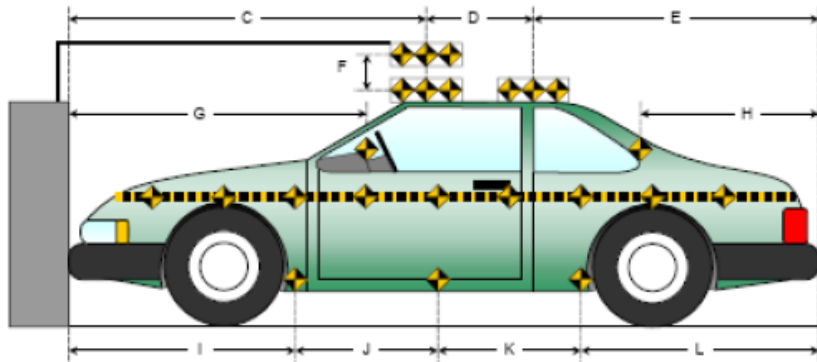
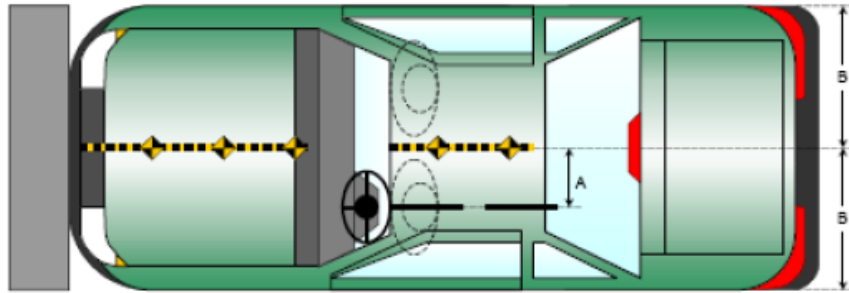
Reference Points:    X – Rear Surface of Vehicle (+ forward)  
                               Y – Vehicle Centerline (+ to right)  
                               Z – Ground Plane (+ up)

## DATA SHEET NO. 8

### PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

Item	Value
A	470
B	925
C	2586
D	610
E	2064
F	353
G	1800
H	1855
I	1283
J	990
K	998
L	1990
M	1856
N	1987
O	998
P	995
Q	1282

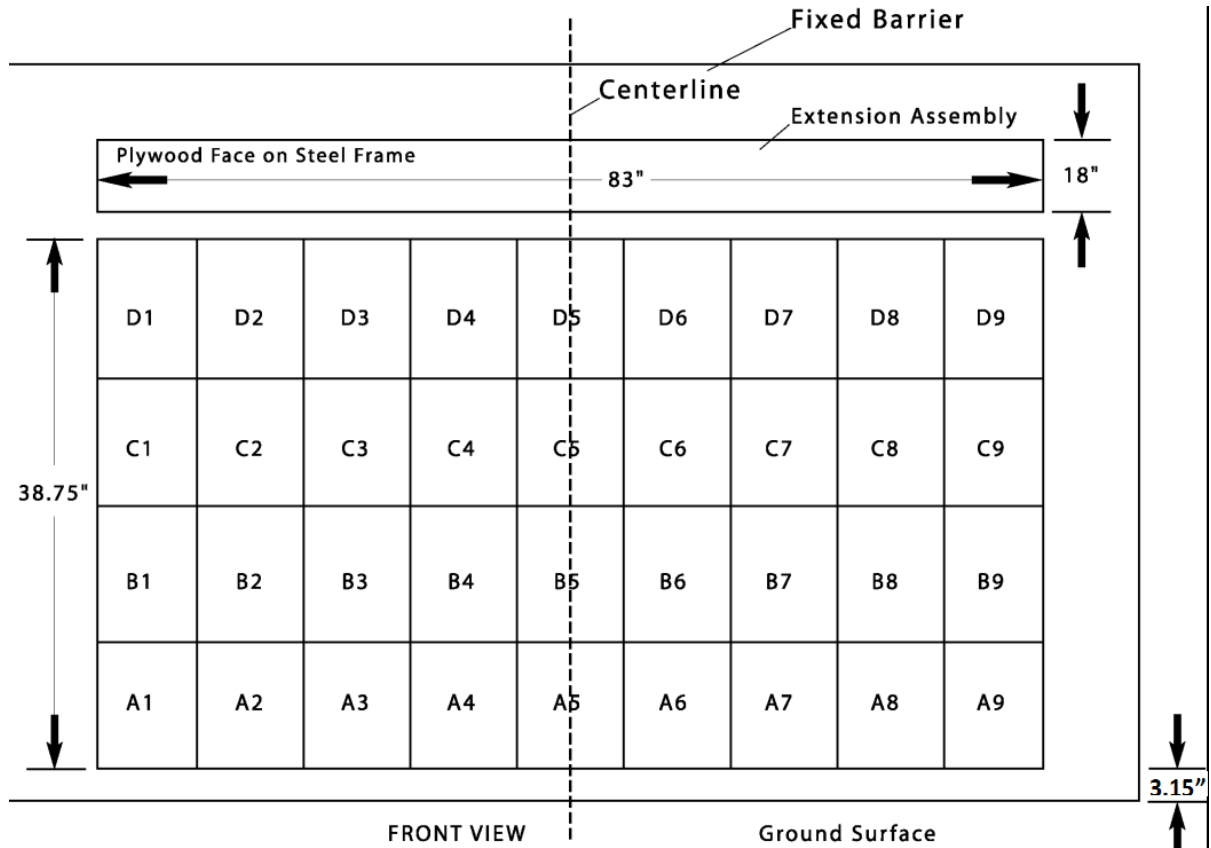


All units in millimeters

**DATA SHEET NO. 9**

**LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan    NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact    Test Date: 11/12/13



**DATA SHEET NO. 10**

**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

**INSTRUMENTATION**

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	42
Passenger Dummy Accelerometers	42
Vehicle Structure Accelerometers	8
<b>Total</b>	<b>92</b>

**CAMERA COVERAGE**

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	14
Real-Time Panning	1
<b>Total</b>	<b>17</b>

**DATA SHEET NO. 11**

**POST-TEST OBSERVATIONS**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

**TEST DUMMY INFORMATION AND CONTACT LOCATIONS**

<b>Description</b>	<b>Driver</b>	<b>Passenger</b>
Dummy Type / Serial No.	Hybrid III 50th/ 037	Hybrid III 5th/ 426
Head Contact	Front airbag, headrest	Front airbag, headrest
Upper Torso Contact	None	None
Lower Torso Contact	None	None
Left Knee Contact	Knee airbag	Glove box
Right Knee Contact	Knee airbag	Glove box

**DOOR OPENING AND SEAT TRACK INFORMATION**

<b>Description</b>	<b>Front</b>	<b>Rear</b>
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed & latched, Operational	Remained closed & latched, Operational
Rear Door Opening	Remained closed & latched, Operational	Remained closed & latched, Operational
Seat Track Shift (mm)	None	None
Seat Back Failure	None	None

**POST-TEST STRUCTURAL OBSERVATIONS**

<b>Critical Areas of Performance</b>	<b>Observations and Conclusions</b>
Windshield Damage	Broken
Window Damage	None
Other Notable Effects	None

**VEHICLE REBOUND FROM BARRIER**

<b>Measured Parameter</b>	<b>Units</b>	<b>Value</b>
Left Side	mm	745
Center	mm	746
Right Side	mm	737
Average	mm	743

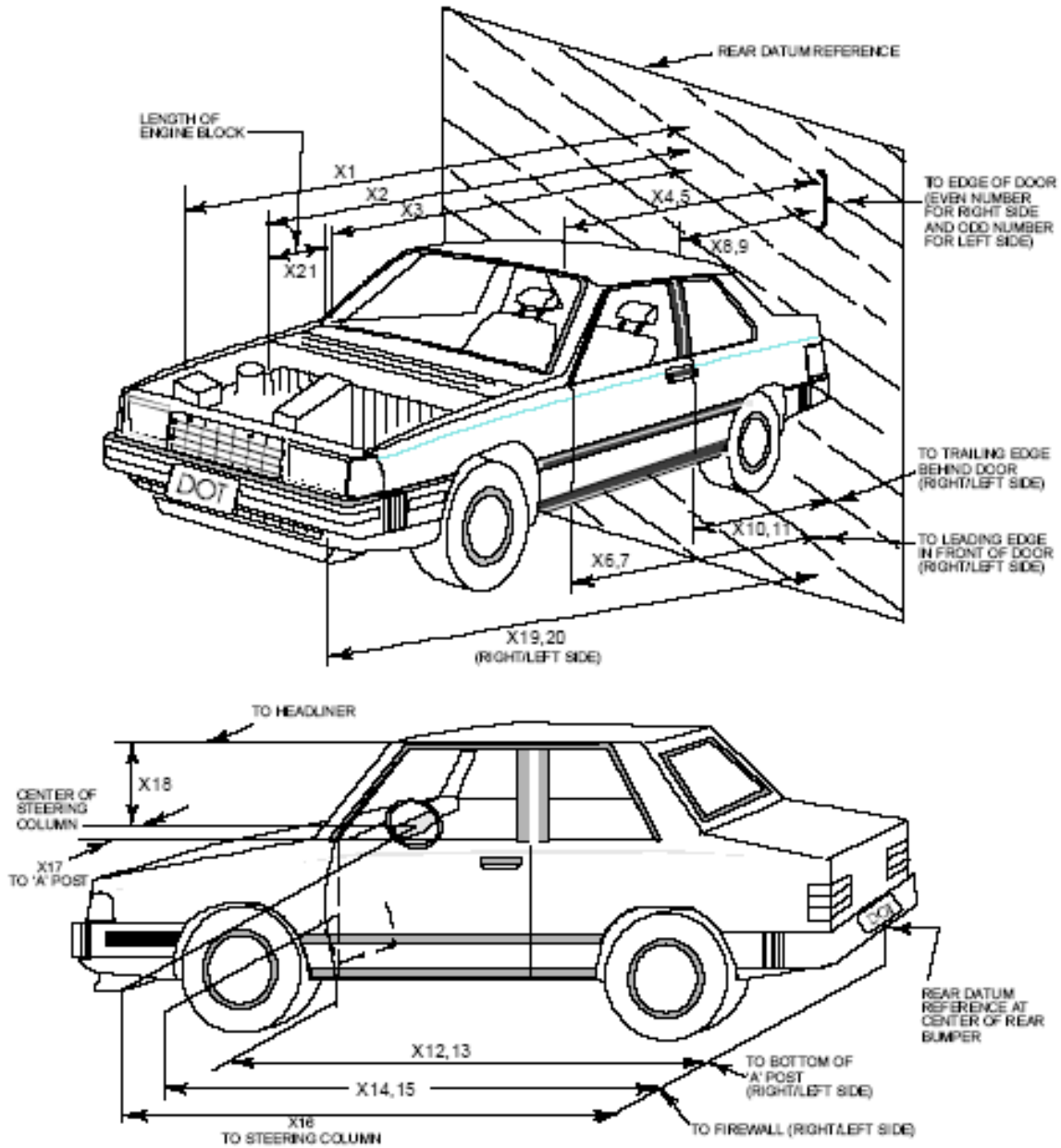
**SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION**

<b>Restraint Type</b>	<b>Driver (Occupant 1)</b>		<b>Passenger (Occupant 2)</b>	
	<b>Installed</b>	<b>Deployed</b>	<b>Installed</b>	<b>Deployed</b>
Front Airbag	Yes	Yes	Yes	Yes
Side Curtain Airbag	Yes	No	Yes	No
Torso Airbag	Yes	No	Yes	No
Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	N/A	N/A	N/A	N/A

DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
Test Program: NCAP Frontal Impact                              Test Date: 11/12/13



**DATA SHEET NO. 12 (CONTINUED)**

**VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

<b>No.</b>	<b>Measurement Description</b>	<b>Pre-Test</b>	<b>Post-Test</b>	<b>Difference</b>
1	Total Length of Vehicle at Centerline	4885	4365	520
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4345	4185	160
3	RSOV to Firewall	3665	305	60
4	RSOV to Upper Leading Edge of Right Door	3313	3315	-2
5	RSOV to Upper Leading Edge of Left Door	3315	3315	0
6	RSOV to Lower Leading Edge of Right Door	3355	3350	5
7	RSOV to Lower Leading Edge of Left Door	3358	3350	8
8	RSOV to Upper Trailing Edge of Right Door	2259	2261	-2
9	RSOV to Upper Trailing Edge of Left Door	2260	2257	3
10	RSOV to Lower Trailing Edge of Right Door	2310	2305	5
11	RSOV to Lower Trailing Edge of Left Door	2303	2300	3
12	RSOV to Bottom of "A" Post-of Right Side	3262	3253	9
13	RSOV to Bottom of "A" Post-of Left Side	3255	3255	0
14	RSOV to Firewall, Right Side	3452	3460	-8
15	RSOV to Firewall, Left Side	3452	3440	12
16	RSOV to Steering Column	2890	2948	-58
17	Center of Steering Column to "A" Post	350	380	-30
18	Center of Steering Column to Headliner	425	480	-55
19	RSOV to Right Side of Front Bumper	4670	4390	280
20	RSOV to Left Side of Front Bumper	4665	4415	250
21	Length of Engine Block	560	560	0
RD	RSOV to Right Side of Dash Panel	3115	3115	0
CD	RSOV to Center of Dash Panel	3060	3055	5
LD	RSOV to Left Side of Dash Panel	3105	3105	0

All Dimensions in mm

**DATA SHEET NO. 13**

**ACCIDENT INVESTIGATION DIVISION DATA**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

**VEHICLE INFORMATION**

VIN: WDDHF8JB0EA860763  
 Vehicle Size Category: Midsize Cars

Wheelbase: 2875  
 Test Weight (kg): 2022.4

**ACCELEROMETER DATA**

Accelerometer Locations: As listed on Page 15 of this report.

Cal. Procedure/Interval: TRC procedure / 6 month interval

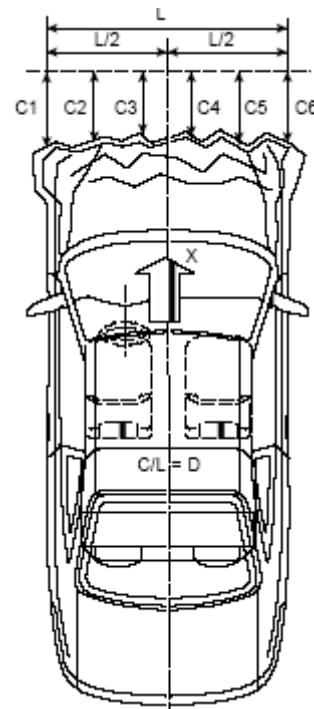
Integration Algorithm: Trapezoidal

Linearity: > 99%

Impact Velocity (km/h): 57.04

Velocity Change (km/h): 65.8

Time of Separation (ms): 115



**CRUSH PROFILE**

Collision Deformation Classification: 12FDEW2

Midpoint of Damage: Centerline

Damage Region Length (mm): 1555

Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4665	4415	250
C2	Crush zone 2 at left side	mm	4775	4363	412
C3	Crush zone 3 at left side	mm	4840	4353	487
C4	Crush zone 4 at right side	mm	4840	4355	485
C5	Crush zone 5 at right side	mm	4780	4342	438
C6	Crush zone 6 at right side	mm	4670	4390	280
L	C1 to C6	mm	1555	1555	0

**DATA SHEET NO. 14**

**VEHICLE INTRUSION MEASUREMENTS**

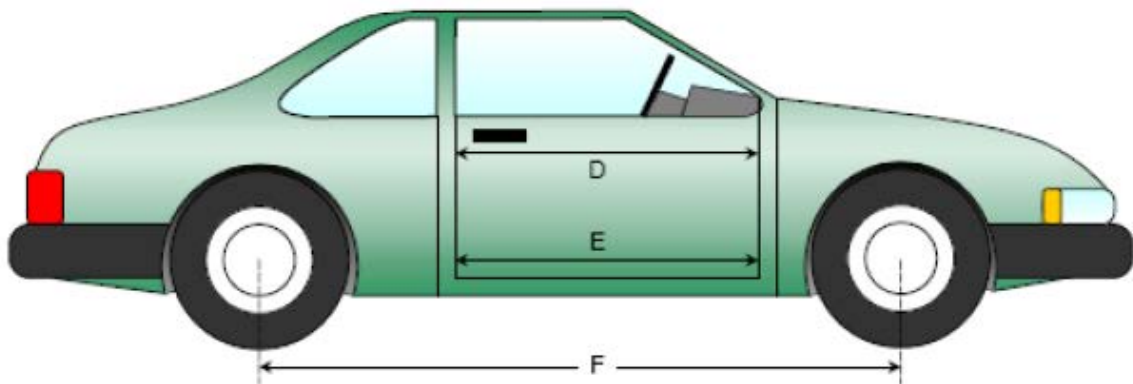
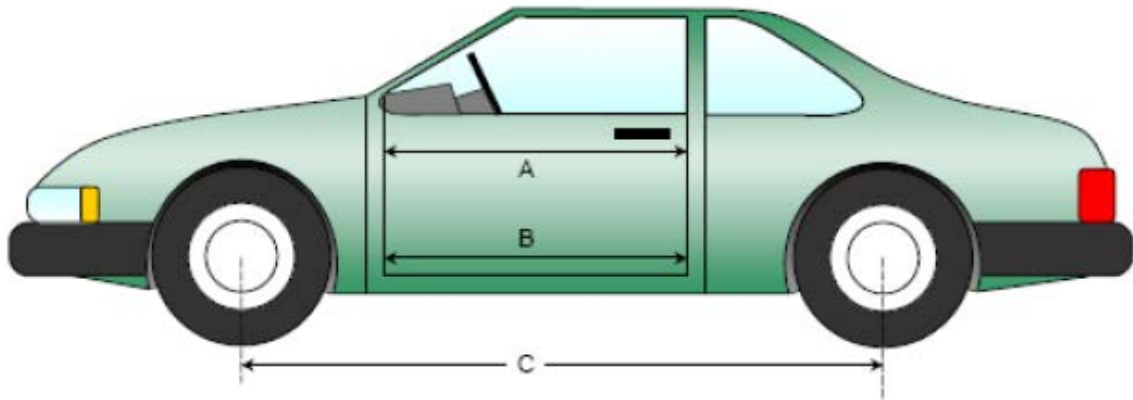
Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                      Test Date: 11/12/13

**DOOR OPENING WIDTH**

No.	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	955	950	5
B	Left Side Lower	mm	878	875	3
C	Right Side Upper	mm	945	945	0
D	Right Side Lower	mm	862	864	-2

**WHEELBASE MEASUREMENTS**

No.	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2875	2745	130
F	Right Side Wheelbase	mm	2875	2760	115



**DATA SHEET NO. 14 (CONTINUED)**

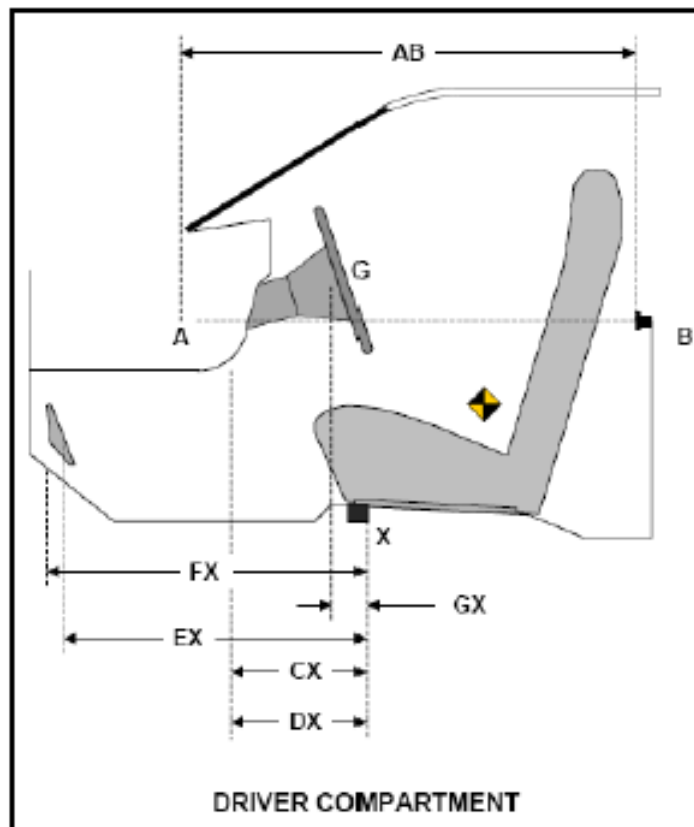
**VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

**DRIVER COMPARTMENT INTRUSION**

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	982	960	22
CX	Left Knee Bolster to X	mm	275	270	5
DX	Right Knee Bolster to X	mm	268	290	-22
EX	Brake Pedal to X	mm	620	596	24
FX	Foot Rest to X	mm	865	670	195
GX	Center of Steering Column Wheel Hub to X	mm	30	140	-110

X = Front of Seat Track (Stationary)



## DATA SHEET NO. 15

### SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact                              Test Date: 11/12/13

Please provide windshield mounting details.

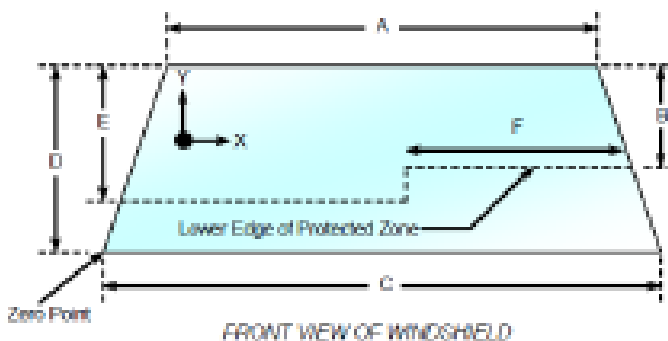
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test:

#### WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2150	2150	100
Right Side	2150	2150	100
Total	4300	4300	100

Item	Units	Value
A	mm	1205
B	mm	500
C	mm	1470
D	mm	805
E	mm	492
F	mm	520



#### AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y
NA	NA
NA	NA
NA	NA
NA	NA

B. The inner surface of the windshield was penetrated by the hood support beneath the protected zone.

X	Y
NA	NA
NA	NA
NA	NA
NA	NA

**DATA SHEET NO. 15 (CONTINUED)**

**SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan NHTSA No.: M20144300  
Test Program: NCAP Frontal Impact Test Date: 11/12/13

**FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA**

Temperature at Time of Impact: \_\_\_\_\_ Test Time: 16:56

Stoddard Solvent Spillage Measurements

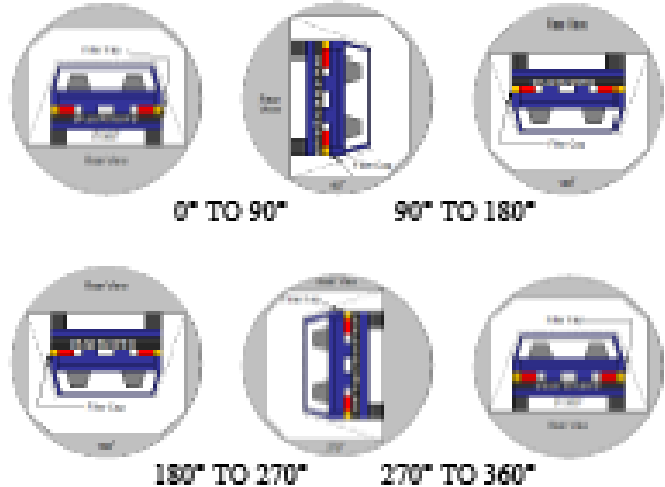
- A From impact until vehicle motion ceases: 0 oz.  
(maximum allowable – 1 oz.)
- B For the 5-minute period after motion ceases: 0 oz.  
(maximum allowable – 5 oz.)
- C For the following 25 minutes: 0 oz.  
(maximum allowable – 1 oz./minutes)
- D Spillage: 0

**DATA SHEET NO. 16**

**FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan      NHTSA No.: M20144300  
 Test Program: NCAP Frontal Impact      Test Date: 11/12/13

1. The specified fixture rollover rate for each 90° of rotation is 50 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage: None



**SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	90	330	420
90° to 180°	90	330	840
180° to 270°	90	330	1260
270° to 360°	90	330	1680

**FMVSS 301 SPILLAGE TABLE**

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

**SOLVENT SPILLAGE LOCATION TABLE**

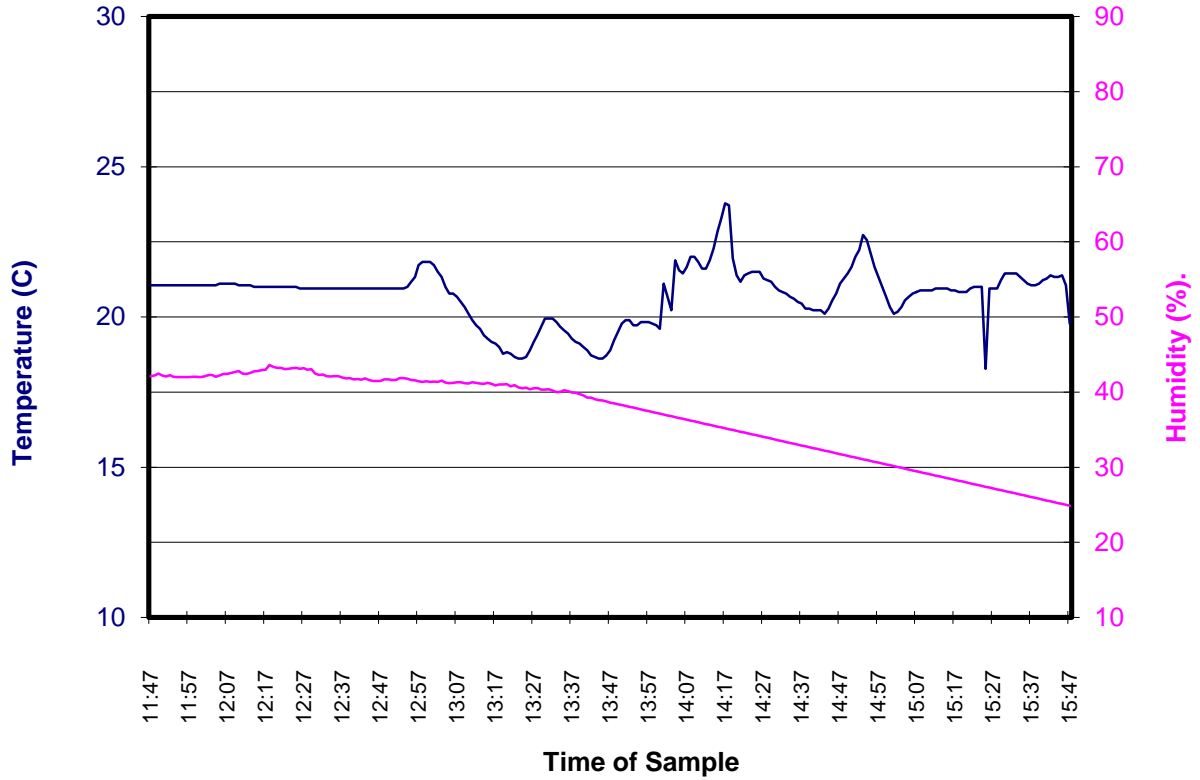
Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

**DATA SHEET NO. 17**

**DUMMY/VEHICLE TEMPERATURE STABILIZATION**

Test Vehicle: 2014 Mercedes-Benz E350 4-Door Sedan NHTSA No.: M20144300  
Test Program: NCAP Frontal Impact Test Date: 11/12/13

**Frontal NCAP 131112: Test Time 15:47**



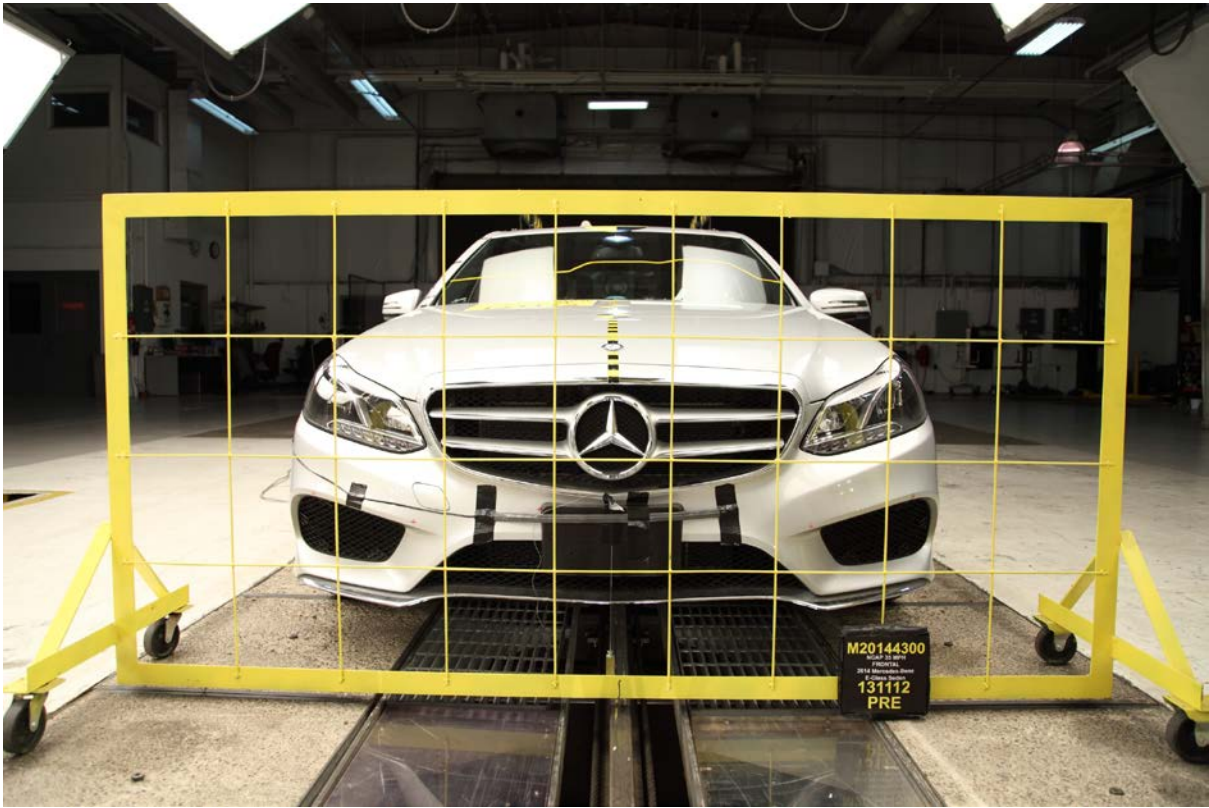
**APPENDIX A**  
**PHOTOGRAPHS**

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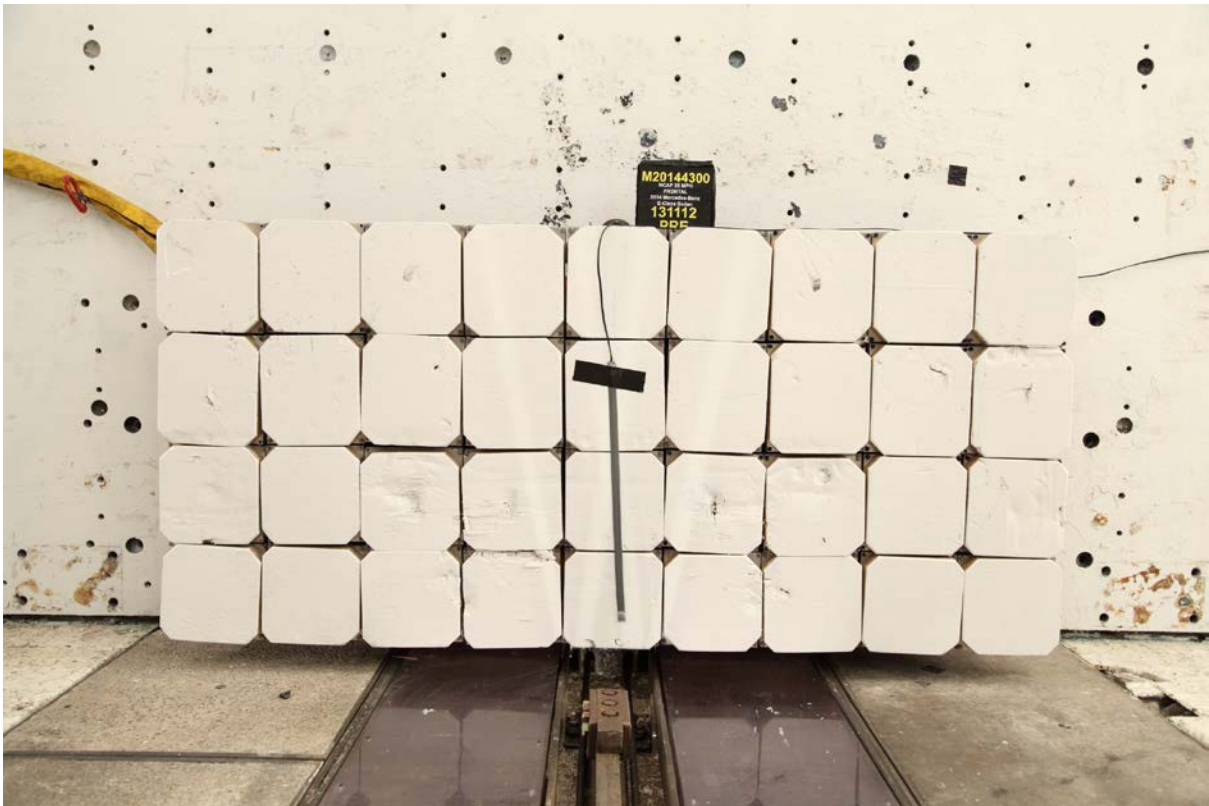
<b>No.</b>	<b>Description</b>	<b>Page</b>
1	Load Cell Location	A-4
2	Load Cell Wall	A-4
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4	Tire Placard	A-5
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12	Post-Test Right View of Test Vehicle	A-9
13	Pre-Test Right Front 3-4 View	A-10
14	Post-Test Right Front 3-4 View	A-10
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39	Pre-Test Driver Dummy Feet	A-23

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57	Post-Test Passenger Seat Fore-Aft Markings	A-32
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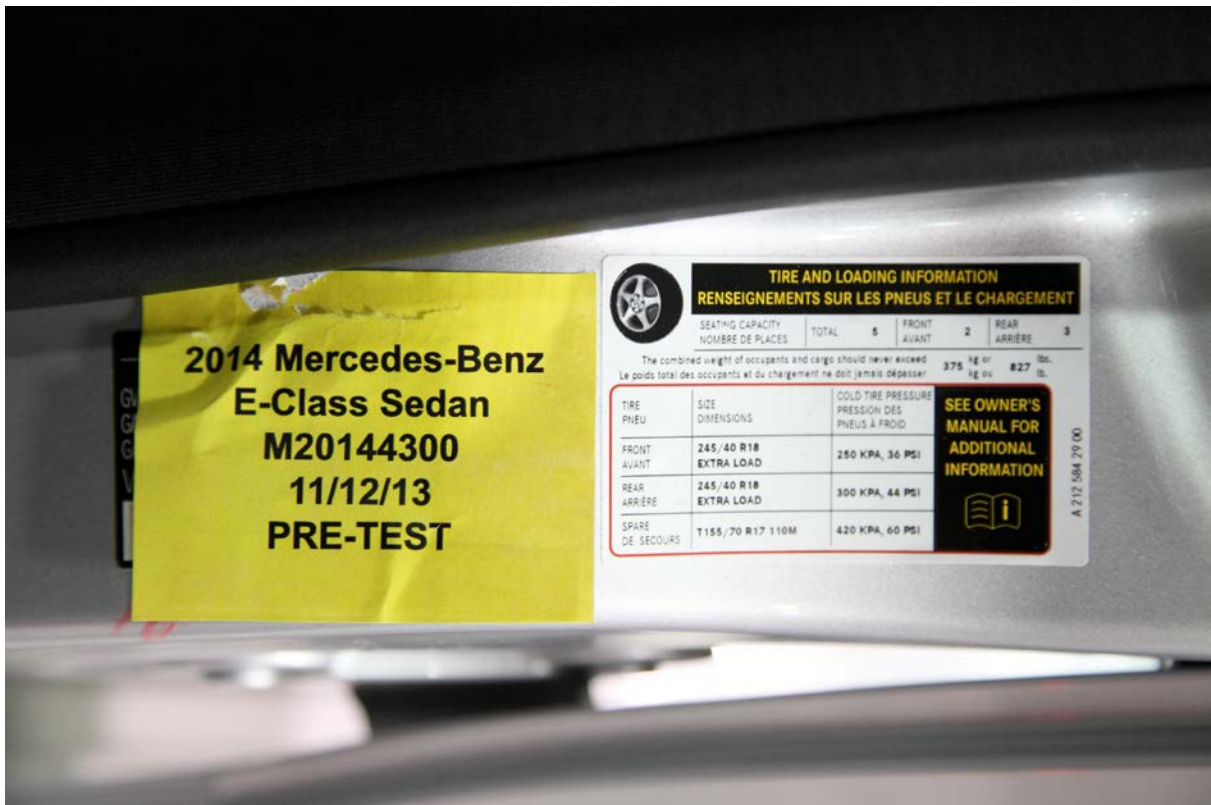
001 Load Cell Location



002 Load Cell Wall



003 Manufacturer's Label



004 Tire Placard



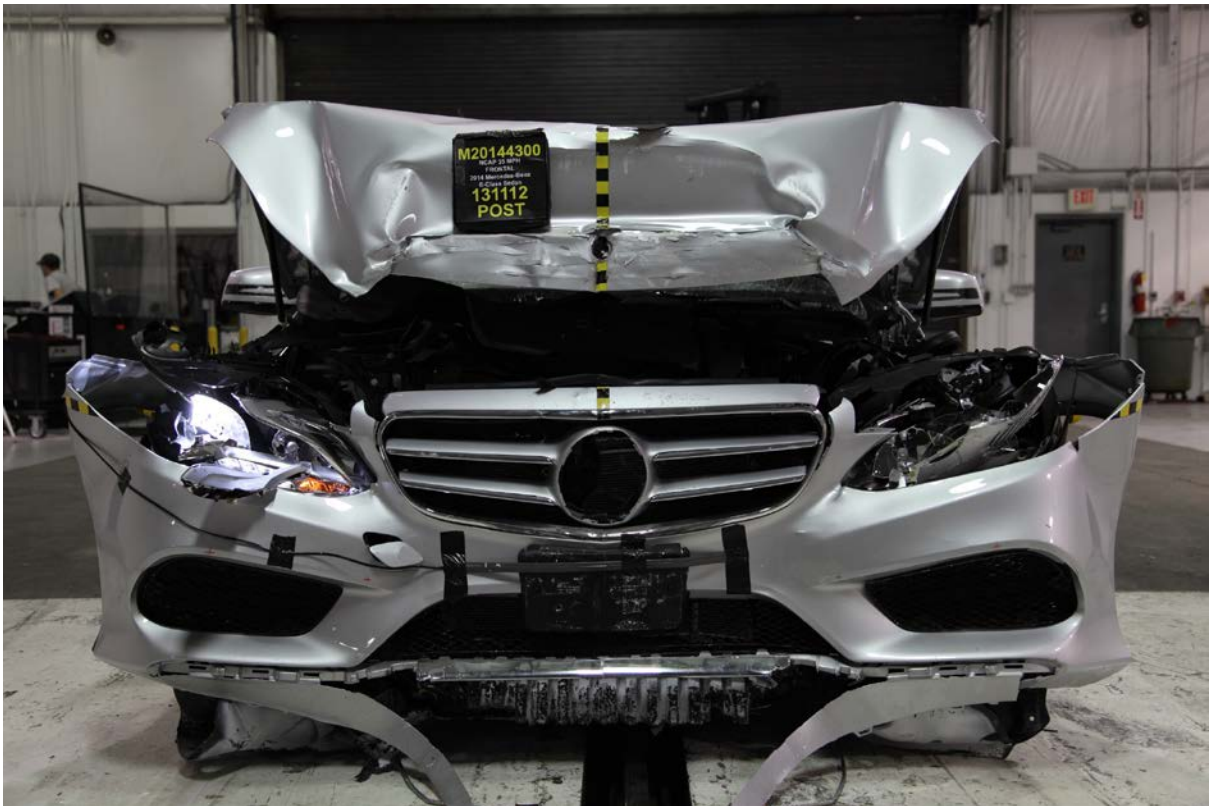
**No. 005 2014 Mercedes-Benz E-350 Frontal As Delivered**



**006 Left Rear 3-4 View, as Received**



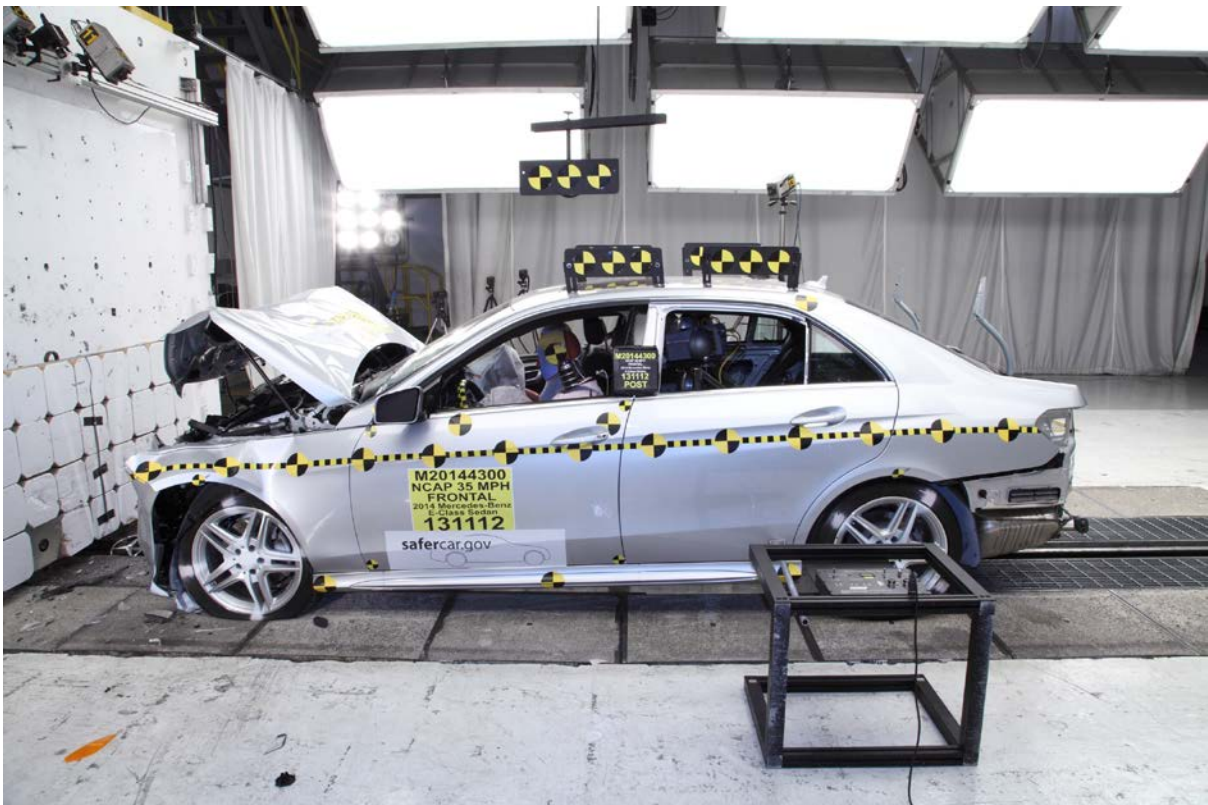
**007 Pre-test Front View of Test Vehicle**



**008 Post-test Front View of Test Vehicle**



**009 Pre-test Left View of Test Vehicle**



**010 Post-test Left View of Test Vehicle**



011 Pre-test Right View of Test Vehicle



012 Post-test Right View of Test Vehicle



**013 Pre-test Right Front 3-4 View**



**014 Post-test Right Front 3-4 View**



**015 Pre-test Left Rear 3-4 View**



**016 Post-test Left Rear 3-4 View**



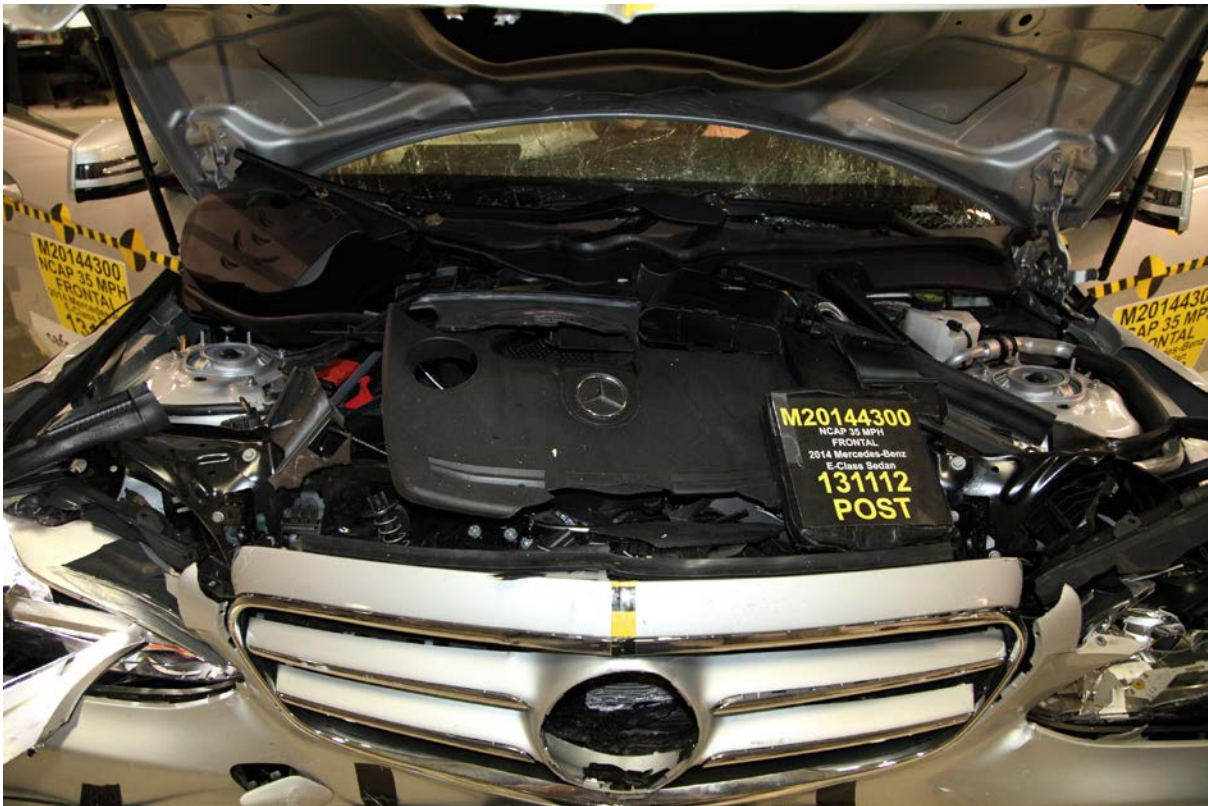
017 Pre-test Windshield View



018 Post-test Windshield View



**019 Pre-test Engine Compartment View**



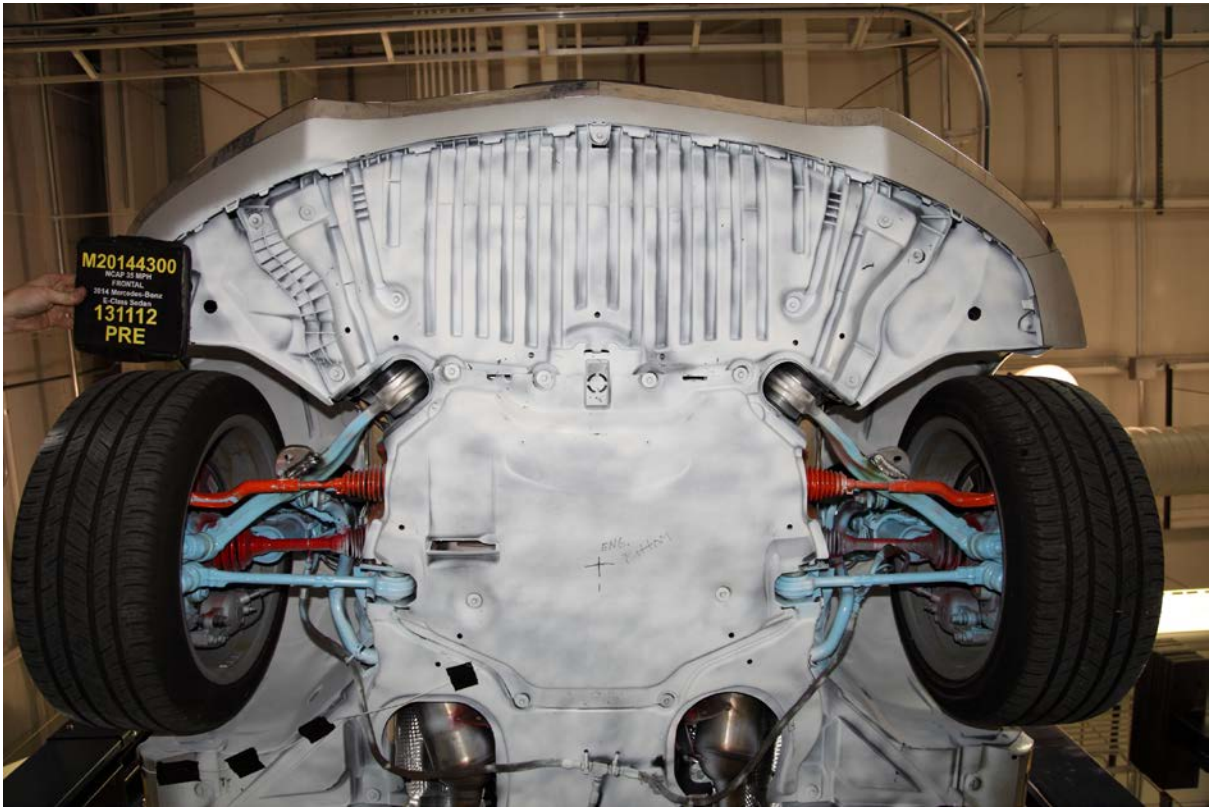
**020 Post-test Engine Compartment View**



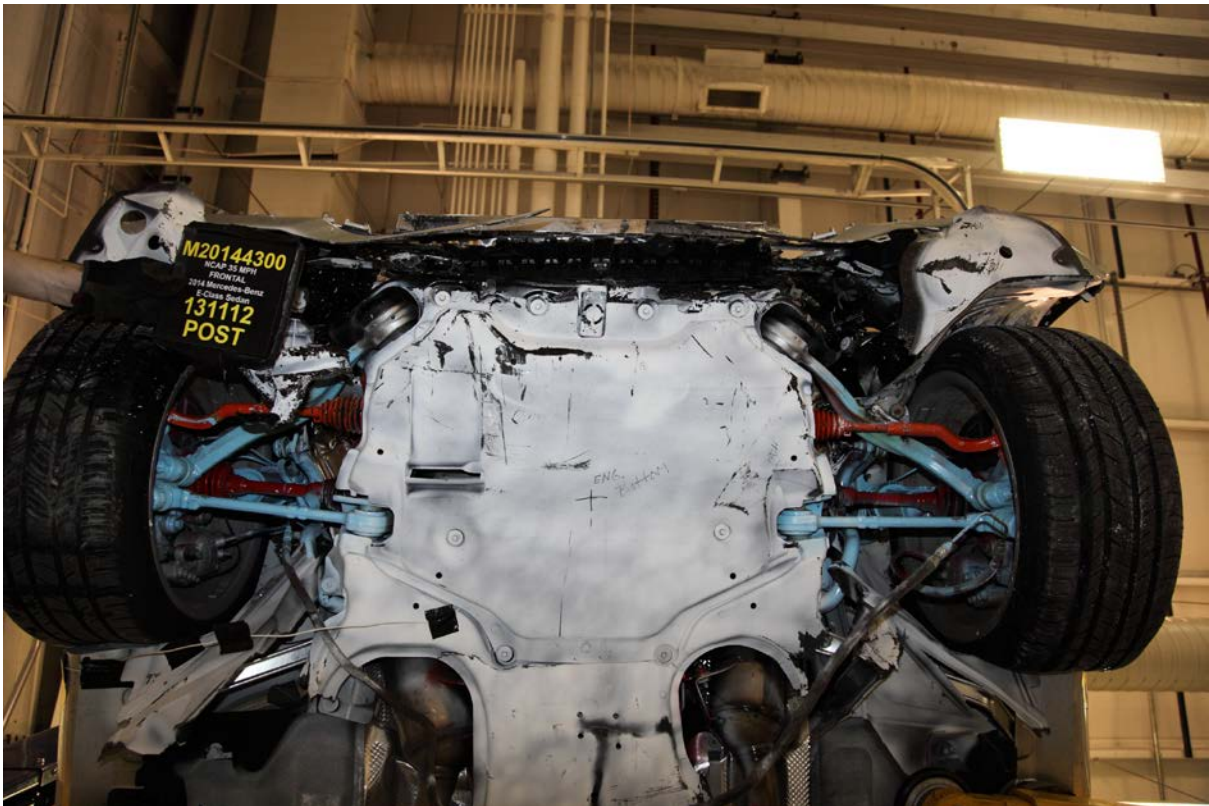
021 Pre-test Fuel Filler Cap View



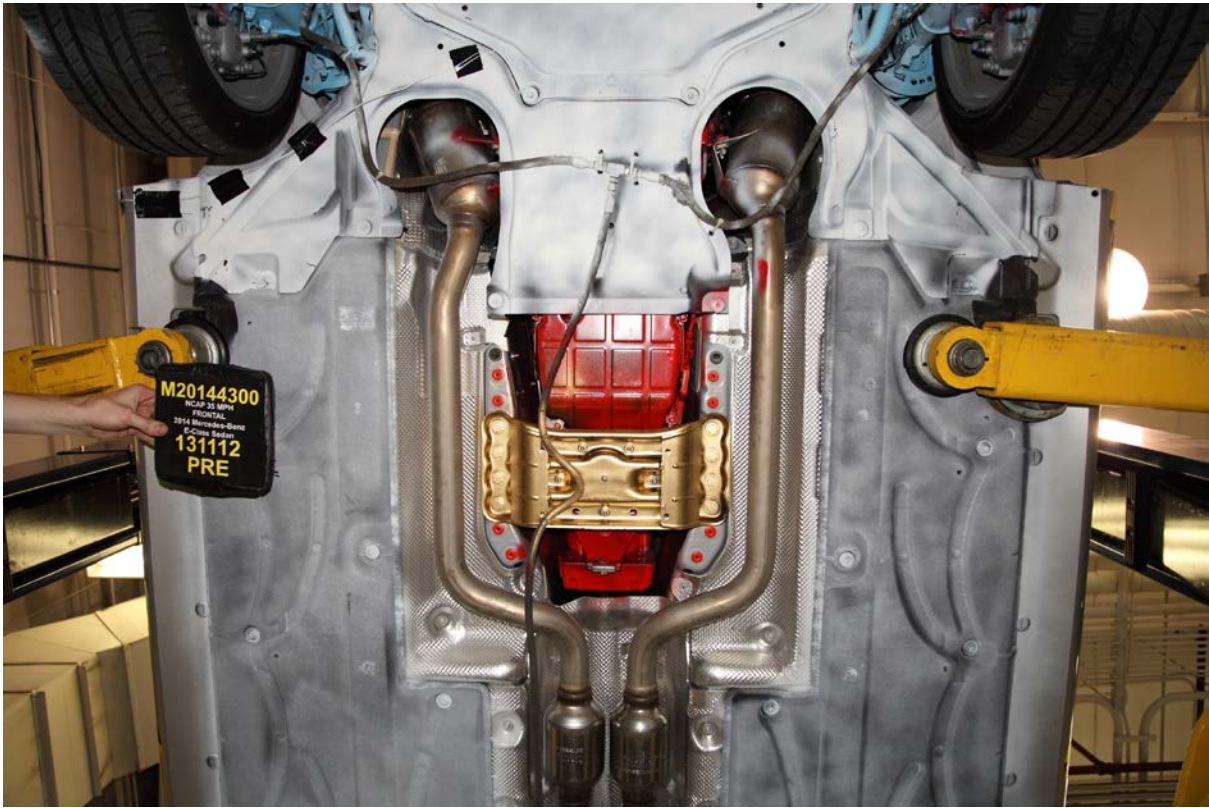
022 Post-test Fuel Filler Cap View



023 Pre-test Front Underbody View



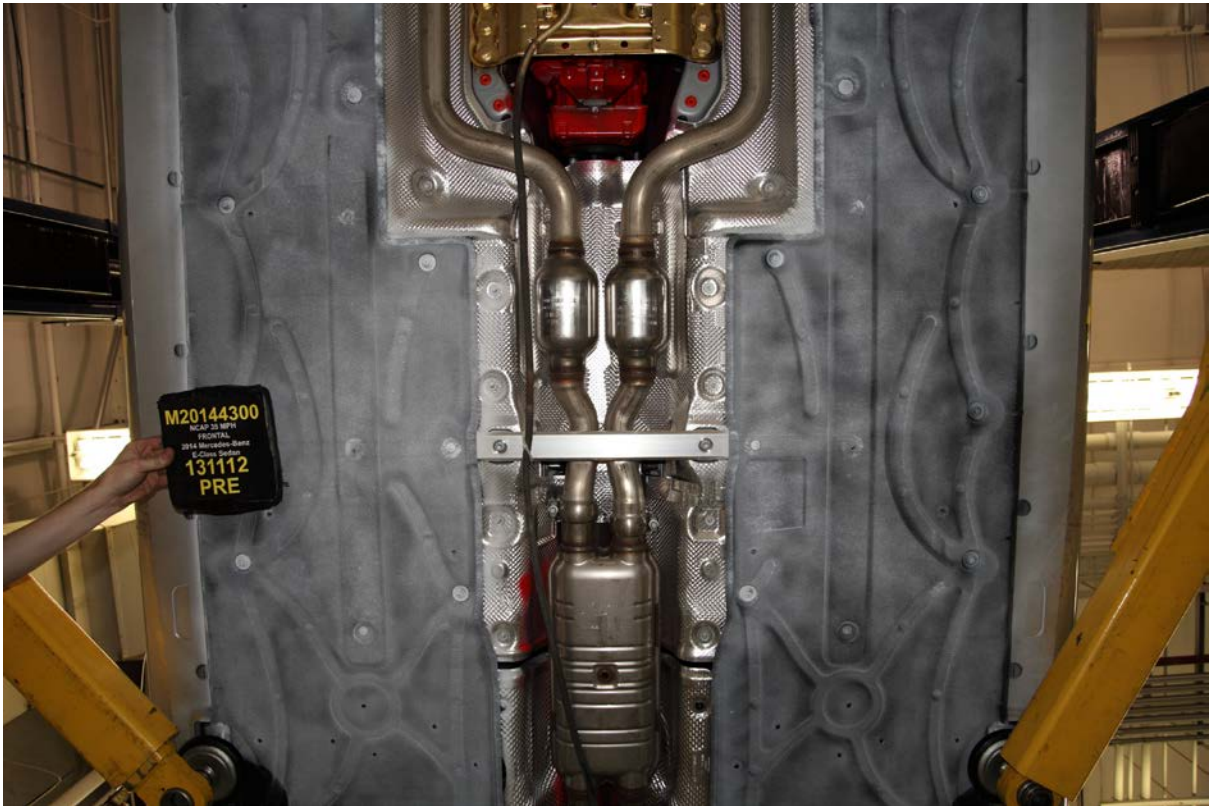
024 Post-test Front Underbody View



024a Pre Test Mid Underbody View



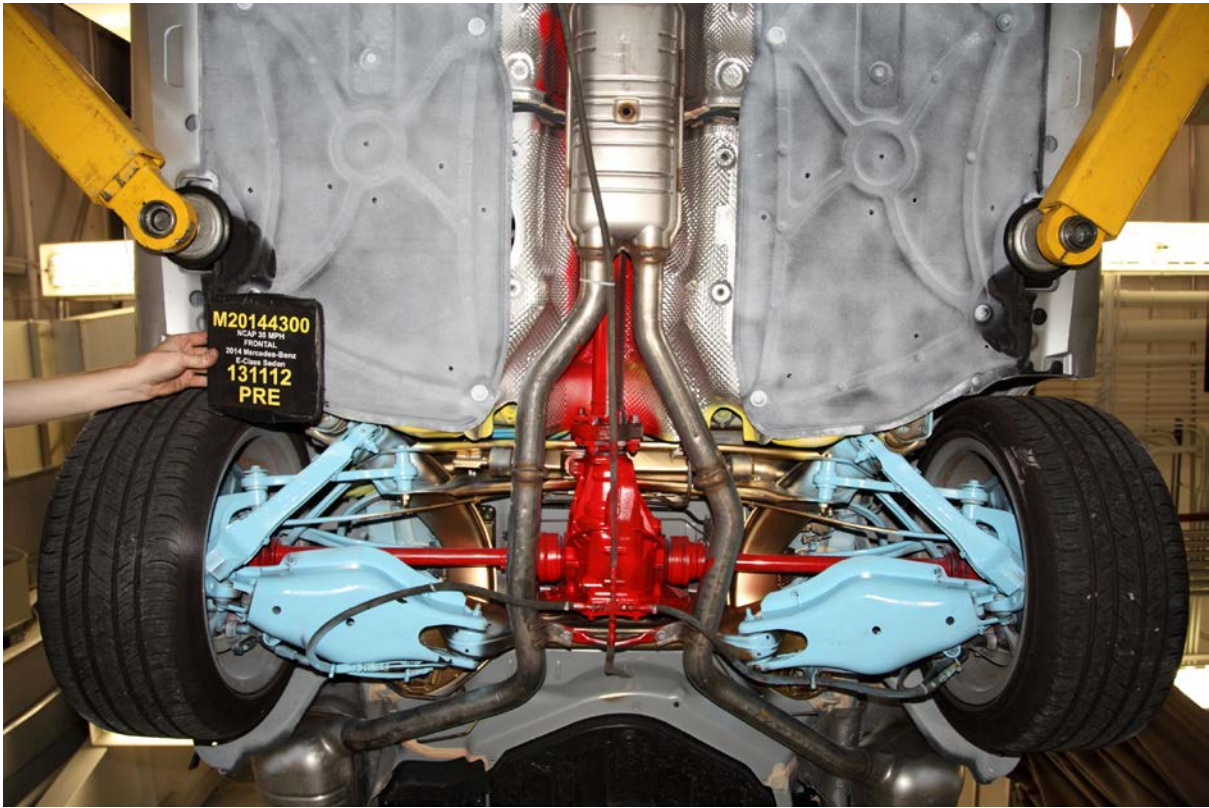
024b Post Test Mid Underbody View



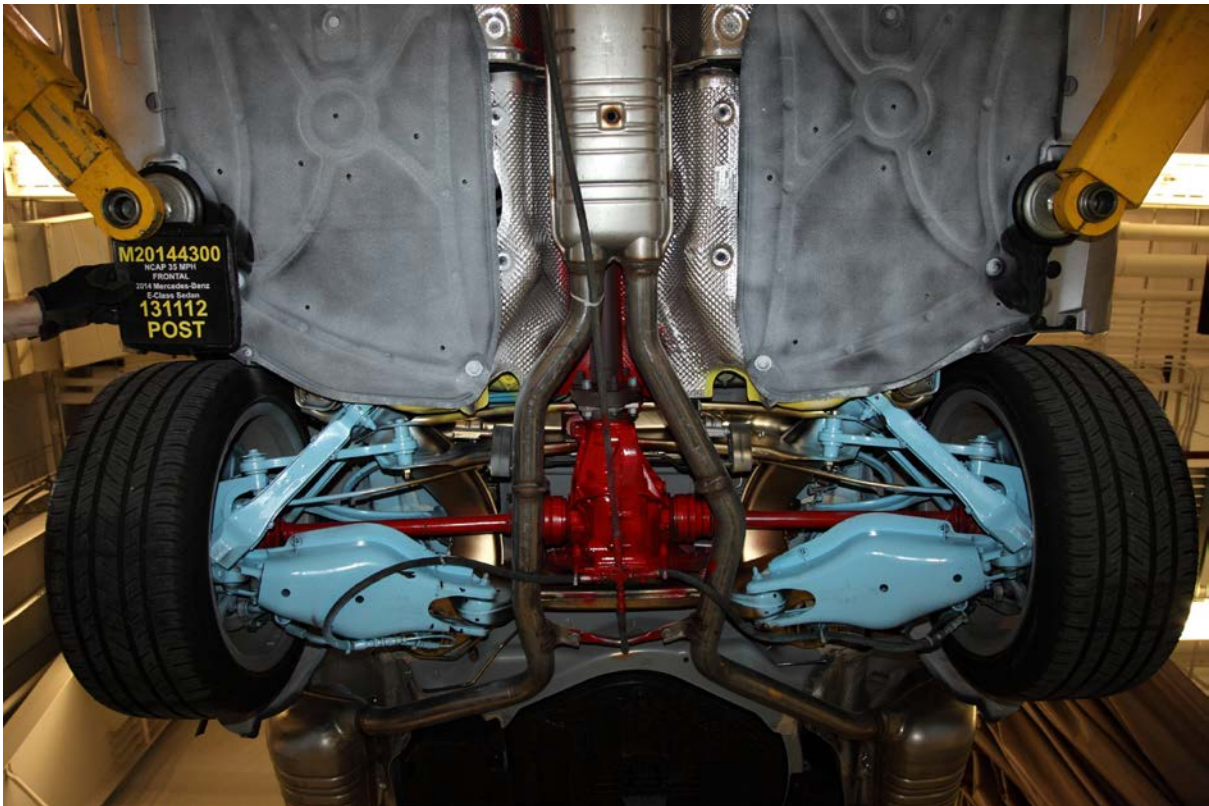
**024c Pre Test Mid Rear Underbody View**



**024d Post Test Mid Rear Underbody View**



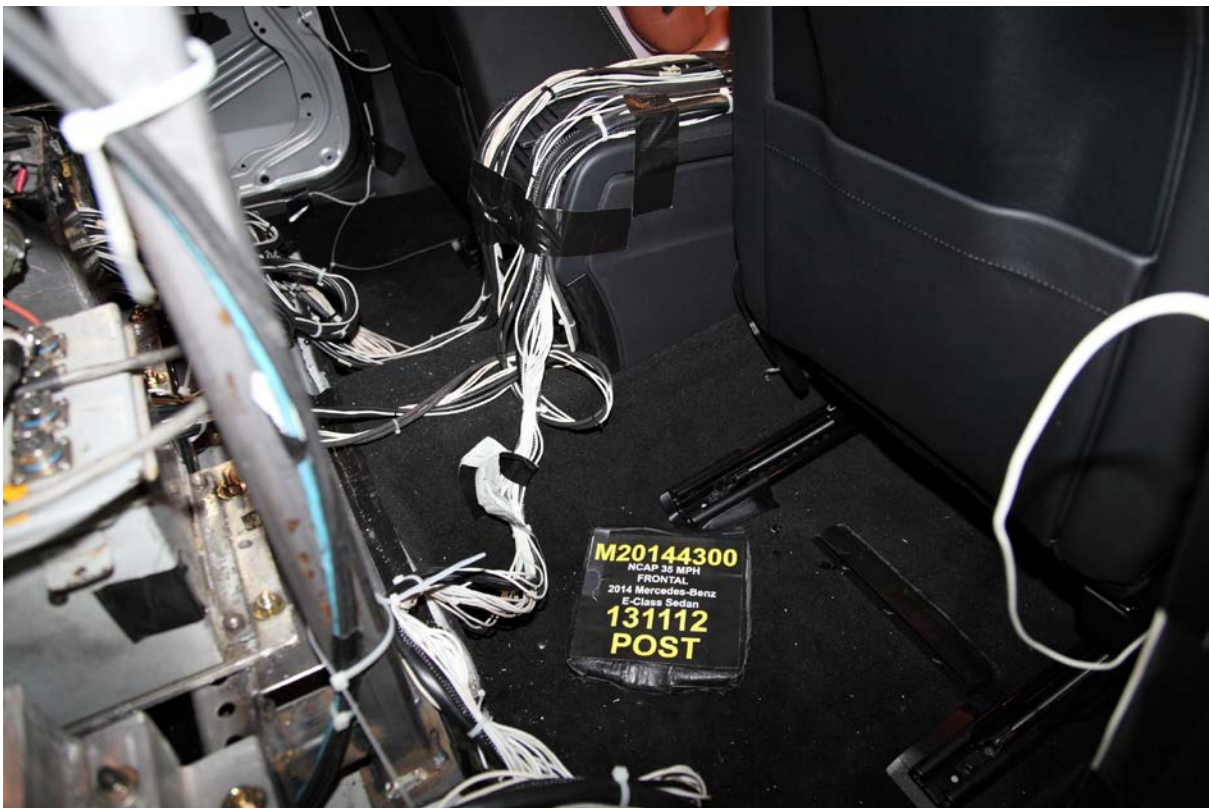
**025 Pre-test Rear Underbody View**



**026 Post-test Rear Underbody View**



027 Pre-test Dummy Cable Routing



028 Post-test Dummy Cable Routing



029 Pre-test Driver Dummy Front View



030 Post-test Driver Dummy Front View



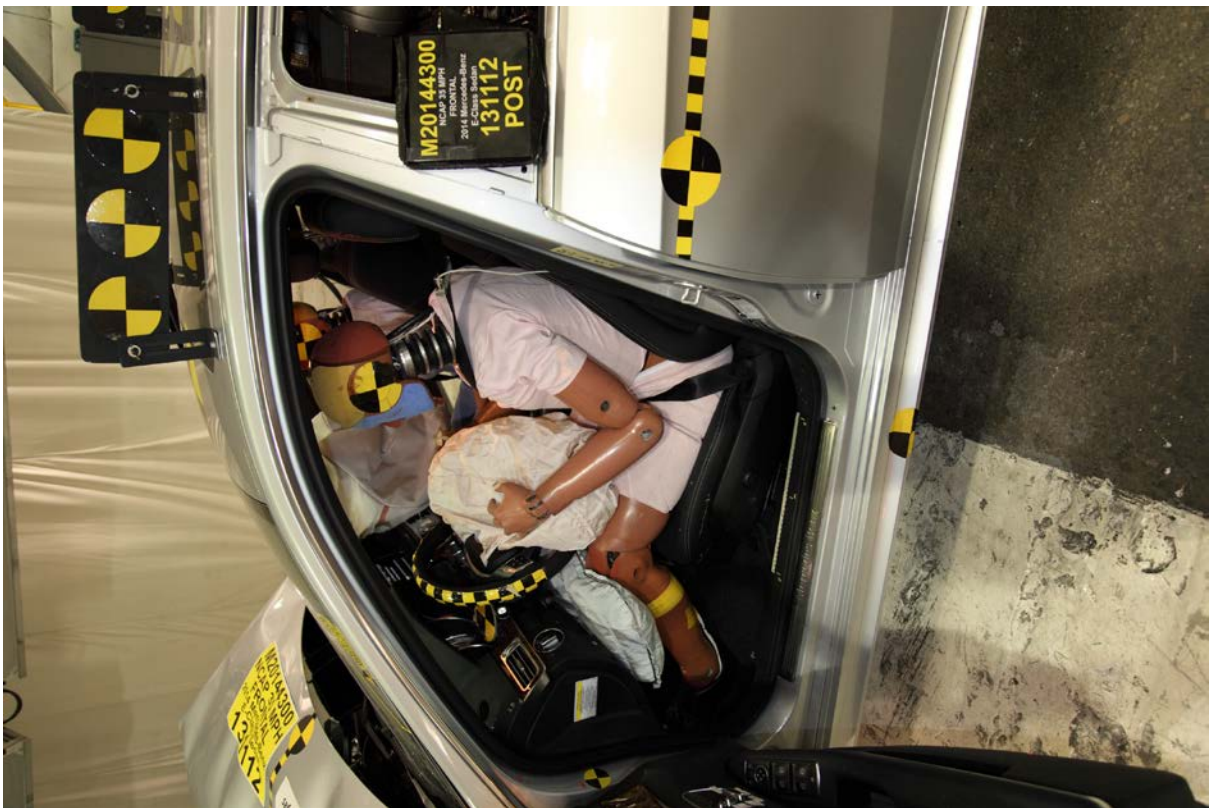
031 Pre-test Driver Dummy Window View



032 Post-test Driver Dummy Window View



033 Pre-test Driver Dummy and Vehicle Interior View



034 Post-test Driver Dummy and Vehicle Interior View



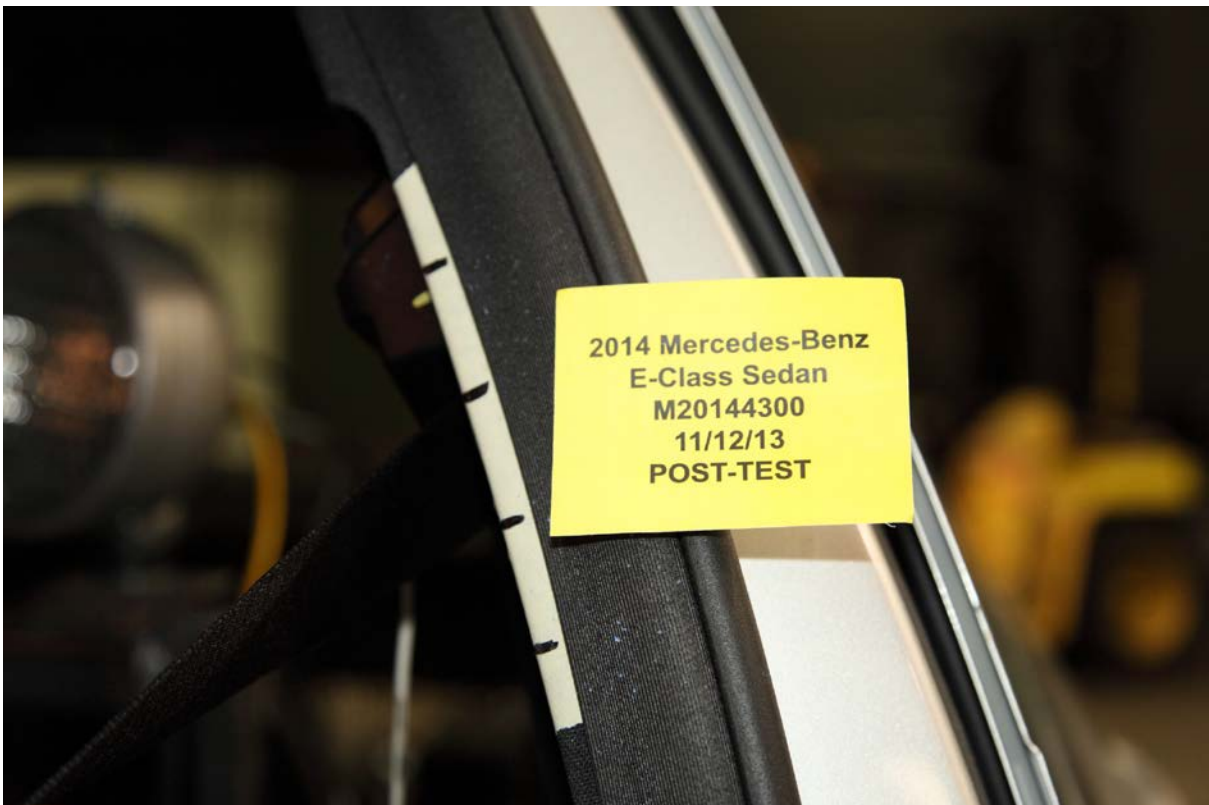
035 Pre-test Driver's Seat Fore-Aft Markings



036 Post-test Driver's Seat Fore-Aft Markings



037 Pre-Test View of Belt Anchorage for Driver Dummy



038 Post-Test View of Belt Anchorage for Driver Dummy



039 Pre-test Driver Dummy Feet



040 Post-test Driver Dummy Feet



**041 Pre-test Driver's Side Knee Bolster**



**042 Post-test Driver's Side Knee Bolster**



043 Pre-test Driver's Side Floorpan



044 Post-test Driver's Side Floorpan



045 Post-Test Driver Dummy Face



046 Post-test Driver Dummy Contact With Airbag



047 Post-test Driver Dummy Contact With Headrest



048 Pre-test View of the Steering Wheel



**049 Post-test View of the Steering Wheel**



**050 Pre-test Passenger Dummy Front View**



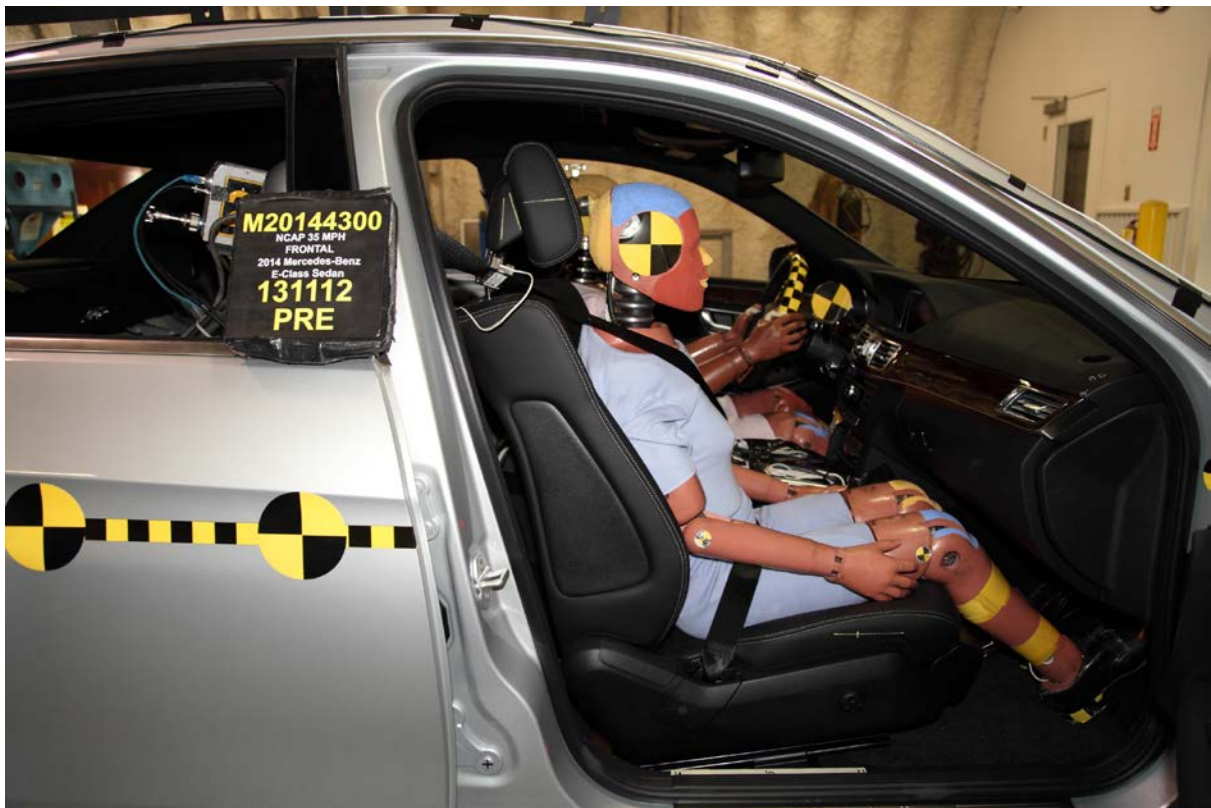
051 Post-test Passenger Dummy Front View



052 Pre-test Passenger Dummy Window View



053 Post-test Passenger Dummy Window View



054 Pre-test Passenger Dummy and Vehicle Interior View



055 Post-test Passenger Dummy and Vehicle Interior View



056 Pre-test Passenger's Seat Fore-Aft Markings



057 Post-test Passenger's Seat Fore-Aft Markings



058 Pre-Test View of Belt Anchorage for Passenger Dummy



**059 Post-Test View of Belt Anchorage for Passenger Dummy**



**060 Pre-test Passenger Dummy Feet**



061 Post-test Passenger Dummy Feet



062 Pre-test Passenger's Side Knee Bolster



**063 Post-test Passenger's Side Knee Bolster**



**064 Pre-test Passenger's Side Floorpan**



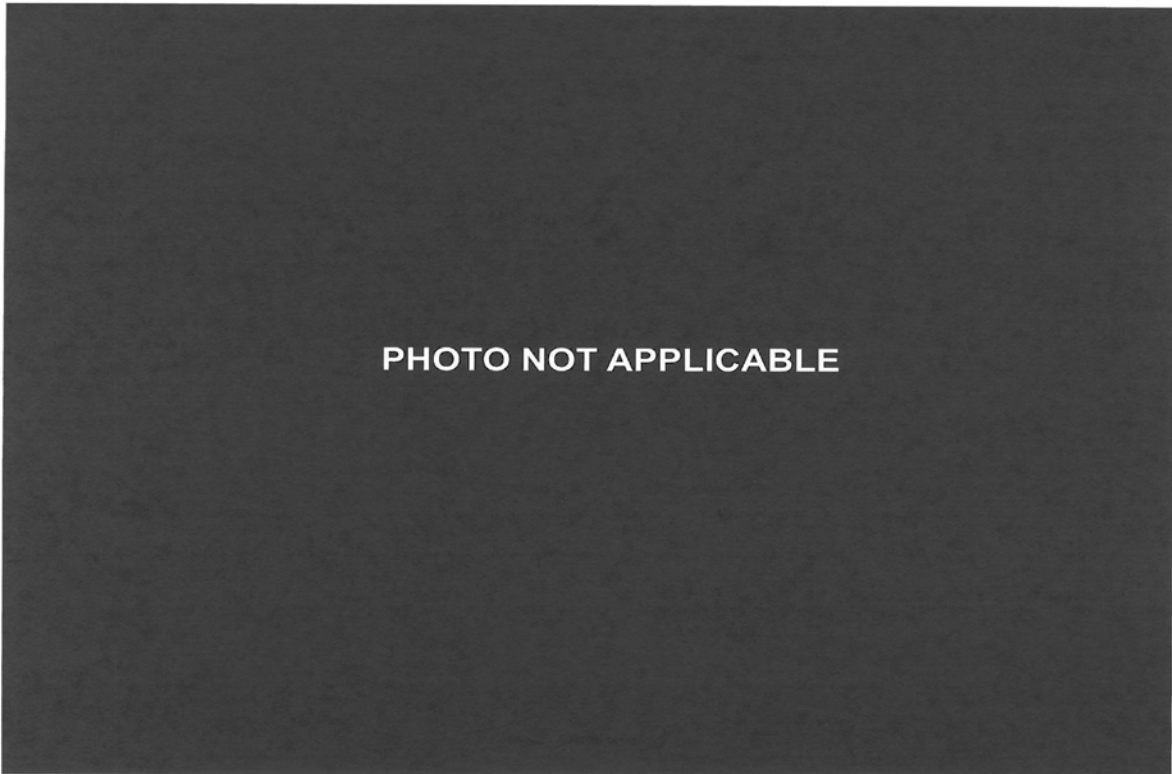
**065 Post-test Passenger's Side Floorpan**



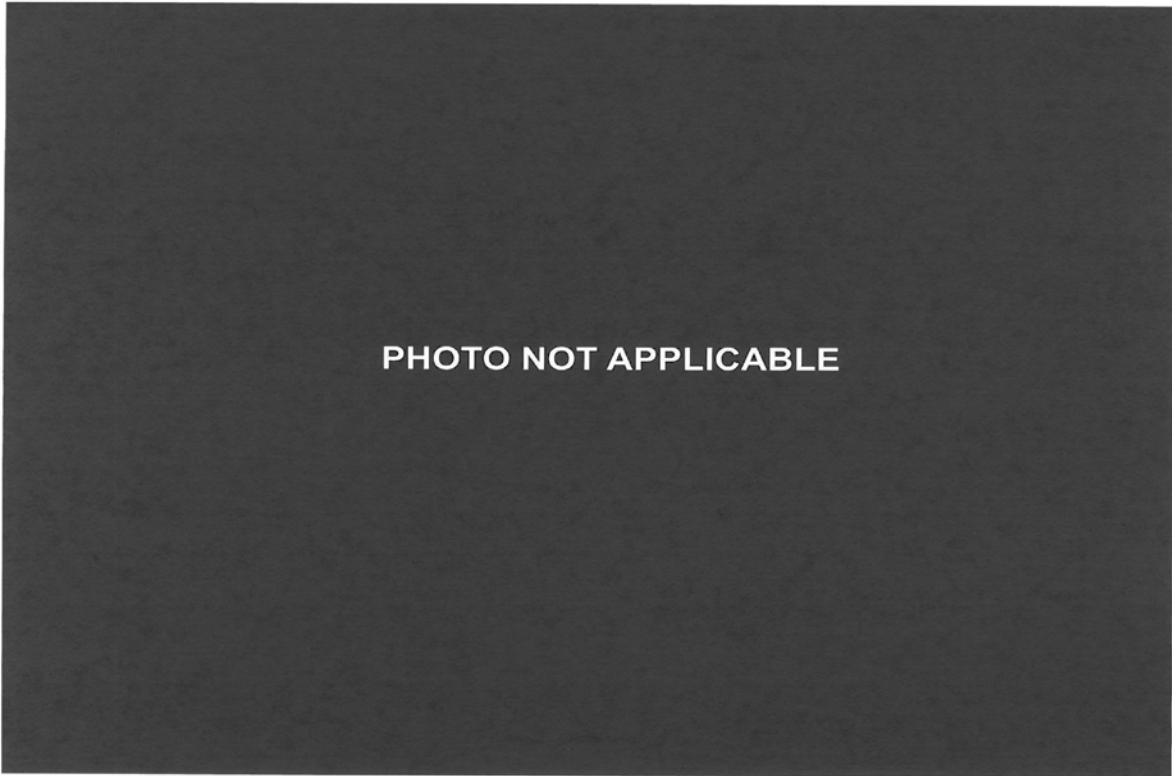
**066 Post-test Passenger Dummy Contact With Headrest**



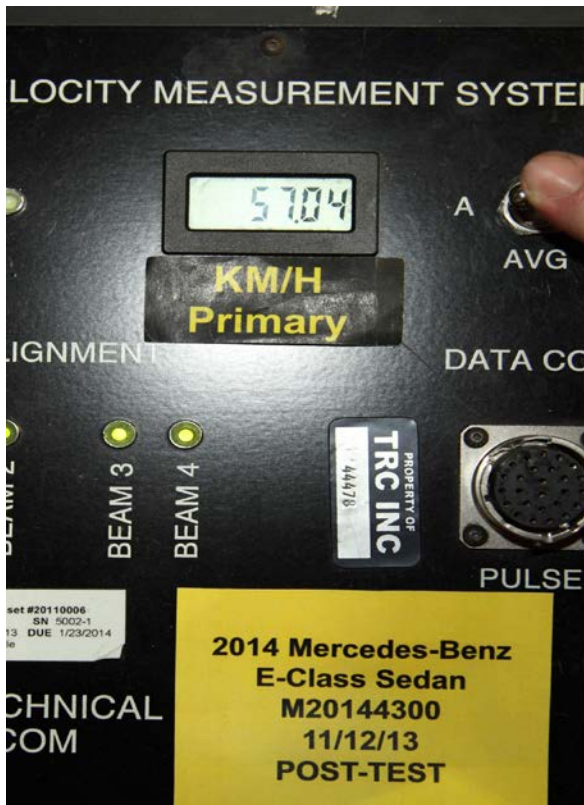
**066a Post-test Passenger Dummy Contact With Airbag**



**067 Photograph of Ballast Installed in Vehicle**



068 Post-test Stoddard Solvent Spillage Location View, if required



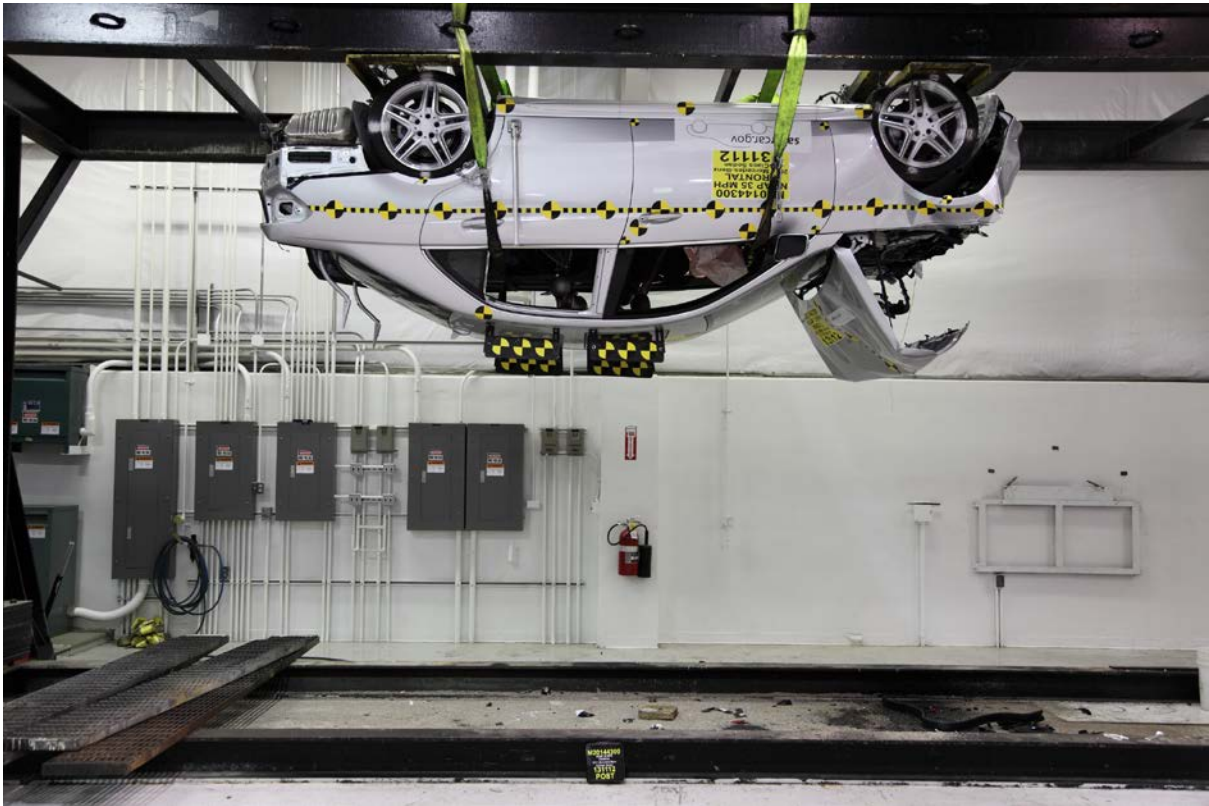
069 Post-test Speed Trap Read-out



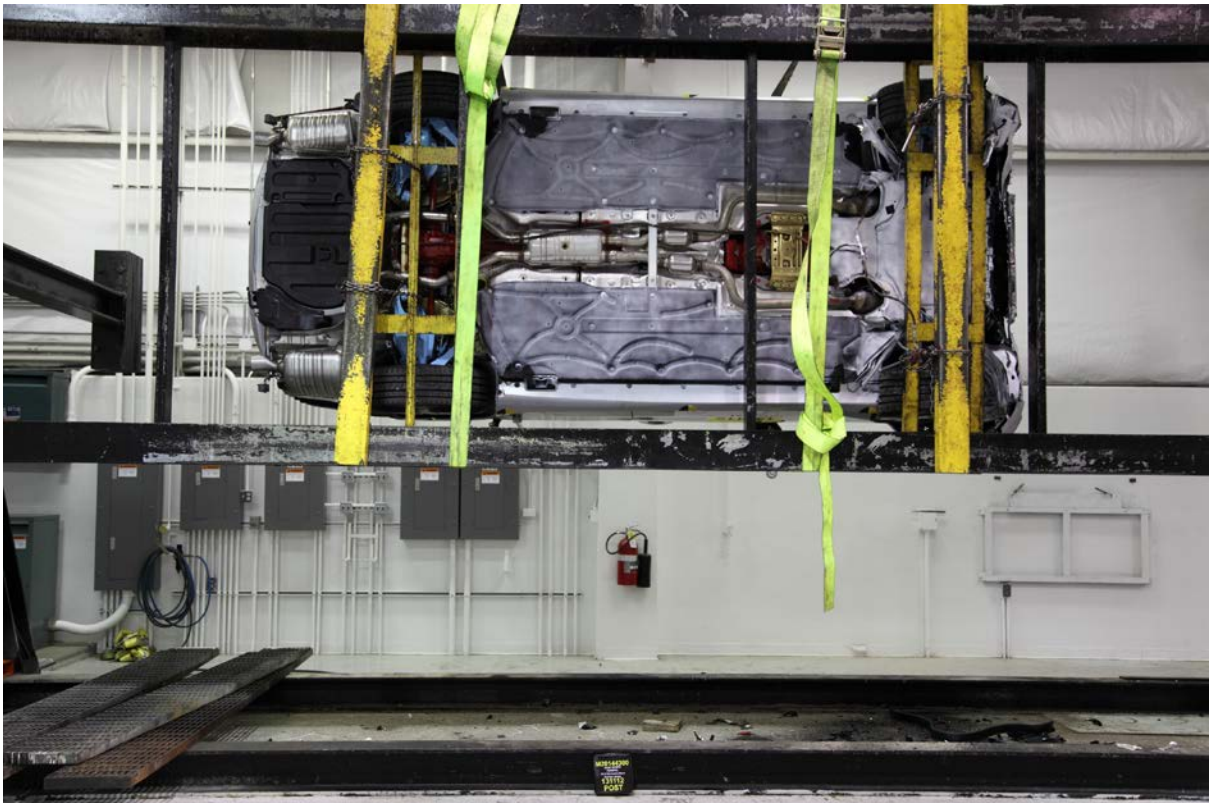
070 Vehicle at 0° on Static Rollover Device



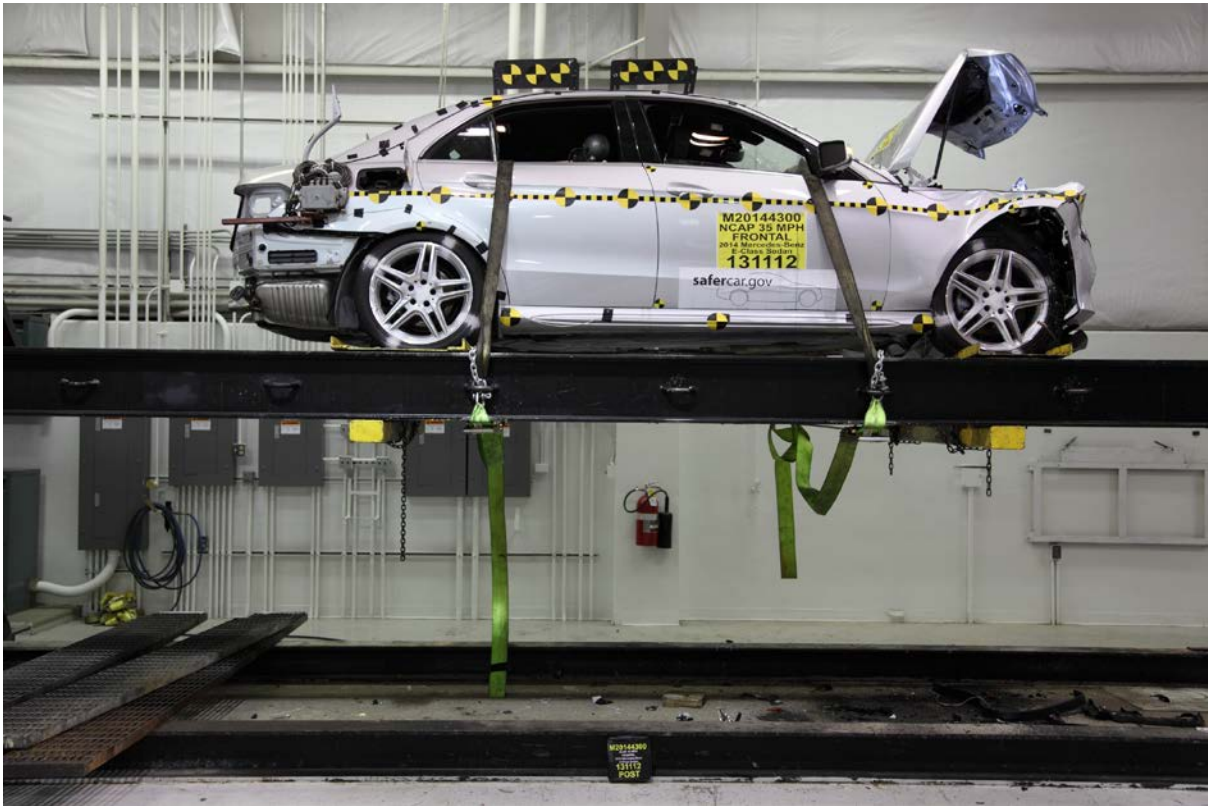
071 Vehicle at 90° on Static Rollover Device



**072 Vehicle at 180° on Static Rollover Device**




**073 Vehicle at 270° on Static Rollover Device**



074 Vehicle at 360° on Static Rollover Device




No. 075 2014 Mercedes-Benz E-350 Frontal Impact Event



# 2014 E350 4MATIC Sedan

PO#: 0470550488  
VIN: WDDHF81B0EA6G0763



Mercedes-Benz

www.MBUSA.com

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**Standard Features**

**PERFORMANCE/HANDLING**

- 2.5 Liter V6 Engine with Direct Injection
- 302 Horsepower
- 272 hp V6 engine
- 7 Speed Automatic Transmission
- MB Drive/Stop System
- 17 Inch Wheels
- 4MATIC® Permanent All-Wheel Drive

**COMFORT/CONVENIENCE**

- Power TV Sliding Screen
- Anti-Lock Braking System
- 18-Ton Air Suspension
- MB-Tex Upholstery
- Steering Wheel Paddle Shifters
- Driver's Side and Exterior Auto-Dimming Mirrors
- COMMANDS System
- CD/MP3 Video/Audio Player
- Bluetooth® Connectivity
- Media Interface

**SAFETY/SECURITY**

- New Vehicle 4 Year/50,000 Mile Warranty
- 24 Hour Roadside Assistance Program
- ATTENTION ASSIST®
- COLLISION PREVENTION ASSIST
- PRE-SAFE®
- LED Daytime Running Lights
- Electronic Stability Program (ESP®)
- ADAPTIVE BRAKE Technology
- Anti-Lock Braking System (ABS)
- Road Active Steering (RAS®)
- Advanced Airbag Protection System

**Suggested Retail Price**

**PAINT/UPHOLSTERY & TRIM**

- 750 Silver
- 111 Black MB-Tex
- 814 Sport Without Wood Trim

**OPTIONAL EQUIPMENT AND VALUE ADDED PACKAGES**

- 277 3 Spoke Sport Steering Wheel
- 287 20" Folding Rear Seats
- 791 18 Inch AMG Twin 5-Spoke Alloy Wheel
- 166 Rear Deck Spoiler
- 132 Comfort Kit
- 321 Sport Package: Lowered Sport Suspension, Sport Bodycladding

**Destination and Delivery**

**Total Retail Price**

\$54,400

\$57,885.00

**Special Message:** Prepaid Maintenance Plan available for this vehicle, see dealer for details.

This vehicle is equipped with tires that can withstand an impact of 2.5 miles per hour with no damage to the vehicle's body and safety systems, although the bumper and related components may sustain damage. The bumper system on this vehicle conforms to the current federal bumper standard of 2.5 miles per hour.

Bluesonic is a registered trademark of Shioeochi LLC, Inc.

**EPA DOT Fuel Economy and Environment**

**Fuel Economy**

**24** MPG  
combined city/hwy

**20** city  
**29** highway  
**4.2** gallons per 100 miles

**Driving Range**  
Estimated: 510 miles  
Maximum: 560 miles

**You spend \$250 more in fuel costs over 5 years compared to the average new vehicle.**

**Annual fuel cost \$2,350**

**Fuel Economy & Greenhouse Gas Rating**

**6** (Best)

**Senog Rating** (Best)

**10** (Best)

This vehicle emits 278 grams CO<sub>2</sub> per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions, learn more at [fuel-economy.gov](http://fuel-economy.gov).

**fuel-economy.gov**  
Calculate personalized estimates and compare vehicles.

**GOVERNMENT 5-STAR SAFETY RATINGS**

**Overall Vehicle Score** **Not Rated**  
Based on the combined ratings of frontal, side and rollover.

<b>Frontal Crash</b>	<b>Driver Passenger</b>	<b>Not Rated</b>
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		
<b>Side Crash</b>	<b>Front seat Rear seat</b>	<b>Not Rated</b>
Based on the risk of injury in a side impact.		
<b>Rollover</b>	★★★★	
Based on the risk of rollover in a single-vehicle crash.		

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.  
Source: National Highway Traffic Safety Administration (NHTSA)  
[www.safercar.gov](http://www.safercar.gov) or 1-888-327-4236

**PARTS CONTENT INFORMATION**

For vehicles in this carline:  
U.S./Canadian Parts Content: 0 %  
Major Sources of Foreign Parts Content: GERMANY: 73 %

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

For this vehicle:  
Final Assembly Plant: SINDELFINGEN, GERMANY  
Country of Origin: GERMANY  
Engine: GERMANY  
Transmission: GERMANY

**Ship To:**  
VEHICLE BODY OR WEIGHTED AVERAGE OF VEHICLE BODY AND WEIGHTED AVERAGE OF WEIGHT

Part of Entry: Bill of Materials  
Transport:

No. 076 Monroney Label Photograph

**APPENDIX B**  
**VEHICLE AND DUMMY RESPONSE DATA PLOTS**

## TABLE OF DATA PLOTS

No.	List of Data Plots Provided in the Test Report	Page
1	Driver Head X Acceleration vs. Time Primary	B-6
2	Driver Head Y Acceleration vs. Time Primary	B-6
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection vs. Time	B-7
6	Driver Chest X Acceleration vs. Time Primary	B-8
7	Driver Chest Y Acceleration vs. Time Primary	B-8
8	Driver Chest Z Acceleration vs. Time Primary	B-8
9	Driver Chest Resultant Acceleration vs. Time Primary	B-8
10	Driver Upper Neck Force X vs. Time	B-9
11	Driver Upper Neck Force Z vs. Time	B-9
12	Driver Upper Neck Moment Y vs. Time	B-9
13	Driver Nij vs. Time	B-10
14	Driver Left Femur Force vs. Time	B-11
15	Driver Right Femur Force vs. Time	B-11
16	Passenger Head X Acceleration vs. Time Primary	B-12
17	Passenger Head Y Acceleration vs. Time Primary	B-12
18	Passenger Head Z Acceleration vs. Time Primary	B-12
19	Passenger Head Resultant Acceleration vs. Time Primary	B-12
20	Passenger Chest X Deflection vs. Time	B-13
21	Passenger Chest X Acceleration vs. Time Primary	B-14
22	Passenger Chest Y Acceleration vs. Time Primary	B-14
23	Passenger Chest Z Acceleration vs. Time Primary	B-14
24	Passenger Chest Resultant Acceleration vs. Time Primary	B-14
25	Passenger Upper Neck Force X vs. Time	B-15
26	Passenger Upper Neck Force Z vs. Time	B-15
27	Passenger Upper Neck Moment Y vs. Time	B-15
28	Passenger Nij vs. Time	B-16
29	Passenger Left Femur Force vs. Time	B-17
30	Passenger Right Femur Force vs. Time	B-17

The following additional dummy and vehicle response data can be found in the R & D section of the NHTSA website at: [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov).

Driver Head Acceleration X Redundant  
 Driver Head Acceleration Y Redundant  
 Driver Head Acceleration Z Redundant  
 Driver Upper Neck Force Y

Driver Upper Neck Moment X  
Driver Upper Neck Moment Z  
Driver Chest X Acceleration Redundant  
Driver Chest Y Acceleration Redundant  
Driver Chest Z Acceleration Redundant  
Driver Pelvis X  
Driver Pelvis Y  
Driver Pelvis Z  
Driver Left Upper Tibia Moment X  
Driver Left Upper Tibia Moment Y  
Driver Left Upper Tibia Force Z  
Driver Left Lower Tibia Moment X  
Driver Left Lower Tibia Moment Y  
Driver Left Lower Tibia Force Z  
Driver Right Upper Tibia Moment X  
Driver Right Upper Tibia Moment Y  
Driver Right Upper Tibia Force Z  
Driver Right Lower Tibia Moment X  
Driver Right Lower Tibia Moment Y  
Driver Right Lower Tibia Force Z  
Driver Left Foot Fore Z  
Driver Left Foot Aft X  
Driver Left Foot Aft Z  
Driver Right Foot Fore Z  
Driver Right Foot Aft X  
Driver Right Foot Aft Z  
Driver Shoulder Belt Force  
Driver Lap Belt Force  
Passenger Head Acceleration X Redundant  
Passenger Head Acceleration Y Redundant  
Passenger Head Acceleration Z Redundant  
Passenger Upper Neck Force Y  
Passenger Upper Neck Moment X  
Passenger Upper Neck Moment Z  
Passenger Chest X Acceleration Redundant  
Passenger Chest Y Acceleration Redundant  
Passenger Chest Z Acceleration Redundant  
Passenger Pelvis X  
Passenger Pelvis Y  
Passenger Pelvis Z  
Passenger Left Upper Tibia Moment X

Passenger Left Upper Tibia Moment Y  
Passenger Left Upper Tibia Force Z  
Passenger Left Lower Tibia Moment X  
Passenger Left Lower Tibia Moment Y  
Passenger Left Lower Tibia Force Z  
Passenger Right Upper Tibia Moment X  
Passenger Right Upper Tibia Moment Y  
Passenger Right Upper Tibia Force Z  
Passenger Right Lower Tibia Moment X  
Passenger Right Lower Tibia Moment Y  
Passenger Right Lower Tibia Force Z  
Passenger Left Foot Fore Z  
Passenger Left Foot Aft X  
Passenger Left Foot Aft Z  
Passenger Right Foot Fore Z  
Passenger Right Foot Aft X  
Passenger Right Foot Aft Z  
Passenger Shoulder Belt Force  
Passenger Lap Belt Force  
Left Rear Seat Crossmember X  
Left Rear Seat Crossmember Z  
Right Rear Seat Crossmember X  
Right Rear Seat Crossmember Z  
Left Rear Seat Crossmember X Redundant  
Right Rear Seat Crossmember X Redundant  
Vehicle Engine Top X  
Vehicle Engine Bottom X  
BARRIER LOAD A1  
BARRIER LOAD A2  
BARRIER LOAD A3  
BARRIER LOAD A4  
BARRIER LOAD A5  
BARRIER LOAD A6  
BARRIER LOAD A7  
BARRIER LOAD A8  
BARRIER LOAD A9  
BARRIER LOAD B1  
BARRIER LOAD B2  
BARRIER LOAD B3  
BARRIER LOAD B4  
BARRIER LOAD B5

BARRIER LOAD B6  
BARRIER LOAD B7  
BARRIER LOAD B8  
BARRIER LOAD B9  
BARRIER LOAD C1  
BARRIER LOAD C2  
BARRIER LOAD C3  
BARRIER LOAD C4  
BARRIER LOAD C5  
BARRIER LOAD C6  
BARRIER LOAD C7  
BARRIER LOAD C8  
BARRIER LOAD C9  
BARRIER LOAD D1  
BARRIER LOAD D2  
BARRIER LOAD D3  
BARRIER LOAD D4  
BARRIER LOAD D5  
BARRIER LOAD D6  
BARRIER LOAD D7  
BARRIER LOAD D8  
BARRIER LOAD D9

# NHTSA

Test Lab: CTF

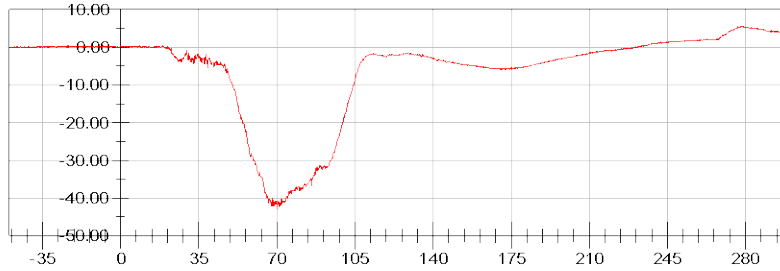
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Driver Head X Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

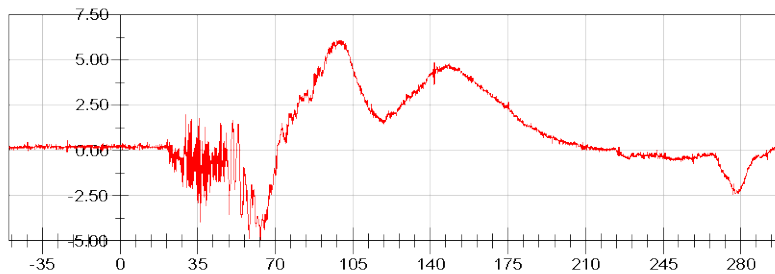
5.63 g at 276.72 ms

**<Min>**

-42.83 g at 70.16 ms

CFC\_1000

Driver Head Y Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

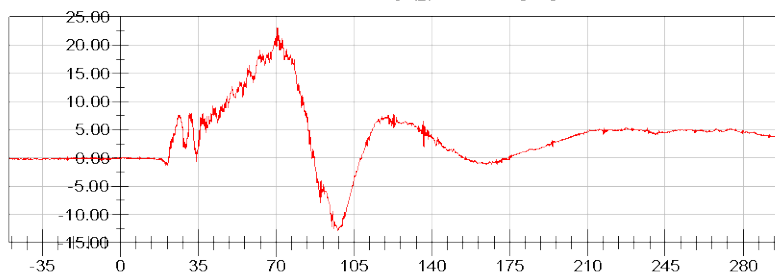
6.09 g at 97.84 ms

**<Min>**

-4.94 g at 63.44 ms

CFC\_1000

Driver Head Z Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

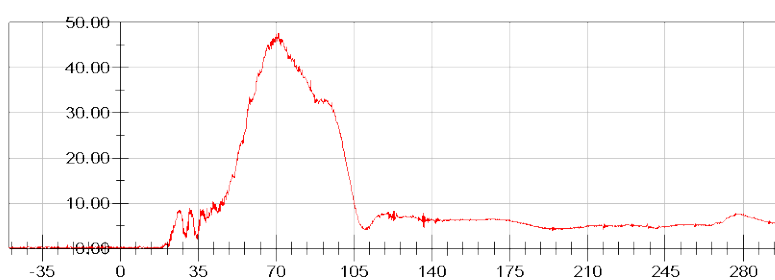
23.10 g at 70.72 ms

**<Min>**

-12.92 g at 97.68 ms

CFC\_1000

Driver Head Resultant Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

47.65 g at 71.20 ms

**<Min>**

0.11 g at -48.64 ms

CFC\_1000



# NHTSA

Test Lab: CTF

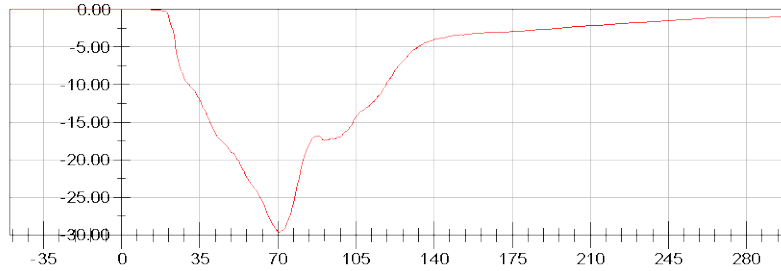
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Driver Chest X Deflection vs. Time (mm) vs. Time [ms]



**<Max>**

0.00 mm at -49.52 ms

**<Min>**

-29.61 mm at 70.80 ms

CFC\_600



# NHTSA

Test Lab: CTF

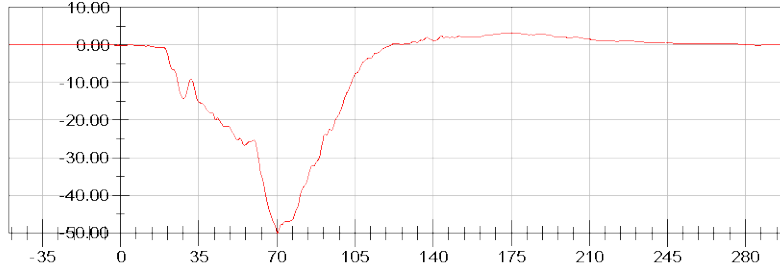
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Driver Chest X Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

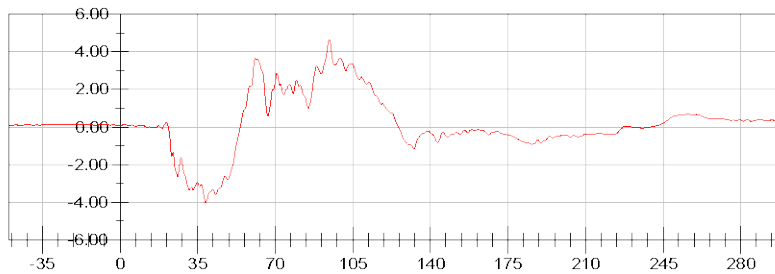
3.30 g at 172.40 ms

**<Min>**

-49.97 g at 70.32 ms

CFC\_180

Driver Chest Y Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

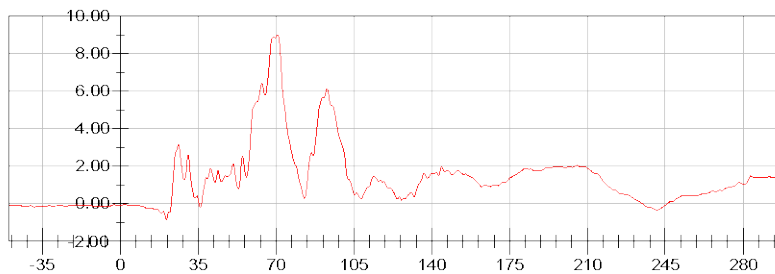
4.64 g at 94.32 ms

**<Min>**

-4.01 g at 38.64 ms

CFC\_180

Driver Chest Z Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

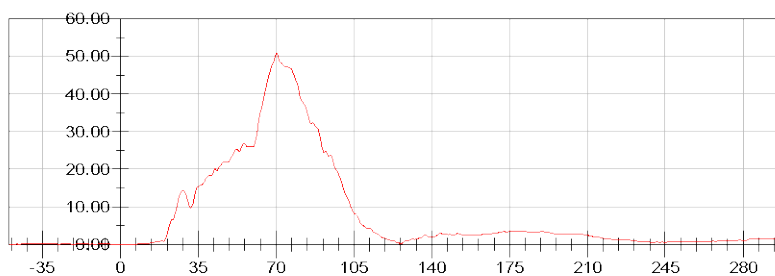
9.00 g at 70.80 ms

**<Min>**

-0.83 g at 20.72 ms

CFC\_180

Driver Chest Resultant Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

50.83 g at 70.32 ms

**<Min>**

0.10 g at 4.32 ms

CFC\_180



# NHTSA

Test Lab: CTF

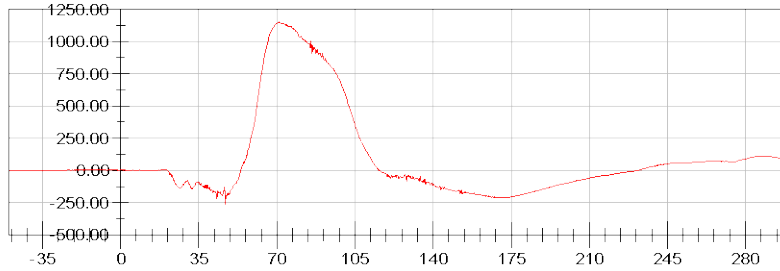
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Driver Upper Neck Force X vs. Time (N) vs. Time [ms]



**<Max>**

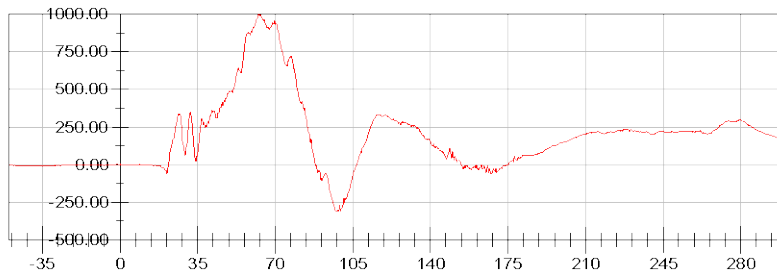
1,152.62 N at 70.88 ms

**<Min>**

-260.08 N at 46.88 ms

CFC\_1000

Driver Upper Neck Force Z vs. Time (N) vs. Time [ms]



**<Max>**

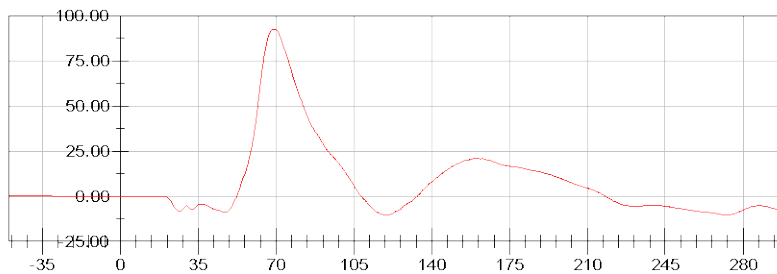
997.83 N at 62.72 ms

**<Min>**

-312.28 N at 97.44 ms

CFC\_1000

Driver Upper Neck Moment Y vs. Time (Nm) vs. Time [ms]



**<Max>**

92.69 Nm at 69.12 ms

**<Min>**

-10.39 Nm at 121.04 ms

CFC\_600



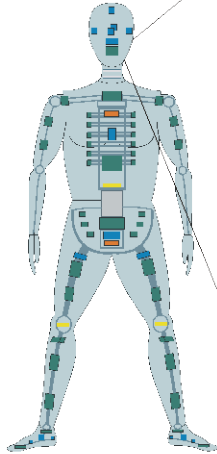


# 2014 Mercedes-Benz E-class Sedan NCAP 35mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 11/12/2013  
Time: 15:53

**Customer: NHTSA**  
**Test Number: M20144300**

Test Orientation = Frontal  
Fz0 (Tension) = 6306  
Fz0 (Compression) = 6160  
My0 (Extension) = 135  
My0 (Flexion) = 310

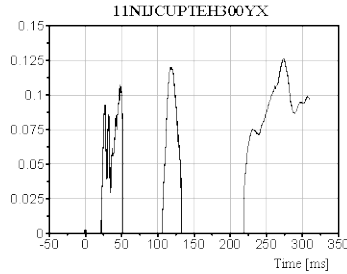
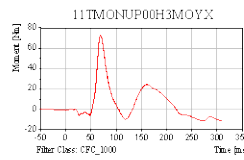


**Dummy: IIHII 50th Male**  
**Seating Position:**

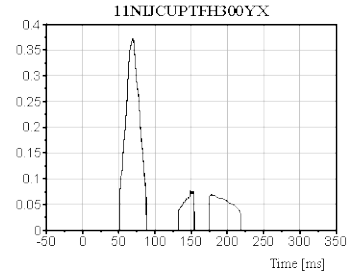
**Driver**

NIJ Source Code: (Fz/Fz0)+(My/My0)

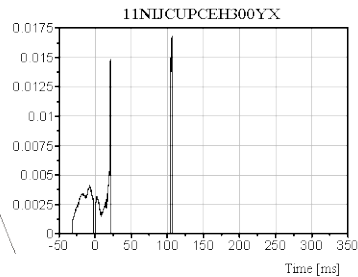
**TRC Inc. Test Lab: CTF**  
**Test Number: 131112**



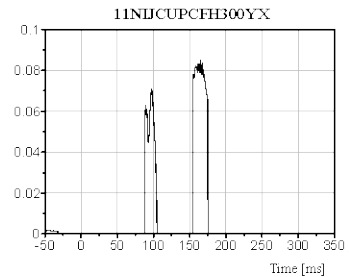
**Max [NTE] 0.1264 at 274.00 ms**



**Max [NTF] 0.3725 at 68.80 ms**



**Max [NCE] 0.0169 at 106.72 ms**



**Max [NCF] 0.0851 at 165.20 ms**

# NHTSA

Test Lab: CTF

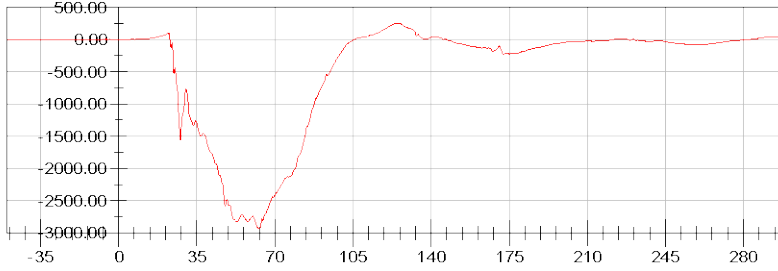
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Driver Left Femur Force vs. Time (N) vs. Time [ms]



**<Max>**

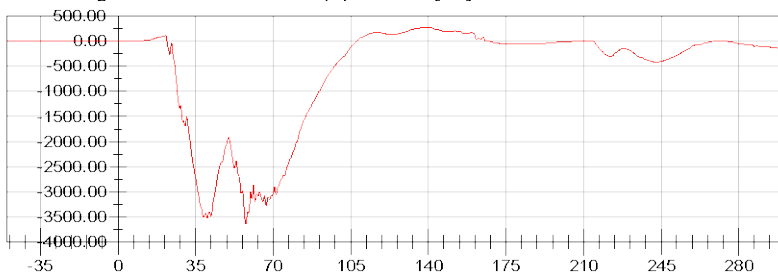
252.39 N at 125.60 ms

**<Min>**

-2,929.67 N at 62.72 ms

CFC\_600

Driver Right Femur Force vs. Time (N) vs. Time [ms]



**<Max>**

274.74 N at 138.80 ms

**<Min>**

-3,653.10 N at 57.52 ms

CFC\_600



# NHTSA

Test Lab: CTF

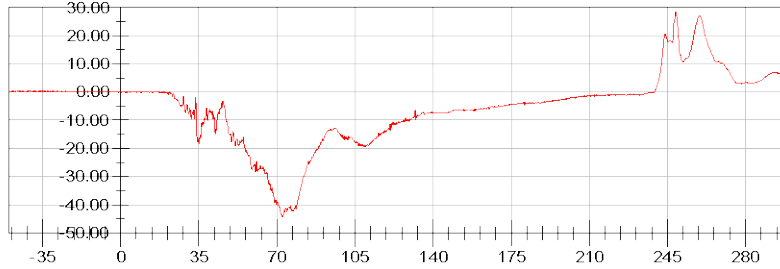
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Passenger Head X Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

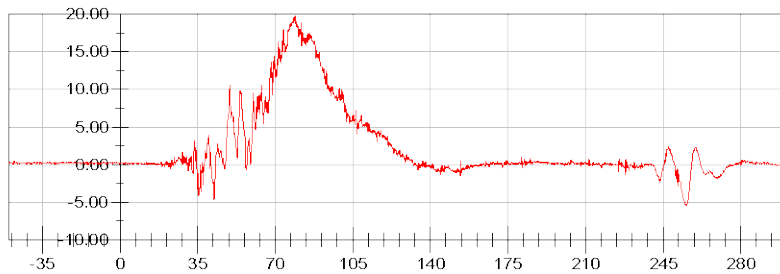
28.48 g at 248.72 ms

<Min>

-44.39 g at 72.48 ms

CFC\_1000

Passenger Head Y Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

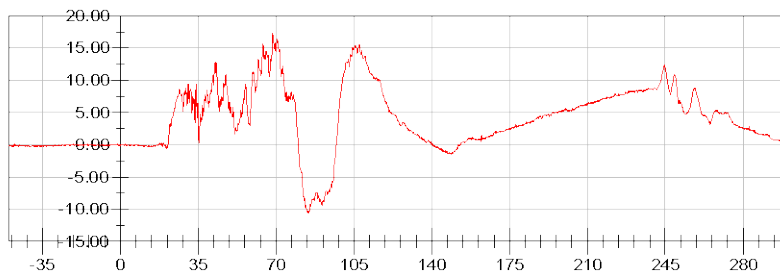
19.78 g at 78.96 ms

<Min>

-5.49 g at 255.44 ms

CFC\_1000

Passenger Head Z Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

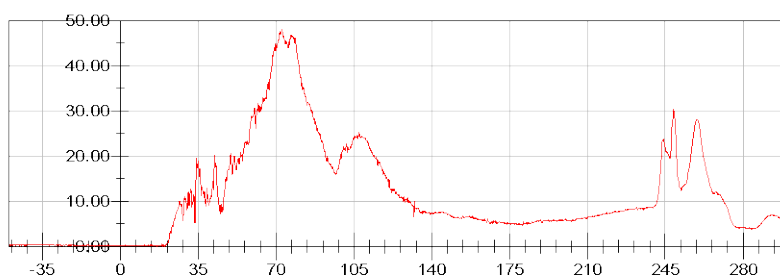
17.34 g at 68.48 ms

<Min>

-10.66 g at 84.56 ms

CFC\_1000

Passenger Head Resultant Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

48.01 g at 72.64 ms

<Min>

0.04 g at 16.72 ms

CFC\_1000



# NHTSA

Test Lab: CTF

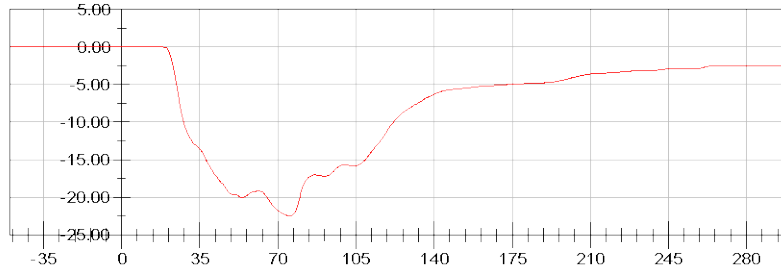
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Passenger Chest X Deflection vs. Time (mm) vs. Time [ms]



**<Max>**

0.01 mm at 1.76 ms

**<Min>**

-22.50 mm at 75.60 ms

CFC\_600



# NHTSA

Test Lab: CTF

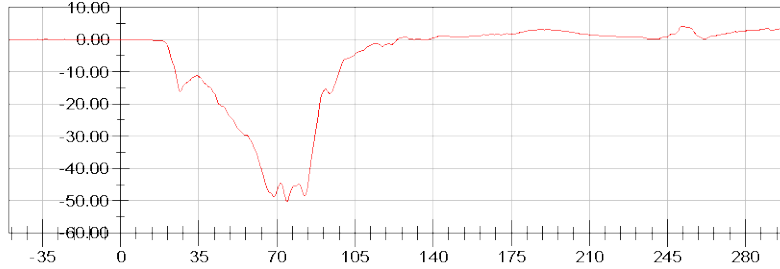
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Passenger Chest X Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

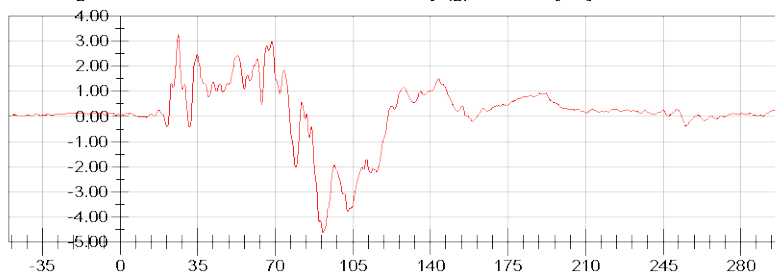
4.18 g at 251.60 ms

**<Min>**

-50.17 g at 74.56 ms

CFC\_180

Passenger Chest Y Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

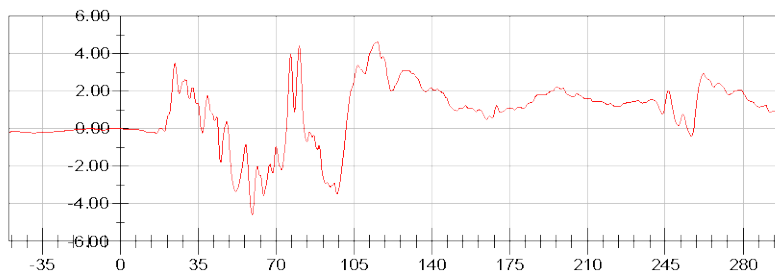
3.26 g at 26.32 ms

**<Min>**

-4.63 g at 91.52 ms

CFC\_180

Passenger Chest Z Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

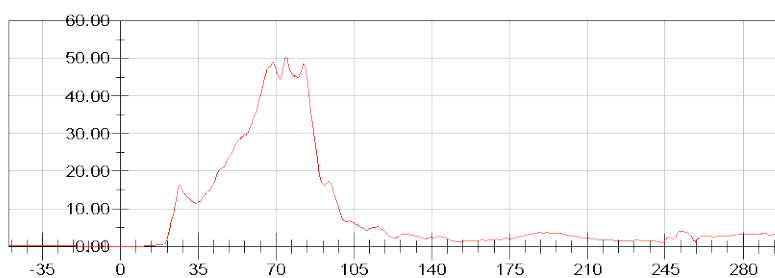
4.63 g at 115.60 ms

**<Min>**

-4.59 g at 59.36 ms

CFC\_180

Passenger Chest Resultant Acceleration vs. Time Primary (g) vs. Time [ms]



**<Max>**

50.20 g at 74.56 ms

**<Min>**

0.06 g at 7.04 ms

CFC\_180



# NHTSA

Test Lab: CTF

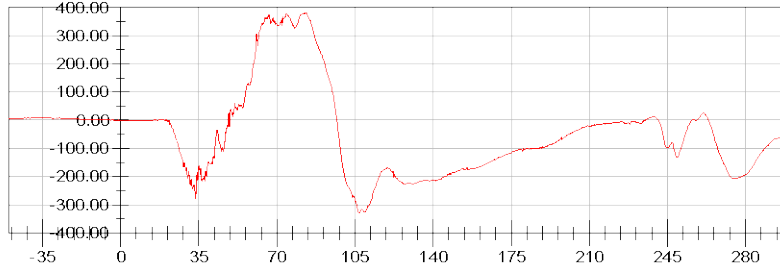
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Passenger Upper Neck Force X vs. Time (N) vs. Time [ms]



**<Max>**

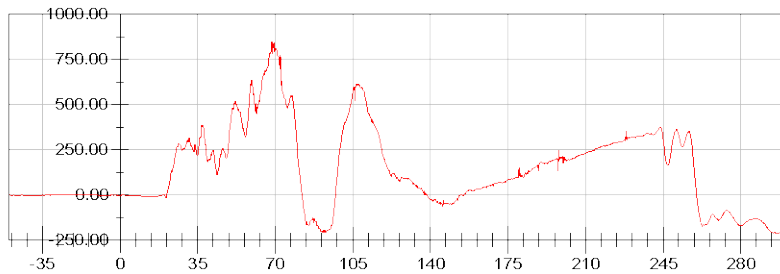
381.49 N at 82.40 ms

**<Min>**

-329.56 N at 106.88 ms

CFC\_1000

Passenger Upper Neck Force Z vs. Time (N) vs. Time [ms]



**<Max>**

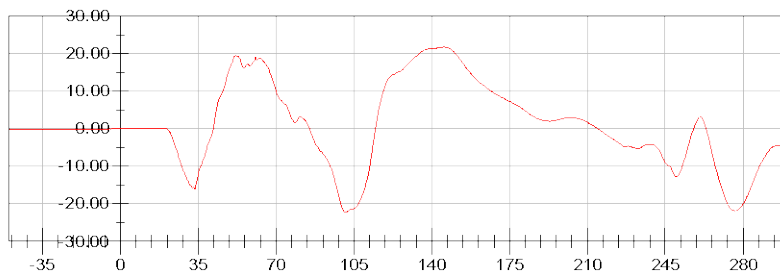
846.64 N at 68.88 ms

**<Min>**

-215.39 N at 296.72 ms

CFC\_1000

Passenger Upper Neck Moment Y vs. Time (Nm) vs. Time [ms]



**<Max>**

21.67 Nm at 145.36 ms

**<Min>**

-22.34 Nm at 101.52 ms

CFC\_600





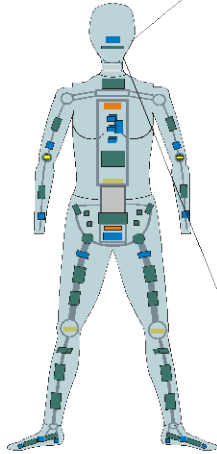
# 2014 Mercedes-Benz E-class Sedan NCAP 35mph Frontal Impact Neck Injury Predictor (NIJ)

Date: 11/12/2013  
Time: 15:53

Customer: NHTSA

Test Number: M20144300

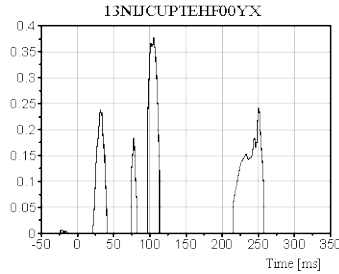
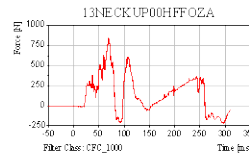
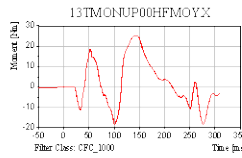
Test Orientation = Frontal  
Fzo(Tension) = 4237  
Fzo(Compression) = 3880  
Myo(Extension) = 67  
Myo(Flexion) = 155



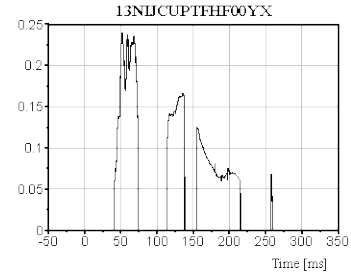
Dummy: IIII 5th Female  
Seating Position:  
Right Front Passenger

NIJ Source Code: (Fz/Fzo)+(My/Myo)

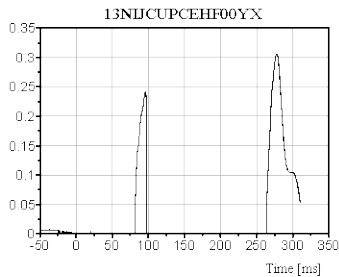
TRC Inc. Test Lab: CTF  
Test Number: 131112



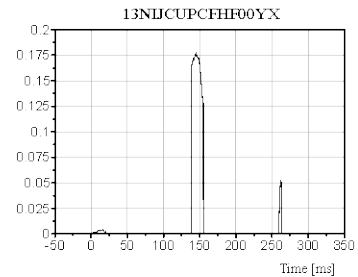
Max [NTE] 0.3778 at 105.20 ms



Max [NTF] 0.2405 at 52.00 ms



Max [NCE] 0.3062 at 277.76 ms



Max [NCF] 0.1776 at 145.44 ms

# NHTSA

Test Lab: CTF

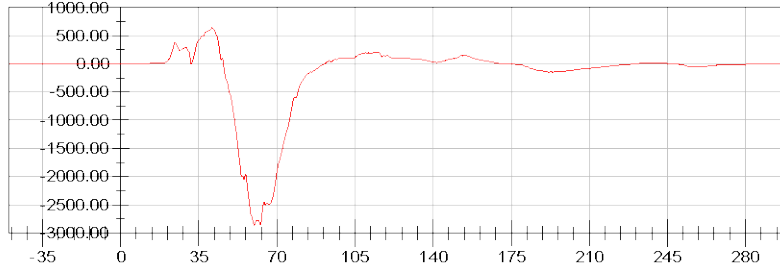
Test Number: 131112 (M20144300)

Test Date: 11/12/2013

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (426)

Passenger Left Femur Force vs. Time (N) vs. Time [ms]



**<Max>**

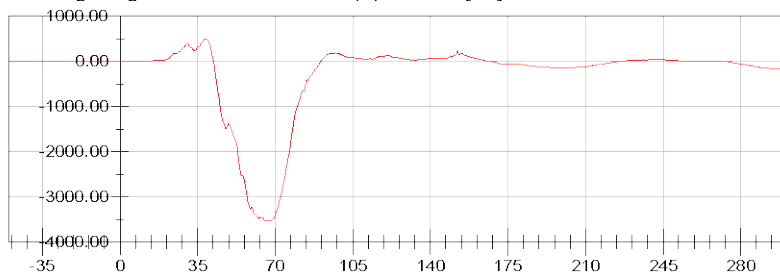
641.33 N at 40.96 ms

**<Min>**

-2,855.99 N at 59.84 ms

CFC\_600

Passenger Right Femur Force vs. Time (N) vs. Time [ms]



**<Max>**

496.87 N at 38.96 ms

**<Min>**

-3,545.82 N at 67.12 ms

CFC\_600



**APPENDIX C**  
**DUMMY CALIBRATION AND PERFORMANCE VERIFICATION**

**Pre-Test Calibration Sheets  
Driver S/N 037**

## Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 20-1

Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	252.3 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-7.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

**Test meets specifications.**

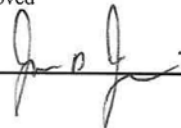
**Comments:**

Technician



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Approved



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

11.07.2013 13:01:14 615

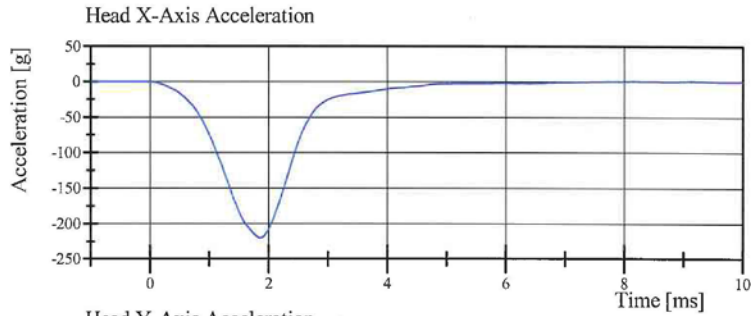


# Transportation Research Center Inc.

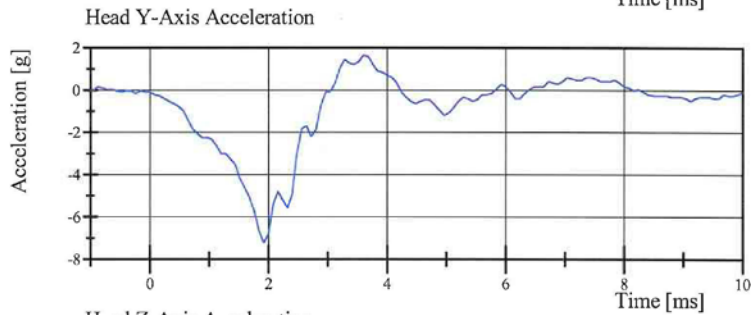
Front Head Drop

HIII 50th Serial No. 037 Certification No. 20-1

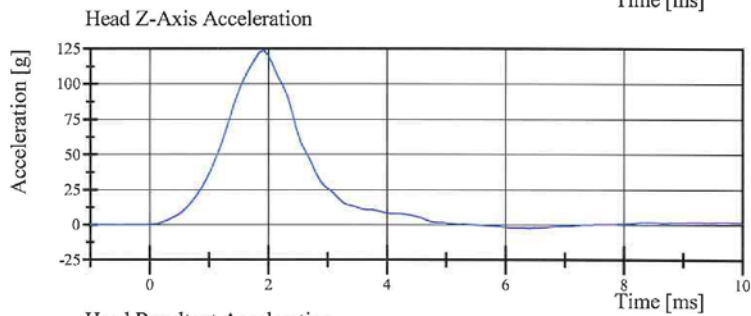
Test Date: 11/7/2013



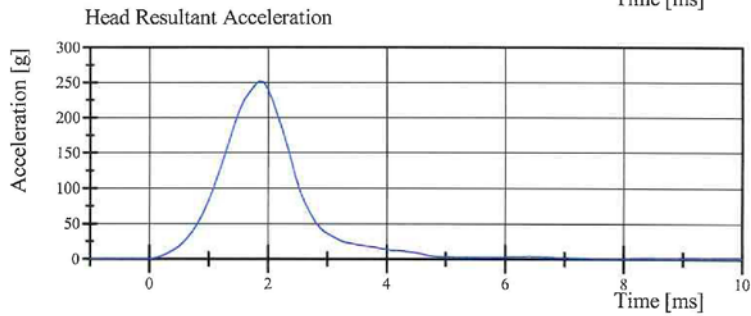
Filter Class: CFC\_1000  
Max: 0.3 g at 8.2 ms  
Min: -220.8 g at 1.8 ms



Filter Class: CFC\_1000  
Max: 1.7 g at 3.6 ms  
Min: -7.2 g at 1.9 ms



Filter Class: CFC\_1000  
Max: 123.8 g at 1.9 ms  
Min: -2.5 g at 6.4 ms



Filter Class: CFC\_1000  
Max: 252.3 g at 1.8 ms  
Min: 0.1 g at -0.7 ms

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

11.07.2013 13:01:27 615



# Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 20-1

Test Date: 11/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.977 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.6 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.01 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.04 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-14.09 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-14.09 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-67.4 °	Yes
Time of Peak	57 - 64 ms	58.8 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	117.6 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	104.4 N·m	Yes
Time of Peak	47 - 58 ms	51.2 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.5 ms	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.08.2013 07:27:50 2947

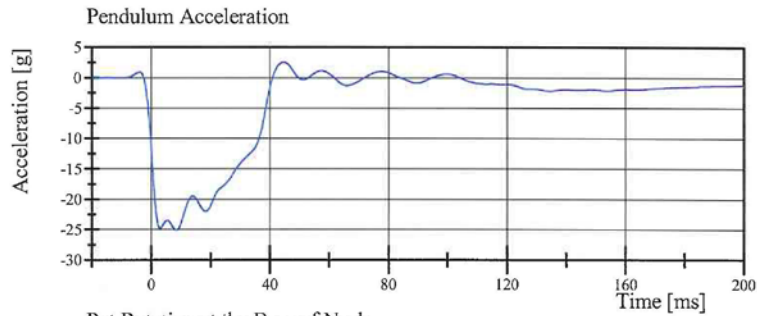


# Transportation Research Center Inc.

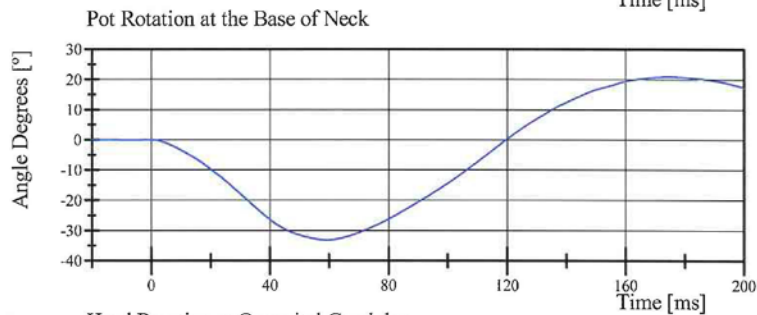
Neck Flexion

HIII 50th Serial No. 037 Certification No. 20-1

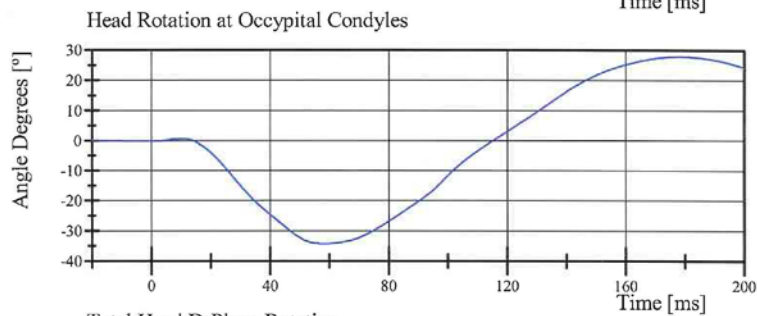
Test Date: 11/8/2013



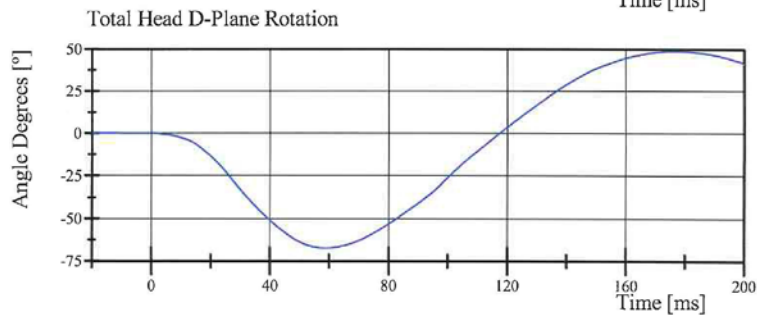
Filter Class: CFC\_60  
Max: 2.5 g at 44.6 ms  
Min: -25.1 g at 8.5 ms



Filter Class: CFC\_60  
Max: 20.9 ° at 174.7 ms  
Min: -33.1 ° at 59.1 ms



Filter Class: CFC\_60  
Max: 27.7 ° at 178.0 ms  
Min: -34.3 ° at 58.2 ms



Filter Class: CFC\_60  
Max: 48.5 ° at 176.4 ms  
Min: -67.4 ° at 58.8 ms

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

11.08.2013 07:27:58 2947

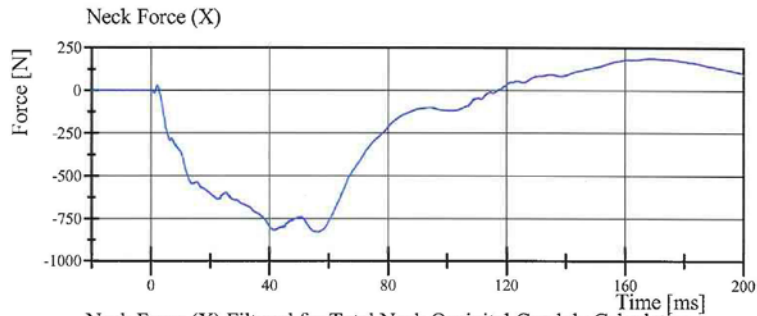


# Transportation Research Center Inc.

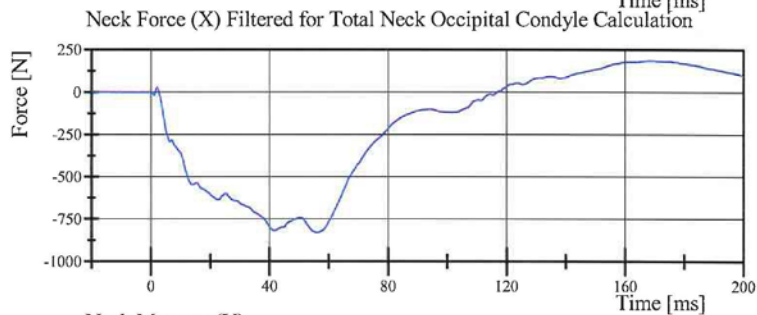
Neck Flexion

HIII 50th Serial No. 037 Certification No. 20-1

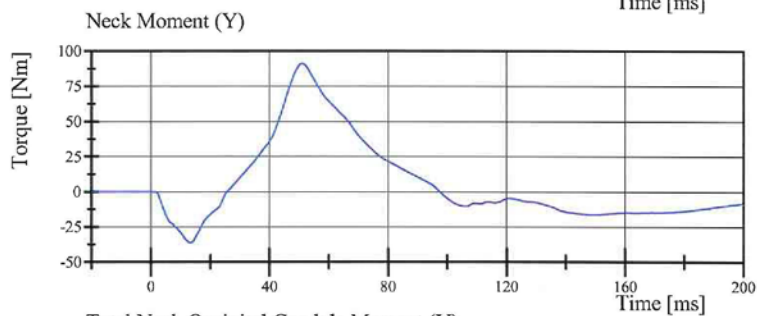
Test Date: 11/8/2013



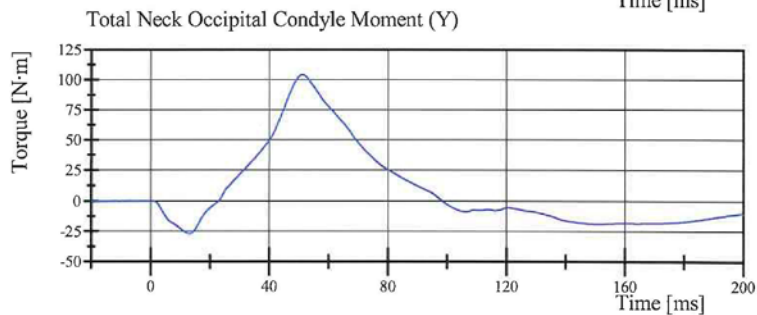
Filter Class: CFC\_1000  
Max: 185.7 N at 168.6 ms  
Min: -829.6 N at 55.7 ms



Filter Class: CFC\_600  
Max: 185.1 N at 168.4 ms  
Min: -829.4 N at 56.5 ms



Filter Class: CFC\_600  
Max: 91.2 Nm at 51.1 ms  
Min: -36.2 Nm at 13.4 ms



Filter Class: Without\_(Consta  
Max: 104.4 N·m at 51.2 ms  
Min: -26.8 N·m at 13.0 ms

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

11.08.2013 07:27:59 2947



## Transportation Research Center Inc.

Neck Extension  
HIII 50th Serial No. 037 Certification No. 20-2  
Test Date: 11/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.964 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.3 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	20.53 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.82 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.20 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.20 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	98.0 °	Yes
Time of Peak	72 - 82 ms	75.7 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	157.4 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-72.9 N·m	Yes
Time of Peak	65 - 79 ms	70.0 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	143.6 ms	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.08.2013 08:35:34 3030

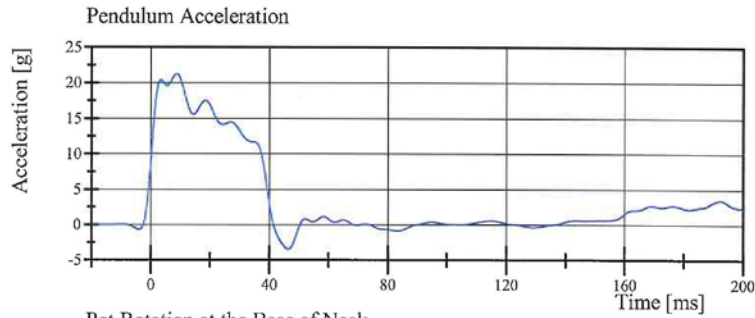


# Transportation Research Center Inc.

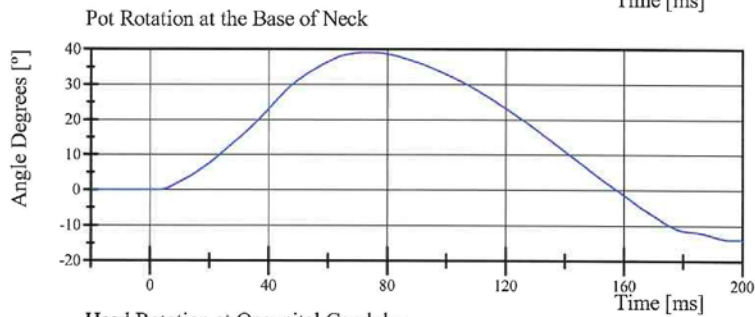
Neck Extension

HIII 50th Serial No. 037 Certification No. 20-2

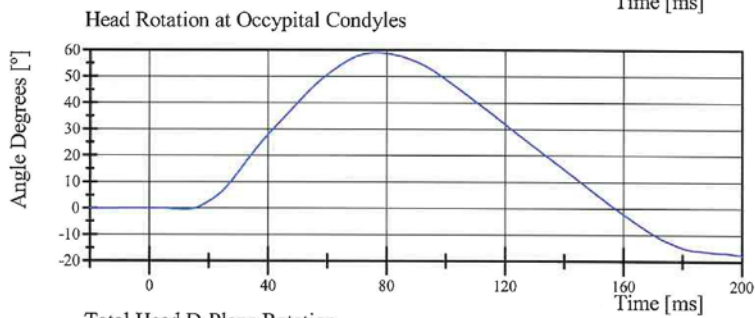
Test Date: 11/8/2013



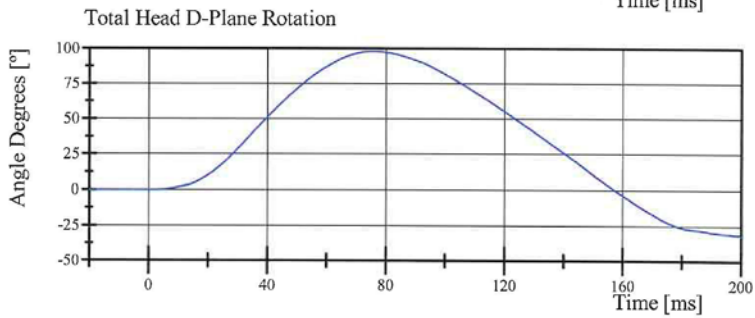
Filter Class: CFC\_60  
Max: 21.2 g at 8.6 ms  
Min: -3.5 g at 46.4 ms



Filter Class: CFC\_60  
Max: 39.1 ° at 73.0 ms  
Min: -14.1 ° at 197.0 ms



Filter Class: CFC\_60  
Max: 58.9 ° at 76.4 ms  
Min: -17.8 ° at 200.0 ms



Filter Class: CFC\_60  
Max: 98.0 ° at 75.7 ms  
Min: -31.8 ° at 200.0 ms

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

11.08.2013 08:35:43 3030

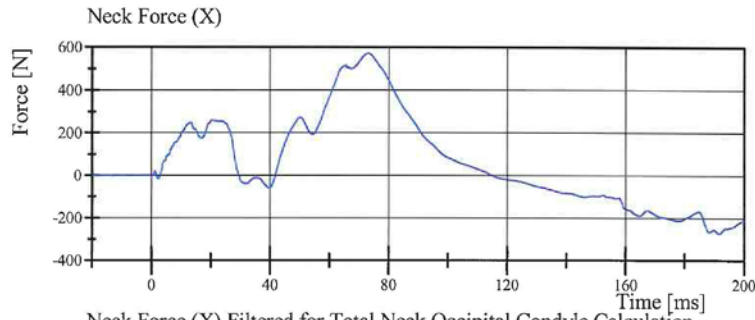


# Transportation Research Center Inc.

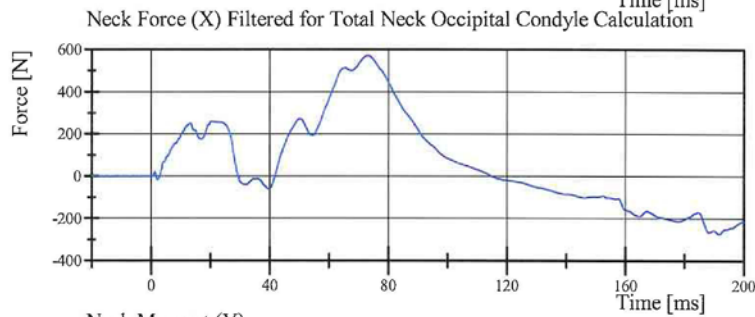
Neck Extension

HIII 50th Serial No. 037 Certification No. 20-2

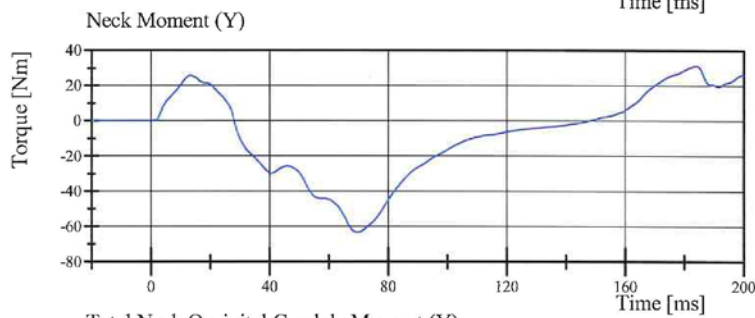
Test Date: 11/8/2013



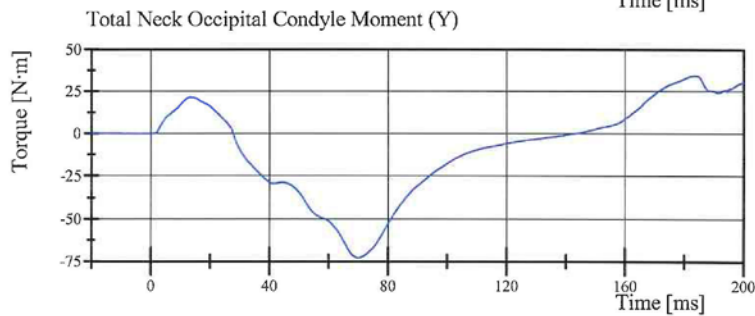
Filter Class: CFC\_1000  
Max: 571.1 N at 73.1 ms  
Min: -275.7 N at 191.8 ms



Filter Class: CFC\_600  
Max: 571.0 N at 73.3 ms  
Min: -275.4 N at 191.8 ms



Filter Class: CFC\_600  
Max: 31.0 Nm at 184.0 ms  
Min: -63.5 Nm at 69.7 ms



Filter Class: Without\_(Consta  
Max: 34.1 N·m at 183.7 ms  
Min: -72.9 N·m at 70.0 ms

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

11.08.2013 08:35:44 3030



## Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 20-2

Test Date: 11/8/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.630 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,675.8 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-70.14 mm	Yes
Internal Hysteresis	65 - 85 %	72.1 %	Yes

**Test meets specifications.**

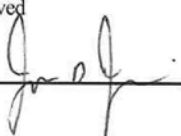
**Comments:**

Technician



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Approved



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

11.08.2013 10:06:09 418

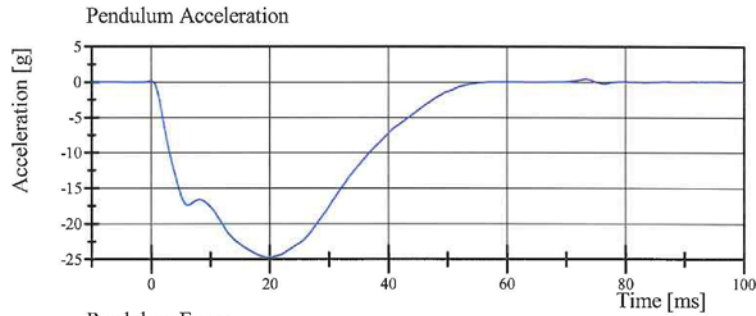


# Transportation Research Center Inc.

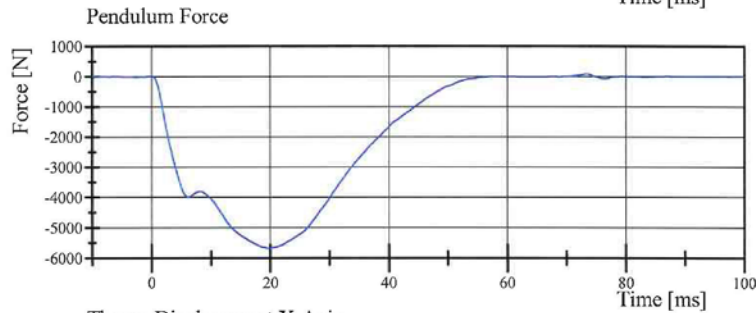
Front Thorax

HIII 50th Serial No. 037 Certification No. 20-2

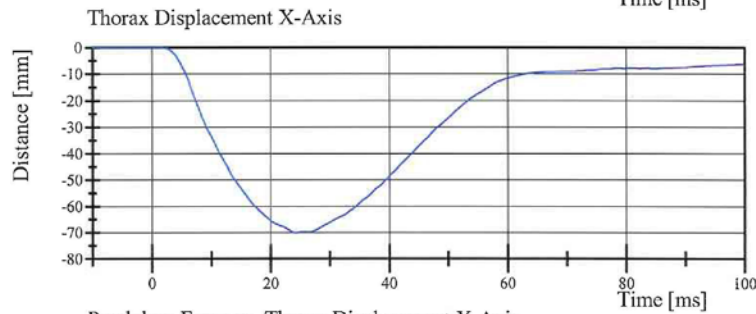
Test Date: 11/8/2013



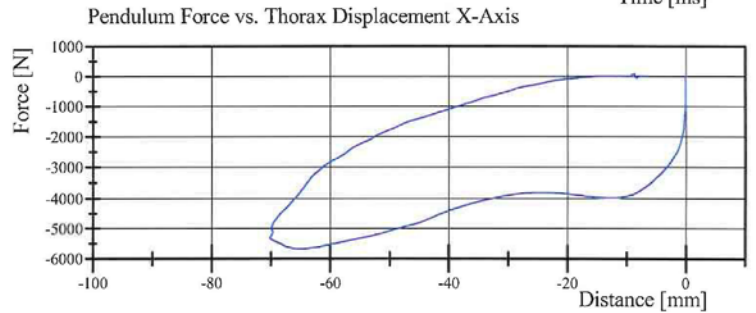
Filter Class: CFC\_180  
Max: 0.4 g at 73.4 ms  
Min: -24.8 g at 19.8 ms



Filter Class: CFC\_180  
Max: 88.2 N at 73.4 ms  
Min: -5,675.8 N at 19.8 ms



Filter Class: CFC\_600  
Max: 0.0 mm at -5.0 ms  
Min: -70.1 mm at 24.2 ms



Filter Class: CFC\_180  
Max: 88.2 N at -8.7 mm  
Min: -5,675.8 N at -65.1 mm

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

11.08.2013 10:06:16 418





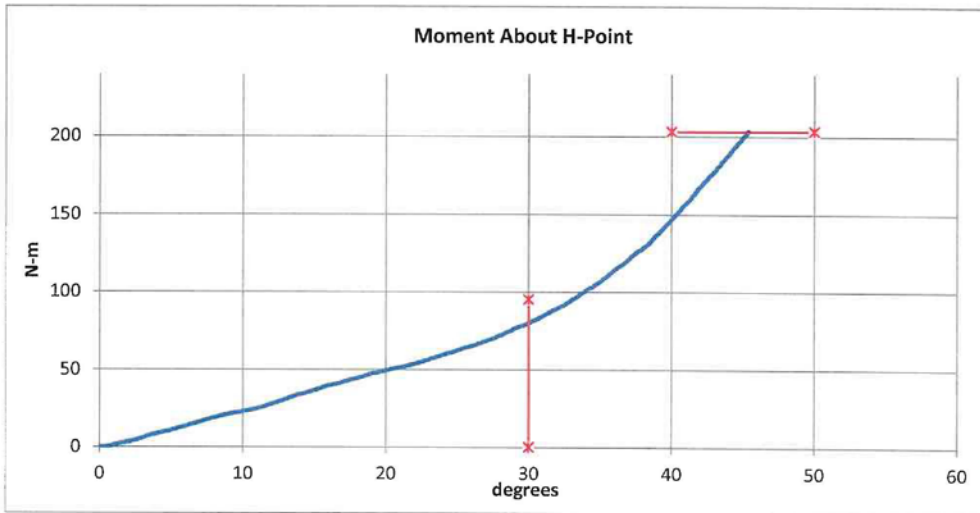
# Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

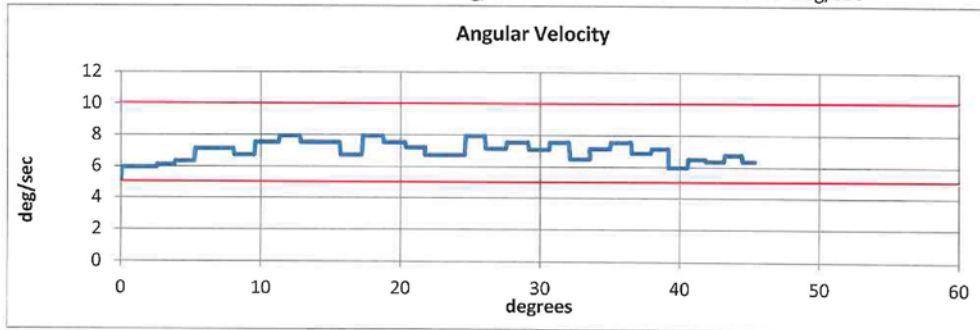


Serial Number: 37                      Date: 07-Nov-2013  
 Test Number: 1                         Time: 12:29  
 Comments: Right

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.9 °C Pass
Humidity	10 - 70	33 % Pass
Moment at 30°	0 ≤ 94.9	80.1 N-m Pass
Angle at 203 Nm	40 - 50	45.38 deg Pass
Average Velocity	5 - 10	6.97 deg/sec Pass



Max: 7.93 deg/sec                      Min: 5.05 deg/sec



Technician *[Signature]*

Approved *[Signature]*

## Transportation Research Center Inc.

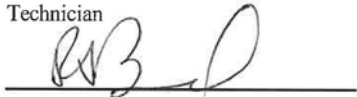
Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 20-1  
Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.116 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,634.01 N	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



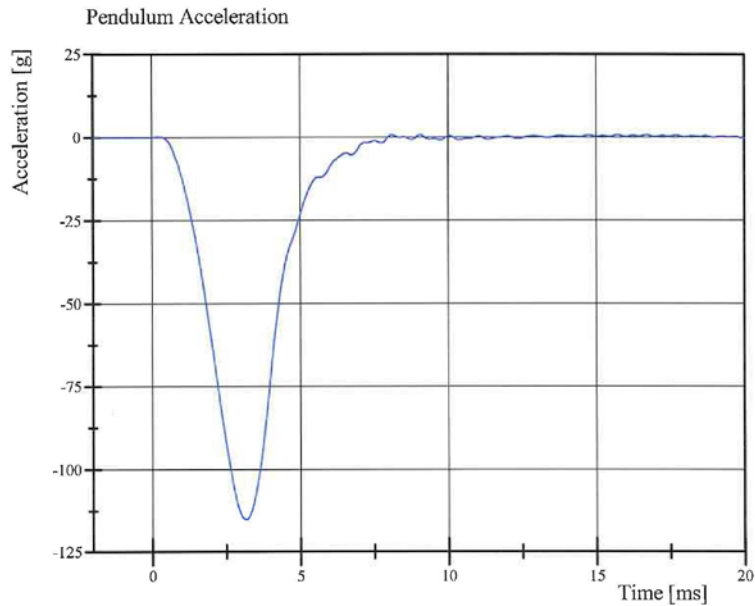
Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

11.07.2013 13:15:16 1747

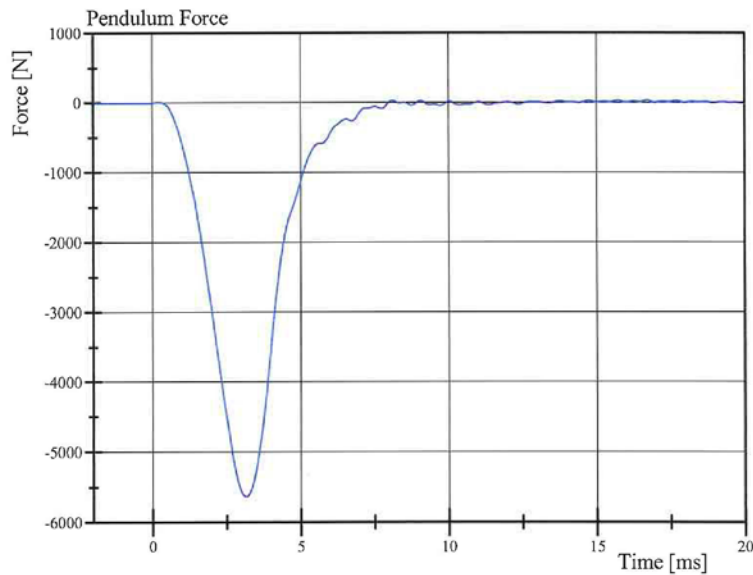


# Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 20-1  
Test Date: 11/7/2013



Filter Class: CFC\_600  
Max: 0.7 g at 8.1 ms  
Min: -115.1 g at 3.1 ms



Filter Class: CFC\_600  
Max: 34.3 N at 8.1 ms  
Min: -5,634.0 N at 3.1 ms

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

11.07.2013 13:15:23 1747



## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 20-1  
Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.117 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,437.03 N	Yes

**Test meets specifications.**


**Comments:**

Technician



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Approved



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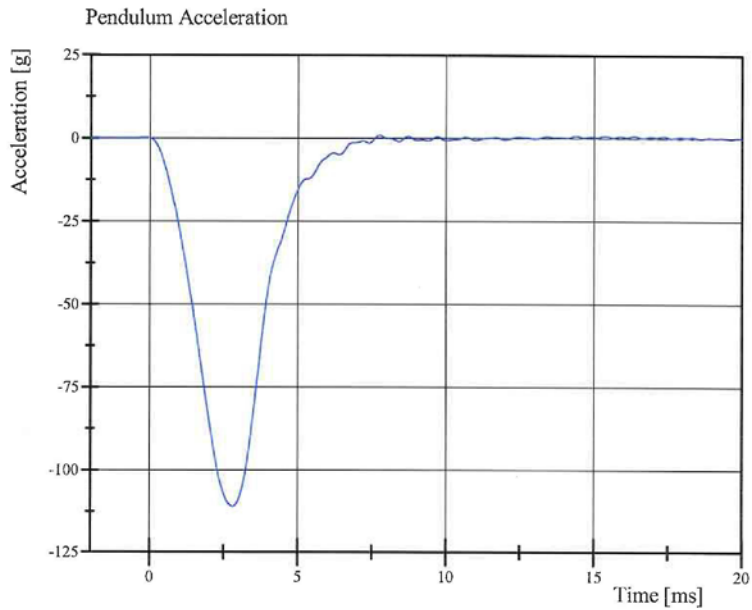
Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

11.07.2013 13:20:19 1751

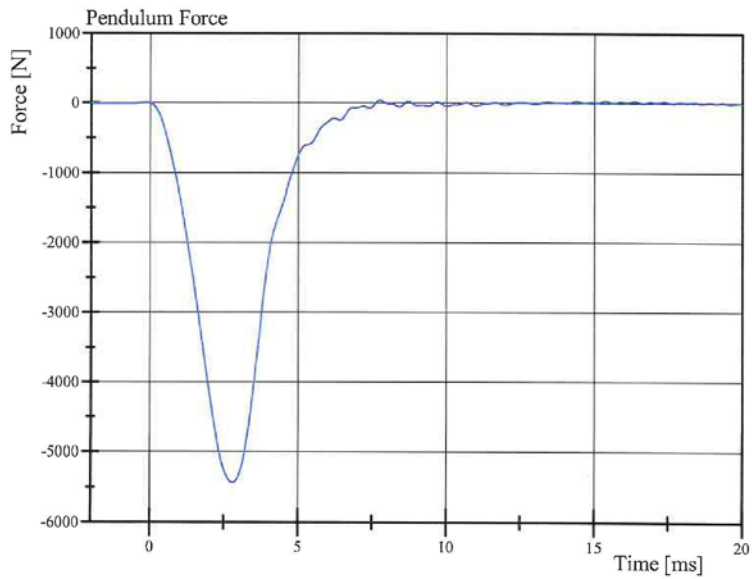


# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 20-1  
Test Date: 11/7/2013



Filter Class: CFC\_600  
Max: 0.9 g at 7.8 ms  
Min: -111.1 g at 2.8 ms



Filter Class: CFC\_600  
Max: 43.7 N at 7.8 ms  
Min: -5,437.0 N at 2.8 ms

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

11.07.2013 13:20:25 1751

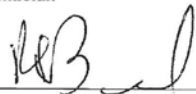


**Transportation Research Center Inc.**  
**572E HIII 50th Male Dummy**  
**External Dimensions**  
**Serial No. 037**  
**Calibration No. 20**

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	884	Yes
B	Shoulder Pivot Height	505.5 - 520.7	520	Yes
C	H-Point Height	83.8 - 88.9	85	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	92	Yes
F	Thigh Clearance	139.7 - 154.9	151	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	294	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	340	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	600	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	225	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	428	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	987	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Technician



Approved



Revised 8/10/12



**Driver S/N 037**

**Post-Test Calibration Sheets**

## Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 21-1

Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	247.3 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-4.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

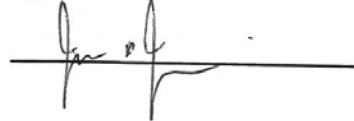
Test meets specifications.

Comments:

Technician



Approved



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

11.13.2013 08:07:19 613

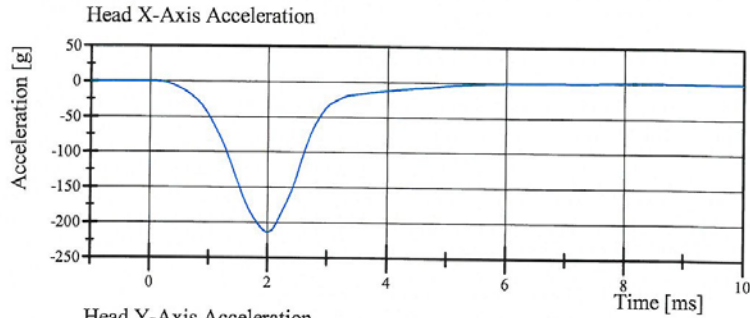


# Transportation Research Center Inc.

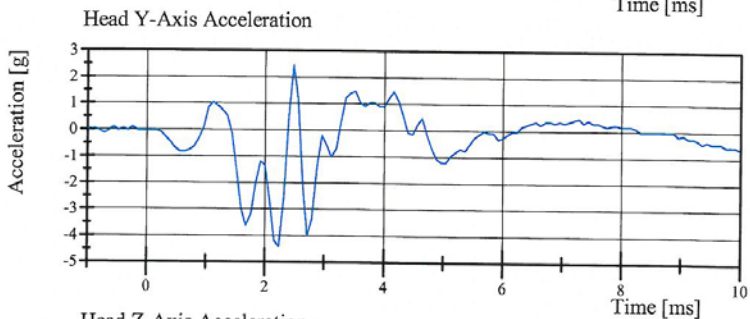
Front Head Drop

HIII 50th Serial No. 037 Certification No. 21-1

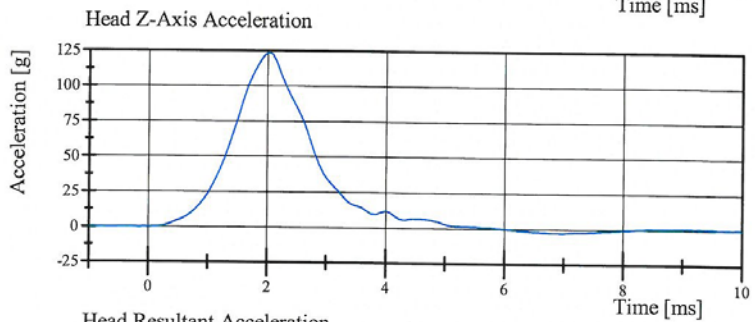
Test Date: 11/13/2013



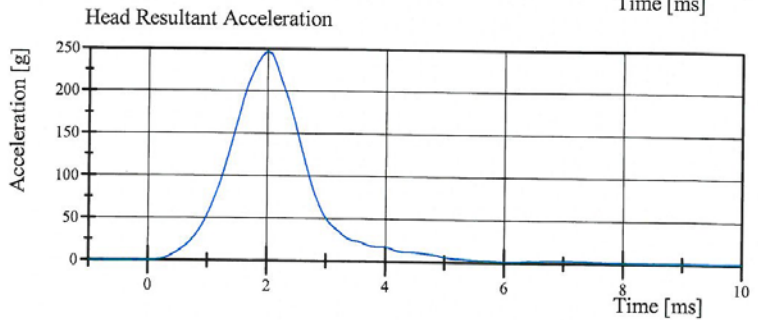
Filter Class: CFC\_1000  
Max: 0.8 g at 8.2 ms  
Min: -214.1 g at 2.0 ms



Filter Class: CFC\_1000  
Max: 2.5 g at 2.5 ms  
Min: -4.4 g at 2.2 ms



Filter Class: CFC\_1000  
Max: 123.7 g at 2.0 ms  
Min: -2.8 g at 7.0 ms



Filter Class: CFC\_1000  
Max: 247.3 g at 2.0 ms  
Min: 0.1 g at -0.9 ms

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

11.13.2013 08:07:26 613



## Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 21-4

Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.970 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	39.4 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.88 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-19.86 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.13 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.13 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-72.6 °	Yes
Time of Peak	57 - 64 ms	59.0 ms	Yes
Total Head D-Plane Rotation			
Decay to 0°	113 - 128 ms	118.2 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88 - 108 N·m	108.0 N·m	Yes
Time of Peak	47 - 58 ms	51.8 ms	Yes
Total Neck Occipital Condyles Moment			
Decay to 0 N·m	97 - 107 ms	98.2 ms	Yes

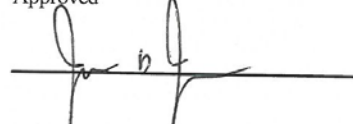
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.13.2013 13:36:09 2946

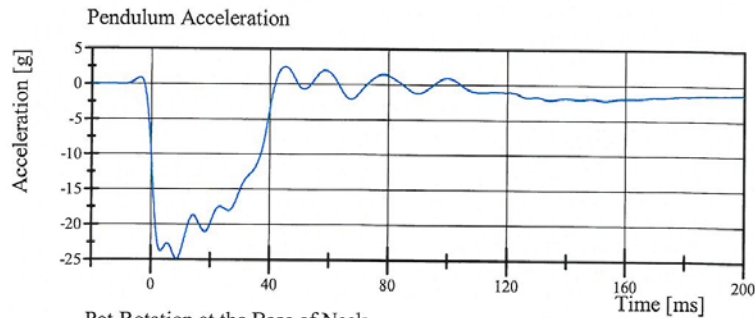


# Transportation Research Center Inc.

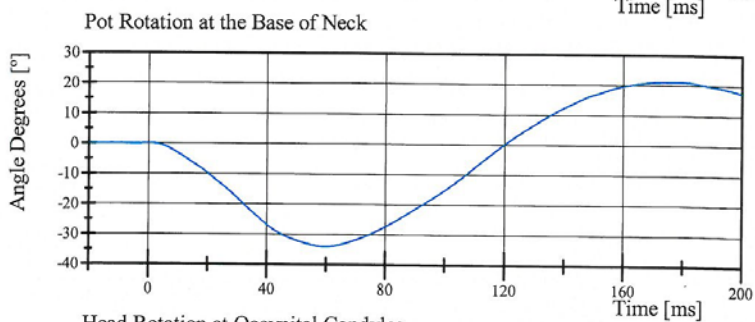
Neck Flexion

HIII 50th Serial No. 037 Certification No. 21-4

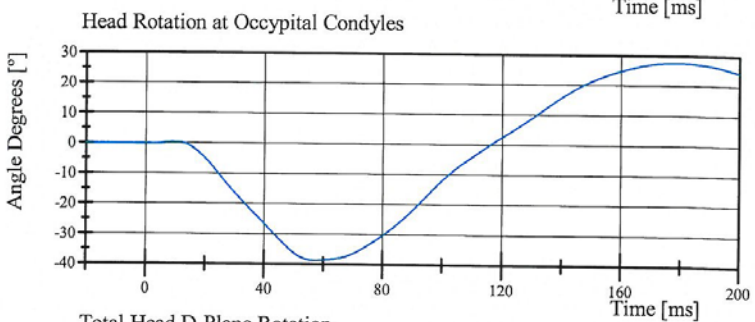
Test Date: 11/13/2013



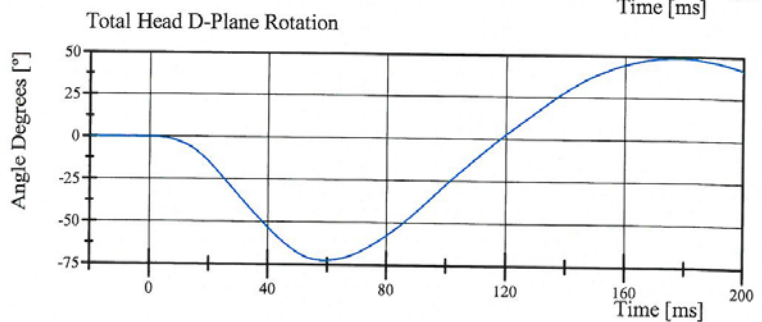
Filter Class: CFC\_60  
Max: 2.4 g at 45.2 ms  
Min: -24.9 g at 8.6 ms



Filter Class: CFC\_60  
Max: 21.2 ° at 175.6 ms  
Min: -34.0 ° at 59.7 ms



Filter Class: CFC\_60  
Max: 27.6 ° at 178.5 ms  
Min: -38.6 ° at 57.4 ms



Filter Class: CFC\_60  
Max: 48.7 ° at 177.3 ms  
Min: -72.6 ° at 59.0 ms

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

11.13.2013 13:36:21 2946

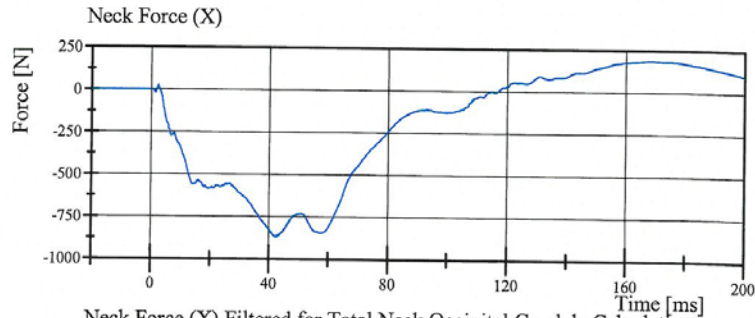


# Transportation Research Center Inc.

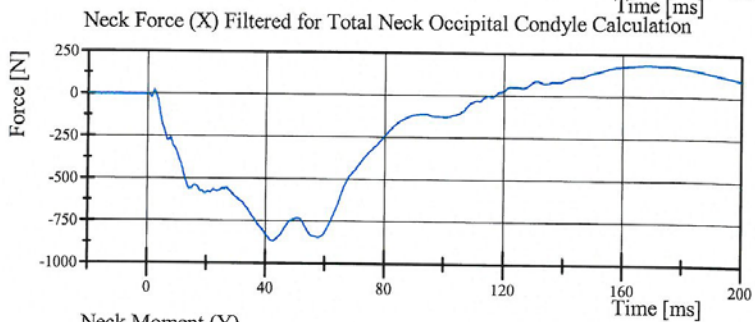
## Neck Flexion

HIII 50th Serial No. 037 Certification No. 21-4

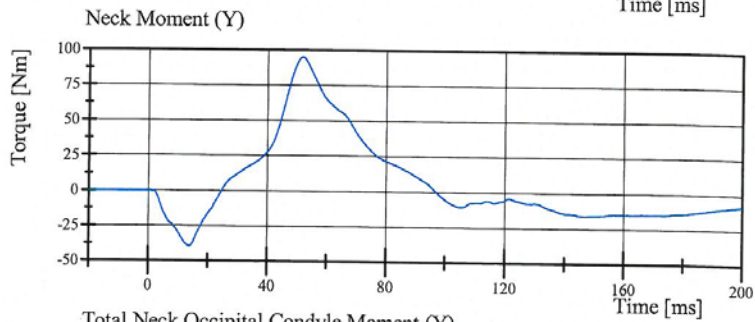
Test Date: 11/13/2013



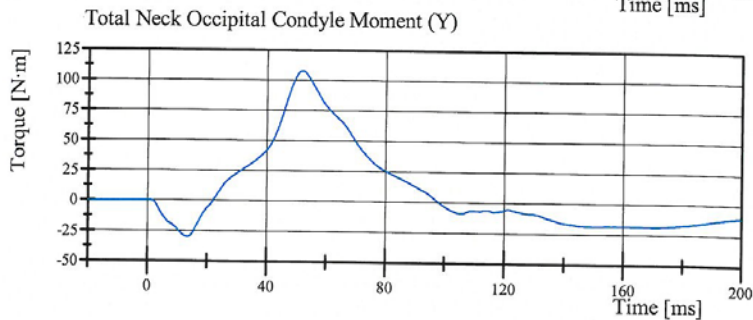
Filter Class: CFC\_1000  
Max: 187.7 N at 168.9 ms  
Min: -871.0 N at 42.6 ms



Filter Class: CFC\_600  
Max: 187.0 N at 169.0 ms  
Min: -866.8 N at 42.6 ms



Filter Class: CFC\_600  
Max: 95.0 Nm at 51.8 ms  
Min: -39.5 Nm at 13.8 ms



Filter Class: Without\_(Consta  
Max: 108.0 N·m at 51.8 ms  
Min: -29.8 N·m at 13.5 ms

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

11.13.2013 13:36:22 2946



## Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 21-2

Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.964 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	38.4 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.69 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.85 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.21 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.21 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	93.1 °	Yes
Time of Peak	72 - 82 ms	75.2 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	154.7 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-72.7 N·m	Yes
Time of Peak	65 - 79 ms	70.0 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	141.2 ms	Yes


Test meets specifications.

Comments:

Technician



Approved



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

11.13.2013 15:04:14 3029

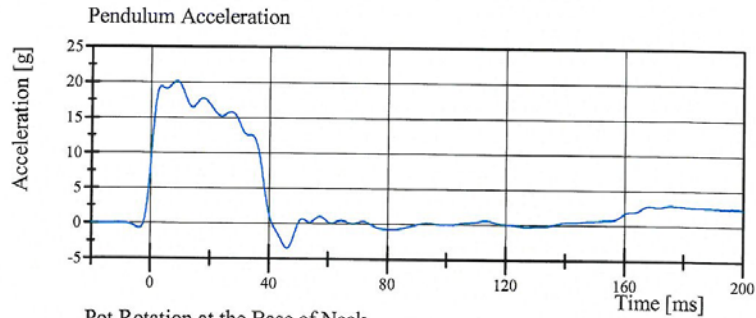


# Transportation Research Center Inc.

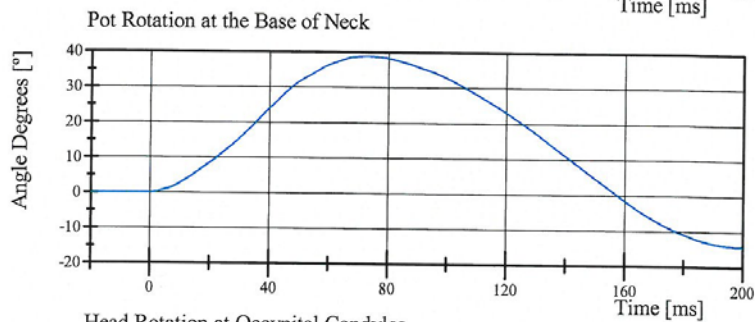
Neck Extension

HIII 50th Serial No. 037 Certification No. 21-2

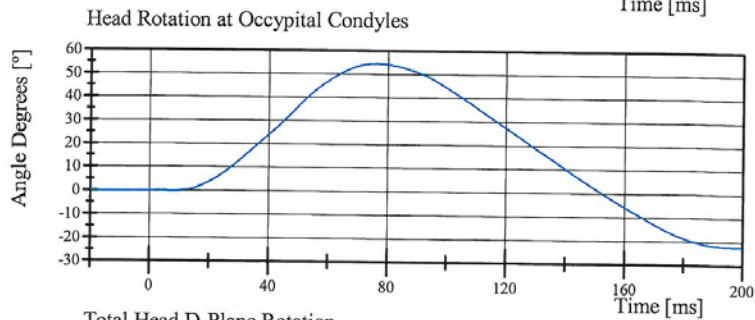
Test Date: 11/13/2013



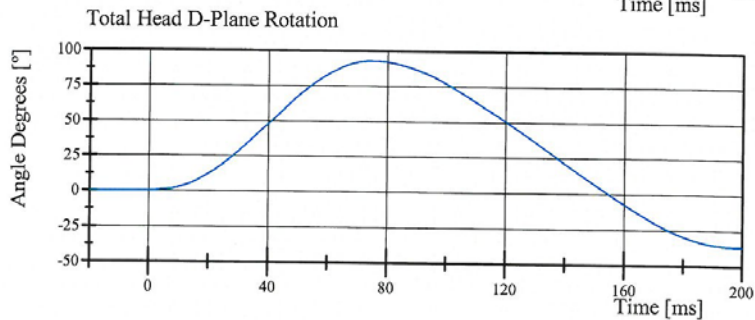
Filter Class: CFC\_60  
Max: 20.1 g at 8.7 ms  
Min: -3.4 g at 46.1 ms



Filter Class: CFC\_60  
Max: 38.9 ° at 73.2 ms  
Min: -14.3 ° at 198.9 ms



Filter Class: CFC\_60  
Max: 54.4 ° at 76.4 ms  
Min: -22.3 ° at 198.0 ms



Filter Class: CFC\_60  
Max: 93.1 ° at 75.2 ms  
Min: -36.6 ° at 198.5 ms

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

11.13.2013 15:04:21 3029

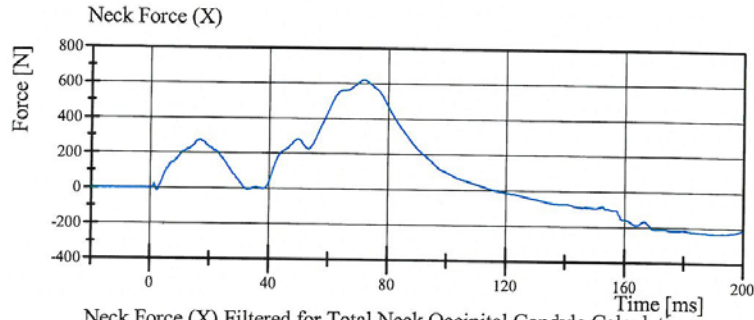


# Transportation Research Center Inc.

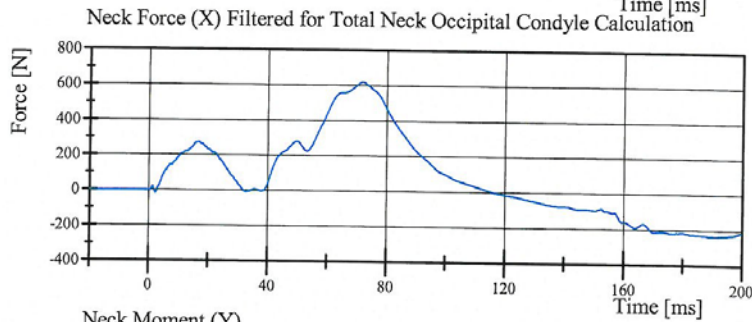
Neck Extension

HIII 50th Serial No. 037 Certification No. 21-2

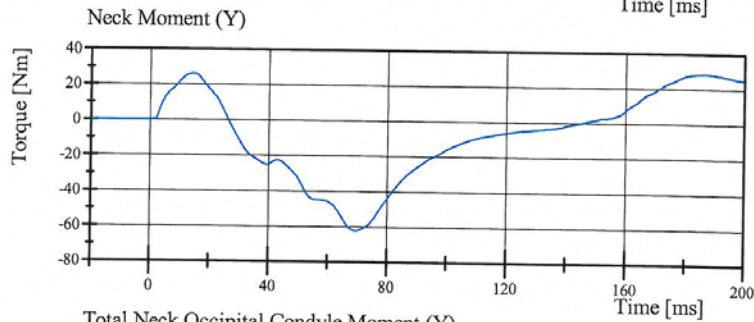
Test Date: 11/13/2013



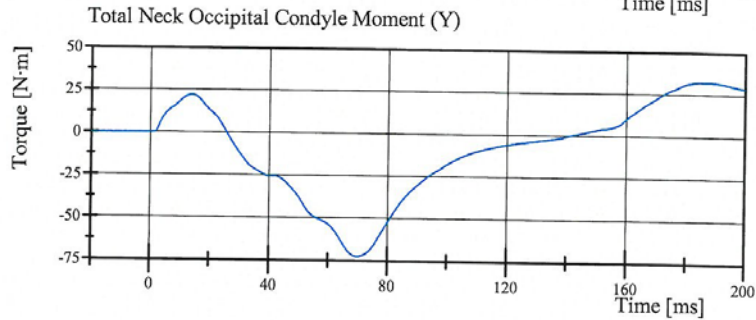
Filter Class: CFC\_1000  
Max: 619.5 N at 71.8 ms  
Min: -236.8 N at 191.4 ms



Filter Class: CFC\_600  
Max: 619.1 N at 71.8 ms  
Min: -236.5 N at 191.4 ms



Filter Class: CFC\_600  
Max: 28.4 Nm at 186.2 ms  
Min: -62.1 Nm at 69.4 ms



Filter Class: Without\_(Consta  
Max: 32.5 N·m at 186.4 ms  
Min: -72.7 N·m at 70.0 ms

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

11.13.2013 15:04:22 3029



# Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 21-1

Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.611 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,706.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-68.85 mm	Yes
Internal Hysteresis	65 - 85 %	72.5 %	Yes

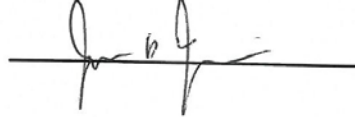
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.13.2013 16:08:41 442

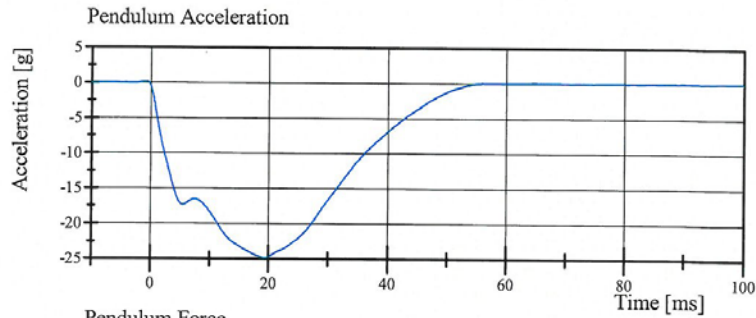


# Transportation Research Center Inc.

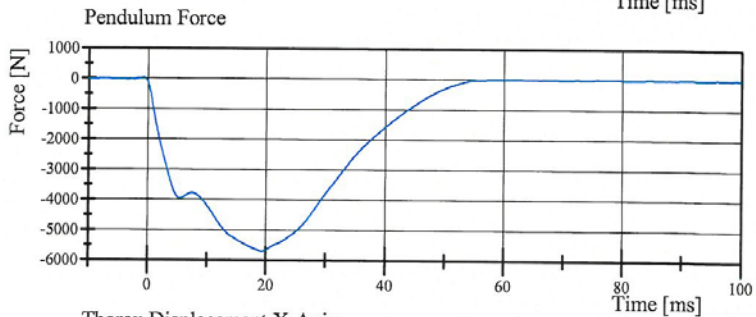
Front Thorax

HIII 50th Serial No. 037 Certification No. 21-1

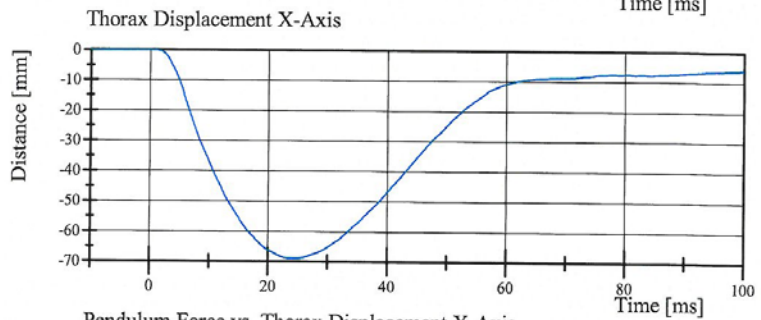
Test Date: 11/13/2013



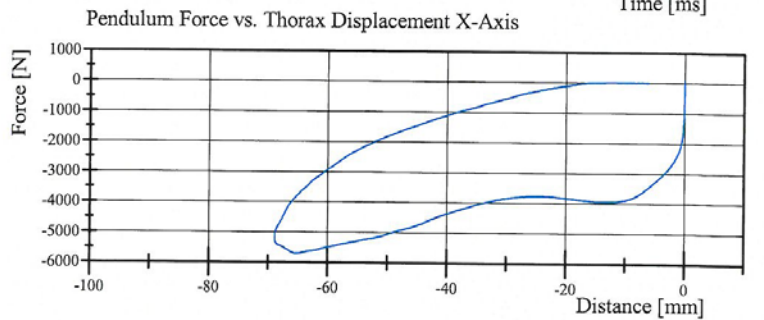
Filter Class: CFC\_180  
Max: 0.1 g at -0.8 ms  
Min: -24.9 g at 19.4 ms



Filter Class: CFC\_180  
Max: 34.0 N at -0.8 ms  
Min: -5,706.5 N at 19.4 ms



Filter Class: CFC\_600  
Max: 0.0 mm at -6.9 ms  
Min: -68.9 mm at 23.9 ms



Filter Class: CFC\_180  
Max: 34.0 N at -0.0 mm  
Min: -5,706.5 N at -65.3 mm

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

11.13.2013 16:08:49 442

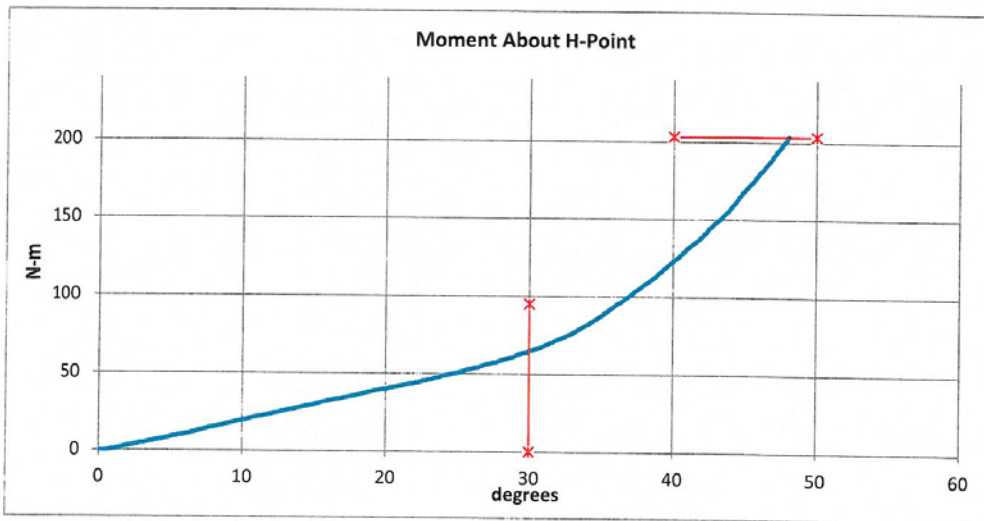


Transportation Research Center Inc.  
Hybrid III 50th Male Hip Range of Motion

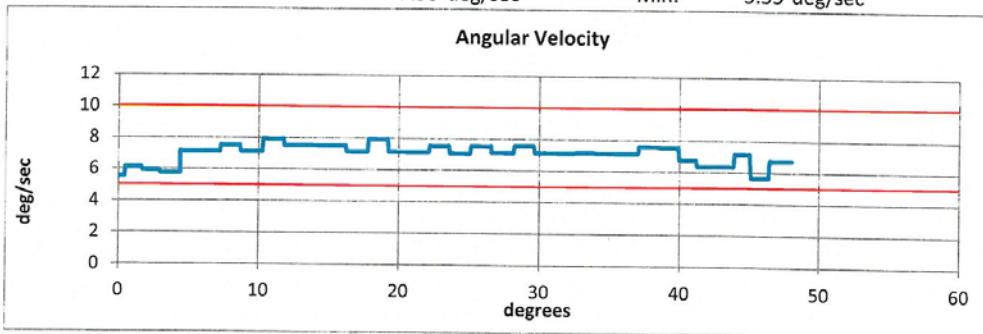


Serial Number: 37 Date: 13-Nov-2013  
Test Number: 1 Time: 8:25  
Comments: Left

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.4 °C Pass
Humidity	10 - 70	37 % Pass
Moment at 30°	0 ≤ 94.9	64.69 N-m Pass
Angle at 203 Nm	40 - 50	48.07 deg Pass
Average Velocity	5 - 10	7.05 deg/sec Pass



Max: 7.93 deg/sec Min: 5.55 deg/sec



Technician RB

Approved JNF

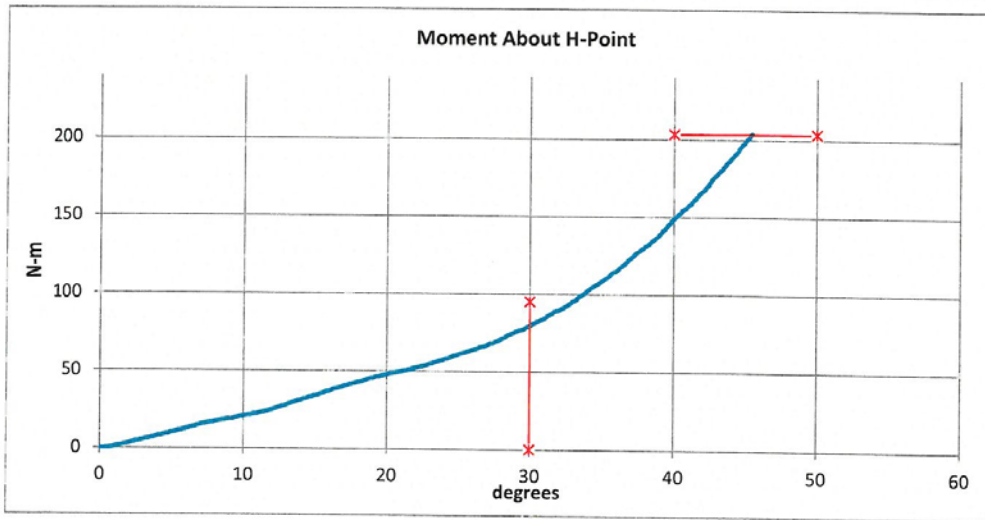
# Transportation Research Center Inc.

Hybrid III 50th Male Hip Range of Motion

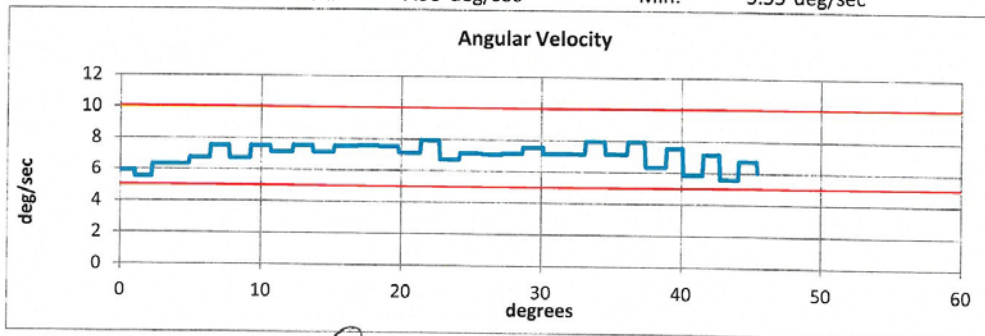


Serial Number: 37 Date: 13-Nov-2013  
 Test Number: 1 Time: 9:35  
 Comments: Right

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.4 °C Pass
Humidity	10 - 70	36 % Pass
Moment at 30°	0 ≤ 94.9	79.55 N-m Pass
Angle at 203 Nm	40 - 50	45.46 deg Pass
Average Velocity	5 - 10	7.01 deg/sec Pass



Max: 7.93 deg/sec Min: 5.55 deg/sec



Technician

Approved

## Transportation Research Center Inc.

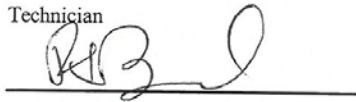
Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 21-1  
Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.127 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,612.53 N	Yes

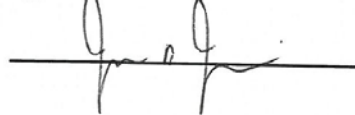
Test meets specifications.

Comments:

Technician



Approved



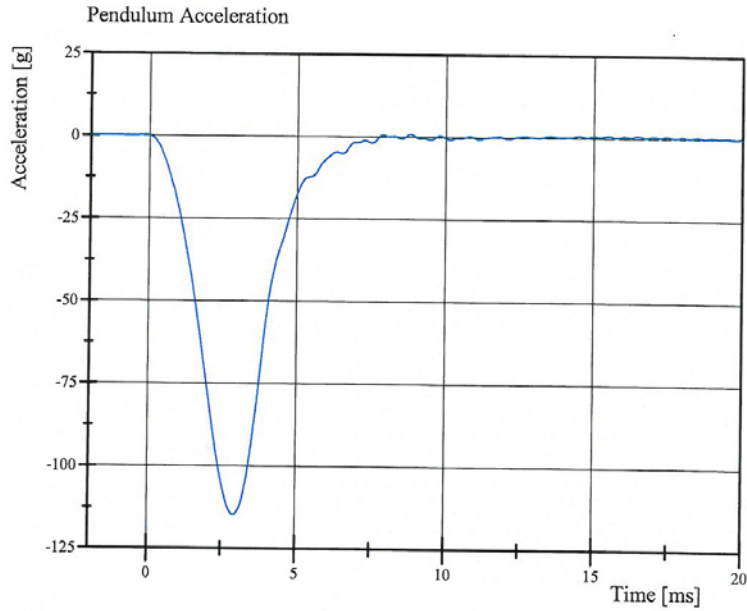
Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

11.13.2013 09:02:19 1752

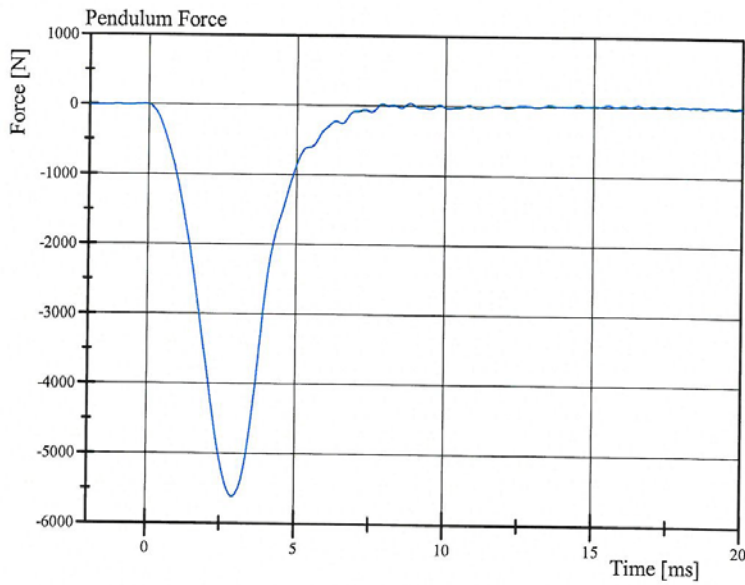


# Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 21-1  
Test Date: 11/13/2013



Filter Class: CFC\_600  
Max: 0.8 g at 8.8 ms  
Min: -114.7 g at 3.0 ms



Filter Class: CFC\_600  
Max: 40.8 N at 8.8 ms  
Min: -5,612.5 N at 3.0 ms

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

11.13.2013 09:02:26 1752



## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 21-1  
Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.120 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,657.39 N	Yes

Test meets specifications.

Comments:

Technician



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Approved



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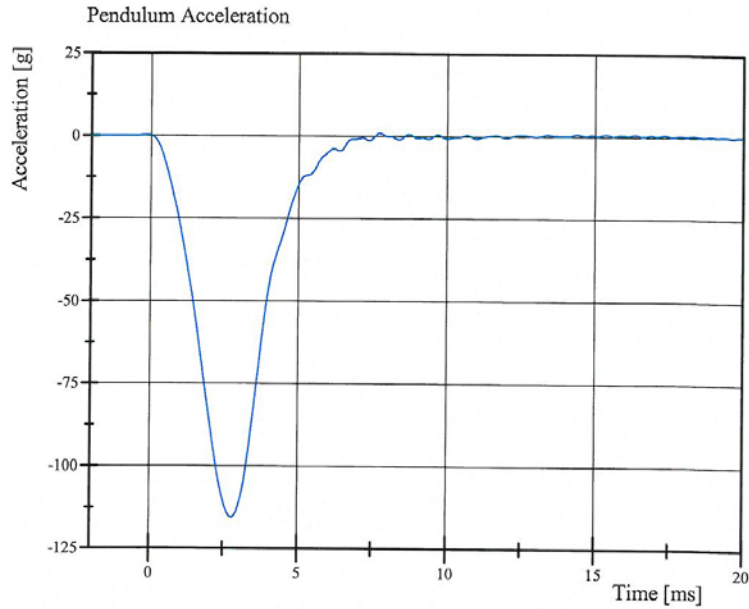
Specification Source: CFR49 Part 572 Subpart E  
with Polarity in accordance with J211

11.13.2013 09:23:50 1752

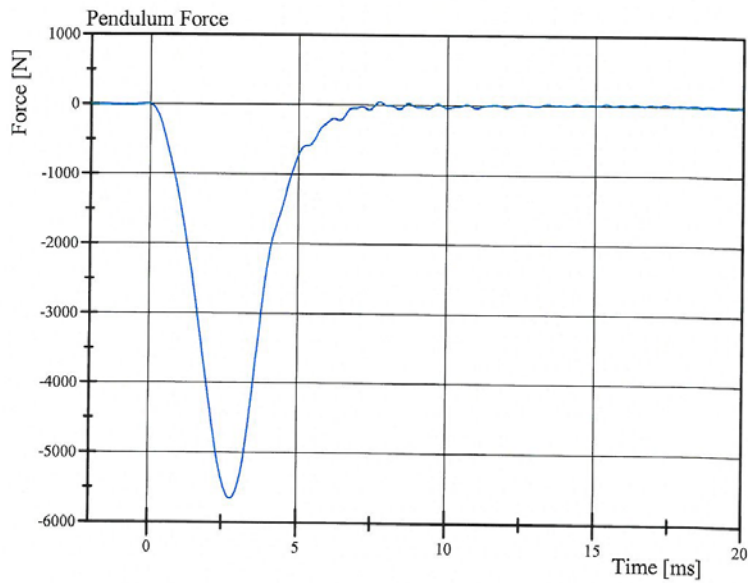


# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 50th Serial No. 037 Certification No. 21-1  
Test Date: 11/13/2013



Filter Class: CFC\_600  
Max: 0.9 g at 7.8 ms  
Min: -115.6 g at 2.8 ms



Filter Class: CFC\_600  
Max: 43.4 N at 7.8 ms  
Min: -5,657.4 N at 2.8 ms

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

11.13.2013 09:25:04 1752



**Transportation Research Center Inc.**  
**572E HIII 50th Male Dummy**  
**External Dimensions**  
**Serial No. 037**  
**Calibration No. 21**

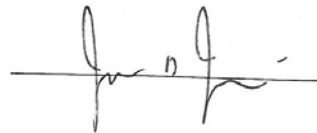
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	884	Yes
B	Shoulder Pivot Height	505.5 - 520.7	520	Yes
C	H-Point Height	83.8 - 88.9	85	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	92	Yes
F	Thigh Clearance	139.7 - 154.9	150	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	294	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	340	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	600	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	225	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	428	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	987	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Technician



Approved



Revised 8/10/12



**Pre-Test Calibration Sheets  
Front Passenger S/N 426**

## Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. 426 Certification No. 22-1

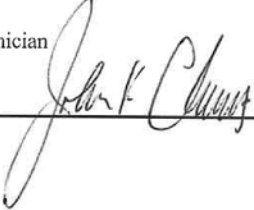
Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	271.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	2.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

**Test meets specifications.**

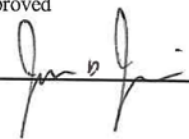
**Comments:**

Technician



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Approved



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

11.07.2013 14:42:05 607

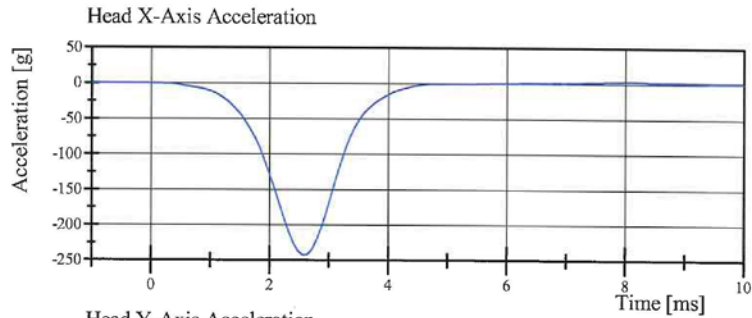


# Transportation Research Center Inc.

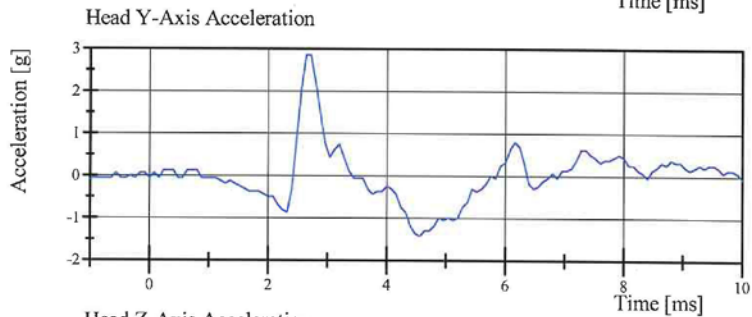
Front Head Drop

HIII 5th Serial No. 426 Certification No. 22-1

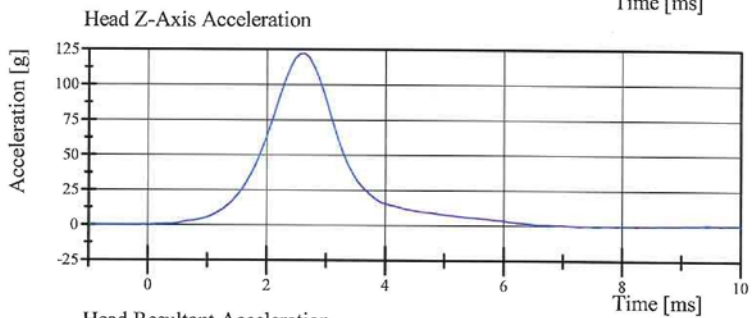
Test Date: 11/7/2013



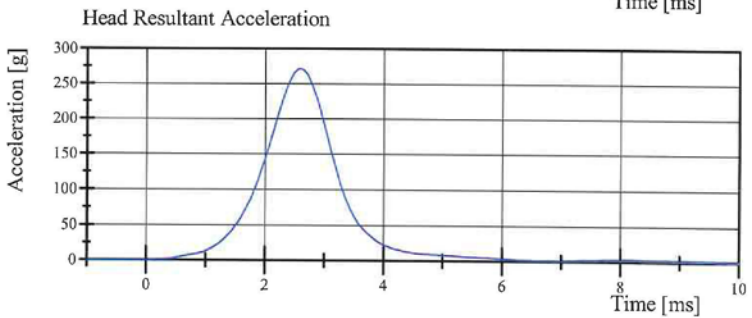
Filter Class: CFC\_1000  
Max: 2.6 g at 8.1 ms  
Min: -242.7 g at 2.6 ms



Filter Class: CFC\_1000  
Max: 2.9 g at 2.6 ms  
Min: -1.4 g at 4.6 ms



Filter Class: CFC\_1000  
Max: 122.2 g at 2.6 ms  
Min: -0.7 g at 7.3 ms



Filter Class: CFC\_1000  
Max: 271.5 g at 2.6 ms  
Min: 0.1 g at -0.3 ms

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

11.07.2013 14:42:15 607



# Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 22-1

Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.031 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.43 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.83 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.76 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-79.1 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	71.9 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	86.6 ms	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.07.2013 11:32:27 1701

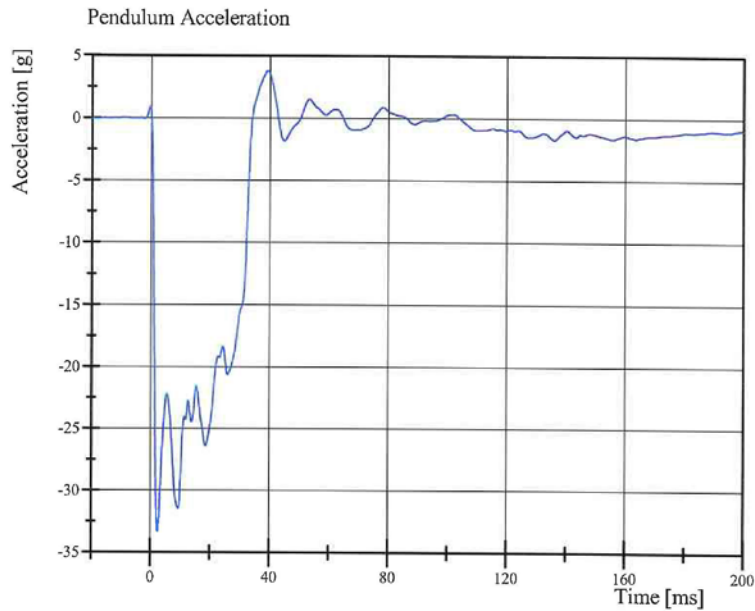


# Transportation Research Center Inc.

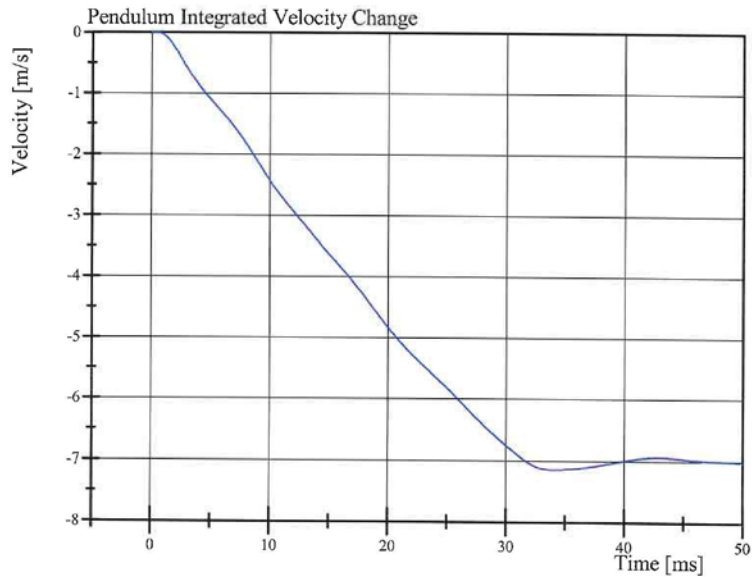
Neck Flexion

HIII 5th Serial No. 426 Certification No. 22-1

Test Date: 11/7/2013



Filter Class: CFC\_180  
Max: 3.8 g at 39.3 ms  
Min: -33.3 g at 2.5 ms



Filter Class: CFC\_180  
Max: 0.0 m/s at 0.1 ms  
Min: -7.1 m/s at 34.1 ms

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

11.07.2013 11:32:39 1701



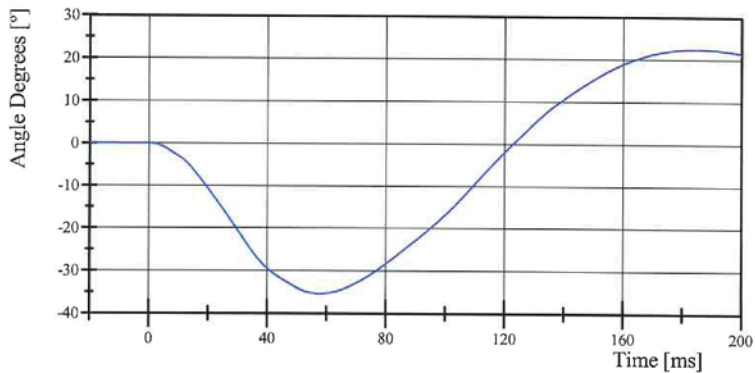
# Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 22-1

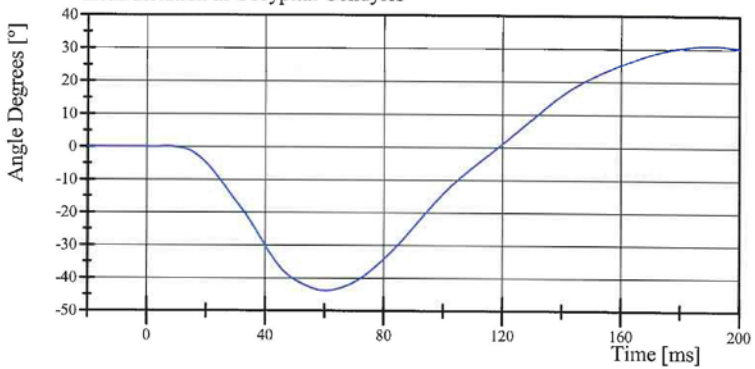
Test Date: 11/7/2013

Pot Rotation at the Base of Neck



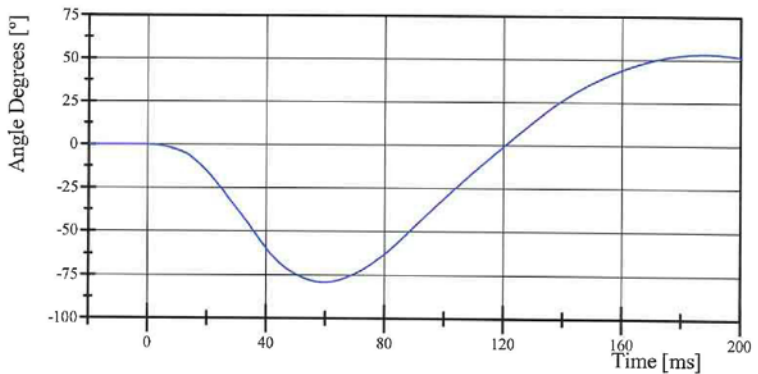
Filter Class: CFC\_60  
Max: 22.3 ° at 184.0 ms  
Min: -35.4 ° at 57.7 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 30.9 ° at 190.2 ms  
Min: -43.9 ° at 60.4 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60  
Max: 53.1 ° at 187.9 ms  
Min: -79.1 ° at 59.5 ms

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

11.07.2013 11:32:40 1701

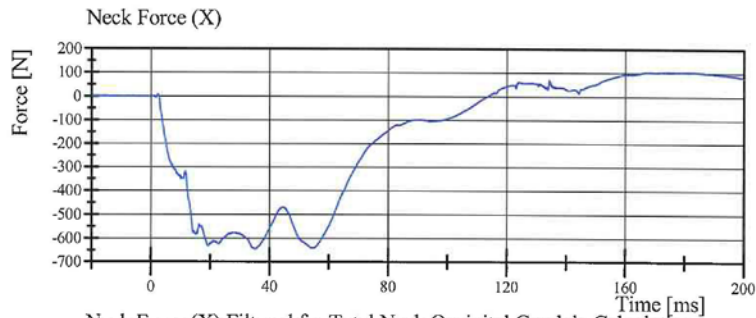


# Transportation Research Center Inc.

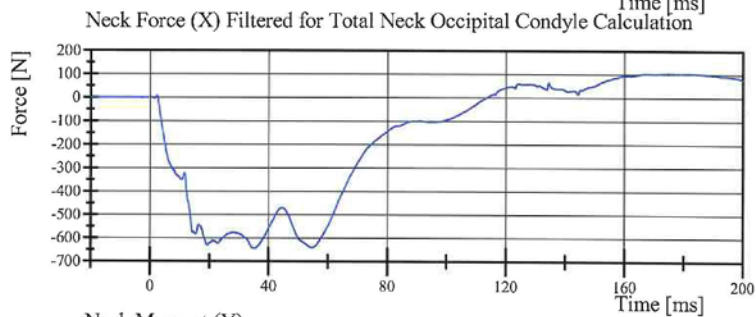
Neck Flexion

HIII 5th Serial No. 426 Certification No. 22-1

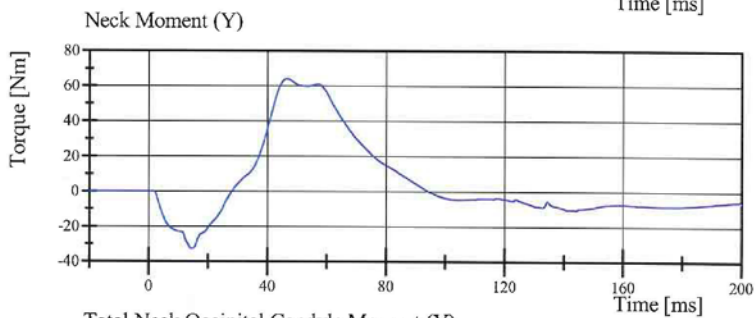
Test Date: 11/7/2013



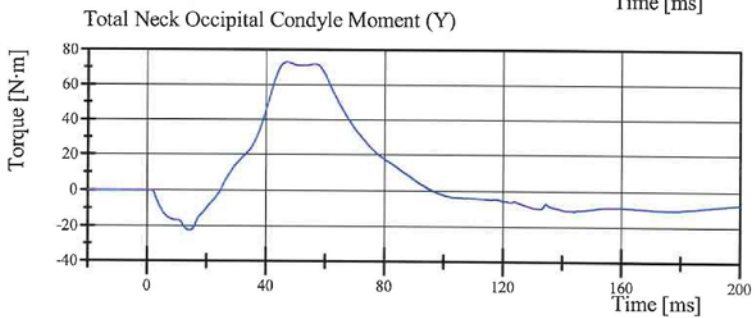
Filter Class: CFC\_1000  
Max: 104.6 N at 175.0 ms  
Min: -646.1 N at 35.3 ms



Filter Class: CFC\_600  
Max: 103.9 N at 174.9 ms  
Min: -645.9 N at 35.3 ms



Filter Class: CFC\_600  
Max: 64.0 Nm at 46.6 ms  
Min: -32.7 Nm at 14.3 ms



Filter Class: Without\_(Constai  
Max: 73.1 N·m at 47.1 ms  
Min: -22.6 N·m at 14.2 ms

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

11.07.2013 11:32:41 1701



## Transportation Research Center Inc.

Neck Extension


IIII 5th Serial No. 426 Certification No. 22-1

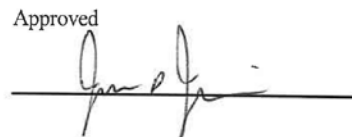
Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.142 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.90 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.63 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.24 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	105.8 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-55.8 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	104.0 ms	Yes

**Test meets specifications.**

**Comments:**

Technician  


Approved  


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

11.07.2013 12:45:33 1824



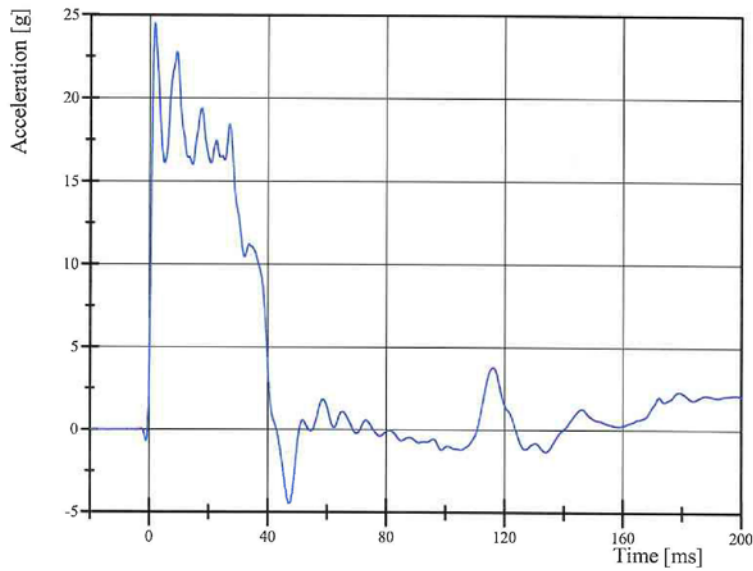
# Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 22-1

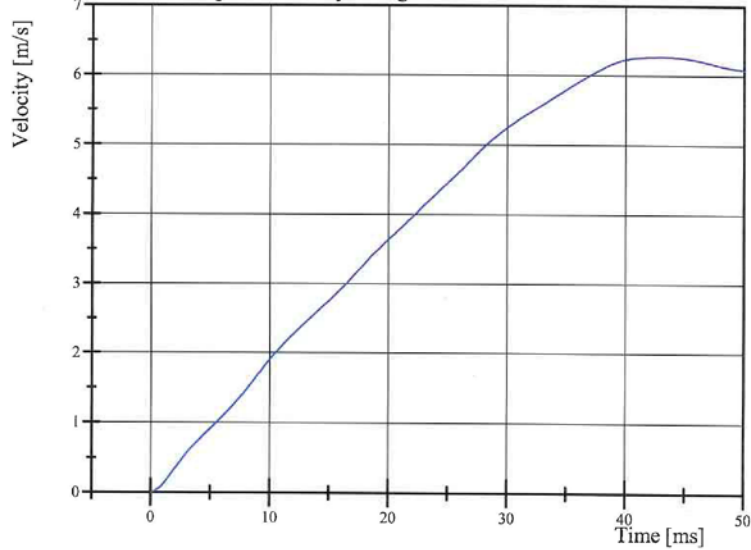
Test Date: 11/7/2013

Pendulum Acceleration



Filter Class: CFC\_180  
Max: 24.5 g at 1.8 ms  
Min: -4.5 g at 47.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC\_180  
Max: 6.3 m/s at 43.0 ms  
Min: 0.0 m/s at 0.0 ms

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

11.07.2013 12:45:42 1824



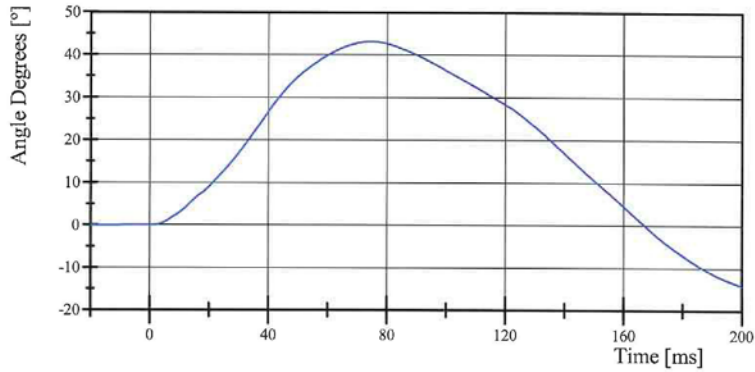
# Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 22-1

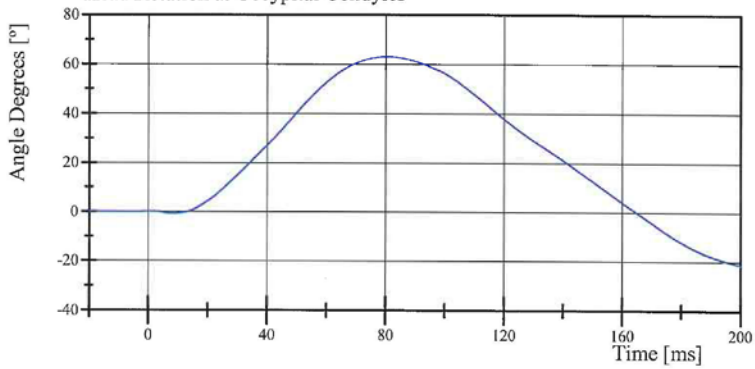
Test Date: 11/7/2013

Pot Rotation at the Base of Neck



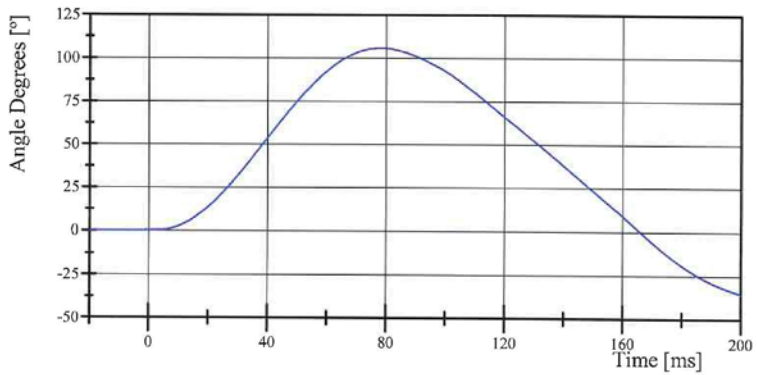
Filter Class: CFC\_60  
Max: 43.1 ° at 74.5 ms  
Min: -14.2 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 63.1 ° at 80.4 ms  
Min: -21.4 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60  
Max: 105.8 ° at 78.5 ms  
Min: -35.6 ° at 200.0 ms

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

11.07.2013 12:45:42 1824

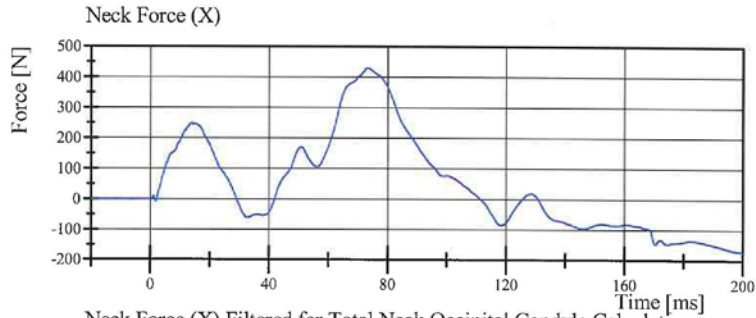


# Transportation Research Center Inc.

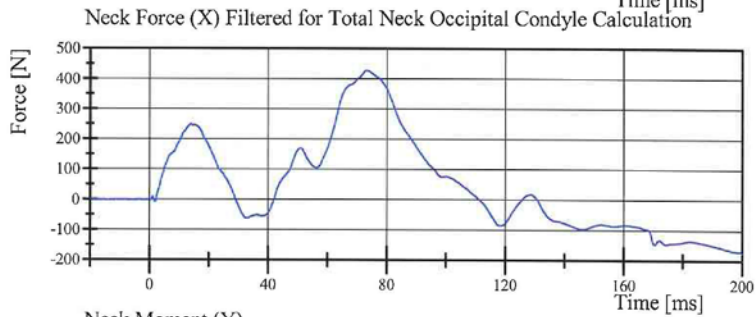
Neck Extension

HIII 5th Serial No. 426 Certification No. 22-1

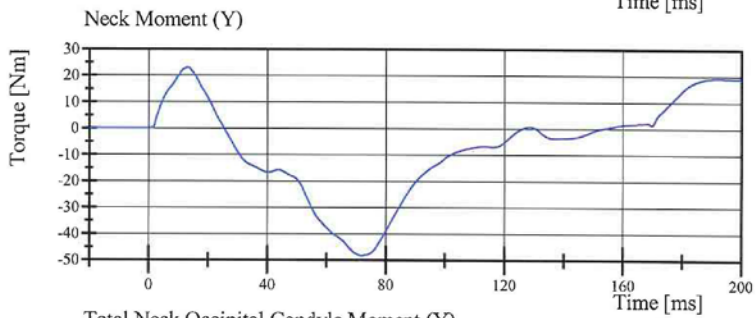
Test Date: 11/7/2013



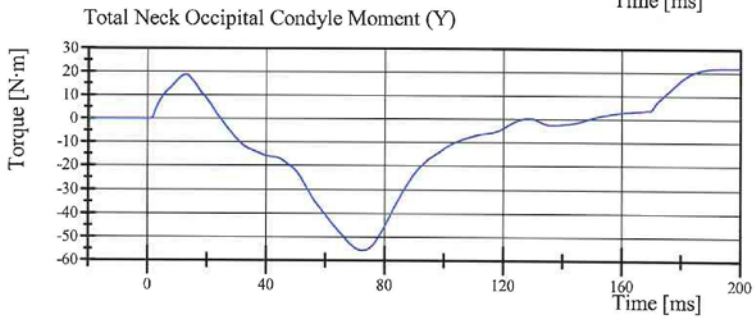
Filter Class: CFC\_1000  
Max: 428.2 N at 73.1 ms  
Min: -173.6 N at 199.8 ms



Filter Class: CFC\_600  
Max: 428.2 N at 73.2 ms  
Min: -172.9 N at 199.8 ms



Filter Class: CFC\_600  
Max: 23.0 Nm at 13.4 ms  
Min: -48.4 Nm at 71.9 ms



Filter Class: Without\_(Consta  
Max: 21.8 N·m at 195.9 ms  
Min: -55.8 N·m at 72.5 ms

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

11.07.2013 12:45:43 1824



# Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. 426 Certification No. 22-1

Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.596 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,377.7 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,398.0 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.7 mm	Yes
Internal Hysteresis	69 - 85 %	75.2 %	Yes

**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.07.2013 17:22:25 397

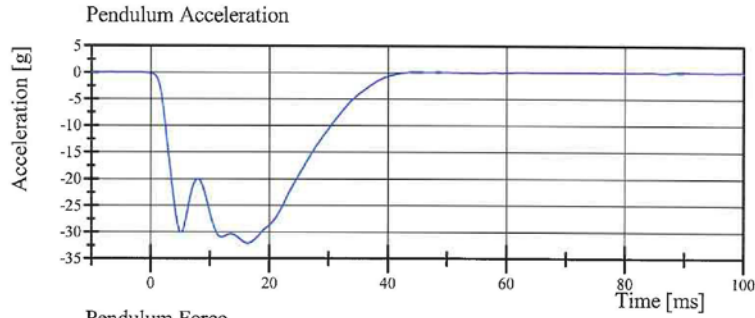


# Transportation Research Center Inc.

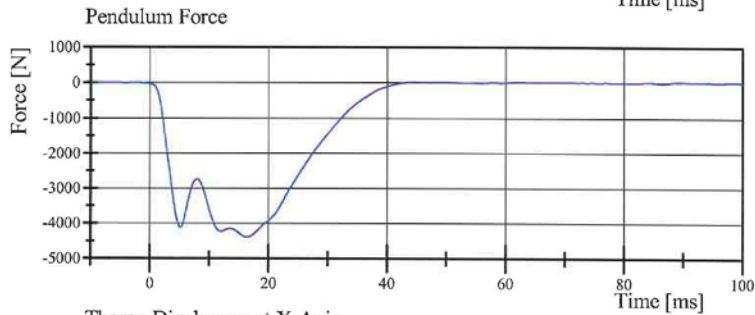
Front Thorax

IIII 5th Serial No. 426 Certification No. 22-1

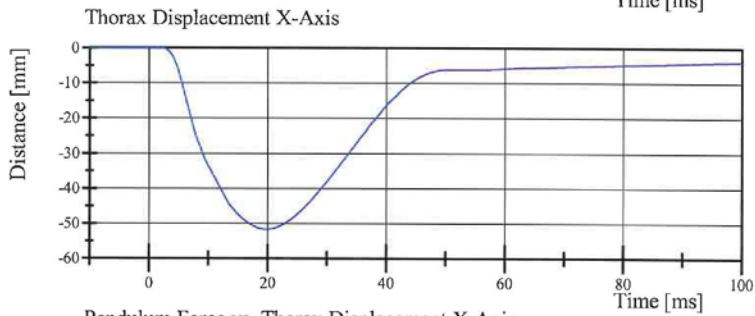
Test Date: 11/7/2013



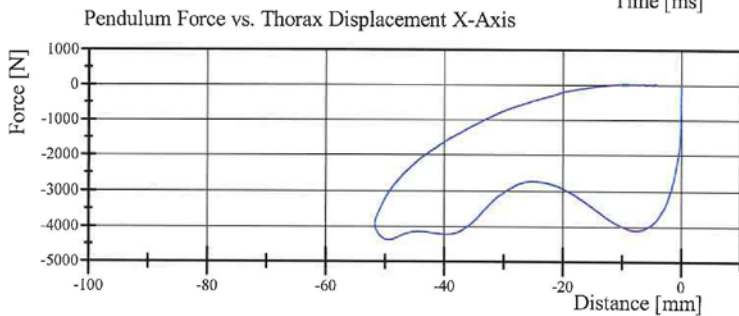
Filter Class: CFC\_180  
Max: 0.1 g at 44.3 ms  
Min: -32.1 g at 16.3 ms



Filter Class: CFC\_180  
Max: 17.0 N at 44.3 ms  
Min: -4,398.0 N at 16.3 ms



Filter Class: CFC\_600  
Max: 0.0 mm at -9.3 ms  
Min: -51.7 mm at 19.8 ms



Filter Class: CFC\_180  
Max: 17.0 N at -9.6 mm  
Min: -4,398.0 N at -49.3 mm

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

11.07.2013 17:22:41 397



# Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion



Serial Number: 426

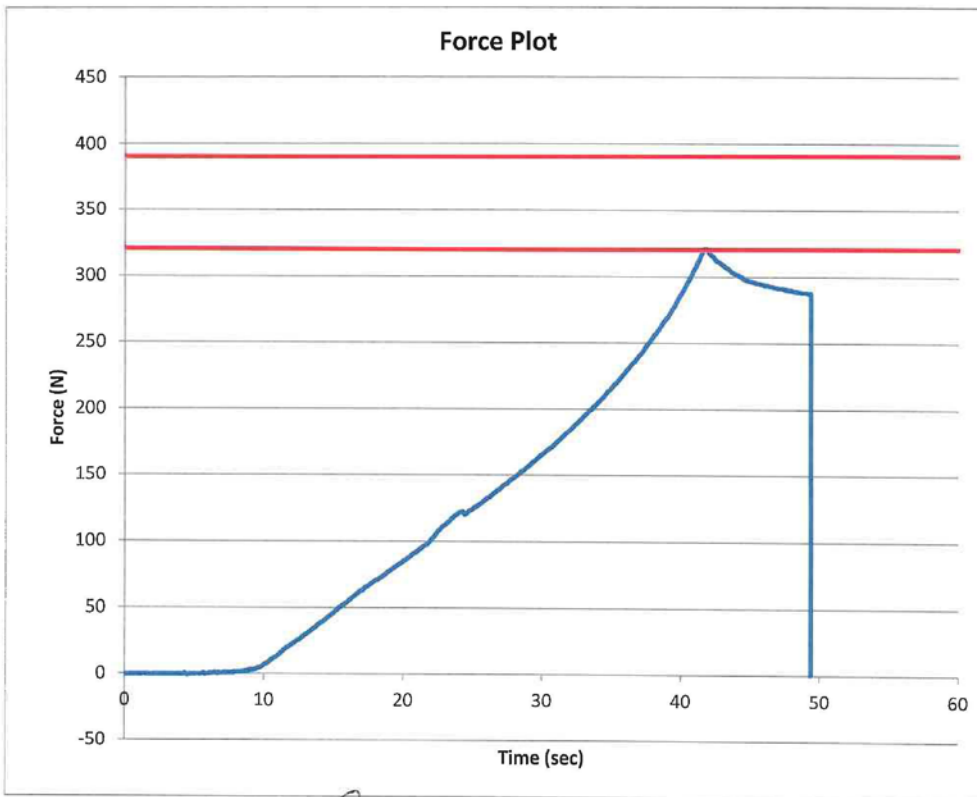
Date: 11/7/2013

Test Number: 1

Time: 10:29

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21 °C Pass
Humidity	10 - 70	38 % Pass
Average Angular Velocity	0.5 - 1.5	0.97 deg/sec Pass
Initial Angle	0 - 20	14.03 deg Pass
Peak Force at 45.19°	320 - 390	320.76 N Pass
Final Angle	-8 - 8	5.45 deg Pass



Technician

Approved

## Transportation Research Center Inc.

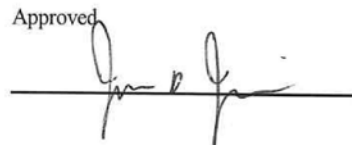
Left Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 22-1  
Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.095 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,701.6 N	Yes

**Test meets specifications.**

**Comments:**

Technician  
  
\_\_\_\_\_

Approved  
  
\_\_\_\_\_

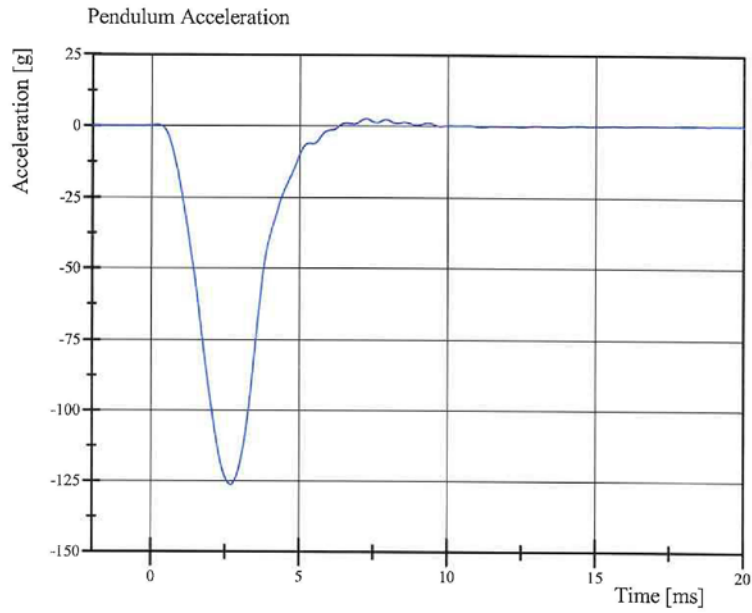
Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

11.07.2013 10:39:18 2215

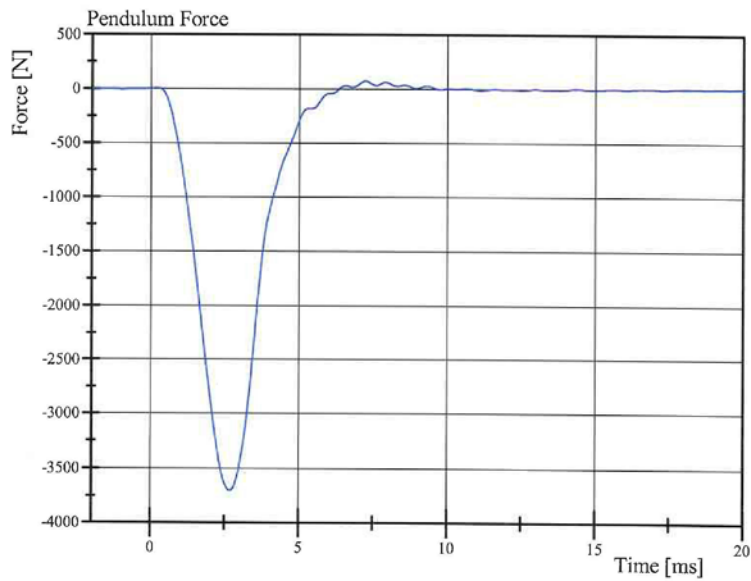


# Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 22-1  
Test Date: 11/7/2013



Filter Class: CFC\_600  
Max: 2.6 g at 7.2 ms  
Min: -126.2 g at 2.7 ms



Filter Class: CFC\_600  
Max: 74.8 N at 7.2 ms  
Min: -3,701.6 N at 2.7 ms

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

11.07.2013 10:39:28 2215



# Transportation Research Center Inc.


Right Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 22-1  
Test Date: 11/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.096 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,724.0 N	Yes

**Test meets specifications.**

**Comments:**

Technician   
\_\_\_\_\_

Approved   
\_\_\_\_\_

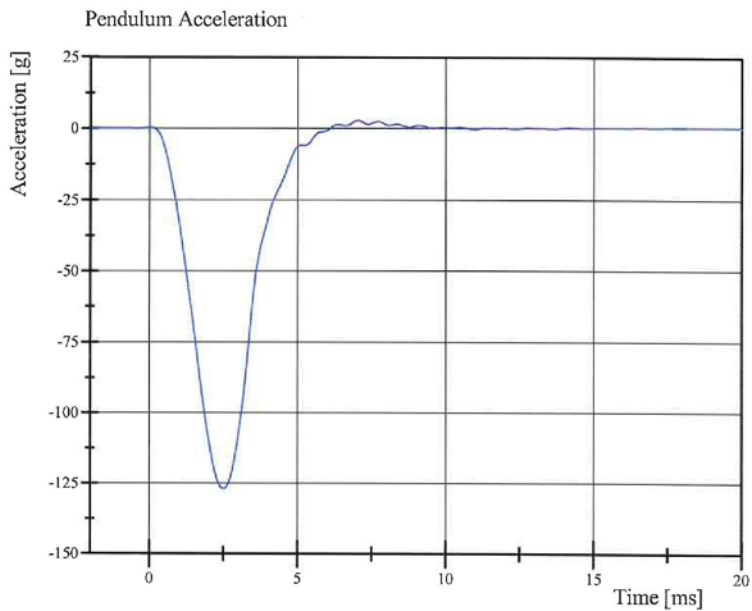
Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

11.07.2013 10:45:30 2218

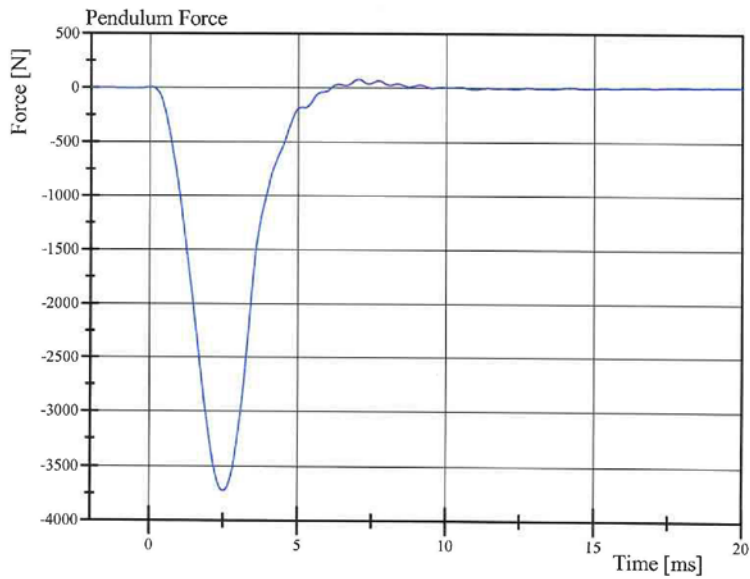


# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 22-1  
Test Date: 11/7/2013



Filter Class: CFC\_600  
Max: 2.7 g at 7.0 ms  
Min: -127.0 g at 2.5 ms



Filter Class: CFC\_600  
Max: 79.5 N at 7.0 ms  
Min: -3,724.0 N at 2.5 ms

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


11.07.2013 10:45:41 2218



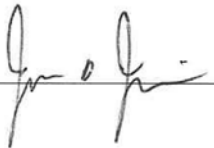
**Transportation Research Center Inc.**  
**5720 HIII 5th Dummy**  
**External Dimensions**  
**Serial No. 426 Calibration No. 22**

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	780	Yes
B	Shoulder Pivot Height	431.8 - 457.2	445	Yes
C	Hip Pivot Height	81.3 - 86.3	85	Yes
D	Hip Pivot from Backline	144.8 - 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	78	Yes
F	Thigh Clearance	119.4 - 134.6	127	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	249	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	283	Yes
J	Elbow Rest Height	182.8 - 203.2	193	Yes
K	Buttock Knee Length	520.7 - 546.1	533	Yes
L	Popliteal Height	355.6 - 376.0	368	Yes
M	Knee Pivot Height	393.7 - 419.1	411	Yes
N	Buttock Popliteal Length	414.0 - 439.4	436	Yes
O	Chest Depth without Jacket	175.3 - 190.5	183	Yes
P	Foot Length	218.5 - 233.7	222	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	140	Yes
T	Head Depth	177.8 - 188.0	182	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	359	Yes
W	Foot Breadth	78.8 - 94.0	83	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	866	Yes
Z	Waist Circumference	759.5 - 789.9	773	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	165	Yes

Technician



Approved



Revised 8/10/12



**Passenger S/N 426**  
**Post-Test Calibration Sheets**

## Transportation Research Center Inc.

Front Head Drop

HIII 5th Serial No. 426 Certification No. 23-3

Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	277.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	4.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

**Test meets specifications.**

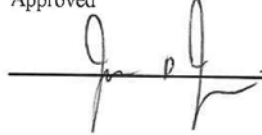
**Comments:**

Technician



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Approved



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

11.13.2013 14:02:04 605

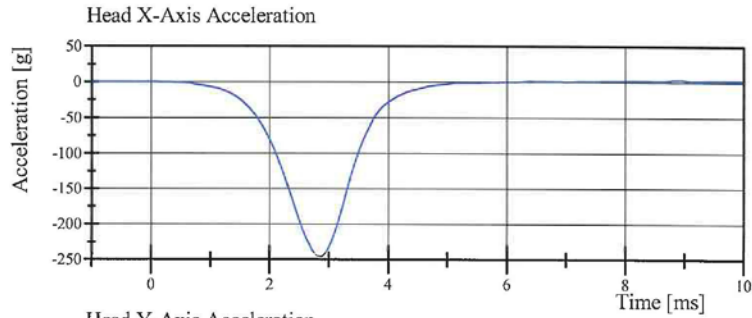


# Transportation Research Center Inc.

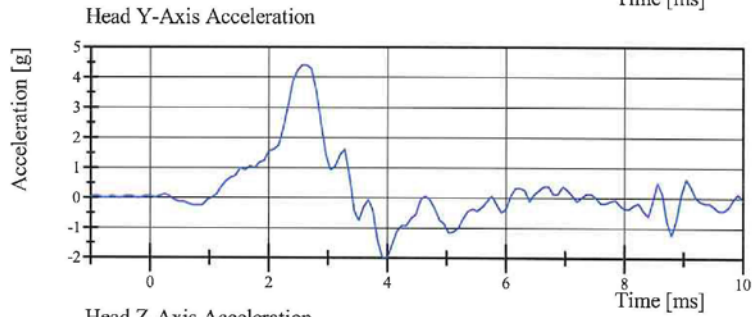
Front Head Drop

HIII 5th Serial No. 426 Certification No. 23-3

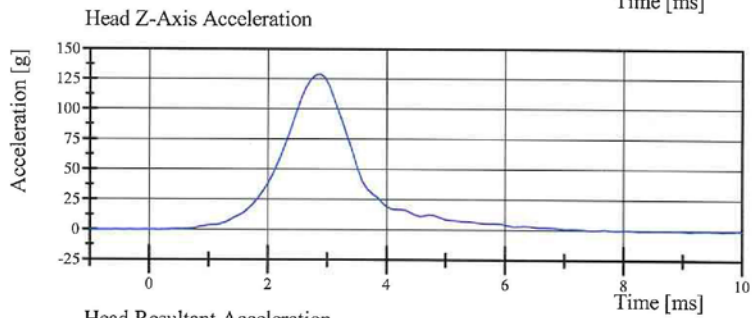
Test Date: 11/13/2013



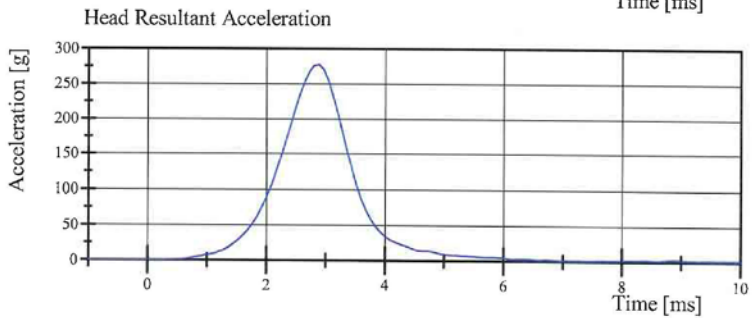
Filter Class: CFC\_1000  
Max: 2.4 g at 8.9 ms  
Min: -245.6 g at 2.9 ms



Filter Class: CFC\_1000  
Max: 4.4 g at 2.6 ms  
Min: -2.0 g at 3.9 ms



Filter Class: CFC\_1000  
Max: 129.1 g at 2.9 ms  
Min: -1.0 g at 9.1 ms



Filter Class: CFC\_1000  
Max: 277.5 g at 2.9 ms  
Min: 0.0 g at -0.8 ms

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

11.13.2013 14:02:14 605



## Transportation Research Center Inc.

Neck Flexion

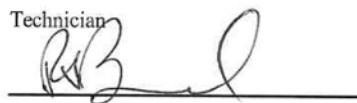
HIII 5th Serial No. 426 Certification No. 23-2

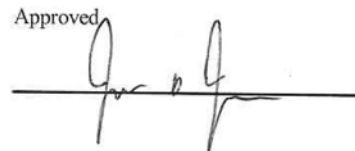
Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.023 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.46 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.83 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.82 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-79.8 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	73.2 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	85.3 ms	Yes

**Test meets specifications.**

**Comments:**

Technician  


Approved  


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

11.13.2013 10:26:06 1703

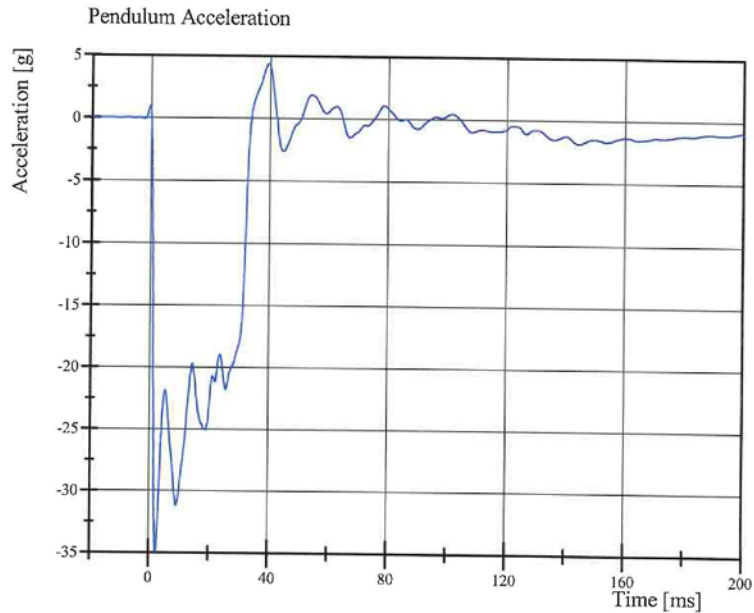


# Transportation Research Center Inc.

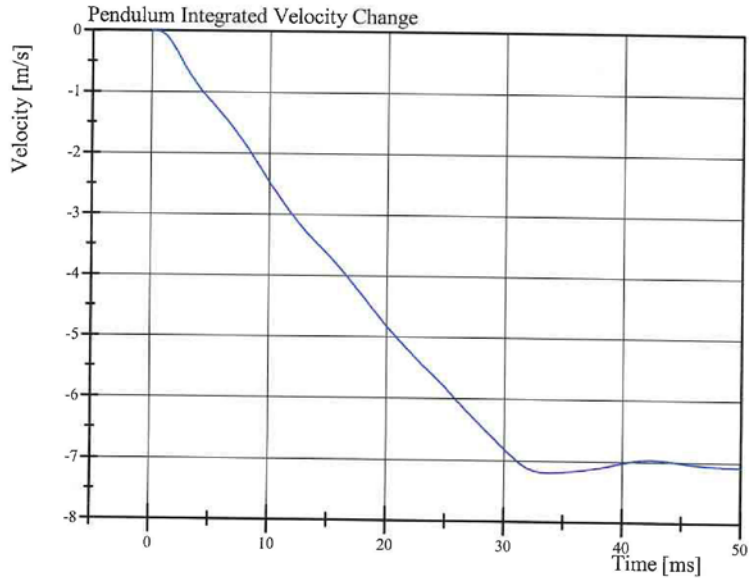
Neck Flexion

HIII 5th Serial No. 426 Certification No. 23-2

Test Date: 11/13/2013



Filter Class: CFC\_180  
Max: 4.4 g at 39.5 ms  
Min: -34.9 g at 2.4 ms



Filter Class: CFC\_180  
Max: 0.0 m/s at 0.1 ms  
Min: -7.2 m/s at 33.8 ms

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

11.13.2013 10:26:23 1703



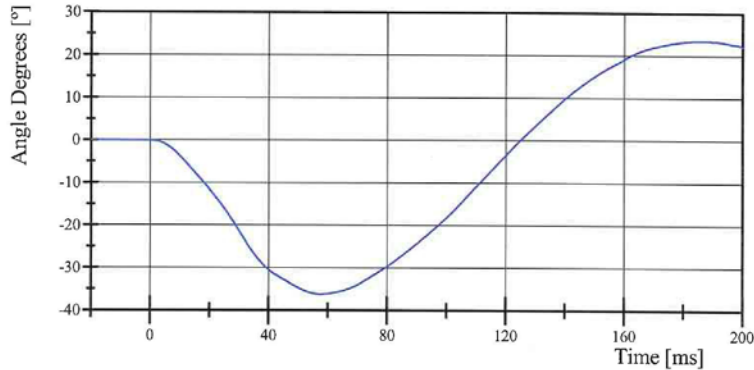
# Transportation Research Center Inc.

Neck Flexion

HIII 5th Serial No. 426 Certification No. 23-2

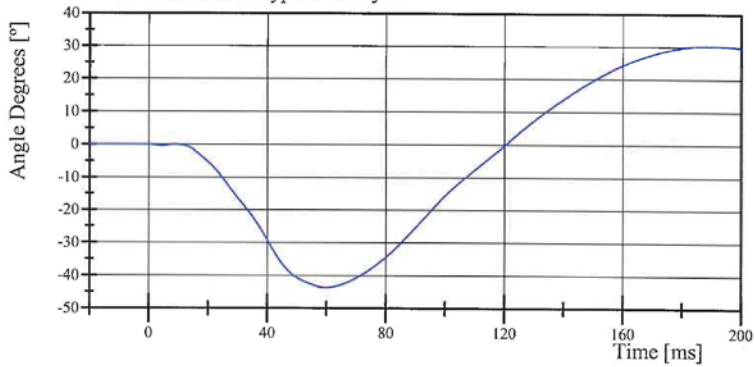
Test Date: 11/13/2013

Pot Rotation at the Base of Neck



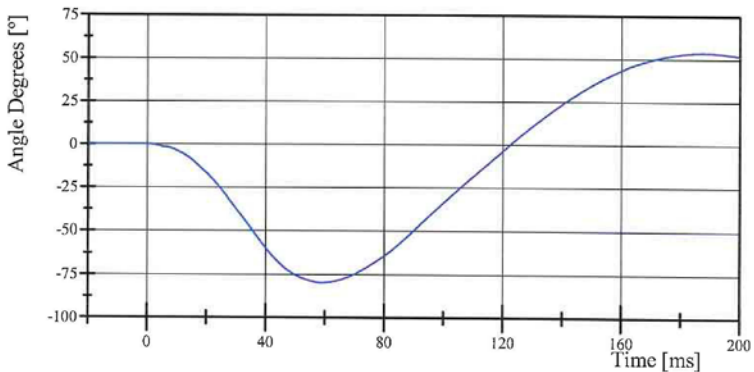
Filter Class: CFC\_60  
Max: 23.4 ° at 185.6 ms  
Min: -36.2 ° at 57.6 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 30.2 ° at 188.3 ms  
Min: -43.6 ° at 59.8 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60  
Max: 53.5 ° at 187.4 ms  
Min: -79.8 ° at 59.1 ms

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

11.13.2013 10:26:24 1703

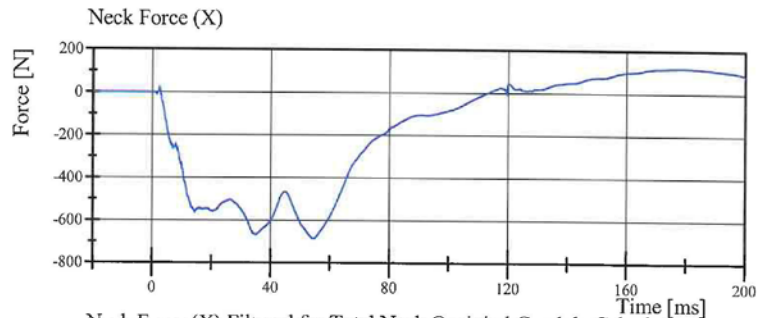


# Transportation Research Center Inc.

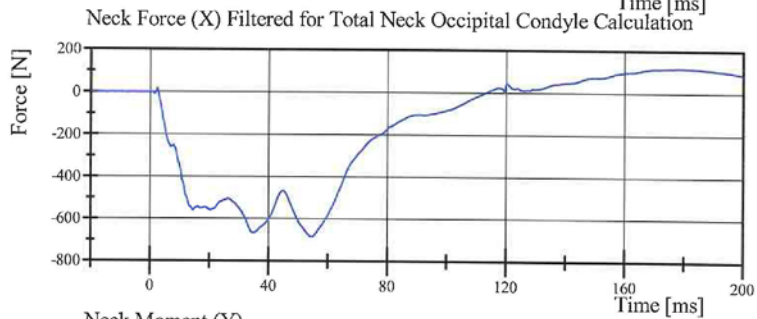
Neck Flexion

HIII 5th Serial No. 426 Certification No. 23-2

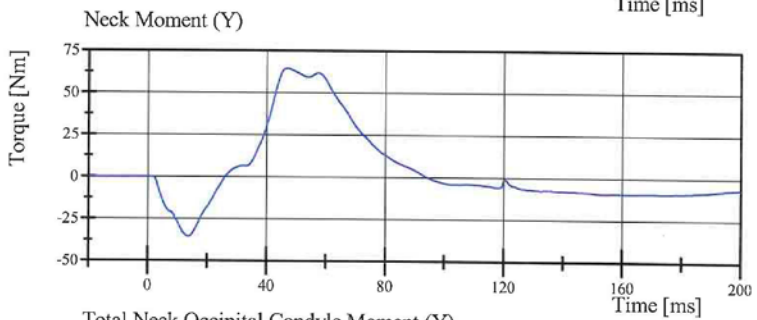
Test Date: 11/13/2013



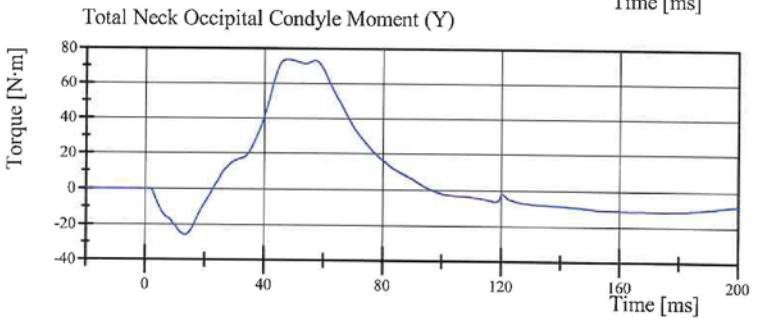
Filter Class: CFC\_1000  
Max: 118.3 N at 178.7 ms  
Min: -685.4 N at 54.4 ms



Filter Class: CFC\_600  
Max: 118.0 N at 178.9 ms  
Min: -685.1 N at 54.5 ms



Filter Class: CFC\_600  
Max: 64.6 Nm at 46.8 ms  
Min: -35.4 Nm at 13.4 ms



Filter Class: Without\_(Consta  
Max: 73.9 N·m at 47.7 ms  
Min: -25.8 N·m at 13.4 ms

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

11.13.2013 10:26:25 1703



## Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 23-1

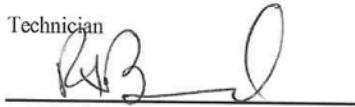
Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.125 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.88 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.76 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.39 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	107.8 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-60.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	101.4 ms	Yes

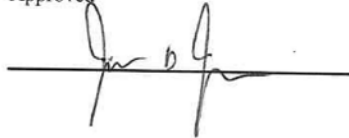
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.13.2013 10:58:27 1818

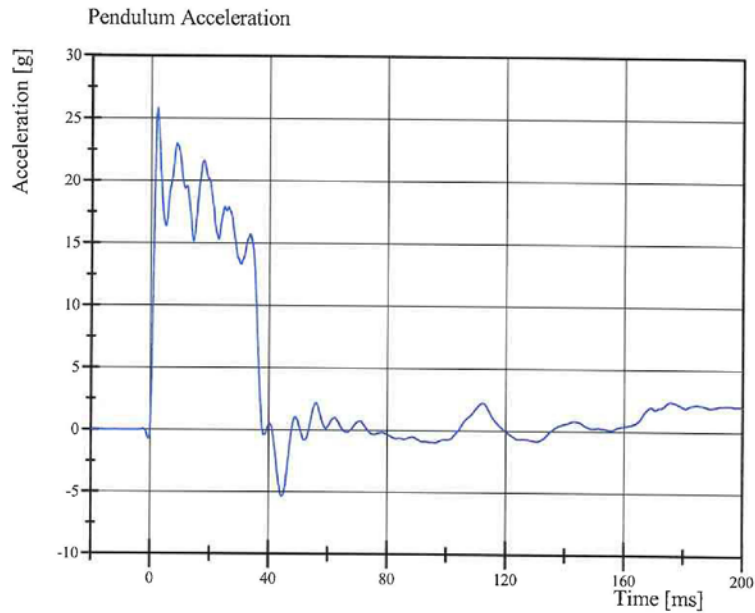


# Transportation Research Center Inc.

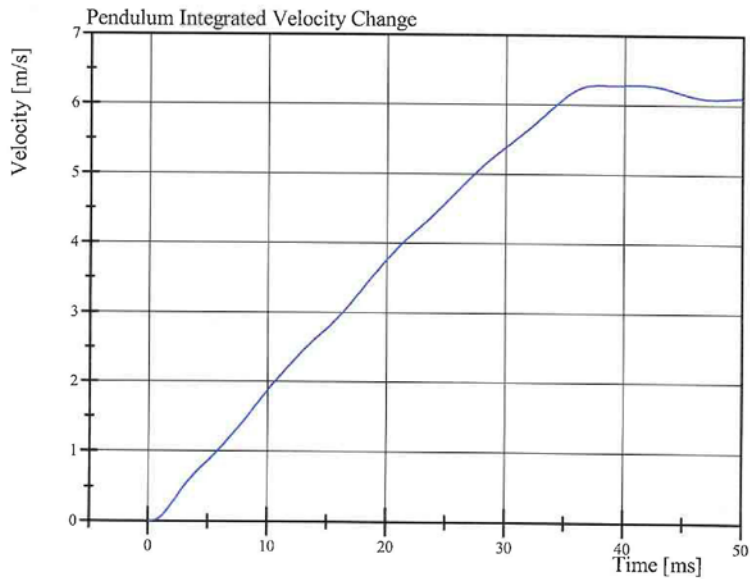
Neck Extension

HIII 5th Serial No. 426 Certification No. 23-1

Test Date: 11/13/2013



Filter Class: CFC\_180  
Max: 25.8 g at 2.2 ms  
Min: -5.4 g at 44.5 ms



Filter Class: CFC\_180  
Max: 6.3 m/s at 41.2 ms  
Min: 0.0 m/s at 0.0 ms

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

11.13.2013 10:58:35 1818



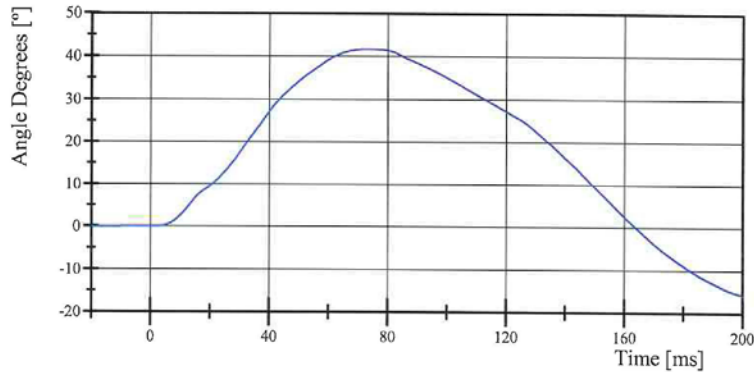
# Transportation Research Center Inc.

Neck Extension

HIII 5th Serial No. 426 Certification No. 23-1

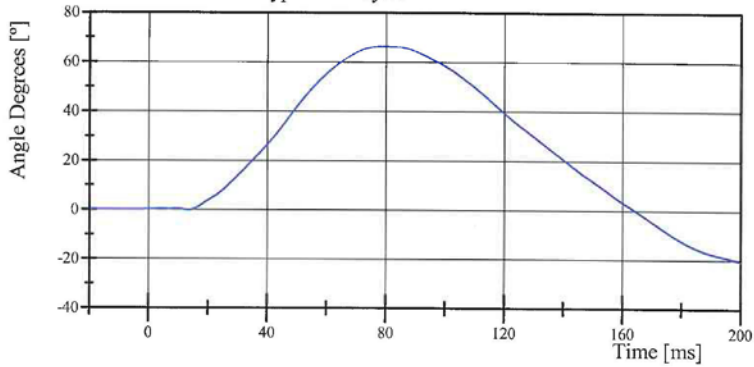
Test Date: 11/13/2013

Pot Rotation at the Base of Neck



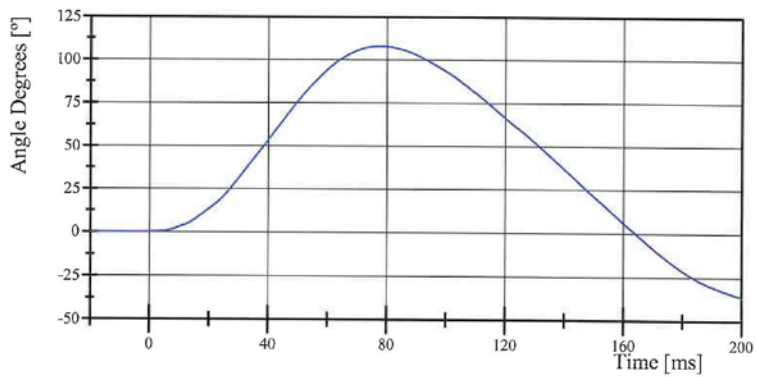
Filter Class: CFC\_60  
Max: 41.6 ° at 72.8 ms  
Min: -15.8 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC\_60  
Max: 66.4 ° at 79.1 ms  
Min: -20.6 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC\_60  
Max: 107.8 ° at 77.8 ms  
Min: -36.4 ° at 200.0 ms

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

11.13.2013 10:58:35 1818

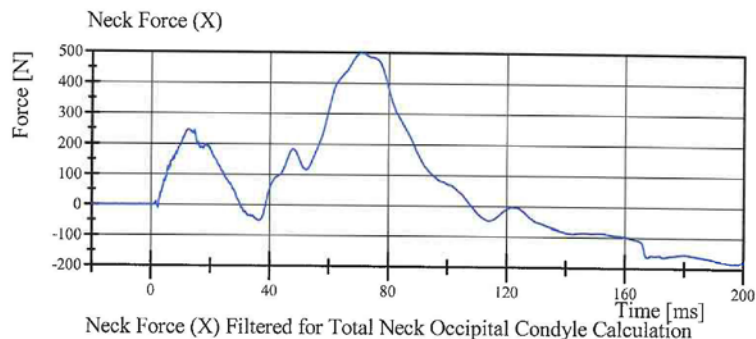


# Transportation Research Center Inc.

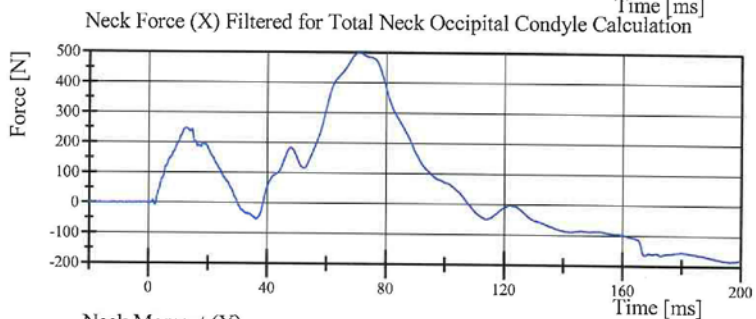
Neck Extension

HIII 5th Serial No. 426 Certification No. 23-1

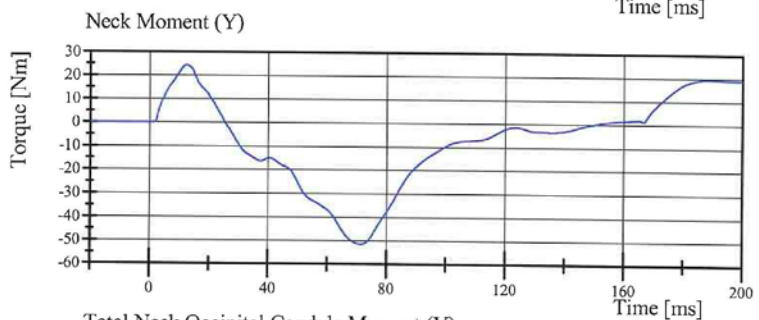
Test Date: 11/13/2013



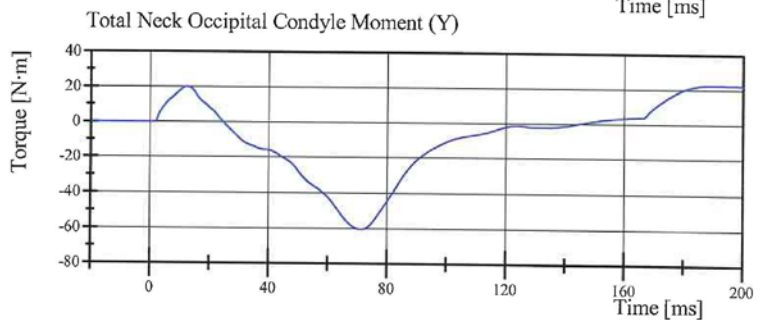
Filter Class: CFC\_1000  
Max: 499.5 N at 70.5 ms  
Min: -184.7 N at 195.8 ms



Filter Class: CFC\_600  
Max: 499.3 N at 70.7 ms  
Min: -184.4 N at 196.5 ms



Filter Class: CFC\_600  
Max: 24.5 Nm at 12.4 ms  
Min: -51.5 Nm at 71.3 ms



Filter Class: Without\_(Consta  
Max: 22.5 N·m at 189.2 ms  
Min: -60.4 N·m at 71.3 ms

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

11.13.2013 10:58:36 1818



## Transportation Research Center Inc.

Front Thorax

HIII 5th Serial No. 426 Certification No. 23-6

Test Date: 11/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	26 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.590 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,374.5 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,473.5 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-50.8 mm	Yes
Internal Hysteresis	69 - 85 %	75.1 %	Yes

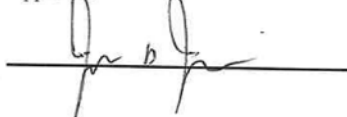
**Test meets specifications.**

**Comments:**

Technician



Approved



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

11.14.2013 06:55:29 426

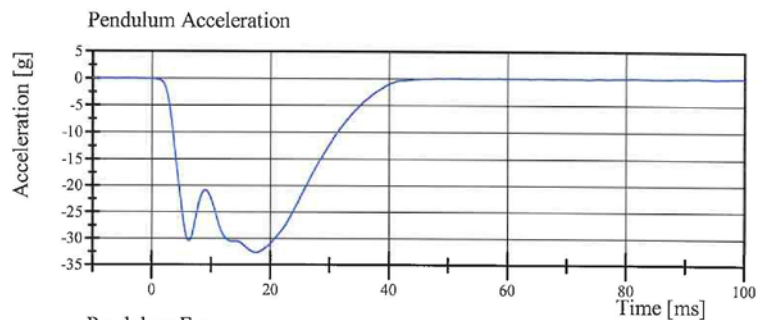


# Transportation Research Center Inc.

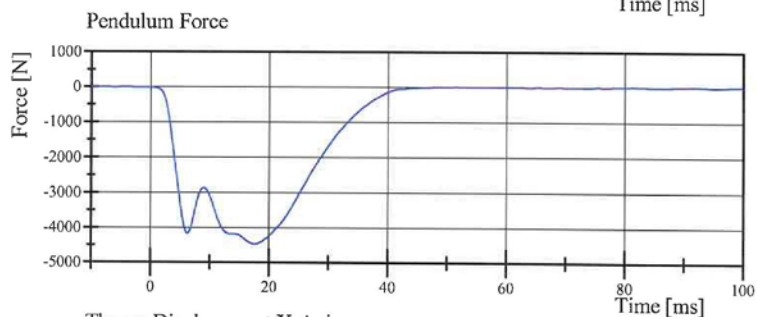
Front Thorax

HIII 5th Serial No. 426 Certification No. 23-6

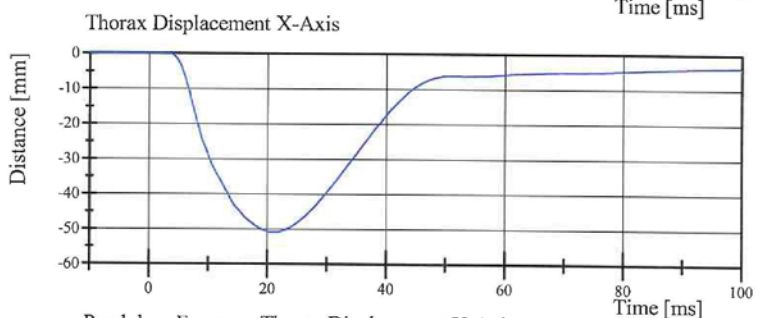
Test Date: 11/14/2013



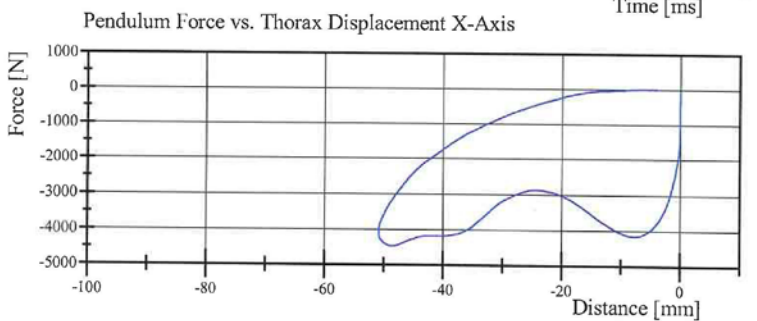
Filter Class: CFC\_180  
Max: 0.1 g at 91.7 ms  
Min: -32.7 g at 17.6 ms



Filter Class: CFC\_180  
Max: 10.0 N at 91.7 ms  
Min: -4,473.5 N at 17.6 ms



Filter Class: CFC\_600  
Max: 0.0 mm at -5.6 ms  
Min: -50.8 mm at 20.6 ms



Filter Class: CFC\_180  
Max: 10.0 N at -4.2 mm  
Min: -4,473.5 N at -48.6 mm

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

11.14.2013 06:55:39 426



# Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion



Serial Number: 426

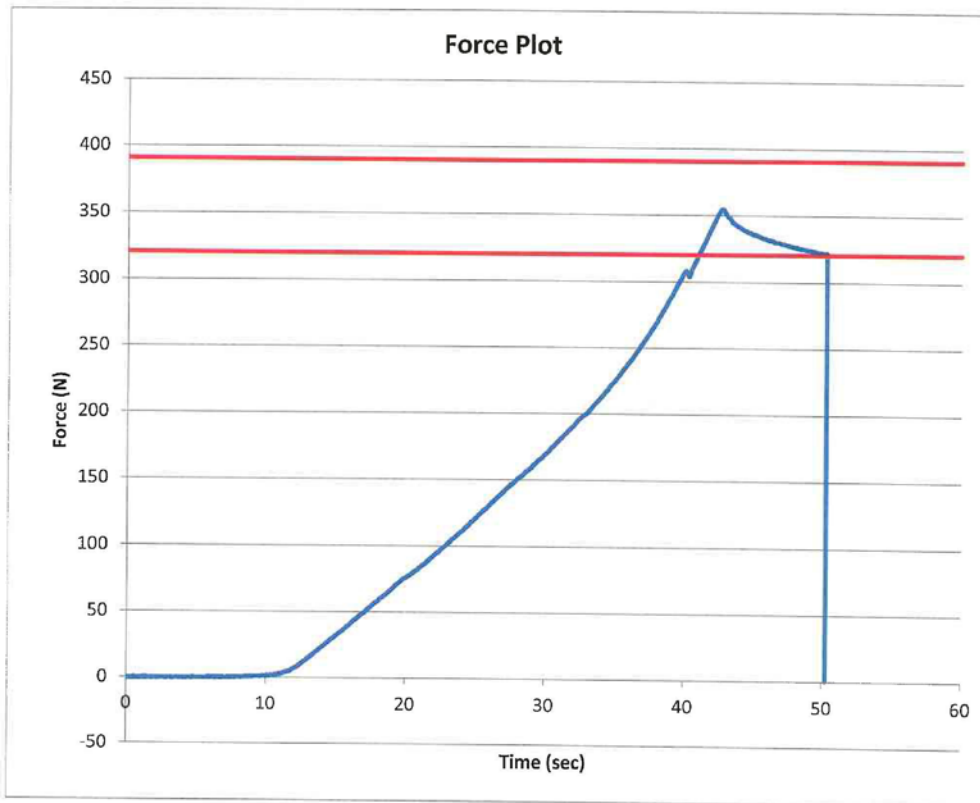
Date: 11/13/2013

Test Number: 1

Time: 16:21

Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.6 °C Pass
Humidity	10 - 70	38 % Pass
Average Angular Velocity	0.5 - 1.5	0.92 deg/sec Pass
Initial Angle	0 - 20	15.99 deg Pass
Peak Force at 45.26°	320 - 390	354.69 N Pass
Final Angle	-8 - 8	5.67 deg Pass



Technician

Approved

## Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 23-1  
Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.118 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,860.6 N	Yes

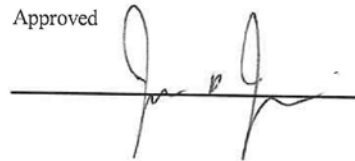
Test meets specifications.

Comments:

Technician



Approved



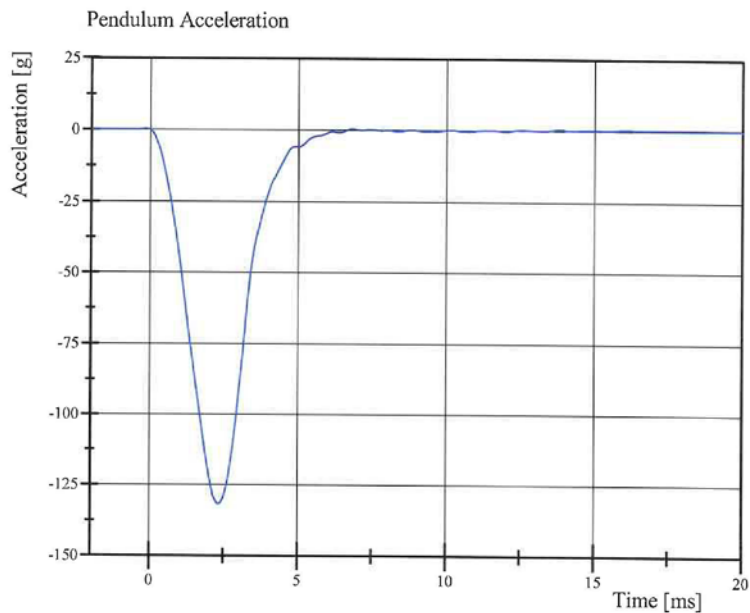
Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

11.13.2013 08:13:59 1770

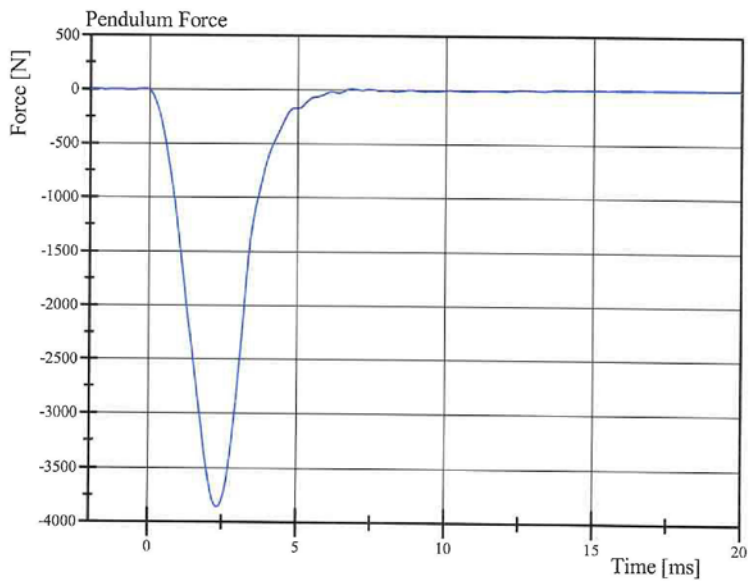


# Transportation Research Center Inc.

Left Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 23-1  
Test Date: 11/13/2013



Filter Class: CFC\_600  
Max: 0.4 g at 6.8 ms  
Min: -131.7 g at 2.3 ms



Filter Class: CFC\_600  
Max: 12.0 N at 6.8 ms  
Min: -3,860.6 N at 2.3 ms

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

11.13.2013 08:14:25 1770



## Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 23-1  
Test Date: 11/13/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.123 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,755.1 N	Yes


**Test meets specifications.**

**Comments:**

Technician



Approved



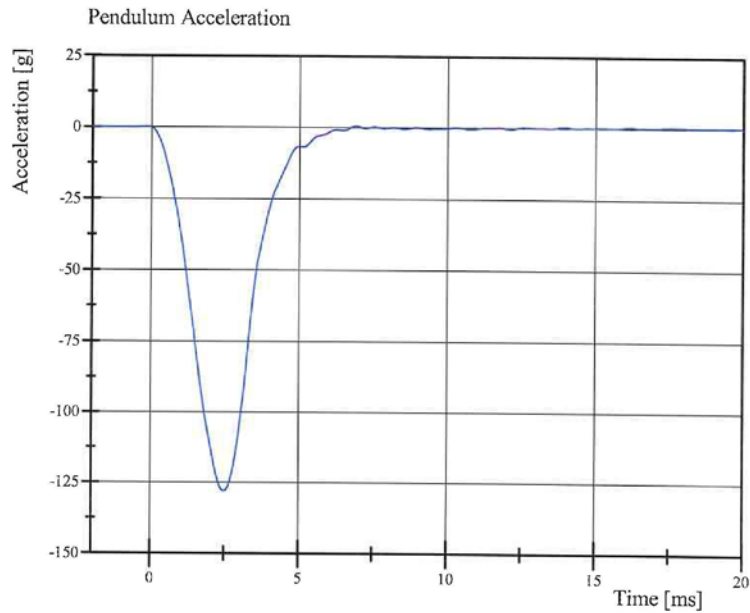
Specification Source: CFR49 Part 572 Subpart O  
with Polarity in accordance with J211

11.13.2013 08:24:14 1765

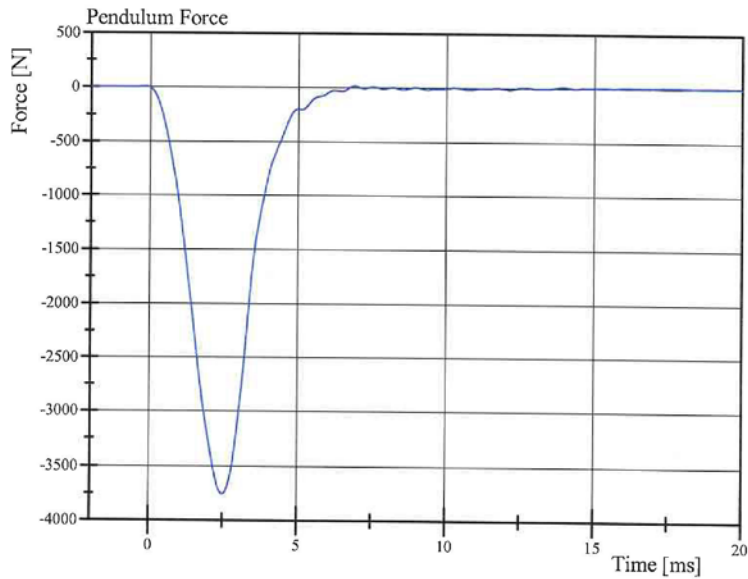


# Transportation Research Center Inc.

Right Knee Femur Response Test  
HIII 5th Serial No. 426 Certification No. 23-1  
Test Date: 11/13/2013



Filter Class: CFC\_600  
Max: 0.6 g at 6.9 ms  
Min: -128.1 g at 2.5 ms



Filter Class: CFC\_600  
Max: 17.1 N at 6.9 ms  
Min: -3,755.1 N at 2.5 ms

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

11.13.2013 08:24:32 1765



**Transportation Research Center Inc.**  
**5720 HIII 5th Dummy**  
**External Dimensions**  
**Serial No. 426 Calibration No. 23**

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	780	Yes
B	Shoulder Pivot Height	431.8 - 457.2	445	Yes
C	Hip Pivot Height	81.3 - 86.3	85	Yes
D	Hip Pivot from Backline	144.8 - 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	78	Yes
F	Thigh Clearance	119.4 - 134.6	129	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	250	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	283	Yes
J	Elbow Rest Height	182.8 - 203.2	194	Yes
K	Buttock Knee Length	520.7 - 546.1	533	Yes
L	Popliteal Height	355.6 - 376.0	368	Yes
M	Knee Pivot Height	393.7 - 419.1	411	Yes
N	Buttock Popliteal Length	414.0 - 439.4	436	Yes
O	Chest Depth without Jacket	175.3 - 190.5	183	Yes
P	Foot Length	218.5 - 233.7	222	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	140	Yes
T	Head Depth	177.8 - 188.0	182	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	359	Yes
W	Foot Breadth	78.8 - 94.0	83	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	866	Yes
Z	Waist Circumference	759.5 - 789.9	773	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	165	Yes

Technician



Approved



Revised 8/10/12

