REPORT NUMBER: CAL-09-03

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

HONDA OF AMERICA MFG
2009 ACURA TL
4-DOOR SEDAN

NHTSA NUMBER: M95304

CALSPAN TEST NUMBER: 8865-NCAP-03

CALSPAN CORPORATION
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October 21, 2008

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
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9. Performing Organization Name and Address Calspan Corporation 4455 Genesee Street Buffalo, New York 14225		*10. Work Unit No.*
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15. Supplementary Notes

16. Abstract

A frontal load cell barrier test of a 2009 Acura TL 4-Door Sedan was performed at Calspan Corporation's crash test facility in Buffalo, New York, on October 21, 2008.

The impact velocity was 57.34 kph and the temperature at the barrier face was 22°C. The maximum post-test vehicle crush was 474 mm. The test vehicle was equipped with 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions.

With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements. The occupant injury criteria summary is as follows:

Measurement Description	**Units**	**Threshold**	**Driver (1046)**	**Passenger (1047)**
Head Injury Criteria (HIC - 36 ms)	-	1000	273.8	471.9
Maximum Thorax Acceleration (3 ms Clip)	g's	60 g's	42.4	40.8
Chest Displacement	mm	-76 mm	-28.4	-28.0
Left Femur Force	Newtons	-10000 N	-2086.0	-2509.9
Right Femur Force	Newtons	-10000 N	-412.3	-4041.6

17. Key Words 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)		*18. Distribution Statement* Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE Washington, DC 20590	
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 57.34 kph 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. DTNH22-06-D-00024. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 57.34 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

1.2 TEST PROCEDURE

This 57.34 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

One real-time camera and 14 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.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis triaxial 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's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 1046) and the right-front passenger (position 2) ATD (Serial No.1047) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 129 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. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2009 Acura TL 4-Door Sedan at a velocity of 57.34 kph. The test was performed at Calspan on October 21, 2008. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

ATD	HIC	T_1	T_2	Clip (g)	T_1	T_2	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver	273.8	53.5	89.5	42.4	62.6	65.6	-28.4	-2086.0	-412.3
Passenger	471.9	75.0	104.0	40.8	90.0	93.0	-28.0	-2509.9	-4041.6

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

TEST NOTES	
Data Channel	Anomalies
V1P1 Upper Neck Mz	Data Noise Spikes
V1P1 Pelvic X	Questionable data between 94 and 98 milliseconds
V1P1 Right Foot Aft X	Sensor failure after 66 milliseconds
V1P1 Right Foot Aft Z	Sensor failure after 65 milliseconds
V1 Engine Bottom X	Sensor Failure after 43 milliseconds
V1 Right Caliper X	Sensor failure after 44 milliseconds
V1 Left Caliper X	Questionable data between 44.8 and 45.8 milliseconds

SECTION 2
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
CRASH TEST SUMMARY

Vehicle NHTSA No.: M95304 Test Mode: 56.3 kph Frontal Barrier
Test Date: October 21, 2008 Time: 16:45 Temperature: 22 °C
Vehicle Make/Model/Body Style: 2009 Acura TL 4-Door Sedan
Vehicle Test Weight: 1869.0 kg Impact Velocity: 57.34 kph (55.5 – 57.1 kph)
Vehicle/Barrier Impact Angle: 0 ° Max Static Crush: 474 mm

ATD INFORMATION AND VISIBLE CONTACT POINTS

	DRIVER	PASSENGER
ATD Type:	Part 572E	Part 572E
Restraint System:	Seatbelt, Airbag, Knee Bolster	Seatbelt, Airbag, Knee Bolster
Head Contact:	Airbag, Back of head to head restraint	Airbag, Back of head to head restraint
Abdomen Contact:	None	None
Chest Contact:	Airbag	Airbag
Left Knee Contact:	Knee Bolster	Glove Box
Right Knee Contact:	Knee Bolster	Glove Box

DOOR OPENING, SEAT TRACK AND GLAZING INFORMATION

Description	Driver Side	Passenger Side
Door Lock Status	Unlocked	Unlocked
Front Door Opening	Closed / Operable without tools	Closed / Operable without tools
Rear Door Opening	Closed / Operable without tools	Closed / Operable without tools
Hatch/Other Door Opening	Closed / Operable without tools	
Front Seat Track Shift (mm)	0	0
Front Seat Back Failure	None	None
Glazing Damage	None	

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Left Side (mm)	Center (mm)	Right Side (mm)	Average (mm)
Value	738	701	664	701

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	850	845
Lap belt length as measured on ATD	mm	605	605
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems	mm	N/A	N/A

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2009 Acura TL 4-Door Sedan

NHTSA No. : M95304 ; VIN: 19UUA86209A001518 ; Color: Red

Engine Data: 6 cylinders; - CID; 3.5 Liters; - cc

Placement: X Longitudinal or In-Line; - Transverse or Lateral

Transmission Data: 5 speeds; - Manual; X Automatic; - Overdrive

Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive

AUTOMATIC DOOR LOCKS:

Is test vehicle equipped with Automatic Door Locks (ADLs)? X Yes; - No;

Does vehicle owner's manual describe how to deactivate ADLs? X Yes; - No; - N/A

DEALER AND DELIVERY INFORMATION:

Date Received: 10/7/08 ; Odometer Reading 11 km

Selling Dealer: MotorCars Acura

Dealer Address: Bedford, Ohio 44146

TEST VEHICLE OPTIONS:

X AC; X Power Steering; X Power Brakes; X Power Locks; X Power Seats

X ABS; X Tilt Wheel; X Stability Control - Traction Control X Anti-Theft

SAFETY BELT FEATURES:

Driver: X Pretensioner (Shoulder); X Load Limiter; X Adjustable Anchorage

Passenger: X Pretensioner (Shoulder); X Load Limiter; X Adjustable Anchorage

AIRBAG FEATURES:

Position	Frontal	Knee Bolster	Side Torso	Side Head/Torso Combination	Side Curtain
Driver:	X	-	X	-	X
Passenger:	X	-	X	-	X
Rear Passenger:	-	-	-	-	X

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Honda of America Mfg

Date of Manufacture 09/08

GVWR: 2130 kg; GAWR: 1165 kg FRONT; 975 kg REAR

VEHICLE CAPACITY DATA:

Type of Front Seats: - Bench; X Bucket; - Split Bench

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 385.0 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 44.8 kg

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	509.0	516.0	61.0	1025.0
Rear =	338.0	316.0	39.0	654.0
			Total Delivered Weight (UDW) =	1679.0

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	1679.0	kg
Rated Cargo/Luggage Weight (RCLW) =	44.8	kg
Weight of 2 p.572 Dummies @ 76 each =	152	kg
TARGET TEST WEIGHT =	1875.8	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 38.0 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	543.0	551.0	58.5	1094.0
Rear =	395.0	380.0	41.5	775.0
			Total Vehicle Test Weight (ATW) =	1869.0

Weight of Ballast Secured in Vehicle Trunk Area[1] = 22.7 kg

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

	Left Front	Right Front	Left Rear	Right Rear	CG[2]
AS DELIVERED:	720	724	719	723	1081.3
FULLY LOADED:	709	712	698	702	-
AS TESTED:	713	715	702	703	1150.3

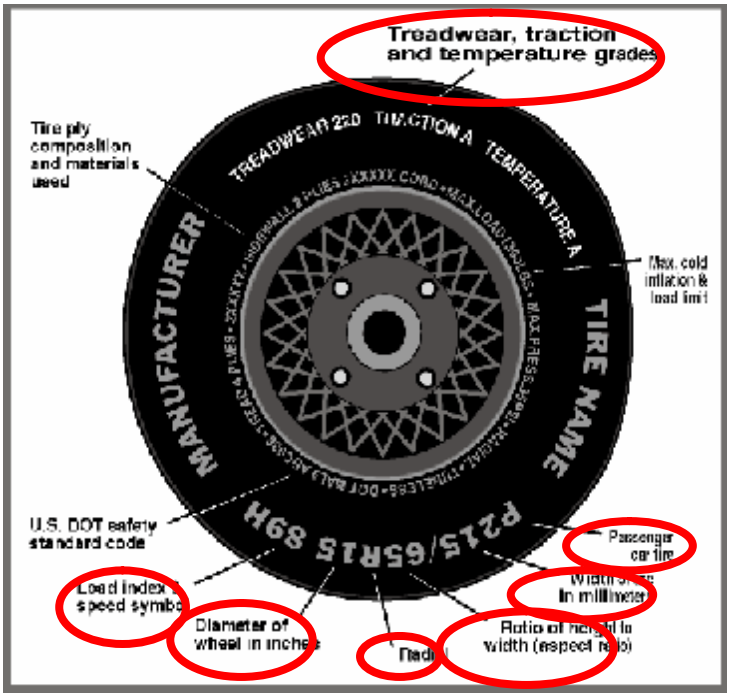
Vehicle's Wheel Base: 2774 mm

[1]Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system
[2]Rearward of the front axle centerline.

DATA SHEET NO. 3
TEST VEHICLE TIRE INFORMATION

Vehicle Year/Make/Model/Body Style: 2009 Acura TL 4-Door Sedan

NHTSA Test No.: M95304 Test Date: October 21, 2008



Measured Parameter	Front	Rear
Maximum Tire Pressure (from sidewall - kPa)	350	350
Cold Pressure (from tire placard - kPa)*	220	220
Recommended Tire Size (from tire placard)	P245/50R17	P245/50R17
Tire size on Vehicle	P245/50R17 98V	P245/50R17 98V
Tire Manufacturer	Bridgestone	Bridgestone
Tire Name	Turanza	Turanza
Tire Type	Passenger	Passenger
Tire Width (mm)	245	245
Ratio of Height to Width (aspect ratio)	50	50
Radial	Yes	Yes
Wheel Diameter	17	17
Load Index & Speed Symbol	98V	98V
Treadwear	260	260
Traction Grade	A	A
Temperature Grade	A	A

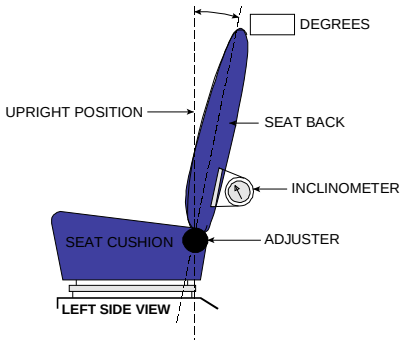
*Tire pressure used for test

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2009 Vehicle Model: Acura TL Body Style : 4-Door Sedan

1. NOMINAL DESIGN RIDING POSITION:
for adjustable driver and passenger seat backs. 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.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat: 10.3*

Measurement instructions: Sunvisor post to head restraint post = 630 mm

* Measured from head restraint post

Seat back angle for passenger's seat: 11.8*

Measurement instructions: Sunvisor post to head restraint post = 613 mm

* Measured from head restraint post

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: Seat was placed in mid-position (148 mm) from a total travel of 296 mm.

Positioning of the passenger's seat: Seat was placed in mid-position (139 mm) from a total travel of 278 mm.

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 70.0 liters

B. "Usable Capacity" of the optional equipment fuel tank is - liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 64.4 to 65.8 liters

3.2 Actual Amount of Stoddard solvent added to vehicle for test = 65.1 liters

3.3 One-Third of Useable Capacity = 23.3 liters

3.4 Is vehicle equipped with electric fuel pump? Yes- X ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

After the ignition key is turned from LOCK(0) to ON(11) Position, the pump will be filled up for two Seconds, and then the pressure is maintained.

DATA SHEET NO. 4
TEST VEHICLE INFORMATION (cont.)

4. STEERING COLUMN ADJUSTMENTS:

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: Telescoping steering column was placed in mid-position (20 mm) from a total travel of 40 mm. The column angle was placed in mid-position (21.9 degrees)

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: The driver and passenger Adjustable D-ring was placed in uppermost detent. Total number of adjustable detents = 4.

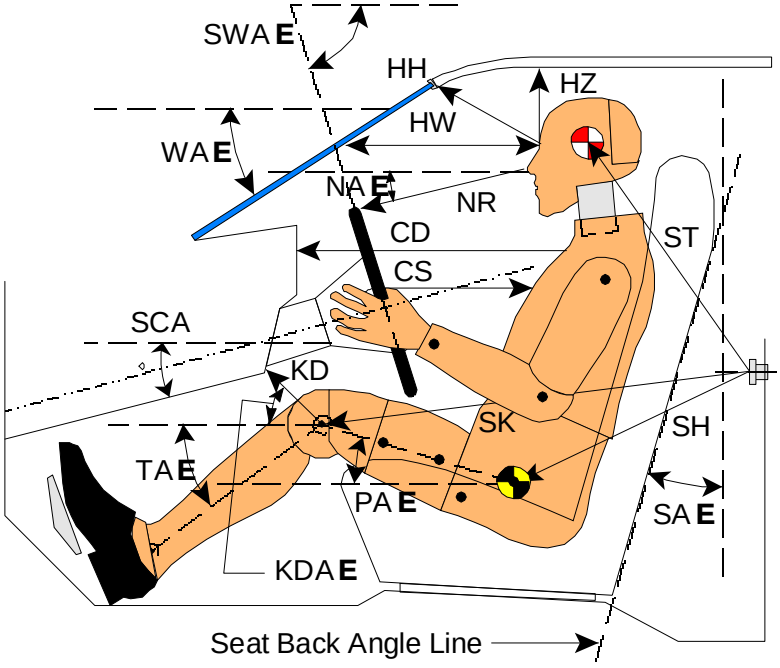
6. AUTOMATIC DOOR LOCKS: Is test vehicle equipped with ADLs? X Yes; - No;

Does vehicle owner's manual describe how to deactivate ADLs? X Yes; - No; - N/A

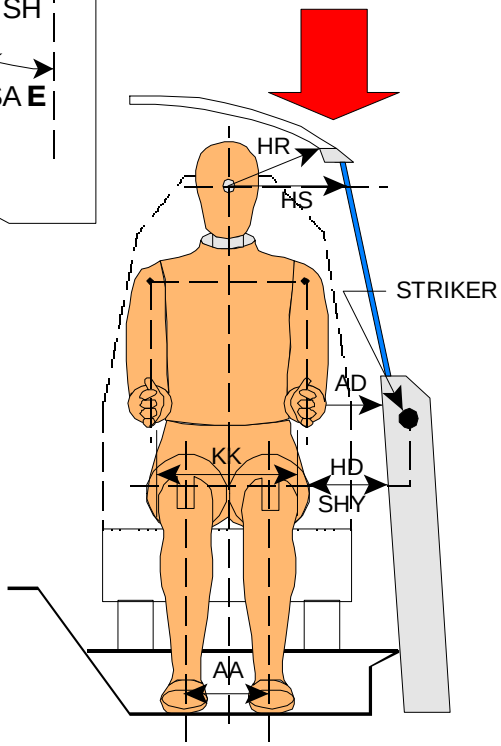
Comments: No

DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE

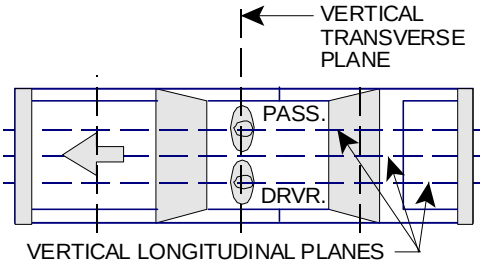
DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
AA - Ankle to Ankle
SHY- Striker to H-Point (Y Direction)



CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
KDA - Knee to Dash Angle
KDL- Left Knee to Dash
KDR - Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA - Steering Column Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
SWA- Steering Wheel Angle
TA - Tibial Angle
WA - Windshield Angle



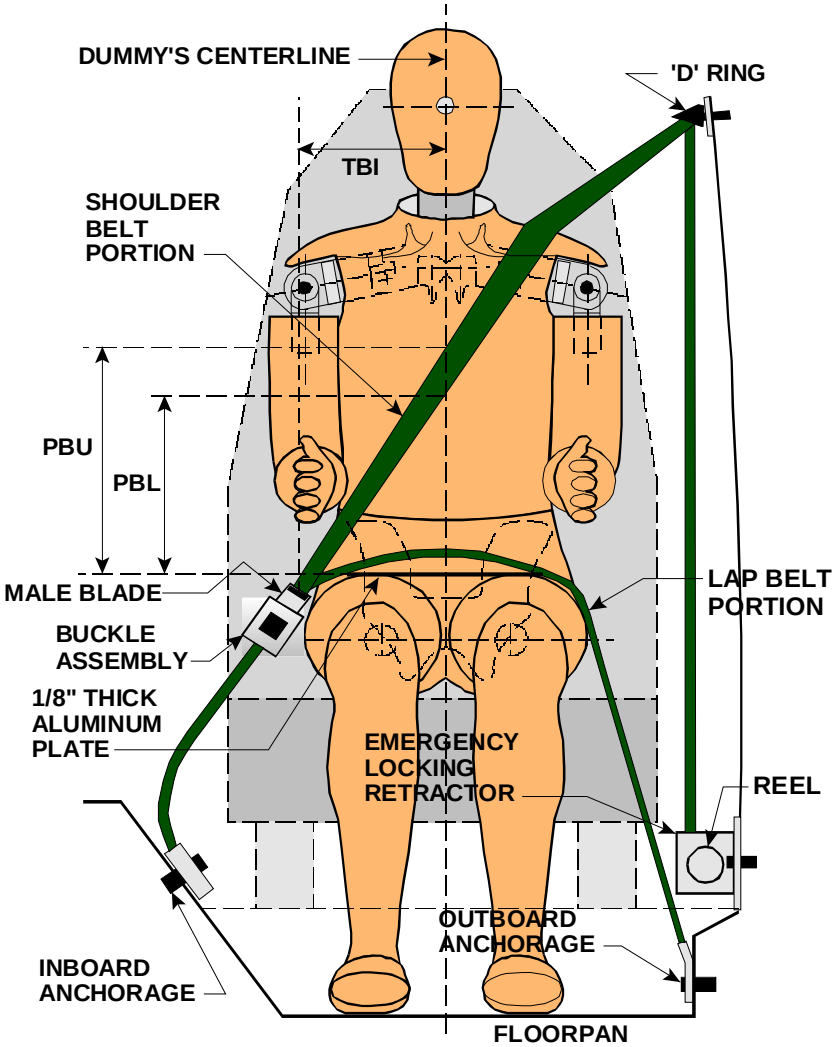
DATA SHEET NO. 5
FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #1046)			PASS. (Serial #1047)		
WA^O	25.6 deg.			N/A		
SWA^O	69.0 deg.			N/A		
SCA^O	21.0 deg.			N/A		
SA^O	10.3 deg.			11.8 deg.		
HZ	205			145		
HH	329			315		
HW	625			564		
HR	207			187		
NR	379	Angle	7 deg.	N/A		
CD	511			548		
CS	309			N/A		
RA	206			N/A		
KDL	167	Angle (KDA)	35 deg.	140		
KDR	139			135	Angle (KDA)	47 deg.
PA^O	21.4 deg.			22.5 deg.		
TA^O	38.2 deg.			37.0 deg.		
KK	362			269		
AA	375			200		
ST	415	Angle	12 deg.	443	Angle	10 deg.
SK	602	Angle	102 deg.	625	Angle	115 deg.
SH	275	Angle	141 deg.	282	Angle	135 deg.
SHY	300			275		
HS	320			298		
HD	167			155		
AD	121			117		

Dimensions in millimeters

DATA SHEET NO. 6
SEAT BELT POSITIONING DATA

SEAT BELT POSITIONING DATA

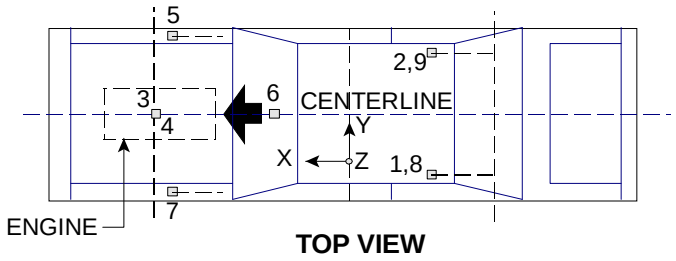


FRONT VIEW OF DUMMY

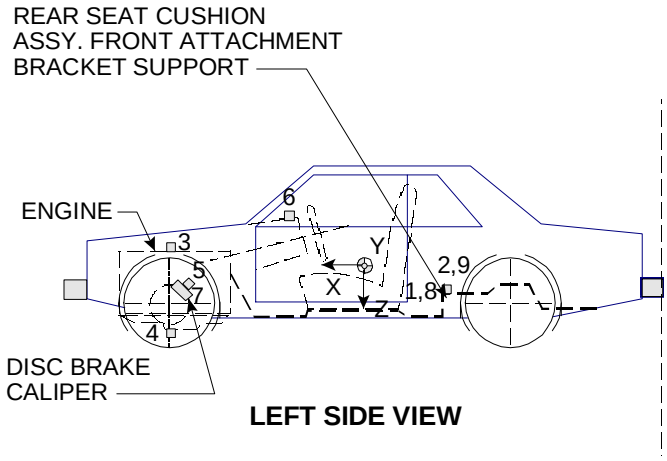
	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	340	340
PBL-- Top surface of alum. plate to belt lower edge	260	260
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

VEHICLE ACCELEROMETER LOCATIONS



TOP VIEW



LEFT SIDE VIEW

		PRE-TEST LENGTH (mm)		
No.	LOCATION	X	Y	Z
1	Left Rear Seat Cross Member X	2001	-681	368
2	Right Rear Seat Cross Member X	1998	681	371
3	Top of Engine Block	4200	-130	786
4	Bottom of Engine	4664	173	169
5	Disc Brake Caliper @ Right Side	3904	708	494
6	Instrument Panel**	-	-	-
7	Disc Brake Caliper @Left Side	3904	-708	494
8	Left Rear Seat Cross Member Z	2001	-681	368
9	Right Rear Seat Cross Member Z	1998	681	371

X – From rear surface of vehicle (+ forward)
Y – From vehicle centerline (+ right)
Z – From ground plane (+ up)
** Accelerometer was not requested by the COTR

DATA SHEET NO.8
SUMMARY OF FMVSS 212 and FMVSS 219 (Partial) DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 16 mm molding.

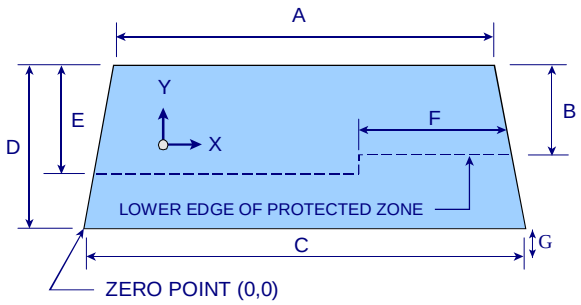
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

Temperature of windshield molding during test: 22ºC.

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2147.5	2147.5	100.0%
LEFT SIDE	2147.5	2147.5	100.0%
TOTAL	4295	4295	100.0%



FRONT VIEW OF WINDSHIELD

DIMENSIONS (mm)	
A	1180
B	487
C	1505
D	805
E	550
F	508
G	16

FAILURE DETAILS: None

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

	COORDINATES	
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

DATA SHEET NO. 9
SUMMARY OF FMVSS NO. 301 DATA

NHTSA TEST No.: M95304 TEST DATE: October 21, 2008

VEHICLE MAKE/MODEL: 2009 Acura TL 4-Door Sedan

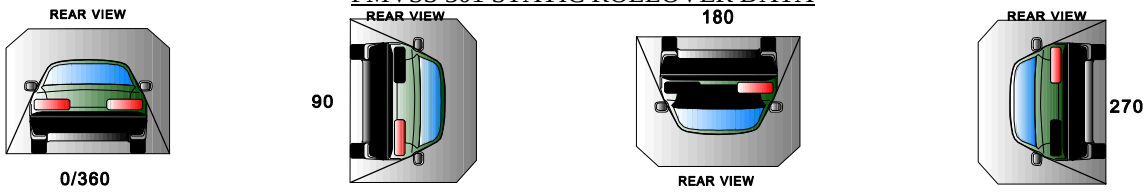
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

FUEL SPILLAGE MEASUREMENT:

Time Interval	Amount	Maximum Allowable Spillage
Impact Until Motion Ceases	0	**28 g**
First Five Minutes Following Impact	0	**142 g**
Next 25 Minutes	0	**28 g / 1 minute**

SOLVENT SPILLAGE DETAILS: None

FMVSS 301 STATIC ROLLOVER DATA



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Stage	Rotation Time (spec. 1 -3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0º - 90º	1	minutes	08	seconds	5	minutes	6	minutes	8	seconds	7	minutes
90º - 180º	1	minutes	07	seconds	5	minutes	6	minutes	7	seconds	7	minutes
180º-270º	1	minutes	01	seconds	5	minutes	6	minutes	1	seconds	7	minutes
270º-360º	1	minutes	13	seconds	5	minutes	6	minutes	13	seconds	7	minutes

II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)
142 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

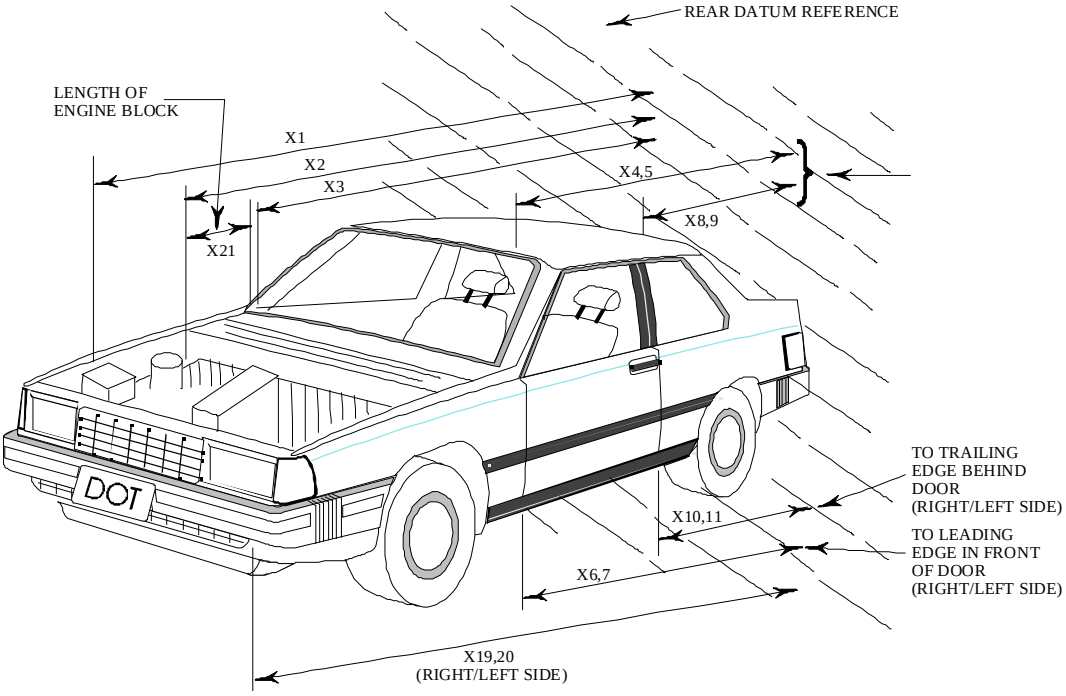
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0º - 90º	0	0	0	N/A
90º - 180º	0	0	0	N/A
180º-270º	0	0	0	N/A
270º-360º	0	0	0	N/A

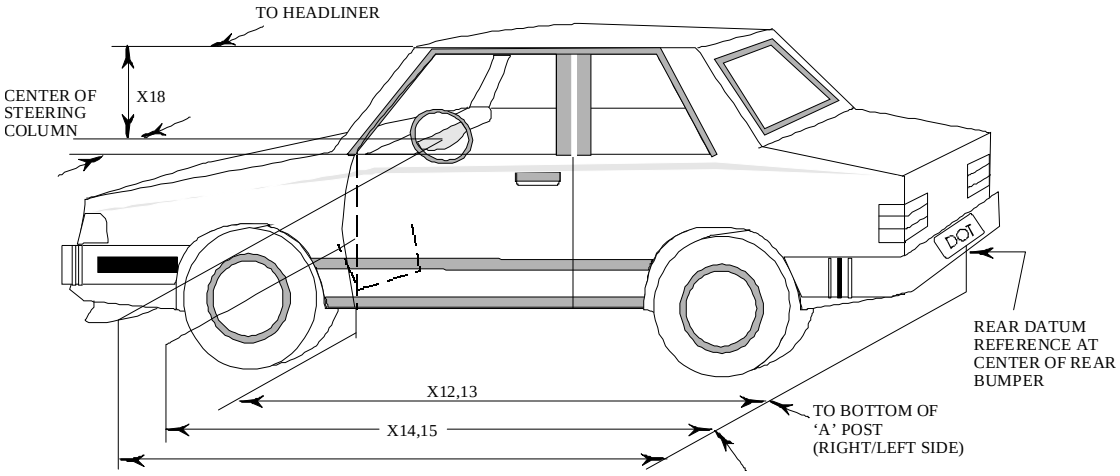
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

Rollover Stage	Spillage Location
0º - 90º	None
90º - 180º	None
180º-270º	None
270º-360º	None

DATA SHEET NO. 10
TEST VEHICLE MEASUREMENTS





DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

NHTSA TEST No.: M95304 TEST DATE: October 21, 2008

VEHICLE MAKE/MODEL: 2009 Acura TL 4-Door Sedan

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4966	4492	474
X2	Rear Surface of Vehicle to Front of Engine	4438	4204	234
X3	Rear Surface of Vehicle to Firewall	3812	3807	5
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3440	3439	1
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3439	3438	1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3400	3393	7
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3400	3398	2
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2277	2277	0
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2276	2275	1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2280	2278	2
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2279	2278	1
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3374	3371	3
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3374	3370	4
X14	Rear Surface of Vehicle to Firewall, Right Side	3772	3741	31
X15	Rear Surface of Vehicle to Firewall, Left Side	3744	3760	-16
X16	Rear Surface of Vehicle to Steering Column	2898	2941	-43
X17	Center of Steering Column to "A" Post	291	305	-14
X18	Center of Steering Column to Headliner	408	401	7
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4832	4365	467
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4832	4501	331
X21	Length of Engine Block	3854	3854	0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	3071	3073	-2
CD	Rear Surface of Vehicle to Center of Dash Panel	3110	3113	-3
LD	Rear Surface of Vehicle to Left Side of Dash Panel	3070	3071	-1

All Dimensions in mm

DATA SHEET NO.10
VEHICLE MEASUREMENTS (cont.)

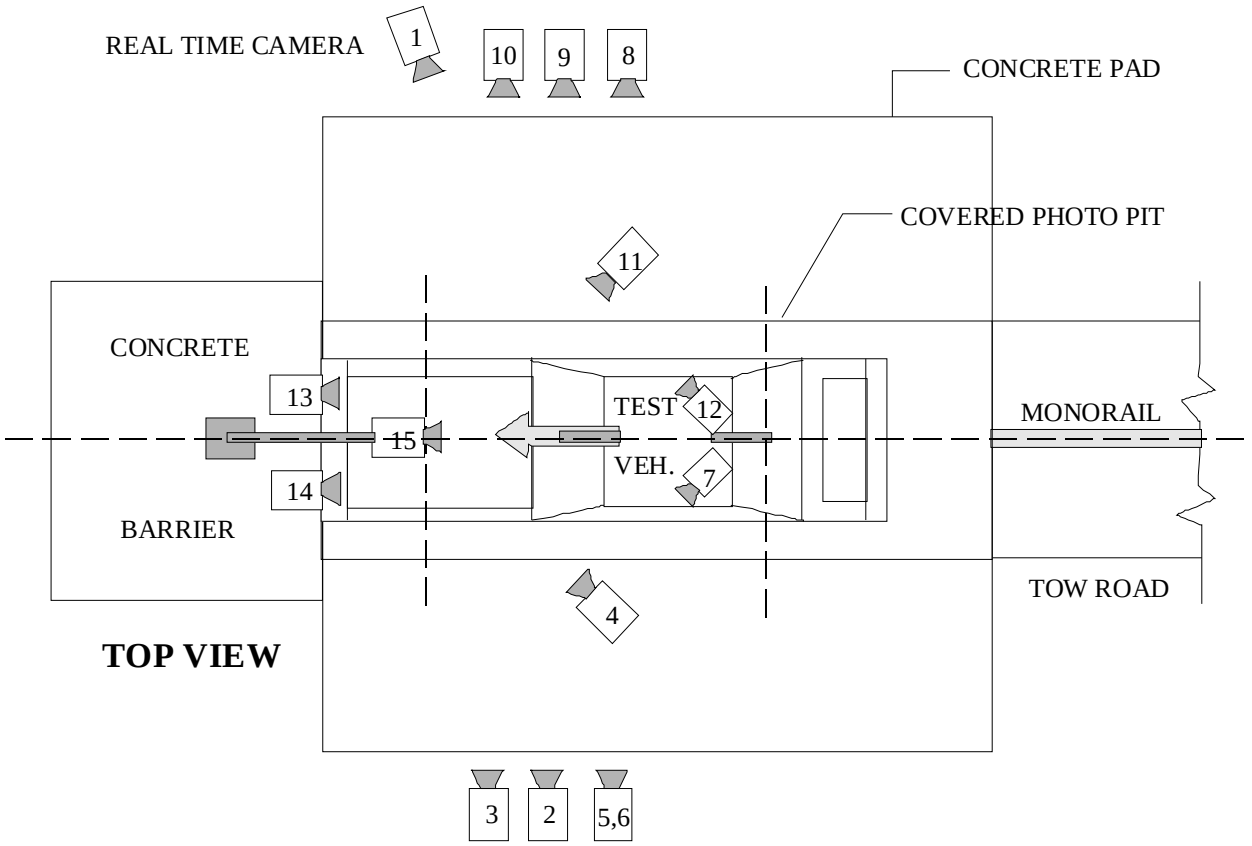
NHTSA TEST No.: M95304 TEST DATE: October 21, 2008

VEHICLE MAKE/MODEL: 2009 Acura TL 4-Door Sedan

TARGET VEHICLE STRUCTURAL MEASUREMENTS

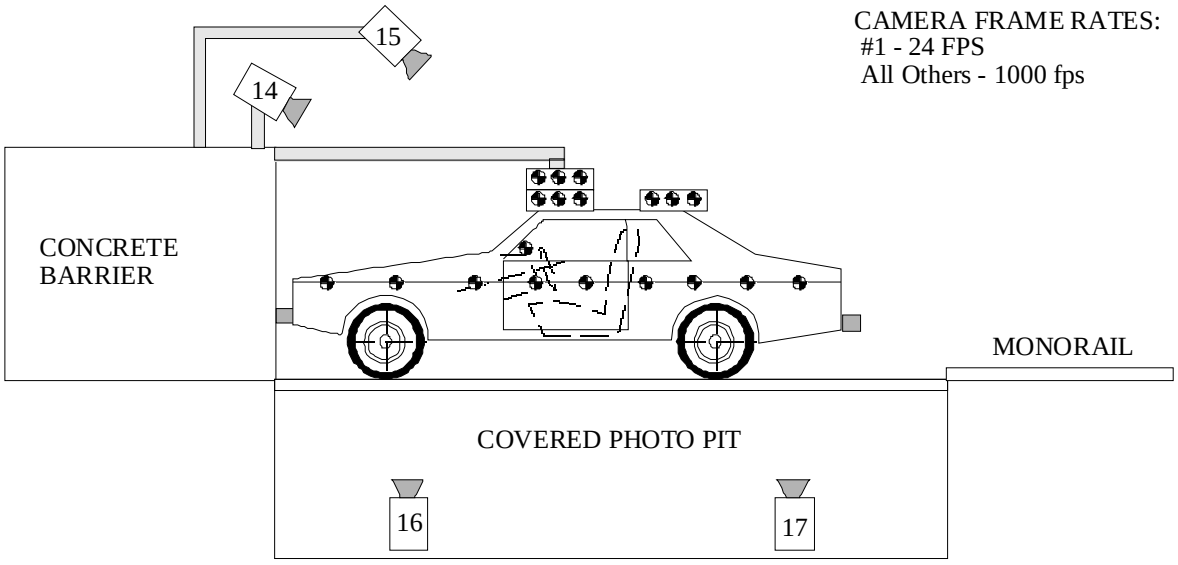
	Elements	Pre-Test (mm)
1	Total length	4966
2	Total Width	1857
3	Bumper Top Height	503
4	Bumper Bottom Height	325
5	Longitudinal Member Top Height	530
6	Distance Between Longitudinal Members	1142
7	Longitudinal Member Width	100
8	Engine top height	843
9	Engine bottom height	169
10	Engine and gearbox width	539
11	Front bumper-engine distance	528
12	Front shock absorber fixing height	830
13	Bonnet leading edge height	788
14	Front shock absorber fixing width	974
15	Front bumper – front axle distance	1049
16	Front axle – A pillar distance	472
17	A-pillar – B pillar distance	1174
18	B-pillar – rear axle distance	1129
19	B-pillar – C Pillar distance	970
20	Roof sill bottom height	1324
21	Roof sill top height	1423
22	Floor sill bottom height	252
23	Floor sill top height	361

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS



TOP VIEW

CAMERA FRAME RATES:
#1 - 24 FPS
All Others - 1000 fps



LEFT SIDE VIEW

DATA SHEET NO.11
HIGH-SPEED CAMERA LOCATIONS (cont.)

NHTSA Test No.: M95304 Vehicle: 2009 Acura TL 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)* X	Y	Z	ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
1	Real-Time Camera	-	-	-	-	-	-	30
2	Overall Left Side	7870	2270	965	-5	7437	24	1000
3	Left Side View	9324	1520	960	-3	8891	50	1000
4	Driver and Interior View	7566	3590	2000	-10	-	50	500
5	Steering Column (Bottom)	8130	2470	1200	-4	7697	28-70	1000
6	Steering Column (Top)	8130	2470	1800	-9	7697	24-70	1000
7	Left CRS Lateral View	-	-	-	-	-	-	-
8	Overall Right Side	7486	2595	930	-2	7053	24	500
9	Right Side View	9180	1980	970	-3	8747	50	1000
10	Right Passenger View	7710	2540	1110	-4	7277	50	1000
11	Passenger and Interior View	7586	3620	1980	-9	-	50	500
12	Right CRS Lateral View	-	-	-	-	-	-	-
13	Passenger Front View	620	-92	1987	-36	-	24	500
14	Driver Front View	620	-92	1987	-36	-	24	500
15	Windshield View	0	-530	3374	-49	-	24	500
16	Pit View of Engine	0	615	-3048	90	-	13	500
17	Pit View of Fuel Tank	0		-3048	90	-	13	500

*X = film plane to monorail centerline ** = referenced to horizontal plane

Y = film plane to impact location N.T. indicates No Timing

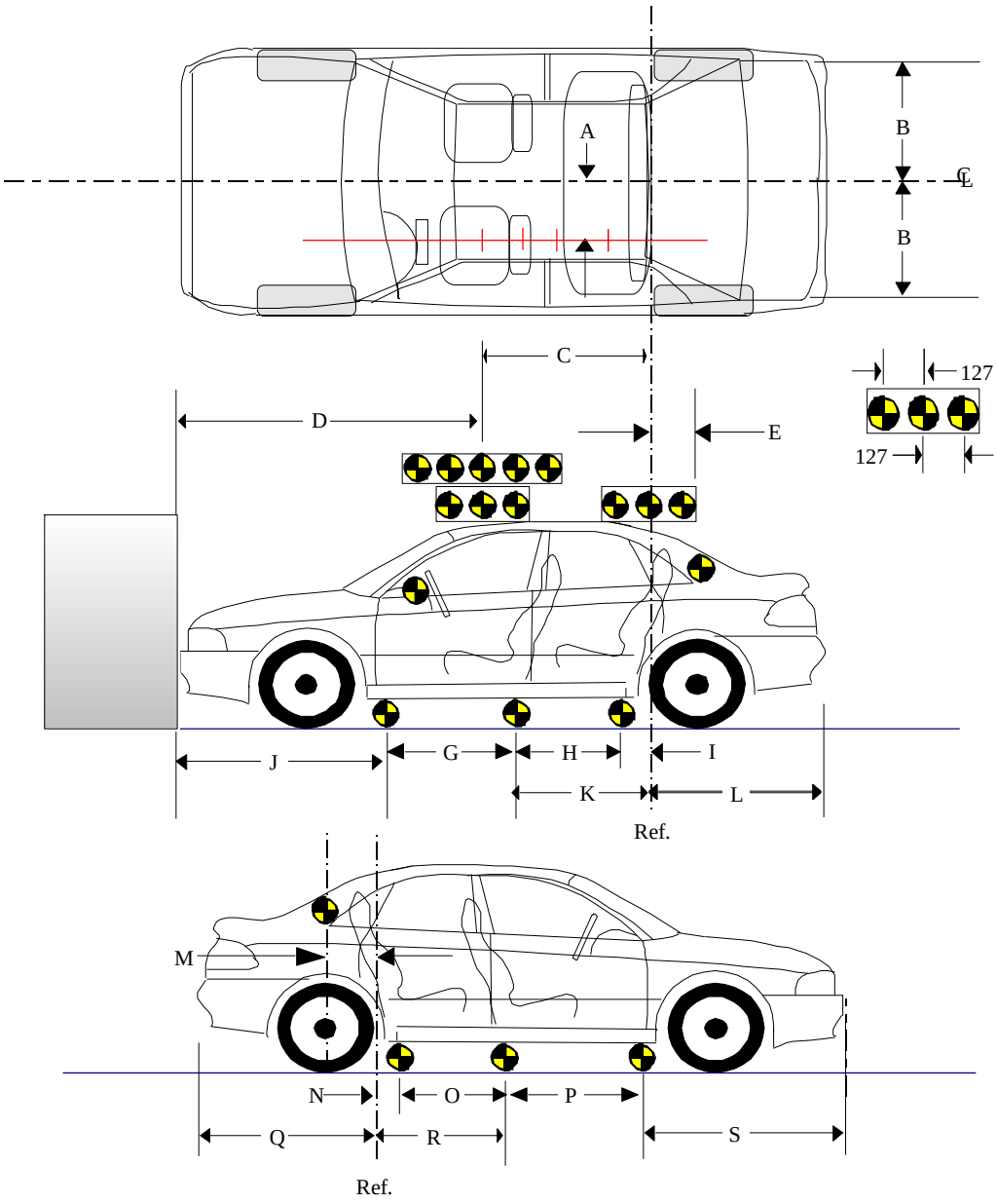
Z = film plane to ground

DATA SHEET NO. 12
VEHICLE REFERENCE PHOTO TARGET LOCATIONS

NHTSA Test No.: M95304 Vehicle: 2009 Acura TL 4-Door Sedan

(Dimensions in millimeters)

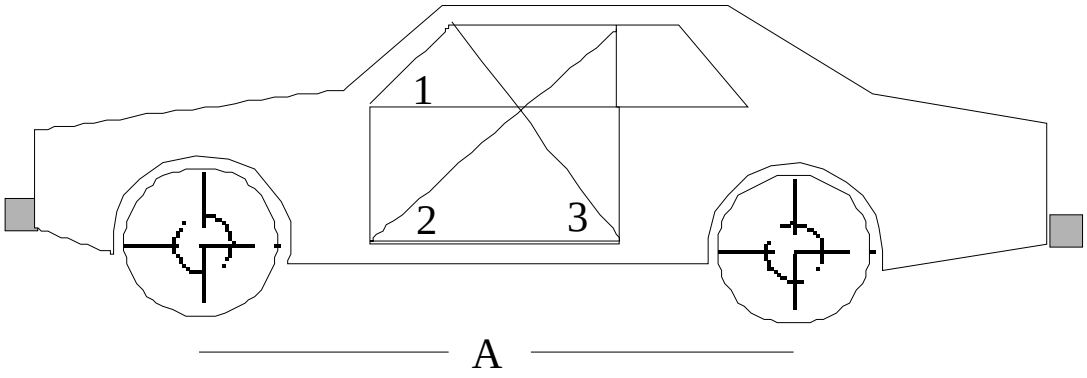
A	357
B	601
C	1220
D	2309
E	340
F	1655
G	930
H	931
I	101
J	1520
K	1032
L	1484
M	337
N	101
O	927
P	930
Q	1487
R	1028
S	1521



DATA SHEET NO. 13
VEHICLE INTRUSION MEASUREMENTS

NHTSA Test No.: M95304 Vehicle: 2009 Acura TL 4-Door Sedan

DOOR OPENING WIDTH AND WHEELBASE MEASUREMENTS



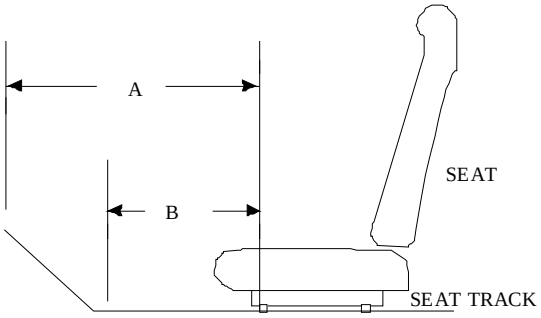
UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	1038	1468	963	1037	1469	957
AFTER TEST	1036	1471	963	1035	1470	957
DIFFERENCE	2	-3	0	2	-1	0

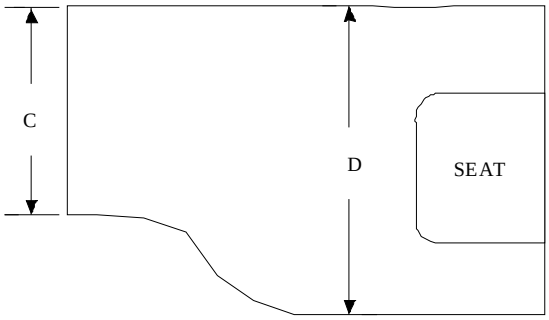
UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2776	2772
AFTER TEST	2683	2673
DIFFERENCE	93	99

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont)

NHTSA Test No.: M95304 Vehicle: 2009 Acura TL 4-Door Sedan

STATIC FOOTWELL DEFORMATION





DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	725	694	31
B	565	561	4
C	482	475	7
D	470	463	7

PASSENGER

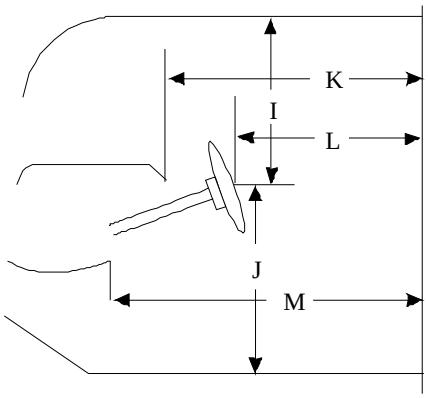
Measurement	Pre-Test	Post-Test	Difference
A	724	688	36
B	572	564	8
C	449	440	9
D	477	469	8

Units = mm

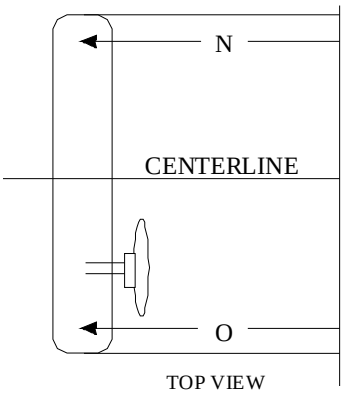
DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M95304 Vehicle: 2009 Acura TL 4-Door Sedan

STATIC PASSENGER COMPARTMENT INTRUSION

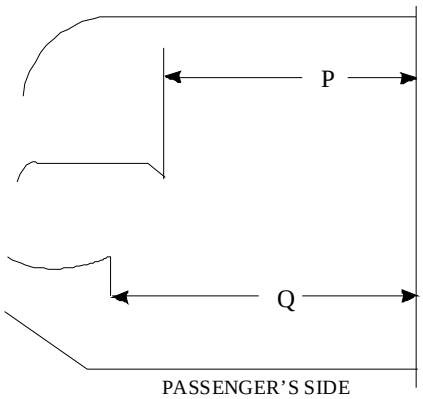


DRIVER'S SIDE



TOP VIEW

MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



PASSENGER'S SIDE

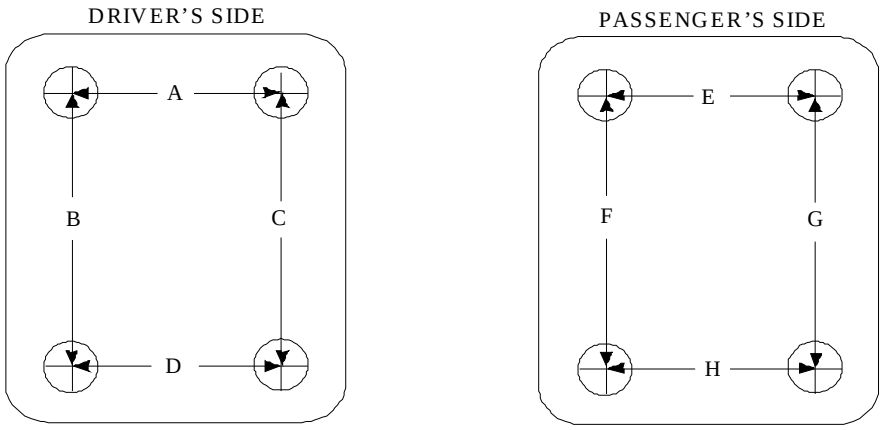
Measurement	Pre-Test	Post-Test	Difference
I	408	401	7
J	647	671	-24
K	728	724	4
L	548	591	-43
M	873	876	-3
N	721	724	-3
O	720	720	0
P = K (PASS.)	917	916	1
Q = M (PASS.)	772	778	-6

Units = mm

DATA SHEET NO.13
VEHICLE INTRUSION MEASUREMENTS (cont.)

NHTSA Test No.: M95304 Vehicle: 2009 Acura TL 4-Door Sedan

FLOORBOARD DEFORMATION



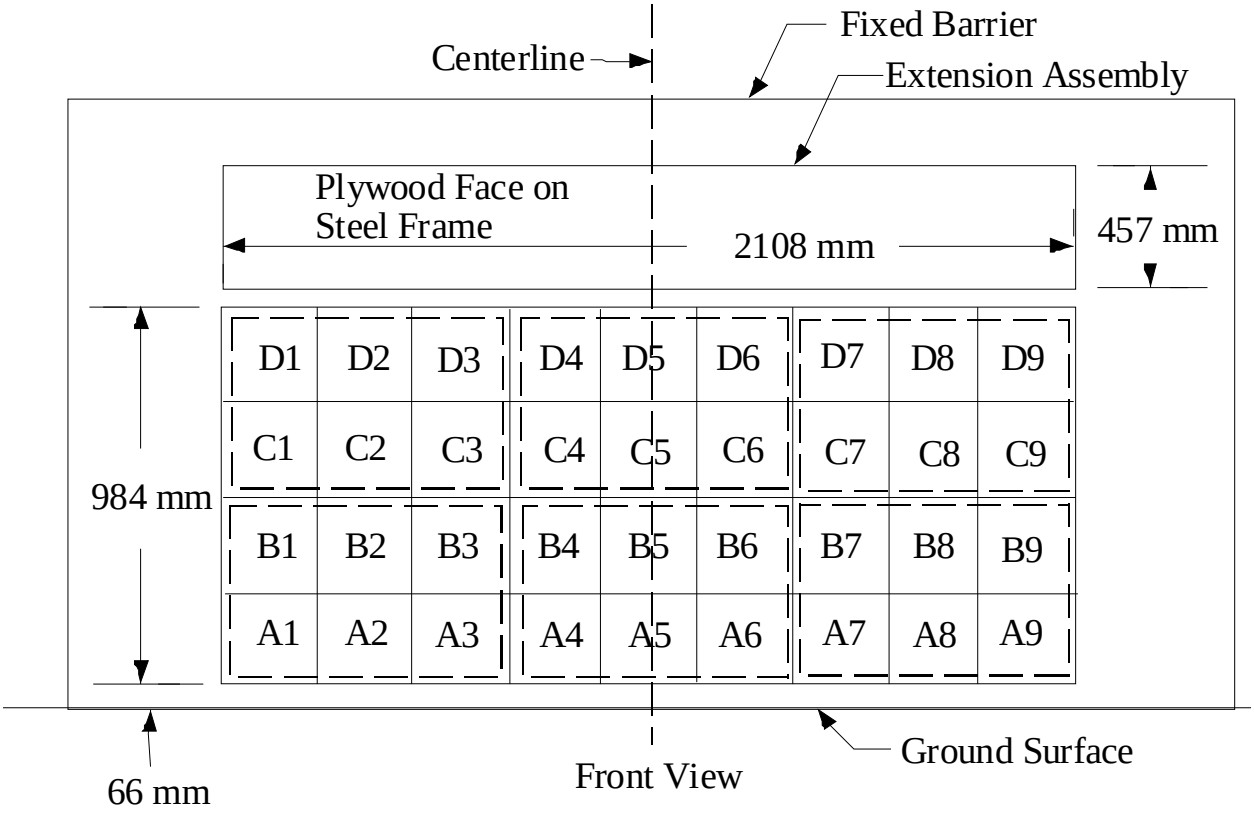
TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	482	475	7
B	338	338	0
C	299	297	2
D	470	463	7
E	449	440	9
F	365	371	-6
G	296	297	-1
H	477	469	8

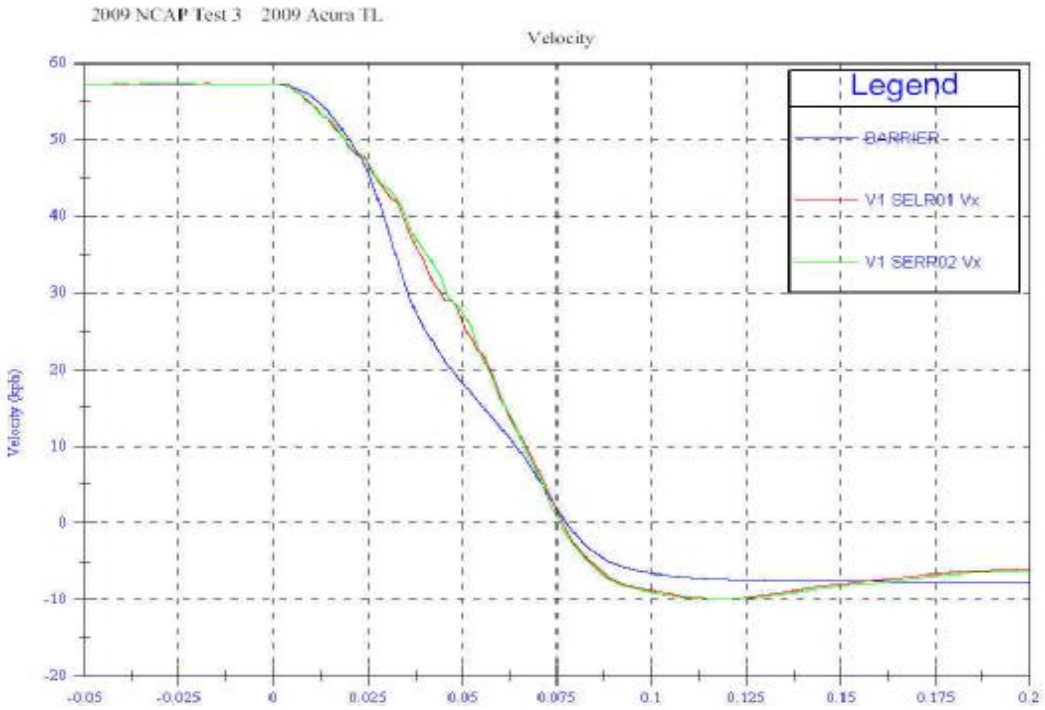
Units = mm

DATA SHEET NO.14
LOAD CELL LOCATIONS ON FIXED BARRIER

36 Load Cells
4 Rows
9 Columns



Momentum Plot



DATA SHEET NO. 15
ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Acura TL 4-Door Sedan

NHTSA Test No.: M95304 VIN: 19UUA86209A001518

Model Year: 2009 Build Date: 09/08 Test Date: October 21, 2008

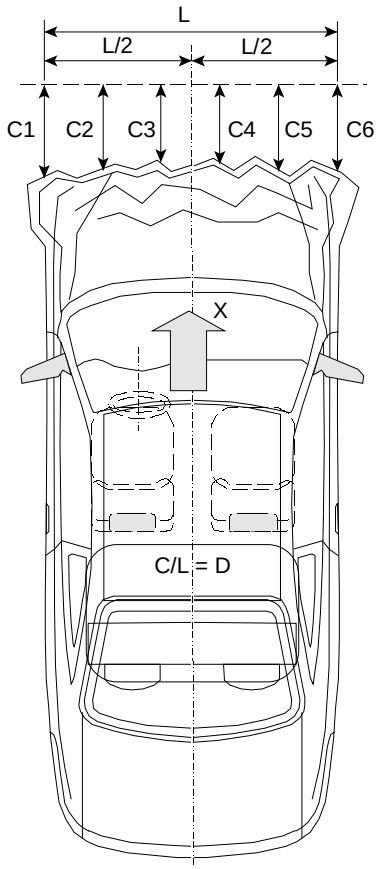
Vehicle Size Category: Sedan Test Weight: 1869.0 kg

Vehicle Wheelbase: 2776 mm; Front Overhang: 1048 mm; Overall Width: 1857 mm

Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4642	4401	241
C2 =	4821	4467	354
C3 =	4922	4457	465
C4 =	4922	4475	447
C5 =	4822	4537	285
C6 =	4643	4492	151



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

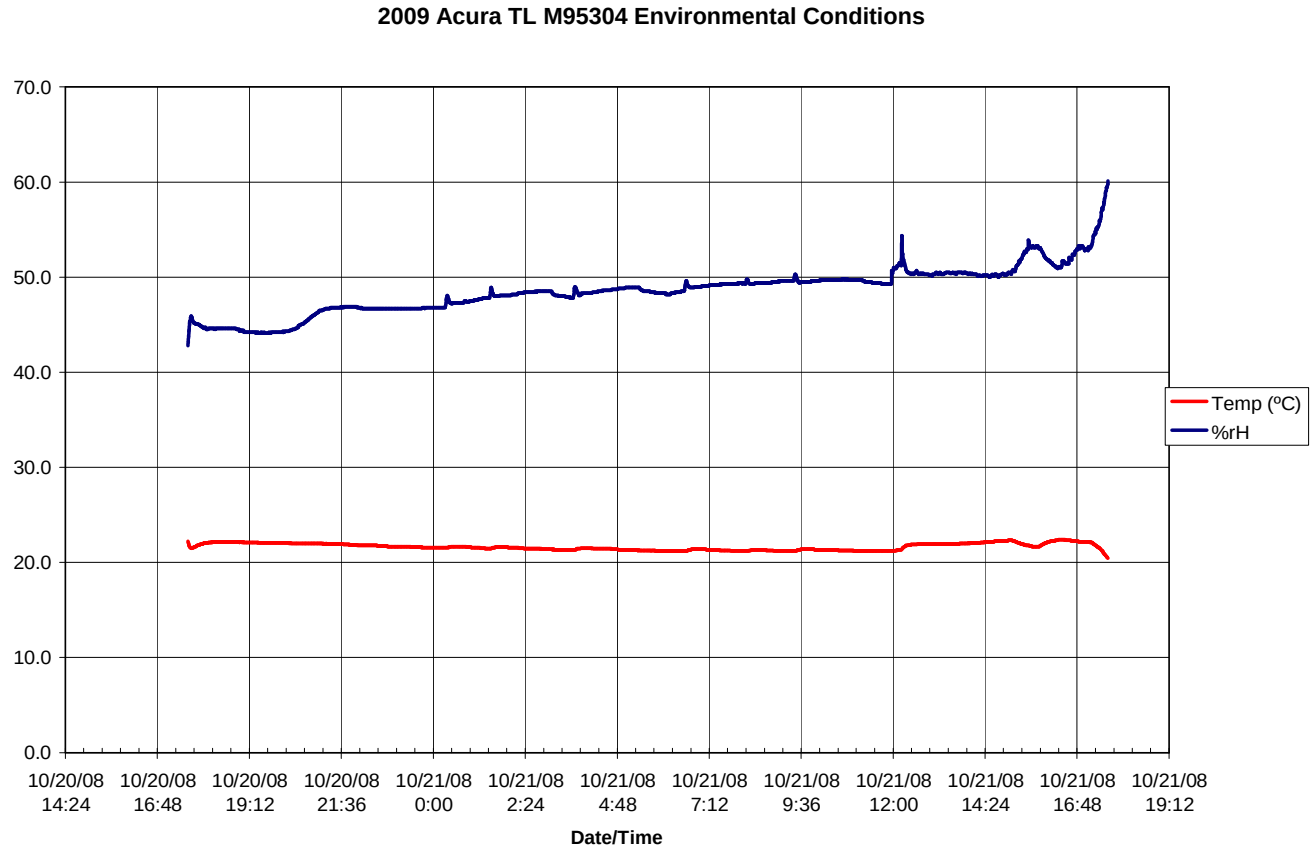
Length of Damaged Region: L1= 1542 mm

L2= 771.0 mm

L5= 308.4 mm

DATA SHEET NO.16
VEHICLE AND DUMMY TEMPERATURE STABILIZATION CHART

NHTSA Test No.: M95304 Vehicle: 2009 Acura TL 4-Door Sedan



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

Figure A-1: Load Cell Locations

Figure A-2: Vehicle Certification Placard

Figure A-3: Vehicle Tire Placard

Figure A-4: Right Front, As Received

Figure A-5: Left Rear, As Received

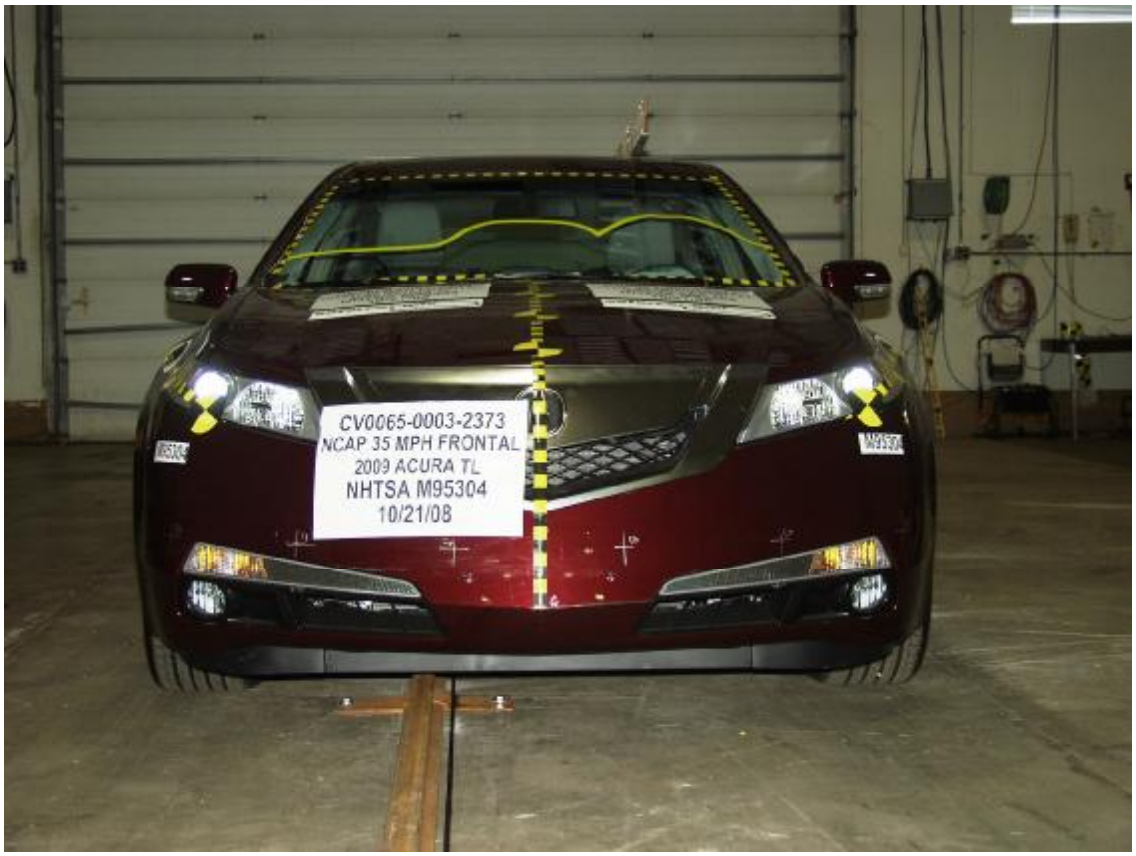


Figure A-6: Pre-Test Front View

Figure A-7: Post-Test Front View

Figure A-8: Pre-Test Left Side View

Figure A-9: Post-Test Left Side View

Figure A-10: Pre-Test Right Side View

Figure A-11: Post-Test Right Side View

Figure A-12: Pre-Test Right Front Three-Quarter View

Figure A-13: Post-Test Right Front Three-Quarter View

Figure A-14: Pre-Test Left Rear Three-Quarter View

Figure A-15: Post-Test Left Rear Three-Quarter View

Figure A-16: Left Rear Three-Quarter View of Doors After Impact

Figure A-17: Right Rear Three-Quarter View of Doors After Impact

Figure A-18: Pre-Test Windshield View

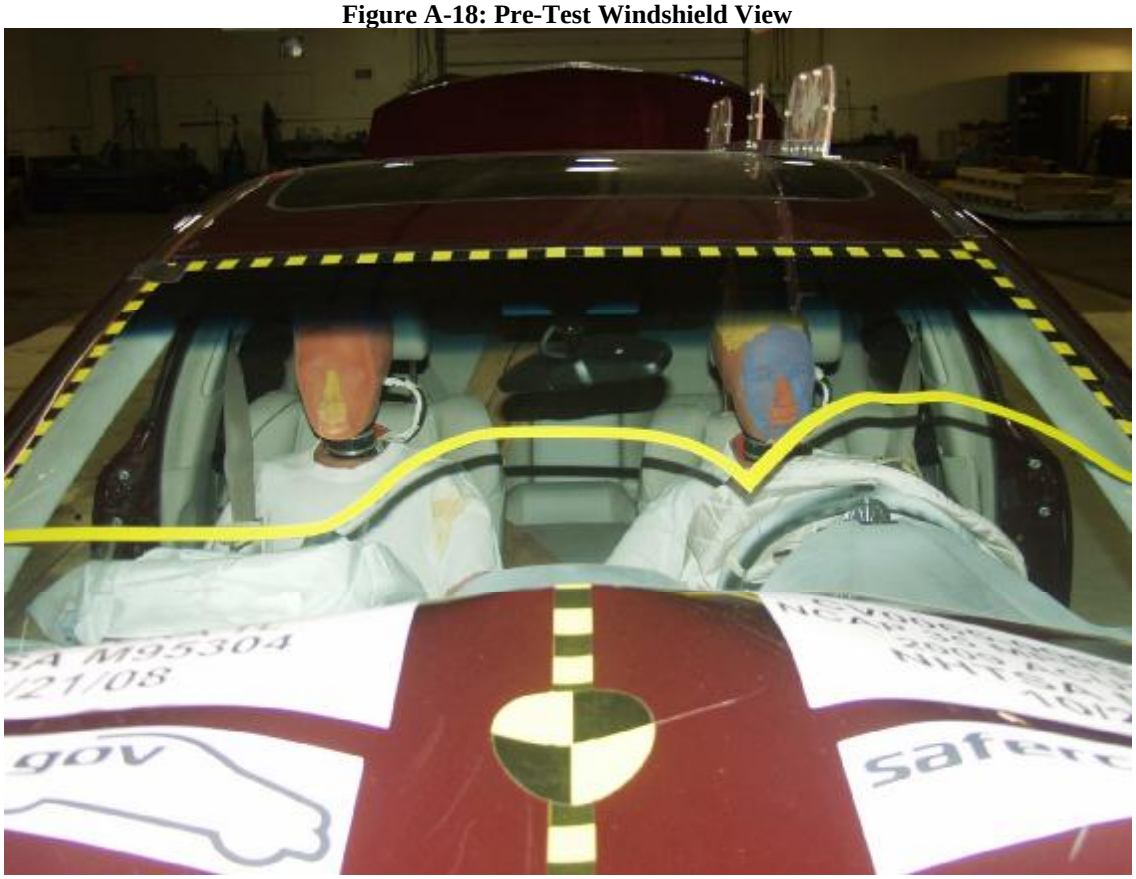


Figure A-19: Post-Test Windshield View

Figure A-20: Pre-Test Engine Compartment View

Figure A-21: Post-Test Engine Compartment View

Figure A-22: Pre-Test Fuel Cap View

Figure A-23: Post-Test Fuel Cap View

Figure A-24: Pre-Test Front Underbody View

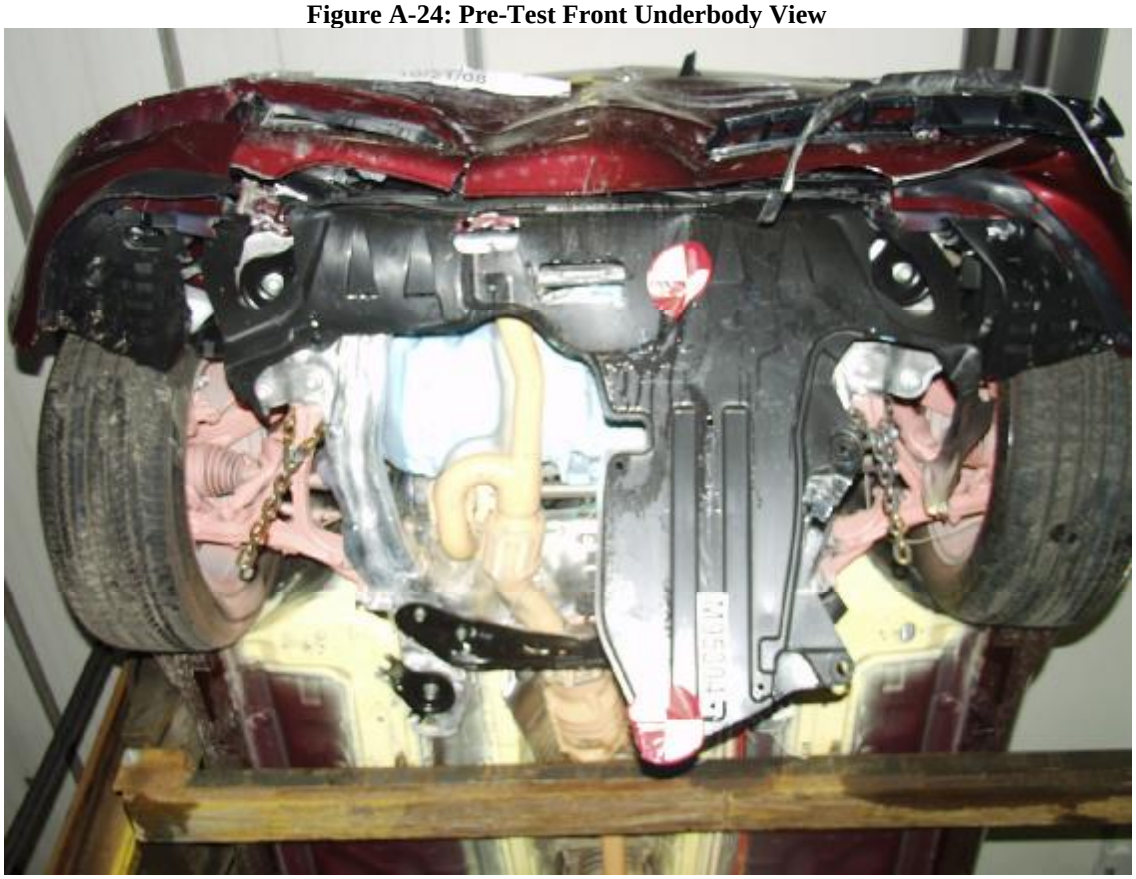


Figure A-25: Post-Test Front Underbody View

Figure A-26: Pre-Test Mid Underbody View

Figure A-27: Post-Test Mid Underbody View

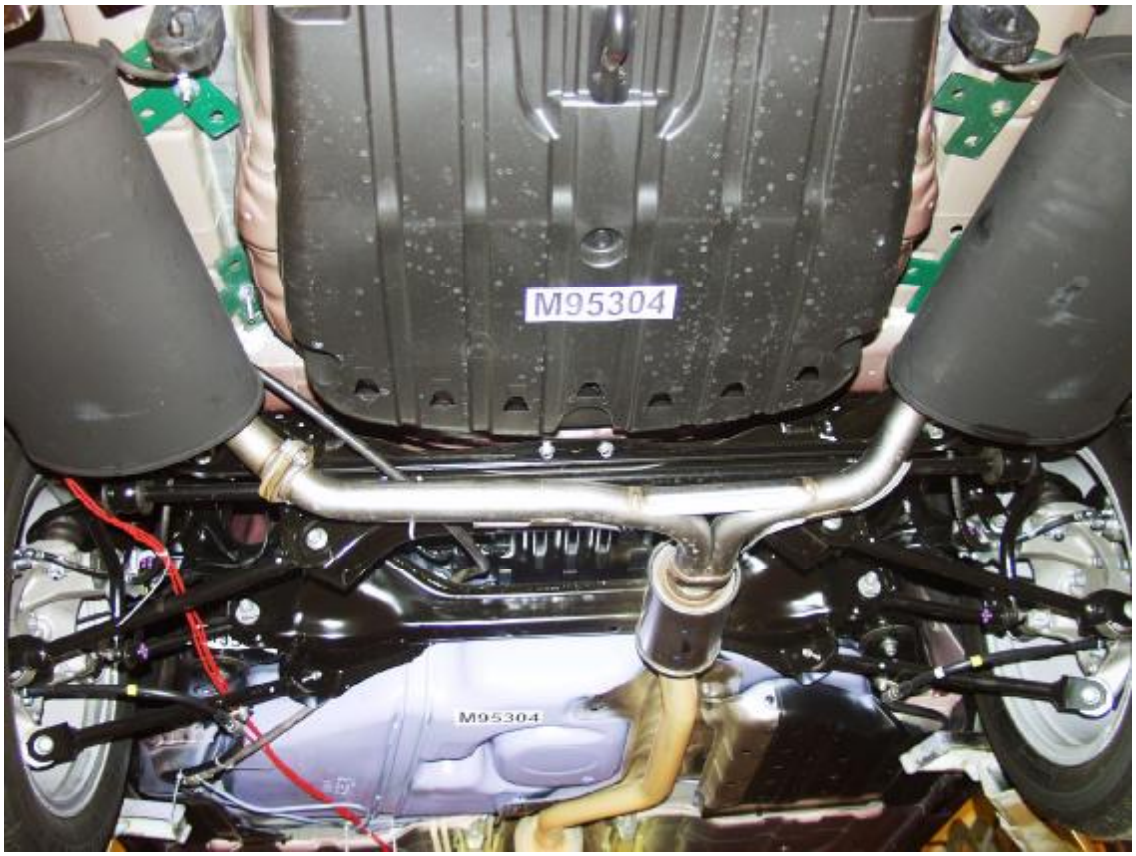


Figure A-28: Pre-Test Rear Underbody View

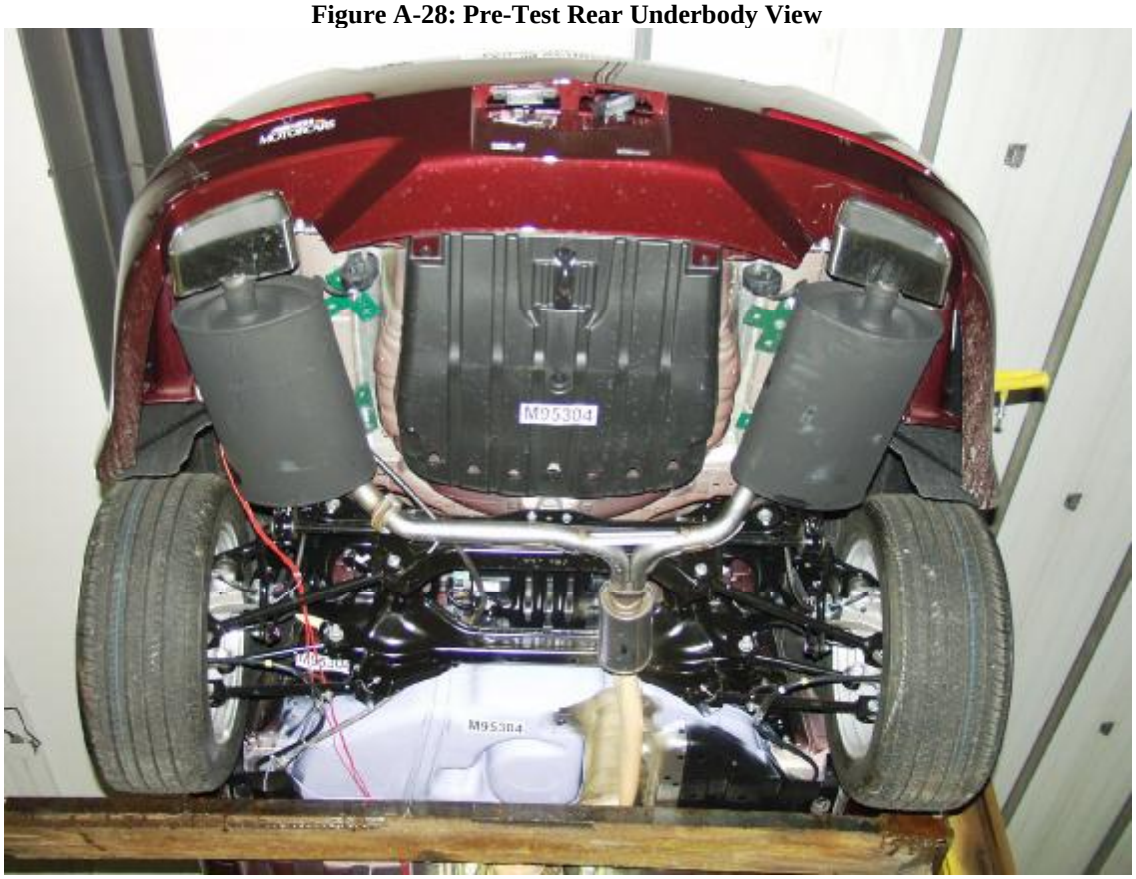


Figure A-29: Post-Test Rear Underbody View

Figure A-30: Pre-Test Driver Head Location

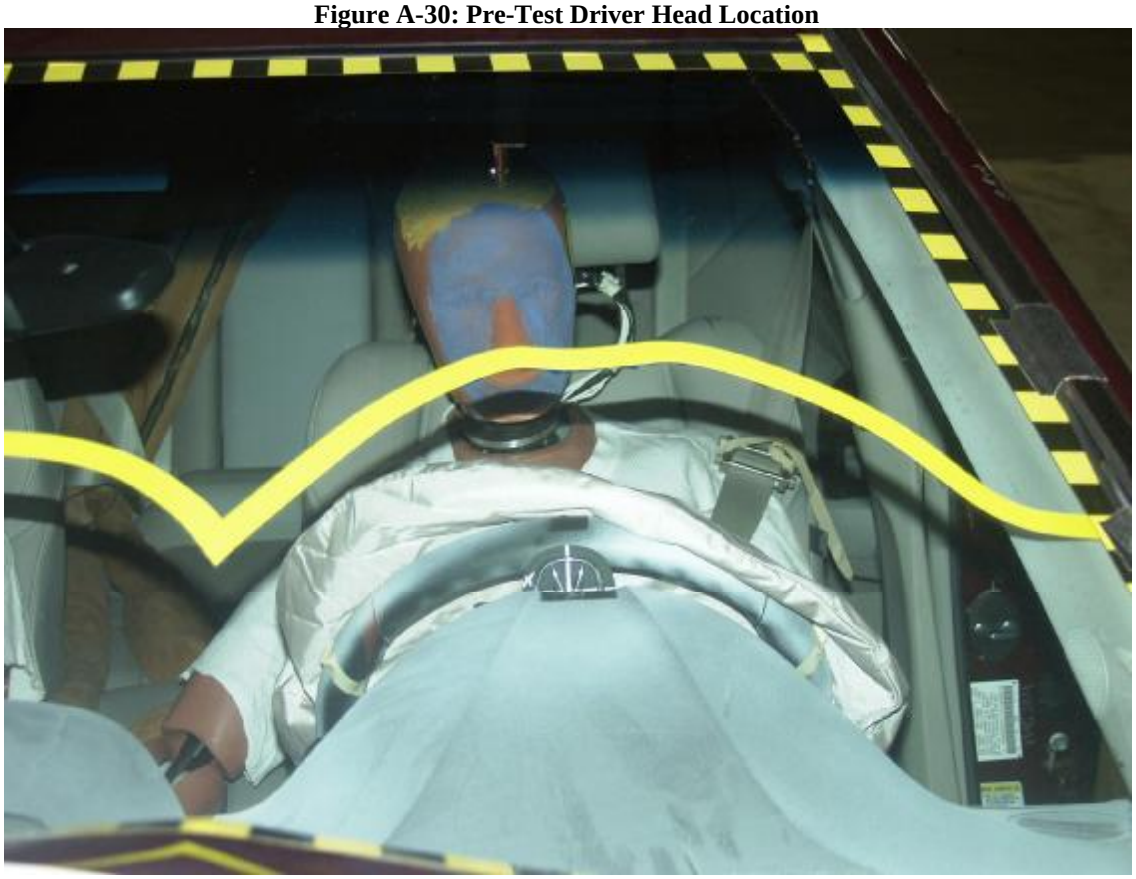


Figure A-31: Post-Test Driver Head Location

Figure A-32: Pre-Test Driver Position View

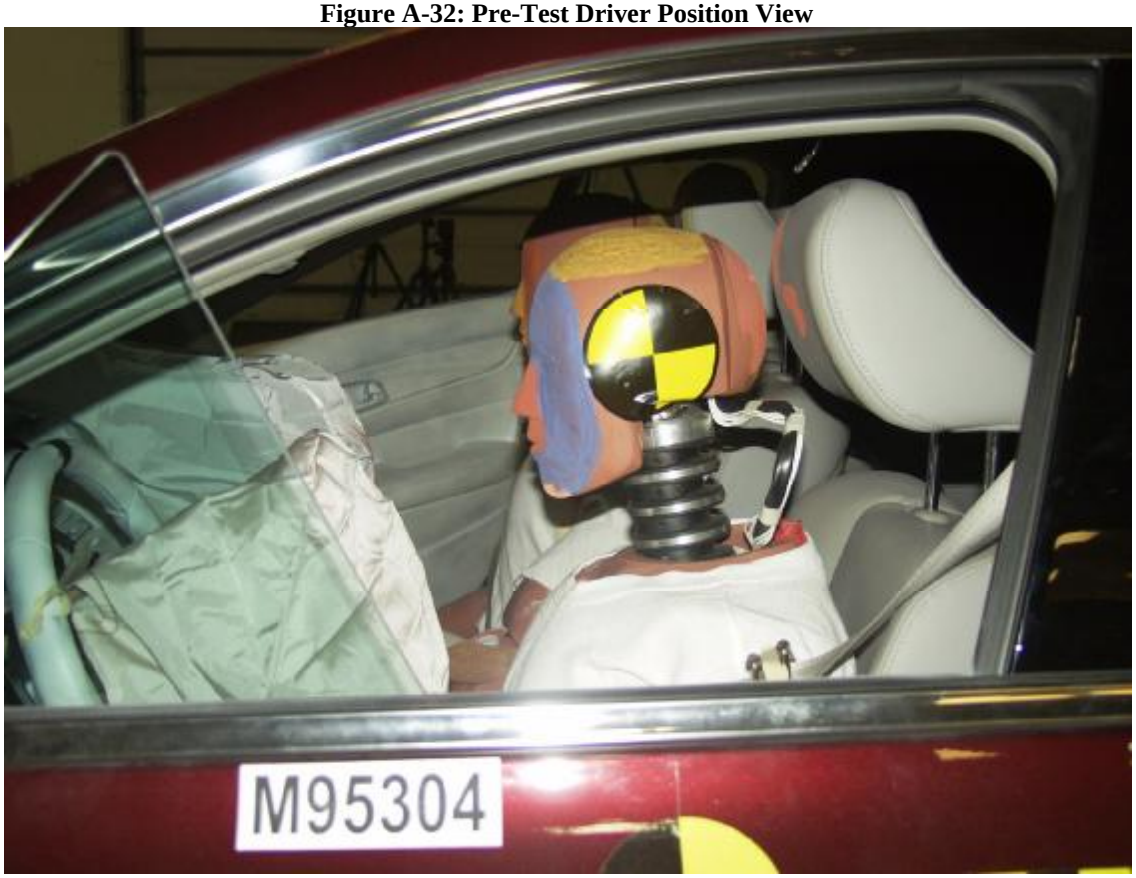


Figure A-33: Post-Test Driver Position View

Figure A-34: Pre-Test Driver and Interior View

Figure A-35: Post-Test Driver and Interior View

Figure A-36: Pre-Test Driver Feet View

Figure A-37: Post-Test Driver Feet View

Figure A-38: Pre-Test Driver Knee Bolster View

Figure A-39: Post-Test Driver Knee Bolster View

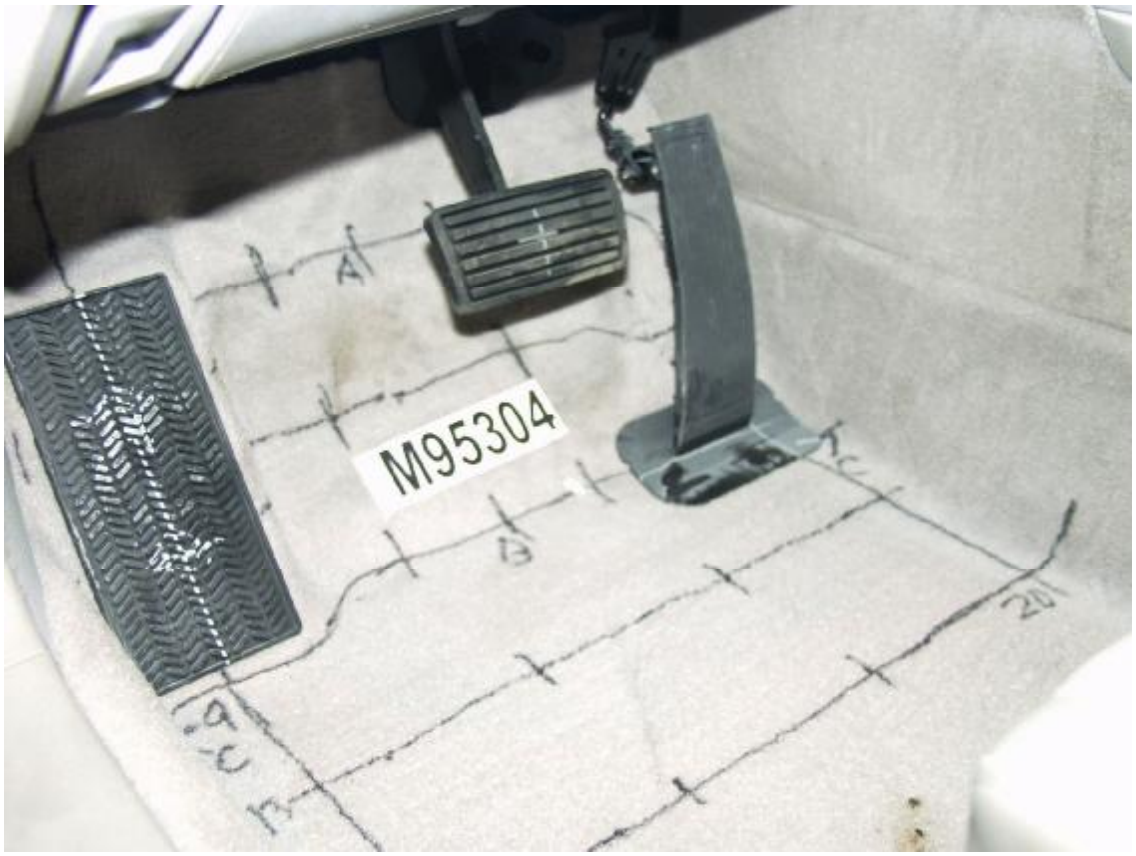


Figure A-40: Pre-Test Driver Floor Pan View

Figure A-41: Post-Test Driver Floor Pan View

Not Available

Figure A-42: Post-Test Driver Head View

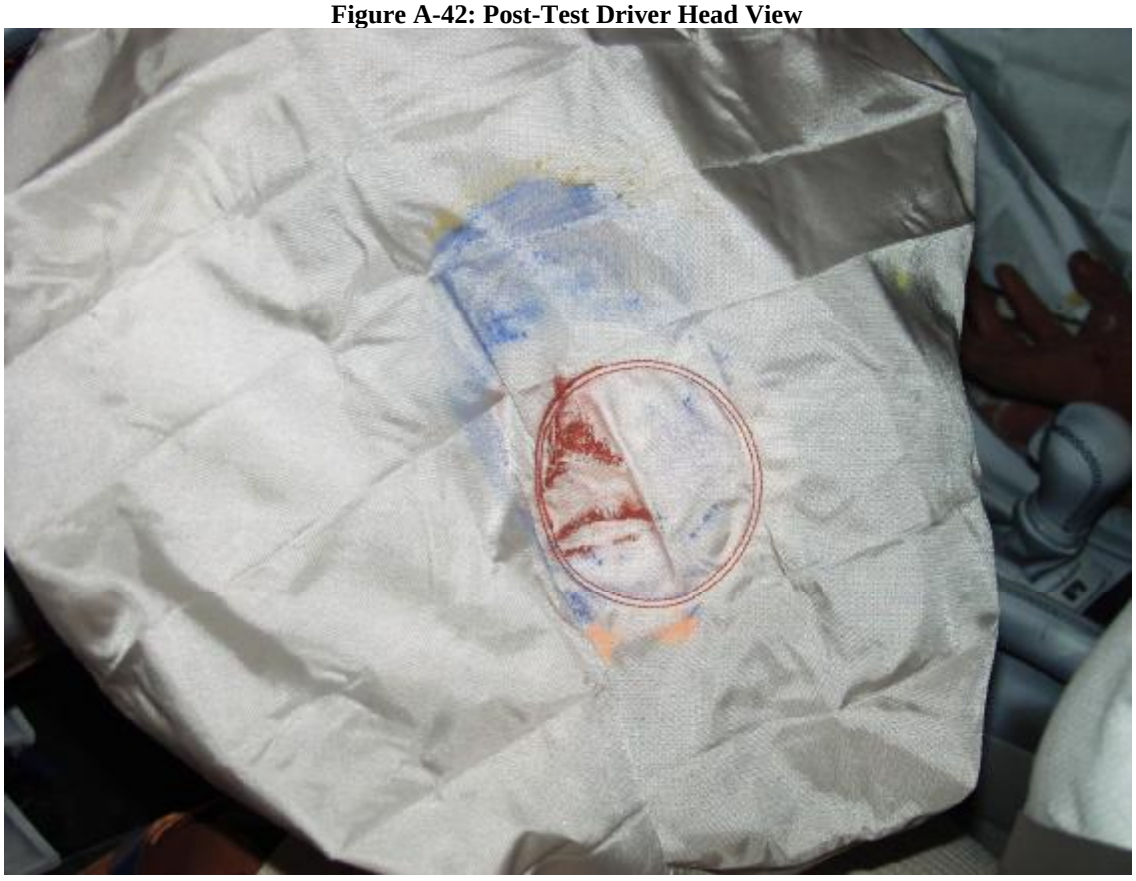


Figure A-43: Post-Test Driver Contact to Airbag

Figure A-44: Pre-Test Passenger Head Location

Figure A-45: Post-Test Passenger Head Location

Figure A-46: Pre-Test Passenger Position View

Figure A-47: Post-Test Passenger Position View

Figure A-48: Pre-Test Passenger and Interior View

Figure A-49: Post-Test Passenger and Interior View

Figure A-50: Pre-Test Passenger Feet View

Figure A-51: Post-Test Passenger Feet View

Figure A-52: Pre-Test Passenger Knee Bolster View

Figure A-53: Post-Test Passenger Knee Bolster View

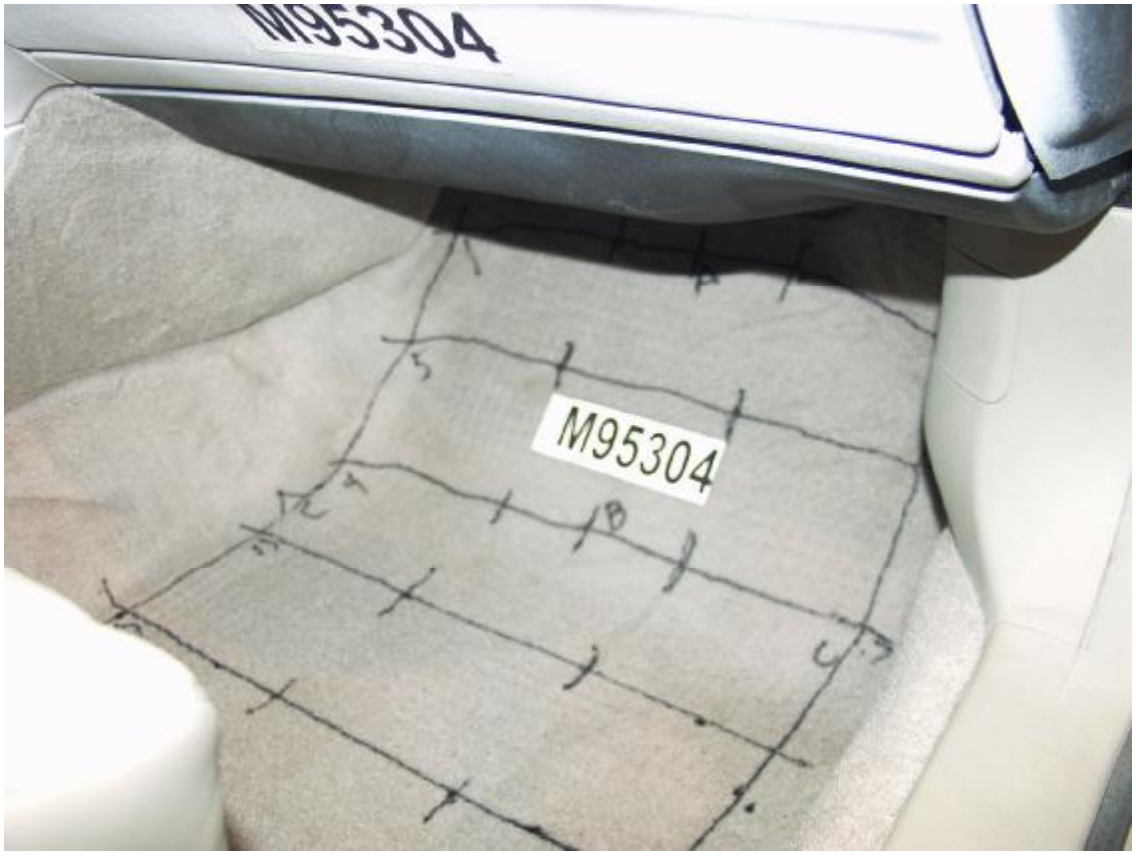


Figure A-54: Pre-Test Passenger Floor Pan View

Figure A-55: Post-Test Passenger Floor Pan View

Not Available

Figure A-56: Post-Test Passenger Head View

Figure A-57: Post-Test Passenger Contact to Airbag

Figure A-58: Rollover View - 90°

Figure A-59: Rollover View - 180°

Figure A-60: Rollover View - 270°

Figure A-61: Rollover View - 360°

Figure A-62: Impact View

APPENDIX B

DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA

Hybrid III Dummy Sign Conventions
Load Cells and Special Transducers

Transducer	**SAE Sign Convention (positive unless noted)**
Upper Neck Load Cell	Fx Head rearward Fy Head left Fz Neck in tension Mx Left ear to left shoulder My Chin to chest (flexion) Mz Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative
Pelvic Load Cell (Lower Lumbar)	Fx Chest rearward Fy Chest left Fz Spine in tension
Femur Load Cell	Compression is negative
Upper Tibia Load Cell (right and left leg)	Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fz Tibia in tension Mx Support tibia at ends, load left side center My Support tibia at ends, load front (shin) center

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO.: M95304

DATA TYPE	**SAE FILTER CLASS (Hz)**
Dummy Head Accelerations	1000
Dummy Chest Accelerations	180
Dummy Chest Displacements	600
Dummy Femur Forces	600
Dummy Belt Loads	60
Dummy Belt Displacements	180
Dummy Neck Forces	1000
Dummy Neck Moments	600
Vehicle Accelerations	60
Vehicle Velocity Integrations	180
Vehicle Displacement Integrations	180
Load Cell Barrier Forces	60

Table of Data Plots

The following dummy, vehicle and load cell response data can be found in the research and development section of the NHTSA website at: www.nhtsa.dot.gov

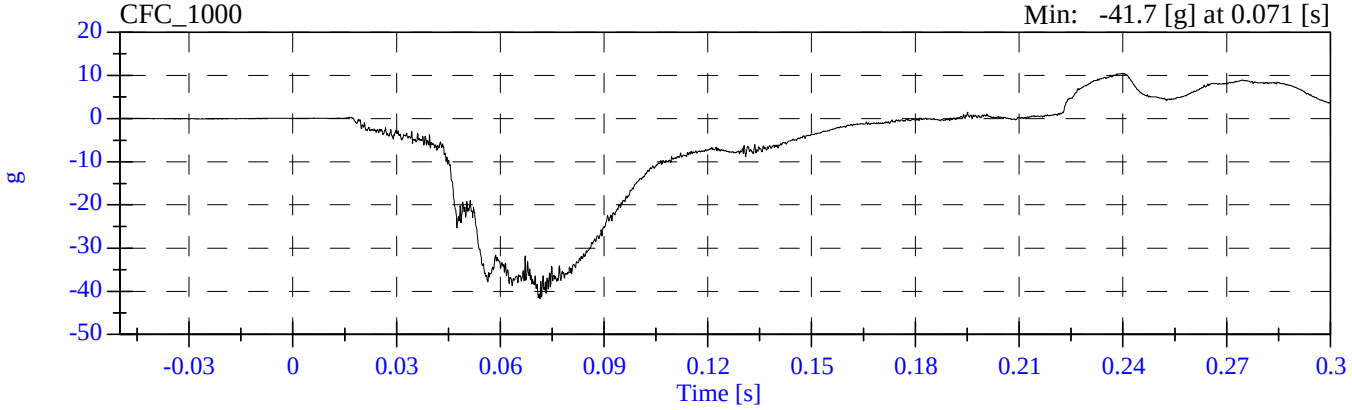
V1P1 Head CG Ax	V1P1 Lap Belt Load
V1P1 Head CG Ay	V1P1 Shoulder Belt Load
V1P1 Head CG Az	V1P2 Lap Belt Load
V1P1 Head CG Red Ax	V1P2 Shoulder Belt Load
V1P1 Head CG Red Ay	V1 Left Rear #1x
V1P1 Head CG Red Az	V1 Right Rear #2x
V1P1 Upper Neck Fx	V1 Engine Top #3x
V1P1 Upper Neck Fy	V1 Engine Bottom #4x
V1P1 Upper Neck Fz	V1 Right Caliper #5x
V1P1 Upper Neck Mx	V1 Left Caliper #7x
V1P1 Upper Neck My	V1 Left Rear #8z
V1P1 Upper Neck Mz	V1 Right Rear #9z
V1P1 Chest Ax	
V1P1 Chest Ay	
V1P1 Chest Az	
V1P1 Chest Red Ax	
V1P1 Chest Red Ay	
V1P1 Chest Red Az	
V1P1 Chest Compression	
V1P1 Pelvic Ax	
V1P1 Pelvic Ay	
V1P1 Pelvic Az	
V1P1 Left Femur Fz	
V1P1 Right Femur Fz	
V1P1 Left Upper Tibia Mx	
V1P1 Left Upper Tibia My	
V1P1 Left Lower Tibia Fz	
V1P1 Left Lower Tibia Mx	
V1P1 Left Lower Tibia My	
V1P1 Right Upper Tibia Fz	
V1P1 Right Upper Tibia Mx	
V1P1 Right Upper Tibia My	
V1P1 Right Lower Tibia Mx	
V1P1 Right Lower Tibia My	
V1P1 Left Foot Aft Ax	
V1P1 Left Foot Aft Az	
V1P1 Left Foot Fore Az	
V1P1 Right Foot Aft Ax	
V1P1 Right Foot Aft Az	
V1P1 Right Foot Fore z	

V1P2 Head CG Ax	Barrier Load Cell A5 Fx
V1P2 Head CG Ay	Barrier Load Cell A6 Fx
V1P2 Head CG Az	Barrier Load Cell A7 Fx
V1P2 Head CG Red Ax	Barrier Load Cell A8 Fx
V1P2 Head CG Red Ay	Barrier Load Cell A9 Fx
V1P2 Head CG Red Az	Barrier Load Cell B1 Fx
V1P2 Upper Neck Fx	Barrier Load Cell B2 Fx
V1P2 Upper Neck Fy	Barrier Load Cell B3 Fx
V1P2 Upper Neck Fz	Barrier Load Cell B4 Fx
V1P2 Upper Neck Mx	Barrier Load Cell B5 Fx
V1P2 Upper Neck My	Barrier Load Cell B6 Fx
V1P2 Upper Neck Mz	Barrier Load Cell B7 Fx
V1P2 Chest Ax	Barrier Load Cell B8 Fx
V1P2 Chest Ay	Barrier Load Cell B9 Fx
V1P2 Chest Az	Barrier Load Cell C1 Fx
V1P2 Chest Red Ax	Barrier Load Cell C2 Fx
V1P2 Chest Red Ay	Barrier Load Cell C3 Fx
V1P2 Chest Red Az	Barrier Load Cell C4 Fx
V1P2 Chest Compression	Barrier Load Cell C5 Fx
V1P2 Pelvic Ax	Barrier Load Cell C6 Fx
V1P2 Pelvic Ay	Barrier Load Cell C7 Fx
V1P2 Pelvic Az	Barrier Load Cell C8 Fx
V1P2 Left Femur Fz	Barrier Load Cell C9 Fx
V1P2 Right Femur Fz	Barrier Load Cell D1 Fx
V1P2 Left Upper Tibia Fz	Barrier Load Cell D2 Fx
V1P2 Left Upper Tibia Mx	Barrier Load Cell D3 Fx
V1P2 Left Upper Tibia My	Barrier Load Cell D4 Fx
V1P2 Left Lower Tibia Mx	Barrier Load Cell D5 Fx
V1P2 Left Lower Tibia My	Barrier Load Cell D6 Fx
V1P2 Right Upper Tibia Mx	Barrier Load Cell D7 Fx
V1P2 Right Upper Tibia My	Barrier Load Cell D8 Fx
V1P2 Right Lower Tibia Fz	Barrier Load Cell D9 Fx
V1P2 Right Lower Tibia Mx	
V1P2 Right Lower Tibia My	
V1P2 Left Foot Aft Ax	
V1P2 Left Foot Aft Az	
V1P2 Left Foot Fore Az	
V1P2 Right Foot Aft Ax	
V1P2 Right Foot Aft Az	
V1P2 Right Foot Fore Az	
Barrier Load Cell A1 Fx	
Barrier Load Cell A2 Fx	
Barrier Load Cell A3 Fx	
Barrier Load Cell A4 Fx	

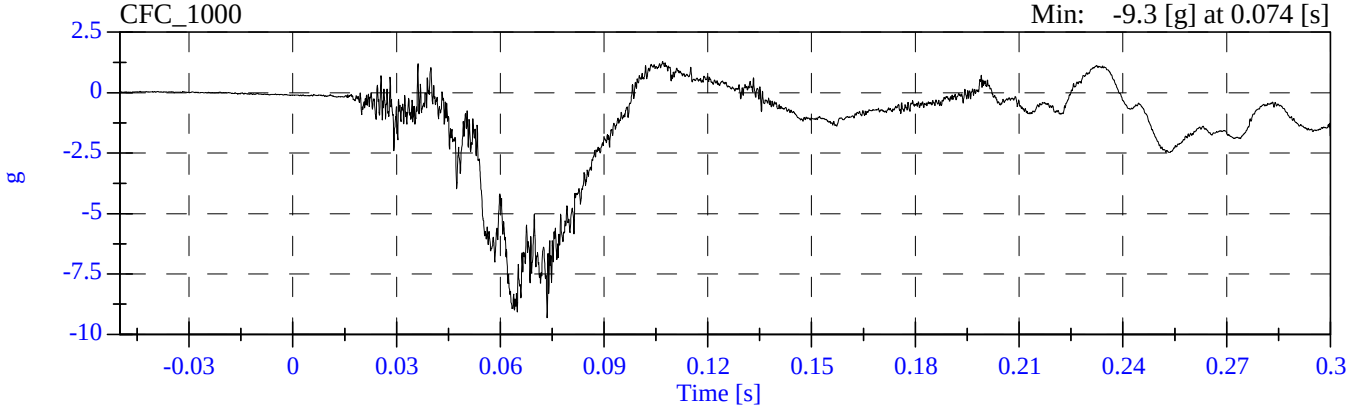
TEST NOTES	
Data Channel	Anomalies
V1P1 Upper Neck Mz	Data Noise Spikes
V1P1 Pelvic X	Questionable data between 94 and 98 milliseconds
V1P1 Right Foot Aft X	Sensor failure after 66 milliseconds
V1P1 Right Foot Aft Z	Sensor failure after 65 milliseconds
V1 Engine Bottom X	Sensor Failure after 43 milliseconds
V1 Right Caliper X	Sensor failure after 44 milliseconds
V1 Left Caliper X	Questionable data between 44.8 and 45.8 milliseconds

2009 NCAP Test 3 2009 Acura TL
M95304 - October 21, 2008

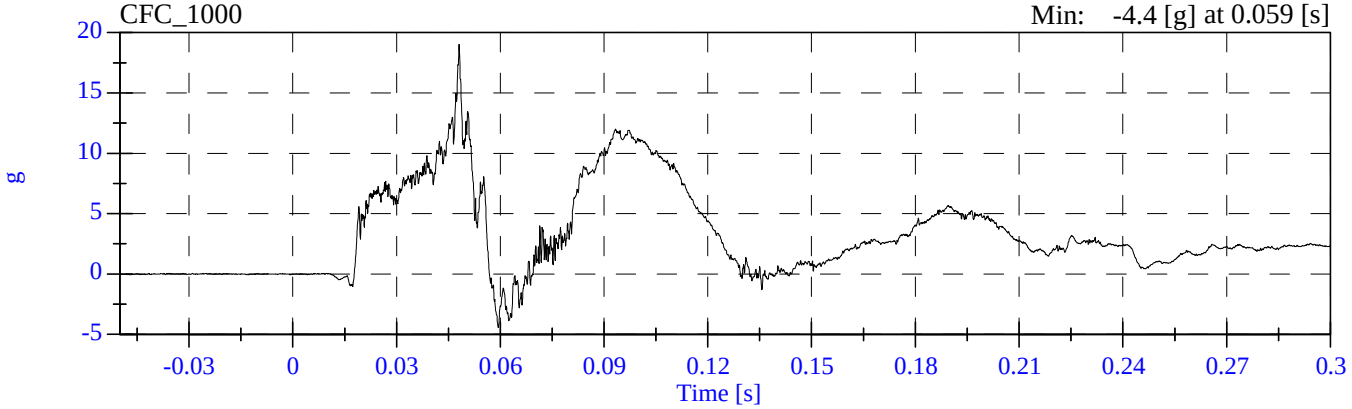
V1P1 Head x
CFC_1000
Max: 10.4 [g] at 0.240 [s]
Min: -41.7 [g] at 0.071 [s]



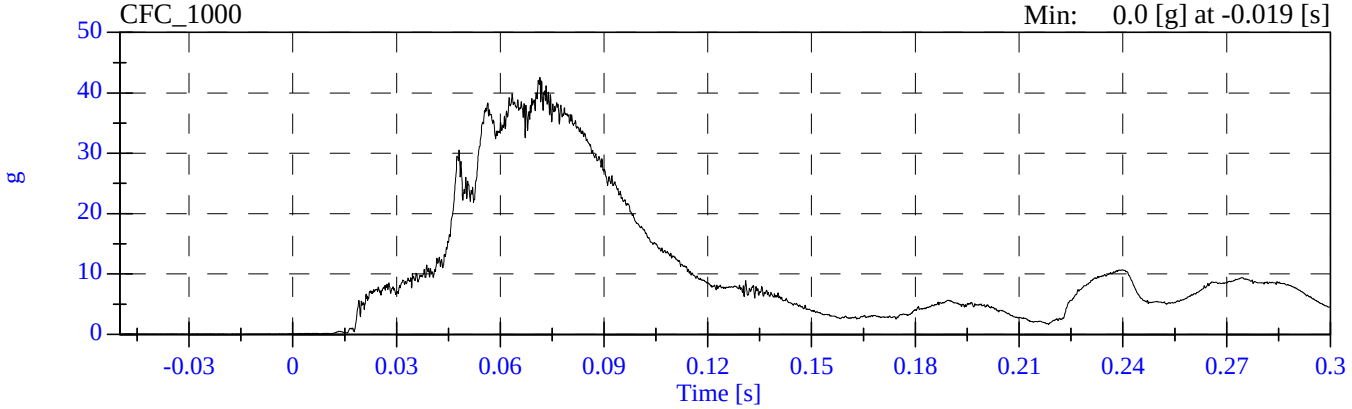
V1P1 Head y
CFC_1000
Max: 1.3 [g] at 0.107 [s]
Min: -9.3 [g] at 0.074 [s]



V1P1 Head z
CFC_1000
Max: 19.0 [g] at 0.048 [s]
Min: -4.4 [g] at 0.059 [s]



V1P1 Head Resultant
CFC_1000
Max: 42.6 [g] at 0.071 [s]
Min: 0.0 [g] at -0.019 [s]



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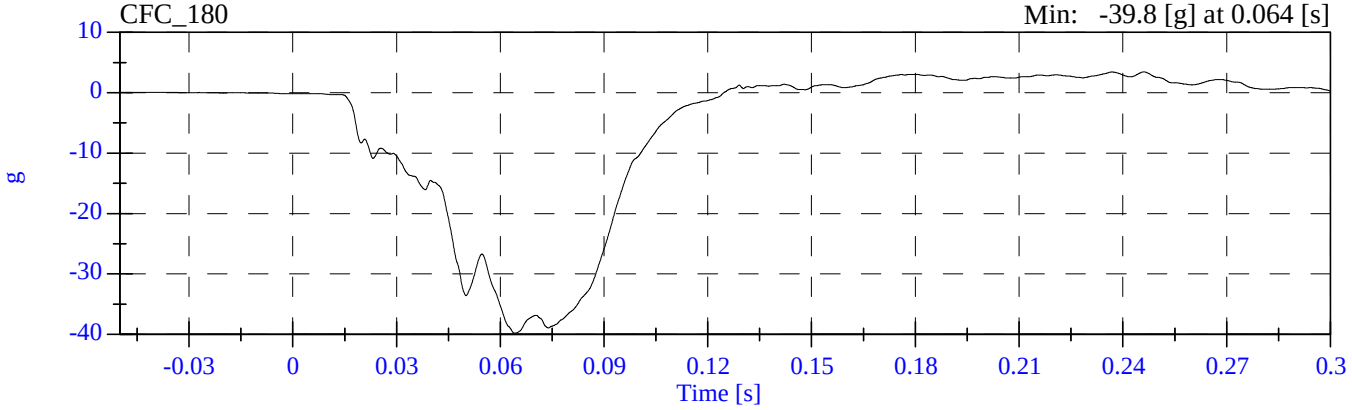
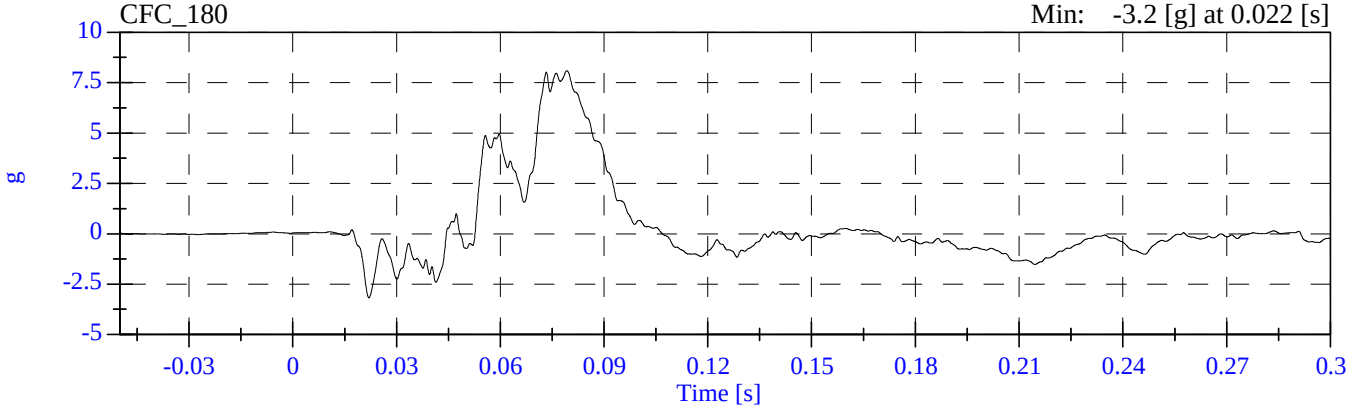
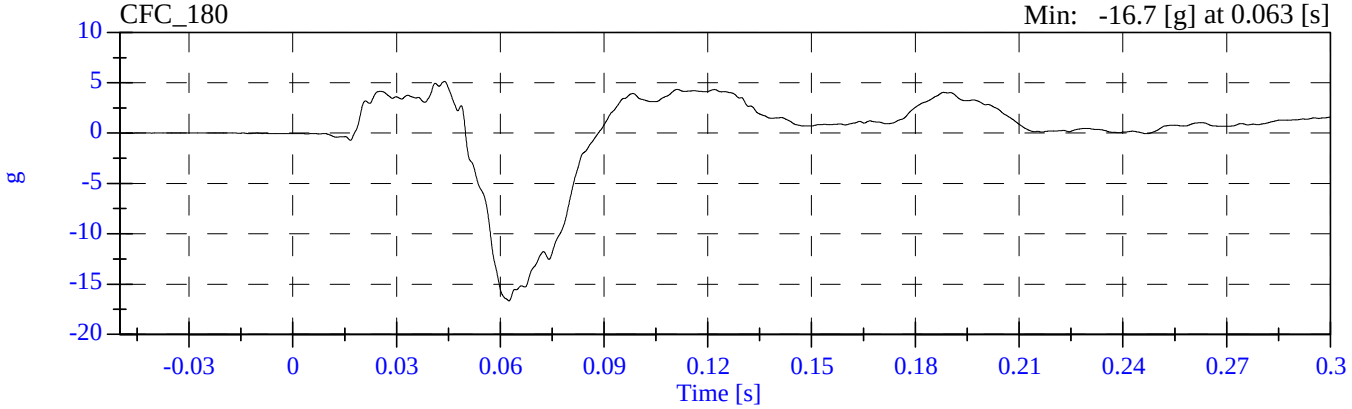
V1P1 Chest x
CFC_180
Max: 3.4 [g] at 0.246 [s]
Min: -39.8 [g] at 0.064 [s]



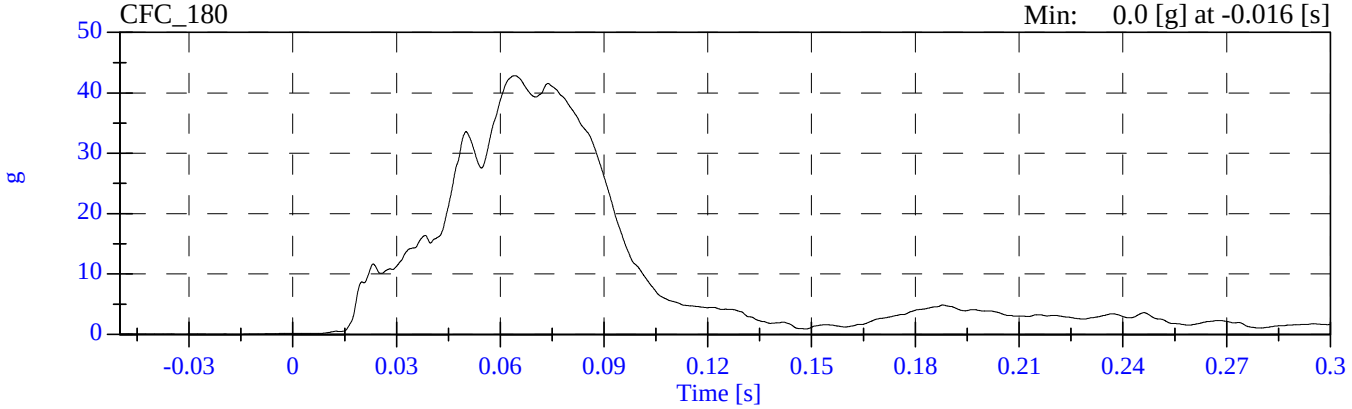
V1P1 Chest y
CFC_180
Max: 8.1 [g] at 0.079 [s]
Min: -3.2 [g] at 0.022 [s]



V1P1 Chest z
CFC_180
Max: 5.1 [g] at 0.044 [s]
Min: -16.7 [g] at 0.063 [s]



V1P1 Chest Resultant
CFC_180
Max: 42.8 [g] at 0.064 [s]
Min: 0.0 [g] at -0.016 [s]



2009 NCAP Test 3 2009 Acura TL
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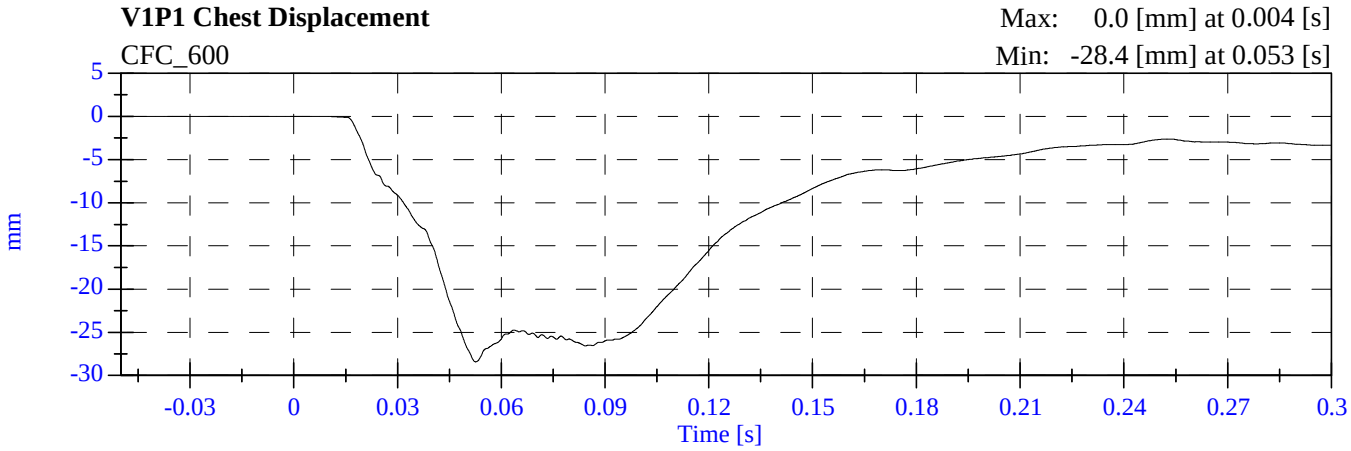

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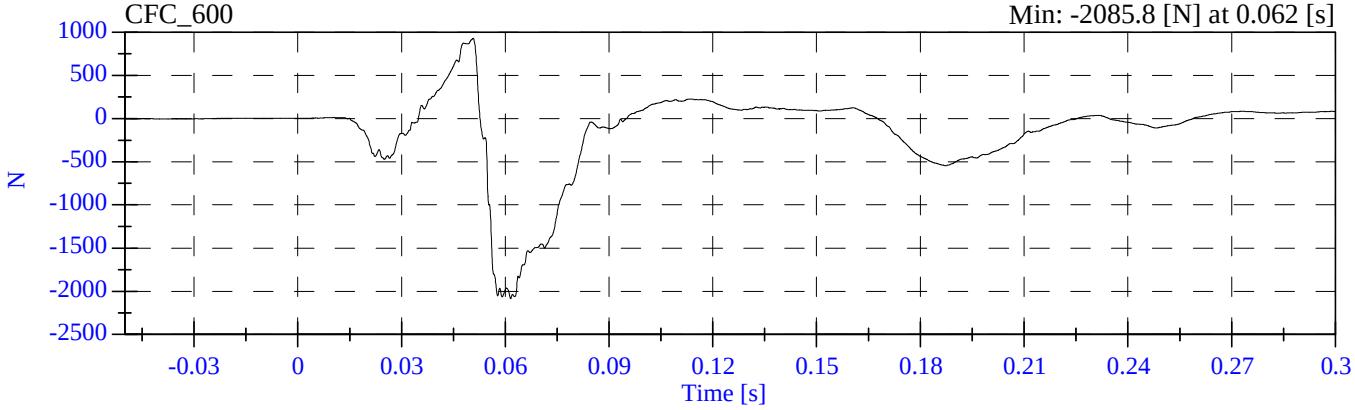
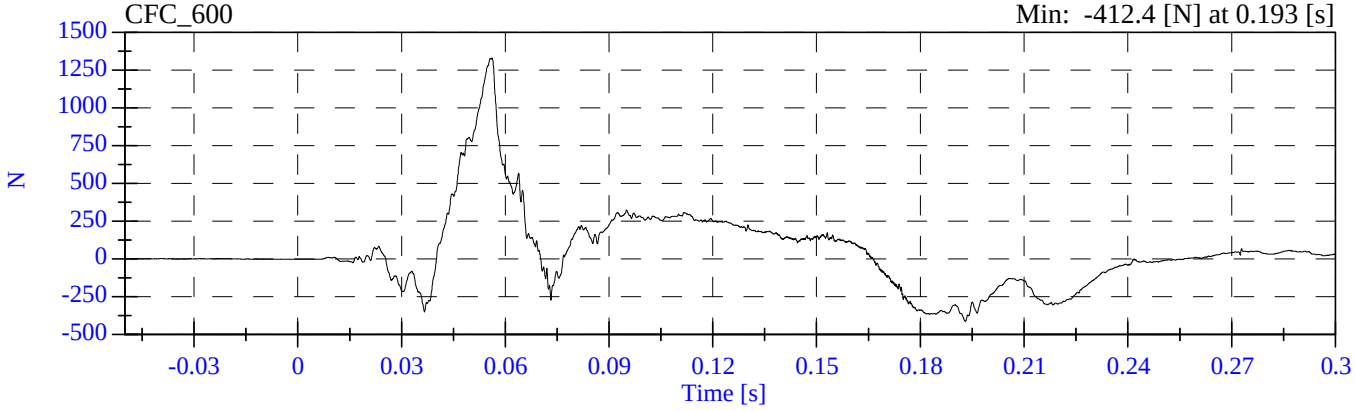
V1P1 Left Femur
CFC_600
Max: 930.7 [N] at 0.051 [s]
Min: -2085.8 [N] at 0.062 [s]

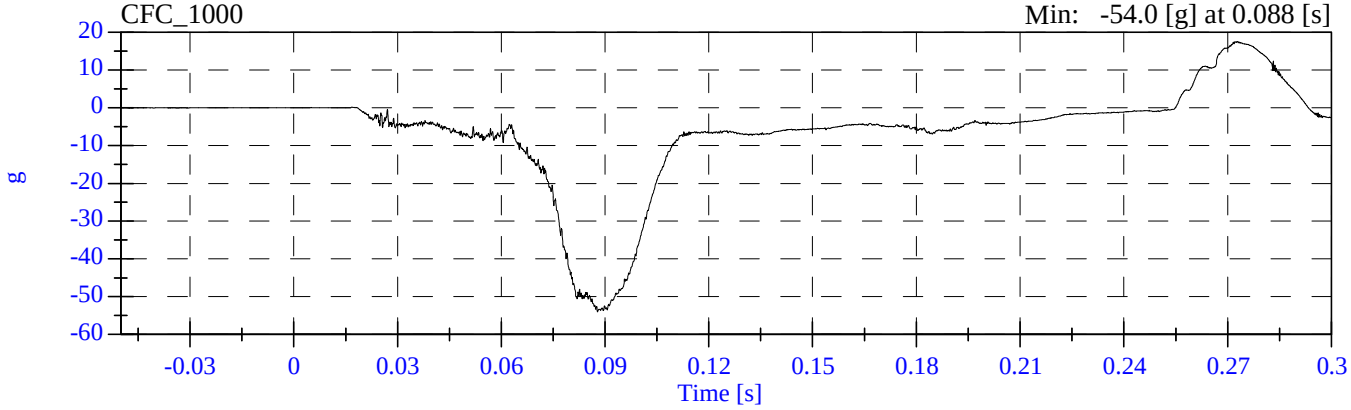


V1P1 Right Femur
CFC_600
Max: 1330.3 [N] at 0.056 [s]
Min: -412.4 [N] at 0.193 [s]

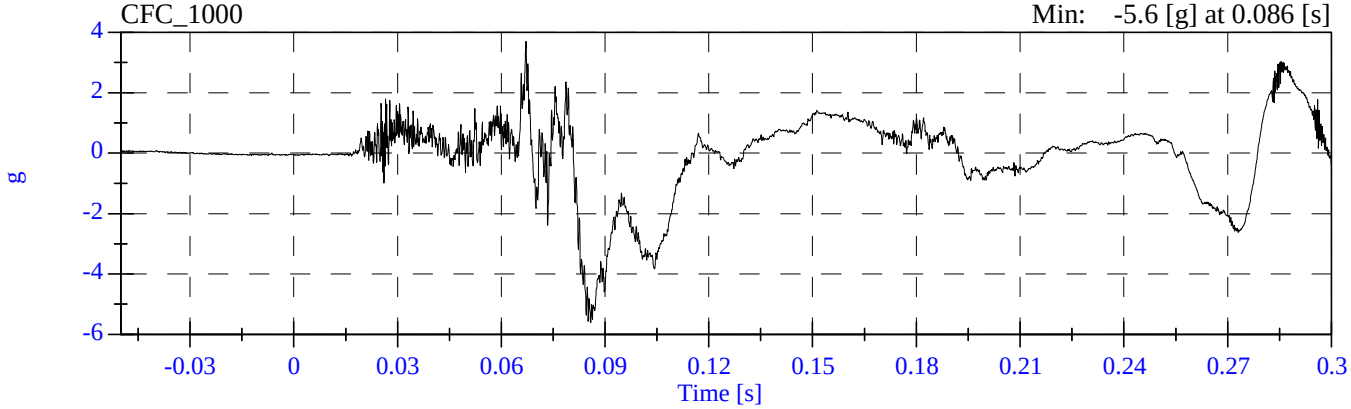


2009 NCAP Test 3 2009 Acura TL
M95304 - October 21, 2008

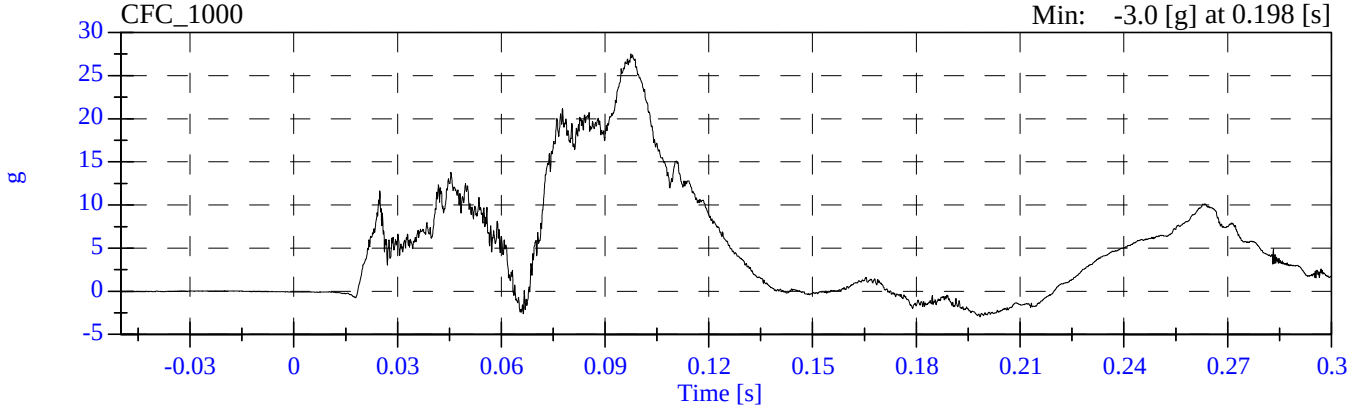
V1P2 Head x
CFC_1000
Max: 17.6 [g] at 0.273 [s]
Min: -54.0 [g] at 0.088 [s]



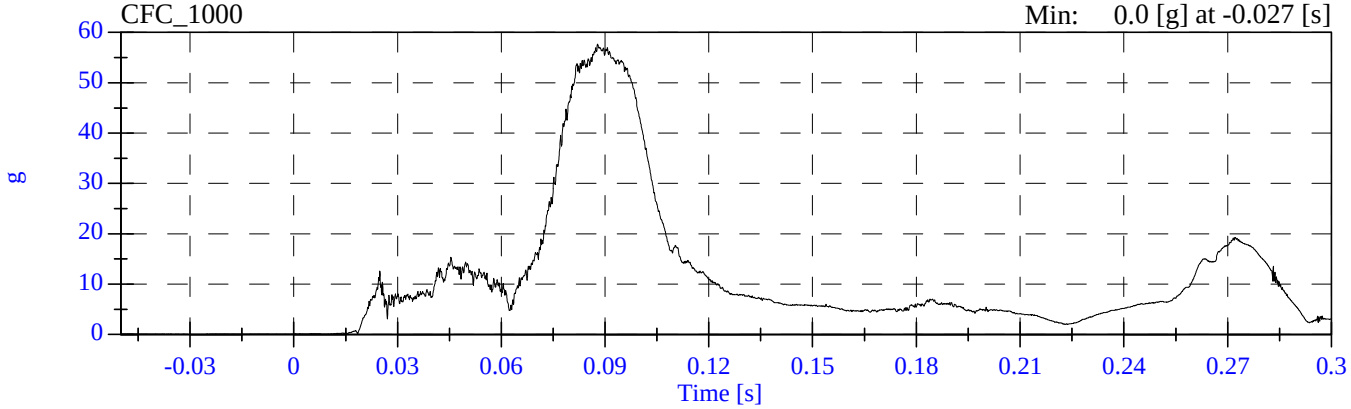
V1P2 Head y
CFC_1000
Max: 3.7 [g] at 0.067 [s]
Min: -5.6 [g] at 0.086 [s]



V1P2 Head z
CFC_1000
Max: 27.5 [g] at 0.097 [s]
Min: -3.0 [g] at 0.198 [s]



V1P2 Head Resultant
CFC_1000
Max: 57.7 [g] at 0.088 [s]
Min: 0.0 [g] at -0.027 [s]



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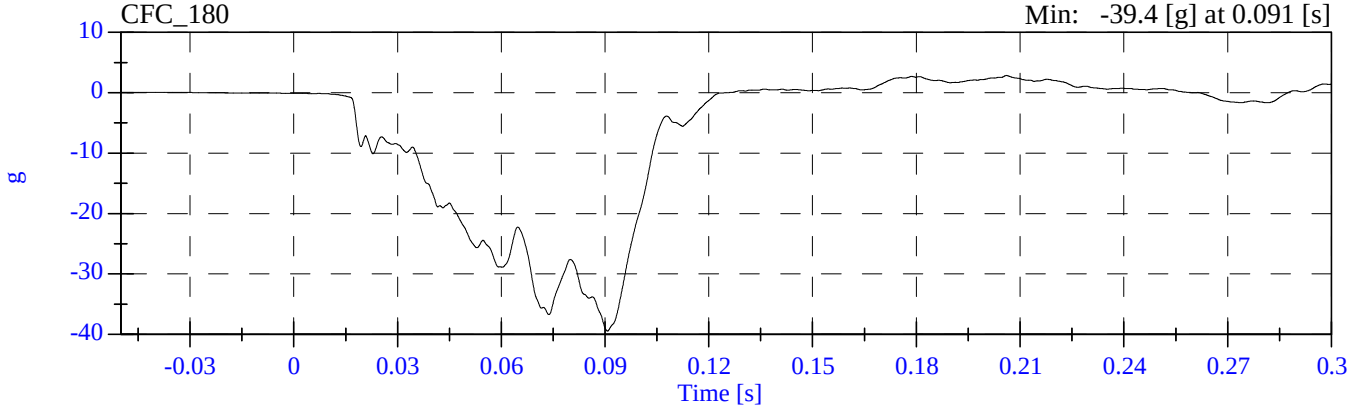
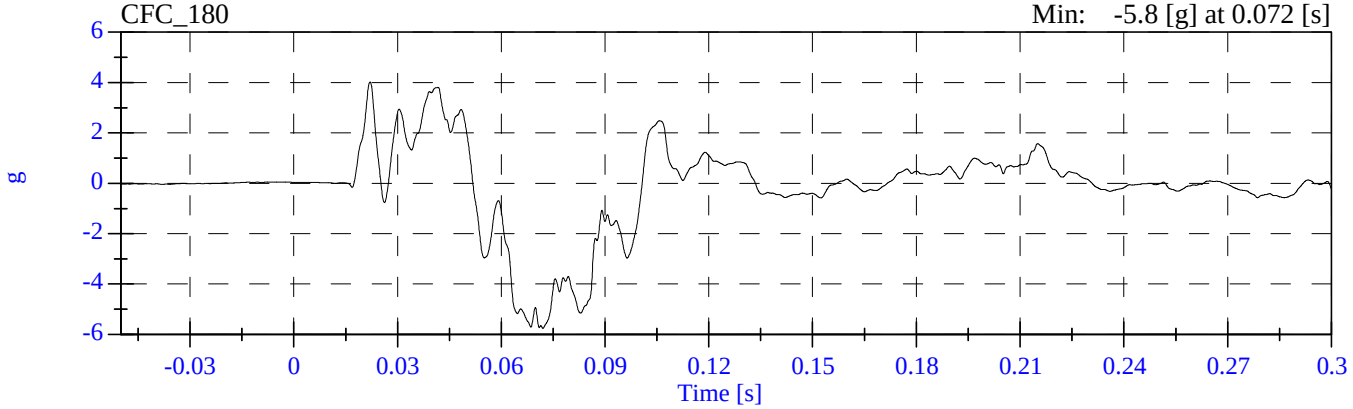
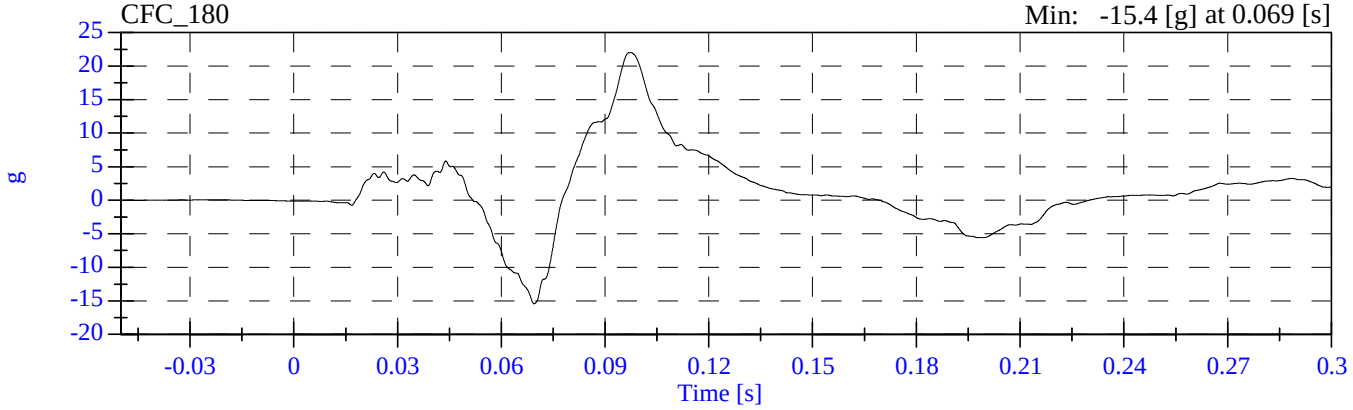
V1P2 Chest x
CFC_180
Max: 2.9 [g] at 0.206 [s]
Min: -39.4 [g] at 0.091 [s]



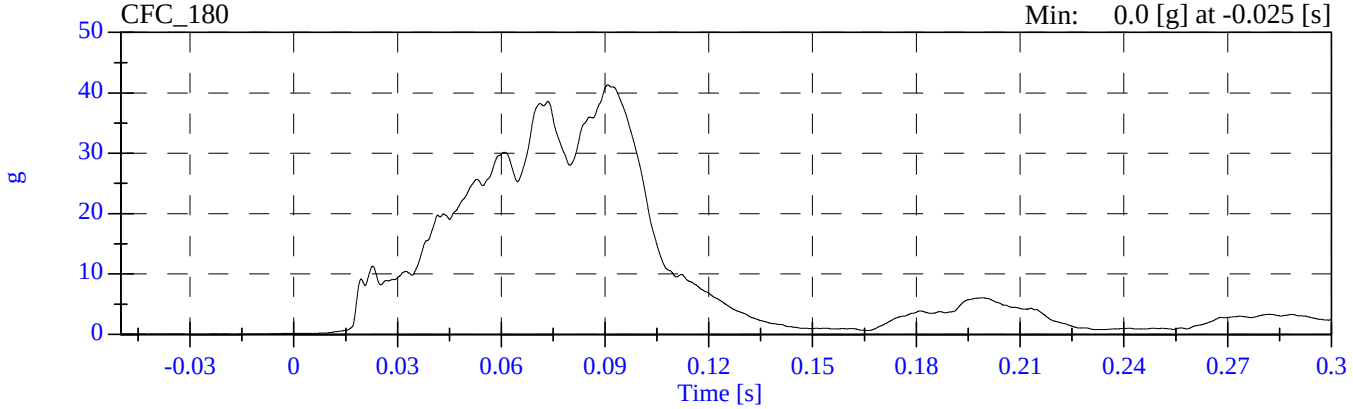
V1P2 Chest y
CFC_180
Max: 4.0 [g] at 0.022 [s]
Min: -5.8 [g] at 0.072 [s]



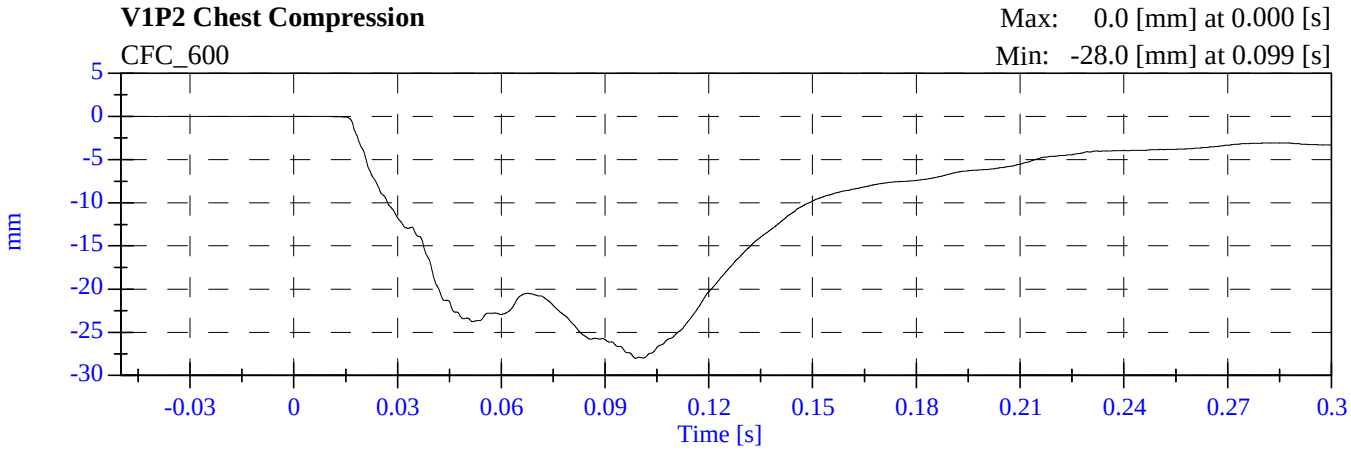
V1P2 Chest z
CFC_180
Max: 22.0 [g] at 0.097 [s]
Min: -15.4 [g] at 0.069 [s]



V1P2 Chest Resultant
CFC_180
Max: 41.3 [g] at 0.091 [s]
Min: 0.0 [g] at -0.025 [s]



2009 NCAP Test 3 2009 Acura TL
M95304 - October 21, 2008



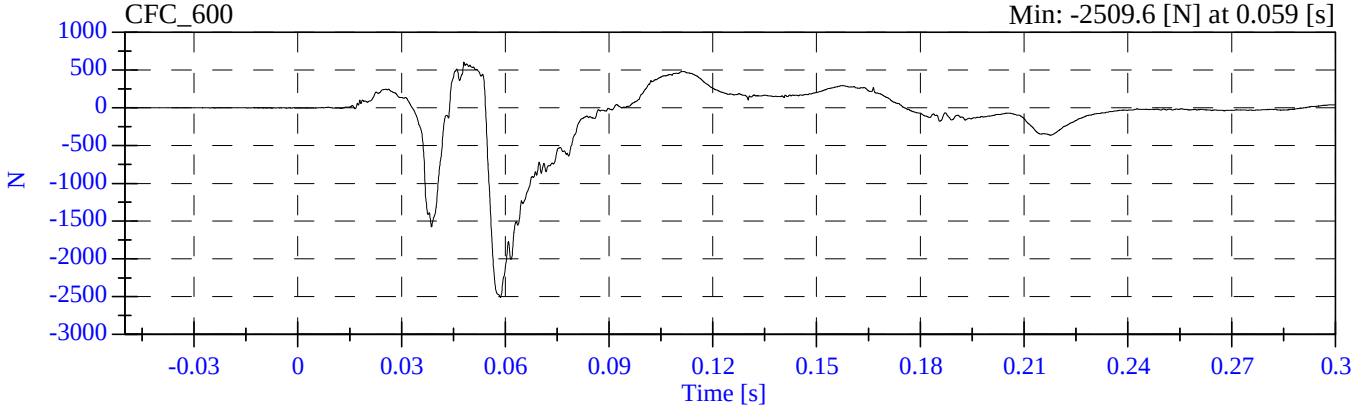
2009 NCAP Test 3 2009 Acura TL
M95304 - October 21, 2008

V1P2 Left Femur

CFC_600

Max: 608.5 [N] at 0.048 [s]

Min: -2509.6 [N] at 0.059 [s]

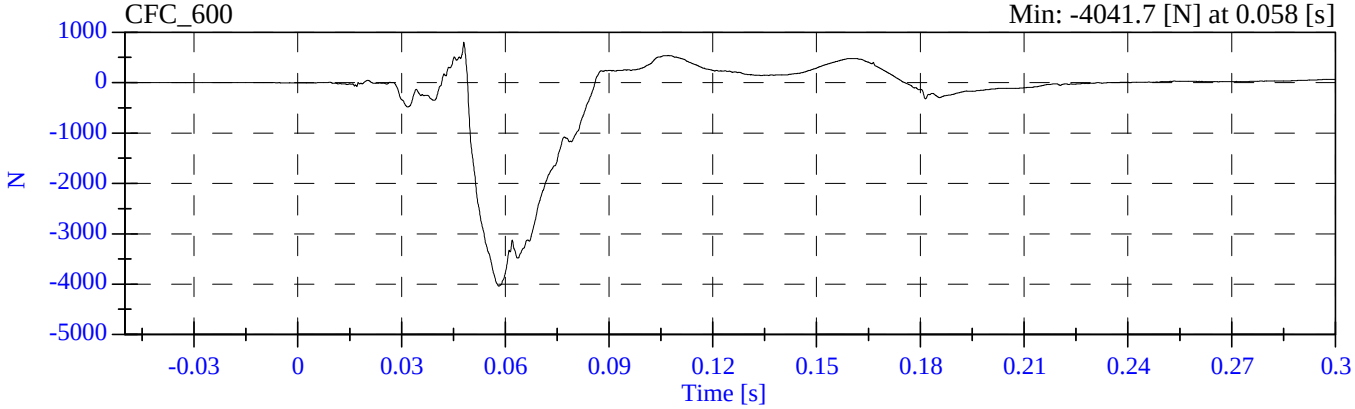


V1P2 Right Femur

CFC_600

Max: 801.5 [N] at 0.048 [s]

Min: -4041.7 [N] at 0.058 [s]



APPENDIX C

PART 572B/E DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

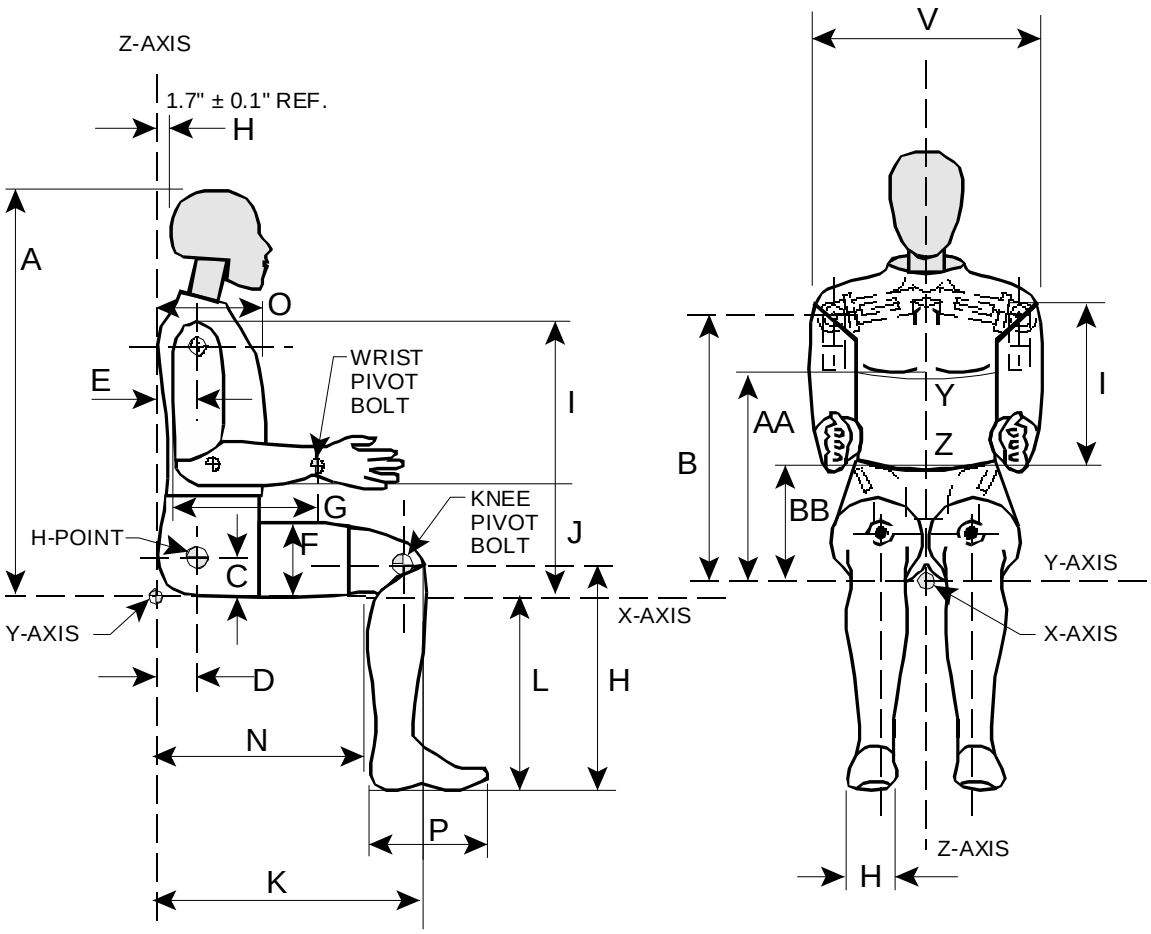
Dummy serial numbers and certification dates are:

Position No./Location	Serial No.	Completion Date
#1/Driver	1046	08-22-08
#2/Right Front Passenger	1047	08-22-08

Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Indicant Testing Final Report No. 6525-V-1.

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude. (REF: S572.31(A)(6))

PART 572E
HEAD DROP TEST

Dummy Serial Number	1046
Sequential Test Number	1
Date	8-18-08
Workfile	1046H 08-18-08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	22.2
Relative Humidity	10% - 70%	60
Peak Resultant Acceleration	225-275 G's	274.49
Peak Lateral Acceleration	15 G's Max	6.79
Is Acceleration Curve Unimodal?	YES	Yes

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	1046	
Sequential Test Number	1	
Date	08-19-08	6 Axis Neck Transducer
Workfile	1046NF4 08-19-08	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.67
Relative Humidity		10% - 70%	61
Impact Velocity		6.89 – 7.13 m/s	7.00
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	23.62
	20 ms	17.60 - 22.60 G's	21.16
	30 ms	12.50 - 18.50 G's	15.90
Max Pendulum G's Above 30 ms		29 G's Max	15.90
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	39
D Plane Rotation	Max	64 - 78 Deg	69.6
	Time	57 - 64 ms	60.30
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	100.01
	Time	47 - 58 ms	51.30
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	114.8
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	98.60

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	1046	
Sequential Test Number	1	
Date	8-19-08	6 Axis Neck Transducer
Workfile	1046NE 08-18-08	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.67
Relative Humidity		10% - 70%	58
Impact Velocity		5.94 – 6.19 m/s	6.07
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	20.06
	20 ms	14.00 - 19.00 G's	18.59
	30 ms	11.00 - 16.00 G's	14.82
Max Pendulum G's Above 30 ms		22 G's Max	14.82
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	39.70
D Plane Rotation	Max	81 - 106 Deg	92.89
	Time	72 - 82 ms	72.80
Moment About Occipital Condyle	Max	-79.99 - -52.88 N-m	-55.41
	Time	65 - 79 ms	70.20
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	149.20
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	146.20

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	1046
Sequential Test Number	1
Date	8-21-08
Workfile	1046T 08-21-08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.1
Relative Humidity	10% - 70%	50
Pendulum Velocity	6.58 – 6.83 m/s	6.70
Maximum Deflection	63.50 – 72.64 mm	67.06
Maximum Resistive Force	5159.9 – 5893.9 N	5165.2
Internal Hysteresis	69 - 85 %	71.5

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	1046
Sequential Test Number	1
Date	08-22-08
Workfile	1046LF 8-22-08; 1046RF 8-22-08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	58
Probe Velocity	2.07 – 2.13 m/s	2.12
Peak Knee Impact Force	4715.1 – 5782.7 N	5377.7
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	56
Probe Velocity	2.07 – 2.13 m/s	2.09
Peak Knee Impact Force	4715.1 – 5782.7 N	5260.9

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 1046
Sequential Test Number 1
Date 8-22-08

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			33.0
Location for Chest Circumference	AA	16.9 -17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Total Sitting Height	A	34.6 - 35.0 in	34.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.0
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.3
Thigh Clearance	F	5.5 - 6.1 in	5.6
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.9
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.3
Elbow Rest Height	J	7.5 - 8.3 in	7.8
Buttock Knee Length	K	22.8 - 23.8 in	23.1
Popliteal Height	L	16.9 - 17.9 in	17.6
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Buttock Popliteal Length	N	17.8 - 18.8 in	18.3
Chest Depth	O	8.4 - 9.0 in	8.7
Foot Length	P	9.9 - 10.5 in	9.9
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Foot Breadth	W	3.6 - 4.2 in	3.8
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	38.7
Waist Circumference	Z	32.9 - 34.1 in	33.5

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
HEAD DROP TEST

Dummy Serial Number	1047
Sequential Test Number	1
Date	08-18-08
Workfile	1047H 08-18-08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 – 25.6 Deg C	22.2
Relative Humidity	10% - 70%	60
Peak Resultant Acceleration	225-275 G's	268.75
Peak Lateral Acceleration	15 G's Max	11.43
Is Acceleration Curve Unimodal?	YES	Yes

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
NECK FLEXION TEST

Dummy Serial Number	1047	
Sequential Test Number	1	
Date	08-20-08	6 Axis Neck Transducer
Workfile	1047NF2 08-20-08	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.1
Relative Humidity		10% - 70%	48
Impact Velocity		6.89 – 7.13 m/s	7.00
Pendulum Deceleration	10 ms	22.50 - 27.50 G's	25.19
	20 ms	17.60 - 22.60 G's	21.08
	30 ms	12.50 - 18.50 G's	16.39
Max Pendulum G's Above 30 ms		29 G's Max	16.39
Deceleration - Time Curve Decay Time to 5 G's		34 - 42 ms	38.20
D Plane Rotation	Max	64 - 78 Deg	70.63
	Time	57 - 64 ms	59.40
Moment About Occipital Condyle	Max	88.13 – 108.47 N-m	96.39
	Time	47 - 58 ms	49.10
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 ms	114.20
Positive Moment - Time Curve Decay Time to Zero		97 - 107 ms	100.20

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
NECK EXTENSION TEST

Dummy Serial Number	1047	
Sequential Test Number	1	
Date	8-20-08	6 Axis Neck Transducer
Workfile	1047NE2 08-20-08	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		20.6 – 22.2 Deg C	21.11
Relative Humidity		10% - 70%	48
Impact Velocity		5.94 – 6.19 m/s	6.07
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	20.40
	20 ms	14.00 - 19.00 G's	17.81
	30 ms	11.00 - 16.00 G's	14.05
Max Pendulum G's Above 30 ms		22 G's Max	14.05
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	40.20
D Plane Rotation	Max	81 - 106 Deg	95.43
	Time	72 - 82 ms	74.90
Moment About Occipital	Max	-79.99 - -52.88 N-m	-71.15
Condyle	Time	65 - 79 ms	70.90
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	153.50
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	138.30

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
THORAX IMPACT TEST

Dummy Serial Number	1047
Sequential Test Number	1
Date	8-21-08
Workfile	1047T5 08-21-08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	20.6 – 22.2 Deg C	21.67
Relative Humidity	10% - 70%	51
Pendulum Velocity	6.58 – 6.83 m/s	6.66
Maximum Deflection	63.50 – 72.64 mm	70.87
Maximum Resistive Force	5159.9 – 5893.9 N	5306.2
Internal Hysteresis	69 - 85 %	70.3

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
KNEE IMPACT TEST

Dummy Serial Number	1047
Sequential Test Number	1
Date	8-22-08
Workfile	1047LF 8-22-08; 1047RF 8-22-08

TEST PARAMETER	SPECIFICATION	TEST RESULTS
LEFT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	56
Probe Velocity	2.07 – 2.13 m/s	2.08
Peak Knee Impact Force	4715.1 – 5782.7 N	4894.4
RIGHT KNEE		
Temperature	18.9 – 25.6 Deg C	21.7
Relative Humidity	10% - 70%	56
Probe Velocity	2.07 – 2.13 m/s	2.09
Peak Knee Impact Force	4715.1 – 5782.7 N	5097.7

Remarks: None

Laboratory Technician: B. Swiecicki

PART 572E
EXTERNAL DIMENSIONS

Dummy Serial Number 1047
Sequential Test Number 1
Date 8-22-08

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			21.1
Relative Humidity			33.0
Location for Chest Circumference	AA	16.9 -17.1 in	16.9
Location for Waist Circumference	BB	8.9 - 9.1 in	8.9
Total Sitting Height	A	34.6 - 35.0 in	34.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.1
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.4
Thigh Clearance	F	5.5 - 6.1 in	5.7
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.3
Elbow Rest Height	J	7.5 - 8.3 in	7.6
Buttock Knee Length	K	22.8 - 23.8 in	22.9
Popliteal Height	L	16.9 - 17.9 in	17.3
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Buttock Popliteal Length	N	17.8 - 18.8 in	17.9
Chest Depth	O	8.4 - 9.0 in	8.6
Foot Length	P	9.9 - 10.5 in	10.2
Shoulder Breadth	V	16.6 - 17.2 in	16.9
Foot Breadth	W	3.6 - 4.2 in	3.8
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	38.6
Waist Circumference	Z	32.9 - 34.1 in	33.2

Remarks: None

Laboratory Technician: B. Swiecicki

APPENDIX D

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 1046)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-P50060	04-Sep-08	03-Mar-09
	Y	ENDEVCO	AC-P59009	03-Sep-08	02-Mar-09
	Z	ENDEVCO	AC-P49239	03-Sep-08	02-Mar-09
Head	X (R)	ENDEVCO	AC-P50098	03-Sep-08	02-Mar-09
	Y (R)	ENDEVCO	AC-P58975	03-Sep-08	02-Mar-09
	Z (R)	ENDEVCO	AC-P58894	03-Sep-08	02-Mar-09
Neck Load Cell	X	DENTON	LC-1911Fx	13-Mar-08	09-Sep-08
	Y	DENTON	LC-1911Fy	13-Mar-08	09-Sep-08
	Z	DENTON	LC-1911Fz	19-Mar-08	15-Sep-08
Neck Moment	X	DENTON	LC-1911Mx	19-Mar-08	15-Sep-08
	Y	DENTON	LC-1911My	19-Mar-08	15-Sep-08
	Z	DENTON	LC-1911Mz	19-Mar-08	15-Sep-08
Chest	X	ENDEVCO	AC-P49224	04-Sep-08	03-Mar-09
	Y	ENDEVCO	AC-P49200	04-Sep-08	03-Mar-09
	Z	ENDEVCO	AC-P49231	04-Sep-08	03-Mar-09
Chest	X (R)	ENDEVCO	AC-P58779	04-Sep-08	03-Mar-09
	Y (R)	ENDEVCO	AC-P58893	04-Sep-08	03-Mar-09
	Z (R)	ENDEVCO	AC-P59008	04-Sep-08	03-Mar-09
Chest Deflection	X	SERVO	DS-1046	19-Mar-08	15-Sep-08
Pelvic	X	ENDEVCO	AC-P52105	04-Sep-08	03-Mar-09
	Y	ENDEVCO	AC-P49440	04-Sep-08	03-Mar-09
	Z	ENDEVCO	AC-P49222	04-Sep-08	03-Mar-09

INSTRUMENT CALIBRATION FOR DRIVER DUMMY
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 1046)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-256	11-Mar-08	07-Sep-08
Right Femur Load Cell	Fz	DENTON	LC-261	11-Mar-08	07-Sep-08
Left Upper Tibia	Mx	DENTON	LC-114Mx	19-Mar-08	15-Sep-08
	My	DENTON	LC-114My	19-Mar-08	15-Sep-08
Left Lower Tibia	Fz	DENTON	LC-115Fz	18-Mar-08	14-Sep-08
	Mx	DENTON	LC-115Mx	18-Mar-08	14-Sep-08
	My	DENTON	LC-115My	18-Mar-08	14-Sep-08
Right Upper Tibia	Mx	DENTON	LC-92UMx	18-Mar-08	14-Sep-08
	My	DENTON	LC-92UMy	18-Mar-08	14-Sep-08
Right Lower Tibia	Fz	DENTON	LC-92LFz	18-Mar-08	14-Sep-08
	Mx	DENTON	LC-92LMx	18-Mar-08	14-Sep-08
	My	DENTON	LC-92LMy	18-Mar-08	14-Sep-08
Left Foot Rear	X	ENDEVCO	AC-P49205	04-Sep-08	03-Mar-09
	Z	ENDEVCO	AC-P49211	04-Sep-08	03-Mar-09
Left Foot Front	Z	ENDEVCO	AC-P49235	04-Sep-08	03-Mar-09
Right Foot Rear	X	ENDEVCO	AC-P49206	03-Sep-08	02-Mar-09
	Z	ENDEVCO	AC-P49195	03-Sep-08	02-Mar-09
Right Foot Front	Z	ENDEVCO	AC-P49185	04-Sep-08	03-Mar-09
Lap Belt Load Cell		First Technology	LC-156	07-Nov-07	05-May-08
Shoulder Belt Load Cell		First Technology	LC-159	07-Nov-07	05-May-08

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 1047)		Manufacturer	Serial #	Calibration	
				Last	Next
Head	X	ENDEVCO	AC-P50073	02-Sep-08	01-Mar-09
	Y	ENDEVCO	AC-P50062	02-Sep-08	01-Mar-09
	Z	ENDEVCO	AC-P50097	02-Sep-08	01-Mar-09
Head	X (R)	ENDEVCO	AC-P58984	02-Sep-08	01-Mar-09
	Y (R)	ENDEVCO	AC-P58786	02-Sep-08	01-Mar-09
	Z (R)	ENDEVCO	AC-P58787	02-Sep-08	01-Mar-09
Neck Load Cell	X	DENTON	LC-441Fx	14-Mar-08	10-Sep-08
	Y	DENTON	LC-441Fy	14-Mar-08	10-Sep-08
	Z	DENTON	LC-441Fz	14-Mar-08	10-Sep-08
Neck Moment	X	DENTON	LC-441Mx	14-Mar-08	10-Sep-08
	Y	DENTON	LC-441My	14-Mar-08	10-Sep-08
	Z	DENTON	LC-441Mz	14-Mar-08	10-Sep-08
Chest	X	ENDEVCO	AC-P49459	02-Sep-08	01-Mar-09
	Y	ENDEVCO	AC-P52108	02-Sep-08	01-Mar-09
	Z	ENDEVCO	AC-P49213	02-Sep-08	01-Mar-09
Chest	X (R)	ENDEVCO	AC-P58892	02-Sep-08	01-Mar-09
	Y (R)	ENDEVCO	AC-P58885	02-Sep-08	01-Mar-09
	Z (R)	ENDEVCO	AC-P51238	03-Sep-08	02-Mar-09
Chest Deflection	X	SERVO	DS-1047	19-Mar-08	15-Sep-08
Pelvic	X	ENDEVCO	AC-P49186	02-Sep-08	01-Mar-09
	Y	ENDEVCO	AC-P49164	02-Sep-08	01-Mar-09
	Z	ENDEVCO	AC-P52126	02-Sep-08	01-Mar-09

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY
(Six Month Calibration Minimum)

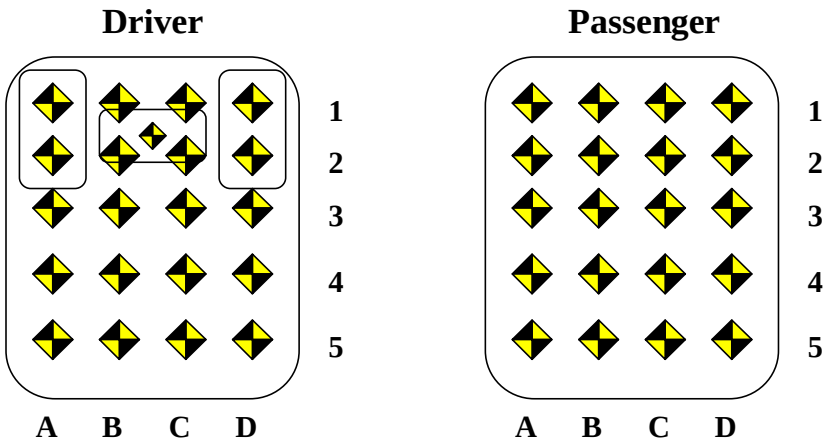
PASSENGER DUMMY (S/N 1047)		Manufacturer	Serial #	Calibration	
				Last	Next
Left Femur Load Cell	Fz	DENTON	LC-255	11-Mar-08	07-Sep-08
Right Femur Load Cell	Fz	DENTON	LC-257	11-Mar-08	07-Sep-08
Left Upper Tibia	Mx	DENTON	LC-368Mx	19-Mar-08	15-Sep-08
	My	DENTON	LC-368My	19-Mar-08	15-Sep-08
Left Lower Tibia	Fz	DENTON	LC-364Fz	18-Mar-08	14-Sep-08
	Mx	DENTON	LC-364Mx	18-Mar-08	14-Sep-08
	My	DENTON	LC-364My	18-Mar-08	14-Sep-08
Right Upper Tibia	Mx	DENTON	LC-370Mx	19-Mar-08	15-Sep-08
	My	DENTON	LC-370My	19-Mar-08	15-Sep-08
Right Lower Tibia	Fz	DENTON	LC-368LFz	18-Mar-08	14-Sep-08
	Mx	DENTON	LC-368LMx	18-Mar-08	14-Sep-08
	My	DENTON	LC-368LMy	18-Mar-08	14-Sep-08
Left Foot Rear	X	ENDEVCO	AC-P50065	03-Sep-08	02-Mar-09
	Z	ENDEVCO	AC-P52123	03-Sep-08	02-Mar-09
Left Foot Front	Z	ENDEVCO	AC-P52149	03-Sep-08	02-Mar-09
Right Foot Rear	X	ENDEVCO	AC-P50089	03-Sep-08	02-Mar-09
	Z	ENDEVCO	AC-P49463	03-Sep-08	02-Mar-09
Right Foot Front	Z	ENDEVCO	AC-P50092	03-Sep-08	02-Mar-09
Lap Belt Load Cell		First Technology	LC-173	07-Nov-07	05-May-08
Shoulder Belt Load Cell		First Technology	LC-178	07-Nov-07	05-May-08

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ENDEVCO	AC-P38188	19-Jun-08	16-Dec-08
Right Rear Seat Crossmember X	ENDEVCO	AC-P35811	11-Jul-08	07-Jan-09
Top of Engine	ICS	AC-FA2481	06-Oct-08	04-Apr-09
Bottom of Engine	ICS	AC-FA2475	02-Jul-08	29-Dec-08
Right Disc Brake Caliper	ICS	AC-FA2480	06-Oct-08	04-Apr-09
Left Disc Brake Caliper	ICS	AC-FA2490	06-Oct-08	04-Apr-09
Left Seat Rear Crossmember Z	ENDEVCO	AC-P15526	11-Jul-08	07-Jan-09
Right Seat Rear Crossmember Z	ENDEVCO	AC-P35803	11-Jul-08	07-Jan-09

APPENDIX E

VEHICLE INTERIOR INTRUSION MEASUREMENTS

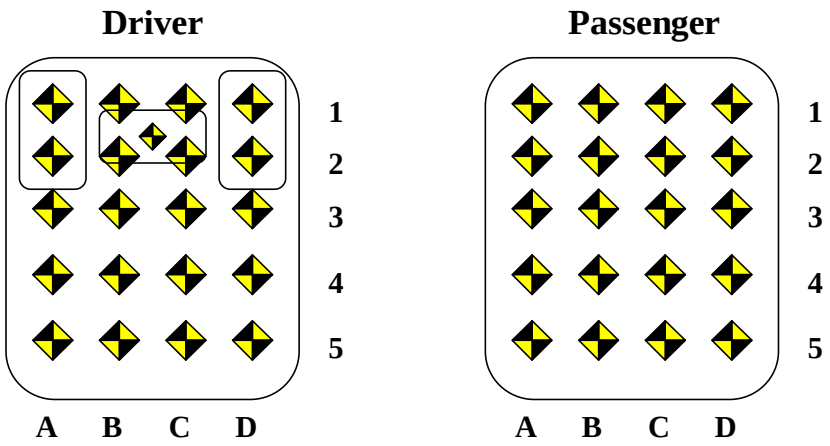


Driver Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3444	-615	375	3440	-610	366	4	-5	9
B1	3550	-477	371	3517	-473	390	33	-4	-19
C1	3559	-344	373	3528	-338	378	31	-6	-5
D1	3540	-210	369	3517	-203	366	23	-7	3
A2	3396	-612	308	3393	-611	301	3	-1	7
B2	3480	-479	305	3467	-474	307	13	-5	-2
C2	3485	-336	307	3468	-335	304	17	-1	3
D2	3445	-217	304	3433	-211	284	12	-6	20
A3	3362	-613	246	3361	-613	237	1	0	9
B3	3404	-477	244	3402	-476	234	2	-1	10
C3	3399	-338	243	3396	-337	226	3	-1	17
D3	3381	-211	251	3375	-204	222	6	-7	29
A4	3275	-611	238	3271	-610	228	4	-1	10
B4	3284	-471	235	3280	-470	215	4	-1	20
C4	3278	-340	238	3276	-341	210	2	1	28
D4	3269	-203	243	3269	-207	215	0	4	28
A5	3167	-608	244	3166	-608	233	1	0	11
B5	3169	-472	235	3168	-472	216	1	0	19
C5	3165	-339	238	3165	-340	213	0	1	25
D5	3161	-210	245	3161	-207	220	0	-3	25
BP	3403	-373	420	3408	-370	415	-5	-3	5
G	3120	-515	687	3122	-515	678	-2	0	9
H	3118	-215	691	3121	-215	673	-3	0	18
L	2898	-383	889	2941	-369	893	-43	-14	-4
AB	2836	-598	281	2836	-595	273	0	-3	8

BP=Brake Pedal, G=Left side of bolster, H=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt

PASSENGER SIDE INTRUSION MEASUREMENTS



Passenger Side Intrusion Measurements

Intrusion Location	PRE-TEST (mm)			POST-TEST (mm)			CHANGE (mm)		
	X	Y	Z	X	Y	Z	X	Y	Z
A1	3519	227	400	3496	217	396	23	10	4
B1	3558	350	398	3523	354	404	35	-4	-6
C1	3561	492	399	3522	495	407	39	-3	-8
D1	3511	617	395	3489	625	393	22	-8	2
A2	3460	222	331	3436	224	320	24	-2	11
B2	3481	348	325	3455	356	323	26	-8	2
C2	3476	487	324	3452	495	320	24	-8	4
D2	3478	615	317	3465	623	314	13	-8	3
A3	3377	211	260	3375	222	236	2	-11	24
B3	3404	343	248	3383	353	245	21	-10	3
C3	3405	489	246	3395	493	228	10	-4	18
D3	3406	615	245	3401	621	231	5	-6	14
A4	3293	210	243	3292	221	210	1	-11	33
B4	3296	342	238	3293	352	200	3	-10	38
C4	3296	484	236	3291	492	206	5	-8	30
D4	3287	610	237	3282	615	220	5	-5	17
A5	3177	206	247	3177	214	214	0	-8	33
B5	3175	343	238	3176	348	204	-1	-5	34
C5	3173	478	236	3168	485	207	5	-7	29
D5	3170	605	243	3166	609	225	4	-4	18
R	3106	230	700	3111	231	681	-5	-1	19
S	3104	531	699	3109	531	687	-5	0	12
AB	2836	597	282	2834	598	268	2	-1	14

R=Left side of bolster, S=Right side of bolster, L=Steering wheel center;
AB = Front outboard seat anchor bolt