

REPORT NUMBER TR-P27121-01-NC

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 SAAB 9-3
4-DOOR SEDAN**

NHTSA NUMBER: A70100

**PREPARED BY:
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MAY 9, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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OFFICE OF CRASHWORTHINESS STANDARDS
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Date of Acceptance

Technical Report Documentation Page

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2007 Saab 9-3 4-Door Sedan at Karco Engineering, LLC on 5/9/07. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 55.80 km/h. The ambient temperature at the barrier face at the time of impact is 32.2 degrees Celcius. The vehicle's maximum post-test static crush is 530 mm at the vehicle's centerline and at Crush Zone C3. The test vehicle is equipped with a 3-point continuous belt system and second generation supplemental airbags in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:					
Measurement Description		Units	Threshold	Driver ATD	Passenger ATD
Head Injury Criteria (HIC)		N/A	1000	551.6	524.4
Max. Chest Accel. (3 msec Clip)		G's	60	45.4	49.7
Left Femur Force		Newtons	10008	-1787.2	-549.9
Right Femur Force		Newtons	10008	-656.8	-1946.8
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SECTION 1

PURPOSE AND SUMMARY OF TEST A70100

1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the New Car Assessment Program (NCAP) sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00027. 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 30 mph (48.3 km/h) requirements.

The 35 mph (56.3 km/h) 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 July 2005. 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.

1.2 SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2007 Saab 9-3 4-Door Sedan at a velocity of 55.80 km/h. The test was performed at Karco Engineering, LLC on May 9, 2007.

Three (3) real-time and fourteen (14) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet number 14 (page number 24) of 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 (primary and redundant), chest (primary and redundant) and pelvis triaxial accelerometers, chest displacement potentiometers, six-axis upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were placed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. Shoulder belt spool-off was measured for the driver and passenger dummies. The driver (position 1) ATD (Serial No. 035) and the right-front passenger (position 2) ATD (Serial No. 034) were calibrated two tests prior to this test.

One hundred and thirty two (132) channels of data were recorded using a TDAS data acquisition system. Appendix A contains Pre and Post-Test Photographs, Appendix B contains the Dummy Response data traces, Appendix C contains the Dummy Calibration data, and Appendix D contains the Child Restraint System Report.

There was 100 percent windshield retention and there was no intrusion into the protected zone of the windshield during the impact 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 530 mm at crush zone 3 (left side of bumper and at the vehicle's centerline) and both the driver and the passenger side doors remained closed and latched during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD's head and chest contacted the airbag and the abdomen had no contact. Both knees contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger ATD's head and chest contacted the airbag. Both knees contacted the glove box.

Occupant injury data is contained in table below.

OCCUPANT DATA SUMMARY					
ATD Position	HIC 36	Clip (g)	Chest Defl. (mm)	Left Femur (N)	Right Femur (N)
Driver	551.6	45.4	-35.2	-1787.2	-656.8
Passenger	524.4	49.7	-32.7	-549.9	-1946.8

Additional data plots for this test are available in the research and development section of the NHTSA website. The website can be found at: www.NHTSA.Dot.Gov

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(tf - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

* Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
Test Program: 2007 NHTSA 35mph NCAP

NHTSA No.: A70100
Test Date: 5/9/07

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	55.80
Test Weight	kg	1705
Impact Angle	degrees	0
Average Rebound	mm	2069
Maximum Static Crush	mm	530

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door opening	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools
Rear Door Opening	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools
Seat Track Shift (mm)	None	None
Seat Back Failure	No	No

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type/ Serial No.	50% Male Hybrid III No. 035	50% Male Hybrid III No. 034
Head Contact	Airbag	Airbag
Chest Contact	Airbag	Airbag
Abdomen Contact	None	Airbag
Left Knee Contact	Knee Bolster	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

MOVIE COVERAGE

Cameras	Standard	Additional
High Speed	14	0
Real Time	1	2
Total	15	2

DATA CHANNELS

Driver ATD Sensors	40
Passenger ATD Sensors	40
Belt Assessment Sensors	8
Vehicle Structure Accelerometers	8
Rigid Barrier Load Cells	36
Total	132

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	A70100
Make	Saab
Model	9-3
Body Style	4-Door Sedan
Vin No.	YS3FD46Y971015113
Color	Grey
Delivery Date	4/23/2007
Odometer (Miles)	106.0
Dealer	Saab of Mission Viejo
Transmission	6-Speed Manual
Final Drive	Front
Type/No. Cyl.	Inline 4-Cylinder
Engine Disp. (L)	2.0
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

Anti-Lock Brakes	Yes
All Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Side Airbag	Yes
Driver Head Airbag	No
Driver Curtain Airbag	Yes
Pass. Airbag	Yes
Pass. Side Airbag	No
Pass. Head Airbag	No
Pass. Curtain Airbag	Yes
Pre-Tensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes
Air. Cond.	Yes
AM/FM CD	Yes
Tilt Steering	Yes
Automatic Door Locks	No
Power Windows	Yes
Power Seats	Yes
Other	None

Does Owners Manual provide instructions to turn off automatic door locks.

N/A

DATA FROM MANUFACTURER

Manufactured By	Saab Automobile AB
Date of Manufacture	Oct-06

GWR (kg)	1887
GAWR Front (kg)	1125
GAWR Rear (kg)	1012

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				421
Cargo Weight (RCLW) (kg)				81

DATA SHEET NO. 2...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

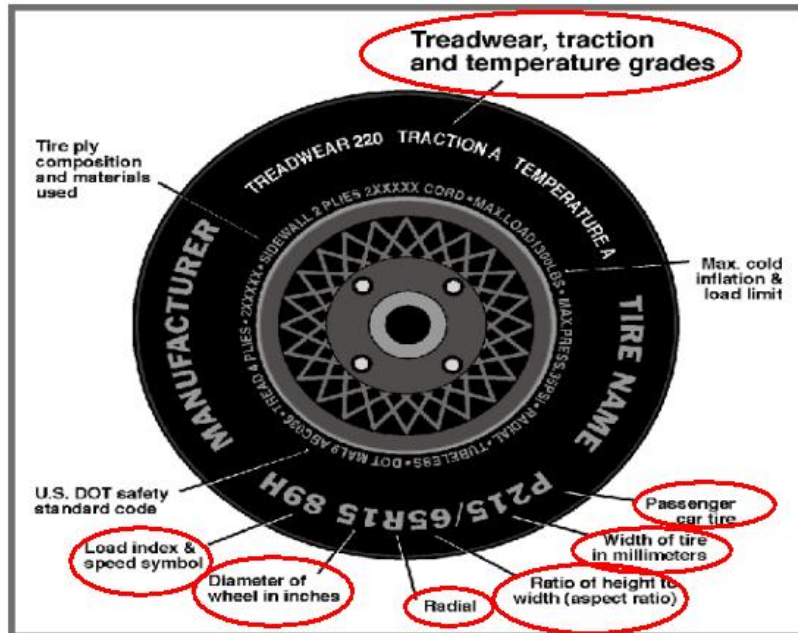
Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

Collect year, make, model, VIN, items circled in red, and tire manufacturer and tire name.



Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kpa)	240	240
Recommended Tire Size	P215/55R16 97H	P215/55R16 97H
Tire Size on Vehicle	P215/55R16 97H	P215/55R16 97H
Tire Manufacturer	Pirelli	Pirelli
Treadwear	400	400
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Rayon	1 Rayon
Tire Plies Body	1 Rayon, 2 Steel, 2 Nylon	1 Rayon, 2 Steel, 2 Nylon
Load Index/Speed Symbol	97 H	97 H
Tire Material	Rayon, Steel, Nylon	Rayon, Steel, Nylon
DOT Safety Code Right	XT BT H068 3606	XT BT H068 3606
DOT Safety Code Left	XT BT H068 3606	XT BT H068 3606

DATA SHEET NO. 2...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	456	308	764	479	378	857
Right	kg	426	288	714	478	370	848
Ratio	%	60	40	100	56	44	100
Totals	kg	882	596	1478	957	748	1705

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1478
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Wt. (RCLW)	kg	81
Calculated Vehicle Target Wt. (TVTW)	kg	1711

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	676	680	676	685	1075
As Tested	mm	670	675	656	657	1169

Vehicle Wheel Base (mm) 2665

Weight of Ballast Secured in cargo area (kg) 0

Weight of Items Removed (kg) 47

Vehicle Components Removed 50% of Exhaust System

* Ballast weight does not include cameras, instrumentation and brake abort system.

FUEL SYSTEM DATA

Fuel System Capacity From Owners Manual (L) 62.07

Actual Test Volume with entire fuel System Filled (L) 57.73

Test Fluid Type: Stoddard Solvent

Kinematic Viscosity: as per ASTM Standard D484-71 Red

Is Vehicle Fuel Pump Electric or Mechanical? Electric

If electric, does pump operate with ignition switch "ON" & engine "OFF" Yes

Fuel System Particulars: Electric fuel pump. Activated when electrical system is activated.

Fuel pump will run during the operation of the engine.

DATA SHEET NO. 3**POST-TEST IMPACT DATA**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**SPEED TRAP DATA**

Measured Parameter	Units	Requirement	Value
Trap No.1 Velocity (Primary)	km/h	55.51 to 57.12	55.80
Trap No.2 Velocity (Redun.)	km/h	55.51 to 57.12	55.78

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4391	4070	-321
Center	mm	4600	4070	-530
Right Side	mm	4391	4005	-386

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	2090
Center	mm	2025
Right Side	mm	2092
Average	mm	2069

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

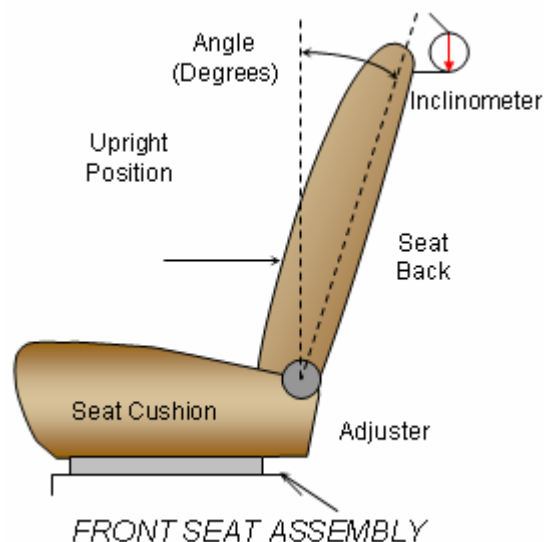
Test Date: 5/9/07

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows: Seat back angle was measured at the headrest of the seat using a digital inclinometer.

SEAT BACK ANGLES

	Deg.
Driver w/seated Dummy	17.0 @ Headrest
Passenger w/seated Dummy	17.0 @ Headrest

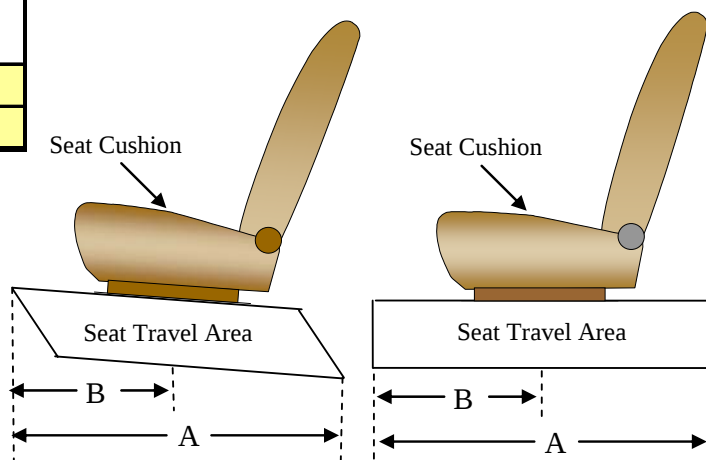


SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position. There were vertical adjustments on the driver seat that was equipped with the vehicle. There were no vertical adjustments on the passenger seat. They were placed at the lowermost position.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position
Driver Seat	280 mm	140 mm
Passenger Seat	47 Detents	23rd Detent



SEAT BELT UPPER ANCHORAGE

Position number two (2) from the uppermost position.

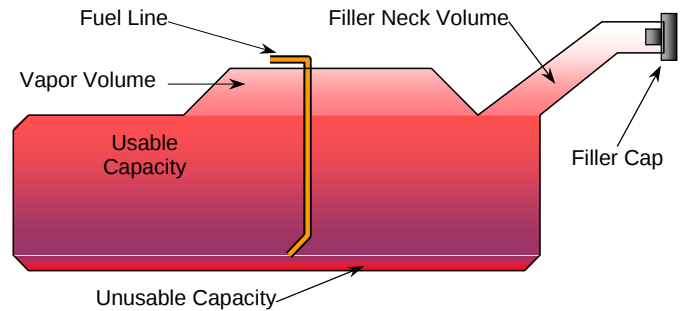
SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	4	2
Passenger Seat	4	2

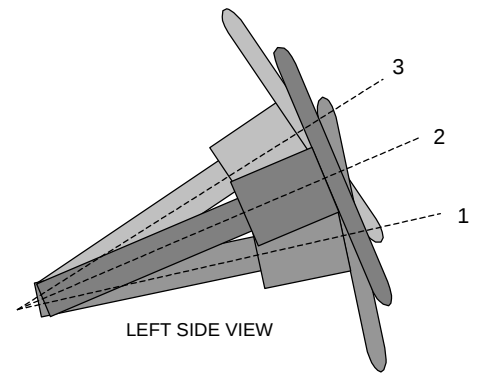
DATA SHEET NO. 4...(CONTINUED)**TEST VEHICLE INFORMATION**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**FUEL TANK CAPACITY**

	Liters
Usable Capacity of "Standard Tank"	62.07
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	57.08 to 58.33
Actual Amount of Solvent used	57.73

The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area under the rear seat.

**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. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.

**STEERING COLUMN ASSEMBLY****STEERING COLUMN POSITIONS**

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	22.8	160
Geometric center position No. 2	24.8	185
Uppermost position No. 3	26.9	210

DATA SHEET NO. 5

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (deg)	Length (mm)	Angle (deg)
WA	Windshield Angle		30.0		
SWA	Steering Wheel Angle		68.0		
SCA	Steering Column Angle		24.8		
SA	Seat Back Angle		17.0 @ Headrest		17.0 @ Headrest
HZ	Head to Roof (Z)	210	90.0	210	
HH	Head to Header	390		432	
HW	Head to Windshield	633		651	
HR	Head to Side Header (Y)	245		235	
NR	Nose to Rim	443	8.3		
CD	Chest to Dash	575		557	
CS	Chest to Steering Hub	383			
RA	Rim to Abdomen	235			
KDL	Left Knee to Dash	162	15.5	150	
KDR	Right Knee to Dash	161		150	25.3
PA	Pelvic Angle		22.7		23.7
TA	Tibia Angle		40.0		35.9
KK	Knee to Knee (Y)	310		270	
SK	Striker to Knee	575	0.5	585	3.8
ST	Striker to Head	584	83.0	515	88.9
SH	Striker to H-Point	165	42.0	167	34.0
SHY	Striker to H-Point (Y)	230		230	
HS	Head to Side Window	330		340	
HD	H-Point to Door (Y)	150		147	
AD	Arm to Door (Y)	104		119	

DATA SHEET NO. 5...(CONTINUED)

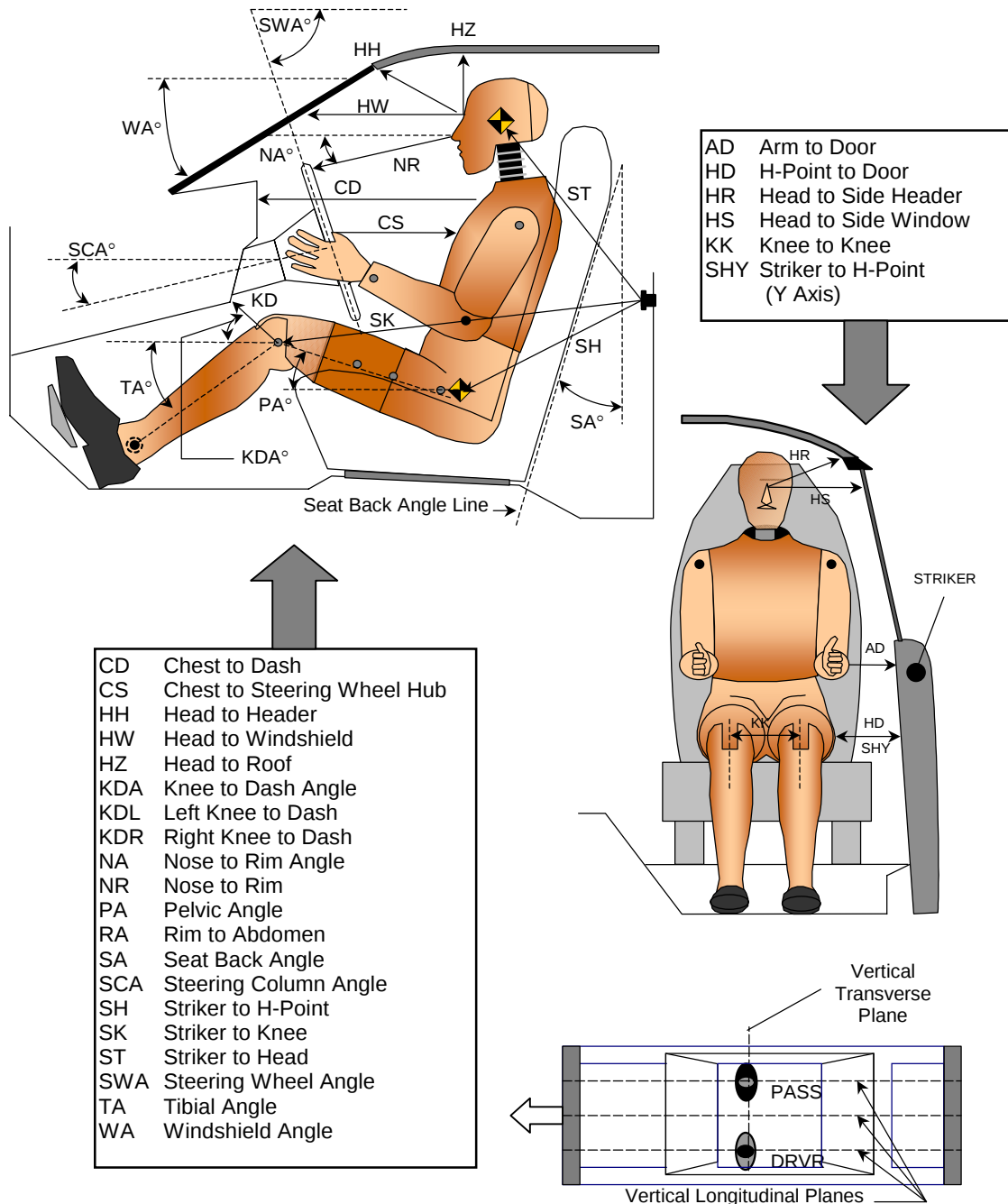
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07



DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

DATA SHEET NO. 6

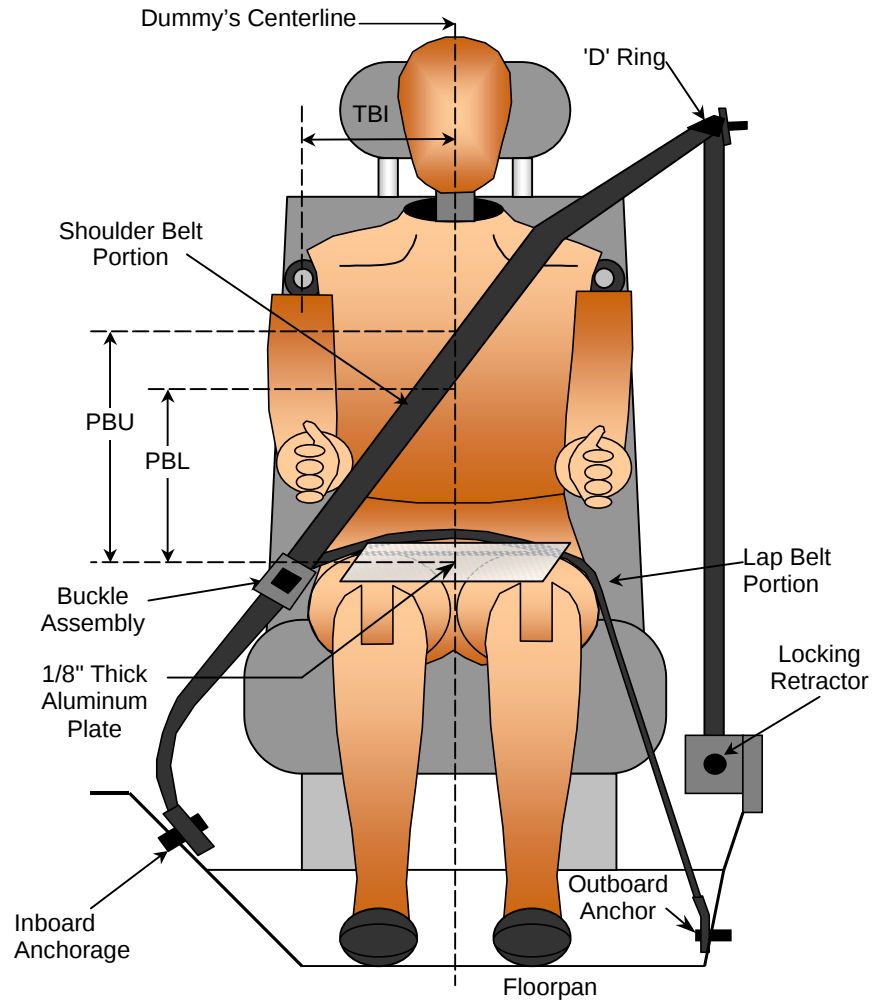
SEAT BELT POSITIONING DATA

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07



SEAT BELT POSITIONING MEASUREMENTS

Measured Parameter	Units	Driver	Passenger
TBI - Dummy C/L to Lap/Shoulder Belt Intersect	mm	215	245
PBU - Top Surface of reference to belt upper edge	mm	390	314
PBL - Top Surface of reference to belt lower edge	mm	265	246
Lap Belt Tension	Newtons	10	10
Shoulder Belt Tension	N/A	Retractor	Retractor

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATION

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

Test Date: 5/9/07

Test Program: 2007 NHTSA 35mph NCAP

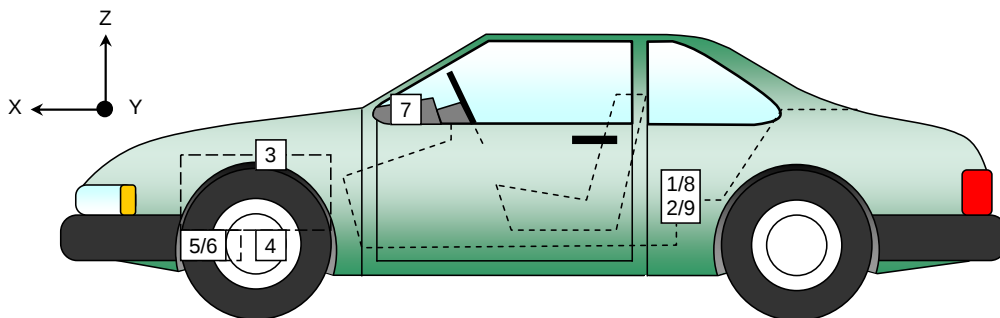
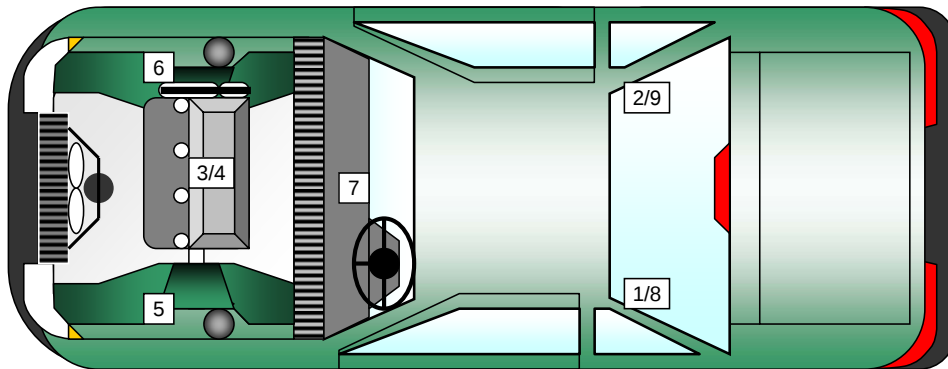
NHTSA No.: A70100

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member	1685	-705	340
2	Right Rear X-Member	1680	703	360
3	Engine Top	3840	20	795
4	Engine Bottom	3790	70	163
5	Left Brake Caliper	3770	-730	260
6	Right Brake Caliper	3770	730	255
7	Instrument Panel			
8	Left Rear X-Member (Z-Axis)	1685	-705	340
9	Right Rear X-Member (Z-Axis)	1680	703	360

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

1.) Instrument Panel no longer used by NHTSA



DATA SHEET NO. 8**SEAT BELT ASSESSMENT TEST DATA**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**SEAT BELT POSITIONING MEASUREMENTS**

Measurement Description	Units	Driver	Passenger
Retractor Reel to "D" ring	mm	710	710
Shoulder Belt length as measured on ATD	mm	850	830
Lap Belt length as measured on ATD	mm	680	637
Remainder of belt on reel	mm	215	215
Total belt length for continuous webbing systems	mm	2455	2392

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	102	165
As determined electronically	mm	119	204

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
Electronically between belt load cell and "D" ring	mm/cm	*	*
Mechanically	mm/cm		

* Not used with shoulder belt pre-tensioner systems

DATA SHEET NO. 9**SUMMARY OF FMVSS 212 DATA**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07

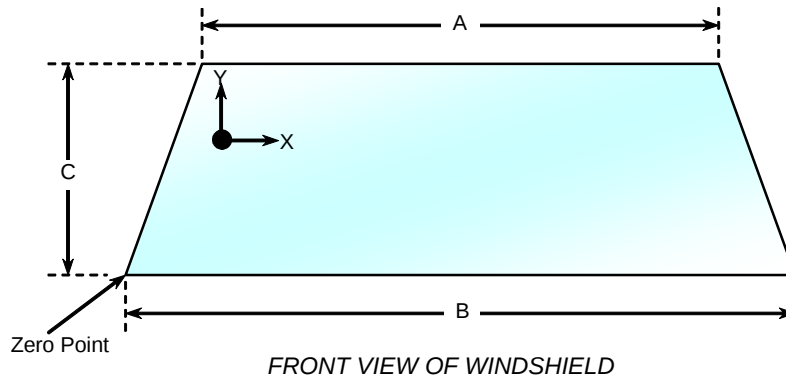
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. No molding covers the windshield periphery at any point.

The standard requires that the post-test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles that are equipped with occupant passive restraints.

Temperature of windshield molding during test: 28.0 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test(mm)	Post-Test(mm)	% of Retention
Left Side	2098	2098	100
Right Side	2098	2098	100
Total	4195	5148	100

**WINDSHIELD DIMENSIONS**

Item	Units	Segment Length	Molding Width
A	mm	1185	13
B	mm	1510	10
C-Left	mm	750	20
C-Right	mm	750	20

DATA SHEET NO. 10

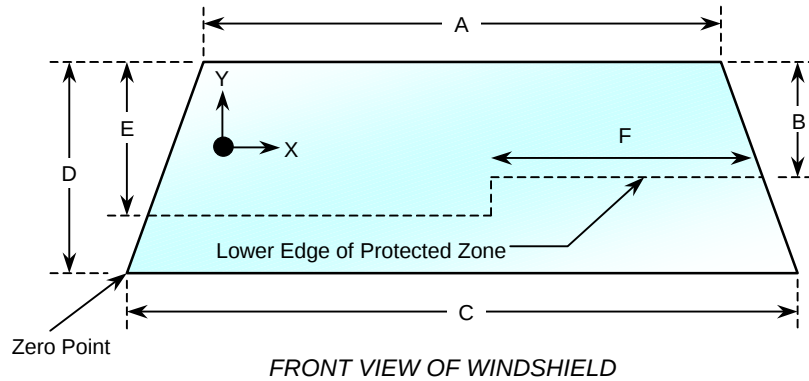
WINDSHIELD ZONE INTRUSION FMVSS 219 DATA (PARTIAL)

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07



WINDSHIELD AND PROTECTED ZONE

Item	Units	Value
A	mm	1185
B	mm	415
C	mm	1510
D	mm	750
E	mm	445
F	mm	483

AREA OF PROTECTED ZONE FAILURES

- A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 in. by a vehicle component other than one that is normally in contact with the windshield.

X	Y

- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y

DATA SHEET NO. 11

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2007 Saab 9-3 4-Door Sedan NHTSA No.: A70100
Test Program: 2007 NHTSA 35mph NCAP Test Date: 5/9/07

Test Time: 4:53 PM

Temperature: 32.2 ° C

STODDARD SOLVENT SPILLAGE MEASUREMENTS

- A. From impact until vehicle motion ceases: 0.0 oz.
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0.0 oz.
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0.0 oz.
(Maximum Allowable = 1 oz./minute)
- D. Spillage Location Details: No leakage occurred

DATA SHEET NO. 12

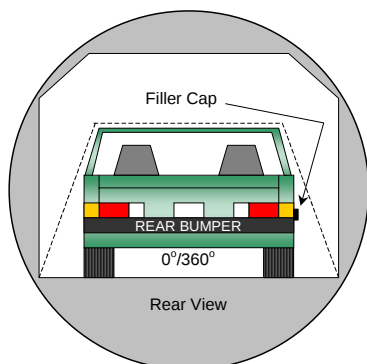
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

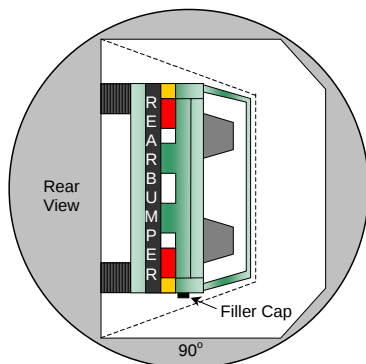
NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

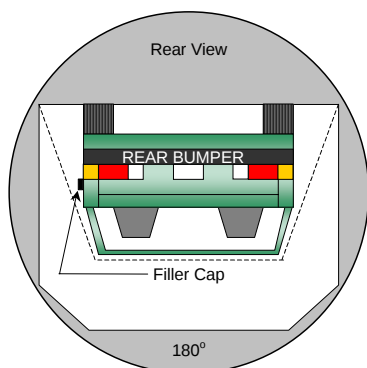
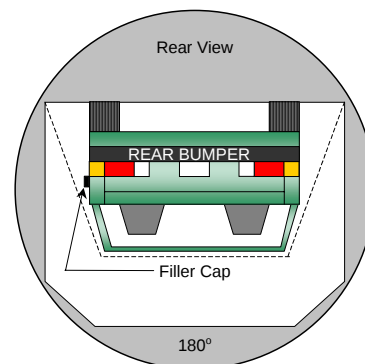
Test Date: 5/9/07



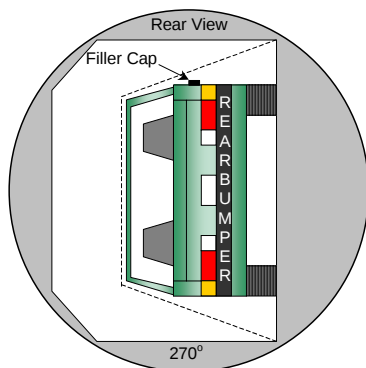
0° to 90°



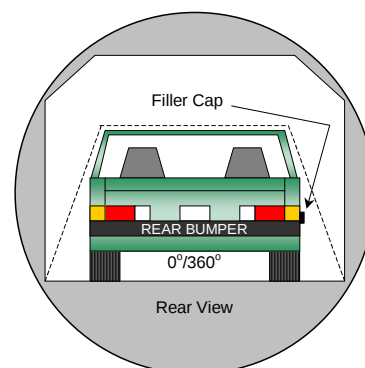
90° to 180°



180° to 270°



270° to 360°



1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. No solvent leakage occurred during rollover.

DATA SHEET NO. 12...(CONTINUED)**FMVSS 301 STATIC ROLLOVER DATA**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	90	300	390
90° to 180°	88	300	388
180° to 270°	91	300	391
270° to 360°	90	301	391

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

First 5 Minutes	5.0
Sixth Minute	1.0
Seventh Minute	1.0
Eighth Minute	1.0

ACTUAL TEST VEHICLE SOLVENT SPILLAGE TABLE (oz.)

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. 13**VEHICLE MEASUREMENTS**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**VEHICLE MEASUREMENT TABLE**

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length of vehicle at centerline	mm	4600	4070	-530
2	RSOV to front of engine	mm	3836	3698	-138
3	RSOV to firewall centerline	mm	3564	3550	-14
4	RSOV to leading edge of right door	mm	3122	3130	8
5	RSOV to leading edge of left door	mm	3123	3123	0
6	RSOV to lower leading edge of right door	mm	3137	3137	0
7	RSOV to lower leading edge of left door	mm	3139	3136	-3
8	RSOV to upper trailing edge of right door	mm	2090	2091	1
9	RSOV to upper trailing edge of left door	mm	2086	2090	4
10	RSOV to lower trailing edge of right door	mm	2107	2107	0
11	RSOV to lower trailing edge of left door	mm	2106	2105	-1
12	RSOV to bottom of right 'A' pillar	mm	3081	3075	-6
13	RSOV to bottom of left 'A' pillar	mm	3079	3068	-11
14	RSOV to firewall on right side	mm	3550	3465	-85
15	RSOV to firewall on left side	mm	3545	3478	-67
16	RSOV to steering column	mm	2698	2745	47
17	Center of steering column to left 'A' pillar	mm	391	394	3
18	Center of steering column to headlining	mm	425	470	45
19	RSOV to right side of front bumper	mm	4391	4070	-321
20	RSOV to left side of front bumper	mm	4391	4005	-386
21	Length of engine block	mm	580	580	0
RD	RSOV to right side of dash panel	mm	2844	2870	26
CD	RSOV to center of dash panel	mm	2723	2745	22
LD	RSOV to left side of dash panel	mm	2848	2850	2

DATA SHEET NO. 13...(CONTINUED)

VEHICLE STRUCTURAL MEASUREMENTS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

VEHICLE STRUCTURAL MEASUREMENT TABLE

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length	mm	4600	4070	-530
2	Total width	mm	1750	1750	0
3	Bumper top height	mm	704	565	-139
4	Bumper bottom height	mm	170	245	75
5	Longitudinal member top height	mm	535	560	25
6	Longitudinal member bottom height	mm	166	188	22
7	Distance between longitudinal members	mm	624	700	76
8	Longitudinal member width	mm	80	80	0
9	Engine top height	mm	785	800	15
10	Engine bottom height	mm	161	183	22
11	Engine and gear box width	mm	724	724	0
12	Front bumper to engine distance	mm	764	390	-374
13	Front shock absorber fixing width	mm	859	895	36
14	Bonnet leading edge height	mm	700	780	80
15	Front shock absorber fixing width	mm	1140	1110	-30
16	Front bumper to front axle distance	mm	963	500	-463
17	Front axle to 'A' pillar distance	mm	500	410	-90
18	'A' pillar to 'B' pillar distance	mm	1033	1030	-3
19	'B' pillar to rear axle distance	mm	1138	1137	-1
20	'B' pillar to 'C' pillar distance	mm	807	810	3
21	Roof sill bottom height	mm	1327	1320	-7
22	Roof sill top height	mm	1380	1380	0
23	Floor sill bottom height	mm	285	265	-20
24	Floor sill top height	mm	355	340	-15

DATA SHEET NO. 13...(CONTINUED)

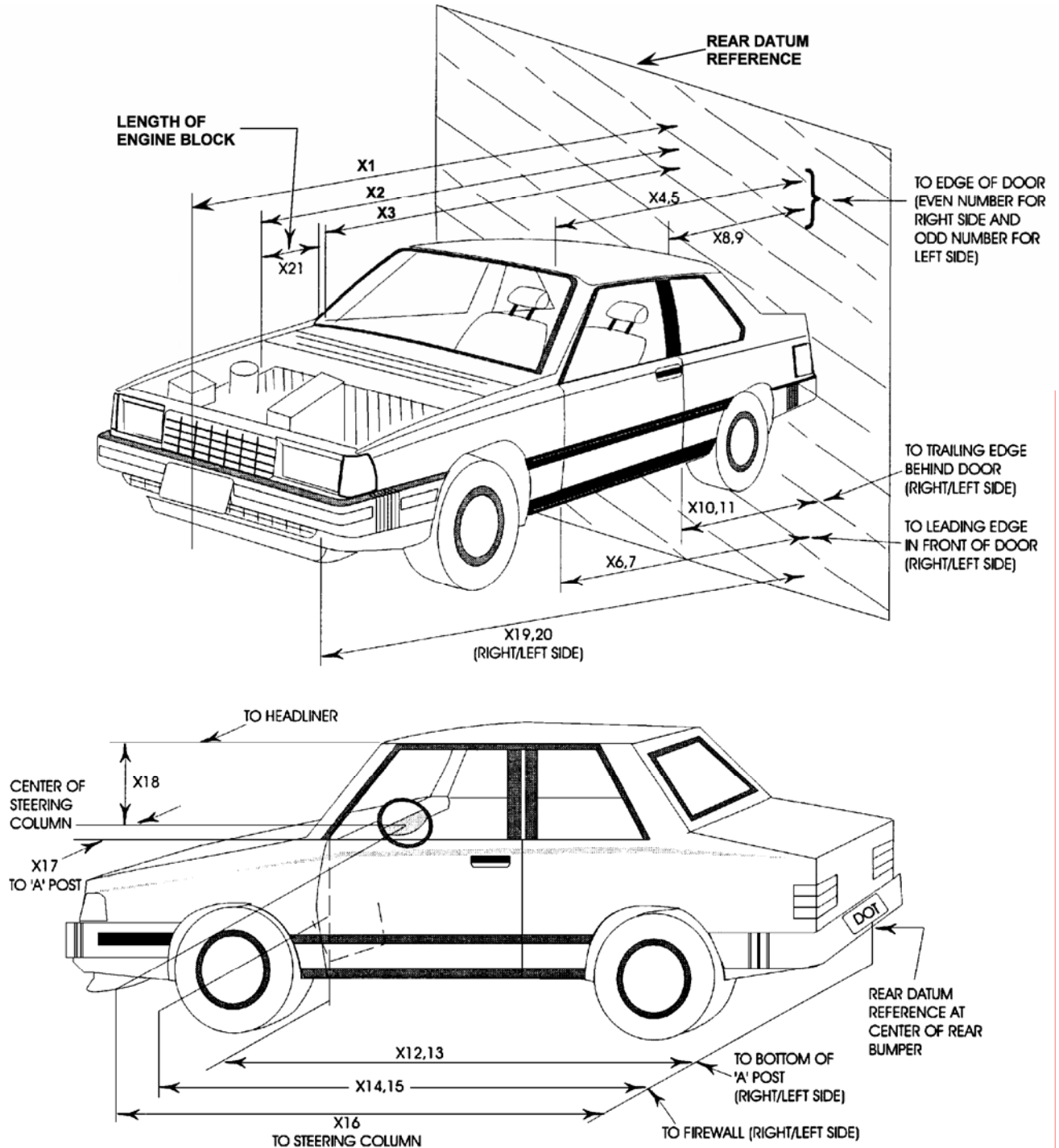
VEHICLE MEASUREMENTS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07



DATA SHEET NO. 14

CAMERA LOCATIONS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

VEHICLE CAMERA MEASUREMENT TABLE

No.	Camera View	Location (mm)			Angle (deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real Time Camera (Panning)	-16589	-7485	-1475	0			30
2	Overall Left Side	-2489	-7397	-1048	0	8087	20mm	1000
3	Closeup Left Side	-2318	-7124	-1095	0	7834	50mm	1000
4	Driver and Interior View	-8696	-12562	-4511	-17	15570	ZOOM	1000
5	Steering Column (Bottom)	-1631	-8234	-2682	-13	9453	35mm	1000
6	Steering Column (Top)	-1663	-8153	-3078	-13	9549	35mm	1000
7	Overall Right Side	-2489	7384	-1048	0	7389	20mm	1000
8	Closeup Right Side	-2318	7052	-1048	0	7068	50mm	1000
9	Passenger and Interior View	-5330	9365	-2407	-10	10211	ZOOM	1000
10	Right Side View	-2006	6967	-1463	-6	7134	ZOOM	1000
11	Windshield View	-589	0	-5556	-90		24mm	1000
12	Driver Front View	378	-286	-2438	-34		25mm	1000
13	Passenger Front View	375	413	-2439	-34		25mm	1000
14	Pit View of Engine	-756	0	1495	90		12mm	1000
15	Pit View of Fuel Tank	-3398	0	1495	90		8mm	1000
16	Real Time Driver	-2458	-7598	1301	-1			30
17	Real Time Passenger	-2985	3981	-1284	-1			30

All measurements are made relative to the point of impact.

DATA SHEET NO. 15

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

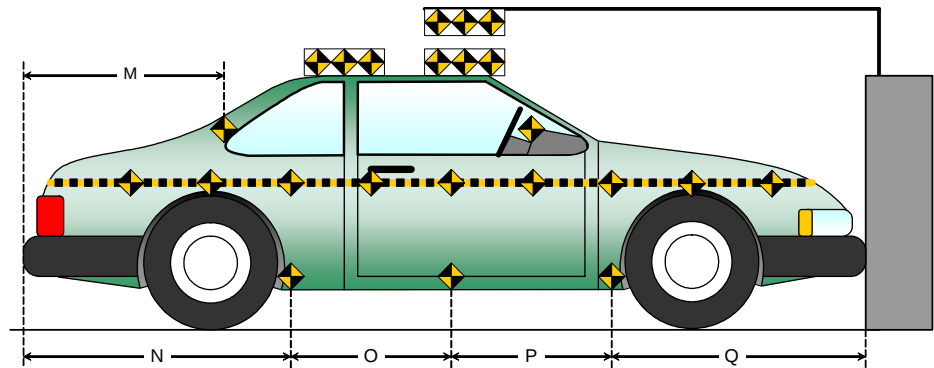
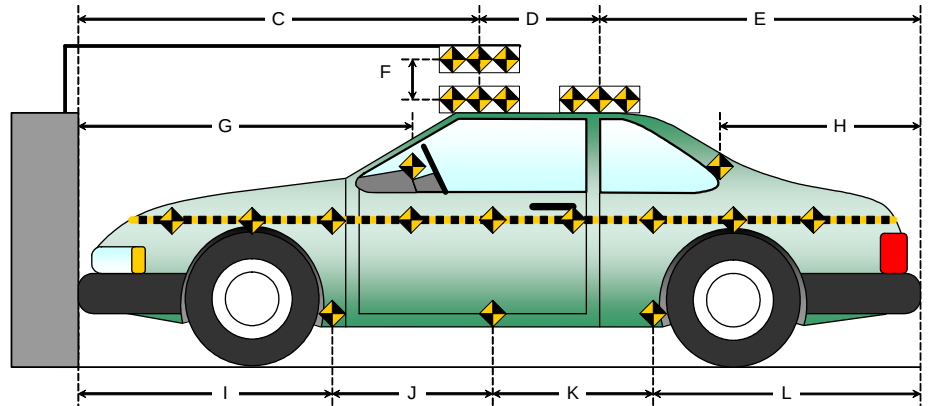
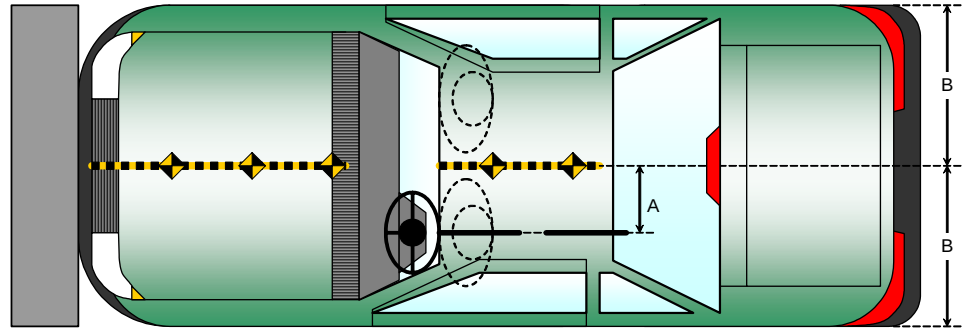
Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

All Dimensions in (mm)	
Item	Value
A	340
B	1750
C	2250
D	615
E	1784
F	150
G	1905
H	1061
I	1390
J	900
K	900
L	1405
M	65
N	1405
O	900
P	900
Q	1390



DATA SHEET NO. 16

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

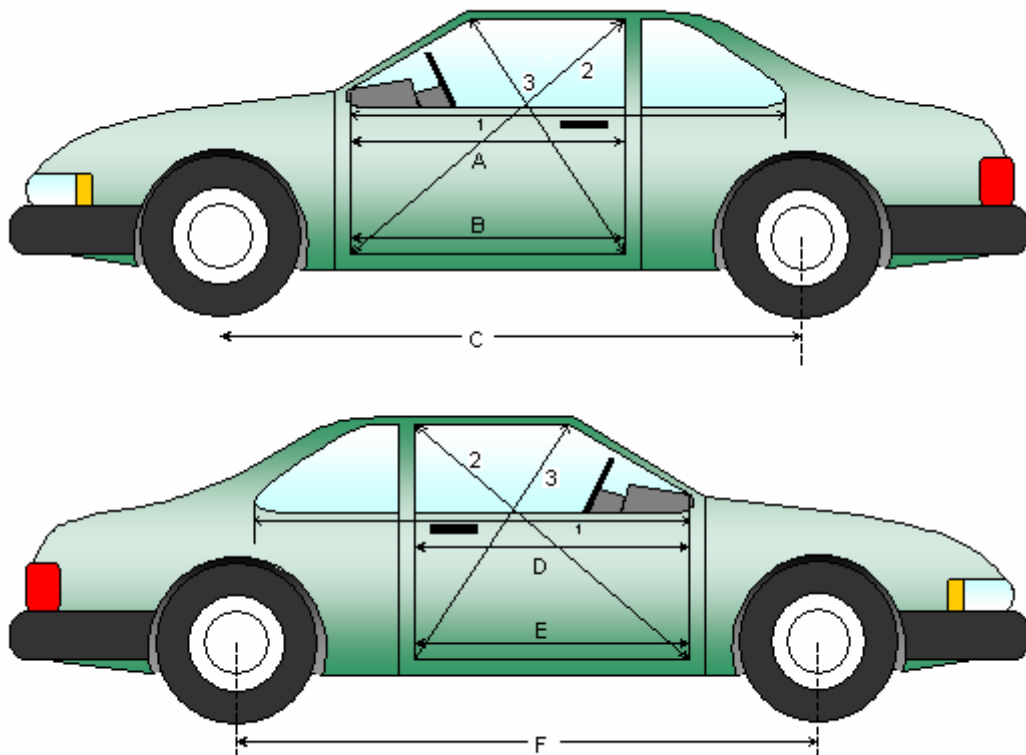
Test Date: 5/9/07

DOOR OPENING WIDTH TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
1L	Left Side	mm	910	900	-10
2L	Left Side (Diagonally)	mm	1360	1357	-3
3L	Left Side (Diagonally)	mm	940	923	-17
1R	Right Side	mm	910	898	-12
2R	Right Side (Diagonally)	mm	1360	1353	-7
3R	Right Side (Diagonally)	mm	940	918	-22

WHEELBASE MEASUREMENT TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
C	Left Side Wheel Base	mm	2665	2590	-75
F	Right Side Wheel Base	mm	2665	2592	-73



DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

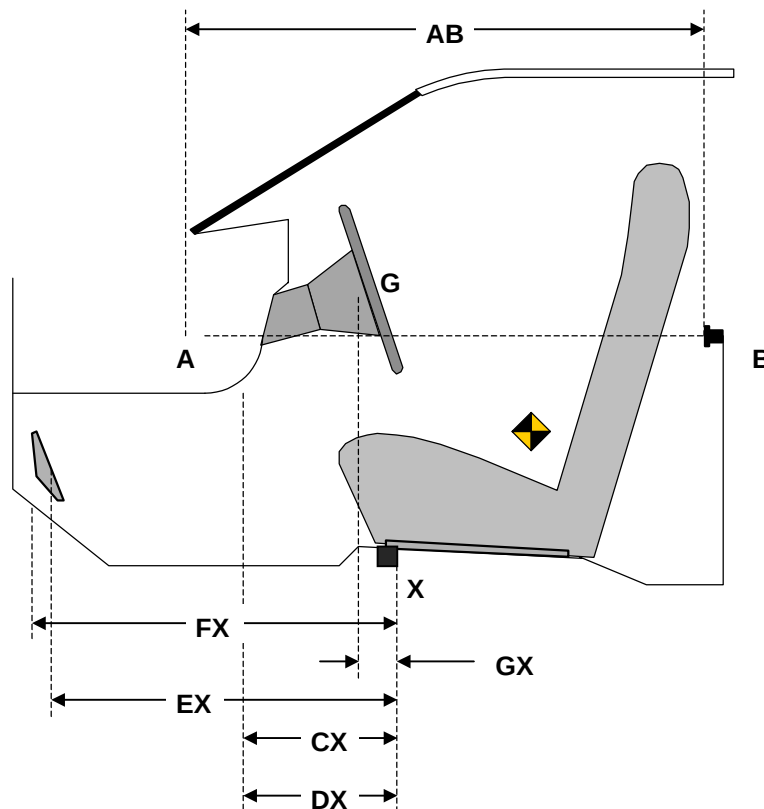
NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

DRIVER COMPARTMENT INTRUSION TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
AB	Door Opening (Inside window jam)	mm	908	898	-10
CX	Left Knee Bolster to X	mm	240	250	10
DX	Right Knee Bolster to X	mm	242	260	18
EX	Brake Pedal to X	mm	580	543	-37
FX	Foot Rest to X	mm	675	658	-17
GX	Center of Steering Wheel Hub to X	mm	105	202	97



DATA SHEET NO. 16...(CONTINUED)

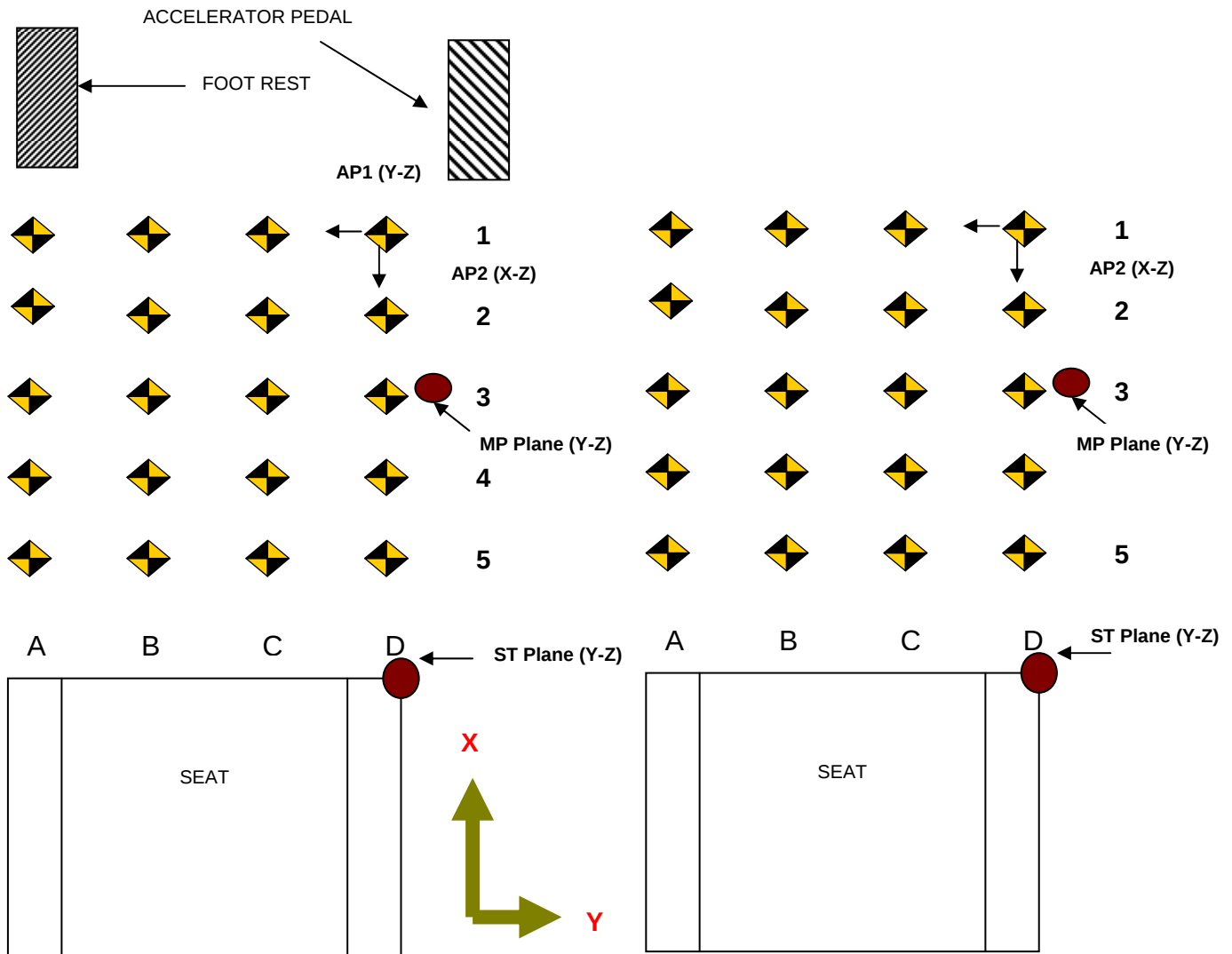
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

MP: Y-Z plane, halfway between the ST plane and AP1 plane

CF Plane: X-Z plane passes through center of footrest.

BP Plane: X-Z plane passes through center of brake pedal

TP Plane: Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

All measurements in mm

PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	710	720	679	563	734	744	736	751	24	24	57	188
2	636	630	607	499	658	654	654	683	22	24	47	184
3	551	548	543	440	577	574	579	595	26	26	36	155
4	451	447	449	344	477	473	473	480	26	26	24	136
5	348	345	345	260	374	374	379	382	26	29	34	122

PASSENGER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	35	159	263	358	40	162	282	420	5	3	19	62
2	36	162	268	366	40	167	279	423	4	5	11	57
3	40	161	280	384	47	167	288	430	7	6	8	46
4	44	166	288	391	50	172	288	432	6	6	0	41
5	50	169	286	401	56	175	285	440	6	6	-1	39

PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-23	-23	-181	-445	-21	-29	-41	-9	2	-6	140	436
2	32	31	-84	-369	29	26	15	54	-3	-5	99	423
3	83	69	36	-279	89	67	68	97	6	-2	32	376
4	88	79	80	-216	94	79	84	102	6	0	4	318
5	91	81	63	-167	98	82	89	102	7	1	26	269

DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

All measurements in mm

PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	713	714	707	704	739	720	720	707	26	6	13	3
2	627	627	619	623	656	642	634	627	29	15	15	4
3	532	531	530	535	560	550	545	546	28	19	15	11
4	424	432	427	430	457	454	442	440	33	22	15	10
5	327	330	323	325	357	351	342	335	30	21	19	10

PASSENGER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-386	-266	-155	-36	-362	-223	-108	12	24	43	47	48
2	-411	-268	-148	-27	-371	-226	-109	13	40	42	39	40
3	-422	-274	-154	-31	-381	-240	-119	9	41	34	35	40
4	-424	-278	-156	-29	-392	-248	-124	5	32	30	32	34
5	-424	-279	-157	-27	-398	-255	-132	1	26	24	25	28

PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-77	-3	-13	-23	43	24	19	13	120	27	32	36
2	22	49	38	38	100	83	74	66	78	34	36	28
3	97	89	77	82	152	134	121	123	55	45	44	41
4	105	91	84	91	160	134	131	134	55	43	47	43
5	105	92	84	93	156	137	131	135	51	45	47	42

DATA SHEET NO. 17

FIXED BARRIER LOAD CELL LOCATIONS

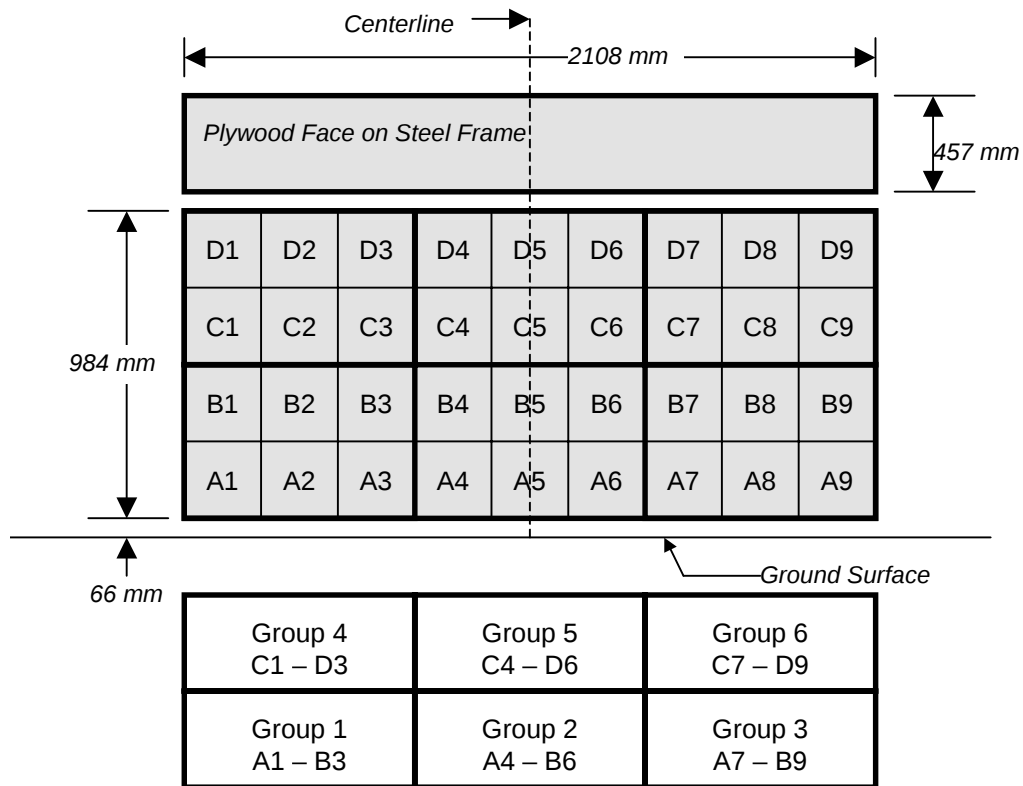
Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

36 Load Cell Rigid Barrier (NHTSA Standard) Load Cell Locations on Fixed Barrier



6 Groups of 6 Load Cells Each

DATA SHEET NO. 18

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

VEHICLE INFORMATION

VIN: YS3FD46Y971015113

Wheel base (mm): 2665

Vehicle Size Category: 4-Door Sedan

Test Weight (kg): 1705

ACCELEROMETER DATA

Accelerometer Location: Left rear cross member

Cal. Procedure/Interval: 6 months / drop test

Integration Algorithm: NHTSA Standard

Linearity: Good

Impact Velocity (km/h): 55.80

Velocity Change (km/h): 64.6

Time of Separation (msec): 70.2

CRUSH PROFILE

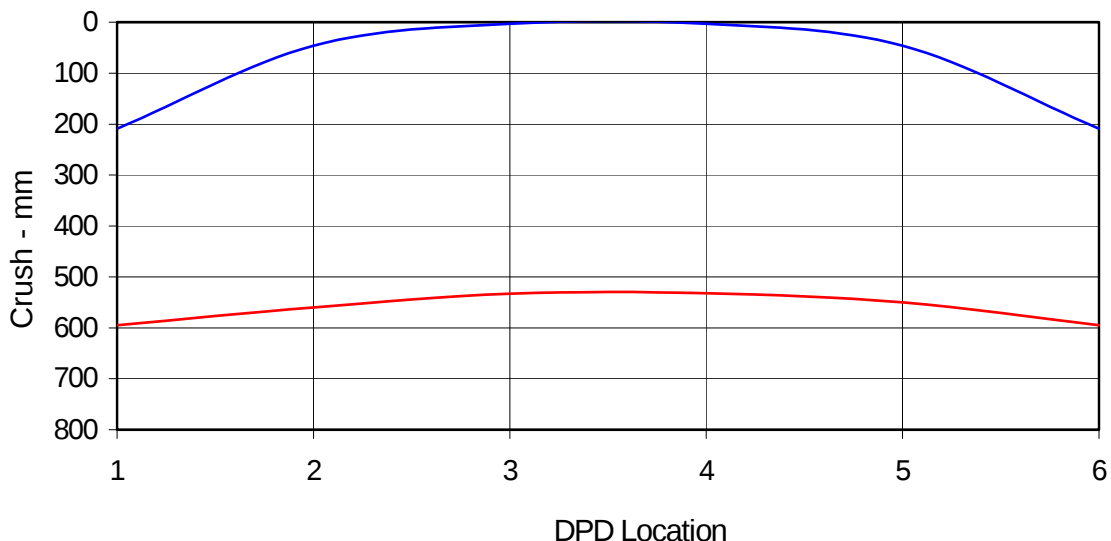
Collision Deformation Classification: 12FDEW6

Midpoint of Damage: Vehicle Centerline

Damage Region Length (mm): 1394

Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	209	595	-386
C2	Crush zone 2 on left side	mm	46	560	-514
C3	Crush zone 3 on left side	mm	3	533	-530
C4	Crush zone 4 on right side	mm	3	532	-529
C5	Crush zone 5 on right side	mm	46	550	-504
C6	Crush zone 6 at right side	mm	209	595	-386



DATA SHEET NO. 19

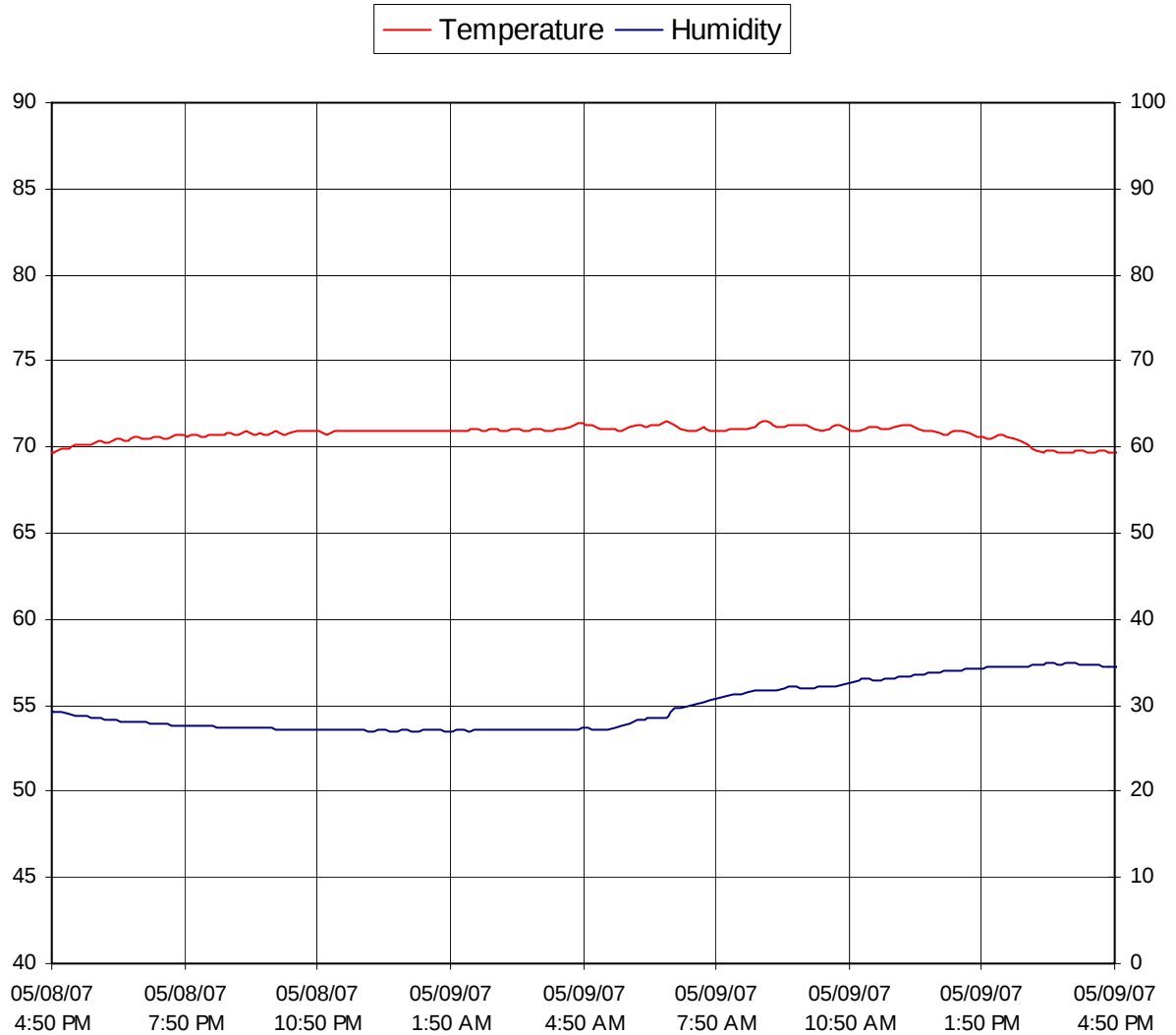
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07



APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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A-21	Post-Test Engine Compartment (Vehicle Moved)	A-21
A-22	Pre-Test Fuel Cap	A-22
A-23	Post-Test Fuel Cap	A-23
A-24	Pre-Test Front Underbody	A-24
A-25	Post-Test Front Underbody	A-25
A-26	Pre-Test Mid Underbody	A-26
A-27	Post-Test Mid Underbody	A-27
A-28	Pre-Test Rear Underbody	A-28
A-29	Post-Test Rear Underbody	A-29
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A-37	Post-Test Driver Dummy Feet	A-37
A-38	Pre-Test Driver Side Knee Bolster	A-38
A-39	Post-Test Driver Side Knee Bolster	A-39
A-40	Pre-Test Driver Side Floor Pan	A-40
A-41	Post-Test Driver Side Floor Pan	A-41
A-42	Post-Test Driver Dummy Head	A-42
A-43	Post-Test Driver Dummy Airbag Contact	A-43
A-44	Pre-Test Passenger Dummy Front View (Head Position)	A-44
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A-47	Post-Test Passenger Dummy Front (Through Window)	A-47
A-48	Pre-Test Passenger Dummy (Door Open)	A-48
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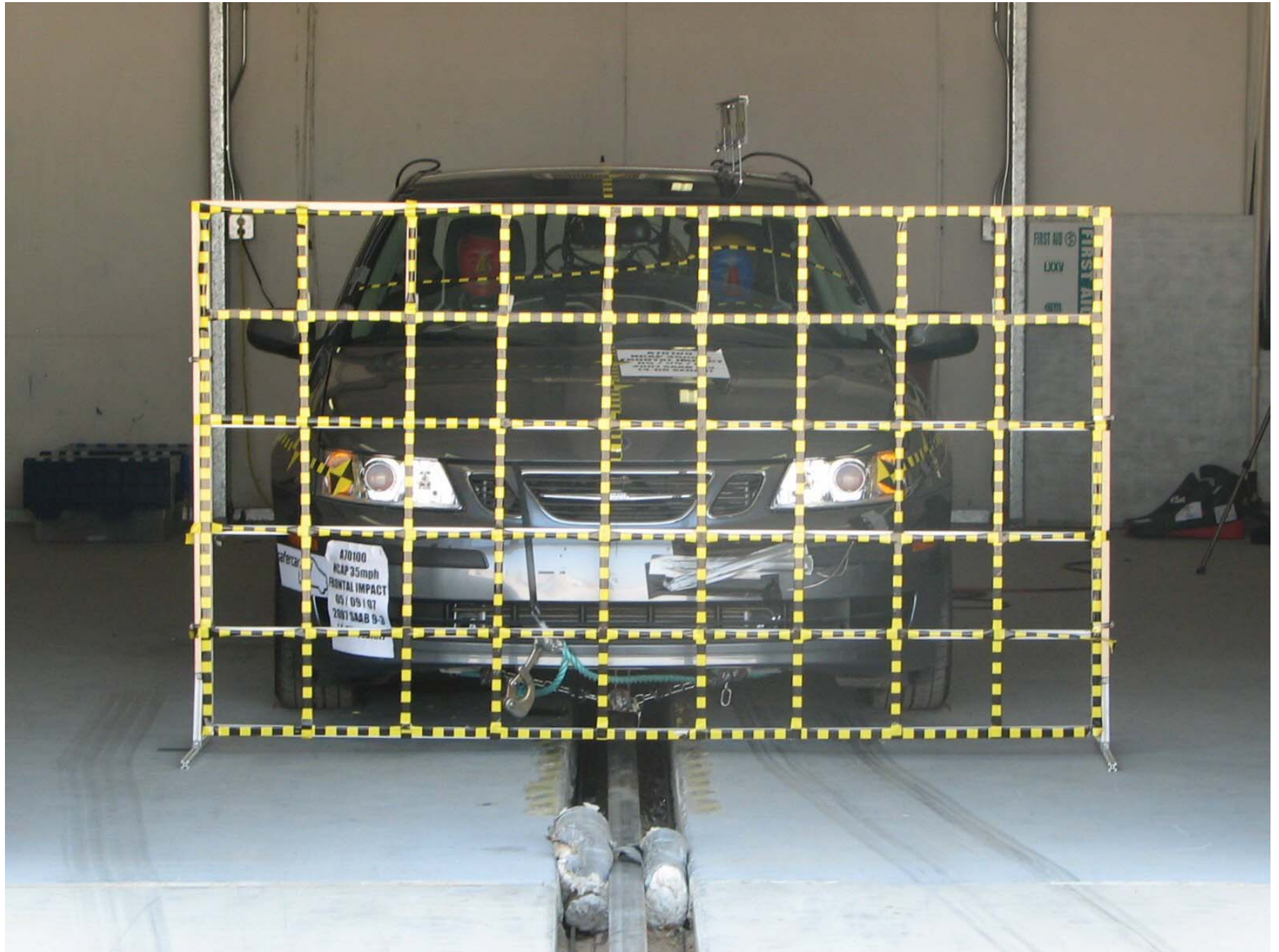


Figure A-1: Load Cell Location

This Space Intentionally Left Blank

DATE: G.V.W.R.
10/06 4160 LB

G.A.W.R. FRONT
2480 LB

G.A.W.R. REAR
2230 LB

**THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY BUMPER AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.**

VIN

YS3FD46Y971015113

PASS.CAR

MFD BY SAAB AUTOMOBILE AB

12 756 430

Figure A-2: Manufacturer's Label



TIRE AND LOADING INFORMATION

SEATING CAPACITY

TOTAL 5

FRONT 2

REAR 3

The combined weight of occupants and cargo should never exceed 421 kg or 928 lbs.

TIRE	SIZE	COLD TIRE PRESSURE
FRONT	215/55R16 97H	240 kPa, 35 PSI
REAR	215/55R16 97H	240 kPa, 35 PSI
SPARE	T125/85R16 99	420 kPa, 60 PSI

**SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION**



12768385

Figure A-3: Tire Placard



Figure A-4: Right Front $\frac{3}{4}$ View, As Received



Figure A-5: Left Rear $\frac{3}{4}$ View, as Received



Figure A-6: Pre-Test Front View

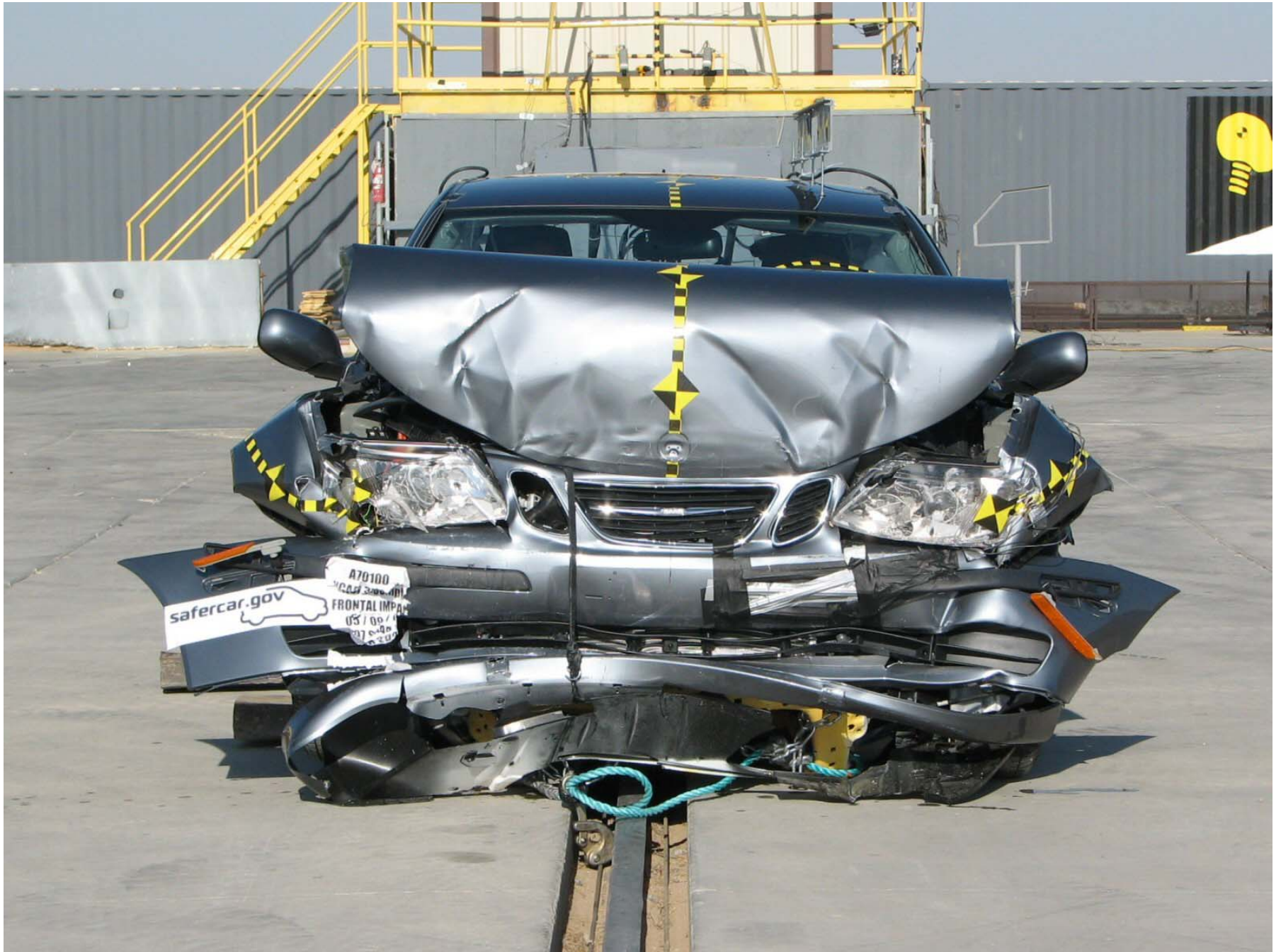


Figure A-7: Post-Test Front View (Vehicle Moved)



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 3/4 View



Figure A-13: Post-Test Right Front ¾ View (Vehicle Moved)



Figure A-14: Pre-Test Left Rear $\frac{3}{4}$ View





Figure A-16: Post-Test Left Side $\frac{3}{4}$ View of Doors After Impact



Figure A-17: Post-Test Right Side $\frac{3}{4}$ View of Doors After Impact

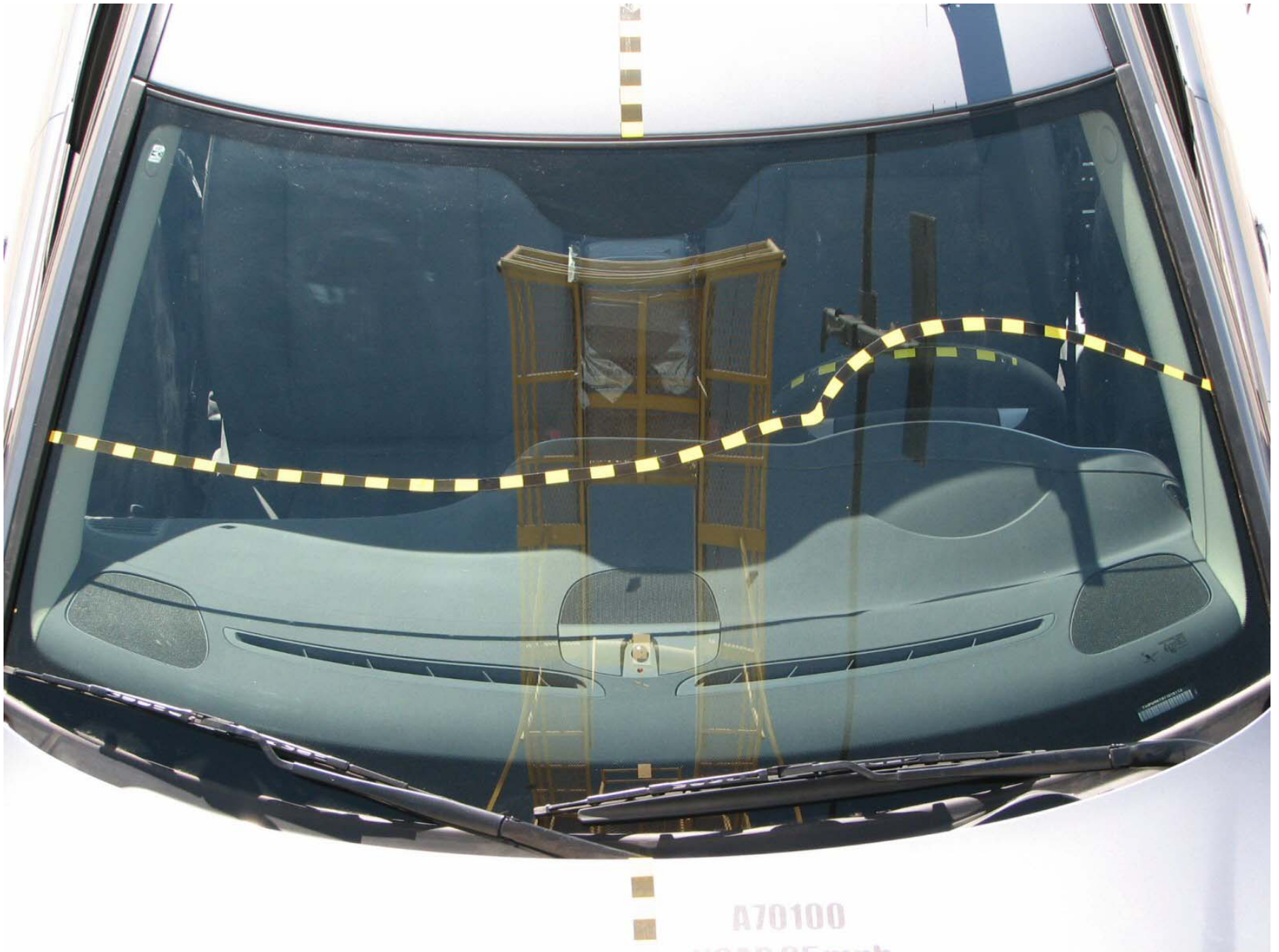


Figure A-18: Pre-Test Windshield



Figure A-19: Post-Test Windshield



Figure A-20: Pre-Test Engine Compartment



Figure A-21: Post-Test Engine Compartment (Vehicle Moved)

**2007 SAAB 9-3
A70100
STODDARD SOLVENT ADDED
15.25 GALLONS
(57.73 LITERS)**



Figure A-22: Pre-Test Fuel Cap

2007 SAAB 9-3
A70100
STODDARD SOLVENT ADDED
15.25 GALLONS
(57.73 LITERS)



Figure A-23: Post-Test Fuel Cap

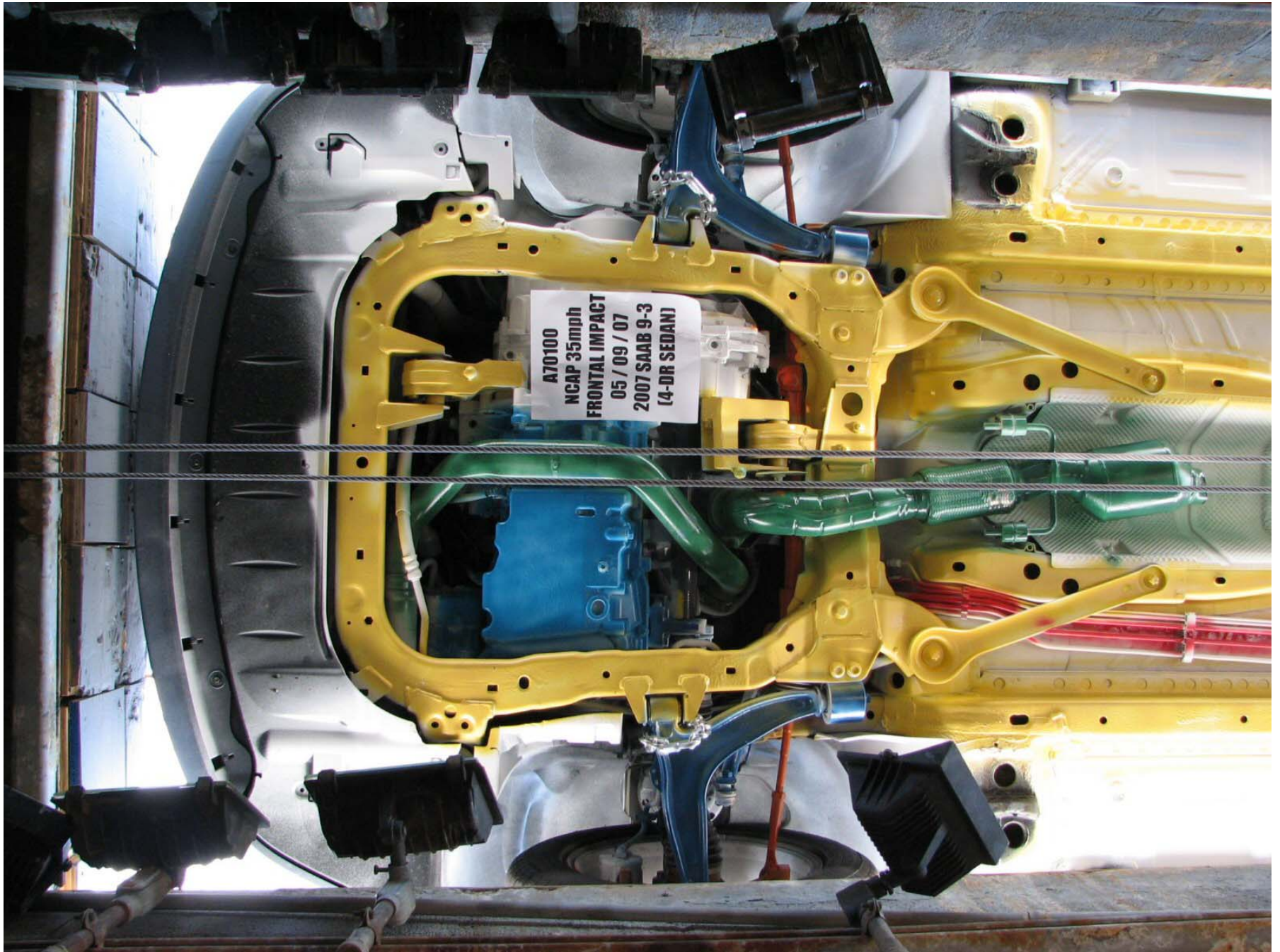


Figure A-24: Pre-Test Front Underbody

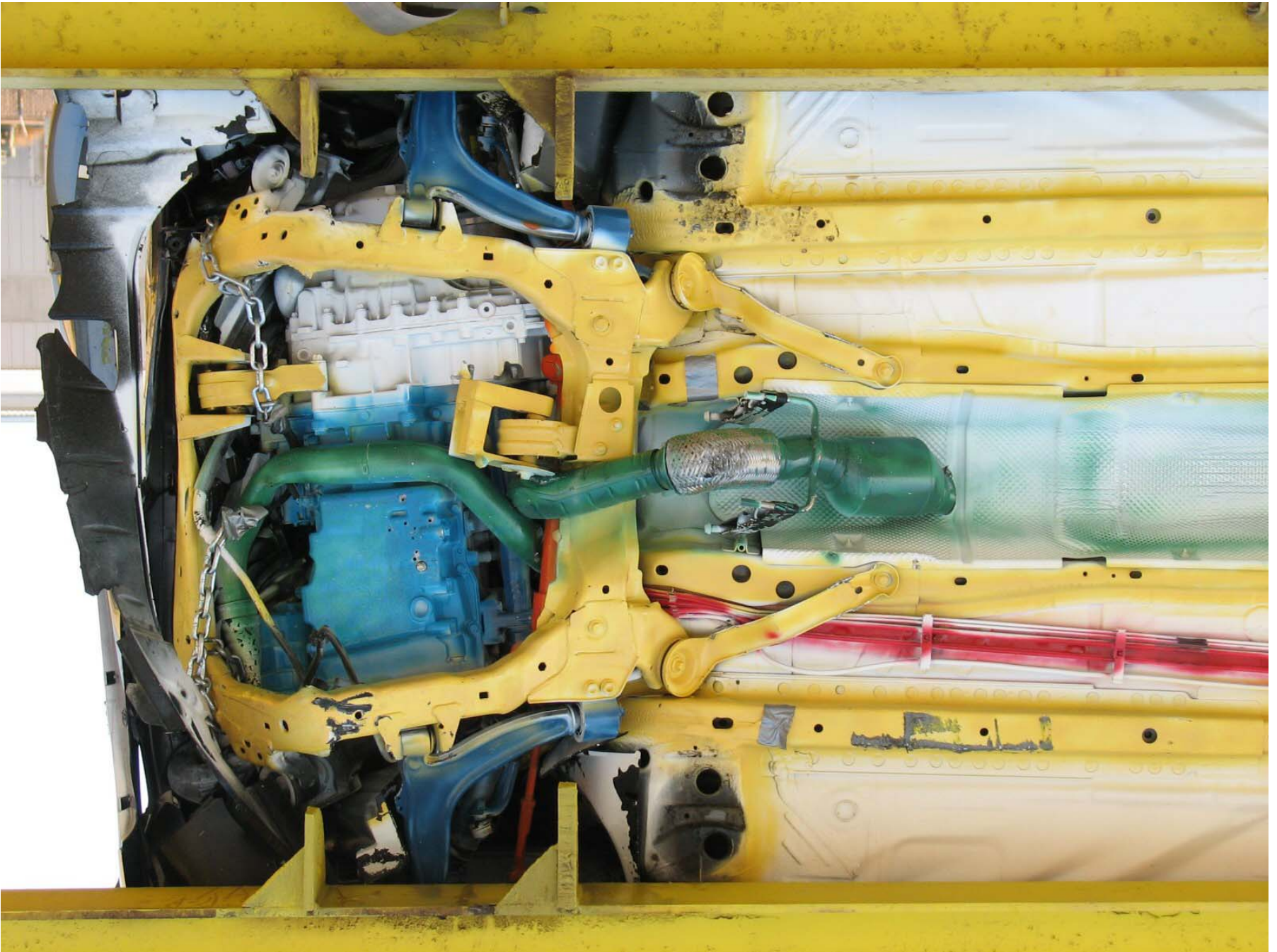


Figure A-25: Post-Test Front Underbody

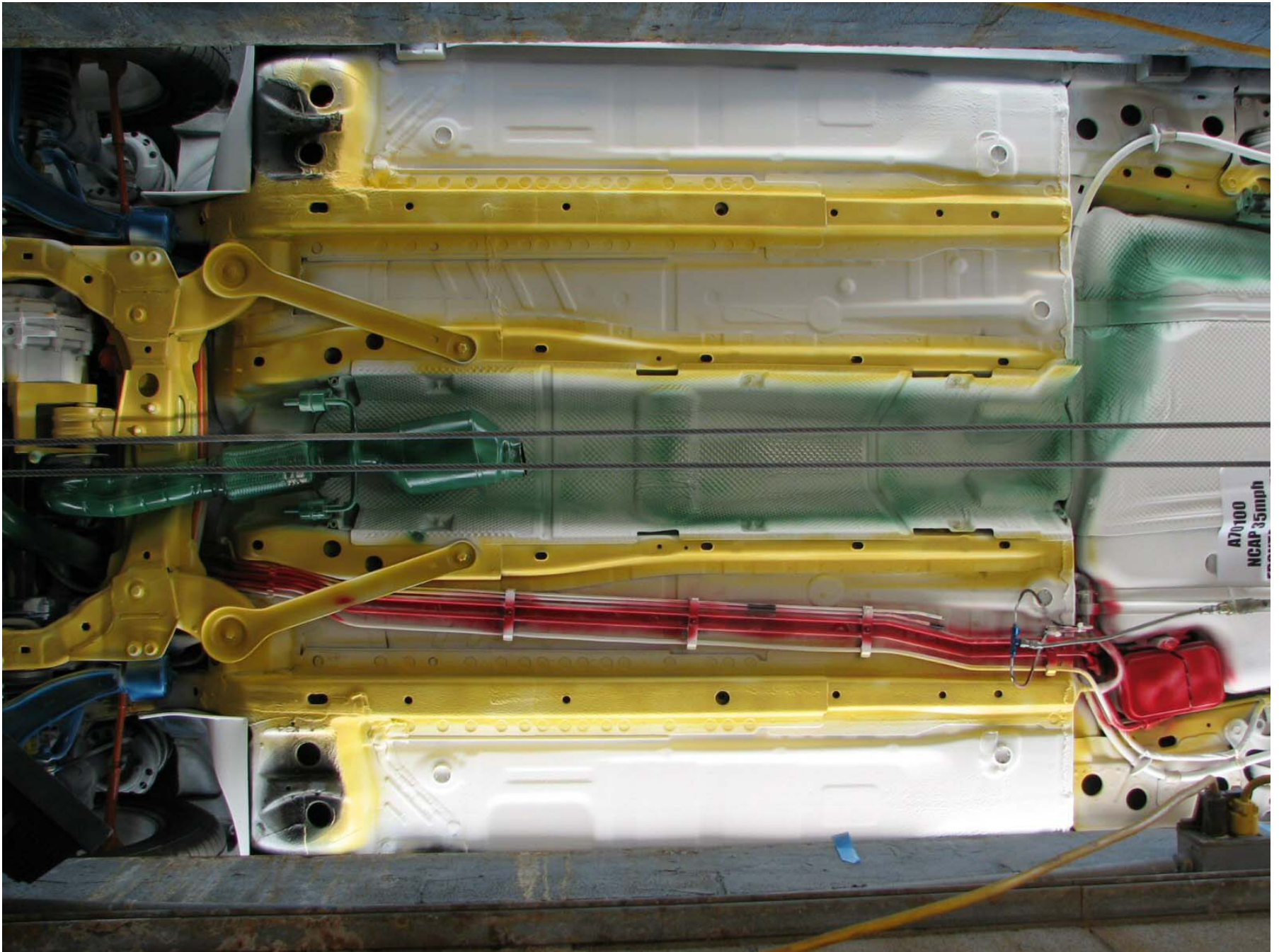


Figure A-26: Pre-Test Mid Underbody

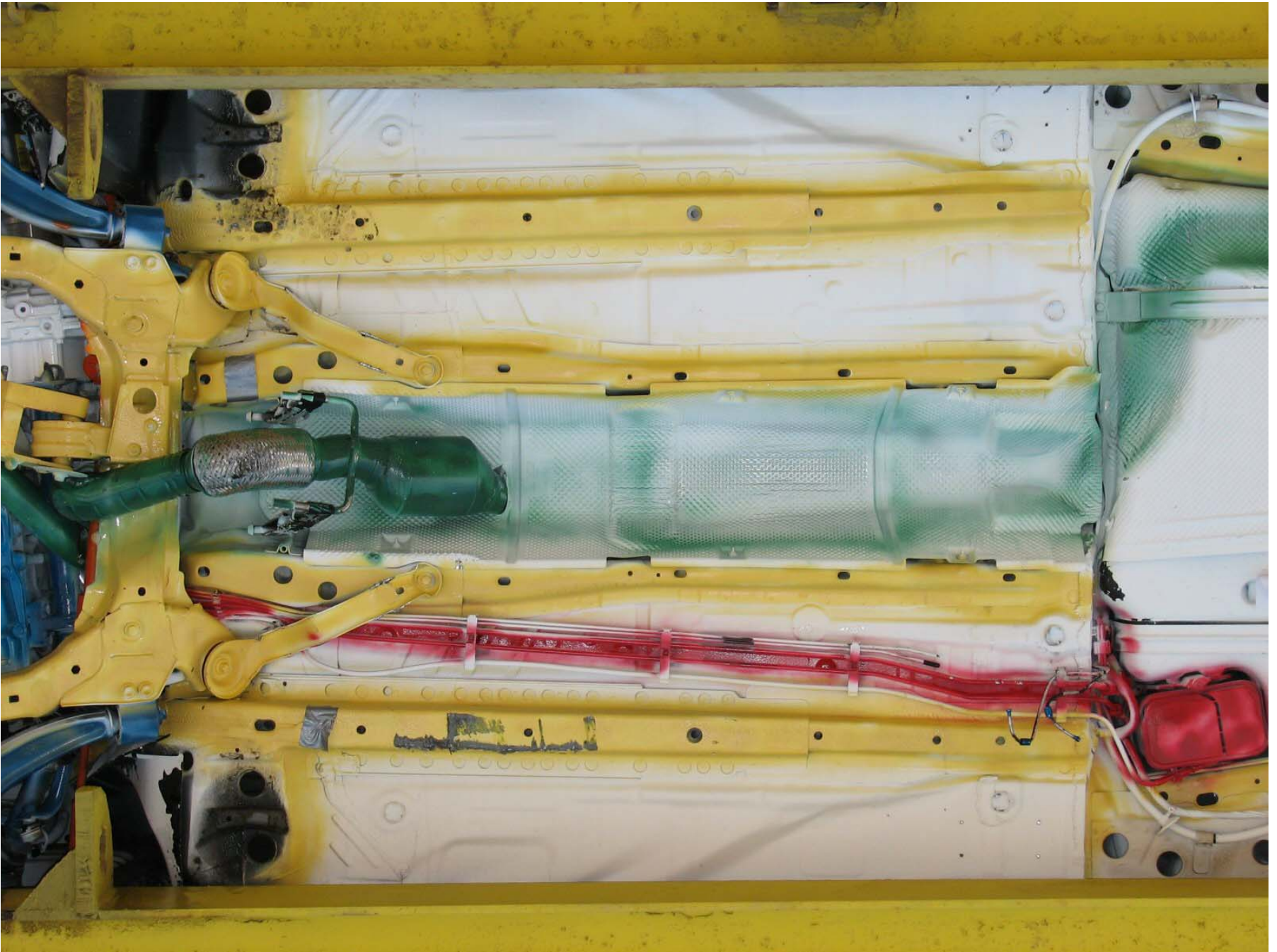


Figure A-27: Post-Test Mid Underbody



Figure A-28: Pre-Test Rear Underbody



Figure A-29: Post-Test Rear Underbody



Figure A-30: Pre-Test Driver Dummy Front View (Head Position)



Figure A-31: Post-Test Driver Dummy Front View (Head Position)



Figure A-32: Pre-Test Driver Dummy (Through Window)



Figure A-33: Post-Test Driver Dummy (Through Window)



Figure A-34: Pre-Test Driver Dummy (Door Open)



Figure A-35: Post-Test Driver Dummy (Door Open)



Figure A-36: Pre-Test Driver Dummy Feet



Figure A-37: Post-Test Driver Dummy Feet



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



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



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



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



Figure A-42: Post-Test Driver Dummy Head



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



Figure A-44: Pre-Test Passenger Dummy Front View (Head Position)



Figure A-45: Post-Test Passenger Dummy Front View (Head Position)



Figure A-46: Pre-Test Passenger Dummy (Through Window)



Figure A-47: Post-Test Passenger Dummy (Through Window)



Figure A-48: Pre-Test Passenger Dummy (Door Open)



Figure A-49: Post-Test Passenger Dummy (Door Open)



Figure A-50: Pre-Test Passenger Dummy Feet



Figure A-51: Post-Test Passenger Dummy Feet



Figure A-52: Pre-Test Passenger Side Glove Box



Figure A-53: Post-Test Passenger Side Glove Box



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



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



Figure A-56: Post-Test Passenger Dummy Head



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



Figure A-58: Vehicle on Rollover Device (0°)



Figure A-59: Vehicle on Rollover Device (90°)

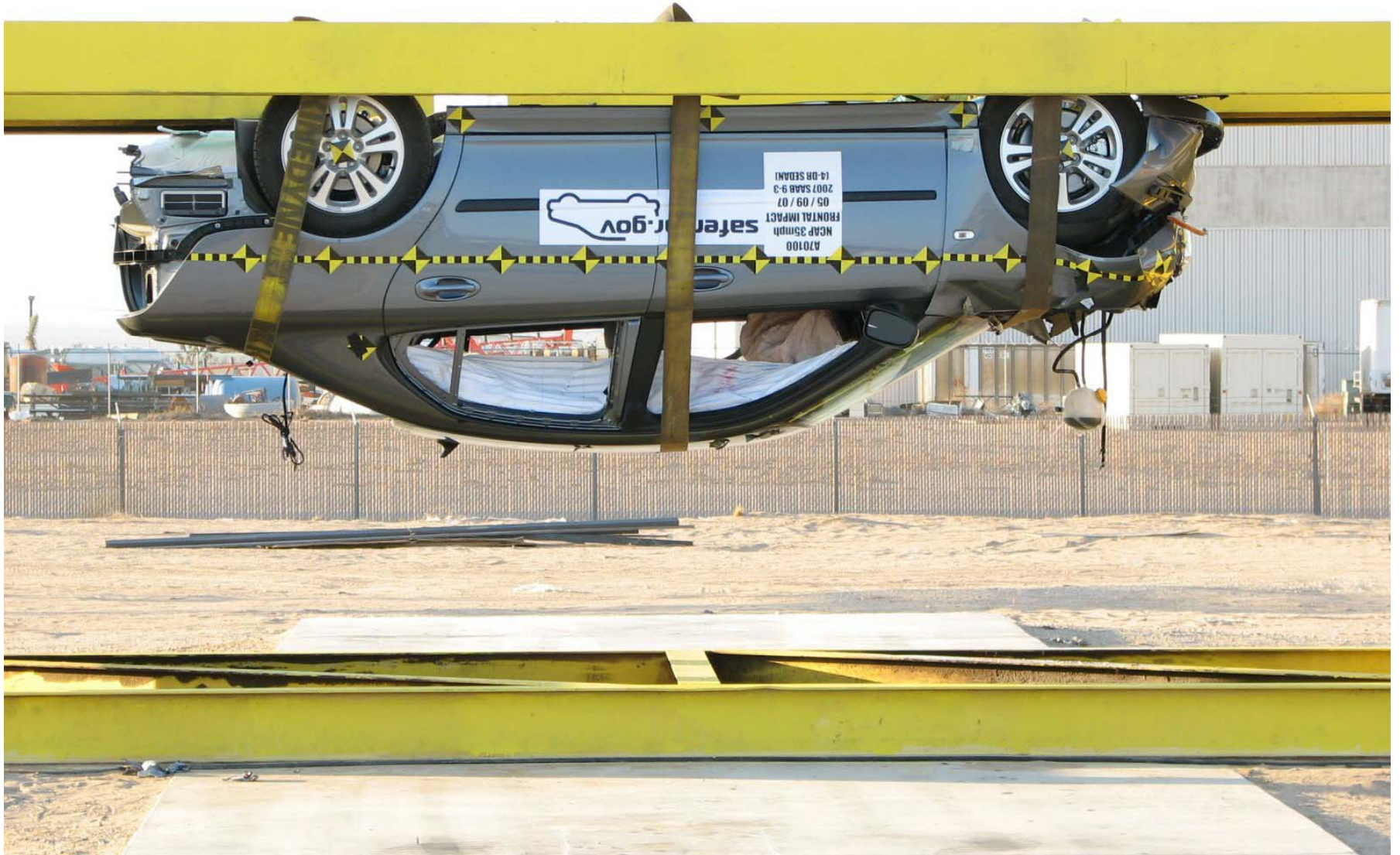


Figure A-60: Vehicle on Rollover Device (180°)

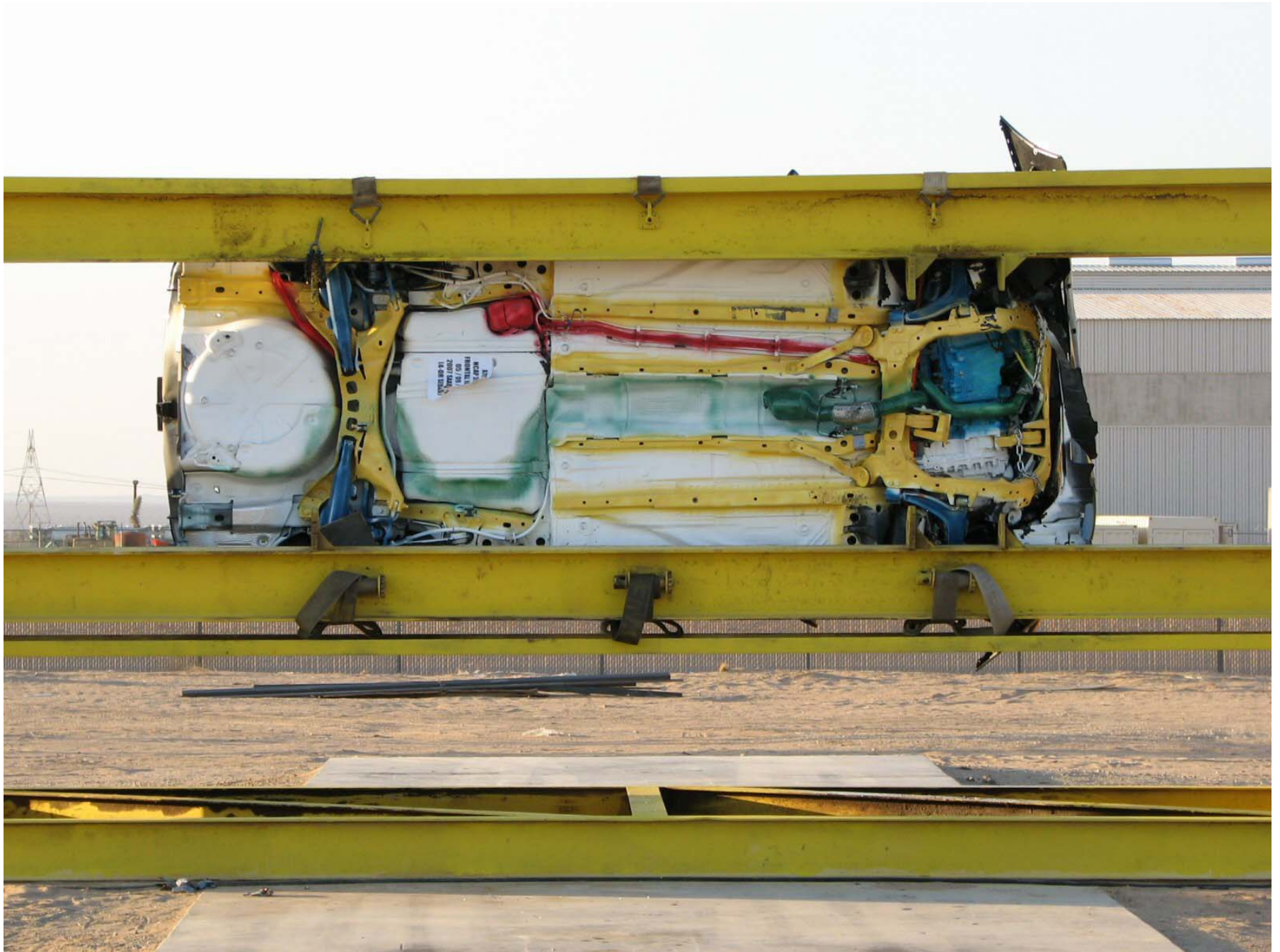


Figure A-61: Vehicle on Rollover Device (270°)



Figure A-62: Vehicle Impact

APPENDIX B
DATA PLOTS

LIST OF DATA PLOTS

Data Plot	Page
B-1	Driver Head Primary X
	Driver Head Primary Y
	Driver Head Primary Z
	Driver Head Resultant Primary
B-2	Driver Chest Primary X
	Driver Chest Primary Y
	Driver Chest Primary Z
	Driver Chest Resultant Primary
B-3	Driver Left Femur Force Z
	Driver Right Femur Force Z
B-4	Passenger Head Primary X
	Passenger Head Primary Y
	Passenger Head Primary Z
	Passenger Head Resultant Primary
B-5	Passenger Chest Primary X
	Passenger Chest Primary Y
	Passenger Chest Primary Z
	Passenger Chest Resultant Primary
B-6	Passenger Left Femur Force Z
	Passenger Right Femur Force Z

LIST OF DATA PLOTS...(CONTINUED)

The following additional data plots for this test can be obtained from the research and development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov.

- Driver Head Primary X Velocity
- Driver Head Primary X Displacement
- Driver Head Redundant X
- Driver Head Redundant Y
- Driver Head Redundant Z
- Driver Head Resultant Redundant
- Driver Head Redundant X Velocity
- Driver Head Redundant X Displacement
- Driver Upper Neck Force X
- Driver Upper Neck Force Y
- Driver Upper Neck Force Z
- Driver Upper Neck Force Resultant
- Driver Upper Neck Moment X
- Driver Upper Neck Moment Y
- Driver Upper Neck Moment Z
- Driver Upper Neck Moment Resultant
- Driver Chest Primary X Velocity
- Driver Chest Primary X Displacement
- Driver Chest Redundant X
- Driver Chest Redundant Y
- Driver Chest Redundant Z
- Driver Chest Resultant Redundant
- Driver Chest Redundant X Velocity
- Driver Chest Redundant X Displacement
- Driver Chest Displacement
- Driver Pelvis X
- Driver Pelvis Y
- Driver Pelvis Z
- Driver Pelvis Resultant
- Driver Pelvis X Velocity
- Driver Pelvis X Displacement
- Driver Left Upper Tibia Moment X
- Driver Left Upper Tibia Moment Y
- Driver Right Upper Tibia Moment X

LIST OF DATA PLOTS...(CONTINUED)

Driver Right Upper Tibia Moment Y
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Left Foot Fore Z
Driver Right Foot Aft X
Driver Right Foot Aft Z
Driver Right Foot Fore Z
Driver Lap Belt Force
Driver Shoulder Belt Force
Driver Shoulder Belt Pullout
Driver Shoulder Belt Elongation
Passenger Head Primary X Velocity
Passenger Head Primary X Displacement
Passenger Head Redundant X
Passenger Head Redundant Y
Passenger Head Redundant Z
Passenger Head Resultant Redundant
Passenger Head Redundant X Velocity
Passenger Head Redundant X Displacement
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Force Resultant
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Upper Neck Moment Resultant
Passenger Chest Primary X Velocity
Passenger Chest Primary X Displacement
Passenger Chest Redundant X

LIST OF DATA PLOTS...(CONTINUED)

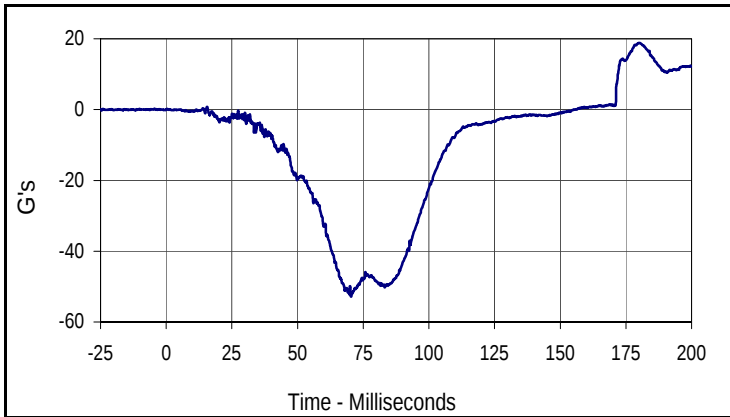
Passenger Chest Redundant Y
Passenger Chest Redundant Z
Passenger Chest Resultant Redundant
Passenger Chest Redundant X Velocity
Passenger Chest Redundant X Displacement
Passenger Chest Displacement
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Pelvis Resultant
Passenger Pelvis X Velocity
Passenger Pelvis X Displacement
Passenger Left Femur Force
Passenger Right Femur Force
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Left Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Right Foot Fore Z
Passenger Lap Belt Force
Passenger Shoulder Belt Force
Passenger Shoulder Belt Pullout
Passenger Shoulder Belt Elongation
Vehicle Left Rear X
Vehicle Left Rear X Velocity

LIST OF DATA PLOTS...(CONTINUED)

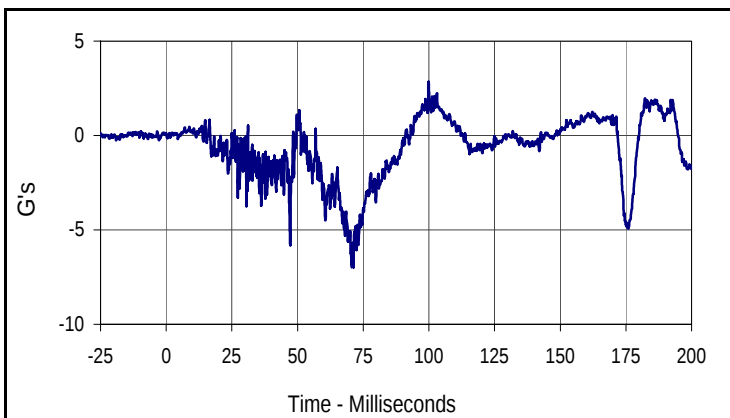
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Vehicle Right Rear X
Vehicle Right Rear X Velocity
Vehicle Right Rear X Displacement
Vehicle Engine Top
Vehicle Engine Top Velocity
Vehicle Engine Top Displacement
Vehicle Engine Bottom
Vehicle Engine Bottom Velocity
Vehicle Engine Bottom Displacement
Vehicle Left Brake Caliper
Vehicle Left Brake Caliper Velocity
Vehicle Left Brake Caliper Displacement
Vehicle Right Brake Caliper
Vehicle Right Brake Caliper Velocity
Vehicle Right Brake Caliper Displacement
Vehicle Instrument Panel
Vehicle Instrument Panel Velocity
Vehicle Instrument Panel Displacement
Vehicle Left Rear Z
Vehicle Left Rear Z Velocity
Vehicle Left Rear Z Displacement
Vehicle Right Rear Z
Vehicle Right Rear Z Velocity
Vehicle Right Rear Z Displacement

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

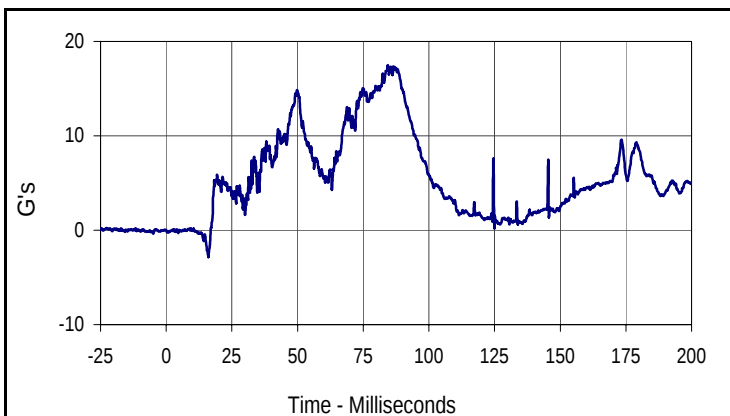
Test Date: 5/9/07
 NHTSA No.: A70100



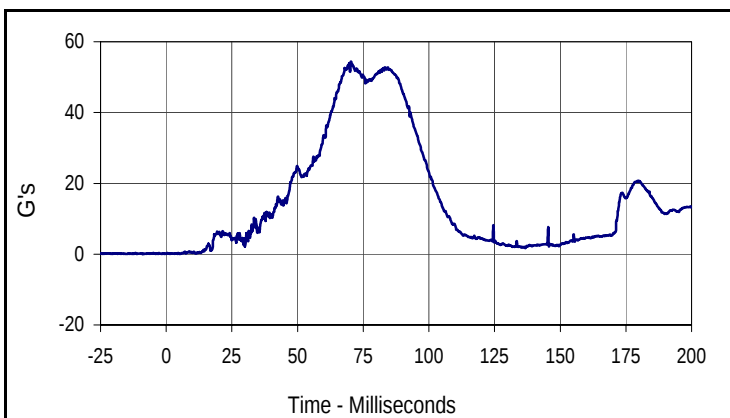
Curve Description			
Driver Head Primary X			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
18.8	180.0	-52.9	70.4



Curve Description			
Driver Head Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.8	99.9	-7.0	70.6



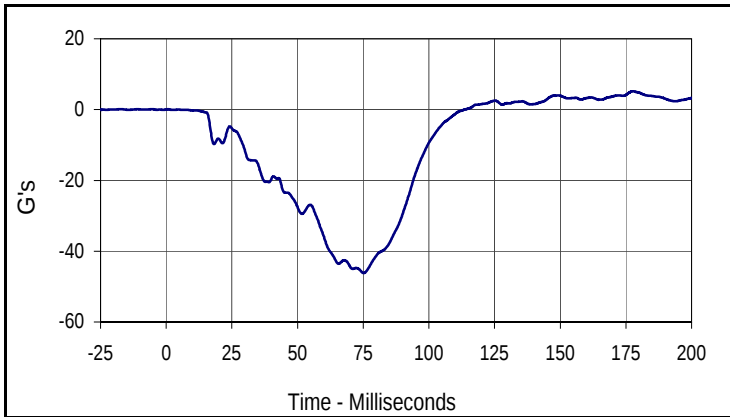
Curve Description			
Driver Head Primary Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
17.5	84.4	-2.8	16.0



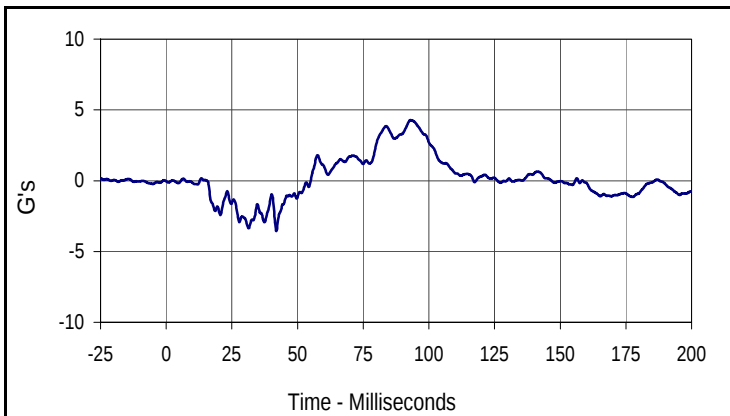
Curve Description			
Driver Head Resultant Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
54.4	70.4	0.0	5.0

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

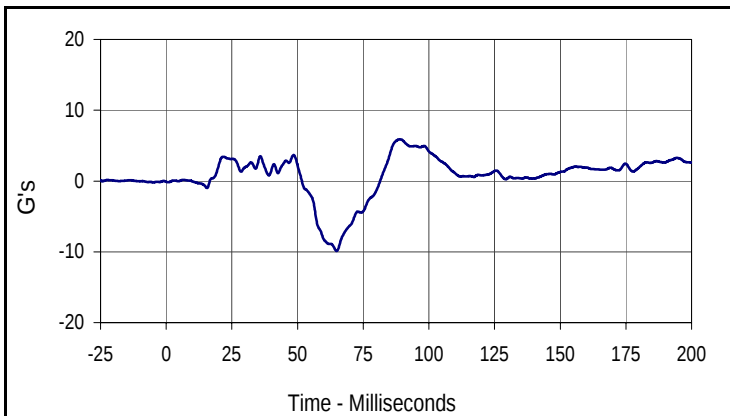
Test Date: 5/9/07
 NHTSA No.: A70100



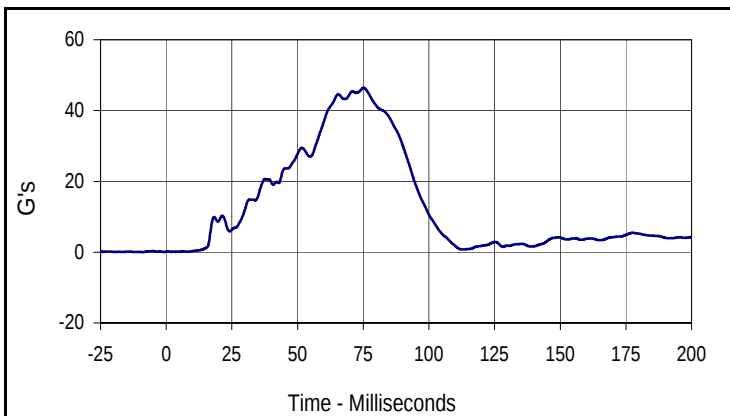
Curve Description			
Driver Chest Primary X			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
5.2	177.7	-46.2	75.2



Curve Description			
Driver Chest Primary Y			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
4.3	93.0	-3.6	41.9



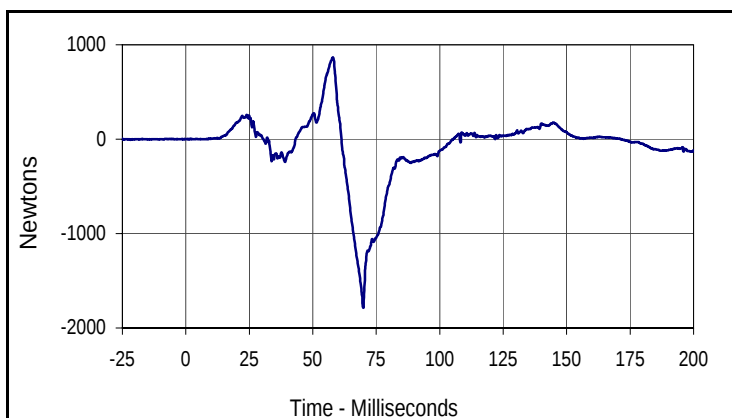
Curve Description			
Driver Chest Primary Z			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
5.9	88.9	-9.9	64.9



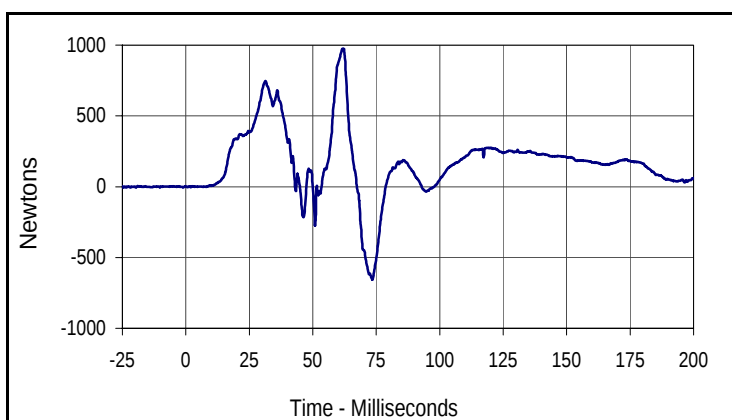
Curve Description			
Driver Chest Resultant Primary			
CURNO	Type	SAE Class	Units
004	RES	180	G's
Max	Time	Min	Time
46.4	75.2	0.1	5.4

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07
 NHTSA No.: A70100



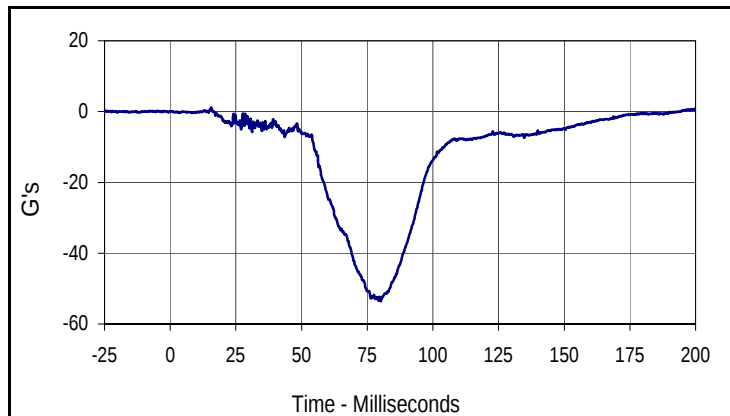
Curve Description			
Driver Left Femur Force Z			
CURNO	Type	SAE Class	Units
007	FIL	600	Newtons
Max	Time	Min	Time
867.0	57.9	-1787.2	69.9



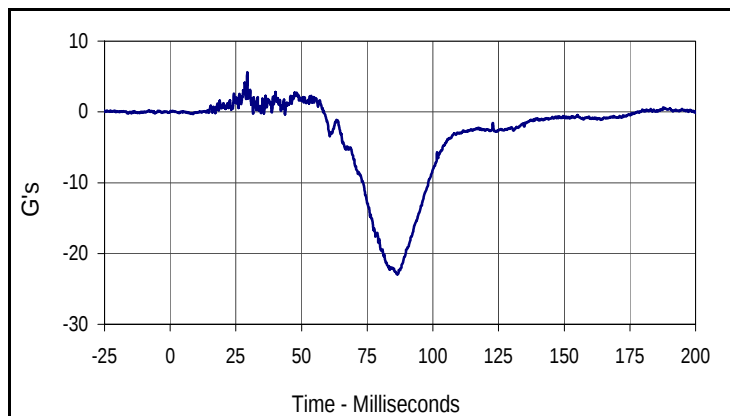
Curve Description			
Driver Right Femur Force Z			
CURNO	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
974.7	61.7	-656.8	73.5

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

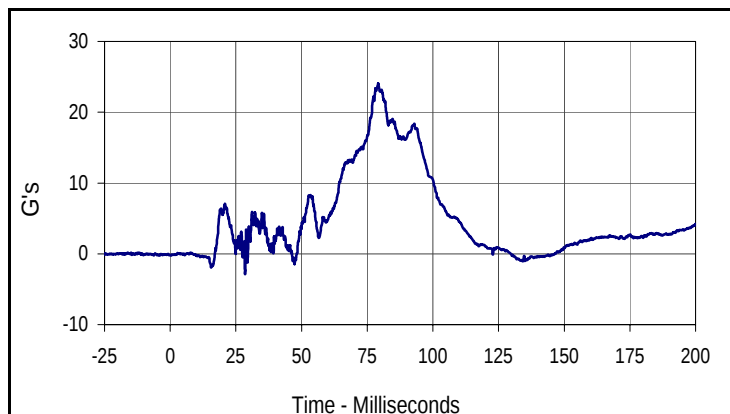
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 NHTSA No.: A70100



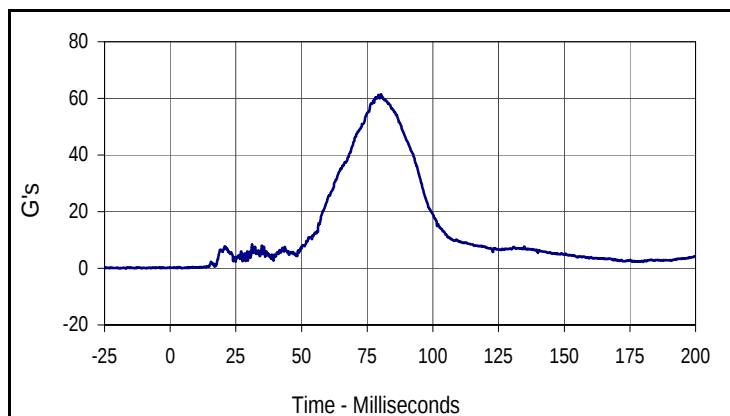
Curve Description			
Passenger Head Primary X			
CURNO	Type	SAE Class	Units
009	FIL	1000	G's
Max	Time	Min	Time
1.1	15.6	-53.6	80.1



Curve Description			
Passenger Head Primary Y			
CURNO	Type	SAE Class	Units
010	FIL	1000	G's
Max	Time	Min	Time
5.6	29.3	-23.0	86.3



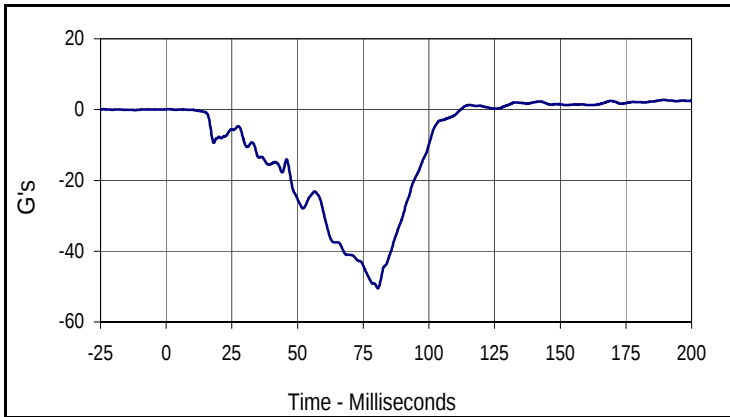
Curve Description			
Passenger Head Primary Z			
CURNO	Type	SAE Class	Units
011	FIL	1000	G's
Max	Time	Min	Time
24.1	79.2	-2.8	28.5



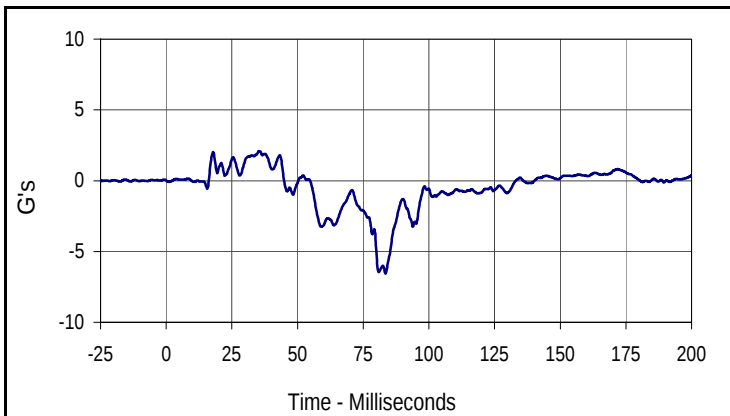
Curve Description			
Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
009	RES	1000	G's
Max	Time	Min	Time
61.5	80.1	0.1	4.3

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

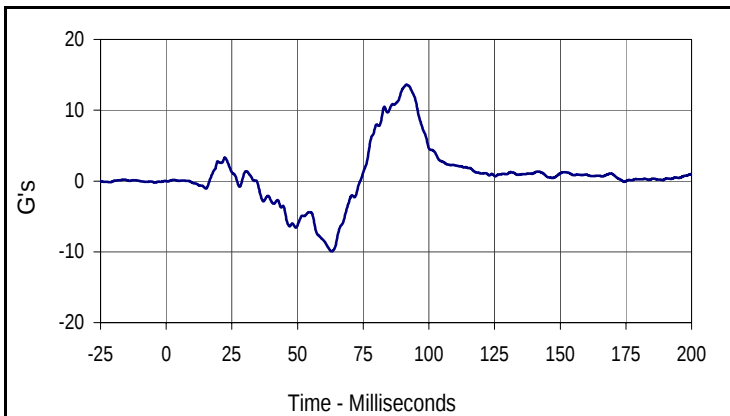
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 NHTSA No.: A70100



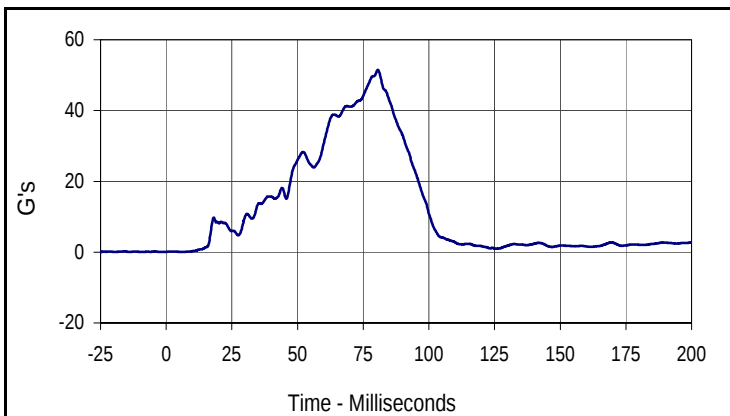
Curve Description			
Passenger Chest Primary X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
2.7	189.0	-50.5	80.5



Curve Description			
Passenger Chest Primary Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
2.1	35.3	-6.6	83.5



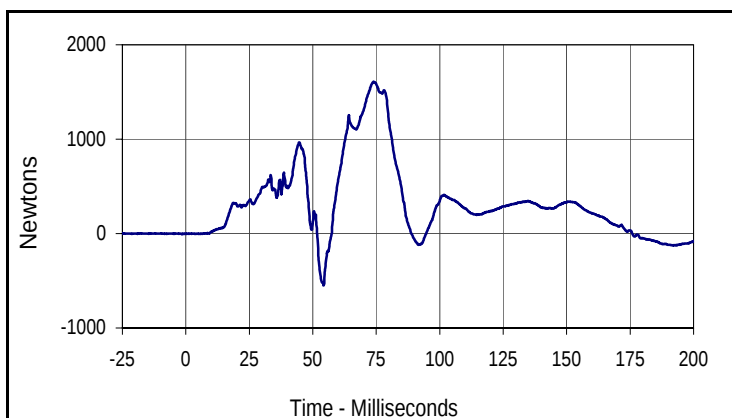
Curve Description			
Passenger Chest Primary Z			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
13.6	91.4	-9.9	62.9



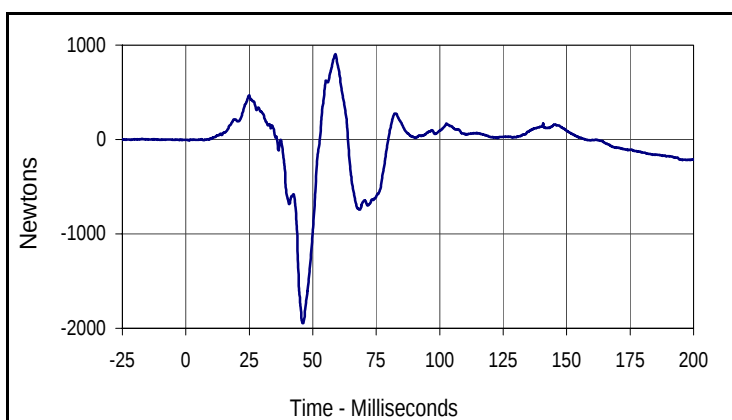
Curve Description			
Passenger Chest Resultant Primary			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
51.5	80.6	0.1	0.0

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07
 NHTSA No.: A70100



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
1609.0	73.9	-549.9	54.3

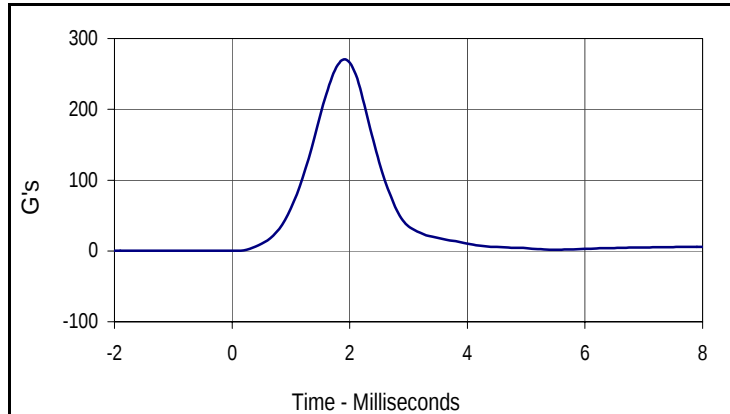


Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
905.4	58.9	-1946.8	46.1

APPENDIX C
DUMMY CALIBRATION DATA

Test Program: Hybrid III 50th Percentile Male Head Drop TestTest Date: 3/30/07ATD Serial No.: 035Test I.D.: HD03D

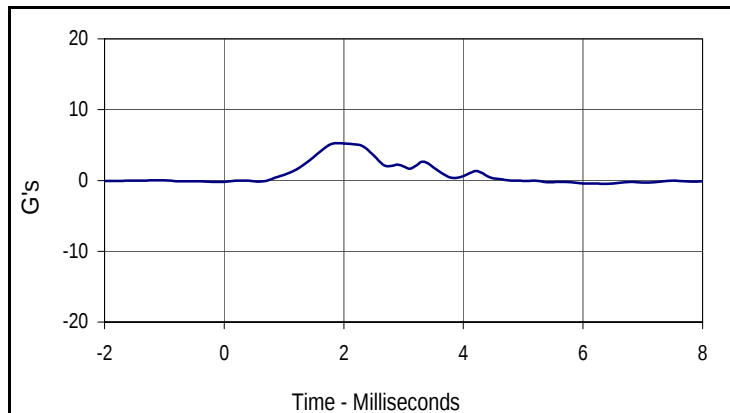
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	270.5	Pass
Peak Lateral Acceleration	G's	≤15.0	5.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
270.5	1.9	0.1	-1.4



Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.3	1.9	-0.4	6.0

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

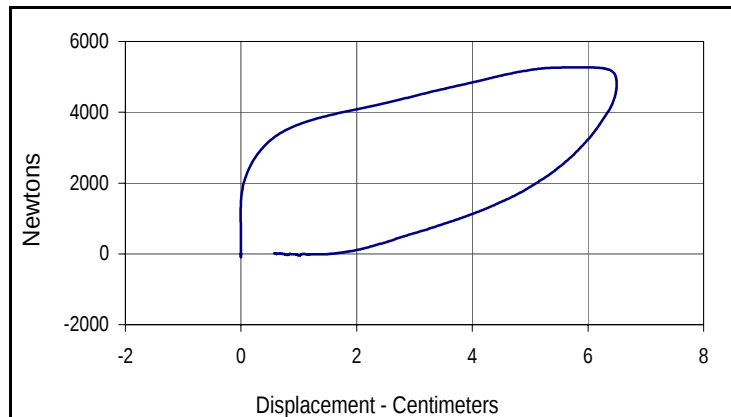
Test Date: 4/2/07

ATD Serial No.: 035

Test I.D.: CH04B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.71	Pass
Peak Probe Force	Newtons	5159 to 5893	5266	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.50	Pass
Internal Hysteresis	%	69 to 85	75.4	Pass
Overall Test Results				Pass



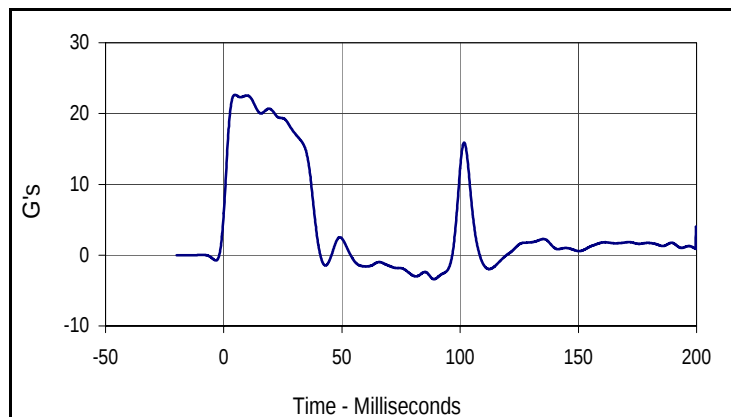
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	75.4
Peak Probe Force		Peak Chest Deflection	
5266		6.50	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 035

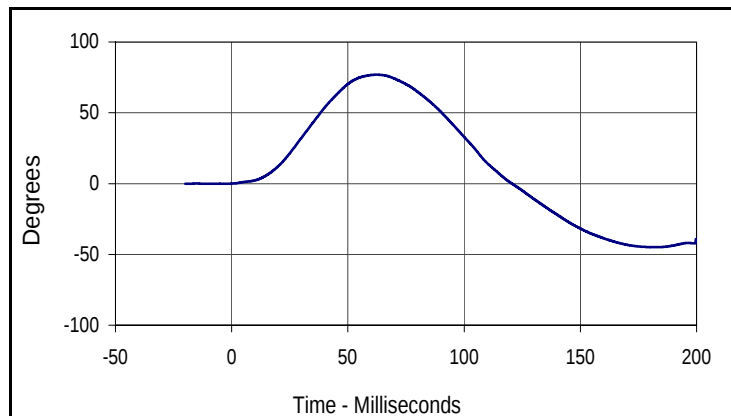
Test Date: 3/29/07
 Test I.D.: NF03D



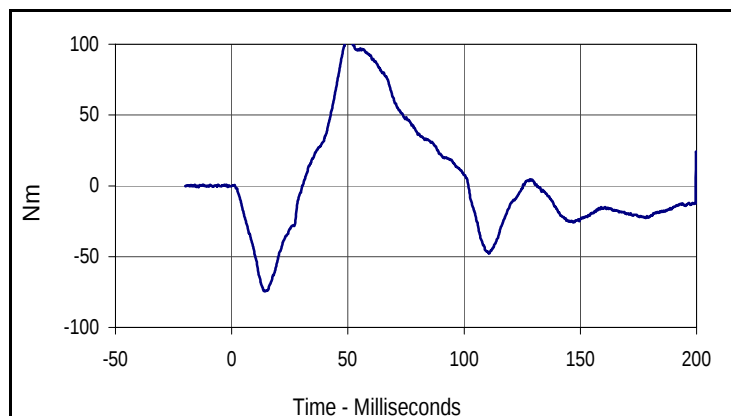
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.5	Pass
	20 Msec.	G's	17.6 to 22.6	20.6	Pass
	30 Msec.	G's	12.5 to 18.5	17.2	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	17.2	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	38.6	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	76.9	Pass
	Time	Msec.	57.0 to 64.0	62.3	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	120.6	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	105.6	Pass
	Time	Msec.	47.0 to 58.0	49.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	101.9	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
22.6	4.7	-3.4	88.9



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.9	62.3	-44.9	182.3



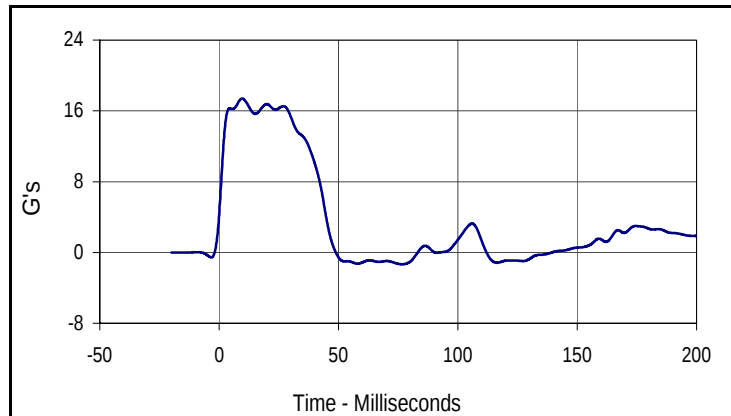
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
105.6	49.9	-74.6	14.5

Test Program: Hybrid III 50th Percentile Male Neck Extension Test
 ATD Serial No.: 035

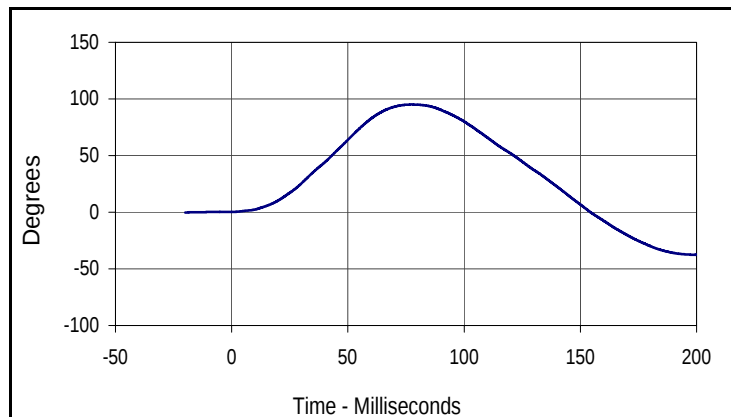
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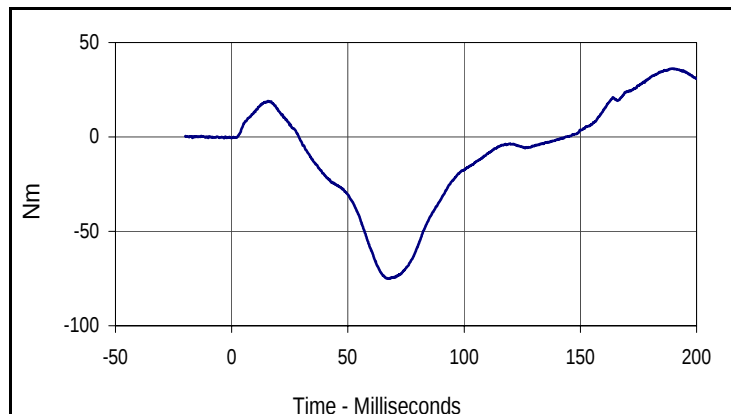
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.05	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.4	Pass
	20 Msec.	G's	14.0 to 19.0	16.8	Pass
	30 Msec.	G's	11.0 to 16.0	15.3	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.3	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	44.2	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	95.1	Pass
	Time	Msec.	72.0 to 82.0	77.4	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	154.4	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-75.1	Pass
	Time	Msec.	65.0 to 79.0	67.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	143.7	Pass
Overall Test Results				Pass	



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
17.4	9.6	-1.3	76.6



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
95.1	77.4	-37.6	200.0



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
36.2	189.5	-75.1	67.9

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 4/2/07

ATD Serial No.: 035

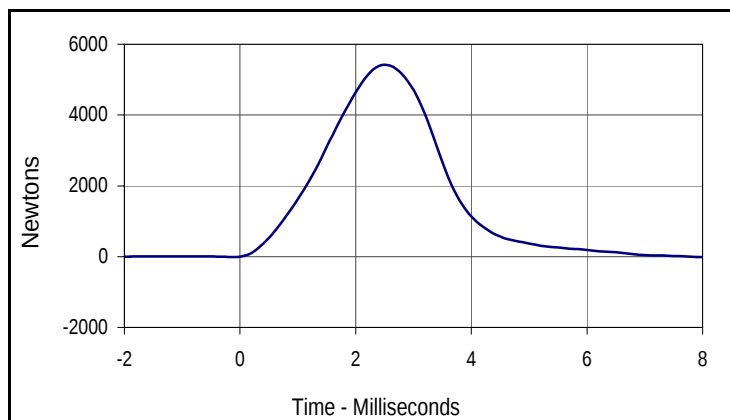
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**Left Knee**

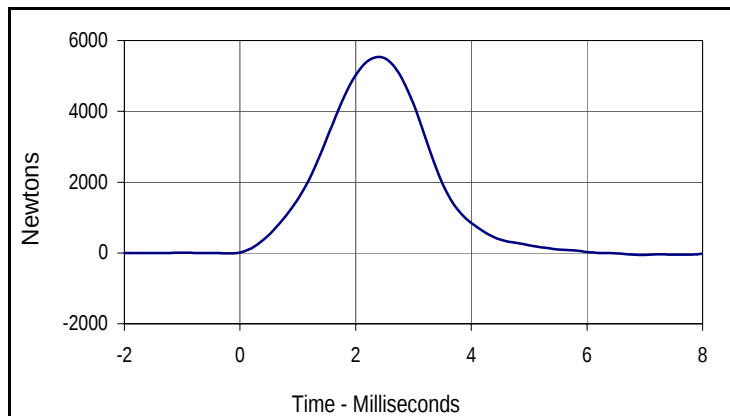
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5425	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5538	Pass
Overall Test Results				Pass

**Curve Description****Left Knee Probe Force**

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5425.0	2.5	-29.6	8.6

**Curve Description****Right Knee Probe Force**

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5538.5	2.4	-58.0	6.9

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 3/29/07

ATD Serial No.: 035

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	886	Pass
B - Shoulder pivot height	mm	505 to 521	510	Pass
C - "H" point height	mm	84 to 89	86	Pass
D - "H" point from seat back	mm	135 to 140	140	Pass
E - Shoulder pivot from back	mm	84 to 94	85	Pass
F - Thigh clearance	mm	140 to 155	150	Pass
G - Elbow back to wrist pivot	mm	290 to 305	300	Pass
H - Skull cap to back line	mm	41 to 46	45	Pass
I - Shoulder to elbow length	mm	330 to 345	336	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	580	Pass
L - Popliteal length	mm	429 to 455	449	Pass
M - Knee pivot height	mm	485 to 500	489	Pass
N - Buttock popliteal length	mm	452 to 477	474	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	253	Pass
V - Shoulder breadth	mm	422 to 437	435	Pass
W - Foot breadth	mm	91 to 107	102	Pass
Y - Chest circumference	mm	970 to 1001	985	Pass
Z - Waist circumference	mm	836 to 866	850	Pass
AA - Location for chest circumference	mm	429 to 434	430	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Test Program: Hybrid III 50th Percentile Male Head Drop Test

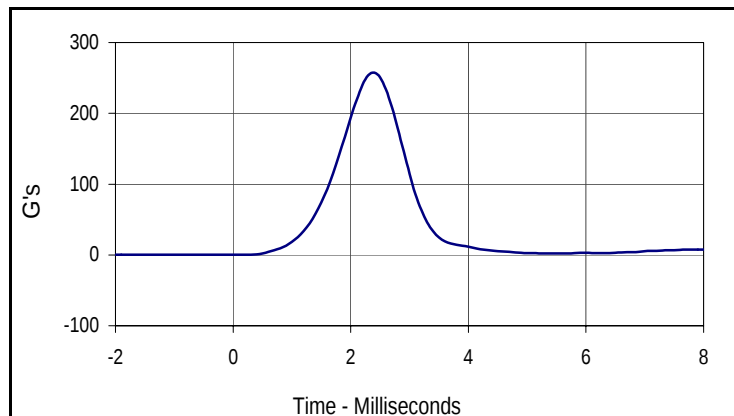
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ATD Serial No.: 034

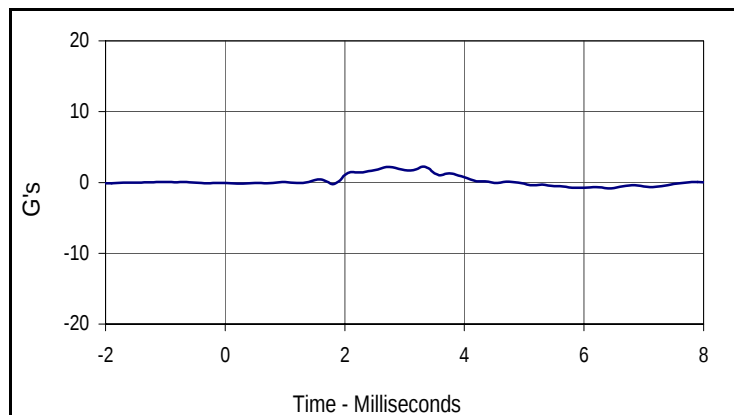
Test I.D.: HD03C



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	257.7	Pass
Peak Lateral Acceleration	G's	≤15.0	2.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
257.7	2.4	0.1	-1.1



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.3	3.3	-0.7	5.9

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

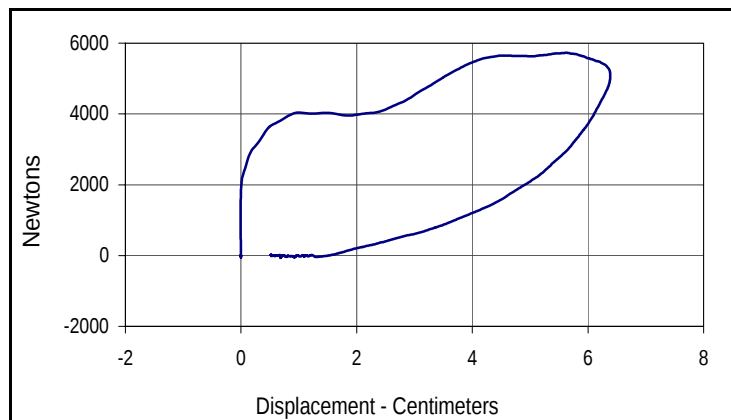
Test Date: 4/2/07

ATD Serial No.: 034

Test I.D.: CH04A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.79	Pass
Peak Probe Force	Newtons	5159 to 5893	5725	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.39	Pass
Internal Hysteresis	%	69 to 85	75.4	Pass
Overall Test Results				Pass



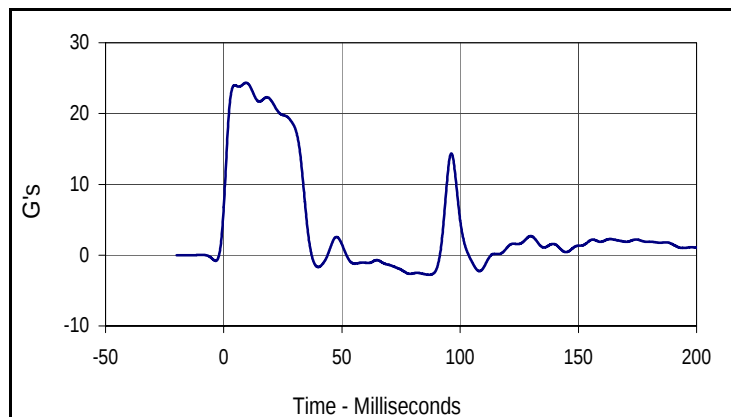
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	75.4
Peak Probe Force		Peak Chest Deflection	
5725		6.39	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 034

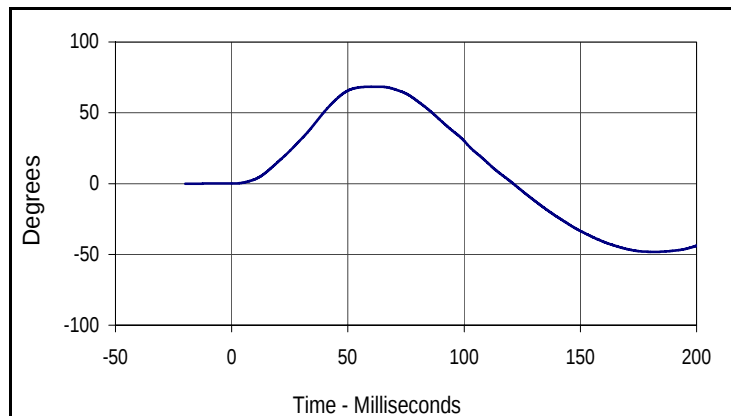
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 Test I.D.: NF03G



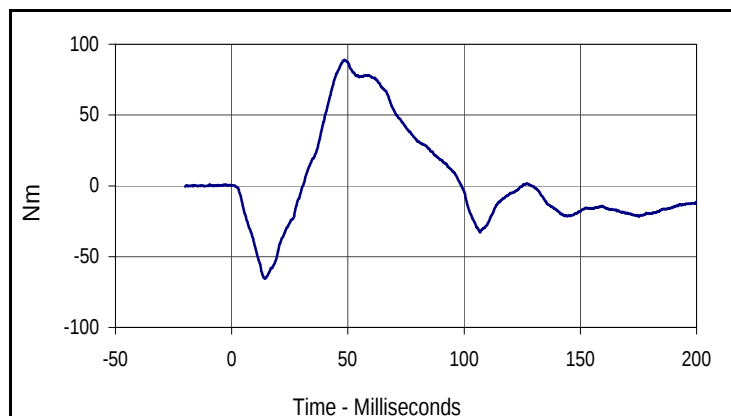
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.08	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	24.3	Pass
	20 Msec.	G's	17.6 to 22.6	21.9	Pass
	30 Msec.	G's	12.5 to 18.5	18.1	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.1	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	35.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	68.4	Pass
	Time	Msec.	57.0 to 64.0	62.4	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	121.1	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	88.9	Pass
	Time	Msec.	47.0 to 58.0	48.6	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	99.0	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
24.3	9.5	-2.8	87.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
68.4	62.4	-48.2	181.9



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
88.9	48.6	-65.5	14.5

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

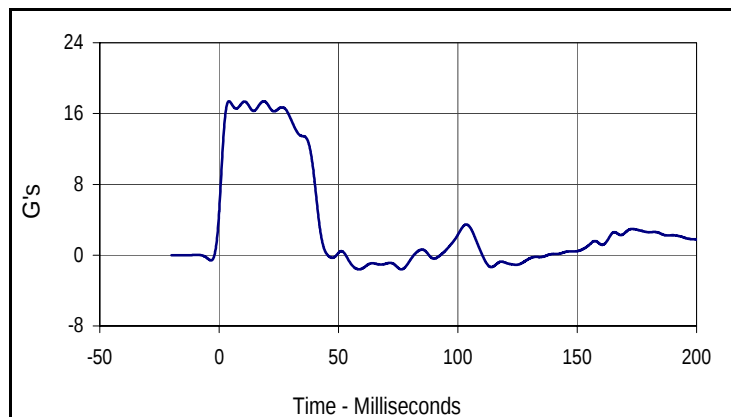
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ATD Serial No.: 034

Test I.D.: NE03H



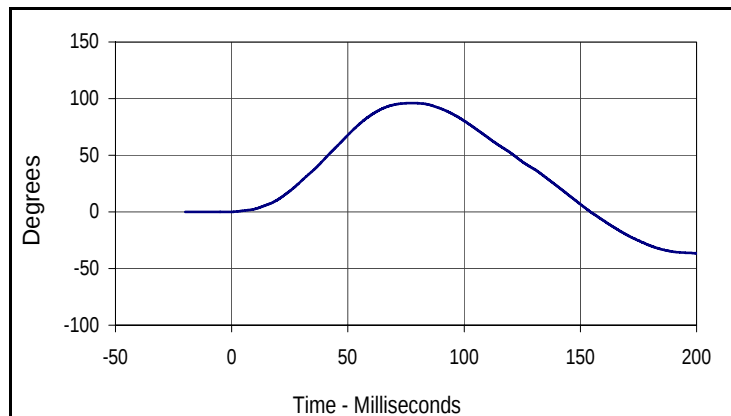
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.14	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	17.3	Pass
	20 Msec.	G's	14.0 to 19.0	17.2	Pass
	30 Msec.	G's	11.0 to 16.0	15.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	41.4	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	96.0	Pass
	Time	Msec.	72.0 to 82.0	77.6	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	154.4	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-76.4	Pass
	Time	Msec.	65.0 to 79.0	68.3	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	142.3	Pass
Overall Test Results				Pass	



Curve Description

Pendulum Deceleration

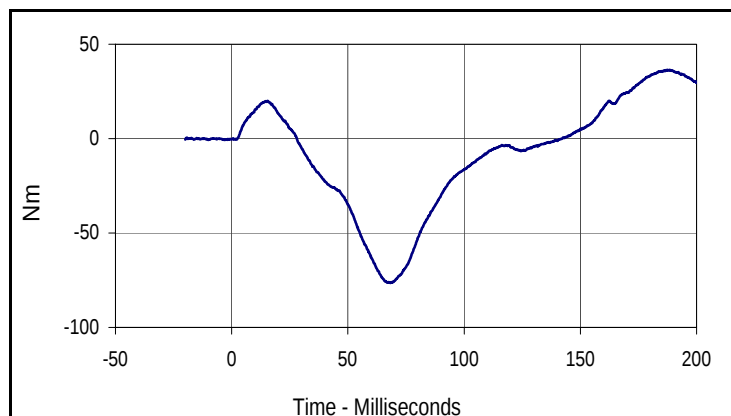
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
17.4	4.1	-1.6	58.6



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
96.0	77.6	-36.4	200.0



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
36.4	187.5	-76.4	68.3

Test Program: Hybrid III 50th Percentile Male Knee Impact Test
 ATD Serial No.: 034

Test Date: 4/2/07
 Test I.D.: LK04A , RK04B

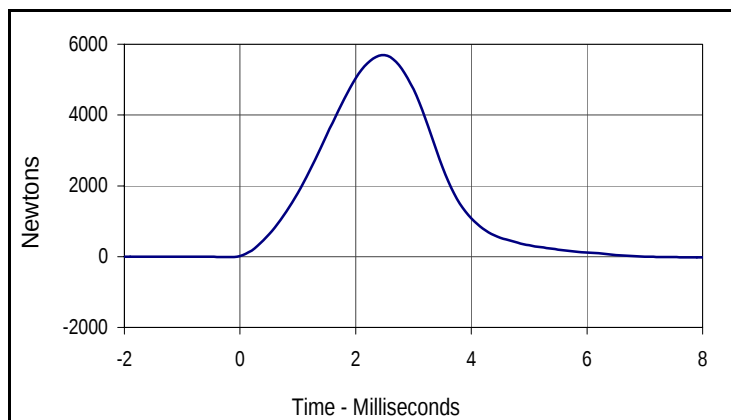


Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force	Newtons	4715 to 5782	5691	Pass
Overall Test Results				Pass

Right Knee

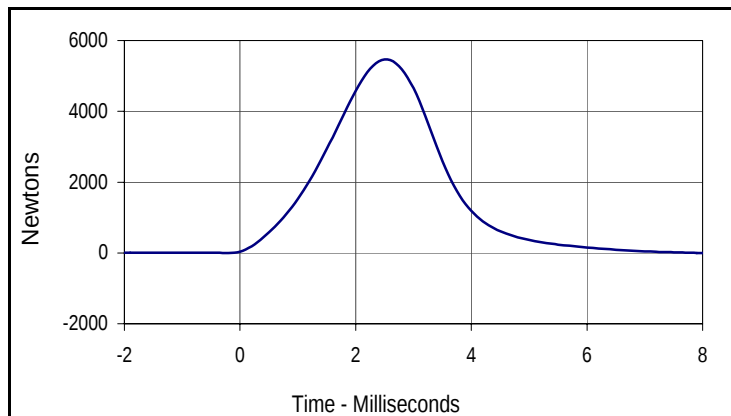
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5465	Pass
Overall Test Results				Pass



Curve Description

Left Knee Probe Force

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5691.0	2.5	-25.0	8.8



Curve Description

Right Knee Probe Force

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5465.2	2.5	-195.5	9.7

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 3/29/07

ATD Serial No.: 034

Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	880	Pass
B - Shoulder pivot height	mm	505 to 521	513	Pass
C - "H" point height	mm	84 to 89	86	Pass
D - "H" point from seat back	mm	135 to 140	138	Pass
E - Shoulder pivot from back	mm	84 to 94	85	Pass
F - Thigh clearance	mm	140 to 155	150	Pass
G - Elbow back to wrist pivot	mm	290 to 305	300	Pass
H - Skull cap to back line	mm	41 to 46	42	Pass
I - Shoulder to elbow length	mm	330 to 345	336	Pass
J - Elbow rest height	mm	190 to 211	207	Pass
K - Buttock to knee length	mm	579 to 604	598	Pass
L - Popliteal length	mm	429 to 455	450	Pass
M - Knee pivot height	mm	485 to 500	489	Pass
N - Buttock popliteal length	mm	452 to 477	475	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	255	Pass
V - Shoulder breadth	mm	422 to 437	434	Pass
W - Foot breadth	mm	91 to 107	102	Pass
Y - Chest circumference	mm	970 to 1001	986	Pass
Z - Waist circumference	mm	836 to 866	850	Pass
AA - Location for chest circumference	mm	429 to 434	431	Pass
BB - Location for waist circumference	mm	226 to 231	229	Pass
Overall Test Results				Pass

Test Program: Dummy Damage Checklist
 ATD Serial No.: 035

Test Date: 4/2/07
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

Test Program: Dummy Damage Checklist
 ATD Serial No.: 034

Test Date: 4/2/07
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

APPENDIX D
CHILD RESTRAINT SYSTEM

REPORT NUMBER TR-P27121-01-NC

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 SAAB 9-3
4-DOOR SEDAN**

NHTSA NUMBER: A70100

**PREPARED BY:
KARCO ENGINEERING, LLC
9270 HOLLY ROAD
ADELANTO, CALIFORNIA 92301**



MAY 9, 2007

FINAL REPORT

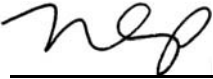
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U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: W43-410
1200 NEW JERSEY AVE SE
WASHINGTON, D.C. 20590**

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Date: May 9, 2007

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KARCO Engineering, LLC

Date: May 9, 2007

Approved by: 
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

Date: May 9, 2007

FINAL REPORT ACCEPTED BY:

Manager, New Car Assessment Program

Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

Technical Report Documentation Page

1. Report No. TR-P27121-01-NC		2. Government Accession No.		3. Recipients Catalog No.	
4. Title and Subtitle Final Report of one (1) Safety 1st Starter CRS Final Report of one (1) Graco Snugride CRS NHTSA NO. A70100				5. Report Date 5/9/2007	
				6. Performing Organization Code KAR	
7. Authors Mr. Johnny H. Dutto, Project Engineer, Karco Mr. Frank Richardson, Program Manager, Karco				8. Performing Organization Report No. TR-P27121-01-NC	
9. Performing Organization Name and Address Karco Engineering, LLC 9270 Holly Rd. Adelanto, CA, 92301				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-06-D-00027	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code: W43-410 1200 New Jersey Ave SE Washington, D.C 20590				13. Type of Report and Period Covered Final Test Report Base Year	
				14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS	
15. Supplementary Notes					
16. Abstract A frontal impact test was conducted on one (1) Safety 1st Starter and one (1) Graco Snugride CRS in conjunction with frontal barrier impact NCAP testing on a 2007 Saab 9-3 4-Door Sedan and in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at Karco Engineering, LLC on May 9, 2007.					
Measurement Description		Units	Threshold	Left Rear (P4)	Right Rear (P3)
Head Injury Criteria (HIC15)		N/A	390	364.1	488.2
3 msec. Chest Clip		G's	50	55.5	74.6
17. Key Words New Car Assessment Program (Frontal NCAP) Frontal Barrier Impact Test Final Report of a Safety 1st Starter CRS Final Report of a Graco Snugride CRS				18. Distribution of Statement Copies of this report available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE Washington, D.C. 20590	
19. Security Classification (this report) Unclassified		20. Security Classification (this page) Unclassified		21. No. of Pages 71	22. Price

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SECTION D1

PURPOSE AND SUMMARY OF TEST A70100

The purpose of this test is to obtain CRS performance data during 35 mph (56.3 km/h) frontal barrier impact NCAP test.

The frontal barrier impact NCAP test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

Two 12-month old CRABI's (P3 & P4) was instrumented with head, chest, and six-axis upper neck load cells. A tri-axial accelerometer was installed on each CRS and the CRS base.

The left rear (Serial No. 022) and right rear (Serial No. 017) CRABI's were calibrated prior to this test. CRABI calibration information is found in Section D-4.

CHILD DUMMY VALUES		
Location	HIC15 Values	3 Msec. Chest Clip
CRABI (P3)	488.2	74.6
CRABI (P4)	364.1	55.5

DATA SHEET NO.1
CRASH TEST SUMMARY

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

CHILD RESTRAINT SYSTEM INFORMATION

Description	Position #3 CRS	Position #4 CRS
Manufacturer	Graco	Safety 1st
Model Name	Snugride	Starter
Serial No.	8643SUP3	22-315SHA
Type	Infant	Infant
Forward/Rearward	Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

Description	Position #3 CRS	Position #4 CRS
Head Contact	Front Passenger Seat back	Front Driver Seat back
Chest Contact	None	None
Abdomen Contact	None	None
Left Knee Contact	None	None
Right Knee Contact	None	None
Left Toe Contact	Rear Seat back	Rear Seat back
Right Toe Contact	Rear Seat back	Rear Seat back

POST-TEST DOOR OPENINGS

Description	Position #3 CRS	Position #4 CRS
Right Rear Door	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools

CAMERA COVERAGE

Description	Standard
High Speed	4
Real Time	0
Total	4

DATA CHANNELS

CRABI (P3 & P4) Sensors	26
Belt Sensors	4
CRS Sensors	12
Total	42

DATA SHEET NO.2**VEHICLE PARAMETER DATA**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	456	308	764	479	378	857
Right	kg	426	288	714	478	370	848
Ratio	%	60	40	100	56	44	100
Totals	kg	882	596	1478	957	748	1705

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1478
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Wt. (RCLW)	kg	81
Calculated Vehicle Target Wt. (TVTW)	kg	1711

DATA SHEET NO.3

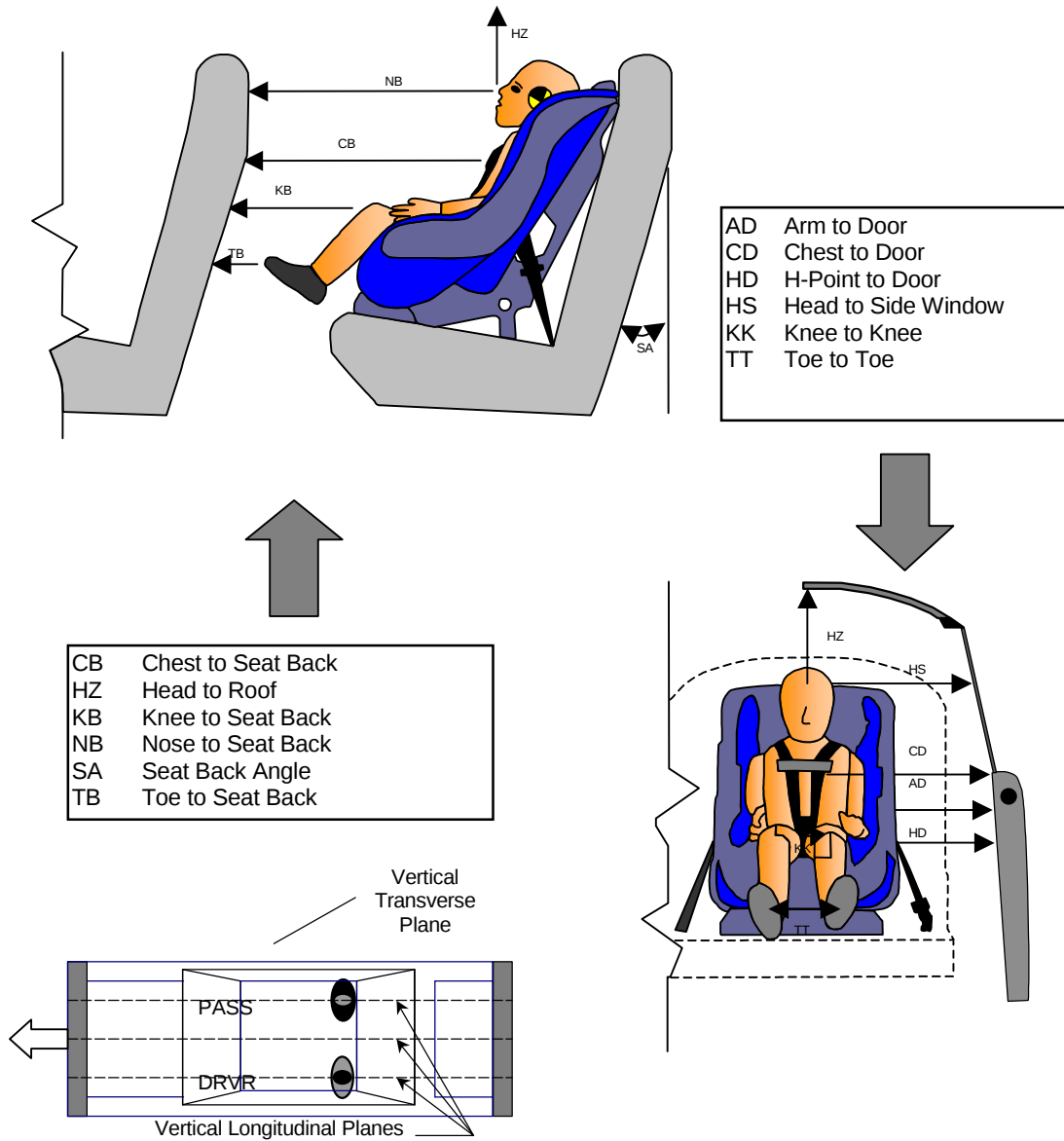
CRABI POSITIONING IN VEHICLE

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07



DUMMY MEASUREMENTS FOR REAR SEAT OCCUPANTS

DATA SHEET NO.3**CRABI POSITIONING IN VEHICLE...(CONTINUED)**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**CRABI POSITION MEASUREMENTS**

Code	Measurement	P3 (Passenger's Side)		P4 (Driver's Side)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
SA	Seat Back Angle		26.0		26.0
HZ	Head to Roof (Z)	413		435	
CD	Chest to Door	358		368	
KK	Knee to Knee (Y)	120		132	
HS	Head to Side Window	420		426	
HD	H-Point to Door (Y)	280		268	
AD	Arm to Door	236		244	
NB	Nose to Seat Back	492		470	
CB	Chest to Seat Back	433		421	
FF	Foot to Foot	113		110	
KB-Left	Knee to Seat Back	182		181	
KB-Right	Knee to Seat Back	181		174	
TB-Left	Toe to Seat Back	55		66	
TB-Right	Toe to Seat Back	59		62	

DATA SHEET NO.4**CRS PERFORMANCE DATA**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**CRS PERFORMANCE DATA**

Location	CRS (P4)		CRS (P3)	
	Damage	Post-Test	Damage	Post-Test
Upper Tether Strap				
Upper Tether Buckle				
Upper Tether Hook				
Veh. Upper Tether Anchor				
Lower Anchor Strap				
Lower Anchor Buckle				
Lower Anchor Hooks	No	None	No	None
Veh. Lower CRS Anchors	No	None	No	None
5-Point Harness Connections	No	None	No	None
Cracks on CRS	No	None	No	None
Fabric Tears on CRS	No	None	No	None
Vehicle Seat Structure	No	None	No	None
Vehicle Seat Fabric Tears	No	None	No	None

DATA SHEET NO. 5
CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Saab 9-3 4-Door Sedan

NHTSA No.: A70100

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 5/9/07

CRS ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	CRS (P4)	1595	-595	720
2	CRS Base (P4)	1595	-595	620
3	CRS (P3)	1595	595	710
4	CRS Base (P3)	1595	595	618

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

1.) Not installed

DATA SHEET NO.6**CRS CAMERA LOCATIONS AND DATA**Test Vehicle: 2007 Saab 9-3 4-Door SedanNHTSA No.: A70100Test Program: 2007 NHTSA 35mph NCAPTest Date: 5/9/07**CAMERA LOCATIONS**

No.	Camera View	Location(mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Driver Side Upper CRS View	3345	694	-1235	-2		12	1000
2	Passenger Side Upper CRS View	-3345	-694	-1235	2		12	1000
3	Driver Side Lower CRS View	2550	412	-1187	-2		10	1000
4	Passenger Side Lower CRS View	-2550	-412	-1187	2		12	1000

X = Barrier Face Y = Monorail Centerline Z = Ground DNR = Did Not Run NTM = No Time Marks

SECTION D2

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36	Post-Test Position 4 Dummy Legs	D2-18

MODEL **8643SUP3**

NAME **SNUGRIDE**

Manufactured in 022807 10

GRACO CHILDREN'S PRODUCTS, INC.

EXTON, PA 19341 1-888-224-6549

Made in U.S.A.

PB-25777

Figure D2-1: Position 3 CRS Label

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Figure D2-2: Pre-Test Frontal View of Position 3 CRS



Figure D2-3: Post-Test Frontal View of Position 3 CRS



Figure D2-4: Pre-Test Rear View of Position 3 CRS



Figure D2-5: Post-Test Rear View of Position 3 CRS



Figure D2-6: Pre-Test Left Side View of Position 3 CRS



Figure D2-7: Post-Test Left Side View of Position 3 CRS



Figure D2-8: Pre-Test Right Side View of Position 3 CRS



Figure D2-9: Post-Test Right Side View of Position 3 CRS



Figure D2-10: Pre-Test Position 3 Front View (Head and Seat Belt Position)



Figure D2-11: Post-Test Position 3 Front View (Head and Seat Belt Position)



Figure D2-12: Pre-Test Position 3 Front View (Seat Belt Position)



Figure D2-13: Post-Test Position 3 Front View (Seat Belt Position)



Figure D2-14: Pre-Test Position 3 Right Side View



Figure D2-15: Post-Test Position 3 Right Side View



Figure D2-16: Pre-Test Position 3 Right Side View (Through Window)



Figure D2-17: Post-Test Position 3 Right Side View (Through Window)



Figure D2-18: Post-Test Position 3 Dummy Legs

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Lap belt

Lap/Shoulder belt

LATCH belt

! WARNING! This restraint is used rear-facing, do not place it in the front seat of a vehicle that has a passenger side air bag. Death or serious injury can occur.

Manufactured in



MODEL #: 22 – 315 – SHA

MFG: L#8B368060 04/28/06

Dorel Juvenile Group, Inc,
2525 State Street, Columbus, IN 47201

Figure D2-19: Position 4 CRS Label

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Figure D2-20: Pre-Test Frontal View of Position 4 CRS



Figure D2-21: Post-Test Frontal View of Position 4 CRS



Figure D2-22: Pre-Test Rear View of Position 4 CRS



Figure D2-23: Post-Test Rear View of Position 4 CRS



Figure D2-24: Pre-Test Left Side View of Position 4 CRS



Figure D2-25: Post-Test Left Side View of Position 4 CRS



Figure D2-26: Pre-Test Right Side View of Position 4 CRS



Figure D2-27: Post-Test Right Side View of Position 4 CRS



Figure D2-28: Pre-Test Position 4 Front View (Head & Seat Belt Position)



Figure D2-29: Post-Test Position 4 Front View (Head & Seat Belt Position)



Figure D2-30: Pre-Test Position 4 Front View (Seat Belt Position)



Figure D2-31: Post-Test Position 4 Front View (Seat Belt Position)



Figure D2-32: Pre-Test Position 4 Left Side View



Figure D2-33: Post-Test Position 4 Left Side View



Figure D2-34: Pre-Test Position 4 Right Side View



Figure D2-35: Post-Test Position 4 Right Side View



Figure D2-36: Post-Test Position 4 Dummy Legs

SECTION D3

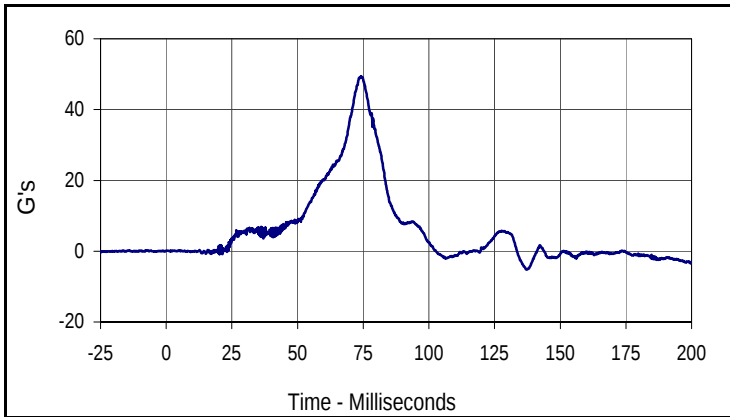
CRABI RESPONSE AND CRS DATA TRACES

LIST OF DATA PLOTS

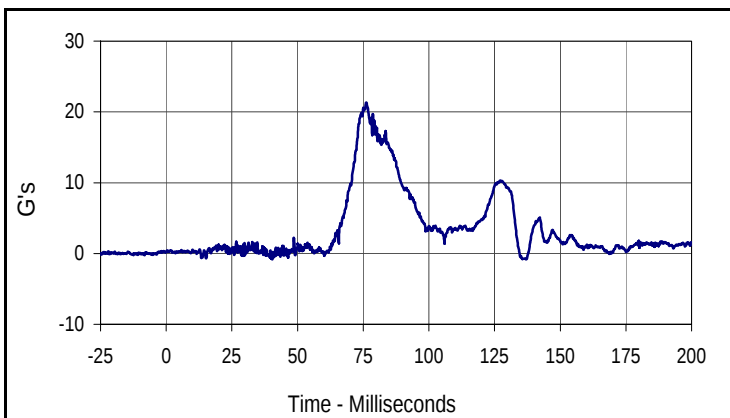
<u>Data Plot</u>		<u>Page</u>
D3-1	Right Rear CRABI (P3) Head X	D3-1
	Right Rear CRABI (P3) Head Y	D3-1
	Right Rear CRABI (P3) Head Z	D3-1
	Right Rear CRABI (P3) Head Resultant	D3-1
D3-2	Right Rear CRABI (P3) Chest X	D3-2
	Right Rear CRABI (P3) Chest Y	D3-2
	Right Rear CRABI (P3) Chest Z	D3-2
	Right Rear CRABI (P3) Chest Resultant	D3-2

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

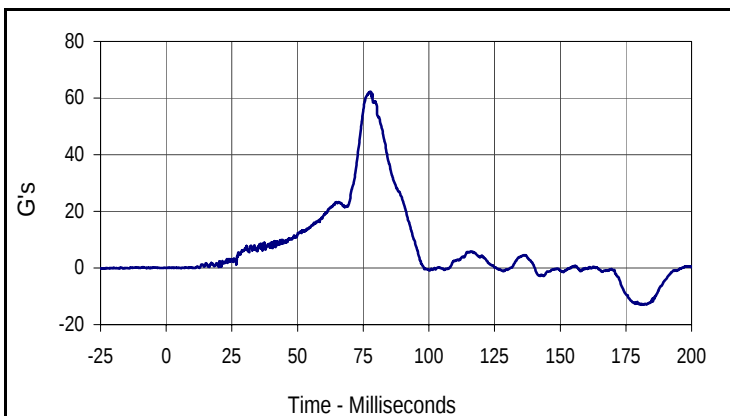
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 NHTSA No.: A70100



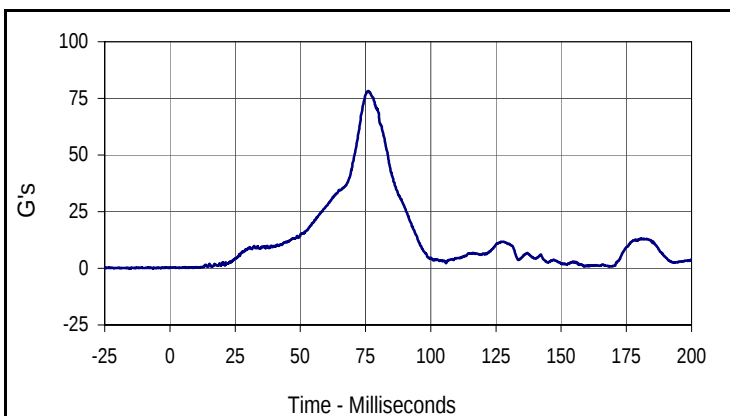
Curve Description			
CRABI Head X (P3)			
CURNO	Type	SAE Class	Units
133	FIL	1000	G's
Max	Time	Min	Time
49.4	74.1	-5.1	137.1



Curve Description			
CRABI Head Y (P3)			
CURNO	Type	SAE Class	Units
134	FIL	1000	G's
Max	Time	Min	Time
21.3	76.2	-0.8	40.3



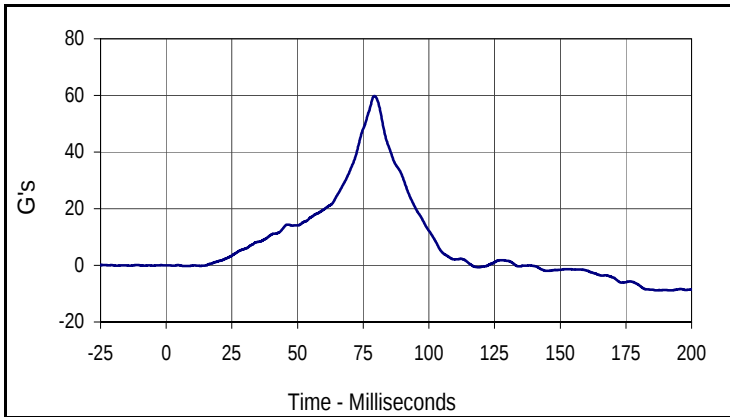
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62.3	77.7	-13.0	180.7



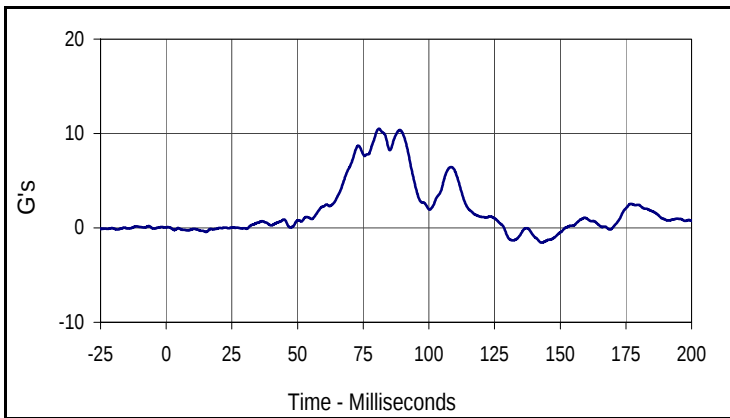
Curve Description			
CRABI Head Resultant (P3)			
CURNO	Type	SAE Class	Units
133	RES	1000	G's
Max	Time	Min	Time
78.3	76.1	0.1	3.6

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

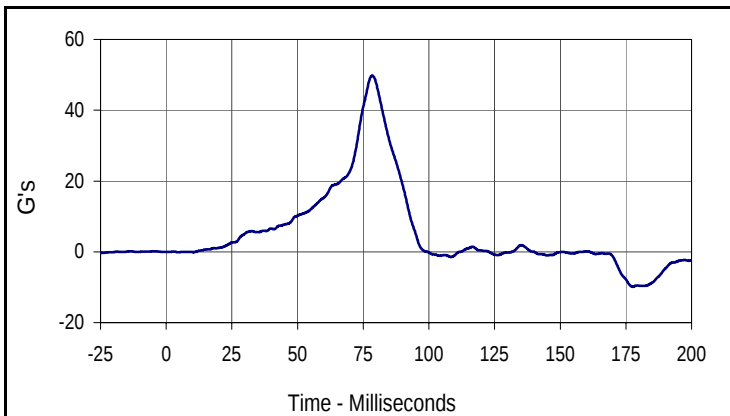
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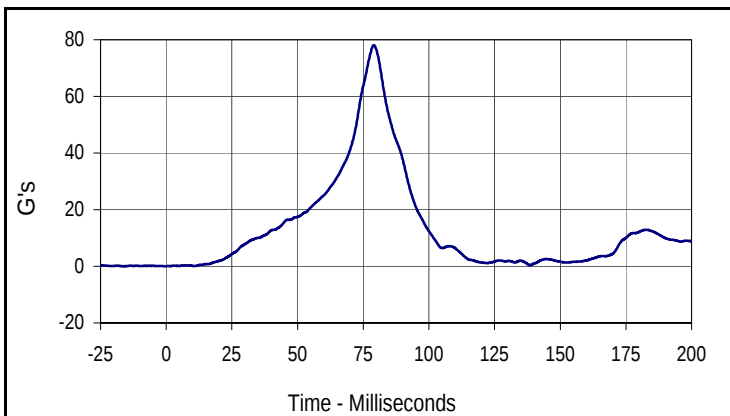
Curve Description			
CRABI Chest X (P3)			
CURNO	Type	SAE Class	Units
143	FIL	180	G's
Max	Time	Min	Time
59.8	79.2	-8.8	186.6



Curve Description			
CRABI Chest Y (P3)			
CURNO	Type	SAE Class	Units
144	FIL	180	G's
Max	Time	Min	Time
10.5	81.0	-1.6	142.9



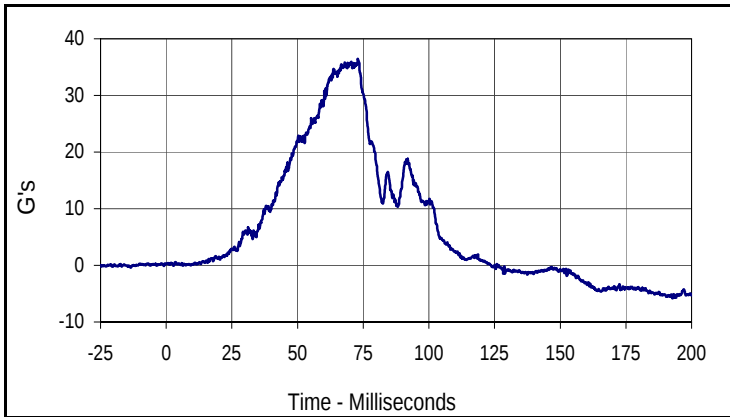
Curve Description			
CRABI Chest Z (P3)			
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145	FIL	180	G's
Max	Time	Min	Time
49.7	78.4	-9.9	177.6



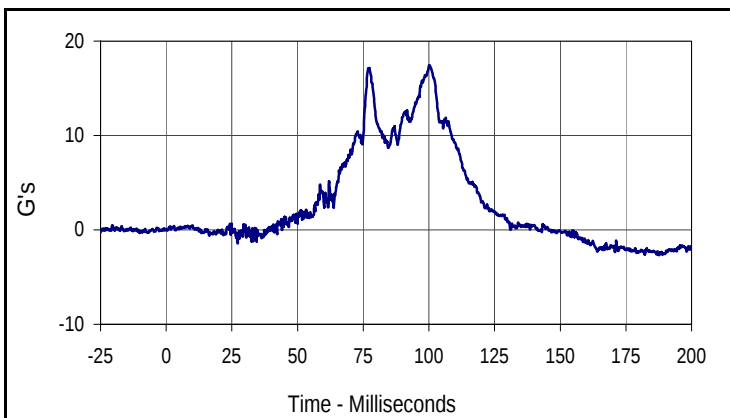
Curve Description			
CRABI Chest Resultant (P3)			
CURNO	Type	SAE Class	Units
143	RES	180	G's
Max	Time	Min	Time
78.1	79.0	0.1	0.0

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

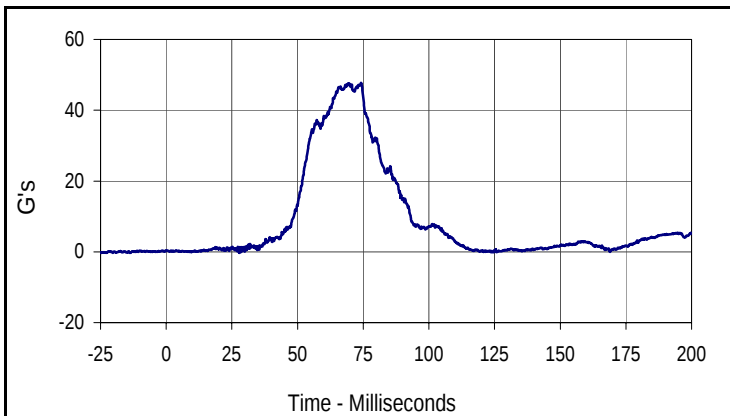
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 NHTSA No.: A70100



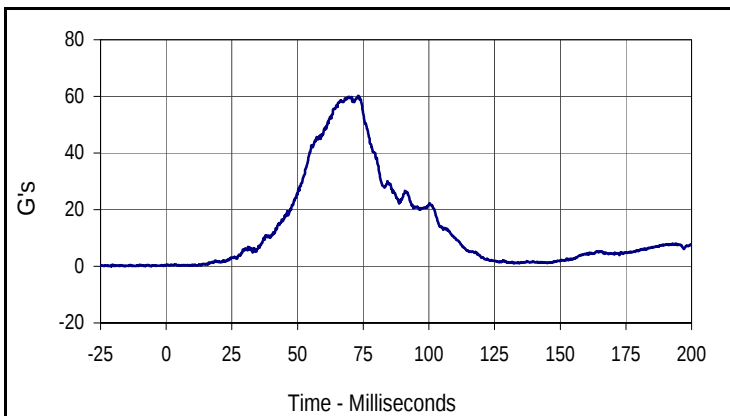
Curve Description			
CRABI Head X (P4)			
CURNO	Type	SAE Class	Units
154	FIL	1000	G's
Max	Time	Min	Time
36.4	73.0	-5.8	192.7



Curve Description			
CRABI Head Y (P4)			
CURNO	Type	SAE Class	Units
155	FIL	1000	G's
Max	Time	Min	Time
17.4	100.2	-2.7	187.7



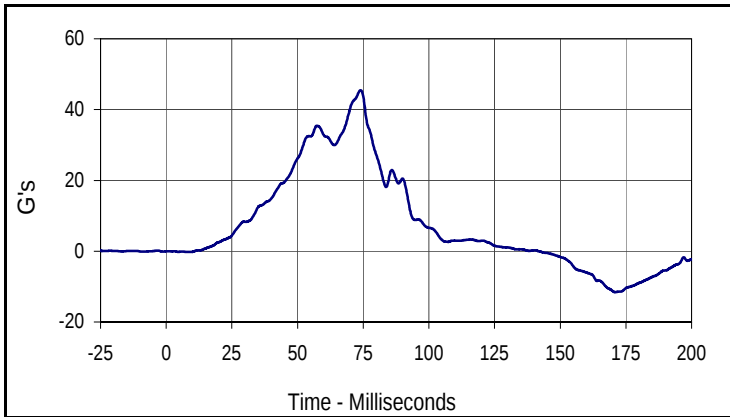
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CRABI Head Z (P4)			
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156	FIL	1000	G's
Max	Time	Min	Time
47.7	74.2	-0.3	27.7



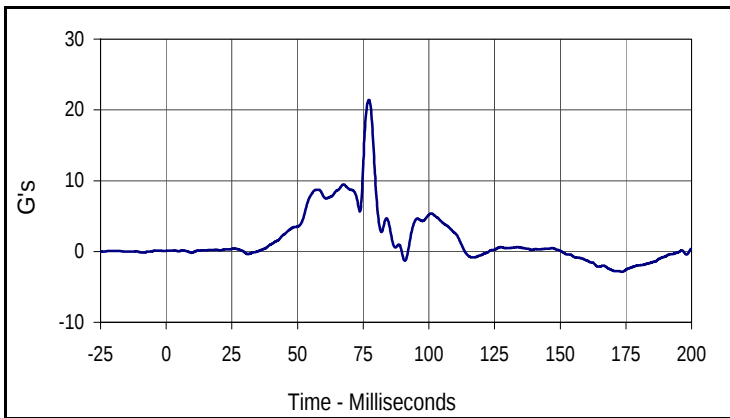
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CRABI Head Resultant (P4)			
CURNO	Type	SAE Class	Units
154	RES	1000	G's
Max	Time	Min	Time
60.2	73.1	0.2	9.0

Test Vehicle: 2007 Saab 9-3 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

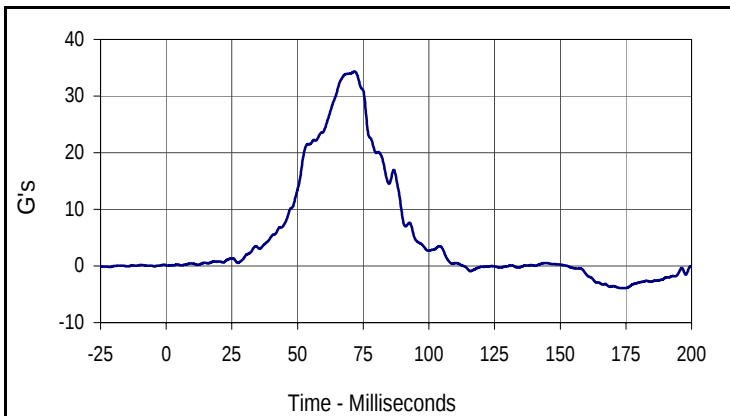
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 NHTSA No.: A70100



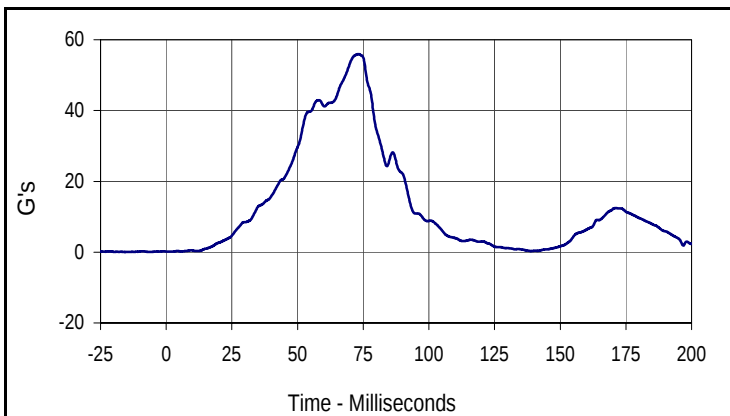
Curve Description			
CRABI Chest X (P4)			
CURNO	Type	SAE Class	Units
164	FIL	180	G's
Max	Time	Min	Time
45.5	74.0	-11.6	170.9



Curve Description			
CRABI Chest Y (P4)			
CURNO	Type	SAE Class	Units
165	FIL	180	G's
Max	Time	Min	Time
21.4	77.2	-2.9	173.5



Curve Description			
CRABI Chest Z (P4)			
CURNO	Type	SAE Class	Units
166	FIL	180	G's
Max	Time	Min	Time
34.3	71.7	-3.9	174.7



Curve Description			
CRABI Chest Resultant (P4)			
CURNO	Type	SAE Class	Units
164	RES	180	G's
Max	Time	Min	Time
56.0	73.1	0.1	0.4

SECTION D4

CRABI CALIBRATION INFORMATION

Test Program: CRABI 12 Month Old Frontal Head Drop Test

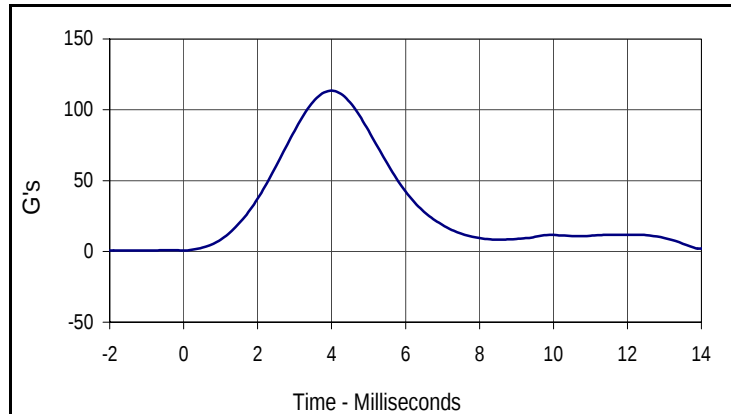
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ATD Serial No.: 017

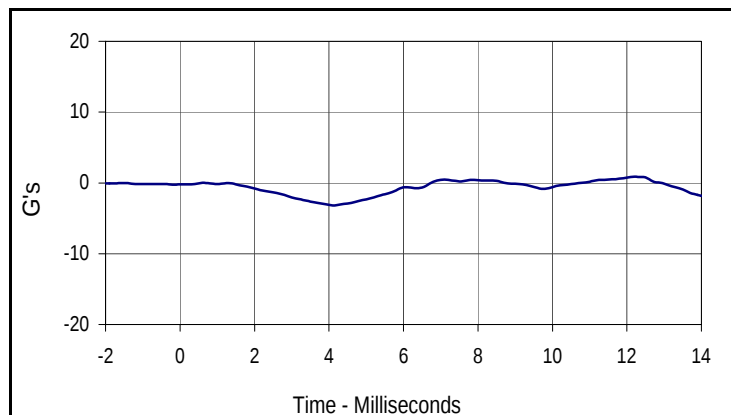
Test I.D.: HD017MA



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	100.0 to 120.0	113.5	Pass
Peak Lateral Acceleration	G's	≤15.0	3.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
113.5	4.0	0.5	0.0



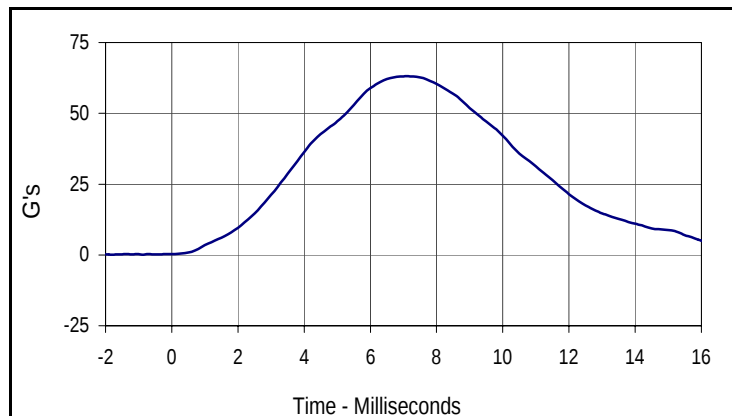
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	0.6	-3.2	4.1

Test Program: CRABI 12 Month Old Rear Head Drop Test
 ATD Serial No.: 017

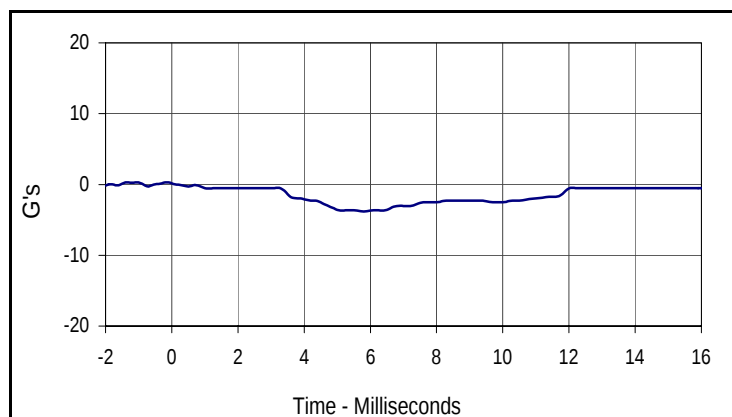
Test Date: 5/1/07
 Test I.D.: HDR17MG



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	55.0 to 71.0	58.9	Pass
Peak Lateral Acceleration	G's	≤15.0	3.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
58.9	6.0	0.1	-1.8



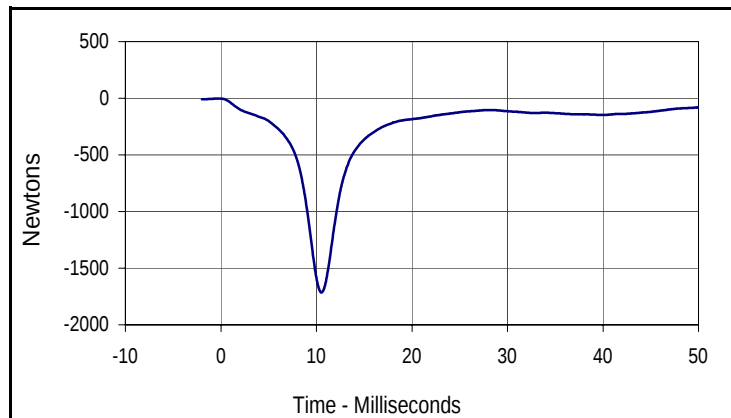
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	-0.2	-3.8	5.8

Test Program: CRABI 12 Month Old Thorax Impact Test
 ATD Serial No.: 017

Test Date: 5/1/07
 Test I.D.: TH05D



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	4.90 to 5.10	4.91	Pass
Peak Probe Force	Newtons	-1514 to -1796	-1583	Pass
Overall Test Results				Pass



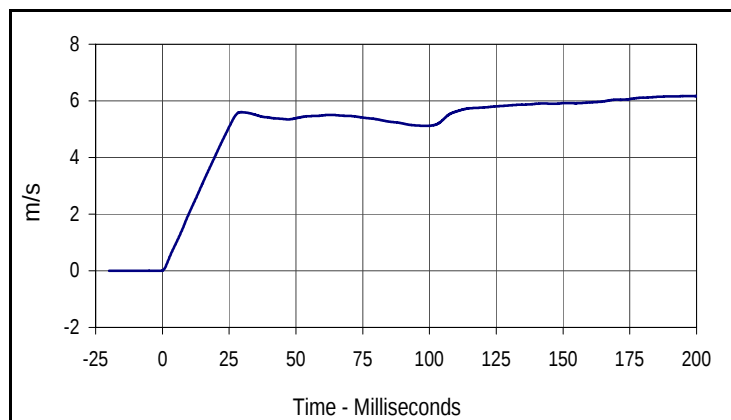
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
-1.5	-0.2	-1582.5	10.0

Test Program: CRABI 12-Month Old Neck Flexion Test
 ATD Serial No.: 017

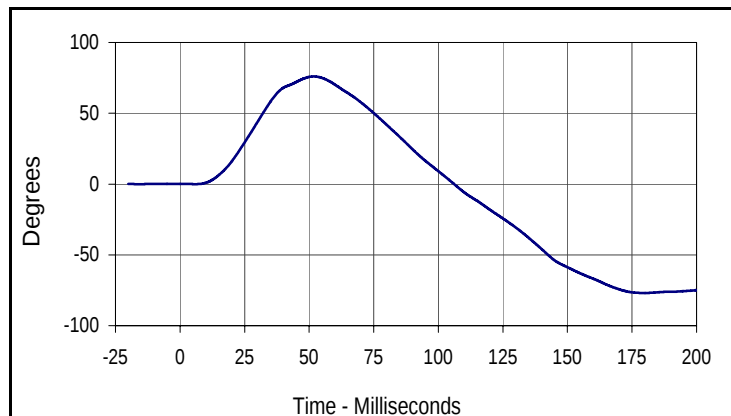
Test Date: 5/1/07
 Test I.D.: NF05F



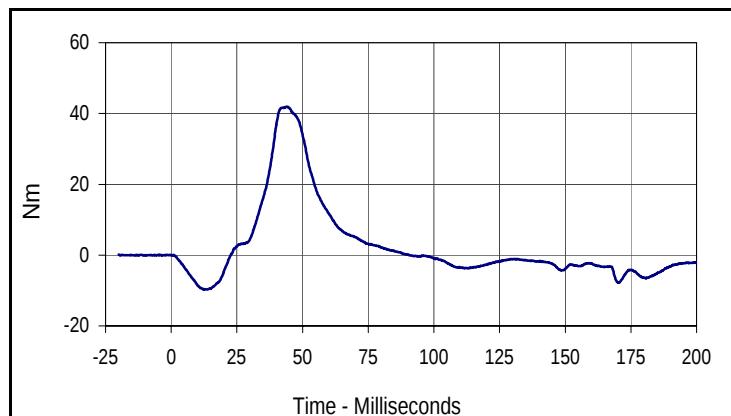
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.22	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	2.0	Pass
	20 Msec.	m/s	3.4 to 4.2	4.1	Pass
	25 Msec.	m/s	4.3 to 5.2	5.1	Pass
"D" Plane Rotation	Max	Degrees	75.0 to 86.0	76.0	Pass
Peak Moment in Rotation	Max	Nm	36.0 to 45.0	37.7	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	60.0 to 80.0	70.6	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.2	199.3	0.0	-0.7



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.0	51.8	-76.9	179.8



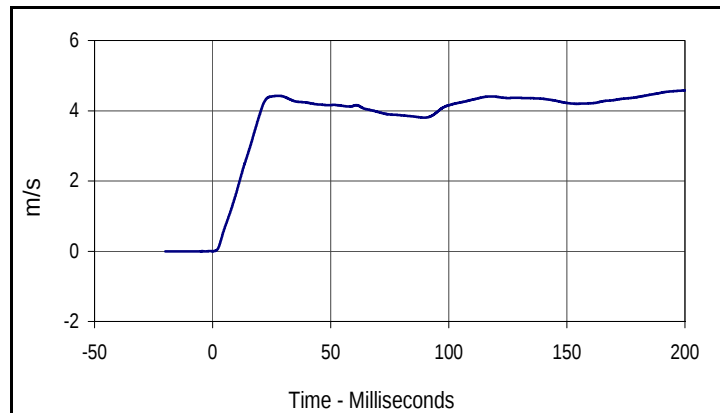
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
41.9	44.3	-9.7	13.5

Test Program: CRABI 12-Month Old Neck Extension Test
 ATD Serial No.: 017

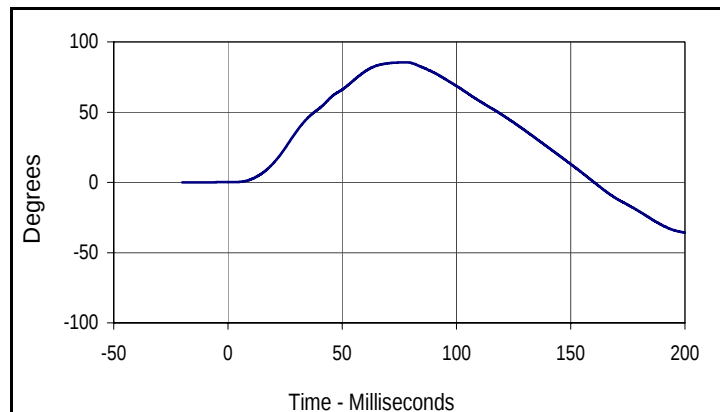
Test Date: 5/1/07
 Test I.D.: NE05F



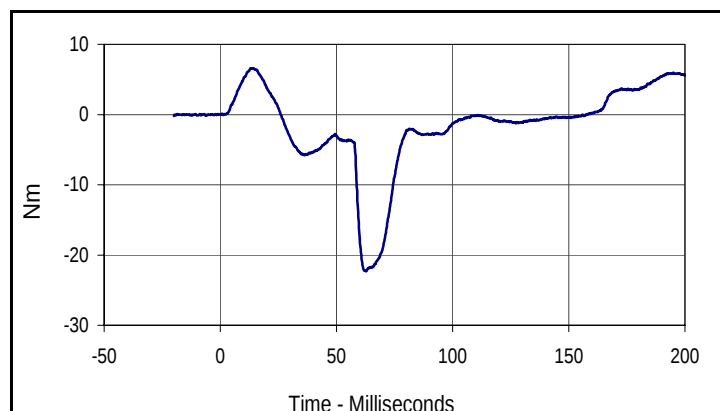
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.52	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	0.8	Pass
	10 Msec.	m/s	1.5 to 2.1	1.7	Pass
	14 Msec.	m/s	2.2 to 2.9	2.6	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	85.5	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-22.3	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	76.0 to 90.0	77.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
4.6	200.0	0.0	0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
85.5	77.7	-35.7	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
6.6	13.2	-22.3	62.8

Test Program: CRABI 12 Month Old External Dimensions
 ATD Serial No.: 017

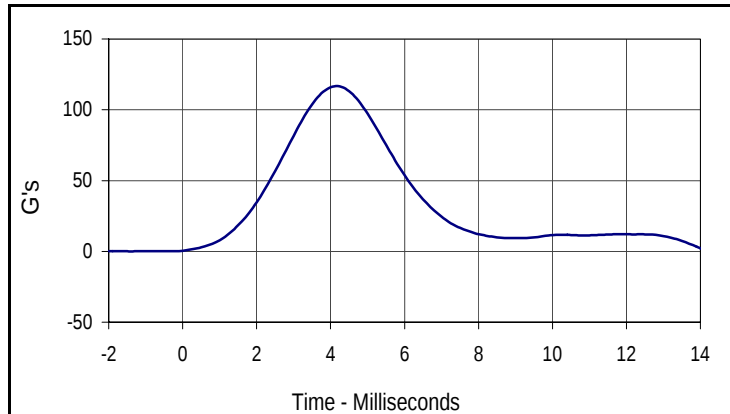
Test Date: 5/1/07
 Test I.D.: N/A



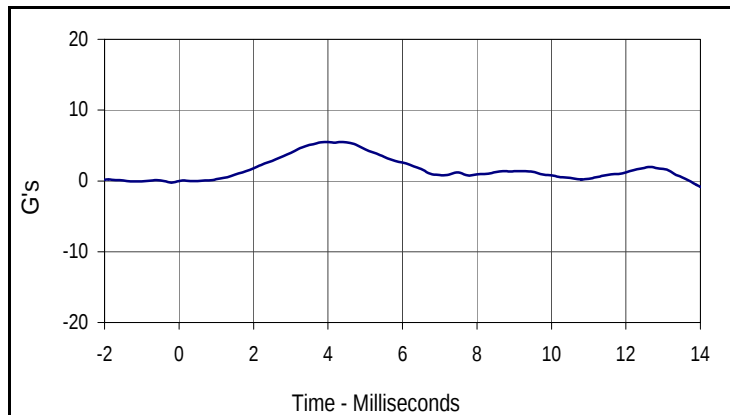
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	456.0 to 471.2	456	Pass
B - Shoulder pivot height	mm	276.6 to 291.8	280	Pass
C - "H" point height	mm	27.9 to 38.1	37	Pass
D - "H" point from backline	mm	40.1 to 50.3	50	Pass
E - Shoulder pivot from back	mm	50.3 to 60.5	53	Pass
F - Thigh clearance	mm	63.0 to 73.2	70	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	185	Pass
I - Shoulder pivot to elbow pivot	mm	99.1 to 114.3	100	Pass
J - Elbow rest height	mm	150.1 to 165.3	153	Pass
K - Buttock to knee length	mm	202.7 to 217.9	204	Pass
L - Popliteal length	mm	138.7 to 153.9	139	Pass
M - Knee pivot height	mm	165.1 to 180.3	169	Pass
N - Buttock popliteal length	mm	144.8 to 160.0	150	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	110	Pass
P - Foot length	mm	92.4 to 102.6	102	Pass
Q- Stature	mm	727.7 to 753.1	N/A	N/A
R - Buttock to knee pivot length	mm	178.5 to 188.7	183	Pass
S - Head Breadth	mm	124.4 to 134.6	130	Pass
T - Head Depth	mm	149.9 to 165.1	155	Pass
U - Hip breadth	mm	158.5 to 173.7	162	Pass
V - Shoulder breadth	mm	200.7 to 215.9	214	Pass
W - Foot breadth	mm	39.1 to 49.3	45	Pass
Y - Chest circumference with jacket	mm	452.4 to 477.8	461	Pass
Z - Waist circumference	mm	447.0 to 472.4	454	Pass
AA - Reference location for dimension Y & O	mm	256.5 to 266.7	264	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	108	Pass
CC - Shoulder Height	mm	299.7 to 314.9	307	Pass
DD - Chin Height	mm	289.6 to 304.8	300	Pass
Overall Test Results				Pass

Test Program: CRABI 12 Month Old Frontal Head Drop TestTest Date: 5/7/07ATD Serial No.: 022Test I.D.: HD022R

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	100.0 to 120.0	116.7	Pass
Peak Lateral Acceleration	G's	≤15.0	5.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
116.7	4.2	0.0	-1.4



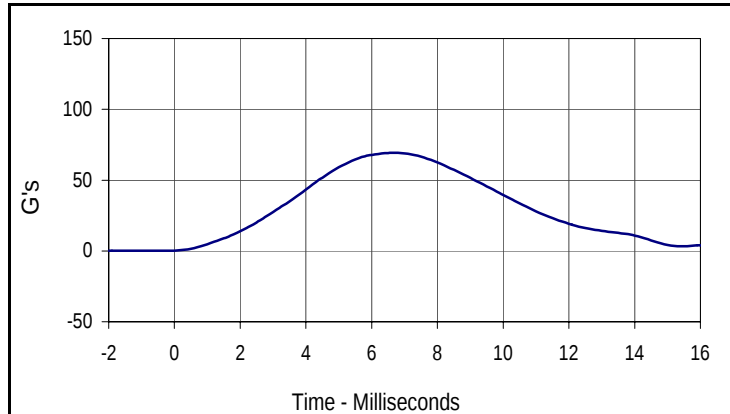
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.5	3.9	-0.2	-0.2

Test Program: CRABI 12 Month Old Rear Head Drop Test
 ATD Serial No.: 022

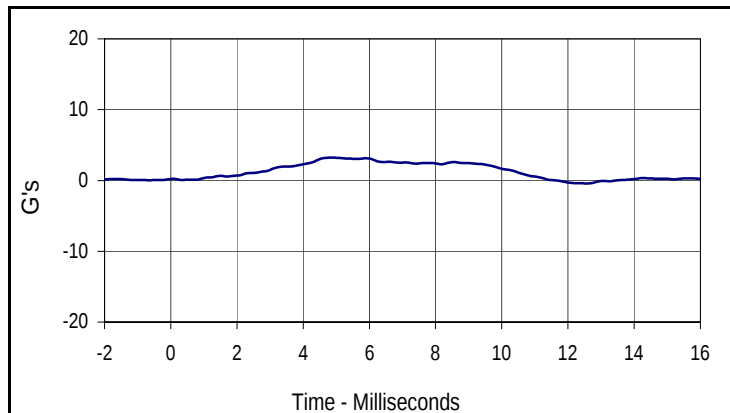
Test Date: 5/7/07
 Test I.D.: HDR22R



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	55.0 to 71.0	67.8	Pass
Peak Lateral Acceleration	G's	≤15.0	3.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
67.8	6.0	0.1	-1.1



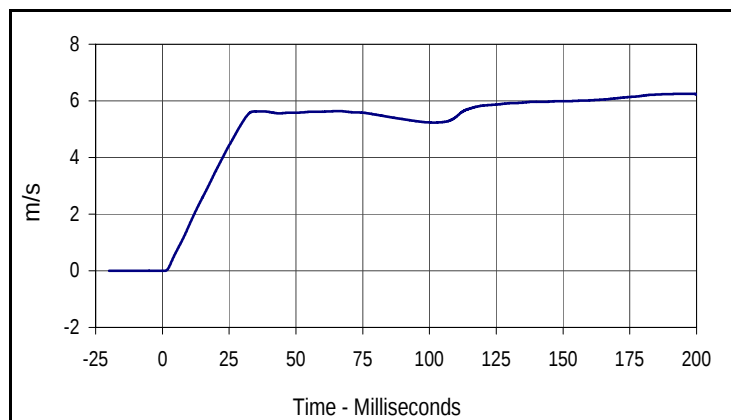
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.2	4.8	0.0	-0.6

Test Program: CRABI 12 Month Old Neck Flexion Test
 ATD Serial No.: 022

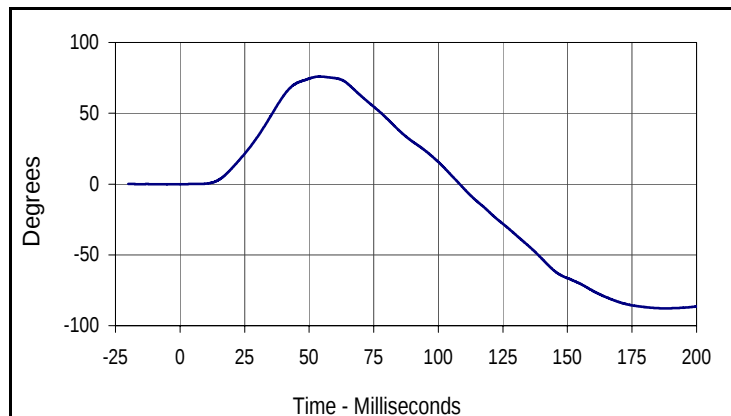
Test Date: 5/7/07
 Test I.D.: NF22R



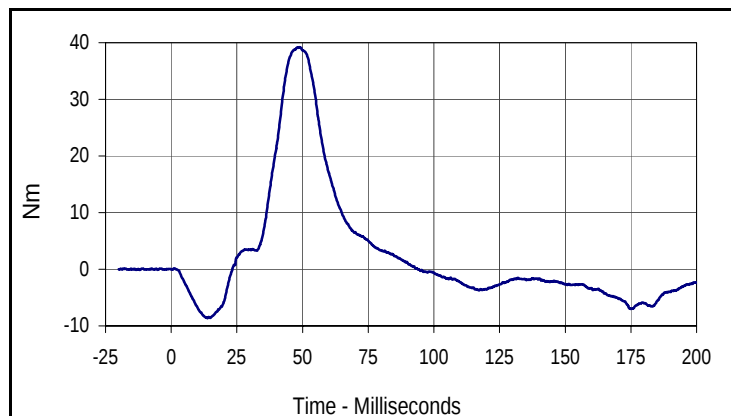
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.18	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	1.6	Pass
	20 Msec.	m/s	3.4 to 4.2	3.5	Pass
	25 Msec.	m/s	4.3 to 5.2	4.4	Pass
"D" Plane Rotation	Max	Degrees	75.0 to 86.0	75.9	Pass
Peak Moment in Rotation	Max	Nm	36.0 to 45.0	38.4	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	60.0 to 80.0	75.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
6.2	197.7	0.0	0.6



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
75.9	54.0	-87.8	188.0



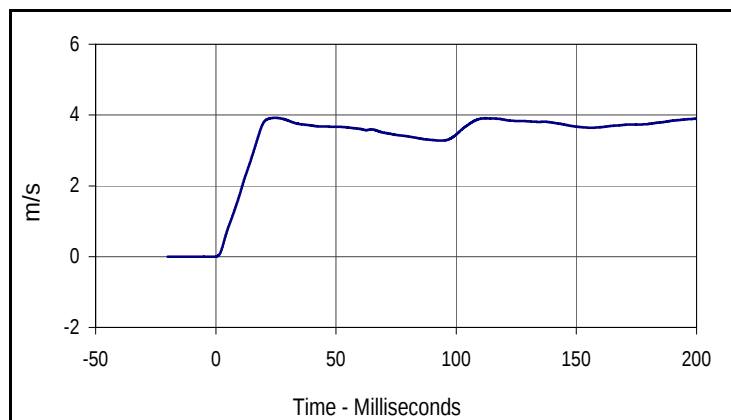
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
39.2	48.7	-8.6	13.7

Test Program: CRABI 12 Month Old Neck Extension Test
 ATD Serial No.: 022

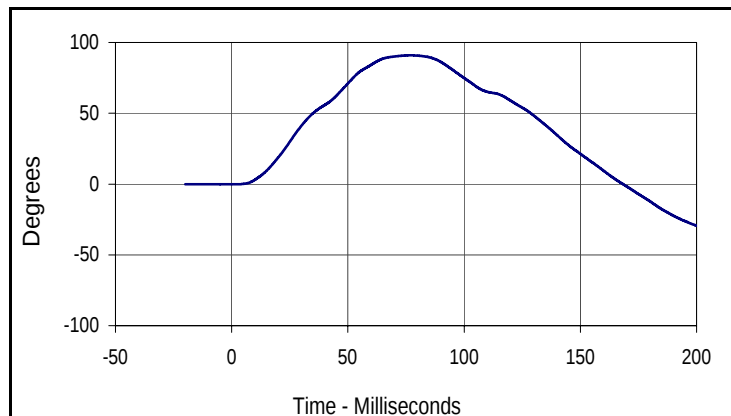
Test Date: 5/7/07
 Test I.D.: NE22R



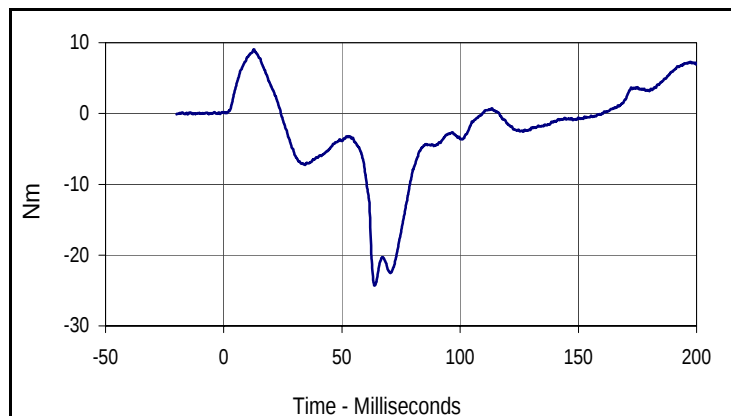
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.43	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	1.0	Pass
	10 Msec.	m/s	1.5 to 2.1	1.8	Pass
	14 Msec.	m/s	2.2 to 2.9	2.6	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	90.9	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-12.9	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	76.0 to 90.0	80.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
3.9	24.6	0.0	-0.7



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
90.9	77.0	-29.3	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
9.0	12.8	-24.3	63.8

Test Program: CRABI 12 Month Old External Dimensions
 ATD Serial No.: 022

Test Date: 5/7/07
 Test I.D.: N/A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	456.0 to 471.2	459	Pass
B - Shoulder pivot height	mm	276.6 to 291.8	279	Pass
C - "H" point height	mm	27.9 to 38.1	35	Pass
D - "H" point from backline	mm	40.1 to 50.3	45	Pass
E - Shoulder pivot from back	mm	50.3 to 60.5	54	Pass
F - Thigh clearance	mm	63.0 to 73.2	64	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	180	Pass
I - Shoulder pivot to elbow pivot	mm	99.1 to 114.3	102	Pass
J - Elbow rest height	mm	150.1 to 165.3	159	Pass
K - Buttock to knee length	mm	202.7 to 217.9	205	Pass
L - Popliteal length	mm	138.7 to 153.9	140	Pass
M - Knee pivot height	mm	165.1 to 180.3	171	Pass
N - Buttock popliteal length	mm	144.8 to 160.0	148	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	110	Pass
P - Foot length	mm	92.4 to 102.6	102	Pass
Q- Stature	mm	727.7 to 753.1	N/A	N/A
R - Buttock to knee pivot length	mm	178.5 to 188.7	182	Pass
S - Head Breadth	mm	124.4 to 134.6	134	Pass
T - Head Depth	mm	149.9 to 165.1	155	Pass
U - Hip breadth	mm	158.5 to 173.7	163	Pass
V - Shoulder breadth	mm	200.7 to 215.9	215	Pass
W - Foot breadth	mm	39.1 to 49.3	46	Pass
Y - Chest circumference with jacket	mm	452.4 to 477.8	462	Pass
Z - Waist circumference	mm	447.0 to 472.4	455	Pass
AA - Reference location for dimension Y & O	mm	256.5 to 266.7	264	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	108	Pass
CC - Shoulder Height	mm	299.7 to 314.9	305	Pass
DD - Chin Height	mm	289.6 to 304.8	300	Pass
Overall Test Results				Pass