

**Side Air Bag Research: Static Testing of Side Impact Air Bags
Using Three and Six Year Old HybridIII Dummies and
the 12 Month CRABI Dummy**

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Table Of Contents

Abstract.....	1
1.0 INTRODUCTION.....	1
2.0 BACKGROUND	2
3.0 TEST CONDITIONS.....	3
3.1 Vehicle Selection	3
3.2 Seating Procedures.....	4
3.2.1 Seat Mounted Systems.....	4
3.2.2 Door Mounted Systems.....	5
3.3 Dummies and Instrumentation	8
3.4 Injury Criteria.....	9
4.0 TEST RESULTS.....	10
5.0 OBSERVATIONS	17
5.1 Seat Mounted Systems.....	17
5.2 Door Mounted Systems.....	23
5.3 General Observations.....	26
6.0 SUMMARY	26
ACKNOWLEDGEMENTS	27
REFERENCES	27
APPENDIX A NHTSA Seating Procedures	29
APPENDIX B Test Results.....	71
APPENDIX C Details of 3 YO Tests	87
APPENDIX D Details of 6 YO Tests	205
APPENDIX E Details of 12 month CRABI Tests.....	225

ABSTRACT

Several thoracic and head protection side impact air bag systems (SAB) are emerging in the U.S. market and are projected to become prevalent in the fleet. These systems appear to offer improved protection in side crashes. However, concerns have been raised as to their potential for causing injury to out-of-position (OOP) occupants. This report describes the National Highway Traffic Safety Administration (NHTSA) research program for evaluation of the SAB systems for OOP occupants. The procedures recommended by the Side Airbag Out-of-Position Injury Technical Working Group (TWG), comprised of the Alliance, AIAM, AORC, and IIHS, for 3-year-old and 6-year-old occupants are evaluated. Additional test procedures are described to augment the TWG procedures.

1.0 INTRODUCTION:

Several thoracic and head protection side impact air bag systems (SAB) are emerging in the U.S. market and are projected to become prevalent in the fleet (Figure 1). The market share of SAB equipped vehicles in 2001 is estimated to be 36% for passenger cars and 15% for LTV/SUV. These inflatable side countermeasures vary widely in designs, sizes, mounting locations and methods, inflation systems, and areas of coverage. In particular, there are several seat and door mounted thorax air bag systems; various versions of a window curtain type head protection air bag system, an inflatable tubular structure head protection system, a combination head/thorax seat mounted air bag system, etc. These systems appear to offer improved protection in side crashes. NCAP tests on forty-five four door cars show that the eleven vehicles with SAB got higher star ratings (for the driver) than those without SAB. Also, the average TTI values (for the driver) of the SAB equipped vehicles were lower than for those without SAB.

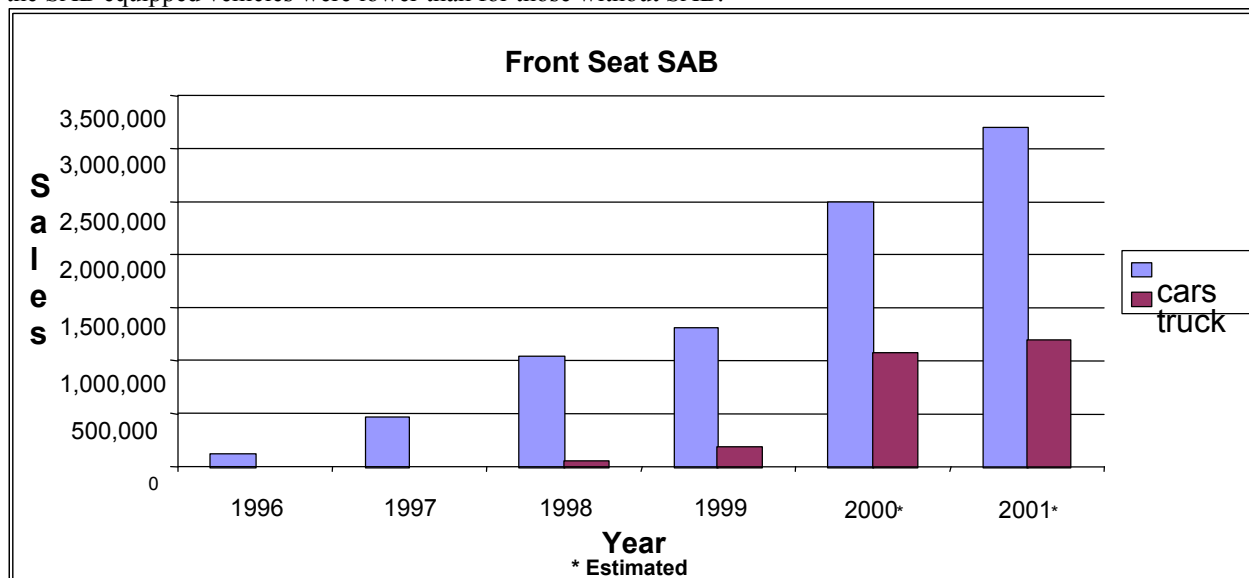


Figure 1. Use of Front Seat SAB in Vehicles

As of January 1, 2001, the NHTSA Special Crash Investigations (SCI) program had studied 48 crashes involving SAB [1]. In vehicles with head protection side air bags, the SAB provided an increase in occupant protection, indicated by a direct contact to the outside surface of the head protection air bag with no head injury reported. There were no serious injuries (AIS-3 or higher) attributed to SAB in the majority of the cases. In a single exception, the driver received an AIS-3 thorax injury from the SAB cover flap in a door mounted thorax SAB system. However, concerns have been raised as to their potential for causing injury to out-of-position (OOP) occupants, especially as the usage of SAB systems increases in the coming years.

The need to understand the benefits and potential for harm to OOP occupants (and certain in-position occupants, e.g., properly restrained infants in child restrained systems) is especially important considering the growth in the number of SAB systems in the past few years and the projected trend for the prevalence of such systems, standard or optional, in the coming years.

This report describes the National Highway Traffic Safety Administration (NHTSA) research program for evaluation of the SAB systems for OOP occupants. The procedures recommended by the Side Airbag Out-of-Position Injury Technical Working Group (TWG) , comprised of the Alliance, AIAM, Automotive Occupant Restraints Council (AORC), and Insurance Institute for Highway Safety (IIHS), for the 3-year-old and 6-year-old occupants were evaluated.

Additional test procedures are described to augment the TWG procedures. This includes assessments of in-position 12 month CRABI dummy in forward and rear facing child restraint systems, which are not addressed by the current TWG procedures. This report focuses on seat mounted and door mounted SAB systems for thorax and head protection. Additional research is ongoing into the evaluation of adult OOP dummies, roof mounted air bag systems, and repeatability of these test procedures.

2.0 BACKGROUND

The agency has been concerned about the potential for injury from side air bags, considering that front air bags have been the cause of injury and fatalities in certain low severity impacts. The agency initiated research in fall of 1998 into 3-year-old child OOP interactions with SAB [2]. The study concluded that some SAB systems had the potential for causing injury to the head-neck-chest of OOP children, although less aggressive airbags reduced that potential. The results were sensitive to the positioning of the dummy and had some test-to-test variability because of variability in the deployment characteristics of the bags.

Research was also initiated by Transport Canada in 1998 to examine the most appropriate and effective means of minimizing injury risks to children under “off-design” conditions [3]. The research concluded that while SAB have the

potential for benefit in side crashes, they also have the potential for causing injury to OOP children. The results from the 1998 NHTSA research and Transport Canada study were presented at a public meeting in April 1999 [4].

In December 1998, then NHTSA Administrator, Ricardo Martinez, M.D., wrote to the automobile manufacturers indicating that the SAB had significant safety potential, and encouraged the manufacturers to confirm that the current and projected applications of advanced technologies did not pose safety risks. The letter also indicated a willingness to work jointly with the industry to establish rigorous internal design protocols to address this possibility. In May 1999, Dr. Martinez, in a letter to the Alliance of Automobile Manufacturers (Alliance) and Association of International Automobile Manufacturers (AIAM), asked the industry to develop comprehensive, open, and timely test procedures for the industry to follow, which would ensure that future side air bags would not pose any risk of serious injury to occupants [5].

In August 2000, the Side Airbag Out-of-Position Injury Technical Working Group (TWG) proposed test devices, performance criteria, and test procedures for assessing SAB deployment injury risks [6]. These proposals were based on a draft procedure [7] developed by the Working Group 3 of the International Organization of Standards Technical Committee 10. The TWG procedures provided a framework for the agency's research activities described in this report.

In the summer of 1999, research was initiated at NHTSA's Vehicle Research and Test Center (VRTC) to study the potential for injury to OOP occupants and to evaluate the benefits of SAB in side impacts. The first phase of this research was to evaluate the TWG procedures and propose any additional procedures or modifications, if necessary, to assess the injury to OOP children and evaluate any risks to properly restrained children in child restraints and booster seats. The 2nd phase of that research is in progress. The findings from the first phase are presented in this report.

3.0 TEST CONDITIONS

3.1 Vehicle Selection:

The vehicles with seat, door, and roof mounted SAB (front seating position, unless specified otherwise) chosen for this study are shown in Table 1.

Specific models were chosen based on vehicle sales in the U.S. and the availability of the SAB in the vehicles. The initial selection of vehicles was done in the Spring of 1999. The goal was to have a range of airbags in the test matrix: head/thorax bags, thorax bags, head bags, seat mounted, door mounted, and roof mounted systems for a wide selection of vehicles with production side air bag systems. Although not prevalent, vehicles with side air bags in the rear seats were especially selected because of the need to evaluate the risks to children in the rear seat in child restraints.

Table 1. Vehicle Selection

Seat Mounted		Door Mounted	Roof Mounted
Thorax bags	Head/Thorax bags		
1999 Geo Prizm	1999 Windstar	1999 Cadillac Deville	1999 Volvo S80
1999 VW Jetta	1999 Mercury Cougar	2000 Mercedes S430 (front and rear)	2000 Mercedes S430
2000 Audi A6 (front and rear)	2000 Nissan Maxima	2000 BMW 528i (front and rear)	2000 BMW 528i
1999 Volvo S80	1999 Saab 95		2000 Audi A6
2000 Cadillac Deville (rear)			2001 Saturn L200.

3.2 Seating Procedures

The TWG OOP Seating Procedures [6] were used as the basis for selecting test positions. High speed videos of “blank deployments” (deployments of the air bags without any occupants in the seated positions) were studied to estimate any other position (for example, positions used in the Medical College of Wisconsin (MCW) study [2]) or variations to TWG positions that might result in high loads to the head and chest. The goal was to understand the location of the bag deployment opening, deployment path, bag size, etc. This was used as a guide for finding the positions for the most severe loads for dummies of various sizes.

A test matrix was set up based on the above study of 13 test vehicles. The vehicles had different types of side airbags; door mounted, seat mounted, and head bag curtains. The test matrix lists the different types of vehicles and the tests that were performed on either the front or the rear passenger seat. The objective of these tests was to evaluate the OOP performance of the side air bags for three-year-old and six-year-old, and the properly restrained 12-month-CRABI dummies. Some of the positions for booster seats (not covered by the TWG procedures) were evaluated with a small child occupant. Evaluation of roof mounted air bags is not included in this report.

3.2.1 Seat Mounted Systems

The following baseline tests were performed on most of the vehicles with the Hybrid III three-year-old dummy in vehicles with seat mounted systems: TWG 3.3.2.2 - peek-a-boo (kneeling on the seat, facing rearwards), TWG 3.3.2.1 - leaning sideways with booster, and TWG 3.3.2.3 - lying across the seat with head on armrest. If the review of the high

speed films indicated an alternative seating position that would more likely produce higher loads, then additional tests were conducted in positions derived from varying the TWG positions.

The following seating procedure variations were tested on several vehicles: peek-a-boo with arm out of the way and the side touching armrest, on foam booster leaning sideways with pelvis forward until head touches seatback, leaning sideways without a foam booster, lying across seat at an angle with head on armrest, properly seated in a belt positioning booster (BPB), on a BPB leaning sideways, the Medical College of Wisconsin Procedure (MCW)-where the dummy is seated in the center of the seat and leaning sideways[2], and MCW position on a booster. The BPB used in all tests was the Fisher Price Booster Model # 79750.

Variations to TWG positions were also tested for the 6-year-old Hybrid III dummy. The baseline test performed for most of the vehicles was TWG 3.3.2.5 - leaning sideways on booster. The following modified seating procedures were performed: leaning sideways without a booster, leaning sideways with the head CG at the horizontal center of the airbag module, leaning sideways at the seat's centerline with the pelvis forward and head CG in line with the top of the airbag module, and MCW.

The 12-month-CRABI dummy was tested in two different types of child restraints: a forward facing child restraint system (FFCRS) with tray shield and a rearward facing child safety seat (RFCSS). The two child seats used were Century Ovation Model # 4665NSK and Fisher Price Safe Embrace Infant Seat Model # 79725, respectively. The child seats were installed according to the manufacturer's instructions (using lap-shoulder belts, without tethers) and were checked for cracks and/or any other damage noted after each test.

Table 2 contains a summary of all the seating positions used for the seat mounted systems. Appendix A contains a detailed description of the procedures followed for each of the NHTSA positions.

3.2.2 Door Mounted Systems

The following baseline TWG tests were performed with the Hybrid III 3-year-old dummy in vehicles with door mounted systems: TWG 3.3.3.1 - kneeling at window, TWG 3.3.3.2 - back on door facing inward, and TWG 3.3.3.3 - head on armrest. The following modified seating procedures were tested on several vehicles: kneeling at window - knees at the door, back on door - lower neck to upper airbag module, dummy's head CG at vertical centerline of airbag module (MCW), sitting at seat centerline with seat at rearmost position leaning sideways with head CG at airbag module, sitting at seat centerline leaning sideways with head CG at horizontal centerline of airbag module, sitting in a BPB, and sitting in a BPB leaning sideways.

Table 2. Test Positions for Seat Mounted Air Bags

TWG Positions			NHTSA's Modifications	Change from TWG position
TWG 3.3.2.1	3YO	Leaning sideways	NHTSA Seat-02-3	Gets head closer to seatback
			NHTSA Seat-03-3	Places head at a different location along the seatback
			NHTSA Seat-07-3	Gets head closer to seatback and places head at a different location along the seatback
			NHTSA Seat-08-3	Gets head closer to seatback and places head at a different location along the seatback
			NHTSA Seat-09-3	Gets head closer to seatback and places head at a different location along the seatback
			NHTSA Seat-10-3	Gets head closer to seatback and places head at a different location along the seatback
TWG 3.3.2.2	3YO	Peek-a-Boo	NHTSA Seat-01-3	Gets dummy closer to the edge of the seat
TWG 3.3.2.3	3YO	Lying across seat	NHTSA Seat-04-3	Gets head closer to the seatback
TWG 3.3.2.4	3YO	Lying Flat on seat	None	
N/A	3YO	Booster Seat	NHTSA Seat-05-3	Restrained dummies in booster seats are not addressed by TWG
			NHTSA Seat-06-3	Restrained dummies in booster seats are not addressed by TWG
TWG 3.3.2.5	6YO	Leaning sideways	NHTSA Seat-01-6	Places head at a different location along the seatback
			NHTSA Seat-02-6	Gets head closer to seatback and places head at a different location along the seatback
			NHTSA Seat-03-6	Gets head closer to seatback and places head at a different location along the seatback
			NHTSA Seat-04-6	Gets head closer to seatback and places head at a different location along the seatback
			NHTSA Seat-05-6	Gets head closer to seatback and places head at a different location along the seatback
N/A	12 mo CRABI	Child Restraints	NHTSA Seat-01-12	Restrained infant dummies in child restraints are not addressed by TWG
			NHTSA Seat-02-12	Restrained infant dummies in child restraints are not addressed by TWG

Table 3. Test Positions for Door Mounted Air Bags

TWG Positions			NHTSA's Modifications	Change from TWG position
TWG 3.3.3.1	3YO	Kneeling at Window	NHTSA Door-01-3	Brings chest closer to the airbag module
TWG 3.3.3.2	3YO	Back at Door	NHTSA Door-03-3	Places neck at a higher location on the air bag module
TWG 3.3.3.3	3YO	Head on Armrest	None	
TWG 3.3.3.4	3YO	Lying on Seat	None	
N/A	3YO	Leaning Sideways	NHTSA Door-04-3	Leaning sideways is not addressed by TWG
			NHTSA Door-06-3	Leaning sideways is not addressed by TWG
N/A	3YO	Booster	NHTSA Door-07-3	Restrained dummies in Booster seats are not addressed by TWG
			NHTSA Door-08-3	Restrained dummies in Booster seats are not addressed by TWG
N/A	6YO	Back at Door	NHTSA Door-01-6	6 YO not addressed by TWG
N/A	6YO	Leaning Sideways	NHTSA Door-02-6	6 YO not addressed by TWG
			NHTSA Door-03-6	6 YO not addressed by TWG
			NHTSA Door-04-6	6 YO not addressed by TWG
			NHTSA Door-05-6	6 YO not addressed by TWG
N/A	12 mo CRABI	Child Restraints	NHTSA Door-01-12	Restrained infant dummies in child restraints are not addressed by TWG
			NHTSA Door-02-12	Restrained infant dummies in child restraints are not addressed by TWG

There were no TWG tests with the Hybrid III 6-year-old dummy used as baseline tests for the door mounted systems. The following tests were performed for door mounted systems: back on door - lower neck to upper airbag module, dummy's head CG at vertical centerline of airbag module (MCW), sitting at seat centerline leaning sideways with head CG at airbag module, sitting at seat centerline leaning sideways with head CG at horizontal centerline of airbag module, and sitting at seat centerline leaning sideways with top of head at horizontal centerline of the airbag module.

The door mounted systems were tested with the 12-month CRABI dummy using the same child seats and positioning procedures as in the seat mounted systems.

Table 3 contains a summary of all seating positions used for the door mounted systems. Appendix A contains a detailed description of the procedures followed for each of the NHTSA positions.

3.3 Dummies and Instrumentation

The Hybrid III 3-year-old dummy used in the testing had the following instrumentation: head tri-axial accelerometers, upper and lower 6-axis neck load cells, left and right biaxial shoulder load cells, T01 tri-axial accelerometers, T12 tri-axial accelerometers, chest tri-axial accelerometers, chest displacement potentiometer, rib #3 uni-axial accelerometer, upper and lower sternum uni-axial accelerometers, 6-axis lumbar load cell, pelvis tri-axial accelerometers, biaxial pubic load cell, and right and left upper and lower biaxial ASIS load cells.

The Hybrid III 6-year-old dummy had the following instrumentation: head tri-axial accelerometers, upper and lower 6-axis neck load cells, chest tri-axial accelerometers, chest displacement potentiometer, upper and lower spine uni-axial accelerometers, upper and lower sternum uni-axial accelerometers, pelvis tri-axial accelerometers, and right and left upper and lower biaxial ASIS load cells.

The 12-month-CRABI dummy had the following instrumentation: head triaxial accelerometers, upper and lower 6-axis neck load cells, chest triaxial accelerometers, 6-axis lumbar load cell, and pelvis triaxial accelerometers.

The body coordinate system used for the dummies was per SAE J211 (March 1995), including the accelerometers (X-Forward; Y-Rightward and Z-Down).

The dummy positions were documented by taking several measurements from the dummy to the interior parts of the vehicle (tip of dummy's nose to corner of glove box, head CG to side air bag center, lower neck junction to top of seat air bag, head CG to head restraint). All tests were documented with digital still photography and two high speed digital videos at 1000 frames per second.

3.4 Injury Criteria

TWG has recommended two sets of injury criteria: Injury Reference Values and Injury Research Values.

A thorough evaluation of the validity of TWG recommended injury criteria, and the corresponding threshold values, was not included in this program. However, to compare the relative safety performance of the dummies in various positions considered in this report, those injury reference and research values were used, with the exception of the injury criteria for the 3-year-old chest deflection and 6-year-old HIC. The injury threshold values for these two criteria were per NHTSA interim final rule for FMVSS 208, published in May 2000.

The injury reference value and the research value thresholds used in this report are listed in Table 4.

Table 4.
Injury Reference and Research Value Thresholds

	12 month	3 year old	6 year old
15ms HIC	390	570	700
NIJ	1	1	1
Tension (+ FZ) (N)	780	1130	1490
Compression (- FZ) (N)	960	1380	1820
Chest Deflection (mm)	N/A	34	40
Deflection Rate (m/s)	N/A	8	8.5

RESEARCH VALUES

Upper Neck - Lateral Moment (MX) (N-m)	N/A	30	42
Upper Neck - Twist Moment (MZ) (N-m)	N/A	17	24
Lower Neck - Flexion Moment (+ MY) (N-m)	N/A	83	119
Lower Neck - Extension Moment (- MY) (N-m)	N/A	34	48
Lower Neck - Lateral Moment (MX) (N-m)	N/A	60	84
Lower Neck - Twist Moment (MZ) (N-m)	N/A	17	24
Lower Neck - Tension (+ FZ) (N)	N/A	1130	1490
Lower Neck - Compression (- FZ) (N)	N/A	1380	1820
Chest Clip - 3 ms (g's)	50	55	60

For this study, the chest deflection rate was calculated by differentiating the chest potentiometer.

4.0 TEST RESULTS

The test matrices for the OOP tests are shown in Tables 5 through 13. The test numbers are denoted in the appropriate cells. The tests that exceeded the injury reference value thresholds are marked with ** while those that exceeded 80% of the injury reference value thresholds are marked with *. Similarly, the tests that exceeded the research value thresholds are marked with ^^ and those that exceeded 80% of the research value thresholds are marked by ^.

The untested combinations were considered unlikely to cause high loads on the dummies based on the dummy positions and the bag deployment characteristics (as determined by the blank deployments).

For some of the tests which produced high injury values, a repeat test was conducted. If the results of the repeat test did not closely match those of the first test, a second repeat test was performed. No repeat tests were done with the 12-month CRABI, since the injury values were very low.

A summary of the injury criteria measurements for all tests is contained in Appendix B. Details of the tests conducted with the Hybrid-III 3YO and 6YO and with the 12 month CRABI are contained in Appendices C, D, and E, respectively.

Table 5. Seat mounted systems – 3 Year Old Dummy

SEAT Mounted Side Airbag Vehicles	TWG 3.3.2.2	TWG 3.3.2.1	TWG 3.3.2.3	NHTSA SEAT-01-3	NHTSA SEAT-02-3	NHTSA SEAT-03-3	NHTSA SEAT-04-3	NHTSA SEAT-06-3	NHTSA SEAT-05-3	NHTSA SEAT-07-3	NHTSA SEAT-08-3	NHTSA SEAT-09-3	NHTSA Seat-10-3
99 Ford Windstar	A01_04^	A01_108 A01_119^			A01_146			A01_18	A01_109			A01_175^ A01_176*^^	
99 Geo Prizm	A01_07^ A01_19* A01_151	A01_08^				A01_34^^							
99 VW Jetta	A01_116	A01_115	A01_118										
00 Nissan Maxima	A01_01*** A01_09*** A01_20***	A01_10^^						A01_11	A01_147				
99 Saab 95	A01_14^	A01_13*** A01_149*** A01_150***						A01_12	A01_148				
99 Volvo S80	A01_72	A01_152 A01_153				A01_74	A01_75			A01_76			A01_73*** A01_178^^
00 Audi A6	A01_87***	A01_112*** A01_113*** A01_179***	A01_114***										
99 Mercury Cougar	A01_77***	A01_124 A01_126^	A01_79		A01_78*** A01_110*** A01_125***		A01_80	A01_82	A01_111	A01_81**			
00 Audi A6 (REAR)	A01_83**	A01_84^^	A01_85					A01_86	A01_144				
00 Cadillac Deville (Rear)	A01_42	A01_45 A01_120		A01_43^					A01_123		A01_44* A01_122*		

Table 6. Front Door mounted systems – 3 Year Old Dummy

FRONT Door Mounted Side Airbag Vehicles	TWG 3.3.3.1	TWG 3.3.3.2	TWG 3.3.3.3	NHTSA DOOR-01-3	NHTSA DOOR-03-3	NHTSA DOOR-04-3	NHTSA DOOR-06-3	NHTSA DOOR-07-3	NHTSA DOOR-08-3
00 Mercedes S430	A01_48** A01_133*** A01_184*	A01_49** A01_134 A01_185	A01_55*** A01_135**	A01_56***	A01_57	A01_53***	A01_132**		
99 Cadillac Deville	A01_40	A01_39 A01_130	A01_41** A01_129 A01_131*** A01_186***				A01_127	A01_128	
00 BMW 528i	A01_35* A01_139 A01_180*	A01_36***	A01_37*** A01_140*** A01_181***	A01_46***	A01_47**	A01_63*** A01_141***	A01_64***		

Table 7. Rear Door mounted systems – 3 Year Old Dummy

REAR Door Mounted Side Airbag Vehicles	TWG 3.3.3.1	TWG 3.3.3.2	TWG 3.3.3.3	NHTSA DOOR-01-3	NHTSA DOOR-03-3	NHTSA DOOR-04-3	NHTSA DOOR-07-3	NHTSA DOOR-08-3		
00 Mercedes S430	A01_51* A01_136**	A01_58***	A01_52***	A01_59**		A01_60**	A01_61	A01_62**		
00 BMW 528i	A01_65**	A01_66	A01_68*** A01_137***			A01_69** A01_138*** A01_199** A01_200*	A01_70	A01_71		

Table 8. Seat mounted systems – 6 Year Old Dummy

SEAT Mounted Side Airbag Vehicles	TWG 3.3.2.5	NHTSA SEAT-01-6	NHTSA SEAT-02-6	NHTSA SEAT-03-6	NHTSA SEAT- 04-6	NHTSA SEAT- 05-3
99 Ford Windstar	B01_24^^		B01_25			
99 Geo Prizm	B01_154^ B01_155^					
99 VW Jetta	B01_100^^			B01_101		
00 Nissan Maxima	B01_29^^ B01_156 *^^ B01_158 ^^				B01_30***^ B01_157***^	
99 Saab 95	B01_26^^				B01_27***^	B01_28***^ B01_162***^
99 Volvo S80	B01_107					
00 Audi A6	B01_99^^					
99 Mercury Cougar	B01_104^					
00 Audi A6 (REAR)	B01_97*^^ B01_160^^ B01_161^^	B01_98^^				
00 Cadillac Deville (REAR)	B01_106				B01_105	

Table 9. Front Door mounted systems – 6 Year Old Dummy

FRONT Door Mounted Side Airbag Vehicles	NHTSA DOOR-01- 6	NHTSA DOOR-02- 6	NHTSA DOOR-03-6	NHTSA DOOR-04-6	NHTSA DOOR-05- 6
00 Mercedes S430	B01_96*^^ B01_159*^ ^		B01_95	B01_94	
99 Cadillac Deville		B01_102			B01_103
00 BMW 528i	B01_88^^ B01_169^^		B01_90^ B01_91^^	B01_89*^	

Table 10. Rear Door mounted systems – 6 Year Old Dummy

REAR Door Mounted Side Airbag Vehicles	NHTSA DOOR-01-6				
00 Mercedes S430	B01_93^				
00 BMW 528i	B01_92^^ B01_170*^^				

Table 11. Seat mounted systems – 12 Month CRABI Dummy

SEAT Mounted Side Airbag Vehicles	NHTSA SEAT-01-12	NHTSA SEAT-02-12
99 Ford Windstar	C01_23	
99 Geo Prizm	D01_195	D01_194
99 VW Jetta		
00 Nissan Maxima	D01_188	D01_189
99 Saab 95	C01_22	
99 Volvo S80		
00 Audi A6	D01_193	D01_192
99 Mercury Cougar	D01_190	D01_191
00 Audi A6 (REAR)		D01_33
00 Cadillac Deville (REAR)		

Table 12. Front Door mounted systems – 12 Month CRABI Dummy

FRONT Door Mounted Side Airbag Vehicles	NHTSA SEAT-01-12	NHTSA SEAT-02-12
00 Mercedes S430		
99 Cadillac Deville	D01_187	
00 BMW 528i		

Table 13. Rear Door mounted systems – 12 Month CRABI Dummy

REAR Door Mounted Side Airbag Vehicles	NHTSA SEAT-01-12	NHTSA SEAT-02-12
00 Mercedes S430		D01_32
00 BMW 528i		D01_31

5.0 OBSERVATIONS

5.1 Seat mounted Systems

For the seat mounted air bag systems, the dummy's loads were affected by the seat bolsters, airbag module locations, and the type of the airbag (i.e., thorax or head/thorax bag).

The TWG 3.3.2.2 procedure, where the Hybrid III 3-year-old was facing rearward in the seat and the chest (upper rib) was aligned with the top of the airbag module, provided a good procedure for measuring injuries to the chest of 3-year-old occupants. Figure 2 shows some of the vehicles with high chest deflection and chest deflection rates produced by this position. However, in some cases, this alignment couldn't be obtained, because the top of the airbag module was too high in the seat (00 Nissan Maxima, 99 Ford Windstar). In these particular cases, the dummy was positioned as close as possible to the desired TWG position.

TWG 3.3.2.1 (leaning sideways on a booster) was an effective procedure for measuring the loads on the head-neck region of the 3-year-old on the vehicles where the TWG position allowed the head to touch the seatback. However, in the 1999 Ford Windstar (Figure 3) and the 1999 Mercury Cougar, when seated per TWG 3.3.2.1, the dummy's head did not touch the seatback. These vehicles have large seat bolsters, causing the dummy to sit farther away. NHTSA developed seating procedures NHTSA-Seat-07-3 (Figure 4), NHTSA-Seat-02-3 (Figure 5) and NHTSA-Seat-08-3 (Figure 6) to put the head in closer proximity to the air bag. These involved sliding the pelvis forward and aligning some portion of the dummy's head to be near the top or middle of the airbag module, or had the dummy sitting in the center of the seat (instead of at the edge), leaning sideways, with its head CG at the center of the airbag module. Figure 7 and Figure 8 show the higher loads produced by NHTSA-Seat-02-3 and NHTSA-Seat-07-3 compared to those produced by TWG 3.3.2.1.

The seat mounted air bags can be located at different heights along the seat back. Adding NHTSA-Seat-03-3 to NHTSA-Seat-02-3, NHTSA-Seat-07-3, NHTSA-Seat-08-3 and the TWG positions, provides the ability to locate the head of the 3-year-old leaning sideways at a range of vertical locations along the seat back (Figure 9). This helps in identifying test conditions which produce more severe loads.

Two vehicles (Volvo S80 and Geo Prizm) passed all TWG position tests but exceeded the neck twist (MZ) criteria in NHTSA-Seat-10-3 (upper neck) and NHTSA-Seat-03-3 (lower neck) positions, respectively (Figure 10).

The above result, and the substantial differences in some of the dummy responses (Figures 7 and 8) indicate that there is some potential for one of the NHTSA procedures to detect an aggressive air bag not identified by the TWG procedures alone.

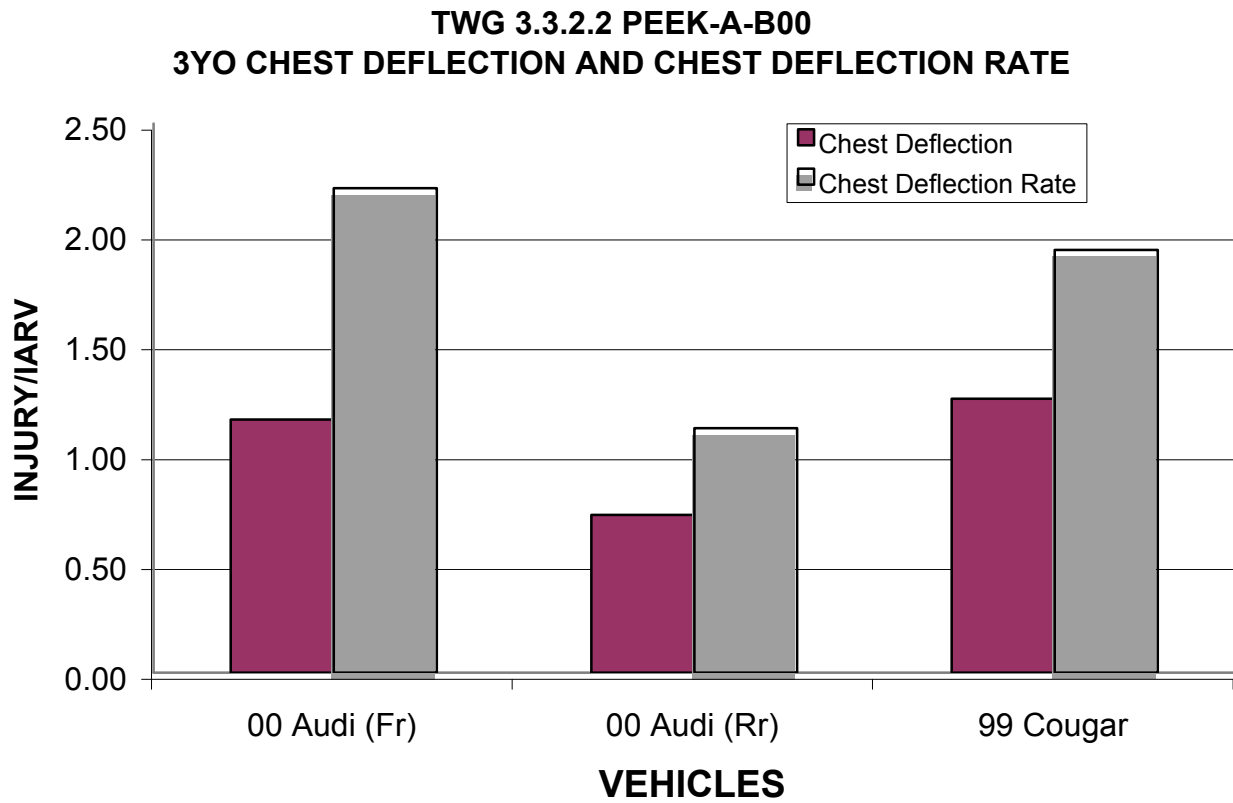


Figure 2. High Chest Injuries in TWG 3.3.2.2



Figure 3. 3 YO in Windstar



Figure 4. 3 YO in Windstar



Figure 5. 3 YO in Windstar



Figure 6. 3 YO in Windstar

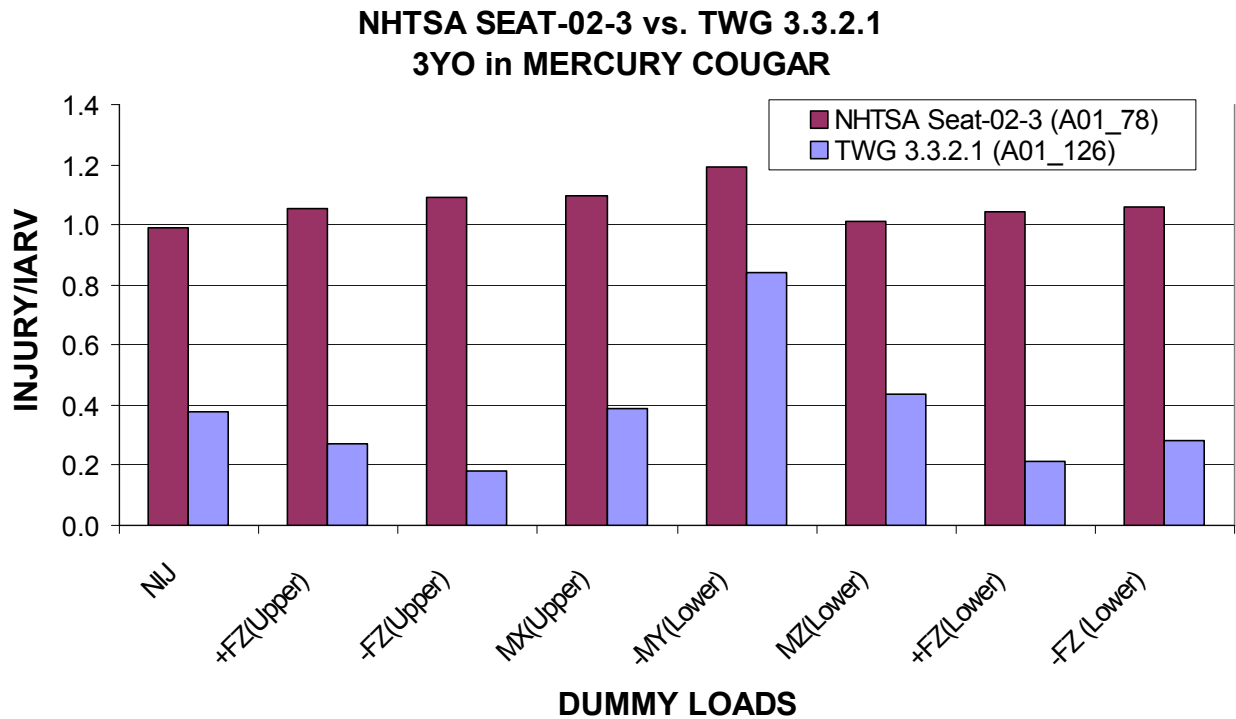


Figure 7. Higher loads in NHTSA procedure

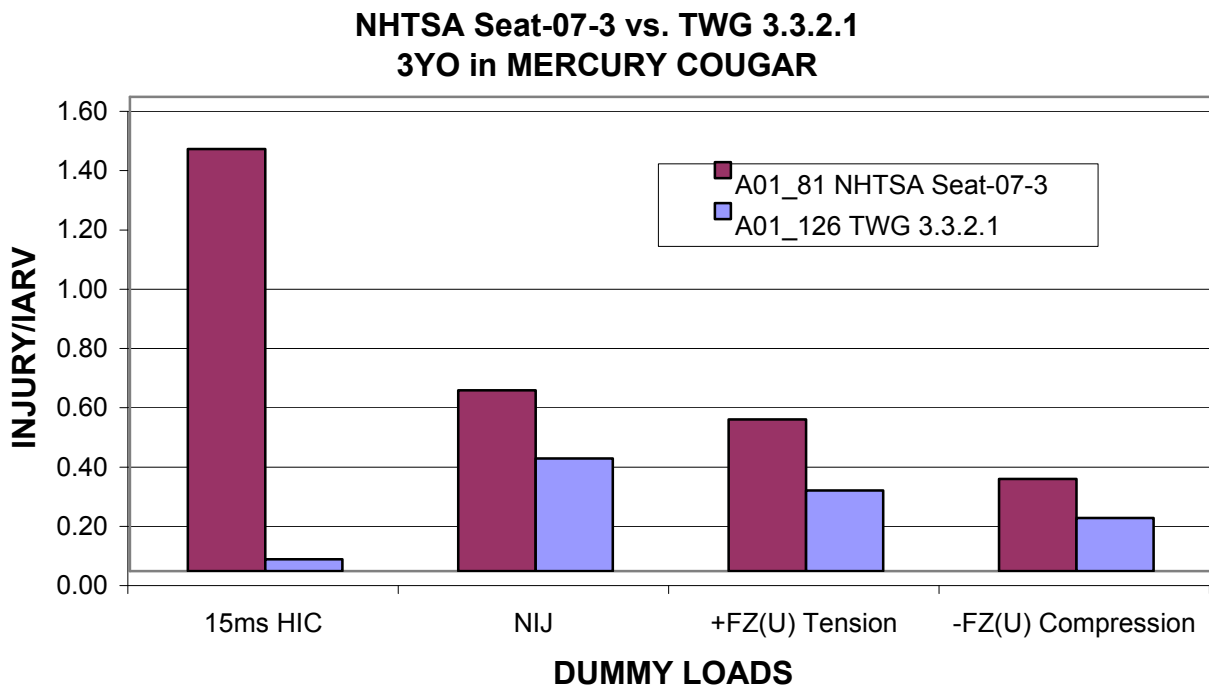


Figure 8. Higher loads in NHTSA Procedure



Figure 9. Location of 3 YO Dummy Head for Seat Mounted Bags

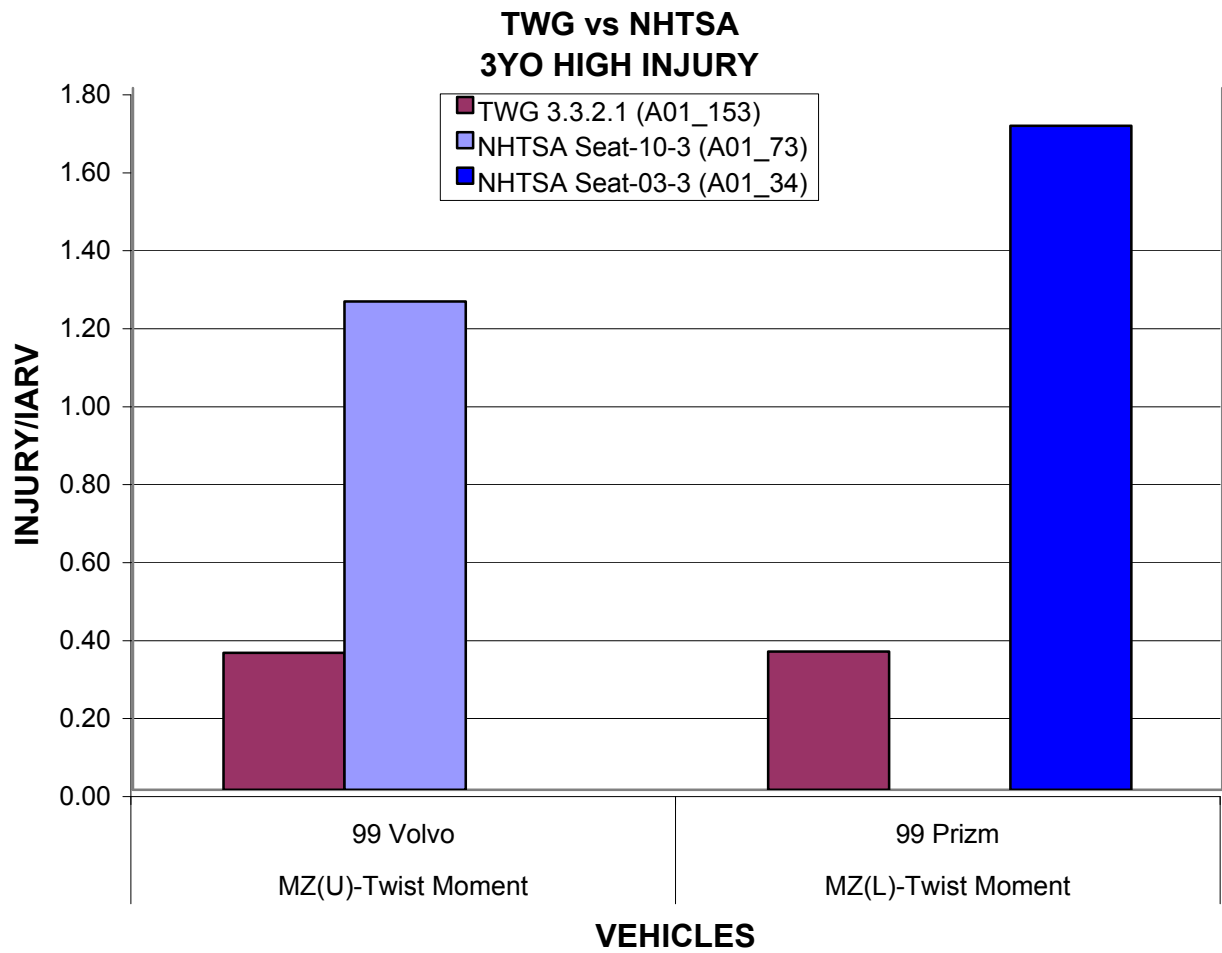


Figure 10. Vehicles Passing TWG and Failing a NHTSA Position

Certain TWG positions were not considered likely to produce any significant loads on the dummies for the vehicles considered in this study. For example, TWG 3.3.2.4 and 3.3.3.4 (lying on the seat, seat and door mounted systems) were not tested, based on the study of blank deployments for the selected vehicles.

5.2 Door Mounted Systems:

All of the door mounted TWG procedures were evaluated, except for TWG 3.3.3.4 (lying across the seat with the head resting on the seat cushion). Based on the blank deployments with the three different vehicles (with two vehicles having rear door mounted systems), it was determined that the airbag would produce very low loads on the dummy or not contact the dummy.

TWG 3.3.3.1 (Hybrid III 3-year-old kneeling at the door with its head facing out the window) produced high chest deflections in some tests.

The TWG 3.3.3.2 position (the dummy facing inward with its back against the door aligned the upper neck to the upper airbag module) produced high upper neck tension force (+FZ) and high research injury numbers in the lower neck tension force (+FZ)

A more severe test for the Hybrid III 3-year-old was TWG 3.3.3.3 (head on armrest). This position put the top of the dummy's head in the opening where the airbag deployed. This was severe for all vehicles, both front and rear. The dummy's neck was forced downward as the flap folded down and the airbag deployed. This caused high loads in head, upper neck, and lower neck. Figure 11 shows the normalized injury values produced by this position for all vehicles, in front and rear seating positions.

TWG did not recommend any positions for door mounted systems with the dummy leaning sideways (while facing forward). NHTSA evaluated some leaning sideways positions, putting the dummy's head CG in different locations on the airbag module. There were several tests with high injury numbers. Figure 12 shows the neck loads produced by one such position with the 3 YO dummy.

TWG did not have any positions for the Hybrid III 6-year-old for door mounted systems. NHTSA Door-01-6 position, where the lower neck is aligned with the upper airbag module was evaluated. The injury numbers were generally low, with some tests producing high values of MY and MZ (neck twist moment) as shown in Figure 13.

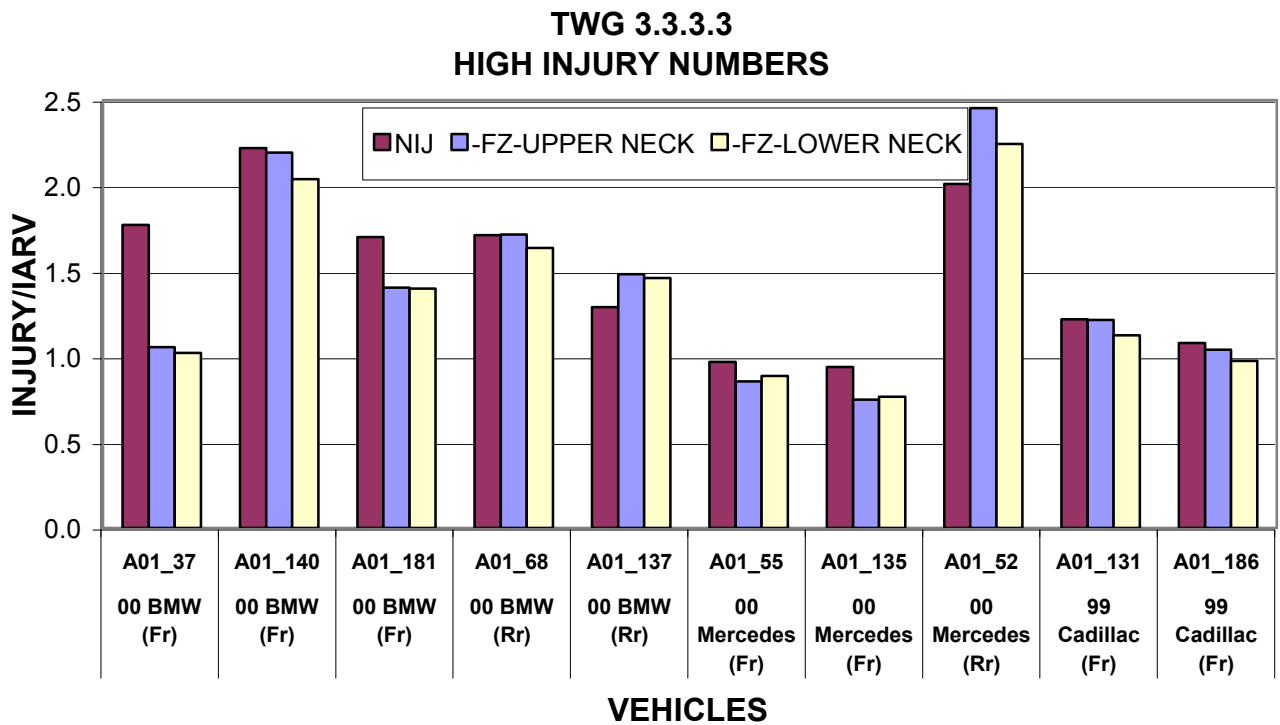


Figure 11. High Loads in TWG 3.3.3.3

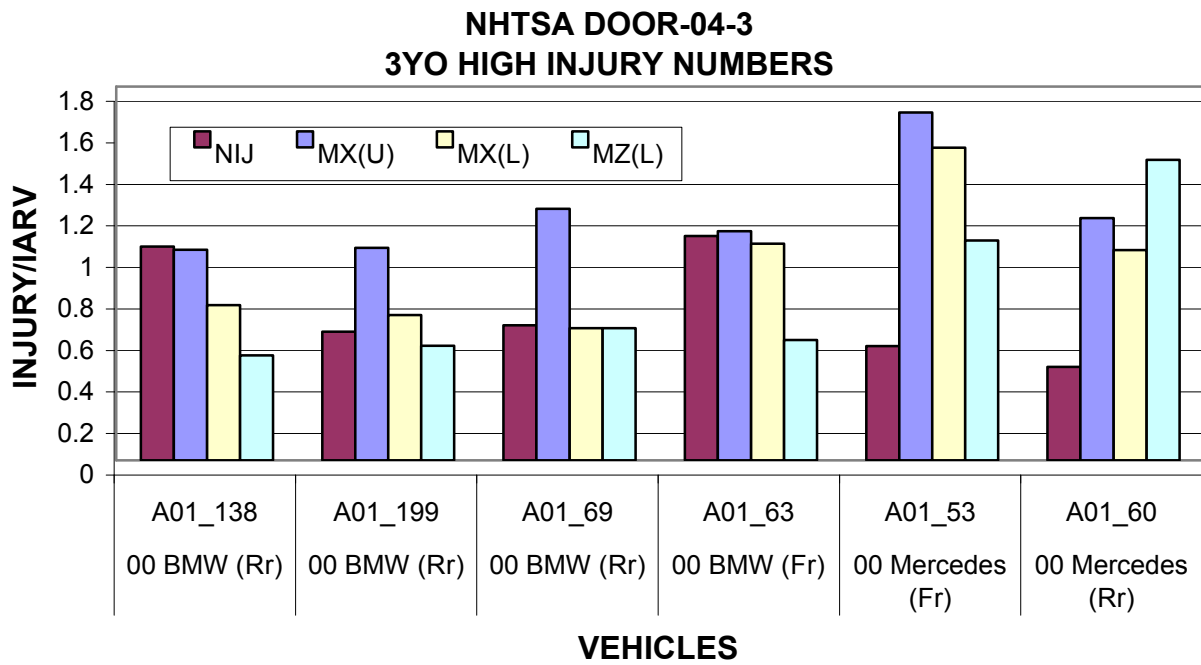


Figure 12. High Loads in NHTSA-DOOR-04-03

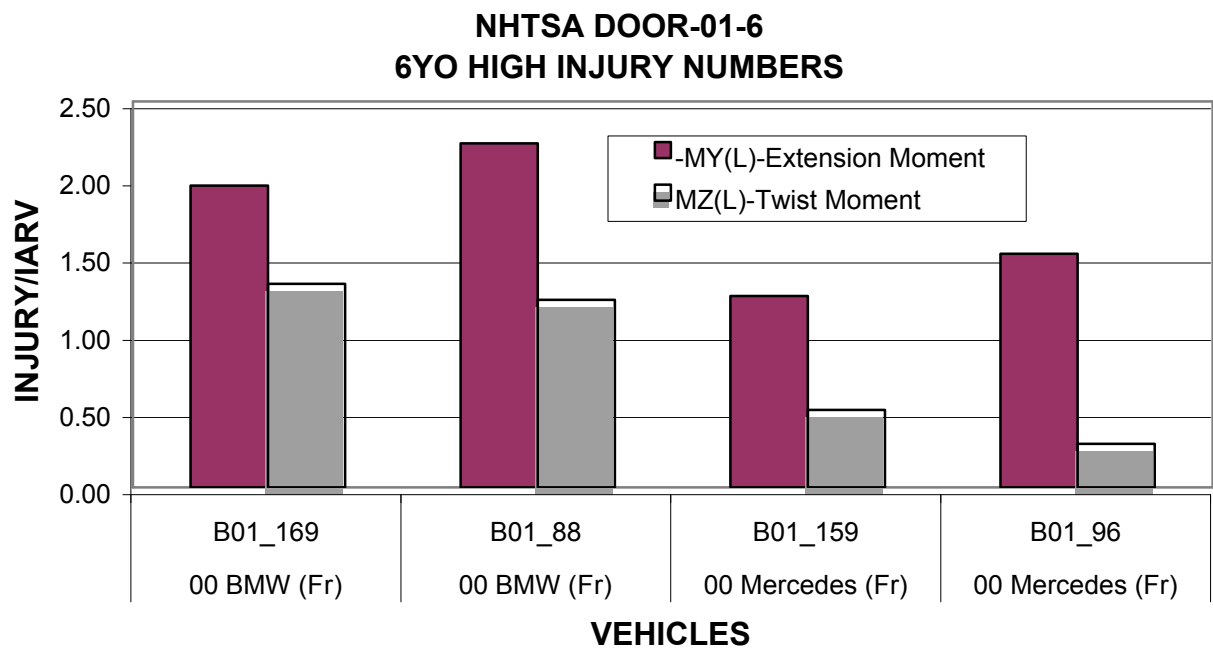


Figure 13. High Injury Values in NHTSA-DOOR-01-06

5.3 General Observations:

TWG procedures are generally capable of discriminating air bag systems over a wide variety of systems. The TWG and NHTSA procedures indicate that high loads are possible in SAB systems, especially from door mounted bags and seat mounted head-thorax combination bags. For example, seven out of twelve vehicles (with door or seat mounted bags) exceeded injury reference values in OOP tests.

For the 3YO dummy, 8 of 10 seat mounted bags and all door mounted bags exceeded injury reference or research values. For the 6YO dummy, 6 of 10 seat mounted bags and 3 of 5 door mounted bags exceeded injury reference or research values.

Tests with in-position, properly restrained occupants in forward and rear facing child restraints did not produce high loads. However, a test (A01_62) of a door-mounted SAB with a 3 YO dummy in the rear seat, restrained in a belt positioning booster, but OOP (leaning towards the door) produced high HIC values.

Considerable resources (time and money) were spent in locating the correct replacement parts for the side air bag systems (module, mounting hardware, etc.). It is of some concern that often the dealerships were unable to identify or supply the correct parts for these late model vehicles. It is hoped that such confusion will not result in incorrect parts getting used to repair vehicles on the road.

6.0 SUMMARY

- TWG procedures are generally capable of discriminating air bag systems over a wide variety of systems.
- Certain TWG positions may not be attainable in some vehicles. This would indicate that a set of generic positions may not be suitable for all vehicles. Variations based on SAB location, deployment path, and bag size and shape may be necessary.
- Certain TWG positions are not expected to produce any significant loads on the dummies in the vehicles included in this study.
- Several vehicles exceeded injury thresholds with the NHTSA procedures but did not with the TWG procedures.
- Some additional positions increase the likelihood of identifying air bags which may produce more severe, and potentially injurious, loads on OOP occupants:
 - NHTSA Seat-02-3 and NHTSA Seat-07-3 : locates the head CG closer to the air bag
 - NHTSA Door-04-3 and NHTSA Door-06-3 : adds leaning sideways condition for 3 YO in door mounted systems (not included in TWG procedures)
 - NHTSA Seat-04-6 and NHTSA Seat-05-6 : adds leaning sideways condition for 6 YO in door mounted systems (not included in TWG procedures)

- NHTSA Door-01-6 : adds back against the door condition for 6 YO in door mounted systems (not included in TWG procedures)
- Tests with in-position, properly restrained occupants in forward and rear facing child restraints did not produce high loads.
- High loads are possible in out of position children in belt positioning boosters in vehicles with door mounted bags, even in the rear seat.
- Considerable efforts were spent in locating the correct replacement parts for the side air bag systems (module, mounting hardware, etc.).

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APPENDIX A

NHTSA's Side Air Bag Out-of-Position Static Deployment Tests Seating Procedures Used in Addition to the TWG Procedures

NHTSA's side air bag evaluation program evaluated the performance of side air bags in out-of-position situations. The test positions suggested by the Technical Working Group (TWG) were used as baseline test conditions. Additional positions, described below, were also tested to evaluate the TWG positions and to achieve the worst case condition (produce higher loads) for the OOP dummies.

The seating procedures described on the following pages are general guidelines. These procedures were developed on some of the vehicles selected for the NHTSA study. The procedures, as written, have not been tested to work in other vehicles.

The following are the first steps in all of the modified seating procedures, unless otherwise stated in the procedure. These are based on the TWG's general guidelines.

1. Place the seat in the rearmost position and the lowest adjustment, unless otherwise specified.
2. Position the seatback at a torso angle of 25 degrees, as measured on the SAE J826 H-Point machine.
3. Mark the airbag module's top and bottom on the seat or door, for easy reference.
4. Mark the seat centerline, for easy reference.
5. Mark the location of the head CG at the sides of the dummy head.
6. Mark the seat for heel placements at two points; 75 mm from the centerline on each side and 20 to 50 mm from the leading edge of the seat.
7. Adjust the head restraint to its full-down position, or remove if interfering.
8. Place the safety belt anchor in its highest position.
9. Position the window either up or down. Most of the tests performed were with the window down, for easier access to the dummy for positioning and better lighting for high speed photography.
10. The foam block booster, used in some of the procedures, should be of the following dimensions: 300 mm deep by 450 mm wide by 75 mm thick. The foam has a density of 40-80 g/l. A typical foam material is expanded polypropylene (EPP).
11. The wedge-shaped foam block, used in some of the procedures, should be the same density as the foam block booster and wide enough to support the dummy's back.

Seat Mounted Side Airbag Seating Procedures For a Hybrid III 3-year old

NHTSA Seat-01-3:



- Place the dummy along the outboard edge of the seat cushion kneeling and facing rearward. Its feet may overhang the front edge of the seat cushion.
- Align the dummy's sternum as close as possible with the leading edge of the seatback bolster or forward most contour line. The sternum should contact the seat.
- Place the dummy's head between the seatback and B-pillar. The head should remain in its neutral orientation and should not be forced into flexion or extension. For rear seats tests, the head should be placed as far outboard as possible.
- Position the outboard leg at the outboard edge of the seat cushion and parallel to the seat centerline. For seat cushions with bolsters, the outboard leg should be placed as close to the edge of the seat cushion as possible, while remaining on the cushion.
- Move the outboard arm up and away from the side of the dummy, slide the dummy toward the door and/or armrest so that it is touching. Try to keep the dummy in the same vertical alignment.
- Slide the outboard knee and lower leg toward the seat bight (seatback/seat cushion junction) until the top edge of the upper rib is aligned horizontally with the top edge of the airbag module. The sternum should be in contact with the leading edge of the seatback bolster.
- Align the inboard leg such that it is parallel to the centerline of the seat cushion. Slide the inboard knee and lower leg towards the seat bight until a line drawn through both shoulder bolts is parallel to the transverse plane of the vehicle.
- Rotate the inboard arm towards the seatback until the thumb contacts the seatback.

NHTSA Seat-02-3:



- Place the foam block booster on the seat between the bolsters.
- Seat the dummy on the outboard edge of the foam block, aligning the spine with the leading edge of the seat bolster (forward most contour line).
- Place the heels at the placement points (20-50 mm from leading edge of cushion and 75 mm from the centerline of each side).
- Holding feet in position, slide the pelvis forward and parallel to the centerline of the vehicle, until the head touches the seatback.
- Slide the dummy over until it touches the armrest or B-Pillar, keeping the dummy in the same plane.
- Reposition heels to the placement points, if necessary.
- Place the outboard arm near or on the armrest.
- Bend the inboard arm so that the upper arm contacts the seatback and the fingertips contact the foam block.

NHTSA Seat-03-3:



- Seat the dummy on the outboard edge of seat, aligning the spine with the leading edge of the seat bolster (forward most contour line).
- Place the dummy's head in between the seat bolster and B-Pillar.
- Place the heels at the placement points (20-50 mm from leading edge of cushion and 75 mm from the centerline of each side).
- Holding feet in position, slide the pelvis forward and parallel to the centerline of the vehicle, until head/neck junction (lower edge of the skin at the base of the head) is aligned vertically with the top of the airbag module. If this cannot be achieved, leave the dummy at this point.
- Reposition heels to the placement points, if necessary.
- Slide the dummy over until it touches the armrest or B-Pillar, keeping the dummy in the same plane.
- Place the outboard arm near or on the armrest.
- Bend the inboard arm so that the upper arm contacts the seatback and the fingertips contact the booster seat.

NHTSA Seat-04-3:



- Place the dummy on the seat perpendicular to the seat centerline, lying on its back, with its arms at its sides, so that its left arm contacts the seatback.
- Bending the dummy at the waist, slide it inboard/outboard until the back of the head can touch the armrest. (Seat may be adjusted to obtain this.) Support the dummy's back with a wedge-shaped foam block so that the head remains in a neutral position.
- Slide the pelvis forward along the centerline of the seat until the head contacts the seatback.
- Pull the head towards the door, as far as possible, to rest the head on the armrest.
- Slightly bend the dummy's knees and rest its feet on the edge of the seat.

NHTSA Seat-05-3:



- Install the child booster seat properly in vehicle, according to manufacturer's instructions.
- Place dummy in seat and fasten the seat belt according to the seat's instructions. (The seat shown above is a Fisher Price Booster Seat, Model #79750)

NHTSA Seat-06-3:



- Install the child booster seat properly in vehicle, according to the manufacturer's instructions.
- Place dummy in seat and fasten the seat belt according to the seat's instructions. (The seat shown above is a Fisher Price Booster Seat, Model #79750)
- While pulling dummy's pelvis away from the door and somewhat forward, (without loosening the belt) lean dummy sideways until head contacts door. If the head-to-door contact cannot be achieved, leave the head as close to the door as possible.

NHTSA Seat-07-3:



- Place dummy in center of seat.
- Lean dummy sideways until head hits armrest and / or door.
- Place legs at the centerline of the seat and space them slightly apart (~40 to 50 mm foot to foot).
- Slowly pull the pelvis forward by pulling the legs until the head hits the seatback.
- The head should rest between the door and the seatback.
- The dummy should be adjusted until the head CG is vertically aligned with the centerline of the airbag module.

NHTSA Seat-08-3:



- Place foam block booster on the seat in between the two seat bolsters.
- Place the dummy in the center of the seat on the booster.
- Lean dummy sideways until head hits armrest and/or door.
- Place the legs at the centerline of the seat and space them slightly apart (~40 to 50 mm foot to foot).
- Slowly pull the pelvis forward by pulling the legs until the head hits the seatback.
- The head should rest between the door and the seatback
- The dummy should be adjusted until the head CG is vertically aligned with the top of the airbag module.

NHTSA Seat-09-3:



- Place the foam block booster on the seat between the bolsters.
- Seat the dummy on the outboard edge of the foam block, aligning the spine with the leading edge of the seat bolster (forward most contour line).
- Place the legs on the centerline of the seat and move them slightly apart (~45 mm foot to foot).
- Holding feet in position, slide the pelvis forward and parallel to the centerline of the vehicle, until the head CG is aligned with the vertical centerline of the airbag module.
- Slide the dummy over until it touches the armrest or B-Pillar, keeping the dummy in the same plane.
- Place the outboard arm near or on the armrest.
- Bend the inboard arm so that the upper arm contacts the seatback and the fingertips contact the foam block.

NHTSA Seat-10-3:



- Adjust the seatback one notch rearward of the baseline seat back angle, making the seatback more reclined.
- Place the foam block booster on the seat between the bolsters.
- Seat the dummy on the outboard edge of the foam block, aligning the spine with the leading edge of the seat bolster (forward most contour line).
- Place the heels at the placement points (20-50 mm from leading edge of cushion and 75 mm from the centerline of each side).
- Holding feet in position, slide the pelvis forward and parallel to the centerline of the vehicle, until the head touches the seatback.
- Slide the dummy over until it touches the armrest or B-Pillar, keeping the dummy in the same plane.
- Reposition heels to the placement points, if necessary.
- Place the outboard arm near or on the armrest.
- Bend the inboard arm so that the upper arm contacts the seatback and the fingertips contact the foam block.

Seat Mounted Side Airbag Seating Procedures For a Hybrid III 6-year old

NHTSA Seat-01-6:



- Seat the dummy on the outboard edge of seat, aligning the spine with the leading edge of the seat bolster (forward most contour line).
- Place the dummy's head in between the seat bolster and B-Pillar.
- Place the heels at the placement points (20-50 mm from leading edge of cushion and 75 mm from the centerline of each side).
- Holding feet in position, slide the pelvis forward and parallel to the centerline of the vehicle, until torso/neck junction (lower edge of the skin at the base of the neck) is aligned vertically with the top of the airbag module. If this cannot be achieved, leave the dummy at this point.
- Reposition heels to the placement points, if necessary.
- Slide the dummy over until it touches the armrest or B-Pillar, keeping the dummy in the same plane.
- Place the outboard arm near or on the armrest.
- Bend the inboard arm so that the upper arm contacts the seatback and the fingertips contact the seat.

NHTSA Seat-02-6:



- Seat the dummy on the outboard edge of seat, aligning the spine with the leading edge of the seat bolster (forward most contour line).
- Place the heels at the placement points (20-50 mm from leading edge of cushion and 75 mm from the centerline of each side).
- Holding feet in position, slide the pelvis forward and parallel to the centerline of the vehicle, until head CG (inboard) is aligned with the vertical centerline of the airbag module.
- Reposition heels to the placement points, if necessary.
- Slide the dummy over until it touches the armrest or B-Pillar, keeping the dummy in the same plane.
- Place the outboard arm near or on the armrest.
- Bend the inboard arm so that the upper arm contacts the seatback and the fingertips contact the seat.

NHTSA Seat-03-6:



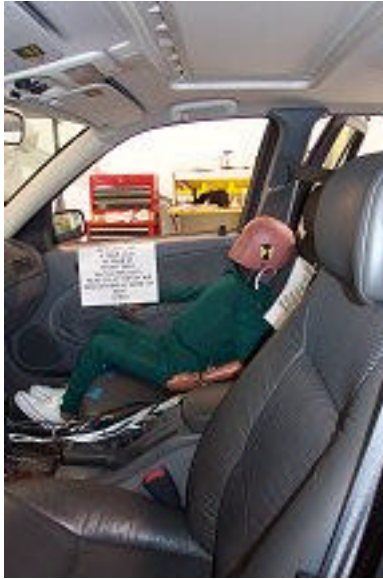
- Place the dummy in the center of the seat.
- Lean dummy sideways until head hits armrest and/or door.
- Place legs at the centerline of the seat and space them slightly apart (~40 to 50 mm foot to foot).
- Slowly pull the pelvis forward by pulling the legs until head hits the seatback.
- The head should rest between the door and the seatback.
- The dummy should be adjusted until the head CG is vertically aligned with the top of the airbag module.

NHTSA Seat-04-6:



- Place the dummy in the center of the seat.
- Lean the dummy sideways until head hits the armrest and/or door.
- Place legs at the centerline of the seat and space them slightly apart (~40 to 50 mm foot to foot).
- Slowly pull the pelvis forward by pulling the legs until head hits seatback.
- The head should rest between the door and the seatback
- The dummy should be adjusted until the head CG is vertically aligned with the vertical centerline of the airbag module.

NHTSA Seat-05-6:



- Seat the dummy on the outboard edge of seat, aligning the spine with the leading edge of the seat bolster (forward most contour line).
- Place the heels at the placement points (20-50 mm from leading edge of cushion and 75 mm from the centerline of each side).
- Holding feet in position, slide the pelvis forward and parallel to the centerline of the vehicle, until head CG (inboard) is aligned with the top of the airbag module.
- Reposition heels to the placement points, if necessary.
- Slide the dummy over until it touches the armrest or B-Pillar, keeping the dummy in the same plane.
- Place the outboard arm near or on the armrest.
- Bend the inboard arm so that the upper arm contacts the seatback and the fingertips contact the seat.

Door Mounted Side Airbags Seating Procedures for Hybrid III 3-year-old

NHTSA Door-01-3:



- Place the window in the down position.
- Place the dummy in a kneeling position facing out the window, so that it just clears the shoulder bolster.
- Adjust the seat's longitudinal position to align the dummy's mid-sagittal plane as close as possible to the vertical centerline of the airbag module.
- Adjust the dummy's knees so that they are placed together and are touching the door.
- Keep the dummy's spine in a vertical alignment and let him fall forward so that his head leans against the door.
- Line up the dummy with its knees touching the door and the vertical center of the airbag module in line with the centerline of the dummy.

NHTSA Door-03-3:



- Place the dummy in the seat with its back against the door.
- Adjust the dummy to the rear of the seat until its arm contacts the seatback.
- Adjust the seat's longitudinal position to align the dummy's mid-sagittal plane as close as possible to the vertical centerline of the airbag module.
- Lean the dummy back until its shoulders or head contacts the door trim panel.
- Slide the pelvis inboard/outboard and perpendicular to the centerline of the vehicle until the **lower neck** is at the same level as the top edge of the airbag module. If the vertical alignment cannot be achieved with the seat in its lowest position, raise the seat (if possible) to achieve this alignment.
- Position the dummy's upper arms to be parallel with its torso and the forearms bent forward so the fingertips just touch the seat cushion.

NHTSA Door-04-3:



- Place the dummy on the center of the seat and lean it towards the door.
- Adjust the seat's longitudinal position to align the dummy so that the head's center of gravity (side) is at the vertical centerline of the airbag module.
- Adjust the dummy by pulling it perpendicular to the seat's centerline until the outboard head CG marker is at the horizontal centerline of the air bag module.
- Make sure the arm nearest the door is out of the way by moving it forward/rearward.

NHTSA Door-06-3:



- Place the dummy on the center of the seat and lean it towards the door.
- Adjust the dummy by pulling it perpendicular to the seat's centerline until the outboard head CG marker is at the horizontal centerline of the air bag module.
- Make sure the arm nearest the door is out of the way by moving it forward/rearward.

NHTSA Door-07-3:



- Install child booster seat properly in vehicle according to the manufacturer's instructions.
- Place dummy in seat and fasten the seat belt according to the seat's instructions. (The seat shown above is a Fisher Price Booster Seat, Model #79750)

NHTSA Door-08-3:



- Install a child booster seat properly in vehicle according to the manufacturer's instructions.
- Place dummy in seat and fasten the seat belt according to the seat's instructions. (The seat shown above is a Fisher Price Booster Seat, Model #79750)
- While pulling dummy's pelvis away from the door and forward, (without loosening the belt) lean dummy sideways until head contacts door. If the head-to-door contact cannot be achieved, leave the head as close to the door as possible.

Door Mounted Side Airbag Seating Procedures For a Hybrid III 6-year old

NHTSA Door-01-6:



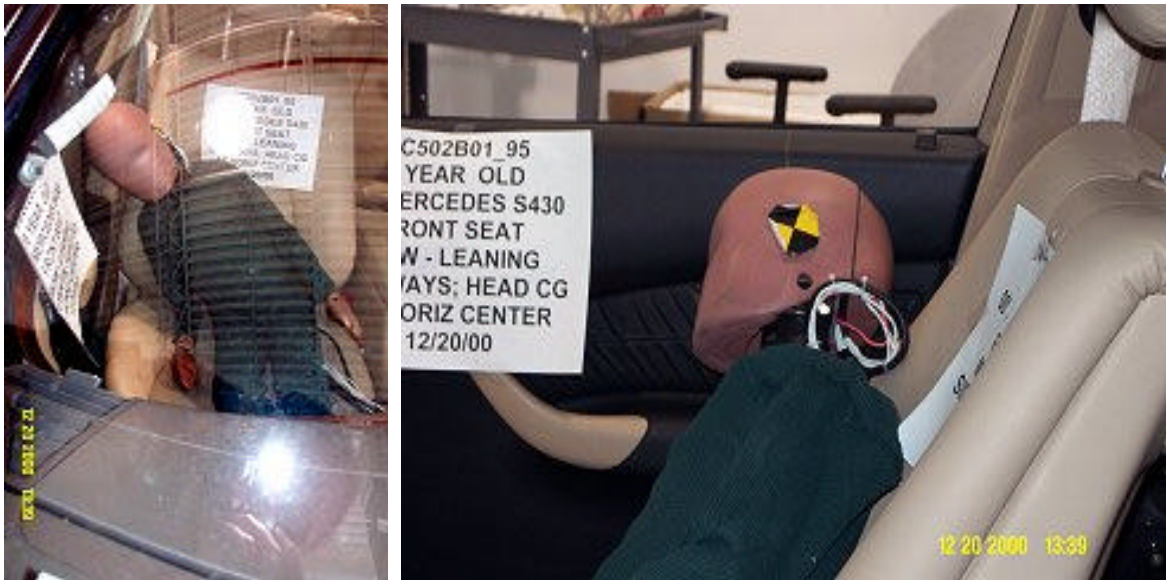
- Place the dummy vertically in the seat with its back against the door and inside leg touching the seatback.
- Lean the dummy to the rear of the vehicle until its arm contacts the seatback.
- Adjust the seat's longitudinal position (if adjustable) to align the dummy's centerline as close as possible to the vertical centerline of the airbag module. If this is not possible, place a piece of foam between the dummy's arm and the seatback to adjust the dummy position.
- Lean the dummy back until its shoulders or head contacts the door trim panel.
- Slide the pelvis inboard/outboard and perpendicular to the centerline of the seat until the **lower neck** is at the same level as the top edge of the airbag module. If this alignment cannot be achieved with the seat in its lowest position, raise the seat (if possible) to achieve this alignment.
- Position the dummy's upper arms to be parallel with its torso and the forearms bent forward so the fingertips just touch the seat cushion.

NHTSA Door-02-6:



- Place the dummy on the center of the seat and lean it towards the door until the head contacts the door airbag.
- Location of head CG is wherever head hits the door.

NHTSA Door-03-6



- Place the dummy on the center of the seat and lean it towards the door.
- Adjust the dummy by moving its pelvis towards the seatback to align the dummy so that the head's CG marker (outboard) is at the vertical centerline of the airbag module.
- Adjust the dummy by pulling it perpendicular to the seat's centerline until the outboard head CG marker is at the horizontal centerline of the air bag module.
- Make sure the arm nearest the door is out of the way by moving it forward/rearward.

NHTSA Door-04-6:



- Place the dummy on the center of the seat and lean it towards the door.
- Adjust the seat's longitudinal position to align the dummy so that the head's CG (outboard) is at the vertical centerline of the airbag module.
- Make sure the arm nearest the door is out of the way by moving it forward/rearward.

NHTSA Door-05-6:



- Place the dummy on the center of the seat and lean it towards the door.
- Adjust the seat's longitudinal position (if adjustable) so that the top of the dummy's head (the center of the flat surface) is at the rear edge of the airbag module.
- Adjust the dummy by pulling it perpendicular to the seat's centerline until the top of the dummy's head (the center of the flat surface) is at the horizontal centerline of the air bag module.
- Make sure the arm nearest the door is out of the way by moving it forward/rearward.

Seat and Door Mounted Side Airbags Seating Procedures for 12-month-old CRABI

NHTSA Seat-01-12 and NHTSA Door-01-12:



- Install child toddler seat properly in vehicle, according to manufacturer's instructions.
- Place dummy in seat and fasten the seat belt according to the seat's instructions. (The seat shown above is a Century Ovation, Model #4665NSK)

NHTSA Seat-02-12 and NHTSA Door-02-12:



- Install rearward facing infant seat properly in vehicle according to manufacturer's instructions.
- Place dummy in seat and fasten the seat belt according to the seat's instructions. (The seat shown above is a Fisher Price Safe Embrace Infant Seat, Model #79725)

Appendix B

Test Results

Table B1. 3 YO Tests Injury Criteria Values
Normalized to Injury Thresholds

Test ID	Test Position	Vehicle	Bag Type	Test Type	15ms HIC	Chest Deflection	Deflection Rate	NIJ	+FZ (Upper Neck) Tension	-FZ (Upper Neck) Compression
A01_01	TWG 3.3.2.2	00 Maxima	Seat	chest	0.10	N/A	0.00	0.97	1.28	0.00
A01_04	TWG 3.3.2.2	99 Windstar	Seat	chest	0.05	0.31	0.29	0.45	0.27	0.06
A01_07	TWG 3.3.2.2	99 Prizm	Seat	chest	0.02	N/A	N/A	0.67	0.39	0.04
A01_08	TWG 3.3.2.1	99 Prizm	Seat	neck/head	0.05	0.11	0.31	0.51	0.53	0.10
A01_09	TWG 3.3.2.2	00 Maxima	Seat	chest	0.11	N/A	N/A	1.57	1.58	0.00
A01_10	TWG 3.3.2.1	00 Maxima	Seat	neck/head	0.34	0.19	0.56	0.64	0.60	0.06
A01_11	NHTSA Seat-06-3	00 Maxima	Seat	neck/head	0.14	0.07	0.14	0.27	0.17	0.21
A01_12	NHTSA Seat-06-3	99 Saab	Seat	neck/head	0.20	0.09	0.18	0.22	0.10	0.13
A01_13	TWG 3.3.2.1	99 Saab	Seat	neck/head	0.32	0.06	0.20	0.64	0.99	0.06
A01_14	TWG 3.3.2.2	99 Saab	Seat	chest	0.03	0.31	0.44	0.62	0.61	0.01
A01_18	NHTSA Seat-06-3	99 Windstar	Seat	neck/head	0.00	0.05	0.10	0.29	0.45	0.07
A01_19	TWG 3.3.2.2	99 Prizm	Seat	chest	0.02	0.64	0.83	0.76	0.41	0.02
A01_20	TWG 3.3.2.2	00 Maxima	Seat	chest	0.08	N/A	N/A	1.23	1.41	0.00
A01_34	NHTSA Seat-03-3	99 Prizm	Seat	neck/head	0.10	0.05	0.28	0.36	0.43	0.18
A01_35	TWG 3.3.3.1	00 BMW (Fr)	Door	chest	0.03	0.69	0.88	0.99	0.79	0.01
A01_36	TWG 3.3.3.2	00 BMW (Fr)	Door	neck/head	0.15	0.15	0.25	1.01	1.43	0.20
A01_37	TWG 3.3.3.3	00 BMW (Fr)	Door	neck/head	1.54	0.10	0.12	1.77	0.31	1.06
A01_39	TWG 3.3.3.2	99 Cadillac (Fr)	Door	neck/head	0.01	0.02	0.08	0.3	0.47	0.02
A01_40	TWG 3.3.3.1	99 Cadillac (Fr)	Door	chest	0.00	0.52	0.56	0.24	0.12	0.02
A01_41	TWG 3.3.3.3	99 Cadillac (Fr)	Door	neck/head	0.45	0.05	0.19	0.92	0.19	0.83
A01_42	TWG 3.3.2.2	00 Cadillac (Rr)	Seat	chest	0.00	0.03	0.15	0.03	0.03	0.03
A01_43	NHTSA Seat-01-3	00 Cadillac (Rr)	Seat	chest	0.00	0.16	0.23	0.1	0.08	0.02
A01_44	NHTSA Seat-08-3	00 Cadillac (Rr)	Seat	neck/head	0.04	0.03	0.07	0.92	0.03	0.47
A01_45	TWG 3.3.2.1	00 Cadillac (Rr)	Seat	neck/head	0.01	0.29	0.10	0.19	0.21	0.10
A01_46	NHTSA Door-01-3	00 BMW (Fr)	Door	chest	0.05	1.15	1.25	1.19	0.87	0.31
A01_47	NHTSA Door-03-3	00 BMW (Fr)	Door	neck/head	0.13	0.15	0.21	0.78	0.68	0.13
A01_48	TWG 3.3.3.1	00 Mercedes (Fr)	Door	chest	0.05	0.34	0.43	1	0.45	0.23
A01_49	TWG 3.3.3.2	00 Mercedes (Fr)	Door	neck/head	0.12	0.09	0.26	0.64	0.92	0.50
A01_51	TWG 3.3.3.1	00 Mercedes (Rr)	Door	chest	0.01	0.59	0.83	0.58	0.28	0.09
A01_52	TWG 3.3.3.3	00 Mercedes (Rr)	Door	neck/head	0.89	0.03	0.25	2.01	0.04	2.45

A01_53	NHTSA Door-04-3	00 Mercedes (Fr)	Door	neck/head	2.05	0.05	0.10	0.55	0.70	0.65
A01_55	TWG 3.3.3.3	00 Mercedes (Fr)	Door	neck/head	1.94	0.06	0.31	0.97	0.54	0.86
A01_56	NHTSA Door-01-3	00 Mercedes (Fr)	Door	chest	0.05	0.91	1.06	1.25	0.69	0.17
A01_57	NHTSA Door-03-3	00 Mercedes (Fr)	Door	neck/head	0.06	0.11	0.26	0.42	0.37	0.32
A01_58	TWG 3.3.3.2	00 Mercedes (Rr)	Door	neck/head	0.06	0.08	0.36	0.85	1.20	0.24
A01_59	NHTSA Door-01-3	00 Mercedes (Rr)	Door	chest	0.02	0.69	1.50	0.69	0.33	0.16
A01_60	NHTSA Door-04-3	00 Mercedes (Rr)	Door	neck/head	0.61	0.04	0.07	0.45	0.39	0.49
A01_61	NHTSA Door-07-3	00 Mercedes (Rr)	Door	n/a	0.00	0.06	0.11	0.04	0.03	0.01
A01_62	NHTSA Door-08-3	00 Mercedes (Rr)	Door	neck/head	1.24	0.04	0.09	0.28	0.48	0.00
A01_63	NHTSA Door-04-3	00 BMW (Fr)	Door	neck/head	1.30	0.08	0.16	1.08	0.26	1.14
A01_64	NHTSA Door-06-3	00 BMW (Fr)	Door	neck/head	0.42	0.05	0.19	0.82	0.08	1.06
A01_65	TWG 3.3.3.1	00 BMW (Rr)	Door	chest	0.01	0.58	1.46	0.33	0.53	0.05
A01_66	TWG 3.3.3.2	00 BMW (Rr)	Door	neck/head	N/A	0.10	0.23	0.41	0.30	0.08
A01_68	TWG 3.3.3.3	00 BMW (Rr)	Door	neck/head	0.45	0.03	0.23	1.71	0.03	1.72
A01_69	NHTSA Door-04-3	00 BMW (Rr)	Door	neck/head	N/A	0.05	0.09	0.65	0.13	0.67
A01_70	NHTSA Door-07-3	00 BMW (Rr)	Door	neck/head	0.00	0.01	0.04	0.05	0.03	0.01
A01_71	NHTSA Door-08-3	00 BMW (Rr)	Door	neck/head	N/A	0.02	0.21	0.35	0.32	0.20
A01_72	TWG 3.3.2.2	99 Volvo	Seat	chest	0.00	0.16	0.24	0.3	0.16	0.04
A01_73	NHTSA Seat-10-3	99 Volvo	Seat	neck/head	0.14	0.15	0.25	0.76	0.82	0.51
A01_74	NHTSA Seat-03-3	99 Volvo	Seat	neck/head	0.05	0.06	0.10	0.17	0.23	0.02
A01_75	NHTSA Seat-04-3	99 Volvo	Seat	neck/head	0.08	0.02	0.04	0.18	0.27	0.10
A01_76	NHTSA Seat-07-3	99 Volvo	Seat	neck/head	0.26	0.03	0.09	0.56	0.60	0.00
A01_77	TWG 3.3.2.2	99 Cougar	Seat	chest	0.03	1.25	1.93	0.62	0.92	0.00
A01_78	NHTSA Seat-02-3	99 Cougar	Seat	neck/head	0.50	0.22	0.73	0.99	1.05	1.09
A01_79	TWG 3.3.2.3	99 Cougar	Seat	neck/head	0.20	0.02	0.03	0.13	0.04	0.17
A01_80	NHTSA Seat-04-3	99 Cougar	Seat	neck/head	0.48	0.02	0.07	0.26	0.16	0.27
A01_81	NHTSA Seat-07-3	99 Cougar	Seat	neck/head	1.42	0.03	0.06	0.61	0.51	0.31
A01_82	NHTSA Seat-06-3	99 Cougar	Seat	neck/head	0.04	0.03	0.07	0.37	0.10	0.31
A01_83	TWG 3.3.2.2	00 Audi(Rr)	Seat	chest	0.01	0.72	1.11	0.48	0.61	0.02
A01_84	TWG 3.3.2.1	00 Audi(Rr)	Seat	neck/head	0.18	0.18	0.55	0.52	0.46	0.47
A01_85	TWG 3.3.2.3	00 Audi (Rr)	Seat	neck/head	0.06	0.01	0.06	0.27	0.06	0.39
A01_86	NHTSA Seat-06-3	00 Audi (Rr)	Seat	neck/head	0.02	0.04	0.07	0.16	0.04	0.13
A01_87	TWG 3.3.2.2	00 Audi(Fr)	Seat	chest	0.05	1.15	2.21	0.59	0.98	0.10
A01_108	TWG 3.3.2.1	99 Windstar	Seat	neck/head	0.11	0.05	0.13	0.35	0.29	0.26
A01_109	NHTSA Seat-05-3	99 Windstar	Seat	n/a	0.00	0.02	0.04	0.07	0.04	0.02

A01_110	NHTSA Seat-02-3	99 Cougar	Seat	neck/head	0.68	0.12	0.44	0.8	0.98	0.66
A01_111	NHTSA Seat-05-3	99 Cougar	Seat	neck/head	0.00	0.01	0.04	0.1	0.02	0.03
A01_112	TWG 3.3.2.1	00 Audi (Fr)	Seat	neck/head	0.21	0.22	0.44	N/A	1.17	0.39
A01_113	TWG 3.3.2.1	00 Audi (Fr)	Seat	neck/head	0.23	0.20	0.41	0.91	1.17	0.38
A01_114	TWG 3.3.2.3	00 Audi (Fr)	Seat	neck/head	0.25	0.02	0.08	0.51	0.91	0.02
A01_115	TWG 3.3.2.1	99 Jetta	Seat	neck/head	0.06	0.08	0.12	0.31	0.40	0.26
A01_116	TWG 3.3.2.2	99 Jetta	Seat	chest	0.01	0.62	0.56	0.61	0.48	0.05
A01_118	TWG 3.3.2.3	99 Jetta	Seat	neck/head	0.04	0.03	0.09	0.27	0.37	0.00
A01_119	TWG 3.3.2.1	99 Windstar	Seat	neck/head	0.06	0.08	0.11	0.4	0.31	0.28
A01_120	TWG 3.3.2.1	00 Cadillac (Rr)	Seat	neck/head	0.00	0.04	0.06	0.21	0.10	0.09
A01_122	NHTSA Seat-08-3	00 Cadillac (Rr)	Seat	neck/head	0.03	0.03	0.04	0.84	0.07	0.47
A01_123	NHTSA Seat-05-3	00 Cadillac (Rr)	Seat	n/a	0.00	0.00	0.02	0.01	0.01	0.01
A01_124	TWG 3.3.2.1	99 Cougar	Seat	neck/head	0.02	0.12	0.38	0.39	0.31	0.19
A01_125	NHTSA Seat-02-3	99 Cougar	Seat	neck/head	0.37	0.18	0.48	0.87	1.35	0.64
A01_126	TWG 3.3.2.1	99 Cougar	Seat	neck/head	0.04	0.15	0.55	0.38	0.27	0.18
A01_127	NHTSA Door-06-3	99 Cadillac (Fr)	Door	neck/head	0.18	0.04	0.03	0.36	0.50	0.17
A01_128	NHTSA Door-07-3	99 Cadillac (Fr)	Door	n/a	0.00	0.00	0.01	0.02	0.01	0.01
A01_129	TWG 3.3.3.3	99 Cadillac (Fr)	Door	neck/head	0.16	0.04	0.07	0.79	0.11	0.76
A01_130	TWG 3.3.3.2	99 Cadillac (Fr)	Door	neck/head	0.00	0.05	0.08	0.23	0.26	0.04
A01_131	TWG 3.3.3.3	99 Cadillac (Fr)	Door	neck/head	0.26	0.05	0.18	1.22	0.06	1.22
A01_132	NHTSA Door-06-3	00 Mercedes (Fr)	Door	neck/head	0.77	0.04	0.06	0.56	0.95	0.41
A01_133	TWG 3.3.3.1	00 Mercedes (Fr)	Door	chest	0.02	0.74	1.06	1.02	0.85	0.25
A01_134	TWG 3.3.3.2	00 Mercedes (Fr)	Door	neck/head	0.12	0.05	0.16	0.43	0.60	0.23
A01_135	TWG 3.3.3.3	00 Mercedes (Fr)	Door	neck/head	1.20	0.10	0.12	0.94	0.53	0.75
A01_136	TWG 3.3.3.1	00 Mercedes (Rr)	Door	chest	0.01	0.69	1.19	0.67	0.37	0.36
A01_137	TWG 3.3.3.3	00 BMW (Rr)	Door	neck/head	0.41	0.04	0.16	1.29	0.01	1.48
A01_138	NHTSA Door-04-3	00 BMW (Rr)	Door	neck/head	0.76	0.05	0.15	1.03	0.19	0.97
A01_139	TWG 3.3.3.1	00 BMW (Fr)	Door	chest	0.02	0.56	0.55	0.27	0.48	0.01
A01_140	TWG 3.3.3.3	00 BMW (Fr)	Door	neck/head	0.91	0.09	0.24	2.22	0.07	2.19
A01_141	NHTSA Door-04-3	00 BMW (Fr)	Door	neck/head	1.15	0.09	0.19	0.91	0.34	1.26
A01_144	NHTSA Seat-05-3	00 Audi (Rr)	Seat	n/a	0.00	0.02	0.05	0.03	0.02	0.02
A01_146	NHTSA Seat-02-3	99 Windstar	Seat	neck/head	0.20	0.04	0.04	0.51	0.11	0.11
A01_147	NHTSA Seat-05-3	00 Maxima	Seat	n/a	0.00	0.02	0.02	0.05	0.03	0.02
A01_148	NHTSA Seat-05-3	99 Saab	Seat	n/a	0.00	0.01	0.04	0.02	0.02	0.02
A01_149	TWG 3.3.2.1	99 Saab	Seat	neck/head	0.14	0.22	0.44	1.07	1.58	0.27

A01_150	TWG 3.3.2.1	99 Saab	Seat	neck/head	0.21	0.13	0.38	0.9	1.35	0.17
A01_151	TWG 3.3.2.2	99 Prizm	Seat	chest	0.01	0.57	0.73	0.61	0.32	0.07
A01_152	TWG 3.3.2.1	99 Volvo	Seat	neck/head	0.02	0.08	0.48	0.3	0.30	0.07
A01_153	TWG 3.3.2.1	99 Volvo	Seat	neck/head	0.02	0.06	0.36	0.26	0.28	0.11
A01_175	NHTSA Seat-09-3	99 Windstar	Seat	neck/head	0.58	0.03	0.03	0.68	0.17	0.08
A01_176	NHTSA Seat-09-3	99 Windstar	Seat	neck/head	0.41	0.03	0.02	0.84	0.18	0.13
A01_178	NHTSA Seat-10-3	99 Volvo	Seat	neck/head	0.10	0.09	0.29	0.63	0.74	0.11
A01_179	TWG 3.3.2.1	00 Audi (Fr)	Seat	neck/head	0.45	0.17	0.30	0.77	0.98	0.13
A01_180	TWG 3.3.3.1	00 BMW (Fr)	Door	chest	0.04	0.68	0.98	0.73	0.65	0.00
A01_181	TWG 3.3.3.3	00 BMW (Fr)	Door	neck/head	1.33	0.13	0.15	1.7	0.14	1.40
A01_184	TWG 3.3.3.1	00 Mercedes (Fr)	Door	chest	0.02	0.71	0.98	0.8	0.47	0.25
A01_185	TWG 3.3.3.2	00 Mercedes (Fr)	Door	neck/head	0.11	0.04	0.08	0.36	0.57	0.44
A01_186	TWG 3.3.3.3	99 Cadillac (Fr)	Door	neck/head	0.37	0.05	0.15	1.08	0.19	1.04
A01_199	NHTSA DOO-04-3	00 BMW (Rr)	Door	neck/head	0.63	0.04	0.12	0.62	0.15	0.63
A01_200	NHTSA DOO-04-3	00 BMW (Rr)	Door	neck/head	0.38	0.02	0.12	0.59	0.07	0.69

Table B2. 3 YO Tests Injury Research Values
Normalized to Injury Thresholds

Test ID	Test Position	Vehicle	Bag Type	Test Type	MX (Upper Neck) Lateral Moment	MZ (Upper Neck) Twist Moment	-MY (Lower Neck) Extension	+MY (Lower Neck) Flexion	MX (Lower Neck) Lateral Moment	MZ (Lower Neck) Twist Moment	+FZ (Lower Neck) Tension	-FZ (Lower Neck) Compression	3 ms Clip
A01_01	TWG 3.3.2.2	00 Maxima	Seat	chest	0.58	0.29	0.39	0.19	0.35	0.44	0.21	0.27	0.83
A01_04	TWG 3.3.2.2	99 Windstar	Seat	chest	0.83	0.79	0.53	0.24	0.30	0.71	0.28	0.11	0.34
A01_07	TWG 3.3.2.2	99 Prizm	Seat	chest	0.33	0.31	0.17	0.28	0.34	0.58	0.43	0.05	0.82
A01_08	TWG 3.3.2.1	99 Prizm	Seat	neck/head	0.39	0.74	0.80	0.13	0.45	0.35	0.43	0.07	0.51
A01_09	TWG 3.3.2.2	00 Maxima	Seat	chest	0.71	0.45	0.22	0.43	0.56	0.61	1.44	0.00	0.97
A01_10	TWG 3.3.2.1	00 Maxima	Seat	neck/head	0.52	0.61	1.10	0.17	0.27	0.99	0.40	0.28	0.56
A01_11	NHTSA Seat-06-3	00 Maxima	Seat	neck/head	0.38	0.13	0.41	0.10	0.16	0.23	0.20	0.25	0.49
A01_12	NHTSA Seat-06-3	99 Saab	Seat	neck/head	0.14	0.13	0.44	0.07	0.14	0.15	0.10	0.09	0.23
A01_13	TWG 3.3.2.1	99 Saab	Seat	neck/head	0.31	0.98	0.50	0.06	0.29	0.86	1.10	0.05	0.67
A01_14	TWG 3.3.2.2	99 Saab	Seat	chest	0.35	0.61	0.12	0.22	0.30	0.83	0.62	0.01	0.55
A01_18	NHTSA Seat-06-3	99 Windstar	Seat	neck/head	0.24	0.12	0.12	0.07	0.10	0.18	0.41	0.09	0.11
A01_19	TWG 3.3.2.2	99 Prizm	Seat	chest	0.37	0.42	0.16	0.29	0.38	0.64	0.41	0.02	0.75
A01_20	TWG 3.3.2.2	00 Maxima	Seat	chest	0.32	0.75	0.14	0.41	0.43	0.96	1.61	0.00	0.57
A01_34	NHTSA Seat-03-3	99 Prizm	Seat	neck/head	0.22	0.58	0.57	0.11	0.09	1.70	0.42	0.19	0.35
A01_35	TWG 3.3.3.1	00 BMW (Fr)	Door	chest	0.32	0.32	0.22	0.22	0.13	0.52	0.71	0.01	0.28
A01_36	TWG 3.3.3.2	00 BMW (Fr)	Door	neck/head	0.41	0.32	0.61	0.21	0.33	0.35	1.58	0.18	0.49
A01_37	TWG 3.3.3.3	00 BMW (Fr)	Door	neck/head	0.22	0.50	0.12	0.69	0.19	0.32	0.18	1.02	0.27
A01_39	TWG 3.3.3.2	99 Cadillac (Fr)	Door	neck/head	0.14	0.11	0.24	0.08	0.17	0.10	0.52	0.02	0.17
A01_40	TWG 3.3.3.1	99 Cadillac (Fr)	Door	chest	0.16	0.31	0.07	0.12	0.16	0.32	0.15	0.02	0.26
A01_41	TWG 3.3.3.3	99 Cadillac (Fr)	Door	neck/head	0.32	0.76	0.09	0.47	0.36	0.39	0.11	0.81	0.24
A01_42	TWG 3.3.2.2	00 Cadillac (Rr)	Seat	chest	0.13	0.19	0.03	0.02	0.16	0.22	0.04	0.03	0.12
A01_43	NHTSA Seat-01-3	00 Cadillac (Rr)	Seat	chest	0.21	0.78	0.11	0.07	0.29	0.80	0.08	0.02	0.18
A01_44	NHTSA Seat-08-3	00 Cadillac (Rr)	Seat	neck/head	0.65	0.43	0.11	0.25	0.16	0.37	0.04	0.46	0.22
A01_45	TWG 3.3.2.1	00 Cadillac (Rr)	Seat	neck/head	0.34	0.47	0.33	0.09	0.47	0.33	0.17	0.11	0.25
A01_46	NHTSA Door-01-3	00 BMW (Fr)	Door	chest	0.79	0.69	0.29	0.39	0.66	0.70	0.93	0.28	0.74
A01_47	NHTSA Door-03-3	00 BMW (Fr)	Door	neck/head	0.34	1.66	1.11	0.21	0.26	0.47	0.66	0.13	0.73
A01_48	TWG 3.3.3.1	00 Mercedes (Fr)	Door	chest	0.34	0.34	0.14	0.23	0.49	0.55	0.54	0.23	0.44

A01_49	TWG 3.3.3.2	00 Mercedes (Fr)	Door	neck/head	0.51	0.43	0.45	0.14	0.36	0.50	0.84	0.46	0.30
A01_51	TWG 3.3.3.1	00 Mercedes (Rr)	Door	chest	0.35	0.14	0.05	0.17	0.41	0.41	0.31	0.10	0.32
A01_52	TWG 3.3.3.3	00 Mercedes (Rr)	Door	neck/head	0.29	0.10	0.15	0.53	0.15	0.23	0.04	2.24	0.67
A01_53	NHTSA Door-04-3	00 Mercedes (Fr)	Door	neck/head	1.68	0.81	0.26	0.31	1.51	1.06	0.58	0.68	0.45
A01_55	TWG 3.3.3.3	00 Mercedes (Fr)	Door	neck/head	0.21	0.19	0.04	0.42	0.21	0.14	0.54	0.89	0.29
A01_56	NHTSA Door-01-3	00 Mercedes (Fr)	Door	chest	0.32	0.40	0.81	0.38	0.40	0.77	0.87	0.33	0.61
A01_57	NHTSA Door-03-3	00 Mercedes (Fr)	Door	neck/head	0.18	0.35	0.58	0.19	0.24	0.39	0.41	0.31	0.33
A01_58	TWG 3.3.3.2	00 Mercedes (Rr)	Door	neck/head	0.28	0.64	0.38	0.17	0.22	0.57	1.18	0.07	0.32
A01_59	NHTSA Door-01-3	00 Mercedes (Rr)	Door	chest	0.64	0.51	0.19	0.25	0.13	0.49	0.43	0.08	0.35
A01_60	NHTSA Door-04-3	00 Mercedes (Rr)	Door	neck/head	1.17	0.61	0.37	0.11	1.01	1.45	0.35	0.49	0.22
A01_61	NHTSA Door-07-3	00 Mercedes (Rr)	Door	n/a	0.04	0.03	0.03	0.02	0.03	0.04	0.04	0.01	0.03
A01_62	NHTSA Door-08-3	00 Mercedes (Rr)	Door	neck/head	0.58	0.28	0.08	0.10	0.58	0.28	0.60	0.00	0.21
A01_63	NHTSA Door-04-3	00 BMW (Fr)	Door	neck/head	1.10	0.64	0.20	0.31	1.04	0.58	0.29	1.02	0.37
A01_64	NHTSA Door-06-3	00 BMW (Fr)	Door	neck/head	0.61	0.50	0.25	0.30	0.95	0.78	0.08	1.00	0.33
A01_65	TWG 3.3.3.1	00 BMW (Rr)	Door	chest	0.15	0.15	0.12	0.05	0.06	0.26	0.43	0.06	0.23
A01_66	TWG 3.3.3.2	00 BMW (Rr)	Door	neck/head	0.35	0.30	0.48	0.10	0.12	0.25	0.31	0.12	0.39
A01_68	TWG 3.3.3.3	00 BMW (Rr)	Door	neck/head	0.23	0.16	0.05	0.32	0.12	0.20	0.04	1.64	0.46
A01_69	NHTSA Door-04-3	00 BMW (Rr)	Door	neck/head	1.21	0.54	0.09	0.22	0.64	0.64	0.10	0.64	0.29
A01_70	NHTSA Door-07-3	00 BMW (Rr)	Door	neck/head	0.05	0.04	0.02	0.01	0.04	0.07	0.04	0.02	0.03
A01_71	NHTSA Door-08-3	00 BMW (Rr)	Door	neck/head	0.37	0.25	0.09	0.14	0.38	0.25	0.43	0.23	0.09
A01_72	TWG 3.3.2.2	99 Volvo	Seat	chest	0.29	0.20	0.05	0.11	0.37	0.40	0.17	0.03	0.27
A01_73	NHTSA Seat-10-3	99 Volvo	Seat	neck/head	0.43	1.25	0.98	0.13	0.46	0.77	0.69	0.51	0.67
A01_74	NHTSA Seat-03-3	99 Volvo	Seat	neck/head	0.20	0.18	0.28	0.14	0.17	0.12	0.21	0.07	0.20
A01_75	NHTSA Seat-04-3	99 Volvo	Seat	neck/head	0.30	0.46	0.02	0.09	0.43	0.49	0.29	0.09	0.11
A01_76	NHTSA Seat-07-3	99 Volvo	Seat	neck/head	0.15	0.17	0.04	0.18	0.12	0.12	0.70	0.00	0.15
A01_77	TWG 3.3.2.2	99 Cougar	Seat	chest	0.55	0.58	0.25	0.21	0.71	0.74	0.88	0.05	0.76
A01_78	TWG 3.3.2.1	99 Cougar	Seat	neck/head	1.09	0.50	1.19	0.33	0.47	1.01	1.04	1.06	0.54
A01_79	TWG 3.3.2.3	99 Cougar	Seat	neck/head	0.39	0.32	0.02	0.03	0.27	0.27	0.04	0.17	0.05
A01_80	NHTSA Seat-04-3	99 Cougar	Seat	neck/head	0.62	0.58	0.03	0.09	0.41	0.56	0.17	0.28	0.06
A01_81	NHTSA Seat-07-3	99 Cougar	Seat	neck/head	0.43	0.52	0.02	0.32	0.23	0.42	0.55	0.29	0.17
A01_82	NHTSA Seat-06-3	99 Cougar	Seat	neck/head	0.36	0.46	0.15	0.09	0.29	0.60	0.11	0.27	0.12
A01_83	TWG 3.3.2.2	00 Audi(Rr)	Seat	chest	0.37	0.36	0.18	0.17	0.37	0.52	0.66	0.03	0.68
A01_84	TWG 3.3.2.1	00 Audi(Rr)	Seat	neck/head	0.80	0.91	0.87	0.35	0.50	0.77	0.53	0.41	1.11
A01_85	TWG 3.3.2.3	00 Audi (Rr)	Seat	neck/head	0.27	0.35	0.08	0.09	0.20	0.31	0.07	0.38	0.10
A01_86	NHTSA Seat-06-3	00 Audi (Rr)	Seat	neck/head	0.35	0.43	0.10	0.09	0.10	0.37	0.05	0.11	0.23

A01_87	TWG 3.3.2.2	00 Audi(Fr)	Seat	chest	0.56	0.65	0.33	0.18	0.24	0.71	1.10	0.10	0.89
A01_108	TWG 3.3.2.1	99 Windstar	Seat	neck/head	0.39	0.47	0.27	0.13	0.19	0.48	0.27	0.22	0.29
A01_109	NHTSA Seat-05-3	99 Windstar	Seat	n/a	0.30	0.13	0.06	0.04	0.28	0.13	0.04	0.03	0.14
A01_110	NHTSA Seat-02-3	99 Cougar	Seat	neck/head	0.83	0.51	0.45	0.19	0.60	0.69	1.04	0.60	0.45
A01_111	NHTSA Seat-05-3	99 Cougar	Seat	neck/head	N/A	0.09	0.04	0.02	0.10	0.04	0.03	0.04	0.04
A01_112	TWG 3.3.2.1	00 Audi (Fr)	Seat	neck/head	0.28	0.62	0.88	0.10	0.41	0.66	1.20	0.41	0.65
A01_113	TWG 3.3.2.1	00 Audi (Fr)	Seat	neck/head	0.33	0.77	0.87	0.10	0.43	0.82	1.33	0.39	0.51
A01_114	TWG 3.3.2.3	00 Audi (Fr)	Seat	neck/head	0.52	0.39	0.07	0.03	0.35	0.35	1.00	0.02	0.16
A01_115	TWG 3.3.2.1	99 Jetta	Seat	neck/head	0.40	0.34	0.46	0.12	0.37	0.29	0.38	0.26	0.29
A01_116	TWG 3.3.2.2	99 Jetta	Seat	chest	0.34	0.33	0.16	0.11	0.15	0.35	0.49	0.05	0.27
A01_118	TWG 3.3.2.3	99 Jetta	Seat	neck/head	0.42	0.26	0.12	0.07	0.39	0.44	0.39	0.00	0.10
A01_119	TWG 3.3.2.1	99 Windstar	Seat	neck/head	0.58	0.80	0.28	0.19	0.32	0.93	0.39	0.25	0.54
A01_120	TWG 3.3.2.1	00 Cadillac (Rr)	Seat	neck/head	0.32	0.25	0.25	0.11	0.37	0.23	0.07	0.08	0.32
A01_122	NHTSA Seat-08-3	00 Cadillac (Rr)	Seat	neck/head	0.65	0.55	0.22	0.24	0.16	0.48	0.06	0.45	0.23
A01_123	NHTSA Seat-05-3	00 Cadillac (Rr)	Seat	n/a	0.03	0.04	0.01	0.00	0.04	0.03	0.01	0.01	0.01
A01_124	TWG 3.3.2.1	99 Cougar	Seat	neck/head	0.34	0.42	0.67	0.16	0.45	0.45	0.29	0.20	0.27
A01_125	NHTSA Seat-02-3	99 Cougar	Seat	neck/head	0.54	0.45	0.96	0.16	0.29	0.76	1.28	0.59	0.32
A01_126	TWG 3.3.2.1	99 Cougar	Seat	neck/head	0.39	0.47	0.84	0.20	0.34	0.43	0.21	0.28	0.34
A01_127	NHTSA Door-06-3	99 Cadillac (Rr)	Door	neck/head	0.66	0.29	0.08	0.09	0.61	0.27	0.47	0.15	0.25
A01_128	NHTSA Door-08-3	99 Cadillac (Rr)	Door	n/a	0.03	0.03	0.02	0.01	0.02	0.02	0.01	0.01	0.02
A01_129	TWG 3.3.3.3	99 Cadillac (Rr)	Door	neck/head	0.29	0.55	0.08	0.22	0.34	0.32	0.09	0.74	0.22
A01_130	TWG 3.3.3.2	99 Cadillac (Rr)	Door	neck/head	0.12	0.08	0.32	0.09	0.13	0.13	0.25	0.04	0.19
A01_131	TWG 3.3.3.3	99 Cadillac (Rr)	Door	neck/head	0.40	0.49	0.16	0.32	0.36	0.57	0.03	1.13	0.35
A01_132	NHTSA Door-06-3	00 Mercedes (Fr)	Door	neck/head	1.05	0.47	0.00	0.00	N/A	0.81	0.99	0.37	0.35
A01_133	TWG 3.3.3.1	00 Mercedes (Fr)	Door	chest	0.36	0.16	0.17	0.23	0.40	0.48	0.89	0.25	0.39
A01_134	TWG 3.3.3.2	00 Mercedes (Fr)	Door	neck/head	0.38	0.34	0.09	0.17	0.28	0.31	0.56	0.21	0.18
A01_135	TWG 3.3.3.3	00 Mercedes (Fr)	Door	neck/head	0.33	0.18	0.08	0.45	0.28	0.18	0.45	0.77	0.28
A01_136	TWG 3.3.3.1	00 Mercedes (Rr)	Door	chest	0.26	0.40	0.19	0.19	0.16	N/A	0.41	0.34	0.33
A01_137	TWG 3.3.3.3	00 BMW (Rr)	Door	neck/head	0.22	0.12	0.01	0.24	0.24	0.11	0.01	1.46	0.36
A01_138	NHTSA Door-04-3	00 BMW (Rr)	Door	neck/head	1.01	0.34	0.16	0.28	0.75	0.51	0.13	0.92	0.38
A01_139	TWG 3.3.3.1	00 BMW (Fr)	Door	chest	0.28	0.23	0.16	0.07	0.09	0.34	0.49	0.01	0.20
A01_140	TWG 3.3.3.3	00 BMW (Fr)	Door	neck/head	0.34	0.37	0.06	0.65	0.33	0.68	0.07	2.04	0.58
A01_141	NHTSA Door-04-3	00 BMW (Fr)	Door	neck/head	0.88	1.02	0.35	0.25	0.97	0.68	0.27	1.15	0.43
A01_144	NHTSA Seat-05-3	00 Audi (Rr)	Seat	n/a	0.11	0.08	0.03	0.01	0.11	0.07	0.02	0.02	0.06
A01_146	NHTSA Seat-02-3	99 Windstar	Seat	neck/head	0.18	0.29	0.04	0.21	0.12	0.27	0.11	0.15	0.16

A01_147	NHTSA Seat-05-3	00 Maxima	Seat	n/a	0.07	0.21	0.10	0.04	0.11	0.18	0.03	0.02	0.11
A01_148	NHTSA Seat-05-3	99 Saab	Seat	n/a	0.21	0.09	0.03	0.01	0.20	0.07	0.02	0.02	0.10
A01_149	TWG 3.3.2.1	99 Saab	Seat	neck/head	0.36	0.50	1.03	0.19	0.19	0.46	1.67	0.24	0.79
A01_150	TWG 3.3.2.1	99 Saab	Seat	neck/head	0.39	0.79	0.85	0.06	0.16	0.68	1.44	0.17	0.65
A01_151	TWG 3.3.2.2	99 Prizm	Seat	chest	0.27	0.42	0.16	0.26	0.30	0.67	0.31	0.06	0.66
A01_152	TWG 3.3.2.1	99 Volvo	Seat	neck/head	0.16	0.47	0.48	0.12	0.22	0.34	0.23	0.07	0.27
A01_153	TWG 3.3.2.1	99 Volvo	Seat	neck/head	0.18	0.35	0.46	0.11	0.23	0.47	0.21	0.13	0.29
A01_175	NHTSA Seat-09-3	99 Windstar	Seat	neck/head	0.48	0.88	0.12	0.33	0.41	0.44	0.11	0.14	0.21
A01_176	NHTSA Seat-09-3	99 Windstar	Seat	neck/head	0.56	1.14	0.12	0.38	0.47	0.57	0.14	0.18	0.21
A01_178	NHTSA Seat-10-3	99 Volvo	Seat	neck/head	0.34	1.16	0.82	0.11	0.46	0.65	0.67	0.11	0.59
A01_179	TWG 3.3.2.1	00 Audi (Fr)	Seat	neck/head	0.45	0.80	0.65	0.10	0.41	0.95	1.13	0.21	0.38
A01_180	TWG 3.3.3.1	00 BMW (Fr)	Door	chest	0.47	0.52	0.15	0.17	0.14	0.68	0.67	0.02	0.38
A01_181	TWG 3.3.3.3	00 BMW (Fr)	Door	neck/head	0.49	0.50	0.08	0.51	0.50	0.22	0.07	1.40	0.39
A01_184	TWG 3.3.3.1	00 Mercedes (Fr)	Door	chest	0.28	0.16	0.17	0.21	0.45	0.42	0.46	0.25	0.36
A01_185	TWG 3.3.3.2	00 Mercedes (Fr)	Door	neck/head	0.60	0.56	0.09	0.17	0.47	0.30	0.49	0.40	0.17
A01_186	TWG 3.3.3.3	99 Cadillac (Fr)	Door	neck/head	0.36	0.67	0.09	0.26	0.40	0.36	0.16	0.98	0.30
A01_199	NHTSA DOOR-04-3	00 BMW (Rr)	Door	neck/head	1.02	0.40	0.09	0.26	0.70	0.55	0.17	0.60	0.35
A01_200	NHTSA DOOR-04-3	00 BMW (Rr)	Door	neck/head	0.81	0.41	0.10	0.17	0.55	0.41	0.07	0.64	0.29

Table B3. 6 YO Tests Injury Criteria Values
Normalized to Injury Thresholds

Test ID	Test Position	Vehicle	Bag Type	Test Type	15ms HIC	Chest Deflection	Chest Deflection Rate	NIJ	+FZ (Upper Neck) Tension	-FZ (Upper Neck) Compression
B01_24	TWG 3.3.2.5	99 Windstar	Seat	neck/head	0.02	0.09	0.39	0.56	0.40	0.32
B01_25	NHTSA Seat-02-6	99 Windstar	Seat	neck/head	0.12	0.07	0.13	0.5	0.43	0.42
B01_26	TWG 3.3.2.5	99 Saab	Seat	neck/head	0.05	0.11	0.28	0.6	0.72	0.21
B01_27	NHTSA Seat-04-6	99 Saab	Seat	neck/head	0.45	0.08	0.09	0.5	0.80	0.31
B01_28	NHTSA Seat-05-6	99 Saab	Seat	neck/head	0.38	0.09	0.27	0.59	1.11	0.05
B01_29	TWG 3.3.2.5	00 Maxima	Seat	neck/head	0.06	0.15	0.41	0.76	0.37	0.47
B01_30	NHTSA Seat-04-6	00 Maxima	Seat	neck/head	1.22	0.09	0.41	0.85	1.50	0.63
B01_88	NHTSA Door-01-6	00 BMW (Fr)	Door	neck/head	0.08	0.12	0.48	0.72	0.51	0.17
B01_89	NHTSA Door-04-6	00 BMW (Fr)	Door	neck/head	0.04	0.01	0.11	0.46	0.86	0.00
B01_90	NHTSA Door-03-6	00 BMW (Fr)	Door	neck/head	0.61	0.04	0.12	N/A	N/A	N/A
B01_91	NHTSA Door-03-6	00 BMW (Fr)	Door	neck/head	0.43	0.01	0.06	0.65	0.12	0.74
B01_92	NHTSA Door-01-6	00 BMW (Rr)	Door	neck/head	0.05	0.08	0.46	0.77	0.42	0.23
B01_93	NHTSA Door-01-6	00 Mercedes (Rr)	Door	neck/head	0.02	0.05	0.32	0.68	0.33	0.24
B01_94	NHTSA Door-03-6	00 Mercedes (Fr)	Door	neck/head	0.12	0.05	0.13	0.35	0.56	0.13
B01_95	NHTSA Door-04-6	00 Mercedes (Fr)	Door	neck/head	0.20	0.02	0.08	0.33	0.50	0.18
B01_96	NHTSA Door-01-6	00 Mercedes (Fr)	Door	neck/head	0.08	0.11	0.54	0.91	0.59	0.26
B01_97	TWG 3.3.2.5	00 Audi (Rr)	Door	neck/head	0.02	0.08	0.46	0.99	0.23	0.30
B01_98	NHTSA Seat-01-6	00 Audi (Rr)	Door	neck/head	0.12	0.12	0.71	0.59	0.61	0.10
B01_99	TWG 3.3.2.5	00 Audi (Fr)	Seat	neck/head	0.02	0.10	0.48	0.49	0.32	0.26
B01_100	TWG 3.3.2.5	99 Jetta	Seat	neck/head	0.01	0.05	0.26	0.41	0.42	0.13
B01_101	NHTSA Seat-03-6	99 Jetta	Seat	neck/head	0.09	0.03	0.13	0.38	0.70	0.07
B01_102	NHTSA Door-02-6	99 Cadillac (Fr)	Seat	neck/head	0.03	0.01	0.05	0.25	0.36	0.02
B01_103	NHTSA Door-05-6	99 Cadillac (Fr)	Seat	neck/head	0.05	0.01	0.08	0.68	0.18	0.73
B01_104	TWG 3.3.2.5	99 Cougar	Seat	neck/head	0.01	0.09	0.36	0.65	0.21	0.44
B01_105	NHTSA Seat-04-6	00 Cadillac (Rr)	Seat	neck/head	0.03	0.03	0.07	0.58	0.03	0.31
B01_106	TWG 3.3.2.5	00 Cadillac (Rr)	Seat	neck/head	0.00	0.01	0.05	0.31	0.08	0.07
B01_107	TWG 3.3.2.5	99 Volvo	Seat	neck/head	0.00	0.03	0.16	0.44	0.08	0.10

B01_154	TWG 3.3.2.5	99 Prizm	Seat	neck/head	0.01	0.05	0.36	0.7	0.17	0.36
B01_155	TWG 3.3.2.5	99 Prizm	Seat	neck/head	0.01	0.05	0.35	0.75	0.17	0.42
B01_156	TWG 3.3.2.5	00 Maxima	Seat	neck/head	0.05	0.15	0.69	0.87	0.41	0.37
B01_157	NHTSA Seat-04-6	00 Maxima	Seat	neck/head	0.48	0.05	0.33	0.9	1.56	0.37
B01_158	TWG 3.3.2.5	00 Maxima	Seat	neck/head	0.05	0.14	0.62	0.58	0.66	0.41
B01_159	NHTSA Door-01-6	00 Mercedes	Door	neck/head	0.05	0.10	0.76	0.8	0.53	0.24
B01_160	TWG 3.3.2.5	00 Audi (Rr)	Seat	neck/head	0.02	0.09	0.54	0.77	0.17	0.24
B01_161	TWG 3.3.2.5	00 Audi (Rr)	Seat	neck/head	0.01	0.08	0.65	0.65	0.17	0.10
B01_162	NHTSA Seat-05-6	99 Saab	Seat	neck/head	0.22	0.04	0.14	0.68	1.21	0.07
B01_163	TWG 3.3.4.1	00 Mercedes (Fr)	head	neck/head	0.01	0.01	0.06	0.14	0.00	0.19
B01_164	NHTSA Head-01-6	00 Mercedes (Fr)	head	neck/head	0.01	0.01	0.07	0.55	0.01	0.29
B01_165	TWG 3.3.4.1	00 Audi (Fr)	head	neck/head	0.01	0.01	0.08	0.26	0.01	0.28
B01_166	NHTSA Head-01-6	00 Audi (Fr)	head	neck/head	0.01	0.01	0.04	0.77	0.01	0.36
B01_167	NHTSA Head-01-6	00 Audi (Fr)	head	neck/head	0.02	0.01	0.05	0.53	0.01	0.30
B01_168	TWG 3.3.4.1	00 BMW (Fr)	head	neck/head	0.00	0.01	0.07	0.19	0.00	0.28
B01_169	NHTSA Door-01-6	00 BMW (Fr)	Door	neck/head	0.06	0.10	0.53	0.58	0.62	0.12
B01_170	NHTSA Door-01-6	00 BMW (Rr)	Door	neck/head	0.03	0.11	0.54	0.89	0.24	0.09
B01_171	TWG 3.3.4.1	99 Volvo	head	neck/head	0.00	0.01	0.04	0.08	0.01	0.03
B01_172	NHTSA Head-01-6	99 Volvo	head	neck/head	0.00	0.01	0.07	0.4	0.06	0.31
B01_173	TWG 3.3.4.1	01 Saturn	head	neck/head	0.04	0.02	0.07	0.32	0.00	0.45
B01_174	NHTSA Head-01-6	01 Saturn	head	neck/head	0.17	0.03	0.07	0.66	0.18	0.63

**Table B4. 6 YO Tests Injury Research Values
Normalized to Injury Thresholds**

Test ID	Test Position	Vehicle	Bag Type	Test Type	MX (Upper Neck) Lateral Moment	MZ (Upper Neck) Twist Moment	-MY (Lower Neck) Extension	+MY (Lower Neck) Flexion	MX (Lower Neck) Lateral Moment	MZ (Lower Neck) Twist Moment	+FZ (Lower Neck) Tension	-FZ (Lower Neck) Compression	3 ms Clip
B01_24	TWG 3.3.2.5	99 Windstar	Seat	neck/head	0.92	0.34	1.14	0.46	0.34	0.90	0.32	0.20	0.33
B01_25	NHTSA Seat-02-6	99 Windstar	Seat	neck/head	0.36	0.46	0.04	0.36	0.15	0.44	0.49	0.43	0.08
B01_26	TWG 3.3.2.5	99 Saab	Seat	neck/head	0.39	0.39	1.72	0.12	0.22	0.91	0.70	0.17	0.46
B01_27	NHTSA Seat-04-6	99 Saab	Seat	neck/head	0.77	1.09	0.43	0.27	0.37	0.79	0.63	0.28	0.21
B01_28	NHTSA Seat-05-6	99 Saab	Seat	neck/head	0.71	0.53	0.77	0.17	0.39	0.87	0.61	0.04	0.28
B01_29	TWG 3.3.2.5	00 Maxima	Seat	neck/head	0.41	0.25	1.35	0.32	0.21	1.60	0.31	0.45	0.53
B01_30	NHTSA Seat-04-6	00 Maxima	Seat	neck/head	0.47	0.26	1.40	0.23	0.23	0.43	1.42	0.52	0.19
B01_88	NHTSA Door-01-6	00 BMW (Fr)	Door	neck/head	0.46	0.43	2.23	0.28	0.29	1.22	0.36	0.28	0.66
B01_89	NHTSA Door-04-6	00 BMW (Fr)	Door	neck/head	0.36	0.15	0.86	0.11	0.37	0.68	0.78	0.01	0.11
B01_90	NHTSA Door-03-6	00 BMW (Fr)	Door	neck/head	N/A	N/A	0.41	0.59	0.52	0.76	0.38	0.88	0.19
B01_91	NHTSA Door-03-6	00 BMW (Fr)	Door	neck/head	1.03	0.36	0.23	0.47	0.47	0.65	0.09	0.69	0.16
B01_92	NHTSA Door-01-6	00 BMW (Rr)	Door	neck/head	0.16	0.15	1.49	0.14	0.08	0.35	0.42	0.23	0.55
B01_93	NHTSA Door-01-6	00 Mercedes (Rr)	Door	neck/head	0.20	0.20	0.93	0.15	0.16	0.37	0.40	0.22	0.56
B01_94	NHTSA Door-04-6	00 Mercedes (Fr)	Door	neck/head	0.68	0.60	0.68	0.13	0.44	0.46	0.49	0.10	0.14
B01_95	NHTSA Door-03-6	00 Mercedes (Fr)	Door	neck/head	0.73	0.52	0.54	0.09	0.47	0.45	0.47	0.16	0.18
B01_96	NHTSA Door-01-6	00 Mercedes (Fr)	Door	neck/head	0.25	0.24	1.51	0.24	0.26	0.28	0.72	0.19	0.77
B01_97	TWG 3.3.2.5	00 Audi (Rr)	Door	neck/head	0.43	0.32	1.35	0.16	0.37	1.18	0.33	0.27	1.01
B01_98	NHTSA Seat-01-6	00 Audi (Rr)	Door	neck/head	0.44	0.43	1.96	0.18	0.31	1.86	0.69	0.12	0.77
B01_99	TWG 3.3.2.5	00 Audi (Fr)	Seat	neck/head	0.27	0.25	0.96	0.06	0.22	1.36	0.26	0.47	0.57
B01_100	TWG 3.3.2.5	99 Jetta	Seat	neck/head	0.12	0.39	1.29	0.07	0.17	0.39	0.35	0.12	0.48
B01_101	NHTSA Seat-03-6	99 Jetta	Seat	neck/head	0.33	0.28	0.72	0.16	0.17	0.40	0.76	0.08	0.13
B01_102	NHTSA Door-02-6	99 Cadillac (Fr)	Seat	neck/head	0.36	0.17	0.52	0.04	0.27	0.40	0.39	0.02	0.15
B01_103	NHTSA Door-05-6	99 Cadillac (Fr)	Seat	neck/head	0.29	0.25	0.24	0.29	0.13	0.35	0.08	0.04	0.19
B01_104	TWG 3.3.2.5	99 Cougar	Seat	neck/head	0.21	0.33	0.94	0.13	0.19	0.72	0.38	0.38	0.47
B01_105	NHTSA Seat-04-6	00 Cadillac (Rr)	Seat	neck/head	0.64	0.28	0.07	0.29	0.17	0.29	0.04	0.31	0.14
B01_106	TWG 3.3.2.5	00 Cadillac (Rr)	Seat	neck/head	0.26	0.20	0.40	0.05	0.37	0.42	0.08	0.11	0.25
B01_107	TWG 3.3.2.5	99 Volvo	Seat	neck/head	0.18	0.14	0.49	0.07	0.20	0.41	0.12	0.10	0.19

B01_154	TWG 3.3.2.5	99 Prizm	Seat	neck/head	0.38	0.29	0.90	0.10	0.36	0.97	0.17	0.32	0.46
B01_155	TWG 3.3.2.5	99 Prizm	Seat	neck/head	0.46	0.27	0.98	0.14	0.41	0.96	0.18	0.38	0.55
B01_156	TWG 3.3.2.5	00 Maxima	Seat	neck/head	0.54	0.56	1.61	0.16	0.35	1.30	0.42	0.32	0.55
B01_157	NHTSA Seat-04-6	00 Maxima	Seat	neck/head	1.03	0.23	1.84	0.30	0.33	0.73	1.46	0.33	0.29
B01_158	TWG 3.3.2.5	00 Maxima	Seat	neck/head	0.56	0.34	1.88	0.29	0.30	1.08	0.63	0.41	0.62
B01_159	NHTSA Door-01-6	00 Mercedes	Door	neck/head	0.26	0.33	1.24	0.29	0.20	0.50	0.67	0.20	0.77
B01_160	TWG 3.3.2.5	00 Audi (Rr)	Seat	neck/head	0.53	0.33	1.23	0.13	0.44	1.33	0.33	0.22	0.91
B01_161	TWG 3.3.2.5	00 Audi (Rr)	Seat	neck/head	0.51	0.38	1.00	0.07	0.44	1.08	0.33	0.13	0.83
B01_162	NHTSA Seat-05-6	99 Saab	Seat	neck/head	0.28	0.50	1.70	0.10	0.27	1.28	1.27	0.05	0.47
B01_169	NHTSA Door-01-6	00 BMW (Fr)	Door	neck/head	0.33	0.15	1.96	0.22	0.23	1.32	0.60	0.42	0.74
B01_170	NHTSA Door-01-6	00 BMW (Rr)	Door	neck/head	0.21	0.19	1.62	0.17	0.18	0.78	0.32	0.15	0.58

Table B.5 12 Month CRABI Tests Injury Criteria Values

Normalized to Injury Thresholds

Test ID	Test Position	Vehicle	Bag Type	15ms HIC	NIJ	+FZ (Upper Neck) Tension	-FZ (Upper Neck) Compression	Chest 3 ms Clip
C01_22	NHTSA Seat-01-12	99 Saab	SEAT	0.01	0.014	0.09	0.04	0.19
C01_23	NHTSA Seat-01-12	99 Windstar	SEAT	0.00	0.08	0.02	0.01	0.10
D01_31	NHTSA Seat-02-12	00 BMW (Rr)	DOOR	0.00	0.07	0.04	0.02	0.05
D01_32	NHTSA Seat-02-12	00 Mercedes (Rr)	DOOR	0.01	0.02	0.02	0.02	0.01
D01_33	NHTSA Seat-02-12	00 Audi (Rr)	DOOR	0.00	0.02	0.04	0.02	0.03
D01_187	NHTSA Seat-01-12	99 Caddy (Fr)	DOOR	0.00	0.07	0.03	0.03	0.07
D01_188	NHTSA Seat-01-12	00 Maxima	SEAT	0.04	0.18	0.09	0.05	0.23
D01_189	NHTSA Seat-02-12	00 Maxima	SEAT	0.00	0.04	0.02	0.01	0.02
D01_190	NHTSA Seat-02-12	99 Cougar	SEAT	0.00	0.04	0.01	0.01	0.02
D01_191	NHTSA Seat-01-12	99 Cougar	SEAT	0.00	0.06	0.03	0.03	0.08
D01_192	NHTSA Seat-01-12	00 Audi (Fr)	SEAT	0.00	0.03	0.02	0.02	0.09
D01_193	NHTSA Seat-02-12	00 Audi (Fr)	SEAT	0.00	0.02	0.02	0.02	0.03
D01_194	NHTSA Seat-02-12	99 Prizm	SEAT	0.00	0.03	0.02	0.01	0.03
D01_195	NHTSA Seat-01-12	99 Prizm	SEAT	0.00	0.05	0.03	0.04	0.17

APPENDIX C
Details of 3 YO tests

Test Number: A01_01

Vehicle: 00 NISSAN MAXIMA

Test Date: 01/27/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements: NONE WERE TAKEN

Notes: -The dummy's nose is aligned with the top of the airbag module instead of the upper rib. The top of the airbag module is too high to meet.

Post Test Notes: -The chest pot malfunctioned during this test.
-The dummy was blown rearward as the airbag deployed.

Injury Numbers:

- HIC15: 56@ 5.9 TO 20.9 (15MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .97 @ 9.4 MS NFT
 - Tension (+FZ): 1442.03 (N)
 - Compression (-FZ): -2.76 (N)
-



Test Number: A01_04

Vehicle: 99 FORD WINDSTAR

Test Date: 02/09/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 30@ 3.2 TO 12.8 (9.6MS)
 - Chest Deflection: 10.4 @16.7 (mm)
 - Deflection Rate: 2.3 @8.8 (m/s)
 - NIJ 10: .45 @ 8.8 MS NFT
 - Tension (+FZ): 307.94 (N)
 - Compression (-FZ): -89.62 (N)
-



Test Number: A01_07

Vehicle: 99 GEO PRIZM

Test Date: 02/15/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 11@ 5.9 TO 20.9 (15MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .67 @ 14.9 MS NET
 - Tension (+FZ): 444.62 (N)
 - Compression (-FZ): -55.78 (N)
-



Test Number: A01_08

Vehicle: 99 GEO PRIZM

Test Date: 02/15/00

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR:	10 INCHES
BACK OF HEAD TO SEATBACK:	1 1/4 INCHES
HEAD CG TO TOP OF A/B MODULE:	2 1/4 INCHES
CHIN TO PS FR. A/B CENTERLINE:	34 5/8 INCHES

Injury Numbers:

- HIC15: 31 @ 4.7 TO 19.9 (15.2MS)
- Chest Deflection: 3.6 @ 9.4 (mm)
- Deflection Rate: 2.5 @ 4.9 (m/s)
- NIJ 10: .51 @ 11.7 MS NFT
 - Tension (+FZ): 599.75 (N)
 - Compression (-FZ): -139.77 (N)



Test Number: A01_09

Vehicle: 00 NISSAN MAXIMA

Test Date: 03/09/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR:	8 ¾ INCHES
TOP OF HEAD TO MARK ON DASH (~ CENTER OF FR A/B):	40 7/8 INCHES
HEAD CG TO TOP OF A/B MODULE:	2 INCHES ABOVE
NOSE TO TOP OF A/B MODULE:	0 INCHES

Notes: -The dummy's nose is aligned with the top of the airbag module instead of the upper rib. The top of the airbag module is too high to meet.

Post Test Notes: -The chest pot did not function properly.

Injury Numbers:

- HIC15: 62@ 3.0 TO 18.0 (15MS)
- Chest Deflection: N/A (mm)
- Deflection Rate: N/A (m/s)
- NIJ 10: 1.6 @ 14.7 MS NET
 - Tension (+FZ): 1783.36 (N)
 - Compression (-FZ): -1.67 (N)



Test Number: A01_10

Vehicle: 00 NISSAN MAXIMA

Test Date: 3/14/00

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR:

11 ³/₄ INCHES

CHIN TO MARK ON DASH (~ CENTER OF FR A/B):

35 ³/₄ INCHES

HEAD CG TO TOP OF A/B MODULE:

1 ¹/₂ INCHES ABOVE

HEAD TO THE SEAT:

1 ⁵/₈ INCHES

Notes: -Head/Neck Junction was not at the top of the airbag module. It couldn't be obtained; the module sits too high in the seat.

Injury Numbers:

- HIC15: 192@ 4.0 TO 7.4 (3.4 MS)
 - Chest Deflection: 6.5 @ 8.9 ms (mm)
 - Deflection Rate: 4.5 @ 4.9 ms (m/s)
 - NIJ 10: .64 @ 10.0 MS NFT
 - Tension (+FZ): 682.04 (N)
 - Compression (-FZ): -79.43 (N)
-



Test Number: A01_11

Vehicle: 00 NISSAN MAXIMA

Test Date: 3/14/00

Test Description: NHTSA SEAT-06-3:BPB LSW

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements: NONE WERE
TAKEN

Injury Numbers:

- HIC15: 79 @ 8.1 TO 11.2 (3.1 MS)
 - Chest Deflection: 2.5 @ 13.1 ms (mm)
 - Deflection Rate: 1.1 @ 9.3 ms (m/s)
 - NIJ 10: .97 @ 9.4 MS NFC
 - Tension (+FZ): 192.93 (N)
 - Compression (-FZ): -295.29 (N)
-



Test Number: A01_12

Vehicle: 99 SAAB 95

Test Date: 03/16/00

Test Description: NHTSA SEAT-06-3:BPB LSW

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 116@ 8.5 TO 11.5 (3MS)
 - Chest Deflection: 2.9 @14.4 (mm)
 - Deflection Rate: 1.4 @10.3 (m/s)
 - NIJ 10: .22 @ 33.2 MS NET
 - Tension (+FZ): 113.82 (N)
 - Compression (-FZ): -172.74 (N)
-



Test Number: A01_13

Vehicle: 99 SAAB 95

Test Date: 03/21/00

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR:

11 INCHES

BACK OF HEAD TO SEATBACK:

0 INCHES

HEAD CG TO TOP OF A/B MODULE:

3 INCHES ABOVE

CHIN TO PS FR. A/B CENTERLINE:

28 1/8 INCHES

Injury Numbers:

- HIC15: 185@ 5.5 TO 17.3 (11.8MS)
 - Chest Deflection: 2.0 @9.7 (mm)
 - Deflection Rate: 1.6 @8.4 (m/s)
 - NIJ 10: .64 @ 13.7 MS NFT
 - Tension (+FZ): 1113.5 (N)
 - Compression (-FZ): -75.90 (N)
-



Test Number: A01_14

Vehicle: 99 SAAB 95

Test Date: 3/21/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR: 7 1/2 INCHES

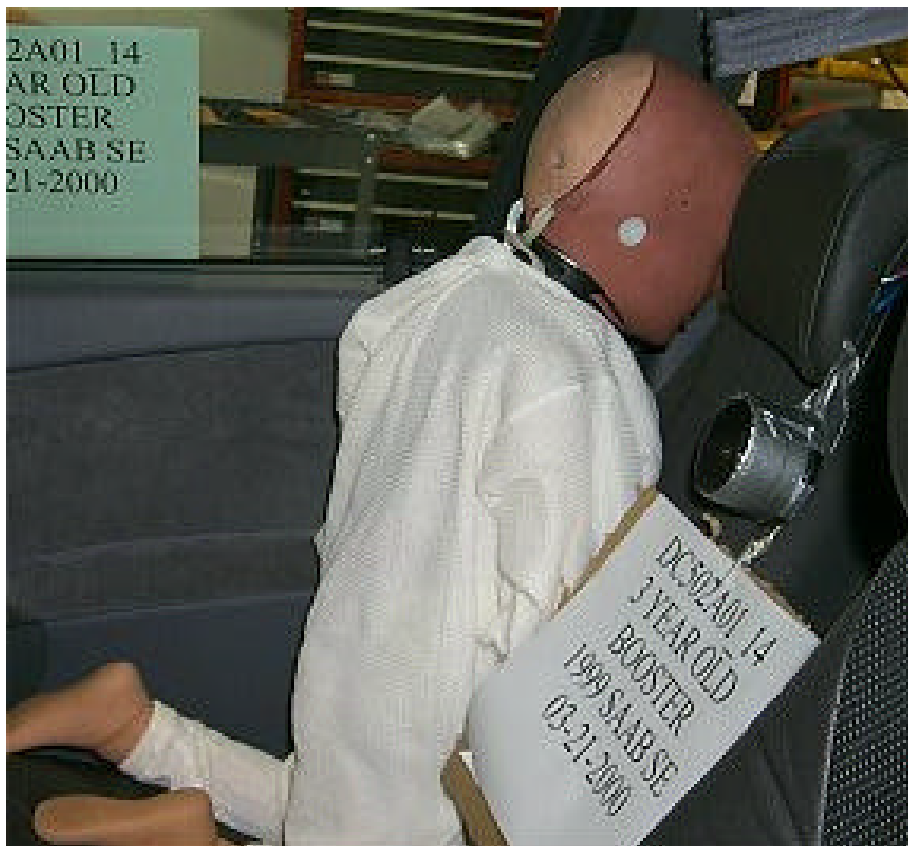
BACK OF HEAD TO SEATBACK: 0 INCHES

NOSE CG TO TOP OF A/B MODULE: 5 INCHES ABOVE

BACK OF HEAD TO PS FR. A/B CENTERLINE: 31 1/4 INCHES

Injury Numbers:

- HIC15: 16@ 9.6 TO 23.2 (13.6MS)
 - Chest Deflection: 10.4 @15.8 (mm)
 - Deflection Rate: 3.5 @12.1 (m/s)
 - NIJ 10: .62 @ 15.3 MS NET
 - Tension (+FZ): 691.63 (N)
 - Compression (-FZ): -20.40 (N)
-



Test Number: A01_18

Vehicle: 99 FORD WINDSTAR

Test Date: 03/27/00

Test Description: NHTSA SEAT-06-3:BPB LSW

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 1@ 18.4 TO 24.8 (6.4MS)
 - Chest Deflection: 1.7 @22.0 (mm)
 - Deflection Rate: .82 @20.9 (m/s)
 - NIJ 10: .29 @ 20.8 MS NFT
 - Tension (+FZ): 505.92 (N)
 - Compression (-FZ): -96.31 (N)
-



Test Number: A01_19

Vehicle: 99 GEO PRIZM

Test Date: 03/28/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR:

7 ¼ INCHES

NOSE TO TOP OF A/B MODULE:

3 ¼ INCHES

BACK OF HEAD TO PS FR. A/B CENTERLINE:

36 ½ INCHES

Injury Numbers:

- HIC15: 10@ 4.6 TO 19.6 (15MS)
 - Chest Deflection: 21.7 @8.7 (mm)
 - Deflection Rate: 6.6 @4.4 (m/s)
 - NIJ 10: .76 @ 12.5 MS NET
 - Tension (+FZ): 462.61 (N)
 - Compression (-FZ): -32.97 (N)
-



Test Number: A01_20

Vehicle: 00 NISSAN MAXIMA

Test Date: 03/28/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR:

8 $\frac{3}{4}$ INCHES

HEAD CG TO TOP OF A/B MODULE:

2 INCHES ABOVE

NOSE TO TOP OF A/B MODULE:

0 INCHES

BACK OF HEAD TO PS FR. A/B CENTERLINE:

40 $\frac{1}{4}$ INCHES

Injury Numbers:

- HIC15: 45@ 6.5 TO 21.1 (15MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: 1.23@ 14.2 MS NET
 - Tension (+FZ): 1598.18 (N)
 - Compression (-FZ): -1.46 (N)
-



Test Number: A01_34

Vehicle: 99 GEO PRIZM

Test Date: 06/15/00

Test Description: NHTSA SEAT-03-3:LSW NO BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TOP OF HEAD TO TOP OF B-PILLAR:	12 INCHES
BACK OF HEAD TO SEATBACK:	2 ¼ INCHES
HEAD CG TO TOP OF A/B MODULE:	¾ INCHES
CHIN TO PS FR. A/B CENTERLINE:	31 INCHES

Injury Numbers:

- HIC15: 58@ 4.6 TO 15.0 (10.3MS)
 - Chest Deflection: 1.7 @8.8 (mm)
 - Deflection Rate: 2.3 @4.4 (m/s)
 - NIJ 10: .36 @ 12.2.4 MS NFT
 - Tension (+FZ): 489.23 (N)
 - Compression (-FZ): -253.07 (N)
-



Test Number: A01_35

Vehicle: 00 BMW 528I FRONT

Test Date: 08/22/00

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER RIB (CENTERLINE OF DUMMY) TO UPPER
EDGE OF SIDE AIRBAG:

4 1/8 INCHES

HEAD CG TO LOWER RH CORNER OF FRONT AIRBAG:

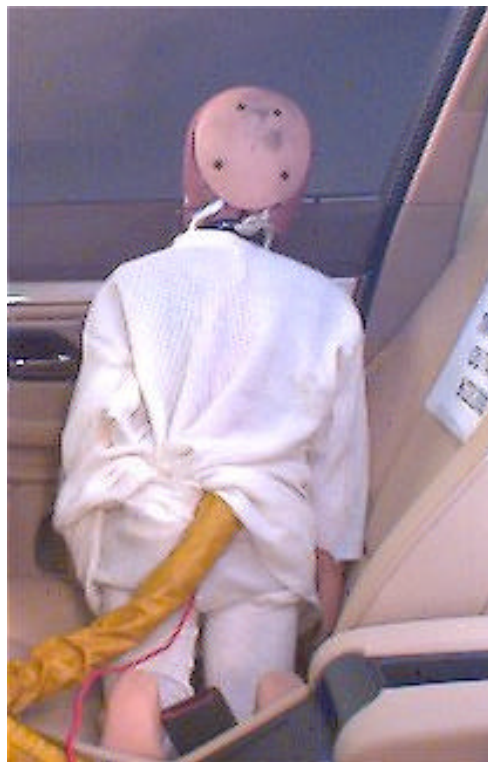
17 15/16 INCHES

HEAD CG TO HEAD REST PILLAR CENTER:

11 15/16 INCHES

Injury Numbers:

- HIC15: 18@ 6.7 TO 20.9 (14.2MS)
 - Chest Deflection: 23.6 (mm)
 - Deflection Rate: 7.0 @6.4 (m/s)
 - NIJ 10: .99 @ 10.7 MS NET
 - Tension (+FZ): 893.74 (N)
 - Compression (-FZ): -8.96 (N)
-



Test Number: A01_36

Vehicle: 00 BMW 528I FRONT

Test Date: 08/22/00

Test Description: TWG 3.3.3.2:BACK ON DOOR-UP NECK AT UP A/B MOD

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER NECK TO UPPER EDGE OF SIDE AIRBAG:

3 3/16 INCHES

HEAD CG TO LOWER RH CORNER OF FRONT AIRBAG:

18 5/16 INCHES

Injury Numbers:

- HIC15: 84@ 4.9 TO 13.3 (8.4MS)
 - Chest Deflection: 5.1 @10.6 (mm)
 - Deflection Rate: 2.0 @6.8 (m/s)
 - NIJ 10: 1.01 @ 9.9 MS NFT
 - Tension (+FZ): 1617.89 (N)
 - Compression (-FZ): -276.13 (N)
-



Test Number: A01_37

Vehicle: 00 BMW 528I FRONT

Test Date: 08/23/00

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER NECK TO ARMREST:

2 ½ INCHES

HEAD CG TO LOWER RH CORNER OF FRONT AIRBAG:

19 2/16 INCHES

Injury Numbers:

- HIC15: 880@ 2.7 TO 10.1 (7.4MS)
 - Chest Deflection: 3.5 @57.2 (mm)
 - Deflection Rate: 0.9 @14.6 (m/s)
 - NIJ 10: 1.77 @ 12.4 MS NEC
 - Tension (+FZ): 352.39 (N)
 - Compression (-FZ): -1457.63 (N)
-



Test Number: A01_39

Vehicle: 99 CADILLAC DEVILLE

Test Date: 08/28/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER NECK TO CENTER OF SIDE AIRBAG:

3 $\frac{3}{4}$ INCHES

HEAD CG TO UPPER RH CORNER OF GLOVE BOX:

20 $\frac{1}{2}$ INCHES

Injury Numbers:

- HIC15: 3@ 7.8 TO 14.2 (6.4MS)
 - Chest Deflection: 0.7 @15.6 (mm)
 - Deflection Rate: 0.6 @10.9 (m/s)
 - NIJ 10: .30 @ 10.4 MS NFT
 - Tension (+FZ): 534.70 (N)
 - Compression (-FZ): -24.83 (N)
-



Test Number: A01_40

Vehicle: 99 CADILLAC DEVILLE

Test Date: 08/28/00

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

CHEST TO CENTER OF SIDE AIRBAF:

2 5/16 INCHES

HEAD CG TO UPPER RH CORNER OF GLOVE BOX:

22 5/8 INCHES

Injury Numbers:

- HIC15: .6@ 10.1 TO 38.5 (37.9MS)
 - Chest Deflection: 17.8 @13.2 (mm)
 - Deflection Rate: 4.5 @9.5 (m/s)
 - NIJ 10: .24 @ 17.2 MS NET
 - Tension (+FZ): 130.412 (N)
 - Compression (-FZ): -28.19 (N)
-



Test Number: A01_41

Vehicle: 99 CADILLAC DEVILLE

Test Date: 08/29/00

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

NECK TO ARMREST:

1 $\frac{3}{4}$ INCHES

HEAD CG TO UPPER RH CORNER OF GLOVE BOX:

20 $\frac{3}{8}$ INCHES

Injury Numbers:

- HIC15: 254 @ 3.9 TO 15.5 (11.6MS)
 - Chest Deflection: 1.7 @ 19.8 (mm)
 - Deflection Rate: 1.5 @ 16.7 (m/s)
 - NIJ 10: .92 @ 9.8 MS NEC
 - Tension (+FZ): 212.76 (N)
 - Compression (-FZ): -1142.08 (N)
-



Test Number: A01_42

Vehicle: 00 CADILLAC DEVILLE

Test Date: 08/29/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO WINDOW LEDGE (WHERE GLASS AND
LINER MEET):

7 1/8 INCHES

Injury Numbers:

- HIC15: .3@ 17.8 TO 31.8 (14MS)
 - Chest Deflection: 1.1 @22.1 (mm)
 - Deflection Rate: 1.2 @34.9 (m/s)
 - NIJ 10: .03 @ 26.0 MS NEC
 - Tension (+FZ): 38.37 (N)
 - Compression (-FZ): -37.72 (N)
-



Test Number: A01_43

Vehicle: 00 CADILLAC DEVILLE

Test Date: 08/29/00

Test Description: NHTSA SEAT-01-3: PEEKABOO W/ SIDE TOUCHING ARMREST

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO WINDOW LEDGE (WHERE GLASS AND LINER MEET): 2 ¾ INCHES

****Variation:** Body is touching armrest, arm pulled backward.

Injury Numbers:

- HIC15: 2@ 509.7 TO 524.8 (15.1MS)
 - Chest Deflection: 5.3 @18.2 (mm)
 - Deflection Rate: 1.8 @16.9 (m/s)
 - NIJ 10: .10 @ 18.3 MS NFT
 - Tension (+FZ): 95.23 (N)
 - Compression (-FZ): -32.46 (N)
-



Test Number: A01_44

Vehicle: 00 CADILLAC DEVILLE

Test Date: 08/30/00

Test Description: NHTSA SEAT-08-3:MCW ON BOOSTER, HEAD CG AT TOP AB
A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO WINDOW LEDGE (WHERE GLASS AND LINER MEET): 1 7/8 INCHES

Injury Numbers:

- HIC15: 22@ 9.3 TO 16.1 (6.8MS)
 - Chest Deflection: .9 @30.3 (mm)
 - Deflection Rate: .5 @20.8 (m/s)
 - NIJ 10: .92 @ 16.0 MS NEC
 - Tension (+FZ): 36.91 (N)
 - Compression (-FZ): -655.22 (N)
-



Test Number: A01_45

Vehicle: 00 CADILLAC DEVILLE

Test Date: 08/31/00

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO WINDOW LEDGE (WHERE GLASS AND LINER MEET): 4 INCHES

Note: Difference from procedure:

- Head/neck junction is below upper airbag module by 25 mm
- Can't scoot hips over to the armrest, because the shoulder hits the C-pillar.

Injury Numbers:

- HIC15: 5@ 16.5 TO 31.6 (15.1MS)
 - Chest Deflection: 10.0 @16.8 (mm)
 - Deflection Rate: .8 @16.2 (m/s)
 - NIJ 10: .19 @ 25.5 MS NFT
 - Tension (+FZ): 242.61 (N)
 - Compression (-FZ): -133.54 (N)
-



Test Number: A01_46

Vehicle: 00 BMW 528I FRONT

Test Date: 09/06/00

Test Description: NHTSA DOOR-01-3: KNEELING AT DOOR W/ KNEES TOUCHING
A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH LOWER CORNER OF FRONT AIRBAG: 20 7/16 INCHES

HEAD CG TO HEAD REST PILLAR CENTER: 18 ¼ INCHES

Note: Difference from procedure:

- Knees are touching the door or armrest, bringing chest closer to airbag.
- Nose is resting on top of window ledge.

Injury Numbers:

- HIC15: 28@ 6.4 to 21.4 (15MS)
 - Chest Deflection: 39.1 @11.2 (mm)
 - Deflection Rate: N9.9 @6.0 (m/s)
 - NIJ 10: 1.19 @ 15.7 MS NET
 - Tension (+FZ): 979.28 (N)
 - Compression (-FZ): -429.60 (N)
-



Test Number: A01_47

Vehicle: 00 BMW 528i FRONT

Test Date: 09/06/00

Test Description: NHTSA DOOR-03-3: BACK ON DOOR-LWR NECK TO UP A/B

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO RH LOWER CORNER OF FRONT AIRBAG: 17 11/16 INCHES

LOWER NECK TO UPPER EDGE OF SIDE AIRBAG: 3 INCHES

****Note:** Difference from procedure:

-Lower neck at top of airbag module

Injury Numbers:

- HIC15: 75@ 6.3 TO 16.7 (10.4MS)
 - Chest Deflection: 5.2 @10.8 (mm)
 - Deflection Rate: 1.7 @4.9 (m/s)
 - NIJ 10: .77 @ 9.5 MS NFT
 - Tension (+FZ): 772.35 (N)
 - Compression (-FZ): -181.0 (N)
-



Test Number: A01_48

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 09/21/00

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH UPPER CORNER OF GLOVE BOX:

22 INCHES

HEAD CG TO HEAD PILLAR CENTER:

16 13/16 INCHES

UPPER RIB TO UPPER EDGE OF SIDE AIRBAG:

3 7/8 INCHES

Injury Numbers:

- HIC15: 29@ 420.8 TO 429.1 (8.7MS)
 - Chest Deflection: 11.4 @9.76 (mm)
 - Deflection Rate: 3.4 @5.3 (m/s)
 - NIJ 10: 1.0 @ 14.5 MS NET
 - Tension (+FZ): 505.43 (N)
 - Compression (-FZ): -312.49 (N)
-



Test Number: A01_49

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 09/25/00

Test Description: TWG 3.3.3.2: BACK ON DOOR-UP NECK AT UP A/B MOD

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH UPPER CORNER OF GLOVE BOX:

20 ³/₄ INCHES

UPPER NECK TO UPPER EDGE OF SIDE AIRBAG:

2 11/16 INCHES

Injury Numbers:

- HIC15: 66@ 4.3 TO 18.4 (14.14MS)
 - Chest Deflection: 3.1 @9.8 (mm)
 - Deflection Rate: 2.1 @5.7 (m/s)
 - NIJ 10: .64 @ 5.9 MS NFT
 - Tension (+FZ): 1039.05 (N)
 - Compression (-FZ): -688.86 (N)
-



Test Number: A01_51

Vehicle: 00 MERCEDES S430 REAR

Test Date: 09/26/00

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER RIB TO UPPER EDGE OF SIDE AIRBAG:

2 1/8 INCHES

Injury Numbers:

- HIC15: 7@ 481.5 TO 491.1 (9.6MS)
 - Chest Deflection: 20.1 @11.0 (mm)
 - Deflection Rate: 6.5 @8.1 (m/s)
 - NIJ 10: .58 @ 19.4 MS NET
 - Tension (+FZ): 318.80 (N)
 - Compression (-FZ): -127.64 (N)
-



Test Number: A01_52

Vehicle: 00 MERCEDES S430 REAR

Test Date: 09/26/00

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

MIDDLE NECK TO ARMREST:

3 INCHES

HEAD CG TO SEATBACK:

5 ¼ INCHES

Injury Numbers:

- HIC15: 509@ 3.1 TO 5.6 (2.5MS)
 - Chest Deflection: 1.1 @19.4 (mm)
 - Deflection Rate: 2.0 @14.1 (m/s)
 - NIJ 10: 2.01 @ 6.6 MS NEC
 - Tension (+FZ): 47.96 (N)
 - Compression (-FZ): -3386.25 (N)
-



Test Number: A01_53

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 09/26/00

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO UPPER RIGHT HAND CORNER OF G. BOX: 20 7/16 INCHES

HEAD CG TO CENTER PILLAR: 17 INCHES

MIDDLE NECK TO ARMREST: 2 ¾ INCHES

Injury Numbers:

- HIC15: 1171@ 2.9 TO 7.9 (5MS)
 - Chest Deflection: 1.6 @3.3 (mm)
 - Deflection Rate: .8 @68.3 (m/s)
 - NIJ 10: .55 @ 4.1 MS NEC
 - Tension (+FZ): 792.08 (N)
 - Compression (-FZ): -895.51 (N)
-



Test Number: A01_55

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 09/26/00

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH UPPER CORNER OF GLOVE BOX:

21 3/16 INCHES

UPPER NECK TO UPPER EDGE OF SIDE AIRBAG:

1 15/16 INCHES

Injury Numbers:

- HIC15: 1106@ 2.6 TO 6.1 (3.5MS)
 - Chest Deflection: 1.9 @16.4 (mm)
 - Deflection Rate: 2.5 @10.6 (m/s)
 - NIJ 10: .97 @ 5.9 MS NEC
 - Tension (+FZ): 608.16 (N)
 - Compression (-FZ): -1182.15 (N)
-



Test Number: A01_56

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 09/26/00

Test Description: NHTSA DOOR-01-3:KNEELING AT DOOR W/ KNEES TOUCHING
A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO UPPER RIGHT HAND OCRNER OF GLOVE BOX: 24 1/8 INCHES

HEAD CG TO DOOR PILLAR (EDGE): 6 INCHES

Injury Numbers:

- HIC15: 31@ 11.9 TO 25.7 (13.8MS)
 - Chest Deflection: 31.0 @11.5 (mm)
 - Deflection Rate: 8.5 @6.0 (m/s)
 - NIJ 10: 1.25@ 15.8 MS NET
 - Tension (+FZ): 783.97 (N)
 - Compression (-FZ): -240.44 (N)
-



Test Number: A01_57

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 09/29/00

Test Description: NHTSA DOOR-03-3: BACK ON DOOR-LWR NECK TO UP A/B

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO UPPER RIGHT HAND CORNER OF G. BOX: 20 7/16 INCHES

HEAD CG TO HEAD PILLAR CENTER: 16 11/16 INCHES

LOWER NECK TO UPPER AIRBAG MODULE: 3 ½ INCHES

Injury Numbers:

- HIC15: 35@ 5.6 TO 20.6 (15MS)
 - Chest Deflection: 3.8 @8.5 (mm)
 - Deflection Rate: 2.1 @5.3 (m/s)
 - NIJ 10: .42 @ 20.7 MS NET
 - Tension (+FZ): 420.91 (N)
 - Compression (-FZ): -438.43 (N)
-



Test Number: A01_58

Vehicle: 00 MERCEDES S430 REAR

Test Date: 10/02/00

Test Description: TWG 3.3.3.2:BACK ON DOOR-UP NECK AT UP A/B MOD

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO BACK SEATBACK:

9 1/16 INCHES

UPPER NECK TO UPPER AIRBAG MODULE:

3 INCHES

****NOTE:** Hips touching armrest

Injury Numbers:

- HIC15: 35 @ 5.4 TO 9.3 (3.9MS)
 - Chest Deflection: 2.7 @9.5 (mm)
 - Deflection Rate: 2.9 @6.0 (m/s)
 - NIJ 10: .85 @ 7.3 MS NFT
 - Tension (+FZ): 1353.44 (N)
 - Compression (-FZ): -329.63 (N)
-



Test Number: A01_59

Vehicle: 00 MERCEDES S430 REAR

Test Date: 10/02/00

Test Description: NHTSA DOOR-01-3: KNEELING AT DOOR W/ KNEES TOUCHING
A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

RH HEAD CG TO EDGE OF WINDOW:

1 INCHES

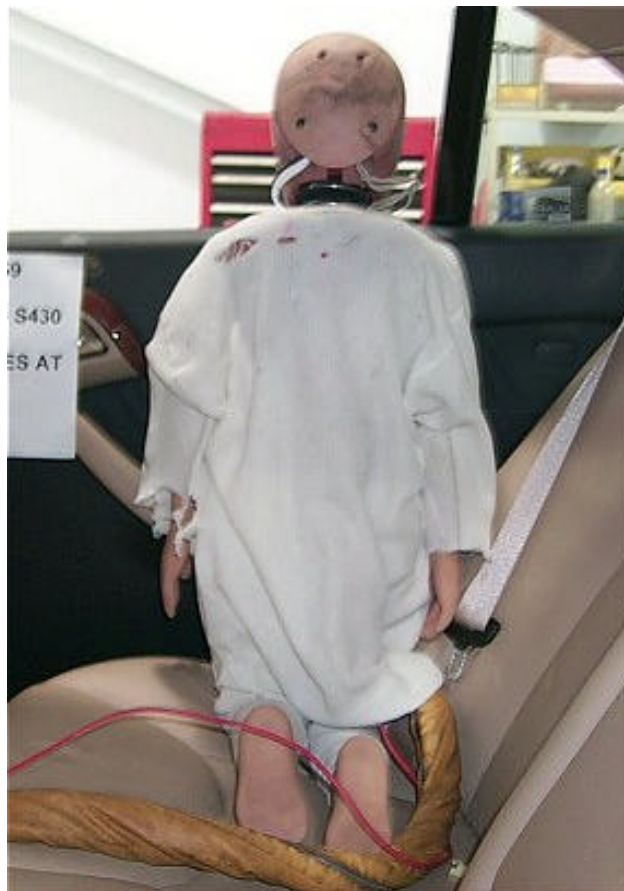
LH HEAD CG TO EDGE OF WINDOW:

20 13/16 INCHES

****NOTE:** Hips touching armrest

Injury Numbers:

- HIC15: 11 @ 483.8 TO 498.8 (15.0 MS)
 - Chest Deflection: 23.3 @ 10.7 (mm)
 - Deflection Rate: 12.0 @ 5.9 (m/s)
 - NIJ 10: .69 @ 17.3 MS NET
 - Tension (+FZ): 368.43 (N)
 - Compression (-FZ): -222.41 (N)
-



Test Number: A01_60

Vehicle: 00 MERCEDES S430 REAR

Test Date: 10/04/00

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO REAR SEAT BACK:

7 INCHES

TIP OF NOSE TO CENTER OF AIRBAG:

4 INCHES

Injury Numbers:

- HIC15: 345@ 3.6 TO 20.2 (10.6MS)
- Chest Deflection: 1.43 @35.2 (mm)
- Deflection Rate: .6 @18.4 (m/s)
- NIJ 10: .45 @ 38.2 MS NET
 - Tension (+FZ): 444.89 (N)
 - Compression (-FZ): -677.72 (N)



Test Number: A01_61

Vehicle: 00 MERCEDES S430 REAR

Test Date: 10/04/00

Test Description: NHTSA DOOR-07-3:BPB

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

CLOSEST SIDE OF SEAT TO DOOR (HORIZ):

6 11/16 INCHES

TIP OF NOSE TO DOOR (HORIZ):

11 ½ INCHES

Injury Numbers:

- HIC15: 2@ 5.5 TO 16.4 (10.9MS)
 - Chest Deflection: 1.9 @12.7 (mm)
 - Deflection Rate: .9 @11.9 (m/s)
 - NIJ 10: .04 @ 15.4 MS NET
 - Tension (+FZ): 39.41 (N)
 - Compression (-FZ): -16.73 (N)
-



Test Number: A01_62

Vehicle: 00 MERCEDES S430 REAR

Test Date: 10/04/00

Test Description: NHTSA DOOR-08-3:BPB LSW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

LOWER NECK TO DOOR (HORIZ):

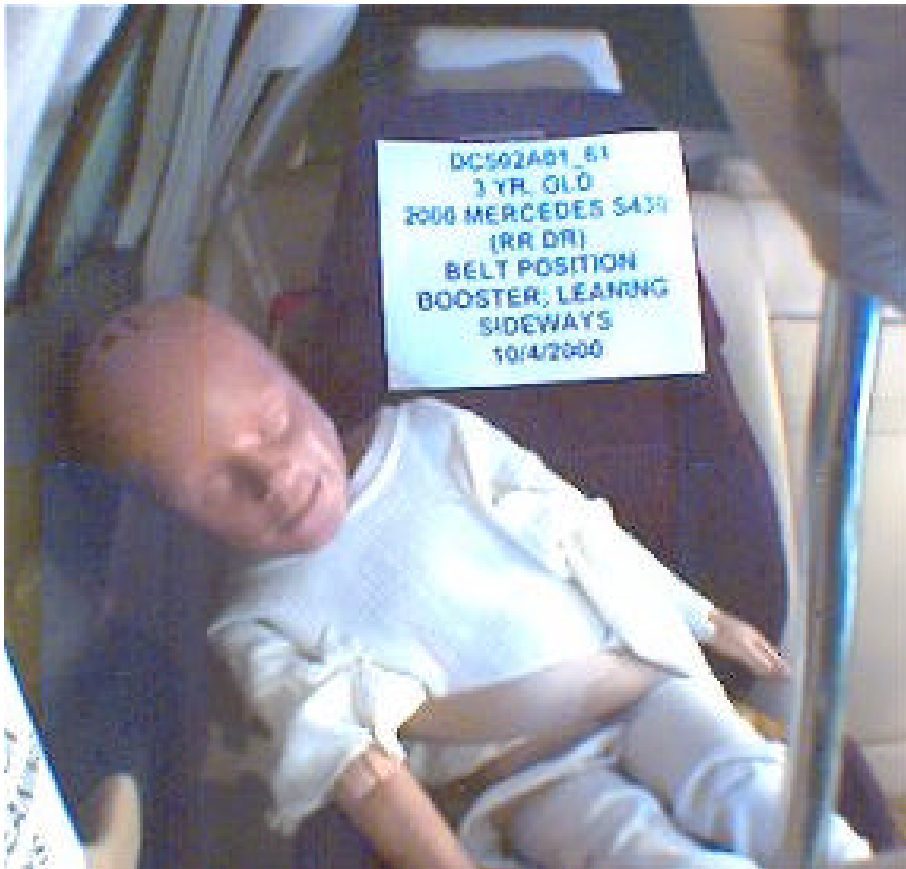
5 ¼ INCHES

TIO OF NOSE TO DOOR (HORIZ):

3 INCHES

Injury Numbers:

- HIC15: 705@ 5.6 TO 6.4 (0.9MS)
 - Chest Deflection: 1.2 @34.0 (mm)
 - Deflection Rate: .75 @12.0 (m/s)
 - NIJ 10: .28 @ 7.1 MS NET
 - Tension (+FZ): 542.70 (N)
 - Compression (-FZ): -1.61 (N)
-



Test Number: A01_63

Vehicle: 00 BMW 528I FRONT

Test Date: 10/11/00

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

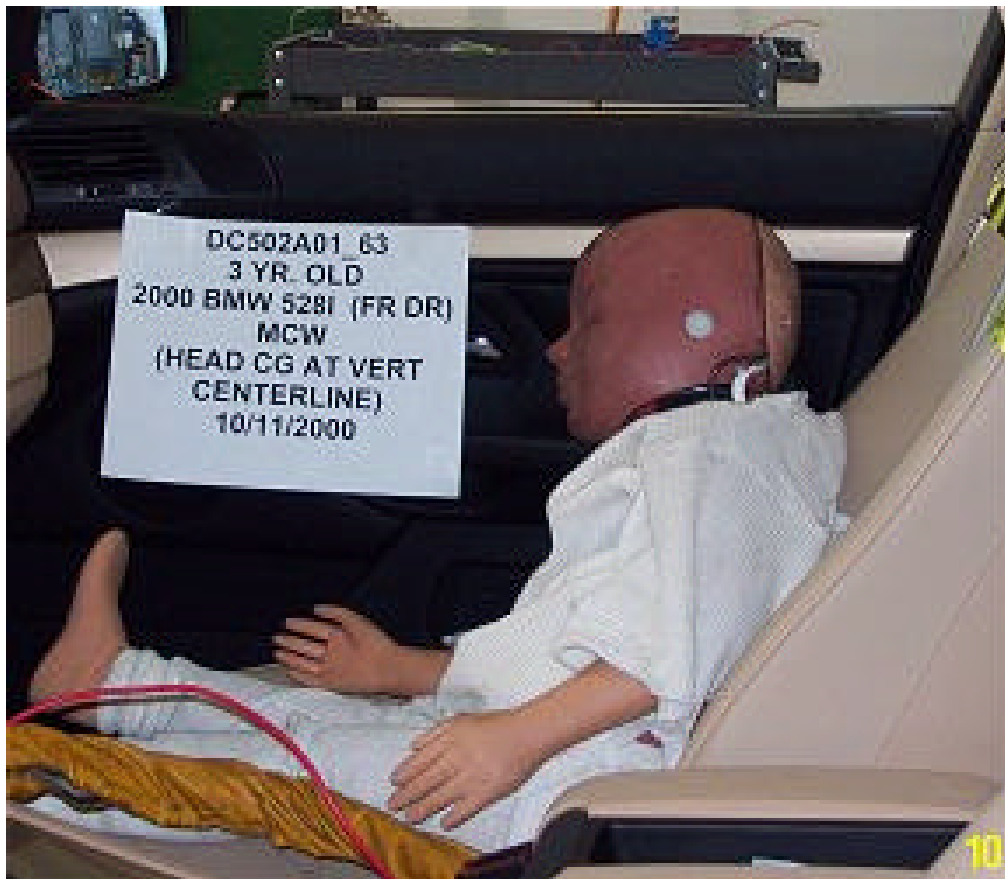
Measurements:

HEAD CG TO SIDE AIRBAG (HORIZ): 2 ¼ INCHES

TIP OF NOSE TO RH LOWER CORNER OF FRONT AIRBAG: 17 5/16 INCHES

Injury Numbers:

- HIC15: 739@ 3.8 TO 12.4 (8.7MS)
- Chest Deflection: 2.6 @23.9 (mm)
- Deflection Rate: 1.3 @17.6 (m/s)
- NIJ 10: 1.08 @ 12.14 MS NEC
 - Tension (+FZ): 297.58 (N)
 - Compression (-FZ): -1567.15 (N)



Test Number: A01_64

Vehicle: 00 BMW 528I FRONT

Test Date: 10/11/00

Test Description: NHTSA DOOR-06-3:MCW W/ HEAD CG @ HORIZ C/L OF AB
A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO SIDE AIRBAG (HORIZ): 2 1/16 INCHES
TIP OF NOSE TO RH LOWER CORNER OF FRONT AIRBAG: 22 11/16 INCHES

Injury Numbers:

- HIC15: 237@ 4.8 TO 15.0 (10.1MS)
 - Chest Deflection: 1.8 @42.6 (mm)
 - Deflection Rate: 1.5 @21.7 (m/s)
 - NIJ 10: .82 @ 11.7 MS NFC
 - Tension (+FZ): 95.91 (N)
 - Compression (-FZ): -1463.59 (N)
-



Test Number: A01_65

Vehicle: 00 BMW 528I REAR

Test Date: 10/11/00

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER RIB TO SIDE AIRBAG (HORIZ):

4 9/16 INCHES

HEAD CG TO REAR SEATBACK:

9 13/16 INCHES

Injury Numbers:

- HIC15: 4@ 8.3 TO 11.8 3.55MS)
 - Chest Deflection: 19.8 @11.8 (mm)
 - Deflection Rate: 11.7 @6.8 (m/s)
 - NIJ 10: .33 @ 10.5 MS NFT
 - Tension (+FZ): 597.79 (N)
 - Compression (-FZ): -74.13 (N)
-



Test Number: A01_66

Vehicle: 00 BMW 528I REAR

Test Date: 10/11/00

Test Description: TWG 3.3.3.2: BACK ON DOOR-UP NECK AT UP A/B MOD

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER NECK TO TOP OF AIRBAG (HORIZ):

2 11/16 INCHES

HEAD CG TO REAR SEATBACK:

5 INCHES

Injury Numbers:

- HIC15: n/a
 - Chest Deflection: 3.3 @11.0 (mm)
 - Deflection Rate: 1.8 @7.5 (m/s)
 - NIJ 10: .41 @ 20.1 MS NET
 - Tension (+FZ): 343.68 (N)
 - Compression (-FZ): -112.43 (N)
-



Test Number: A01_68

Vehicle: 00 BMW 528I REAR

Test Date: 10/12/00

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

LOWER NECK TO ARMREST (HORIZ):

3 9/16 INCHES

HEAD CG TO REAR SEATBACK:

3 5/8 INCHES

Injury Numbers:

- HIC15: 257@ 3.2 TO 5.1 (1.9MS)
 - Chest Deflection: 1.1 @23.3 (mm)
 - Deflection Rate: 1.8 @16.3 (m/s)
 - NIJ 10: 1.71 @ 8.2 MS NEC
 - Tension (+FZ): 38.41 (N)
 - Compression (-FZ): -2367.29 (N)
-



Test Number: A01_69

Vehicle: 00 BMW 528I REAR

Test Date: 10/12/00

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO AIRBAG (HORIZ):

5 7/8 INCHES

HEAD CG TO VERTICAL C/L OF AIRBAG:

2 1/16 INCHES

Injury Numbers:

- HIC15: n/a
 - Chest Deflection: 1.6 @23.3 (mm)
 - Deflection Rate: .7 @15.9 (m/s)
 - NIJ 10: .65 @ 7.1 MS NEC
 - Tension (+FZ): 144.00 (N)
 - Compression (-FZ): -918.55 (N)
-



Test Number: A01_70

Vehicle: 00 BMW 528I REAR

Test Date: 10/12/00

Test Description: NHTSA DOOR-07-3:BPB

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO TOP EDGE OF DOOR (HORIZ):

14 7/8 INCHES

CLOSEST EDGE OF BOOSTER SEAT TO DOOR:

5 13/16 INCHES

Injury Numbers:

- HIC15: 0@ 9.5 TO 17.5 (8MS)
 - Chest Deflection: 0.4 @16.6 (mm)
 - Deflection Rate: 0.3 @12.7 (m/s)
 - NIJ 10: .05 @ 14.7 MS NET
 - Tension (+FZ): 35.13 (N)
 - Compression (-FZ): -17.66 (N)
-



Test Number: A01_71

Vehicle: 00 BMW 528I REAR

Test Date: 10/12/00

Test Description: NHTSA DOOR-08-3:BPB LSW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO DOOR (HORIZ):

2 13/16 INCHES

TIP OF NOSE TO DOOR (HORIZ):

6 1/16 INCHES

Injury Numbers:

- HIC15: n/a
 - Chest Deflection: .7 @21.9 (mm)
 - Deflection Rate: 1.7 @10.7 (m/s)
 - NIJ 10: .35 @ 7.8 MS NET
 - Tension (+FZ): 361.93 (N)
 - Compression (-FZ): -280.76 (N)
-



Test Number: A01_72

Vehicle: 99 VOLVO S80

Test Date: 10/19/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO B-PILLAR (HORIZ): 15/16 INCHES

BACK OF HEAD (EDGE OF SKIN AT NECK) TO RH

UPPER CORNER OF GLOVE BOX: 34 INCHES

UPPER RIB TO TOP OF A/B MODULE: 4 ¾ INCHES

Injury Numbers:

- HIC15: 2@ 12.0 TO 27.0 (15MS)
 - Chest Deflection: 5.3 @9.7 (mm)
 - Deflection Rate: 1.9 @4.1 (m/s)
 - NIJ 10: .30 @ 16.1 MS NET
 - Tension (+FZ): 175.41 (N)
 - Compression (-FZ): -52.21 (N)
-



Test Number: A01_73

Vehicle: 99 VOLVO S80

Test Date: 10/23/00

Test Description: NHTSA SEAT-10-3:LSW ON BST, W/ MORE INCLINED S/B

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO B-PILLAR (HORIZ): 1 3/8 INCHES

TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX: 30 7/16 INCHES

UPPER NECK (HEAD/NECK JUNCTION) TO TOP OF A/B MOD.: 3 3/4 INCHES

*****Note: Differences from procedure:

- Pelvis couldn't be slid all the way over to door, because shoulder hits B-Pillar first.
- Arm couldn't be put on armrest because it couldn't reach.
- Head/Neck junction never reaches the top of the airbag module
- The seats' rearmost position pushes it way back, so that it interferes more with the B-Pillar instead of the side of the door

Injury Numbers:

- HIC15: 80@ 2.9 TO 15.0 (12.1MS)
 - Chest Deflection: 5.1 @10.5 (mm)
 - Deflection Rate: 2.0 @ 25.6 (m/s)
 - NIJ 10: .76 @ 11.1 MS NFT
 - Tension (+FZ): 922.75 (N)
 - Compression (-FZ): -700.81 (N)
-



Test Number: A01_74

Vehicle: 99 VOLVO S80

Test Date: 10/24/00

Test Description: NHTSA SEAT-03-3:LSW NO BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO B-PILLAR (HORIZ): 1 ½ INCHES

TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX: 27 INCHES

UPPER NECK (HEAD/NECK JUNCTION TO TOP OF A/B MODULE: 6 ¼ INCHES

****NOTE: DIFFERENCES FROM PROCEDURE:**

- Head couldn't touch the seatback all the way, bolster was making it stick a little out.
- Arm couldn't be put on armrest because it couldn't reach.
- Head/Neck Junction never reaches the top of the airbag module.
- The seats' rearmost position pushes it way back, so that it interferes more with the B-Pillar instead of the side of the door

Injury Numbers:

- HIC15: 30@ 3.4 TO 14.2 (10.8MS)
 - Chest Deflection: 2.2 @9.6 (mm)
 - Deflection Rate: .8 @4.2 (m/s)
 - NIJ 10: .17 @ 8.7 MS NFT
 - Tension (+FZ): 256.03 (N)
 - Compression (-FZ): -24.22 (N)
-



Test Number: A01_75

Vehicle: 99 VOLVO S80

Test Date: 10/24/00

Test Description: NHTSA SEAT-04-3: HEAD ON ARMREST AT AN ANGLE

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO DOOR (HORIZ): 2 11/16 INCHES

HEAD CG TO RH UPPER CORNER OF GLOVE BOX: 20 7/16 INCHES

UPPER NECK (HEAD/NECK JUNCTION) TO TOP OF A/B MOD.: 12 ¼ INCHES

****NOTE: DIFFERENCES FROM PROCEDURE:**

- Move seat from rearmost position to center position
- Shoulder touching bolster, space between armrest and door

Injury Numbers:

- HIC15: 46@ 2.1 TO 10.2 (8.1MS)
- Chest Deflection: 0.6 @12.3 (mm)
- Deflection Rate: 0.3 @11.4 (m/s)
- NIJ 10: .18 @ 4.0 MS NET
 - Tension (+FZ): 302.62 (N)
 - Compression (-FZ): -131.33 (N)



Test Number: A01_76

Vehicle: 99 VOLVO S80

Test Date: 10/24/00

Test Description: NHTSA SEAT-07-3:MCW HEAD CG AT C/L OF A/B MOD

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO DOOR (HORIZ): 5 3/8 INCHES

TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX: 25 1/2 INCHES

CENTERLINE OF HEAD AT LOWER SKIN (WHERE SEAT CONTACTS

HEAD) TO TOP OF A/B MODULE (A LONG SEAT SEAM): 9 1/4 INCHES

Injury Numbers:

- HIC15: 150@ 2.7 TO 5.0 (2.3MS)
- Chest Deflection: 0.9 @9.6 (mm)
- Deflection Rate: 0.7 @5.8 (m/s)
- NIJ 10: .56 @ 18.2 MS NET
 - Tension (+FZ): 676.01 (N)
 - Compression (-FZ): -1.86 (N)



Test Number: A01_77

Vehicle: 99 MERCURY COUGER

Test Date: 10/25/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO WINDOW (HORIZ):

4 $\frac{3}{4}$ INCHES

HEAD CG TO RH UPPER CORNER OF GLOVE BOX:

34 $\frac{1}{4}$ INCHES

UPPER RIB TO TOP OF A/B MODULE:

0 INCHES

Injury Numbers:

- HIC15: 19@ 6.7 TO 17.1 (10.4MS)
 - Chest Deflection: 42.4 @8.9 (mm)
 - Deflection Rate: 15.4 @5.4 (m/s)
 - NIJ 10: .62 @ 15.1 MS NET
 - Tension (+FZ): 1034.47 (N)
 - Compression (-FZ): -1.67 (N)
-



Test Number: A01_78

Vehicle: 99 MERCURY COUGER

Test Date: 01026/00

Test Description: NHTSA SEAT-02-3:LSW W BOOSTER PEL FWD

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO WINDOW (HORIZ):

3 ¼ INCHES

TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX:

29 1/8 INCHES

UPPER NECK TO TOP OF A/B MODULE:

3/16 INCHES

Injury Numbers:

- HIC15: 283@ 6.4 TO 16.5 (10.1MS)
 - Chest Deflection: 7.6 @9.2 (mm)
 - Deflection Rate: 5.8 @5.8 (m/s)
 - NIJ 10: .99 @ 9.5 MS NFT
 - Tension (+FZ): 1190.55 (N)
 - Compression (-FZ): -1507.72 (N)
-



Test Number: A01_79

Vehicle: 99 MERCURY COUGER

Test Date: 10/26/00

Test Description: TWG 3.3.2.3 HEAD ON ARMREST

A/B LOC.: SEAT

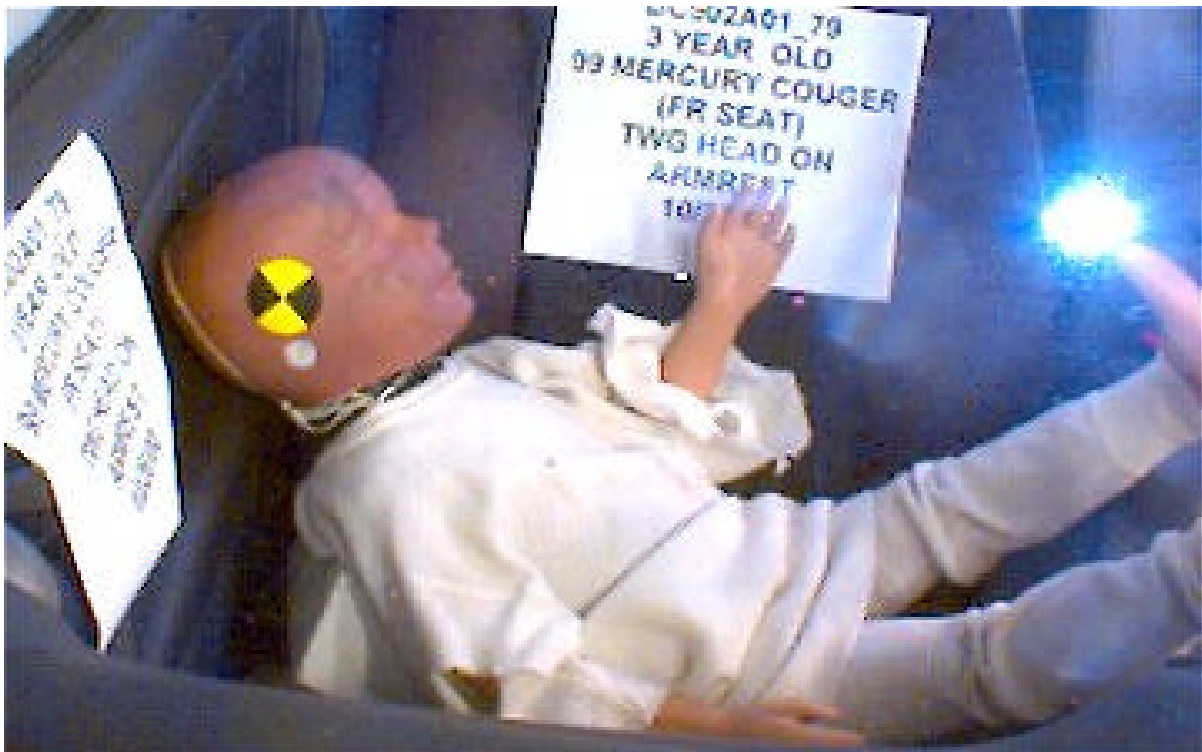
Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX: 72 ½ INCHES

Injury Numbers:

- HIC15: 116@ 6.3 TO 7.4 (1.1MS)
 - Chest Deflection: 0.7 @35.2 (mm)
 - Deflection Rate: 0.2 @31.8 (m/s)
 - NIJ 10: .13 @ 9.6 MS NFC
 - Tension (+FZ): 49.83 (N)
 - Compression (-FZ): -241.45 (N)
-



Test Number: A01_80

Vehicle: 99 MERCURY COUGER

Test Date: 10/26/00

Test Description: NHTSA SEAT-04-3: HEAD ON ARMREST AT AN ANGLE

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO SEATBACK:

1 1/8 INCHES

TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX:

24 7/16 INCHES

HEAD CG TO DOOR:

3 1/8 INCHES

Injury Numbers:

- HIC15: 273 @ 5.9 TO 6.9 (1MS)
 - Chest Deflection: 0.8 @ 15.5 (mm)
 - Deflection Rate: 0.5 @ 13.6 (m/s)
 - NIJ 10: .26 @ 8.3 MS NEC
 - Tension (+FZ): 184.94 (N)
 - Compression (-FZ): -372.87 (N)
-



Test Number: A01_81

Vehicle: 99 MERCURY COUGER

Test Date: 10/30/00

Test Description: NHTSA SEAT-07-3:MCW HEAD CG AT C/L OF A/B MOD

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

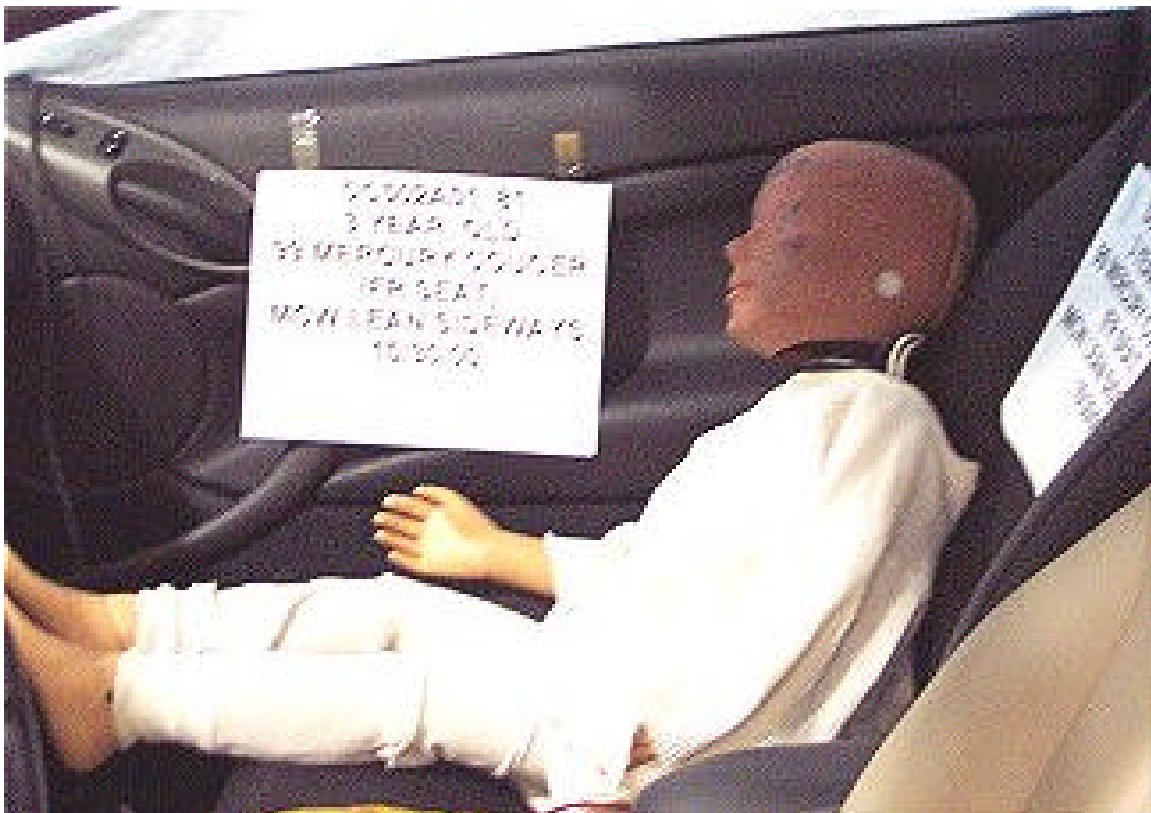
TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX: 23 3/8 INCHES

TIP OF NOSE TO DOOR: 4 3/8 INCHES

TOP OF AIRBAG MODULE TO WHERE SEAT TOUCHES BACK
OF HEAD (ALONG THE SEAM): 3 1/2 INCHES

Injury Numbers:

- HIC15: 812@ 4.8 TO 5.8 (1MS)
 - Chest Deflection: 0.9 @16.5 (mm)
 - Deflection Rate: 0.5 @9.1 (m/s)
 - NIJ 10: .61 @ 5.4 MS NET
 - Tension (+FZ): 578.75 (N)
 - Compression (-FZ): -429.53 (N)
-



Test Number: A01_82

Vehicle: 99 MERCURY COUGER

Test Date: 10/30/00

Test Description: NHTSA SEAT-06-3:BPB LSW

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

LOWER NECK TO DOOR:

4 1/8 INCHES

TIP OF NOSE TO DOOR:

4 1/8 INCHES

Injury Numbers:

- HIC15: 25@ 6.2 TO 11.4 (5.2MS)
 - Chest Deflection: 0.9 @7.9 (mm)
 - Deflection Rate: 0.6 @6.9 (m/s)
 - NIJ 10: .37 @ 10.6 MS NEC
 - Tension (+FZ): 107.01 (N)
 - Compression (-FZ): -426.01 (N)
-



Test Number: A01_83

Vehicle: 00 AUDI A6 REAR

Test Date: 10/31/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

UPPER RIB TO UPPER AIRBAG:

1 ½ INCHES

UPPER NECK TO WINDOW:

9 INCHES

Injury Numbers:

- HIC15: 8@ 5.3 TO 18.9 (13.6MS)
 - Chest Deflection: 24.4 @8.4 (mm)
 - Deflection Rate: 8.9 @7.0 (m/s)
 - NIJ 10: .48 @ 14.0 MS NFT
 - Tension (+FZ): 694.54 (N)
 - Compression (-FZ): -27.16 (N)
-



Test Number: A01_84

Vehicle: 00 AUDI A6 REAR

Test Date: 10/31/00

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO DOOR:

1 15/16 INCHES

TIP OF NOSE TO EDGE OF ROOF:

9 3/4 INCHES

Injury Numbers:

- HIC15: 100@ 4.2 TO 6.8 (2.6MS)
 - Chest Deflection: 6.0 @8.2 (mm)
 - Deflection Rate: 4.4 @3.9 (m/s)
 - NIJ 10: .52 @ 7.2 MS NFT
 - Tension (+FZ): 524.31 (N)
 - Compression (-FZ): -646.76 (N)
-



Test Number: A01_85

Vehicle: 00 AUDI A6 REAR

Test Date: 10/31/00

Test Description: TWG 3.3.2.3 HEAD ON ARMREST

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO DOOR:

4 ¼ INCHES

TIO OF NOSE TO SEATBACK:

7 INCHES

Injury Numbers:

- HIC15: 35@ 4.3 TO 6.6 (2.3MS)
 - Chest Deflection: 0.5 @208.9 (mm)
 - Deflection Rate: .46 @23.6 (m/s)
 - NIJ 10: .27 @ 7.6 MS NFC
 - Tension (+FZ): 70.30 (N)
 - Compression (-FZ): -537.17 (N)
-



Test Number: A01_86

Vehicle: 00 AUDI A6 REAR

Test Date: 11/01/00

Test Description: NHTSA SEAT-06-3:BPB LSW

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO DOOR:

4 15/16 INCHES

UPPER NECK TO SEATBACK:

6 7/16 INCHES

Injury Numbers:

- HIC15: 9@ 5.939 TO 10.7 (5.4MS)
 - Chest Deflection: 1.4 @11.0 (mm)
 - Deflection Rate: 0.5 @8.2 (m/s)
 - NIJ 10: .16 @ 23.2 MS NET
 - Tension (+FZ): 40.19 (N)
 - Compression (-FZ): -185.27 (N)
-



Test Number: A01_87

Vehicle: 00 AUDI A6 FRONT

Test Date: 11/30/00

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

CENTER OF NECK TO DOOR PILLAR:

7 INCHES

HEAD CG TO B-PILLAR:

5/8 INCHES

CENTER OF NECK TO RH UP CORNER OF GLOVEBOX:

31 ½ INCHES

Injury Numbers:

- HIC15: 26@ 4.2 TO 8.4 (4.3MS)
 - Chest Deflection: 39.2 @6.5 (mm)
 - Deflection Rate: 17.7 @2.5 (m/s)
 - NIJ 10: .59 @ 5.8 MS NFT
 - Tension (+FZ): 1109.05 (N)
 - Compression (-FZ): -137.49 (N)
-



Test Number: A01_108

Vehicle: 99 FORD WINDSTAR

Test Date: 01/24/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO RH LWR CORNER OF AIRBAG:

35 INCHES

HEAD CG TO EDGE OF WINDOW MOLDING:

5 ³/₄ INCHES

UPPER A/B MODULE TO NECK TORSO JUNCTION:

4 ³/₄ IN. BELOW

Injury Numbers:

- HIC15: 61 @ 3.4 TO 1.0 (6.6MS)
 - Chest Deflection: 1.8 @ 11.0 (mm)
 - Deflection Rate: 1.0 @ 6.6 (m/s)
 - NIJ 10: .35 @ 6.1 MS NET
 - Tension (+FZ): 327.97 (N)
 - Compression (-FZ): -356.45 (N)
-



Test Number: A01_109

Vehicle: 99 FORD WINDSTAR

Test Date: 01/24/01

Test Description: NHTSA SEAT-05-3:BPB

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO RH LWR CORNER OF AIRBAG: 33 9/16 INCHES

HEAD CG TO EDGE OF WINDOW MOLDING: 13 7/8 INCHES

CENTER OF DUMMY AT TORSO TO DOOR: 14 15/16 INCHES

Injury Numbers:

- HIC15: 0.4@ 30.3 TO 45.3 (15MS)
 - Chest Deflection: 0.8 @12.6 (mm)
 - Deflection Rate: 0.35 @34.0 (m/s)
 - NIJ 10: .07 @ 53.8 MS NET
 - Tension (+FZ): 45.02 (N)
 - Compression (-FZ): -29.18 (N)
-



Test Number: A01_110

Vehicle: 99 MERCURY COUGER

Test Date: 01/29/01

Test Description: NHTSA SEAT-02-3:LSW W BOOSTER PEL FWD

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CORNER OF AIRBAG:	31 ½ INCHES
TIP OF NOSE TO EDGE OF WINDOW MOLDING:	8 1/16 INCHES
TIP OF NOSE TO EDGE OF HEADER (AT INSIDE EDGE):	13 ½ INCHES

Injury Numbers:

- HIC15: 389@ 3.9 TO 17.5 (13.7MS)
 - Chest Deflection: 3.95 @9.4 (mm)
 - Deflection Rate: 3.5 @5.7 (m/s)
 - NIJ 10: .80 @ 17.7 MS NET
 - Tension (+FZ): 1112.59 (N)
 - Compression (-FZ): -911.50 (N)
-



Test Number: A01_111

Vehicle: 99 MERCURY COUGER

Test Date: 01/30/01

Test Description: NHTSA SEAT-05-3:BPB

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CORNER OF AIRBAG: 29 7/8 INCHES

TIP OF NOSE TO EDGE WINDOW CENTER AT MOLDING: 16 3/8 INCHES

TIP OF NOSE EDGE OF HEADER (AT INSIDE EDGE): 13 5/8 INCHES

Post Test: Upper Neck MX recorded questionable data – became unplugged in umbilical.
(didn't catch until after test 112)

Injury Numbers:

- HIC15: .5@ 9.1 TO 16.4 (7.4MS)
 - Chest Deflection: 0.2 @45.6 (mm)
 - Deflection Rate: 0.3 @26.4 (m/s)
 - NIJ 10: .10 @ 23.1 MS NEC
 - Tension (+FZ): 28.04 (N)
 - Compression (-FZ): -40.52 (N)
-



Test Number: A01_112

Vehicle: 00 AUDI A6 FRONT

Test Date: 01/31/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CORNER OF GLOVE BOX: 28 1/16 INCHES

TIP OF NOSE TO EDGE TO OUTER EDGE OF WINDOW AT
B-PILLAR: 8 7/8 INCHES

HEAD/NECK JUNCTION IN LINE WITH TOP OF MODULE

****NOTE:-**This is very similar to our position (NHTSA Seat-02-3) because the upper airbag module is lower in the seat

-Upper Neck MY recorded questionable data – became unplugged in umbilical.
No valid NIJ could be calculated!

Injury Numbers:

- HIC15: 122@ 3.7 TO 6.3 (2.7MS)
 - Chest Deflection: 7.3 @7.1 (mm)
 - Deflection Rate: 3.5 @6.7 (m/s)
 - NIJ 10: n/a N/A
 - Tension (+FZ): 1321.75 (N)
 - Compression (-FZ): -543.63 (N)
-



Test Number: A01_113

Vehicle: 00 AUDI A6 FRONT

Test Date: 01/31/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CORNER OF GLOVE BOX: 28 3/16 INCHES

TIP OF NOSE TO EDGE TO OUTER EDGE OF WINDOW AT
B-PILLAR: 8 3/4 INCHES

HEAD/NECK JUNCTION IN LINE WITH TOP OF MODULE

****NOTE:-**This is very similar to our position (NHTSA Seat-02-3) because the upper airbag module is lower in the seat.

Injury Numbers:

- HIC15: 129@ 4.2 TO 6.9 (2.7MS)
 - Chest Deflection: 6.9 @7.7 (mm)
 - Deflection Rate: 3.3 @4.8 (m/s)
 - NIJ 10: .91 @ 6.2 MS NFT
 - Tension (+FZ): 1320.87 (N)
 - Compression (-FZ): -523.01 (N)
-



Test Number: A01_114

Vehicle: 00 AUDI A6 FRONT

Test Date: 02/03/01

Test Description: TWG 3.3.2.3 HEAD ON ARMREST

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CORNER OF GLOVE BOX:

23 ½ INCHES

HEAD CG TO DOOR:

4 ¾ INCHES

HEAD CG TO S/B SEAM:

4 ¼ INCHES

Injury Numbers:

- HIC15: 143@ 3.7 TO 4.8 (1.1MS)
 - Chest Deflection: 0.6 @8.7 (mm)
 - Deflection Rate: 0.6 @10.7 (m/s)
 - NIJ 10: .51 @ 8.1 MS NFT
 - Tension (+FZ): 1025.89 (N)
 - Compression (-FZ): -30.82 (N)
-



Test Number: A01_115

Vehicle: 99 VW JETTA

Test Date: 02/05/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH UPPER CORNER OF GLOVE BOX: 29 ½ INCHES

TIP OF NOSE TO CENTER OF WINDOW MOLDING: 8 11/16 INCHES

HEAD/NECK JUNCTION IS INLINE WITH TOP OF A/B MODULE

****NOTE:** Sits low in the seat like our modification

Injury Numbers:

- HIC15: 37@ 5.9 TO 20.9 (15MS)
- Chest Deflection: 2.7 @12.1 (mm)
- Deflection Rate: 0.9 @6.5 (m/s)
- NIJ 10: .31 @ 10.4 MS NFT
 - Tension (+FZ): 448.19 (N)
 - Compression (-FZ): -364.61 (N)



Test Number: A01_116

Vehicle: 99 VW JETTA

Test Date: 02/05/01

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO RH UPPER CORNER OF GLOVE BOX:

35 INCHES

CENTERLINE OF NECK TO B-PILLAR:

4 ¼ INCHES

UPPER RIB IS INLINE WITH TOP OF A/B MODULE

Injury Numbers:

- HIC15: 5@ 6.7 TO 21.7 (15MS)
 - Chest Deflection: 20.9 @14.9 (mm)
 - Deflection Rate: 4.5 @8.6 (m/s)
 - NIJ 10: .61 @ 20.6 MS NET
 - Tension (+FZ): 538.08 (N)
 - Compression (-FZ): -74.16 (N)
-



Test Number: A01_118

Vehicle: 99 VW JETTA

Test Date: 02/06/01

Test Description: TWG 3.3.2.3 HEAD ON ARMREST

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH CRN OT GLOVEBOX: 25 5/8 INCHES

HEAD CG TO DOOR: 5 INCHES

CLOSEST SIDE OF HEAD TO SEAT SEAM (HORIZ): 3 1/4 INCHES

***NOTE:-Head rests on B-Pillar and edge of armrest-because seat slides back so far (4dr).

Injury Numbers:

- HIC15: 24@ 8.0 TO 17.2 (9.2MS)
 - Chest Deflection: 1.1 @16.1 (mm)
 - Deflection Rate: 0.7 @13.8 (m/s)
 - NIJ 10: .27 @ 16.2 MS NFT
 - Tension (+FZ): 421.48 (N)
 - Compression (-FZ): -3.87 (N)
-



Test Number: A01_119

Vehicle: 99 FORD WINDSTAR

Test Date: 02/08/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO RH LWR CRN OF AIRBAG: 35 ½ INCHES

HEAD CG TO WINDOW MOLDING (CENTER): 5 ½ INCHES

HEAD/NECK JUNCTION TO TOP OF AIRBAG MODULE: 3 ¼ INCHES

Injury Numbers:

- HIC15: 36@ 4.6 TO 19.5 (14.9MS)
 - Chest Deflection: 2.6 @14.3 (mm)
 - Deflection Rate: 0.9 @10.5 (m/s)
 - NIJ 10: .40 @ 26.0 MS NET
 - Tension (+FZ): 354.63 (N)
 - Compression (-FZ): -391.77 (N)
-



Test Number: A01_120

Vehicle: 00 CADILLAC DEVILLE

Test Date: 02/08/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO WINDOW MOLDING (INSIDE EDGE): 8 INCHES

HEAD CG TO WINDOW MOLDING (INSIDE EDGE): 3 ½ INCHES

HEAD/NECK JUNCTION TO TOP OF AIRBAG MODULE: 1 1/8 INCHES

Injury Numbers:

- HIC15: 1@ 15.7 TO 30.7 (15MS)
 - Chest Deflection: 1.4 @18.4 (mm)
 - Deflection Rate: 0.5 @15.0 (m/s)
 - NIJ 10: .21 @ 53.9 MS NEC
 - Tension (+FZ): 116.66 (N)
 - Compression (-FZ): -122.40 (N)
-



Test Number: A01_122

Vehicle: 00 CADILLAC DEVILLE

Test Date: 02/12/01

Test Description: NHTSA SEAT-08-3:MCW ON BOOSTER, HEAD CG AT TOP AB
A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO DOOR:

4 ³/₄ INCHES

HEAD CG TO DOOR:

1 ⁵/₈ INCHES

ANGLE AT HEAD CG:

48.6 DEGREES

Injury Numbers:

- HIC15: 19@ 8.4 TO 16.7 (8.3MS)
 - Chest Deflection: 1.0 @2.8 (mm)
 - Deflection Rate: 0.3 @18.4 (m/s)
 - NIJ 10: .84 @ 16.9 MS NEC
 - Tension (+FZ): 74.61 (N)
 - Compression (-FZ): -641.88 (N)
-



Test Number: A01_123

Vehicle: 00 CADILLAC DEVILLE

Test Date: 02/13/01

Test Description: NHTSA SEAT-05-3:BPB

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO WINDOW MOLDING (CENTER):

16 INCHES

HEAD CG TO WINDOW MOLDING (CENTER):

13 1/16 INCHES

Injury Numbers:

- HIC15: .003@ 36.2 TO 51.2 (15MS)
 - Chest Deflection: .06 @4.7 (mm)
 - Deflection Rate: 0.1 @29.7 (m/s)
 - NIJ 10: .012 @ 69.4 MS NET
 - Tension (+FZ): 12.81 (N)
 - Compression (-FZ): -9.68 (N)
-



Test Number: A01_124

Vehicle: 99 MERCURY COUGER

Test Date: 02/13/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CRN OF A/B:	29 ¼ INCHES
HEAD CG TO WINDOW MOLDING (CENTER):	6 INCHES
UPPER NECK TO TOP OF AIRBAG MODULE:	0 INCHES
DISTANCE AWAY FROM THE SEATBACK (UPPER NECK TO SEAT SEAM):	4 ¾ INCHES

Injury Numbers:

- HIC15: 10@ 5.5 TO 14.7 (9.2MS)
 - Chest Deflection: 4.1 @11.4 (mm)
 - Deflection Rate: 3.0 @6.2 (m/s)
 - NIJ 10: .39 @ 29.4 MS NET
 - Tension (+FZ): 354.27 (N)
 - Compression (-FZ): -267.87 (N)
-



Test Number: A01_125

Vehicle: 99 MERCURY COUGER

Test Date: 02/14/01

Test Description: NHTSA SEAT-02-3:LSW W BOOSTER PEL FWD

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CRN OF A/B: 32 INCHES

TIP OF NOSE TO WINDOW MOLDING (CENTER): 7 ¼ INCHES

TIP OF NOSE TO LHEADER (VERTICALLY) INSIDE EDGE: 13 1/8 INCHES

Injury Numbers:

- HIC15: 209@ 5.0 TO 14.2 (9.15MS)
 - Chest Deflection: 6.2 @10.2 (mm)
 - Deflection Rate: 3.8 @5.7 (m/s)
 - NIJ 10: .87 @ 9.9 MS NFT
 - Tension (+FZ): 1522.73 (N)
 - Compression (-FZ): -877.16 (N)
-



Test Number: A01_126

Vehicle: 99 MERCURY COUGER

Test Date: 02/14/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH LWR CRN OF A/B: 29 ½ INCHES

HEAD CG TO WINDOW MOLDING (CENTER): 5 ½ INCHES

UPPER NECK TO TOP OF A/B MODULE: 0 INCHES

DISTANCE FROM SEAT (UPPER NECK TO SEAT SEAM): 4 ¼ INCHES

Injury Numbers:

- HIC15: 23 @ 7.7 TO 16.7 (9MS)
 - Chest Deflection: 5.2 @ 9.5 (mm)
 - Deflection Rate: 4.4 @ 6.0 (m/s)
 - NIJ 10: .38 @ 32.5 MS NET
 - Tension (+FZ): 307.68 (N)
 - Compression (-FZ): -247.84 (N)
-



Test Number: A01_127

Vehicle: 00 CADILLAC DEVILLE

Test Date: 02/19/01

Test Description: NHTSA DOOR-06-3:MCW W/ HEAD CG @ HORIZ C/L OF AB
A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH UP CRN OF BG/B:

22 5/8 INCHES

TIP OF NOSE TO SIDE A/B (HORIZ):

4 1/4 INCHES

Injury Numbers:

- HIC15: 103@ 5.2 TO 15.1 (9.9MS)
- Chest Deflection: 1.2 @24.8 (mm)
- Deflection Rate: 0.3 @17.6 (m/s)
- NIJ 10: .36 @ 23.6 MS NFT
 - Tension (+FZ): 560.48 (N)
 - Compression (-FZ): -240.94 (N)



Test Number: A01_128

Vehicle: 99 CADILLAC DEVILLE

Test Date: 02/19/01

Test Description: NHTSA DOOR-08-3:BPB LSW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH UP CRN OF G/B: 25 9/16 INCHES

TIP OF NOSE TO WINDOW (CENTER OF MOLDING): 18 ½ INCHES

HEAD CG TO B-PILLAR AT WINDOW MOLDING (HORIZ): 14 ½ INCHES

Injury Numbers:

- HIC15: .003@ 17.2 TO 29.5 (12.4MS)
 - Chest Deflection: .13 @88.2 (mm)
 - Deflection Rate: .08 @19.4 (m/s)
 - NIJ 10: .02 @ 51.0 MS NET
 - Tension (+FZ): 10.59 (N)
 - Compression (-FZ): -12.10 (N)
-



Test Number: A01_129

Vehicle: 99 CADILLAC DEVILLE

Test Date: 02/19/01

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER NECK TO ARMREST:

2 INCHES

HEAD CG TO RH UP CRN OF G/B:

20 5/8 INCHES

HEAD CG TO SEATBACK SEAM:

3 INCHES

Injury Numbers:

- HIC15: 94@ 4.9 TO 11.1 (6.3MS)
 - Chest Deflection: 1.3 @20.2 (mm)
 - Deflection Rate: 0.5 @15.1 (m/s)
 - NIJ 10: .79 @ 10.3 MS NEC
 - Tension (+FZ): 128.82 (N)
 - Compression (-FZ): -1051.1 (N)
-



Test Number: A01_130

Vehicle: 99 CADILLAC DEVILLE

Test Date: 02/20/01

Test Description: TWG 3.3.3.2:BACK ON DOOR-UP NECK AT UP A/B MOD

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

NECK TO CENTER OF AIRBAG (HORIZ): 3 ¾ INCHES

HEAD CG TO RH UP CRN OF G/B: 20 9/16 INCHES

HEAD/NECK JUNCTION TO TOP OF AIRBAG (HORIZ): 3 ½ INCHES

Injury Numbers:

- HIC15: 2@ 10.8 TO 12.4 (1.6MS)
 - Chest Deflection: 1.8 @15.7 (mm)
 - Deflection Rate: 0.6 @12.2 (m/s)
 - NIJ 10: .23 @ 12.9 MS NFT
 - Tension (+FZ): 290.48 (N)
 - Compression (-FZ): -50.29 (N)
-



Test Number: A01_131

Vehicle: 99 CADILLAC DEVILLE

Test Date: 02/20/01

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

NECK TO ARMREST (HORIZ): 3 INCHES

HEAD CG TO RH UP CRN OF G/B: 20 ½ INCHES

HEAD CG TO SEATBACK SEAM (HORIZ): 3 5/8 INCHES

Injury Numbers:

- HIC15: 146@ 4.6 TO 15.2 (10.6MS)
 - Chest Deflection: 1.6 @22.9 (mm)
 - Deflection Rate: 1.4@17.9 (m/s)
 - NIJ 10: 1.22 @ 12.0 MS NEC
 - Tension (+FZ): 62.78 (N)
 - Compression (-FZ): -1678.2 (N)
-



Test Number: A01_132

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 02/20/01

Test Description: NHTSA DOOR-06-3:MCW W/ HEAD CG @ HORIZ C/L OF AB

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO SIDE A/B (HORIZ):	5 1/8 INCHES
HEAD CG TO RH UP CRN OF G/B:	21 1/16 INCHES
HEAD CG TO INSIDE HEADER (ROOF):	18 INCHES
HEAD CG TO C/L OF AIRBAG (HORIZ):	1 3/4 INCHES

****NOTE:** LNKXM2 and LNKYM3 over ranged during the causing DAE's

Injury Numbers:

- HIC15: 439@ 4.4 TO 7.8 (3.4MS)
 - Chest Deflection: 1.4 @29.7 (mm)
 - Deflection Rate: 0.5 @200.9 (m/s)
 - NIJ 10: .56 @ 11.0 MS NFT
 - Tension (+FZ): 1072.44 (N)
 - Compression (-FZ): -569.09 (N)
-



Test Number: A01_133

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 02/21/01

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER RIB TO KUPPER A/B MODULE (HORIZ):

4 1/16

HEAD CG TO RH UP CRN OF G/B:

22 1/16 INCHES

HEAD CG TO HEAD PILLAR CENTER:

18 3/8 INCHES

Injury Numbers:

- HIC15: 13@ 9.9 TO 24.9 (15MS)
 - Chest Deflection: 25.0 @10.8 (mm)
 - Deflection Rate: 8.5 @5.9 (m/s)
 - NIJ 10: 1.02 @ 15.0 MS NET
 - Tension (+FZ): 963.09 (N)
 - Compression (-FZ): -342.68 (N)
-



Test Number: A01_134

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 02/22/01

Test Description: TWG 3.3.3.2: BACK ON DOOR-UP NECK AT UP A/B MOD

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER NECK TO UPPER A/B MODULE (HORIZ): 2 13/16 INCHES

HEAD CG TO RH UP CRN OF G/B: 20 5/8 INCHES

HEAD CG TO ROOF HEADER (INSIDE): 16 1/4 INCHES

Injury Numbers:

- HIC15: 69@ 5.0 TO 19.7 (14.7MS)
 - Chest Deflection: 1.6 @8.5 (mm)
 - Deflection Rate: 1.3 @7.2 (m/s)
 - NIJ 10: .43 @ .6 MS NFT
 - Tension (+FZ): 677.36 (N)
 - Compression (-FZ): -314.09 (N)
-



Test Number: A01_135

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 02/22/01

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

MIDDLE NECK TO ARMREST (HORIZ):

1 15/4 INCHES

HEAD CG TO RH UP CRN OF (G/B):

21 1/4 INCHES

HEAD CG TO ROOF HEADER (INSIDE):

20 INCHES

Injury Numbers:

- HIC15: 685@ 3.5 TO 8.5 (5MS)
 - Chest Deflection: 3.4 @47.6 (mm)
 - Deflection Rate: 0.9 @15.8 (m/s)
 - NIJ 10: .94 @ 9.3 MS NEC
 - Tension (+FZ): 596.90 (N)
 - Compression (-FZ): -1035.61 (N)
-



Test Number: A01_136

Vehicle: 00 MERCEDES S430 REAR

Test Date: 02/26/01

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER RIB TO UPPER A/B MODULE:

3 INCHES

HEAD CG TO OUTSIDE WINDOW MOLDING:

3 ¼ INCHES

HEAD CG TO ROOF HEADER (INSIDE):

10 5/8 INCHES

Injury Numbers:

- HIC15: 8@ 11.0 TO 26.09 (15MS)
 - Chest Deflection: 23.6 @10.9 (mm)
 - Deflection Rate: 9.5 @6.2 (m/s)
 - NIJ 10: .67 @ 18.9 MS NET
 - Tension (+FZ): 422.24 (N)
 - Compression (-FZ): -498.46 (N)
-



Test Number: A01_137

Vehicle: 00 BMW 528i REAR

Test Date: 02/26/01

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

LOWER NECK TO ARMREST (HORIZ):

3 ¾ INCHES

HEAD CG TO SEATBACK:

3 5/8 INCHES

TIP OF NOSE TO ROOF HEADER (INSIDE):

10 ¾ INCHES

Injury Numbers:

- HIC15: 232@ 4.1 TO 6.0 (1.9MS)
 - Chest Deflection: 1.2 @19.7 (mm)
 - Deflection Rate: 1.3 @14.7 (m/s)
 - NIJ 10: 1.29 @ 8.8 MS NEC
 - Tension (+FZ): 15.17 (N)
 - Compression (-FZ): -2047.42 (N)
-



Test Number: A01_138

Vehicle: 00 BMW 528I REAR

Test Date: 02/27/01

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO A/B (HORIZ):	6 ½ INCHES
HEAD CG TO VERT. C/L OF A/B:	2 3/8 INCHES
TIP OF NOSE TO ROOF HEADER (INSIDE)	20 ½ INCHES

Injury Numbers:

- HIC15: 432@ 3.7 TO 7.2 (3.5MS)
 - Chest Deflection: 1.8 @4.7 (mm)
 - Deflection Rate: 1.21 @17.2 (m/s)
 - NIJ 10: 1.03 @ 8.6 MS NFT
 - Tension (+FZ): 213.86 (N)
 - Compression (-FZ): -1332.76 (N)
-



Test Number: A01_139

Vehicle: 00 BMW 528i FRONT

Test Date: 02/27/01

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER RIB TO UPPER SAB (HIRIZ):

4 1/8 INCHES

HEAD CG TO RH LWR CRN OF FR A/B:

19 INCHES

HEAD CG TO HEAD REST PILLAR:

14 1/8 INCHES

Injury Numbers:

- HIC15: 13@ 7.8 TO 22.8 (15MS)
 - Chest Deflection: 18.9@12.3 (mm)
 - Deflection Rate: 4.4 @6.9 (m/s)
 - NIJ 10: .27 @ 13.2 MS NET
 - Tension (+FZ): 536.75 (N)
 - Compression (-FZ): -17.87 (N)
-



Test Number: A01_140

Vehicle: 00 BMW 528I FRONT

Test Date: 02/27/01

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

UPPER NECK TO ARMREST (HORIZ):

2 ¾ INCHES

HEAD CG TO RH LWR CRN OF FR A/B:

18 9/16 INCHES

HEAD CG TO SEATBACK SEAM (HORIZ):

4 INCHES

Injury Numbers:

- HIC15: 521 @ 3.2 TO 8.1 (5.0MS)
 - Chest Deflection: 3.2 @ 23.1 (mm)
 - Deflection Rate: 1.9 @ 15.9 (m/s)
 - NIJ 10: 2.22 @ 11.0 MS NET
 - Tension (+FZ): 82.11 (N)
 - Compression (-FZ): -3026.43 (N)
-



Test Number: A01_141

Vehicle: 00 BMW 528I FRONT

Test Date: 02/27/01

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO AIRBAG (HORIZ): 2 5/16 INCHES

TIP OF NOSE TO RH LWR CRN OF FR A/B: 17 15/16 INCHES

TIP OF NOSE TO (INSIDE) ROOF HEADER: 20 ½ INCHES

Injury Numbers:

- HIC15: 655@ 3.7 TO 11.7 (8MS)
- Chest Deflection: 3.2 @24.9 (mm)
- Deflection Rate: 1.5 @17.7 (m/s)
- NIJ 10: .91 @ 12.8 MS NEC
 - Tension (+FZ): 385.10 (N)
 - Compression (-FZ): -1745.52 (N)



Test Number: A01_144

Vehicle: 00 AUDI A6 REAR

Test Date: 02/28/01

Test Description: NHTSA SEAT-05-3:BPB

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO WINDOW AT B-PILLAR (HORIZ):

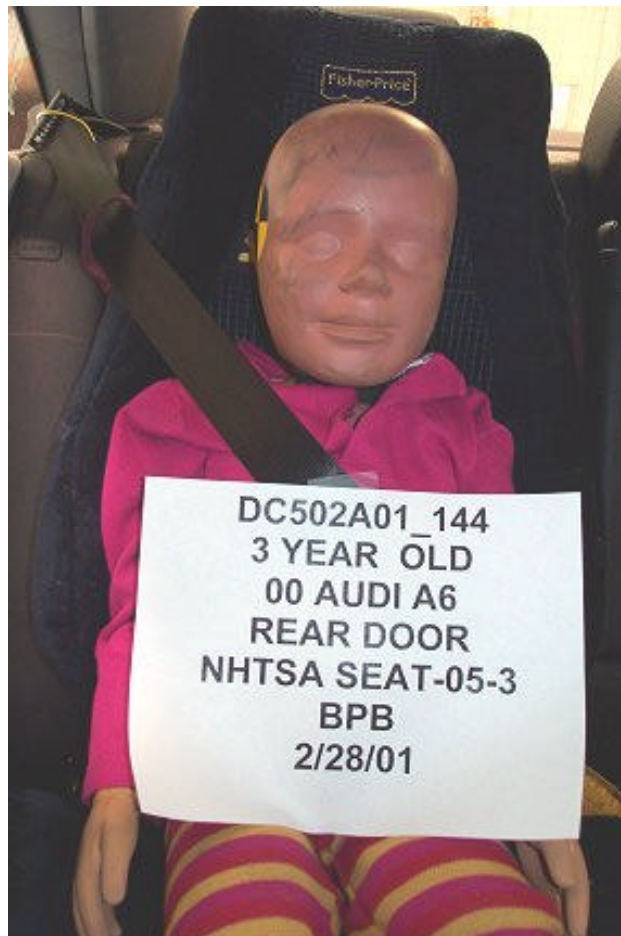
13 ¼ INCHES

TIP OF NOSE TO OUTER EDGE MOLDING OF WINDOW:

16 ½ INCHES

Injury Numbers:

- HIC15: .03@ 38.7 TO 53.7 (15MS)
 - Chest Deflection: 0.6 @17.5 (mm)
 - Deflection Rate: 0.4 @16.4 (m/s)
 - NIJ 10: .03 @ 19.8 MS NEC
 - Tension (+FZ): 17.34 (N)
 - Compression (-FZ): -29.21 (N)
-



Test Number: A01_146

Vehicle: 99 FORD WINDSTAR

Test Date: 03/01/01

Test Description: NHTSA SEAT-02-3:LSW W BOOSTER PEL FWD

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO WINDOW AT B-PILLAR (HORIZ):	9 INCHES
TIP OF NOSE TO RH UP CRN OF GB:	34 3/8 INCHES
TIP OF NOSE TO OUTER ROOF HEADER (INSIDE):	14 1/4 INCHES
CHIN TO CENTER OF FRONT AIRBAG:	36 INCHES
TOP OF HEAD TO TOP OF B-PILLAR:	13 1/2 INCHES

Injury Numbers:

- HIC15: 113 @ 3.7 TO 7.4 (3.8MS)
 - Chest Deflection: 1.2 @ 17.6 (mm)
 - Deflection Rate: 0.3 @ 11.7 (m/s)
 - NIJ 10: .51 @ 11.8 MS NEC
 - Tension (+FZ): 127.71 (N)
 - Compression (-FZ): -153.74 (N)
-



Test Number: A01_147

Vehicle: 00 NISSAN MAXIMA

Test Date: 03/05/01

Test Description: NHTSA SEAT-05-3:BPB

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO WINDOW MOLDING (OUTSIDE):

17 INCHES

TIP OF NOSE TO CENTER OF FRONT AIRBAG:

34 ½ INCHES

Injury Numbers:

- HIC15: 1 @ 13.7 TO 16.9 (3.2MS)
 - Chest Deflection: 0.6 @ 17.6 (mm)
 - Deflection Rate: 0.2 @ 43.0 (m/s)
 - NIJ 10: .05 @ 38.1 MS NET
 - Tension (+FZ): 29.02 (N)
 - Compression (-FZ): -33.86 (N)
-



Test Number: A01_148

Vehicle: 99 SAAB 95

Test Date: 03/06/01

Test Description: NHTSA SEAT-05-3:BPB

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OD NOSE TO WINDOW NOLDING (OUTSIDE):

17 INCHES

TIP OF NOSE TO RH FR CRN OF GB:

28 ³/₄ INCHES

CENTER OF CHIN TO DOOR (HORIZ):

14 INCHES

Post Test: Seatbelt interacted with the airbag – it did deploy properly, but the seatbelt was in the airbag

Injury Numbers:

- HIC15: 0.2@ 22.5 TO 37.5 (15MS)
 - Chest Deflection: 0.3 @16.7 (mm)
 - Deflection Rate: 0.3 @41.8 (m/s)
 - NIJ 10: .02 @ 23.2 MS NFC
 - Tension (+FZ): 21.02 (N)
 - Compression (-FZ): -27.95 (N)
-



Test Number: A01_149

Vehicle: 99 SAAB 95

Test Date: 03/06/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO WINDOW MOLDING (OUTSIDE):	10 INCHES
TIP OF NOSE TO RH UP CRN OF GB:	29 ½ INCHES
CENTER OF CHIN TO FRONT AIRBAG (MARK ON DASH):	28 ¾ INCHES
HEAD/NECK JUNCTION TO TOP OF AIRBAG MODULE:	0 INCHES

Injury Numbers:

- HIC15: 79@ 6.7 TO 17.3 (10.7MS)
 - Chest Deflection: 7.4 @14.8 (mm)
 - Deflection Rate: 3.5 @11.2 (m/s)
 - NIJ 10: 1.07 @ 11.8 MS NFT
 - Tension (+FZ): 1791.02 (N)
 - Compression (-FZ): -368.90 (N)
-



Test Number: A01_150

Vehicle: 99 SAAB 95

Test Date: 03/07/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO WINDOW MOLDING (OUTSIDE):	10 INCHES
TIP OF NOSE TO RH UP CRN OF GB:	29 2/3 INCHES
CENTER OF CHIN TO FRONT AIRBAG (MARK ON DASH):	28 7/8 INCHES
HEAD/NECK JUNCTION TO TOP OF AIRBAG MODULE:	0 INCHES

Injury Numbers:

- HIC15: 121 @ 6.4 TO 19.6 (13.2MS)
 - Chest Deflection: 4.3 @ 17.3 (mm)
 - Deflection Rate: 3.0 @ 10.9 (m/s)
 - NIJ 10: .90 @ 13.0 MS NFT
 - Tension (+FZ): 1526.59 (N)
 - Compression (-FZ): -239.79 (N)
-



Test Number: A01_151

Vehicle: 99 GEO PRIZM

Test Date: 02/07/01

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

UPPER NECK TO WINDOW MOLDING (OUTSIDE):

9 ³/₄ INCHES

UPPER NECK TO RH UP CRN OFGB:

31 ³/₄ INCHES

UPPER RIB TO TOP OF AIRBAG MODULE:

~2 INCHES BELOW

Injury Numbers:

- HIC15: 6@ 6.6 TO 21.6 (15MS)
 - Chest Deflection: 19.3 @9.4. (mm)
 - Deflection Rate: 5.8 @6.3 (m/s)
 - NIJ 10: .61 @ 15.2 MS NET
 - Tension (+FZ): 363.28 (N)
 - Compression (-FZ): -100.27 (N)
-



Test Number: A01_152

Vehicle: 99 VOLVO S80

Test Date: 03/07/01

Test Description: TWG 3.3.2.2: PEEKABOO

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO B-PILLAR:

1 ½ INCHES

TIP OF NOSE TO RH UP CRN OF GB:

29 ½ INCHES

HEAD/NECK JUNCTION TO TOP OF AIRBAG MODULE: ~3 INCHES BELOW

Injury Numbers:

- HIC15: 9@ 17.9 TO 32.9 (15MS)
 - Chest Deflection: 2.7 @22.3 (mm)
 - Deflection Rate: 3.8 @18.3 (m/s)
 - NIJ 10: .29 @ 27.4 MS NFT
 - Tension (+FZ): 340.30 (N)
 - Compression (-FZ): -101.97 (N)
-



Test Number: A01_153

Vehicle: 99 VOLVO S80

Test Date: 03/07/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO B-PILLAR:

1 ½ INCHES

TIP OF NOSE TO RH UP CRN OF GB:

29 ¼ INCHES

HEAD/NECK JUNCTION TO TOP OF AIRBAG MODULE: ~3 INCHES BELOW

Injury Numbers:

- HIC15: 9@ 19.1 TO 34.1 (15MS)
 - Chest Deflection: 2.2 @22.1 (mm)
 - Deflection Rate: 2.9 @18.9 (m/s)
 - NIJ 10: .26 @ 53.5 MS NET
 - Tension (+FZ): 316.15 (N)
 - Compression (-FZ): -153.77 (N)
-



Test Number: A01_175

Vehicle: 99 FORD WINDSTAR

Test Date: 04/23/01

Test Description: NHTSA SEAT-09-3:LSW ON BST, PEL FWD, HEAD CG @ C/L

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

CHIN TO C/L OF FR A/B:	35 ¾ INCHES
TOP OF HEAD TO TOP OF B-PILLAR:	13 1/16 INCHES
TIP OF NOSE TO RH UP CRN OF AB:	32 15/16 INCHES
TIP OF NOSE TO WINDOW (HORIZ):	8 ¼ INCHES
ANGLE OF DUMMY FROM CHIN:	34.4 DEGREES
LEFT LEG ON C/L OF SEAT AND RIGHT LEG:	40 mm ANKLE TO ANKLE

Injury Numbers:

- HIC15: 333 @ 3.8 TO 7.1 (3.3MS)
 - Chest Deflection: .92 @ 19.4 (mm)
 - Deflection Rate: .21 @ 11.4 (m/s)
 - NIJ 10: .68 @ 10.4 MS NEC
 - Tension (+FZ): 195.54 (N)
 - Compression (-FZ): -114.16 (N)
-



Test Number: A01_176

Vehicle: 99 FORD WINDSTAR

Test Date: 04/23/01

Test Description: NHTSA SEAT-09-3:LSW ON BST, PEL FWD, HEAD CG @ C/L

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

CHIN TO C/L OF FR A/B:	35 13/16 INCHES
TOP OF HEAD TO TOP OF B-PILLAR:	13 1/16 INCHES
TIP OF NOSE TO RH LWR CRN OF AB:	33 5/8 INCHES
TIP OF NOSE TO WINDOW (HORIZ):	8 1/2 INCHES
ANGLE OF DUMMY FROM CHIN:	35.1 DEGREE
LEFT LEG ON C/L OF SEAT AND RIGHT LEG:	45 mm ANKLE TO ANKLE
LEFT LEG	~10mm LEFT OF C/L;
CORNER OF HEAD TOUCHING B-PILLAR	

Injury Numbers:

- HIC15: 233 @ 3.9 TO 11.0 (6.5MS)
 - Chest Deflection: 1.0 @ 27.7 (mm)
 - Deflection Rate: 0.2 @ 7.5 (m/s)
 - NIJ 10: .84 @ 15.2 MS NEC
 - Tension (+FZ): 203.32 (N)
 - Compression (-FZ): -176.63 (N)
-



Test Number: A01_178

Vehicle: 99 VOLVO S80

Test Date: 04/25/01

Test Description: NHTSA SEAT-10-3:LSW ON BST, W/ MORE INCLINED S/B

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

HEAD CG TO B-PILLAR (HORIZ):	1 ½ INCHES
TIP OF NOSE TO RH UP CRN OF GB:	30 7/16 INCHES
ANGLE OF DUMMY FROM CHIN:	49 DEGREES
UPPER NECK TO TOP OF A/B MOD:	3 5/8 INCHES

Injury Numbers:

- HIC15: 57@ 15.8 TO 27.0 (11.3MS)
- Chest Deflection: 3.1 @23.4 (mm)
- Deflection Rate: 2.3 @15.7 (m/s)
- NIJ 10: .63 @ 25.1 MS NFT
 - Tension (+FZ): 837.57 (N)
 - Compression (-FZ): -154.04 (N)



Test Number: A01_179

Vehicle: 00 AUDI A6 FRONT

Test Date: 04/26/01

Test Description: TWG 3.3.2.1 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO RH UP CRN OF GB: 28 ¼ INCHES

TIP OF NOSE TO OUTER EDGE OF WINDOW (AT B-PILLAR) 8 ¾ INCHES

HEAD/NECK JUNCTION TO TOP OF A/B MOD: 0 INCHES

Injury Numbers:

- HIC15: 258@ 4.6 TO 8.2 (3.2MS)
 - Chest Deflection: 5.7 @8.7 (mm)
 - Deflection Rate: 2.4 @5.3 (m/s)
 - NIJ 10: .77 @ 6.2 MS NFT
 - Tension (+FZ): 1111.9 (N)
 - Compression (-FZ): -184.76 (N)
-



Test Number: A01_180

Vehicle: 00 BMW 528I FRONT

Test Date: 04/30/01

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH LWR CRN OF AB:

20 9/16 INCHES

HEAD CG TO HEAD REST PILLAR CENTER:

14 ½ INCHES

UPPER RIB TO TOP OF A/B MOD:

4 1/8 INCHES

Injury Numbers:

- HIC15: 24@ 7.2 TO 22.2 (15MS)
 - Chest Deflection: 23.0 @12.0 (mm)
 - Deflection Rate: 7.8 @6.5 (m/s)
 - NIJ 10: .73 @ 14.7 MS NET
 - Tension (+FZ): 737.81 (N)
 - Compression (-FZ): -2.59 (N)
-



Test Number: A01_181

Vehicle: 00 BMW 528I FRONT

Test Date: 05/01/01

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH LWR CRN OF AB:

18 11/16 INCHES

HEAD CG TO DOOR (HORIZ):

4 5/8 INCHES

UPPER NECK TO ARMREST:

2 5/8 INCHES

TIP OF NOSE TO 5/8 (HORIZ): 10 INCHES

Injury Numbers:

- HIC15: 758@ 3.2 TO 9.2 (6MS)
 - Chest Deflection: 4.3 @46.8 (mm)
 - Deflection Rate: 1.2 @15.6 (m/s)
 - NIJ 10: 1.69 @ 7.6MS NEC
 - Tension (+FZ): 154.81 (N)
 - Compression (-FZ): -1926.85 (N)
-



Test Number: A01_184

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 05/07/01

Test Description: TWG 3.3.3.1: KNEELING AT WINDOW

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH UPP CRN OF GB:

22 1/16 INCHES

HEAD CG TO HEAD PILLAR CENTER:

16 1/2 INCHES

UPPER RIB TO UPPER AIRBAG MODULE:

3 3/4 INCHES

Injury Numbers:

- HIC15: 10@ 9.9 TO 24.9 (15MS)
 - Chest Deflection: 24.2 @9.8 (mm)
 - Deflection Rate: 7.8 @5.6 (m/s)
 - NIJ 10: .80 @ 16.8 MS NET
 - Tension (+FZ): 535.02 (N)
 - Compression (-FZ): -340.32 (N)
-



Test Number: A01_185

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 05/07/01

Test Description: TWG 3.3.3.2: BACK ON DOOR-UP NECK AT UP A/B MOD

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH UPP CRN OF GB:

20 11/16 INCHES

UPPER NECK TO UPPER AIRBAG MODULE:

3 INCHES

Injury Numbers:

- HIC15: 60@ 4.8 TO 19.8 (15MS)
- Chest Deflection: 1.2 @9.2 (mm)
- Deflection Rate: .7 @7.0 (m/s)
- NIJ 10: .36 @ 6.6 MS NFT
 - Tension (+FZ): 645.11 (N)
 - Compression (-FZ): -605.25 (N)



Test Number: A01_186

Vehicle: 99 CADILLAC DEVILLE

Test Date: 05/08/01

Test Description: TWG 3.3.3.3: HEAD ON ARMREST

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

HEAD CG TO RH UPP CRN OF GB: 20 9/16 INCHES

UPPER NECK TO ARMREST (HEAD TOUCHING DOOR): 2 INCHES

HEAD CG TO S/B SEAM: 4 ½ INCHES

HEAD CG TO DOOR: 4 3/8 INCHES

Injury Numbers:

- HIC15: 212@ 4.7 TO 14.1 (9.5MS)
 - Chest Deflection: 1.7 @22.1 (mm)
 - Deflection Rate: 1.2 @17.6 (m/s)
 - NIJ 10: 1.08 @ 10.1 MS NEC
 - Tension (+FZ): 217.86 (N)
 - Compression (-FZ): -1437.84 (N)
-



Test Number: A01_199

Vehicle: 00 BMW 528I REAR

Test Date: 06/12/01

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO A/B (HORIZ):

6 3/8 INCHES

HEAD CG TO VERT. C/L OF A/B:

2 3/16 INCHES

Injury Numbers:

- HIC15: 357@ 4.2 TO 12.1 (7.9MS)
- Chest Deflection: 1.5 @25.7 (mm)
- Deflection Rate: 1.0 @17.4 (m/s)
- NIJ 10: .62@ 7.8 MS NEC
 - Tension (+FZ): 167.61 (N)
 - Compression (-FZ): -870.59 (N)



Test Number: A01_200

Vehicle: 00 BMW 528I REAR

Test Date: 06/13/01

Test Description: NHTSA DOOR-04-3:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 3YO-070

Measurements:

TIP OF NOSE TO A/B (HORIZ):

6 5/16 INCHES

HEAD CG TO VERT. C/L OF A/B:

2 3/8 INCHES

Injury Numbers:

- HIC15: 219@ 4.1 TO 6.0 (1.9MS)
- Chest Deflection: .75 @63.3 (mm)
- Deflection Rate: .95 @16.6 (m/s)
- NIJ 10: .59@ 7.9 MS NEC
 - Tension (+FZ): 82.46 (N)
 - Compression (-FZ): -954.01 (N)



APPENDIX D
Details of 6 YO tests

Test Number: B01_24

Vehicle: 99 FORD WINDSTAR

Test Date: 04/24/00

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 15@ 12.1 TO 27.1 (15MS)
 - Chest Deflection: 3.6@11.35 (mm)
 - Deflection Rate: 3.27 @7.45 (m/s)
 - NIJ 10: .56@42.45 ms NET
 - Tension (+FZ): 591.01 (N)
 - Compression (-FZ): -580.78 (N)
-



Test Number: B01_25

Vehicle: 99 FORD WINDSTAR

Test Date: 04/26/00

Test Description: NHTSA SEAT-02-6:LSW W/ HEAD CG AT C/L OF A/B

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 82@ 4.8 TO 8.2 (3.4MS)
- Chest Deflection: 2.6@20.35 (mm)
- Deflection Rate: 1.08 @19.9 (m/s)
- NIJ 10: .50 @ 15.6 MS NET
 - Tension (+FZ): 637.43 (N)
 - Compression (-FZ): -770.6 (N)



Test Number: B01_26

Vehicle: 99 SAAB 95

Test Date: 04/27/00

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 35@ 10.7 TO 19.0 (8.3MS)
 - Chest Deflection: 4.2@11.4 (mm)
 - Deflection Rate: 2.36 @10.9 (m/s)
 - NIJ 10: .60 @ 14.2 MS NFT
 - Tension (+FZ): 1078.01 (N)
 - Compression (-FZ): -382.21 (N)
-



Test Number: B01_27

Vehicle: 99 SAAB 95

Test Date: 05/01/00

Test Description: NHTSA SEAT-04-6:MCW HEAD CG AT C/L OF A/B MOD

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 312@ 6.5 TO 14.8 (8.3MS)
 - Chest Deflection: 3.2@88.1 (mm)
 - Deflection Rate: 0.78 @12.9 (m/s)
 - NIJ 10: .50 @ 12.1 MS NET
 - Tension (+FZ): 1198.78 (N)
 - Compression (-FZ): -562.30 (N)
-



Test Number: B01_28

Vehicle: 99 SAAB 95

Test Date: 05/01/00

Test Description: NHTSA SEAT-05-6: SEAT ON EDGE, HEAD CG AT TOP AB
A/B LOC.: SEAT

Dummy: 6YO-030

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 267@ 6.1 TO 17.0 (10.9MS)
 - Chest Deflection: 3.5@12.1 (mm)
 - Deflection Rate: 2.26 @11.6 (m/s)
 - NIJ 10: .59 @ 11.75 MS NFT
 - Tension (+FZ): 1647.66 (N)
 - Compression (-FZ): -82.69 (N)
-



Test Number: B01_29

Vehicle: 00 NISSAN MAXIMA

Test Date: 05/02/00

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 45@ 10.1 TO 25.2 (15.1MS)
 - Chest Deflection: 5.9@9.05 (mm)
 - Deflection Rate: 3.49 @6.2 (m/s)
 - NIJ 10: .76 @ 31.5 MS NET
 - Tension (+FZ): 543.96 (N)
 - Compression (-FZ): -852.79 (N)
-



Test Number: B01_30

Vehicle: 00 NISSAN MAXIMA

Test Date: 05/02/00

Test Description: NHTSA SEAT-04-6:MCW HEAD CG AT C/L OF A/B MOD

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 855@ 4.6 TO 6.4 (1.8MS)
 - Chest Deflection: 3.4@9.4 (mm)
 - Deflection Rate: 3.5 @8.9 (m/s)
 - NIJ 10: .85 @ 9.7 MS NET
 - Tension (+FZ): 2233.76 (N)
 - Compression (-FZ): -1142.31 (N)
-



Test Number: B01_88

Vehicle: 00 BMW 528I FRONT

Test Date: 12/13/00

Test Description: NHTSA DOOR-01-6:BACK ON DOOR-LWR NECK TO UP A/B

A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

CENTER OF NECK TO SEATBACK: 8 ¼ INCHES

CENTER OF NECK TO RH FR LWR CORNER OF FR A/B: 20 1/16 INCHES

TOP OF HEAD TO EDGE OF WINDOW: 9 7/8 INCHES

LOWER NECK TO UPPER A/B SIDE MODULE (HORIZ): 3 1/16 INCHES

Injury Numbers:

- HIC15: 53@ 14.7 TO 7.2 (7.15MS)
 - Chest Deflection: 4.8 @9.6 (mm)
 - Deflection Rate: 4.12 @4.8 (m/s)
 - NIJ 10: .72 @ 9.5 MS NFT
 - Tension (+FZ): 758.31 (N)
 - Compression (-FZ): -303.21 (N)
-



Test Number: B01_89

Vehicle: 00 BMW 528I FRONT

Test Date: 12/14/00

Test Description: NHTSA DOOR-04-6:MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

CENTER OF NECK TO SIDE A/B:

7 1/16 INCHES

HEAD CG TO RH FR LWR CORNER OF FR A/B:

22 INCHES

HEAD CG TO SEATBACK:

6 3/4 INCHES

Injury Numbers:

- HIC15: 29@ 6.5 TO 20.3 (13.8MS)
 - Chest Deflection: 0.5 @11.5 (mm)
 - Deflection Rate: 1.0 @15.1 (m/s)
 - NIJ 10: .464 @ 10.3 MS NFT
 - Tension (+FZ): 1282.88 (N)
 - Compression (-FZ): -3.99 (N)
-



Test Number: B01_90

Vehicle: 00 BMW 528I FRONT

Test Date: 12/14/00

Test Description: NHTSA DOOR-03-6:MCW W/ HEAD CG @ HORIZ C/L OF AB
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

HEAD CG TO SIDE A/B:	2 7/8 INCHES
CENTER OF NECK TO RH FR LWR CORNER OF FR A/B:	22 ½ INCHES
CENTER OF NECK TO SEATBACK:	4 ¾ INCHES
CENTER OF CHIN TO SIDE A/B:	7 9/16 INCHES

Injury Numbers:

- HIC15: 429@ 3.4 TO 12.1 (8.7MS)
 - Chest Deflection: 1.5 @23.8 (mm)
 - Deflection Rate: 0.98 @19.2 (m/s)
 - NIJ 10: N/A NFT
 - Tension (+FZ): N/A (N)
 - Compression (-FZ): N/A (N)
-



Test Number: B01_91

Vehicle: 00 BMW 528I FRONT

Test Date: 12/18/00

Test Description: NHTSA DOOR-03-6:MCW W/ HEAD CG @ HORIZ C/L OF AB
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

HEAD CG TO SIDE A/B:	2 7/8 INCHES
CENTER OF NECK TO RH FR LWR CORNER OF FR A/B:	22 ½ INCHES
CENTER OF NECK TO SEATBACK :	4 ¾ INCHES
CENTER OF CHIN TO SIDE A/B:	7 9/16 INCHES

Injury Numbers:

- HIC15: 300@ 3.4 TO 11.2 (7.9MS)
 - Chest Deflection: 0.3 @5.9 (mm)
 - Deflection Rate: 0.55 @16.4 (m/s)
 - NIJ 10: .65 @ 10.9 MS NEC
 - Tension (+FZ): 176.75 (N)
 - Compression (-FZ): -1345.7 (N)
-



Test Number: B01_92

Vehicle: 00 BMW 528I REAR

Test Date: 12/19/00

Test Description: NHTSA DOOR-01-6:BACK ON DOOR-LWR NECK TO UP A/B
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

HEAD CG TO SEATBACK:	8 ½ INCHES
CENTER OF NECK TO SEATBACK:	9 INCHES
LOWER NECK TO UPPER SIDE A/B:	2 15/16 INCHES

Injury Numbers:

- HIC15: 36@ 3.7 TO 13.6 (10MS)
 - Chest Deflection: 3.3 @9.2 (mm)
 - Deflection Rate: 3.94 @5.3 (m/s)
 - NIJ 10: .77 @ 27.1 MS NET
 - Tension (+FZ): 623.09 (N)
 - Compression (-FZ): -410.38 (N)
-



Test Number: B01_93

Vehicle: 00 MERCEDES S430 REAR

Test Date: 12/19/00

Test Description: NHTSA DOOR-01-6: BACK ON DOOR-LWR NECK TO UP A/B
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

HEAD CG TO SEATBACK:	11 ½ INCHES
CENTER OF NECK TO SEATBACK:	10 ½ INCHES
LOWER NECK TO UPPER SIDE A/B:	3 ½ INCHES

Injury Numbers:

- HIC15: 11@ 7.2 TO 22.1 (14.9MS)
 - Chest Deflection: 2.0 @11.5 (mm)
 - Deflection Rate: 2.75 @5.5 (m/s)
 - NIJ 10: .68 @ 29.5 MS NET
 - Tension (+FZ): 497.68 (N)
 - Compression (-FZ): -434.31 (N)
-



Test Number: B01_94

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 12/20/00

Test Description: NHTSA SEAT-03-6:LSW @CENTER, PEL FWD, HEAD CG @ TOP
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

HEAD CG TO SEATBACK:	8 3/16 INCHES
HEAD CG TO RH FR UPPER CORNER OF GLOVE BOX:	23 1/2 INCHES
CENTER OF NECK TO UPPER SIDE A/B:	5 3/4 INCHES

Injury Numbers:

- HIC15: 81@ 5.2 TO 20.2 (15MS)
 - Chest Deflection: 1.9 @ 498.1 (mm)
 - Deflection Rate: 1.12 @16.8 (m/s)
 - NIJ 10: .35 @ 11.9 MS NFT
 - Tension (+FZ): 828.96 (N)
 - Compression (-FZ): -235.04 (N)
-



Test Number: B01_95

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 12/20/00

Test Description: NHTSA DOOR-04-6: MCW W/ HEAD CG @ VERT C/L

A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

HEAD CG TO SEATBACK:

7 INCHES

HEAD CG TO RH FR UPPER CORNER OF GLOVE BOX:

22 9/16 INCHES

CENTER OF NECK TO UPPER SIDE A/B:

7 INCHES

Injury Numbers:

- HIC15: 143 @ 3.9 TO 15.4 (11.5MS)
- Chest Deflection: 0.8 @ 423.4 (mm)
- Deflection Rate: 0.65 @ 11.5 (m/s)
- NIJ 10: .33 @ 20.5 MS NFT
 - Tension (+FZ): 738.31 (N)
 - Compression (-FZ): -323.93 (N)



Test Number: B01_96

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 12/20/00

Test Description: NHTSA DOOR-01-6: BACK ON DOOR-LWR NECK TO UP A/B
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

CENTER OF NECK TO SEATBACK:	9 ¾ INCHES
HEAD CG TO RH FR UPPER CORNER OF GLOVE BOX:	21 9/16 INCHES
LOWER NECK TO UPPER SIDE A/B:	2 ¾ INCHES

Injury Numbers:

- HIC15: 59@ 7.9 TO 22.5 (14.6MS)
 - Chest Deflection: 4.2 @ 9.4 (mm)
 - Deflection Rate: 4.63 @ 5.6 (m/s)
 - NIJ 10: .90 @ 26.9 MS NFT
 - Tension (+FZ): 881.93 (N)
 - Compression (-FZ): -464.50 (N)
-



Test Number: B01_97

Vehicle: 00 AUDI A6 REAR

Test Date: 01/29/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

CENTER OF LOWER NECK TO DOOR:

5 INCHES

HEAD CG TO OUTER WINDOW EDGE:

5 ¾ INCHES

BOTTOM OF CHIN TO ROOF (EDGE OF HEADER):

12 1/8 INCHES

Injury Numbers:

- HIC15: 15@ 7.2 TO 18.1 (10.9MS)
 - Chest Deflection: 3.2 @5.6 (mm)
 - Deflection Rate: 3.93 @4.9 (m/s)
 - NIJ 10: .99 @ 28.4 MS NET
 - Tension (+FZ): 336.80 (N)
 - Compression (-FZ): -544.64 (N)
-



Test Number: B01_98

Vehicle: 00 AUDI A6 REAR

Test Date: 01/09/01

Test Description: NHTSA SEAT-01-6:LSW W/O BOOSTER

A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

CENTER OF LOWER NECK TO DOOR: 5 3/8 INCHES

HEAD CG TO DOOR: 2 1/8 INCHES

BOTTOM OF CHIN TO ROOF (EDGE OF HEADER): 15 5/8 INCHES

UPPER AIRBAG MODULE TO LOWER NECK/TORSO JUNC.: 2 3/4 INCHES

****NOTE:** WHEN POSITIONING THE NECK/TORSO JUNCTION IS MORE THAN
20 mm BELOW THE UPPER AIRBAG MODULE

Injury Numbers:

- HIC15: 85@ 5.4 TO 11.3 (5.95MS)
 - Chest Deflection: 4.6 @7.1 (mm)
 - Deflection Rate: 6.0 @4.4 (m/s)
 - NIJ 10: .59 @ 8.5 MS NFT
 - Tension (+FZ): 911.51 (N)
 - Compression (-FZ): -187.37 (N)
-



Test Number: B01_99

Vehicle: 00 AUDI A6 FRONT

Test Date: 01/15/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

C/L OF DUMMY AT EDGE OF TORSO SKIN TO DOOR: 9 1/8 INCHES

CENTER OF BOTTOM OF CHIN TO WINDOW: 9 INCHES

CENTER OF BOTTOM OF CHIN TO RH LWR CRN OF DASH: 28 5/16 INCHES

UPPER A/B MOD. TO LOWER NECK/TORSO JUNCTION: 0 INCHES

****NOTE:** The head rests in between the B-Pillar and the seat. Dummy's feet had to be placed on seat in order for him to be in alignment. (6 year old doesn't bend like 3 year old) Stomach would be open in the dummy.

Injury Numbers:

- HIC15: 12@ 4.0 TO 11.4 (7.4MS)
 - Chest Deflection: 3.8 @7.4 (mm)
 - Deflection Rate: 4.06 @3.7 (m/s)
 - NIJ 10: .49 @ 28.7 MS NET
 - Tension (+FZ): 478.05 (N)
 - Compression (-FZ): -481.97 (N)
-



Test Number: B01_100

Vehicle: 99 VW JETTA

Test Date: 01/16/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

C/L OF DUMMY AT EDGE OF TORSO SKIN TO DOOR: 9 5/16 INCHES

CENTER OF BOTTOM OF CHIN TO WINDOW: 9 1/16 INCHES

CENTER OF BOTTOM OF CHIN TO RH LWR CRN. OF G.B.: 29 ¼ INCHES

UPPER AIRBAG MODULE TO LOWER NECK/TORSO JUNC.: 0 INCHES

****NOTE:** Dummy's feet had to be placed on seat in order for him to be in alignment.
(6 year old doesn't bend like 3 year old) Stomach would be open in the dummy.

Injury Numbers:

- HIC15: 9 @ 7.5 TO 22.5 (15MS)
 - Chest Deflection: 2.0 @12.3 (mm)
 - Deflection Rate: 2.23 @7.2 (m/s)
 - NIJ 10: .41 @ 16.6 MS NFT
 - Tension (+FZ): 629.54 (N)
 - Compression (-FZ): -239.31 (N)
-



Test Number: B01_101

Vehicle: 99 VW JETTA

Test Date: 01/16/01

Test Description: NHTSA SEAT-03-6:LSW @CENTER, PEL FWD, HEAD CG @ TOP
A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

C/L OF DUMMY AT EDGE OF TORSO SKIN TO DOOR: 10 11/16 INCHES

CENTER OF BOTTOM OF CHIN TO DOOR: 6 INCHES

CENTER OF BOTTOM OF CHIN TO RH LWR CRN. OF G.B.: 25 1/8 INCHES

UPPER AIRBAG MODULE TO LOWER NECK/TORSO JUNC.: 0 INCHES

Injury Numbers:

- HIC15: 62@ 3.9 TO 18.3 (14.5MS)
 - Chest Deflection: 1.3 @81.2 (mm)
 - Deflection Rate: 1.09 @8.7 (m/s)
 - NIJ 10: .38 @ 10.4 MS NFT
 - Tension (+FZ): 1047.84 (N)
 - Compression (-FZ): -122.86 (N)
-



Test Number: B01_102

Vehicle: 99 CADILLAC DEVILLE

Test Date: 01/17/01

Test Description: NHTSA DOOR-02-6: SITTING AT C/L, LSW REARMOST POS

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

C/L OF DUMMY AT EDGE OF TORSO SKIN TO DOOR: 11 1/8 INCHES

CENTER OF BOTTOM OF CHIN TO DOOR: 6 1/16 INCHES

CENTER OF BOTTOM OF CHIN TO RH UP FR CRN OF GB: 25 1/16 INCHES

Injury Numbers:

- HIC15: 19@ 7.6 TO 16.6 (16MS)
 - Chest Deflection: 0.4 @95.6 (mm)
 - Deflection Rate: 0.40 @17.3 (m/s)
 - NIJ 10: .25 @ 20.7 MS NFT
 - Tension (+FZ): 540.13 (N)
 - Compression (-FZ): -34.69 (N)
-



Test Number: B01_103

Vehicle: 99 CADILLAC DEVILLE

Test Date: 01/17/01

Test Description: NHTSA DOOR-05-6:MCW W/ TOP OF HEAD @ HORIZ C/L AB
A/B LOC.: SEAT

Dummy: 6YO-030

C/L OF DUMMY AT EDGE OF TORSO SKIN TO DOOR: 14 INCHES

CENTER OF BOTTOM OF CHIN TO ARMREST: 4 3/8 INCHES

CENTER OF BOTTOM OF CHIN TO RH UP FR CRN OF GB: 25 3/16 INCHES

Injury Numbers:

- HIC15: 32@ 7.1 TO 22.1 (15MS)
 - Chest Deflection: 0.3 @ 45.1 (mm)
 - Deflection Rate: 0.70 @44.1 (m/s)
 - NIJ 10: .68 @ 17.5 MS NFC
 - Tension (+FZ): 264.41 (N)
 - Compression (-FZ): -1322.04 (N)
-



Test Number: B01_104

Vehicle: 99 MERCURY COUGER

Test Date: 01/18/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

C/L OF DUMMY AT EDGE OF TORSO SKIN TO DOOR: 8 11/16 INCHES

CENTER OF LWR NECK TO WINDOW: 8 ½ INCHES

CENTER OF BOTTOM OF CHIN TO RH LWR CRN OF A/B: 31 1/8 INCHES

****NOTE:** LWR neck/torso junction to upper airbag was aligned

Injury Numbers:

- HIC15: 10@ 9.5 to 24.5 (15MS)
 - Chest Deflection: 3.5 @ 10.0 (mm)
 - Deflection Rate: 3.13 @6.8 (m/s)
 - NIJ 10: .65 @ 33.1 MS NET
 - Tension (+FZ): 318.37 (N)
 - Compression (-FZ): -808.81 (N)
-



Test Number: B01_105

Vehicle: 00 CADILLAC DEVILLE

Test Date: 01/18/01

Test Description: NHTSA SEAT-04-6:MCW HEAD CG AT C/L OF A/B MOD

A/B LOC.: SEAT

Dummy: 3YO-070

Measurements:

C/L OF DUMMY AT EDGE OF TORSO SKIM TO DOOR: 10 ¼ INCHES

CENTER OF CHIN TO DOOR: 6 ½ INCHES

CENTER OF BOTTOM OF CHIN TO ROOF HEADER: 17 INCHES

Injury Numbers:

- HIC15: 20@ 10.2 TO 17.1 (6.9MS)
- Chest Deflection: 1.0 @ 27.8 (mm)
- Deflection Rate: 0.56 @25.7 (m/s)
- NIJ 10: .58 @ 21.9 MS NEC
 - Tension (+FZ): 44.47 (N)
 - Compression (-FZ): -565.04 (N)



Test Number: B01_106

Vehicle: 00 CADILLAC DEVILLE

Test Date: 01/22/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO EDGE OF B-PILLAR MOLD: 28 ½ INCHES

CENTER OF CHIN TO WINDOW: 7 ¼ INCHES

CENTER OF BOTTOM OF CHIN TO ROOF HEADER: 11 ½ INCHES

Injury Numbers:

- HIC15: 2@ 16.2 TO 31.2 (15MS)
 - Chest Deflection: 0.56 @ 15.7 (mm)
 - Deflection Rate: 0.45 @ 11.7 (m/s)
 - NIJ 10: .31 @ 47.1 MS NET
 - Tension (+FZ): 112.77 (N)
 - Compression (-FZ): -136.13 (N)
-



Test Number: B01_107

Vehicle: 99 VOLVO S80

Test Date: 01/23/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CHIN TO RH UP CORNER OF GLOVEBOX: 30 ½ INCHES

CENTER OF CHIN TO EDGE OF WINDOW MOLDING: 11 ¼ INCHES

CENTER OF CHIN TO DOOR: 11 INCHES

UPPER A/B MODULE TO NECK/TORSO JUNCTION: 2 ½ INCHES BELOW

**** NOTE:** Head hits B-Pillar - can't slide over as far over to the door.

Injury Numbers:

- HIC15: 2@ 6.95 TO 21.95 (15MS)
 - Chest Deflection: 1.2 @ 5.7 (mm)
 - Deflection Rate: 1.4 @ 6.8 (m/s)
 - NIJ 10: .44 @ 37.9 MS NET
 - Tension (+FZ): 120.44 (N)
 - Compression (-FZ): -186.71 (N)
-



Test Number: B01_154

Vehicle: 99 GEO PRIZM

Test Date: 03/13/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO OUTSIDE WINDOW MLDG (HORIZ): 9 INCHES

CENTER OF CHIN TO RH UP CRN OF GB: 29 5/8 INCHES

CENTER OF CHIN TO CENTER OF FRONT A/B: 34 3/8 INCHES

NECK/TORSO JUNCTION TO TOP OF AIRBAG MODULE: 0 INCHES

Injury Numbers:

- HIC15: 8@ 9.1 TO 23.3 (14.4MS)
 - Chest Deflection: 1.9 @5.4 (mm)
 - Deflection Rate: 3.09 @4.95 (m/s)
 - NIJ 10: .70 @ 33.7 MS NET
 - Tension (+FZ): 252.20 (N)
 - Compression (-FZ): -649.62 (N)
-



Test Number: B01_155

Vehicle: 99 GEO PRIZM

Test Date: 03/13/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO OUTSIDE WINDOW MLDG (HORIZ): 9 1/16 INCHES

CENTER OF CHIN TO RH UP CRN OF GB: 29 3/4 INCHES

CENTER OF CHIN TO CENTER OF FRONT A/B: 35 1/16 INCHES

NECK/TORSO JUNCTION TO TOP OF AIRBAG MODULE: 0 INCHES

Injury Numbers:

- HIC15: 9@ 7.1 TO 21.6 (14.5MS)
 - Chest Deflection: 1.8 @6.7 (mm)
 - Deflection Rate: 3.0 @4.3 (m/s)
 - NIJ 10: .75 @ 32.0 MS NET
 - Tension (+FZ): 260.03 (N)
 - Compression (-FZ): -760.57 (N)
-



Test Number: B01_156

Vehicle: 00 NISSAN MAXIMA

Test Date: 03/13/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO OUTSIDE WINDOW MLDG (HORIZ): 10 ½ INCHES

CENTER OF CHIN TO RH UP CRN OF GB: 30 ½ INCHES

CENTER OF CHIN TO CENTER OF FRONT A/B: 35 ¾ INCHES

NECK/TORSO JUNCTION TO TOP OF A/B MODULE: ~2 INCHES BELOW

Injury Numbers:

- HIC15: 36@ 8.3 TO 23.3 (15MS)
 - Chest Deflection: 5.9 @9.6 (mm)
 - Deflection Rate: 5.95 @6.4 (m/s)
 - NIJ 10: .87 @ 31.25 MS NET
 - Tension (+FZ): 614.33 (N)
 - Compression (-FZ): -680.43 (N)
-



Test Number: B01_157

Vehicle: 00 NISSAN MAXIMA

Test Date: 03/14/01

Test Description: NHTSA SEAT-04-6:MCW HEAD CG AT C/L OF A/B MOD

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO RH UP CRN OF GB:	28 ¼ INCHES
CENTER OF CHIN TO CENTER OF FRONT A/B:	35 INCHES
INBOARD HEAD CG TO CENTER OF A/B MOD:	0 INCHES
HEAD CG TO DOOR (HORIZ):	8 INCHES

Injury Numbers:

- HIC15: 337@ 5.3 TO 6.4 (1.1MS)
 - Chest Deflection: 2.1 @10.5 (mm)
 - Deflection Rate: 2.8 @7.2 (m/s)
 - NIJ 10: .9 @ 10 MS NFT
 - Tension (+FZ): 2324.29 (N)
 - Compression (-FZ): -680.07 (N)
-



Test Number: B01_158

Vehicle: 00 NISSAN MAXIMA

Test Date: 03/14/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO OUTSIDE WINDOW MLDG (HORIZ): 10 ½ INCHES

CENTER OF CHIN TO RH UP CRN OF GB: 31 INCHES

CENTER OF CHIN TO CENTER OF FRONT A/B: 36 INCHES

NECK/TORSO JUNCTION TO TOP OF A/B MODULE: ~2 INCHES BELOW

Injury Numbers:

- HIC15: 34@ 7.4 TO 22.0 (14.7MS)
 - Chest Deflection: 5.4 @10.1 (mm)
 - Deflection Rate: 5.3 @6.7 (m/s)
 - NIJ 10: .58 @ 14.6 MS NFT
 - Tension (+FZ): 983.32 (N)
 - Compression (-FZ): -749.78 (N)
-



Test Number: B01_159

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 03/14/01

Test Description: NHTSA DOOR-01-6: BACK ON DOOR-LWR NECK TO UP A/B
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

LOWER NECK TO SIDE A/B (HORIZ):	2 ¾ INCHES
HEAD CG TO RH UP CRN OF GB:	21 INCHES
CENTER OF CHIN TO ROOF HEADER (INSIDE):	17 ½ INCHES

Injury Numbers:

- HIC15: 37@ 7.8 TO 20.5 (12.7MS)
 - Chest Deflection: 3.9 @8.6 (mm)
 - Deflection Rate: 6.5 @5.6 (m/s)
 - NIJ 10: .80 @ 27.1 MS NET
 - Tension (+FZ): 784.64 (N)
 - Compression (-FZ): -430.85 (N)
-



Test Number: B01_160

Vehicle: 00 AUDI A6 REAR

Test Date: 03/15/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

LOWER NECK TO SEATBACK (HORIZ): ~3 INCHES

C/L OF CHIN TO WINDOW (OUTSIDE) EDGE MOLDING: 9 7/16 INCHES

CENTER OF CHIN TO ROOF HEADER (INSIDE): 12 11/16 INCHES

NECK/TORSO JUNCTION TO TOP OF A/B MOD: 0 INCHES

Injury Numbers:

- HIC15: 13@ 4.3 TO 17.7 (13.5MS)
 - Chest Deflection: 3.6 @7.2 (mm)
 - Deflection Rate: 4.6 @3.6 (m/s)
 - NIJ 10: .77 @ 29.3 MS NET
 - Tension (+FZ): 246.51 (N)
 - Compression (-FZ): -443.51 (N)
-



Test Number: B01_161

Vehicle: 00 AUDI A6 REAR

Test Date: 03/15/01

Test Description: TWG 3.3.2.5 LSW W BOOSTER

A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

LOWER NECK TO SEATBACK (HORIZ):	2 ¼ INCHES
C/L OF CHIN TO WINDOW (OUTSIDE) EDGE MOLDING:	9 3/16 INCHES
CENTER OF CHIN TO ROOF HEADER (INSIDE):	12 ½ INCHES
NECK/TORSO JUNCTION TO TOP OF A/B MOD:	0 INCHES

****Note:** Top of Airbag to SRS label: 2 ½ inches

Injury Numbers:

- HIC15: 9@ 6.7 TO 17.8 (11.1MS)
 - Chest Deflection: 3.0 @7.7 (mm)
 - Deflection Rate: 5.5 @4.6 (m/s)
 - NIJ 10: .65 @ 31.2 MS NET
 - Tension (+FZ): 252.14 (N)
 - Compression (-FZ): -179.03 (N)
-



Test Number: B01_162

Vehicle: 99 SAAB 95

Test Date: 03/20/01

Test Description: NHTSA SEAT-05-6: SEAT ON EDGE, HEAD CG AT TOP AB
A/B LOC.: SEAT

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO DOOR (HORIZ):

7 INCHES

CENTER OF CHIN TO RH UP CRN OF GB:

26 ½ INCHES

Injury Numbers:

- HIC15: 151 @ 8.6 TO 17.5 (8.9MS)
 - Chest Deflection: 1.4 @ 17.7 (mm)
 - Deflection Rate: 1.2 @ 15.7 (m/s)
 - NIJ 10: .68 @ 12.6 MS NFT
 - Tension (+FZ): 1799.17 (N)
 - Compression (-FZ): -133.40 (N)
-



Test Number: B01_163

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 03/20/01

Test Description: TWG 3.3.4.1:BACK AGAINST DOOR (HEAD)

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

C/L OF CHIN TO OUTSIDE WINDOW MLDG (HORIZ): 10 3/16 INCHES

CENTER OF CHIN TO RH UP CRN OF GB: 28 INCHES

CENTER OF CHIN TO ROOF HEADER (INSIDE): 13 7/8 INCHES

****Seating Position Variations:** -seat in rearmost pos.

-seat back adjusted to less than 25 deg in order to help
sit the dummy more upright

-feet on center console

-back rests on the B-Pillar

Injury Numbers:

- HIC15: 7@ 90.4 TO 97.5 (7.1MS)
 - Chest Deflection: 0.4 @43.0 (mm)
 - Deflection Rate: 0.5 @42.7 (m/s)
 - NIJ 10: .14 @ 31.8 MS NFC
 - Tension (+FZ): 5.71 (N)
 - Compression (-FZ): -348.13 (N)
-



Test Number: B01_164

Vehicle: 00 MERCEDES S430 FRONT

Test Date: 03/21/01

Test Description: NHTSA HEAD-01-6: KNEELING AT FR DOOR

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

C/L OF CHIN TO OUTSIDE WINDOW MLDG (HORIZ): 7 3/16 INCHES

HEAD CG TO RH UP CRN OF GB: 31 3/16 INCHES

HEAD CG TO ROOF HEADER (INSIDE): 4 3/4 INCHES

Post Test: The head got stuck between the foam block and the airbag causing a strain on dummy's neck. (FZ & FX didn't return to zero)

Injury Numbers:

- HIC15: 5@ 21.6 TO 24.3 (2.7MS)
 - Chest Deflection: 0.4 @38.0 (mm)
 - Deflection Rate: 0.6 @36.6 (m/s)
 - NIJ 10: .55 @ 40.5 MS NEC
 - Tension (+FZ): 7.73 (N)
 - Compression (-FZ): -525.11 (N)
-



Test Number: B01_165

Vehicle: 00 AUDI A6 FRONT

Test Date: 03/22/01

Test Description: TWG 3.3.4.1: BACK AGAINST DOOR (HEAD)

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

CENTER OF CHIN TO OUTSIDE WINDOW MLDG (HORIZ): 10 1/16 INCHES

HEAD CG TO RH UP CRN OF GB: 24 3/8 INCHES

TOP OF HEAD TO ROOF HEADER (INSIDE): 5 1/4 INCHES

Injury Numbers:

- HIC15: 6@ 25.7 TO 26.8 (1.15MS)
 - Chest Deflection: 0.3 @37.5 (mm)
 - Deflection Rate: 0.7 @36.0 (m/s)
 - NIJ 10: .256 @ 29.9 MS NEC
 - Tension (+FZ): 18.54 (N)
 - Compression (-FZ): -517.64 (N)
-



Test Number: B01_166

Vehicle: 00 AUDI A6 FRONT

Test Date: 03/22/01

Test Description: NHTSA HEAD-01-6: KNEELING AT FR DOOR

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

HEAD CG TO RH UP CRN OF GB:

29 ¼ INCHES

TOP OF HEAD TO ROOF HEADER (INSIDE):

4 ¼ INCHES

****Note:** Didn't need foam block for window.

Post Test: Head got stuck between window and bag causing the neck to be flexed, FZ and FX did not return to zero.

Injury Numbers:

- HIC15: 10@ 21.7 TO 25.2 (3.5MS)
 - Chest Deflection: 0.5 @40.8 (mm)
 - Deflection Rate: 0.4 @40.3 (m/s)
 - NIJ 10: .766 @ 37.7 MS NEC
 - Tension (+FZ): 14.93 (N)
 - Compression (-FZ): -654.92 (N)
-



Test Number: B01_167

Vehicle: 00 AUDI A6 FRONT

Test Date: 03/26/01

Test Description: NHTSA HEAD-01-6: KNEELING AT FR DOOR

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

HEAD CG TO RH UP CRN OF GB: 29 ½ INCHES

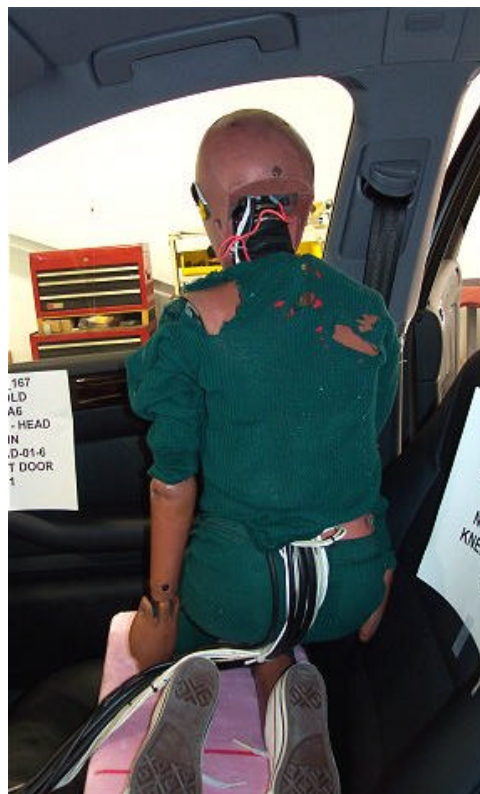
TOP OF HEAD TO ROOF HEADER (INSIDE): 4 5/8 INCHES

****Note:** Didn't need foam block for window.

Post Test: Head got stuck between window and bag causing the neck to be flexed,
FZ and FX did not return to zero.

Injury Numbers:

- HIC15: 15@ 24.4 TO 28.0 (3.6MS)
 - Chest Deflection: 0.3 @53.9 (mm)
 - Deflection Rate: 0.4 @62.7 (m/s)
 - NIJ 10: .534 @ 42.3 MS NEC
 - Tension (+FZ): 9.58 (N)
 - Compression (-FZ): -538.77 (N)
-



Test Number: B01_168

Vehicle: 00 BMW 528I FRONT

Test Date: 03/27/01

Test Description: TWG 3.3.4.1:BACK AGAINST DOOR (HEAD)

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

HEAD CG TO RH UP CRN OF GB: 25 INCHES

TOP OF HEAD TO ROOF HEADER (INSIDE): 5 ¾ INCHES

HEAD CG TO OUTSIDE WINDOW MOLDING (HORIZ): 6 ½ INCHES

**Airbag was a tube

Injury Numbers:

- HIC15: 0@ 18.9 TO 33.9 (15MS)
 - Chest Deflection: 0.2 @38.3 (mm)
 - Deflection Rate: 0.6 @36.4 (m/s)
 - NIJ 10: .189 @ 46.3 MS NFC
 - Tension (+FZ): 7.24 (N)
 - Compression (-FZ): -501.05 (N)
-



Test Number: B01_169

Vehicle: 00 BMW 528I FRONT

Test Date: 03/27/01

Test Description: NHTSA DOOR-01-6: BACK ON DOOR-LWR NECK TO UP A/B
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

CENTER OF NECK TO RH LWR CRN OF AB:	20 INCHES
TOP OF HEAD TO EDGE OF WINDOW:	9 ½ INCHES
LOWER NECK TO UPPER A/B MODULE:	2 9/16 INCHES
HEAD CG TO RH LWR CRN OF A/B:	17 13/16 INCHES

Injury Numbers:

- HIC15: 44@ 7.3 TO 18.8 (11.6MS)
 - Chest Deflection: 4.1 @11.3 (mm)
 - Deflection Rate: 4.5 @4.9 (m/s)
 - NIJ 10: .575 @ 11.0 MS NFT
 - Tension (+FZ): 930.24 (N)
 - Compression (-FZ): -215.60 (N)
-



Test Number: B01_170

Vehicle: 00 BMW 528I REAR

Test Date: 03/27/01

Test Description: NHTSA DOOR-01-6:BACK ON DOOR-LWR NECK TO UP A/B
A/B LOC.: DOOR

Dummy: 6YO-030

Measurements:

CENTER OF NECK TO SEATBACK:	9 INCHES
LOWER NECK TO UPPER A/B MODULE:	2 3/8 INCHES
HEAD CG TO SEATBACK:	9 3/8 INCHES
TOP OF HEAD TO WINDOW MOLDING:	8 5/8 INCHES

Injury Numbers:

- HIC15: 19@ 7.9 TO 17.0 (9.2MS)
 - Chest Deflection: 4.5 @9.9 (mm)
 - Deflection Rate: 4.6 @5.2 (m/s)
 - NIJ 10: .89 @ 30.1 MS NET
 - Tension (+FZ): 361.11 (N)
 - Compression (-FZ): -169.96 (N)
-



Test Number: B01_171

Vehicle: 99 VOLVO S80

Test Date: 04/04/01

Test Description: TWG 3.3.4.1:BACK AGAINST DOOR (HEAD)

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

OUTBOARD HEAD CG TO OPENING OF HEAD CURTAIN:	9 ¼ INCHES
INBOARD HEAD CG TOB-PILLAR:	2 ¾ INCHES
OUTBOARD HEAD CG TO RH UP CRN OF GB:	26 INCHES
TOP OF HEAD TO ROOF HEADER (INSIDE):	6 1/8 INCHES
ANGLE OF DUMMY AT C/L (FROM CHIN AT CHEST)	64.4 DEGREES

Injury Numbers:

- HIC15: 2@ 139.4 TO 146.1 (6.7MS)
 - Chest Deflection: 0.3 @119.4 (mm)
 - Deflection Rate: 0.3 @111.3 (m/s)
 - NIJ 10: .08 @ 141.2 MS NEC
 - Tension (+FZ): 12.64 (N)
 - Compression (-FZ): -54.27 (N)
-



Test Number: B01_172

Vehicle: 99 VOLVO S80

Test Date: 01/27/00

Test Description: NHTSA HEAD-01-6: KNEELING AT FR DOOR

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

OUTBOARD HEAD CG TO ROOF HEADER: 4 11/16 INCHES

OUTBOARD HEAD CG TO RH UP CRN OF GB: 27 3/4 INCHES

OUTBOARD HEAD CG TO WINDOW: 82.1 DEGREE

Note: -Adjusted the seatback forward to help hold the dummy in a more upright position
-Put foam block on window to rest his head and align head CG with opening

Injury Numbers:

- HIC15: 3@ 27.4 TO 29.4 (2.2MS)
 - Chest Deflection: 0.4 @ 41.3 (mm)
 - Deflection Rate: 0.6 @ 31.9 (m/s)
 - NIJ 10: .402 @ 37.0 MS NEC
 - Tension (+FZ): 92.60 (N)
 - Compression (-FZ): -565.59 (N)
-



Test Number: B01_173

Vehicle: 01 SATURN L200

Test Date: 04/05/01

Test Description: TWG 3.3.4.1:BACK AGAINST DOOR (HEAD)

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

OUTBOARD HEAD CG TO ROOF HEADER:	7 7/8 INCHES
OUTBOARD HEAD CG TO RH UP CRN OF GB:	24 9/16 INCHES
OUTBOARD HEAD CG TO WINDOW (HORIZ):	5 ½ INCHES
ANGLE OF DUMMY AT C/L (FROM CHIN AT CHEST):	71.6 DEGREE

****Note:** Didn't need to adjust the seatback

Injury Numbers:

- HIC15: 28@ 46.9 TO 52.0 (5.2MS)
 - Chest Deflection: 0.6 @51.5 (mm)
 - Deflection Rate: 0.6 @37.7 (m/s)
 - NIJ 10: .317 @ 106.3 MS NFC
 - Tension (+FZ): 6.76 (N)
 - Compression (-FZ): -813.29 (N)
-



Test Number: B01_174

Vehicle: 01 SATURN L200

Test Date: 04/10/01

Test Description: TWG 3.3.4.1:BACK AGAINST DOOR (HEAD)

A/B LOC.: CURTAIN

Dummy: 6YO-030

Measurements:

OUTBOARD HEAD CG TO ROOF HEADER:	4 15/16 INCHES
OUTBOARD HEAD CG TO RH UP CRN OF GB:	28 1/16 INCHES
CENTER OF CHIN (AT BOTTOM) TO WINDOW (HORIZ):	6 ¼ INCHES
ANGLE OF DUMMY AT C/L (AT SPINE):	80.2 DEGREES
TOP OF HEAD TO HEADER OPENING (VERT):	1 3/16 INCHES

Note:-Moved seatback up to keep the dummy more vertical

-Dummy still leaned because of bolsters in the seat

Injury Numbers:

- HIC15: 119@ 54.0 TO 62.4 (8.4MS)
 - Chest Deflection: 1.1 @70.6 (mm)
 - Deflection Rate: 0.6 @24.6 (m/s)
 - NIJ 10: .663 @ 62.0 MS NEC
 - Tension (+FZ): 262.11 (N)
 - Compression (-FZ): -1138.19 (N)
-



APPENDIX E

Details of CRABI tests

Test Number: C01_22

Vehicle: 99 SAAB 95

Test Date: 04/18/00

Test Description: NHTSA SEAT-01-12:FWD FACING CRS W/ FLIP OVER TRAY
A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: 3.2@ 17.3 TO 25.4 (8.2MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .14 @ 46.0 MS NET
 - Tension (+FZ): 69.23 (N)
 - Compression (-FZ): -38.05 (N)
-



Test Number: C01_23

Vehicle: 99 FORD WINDSTAR

Test Date: 04/18/00

Test Description: NHTSA SEAT-01-12:FWD FACING CRS W/ FLIP OVER TRAY
A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: .28@ 21.0 TO 34.1 (13.1MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .08 @ 42.0 MS NEC
 - Tension (+FZ): 12.68 (N)
 - Compression (-FZ): -11.94 (N)
-



Test Number: D01_31

Vehicle: 00 BMW 528I REAR

Test Date: 05/09/00

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: DOOR

Dummy: 12 MTH CRABI-25

Measurements: NONE WERE TAKEN

Injury Numbers:

- HIC15: .02@ 21.7 TO 36.7 (15MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .07 @ 17.7 MS NET
 - Tension (+FZ): 29.49 (N)
 - Compression (-FZ): -21.04 (N)
-



Test Number: D01_32

Vehicle: 00 MERCEDES S430 REAR

Test Date: 06/07/00

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: DOOR

Dummy: 12 MTH CRABI-25

Measurements:

TOP OF HEAD TO HEADLINER:	16 ¾ INCHES
TOP OF HEAD TO TOP OF CHILD SEAT:	6 INCHES
TOP OF HEAD TO REAR SEATBACK:	23 7/8 INCHES
CHILD SEAT HANDLE (PIVOT POINT) TO STRIKER:	17 ½ INCHES
CHILD SEAT TO THE DOOR:	11 7/8 INCHES

Injury Numbers:

- HIC15: 2.8@ 5.1 TO 10.0 (5.0MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .02 @ 13.0 MS NET
 - Tension (+FZ): 16.36 (N)
 - Compression (-FZ): -16.28 (N)
-



Test Number: D01_33

Vehicle: 00 AUDI A6 REAR

Test Date: 06/08/00

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

TOP OF HEAD TO HEADLINER:	16 7/8 INCHES
TOP OF HEAD TO TOP OF CHILD SEAT:	6 INCHES
TOP OF HEAD TO REAR SEATBACK:	24 INCHES
CHILD SEAT HANDLE (PIVOT POINT) TO STRIKER:	16 ½ INCHES
CHILD SEAT TO THE DOOR:	13 ¾ INCHES

Injury Numbers:

- HIC15: .02@ 4.9 TO 14.3 (9.5MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .02 @ 54.3 MS NET
 - Tension (+FZ): 27.87 (N)
 - Compression (-FZ): -20.40 (N)
-



Test Number: D01_187

Vehicle: 99 CADILLAC DEVILLE

Test Date: 05/09/01

Test Description: NHTSA SEAT-01-12:FWD FACING CRS W/ FLIP OVER TRAY

A/B LOC.: DOOR

Dummy: 12 MTH CRABI-25

Measurements:

FR TARGET (ON TRAY) TO DOOR: 5 3/8 INCHES

RR TARGET (ON TRAY) TO DOOR: 5 3/4 INCHES

BRIDGE OF THE NOSE TO WINDOW OPENING: 17 3/4 INCHES

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: .23@ 23.2 TO 37.5 (14.3MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .07 @ 66.5 MS NET
 - Tension (+FZ): 20.04 (N)
 - Compression (-FZ): -24.89 (N)
-



Test Number: D01_188

Vehicle: 00 NISSAN MAXIMA

Test Date: 05/09/01

Test Description: NHTSA SEAT-01-12:FWD FACING CRS W/ FLIP OVER TRAY

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

FR TARGET (ON TRAY) TO DOOR:	5 INCHES
RR TARGET (ON SEAT) TO B-PILLAR (HORIZ):	2 ¼ INCHES
BRIDGE OF THE NOSE TO TOP OF SEAT:	7 1/8 INCHES
TOP OF A/B MOD TO RR TARGET (ON SEAT) (VERT):	2 7/8 INCHES BELOW

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: 17@ 16.3 TO 22.1 (5.7MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .18 @ 27.2 MS NEC
 - Tension (+FZ): 69.09 (N)
 - Compression (-FZ): -43.91 (N)
-



Test Number: D01_189

Vehicle: 00 NISSAN MAXIMA

Test Date: 05/10/01

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

HANDLE TARGET TO DOOR: 2 1/4 INCHES

BRIDGE OF THE NOSE TO DOOR: 13 14/16 INCHES

TOP OF A/B MOD TO BRIDGE OF NOSE (VERT): 2 3/4 INCHES BELOW

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: .01@ 65.3 TO 80.3 (15MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .04 @ 30.6 MS NET
 - Tension (+FZ): 13.84 (N)
 - Compression (-FZ): -13.89 (N)
-



Test Number: D01_190

Vehicle: 99 MERCURY COUGER

Test Date: 05/10/01

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

HANDLE TARGET TO DOOR:

4 13/16 INCHES

BRIDGE OF THE NOSE TO DOOR:

12 3/8 INCHES

TOP OF A/B MOD TO BRIDGE OF NOSE (VERT):

0 INCHES BELOW

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: .005@ 30.6 TO 43.9 (13.3MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .04 @ 61.9 MS NET
 - Tension (+FZ): 10.23 (N)
 - Compression (-FZ): -9.83 (N)
-



Test Number: D01_191

Vehicle: 99 MERCURY COUGER

Test Date: 05/14/01

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

FR TARGET (ON TRAY) TO DOOR: 2 17/16 INCHES

RR TARGET (ON SEAT) TO DOOR (HORIZ): 4 INCHES

BRIDGE OF THE NOSE TO TOP OF SEAT: 2 3/4 INCHES ABOVE

RR TARGET ALMOST IN LINE WITH TOP OF A/B MOD: ~10 MM ABOVE

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: .22@ 12.6 TO 22.3 (9.8MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .06 @ 30.9 MS NET
 - Tension (+FZ): 23.31 (N)
 - Compression (-FZ): -26.83 (N)
-



Test Number: D01_192

Vehicle: 00 NISSAN MAXIMA

Test Date: 05/15/01

Test Description: NHTSA SEAT-01-12:FWD FACING CRS W/ FLIP OVER TRAY

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

FR TARGET (ON TRAY) TO DOOR:

6 INCHES

RR TARGET (ON SEAT) TODOOR (HORIZ):

4 3/8 INCHES

BRIDGE OF THE NOSE TO TOP OF SEAT:

5 1/2 INCHES ABOVE

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: .23@ 15.2 TO 25.2 (10MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .03 @ 139.2 MS NET
 - Tension (+FZ): 17.26 (N)
 - Compression (-FZ): -15.40 (N)
-



Test Number: D01_193

Vehicle: 00 AUDI A6 FRONT

Test Date: 05/15/01

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

HANDLE TARGET TO DOOR: 3 1/8 INCHES

BRODGE PF THE NOSE TO DOOR: 14 1/2 INCHES

TOP OF A/B MOD TO BRIDGE OF NOSE (VERT): 2 INCHES ABOVE A/B

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: .01@ 31.6 TO 46.3 (14.8MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .02 @ 108.8 MS NET
 - Tension (+FZ): 16.22 (N)
 - Compression (-FZ): -16.62 (N)
-



Test Number: D01_194

Vehicle: 99 GEO PRIZM

Test Date: 05/15/01

Test Description: NHTSA SEAT-02-12:RFCSS

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

HANDLE TARGET TO DOOR: 4 9/16 INCHES

BRIDGE OF THE NOSE TO DOOR: 12 INCHES

TOP OF A/B MOD TO BRIDGE OF NOSE (VERT): 1 ¾ INCHES BELOW A/B

****NOTE:** No cracks in the seat

Injury Numbers:

- HIC15: .005@ 56.4 TO 71.4 (15MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .03 @ 32.7 MS NEC
 - Tension (+FZ): 14.62 (N)
 - Compression (-FZ): -14.00 (N)
-



Test Number: D01_195

Vehicle: 99 GEO PRIZM

Test Date: 05/16/01

Test Description: NHTSA SEAT-01-12: FWD FACING CRS W/ FLIP OVER TRAY

A/B LOC.: SEAT

Dummy: 12 MTH CRABI-25

Measurements:

FR TARGET (ON TRAY) TO DOOE: 2 ¾ INCHES

RR TARGET (ON SEAT) TO DOOR (HORIZ): 2 3/8 INCHES

BRIDGE OF THE NOSE TO CENTER OF FR A/B MOD: 31 ½ INCHES

****NOTE:** Broke a plastic piece off of the arm. No damage to main portion of seat. Still functional.

Injury Numbers:

- HIC15: .79@1 5.0 TO 26.7 (11.8MS)
 - Chest Deflection: N/A (mm)
 - Deflection Rate: N/A (m/s)
 - NIJ 10: .05 @ 26.2 MS NFC
 - Tension (+FZ): 22.83 (N)
 - Compression (-FZ): -39.55 (N)
-

