FINAL REPORT NUMBER 202a-MGA-09-001

SAFETY COMPLIANCE TESTING FOR FMVSS 202a
"Head Restraints"

FORD MOTOR COMPANY
2009 Ford Flex
NHTSA No. C90204

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Dates: July 16 and 24, 2009
Report Date: August 17, 2009

FINAL REPORT

Prepared For:

U.S DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance (Rm W45-304)
1200 New Jersey Avenue, SE
Washington, DC 20590

Prepared By: Chris Collins

Chris Collins, Project Engineer

Helen A. Kaleto

Helen A. Kaleto, Laboratory Manager

P. Michael Miller II

Approved By:

P. Michael Miller II, Vice President

Approval Date: 9/4/2009

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: Edward E. Chan

Digitally signed by Edward E. Chan
DN: cn=Edward E. Chan, email=ed.chan@nhtsa.dot.gov, o=National Highway Traffic Safety Administration, ou=Office of Vehicle Safety Compliance, c=US
Date: 2009.09.30 13:51:42 -04'00'

Acceptance Date:

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 202a-MGA-09-001	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 202 Compliance Testing of a 2009 Ford Flex, NHTSA No. C90204		5. Report Date July 16 and 24, 2009 6. Performing Organization Code MGA	
7. Author(s) Helen A. Kaleto, Laboratory Manager Chris Collins, Project Engineer David Maier, Test Personnel		8. Performing Organization Report No. 202a-MGA-09-001	
9. Performing Organization Name and Address MGA Research Corporation 446 Executive Drive Troy, Michigan 48083		10. Work Unit No. 11. Contract or Grant No. DTNH22-06-C-00030/0007	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (Rm W45-304) 1200 New Jersey Avenue, SE Washington, DC 20590		13. Type of Report and Period Covered Final Test Report 14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes			
16. Abstract A compliance test was conducted on the subject 2009 Ford Flex, NHTSA No. C90204, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-202aS-00S-00 for the determination of FMVSS 202a compliance. The test was conducted at MGA Research Corporation in Troy, Michigan on July 16 and 24, 2009. Test failures identified were as follows: NONE The data recorded indicates that the 2009 Ford Flex tested appears to meet the requirements of FMVSS 202a.			
17. Key Words Compliance Testing Safety Engineering FMVSS 202a 2009 Ford Flex		18. Distribution Statement Copies of this report are available From: NHTSA Technical Reference Technical Information Services Division, NPO-411 1200 New Jersey Avenue, SE (Rm E12-100) Washington, D.C. 20590 Telephone No. (202) 366-4946	
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Form DOT F 1700.7 (8-70)

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1.0 PURPOSE AND PROCEDURE

Purpose: The purpose of testing was to determine whether head restraints equipped in vehicles supplied by the National Highway Traffic Safety Administration meet the requirements of Federal Motor Vehicle Safety Standard Number 202a, entitled "Head Restraints".

Test Procedures: The "MGA Research Corporation Testing Procedures for FMVSS 202a, submitted to and approved by the National Highway Transportation Safety Administration, contains the specific procedures used to conduct the testing.

This procedure shall not be interpreted to conflict with any portion of NHTSA TP-202aS-00, FMVSS 202a nor any amendment thereof within the applicable contract.

2.0 DATA SUMMARY

Summary data is provided below. Data for the configuration and the location of seating position tested provided in Section 5.0. Photographs are found in Section 6.0 and test plots are found in Section 7.0. The data recorded indicates that the 2009 Ford Flex tested appears to meet the requirements of FMVSS 202a.

Table 1. Summary Data

MGA Test #	Test Type	Seat Description
ES9546	Dimensional Measurements	Front LH 6-Way Power Cloth
ES9547	Dimensional Measurements	Front RH 2-Way Manual Cloth
DS9208	Energy Absorption	Front RH 2-Way Manual Cloth
ES9559	Height Retention	Front RH 2-Way Manual Cloth
ES9560	Backset Retention, Displacement and Strength	Front LH 6-Way Power Cloth

3.0 TEST VEHICLE INFORMATION

Table 2. General Test and Vehicle Parameter Data

VEH. MOD YR/MAKE/MODEL/BODY	2009 Ford Flex
VEH. NHTSA NO.	C90204
VIN	2FMDK51C09BA11234
COLOR	Dark Blue
VEH. BUILD DATE	07/08
TEST DATE	July 16 and 24, 2009
TEST LABORATORY	MGA Research Corporation
OBSERVERS	Chris Collins , Helen Kaleto, Dave Maier

GENERAL INFORMATION:

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Ford Motor Company

Date of Manufacture: 07/08 VIN: 2FMDK51C09BA11234

GVWR: 5,970 lbs GAWR FRONT: 2,890 lbs

GAWR REAR: 3,130 lbs

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 35 psi REAR: 35 psi

Recommended Tire Size: P235/60R18

Recommended Cold Tire Pressure:

FRONT: 35 psi REAR: 35 psi

Size of Tire on Test Vehicle: P234/60R18

Size of Spare Tire: T155/70D17

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ____; Bucket _X__; Split Bench___

Number of Occupants: Front _2_ ; Middle__5__; Rear _2_ TOTAL _7_.

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

MGA Research Corporation 446 Executive Drive Troy, Michigan 48083	
Test Equipment Used for Testing	**Calibration Due Date**
MGA Hydraulic Test Frame (202a)	N/A
Hydraulic Pump	N/A
MGA Data Acquisition System (202a)	12/31/2009
Inclinometer (Digital) - MGA00575	11/5/2009
Accelerometer - P47818, P47963	9/2/2009
LVDT's - H1, H3, T1, T3	9/9/2009
Load Cells - 500 lbs - 143138, 143538, 145489	9/4/2009

5.0 DATA

Table 3. S5.2.1-5.2.4 Dimensional Measurement

MGA Test #	Average H-Point (Reference Point)		S4.2.1 – Average Height (mm) (Req't>800 R/S at 1 adj. / No adjustments below 750)			S4.2.3-Average Backset (mm) Req't<55			S4.2.2-Width (mm) Req't>170	S4.2.4- Gaps Did Cylinder Pass Through? (Yes/No) Req't = No
	X (mm)	Z (mm)	H1	H2	H3	H1	H2	H3		
ES9546	-166	63	816	796	762	0	0	0	232	No
ES9547	-170	53	837	813	778	12	3	0	231	No

Table 4. S5.2.5 Energy Absorption

MGA Test #	Impact Angle (θ_h)	Impact Velocity (kph)	Accel 1 (g's)		Accel 2 (g's)		Post-Test Comments
			Peak	3msec Clip Req't<80	Peak	3msec Clip Req't<80	
DS9208	0.0	24.0	23.0	22.2	24.1	22.2	• No visible damage.

Table 5. S5.2.6 Height Retention

MGA Test #	Initial Displacement at 50 N (mm) Req't < 25	Max. Load (N) Req't=500 N (Hold 5 Sec.)	Height Retention (mm) Req't < 13	Post-Test Comments
ES9559	7.7	507	3.4	• The H/R successfully completed the load profile.

Table 6. S5.2.7 Backset Retention, Displacement and Strength

MGA Test #	H/R Type	H/R Test Position	Displaced Torso Angle (deg)	Initial Headform Disp. at 37 Nm (mm) Req't<25	Headform Disp. at 373 Nm (mm) Req't<102	Backset Retention (mm) Req't<13	Max Load Applied Through Headform (N) Req't>890	Headform Loading Axis Distance (mm)
ES9560	2-Way	Full Up (816)	27.4	11.5	-47.8	5.3	892	749

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DATA SHEET 1

SUMMARY OF RESULTS

VEH. MOD YR/MAKE/MODEL/BODY STYLE: 2009 Ford Flex

VEH. NHTSA NO.: C90204 ; VIN: 2FMDK51C09BA11234

VEH. BUILD DATE: July 2008 ; TEST DATE: July 16th and 24th, 2009

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Chris Collins, Helen Kaleto, David Maier

A. VISUAL INSPECTION OF TEST VEHICLE

Upon receipt for completeness, function, and discrepancies or damage which might influence the testing.

RESULTS:

B.	**DIMENSIONAL REQUIREMENTS**	**PASS**	**FAIL**	
	Driver's Side	X		
	Passenger's Side	X		
	Rear Designated Seating Positions	NA	NA	
C.	**OWNER'S MANUAL**	**PASS**	**FAIL**	
D.	**REMOVABILITY**	**PASS**	**FAIL**	**N/A**
	Driver's Side	X		
	Passenger's Side	X		
	Rear Designated Seating Positions	NA	NA	
E.	**NON-USE POSITION**	**PASS**	**FAIL**	**N/A**
	Rear Designated Seating Positions	NA	NA	
F.	**ENERGY ABSORPTION TEST**	**PASS**	**FAIL**	
	Driver's Side	NA	NA	
	Passenger's Side	X		

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	Rear Designated Seating Positions	NA	NA
G.	**HEIGHT RETENTION TEST**	**PASS**	**FAIL**
	Driver's Side	NA	NA
	Passenger's Side	X	
	Rear Designated Seating Positions	NA	NA
H.	**BACKSET RETENTION TEST**	**PASS**	**FAIL**
	Driver's Side	X	
	Passenger's Side	NA	NA
	Rear Designated Seating Positions	NA	NA

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

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DATA SHEET 2a

DIMENSIONAL REQUIREMENTS FOR FIXED HEAD RESTRAINTS

VEH. NHTSA NO.: C90204 TEST DATE: July 16th

Seat Location: Passenger 2-Way Manual (Cloth)

Height Measurement

SAE J826 three-dimensional manikin torso angle: 21°

Striker to H-Point (mm): NA Striker to H-Point angle: NA

Height, H (mm): 837 mm __X__ **PASS** **FAIL**

Hh > or = 800 mm for front seats.

If the head restraint is less than the required height, check for passage of the 25 mm diameter sphere.

Position the head restraint in the lowest position of vertical adjustment.

Height, H (mm): 778 mm __X__ **PASS** **FAIL**

Hh > or = 750 mm for front seats and rear seats with head restraints.

If the head restraint is less than the required height, check for passage of the 25 mm diameter sphere.

Width Measurement

If the manikin is moved between the Height measurement and the Width measurement, re-record the torso angle, striker to H-Point distance and angle.

Position the head restraint in the highest position of vertical adjustment.

Width is measured 65 mm below the measured Height, Hh.

Height, Hw (= H – 65): 772 mm

Width, W (mm): 231 mm __X__ **PASS** **FAIL**

Width must be greater than of equal to 170 mm. If a vehicle has a front center designated seating position the front outboard head restraints must be greater than or equal to 254 mm.

Backset Measurement (Front Head Restraints Only)

Position the HRMD and record the following measurements.

HRMD torso angle: 21°

Striker to H-Point (mm): NA Striker to H-Point angle: NA

Backset, B (mm): 0 mm __X__ **PASS** **FAIL**

Backset must be less than or equal to 55 mm.

Gap Measurement

Position the head restraint in the lowest position of vertical adjustment.

Number of gaps within the gap measurement zone: 3

Least dimension of each gap (measured with a steel tape): NA

Size of each gap (measured with the spherical head form): NA

Gap Size 25 mm Cylinder did not pass through each gap. __X__ **PASS** **FAIL**

Gaps must be less than or equal to 60 mm.

REMARKS:

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

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DATA SHEET 2b

DIMENSIONAL REQUIREMENTS FOR ADJUSTABLE HEAD RESTRAINTS

VEH. NHTSA NO.: C90204 TEST DATE: July 16th 2009

Seat Location: Driver 6-Way Power (Cloth)

Height Measurement

SAE J826 three-dimensional manikin torso angle: 21°

Striker to H-Point (mm): NA Striker to H-Point angle: NA

Position the head restraint in the highest position of vertical adjustment.

Height, Hh (mm): 816 mm __X__ **PASS** **FAIL**

Hh > or = 800 mm for front seats.

If the head restraint is less than the required height, check for passage of the 25 mm diameter sphere.

Position the head restraint in the lowest position of vertical adjustment.

Height, Hl (mm): 762 mm __X__ **PASS** **FAIL**

Hl > or = 750 mm for front seats and rear seats with head restraints.

If the head restraint is less than the required height, check for passage of the 25 mm diameter sphere.

Width Measurement

If the manikin is moved between the Height measurement and the Width measurement, re-record the torso angle, striker to H-Point distance and angle.

Position the head restraint in the highest position of vertical adjustment.

Width is measured 65 mm below the measured Height, Hh.

Height, Hw (= Hh – 65): 751 mm

Width, W (mm): 232 mm __X__ **PASS** **FAIL**

Width must be greater than of equal to 170 mm. If a vehicle has a front center designated seating position the front outboard head restraints must be greater than or equal to 254 mm.

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Backset Measurement (Front Head Restraints Only)

Position the HRMD and record the following measurements.

HRMD torso angle: 21°

Striker to H-Point (mm): NA Striker to H-Point angle: NA

Position the head restraint at a height greater than or equal to 750 mm and less than or equal to 800 mm for front head restraints. Exception: head restraint with lowest position higher than 800 mm, adjust to lowest position.

Backset, B (mm): 0 mm __X__ **PASS** **FAIL**

Backset must be less than or equal to 55 mm.

Gap Measurement

Position the head restraint in the lowest position of vertical adjustment.

Number of gaps within the gap measurement zone: 3

Least dimension of each gap (measured with a steel tape): NA

Size of each gap (as measured with the spherical head form): NA

Gap Size 25 mm Cylinder did not pass through each gap. __X__ **PASS** **FAIL**

Gaps must be less than or equal to 60 mm.

REMARKS:

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

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DATA SHEET 3

OWNER'S MANUAL

VEH. NHTSA NO.: C90204 TEST DATE: July 24th 2009

Emphasize that all occupants should place their head restraint in a proper position prior to operating the vehicle in order to prevent the risk of serious injury.

PASS X **FAIL** ____

Description of the head restraint system and identification of which seats are equipped.

PASS X **FAIL** ____

If the head restraint is removable, instructions on how to properly remove and reinstall using a deliberate action distinct from any act necessary for adjustment.

PASS X **FAIL** ____ **N/A** ____

Warning that all head restraints must be reinstalled properly to protect occupants.

PASS X **FAIL** ____

Describe the adjustment of the head restraints and/or seat back to achieve proper head restraint position relative the head. The description must include the following:

1) a presentation and explanation of the main components of the vehicle's head restraints

2) the basic requirements for proper head restraint operation, including an explanation of the actions that may affect the proper functioning of the head restraints.

3) the basic requirements for proper positioning of a head restraint in relation to an occupant's head position, including information regarding the proper positioning of the center of gravity of an occupant's head in relation to the head restraint.

PASS X **FAIL**

Include copies of relevant pages from the owner's manual in the final report.

REMARKS:

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

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DATA SHEET 4

REMOVABILITY

VEH. NHTSA NO.: C90204 TEST DATE: July 24th 2009

Are the head restraints removable? **YES** X **NO**

If removable, does removal REQUIRE an action distinct from actions to adjust the head restraint? X **YES (PASS)** **NO (FAIL)**

Description of action(s) for head restraint adjustment:

1. Raise the head restraint by pulling up on the head restraint.
2. Lower the head restraint by pressing and holding the guide sleeve adjust/release button and pushing down on the head restraint.

Description of distinct action for removal:

1. Pull up the head restraint until it reaches the highest adjustment position.
2. Simultaneously press and hold both the adjust/release button and the unlock/remove button, and then pull up on the head restraint.

REMARKS:

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

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DATA SHEET 5

ENERGY ABSORPTION TEST

VEH. NHTSA NO.: C90204 TEST DATE: July 24th 2009

Seat Location: Passenger 2-Way Manual Type of head restraint: Adjustable

635 mm Height Measurement for lower boundary of the impact zone

SAE J826 three-dimensional manikin torso angle: 21°

Striker to H-Point (mm): NA Striker to H-Point angle: NA

Accelerometer identification: P47818, P47963 Accelerometer type/brand: Endevco

Last calibration date: March 2nd 2009

Head form vertical angle (-2° - +2°): 0.2°

Distance between head form and target location (> or = 25 mm): 300 mm

Impact velocity (23.6 kph ± 0.5 kph): 24.00 kph

Impact location: 635 mm above the h-point and within 70 mm of vertical centerline.

Maximum deceleration (< or = 785 m/s² (80 g)): 22.2 g's __X__ **PASS** **FAIL**

REMARKS: HR test position was full down for testing.

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

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DATA SHEET 6

HEIGHT RETENTION TEST (ADJUSTABLE HEAD RESTRAINTS ONLY)

VEH. NHTSA NO.: C90204 TEST DATE: July 24th 2009

Seat Location: Passenger 2-Way Manual (Cloth)

Pre-test measurements

SAE J826 Manikin torso angle: 21° Top of Head Restraint Height (mm): 837 mm

Striker to H-Point (mm): NA Striker to H-Point angle: NA

Description of height retention lock: Spring loaded button catch.

Test measurements

Initial load (50 N ± 1 N): 50 N Initial Displacement, D1 (mm): 7.7 mm

Initial Displacement (D1) < 25 mm yes X **PASS** **FAIL**

Maximum load (495 N ± 5 N): 507 N Maximum Displacement, D2 (mm):

Return load (50 N ± 1 N): 50 N Return Displacement, D3 (mm):

Total displacement (D3-D1) < 13 mm: X **PASS** **FAIL**

REMARKS: HR test position was full up.

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

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DATA SHEET 8

BACKSET RETENTION TEST

VEH. NHTSA NO.: C90204 TEST DATE: July 24th 2009

Seat Location: Driver 6-Way Power (Cloth) Type of head restraint: Adjustable

Pre-test measurements

SAE J826 Manikin torso angle: 21° Top of Head Restraint Height (mm):

Striker to H-Point (mm): NA Striker to H-Point angle: NA

Displacement torso reference line

Test device back pan angle: 27.4°

Distance from the H-point to the initial location of the load (0.290 ± 0.013 m): 290 m

Initial load (N): 1,286 N Initial moment (373 ± 7.5 Nm): 373 Nm

Backset retention and strength

Distance from the H-point to the head form tangency point (m): 749 m

Initial load (N): 49 N Initial moment (37 ± 0.7 Nm): 37 Nm

Initial head form displacement, D1 (< or = 25 mm): 11.5 mm X **PASS** **FAIL**

Load range to generate a 373 ± 7.5 Nm rearward moment (N): 498 N

Actual load applied (N): 498 N Resultant moment (Nm): 373 Nm

Maximum Head form displacement, D2 (< or = 102 mm): -47.8 mm X **PASS** **FAIL**

Final head form displacement, D3 (mm): 16.8 ,,
measured at (37 ± 0.7 Nm)

Total displacement (D3-D1) < 13 mm : 5.3 mm X **PASS** **FAIL**

Maximum applied load (> or equal to 885 N): 892 N X **PASS** **FAIL**

REMARKS: HR test position was full up.

RECORDED BY: Chris Collins DATE: July 24th 2009

APPROVED BY: Helen Kaleto

6.0 PHOTOGRAPHS

6.1 Front view

6.2 Rear view

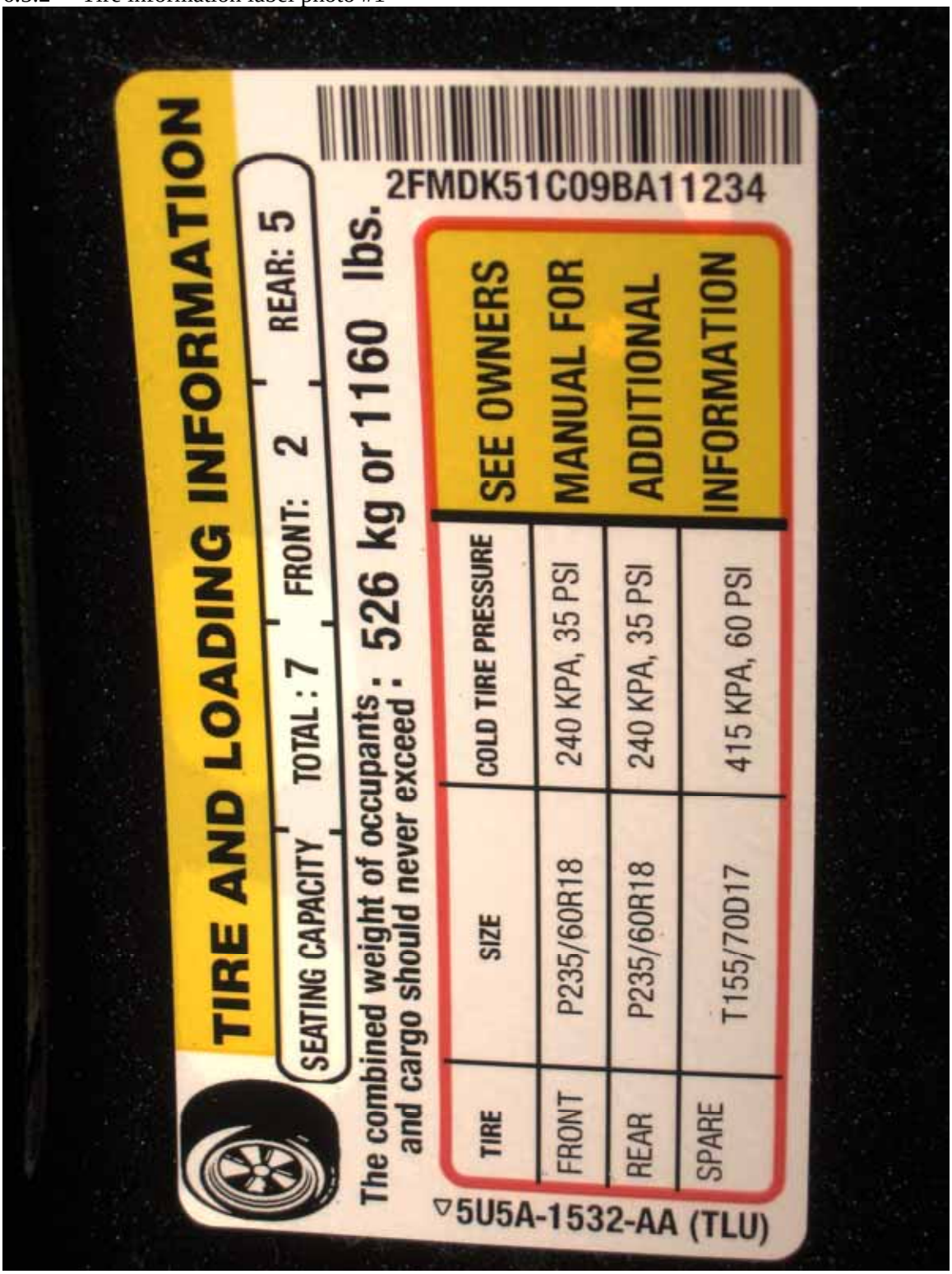
6.3 Front left view

6.4 Front right view

6.5 Test vehicle's certification label

6.5.1 Certification label photo #1

6.5.2 Tire information label photo #1



6.6 S5.2.1-5.2.4 Dimensional Measurements

6.6.1 Driver Test Photo #1

6.6.2 Driver Test Photo #2

6.6.3 Passenger Test Photo #1

6.6.4 Passenger Test Photo #2

6.6.5 Passenger Test Photo #3

6.7 S5.2.5 Energy Absorption

6.7.1 Pre-Test Photo #1

6.7.2 Pre-Test Photo #2

6.7.3 Post-Test Photo #1

6.7.4 Post-Test Photo #2

6.8 S5.2.6 Height Retention

6.8.1 Test Photo #1

6.8.2 Test Photo #2

6.8.3 Test Photo #3

6.8.4 Test Photo #4

6.8.5 Test Photo #5

6.8.6 Test Photo #6

6.8.7 Test Photo #7

6.8.8 Test Photo #8

6.9 S5.2.7 Backset Retention, Displacement and Strength

6.9.1 Test Photo #1

6.9.2 Test Photo #2

6.9.3 Test Photo #3

6.9.4 Test Photo #4

6.9.5 Test Photo #5

6.9.6 Test Photo #6

6.9.7 Test Photo #7

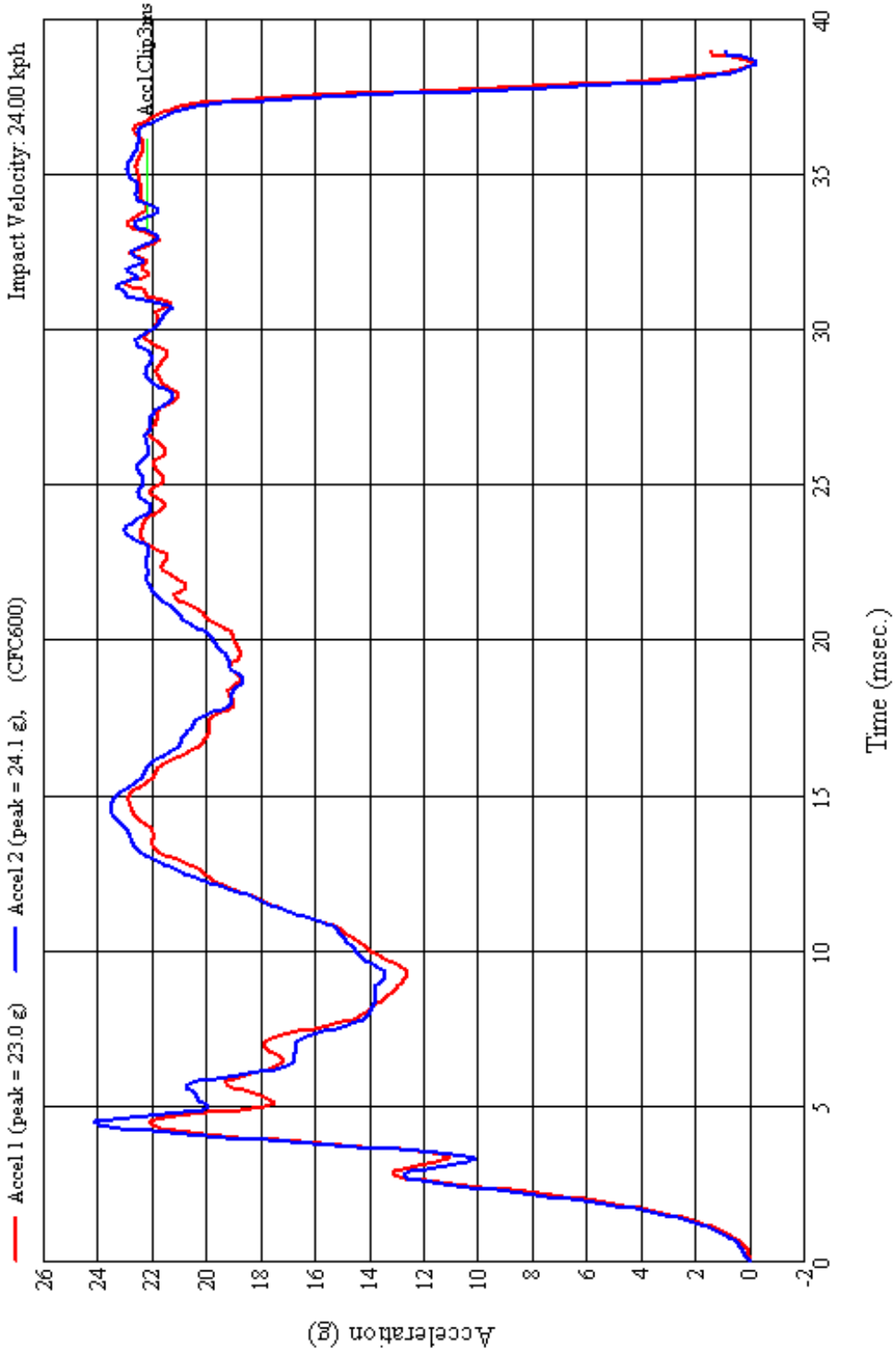
6.9.8 Test Photo #8

6.9.9 Test Photo #9

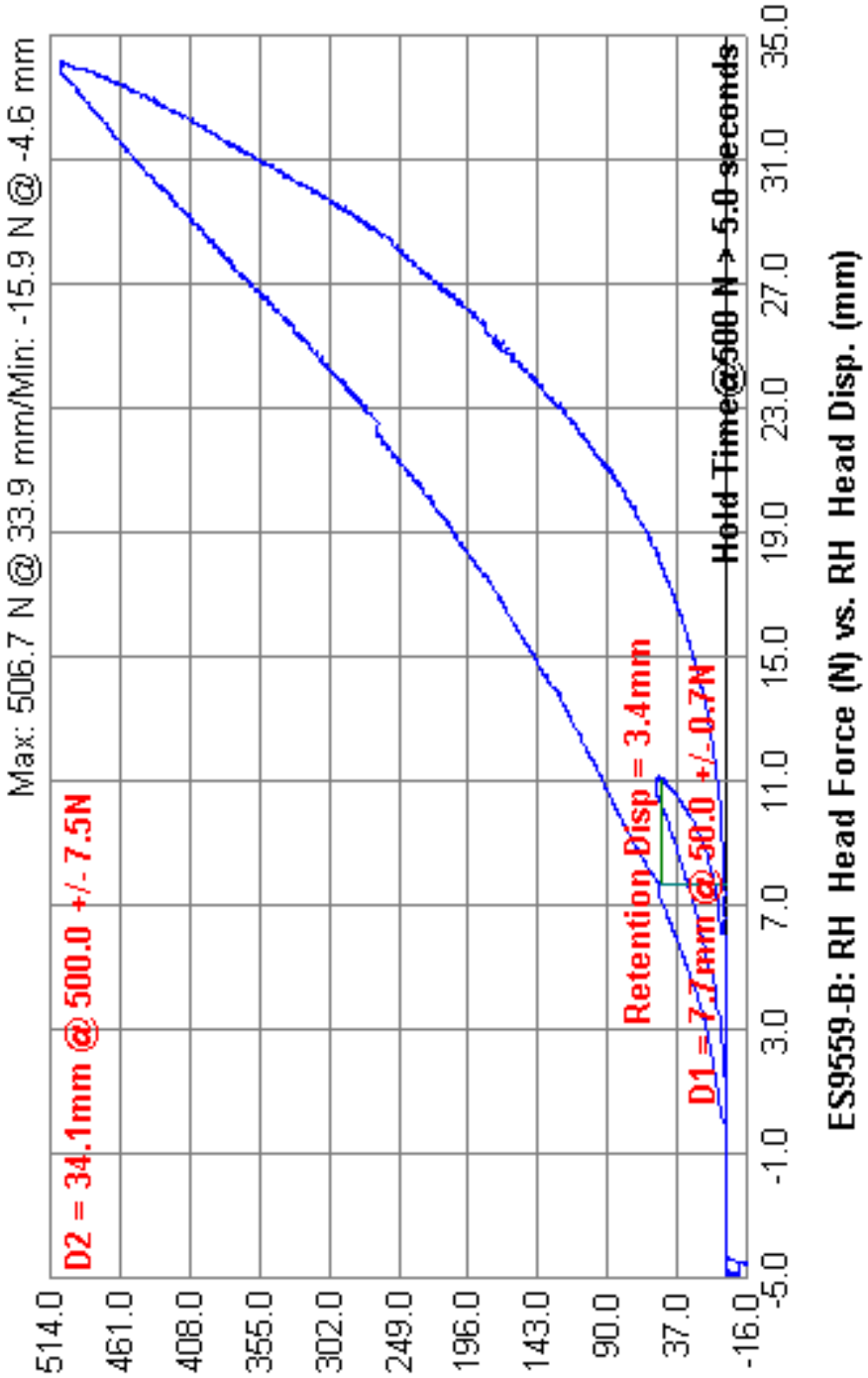
6.9.10 Test Photo #10

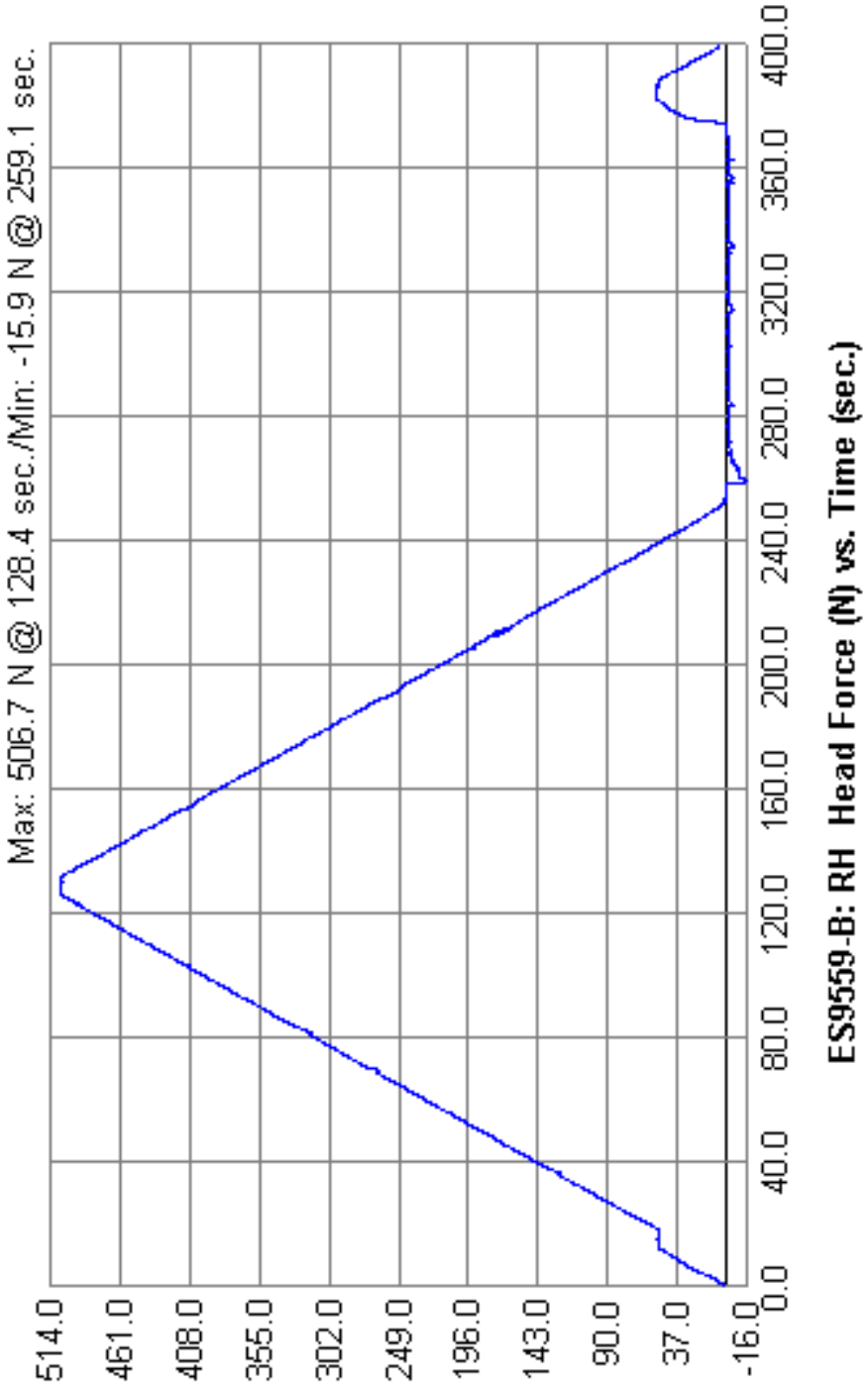
7.0 PLOTS

7.1 S5.2.5 Energy Absorption



S5.2.6 Height Retention

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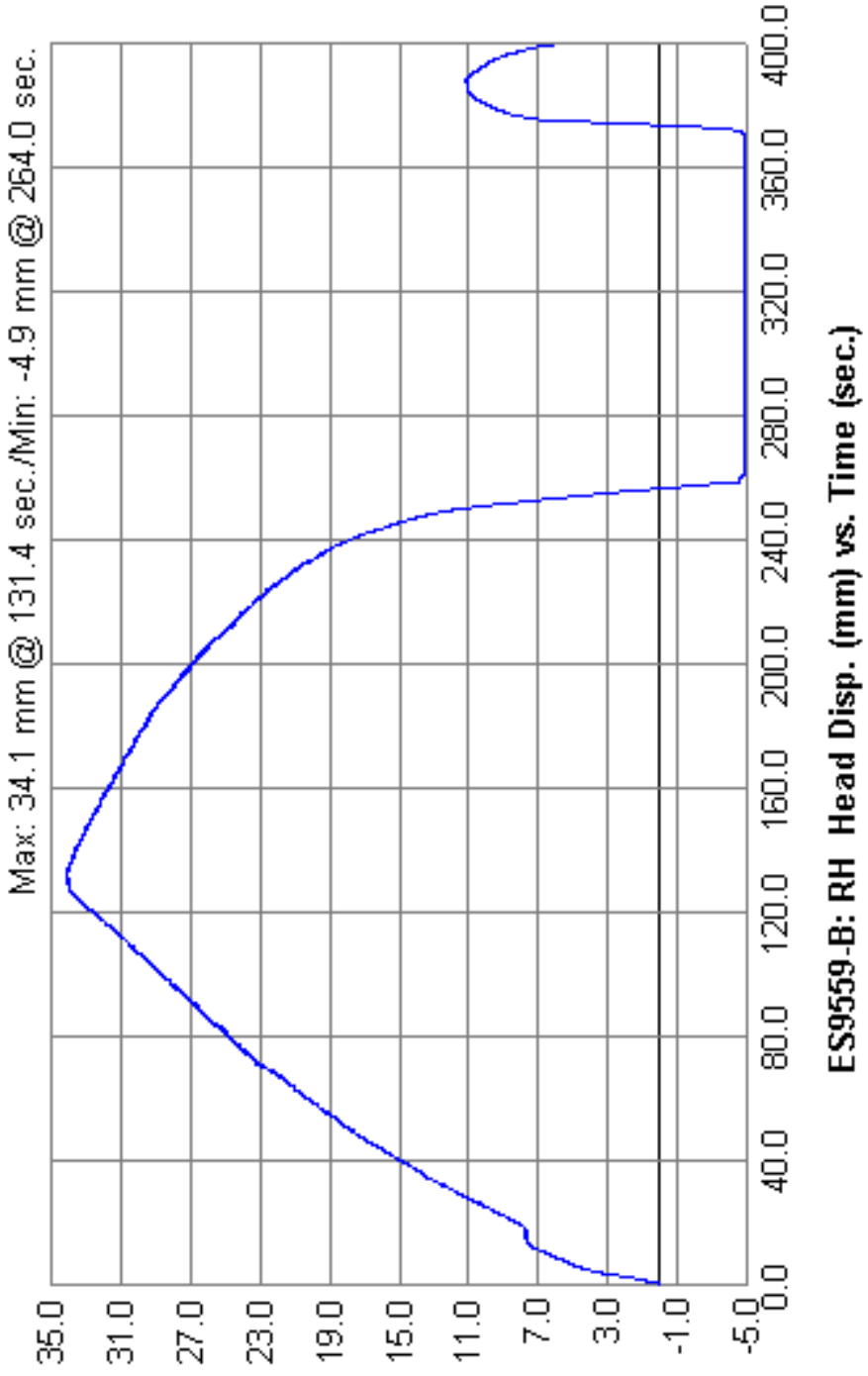
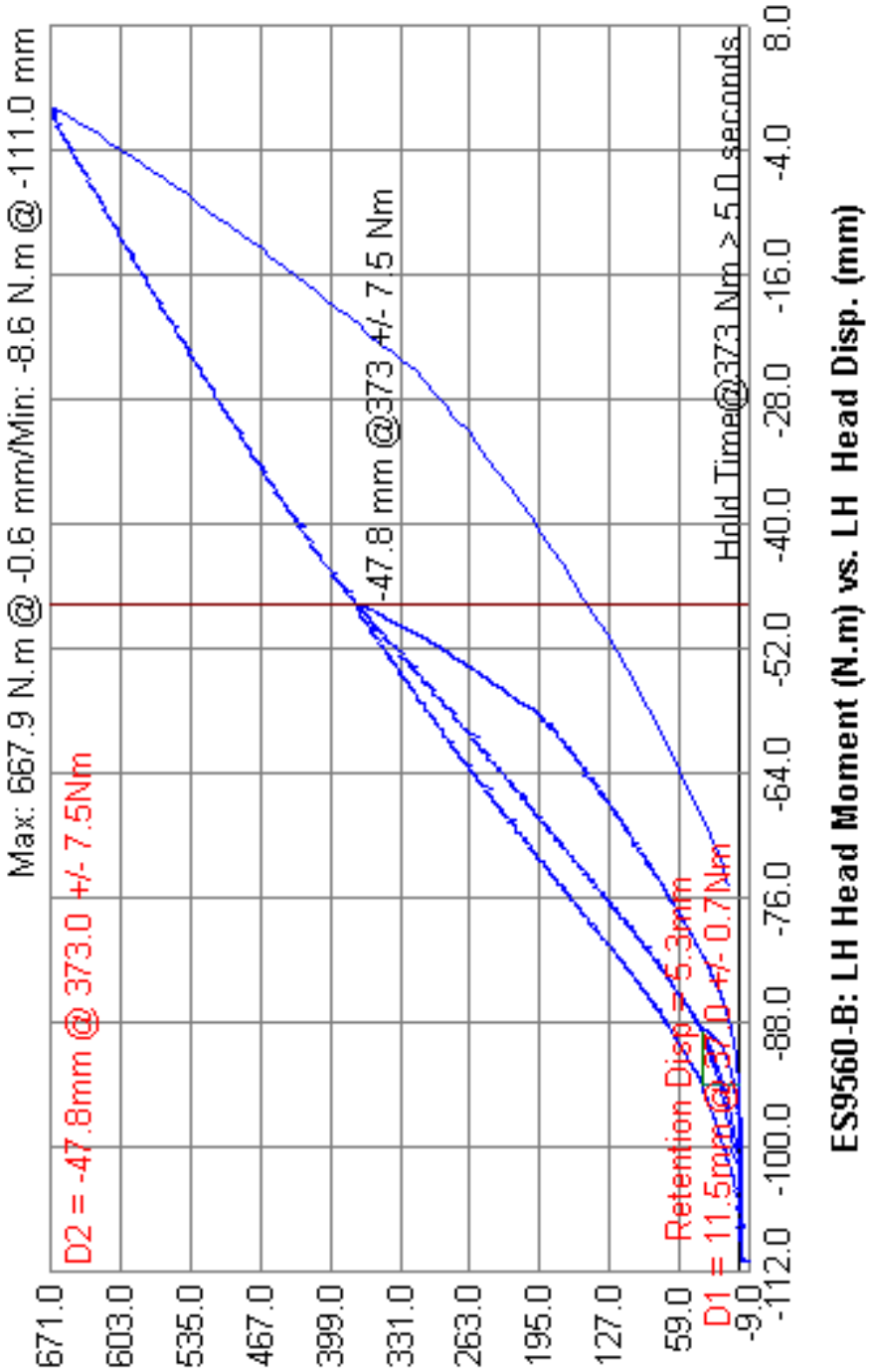
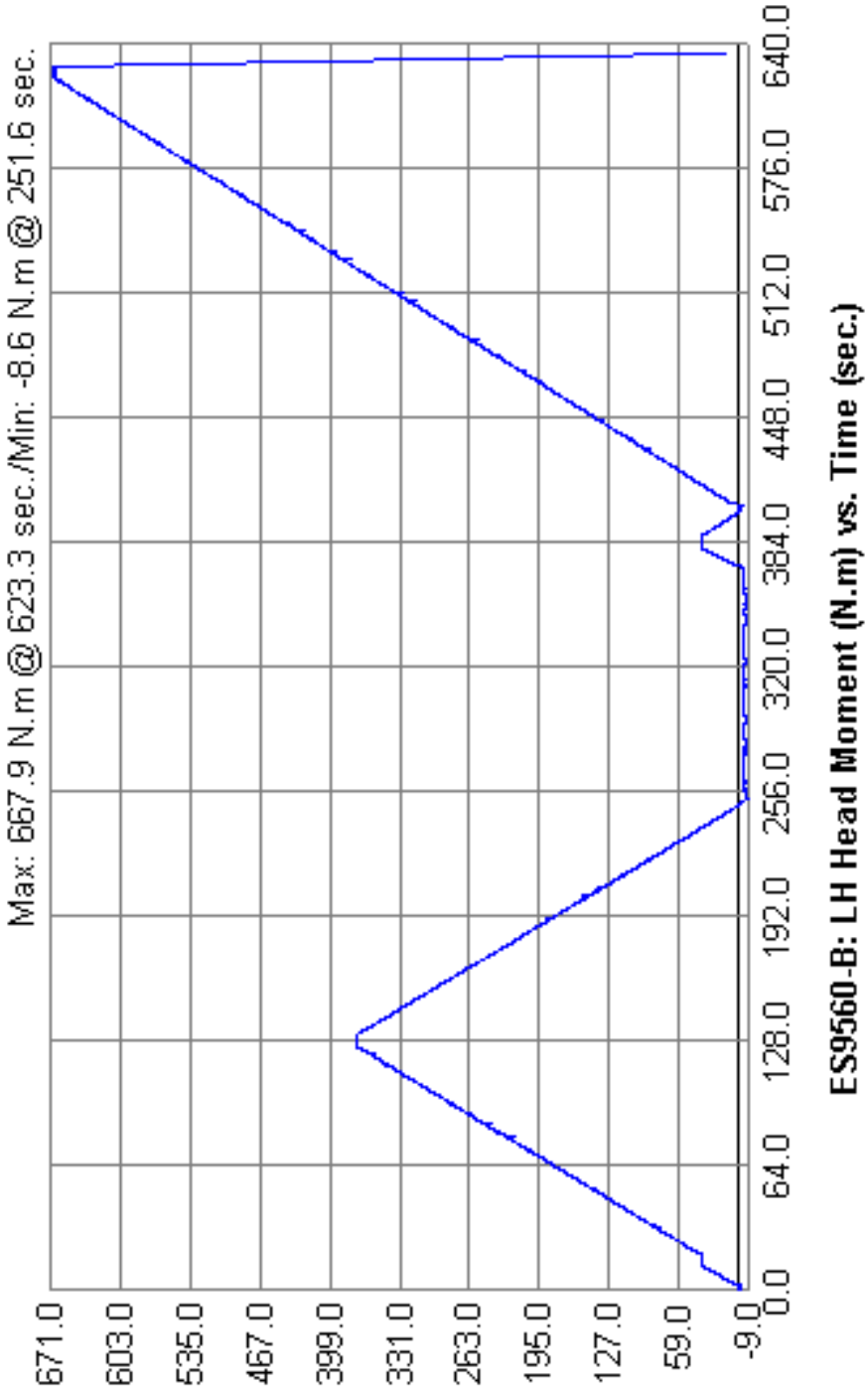
514.0
461.0
408.0
355.0
302.0
249.0
196.0
143.0
90.0
37.0
-16.0
0.0
40.0
80.0
120.0
160.0
200.0
240.0
280.0
320.0
360.0
400.0
ES9559-B: RH Head Force (N) vs. Time (sec.)


Max: 34.1 mm @ 131.4 sec./Min: -4.9 mm @ 264.0 sec.
ES9559-B: RH Head Disp. (mm) vs. Time (sec.)
35.0
31.0
27.0
23.0
19.0
15.0
11.0
7.0
3.0
-1.0
-5.0
0.0
40.0
80.0
120.0
160.0
200.0
240.0
280.0
320.0
360.0
400.0

7.3 S5.2.7 Backset Retention, Displacement and Strength

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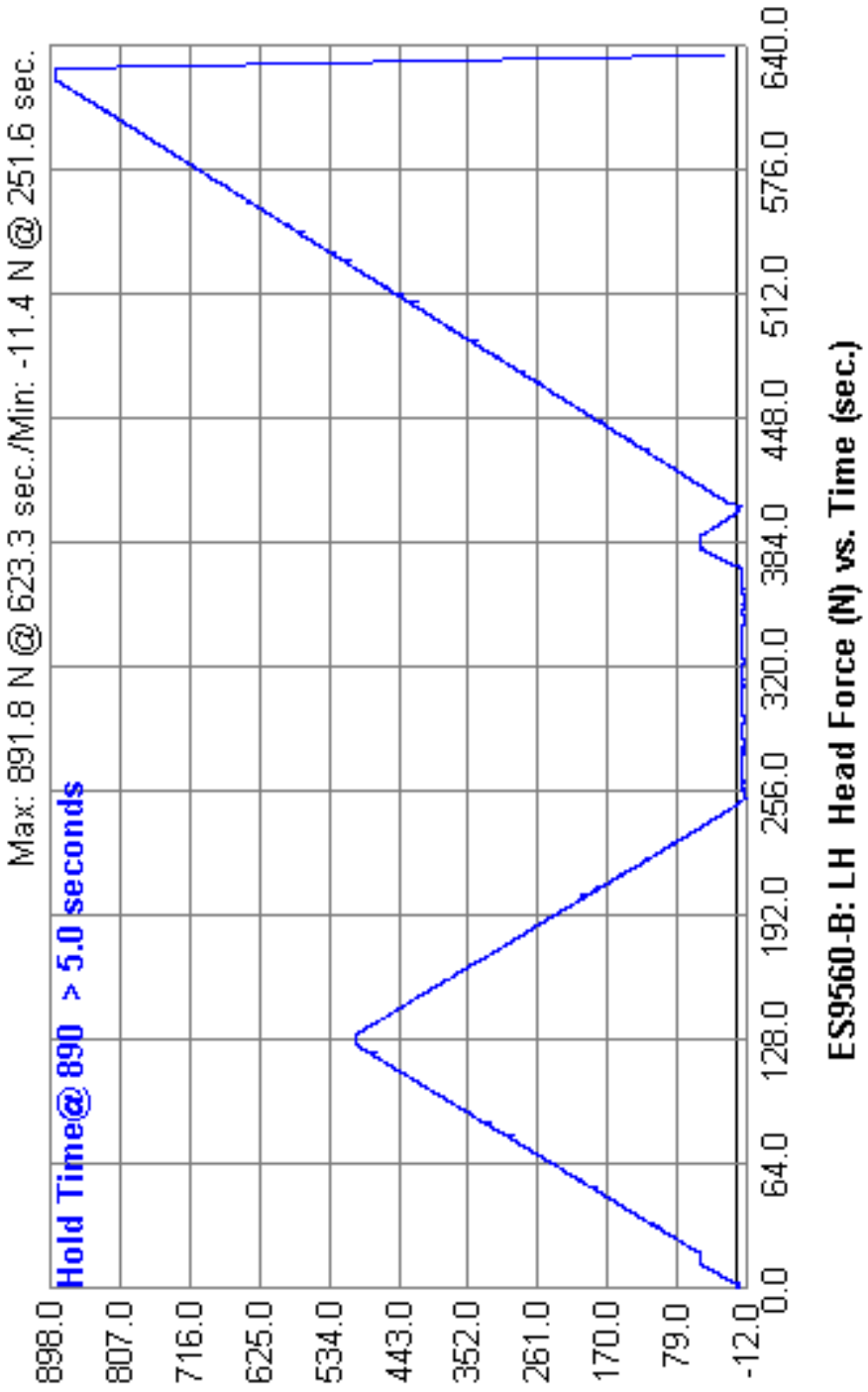
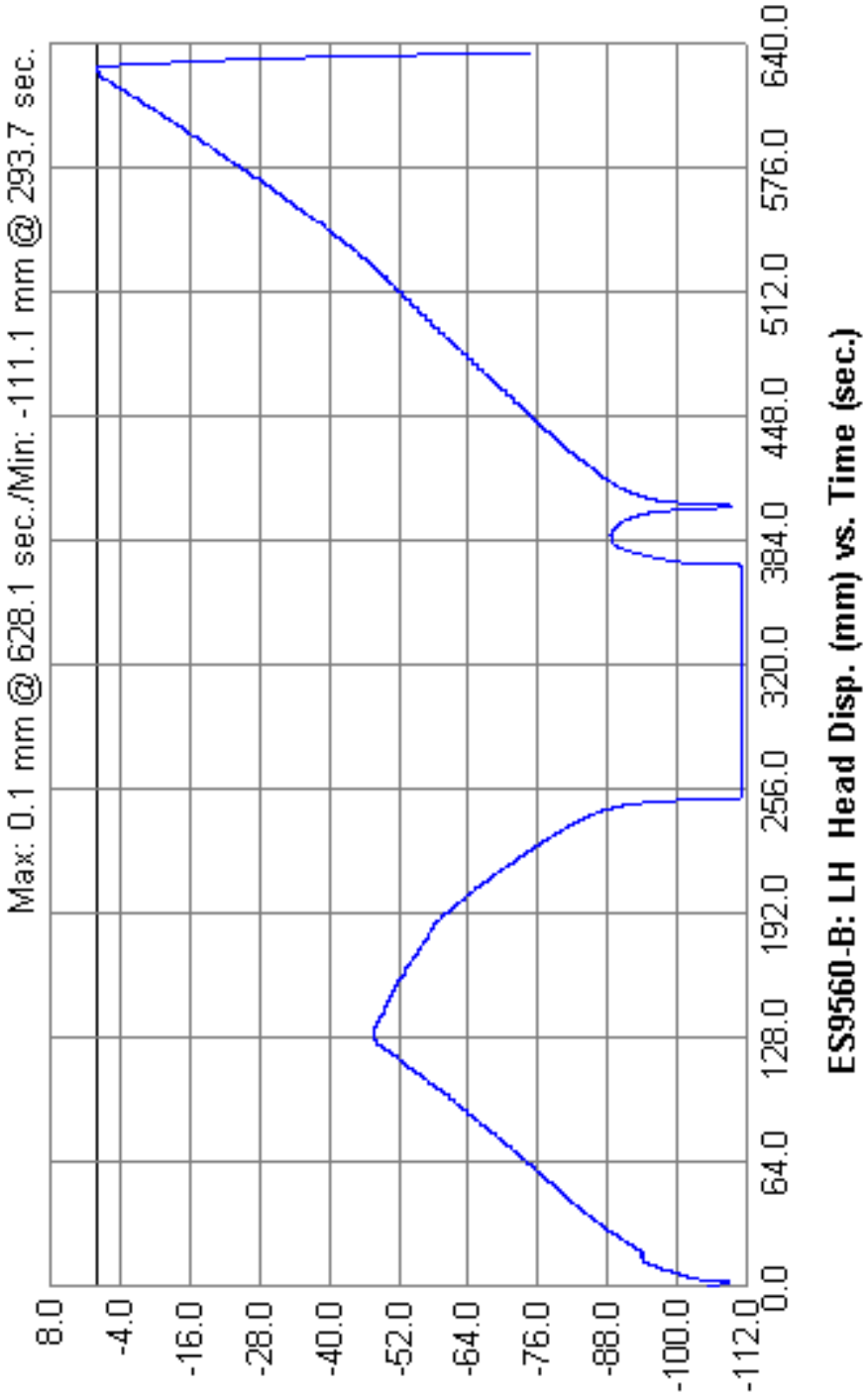
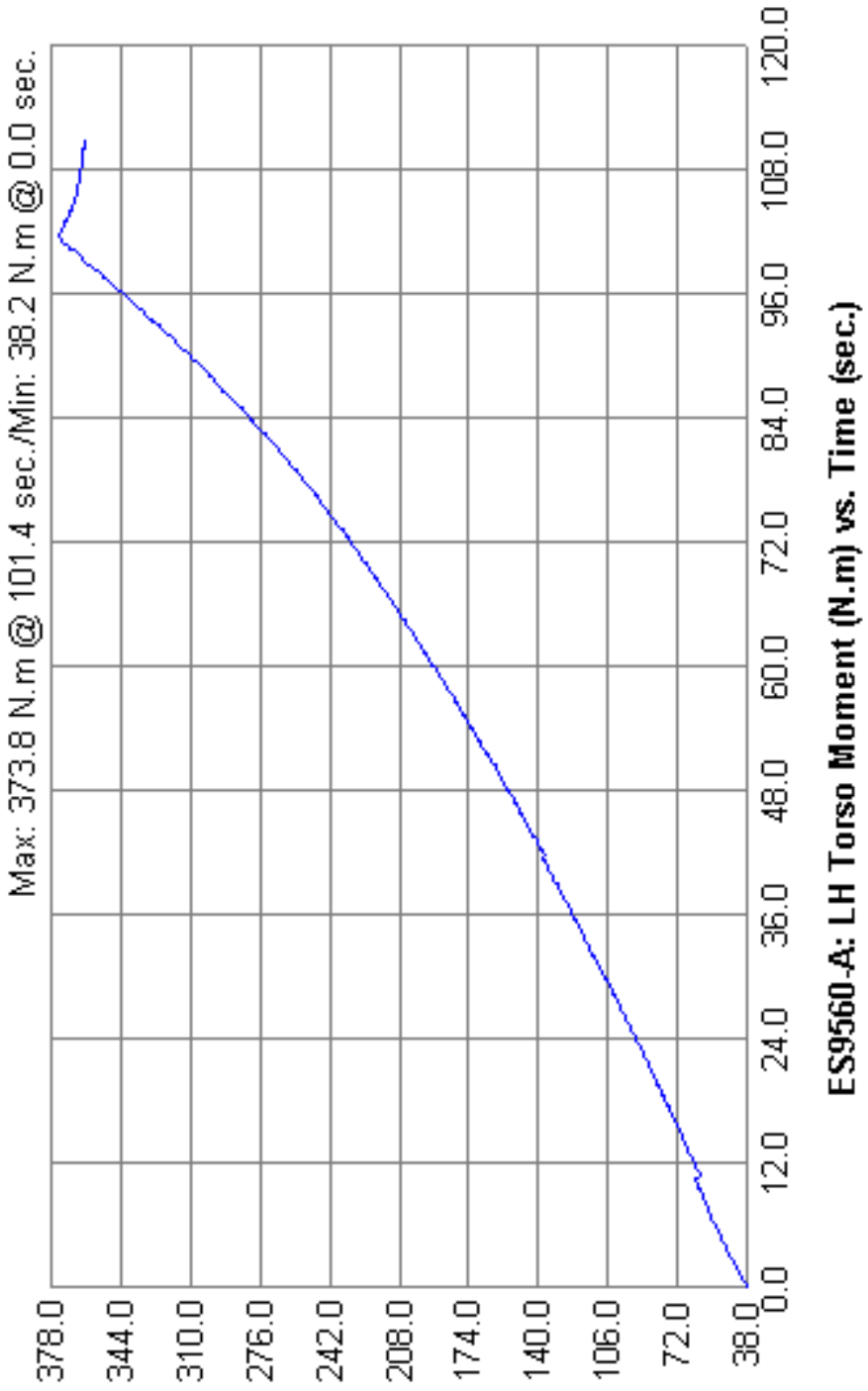
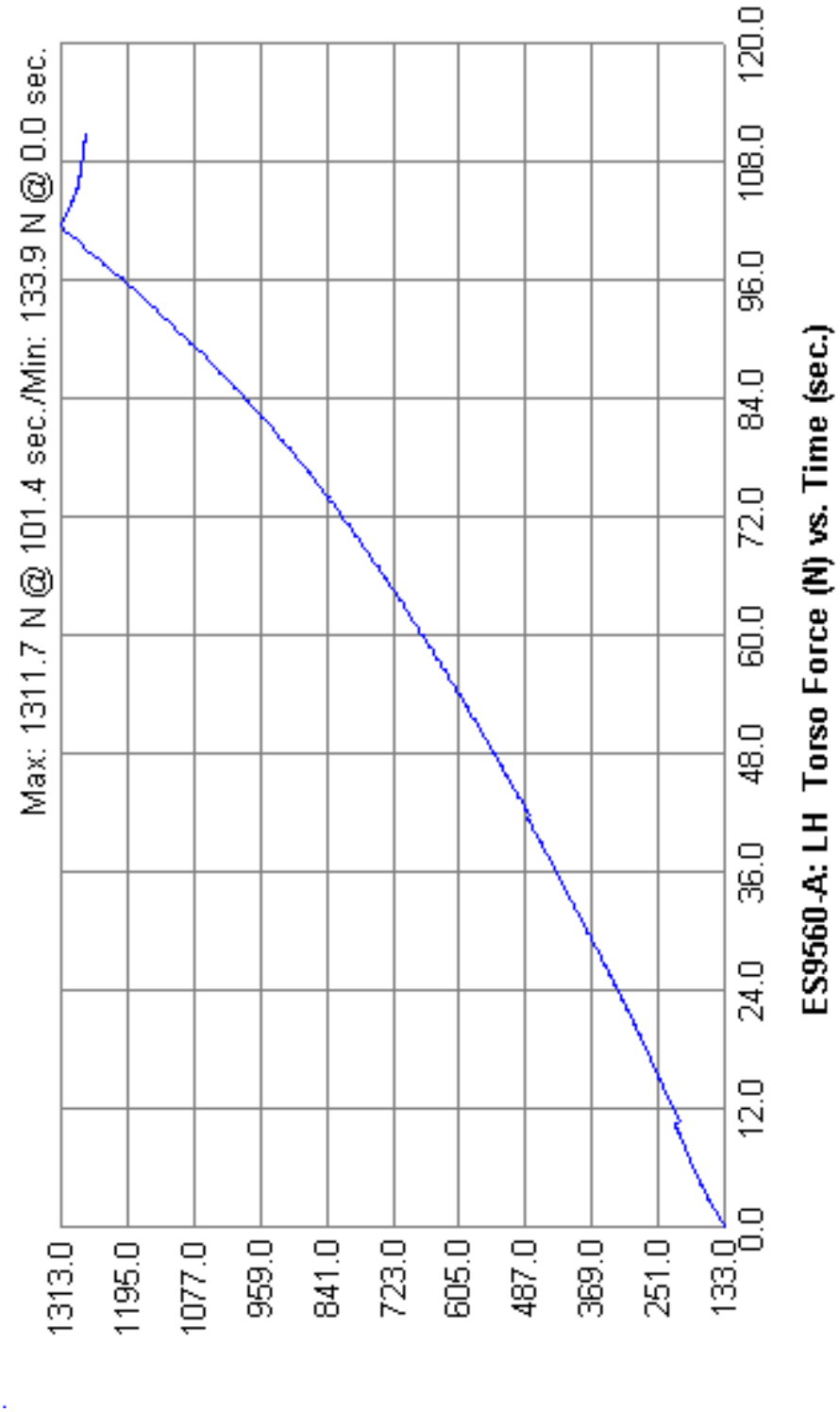
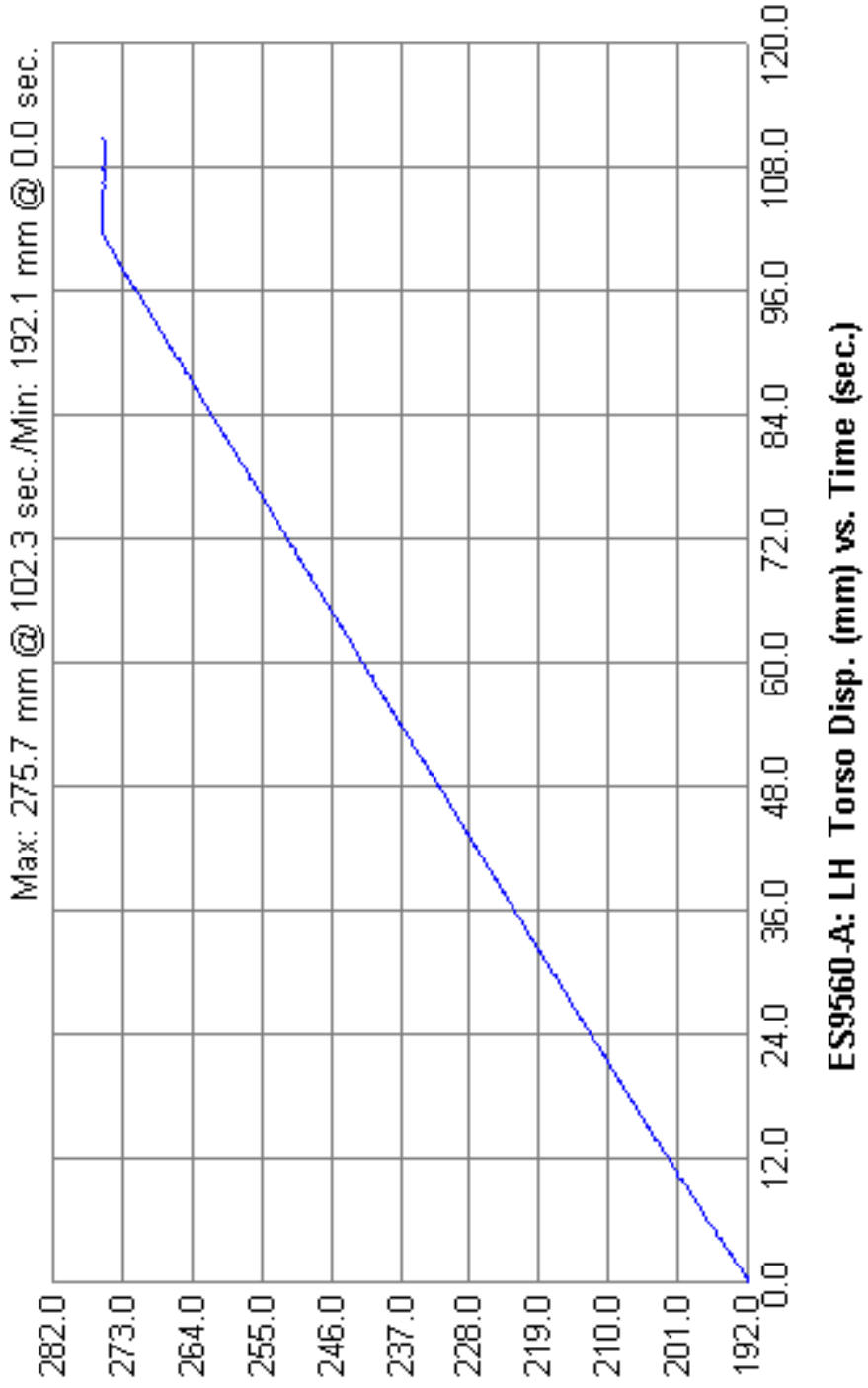
671.0
603.0
535.0
467.0
399.0
331.0
263.0
195.0
127.0
59.0
-9.0
0.0
64.0
128.0
192.0
256.0
320.0
384.0
448.0
512.0
576.0
640.0
ES9560-B: LH Head Moment (N.m) vs. Time (sec.)


Max: 891.8 N @ 623.3 sec./Min: -11.4 N @ 251.6 sec.
Hold Time@ 890 > 5.0 seconds
898.0
807.0
716.0
625.0
534.0
443.0
352.0
261.0
170.0
79.0
-12.0
0.0
64.0
128.0
192.0
256.0
320.0
384.0
448.0
512.0
576.0
640.0
ES9560-B: LH Head Force (N) vs. Time (sec.)


Max: 0.1 mm @ 628.1 sec./Min: -111.1 mm @ 293.7 sec.
8.0
-4.0
-16.0
-28.0
-40.0
-52.0
-64.0
-76.0
-88.0
-100.0
-112.0
0.0
64.0
128.0
192.0
256.0
320.0
384.0
448.0
512.0
576.0
640.0
ES9560-B: LH Head Disp. (mm) vs. Time (sec.)


Max: 373.8 N.m @ 101.4 sec./Min: 38.2 N.m @ 0.0 sec.
ES9560-A: LH Torso Moment (N.m) vs. Time (sec.)
378.0
344.0
310.0
276.0
242.0
208.0
174.0
140.0
106.0
72.0
38.0
0.0
12.0
24.0
36.0
48.0
60.0
72.0
84.0
96.0
108.0
120.0


Max: 1311.7 N @ 101.4 sec./Min: 133.9 N @ 0.0 sec.
ES9560-A: LH Torso Force (N) vs. Time (sec.)
1313.0
1195.0
1077.0
959.0
841.0
723.0
605.0
487.0
369.0
251.0
133.0
0.0
12.0
24.0
36.0
48.0
60.0
72.0
84.0
96.0
108.0
120.0


Max: 275.7 mm @ 102.3 sec./Min: 192.1 mm @ 0.0 sec.
282.0
273.0
264.0
255.0
246.0
237.0
228.0
219.0
210.0
201.0
192.0
0.0
12.0
24.0
36.0
48.0
60.0
72.0
84.0
96.0
108.0
120.0
ES9560-A: LH Torso Disp. (mm) vs. Time (sec.)

8.0 REPORT OF VEHICLE CONDITION

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT No.: DTNH22-06-C-00030/0007 DATE: July 16 and 24, 2009

From: MGA Research Corporation, 446 Executive Drive, Troy, MI 48083

To: NHTSA, OVSC, NVS-220

The following vehicle has been subjected to compliance testing for FMVSS No. 201U & 202a

The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrial Property Manager (NAD0-30), with a copy to the OVSC COTR. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

VEH. MOD YR/MAKE/MODEL/BODY: 2009 Ford Flex

VEH. NHTSA NO.: C90204 VIN: 2FMDK51C09BA11234

COLOR: Dark Blue

ODOMETER READINGS: ARRIVAL 196 miles Date: 2/12/09

COMPLETION 196 miles Date: 7/24/09

PURCHASE PRICE: $24,961.40 DEALER'S NAME: Soerens Ford

ENGINE DATA: 6 Cylinders 3.5 Liters ___ Cubic Inches

TRANSMISSION DATA: X Automatic ___ Manual 6 No. of Speeds

FINAL DRIVE DATA: ___ Rear Drive ___ Front Drive X 4 Wheel Drive

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT:

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Chris Collins, Helen Kaleto, Dave Maier

X	Air Conditioning		Traction Control	X	Clock
X	Tinted Glass	X	All Wheel Drive		Roof Rack
X	Power Steering	X	Speed Control	X	Console
X	Power Windows	X	Rear Window Defroster	X	Driver Air Bag
X	Power Door Locks		Sun Roof or T-Top	X	Passenger Air Bag
X	Power Seat(s)		Tachometer	X	Front Disc Brakes
X	Power Brakes	X	Tilt Steering Wheel	X	Rear Disc Brakes
X	Antilock Brake System	X	AM/FM/Compact Disc		Other

REMARKS:

Salvage only.

Equipment that is no longer on the test vehicle as noted on previous pages:

All equipment inventoried and placed in vehicle.

Explanation for equipment removal:

Roof removed and vehicle cut to accommodate test equipment.

Test Vehicle Condition:

Salvage only. Vehicle cut in half to complete testing.

RECORDED BY: Chris Collins, David Maier DATE: July 24, 2009

APPROVED BY: Helen Kaleto

APPENDIX A
OWNERS MANUAL HEAD RESTRAINTS

SEATING

WARNING: Reclining the seatback can cause an occupant to slide under the seat's safety belt, resulting in severe personal injuries in the event of a collision.

WARNING: Do not pile cargo higher than the seatbacks to reduce the risk of injury in a collision or sudden stop.

WARNING: Before returning the seatback to its original position, make sure that cargo or any objects are not trapped behind the seatback. After returning the seatback to its original position, pull on the seatback to ensure that it has fully latched. An unlatched seat may become dangerous in the event of a sudden stop or collision.

Adjustable head restraints

Your vehicle is equipped with front row outboard head restraints that are vertically adjustable.

WARNING: To minimize the risk of neck injury in the event of a crash, the driver and passenger occupants should not sit in and/or operate the vehicle, until the head restraint is placed in its proper position. The driver should never adjust the head restraint while the vehicle is in motion.

The adjustable head restraints consist of:

- a trimmed energy absorbing foam and structure (1),
- two steel stems (2),
- a guide sleeve adjust/release button (3),
- and a guide sleeve unlock/remove button (4).

To adjust the head restraint, do the following:

1. Adjust the seatback to an upright driving/riding position. Refer to *Adjusting the front manual seat* later in this chapter.
2. Raise the head restraint by pulling up on the head restraint.

3. Lower the head restraint by pressing and holding the guide sleeve adjust/release button and pushing down on the head restraint.

Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

WARNING: The adjustable head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

Seating and Safety Restraints

To remove the adjustable head restraint, do the following:

1. Pull up the head restraint until it reaches the highest adjustment position.

2. Simultaneously press and hold both the adjust/release button and the unlock/remove button, then pull up on the head restraint.

To reinstall the adjustable head restraint, do the following:

1. Insert the two stems into the guide sleeve collars.
2. Push the head restraint down until it locks.

Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

Seating and Safety Restraints

WARNING: To minimize the risk of neck injury in the event of a crash, head restraints must be installed properly.

Adjusting the front manual seat (if equipped)

WARNING: Never adjust the driver's seat or seatback when the vehicle is moving.

WARNING: Always drive and ride with your seatback upright and the lap belt snug and low across the hips.

Lift handle to move seat forward or backward.

Pull lever up to adjust seatback.

WARNING: Before returning the seatback to its original position, make sure that cargo or any objects are not trapped behind the seatback. After returning the seatback to its original position, pull on the seatback to ensure that it has fully latched. An unlatched seat may become dangerous in the event of a sudden stop or collision.

APPENDIX B
MANUFACTURER'S DATA (OVSC FORM-SRP)

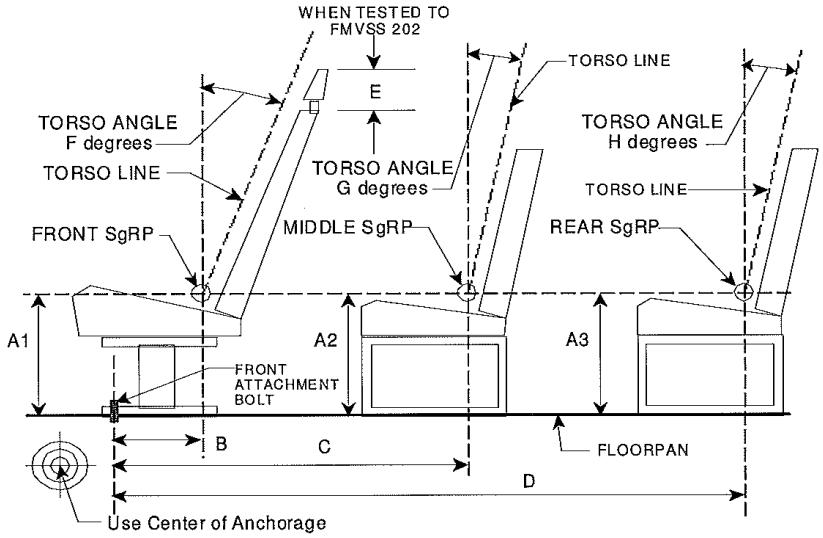
FORM – SRP
Rev. 01/24/07

SEATING REFERENCE POINT (SRP) AND TORSO ANGLE DATA

FMVSS No. 201, 202, 203, 207 & 210
(All dimensions in inches)

Model Year: 2009 / Make: Ford / Model: Flex

Body Style: Crossover Utility / Seat Style: 3 Row, 6/7 Pass



LEFT SIDE VIEW OF TEST VEHICLE

DIMENSION	FRONT, A1	MIDDLE, A2	REAR, A3
A	12.09	9.93 (O/B), 10.63 (Ctr)	12.47^
B	14.86		
C	53.61 (O/B), 52.12 (Ctr)		
D	85.04		
E	7.95		
F	21 Deg.		
G	21 Deg.		
H	20 Deg.		

^ Third row A3 dimension reference is floor pan under second row risers.

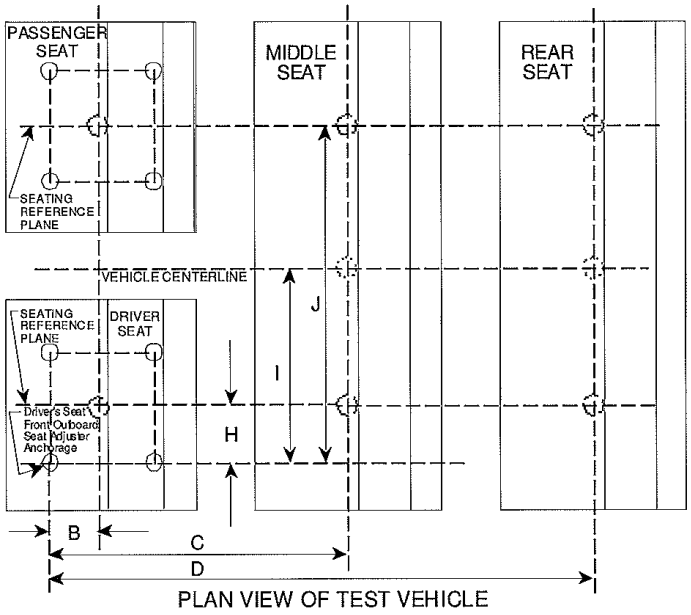
2

SEATING REFERENCE POINT (SRP) AND TORSO ANGLE DATA

FMVSS No. 201, 202, 203, 207 & 210
(All dimensions in inches)

Model Year: 2009 / Make: Ford / Model: Flex

Body Style: Crossover Utility / Seat Style: 3 Row, 6/7 Pass



PLAN VIEW OF TEST VEHICLE

B	14.86
C	53.61 (O/B), 52.12 (Ctr)
D	85.04
H*	8.03 (1st row), 7.21 (2nd row), 13.00 (3rd row)
I*	22.92
J*	37.81 (1st row), 38.63 (2nd row), 32.84 (3rd row)

* Provide all dimensions needed to locate SRP.

FORM – SRP

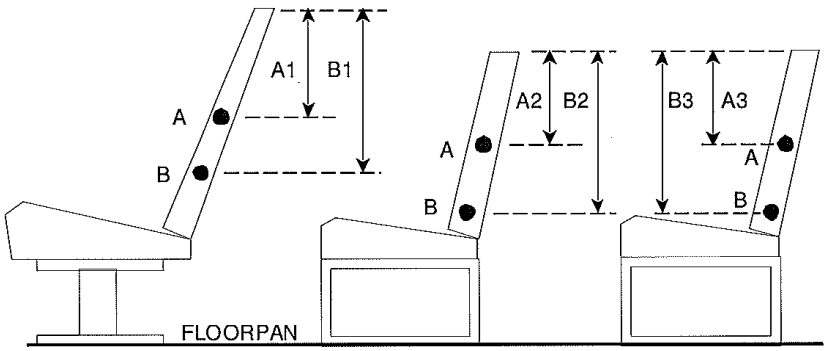
3

TEST VEHICLE SEAT INFORMATION

FMVSS No. 201, 202, 203, 207 & 210
(All dimensions in inches)

Model Year: 2009 / Make: Ford / Model: Flex

Body Style: Crossover Utility / Seat Style: 3 Row 6/7 Pass



LEFT SIDE VIEW OF VEHICLE

Note: A: CG of Seat Back
B: CG of total seating system

			FRONT	2nd ROW	3rd ROW
A1	10.74 (RH Pwr), 12.53 (RH Man), 10.81 (LH)				
B1	19.62 (RH Pwr), 19.12 (RH Man), 19.26 (LH)	Weight of Hinged or Folding portion of seat (lbs)	27.8 RHP, 25.7, RHM, 24.2 LH	37.8 (60%), 17.3 (40%)	11.6
A2	13.16 (60%), 9.22 (40%)	Weight of Total Seat System	68.8 RHP, 54.1 RHM, 63.5 LH	75.6 (60%), 55.7 (40%, Tck), 46.2 (40 fixed)	92.4
B2	16.72 (60%), 19.04 (40%, Tck), 19.25 (40% Fixed)	Angle of Seat Back	16.7	17.7	16.5
A3	6.22	REMARKS: Seat back angle is measured on head restraint posts.			
B3	17.76				

FORM – SRP