REPORT NUMBER 202a-GTL-05-002

FMVSS NO. 202a – HEAD RESTRAINTS INDICANT TEST

GENERAL MOTORS CORPORATION
2005 CHEVROLET EQUINOX, MPV
NHTSA NO. C50100

GENERAL TESTING LABORATORIES, INC.
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MAY 9, 2006

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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9. Performing Organization Name and Address General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443		10. Work Unit No. (TRAIS) N/A 11. Contract or Grant No. DTNH22-05-P-02081
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15. Supplementary Notes		
16. Abstract Tests were conducted on the subject, 2005 Chevrolet Equinox MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-202aS-00. This was an indicant test for FMVSS 202 compliance. The results indicate that the 2005 Chevrolet Equinox meets the requirements of FMVSS 202.		
17. Key Words Safety Engineering FMVSS 202a Head Restraints	18. Distribution Statement	
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SECTION 1

PURPOSE OF TEST

1.0 PURPOSE OF TEST

A 2005 Chevrolet Equinox MPV was subjected to Position Retention Tests in Federal Motor Vehicle Safety Standard (FMVSS) No. 202a to determine the effect of test procedure variations. The purpose of this standard is to establish requirements for head restraints to reduce the frequency and severity of neck injury in rear end and other collisions.

1.1 The test vehicle was a 2005 Chevrolet Equinox MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 2CNDL63F456031337

B. NHTSA No.: C50100

C. Manufacturer: GENERAL MOTORS CORPORATION

D. Manufacture Date: 05/04

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 202a testing during the time period February 23-27, 2006.

SECTION 2

TEST PROCEDURE

2.0 TEST PROCEDURE

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedures, TP-202As-00 dated 22 December 2004.

NOTE:
1. The Backset Retention maximum loading to 885 newtons was not performed at this time.
2. The Head Impact Energy Absorption test was not performed at this time.

SECTION 3

RESULTS AND TEST DATA

3.0 RESULTS AND TEST DATA

The following data sheets document the results of testing on the 2005 Chevrolet Equinox.

DATA SHEET 1
HEIGHT RETENTION TEST
(ADJUSTABLE HEAD RESTRAINTS ONLY)

VEHICLE: 2005 CHEVROLET EQUINOX, MPV

VEH. NHTSA NO.: C50100 TEST DATE: 02/23/06

TEST #5379

Seat Location: Driver

Pre-test measurements

HEAD RESTRAINT IN POSITION 3 (0-5)

SAE J826 Manikin torso angle: Top of Head Restraint Height (mm): 830 mm

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

DESCRIPTION OF HEIGHT RETENTION LOCK: The head restraint has two mounting posts. The left side post has detents cut into it which engage into a lock mechanism which prevents downward movement of the head restraint in each position. Only the full up position locks in the upward direction to prevent headrest removal. The right side post has no locking detents.

Test measurements

Initial load (50 N ± 1 N): 49 N Initial Displacement, D1 (mm): 7.1 mm

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

Maximum load (495 N ± 5 N): 497 N Maximum Displacement, D2 (mm): 56.4 mm

Return load (50 N ± 1 N): 50 N Return Displacement, D3 (mm): 19.2 mm

Total displacement (D3-D1) < 13 mm: 12.1 mm **PASS X** **FAIL** _____

REMARKS:

RECORDED BY: G. Farrand DATE: 02/23/06

APPROVED BY: D. Messick

DATA SHEET 2
BACKSET RETENTION TEST

VEHICLE: 2005 CHEVROLET EQUINOX, MPV
VEH. NHTSA NO.: C50100 TEST DATE: 02/24/06

TEST #5388, 5389
Seat Location: Driver Type of head restraint:

Pre-test measurements

SAE J826 Manikin torso angle: Top of Head Restraint Height (mm): 830 mm FULL UP
812 mm IN POS.2
Striker to H-Point (mm): Striker to H-Point angle:

Displacement torso reference line

Test device back pan angle: Pre-Test 19.4°; Full Load 34.7°

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

Initial load (N): 1286 N Initial moment (373 ± 7.5 Nm): 373 Nm

Backset retention and strength
Zero Displacement set at torso reference line.

Distance from the H-point to the head form tangency point (m): .747 m
Zero Contact Ref. -117.0 mm

Initial load (N): 50 N Initial moment (37 ± 0.7 Nm): 37.35 Nm
Initial displacement: -104.0 mm
Initial head form displacement, D1 (< or = 25 mm): 13.0 mm **PASS X** **FAIL**

Load range to generate a 373 ± 7.5 Nm rearward moment (N): 499 N

Actual load applied (N): 501 N Resultant moment (Nm): 374 Nm
Actual displacement: -41.7 mm
Maximum Head form displacement, D2 (< or = 102 mm): -41.7 mm **PASS X** **FAIL**

Final Load (N): 51 N
Final head form displacement, D3 (mm): -85 mm Measured at (37± 0.7 Nm) 38.1 Nm

Total displacement (D3-D1) < 13 mm : 19.0 mm **PASS** **FAIL X**

Maximum applied load (> or equal to 885 N): N/A **PASS** **FAIL**

REMARKS:

RECORDED BY: G. Farrand DATE: 02/24/06
APPROVED BY: D. Messick

DATA SHEET 3

VEHICLE INFORMATION	Year:	2005	Type:	
	Make:	Chevrolet	VIN:	2CNDL63F456031337
	Model:	Equinox	NHTSA No:	C50100

SEAT SETUP	OCCUPANT LOCATION P1		GTL
	1. Seat Fore/Aft	Full Rear	
	2. Seat Raise/Lower	Full Down	
	3. Seat Tilt	Rear of Seat Cushion Full Up	
	4. Seat Cushion		
	5. Seat Back Adjustment with manikin installed (25 deg. target torso angle)	6.5	degree from vertical of head restraint post
		795	distance (mm) from visor bolt to head restraint post center
	6. Seat Back Adjustment without manikin	5.9	degree from vertical of head restraint post
		790	distance (mm) from visor bolt to head restraint post center

NOTE: LUMBAR SUPPORT SHOULD BE RETRACTED

H-POINT LOCATION (mm)*	X (forward of striker) Z (below striker)		60 55
TORSO ANGLE (deg)			24.0
VEHICLE SILL ANGLE (deg)		LEFT	
Curb weight plus SAE J826 manikin		RIGHT	
HEAD RESTRAINT HEIGHT (mm)	LOWEST	Position 0	782.0
SAE J826 manikin head room probe		Position 1	796.0
(dimension has been offset 101.6 mm)		Position 2	816.0
		Position 3	834.0
		Position 4	
		Position 5	
		Position 6	
	HIGHEST		

*SAE J826 H-POINT TARGET REFERENCED TO THE VEHICLE STRIKER

DATA SHEET 4

VEHICLE INFORMATION	Year:	2005	Type:	
	Make:	Chevrolet	VIN:	2CNDL63F456031337
	Model:	Equinox	NHTSA No:	C50100

SEAT SETUP	OCCUPANT LOCATION P1	GTL	
	7. Seat Fore/Aft	Full Rear	
	8. Seat Raise/Lower		
	9. Seat Tilt		
	10. Seat Cushion		
	11. Seat Back Adjustment with manikin installed (25 deg. target torso angle)	3.5	degree from vertical of head restraint post
		775	distance (mm) from visor bolt to head restraint post center
	12. Seat Back Adjustment without manikin	2.9	degree from vertical of head restraint post
		764	distance (mm) from visor bolt to head restraint post center
		1	detents with full up locked being 0

NOTE: LUMBAR SUPPORT SHOULD BE RETRACTED

H-POINT LOCATION (mm)*	X (forward of striker) Z (below striker)		45 72
TORSO ANGLE (deg)			19.0
VEHICLE SILL ANGLE (deg)		LEFT	
Curb weight plus SAE J826 manikin		RIGHT	
HEAD RESTRAINT HEIGHT (mm)	LOWEST	Position 0	773.0
SAE J826 manikin head room probe		Position 1	792.0
(dimension has been offset 101.6 mm)		Position 2	810.0
		Position 3	831.0
		Position 4	
		Position 5	
		Position 6	
HIGHEST			

*SAE J826 H-POINT TARGET REFERENCED TO THE VEHICLE STRIKER

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 – INSTRUMENTATION & EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
HRMD	RONA KINETICS & ASSOCIATES LTD.	HRMD 0-62	N/A	N/A
J826 MANIKIN	ALDERSON RESEARCH LABS	3 DM/92	N/A	N/A
DIGITAL PROTRACTOR	MITUTOYO	950-315 PRO 360	BEFORE USE	BEFORE USE
RULE/SCALE	STARRET	C331	05/05	05/06
TORPEDO LEVEL	SANDS	500	BEFORE USE	BEFORE USE
FORCE GAUGE	CHATILLON	DPPN-50 870	BEFORE USE	BEFORE USE
CALIPER	STARRET	N/A	BEFORE USE	BEFORE USE
LEVEL, LASER	BLACK & DECKER	360	BEFORE USE	BEFORE USE
LEVEL, LASER	SEAN & STEPHEN CORP	90º, 45º	BEFORE USE	BEFORE USE
LEVEL, LASER	GAERTNER	2789-A	BEFORE USE	BEFORE USE

SECTION 5
PHOTOGRAPHS

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.1
LEFT SIDE VIEW OF VEHICLE

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

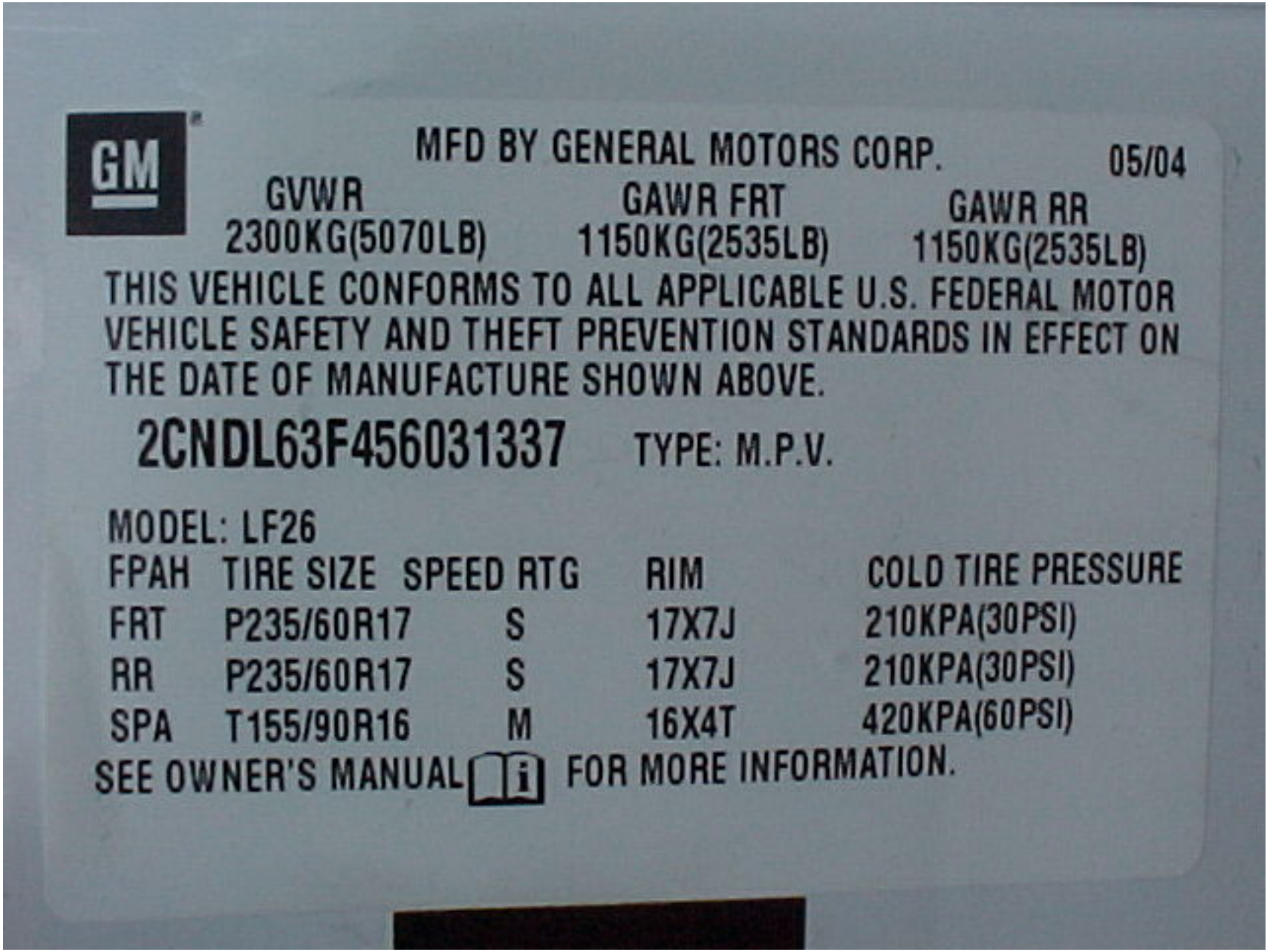
FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE

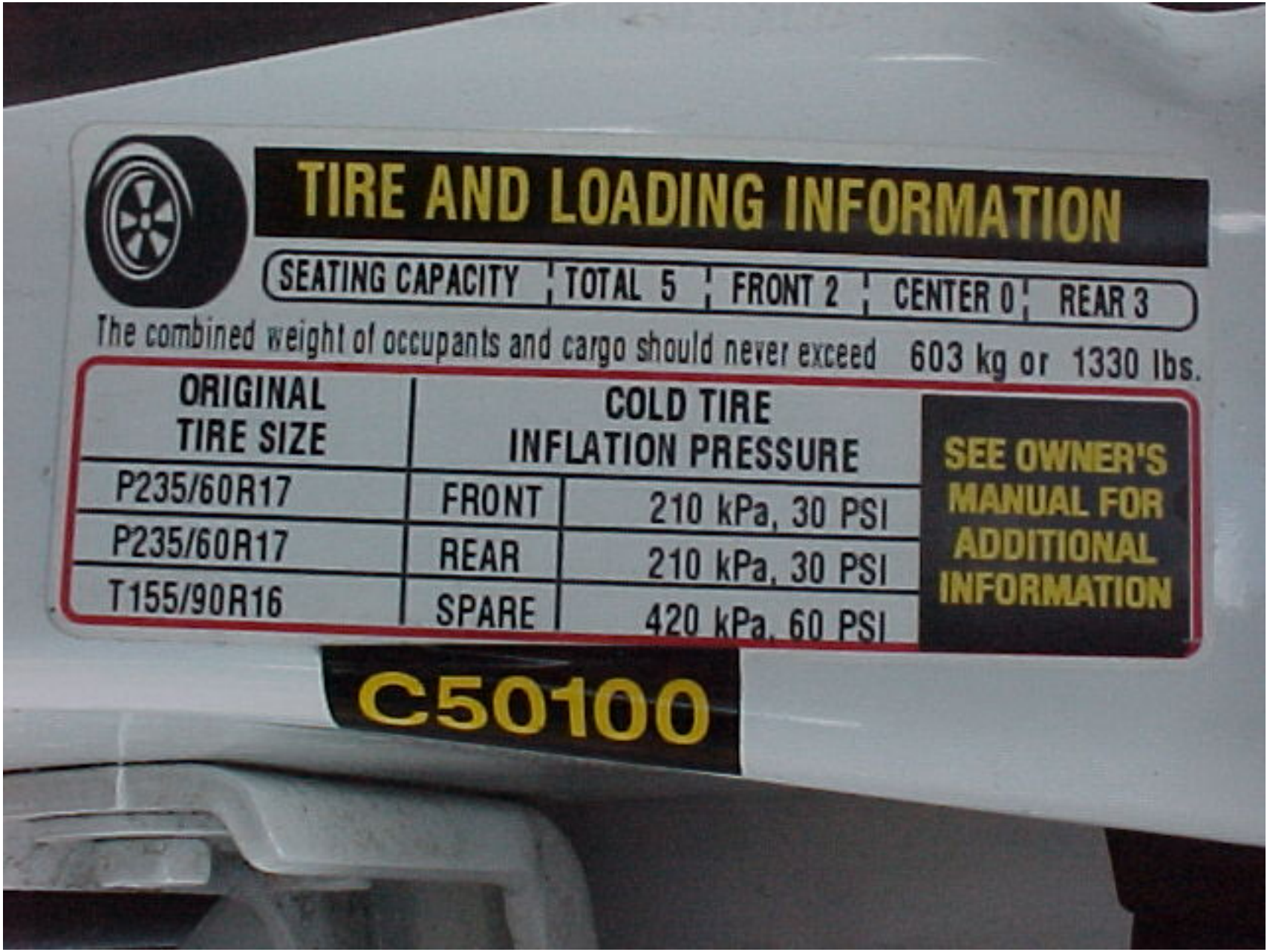
2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE VIEW OF VEHICLE



2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.5
VEHICLE CERTIFICATION LABEL

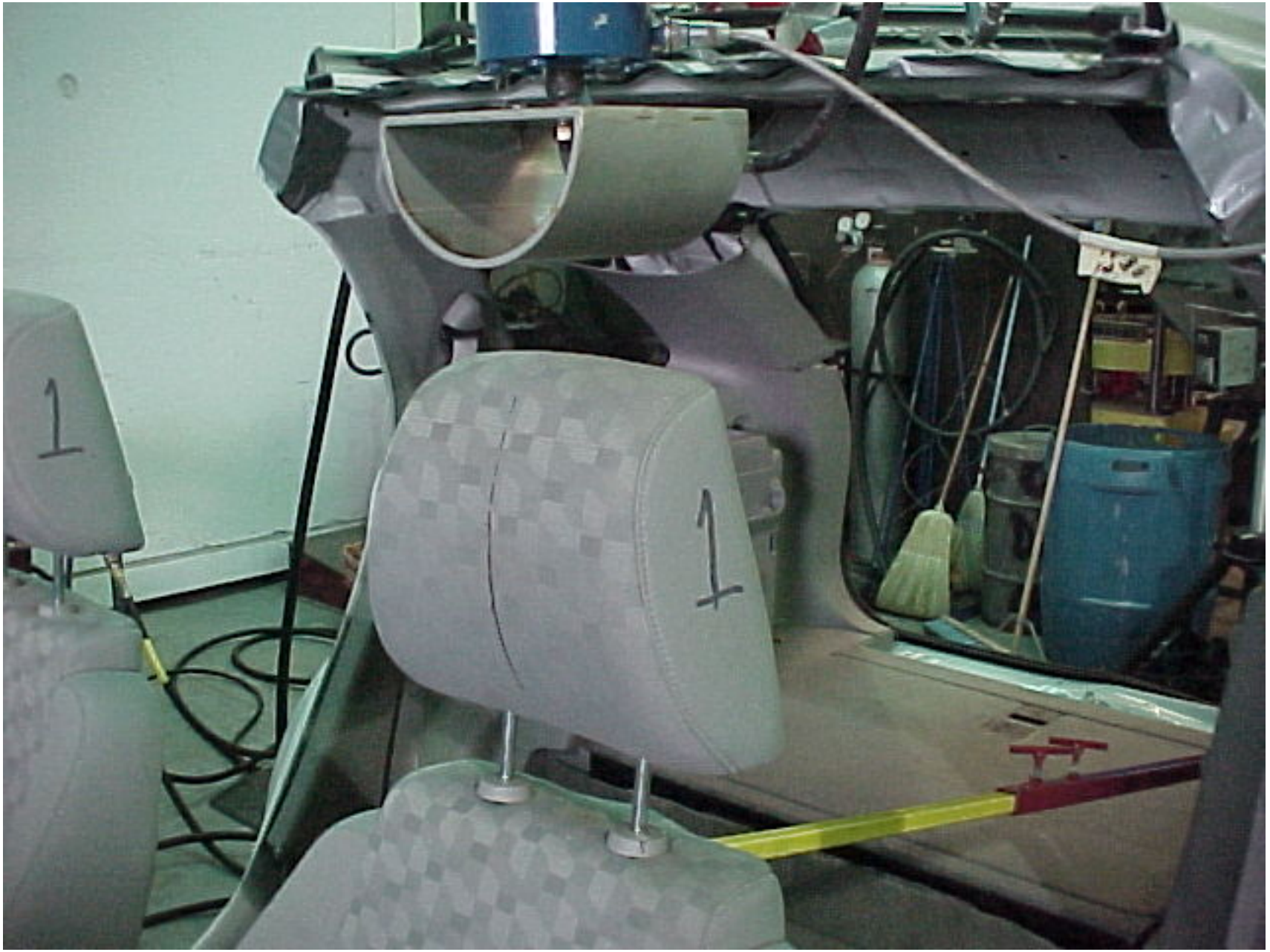


2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.6
VEHICLE TIRE INFORMATION LABEL

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.7
VEHICLE PRE-TEST SET-UP

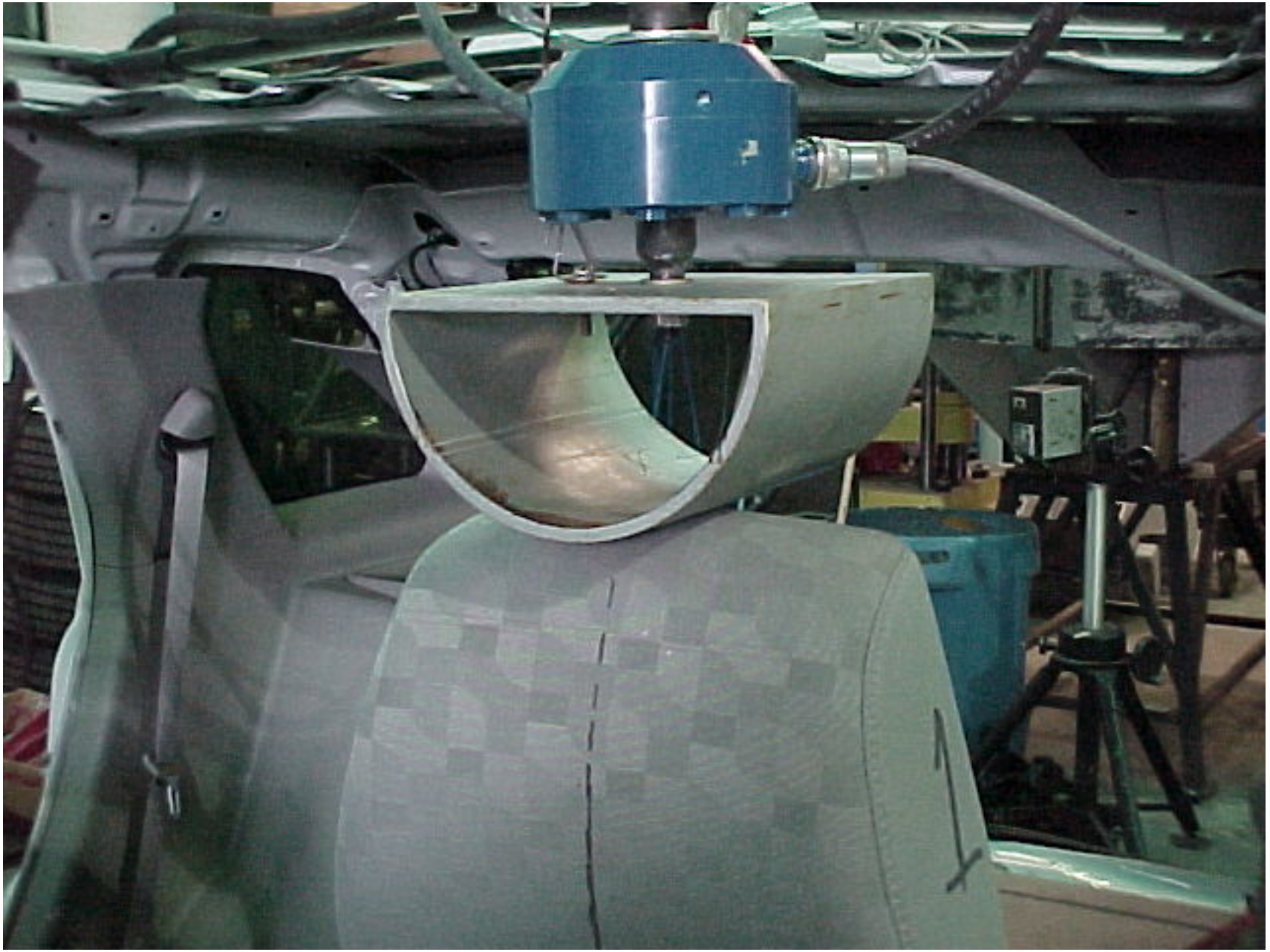


2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.8
PRE-TEST, HEIGHT RETENTION, DRIVER #1

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.9
PRE-TEST, HEIGHT RETENTION, DRIVER #1



2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.10
CONTACT, HEIGHT RETENTION, DRIVER #1

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.11
FULL LOAD, HEIGHT RETENTION, DRIVER #1

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.12
10% POST LOAD, HEIGHT RETENTION, DRIVER #1

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.13
POST TEST, HEIGHT RETENTION, DRIVER #1

2005 CHEVROLET EQUINOX
NHTSA NO. C50100
FMVSS NO. 202a

FIGURE 5.14
POST TEST, HEIGHT RETENTION, DRIVER #1

C50100 ¾ VIEW OF UNOCCUPIED DRIVER SEAT

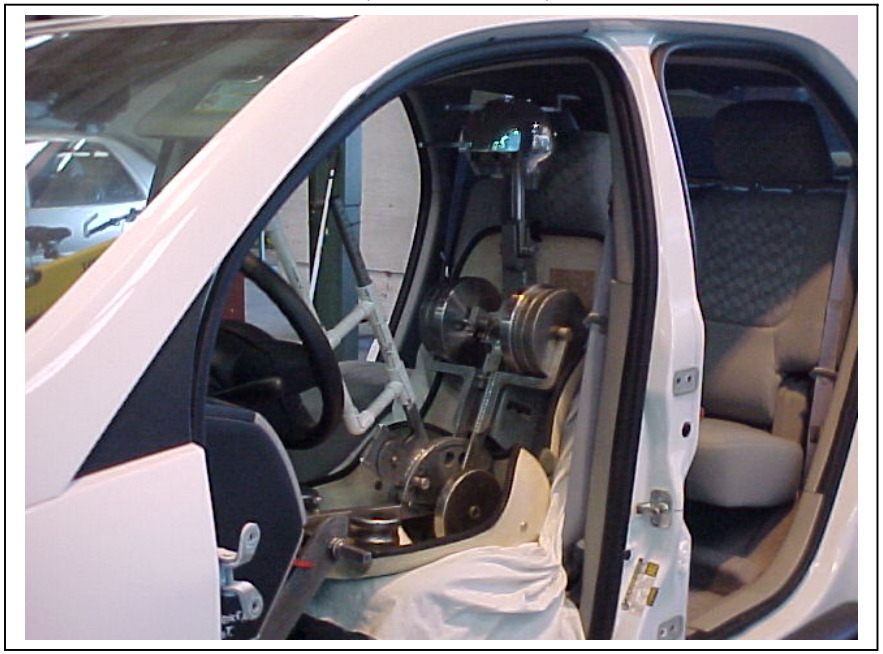
¾ VIEW OF UNOCCUPIED PASSENGER SEAT

¾ VIEW OF MANIKIN IN DRIVER SEAT, ITERATION 1

SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 0

C50100 SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 1

SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 2



SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 3

¾ VIEW OF MANIKIN WITH HRMD IN DRIVER SEAT, ITERATION 1

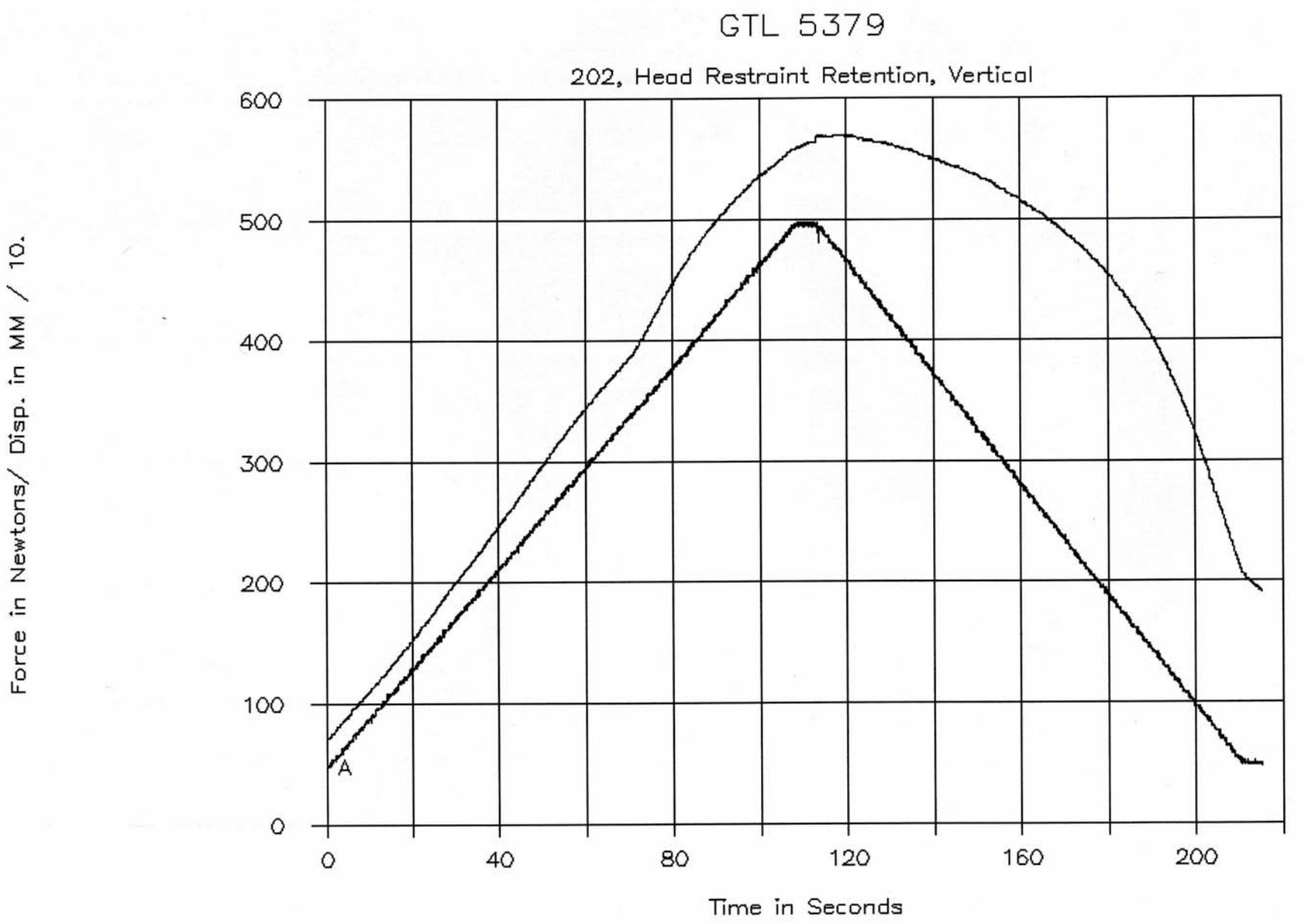
C50100 SIDE VIEW OF LOC P1, ITERATION 1, POS O WITH HRMD

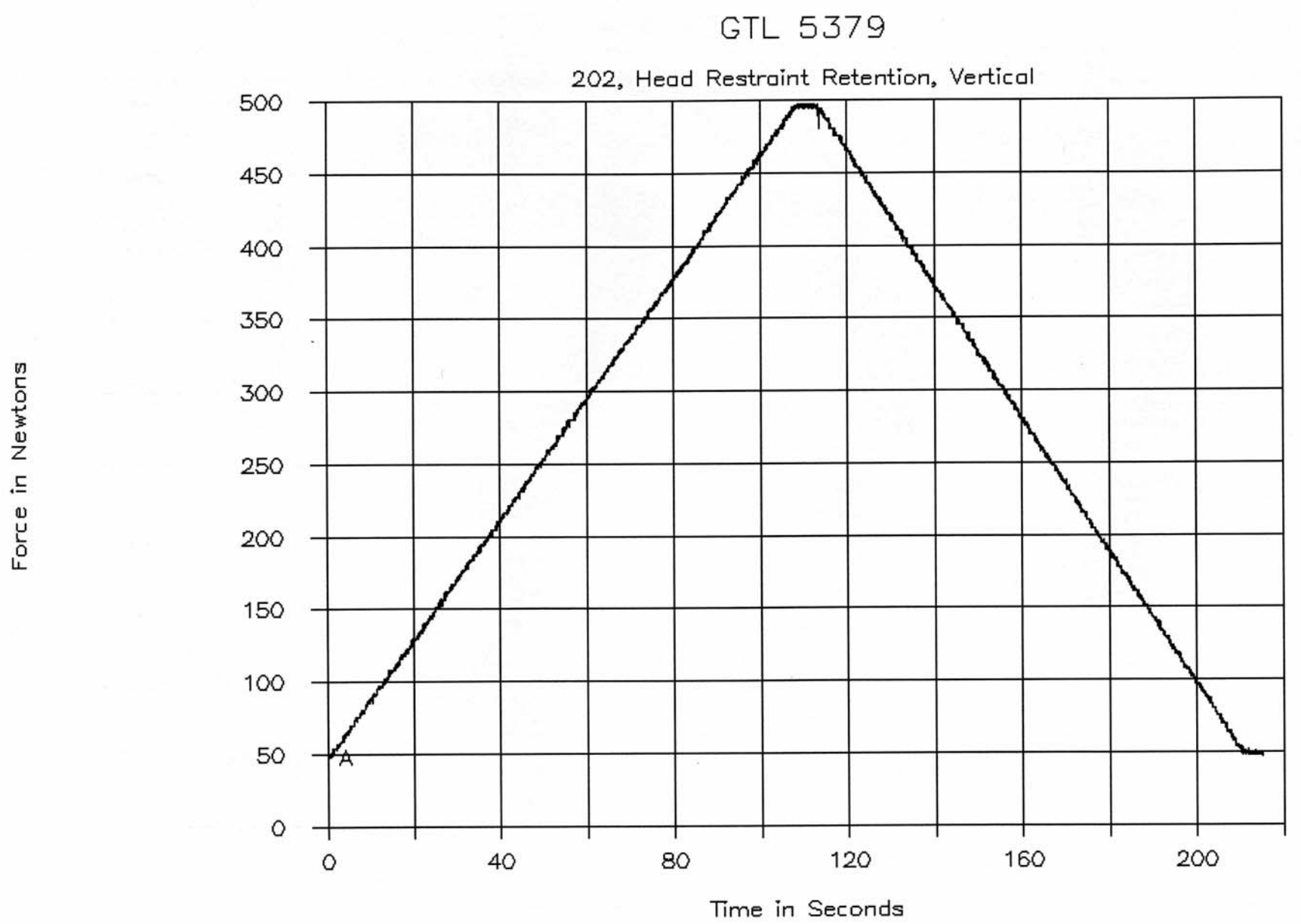
SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 1 WITH HRMD

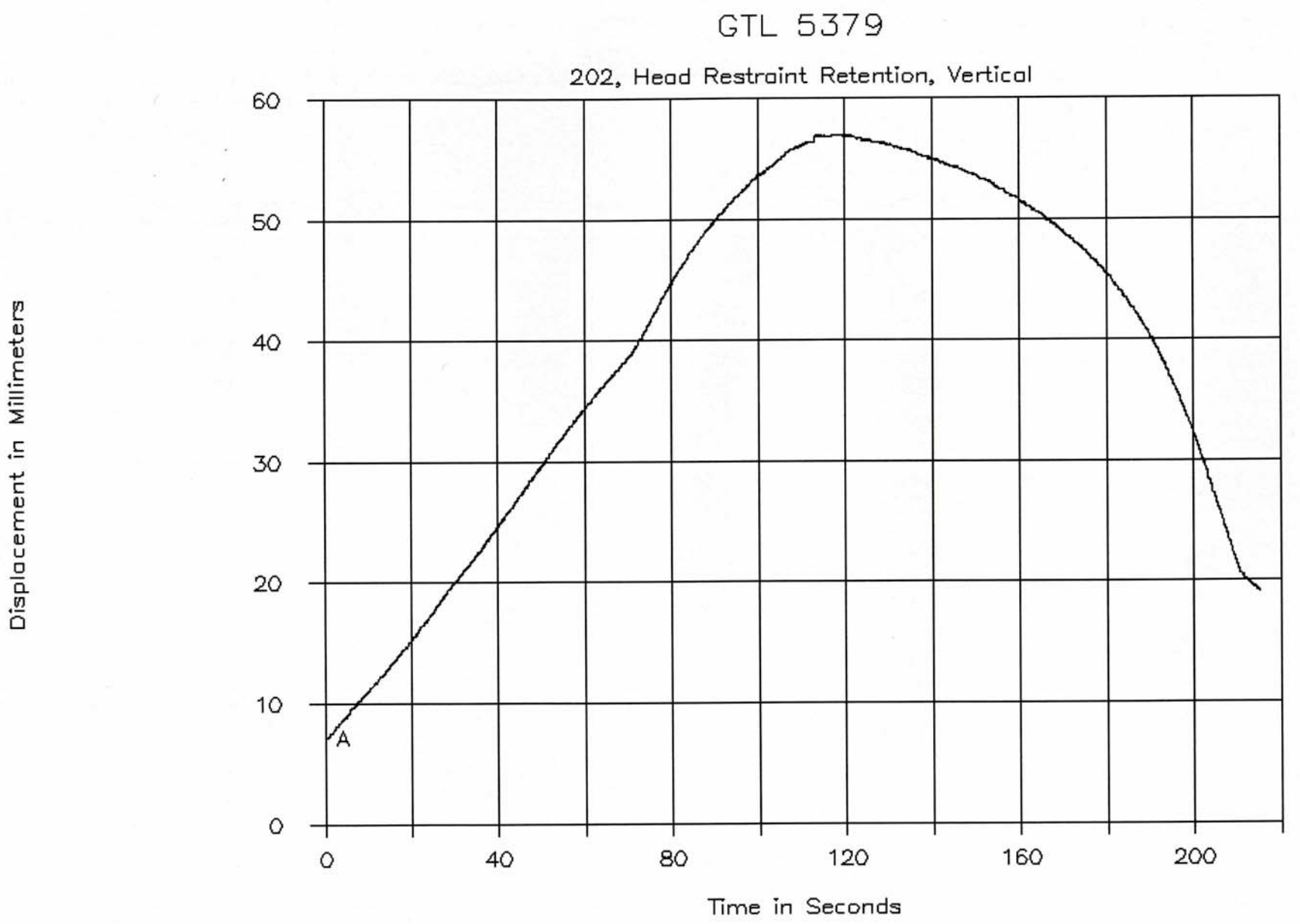
SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 2 WITH HRMD

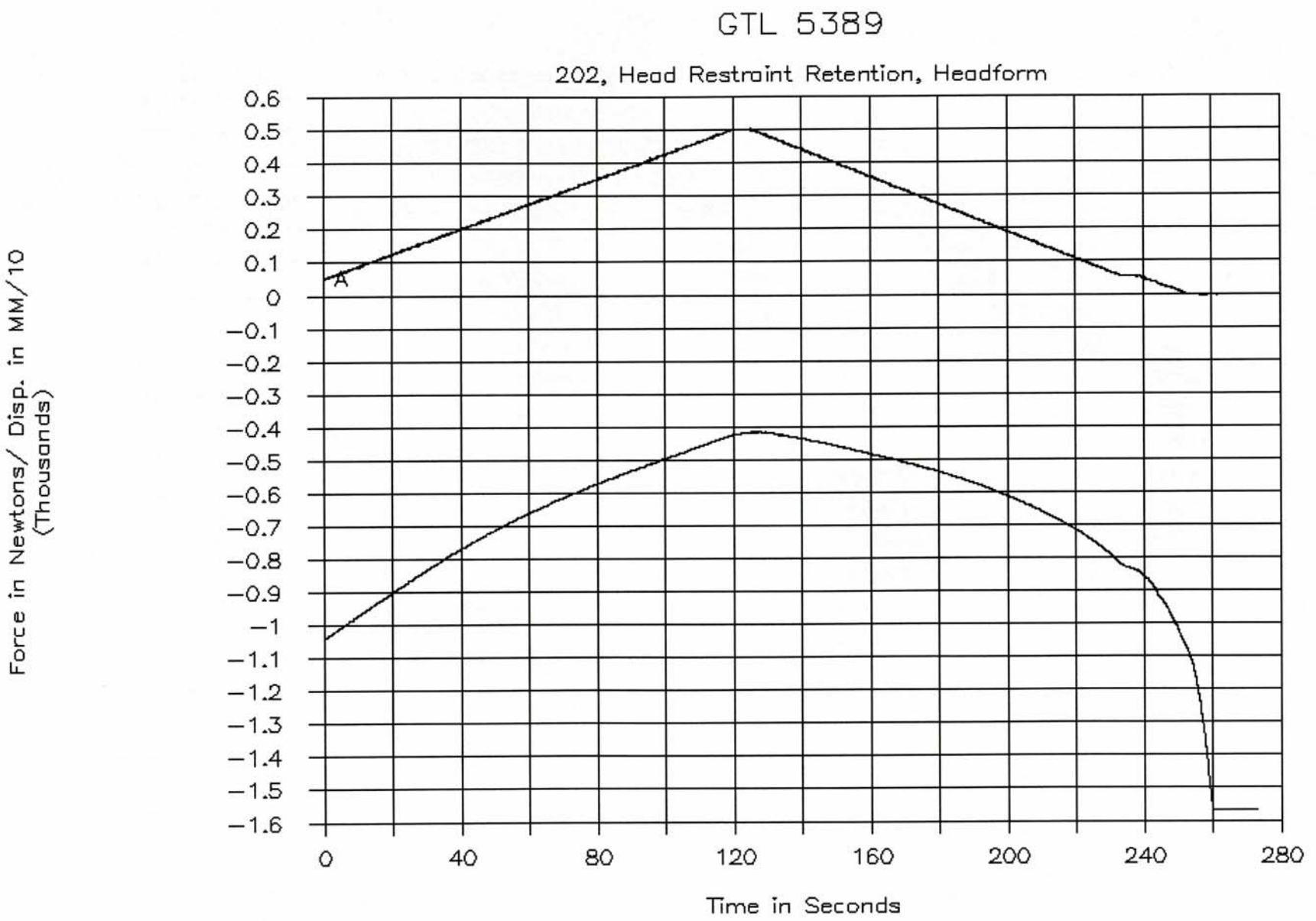
SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 3 WITH HRMD

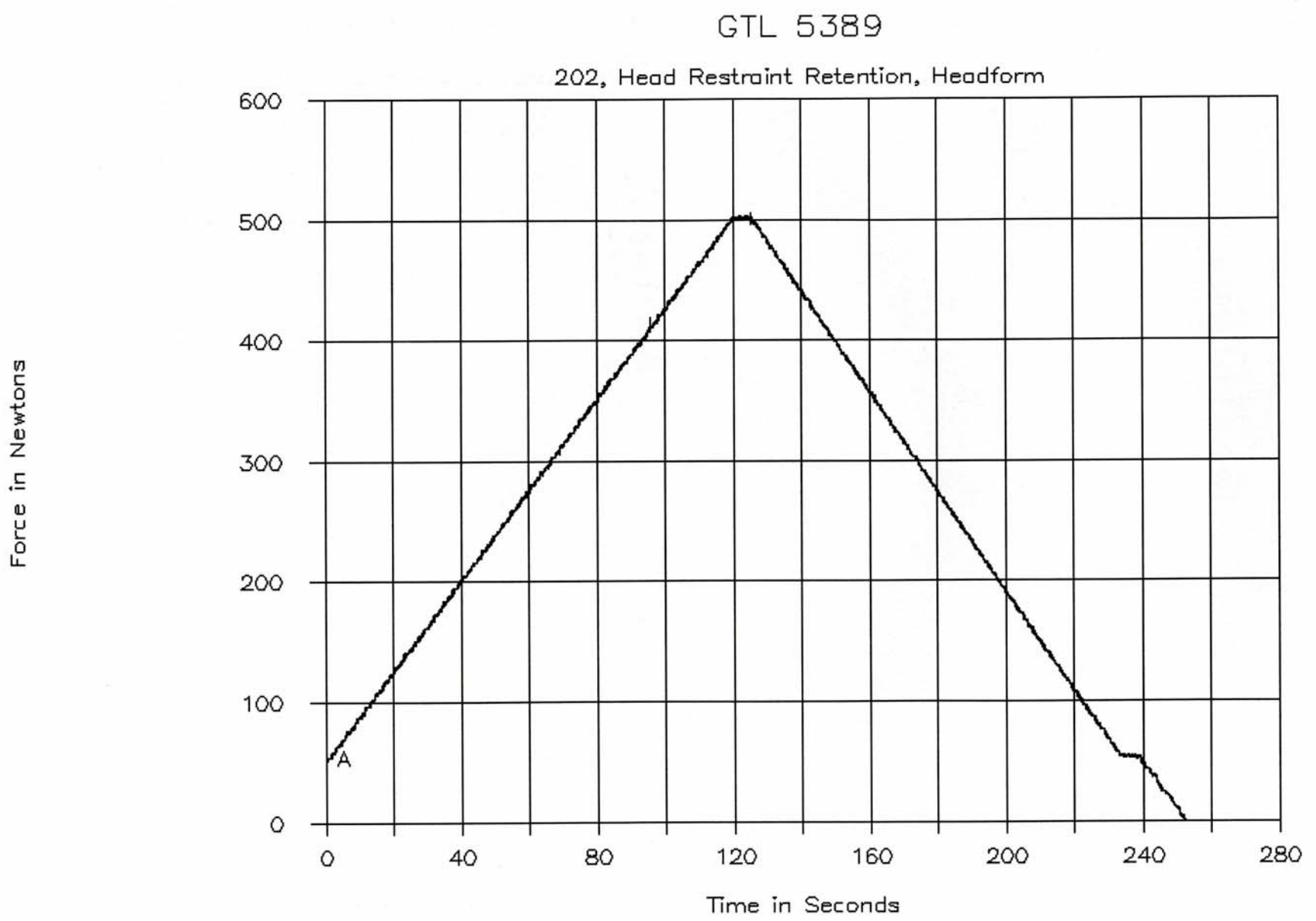
SECTION 6
TEST PLOTS

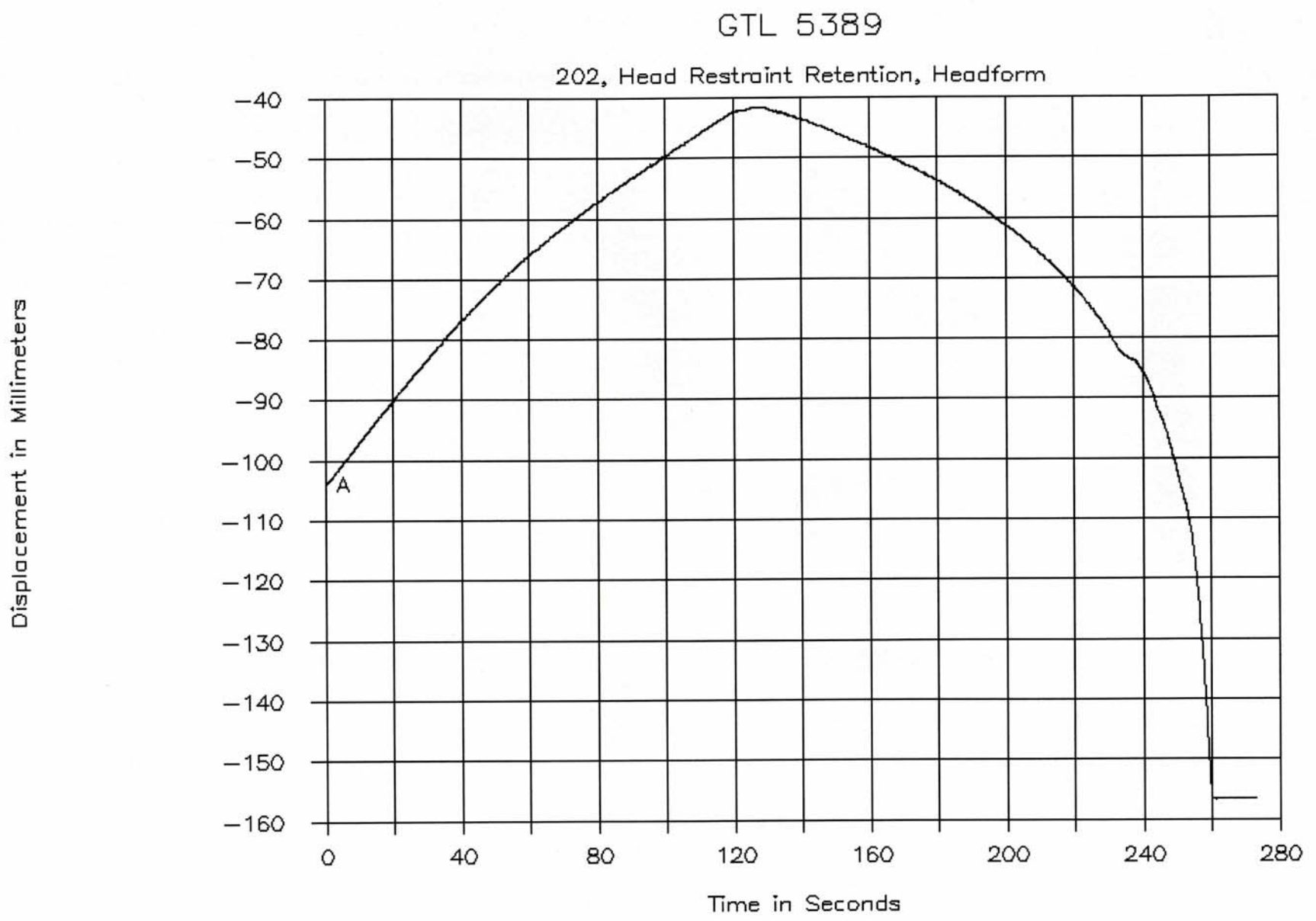

GTL 5379
202, Head Restraint Retention, Vertical
Force in Newtons/ Disp. in MM / 10.
600
500
400
300
200
100
0
A
0
40
80
120
160
200
Time in Seconds


GTL 5379
202, Head Restraint Retention, Vertical
Force in Newtons
500
450
400
350
300
250
200
150
100
50
0
A
0
40
80
120
160
200
Time in Seconds


GTL 5379
202, Head Restraint Retention, Vertical
Displacement in Millimeters
60
50
40
30
20
10
0
A
0
40
80
120
160
200
Time in Seconds


GTL 5389
202, Head Restraint Retention, Headform
Force in Newtons/ Disp. in MM/10
(Thousands)
0.6
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
−0.6
−0.7
−0.8
−0.9
−1
−1.1
−1.2
−1.3
−1.4
−1.5
−1.6
A
0
40
80
120
160
200
240
280
Time in Seconds


GTL 5389
202, Head Restraint Retention, Headform
600
500
400
300
200
100
0
A
0
40
80
120
160
200
240
280
Force in Newtons
Time in Seconds


GTL 5389
202, Head Restraint Retention, Headform
Displacement in Millimeters
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
A
0
40
80
120
160
200
240
280
Time in Seconds