

FMVSS NO. 202a – HEAD RESTRAINTS INDICANT TEST

**TOYOTA MOTOR CORPORATION
2005 SCION tC, PASSENGER CAR
NHTSA NO. C55100**

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APRIL 24, 2006

FINAL REPORT

PREPARED FOR

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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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16. Abstract Tests were conducted on the subject, 2005 Scion tC passenger car 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 Scion tC meets the requirements of FMVSS 202.		
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SECTION 1

PURPOSE OF TEST

1.0 PURPOSE OF TEST

A 2005 Scion tC passenger car 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 Scion tC passenger car. Nomenclature applicable to the test vehicle are:

- A. Vehicle Identification Number: JTKDE177450002006
- B. NHTSA No.: C55100
- C. Manufacturer: TOYOTA MOTOR 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 14-17, 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

2.0 RESULTS AND TEST DATA

The following data sheets document the results of testing on the 2005 Scion tC.

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

VEHICLE: 2005 SCION tC, PASSENGER CAR

VEH. NHTSA NO.: C55100 TEST DATE: 02/14/06

TEST #5363

Seat Location: Driver

Pre-test measurements

HEAD RESTRAINT IN POSITION 5 (0-5)

SAE J826 Manikin torso angle: Top of Head Restraint Height (mm): 804 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): 48.9 N Initial Displacement, D1 (mm): 11.4 mm

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

Maximum load (495 N ± 5 N): 498 N Maximum Displacement, D2 (mm): 38.9 mm

Return load (50 N ± 1 N): 44.5 N Return Displacement, D3 (mm): 28.5 mm

Total displacement (D3-D1) < 13 mm: 17.1 mm **PASS** _____ **FAIL** X

REMARKS: Head Restraint cushion allowed approximately 18° of rotation without locking. Held in place by friction.

RECORDED BY: G. Farrand DATE: 02/14/06

APPROVED BY: D. Messick

DATA SHEET 2
BACKSET RETENTION TEST

VEHICLE: 2005 SCION tC, PASSENGER CAR
VEH. NHTSA NO.: C55100 TEST DATE: 02/15/06

TEST #5377

Seat Location: Driver

Type of head restraint:

Pre-test measurements

SAE J826 Manikin torso angle: Top of Head Restraint Height (mm): 804 mm FULL UP

Striker to H-Point (mm):

Striker to H-Point angle:

Displacement torso reference line

Test device back pan angle: Pre-Test 19°; Full Load 33.9°

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): .739 m

Head Restraint Contact: -103.7 mm

Initial load (N): 51 N @ -92.3 mm Initial moment (37 ± 0.7 Nm): 38 Nm

Initial head form displacement, D1 (< or = 25 mm): 11.4 mm **PASS** X **FAIL** _____

Load range to generate a 373 ± 7.5 Nm rearward moment (N): 505 N

Actual load applied (N): 505 N @ -36.9 mm Resultant moment (Nm): 373 Nm

Maximum Head form displacement, D2 (< or = 102 mm): -36.9 mm **PASS** X **FAIL** _____

Final head form displacement, D3 (mm): 51 N @ -58.3 mm (measured at 37 ± 0.7 Nm)

Total displacement (D3-D1) < 13 mm : 34.0 mm **PASS** _____ **FAIL** X

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

REMARKS:

RECORDED BY: G. Farrand

DATE: 02/17/06

APPROVED BY: D. Messick

DATA SHEET 3

VEHICLE INFORMATION	Year:	2005	Type:	
	Make:	Scion	VIN:	JTKDE17745002006
	Model:	tC	NHTSA No:	C55100

SEAT SETUP	OCCUPANT LOCATION P1	GTL		
	1. Seat Fore/Aft	Full Rear		
	2. Seat Raise/Lower	Full Down		
	3. Seat Tilt	Full Down		
	4. Seat Cushion			
	5. Seat Back Adjustment with manikin installed (25 deg. target torso angle)	2.4	degree from vertical of head restraint post	
		711	distance (mm) from visor bolt to head restraint post center	
6. Seat Back Adjustment without manikin	2.2	degree from vertical of head restraint post		
	700	distance (mm) from visor bolt to head restraint post center		
	3	detents with full up locked being 0		

NOTE: LUMBAR SUPPORT SHOULD BE RETRACTED

H-POINT LOCATION (mm)*	X (forward of striker)	342	
	Z (below striker)	247	
TORSO ANGLE (deg)		22.0	
VEHICLE SILL ANGLE (deg) Curb weight plus SAE J826 manikin	LEFT		
	RIGHT		
HEAD RESTRAINT HEIGHT (mm) SAE J826 manikin head room probe (dimension has been offset 101.6 mm)	LOWEST	Position 0	737.0
		Position 1	743.0
		Position 2	758.0
		Position 3	770.0
		Position 4	786.0
		Position 5	801.0
		Position 6	N/A
HIGHEST			

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

DATA SHEET 4

VEHICLE INFORMATION	Year:	2005	Type:	
	Make:	Scion	VIN:	JTKDE17745002006
	Model:	tC	NHTSA No:	C55100

SEAT SETUP	OCCUPANT LOCATION P1	GTL		
	7. Seat Fore/Aft	Full Rear		
	8. Seat Raise/Lower	Not Adjustable		
	9. Seat Tilt			
	10. Seat Cushion			
	11. Seat Back Adjustment with manikin installed (25 deg. target torso angle)	5.2	degree from vertical of head restraint post	
		721	distance (mm) from visor bolt to head restraint post center	
12. Seat Back Adjustment without manikin	5.3	degree from vertical of head restraint post		
	718	distance (mm) from visor bolt to head restraint post center		
	6	detents with full up locked being 0		

NOTE: LUMBAR SUPPORT SHOULD BE RETRACTED

H-POINT LOCATION (mm)*	X (forward of striker)	347
	Z (below striker)	223
TORSO ANGLE (deg)		24.0
VEHICLE SILL ANGLE (deg)	LEFT	
Curb weight plus SAE J826 manikin	RIGHT	
HEAD RESTRAINT HEIGHT (mm)	LOWEST	Position 0 758.0
SAE J826 manikin head room probe (dimension has been offset 101.6 mm)		Position 1 767.0
		Position 2 782.0
		Position 3 797.0
		Position 4 811.0
		Position 5 824.0
		Position 6 N/A
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	90°, 45°	BEFORE USE	BEFORE USE
LEVEL, LASER	GAERTNER	2789-A	BEFORE USE	BEFORE USE

SECTION 5
PHOTOGRAPHS



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.1
LEFT SIDE VIEW OF VEHICLE



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE

MFD. BY: TOYOTA MOTOR CORPORATION 05/04
GVWR 3945LB GAWR FR 2130LB RR 1835LB
THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.
JTKDE177450002006 PASS CAR



C/TR: 3P2/FA14 ANTIOL-ALMGKA
A/TM: -02A/E350* MADE IN JAPAN 609 A

C55100

2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.5
VEHICLE CERTIFICATION LABEL



TIRE AND LOADING INFORMATION

INFORMATION SUR LES PNEUS ET LE CHARGEMENT

SEATING CAPACITY: TOTAL 5
FRONT 2: REAR 3
The combined weight of occupants and cargo should never exceed 392 kg or 865 lbs.

NOMBRE DE PLACES ASSISES: TOTAL 5
AVANT 2: ARRIERE 3
Le poids total des occupants et du chargement ne doit jamais être supérieur à 392 kg ou 865 lb.

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE	
	215/45ZR17	FRONT
REAR		200kPa, 29PSI
COMPACT SPARE TIRE	COLD TIRE INFLATION PRESSURE	
T125/70D17	420kPa, 60PSI	

DIMENSION DES PNEUS D'ORIGINE	PRESSION DE GONFLAGE À FROID	
	215/45ZR17	AVANT
ARRIÈRE		200kPa, 29PSI
ROUE DE SECOURS COMPACTE	PRESSION DE GONFLAGE À FROID	
T125/70D17	420kPa, 60PSI	

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION.

POUR DE PLUS AMPLES INFORMATIONS, VOIR LE MANUEL DU PROPRIÉTAIRE.

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C55100

FIGURE 5.6
VEHICLE TIRE INFORMATION LABEL



2005 SCION tC
NHTSA NO. C55100
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FIGURE 5.7
VEHICLE PRE-TEST SET-UP



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.8
PRE-TEST HEIGHT RETENTION, DRIVER #1



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.9
PRE-TEST HEIGHT RETENTION, DRIVER #1



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.10
POST TEST HEIGHT RETENTION, DRIVER #1



2005 SCION iC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.11
POST TEST HEIGHT RETENTION, DRIVER #1



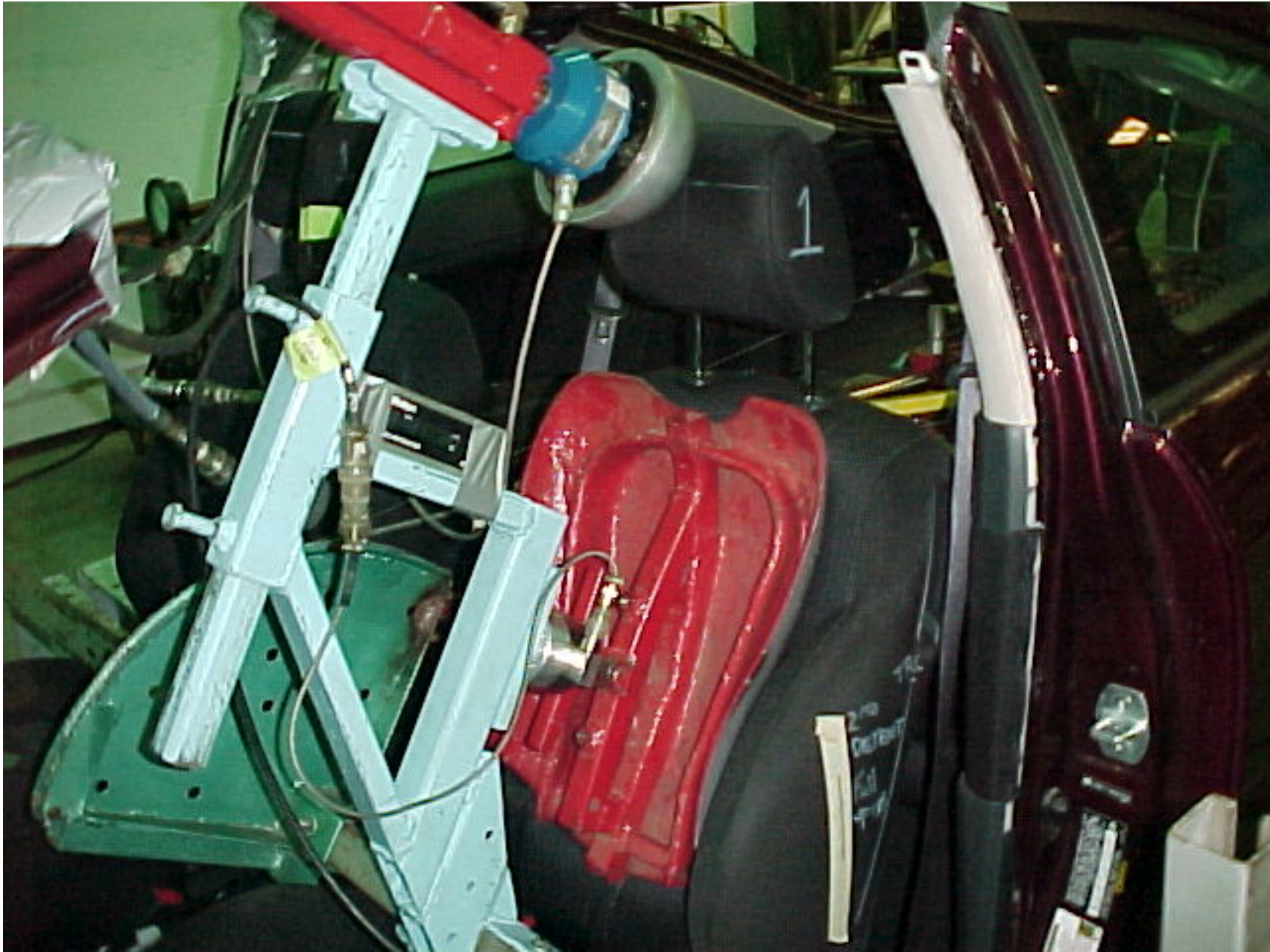
2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.12
PRE-TEST, BACK PAN, DRIVER #1



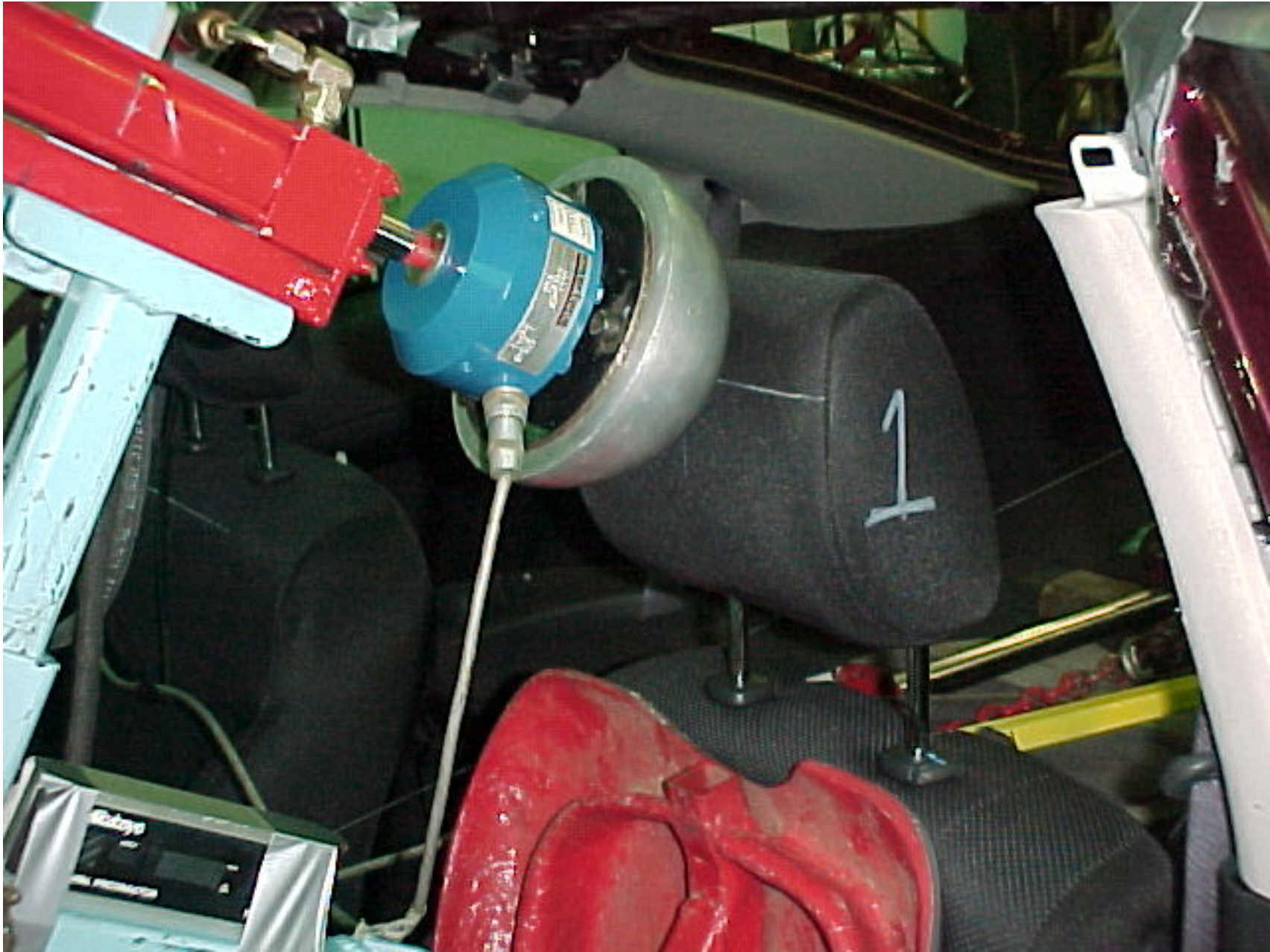
2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.13
PRE-TEST, BACK PAN, DRIVER #1



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.14
FULL LOAD, BACK PAN, DRIVER #1



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.15
PRE-TEST, BACKSET RETENTION, DRIVER #1



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.16
PRE-TEST, BACKSET RETENTION, DRIVER #1



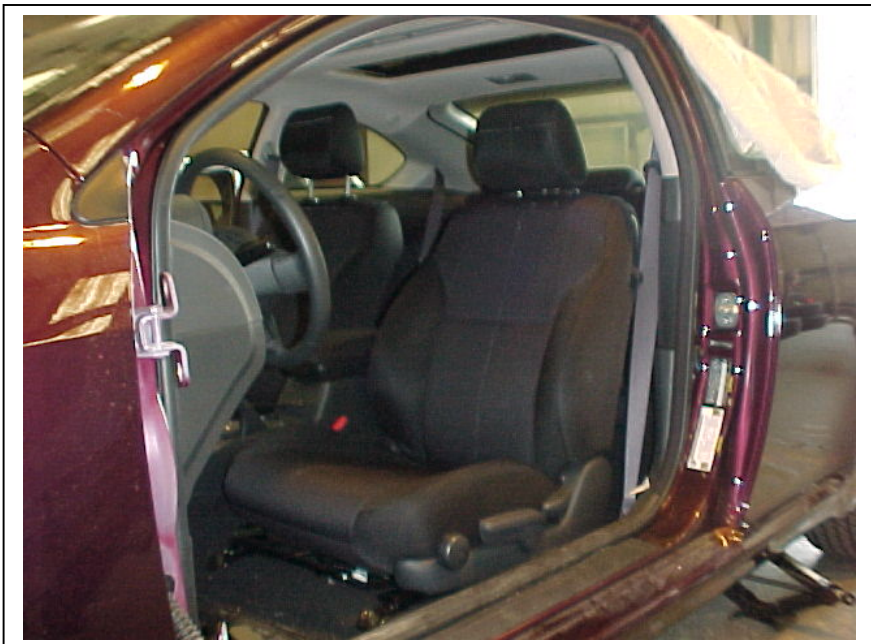
2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

FIGURE 5.17
POST TEST, BACKSET RETENTION, DRIVER #1



2005 SCION tC
NHTSA NO. C55100
FMVSS NO. 202a

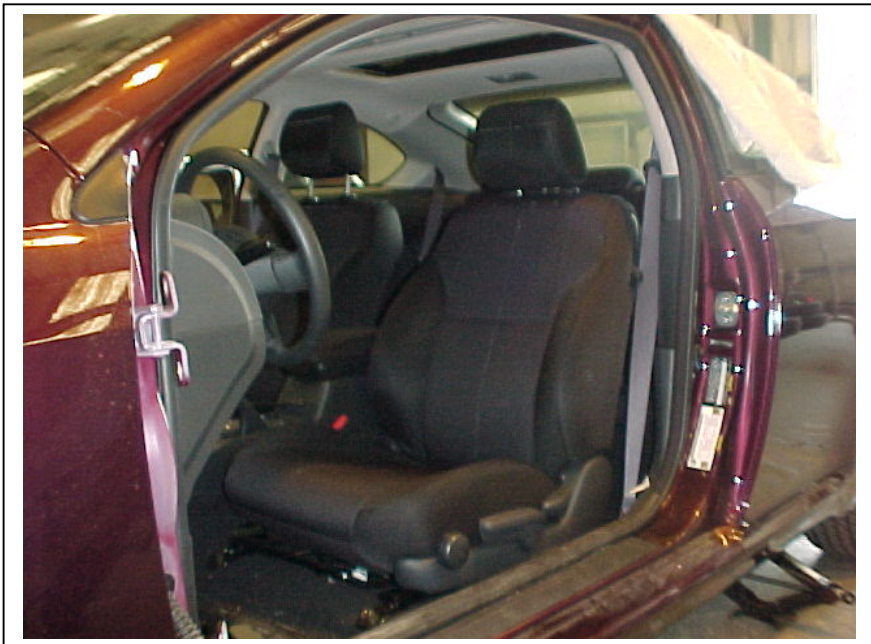
FIGURE 5.18
POST TEST, BACKSET RETENTION, DRIVER #1



C55100 ¾ VIEW OF UNOCCUPIED DRIVER SEAT



¾ VIEW OF UNOCCUPIED PASSENGER SEAT



¾ VIEW OF UNOCCUPIED DRIVER SEAT



¾ VIEW OF MANIKIN IN DRIVER SEAT



C55100 SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 0



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



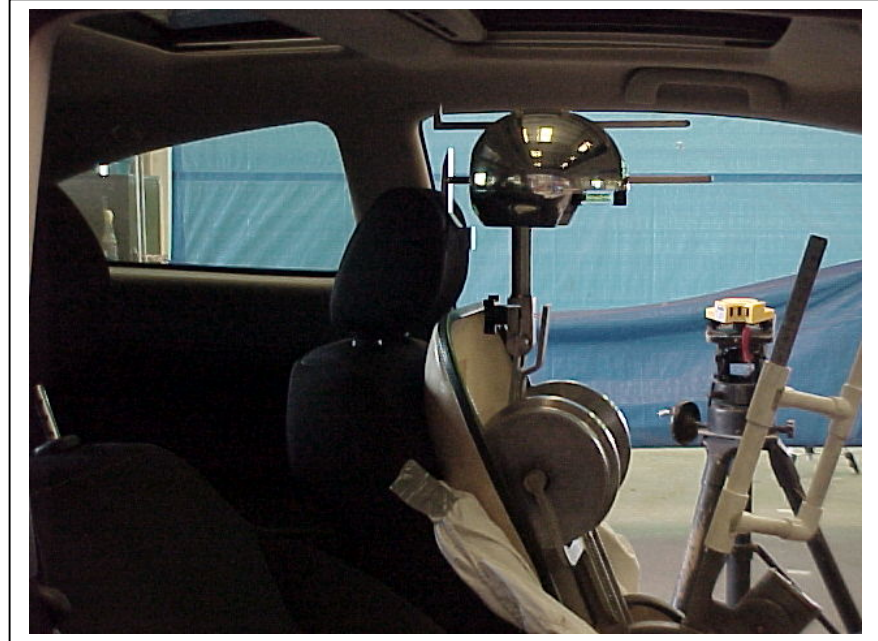
C55100 SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 4



SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 5



3/4 VIEW OF MANIKIN WITH HRMD IN DRIVER SEAT, ITERATION 1



SIDE VIEW OF LOCATION P1, ITERATION 1, POSITION 0 WITH HRMD



C55100 SIDE VIEW OF LOC P1, ITERATION 1, POS 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



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



C55100 SIDE VIEW OF LOC 1, ITERATION 1, POS 5 WITH HRMD



C55100 ¾ VIEW OF MANIKIN IN PASSENGER SEAT



SIDE VIEW OF LOCATION P2, ITERATION 1, POSITION 0



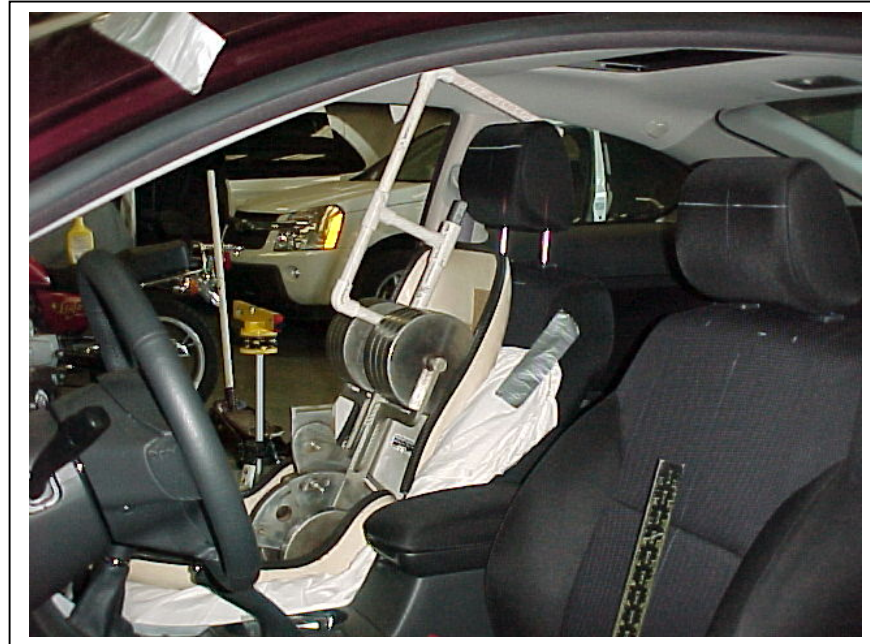
SIDE VIEW OF LOCATION P2, ITERATION 1, POSITION 1



SIDE VIEW OF LOCATION P2, ITERATION 1, POSITION 2



C55100 SIDE VIEW OF LOCATION P2, ITERATION 1, POSITION 3



SIDE VIEW OF LOCATION P2, ITERATION 1, POSITION 4



SIDE VIEW OF LOCATION P2, ITERATION 1, POSITION 5

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



C55100 SIDE VIEW OF LOC P2, ITERATION 1, POS 0 WITH HRMD



SIDE VIEW OF LOC P2, ITERATION 1, POS 1 WITH HRMD



SIDE VIEW OF LOC P2, ITERATION 1, POS 2 WITH HRMD



SIDE VIEW OF LOC P2, ITERATION 1, POS 3 WITH HRMD



C55100 SIDE VIEW OF LOC P2, ITERATION 1, POS 4 WITH HRMD

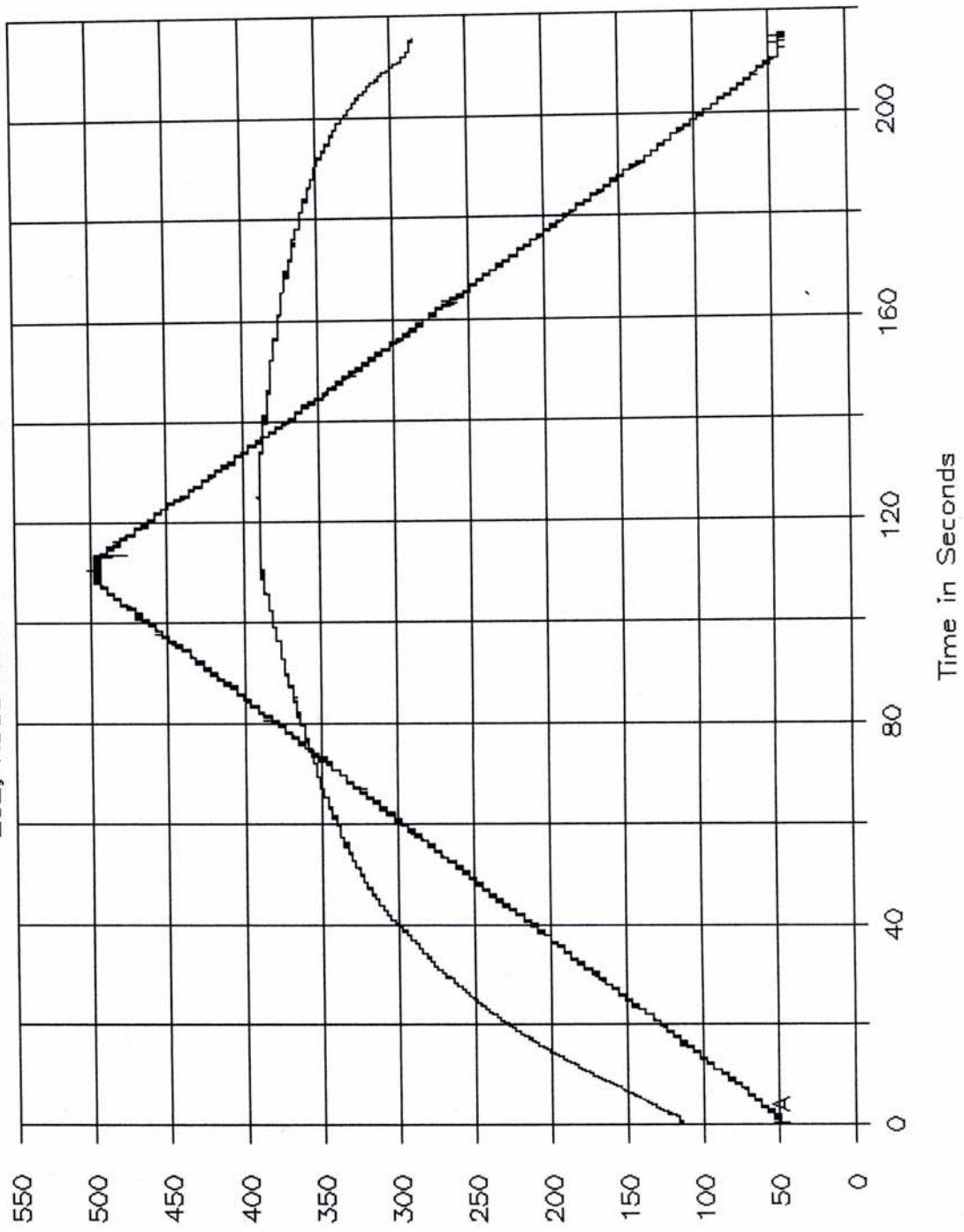


SIDE VIEW OF LOC P2, ITERATION 1, POS 5 WITH HRMD

SECTION 6
TEST PLOTS

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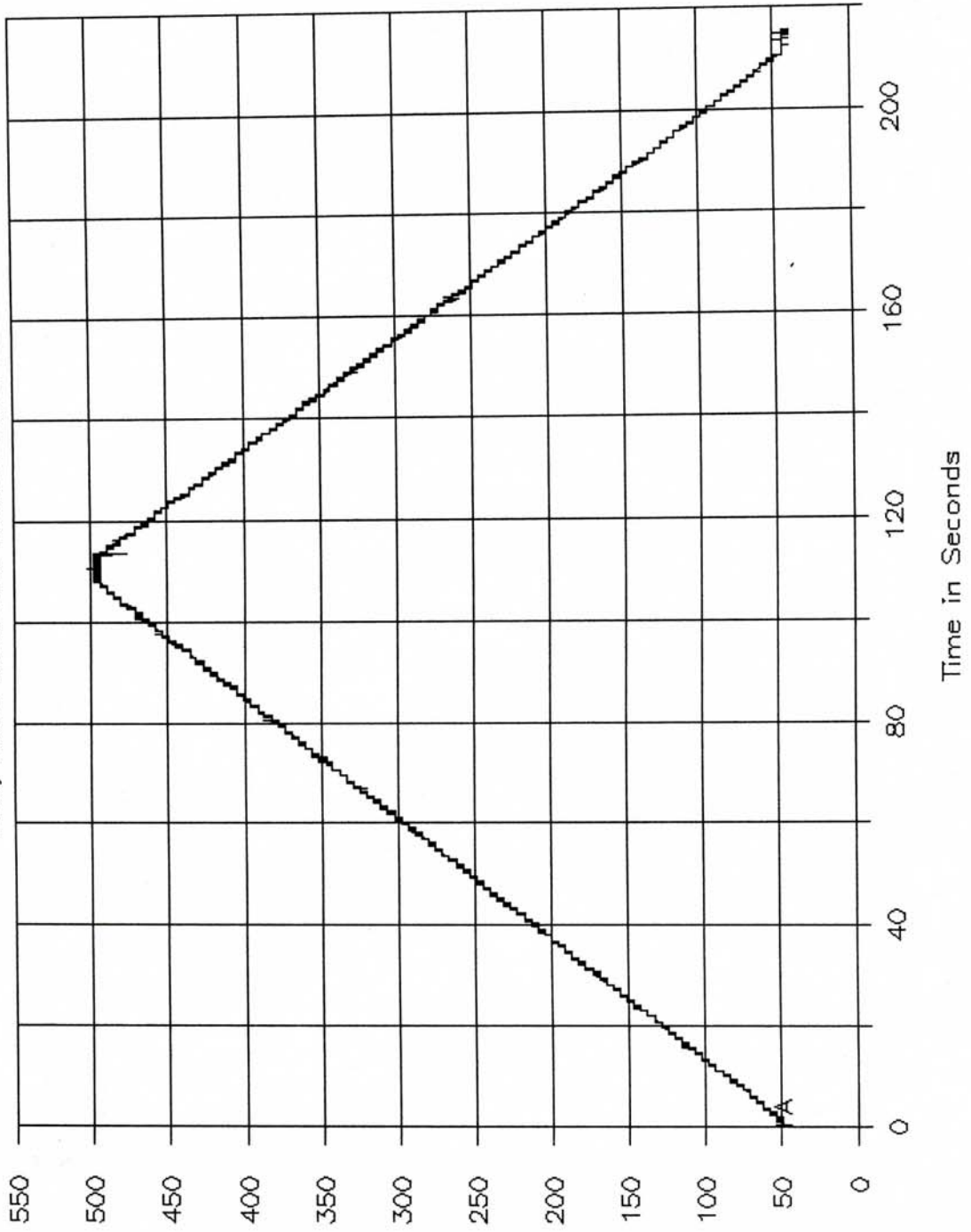
202, Head Restraint Retention, Vertical.



Force in Newtons/Disp. in MM / 10.

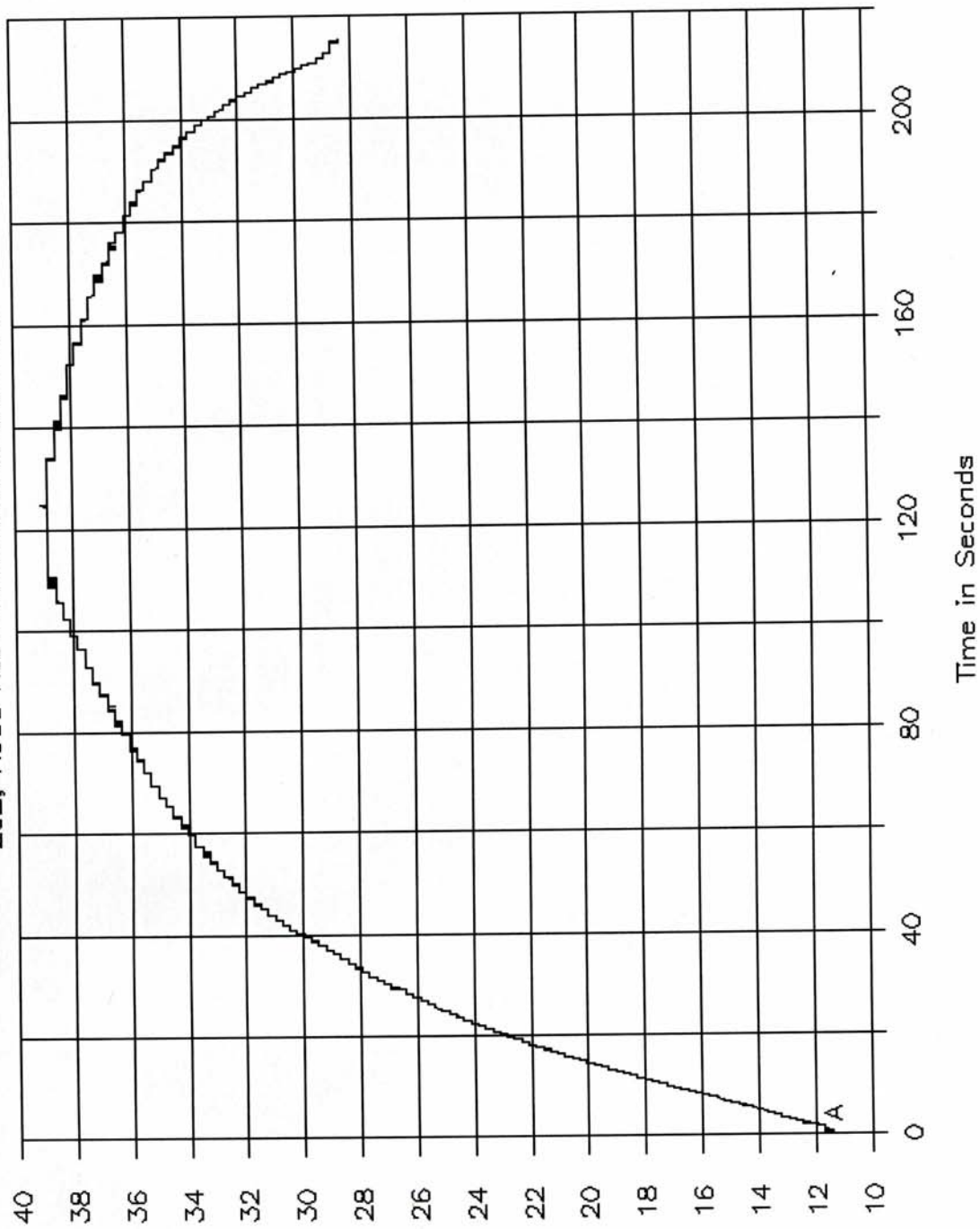
GTL 5363

202, Head Restraint Retention, Vertical.

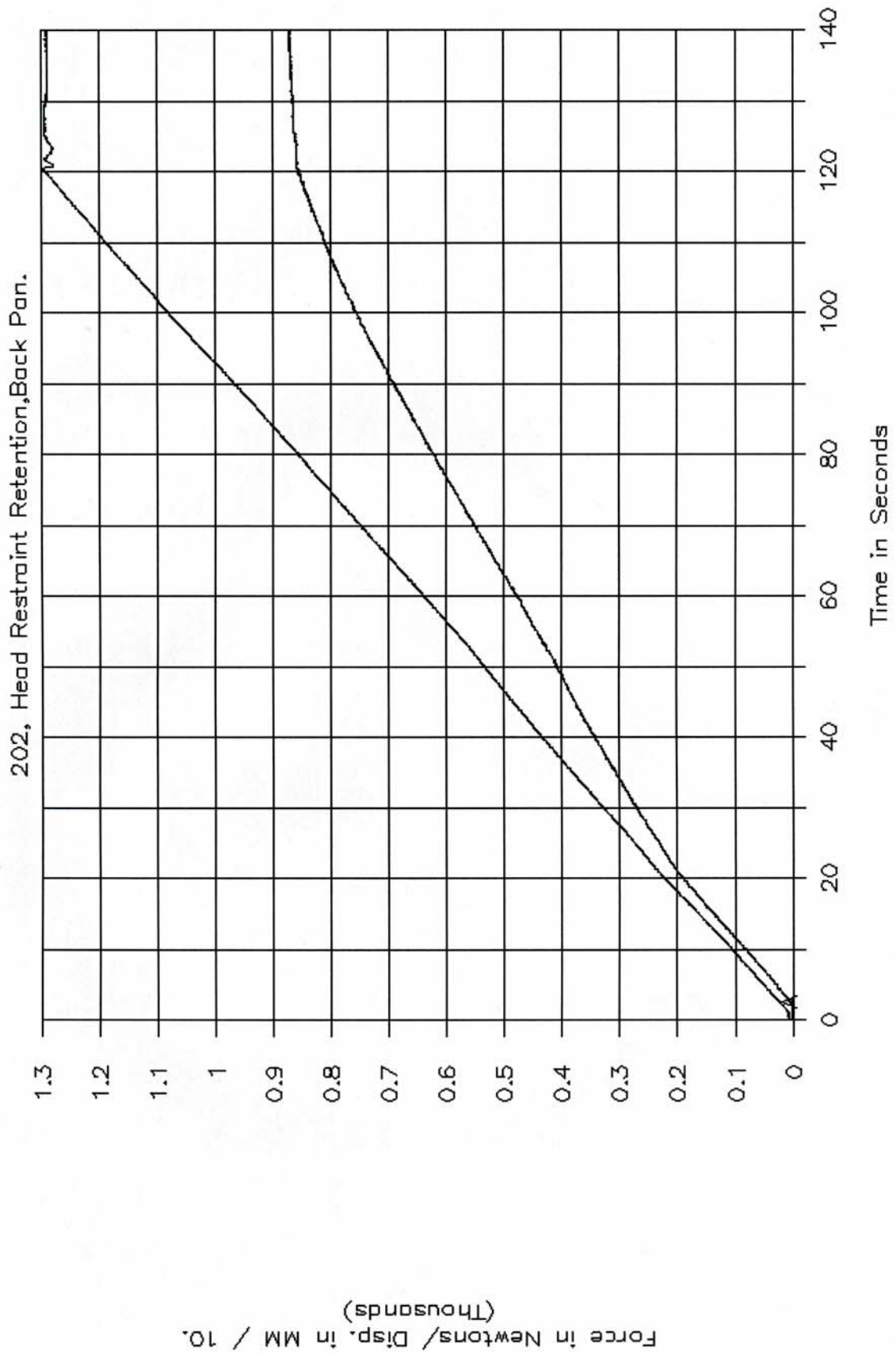


GTL 5363

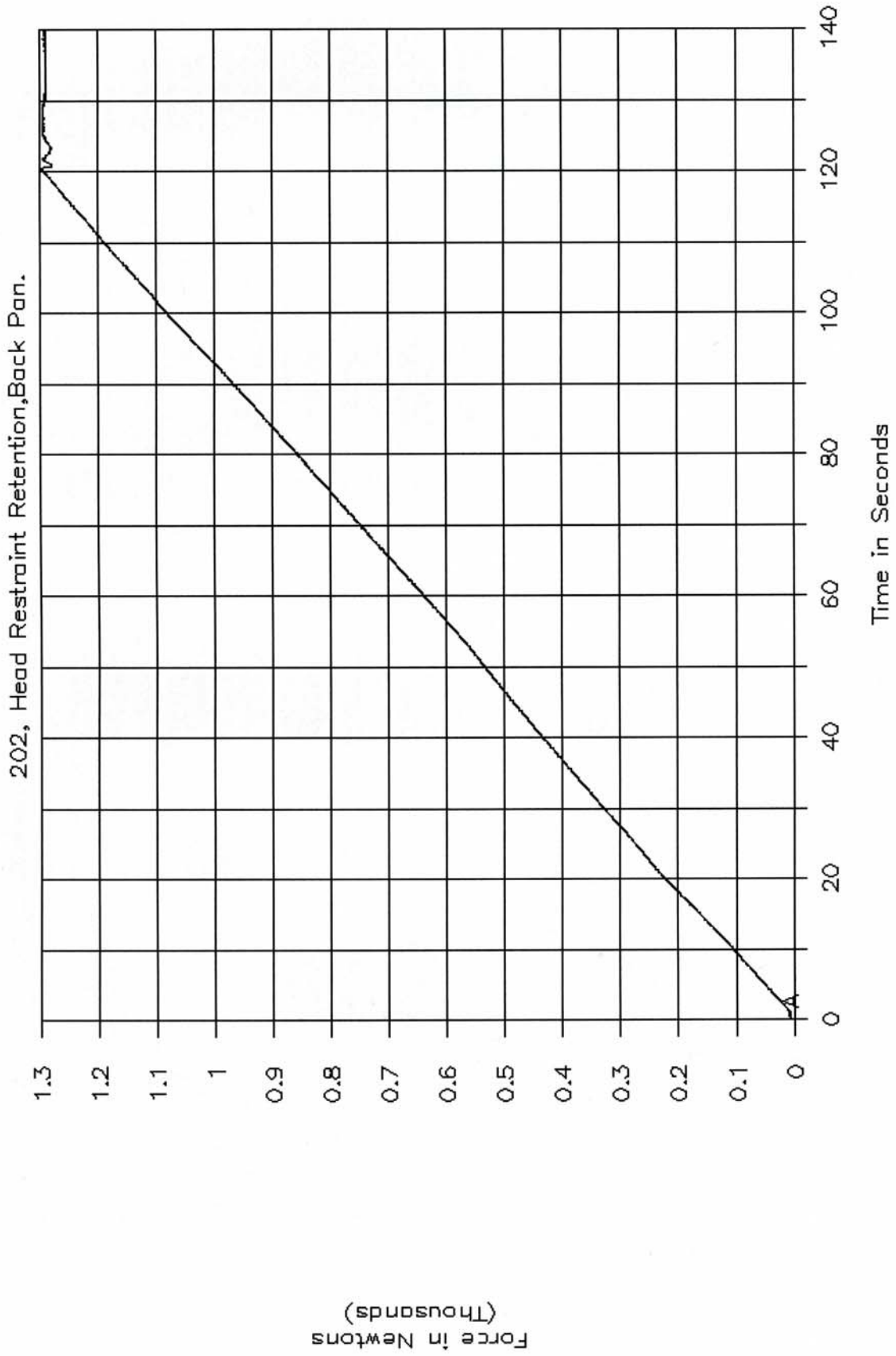
202, Head Restraint Retention, Vertical.



GTL 5377

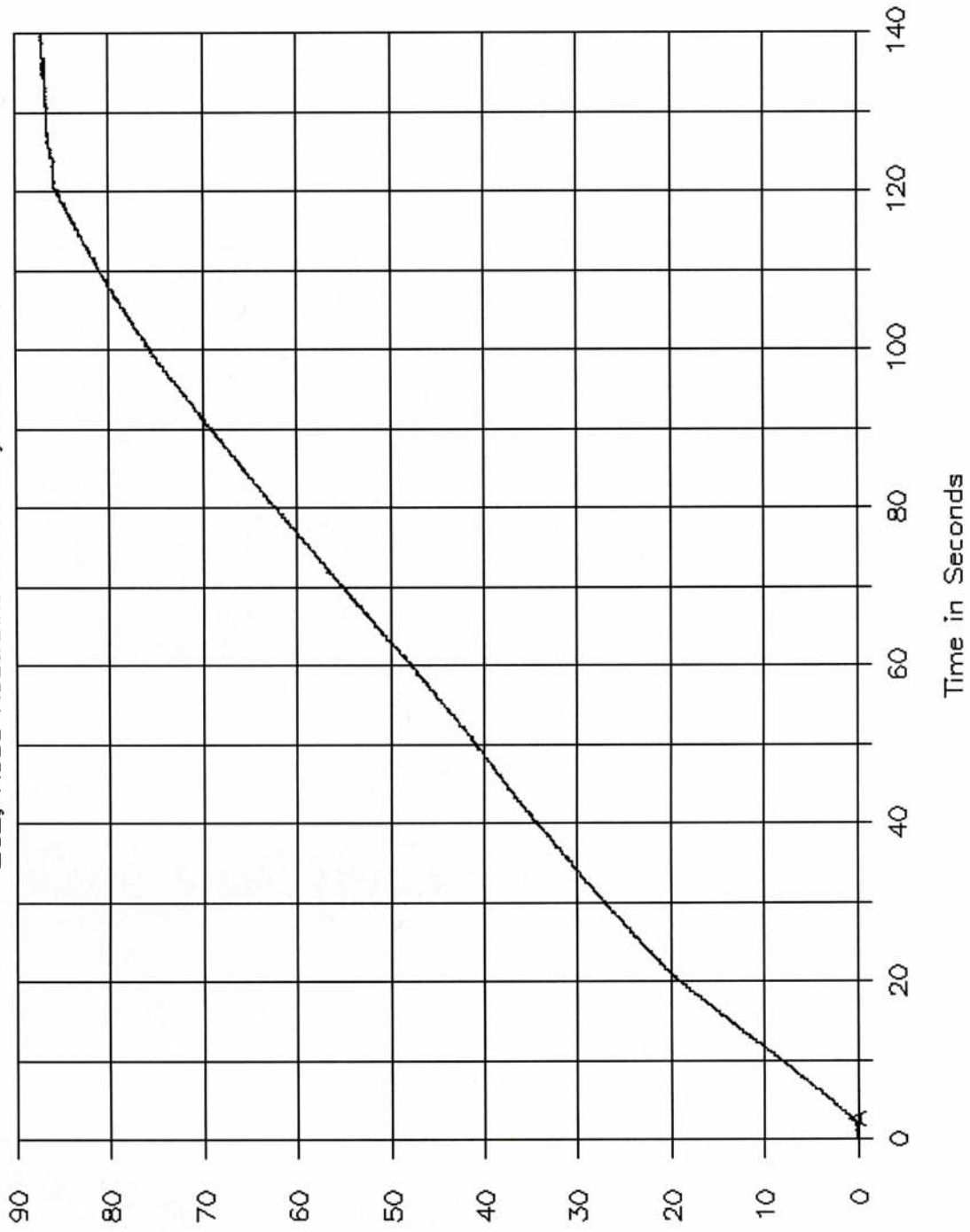


GTL 5377

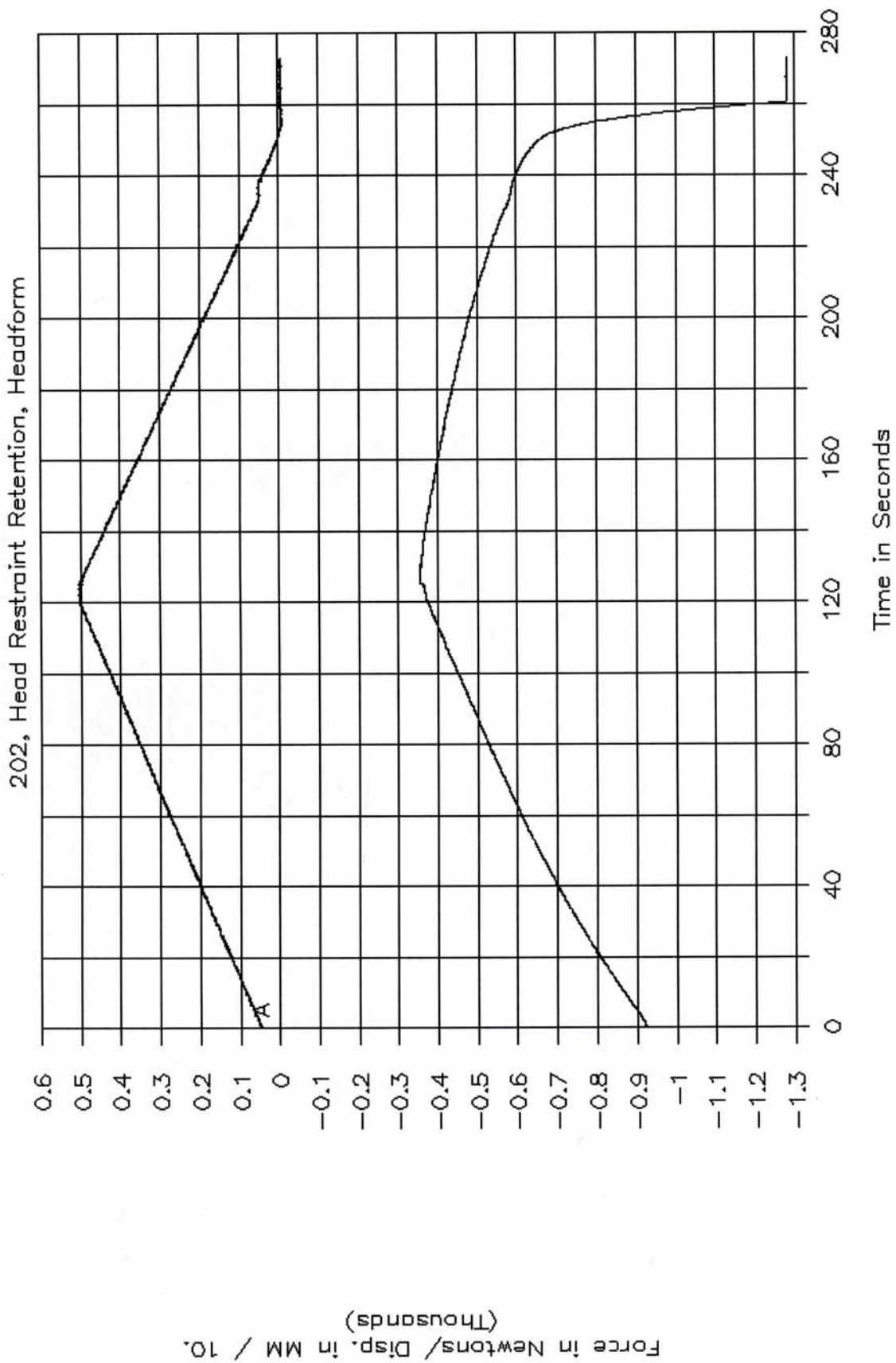


GTL 5377

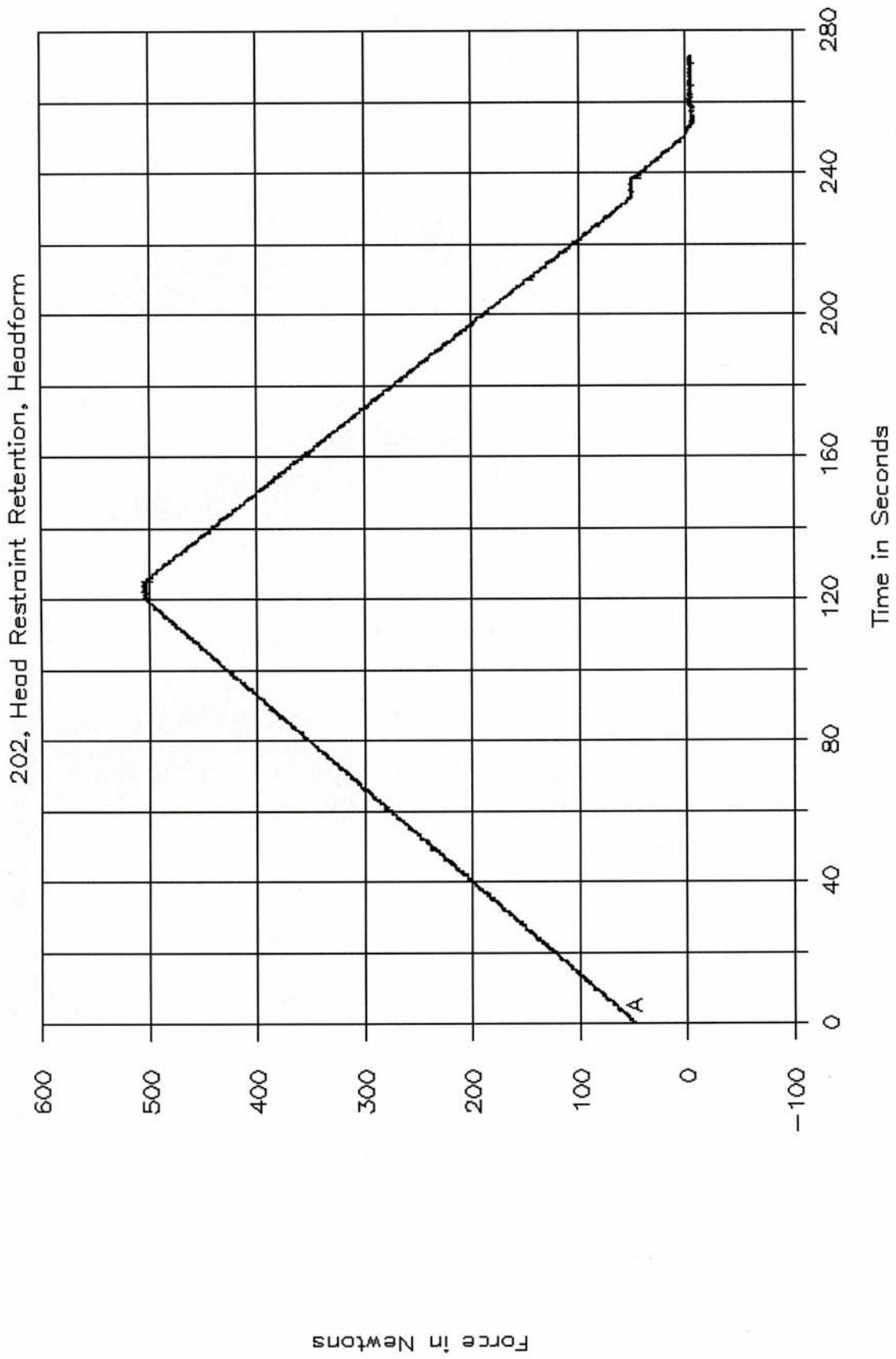
202, Head Restraint Retention, Back Pan.



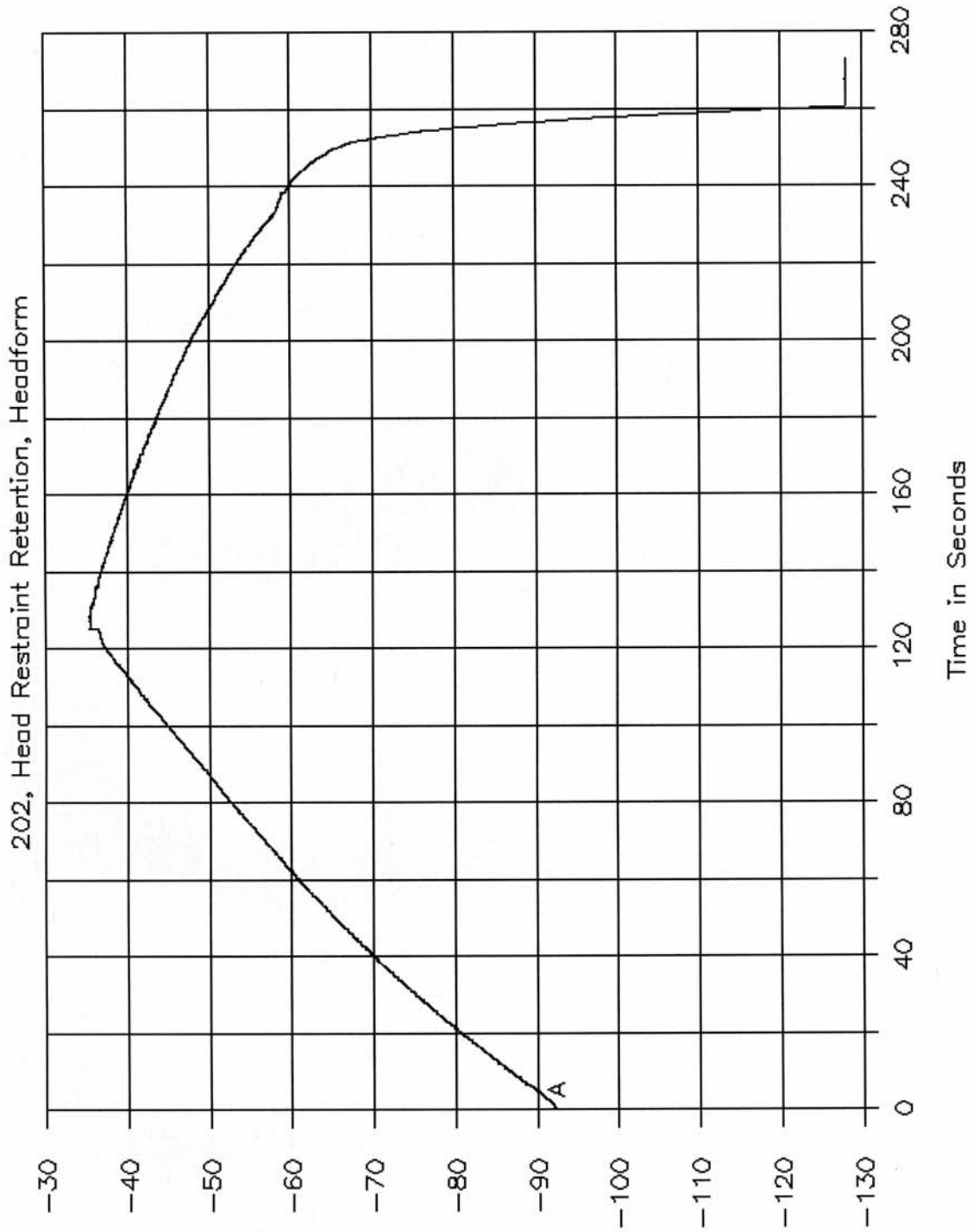
GTL 5378



GTL 5378



GTL 5378



Displacement in Millimeters (0=DTL)