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REPORT NO. 208-MGA-2003-001

SAFETY COMPLIANCE SLED TESTING FOR FMVSS 208
OCCUPANT CRASH PROTECTION

Hyundai Motor Company
2003 Hyundai Santa Fe MPV
NHTSA NO. C30504

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: March 25, 2003

Report Date: April 15, 2003

FINAL REPORT

Prepared For:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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16. Abstract A compliance test (sled test) was conducted on the subject 2003 Hyundai Santa Fe MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208S-01 for the determination of FMVSS 208 compliance. Test failures identified were as follows: NONE					
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Purpose

This FMVSS 208 compliance sled test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by MGA Research Corporation (MGA) under Contract No. DTNH22-98-D-11055. The purpose of this test was to determine if the subject vehicle, a 2003 Hyundai Santa Fe MPV, NHTSA No. C30504, meets the performance requirements of FMVSS 208, "Occupant Crash Protection," in the impact simulation sled test mode.

Test Procedure

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208S-01 dated January 15, 1998. Data was obtained relative to FMVSS 208, "Occupant Crash Protection," performance.

The test vehicle was instrumented with four (4) accelerometers to measure longitudinal axis accelerations.

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard seating positions according to the dummy placement procedures specified in Appendix B of the Laboratory Test Procedure. The dummies were not restrained by seat belts.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations; chest deflection potentiometers; left and right femur load cells to measure axial forces; and upper neck load cells to measure longitudinal, lateral, and vertical forces and moments.

The thirty-seven (37) data channels were digitally sampled at 10,000 samples per second and processed per Sections 11.7 through 11.9 of the Laboratory Test Procedure.

The crash event was recorded by six (6) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

Test Results Summary

This FMVSS 208 compliance sled test was conducted at MGA Research Corporation on March 25, 2003.

The test vehicle, a 2003 Hyundai Santa Fe MPV, NHTSA No. C30504, appeared to comply with the performance requirements of FMVSS 208 in the impact simulation sled test mode as measured by Hybrid III 50th percentile male dummies.

	FMVSS 208 Max. Allowable Injury Assessment Values	Driver (Serial #401)	Passenger (Serial #403)
HIC	1000	157	102*
Chest g	60 g	38.1 g	42.4 g
Chest displacement	3 in.	1.2 in.	0.3 in.
Left Femur	2250 lb	1265 lb	1491 lb
Right Femur	2250 lb	1234 lb	1106 lb
Neck Extension	57 Nm	8.1 Nm	16.6 Nm
Neck Flexion	190 Nm	24.6 Nm	60.7 Nm
Neck Tension	3300 N	1063 N	794 N
Neck Compression	4000 N	60 N	2152 N
Neck Shear	3100 N	517 N	1389 N

* - Calculated from X and Z acceleration channels only.

The vehicle also appears to meet the other FMVSS 208 requirements for which it was tested. These results are shown in the data sheets that are included in this report.

The test vehicle was equipped with air bags at the driver and passenger seating positions. The dummies were not restrained by seat belts. The sled carriage was accelerated to 17.2 g with an integrated velocity change of 29.0 mph. After filtering the acceleration signal to Channel Class 60, the airbag system was triggered 21.7 milliseconds after 0.5 g acceleration.

INCLUDE DISCUSSION OF LOST CHANNELS OR OTHER TEST ISSUES.

- Passenger Head Y Acceleration channel was not valid after approximately 102 milliseconds.
The Passenger HIC was therefore calculated from the X and Z acceleration channels only.

Sled Test Summary

Vehicle NHTSA No.: C30504 Test Mode: FMVSS 208 SLED TEST

Vehicle Yr/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Test Date: March 25, 2003 Time: 1:20 p.m. Temp: 70°F

Vehicle Test Weight: 4142 lbs.

DUMMY INFO.

DRIVER

PASSENGER

Dummy Type

Part 572E

Part 572E

Serial Number

401

403

Restraint System

Frontal airbag

Frontal airbag

No. Data Channels

15

15

Number of Cameras:

1 Real Time

6 High Speed

Door Opening Data:

yes Left Front

yes Right Front

FRONT SEAT(S) DATA

DRIVER

PASSENGER

Seat Track Failure -

0.0 inches shift;

0.0 inches shift

Seat Back Failure -

no

no

VISIBLE DUMMY CONTACT POINTS:

DRIVER

PASSENGER

Head

airbag/roof/sunvisor

airbag/windshield/sunvisor

Chest

airbag

airbag

Left Knee

knee bolster

glove box

Right Knee

knee bolster

glove box

General Test And Vehicle Parameter Data

Vehicle Yr/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Vehicle NHTSA No.: C30504 VIN: KM8SB12B33U389801 Color: Red

Engine Data:

No. Cylinders: 4; CID: ; Liters: 2.4; CCs:

Placement: Longitudinal/Inline: ; Transverse/Lateral: X

Transmission Data:

Speeds: 5; Manual: X; Automatic: ; Overdrive: X

Final Drive:

Rear Wheel Drive: ; Front Wheel Drive: X; Four Wheel Drive:

Major Options:

A/C: X; Pwr. Strg.: X; Pwr. Brakes: X; Pwr. Windows: X

Pwr. Dr. Locks: X; Other: tilt wheel, cruise control

Date Received: 1/30/03; Odometer Reading: 101 miles

Selling Dealer: Arrow Hyundai, 10611 W. Arthur Avenue, West Allis, WI 53227

REMARKS: None

General Test And Vehicle Parameter Data (Cont.)

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Hyundai Motor Company

Date of Manufacture: 10/18/02 ; VIN: KM8SB12B33U389801

GVWR: 4870 lbs; GAWR Front: 2645 lbs.

GAWR Rear: 2865 lbs.

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 32 psi REAR: 32 psi

Recommended Tire Size: P225/70R16 ; Load Range - 102T

Recommended Cold Tire Pressure:

FRONT: 32 psi REAR: 32 psi

Size of Tires on Test Vehicle: P225/70R16

Type of Spare Tire: P225/70R16; Space Saver: ; Standard: X

Vehicle Capacity Data:

Type of Front Seats: X Bucket; Bench; Split Bench

Number of Occupants: 2 Front; 3 Rear; 3rd Seat; 5 TOTAL

REMARKS: None

VEHICLE CAPACITY WEIGHT (VCW) = 880 lbs.

No. Of Occupants x 150 lbs = 750 lbs.

Rated Cargo/Luggage Weight (RCWL) = 130 lbs. (Difference)

General Test And Vehicle Parameter Data (Cont.)

WEIGHT OF TEST VEHICLE AS RECEIVED AT LABORATORY: (with maximum fluids)

Right Front =	<u>1057</u> lbs.	Right Rear =	<u>782</u> lbs.
Left Front =	<u>1092</u> lbs.	Left Rear =	<u>737</u> lbs.
TOTAL FRONT =	<u>2149</u> lbs.	TOTAL REAR =	<u>1519</u> lbs.
% Total Weight =	<u>58.6</u> %	% Total Weight =	<u>41.4</u> %
TOTAL DELIVERED WEIGHT = <u>3668</u> lbs.			

WEIGHT OF FULLY LOADED TEST VEHICLE WITH TWO DUMMIES (344 LB) AND 130 POUNDS OF CARGO WEIGHT:

Right Front =	<u>1137</u> lbs.	Right Rear =	<u>941</u> lbs.
Left Front =	<u>1165</u> lbs.	Left Rear =	<u>899</u> lbs.
TOTAL FRONT =	<u>2302</u> lbs.	TOTAL REAR =	<u>1840</u> lbs.
% Total Weight =	<u>55.6</u> %	% Total Weight =	<u>44.4</u> %
TOTAL WEIGHT = <u>4142</u> lbs.			

TEST VEHICLE ATTITUDE: (all measurements in degrees)

AS DELIVERED DOOR SILL ANGLE:	<u>0.9° nose down</u>
AS TESTED DOOR SILL ANGLE:	<u>0.8° nose down</u>
FULLY LOADED DOOR SILL ANGLE:	<u>0.5° nose down</u>

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 17.2 gallons
Usable Capacity Figure Furnished by COTR = 17.2 gallons

REMARKS: None

Post-Impact Data

Test number: HT03032501
NHTSA number: C30504
Test date: March 25, 2003
Test time: 1:20 p.m.
Test type: FMVSS 208 Compliance Sled Test
Impact angle: 0°
Ambient Temperature
at Impact Area: 70°F
Temperature in
Occupant Compartment: 70°F

Impact Velocity:

Integrated velocity from the integration of the entire sled acceleration: 29.0 mph
Specified integrated velocity range: 28 to 30 mph

Sled Carriage Acceleration:

Acceleration: 17.2 g
Specified Acceleration Range: 16.0 - 18.2 g

Sled Carriage Acceleration Duration:

Time from T-0 (-0.5 g) to 0.0 g: 122.6 msec
Specified Acceleration Duration: 120.0 to 130.0 msec

The sled acceleration corridor was achieved.

Seat and Steering Column Positioning Data

Vehicle Yr/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

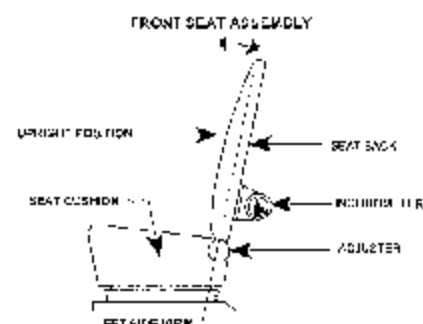
Vehicle NHTSA No.: C30504 Test Date: March 25, 2003

NOMINAL DESIGN RIDING POSITION:

Driver Seat: Seat Back Angle = 12.8°*

Passenger Seat: Seat Back Angle = 13.3°*

* - Measured at headrest post with seat back set to 15th notch (1st as zero). (See note below)



SEAT FORE AND AFT POSITIONS:

Driver Seat: The seat track had a total position movement of 24 notches and was positioned 12 notches rearward from the foremost position with the forward most locking position as zero.

Passenger Seat: The seat track had a total position movement of 24 notches and was positioned 12 notches rearward from the foremost position with the forward most locking position as zero.

STEERING COLUMN ADJUSTMENTS:

The steering column was placed in the mid position (4th position of 7 total).

Note: The seat back was set at the 15th notch and not the 5th notch as specified by the manufacturer. The information from the manufacturer was determined to be incorrect at the time of the test.

Dummy Positioning Measurement Table

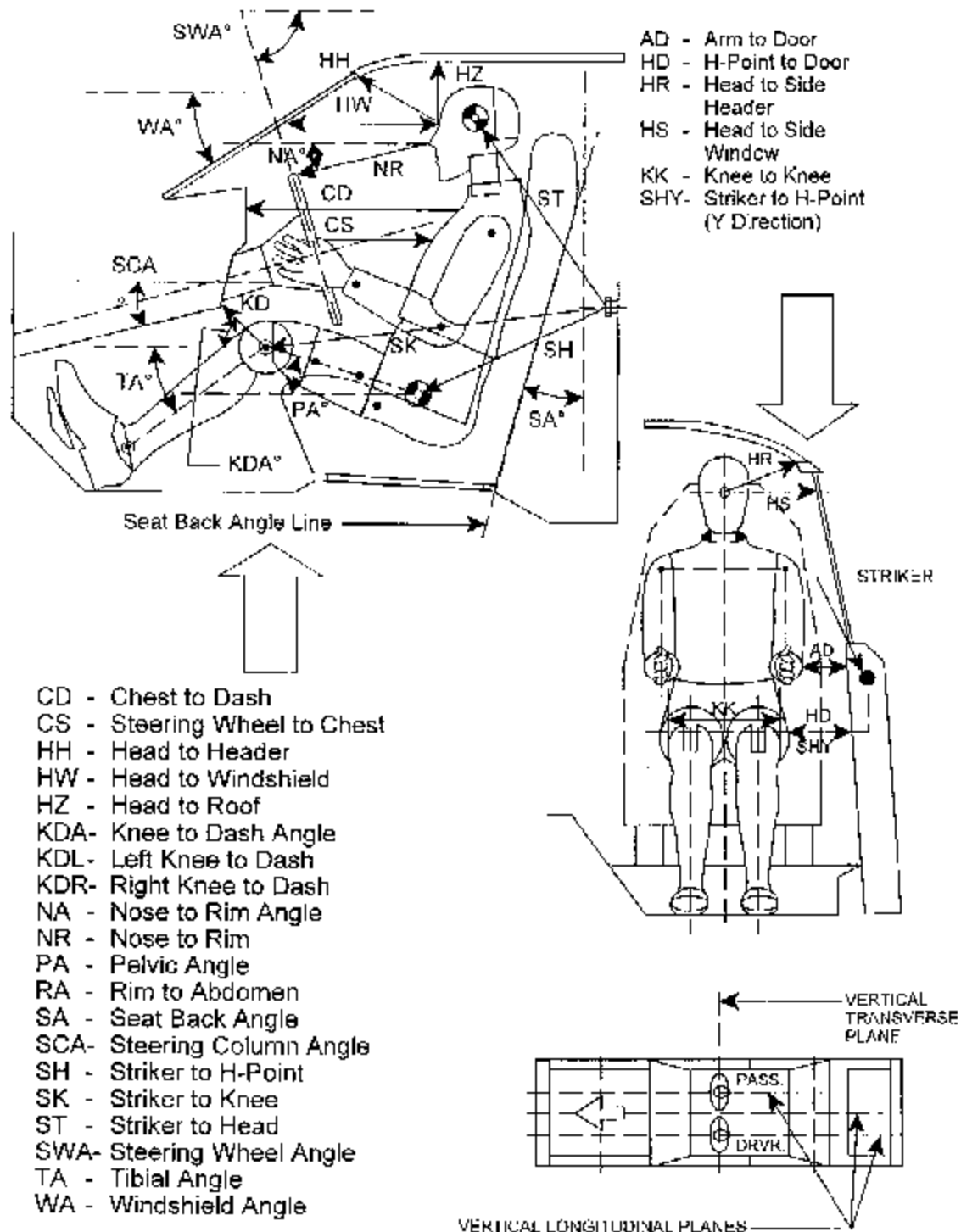
Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Vehicle NHTSA No.: C30504 Test Date: March 25, 2003

	DRIVER (Serial #401)	PASSENGER (Serial #403)
WA°	31.4°	
SWA°	62.4°	
SCA°	28.2°	
SA°*	12.8°	13.3°
HZ	7.1	6.7
HH	13.7	13.2
HW	23.0	21.9
HR	8.3	8.0
NR	17.2 Angle (NA°) 17.6°	
CD	20.6	21.2
CS	13.0	
RA	6.3	
KDL	4.5 Angle (KDA°) 0.0°	6.9
KDR	6.1	7.1 Angle (KDA°) 0.0°
PA°	23.8°	24.3°
TA°	53.8°	45.0°
KK	12.4	10.6
ST	23.3 Angle 6.1°	23.3 Angle 7.2°
SK	23.7 Angle 87.1°	24.6 Angle 90.8°
SH	8.3 Angle 102.5°	8.5 Angle 106.7°
SHY	10.4	10.4
HS	11.8	11.1
HD	6.7	6.6
AD	4.4	4.6

* - Measured at headrest post

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



Description of Dummy Measurements

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

The following measurements are to be made within a vertical longitudinal plane.

- * HH Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header.
- * HW Head to Windshield, taken from the point where the dummy's nose meets his forehead (between his eyes) to a point on the windshield. Use a level.
- HZ Head to Roof, taken from the point where the dummy's nose meets his forehead (between his eyes) to the point on the roof directly above it. Use a level.
- * CS Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level.
- * CD Chest to Dash, place a tape measure on the tip of the dummy's chin and rotate five inches of it downward toward the dummy to the point of contact on the transverse center of the dummy's chest. Then measure from this point to the closest point on the dashboard either between the upper part of the steering wheel between the hub and the rim, or measure to the dashboard placing the tape measure above the rim, whichever is a shorter measurement. See photograph.
- RA Steering Wheel Rim to Abdomen, taken from the bottommost point of the steering wheel rim horizontally rearward to the dummy. Use a level.
- NR Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA).
- *¹ KDL, KDR Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard. Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA). See photograph.

* Measurement used in Data Tape Reference Guide

¹ Only outboard measurement is referenced in Data Tape Reference Guide

Description of Dummy Measurements (Cont.)

SH, SK, ST Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z plane measured from the forward most center point on the striker to the center of the H-point, outer knee bolt, and head target. When taking this measurement a firm device that can be rigidly connected to the striker should be used. Use a level. The angles of these measurements with respect to the horizontal should also be recorded. The measurement in the Y (transverse) direction from the striker to the H-point should also be taken (SHY). See photograph.

The following measurements are to be made within a vertical transverse plane.

- | | |
|------|---|
| HS | Head to Side Window, taken from the point where the dummy's nose meets his forehead (between his eyes) to the outside of the side window. In order to make this measurement, roll the window down to the exact height which allows a level measurement. Use a level. See photograph. |
| * AD | Arm to Door, taken from the outer surface of the elbow pivot bolt on a Hybrid II dummy to the first point it hits on the door. In the case of a Hybrid III dummy, measure from the bolt on the outer biceps. When a SID is used make the measurement from the center of the bottom of the arm segment where it meets the dummy's torso. |
| * HD | H-point to Door, taken from the H-point on the dummy to the closest point on the door. Use a level. |
| * HR | Head to Side Header, measure the shortest distance from the point where the dummy's nose meets his forehead (between his eyes) to the side edge of the header just above the window frame, directly adjacent to the dummy. |
| SHY | Striker to H-point, taken from a rod rigidly connected to the forward most center point on the striker to the H-point. Use a level. See photograph. |
| KK | Knee to Knee, for Hybrid II dummies measure the distance between knee pivot bolt head outer surfaces. For Hybrid III dummies measure the distance between the outboard knee clevis flange surfaces. (This measurement may not be exactly transverse) |

* Measurement used in Data Tape Reference Guide

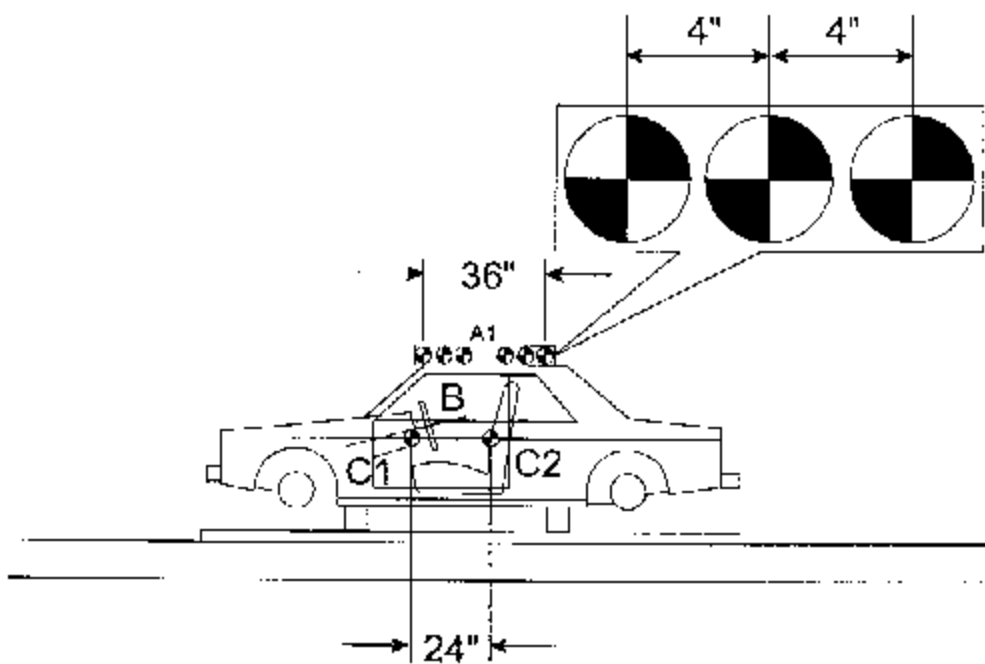
Description of Dummy Measurements (Cont.)

Angles

SA	Seat Back Angle, find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR.
PA	Pelvic or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the H-point hole and the outer knee pivot bolt hole on a Hybrid II dummy with respect to the horizontal, to find the femur angle.
SWA	Steering Wheel Angle, find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.
SCA	Steering Column Angle, measured with respect to the horizontal by placing an inclinometer on the center of the underside of the steering column.
NA	Measure the angle made when taking the measurement NR with respect to the horizontal.
KDA	Knee to Dash Angle, the angle that the measurement KD is taken at with respect to the horizontal. Only get this angle for the outboard knee. See photograph.
WA	Windshield Angle, place an inclinometer along the transverse center of the windshield exterior (measurement is made with respect to horizontal).
TA	Tibial Angle, use a straight edge to connect the dummy's knee and ankle bolts. Then place an inclinometer on the straight edge and measure the angle with respect to the horizontal.

Vehicle Targeting Measurements

REFERENCE PHOTO TARGETS

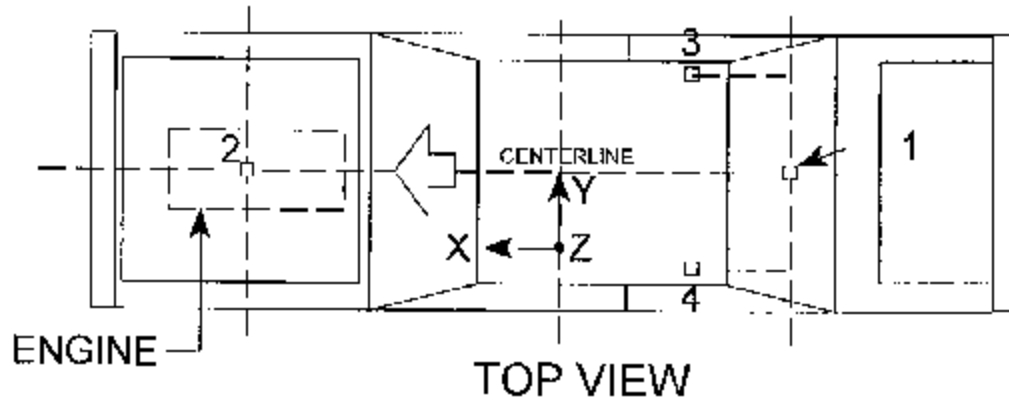


LEFT SIDE VIEW

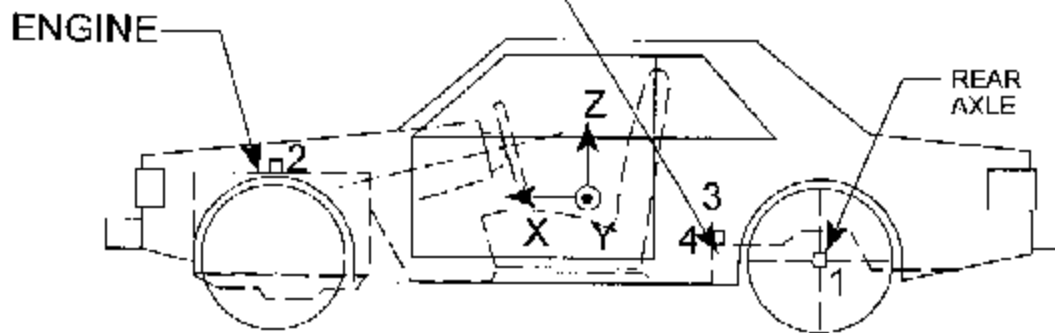
Vehicle Accelerometer Placement and Data Summary

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Vehicle NHTSA No.: C30504 Test Date: March 25, 2003



REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



LEFT SIDE VIEW

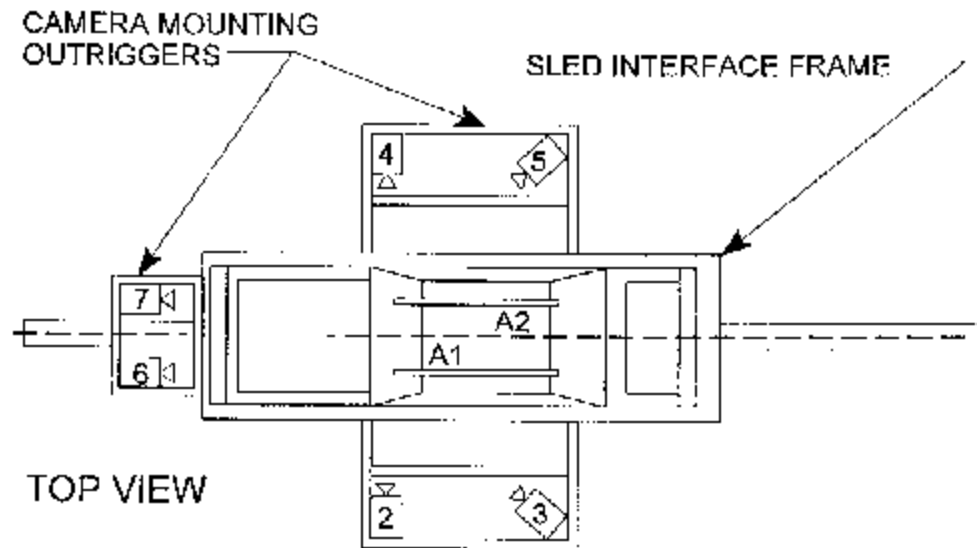
Vehicle Accelerometer Location Measurements and Data Summary

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Vehicle NHTSA No.: C30504 Test Date: March 25, 2003

No.	Location	X (in)	Y (in)	Positive Direction		Negative Direction	
				Value	Time (msec)	Value	Time (msec)
	Sled Primary Longitudinal	67.0	0	17.2 g	62	-1.5 g	126
	Sled Redundant Longitudinal	67.0	4.0	17.5 g	62	-1.5 g	126
	Sled Velocity Measured Integrated	67.0	0	29.0 mph	123	--	--
1	Rear Axle Longitudinal	44.0	0	17.1 g	55	-1.3 g	126
2	Top Engine Longitudinal	150.0	0	17.7 g	41	-3.9 g	166
3	Right Rear Seat Member Longitudinal	65.0	20.0	18.2 g	62	-1.7 g	127
4	Left Rear Seat Member Longitudinal	65.0	20.0	17.2 g	49	-1.8 g	127

Camera Positions



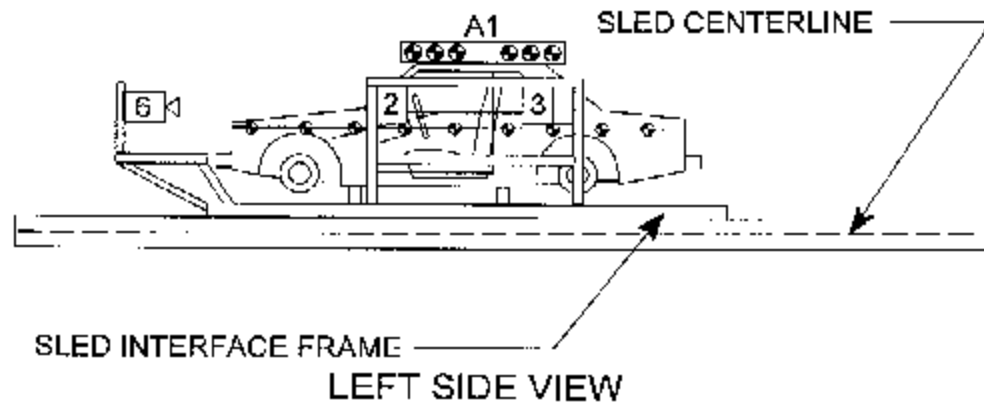
CAMERA FRAME RATES:

#1 = 24 fps

All Others = 1,000 fps



REAL TIME CAMERA



Camera Location Measurements

Camera No.	VIEW	Camera Positions (inches)*			Angle (deg)	Film Plane To Head Target	Lens (mm)	Speed (fps)**
		X	Y	Z				
1	Real-Time (Pre and Post)						10	24
2	Onboard Driver	70.6	88.6	38.4	90	72.4	13	1000
3	Onboard Driver Angle	150.9	91.1	47.8			13	716
4	Onboard Passenger	71.8	89.6	38.5	90	71.1	13	990
5	Onboard Passenger Angle	146.7	88.5	47.9			13	1000
6	Onboard Windshield Driver	18.3	14.1	42.9			13	1010
7	Onboard Windshield Passenger	18.3	13.9	42.9			13	755

Reference* X = Front of sled carriage
Y = Center of sled carriage
Z = Top of sled carriage

** There were no timing marks on the film. Film speed was determined through film analysis.

Occupant Injury Data

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Vehicle NHTSA No.: C30504 Test Date: March 25, 2003

MAXIMUM ACCELERATION VALUES: (g's)	DRIVER DUMMY #401	PASSENGER DUMMY #403
Head Channel X	-32.4	-61.7
Head Channel Y	11.6	-21.8*
Head Channel Z	16.5	-37.0
HEAD RESULTANT	35.4	67.1**
Chest Channel X	-38.3	-39.9
Chest Channel Y	4.4	-3.4
Chest Channel Z	7.7	24.6
CHEST RESULTANT	38.8	43.8

* - No valid data after approximately 102 milliseconds.

** - Calculated from X and Z acceleration channels only

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	157	102**
$t_1 =$ (msec)	92.8	86.5
$t_2 =$ (msec)	128.8	122.5

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

CHEST INJURY CRITERIA (CLIP) VALUES: (g's)

CLIP	38.1	42.4
$t_1 =$ (msec)	90.4	98.4
$t_2 =$ (msec)	93.4	101.4
CHEST DEFLECTION (in)	1.2	0.3

Occupant Injury Data (Cont.)

MAX. COMPRESSIVE FEMUR FORCES:	DRIVER DUMMY #401	PASSENGER DUMMY #403
Left Side (lbs)	1265	1491
Right Side (lbs)	1234	1106

NECK INJURY CRITERIA:

Peak Flexion Bending Moment about the Occipital Condyle (N-m)	24.6	60.7
Peak Extension Bending Moment about the Occipital Condyle (N-m)	8.1	16.6
Peak Axial Tension (N)	1063	794
Peak Axial Compression (N)	60	2152
Peak Fore Shear (N)	517	1389
Peak Aft Shear (N)	249	101

Seat Belt Warning System Data

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504 ; Technician: Chad Gadberry; Date: February 10, 2003

Complete the following to determine which seat belt warning system option (S7.3(a)(1) or S7.3(a)(2)) is used. (Manufacturers may use either option.)

A. With occupant in driver's position and lap belt in stowed position and ignition switch placed in "Start/On" position:

A.1 S7.3(a)(1)

Time duration of audible warning signal = 6 seconds
(4 to 8 seconds)

Time duration of reminder light operation = >60 seconds
(no less than 60 seconds)

A.2 S7.3(a)(2)

Time duration of audible warning signal = seconds
(4 to 8 seconds)(see 49 USCS @ 30124)

Time duration of reminder light operation = seconds
(4 to 8 seconds)

B. With occupant in driver's position and lap belt in use and ignition switch placed in "Start/On" position:

B.1 S7.3(a)(1)

Time duration of audible warning signal = 0 seconds
(audible warning not required)

Time duration of reminder light operation = 0 seconds
(reminder light not required)

B.2 S7.3(a)(2)

Time duration of audible warning signal = seconds
(audible warning not required)

Time duration of reminder light operation = seconds
(4 to 8 seconds)

C. Note wording of visual warning:

Fasten seat belt	_____
Fasten Belt	_____
Symbol 101	_____ X _____

Readiness Indicator

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504 ; Technician: Chad Gadberry ; Date: February 10, 2003

An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement. (11/8/94 legal interpretation)

1. Is the system totally mechanical? (☐) Yes (☒) No
(If YES this Data Sheet is complete.)
2. Describe the location of the readiness indicator: lower left of instrument panel.

3. Is the readiness indicator clearly visible to the driver?
(☒) Yes-Pass (☐) No-FAIL
4. Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided?
(☒) Yes-Pass (☐) No-FAIL

Air Bag Labels Data

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504 ; Technician: Chad Gadberry ; Date: February 10, 2003

1. Air bag maintenance label and owner's manual instructions (S4.5.1(a)):
 - 1.1. Does the manufacturer recommend periodic maintenance or replacement of the airbag?
() Yes, go to 1.2 (X) No, go to 2
 - 1.2. Does the vehicle have a maintenance or replacement label?
() Yes-Pass () No-FAIL
 - 1.3. Does the label contain one of the following?
() Yes-Pass () No-FAIL
() Schedule on label specifies month and year (Date: _____)
() Schedule on label specifies vehicle mileage (Mileage: _____)
() Schedule on label specifies interval measured from date on certification label (Date: _____)
 - 1.4. Is the label permanently affixed within the passenger compartment?
() Yes-Pass () No-FAIL
 - 1.5. Is the label lettered in English?
() Yes-Pass () No-FAIL
 - 1.6. Is the label in block capitals and numerals?
() Yes-Pass () No-FAIL
 - 1.7. Are the letters and numerals at least 3/32 inches high?
() Yes-Pass () No-FAIL
 - 1.8. Does the owner's manual set forth the recommended schedule for maintenance or replacement?
() Yes-Pass () No-FAIL
2. Does the owner's manual (S4.5.1(f)):
 - 2.1. Include a description of the vehicle's airbag system in an easily understandable format?
(X) Yes-Pass () No-FAIL
 - 2.2. Include a statement that the vehicle is equipped with an airbag and a lap/shoulder belt at the front outboard seating positions?
(X) Yes-Pass () No-FAIL

Air Bag Labels Data (Cont.)

- 2.3 Include a statement that the air bag is a supplemental restraint at the front outboard seating positions?
(X)Yes-Pass () No-FAIL
- 2.4 Emphasize that all occupants, including the driver, should always wear their seat belts whether or not an airbag is also provided at their seating positions to minimize the risk of severe injury or death in the event of a crash?
(X)Yes-Pass () No-FAIL
- 2.5 Provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to insure maximum safety protection for those occupants?
(X)Yes-Pass () No-FAIL
- 2.6 Explain that no objects should be placed over or near the air bag on the steering wheel or on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate?
(X)Yes-Pass () No-FAIL

3. Does the vehicle:

- 3.1. Provide an automatic means to ensure that the airbag does not deploy when a child seat or child with a total mass of 30 kg or less is present on the front outboard passenger?
()Yes (X) No
- 3.2. Incorporate sensors, other than or in addition to weight sensors, which automatically prevent the passenger air bag from deploying in situations in which it might have an adverse effect on infants in rear-facing child seats, and unbelted or improperly belted children?
()Yes (X) No
- 3.3. Have a passenger air bag designed to deploy in a manner that does not create a risk of serious injury to infants in rear-facing child seats, and unbelted or improperly belted children?
()Yes (X) No

If yes to 3.1, or 3.2, or 3.3, the vehicle is not required to have a sunvisor warning label (S4.5.1(6)), an airbag alert label (S4.5.1(c)) or a label on the dash (S4.5.2(e)) and this check sheet is complete (S4.5.1). If no to 3.1, 3.2, and 3.3, go to 4.

4. Sun Visor Warning Label

- 4.1. Is the label permanently affixed (may be permanent marking or molding) to either side of the sunvisor at each front outboard seating position with an airbag?
(S4.5.1(b)(2))
- | | | |
|------------------|-------------|-------------------------|
| Driver Side - | (X)Yes-Pass | () No-FAIL |
| Passenger Side - | () N/A | (X)Yes-Pass () No-FAIL |

Air Bag Labels Data (Cont.)

- 4.2. Does the label conform in content (vehicles without back seats may omit the statement: "The back seat is the safest place for children.") (S4.5.1(b)(2)(v)) to either label shown on the next page as appropriate at each front outboard seating position with an air bag? (S4.5.1(b)(2))

4.2.1 **Dual air bags:** ☐ Not Applicable
Driver Side - ☒ Yes-Pass ☐ **No-FAIL**
Passenger Side - ☒ Yes-Pass ☐ **No-FAIL**

4.2.2 **Vehicle with driver air bag ONLY - either 4.2.2.1 or 4.2.2.2 is applicable, not both.** (S4.5.1(b)(2)(iv))

4.2.2.1 Does the label conform in content to either label shown on the following page as appropriate?
☒ Not Applicable
Driver Side - ☐ Yes-Pass ☐ **No-FAIL**

4.2.2.2 Does the label conform in content to the first label shown on the following page where the label can be modified to omit the pictogram and the message text may read:

DEATH or SERIOUS INJURY can occur.

- Sit as far back as possible from the air bag.
- ALWAYS use SEAT BELTS and CHILD RESTRAINTS
- The BACK SEAT is the SAFEST place for children.

☒ Not Applicable
Driver Side - ☐ Yes-Pass ☐ **No-FAIL**

Air Bag Labels Data (Cont.)

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

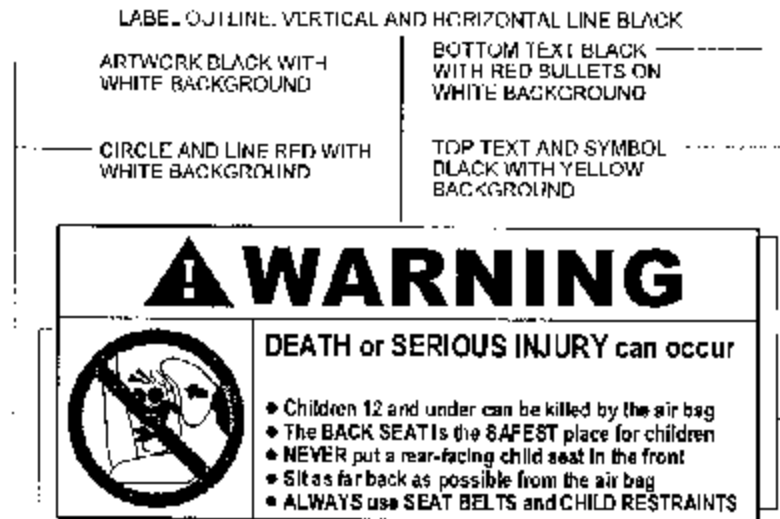


Figure 6a (S4.5.1(b)(2))

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

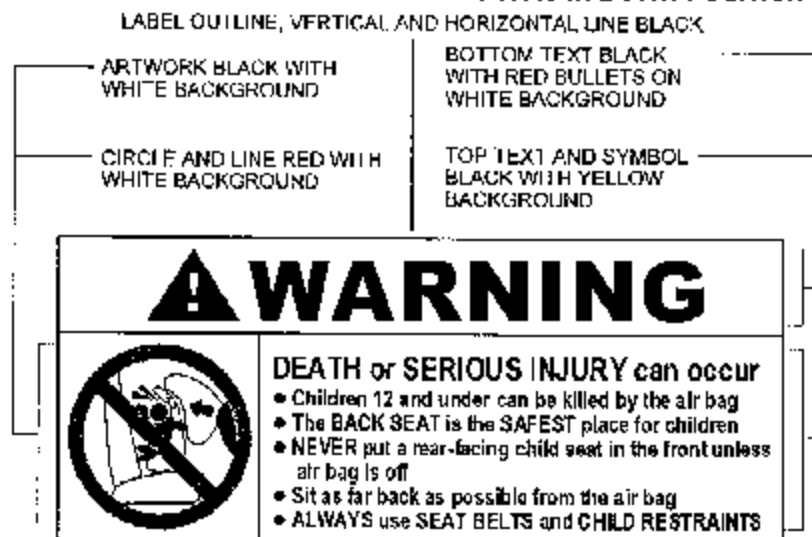


Figure 6b (S4.5.1(b)(2))

- 4.3 Is the label heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1(b)(2)(i))
- | | | | |
|------------------|--|--|----------------------------------|
| Driver Side - | ☒ Yes-Pass | ☐ No-FAIL | |
| Passenger Side - | ☐ No air bag | ☒ Yes-Pass | ☐ No-FAIL |
- 4.4 Is the message white with black text? (S4.5.1(b)(2)(ii))
- | | | | |
|------------------|--|--|----------------------------------|
| Driver Side - | ☒ Yes-Pass | ☐ No-FAIL | |
| Passenger Side - | ☐ No air bag | ☒ Yes-Pass | ☐ No-FAIL |

Air Bag Labels Data (Cont.)

- 4.5 Is the message area at least 30 cm²? (S4.5.1(b)(2)(ii))
Actual message area: 35.1 cm²
- | | | |
|---------------------------------|-------------|-------------|
| Driver Side - | (X)Yes-Pass | () No-FAIL |
| Passenger Side - () No air bag | (X)Yes-Pass | () No-FAIL |
- 4.6 Is the pictogram black with a red circle and slash on a white background?
(S4.5.1(b)(2)(iii) & (S4.5.1(b)(2)(iv))
- | | |
|--|-------------------------|
| For vehicles with driver side air bag ONLY | () Not Applicable |
| Driver Side - | (X)Yes-Pass () No-FAIL |
| Passenger Side - () No air bag | (X)Yes-Pass () No-FAIL |
- 4.7 Is the pictogram at least 30 mm in diameter? (S4.5.1(b)(2)(iii))
Actual diameter: 33 mm
- | | |
|--|-------------------------|
| For vehicles with driver side air bag ONLY | () Not Applicable |
| Driver Side - | (X)Yes-Pass () No-FAIL |
| Passenger Side - () No air bag | (X)Yes-Pass () No-FAIL |
- 4.8 Is the same side of the sun visor to which the sun visor label is affixed free of other information with the exception of an air bag maintenance label?
(S4.5.1(b)(3))
- | | |
|---------------------------------|-------------------------|
| Driver Side - | (X)Yes-Pass () No-FAIL |
| Passenger Side - () No air bag | (X)Yes-Pass () No-FAIL |
- 4.9 Is the sun visor free of other information about air bags or the need to wear seat belts with the exception of the air bag alert label or the utility vehicle label?
(S4.5.1(b)(3))
- | | |
|---------------------------------|-------------------------|
| Driver Side - | (X)Yes-Pass () No-FAIL |
| Passenger Side - () No air bag | (X)Yes-Pass () No-FAIL |

5. Air Bag Alert Label

- 5.1 Is the Sun Visor Warning Label visible when the sunvisor is in the stowed position?
- Driver Side - () Yes, go to 6 (X) No
- Passenger Side - () No air bag () Yes (X) No
- 5.2 Does the label conform in content to the label shown below? (S4.5.1(c)(2))
- Driver Side - (X) Yes-Pass () No-FAIL
- Passenger Side - () No air bag (X) Yes-Pass () No-FAIL
- 5.3 Is the message area black with yellow text? (S4.5.1(c)(2)(i))
- Driver Side - (X) Yes-Pass () No-FAIL
- Passenger Side - () No air bag (X) Yes-Pass () No-FAIL

Air Bag Labels Data (Cont.)

- 5.4 Is the message area at least 20 cm²? (S4.5.1(c)(2)(i))
 Actual message area: 34.5 driver, 26.9 passenger cm²
 Driver Side - (X)Yes-Pass () No-FAIL
 Passenger Side - ()No air bag (X)Yes-Pass () No-FAIL
- 5.5 Is the pictogram black with a red circle and slash on a white background?
 (S4.5.1(c)(2)(ii))
 For vehicles with driver side air bag ONLY () Not Applicable
 (X)Yes-Pass () No-FAIL
- 5.6 Is the pictogram at least 20 mm in diameter? (S4.5.1(c)(2)(ii))
 Actual diameter 41 driver, 30 passenger mm
 For vehicles with driver side air bag ONLY () Not Applicable
 (X)Yes-Pass () No-FAIL

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN UP POSITION

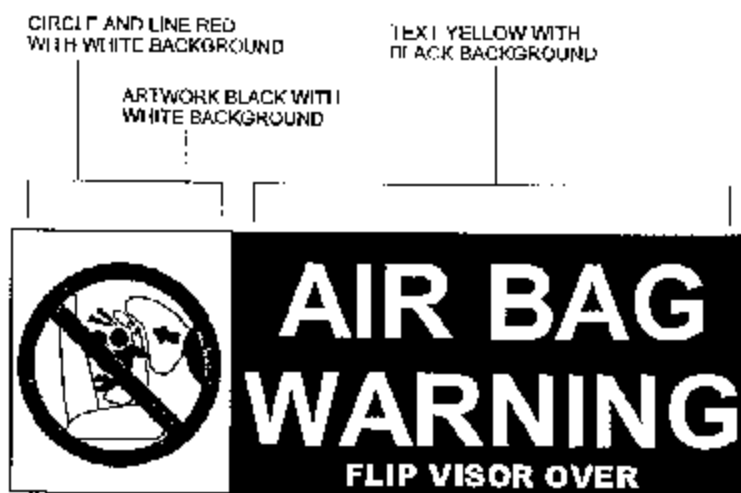


Figure 6c

(S4.5.1(c)(2))

6. Label On the Dash
- 6.1 Does the vehicle have a passenger side air bag?
 (X)Yes () No, check sheet is complete.
- 6.2 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e))
 (X)Yes-Pass () No-FAIL
- 6.3 Does the label conform in content (vehicles without back seats may omit the statement: "The back seat is the safest place for children 12 and under." (S4.5.1(e)(iii)) to the label shown below. (S4.5.1(e))
 (X)Yes-Pass () No-FAIL

Air Bag Labels Data (Cont.)

- 6.4 Is the heading area yellow with the word "warning" and the alert symbol in black?
(S4.5.1(e)(i)) (X) Yes-Pass () No-FAIL
- 6.5 Is the message white with black text? (S4.5.1(e)(ii))
(X) Yes-Pass () No-FAIL
- 6.6 Is the message area at least 30 cm²? (S4.5.1(e)(ii))
Actual message area: 32.0 cm²
(X) Yes-Pass () No-FAIL

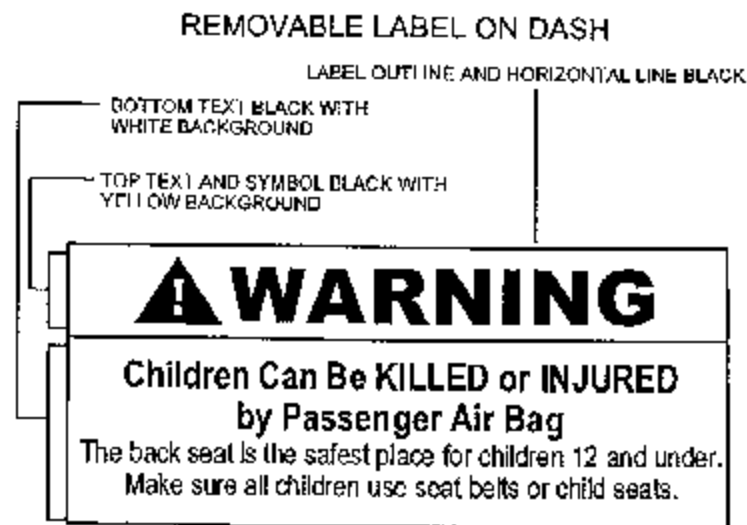


Figure 7 (S4.5.1(e))

Rear Outboard Seating Position Seat Belt Data

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504 ; Technician: Chad Gadberry; Date: February 10, 2003

Do all rear outboard seating positions have type 2 seat belts?

(X)Yes

()No

If NO, describe the seat belt installed, the seat location, and any other information about the seat that would explain why a type 2 belt was not installed.

Lap Belt Lockability Data

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504 ; Technician: Chad Gadberry ; Date: February 10, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing **and** that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Right Front

1. Record the seating position. Fully rearward
(S7.1.1.5(c)(1))
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))

(X)Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))

(X)Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing? (X)Yes, go to 6.1 () No, go to 7.
 - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))

(X)Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

Lap Belt Lockability Data (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 71.0 inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)

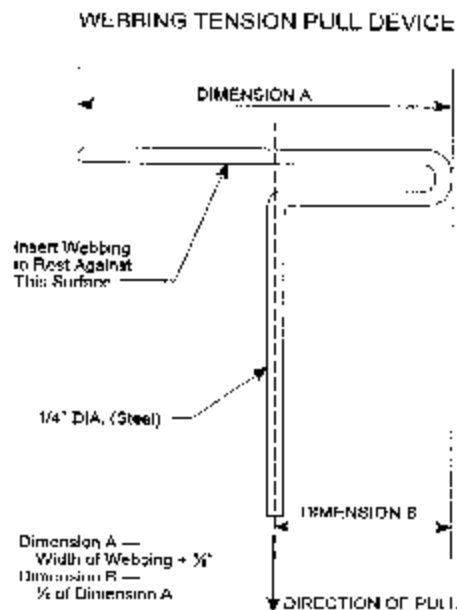


Figure 5 (S7.1.1.5(c)(4))

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 31.5 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 31.5 inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 0.0 inches

(X)Yes-Pass

() No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 38.5 inches

(X)Yes-Pass

() No-FAIL

REMARKS: None

Lap Belt Lockability Data (Cont.)

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504; Technician: Chad Gadberry; Date: February 10, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for each designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing and that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Left Rear

1. Record the seating position. Non-adjustable
(S7.1.1.5(c)(1))
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))

(X)Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))

(X)Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing? (X)Yes, go to 6.1 () No, go to 7.
 - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))

(X)Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

Lap Belt Lockability Data (Cont.)

8. Locate a reference point **B** on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 64.8 inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)

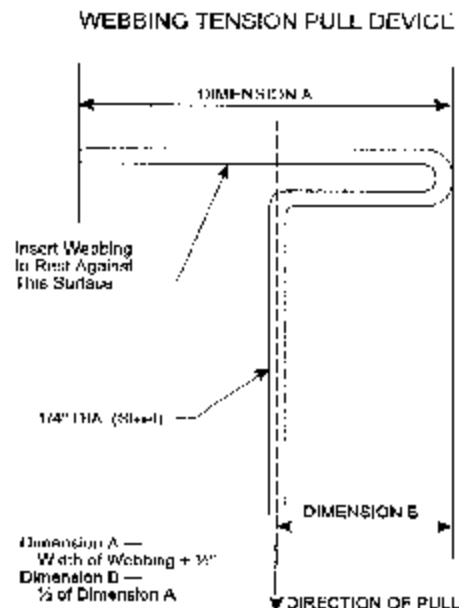


Figure 5 (S7.1.1.5(c)(4))

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 34.5 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 35.9 inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 1.4 inches

(X)Yes-Pass

() No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 28.9 inches

(X)Yes-Pass

() No-FAIL

REMARKS: None

Lap Belt Lockability Data (Cont.)

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504; Technician: Chad Gadberry; Date: February 10, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing **and** that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Center Rear

1. Record the seating position. Non-adjustable
(S7.1.1.5(c)(1))
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))

(X) Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))

(X) Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing? () Yes, go to 6.1 (X) No, go to 7.
 - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))

() Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

Lap Belt Lockability Data (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 63.9 inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)

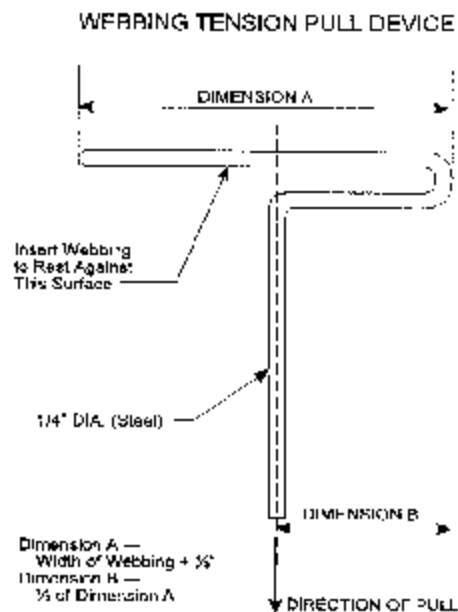


Figure 5 (S7.1.1.5(c)(4))

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 31.9 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 31.9 inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 0.0 inches

(X)Yes-Pass

()No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 32.0 inches

(X)Yes-Pass

()No-FAIL

REMARKS: None

Lap Belt Lockability Data (Cont.)

Vehicle Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

NHTSA No.: C30504 ; Technician: Chad Gadberry ; Date: February 10, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for **each** designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing **and** that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Right Rear

1. Record the seating position. Non-adjustable
(S7.1.1.5(c)(1))
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))

(X)Yes-Pass () No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))

(X)Yes-Pass () No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing? (X)Yes, go to 6.1 () No, go to 7.
 - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))

(X)Yes-Pass () No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

Lap Belt Lockability Data (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 64.8 inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)

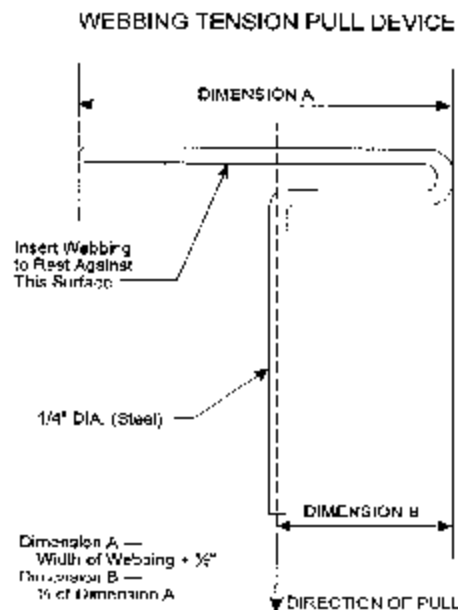


Figure 5 (S7.1.1.5(c)(4))

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 31.0 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 31.5 inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 0.5 inches

(X)Yes-Pass

() No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 33.3 inches

(X)Yes-Pass

() No-FAIL

REMARKS: None

Seat Belt Comfort and Convenience Data

1. **BELT CONTACT FORCE (S7.4.3)**

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Left Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?
() Yes - go to latchplate access
(X) No - continue with this check sheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
(X) Check
() N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
(X) Check
() N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
(X) Check
() N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
(X) Check
() N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
(X) Check
() N/A

Seat Belt Comfort and Convenience Data (Cont.)

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
(X) Check
() N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
(X) Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.
Contact Force 0.6 lb. (X) 0.0 to 0.7 pounds - Pass
() greater than 0.7 pounds - FAIL*
- * If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

Seat Belt Comfort and Convenience Data (Cont.)

1. BELT CONTACT FORCE (S7.4.3)

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Right Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?
() Yes - go to latchplate access
(X) No - continue with this check sheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
(X) Check
() N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
() Check
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
(X) Check
() N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
(X) Check
() N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
(X) Check
() N/A

Seat Belt Comfort and Convenience Data (Cont.)

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
() Check
(X) N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
(X) Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.
Contact Force 0.6 lb. (X) 0.0 to 0.7 pounds - Pass
() greater than 0.7 pounds - FAIL*
- * If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

Seat Belt Comfort and Convenience Data (Cont.)

1. BELT CONTACT FORCE (S7.4.3)

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Left Rear

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?
() Yes - go to latchplate access
(X) No - continue with this check sheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
() Check
(X) N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
() Check
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
(X) Check
() N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
() Check
(X) N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
(X) Check
() N/A

Seat Belt Comfort and Convenience Data (Cont.)

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
☐ Check
☒ N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
☒ Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.
Contact Force 0.6 lb. ☒ 0.0 to 0.7 pounds - Pass
☐ greater than 0.7 pounds - FAIL*
- * If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

Seat Belt Comfort and Convenience Data (Cont.)

1. **BELT CONTACT FORCE (S7.4.3)**

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Right Rear

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?
() Yes - go to latchplate access
(X) No - continue with this check sheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
() Check
(X) N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
() Check
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
(X) Check
() N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
() Check
(X) N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.
(X) Check
() N/A

Seat Belt Comfort and Convenience Data (Cont.)

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)
☐ Check
☒ N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.
☒ Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.
Contact Force 0.6 lb. ☒ 0.0 to 0.7 pounds - Pass
☐ greater than 0.7 pounds - FAIL*
- * If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

Seat Belt Comfort and Convenience Data (Cont.)

2. **LATCHPLATE ACCESS (S7.4.4)**

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Left Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 2.1 Position the seat in its forward most adjustment position.
(X) Check
- 2.2 Position the test dummy using the procedures in Appendix B. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.)
(X) Check
- 2.3 Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant.
(X) Check
- 2.4 Attach the inboard and outboard reach string following the instructions on Figure 1C.
(X) Check
- 2.5 Place the latch plate in the stowed position.
(X) Check
- 2.6 Extend each line backward and outboard to generate arcs of the reach envelop of the test dummy's arms. Is the latch plate within the reach envelope?
(X) Yes-Pass () No-FAIL
- 2.7 Using the clearance test block, specified in Figure 2C, is there sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latch plate or buckle?
(X) Yes-Pass () No-FAIL

Seat Belt Comfort and Convenience Data (Cont.)

2. LATCHPLATE ACCESS (S7.4.4)

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Right Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 2.1 Position the seat in its forward most adjustment position.
(X) Check
- 2.2 Position the test dummy using the procedures in Appendix B. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.)
(X) Check
- 2.3 Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant.
(X) Check
- 2.4 Attach the inboard and outboard reach string following the instructions on Figure 1C.
(X) Check
- 2.5 Place the latch plate in the stowed position.
(X) Check
- 2.6 Extend each line backward and outboard to generate arcs of the reach envelop of the test dummy's arms. Is the latch plate within the reach envelope?
(X) Yes-Pass () No-FAIL
- 2.7 Using the clearance test block, specified in Figure 2C, is there sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latch plate or buckle?
(X) Yes-Pass () No-FAIL

Seat Belt Comfort and Convenience Data (Cont.)

3. **RETRACTION (S7.4.5)**

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Left Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 3.1 Is the vehicle a passenger car or walk-in van-type vehicle?
() Yes If yes, go to seat belt guides and hardware.
(X) No
- 3.2 Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
(X) Check
- 3.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
(X) Check
- 3.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
(X) Check
- 3.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
(X) Check
- 3.6 Place each adjustable head restraint in its highest adjustment position.
(X) Check
- 3.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position (S8.1.3)
(X) Check

Seat Belt Comfort and Convenience Data (Cont.)

- 3.8 Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B.
(X) Check
- 3.9 Restrain the dummies using the belt systems for the position being tested.
(X) Check
- 3.10 Stow outboard armrests which are capable of being stowed.
(X) Check
- 3.11 Check the statement that applies to this test vehicle:
- (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.
(X) Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released.
(X) Pass
- (C) Neither A or B apply.
() FAIL
- 3.12 With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
(X) Yes - Pass
() No - FAIL
- 3.13 If this test vehicle has an open body (without doors) and has a seat belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated?
(X) N/A
() Yes - Pass
() No - FAIL

3. RETRACTION (S7.4.5)

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Right Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 3.1 Is the vehicle a passenger car or walk-in van-type vehicle?
() Yes If yes, go to seat belt guides and hardware.
(X) No
- 3.2 Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)
(X) Check
- 3.3 If separately adjustable in a vertical direction, the seats are at the lowest position.
(X) Check
- 3.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.
(X) Check
- 3.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.
(X) Check
- 3.6 Place each adjustable head restraint in its highest adjustment position.
(X) Check
- 3.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position (S8.1.3)
(X) Check

Seat Belt Comfort and Convenience Data (Cont.)

- 3.8 Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B.
(X) Check
- 3.9 Restrain the dummies using the belt systems for the position being tested.
(X) Check
- 3.10 Stow outboard armrests which are capable of being stowed.
(X) Check
- 3.11 Check the statement that applies to this test vehicle:
- (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.
(X) Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released.
(X) Pass
- (C) Neither A or B apply.
() FAIL
- 3.12 With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?
(X) Yes - Pass
() No - FAIL
- 3.13 If this test vehicle has an open body (without doors) and has a seat belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated?
(X) N/A
() Yes - Pass
() No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

4. **SEAT BELT GUIDES AND HARDWARE (S7.4.6)**

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Left Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
☐ Yes - Go to 4.2.
☒ No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?
☐ Yes - Pass
☐ No - **FAIL**
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
☐ Yes - Pass
☐ No - **FAIL**

Seat Belt Comfort and Convenience Data (Cont.)

- 4.4 The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check
 - (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
 - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- ☐ Yes - Pass
☐ No - **FAIL**
- 4.5 Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?
- ☐ Yes - Pass
☐ No - **FAIL**

Seat Belt Comfort and Convenience Data (Cont.)

4. **SEAT BELT GUIDES AND HARDWARE (S7.4.6)**

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Right Front

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
 - () Yes - Go to 4.2.
 - (X) No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?
 - () Yes - Pass
 - () No - FAIL
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
 - () Yes - Pass
 - () No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

- 4.4 The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check
 - (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
 - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- ☐ Yes - Pass
☐ No - FAIL
- 4.5 Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?
- ☐ Yes - Pass
☐ No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

4. SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Left Rear - Does not apply (Requirement A)

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
 - () Yes - Go to 4.2.
 - () No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?
 - () Yes - Pass
 - () No - FAIL
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
 - () Yes - Pass
 - () No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

- 4.4 The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check
 - (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
 - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- ☐ Yes - Pass
☐ No - FAIL
- 4.5 Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?
- ☐ Yes - Pass
☐ No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

4. SEAT BELT GUIDES AND HARDWARE (S7.4.6)

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Center Rear - Does not apply (Requirement A)

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
 - () Yes - Go to 4.2.
 - () No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?
 - () Yes - Pass
 - () No - FAIL
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
 - () Yes - Pass
 - () No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

- 4.4 The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check
 - (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
 - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- ☐ Yes - Pass
☐ No - FAIL
- 4.5 Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?
- ☐ Yes - Pass
☐ No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

4. **SEAT BELT GUIDES AND HARDWARE (S7.4.6)**

Test Vehicle NHTSA No.: C30504

Vehicle Model Year/Make/Model/Body Style: 2003/Hyundai/Santa Fe/MPV

Designated Seating Position Tested: Right Rear - Does not apply (Requirement A)

Date of Comfort/Convenience Check: February 10, 2003

Technician Performing Check: Chad Gadberry

GVWR: 4870 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
 - () Yes - Go to 4.2.
 - () No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?
 - () Yes - Pass
 - () No - FAIL
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
 - () Yes - Pass
 - () No - FAIL

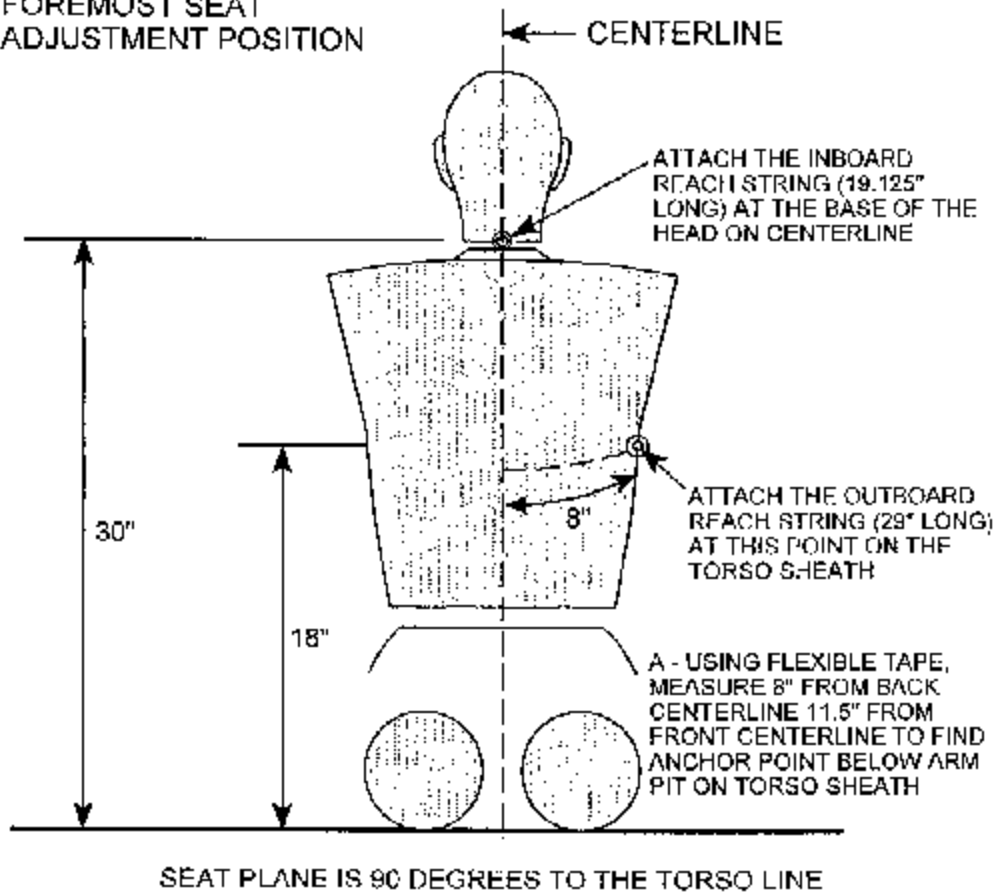
Seat Belt Comfort and Convenience Data (Cont.)

- 4.4 The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check
 - (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
 - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- ☐ Yes - Pass
☐ No - **FAIL**
- 4.5 Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?
- ☐ Yes - Pass
☐ No - **FAIL**

**LOCATION OF ANCHORING POINTS FOR
LATCHPLATE REACH LIMITING CHAINS OR STRINGS
TO TEST FOR LATCHPLATE ACCESSIBILITY**

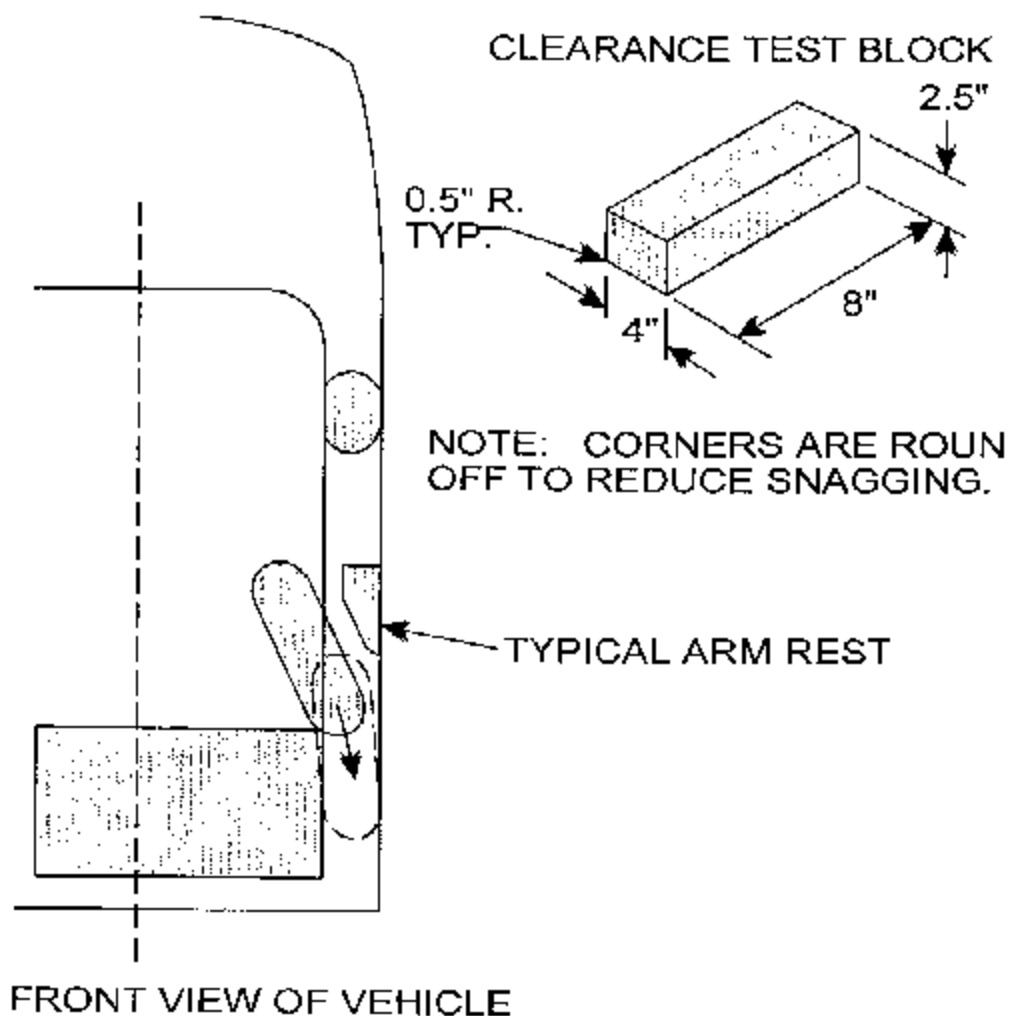
PART 572E DUMMY

50TH PERCENTILE
DUMMY SEATED IN
FOREMOST SEAT
ADJUSTMENT POSITION



REAR VIEW

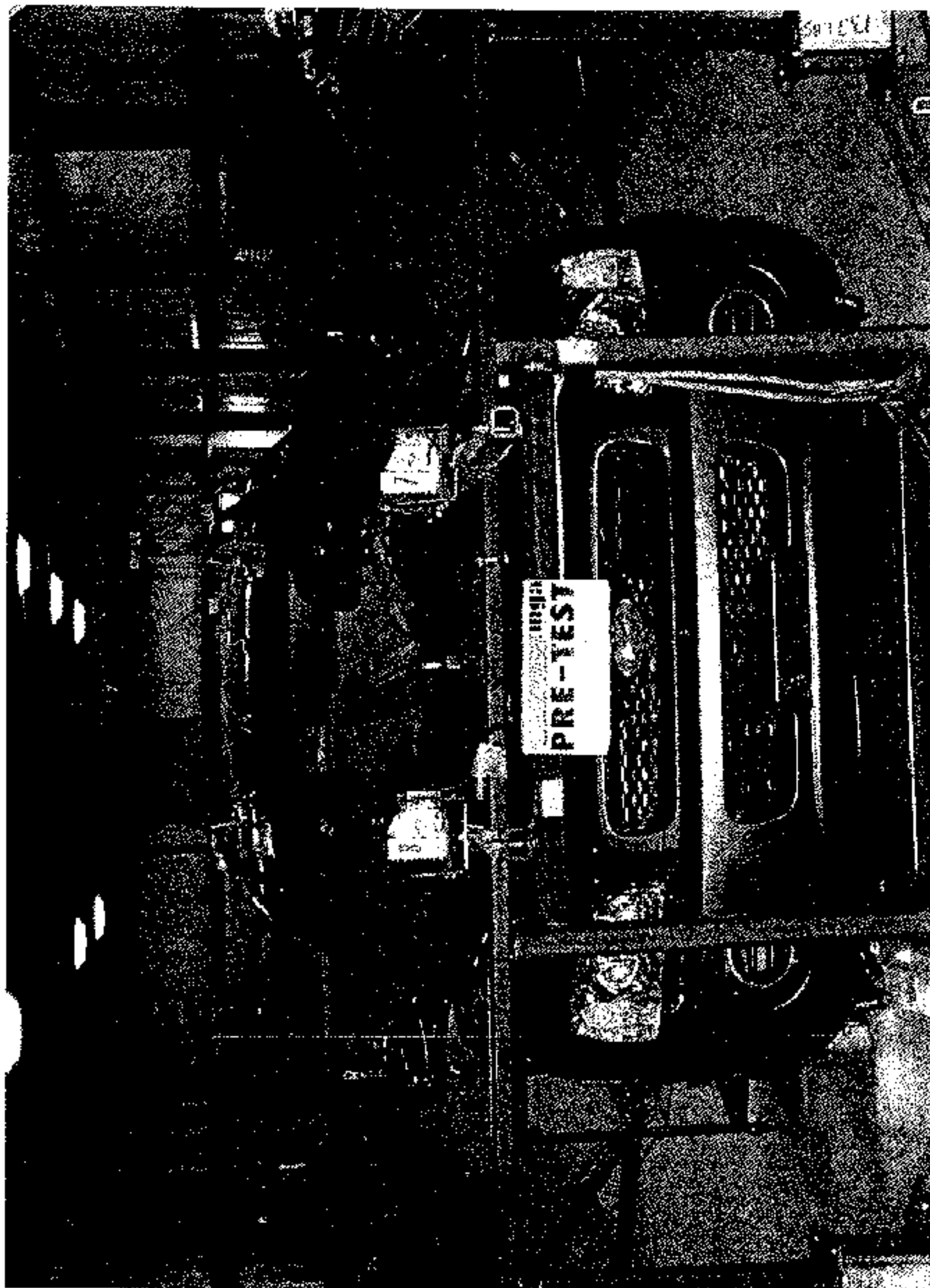
USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS



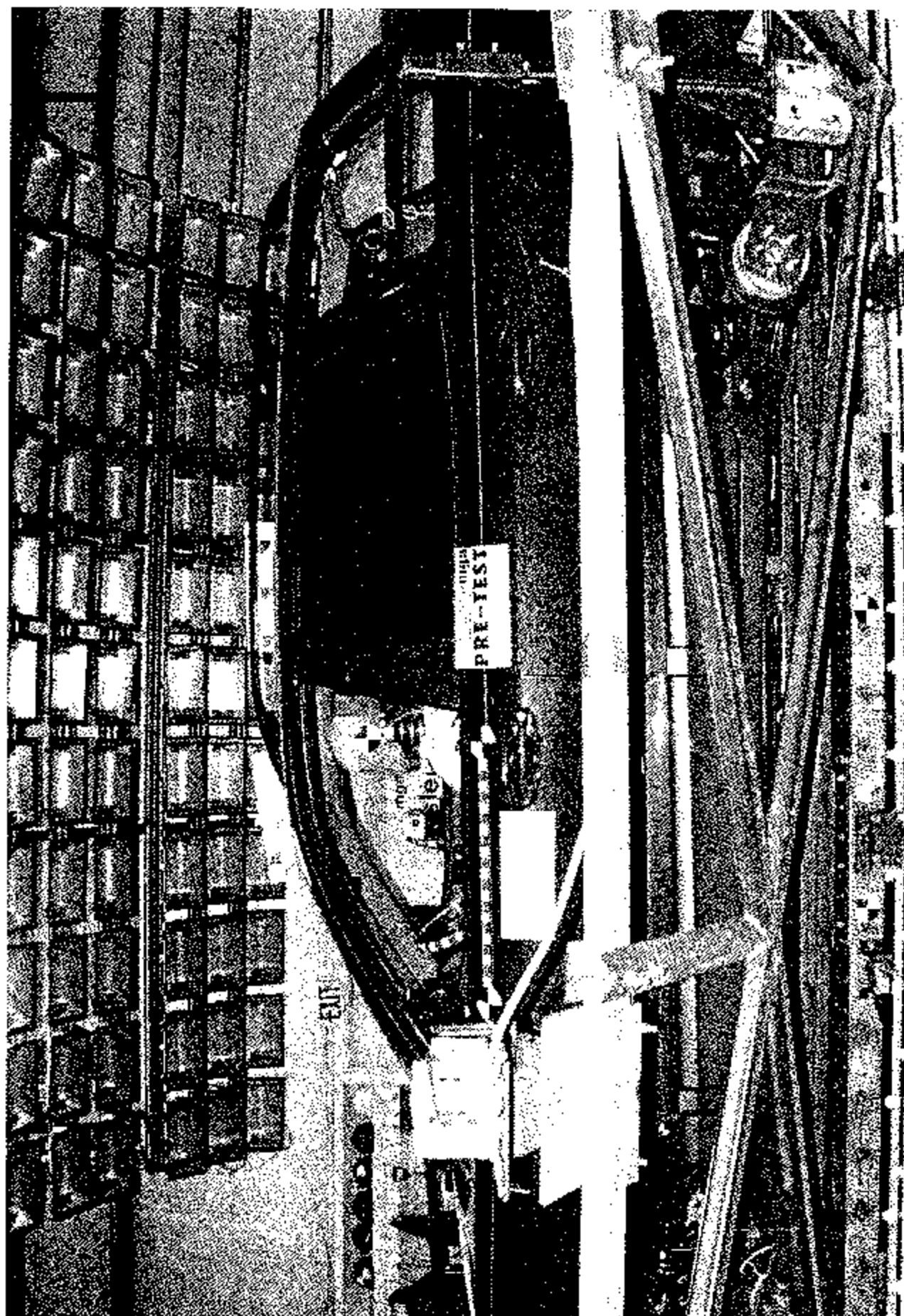
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PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

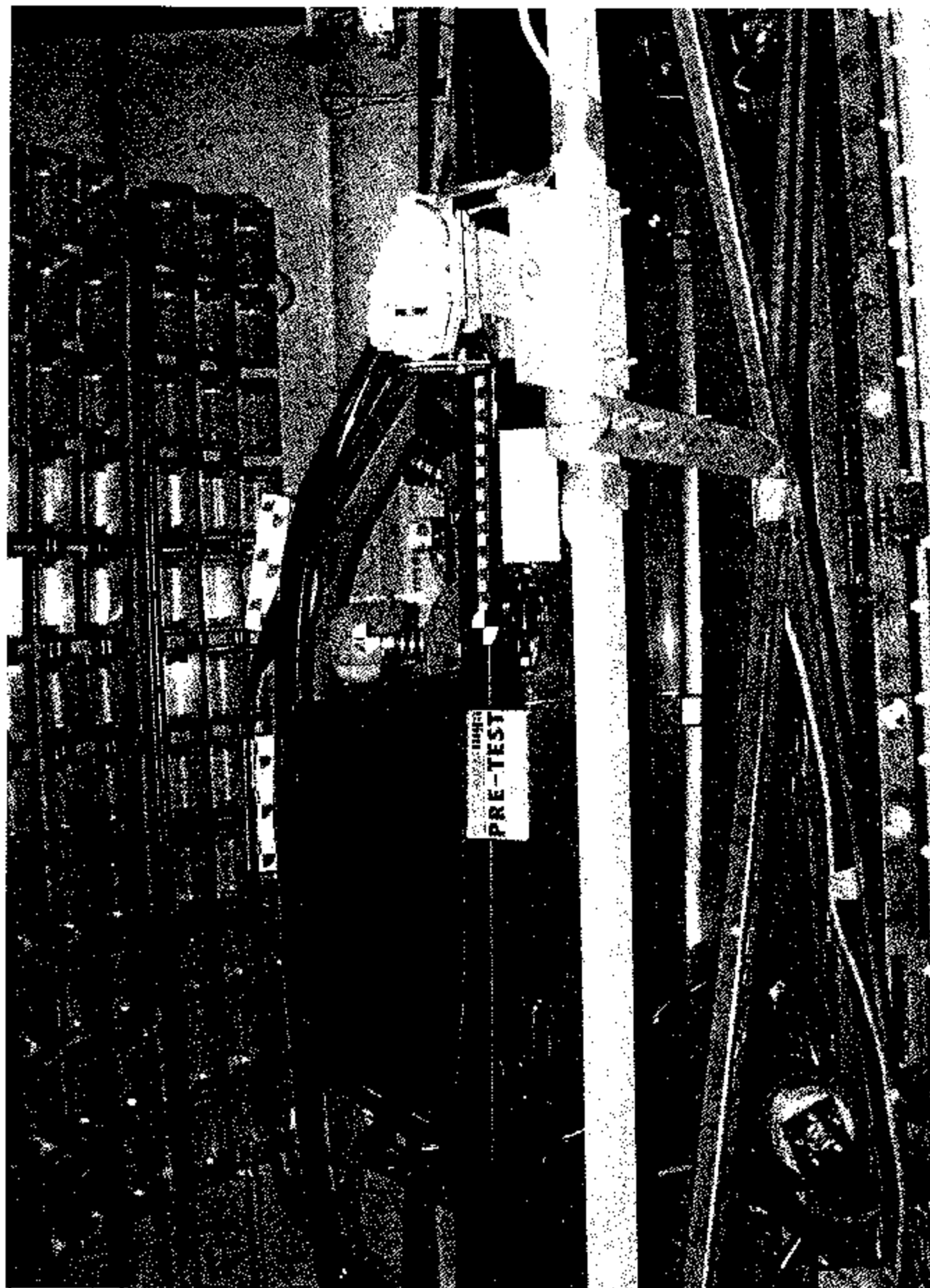
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Photo No. A-3 - Pre-Test Right Side View	A-3
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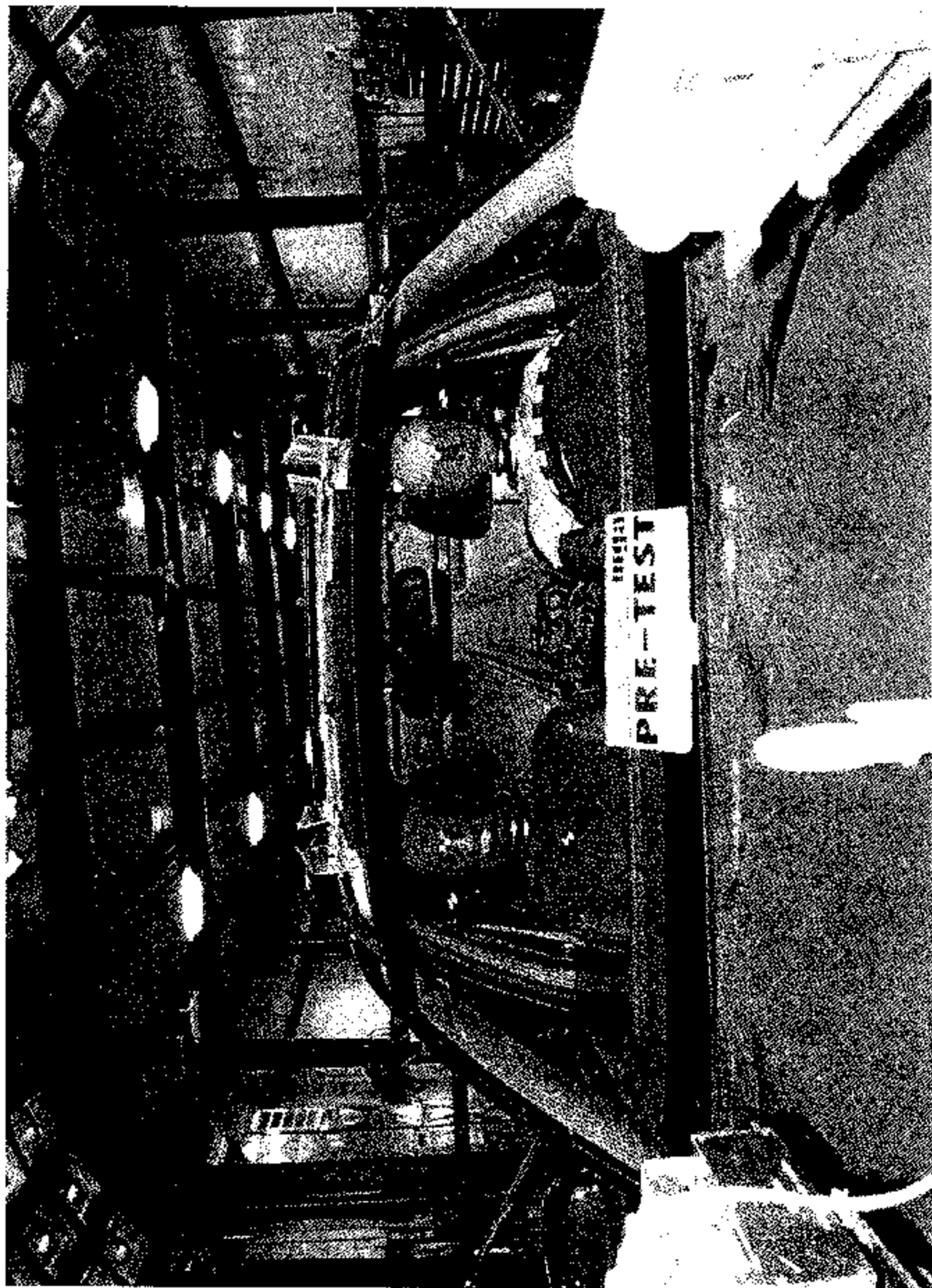
Pre-Test Frontal View



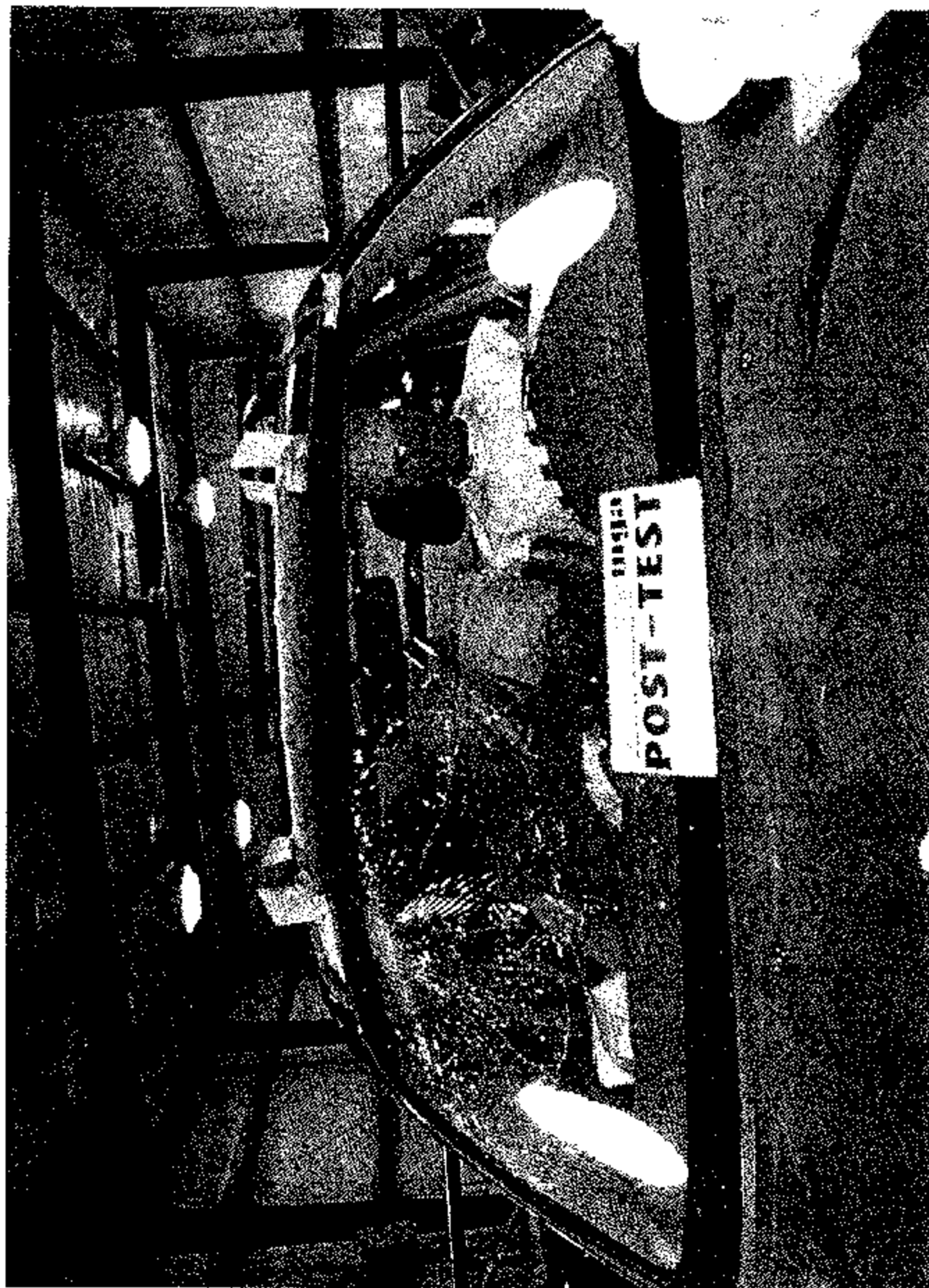
Pre-Test Left Side View



Pre-Test Right Side View



Pre-Test Windshield View



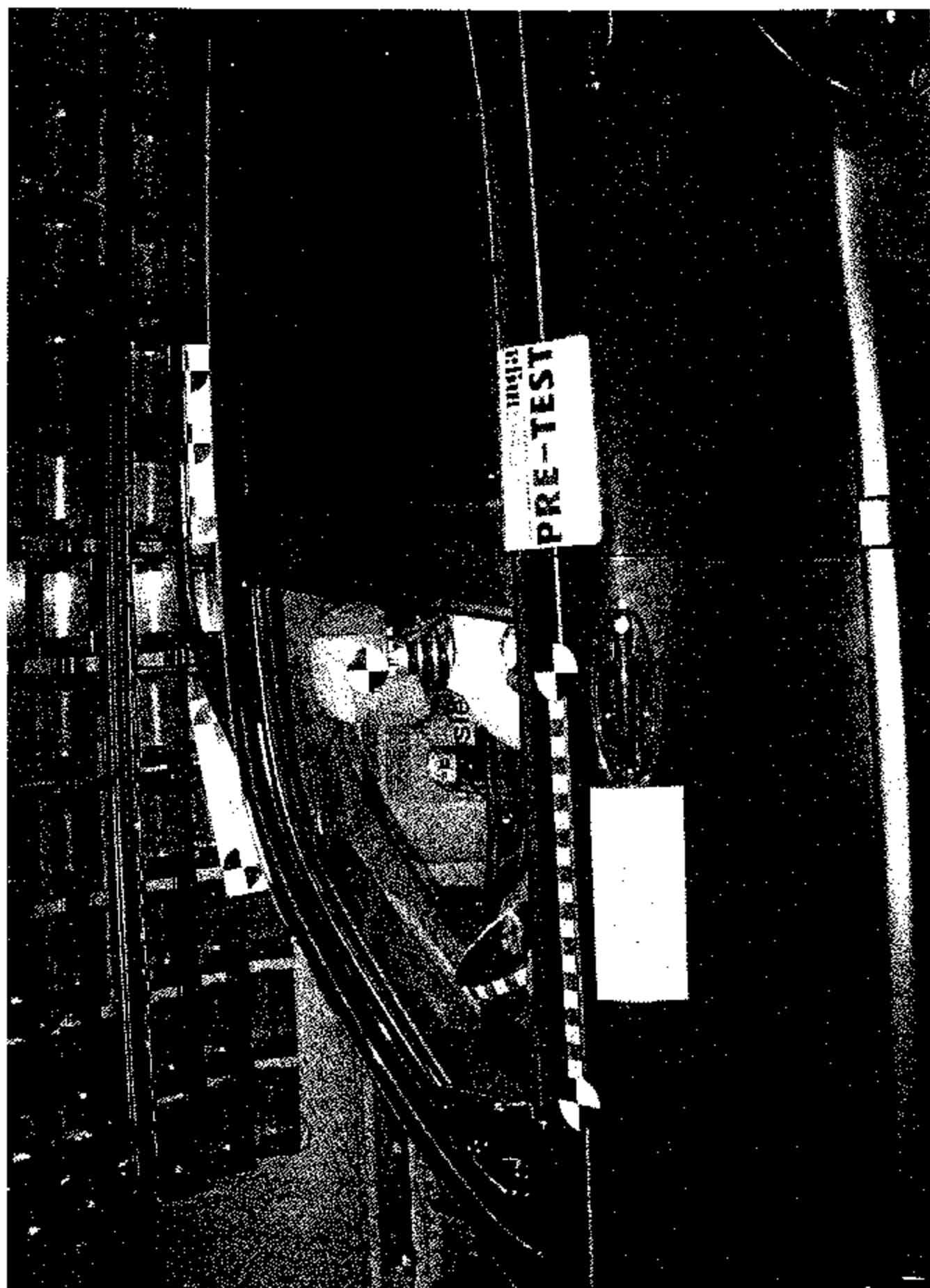
Post-Test Windshield View



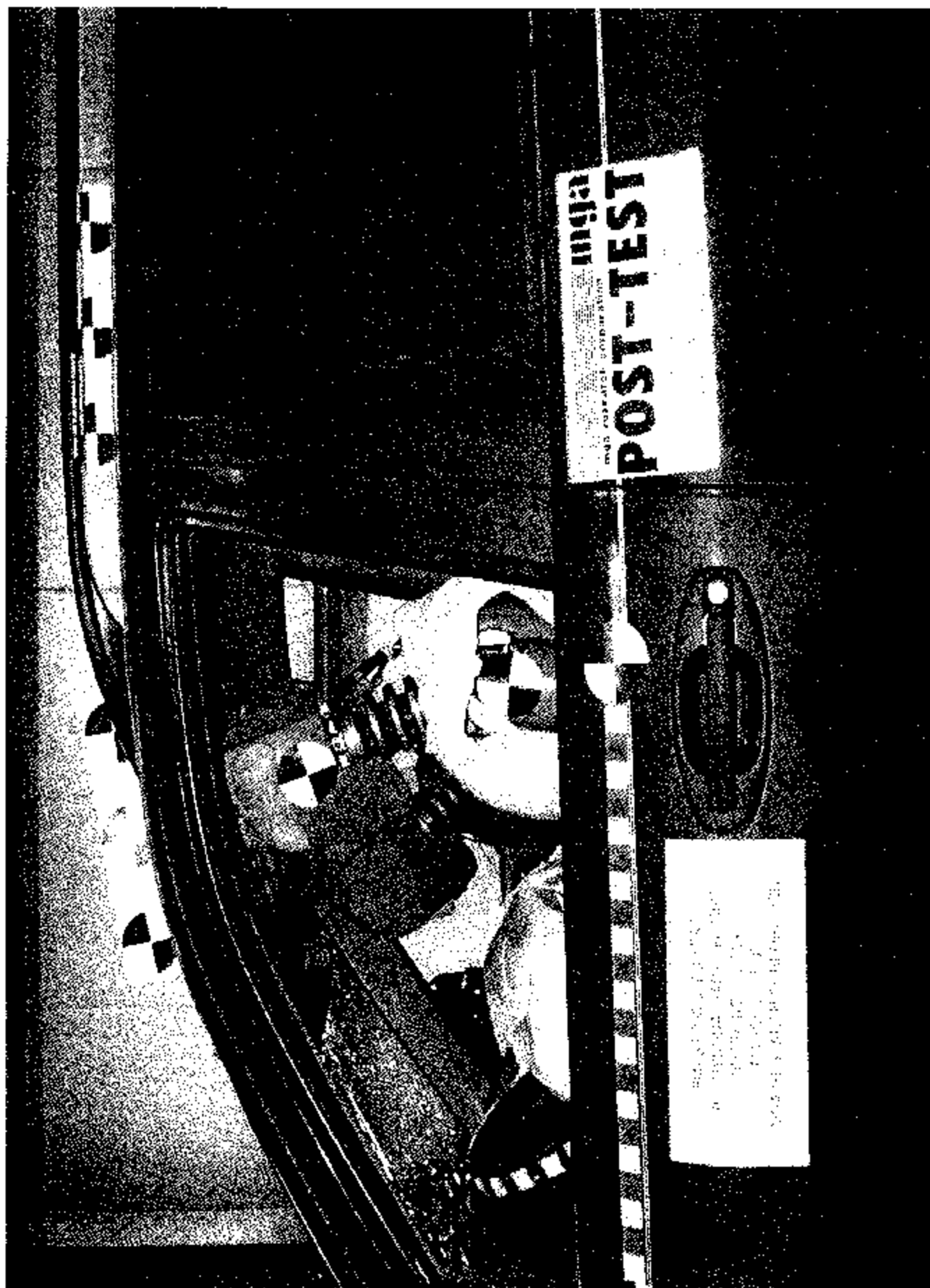
Pre-Test Driver Dummy Position View (Door Open)



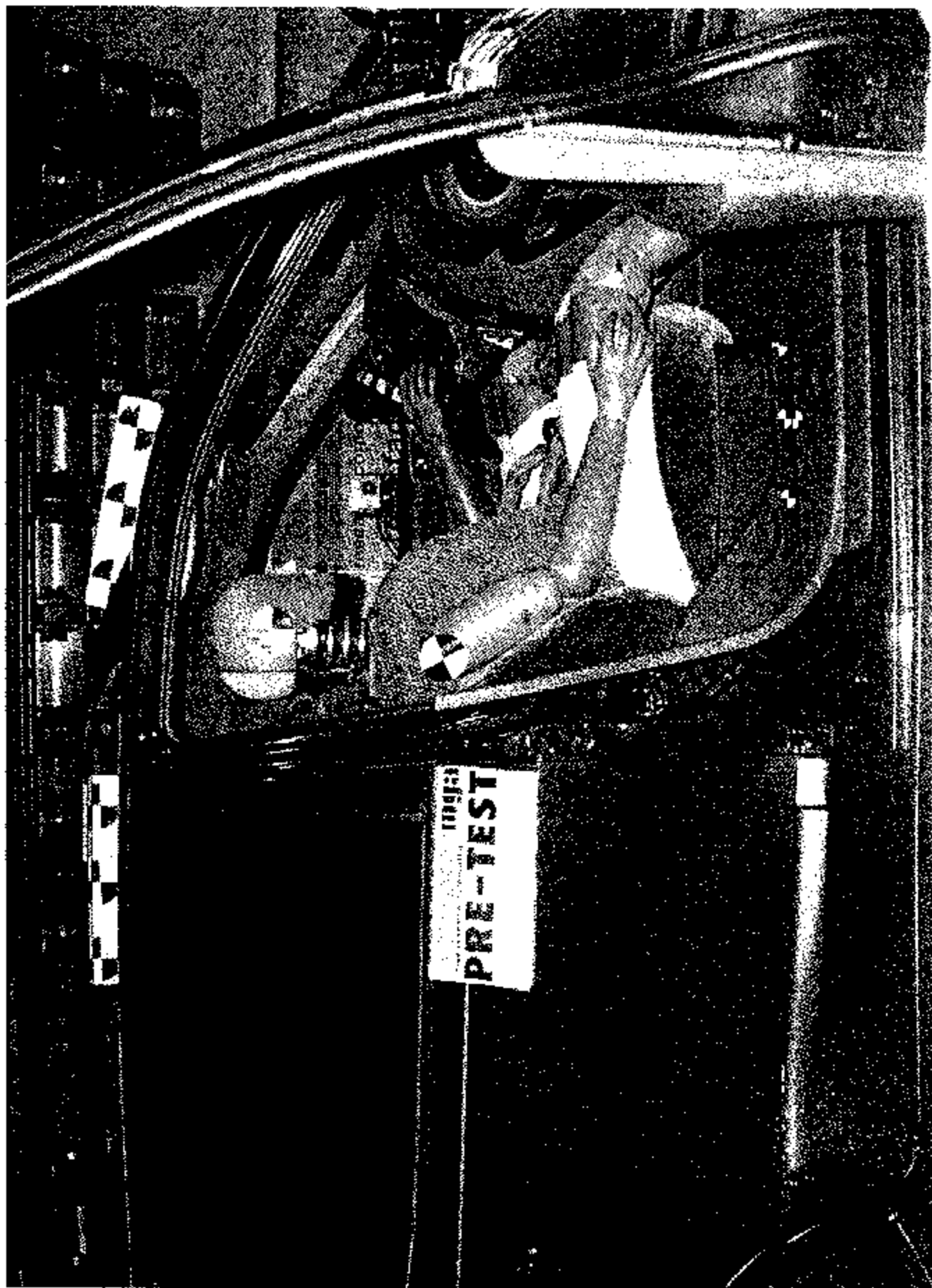
Post-Test Driver Dummy Position View (Door Open)



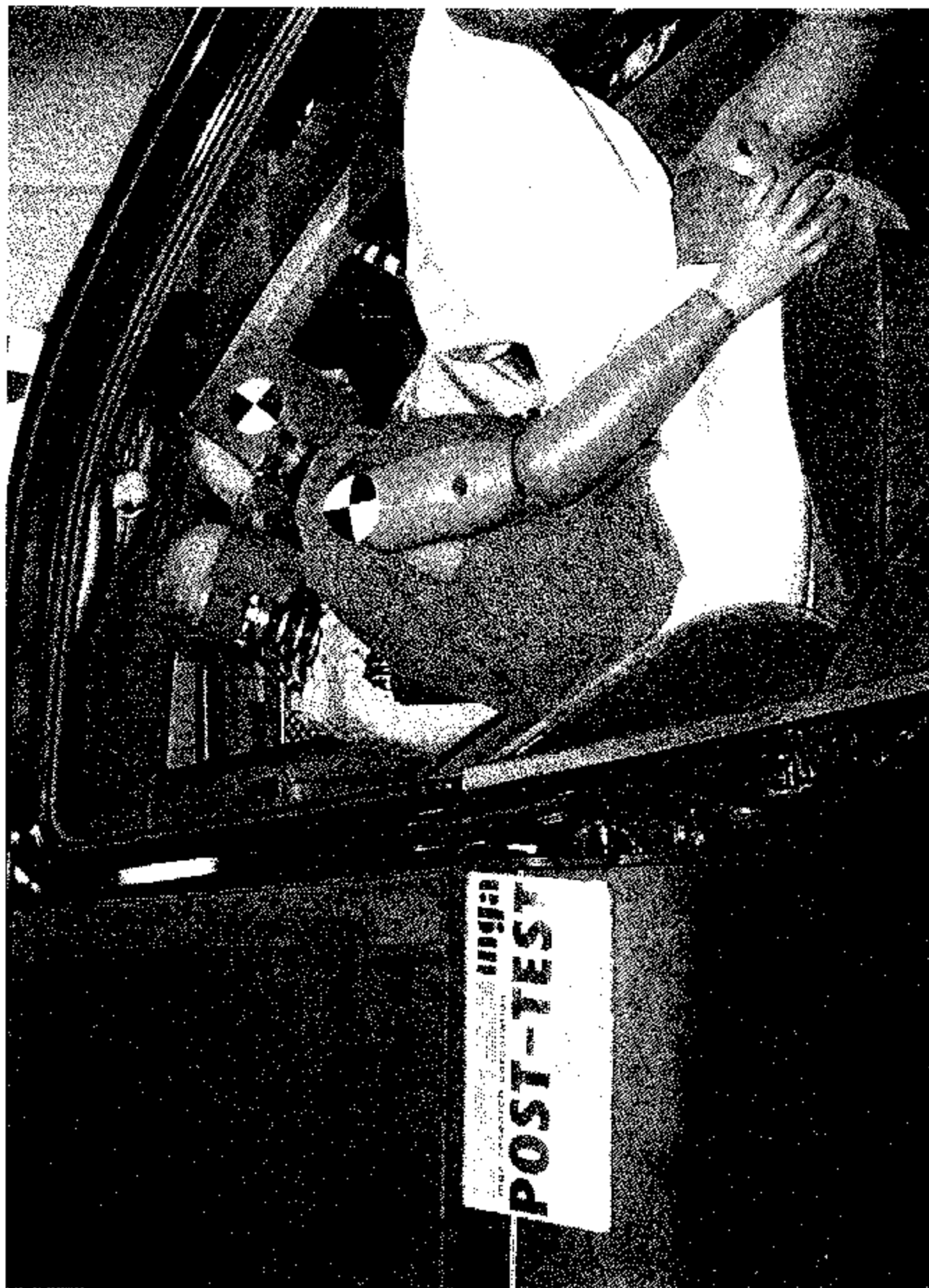
Pre-Test Driver Dummy Position View



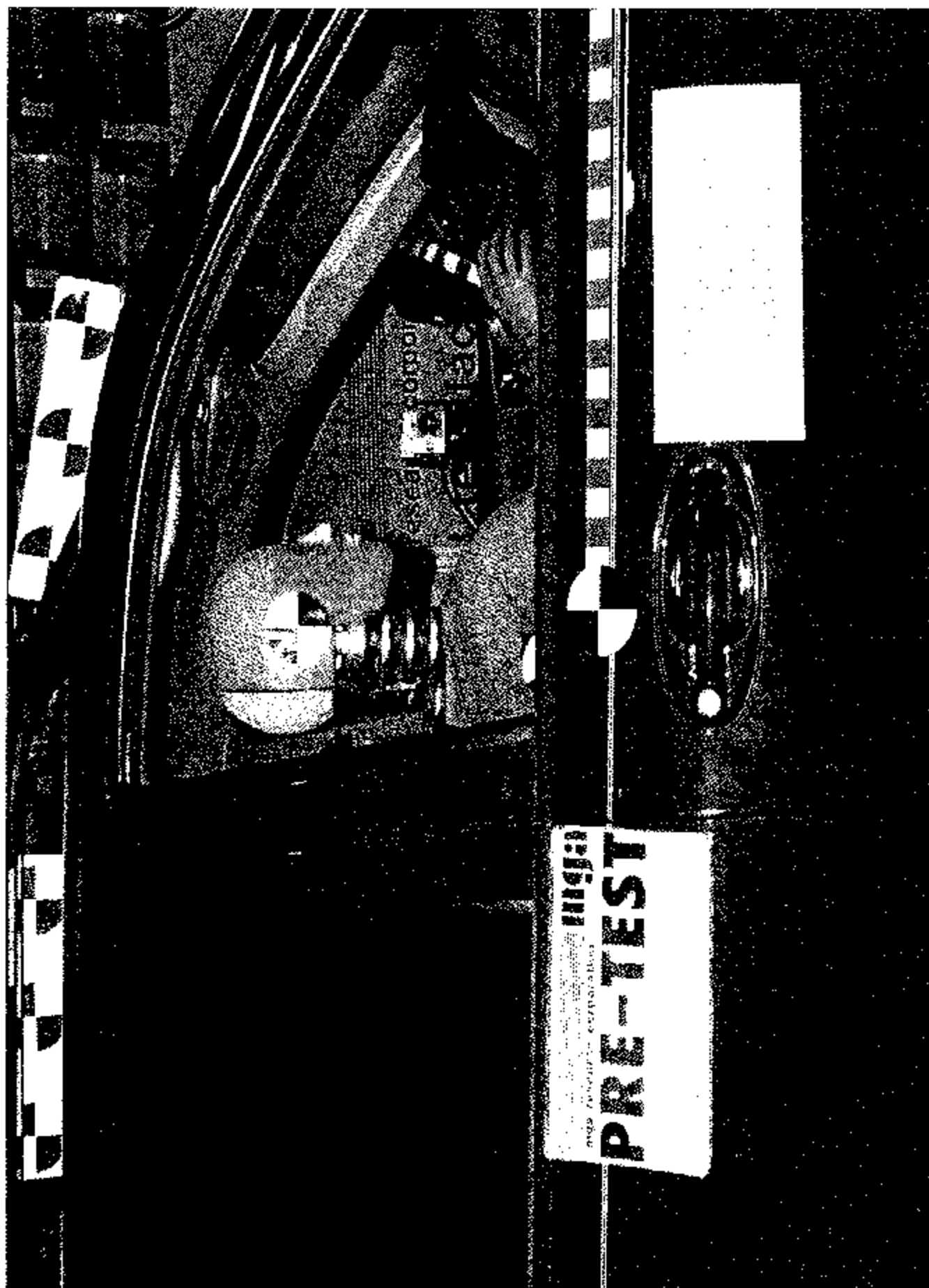
Post-Test Driver Dummy Position View



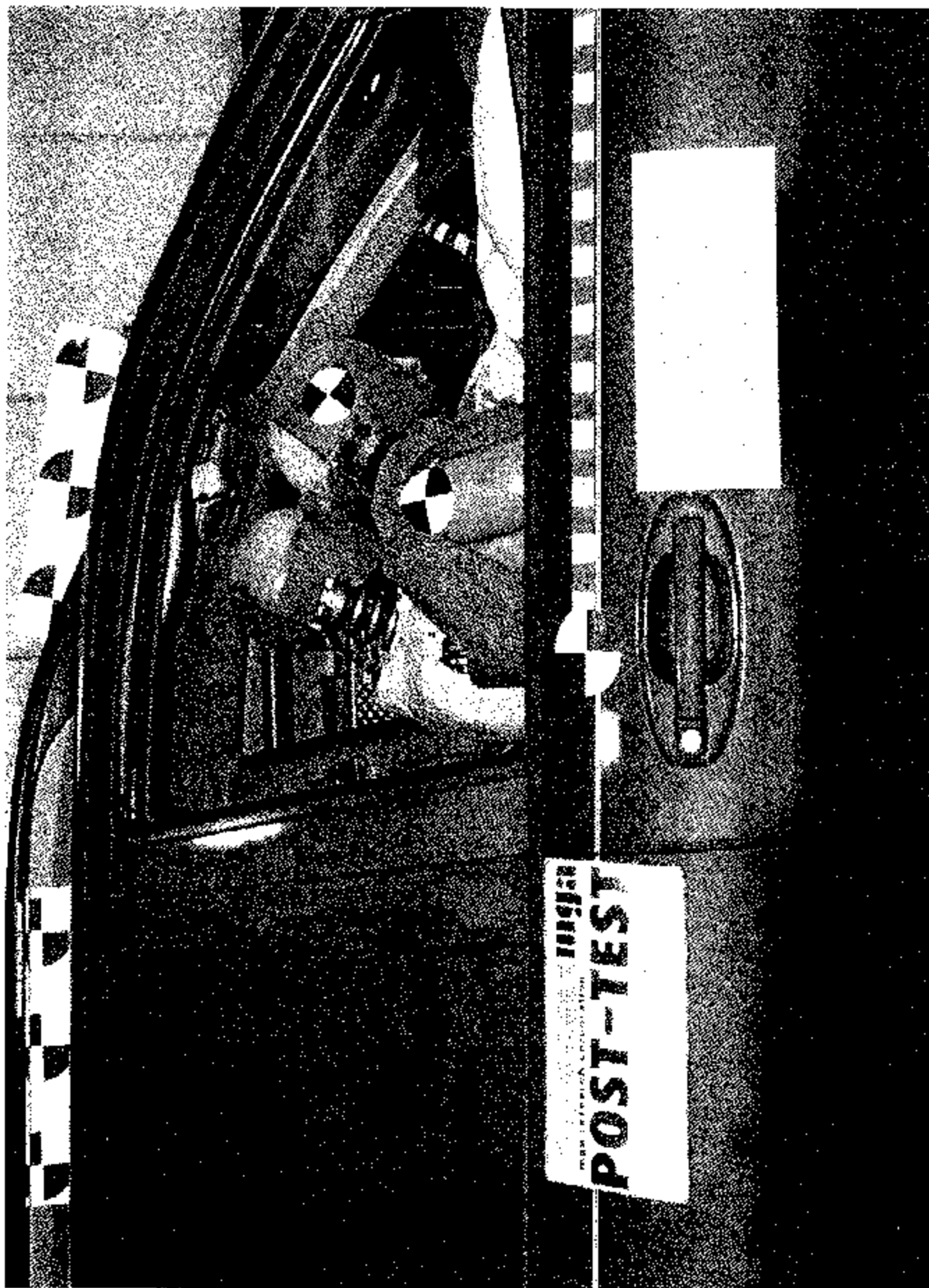
Pre-Test Passenger Dummy Position View (Door Open)



Post-Test Passenger Dummy Position View (Door Open)



Pre-Test Passenger Dummy Position View



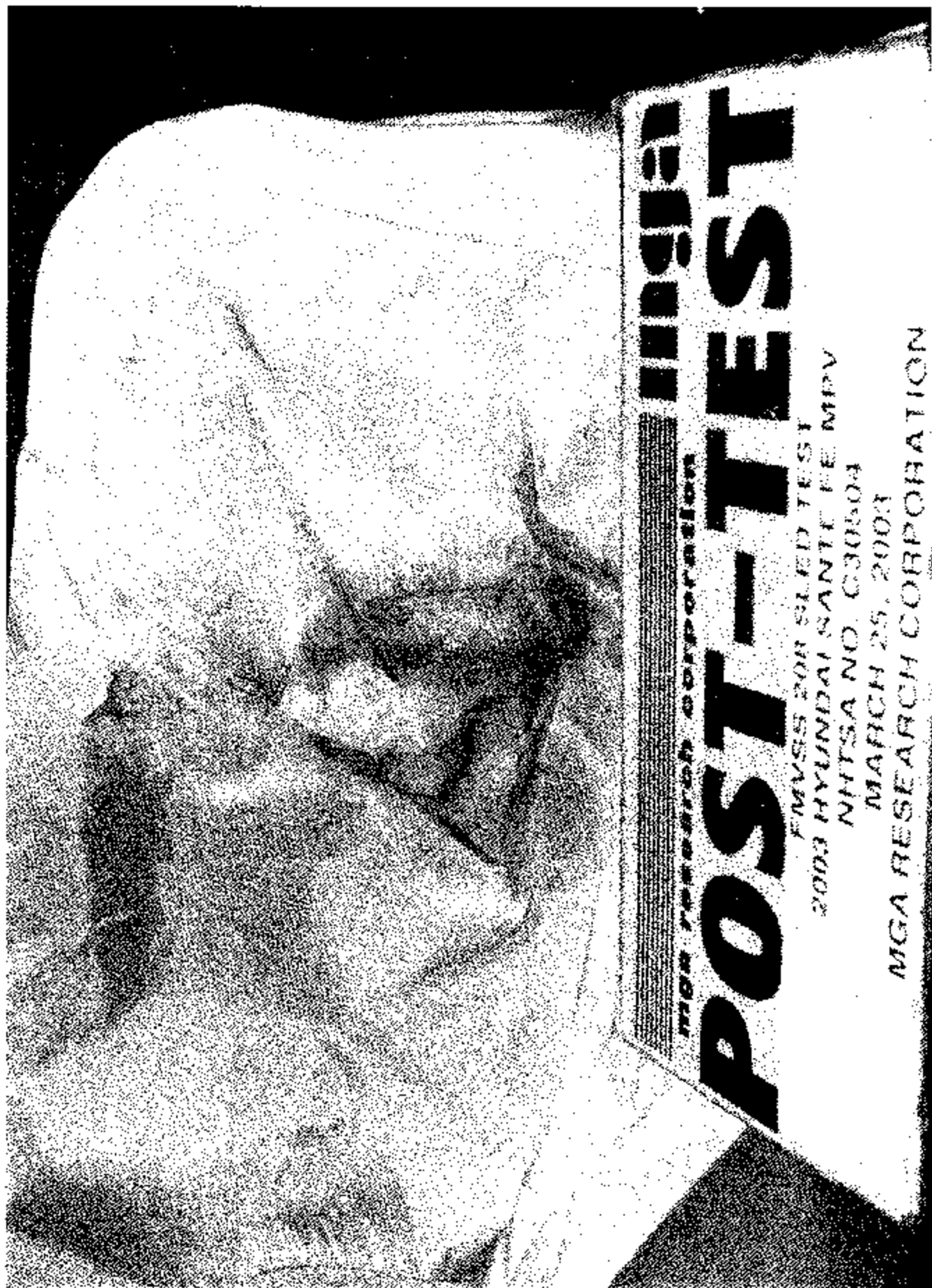
Post-Test Passenger Dummy Position View



Post-Test Driver Dummy Airbag View



Post-Test Driver Dummy Head Contact View (visor, windshield header, and roof)



Original

MGA Research Corporation

POST-TEST

FMVSS 208 SLED TEST
2003 HYUNDAI SANTA FE MPV
NHTSA NO. C30604
MARCH 25, 2003
MGA RESEARCH CORPORATION

Post-Test Passenger Dummy Airbag View



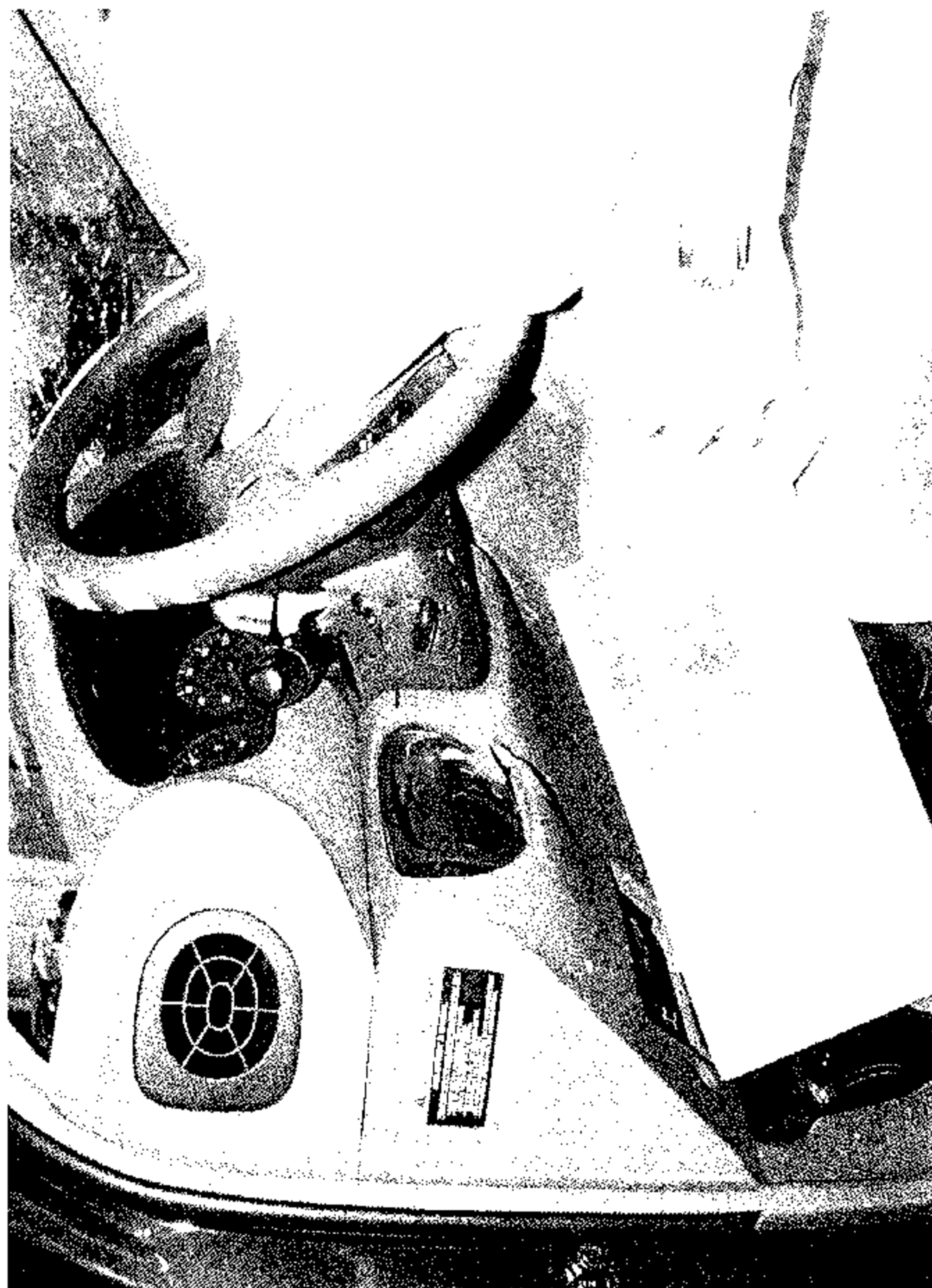
Post-Test Passenger Dummy Head Contact View (visor)



Post-Test Passenger Dummy Head Contact (windshield)



Pre-Test Driver Kree Bolster View



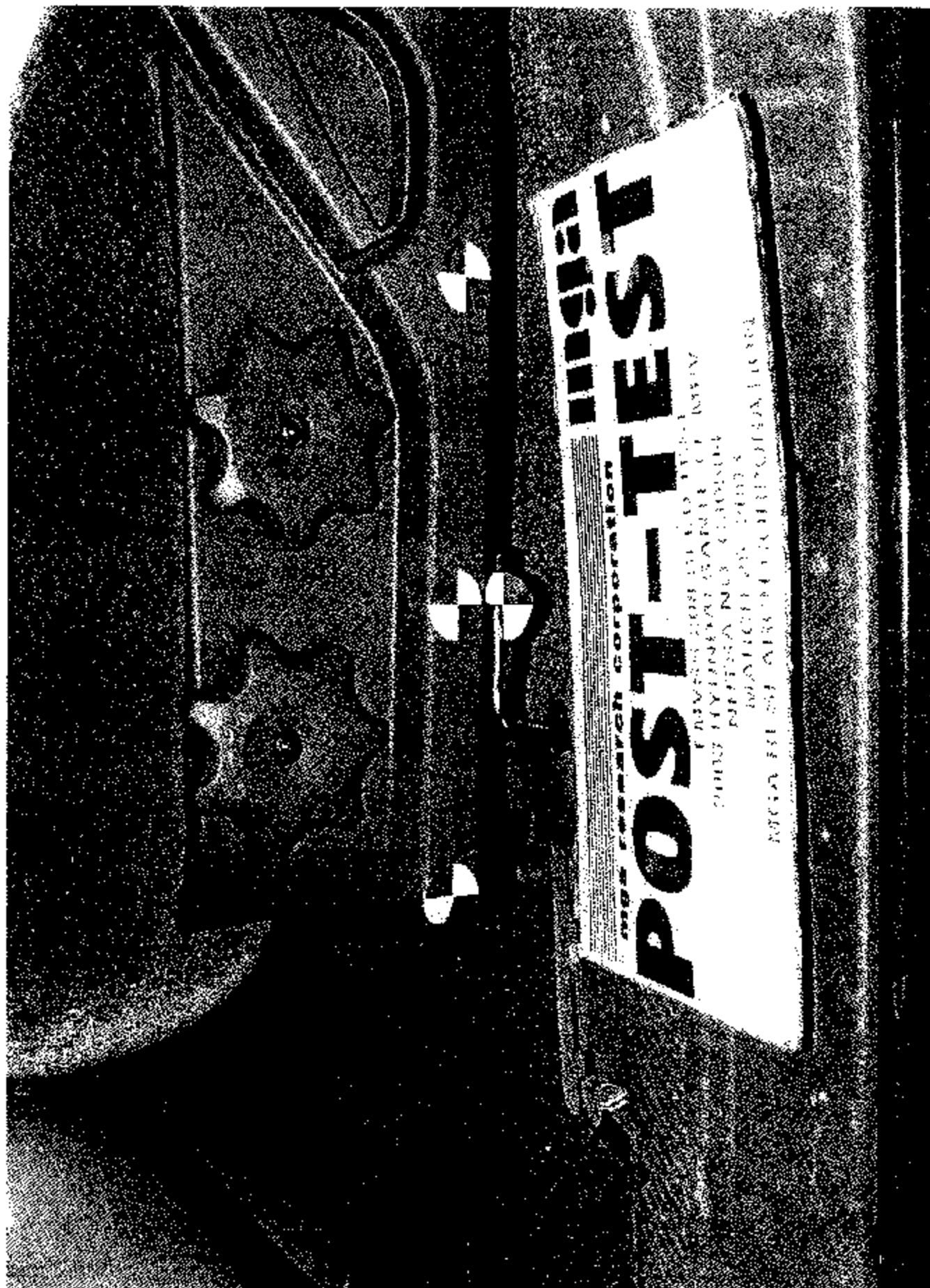
Post-Test Driver Knee Bolster View



Pre-Test Passenger Knee Bolster View



Post-Test Passenger Knee Bolster View



Post-Test Driver Seat Position View



Pre-Test Passenger Seat Position View



Post-Test Passenger Seat Position View



MANUFACTURED IN KOREA BY
HYUNDAI MOTOR COMPANY

OCT/18/02 GWR 4870 lbs PART NO

GWR 2645 lbs GWR 2865 lbs TIR YD
FRONT REAR

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

V.I.N. KM8SB12B33U389801
MPV

Vehicle Certification Label

5 TIRE INFLATION PRESSURE La Pression de Gonflage Des Pneus				
VEHICLE CAPACITY WEIGHT 4000LBS (1818KG) Poids en lb de la capacité de véhicule 4000 (1818)				
SEATING CAPACITY TOTAL 5 FRONT 2 REAR 3 Capacité de transport total 5, 2 à l'avant 3 à l'arrière				
TIRE PRESSURES-COLD KPA(PBSI) Pression de gonflage à froid kPa(psi)				
TIRE SIZE Dimension du pneu	UP TO 2 PERSONS Jusqu'à 2 Personnes	UP TO MAX LOAD Pour charge maximum		
	FRONT Avant	REAR Arrière	FRONT Avant	REAR Arrière
P225/70 R16	207(30)	207(30)	221(32)	221(32)

APPENDIX B

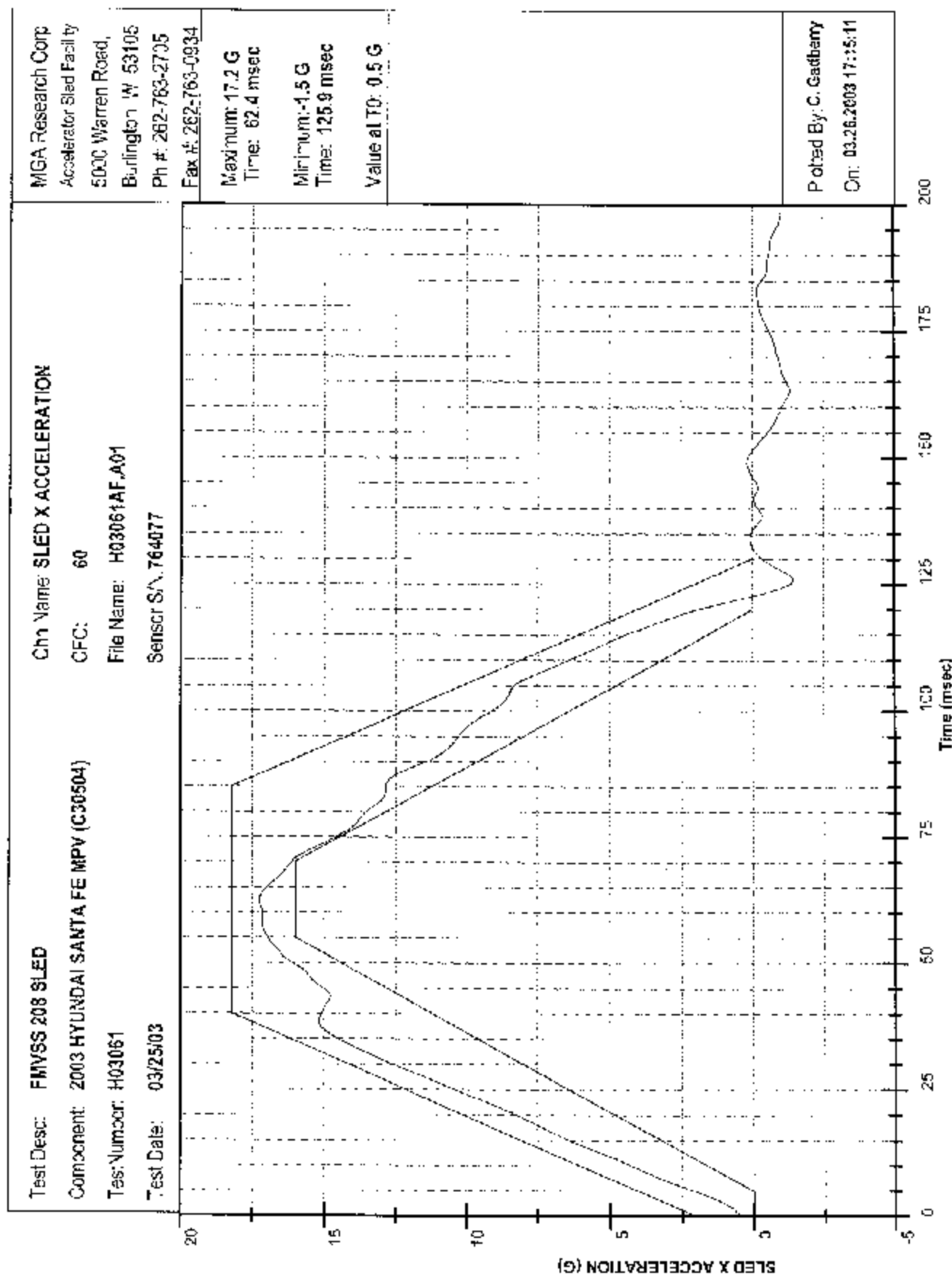
DATA PLOTS

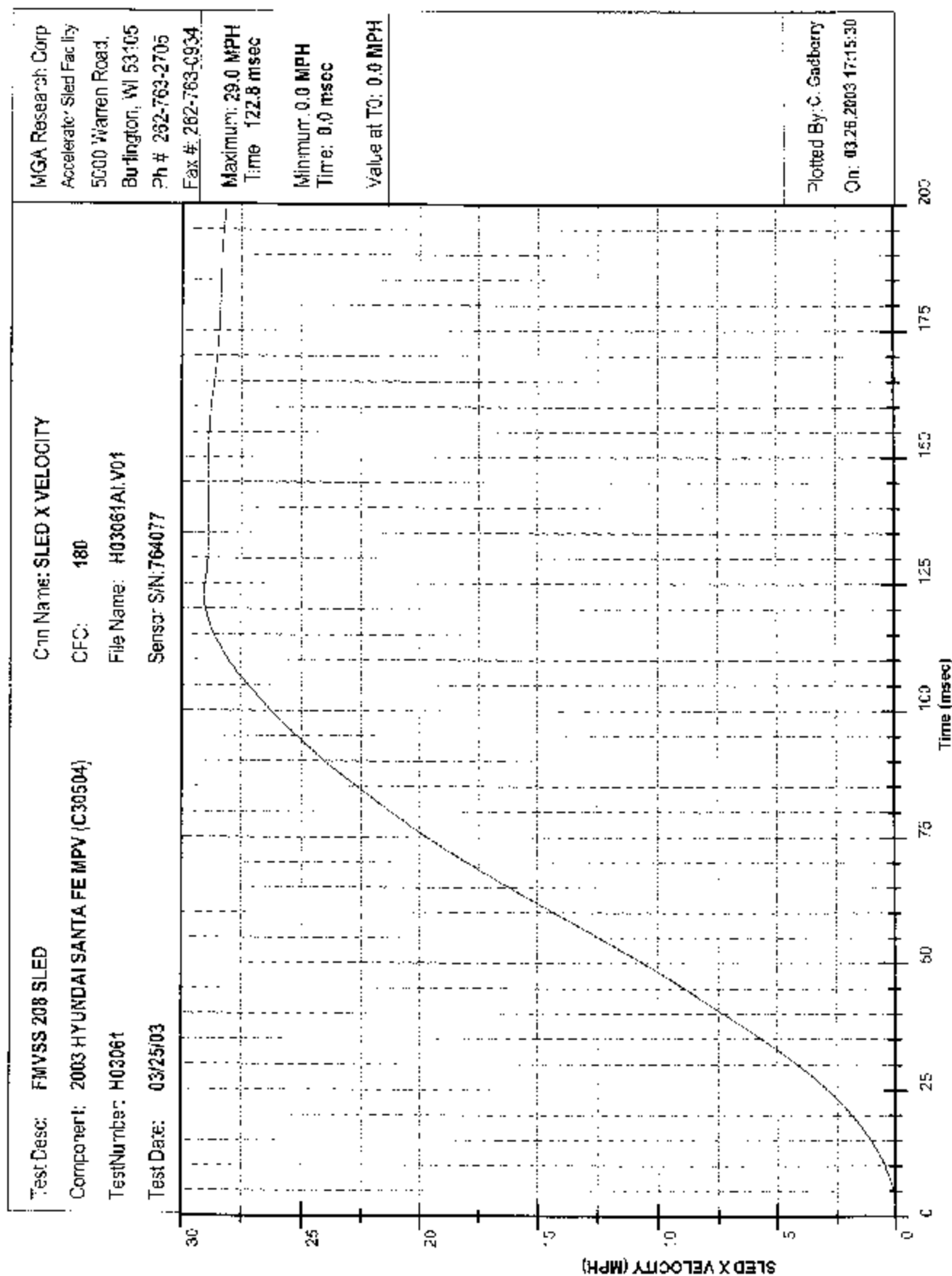
TABLE OF DATA PLOTS

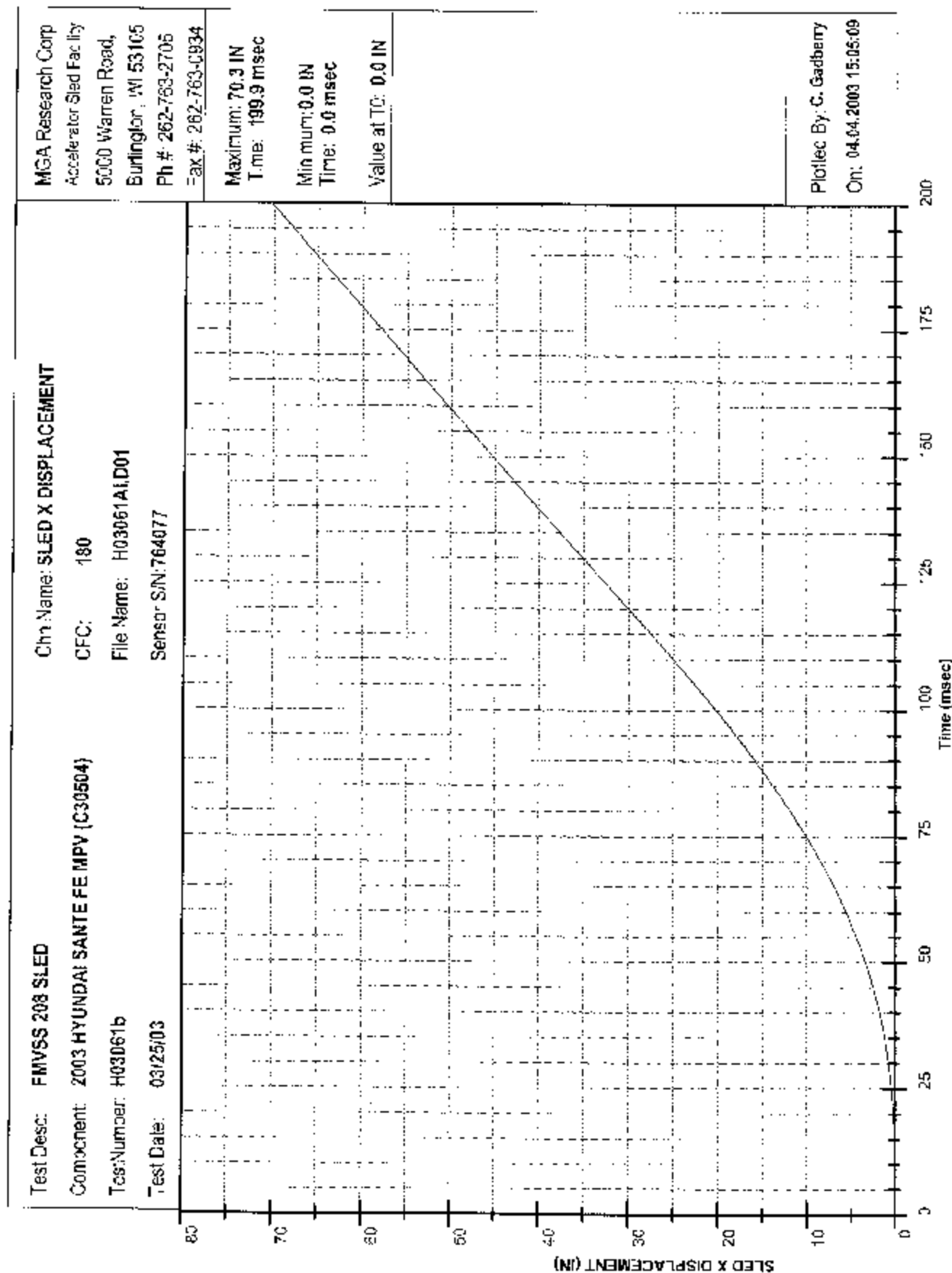
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Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061b

Test Date: 03/25/03

Chn Name: 1 METER

CFC: 1000

File Name H03061OT.010

Sensor S/N: N/A

MGA Research Corp

Accelerator Sled Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0334

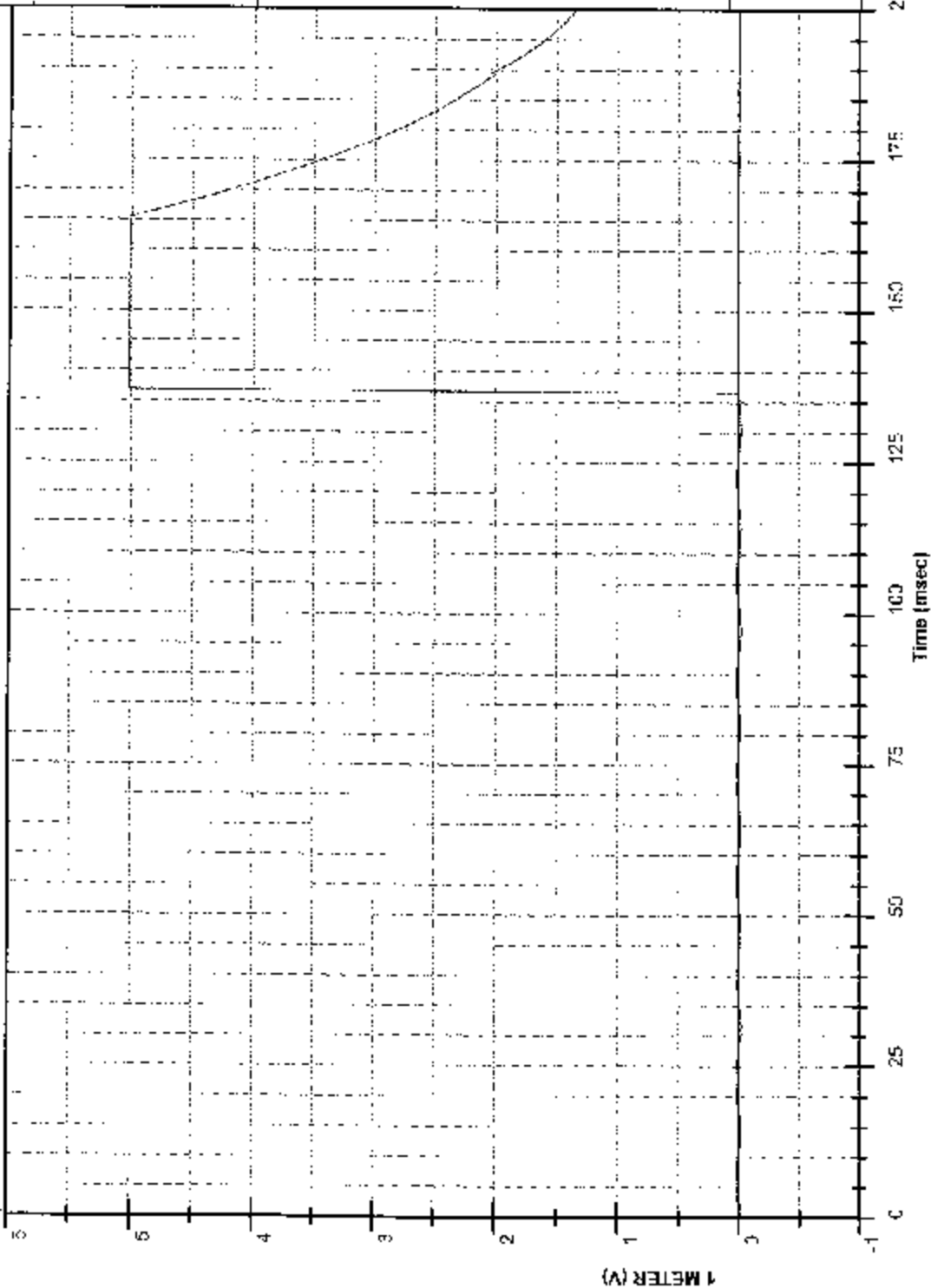
Maximum: 5.0 V
Time: 136.8 msec

Minimum: -0.0 V
Time: 30.4 msec

Value at T0: -0.0 V

Plotted By: C. Gadberry

Cn: 04.04.2003 15:05:12



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C305D4)

Test Number: H03061

Test Date: 03/25/03

Ctr Name: AIRBAG VOLTAGE

CFC: 1000

File Name: H030610T.047

Sensor S/N: N/A

MGA Research Corp

Accelerator Seat Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 20.2 V

Time: 22.1 msec

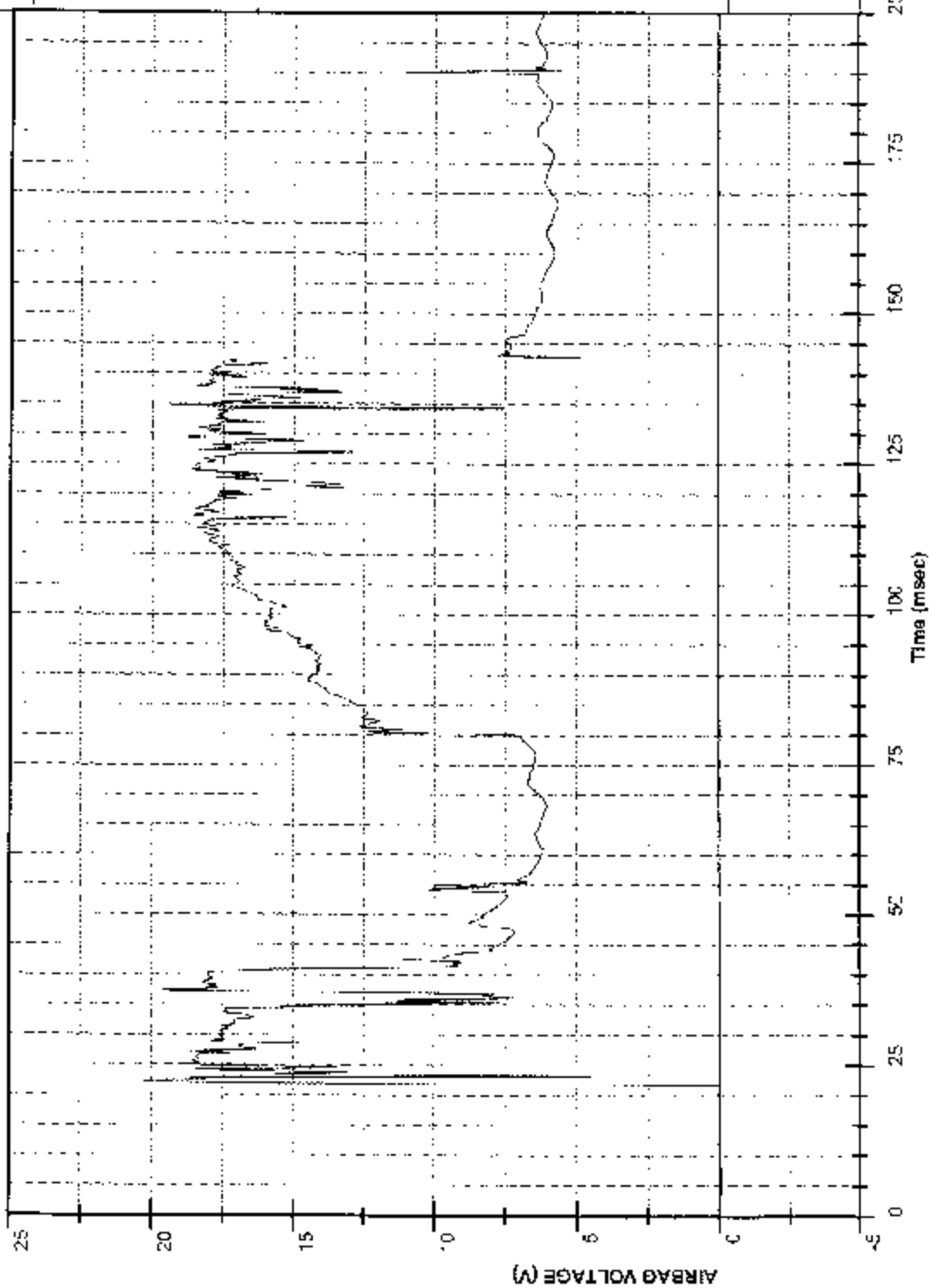
Minimum: -0.1 V

Time: 4.2 msec

Value at T0: 0.0 V

Collec By: C. Gadberry

On: 03-26-2003 17:16:19



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: LEFT REAR CROSSMEMBER X

OFC: 60

File Name: H03061AF.A44

Sensor S/N: K21-N05

MGA Research Corp

Accelerator Sled Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum 17.2 G

Time: 49.1 msec

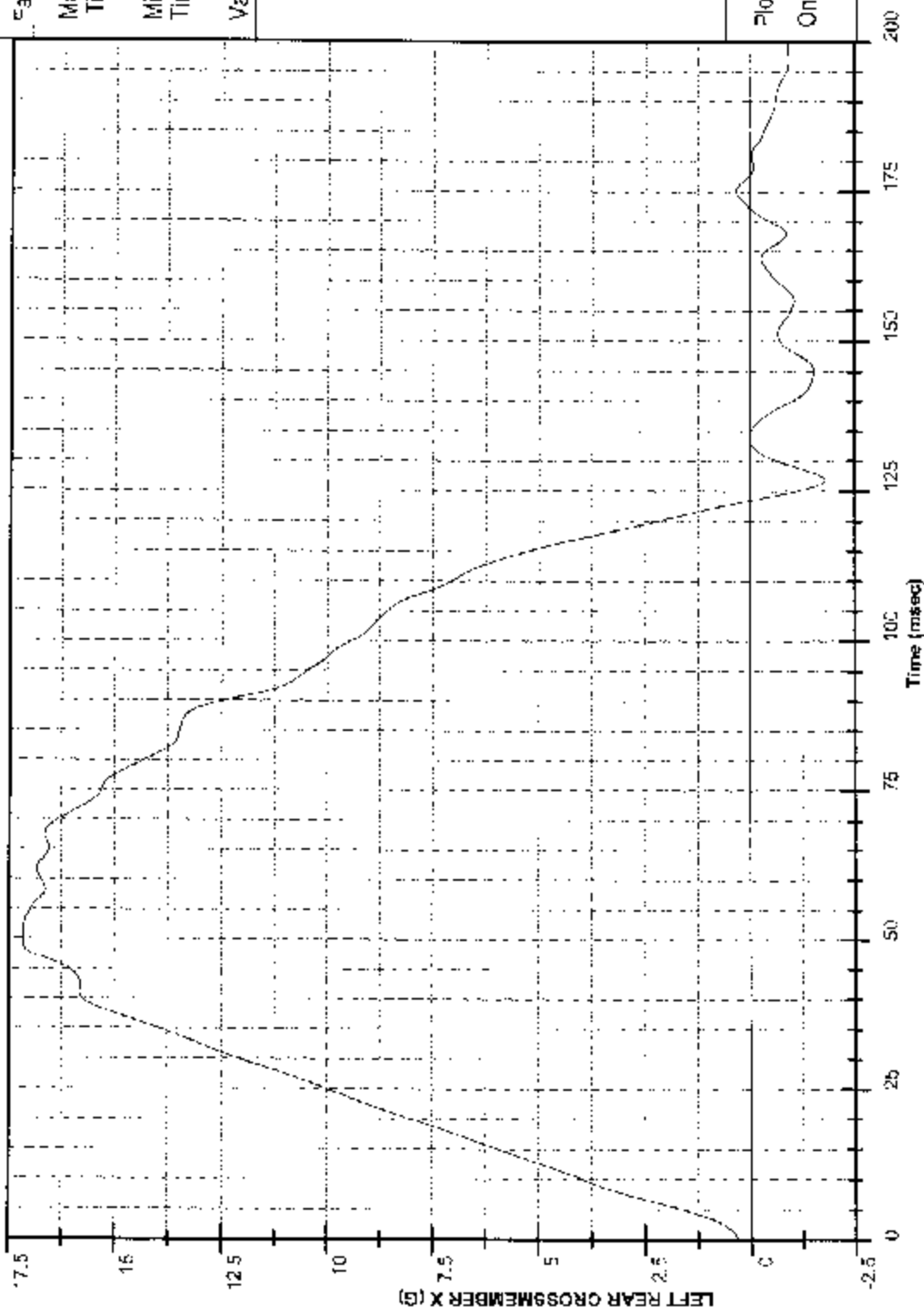
Minimum: -4.8 G

Time: 126.8 msec

Value at TD: 0.3 G

Plotted By: C. Gadberry

On: 03/25/2003 17:15:27



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chr Name: RIGHT REAR CROSSMEMBER X

CFC: 60

File Name: H03061AF.A45

Sensor S/N: 112-F12

MG&A Research Corp

Accelerator Sled Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 18.2 G

Time: 61.6 msec

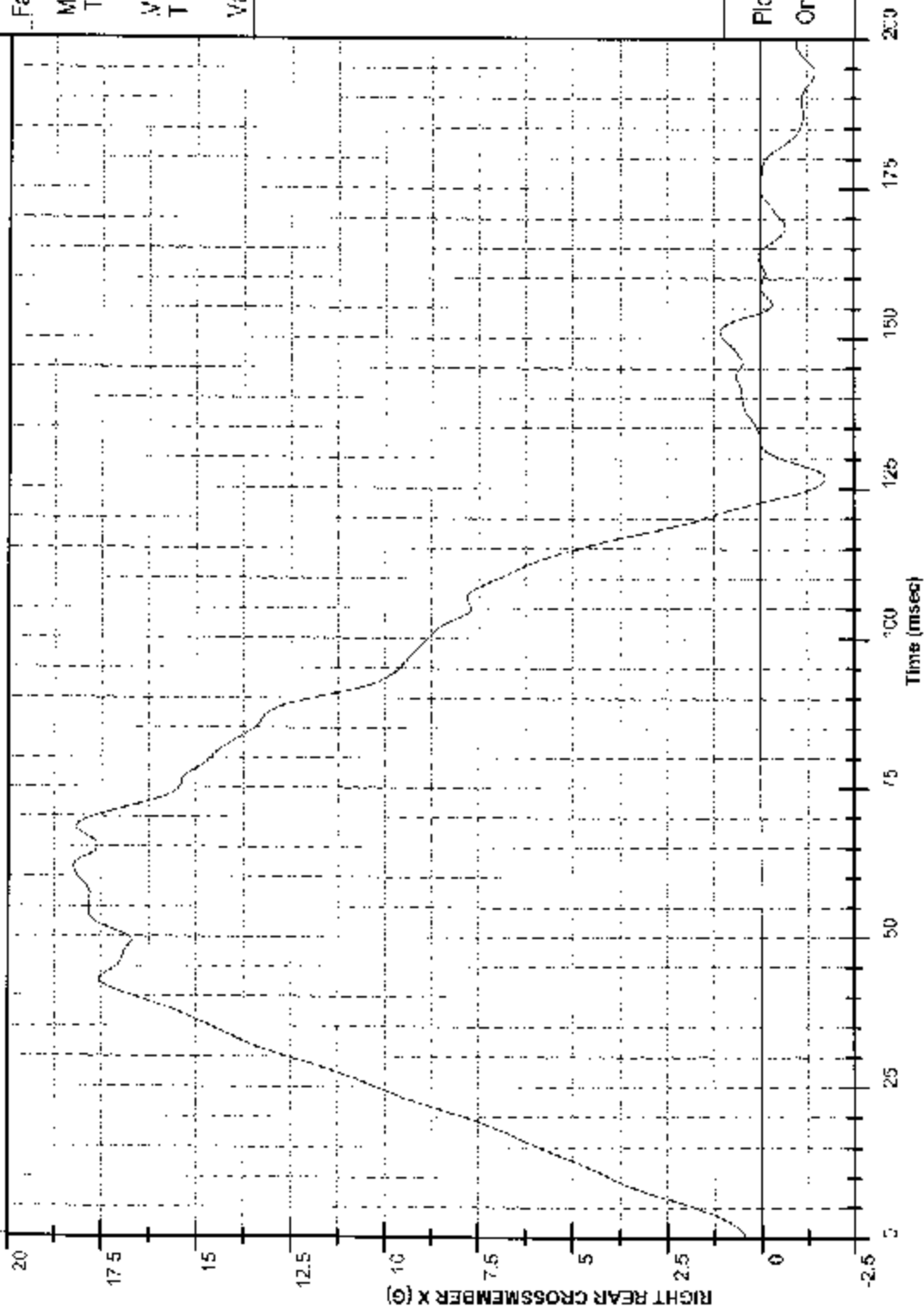
Minimum: -1.7 G

Time: 126.7 msec

Value at TC: 0.4 G

Plotted By: C. Gadberry

On: 03.26.2003 17:15:28



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: TOP OF ENGINE X

CFC: 60

File Name: H03061AFA18

Sensor S/N: 99F272

MGA Research Corp

Accelerator: Sled Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

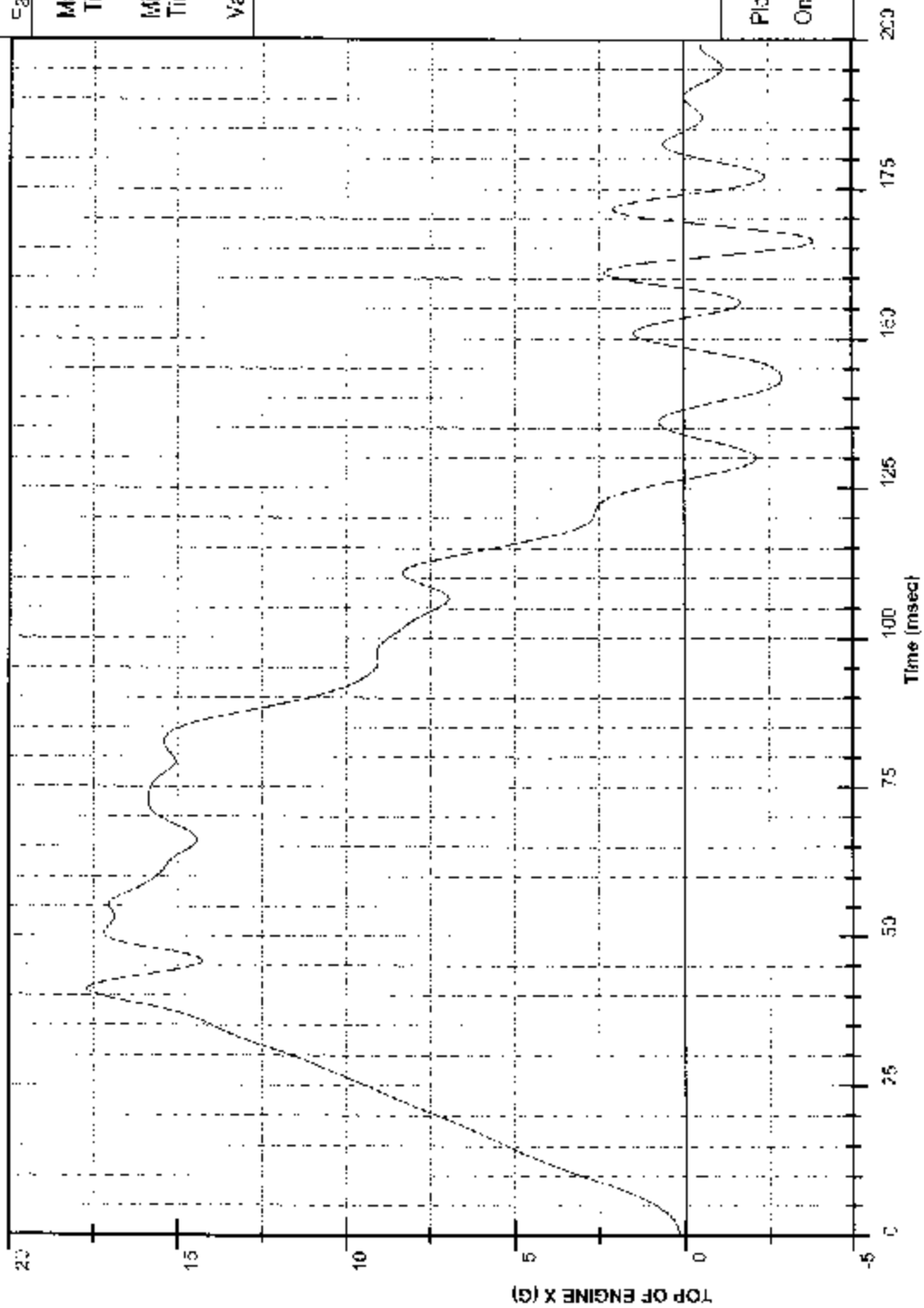
Fax #: 262-763-0934

Maximum: 17.7 G
Time: 41.0 msec

Minimum: -3.9 G
Time: 166.3 msec

Value at T0: 0.2 G

Plotted By: C. Gadberry
On: 03.26.2003 17:15:15



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: REAR AXLE X

CFC: 60

File Name: H03061AF.A43

Sensor S/N: G03-N12

MGA Research Corp

Accelerator Sled Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2735

Fax #: 262-763-0934

Maximum 17.1 G

Time: 55.2 msec

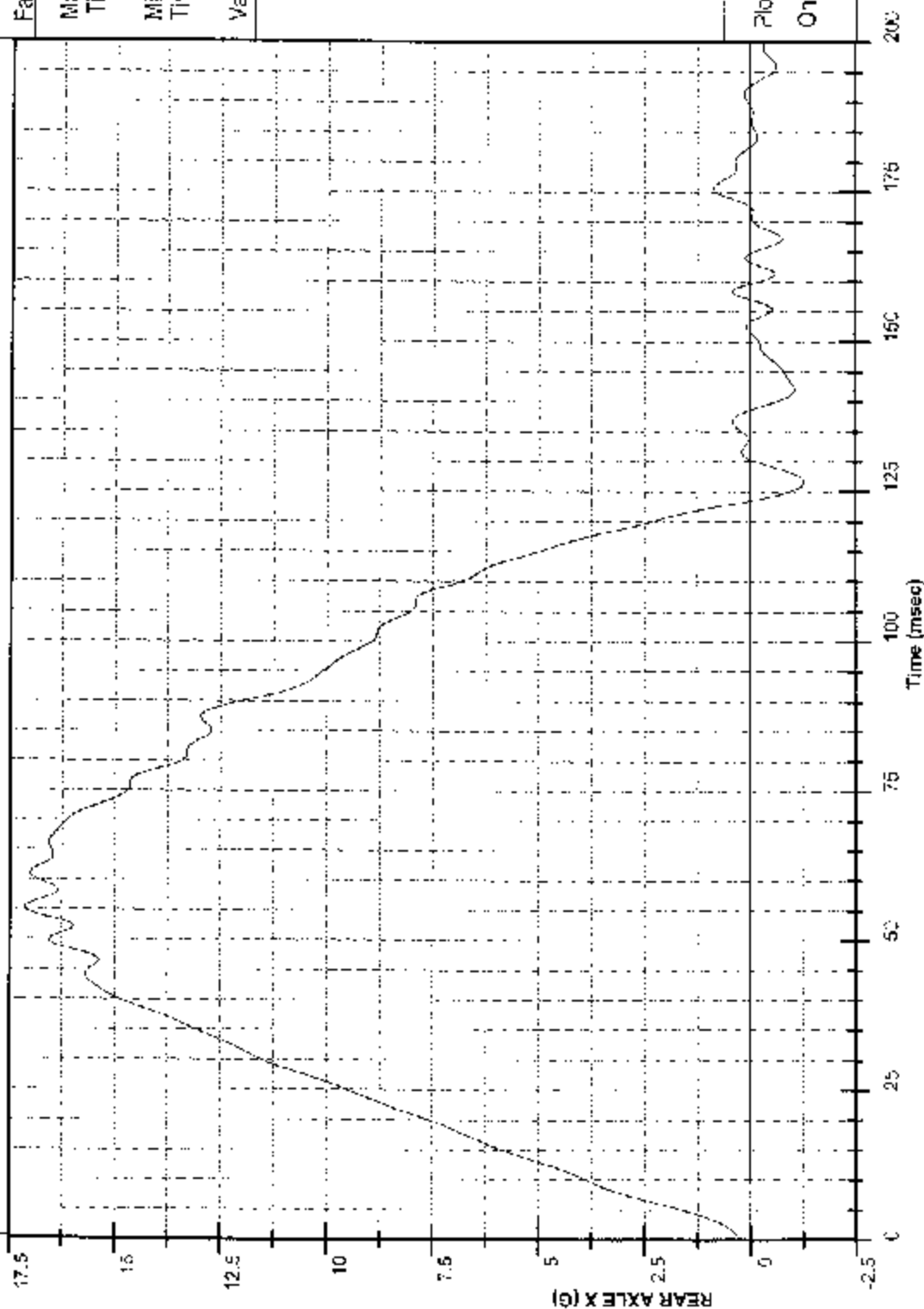
Minimum -1.3 G

Time: 126.6 msec

Value at T0: 0.3 G

Plotted By: C. Gadberry

On 03/26/2003 17:15:25



Test Desc: FIMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Cin Name: DRIVER HEAD X

CFC: 1000

File Name: H03061AT.A03

Sensor S/N: C10727

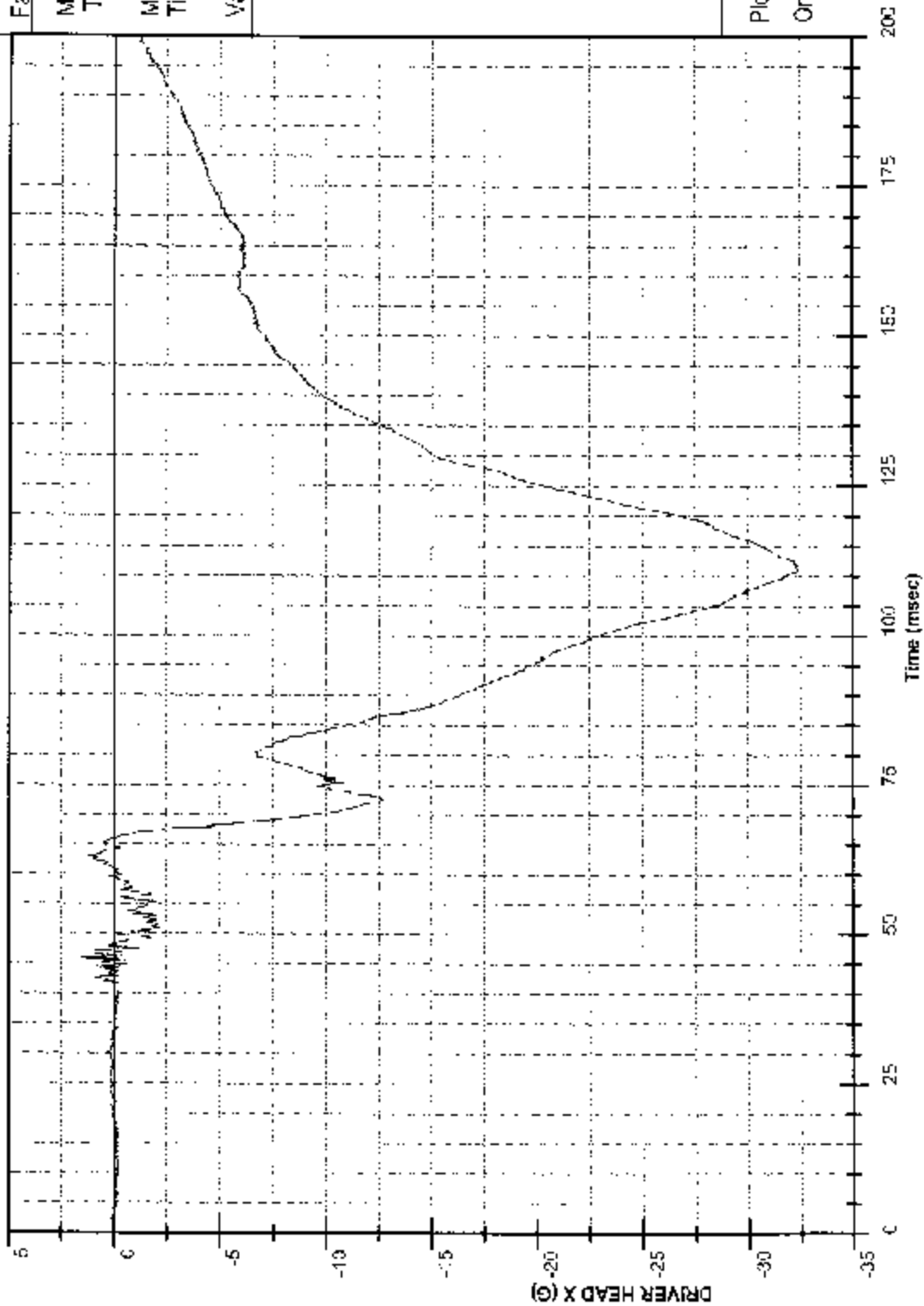
MGA Research Corp
Accelerate Slec Facility
5000 Warren Road,
Burlington, WI 53105
Ph #: 262-763-2705
Fax #: 262-763-0834

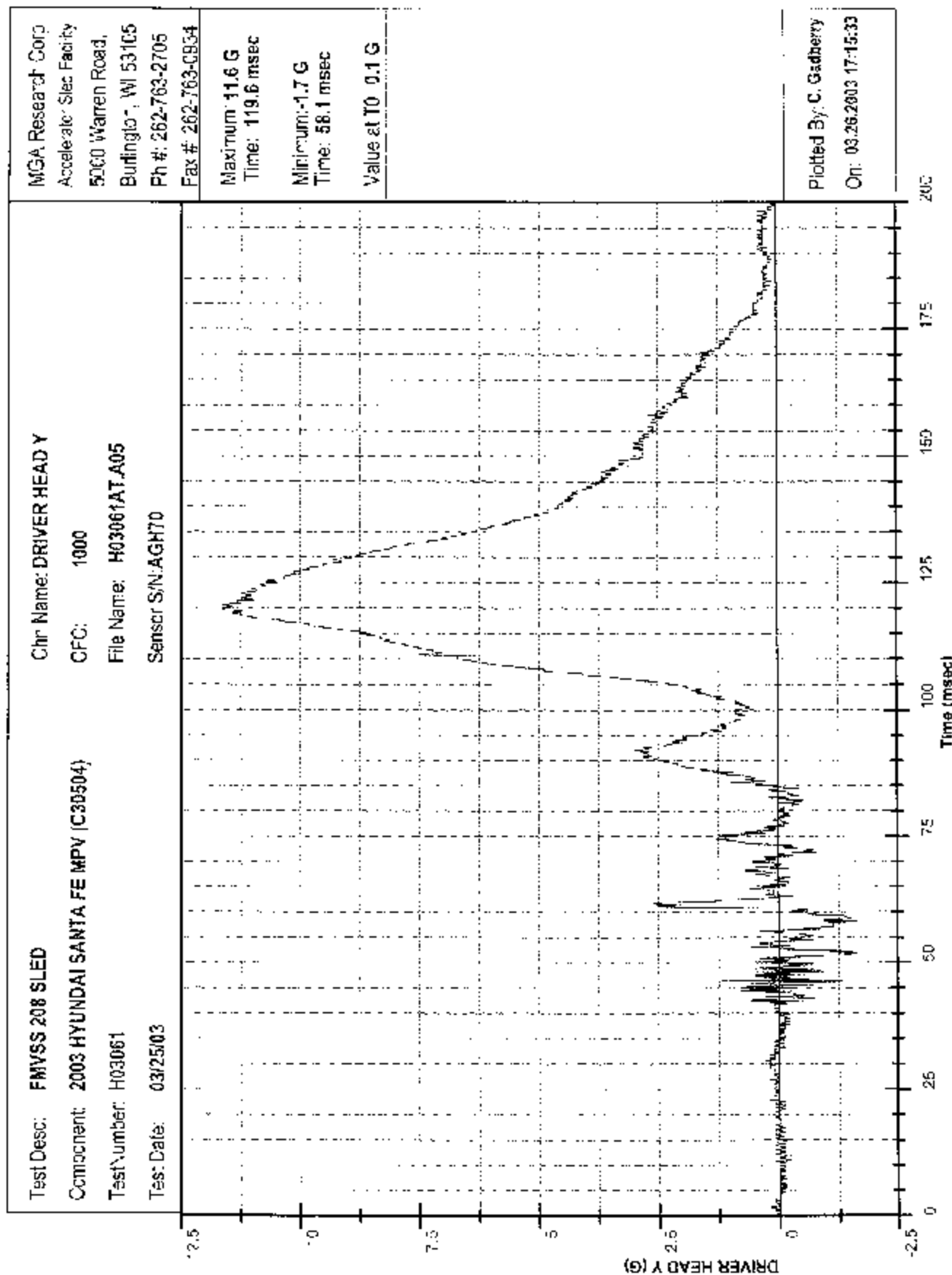
Maximum: 1.6 G
Time: 45.8 msec

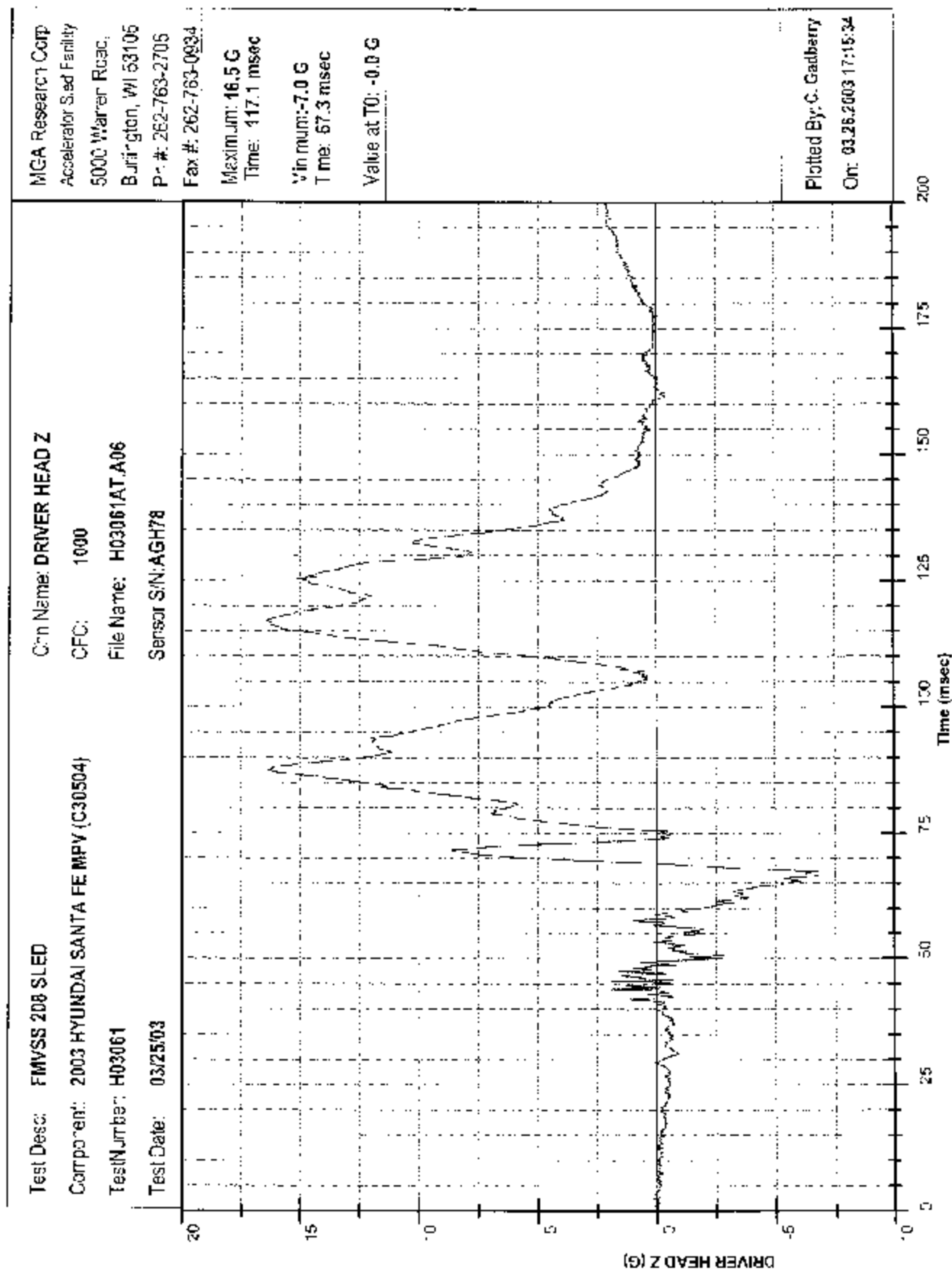
Minimum: -32.4 G
Time: 110.8 msec

Value at T0: -0.0 G

Plotted By: C. Gadberry
On: 03/26/2003 17:15:31







Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Car Name: DRIVER HEAD RESULTANT

CFC: 1000

File Name: H03061AV.A03

Sensor S/N: AGH78

MGA Research Corp

Accelerator Sled Facility

5000 Warren Road.

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 35.4 G
Time: 115.0 msec

Minimum: 0.0 G
Time: 0.3 msec

Value at TD: 0.1 G

HIC VAL: 173.6

T1: 84.6 msec

T2: 134.9 msec

HIC36 VAL: 167.1

T1: 92.8 msec

T2: 128.8 msec

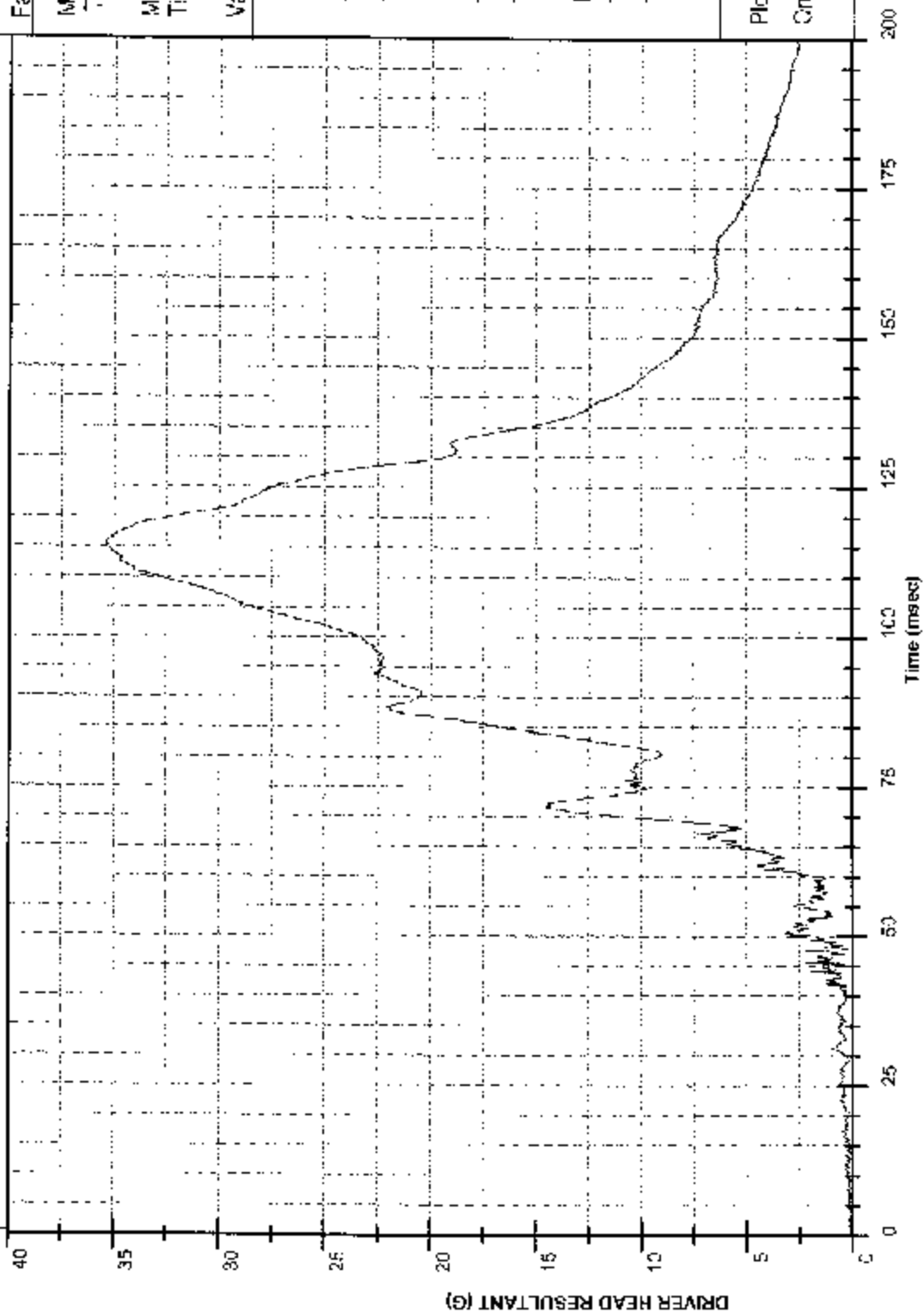
HIC15 VAL: 95.9

T1: 106.5 msec

T2: 121.5 msec

Plotted By: C. Gadberry

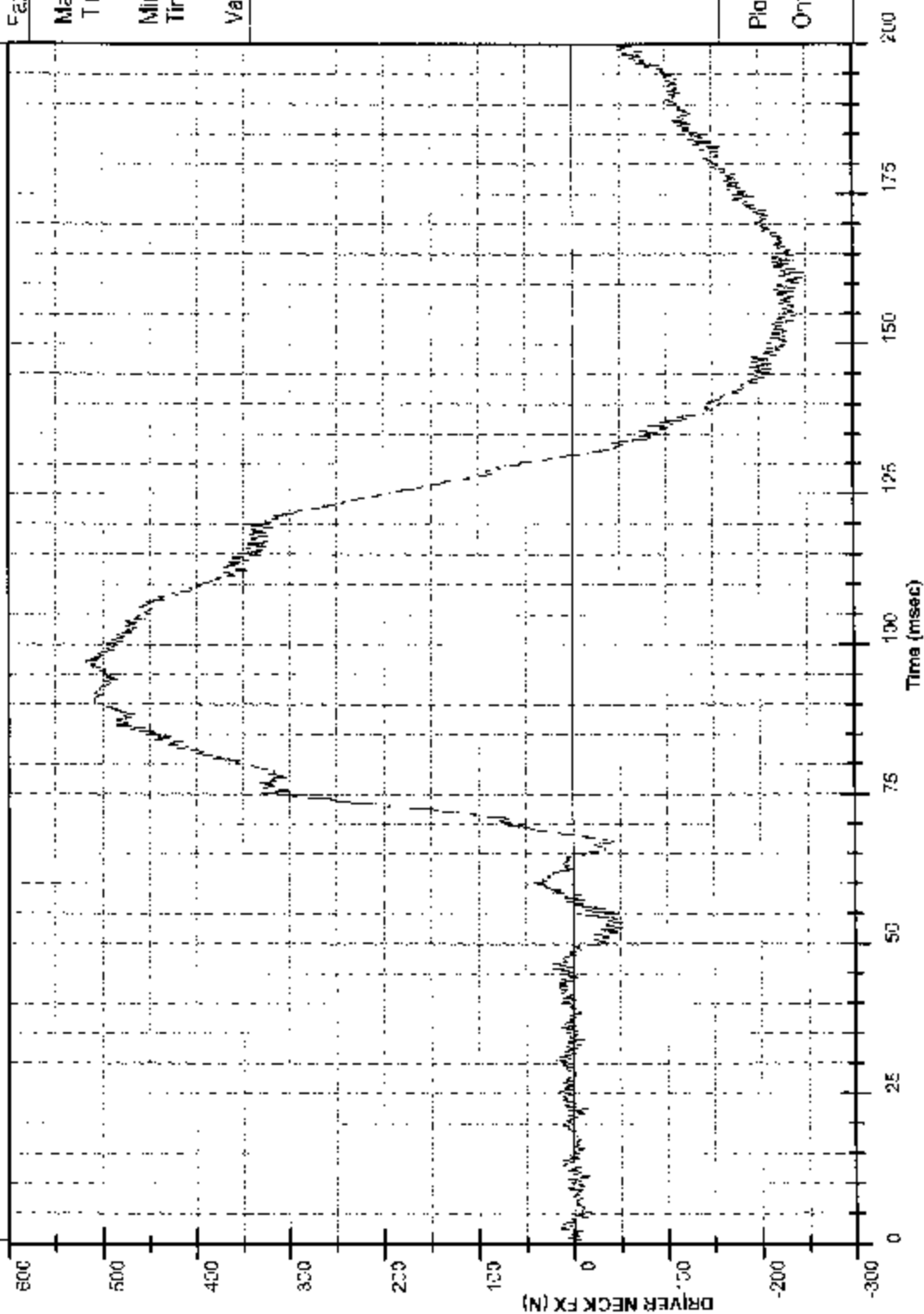
On: 03/25/2003 17:15:41

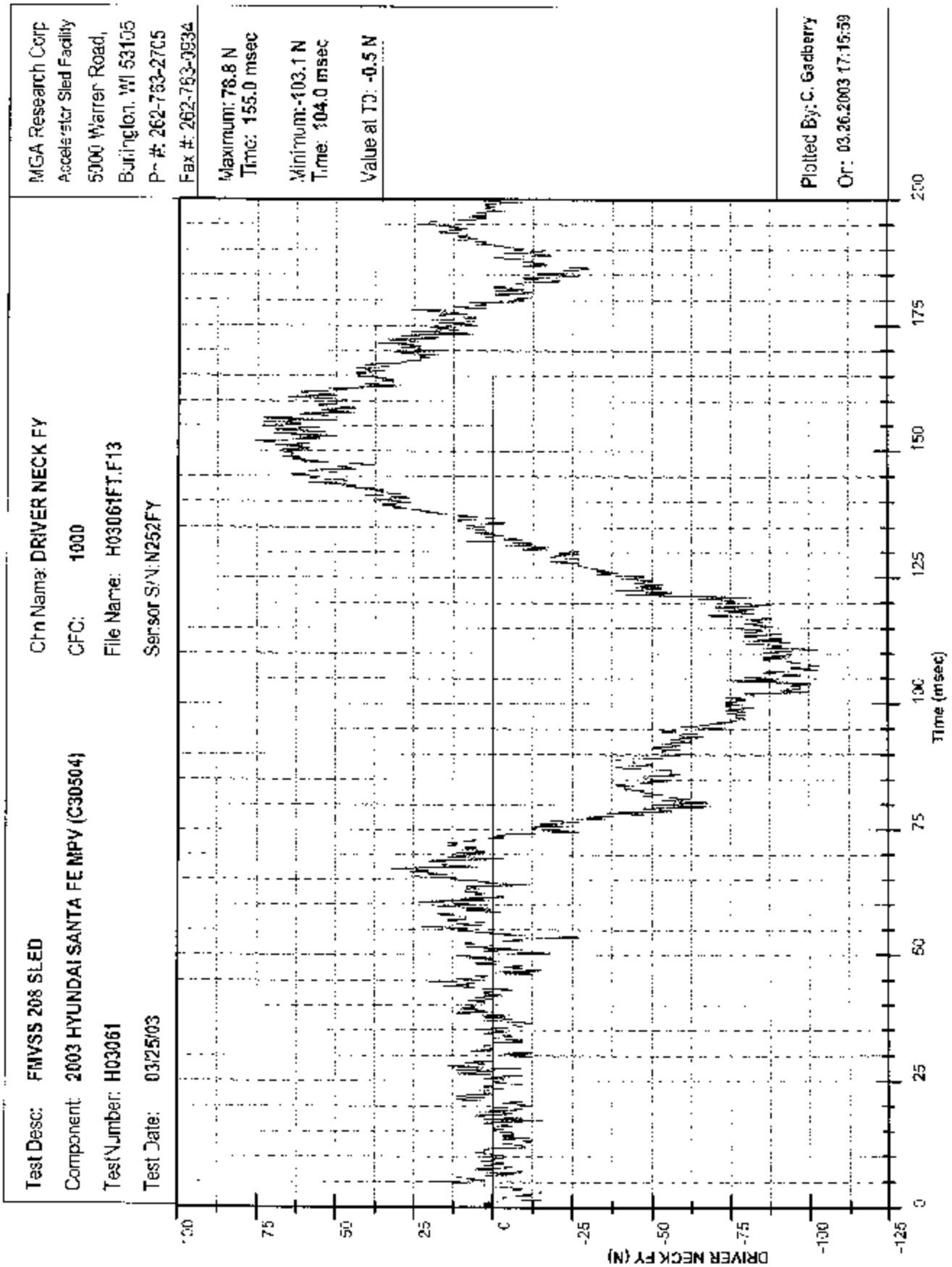


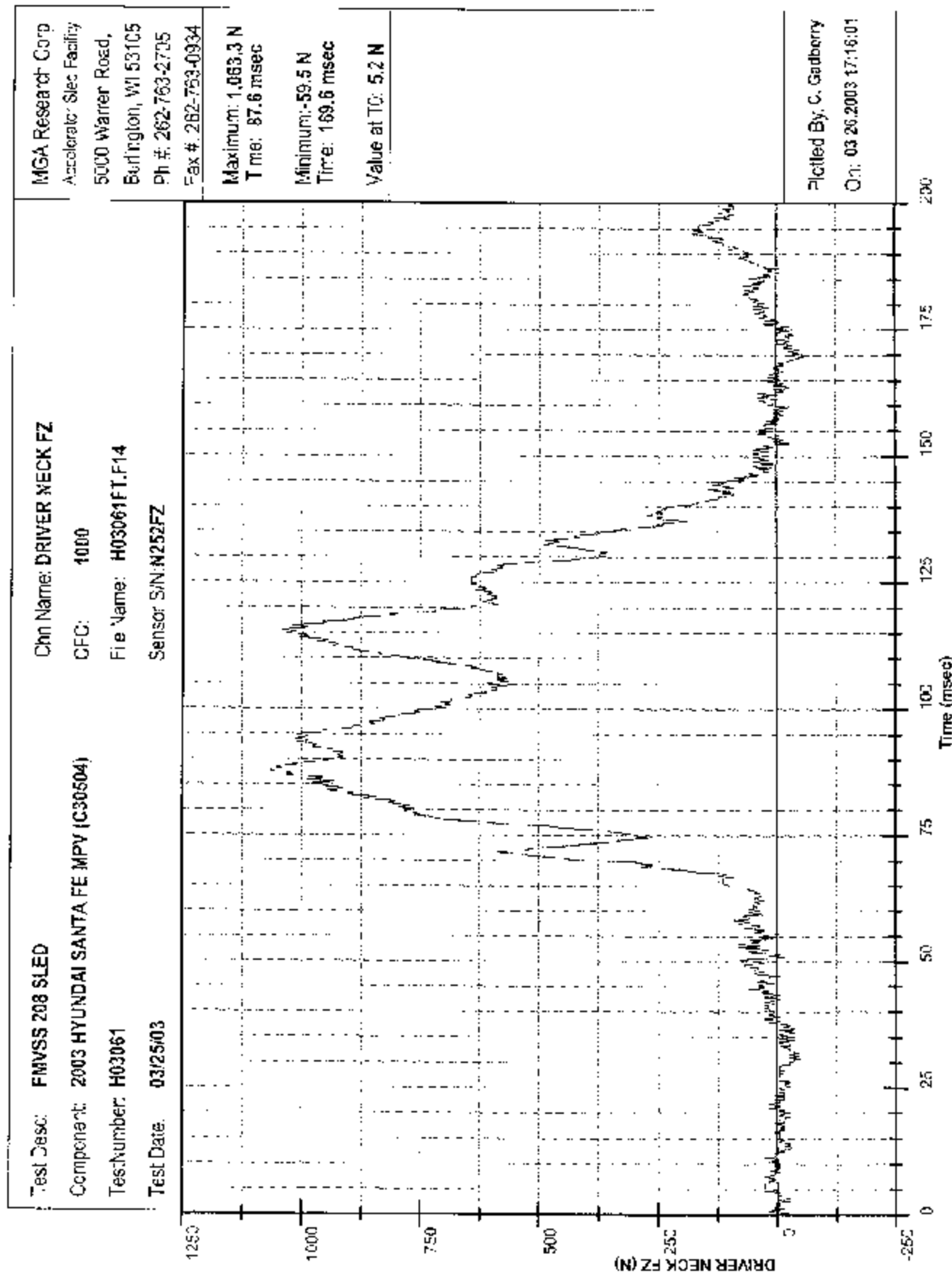
Test Desc: FMVSS 208 SLED Component: 2003 HYUNDAI SANTA FE MPV (C30504) Test Number: H03061 Test Date: 03/25/03	Chn Name: DRIVER NECK FX CFC: 1000 File Name: H03061FT.F12 Sensor S/N: N252FX	VICA Research Corp Accelerator Sled Facility 5000 Warren Road, Burlington, WI 53105 Ph #: 262-763-2705 Fax #: 262-763-0934
--	--	--

Maximum: 516.6 N Time: 96.9 msec Minimum: -249.0 N Time: 161.7 msec Value at TD: -5.5 N
--

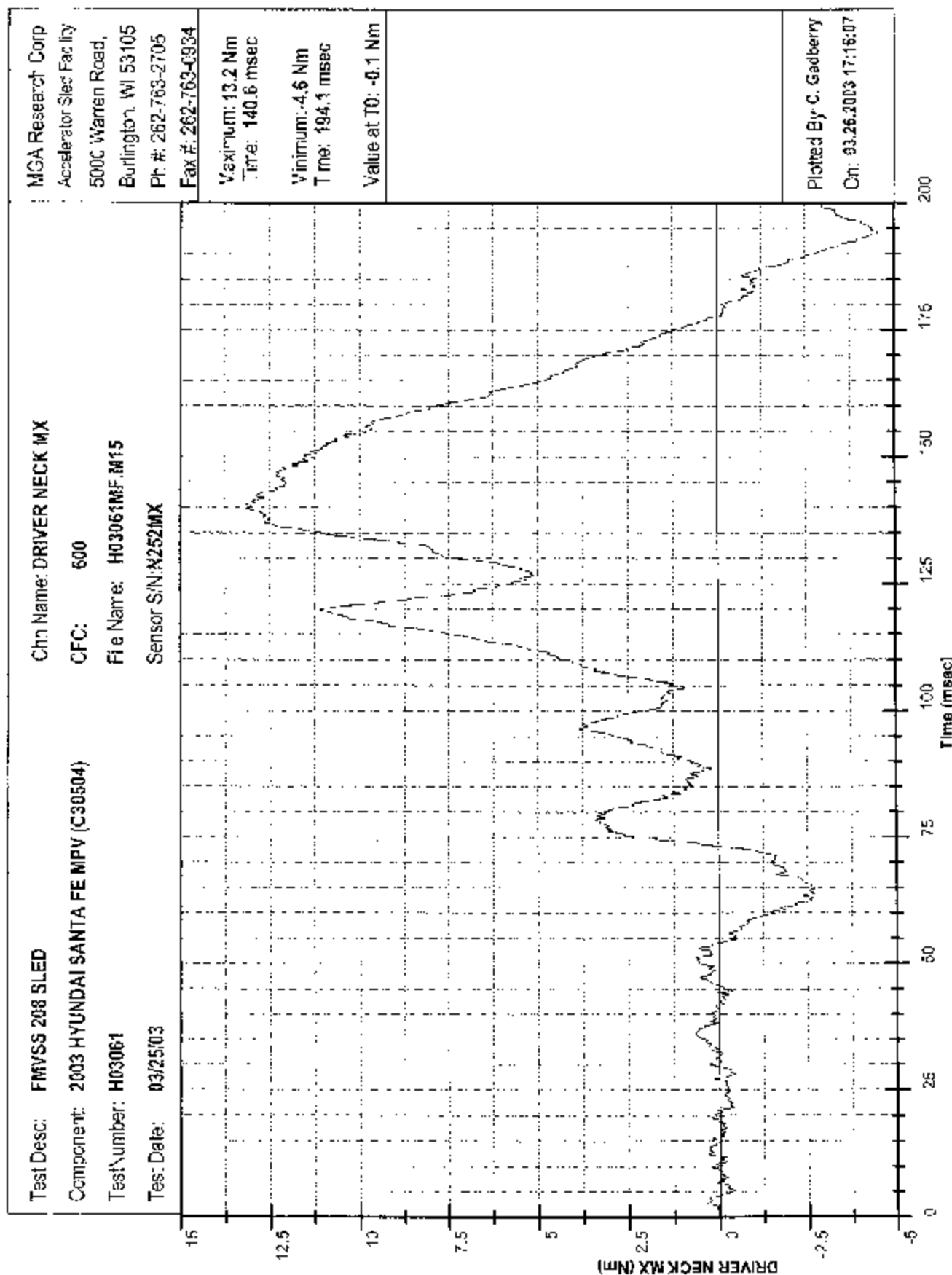
Plotted By: C. Gadberry On: 03/26/2003 17:15:58
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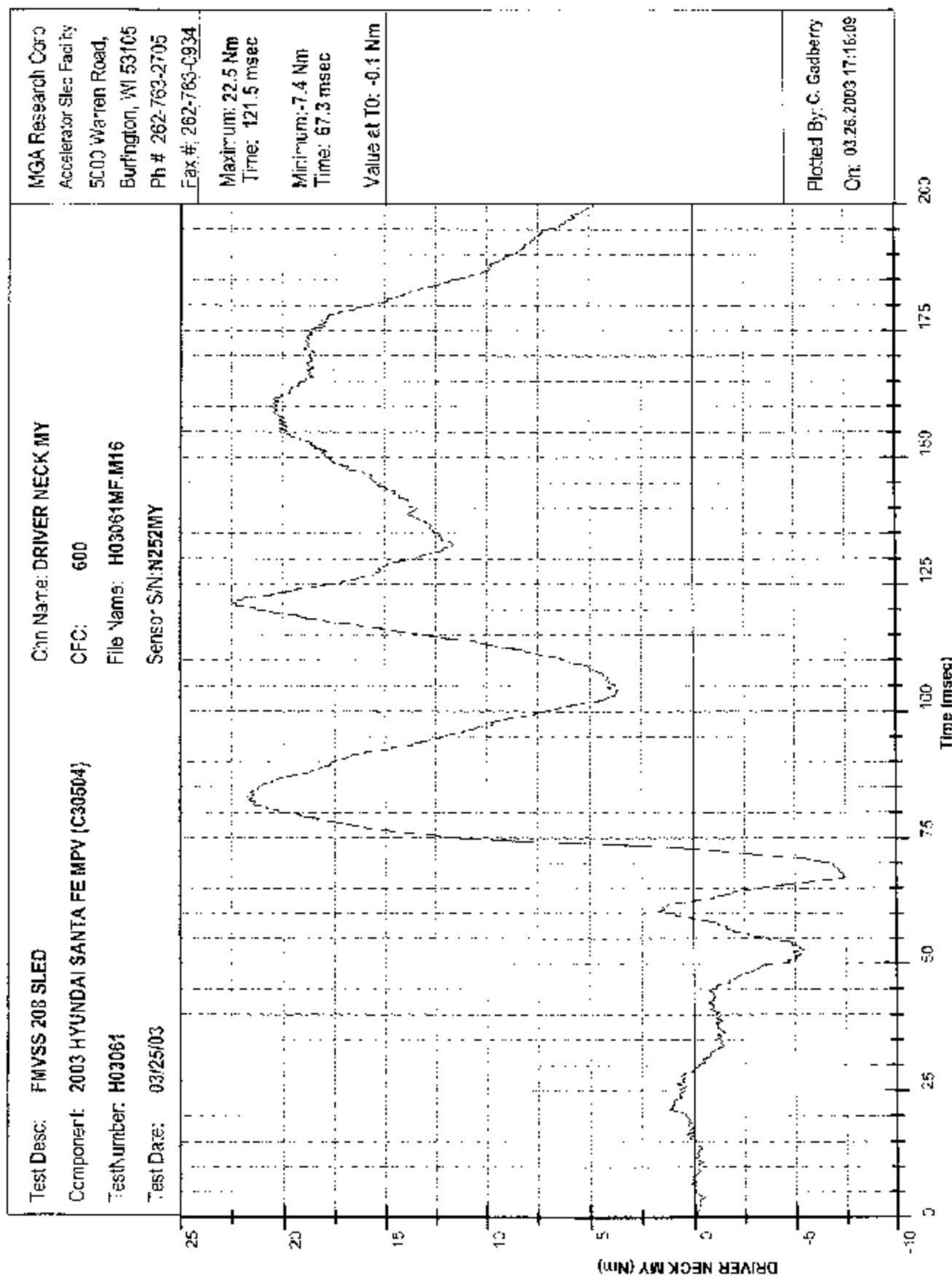


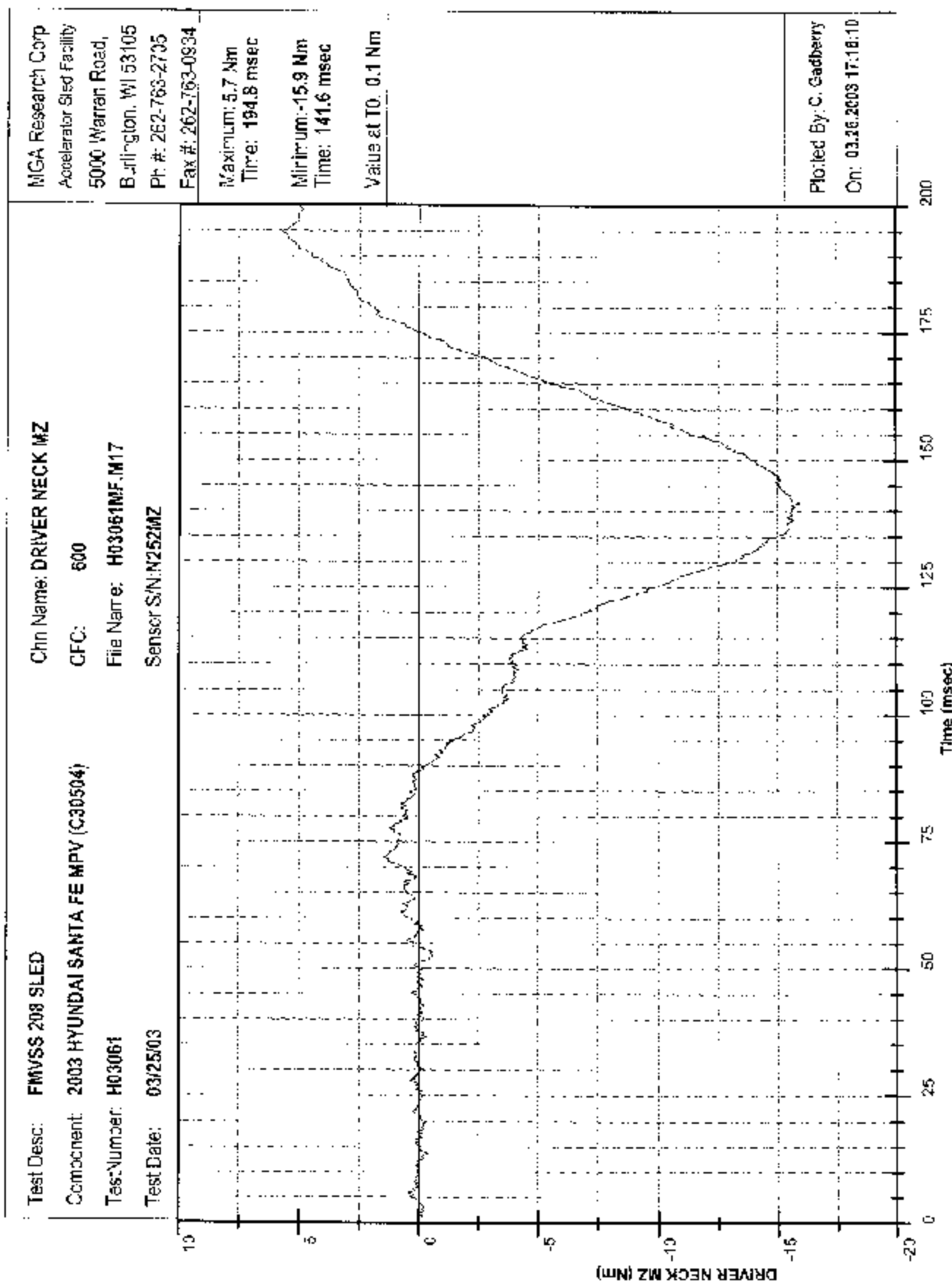




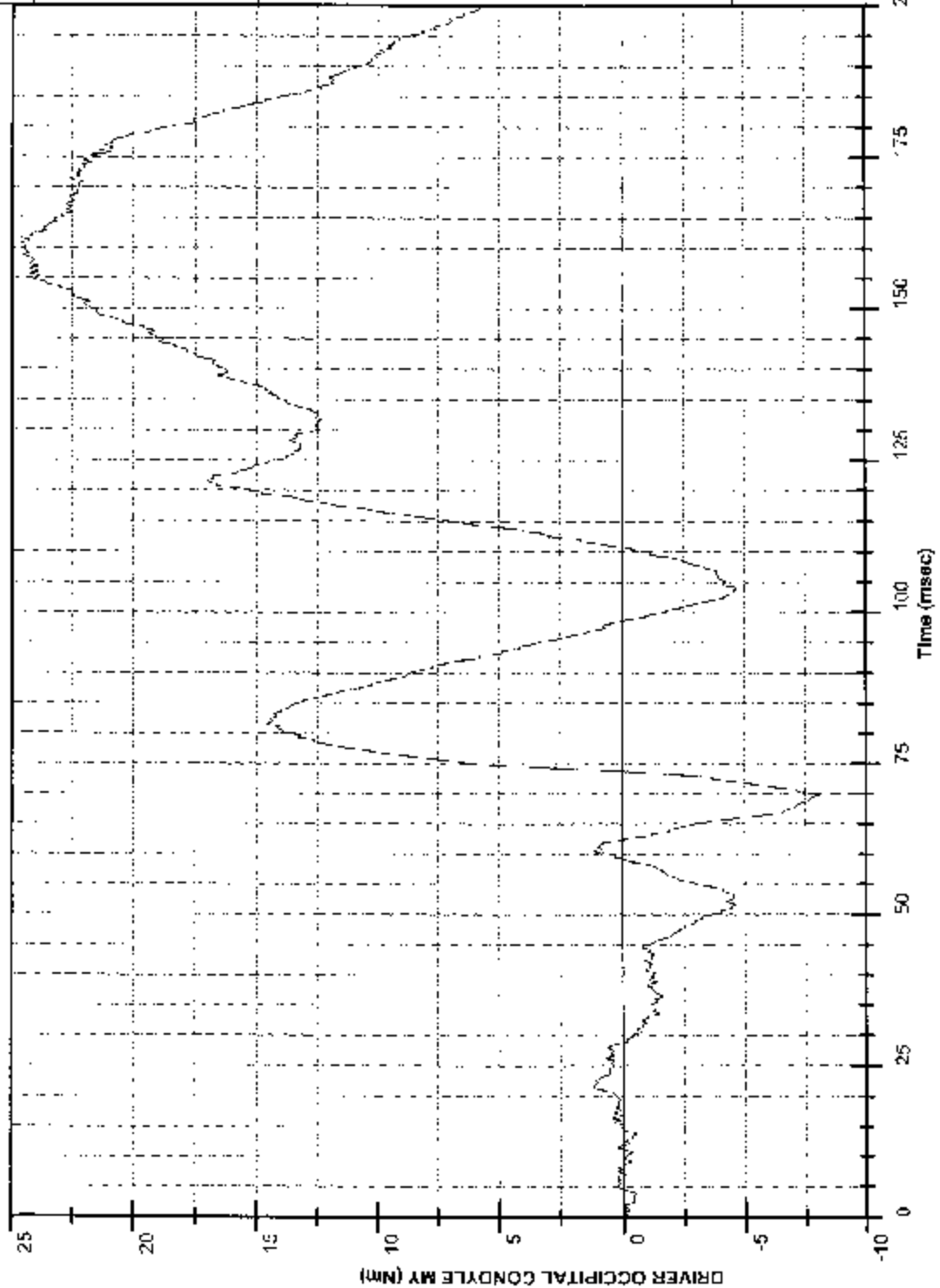
Plotted By: C. Gadberry
 On: 03/26/2003 17:16:01







Test Desc: FMVSS 208 SLED Component: 2003 HYUNDAI SANTA FE MPV (C30504) Test Number: H03061 Test Date: 03/25/03	Chr Name: DRIVER OCCIPITAL CONDYLE MY CFC: 600 File Name: H03061MO.M16 Sensor S/N: N252MY	MGA Research Corp Accelerator Sled Facility 5000 Warren Road, Burlington, WI 53105 Ph #: 262-763-2795 Fax #: 262-763-0934
Maximum: 24.6 Nm Time: 161.5 msec Minimum: -8.1 Nm Time: 69.8 msec Value at T0: -0.1 Nm		Plotter By: C. Gadberry On: 03.26.2003 17:16:16



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: DRIVER CHEST X

CFC: 180

File Name: H03061AF.A21

Sensor S/N: C10591

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5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-753-5934

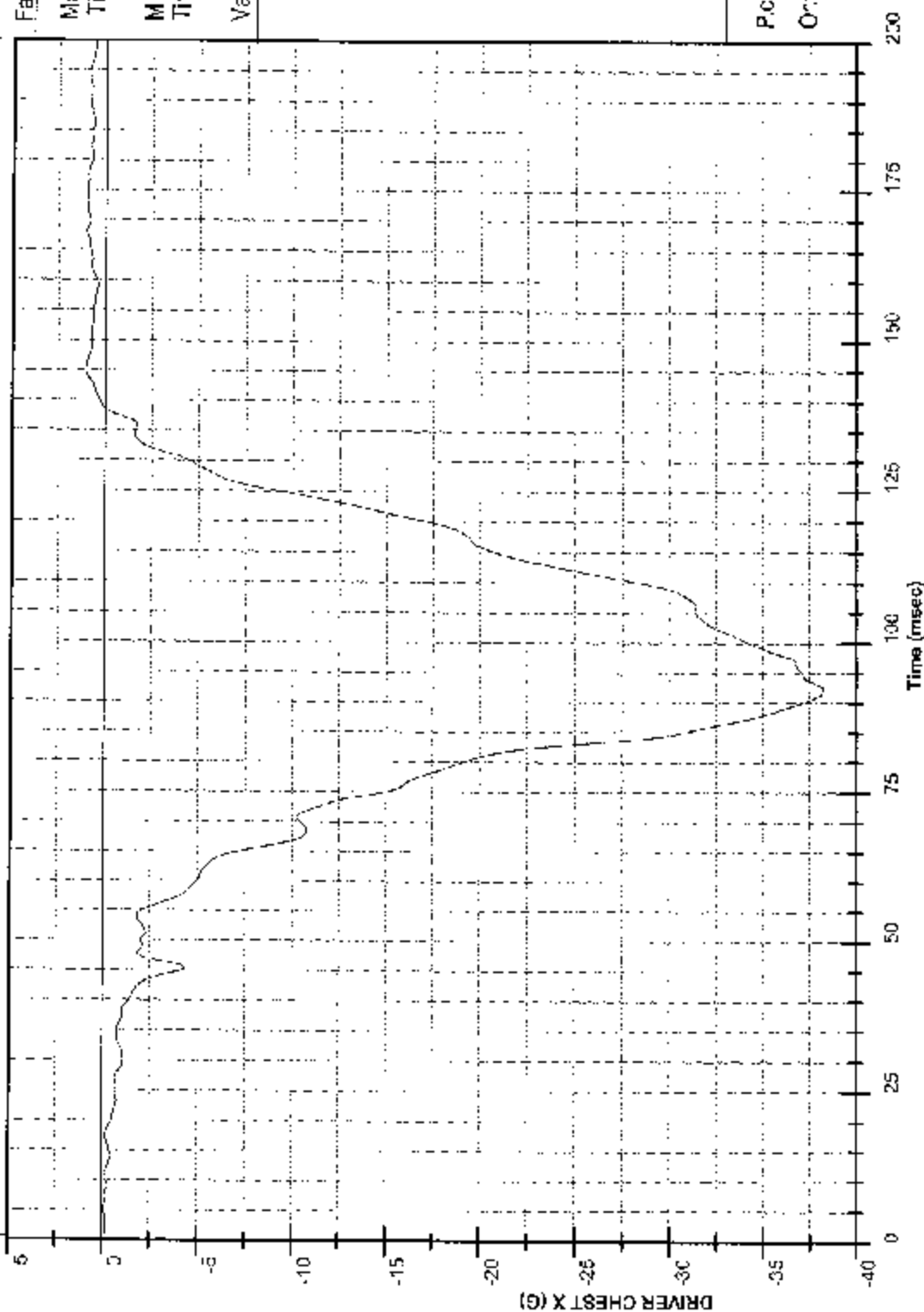
Maximum: 1.0 G
Time: 145.0 msec

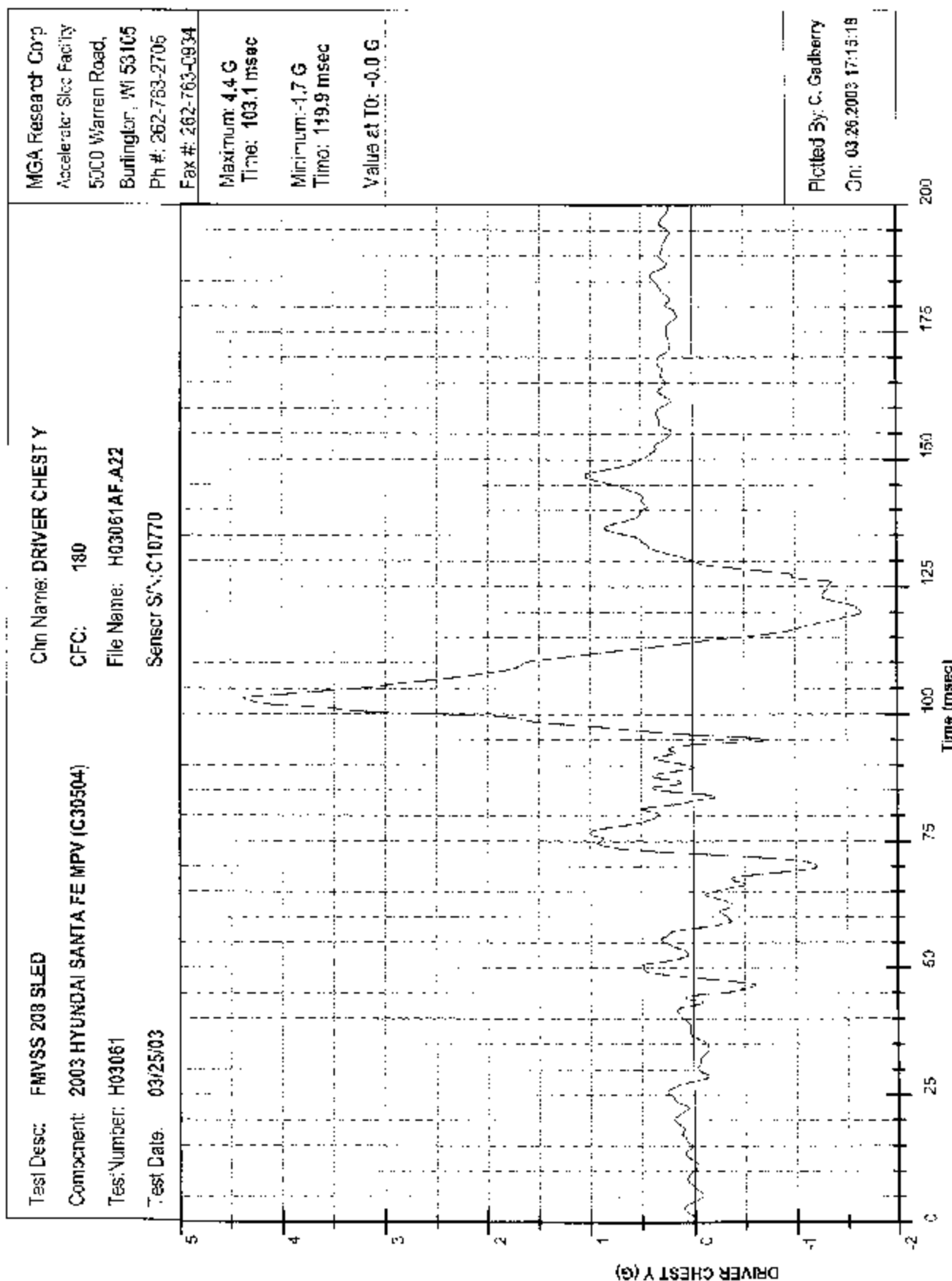
Minimum: -38.3 G
Time: 92.0 msec

Value at TD: -0.2 G

Polled By: C. Gadberry

On: 03/26/2003 17:15:16





Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chr Name: DRIVER CHEST Z

CFC: 180

File Name: H03061AF.A23

Sensor S/N: AGH72

MGA Research Corp

Accelerator Sled Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

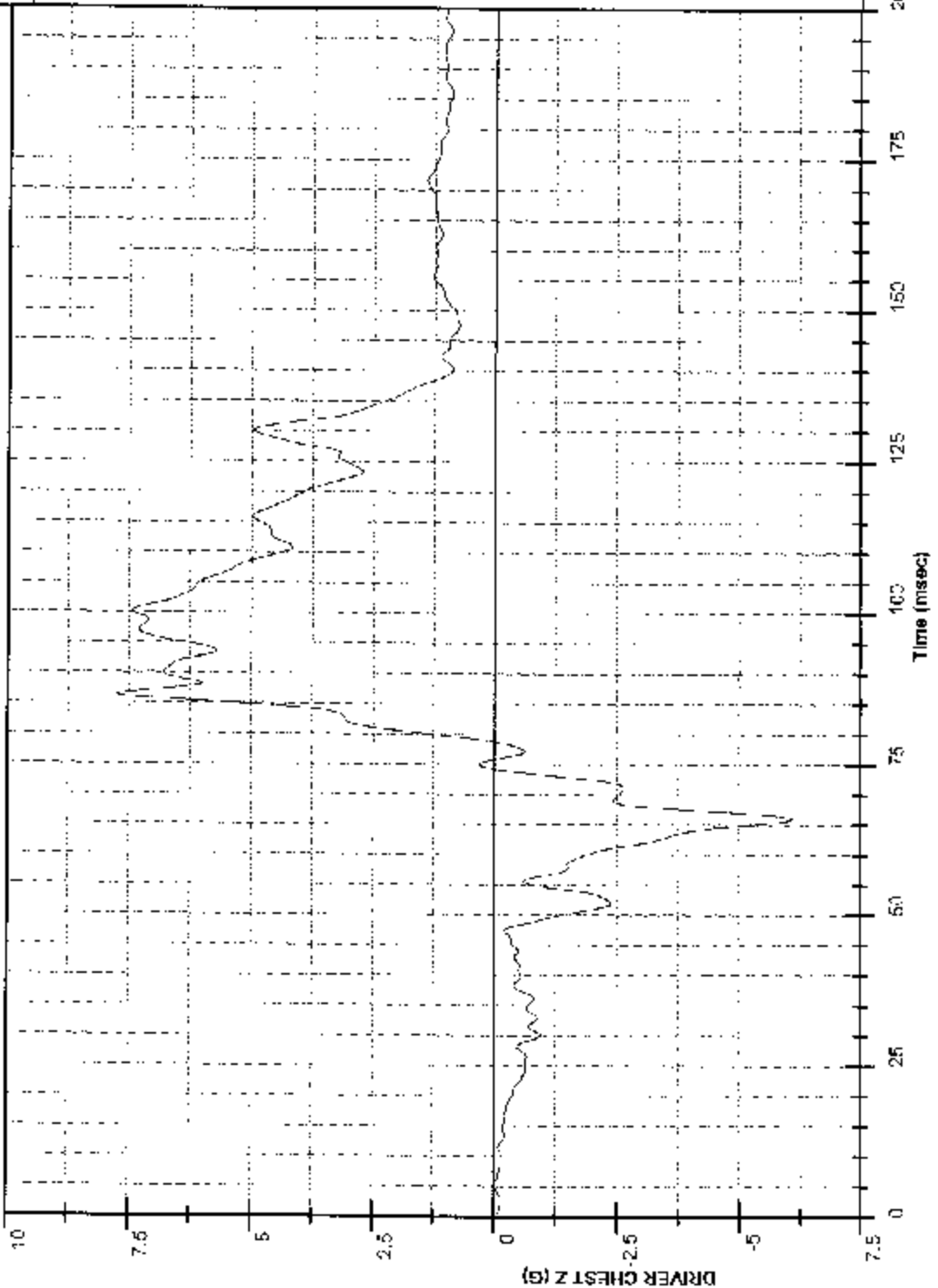
Maximum: 7.7 G
Time: 86.4 msec

Minimum: -6.1 G
Time: 66.0 msec

Value at T0: -0.1 G

Plotted By: C. Gadberry

On: 03/26/2003 17:15:19



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Crash Name: DRIVER CHEST RESULTANT

CFC: 180

File Name: H03061AV.A21

Sensor S/N: AGH72

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Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

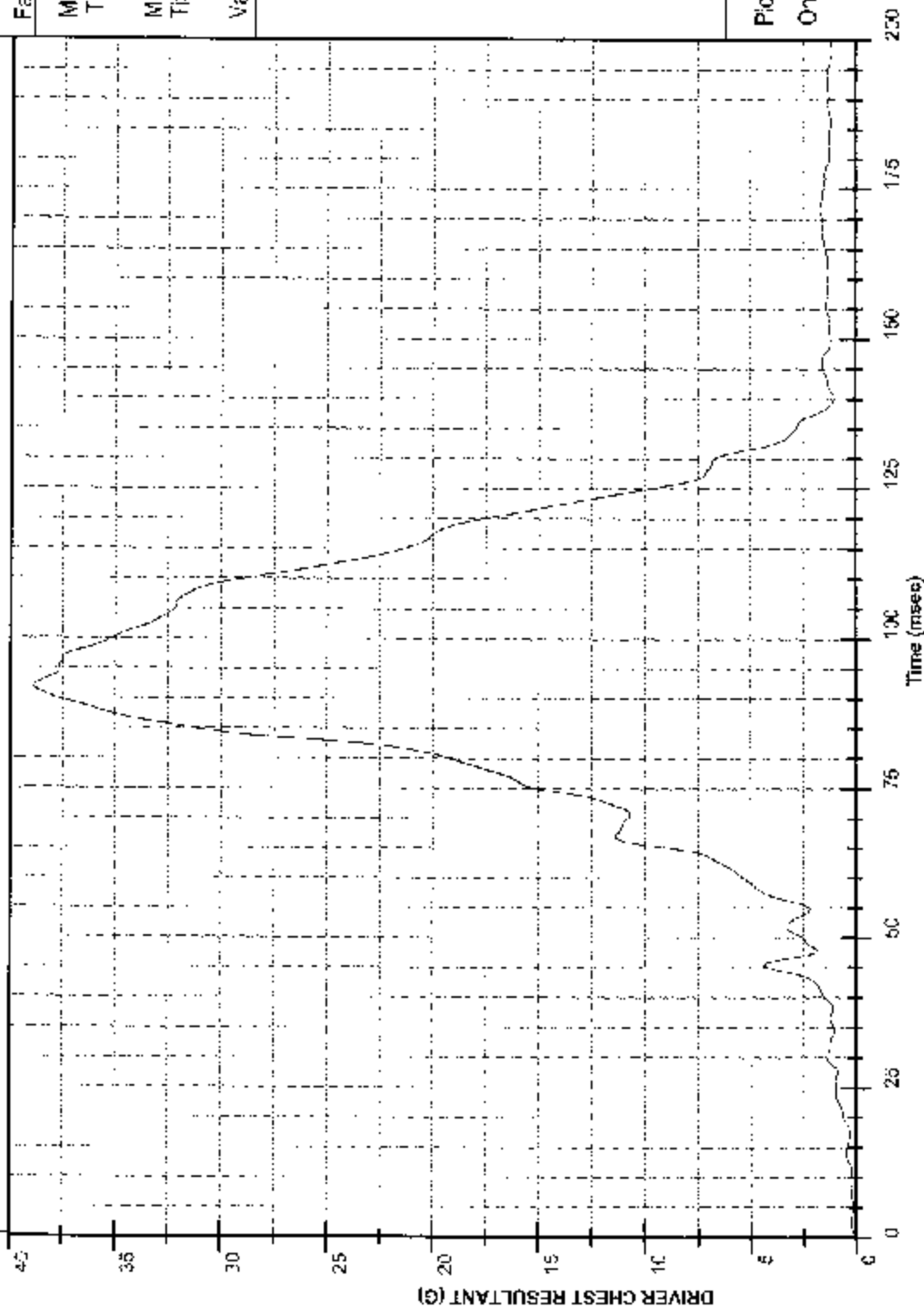
Maximum: 38.8 G
Time: 91.9 msec

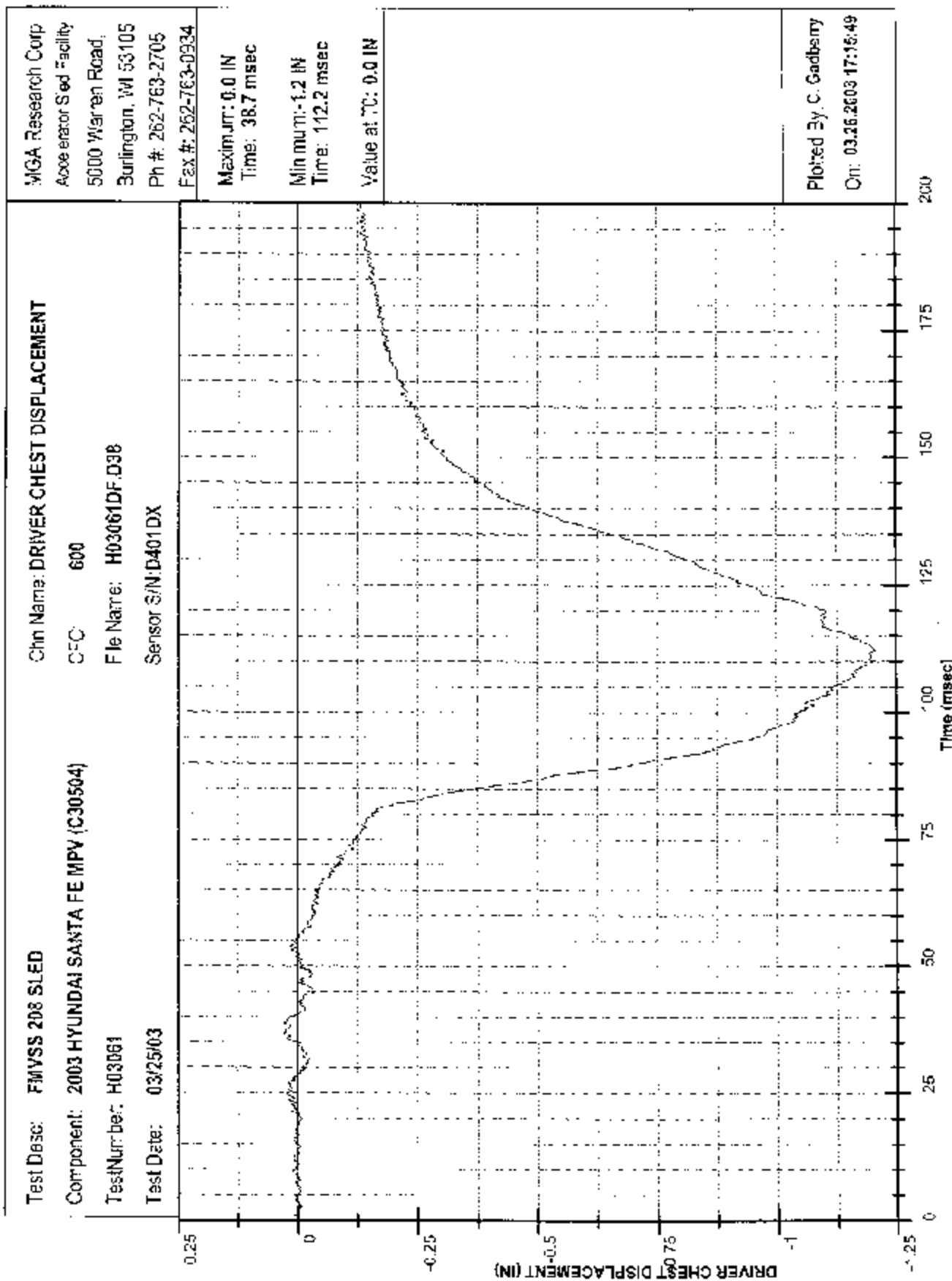
Minimum: 0.1 G
Time: 5.1 msec

Value at TC: 0.2 G

Plotted By: C. Gadberry

On: 03.26.2003 17:15:43





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Accelerator Sled Facility
5000 Warren Road
Burlington, WI 53105
P: # 262-763-2705

Fax #: 262-763-0834

Maximum: 13.9 LB
Time: 171.7 msec

Minimum: -1,265.4 LB
Time: 73.4 msec

Value at TC: -3.0 LB

Plotted By: C. Gadberry
On: 03/26/2003 17:15:52

Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

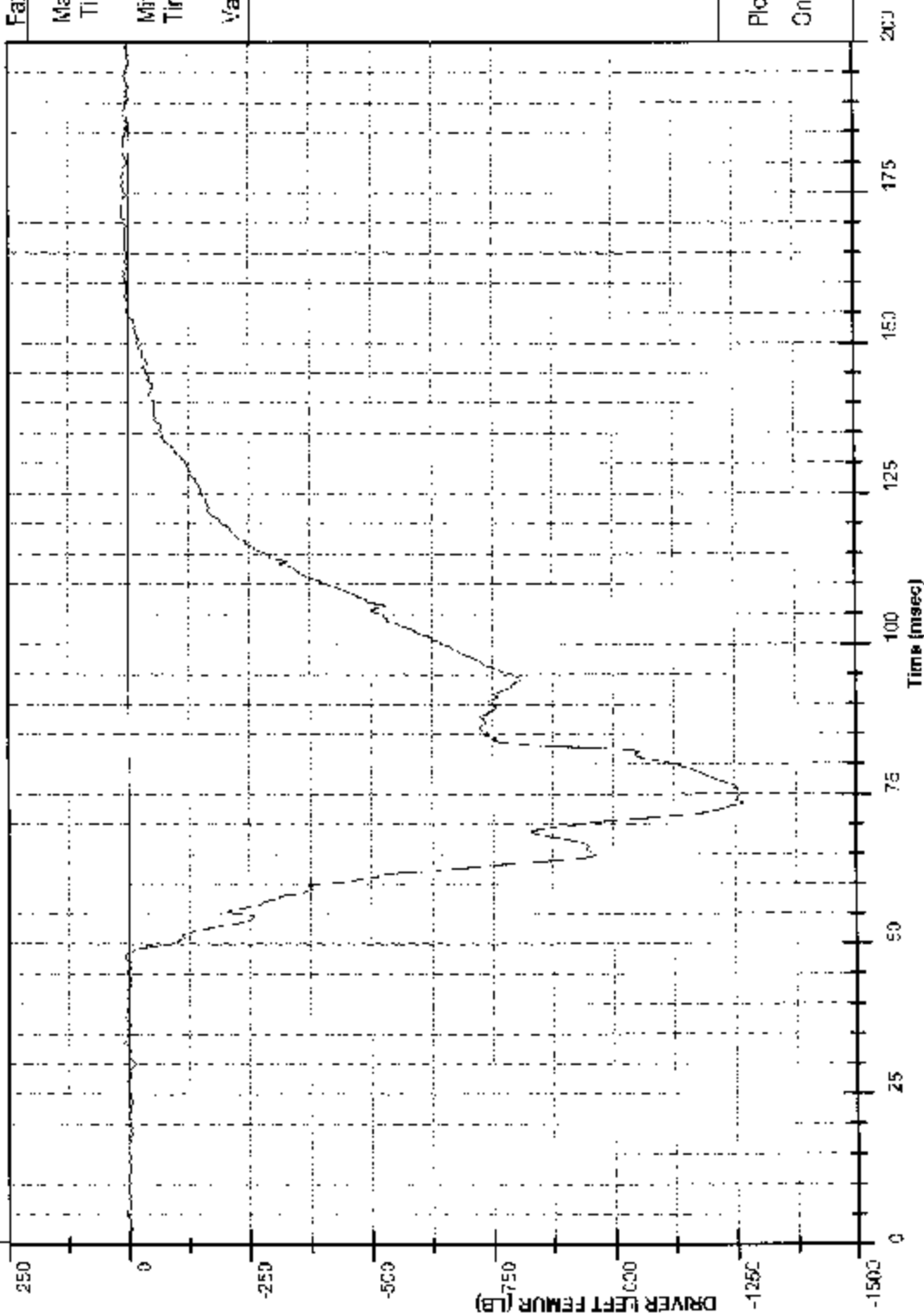
Test Date: 03/25/03

Chn Name: DRIVER LEFT FEMUR

CFC: 600

File Name: H03061FF.F08

Sensor S/N: 946



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: DRIVER RIGHT FEMUR

Q-C: 600

File Name: H03061FF.F09

Sensor S/N: 945

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Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 36.5 LB

Time: 171.3 msec

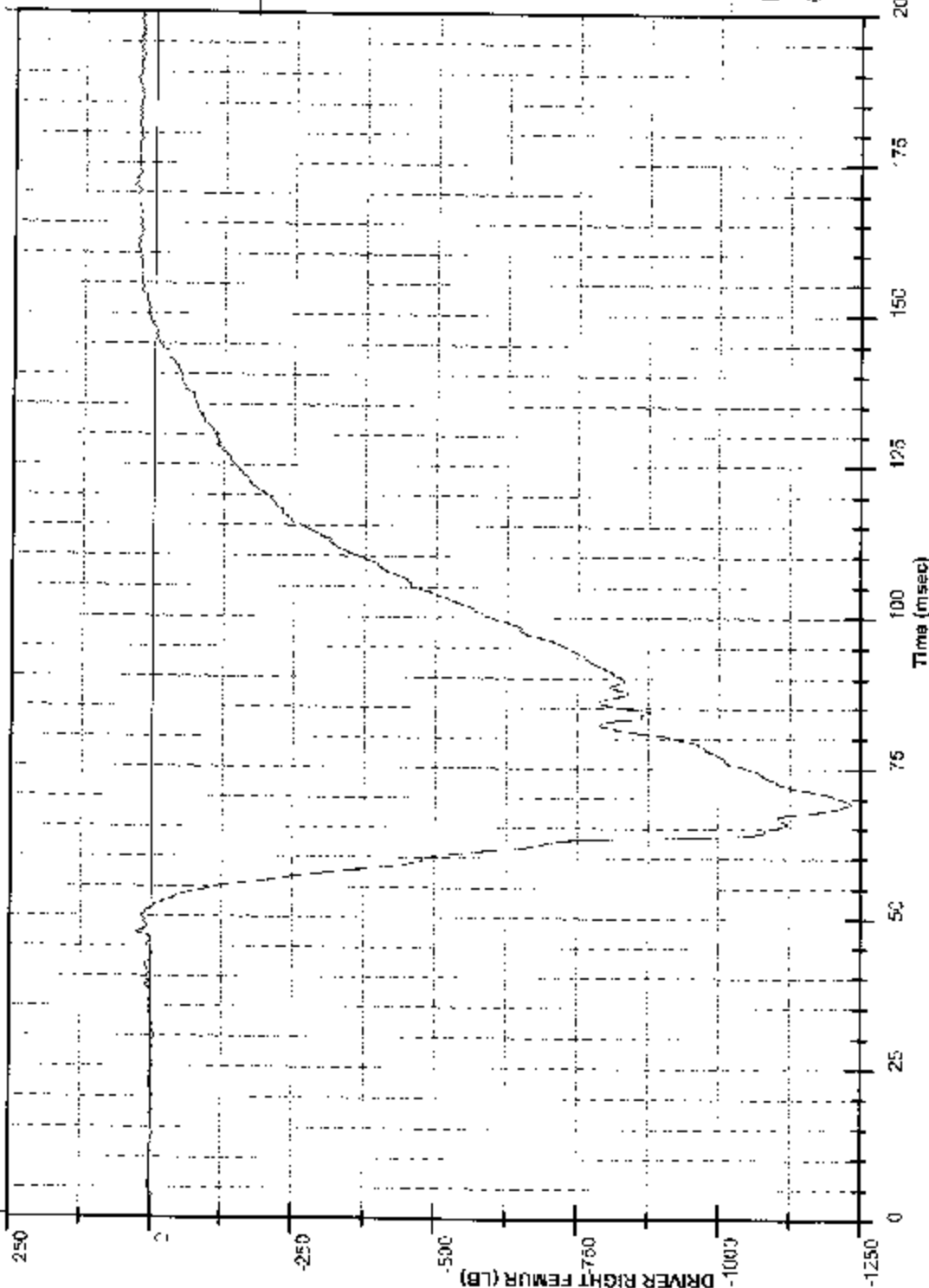
Minimum: -1,234.1 LB

Time: 69.1 msec

Value at TD: -1.3 LB

Plotted By: C. Gadberry

On: 03/26/2003 17:15:53



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER HEAD X

CFC: 1000

File Name: H03061AT.A24

Sensor S/N: AL6Y2

MGA Research Corp

Accelerator Seat Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2765

Fax #: 262-763-3634

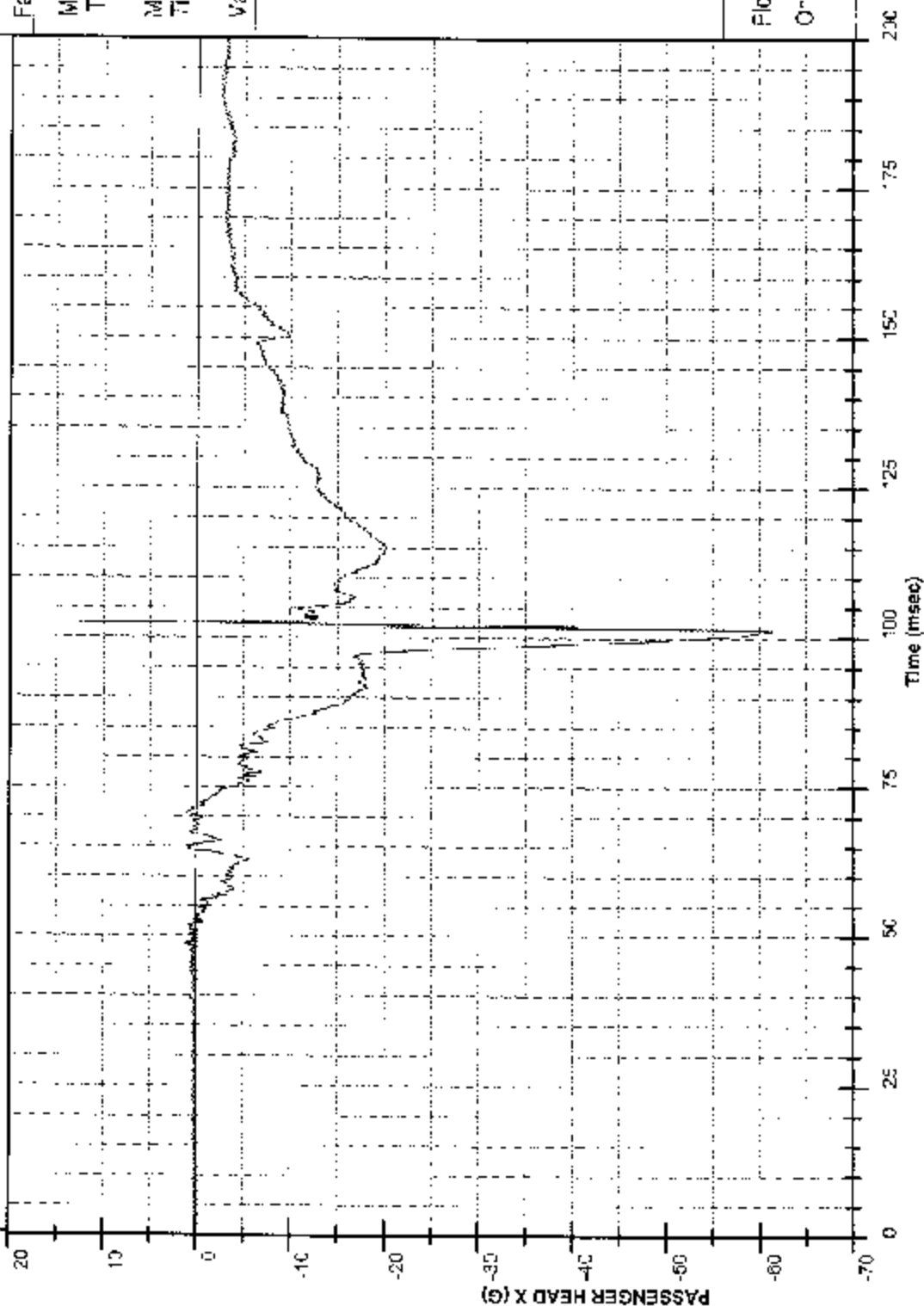
Maximum: 12.8 G
Time: 102.5 msec

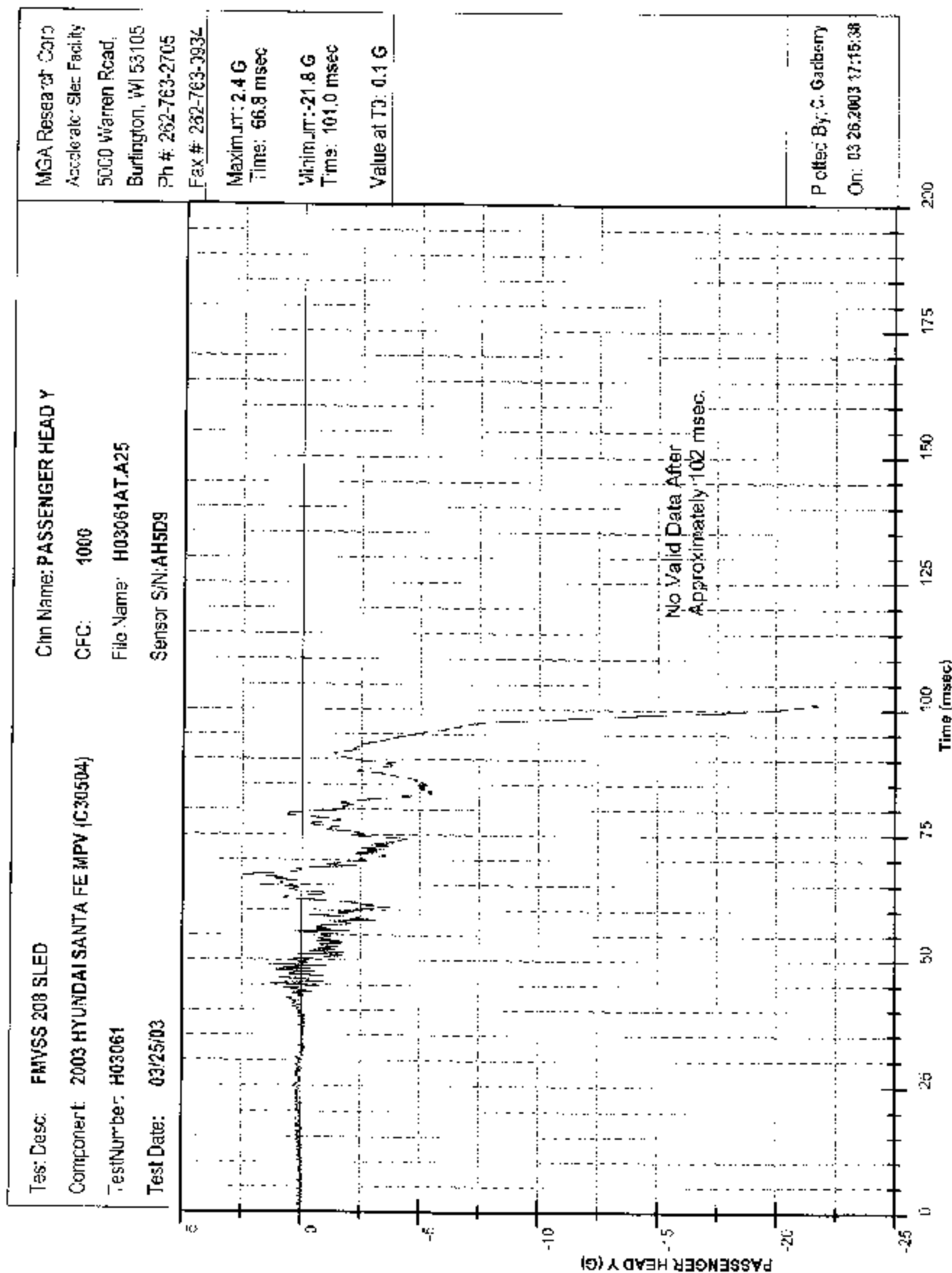
Minimum: -61.7 G
Time: 101.3 msec

Value at T0: -0.0 G

Plotted By: C. Gadberry

On: 03.26.2003 17:15:36





Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name PASSENGER HEAD Z

CFC: 1000

File Name: H03061AT.A26

Sensor S/N: AH5E5

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5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 36.2 G

Time: 99.5 msec

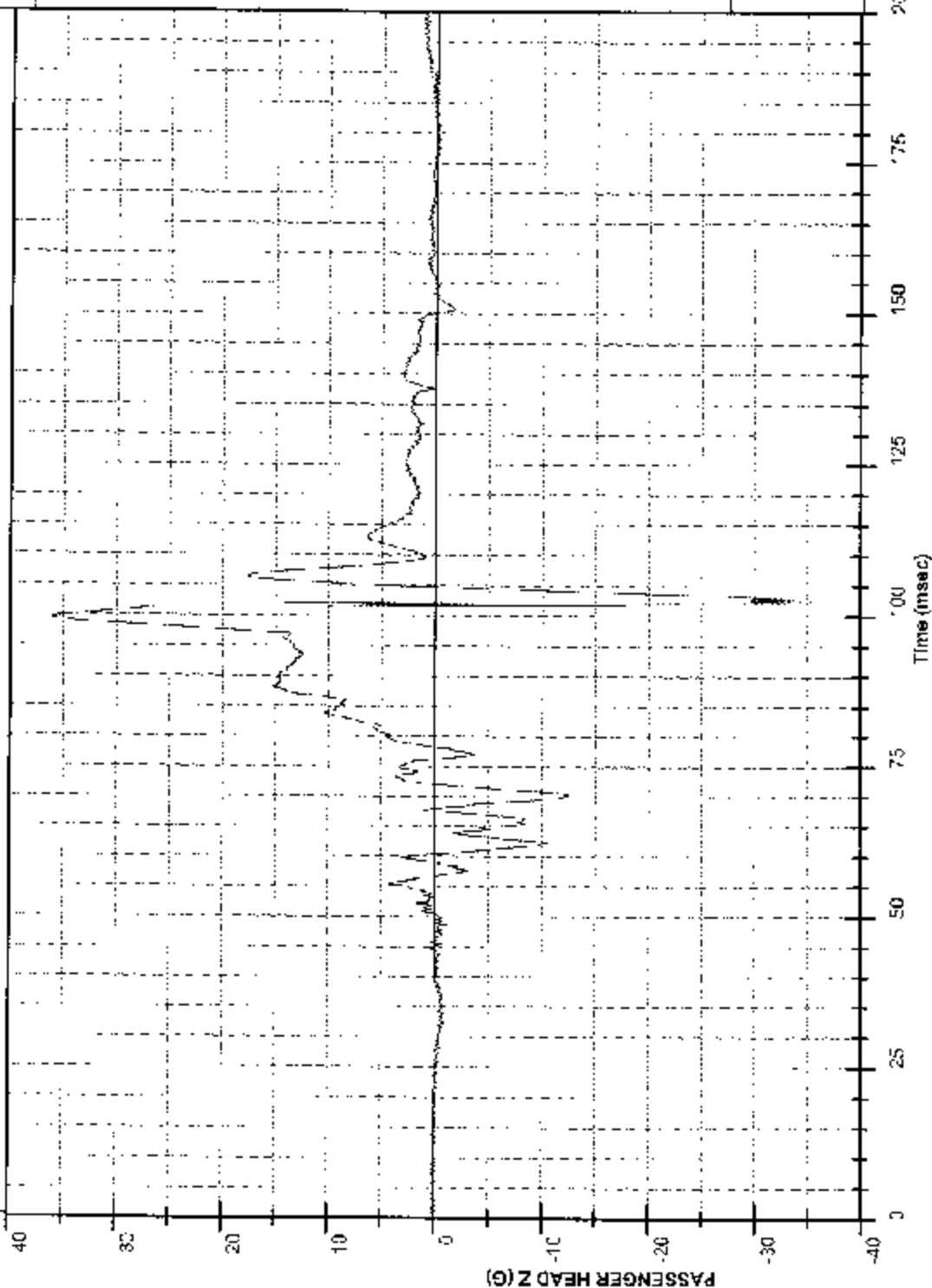
Minimum: -37.0 G

Time: 102.4 msec

Value at T0: 0.0 G

Plotted By: C. Gadberry

On: 03.26.2003 17:15:39



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chr Name: PASSENGER HEAD RESULTANT

CFC: 1000

File Name: H03061AV.A24

Sensor S/N: AH5E5

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Burlington, WI 53105
Ph #: 262-763-2705
Fax #: 262-763-0834

Maximum: 67.1 G
Time: 101.2 msec

Minimum: 0.1 G
Time: 0.0 msec

Value at T0: 0.1 G

HIC VAL: 31.7

T1: 85.4 msec

T2: 122.5 msec

HIC36 VAL: 101.7

T1: 86.5 msec

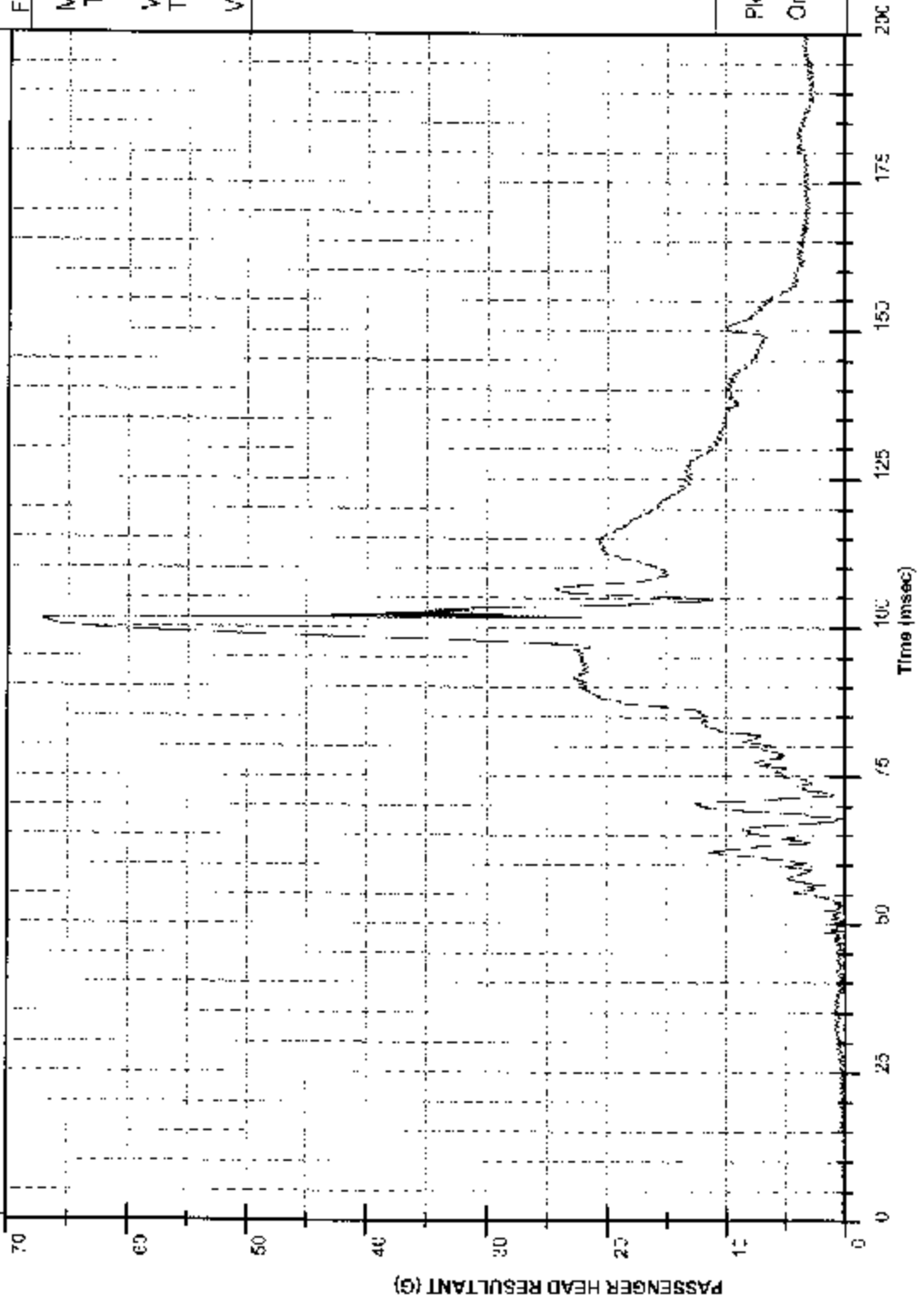
T2: 122.5 msec

HIC15 VAL: 94.3

T1: 97.7 msec

T2: 103.4 msec

Plotted By: C. Gadberry
On: 03/26/2003 17:15:45



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER NECK FX

CFC: 1000

File Name: H03061FT.F31

Sensor S/N: N253FX

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Burlington, WI 53105

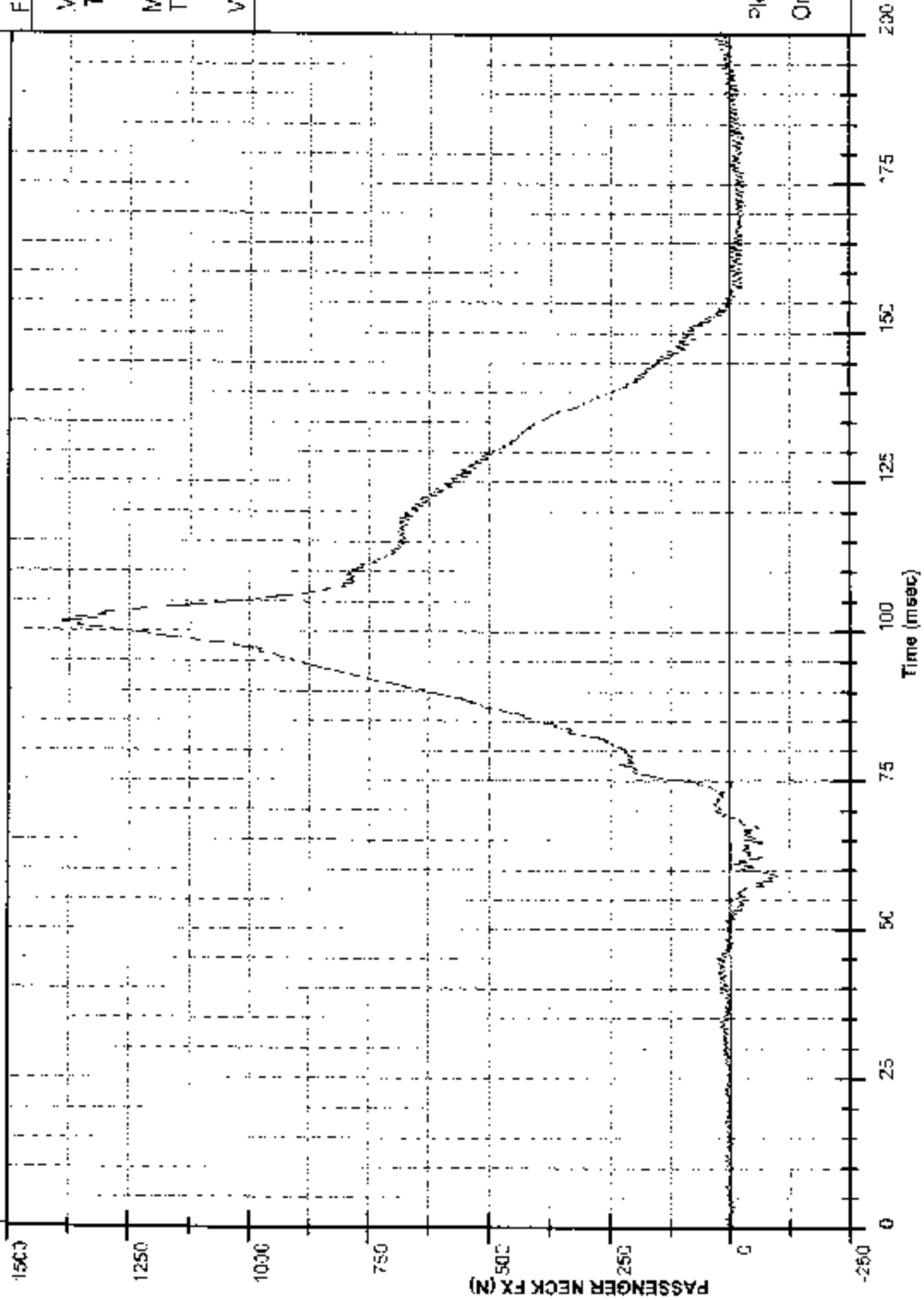
PT #: 262-763-2705

Fax #: 262-763-0834

Maximum: 1,388.6 N
Time: 101.5 msec

Minimum: -100.7 N
Time: 59.0 msec

Value at T0: 3.4 N



Plotted By: C. Gadberry

On: 03/26/2003 17:16:02

Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER NECK FY

CFC: 1000

File Name: H03061FT.F32

Sensor S/N: N253FY

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5000 Warren Road,

Burlington, W 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 378.8 N

Time: 115.7 msec

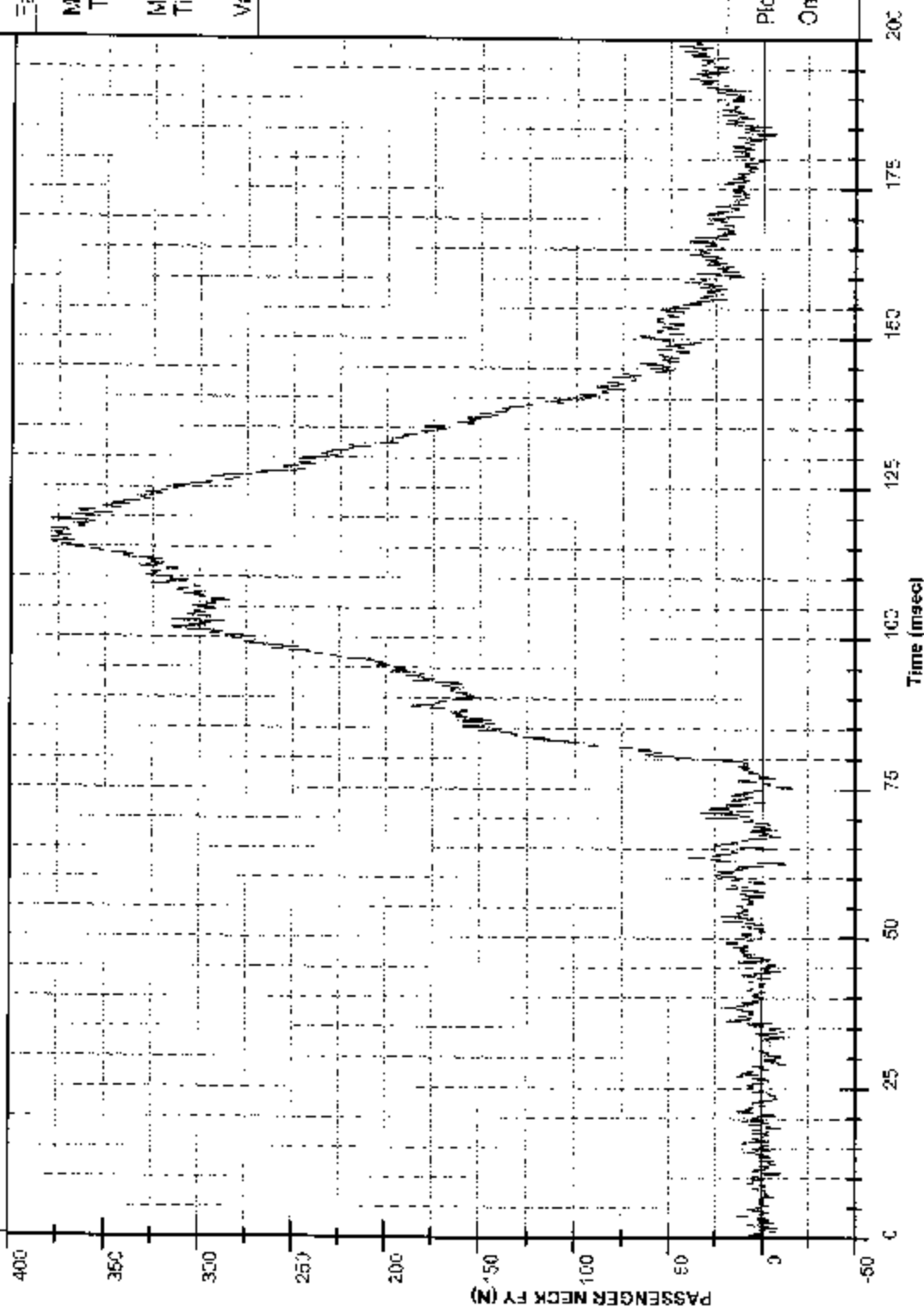
Minimum: -18.9 N

Time: 33.5 msec

Value at TC: -4.3 N

Plotted By: C. Gadberry

On: 03/26/2003 17:16:04



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER NECK FZ

CFC: 1000

File Name: H03061FT.F33

Sensor S/N: N253FZ

MGA Research Corp

Accelerator Sled Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

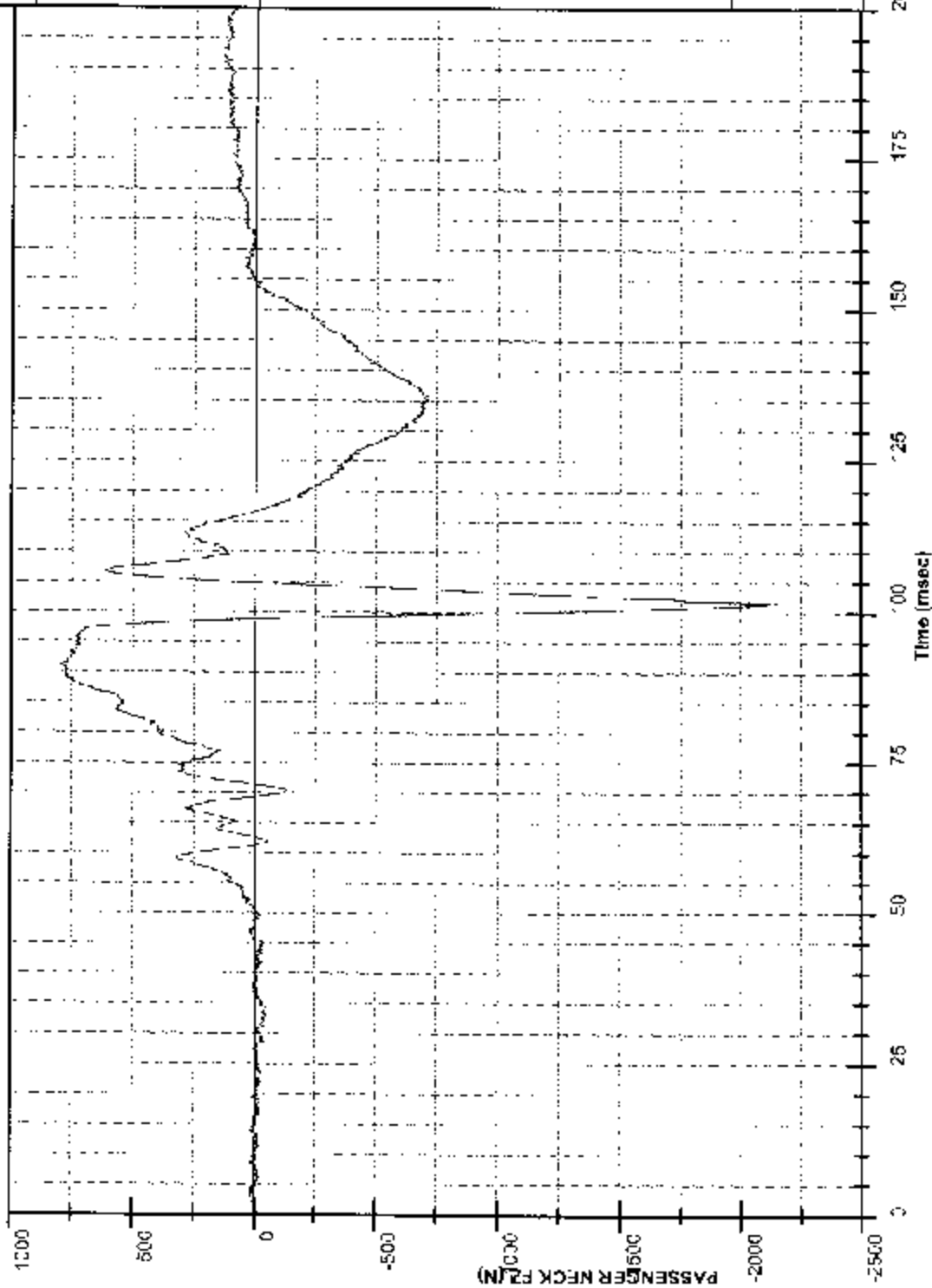
Maximum: 794.2 N
Time: 91.2 msec

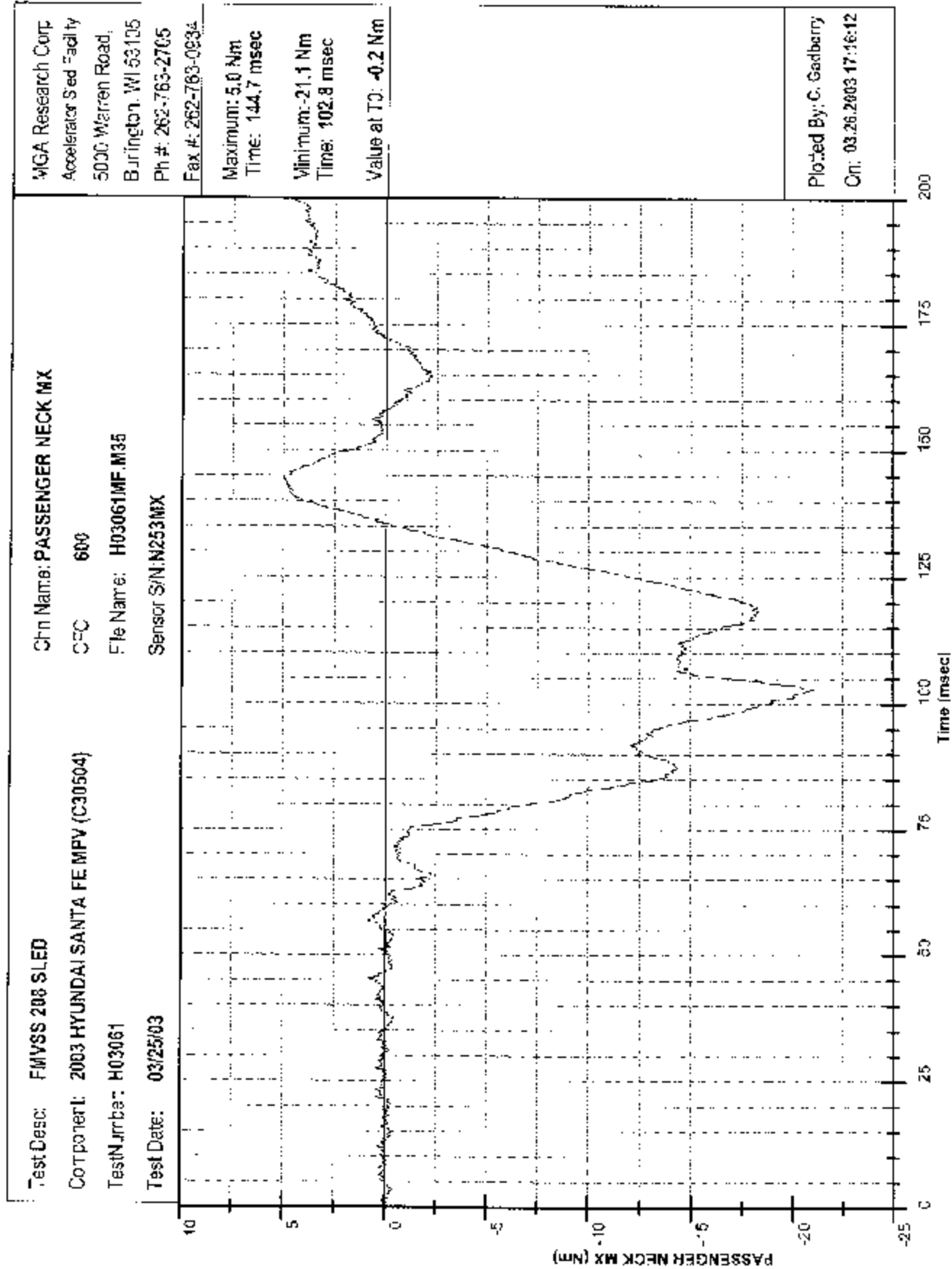
Minimum: -2,152.1 N
Time: 101.6 msec

Value at TC: -13.8 N

Plotted By: C. Gadberry

On: 03.26.2003 17:18:05





Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

C'm Name: PASSENGER NECK MY

CFC: 600

File Name: H03061MF.M36

Sensor S/N: N253MY

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Accelerator Spec Facility

5000 Warren Road,

Burlington, WI 53105

P.h #: 262-763-2705

Fax #: 262-763-0934

Maximum: 84.4 Nm

Time: 102.4 msec

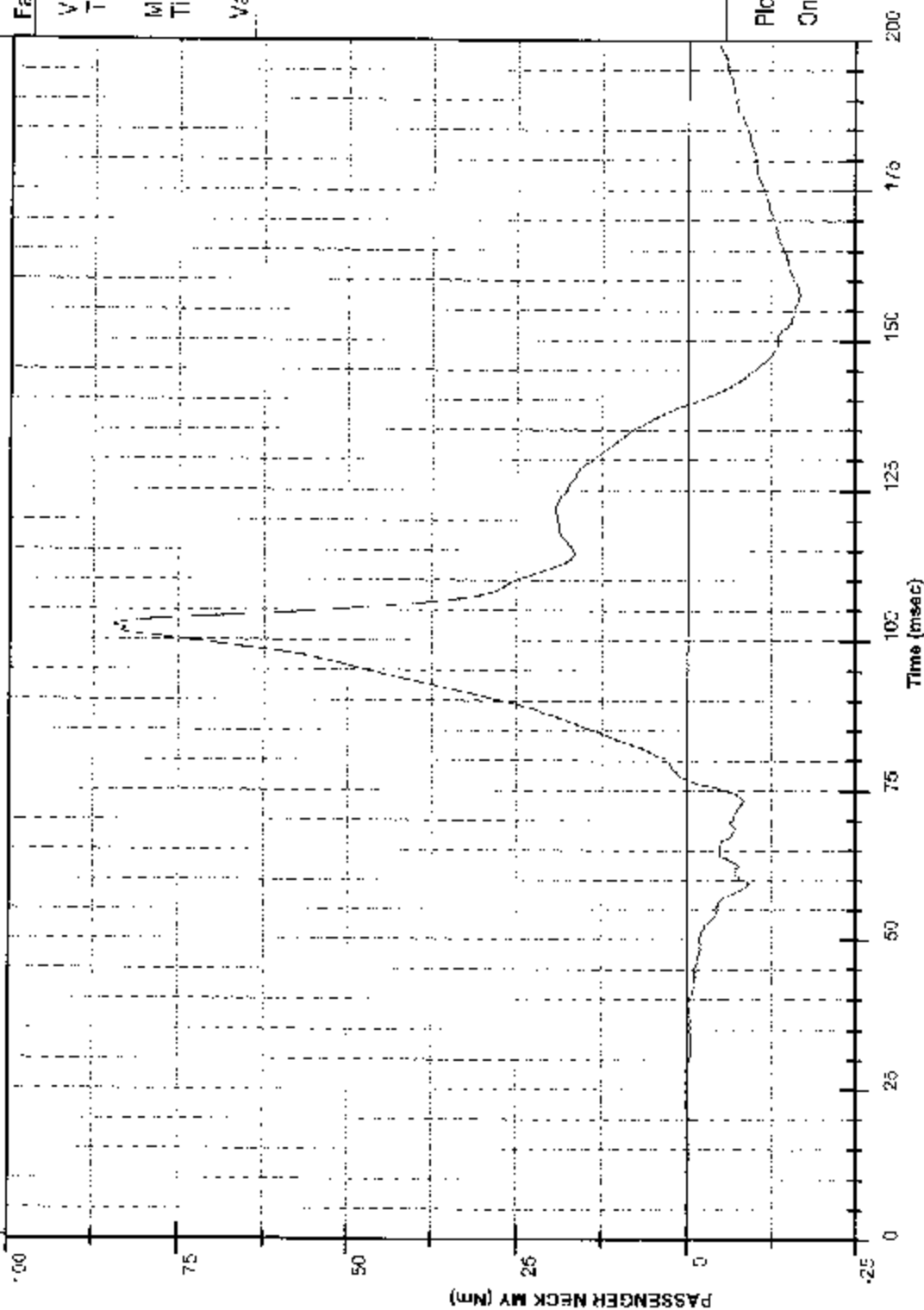
Minimum: -16.9 Nm

Time: 157.7 msec

Value at T0: 0.1 Nm

Plotted By: C. Gadberry

On: 03/26/2003 17:15:13



Test Desc: FMYSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chr Name: PASSENGER NECK MZ

CFC: 600

File Name: H03061MF.M37

Sensor S/N: N253MZ

MGA Research Corp

Accelerator Spec Facility

5000 Warren Road

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 23.9 Nm

Time: 127.7 msec

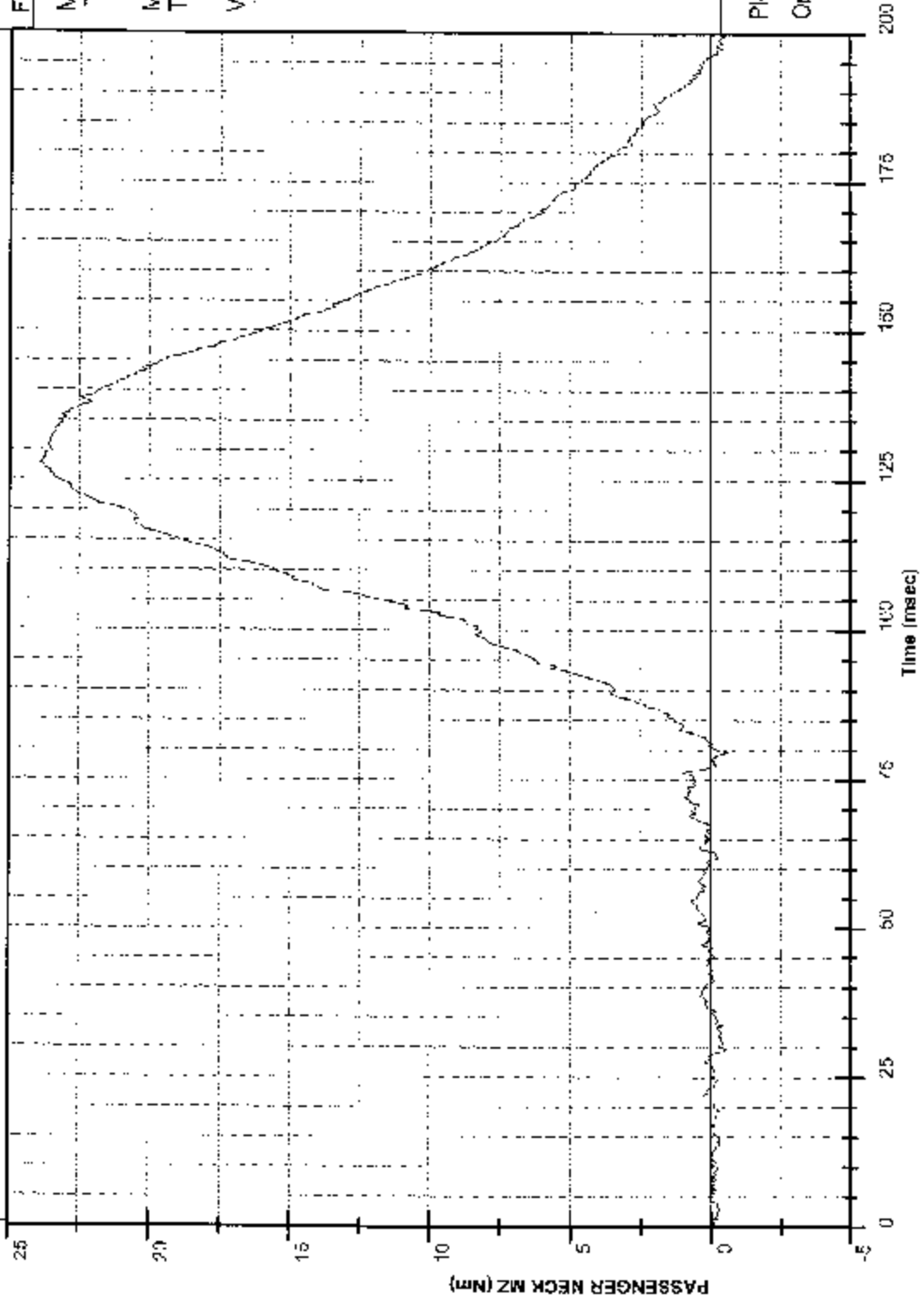
Minimum: -0.6 Nm

Time: 79.7 msec

Value at T0: -0.0 Nm

Plotted By: C. Gadberry

On: 03/26/2003 17:16:15



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER OCCIPITAL CONDYLE MY

CFC: 600

File Name: H03061MO.M36

Sensor S/N: H253MY

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Accelerator Sled Facility

5000 Warren Road,

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Ph #: 262-763-2705

Fax #: 262-763-1934

Maximum: 60.7 Nm

Time: 102.5 msec

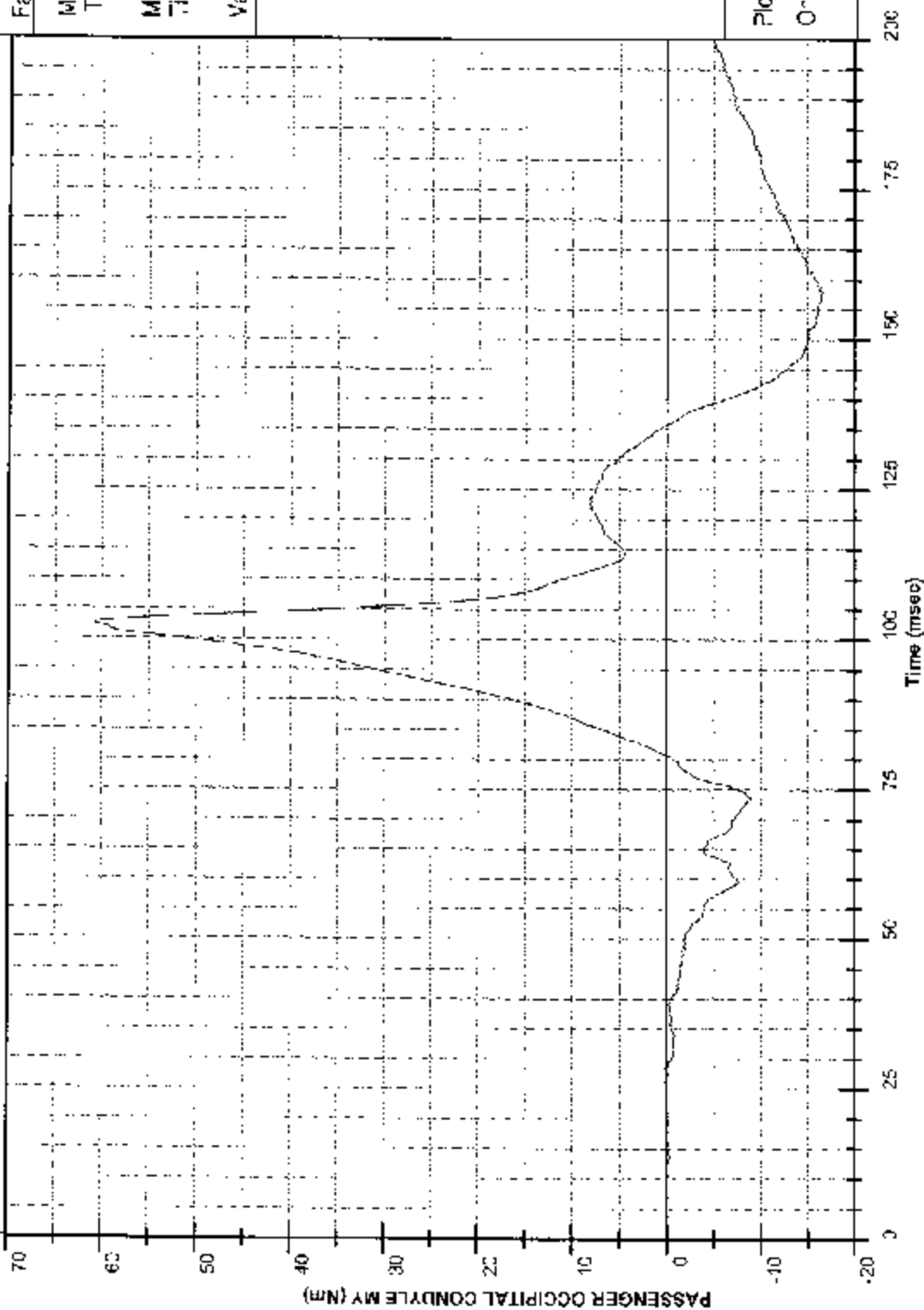
Minimum: -16.6 Nm

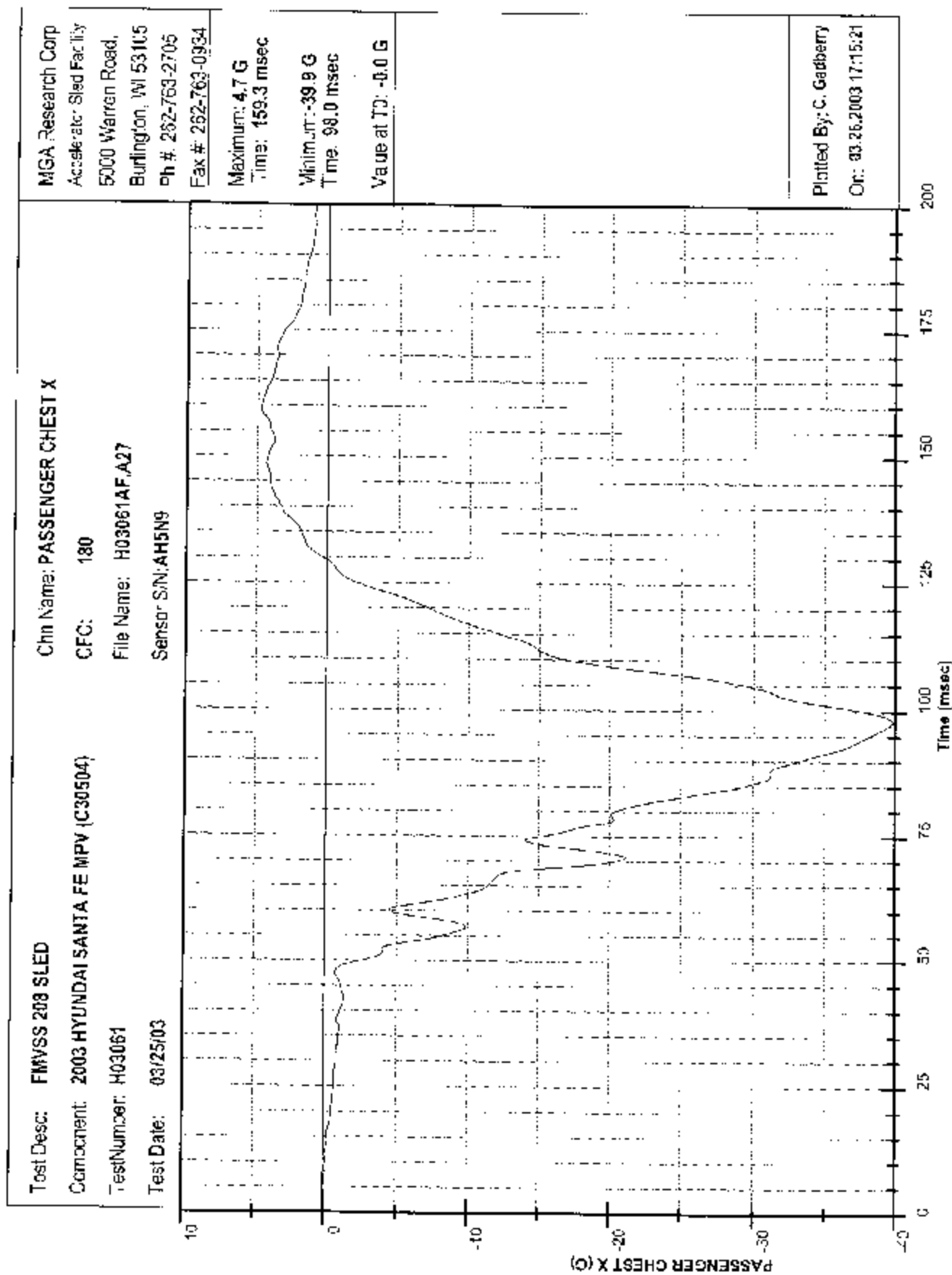
Time: 157.9 msec

Value at T0: 0.0 Nm

Plotted By: C. Gadberry

On: 03/26/2003 17:16:19





Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER CHEST Y

CFC: 180

File Name: H03061AF.A28

Sensor: S/N: AGH11

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Ph #: 262-763-2705

Fax #: 262-763-0934

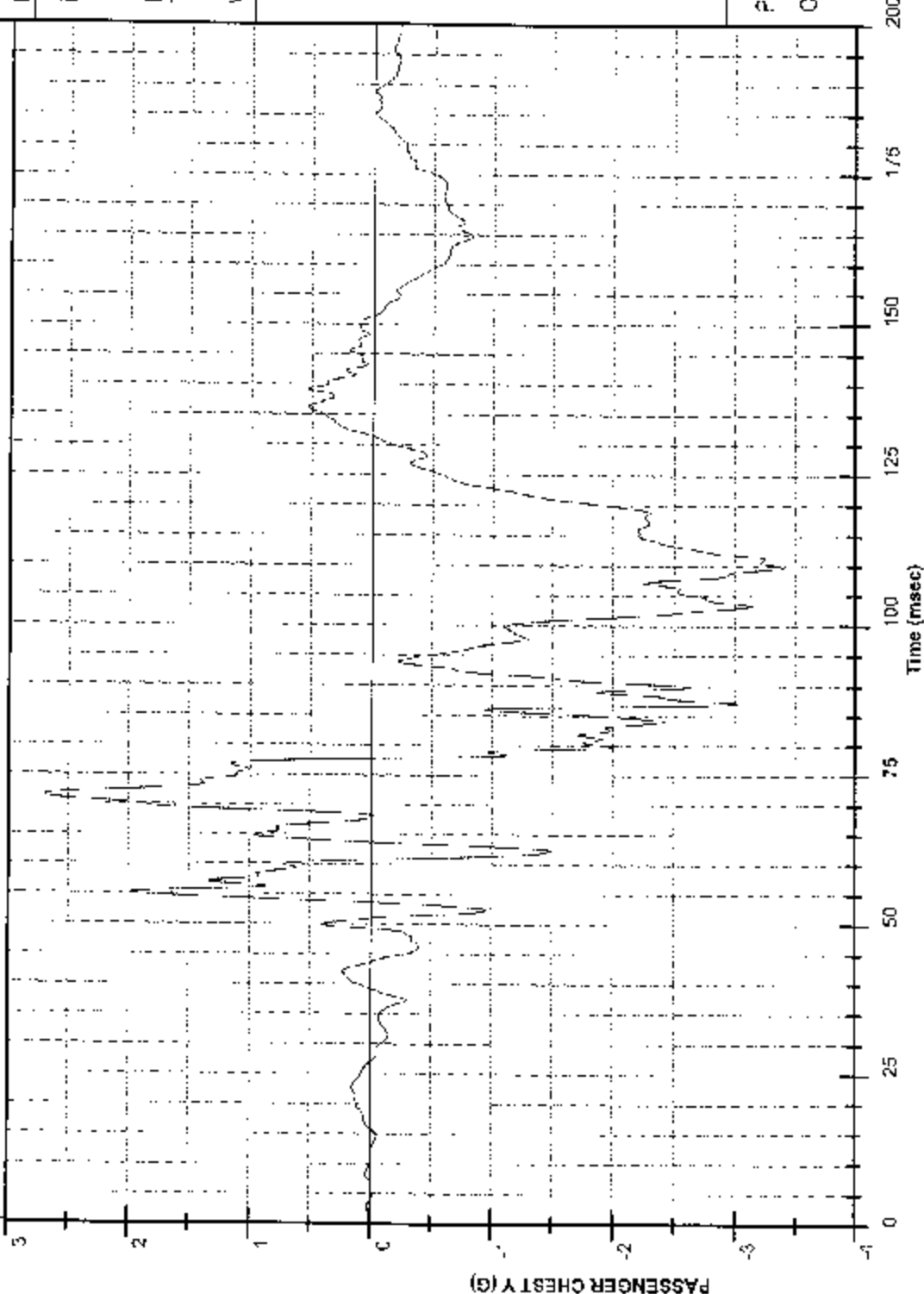
Maximum: 2.7 G
Time: 71.3 msec

Minimum: -3.4 G
Time: 109.8 msec

Value at T0: -0.0 G

Plotted By: C. Gadberry

On: 03.28.2003 17:15:22



Test Desc: FMYSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER CHEST Z

CFC: 180

File Name: H03061AF.A29

Sensor S/N: AGH51

MGA Research Corp

Accelerator Sled Facility

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Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 24.6 G

Time: 101.2 msec

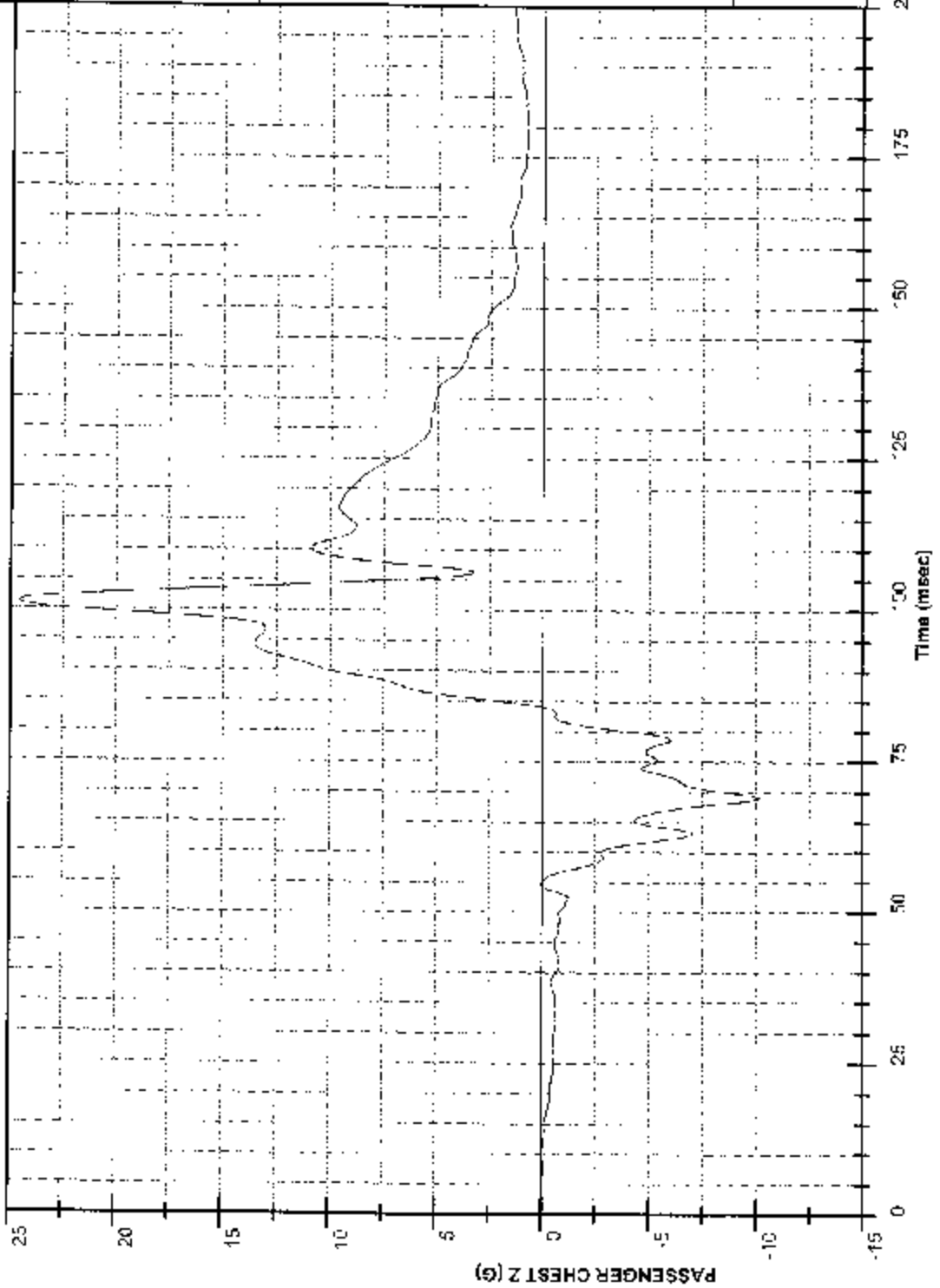
Minimum: -10.2 G

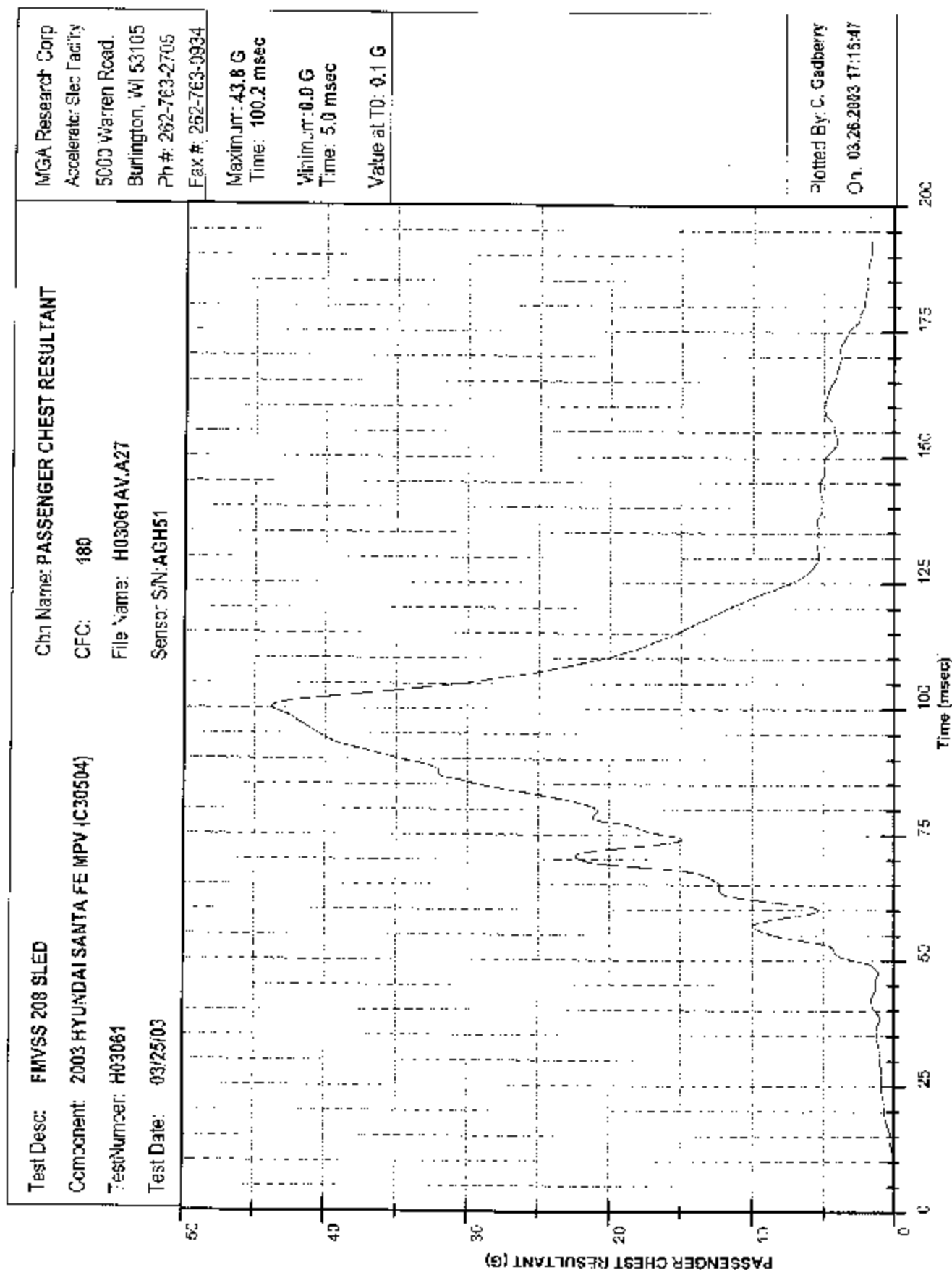
Time: 69.0 msec

Value at T0: -0.1 G

Plotted By: C. Gadberry

On: 03.26.2003 17:15:24





Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chn Name: PASSENGER CHEST DISPLACEMENT

C=C: 600

File Name: H03061DF.D39

Sensor S/N: D403DX

WGA Research Corp

Accelerator Sled Facility

5003 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

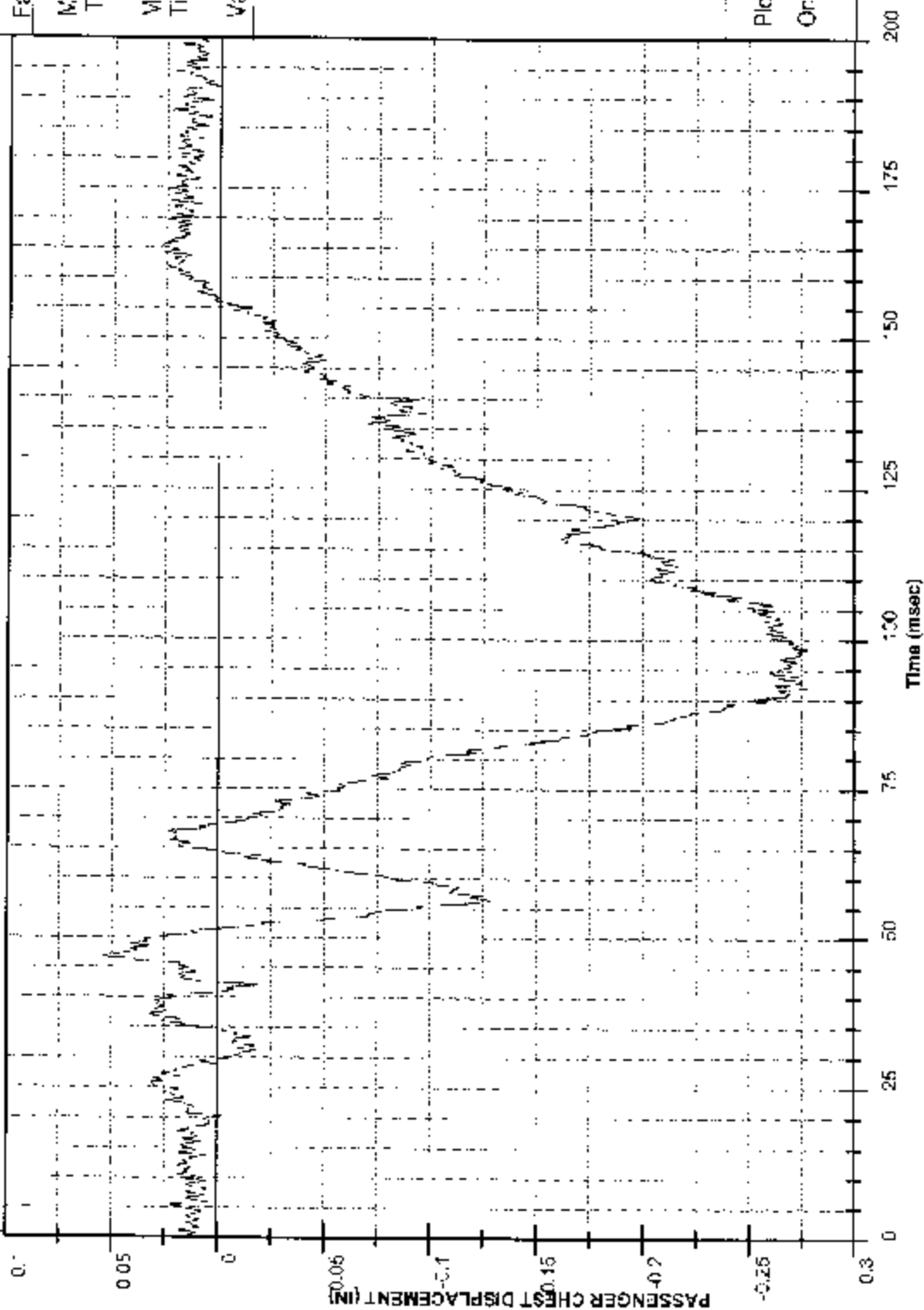
Fax #: 262-763-3934

Maximum: 0.1 IN
Time: 46.8 msec

Minimum: -0.3 IN
Time: 98.4 msec

Value at TC: -0.0 IN

Plotted By: C. Gadberry
On: 03.26.2003 17:15:50



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Chr Name: PASSENGER LEFT FEMUR

CFC: 600

File Name: H03061FF.F41

Sensor S/N: 19428

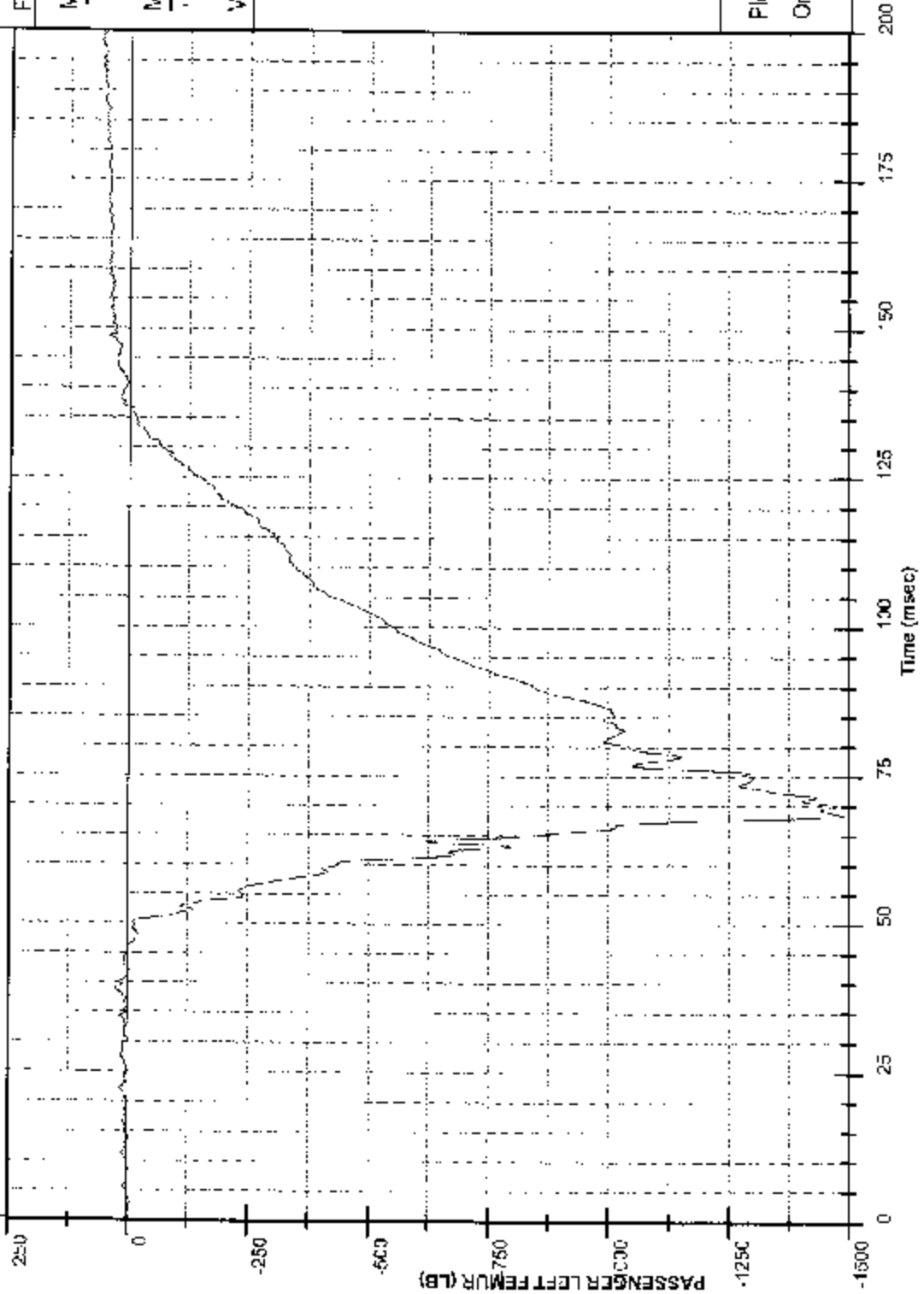
MGA Research Corp
Accelerator Sled Facility
5000 Warren Road,
Burlington, WI 53105
Ph #: 262-763-2765
Fax #: 262-763-0934

Maximum: 62.1 LB
Time: 198.3 msec

Minimum: -1,491.0 LB
Time: 68.4 msec

Value at T0: 3.5 LB

Plotted By: C. Gadberry
On: 03/26/2003 17:15:55



Test Desc: FMVSS 208 SLED

Component: 2003 HYUNDAI SANTA FE MPV (C30504)

Test Number: H03061

Test Date: 03/25/03

Ctn Name: PASSENGER RIGHT FEMUR

CFC: 600

File Name: H03061FF.F42

Sensor S/N: 9427

MGA Research Corp

Accelerator Seat Facility

5000 Warren Road,

Burlington, WI 53105

Ph #: 262-763-2705

Fax #: 262-763-0934

Maximum: 47.7 LB

Time: 172.0 msec

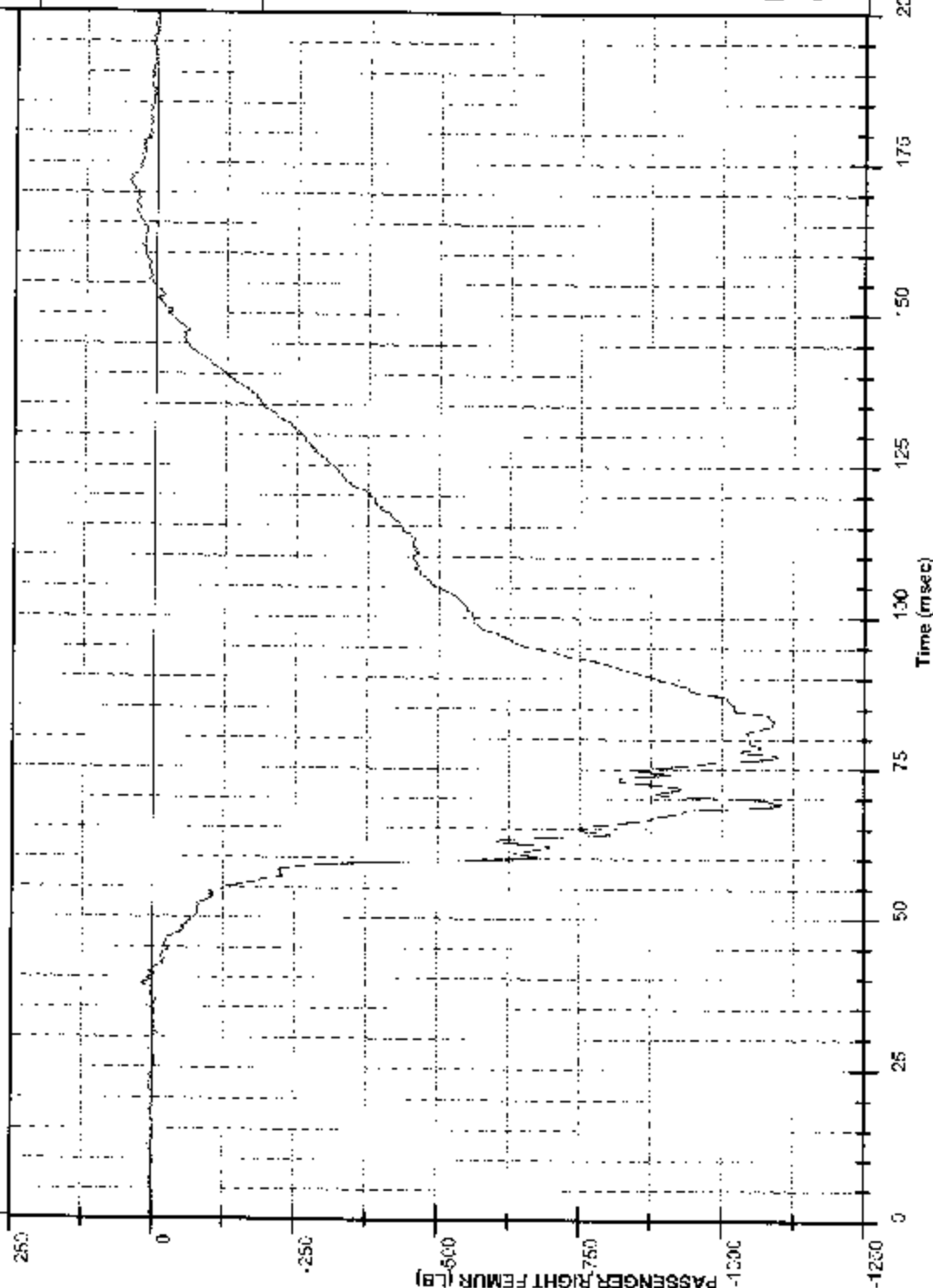
Minimum: -1,105.8 LB

Time: 69.1 msec

Value at T0: 0.2 LB

Plotted By: C. Gadberry

On: 03/28/2003 17:15:56



APPENDIX C
MANUFACTURER'S VEHICLE INFORMATION

TEST VEHICLE INFORMATION

Vehicle Model Year and Make: 2002 MY / Hyundai Motor Company
 Vehicle Model and Body Style: SANTA FE / Hatch Back

1. NOMINAL DESIGN RIDING POSITION –

For adjustable driver and passenger seat backs, describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable.

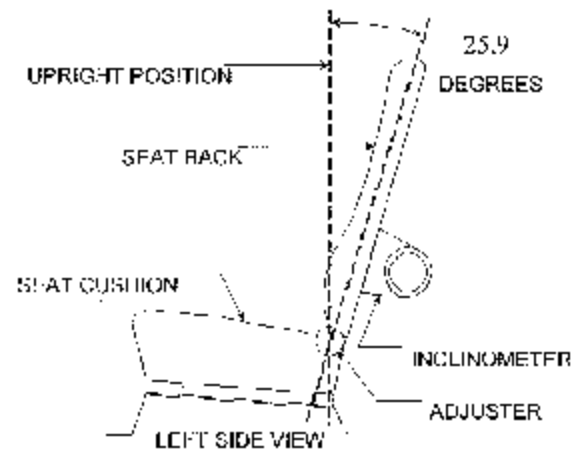
Seat back angle for driver's seat = 25.9 °.

Measurement Instructions: Seat back angle is measured along rear edge of metal seat back frame from the vertical line as shown in attached drawing. Position can also be located with back adjusted to the 5th latch position from the initial lock position.

* Power Seat: *

Seat back angle for passenger's seat = 25.9 °.

Measurement Instructions:



2. SEAT FORE AND AFT POSITIONS –

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Position of the driver's seat:

Adjustable driver's seat position is the 12th lock position from the fore 1st lock position

Position of the passenger's seat (if applicable):

3. ADJUSTABLE UPPER ANCHORAGE POSITION (Note application --)

Adjustable upper anchorage position is 2nd lock position from the top 1st lock position

4. STEERING COLUMN ADJUSTMENTS –

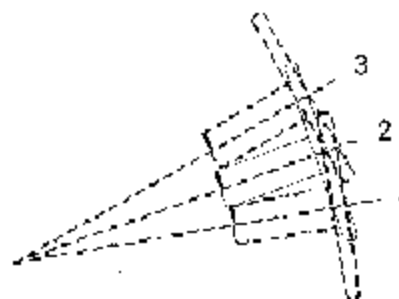
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

Steering wheel can be located at midpoint. The angles for full range of driving position between position 1 and position 3 divided by two makes midpoint position 2 angles. Steering wheel angle is 62 ° and Steering column angle is 28 ° from the horizontal line.

STEERING COLUMN ASSEMBLY



LEFT SIDE VIEW

5. FUEL TANK CAPACITY DATA –

- 5.1 A. "Usable Capacity" of standard equipment fuel tank = 17.2 gallons.
 B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.
 C. Capacity used when certification testing to requirements of FMVSS 301 = 16.0 gallons.

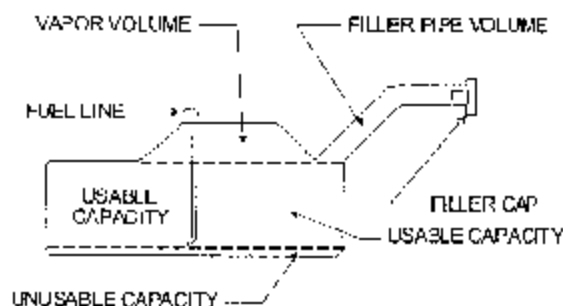
Operational Instructions:

Operate vehicle engine to "Run Dry" condition.

Add 93% of the Stoddard solvent of usable capacity

To vehicle fuel tank.

VEHICLE FUEL TANK ASSEMBLY



- 5.2 Amount of Stoddard solvent added to vehicle for certification test = 16.0 gallons.

- 5.3 Is vehicle equipped with electric fuel pump? ☐ YES ☐ NO

If YES, does pump normally operate when vehicle's electrical system is activated?

☐ YES ☐ NO

6. SEATING REFERENCE POINT (SRP) –

Provide drawing which shows the driver's SRP location.

Refer to drawing "DRIVER SRP".

7. FUEL TANK LOCATION –

Provide drawing which shows the undercarriage view of the vehicle.

Refer to drawing "FUEL TANK LOCATION".

Attachment 1: 03MY SM FMVSS 208 Compliance Test Information

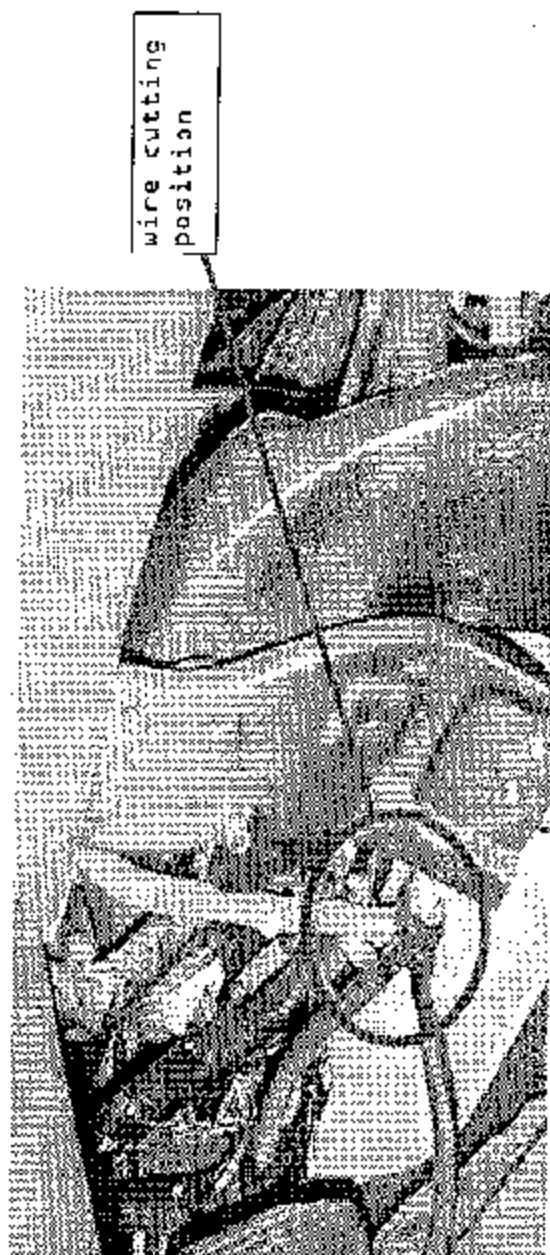
No.	Paraphrased NHTSA Questions	Information																																								
1	Under which option in the subject vehicle Provide copies of test reports.	671.208 § 4.3.2.1 First Option 30 mph Frontal & oblique Test & SLED test report - 30 mph LH Oblique : LSASN-00046 (00-3/18) : See Attachment 2-1 - 30 mph RH Oblique RH : LSASN-00055 (00-4/18) : See Attachment 2-2 - Frontal : LSASN-00039 (00-3/03) : See Attachment 2-3 - SLED : LSASN-00121 (00-5/17) : See Attachment 2-4																																								
2	(1) What are the differences between 2002MY and 2003MY A/Bag System?	<table border="1"> <tr> <td>PAB</td><td>- BAG VENT HOLE DIAMETER : 40mm</td><td>- BAG VENT HOLE DIAMETER : 45mm</td></tr> <tr> <td>SAB</td><td>Not Installed</td><td>- New: HEAD & THORAX TYPE</td></tr> <tr> <td></td><td></td><td>- INFLATOR : HYBRID</td></tr> <tr> <td>Belt</td><td>- PRE-TENSIONER (LOAD LIMITER (4.0kn))</td><td>PRE-TENSIONER (LOAD LIMITER (5.5kn))</td></tr> </table> (2) explain what other restraint change <table border="1"> <tr> <td>1</td><td>EP110001</td><td>2002-08-10</td><td>Buckle stem and wire length</td></tr> <tr> <td>2</td><td>EP130673</td><td>2001-11-20</td><td>Height adjuster bolt change</td></tr> <tr> <td>3</td><td>EP120015</td><td>2002-11-26</td><td>PT TTF shortened by 2-3 ms</td></tr> <tr> <td>4</td><td>EP111272</td><td>2002-05-02</td><td>Reinforce outer plate type changes Material change for steel material changed</td></tr> <tr> <td>5</td><td>EP120440</td><td>2002-08-09</td><td>Crash pad material changed</td></tr> <tr> <td>6</td><td>EP111507</td><td>2002-06-21</td><td>Door core size changed</td></tr> <tr> <td>7</td><td>EP120600</td><td>2002-10-02</td><td>Vent hose size changed (40mm > 45mm) Load limiter load changed (4.0 kn > 5.5 kn)</td></tr> </table>	PAB	- BAG VENT HOLE DIAMETER : 40mm	- BAG VENT HOLE DIAMETER : 45mm	SAB	Not Installed	- New: HEAD & THORAX TYPE			- INFLATOR : HYBRID	Belt	- PRE-TENSIONER (LOAD LIMITER (4.0kn))	PRE-TENSIONER (LOAD LIMITER (5.5kn))	1	EP110001	2002-08-10	Buckle stem and wire length	2	EP130673	2001-11-20	Height adjuster bolt change	3	EP120015	2002-11-26	PT TTF shortened by 2-3 ms	4	EP111272	2002-05-02	Reinforce outer plate type changes Material change for steel material changed	5	EP120440	2002-08-09	Crash pad material changed	6	EP111507	2002-06-21	Door core size changed	7	EP120600	2002-10-02	Vent hose size changed (40mm > 45mm) Load limiter load changed (4.0 kn > 5.5 kn)
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2	(3) Explain changes that affect FMVSS 208 per (4) describe features that may affect performance with respect to children	1. PAB BAG VENT HOLE change (40mm→45mm) 2. S/BELT LOAD LIMITER change (4.0kn→5.5kn) 3. PT TTF (2-3ms) None.																																								
3	If meet S12, describe how to disconnect air bags from vehicle sensors and connect to test sensors for airways with dual stage or multi-stage	(1) See attachments 4 - A/Bag disconnect & triggering mechanism in sled test. (2) Dual & Multi stage : N/A																																								
4	For vehicle certified to AAD requirements	Not certified to AAD.																																								

NO.	Paraphrased NHTSA Question	Information
6	State if equipped with tension-relieving device	Not equipped with TRD
7	State whether windows or vents open	Front and rear LH/RH windows open for all tests
7	Submit dummy measurements, etc.	(1) See attachments 2-6 through 2-4 - At 16.08.93 page reference
8	For vehicles certified to AAB	Not certified to AAB.
9	For vehicles certified to AAB suppression	Not certified to AAB.
10	Footrest for driver?	Drivers side footrest installed.
11	Provide seat positioning, steering column posi	- see attachment 4 : NHTSA form - see attachment 5-1 : S/Back angle - see attachment 5-2 : Seat Track Position - see attachment 5-3 : Seat 'R' joint - see attachment 5-4 : Fuel Tank Location
12	For vehicles certified to low risk deployment sections of AAB	Not certified to AAB
13	If equipped with adjustable anchorages	- See attachment 5-5 : S/Belt Lower Anchorage Position
14	Summary of other test results	1) NCAP : DRIVER (★★★★) / PASSENGER (★★★★) -- U.S. KARC0, '00.11 2) NCAP : DRIVER (★★★★) / Passenger (★★★★) -- U.S. KARC0, '01.1 3) OFFCAP : GOOD -- U.S. 11MS, 02.P/PP
15	Part Removal recommendation, what priority	no recommended removal - Priority order if necessary: 1) Jack & Jack stand 2) RR combination lamp ASSY 3) Spare tire (Temporary tire)
16	If use pressure vessel to inflate air bag	- N/A

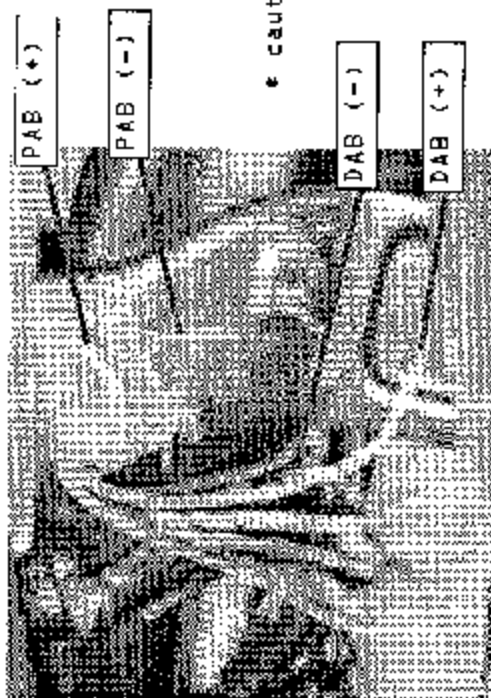
NO.	Paraphrased MNTA Questions	Information
17	If vehicle use explosive device ...	- see attachment 6 : DOT No. EX-9304310

Question E-1:

Answer) Air bag ECU and wires are on the center floor. So there needs to disassemble the console. First remove the knob of transmission handle to pull out the console. (2 screws at the front side of the knob) Then unscrew the center console mounting screws in the left and right side of it while moving the seat. (6 screws) Then the console can be removed by hand. The air bag ECU and wires (covered yellow tube) connected from the ECU to the air bags can be seen. Cut the wires. (See picture 2)
Connect the DAB and FAE wires to the air bag triggering system. (See wire color code:



< Line color code >



PAB(+) : YELLOW
 PAB(-) : PINK
 DAB(-) : GRAY
 DAB(+) : WHITE

* caution: Do not use all colors wire with solid black line.

Question 3-2)

answer) We used YDMA (Japan) air bag ignition system to trigger air bags. It consists of signal input feature (receiving time zero signal), time delaying feature (to trigger the air bags at expected time), and current output feature (to trigger the air bags). The time zero signal comes from the defined acceleration level of the sled pulses. The time of time zero signal can be selected at 0.5 G's and the signal initializes both the data acquisition system and the air bag trigger system simultaneously. So if the delaying time set at 20 ms then the output current triggers the air bags 20 ms after the time zero. We set the current by 4 ampere and the current duration by 100 millisecond.