

REPORT NO. 208-MGA-2002-008

SAFETY COMPLIANCE SLED TESTING FOR FMVSS 208
OCCUPANT CRASH PROTECTION

Toyota Motor Manufacturing, Kentucky, Inc
2002 Toyota Avalon 4 Door
NHTSA NO. C25109

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date May 22, 2002

Report Date May 30, 2002

FINAL REPORT

Prepared For
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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OFFICE OF VEHICLE SAFETY COMPLIANCE
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15 Supplementary Notes			
16 Abstract A compliance test (sled test) was conducted on the subject 2002 Toyota Avalon 4 Door 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 The driver neck extension (moment y about the occipital condyle) of 65 Nm exceeded the maximum of 57 Nm allowed by FMVSS 208, S13 2			
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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 2002 Toyota Avalon 4 Door, NHTSA No C25109, 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 May 22, 2002

The test vehicle, a 2002 Toyota Avalon 4 Door, NHTSA No C25109, did not appear to comply with all of 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 #340)	Passenger (Serial #312)
HIC	1000	120*	269
Chest g	60 g	36.3 g	46.6 g
Chest displacement	3 in	1.4 in	0.3 in
Left Femur	2250 lb	1535 lb	1099 lb
Right Femur	2250 lb	1409 lb	904 lb
Neck Extension	57 Nm	64.7 Nm	14.4 Nm
Neck Flexion	190 Nm	21.6 Nm	66.8 Nm
Neck Tension	3300 N	1348 N	766 N
Neck Compression	4000 N	535 N	841 N
Neck Shear	3100 N	708 N	1736 N

* There was no Head Y data after 166 ms. The HIC of 120 occurred between 94 and 130 ms

The driver neck extension exceeded the allowable limit. The vehicle 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 18.0 g with an integrated velocity change of 29.8 mph. After filtering the acceleration signal to Channel Class 60, the airbag system was triggered 21.0 milliseconds after 0.5 g acceleration.

Test Anomalies

The airbag warning label on the dash was removed prior to receiving the vehicle. It is not known whether the label was removed by the dealer, by a potential customer, or not installed at all.

There was no Head Y data after 166 ms. The HIC of 120 occurred between 94 and 130 ms.

Sled Test Summary

Vehicle NHTSA No C25109 Test Mode FMVSS 208 SLED TEST

Vehicle Yr/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Test Date: May 22, 2002 Time 12 45 p m Temp 71°F

Vehicle Test Weight 3890 lbs.

DUMMY INFO.

DRIVER

PASSENGER

Dummy Type

Part 572E

Part 572E

Serial Number

340

312

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/windshield

Airbag/sunvisor

Chest

Airbag/steering wheel

Airbag

rim

Left Knee

Knee bolster

Glove box

Right Knee

Knee bolster

Glove box

General Test And Vehicle Parameter DataVehicle Yr/Make/Model/Body Style 2002/Toyota/Avalon/4 DoorVehicle NHTSA No C25109 VIN 4T1BF28B92U244424 Color Silver

Engine Data

No Cylinders 6, CID , Liters: 3.0, CCs Placement Longitudinal/Inline , Transverse/Lateral X

Transmission Data

Speeds 4, Manual , Automatic X, 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 XPwr Dr Locks X, Other Power seats, tilt wheel, cruise control, rear defoggerDate Received 4/18/02, Odometer Reading 42 milesSelling Dealer Wilde Toyota, 3225 S 108th Street, West Allis, WI 53227

REMARKS None

General Test And Vehicle Parameter Data (Cont)

DATA FROM VEHICLE'S CERTIFICATION LABEL

Vehicle Manufactured By Toyota Motor Manufacturing, Kentucky, Inc

Date of Manufacture 2/02; VIN 4T1BF28B92U244424

GVWR 4550 lbs, GAWR Front 2665 lbs

GAWR Rear 2665 lbs

DATA FROM TIRE PLACARD

Tire Pressure with Maximum Capacity Vehicle Load

FRONT 31 psi REAR 31 psi

Recommended Tire Size P205/65R15 92H or P205/60R16 91H,

Recommended Cold Tire Pressure

FRONT 31 psi REAR 31 psi

Size of Tires on Test Vehicle P205/65R15 92H

Type of Spare Tire P205/65R15 92H, 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) = 902 lbs

No. Of Occupants x 150 lbs = 750 lbs

Rated Cargo/Luggage Weight (RCWL) = 152 lbs (Difference)

General Test And Vehicle Parameter Data (Cont)

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

Right Front =	<u>1032</u> lbs	Right Rear =	<u>644</u> lbs
Left Front =	<u>1045</u> lbs	Left Rear =	<u>673</u> lbs
TOTAL FRONT =	<u>2077</u> lbs	TOTAL REAR =	<u>1317</u> lbs
% Total Weight =	<u>61 2</u> %	% Total Weight =	<u>38 8</u> %
TOTAL DELIVERED WEIGHT = <u>3394</u> lbs			

WEIGHT OF FULLY LOADED TEST VEHICLE WITH TWO DUMMIES (344 LB) AND 152
POUNDS OF CARGO WEIGHT

Right Front =	<u>1116</u> lbs	Right Rear =	<u>810</u> lbs
Left Front =	<u>1132</u> lbs.	Left Rear =	<u>832</u> lbs
TOTAL FRONT =	<u>2248</u> lbs	TOTAL REAR =	<u>1642</u> lbs
% Total Weight =	<u>57 8</u> %	% Total Weight =	<u>42 2</u> %
TOTAL WEIGHT = <u>3890</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 9° nose down</u>
FULLY LOADED DOOR SILL ANGLE.	<u>0 5° nose down</u>

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual = 18 5 gallons
Usable Capacity Figure Furnished by COTR = 18 5 gallons

REMARKS None

Post-Impact Data

Test number	HT02052201	
NHTSA number	C25109	
Test date.	May 22, 2002	
Test time	12 45 p.m	
Test type	FMVSS 208 Compliance Sled Test	
Impact angle	0°	
Ambient Temperature at Impact Area	71°F	
Temperature in Occupant Compartment	71°F	
Impact Velocity		
Integrated velocity from the integration of the entire sled acceleration	29.8	mph
Specified integrated velocity range	28 to 30	mph
Sled Carriage Acceleration		
Acceleration	18.0	g
Specified Acceleration Range	16.0 - 18.2	g
Sled Carriage Acceleration Duration		
Time from T-0 (-0.5 g) to 0.0 g	124.1	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 2002/Toyota/Avalon/4 Door

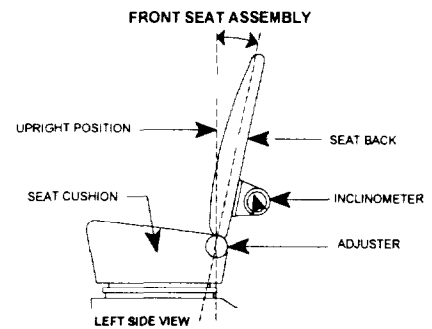
Vehicle NHTSA No C25109 Test Date May 22, 2002

NOMINAL DESIGN RIDING POSITION

Driver Seat Seat Back Angle = 8.9° *

Passenger Seat Seat Back Angle = 8.3° *

* - Measured at headrest post



SEAT FORE AND AFT POSITIONS:

Driver Seat The seat track had a total movement of 225 mm and was positioned 113 mm rearward from the foremost position

Passenger Seat The seat track had a total position movement of 225 mm and was positioned 113 mm rearward from the foremost position

STEERING COLUMN ADJUSTMENTS

The steering column was placed in the mid position (3rd position of 5)

Dummy Positioning Measurement Table

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

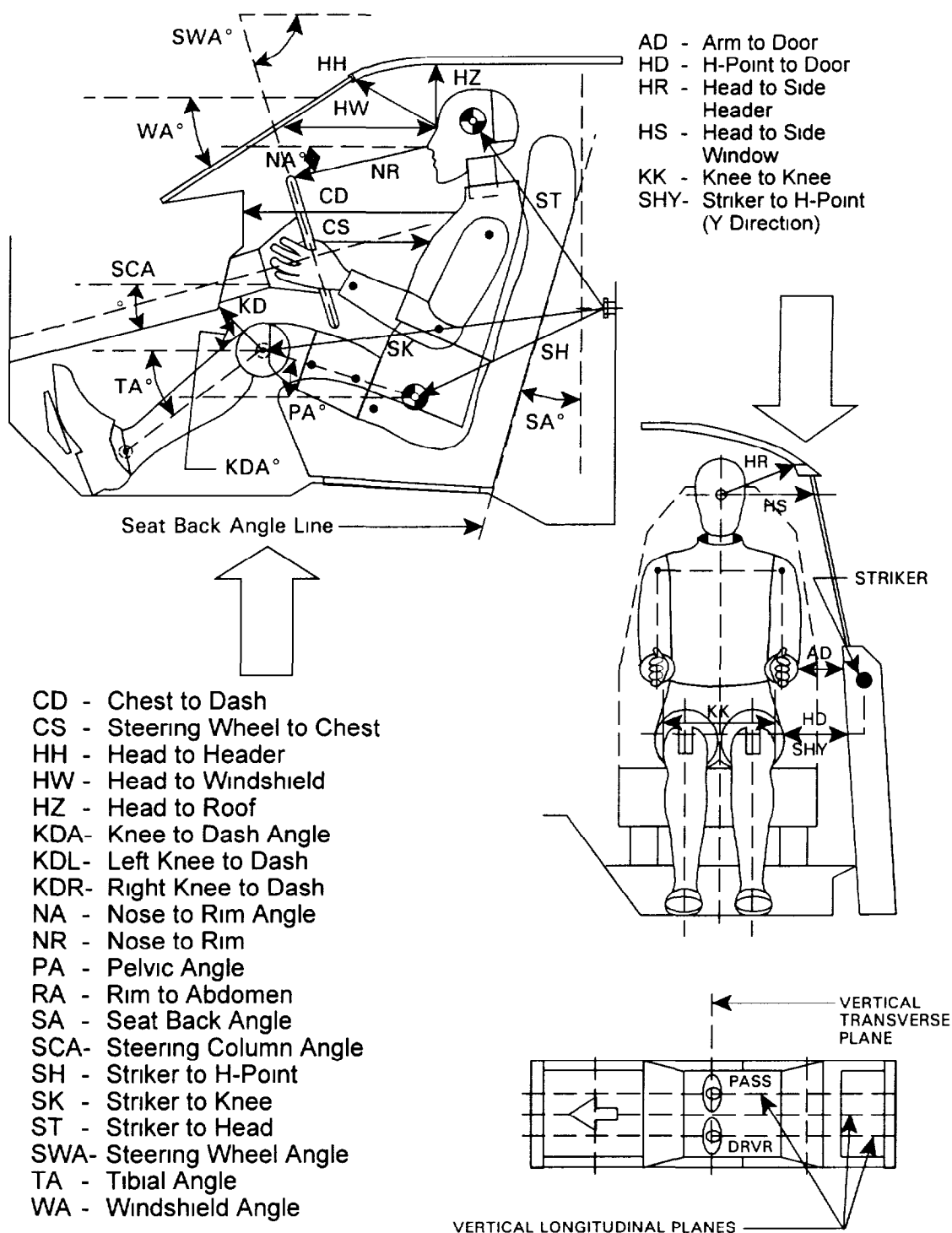
Vehicle NHTSA No · C25109 Test Date May 22, 2002

	DRIVER (Serial #340)	PASSENGER (Serial #312)
WA°	29.6°	
SWA°	63 0°	
SCA°	26 5°	
SA°*	8 9°	8 3°
HZ	7.7	7 3
HH	14 0	14 5
HW	24 2	23 4
HR	9.1	9 3
NR	16 9 Angle (NA°) 12 1°	
CD	27.2	27 2
CS	13 7	
RA	8 5	
KDL	8 7 Angle (KDA°) 0 0°	8.3
KDR	8 4	9 1 Angle (KDA°) 0 0°
PA°	24.3°	22.0°
TA°	40 8°	39 8°
KK	12 4	10.9
ST	18.3 Angle 11 0°	17 9 Angle 7 5°
SK	23 5 Angle 100 8°	23 5 Angle 100 3°
SH	10 4 Angle 135 4°	9 8 Angle 134 1°
SHY	11 6	10 8
HS	12 9	13 3
HD	7 2	7 0
AD	4.9	5.4

* measurement reflects setting the seatback 6 0° from fully upright when measured at the headrest post

Dummy Positioning Measurement Locations

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).

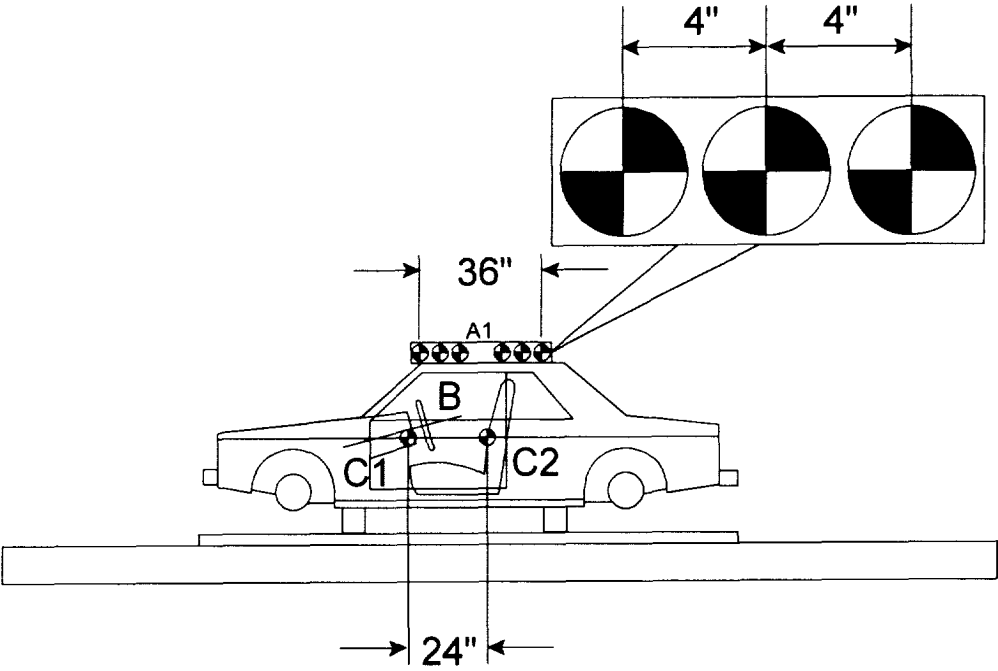
* Measurement used in Data Tape Reference Guide

Description of Dummy Measurements (Cont.)**Angles**

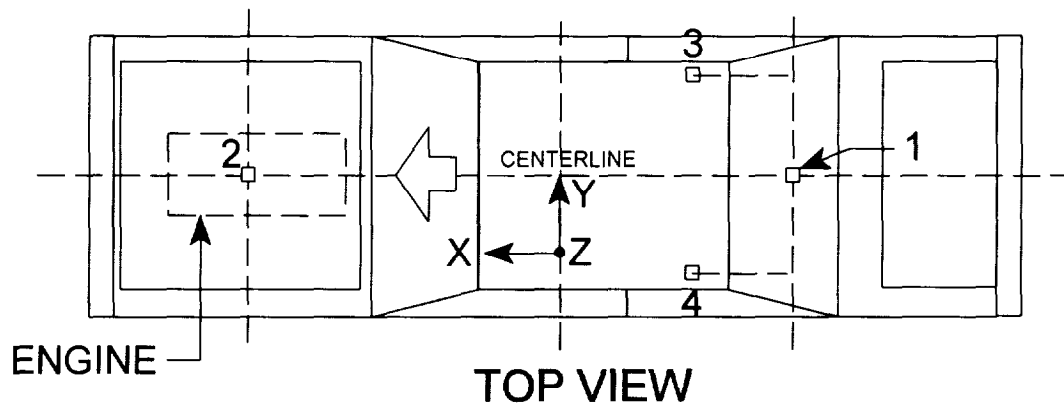
SA	Seat Back Angle, find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR
PA	Pelvic or Femur Angle, taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking 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

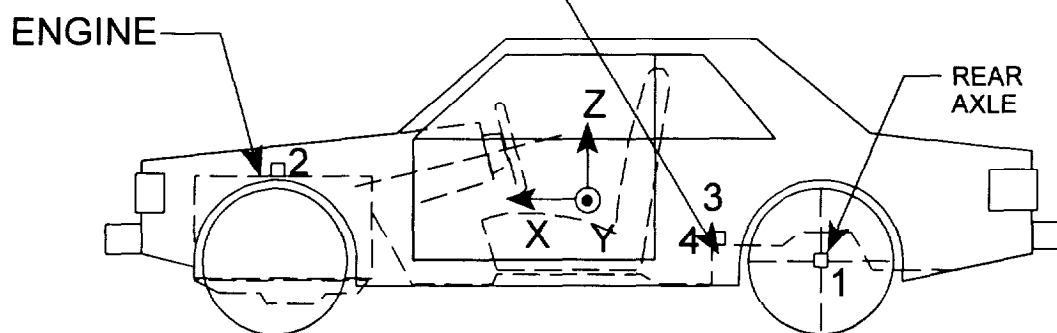
REFERENCE PHOTO TARGETS



LEFT SIDE VIEW

Vehicle Accelerometer Placement and Data SummaryVehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 DoorVehicle NHTSA No C25109 Test Date May 22, 2002

REAR SEAT CUSHION
ASSY. FRONT ATTACHMENT
BRACKET SUPPORT



LEFT SIDE VIEW

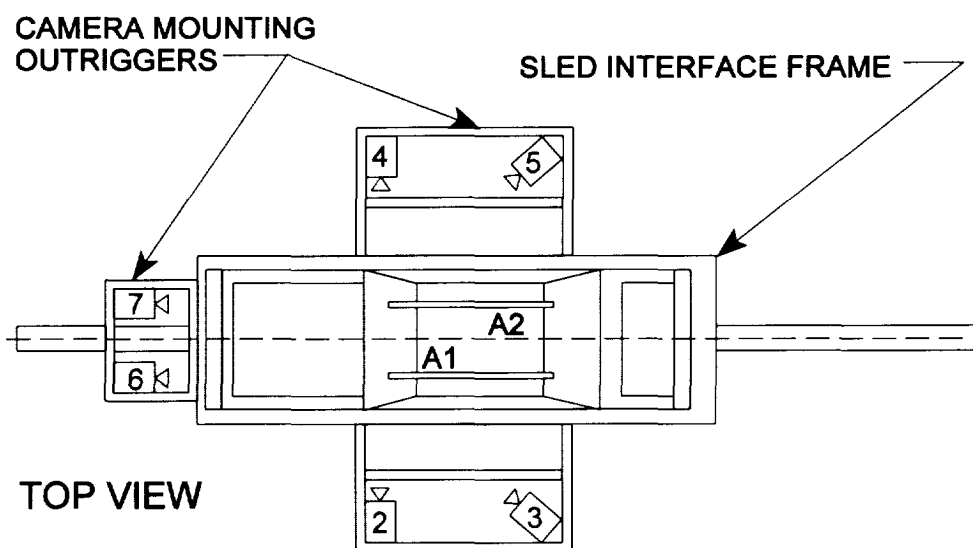
Vehicle Accelerometer Location Measurements and Data Summary

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Vehicle NHTSA No C25109 Test Date May 22, 2002

No	Location	X (in)	Y (in)	Positive Direction		Negative Direction	
				Value	Time (msec)	Value	Time (msec)
	Sled Primary Longitudinal	67 0	0	18 0 g	52	-1 1 g	127
	Sled Redundant Longitudinal	67 0	4 0	18.1 g	52	-1 1 g	127
	Sled Velocity Measured Integrated	67 0	0	29 8 mph	124	--	--
1	Rear Axle Longitudinal	49 0	0	18 3 g	69	-1.5 g	128
2	Top Engine Longitudinal	163.0	0	19 9 g	58	-1 5 g	129
3	Right Rear Seat Member Longitudinal	77 0	13 3	19 7 g	66	-1.8 g	128
4	Left Rear Seat Member Longitudinal	77 0	13 3	18 5 g	51	-2 0 g	128

Camera Positions



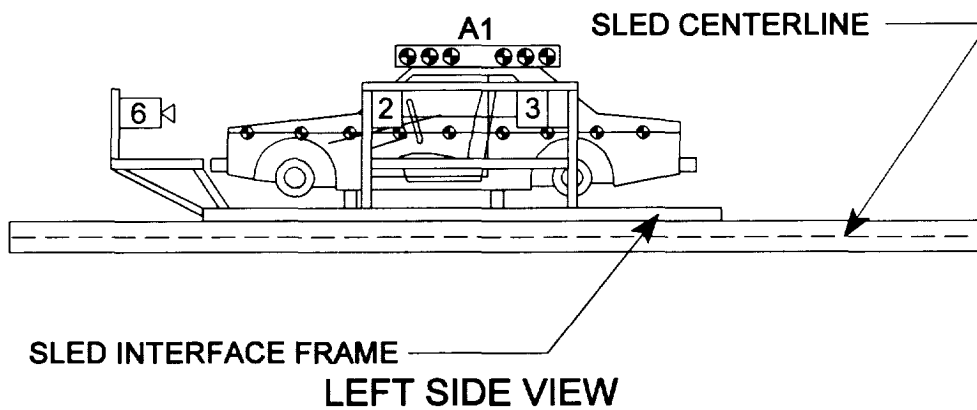
CAMERA FRAME RATES

#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	930
3	Onboard Driver Angle	150 9	91 1	47.8			13	1000
4	Onboard Passenger	71.8	89 6	38 5	90	71 1	13	1000
5	Onboard Passenger Angle	146 7	88 5	47.9			13	866
6	Onboard Windshield Driver	18 3	14 1	42 9			13	1000
7	Onboard Windshield Passenger	18 3	13 9	42 9			13	893

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

Occupant Injury Data

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Vehicle NHTSA No C25109 Test Date May 22, 2002

MAXIMUM ACCELERATION VALUES (g's)	DRIVER DUMMY #340	PASSENGER DUMMY #312
Head Channel X	-33.4	-58.0
Head Channel Y	16.3	-14.2
Head Channel Z	16.7	21.0
HEAD RESULTANT	36.8	60.1
Chest Channel X	-34.6	-42.7
Chest Channel Y	5.7	-3.1
Chest Channel Z	13.7	22.8
CHEST RESULTANT	36.8	47.3

HEAD INJURY CRITERIA (HIC) VALUES

HIC	120*	269
t_1 = (msec)	94.2	83.5
t_2 = (msec)	130.2	119.5

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

* There was no Head Y data after 166 ms. The HIC of 120 occurred between 94 and 130 ms

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

CLIP	36.3	46.6
t_1 = (msec)	96.5	100.0
t_2 = (msec)	99.5	103.0
CHEST DEFLECTION (in)	1.4	0.3

Occupant Injury Data (Cont)

MAX COMPRESSIVE FEMUR FORCES	DRIVER DUMMY #340	PASSENGER DUMMY #312
Left Side (lbs)	1535	1099
Right Side (lbs)	1409	904

NECK INJURY CRITERIA

Peak Flexion Bending Moment about the Occipital Condyle (N-m)	21 6	66 8
Peak Extension Bending Moment about the Occipital Condyle (N-m)	64 7	14 4
Peak Axial Tension (N)	1348	766
Peak Axial Compression (N)	535	841
Peak Fore Shear (N)	381	1736
Peak Aft Shear (N)	708	172

Seat Belt Warning System Data

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

NHTSA No C25109, Technician Chad Gadberry, Date May 3, 2002

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	<u>X</u>

Readiness IndicatorVehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 DoorNHTSA No C25109, Technician Chad Gadberry, Date May 3, 2002

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 (X)No
(If YES this Data Sheet is complete.)
- 2 Describe the location of the readiness indicator Left side of center indicator panel

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

Air Bag Labels Data

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

NHTSA No C25109, Technician Chad Gadberry, Date May 3, 2002

- 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

LABEL OUTLINE VERTICAL AND HORIZONTAL LINE BLACK

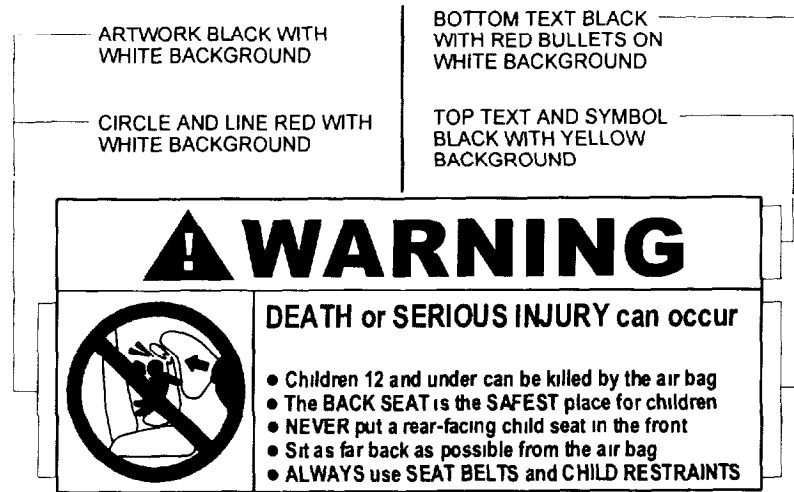


Figure 6a (S4 5 1(b)(2))

SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK

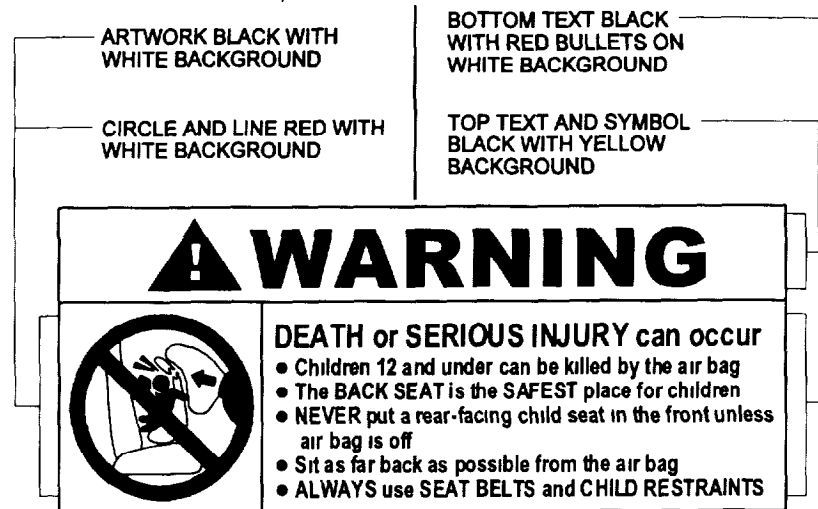


Figure 6b (S4 5 1(b)(2))

- | | | | | |
|-----|---|----------------|-------------|-------------|
| 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 - | (X)Yes-Pass | () No-FAIL |
| | Passenger Side - | () No air bag | (X)Yes-Pass | () No-FAIL |
| 4 4 | Is the message white with black text? (S4 5 1(b)(2)(ii)) | Driver Side - | (X)Yes-Pass | () No-FAIL |
| | Passenger Side - | () No air bag | (X)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 65 0 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: 31 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 - (X)Yes, go to 6 () No
 Passenger Side - () No air bag (X)Yes () No
- 5 2 Does the label conform in content to the label shown below? (S4 5 1(c)(2))
 Driver Side - () Yes () **No-FAIL**
 Passenger Side - () No air bag () Yes-Pass () **No-FAIL**
- 5 3 Is the message area black with yellow text? (S4 5 1(c)(2)(i))
 Driver Side - () Yes-Pass () **No-FAIL**
 Passenger Side - () No air bag () 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 _____ cm²
 Driver Side - () Yes-Pass () **No-FAIL**
 Passenger Side - () No air bag () 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
 () Yes-Pass () **No-FAIL**
- 5 6 Is the pictogram at least 20 mm in diameter? (S4 5 1(c)(2)(ii))
 Actual diameter _____ mm
 For vehicles with driver side air bag ONLY () Not Applicable
 () 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))
 () Yes-Pass (X) **No**

Note The air bag warning on the dash was not with the vehicle when it was received. It is not known whether the label was removed by the dealer, by a potential customer, or not installed at all.

Air Bag Labels Data (Cont.)

- 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))
() Yes-Pass () No-FAIL
- 6 4 Is the heading area yellow with the word "warning" and the alert symbol in black? (S4 5 1(e)(i))
() Yes-Pass () No-FAIL
- 6 5 Is the message white with black text? (S4 5 1(e)(ii))
() Yes-Pass () No-FAIL
- 6 6 Is the message area at least 30 cm²? (S4 5 1(e)(ii))
Actual message area ____ cm²
() Yes-Pass () No-FAIL

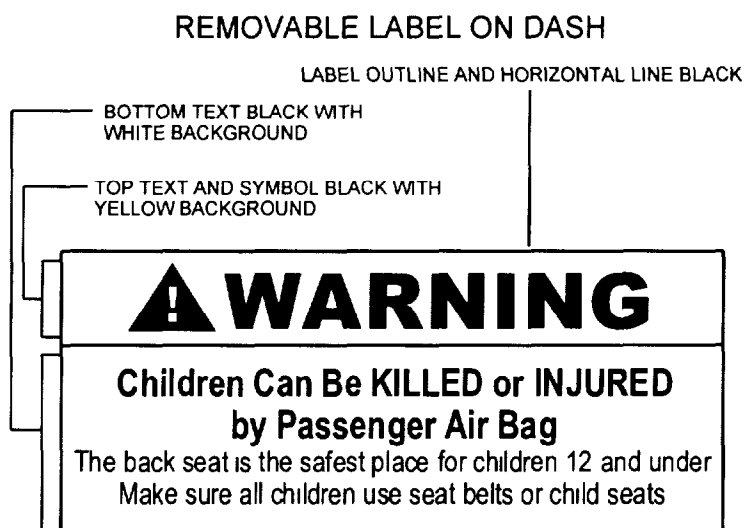


Figure 7 (S4 5 1(e))

Rear Outboard Seating Position Seat Belt DataVehicle Year/Make/Model/Body Style. 2002/Toyota/Avalon/4 DoorNHTSA No C25109, Technician: Chad Gadberry; Date May 3, 2002

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

☒ 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 2002/Toyota/Avalon/4 Door

NHTSA No. C25109, Technician Chad Gadberry, Date May 3, 2002

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 65.5 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)

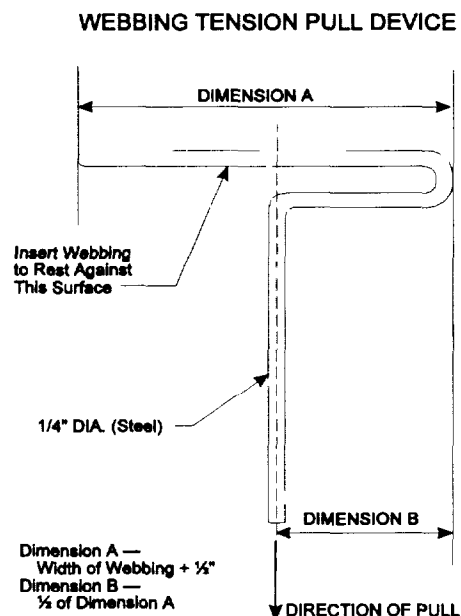


Figure 5 (S7 1 1 5(c)(4))

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 33 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 34 1 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 1 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 = 31 4 inches

(X)Yes-Pass

() No-FAIL

REMARKS None

Lap Belt Lockability Data (Cont)

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

NHTSA No C25109, Technician Chad Gadberry; Date May 3, 2002

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 61.6 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)

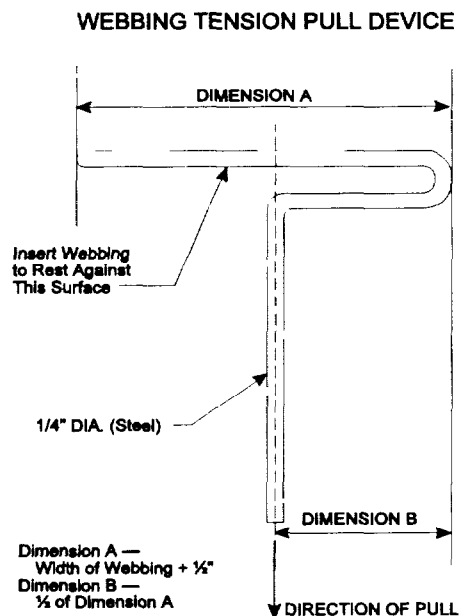


Figure 5 (S7 1 1 5(c)(4))

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 23 7 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 24 1 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 = 0.4 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 = 37 5 inches

(X)Yes-Pass

() No-FAIL

REMARKS None

Lap Belt Lockability Data (Cont)

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

NHTSA No C25109, Technician Chad Gadberry, Date May 3, 2002

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? (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 69.4 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)

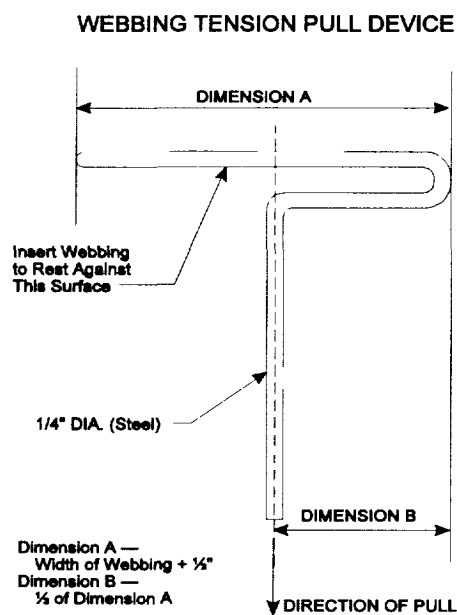


Figure 5 (S7.1.1.5(c)(4))

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 27 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 28 6 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 6 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 = 40 8 inches

(X)Yes-Pass

() No-FAIL

REMARKS None

Lap Belt Lockability Data (Cont)

Vehicle Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

NHTSA No C25109, Technician Chad Gadberry, Date May 3, 2002

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 62 3 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)

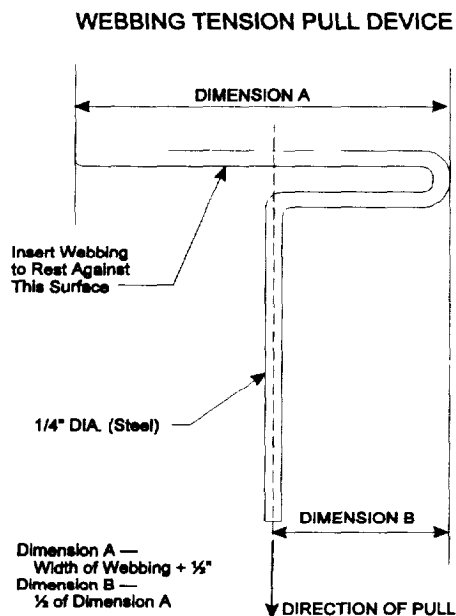


Figure 5 (S7.1.1 5(c)(4))

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 26.5 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 26.8 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 = 0.3 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 = 35.5 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 C25109

Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Designated Seating Position Tested. Left Rear

Date of Comfort/Convenience Check: May 3, 2002

Technician Performing Check Chad Gadberry

GVWR 4550 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.
 () Check
 (X) 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 BELT CONTACT FORCE (S7.4.3)**Test Vehicle NHTSA No C25109Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 DoorDesignated Seating Position Tested Center RearDate of Comfort/Convenience Check May 3, 2002Technician Performing Check Chad GadberryGVWR 4550 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.
() Check
(X) 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
(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 3 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 C25109

Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Designated Seating Position Tested Right Rear

Date of Comfort/Convenience Check May 3, 2002

Technician Performing Check Chad Gadberry

GVWR 4550 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
 () Check
 (X) 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)

2 LATCHPLATE ACCESS (S7.4.4)

Test Vehicle NHTSA No C25109

Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Designated Seating Position Tested **Not applicable - passenger car**

Date of Comfort/Convenience Check: _____

Technician Performing Check _____

GVWR: _____

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
() 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)
() Check
- 2.3 Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant
() Check
- 2.4 Attach the inboard and outboard reach string following the instructions on Figure 1C
() Check
- 2.5 Place the latch plate in the stowed position
() Check
- 2.6 Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?
() 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?
() Yes-Pass () **No-FAIL**

Seat Belt Comfort and Convenience Data (Cont.)

3 RETRACTION (S7.4.5)

Test Vehicle NHTSA No C25109

Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Designated Seating Position Tested Not applicable - passenger car

Date of Comfort/Convenience Check _____

Technician Performing Check _____

GVWR _____

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
() 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)
() Check
- 3 3 If separately adjustable in a vertical direction, the seats are at the lowest position
() Check
- 3 4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer
() 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
() Check
- 3 6 Place each adjustable head restraint in its highest adjustment position
() Check
- 3 7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position (S8 1 3)
() 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
() Check
- 3 9 Restrain the dummies using the belt systems for the position being tested
() Check
- 3 10 Stow outboard armrests which are capable of being stowed
() 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
() Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released.
() 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?
() 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?
() 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 C25109

Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 Door

Designated Seating Position Tested Left Rear

Date of Comfort/Convenience Check May 3, 2002

Technician Performing Check Chad Gadberry

GVWR 4550 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. (X) Check

(B) The seat is moved to any position to which it is designed to be adjusted (X) Check

(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position (X) Check

(X) 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)?

(X) Yes - Pass

() No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)**4 SEAT BELT GUIDES AND HARDWARE (S7.4.6)**Test Vehicle NHTSA No. C25109Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 DoorDesignated Seating Position Tested Center RearDate of Comfort/Convenience Check. May 3, 2002Technician Performing Check Chad GadberryGVWR 4550 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?

(X)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)?

(X)Yes - Pass

() No - FAIL

- 4 3 Are the remaining two seat belt parts accessible under normal conditions?

(X)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 (X) Check

(B) The seat is moved to any position to which it is designed to be adjusted (X) Check

(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position (X) Check

(X) 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)?

(X) Yes - Pass

() No - FAIL

Seat Belt Comfort and Convenience Data (Cont)**4 SEAT BELT GUIDES AND HARDWARE (S7.4.6)**Test Vehicle NHTSA No C25109Vehicle Model Year/Make/Model/Body Style 2002/Toyota/Avalon/4 DoorDesignated Seating Position Tested Right RearDate of Comfort/Convenience Check May 3, 2002Technician Performing Check Chad GadberryGVWR 4550 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?

(X)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)?

(X)Yes - Pass

() No - FAIL

- 4 3 Are the remaining two seat belt parts accessible under normal conditions?

(X)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 (X) Check

(B) The seat is moved to any position to which it is designed to be adjusted (X) Check

(C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. (X) Check

(X) 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)?

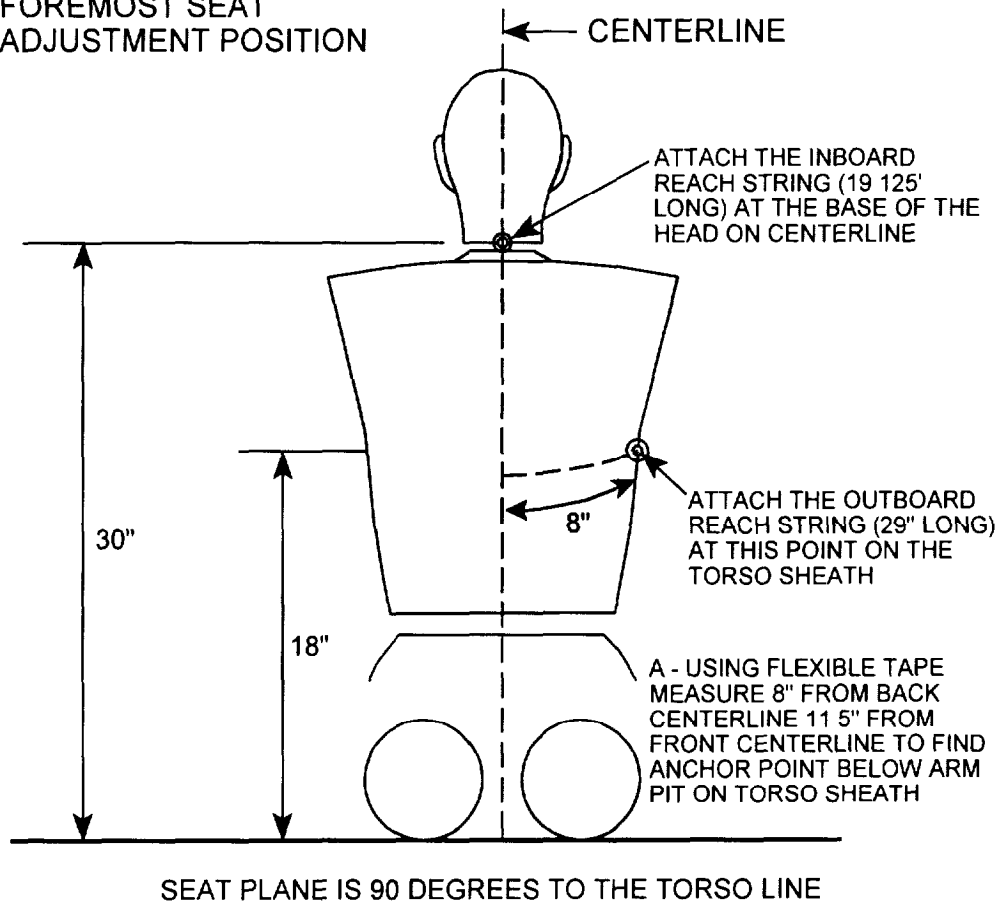
(X) Yes - Pass

() No - FAIL

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

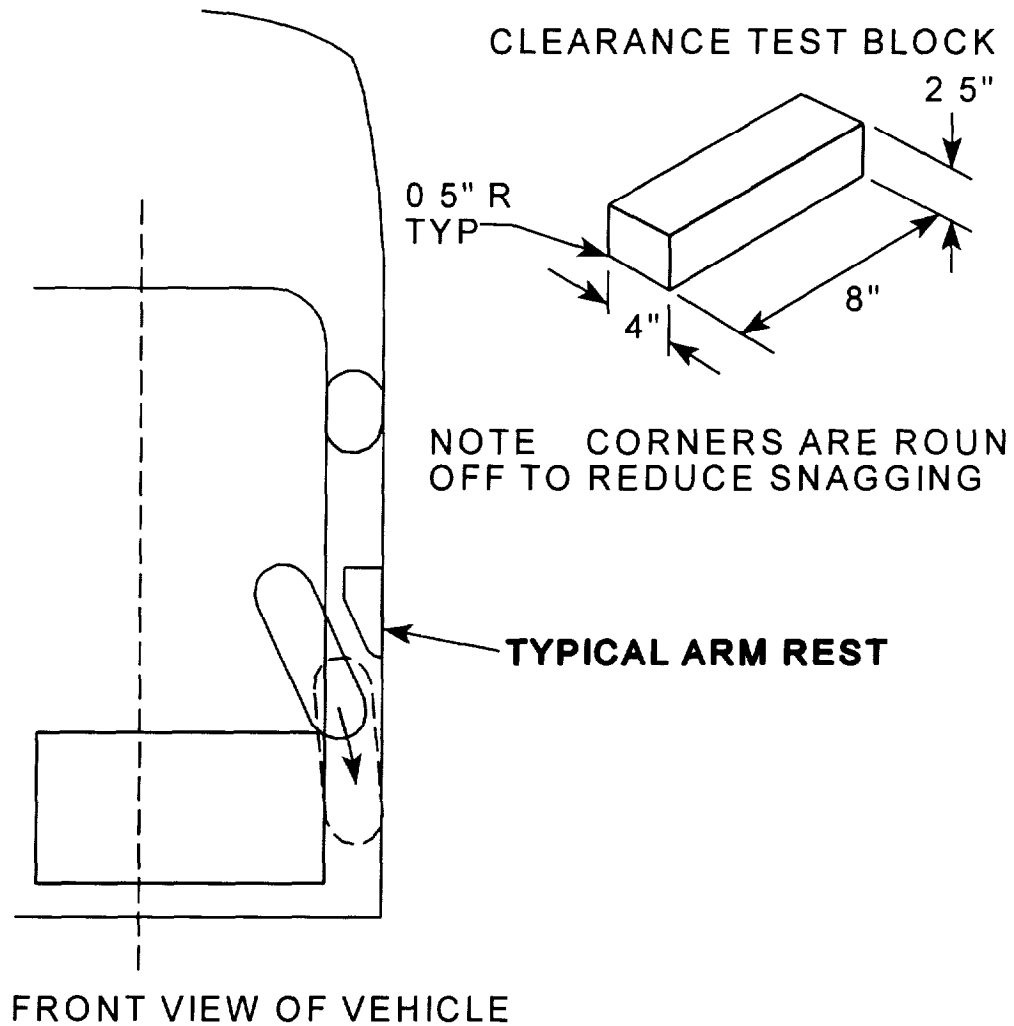
PART 572E DUMMY

50TH PERCENTILE
DUMMY SEATED IN
FOREMOST SEAT
ADJUSTMENT POSITION



REAR VIEW

USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS



APPENDIX A
PHOTOGRAPHS

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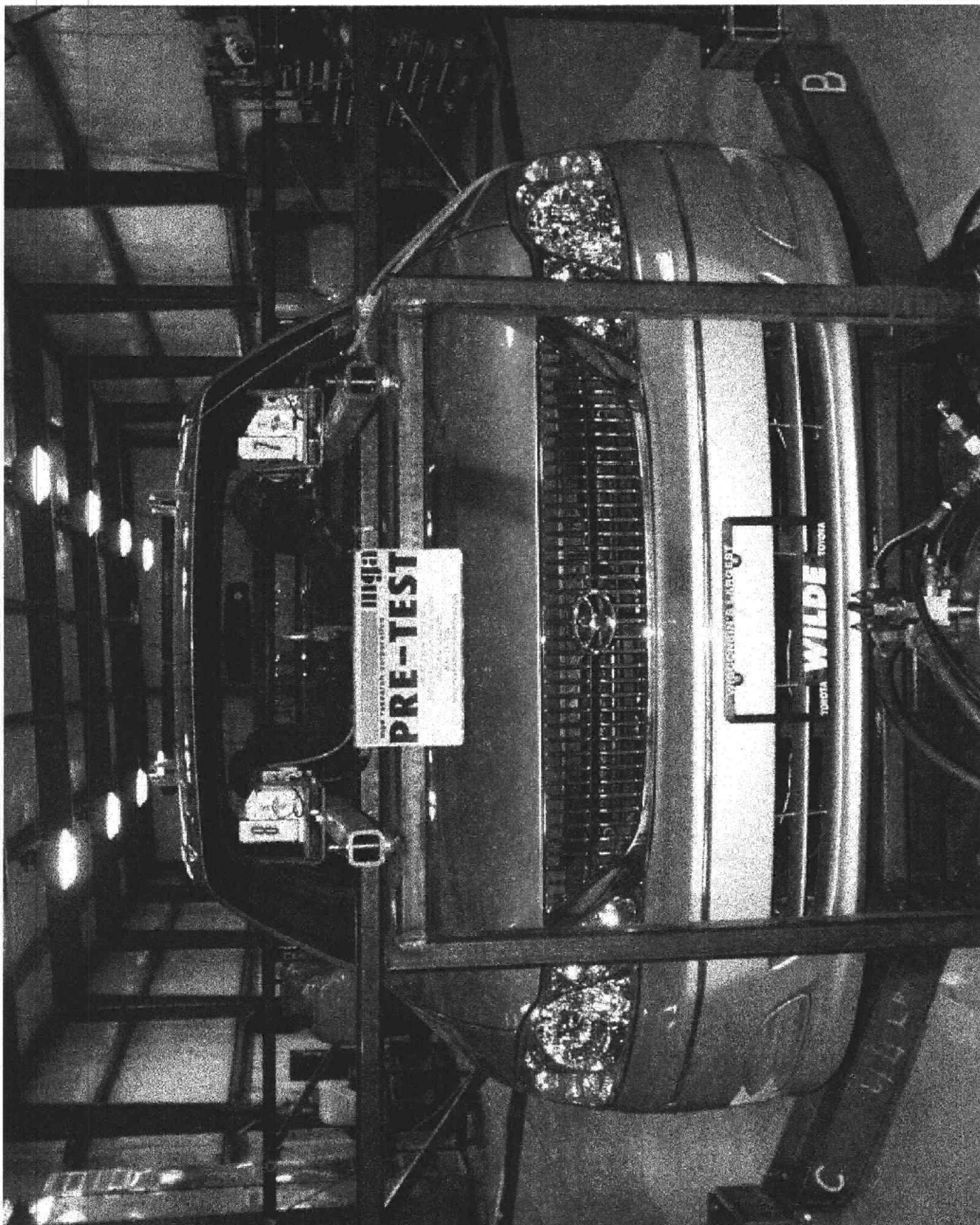


Photo No. A-1 - Pre-Test Frontal View

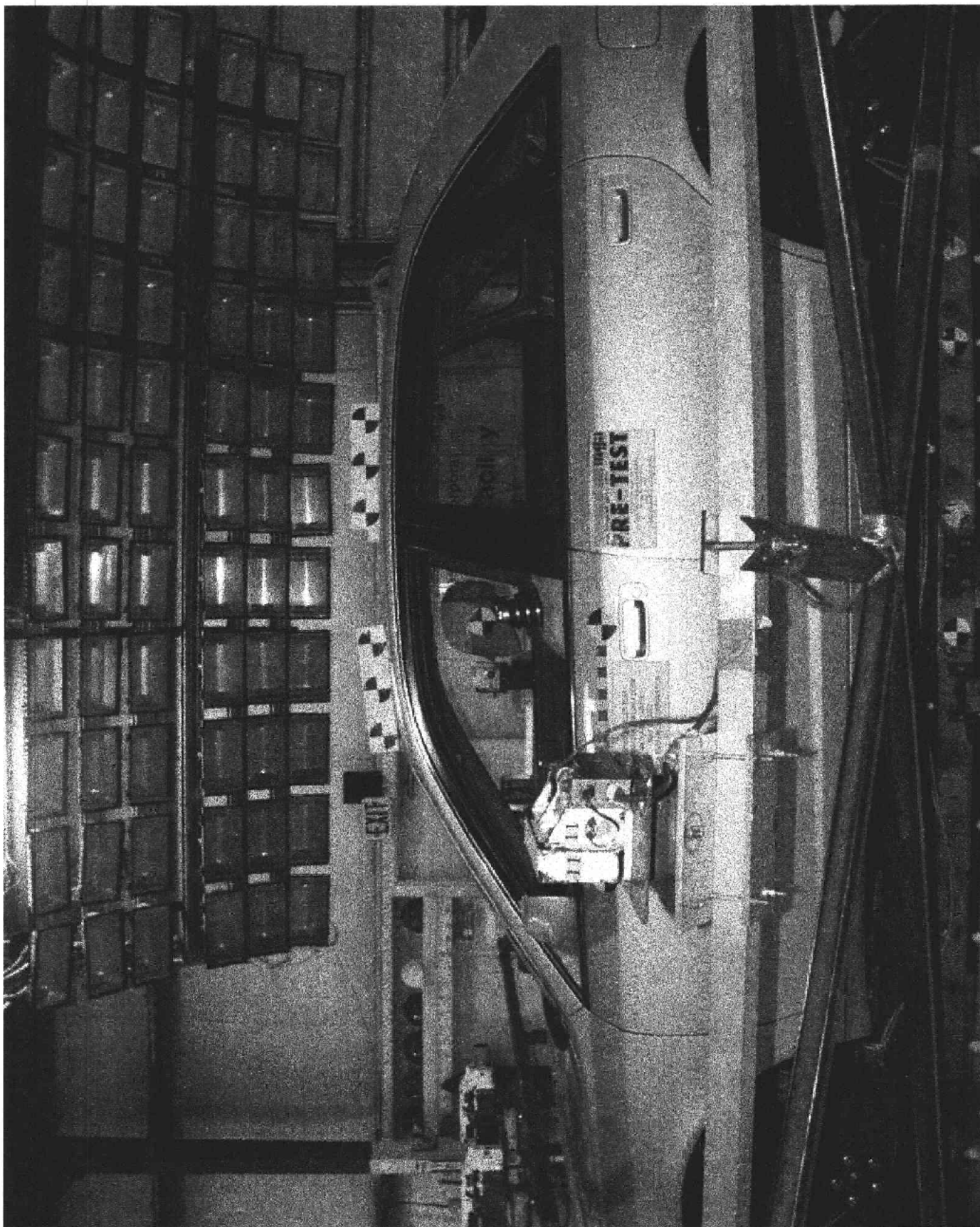


Photo No. A-2 - Pre-Test Left Side View

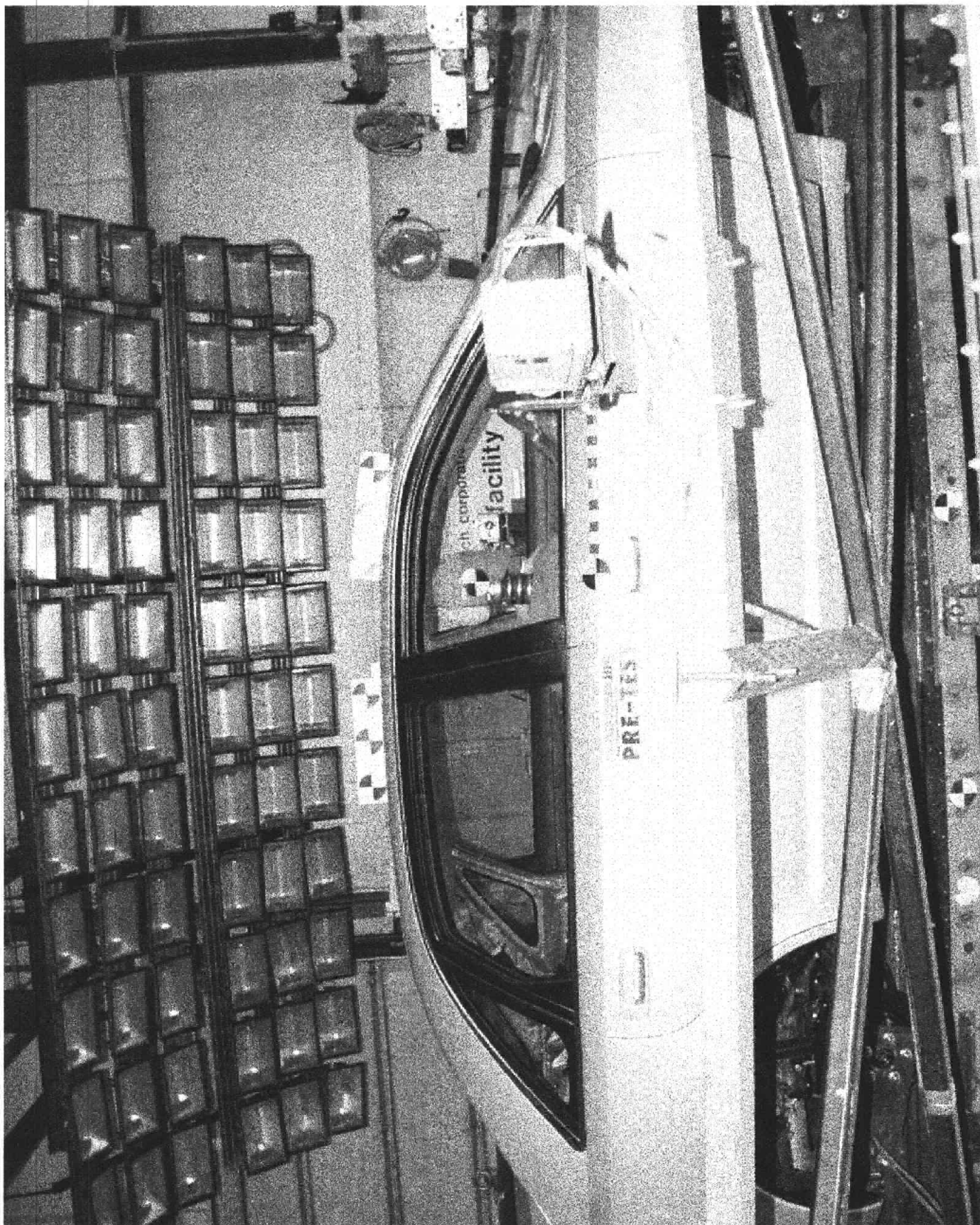


Photo No. A-3 - Pre-Test Right Side View

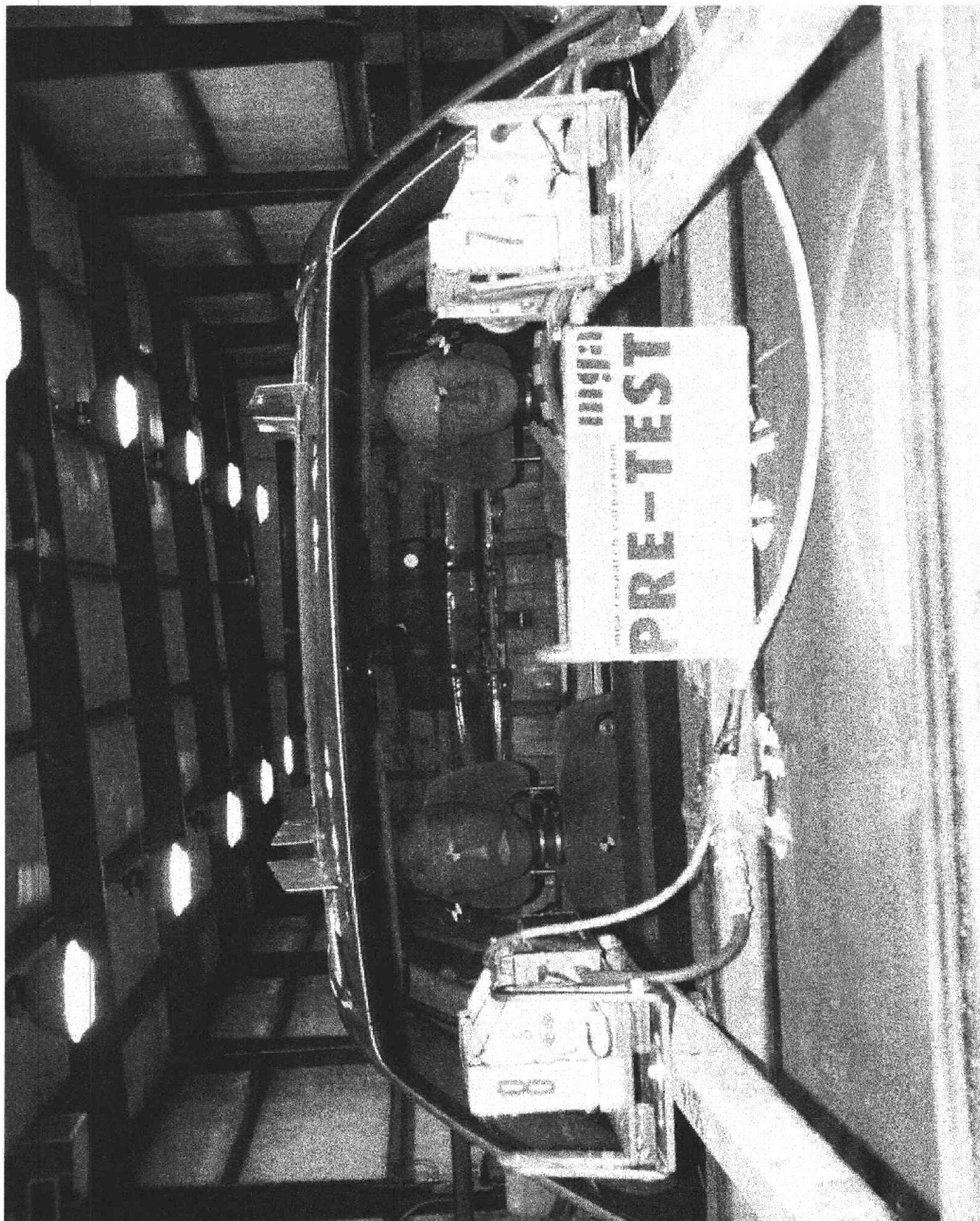


Photo No. A-4 - Pre-Test Windshield View

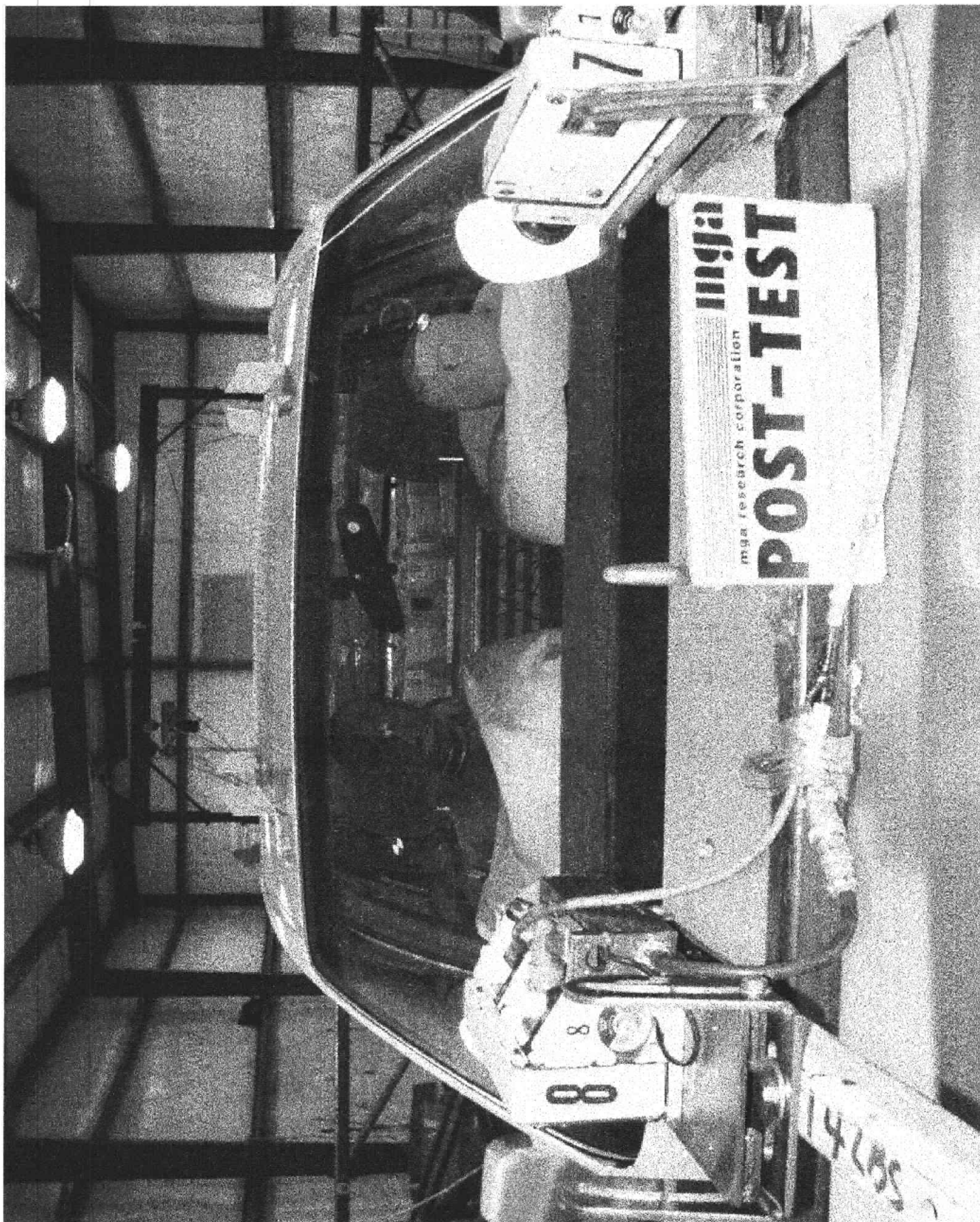


Photo No. A-5 - Post-Test Windshield View



Photo No. A-6 - Pre-Test Driver Dummy Position View (Door Open)



Photo No. A-7 - Post-Test Driver Dummy Position View (Door Open)

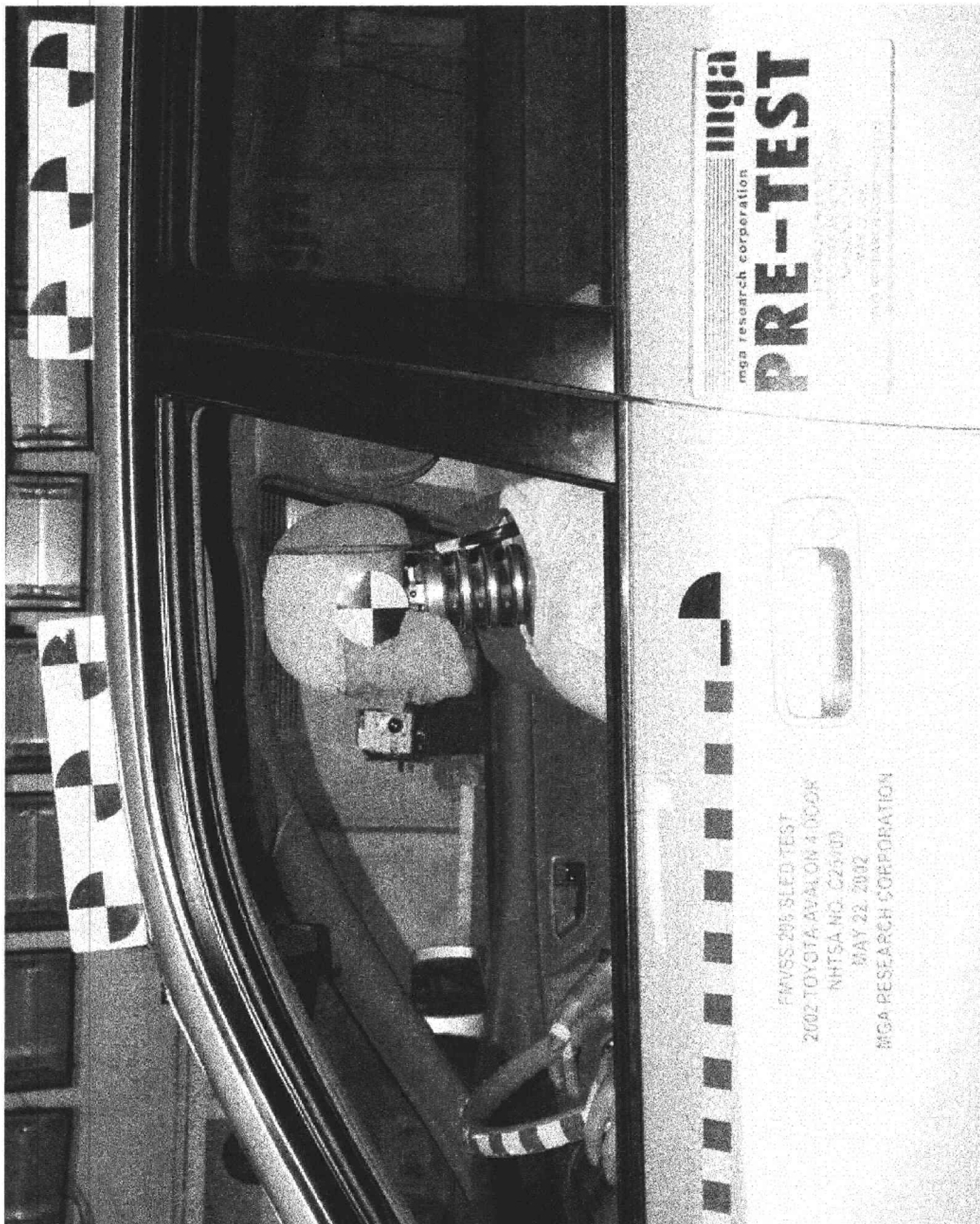


Photo No. A-8 - Pre-Test Driver Dummy Position View

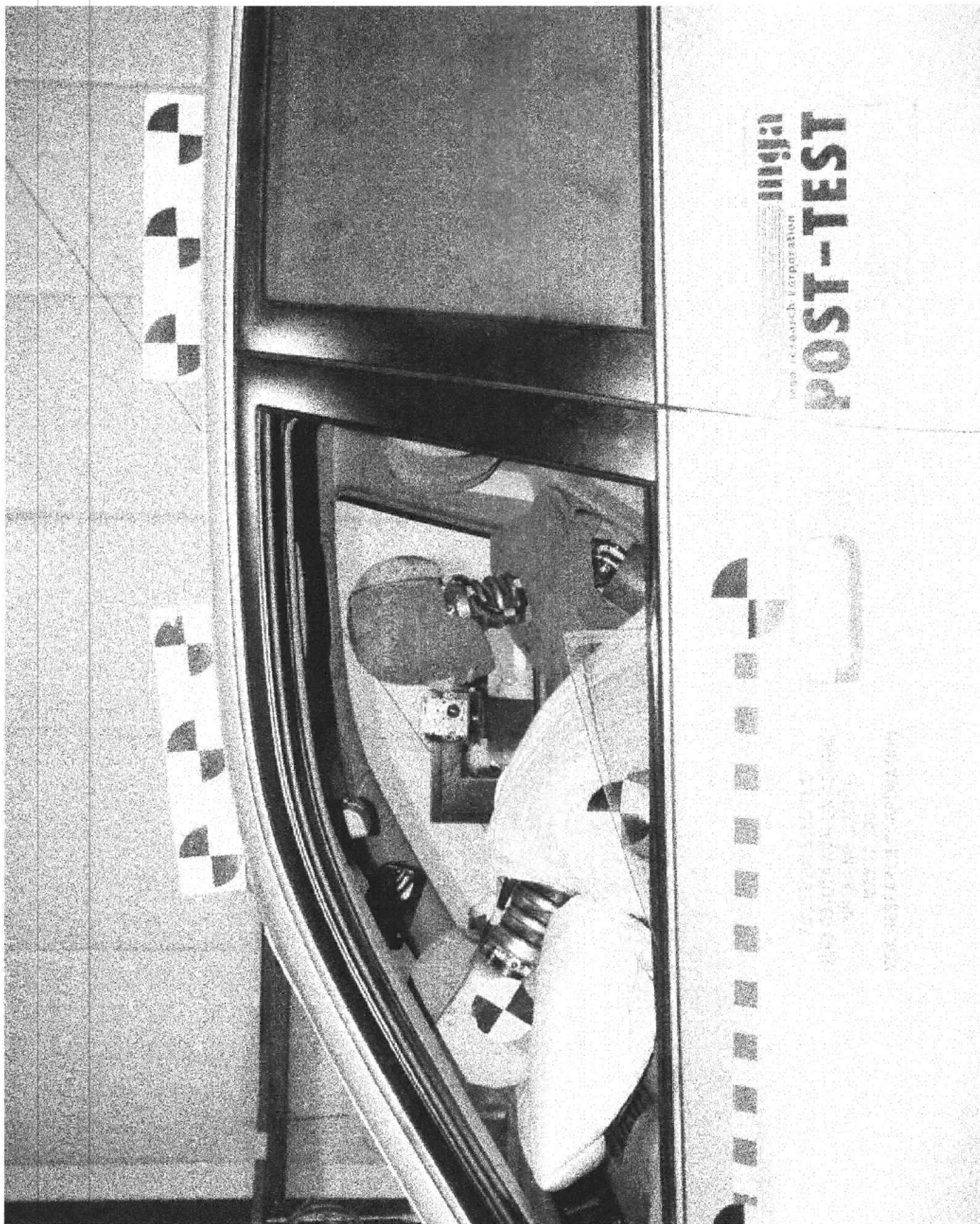


Photo No. A-9 - Post-Test Driver Dummy Position View



Photo No. A-10 - Pre-Test Passenger Dummy Position View (Door Open)



Photo No. A-11 - Post-Test Passenger Dummy Position View (Door Open)

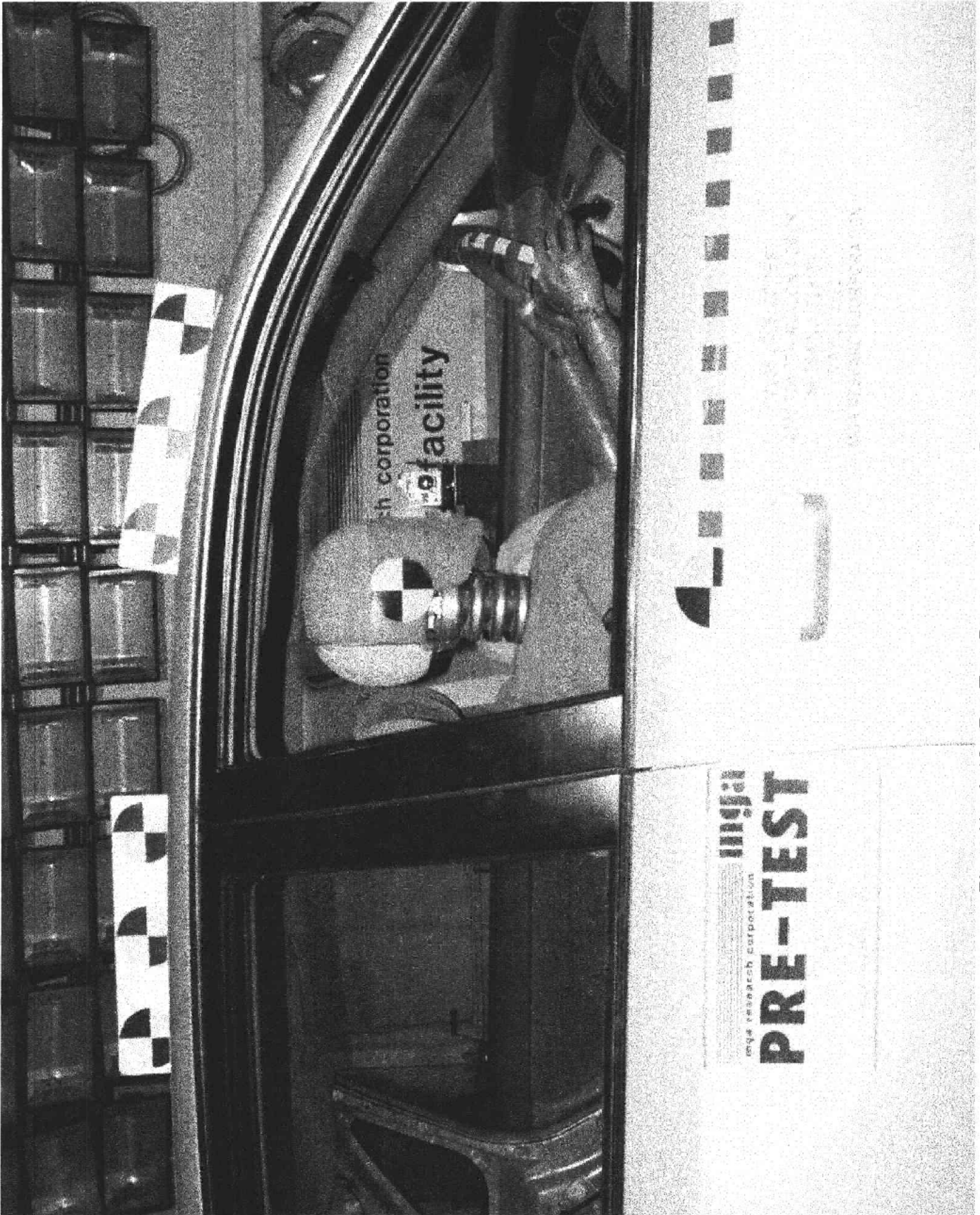


Photo No. A-12 - Pre-Test Passenger Dummy Position View



Photo No. A-13 - Post-Test Passenger Dummy Position View

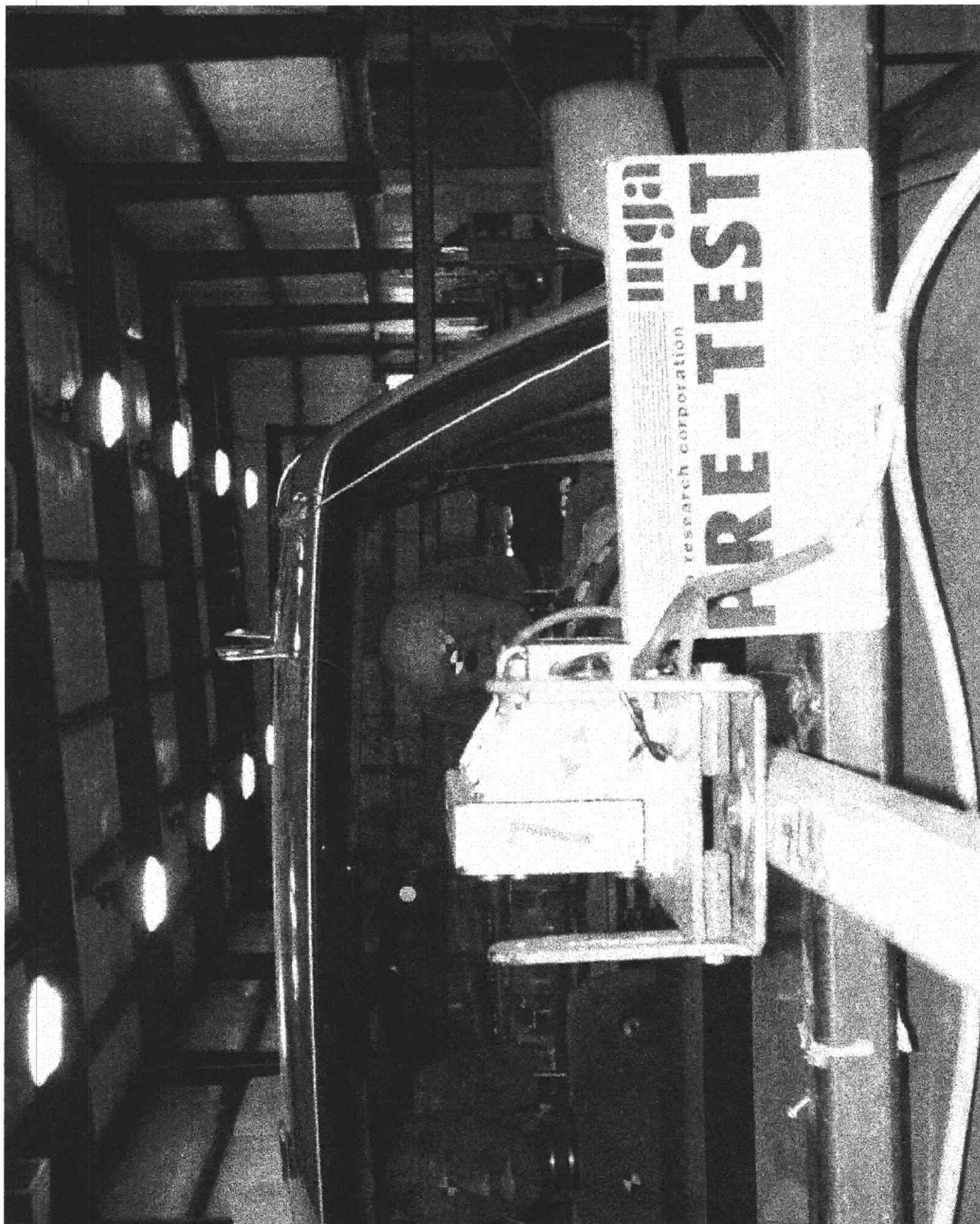


Photo No. A-14 - Pre-Test Driver Front View

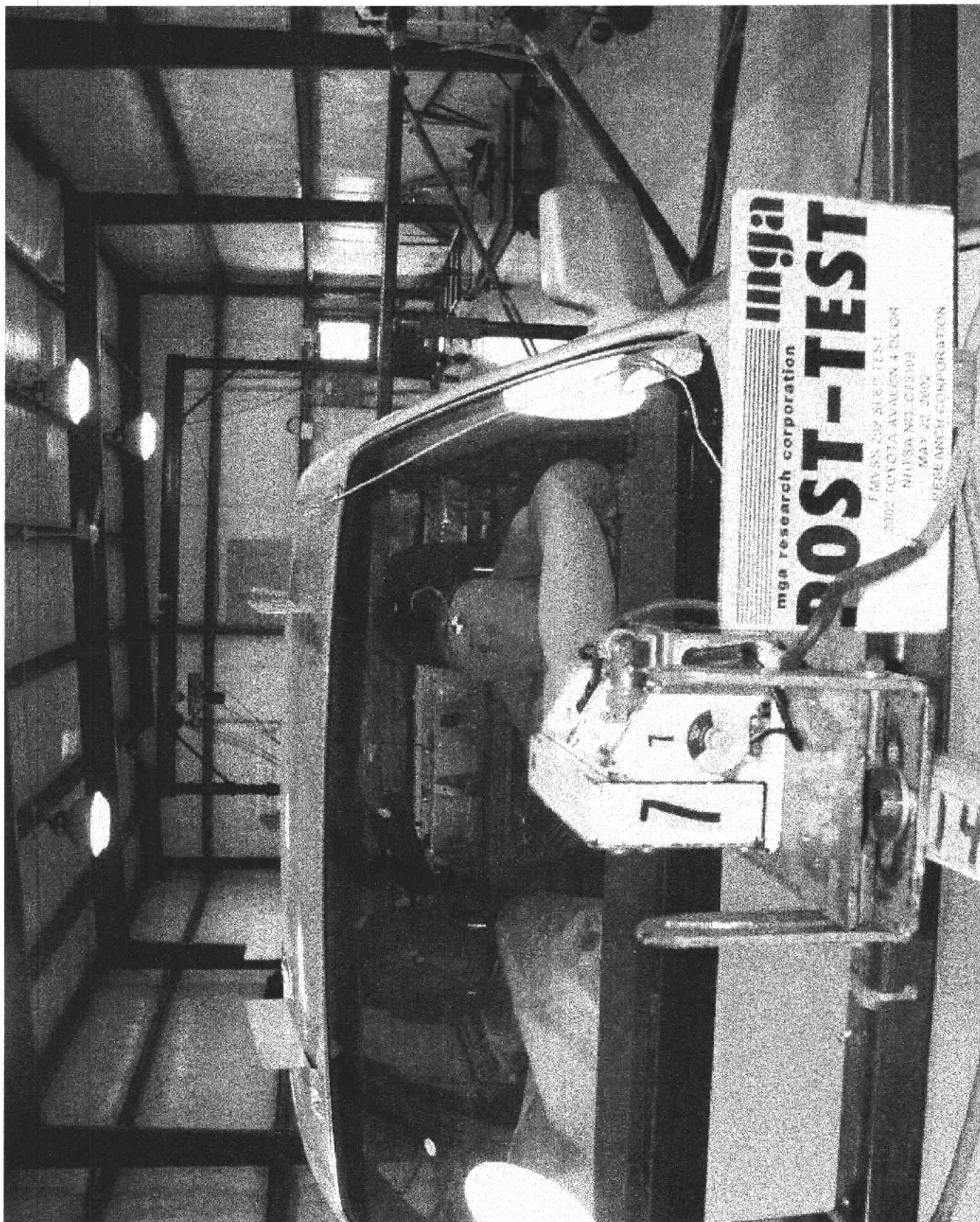


Photo No. A-15 - Post-Test Driver Front View

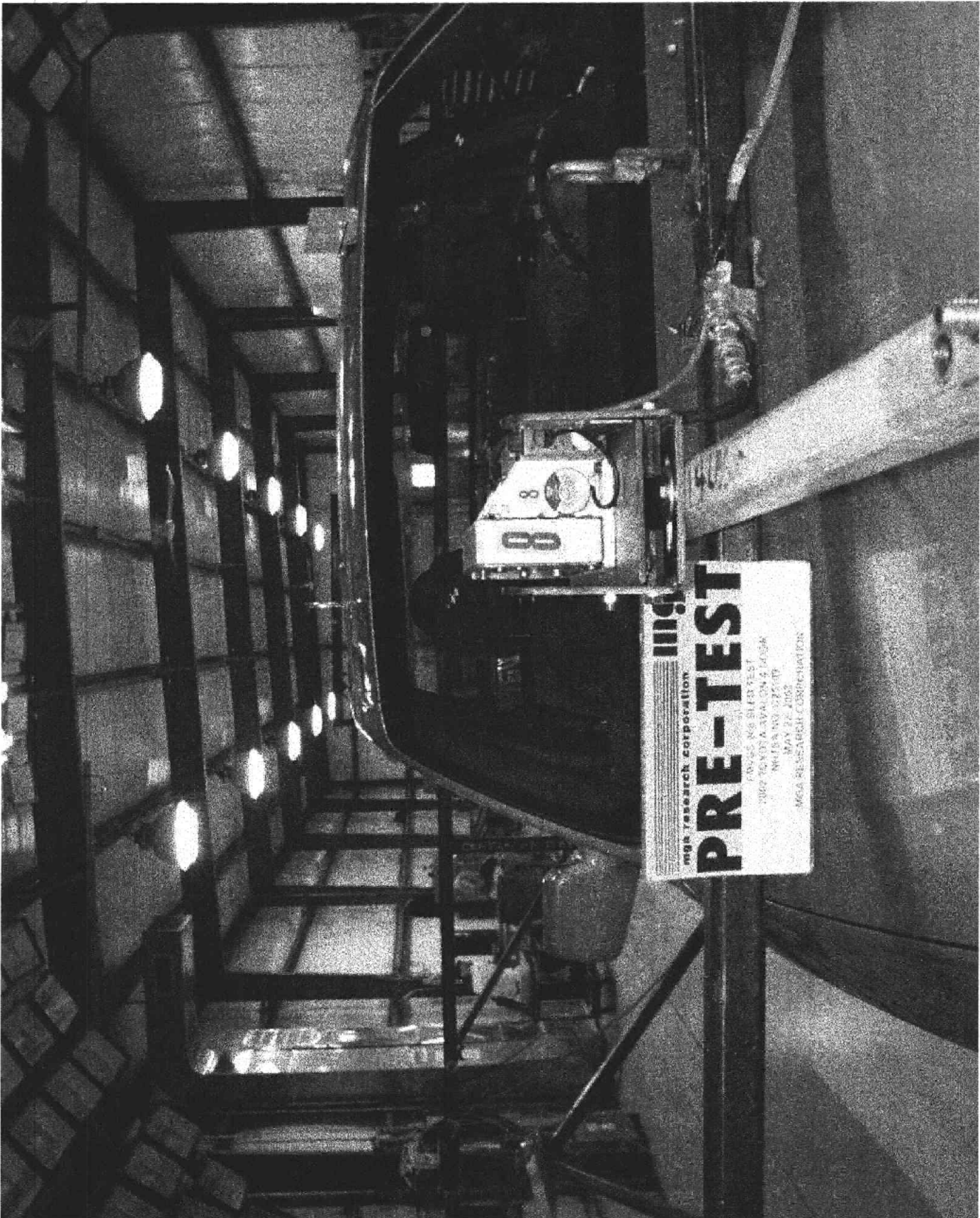


Photo No. A-16 - Pre-Test Passenger Front View

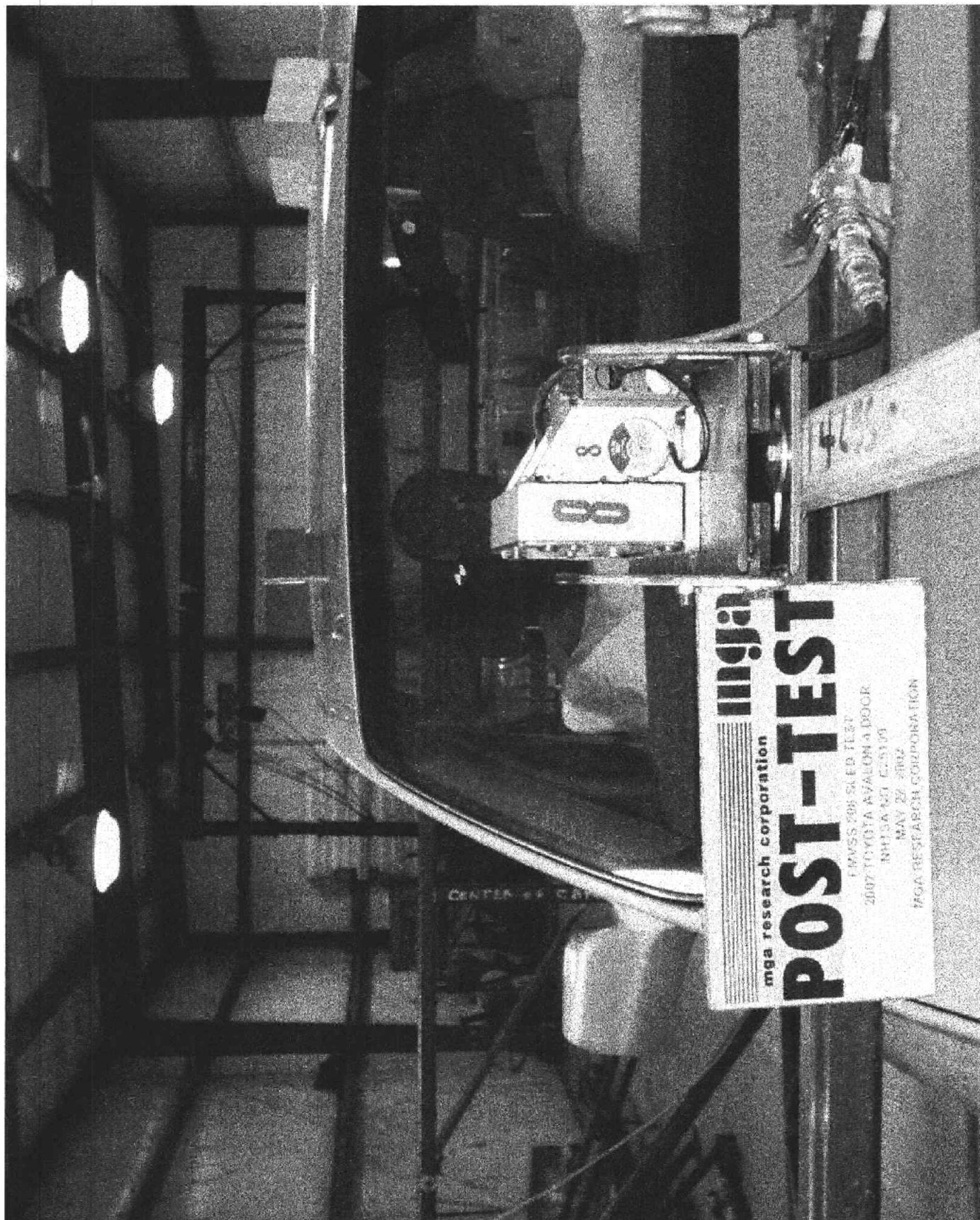


Photo No. A-17 - Post-Test Passenger Front View



Photo No. A-18 - Post-Test Driver Airbag View



Photo No. A-19 - Post-Test Driver Head Contact View (windshield)



Photo No. A-20 - Post-Test Passenger Dummy Airbag View

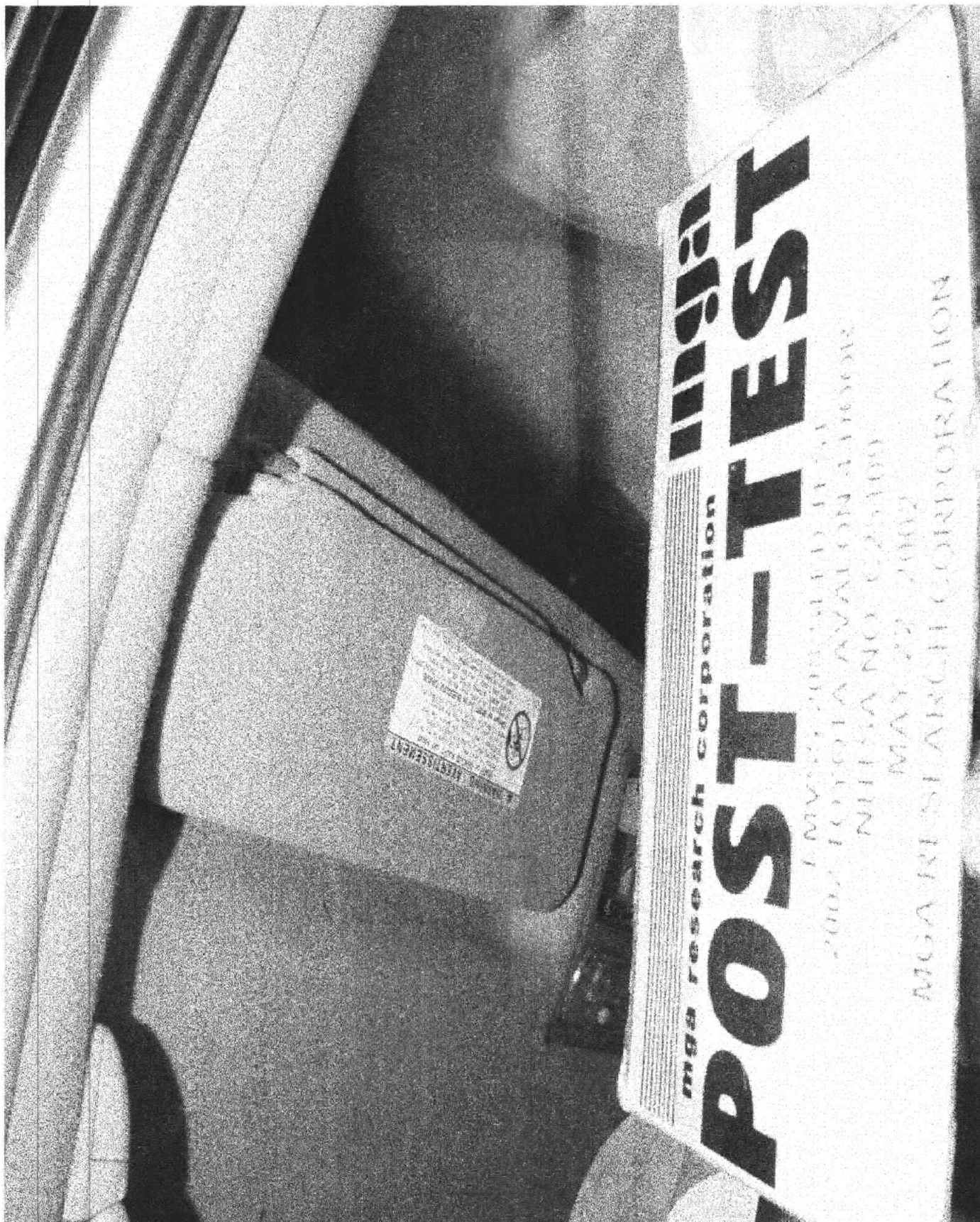


Photo No. A-21 - Post-Test Passenger Dummy Head Contact View (visor)



Photo No. A-22 - Pre-Test Driver Knee Bolster View

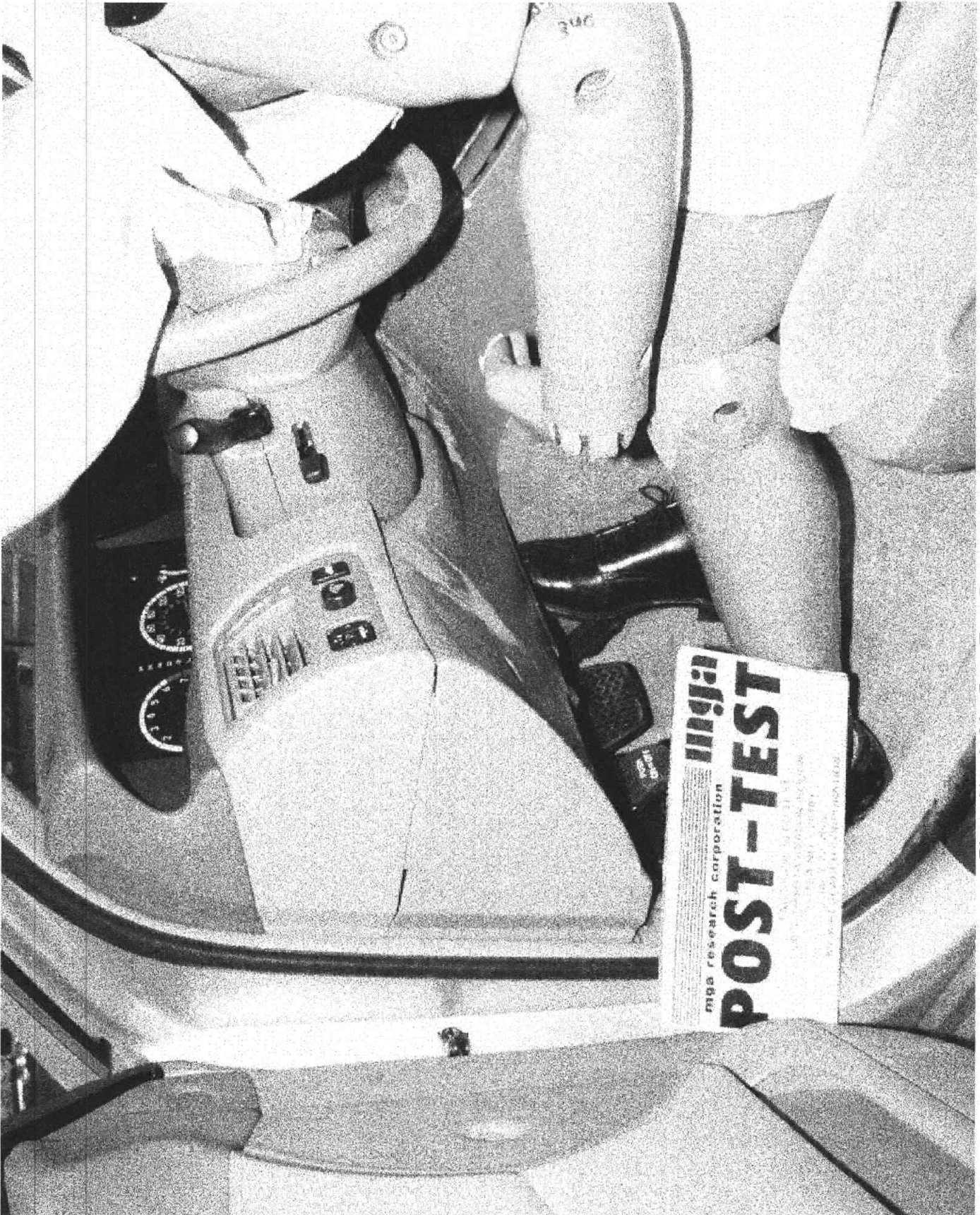


Photo No. A-23 - Post-Test Driver Knee Bolster View



Photo No. A-24 - Pre-Test Passenger Knee Bolster View



Photo No. A-25 - Post-Test Passenger Knee Bolster View

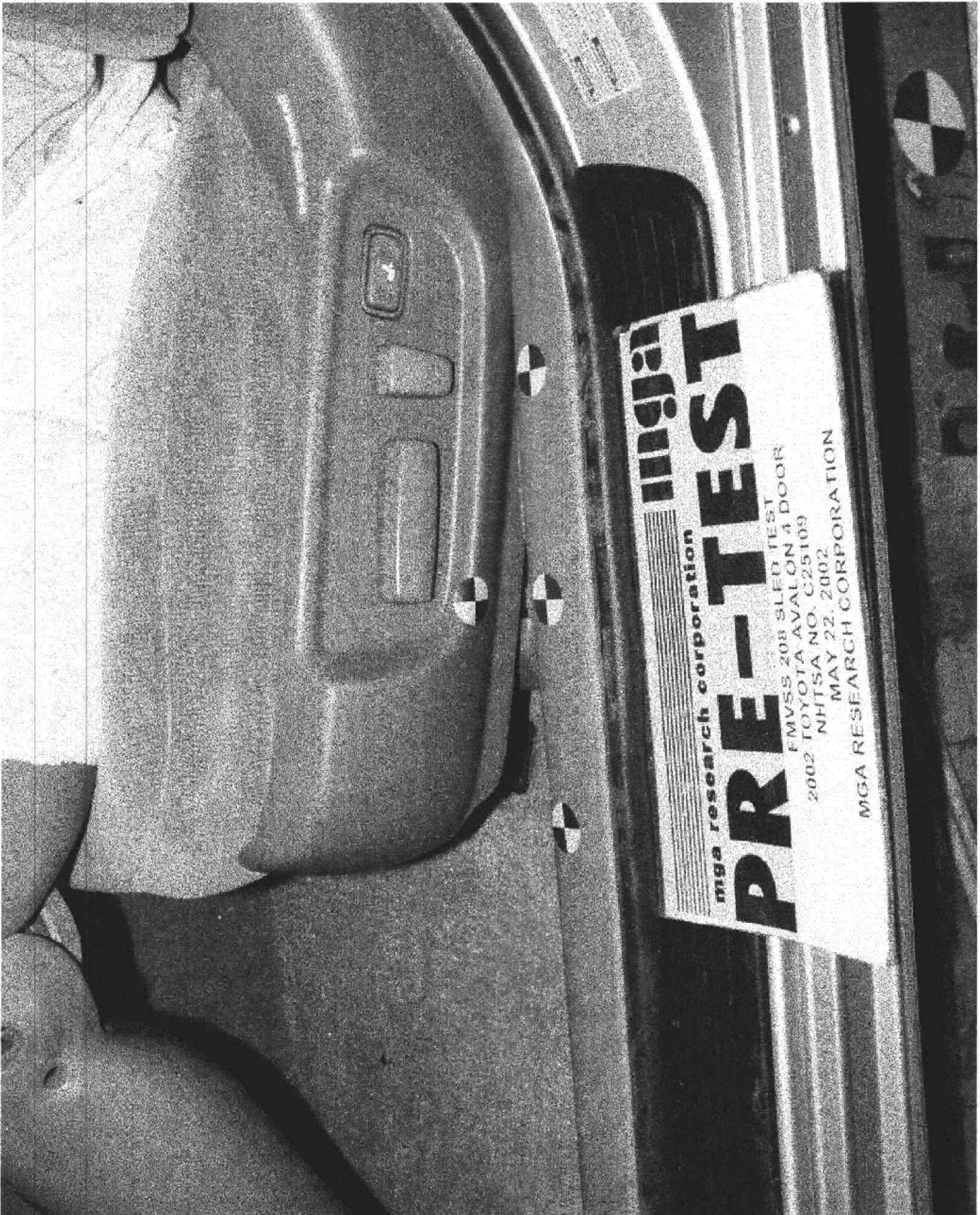


Photo No. A-26 - Pre-Test Driver Seat Position View

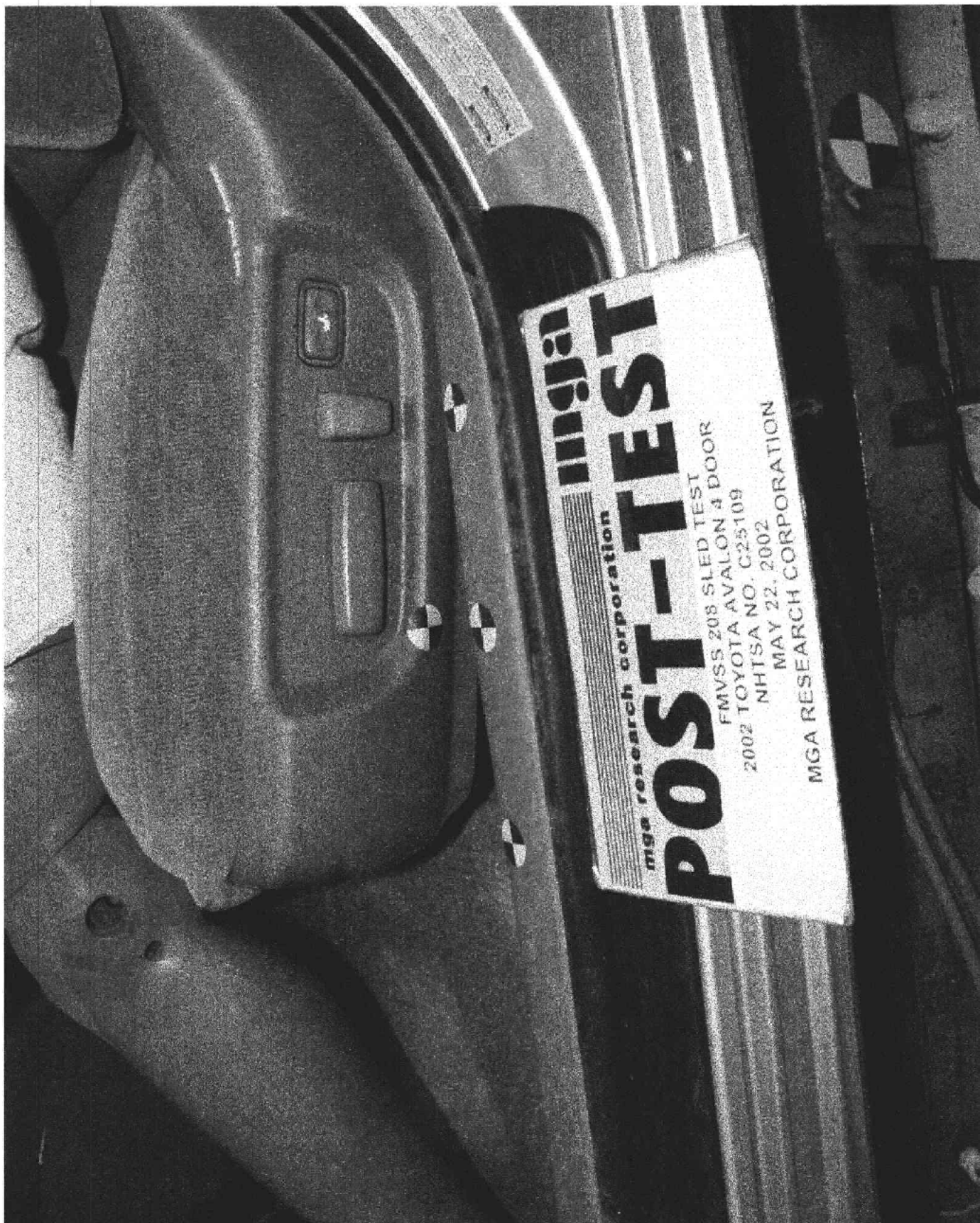


Photo No. A-27 - Post-Test Driver Seat Position View

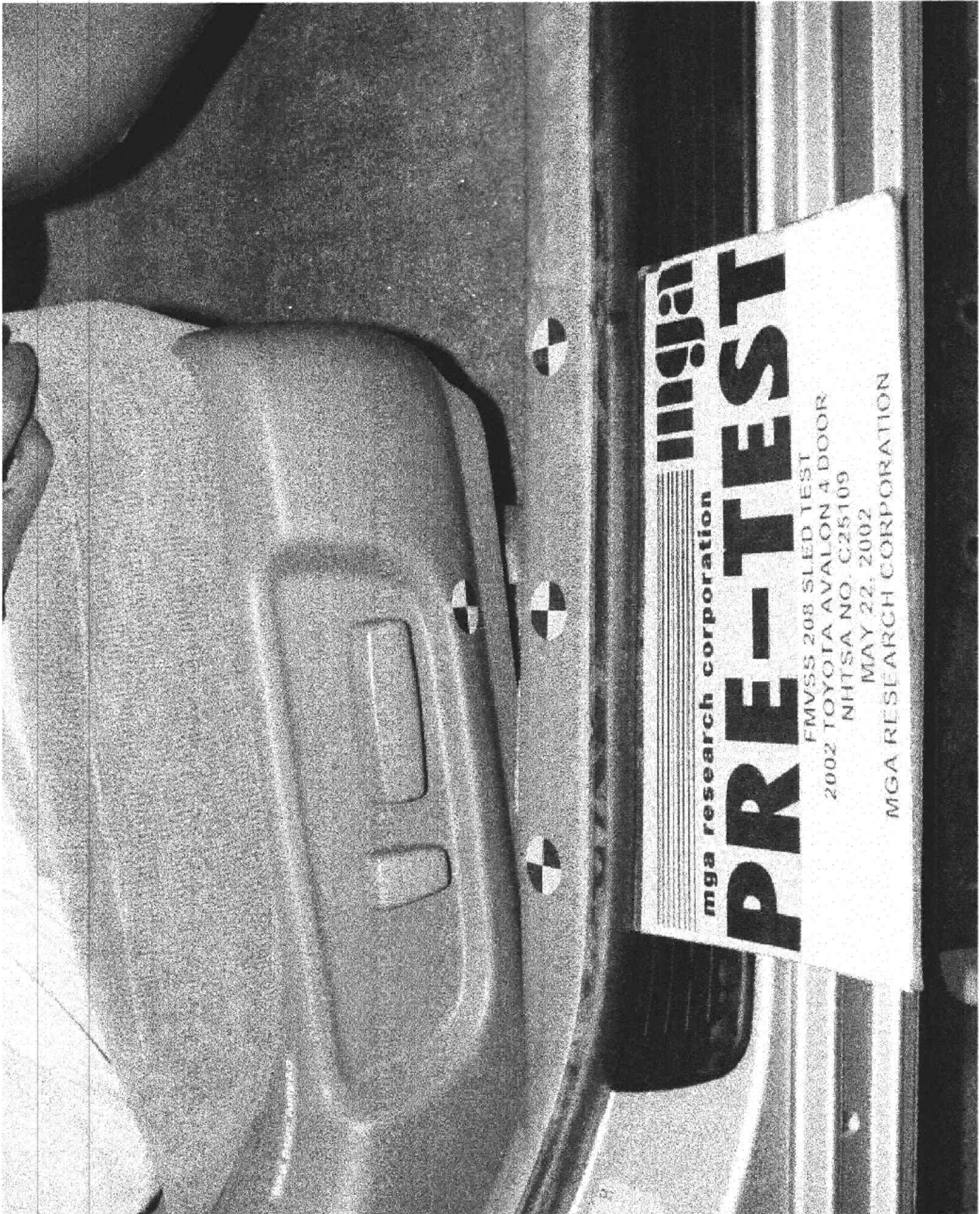


Photo No. A-28 - Pre-Test Passenger Seat Position View

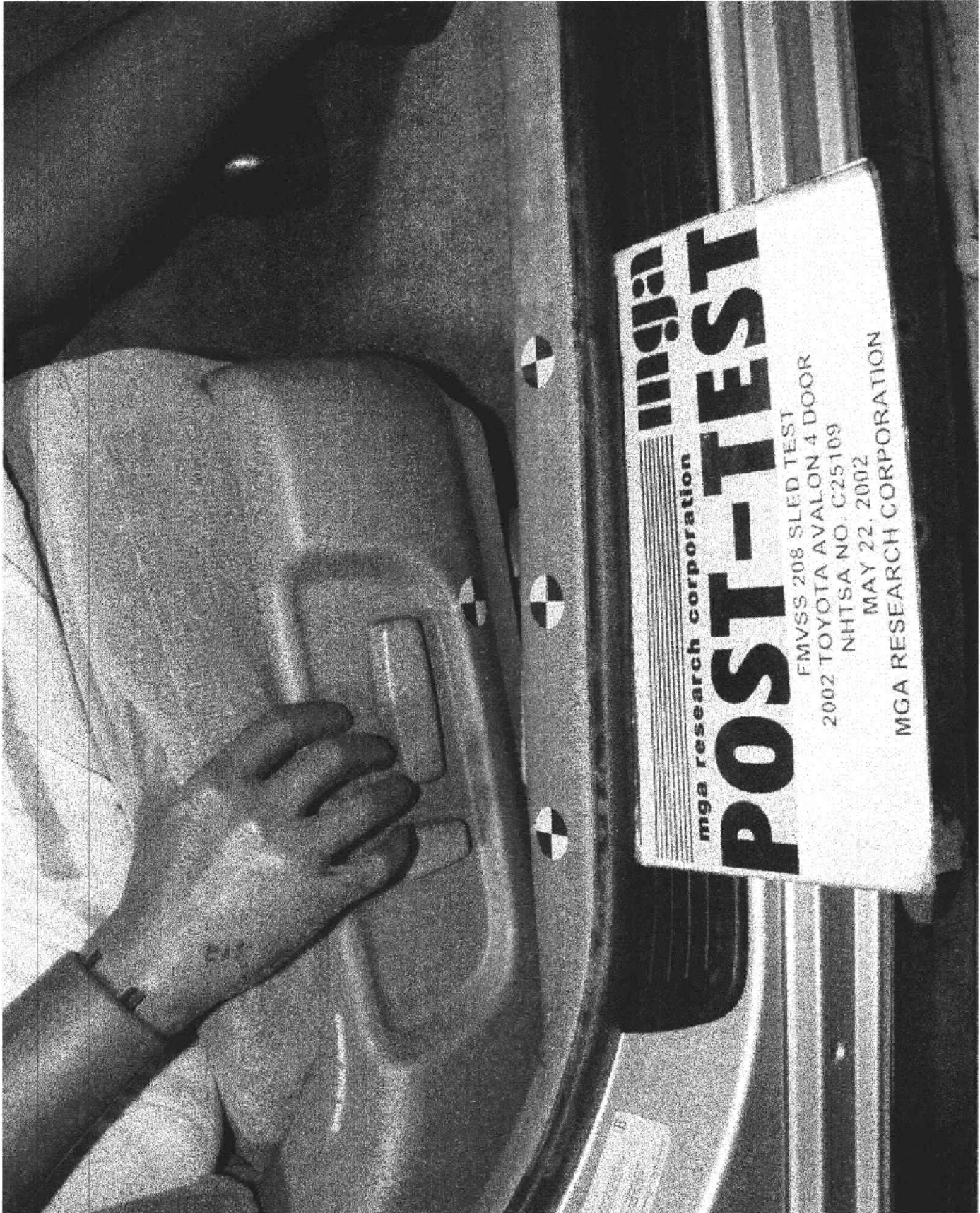


Photo No. A-29 - Post-Test Passenger Seat Position View

TOYOTA

VEHICLE CAPACITY WEIGHT: 410 kg (902 lbs)

OCCUPANT: TOTAL 5 (FRONT 2, REAR 3)

RECOMMENDED COLD TIRE INFLATION PRESSURE : kPa (psi)

TIRE SIZE	P205/65R15 92H	P205/60R16 91H
UP TO 4 OCCUPANTS	Frt 210 (31), Rt 210 (31)	Frt 220 (32), Rt 220 (32)

VEHICLE CAPACITY WEIGHT Frt 210 (31), Rt 210 (31) Frt 220 (32), Rt 220 (32)

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

CHARGE MAXIMALE DU VEHICULE: 410 kg (902 LIVRES)

PERSONNES: TOTAL 5 (AVANT 2, ARRIERE 3)

PRESSION DE PNEUS: kPa (LB/PO²)

DIMENSION DES PNEUS P205/65R15 92H P205/60R16 91H

AVEC 4 PERSONNES A BORD AVANT 210 (31), ARRIERE 210 (31) AVANT 220 (32), ARRIERE 220 (32)

LA CHARGE MAXIMALE AVANT 210 (31), ARRIERE 210 (31) AVANT 220 (32), ARRIERE 220 (32)

POUR DE PLUS AMPLES DETAILS, VOIR LE MANUEL DU PROPRIETAIRE 2 H

07060

APPENDIX B
DATA PLOTS

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* No valid data after approximately 166 msec

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TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

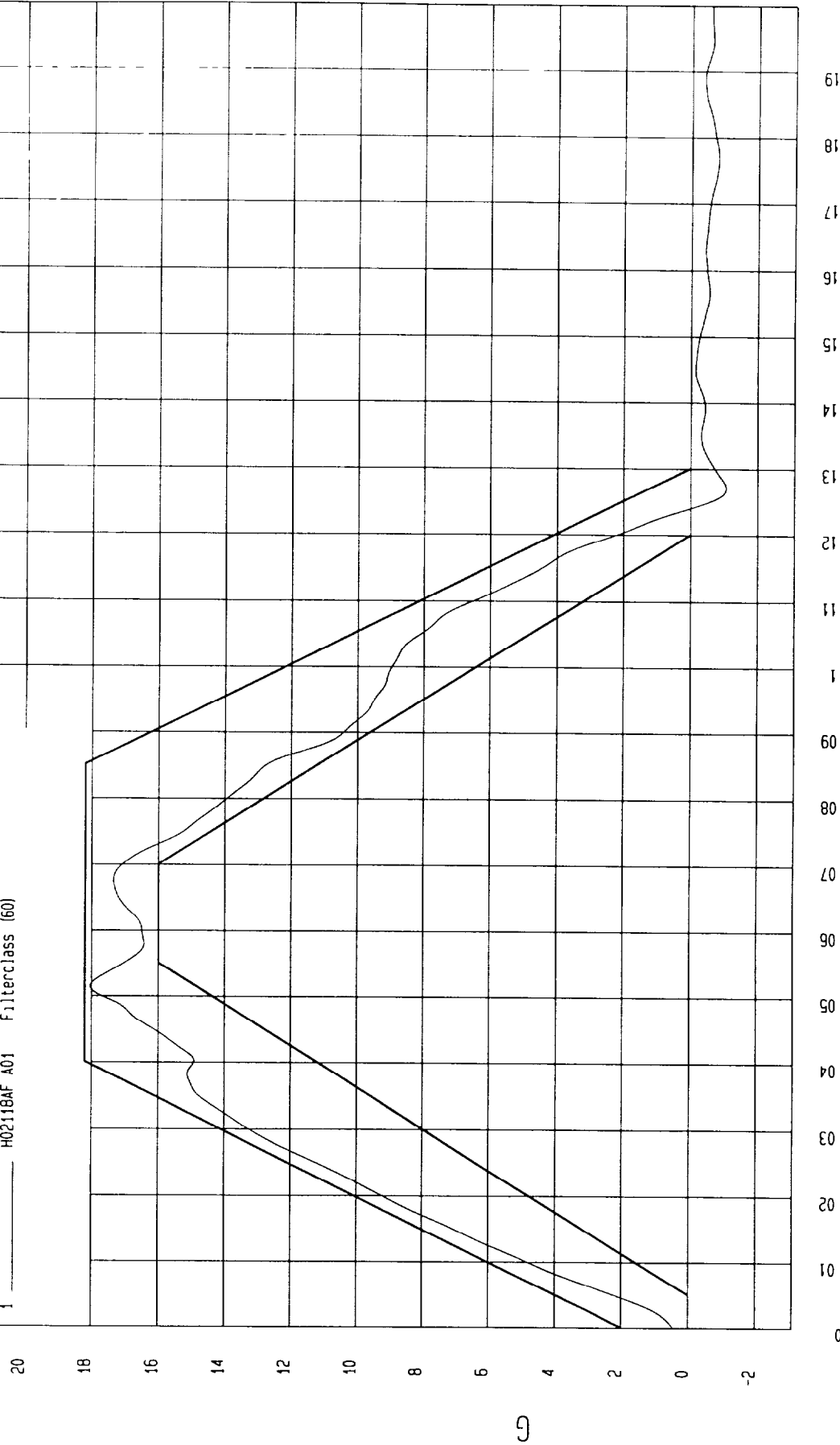
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1.05 G at 127.1 msec

Maximum = 18.03 G at 51.5 msec

SLED X ACCELERATION

1 ——— H02118AF A01 Filterclass (60)



TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

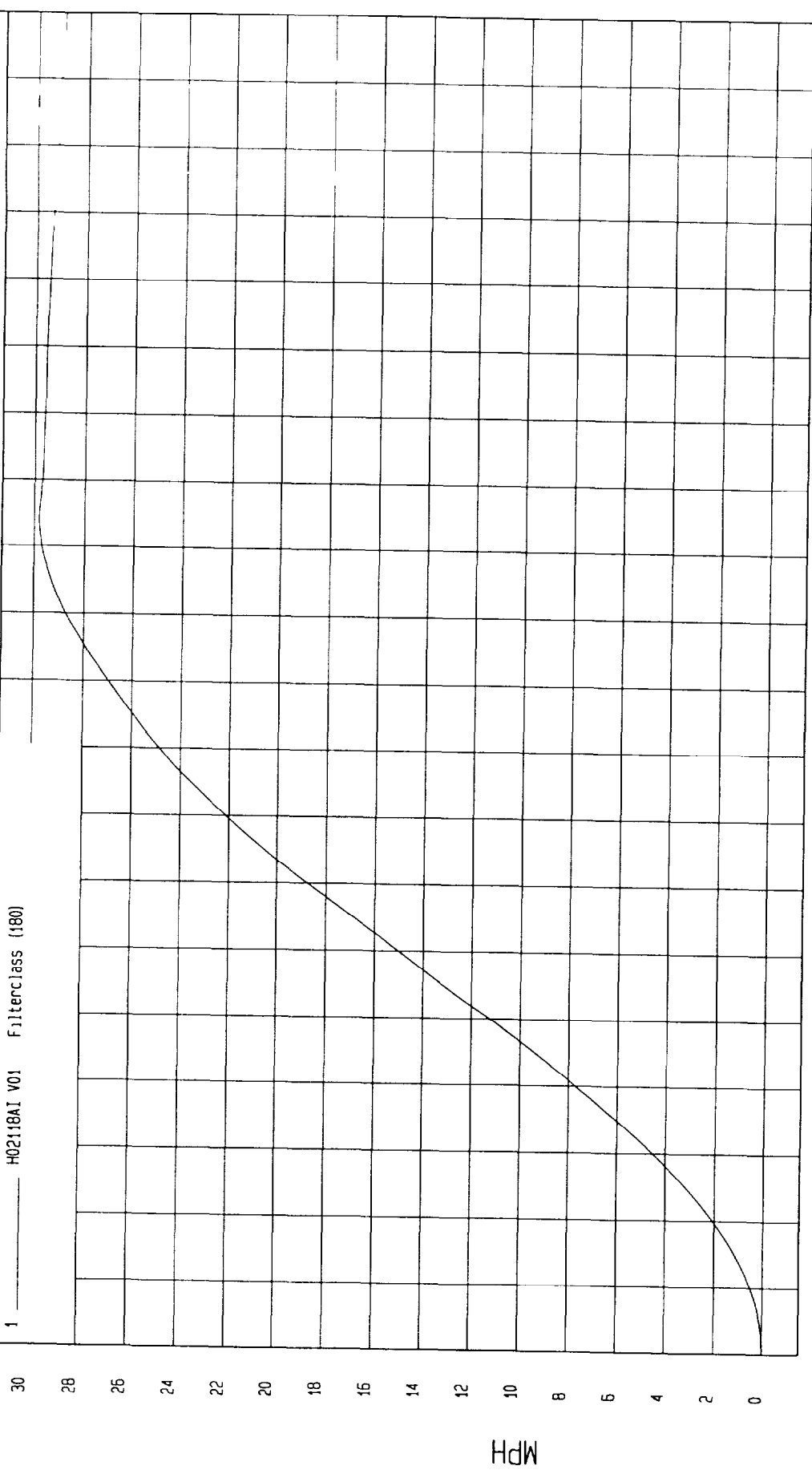
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = 0 MPH at 0 msec

Maximum = 29.81 MPH at 124 msec

SLED X VELOCITY

1 ——— H02118A1 V01 Filterclass (180)

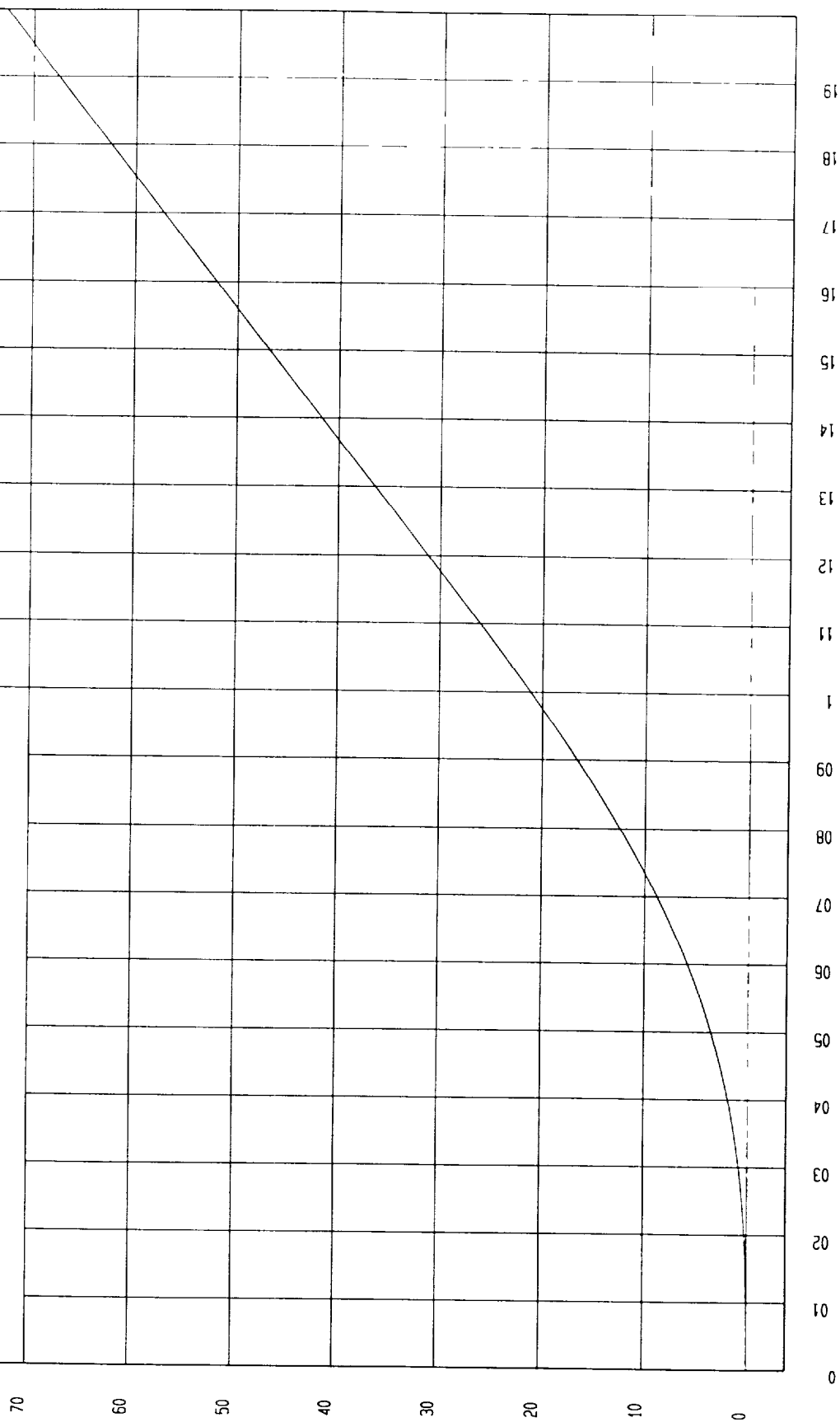


TIME Seconds

TEST FMVSS 208 SLED (H02118)	TEST DATE 05-22-2002
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)	
Minimum = 0 IN at 0 msec	Maximum = 72.58 IN at 200 msec

SLED X DISPLACEMENT

1 ——— H02118A1 001 Filterclass (180)



TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

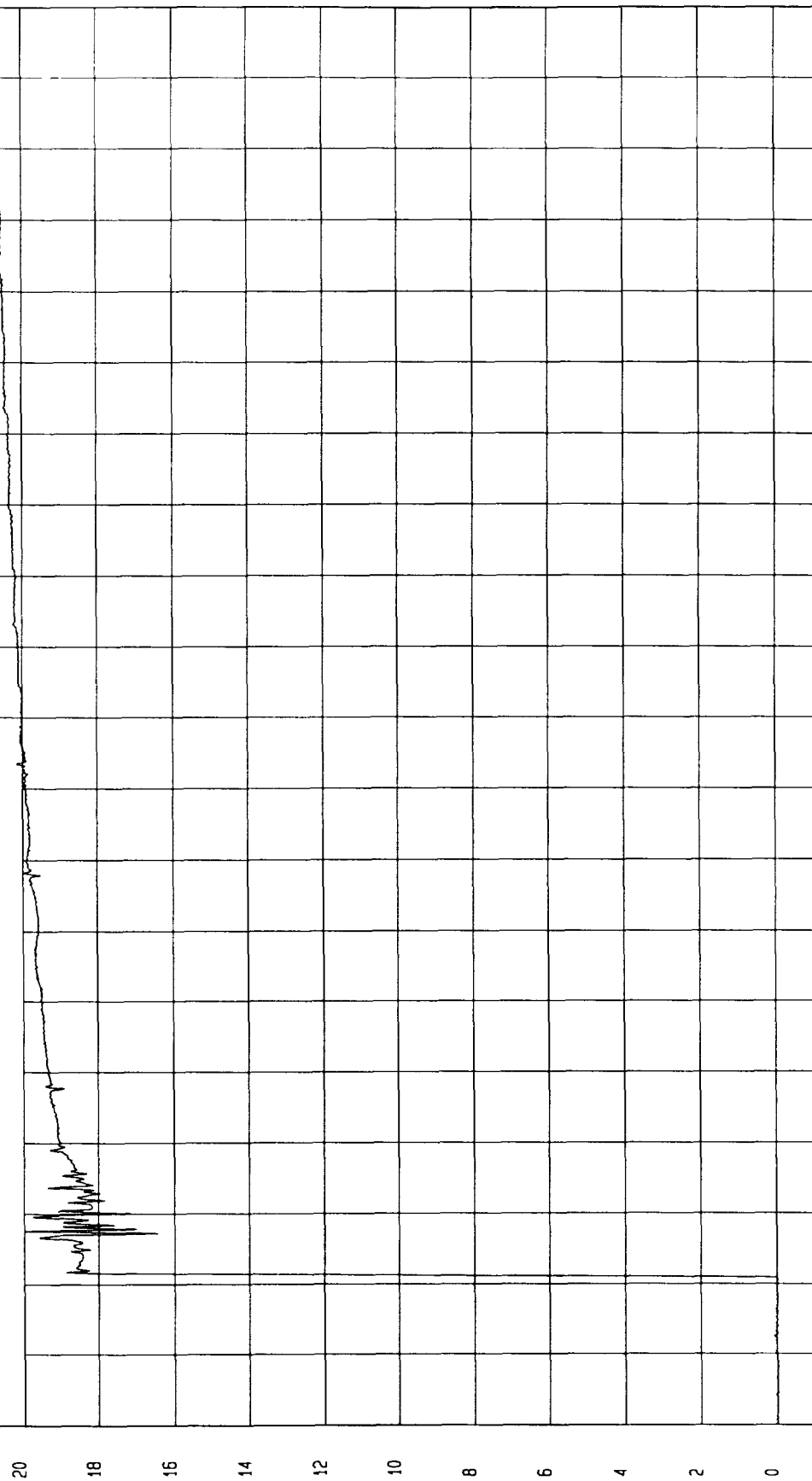
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -4 31E-02 V at 0 msec

Maximum = 20 68 V at 179 msec

AIRBAG VOLTAGE

1 _____ H021180T 047 Filterclass (1000)



TIME (SECONDS)

MCA Research
05-22-2002 13 10

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

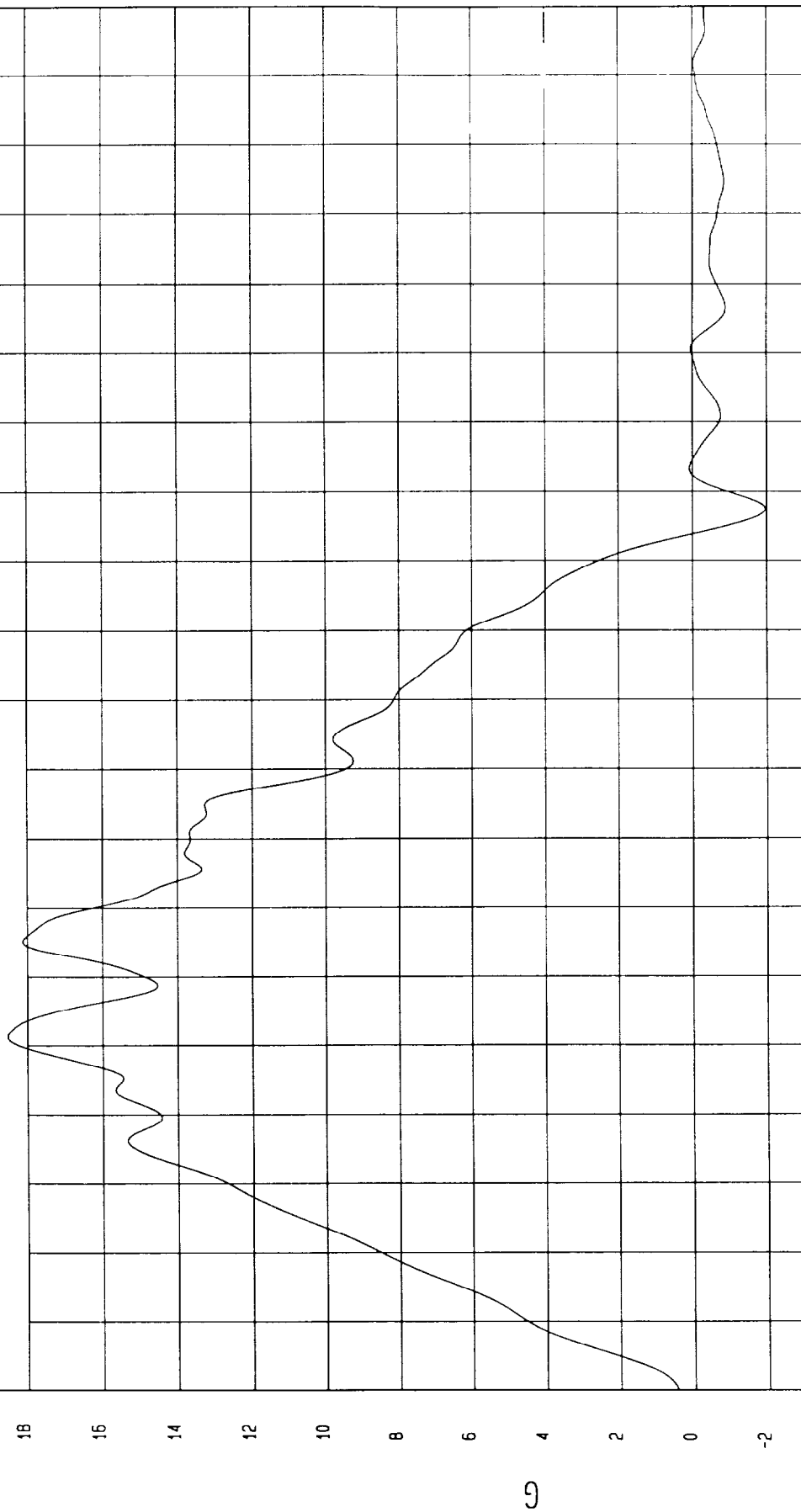
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1.97 G at 128 msec

Maximum = 18.53 G at 51 msec

LEFT REAR SEAT CROSSMEMBER X ACCELERATION

1 H02118AF A51 Filterclass (60)



TIME (SECONDS)

MGA Research
05-22-2002 13:10

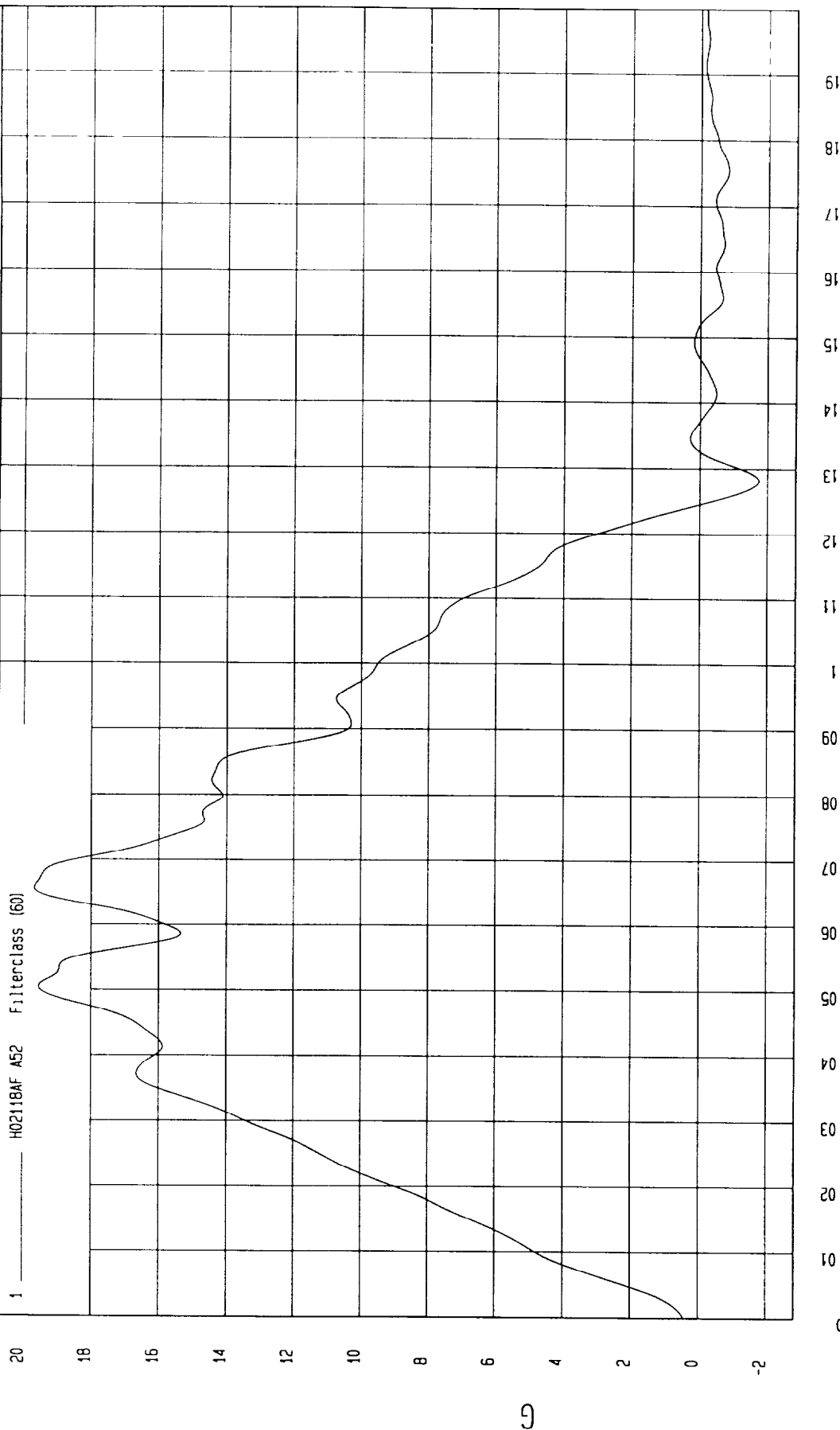
TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1.75 G at 128 msec

Maximum = 19.69 G at 66 msec

RIGHT REAR SEAT CROSSMEMBER X ACCELERATION



TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

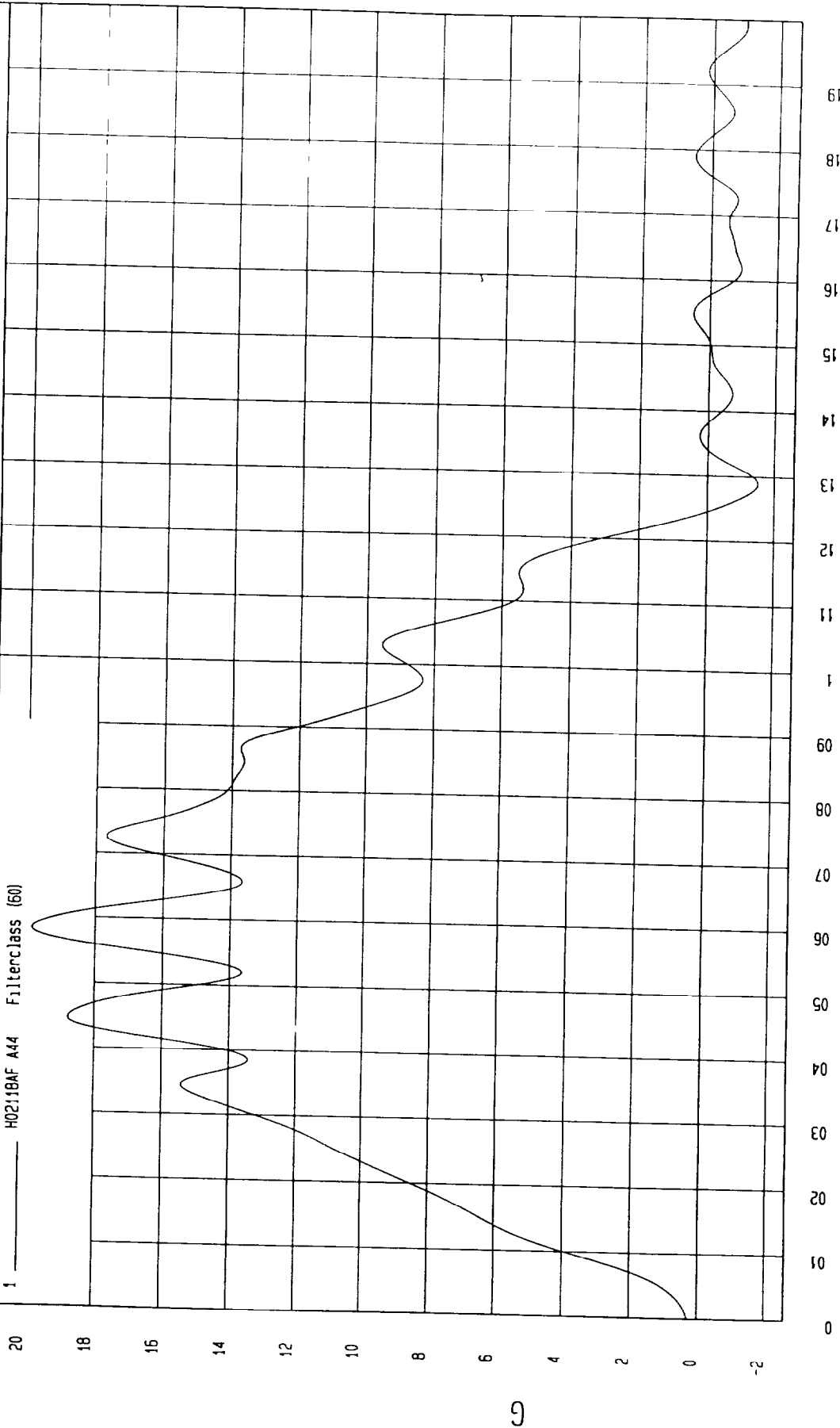
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1.51 G at 129 msec

Maximum = 19.86 G at 58 msec

TOP OF ENGINE X ACCELERATION

1 ——— H02118AF A44 Filterclass (60)



TEST FMVSS 208 SLED (H02118)

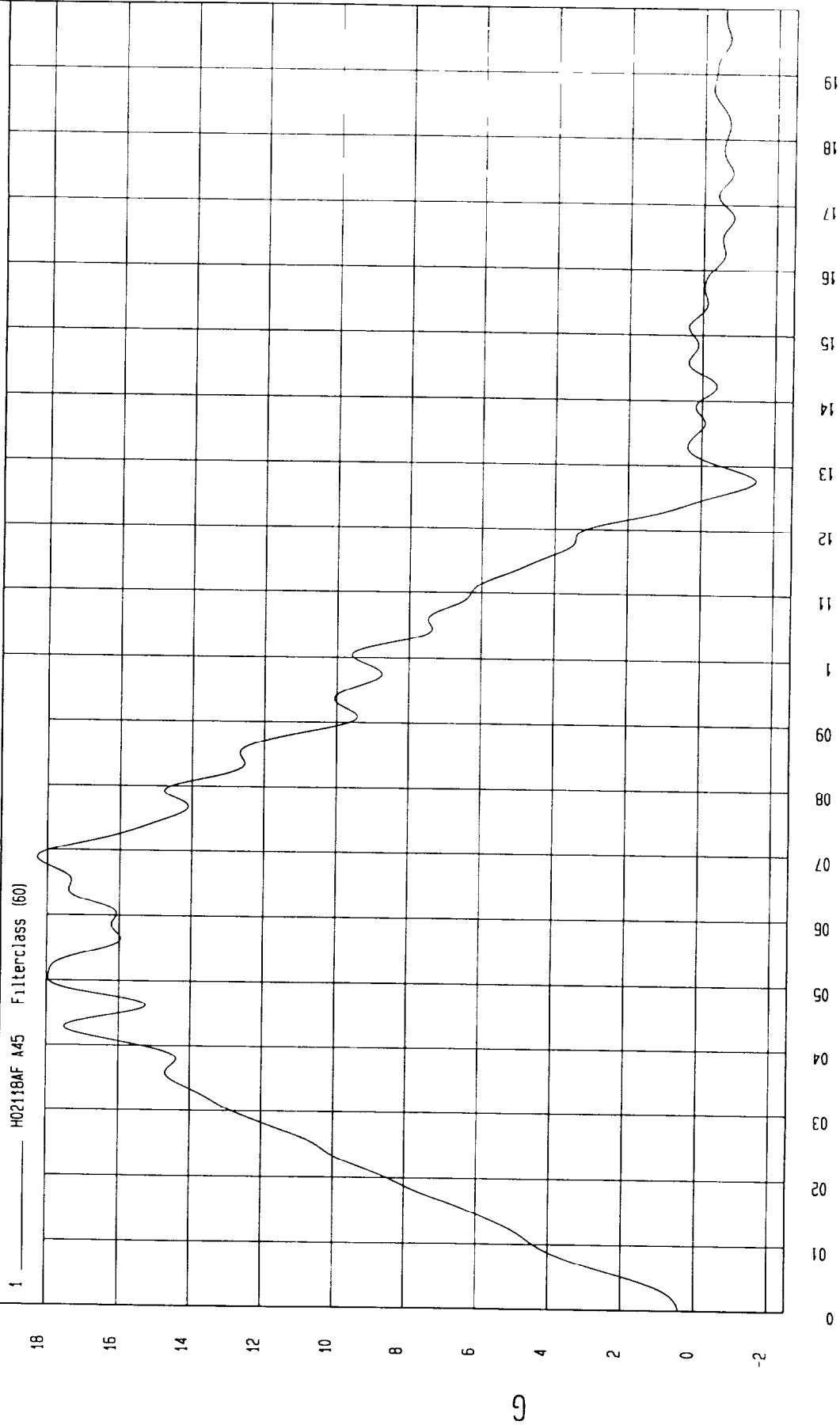
TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1.5 G at 128 msec

Maximum = 19.28 G at 69 msec

REAR AXLE X ACCELERATION



TIME (SECONDS)

MGA Research
05-22-2002 13 10

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

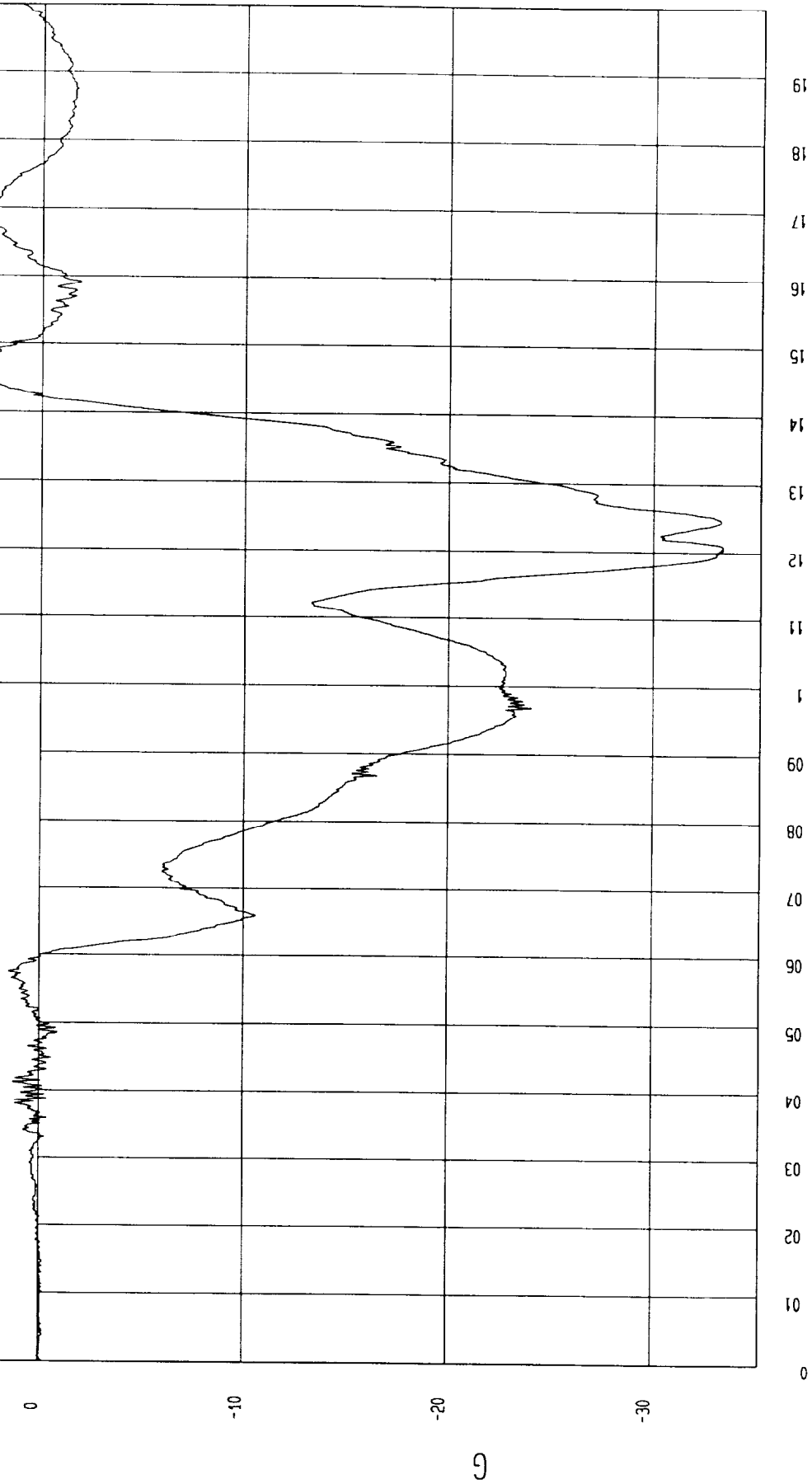
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -33.38 G at 120 msec

Maximum = 3.52 G at 146 msec

DRIVER HEAD X ACCELERATION

1 ——— H02118AT A03 Filterclass (1000)



TIME (SECONDS)

MGA Research
05-22-2002 13:08

TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

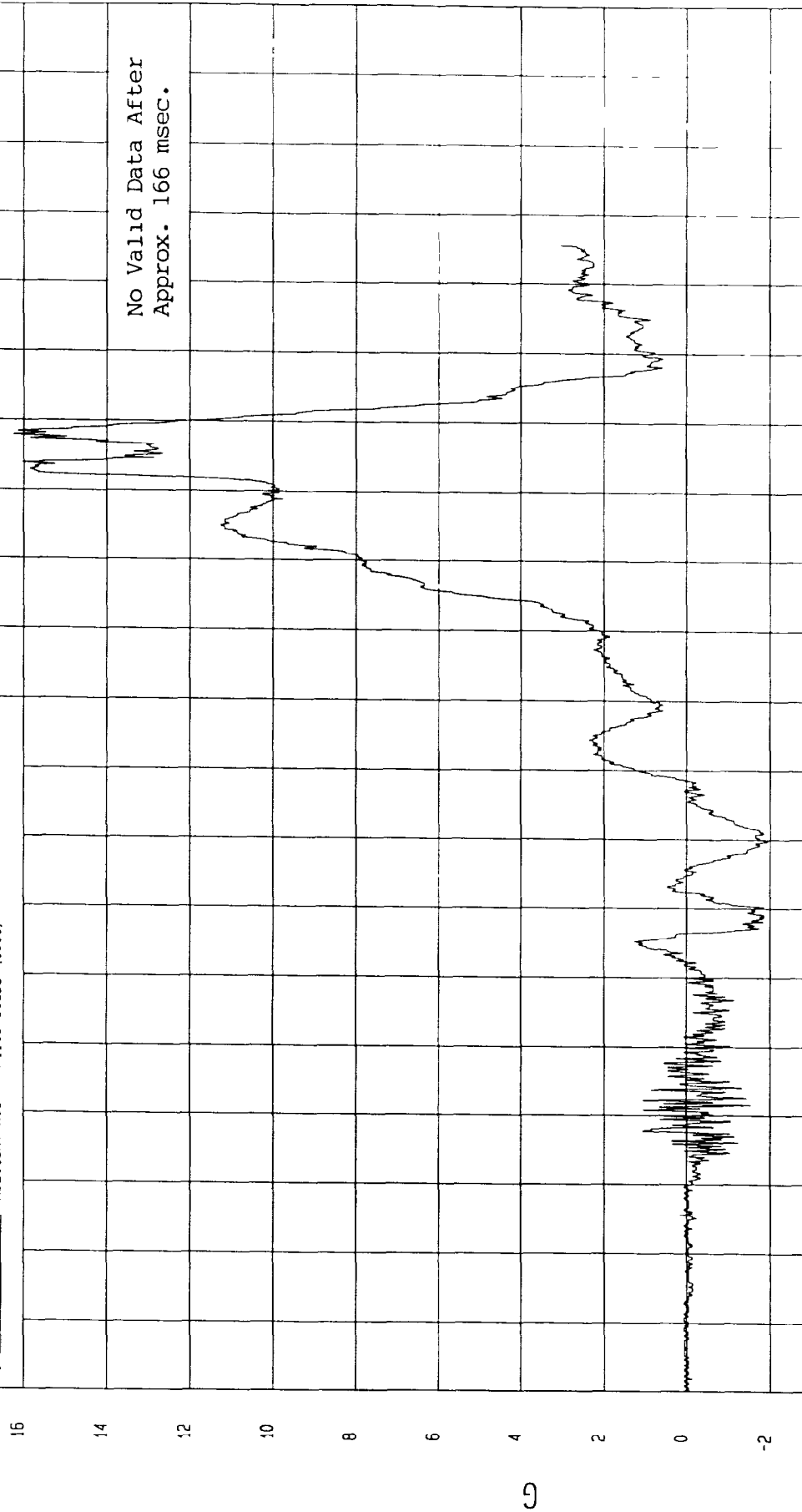
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1.94 G at 80 msec

Maximum = 16.25 G at 138 msec

DRIVER HEAD Y ACCELERATION

1 H0211BAT A05 Filterclass (1000)



TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

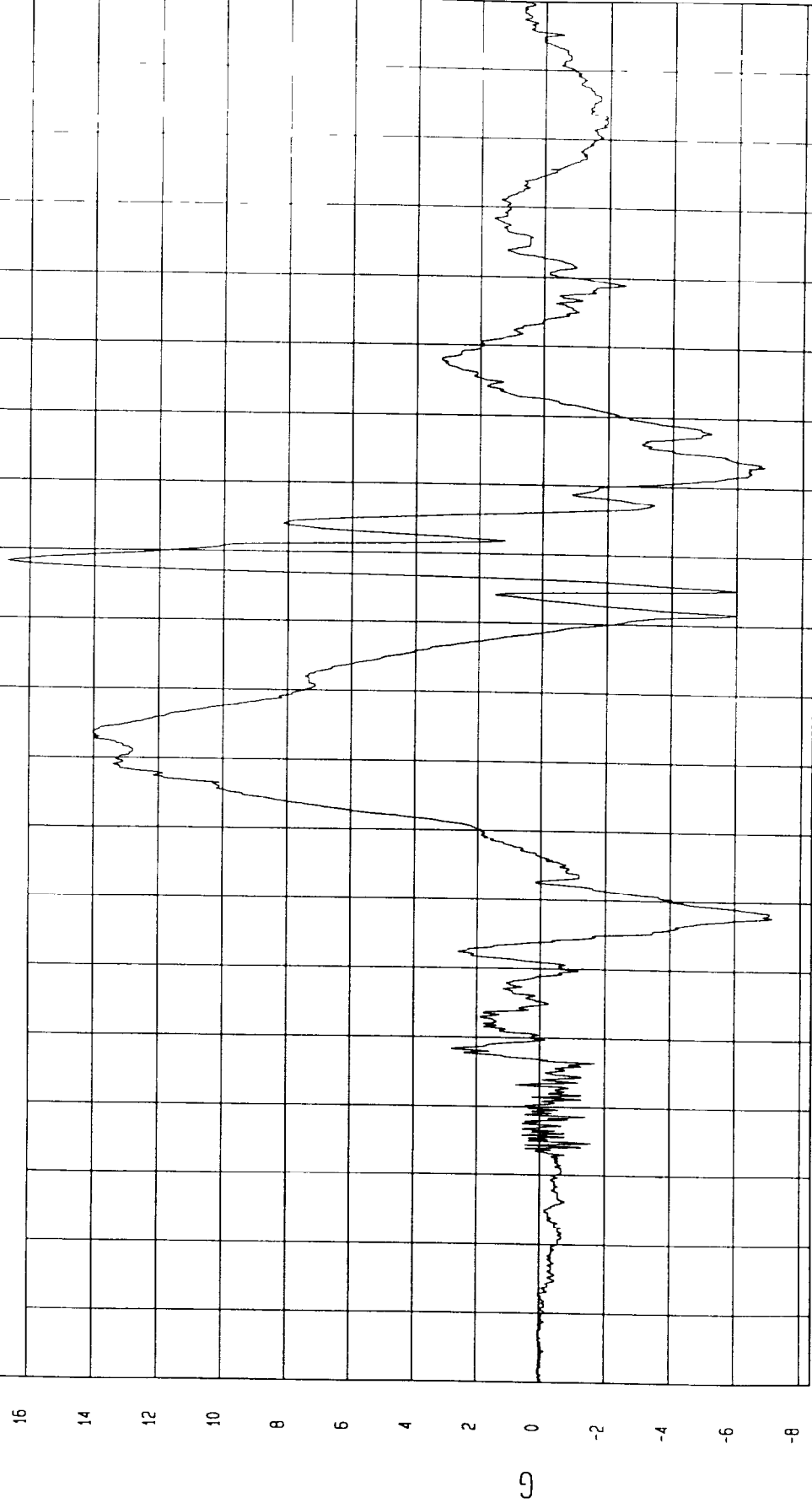
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -7.15 G at 68 msec

Maximum = 16.69 G at 118 msec

DRIVER HEAD Z ACCELERATION

1 H02118AT A06 Filterclass (1000)



TIME (SECONDS)

MCA Dr. H. H. H.
05/24/2002 10:26

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = 6.76E-02 G at 1 msec

Maximum = 36.81 G at 119 msec

DRIVER HEAD RESULTANT ACCELERATION

1 H02118AV A03 Filterclass (1000)

38

36

34

32

30

28

26

24

22

20

18

16

14

12

10

8

6

4

2

0

G

No Valid Data After
Approx. 166 msec.

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9

TIME (SECONDS)

MCA Research
05/22/2002 13:14

TEST FMVSS 208 SLED (H02118)

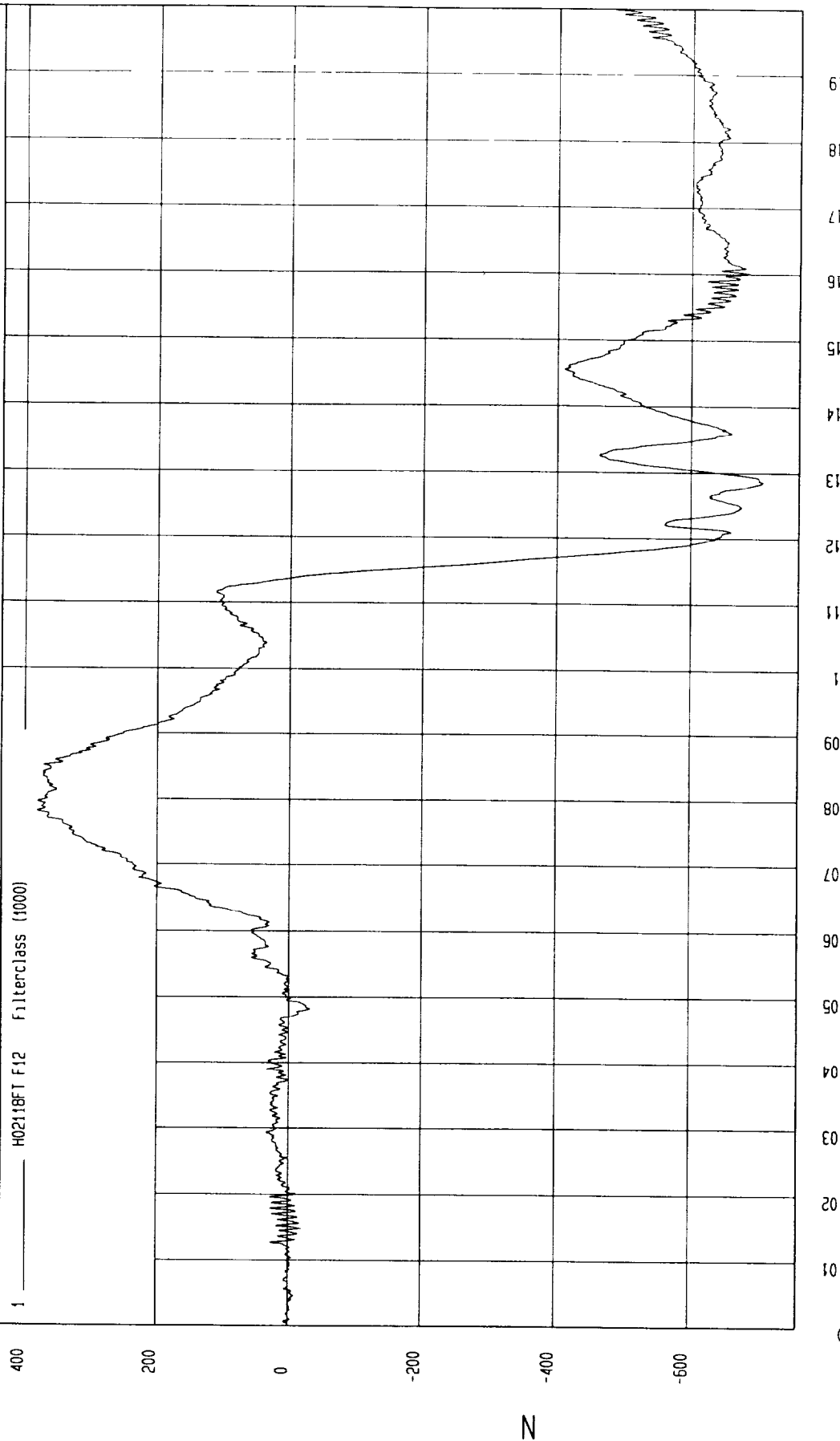
TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -707 95 N at 128 msec

Maximum = 381 19 N at 78 msec

DRIVER NECK FORCE X



TEST FMVSS 208 SLED (H02118)

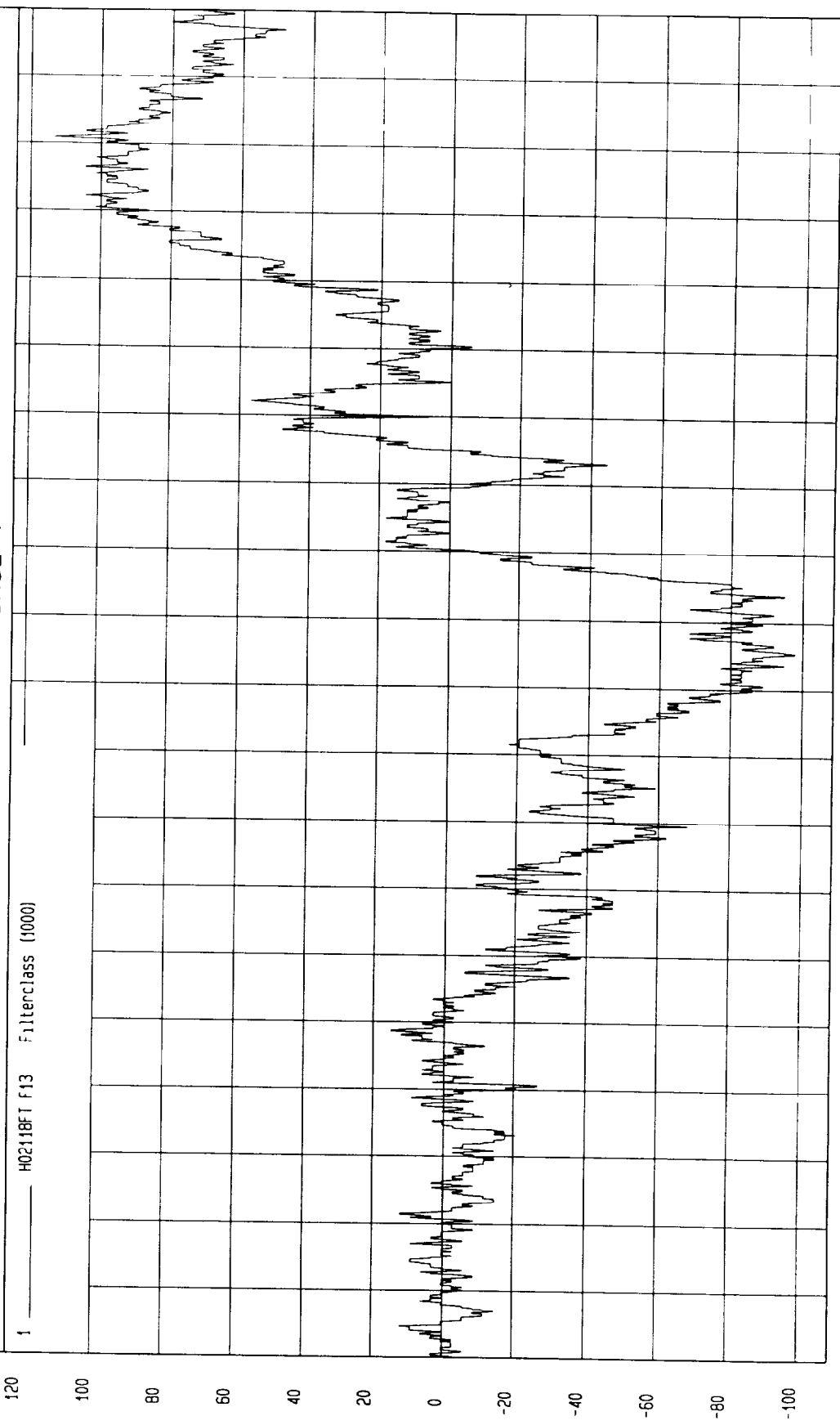
TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 D00R (C25109)

Minimum = -97 92 N at 105 msec

Maximum = 113 33 N at 181 msec

DRIVER NECK FORCE Y



TEST FMVSS 208 SLED (H02118)

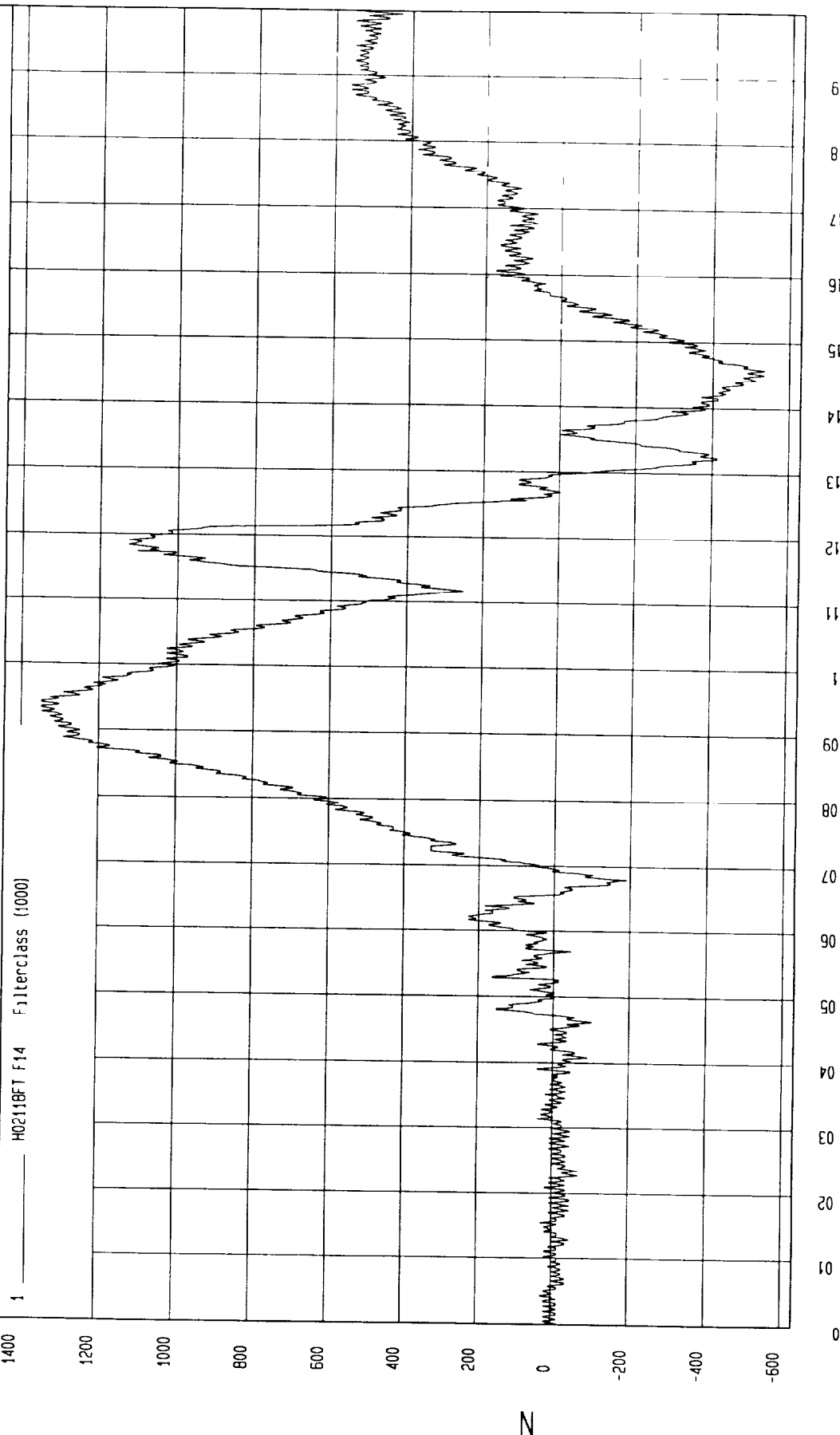
TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -535 14 N at 145 msec

Maximum = 1348 18 N at 93 msec

DRIVER NECK FORCE Z



TIME (SECONDS)

N

M&A Research
05-22-2002 13:08

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

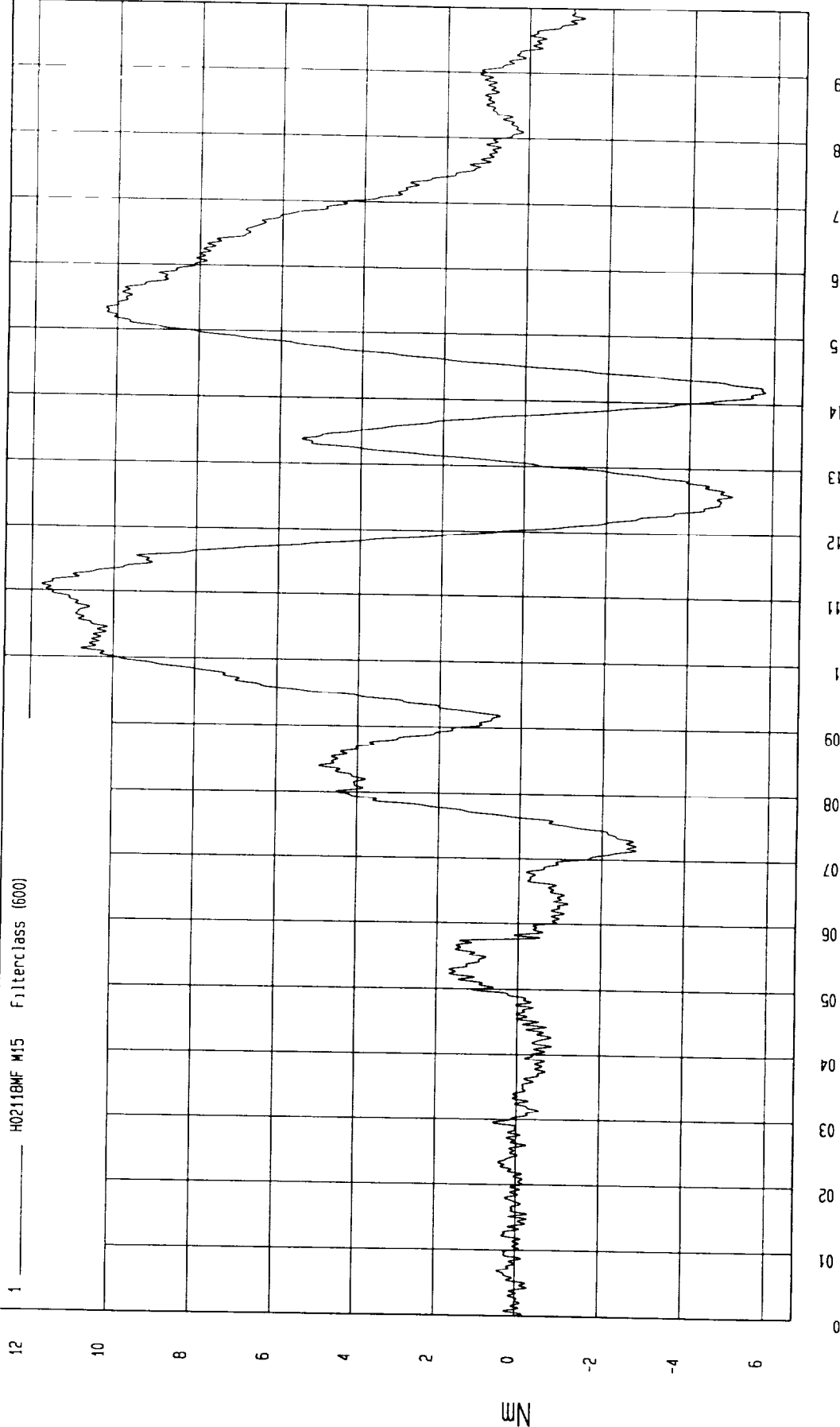
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -5.81 Nm at 142 msec

Maximum = 11.77 Nm at 111 msec

DRIVER NECK MOMENT X

1 ——— H02118MF M15 Filterclass (600)



TIME (SECONDS)

Nm

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

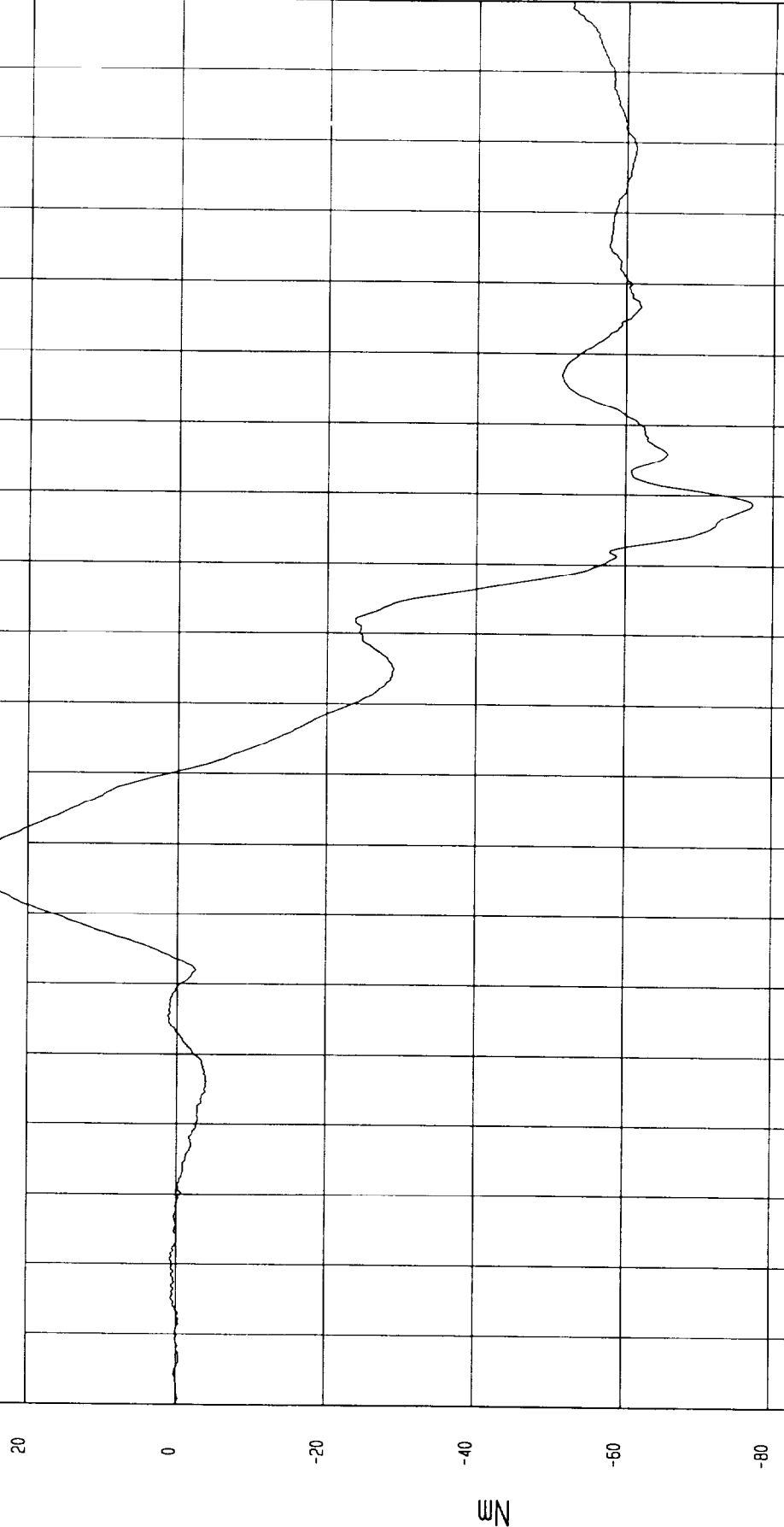
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -77.2 Nm at 129 msec

Maximum = 27.77 Nm at 77 msec

DRIVER NECK MOMENT Y

1 — H02118NF M17 Filterclass (600)



TIME (SECONDS)

MCA Research
05-22-2002 13 09

TEST FMVSS 208 SLED (H02118)

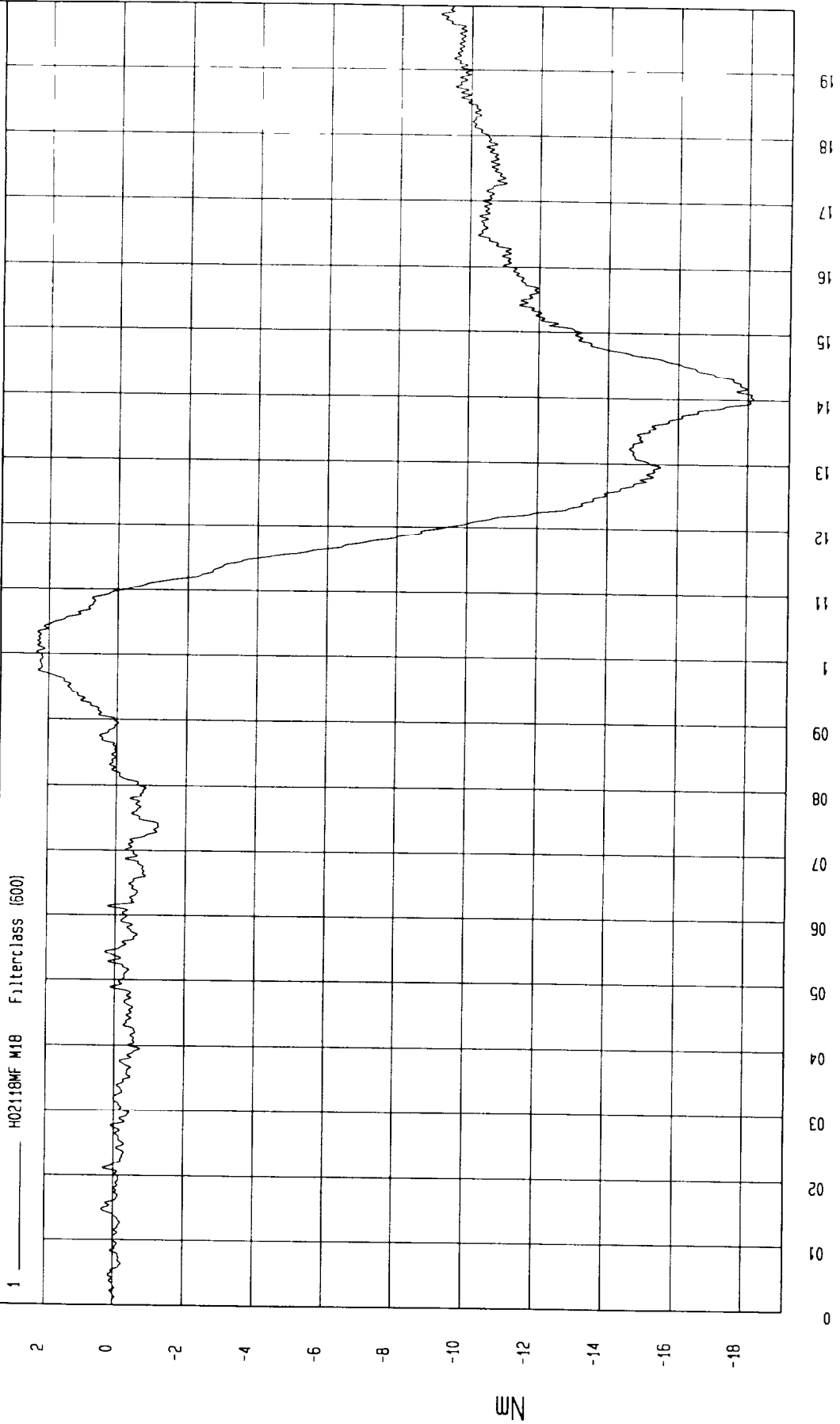
TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -18.16 Nm at 140 msec

Maximum = 2.36 Nm at 100 msec

DRIVER NECK MOMENT Z



TIME (SECONDS)

MCA Research
05/22/2002 13:09

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

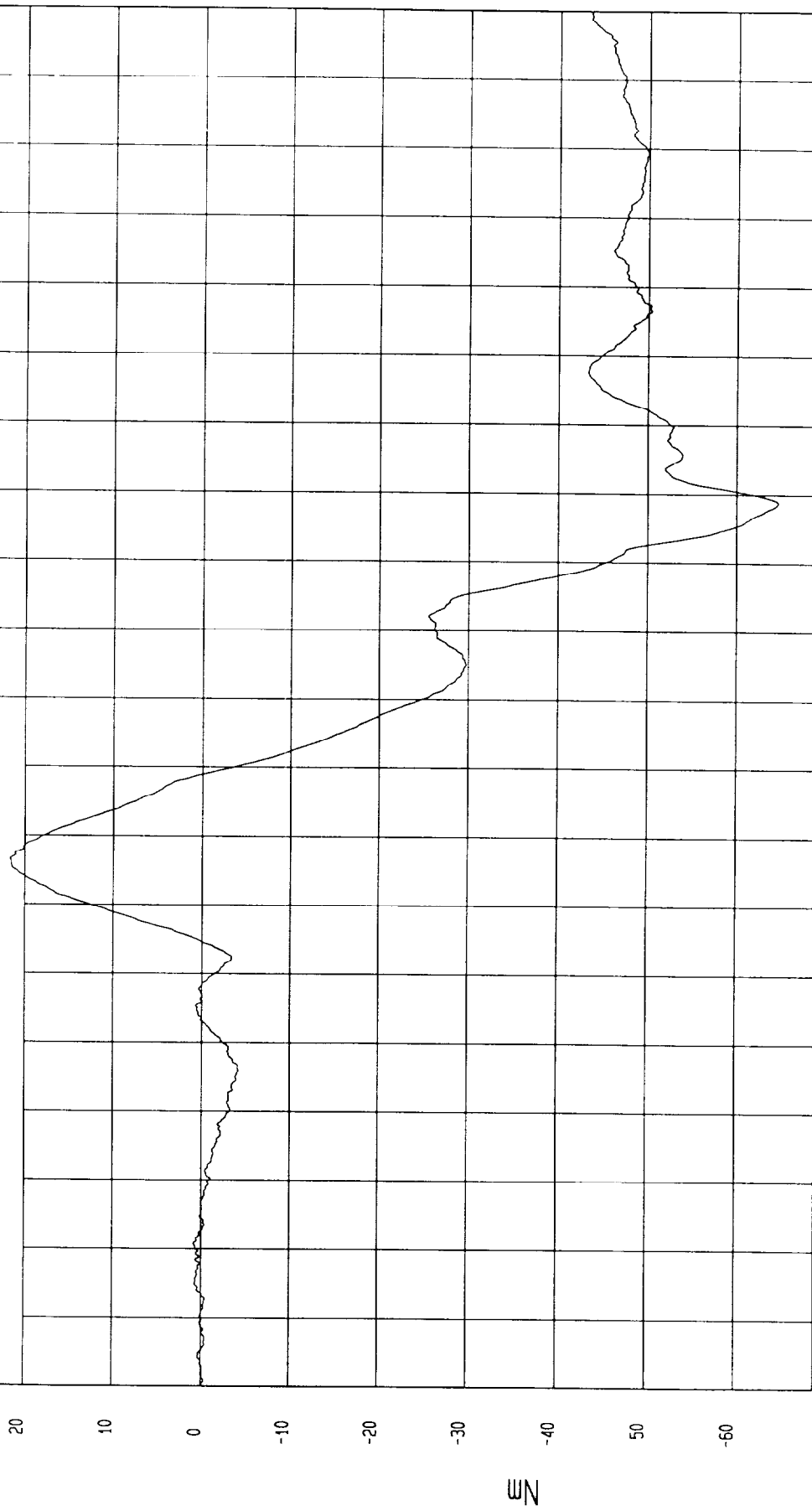
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -64.68 Nm at 129 msec

Maximum = 21.63 Nm at 76 msec

DRIVER OCCIPITAL CONDYLE MOMENT Y

1 ——— H02118M0 M17 Filterclass (600)



TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

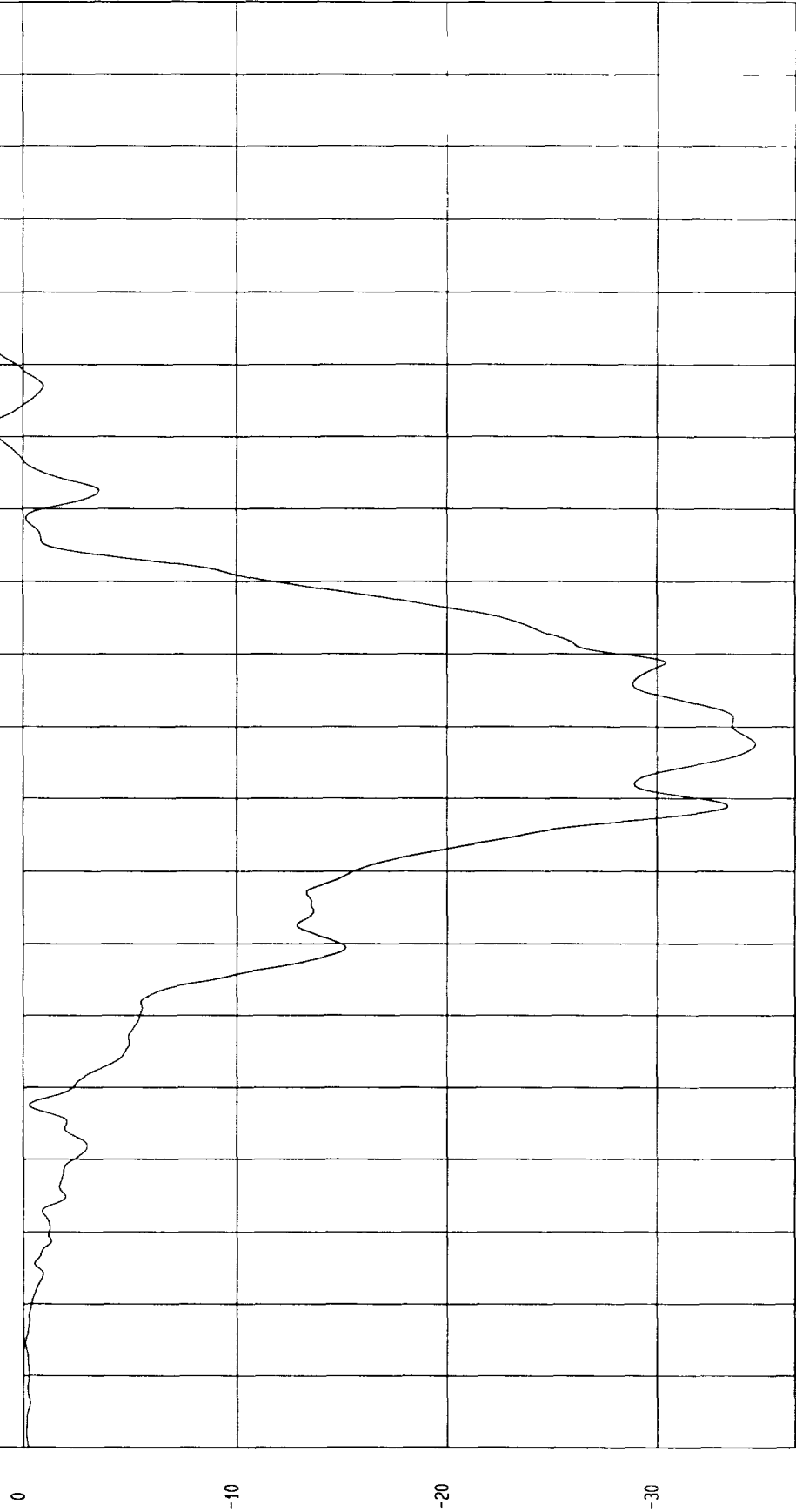
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -34.62 G at 98 msec

Maximum = 2.52 G at 160 msec

DRIVER CHEST X ACCELERATION

1 H02118AF A21 Filterclass (180)



MCA DE FRENCH
05-22-2002 13:09

TIME (SECONDS)

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

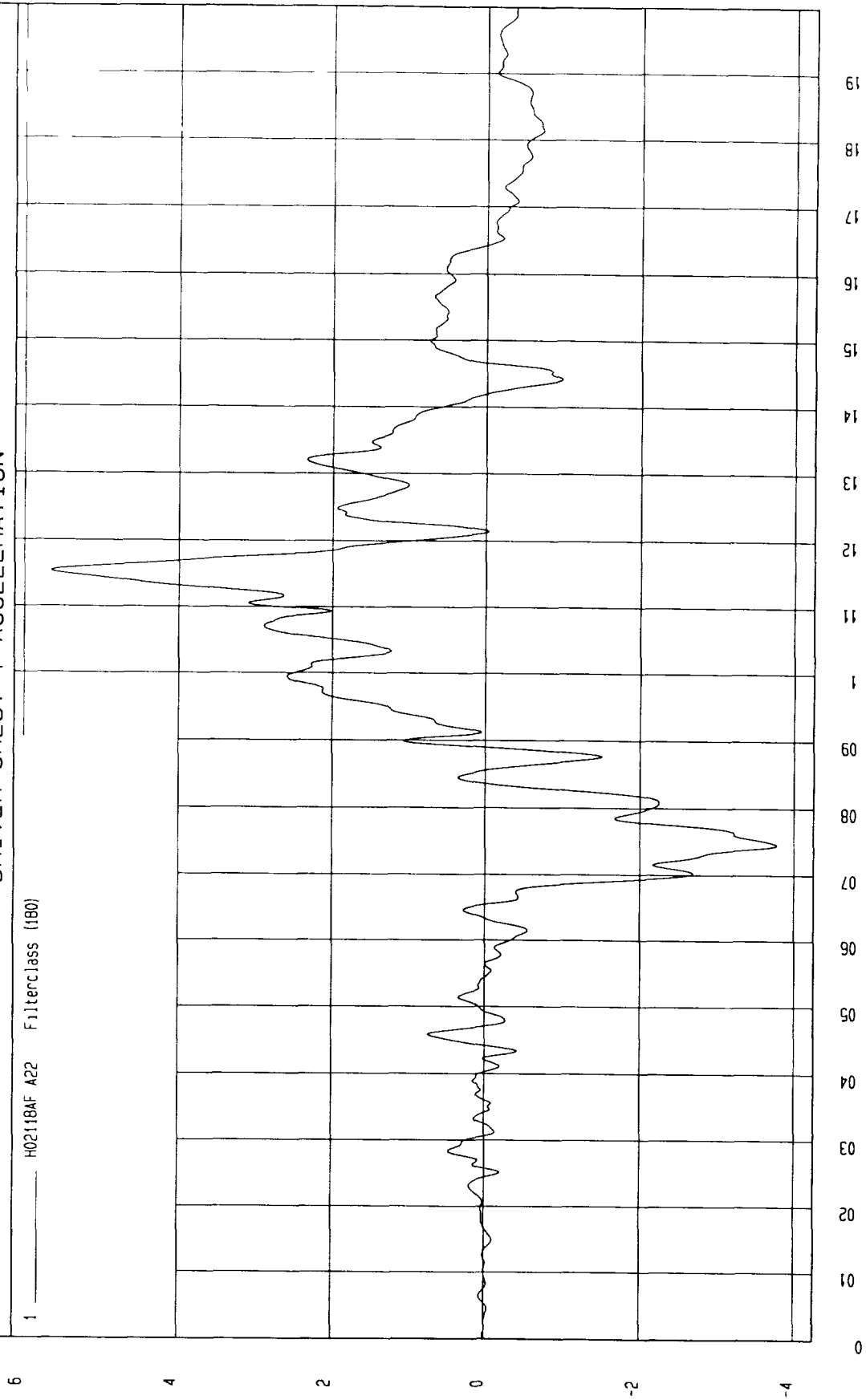
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -3.78 G at 74 msec

Maximum = 5.66 G at 115 msec

DRIVER CHEST Y ACCELERATION

1 H02118AF A22 Filterclass (180)



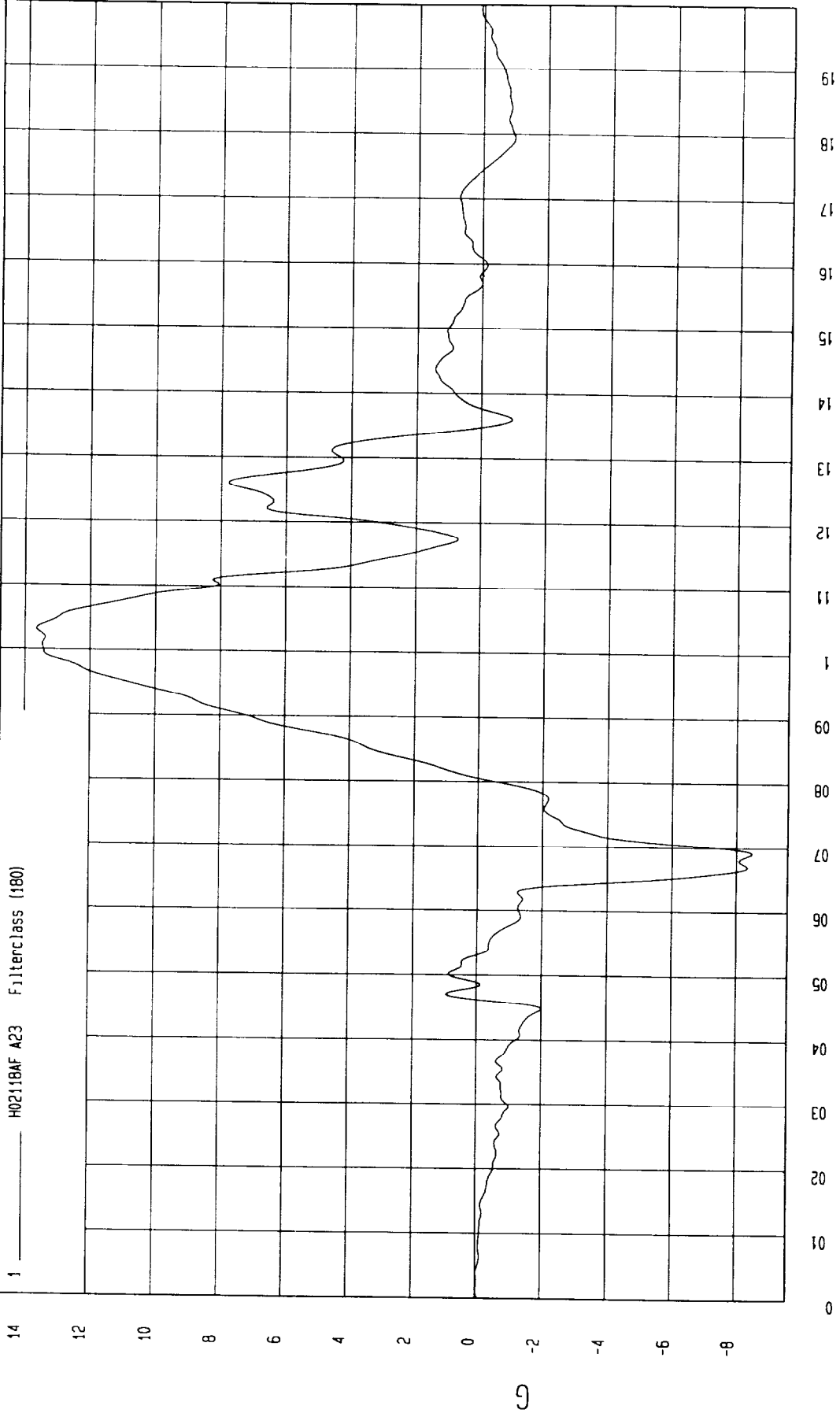
TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -8.49 G at 59 msec

Maximum = 13.65 G at 103 msec

DRIVER CHEST Z ACCELERATION



TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

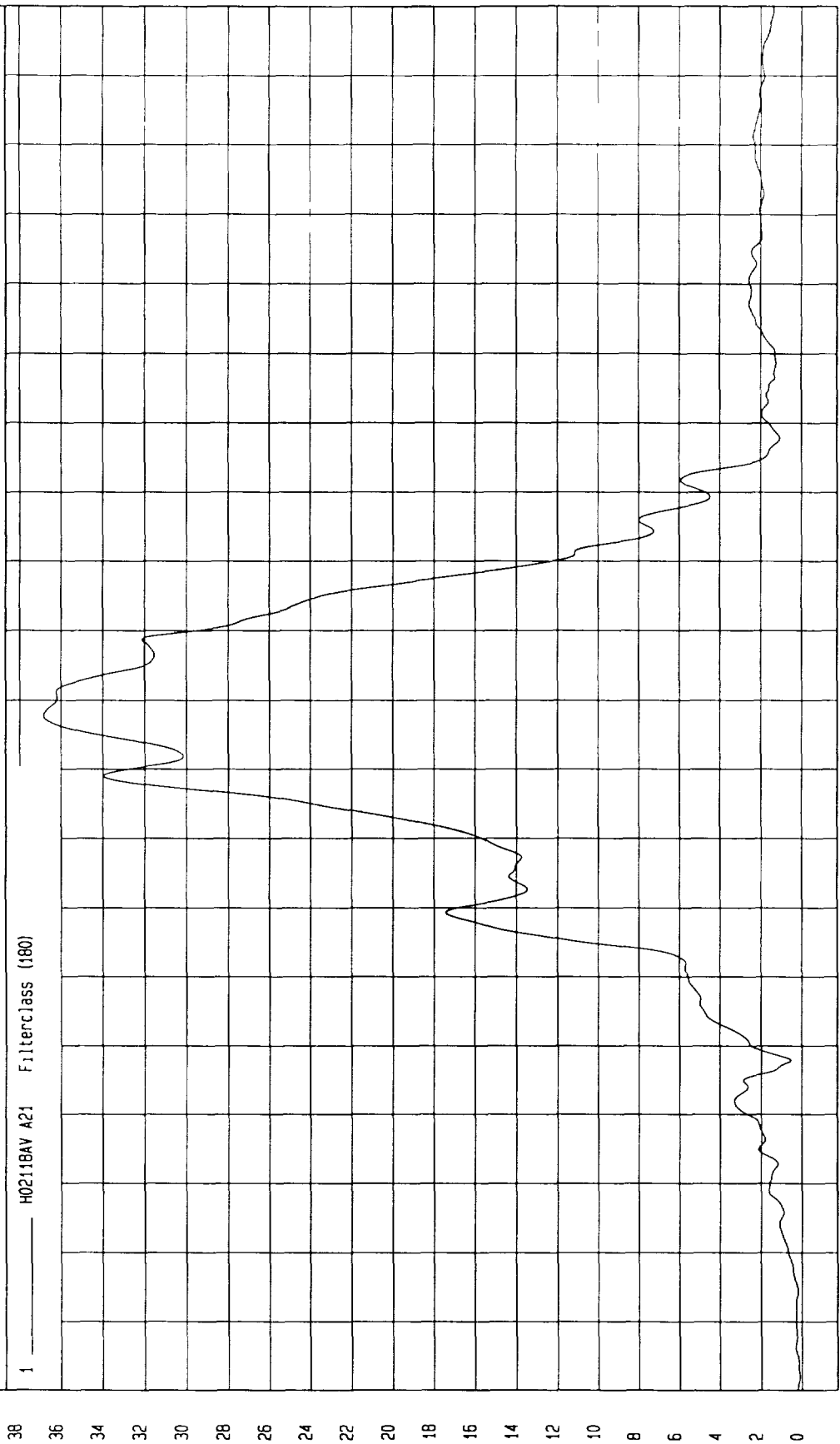
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = 12 G at 2 msec

Maximum = 36.84 G at 98 msec

DRIVER CHEST RESULTANT ACCELERATION

1 ——— H02118AV A21 Filterclass (180)



TEST FMVSS 208 SLED (H02118)

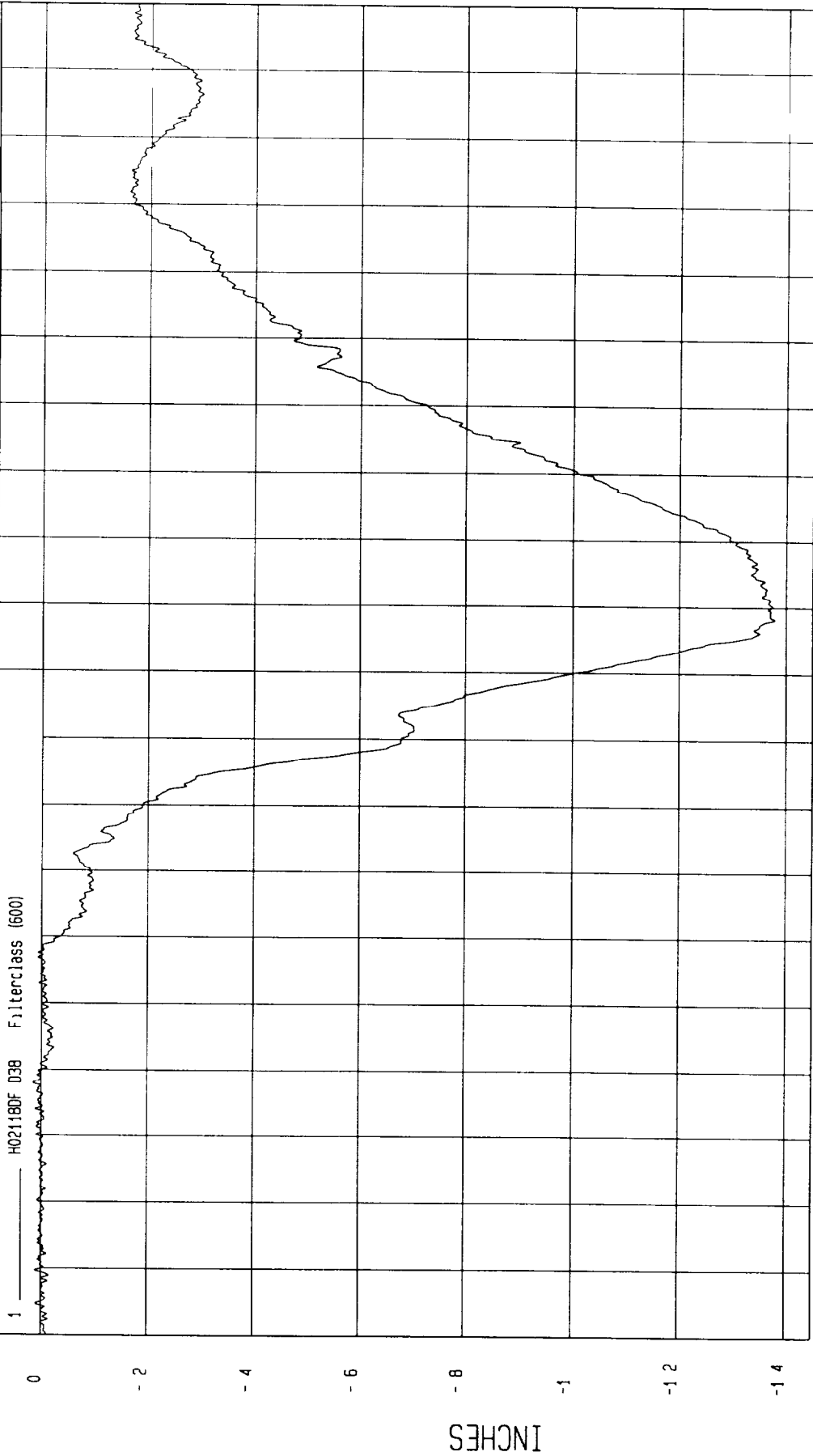
TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1.38 INCHES at 108 msec

Maximum = 0.02 INCHES at 38 msec

DRIVER CHEST COMPRESSION



TIME SECONDS

TEST FMVSS 208 SLED (H02118)

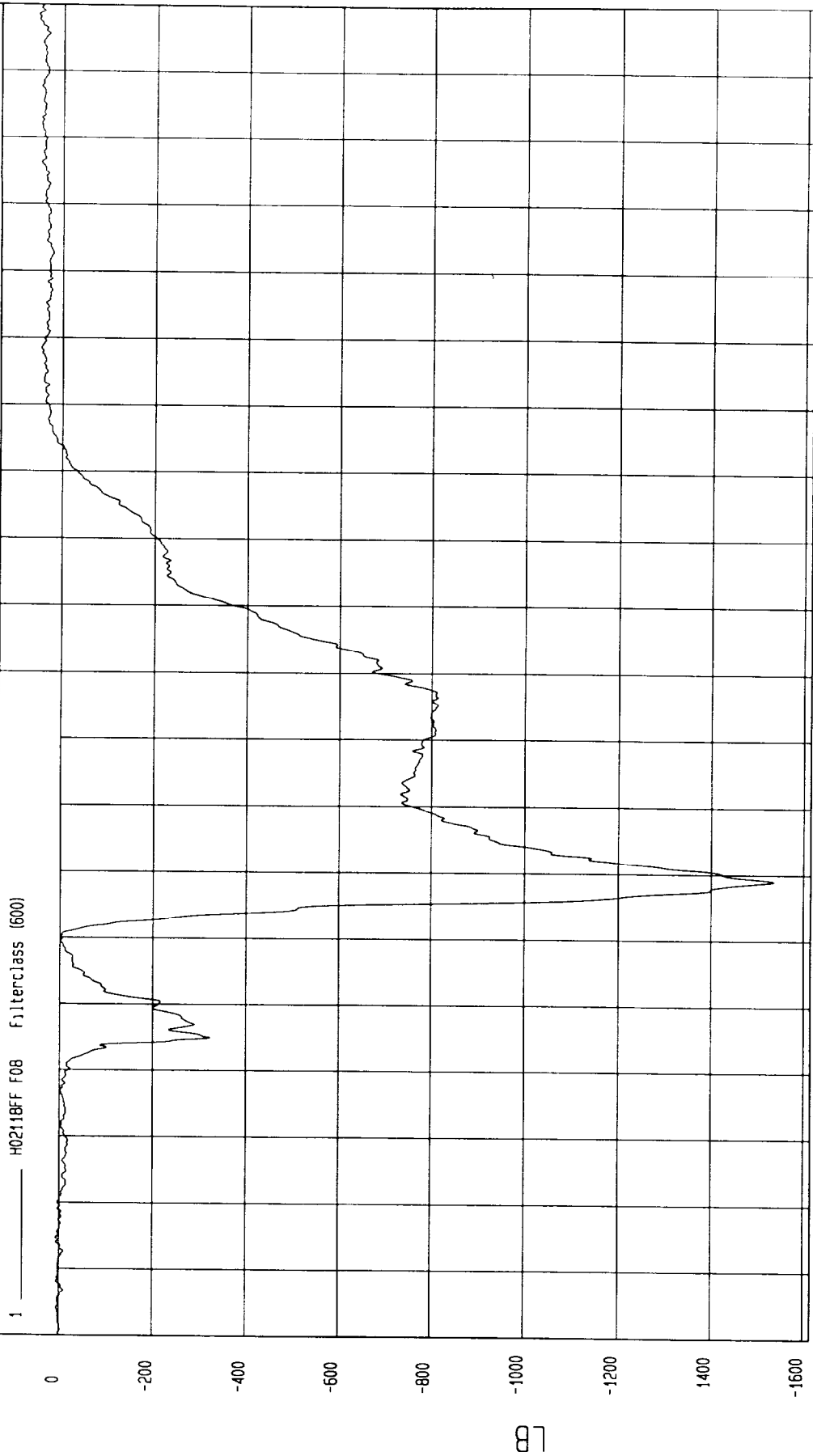
TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1535 29 LB at 69 msec

Maximum = 54 19 LB at 198 msec

DRIVER LEFT FEMUR FORCE



TIME (SECONDS)

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

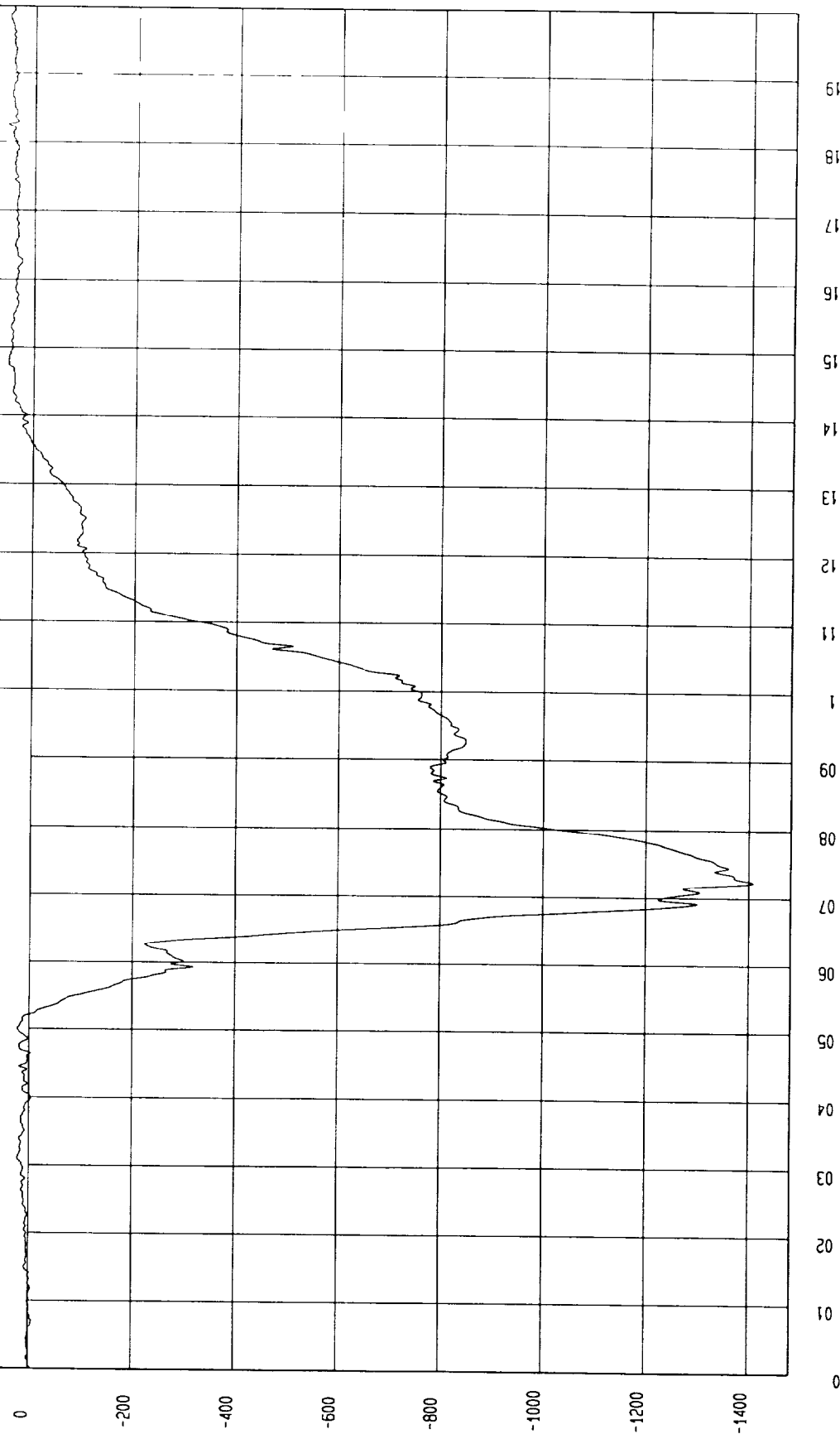
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -1408 57 LB at 72 msec

Maximum = 52 37 LB at 182 msec

DRIVER RIGHT FEMUR FORCE

1 — H02118FF F09 Filterclass (600)



TIME (SECONDS)

MGA Research
05-22-2002 13 09

TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

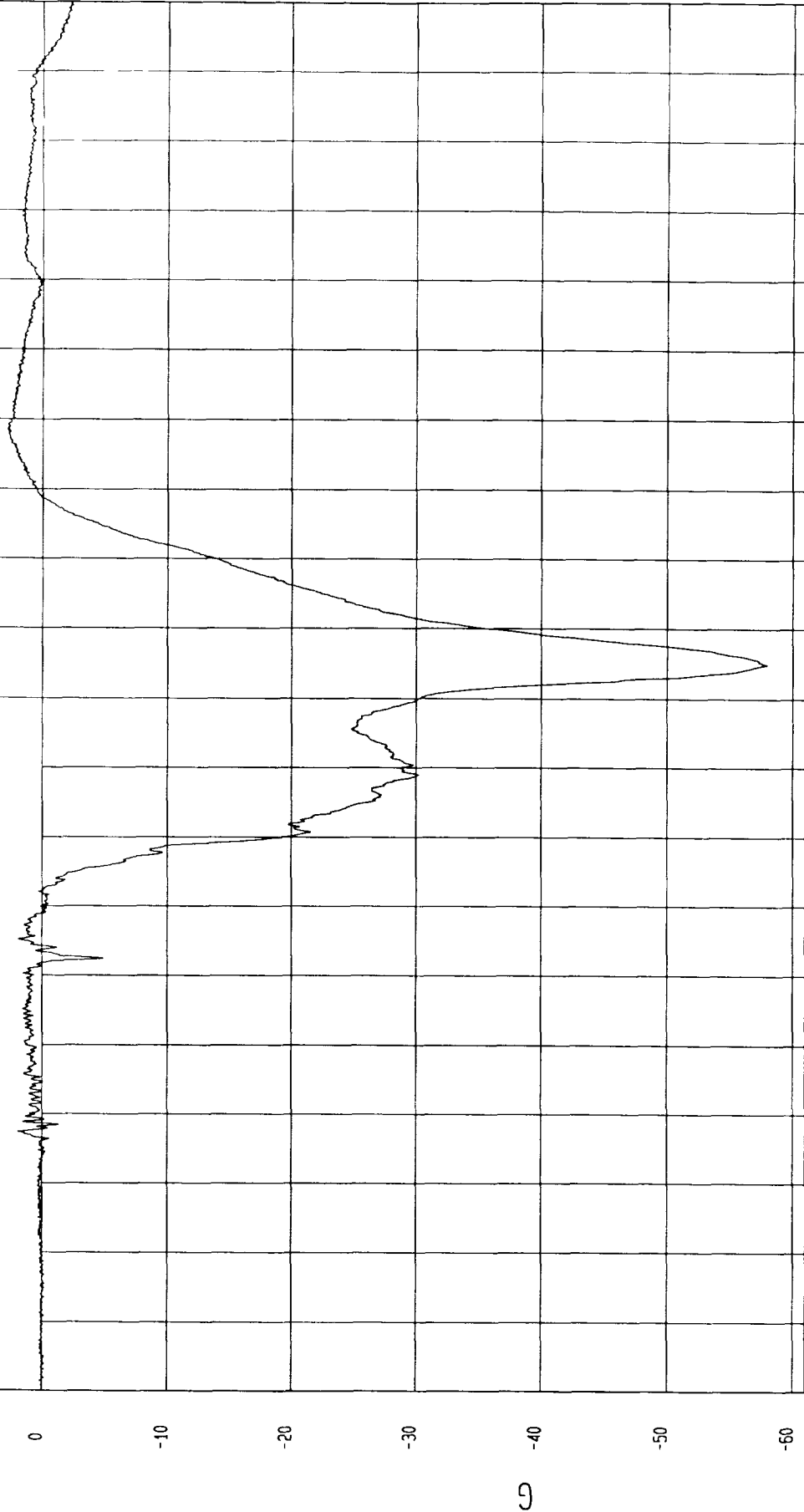
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -57.95 G at 105 msec

Maximum = 2.85 G at 138 msec

PASSENGER HEAD X ACCELERATION

1 H02118AT A24 Filterclass (1000)



TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

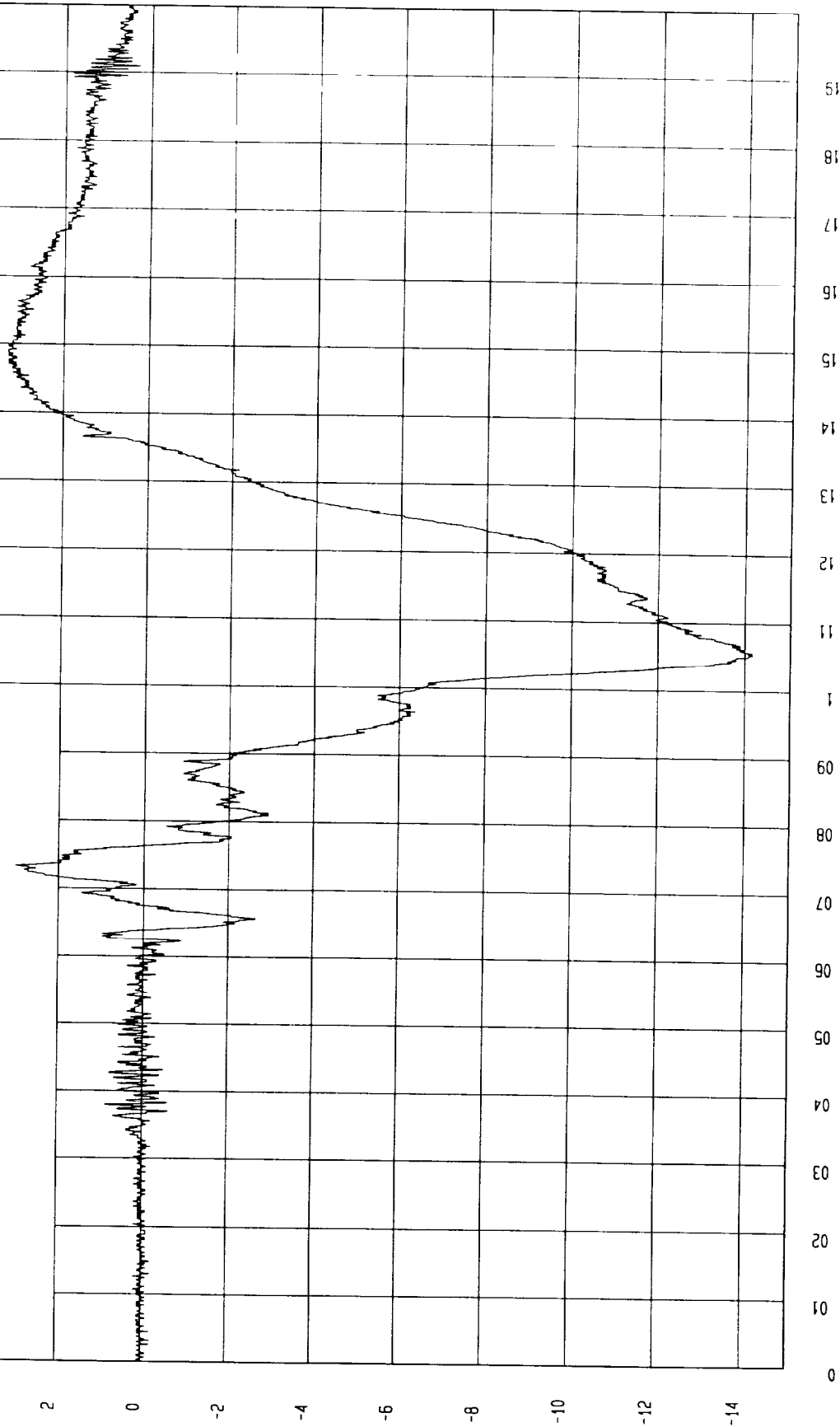
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -14.18 G at 105 msec

Maximum = 3.31 G at 147 msec

PASSENGER HEAD Y ACCELERATION

1 ——— H02118AT A25 Filterclass (1000)



WJA
05/22/02 13:08

TEST FMVSS 208 SLED (H0211B) TEST DATE 05-22-2002

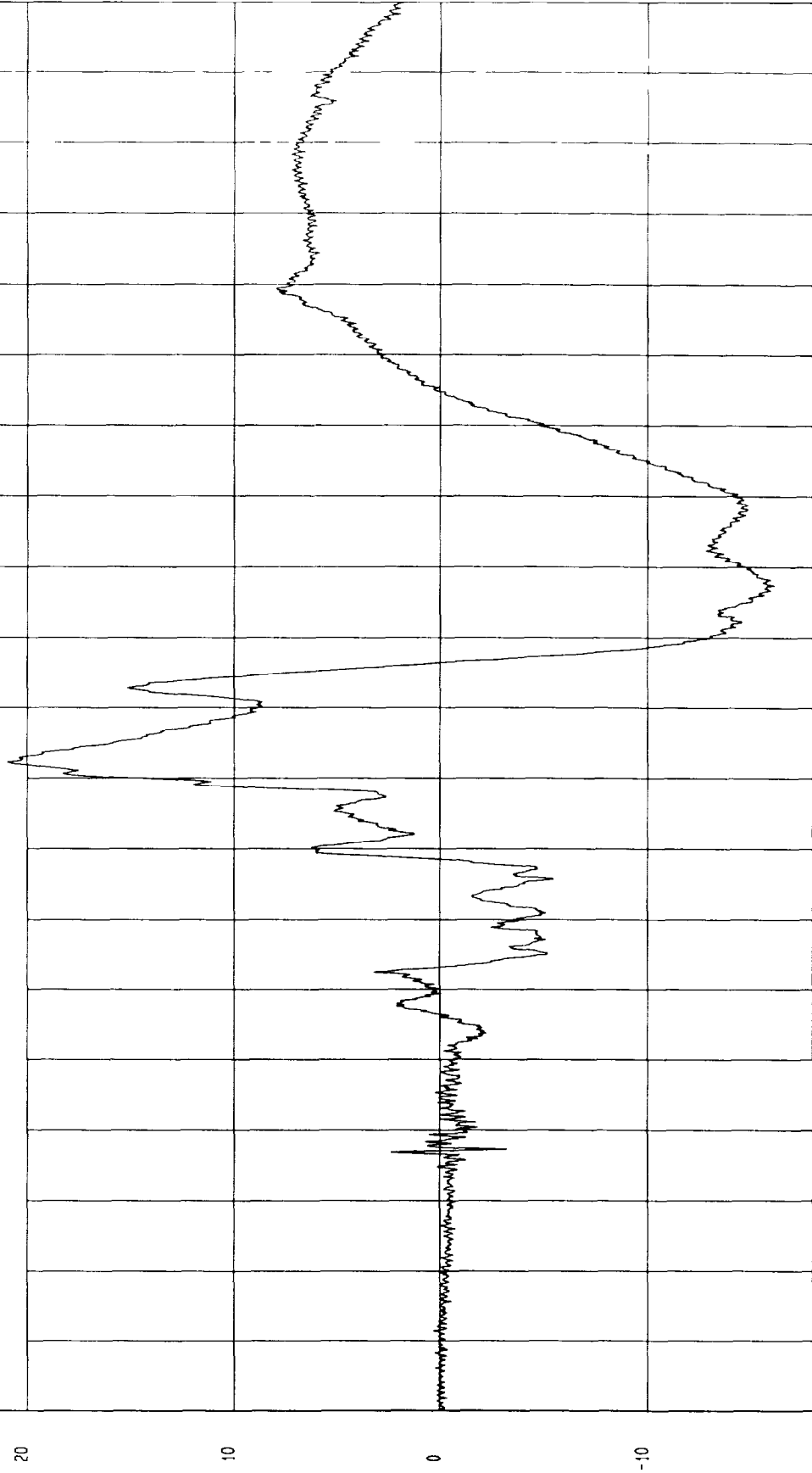
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -16.15 G at 117 msec

Maximum = 20.97 G at 92 msec

PASSENGER HEAD Z ACCELERATION

1 H0211BAT A26 Filterclass (1000)



MGA Research
05/22/2002 13:08

TIME (SECONDS)

TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

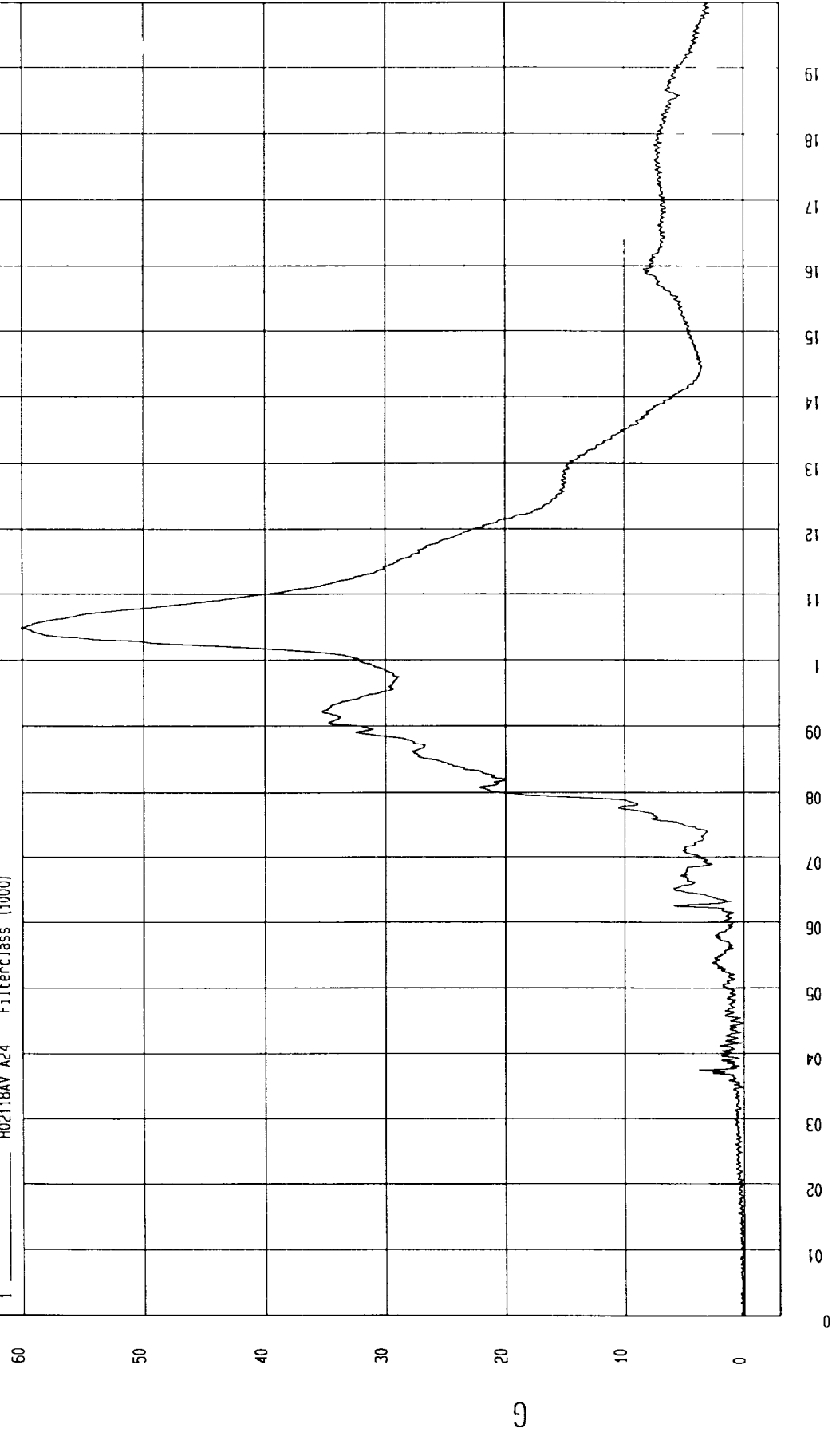
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = 4.24E-02 G at 0 msec

Maximum = 60.1 G at 105 msec

PASSENGER HEAD RESULTANT ACCELERATION

1 H02118AV A24 Filterclass (1000)



MCA Research
05/22/2002 13:08

TIME (SECONDS)

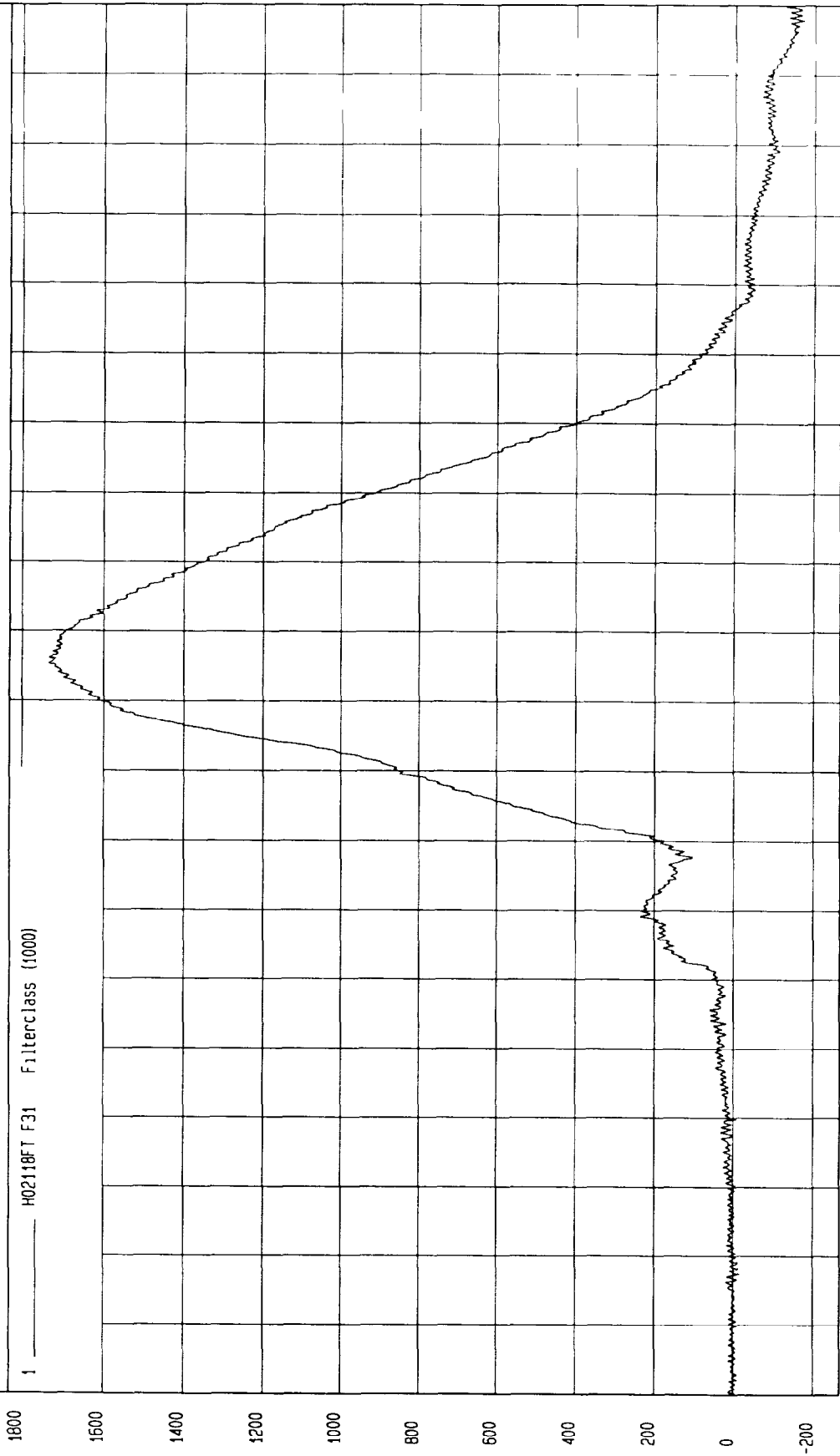
TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -172 42 N at 198 msec

Maximum = 1735 57 N at 105 msec

PASSENGER NECK FORCE X



MGA Research
05-22-2002 13:09

TIME (SECONDS)

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

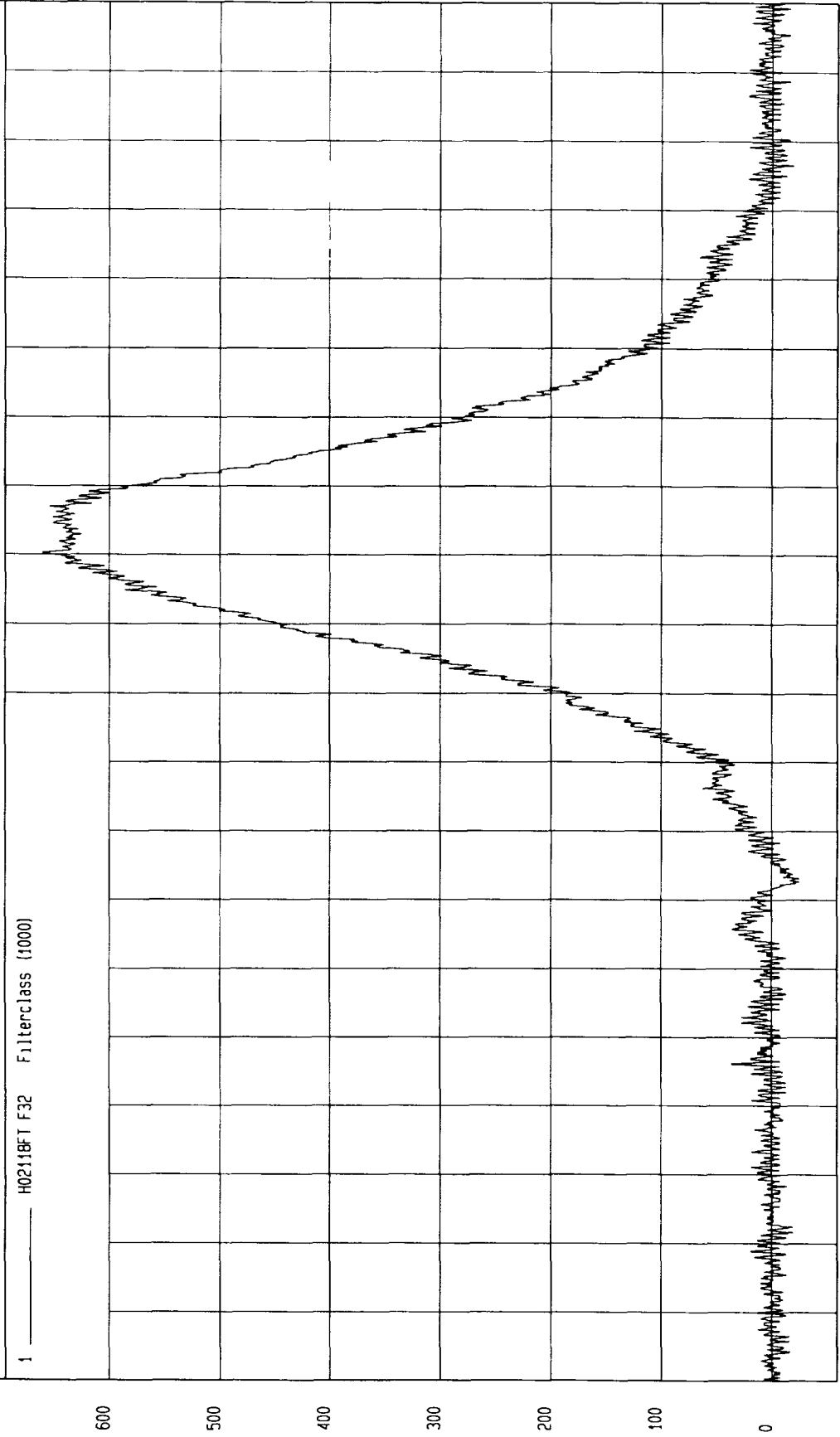
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -25 36 N at 73 msec

Maximum = 659 98 N at 120 msec

PASSENGER NECK FORCE Y

1 H02118FT F32 Filterclass (1000)



MGA Research
05-22-2002 13 09

TIME (SECONDS)

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

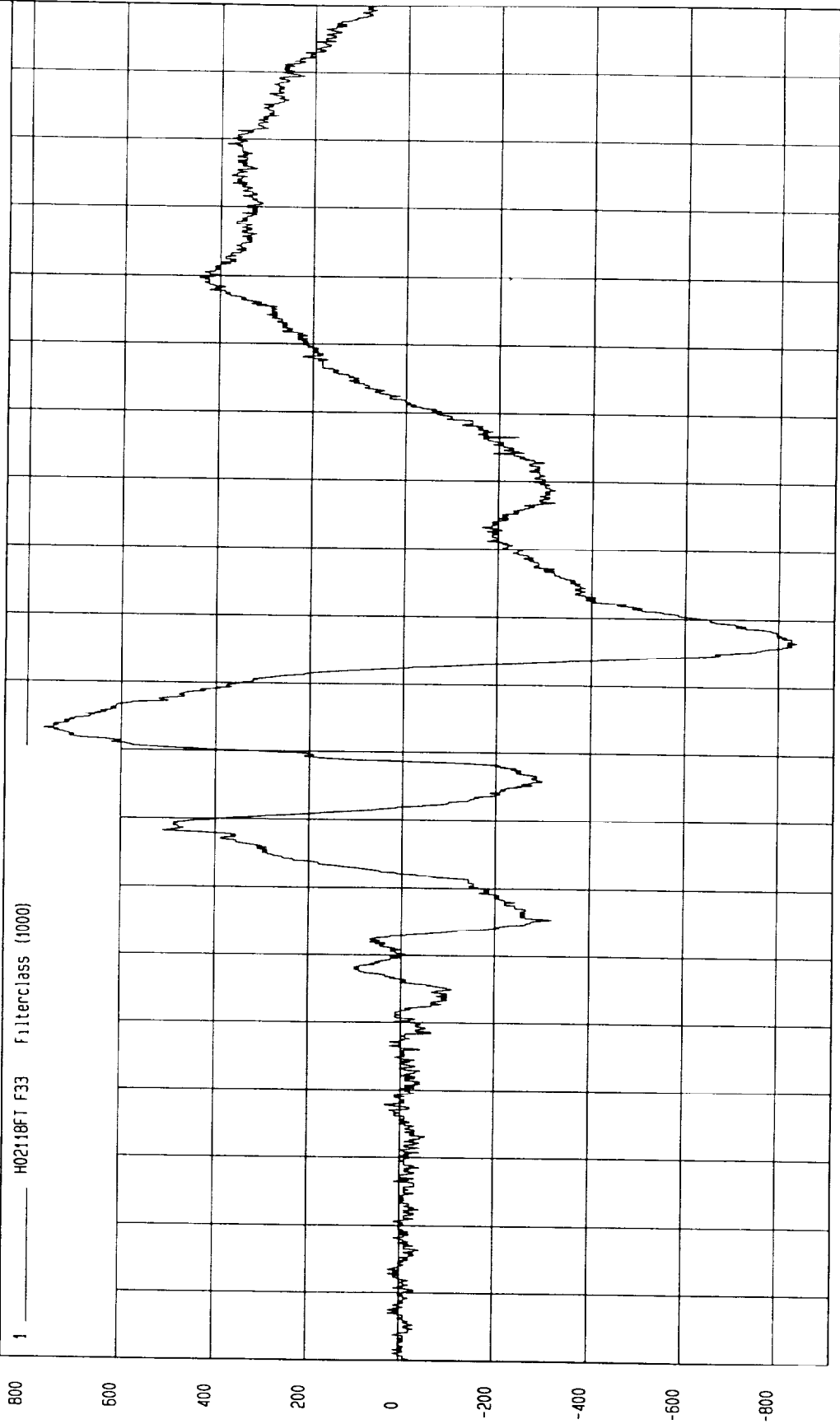
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -840 88 N at 107 msec

Maximum = 766 23 N at 93 msec

PASSENGER NECK FORCE Z

1 H02118FT F33 Filterclass (1000)



TIME (SECONDS)

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

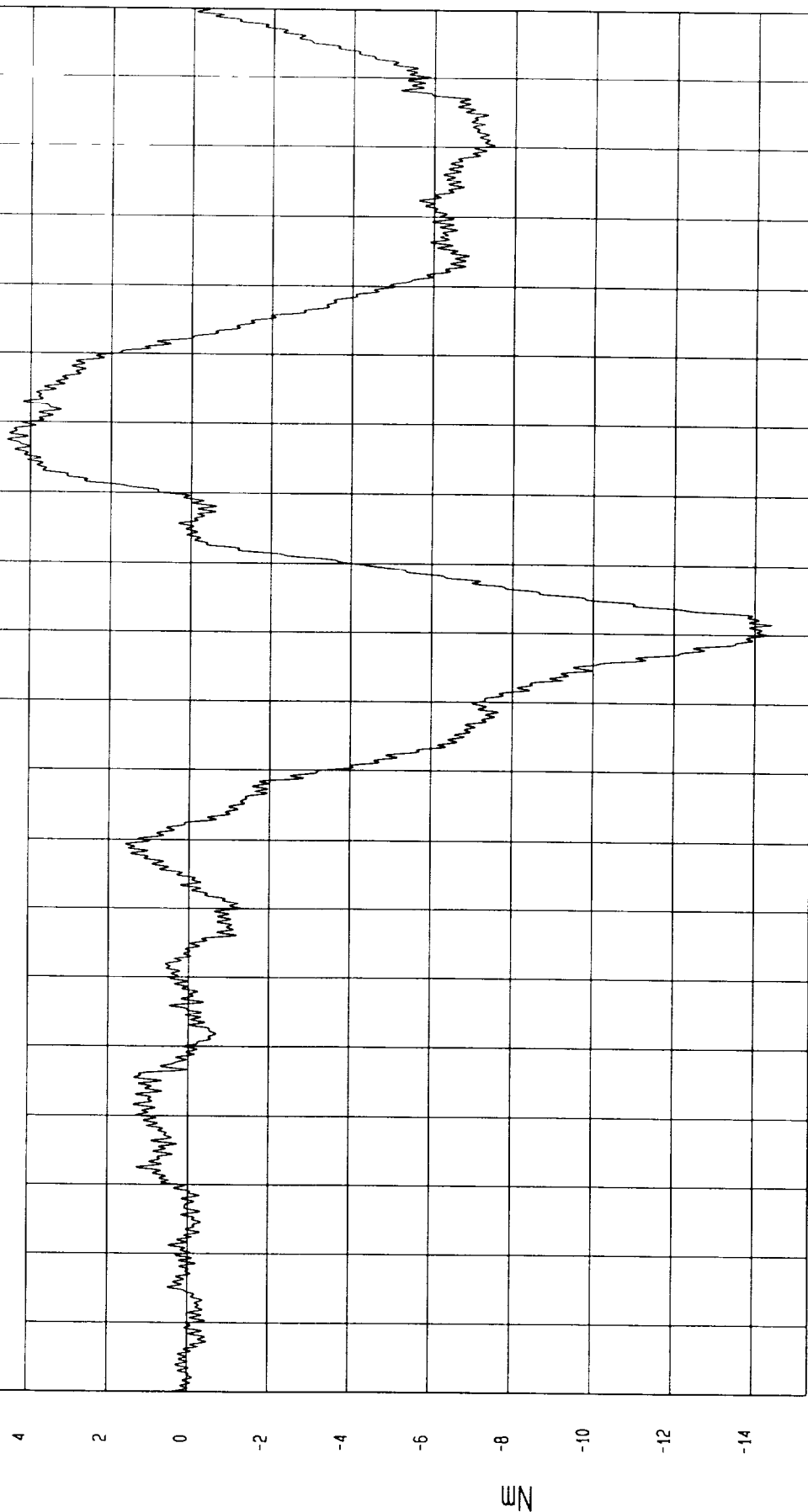
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -14.41 Nm at 112 msec

Maximum = 4.59 Nm at 138 msec

PASSENGER NECK MOMENT X

1 H02118MF M35 Filterclass (600)



TIME (SECONDS)

05 22 2002 13 09

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

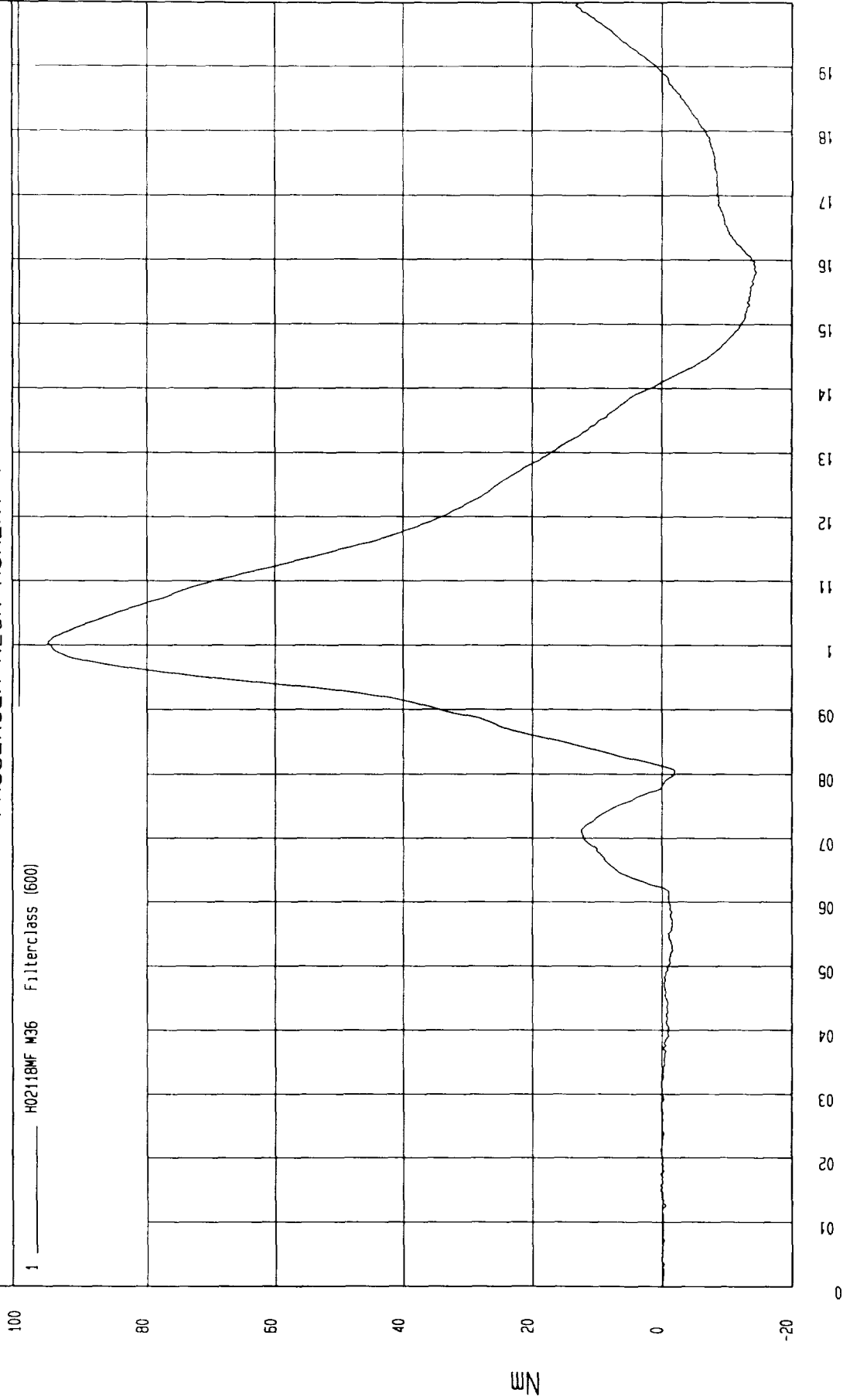
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -14 56 Nm at 158 msec

Maximum = 95 54 Nm at 100 msec

PASSENGER NECK MOMENT Y

1 _____ H02118MF M36 Filterclass (600)



MCA Research
05/22/2002 13:09

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

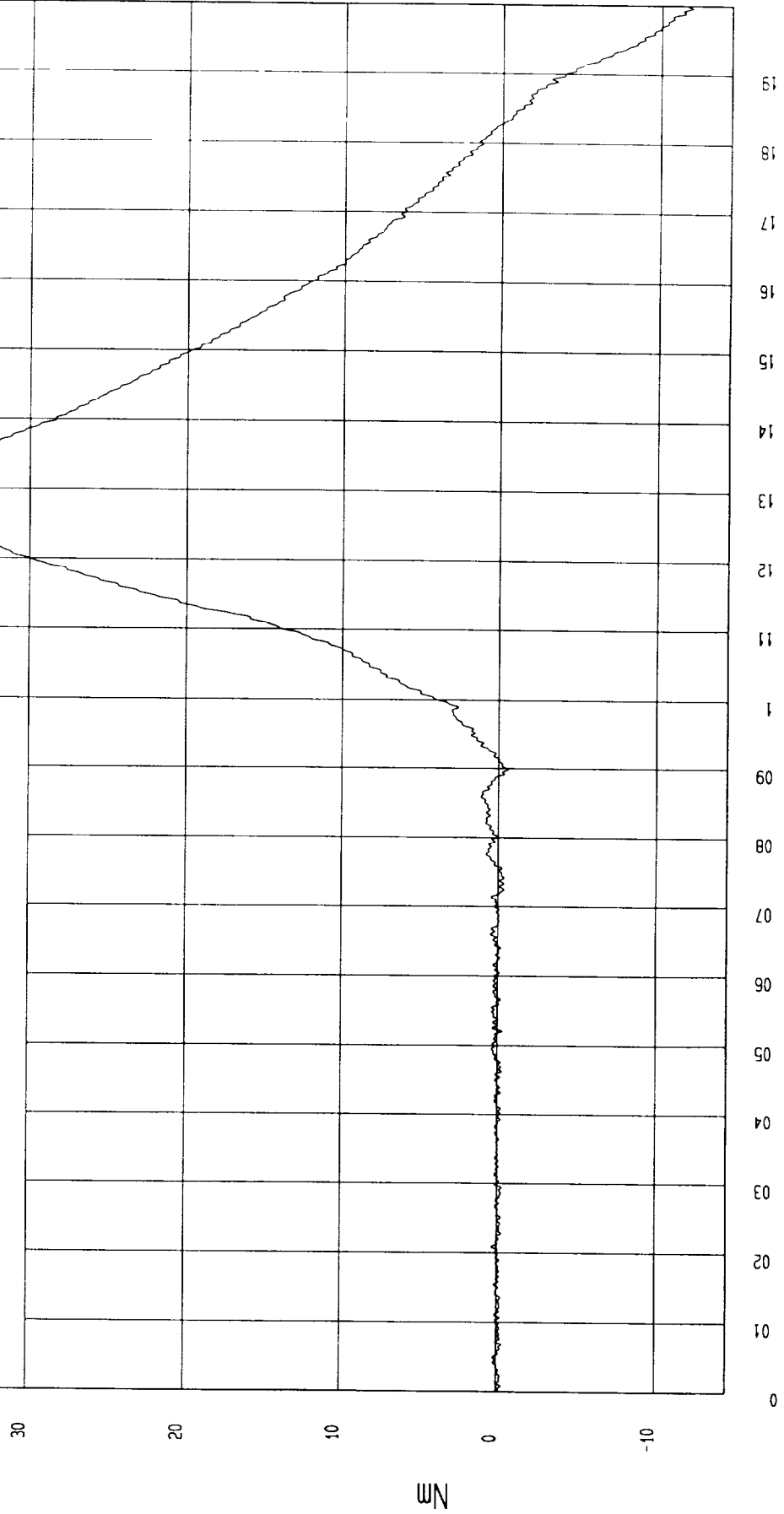
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -11 98 Nm at 200 msec

Maximum = 35 86 Nm at 129 msec

PASSENGER NECK MOMENT Z

1 H02118MF M37 Filterclass (600)



MOA Research
05 22 2002 13 09

TIME (SECONDS)

MCA Research
05/22/2002 13:12

TIME (SECONDS)

PASSENGER OCCIPITAL CONDYLE MOMENT Y

Maximum = 66.84 Nm at 100 msec

Minimum = -14.4 Nm at 153 msec

1 H02118M0 M36 Filterclass (600)

70

60

50

40

30

20

10

0

10

Nm

0

0.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

0.9

1

1.1

1.2

1.3

1.4

1.5

1.6

1.7

1.8

1.9

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

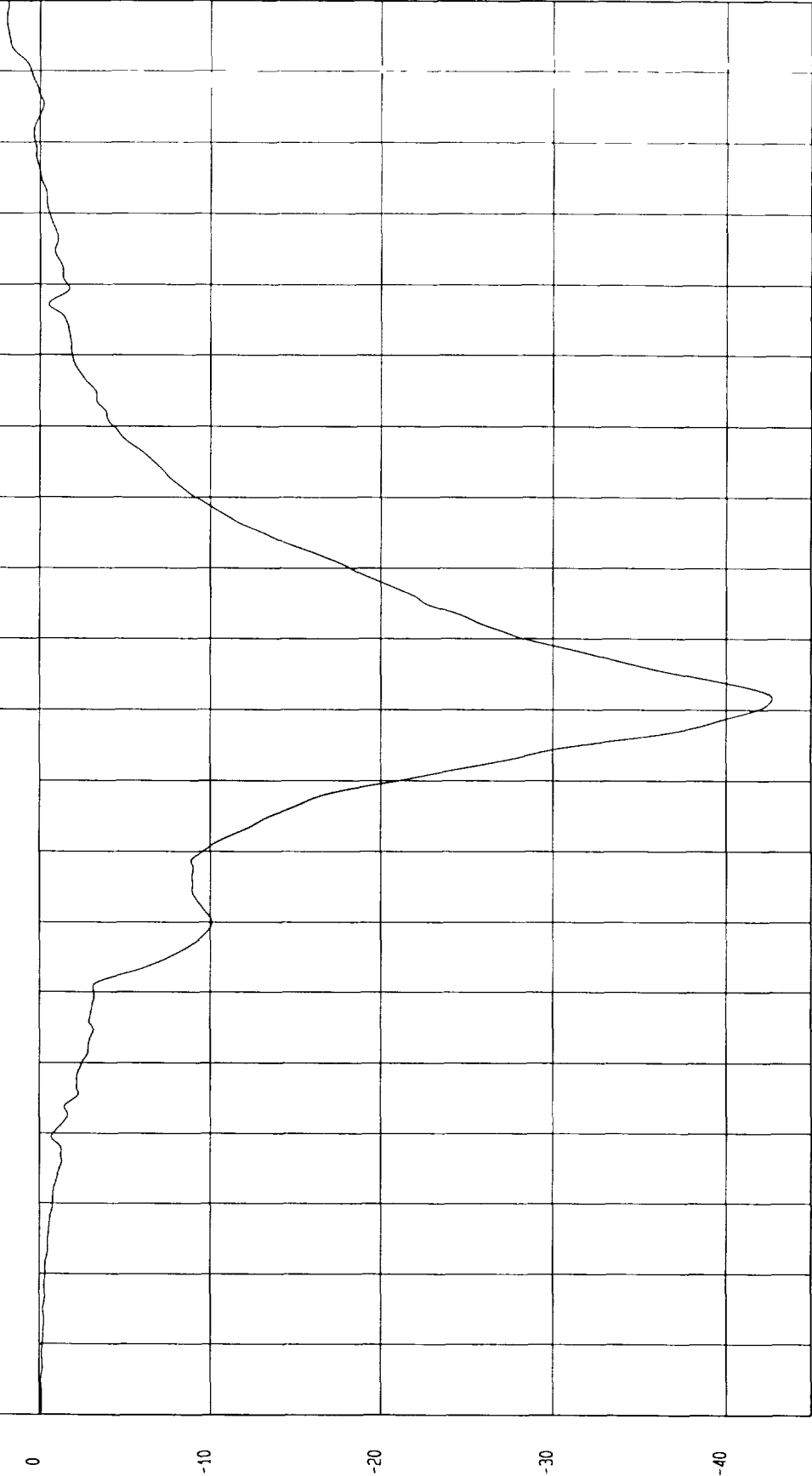
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -42.66 G at 102 msec

Maximum = 1.9 G at 197 msec

PASSENGER CHEST X ACCELERATION

1 ——— H02118AF A27 Filterclass (180)



TIME (SECONDS)

MGA Research
05 22 2002 13 09

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

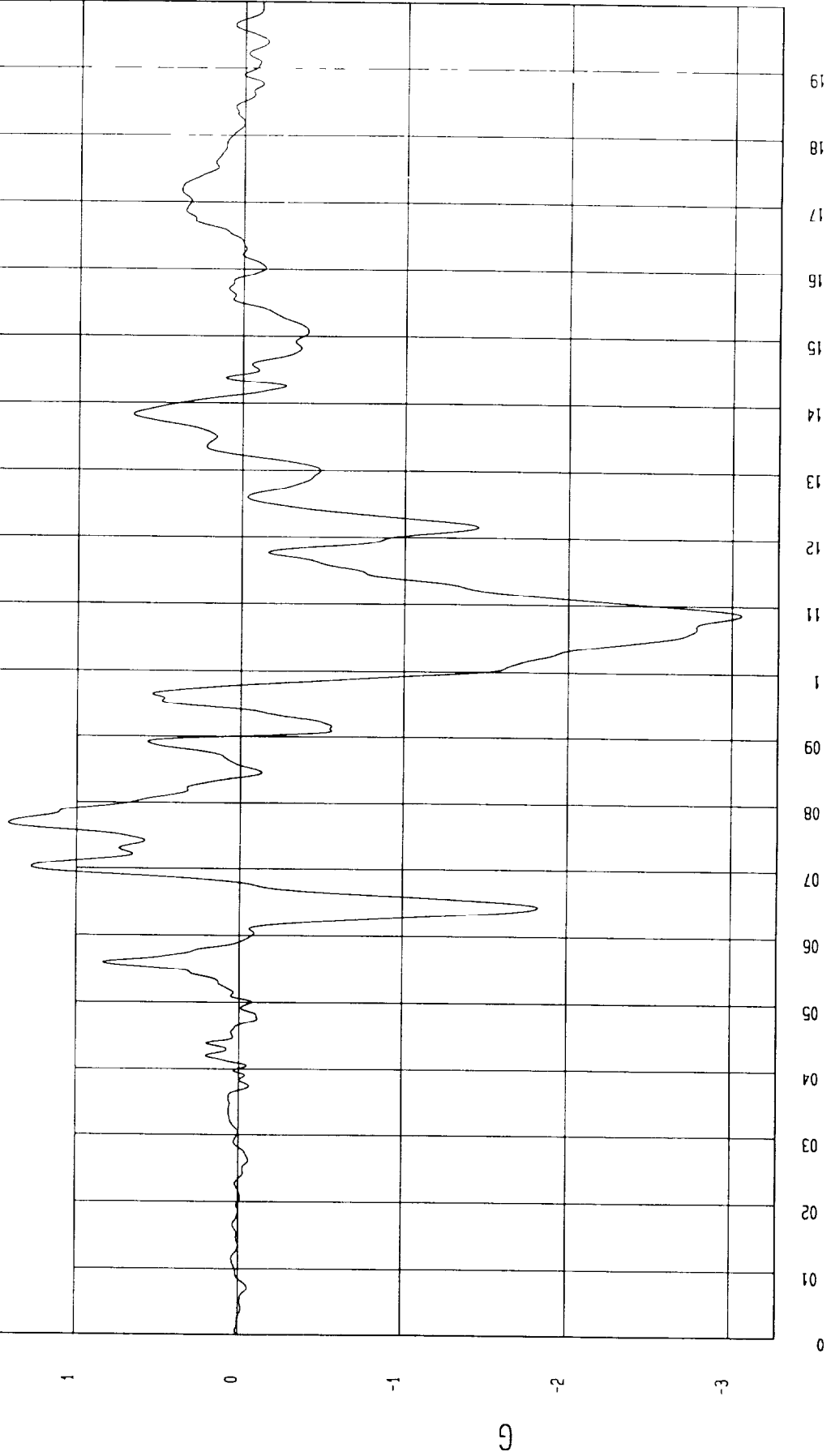
COMPONENT 2002 TOYOTA AVALON 4 D00R (C25109)

Minimum = -3.06 G at 109 msec

Maximum = 1.42 G at 77 msec

PASSENGER CHEST Y ACCELERATION

1 ——— H02118AF 428 FilterClass (180)



MGA Research
05-22-2002 13 09

TIME (SECONDS)

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

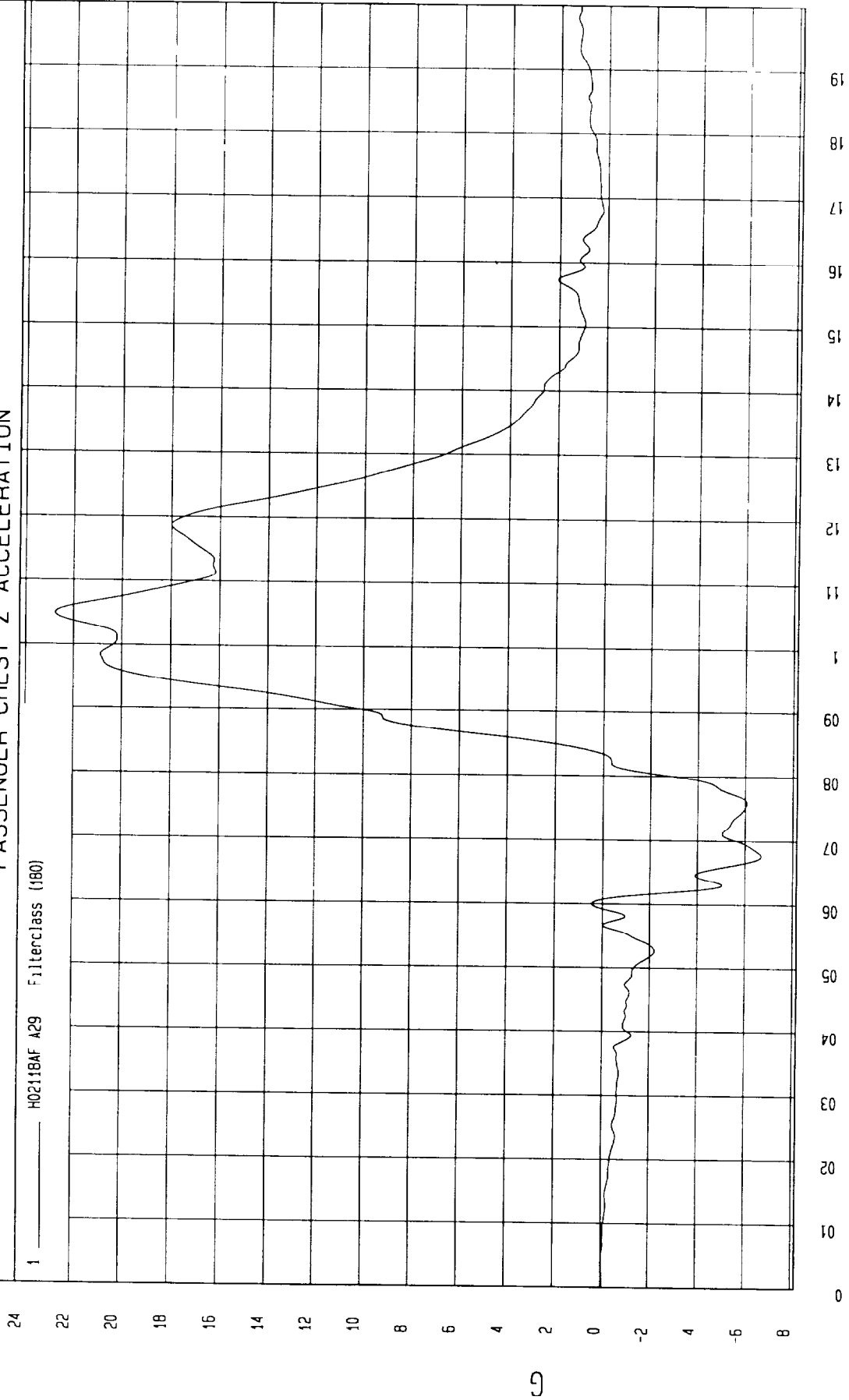
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -6.69 G at 68 msec

Maximum = 22.77 G at 105 msec

PASSENGER CHEST Z ACCELERATION

1 H02118AF A29 Filterclass (180)



WGA Research
05/22/2002 13:09

TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

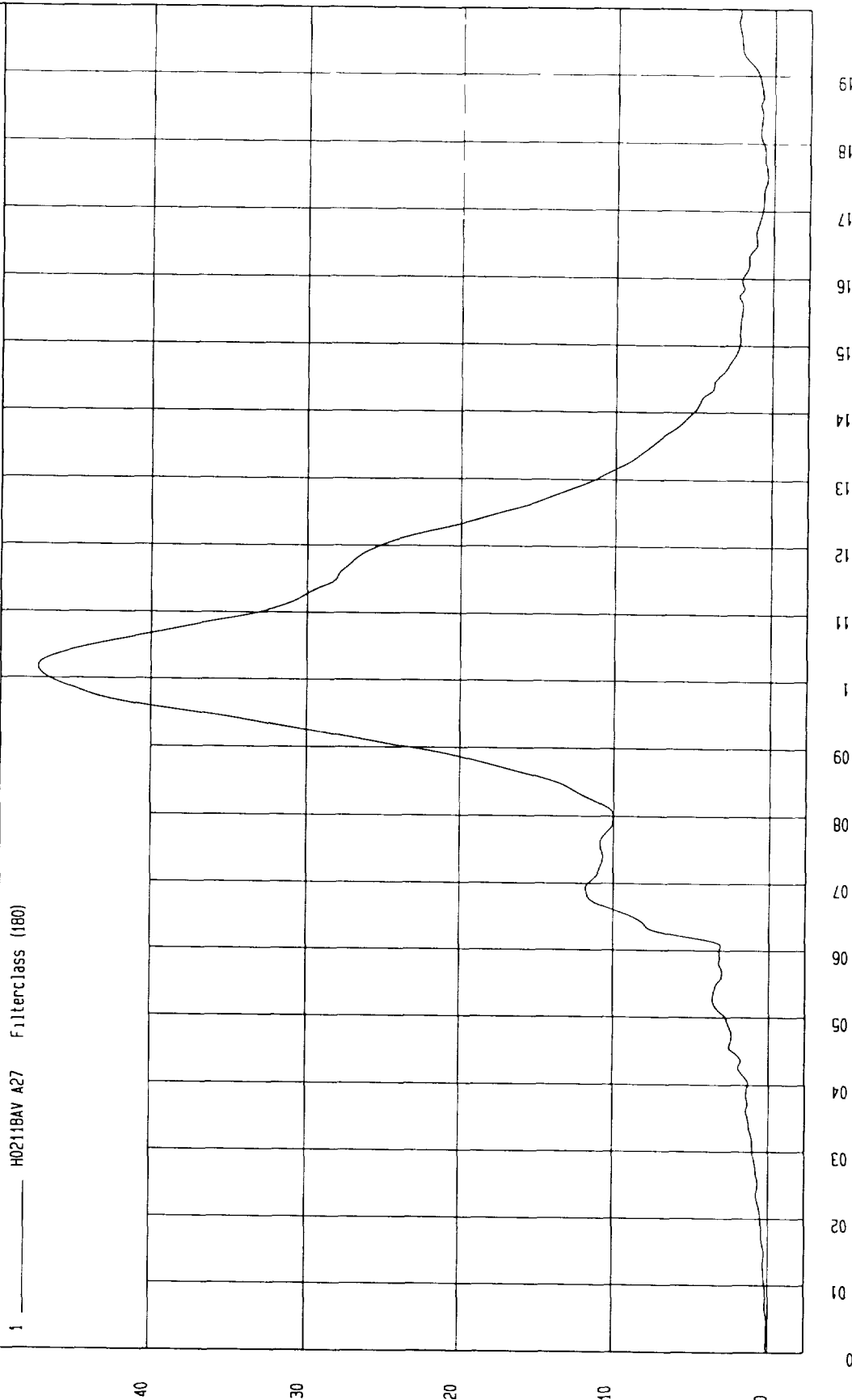
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = 5.49E-02 G at 0 msec

Maximum = 47.24 G at 102 msec

PASSENGER CHEST RESULTANT ACCELERATION

1 ——— H0211BAV A27 Filterclass (180)



TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

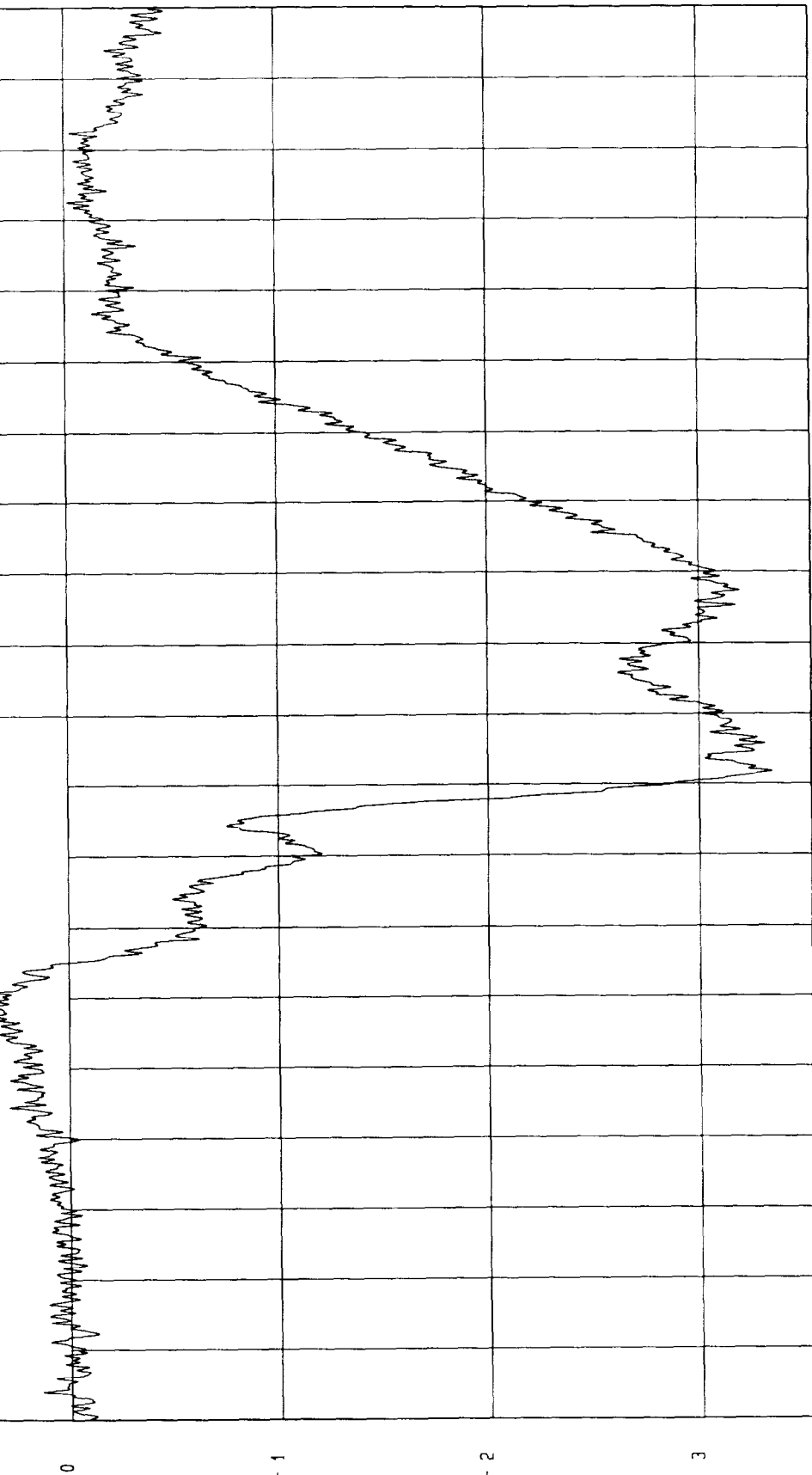
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = - 34 INCHES at 92 msec

Maximum = 3 72E-02 INCHES at 59 msec

PASSENGER CHEST COMPRESSION

1 H02118DF 039 Filterclass (600)

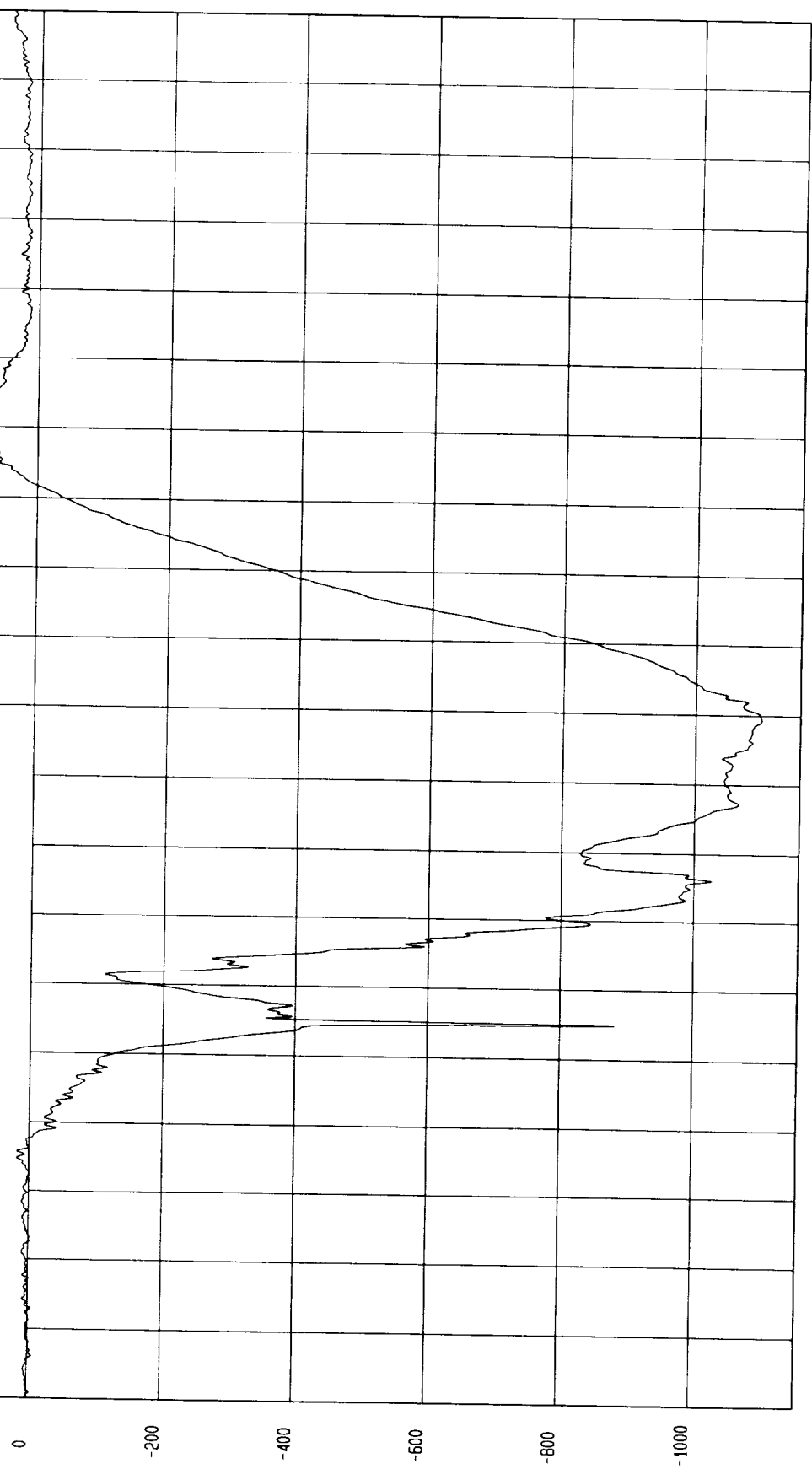


MCA Research
05-24-2002 09:20

MGA Research
05-22-2002 13 10

TIME (SECONDS)

19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0



1 ——— H0210FF F41 Filterclass (600)

PASSENGER LEFT FEMUR FORCE

Maximum = 69 69 LB at 143 msec

Minimum = -1099 18 LB at 99 msec

COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

TEST FMVSS 208 SLED (H02118) TEST DATE 05-22-2002

LB

WGA Research
05/22/2007 13:10

TEST FMVSS 208 SLED (H02118)

TEST DATE 05-22-2002

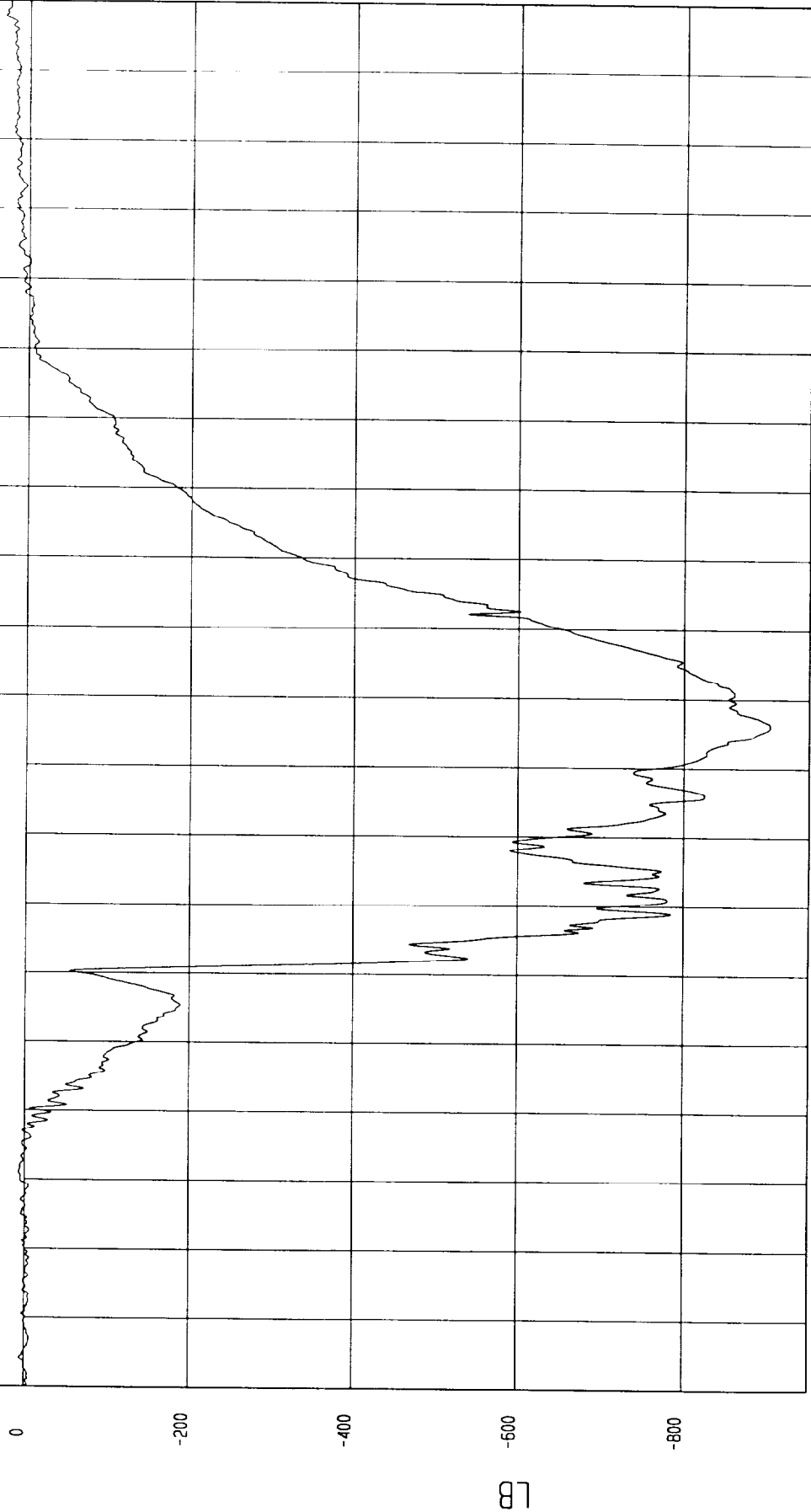
COMPONENT 2002 TOYOTA AVALON 4 DOOR (C25109)

Minimum = -903 74 LB at 96 msec

Maximum = 29 44 LB at 198 msec

PASSENGER RIGHT FEMUR FORCE

1 ——— H02118FF F43 Filterclass (600)



TIME (SECONDS)

LB

APPENDIX C
MANUFACTURER'S VEHICLE INFORMATION

TOYOTA
TOYOTA MOTOR NORTH AMERICA, INC.

C-1

WASHINGTON OFFICE
1850 M STREET NW, SUITE 600 WASHINGTON DC 20036

TEL (202) 775 1707
FAX (202) 463 8513

November 2, 2001

Ms Marilynne Jacobs
Director, Office of Vehicle Safety Compliance
National Highway Traffic Safety Administration
400 Seventh Street, S W (NSA-31), Rm 6111
Washington, D C 20590

Re 2002 Toyota Camry, Sienna, Avalon, Tacoma FMVSS208 Information
[NSA-31CCa/OA-208-010924U, V, W, X]

Dear Ms Jacobs

On behalf of Toyota Motor Corporation (TMC), I am submitting the attached information in response to your September 28, 2001 letter [NSA-31CCa/OA-208-010924U, V, W, X]

Should you have any questions about this report, please contact Mr Mitch Kato at (202) 775-1707

Sincerely,



Chris Tinto
Director
TOYOTA MOTOR NORTH AMERICA, INC

CT mk
Attachment

TOYOTA'S RESPONSE TO
NIHTSA'S REQUEST ON FMVSS No 208 FOR
THE 2002 TOYOTA AVALON
(NSA-31CCa, OA-208-010924-W)

Q 1 Please inform OVSC to which sections of FMVSS No 208 the subject vehicle is certified with respect to dynamic tests in which seat belts are fastened and seat belts are unfastened. Provide a copy of the certification test reports for all the applicable impact tests with regard to these sections.

Response 1

The air bag restraint system of the 2002 Toyota Avalon meets the requirements of S13 of FMVSS No 208.

We provide the summary reports for frontal barrier impact test with the safety manual belts fastened at 35mph as Attachment I-1 and the sled test with only the automatic restraint system are provided as Attachment I-2. And we provide the technical analysis reports for estimation of 30mph belted test results as Attachment I-3 and Attachment I-4.

Q 2 Provide the following: (1) describe the difference between the MY 2002 air bag system and the MY 2001 air bag system, (2) explain what other restraint changes have been made, (3) explain what other vehicle changes have been made that might have affected FMVSS No 208 performance, and (4) describe any features that might affect performance with respect to children and out of position.

Response 2

Since Toyota Avalon is not a new design vehicle/model, the following information are provided,

(1) Difference is following

- (a) Driver side (1) Bag Coating
(2) Vent-Hole Size
- (b) Passenger side Nothing

(2) No other restraint changes

(3) No other vehicle changes, that might have affected FMVSS208 performance

(4) No features, that might affect performance with respect to children and out of position

- Q 3 If the vehicle was certified with unrestrained dummies to meet the requirements of S13, describe how to disconnect the air bags from the vehicle sensors and connect them to the triggering mechanism used in the sled test. Describe the method used in certification to determine when to trigger the air bag and the system used to trigger the air bag.

For air bags with dual stage or multistage inflators describe when the stages are triggered and provide data to show that this is similar to what would occur in a crash of similar severity.

Response 3

We provide the illustration which shows the location of the air bag connector to disconnect the air bag as Attachment II-1.

And we describe the air bag triggering system used in certification test in Attachment II-2.

Air bag with dual stage or multistage inflators is not used in the 2002 Toyota Avalon.

- Q 4 State for any safety belt system in this vehicle whether or not it is equipped with a tension-relieving device. Provide a copy of the information furnished in accordance with S7 4 2 if the tension-relieving device is used.

Response 4

Tension-relieving device is not used in the 2002 Toyota Avalon.

- Q 5 FMVSS No. 208, S8 1.5 allows the manufacturer the option of having movable vehicle windows and vents placed in the closed position. State whether the vehicle's movable windows and vents were opened or closed for the certification tests.

Response 5

Both sides of the front and rear windows were opened during the tests.

- Q 6 Submit dummy placement measurements, including diagrams or photographs which show exactly where measurements were taken. Enclosed is a diagram of some of OVSC's dummy measurements. Where possible, use the dimension shown in the diagram to provide the individual dummy placement measurements.

Response 6

The dummy placement measurement data in the OVSC form is provided in Attachment III, and in addition, we provide our diagrams and measurement data in section 11 of Attachment IV-1.

Q 7 State whether the vehicle has a foot rest for the driver

Response 7

A foot rest is provided for the driver

Q 8 Provide the seat positioning, steering column positioning, and fuel tank data on the enclosed form. If more than one front seating, steering column or fuel tank configuration are available on this vehicle, provide separate information for each. In addition, provide the seating reference point for each seat for the lockable seat belt requirement in S7.1.1.5

Response 8

We provide the seat positioning, steering column positioning, and fuel tank data as Attachment IV-1, and the seating reference point for each seat as below matrix

seat type	Attachment No
separate	IV-2
bench	IV-3

Q 9 If the vehicle is equipped with adjustable seat belt anchorages, provide the manufacturer's nominal design position for a 50th percentile adult male occupant

Response 9

See section 8 of the Attachment IV-1

Q 10 For all certification barrier tests, provide the speed at impact, vehicle test weight, and resulting injury criteria (i.e., HIC, chest acceleration, chest compression, and femur loads, and where applicable neck moments and forces). For all certification sled tests, provide the resulting injury criteria (i.e., HIC, chest acceleration, chest compression, femur loads, and neck moments and forces)

Response 10

We provide the speed at impact, vehicle test weight, and resulting injury criteria recorded for each certification test in Attachment I-1 through I-2 in response to your request No 1

Q 11 When vehicle components must be removed to obtain the proper test weight for the barrier test, what components do you recommend for removal and in what priority order do you recommend removal?

Response 11

The recommended parts for vehicle weight adjustment are listed in Attachment V

Q 12 If the vehicle uses a pressure vessel to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements S9 1

Response 12

We provide the approval letters of Research and Special Program Administration as Attachment VI-1 for the passenger's air bag

Q 13 If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test report or engineering analysis to demonstrate that it meets all the requirements of S9 2

Response 13

We provide the approval letters of Research and Special Program Administration as Attachment VI-2 for the driver's air bag

Attachment I 1
 Report No T0105 0827
 Report Date May 18 2001

**FMVSS 208 "Occupant Crash Protection" Compliance Test
 for the 2002 Toyota AVALON (summary)**

- 1 Test Date January. 20 2001
2. Test Location : Toyota Vehicle Safety Laboratory
- 3 Test Vehicle 2002 Model Toyota AVALON
- 4 Test Condition .

4.1 Type of Test

☒ frontal , ☐ angular Left , ☐ angular Right , ☐ Sled Test

4.2 Use of Manual or Automatic Belt

Driver ☒ Yes , ☐ No

Passenger ☒ Yes , ☐ No

4.3 Test Speed (or ΔV) : 56.5 km/h (35.3 mph)

4.4 Vehicle Weight 1764 kg (3889 lbs)

5 Test Results

		Driver	Passenger
Head Injury Criterion (HIC)		674	520
Chest Deceleration (G's)		43.2	37.5
Chest Deflection mm(inch)		35.6 (1.4)	38.9 (1.5)
Femur Load kN(lbs)	Right	3.686 (828.1)	2.628 (590.7)
	Left	5.370 (1207.2)	3.235 (727.3)
Neck Injury	Flection Bending Moment(Nm)	31	30
	Extension Bending Moment(Nm)	31	27
	Axial Tension (N)	1762	967
	Axial Compression (N)	6	89
	Fore-and-Aft Shear (N)	689	525

Attachment I-2

Report No T0105 0828 (Driver side)
 T9812 0367 (Passenger side)
 Report Date May 18 2001 (Driver side)
 December 8 1998 (Passenger side)

FMVSS 208 "Occupant Crash Protection" Compliance Test
 for the 2002 Toyota AVALON (summary)

1 Test Date April 4 2001 (Driver side)

October 28 1998 (Passenger side)

2 Test Location Toyota Vehicle Safety Laboratory

3 Test Vehicle 2002 Model Toyota AVALON (Driver side)

2000 Model Toyota AVALON (Passenger side)

4 Test Condition

4 1 Type of Test

☐ frontal , ☐ angular Left , ☐ angular Right , ☒ Sled Test

4 2 Use of Manual or Automatic Belt

Driver ☐ Yes , ☒ No

Passenger ☐ Yes , ☒ No

4 3 Test Speed (or ΔV) 45 0km/h (28 0mph) Driver side

49 4km/h (30 7mph) Passenger side

4 4 Vehicle Weight _____

5 Test Results

		Driver	Passenger
Head Injury Criterion (HIC)		92	180
Chest Deceleration (G's)		37 8	43 8
Chest Deflection mm(inch)		27 5 (1.1)	14.6 (0 6)
Femur Load kN(lbs)	Right	6 183 (1390 1)	4 360 (980 1)
	Left	4 875 (1095 9)	3 616 (812 9)
Neck Injury	Flection Bending Moment(Nm)	67	120
	Extention Bending Moment(Nm)	31	15
	Axial Tension (N)	1261	383
	Axial Compression (N)	82	2730
	Fore and-Aft Shear (N)	539	1889

THECNICAL ANALYSIS REPORT

Purpose

This analysis is to demonstrate that the conformity of an airbag equipped vehicle with the 30 mph angular vehicle impact criteria of the FMVSS 208 (with the manual belt fastened) can be judged by the 35 mph (NCAP) frontal crash test data and the non-belted FMVSS 208 (30 mph) test data

Analysis

(1) HIC / Chest Deceleration / Chest Compression

Figure 1,2 and 3 Show the HIC, Chest Deceleration and Chest Compression value relation between 30 mph frontal / angular impact with manual belt and 35 mph frontal impact with manual belt

In these Figures, one plot shows an injury data at 30 mph vehicle impact (frontal or right / left angular) on the vertical axis and shows the injury data at 35 mph frontal impact on the horizontal axis of one model vehicle

In these Figures, the HIC, Chest Deceleration and Chest Compression of 35 mph frontal impact tests result larger than those of the 30 mph impacts

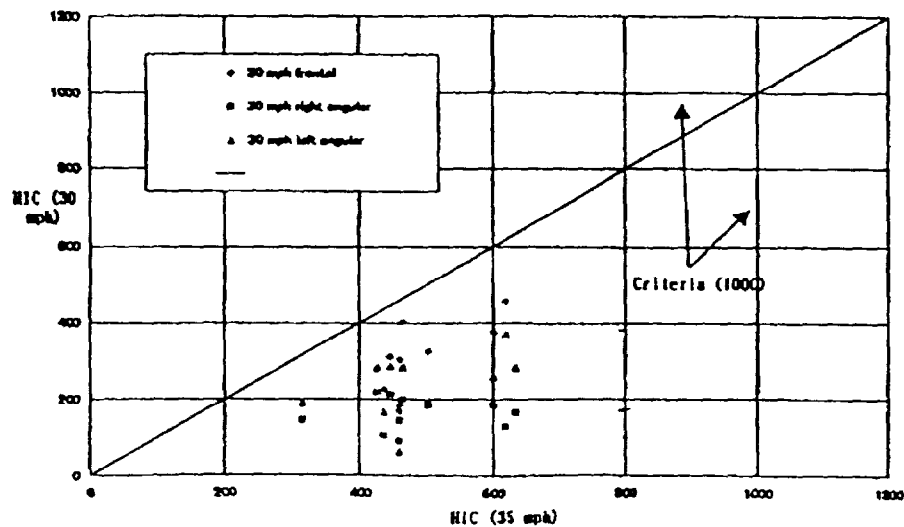


Figure 1

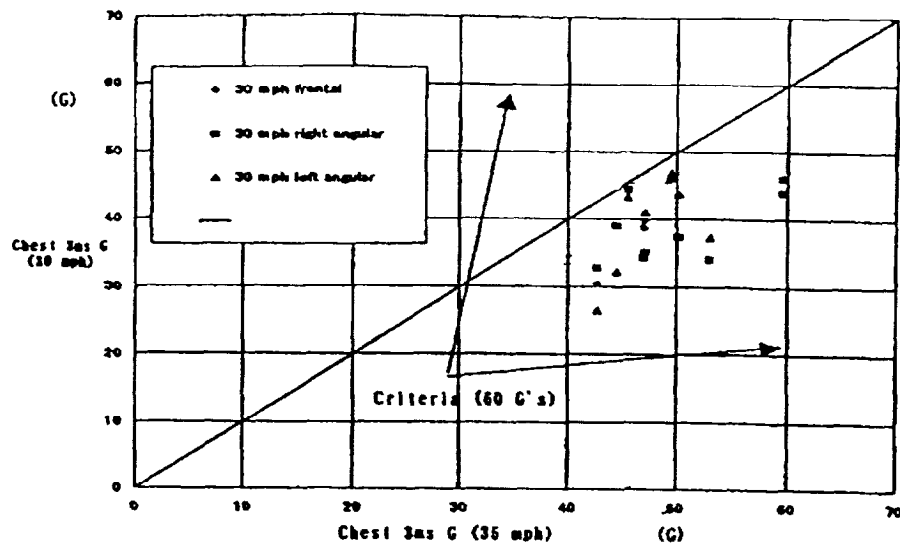


Figure 2

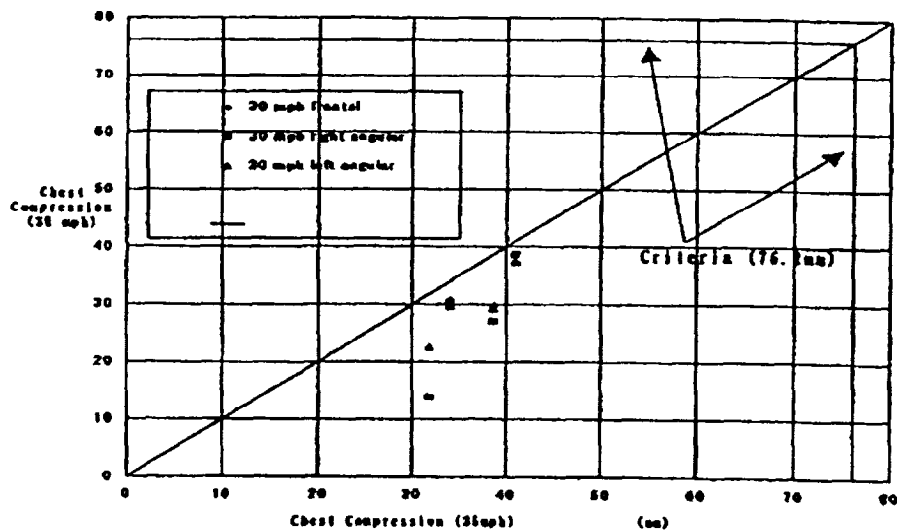


Figure 3

This relation is reasonable since those injury data basically depends upon the vehicle impact speed. Concerning the vehicle impact configuration difference between 35 mph frontal and 30 mph angular impact, the difference does not spoil (or affect) these injury data relation since the upper torso is always restrained by similar operation of the seat belt and the airbag during collision.

Therefore, we can conclude that a vehicle whose HIC Chest Deceleration

And Chest Compression values were recorded less than the FMVSS 208 criteria in a 35 mph frontal impact test also satisfies the criteria in each of the 30 mph vehicle impact test (frontal / angular)

(2) Femur Load

The Figure 4 shows the femur load relation between belted 30 mph frontal / angular impact test and non-belted 30 mph frontal / angular impact test

In the Figure, one plot shows a femur load with belt at 30 mph on the vertical axis and a femur load without belt at 30 mph on the horizontal axis of one model vehicle

In the Figure, the femur load with manual belt results smaller than that without manual belt

This relation is reasonable since the lower torso is restrained by the lap belt in the belted test and the forward movement of femur results smaller than that of the non-belted test

Therefore, we can conclude that a vehicle whose femur load measurement was recorded less than 2250 lbs (1021 kgf) at 30 mph impact test without the manual belt also satisfies the FMVSS 208 criteria at 30 mph impact with the manual belt fastened

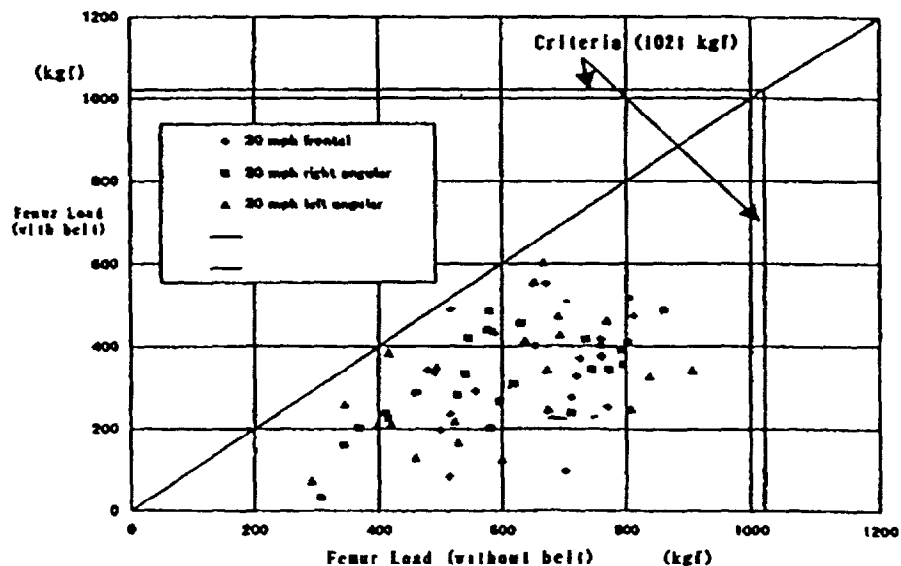


Figure 4

Conclusion

The conformity of airbag equipped vehicle with the 30 mph angular vehicle impact criteria of the FMVSS 208 (with the manual belt) can be judged by 35 mph (with belt) data and the non belted FMVSS 208 (30 mph) test data as follow

(1) HIC / Chest Deceleration / Chest Compression

If those injury data are recorded less than the FMVSS 208 criteria (HIC 1000, Chest 3msG 60, Chest Compression 3 inches) at 35 mph vehicle impact test, the vehicle can be judged to satisfy the FMVSS 208 criteria in 30 mph vehicle impact test with manual belt fastened

(2) Femur Load

If the femur load is recorded less than 2250 lbs (1021 kgf) in a 30 mph non-belted impact test, the vehicle can be judged to satisfy the FMVSS 208 criteria in the 30 mph impact test with the manual belt fastened

ATTACHMENT I 4

FMVSS 208 CONFORMITY TECHNICAL ANALYSIS REPORT- 2002 TOYOTA AVALON

1 Purpose

This analysis is due to determine whether the 2002 model TOYOTA AVALON complies with the FMVSS 208 injury criteria with the manual safety belt fastened or not by using the 35 mph vehicle impact test data and the femur load data obtained in the 30 mph sled test without the manual belt

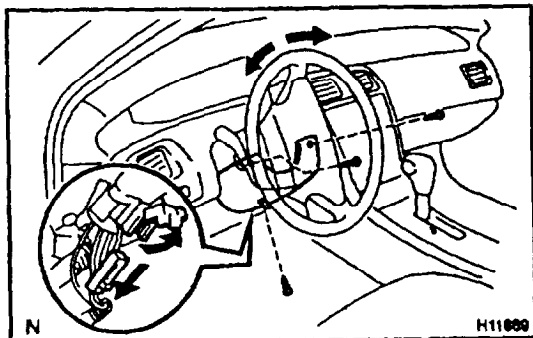
2 Data Check

No	Injury Criteria	FMVSS 208 Criteria	35 mph test data		pass/fail
			Driver	Passenger	
1	HIC	1000	674	520	pass
2	Chest 3ms G	60 G's	43.2	37.5	pass
3	Chest Compression	3 inches	1.4	1.5	pass
4	Femur Load without seat belt		30 mph test data		
			Driver	Passenger	
	(1)Left Femur	2250 lbs	1096	813	pass
	(2)Right Femur	2250 lbs	1390	980	pass

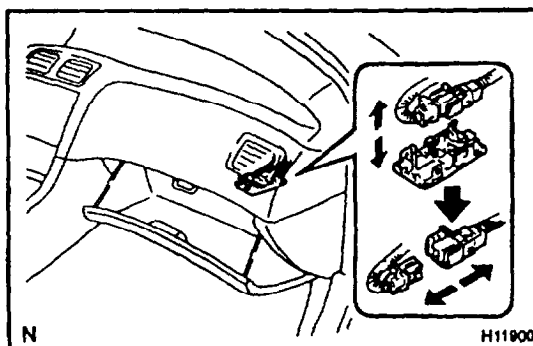
3 Conclusion

The 2002 model TOYOTA AVALON can satisfy the FMVSS 208 injury criteria with its manual safety belt fastened

ATTACHMENT II-1

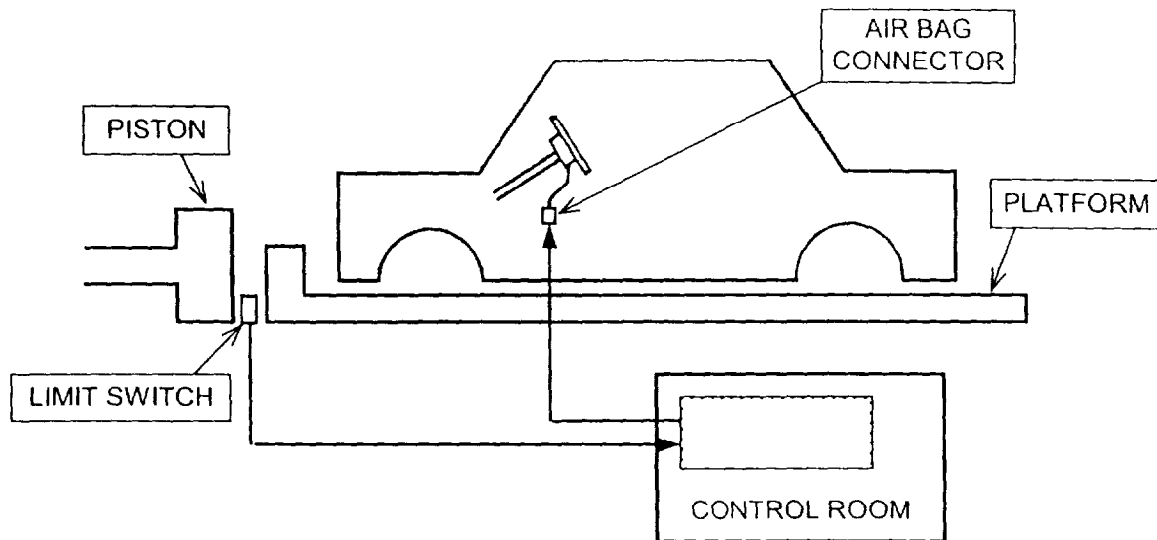
LOCATION AND DISCONNECTION
OF THE AIRBAG CONNECTORDRIVER SIDE AIRBAG

- (1) Remove the 3 screws and steering column lower cover as shown in the illustration
- (2) Disconnect the airbag connector of the spiral cable

PASSENGER SIDE AIRBAG

- (1) Pry out the glove compartment door finish plate inside the lower panel
- (2) Remove the connector from the glove compartment door finish plate
- (3) Disconnect the airbag connector

ATTACHMENT II-2

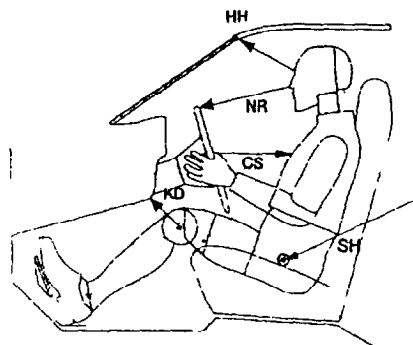
AIR BAG TRIGGERING SYSTEM FOR SLED TEST

- 1 The timing of the initiation of the platform acceleration is measured by the limit switch that is installed between the piston and the platform
- 2 Connect the limit switch, air bag and Master computer which controls the trigger time for the air bag
- 3 When the platform acceleration is initiated, the limit switch send out a signal to the Master computer
- 4 Master computer controls the trigger time for the air bag with the limit switch signal
- 5 At 20ms from the time that 0.5G is measured on the platform, Master computer send out the trigger signal to the air bag

ATTACHMENT III

OCCUPANT CLEARANCE DIMENSION

	Seat inch(mm)	
	DRIVER	PASSENGER
HH	_____	_____
NR	17 0 (432)	_____
CS	12 6 (320)	_____
KDL	_____	_____
KDR	_____	_____
SH	_____	_____



HH – Head to Header

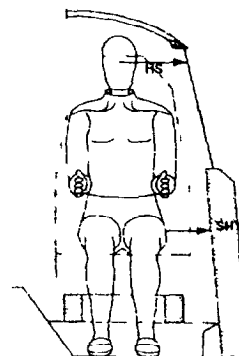
NR – Nose to Rim

CS – Steering Wheel to Chest

KDL/KDR – Knee to Dash

SH – Striker to H Point

	Seat inch(mm)	
	DRIVER	PASSENGER
SHY	_____	_____
HS	_____	_____



SHY – Striker to H Point

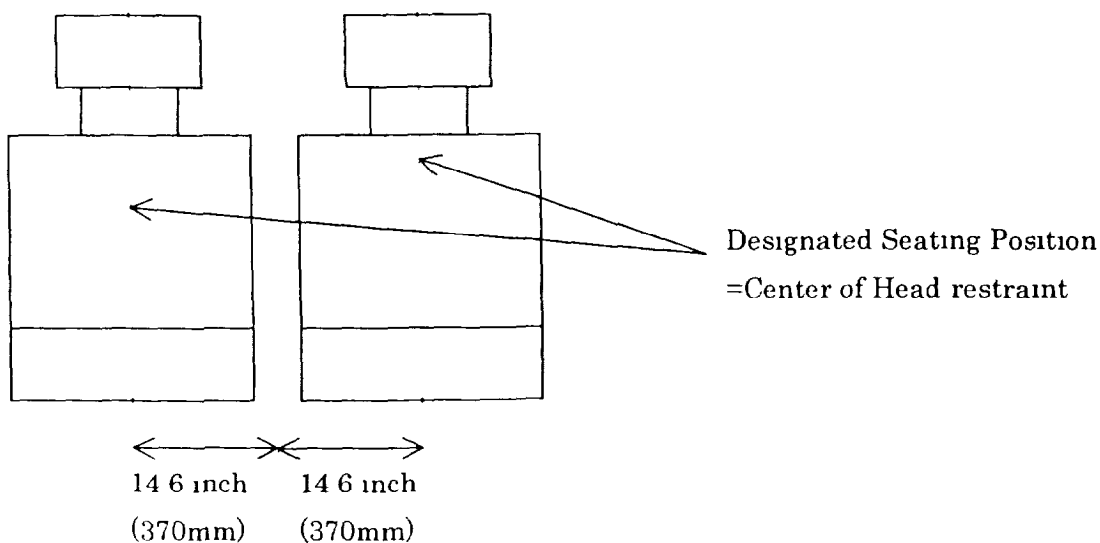
HS – Head to Side Window

Information for NHTSA Regarding The 2002 TOYOTA AVALON
(Test Conditions for Barrier Crash Test)

Test Conditions

4. Outboard Designated Seating Position

14 6 inch (370mm) outboard of the vertical plane that includes vehicle center

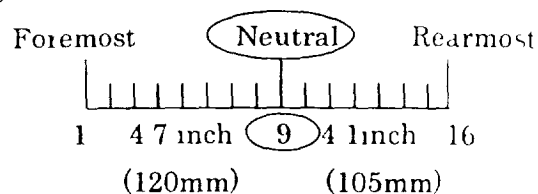


Vehicle Center

5 Front Seat Adjustment (Driver & Passenger Side)

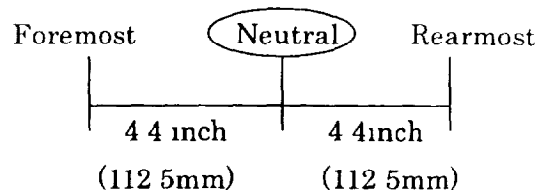
5.1 Manual Seat

Move to the ninth notch rearward from the foremost position



5.2 Power Seat

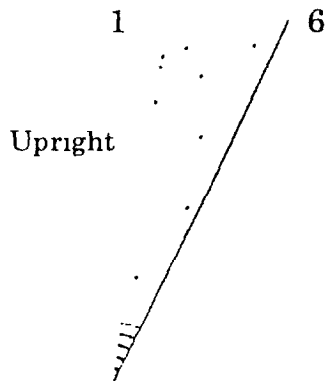
Move to 112.5mm (4.4 inch) rearward from the foremost position



6 Designated Front Seat Back Positions (Driver & Passenger Side)

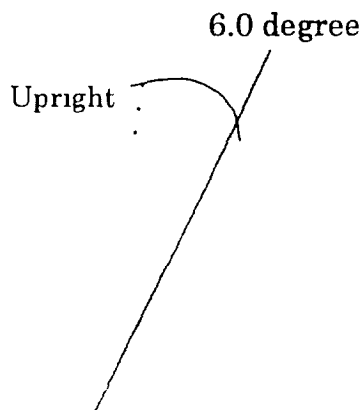
Manual Seat

Recline to the sixth notch rearward from the most upright position
(Five (5) notch rearward from the most upright position)



Power Seat

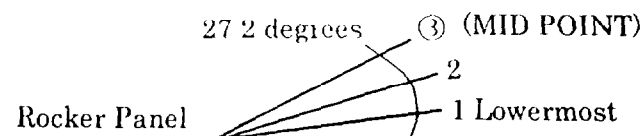
Recline 6.0 degrees rearward from the most upright position



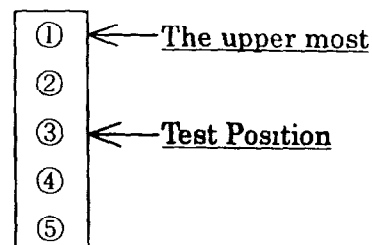
7. Steering Column Position

Tilt third notch upward from the lowermost position

Steering column angle is 27.2 degrees to the rocker panel

8. Shoulder Belt Anchor

We conducted our certification tests with the adjustable shoulder belt connection locked in the second position from the upper most

9. Anthropomorphic Test Device

Driver HYBRID-III

Passenger HYBRID-III

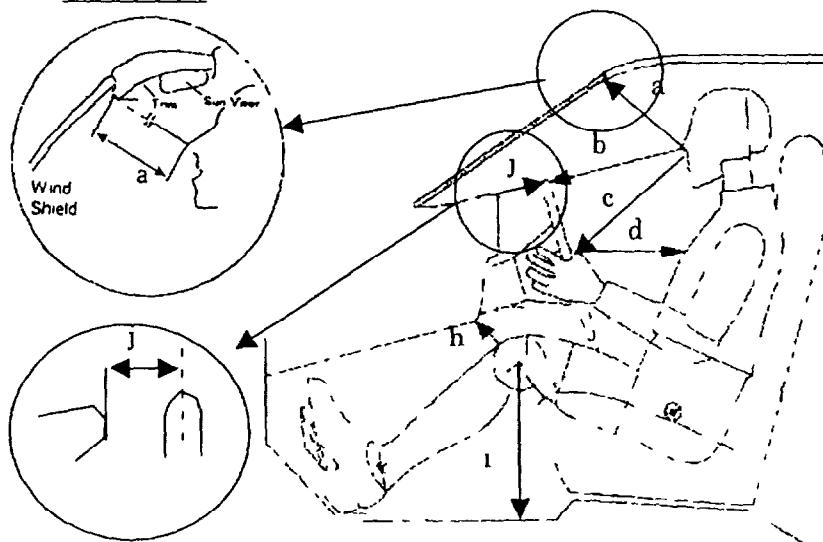
10. Other Seat Adjustment

Lumber Support Rearmost

Vertical Adjuster Lowermost

11. Dummy Clearance Dimensions

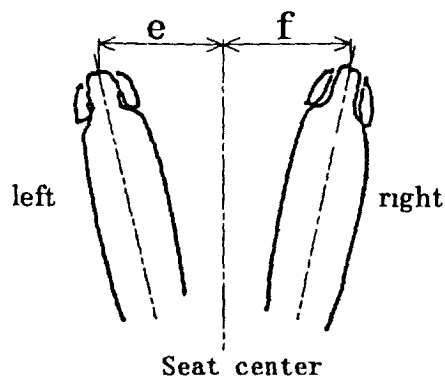
If the dummies are properly positioned on the adjusted seating system, the dimensions are as follows

11.1 Driver

Driver		
a		14.7inch(373mm)
b		17.0inch(432mm)
c		16.3inch(415mm)
d		12.6inch(320mm)
h	R	4.7inch(120mm)
	L	5.1inch(130mm)
i	R	15.0inch(380mm)
	L	14.6inch(370mm)
j		9.8inch(248mm)

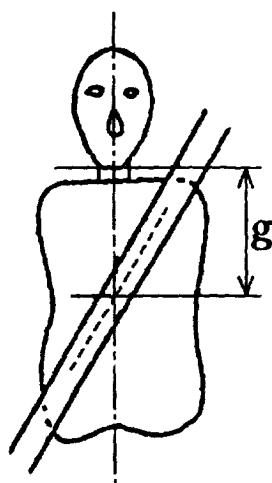
R Right L Left

Interval of the Knee



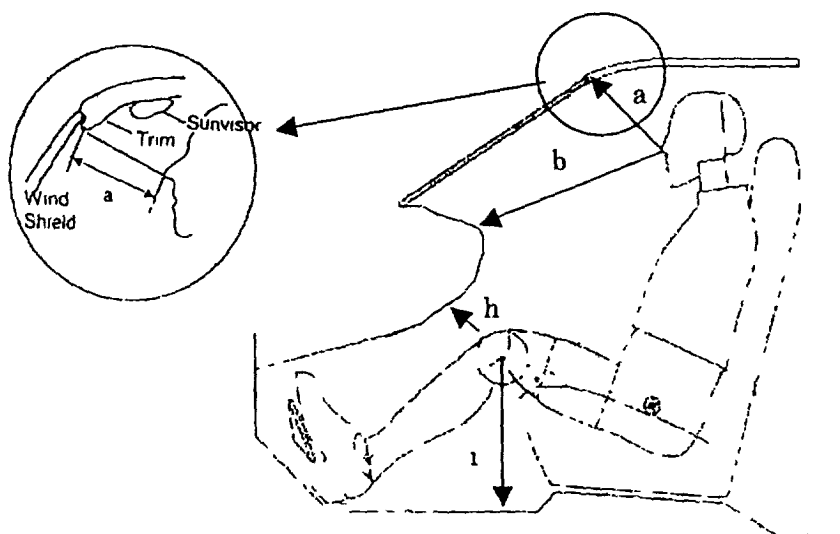
	Driver
e	5 9inch(150mm)
f	4 7inch(120mm)

Belt Position



	Driver
g	5.5inch(140mm)

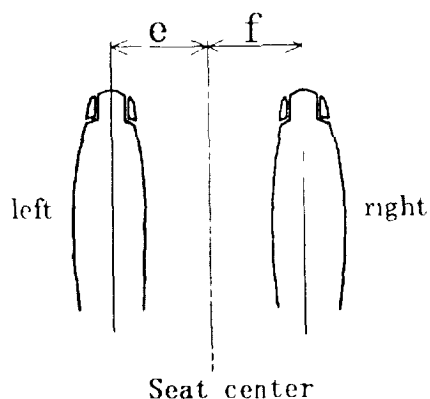
11 2 Passenger



		Passenger
a		14 7inch(373mm)
b		28 3inch(720mm)
h	R	4 7inch(120mm)
	L	4 6inch(118mm)
1	R	14 2inch(360mm)
	L	14 2inch(360mm)

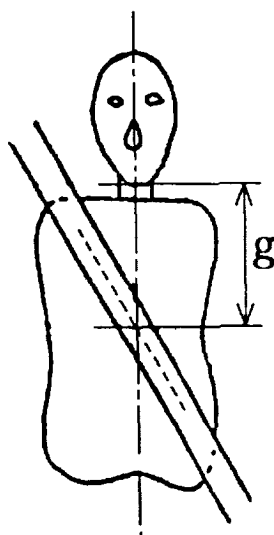
R Right L Left

• Interval of the Knee



	Passenger
e	3 9inch(100mm)
f	3 9inch(100mm)

• Belt Position



	Passenger
g	5 5inch(140mm)

12 Reconfirmation of test procedure

Please assure following procedures in order to avoid test procedure problem which may affect test result

(1) Dummy center position

Adjust dummy center position in the following manner

- 1 Scribe a line for dummy center position 14 6 inches apart from the vehicle center line in each side (right & left) as illustrated below
- 2 Place dummies with its center line described in 1

- 3 Scribing portions are on the windshield seat cushions, seat backs roof and rear window

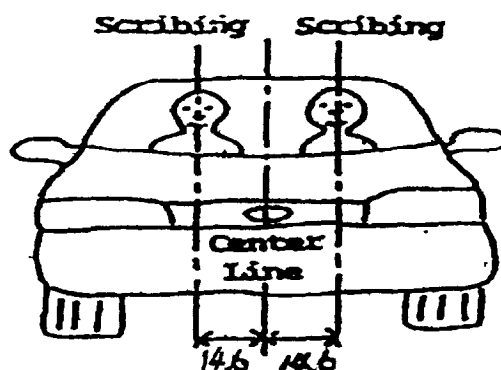


Figure 1. Center line scribing portion

(2) Dummy H point

Adjust dummy's H point as close as possible with the H-point obtained by using a three dimensional dummy. If differs, take record of the gap between the position of the three dimensional dummy and that of the actual set position

(3) Hands

The palms of driver side test dummy shall be contacted with the outer part of the steering wheel rim. The thumbs shall be over the steering wheel rim and shall be lightly taped to the steering rim so that if the hand of test dummy is pushed upward by a force of not less than 2 pounds and not more than 5 pounds, the tape shall release the hand from the steering wheel rim. The tape shall be 0.5 inch width and thumb taping shall be one round.

(4) Limb joints

The dummy limb joints shall be set at 1G, barely restraining the weight of the limb when it is extended horizontally. The force required to move a limb segment shall not exceed 2Gs throughout the range of limb motion.

(5) Abdomen assay

An extremely worn abdomen assembly which had seemed to fail with the calibration requirements was used in a compliance test. If any abnormal condition can be seen on dummy, please assure that the abdomen complies with the calibration requirements.

(6) Ribs

Assure that the ribs of the dummies are not deformed. If any deformation can be seen on ribs, please exchange it to an undeformed one.

(7) Leg positioning

Please set the legs in accordance with the following manner:

- 1 Put driver's feet on the accelerator pedal and foot rest.
- 2 After the feet are positioned, adjust the knee position so that the legs stand perpendicularly.

(8) Shoulder belt

The shoulder belt shall be straightly fastened on the upper torso.

(9) Steering column target

In some NHTSA's vehicle impact tests, steering column target made from metal plate was fixed onto the steering column cover.

The metal plate fixed on the steering column cover may contact with the speed meter, has a possibility of preventing normal steering column stroke.

Therefore, we propose following countermeasures:

<Proposed countermeasures>

- 1 Use any breakable materials like plastics as a substitution for metal plate.
- 2 Take sufficient distance (at least, not less than 40mm) between bracket of target and speed meter.

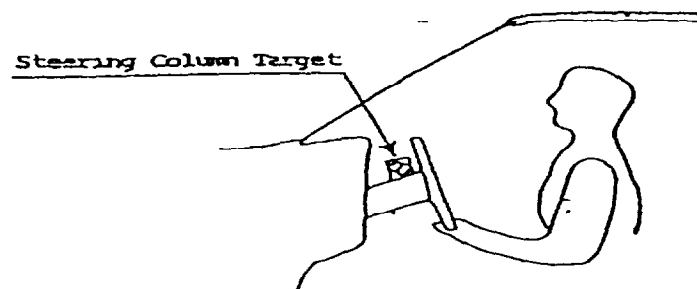


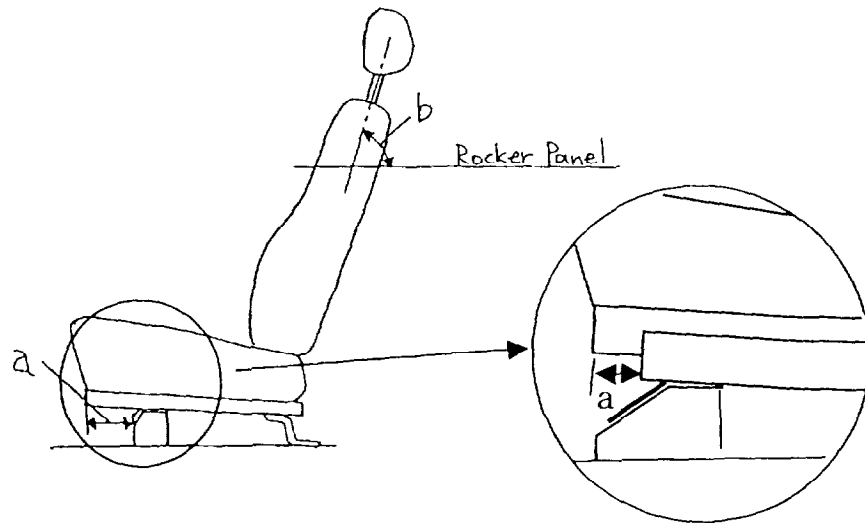
Figure 2 Steering column target

SUPPLEMENTALY EXPLANATION FOR FRONT SEAT ADJUSTMENT

1 Manual Seat

If the seat slide is at the 9 notch rearward from the foremost position and the seat back is the 6 notch rearward from the most upright position , the relationship of the location are as follows

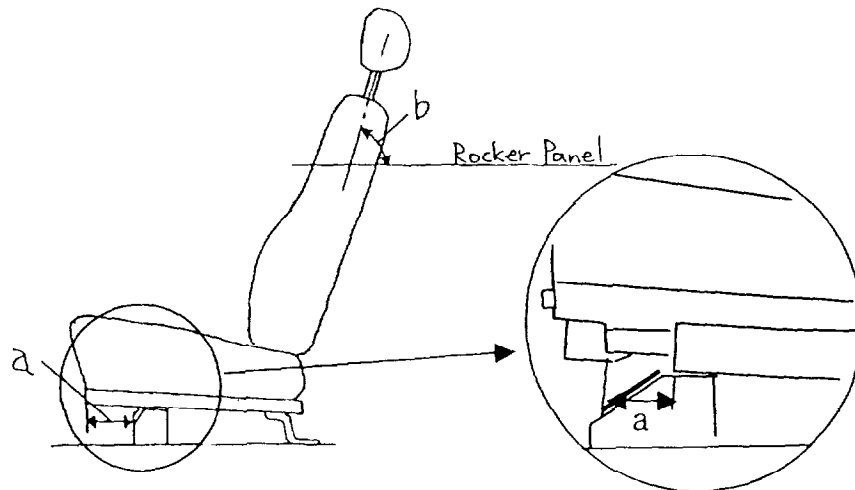
- a 11 5mm (0 45 inch) estimated value
- b 81 degrees



2 Power Seat

If the seat slide is at the 9 notch rearward from the foremost position and the seat back is the 6 notch rearward from the most upright position , the relationship of the location are as follows

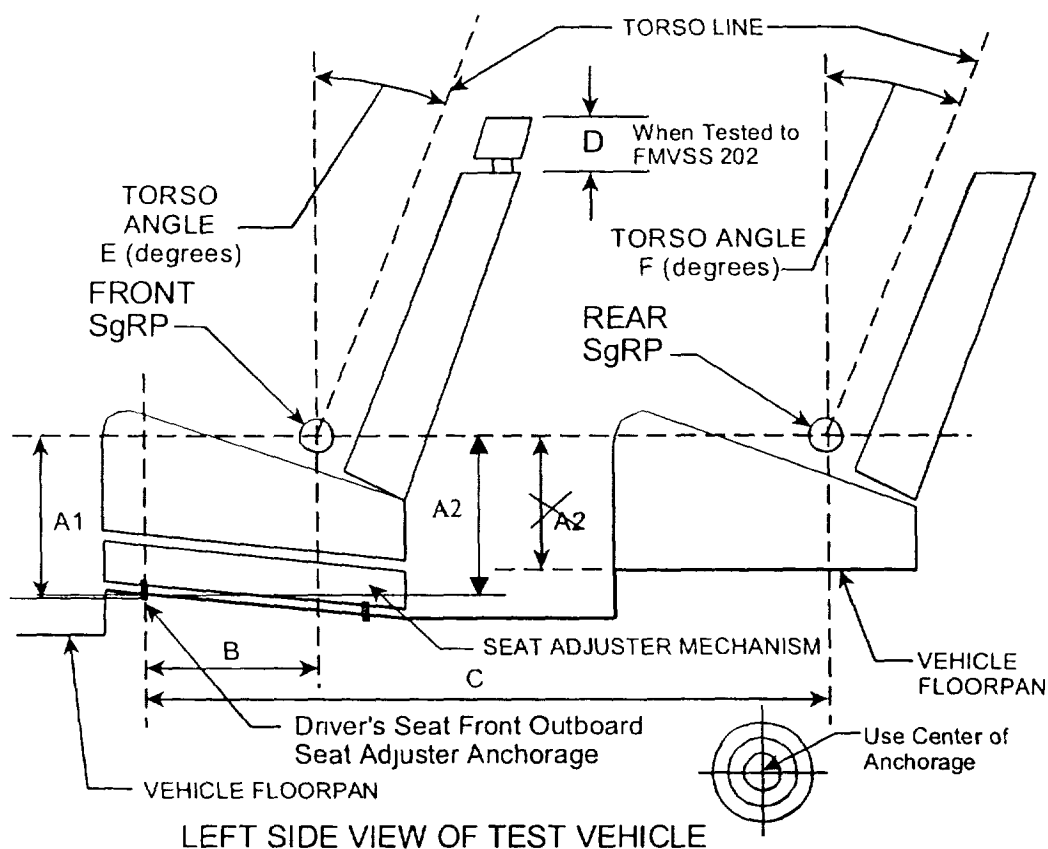
- a 72 5mm (2 85 inch) estimated value
- b 81 degrees



ATTACHMENT IV-2

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
 FOR FMVSS 201, 202, 203, 207 & 210
 (All dimensions in inches)

Model Year 2002, Make TOYOTA, Model AVALON
 Body Style 4-Door Sedan, Seat Style Fr separate seat Rr bench seat

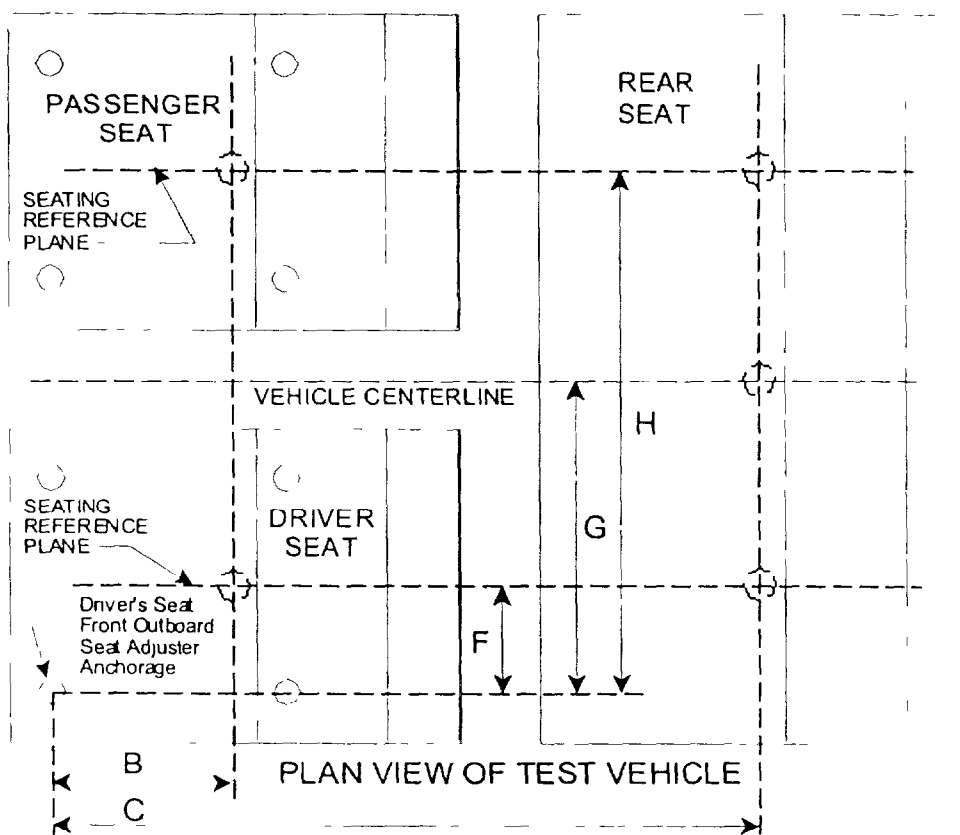


LEFT SIDE VIEW OF TEST VEHICLE

DIMENSION	FRONT, A1		REAR, A2	
	Outboard	Center	Outboard	Center
A	9 8		9 8	10 8
B	12 4			
C			48 4	47 6
D				
E	21			
F			27	23

**SEATING REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in inches)**

Model Year. 2002, Make TOYOTA; Model AVALON
Body Style 4-Door Sedan, Seat Style: Fr :separate seat Rr bench seat



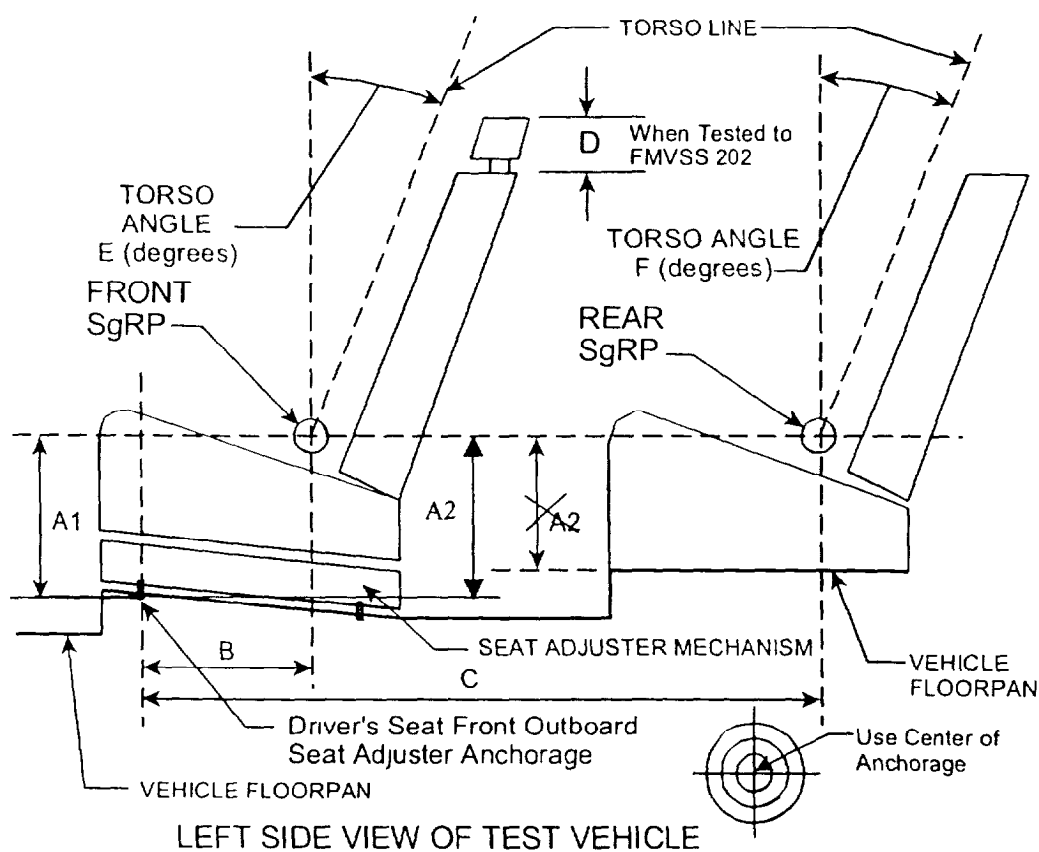
B	12 4			
C	Outboard	48.4	Center	47 6
F*	Fr	8 6	Rr	8 2
G	23 2			
H*	Fr	37 7	Rr	38 1

* Provide all dimensions needed to locate SRP

Attachment IV-3

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in inches)

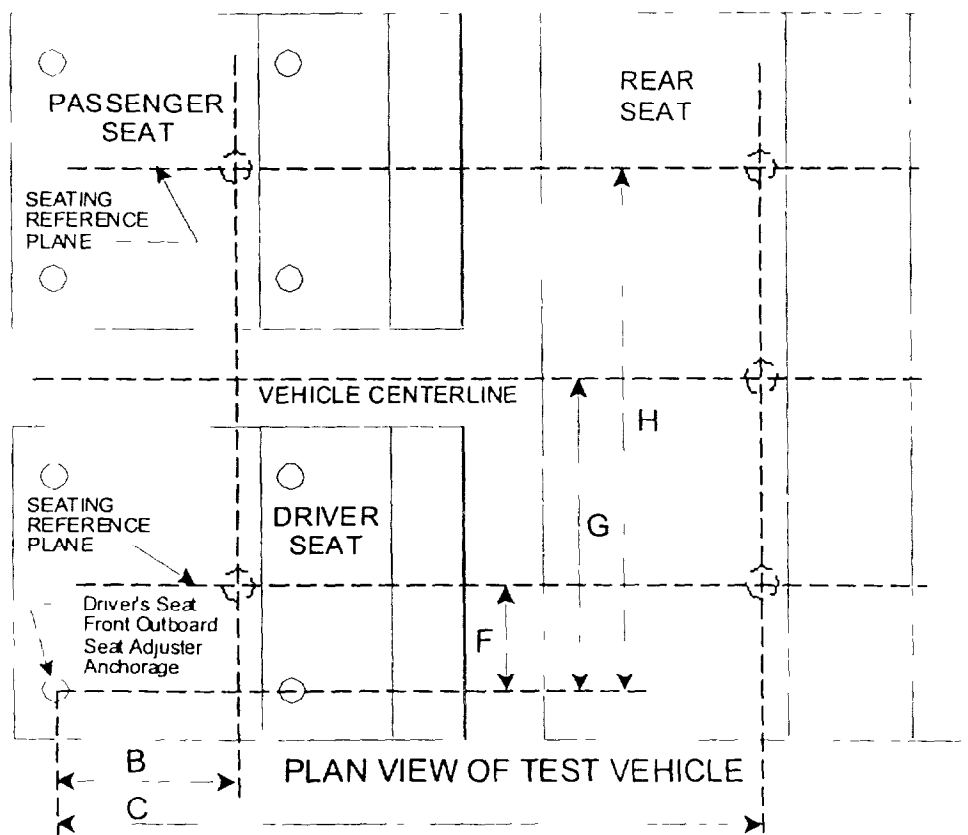
Model Year 2002, Make TOYOTA, Model: AVALON
Body Style 4-Door Sedan, Seat Style: Fr split bench seat Rr .bench seat



DIMENSION	FRONT, A1		REAR, A2	
	Outboard	Center	Outboard	Center
A	9 8	11 4	9 8	10 8
B	12 4	10 0		
C			48 4	47 6
D				
E	21			
F			27	23

**SEATING REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 201, 202, 203, 207 & 210
(All dimensions in inches)**

Model Year: 2002, Make: TOYOTA, Model AVALON
Body Style: 4-Door Sedan; Seat Style: Fr split bench seat Rr bench seat



B	Outboard	12 4	Center	10 0
C	Outboard	48 4	Center	47 6
F*	Fr	8 6	Rr	8 2
G	23 2			
H*	Fr	37 7	Rr	38 1

* Provide all dimensions needed to locate SRP

ATTACHMENT V

RECOMENDED REMOVAL PARTS FOR WEIGHT ADJUSTMENT

Following is the list of the vehicle components that may be removed in order to adjust the test vehicle weight

No	Parts Name	Estimated Weight (lbs)
1	Rear Bumper Assy	29 7
2	Rear Combination Lamp	2 2 × 2
3	Outside Mirror	4 1 × 2
4	Inner Mirror	0 7
5	Rear Seat Back	33 1
6	Rear Seat Cushion	12 8