REPORT NOS. 208-TRC-91-011

212-TRC-91-011

301-TRC-91-011

VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT CRASH PROTECTION, WINDSHIELD MOUNTING, WINDSHIELD ZONE INTRUSION, AND FUEL SYSTEM INTEGRITY

MAZDA MOTOR CORPORATION

1991 MAZDA MIATA

2-DOOR CONVERTIBLE

NHTSA NO. CM5403

TRC TEST NO. 910320

THE TRANSPORTATION RESEARCH CENTER OF OHIO

10820 STATE ROUTE 347

EAST LIBERTY, OHIO 43319

APRIL 8, 1991

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF VEHICLE SAFETY COMPLIANCE (NEF-31)

400 SEVENTH STREET, S.W., ROOM NO. 6111

WASHINGTON, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-90-C-21003. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

REPORT PREPARED BY:

Jeffery W. Sankey Date 4/5/91

Jeffery W. Sankey, Supervisor, Laboratory Engineering
Transportation Research Center of Ohio

REPORT APPROVED BY:

C. Kay Latimer Date 4/5/91

C. Kay Latimer, Project Manager
Transportation Research Center of Ohio

FINAL REPORT ACCEPTED BY:

Date 4/11/91

Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Vehicle Safety Compliance

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
208-TRC-91-011 212-TRC-91-011 301-TRC-91-011		

4. Title and Subtitle	5. Report Date
FINAL REPORT OF FMVSS NOS. 208, 212, 219 (PARTIAL), AND 301 COMPLIANCE TESTING OF A 1991 MAZDA MIATA 2-DOOR CONVERTIBLE, NHTSA NO. CM5403	APRIL 8, 1991
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
J.W. Sankey, Supervisor, Laboratory Engineering, TRC	208-TRC-91-011 212-TRC-91-011 301-TRC-91-011
9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Transportation Research Center of Ohio 10820 State Route 347 East Liberty, Ohio 43319	11. Contract or Grant No. DTNH22-90-C-21003
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (NEF-31) 400 Seventh St., S.W., Washington, DC 20590	FINAL REPORT APRIL 1991
	14. Sponsoring Agency Code NEF-30

15. Supplementary Notes

16. Abstract

A 30 mph flat frontal barrier impact test was conducted on a 1991 Mazda Miata 2-door convertible, NHTSA No. CM5403, at the Transportation Research Center of Ohio on March 20, 1991. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standards: FMVSS No. 208, "Occupant Crash Protection"; FMVSS No. 212, "Windshield Mounting"; FMVSS No. 219 (partial), "Windshield Zone Intrusion"; FMVSS 301, "Fuel System Integrity." The barrier impact velocity was 29.5 mph. The vehicle's maximum crush was 19.0 inches. The ambient temperature was 73° F.

The driver's head injury criteria (HIC) was 790. The driver's maximum chest deceleration over three (3) milliseconds was 46.1 g. The driver's maximum left and right femur forces were 1262 pounds and 1160 pounds, respectively.

The passenger's head injury criteria (HIC) was 326. The passenger's maximum chest deceleration over three (3) milliseconds was 38.5 g. The passenger's maximum left and right femur forces were 549 pounds and 1008 pounds, respectively.

The vehicle appears to comply with the applicable requirements of FMVSS 208, 212, 219 (partial), and 301.

17. Key Words	18. Distribution Statement
Frontal Impact 30 mph Vehicle Safety Compliance Testing: FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219P, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"	Available from: NHTSA Technical Reference Division Room 5108, (NAD-52) 400 Seventh Street, SW Washington, DC 20590 Attn: Mr. Robert Hornickle

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	107	

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
	VOLUME			
tsp	teaspoons	5	milliliters	mL
Tbsp	tablespoons	15	milliliters	mL
in^3	cubic inches	16	milliliters	mL
fl oz	fluid ounces	30	milliliters	mL
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10 000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
	VOLUME			
mL	milliliters	0.03	fluid ounces	fl oz
mL	milliliters	0.06	cubic inches	in^3
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F

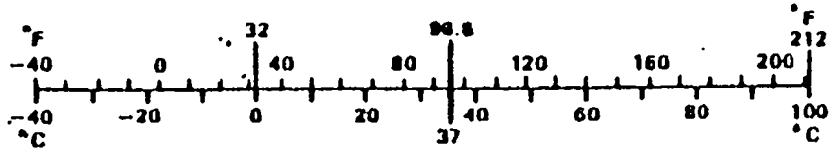


TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF PHOTOGRAPHS, CONT'D.

SECTION 1.0

PURPOSE & TEST PROCEDURE

PURPOSE

This 30 mph flat frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial), and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center of Ohio (TRC) under Contract No. DTNH22-90-C-21003. The purpose of this test was to determine if the subject vehicle, a 1991 Mazda Miata 2-door convertible, NHTSA No. CM5403, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," in the flat frontal barrier impact mode.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-08. Data was obtained relative to FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with seven (7) accelerometers to measure longitudinal axis accelerations. The vehicle's specified impact velocity range was 28.9 to 29.9 mph. The vehicle impacted a flat frontal barrier.

The test vehicle contained two (2) Part 572 B 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedure specified in Appendices B and C of the Laboratory Test Procedure.

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

The twenty-three (23) data channels were multiplexed and recorded on a 14-track tape drive. The data was digitally sampled at 8000 samples per second and processed per sections 12.8 and 12.9 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208, 212, 219 (partial) and 301 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots.

SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This flat frontal barrier test was conducted at TRC on March 20, 1991.

The test vehicle, a 1991 Mazda Miata 2-door convertible, NHTSA No. CM5403, appeared to comply with the performance requirements of FMVSS test Nos. 208, 212, 219 (partial), and 301 in the flat frontal barrier impact mode. The Head Injury Criteria (HIC) calculations were less than 1000, the chest resultant accelerations did not exceed 60 g's, and the compressive forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Part 572 B dummies seated in the front outboard designated seating positions. The vehicle's restraint system met the applicable comfort and convenience requirements. The windshield periphery retention was 100 percent. There was no penetration into any portion of the windshield. No fluid spilled from the vehicle's fuel system following the impact or during the static rollover test.

The test vehicle was equipped with a 1.6 liter, longitudinal engine, manual transmission, power steering, and power brakes. The vehicle's test weight was 2527 pounds. The vehicle's impact speed was 29.5 mph. The vehicle's maximum crush was 19.0 inches.

The driver's head injury criteria (HIC) was 790. The driver's maximum chest resultant acceleration over three (3) milliseconds was 46.1 g. The driver's maximum left and right femur forces were 1262 pounds and 1160 pounds, respectively.

The right front passenger's HIC was 326. The right front passenger's maximum chest resultant acceleration over three (3) milliseconds was 38.5 g. The right front passenger's maximum left and right femur forces were 549 pounds and 1008 pounds, respectively.

There was no loss of windshield periphery retention.

There was no intrusion through the windshield.

There was no fluid spillage from the vehicle's fuel system following the crash test event or during the static rollover test.

DATA ACQUISITION EXPLANATIONS

The instrument panel X-axis accelerometer, DPCXG, data exceeded the data channel's full scale at 105 milliseconds.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: CM5403 TEST TYPE: Frontal Barrier Impact

TEST DATE: 03/20/91 TEST TIME: 1527 AMBIENT TEMP. (°F): 73

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1991/Mazda/Miata/2-door convertible

VEHICLE TEST WEIGHT (LBS): 2527

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (MPH)**: PRIMARY = 29.5 SECONDARY = 29.5

MAXIMUM STATIC CRUSH (IN): 19.0

AVERAGE REBOUND (IN): 4.4

DUMMIES:	Driver #354	Passenger #1173
TYPE:	Part 572 B	Part 572 B
LOCATION:	Left front	Right front
RESTRAINT:	Driver's airbag	3-point unibelt

NUMBER OF DATA CHANNELS: 23

NUMBER OF CAMERAS: HIGH-SPEED 14 REAL-TIME 2

*With respect to tow track centerline.
**Speed trap measurement (± .05 mph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Mazda Motor Corporation

MAKE/MODEL: Mazda/Miata VIN: JM1NA3519M1216919

BODY STYLE: 2-door convertible MODEL YEAR: 1991

NHTSA NO.: CM5403 COLOR: Silver

ENGINE DATA: TYPE: longitudinal CYLINDERS: 4 DISPLACEMENT: 1.6 liter

TRANSMISSION DATA: _5_SPEED, _X_MANUAL, ___AUTOMATIC, ___FWD, _X_RWD,___4WD

DATE VEHICLE RECEIVED: 03/08/91 ODOMETER READING: 107.0

DEALER'S NAME AND ADDRESS: Mid-Ohio Mazda
4050 Morse Road
Columbus, OH 43230

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	No
OTHER	Limited slip differential floor mats		

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE ALTERED BY: Mazda Motor Corporation

DATE OF MANUFACTURE: 10/90 VIN: JM1NA3519M1216919

GVWR: 2700 LBS

GAWR: FRONT: 1380 LBS., REAR: 1365 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Bridgestone SF-325 P185/60R14

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 35 PSI

SPARE TIRE (MFR., LINE, SIZE): Tracompa-3 T115/70D14

TYPE OF SEATS: FRONT: Bucket
REAR: None

TYPE OF FRONT SEAT BACKS: Manual adjustable

MAXIMUM WIDTH: 64.8 INCHES

WHEELBASE: 89.1 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA: THE LABEL WAS LOCATED ON THE DRIVER'S DOOR.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: FRONT: P185/60R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 26 PSI; REAR: 26 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 0 REAR 2 TOTAL

VEHICLE CAPACITY WEIGHT: 340 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE:	LF	25.1;	RF	25.2;	LR	26.1;	RR	26.1
FULLY LOADED ATTITUDE:	LF	24.5;	RF	24.5;	LR	24.5;	RR	24.1
PRE-TEST ATTITUDE:	LF	24.8;	RF	25.0;	LR	24.6;	RR	24.6
POST-TEST ATTITUDE:	LF	24.8;	RF	24.8;	LR	24.4;	RR	23.3

TABLE 2 TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	560 LBS.	RIGHT REAR	533 LBS.
LEFT FRONT	560 LBS.	LEFT REAR	517 LBS.
TOTAL FRONT WEIGHT	1120 LBS.	(51.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1050 LBS.	(48.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	2170 LBS.		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2170 LBS)

VCW = VEHICLE CAPACITY WEIGHT (340 LBS)

DSC = DESIGNATED SEATING CAPACITY (2)

RCLW*= VCW - 150 (DSC) = 340 - 150 (2) = 40

TARGET TEST WEIGHT = UDW + RCLW*+ (NO. OF HYBRID II DUMMIES X 164 LBS/DUMMY)

TARGET TEST WEIGHT = 2170 + 40 + 328

TARGET TEST WEIGHT = 2538 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 29 LBS. OF CARGO WEIGHT:

RIGHT FRONT	595 LBS.	RIGHT REAR	657 LBS.
LEFT FRONT	618 LBS.	LEFT REAR	657 LBS.
TOTAL FRONT WEIGHT	1213 LBS.	(48.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1314 LBS.	(52.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	2527 LBS.	(0.4% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: Trunk lid and rear bumper

CG = 46.3 INCHES REARWARD OF FRONT WHEEL CENTERLINE

*Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 300 pounds, whichever is less.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 910320 NHTSA NO.: CM5403

TEST DATE: 03/20/91 TEST TIME: 1527

TEST TYPE: Frontal Barrier Impact IMPACT ANGLE: 0

AMBIENT TEMPERATURE AT IMPACT AREA: 73° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 71° F

IMPACT VELOCITY: PRIMARY = 29.5 MPH SECONDARY = 29.5 MPH

(SPECIFIED RANGE = 28.9 TO 29.9 MPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 26.0 IN.

EXITING VELOCITY TRAP = 2.0 IN.

TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN INCHES):

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 150.8; C 155.0; R 150.5

POST-TEST: L 136.9; C 138.1; R 136.0

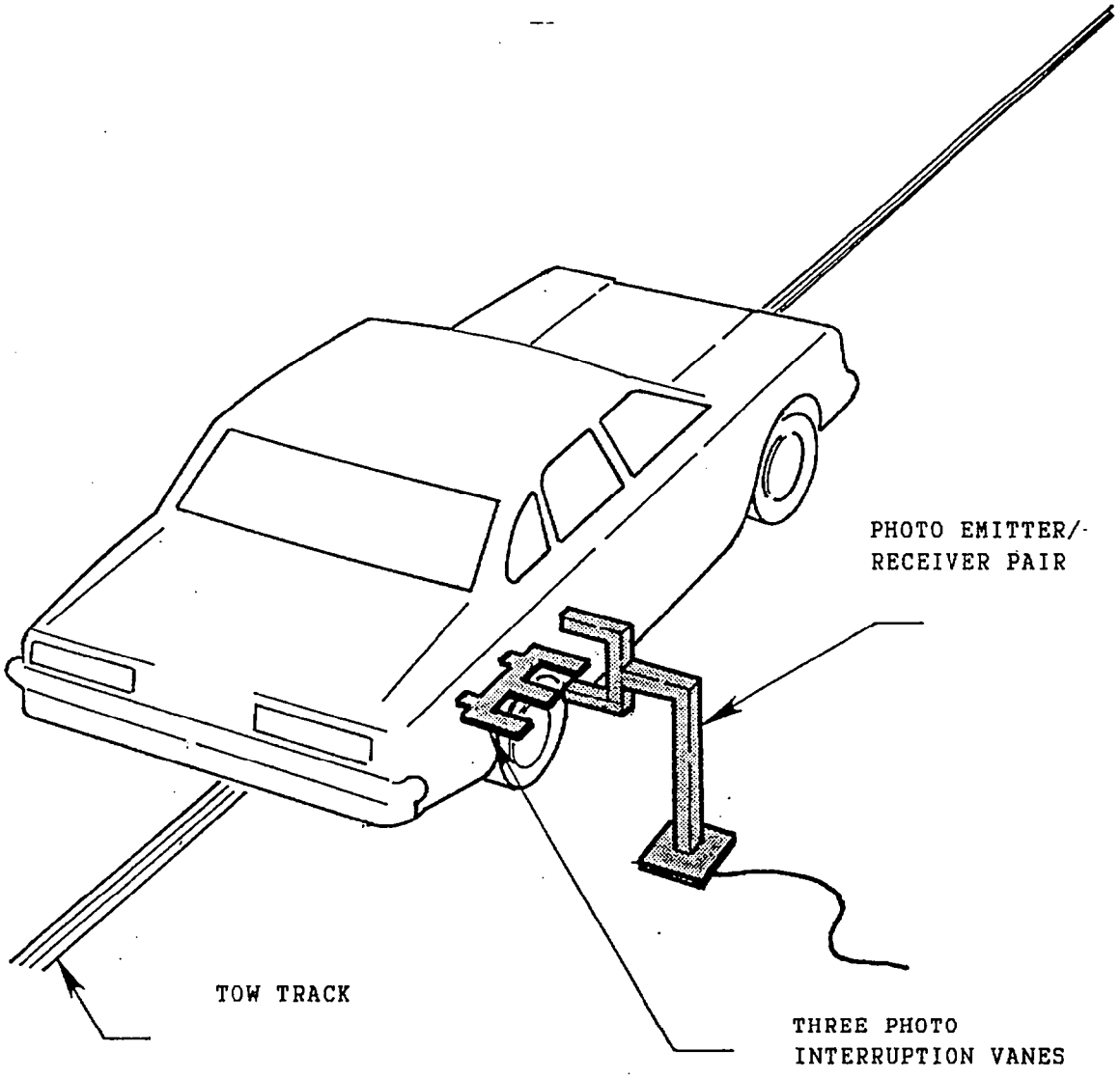
TOTAL CRUSH: L 13.9; C 16.9; R 14.5

AVERAGE CRUSH: 15.1

TEST VEHICLE REBOUND FROM FLAT BARRIER (ALL MEASUREMENTS ARE IN INCHES):

DISTANCE FROM TEST VEHICLE TO BARRIER: L 4.3; C 3.5; R 5.4; AVG. 4.4

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver two inches before impact.

The vanes have one foot spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 30 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Mazda/Miata/2-door convertible

VEHICLE NHTSA NO.: CM5403 ; VIN: JM1NA3519M1216919

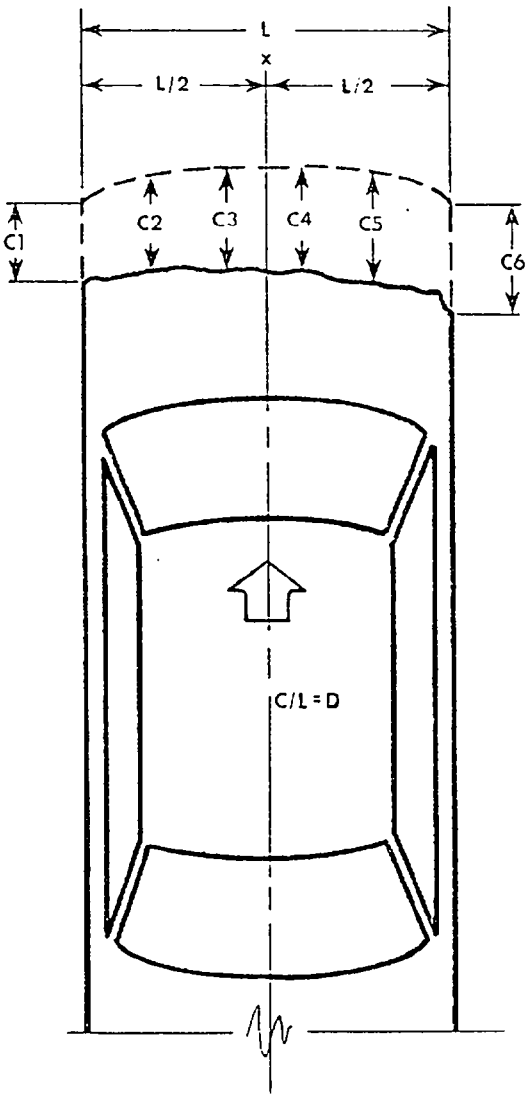
MODEL YEAR: 1991 ; BUILD DATE: 10/90 ; TEST DATE: 03/20/91

VEHICLE SIZE CATEGORY: Two seaters ; TEST WEIGHT: 2527 LBS.

VEHICLE WHEELBASE: 89.1 INCHES

MAXIMUM WIDTH: 64.8 INCHES

FRONT OVERHANG: 31.0 INCHES



COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH
MEASUREMENTS:

C1 = 13.9 INCHES

C2 = 18.3 INCHES

C3 = 17.0 INCHES

C4 = 17.1 INCHES

C5 = 19.0 INCHES

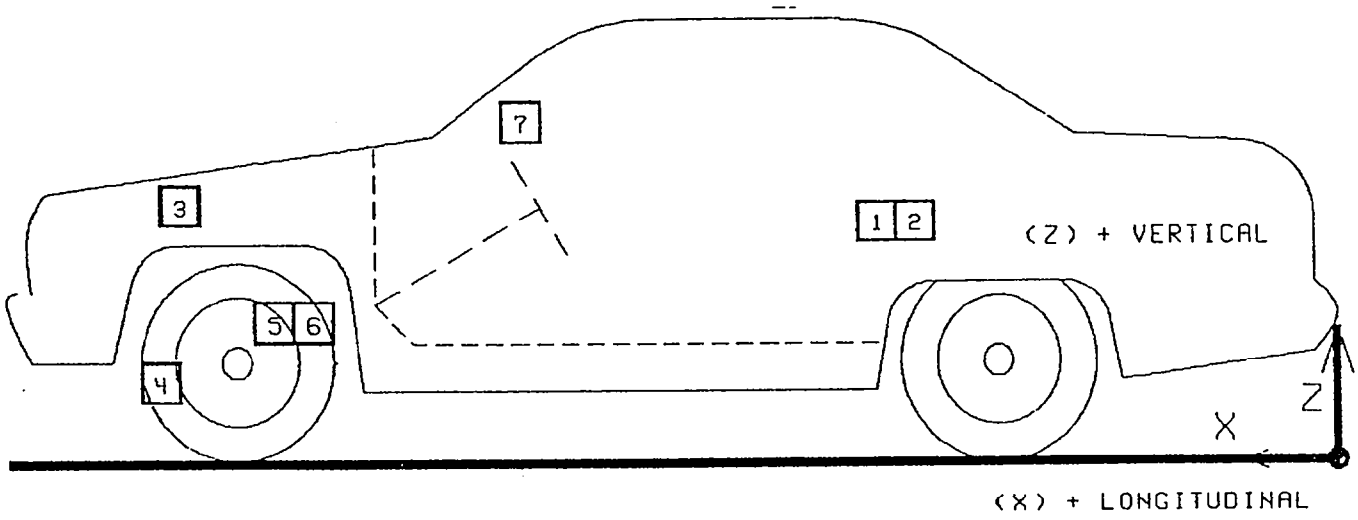
C6 = 14.5 INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE (LONGITUDINAL)

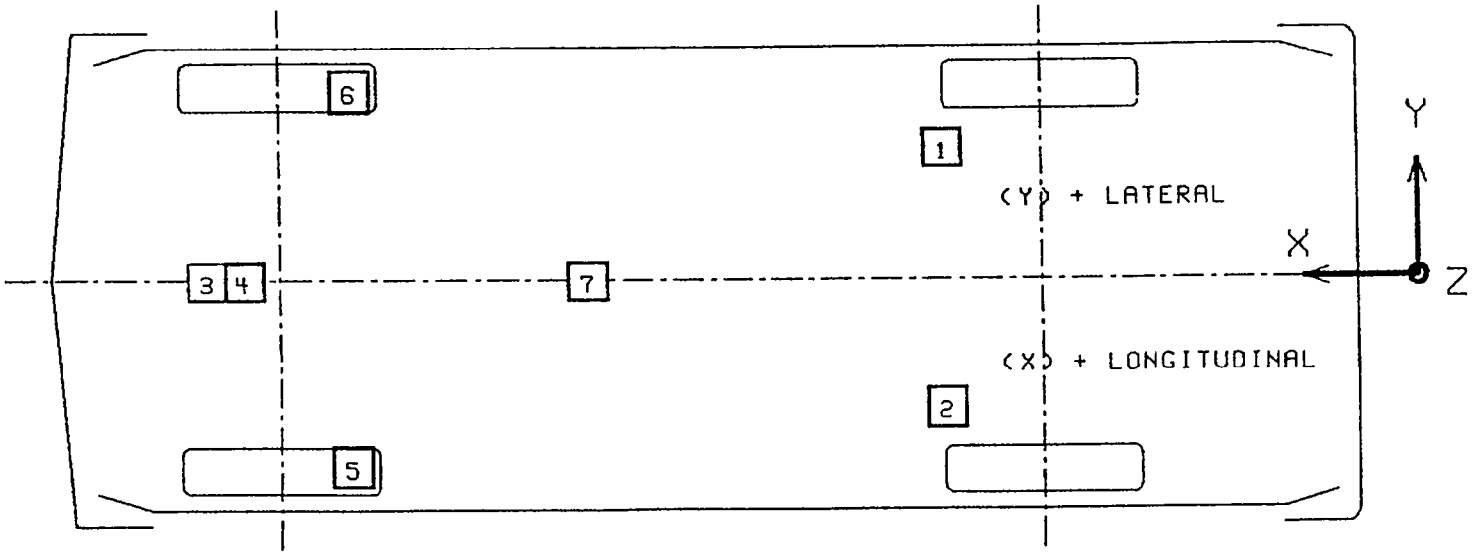
LENGTH OF DAMAGED
REGION: L = 45.5 INCHES

FIGURE 3

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910320

No.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION MAX G	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION MAX G	NEGATIVE DIRECTION MSEC
1	LEFT REAR SEAT	PRE	56.2	20.0	11.8				
	CROSSMEMBER	POST	56.5	20.0	12.2				
	LONGITUDINAL					1.7	193.4	37.8	62.6
2	RIGHT REAR SEAT	PRE	57.9	-21.0	11.1				
	CROSSMEMBER	POST	56.6	-21.0	11.5				
	LONGITUDINAL					1.9	200.0	31.7	61.3
3	ENGINE TOP	PRE	121.5	2.5	29.8				
		POST	119.1	2.5	29.9				
	LONGITUDINAL					14.3	74.0	51.8	51.0
4	ENGINE BOTTOM	PRE	118.0	0.0	5.3				
		POST	116.5	-0.5	5.4				
	LONGITUDINAL					7.4	73.0	48.6	52.8
5	RIGHT BRAKE CALIPER	PRE	119.0	-24.8	12.0				
		POST	118.4	-24.2	10.9				
	LONGITUDINAL					52.1	70.5	83.6	52.9
6	LEFT BRAKE CALIPER	PRE	119.0	24.8	11.8				
		POST	119.0	24.2	10.8				
	LONGITUDINAL					41.7	68.1	71.5	59.9
7	INSTRUMENT PANEL	PRE	95.5	0.0	32.6				
	CENTER	POST	96.0	0.0	32.6				
	LONGITUDINAL					27.1	87.4	127.0	100.8 Y

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

Y See DATA ACQUISITION EXPLANATION

REPORT OF VEHICLE CONDITION AT THE
COMPLETION OF TESTING

CONTRACT NO.: DTNH22-90-C-21003
FROM: The Transporation Research Center of Ohio
10820 State Route 347
East Liberty, OH 43319

TO: Mr. Glen Brammeier
COTR
Office of Vehicle Safety Compliance

The following vehicle has been subjected to testing for FMVSS 208. The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrial Property Manager/NAD-30, with a carbon copy to the responsible testing office. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

NHTSA NO.: CM5403
MAKE/MODEL/BODY STYLE: Mazda/Miata/2-door convertible
MODEL YEAR: 1991 BODY COLOR: Silver
VIN: JM1NA3519M1216919
ODOMETER (ARRIVAL): 107 DATE: 03/08/91
ODOMETER (COMPLETION): 110 DATE: 03/20/91
COST: $13,900.00

___ AIR CONDITIONER	___ CONSOLE	BRAKES: X POWER
___ TINTED GLASS	___ TACHOMETER	FRONT: Disc
X POWER STEERING	___ SPEED CONTROL	REAR: Disc
___ POWER WINDOWS	___ REAR WINDOW DEF.	
___ POWER DOOR LOCKS	___ SUN/MOON ROOF	FRONT SEATS: ___ POWER
___ RADIO	___ T-TOP	SEAT TYPE: Bucket
___ CLOCK	___ TILT STEERING WHEEL	NO. OF SEATS: 2
___ ROOF RACK	X OTHER OPTIONS: Floor mats	
	Limited slip differential	

ENGINE: 4 CYLINDERS; 1.6 LITERS
TRANSMISSION: Manual; DRIVE TYPE: Rear
TIRE SIZE: P185/60R14
GASOLINE TYPE: Unleaded

EQUIPMENT THAT IS NO LONGER ON THE VEHICLE AS NOTED ABOVE: None

EXPLANATION: NA

VEHICLE CONDITION: Vehicle has been subjected to a 30 mph frontal barrier crash test.

SECTION 3.0

FMVSS 208, 212, 219 (partial), & 301 DATA

TABLE 5 DUMMY INJURY CRITERIA

MAXIMUM ACCELERATION (G)

	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DRIVER	-89.6	23.1	-116.0	139.4	-47.7	13.2	-16.4	46.1
PASSENGER	-22.5	-13.3	-47.7	48.7	-38.8	-10.5	11.4	38.5

MAXIMUM FEMUR COMPRESSIVE FORCE (LBS)

	LEFT FEMUR	RIGHT FEMUR
DRIVER	1262	1160
PASSENGER	549	1008

HEAD INJURY CRITERIA**

	HIC	TIME t_1 (MSEC)	TIME t_2 (MSEC)
DRIVER	790	76.8	87.6
PASSENGER	326	71.0	107.0

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #354	PASSENGER #1173
HEAD	Airbag, headliner & sunvisor	Chest
CHEST	Airbag	None
ABDOMEN	None	None
LEFT KNEE	Instrument panel	Instrument panel
RIGHT KNEE	Instrument panel	Instrument panel

DOOR OPENING:

	LEFT	RIGHT
FRONT	Easy	Easy
REAR	NA	NA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	NA	NA

GLAZING DAMAGE:

None

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

Driver Dummy

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head contacted the sunvisor and headliner as the dummy's head and chest were restrained by the airbag. The dummy's upper torso then rebounded into the seat back as the dummy's head rotated rearward into the head restraint. The dummy came to rest seated in the driver's seat.

Right Front Passenger Dummy

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head then rotated downward impacting the dummy's chest. The dummy was restrained by the three-point unibelt. The dummy's upper torso then rebounded into the seat back as the dummy's head rotated rearward into the head restraint. The right front passenger dummy came to rest in the right front passenger's seat restrained by the three-point unibelt.

TABLE 7 FMVSS 208 COMFORT & CONVENIENCE DATA FOR MANUAL SEAT BELTS

MAKE/MODEL: Mazda/Miata VIN: JM1NA3519M1216919

BODY STYLE: 2-door convertible NHTSA NO.: CM5403

DATE OF MANUFACTURE: 10/90

WEBBING TENSION - RELIEVING DEVICE:

DO OUTBOARD SEATING POSITION SEAT BELTS HAVE WEBBING TENSION - RELIEVING DEVICES? No

BELT CONTACT FORCE:

BELT CONTACT FORCE ON CHEST OF TEST DUMMY: .2 POUNDS

LATCHPLATE ACCESS:

ARE THE SEAT BELT LATCHPLATES, IN THEIR NORMAL STOWED POSITION, WITHIN THE REACH ENVELOPE? Yes

DOES THE CLEARANCE TEST BLOCK MOVE UNHINDERED TO THE LATCHPLATE OR BUCKLE? Yes

RETRACTION:

SEAT BELT AUTOMATICALLY RETRACTS WHEN

(check one): _____ The adjacent vehicle door is open and the seat belt latchplate is released.

X The seat belt latchplate is released.

ARE THE STOWED SEAT BELT WEBBING AND HARDWARE PINCHED WHEN THE DOOR IS CLOSED? No

OPEN-BODY VEHICLE (without doors): DOES THE SEAT BELT SYSTEM FULLY RETRACT WHEN THE WEBBING TENSION-RELIEVING DEVICE IS MANUALLY DEACTIVATED? NA

TABLE 7 FMVSS 208 COMFORT & CONVENIENCE DATA FOR MANUAL SEAT BELTS, CONT'D

MAKE/MODEL: Mazda/Miata VIN: JM1NA3519M1216919

BODY STYLE: 2-door convertible NHTSA: CM5403

DATE OF MANUFACTURE: 10/90

ACCESSIBILITY:

IS THE SEAT CUSHION REMOVABLE SO THE SEAT BACK SERVES A FUNCTION OTHER THAN SEATING? No

IS THE SEAT REMOVABLE? No

IS THE SEAT MOVABLE SO THE SPACE FORMERLY OCCUPIED BY THE SEAT CAN BE USED FOR A SECONDARY FUNCTION? No

NOTE: IF ANY OF THE ABOVE ANSWERS ARE "YES", THE ACCESSIBILITY REQUIREMENTS DO NOT APPLY.

IF WEBBING IS DESIGNED TO PASS THROUGH THE SEAT CUSHION OR BETWEEN THE CUSHION AND SEAT BACK ARE ONE OF THE FOLLOWING PARTS NORMALLY ON TOP OF OR ABOVE THE SEAT CUSHION: LATCHPLATE, BUCKLE, WEBBING? NA, the webbing was not designed to pass through the seat cushion or between the cushion and seat back.

ARE THE REMAINING TWO PARTS ACCESSIBLE UNDER NORMAL CONDITIONS? NA, the webbing was not designed to pass through the seat cushion or between the cushion and seat back.

DO THE LATCHPLATE AND BUCKLE PASS THROUGH THE GUIDES PROVIDED AND FALL BEHIND THE SEAT WHEN THE BELT IS COMPLETELY RETRACTED (OR DETACHED IF NOT RETRACTABLE); THE SEAT IS MOVED TO ANY POSITION; AND THE SEAT BACK, IF FOLDABLE, IS FOLDED FORWARD AS FAR AS POSSIBLE AND THEN MOVED BACKWARD INTO POSITION? No

IS THE INBOARD RECEPTACLE END OF THE OUTBOARD SEATING POSITION'S SEAT BELT ACCESSIBLE WITH THE CENTER ARM REST IN ANY POSITION TO WHICH IT CAN BE ADJUSTED WITHOUT MOVING THE ARM REST FOR ACCESS? Yes

TABLE 8 FMVSS 208 SEAT BELT WARNING SYSTEM DATA

WITH OCCUPANT IN DRIVER'S POSITION AND UNIBELT IN STOWED POSITION AND IGNITION SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal = 6 sec.

Duration of reminder light operation = 6 sec.

WITH OCCUPANT IN DRIVER'S POSITION AND UNIBELT IN USE AND THE IGNITION SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal = 0 sec.

(NOTE: audible warning should not operate)

Duration of reminder light operation = 6 sec.

WORDING OF VISUAL WARNING:

Fasten Seat Belt	
Fasten Belt	
Symbol 101-80	X
Belts	X

TABLE 9 FMVSS 208 LABELING AND DRIVER'S MANUAL DATA

DESCRIBE LOCATION OF LABEL WHICH DESCRIBES MANUFACTURER'S MAINTENANCE OR REPLACEMENT SCHEDULE FOR CRASH-DEPLOYED OCCUPANT PROTECTON SYSTEM:

The label was located on the top of the driver's sun visor.

THE MANUFACTURER'S RECOMMENDED SCHEDULE IS TO: (check one)

replace _____ or repair _____ this system: (check one)

a. by _____ month, _____ year

b. by _____ miles

c. or after a time interval of _____ months or _____ years.

_X_ No maintenance is needed unless:

1. "AIRBAG" lamp does not light when key is turned.
2. "AIRBAG" lamp flashes or stays lit.
3. Group of five "BEEPS" are heard.
4. The airbag has inflated.

WERE APPROPRIATE INSTRUCTIONS CONCERNING MAINTENANCE AND/OR REPLACEMENT OF THIS SYSTEM PROVIDED? Yes

WAS A DESCRIPTION OF THE FUNCTIONAL OPERATION OF THE SYSTEM PROVIDED?
Yes, owner's manual; pages 2-16 & 2-17

IS THERE A REFERENCE TO THE INSTRUCTIONS AND DESCRIPTION OF THE SYSTEM ON THE LABEL? Yes

WAS AN OWNER'S MANUAL PROVIDED? Yes

DID THE OWNER'S MANUAL CONTAIN APPROPRIATE INFORMATION CONCERNING MAINTENANCE AND/OR REPLACEMENT AND A DESCRIPTION OF THE FUNCTIONAL OPERATION OF THE SYSTEMS? Yes, pages 2-16 & 2-17

TABLE 10 FMVSS 208 READINESS INDICATOR DATA

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.

Is the system totally mechanical? No

IF NO:

Describe the location of the readiness indicator:

The readiness indicator is a light stating "AIRBAG" located on the lower left portion of the tachometer dial.

Is the readiness indicator clearly visible to the driver? Yes

Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided? Yes, Page 2-18

FIGURE 4 FMVSS 212 TEST DATA

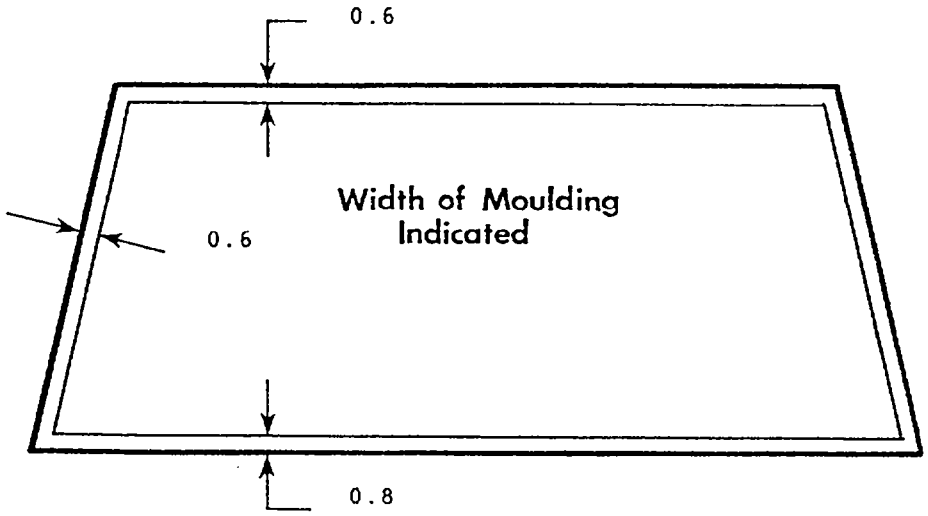
DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:
Plastic trim around outer perimeter, adhesive around inner perimeter.

FMVSS 212 REQUIREMENTS: The post-test periphery retention amount must be at least 75% of the pre-test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

WINDSHIELD PERIPHERY MEASUREMENTS:

	PRE-TEST	POST-TEST	PERCENT RETENTION
RIGHT SIDE	69.1	69.1	100%
LEFT SIDE	69.1	69.1	100%
TOTAL	138.2	138.2	100%

PRE-TEST WINDSHIELD MOUNTING MATERIAL TEMPERATURE: 71° F



FRONT VIEW OF WINDSHIELD*

LOSS OF WINDSHIELD RETENTION LENGTHS: None

ALL DISTANCE MEASUREMENTS ARE IN INCHES.
*INDICATE AREAS OF LOSS OF RETENTION, IF ANY, ON WINDSHIELD DIAGRAM.

FIGURE 5 FMVSS 219 TEST DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5 inch diameter rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 0.5 inch from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

WINDSHIELD MEASUREMENTS:

A = 43.0

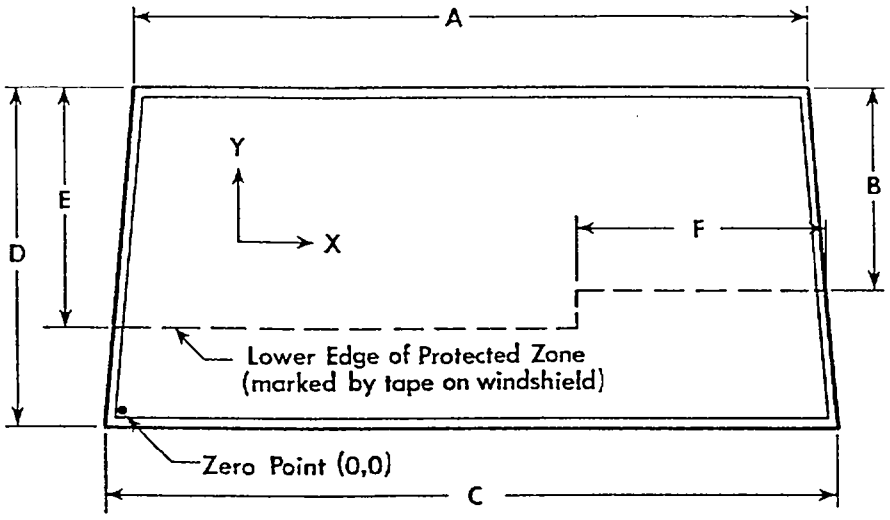
B = 12.2

C = 56.8

D = 21.5

E = 14.2

F = 20.0



FRONT VIEW

METHOD OF ADHERING PROTECTED ZONE TEMPLATE TO WINDSHIELD: NA

AREAS OF WINDSHIELD TEMPLATE PENETRATION GREATER THAN 0.25 IN.: NA

COORDINATES	X	Y
1.		
2.		
3.		

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE, THROUGH THE INNER SURFACE OF THE WINDSHIELD: None

1.		
2.		
3.		

ALL MEASUREMENTS ARE IN INCHES.

TABLE 11 FUEL SYSTEM DATA

MAKE/MODEL: Mazda/Miata NHTSA NO.: CM5403

FUEL SYSTEM CAPACITY: 11.9 GALLONS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 11.68 GALLONS (FURNISHED BY COTR)

TEST VOLUME RANGE: 10.7 GALLONS TO 11.0 GALLONS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 10.9 GALLONS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel tank was located in front of and above the rear axle. The fuel filler neck was located on the left side. The fuel lines ran along the left frame rail to the front.

ELECTRIC FUEL PUMP: Yes FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? No

TABLE 12 FMVSS 301 POST-IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: CM5403 ; TEST DATE: 03/20/91

VEHICLE MAKE/MODEL/BODY STYLE: Mazda/Miata/2-door convertible

TEST REQUIREMENTS:

Test vehicle fuel tank filled to 92 to 94% of manufacturer's usable capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE:

X FRONTAL (30 MPH)

_____ OBLIQUE (30 MPH) WITH ___° BARRIER FACE
FIRST CONTACTING _____ (DRIVER/PASS.) SIDE.

_____ REAR MOVING BARRIER (30 MPH)

_____ LATERAL MOVING BARRIER (20 MPH)

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

	TEST RESULTS	MAXIMUM ALLOWABLE
1. FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 OZ.	1 OZ.
2. 5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 OZ.	5 OZ.
3. NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - - -	0 OZ.	1 OZ./1 MIN.

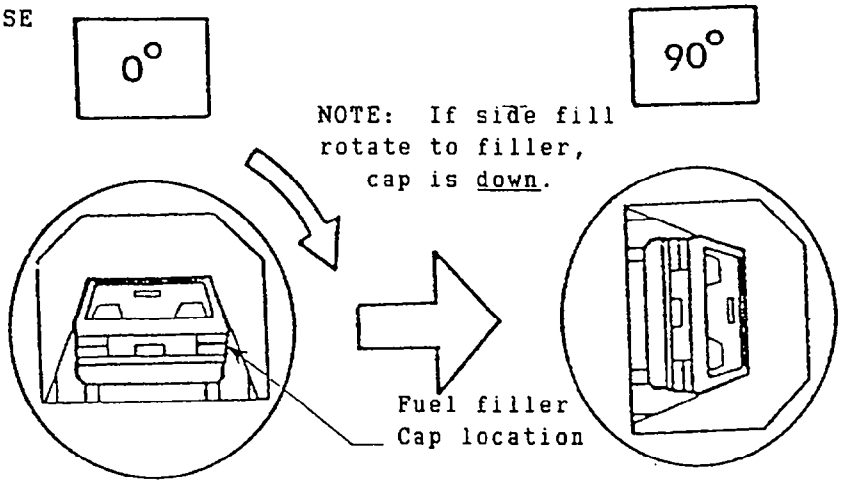
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: CM5403

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 7 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

0° TO 90° ROTATION (FUEL FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.

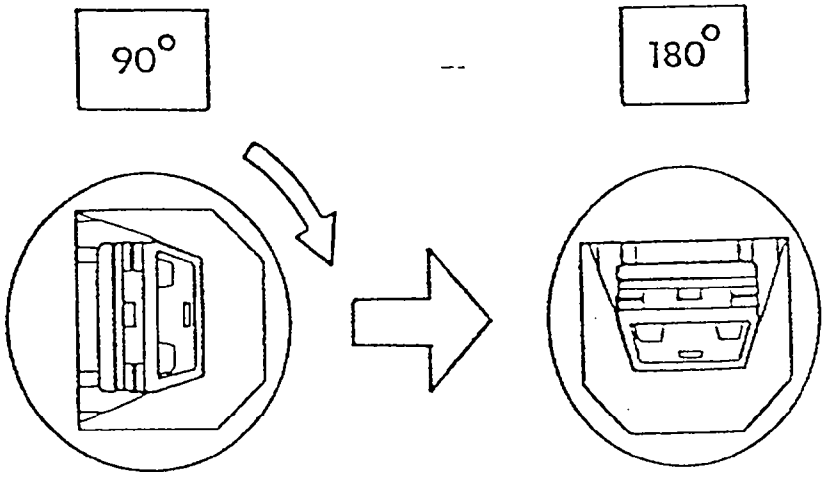
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CM5403

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 14 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.

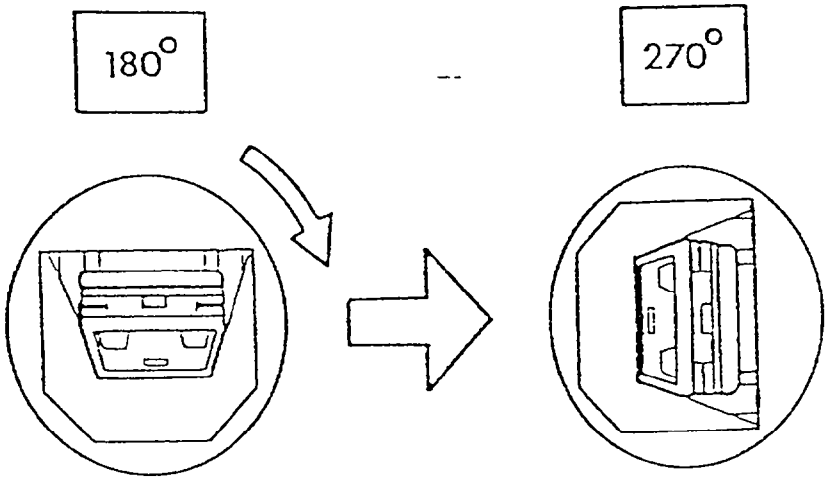
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CM5403

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 21 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - - -	0 oz.	1 oz.

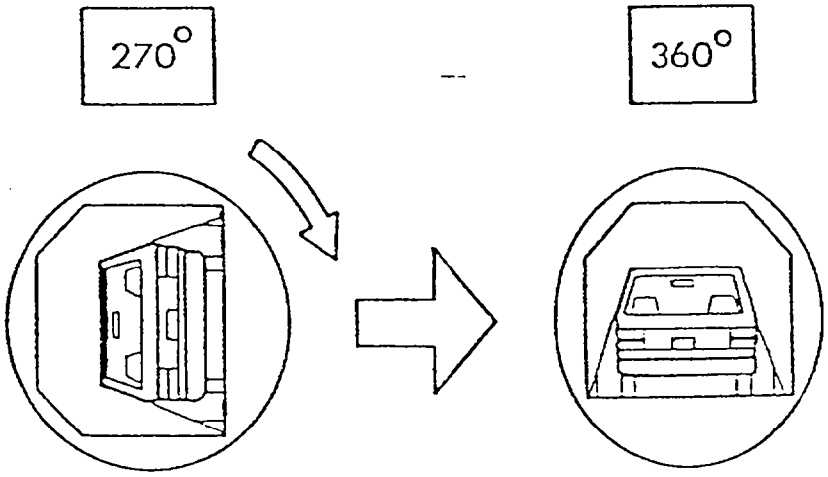
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CM5403

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 28 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

SECTION 4.0

VEHICLE, OCCUPANT, AND CAMERA MEASUREMENTS

FIGURE 7

PRE-TEST AND POST-TEST MEASUREMENT POINTS

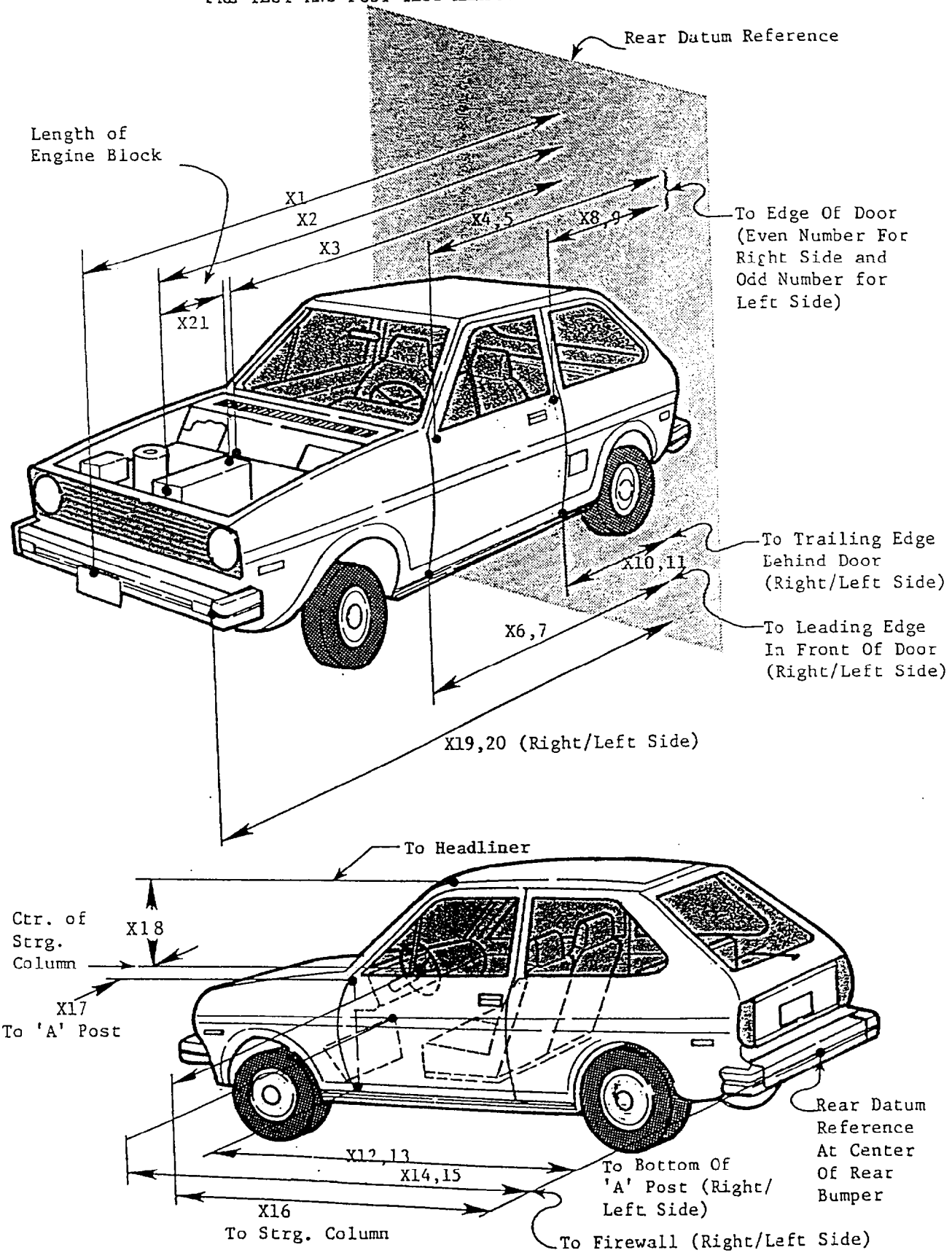


TABLE 13 IMPACTED VEHICLE MEASUREMENTS

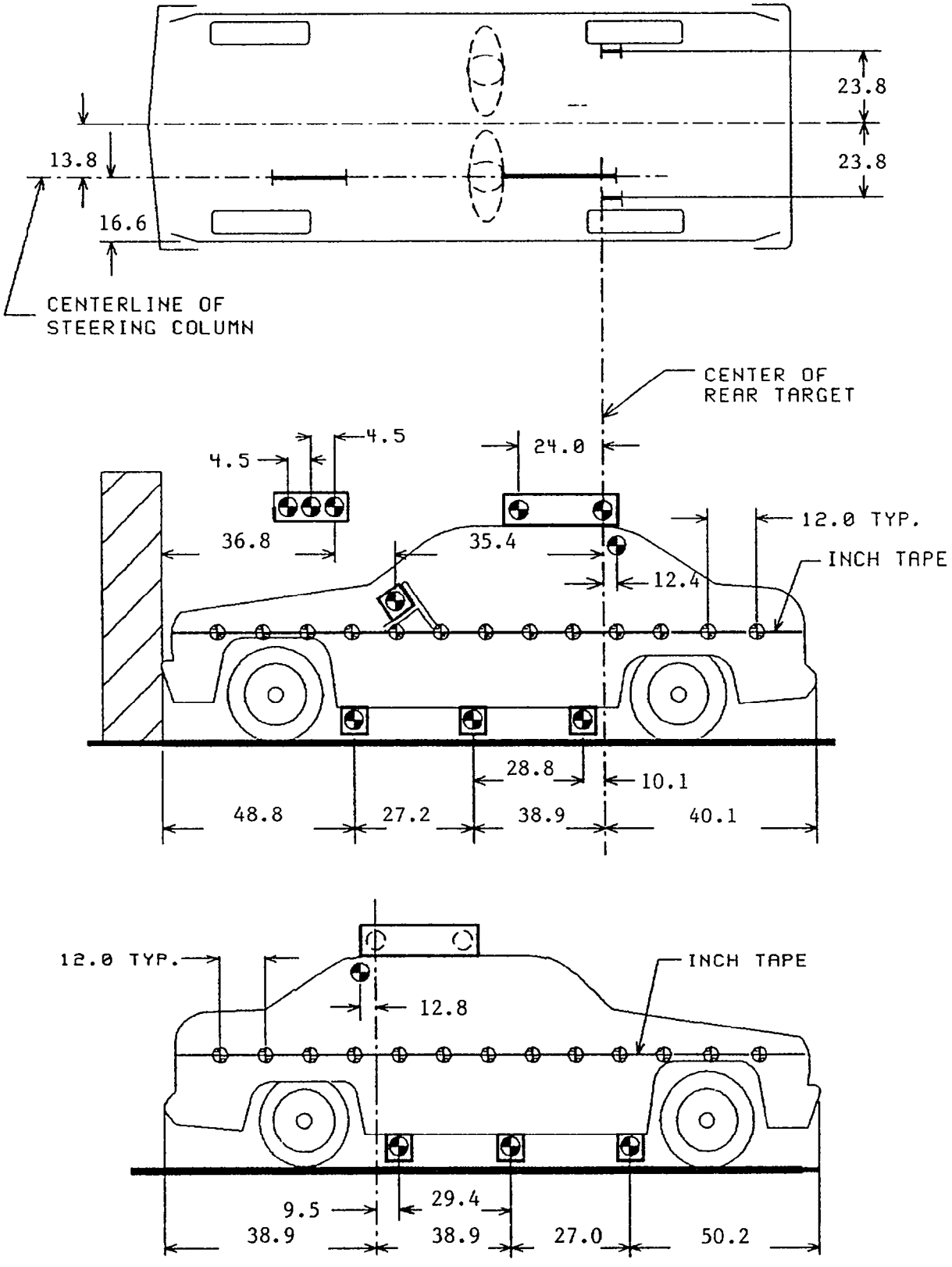
VEHICLE MAKE/MODEL: Mazda/Miata TEST NUMBER: 910320

ALL MEASUREMENTS ARE IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	155.0	138.1	16.9
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	128.9	125.5	3.4
X3	REAR SURFACE OF VEHICLE TO FIREWALL	109.0	109.1	-0.1
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	95.0	95.2	-0.2
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	95.0	95.5	-0.5
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	98.1	98.2	-0.1
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	98.5	98.2	0.3
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	55.5	55.7	-0.2
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	55.5	55.6	-0.1
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	58.4	58.1	0.3
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	58.5	58.2	0.3
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	98.0	97.5	0.5
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	98.1	97.8	0.3
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	109.3	109.0	0.3
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	109.2	109.4	-0.2
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	82.0	82.5	-0.5
X17	CENTER OF STEERING COLUMN TO "A" POST	12.2	13.0	-0.8
X18	CENTER OF STEERING COLUMN TO HEADLINER	15.6	15.7	-0.1
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	150.5	136.0	14.5
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	150.8	136.9	13.9
X21	LENGTH OF ENGINE BLOCK	20.0	20.0	0.0

FIGURE 8

VEHICLE TARGET LOCATIONS



ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 9 DUMMY AND SEAT POSITIONING DATA

PRE-IMPACT DATA:

MAKE/MODEL: Mazda/Miata

BODY STYLE: 2-door convertible MODEL YEAR: 1991

NHTSA NO.: CM5403 COLOR: Silver

DATA FROM CERTIFICATION LABEL:

VEHICLE MANUFACTURER: Mazda Motor Corporation

DATE OF MANUFACTURE: 10/90 VIN: JM1NA3519M1216919

GVWR: 2700 LBS.; GAWR: FRONT = 1380 LBS.; REAR = 1365 LBS.

POST-IMPACT DATA:

DATE OF TEST: 03/20/91 TIME: 1527 TEMPERATURE: 73° F

IMPACT VELOCITY: PRIMARY = 29.5 MPH SECONDARY = 29.5 MPH

REQUIRED IMPACT VELOCITY RANGE: 28.9 TO 29.9 MPH

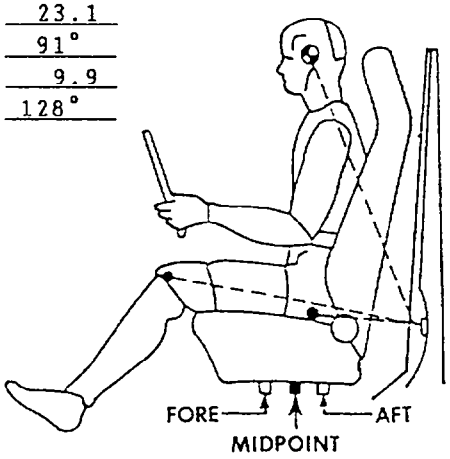
SEAT TYPE: Bucket ADJUSTER TYPE: Manual

FRONT SEAT BACK TYPE: Manual adjustable

TECHNICIANS: R. Branham, P. Cummins, B. Fishbaugh

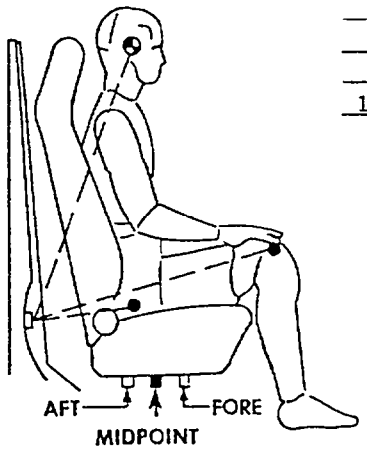
DRIVER DUMMY # 354 TYPE: HII

HEAD	18.4
TARGET	2°
KNEE	23.1
JOINT	91°
APPROX-	9.9
IMATE	128°
"H"	
POINT	



PASSENGER DUMMY #1173 TYPE: HII

19.4	HEAD
1°	TARGET
23.8	KNEE
92°	JOINT
9.5	APPROX-
123°	IMATE
	"H"
	POINT



A = 47.8

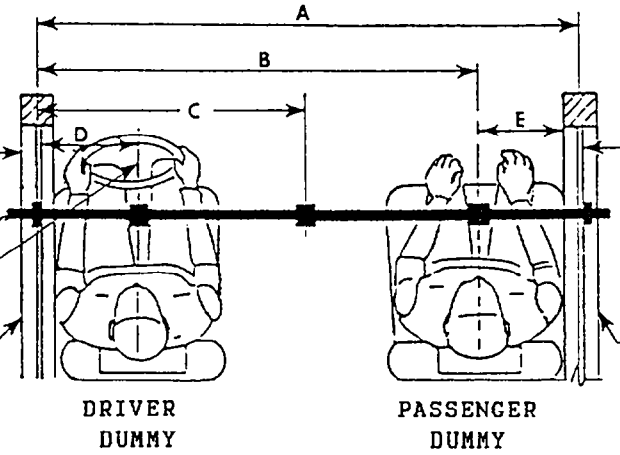
B = 38.2

C = 23.9

D = 9.8

E = 9.6

DOOR GLASS HEIGHT = 9.5



DOOR GLASS HEIGHT = 9.5

LATERAL BAR

ADJUSTABLE POINTER

LEFT FRONT DOOR

DRIVER DUMMY

PASSENGER DUMMY

RIGHT FRONT DOOR

ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.

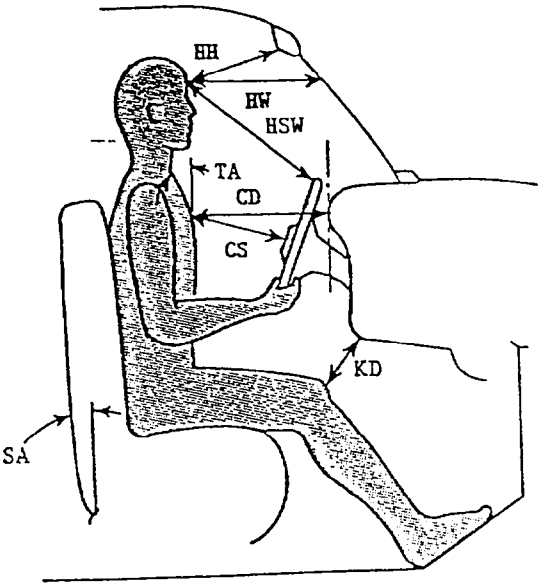
ALL DISTANCE MEASUREMENTS ARE IN INCHES.

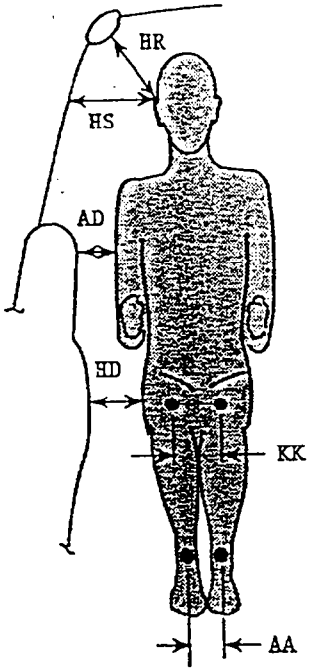
FIGURE 10 DUMMY IN VEHICLE POSITIONING DATA

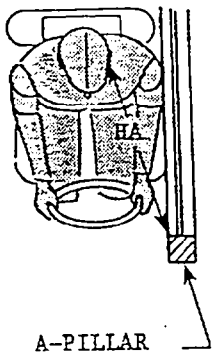
	DRIVER	PASSENGER
HH	19.1	18.8
HW	20.3	20.3
CD	23.7	22.6
CS	14.9	NA
KDL	6.0	6.0
KDR	6.4	5.6
TA	25°	28°
SA	23°	23°
HSW	22.0	NA

	DRIVER	PASSENGER
HR	5.4	4.5
HS	7.6	6.6
AD	2.5	1.8
HD	5.3	5.1
KK	10.6	8.0
AA	11.4	7.8
HA	22.7	20.1

KNEE OUTER BOLT HEAD TO OUTER BOLT HEAD SPACING:
DRIVER = 14.5
PASSENGER = 11.8





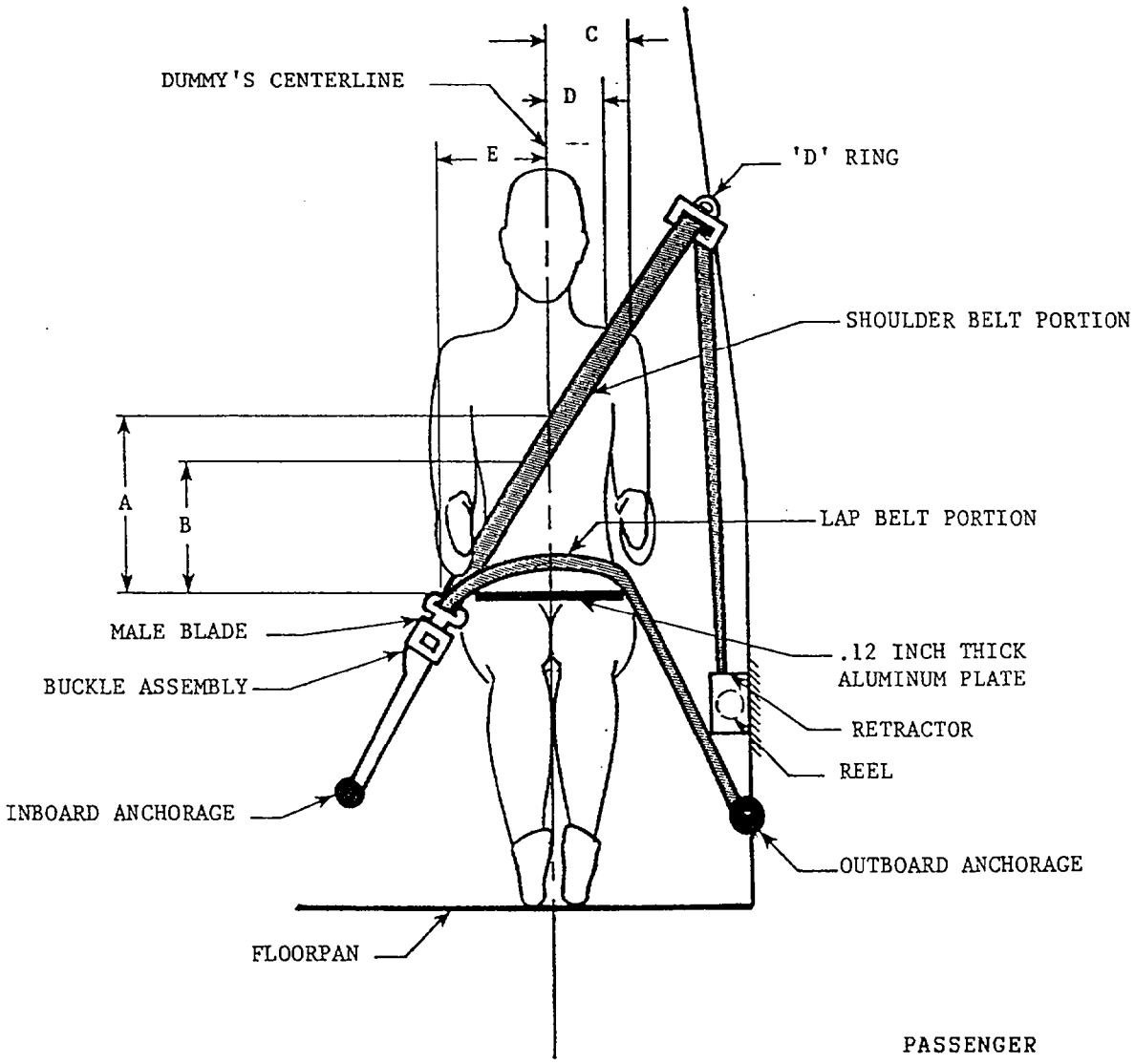


HH = HEAD TO WINDSHIELD HEADER
HW = HEAD TO WINDSHIELD
CD = CHEST TO DASH
CS = CHEST TO STEERING WHEEL
KD = KNEE TO DASH
TA = TORSO ANGLE
SA = SEAT BACK ANGLE
HSW= HEAD TO STEERING WHEEL

HR = HEAD C.G. TARGET TO SIDE ROOF HEADER
HS = HEAD C.G. TARGET TO SIDE WINDOW
AD = ARM TO DOOR
HD = HIP TO DOOR
KK = KNEE TO KNEE
AA = ANKLE TO ANKLE
HA = HEAD C.G. TARGET TO A-PILLAR

TORSO AND SEAT BACK ANGLES ARE RELATIVE TO VERTICAL.
ALL DISTANCE MEASUREMENTS ARE IN INCHES.

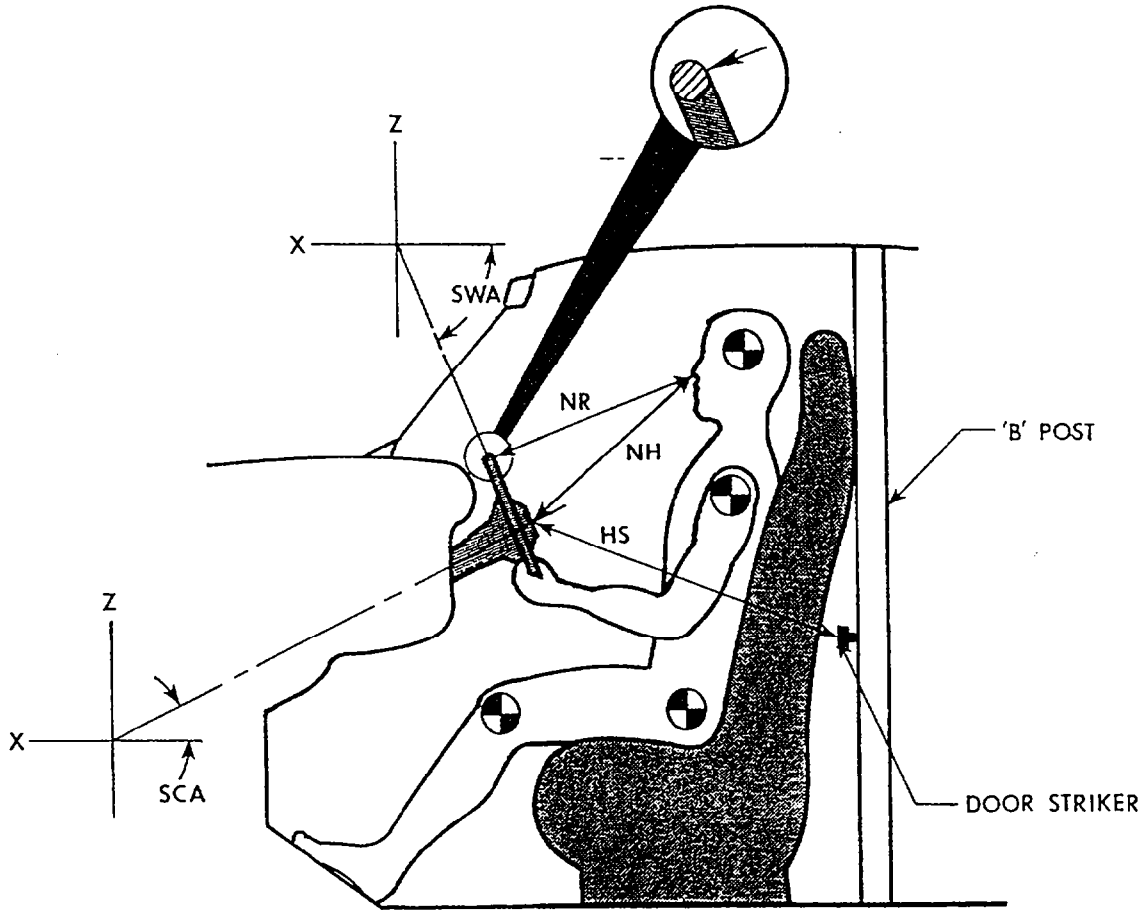
FIGURE 11 SEAT BELT POSITIONING DATA



	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	12.5
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	9.5
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	6.0
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	3.2
E - DUMMY CENTERLINE TO INTERSECTION OF UPPER TORSO BELT AND LAP BELT	8.4

ALL MEASUREMENTS ARE IN INCHES.

FIGURE 12 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:
The steering column was not adjustable.

	MEASUREMENTS
NR - DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	19.3
NH - DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	19.8
HS - DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	24.2
SCA - ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	20°
SWA - ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	70°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 13

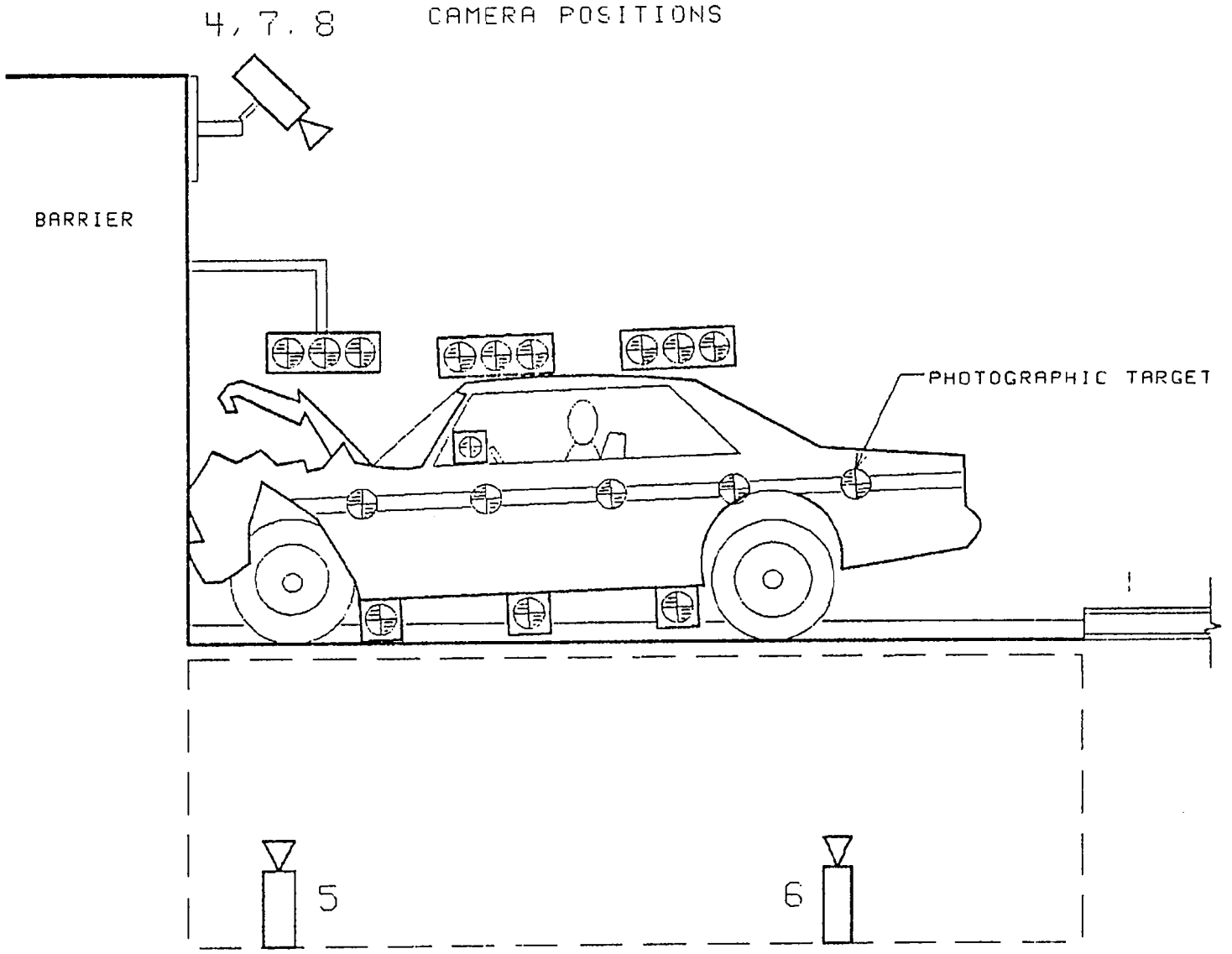


FIGURE 13

CAMERA POSITIONS, CONTINUED

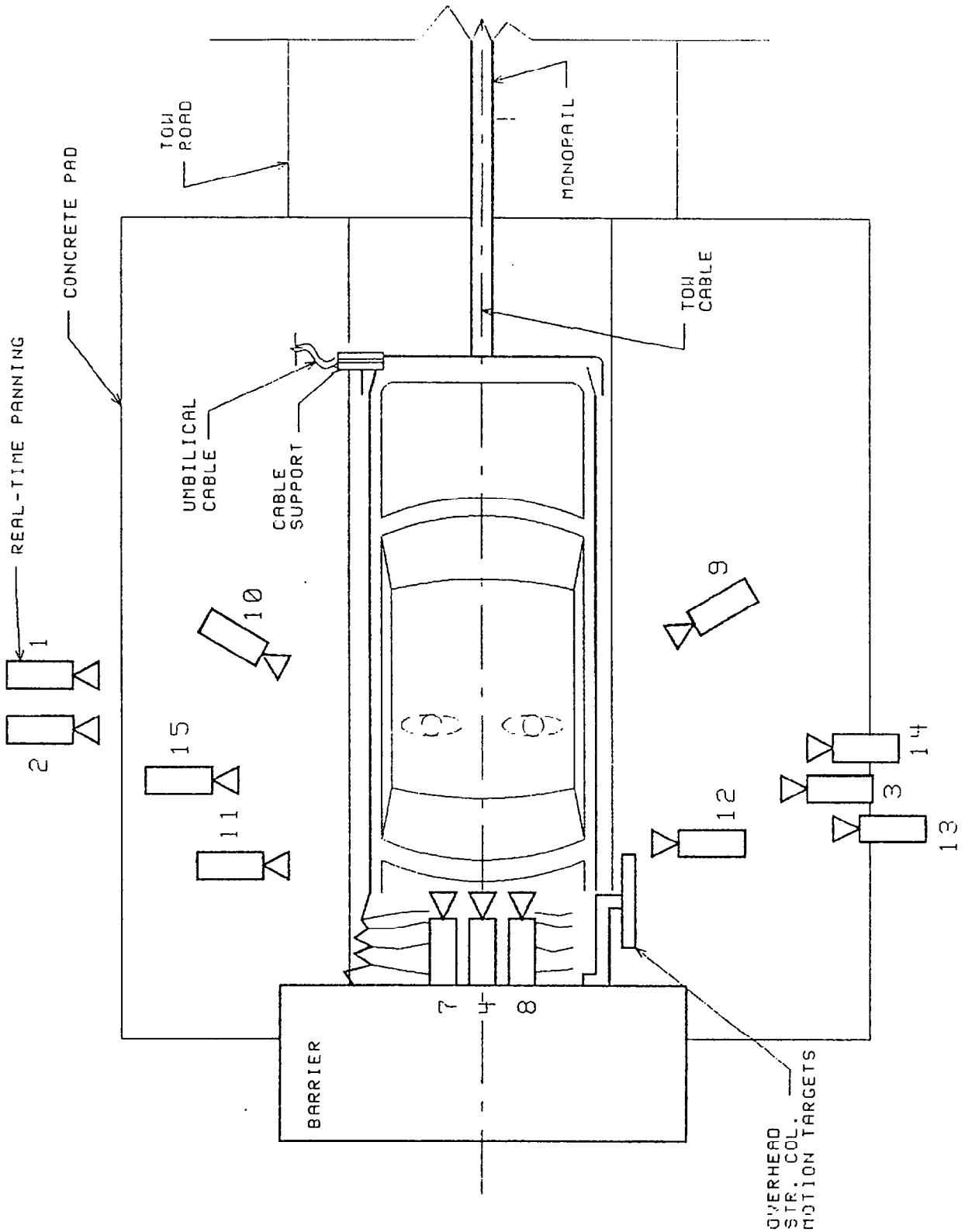


TABLE 14 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 910320 VEHICLE: Mazda Miata 2-door convertible

CAMERA NO.	VIEW	CAMERA POSITIONS (IN)* X	Y	Z	ANGLE** (DEG)	FILM PLANE TO HEAD TARGET(IN)	LENS (MM)	FILM SPEED (FPS)
1	Real-time panning	-142.0	-504.0	61.0	NA	NA	16	24
2	Right overall	-81.3	-266.4	37.1	-2	NA	13	497
3	Left vehicle crush	-41.5	295.0	44.0	-4	203.0	25	490
4	Windshield front view	-6.0	0.0	98.0	-40	NA	13	507
5	Pit front position	-50.5	0.0	-92.4	90	NA	13	998
6	Pit rear position	-99.3	0.0	-99.0	90	NA	13	1000
7	Passenger front view	-4.5	-13.8	93.0	-50	NA	17	495
8	Driver front view	-6.8	14.5	93.0	-50	NA	17	500
9	Driver kinematics	-157.3	116.0	87.0	-27	82.0	25	500
10	Passenger kinematics	-152.1	-116.0	87.0	-26	73.0	25	500
11	Right windshield intrusion	-38.1	-306.1	44.0	0	NA	50	500
12	Left windshield instrusion	-53.0	309.4	42.3	0	NA	50	1000
13	Steering column motion	-110.0	225.0	103.0	-14	NA	25	500
14	Steering column motion	-110.0	225.0	75.1	-9	NA	25	500
15	Passenger kinematics	-38.8	-293.0	45.3	-4	217.0	25	488
16	Real-time documentation	NA	NA	NA	NA	NA	12-120	24

* +X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

** +Angle = Film plane angled upward from horizontal plane

APPENDIX A

PHOTOGRAPHS

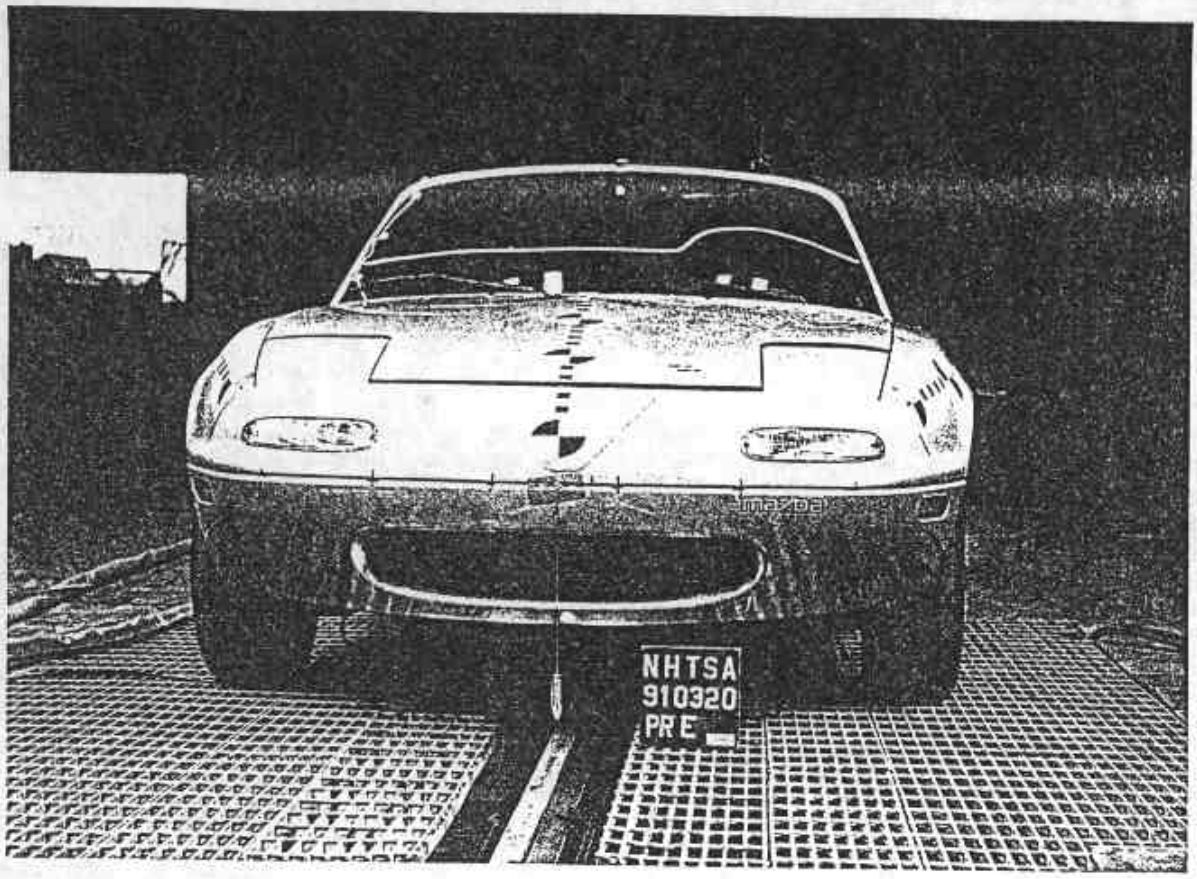


Figure A-1. PRE-TEST FRONT VIEW

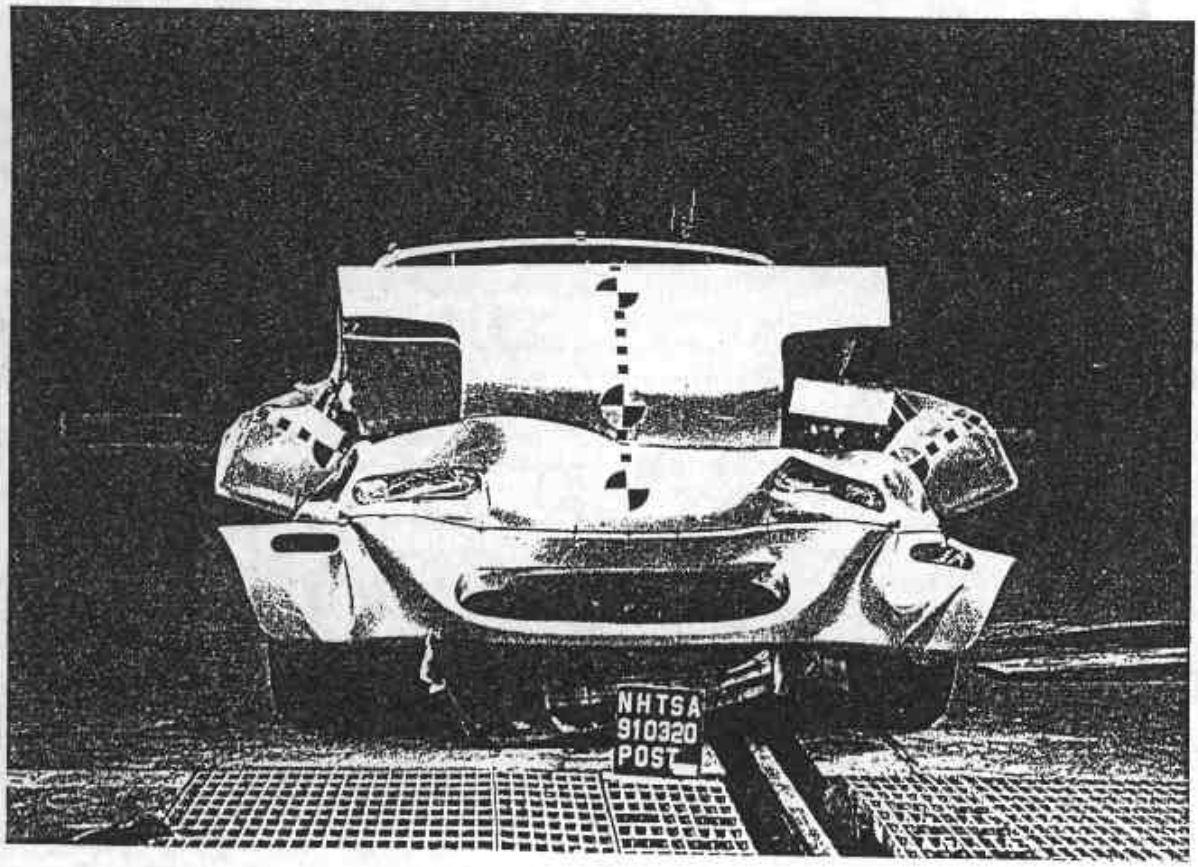


Figure A-2. POST-TEST FRONT VIEW

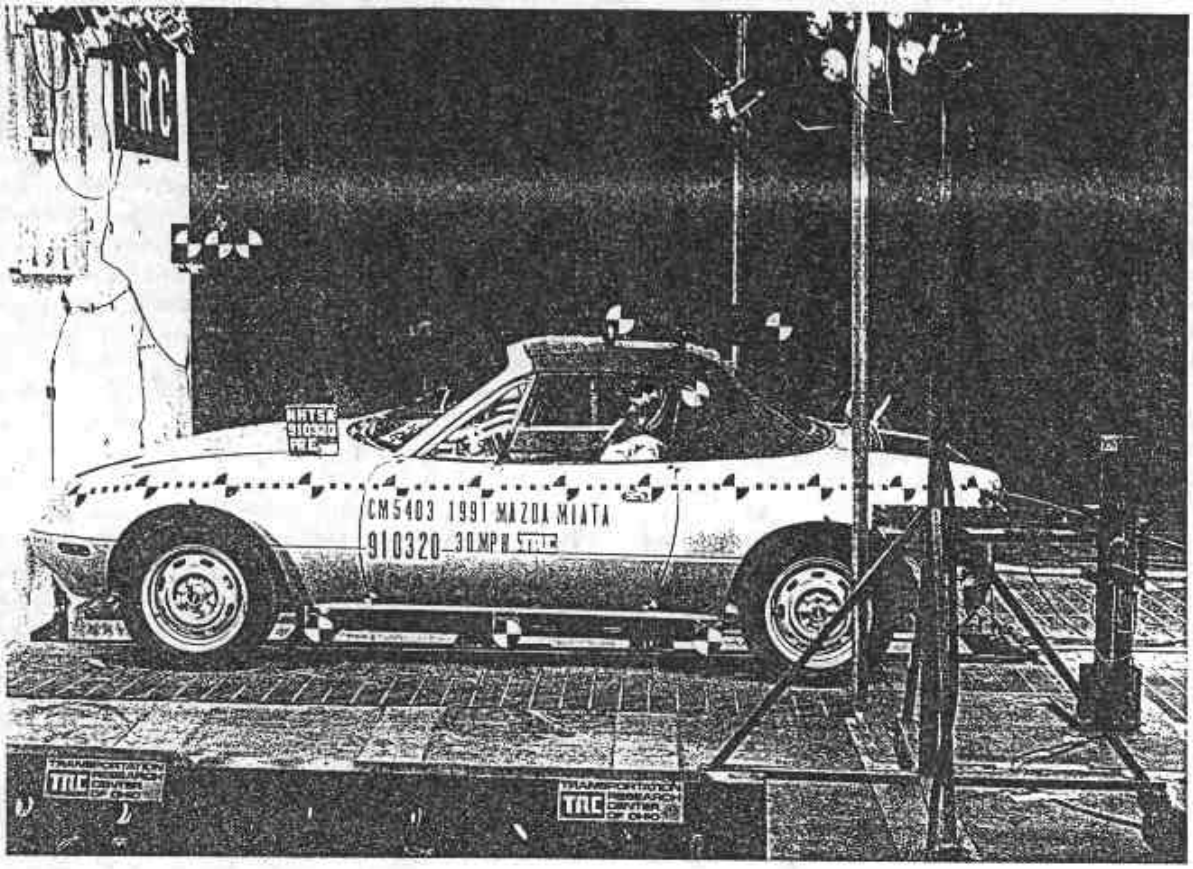


Figure A-3. PRE-TEST LEFT SIDE VIEW

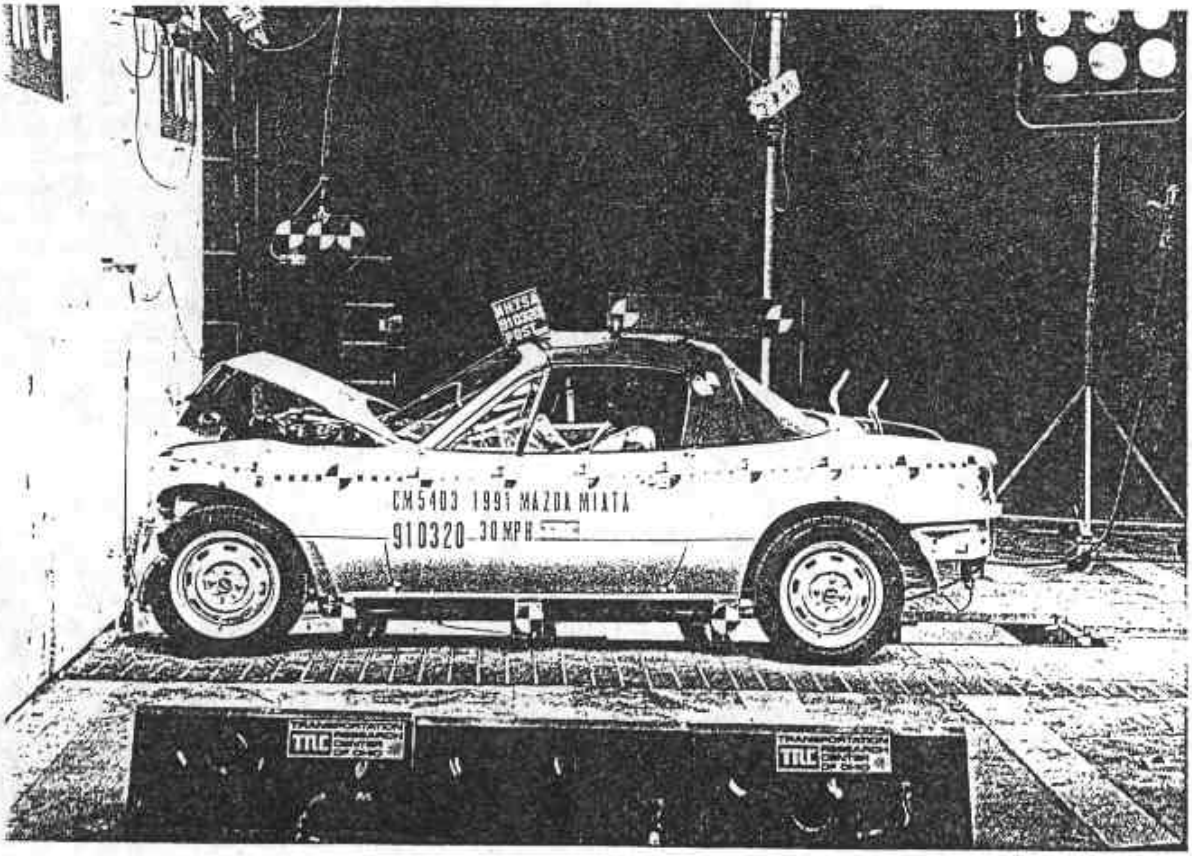


Figure A-4. POST-TEST LEFT SIDE VIEW

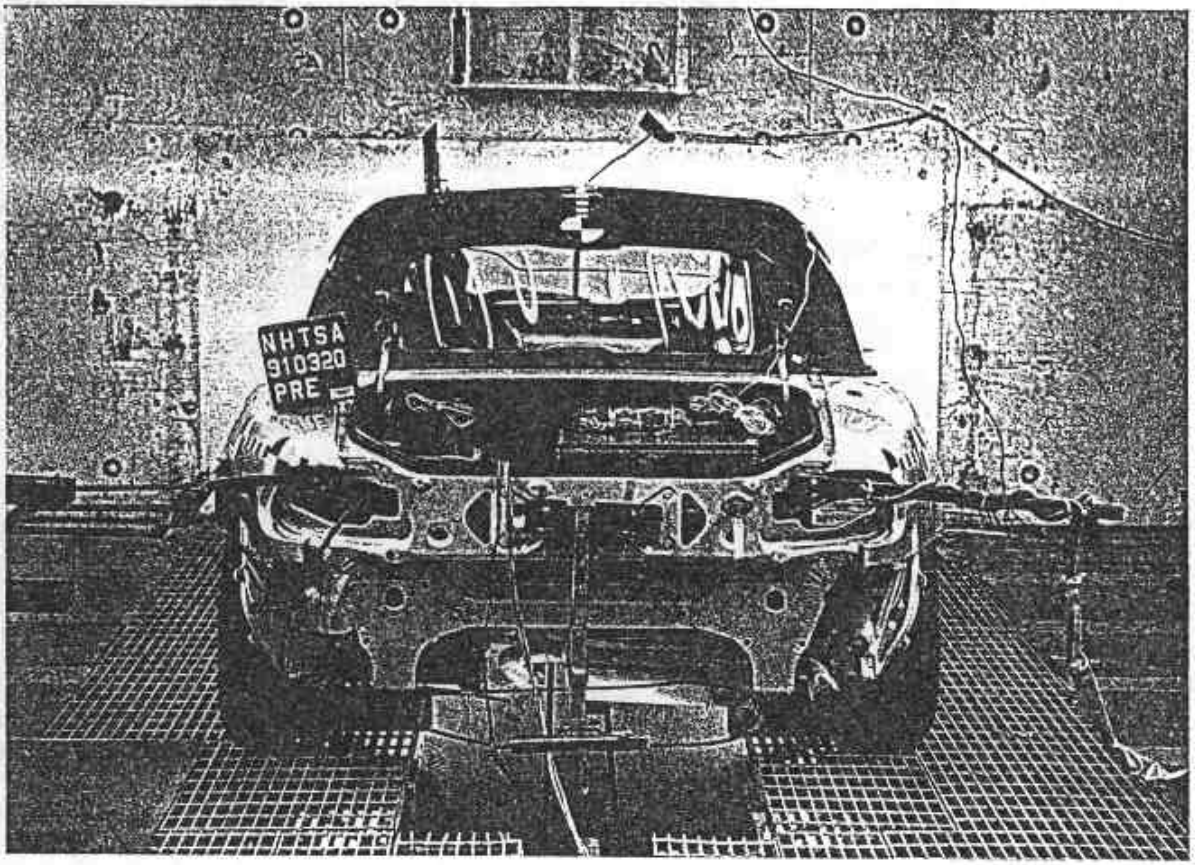


Figure A-5. PRE-TEST REAR VIEW

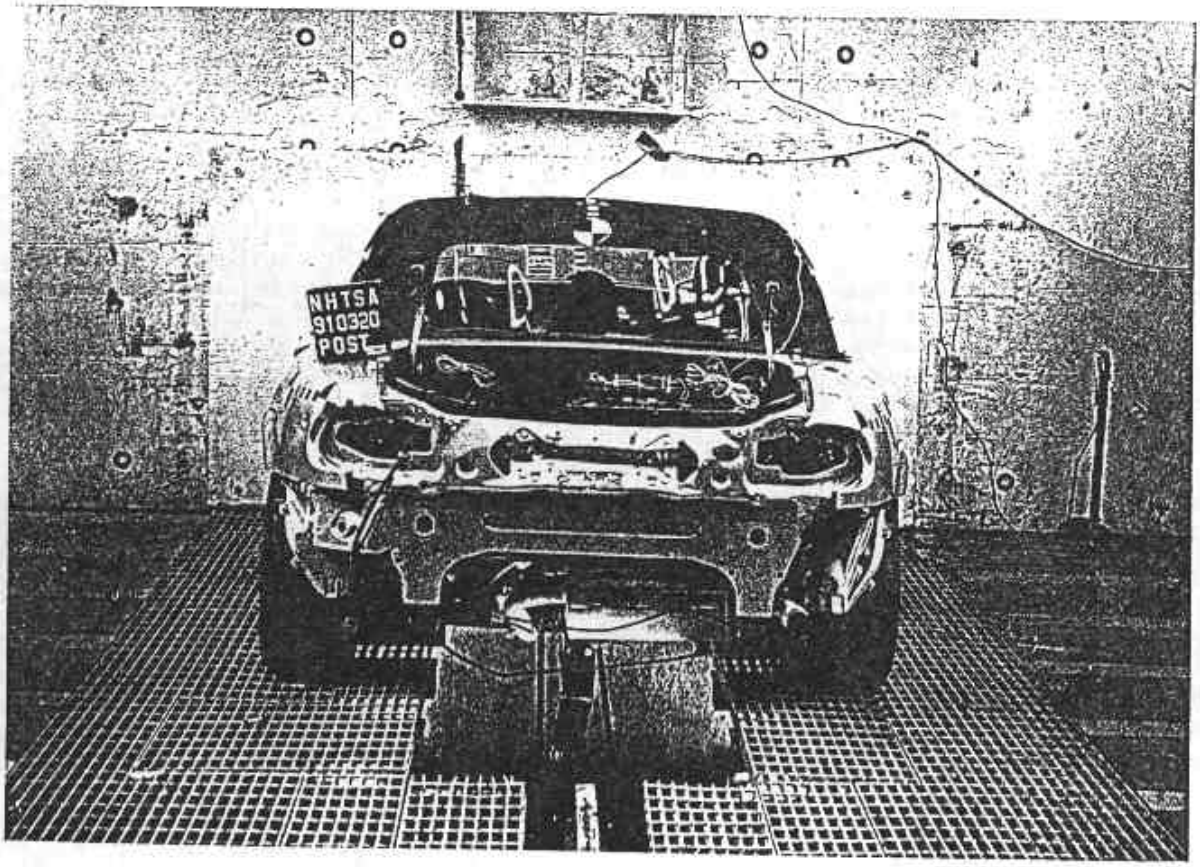


Figure A-6. POST-TEST REAR VIEW

Figure A-7. PRE-TEST RIGHT SIDE VIEW

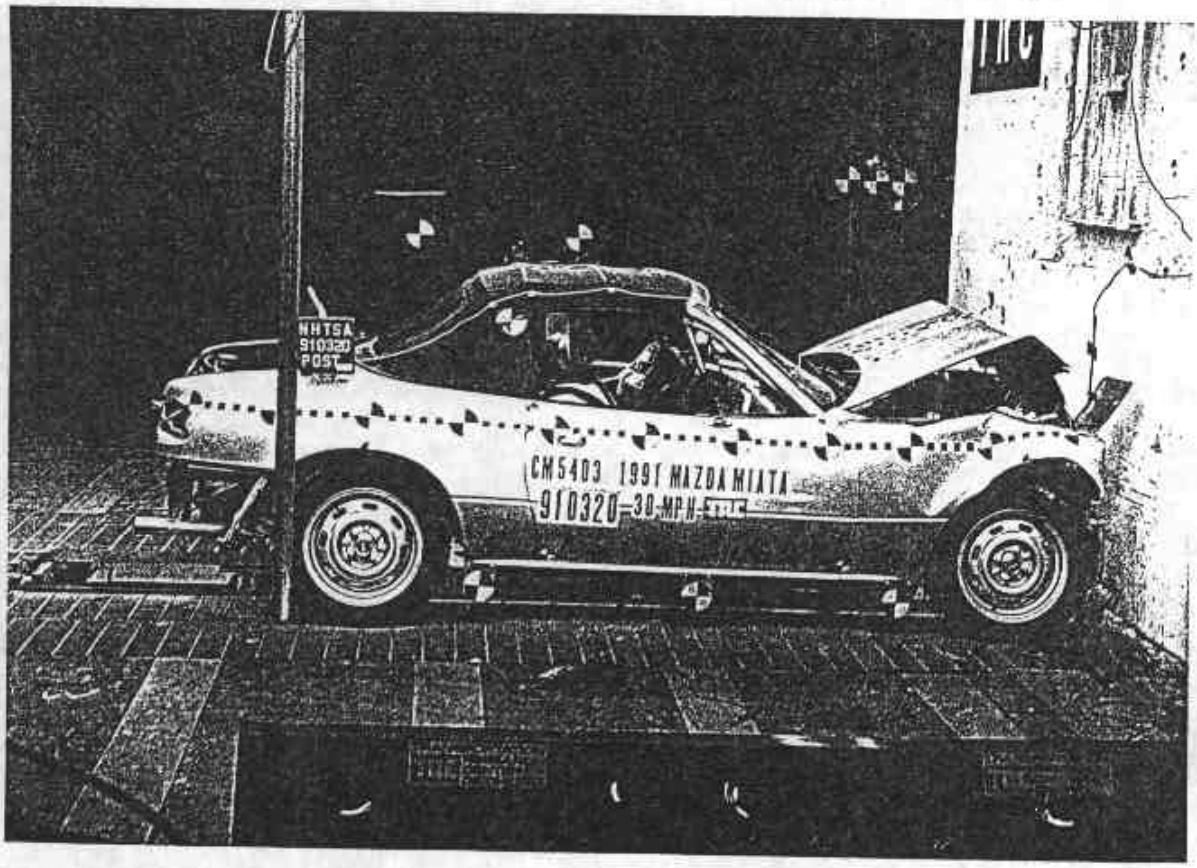


Figure A-8. POST-TEST RIGHT SIDE VIEW

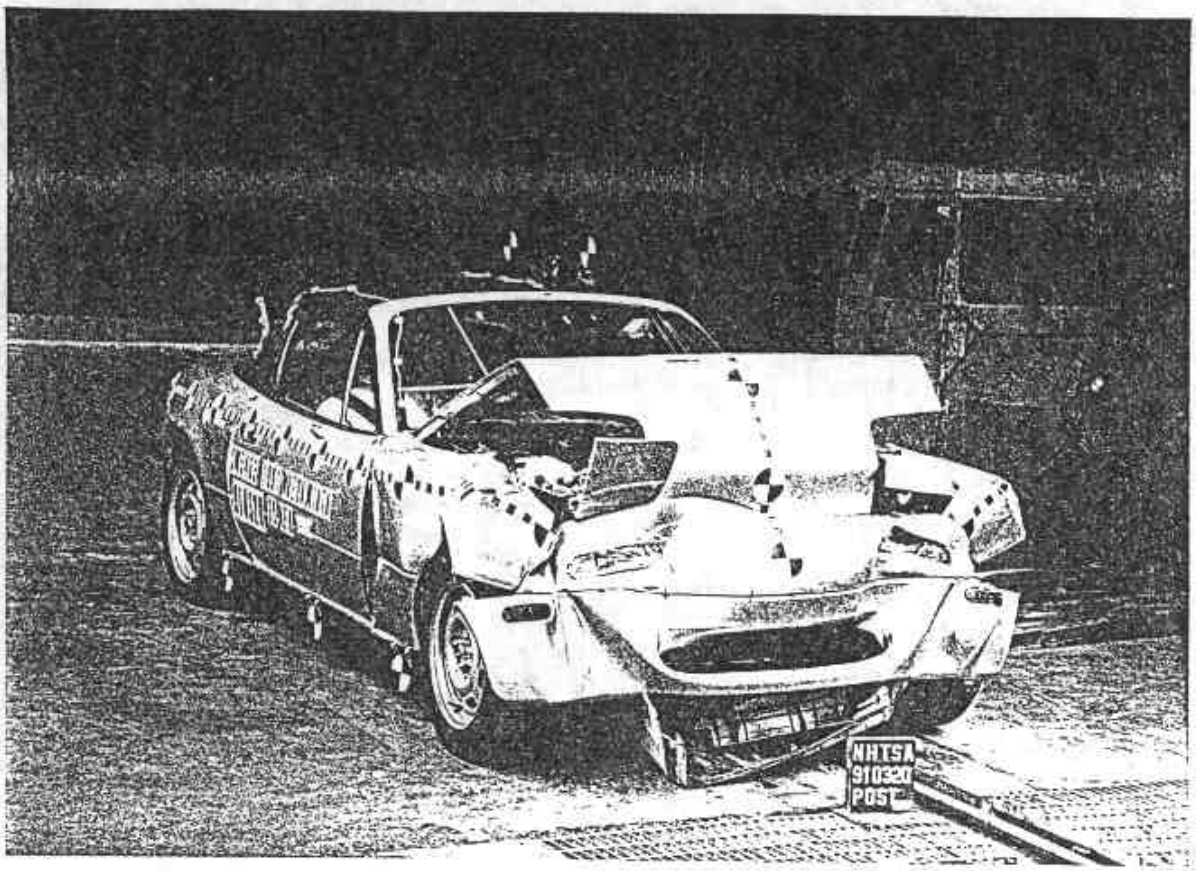


Figure A-9. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

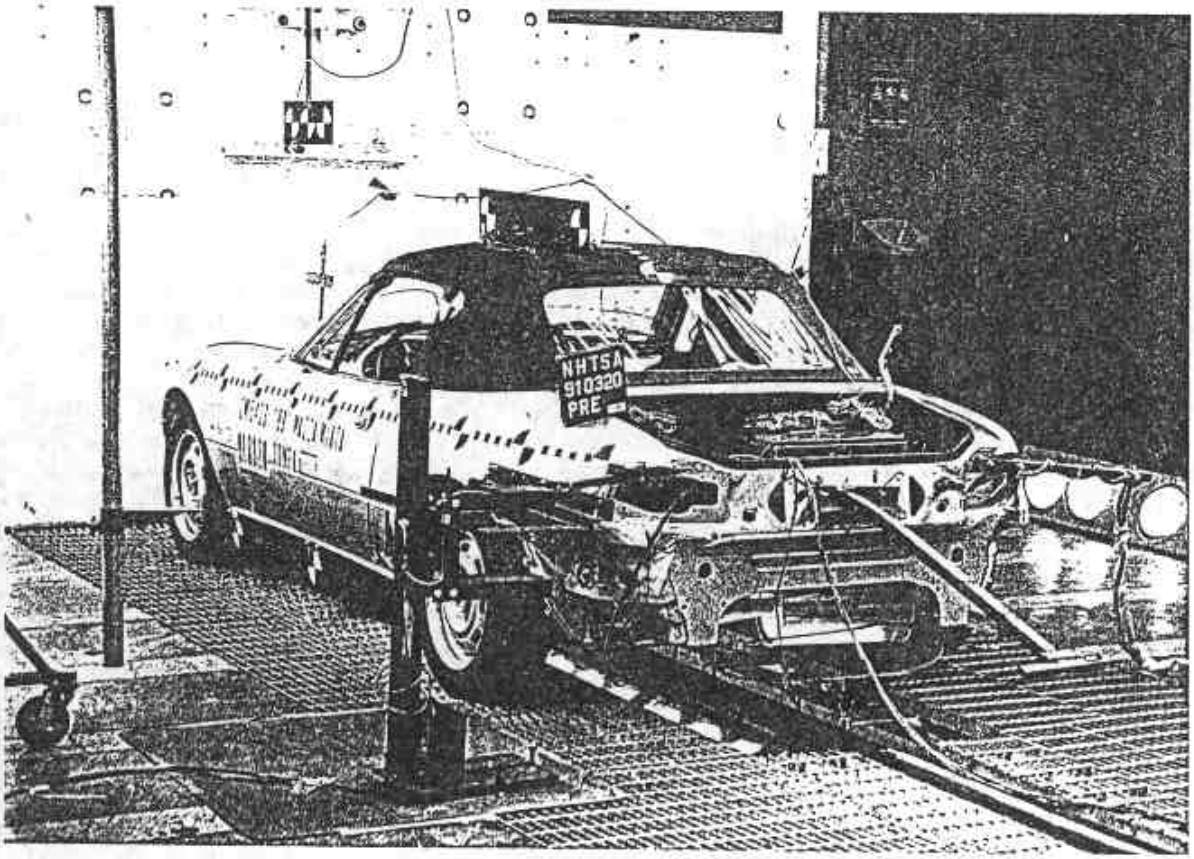


Figure A-10. PRE-TEST LEFT REAR THREE-QUARTER VIEW

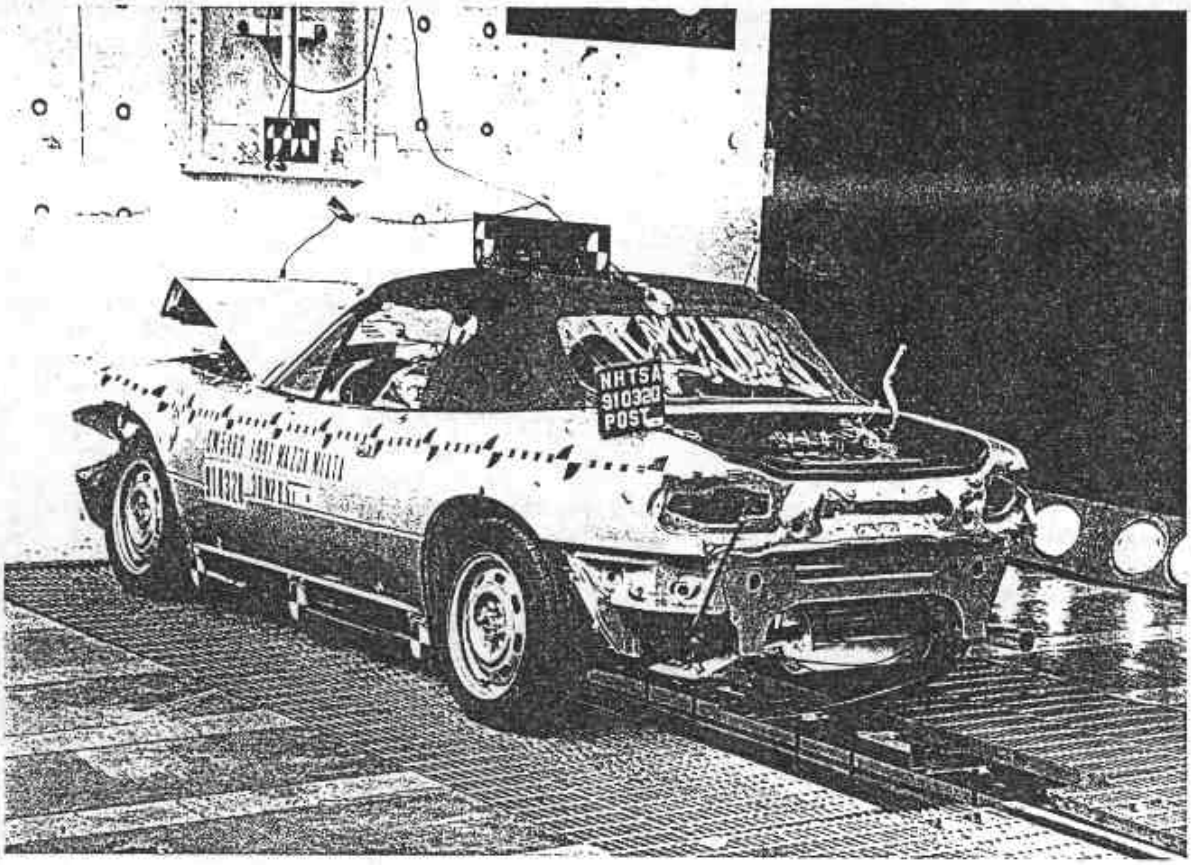


Figure A-11. POST-TEST LEFT REAR THREE-QUARTER VIEW

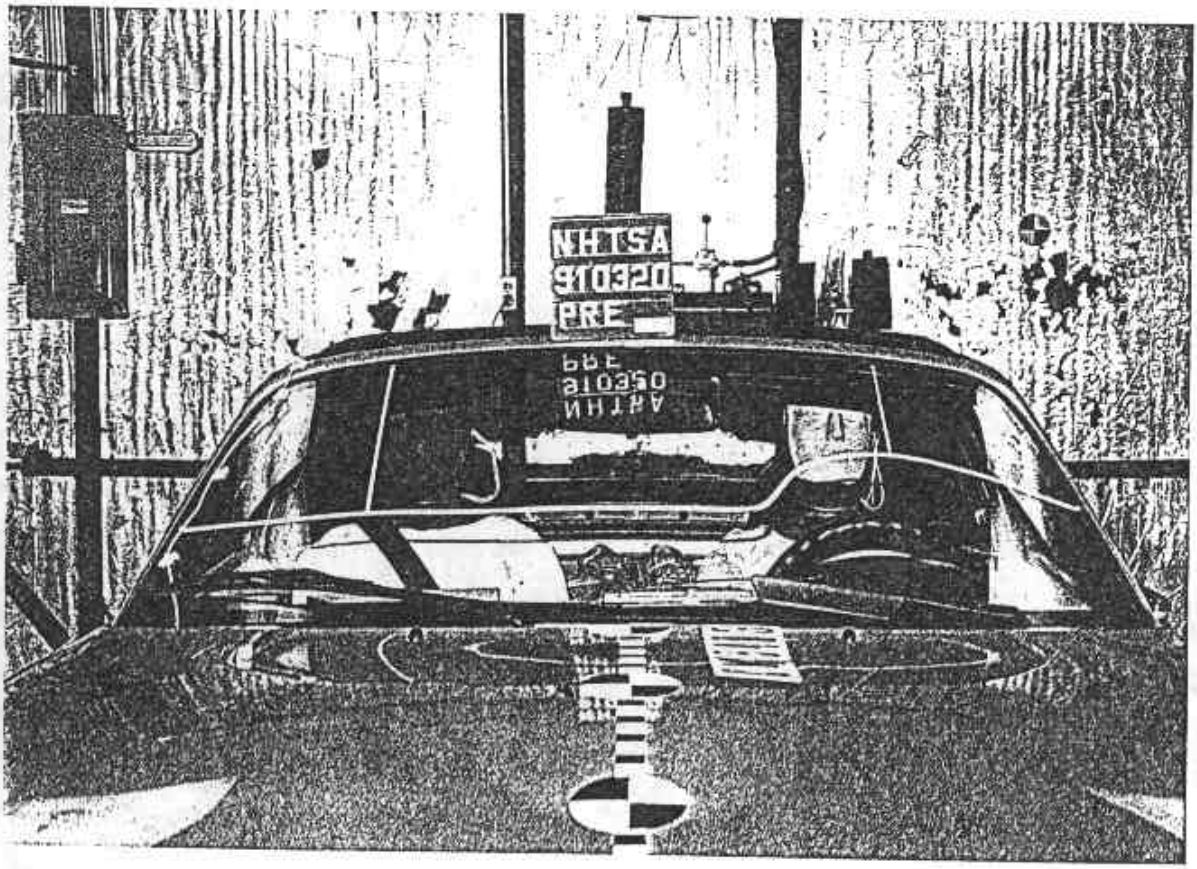


Figure A-12. PRE-TEST WINDSHIELD VIEW

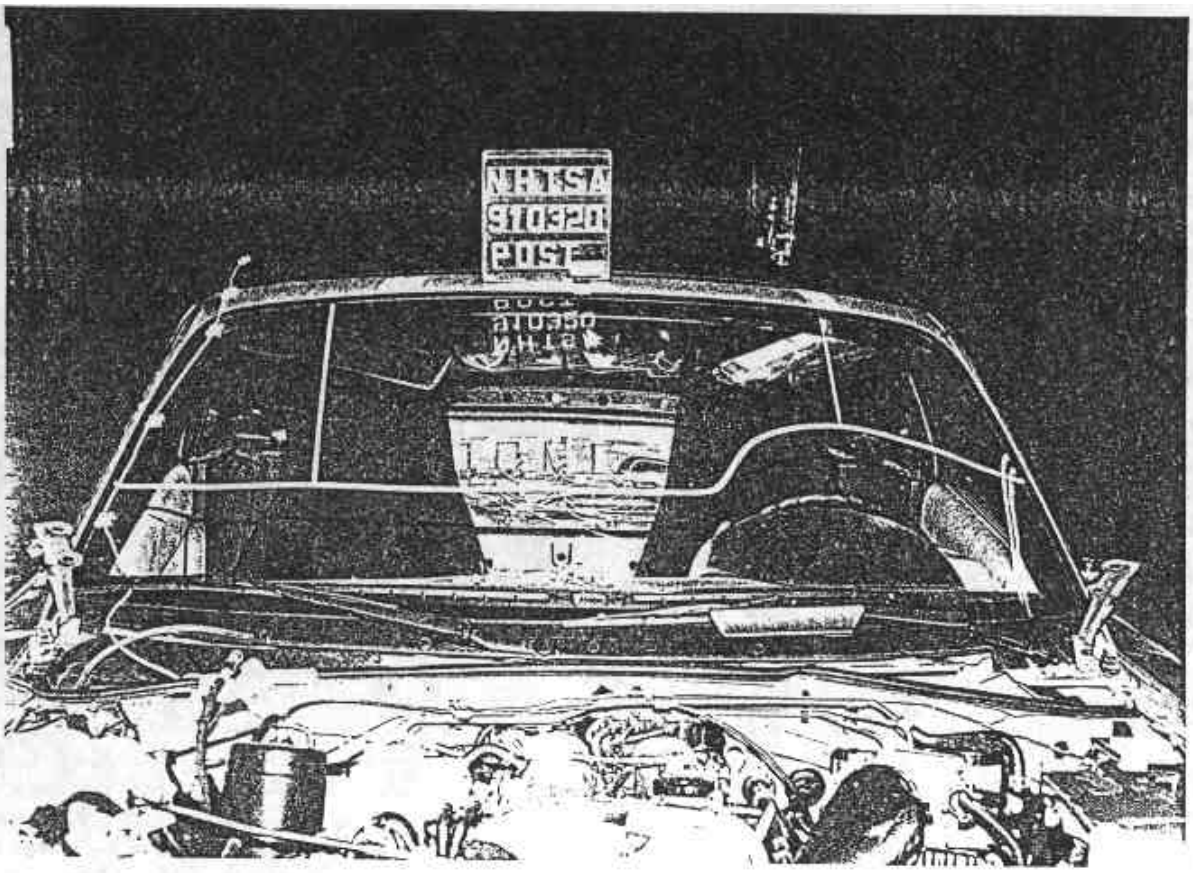


Figure A-13. POST-TEST WINDSHIELD VIEW

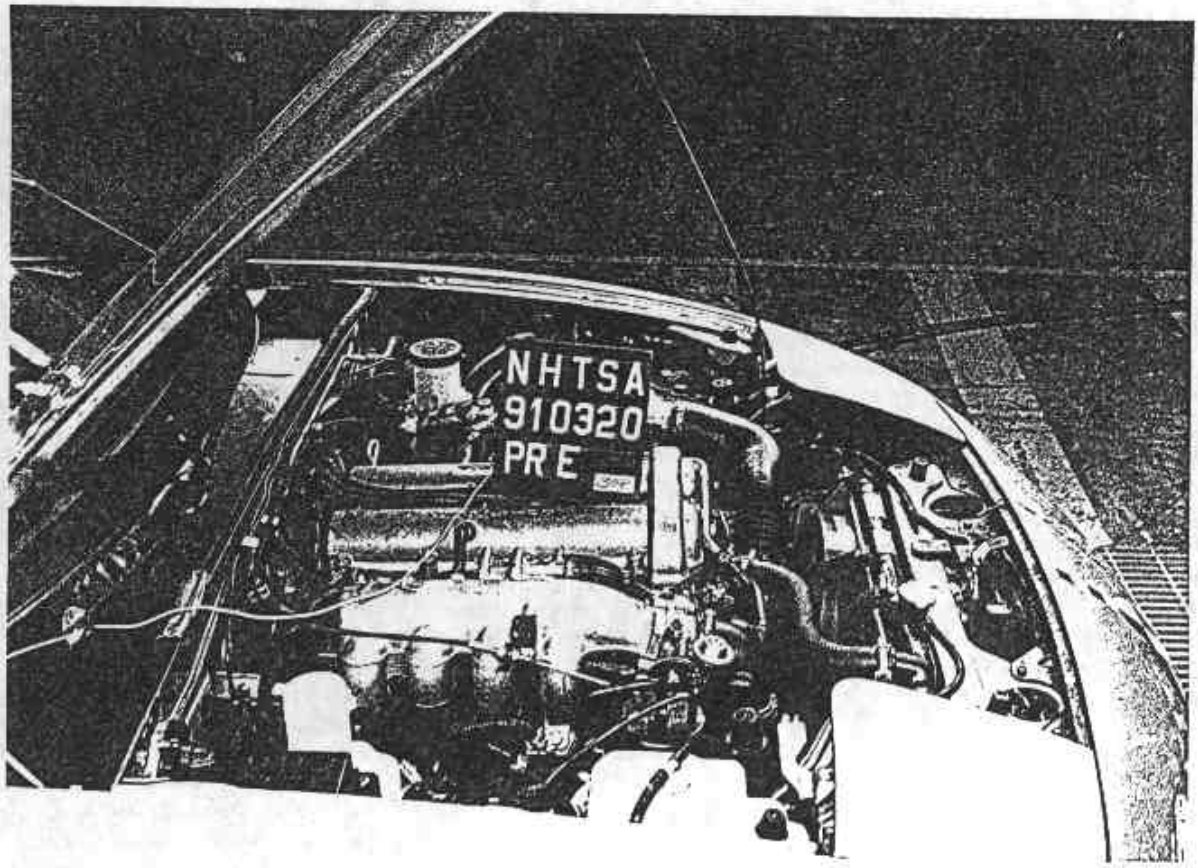


Figure A-14. PRE-TEST ENGINE COMPARTMENT VIEW

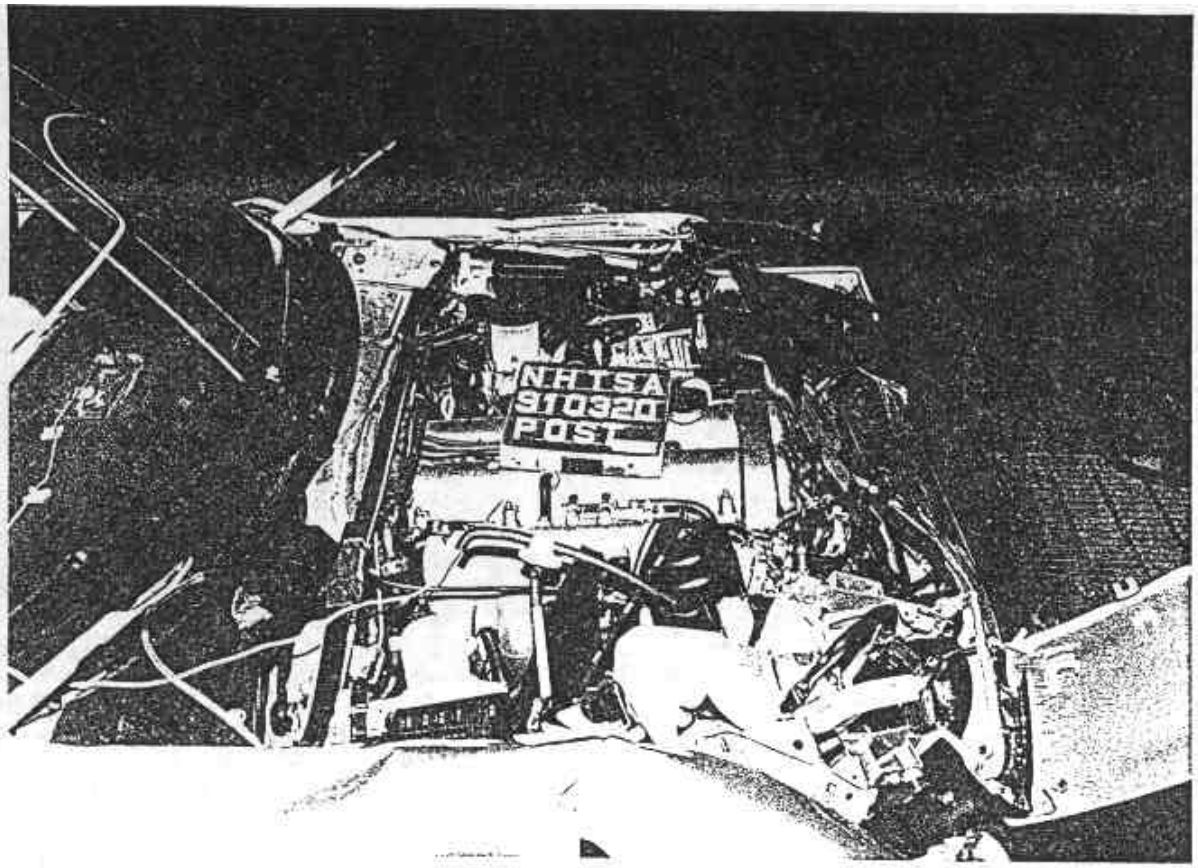


Figure A-15. POST-TEST ENGINE COMPARTMENT VIEW

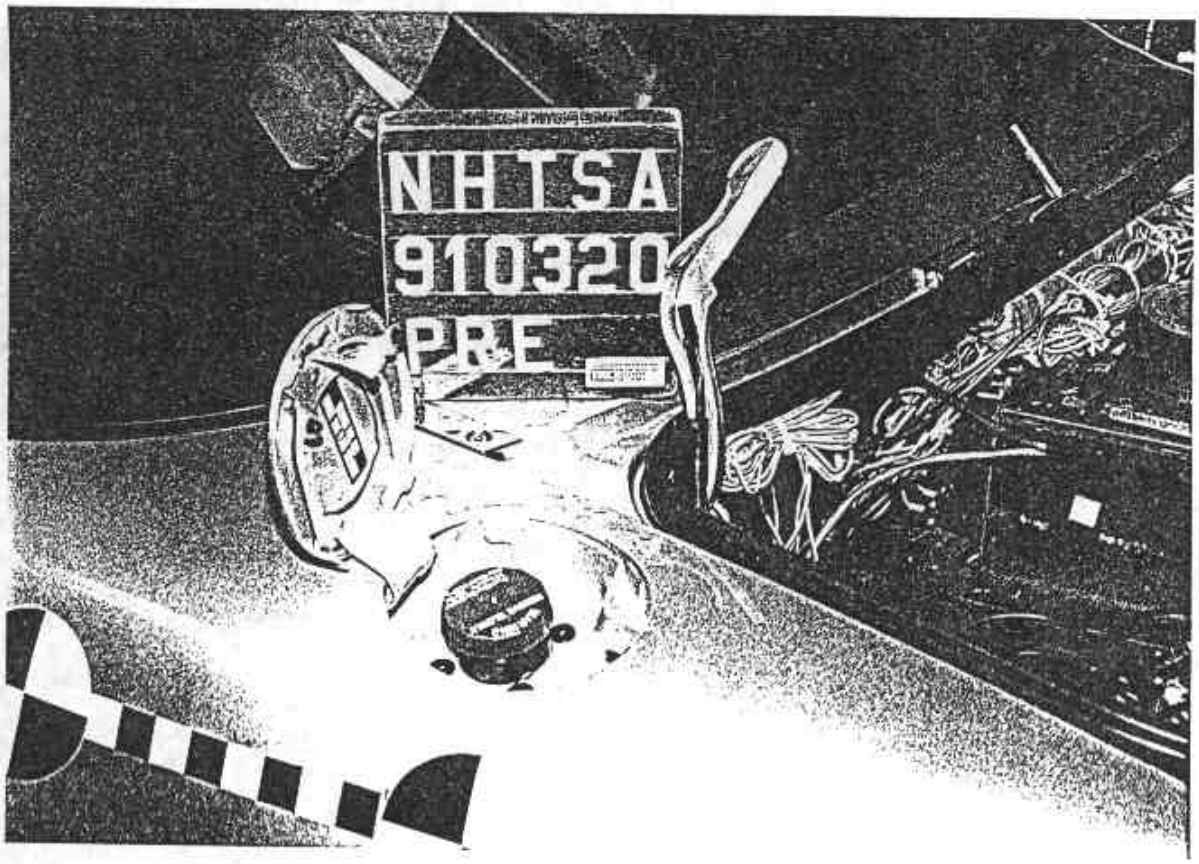


Figure A-16. PRE-TEST FUEL FILLER CAP VIEW

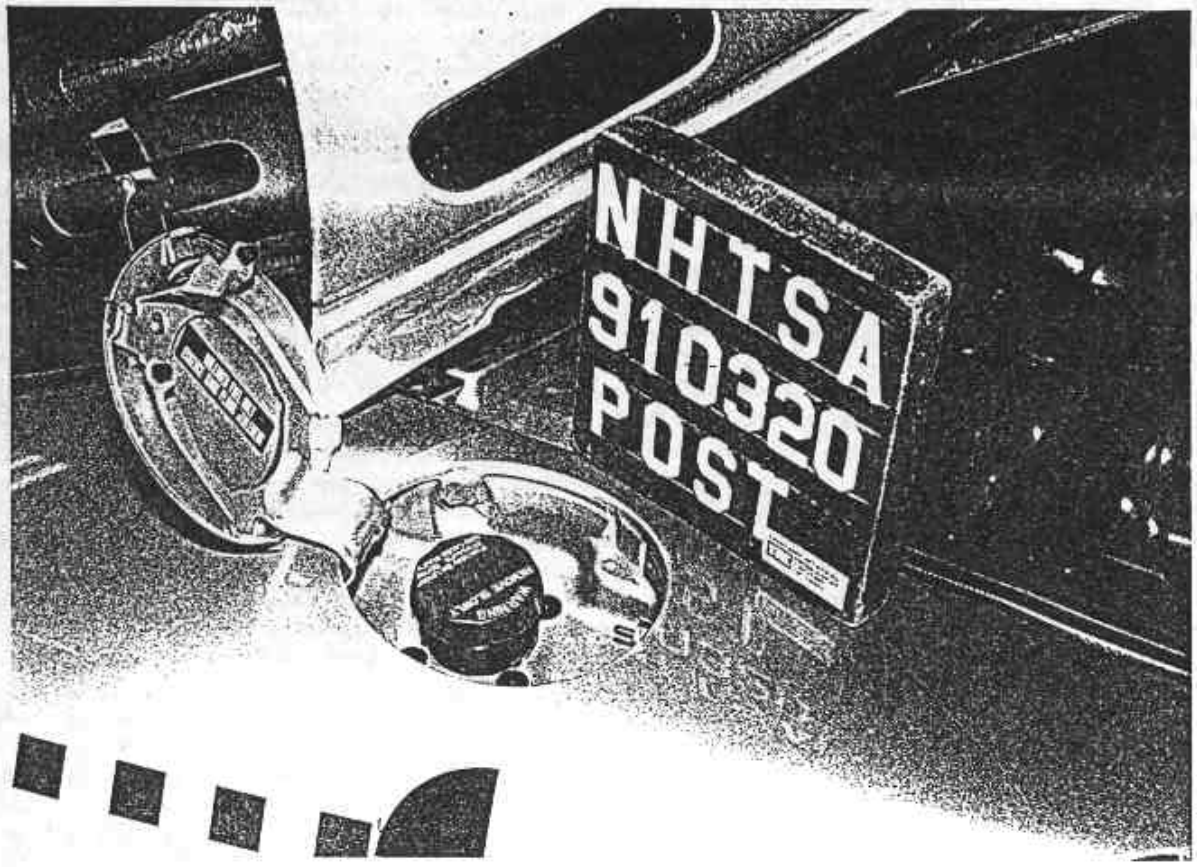


Figure A-17. POST-TEST FUEL FILLER CAP VIEW

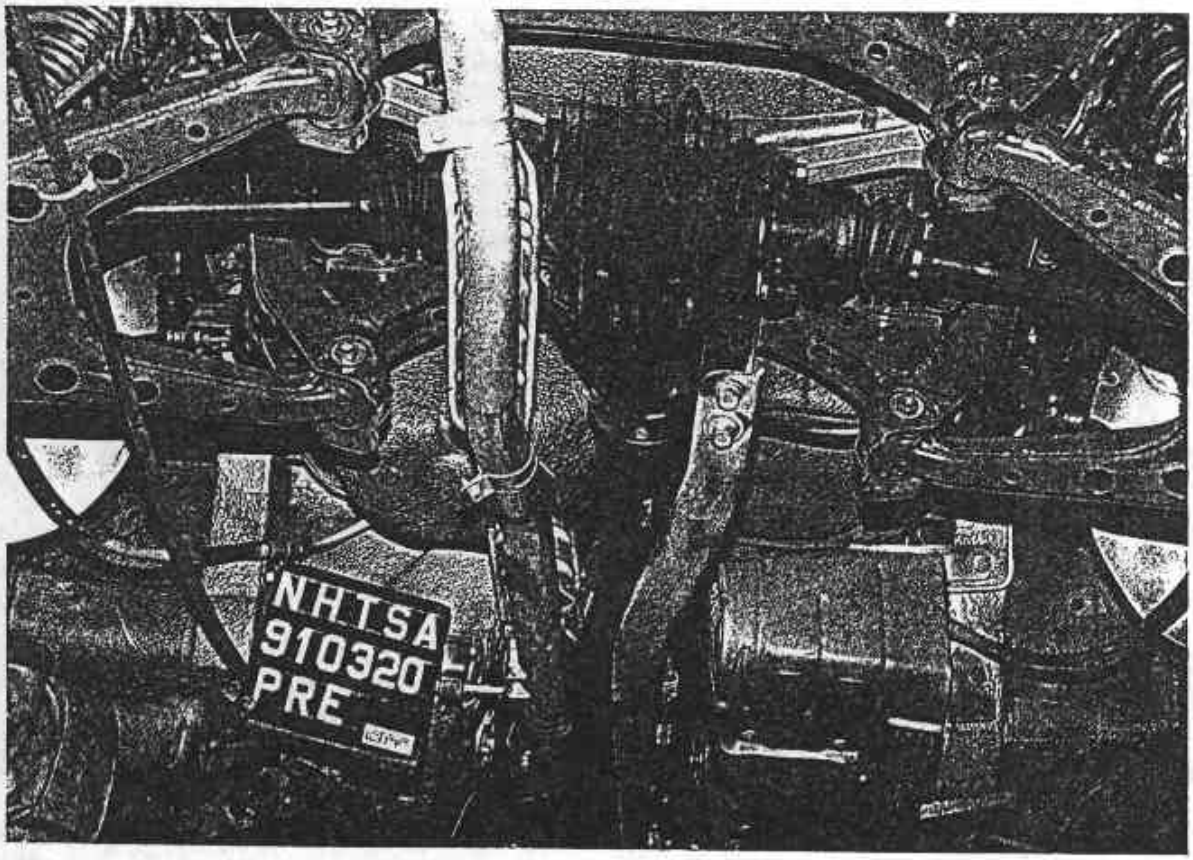


Figure A-18. PRE-TEST FUEL TANK VIEW

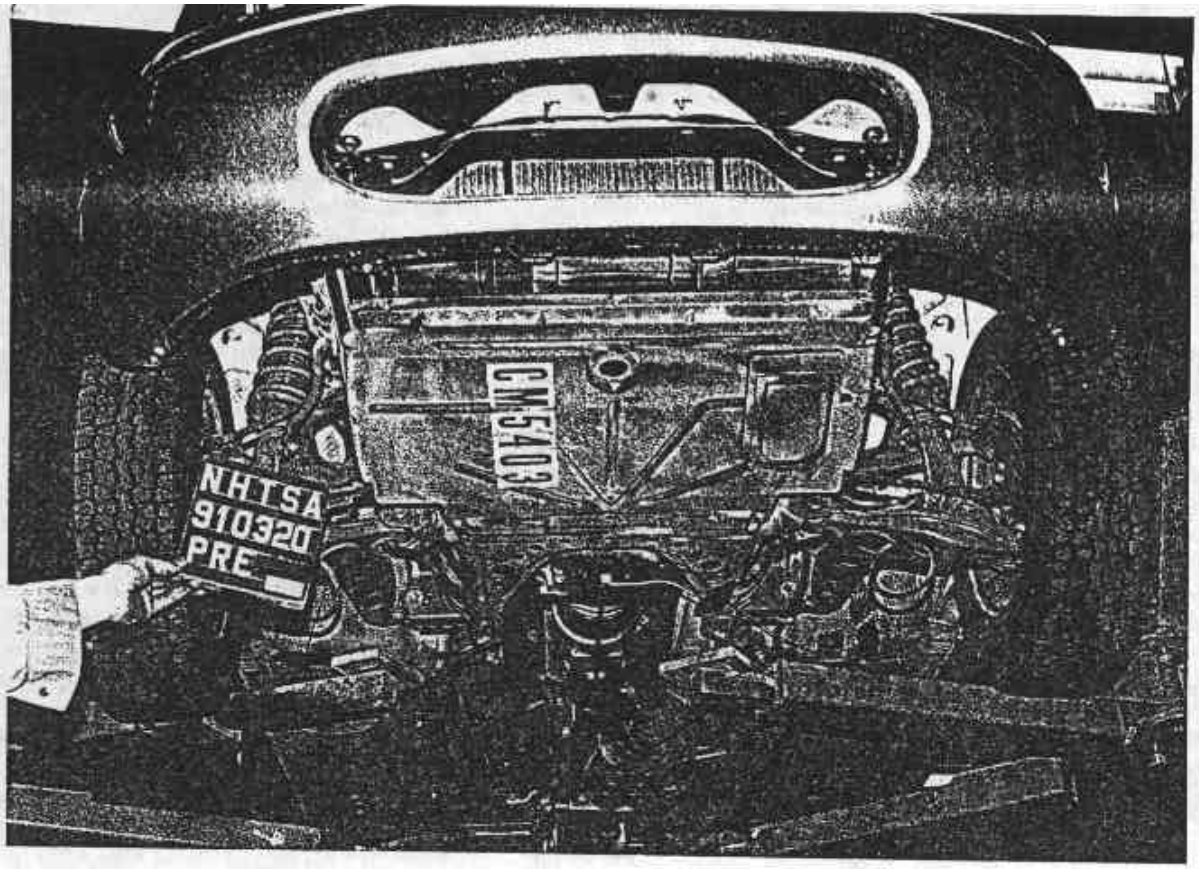


Figure A-19. PRE-TEST FRONT UNDERBODY VIEW

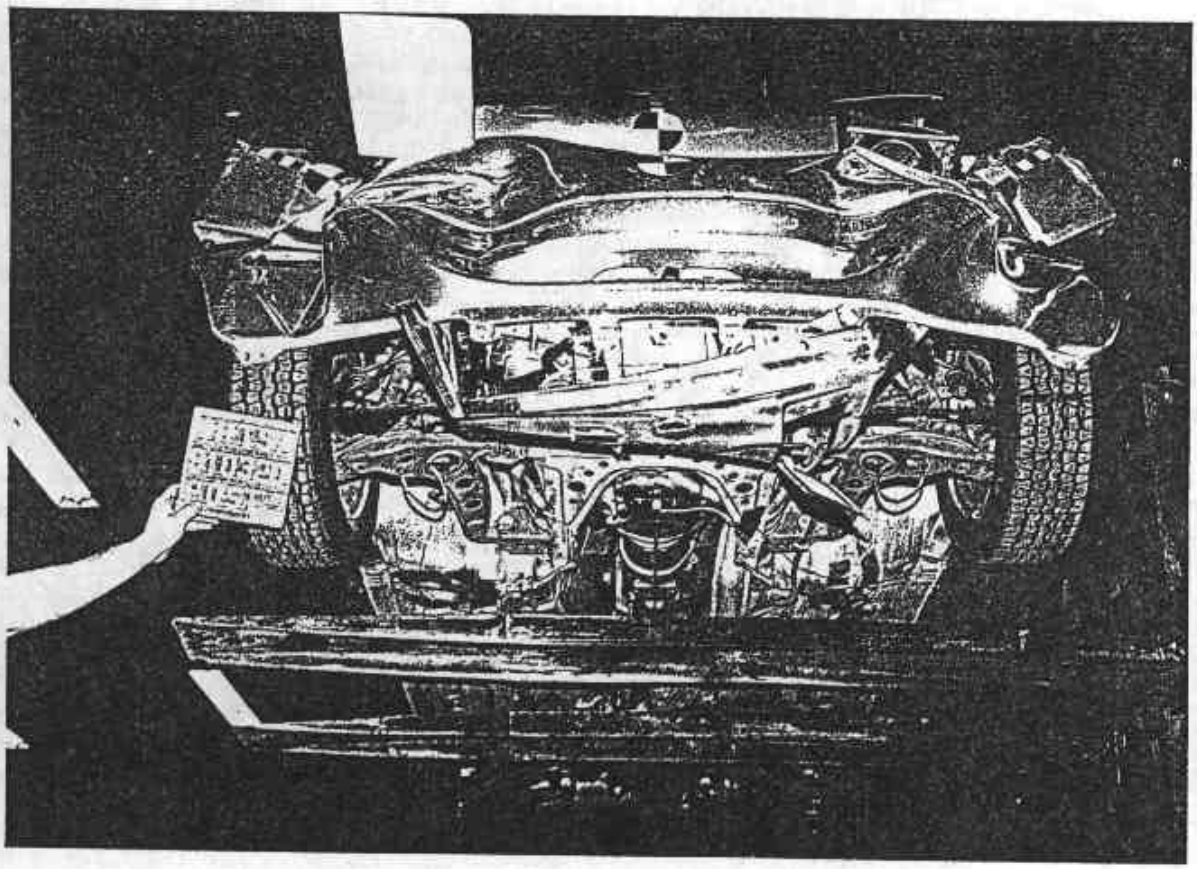


Figure A-20. POST-TEST FRONT UNDERBODY VIEW

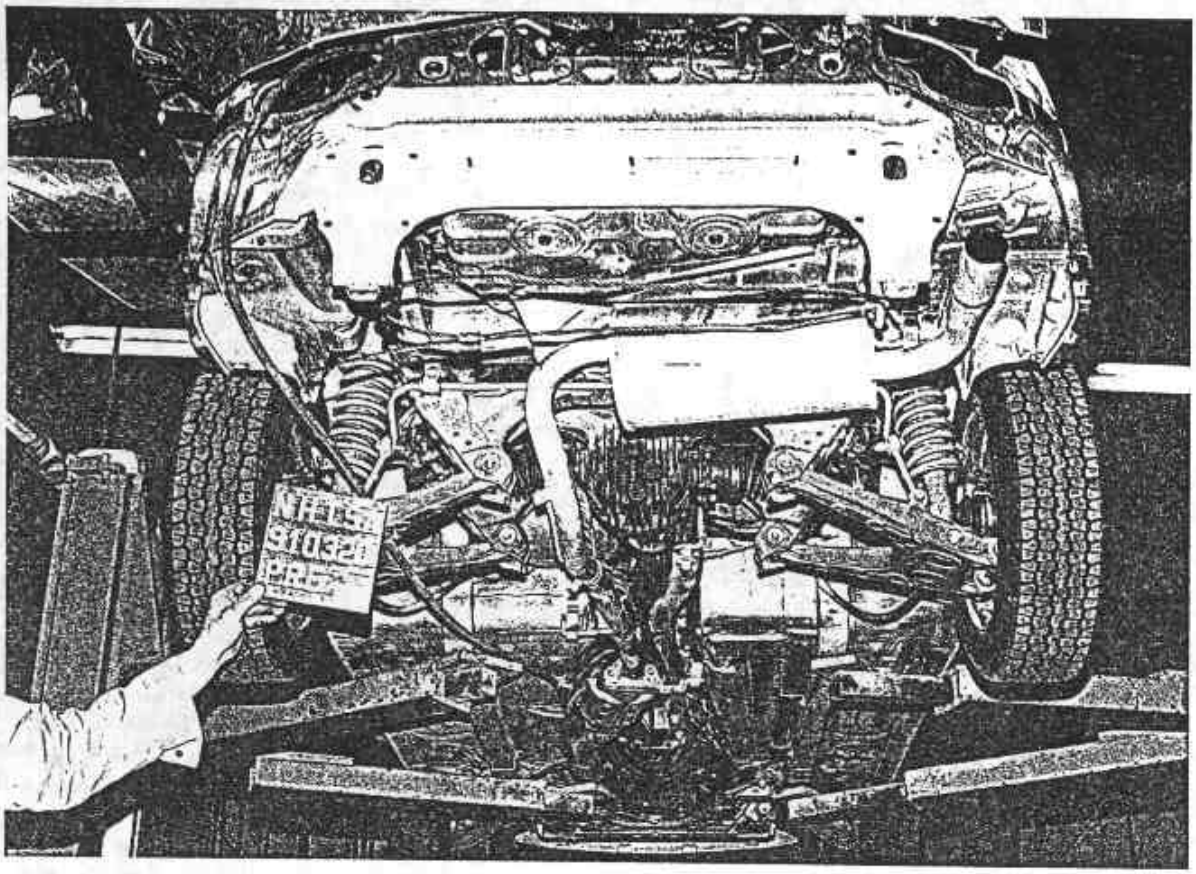


Figure A-21. PRE-TEST REAR UNDERBODY VIEW

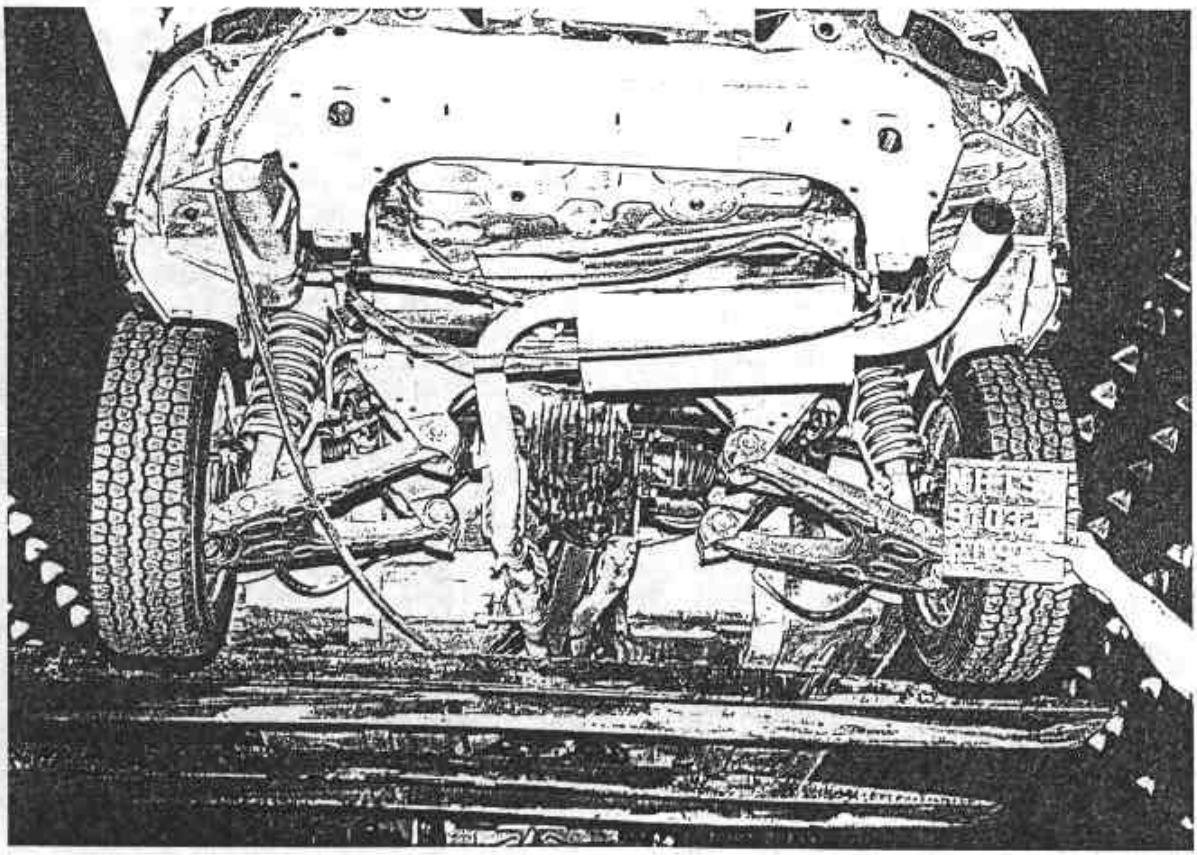


Figure A-22. POST-TEST REAR UNDERBODY VIEW

Figure A-23. PRE-TEST DRIVER DUMMY POSITION VIEW

Figure A-24. POST-TEST DRIVER DUMMY POSITION VIEW

Figure A-25. PRE-TEST PASSENGER DUMMY POSITION VIEW

Figure A-26. POST-TEST PASSENGER DUMMY POSITION VIEW

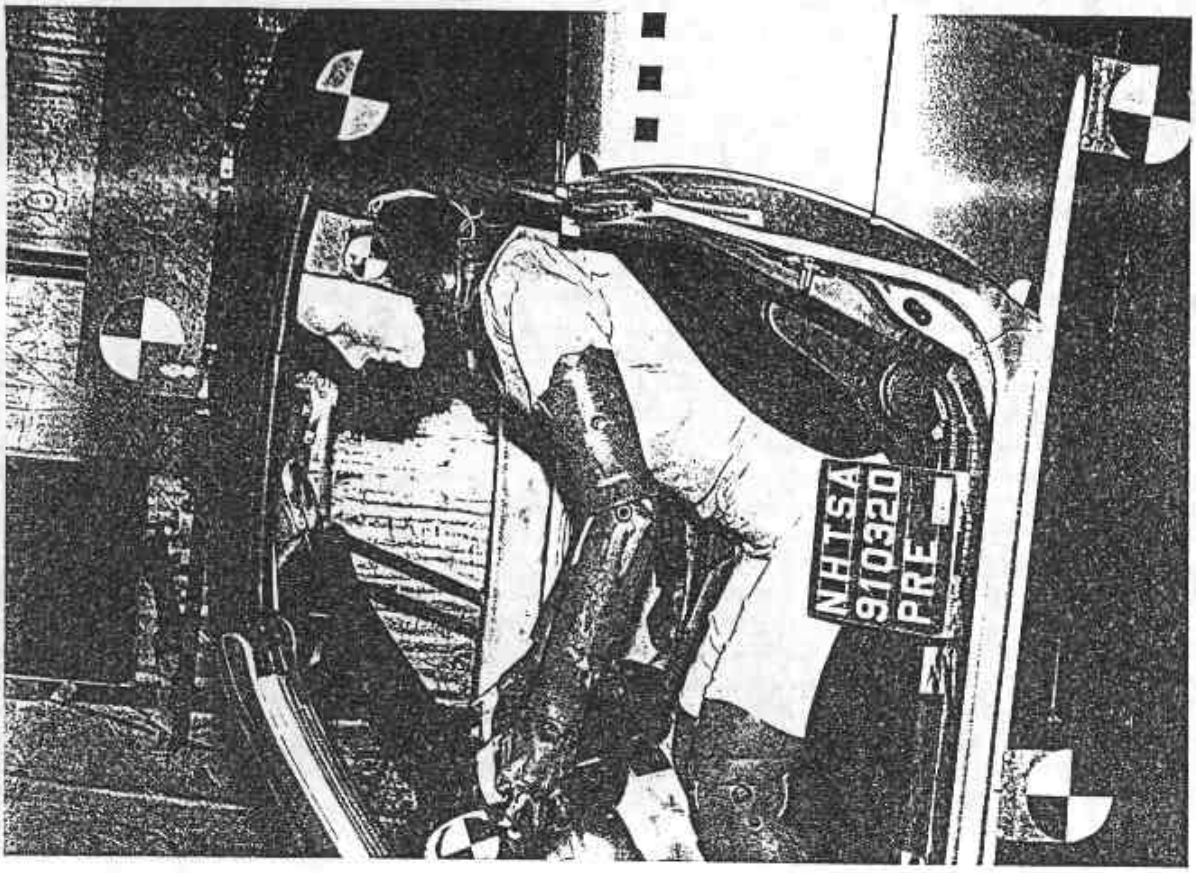


Figure A-27. PRE-TEST DRIVER DUMMY AND VEHICLE INTERIOR - VIEW 1

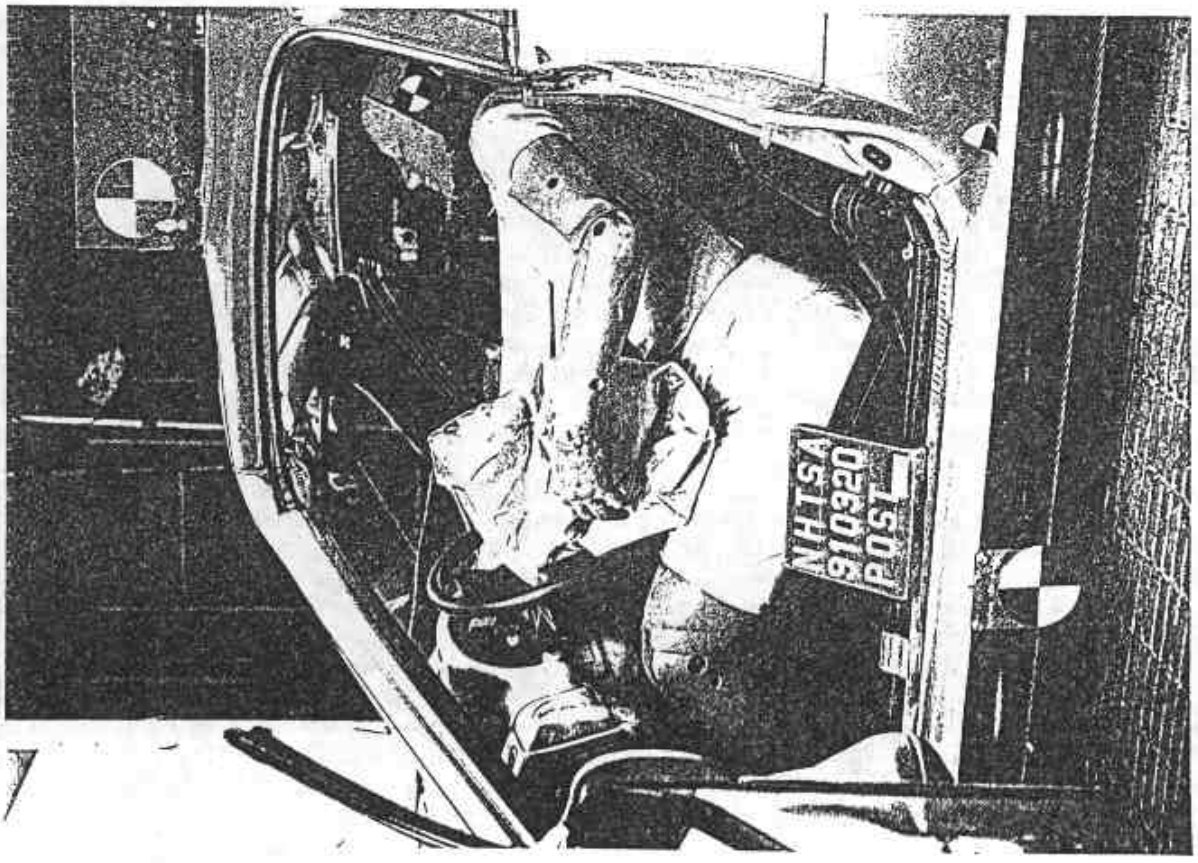


Figure A-28. POST-TEST DRIVER DUMMY AND VEHICLE INTERIOR - VIEW 1

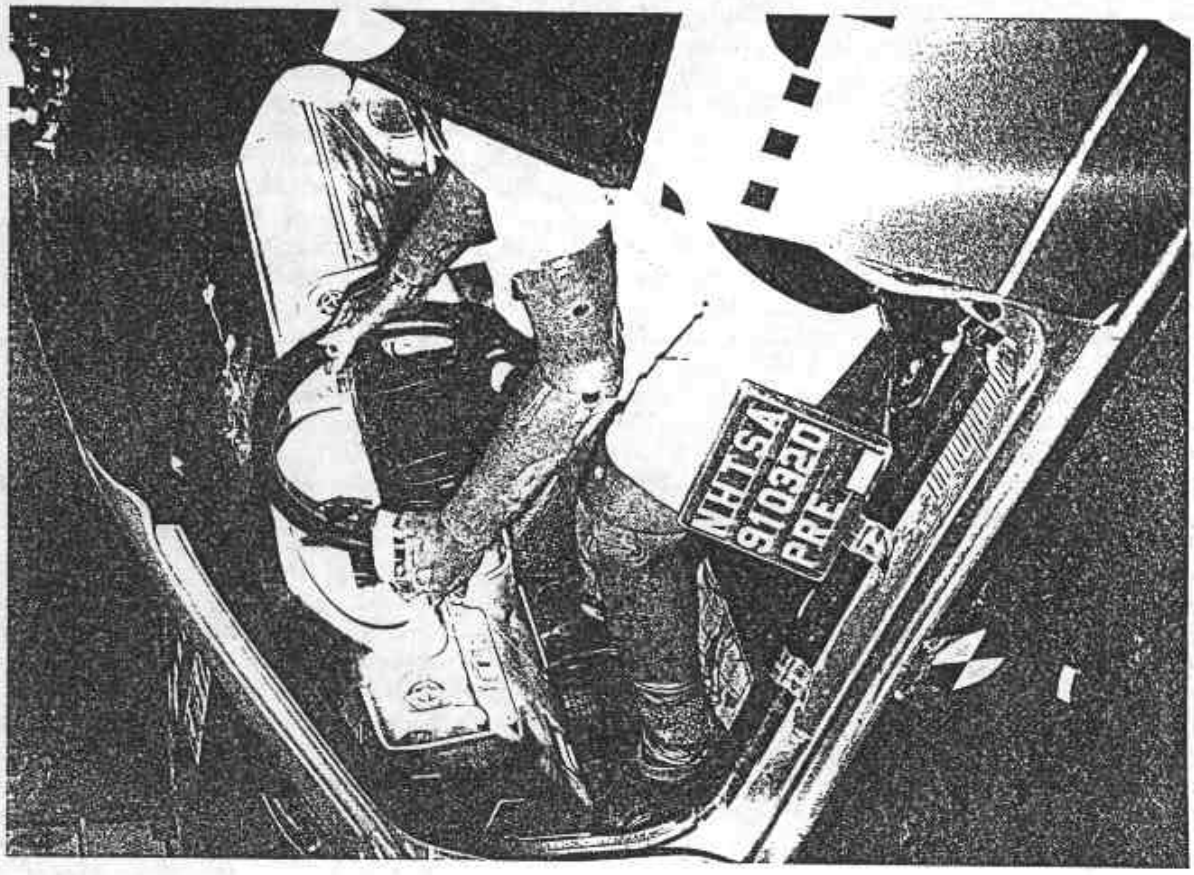


Figure A-29. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

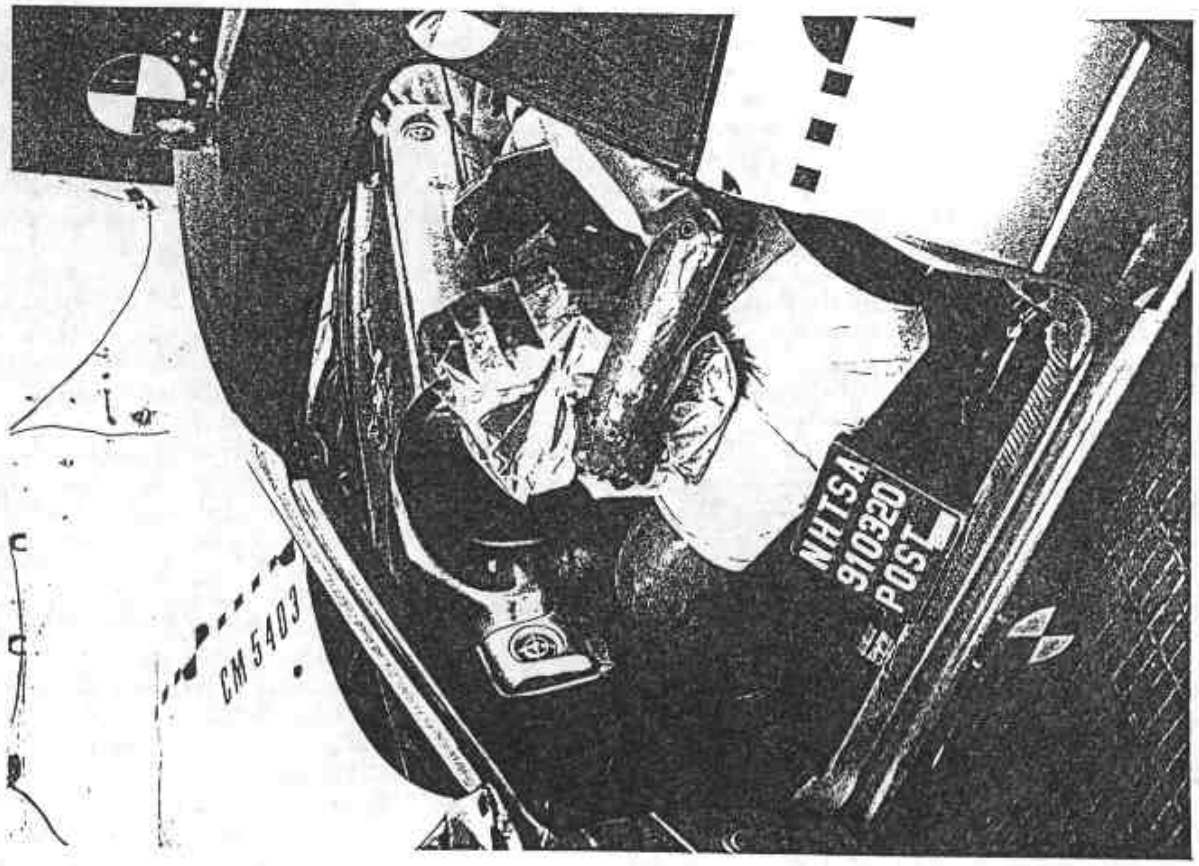


Figure A-30. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

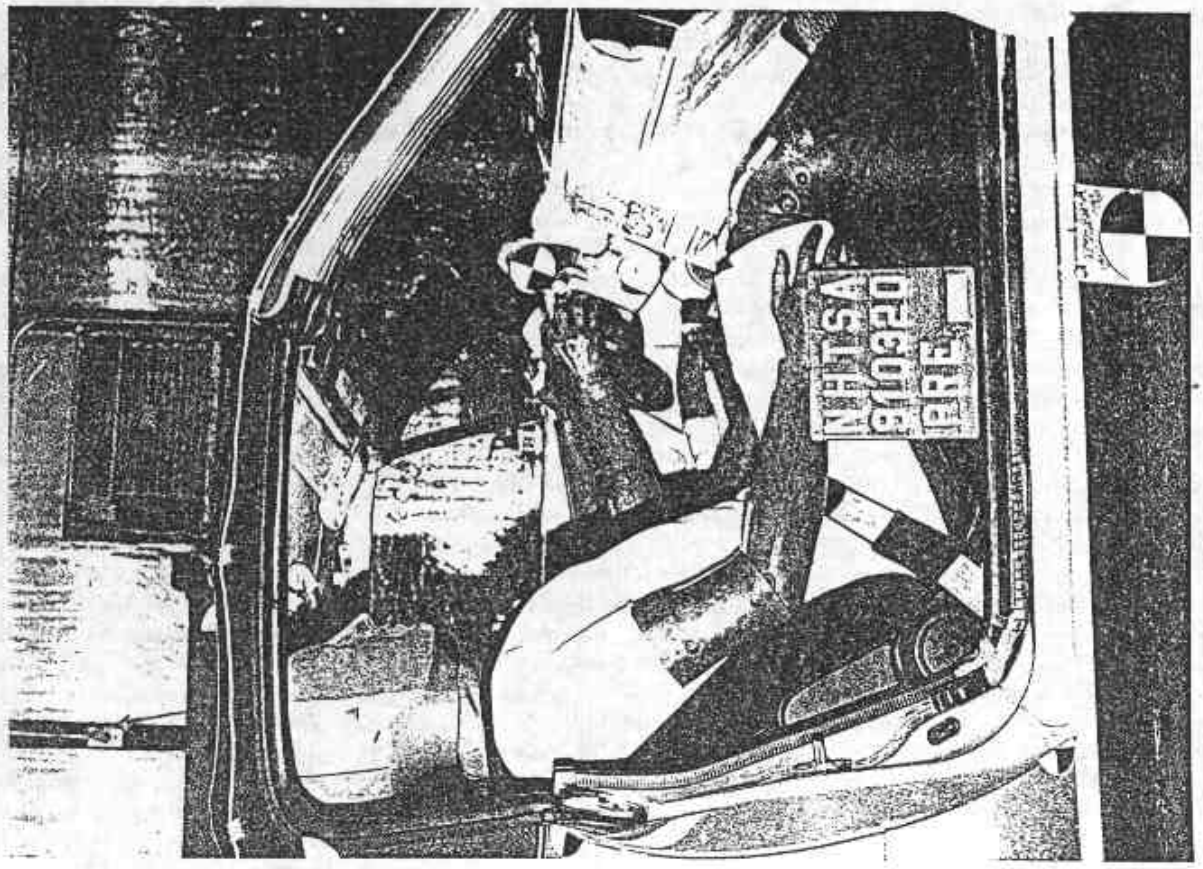


Figure A-31. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

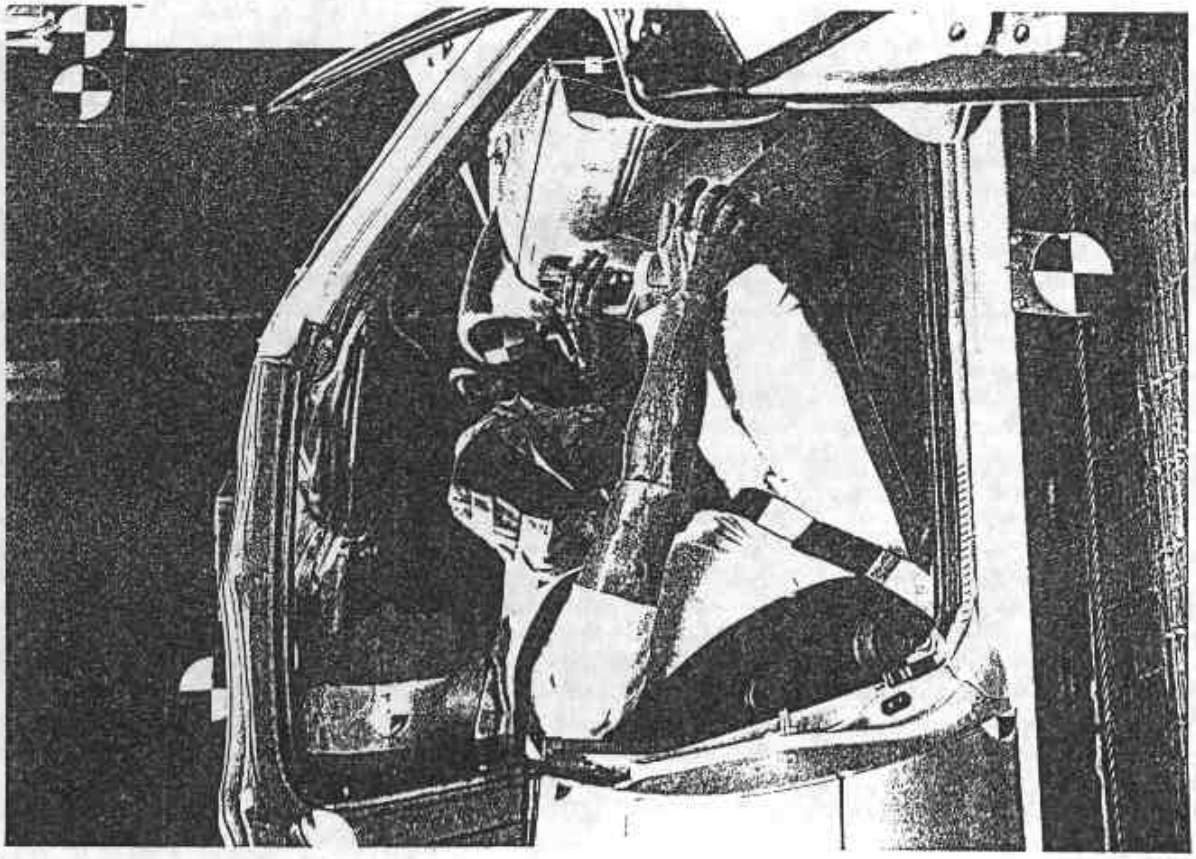


Figure A-32. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

Figure A-33. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

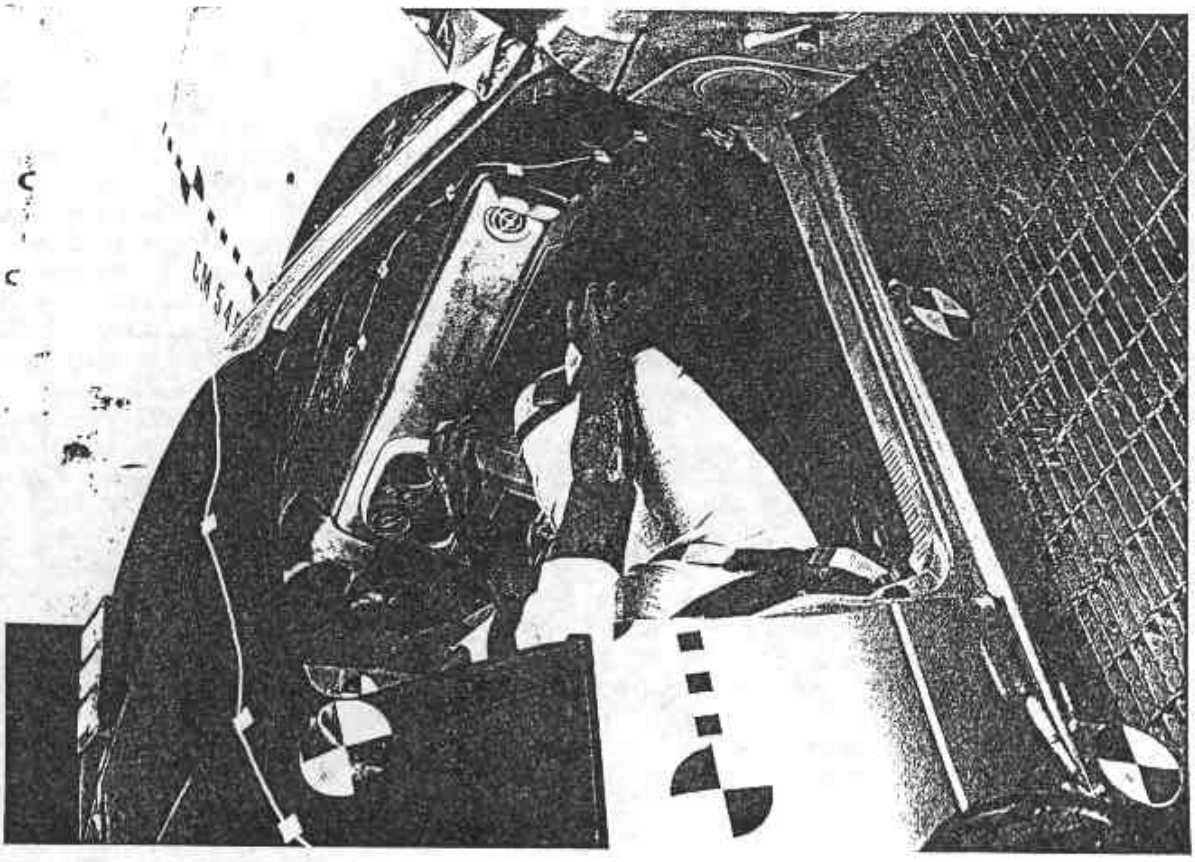


Figure A-34. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

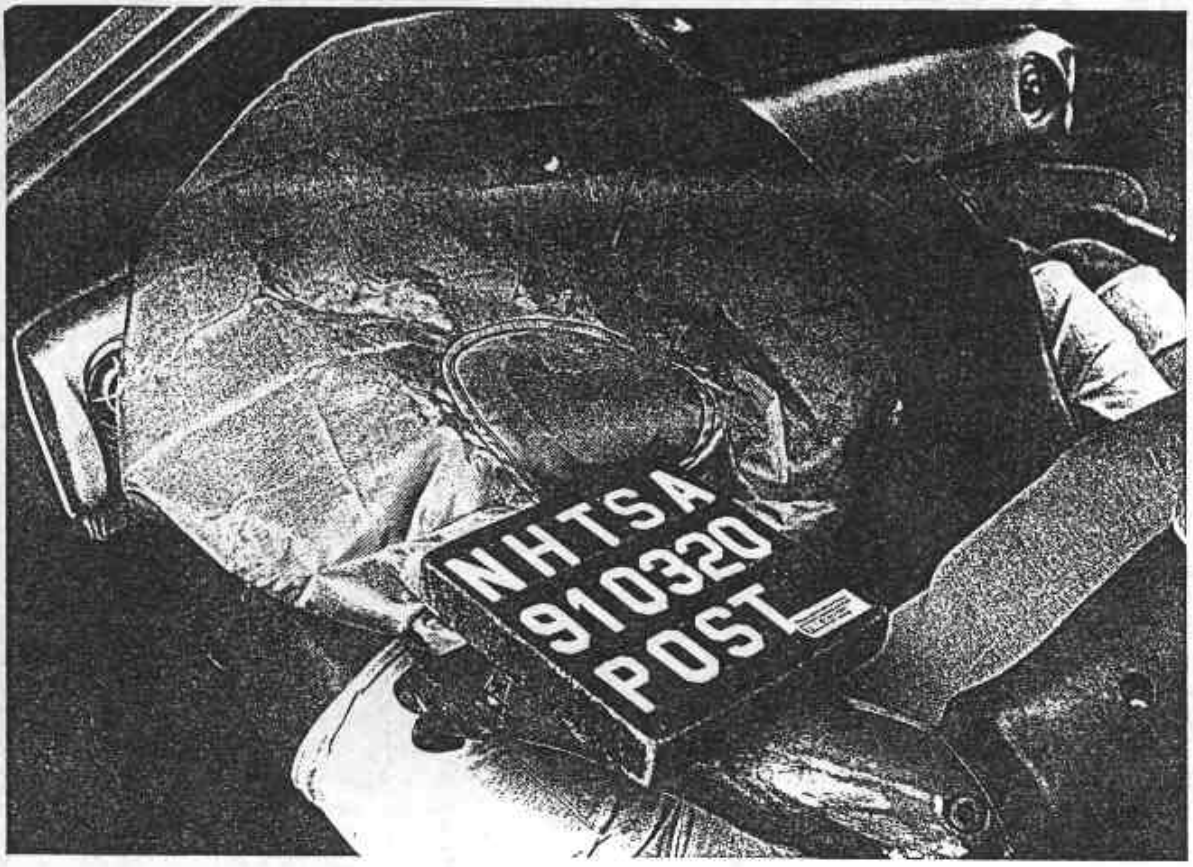


Figure A-35. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

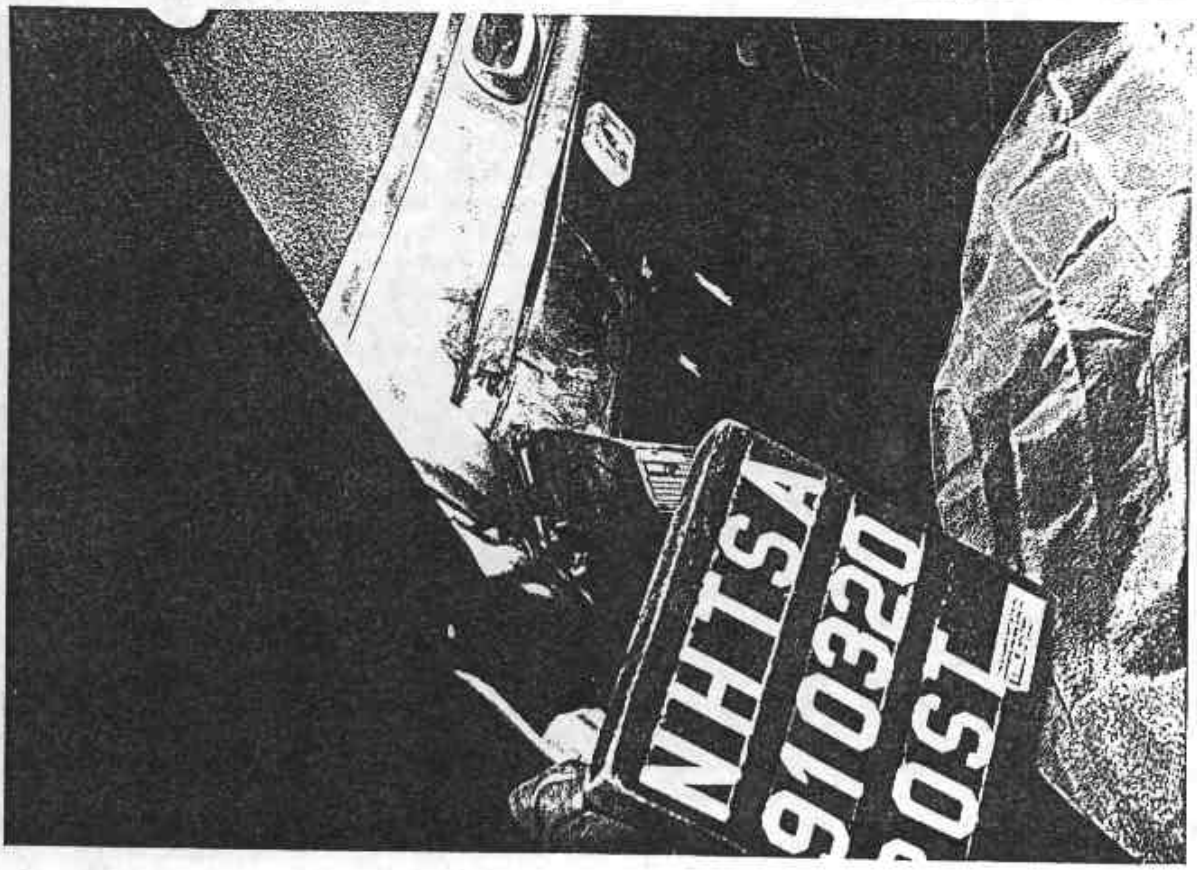


Figure A-36. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

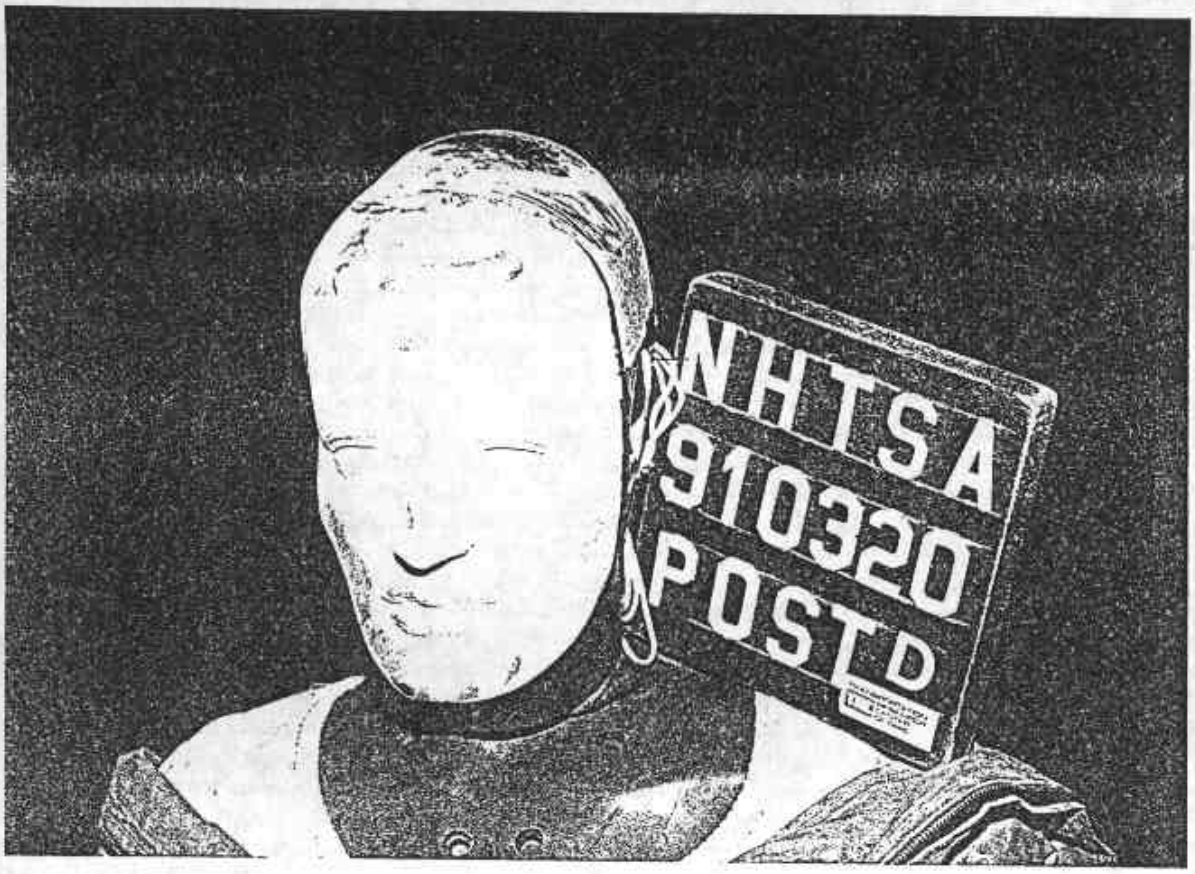


Figure A-37. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

Figure A-38. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

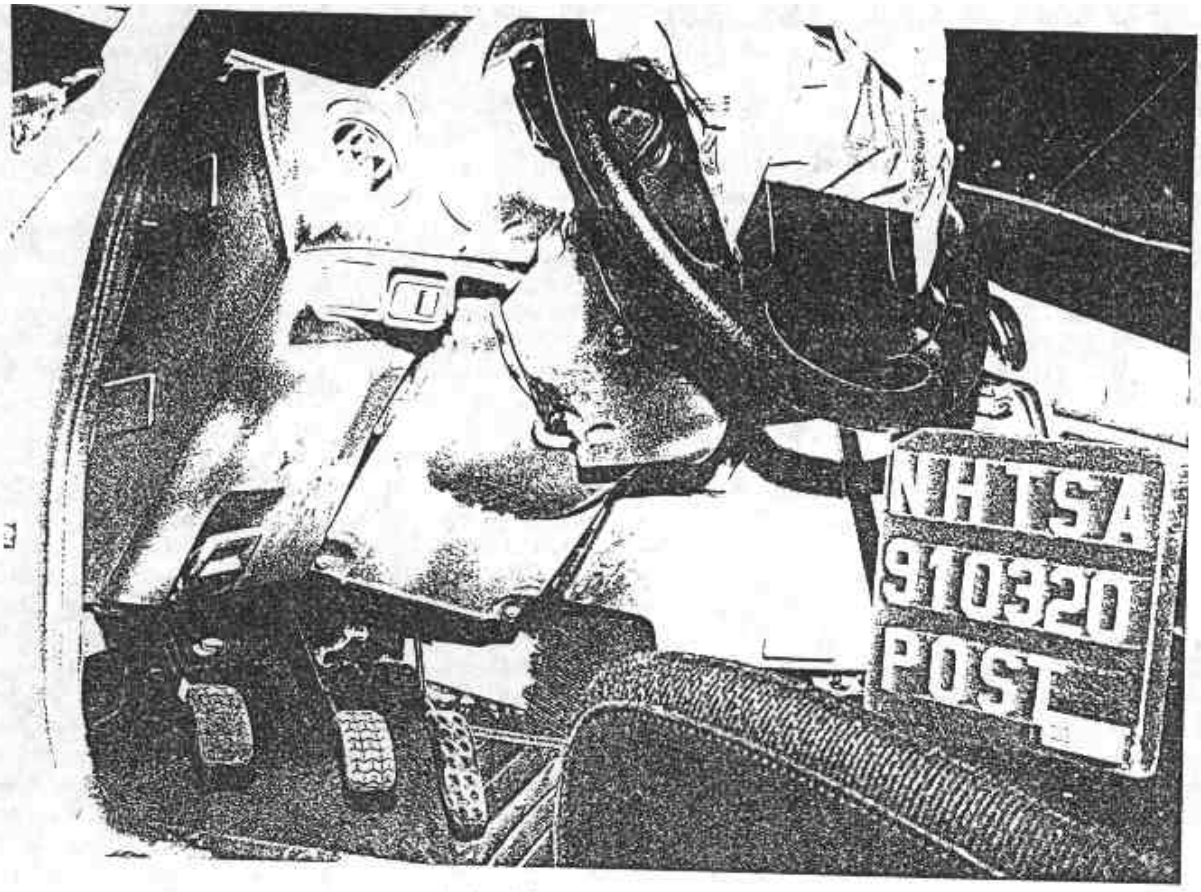


Figure A-39. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

Figure A-40. POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW

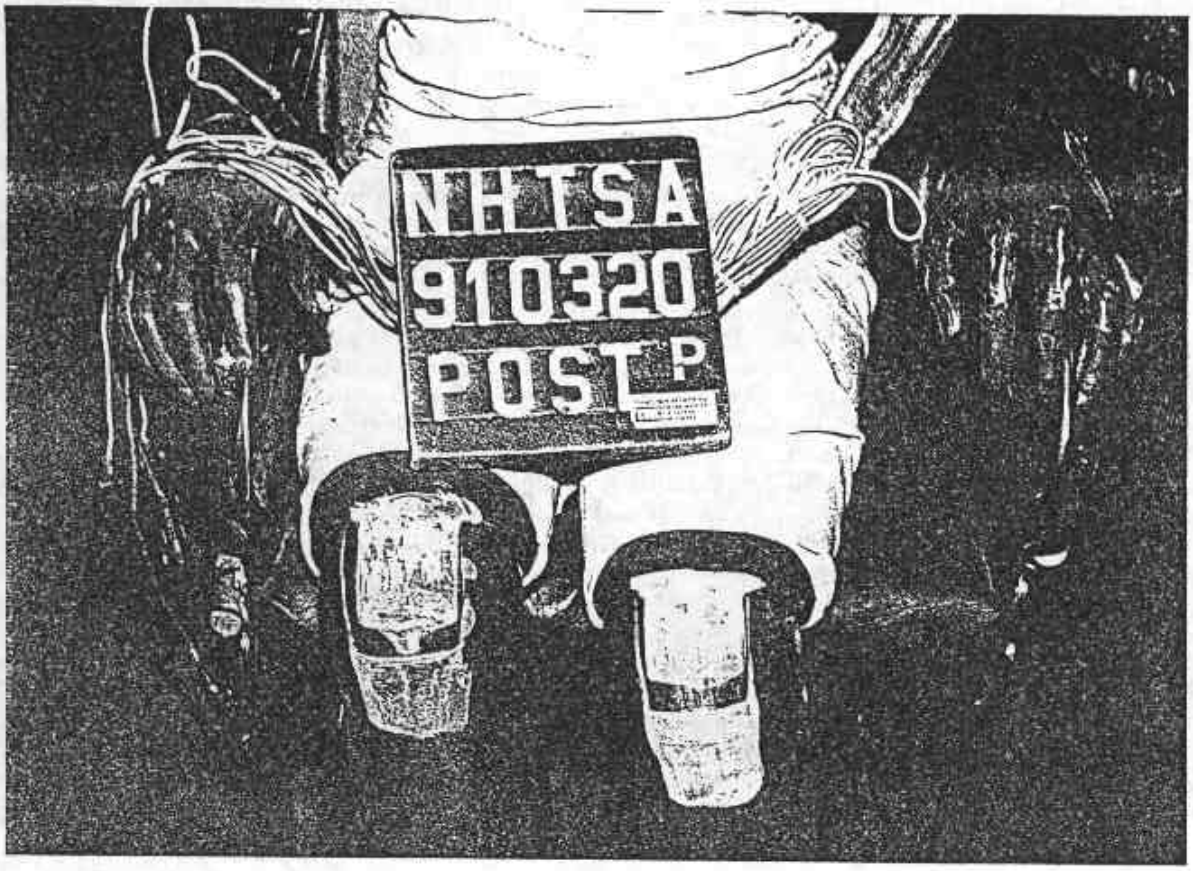


Figure A-41. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

Figure A-42. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

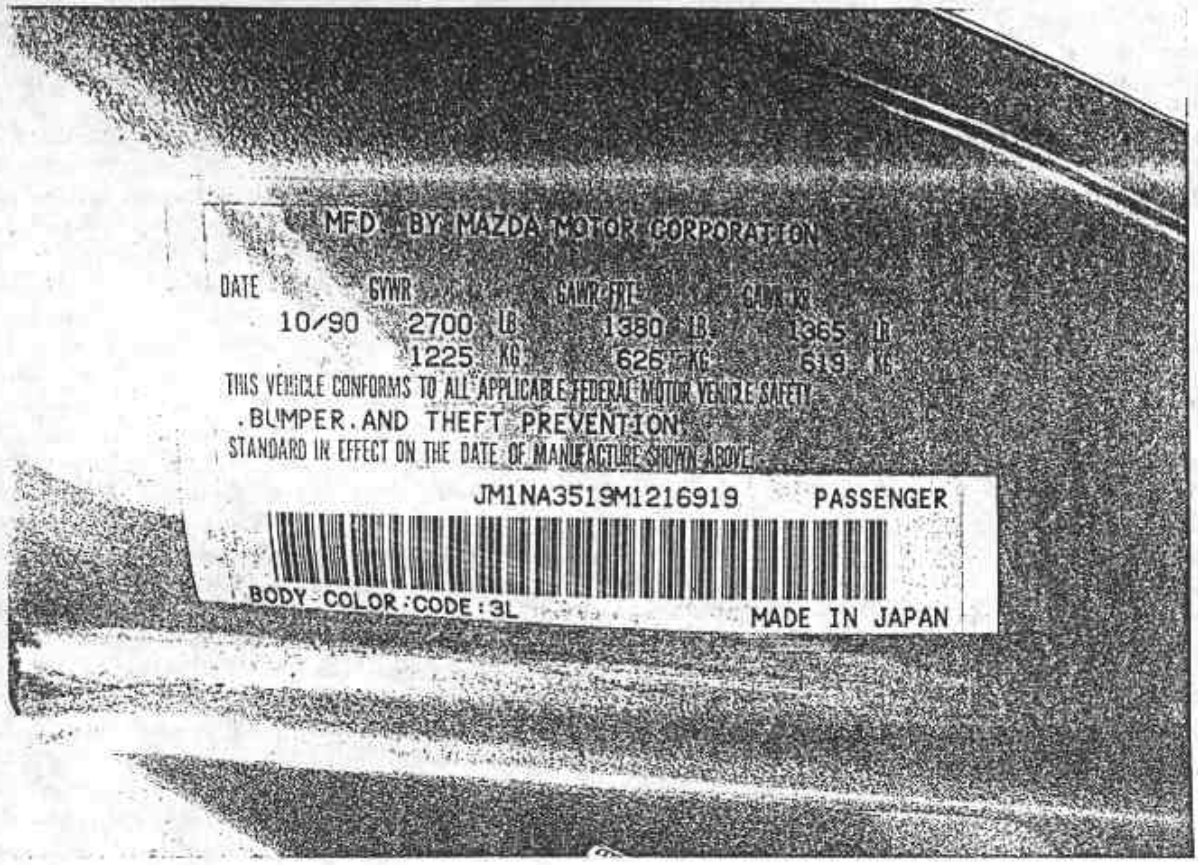


Figure A-43. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW

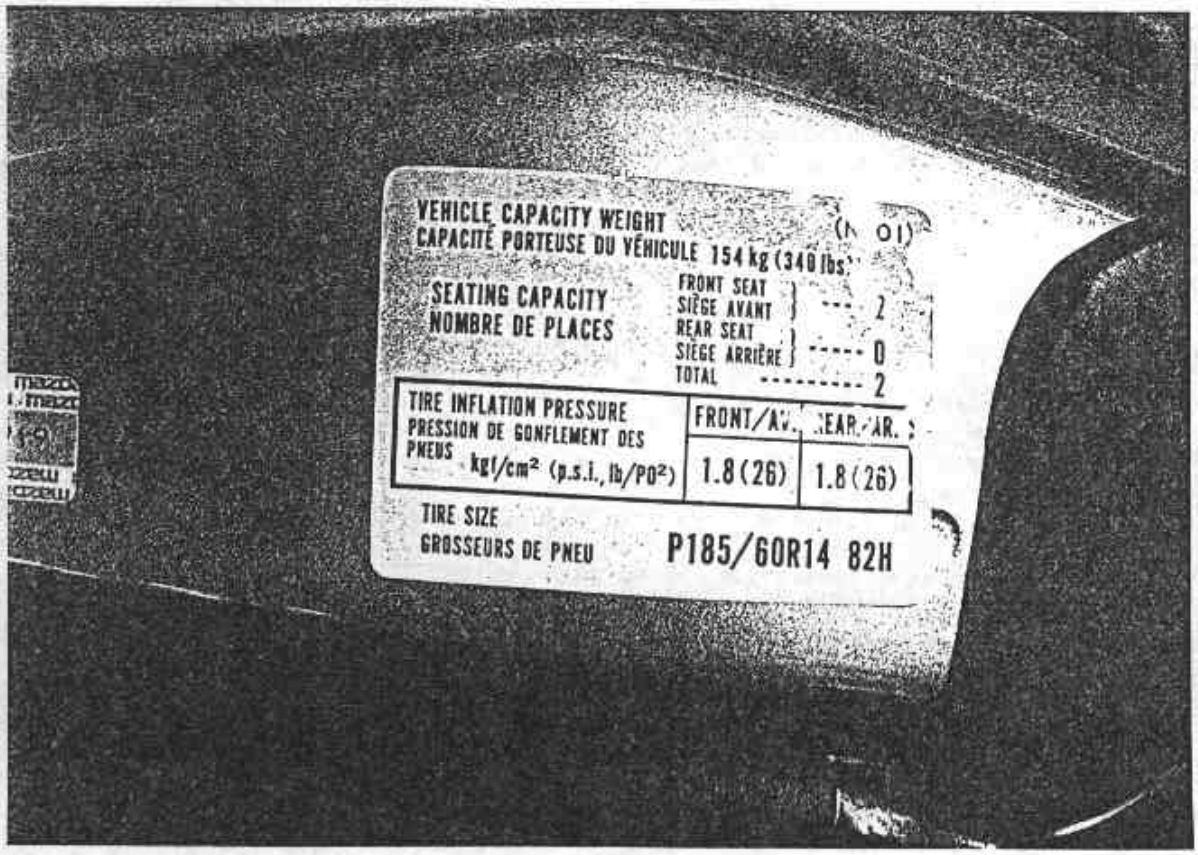


Figure A-44. PRE-TEST VEHICLE RECOMMENDED TIRE PRESSURE LABEL VIEW

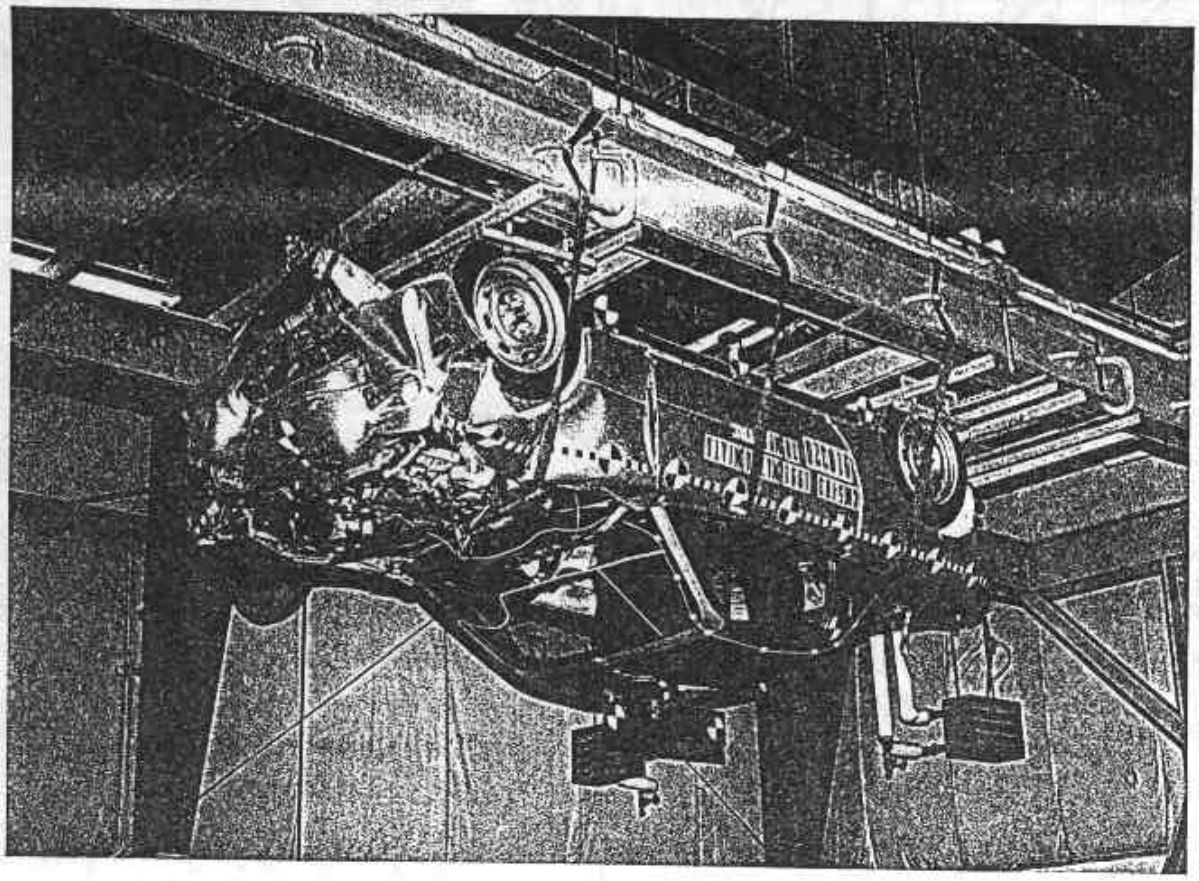
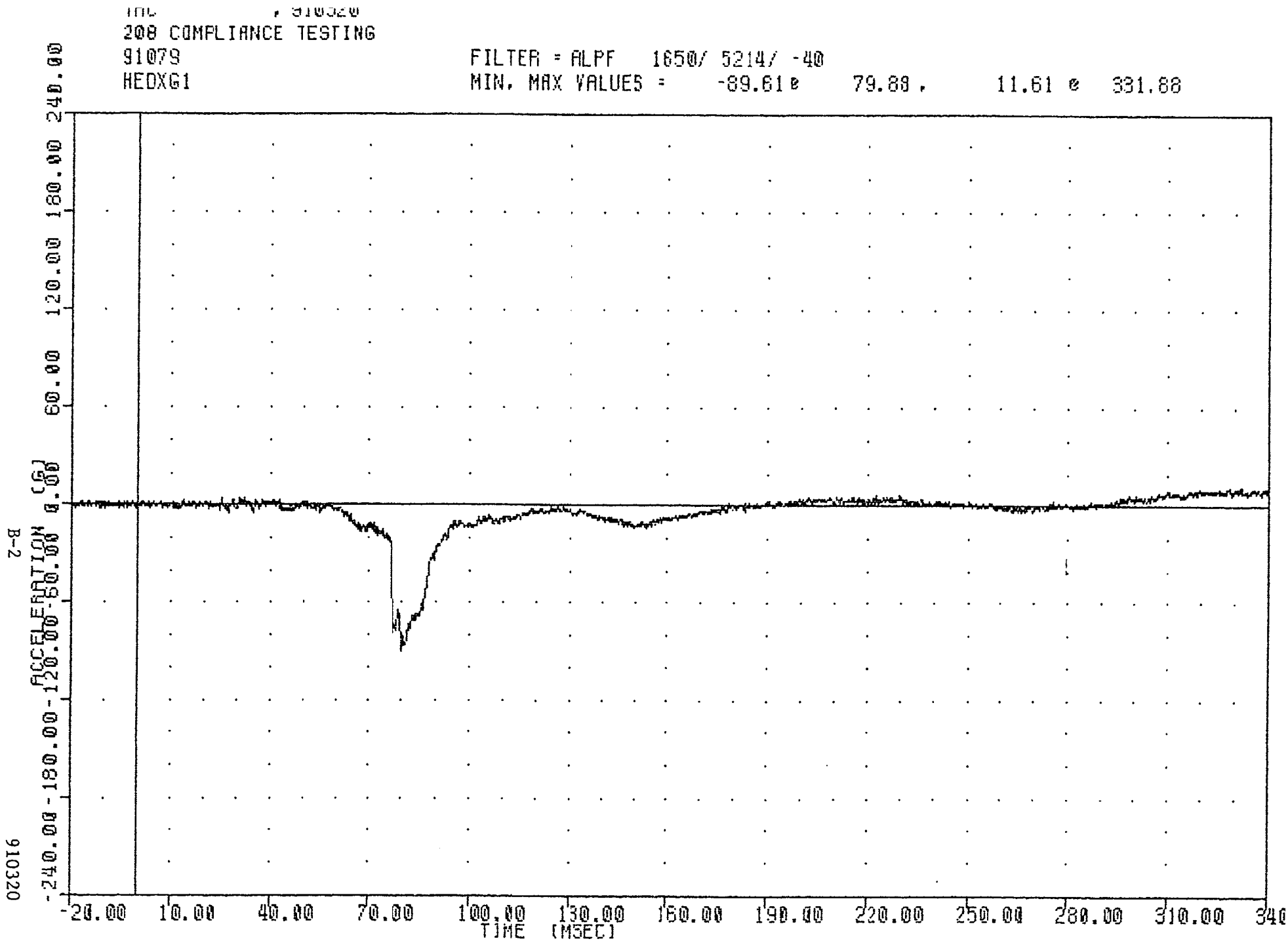


Figure A-45. PRE-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW

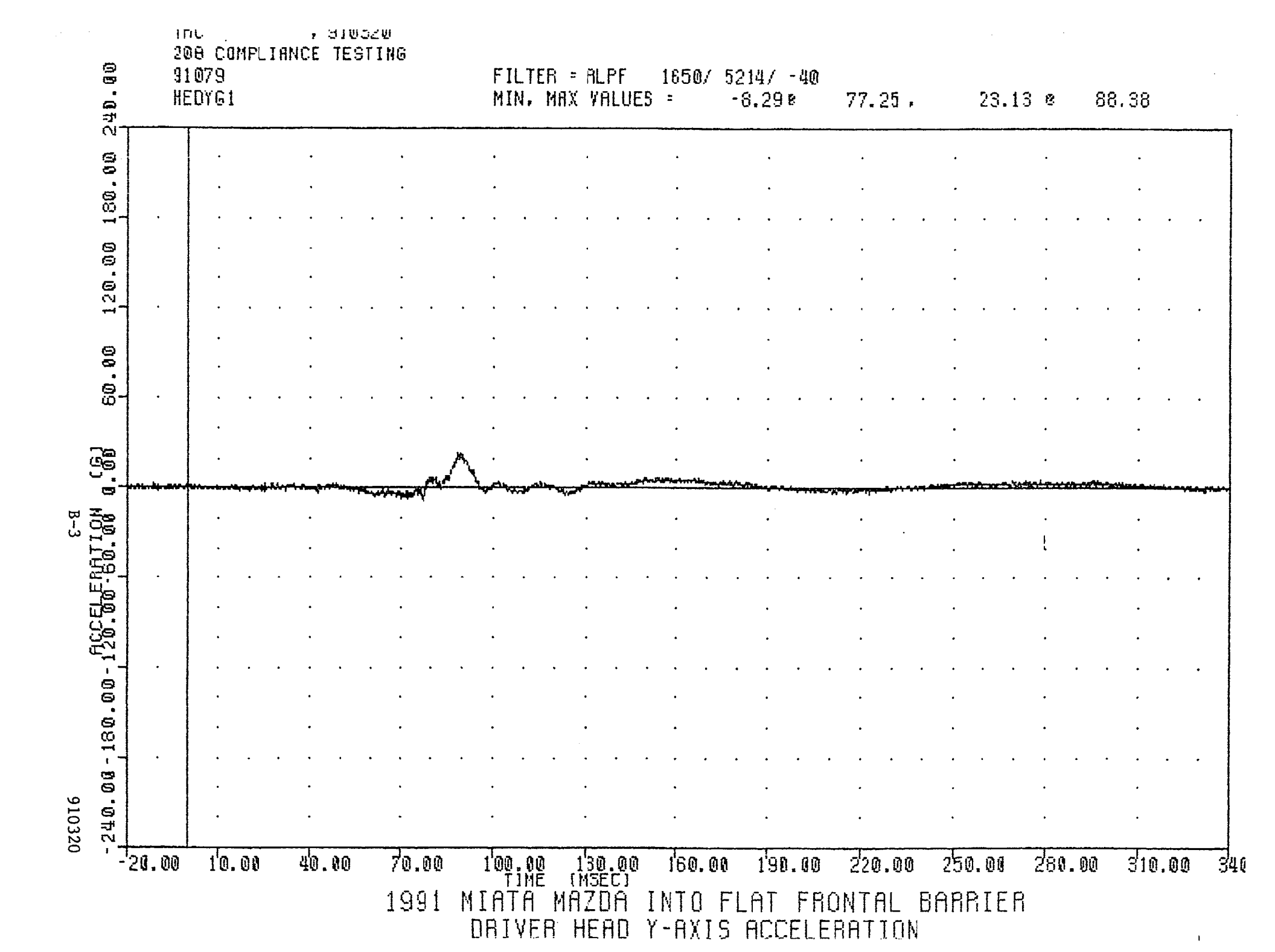
APPENDIX B

DATA PLOTS



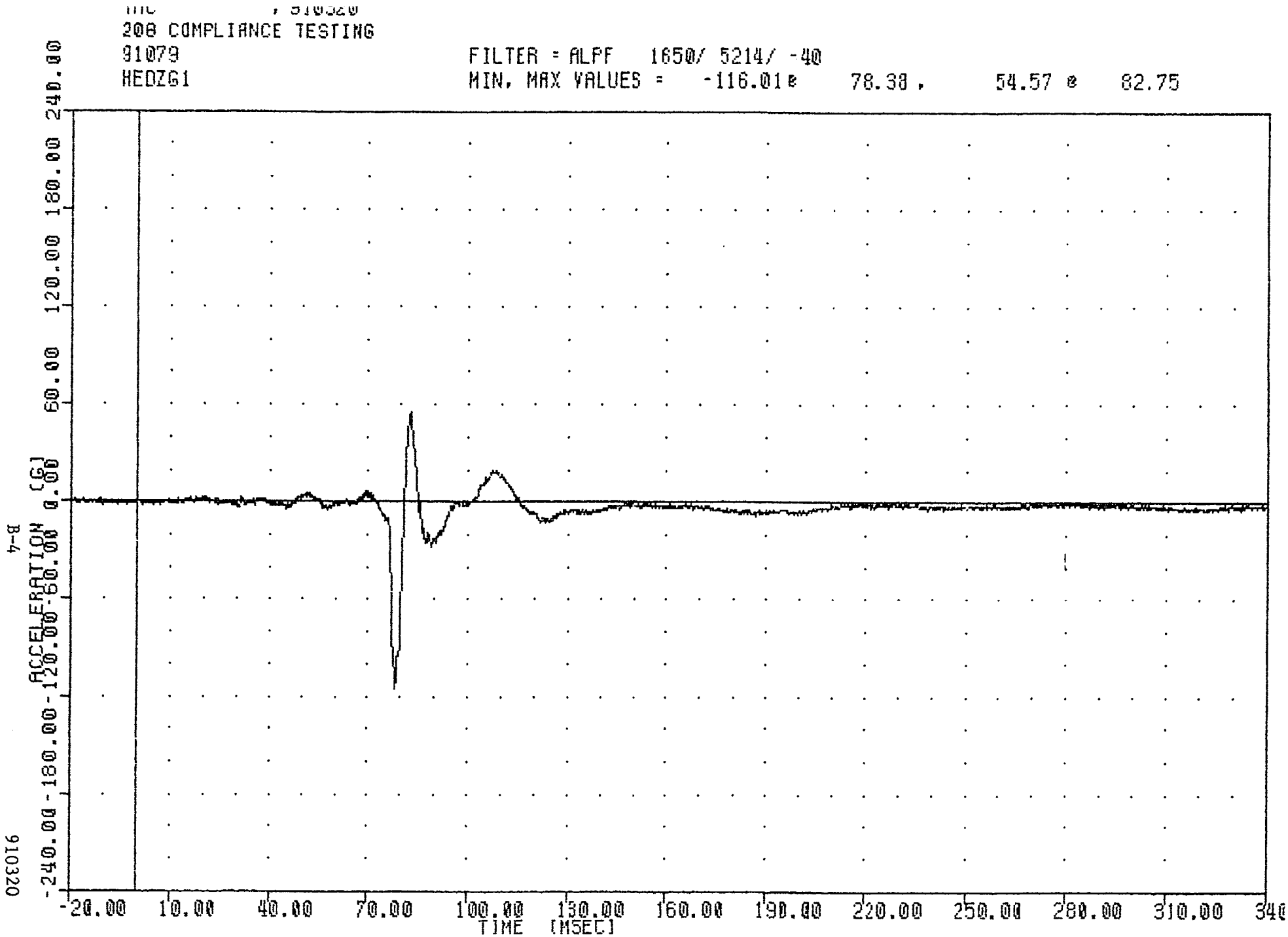
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION

910320

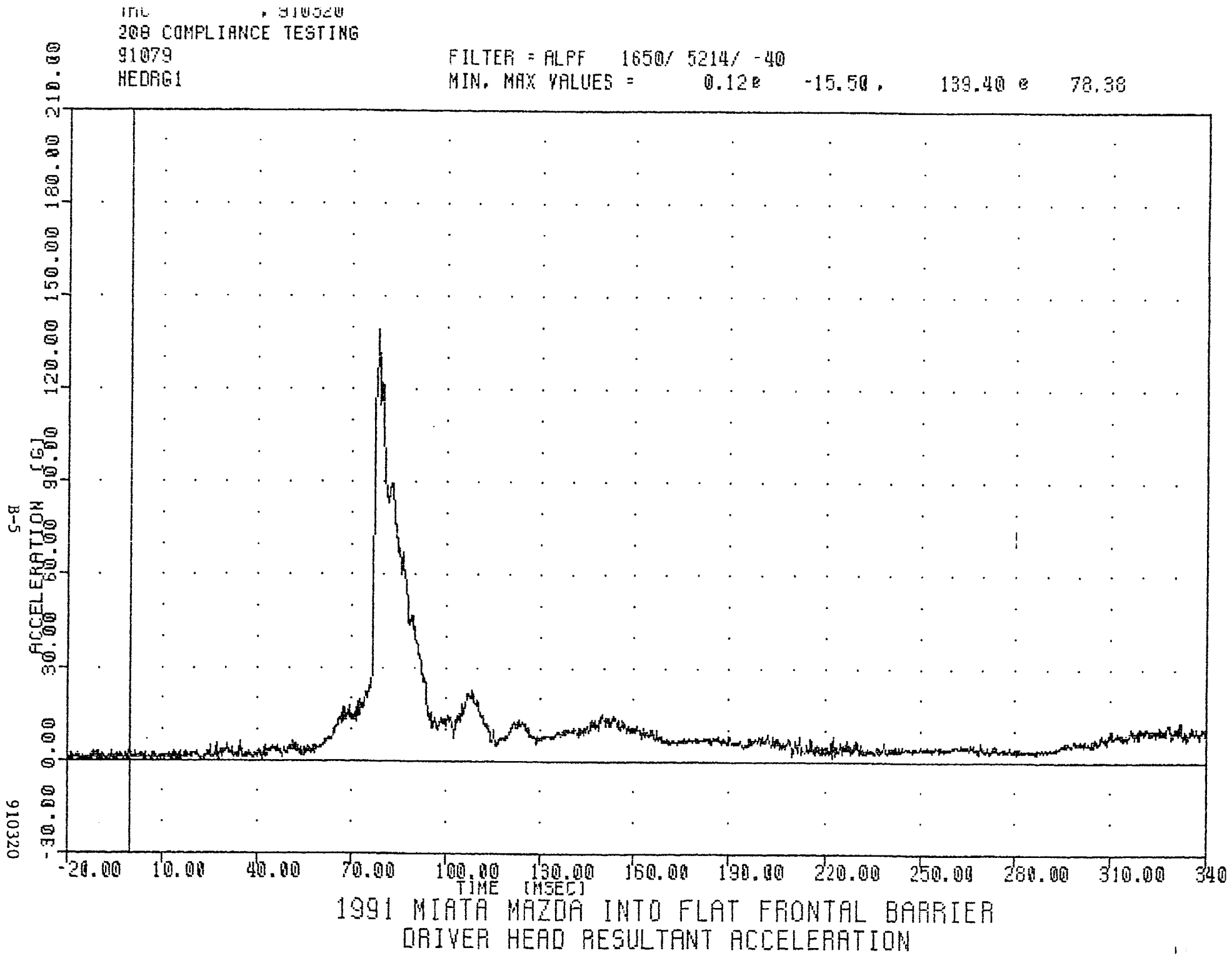


1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION

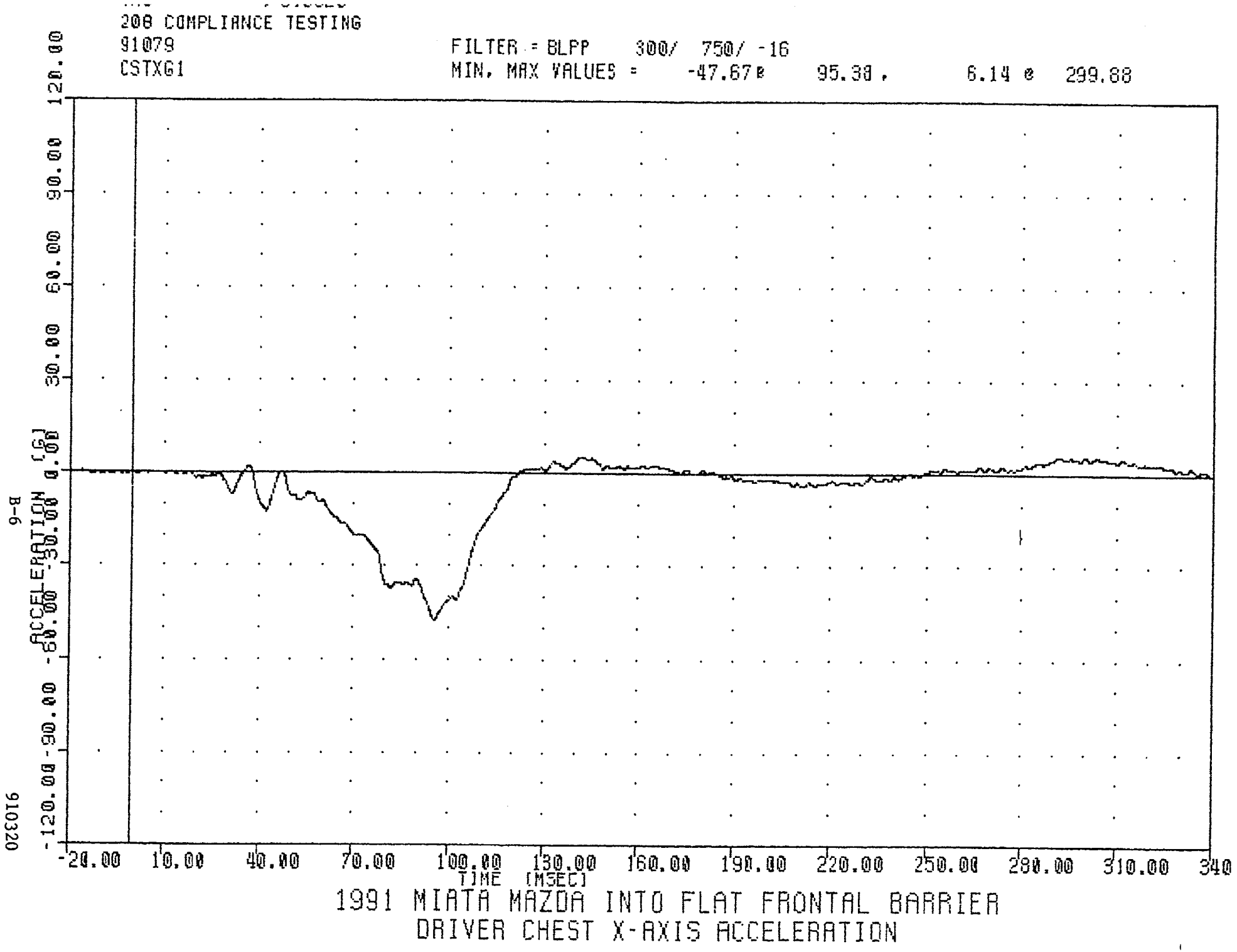
910320



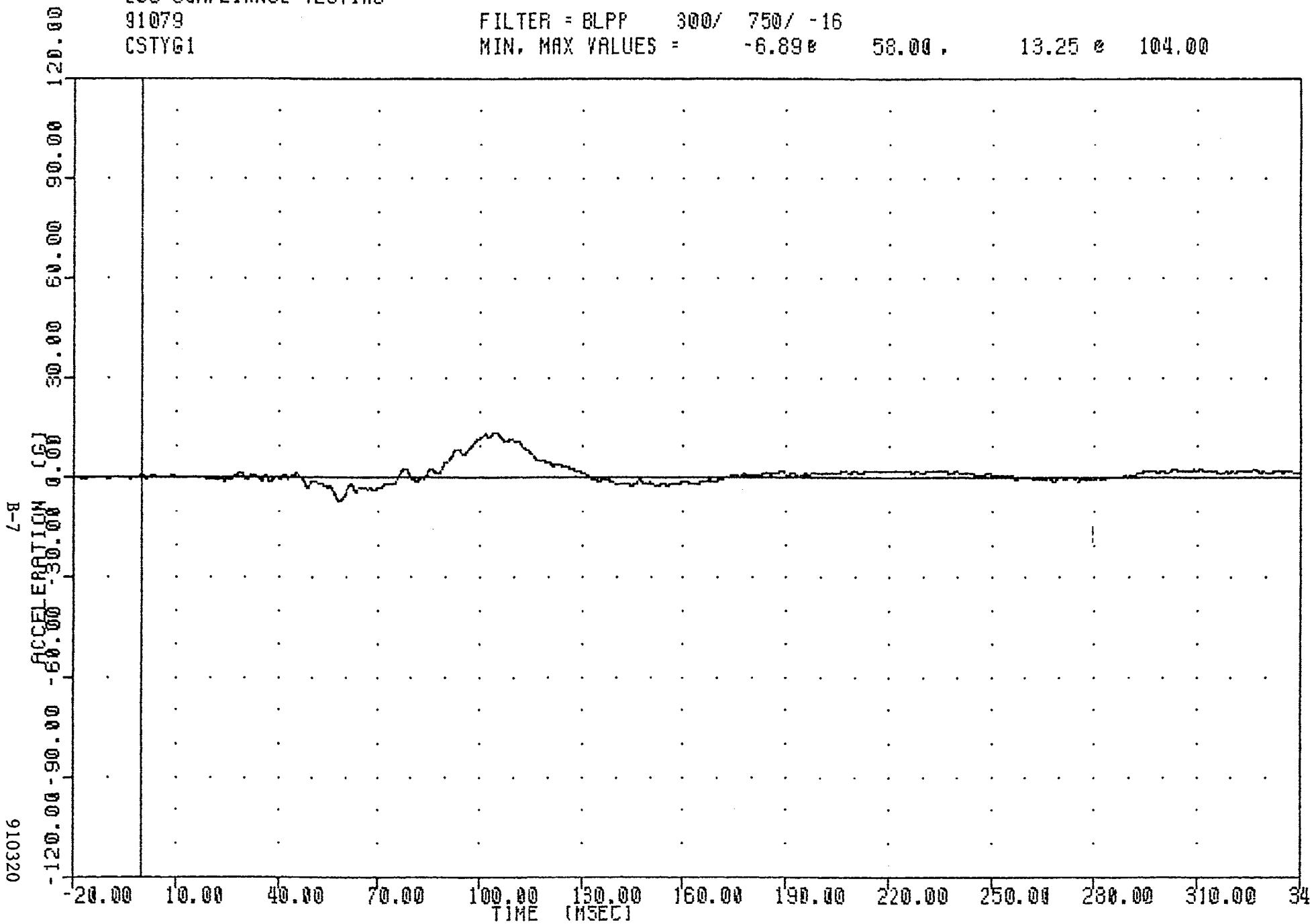
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION



1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION

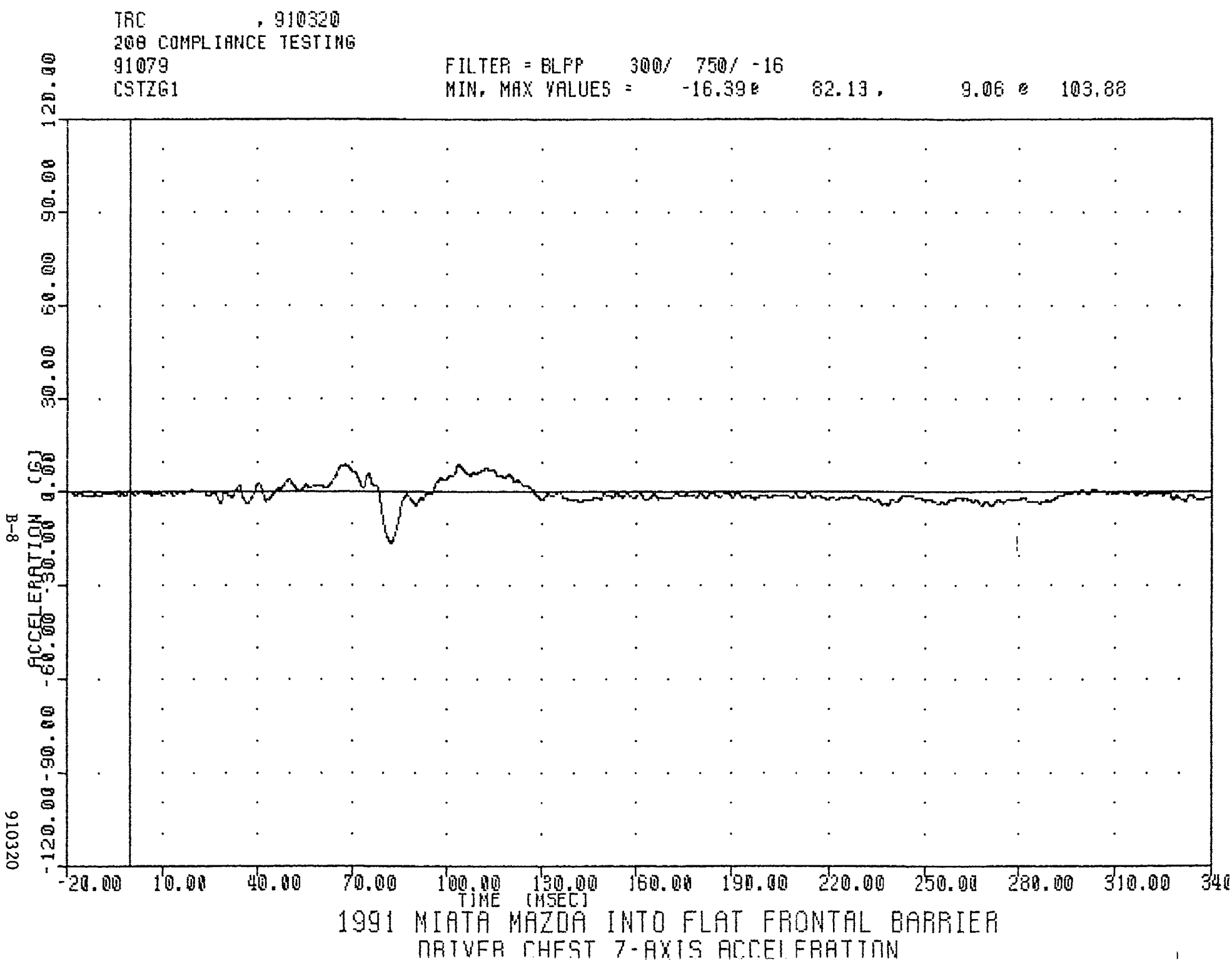

208 COMPLIANCE TESTING
91079
CSTXG1
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -47.67 @ 95.38 , 6.14 @ 299.88
120.00
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
ACCELERATION [G]
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340
TIME [MSEC]
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION

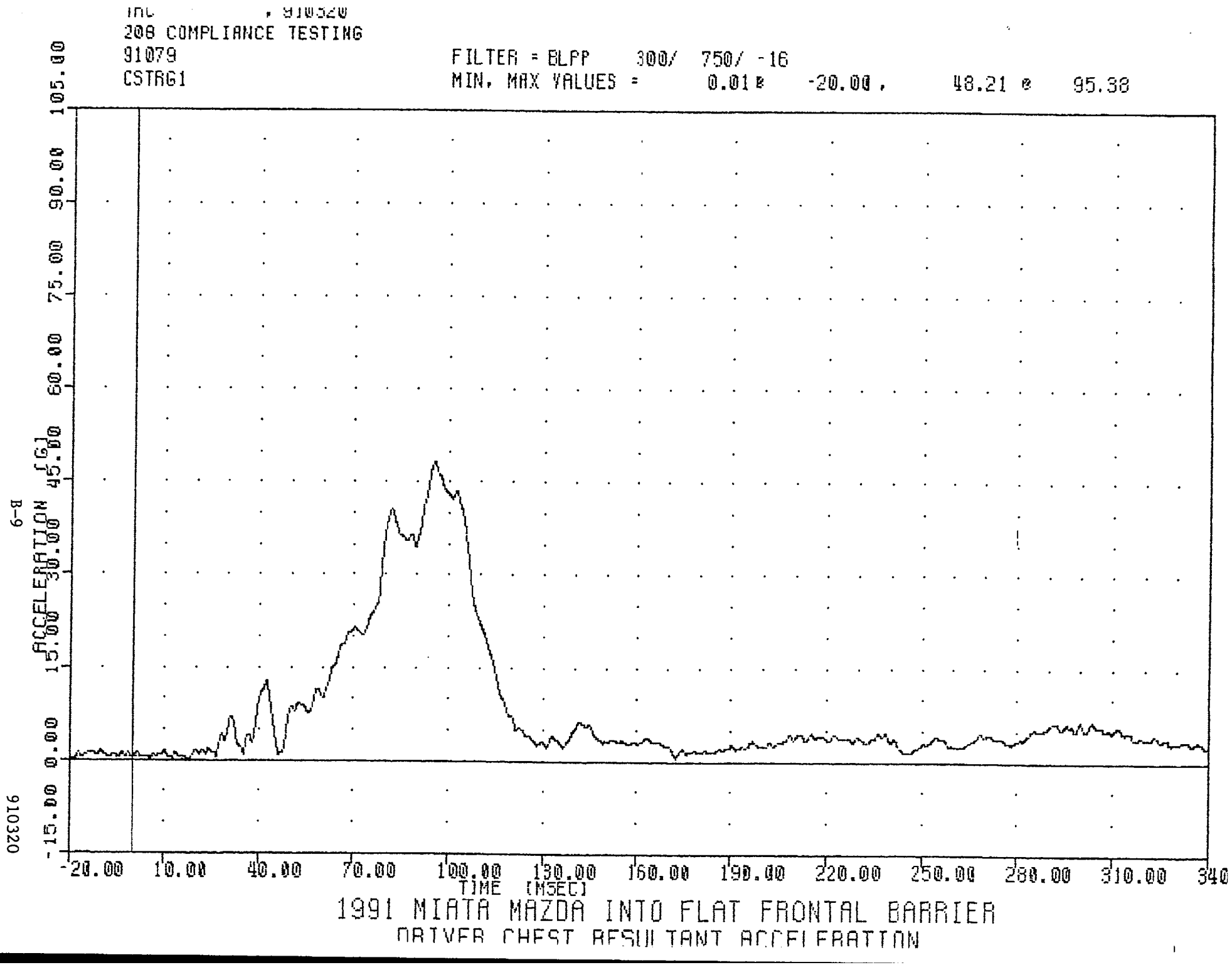
910320



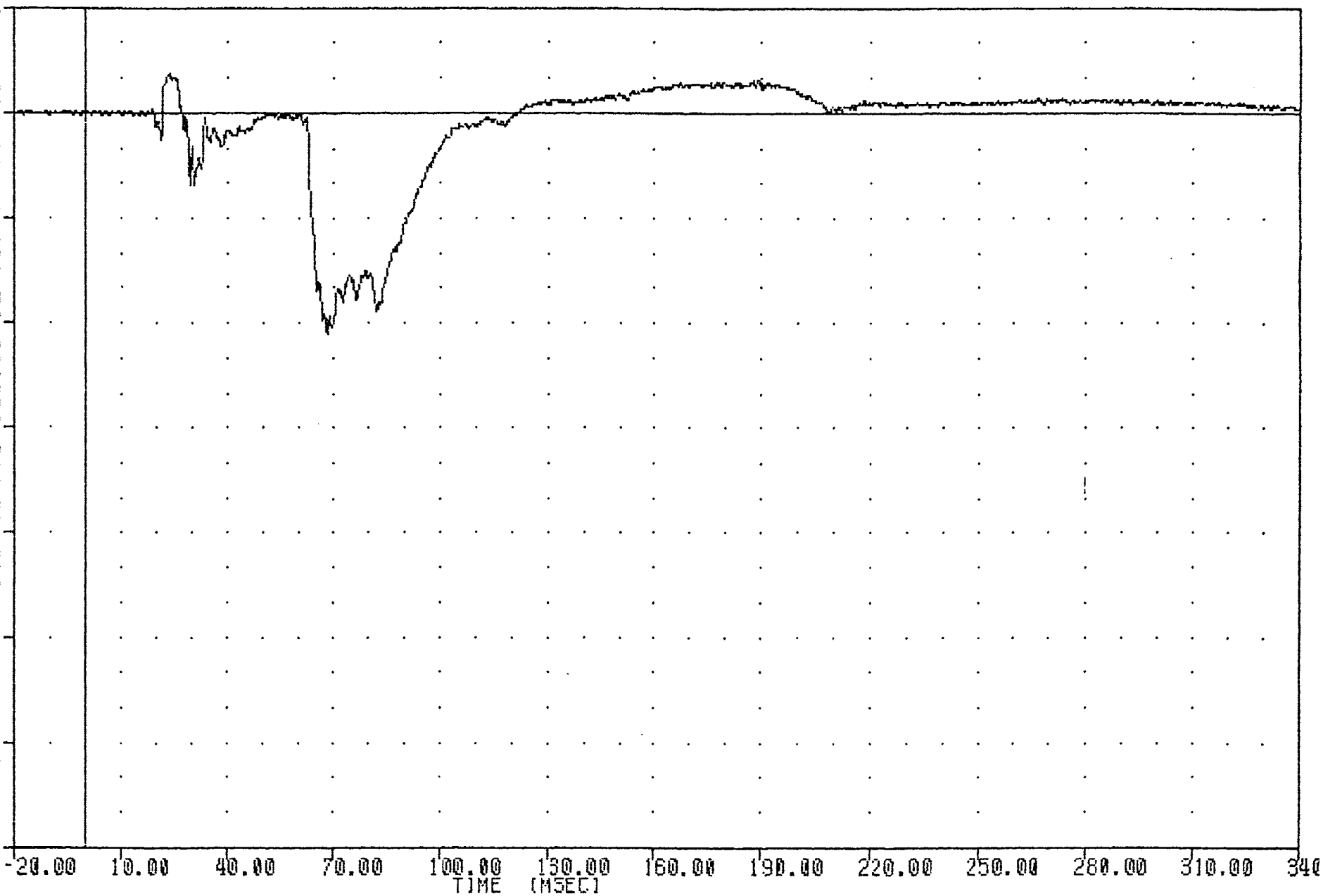
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

910320


TRC , 910320
208 COMPLIANCE TESTING
91079
CSTZG1
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -16.39 @ 82.13 , 9.06 @ 103.88
120.00
90.00
60.00
30.00
0.00
-30.00
-60.00
-90.00
-120.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER CHEST 7-AXIS ACCELERATION
B-8
910320

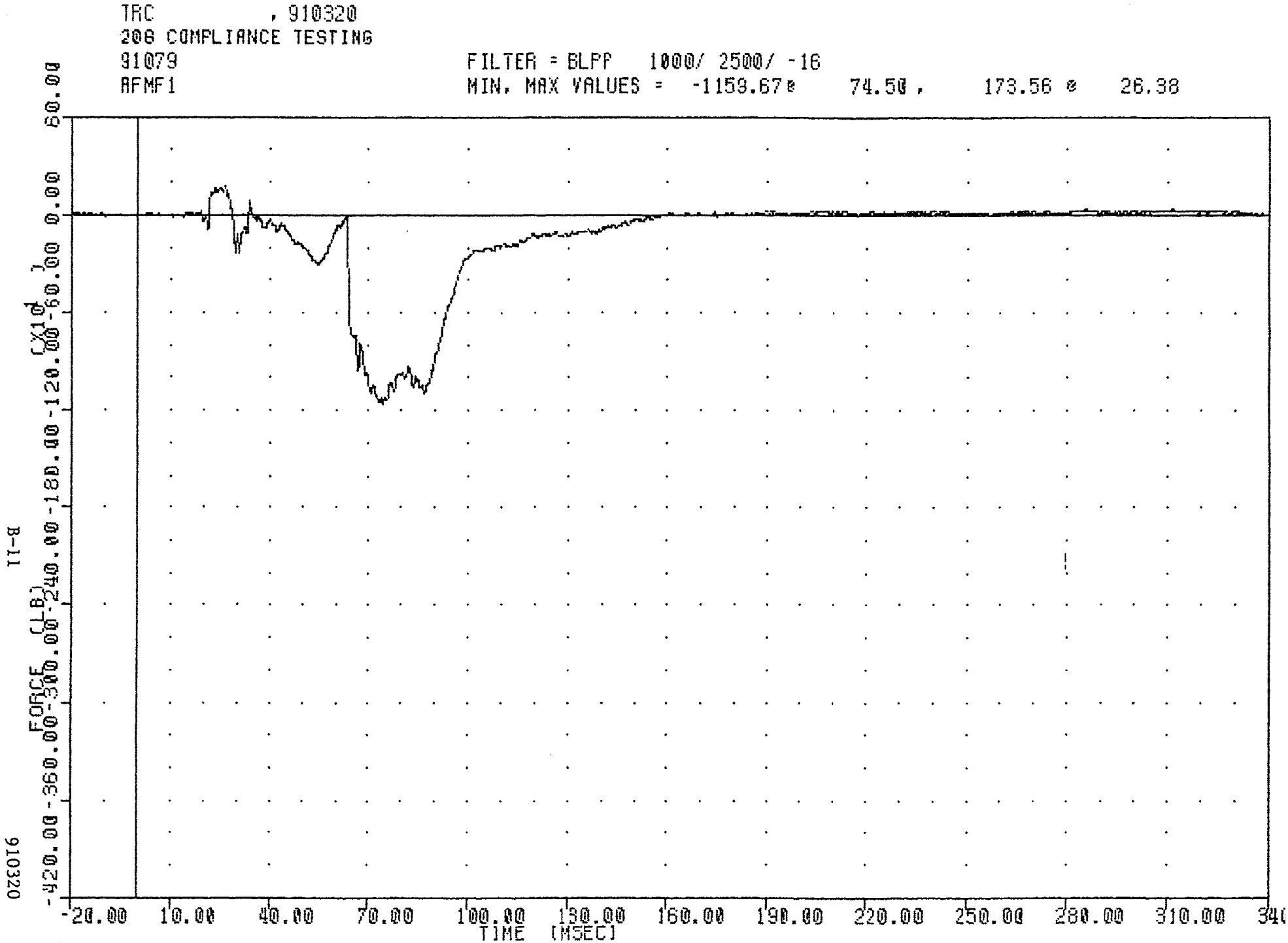

208 COMPLIANCE TESTING
91079
CSTRG1
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.01 @ -20.00 , 48.21 @ 95.38
105.00
90.00
75.00
60.00
45.00
30.00
15.00
0.00
-15.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
910320

TRC , 910320
208 COMPLIANCE TESTING
91079
LFMF1
FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -1261.99 @ 68.13 , 220.50 @ 23.63



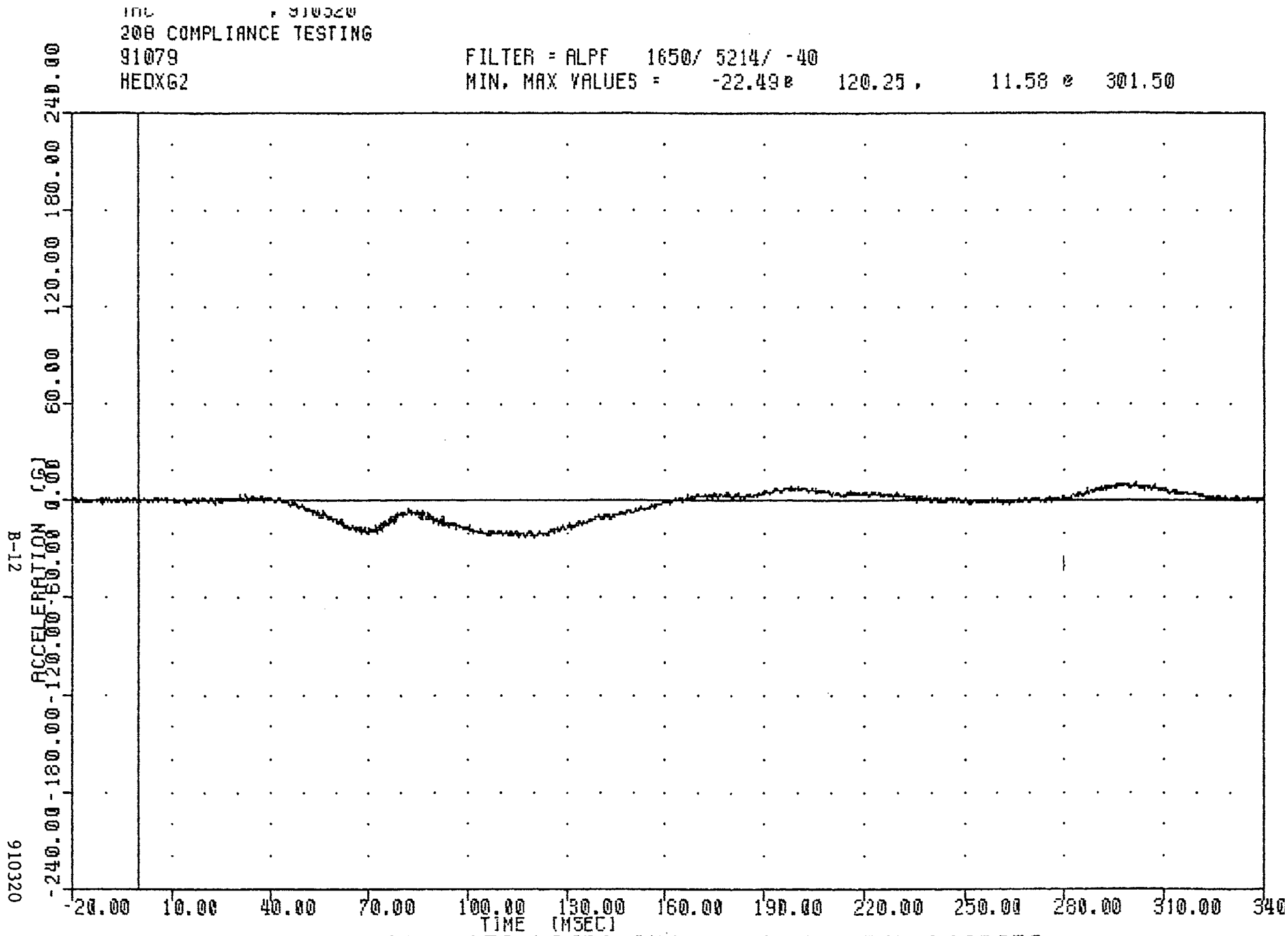
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE

910320



1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE

910320

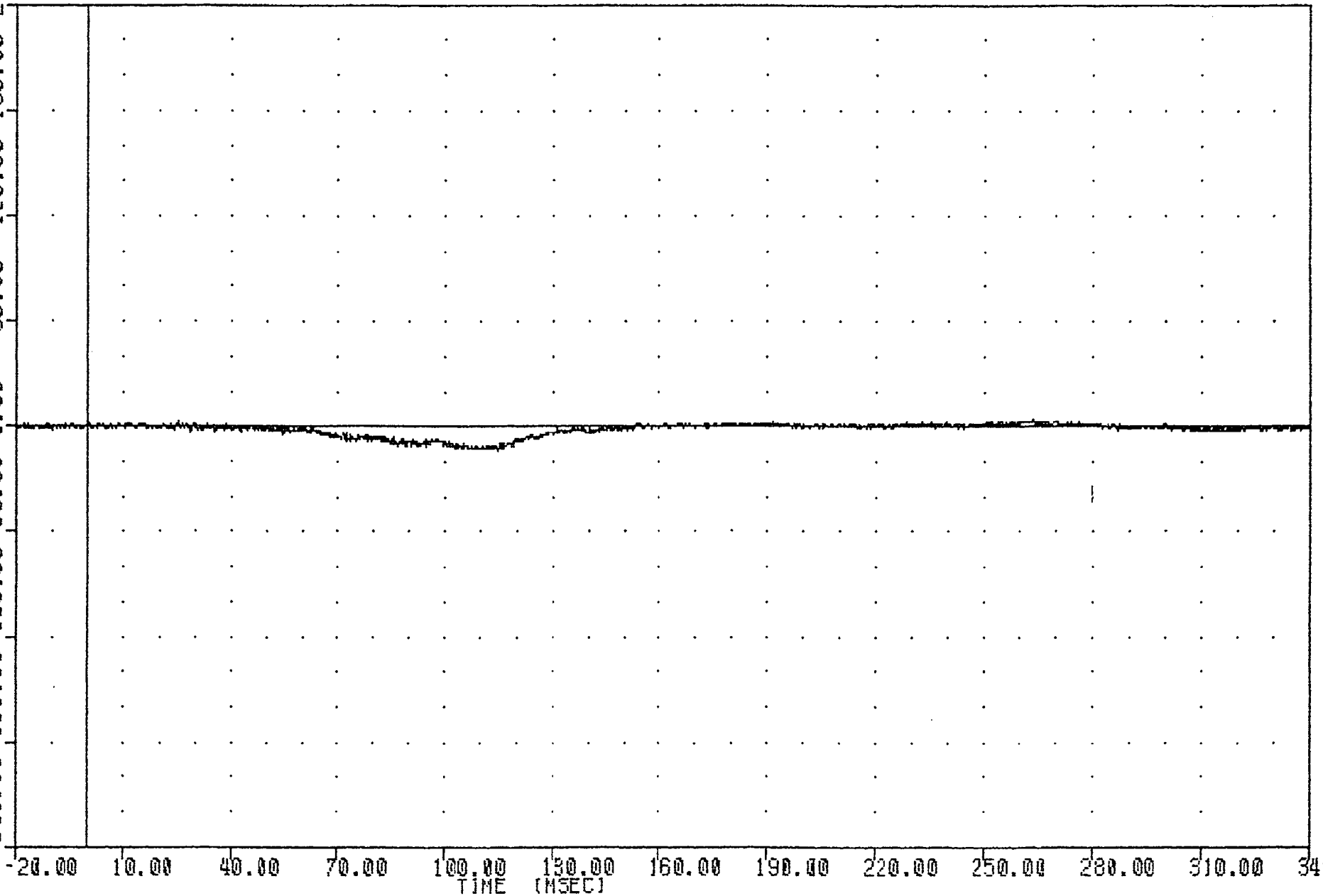


1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

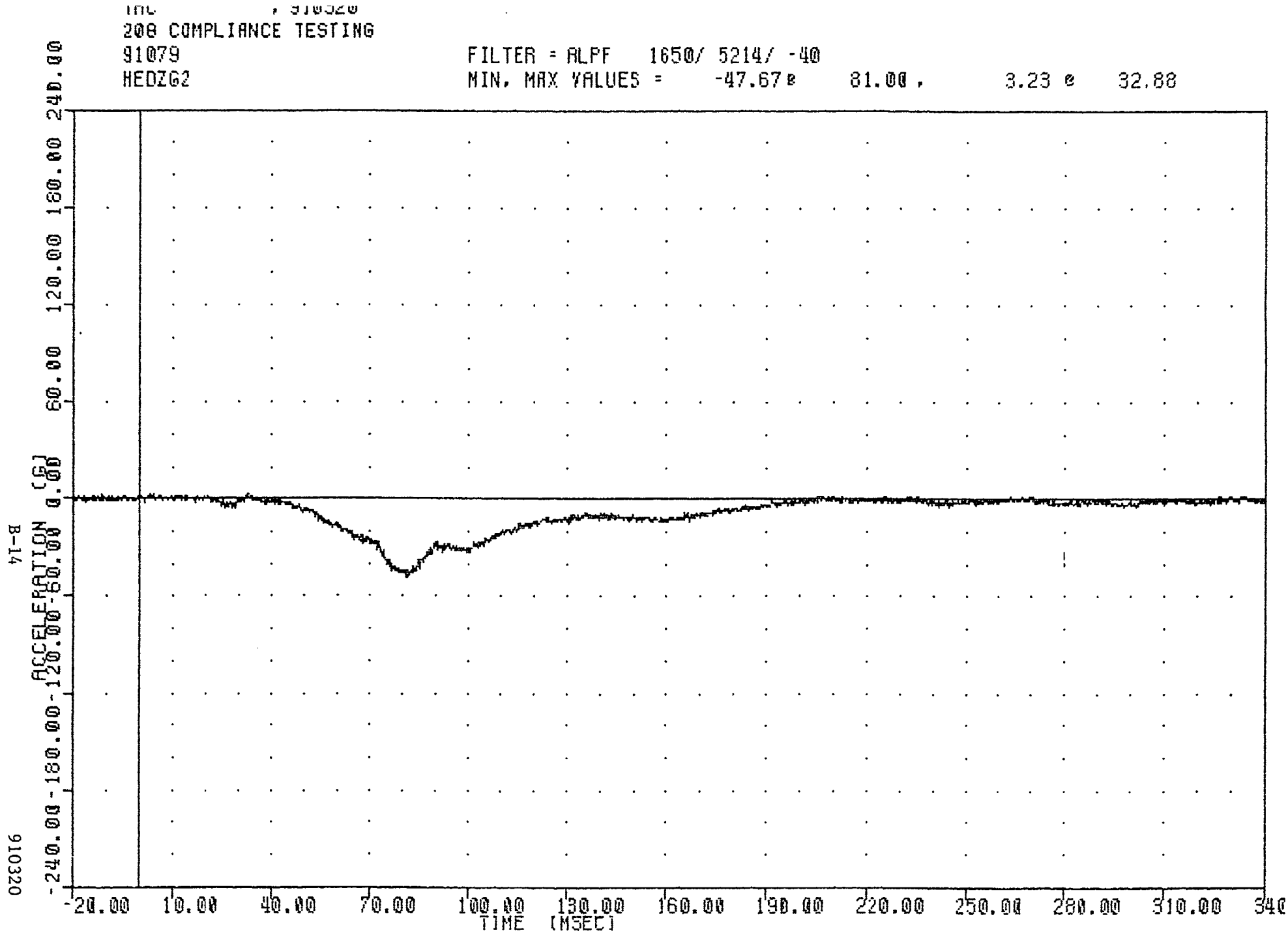
910320

208 COMPLIANCE TESTING
91079
HEDYG2

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -13.26 @ 114.63 , 4.14 @ 263.38

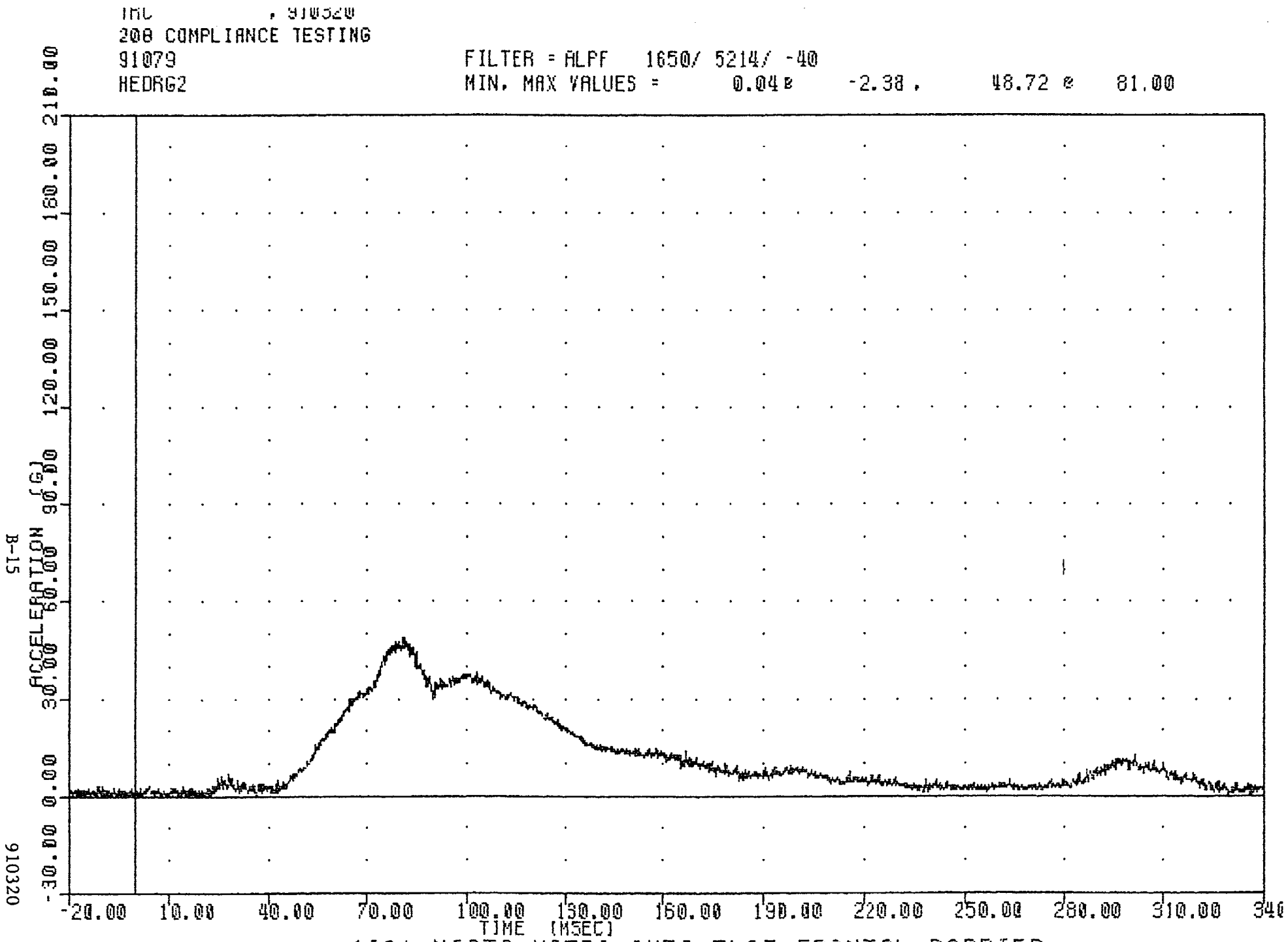


1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION



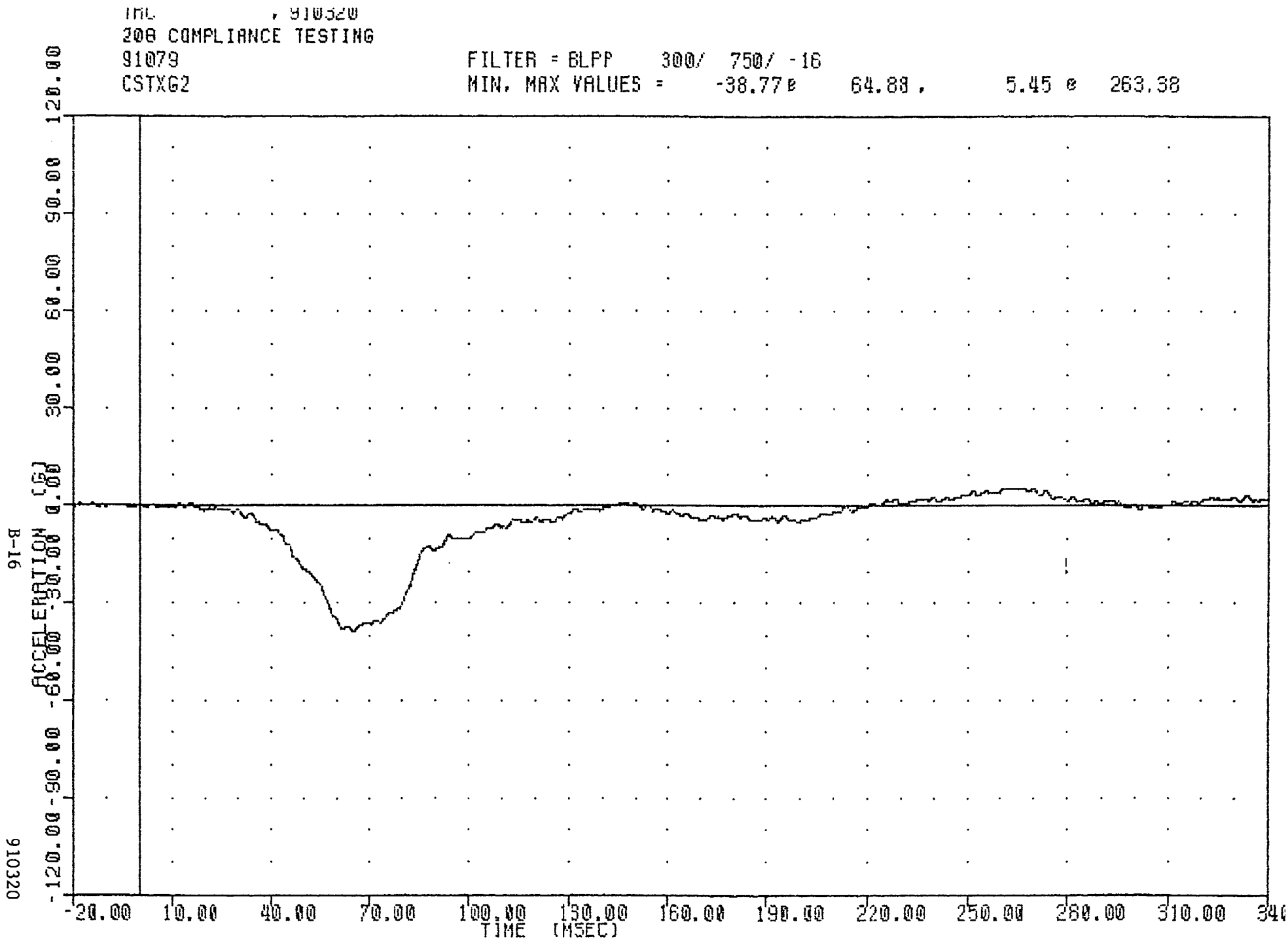
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

910320



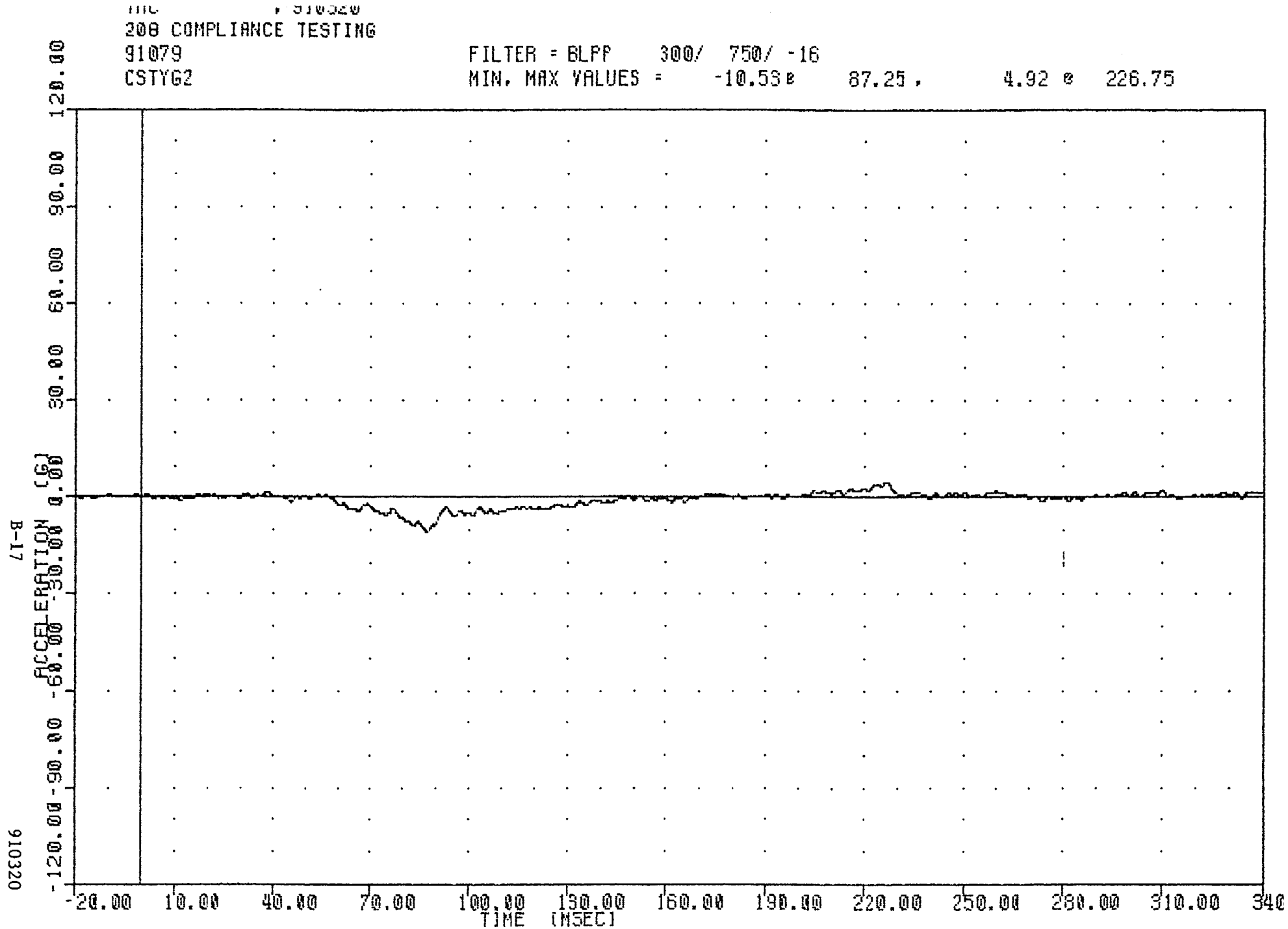
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

910320



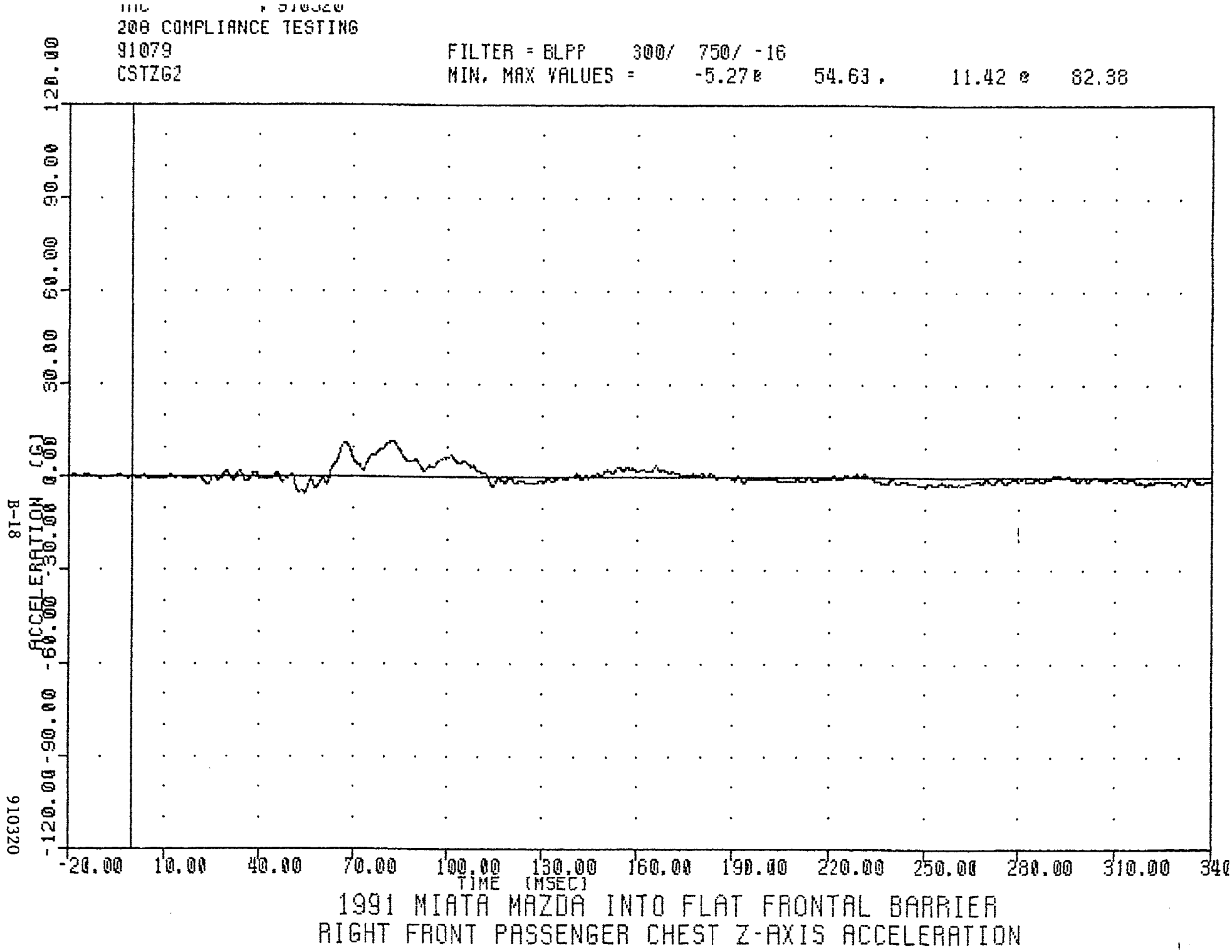
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

910320



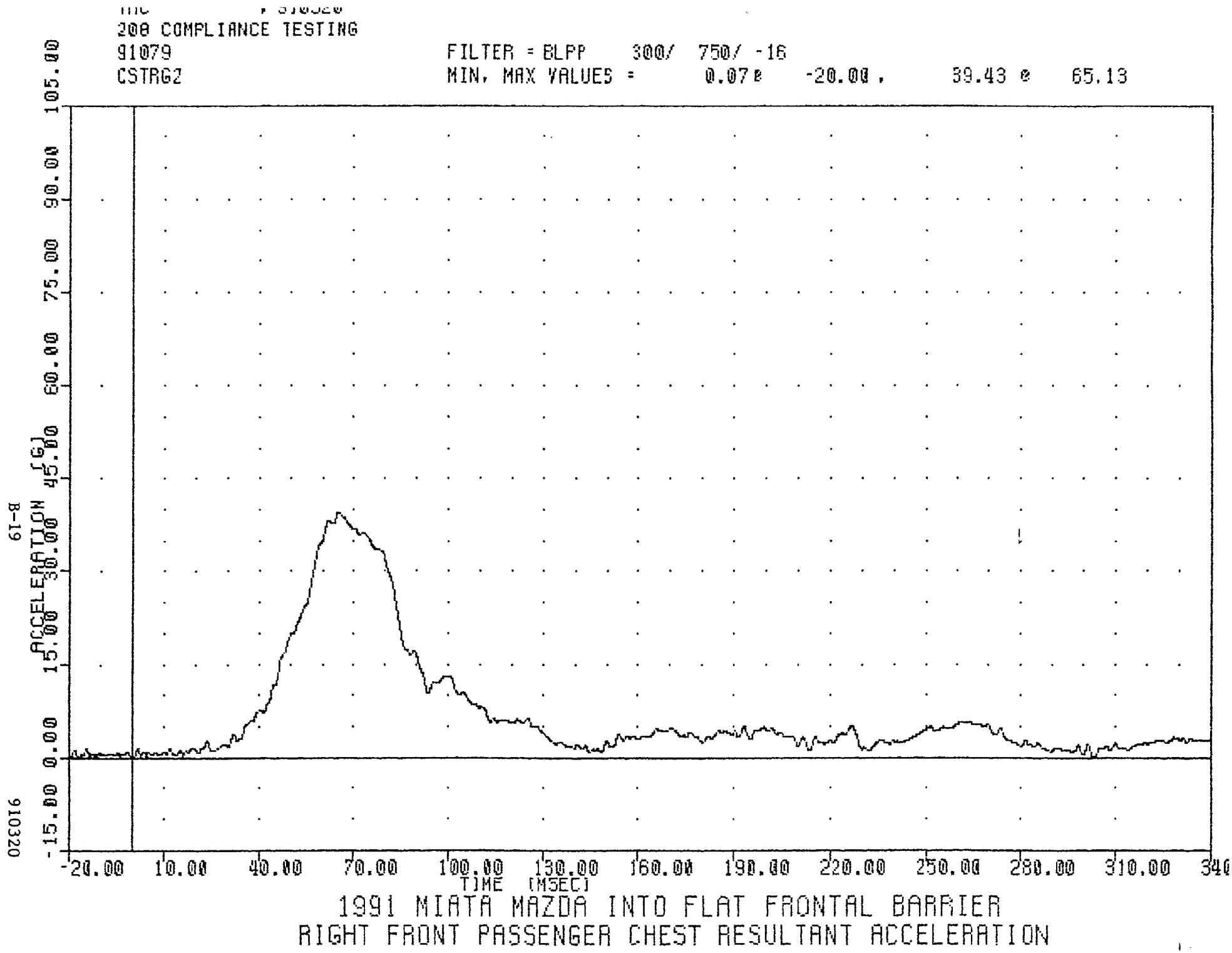
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

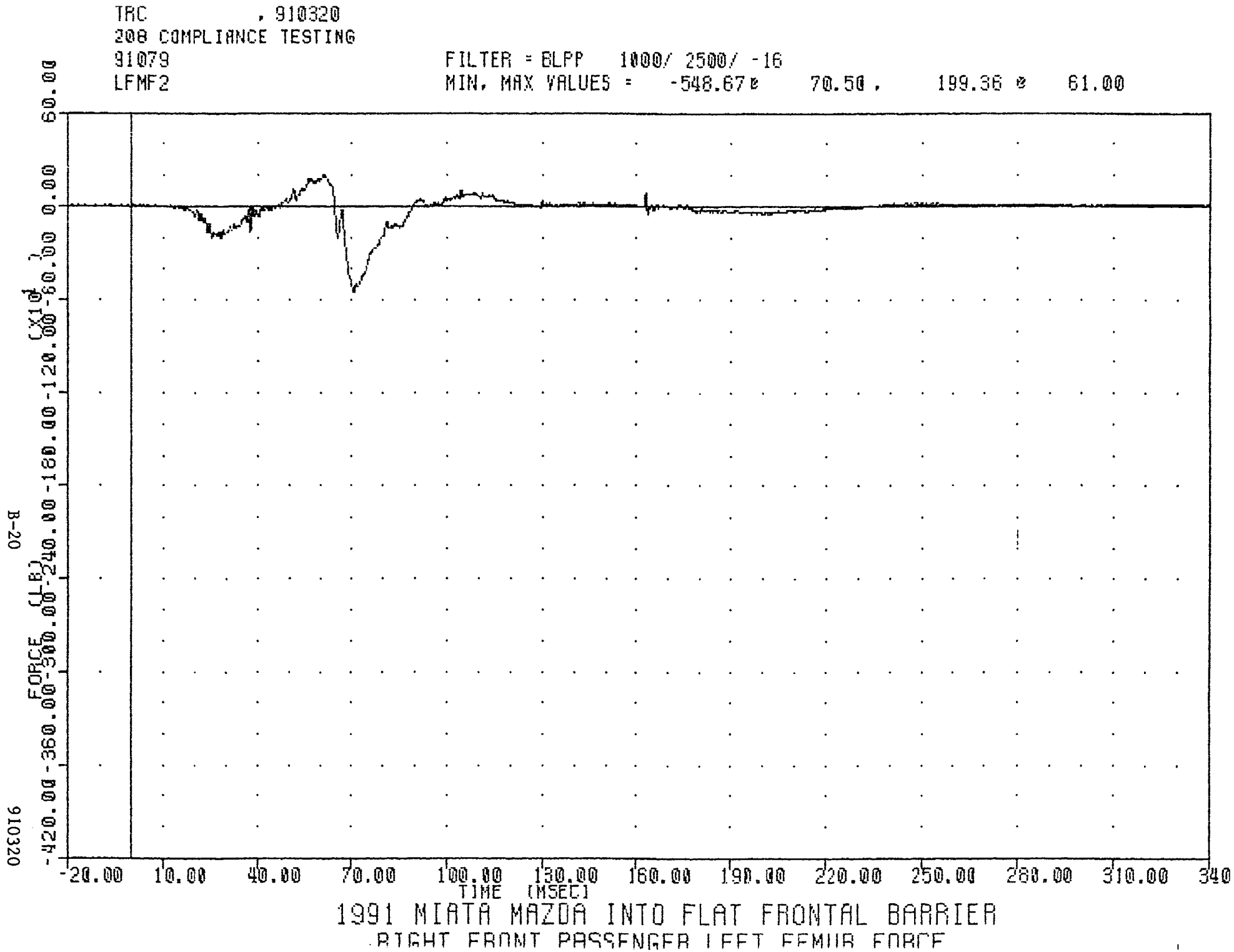
910320



1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

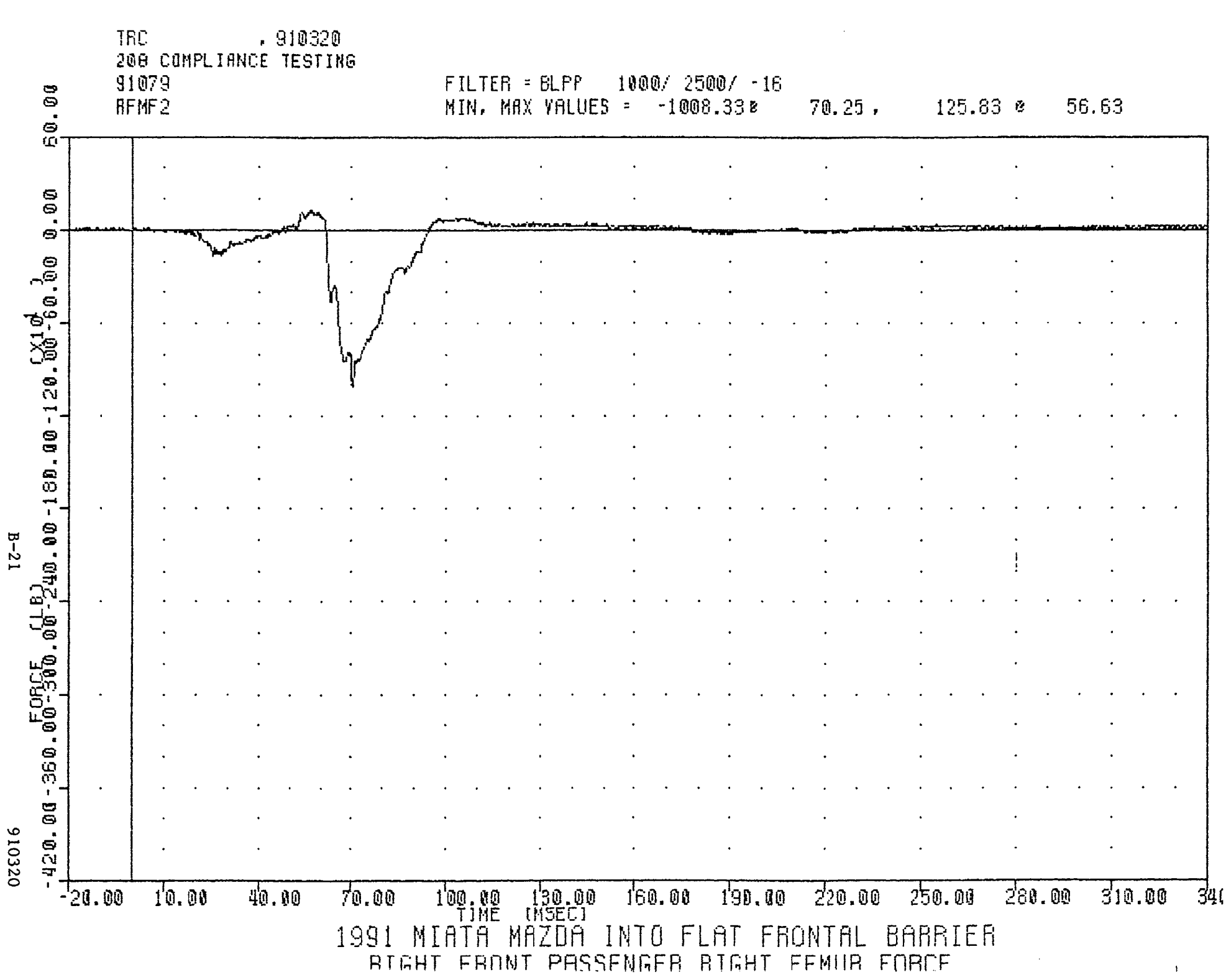
910320


200 COMPLIANCE TESTING
91079
CSTRG2
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.07 @ -20.00 , 39.43 @ 65.13
105.00
90.00
75.00
60.00
45.00
30.00
15.00
0.00
-15.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION



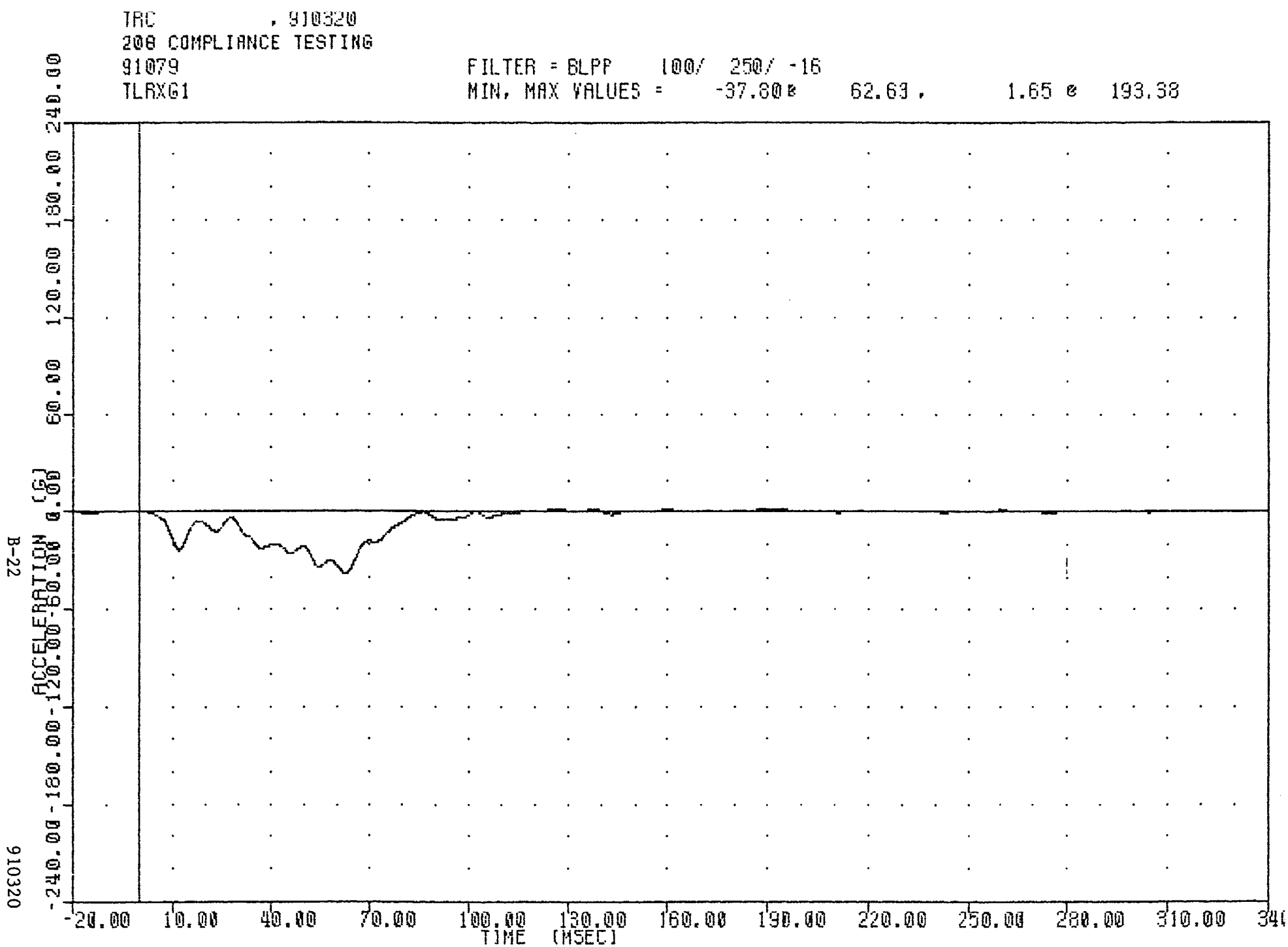
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER

RIGHT FRONT PASSENGER LEFT FEMUR FORCE

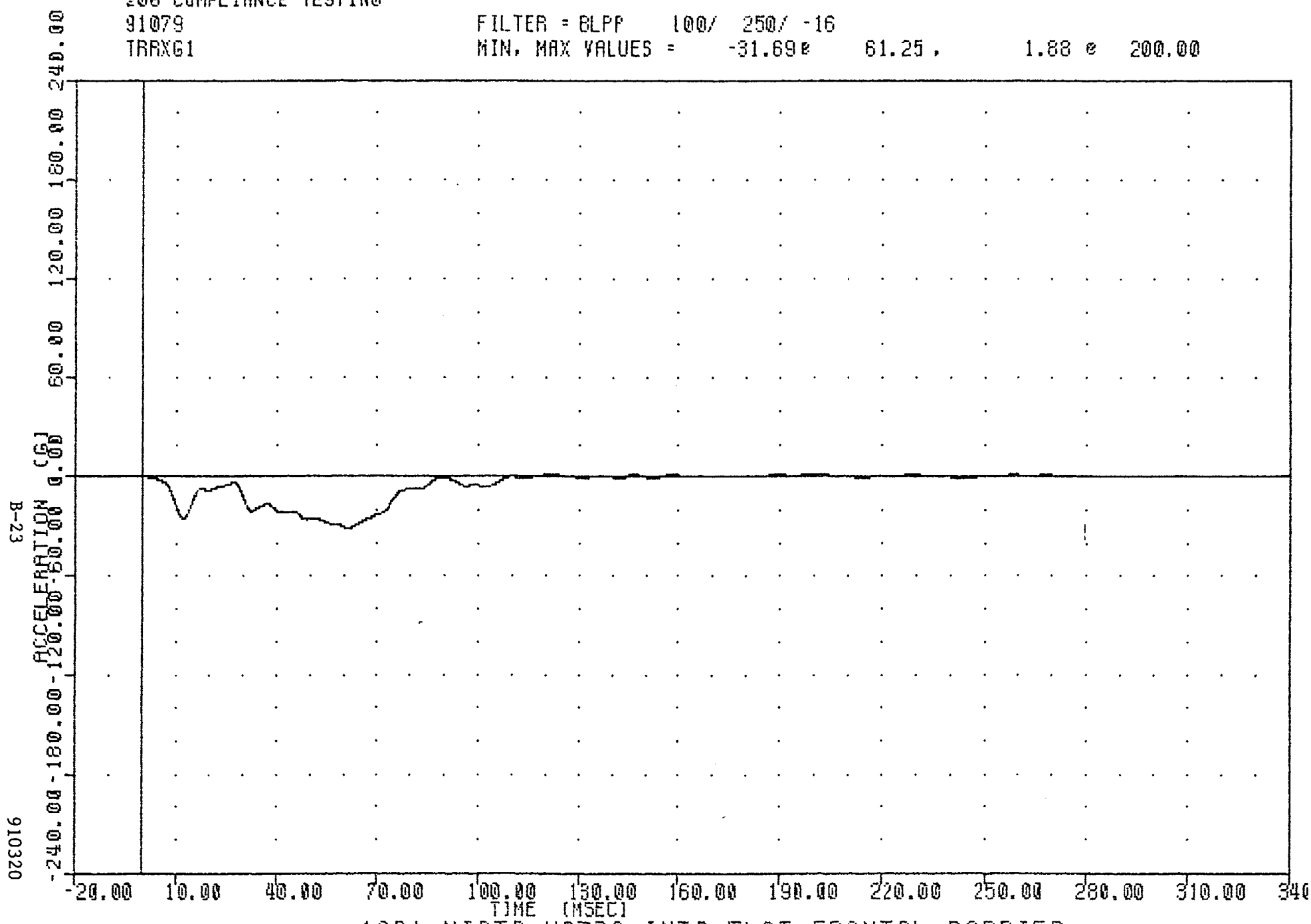


1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER

RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

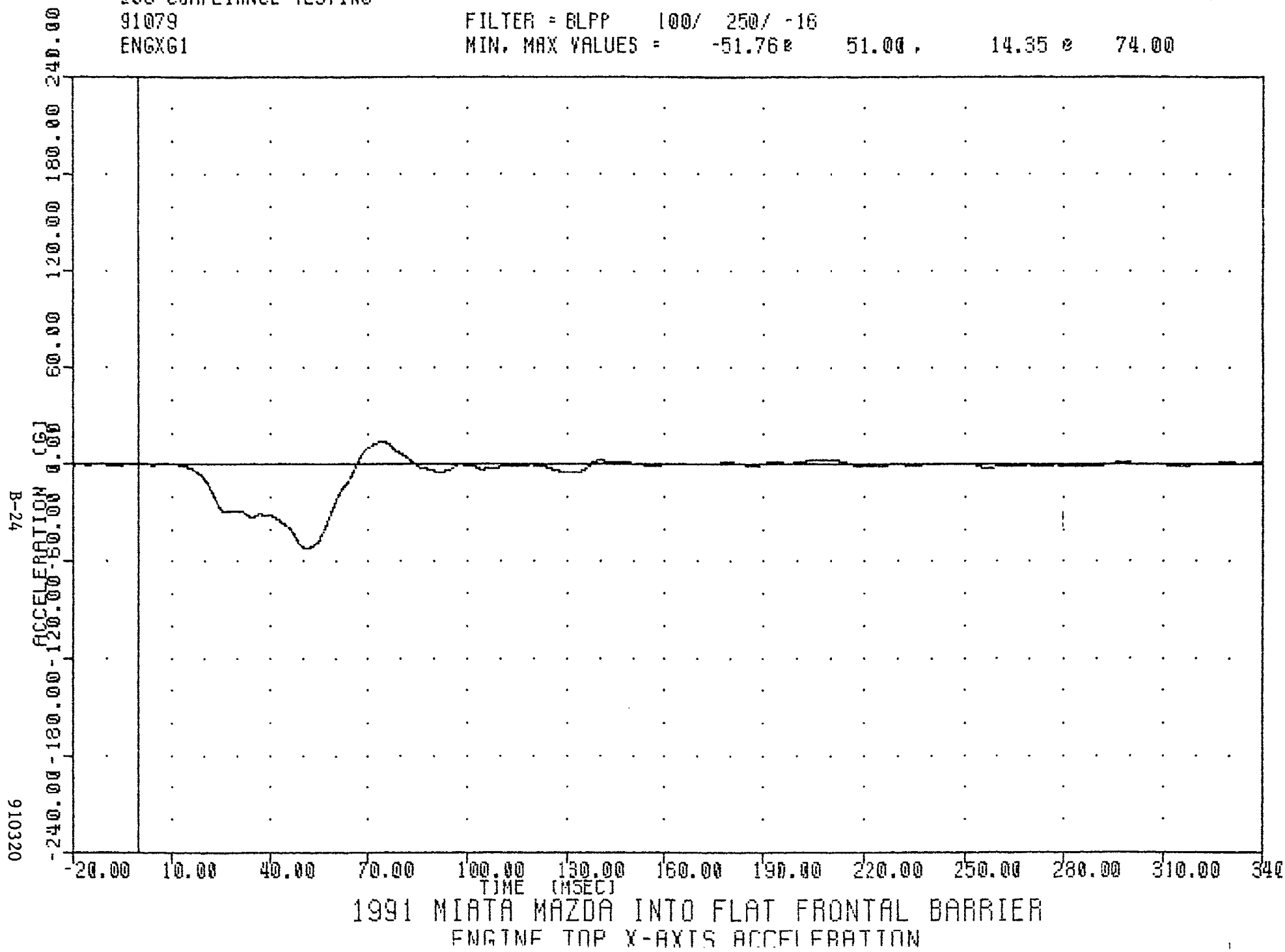

TRC , 910320
208 COMPLIANCE TESTING
91079
TLRXG1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -37.80 @ 62.63 , 1.65 @ 193.38
240.00
180.00
120.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION

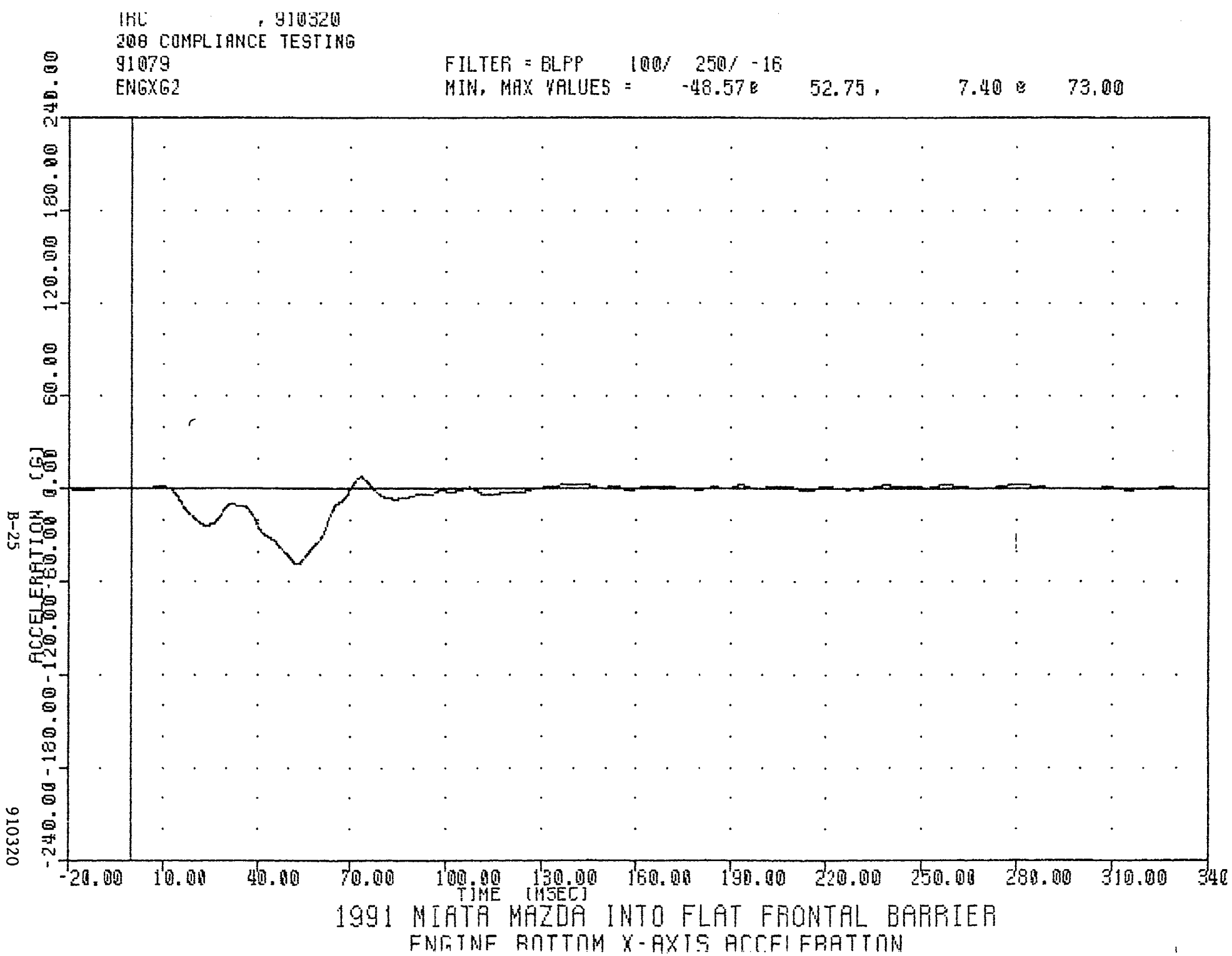
910320



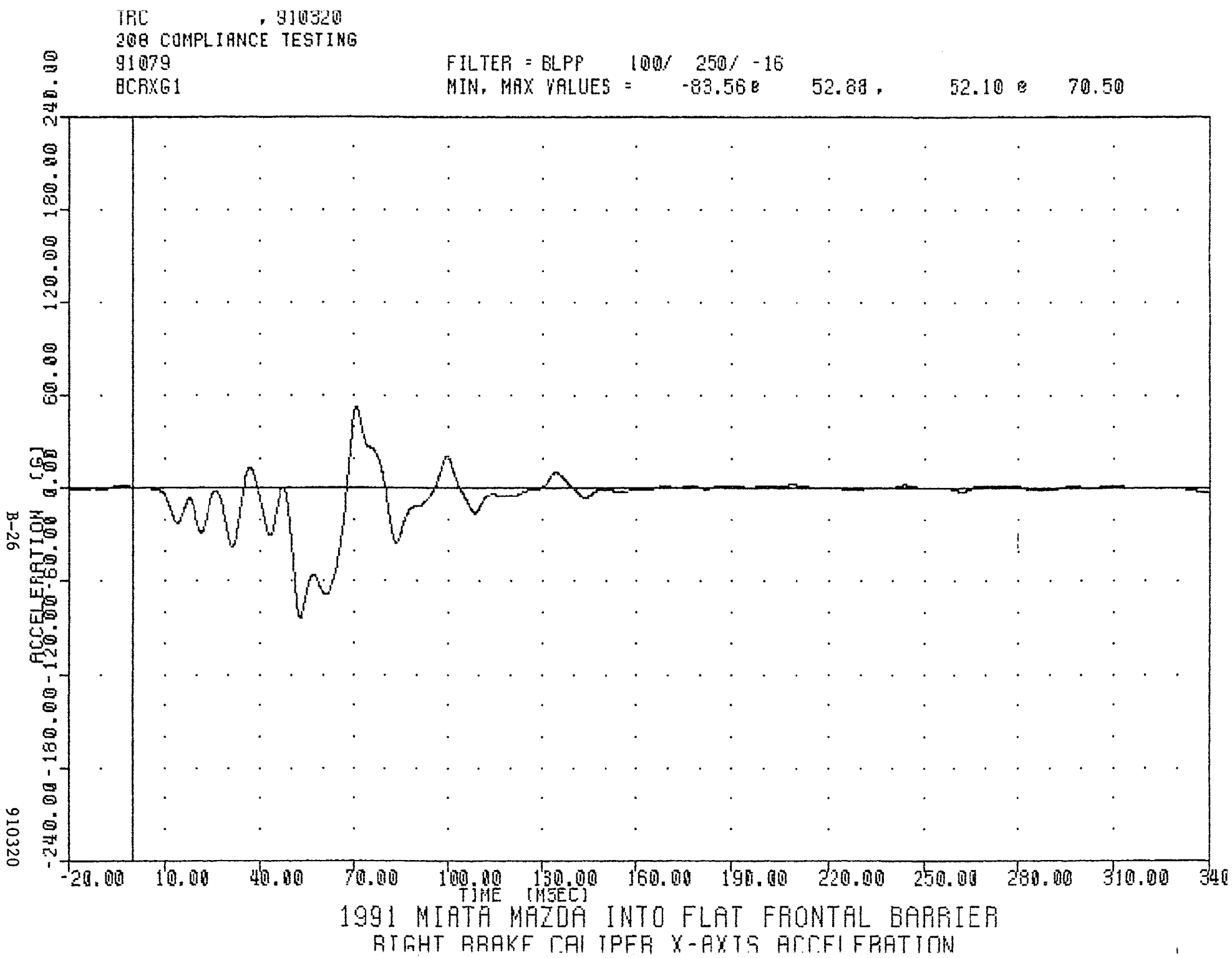
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION

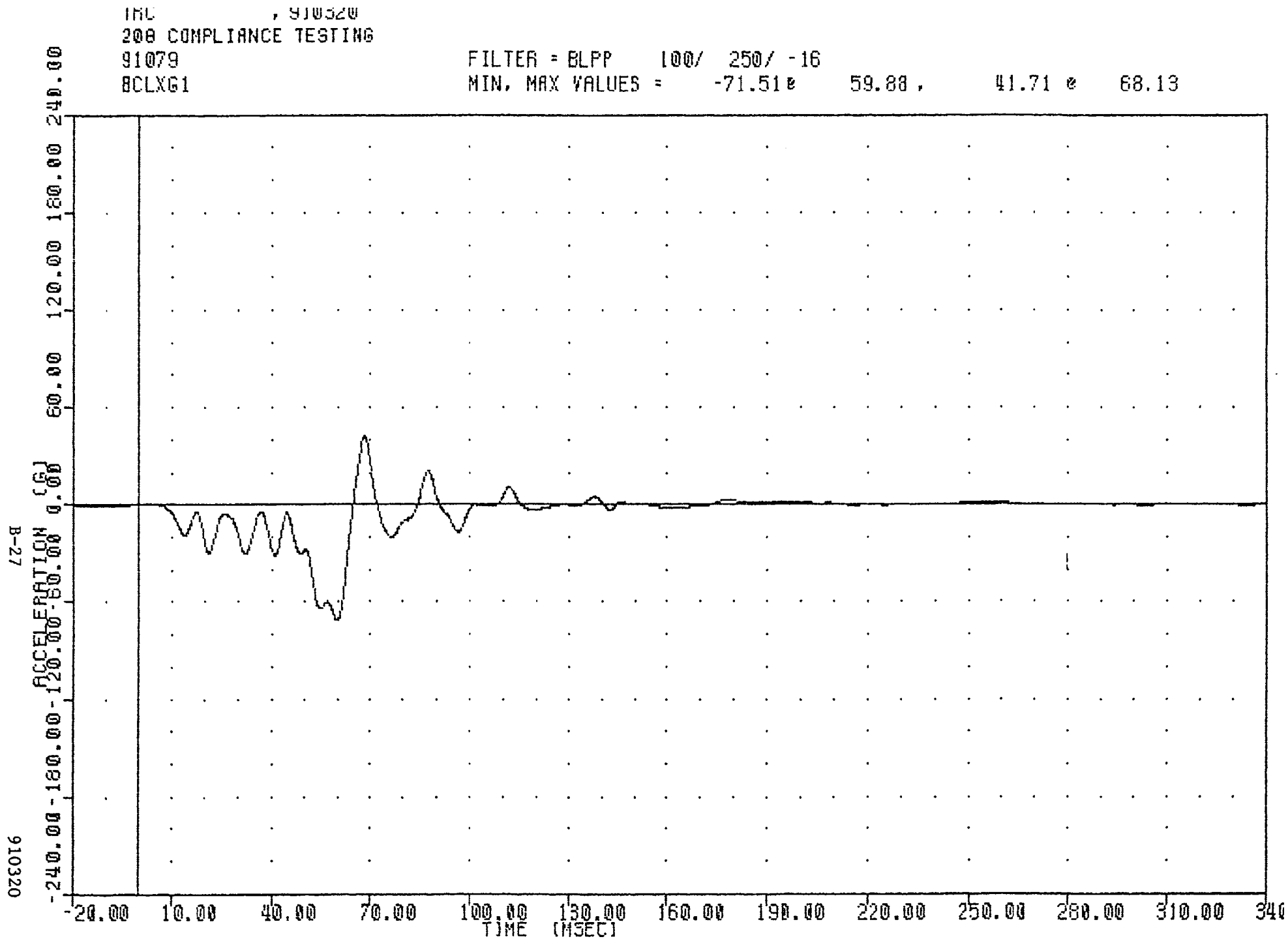
910320


TRC , 910320
208 COMPLIANCE TESTING
91079
ENGXG1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -51.76 @ 51.00 , 14.35 @ 74.00
240.00
180.00
120.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
ACCELERATION [G]
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
ENGINE TOP X-AXIS ACCELERATION
B-24
910320


IHC , 910320
208 COMPLIANCE TESTING
91079
ENGXG2
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -48.57 @ 52.75 , 7.40 @ 73.00
240.00
180.00
120.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
ACCELERATION (G)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

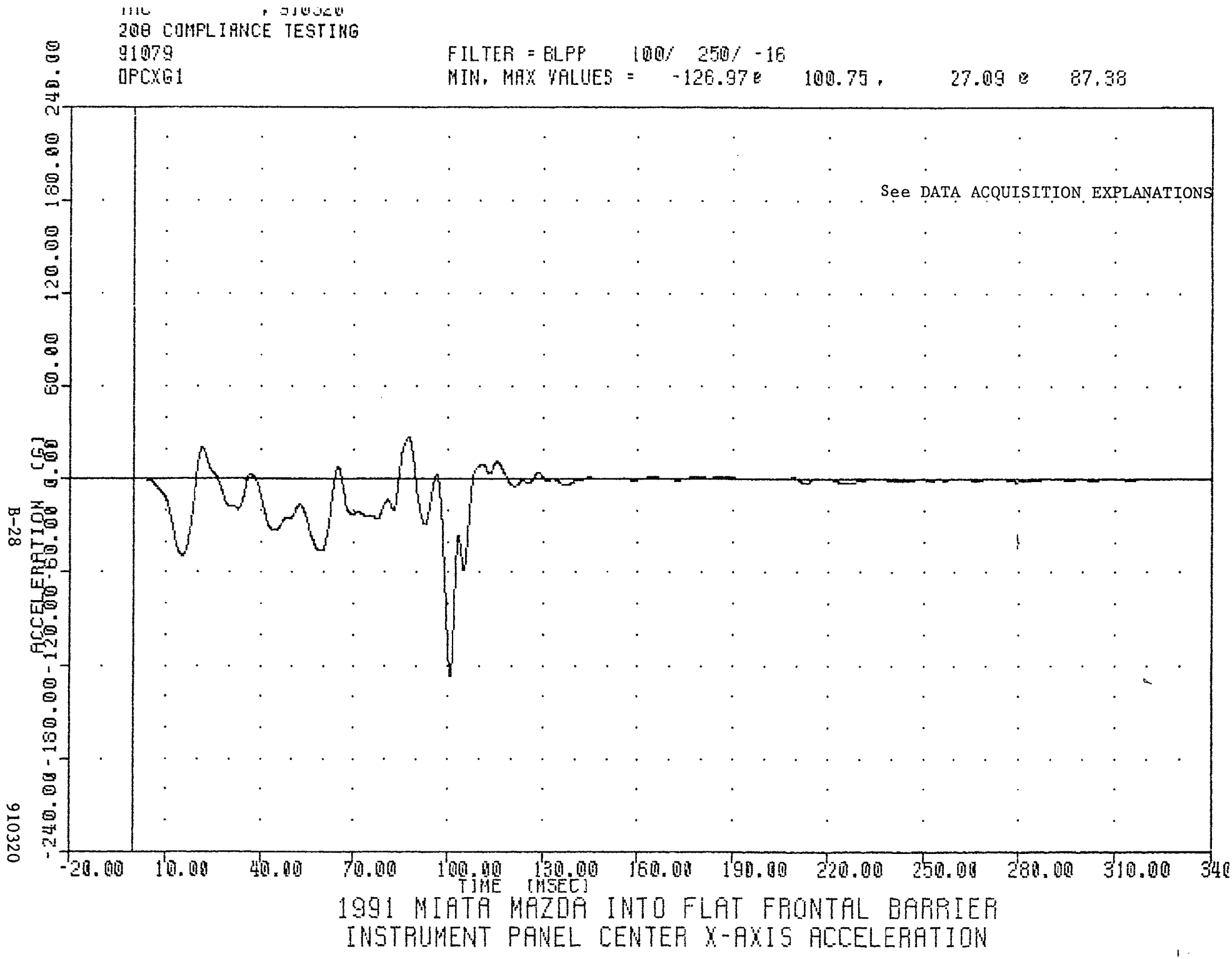
910320


TRC , 910320
208 COMPLIANCE TESTING
91079
BCRXG1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -83.56 @ 52.88 , 52.10 @ 70.50
240.00
180.00
120.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
ACCELERATION [G]
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
B-26
910320



1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

910320


208 COMPLIANCE TESTING
91079
OPCXG1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -126.97 @ 100.75 , 27.09 @ 87.38
See DATA ACQUISITION EXPLANATIONS
ACCELERATION [G]
240.00
180.00
120.00
60.00
0.00
-60.00
-120.00
-180.00
-240.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
TIME (MSEC)
1991 MIATA MAZDA INTO FLAT FRONTAL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

910320