REPORT NOS. 208-TRC-92-011

212-TRC-92-011

301-TRC-92-011

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

FORD MOTOR COMPANY

1992 FORD CLUB WAGON XLT

VAN

NHTSA NO. CN0210

TRC TEST NO. 920219

TRANSPORTATION RESEARCH CENTER INC.

10820 STATE ROUTE 347

EAST LIBERTY, OHIO 43319

MARCH 6, 1992

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

Rec'd 3/18/92

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.

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15. Supplementary Notes

16. Abstract

A 30 mph flat frontal barrier impact test was conducted on a 1992 Ford Club Wagon XLT van, NHTSA No. CN0210, at the Transportation Research Center Inc. on February 19, 1992. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standards: FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; FMVSS 301, "Fuel System Integrity." The barrier impact velocity was 29.3 mph. The vehicle's maximum static crush was 16.2 inches. The ambient temperature was 68° F.

The driver's head injury criteria (HIC) was 353. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 38.1 g. The driver's left and right femur maximum axial forces were 1277 pounds and 812 pounds, respectively. (See DATA ACQUISITION EXPLANATIONS.)

The passenger's head injury criteria (HIC) was 418. (See DATA ACQUISITION EXPLANATIONS.) The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 38.0 g. The passenger's left and right femur maximum axial forces were 698 pounds and 111 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

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METRIC CONVERSION FACTORS

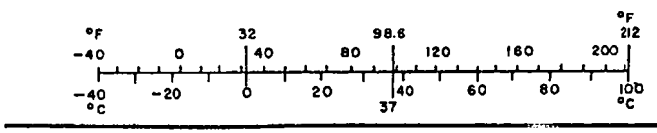
Approximate Conversions to Metric Measures

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	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	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	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

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	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
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	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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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 Inc. (TRC) under Contract No. DTNH22-90-C-21003. The purpose of this test was to determine if the subject vehicle, a 1992 Ford Club Wagon XLT van, NHTSA No. CN0210, 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 February 19, 1992.

The test vehicle, a 1992 Ford Club Wagon XLT van, NHTSA No. CN0210, appeared to comply with the performance requirements of FMVSS 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 axial 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 5.0 liter, inline engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 5936 pounds. The vehicle's impact speed was 29.3 mph. The vehicle's maximum static crush was 16.2 inches.

The driver's head injury criteria (HIC) was 353. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 38.1 g. The driver's left and right femur maximum axial forces were 1277 pounds and 812 pounds, respectively.

The right front passenger's HIC was 418. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 38.0 g. The right front passenger's left and right femur maximum axial forces were 698 pounds and 111 pounds, respectively.

There was no loss of windshield periphery retention.

There was no intrusion through the windshield.

No fluid spilled from the vehicle's fuel system following the crash test event or during the static rollover test.

DATA ACQUISITION EXPLANATIONS

The following data channels recorded a questionable data spike at 99 milliseconds : driver's head Z-axis accelerometer, HEDZG1; driver's left and right femur load cells, LFMF1 and RFMF1; and passenger's head Y-axis accelerometer, HEDYG2.

The above questionable data spikes affected the driver's head resultant acceleration calculation and the passenger's head resultant acceleration and HIC calculations.

The engine bottom X-axis accelerometer, ENGXG2, lost data at 35 milliseconds due to the accelerometer being damaged by the vehicle's crush on impact.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: CN0210 TEST TYPE: Frontal Barrier Impact

TEST DATE: 02/19/92 TEST TIME: 1422 AMBIENT TEMP. (°F): 68

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1992/Ford/Club Wagon XLT/van

VEHICLE TEST WEIGHT (LBS): 5936

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (MPH)**: PRIMARY = 29.3 SECONDARY = 29.3

MAXIMUM STATIC CRUSH (IN): 16.2

AVERAGE REBOUND (IN): 16.9

DUMMIES:	Driver #354	Passenger #1173
TYPE:	Part 572 B	Part 572 B
LOCATION:	Left front	Right front
RESTRAINT:	Three-point unibelt and airbag	Three-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: Ford Motor Company

MAKE/MODEL: Ford/Club Wagon XLT VIN: 1FMEE11NONHA21135

BODY STYLE: Van MODEL YEAR: 1992

NHTSA NO.: CN0210 COLOR: Blue

ENGINE DATA: TYPE: inline CYLINDERS: 8 DISPLACEMENT: 5.0 liter

TRANSMISSION DATA: _4_SPEED, ___MANUAL, _X_AUTOMATIC, ___FWD, _X_RWD, ___4WD

DATE VEHICLE RECEIVED: 02/05/92 ODOMETER READING: 68.0

DEALER'S NAME AND ADDRESS: Graham Ford, Inc.
707 West Broad Street
Columbus, OH 43216

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	Yes
POWER SEATS	Yes	TILTING STEERING WHEEL	Yes
POWER WINDOWS	Yes	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	Rear only
CLOCK	Yes	REAR WINDOW DEFROSTER	No
OTHER	None		

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 MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 10/91 VIN: 1FMEE11NONHA21135

GVWR: 6700 LBS

GAWR: FRONT: 3400 LBS., REAR: 3800 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear Wrangler HT P235/75R15 M+S

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 41 PSI
REAR: 41 PSI

SPARE TIRE (MFR., LINE, SIZE): Goodyear Wrangler HT P235/75R15 M+S

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 79.5 INCHES

WHEELBASE: 137.8 INCHES

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

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P235/75R15 SL

RECOMMENDED COLD TIRE PRESSURE: FRONT: 41 PSI; REAR: 41 PSI

DESIGNATED SEATING CAPACITY: NA FRONT NA REAR NA TOTAL

VEHICLE CAPACITY WEIGHT: NA LBS

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE:	LF	32.9;	RF	33.1;	LR	32.9;	RR	33.2
FULLY LOADED ATTITUDE:	LF	32.1;	RF	32.1;	LR	32.1;	RR	32.1
PRE-TEST ATTITUDE:	LF	33.0;	RF	33.2;	LR	32.4;	RR	32.5
POST-TEST ATTITUDE:	LF	35.8;	RF	32.2;	LR	34.0;	RR	30.1

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	1257 LBS.	RIGHT REAR	1463 LBS.
LEFT FRONT	1216 LBS.	LEFT REAR	1390 LBS.
TOTAL FRONT WEIGHT	2473 LBS.	(46.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	2853 LBS.	(53.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	5326 LBS.		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

CLW = RATED CARGO AND LUGGAGE WEIGHT*

GVWR = GROSS VEHICLE WEIGHT RATING (6700 LBS)

UDW = UNLOADED DELIVERED WEIGHT (5326 LBS)

VCW = VEHICLE CAPACITY WEIGHT = GVWR - UDW = 6700 - 5326 = 1374

DSC = DESIGNATED SEATING CAPACITY (7) **

CLW* = VCW - 150 (DSC) = 1374 - 150 (7) = 324 LBS.

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

TARGET TEST WEIGHT = 5326 + 300* + 328

TARGET TEST WEIGHT = 5954 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 282 LBS. OF CARGO WEIGHT:

RIGHT FRONT	1474 LBS.	RIGHT REAR	1417 LBS.
LEFT FRONT	1582 LBS.	LEFT REAR	1463 LBS.
TOTAL FRONT WEIGHT	3056 LBS.	(51.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	2880 LBS.	(48.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	5936 LBS.	(0.3% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 125 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 66.9 INCHES REARWARD OF FRONT WHEEL CENTERLINE

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

**The designated seating capacity is determined by counting the number of seat belts installed in the vehicle.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 920219 NHTSA NO.: CN0210

TEST DATE: 02/19/92 TEST TIME: 1422

TEST TYPE: Frontal Barrier Impact IMPACT ANGLE: 0

AMBIENT TEMPERATURE AT IMPACT AREA: 68° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 70° F

IMPACT VELOCITY: PRIMARY = 29.3 MPH SECONDARY = 29.3 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):

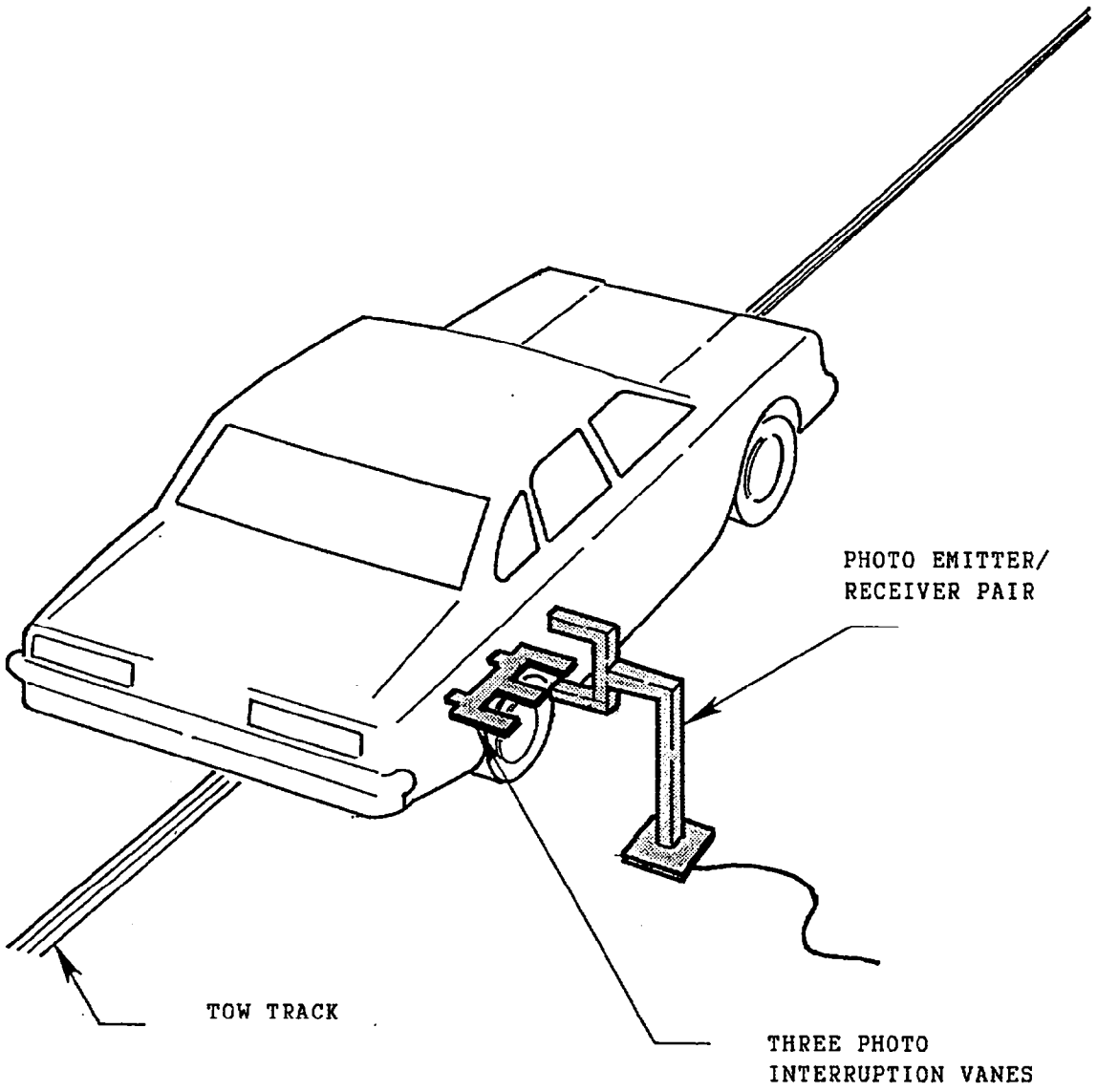
OVERALL LENGTH OF TEST VEHICLE:	PRE-TEST:	L	208.5;	C	213.1;	R 208.4
	POST-TEST:	L	195.8;	C	196.9;	R 195.8
	TOTAL CRUSH:	L	12.7;	C	16.2;	R 12.6

AVERAGE CRUSH: 13.8

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 16.5; C 16.3; R 18.0; AVG. 16.9

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: Ford/Club Wagon XLT/van

VEHICLE NHTSA NO.: CN0210 ; VIN: 1FMEE11N0NHA21135

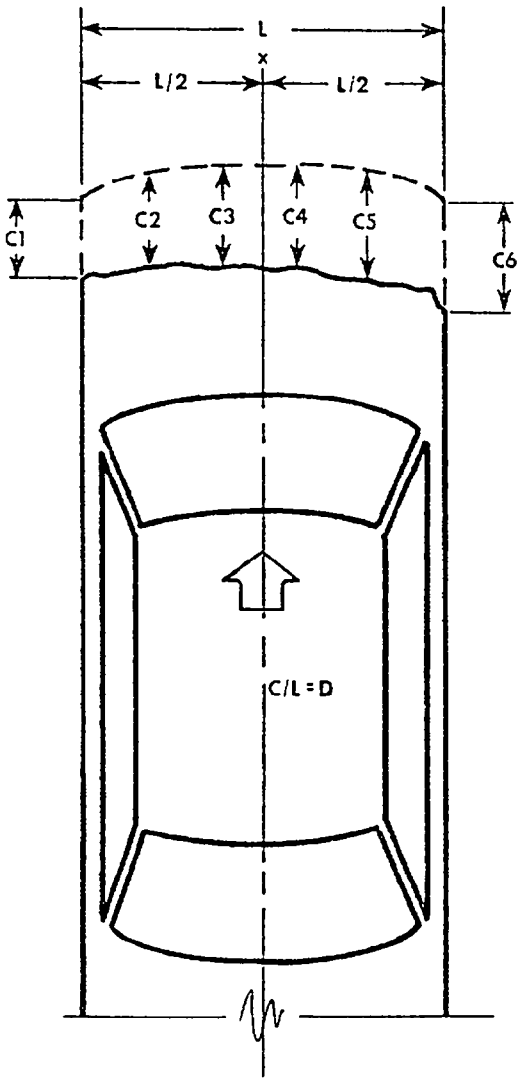
MODEL YEAR: 1992 ; BUILD DATE: 10/91 ; TEST DATE: 02/19/92

VEHICLE SIZE CATEGORY: Van ; TEST WEIGHT: 5936 LBS.

VEHICLE WHEELBASE: 137.8 INCHES

MAXIMUM WIDTH: 79.5 INCHES

FRONT OVERHANG: 31.1 INCHES



COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH MEASUREMENTS:

C1 = 12.7 INCHES

C2 = 14.3 INCHES

C3 = 14.9 INCHES

C4 = 14.9 INCHES

C5 = 14.3 INCHES

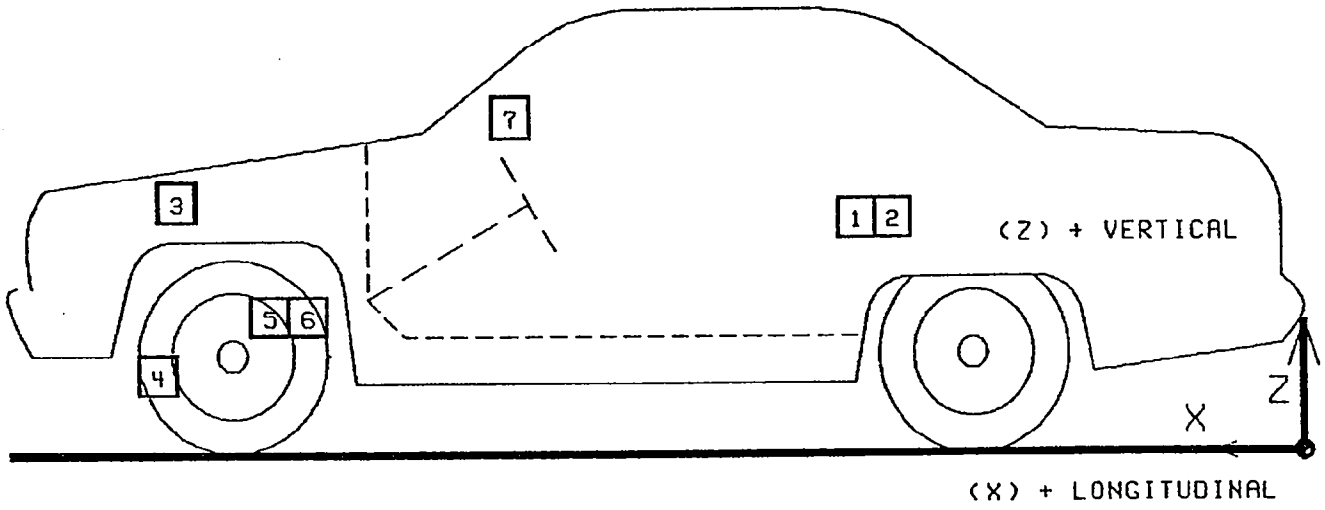
C6 = 12.6 INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE (LONGITUDINAL)

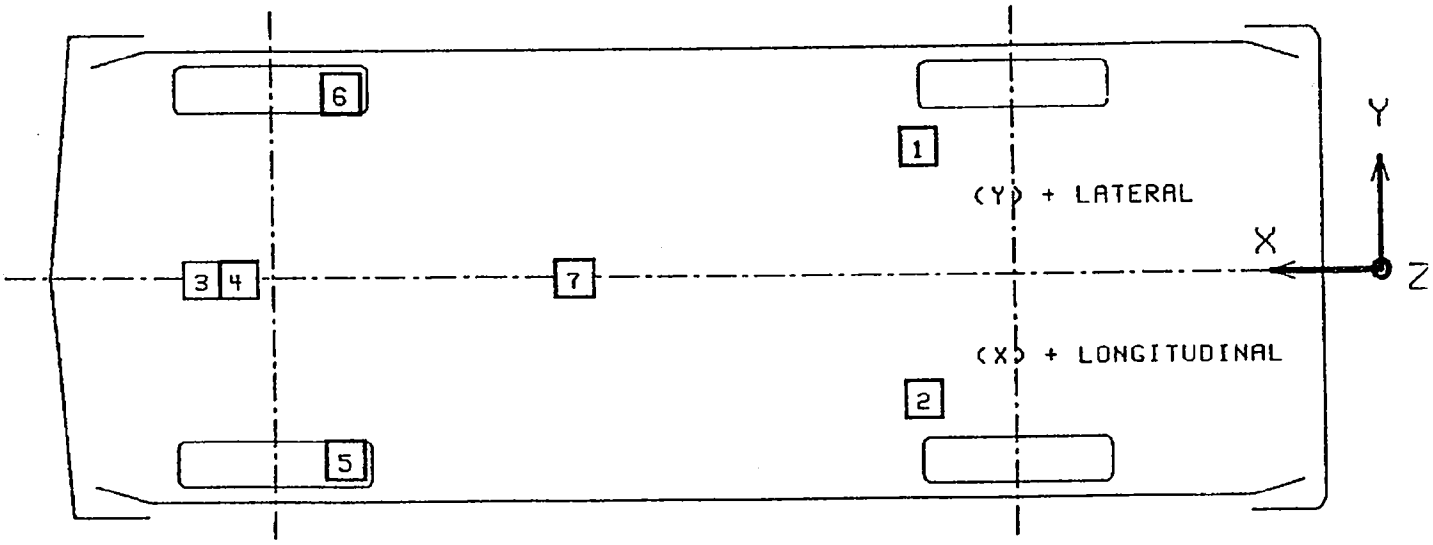
LENGTH OF DAMAGED REGION: L = 66.0 INCHES

FIGURE 3

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920219

No.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION MAX G	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION MAX G	NEGATIVE DIRECTION MSEC
1	LEFT REAR SEAT CROSSMEMBER	PRE	76.9	26.8	25.2				
		POST	76.9	26.8	25.8				
	LONGITUDINAL					2.8	126.1	33.5	17.4
2	RIGHT REAR SEAT CROSSMEMBER	PRE	75.9	-24.4	25.2				
		POST	75.9	-24.4	24.2				
	LONGITUDINAL					2.8	123.4	35.2	17.0
3	ENGINE TOP	PRE	163.4	8.8	32.5				
		POST	157.2	9.0	33.1				
	LONGITUDINAL					8.9	68.5	50.8	43.1
4	ENGINE BOTTOM	PRE	169.5	-6.1	12.8				
		POST	168.9	-4.4	14.0				
	LONGITUDINAL					---	---Y	---	---Y
5	RIGHT BRAKE CALIPER	PRE	176.4	-29.1	15.0				
		POST	172.0	-31.0	14.4				
	LONGITUDINAL					26.1	41.1	76.1	15.8
6	LEFT BRAKE CALIPER	PRE	176.4	29.1	15.0				
		POST	173.2	31.6	14.8				
	LONGITUDINAL					18.9	36.3	76.2	17.1
7	INSTRUMENT PANEL CENTER	PRE	169.4	-3.5	53.4				
		POST	169.8	-3.5	54.9				
	LONGITUDINAL					17.4	100.3	43.4	34.5

* 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 EXPLANATIONS

REPORT OF VEHICLE CONDITION AT THE
COMPLETION OF TESTING

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

TO: Mr. Charles Case
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.: CN0210
MAKE/MODEL/BODY STYLE: Ford/Club Wagon XLT/Van
MODEL YEAR: 1992 BODY COLOR: Blue
VIN: 1FMEE11NONHA21135
ODOMETER (ARRIVAL): 68 DATE: 02/05/92
ODOMETER (COMPLETION): 74 DATE: 02/19/92
COST: $19,655.00

X AIR CONDITIONER	___ CONSOLE	BRAKES: X POWER
X TINTED GLASS	___ TACHOMETER	FRONT: Disc
X POWER STEERING	X SPEED CONTROL	REAR: Drum ABS
X POWER WINDOWS	___ REAR WINDOW DEF.	FRONT SEATS: X POWER
___ POWER DOOR LOCKS	___ SUN/MOON ROOF	SEAT TYPE: Dvr-power
X RADIO	___ T-TOP	Psgr-manual
X CLOCK	X TILT STEERING WHEEL	NO. OF SEATS: 7
___ ROOF RACK	___ OTHER OPTIONS: _____	

ENGINE: 8 CYLINDERS; 5.0 LITERS
TRANSMISSION: Automatic; DRIVE TYPE: RWD
TIRE SIZE: P235/75R15
GASOLINE TYPE: Unleaded

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

EXPLANATION: NA

VEHICLE CONDITION: This vehicle has been subjected to a 30 mph frontal barrier impact.

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	-49.2	17.3	-30.7 γ	54.4 γ	-38.6	7.8	-7.4	38.1
PASSENGER	-35.4	12.8 γ	-48.9	49.8 γ	-40.2	23.0	-12.2	38.0

MAXIMUM FEMUR COMPRESSIVE FORCE (LBS)

	LEFT FEMUR	RIGHT FEMUR
DRIVER	1277 γ	812 γ
PASSENGER	698	111

HEAD INJURY CRITERIA**

	HIC	TIME t_1 (MSEC)	TIME t_2 (MSEC)
DRIVER	353	59.8	92.4
PASSENGER	418 γ	71.1	107.1

*Defined as exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

γ See DATA ACQUISITION EXPLANATIONS

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #354	PASSENGER #1173
HEAD	Airbag	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	Easy

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	NA	NA

GLAZING DAMAGE:

The entire windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

Driver Dummy

Upon impact, the driver dummy's head and chest contacted the airbag. The driver dummy then translated forward on the seat impacting both knees into the instrument panel followed by the dummy's head rotating slightly downward into the airbag. The driver dummy was restrained by the three-point unibelt and airbag. The dummy's upper torso then rebounded rearward 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, restrained by the three-point unibelt.

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 right front passenger dummy was restrained by the three-point unibelt. The dummy's upper torso then rebounded rearward into the seat back as the dummy's head rotated rearward into the head restraint. The right front passenger dummy came to rest seated 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: Ford/Club Wagon XLT VIN: 1FMEE11NONHA21135

BODY STYLE: Van NHTSA NO.: CN0210

DATE OF MANUFACTURE: 10/91

WEBBING TENSION - RELIEVING DEVICE:

DO OUTBOARD SEATING POSITION SEAT BELTS HAVE WEBBING TENSION - RELIEVING DEVICES?(check one): NO

BELT CONTACT FORCE:

BELT CONTACT FORCE ON CHEST OF TEST DUMMY: .4 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

ACCESSIBILITY:

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

IS THE SEAT REMOVABLE? NO

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

MAKE/MODEL: Ford/Club Wagon XLT VIN: 1FMEE11N0NHA21135

BODY STYLE: Van NHTSA NO.: CN0210

DATE OF MANUFACTURE: 10/91

ACCESSIBILITY, CONT'D:

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?
Not Applicable, the webbing is not designed to pass through the seat cushion or between the cushion and seat back.

ARE THE REMAINING TWO PARTS ACCESSIBLE UNDER NORMAL CONDITIONS?
Not Applicable, the webbing is 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?
Not Applicable, the restraint system does not provide guides.

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?
Not Applicable, the vehicle does not contain a center arm rest.

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

__X__ Symbol 101-80

_____ Other: _____

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 driver's side sun visor.

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

_____ Replace

_____ Repair

__X__ Other: __Have system serviced by dealer__

This system: (check one)

___a. by _____ month, _____ year

___b. by _____ miles

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

___d. other: When airbag lamp flashes or stays lit or airbag lamp does not light when key is turned on or groups of five beeps are heard.

WERE APPROPRIATE INSTRUCTIONS CONCERNING MAINTENANCE AND/OR REPLACEMENT OF THIS SYSTEM PROVIDED? YES, owner's manual, page 27

WAS A DESCRIPTION OF THE FUNCTIONAL OPERATION OF THE SYSTEM PROVIDED? YES, owner's manual, page 26

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 26 and 27

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 was located in the lower right corner of the instrument cluster.

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, owner's manual, page 26

FIGURE 4 FMVSS 212 TEST DATA

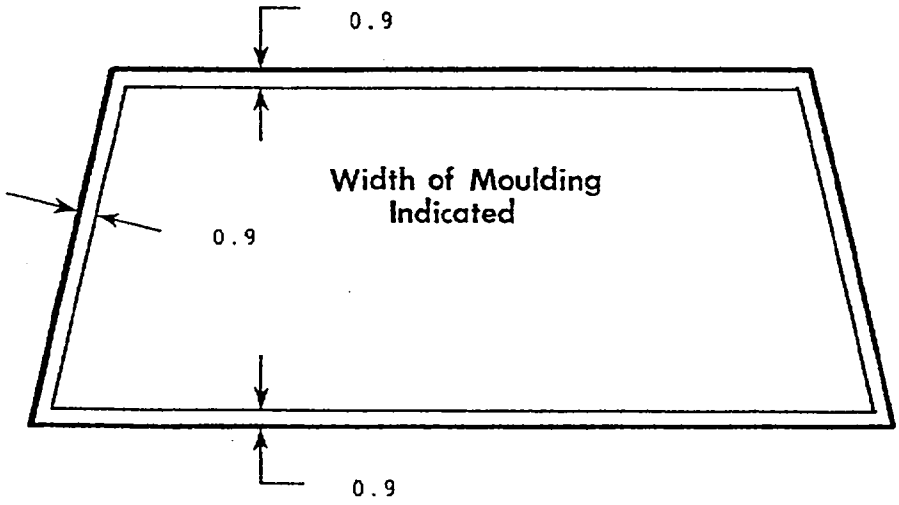
DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:
Plastic trim around outer perimeter, adhesive around inner perimeter.

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	96.8	96.8	100
LEFT SIDE	96.8	96.8	100
TOTAL	193.6	193.6	100

PRE-TEST WINDSHIELD MOUNTING MATERIAL TEMPERATURE: 70° 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 = 62.0

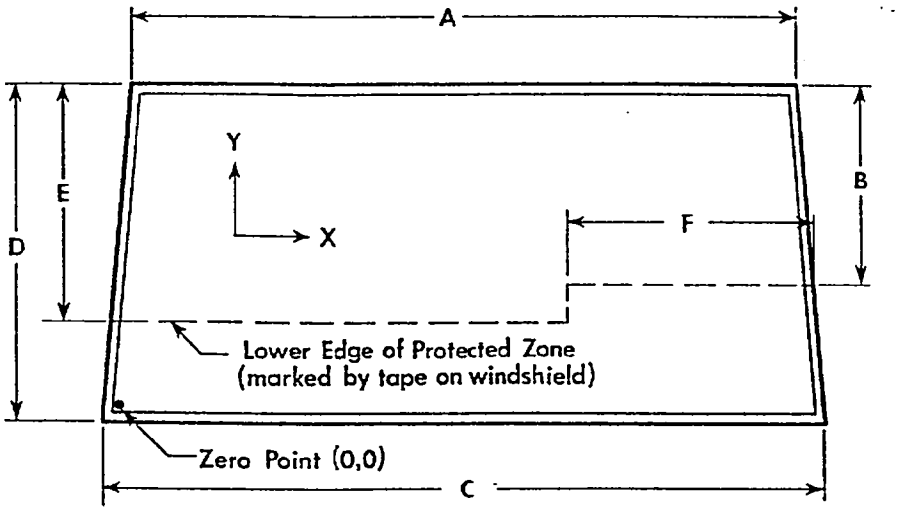
B = 21.0

C = 74.5

D = 32.0

E = 22.4

F = 38.1



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: Ford/Club Wagon XLT

NHTSA NO.: CN0210

FUEL SYSTEM CAPACITY: 35.0 GALLONS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 35.0 GALLONS (FURNISHED BY COTR)

TEST VOLUME RANGE: 32.2 GALLONS TO 32.9 GALLONS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 32.6 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 the rear axle on the left side. 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.: CN0210 ; TEST DATE: 02/19/92

VEHICLE MAKE/MODEL/BODY STYLE: Ford/Club Wagon XLT/van

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:

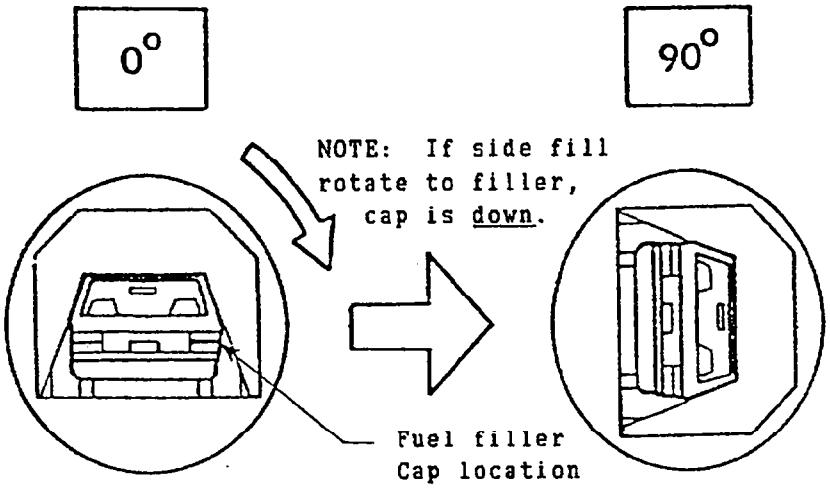
		TEST RESULTS	MAXIMUM ALLOWABLE
1.	FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 OZ.	1 OZ.
2.	5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 OZ.	5 OZ.
3.	NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - - -	0 OZ.	1 OZ./1 MIN.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: CN0210
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:

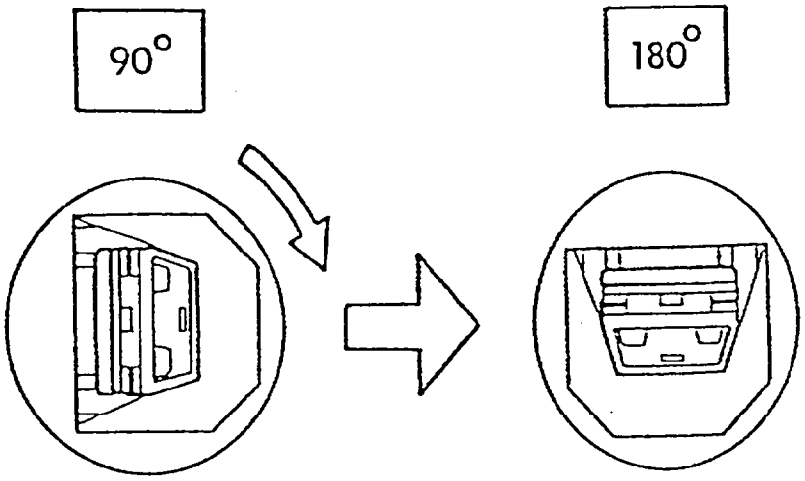
0° TO 90° ROTATION (FUEL FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

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

NHTSA NO.: CN0210
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:

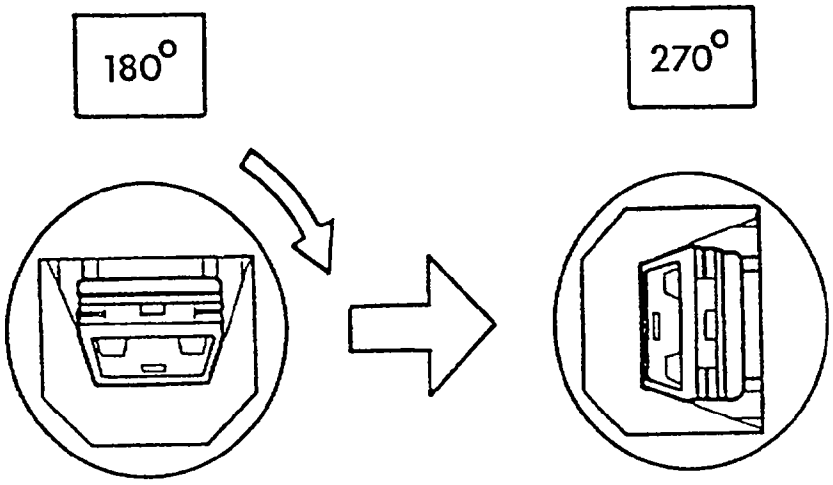
90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

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

NHTSA NO.: CN0210
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:

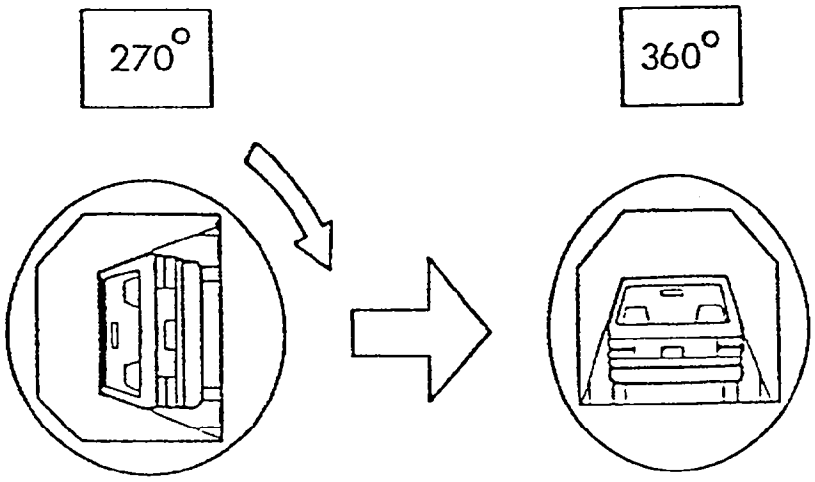
180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

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

NHTSA NO.: CN0210
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

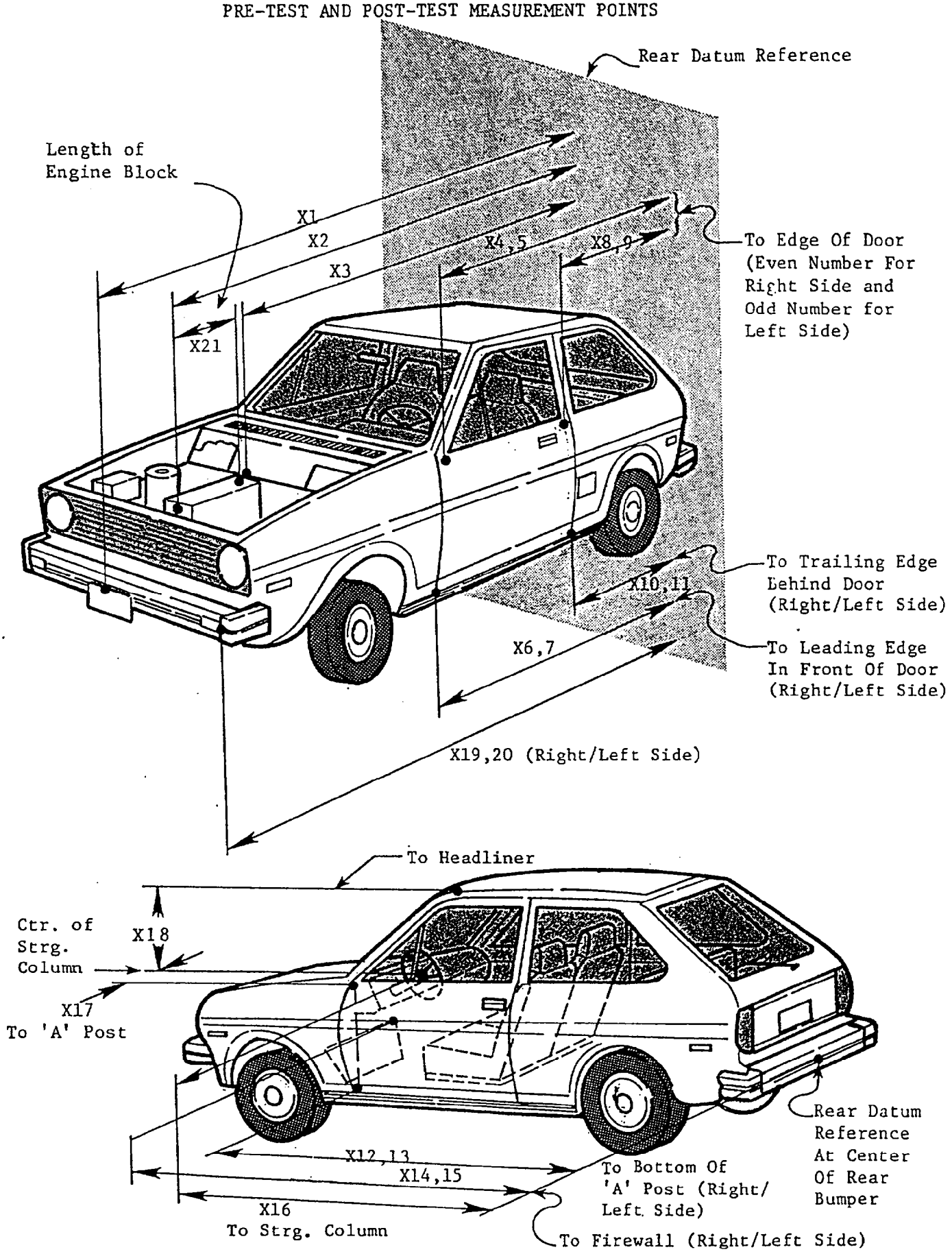


TABLE 13 IMPACTED VEHICLE MEASUREMENTS

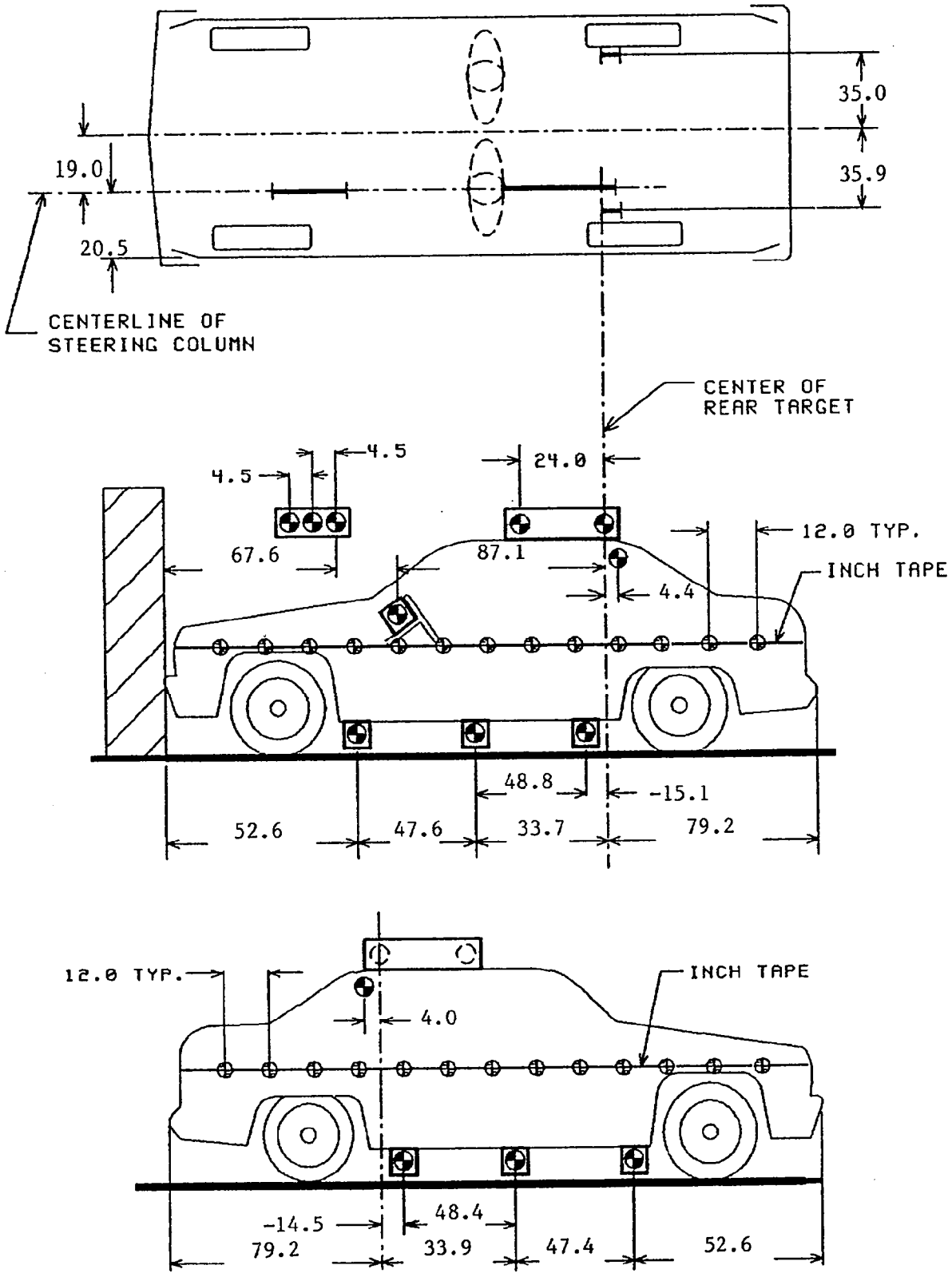
VEHICLE MAKE/MODEL: Ford/Club Wagon XLT TEST NUMBER: 920219

ALL MEASUREMENTS ARE IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	213.1	196.9	16.2
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	185.2	184.8	0.4
X3	REAR SURFACE OF VEHICLE TO FIREWALL	185.5	185.8	-0.3
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	165.6	168.1	-2.5
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	165.6	168.8	-3.2
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	160.2	161.4	-1.2
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	160.4	162.0	-1.6
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	125.0	127.5	-2.5
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	124.6	127.8	-3.2
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	126.2	127.5	-1.3
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	126.3	128.1	-1.8
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	162.8	163.2	-0.4
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	162.8	163.8	-1.0
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	184.6	185.2	-0.6
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	183.2	184.8	-1.6
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	147.6	150.2	-2.6
X17	CENTER OF STEERING COLUMN TO "A" POST	13.0	14.9	-1.9
X18	CENTER OF STEERING COLUMN TO HEADLINER	21.8	20.8	1.0
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	208.4	195.8	12.6
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	208.5	195.8	12.7
X21	LENGTH OF ENGINE BLOCK	19.5	19.5	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: Ford/Club Wagon XLT

BODY STYLE: Van MODEL YEAR: 1992

NHTSA NO.: CN0210 COLOR: Blue

DATA FROM CERTIFICATION LABEL:

VEHICLE MANUFACTURER: Ford Motor Company

DATE OF MANUFACTURE: 10/91 VIN: 1FMEE11N0NHA21135

GVWR: 6700 LBS.; GAWR: FRONT = 3400 LBS.; REAR = 3800 LBS.

POST-IMPACT DATA:

DATE OF TEST: 02/19/92 TIME: 1422 TEMPERATURE: 68° F

IMPACT VELOCITY: PRIMARY = 29.3 MPH SECONDARY = 29.3 MPH

REQUIRED IMPACT VELOCITY RANGE: 28.9 TO 29.9 MPH

SEAT TYPE: Bucket ADJUSTER TYPE: Driver-electronic, Passenger-manual FRONT SEAT BACK TYPE: Driver-electronically adjustable, Passenger-manually adjustable

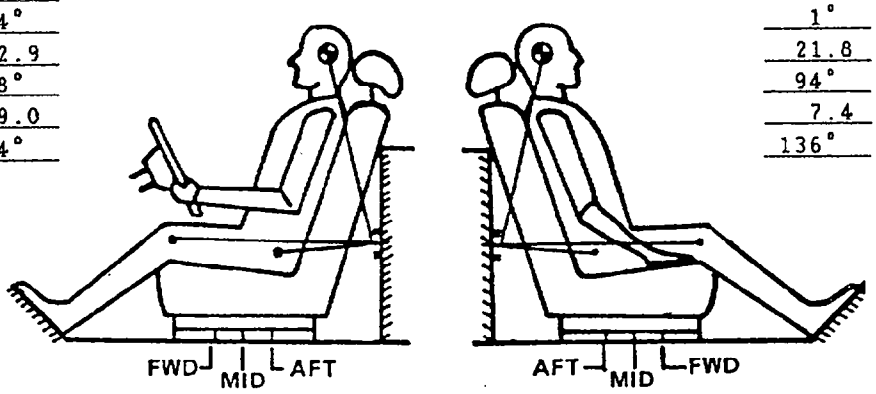
TECHNICIANS: R. Branham, B. Crabtree, D. Jones

DRIVER DUMMY # 354 TYPE: HII

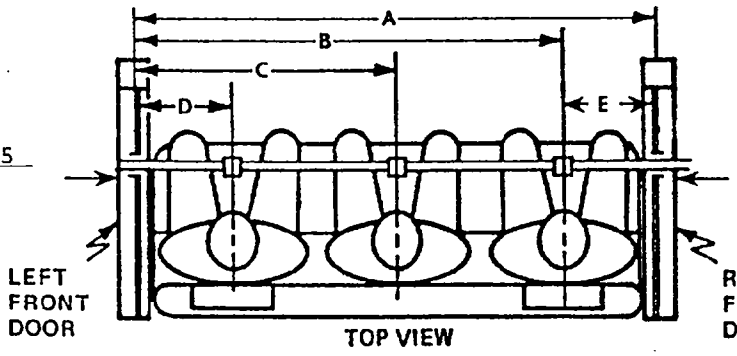
HEAD	20.2
TARGET	4°
KNEE	22.9
JOINT	98°
APPROX-IMATE "H" POINT	9.0 / 124°

PASSENGER DUMMY # 1173 TYPE: HII

20.8	HEAD
1°	TARGET
21.8	KNEE
94°	JOINT
7.4 / 136°	APPROX-IMATE "H" POINT



A = 70.0
B = 54.5
C = NA
D = 16.4
E = 15.5
DOOR GLASS HEIGHT = 13.5



DOOR GLASS HEIGHT = 13.5

DRIVER DUMMY PASSENGER DUMMY

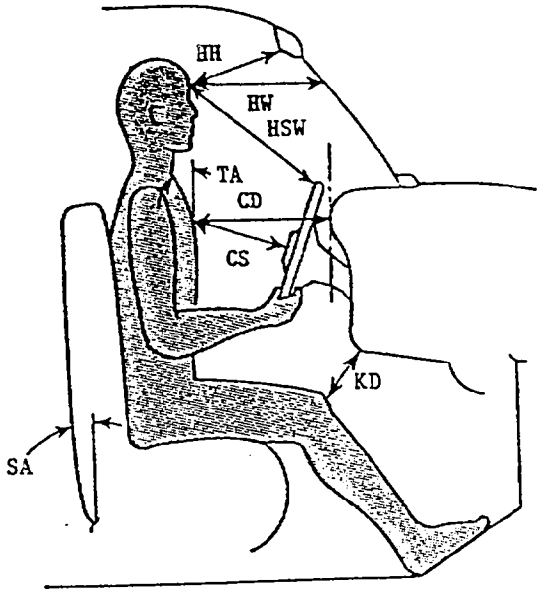
ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.
ALL DISTANCE MEASUREMENTS ARE IN INCHES.

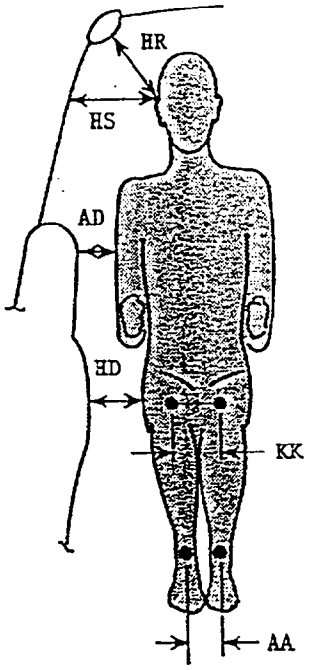
FIGURE 10 DUMMY IN VEHICLE POSITIONING DATA

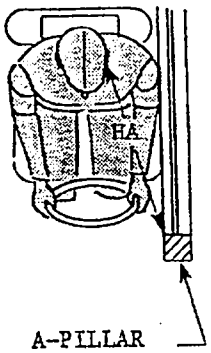
	DRIVER	PASSENGER
HH	19.7	21.1
HW	26.4	27.1
CD	22.0	26.4
CS	12.5	NA
KDL	4.1	9.6
KDR	3.6	9.7
TA	15°	21°
SA	17.5°	17.5°
HSW	18.6	NA

	DRIVER	PASSENGER
HR	11.9	10.0
HS	13.7	12.6
AD	6.1	3.7
HD	8.5	8.1
KK	10.5	8.0
AA	7.5	4.2
HA	27.5	27.3

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





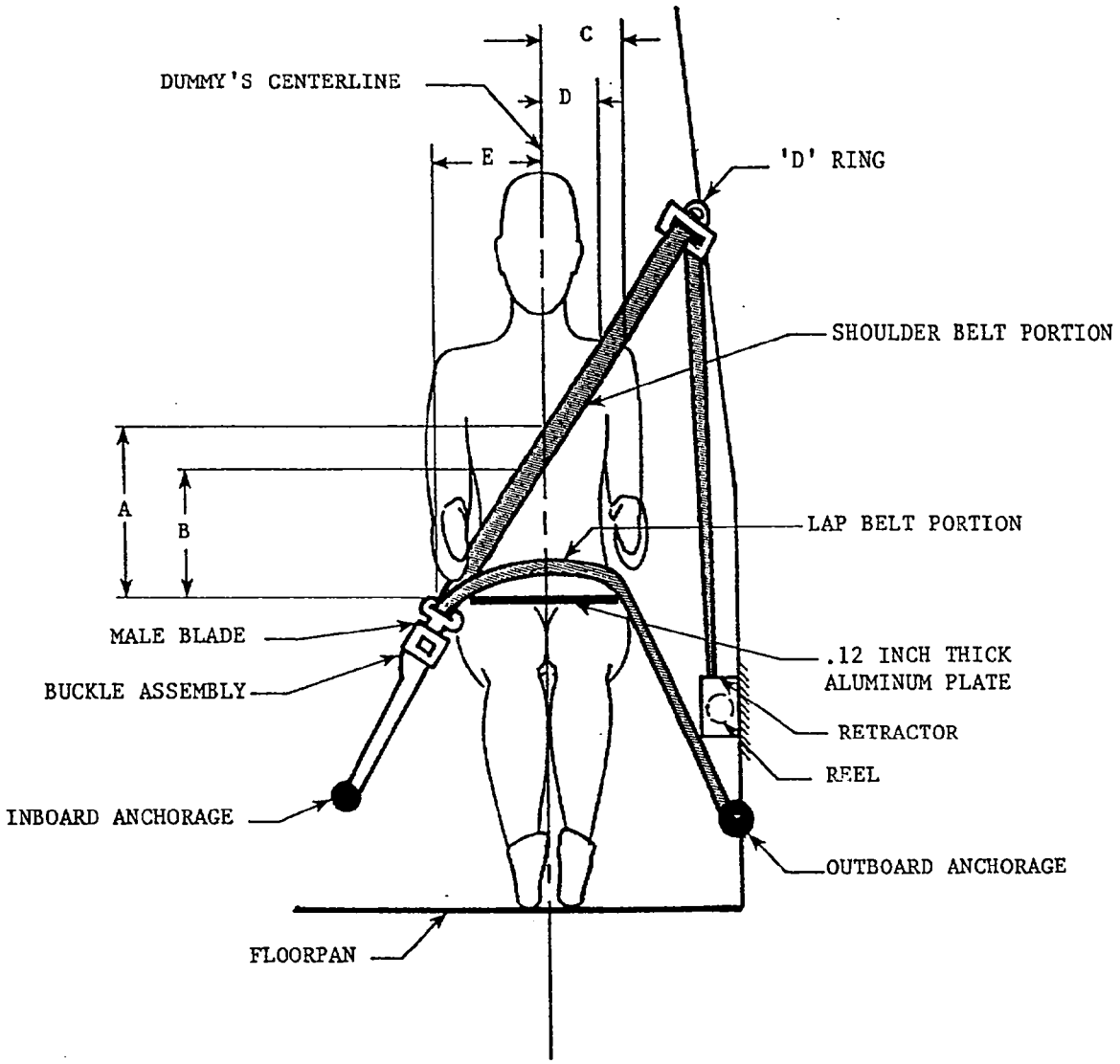


HH = HEAD TO WINDSHIELD HEADER
HW = HEAD TO WINDSHIELD
CD = CHEST TO DASH
CS = CHEST TO STEERING WHEEL
KD = KNEE TO DASH
TA = TORSO ANGLE
SA = SEAT BACK ANGLE
HSW= HEAD TO STEERING WHEEL

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.

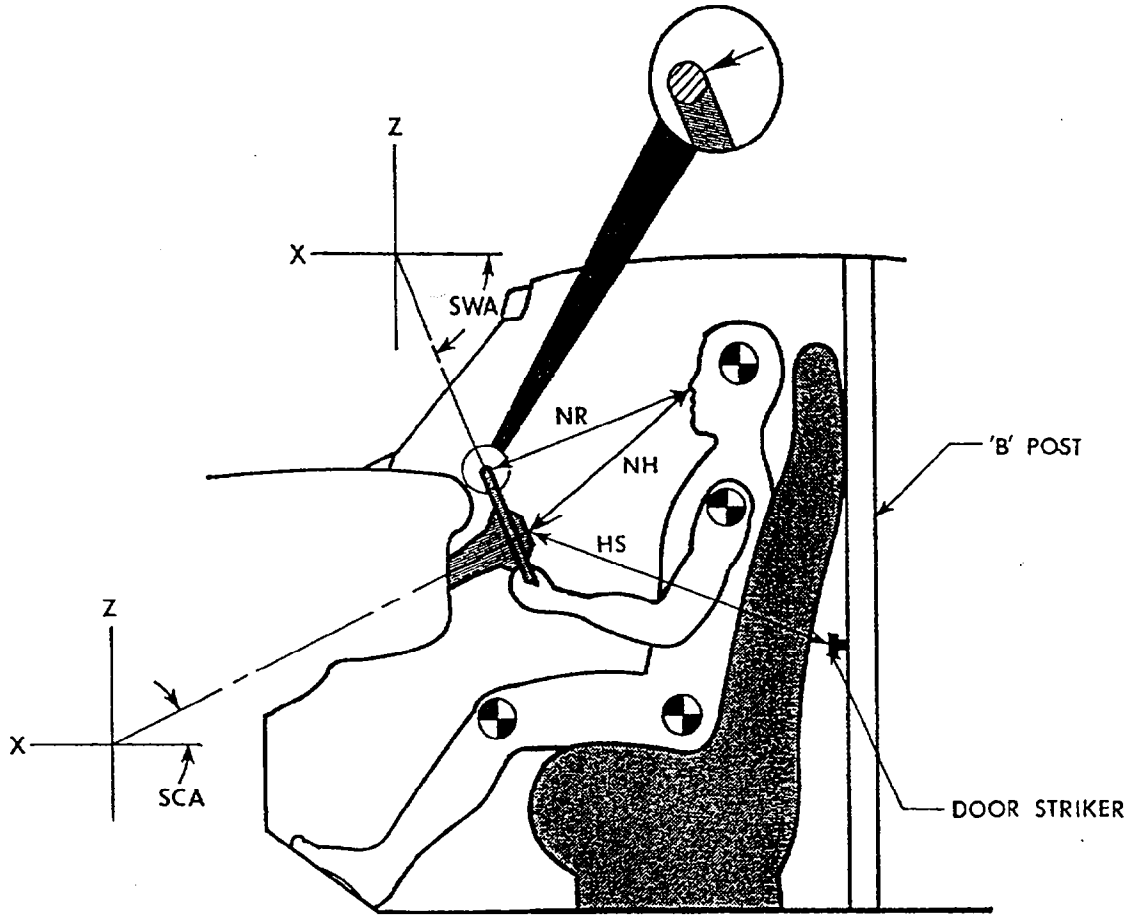
FIGURE 11 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	14.2	15.8
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	11.0	12.1
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	5.1	4.6
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	2.8	2.3
E - DUMMY CENTERLINE TO INTERSECTION OF UPPER TORSO BELT AND LAP BELT	10.2	10.9

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 placed at the mid point of the possible range of adjustment locations.

	MEASUREMENTS
NR - DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	16.7
NH - DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	17.9
HS - DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	21.8
SCA - ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	28°
SWA - ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	62°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 13

CAMERA POSITIONS

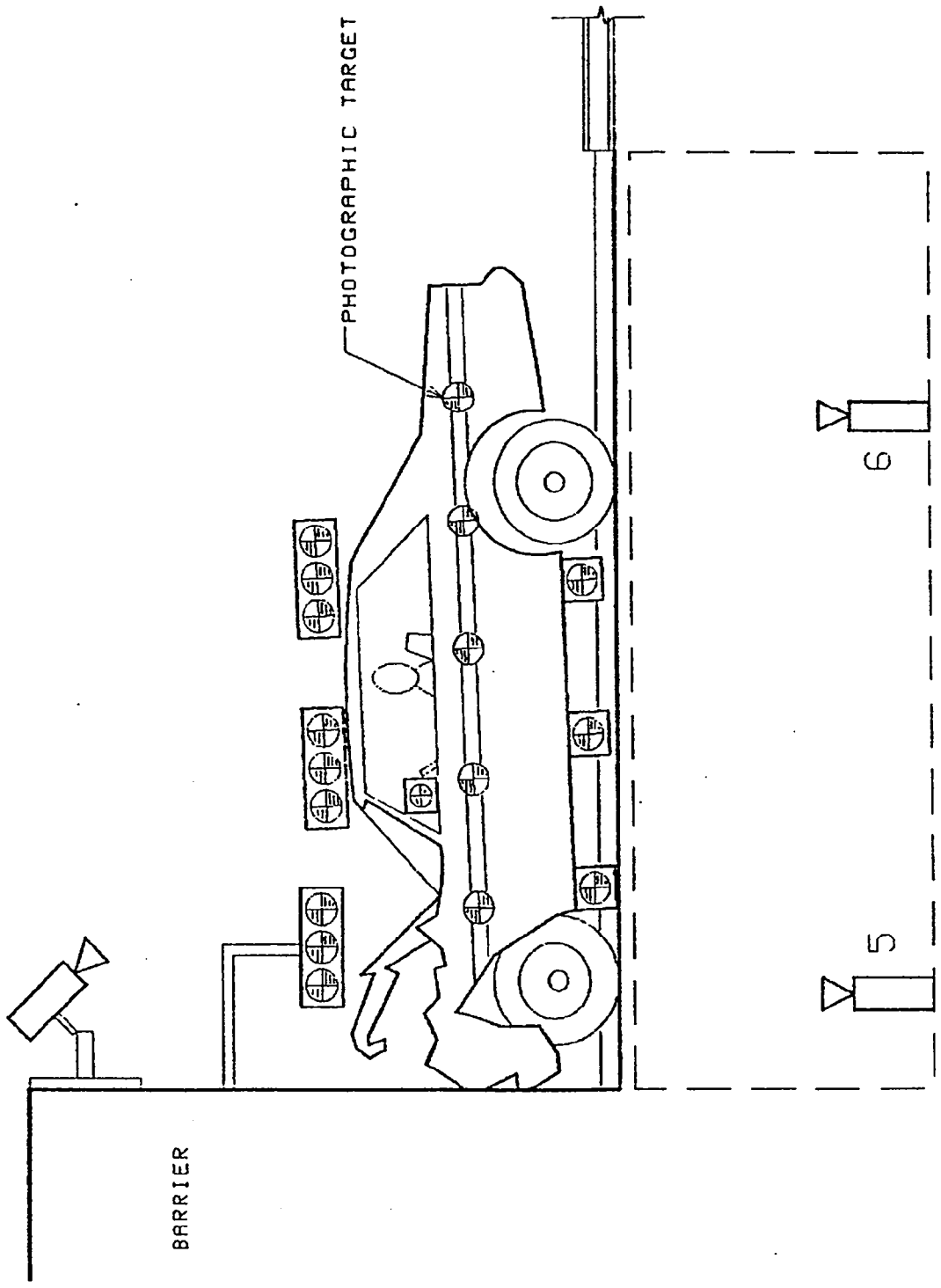


FIGURE 13

CAMERA POSITIONS, CONTINUED

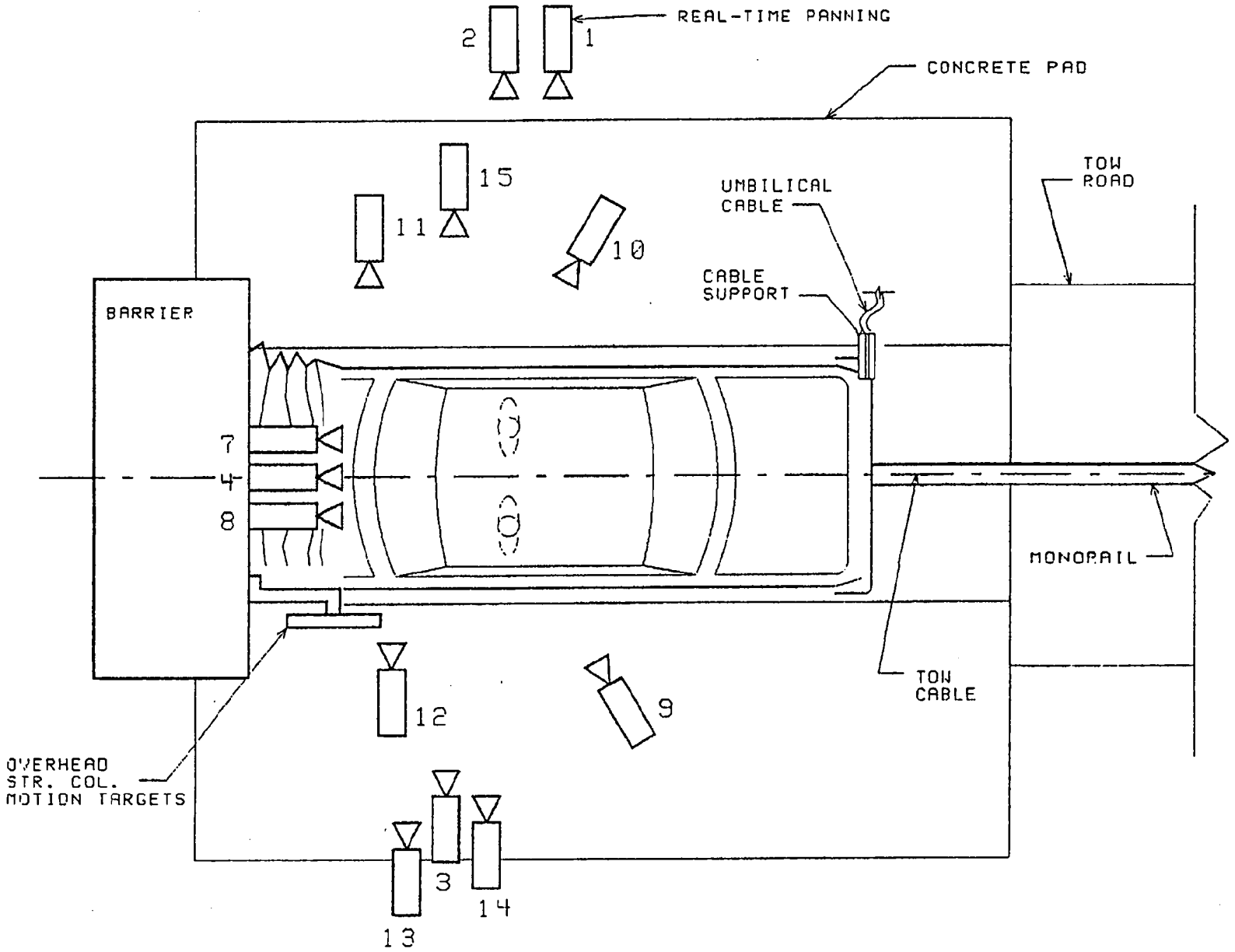


TABLE 14 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 920219 VEHICLE: 1992 Ford Club Wagon XLT

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	485
3	Left vehicle crush	-41.5	295.0	44.0	-4	217.0	25	500
4	Windshield front view	-6.0	0.0	86.6	-40	NA	13	498
5	Pit front position	-50.5	0.0	-92.4	90	NA	13	1000
6	Pit rear position	-99.3	0.0	-99.0	90	NA	13	1002
7	Passenger front view	-4.5	-13.8	93.0	-50	NA	17	498
8	Driver front view	-6.8	14.5	93.0	-50	NA	17	500
9	Driver kinematics	-157.3	116.0	87.0	-27	87.0	25	510
10	Passenger kinematics	-152.1	-116.0	87.0	-26	69.0	25	500
11	Right windshield intrusion	-38.1	-306.1	44.0	0	NA	50	495
12	Left windshield instrusion	-53.0	309.4	42.3	0	NA	50	510
13	Steering column motion	-120.0	286.0	103.0	-14	NA	25	505
14	Steering column motion	-120.0	286.0	75.1	-9	NA	25	500
15	Passenger kinematics	-38.8	-293.0	45.3	-4	223.0	25	1025
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

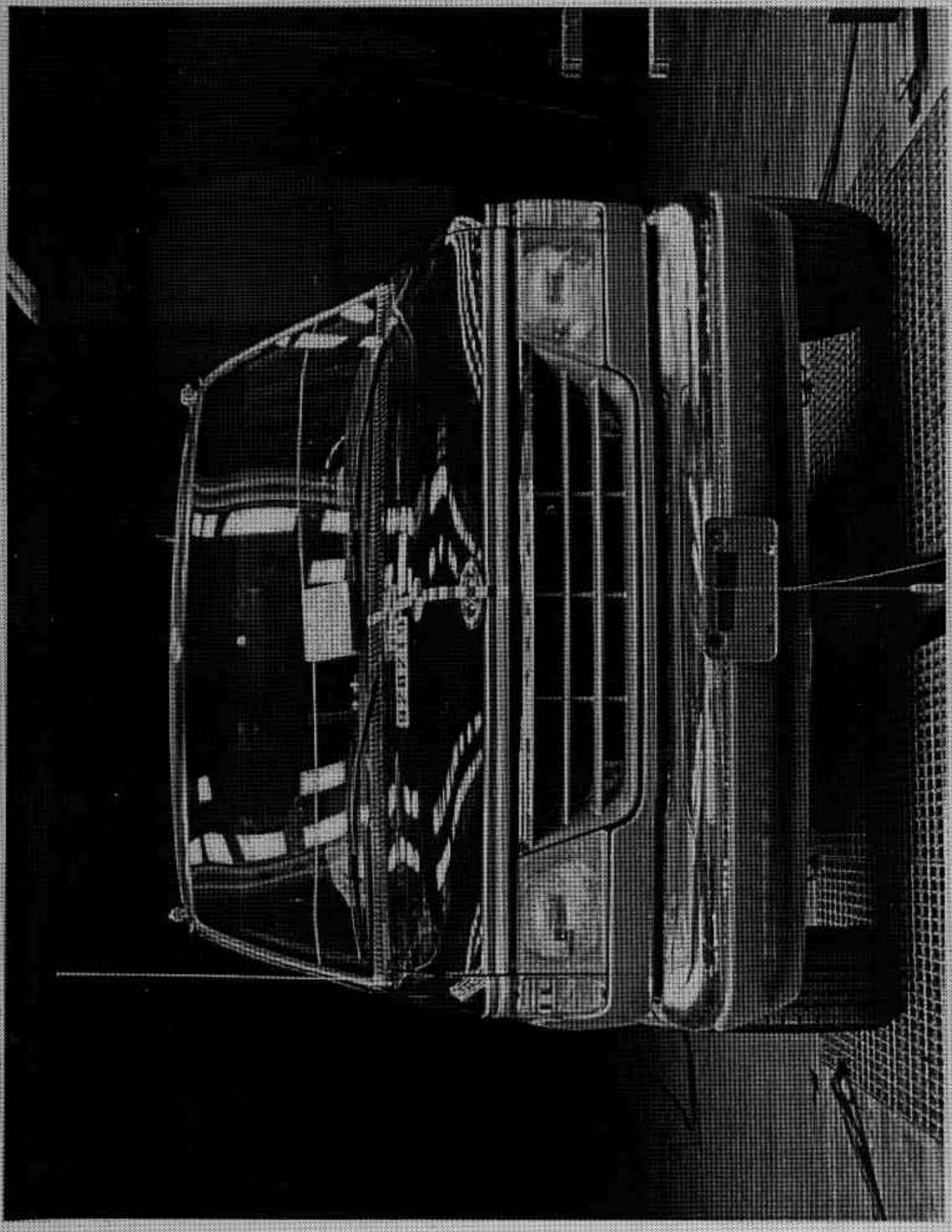


FIGURE A-1. PRE-TEST FRONT VIEW

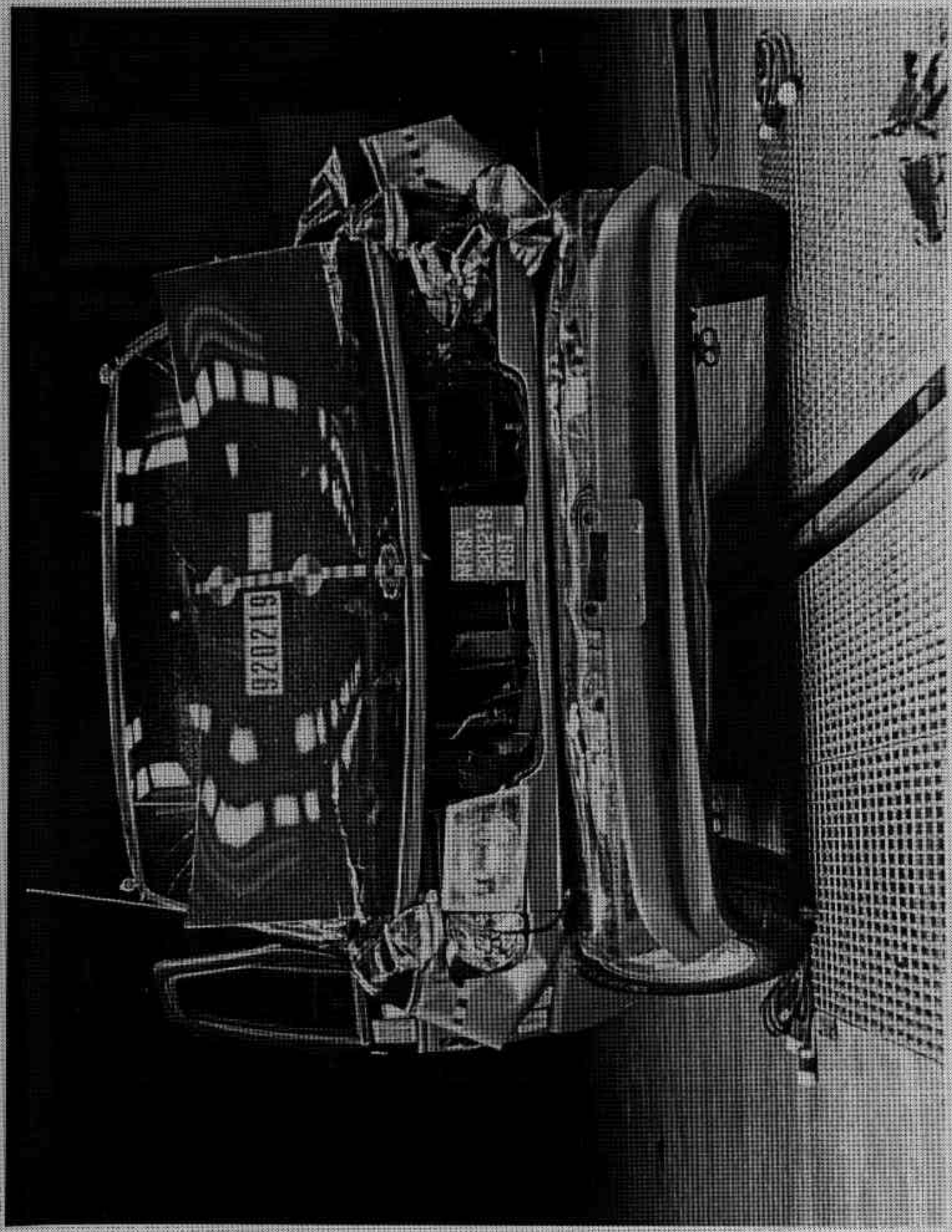


FIGURE A-2. POST-TEST FRONT VIEW

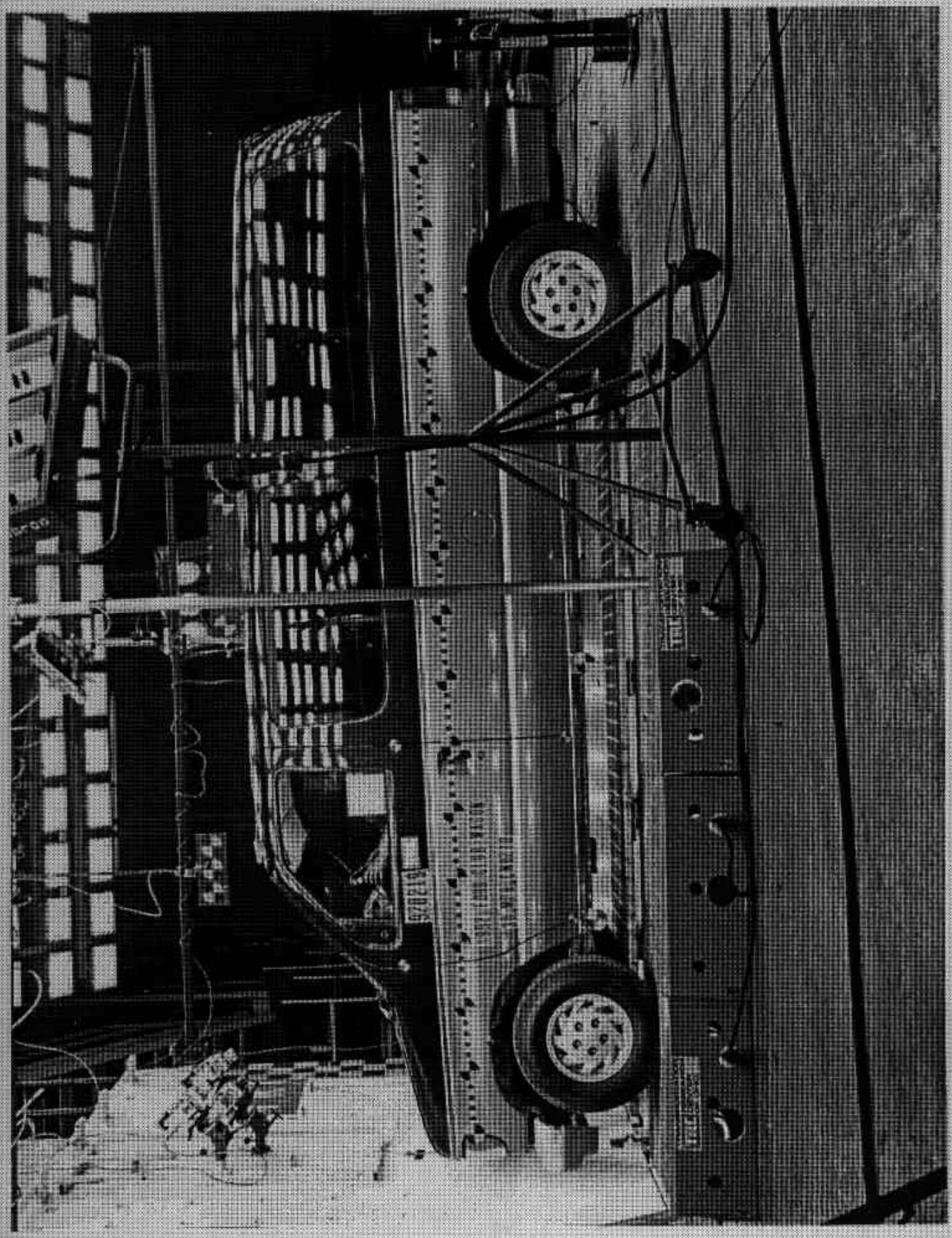


FIGURE A-3. PRE-TEST LEFT SIDE VIEW

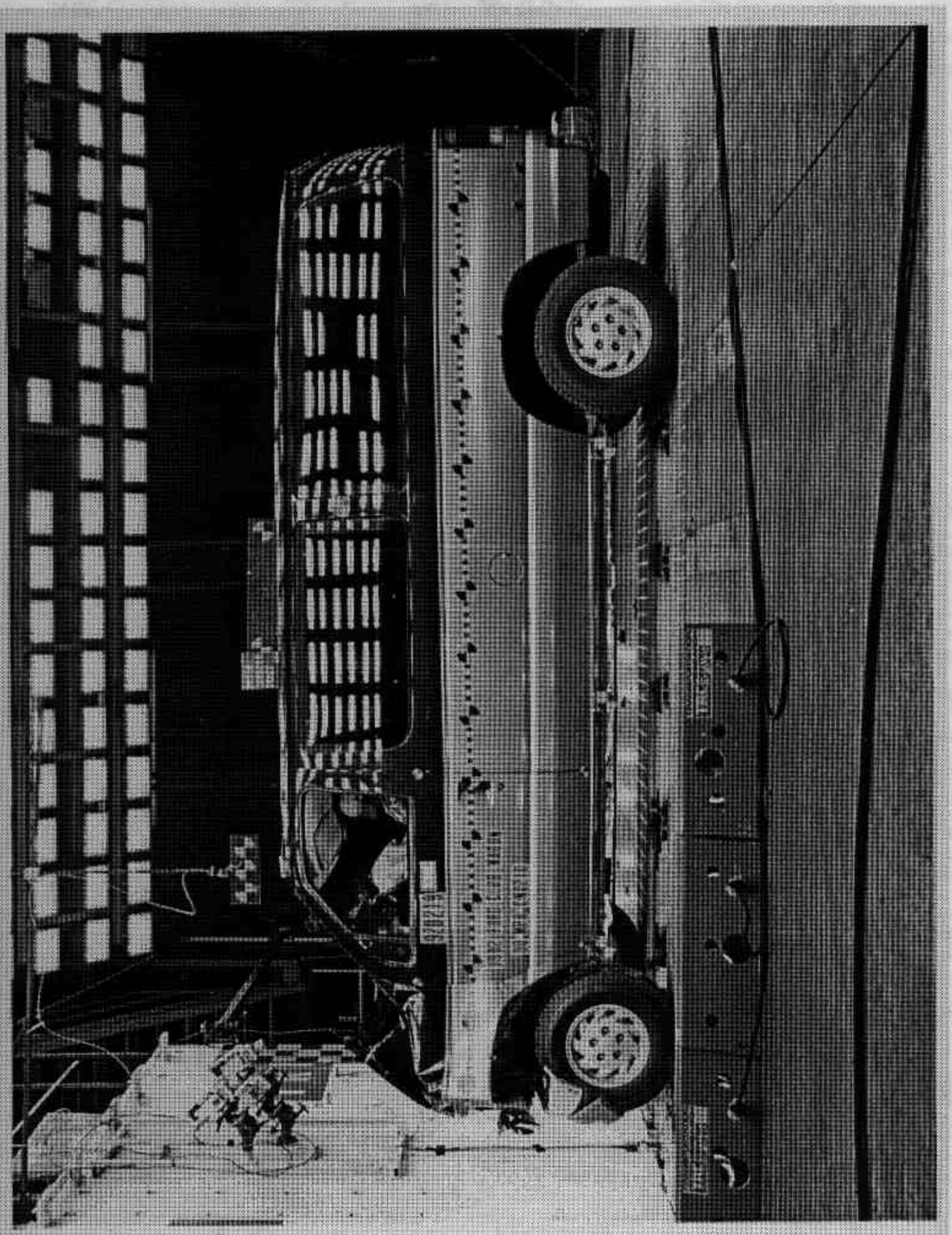


FIGURE A-4. POST-TEST LEFT SIDE VIEW

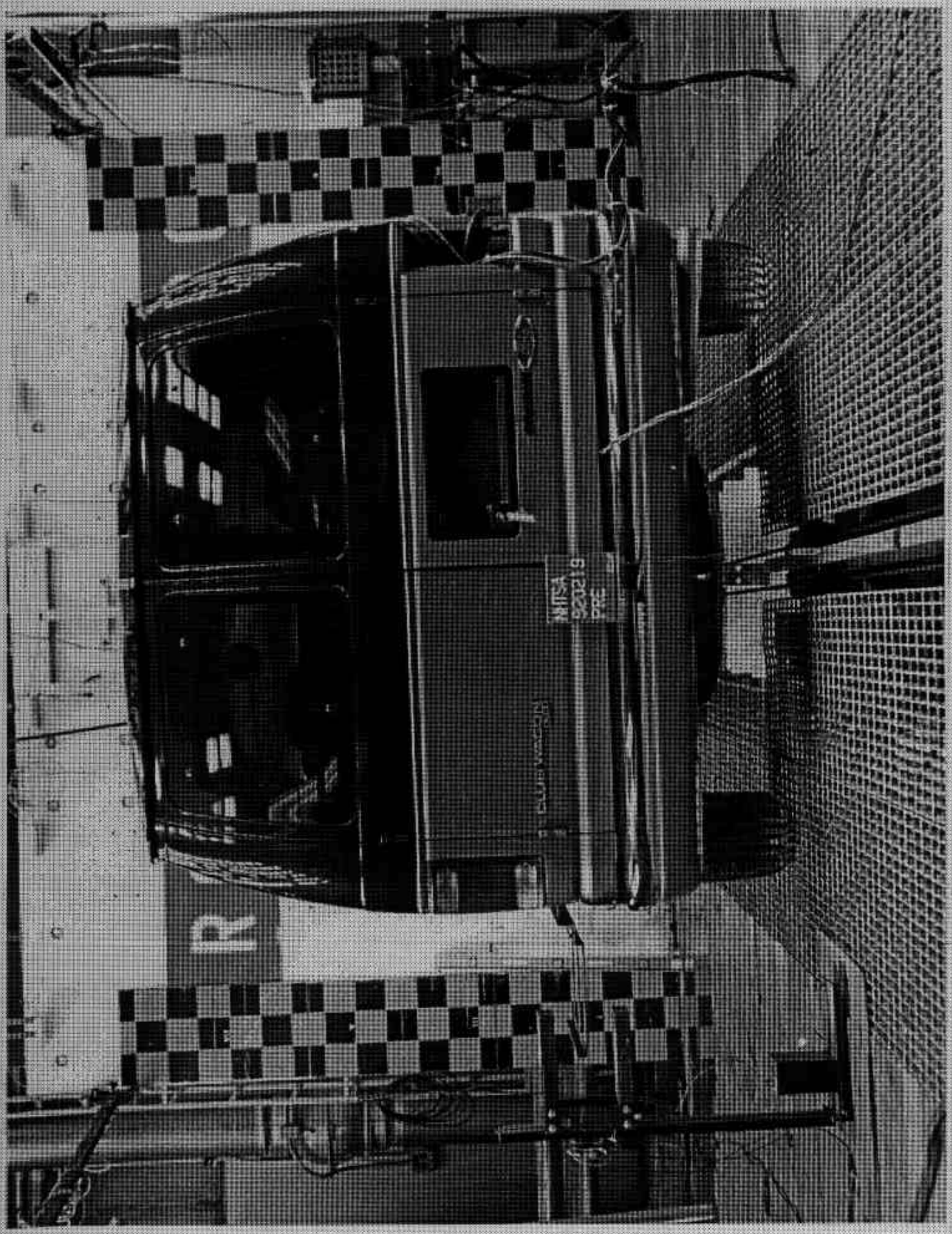


FIGURE A-5. PRE-TEST REAR VIEW

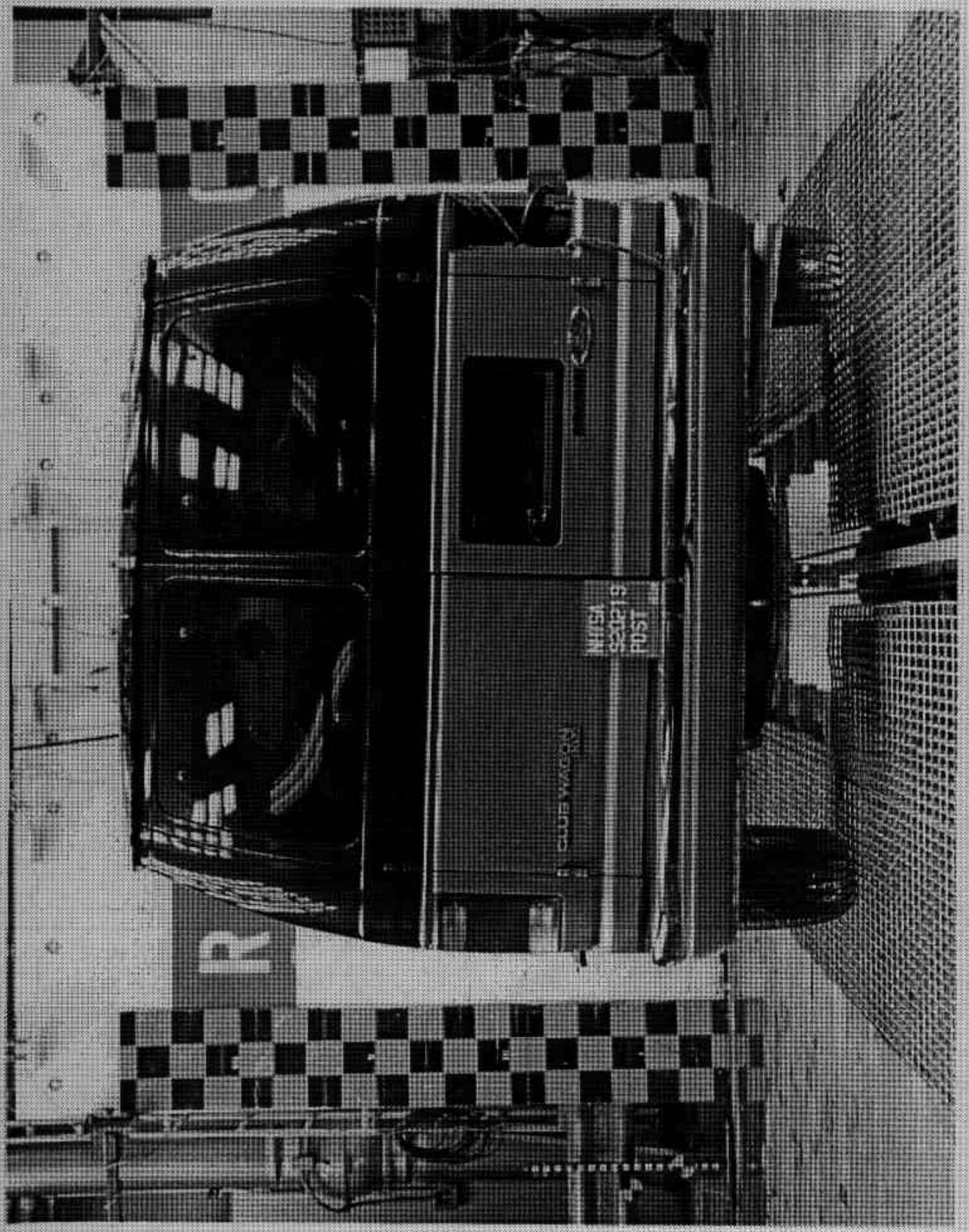


FIGURE A-6. POST-TEST REAR VIEW

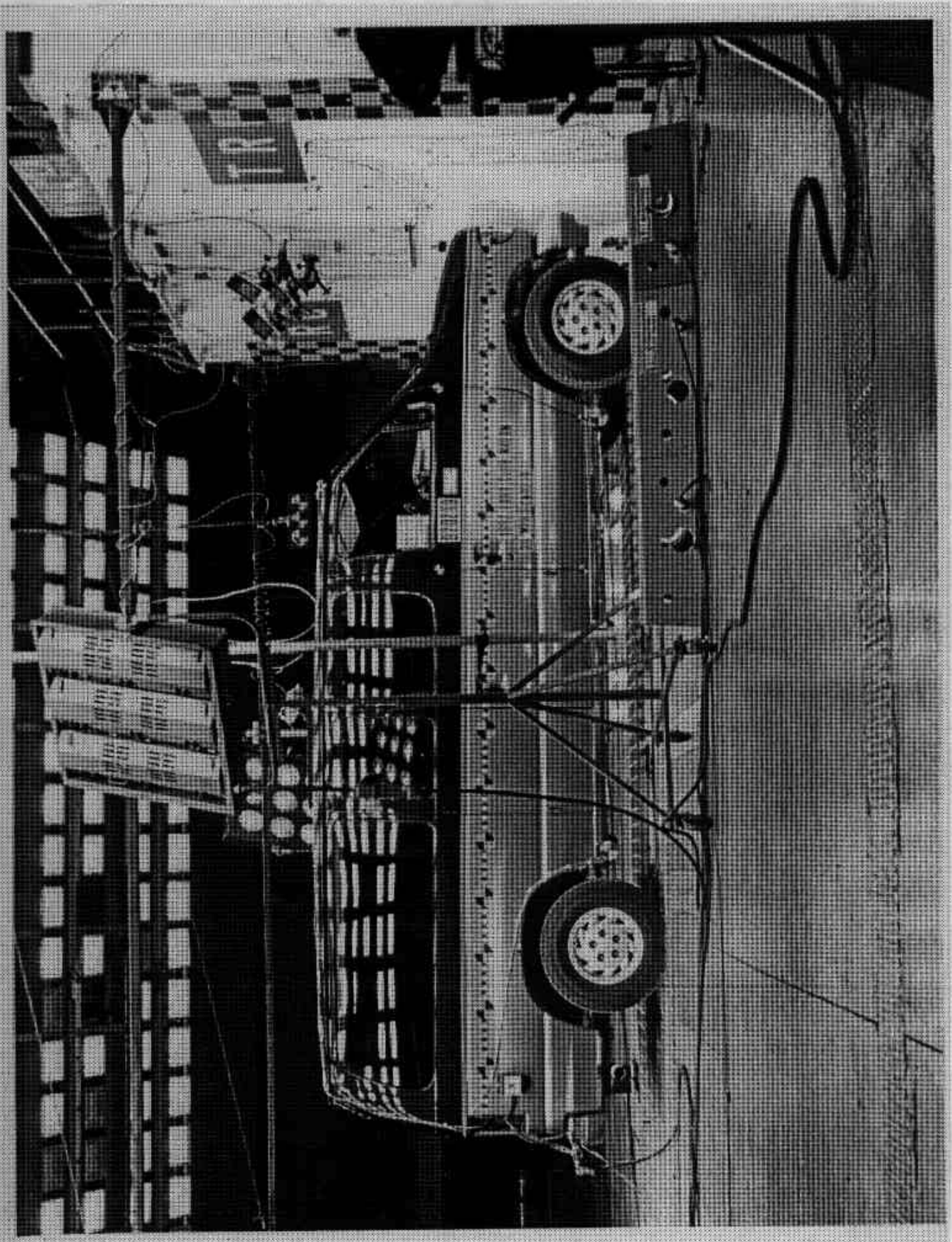


FIGURE A-7. PRE-TEST RIGHT SIDE VIEW

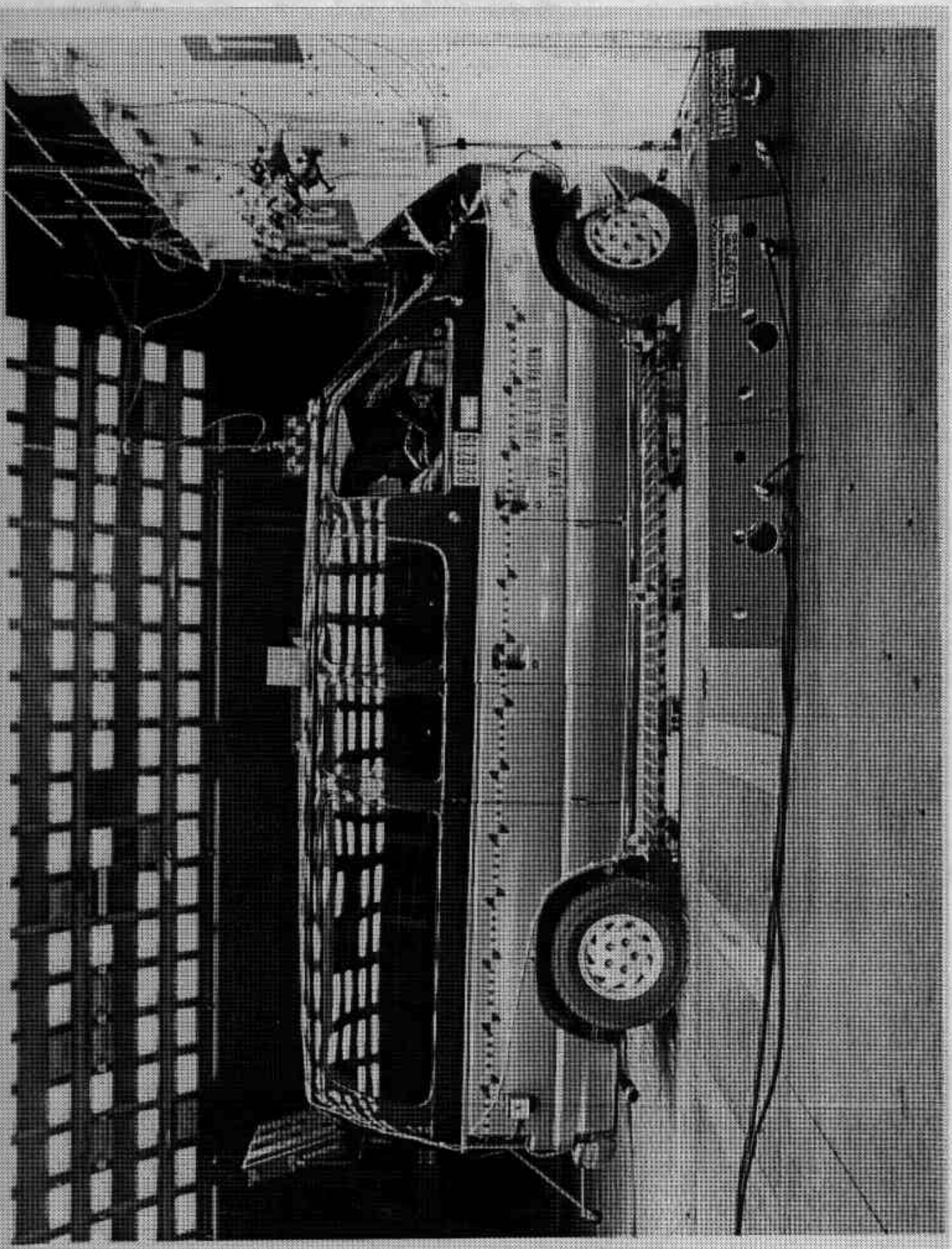


FIGURE A-8. POST-TEST RIGHT SIDE VIEW

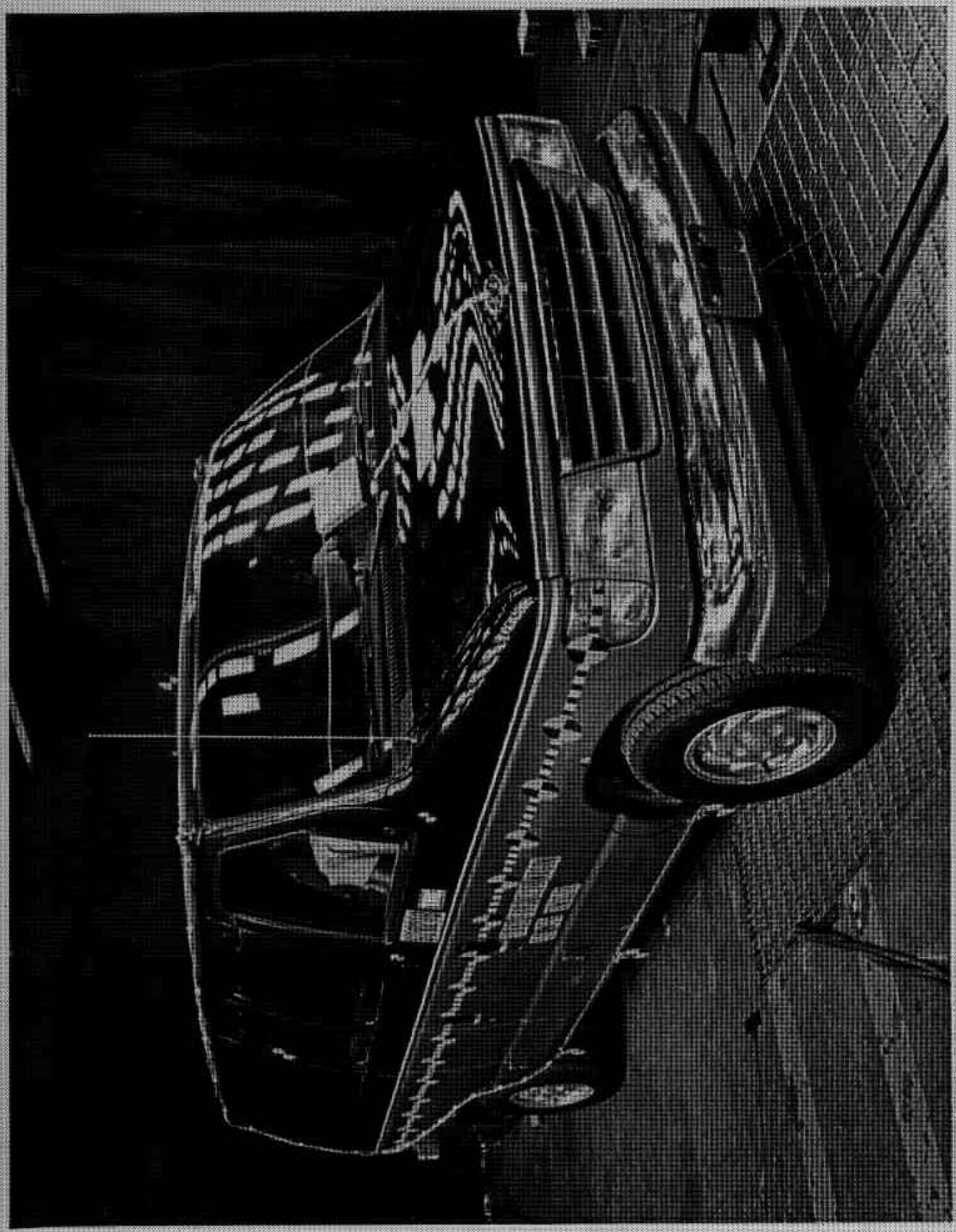


FIGURE A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

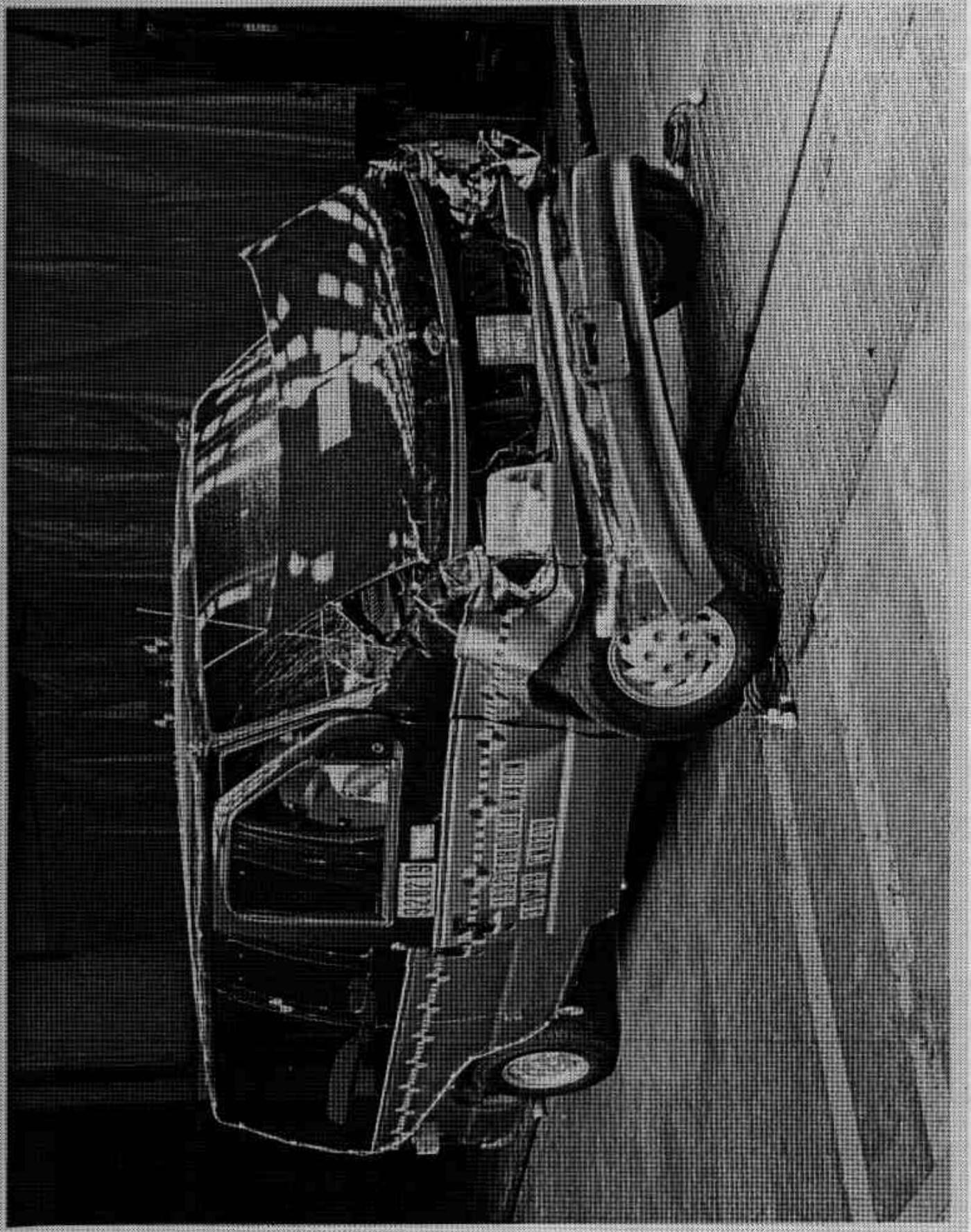


FIGURE A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

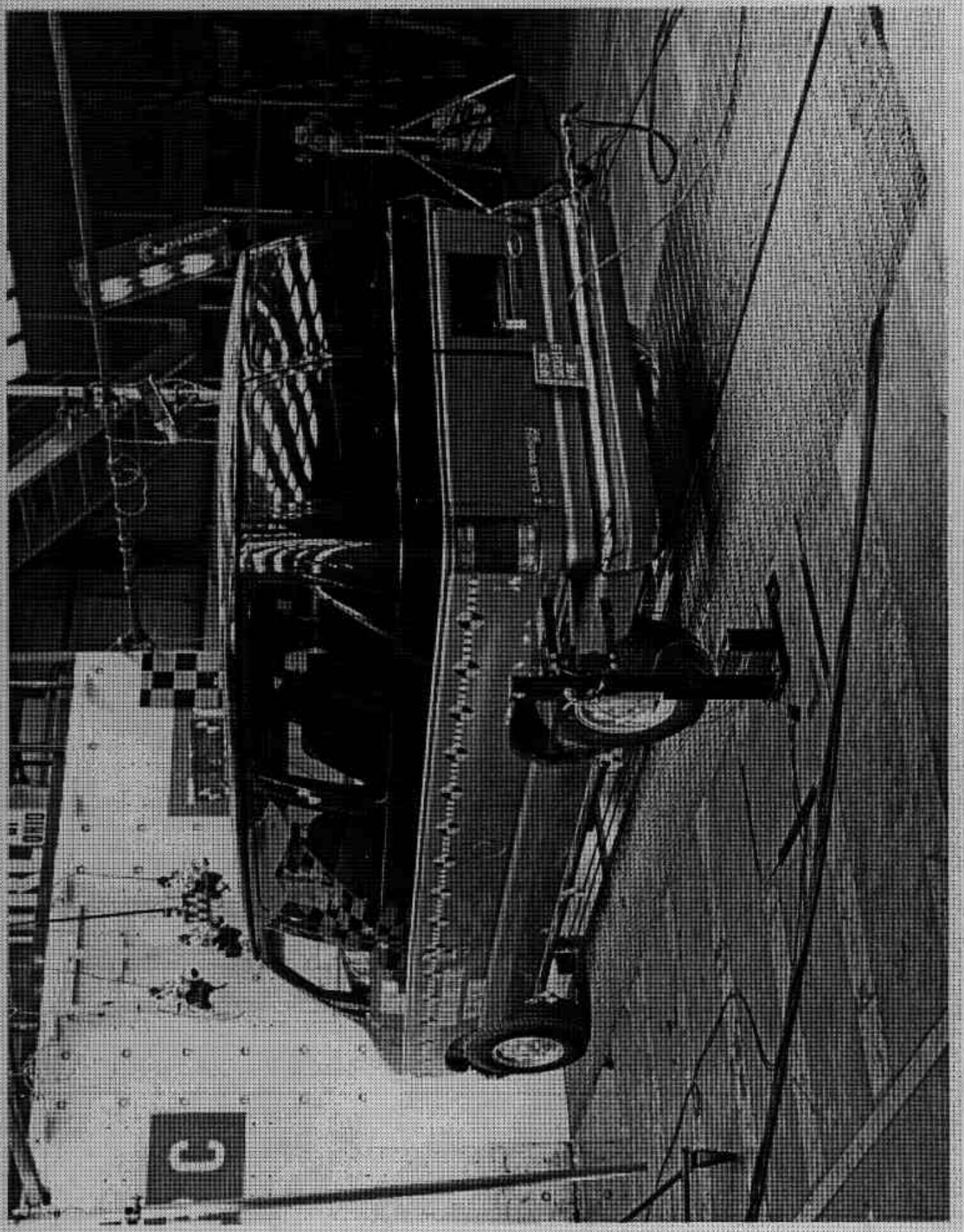


FIGURE A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW

FIGURE A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

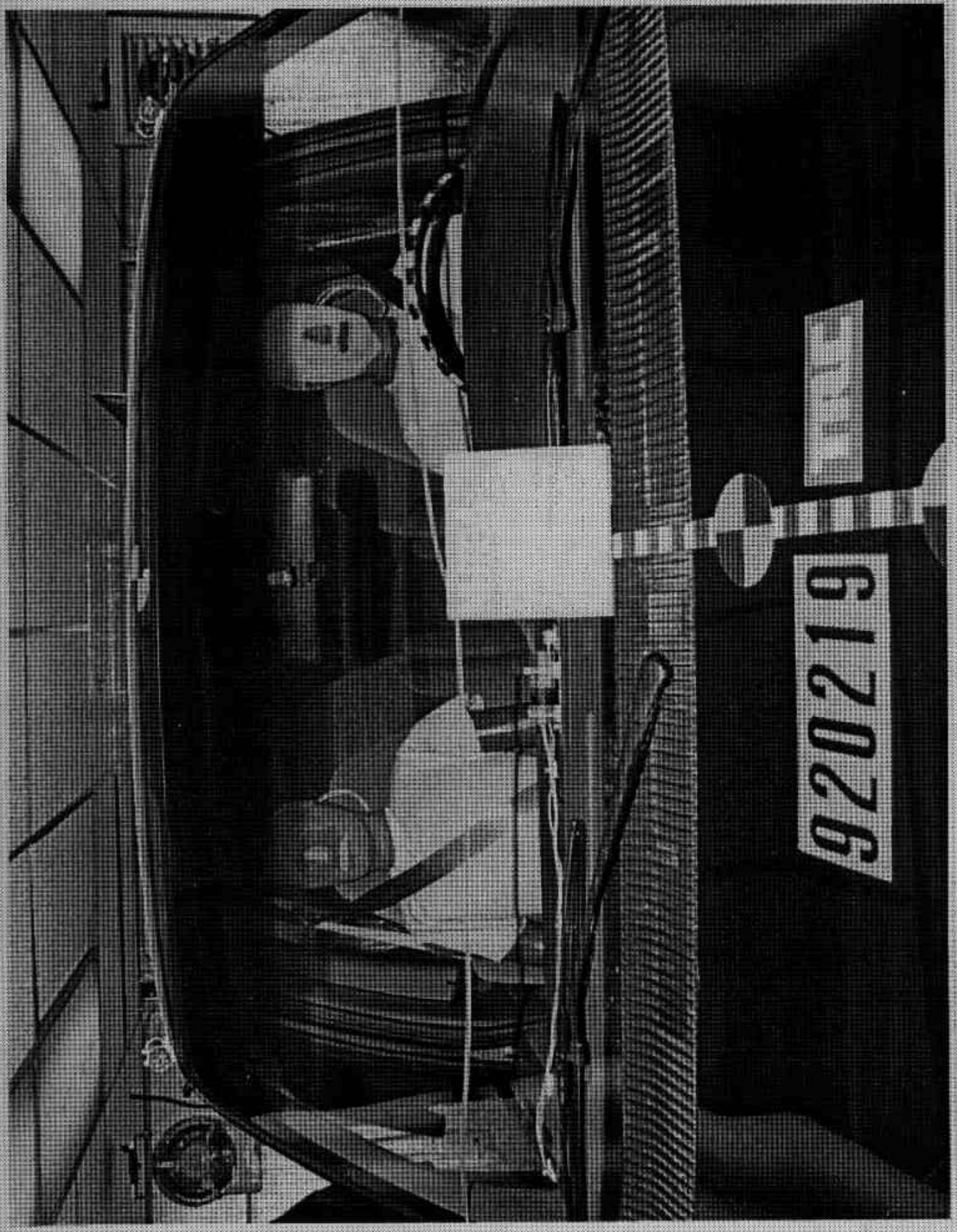


FIGURE A-13. PRE-TEST WINDSHIELD VIEW

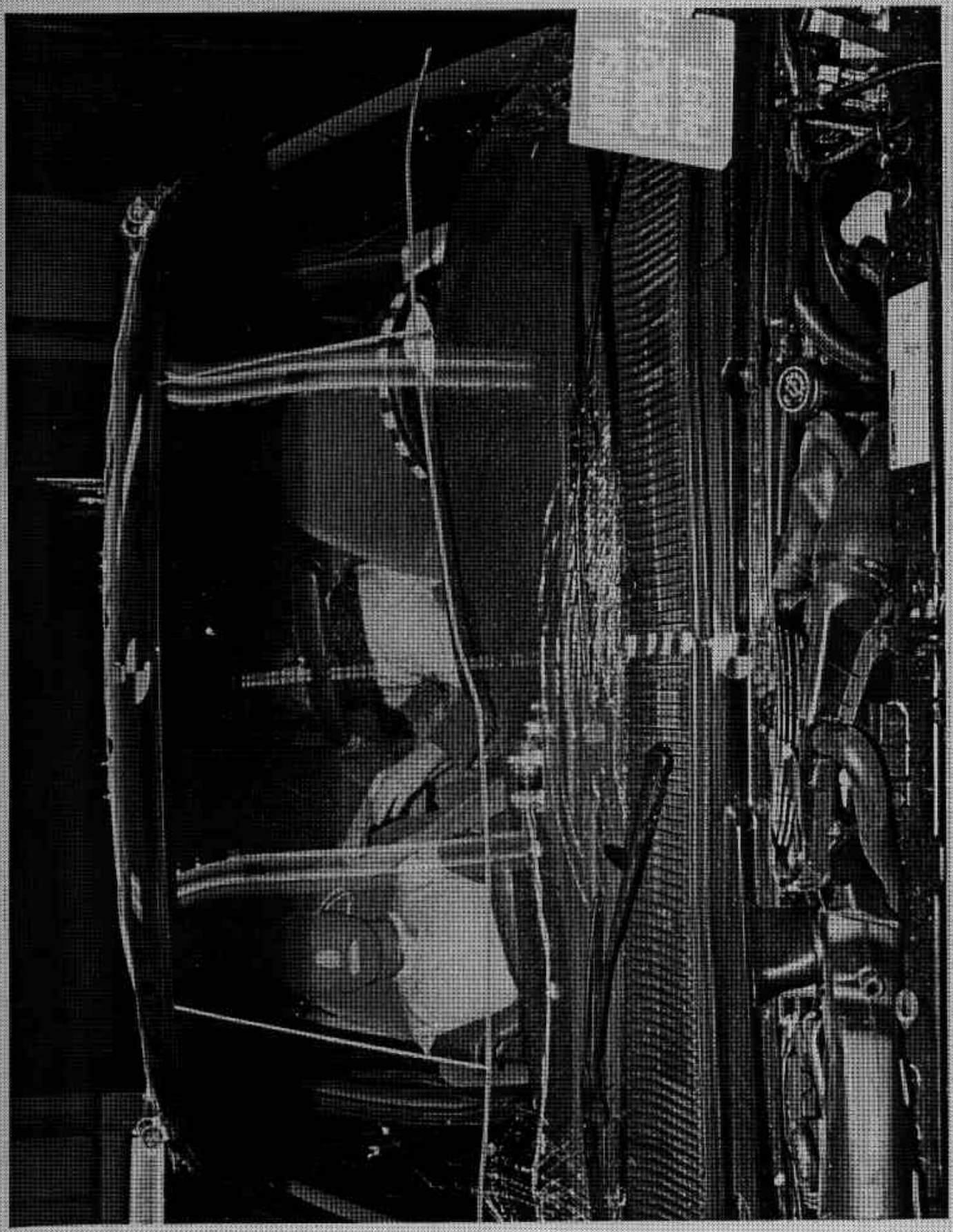


FIGURE A-14. POST-TEST WINDSHIELD VIEW

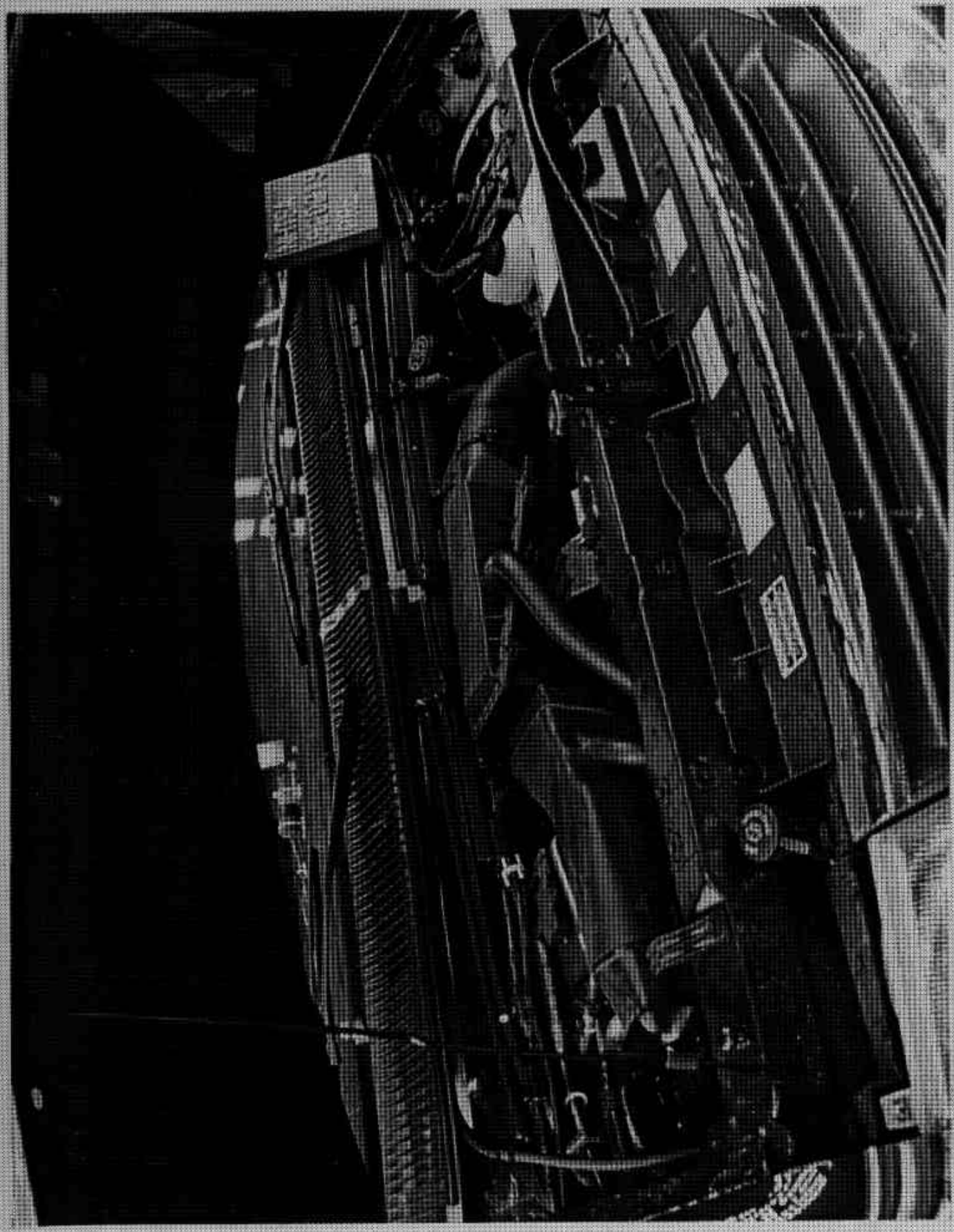


FIGURE A-15. PRE-TEST ENGINE COMPARTMENT VIEW

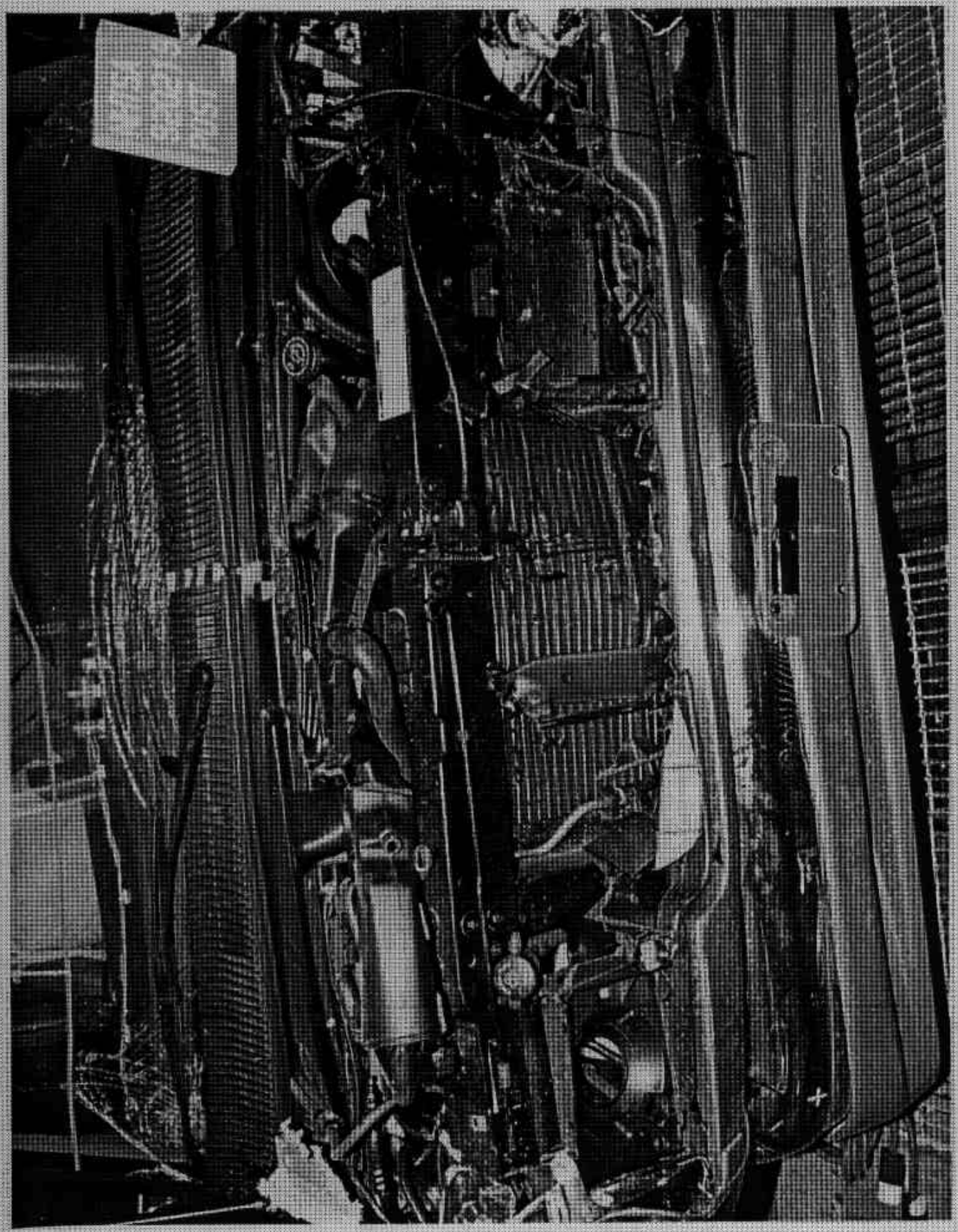


FIGURE A-16. POST-TEST ENGINE COMPARTMENT VIEW

FIGURE A-17. PRE-TEST FUEL FILLER CAP VIEW

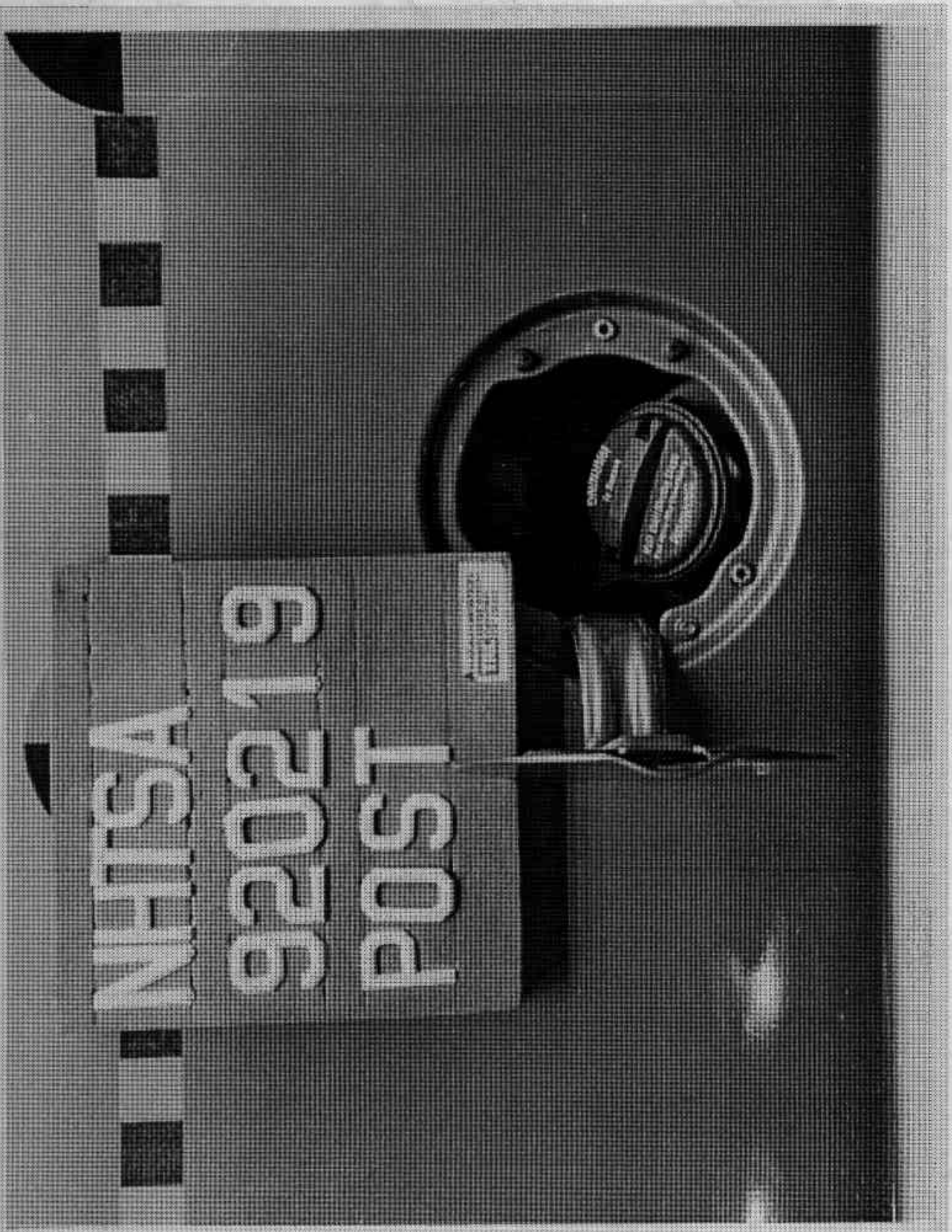


FIGURE A-18. POST-TEST FUEL FILLER CAP VIEW

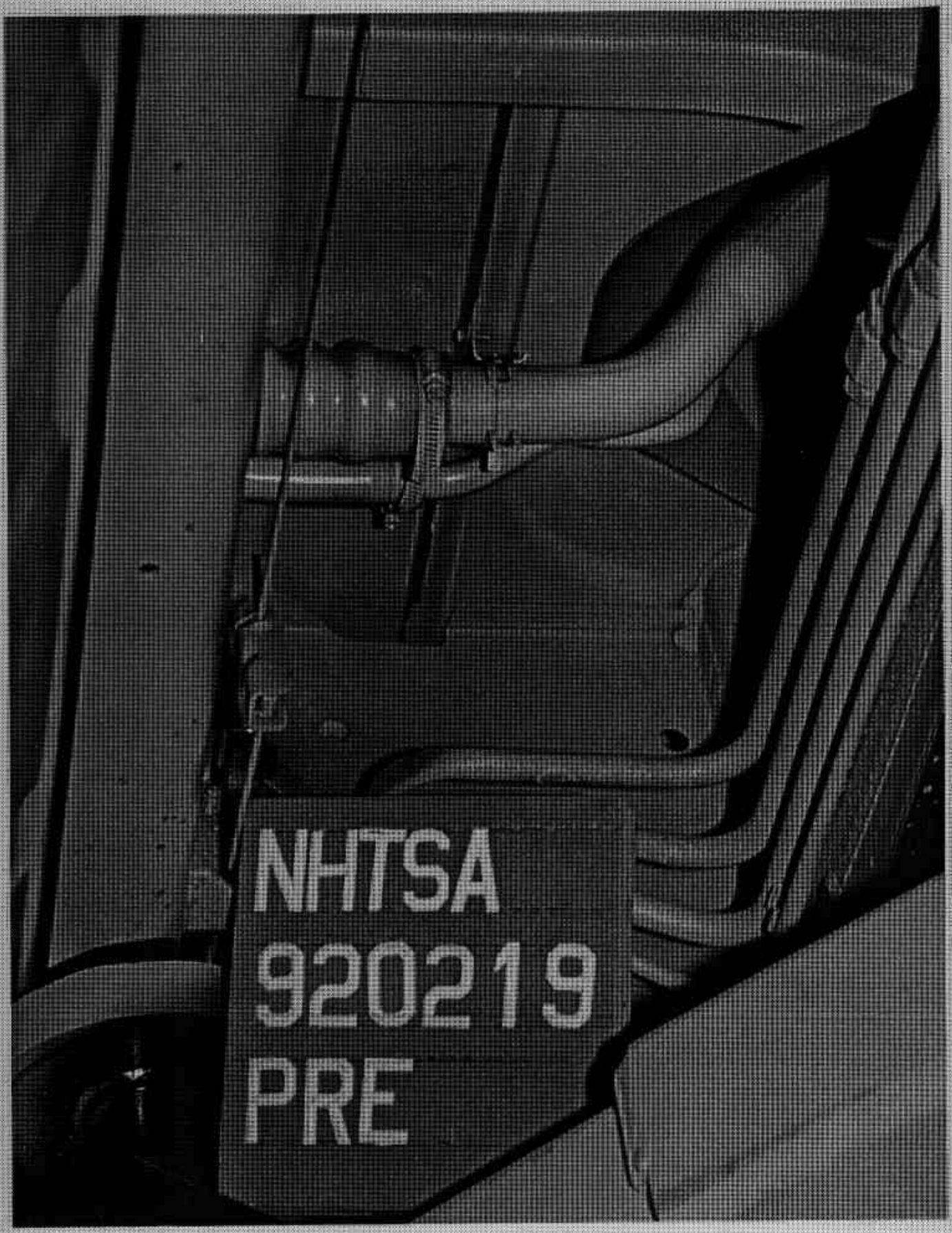


FIGURE A-19. PRE-TEST FUEL FILLER NECK VIEW

FIGURE A-20. POST-TEST FUEL FILLER NECK VIEW

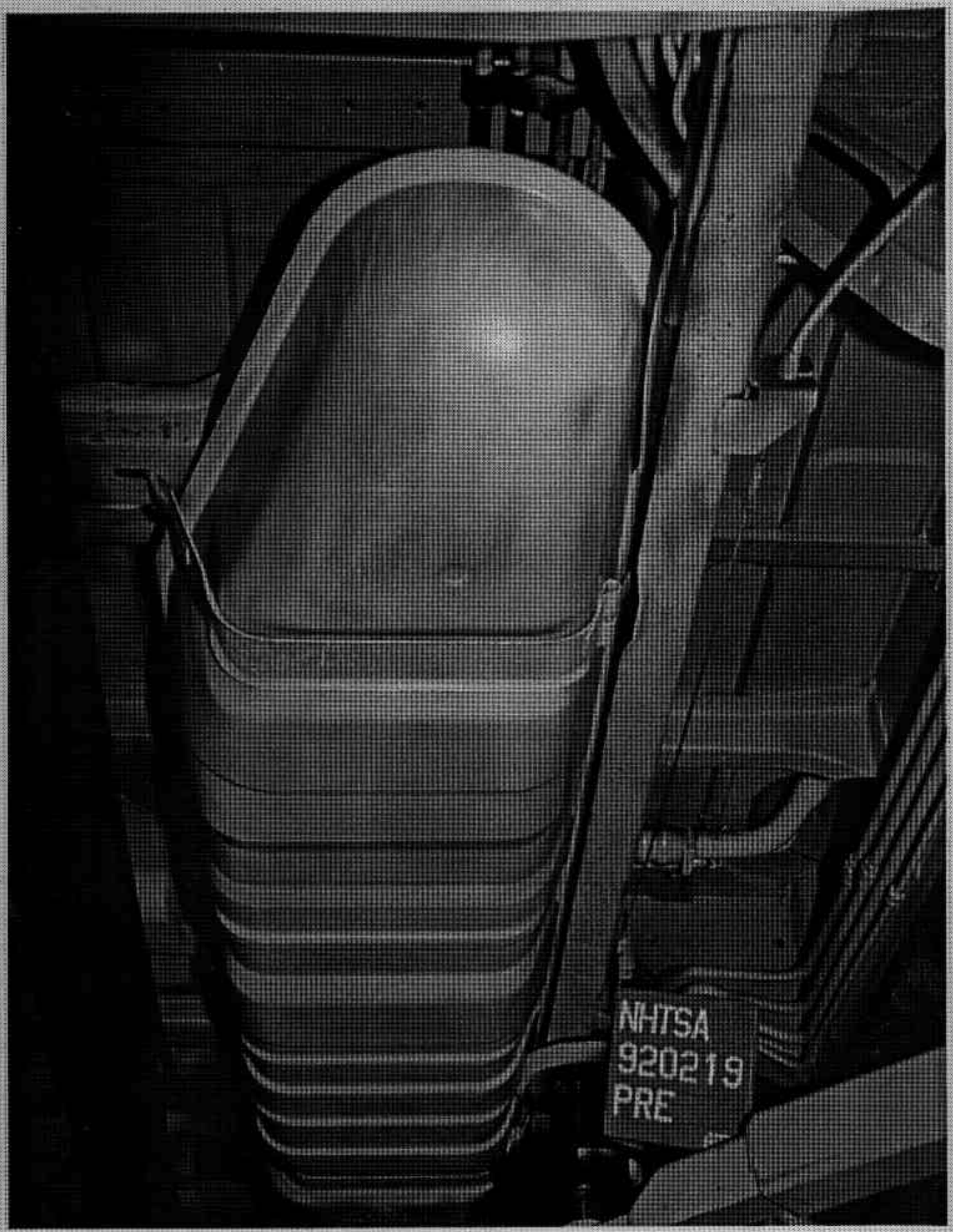


FIGURE A-21. PRE-TEST FUEL TANK VIEW

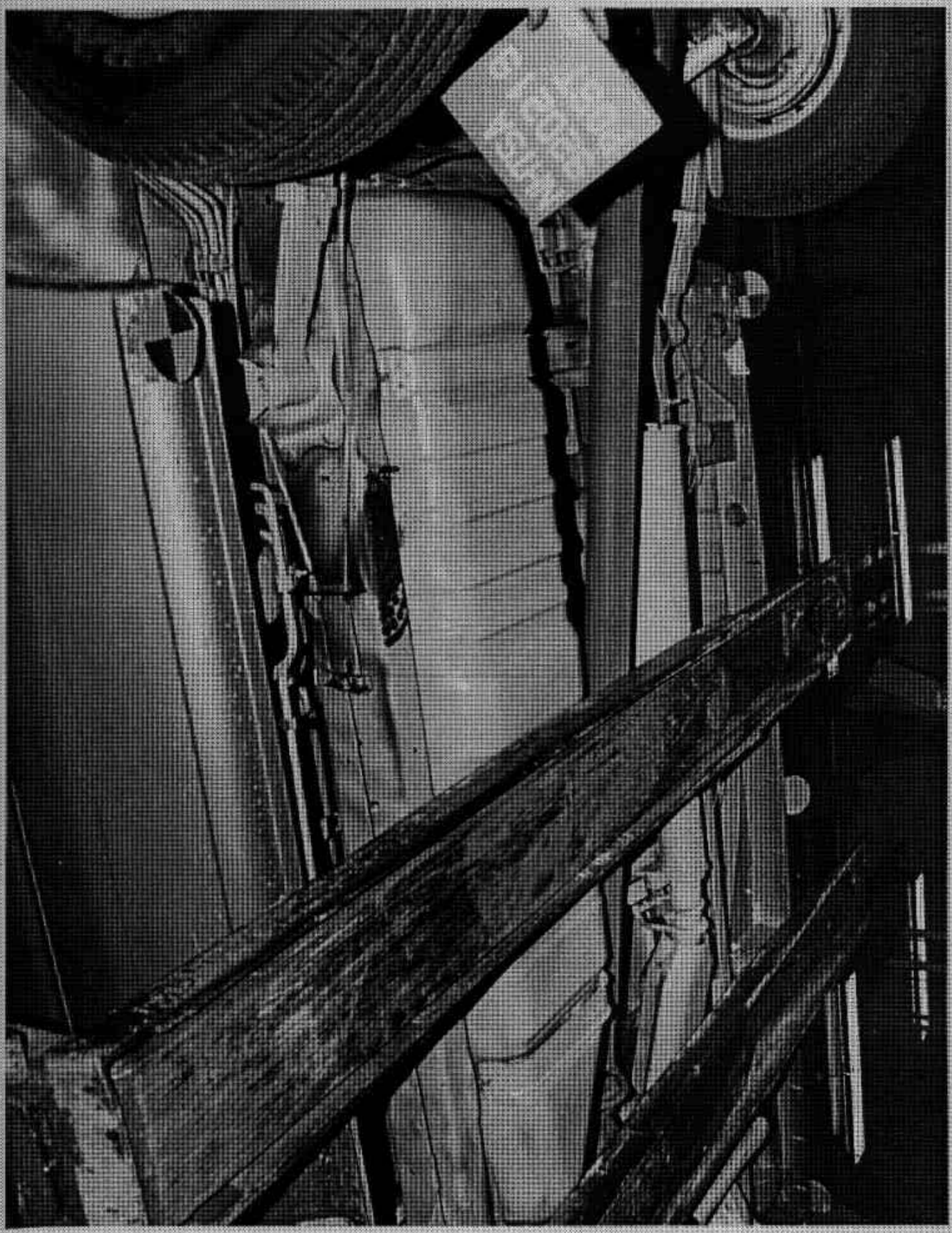


FIGURE A-22. POST-TEST FUEL TANK VIEW

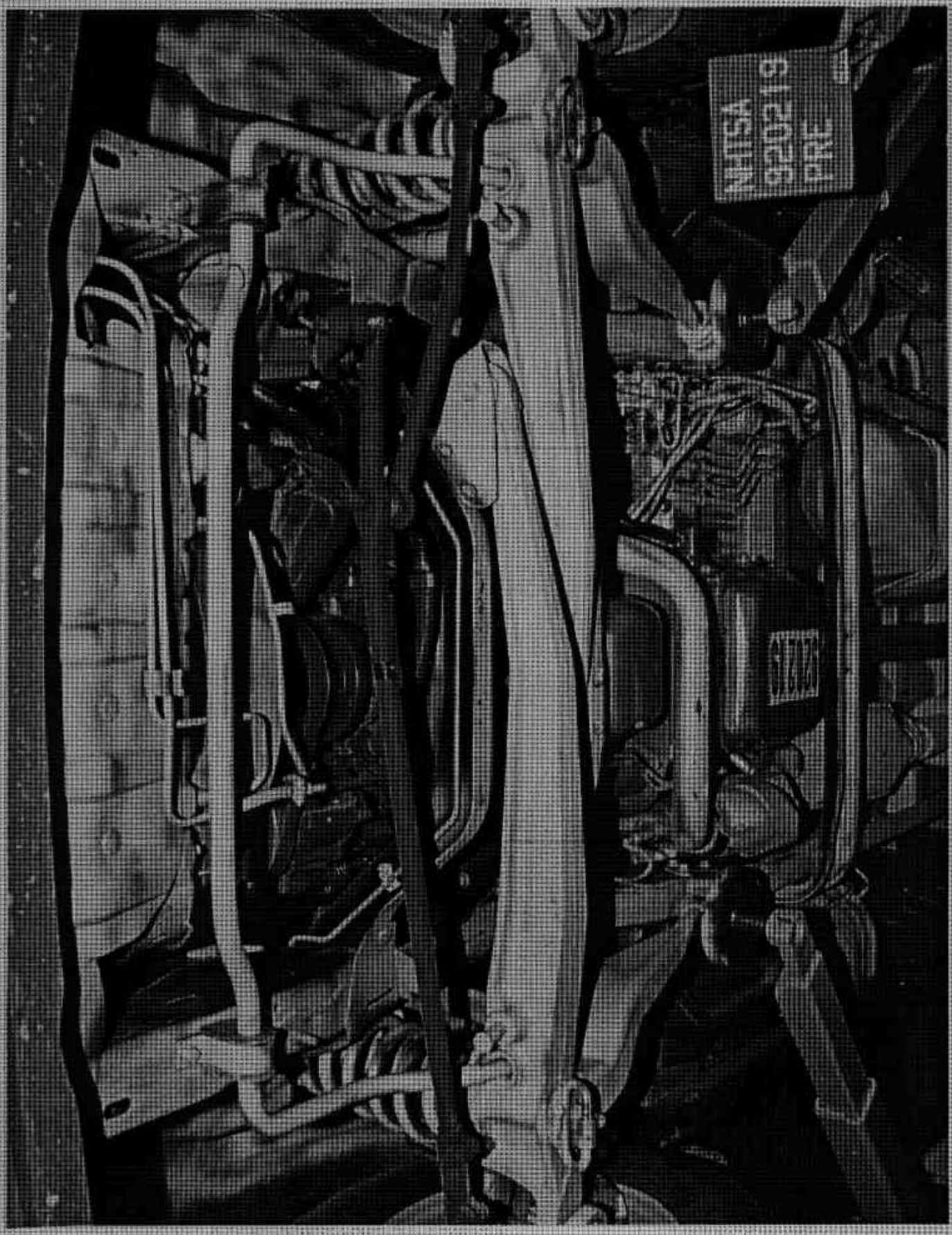


FIGURE A-23. PRE-TEST FRONT UNDERBODY VIEW

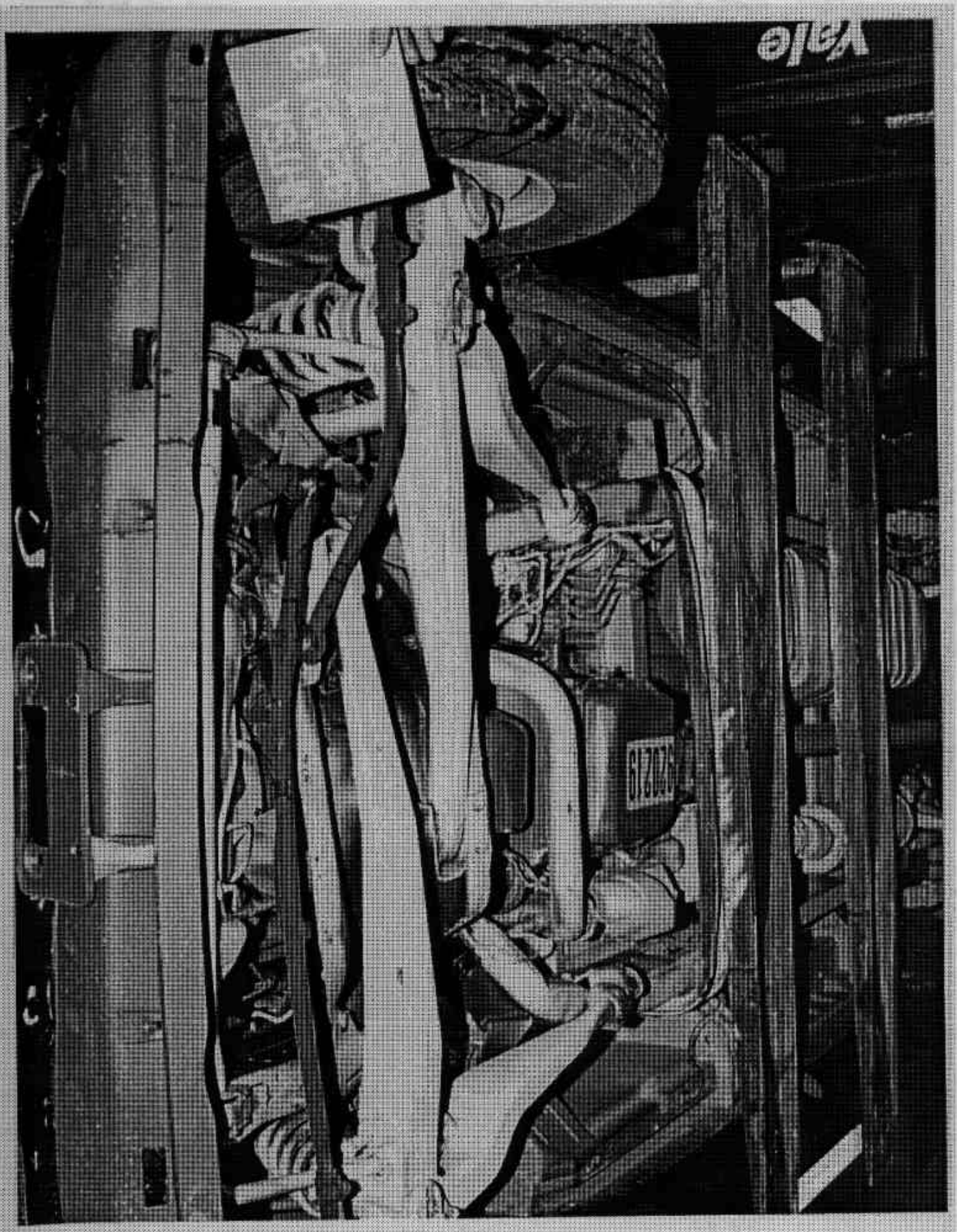


FIGURE A-24. POST-TEST FRONT UNDERBODY VIEW

FIGURE A-25. PRE-TEST REAR UNDERBODY VIEW

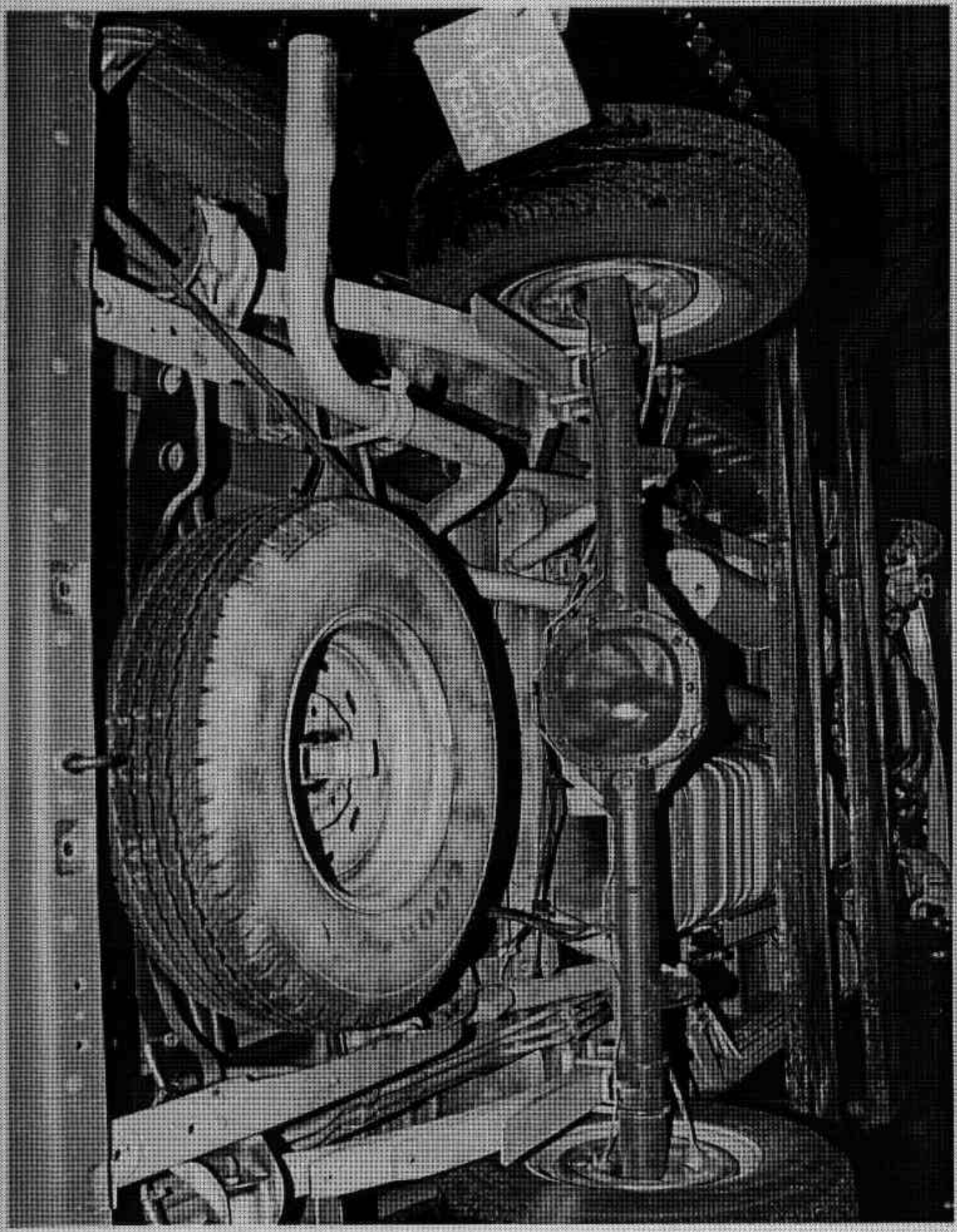


FIGURE A-26. POST-TEST REAR UNDERBODY VIEW

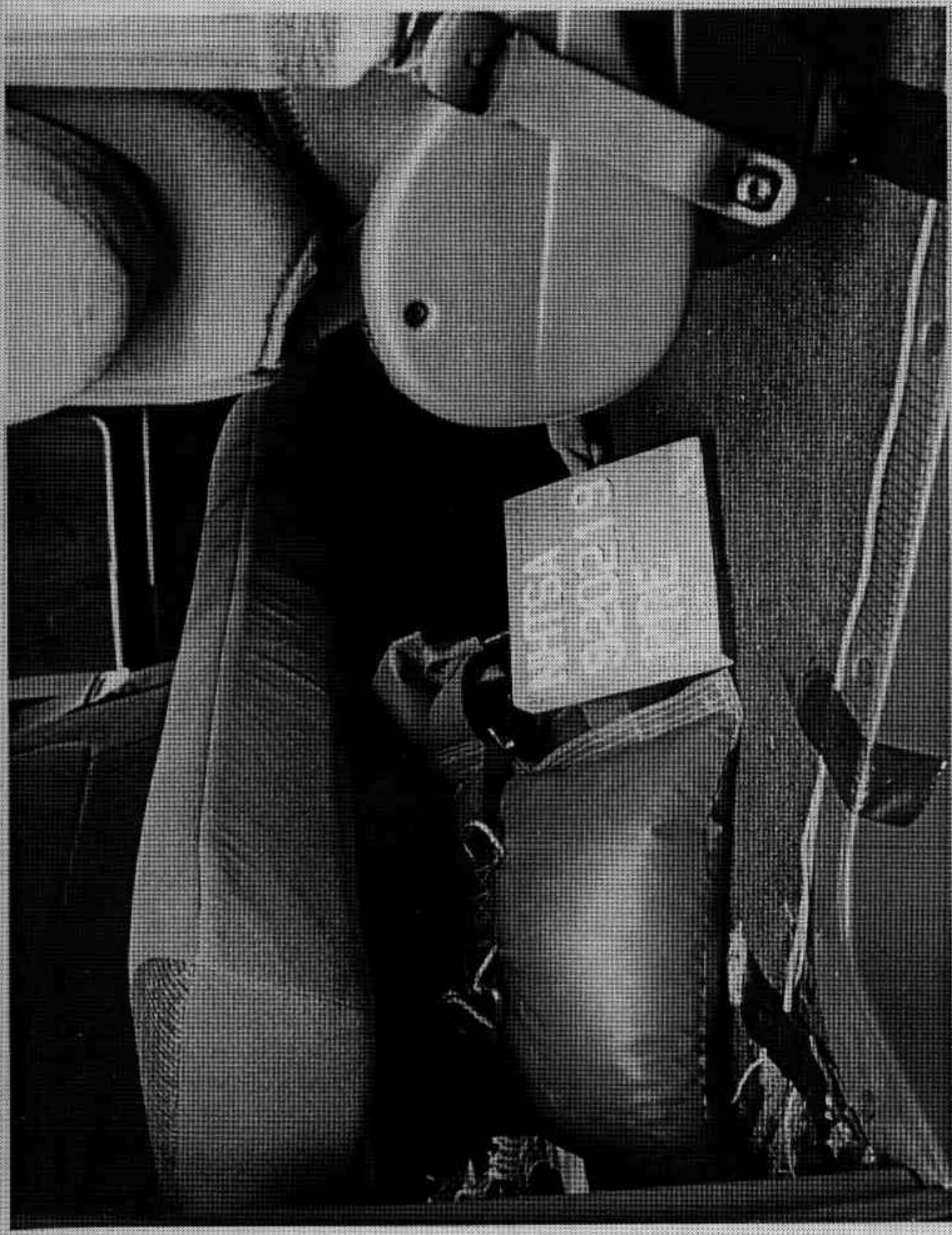


FIGURE A-27. PRE-TEST BALLAST LOCATION - VIEW 1

FIGURE A-28. PRE-TEST BALLAST LOCATION - VIEW 2

FIGURE A-29. PRE-TEST DRIVER DUMMY POSITION VIEW

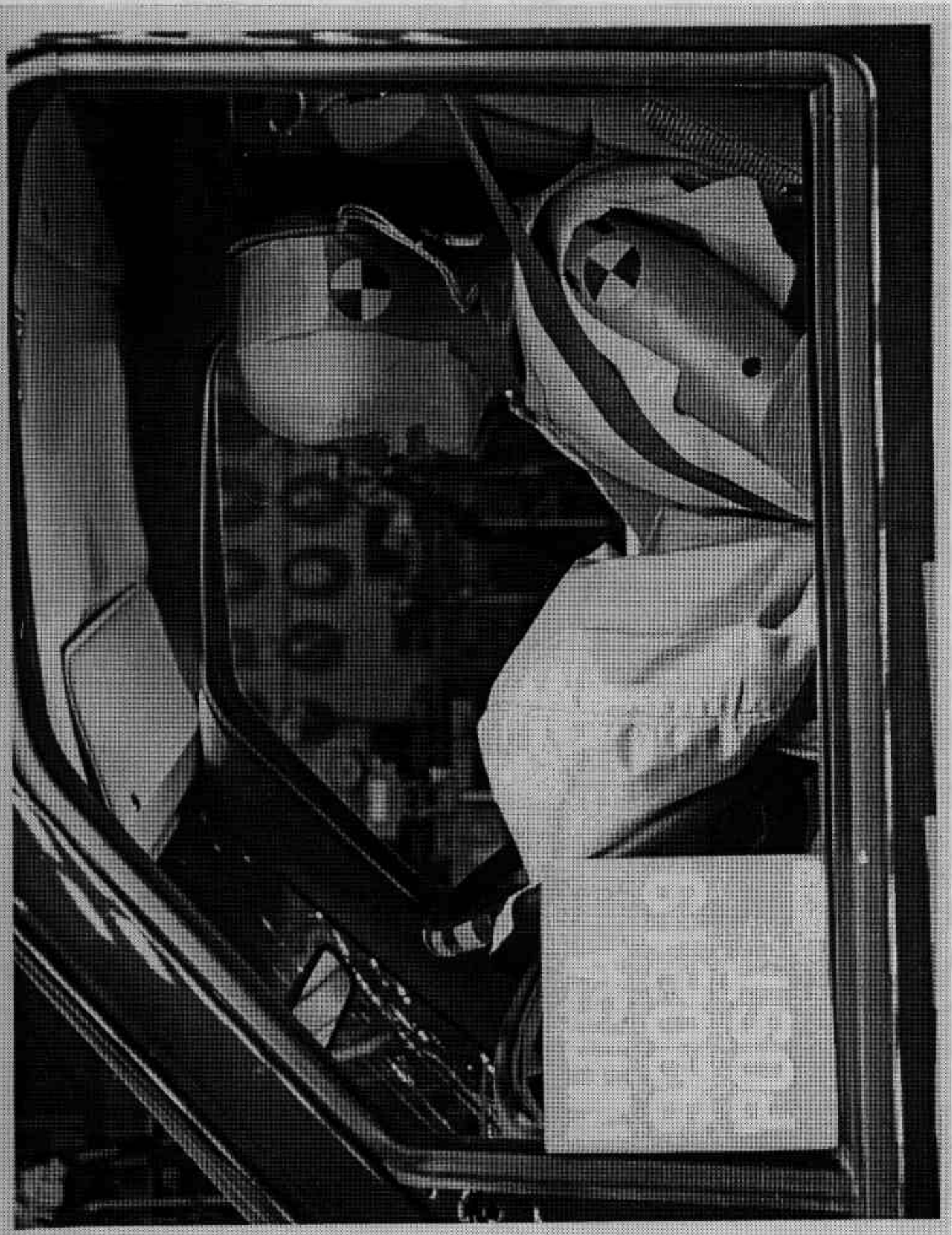


FIGURE A-30. POST-TEST DRIVER DUMMY POSITION VIEW

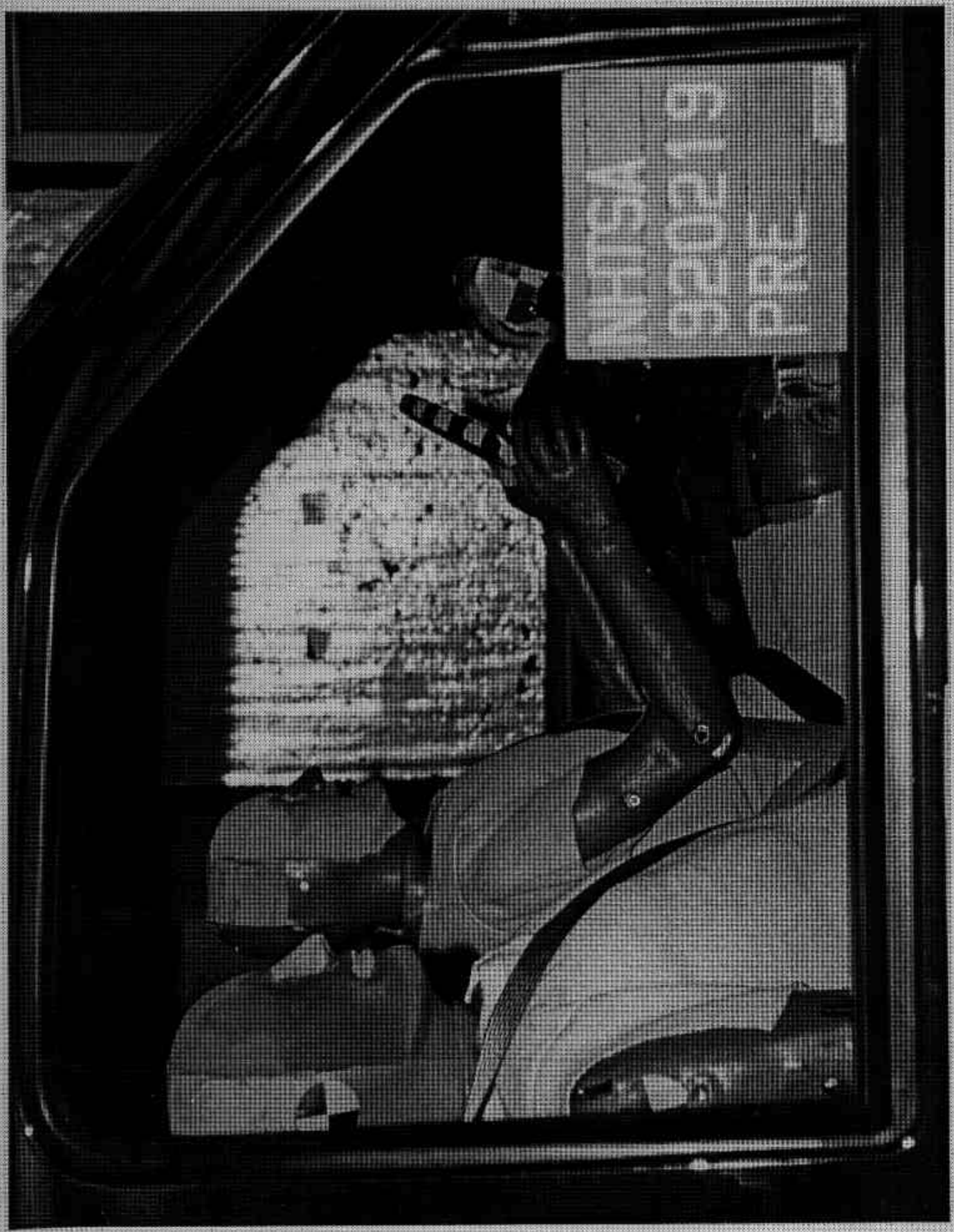


FIGURE A-31. PRE-TEST PASSENGER DUMMY POSITION VIEW

FIGURE A-32. POST-TEST PASSENGER DUMMY POSITION VIEW

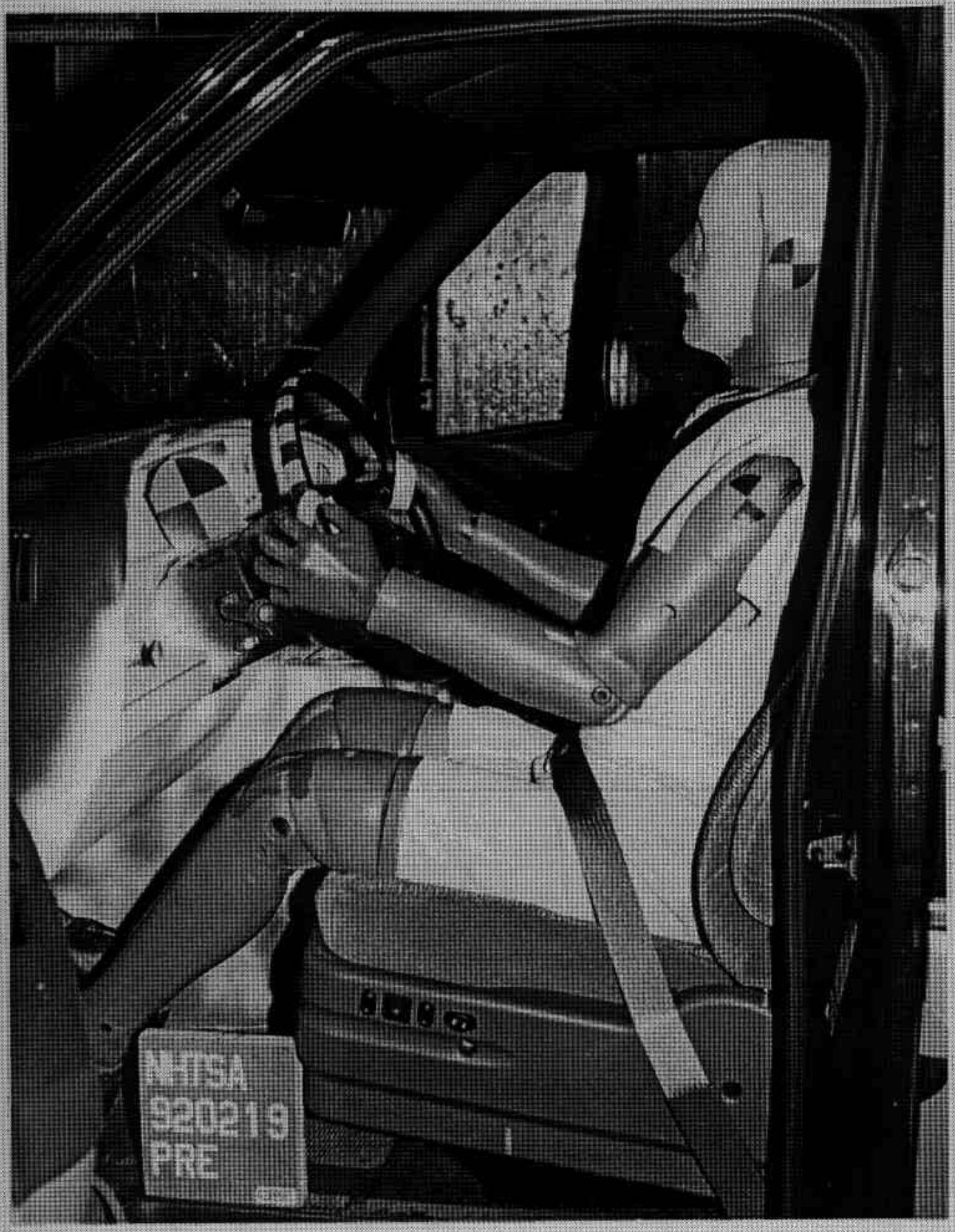


FIGURE A-33. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

FIGURE A-34. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

FIGURE A-35. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

FIGURE A-36. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

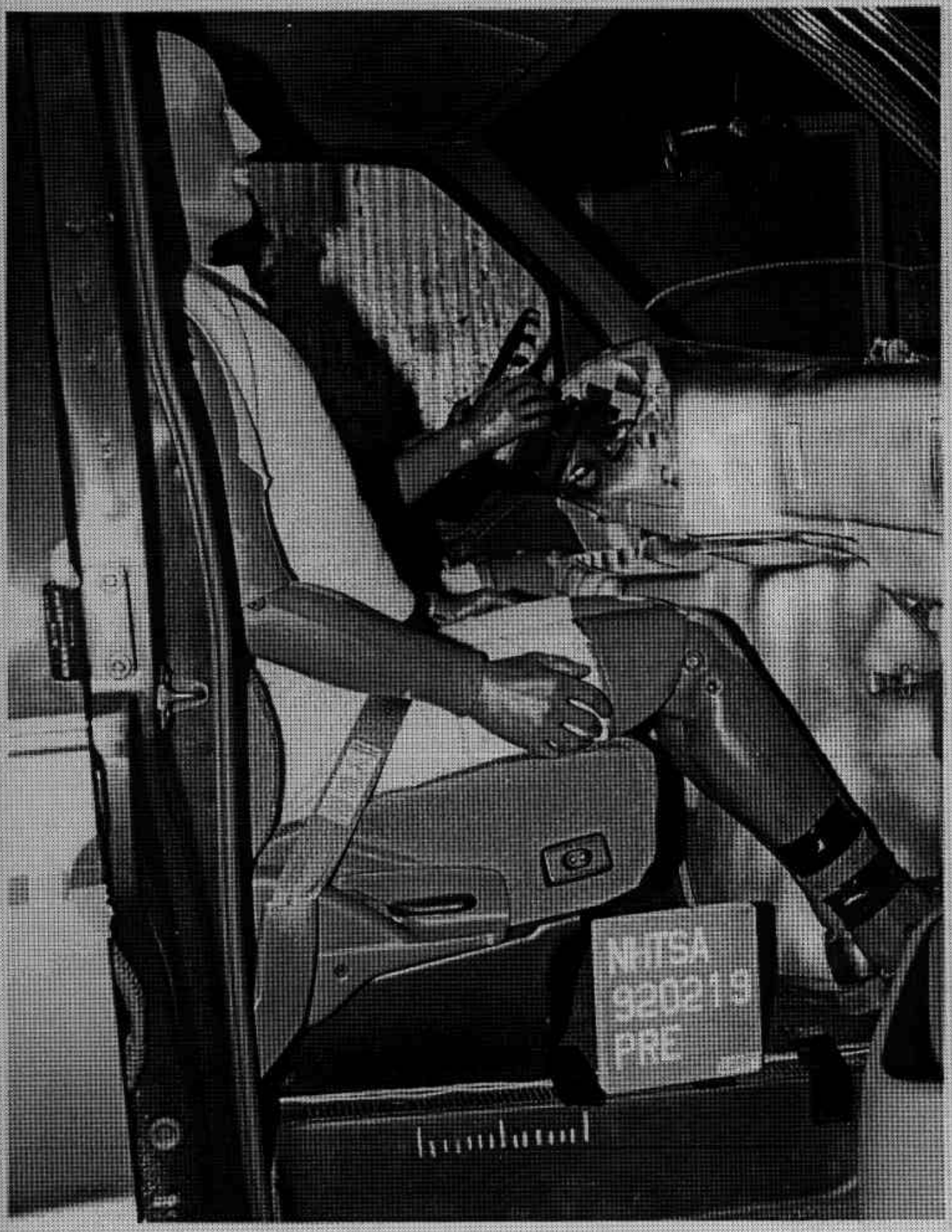


FIGURE A-37. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

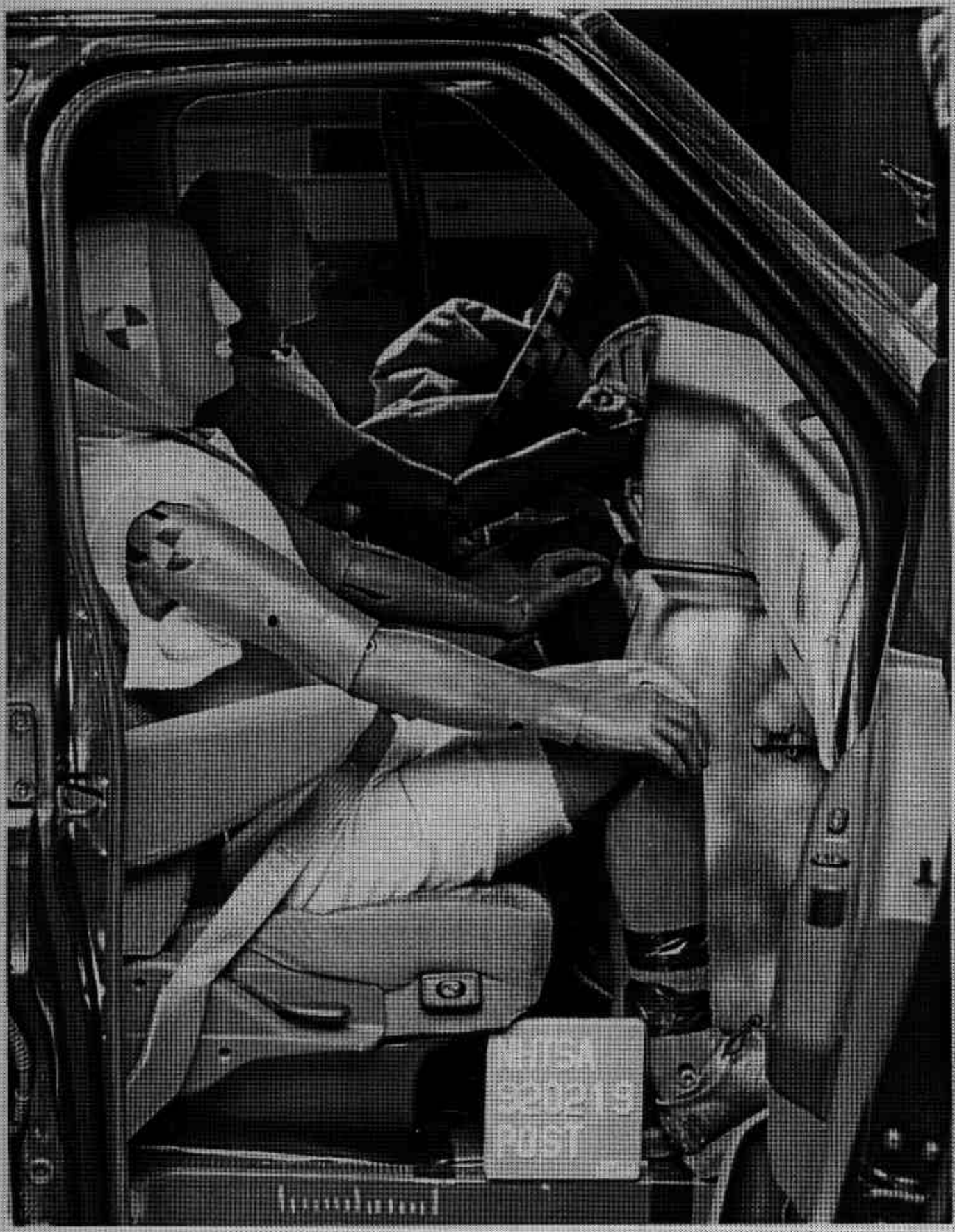


FIGURE A-38. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

FIGURE A-39. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

FIGURE A-40. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

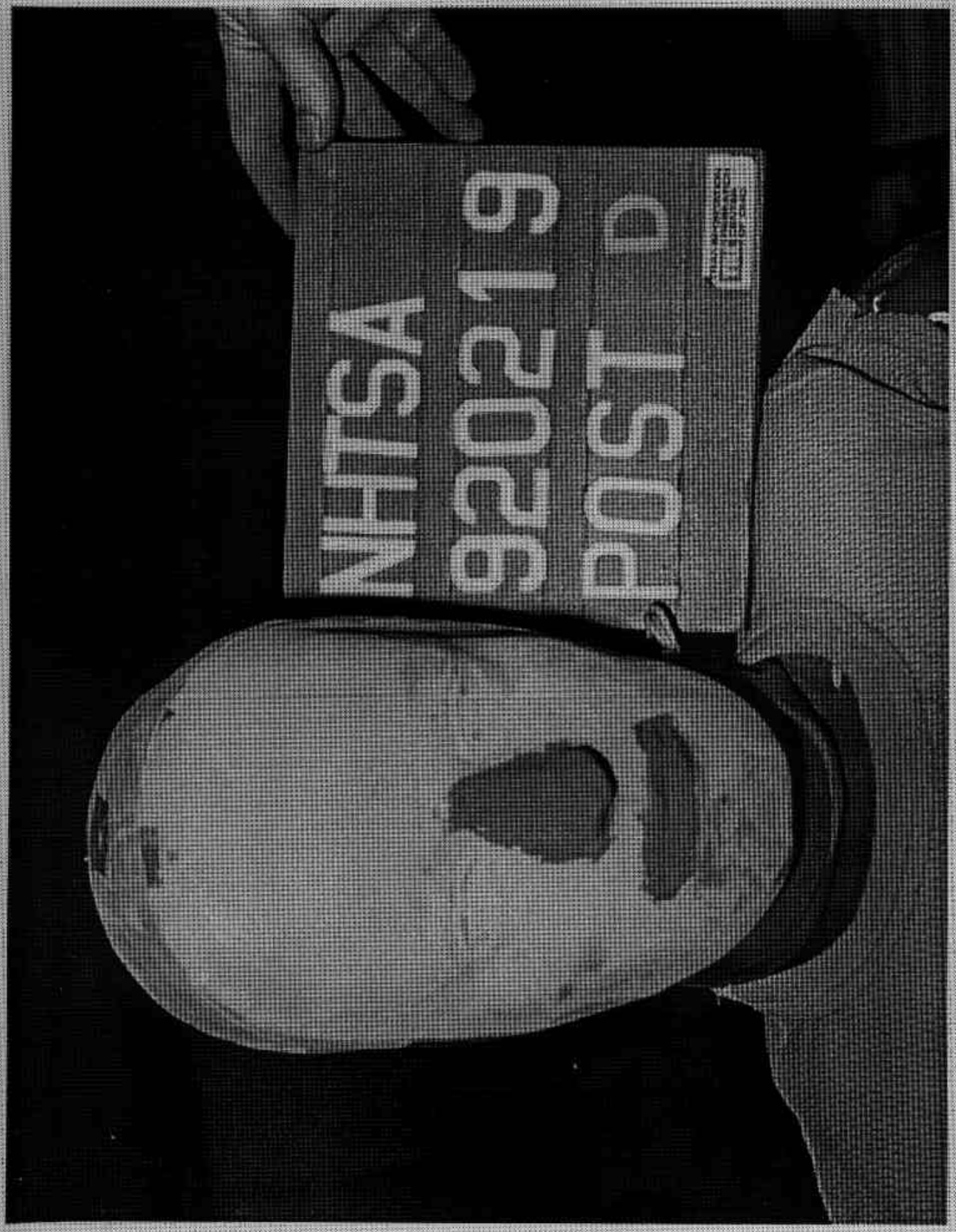


FIGURE A-41. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

FIGURE A-42. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

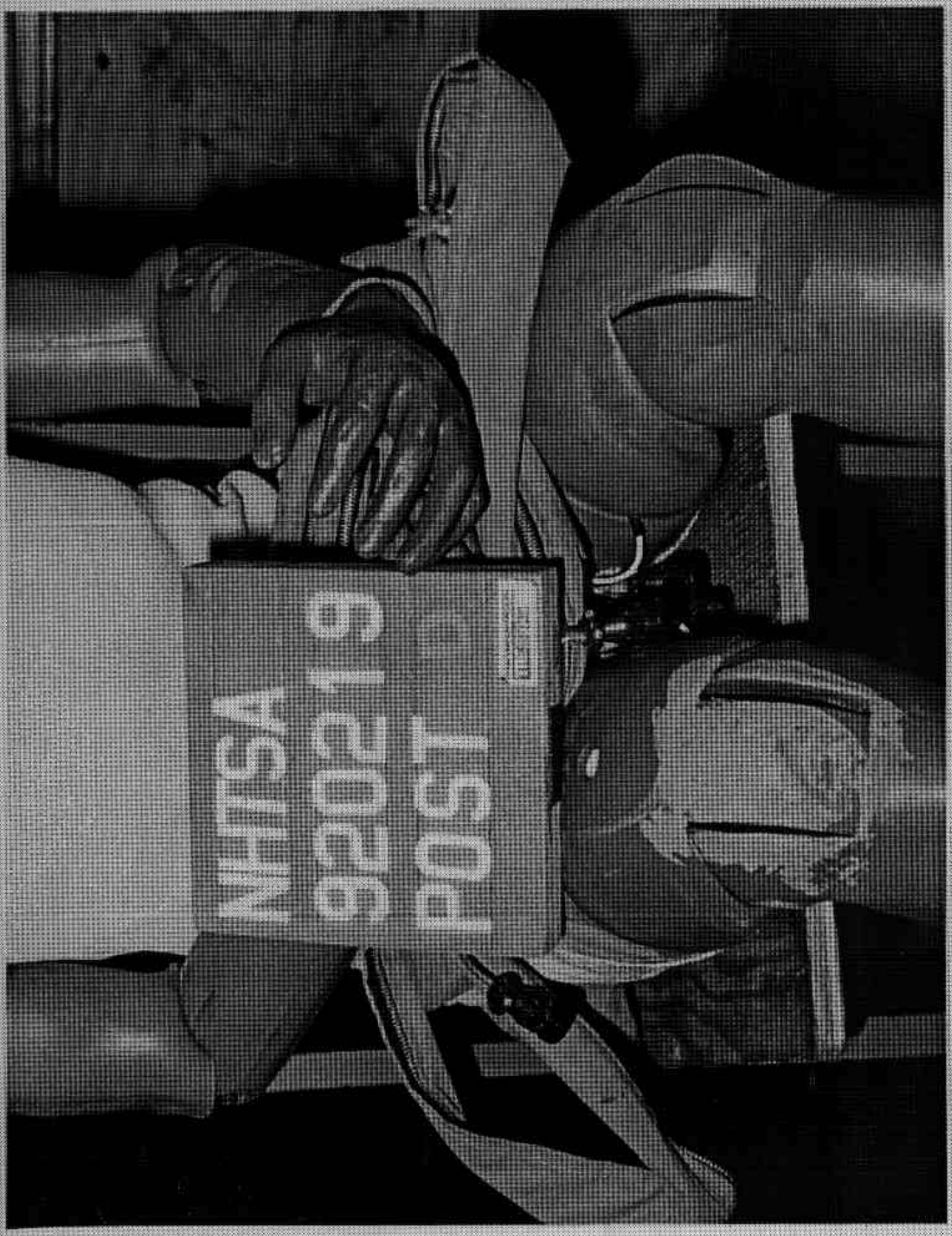


FIGURE A-43. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

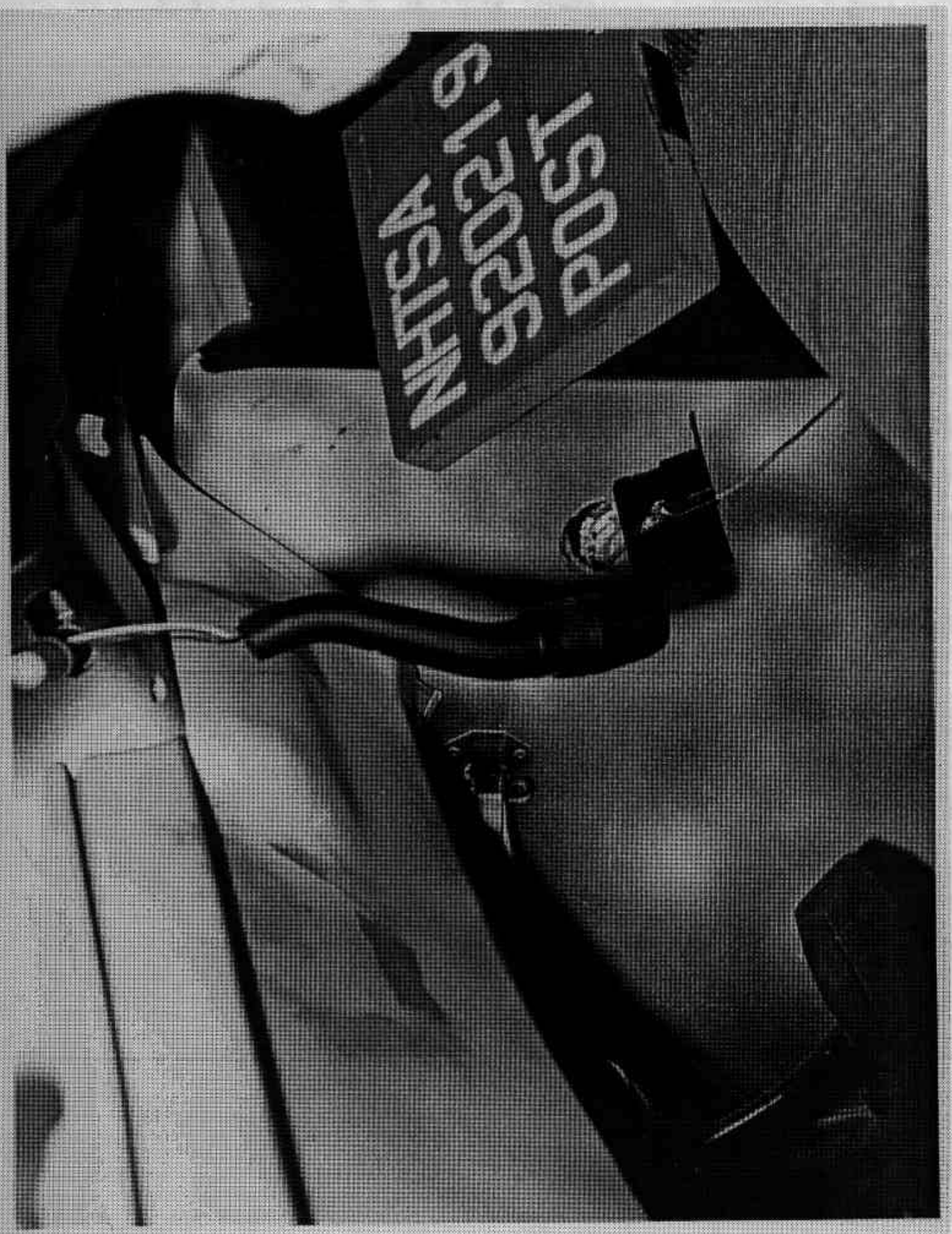


FIGURE A-44. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

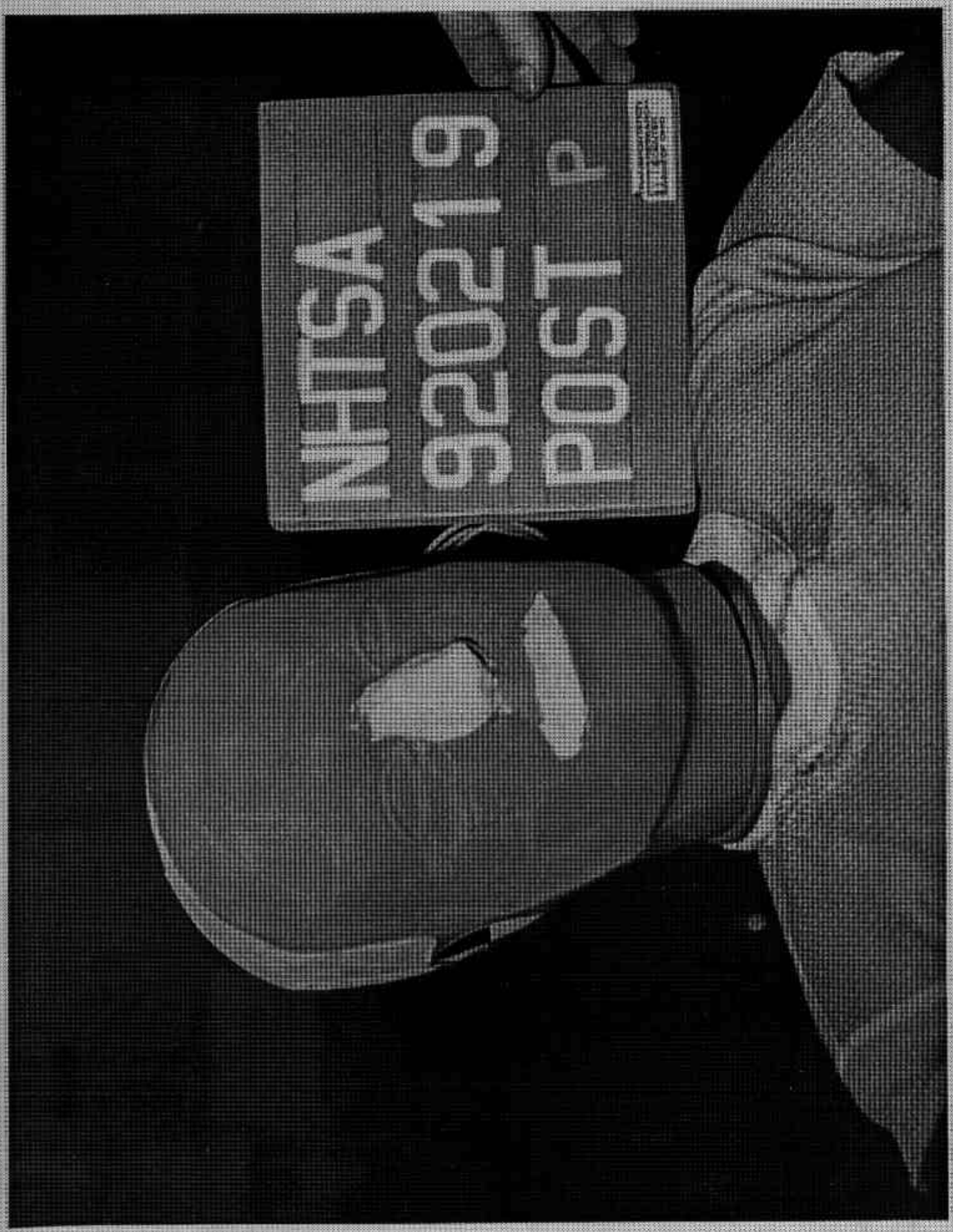


FIGURE A-45. POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW

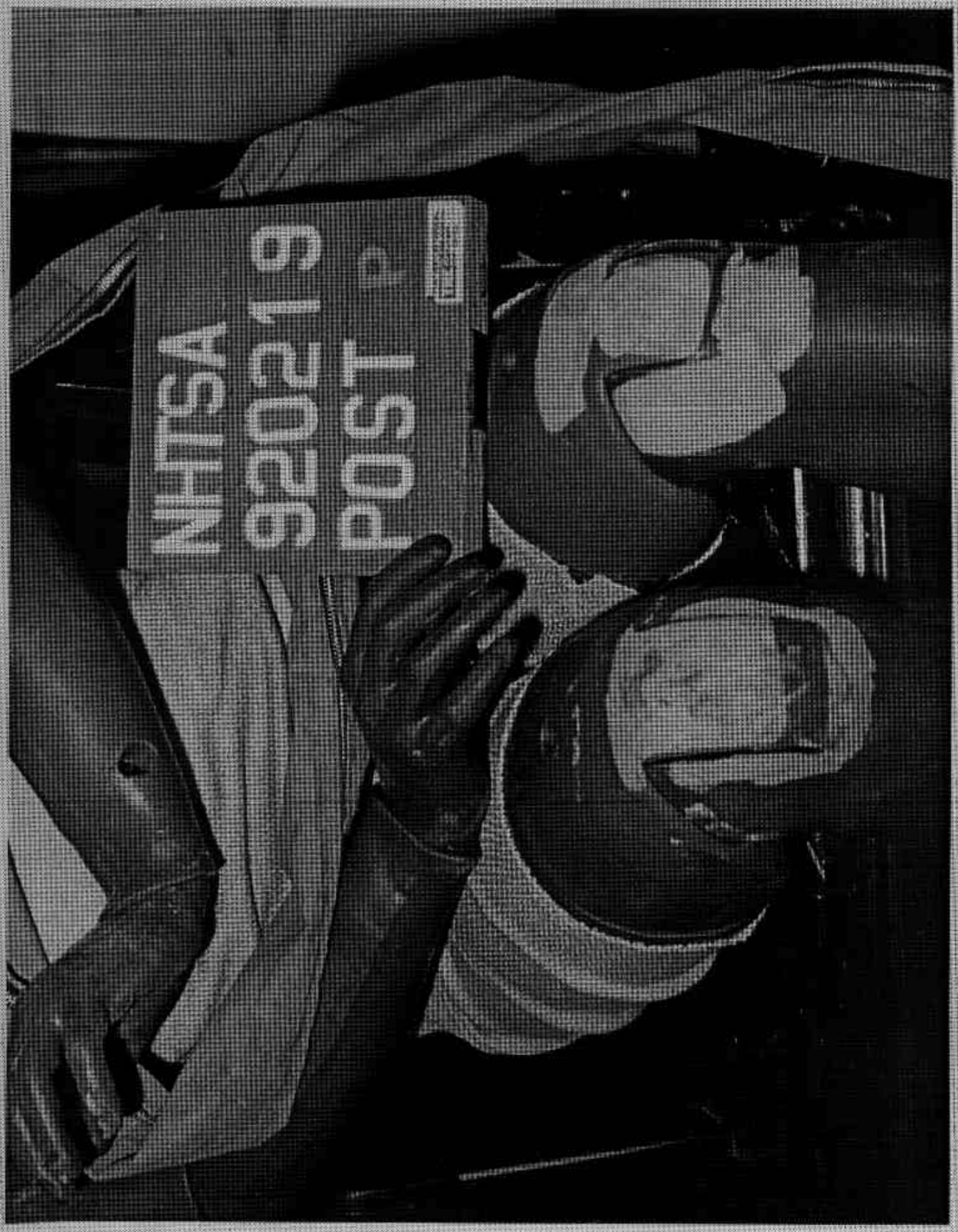


FIGURE A-46. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

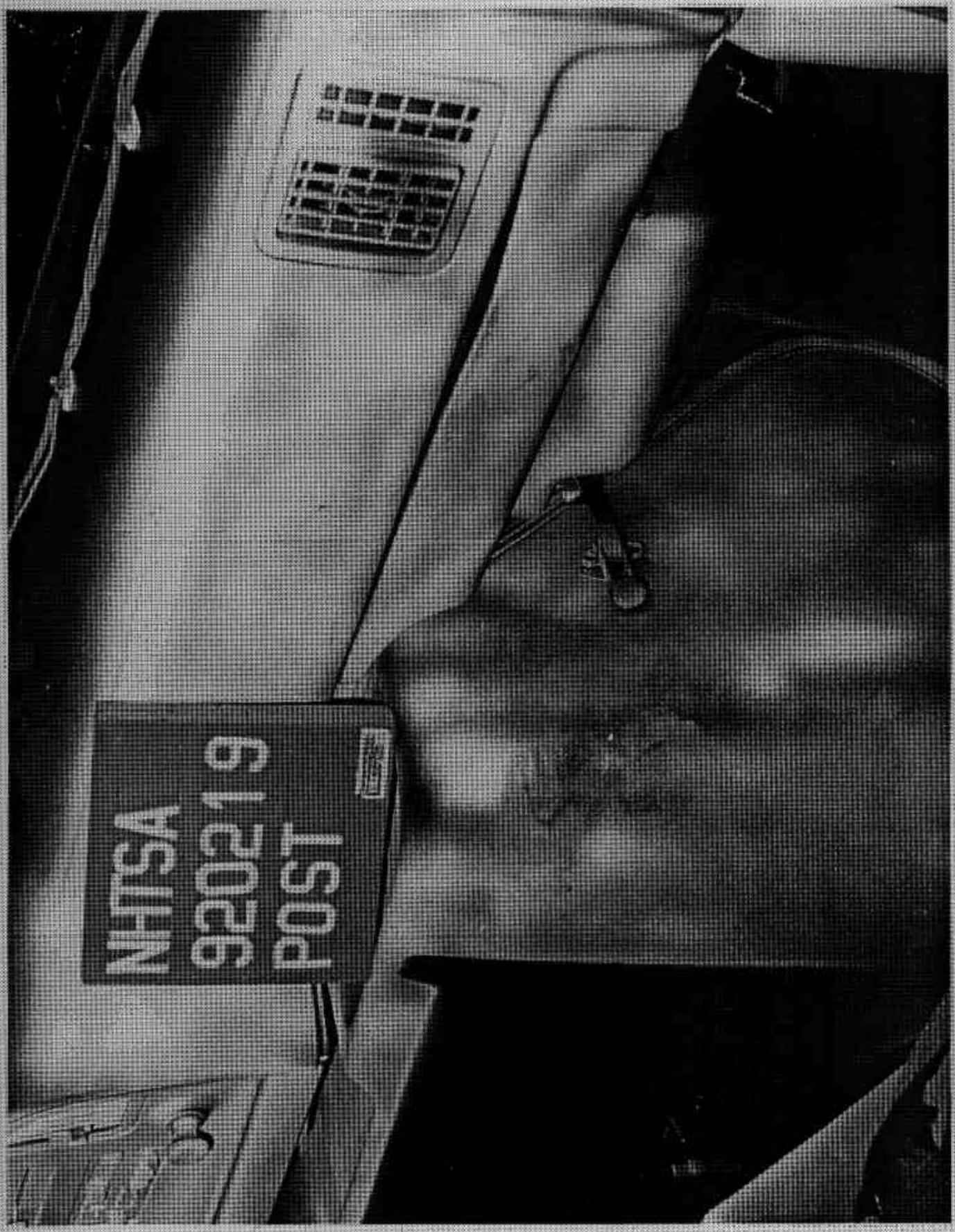


FIGURE A-47. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

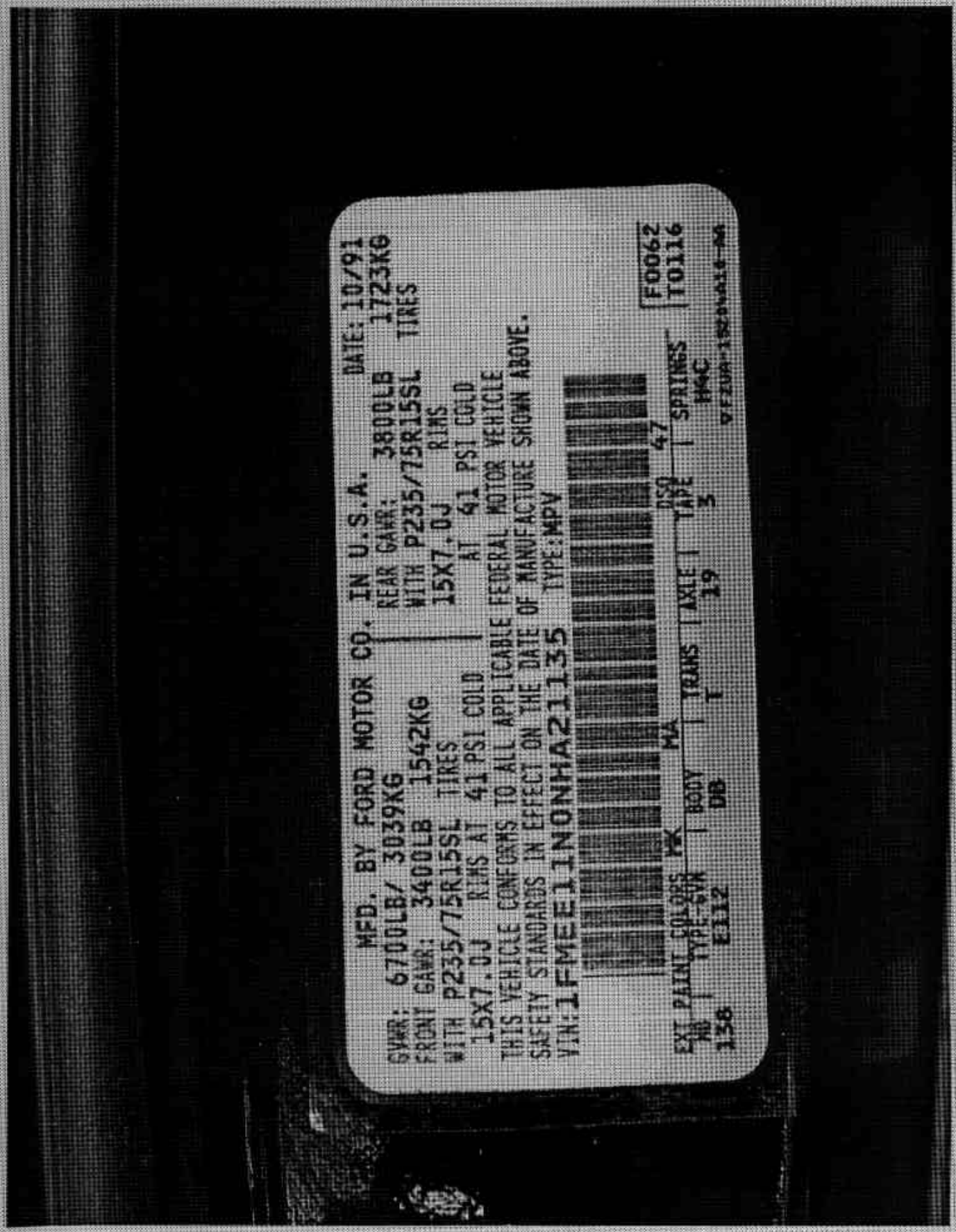


FIG. A-48. PRE-TEST VEHICLE CERT. & RECOMMENDED TIRE PRES. LABEL

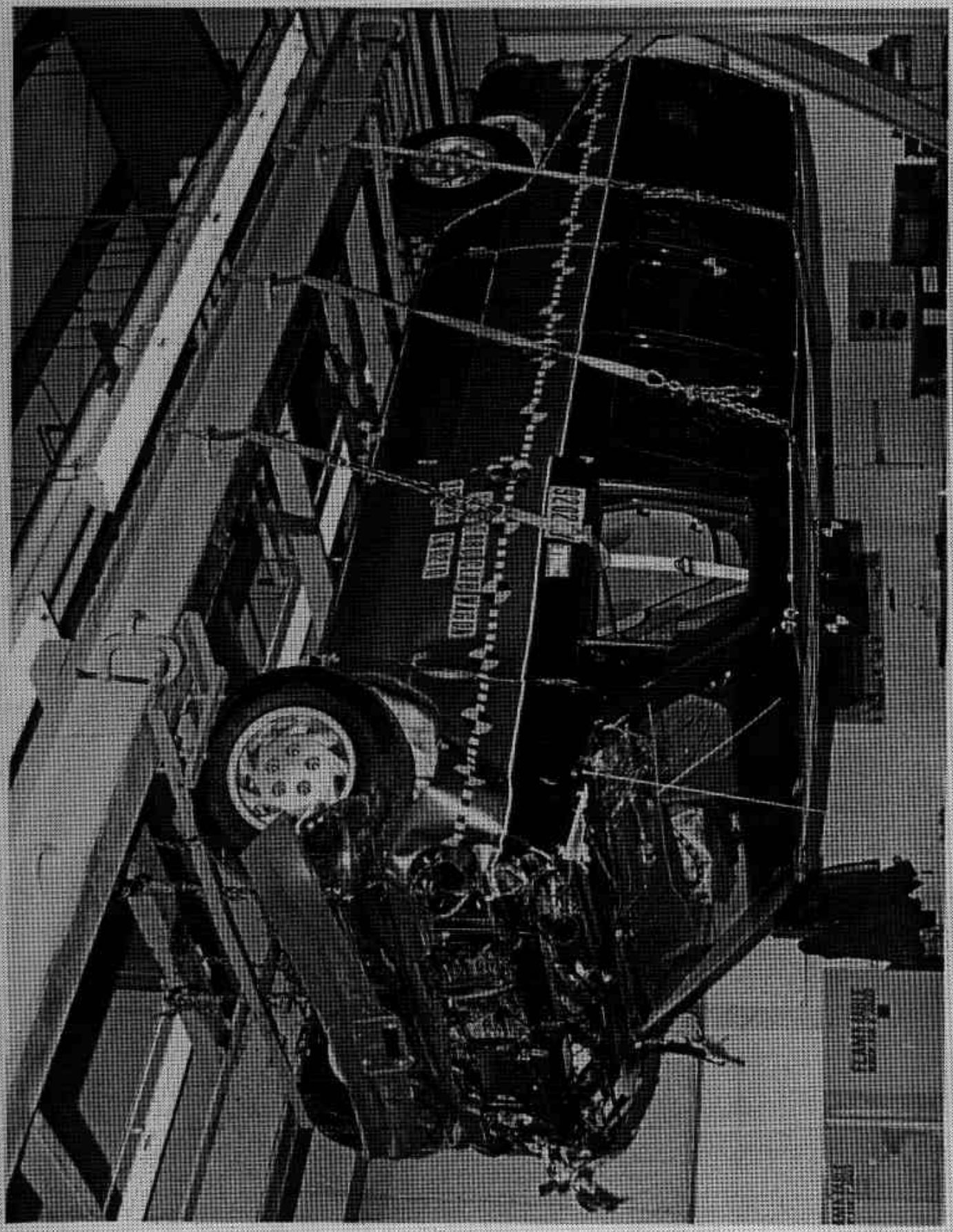
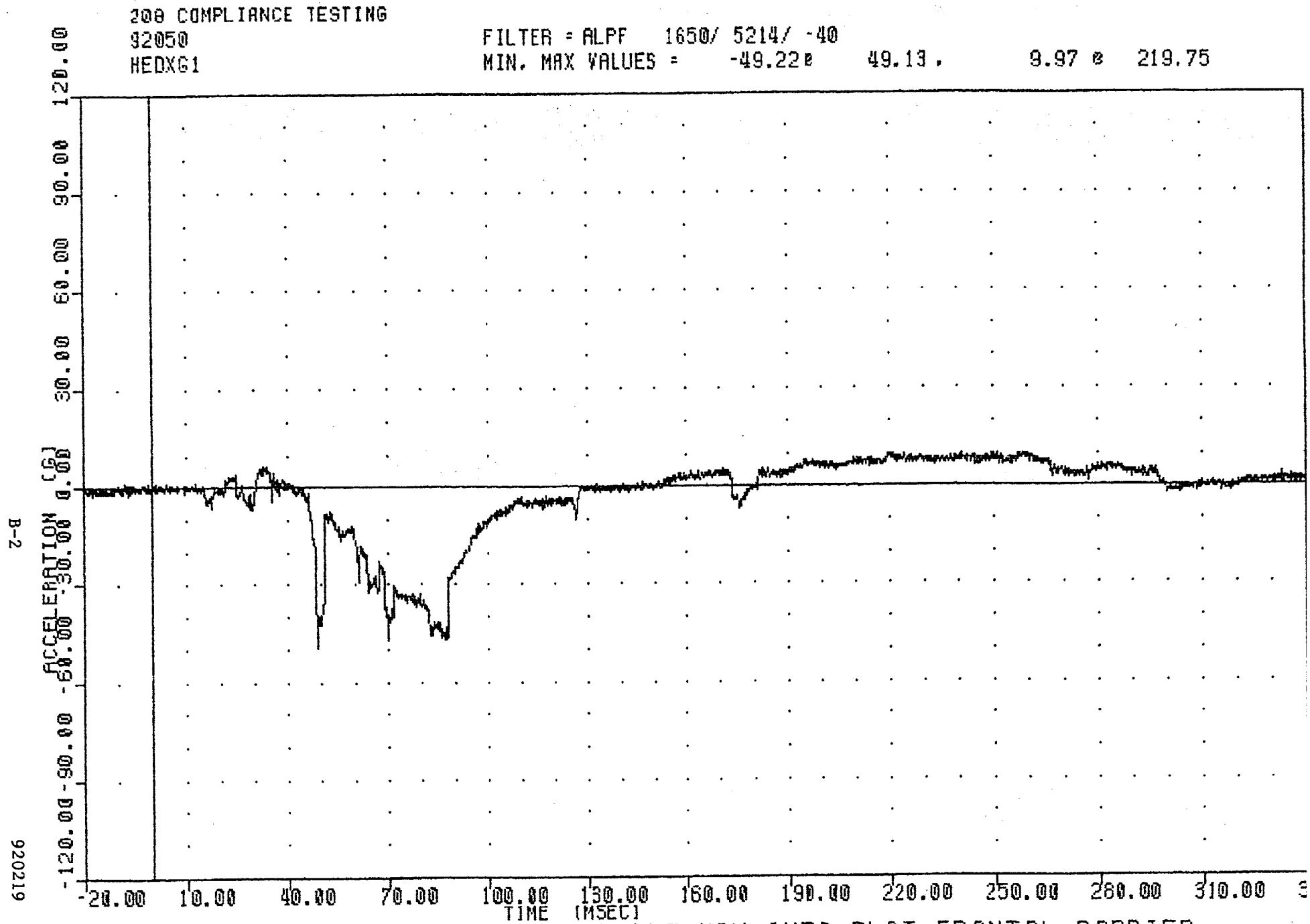


FIGURE A-49. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW

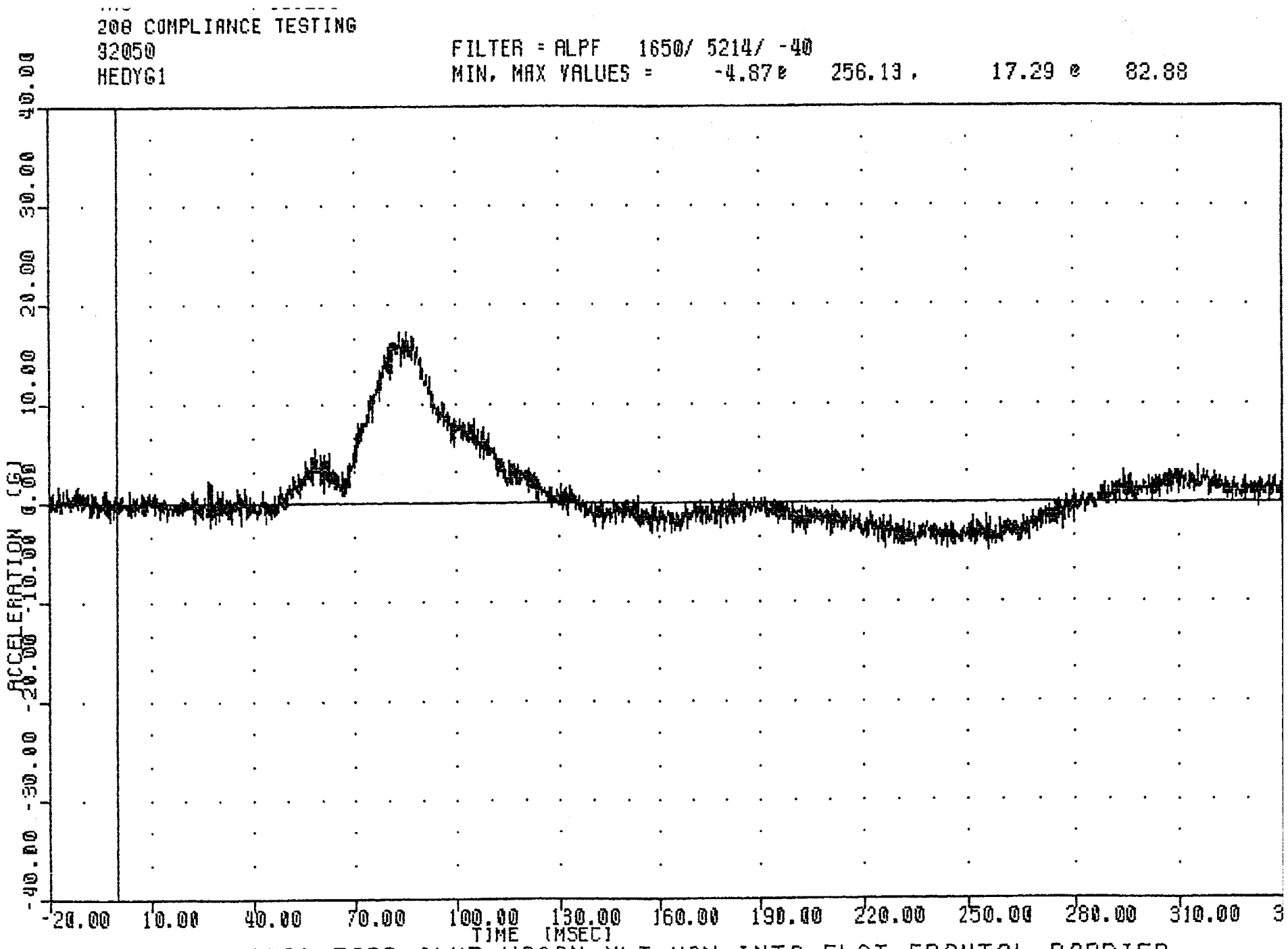
APPENDIX B

DATA PLOTS



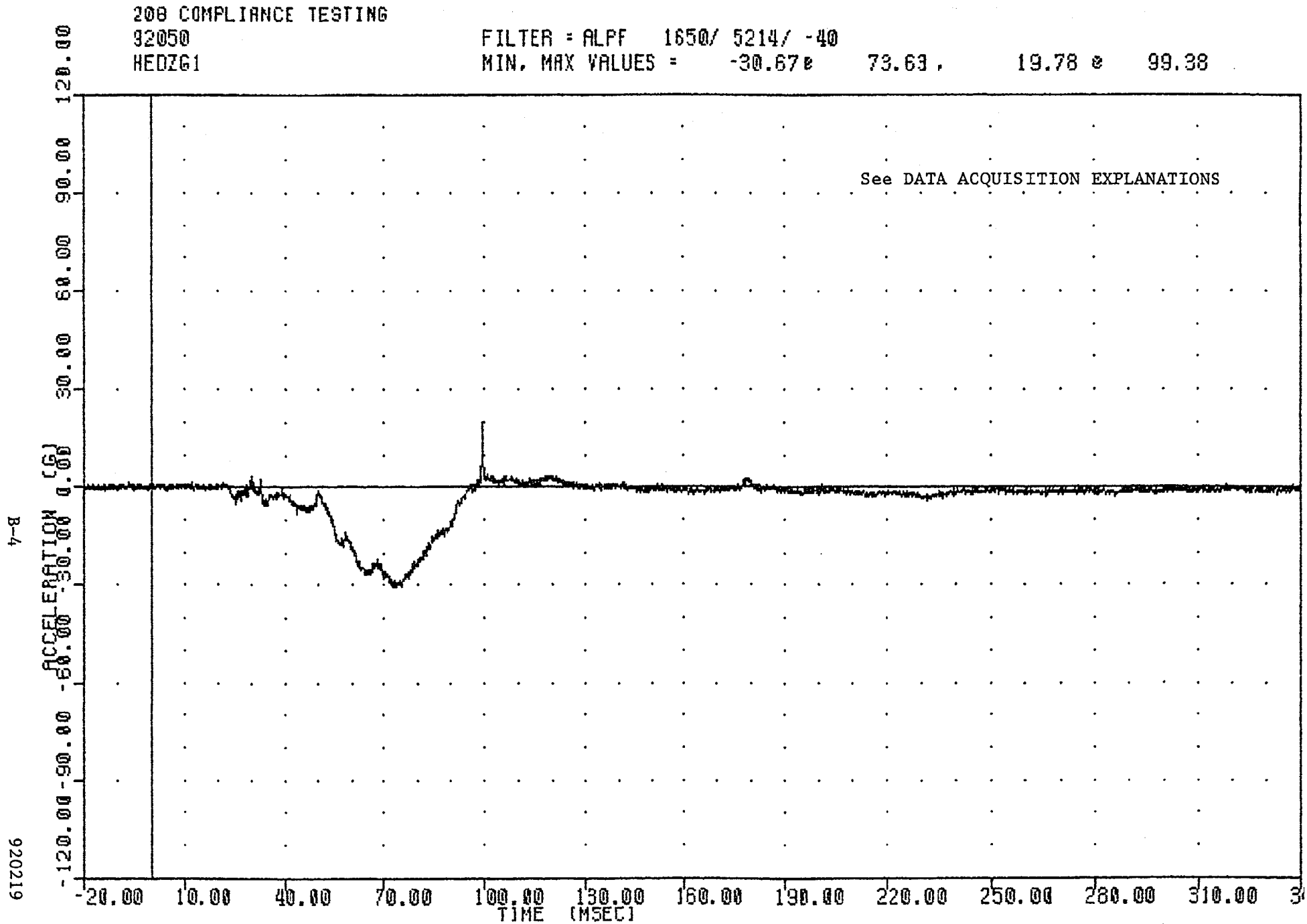
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION

920219



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION

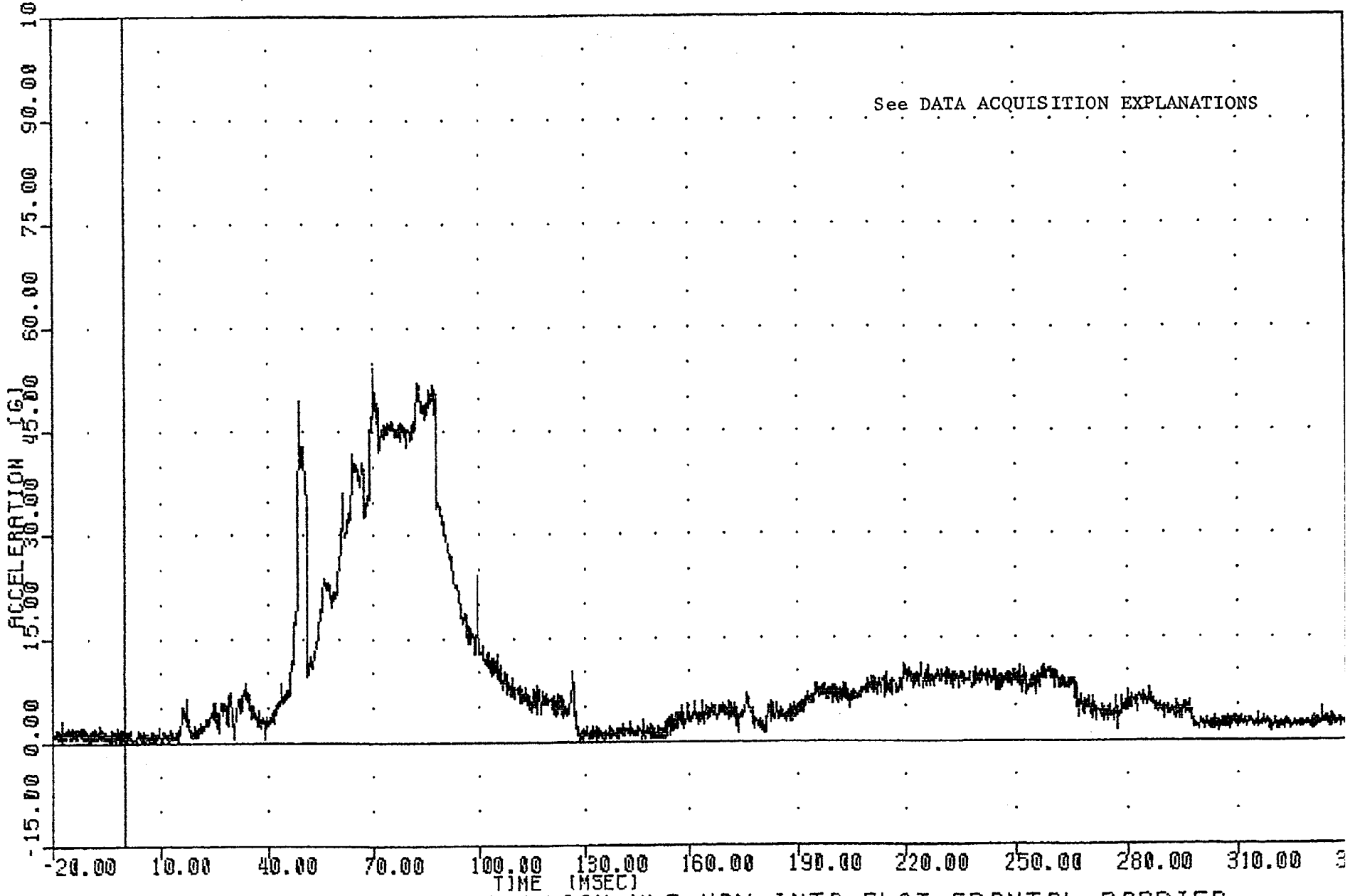
920219



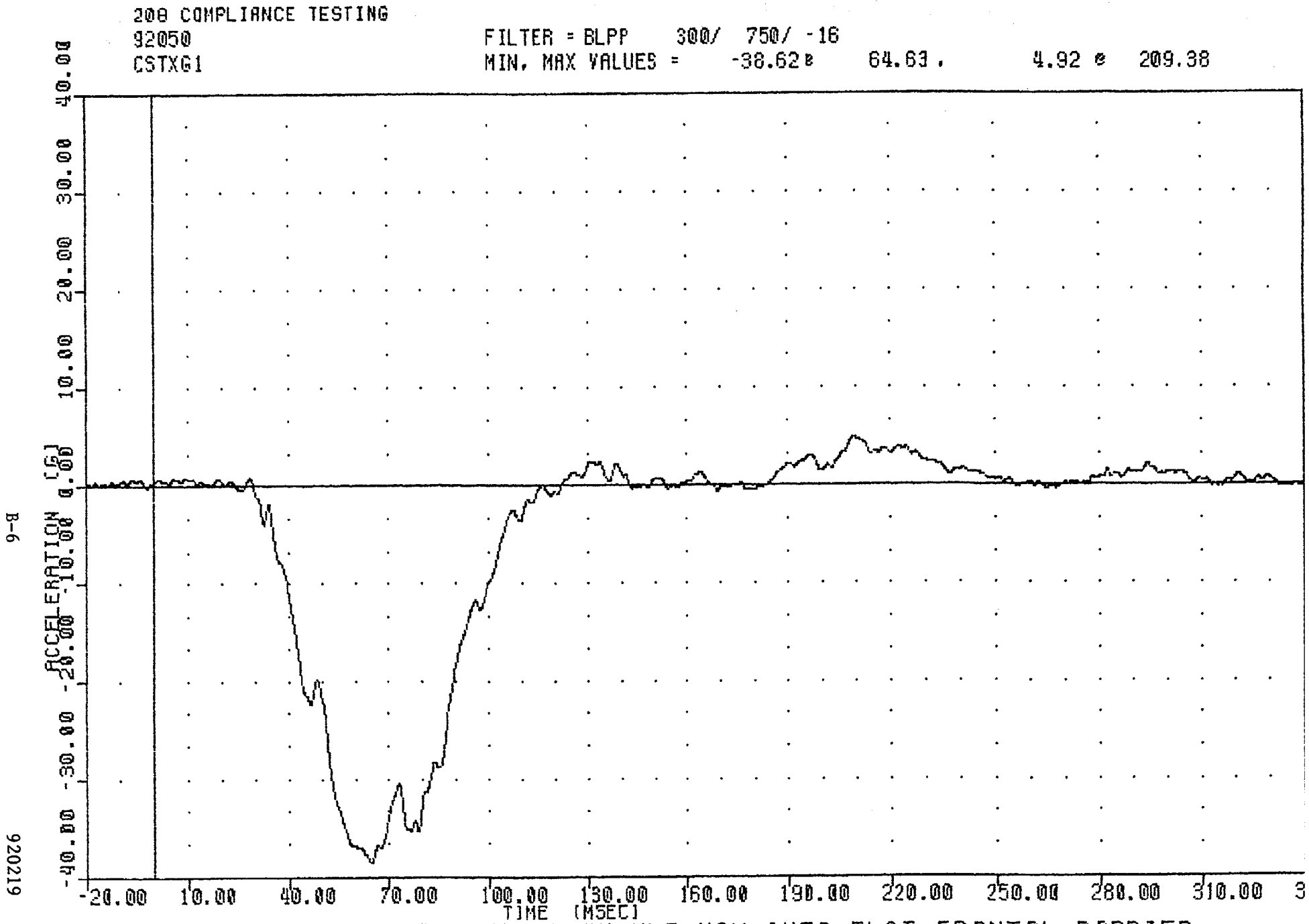
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION

208 COMPLIANCE TESTING
92050
HEDRG1

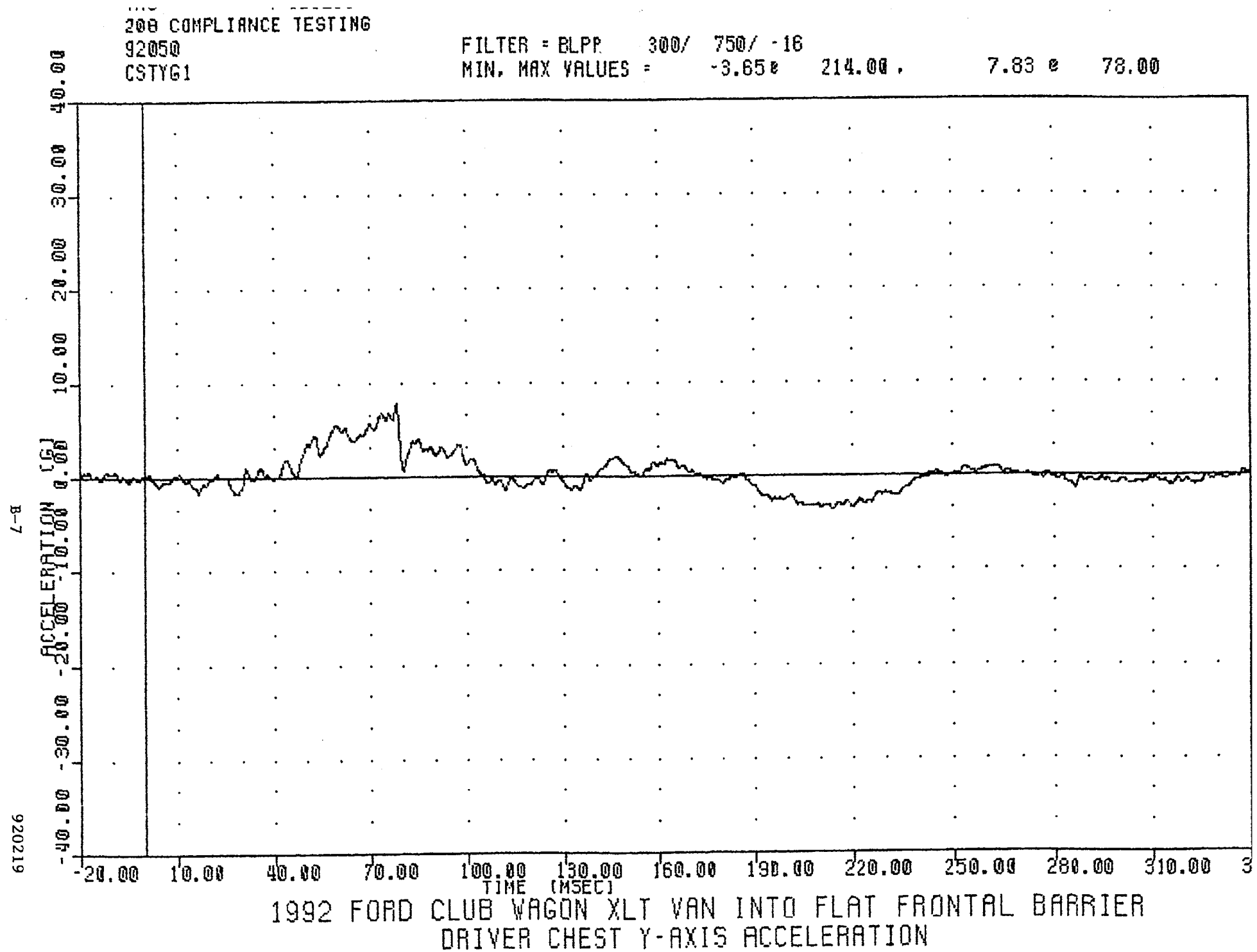
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.01 @ 8.25 , 54.41 @ 69.88



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION

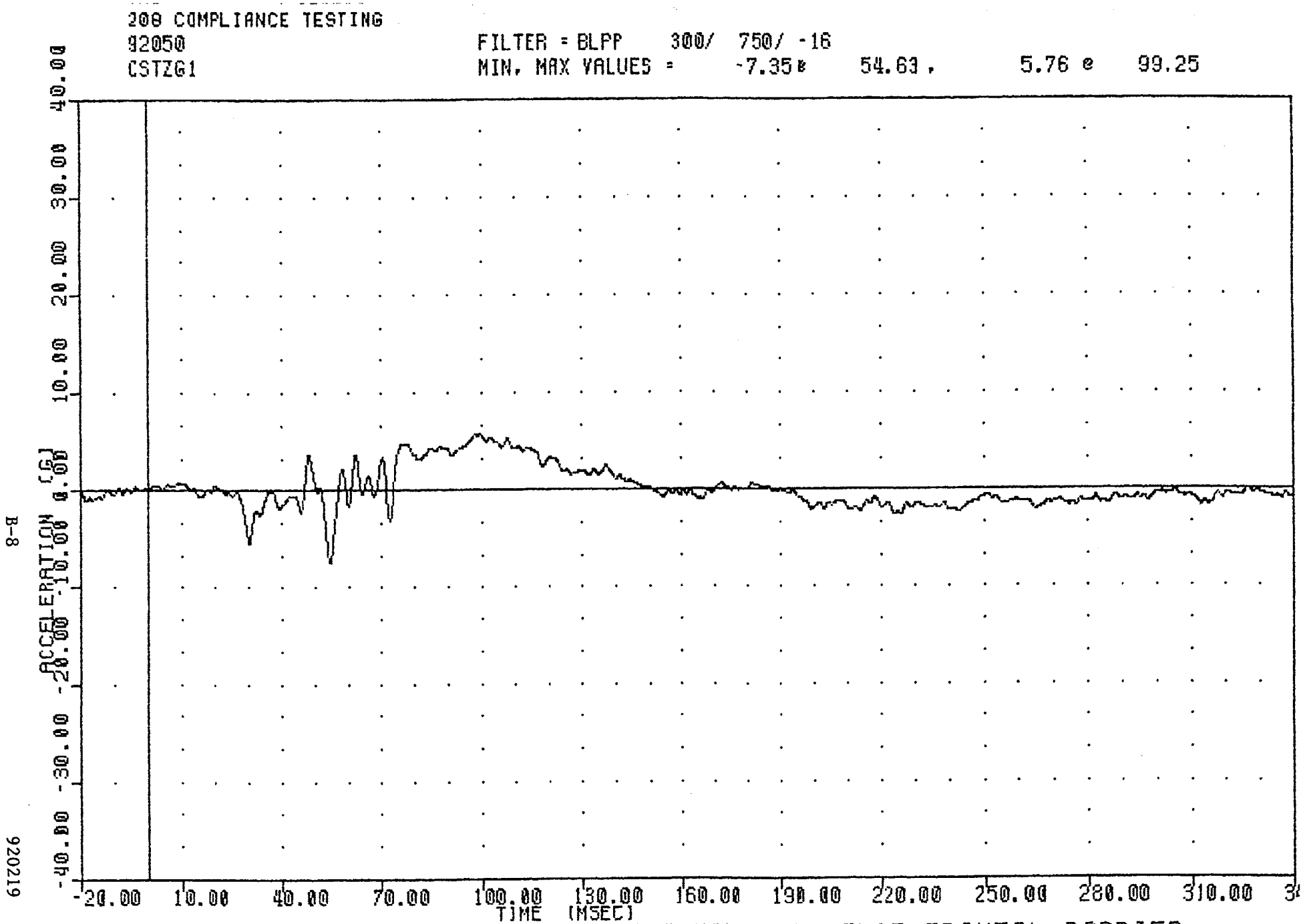


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION

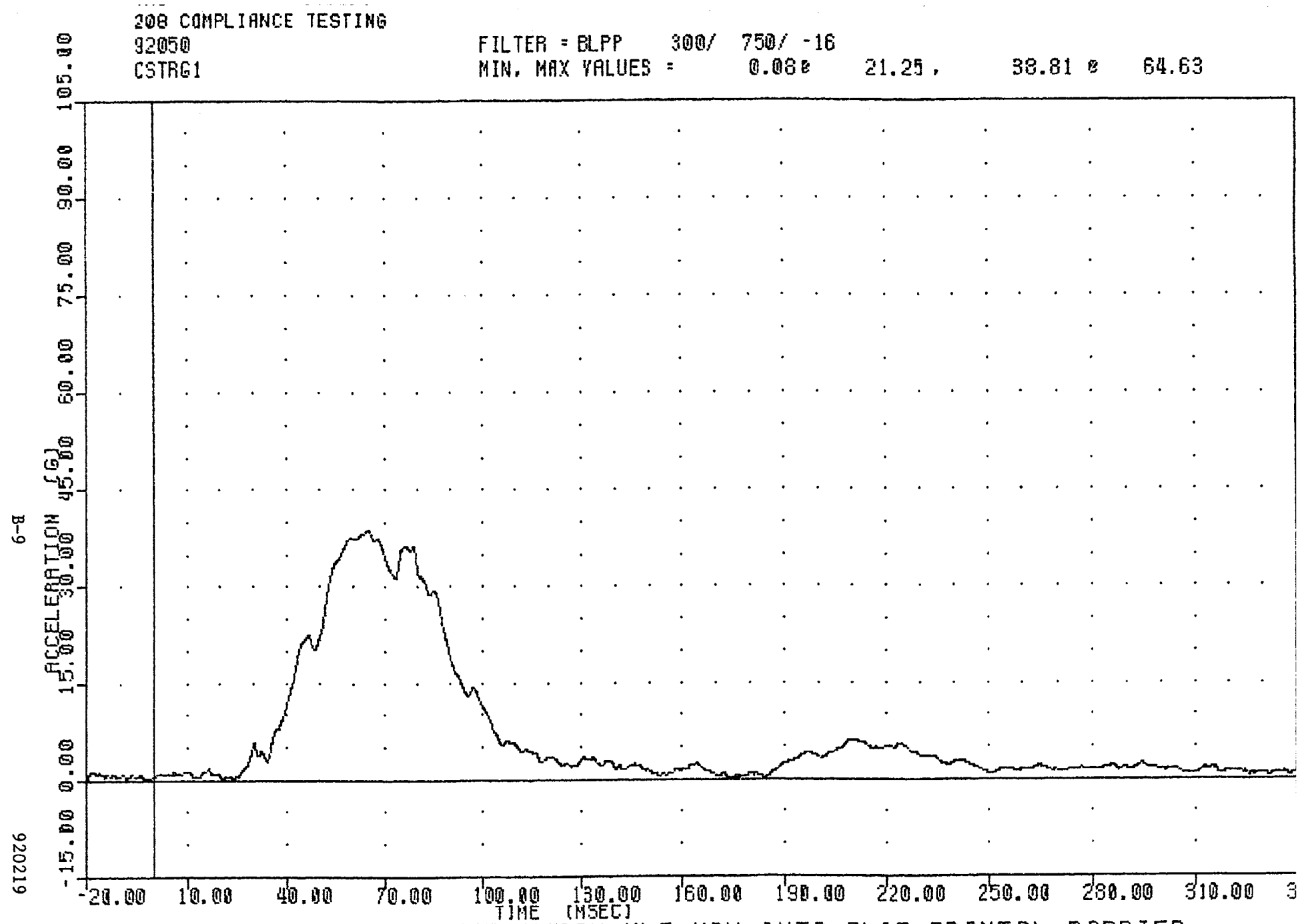


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

920219



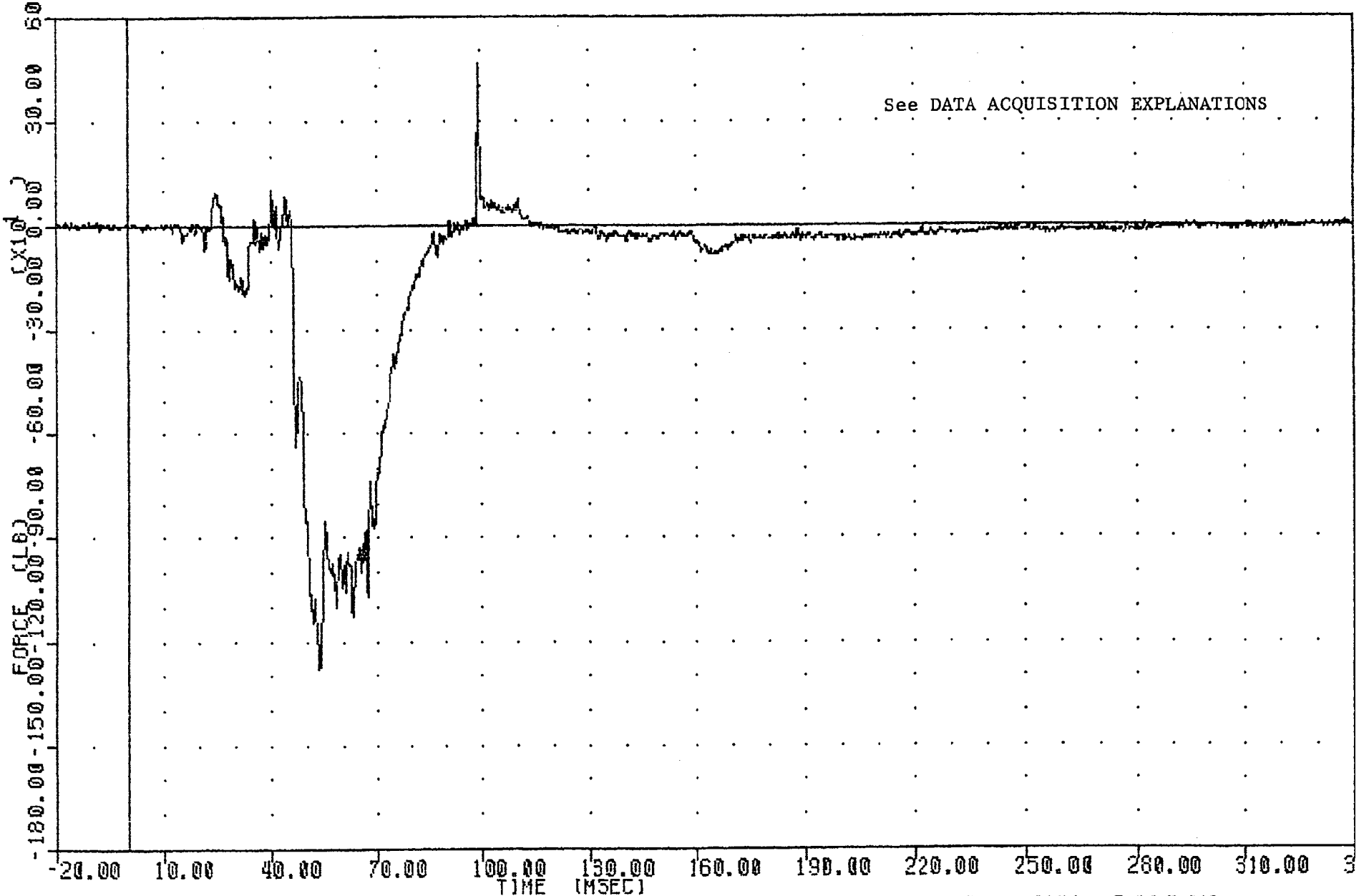
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION



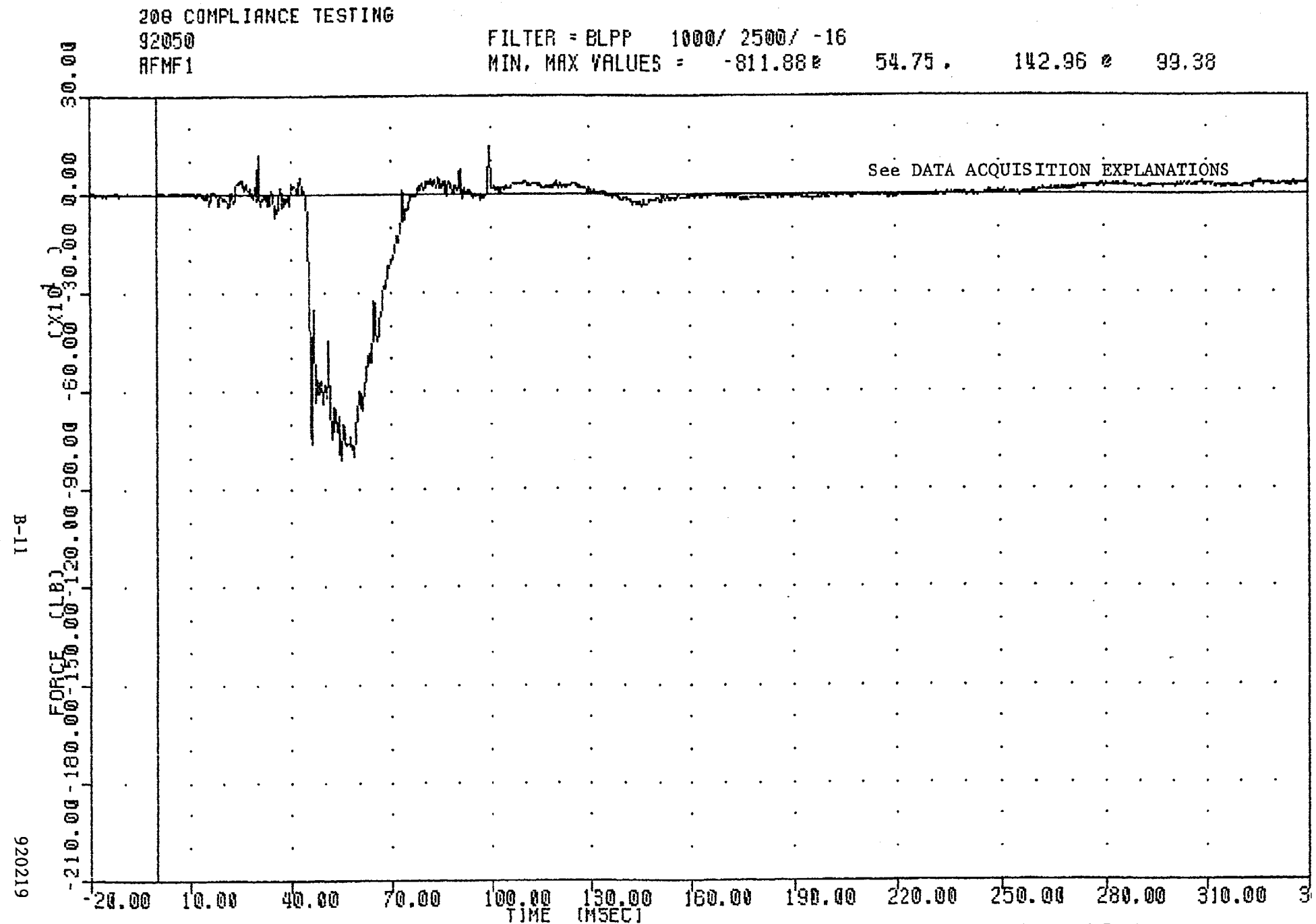
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION

208 COMPLIANCE TESTING
92050
LFMF1

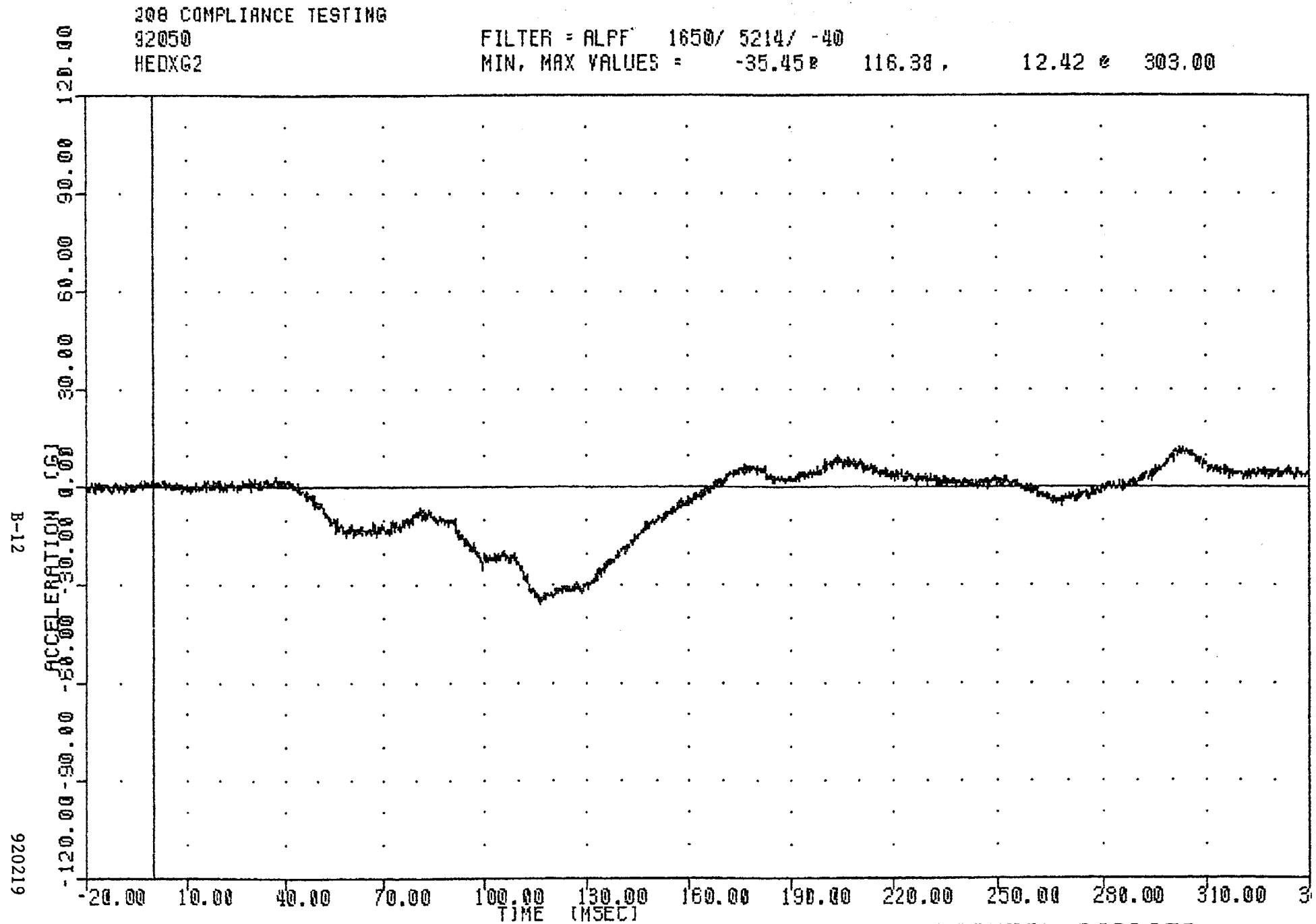
FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -1276.76 @ 53.63 , 461.13 @ 99.38



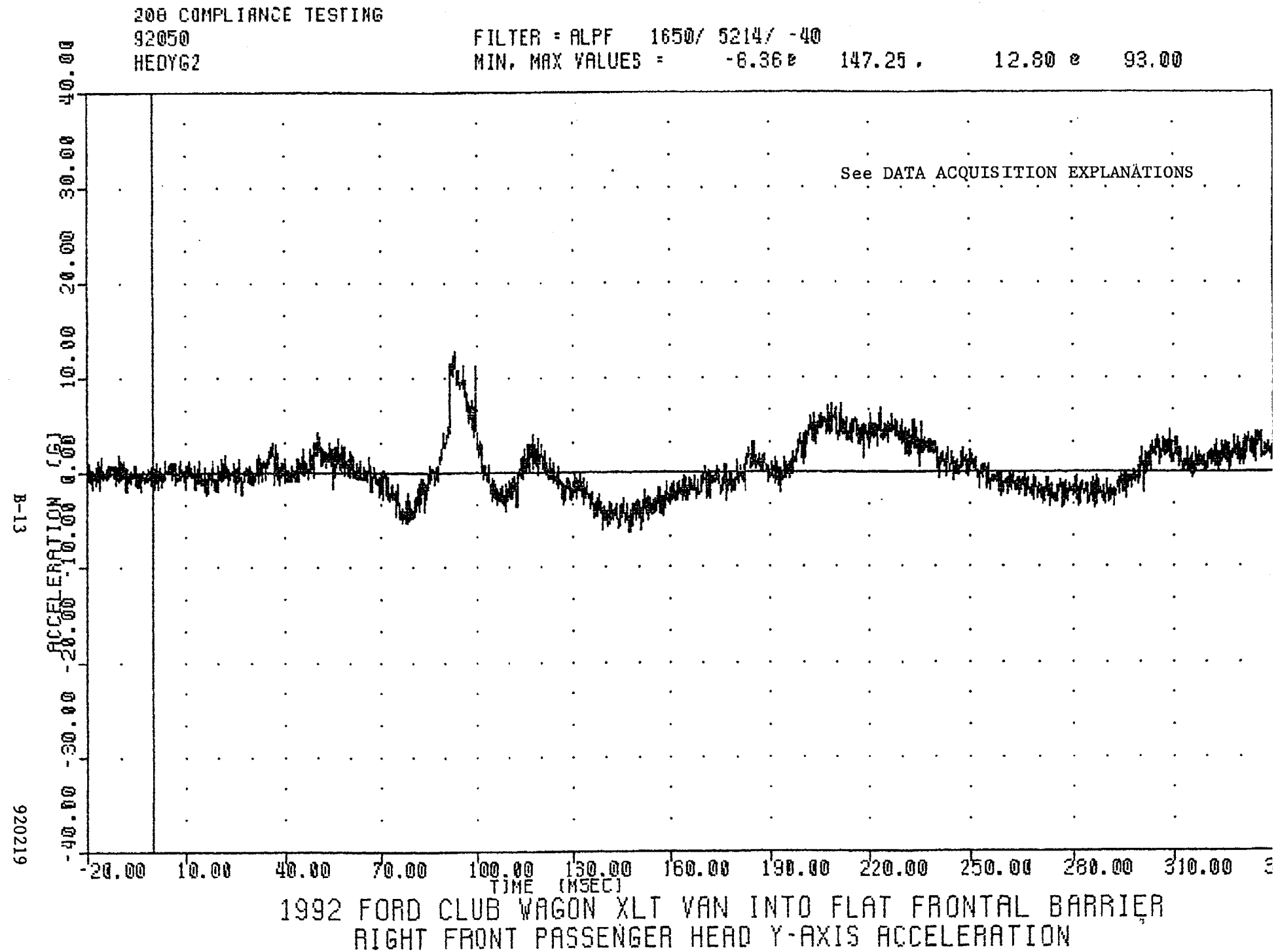
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE

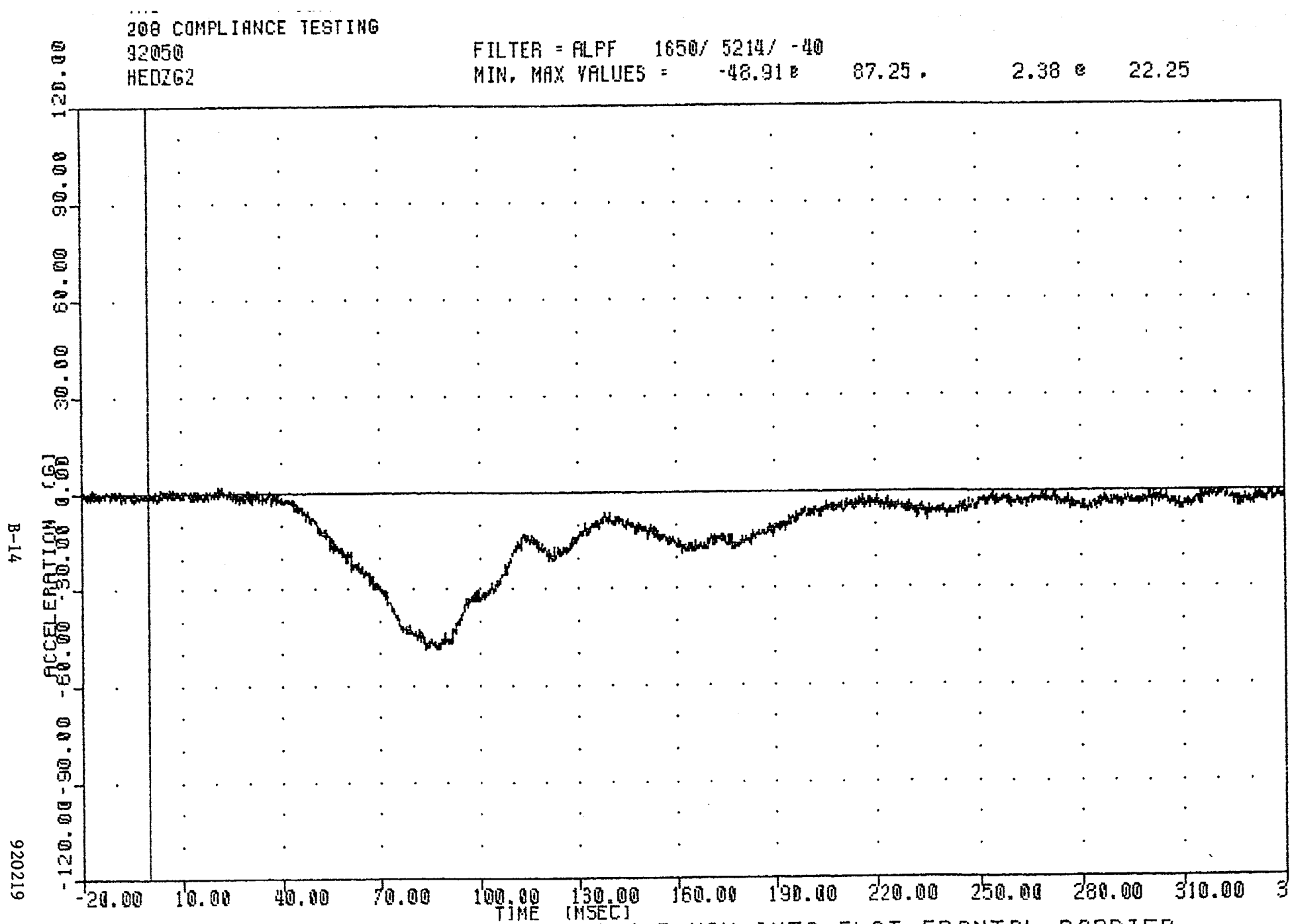


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

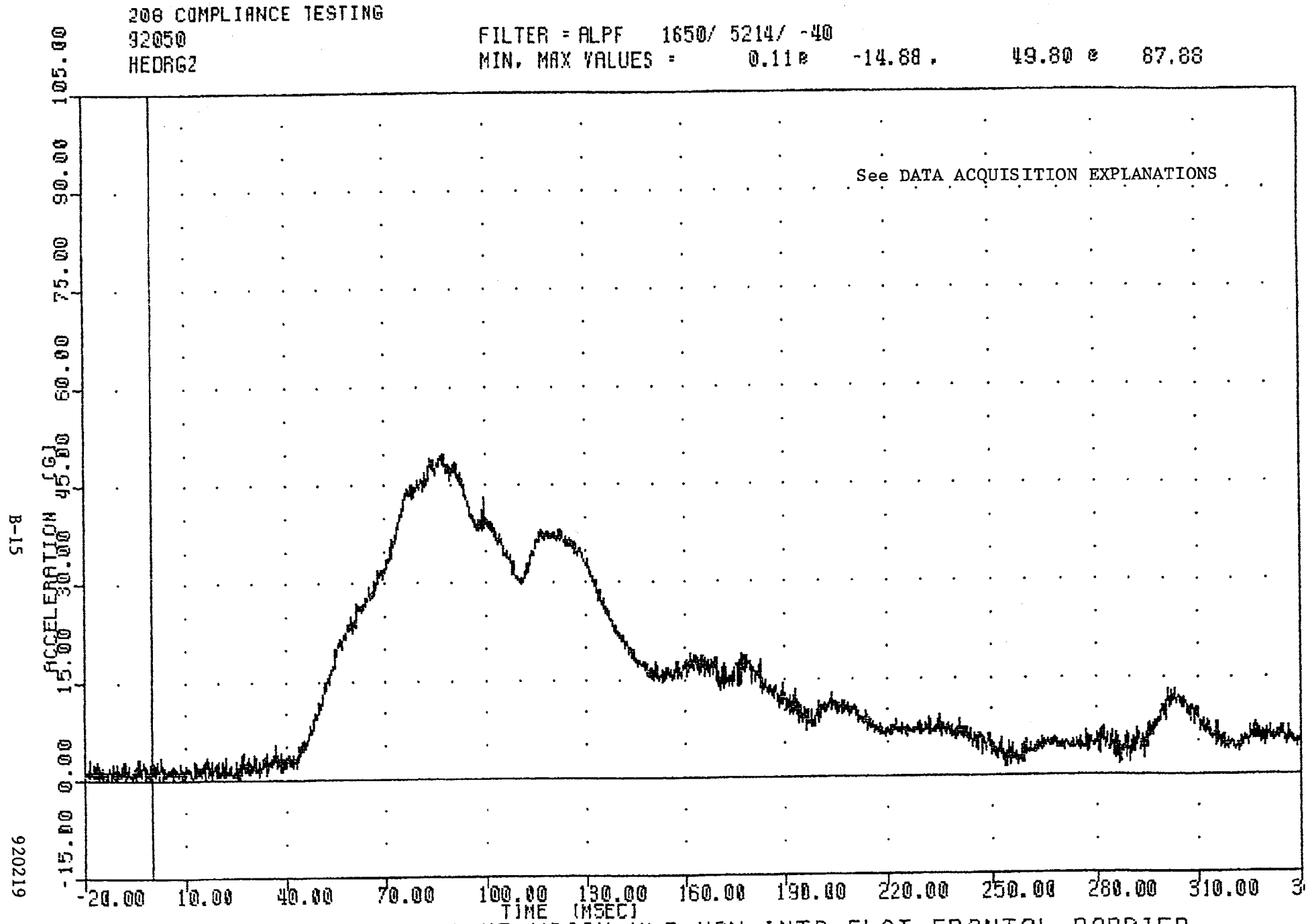


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

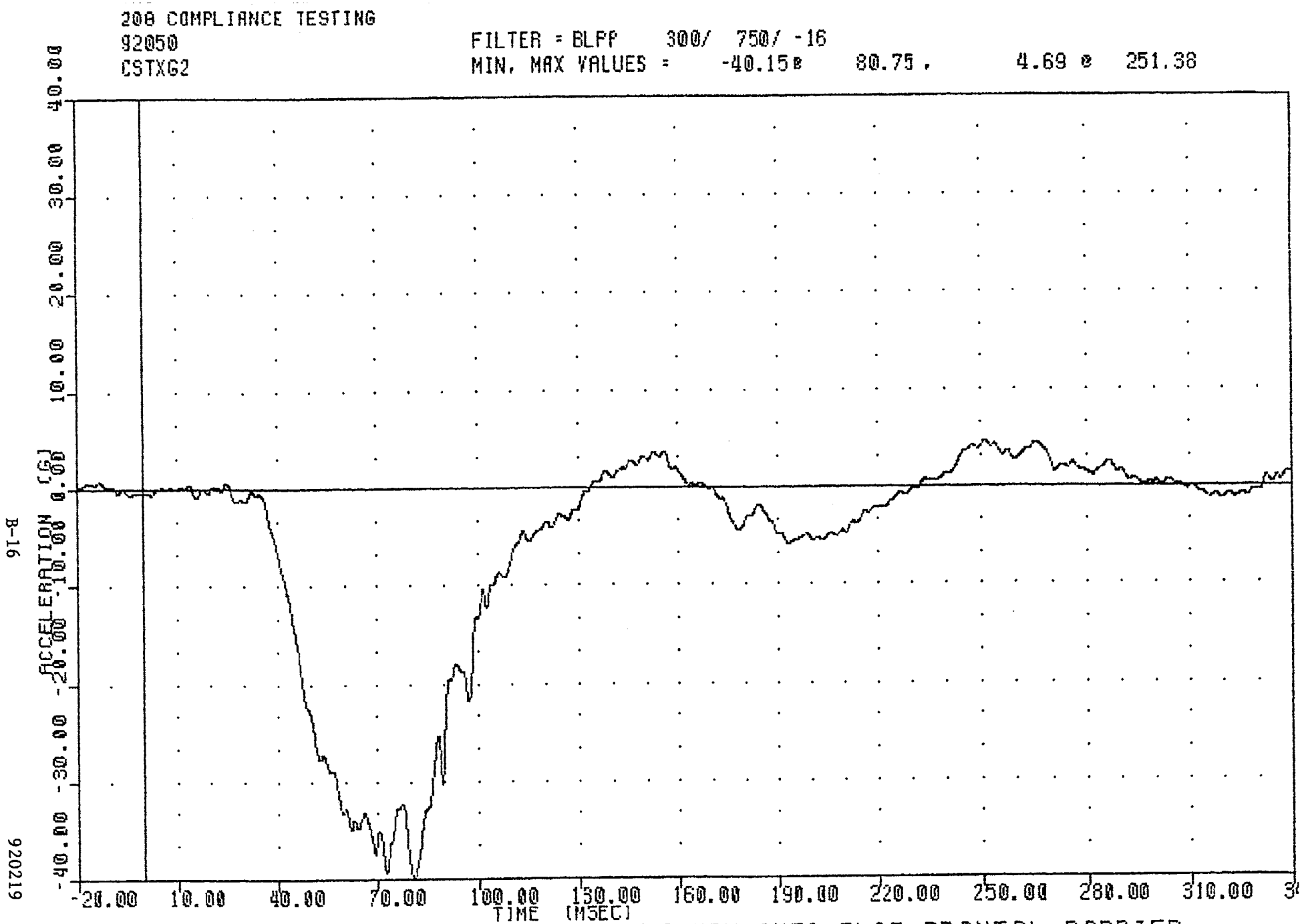
920219



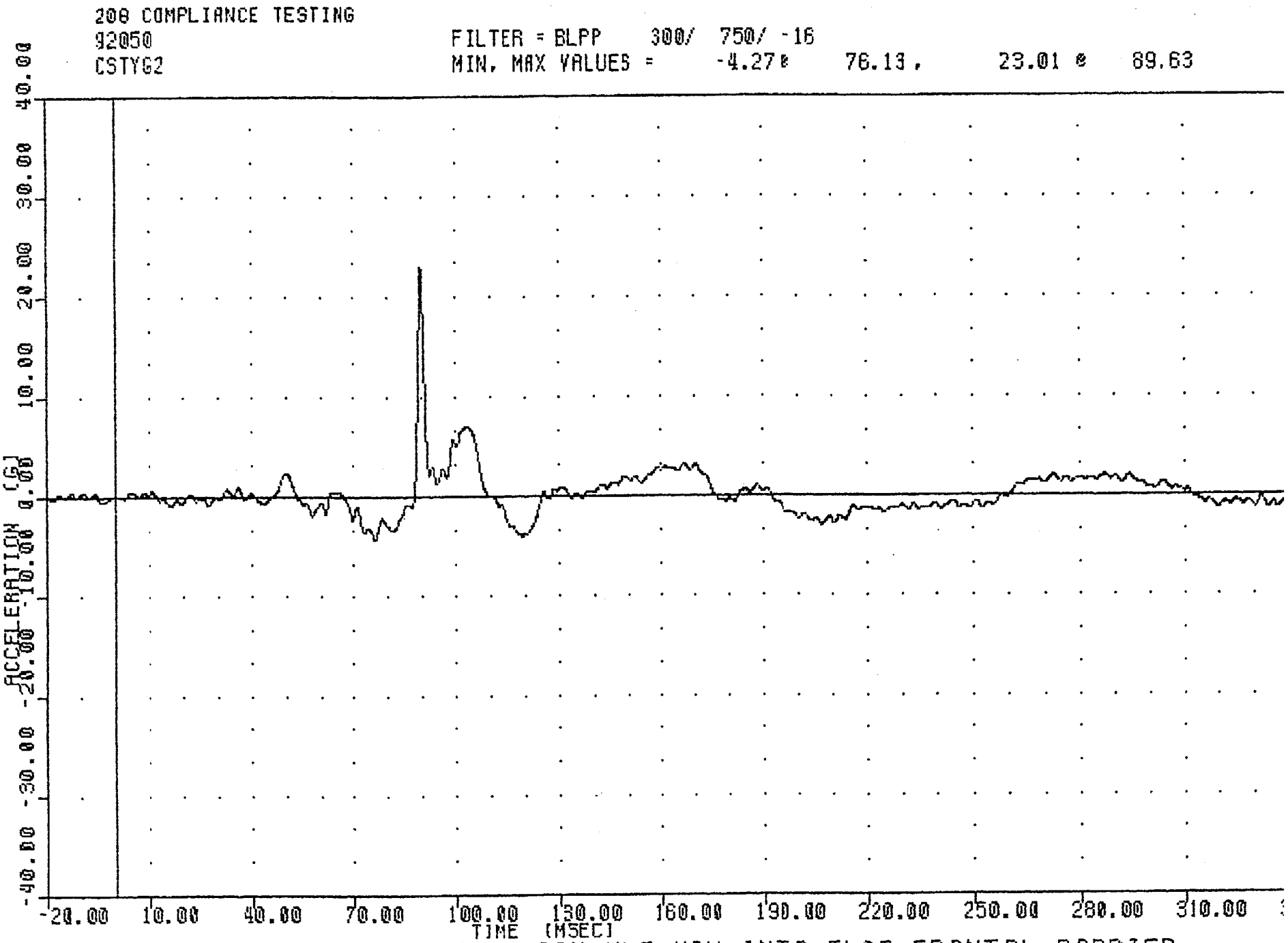
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

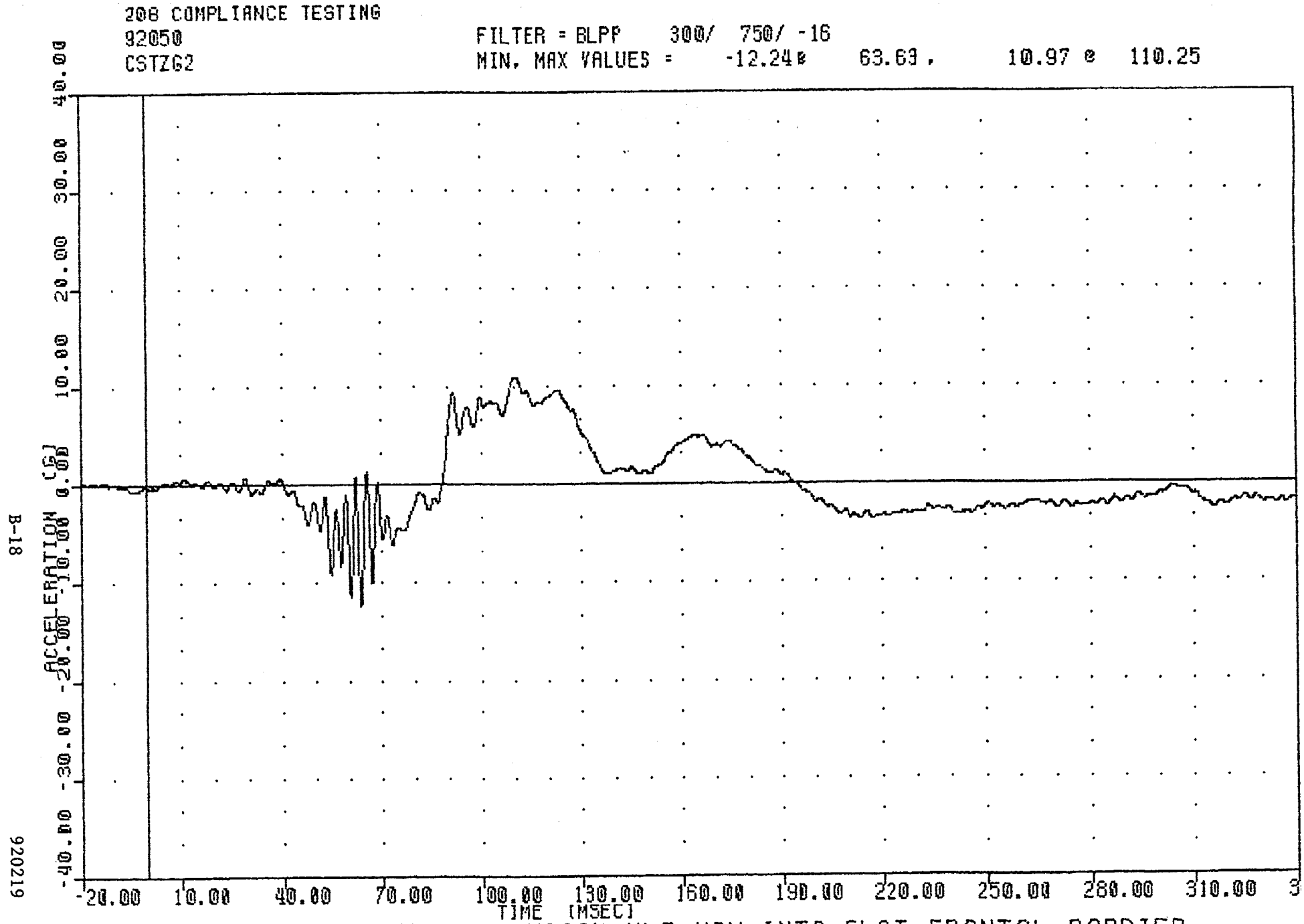


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

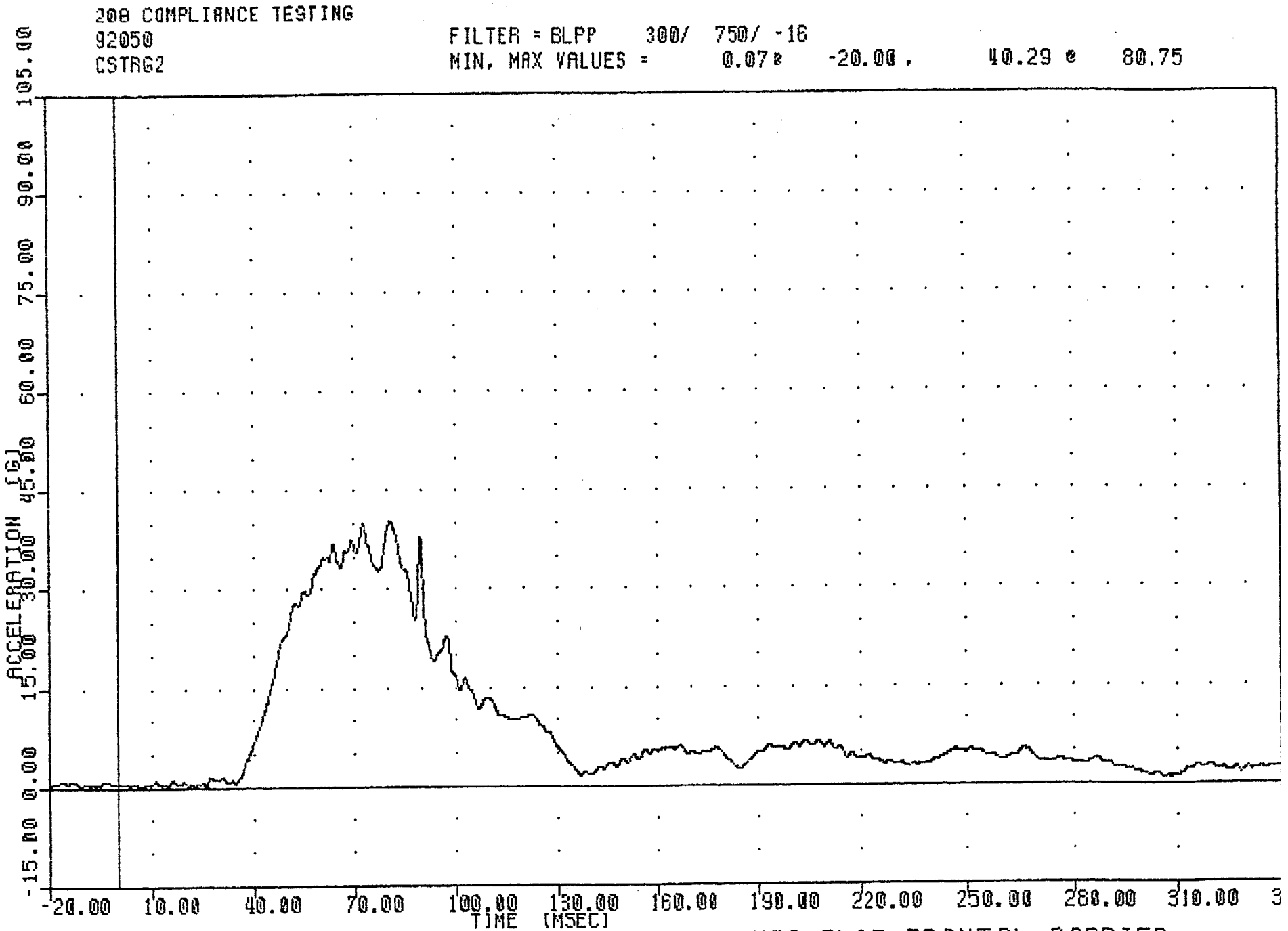


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

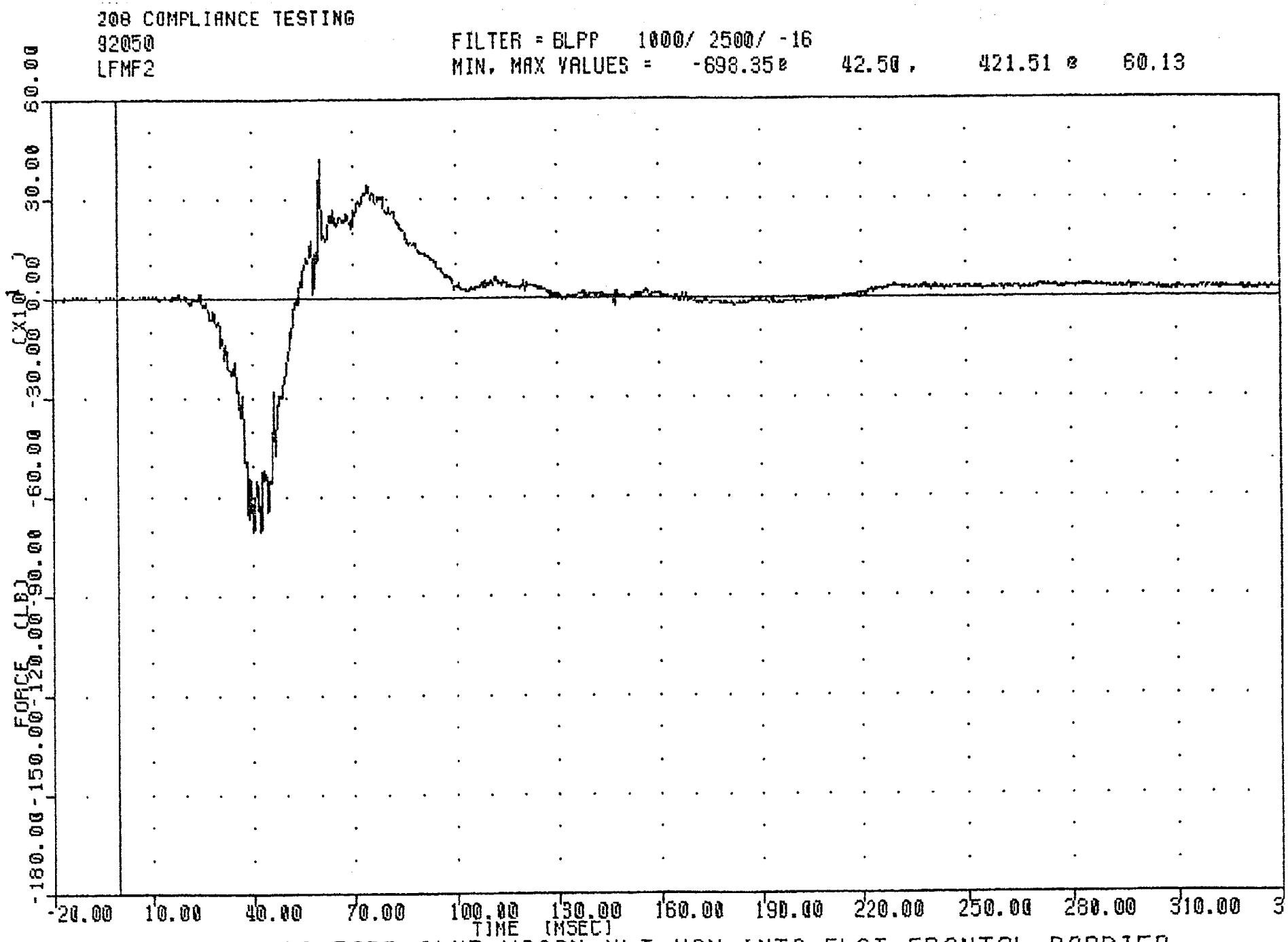
920219



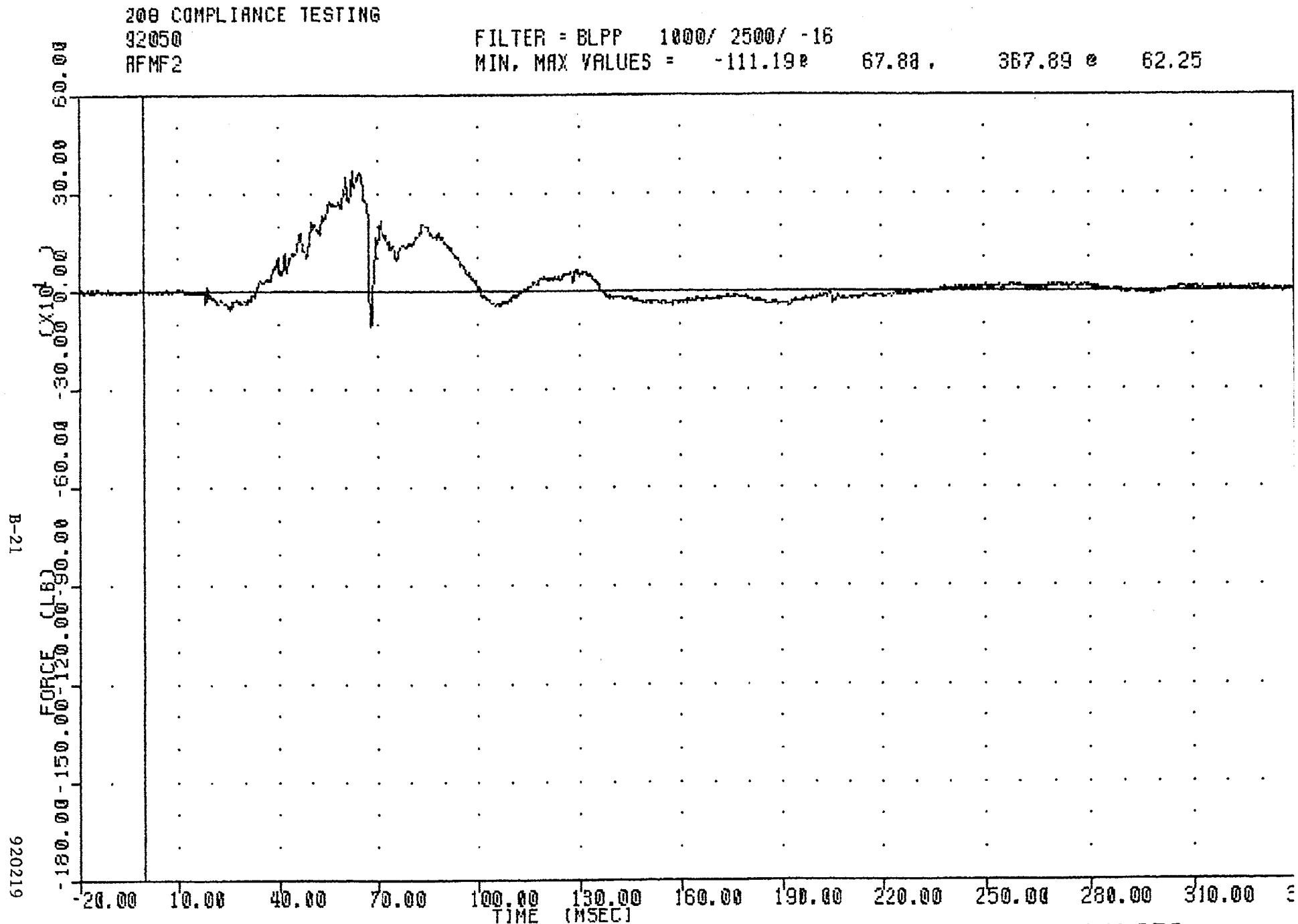
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

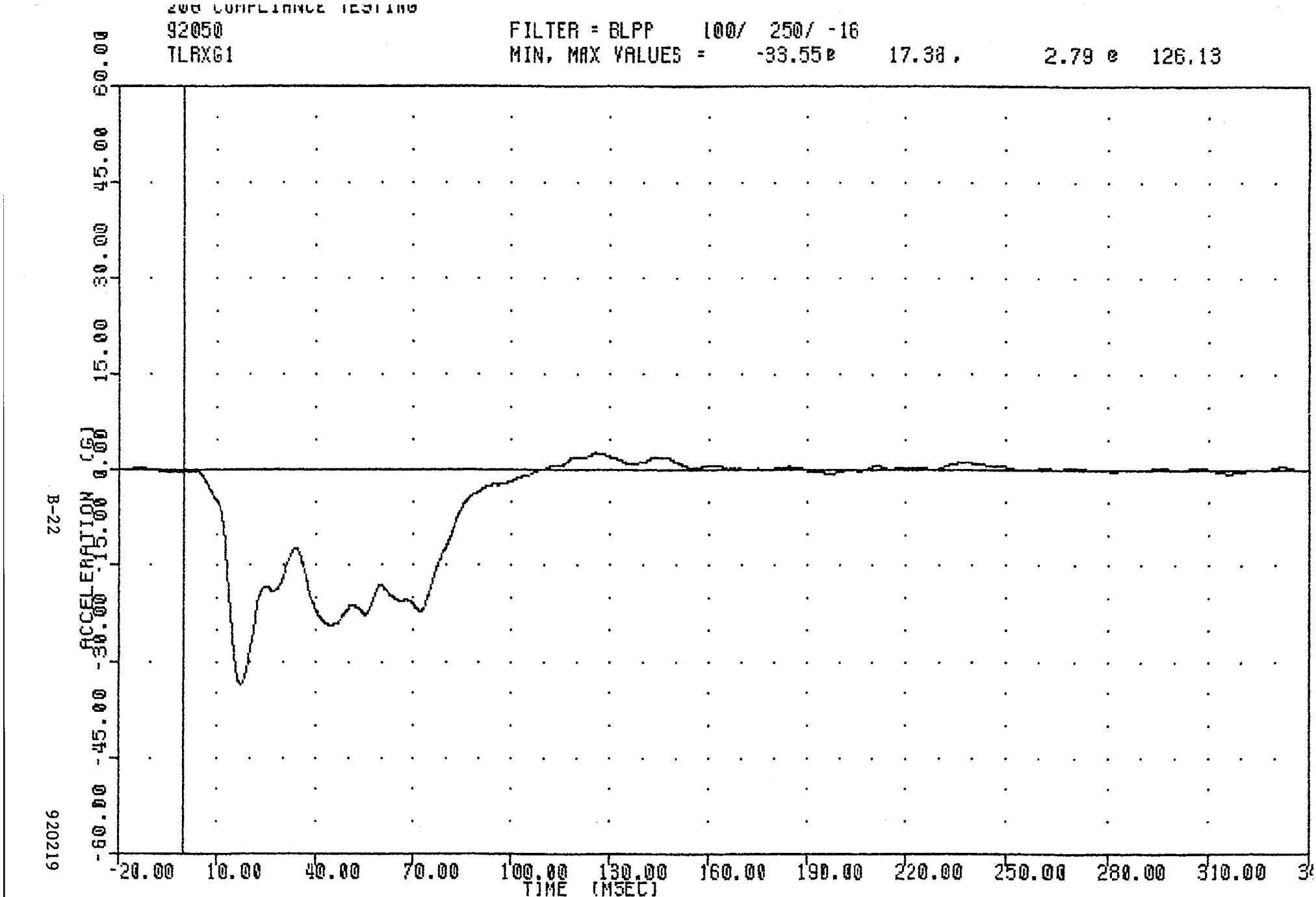


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT FEMUR FORCE



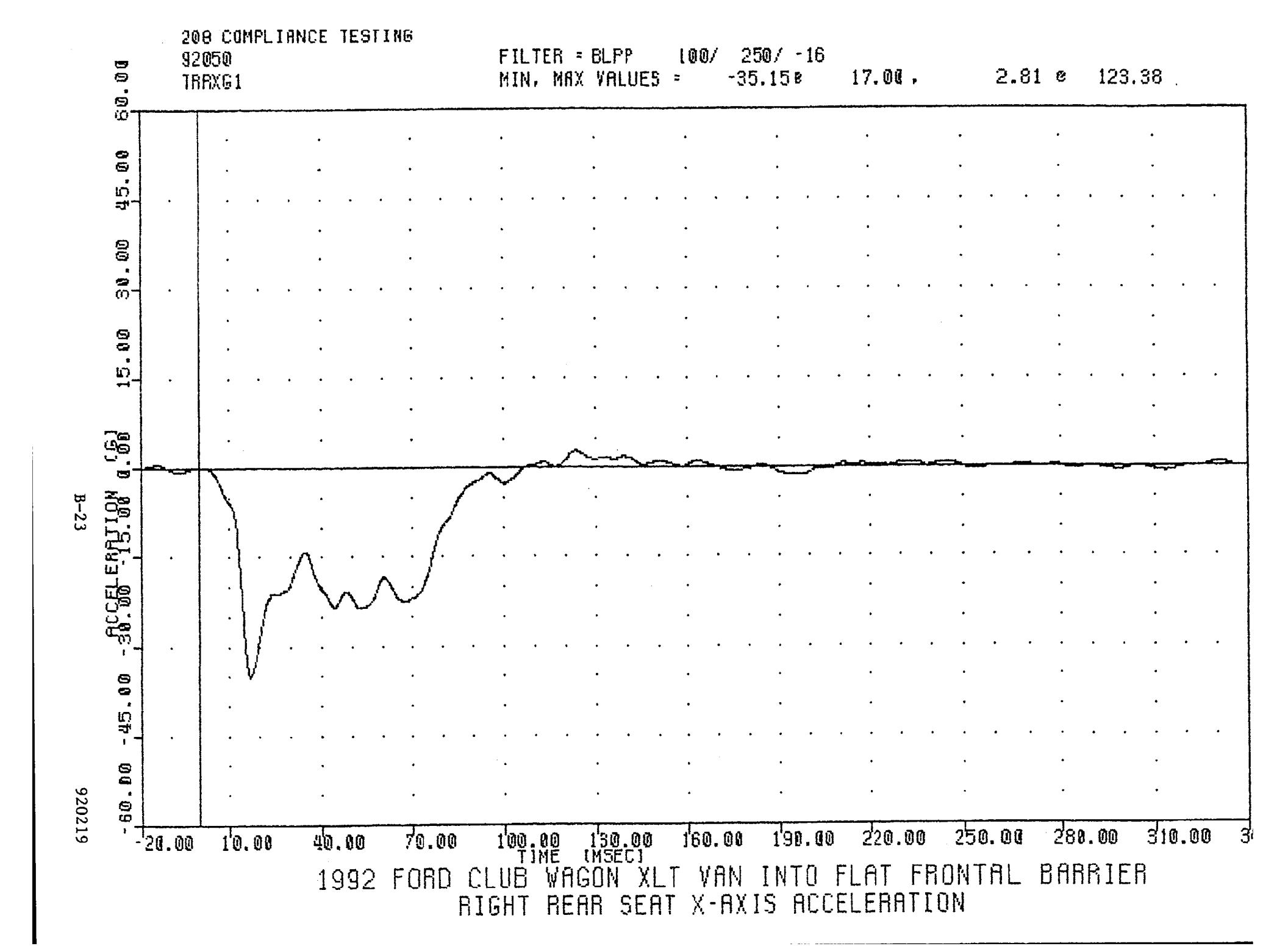
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

920219



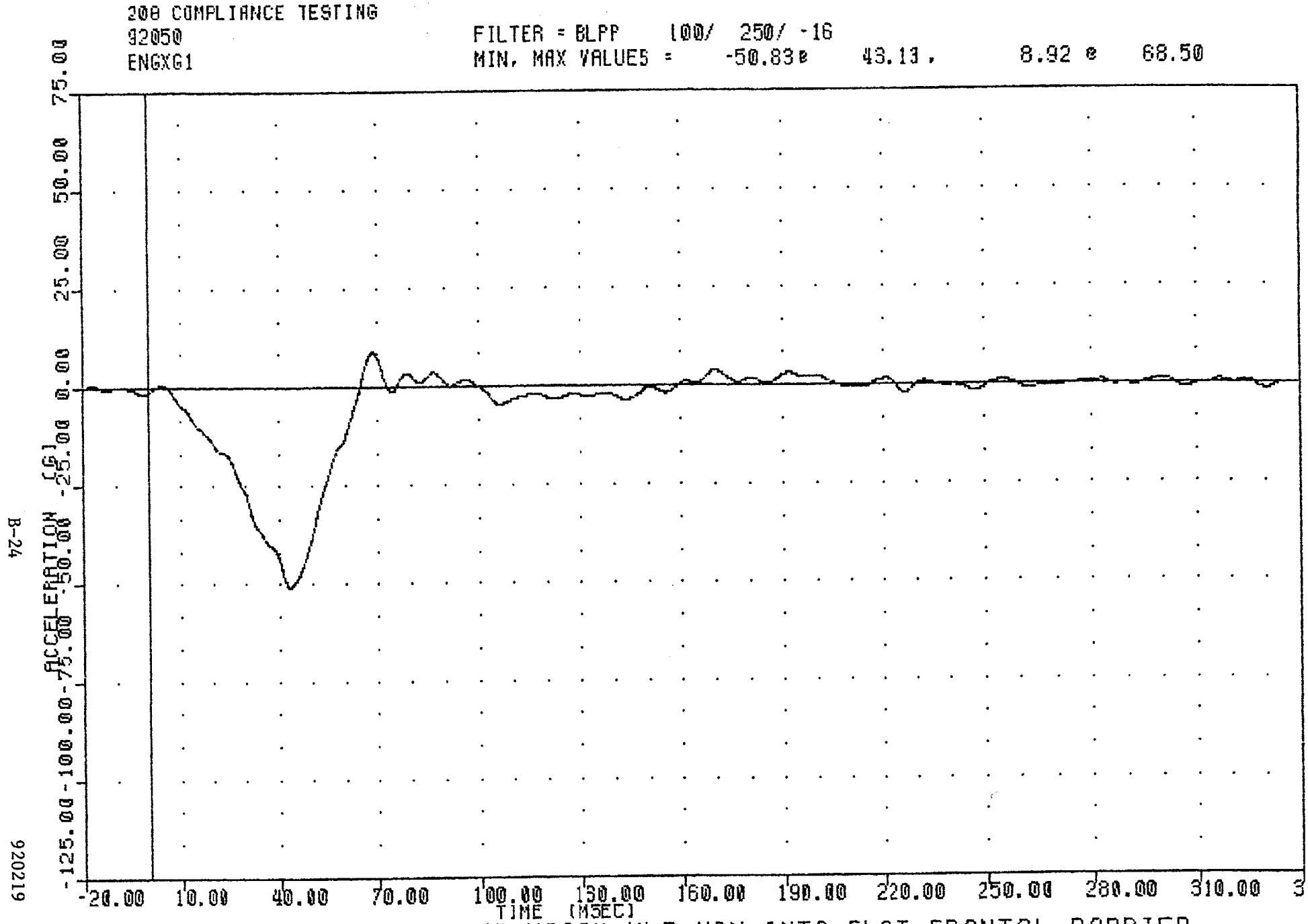
1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION

920219

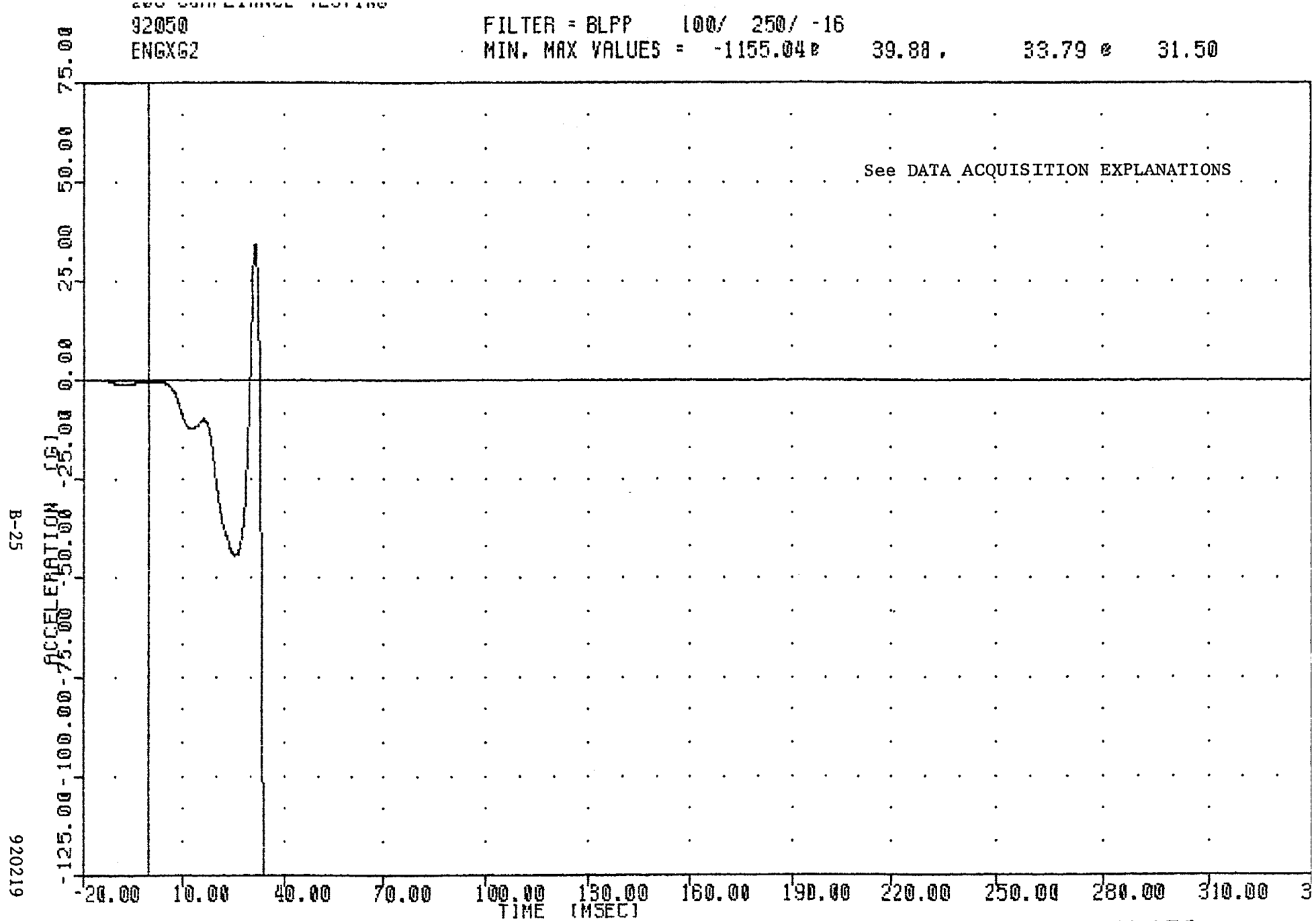


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION

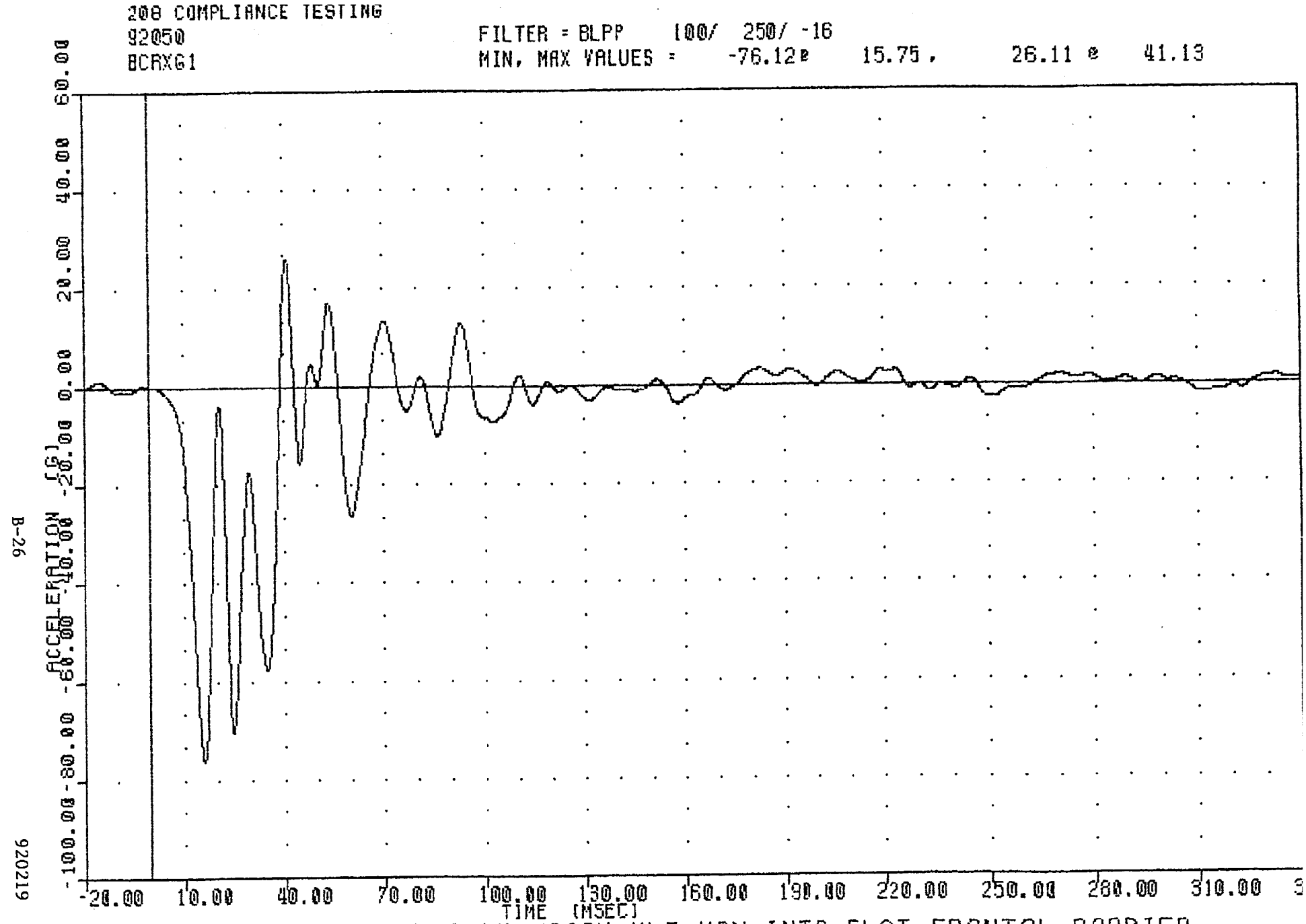
920219



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
ENGINE TOP X-AXIS ACCELERATION

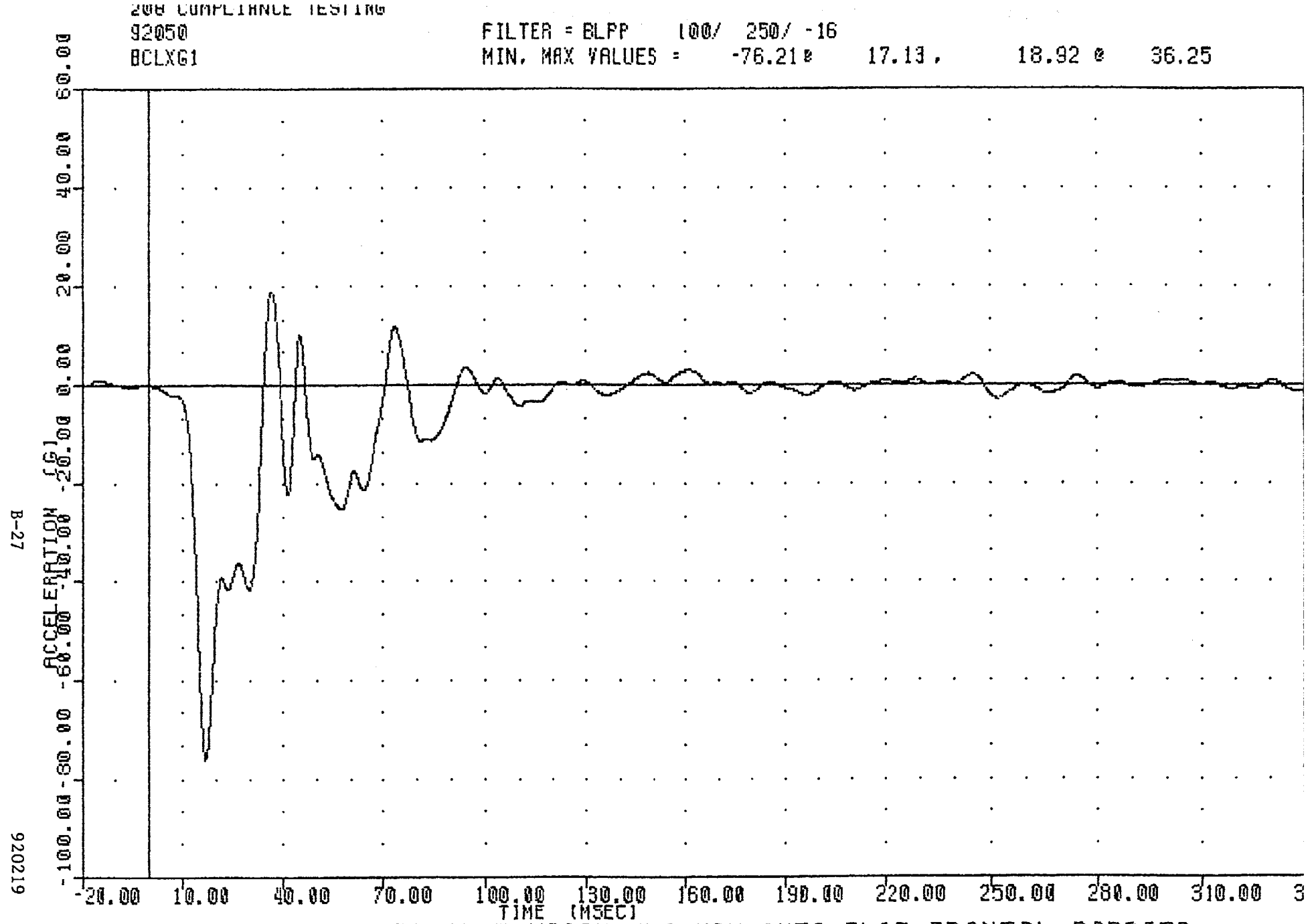


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

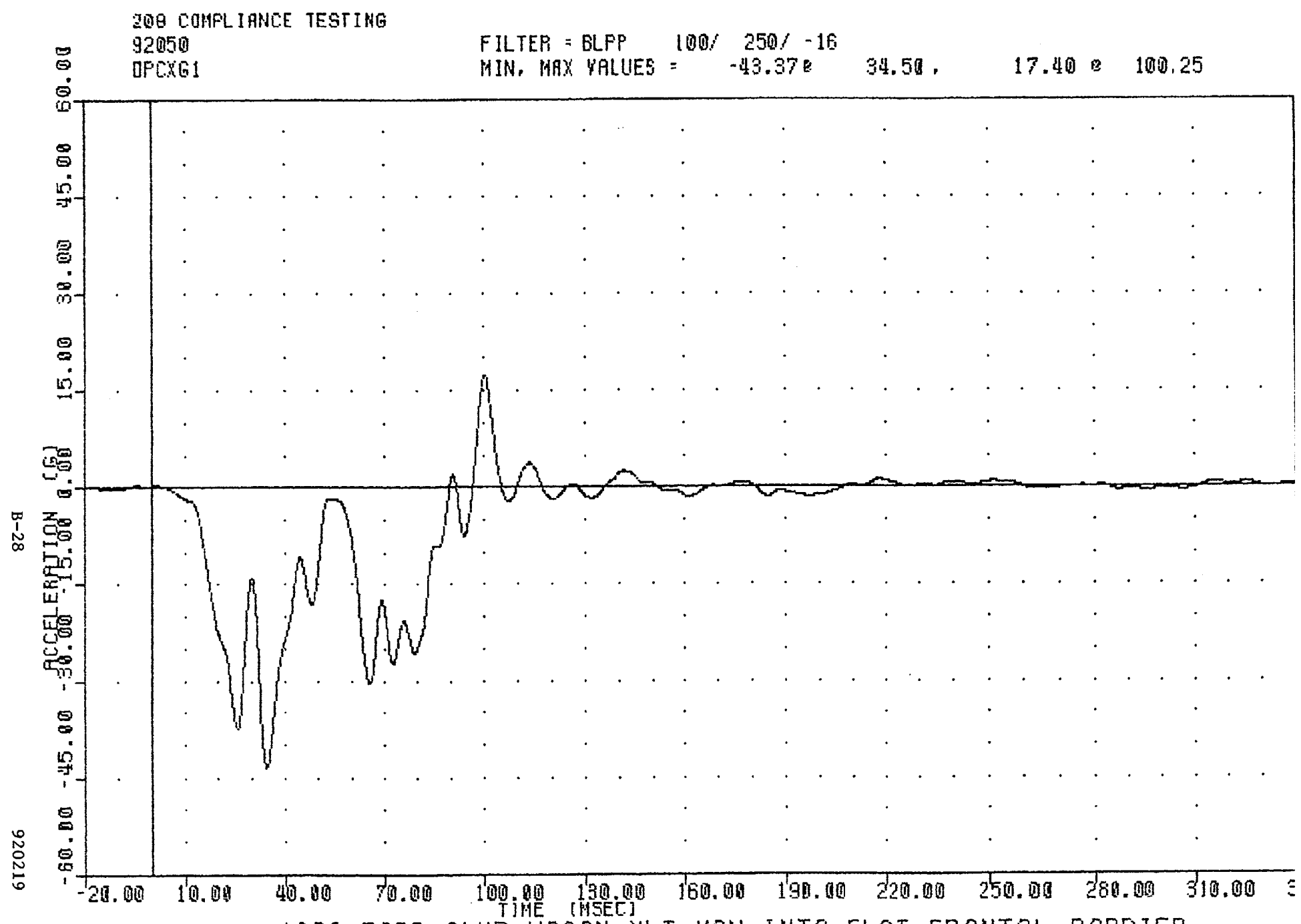


1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

920219



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION



1992 FORD CLUB WAGON XLT VAN INTO FLAT FRONTAL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION