

V1702

REPORT NOS. 208-TRC-92-015

212-TRC-92-015

301-TRC-92-015

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

GENERAL MOTORS CORPORATION
1992 PONTIAC BONNEVILLE SSE1

4-DOOR SEDAN

NHTSA NO. CN0116

TRC TEST NO. 920318

TRANSPORTATION RESEARCH CENTER INC.

10820 STATE ROUTE 347

EAST LIBERTY, OHIO 43319



APRIL 3, 1992

FINAL REPORT

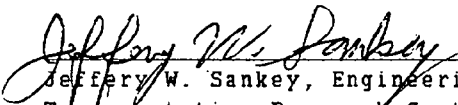
PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE (NEF-31)
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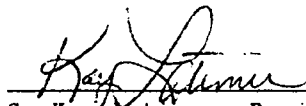
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Date 6/18/92

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16. Abstract A 30 mph flat frontal barrier impact test was conducted on a 1992 Pontiac Bonneville SSEi 4-door sedan, NHTSA No. CN0116, at the Transportation Research Center Inc. on March 18, 1992. This test was conducted to determine compliance with Federal Motor Vehicle 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 29.4 mph. The vehicle's maximum static crush was 23.9 inches. The ambient temperature was 70° F. The driver's head injury criteria (HIC) was 222. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.7 g. The driver's chest maximum deflection was 1.1 inches. The driver's left and right femur maximum axial forces were 1319 pounds and 1488 pounds, respectively. The passenger's head injury criteria (HIC) was 468. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 52.9 g. The passenger's chest maximum deflection was 0.4 inches. The passenger's left and right femur maximum axial forces were 1756 pounds and 1283 pounds, respectively. The vehicle appears to comply with the applicable requirements of FMVSS 208, 212, 219 (partial), and 301.					
17. Key Words 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"			18. Distribution Statement Available from: NHTSA Technical Reference Division Room 5108, (NAD-52) 400 Seventh Street, SW Washington, DC 20590 Attn: Mr. Robert Hornick		
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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	meters	m
yd	yards	0.9	kilometers	km
mi	miles	1.6		
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, SO Catalog No. C13102-88.

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
km	kilometers	1.1	miles	mi
		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
m ³	cubic meters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
		1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

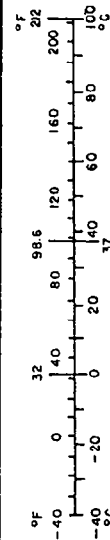


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SECTION 1.0

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 of Ohio (TRC) under Contract No. DTNH22-90-C-21003. The purpose of this test was to determine if the subject vehicle, a 1992 Pontiac Bonneville SSEi 4-door sedan, NHTSA No. CN0116, 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 E 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 Appendix B and Optional Appendix 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. Each Part 572 E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection.

The twenty-five (25) 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 18, 1992.

The test vehicle, a 1992 Pontiac Bonneville SSEi 4-door sedan, NHTSA No. CN0116, 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 E dummies seated in the front outboard designated seating positions. For each Part 572 E dummy, the chest deflection did not exceed 3.0 inches. 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 3.8 liter, transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 4202 pounds. The vehicle's impact speed was 29.4 mph. The vehicle's maximum static crush was 23.9 inches.

The driver's head injury criteria (HIC) was 222. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 40.7 g. The driver's chest maximum deflection was 1.1 inches. The driver's left and right femur maximum axial forces were 1319 pounds and 1488 pounds, respectively.

The right front passenger's HIC was 468. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 52.9 g. The right front passenger's chest maximum deflection was 0.4 inches. The right front passenger's left and right femur maximum axial forces were 1756 pounds and 1283 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 instrument panel center X-axis accelerometer, DPCXG1, lost data after 30 milliseconds.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: CNO116 TEST TYPE: Frontal Barrier Impact

TEST DATE: 03/18/92 TEST TIME: 1436 AMBIENT TEMP. (°F): 70

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1992/Pontiac/Bonneville SSEi/4-door sedan

VEHICLE TEST WEIGHT (LBS): 4202

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (MPH)**: PRIMARY = 29.4 SECONDARY = 29.5

MAXIMUM STATIC CRUSH (IN): 23.9

AVERAGE REBOUND (IN): 39.4

DUMMIES: Driver #314 Passenger #229

TYPE: Part 572 E Part 572 E

LOCATION: Left front Right front

RESTRAINT: Airbag Airbag

NUMBER OF DATA CHANNELS: 25

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

*With respect to tow track centerline.

**Speed trap measurement ($\pm$.05 mph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: General Motors Corporation

MAKE/MODEL: Pontiac/Bonneville SSEi VIN: 1G2HY5218N1261705

BODY STYLE: 4-door sedan MODEL YEAR: 1992

NHTSA NO.: CN0116 COLOR: Black

ENGINE DATA: TYPE: transverse CYLINDERS: 6 DISPLACEMENT: 3.3 liter

TRANSMISSION DATA: 4 SPEED, MANUAL, X AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: 02/07/92 ODOMETER READING: 174.0

DEALER'S NAME AND ADDRESS: Haydocy Pontiac
101 Phillipi Rd.
Columbus, OH 43228

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	Yes
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER	Option package R6A		

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: General Motors Corporation

DATE OF MANUFACTURE: 11/91 VIN: 1G2HY5218N1261705

GVWR: 4729 LBS

CAWR: FRONT: 2600 LBS., REAR: 2129 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear, Eagle GT + 4, P225/60ZR16

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 30 PSI
REAR: 30 PSI

SPARE TIRE (MFR., LINE, SIZE): Goodyear, Temporary, T135/70R15

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Electronically adjustable

MAXIMUM WIDTH: 74.2 INCHES

WHEELBASE: 111.0 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: P225/60ZR16

RECOMMENDED COLD TIRE PRESSURE: FRONT: 30 PSI; REAR: 20 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 926 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 27.9; RF 27.9; LR 28.8; RR 28.8

FULLY LOADED ATTITUDE: LF 27.7; RF 27.7; LR 28.0; RR 28.1

PRE-TEST ATTITUDE: LF 27.8; RF 27.8; LR 28.3; RR 28.3

POST-TEST ATTITUDE: LF 27.0; RF 34.6; LR 27.7; RR 28.3

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	1181 LBS.	RIGHT REAR	677 LBS.
LEFT FRONT	1190 LBS.	LEFT REAR	653 LBS.
TOTAL FRONT WEIGHT	2371 LBS.	(64.1% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1330 LBS.	(35.9% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 3701 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (3701 LBS)

VCW = VEHICLE CAPACITY WEIGHT (926 LBS)

DSC = DESIGNATED SEATING CAPACITY (5)

$RCLW* = VCW - 150 (DSC) = 926 - 150(5) = 176$

TARGET TEST WEIGHT = UDW + RCLW* + (NO. OF HYBRID III DUMMIES X 167 LBS/DUMMY)

TARGET TEST WEIGHT = 3701 + 176 + 334

TARGET TEST WEIGHT = 4211 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 167 LBS. OF CARGO WEIGHT:

RIGHT FRONT	1262 LBS.	RIGHT REAR	861 LBS.
LEFT FRONT	1246 LBS.	LEFT REAR	833 LBS.
TOTAL FRONT WEIGHT	2508 LBS.	(59.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1694 LBS.	(40.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	4202 LBS.	(0.2% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 100 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 44.7 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: 920318 NHTSA NO.: CN0116
TEST DATE: 03/18/92 TEST TIME: 1436
TEST TYPE: Frontal Barrier Impact IMPACT ANGLE: 0
AMBIENT TEMPERATURE AT IMPACT AREA: 70° F
TEMPERATURE IN OCCUPANT COMPARTMENT: 71° F
IMPACT VELOCITY: PRIMARY = 29.4 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.

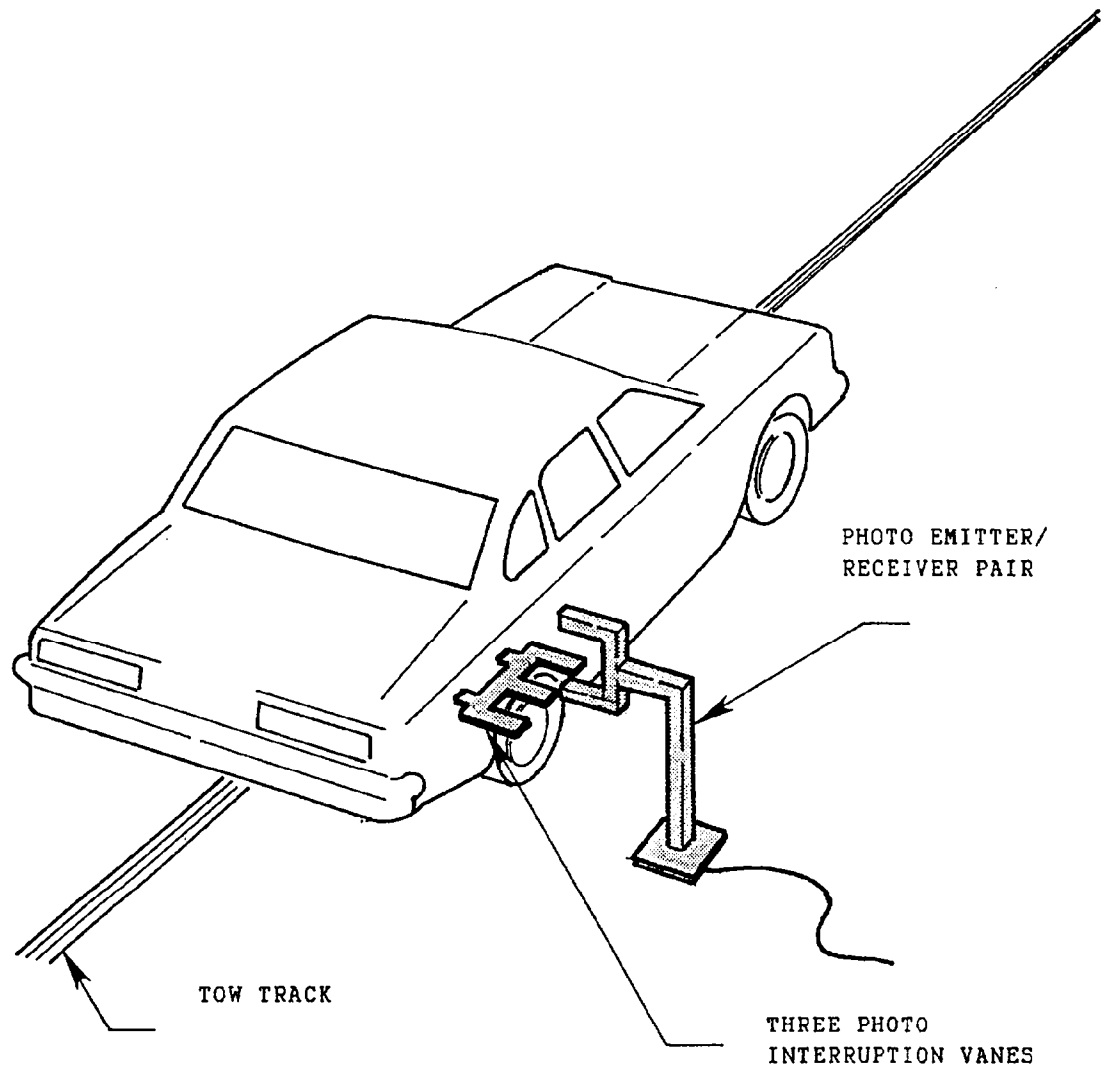
TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN INCHES):

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 194.2; C 202.0; R 194.2
POST-TEST: L 177.9; C 178.1; R 179.1
TOTAL CRUSH: L 16.3; C 23.9; R 15.1
AVERAGE CRUSH: 18.4

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 41.5; C 39.1; R 37.7; AVG. 39.4

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: Pontiac/Bonneville SSEi/4-door sedan

VEHICLE NHTSA NO.: CN0116; VIN: 1G2HY5218N1261705

MODEL YEAR: 1992; BUILD DATE: 11/91; TEST DATE: 03/18/92

VEHICLE SIZE CATEGORY: Large; TEST WEIGHT: 4202 LBS.

VEHICLE WHEELBASE: 111.0 INCHES

MAXIMUM WIDTH: 74.2 INCHES

FRONT OVERHANG: 44.8 INCHES

COLLISION DEFORMATION
 CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH
 MEASUREMENTS:

C1 =	<u>16.3</u>	INCHES
C2 =	<u>18.2</u>	INCHES
C3 =	<u>20.7</u>	INCHES
C4 =	<u>20.0</u>	INCHES
C5 =	<u>17.4</u>	INCHES
C6 =	<u>15.1</u>	INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE
(LONGITUDINAL)

LENGTH OF DAMAGED
 REGION: L = 62.0 INCHES

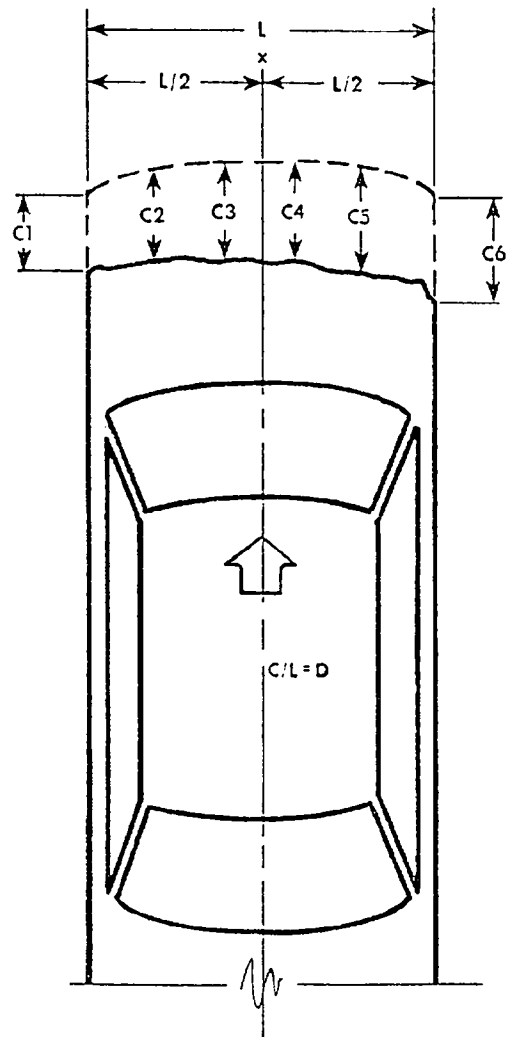
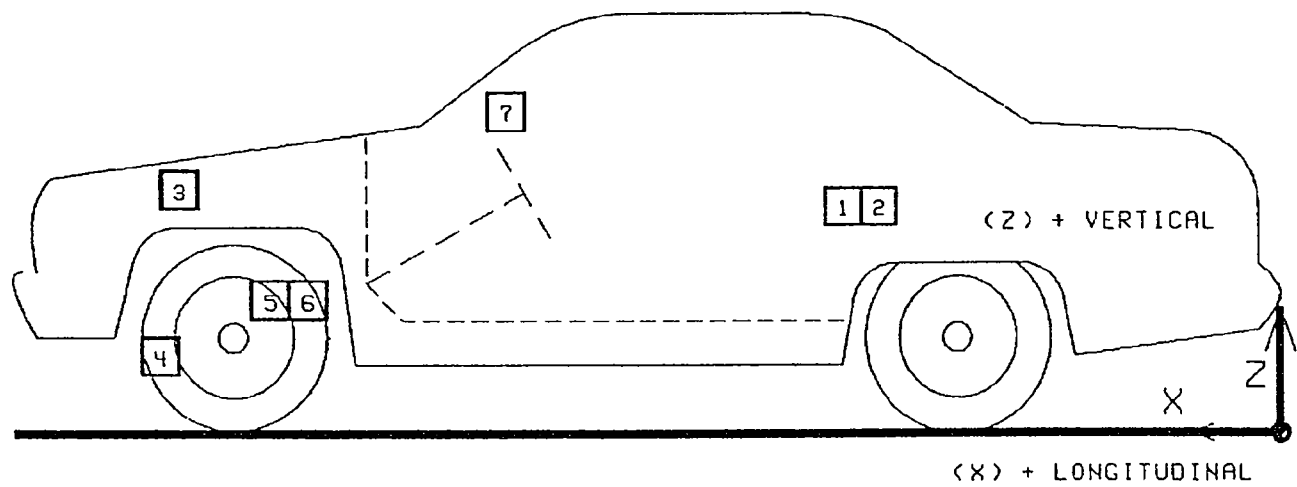
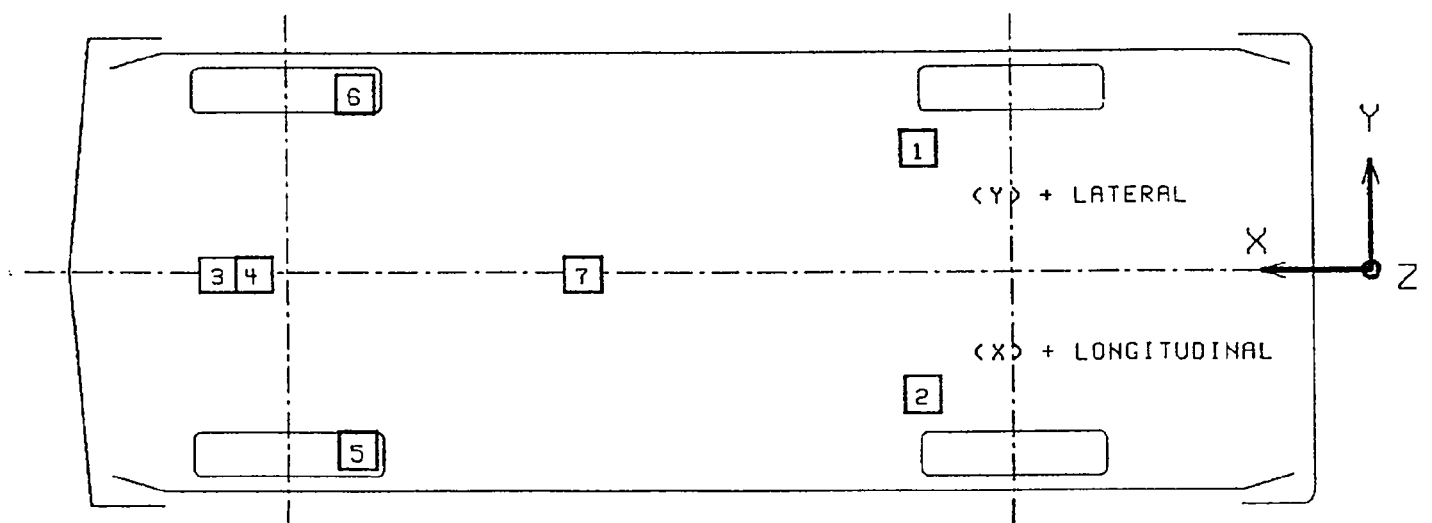


FIGURE 3
VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920318

No.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
						MAX G MSEC		MAX G MSEC	
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	67.9	26.8	12.2				
		POST	67.1	26.8	12.0				
						1.7	159.1	22.9	57.0
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	67.0	-26.7	12.4				
		POST	67.1	-26.7	15.0				
						1.7	159.0	21.3	57.9
3	ENGINE TOP LONGITUDINAL	PRE	173.9	1.3	27.8				
		POST	171.9	1.3	28.5				
						28.5	63.3	116.6	44.1
4	ENGINE BOTTOM LONGITUDINAL	PRE	163.2	-7.5	6.2				
		POST	160.2	-7.8	8.2				
						21.5	56.4	66.5	41.0
5	RIGHT BRAKE CALIPER LONGITUDINAL	PRE	162.6	-25.7	15.4				
		POST	159.5	-25.8	13.9				
						12.0	86.0	68.4	61.3
6	LEFT BRAKE CALIPER LONGITUDINAL	PRE	162.6	25.7	15.4				
		POST	159.5	26.4	12.1				
						22.4	77.3	70.2	60.4
7	INSTRUMENT PANEL CENTER LONGITUDINAL	PRE	133.5	0.4	37.5				
		POST	133.7	0.4	38.2				
						---	--- Y	---	--- Y

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES. X-AXIS LOCATIONS ARE MEASURED REARWARD FROM THE FRONT BUMPER.

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: Transportation 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.: CN0116
MAKE/MODEL/BODY STYLE: Pontiac/Bonneville SSEi/4-door sedan
MODEL YEAR: 1992 BODY COLOR: Black
VIN: 1G2HY5218N1261705
ODOMETER (ARRIVAL): 174 DATE: 02/07/92
ODOMETER (COMPLETION): 177 DATE: 03/18/92
COST: \$26,230.00

☒ AIR CONDITIONER	☒ CONSOLE	BRAKES: ☒ POWER
☒ TINTED GLASS	☐ TACHOMETER	FRONT: Disc
☒ 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: 5
☐ ROOF RACK	☒ OTHER OPTIONS: <u>Option package R6A</u>	

ENGINE: 6 CYLINDERS; 3.8 LITERS
TRANSMISSION: Automatic; DRIVE TYPE: Front wheel
TIRE SIZE: P225/60ZR16
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	-41.8	-9.2	-22.4	42.1	-41.2	-3.2	-12.5	40.7
PASSENGER	-50.1	23.8	-34.3	58.6	-49.2	5.8	-25.2	52.9

MAXIMUM FEMUR COMPRESSIVE FORCE (LBS)

	LEFT FEMUR	RIGHT FEMUR
DRIVER	1319	1488
PASSENGER	1756	1283

HEAD INJURY CRITERIA**

	HIC	TIME t ₁ (MSEC) ¹	TIME t ₂ (MSEC) ²
DRIVER	222	81.0	117.0
PASSENGER	468	81.5	117.5

MAXIMUM CHEST DEFLECTION

DRIVER	1.1
PASSENGER	0.4

*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 #314	PASSENGER #229
HEAD	<u>Airbag</u>	<u>Airbag</u>
CHEST	<u>Airbag</u>	<u>Airbag</u>
ABDOMEN	<u>None</u>	<u>None</u>
LEFT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>
RIGHT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Easy</u>	<u>Easy</u>
REAR	<u>Easy</u>	<u>Easy</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>None</u>	<u>None</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

The entire windshield was cracked upon impact.

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 rotated rearward as the dummy's head and chest were restrained by the driver's airbag. The dummy's head rotated forward, and then rearward into the head restraint, as the dummy rebounded into the seat back. 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 rotated rearward as the dummy's head and chest were restrained by the passenger's airbag. The dummy's head rotated forward, and then rearward into the head restraint, as the dummy rebounded into the seat back. The dummy came to rest seated in the right front passenger's seat.

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

MAKE/MODEL: Pontiac/Bonneville SSEi

VIN: 1G2HY5218N1261705

BODY STYLE: 4-door sedan

NHTSA NO.: CN0116

DATE OF MANUFACTURE: 11/91

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: .1 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: Pontiac/Bonneville SSEi

VIN: 1G2HY5218N1261705

BODY STYLE: 4-door sedan

NHTSA NO.: CN0116

DATE OF MANUFACTURE: 11/91

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? 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

 X 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 PROTECTION SYSTEM: The label was located on the small sunvisor.

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

- ☐ Replace
☐ Repair
☒ Other: See vehicle for service

This system: (check one)

- ☐ a. by ☐ month, ☐ year
☐ b. by ☐ miles
☐ c. or after a time interval of ☐ months or ☐ years.
☒ d. other: If readiness indicator does not come on or if it comes on during vehicle operation

WERE APPROPRIATE INSTRUCTIONS CONCERNING MAINTENANCE AND/OR REPLACEMENT OF THIS SYSTEM PROVIDED? YES, owner's manual, page 24

WAS A DESCRIPTION OF THE FUNCTIONAL OPERATION OF THE SYSTEM PROVIDED?
YES, owner's manual, pages 24 and 25

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 24 and 25

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 upper middle right portion 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 24

FIGURE 4 FMVSS 212 TEST DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

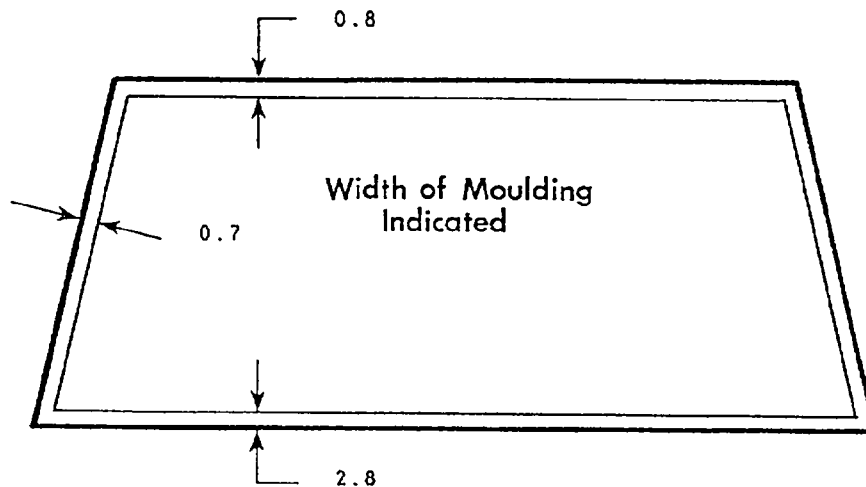
Plastic trim around outer perimeter, adhesive around inner perimeter.

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	90.8	90.8	100
LEFT SIDE	90.8	90.8	100
TOTAL	181.6	181.6	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.

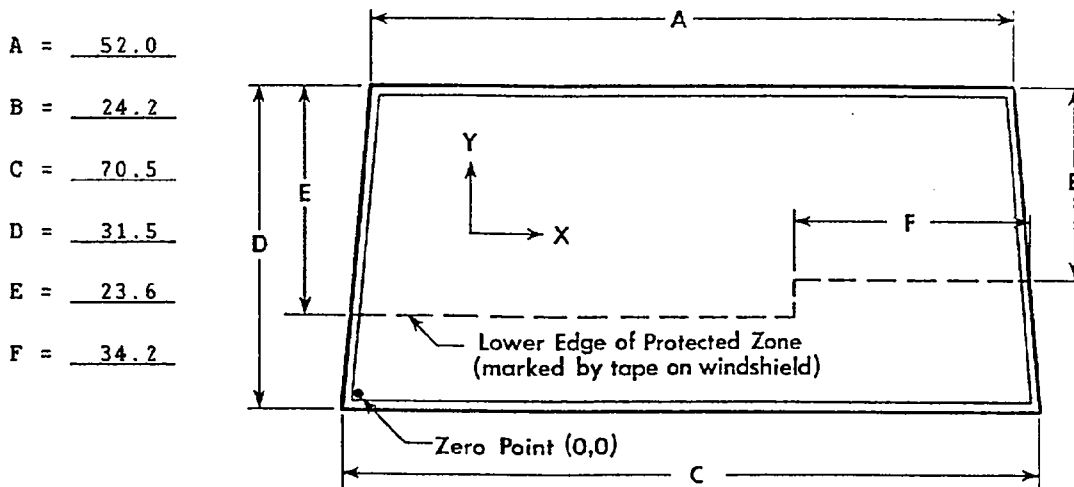
*INDICATE AREAS OF LOSS OF RETENTION, IF ANY, ON WINDSHIELD DIAGRAM.

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:



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.		

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: Pontiac/Bonneville SSEi

NHTSA NO.: CN0116

FUEL SYSTEM CAPACITY: 18.0 GALLONS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 18.0 GALLONS (FURNISHED BY COTR)

TEST VOLUME RANGE: 16.6 GALLONS TO 16.9 GALLONS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 16.8 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 is located in front of the rear
axle. The fuel lines run along the right frame rail to the front. The
fuel filler neck is located on the left side.

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.: CN0116; TEST DATE: 03/18/92
VEHICLE MAKE/MODEL/BODY STYLE: Pontiac/Bonneville SSEi/4-door sedan

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:

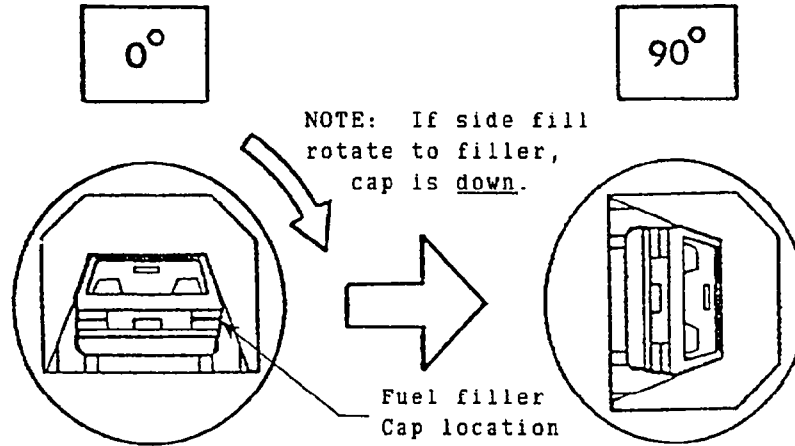
	<u>TEST</u> <u>RESULTS</u>	<u>MAXIMUM</u> <u>ALLOWABLE</u>
1. FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 OZ.	1 OZ.
2. 5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 OZ.	5 OZ.
3. NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - -	0 OZ.	1 OZ./1 MIN.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: CN0116
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:

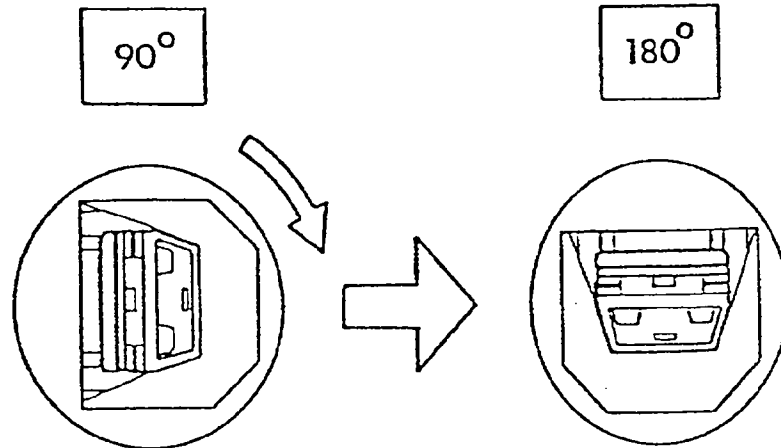
<u>0° TO 90° ROTATION (FUEL FILLER CAP DOWN)</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

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

NHTSA NO.: CN0116
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:

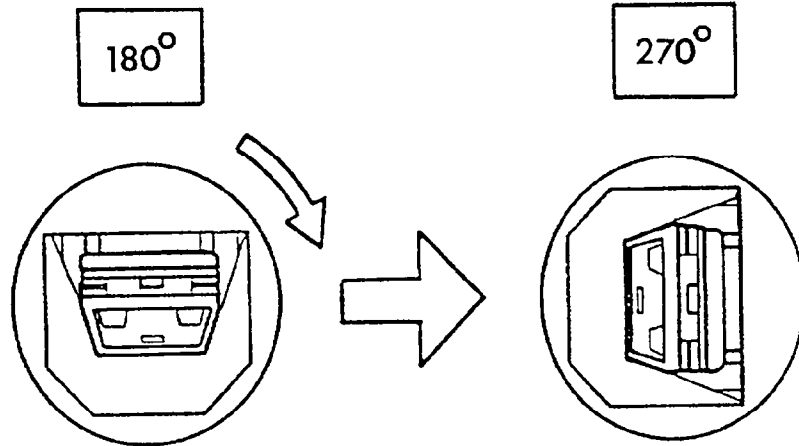
<u>90° TO 180° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

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

NHTSA NO.: CNO116
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:

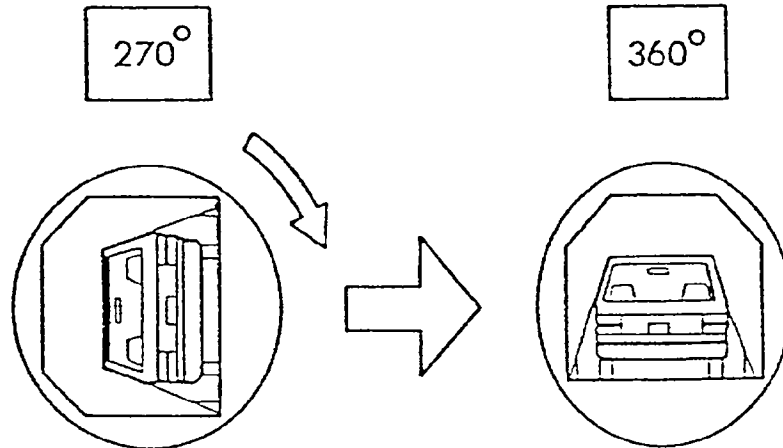
<u>180° TO 270° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

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

NHTSA NO.: CN0116
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:

<u>270° TO 360° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
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

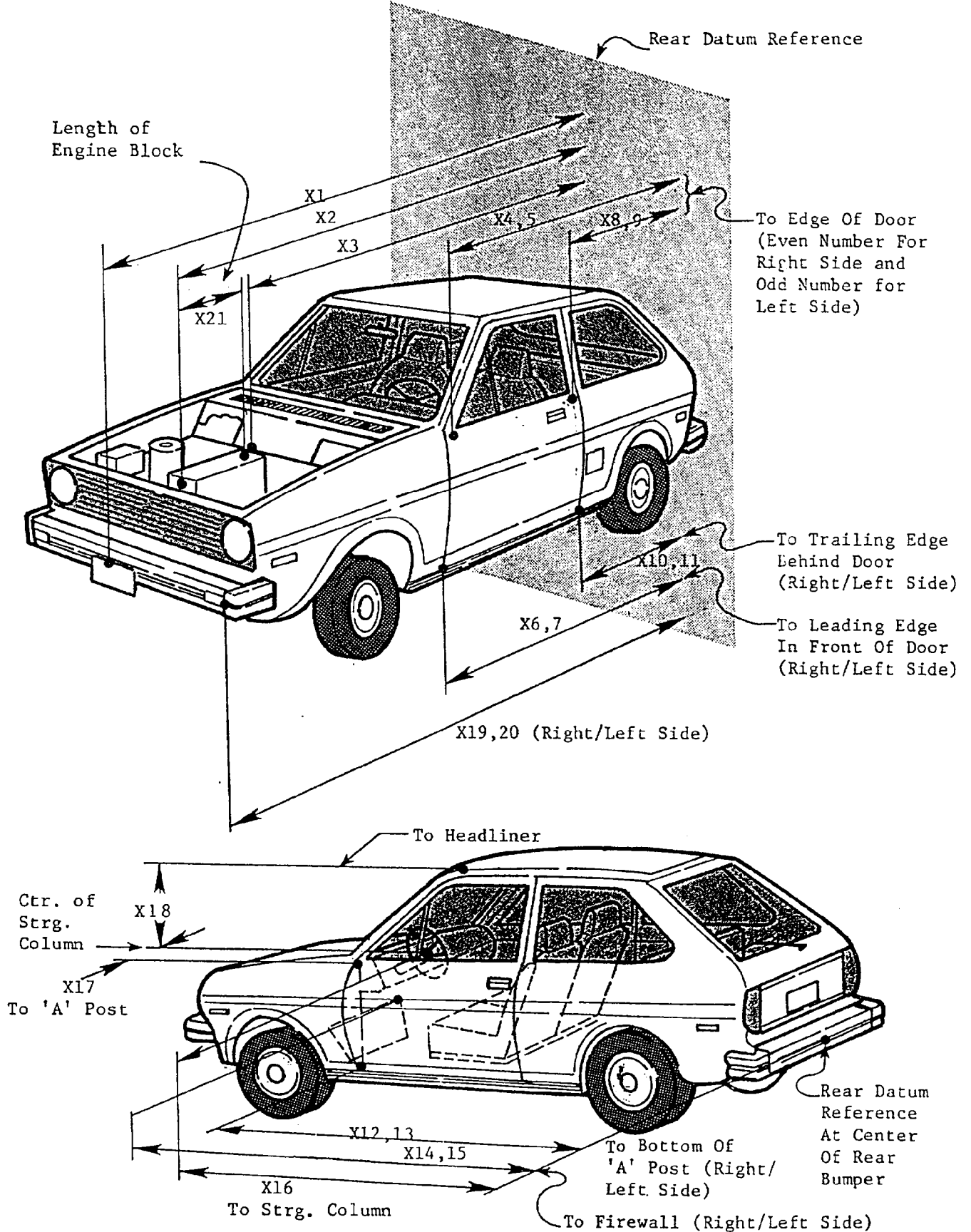
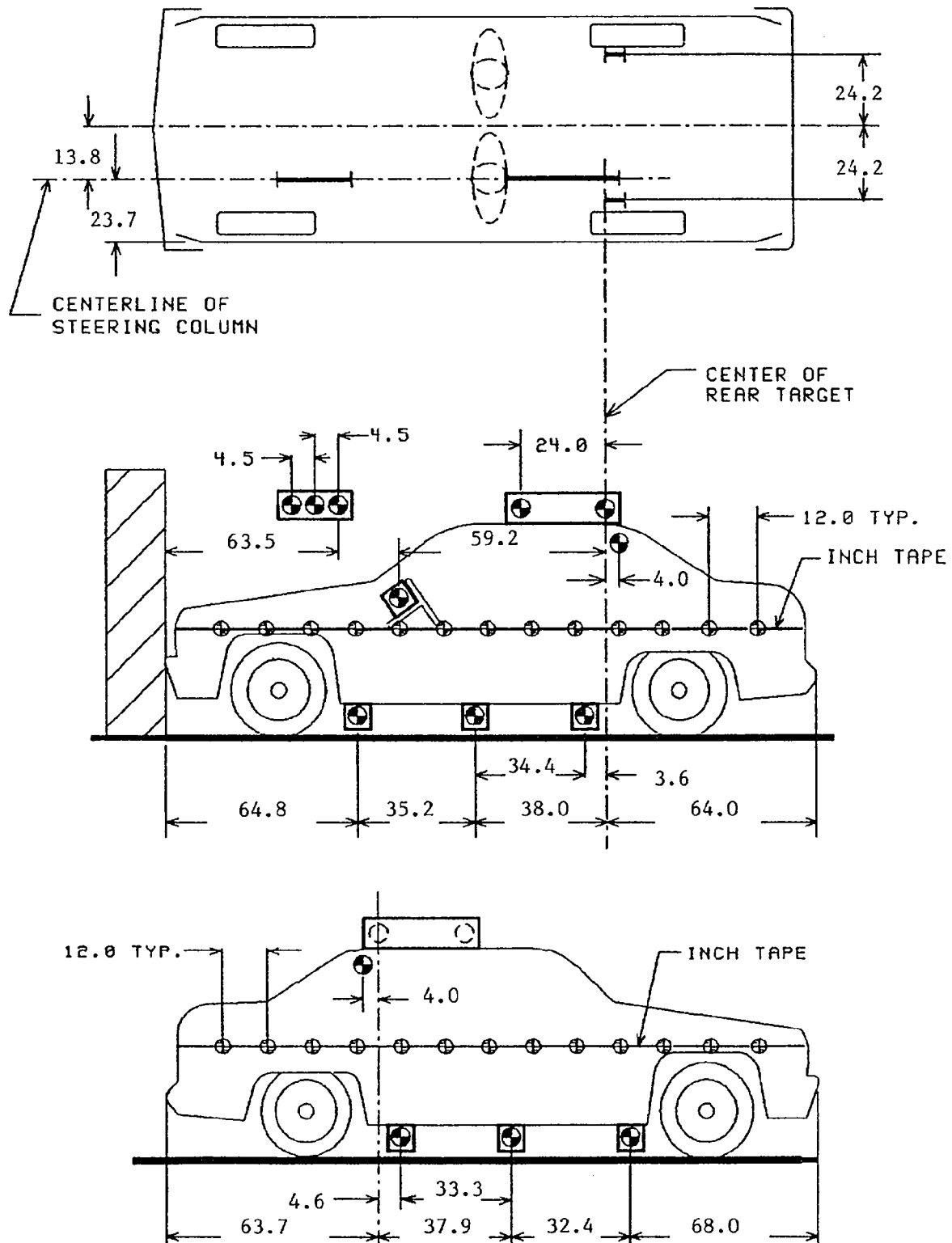


TABLE 13 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Pontiac/Bonneville SSE1		TEST NUMBER: 920318	ALL MEASUREMENTS ARE IN INCHES		
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.	
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	202.0	178.1	23.9	
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	177.0	168.9	8.1	
X3	REAR SURFACE OF VEHICLE TO FIREWALL	148.0	146.9	1.1	
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	134.0	133.4	0.6	
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	133.0	133.1	-0.1	
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	133.2	133.8	-0.6	
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	134.3	134.0	0.3	
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	93.4	93.7	-0.3	
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	93.4	93.5	-0.1	
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	93.1	93.1	0.0	
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	93.6	93.1	0.5	
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	134.1	134.3	-0.2	
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	134.2	134.5	-0.3	
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	144.8	144.5	0.3	
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	146.0	145.2	0.8	
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	116.5	120.1	-3.6	
X17	CENTER OF STEERING COLUMN TO "A" POST	13.5	12.6	0.9	
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.2	18.0	-0.8	
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	194.2	179.1	15.1	
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	194.2	177.9	16.3	
X21	LENGTH OF ENGINE BLOCK	15.5	15.5	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: Pontiac/Bonneville SSEi
 BODY STYLE: 4-door sedan MODEL YEAR: 1992
 NHTSA NO.: CN0116 COLOR: Black

DATA FROM CERTIFICATION LABEL:

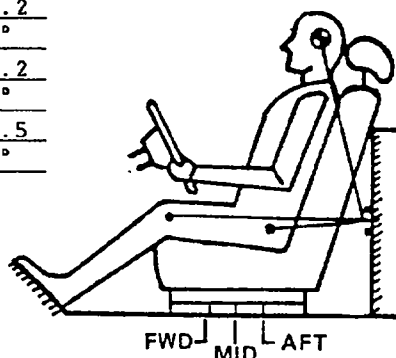
VEHICLE MANUFACTURER: General Motors Corporation
 DATE OF MANUFACTURE: 11/91 VIN: 1G2HY5218N1261705
 GVWR: 4729 LBS.; GAWR: FRONT = 2600 LBS.; REAR = 2129 LBS.

POST-IMPACT DATA:

DATE OF TEST: 03/18/92 TIME: 1436 TEMPERATURE: 70° F
 IMPACT VELOCITY: PRIMARY = 29.4 MPH SECONDARY = 29.5 MPH
 REQUIRED IMPACT VELOCITY RANGE: 28.9 TO 29.9 MPH
 SEAT TYPE: Bucket ADJUSTER TYPE: Electronically adj.
 FRONT SEAT BACK TYPE: Electronically adjustable
 TECHNICIANS: D. Carpenter, R. Cribley, B. Fishbaugh

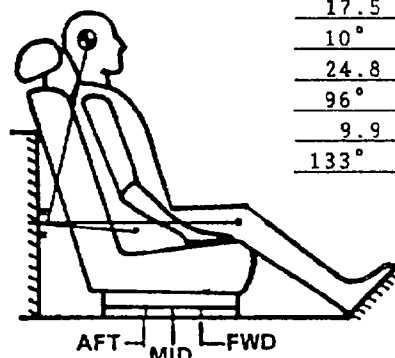
DRIVER DUMMY # 314 TYPE: HIIL

HEAD 18.2
 TARGET 10°
 KNEE 25.2
 JOINT 97°
 APPROX- 12.5
 IMATE 132°
 "H"
 POINT



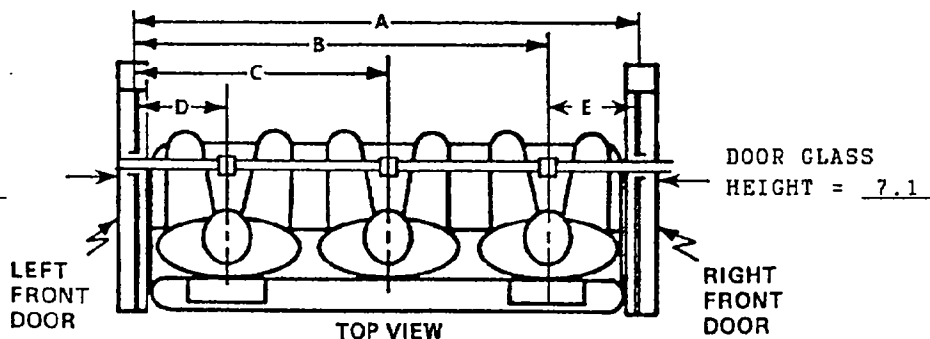
PASSENGER DUMMY # 229 TYPE: HIIL

HEAD 17.5
 TARGET 10°
 KNEE 24.8
 JOINT 96°
 APPROX- 9.9
 IMATE 133°
 "H"
 POINT



A = 59.1
 B = 44.5
 C = NA
 D = 14.6
 E = 14.6

DOOR GLASS
 HEIGHT = 7.1



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	12.8	12.7
HW	21.2	21.0
CD	18.7	19.9
CS	10.2	NA
KDL	4.4	5.0
KDR	4.7	4.6
TA	16°	19°
SA	26°	26°
HSW	15.8	NA

	DRIVER	PASSENGER
HR	8.2	6.9
HS	11.0	11.4
AD	5.8	5.3
HD	6.9	6.8
KK	8.8	7.4
AA	10.0	7.0
HA	20.2	20.2

KNEE OUTER CLEVIS TO OUTER CLEVIS SPACING:

DRIVER = 11.8
PASSENGER = 10.6

PELVIS ANGLE:

DRIVER = 23°
PASSENGER = 22°

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.

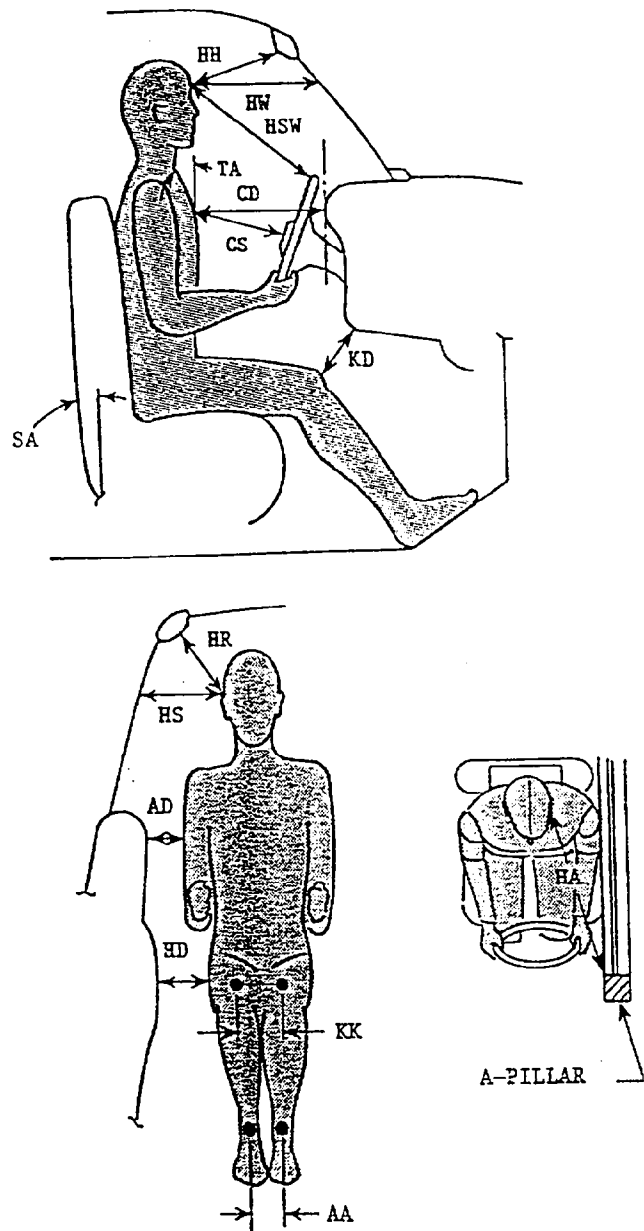
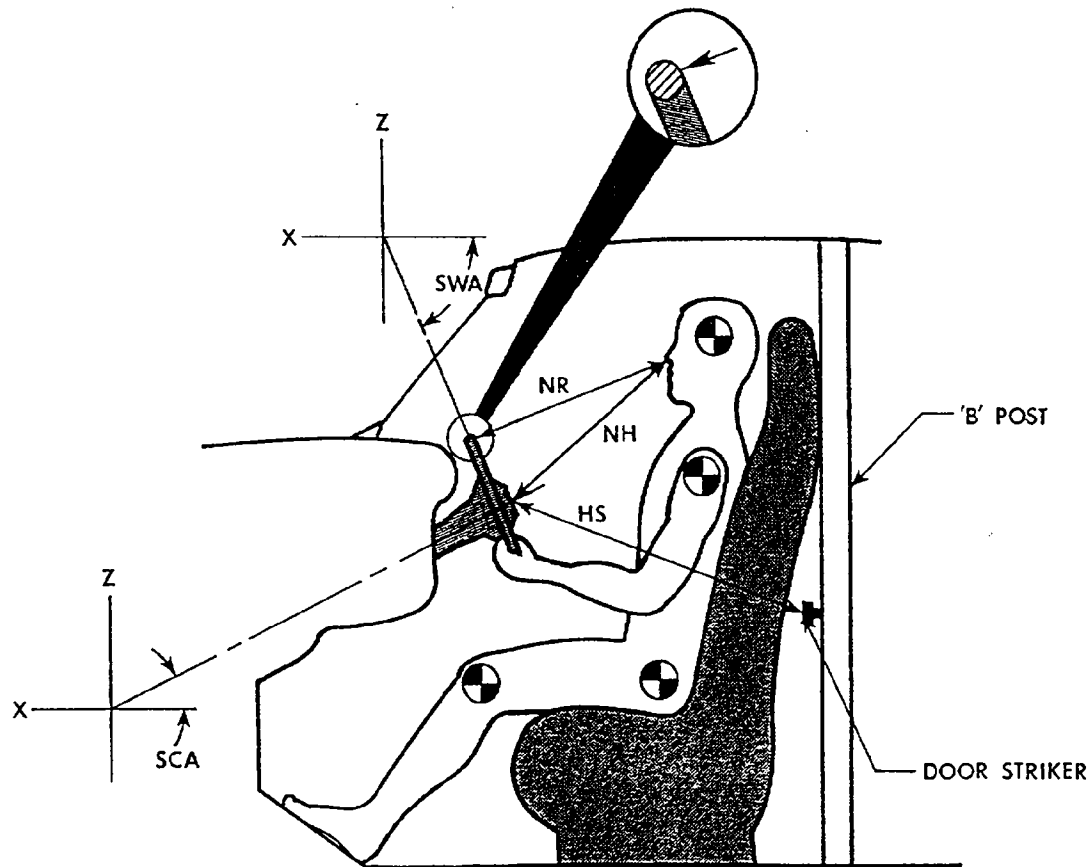


FIGURE 11 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:
The steering column was latched in the third position up from the bottom.

MEASUREMENTS

NR - DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	13.8
NH - DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	13.9
HS - DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	24.1
SCA - ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	18°
SWA - ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	67°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 12
4, 7, 8 CAMERA POSITIONS

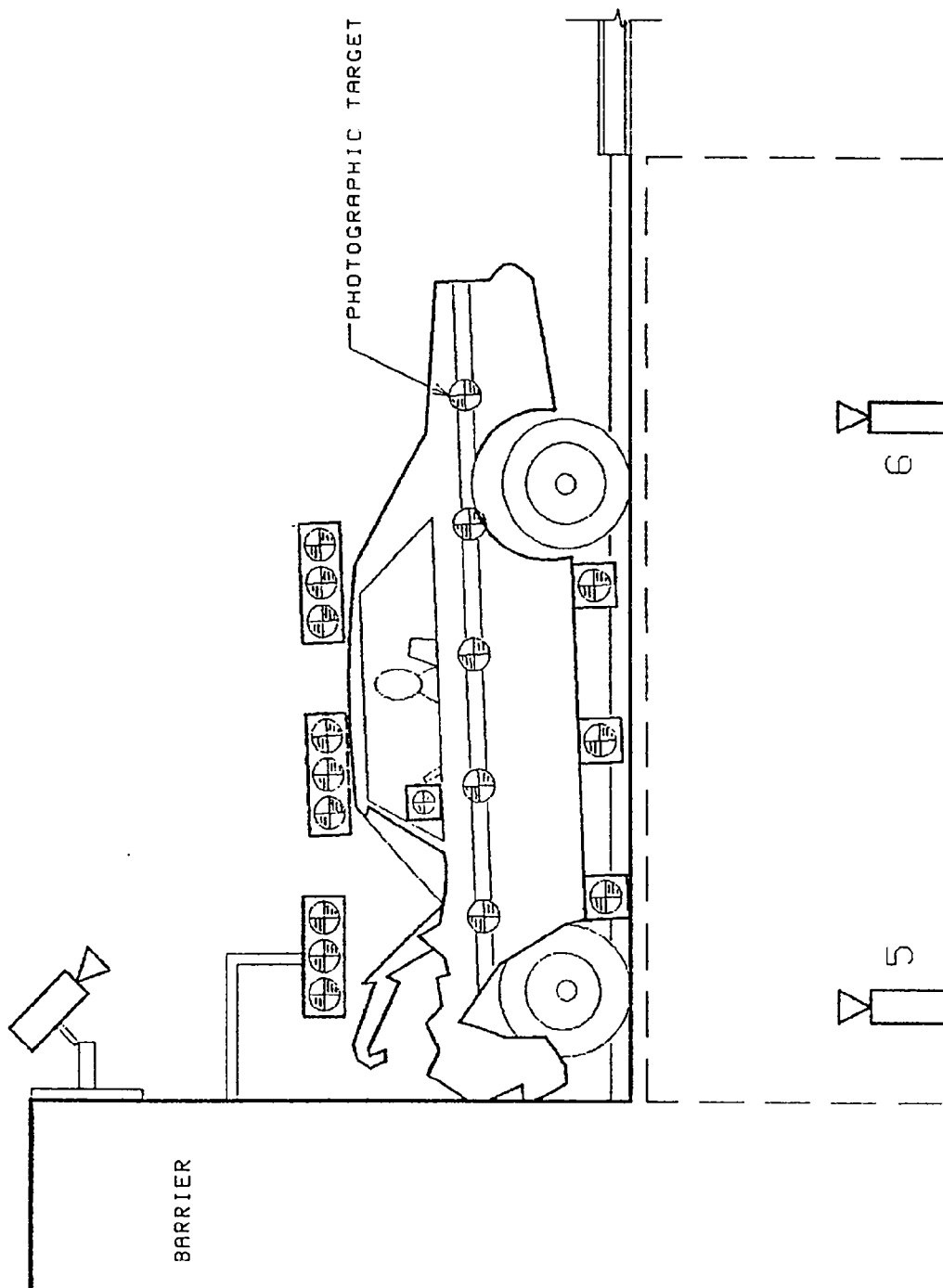


FIGURE 12

CAMERA POSITIONS, CONTINUED

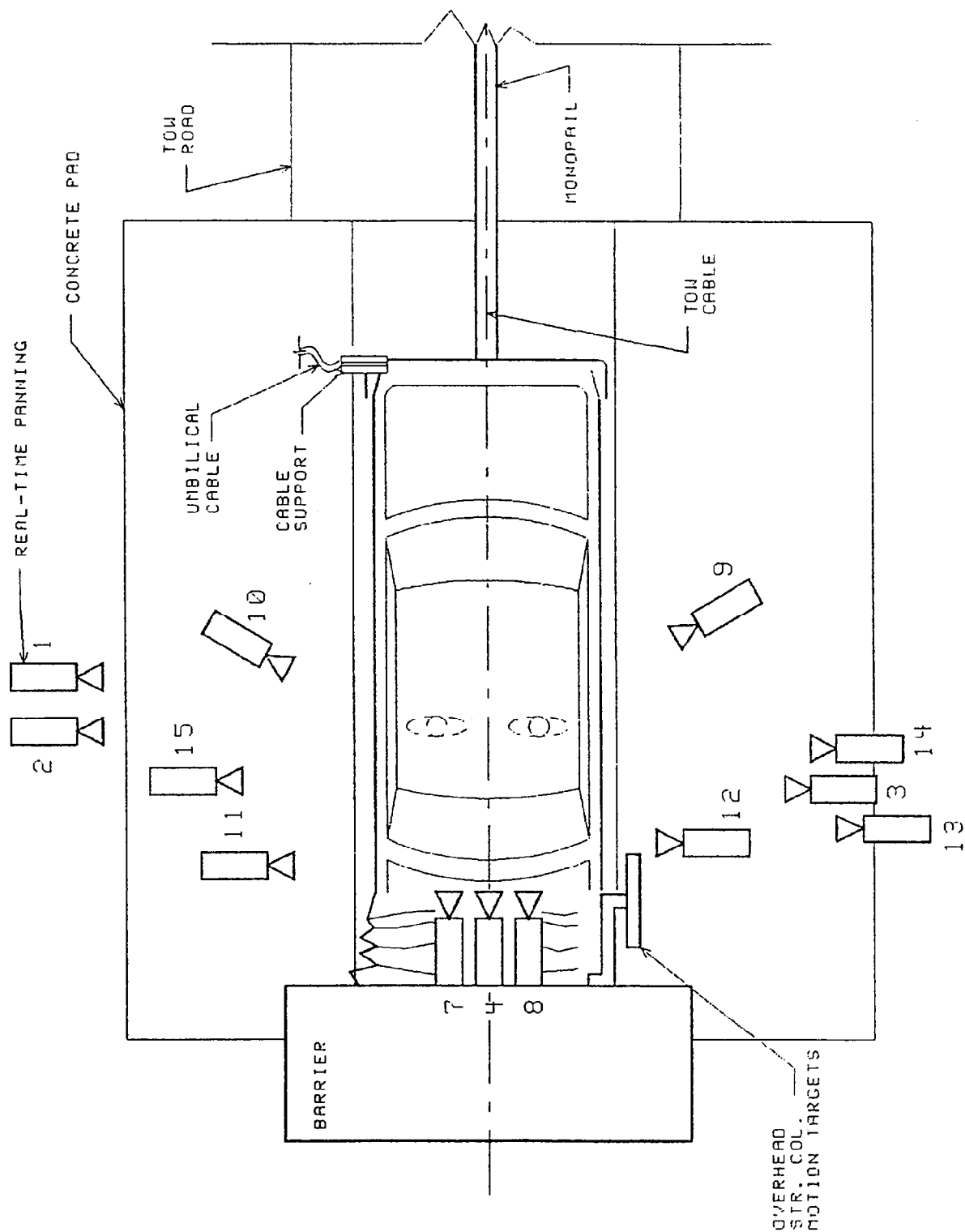


TABLE 14. MOTION PICTURE CAMERA LOCATIONS

TEST NO.:	CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE** (DEG)	FILM PLANE		FILM SPEED (FPS)
			X	Y	Z		TO HEAD TARGET(IN)	LENS (MM)	
			VEHICLE: Pontiac/Bonneville SSEi/4-door sedan						
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	498
3		Left vehicle crush	-41.5	295.0	44.0	-4	196.0	25	998
4		Windshield front view	-6.0	0.0	84.0	-40	NA	13	495
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	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	482
9		Driver kinematics	-157.3	116.0	87.0	-27	93.0	25	498
10		Passenger kinematics	-152.1	-116.0	87.0	-26	87.0	25	505
11		Right windshield intrusion	-38.1	-306.1	44.0	0	NA	50	500
12		Left windshield intrusion	-53.0	309.4	42.3	0	NA	50	510
13		Steering column motion	-168.0	285.0	103.0	-14	NA	25	500
14		Steering column motion	-168.0	285.0	75.1	-9	NA	25	500
15		Passenger kinematics	-38.8	-293.0	45.3	-4	226.0	25	1010
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

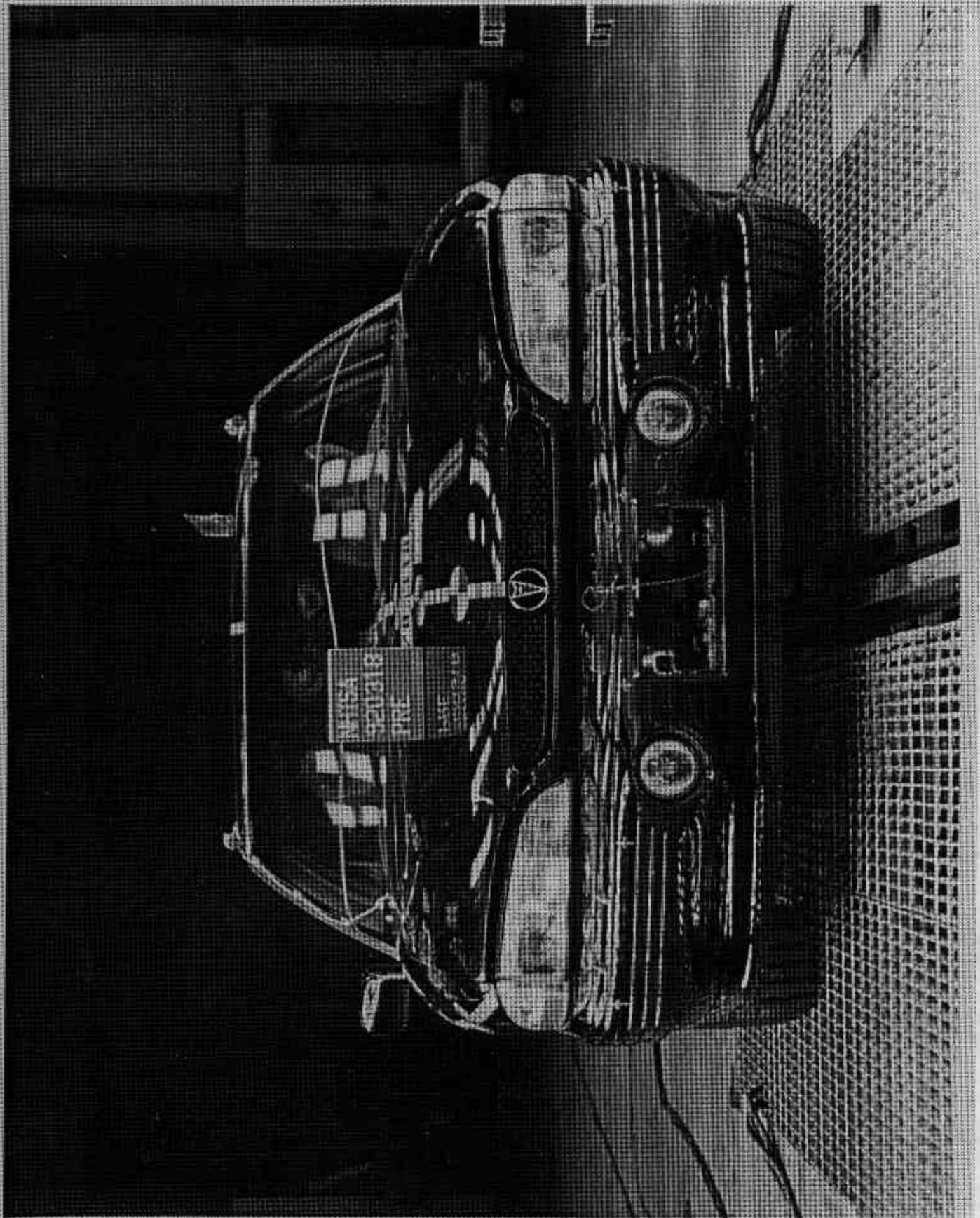


FIGURE A-1. PRE-TEST FRONT VIEW

A-2

920318

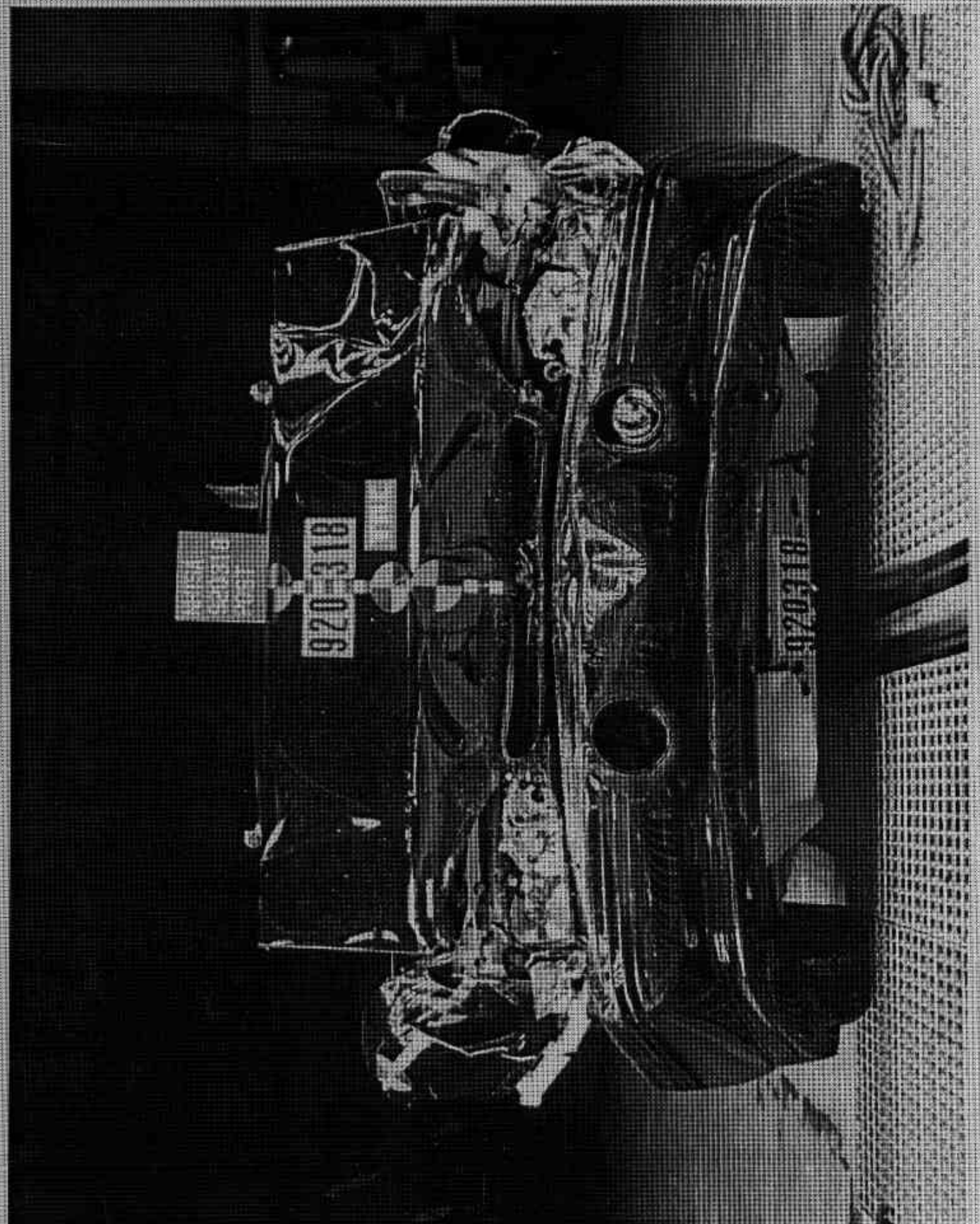


FIGURE A-2. POST-TEST FRONT VIEW

A-3

920318

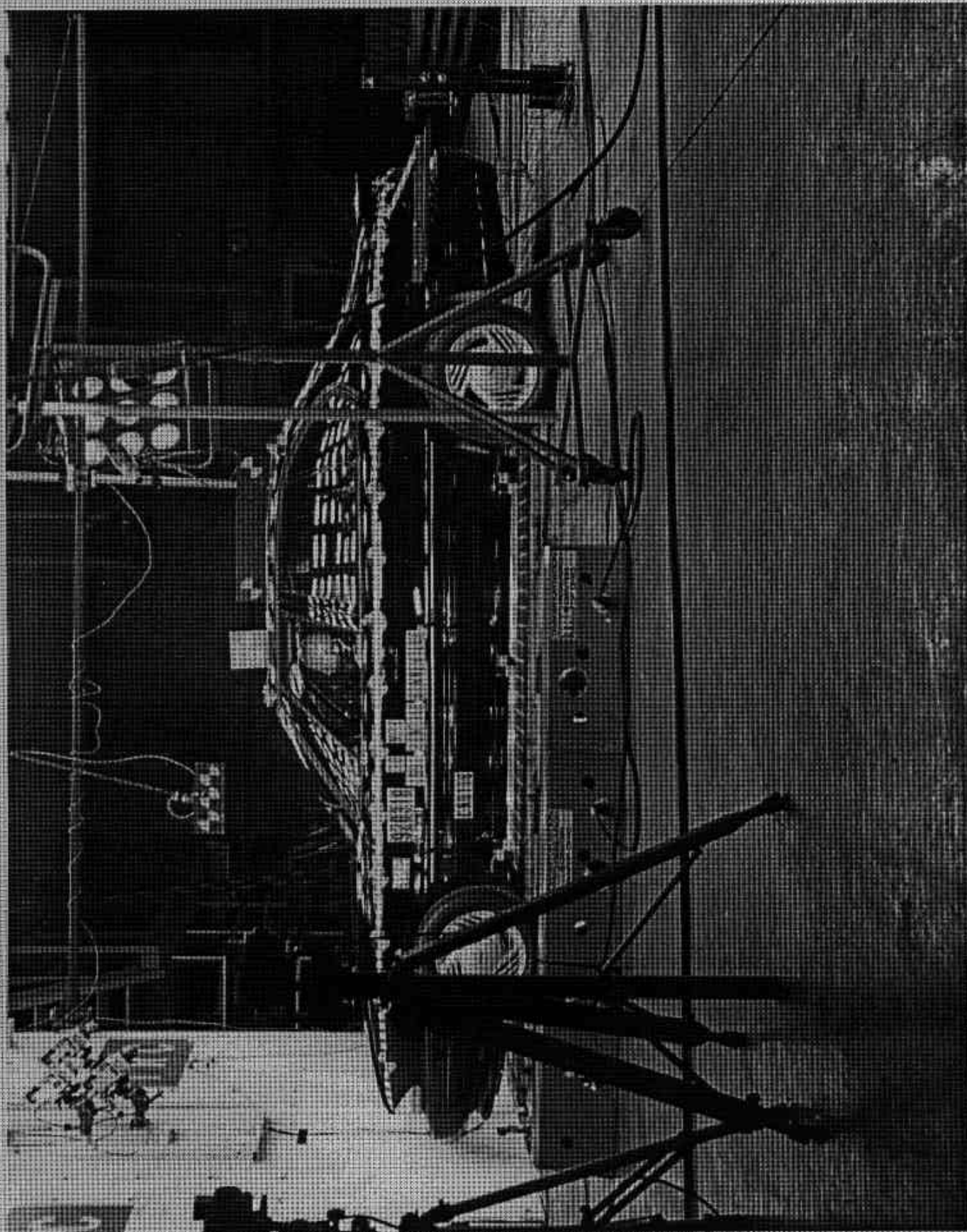


FIGURE A-3. PRE-TEST LEFT SIDE VIEW
A-4

920318

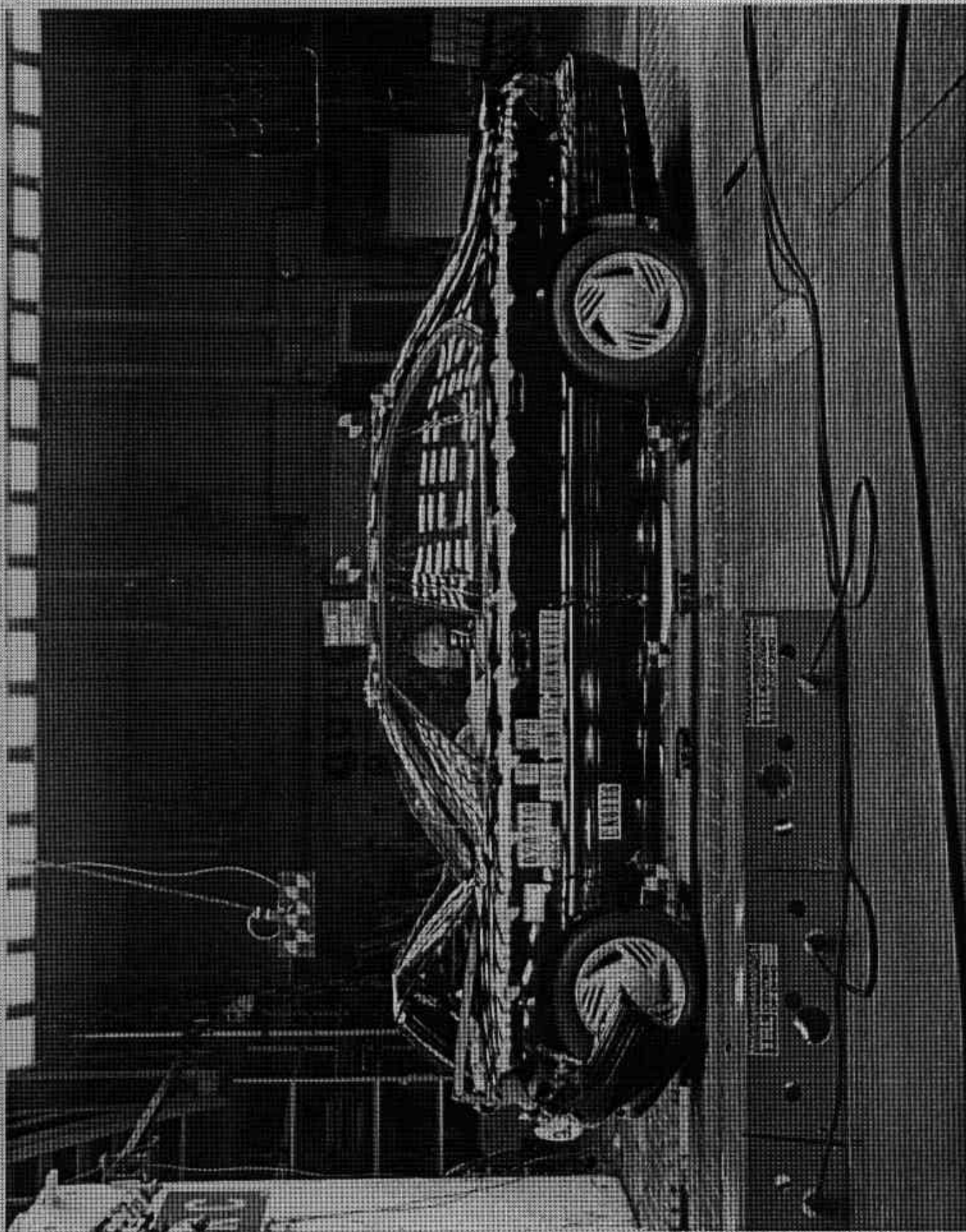


FIGURE A-4. POST-TEST LEFT SIDE VIEW
A-5

920318

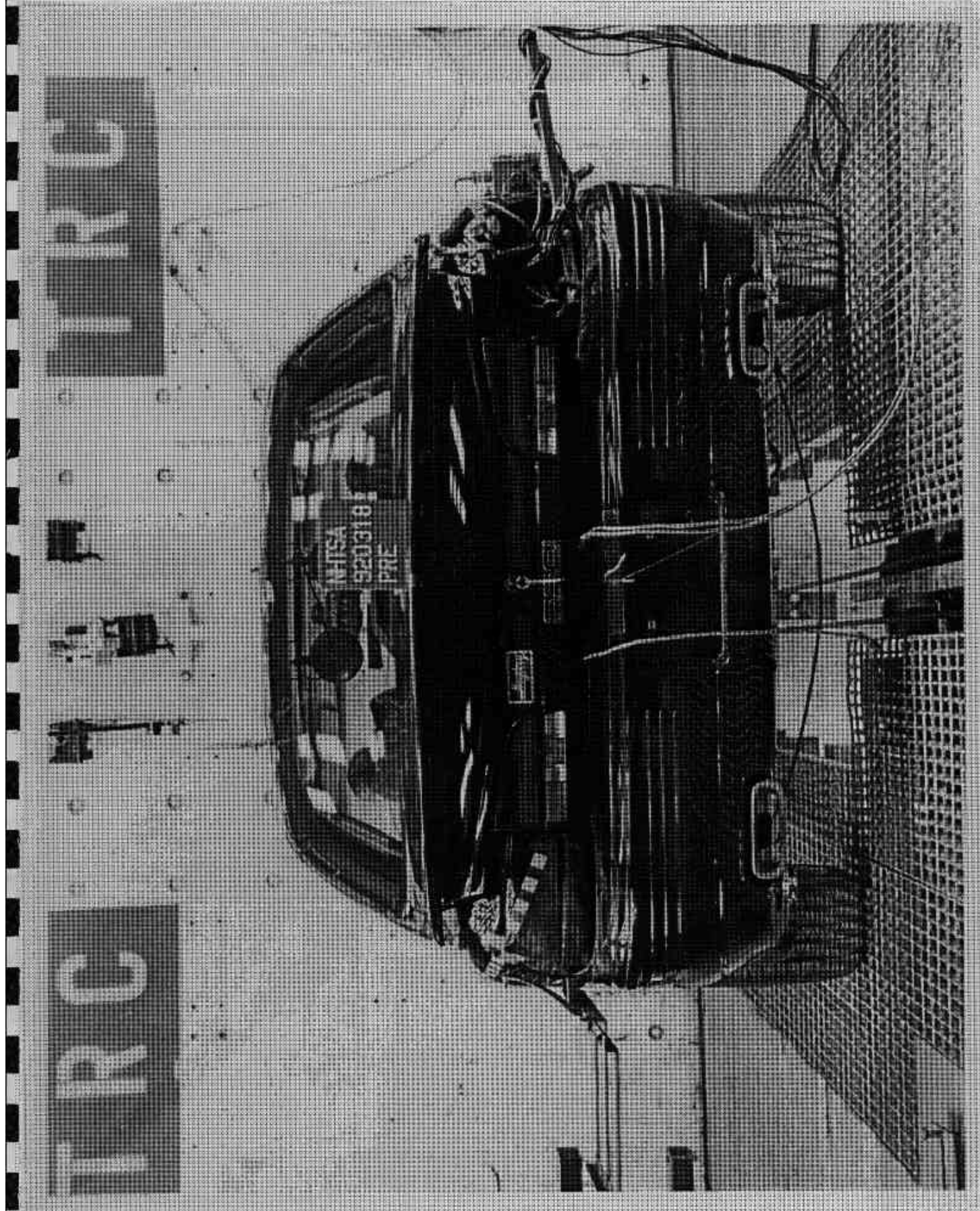


FIGURE A-5. PRE-TEST REAR VIEW

TRC

TRC

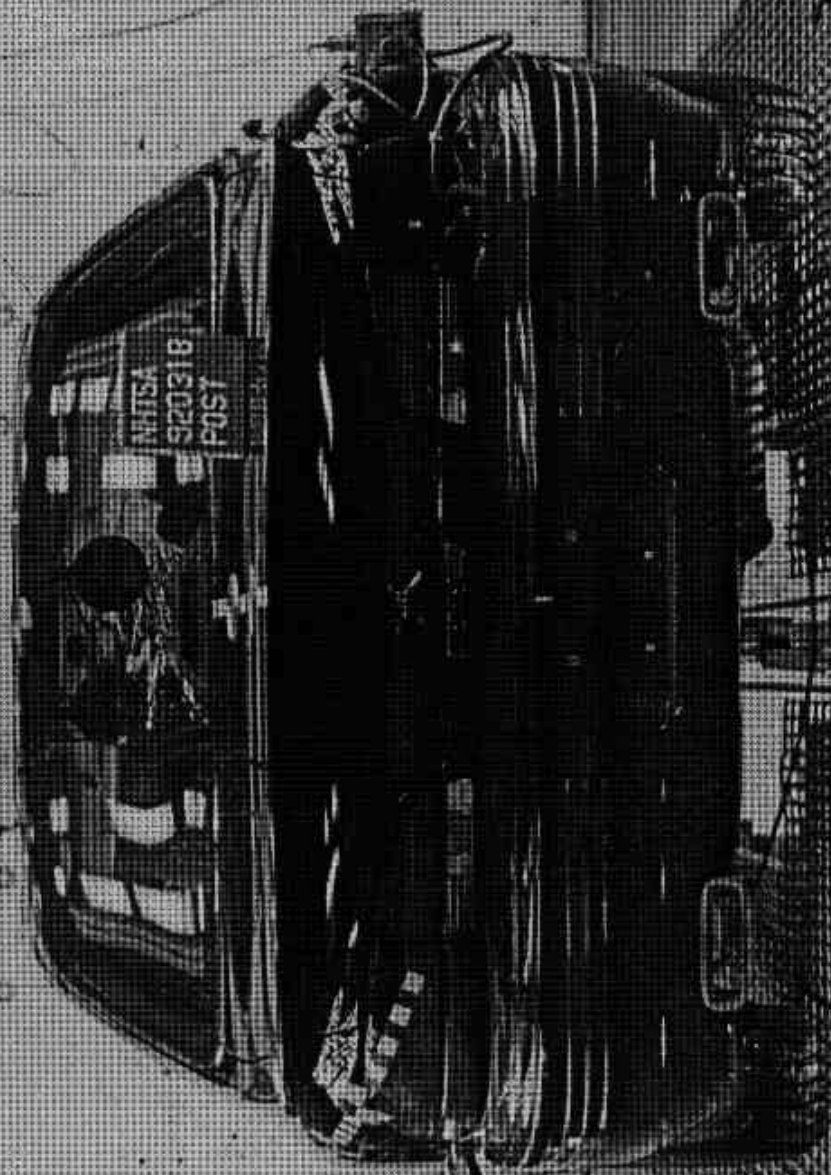


FIGURE A-6. POST-TEST REAR VIEW

A-7

920318

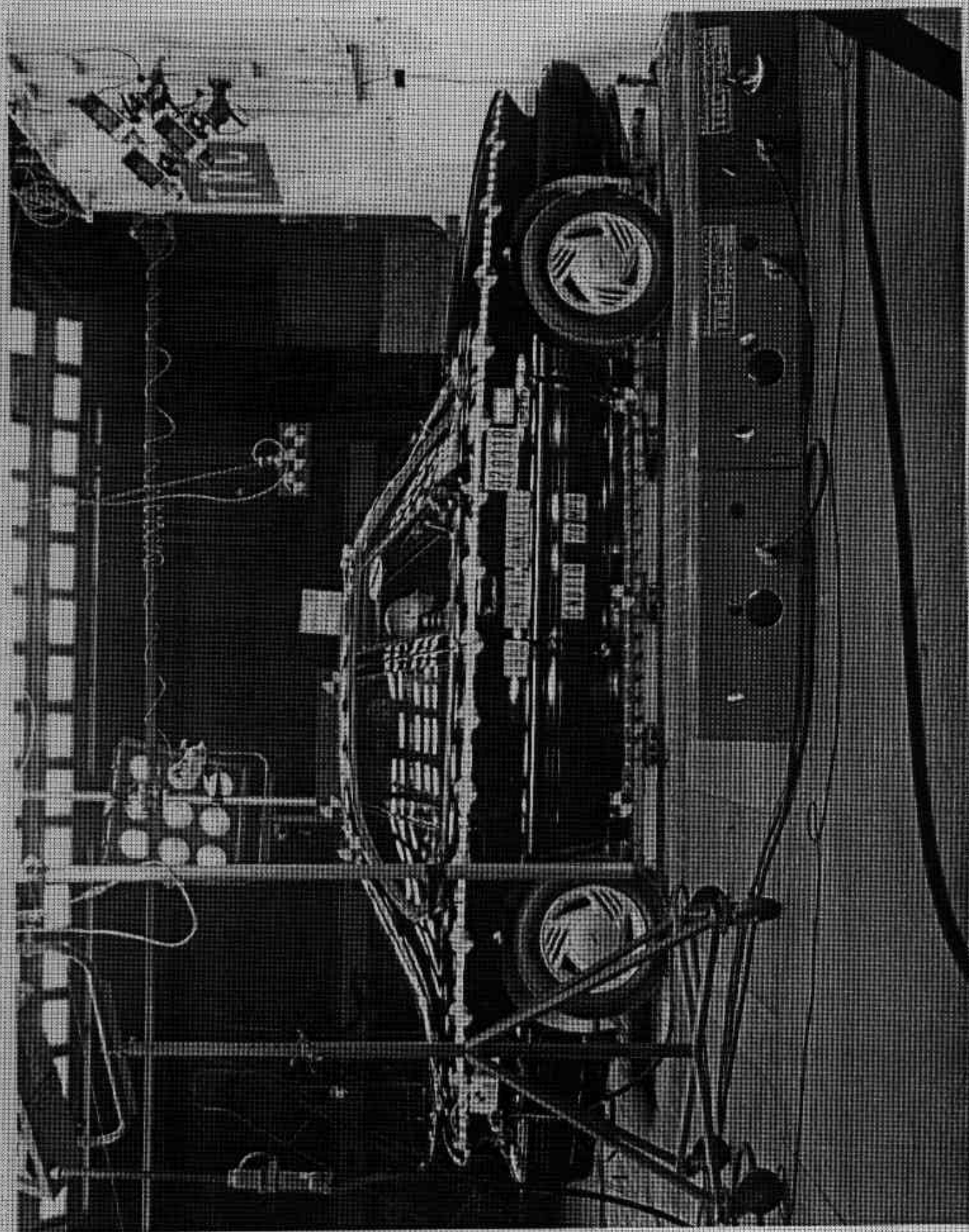


FIGURE A-7. PRE-TEST RIGHT SIDE VIEW
A-8

920318

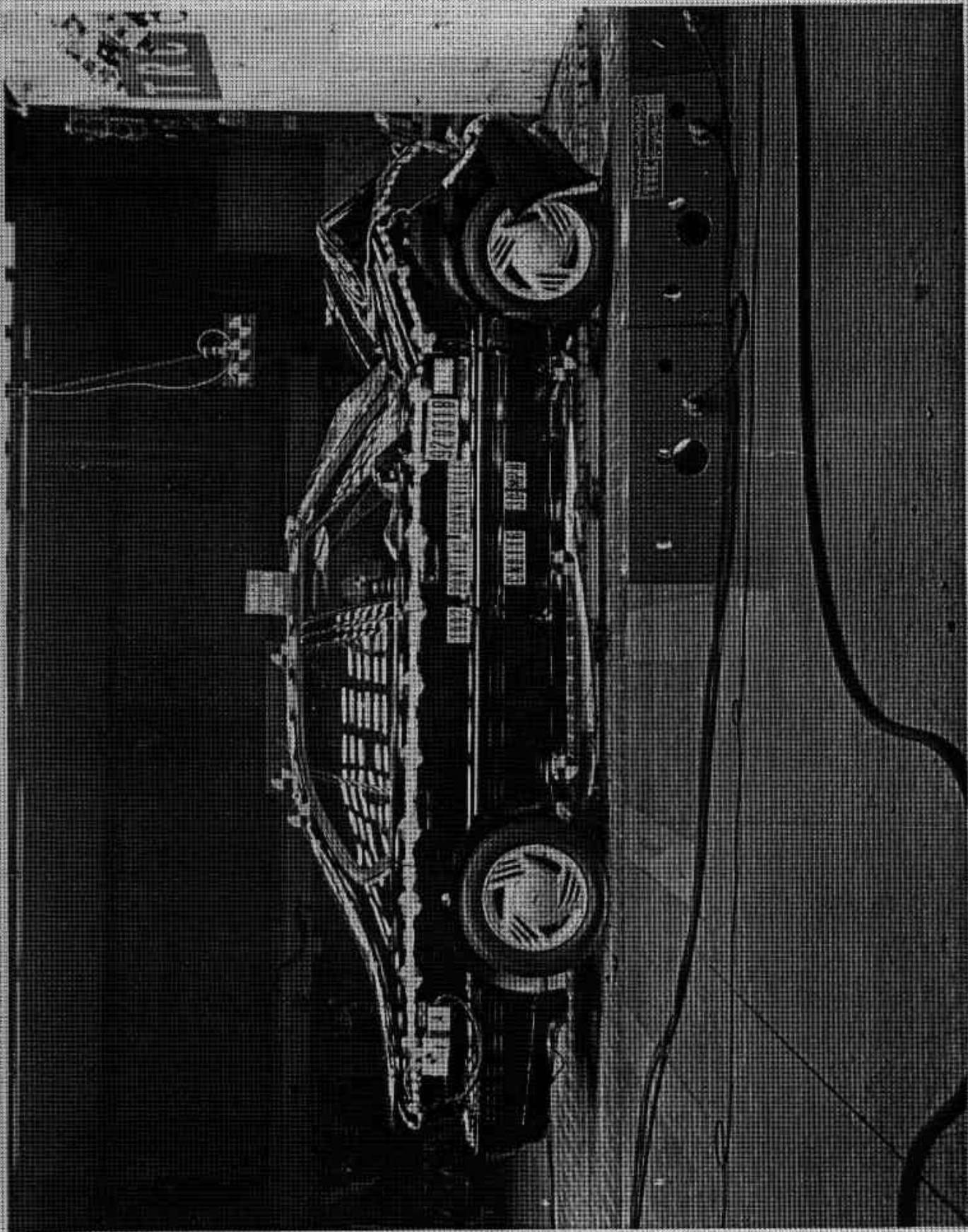


FIGURE A-8. POST-TEST RIGHT SIDE VIEW

A-9

920318



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

A-10

920318

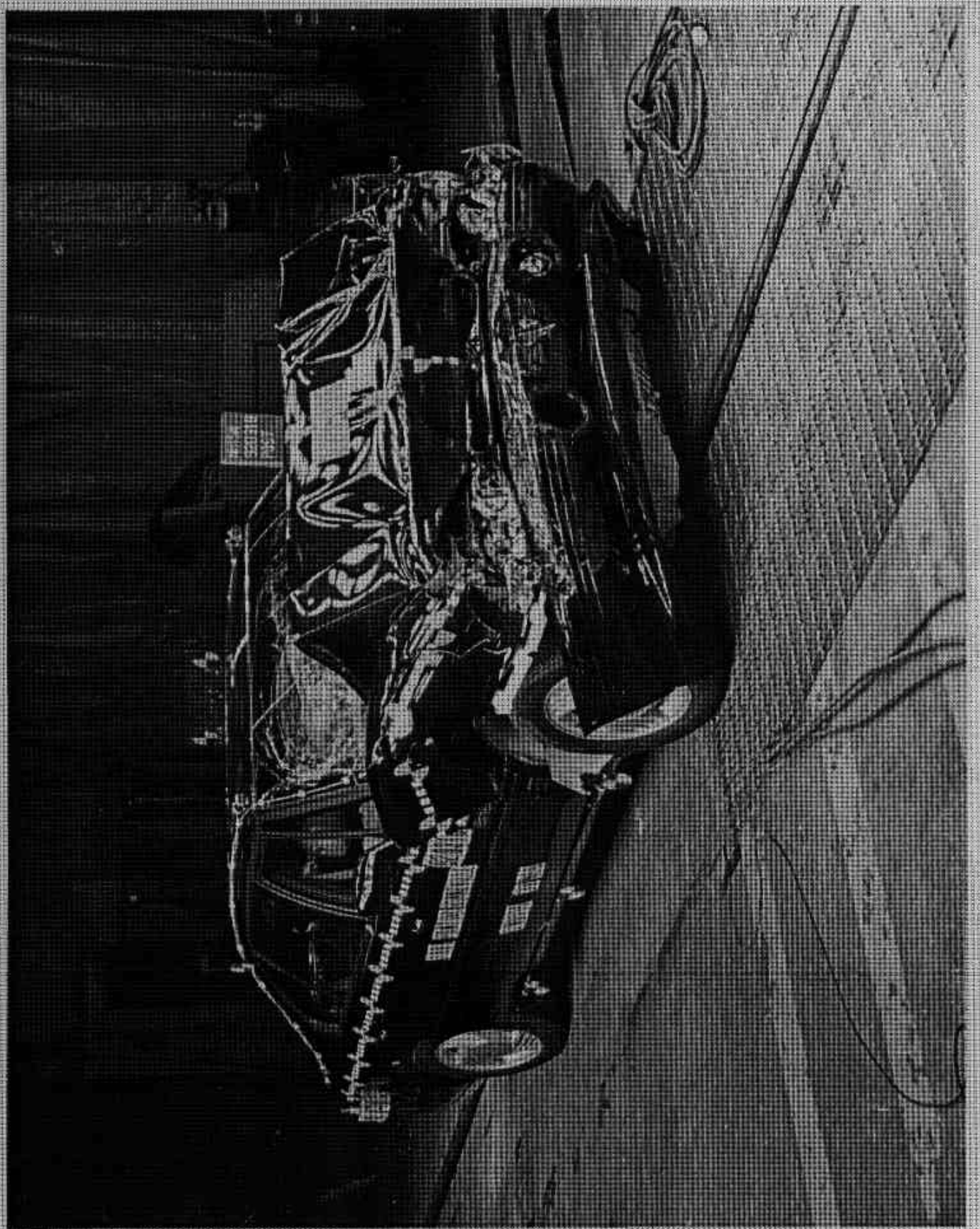


FIGURE A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

920318

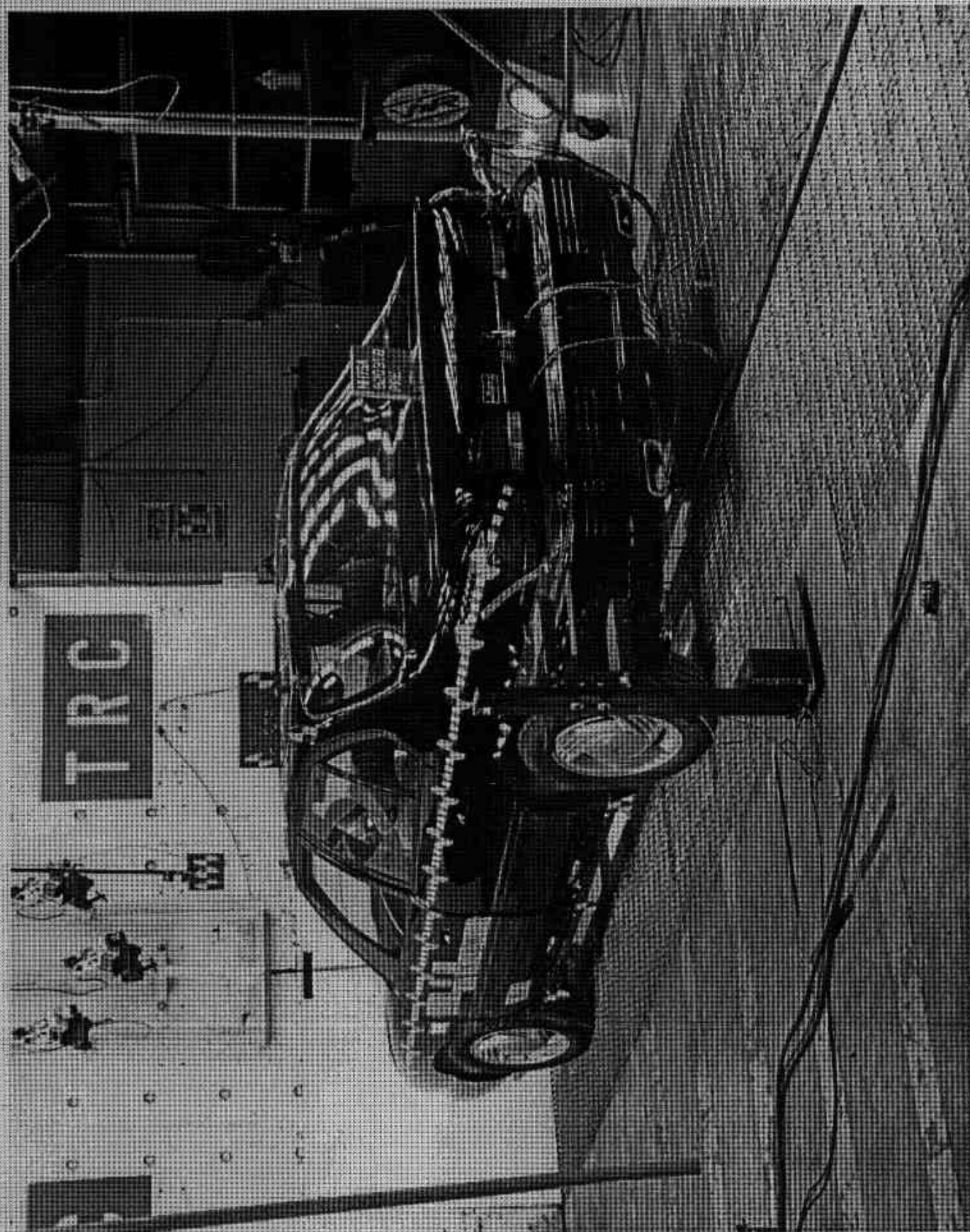


FIGURE A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW
A-12

920318

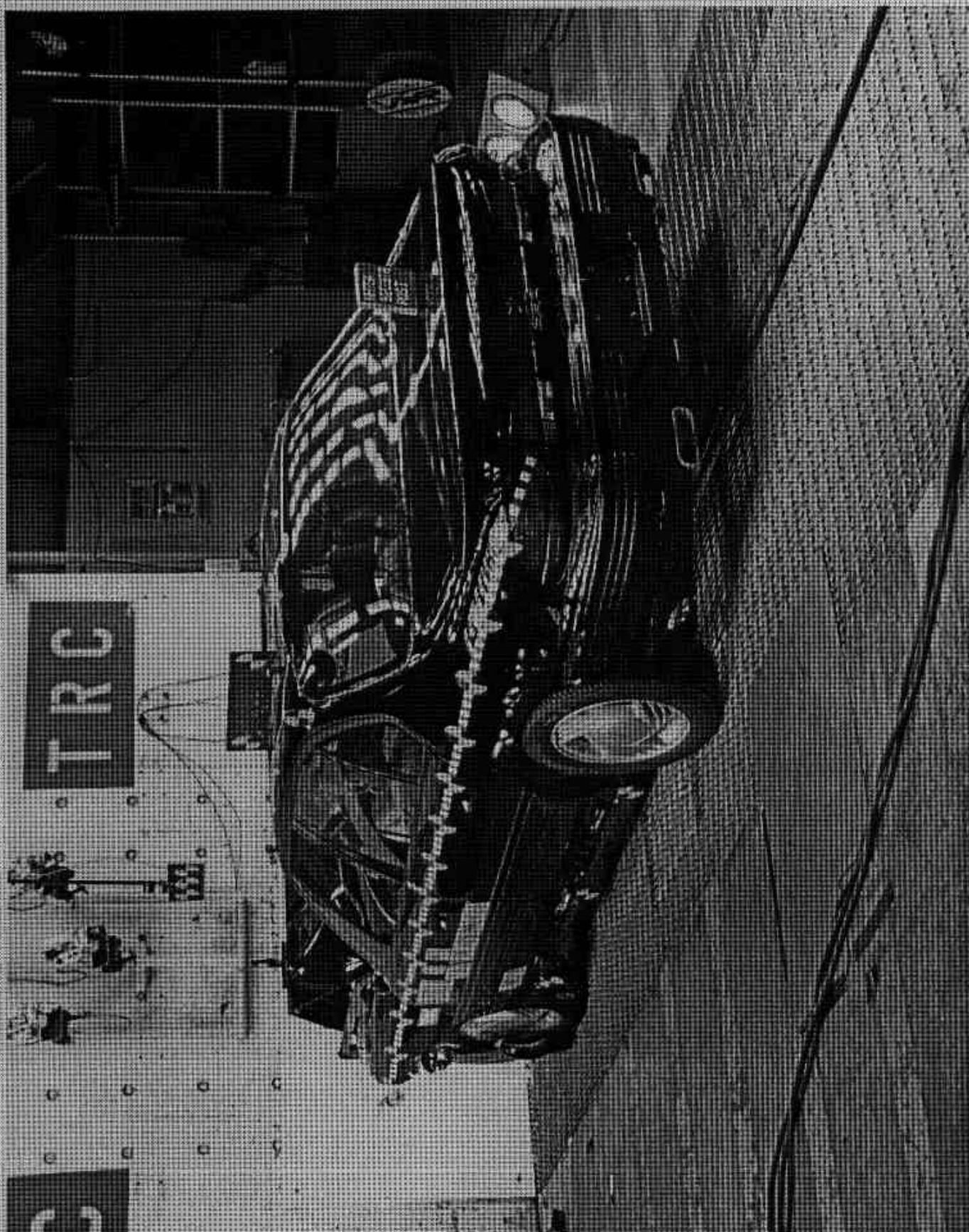


FIGURE A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW
A-13

920318

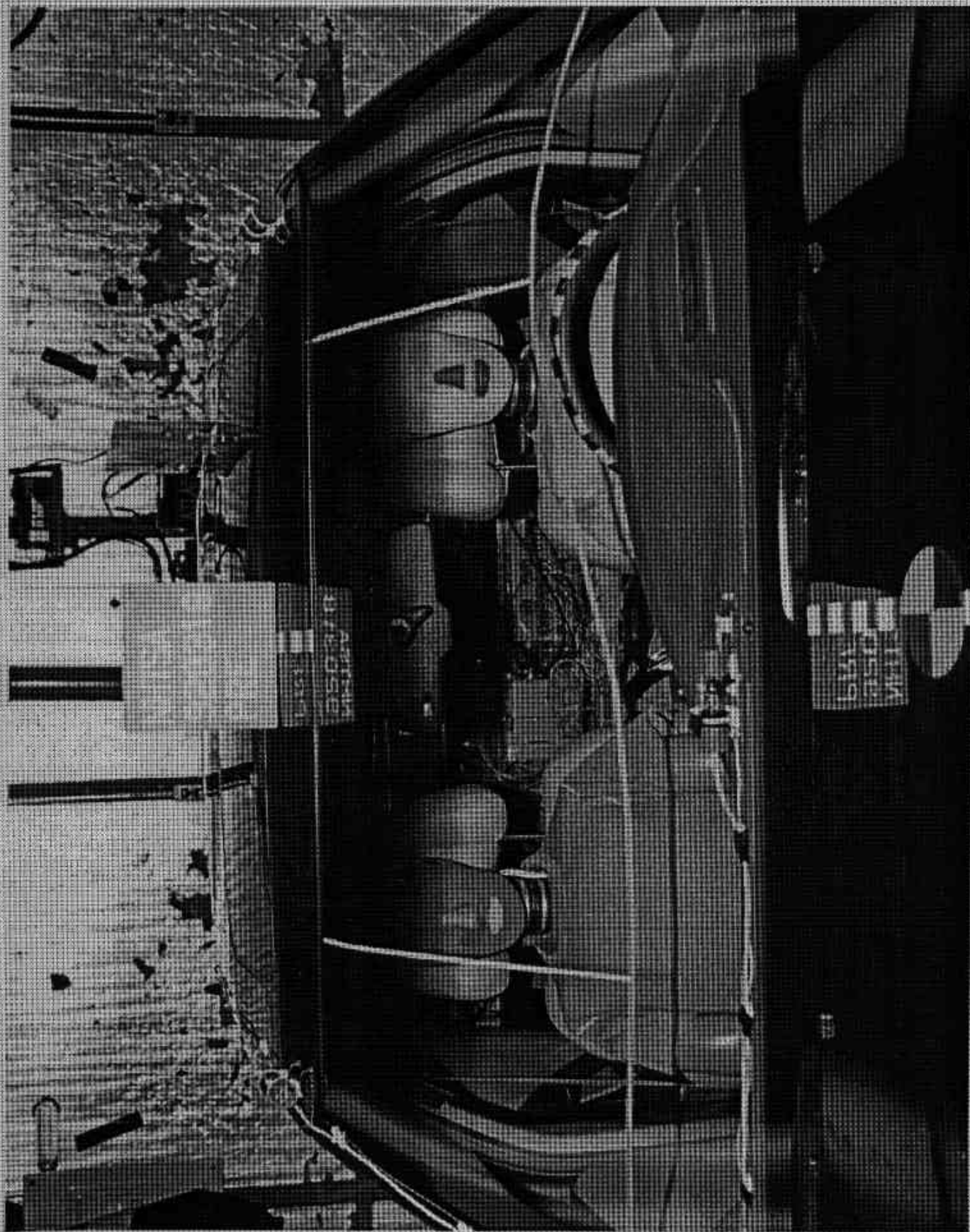


FIGURE A-13. PRE-TEST WINDSHIELD VIEW
A-14

920318



FIGURE A-14. POST-TEST WINDSHIELD VIEW
A-15

920318

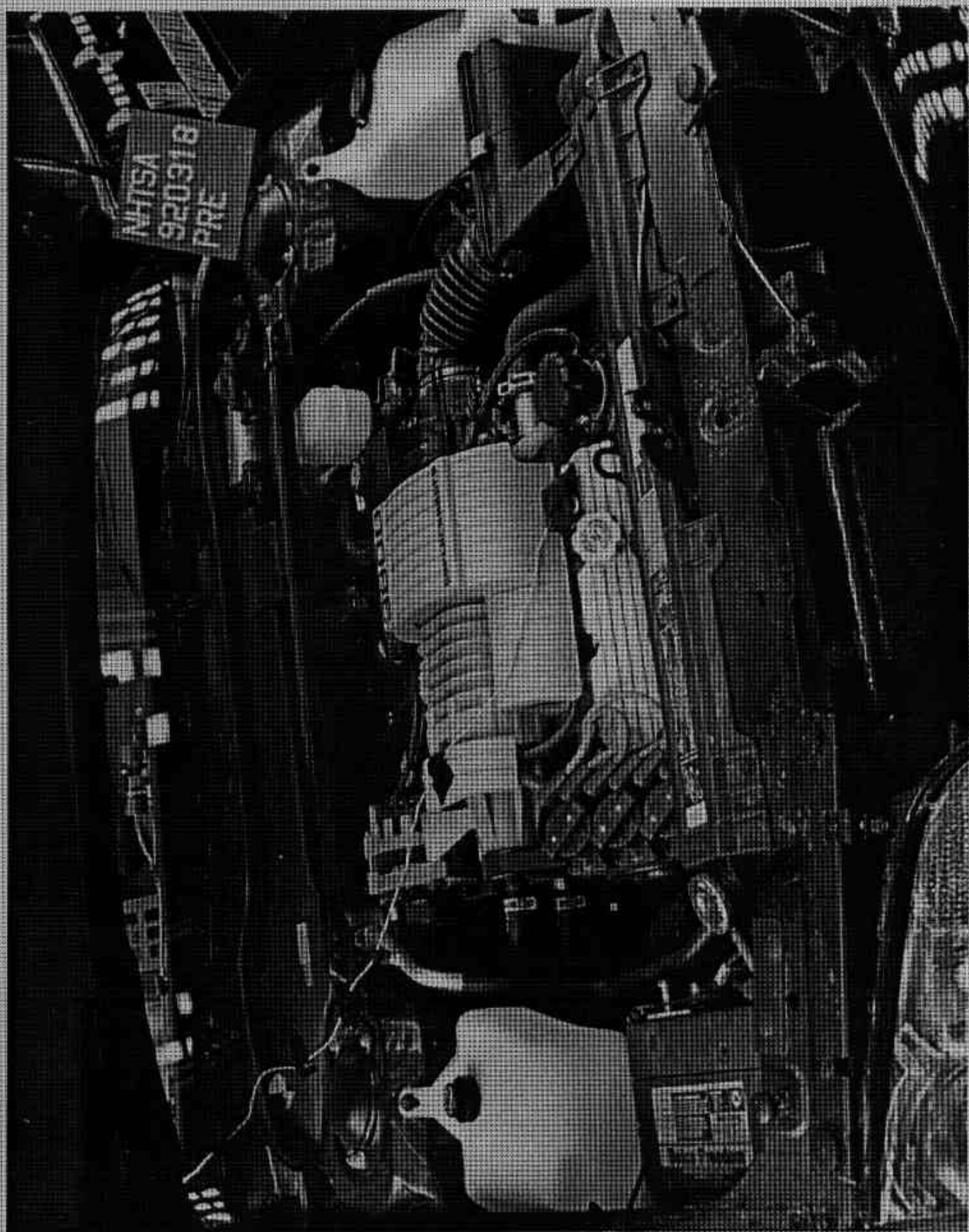


FIGURE A-15. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

920318

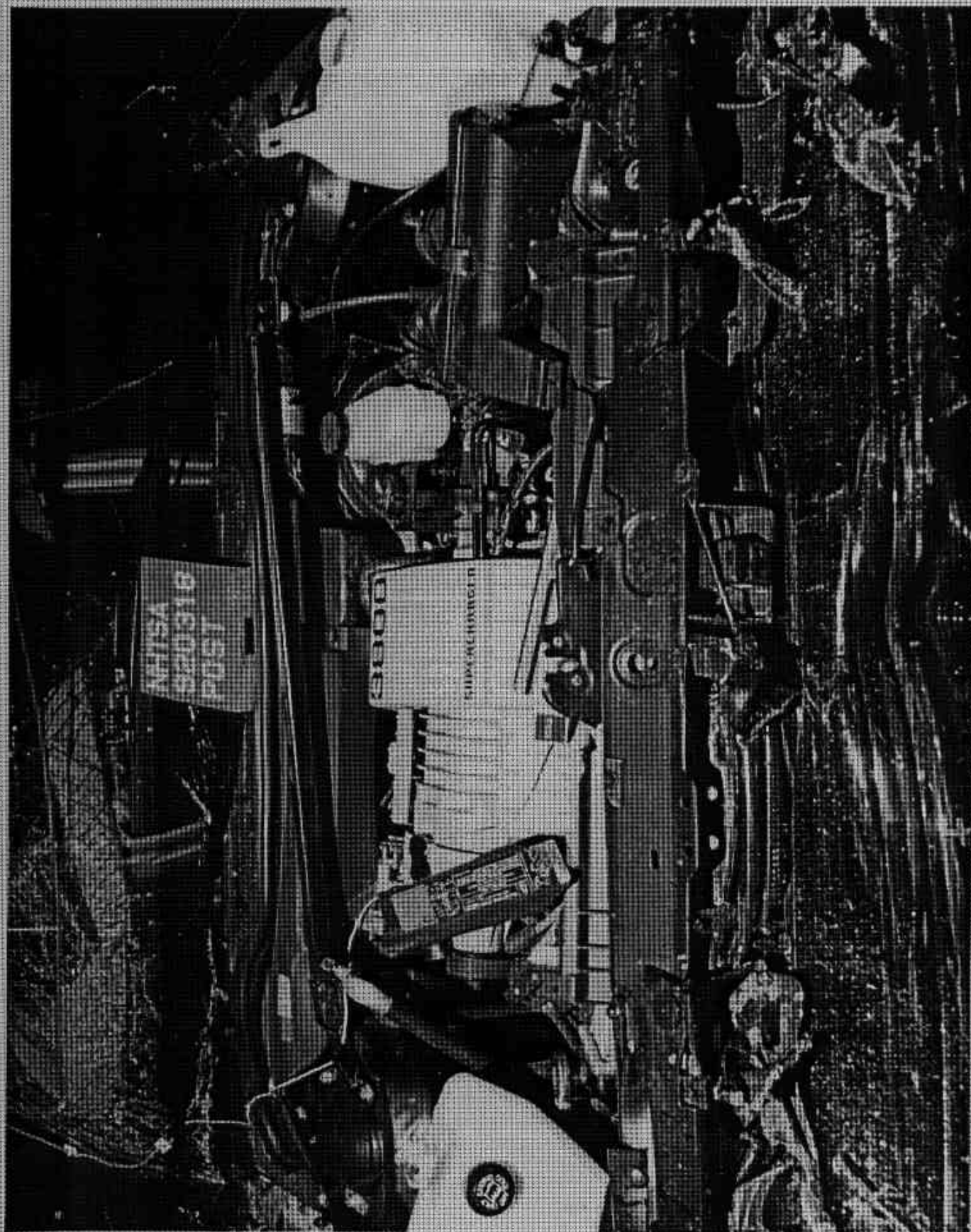


FIGURE A-16. POST-TEST ENGINE COMPARTMENT VIEW

A-17

920318

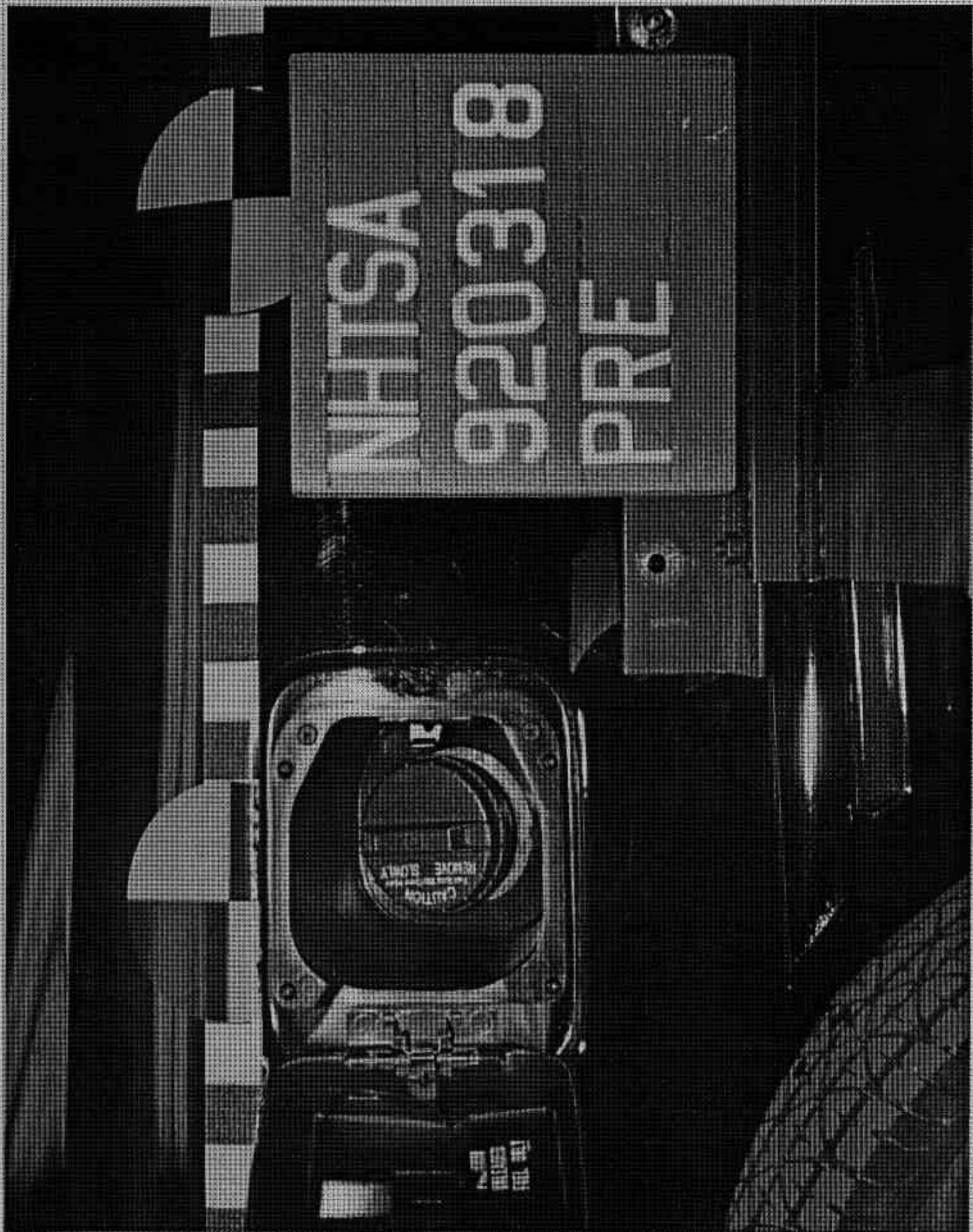


FIGURE A-17. PRE-TEST FUEL FILLER CAP VIEW

A-18

920318



FIGURE A-18. POST-TEST FUEL FILLER CAP VIEW
A-19

920318

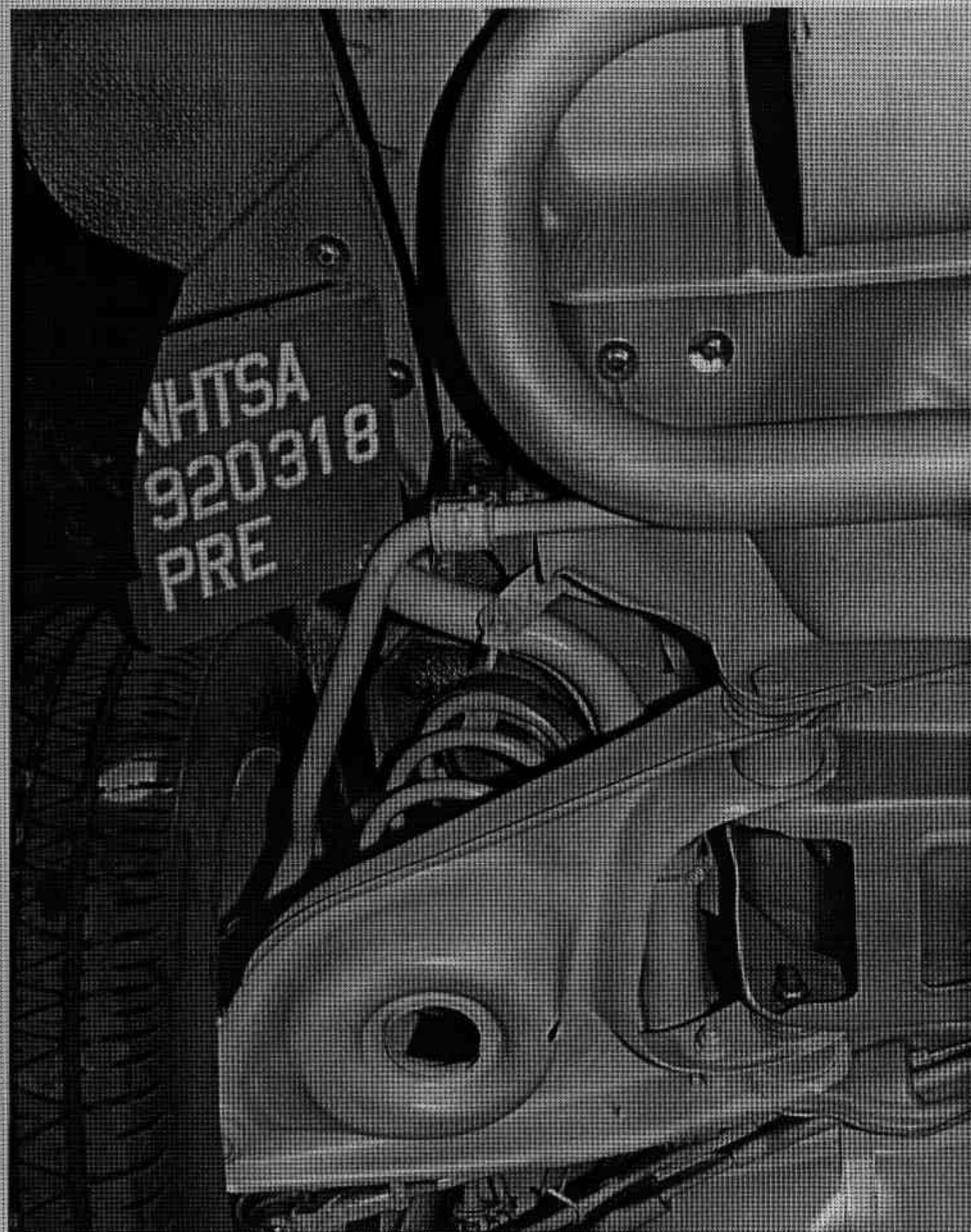


FIGURE A-19. PRE-TEST FUEL FILLER NECK VIEW

A-20

920318



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

A-21

920318



FIGURE A-21. PRE-TEST FUEL TANK VIEW
A-22

920318



FIGURE A-22. POST-TEST FUEL TANK VIEW

A-23

920318



FIGURE A-23. PRE-TEST FRONT UNDERBODY VIEW

A-24

920318



FIGURE A-24. POST-TEST FRONT UNDERBODY VIEW
A-25

920318

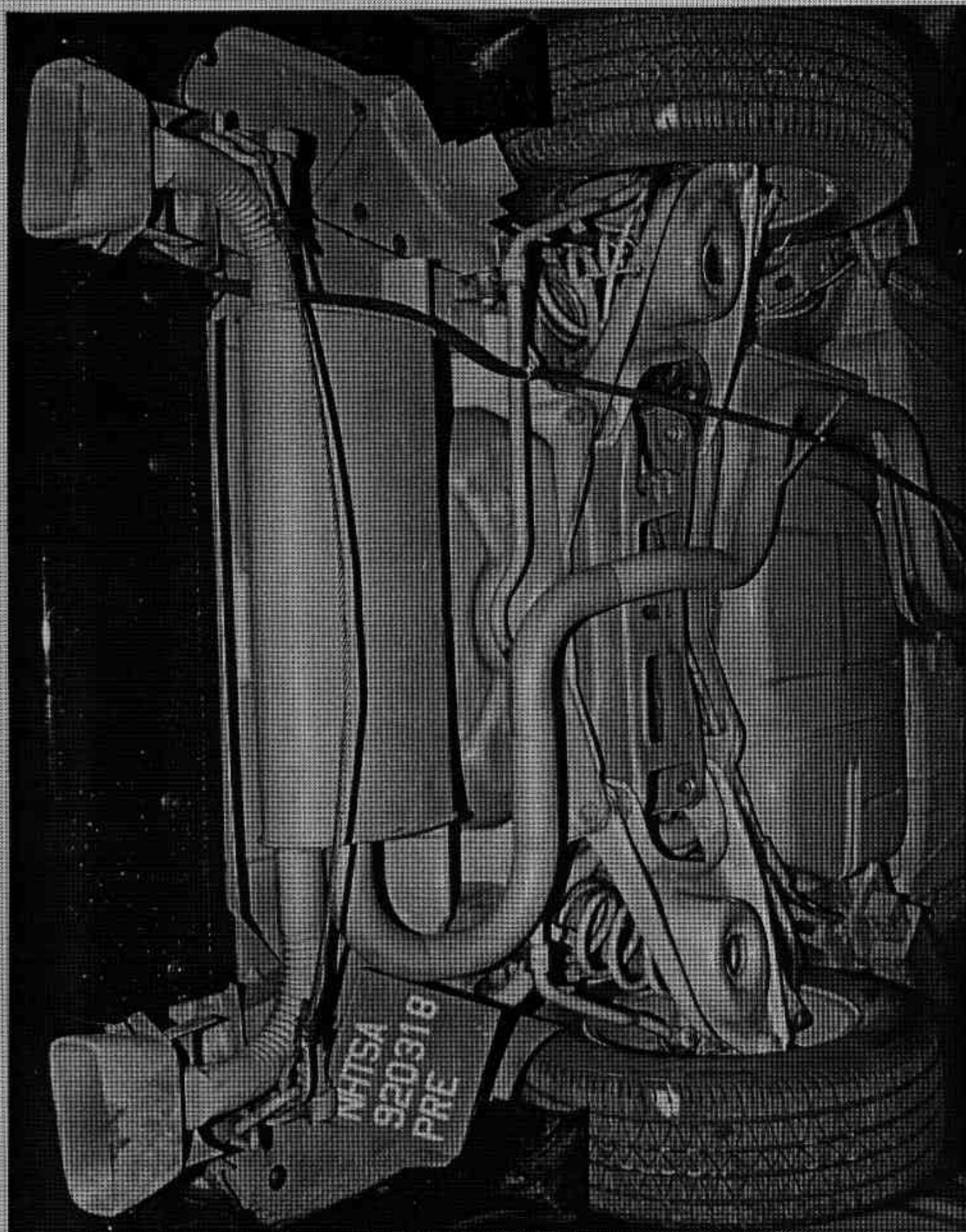


FIGURE A-25. PRE-TEST REAR UNDERBODY VIEW

A-26

920318

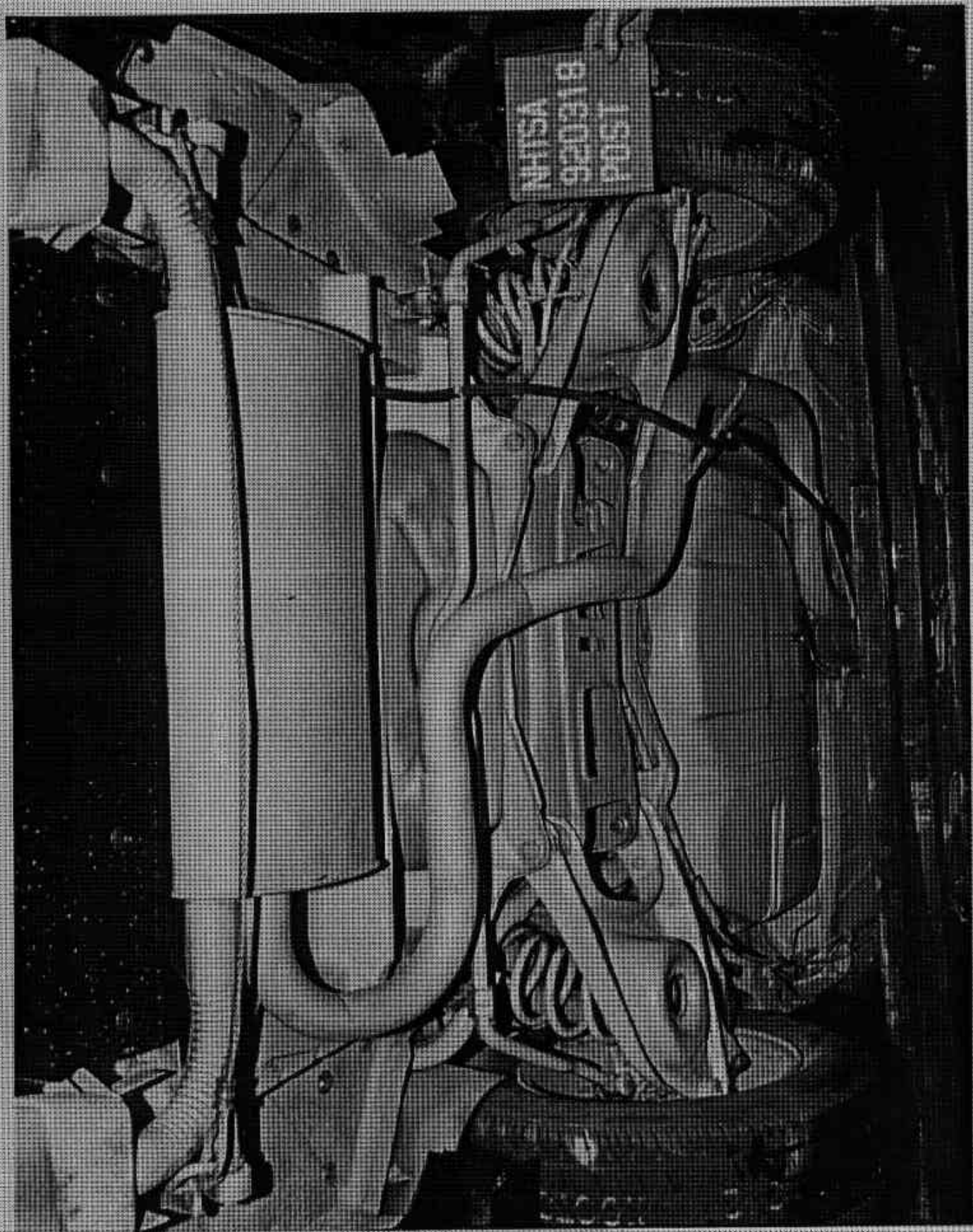


FIGURE A-26. POST-TEST REAR UNDERBODY VIEW
A-27

920318



FIGURE A-27. PRE-TEST BALLAST LOCATION VIEW
A-28

920318



FIGURE A-28. PRE-TEST DRIVER DUMMY POSITION VIEW

A-29

920318



FIGURE A-29, POST-TEST DRIVER DUMMY POSITION VIEW

A-30

920318

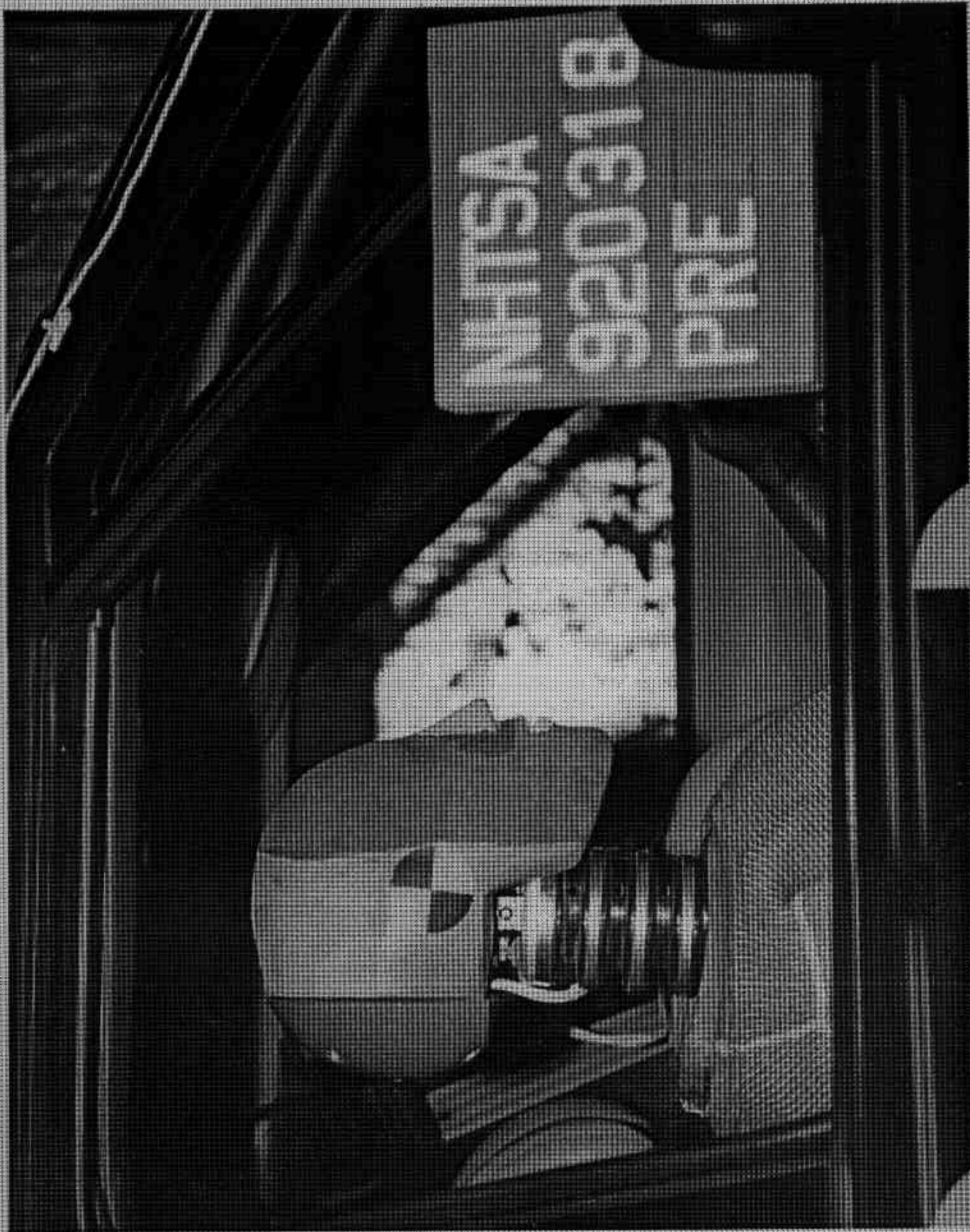


FIGURE A-30. PRE-TEST PASSENGER DUMMY POSITION VIEW
A-31

920318



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

A-32

920318



FIGURE A-32. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

A-33

920318

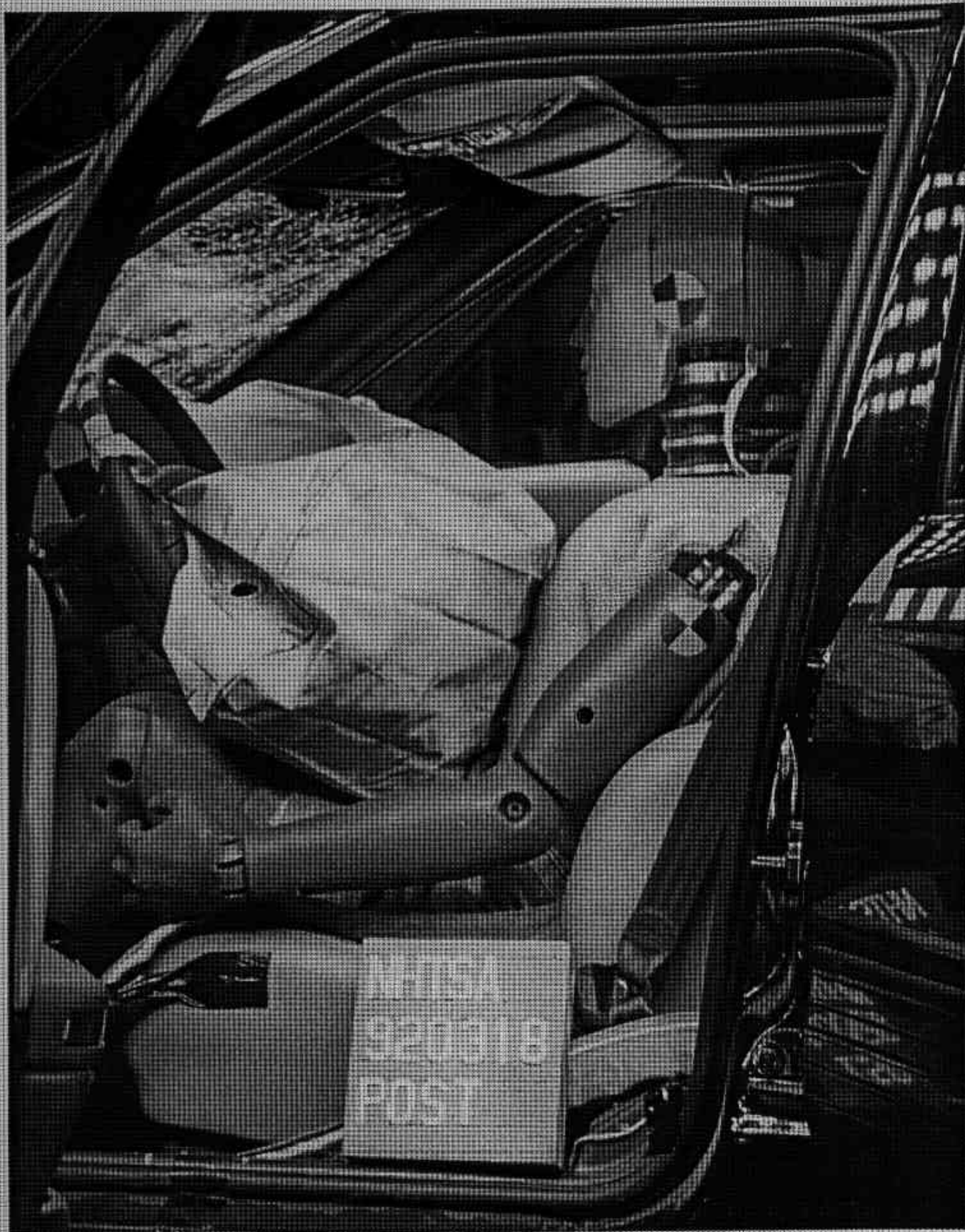


FIGURE A-33. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

A-34

920318

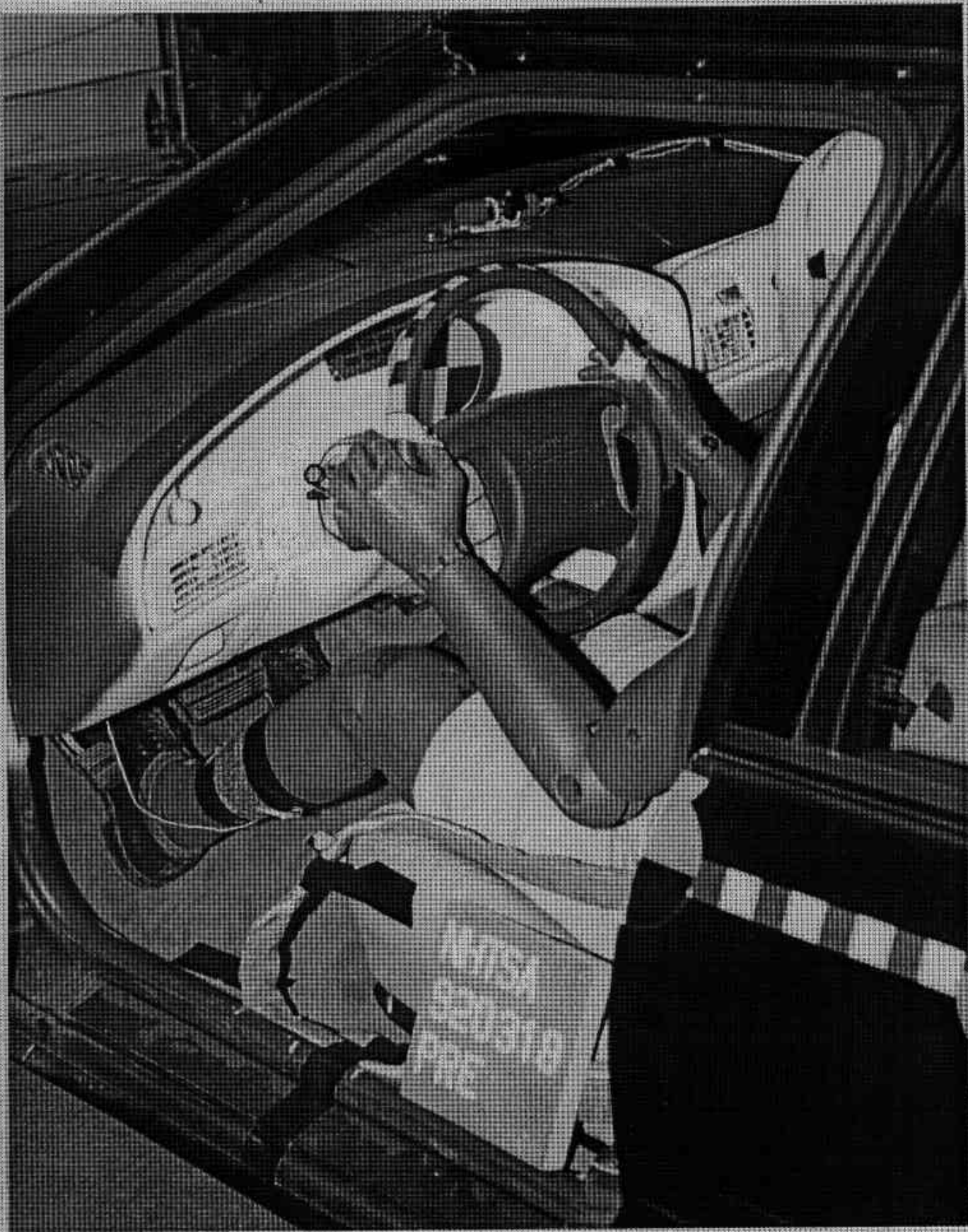


FIGURE A-34. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-35

920318



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

A-36

920318



FIGURE A-36. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
A-37 920318



FIGURE A-37, POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
A-38 920318



FIGURE A-38. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
A-39 920318



FIGURE A-39. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
A-40 920318

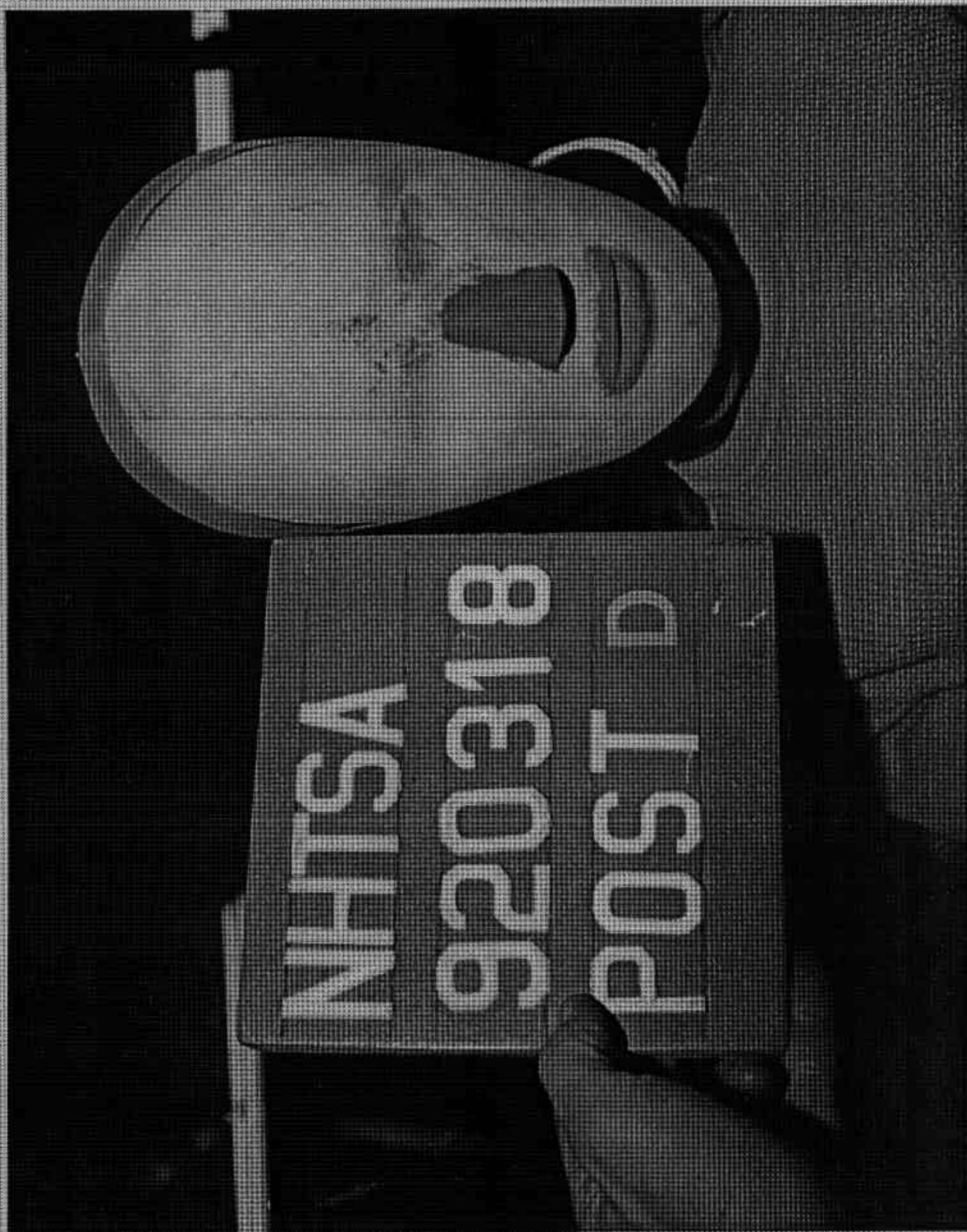


FIGURE A-40. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

A-41

920318

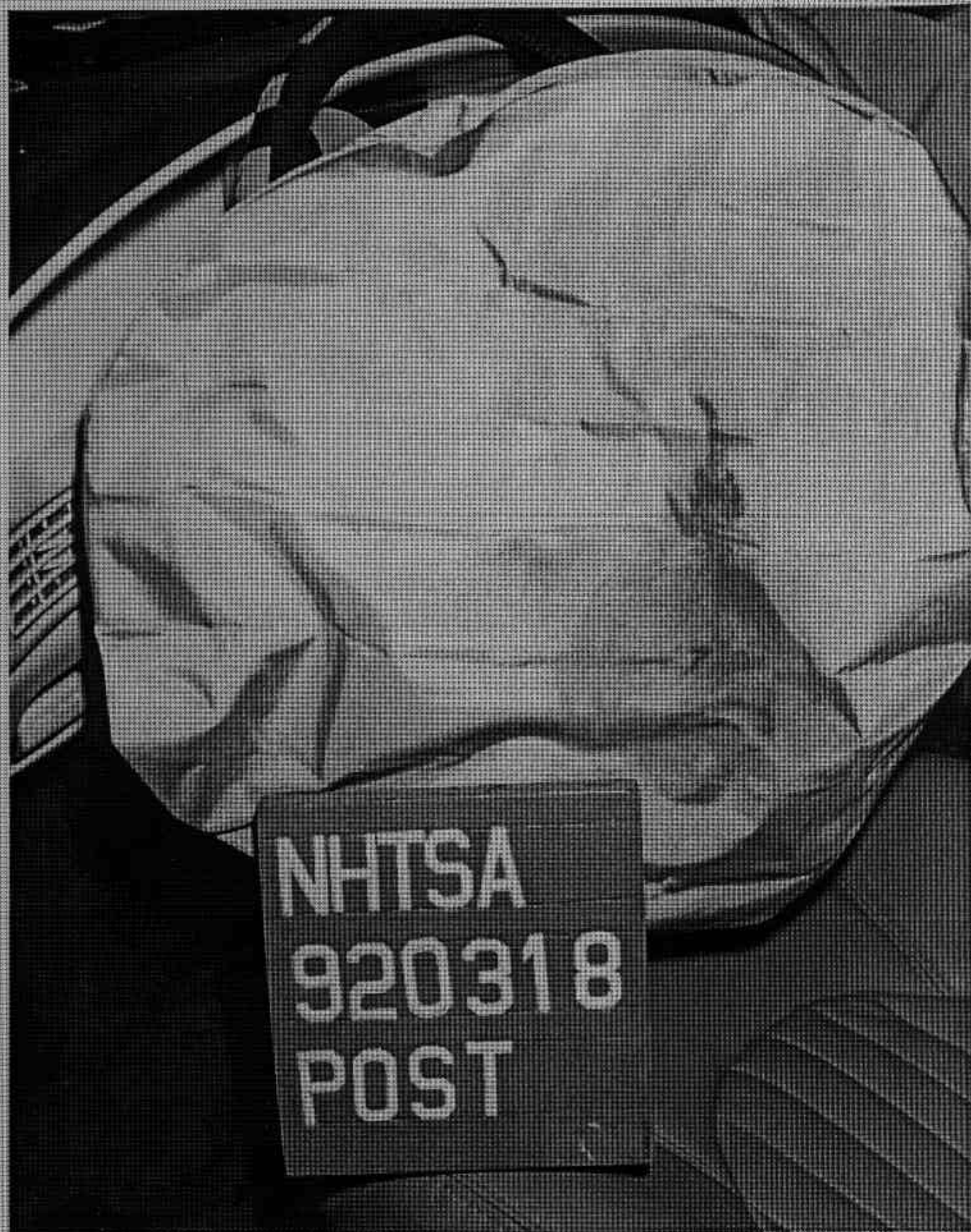


FIGURE A-41. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

A-42

920318



FIGURE A-42. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

A-43

920318

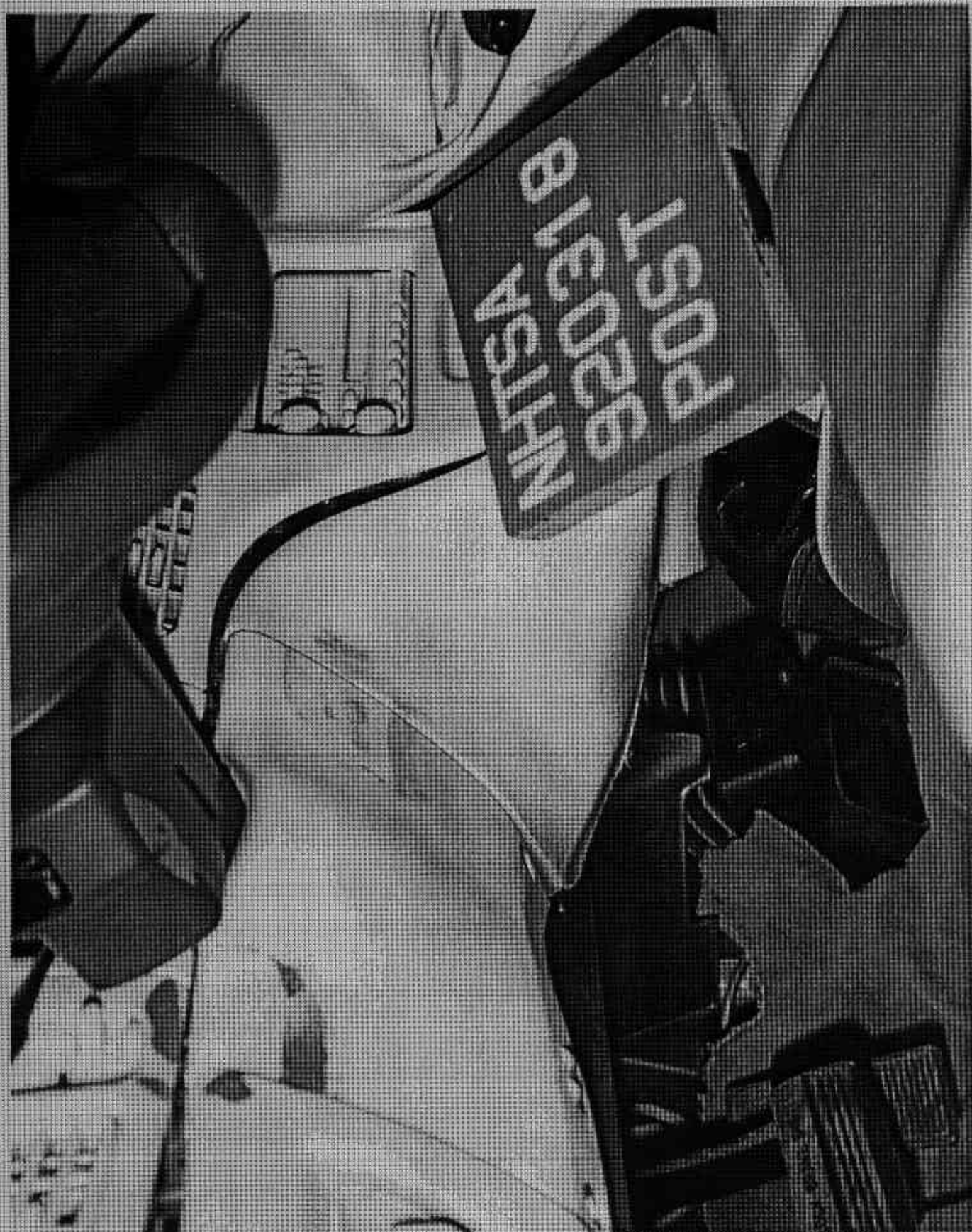


FIGURE A-43. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

A-44

920318



FIGURE A-44. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 1

A-45

920318



FIGURE A-45. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 2

A-46

920318



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

A-47

920318

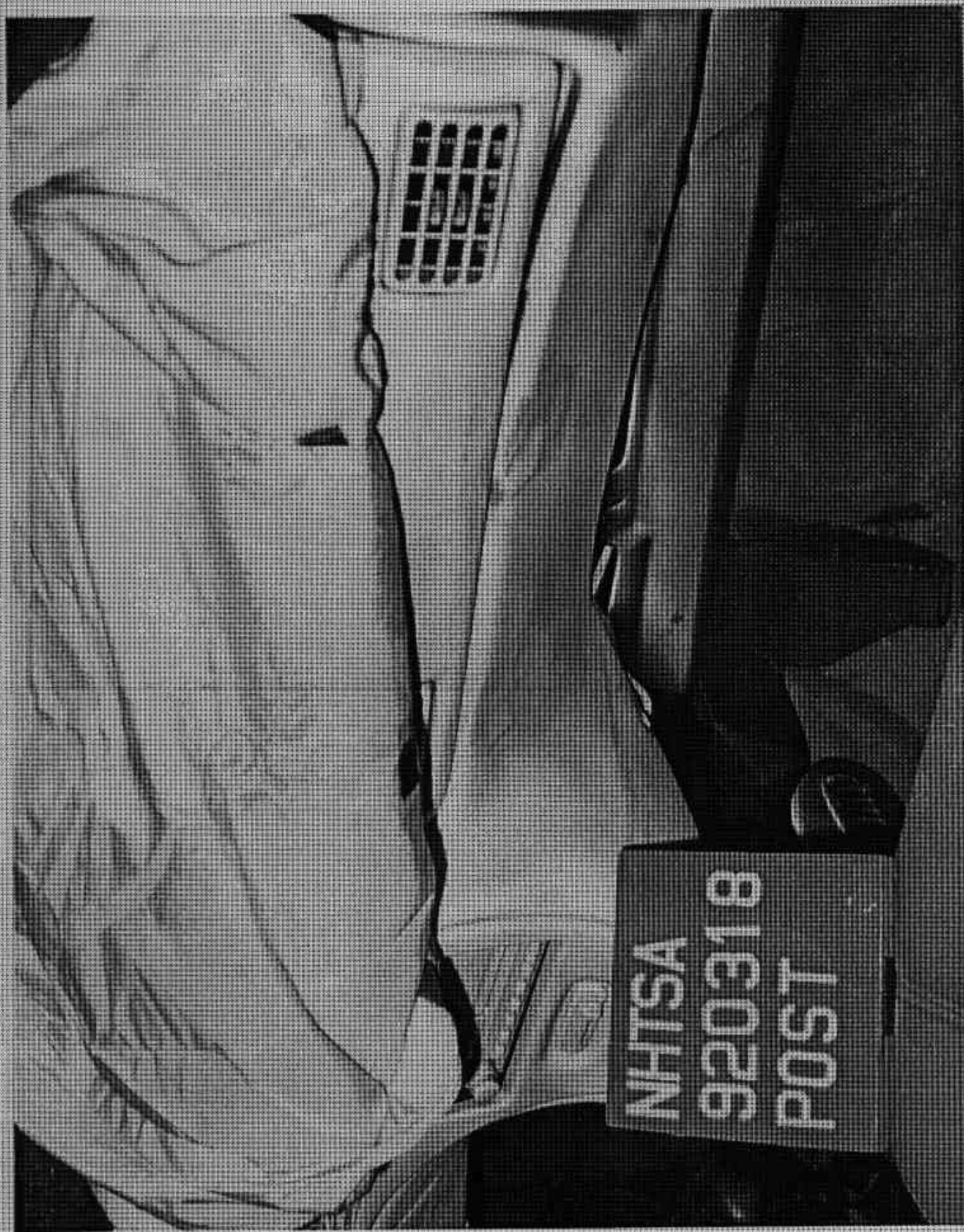


FIGURE A-47. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

A-48

920318

MFD BY GENERAL MOTORS CORP.	
DATE	GVWR
11/91	4729LB
	2145KG
	1179KG
THIS VEHICLE CONFORMS TO ALL APPLI-	
CABLE U.S. FEDERAL MOTOR VEHICLE	
SAFETY, BUMPER, AND THEFT PREVENTION	
STANDARDS IN EFFECT ON THE DATE OF	
MANUFACTURE SHOWN ABOVE.	
1G2HY5218N1261705	PASS CAR

10105543-A

GENCORP



FRT
2

MAX

CAPACITY

MODEL

FRT

FR

SPA

HA

SLE

IN

FIGURE A-48. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW

FRS CORP.
 FRT GAWR PR
 GLB 2129LB
 SKG 966KG
 ALL APPLI-
 VEHICLE
 PREVENTION
 DATE OF

10135543-A

TIRE-LOADING INFORMATION
 OCCUPANTS VEHICLE CAP. WT.
 FRT. CIR. PR. TOTAL LBS KG
 2 0 3 5 926 420
 MAX. LOADING & GVWR SAME AS VEHICLE
 CAPACITY WEIGHT MCN COLD TIRE
 MODEL: HY69 SPEED PRESSURE
 TIRE SIZE RTG PSI/KPA
 FRT P 225/60ZR16 Z 30/210
 RR P 225/60ZR16 Z 30/210
 SPA T135/70R15 H 60/420
 IF TIRES ARE HCT, ADD 4PSI/28KPA
 SEE OWNER'S MANUAL FOR ADDITIONAL
 INFORMATION

10135543-B

FIGURE A-49. PRE-TEST VEHICLE RECOMMENDED TIRE PRESSURE LABEL VIEW
 A-50 920318

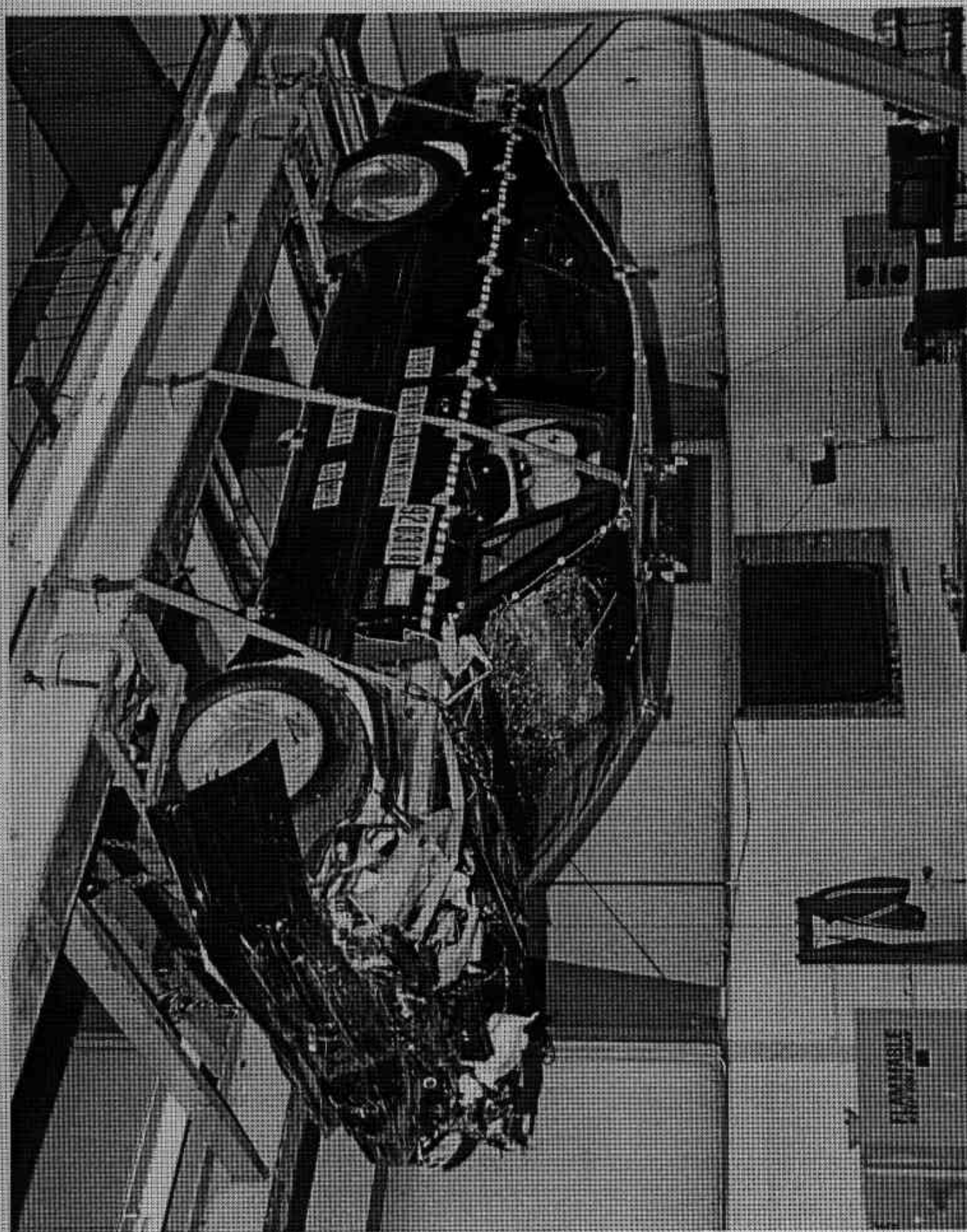


FIGURE A-50. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW

A-51

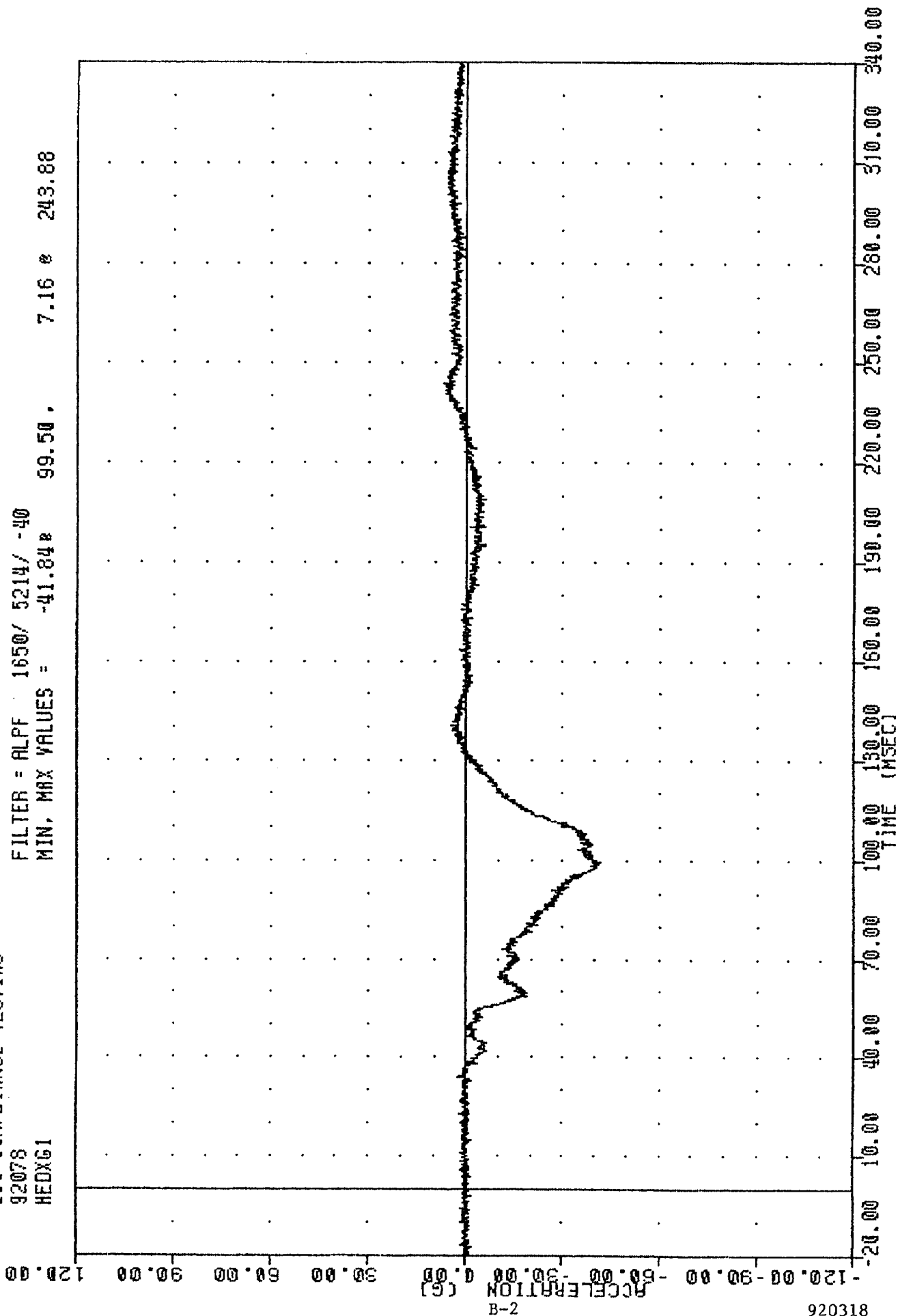
920318

APPENDIX B

DATA PLOTS

TRC , 920318
200 COMPLIANCE TESTING
92078
HEDXG1

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -41.84 99.50, 7.16 243.88



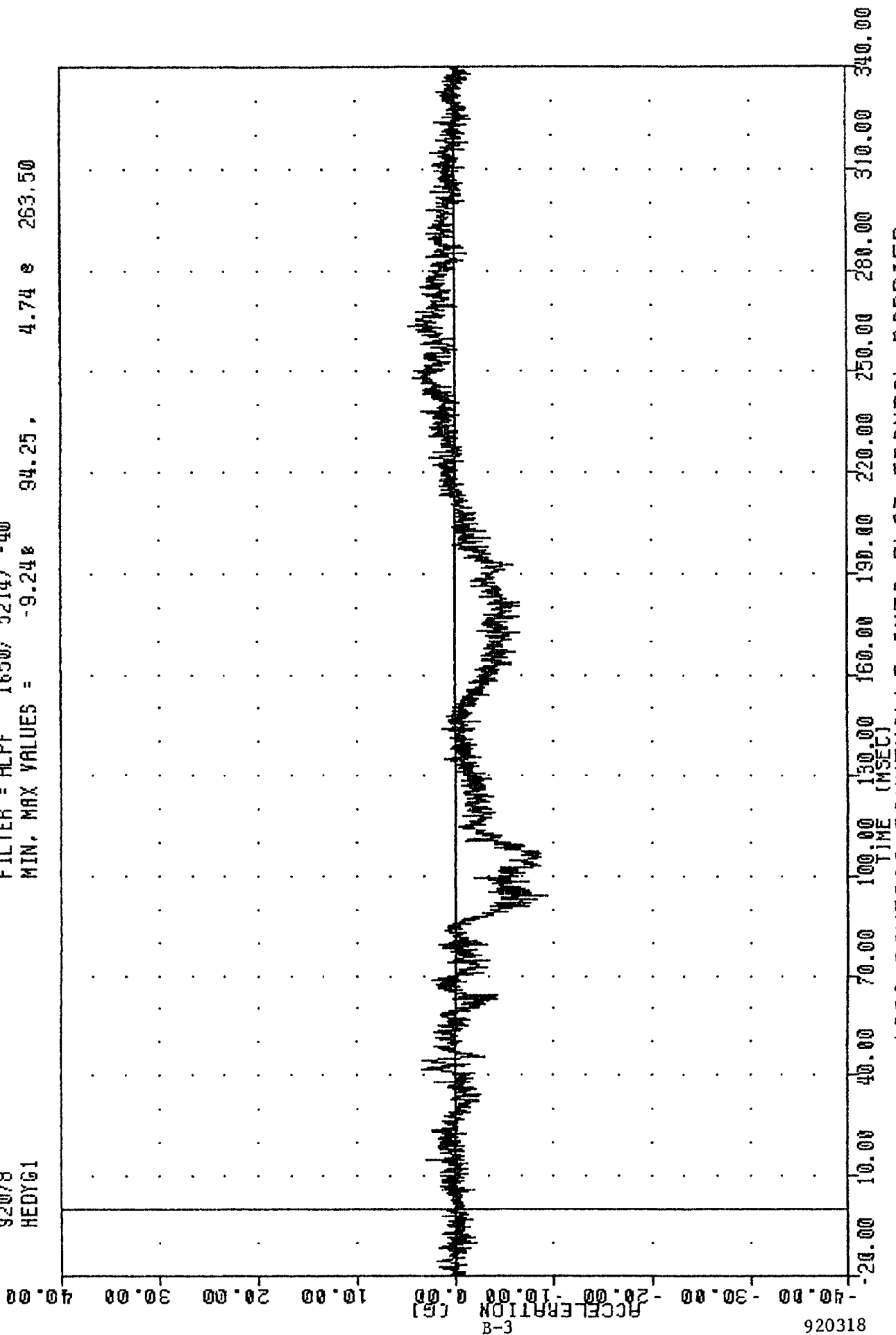
B-2

920318

1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION

TRC , 920318
208 COMPLIANCE TESTING
92078
HEDYG1

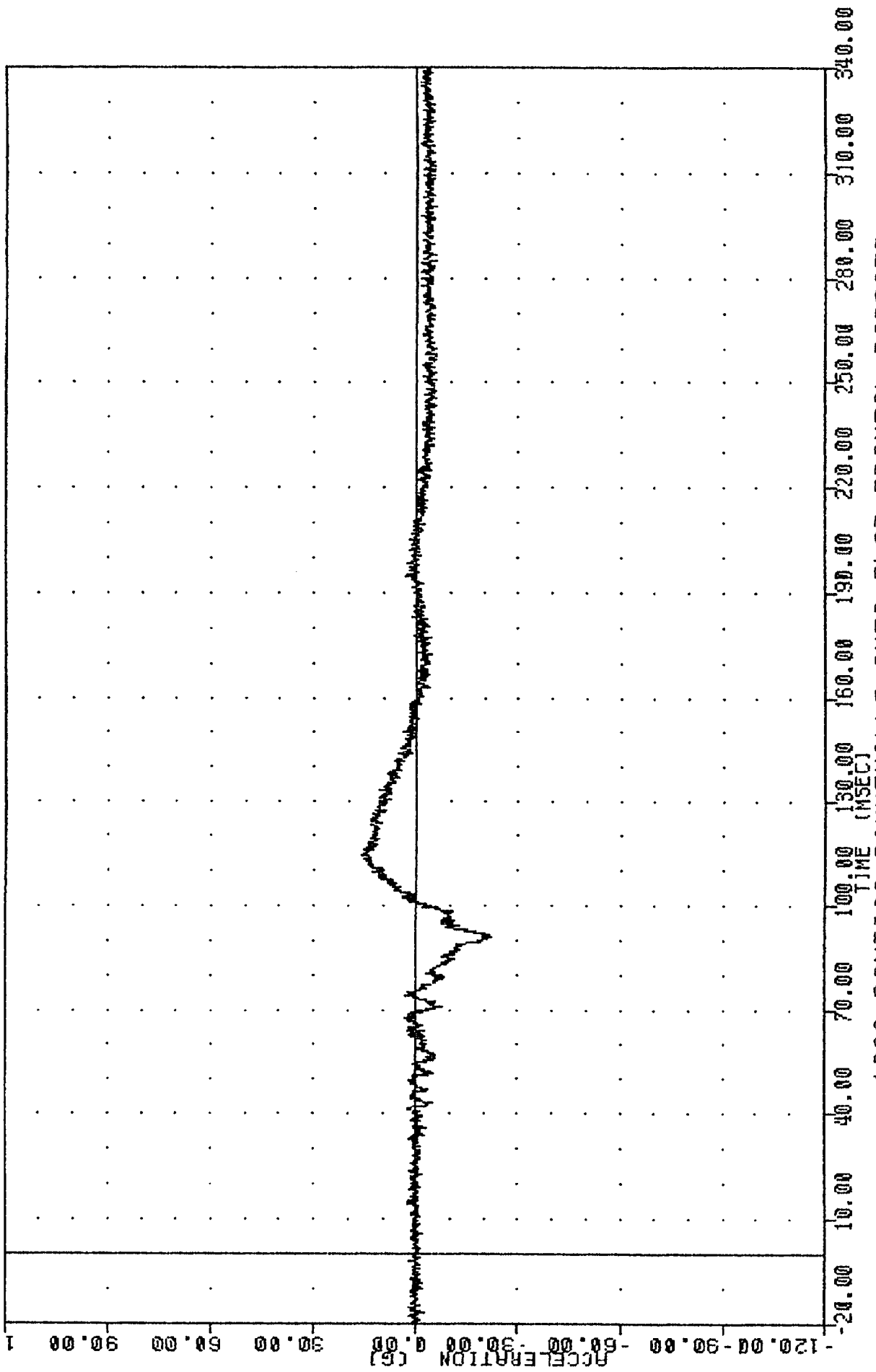
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -9.248 94.25 , 4.74 8 263.50



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION

TRC
200 COMPLIANCE TESTING
92078
HE02G1

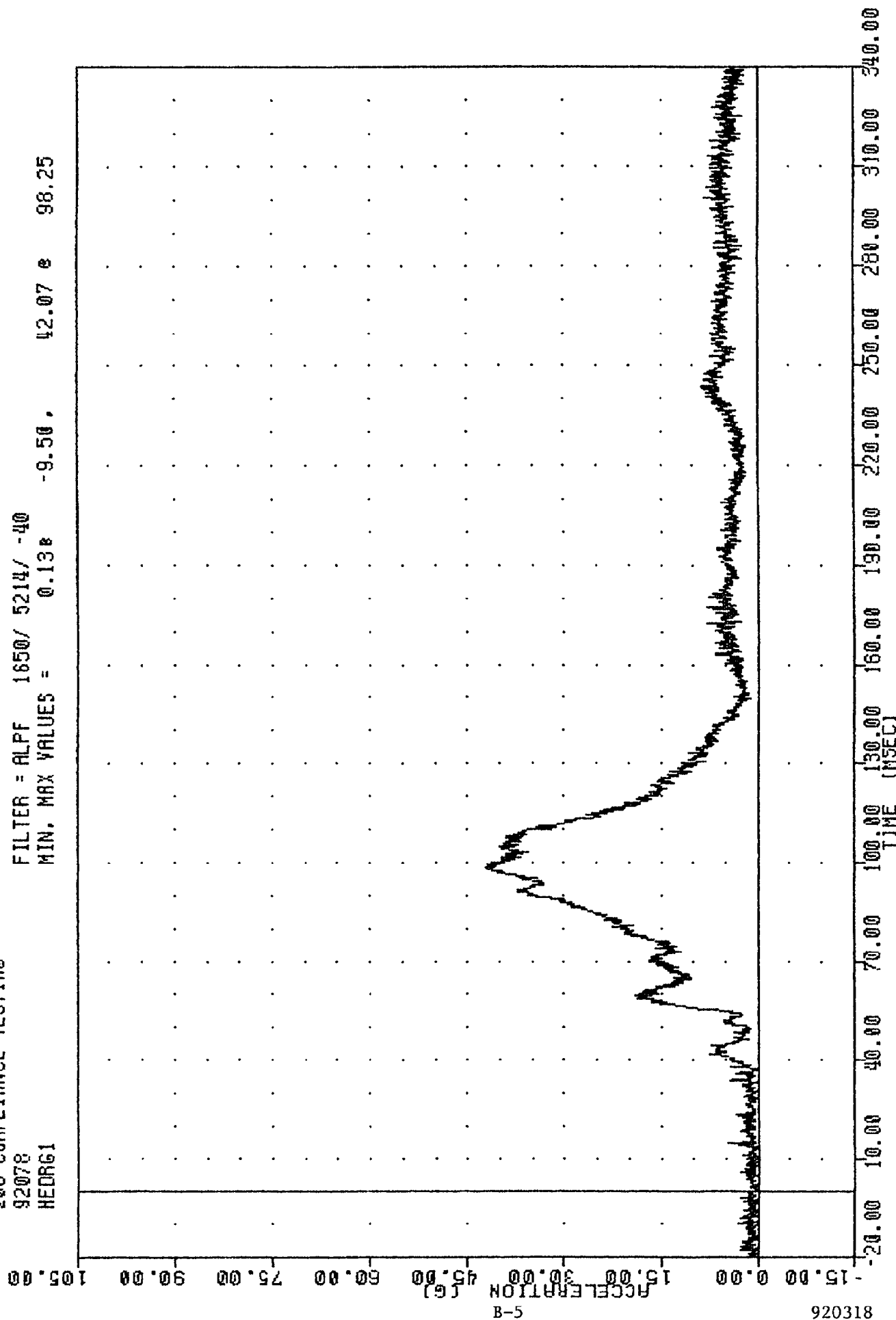
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -22.42e 91.00, 16.14 e 114.50



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION

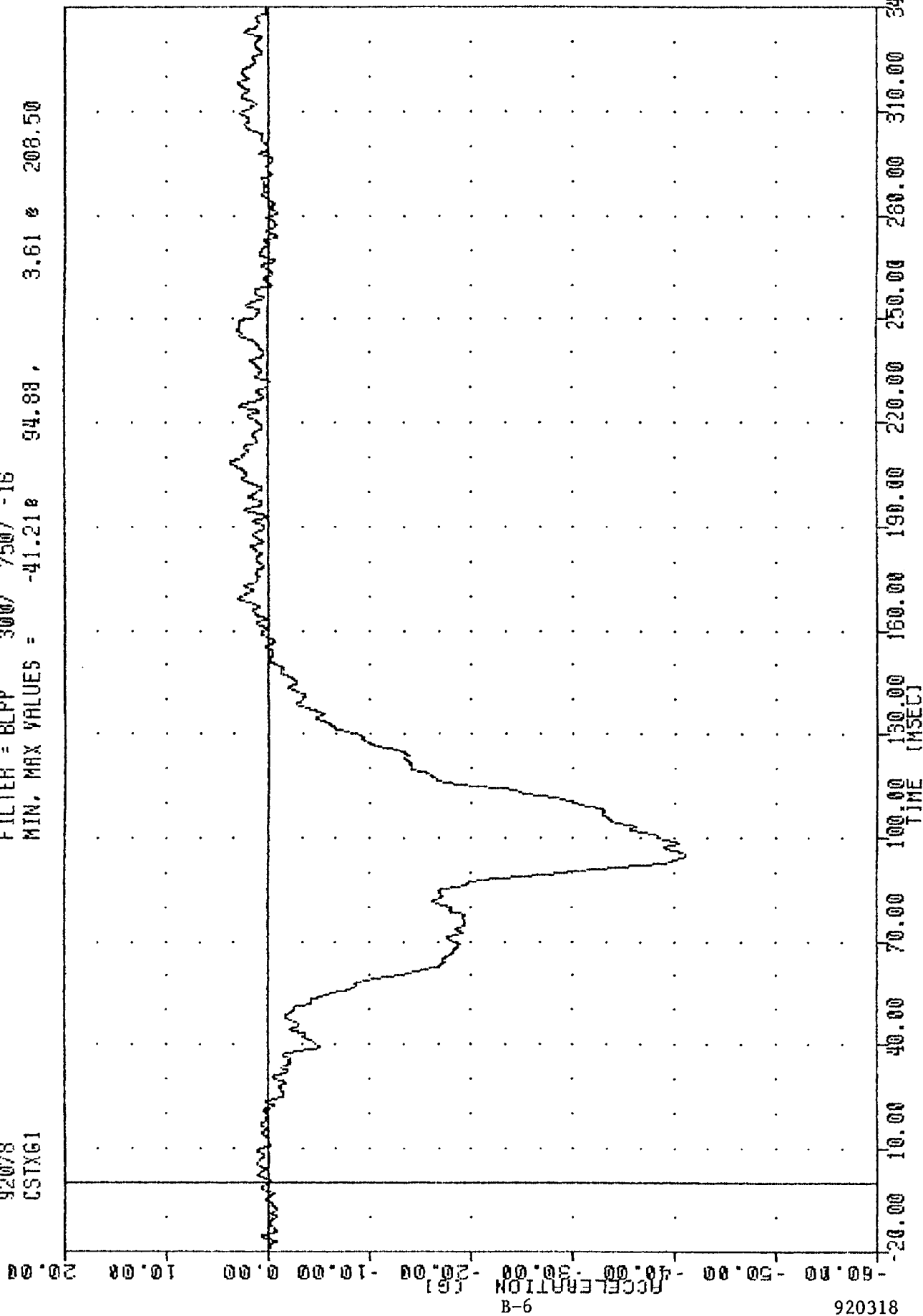
TRC 920318
 200 COMPLIANCE TESTING
 92078
 HEDRG1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.138 -9.50 42.07 98.25



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION

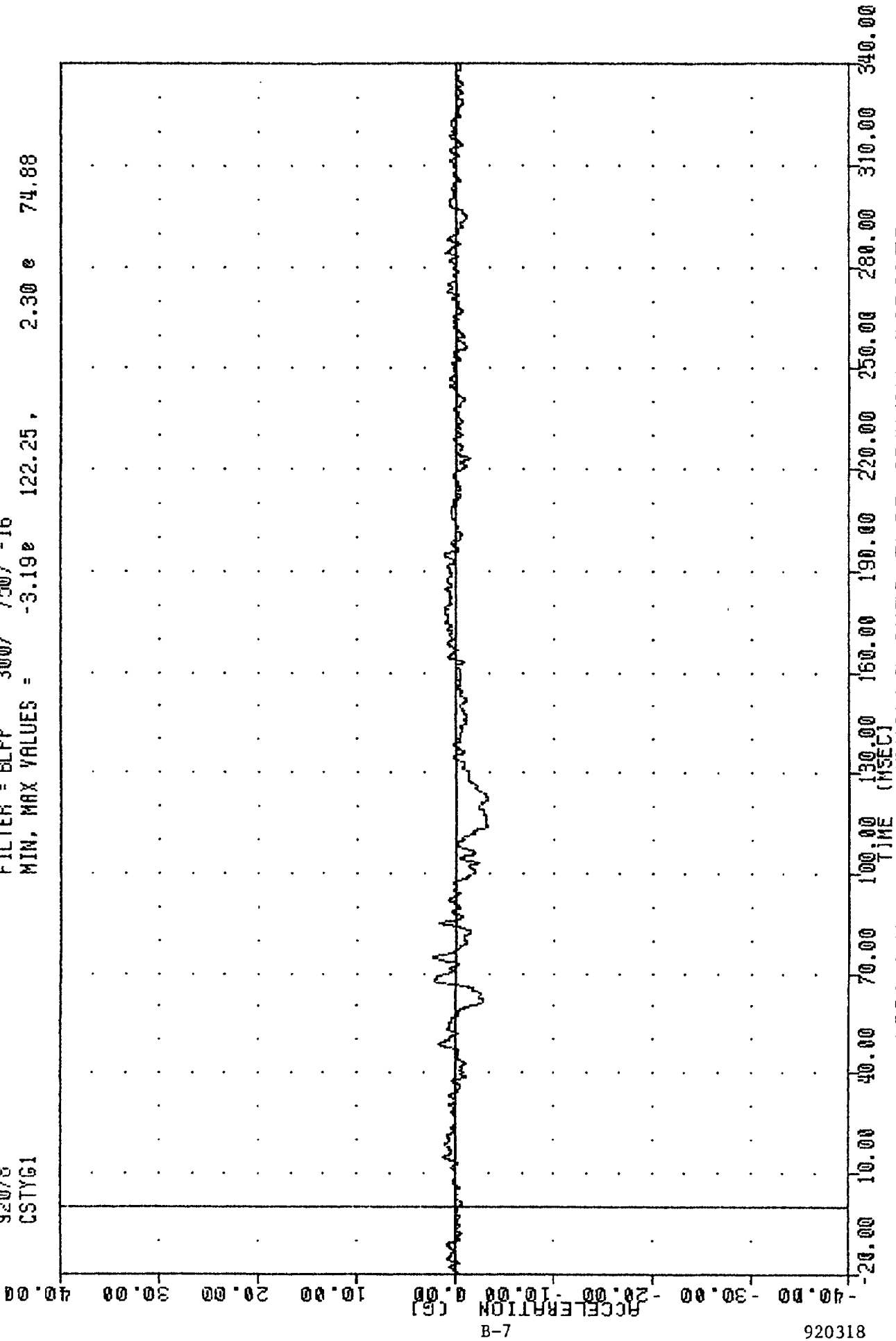
IRU 318
 200 COMPLIANCE TESTING
 92078
 CSTXG1
 FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -41.21 94.88, 3.61 208.50



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
 DRIVER CHEST X-AXIS ACCELERATION

TRC 920318
 208 COMPLIANCE TESTING
 92078
 CSTYG1

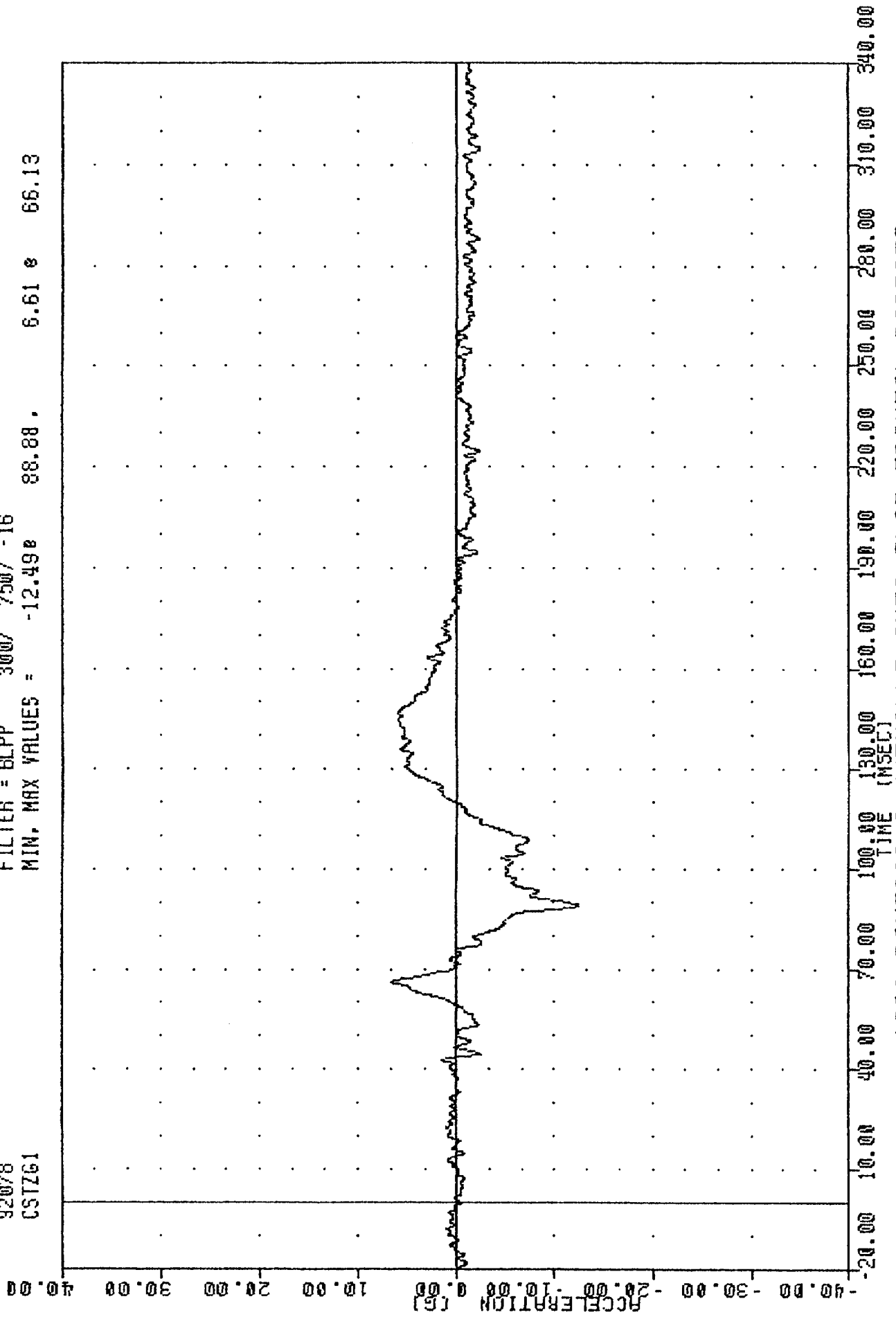
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -3.19e 122.25, 2.30 e 74.88



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
 DRIVER CHEST Y-AXIS ACCELERATION

TRC , 920318
208 COMPLIANCE TESTING
92078
CSTZ61

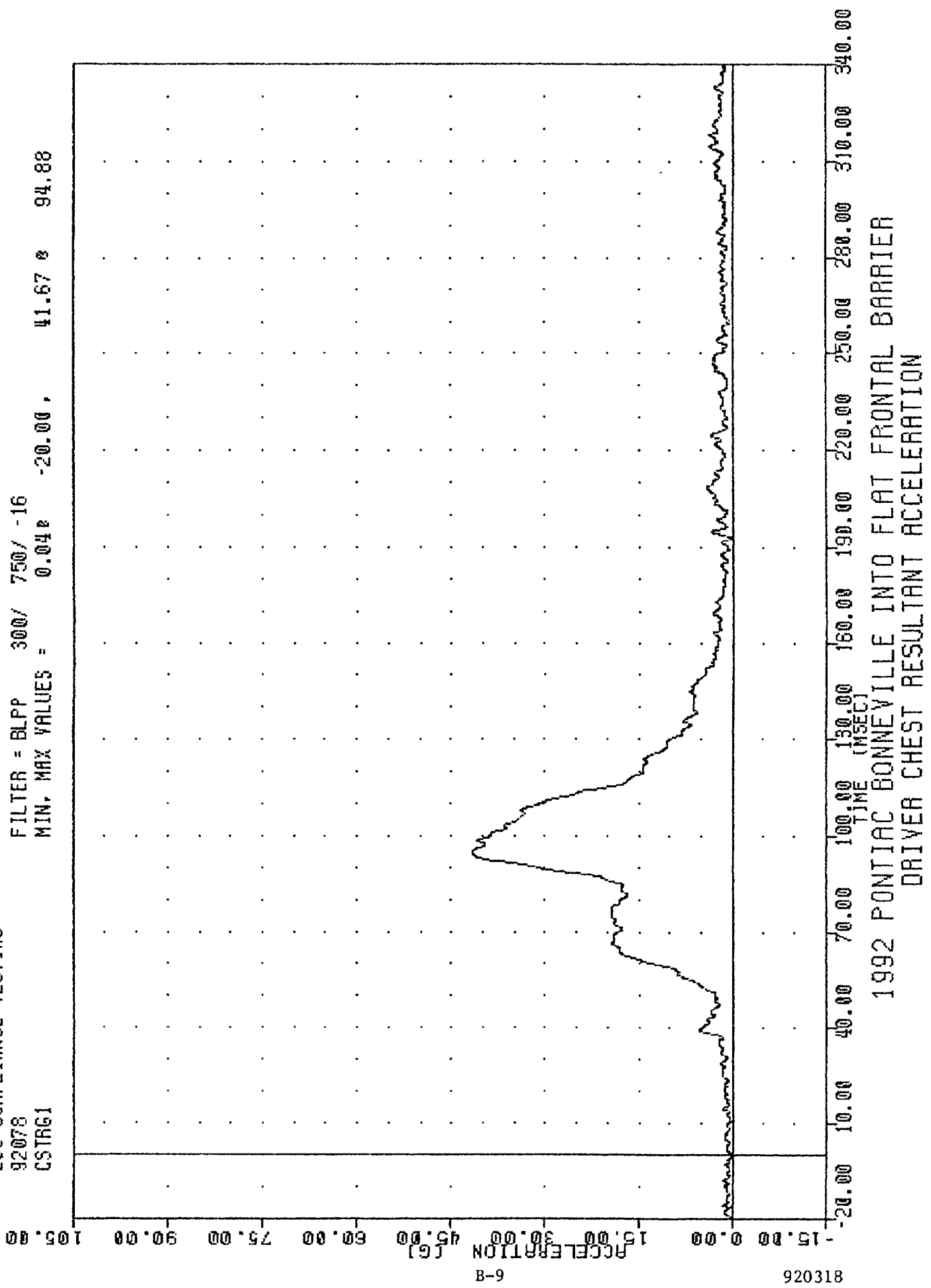
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -12.498 88.88, 6.61 e 66.13



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION

TRC 920318
 208 COMPLIANCE TESTING
 92078
 CSTRG1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.048 -20.00, 41.67 8 94.88



B-9

920318

1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION

TRC , 920318

208 COMPLIANCE TESTING

92078

CSTXD1

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -1.07E 109.00, 0.01E 16.75

4.00

3.00

2.00

1.00

0.00

-1.00

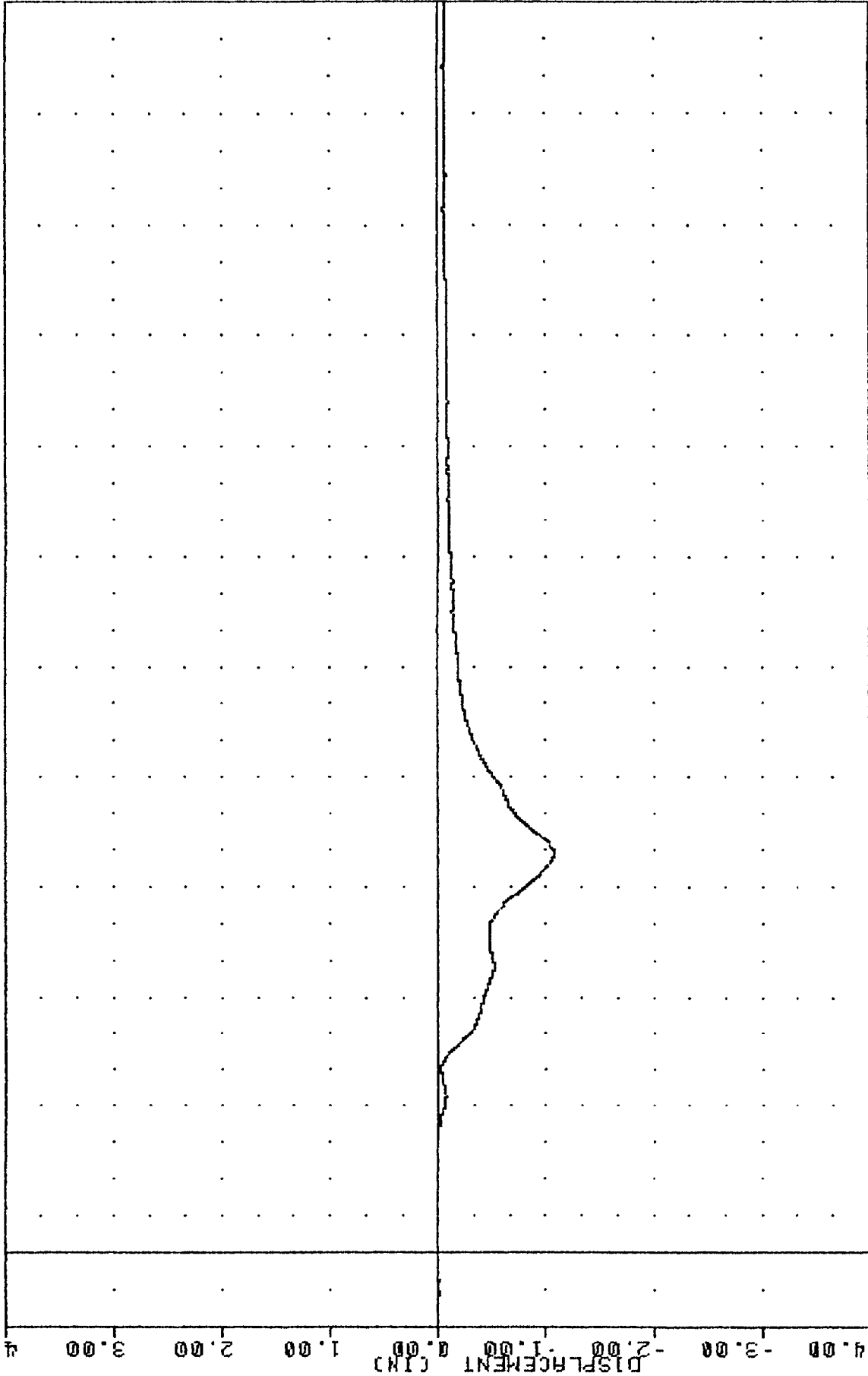
-2.00

-3.00

-4.00

B-10

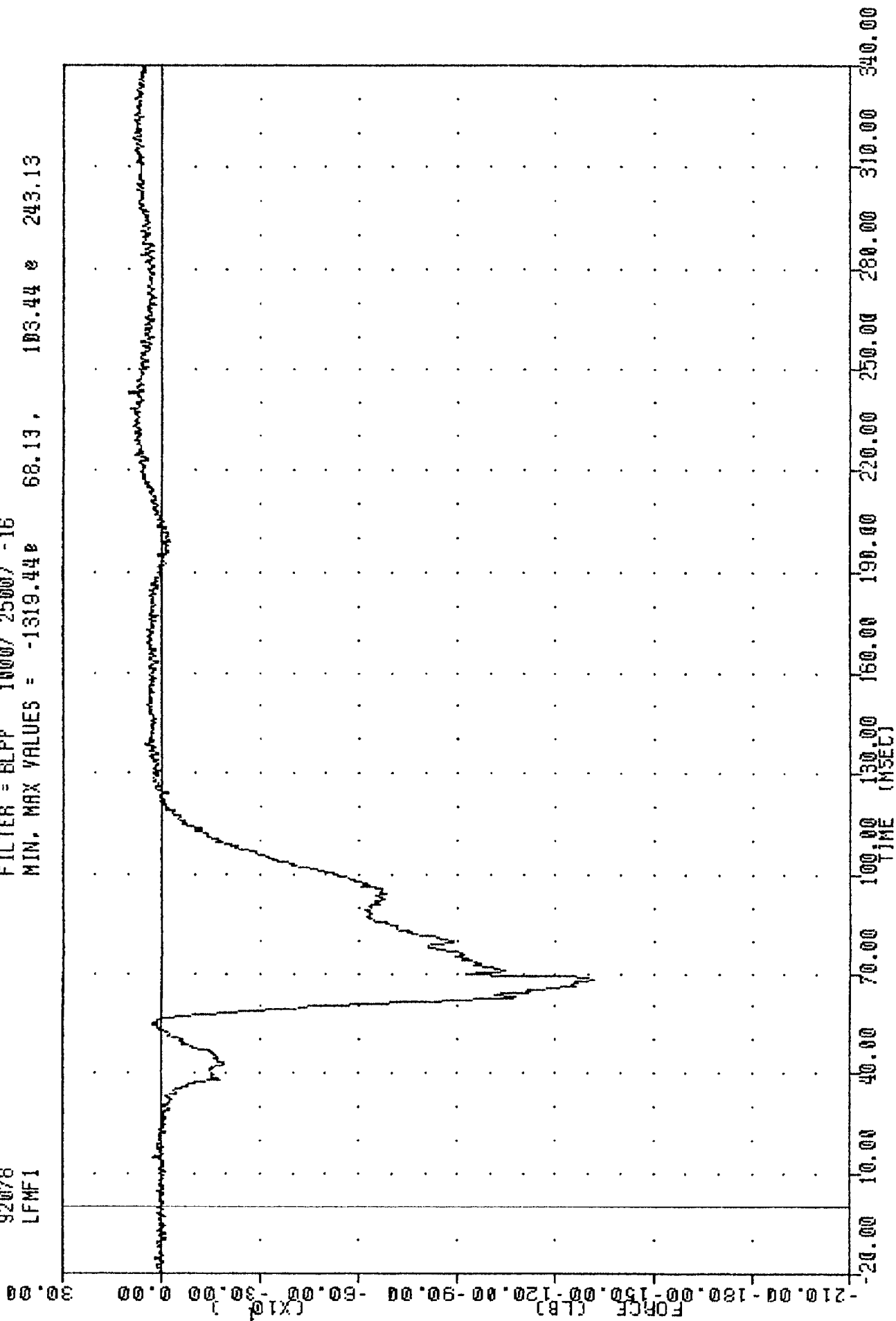
920318



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
DRIVER CHEST DEFLECTION

TRC , 920318
208 COMPLIANCE TESTING
92078
LFMF1

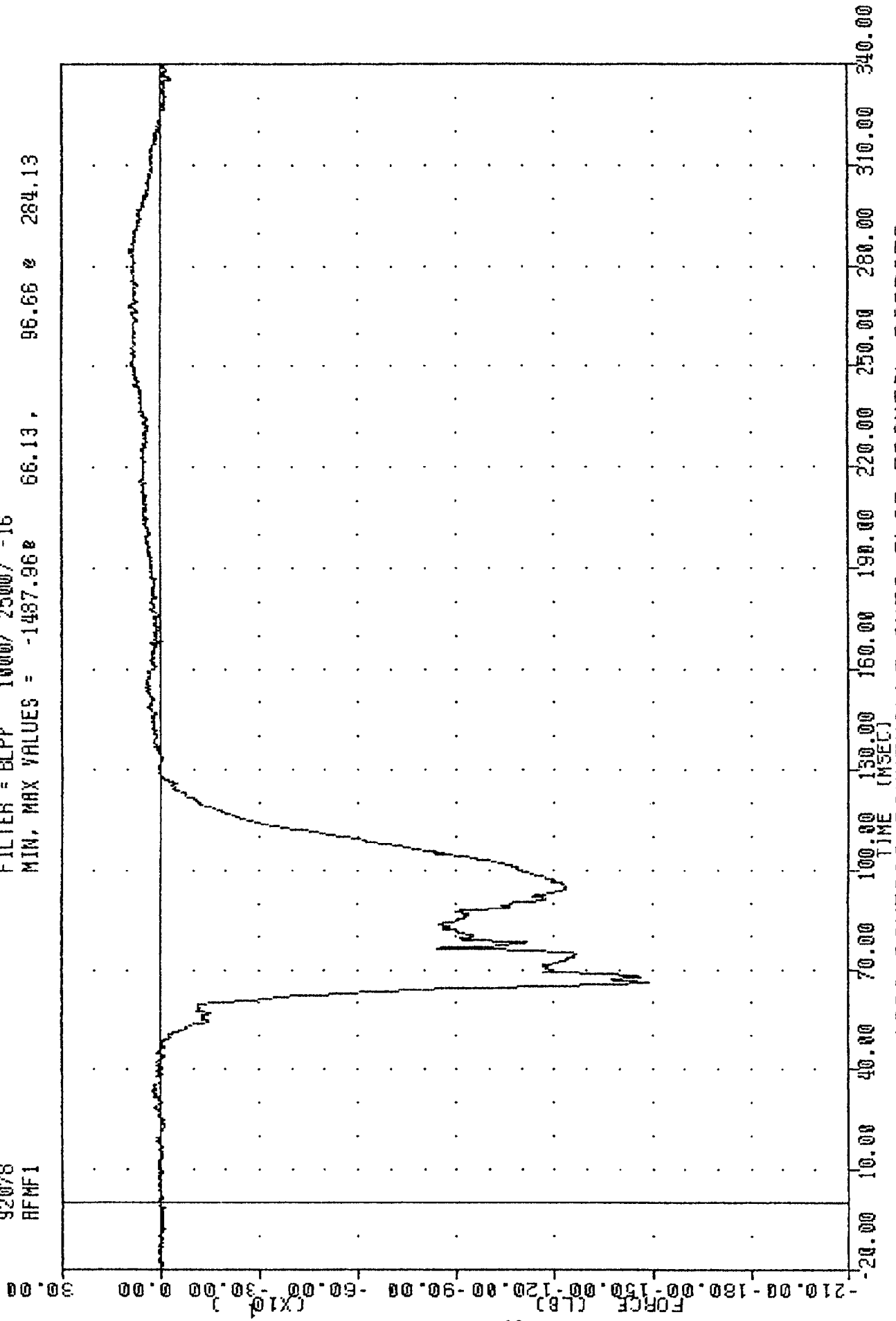
FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -1319.448 68.13, 103.44 @ 243.13



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE

TRC , 920318
200 COMPLIANCE TESTING
92078
RFMF1

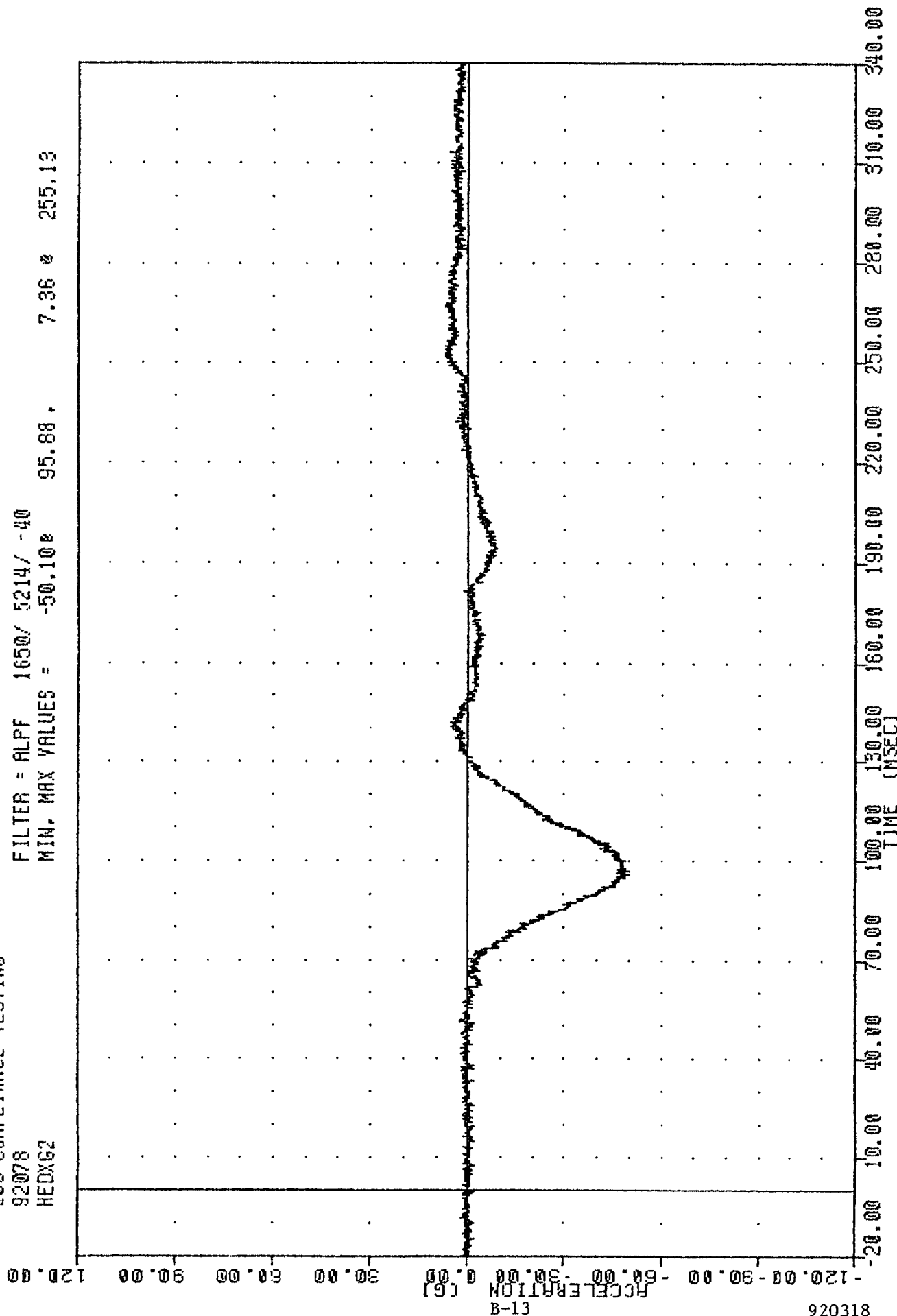
FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -1487.96 66.13, 96.66 284.13



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE

TRC 920318
208 COMPLIANCE TESTING
92078
HEDXG2

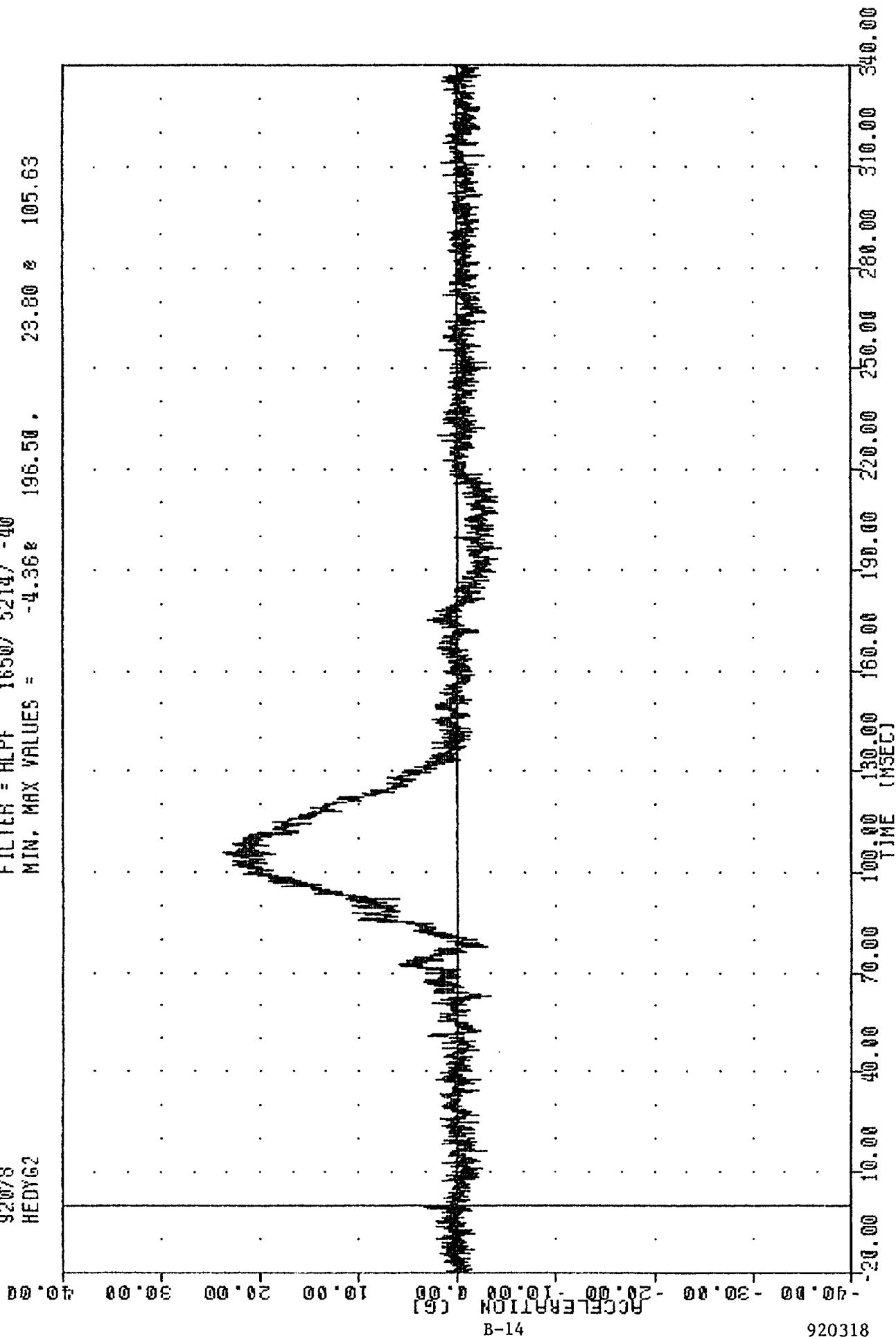
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -50.100 95.88, 7.36 255.13



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

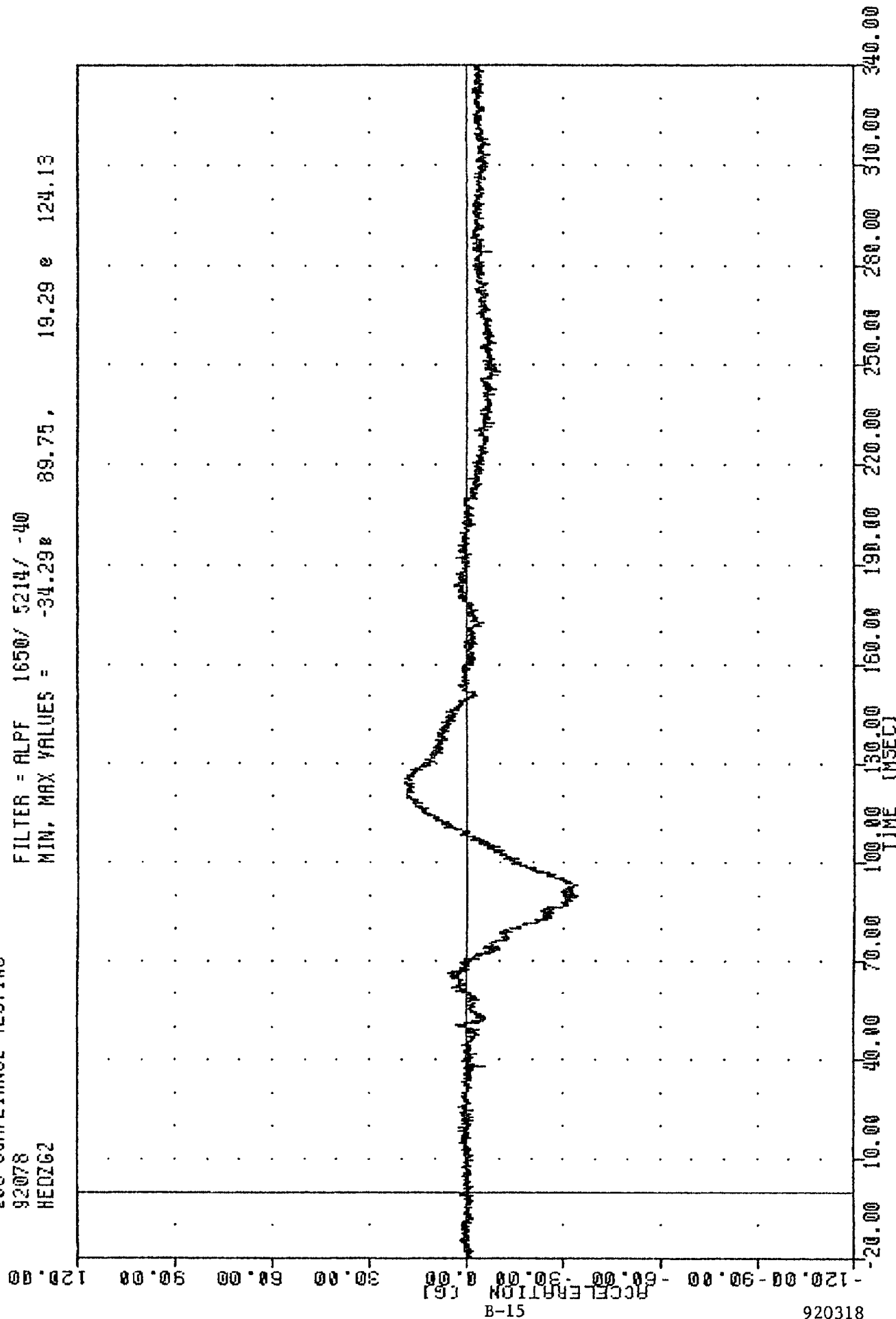
TRC 920318
200 COMPLIANCE TESTING
92078
HEDY62

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -4.36% 195.50 23.80 105.63



TRC , 920318
208 COMPLIANCE TESTING
92078
HEQZG2

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -34.29 89.75, 19.29 e 124.13

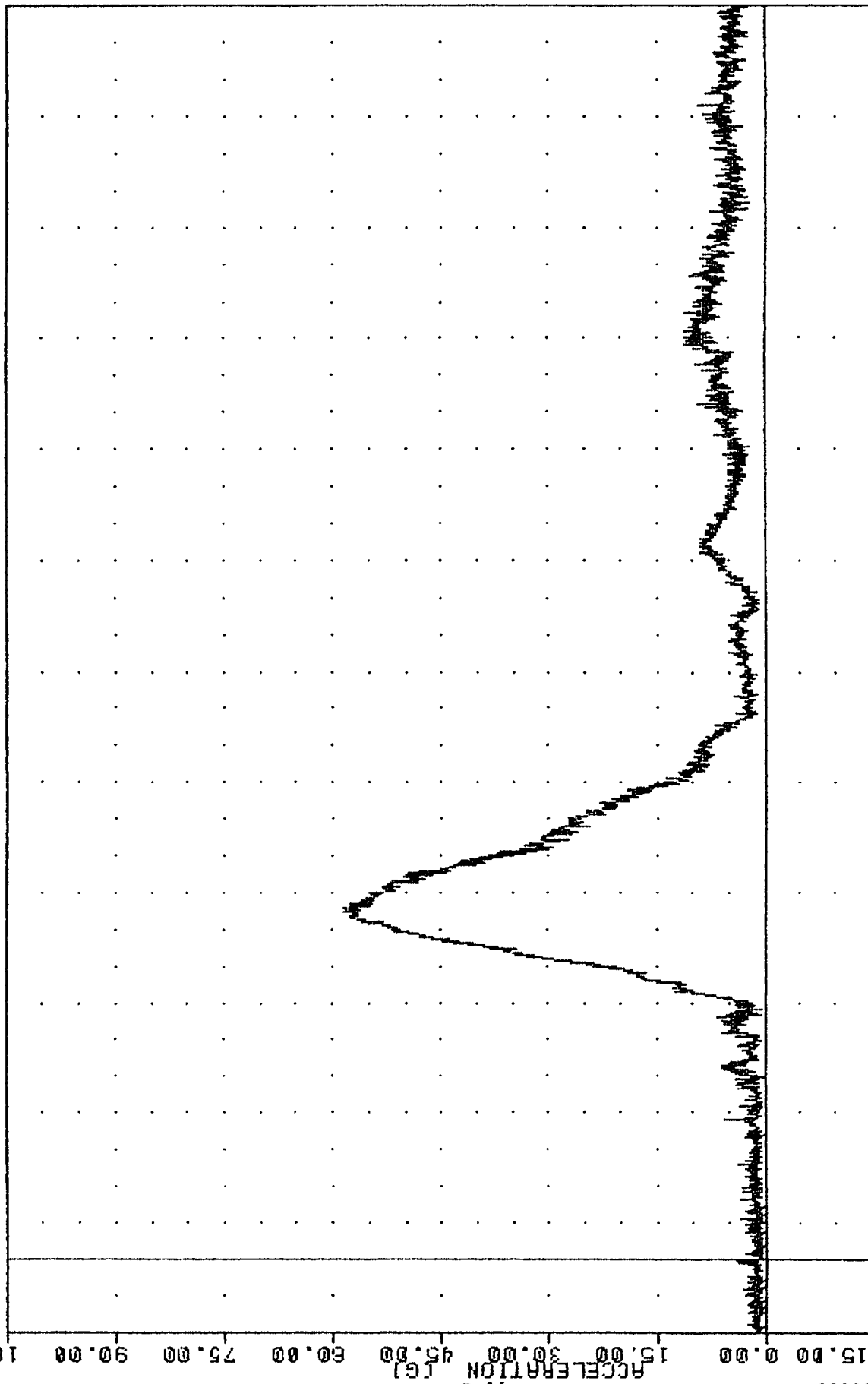


1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TRC 920318
 208 COMPLIANCE TESTING
 92078
 HEDRG2

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.17e 9.75, 58.55 e 95.88

105.00



B-16

920318

-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION

TRC 920318

208 COMPLIANCE TESTING

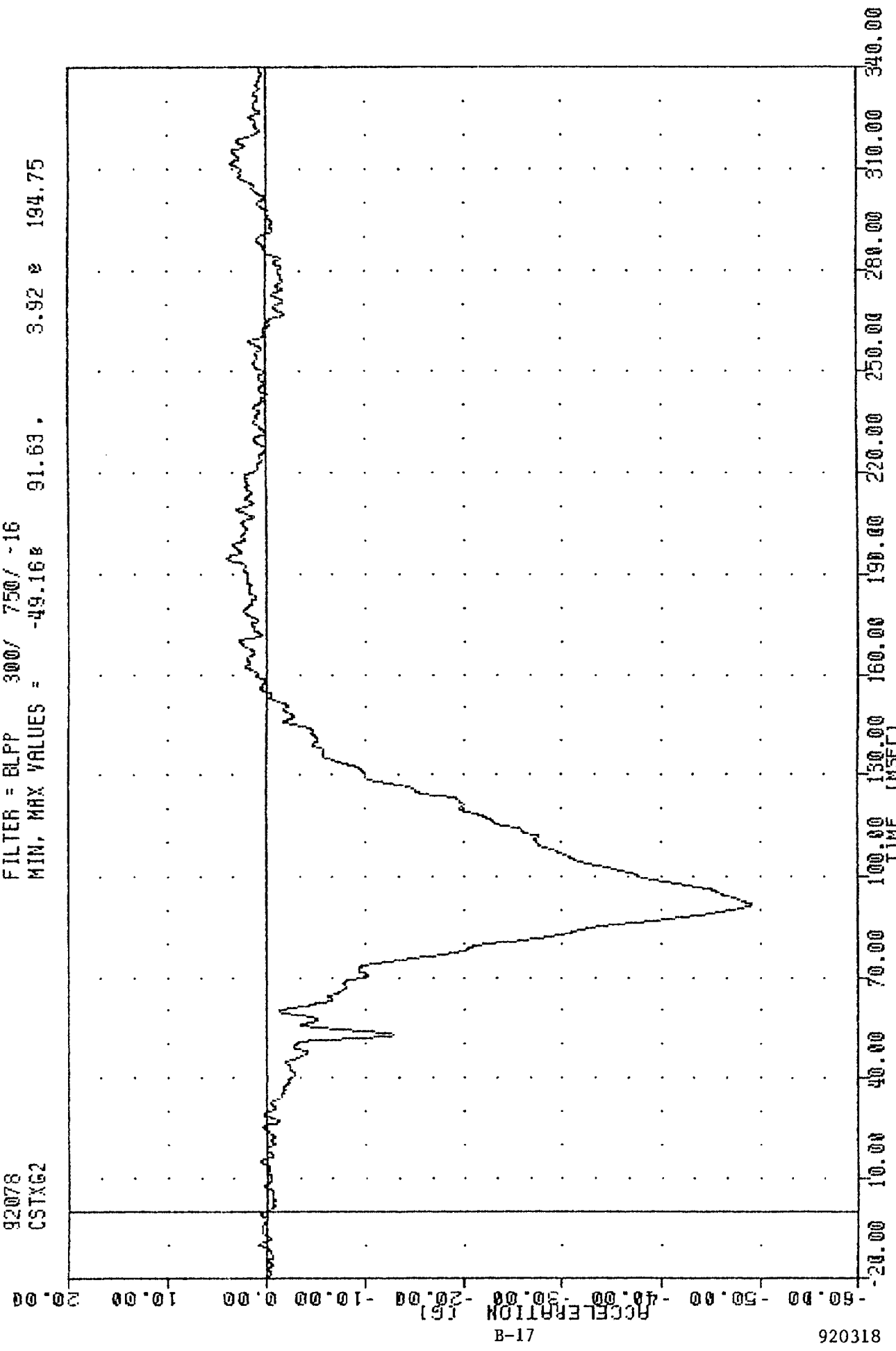
92078

CSTXG2

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -49.16 91.63

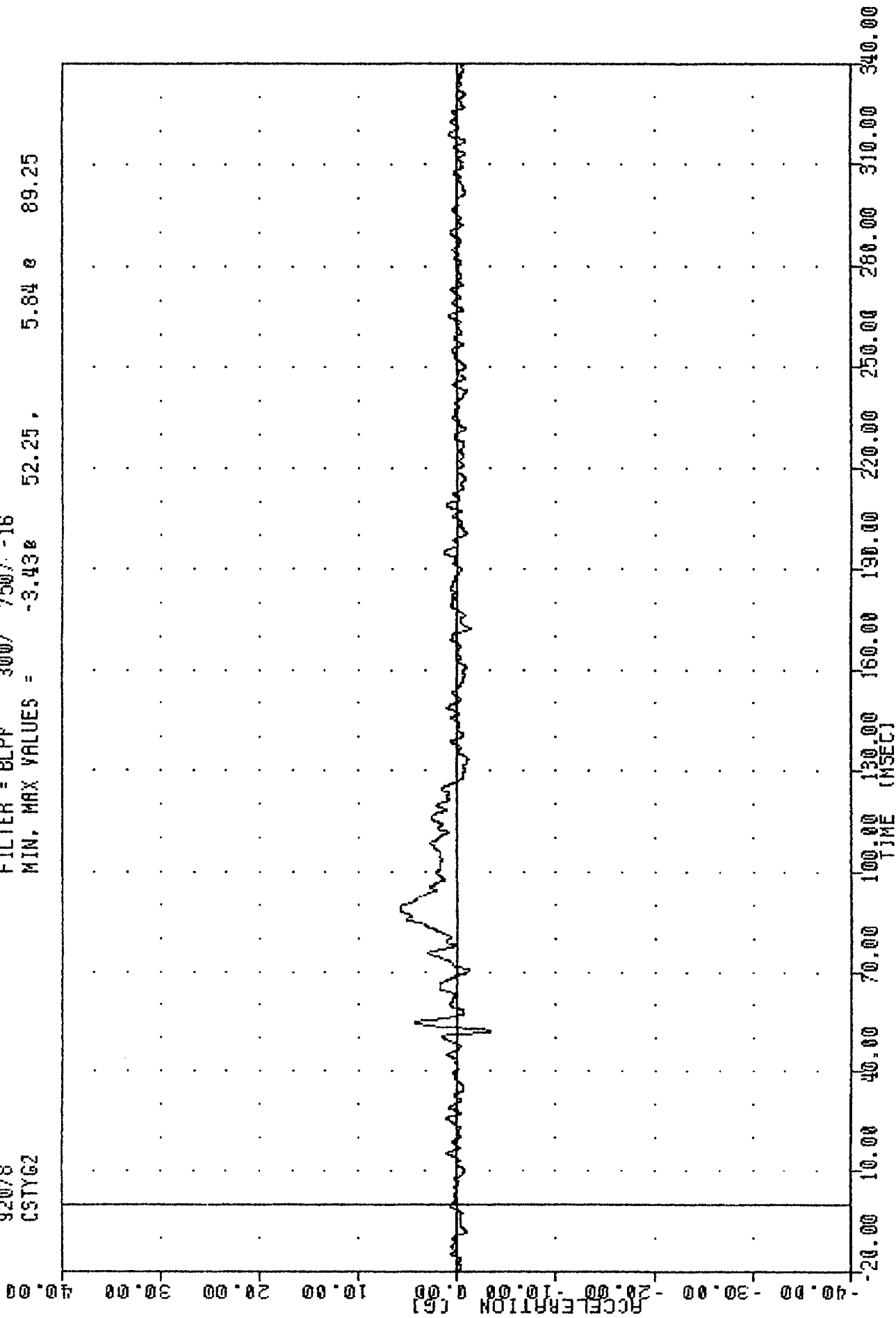
3.92 e 194.75



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

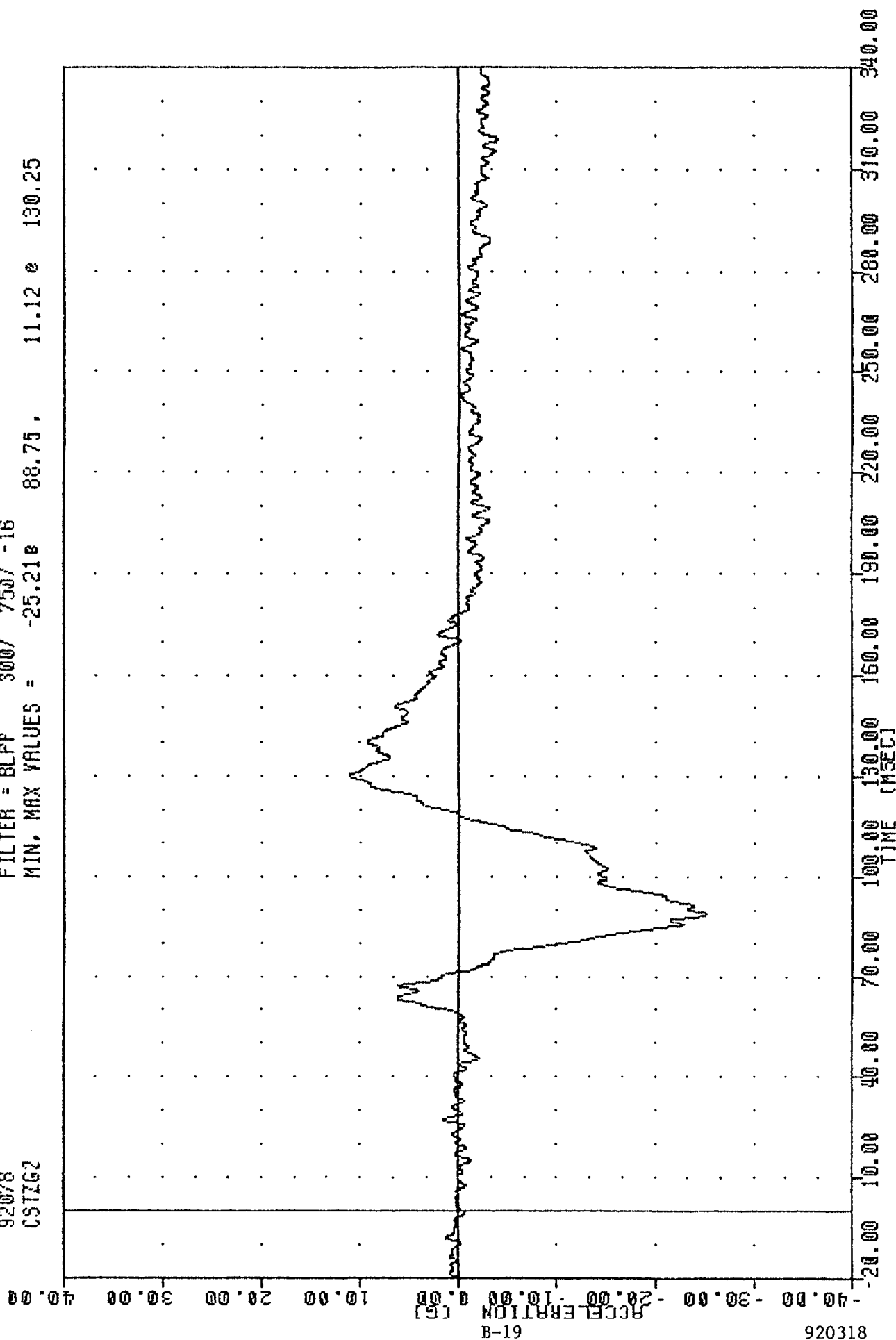
TRC , 920318
200 COMPLIANCE TESTING
92078
CSTYG2

FILTER = BLPF 300/ 750/-16
MIN. MAX VALUES = -3.43e 52.25, 5.84 e 89.25



TRC , 920318
208 COMPLIANCE TESTING
92078
CSTIG2

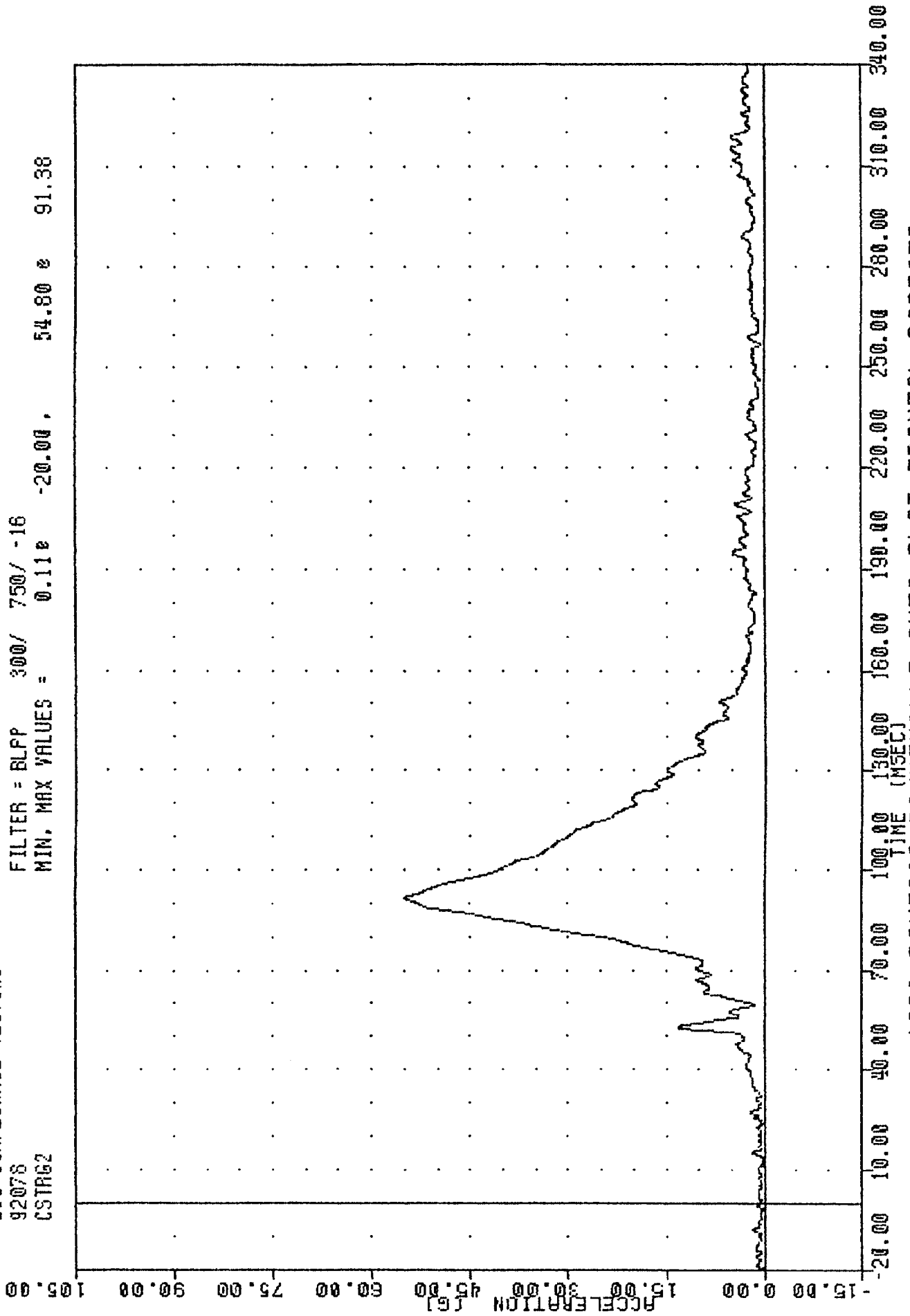
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -25.218 88.75, 11.12 e 130.25



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TAC 920318
200 COMPLIANCE TESTING
92078
CSTR62

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 0.11e -20.00, 54.80 e 91.38



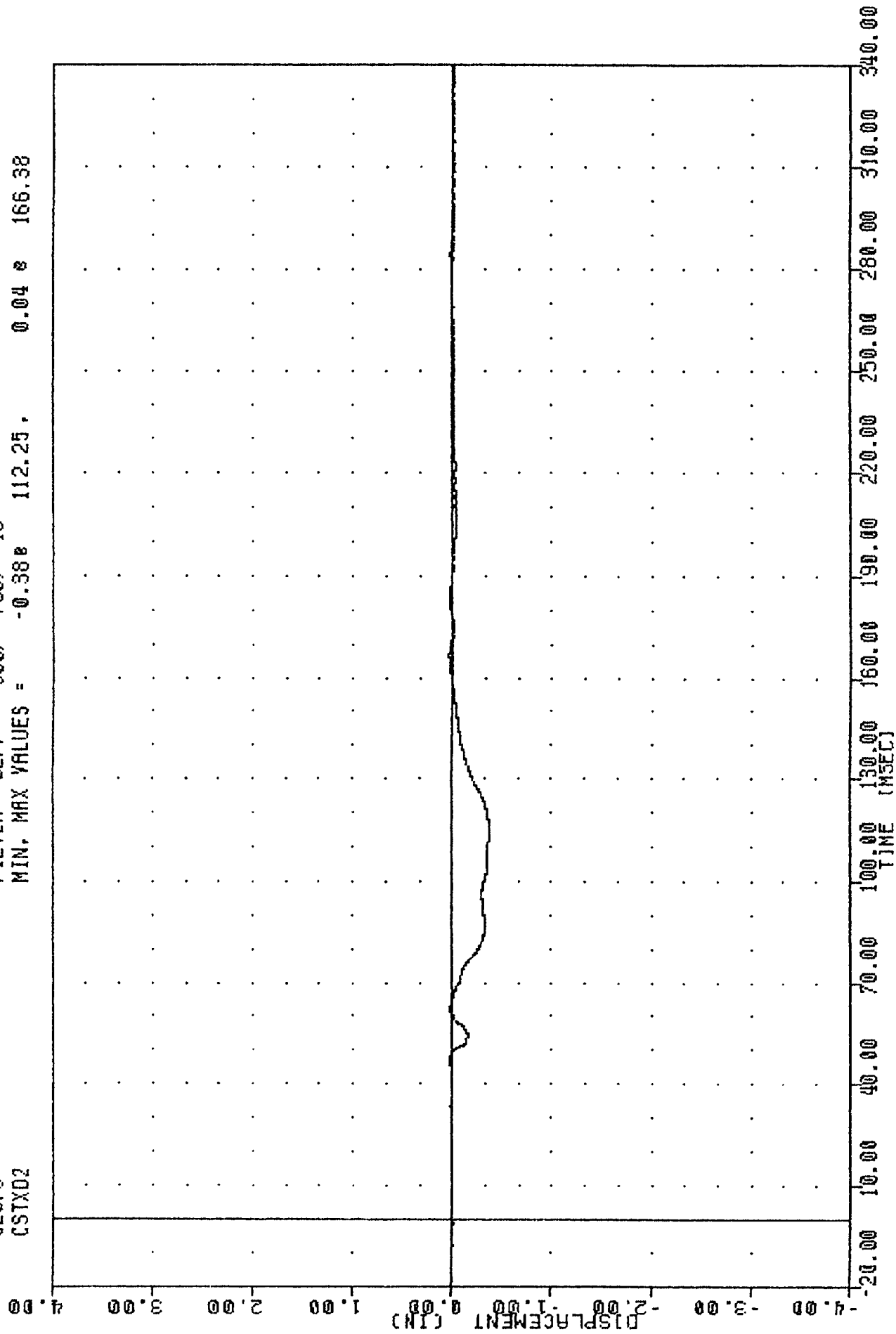
B-20

920318

1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TRC , 920318
200 COMPLIANCE TESTING
92078
CSTD2

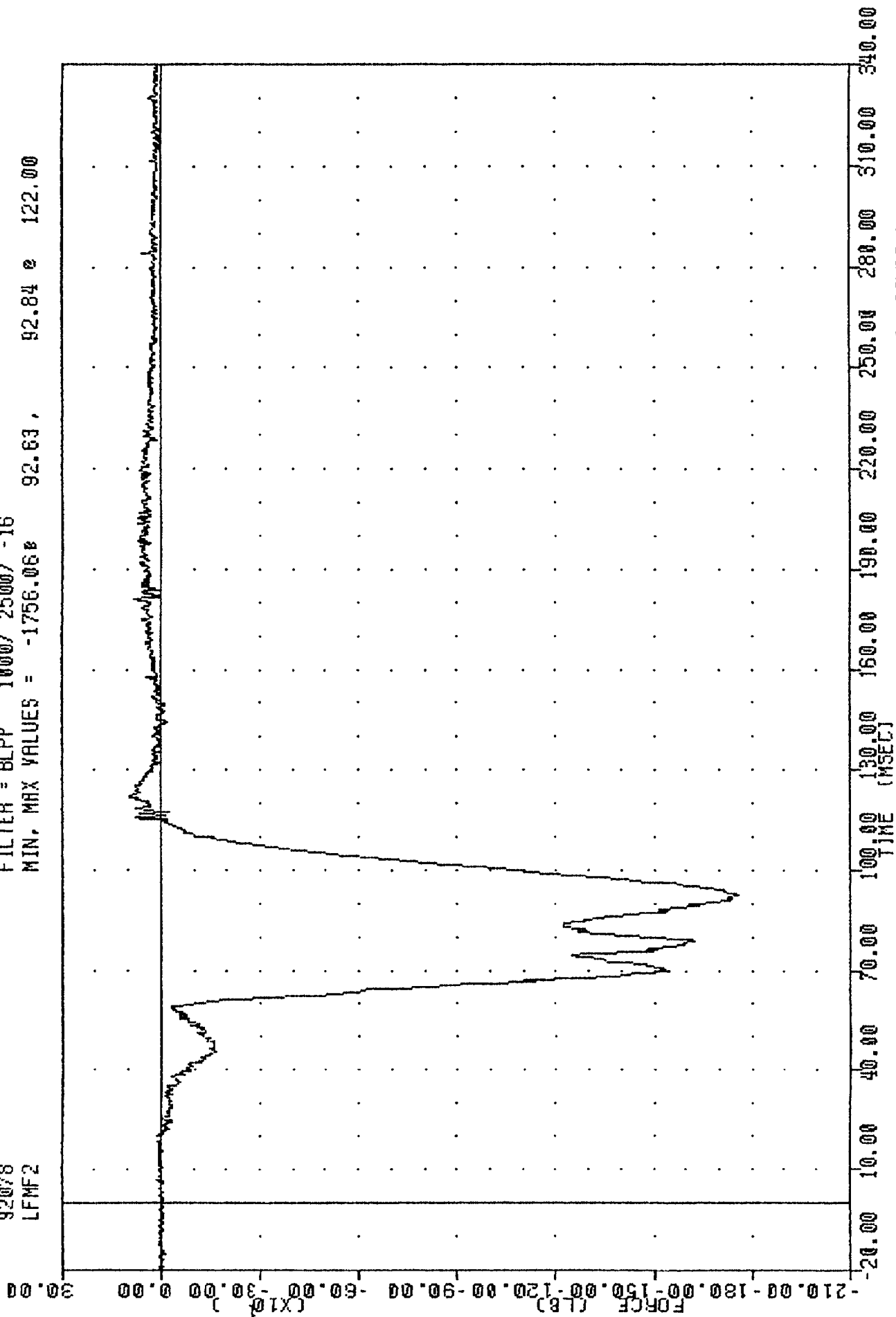
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -0.38 112.25. 0.04 166.38



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST DEFLECTION

TRC , 920318
200 COMPLIANCE TESTING
92078
LFMF2

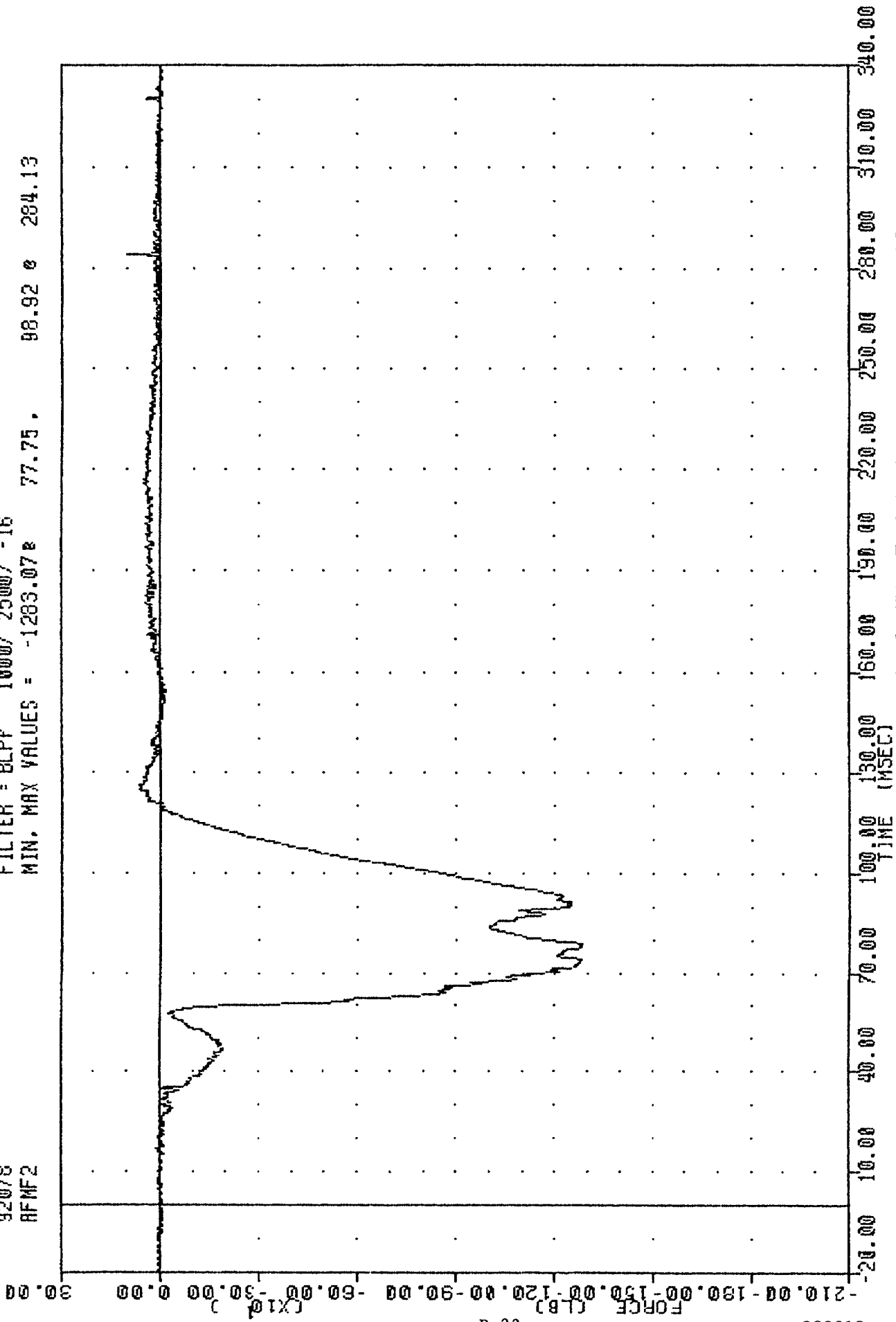
FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -1756.068 92.63 , 92.84 @ 122.00



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TRC , 920318
208 COMPLIANCE TESTING
92078
AFMF2

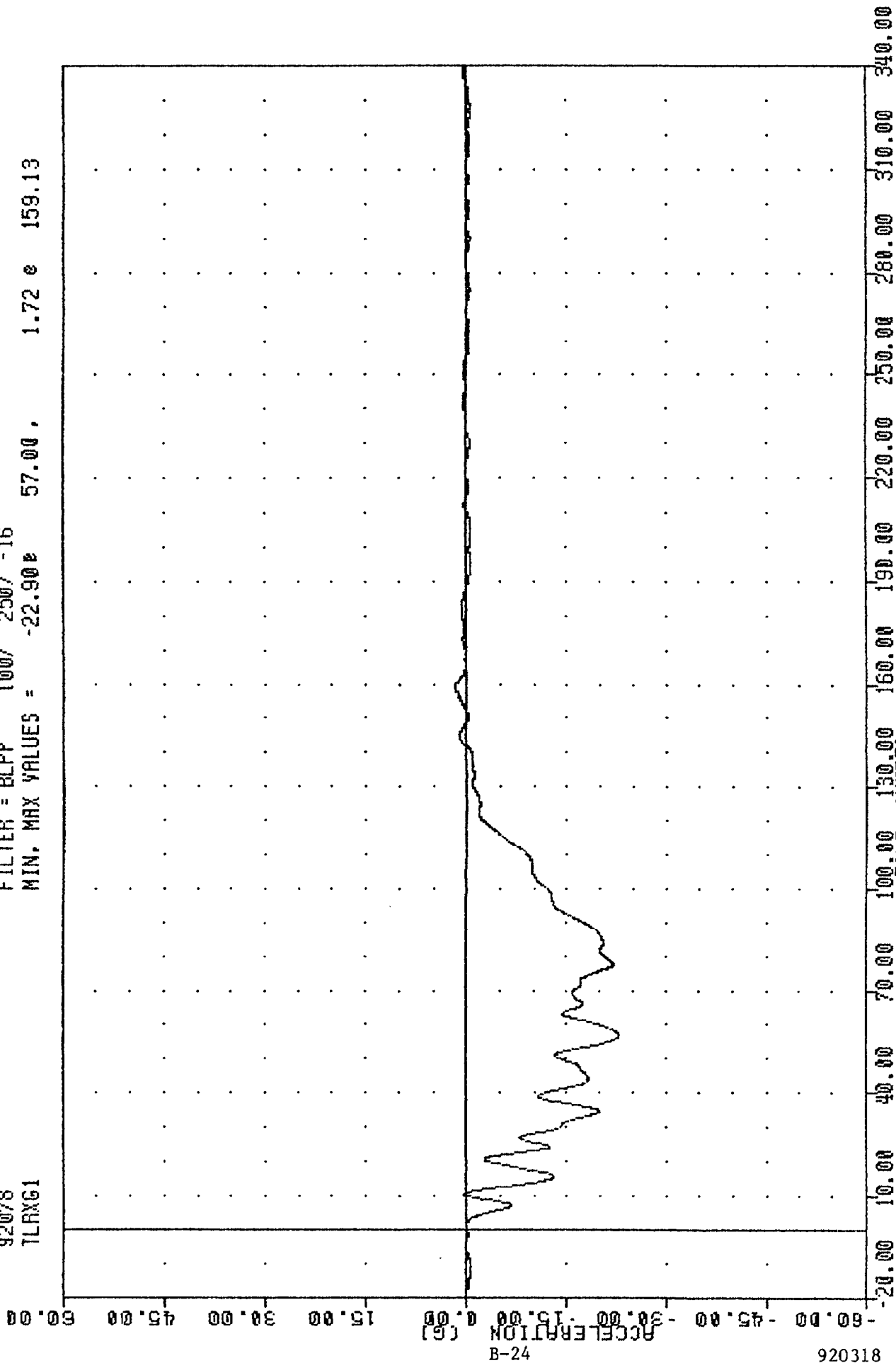
FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -1283.078 77.75 . 98.92 0 284.13



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

TRC , 920318
208 COMPLIANCE TESTING
92078
TLRXG1

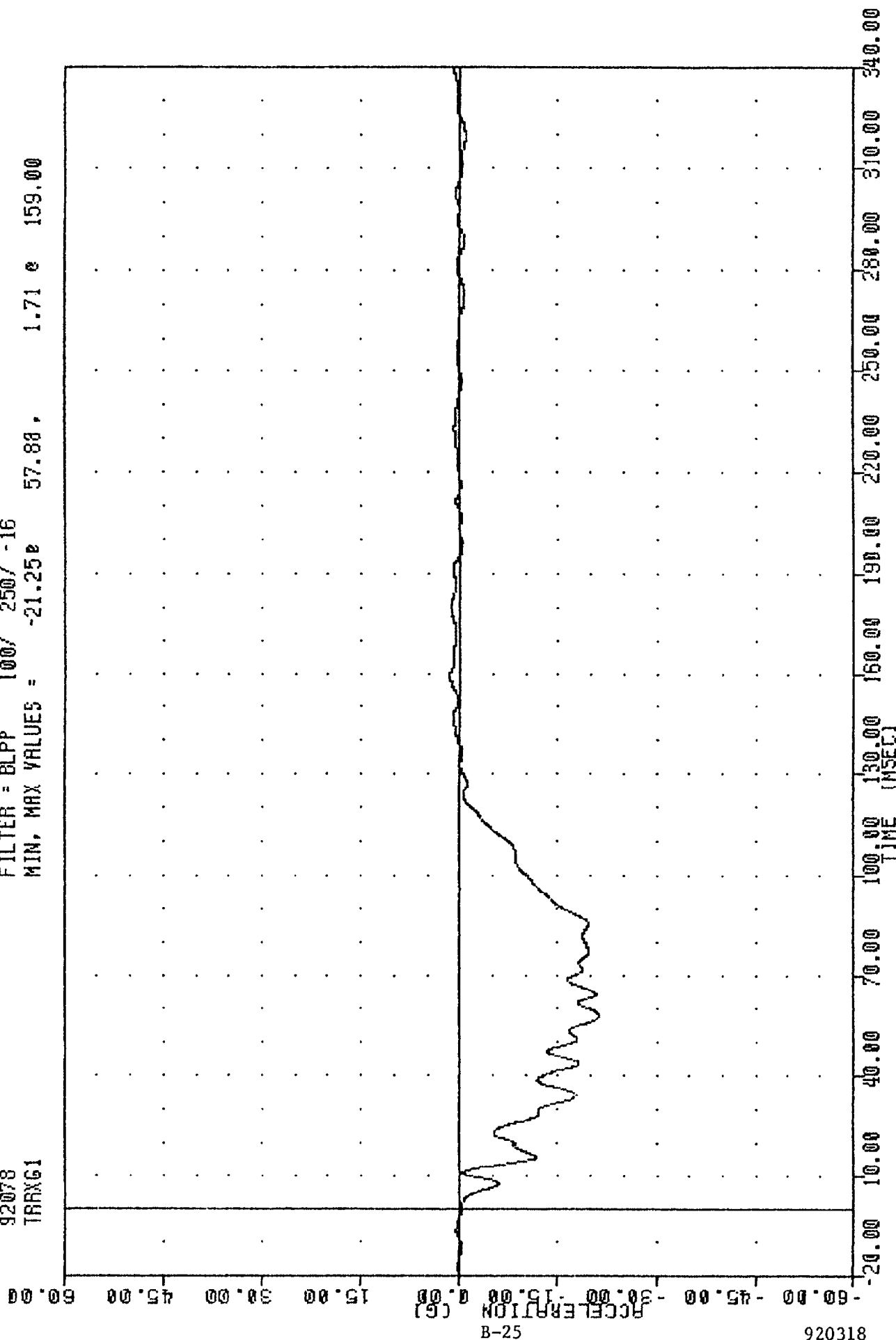
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -22.90e 57.00, 1.72 e 159.13



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION

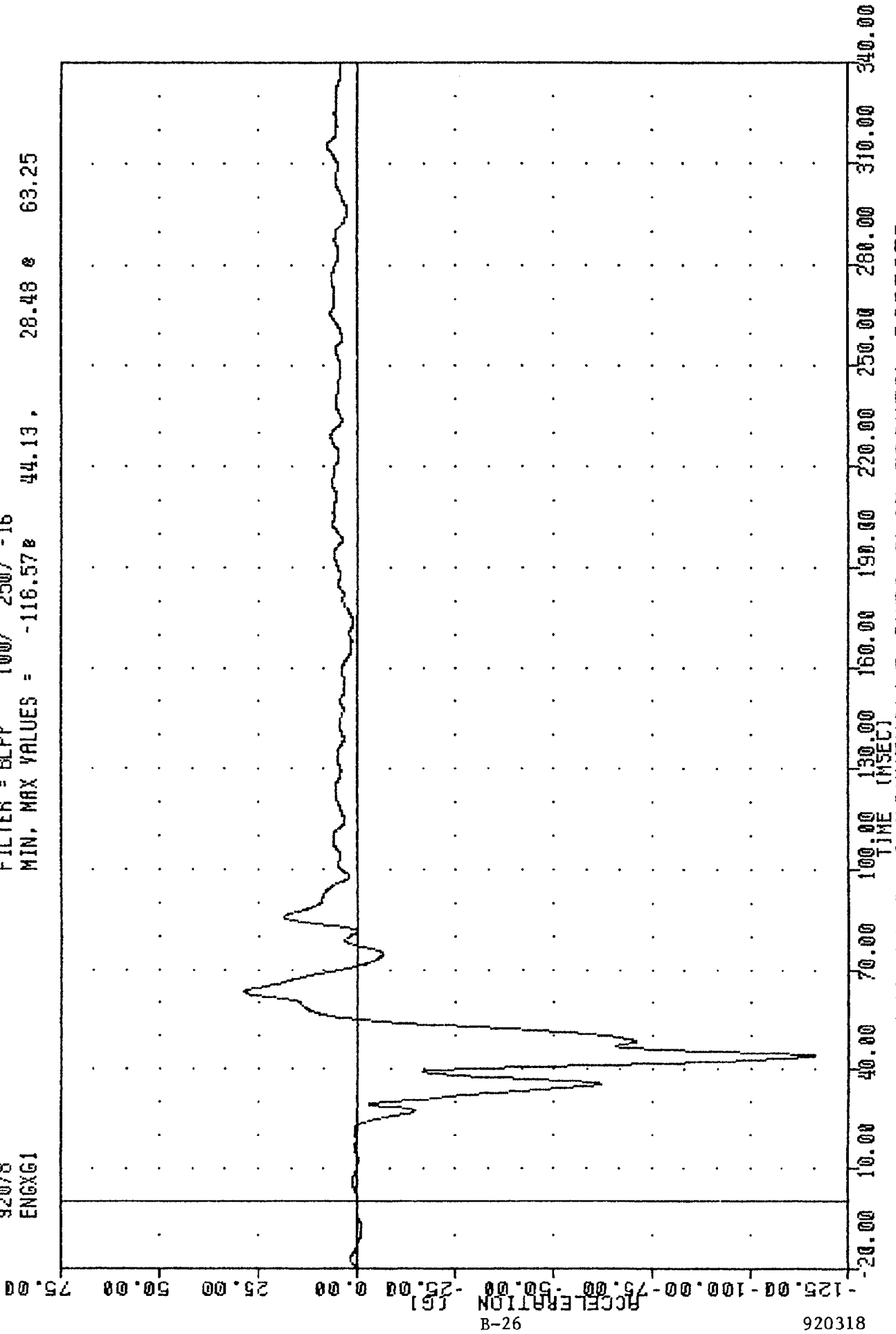
TRC , 920318
200 COMPLIANCE TESTING
92078
TRXG1

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -21.250 57.80, 1.71 0 159.00



TRC , 920318
208 COMPLIANCE TESTING
92078
ENGXG1

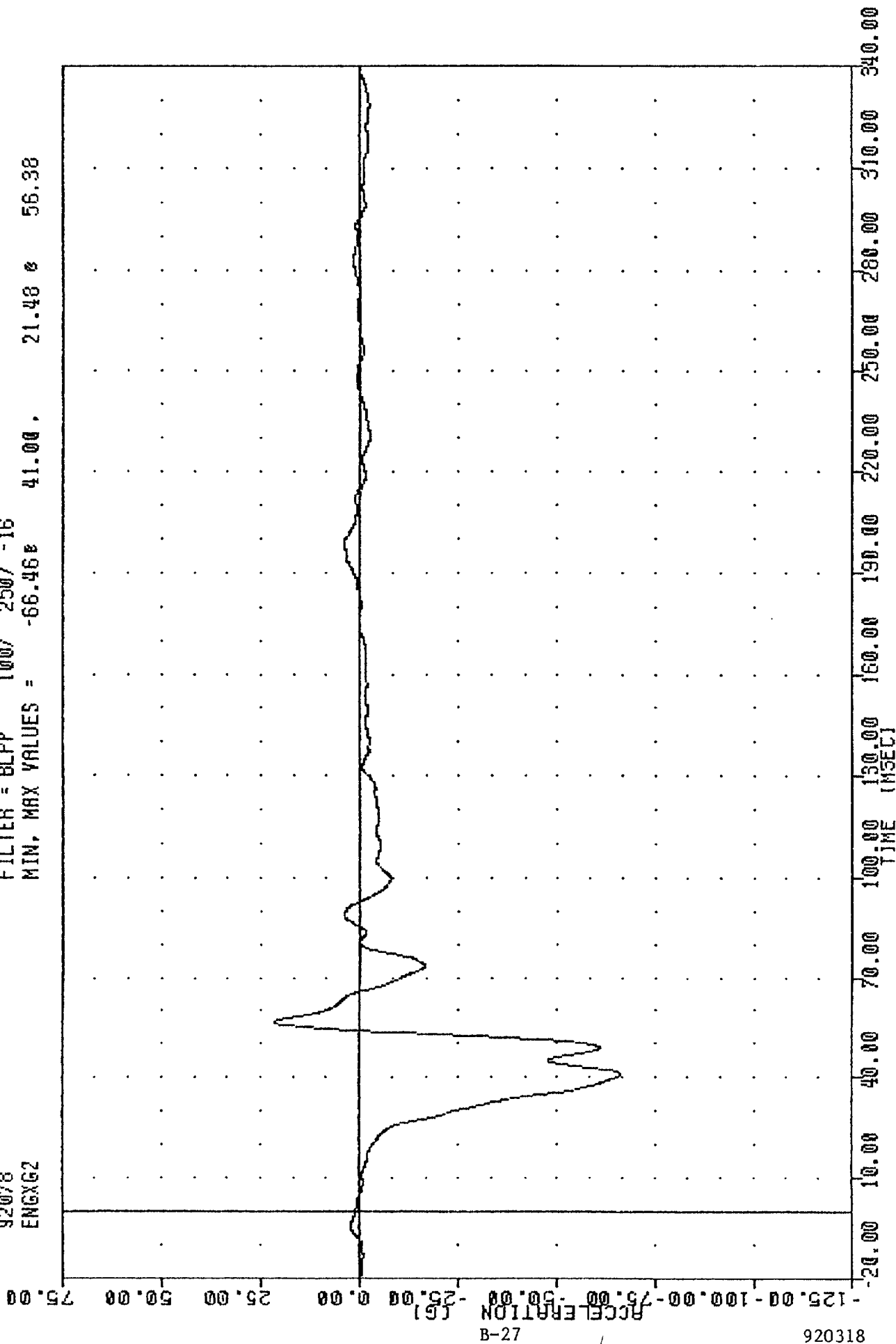
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -116.57 44.13, 28.48 63.25



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
ENGINE TOP X-AXIS ACCELERATION

TRC , 920318
200 COMPLIANCE TESTING
92078
ENGXG2

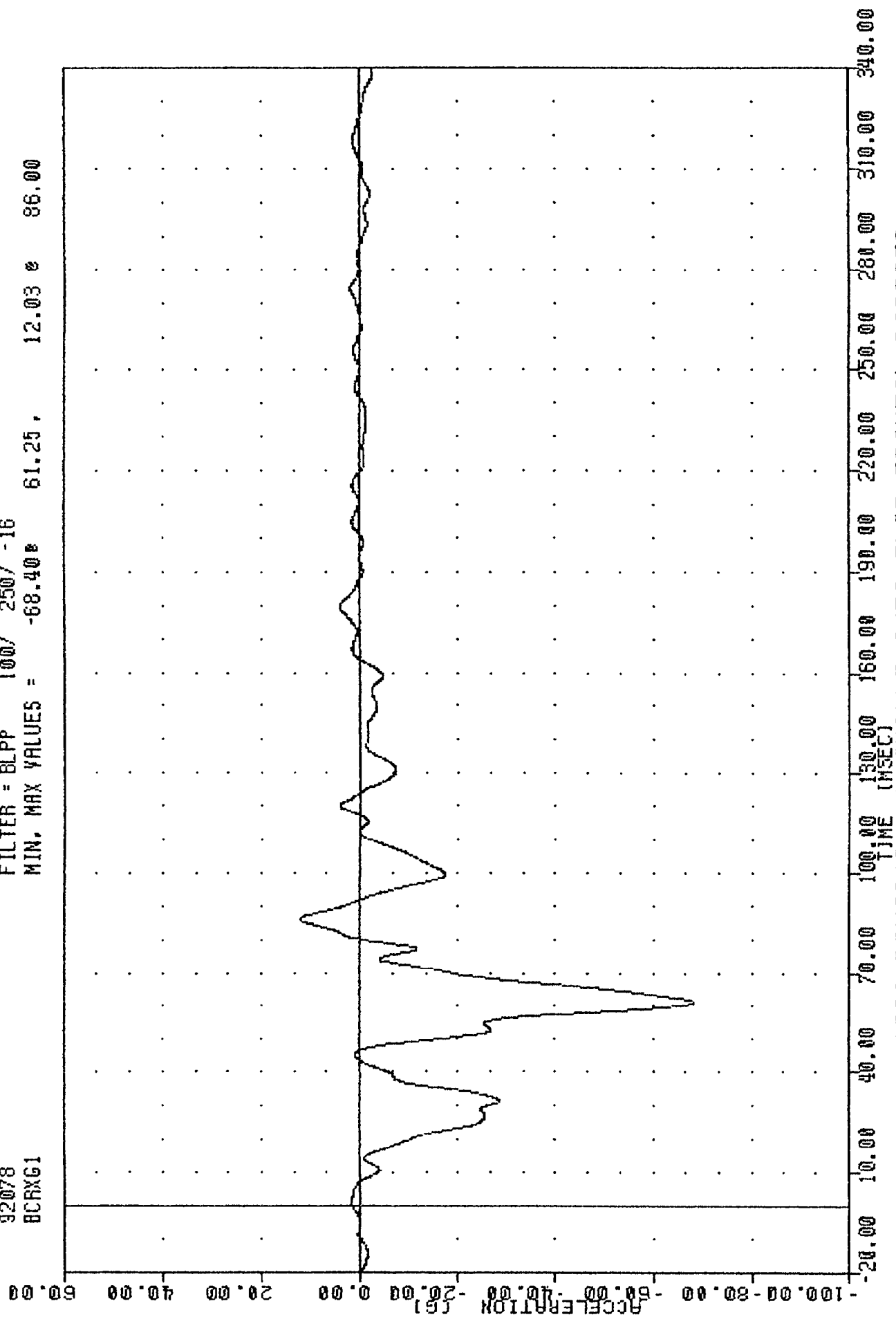
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -66.468 41.00, 21.48 56.38



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION

TRC , 920318
208 COMPLIANCE TESTING
92078
BCRXG1

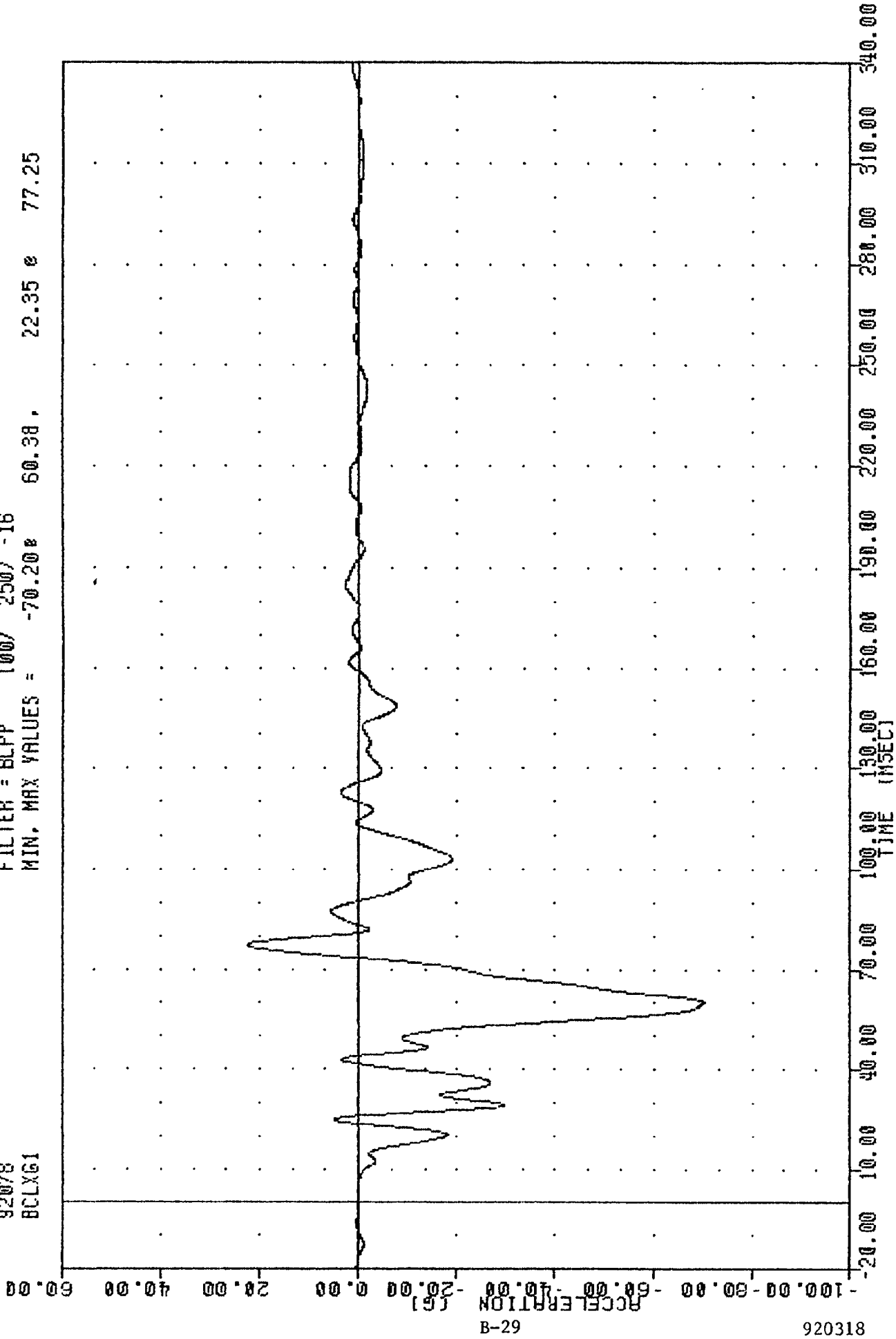
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -68.40e 61.25, 12.03 e 86.00



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TRC , 920318
208 COMPLIANCE TESTING
92078
BCLXG1

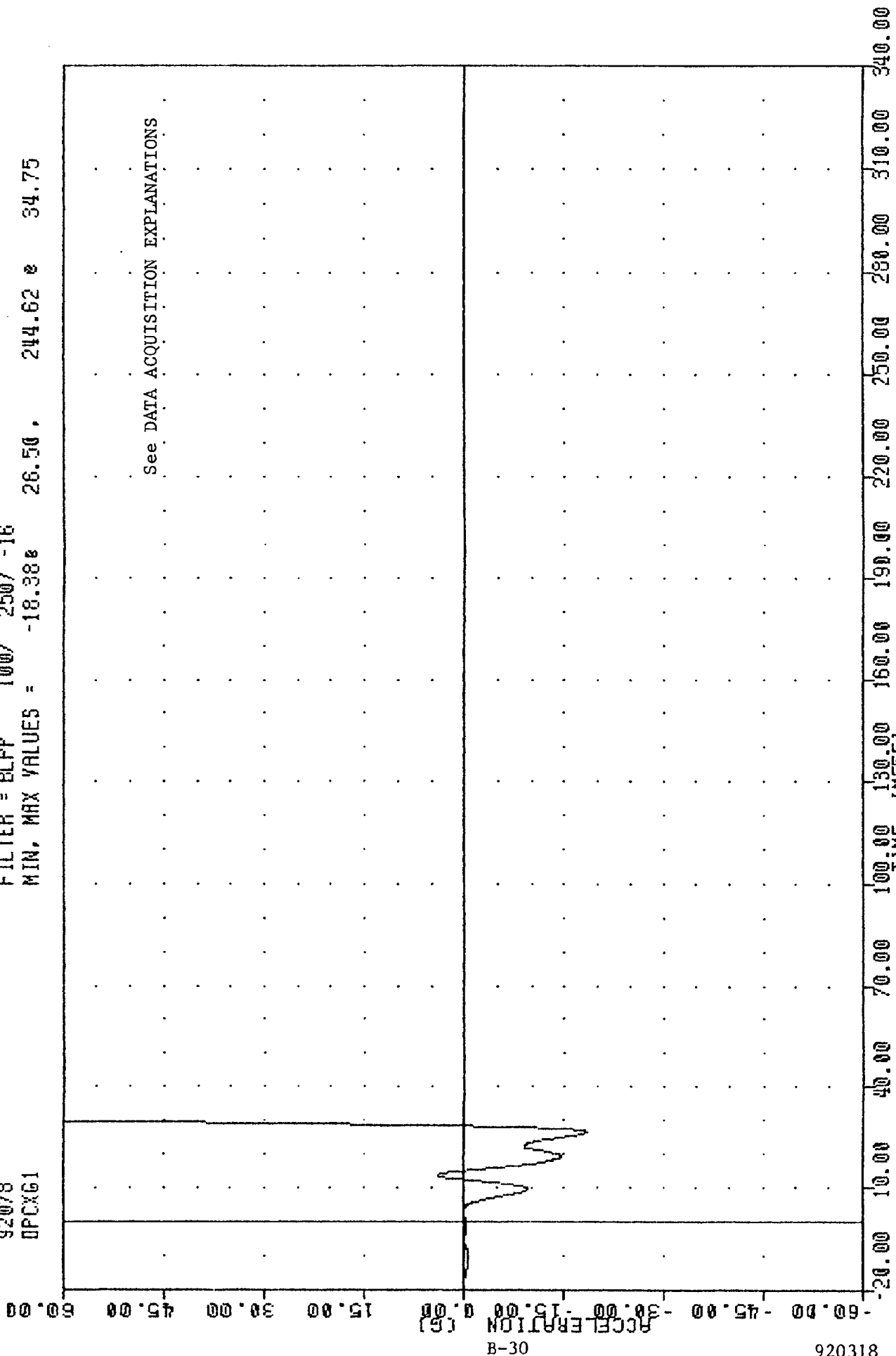
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -70.20e 60.38, 22.35 e 77.25



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TRC , 920318
 208 COMPLIANCE TESTING
 92078
 DPCXG1

FILTER = BLFP 100/ 250/ -16
 MIN, MAX VALUES = -18.388 26.50 244.62 e 34.75



1992 PONTIAC BONNEVILLE INTO FLAT FRONTAL BARRIER
 INSTRUMENT PANEL CENTER X-AXIS ACCELERATION