

V1701

REPORT NO. TRC-91-N09

NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST

CHRYSLER CORPORATION  
1992 DODGE RAM WAGON VAN  
NHTSA NO. MN0301  
TRC TEST NO. 920316

PREPARED BY:  
TRANSPORTATION RESEARCH CENTER INC.  
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APRIL 8, 1992

FINAL REPORT

PREPARED FOR:  
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OFFICE OF MARKET INCENTIVES  
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16. Abstract  A 35 mph frontal load cell barrier impact test was conducted on a 1992 Dodge Ram Wagon van, NHTSA No. MNO301, at the Transportation Research Center Inc. on March 16, 1992. This test was conducted to obtain new car assessment and research data indicant of FMVSS No. 208 performance. The barrier impact velocity was 35.0 mph. The vehicle's maximum crush was 17.8 inches. The ambient temperature was 75° F. The driver's head injury criteria (HIC) was 1392. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 65.8 g. The driver's chest maximum deflection was 1.7 inches. The driver's left and right femur maximum axial forces were 2402 pounds and 2173 pounds, respectively. The passenger's head injury criteria (HIC) was 1113. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 53.8 g. The passenger's chest maximum deflection was 2.2 inches. The passenger's left and right femur maximum axial forces were 472 pounds and 179 pounds, respectively.					
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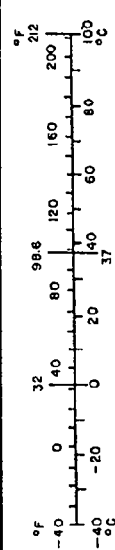
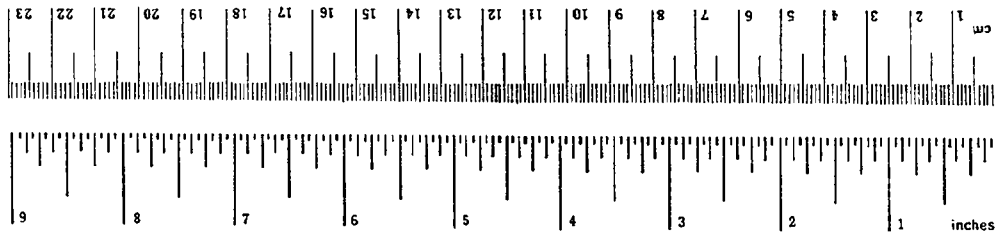
## METRIC CONVERSION FACTORS

### Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	2.54	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
<b>VOLUME</b>				
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 <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

### Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
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
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	ac
<b>MASS (weight)</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	st
<b>VOLUME</b>				
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 <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



\* 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.

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SECTION 1.0

PURPOSE AND TEST PROCEDURE

PURPOSE

This 35 mph frontal barrier impact test is part of the New Car Assessment Program (NCAP) conducted for the National Highway Traffic Safety Administration's (NHTSA) Office of Market Incentives by the Transportation Research Center Inc. (TRC) under Contract No. DTNH22-90-D-22121.

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1992 Dodge Ram Wagon van, NHTSA No. MN0301, at an impact speed in excess of the current 30 mph FMVSS 208 requirements.

## TEST PROCEDURE

This test was conducted in accordance with NHTSA's Laboratory Indicant Test Procedure, New Car Assessment Program, dated January 1, 1990. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection" performance.

The test vehicle was instrumented with seven (7) accelerometers to measure longitudinal axis accelerations and two (2) accelerometers to measure vertical axis accelerations. The driver's and passenger's restraint systems were instrumented with four (4) seat belt load cells to measure lap belt tension and shoulder belt tension, two (2) string potentiometers to measure shoulder belt displacement, and two (2) linear potentiometers to measure shoulder belt stretch. The vehicle impacted a frontal load cell barrier instrumented with thirty-six (36) barrier face load cells. The vehicle's specified impact velocity range was 34.5 to 35.5 mph.

The test vehicle contained two (2) Part 572E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendices VII and VIII of the Laboratory Indicant 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 and a six-axis neck load cell to measure longitudinal, lateral and vertical forces and moments.

The eighty-three (83) data channels were multiplexed and recorded on two (2) 14-track tape drives. The data was digitally sampled at 8000 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and sixteen (16) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle, occupant, and load cell barrier data are presented in Section 2.0. The occupant, camera, and vehicle measurements are presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the dummy, vehicle, and load cell barrier data plots. Appendix C contains the dummy certification data. Appendix D contains miscellaneous test information. Appendix E contains the restraint system instructions from the owner's manual.

SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

### TEST RESULTS SUMMARY

This frontal load cell barrier test was conducted at TRC on March 16, 1992.

The test vehicle, a 1992 Dodge Ram Wagon van, NHTSA No. MN0301, was equipped with a 5.2 liter inline engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 5514 pounds. The vehicle's impact speed was 35.0 mph. The vehicle sustained 17.8 inches of static crush during the impact.

The driver's head injury criteria (HIC) was 1392. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 65.8 g. The driver's chest maximum deflection was 1.7 inches. The driver's left and right femur maximum axial forces were 2402 pounds and 2173 pounds, respectively.

The passenger's HIC was 1113. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 53.8 g. The passenger's chest maximum deflection was 2.2 inches. The passenger's left and right femur maximum axial forces were 472 pounds and 179 pounds, respectively.

DATA ACQUISITION EXPLANATIONS

The right front passenger's seat belt extension potentiometer, SBED2, recorded questionable data.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: MN0301            TEST TYPE: Frontal Load Cell Barrier  
TEST DATE: 03/16/92        TEST TIME: 1524            AMBIENT TEMP. (°F): 75  
VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1992/Dodge/Ram Wagon/van  
VEHICLE TEST WEIGHT (LBS): 5514  
IMPACT ANGLE (DEG)\*: 0  
IMPACT VELOCITY (MPH)\*\*:    PRIMARY = 35.0            SECONDARY = 35.0  
MAXIMUM STATIC CRUSH (IN): 17.8  
AVERAGE REBOUND (IN): 17.0  
DUMMIES:            Driver #192                            Passenger #142  
TYPE:                Part 572 E                            Part 572 E  
LOCATION:             Left front                            Right front  
RESTRAINT:          3-point Unibelt                      3-point Unibelt  
NUMBER OF DATA CHANNELS: 83  
NUMBER OF CAMERAS: HIGH-SPEED 16            REAL-TIME 2

\*With respect to tow track centerline.

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

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Chrysler Corporation

MAKE/MODEL: Dodge/Ram Wagon

VIN: 2B4HB25Y1NK111327

BODY STYLE: Van

MODEL YEAR: 1992

NHTSA NO.: MN0301

COLOR: Gray

ENGINE DATA: TYPE: inline CYLINDERS: 8 DISPLACEMENT: 5.2 liter

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

DATE VEHICLE RECEIVED: 03/09/92

ODOMETER READING: 203.0

DEALER'S NAME AND ADDRESS: Great Northern Dodge, Inc.  
26100 Lorain Road  
North Olmsted, OH 44070

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	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	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: Chrysler Corporation

DATE OF MANUFACTURE: 09/91

VIN: 2B4HB25Y1NK111327

GVWR: 6400 LBS

GAWR: FRONT: 3300 LBS., REAR: 3700 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Michelin, XW4, P235/75R15

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

SPARE TIRE (MFR., LINE, SIZE): Michelin, WX4, P235/75R15

TYPE OF SEATS: FRONT: Bucket  
REAR: Bench

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 78.5 INCHES

WHEELBASE: 126.0 INCHES

LOCATION OF LABEL STATING TIRE DATA:

The label was located on the left B-pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P235/75R15 XL

RECOMMENDED COLD TIRE PRESSURE: FRONT: 35 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 32.1; RF 32.2; LR 31.5; RR 31.2

PRE-TEST ATTITUDE: LF 31.5; RF 30.6; LR 30.8; RR 31.8

POST-TEST ATTITUDE: LF 38.2; RF 35.5; LR 31.4; RR 29.0

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	1371 LBS.	RIGHT REAR	1097 LBS.
LEFT FRONT	1302 LBS.	LEFT REAR	1120 LBS.
TOTAL FRONT WEIGHT	2673 LBS.	(54.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	2217 LBS.	(45.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 4890 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT\*

UDW = UNLOADED DELIVERED WEIGHT (4890 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA LBS) \*

DSC = DESIGNATED SEATING CAPACITY (NA) \*

RCLW\* = VCW - 150 (DSC) = NA LBS

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

TARGET TEST WEIGHT = 4890 + 300\* + 334

TARGET TEST WEIGHT = 5524 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 296 LBS. OF CARGO WEIGHT:

RIGHT FRONT	1475 LBS.	RIGHT REAR	1275 LBS.
LEFT FRONT	1436 LBS.	LEFT REAR	1328 LBS.
TOTAL FRONT WEIGHT	2911 LBS.	(52.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	2603 LBS.	(47.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	5514 LBS.	(0.2% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 75 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 59.5 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: 920316 NHTSA NO.: MN0301  
TEST DATE: 03/16/92 TEST TIME: 1524  
TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°  
AMBIENT TEMPERATURE AT IMPACT AREA: 75° F  
TEMPERATURE IN OCCUPANT COMPARTMENT: 73° F  
IMPACT VELOCITY: PRIMARY = 35.0 MPH SECONDARY = 35.0 MPH  
(SPECIFIED RANGE = 34.5 TO 35.5 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 198.1; C 200.6; R 197.8  
POST-TEST: L 182.0; C 182.8; R 181.1  
TOTAL CRUSH: L 16.1; C 17.8; R 16.7  
AVERAGE CRUSH: 16.9

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 18.2; C 16.6; R 16.2; AVG. 17.0

TABLE 4 FUEL SYSTEM DATA

MAKE/MODEL: Dodge/Ram Wagon

NHTSA NO.: MN0301

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

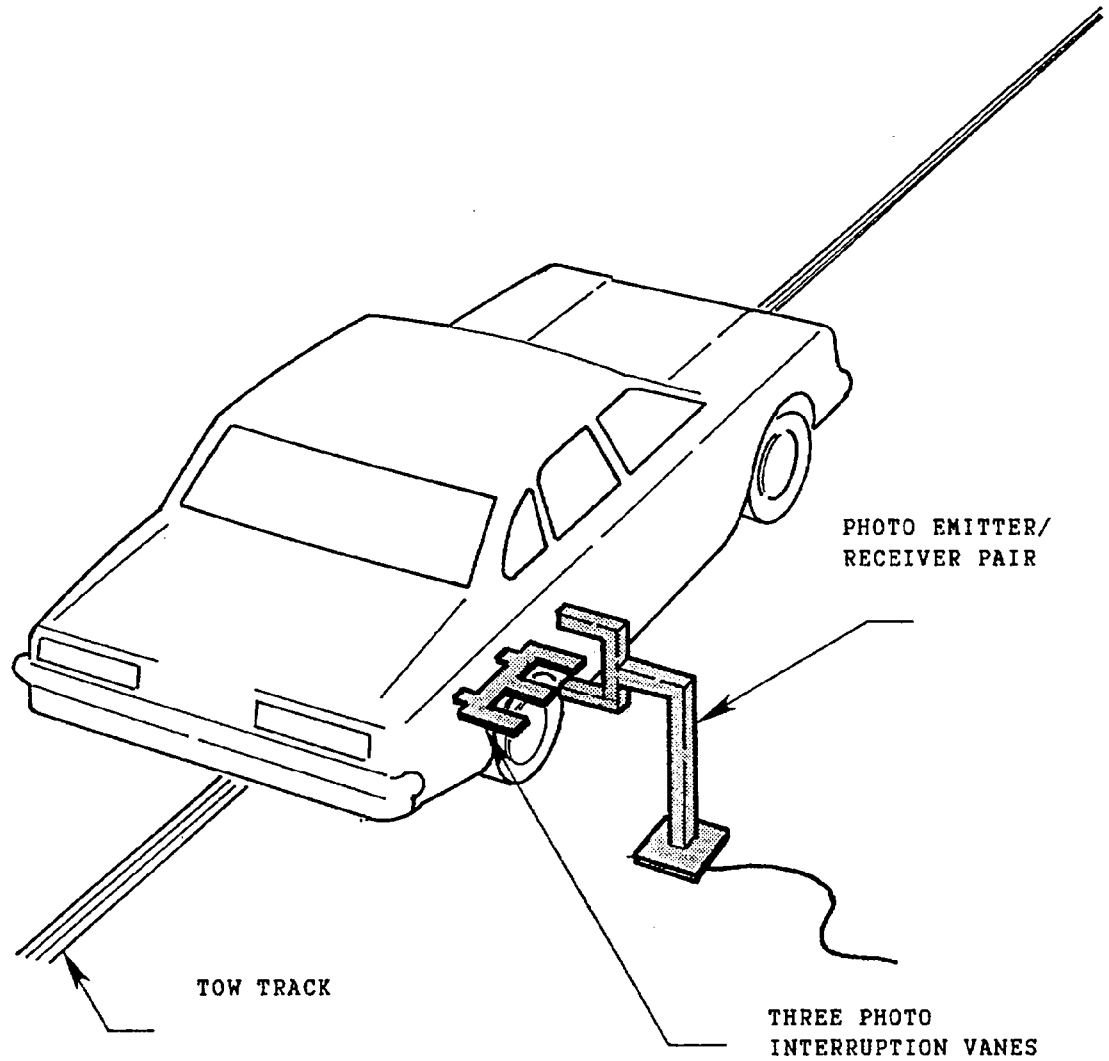
TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel filler is on the left side. The fuel tank is behind the rear axle. The fuel lines run along the right 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

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 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Dodge/Ram Waqon/Van

VEHICLE NHTSA NO.: MN0301; VIN: 2B4HB25Y1NK111327

MODEL YEAR: 1992; BUILD DATE: 09/91; TEST DATE: 03/16/92

VEHICLE SIZE CATEGORY: Van; TEST WEIGHT: 5514 LBS.

VEHICLE WHEELBASE: 128.0 INCHES

MAXIMUM WIDTH: 79.2 INCHES

FRONT OVERHANG: 32.0 INCHES

COLLISION DEFORMATION  
CLASSIFICATION (CDC) CODE: 12FDEW4

CRUSH DEPTH  
MEASUREMENTS:

C1 =	<u>16.1</u>	INCHES
C2 =	<u>16.7</u>	INCHES
C3 =	<u>17.2</u>	INCHES
C4 =	<u>17.7</u>	INCHES
C5 =	<u>17.5</u>	INCHES
C6 =	<u>16.7</u>	INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE (LONGITUDINAL)

LENGTH OF DAMAGED  
REGION: L = 69.5 INCHES

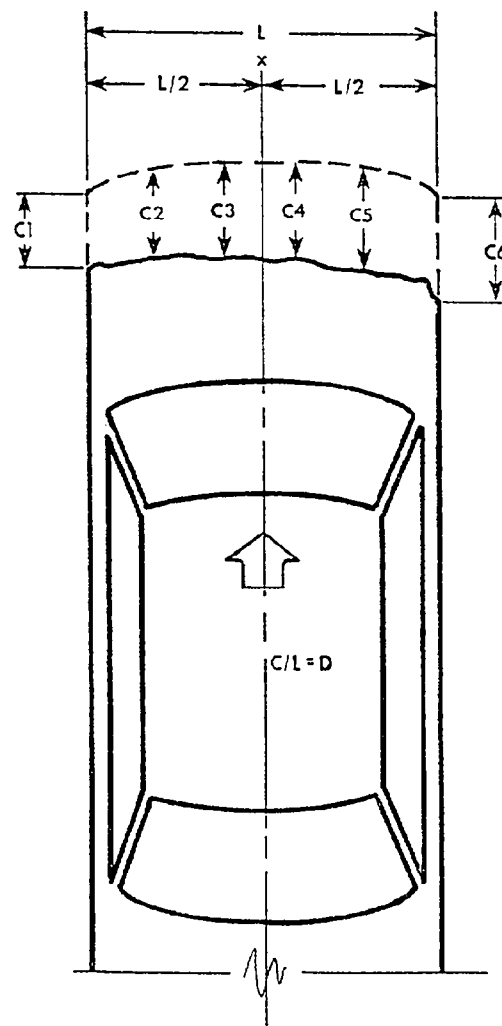
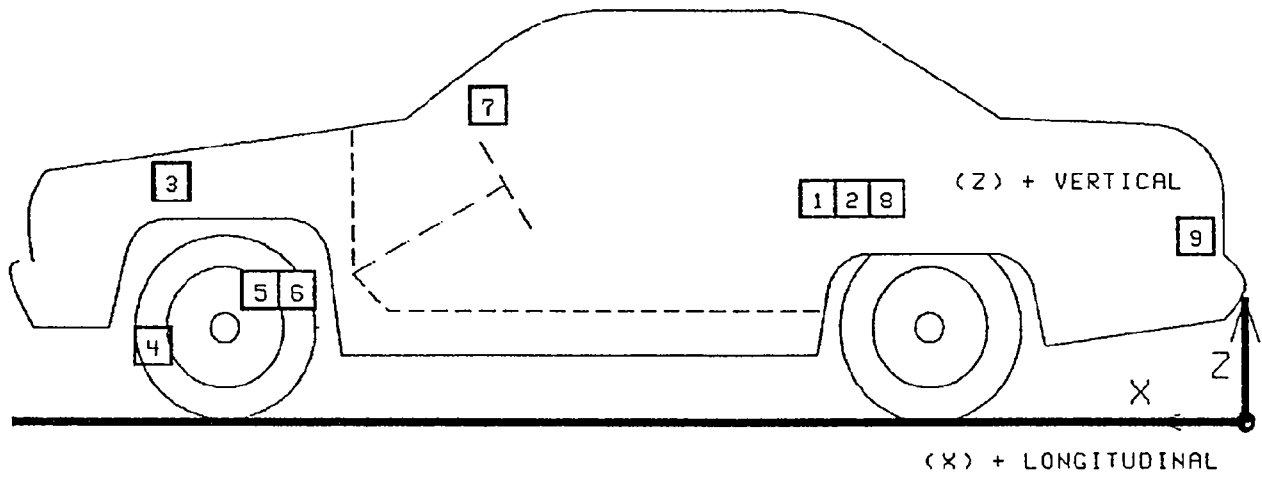
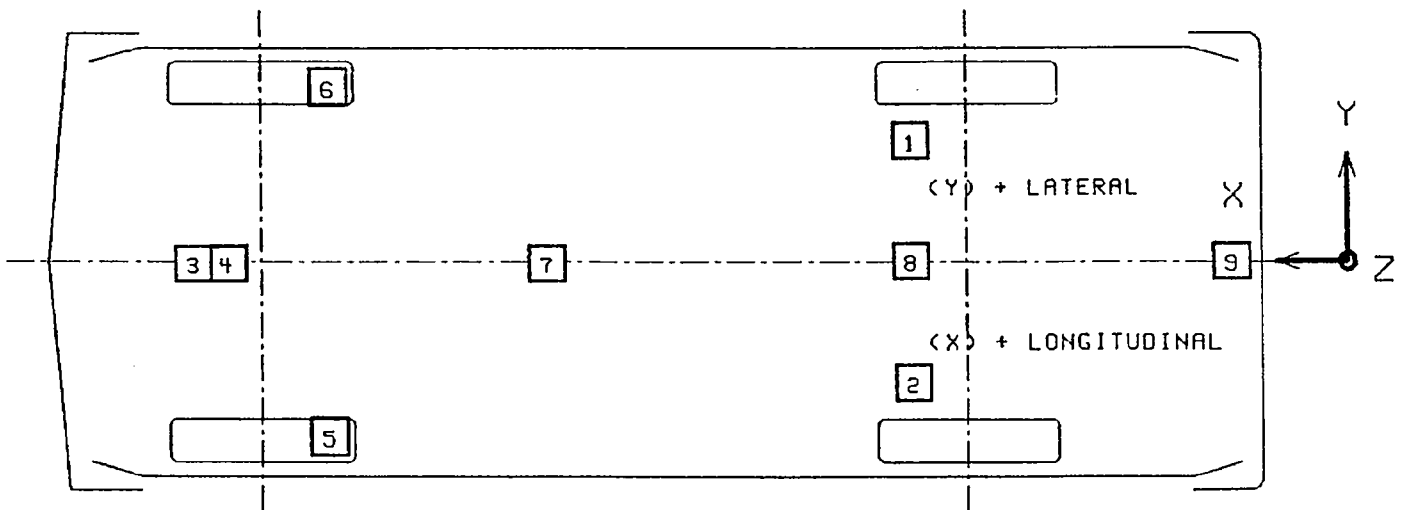


FIGURE 3  
 VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920316

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	95.8	30.0	24.4	1.6	152.0	40.1	13.1
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	95.8	-20.0	24.5	1.6	108.0	39.3	12.1
3	ENGINE TOP LONGITUDINAL	35.4	9.5	35.6	32.6	55.4	120.0	37.3
4	ENGINE BOTTOM LONGITUDINAL	41.1	-6.5	14.0	30.7	58.6	111.4	39.0
5	RIGHT BRAKE CALIPER LONGITUDINAL	35.1	-27.2	15.4	50.0	61.0	82.2	40.8
6	LEFT BRAKE CALIPER LONGITUDINAL	35.4	27.2	15.6	29.4	61.0	62.1	24.0
7	INSTRUMENT PANEL CENTER LONGITUDINAL	27.8	1.0	57.8	25.8	47.1	77.8	26.3
8	REAR SEAT CROSSMEMBER CENTER VERTICAL	95.8	0.0	24.4	30.3	38.6	25.8	51.4
9	VEHICLE REAR CENTER VERTICAL	189.6	0.0	25.0	51.1	22.5	5.2	92.1

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

REFERENCE: X: + FORWARD ACCELERATION  
 Y: + LEFT FROM VEHICLE CENTERLINE  
 Z: + UP FROM GROUND LEVEL

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #192	PASSENGER #142
HEAD	<u>Steering wheel rim and hub</u>	<u>Dummy's chest</u>
CHEST	<u>None</u>	<u>None</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>Difficult, tools required</u>	<u>Difficult, tools required</u>
REAR	<u>NA</u>	<u>NA</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 fell out of the vehicle on  
impact.

OTHER NOTABLE IMPACT EFFECTS:

None

TABLE 7 FMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1992/Dodge/Ram Wagon/van

VEH. NHTSA NO.: MN0301; TEST DATE: 03/16/92

MAXIMUM ACCELERATIONS (G):	DRIVER DUMMY #192	PASSENGER DUMMY #142
HEAD X-AXIS	-108.7	-76.9
HEAD Y-AXIS	-18.9	-7.6
HEAD Z-AXIS	-104.4	-57.9
HEAD RESULTANT	148.3	79.8
CHEST X-AXIS	-82.1	-54.4
CHEST Y-AXIS	-5.7	-7.2
CHEST Z-AXIS	17.0	17.4
CHEST RESULTANT*	65.8	53.8
CHEST RESULTANT TIME INTERVAL (SEC.)*	.003	.003

HEAD INJURY CRITERIA (HIC) VALUES:

HIC**	1392	1113
HIC STARTING TIME (SEC.)	.060	.074
HIC ENDING TIME (SEC.)	.081	.110
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	84.0	62.5

MAXIMUM CHEST DEFLECTIONS (IN):

CHEST X-AXIS	1.7	2.2
MAXIMUM CHEST DEFLECTION TIME (SEC.)	.078	.087

MAXIMUM COMPRESSIVE FEMUR FORCES (LBS):

LEFT FEMUR	2402	472
RIGHT FEMUR	2173	179

MAXIMUM SEAT BELT FORCES (LBS):

LAP BELT	1404	2188
SHOULDER BELT	2277	2057

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.  
(HEAD ACCELERATIONS LISTED MUST BE DURING HIC TIME INTERVAL.)

\*0.003 SEC. MINIMUM DURATION.

\*\*THE MAXIMUM HIC TIME INTERVAL IS 36 MILLISECONDS.

TABLE 8 HYBRID III NECK DATA SUMMARY

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1992/Dodge/Ram Wagon/van

VEHICLE NHTSA NO.: MN0301; TEST DATE: 03/16/92

<u>MAXIMUM VALUES:</u>	<u>DRIVER DUMMY #192</u>	<u>PASSENGER DUMMY #142</u>
NECK X-AXIS FORCE (LBS.)	472	523
NECK Y-AXIS FORCE (LBS.)	39	-71
NECK Z-AXIS FORCE (LBS.)	552	1106
NECK MOMENT ABOUT X AXIS (FT.-LBS.)	15	21
NECK MOMENT ABOUT Y AXIS (FT.-LBS.)	80	-74
NECK MOMENT ABOUT Z AXIS (FT.-LBS.)	10	-11

NOTE: ALL VALUES LISTED MUST BE OCCURRING DURING PRIMARY IMPACT EVENT.

## 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 chin and neck then impacted the lower rim of the steering wheel followed by the dummy's head rotating downward impacting the steering wheel hub. The driver dummy was restrained by the three-point unbelt. The dummy then rebounded rearward into the seat back as the dummy's head rotated rearward into the head restraint. The driver dummy came to rest in the driver's seat restrained by the three-point unbelt.

### 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 downward and impacted the dummy's chest as the dummy's upper torso rotated slightly forward. The right front passenger dummy was restrained by the three-point unbelt. The dummy then rebounded rearward into the seat back as the dummy's head rotated rearward contacting the head restraint. The right front passenger came to rest in the right front passenger's seat restrained by the three-point unbelt.

TABLE 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

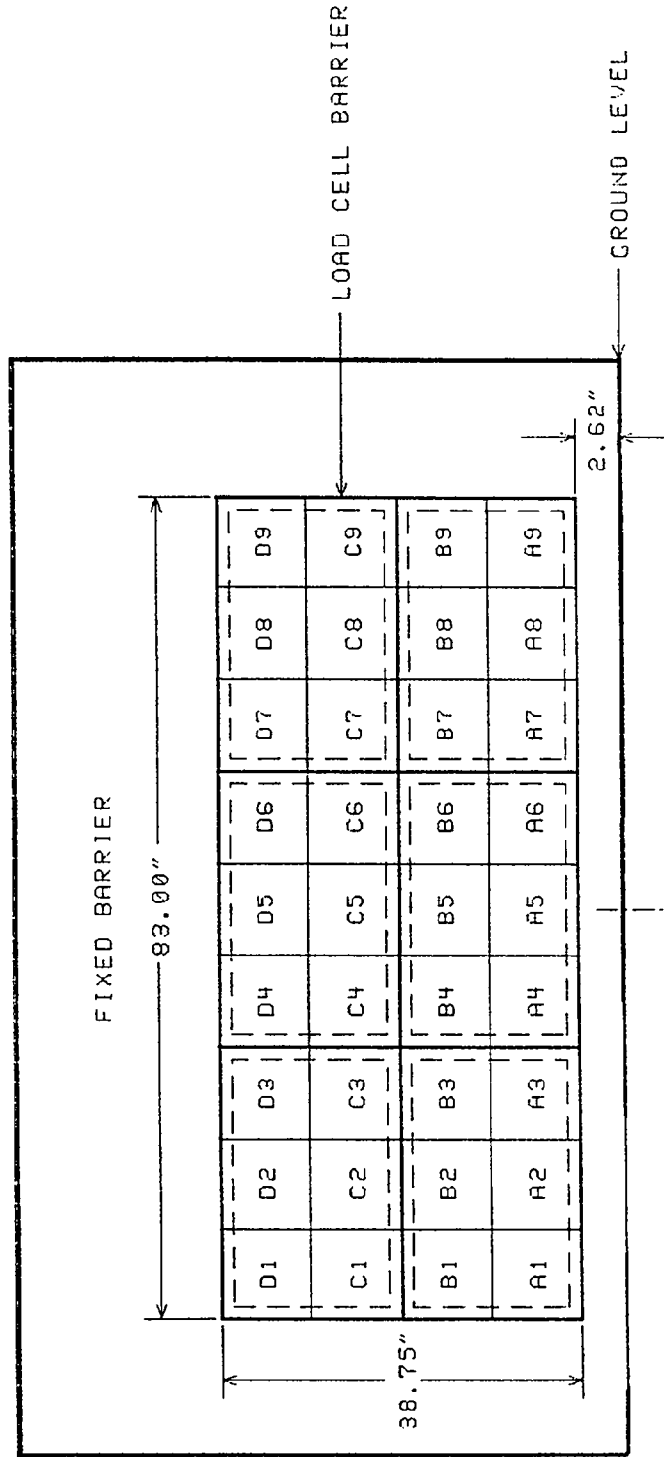
	DRIVER	PASSENGER
<u>BELT LENGTH DATA:</u>		
BELT LENGTH FROM TRIM PANEL EXIT TO BOLT HOLE ANCHOR POINT FOR CONTINUOUS WEBBING SYSTEMS.	128.6	127.0
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	35.5	38.6
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	40.1	40.9
<u>SHOULDER BELT SPOOL-OFF LENGTH:</u>		
AS DETERMINED BY FILM ANALYSIS	0.5	0.2
AS DETERMINED MECHANICALLY	1.2	0.8
AS DETERMINED ELECTRONICALLY	3.9	3.2
<u>BELT STRETCH LENGTH (IN/FT):</u>		
AS MEASURED MECHANICALLY	0.0	0.0
AS MEASURED ELECTRONICALLY	0.0	--- γ
<u>RETRACTOR LOCK-UP TIME (MS):</u>		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	26	22

ALL MEASUREMENTS ARE IN INCHES UNLESS OTHERWISE NOTED.  
 γ See DATA ACQUISITION EXPLANATIONS

FIGURE 4

LOAD CELL BARRIER CONFIGURATION  
FRONT VIEW

36 LOAD CELLS  
4 ROWS  
9 COLUMNS



- GROUP 1: A1 THRU B3
- GROUP 2: A4 THRU B6
- GROUP 3: A7 THRU B9
- GROUP 4: C1 THRU D3
- GROUP 5: C4 THRU D6
- GROUP 6: C7 THRU D9

TABLE 10

LOAD CELL BARRIER DATA SUMMARY

TEST NUMBER 920316

LOCATION	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	LB	MSEC	LB	MSEC
TOTAL GROUP 1	277	217.1	54202	27.1
TOTAL GROUP 2	408	152.4	19223	39.0
TOTAL GROUP 3	470	164.9	70936	34.8
TOTAL GROUP 4	366	132.0	25149	13.9
TOTAL GROUP 5	231	164.8	72312	38.4
TOTAL GROUP 6	385	202.0	15142	12.9
TOTAL LOAD CELL FORCE	1485	152.1	225126	36.8

TENSION IS POSITIVE  
COMPRESSION IS NEGATIVE

SECTION 3.0

OCCUPANT, CAMERA, & VEHICLE MEASUREMENTS

FIGURE 5 DUMMY AND SEAT POSITIONING DATA

TEST NO.: 920316; VEHICLE: 1992 Dodge Ram Wagon

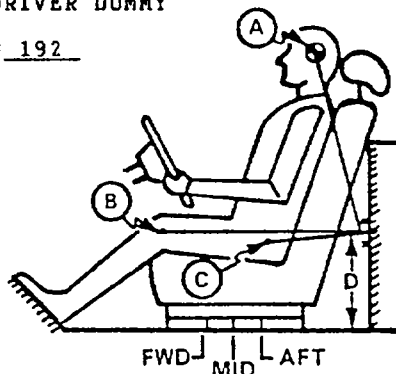
SEAT TYPE:        BENCH  
  X   BUCKET  
       SPLIT BENCH

ADJUSTER TYPE:   X   MANUAL  
       POWER

FRONT SEAT BACK TYPE:        NON-ADJUSTABLE  
  X   ADJUSTABLE RECLINING

DRIVER DUMMY

# 192

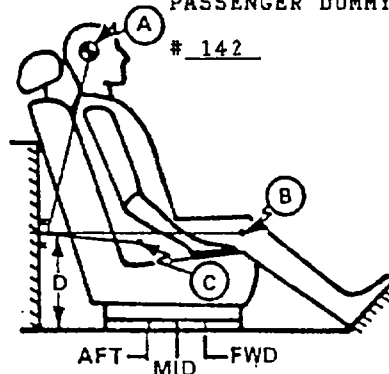


MEASUREMENT LOCATION

- A - HEAD TARGET
- B - KNEE JOINT
- C - APPROXIMATE 'H' POINT
- D - SILL TO DOOR STRIKER REFERENCE POINT

PASSENGER DUMMY

# 142

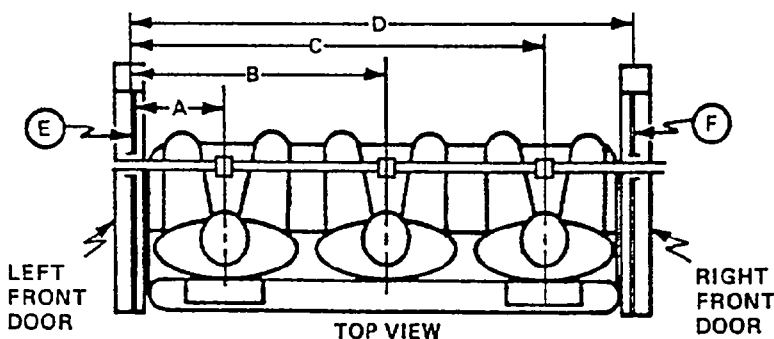


A = 26.5 IN.   2   DEGREES  
 B = 23.0 IN.  78  DEGREES  
 C =  4.8 IN.  45  DEGREES  
 D = 20.5 IN.

A = 26.2 IN.   5  DEGREES  
 B = 20.4 IN.  71  DEGREES  
 C =  3.4 IN.  35  DEGREES  
 D = 20.5 IN.

SEAT TRACK REARWARD:   7   NOTCHES

SEAT TRACK REARWARD:   7   NOTCHES



A = LEFT DOOR TO DRIVER CENTERLINE  13.0  IN.  
 B = LEFT DOOR TO CENTER PASSENGER CENTERLINE   NA  IN.  
 C = LEFT DOOR TO RIGHT PASSENGER CENTERLINE  54.0  IN.  
 D = LEFT DOOR TO RIGHT DOOR  68.3  IN.  
 E, F = WINDOW GLASS HEIGHT (RIGHT AND LEFT MUST BE EQUAL)  11.5  IN.

ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.

FIGURE 6 DUMMY IN-VEHICLE POSITIONING DATA

	DRIVER	PASSENGER
HH	24.8	26.4
HW	29.2	29.9
CD	25.0	29.8
CS	15.6	NA
KDL	8.2	10.4
KDR	6.6	10.5
TA	16°	16°
SA	20°	20°
HSW	21.4	NA

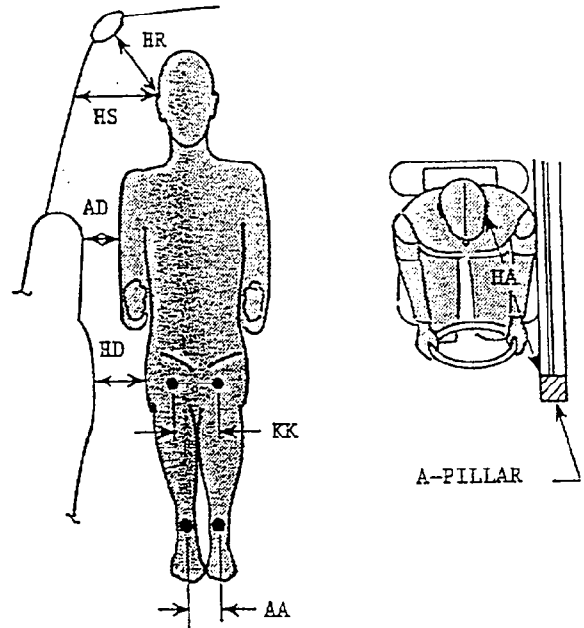
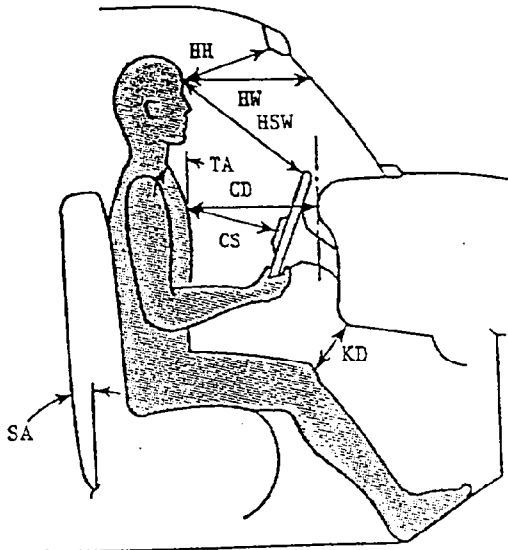
	DRIVER	PASSENGER
HR	8.6	7.8
HS	9.0	8.2
AD	3.5	2.1
HD	6.0	4.4
KK	8.0	8.0
AA	8.8	3.6
HA	26.2	28.2

KNEE OUTER CLEVIS TO OUTER CLEVIS SPACING:

PASSENGER = 10.6  
DRIVER = 10.6

PELVIS ANGLE:

PASSENGER = 21°  
DRIVER = 20°

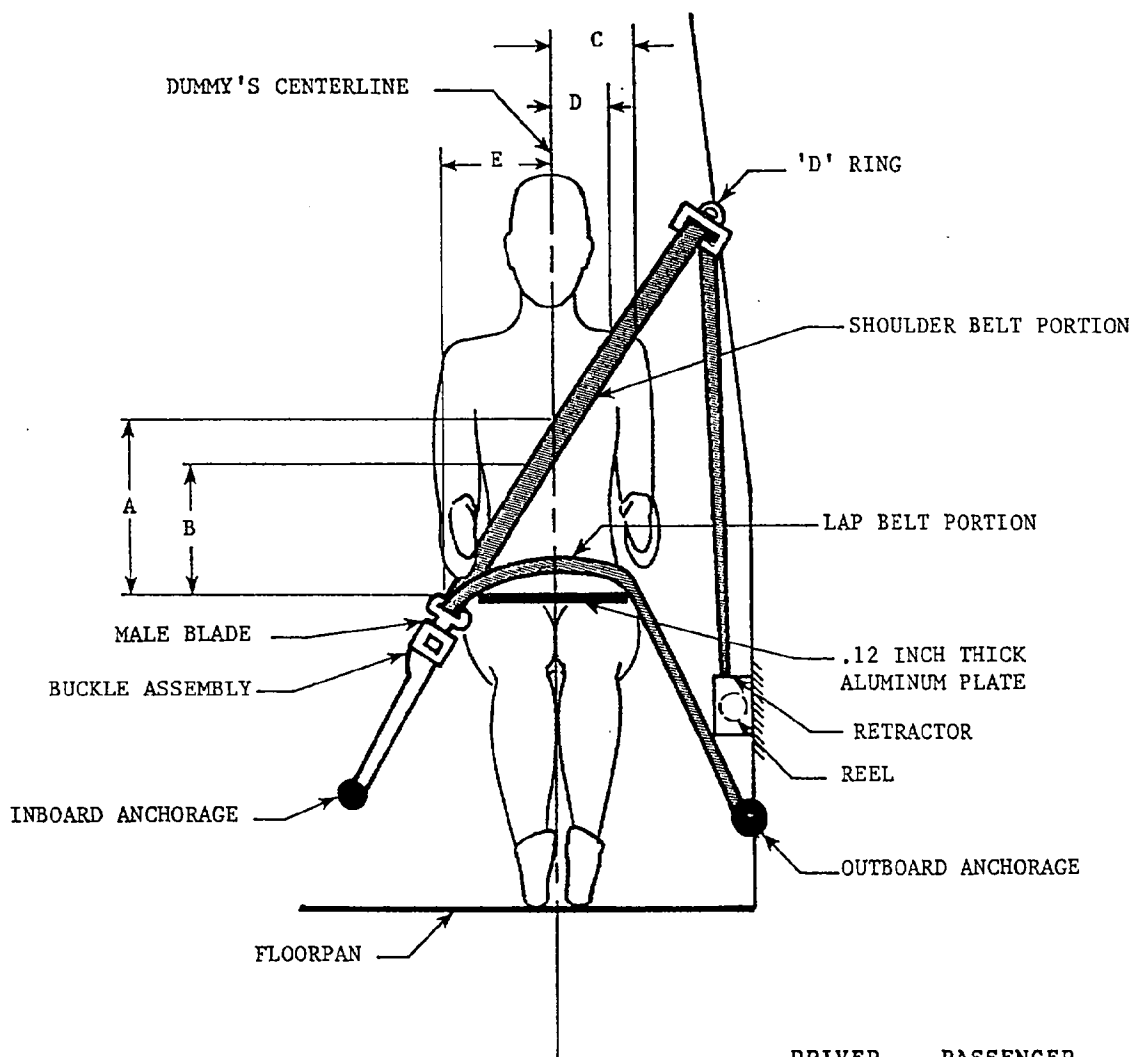


HH = HEAD TO WINDSHIELD HEADER  
HW = HEAD TO WINDSHIELD  
CD = CHEST TO DASH  
CS = CHEST TO STEERING WHEEL  
KD = KNEE TO DASH  
TA = TORSO ANGLE  
SA = SEAT BACK ANGLE  
HSW = HEAD TO STEERING WHEEL

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.

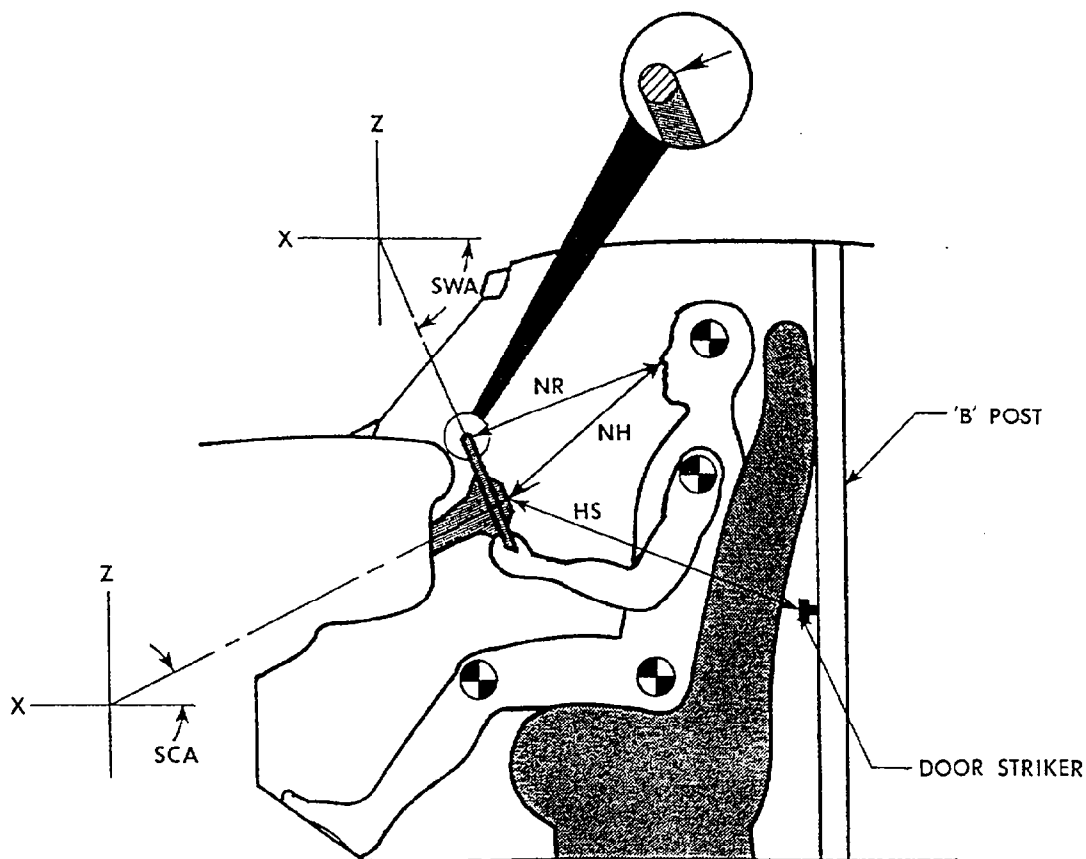
FIGURE 7 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	14.9	14.5
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	11.6	10.9
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	5.6	4.8
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	3.0	2.5
LAP BELT TENSION (LBS)	4	4
SHOULDER BELT TENSION (LBS)	4	4

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 8 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:  
 The steering column was placed in the fourth position down from the  
 uppermost position.

MEASUREMENTS

NR	- DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	19.6
NH	- DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	19.4
HS	- DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	24.7
SCA	- ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	32°
SWA	- ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	58°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 9  
CAMERA POSITIONS

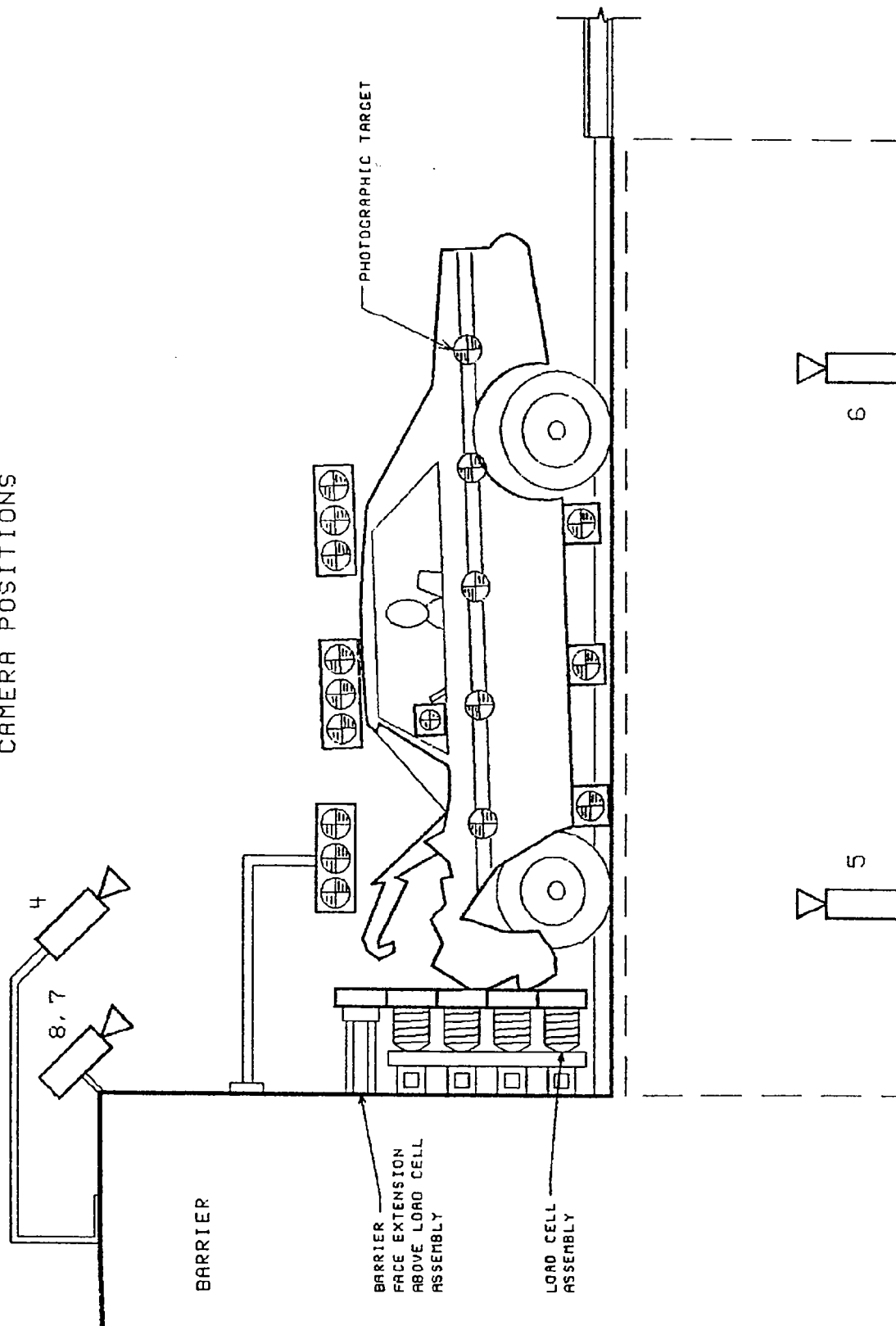


FIGURE 9  
CAMERA POSITIONS, CONTINUED

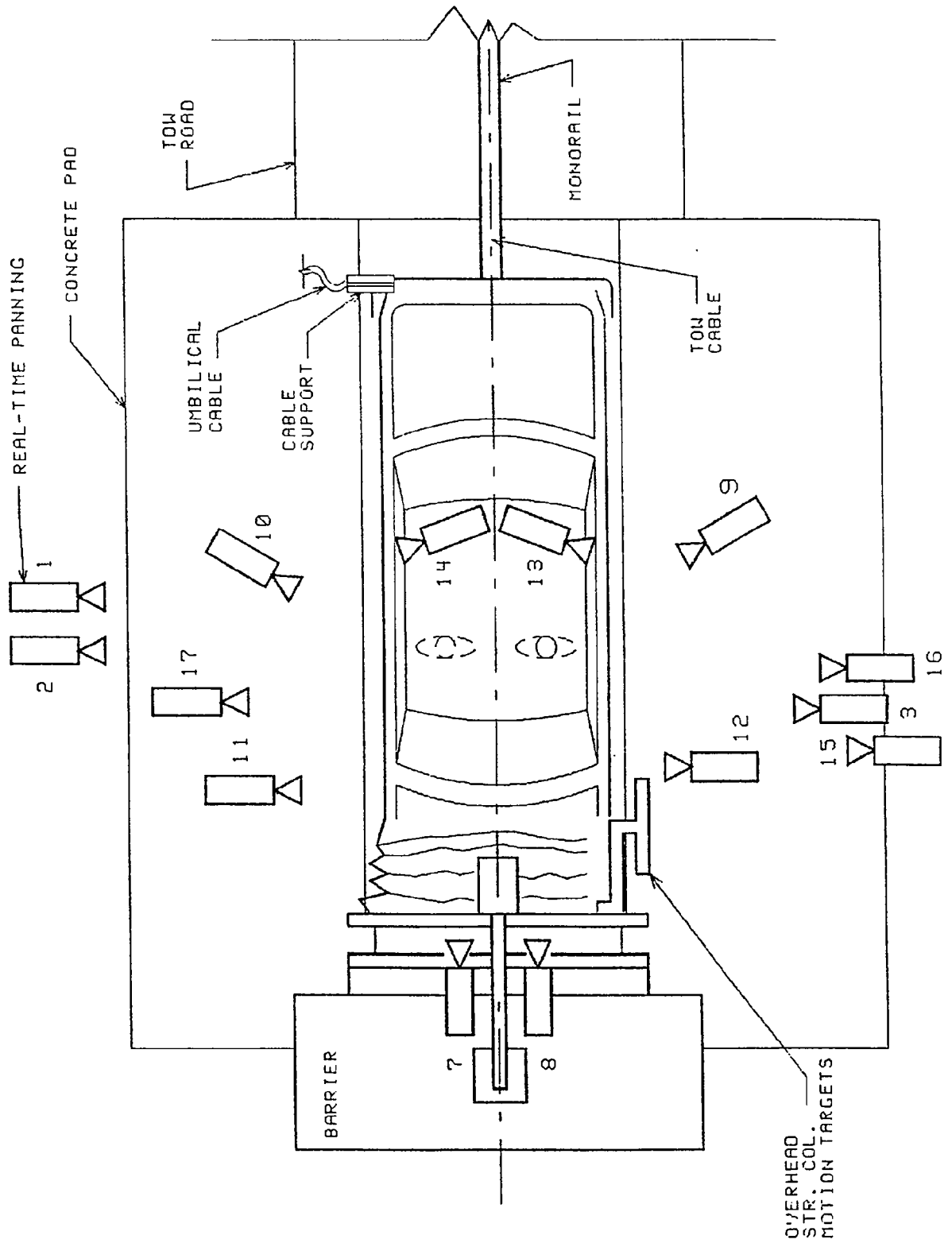


TABLE 11 MOTION PICTURE CAMERA LOCATIONS

CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE** (DEG)	FILM PLANE		FILM SPEED (FPS)
		X	Y	Z		TO HEAD TARGET (IN)	LENS (MM)	
1	Real-time panning	-142.0	-504.0	61.0	NA	NA	16	24
2	Vehicle crush	-81.3	-266.4	37.1	-2	NA	13	500
3	Dummy kinematics	-41.5	295.0	44.0	-12	184.0	25	998
4	Windshield damage	-36.4	0.0	98.0	-40	NA	13	498
5	Crush & fluid spillage	-50.5	0.0	-92.4	90	NA	13	1005
6	Fluid spillage	-99.3	0.0	-99.0	90	NA	13	998
7	Passenger kinematics	-4.5	-13.8	85.0	-40	NA	17	500
8	Driver kinematics	-6.8	14.5	85.0	-41	NA	17	498
9	Driver kinematics	-180.0	73.0	102.0	-27	77.0	25	500
10	Passenger kinematics	-184.0	-74.0	100.0	-26	70.0	25	500
11	Windshield intrusion	-38.1	-306.1	44.0	0	NA	50	498
12	Windshield intrusion	-53.0	309.4	42.3	0	NA	50	508
13	Driver seatbelt movement	NA	NA	NA	NA	NA	13	500
14	Passenger seatbelt movement	NA	NA	NA	NA	NA	13	498
15	Column movement	-108.0	286.0	103.0	-14	NA	25	505
16	Column movement	-108.0	286.0	75.1	-9	NA	25	500
17	Passenger kinematics	-38.8	-210.8	45.3	7	195.0	25	1010

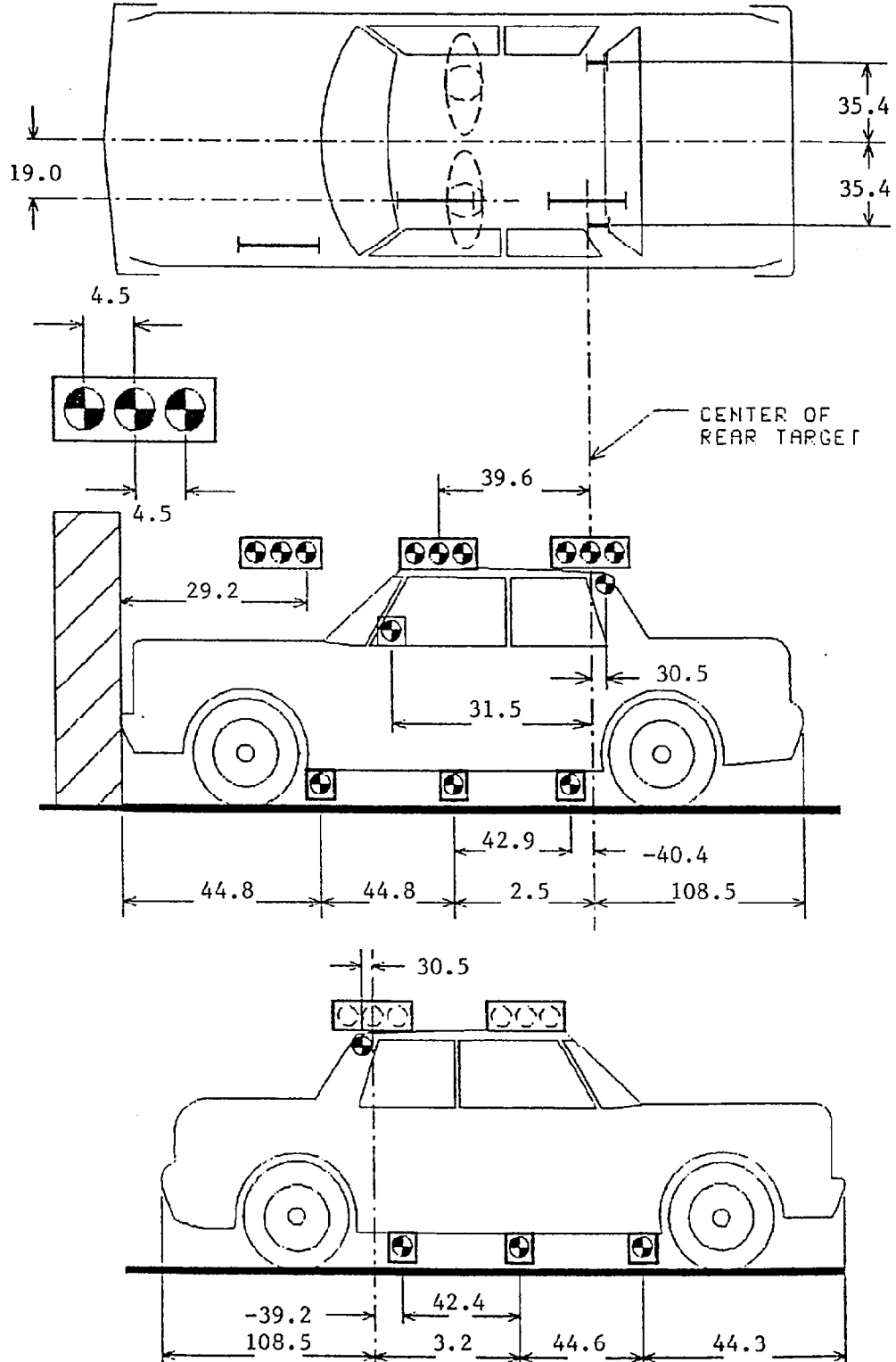
\*\*X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

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

FIGURE 10  
VEHICLE TARGET LOCATIONS



ALL DISTANCE MEASUREMENTS ARE IN INCHES.  
3-9

920316

FIGURE 11

PRE-TEST AND POST-TEST MEASUREMENT POINTS

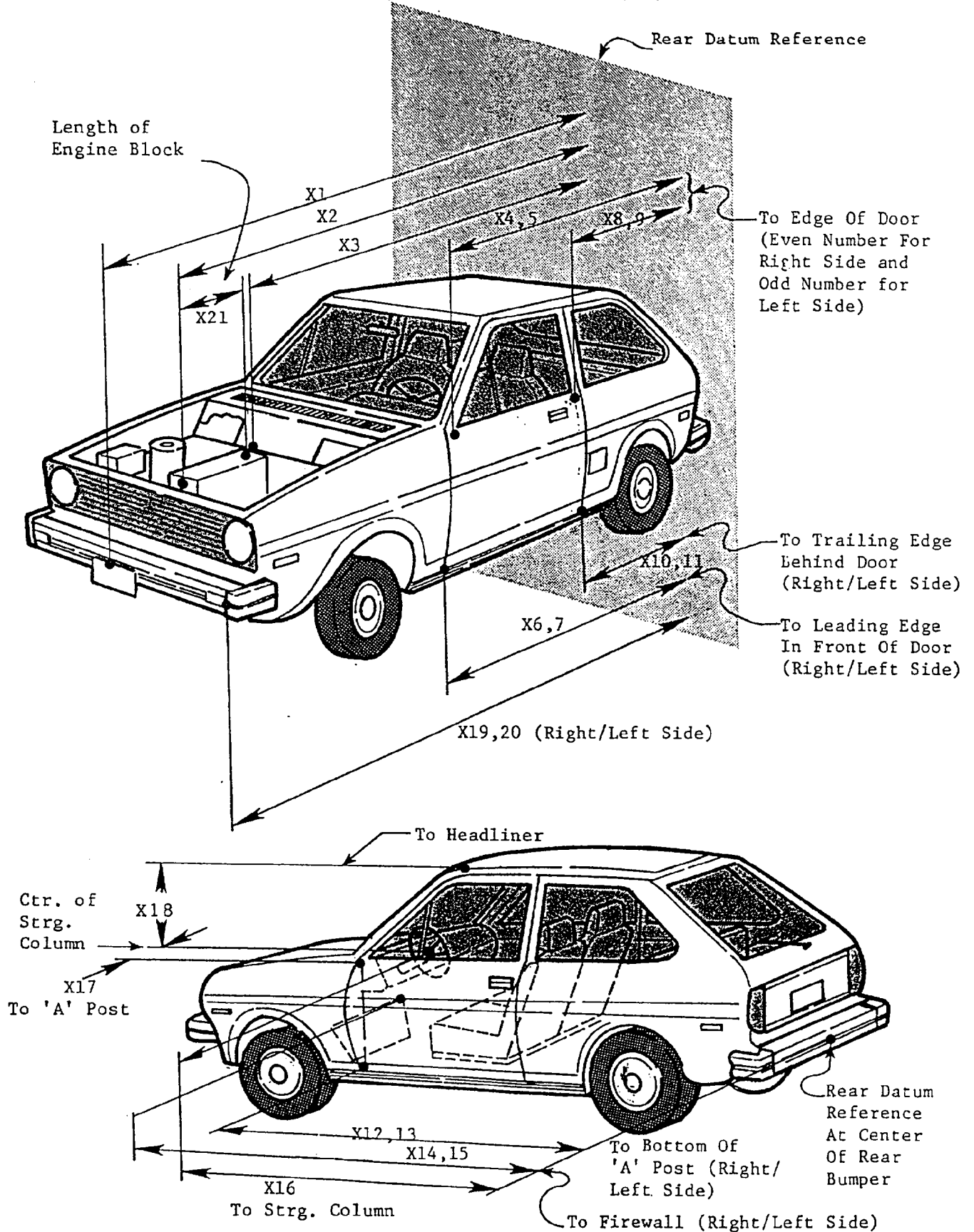


TABLE 12 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Dodge/Ram Wagon

TEST NUMBER: 920316

ALL MEASUREMENTS ARE IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	200.6	182.8	17.8
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	176.8	167.5	9.3
X3	REAR SURFACE OF VEHICLE TO FIREWALL	176.4	170.9	5.5
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	170.5	168.0	2.5
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	170.3	167.2	3.1
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	170.5	167.9	2.6
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	170.6	167.8	2.8
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	130.2	128.2	2.0
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	130.2	128.1	2.1
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	130.4	130.2	0.2
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	130.8	130.4	0.4
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	168.4	165.6	2.8
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	168.2	163.6	4.6
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	173.5	169.8	3.7
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	177.9	171.4	6.5
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	152.5	149.2	3.3
X17	CENTER OF STEERING COLUMN TO "A" POST	13.9	13.2	0.7
X18	CENTER OF STEERING COLUMN TO HEADLINER	20.8	20.2	0.6
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	197.8	181.1	16.7
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	198.1	182.0	16.1
X21	LENGTH OF ENGINE BLOCK	20.5	20.5	0.0

APPENDIX A

PHOTOGRAPHS

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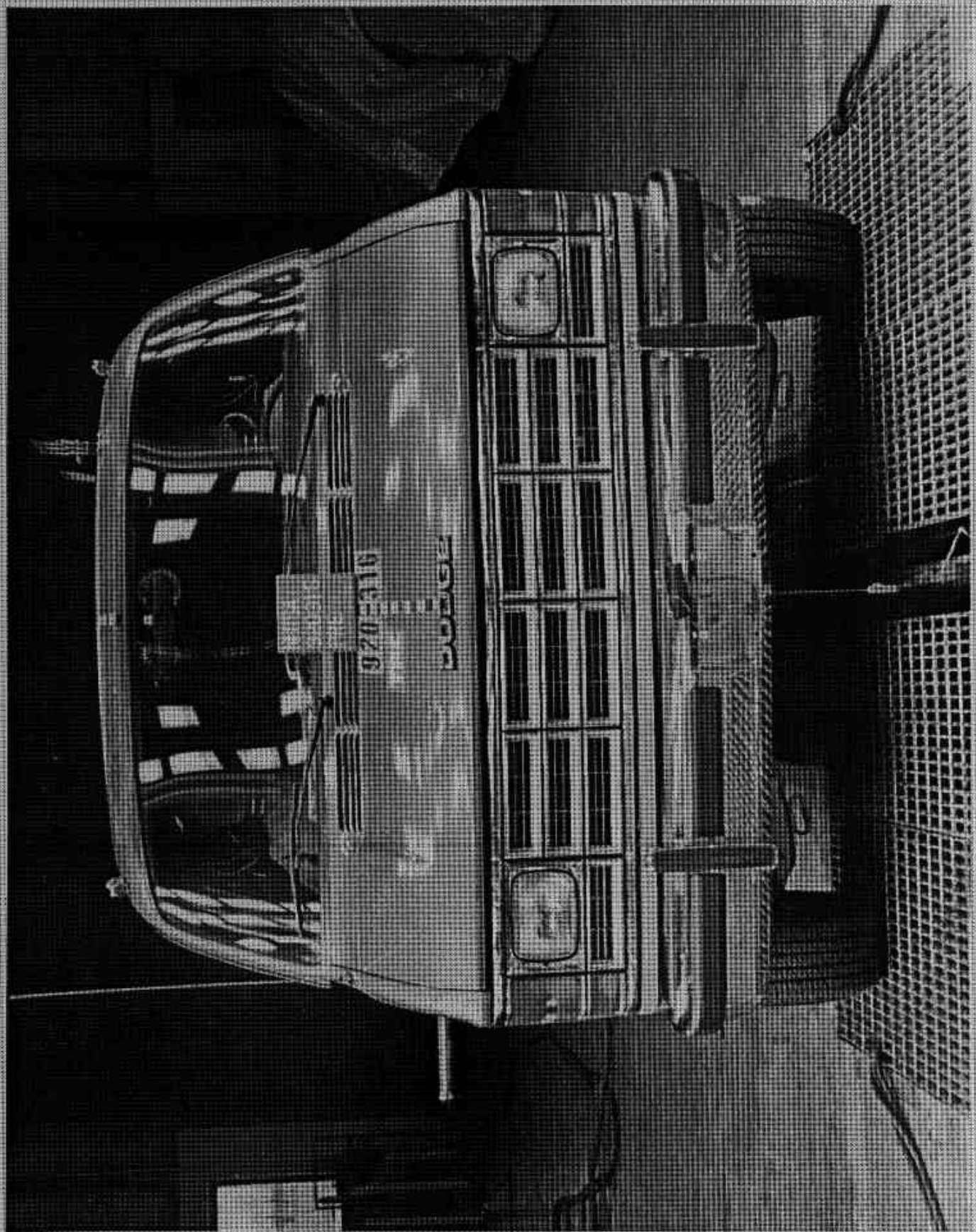


FIGURE A-1. PRE-TEST FRONT VIEW

A-2

920316

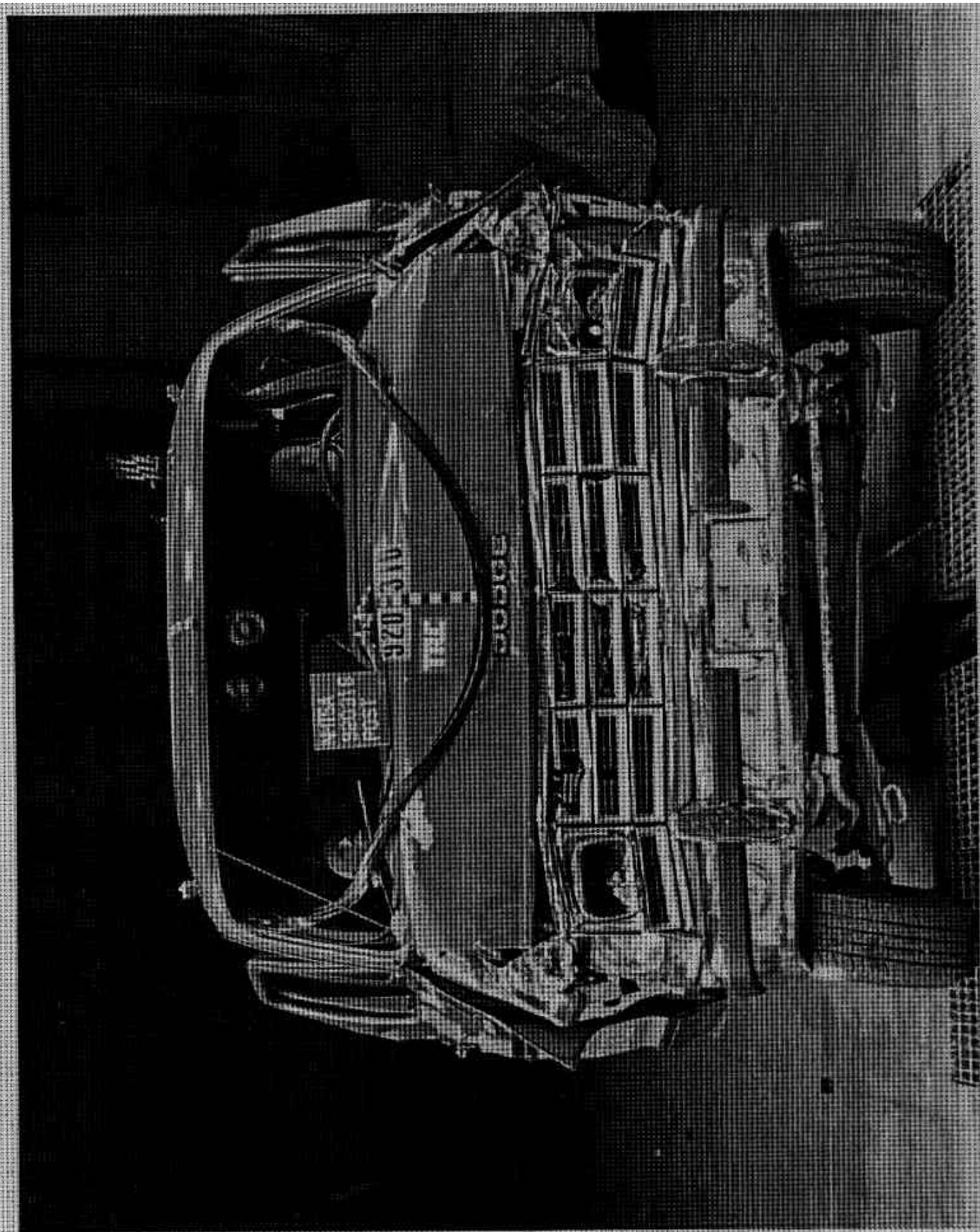


FIGURE A-2. POST-TEST FRONT VIEW

A-3

920316

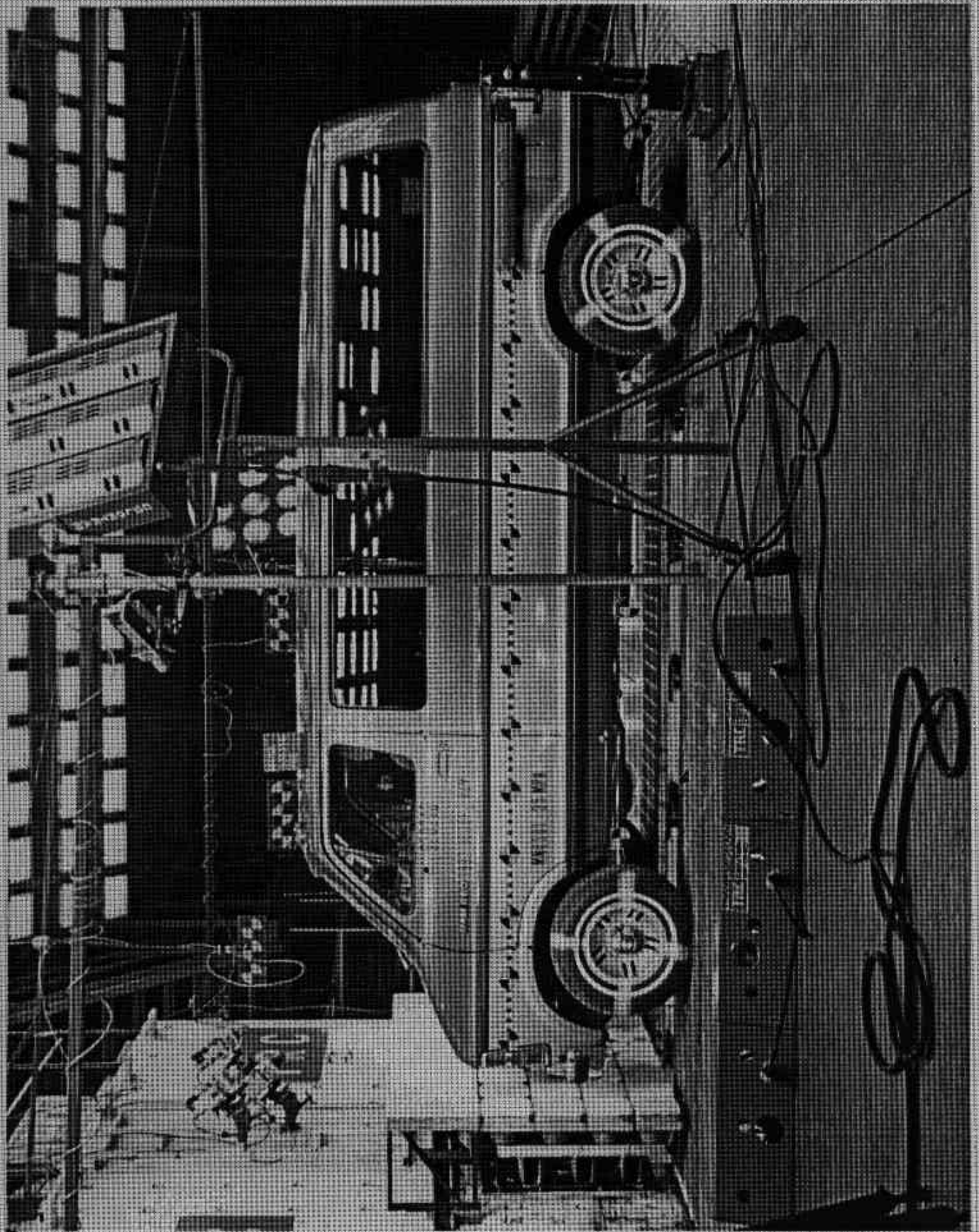


FIGURE A-3. PRE-TEST LEFT SIDE VIEW

A-4

920316

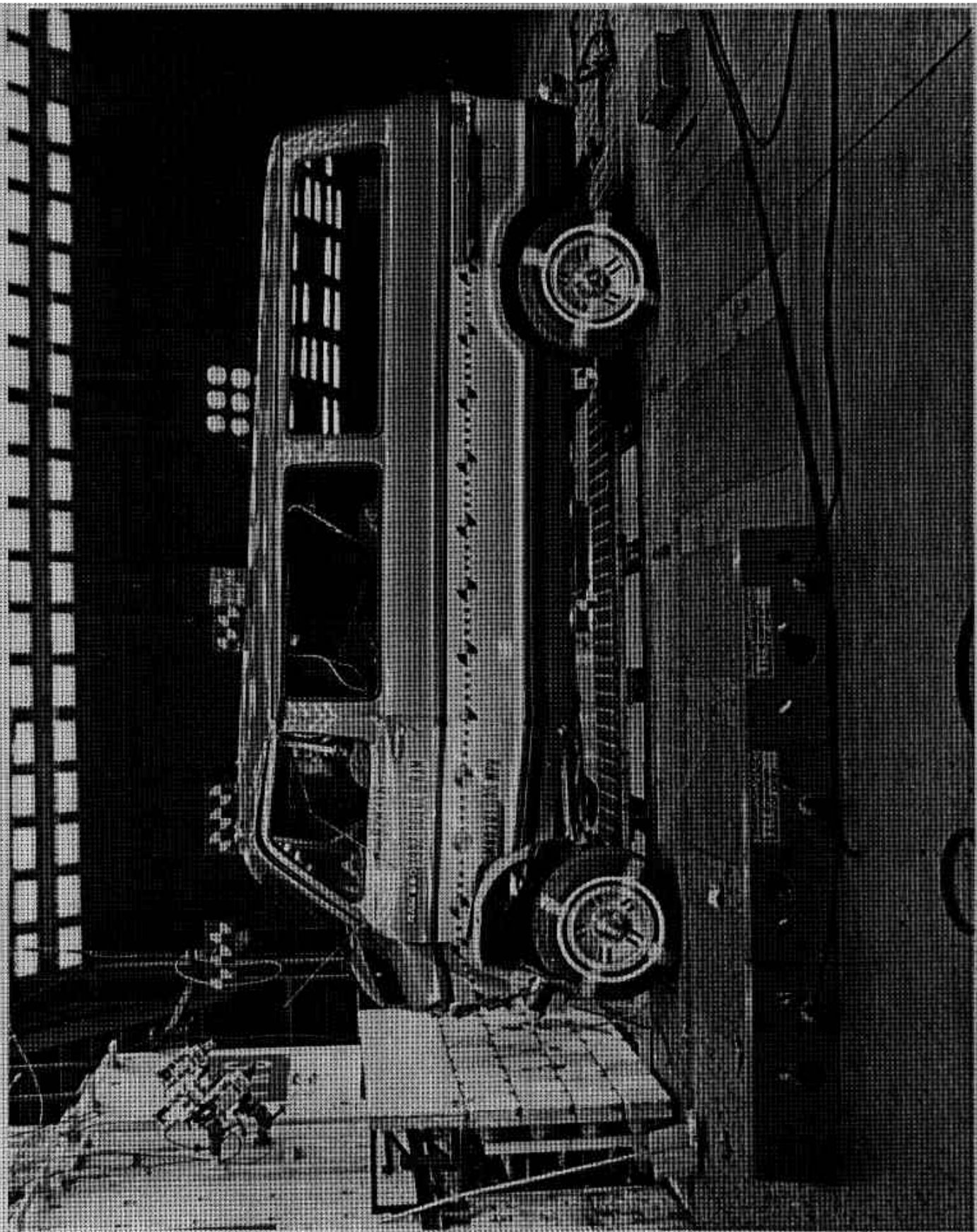


FIGURE A-4. POST-TEST LEFT SIDE VIEW  
A-5

920316

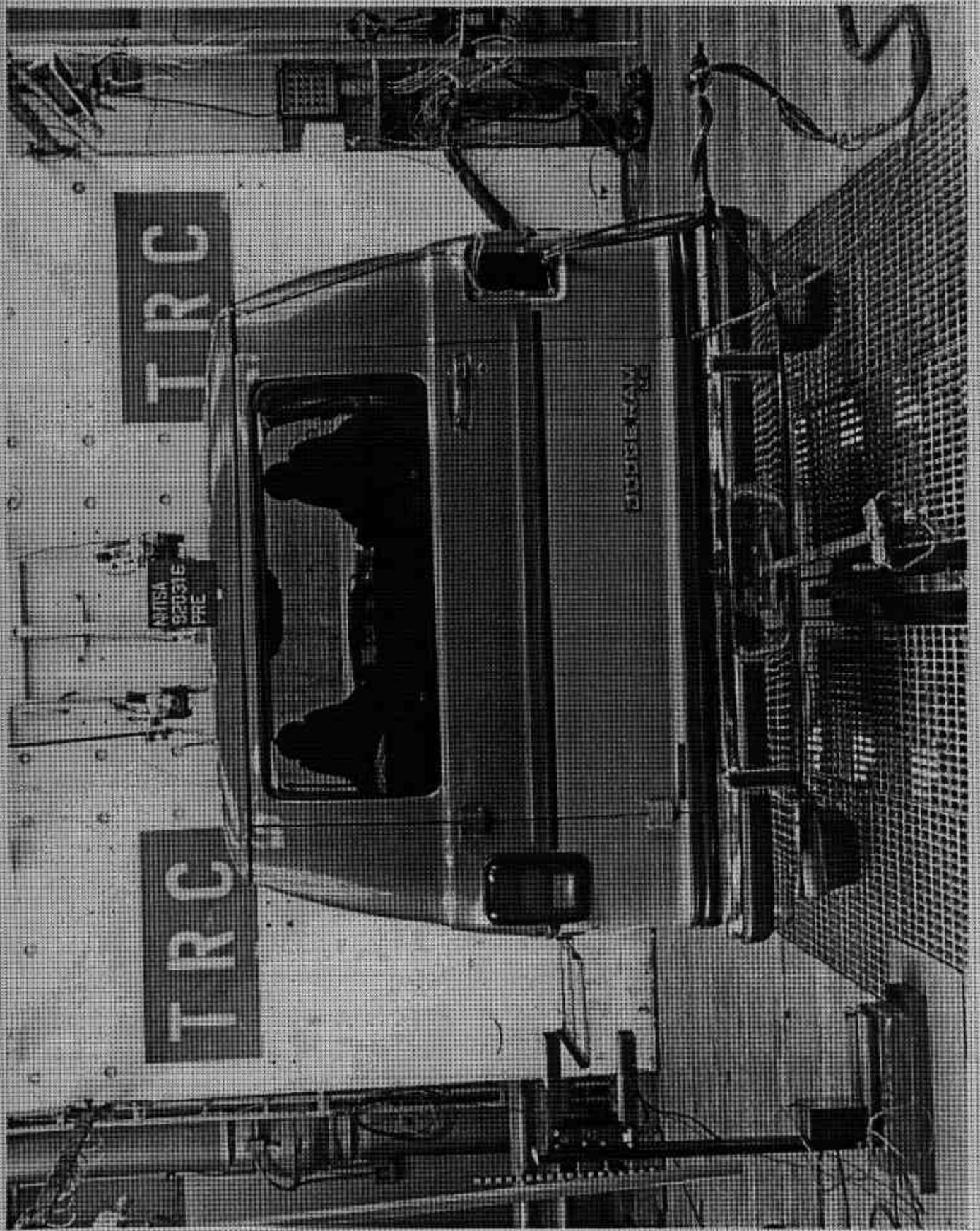


FIGURE A-5. PRE-TEST REAR VIEW

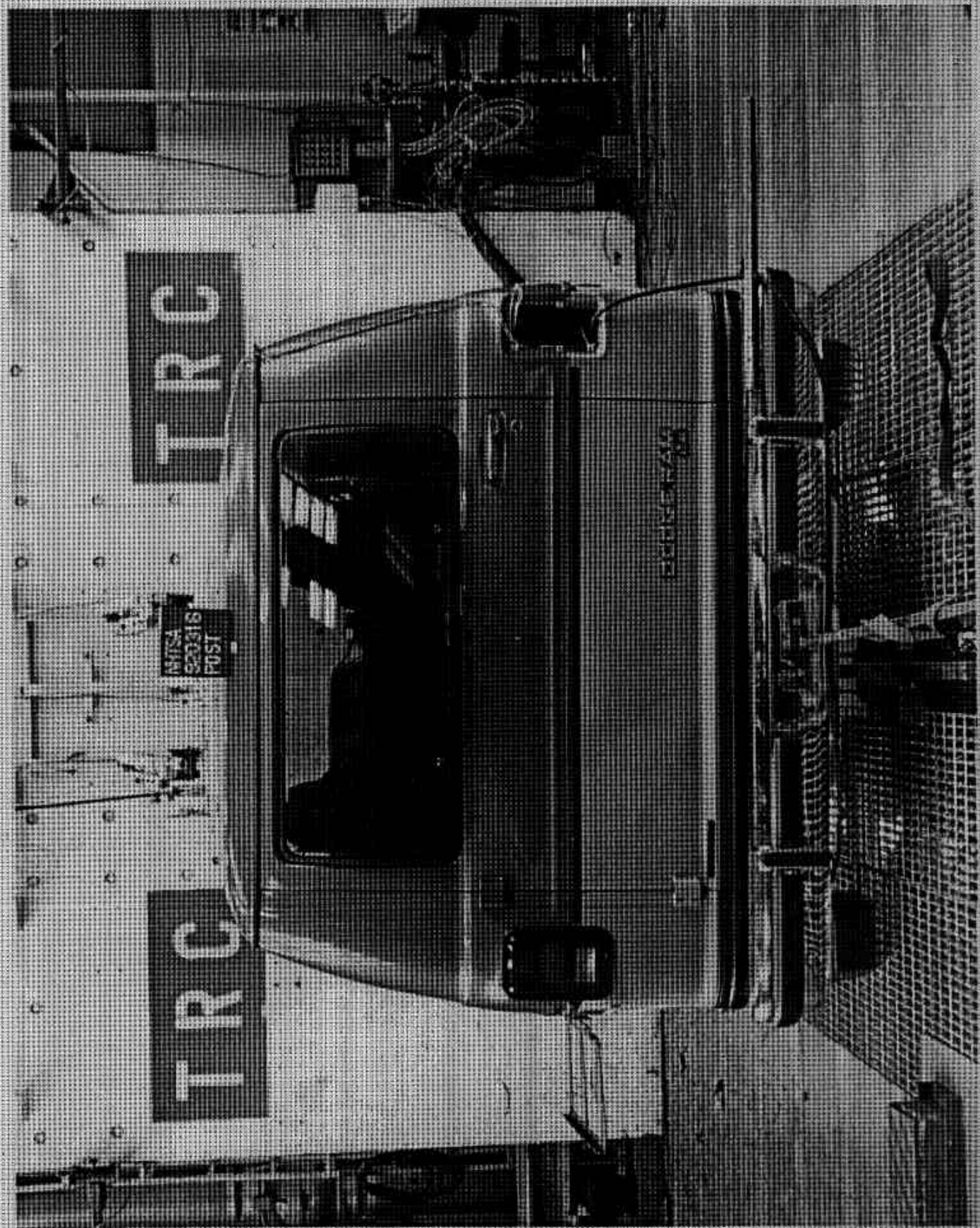


FIGURE A-6. POST-TEST REAR VIEW

A-7

920316

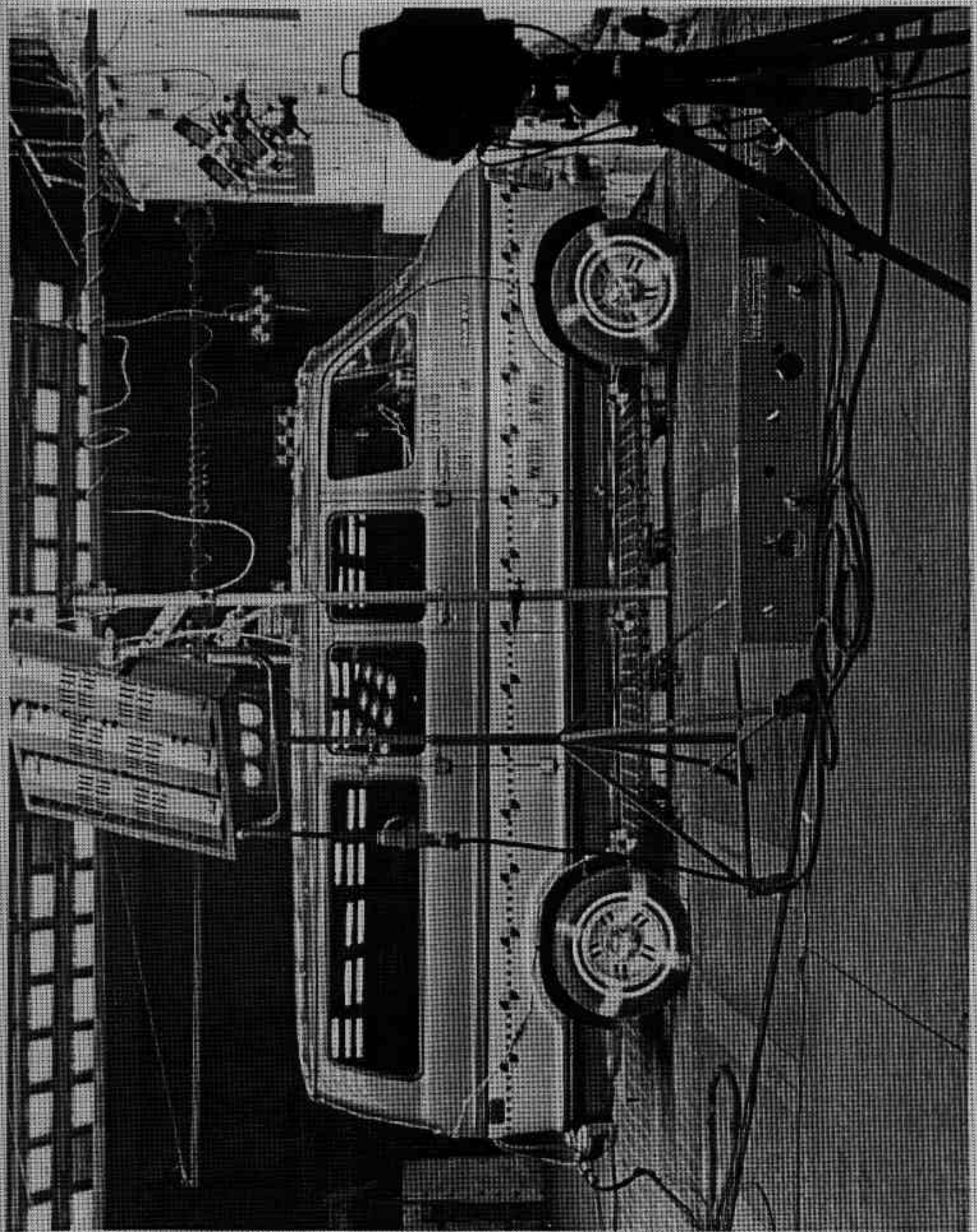


FIGURE A-7. PRE-TEST RIGHT SIDE VIEW

A-8

920316

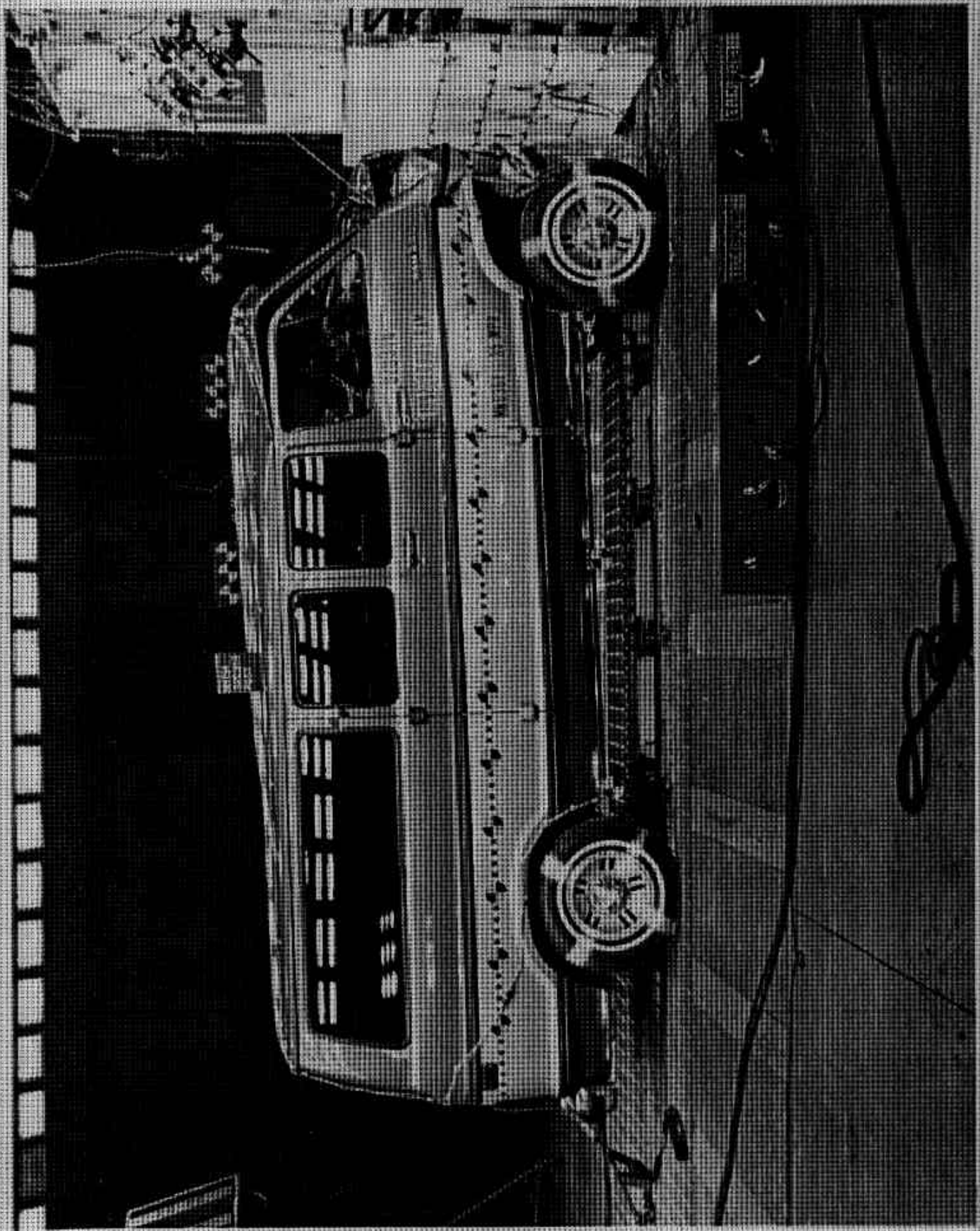


FIGURE A-8. POST-TEST RIGHT SIDE VIEW  
A-9

920316

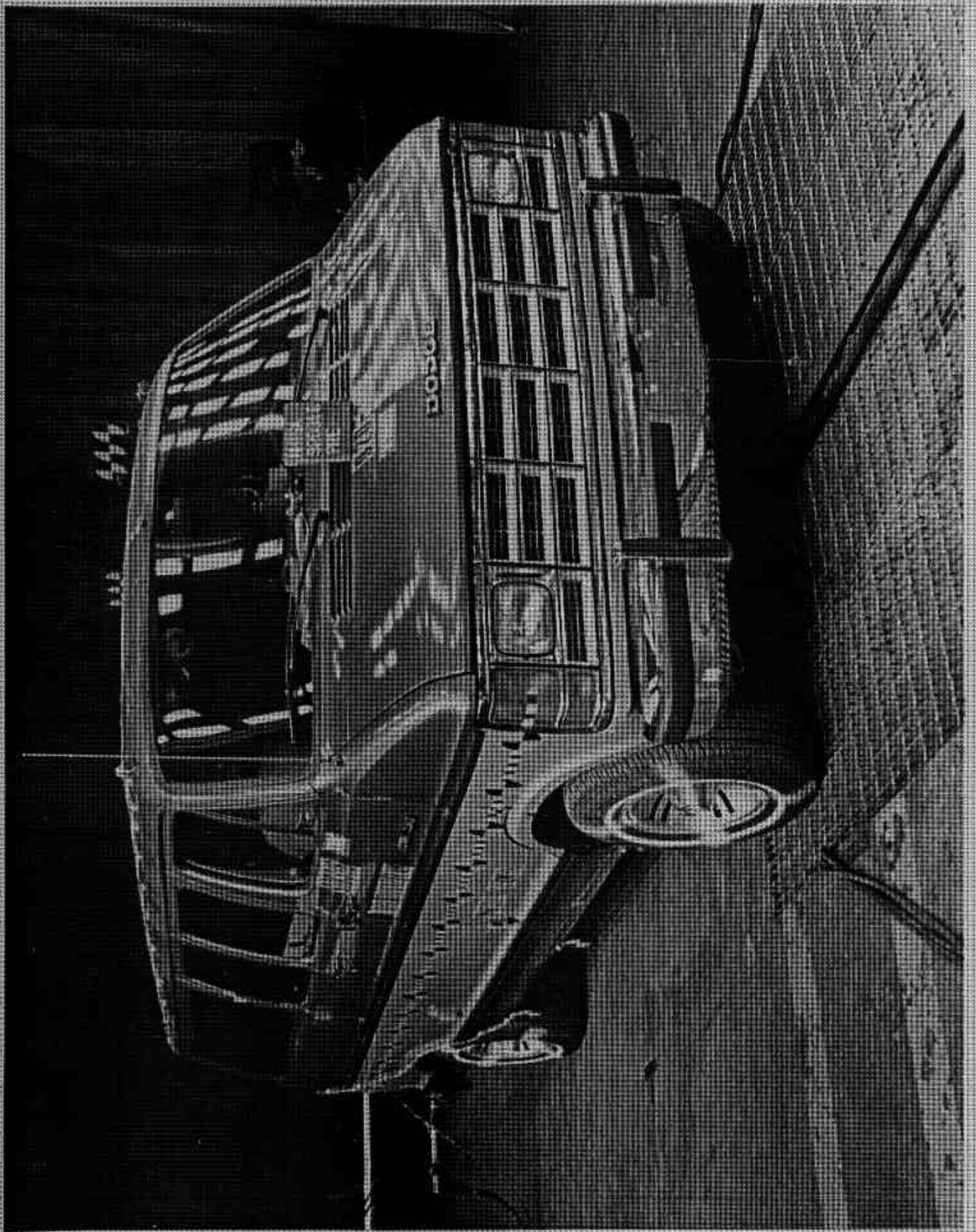


FIGURE A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

920316

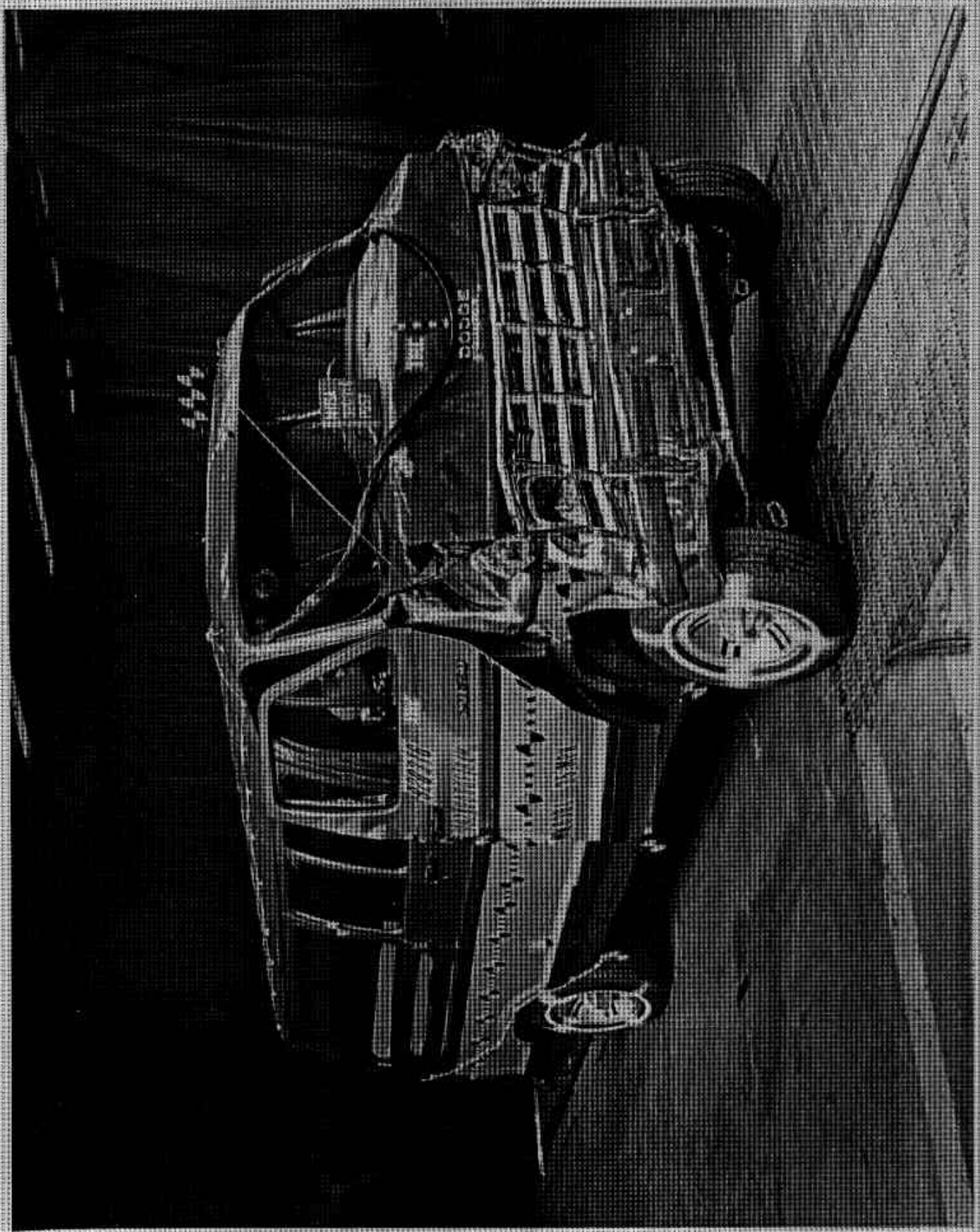


FIGURE A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

920316

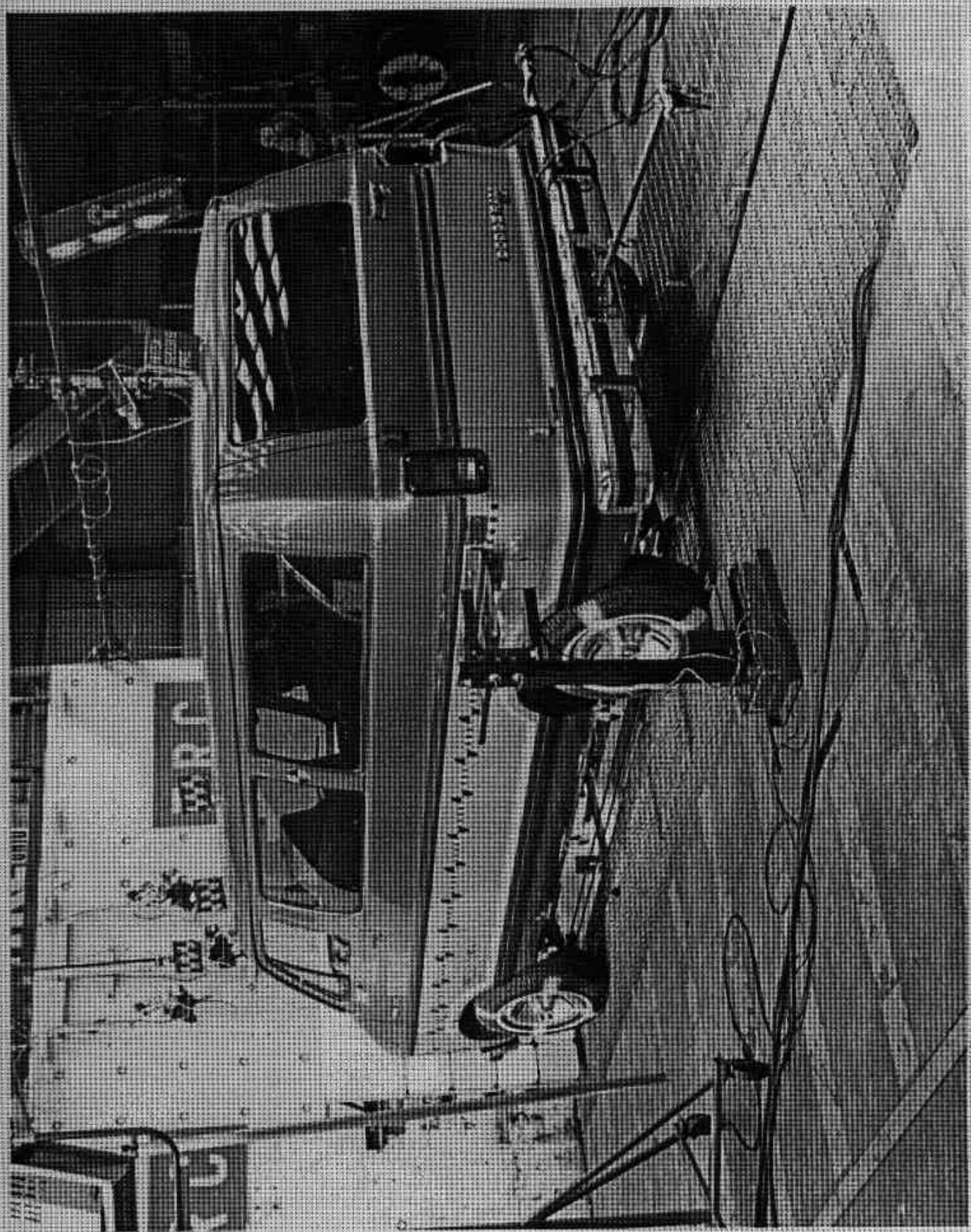


FIGURE A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW  
A-12

920316

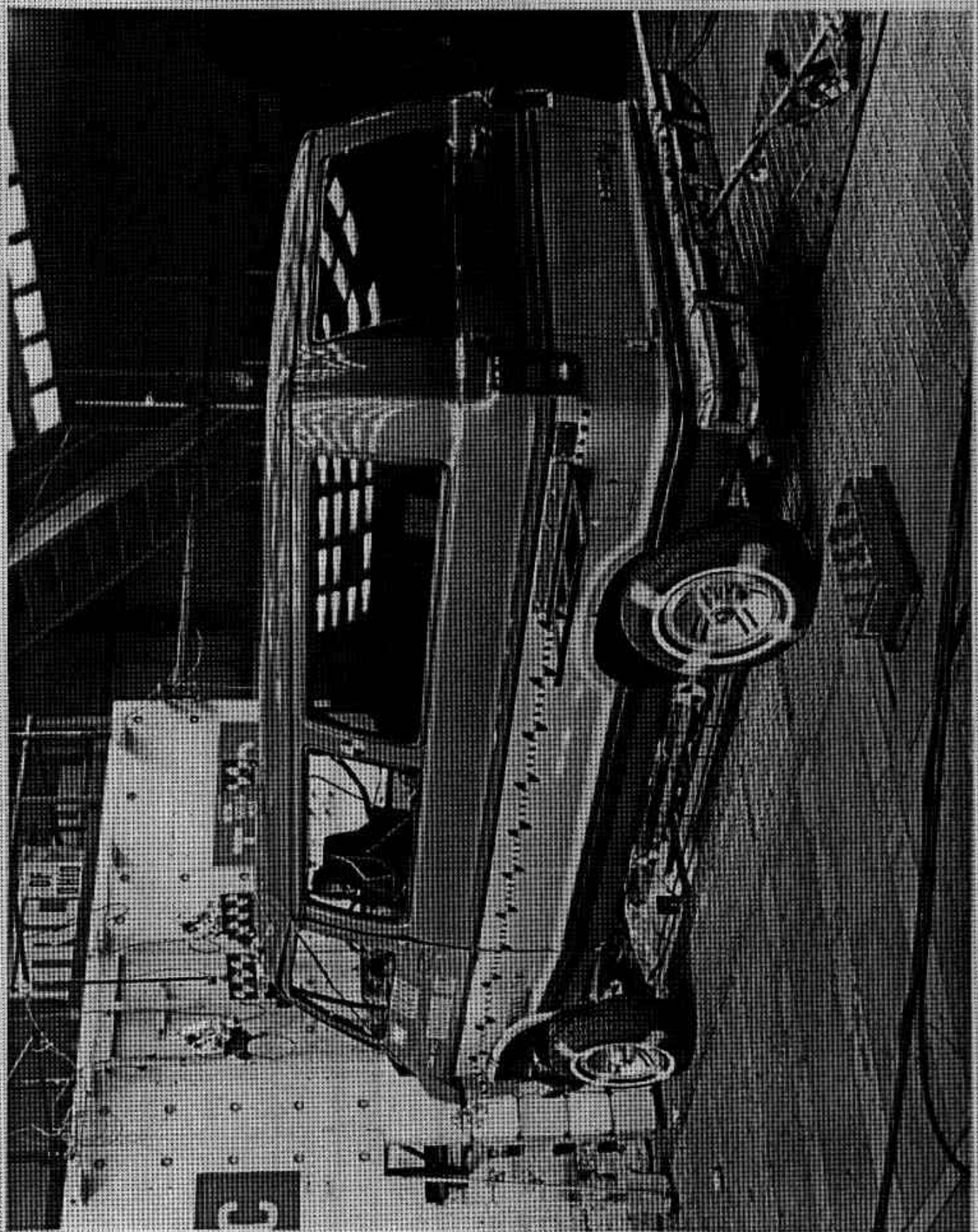


FIGURE A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

A-13

920316

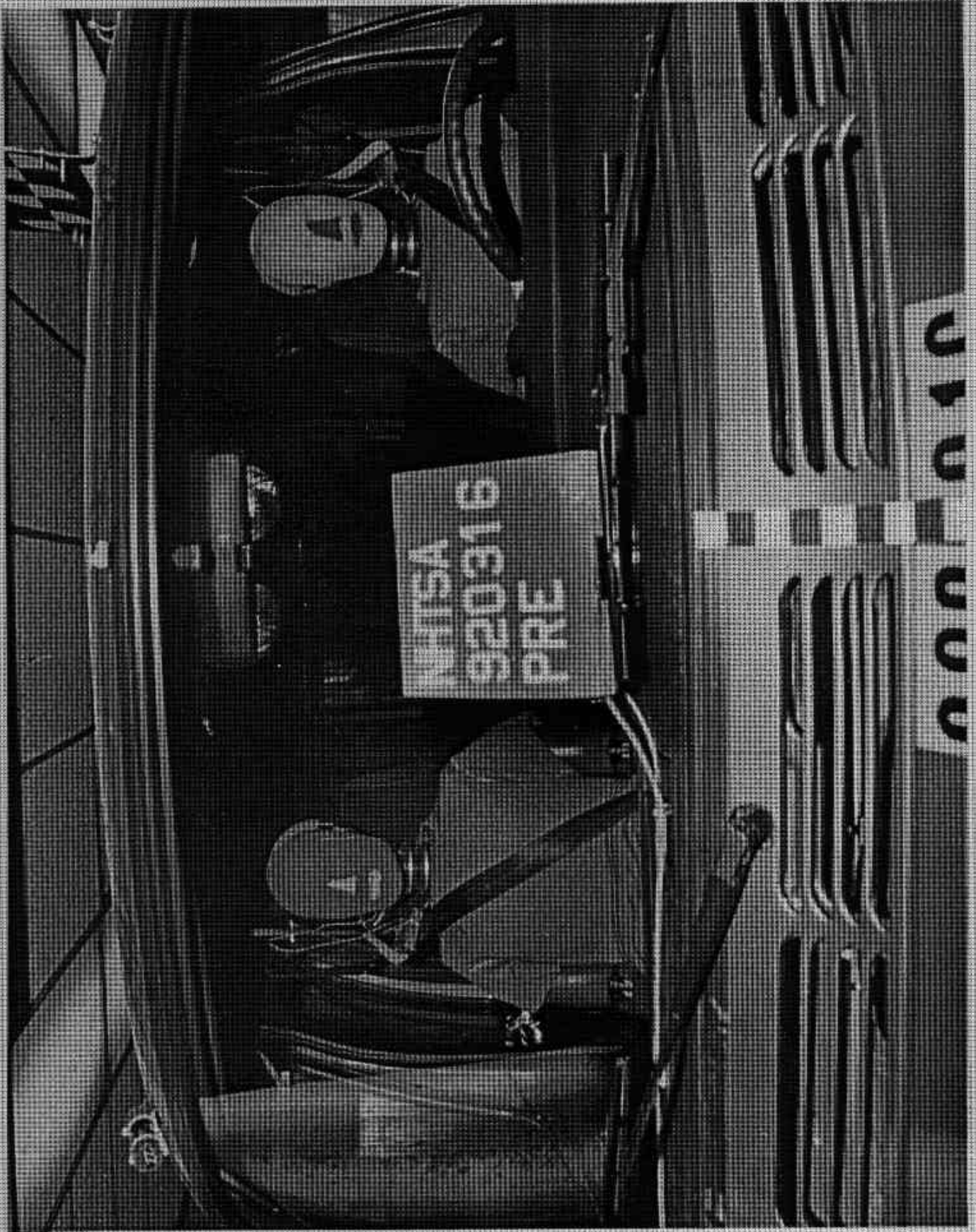


FIGURE A-13. PRE-TEST WINDSHIELD VIEW  
A-14

920316

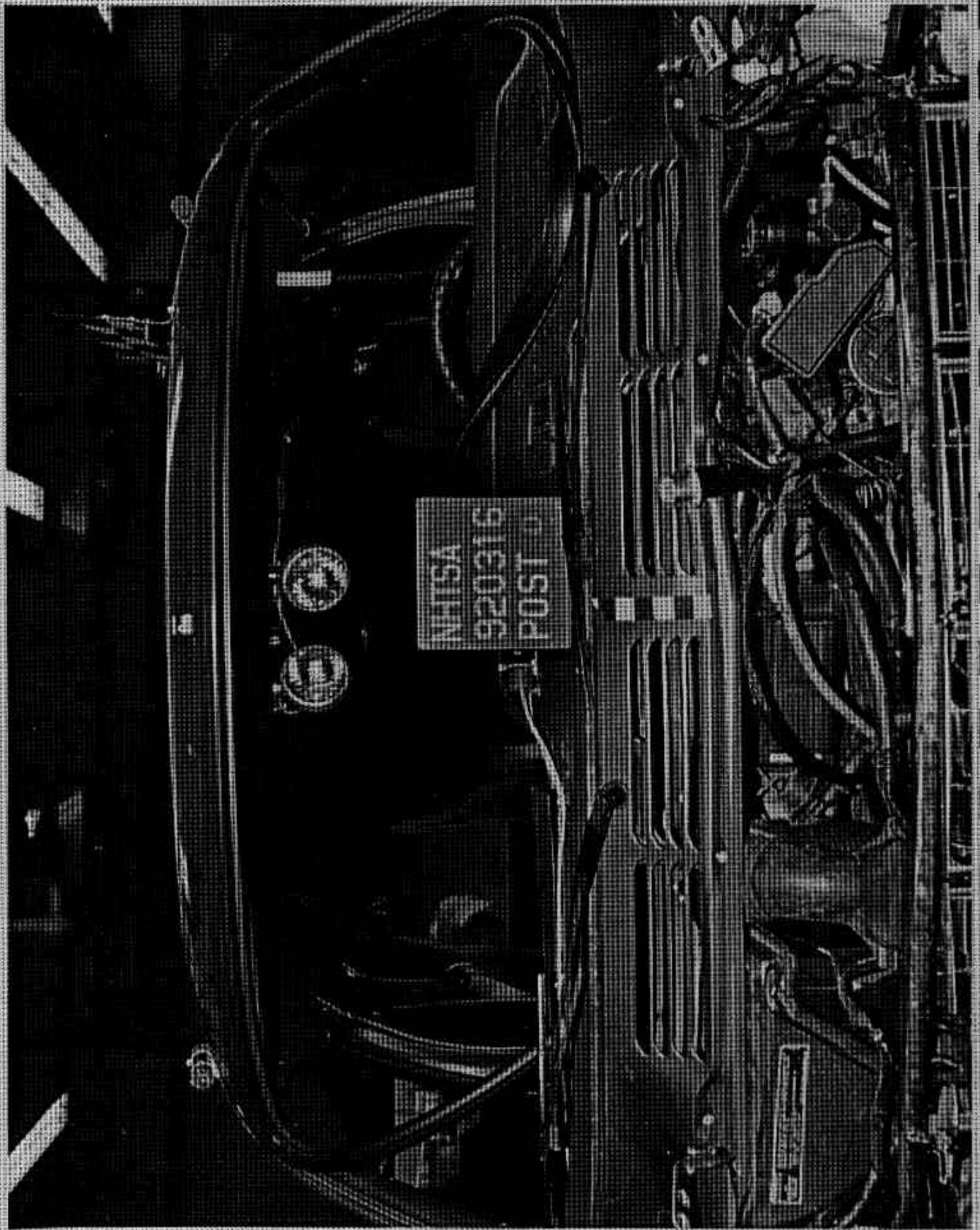


FIGURE A-14. POST-TEST WINDSHIELD - VIEW 1

A-15

920316



FIGURE A-15. POST-TEST WINDSHIELD - VIEW 2

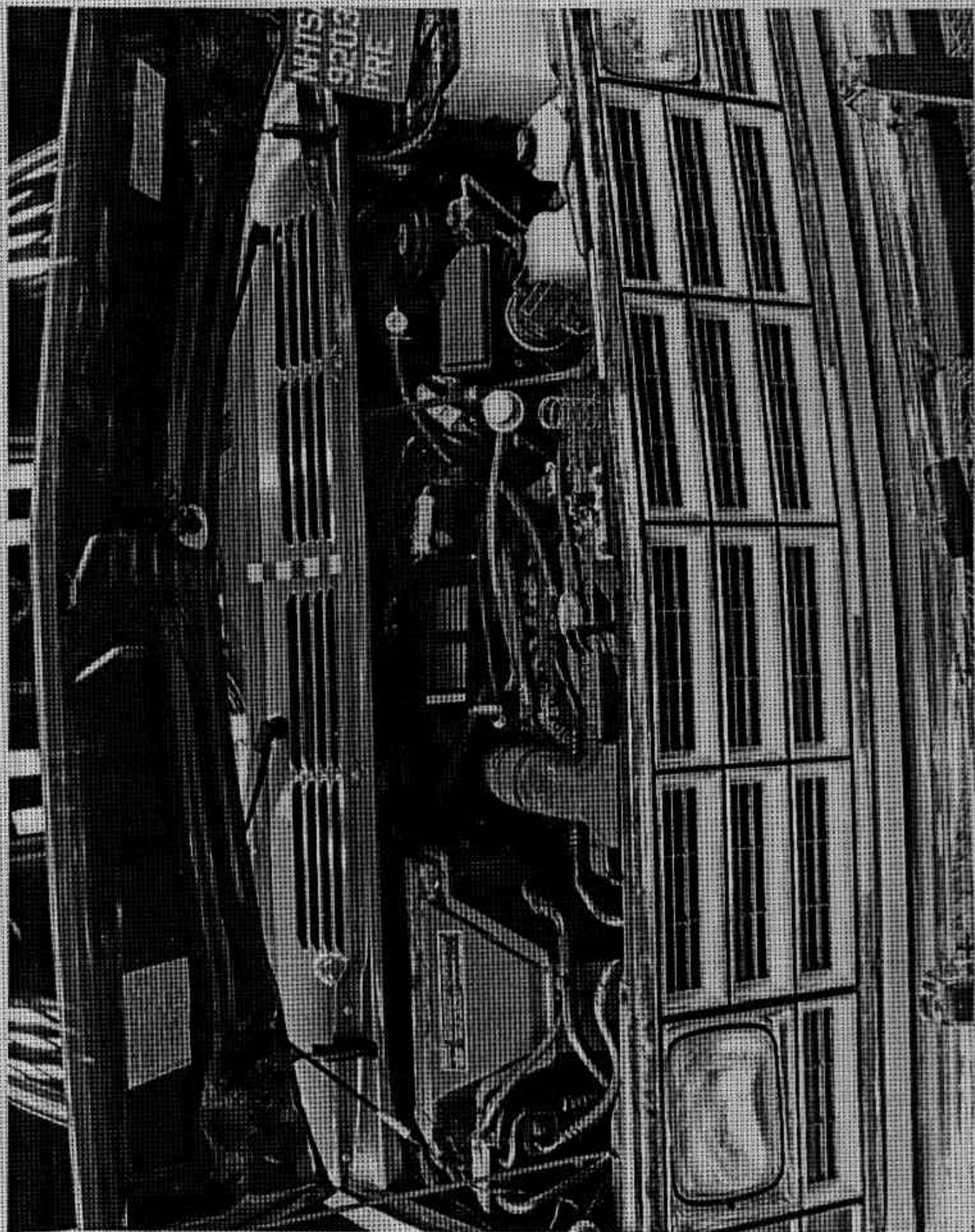


FIGURE A-16. PRE-TEST ENGINE COMPARTMENT VIEW  
A-17

920316

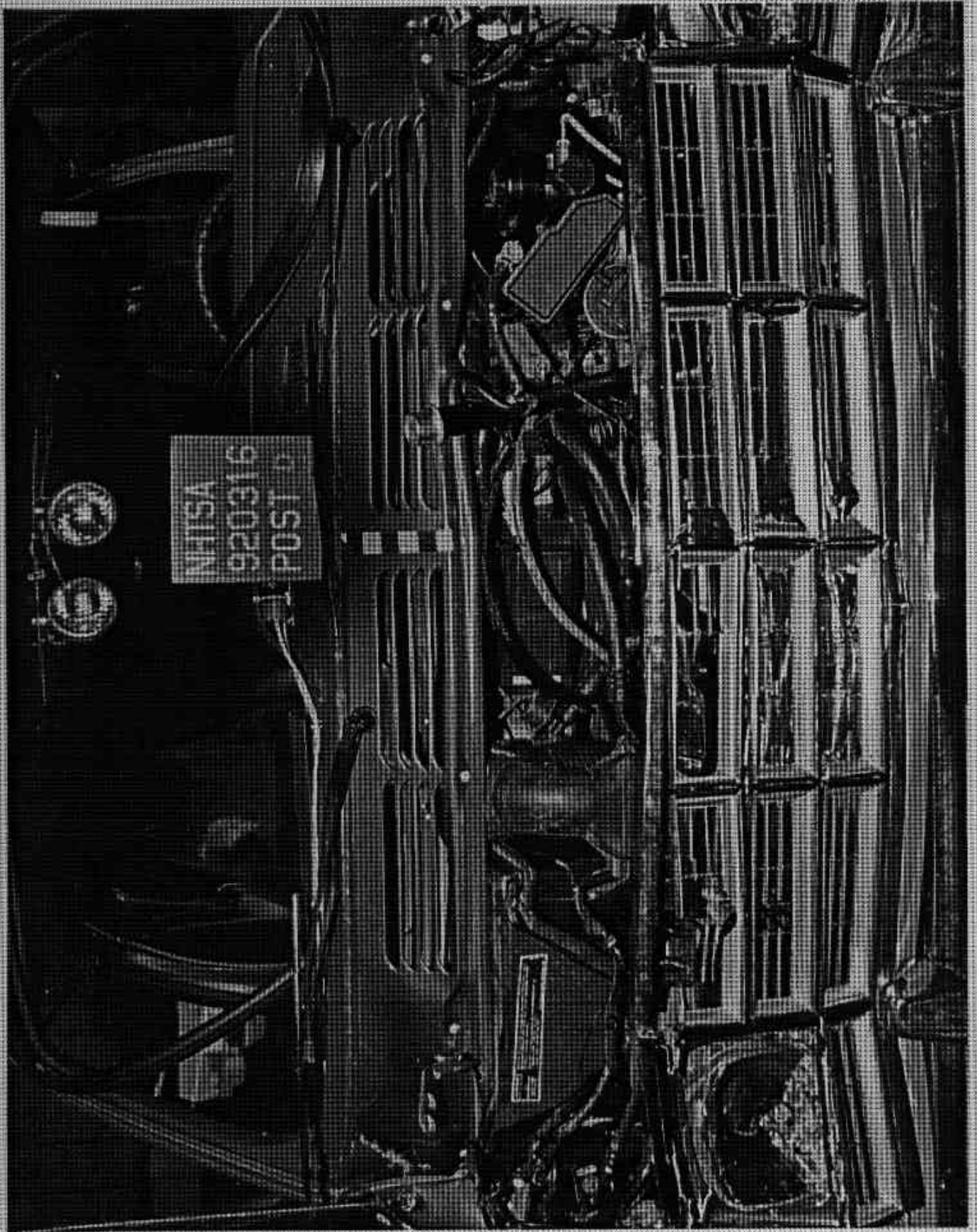


FIGURE A-17. POST-TEST ENGINE COMPARTMENT VIEW

A-18

920316

NHTSA  
920316  
PRE

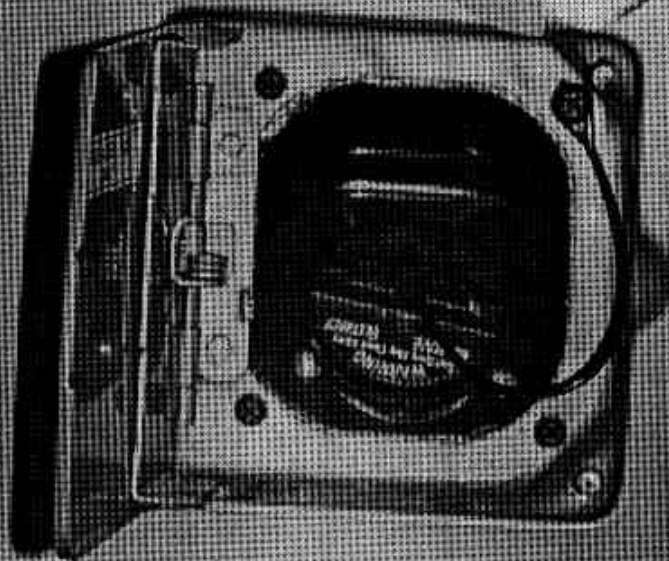


FIGURE A-18. PRE-TEST FUEL FILLER CAP VIEW  
A-19

920316

NHTSA  
920316  
POST

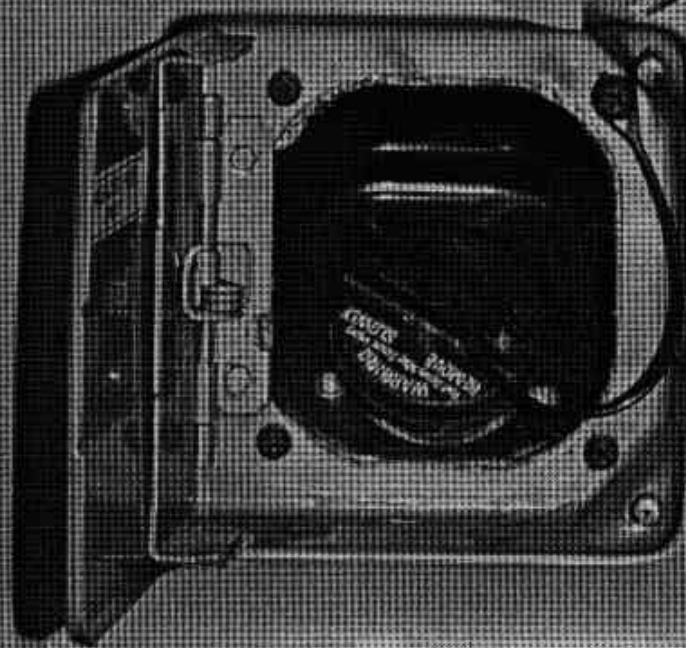


FIGURE A-19. POST-TEST FUEL FILLER CAP VIEW

A-20

920316

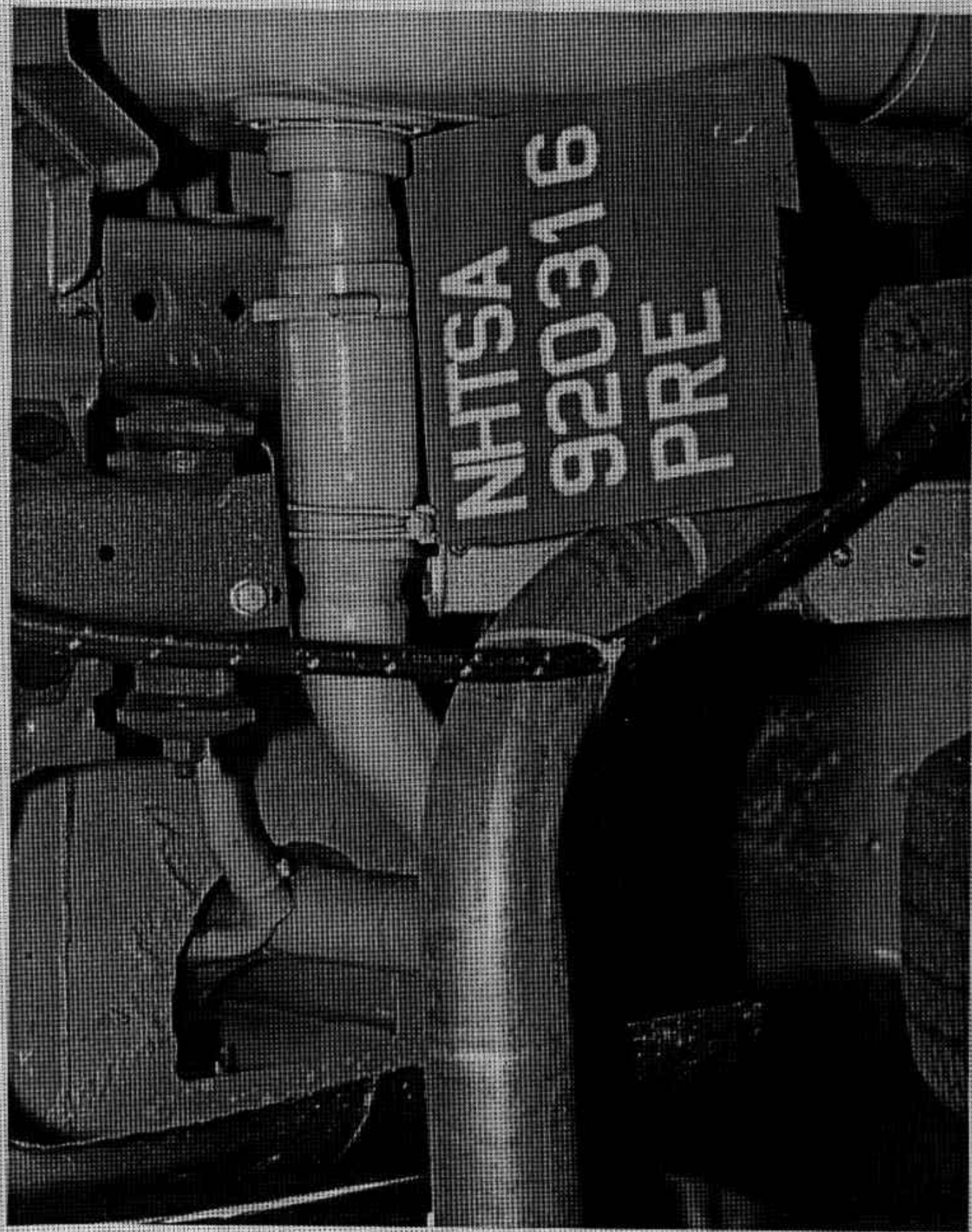


FIGURE A-20. PRE-TEST FUEL FILLER NECK VIEW

A-21

920316

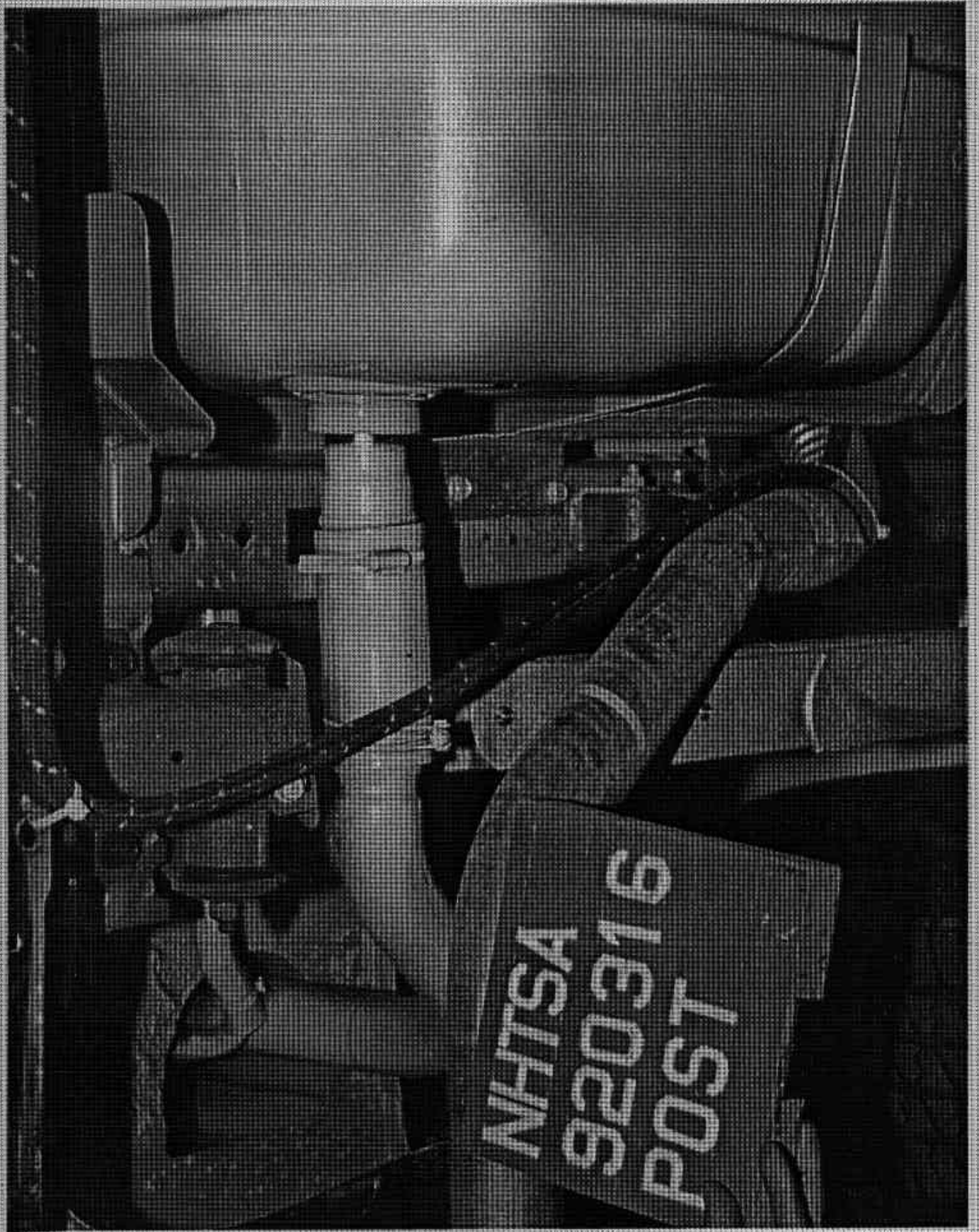


FIGURE A-21. POST-TEST FUEL FILLER NECK VIEW

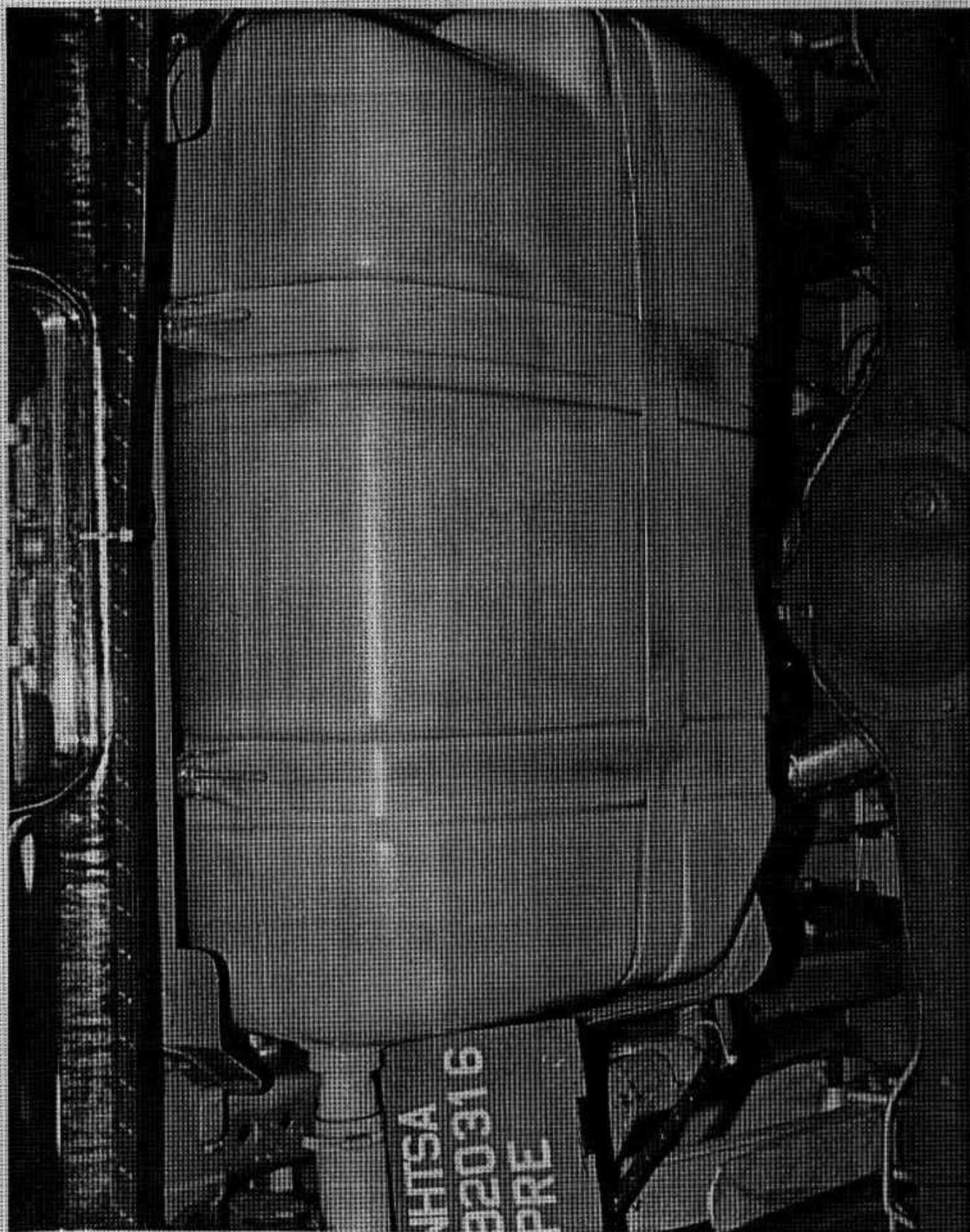


FIGURE A-22. PRE-TEST FUEL TANK VIEW  
A-23

920316

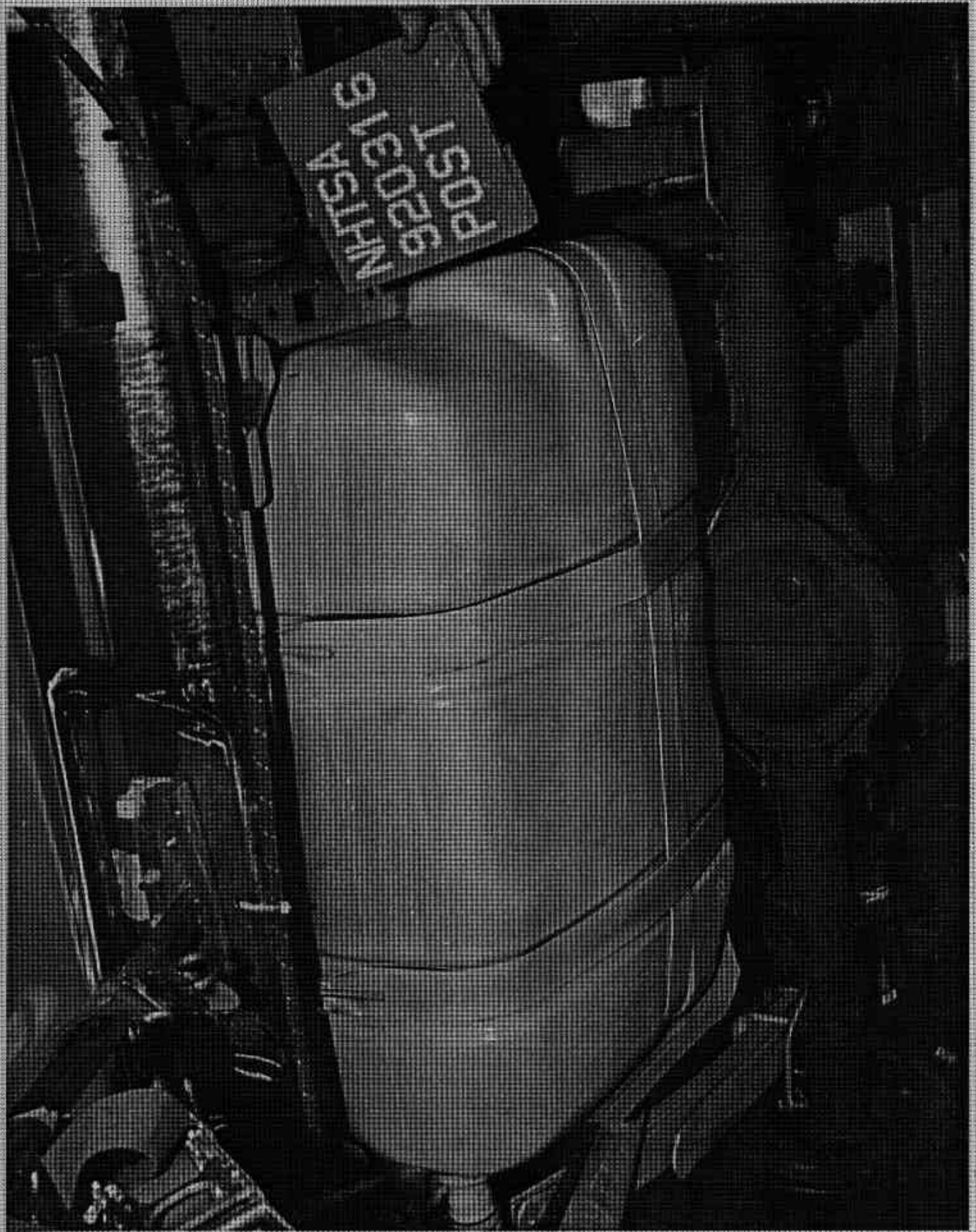


FIGURE A-23. POST-TEST FUEL TANK VIEW

A-24

920316

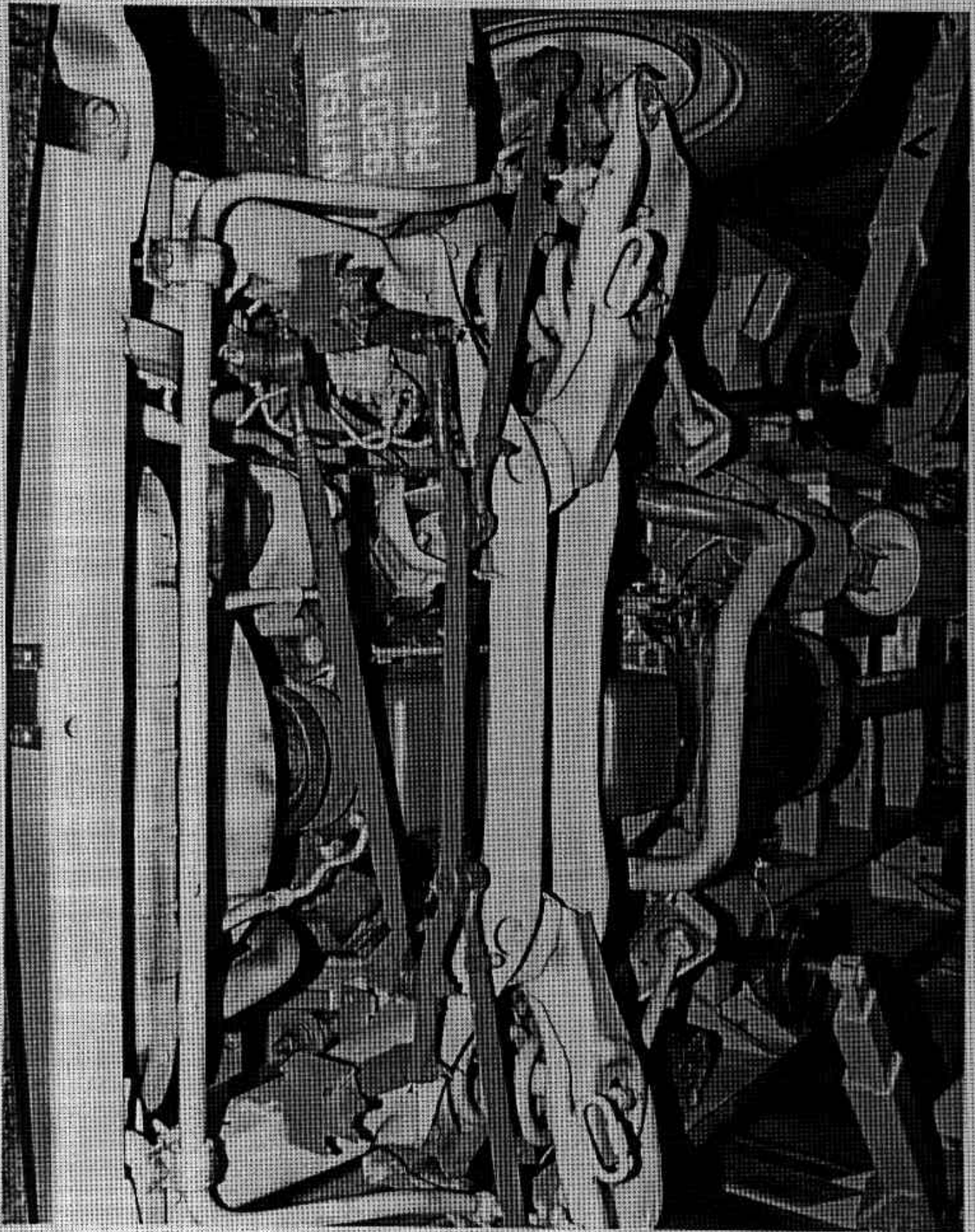


FIGURE A-24. PRE-TEST FRONT UNDERBODY VIEW  
A-25

920316



FIGURE A-25. POST-TEST FRONT UNDERBODY VIEW

A-26

920316

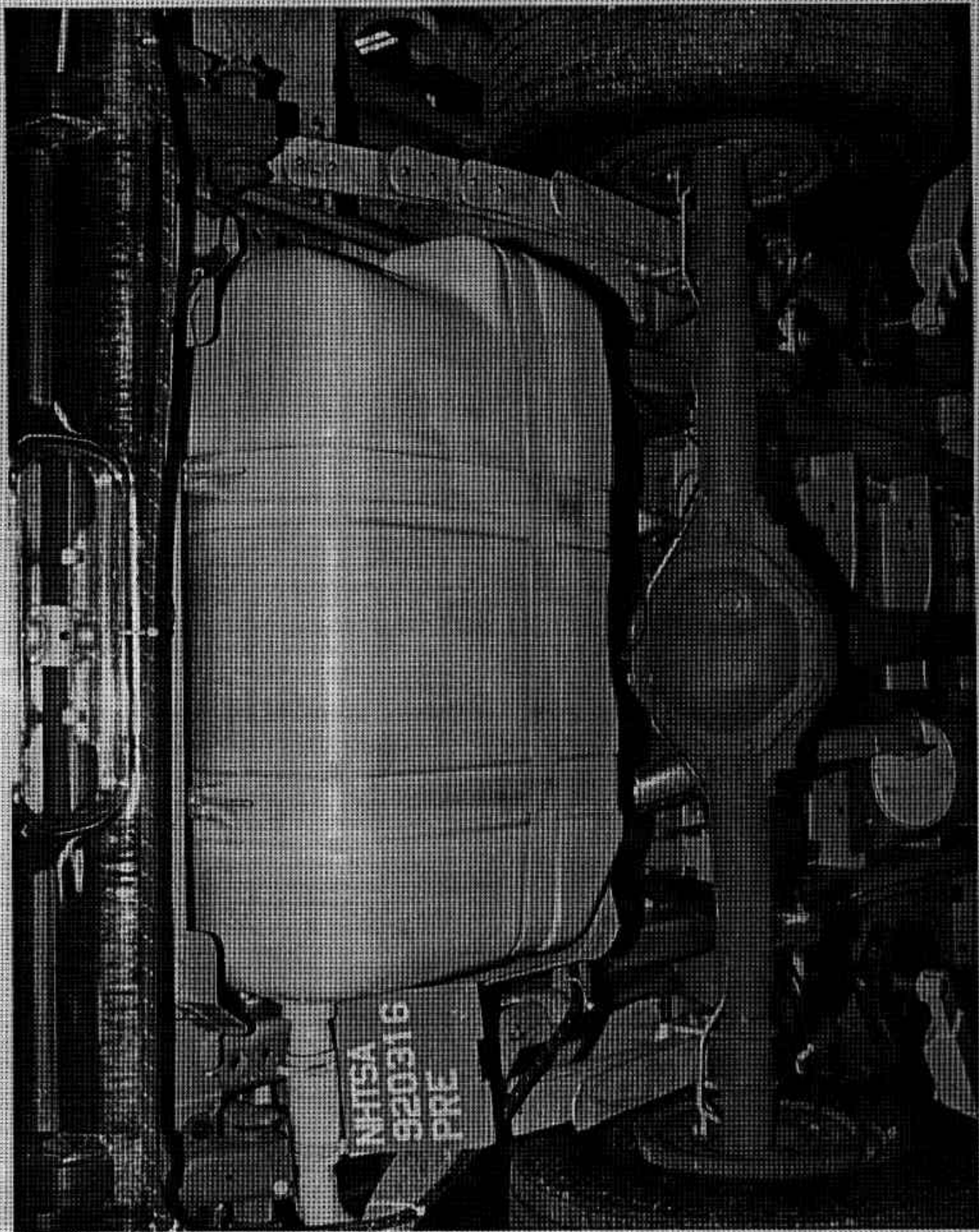


FIGURE A-26. PRE-TEST REAR UNDERBODY VIEW

A-27

920316

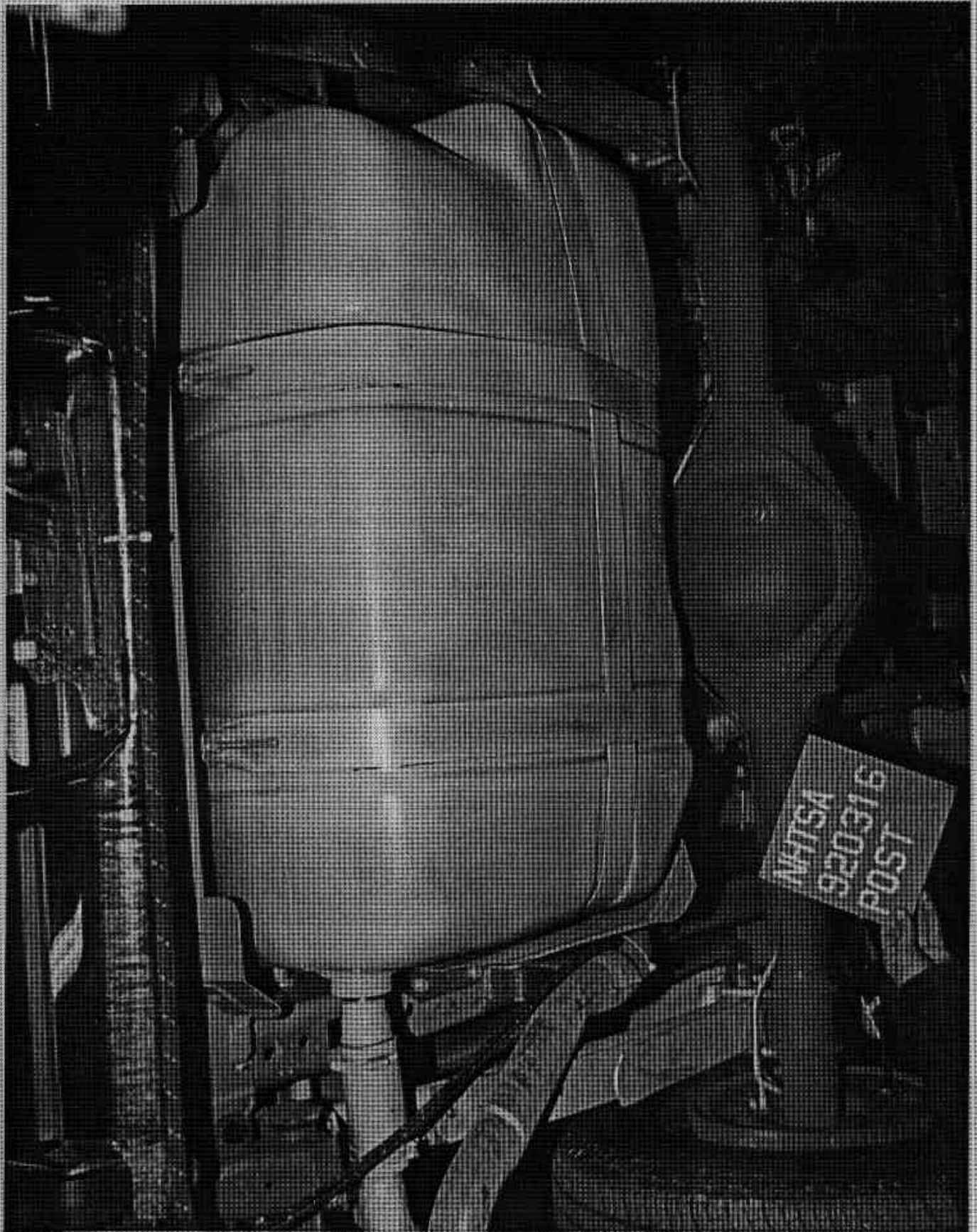


FIGURE A-27. POST-TEST REAR UNDERBODY VIEW

A-28

920316

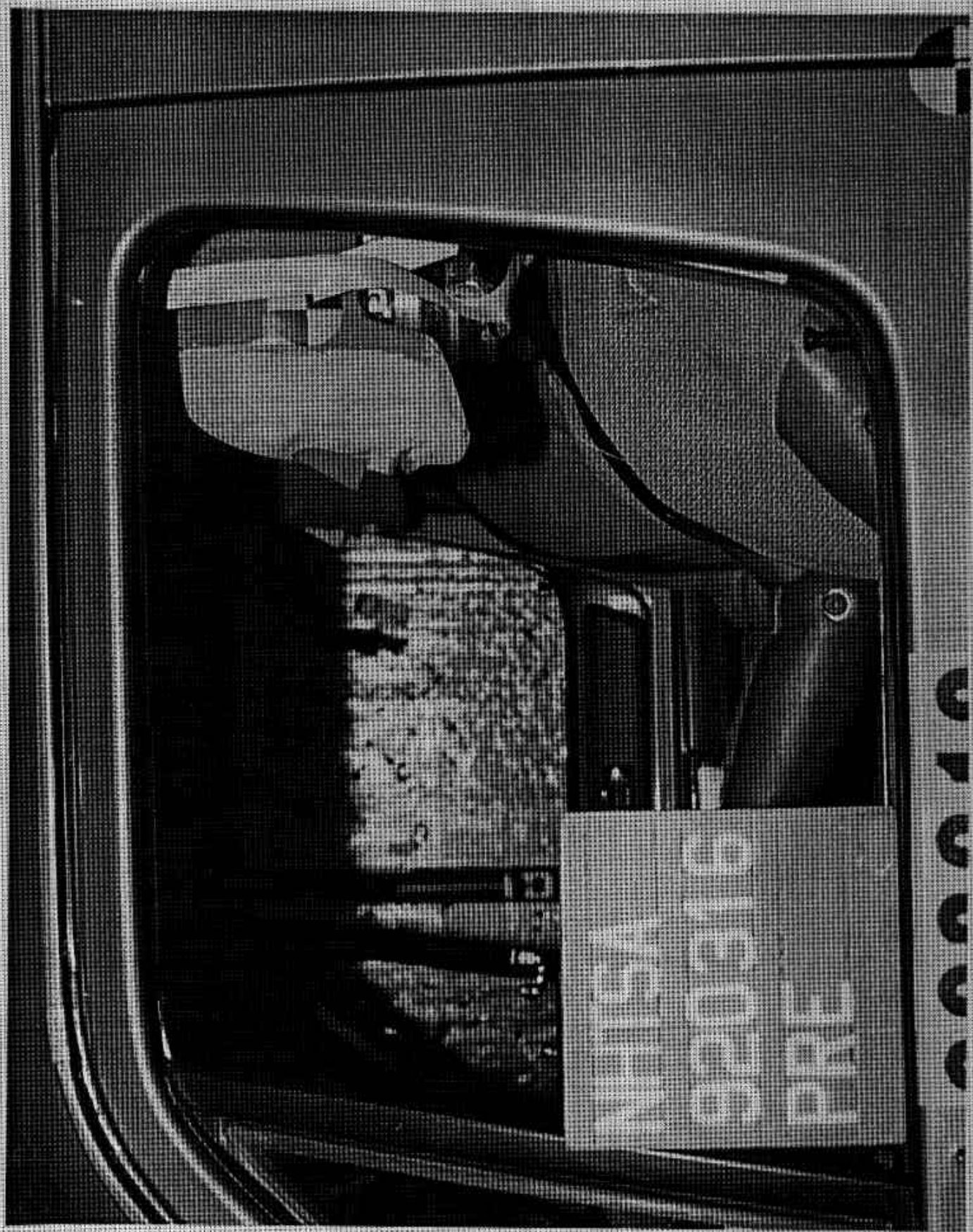


FIGURE A-28. PRE-TEST DRIVER DUMMY POSITION VIEW

A-29

920316



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

A-30

920316



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

920316



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



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

A-33

920316



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

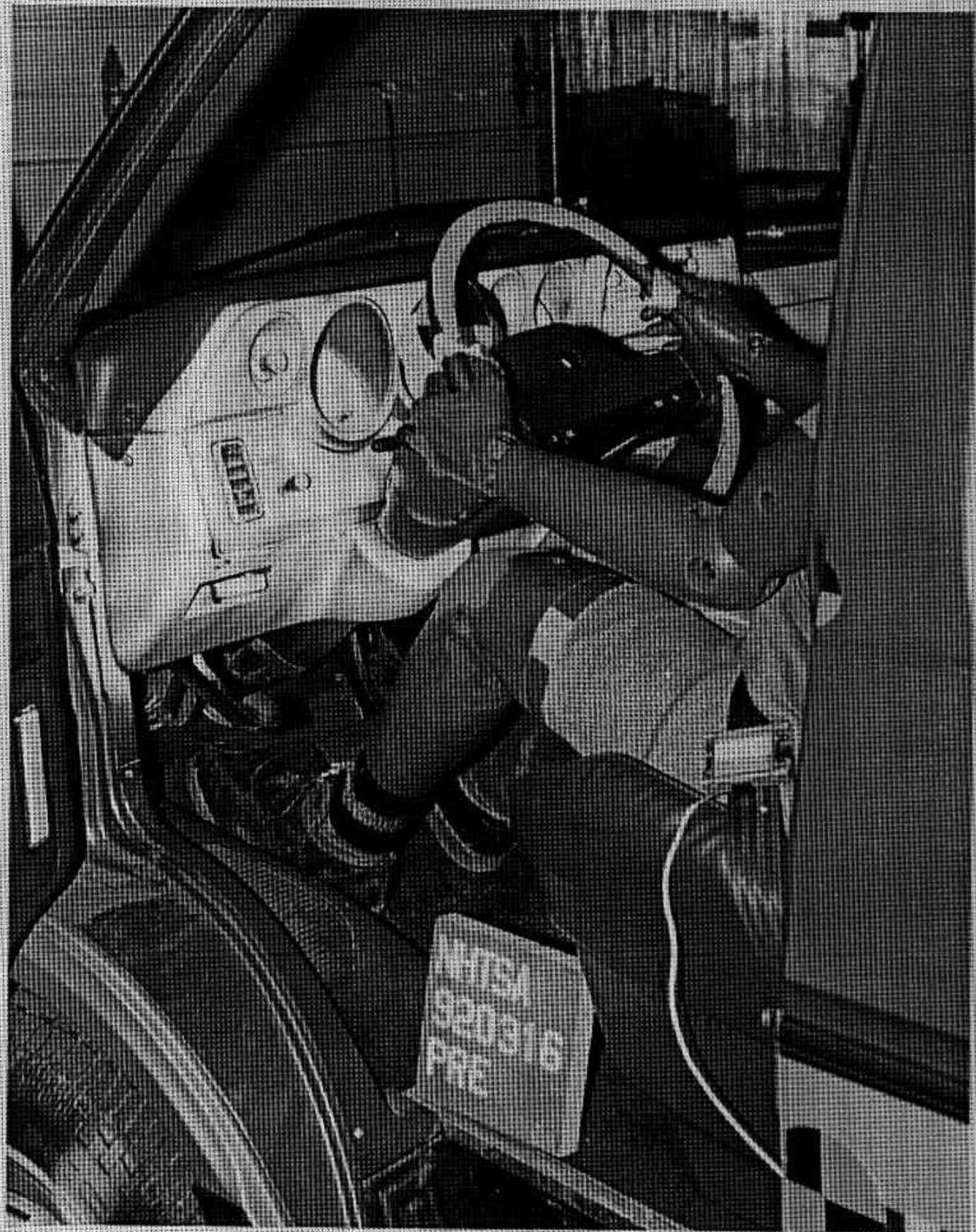


FIGURE A-34. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-35

920316



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

A-36

920316

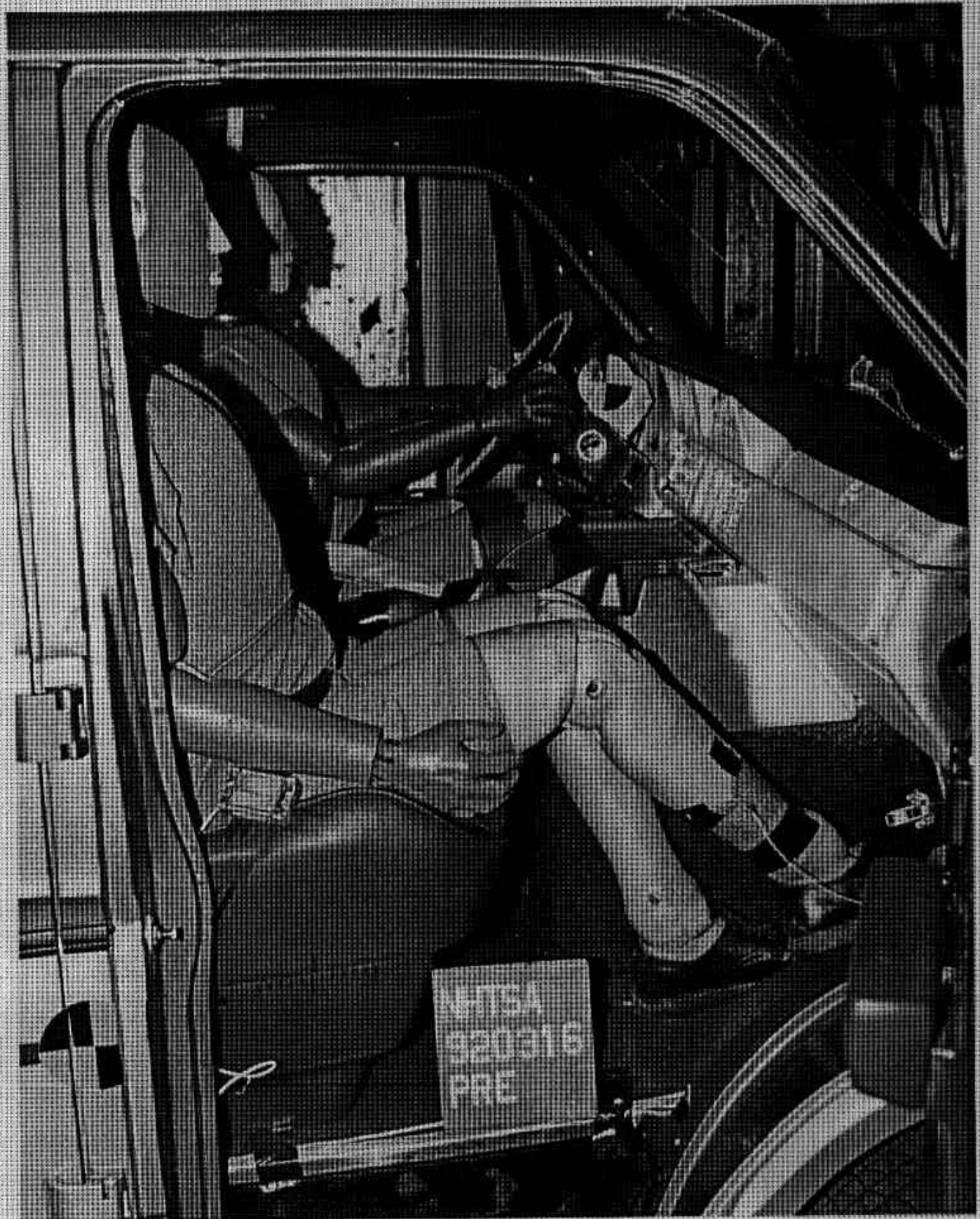


FIGURE A-36. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1  
A-37 920316

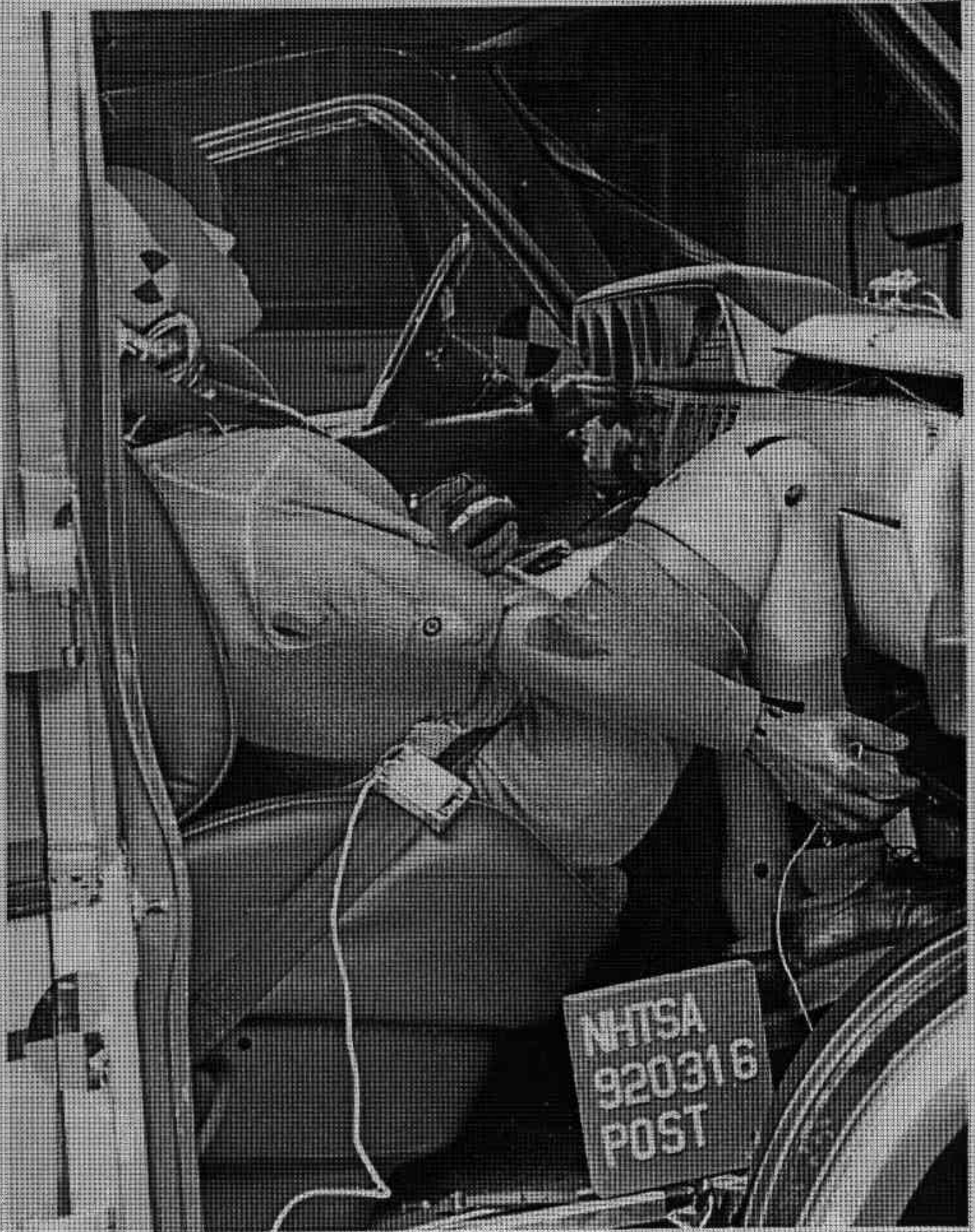


FIGURE A-37. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1  
A-38 920316

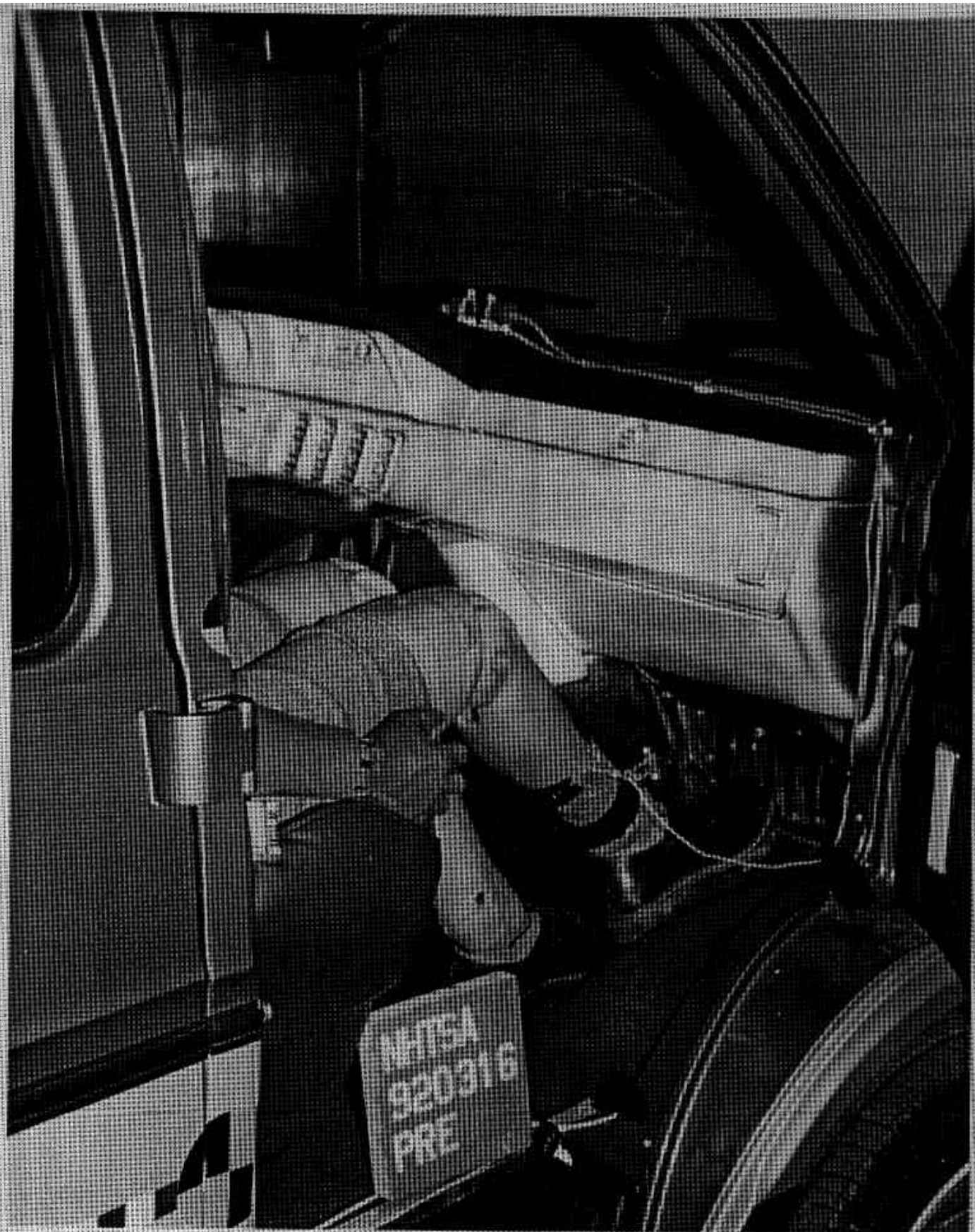


FIGURE A-38, PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2  
A-39 920316

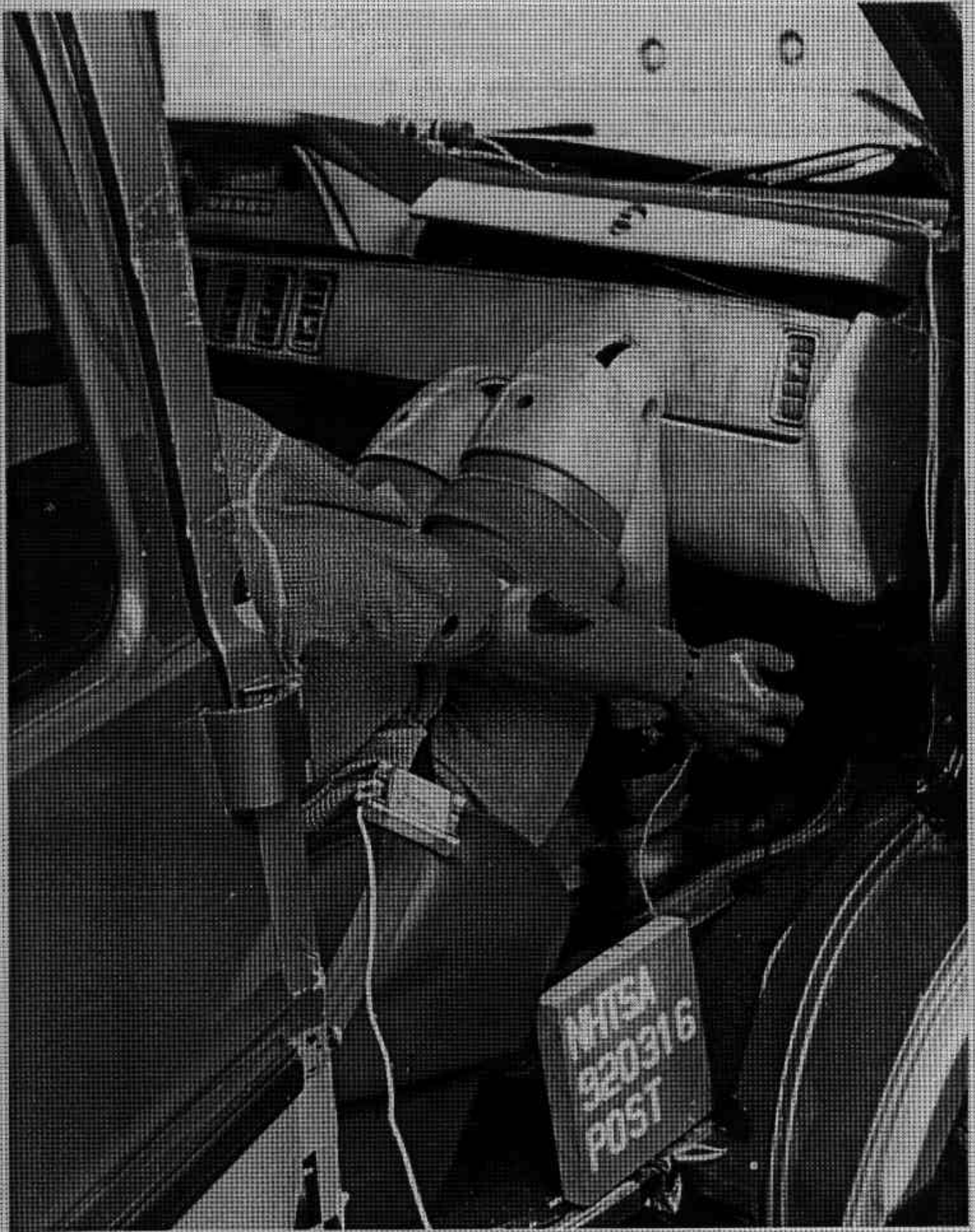


FIGURE A-39. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2  
A-40 920316

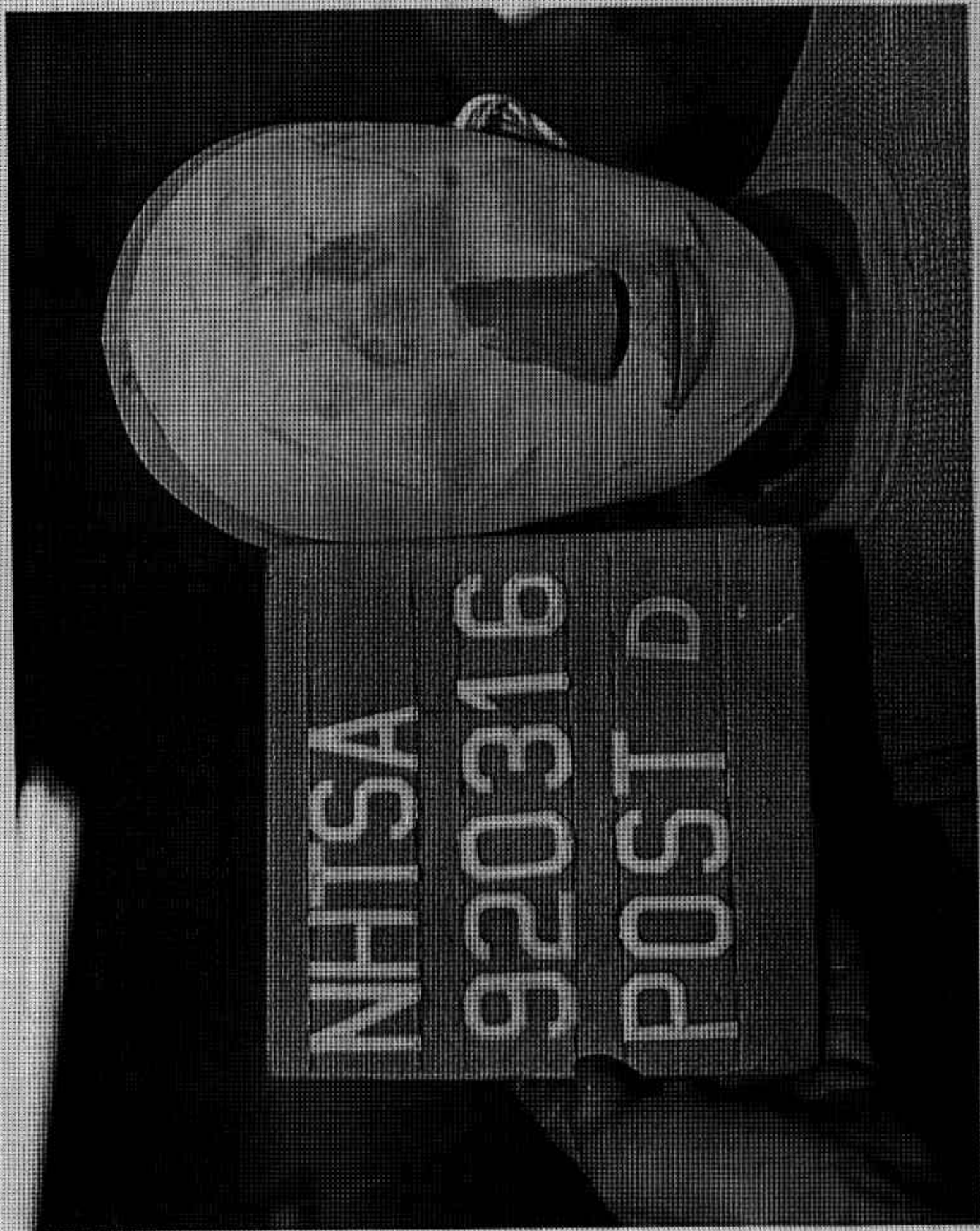


FIGURE A-40. POST-TEST DRIVER DUMMY HEAD CONTACT VIEW

A-41

920316

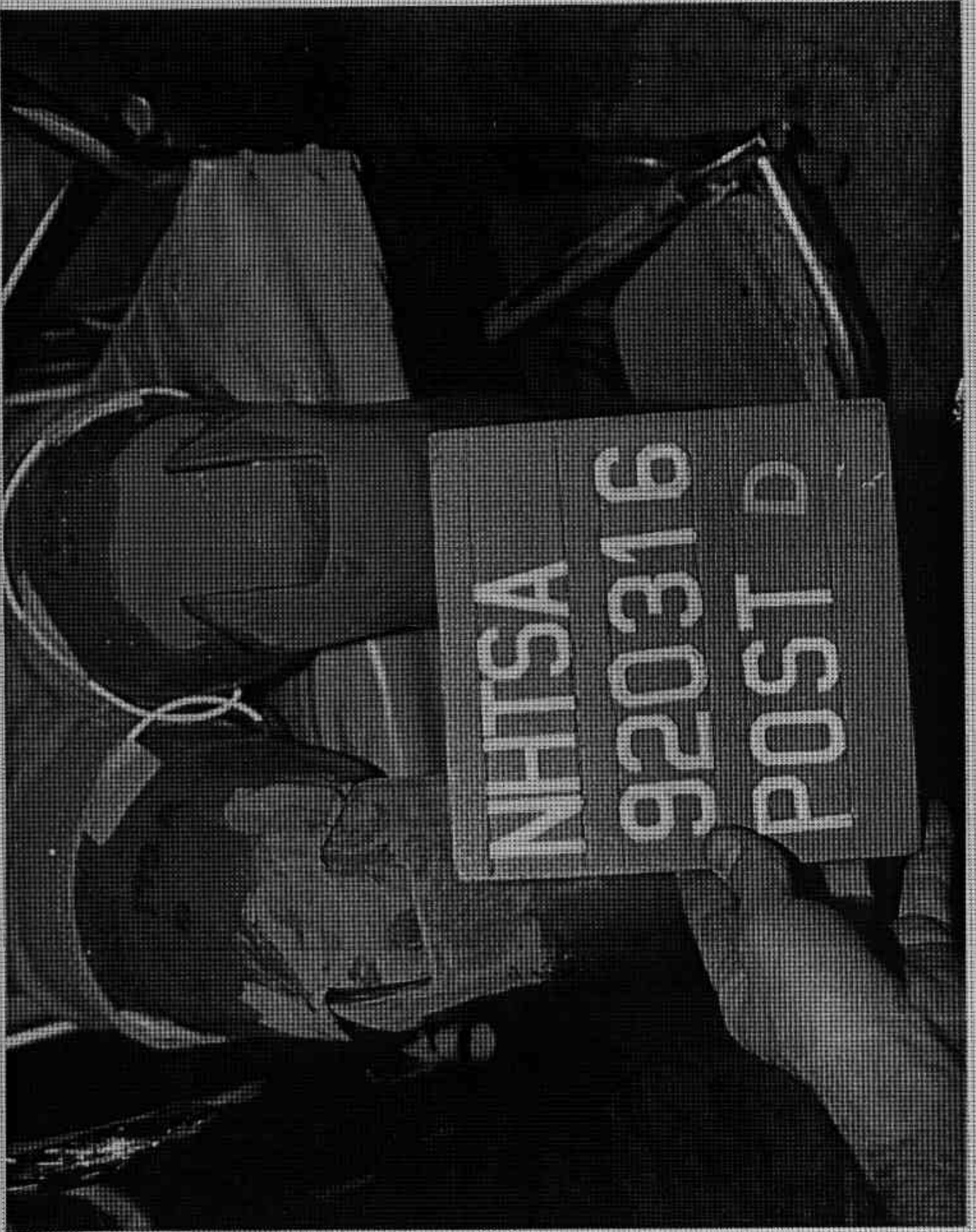


FIGURE A-41. POST-TEST DRIVER DUMMY KNEE CONTACT VIEW

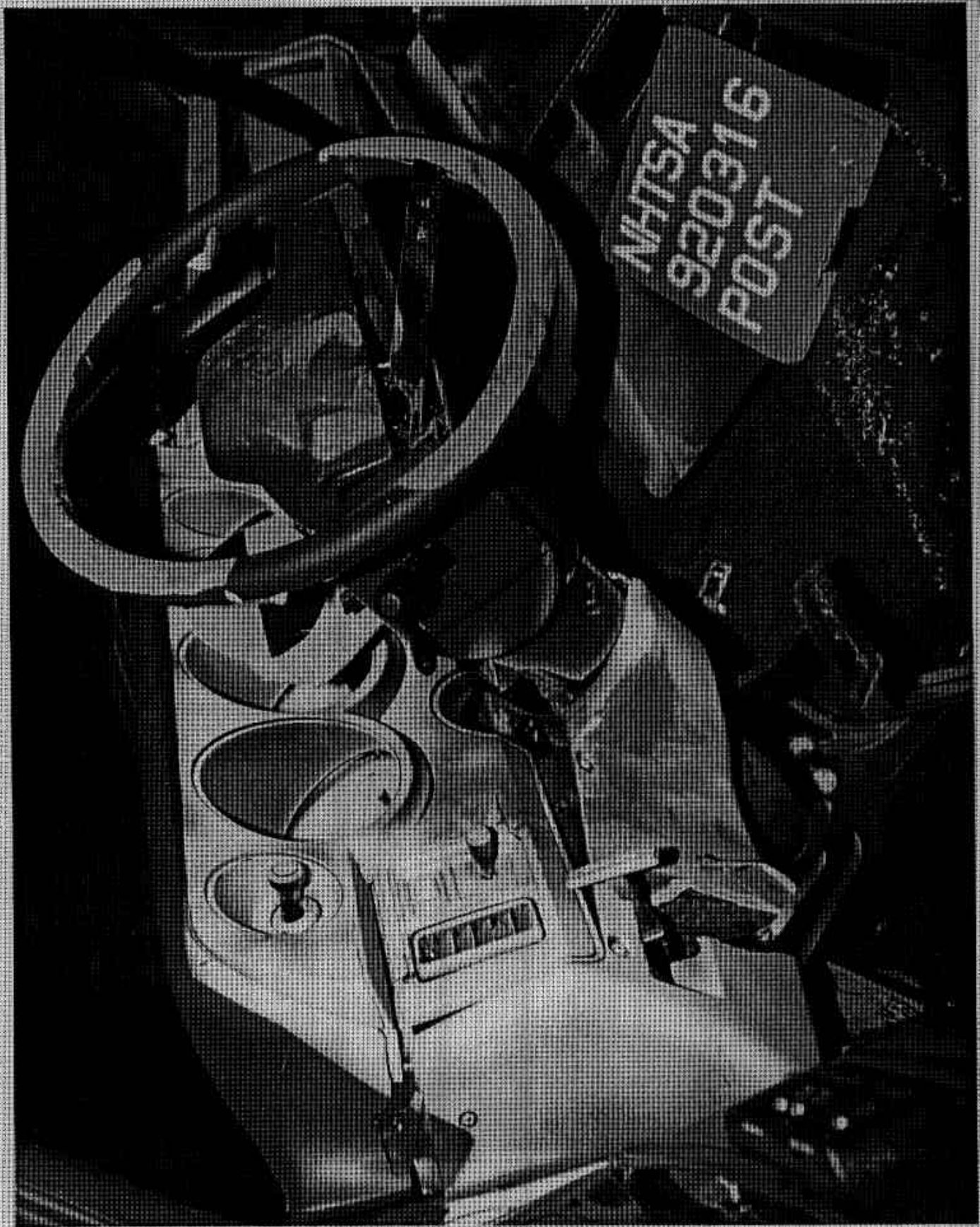


FIGURE A-42. POST-TEST DRIVER DUMMY HEAD AND KNEE CONTACT VIEW

A-43

920316

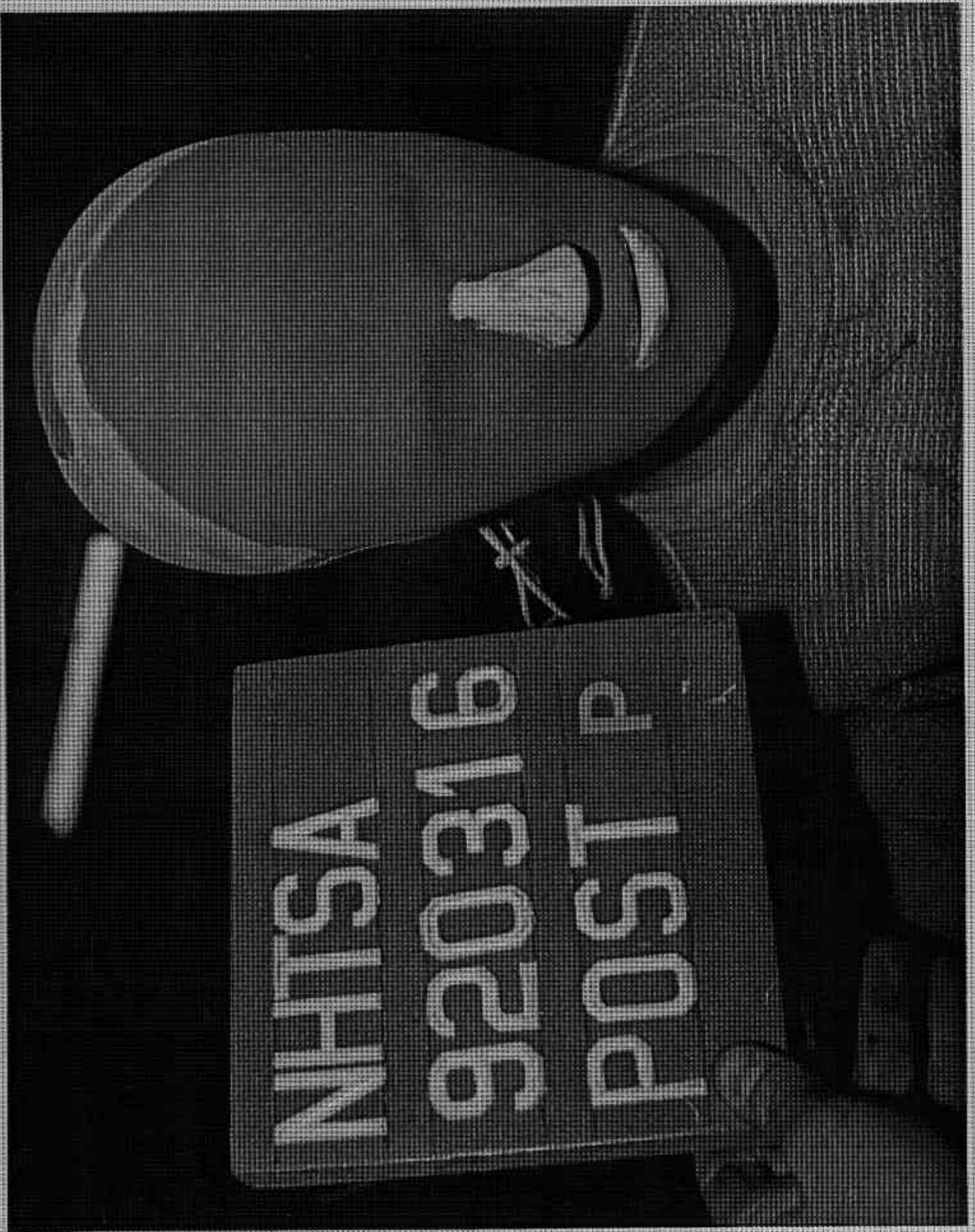


FIGURE A-43. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 1

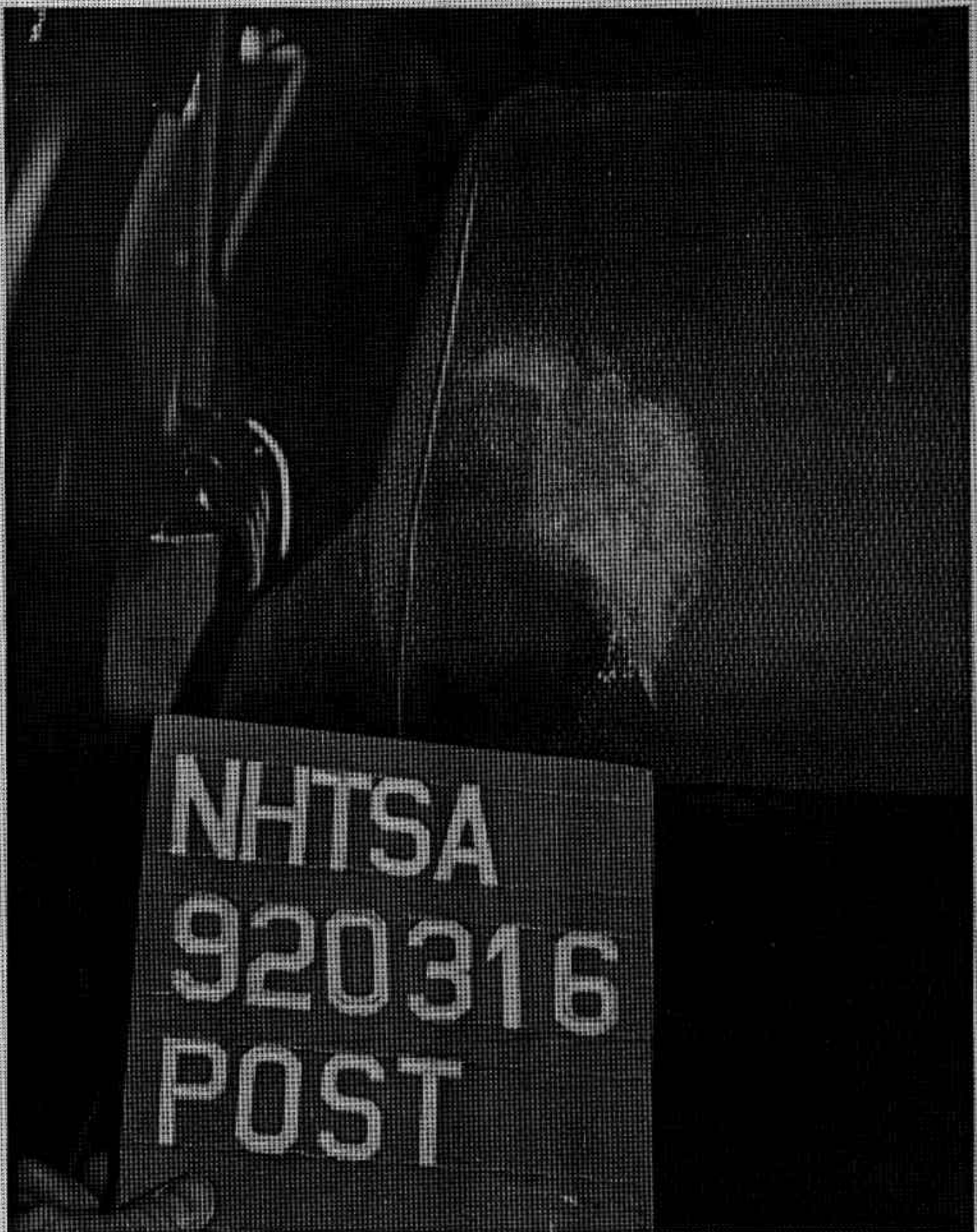


FIGURE A-44. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 2

A-45

920316



FIGURE A-45. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

A-46

920316

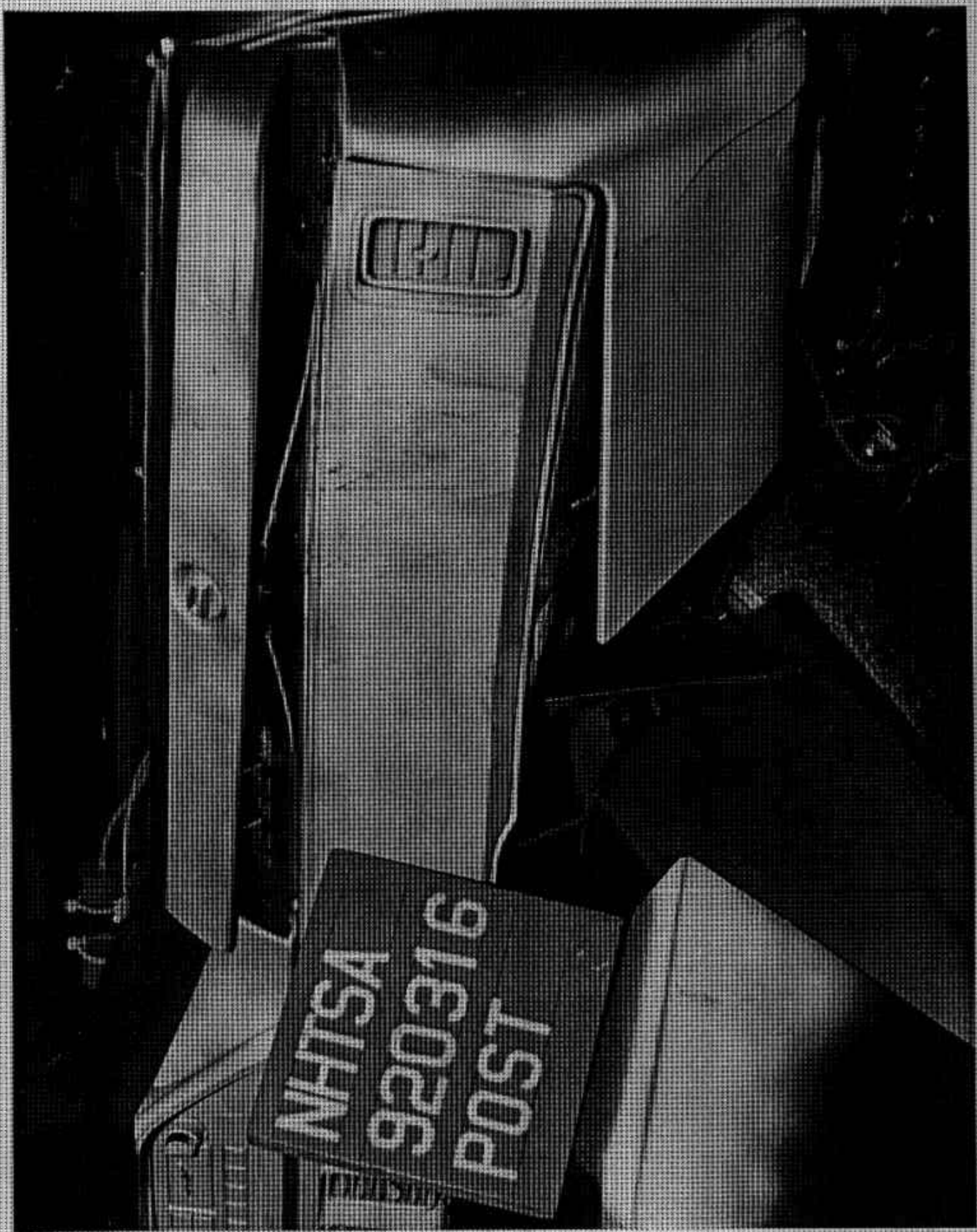


FIGURE A-46. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

A-47

920316

MFD BY 922717 003 CORPORATION  
 VEHICLE MADE IN CANADA 9-91 4548505  
 GEAR FRONT 1497 KG WITH TIRES P235/75R15XL RIMS AT 15 X 6.5 PSI COLD 035  
 GEAR REAR 1679 KG WITH TIRES P235/75R15XL RIMS AT 15 X 6.5 PSI COLD 041  
 VIN: 2B4HB25Y1NK111327 TYPE: MPV SINGLE X DUAL  
 TDI: 052717 003 VEHICLE MADE IN CANADA 4548505

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

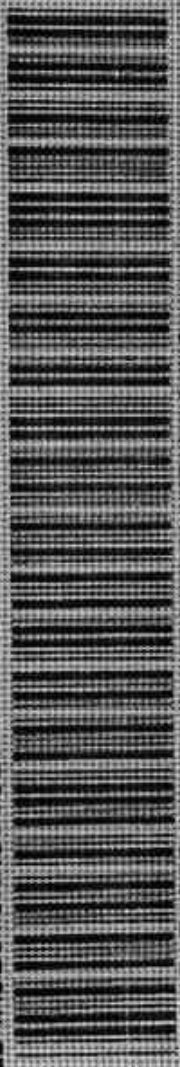


FIGURE A-47. PRE-TEST VEHICLE CERT. & RECOMMENDED TIRE PRES. LABEL  
 A-48 920316

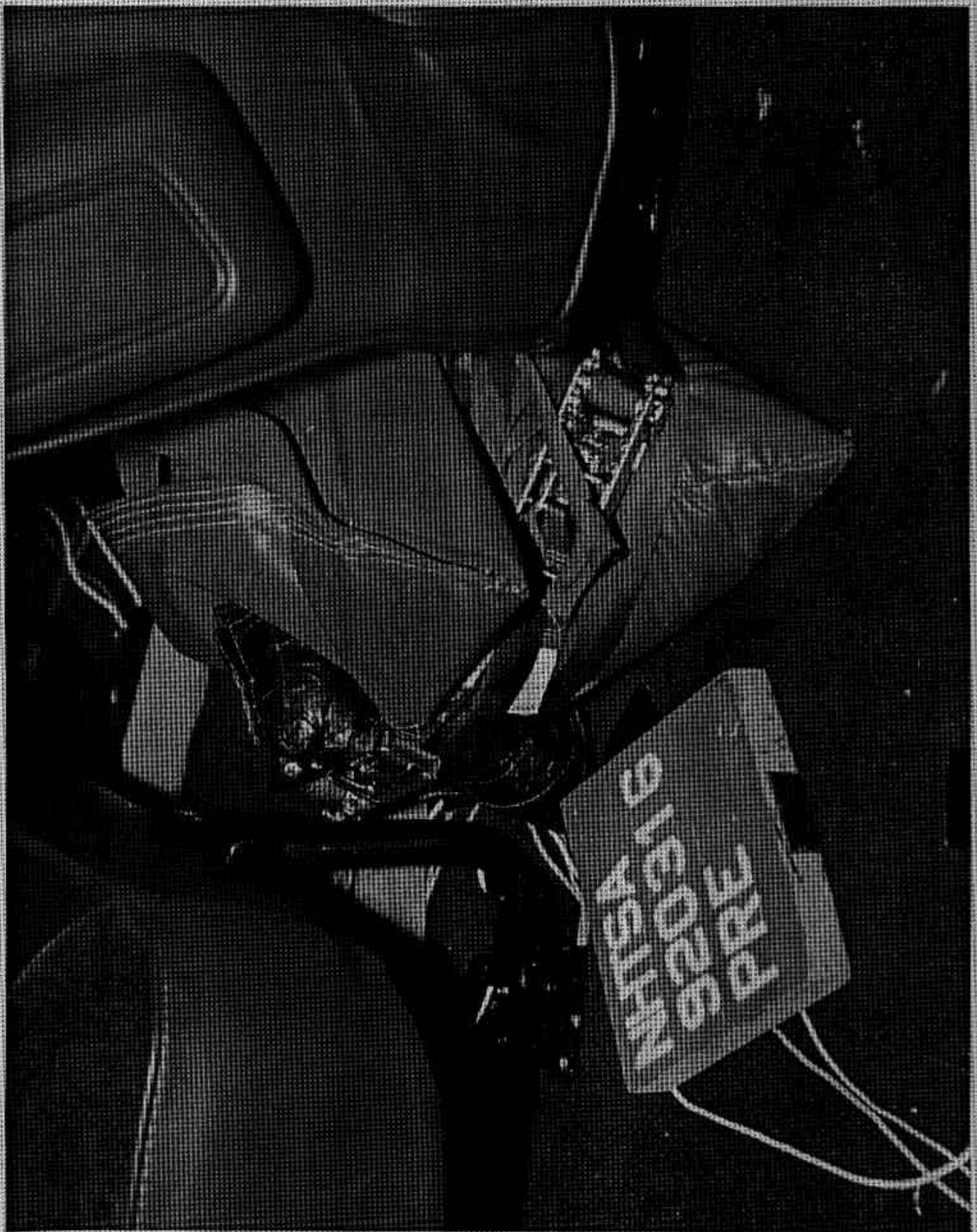


FIGURE A-48. PRE-TEST VEHICLE BALLAST LOCATION VIEW

A-49

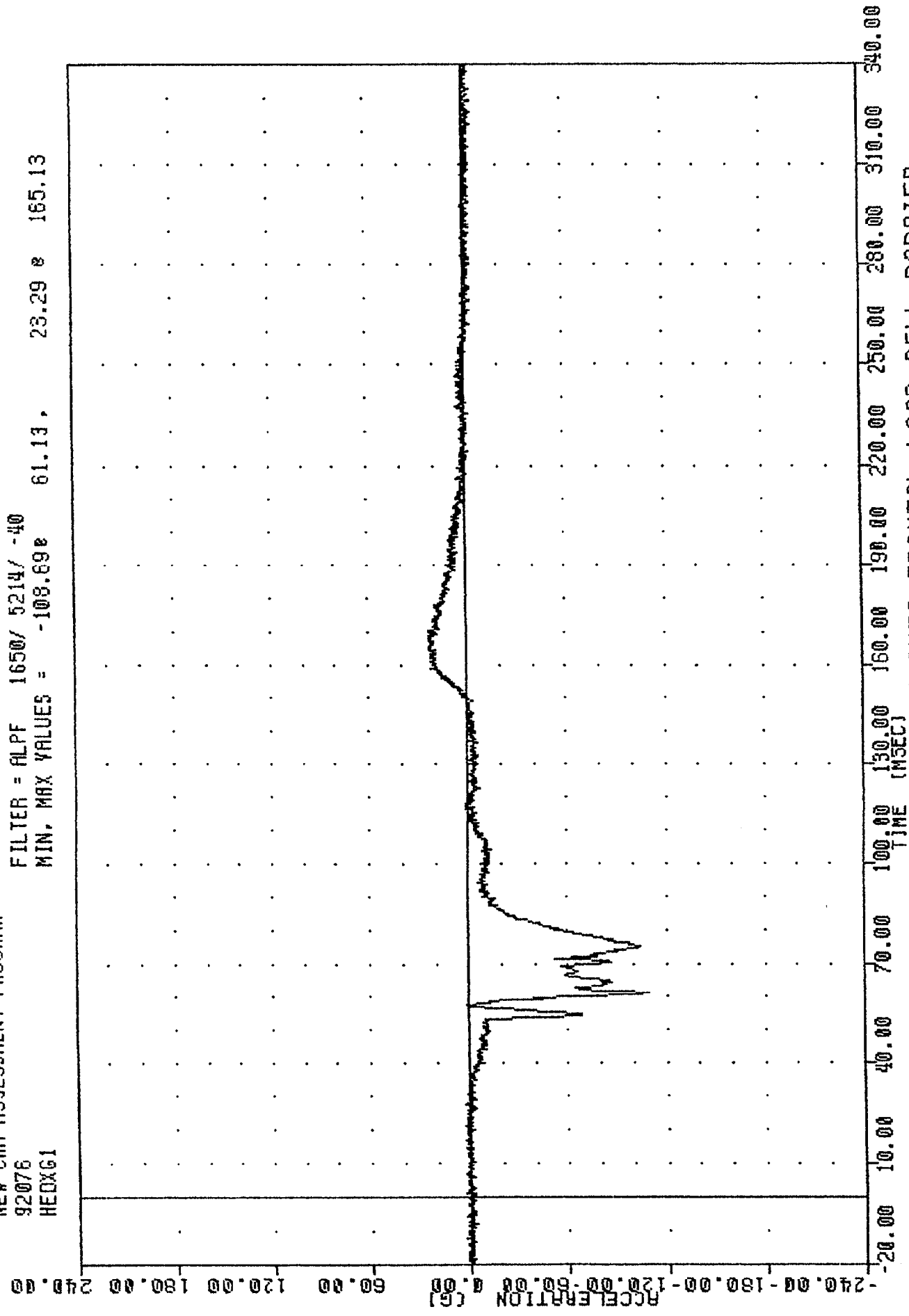
920316

APPENDIX B

DATA PLOTS

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 HEXG1

FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = -108.69e 61.13, 23.29 e 165.13

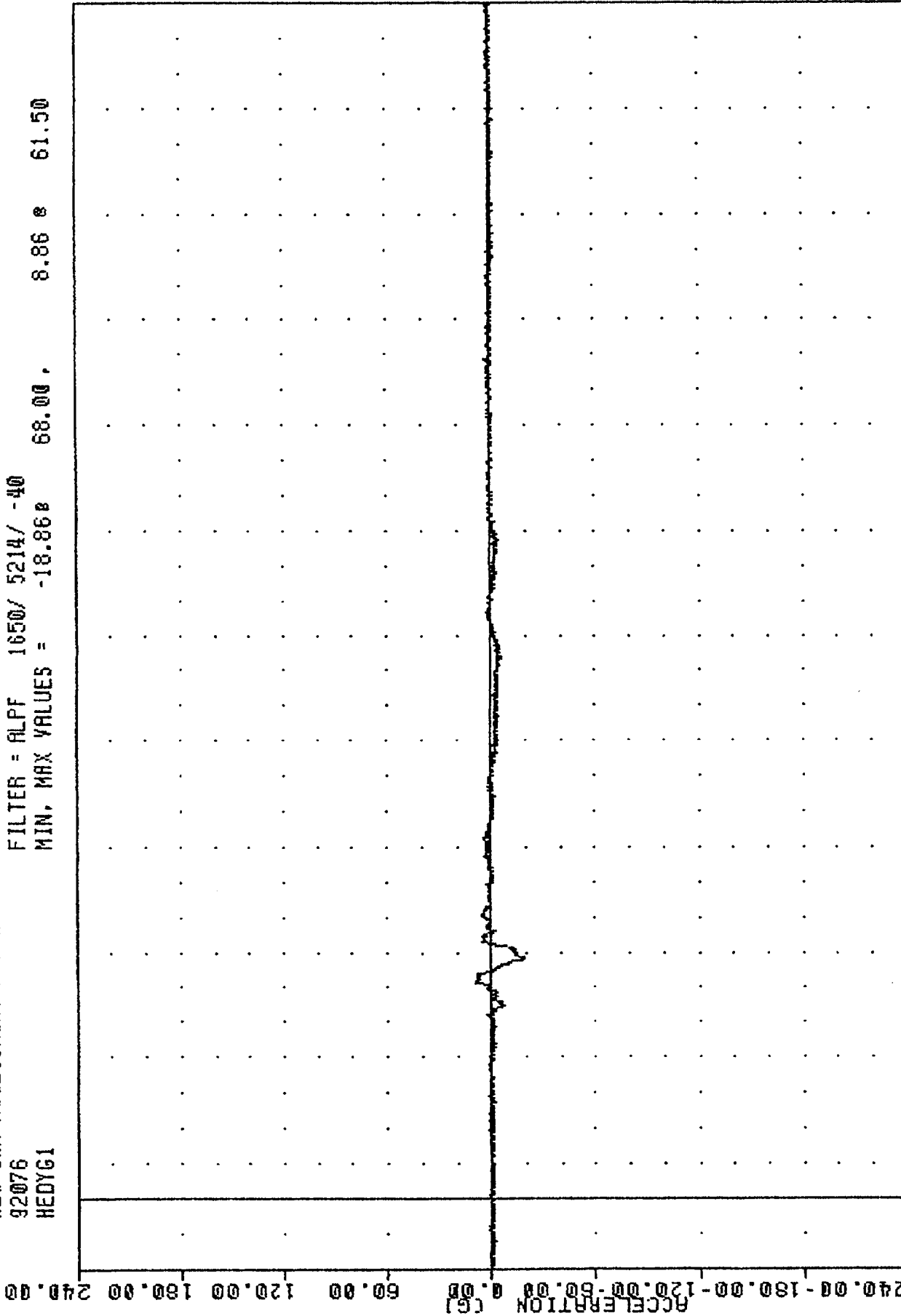


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER HEAD X-AXIS ACCELERATION

TRC  
92076  
NEW CAR ASSESSMENT PROGRAM  
HEDYG1

920316

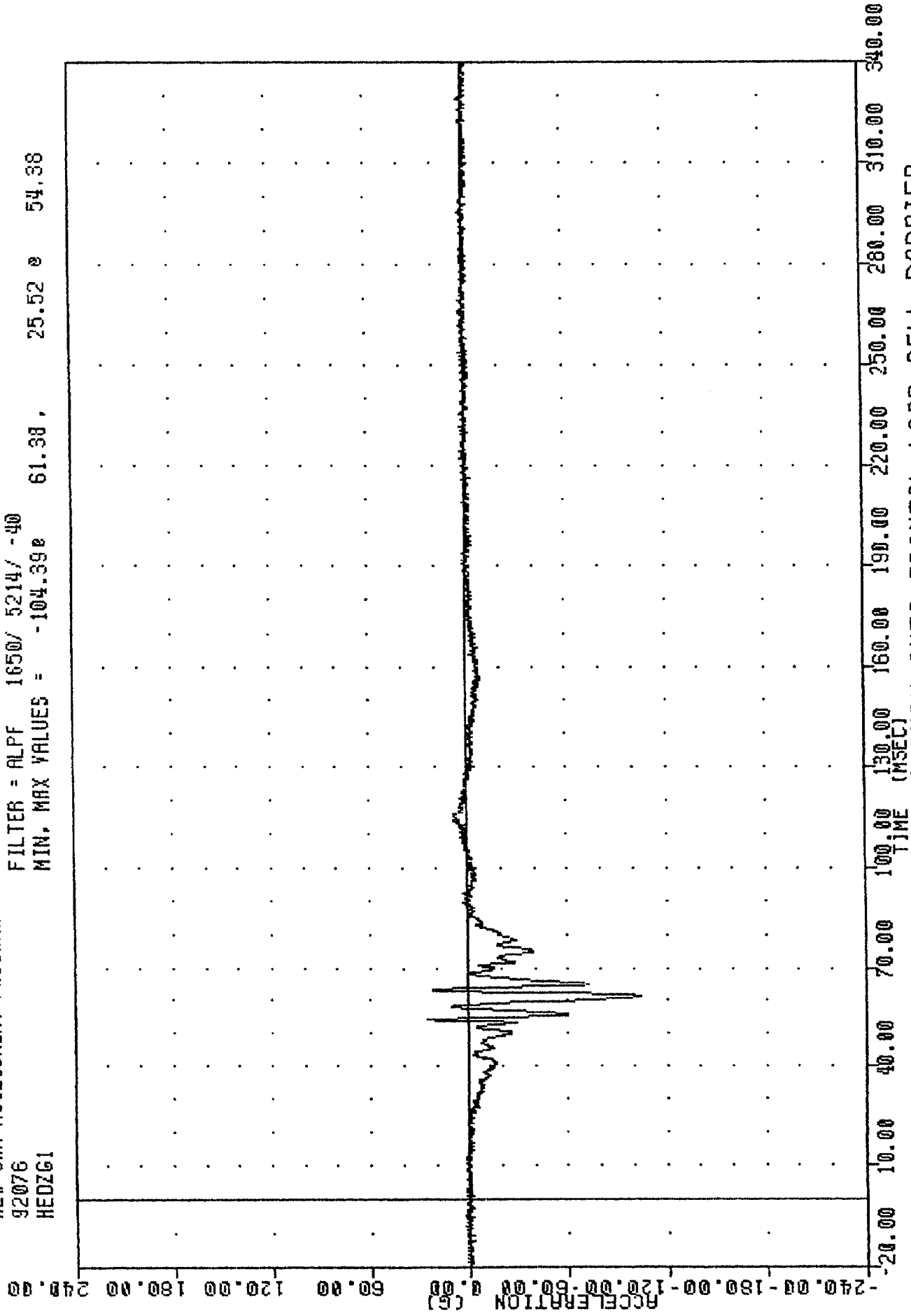
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -18.86g 68.00g 8.86g 61.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
DRIVER HEAD Y-AXIS ACCELERATION

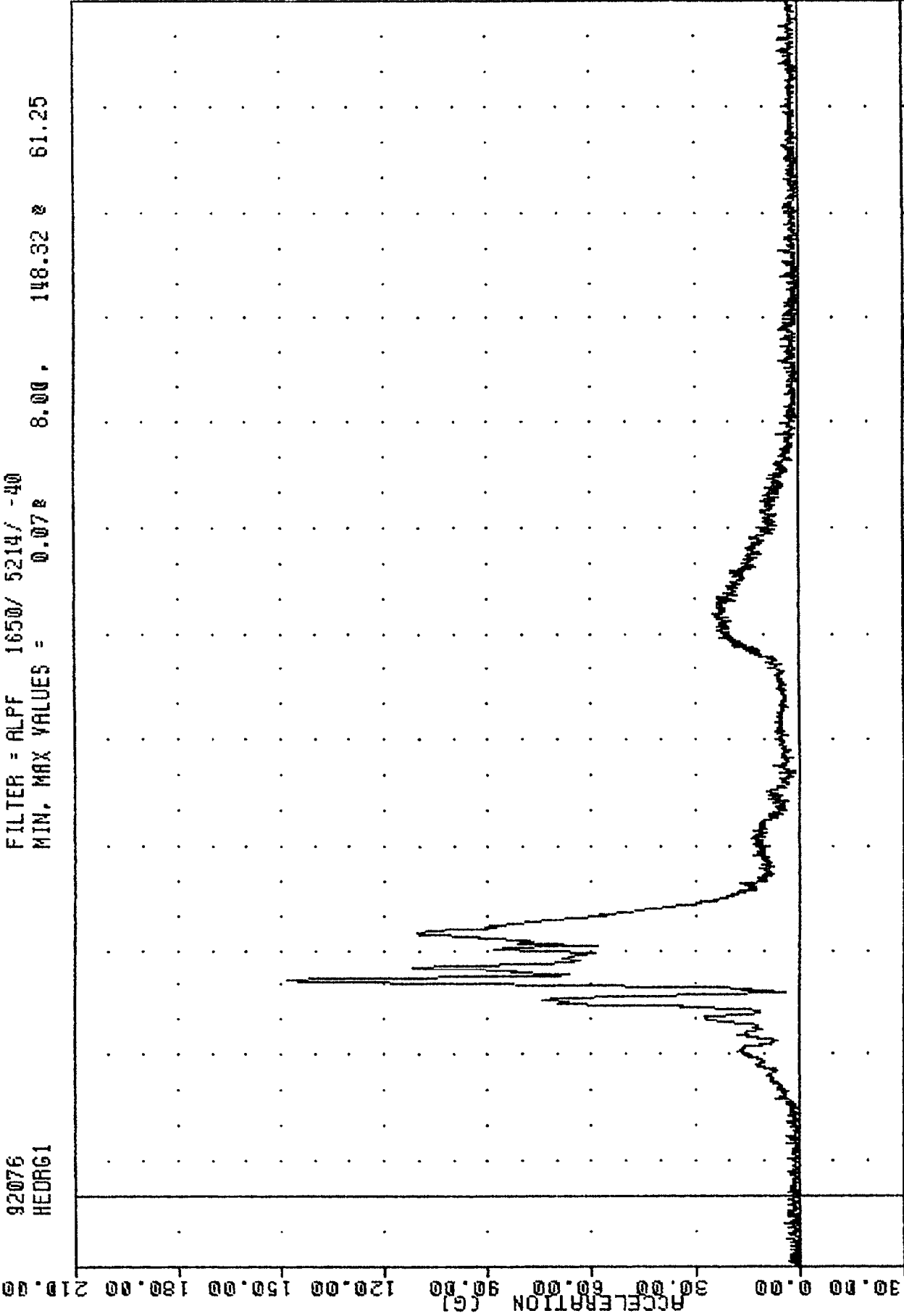
TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
HEDZG1

FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -104.39e 61.38 , 25.52 e 54.38



TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 HEDRG1

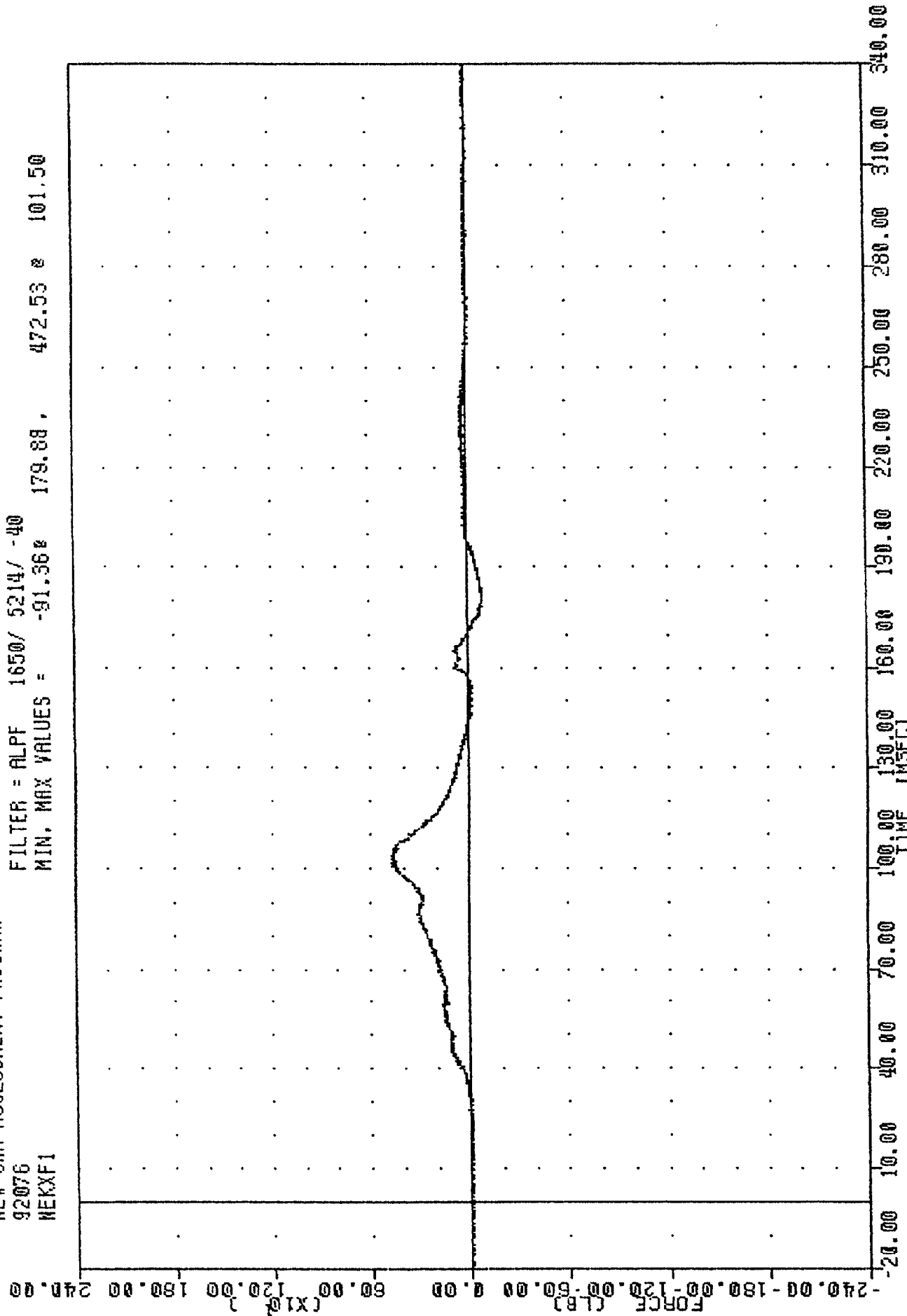
FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = 0.07R 8.00, 148.32 & 61.25



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER HEAD RESULTANT ACCELERATION

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 MEKXF1

FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -91.36e 179.88 , 472.53 e 101.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER NECK X-AXIS SHEAR FORCE

TRC

920316

NEW CAR ASSESSMENT PROGRAM

92076

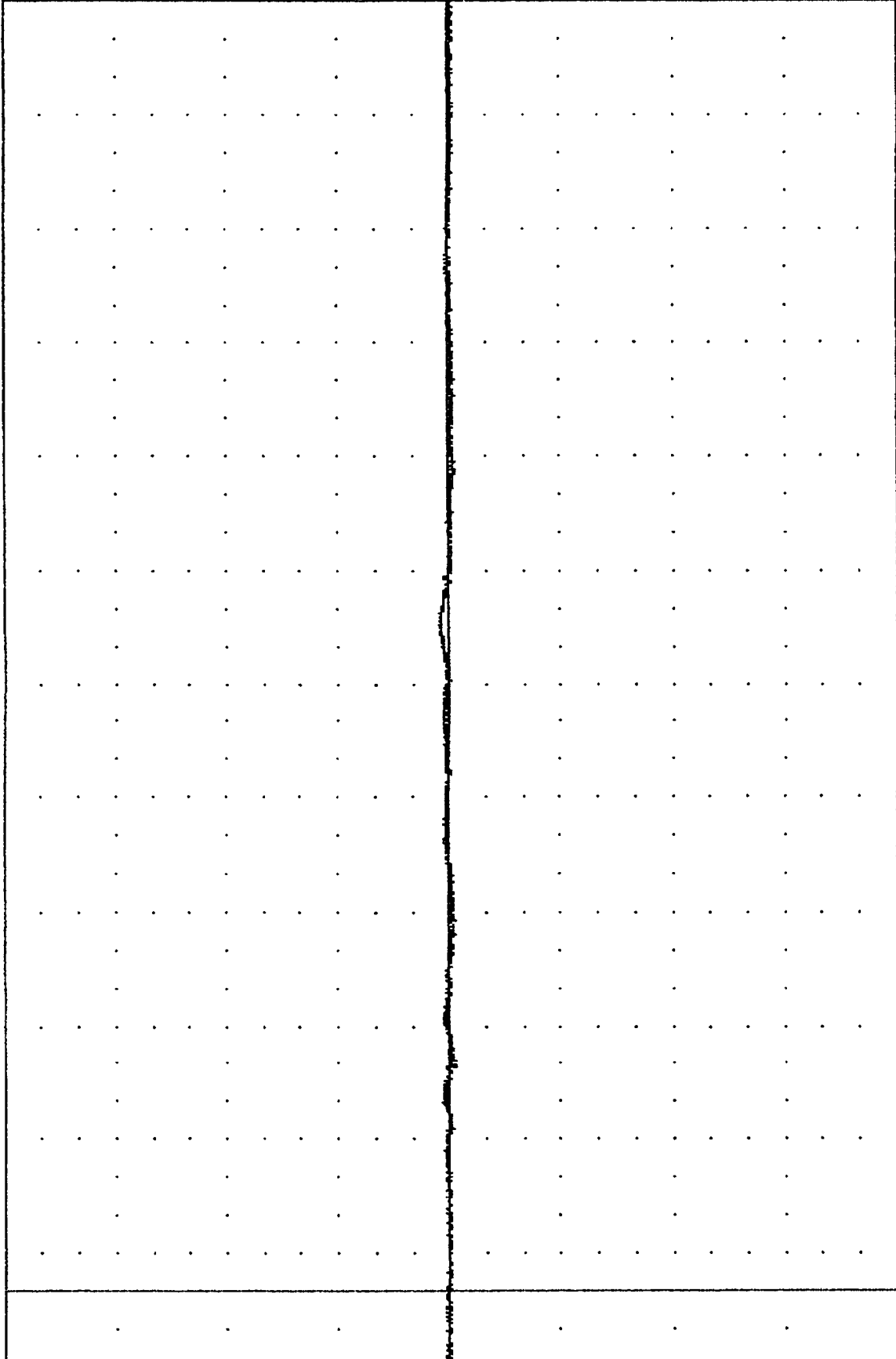
MEKYF1

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = -35.548 59.50

55.93 173.00

240.00 180.00 120.00 60.00 0.00 60.00 120.00 180.00 240.00

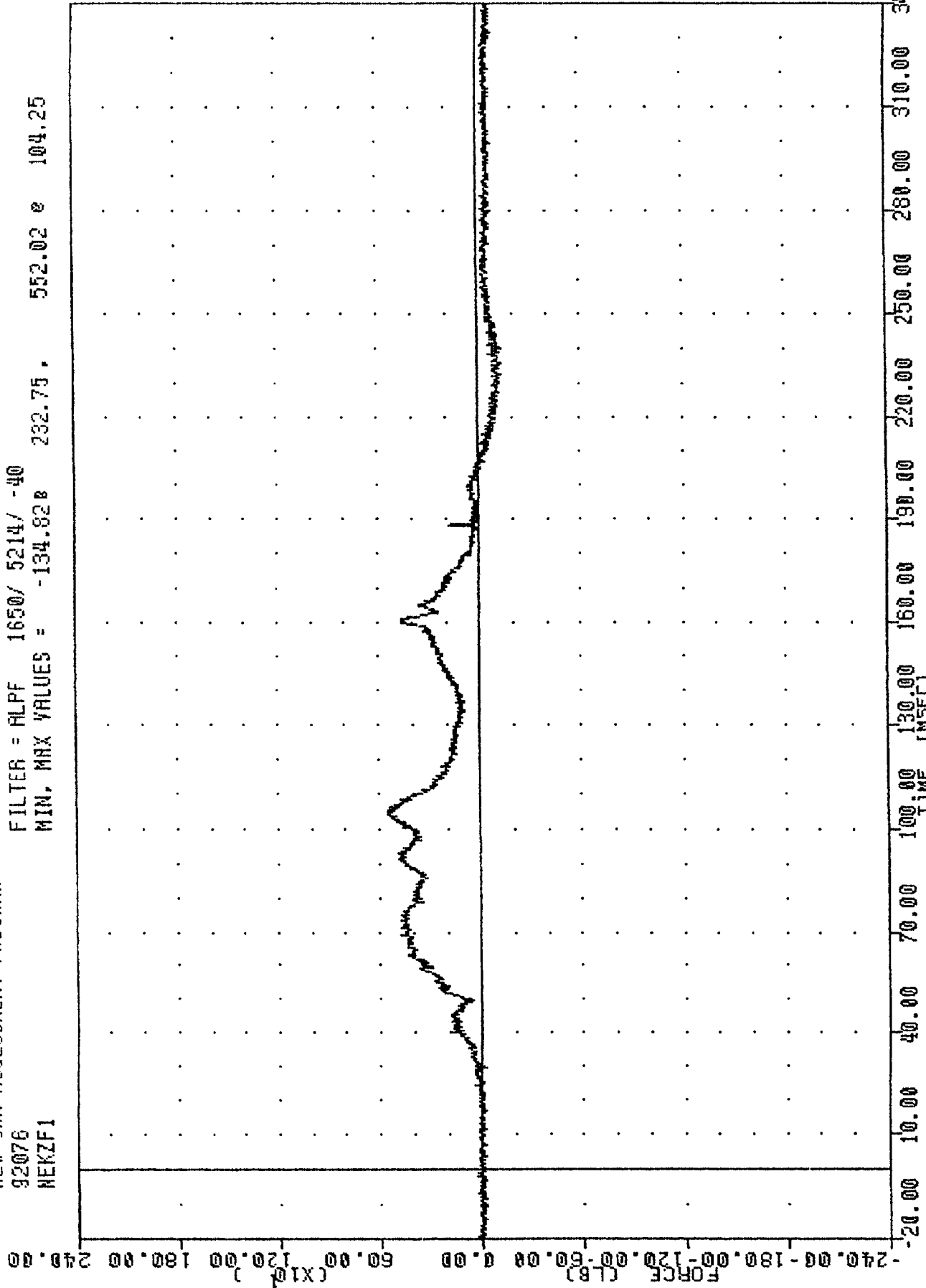


240.00 180.00 120.00 60.00 0.00 60.00 120.00 180.00 240.00

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
DRIVER NECK Y-AXIS SHEAR FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 NEKZF1

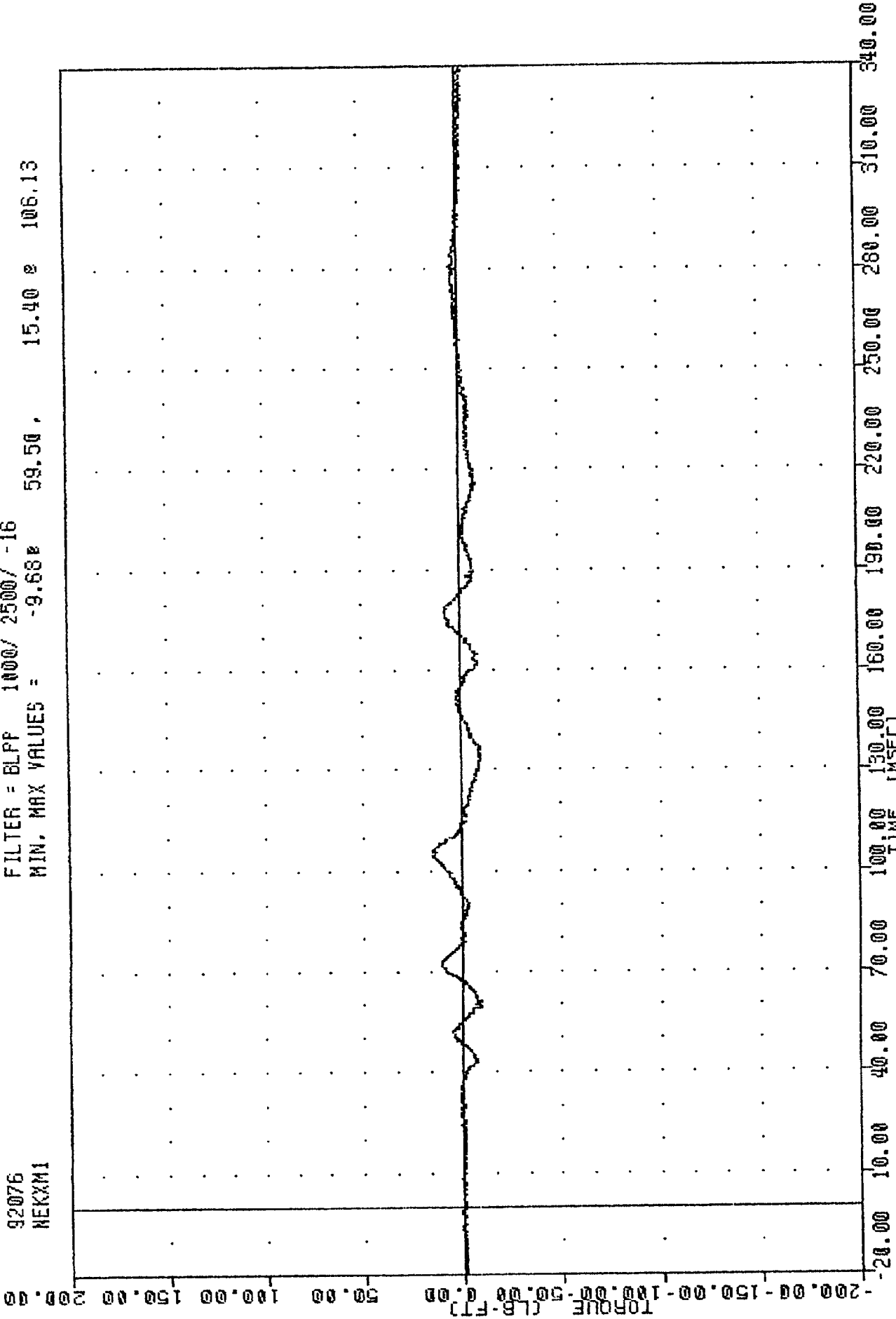
FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = -134.82 B 232.75 , 552.02 e 104.25



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER NECK Z-AXIS AXIAL FORCE

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 NEKX1

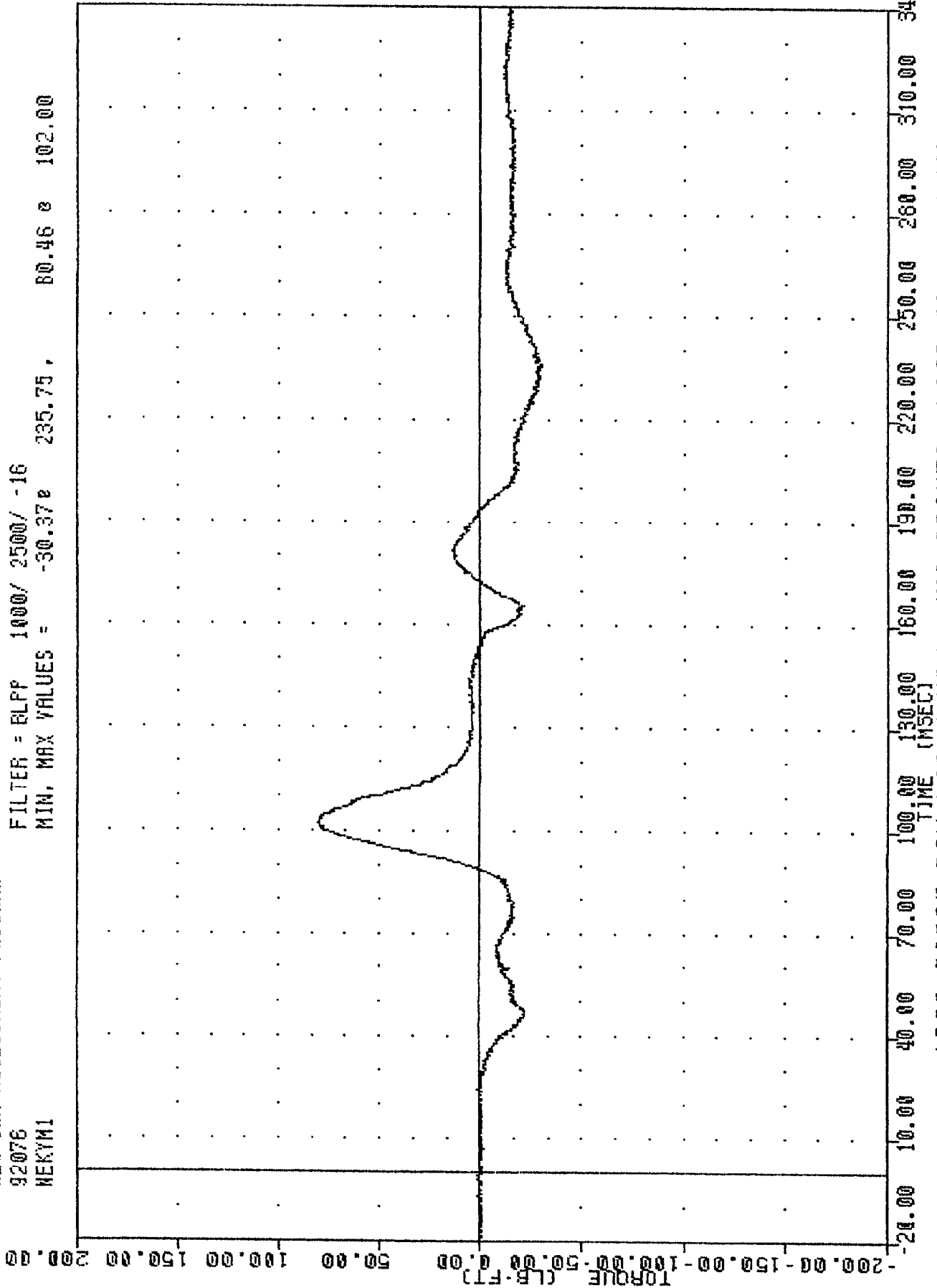
FILTER = BLPF 1000/ 2500/ -16  
 MIN. MAX VALUES = -9.68 59.50 15.40 106.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER NECK MOMENT ABOUT X AXIS

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 MEKYM1

FILTER = RLFF 1000/ 2500/ -16  
 MIN, MAX VALUES = -30.37e 235.75 , 80.46 e 102.00



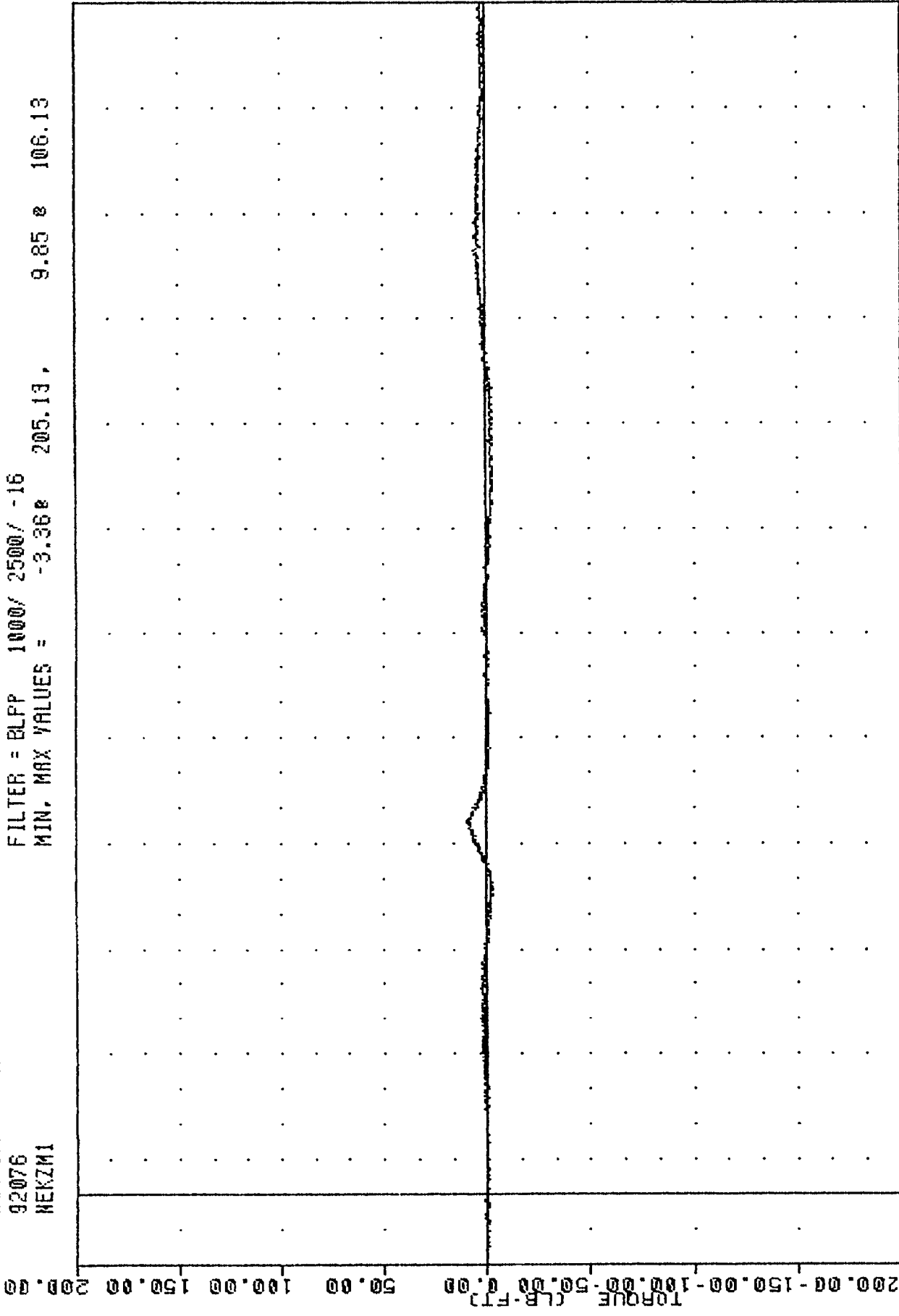
920316

B-10

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER NECK MOMENT ABOUT Y AXIS

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 HEKZM1

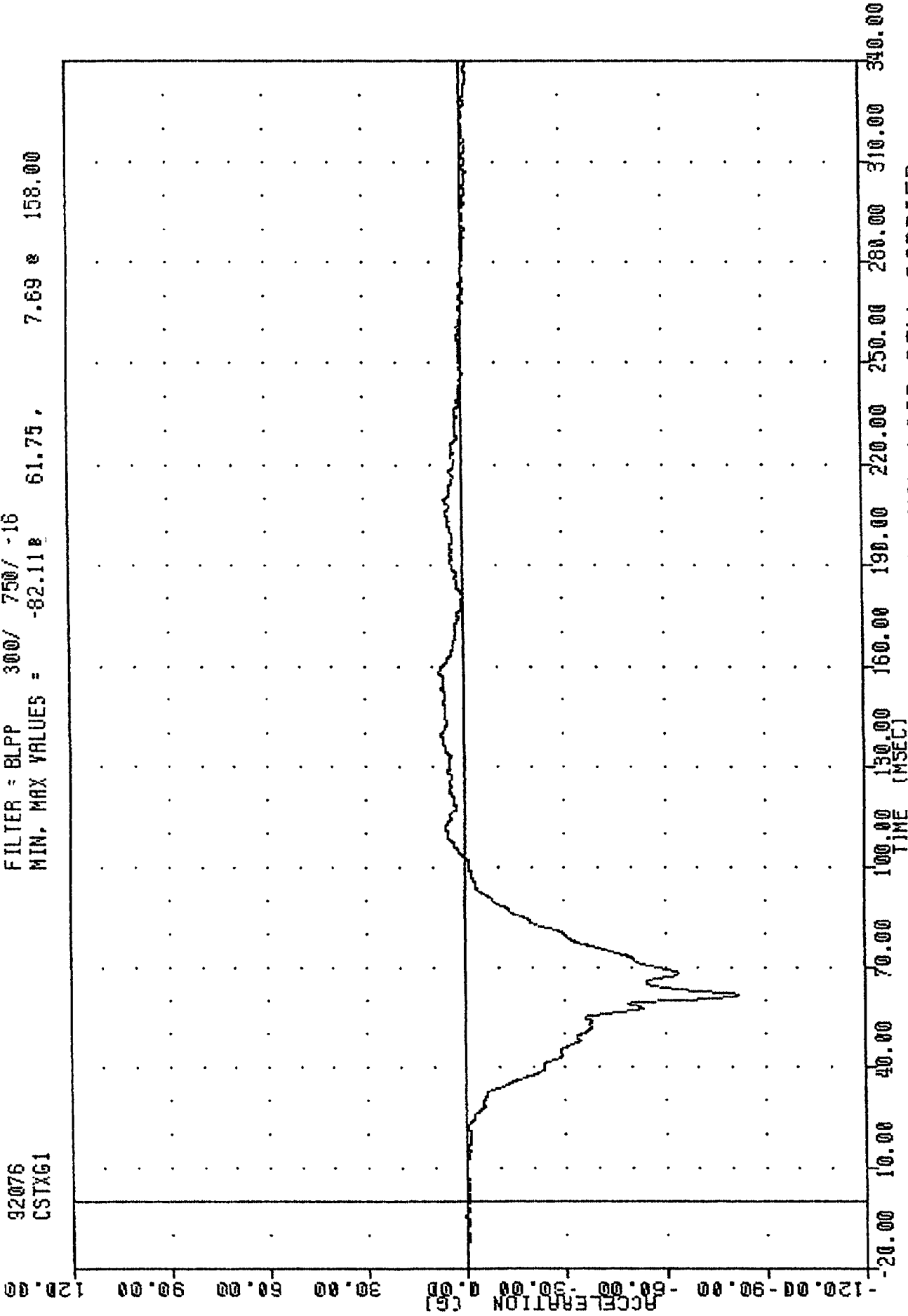
FILTER = BLPP 1000/ 2500/ -16  
 MIN. MAX VALUES = -3.36e 205.13, 9.85 e 106.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER NECK MOMENT ABOUT Z AXIS

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
CSTXG1

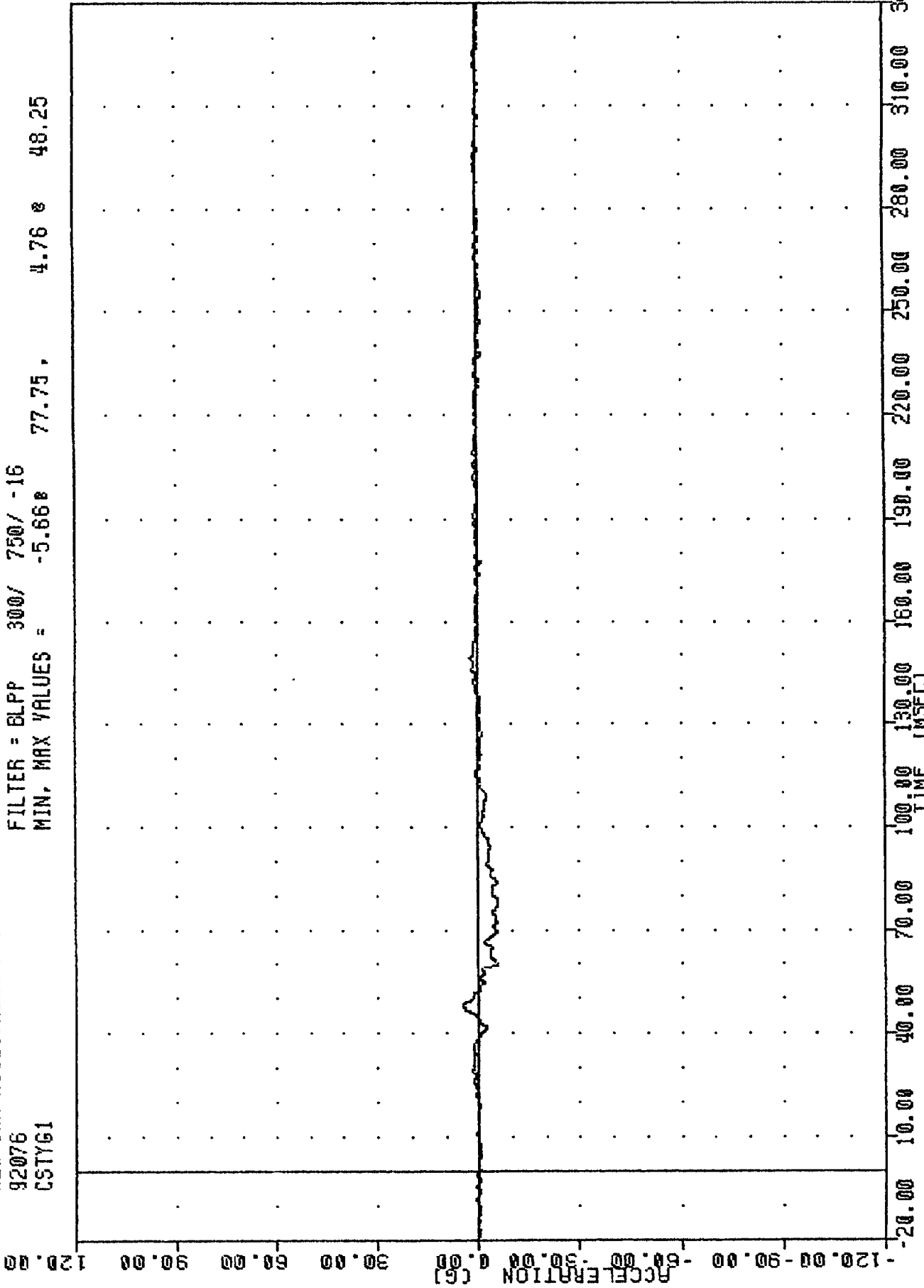
FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = -82.11E 61.75, 7.69 E 158.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
DRIVER CHEST X-AXIS ACCELERATION

TRC  
920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
CSTY61

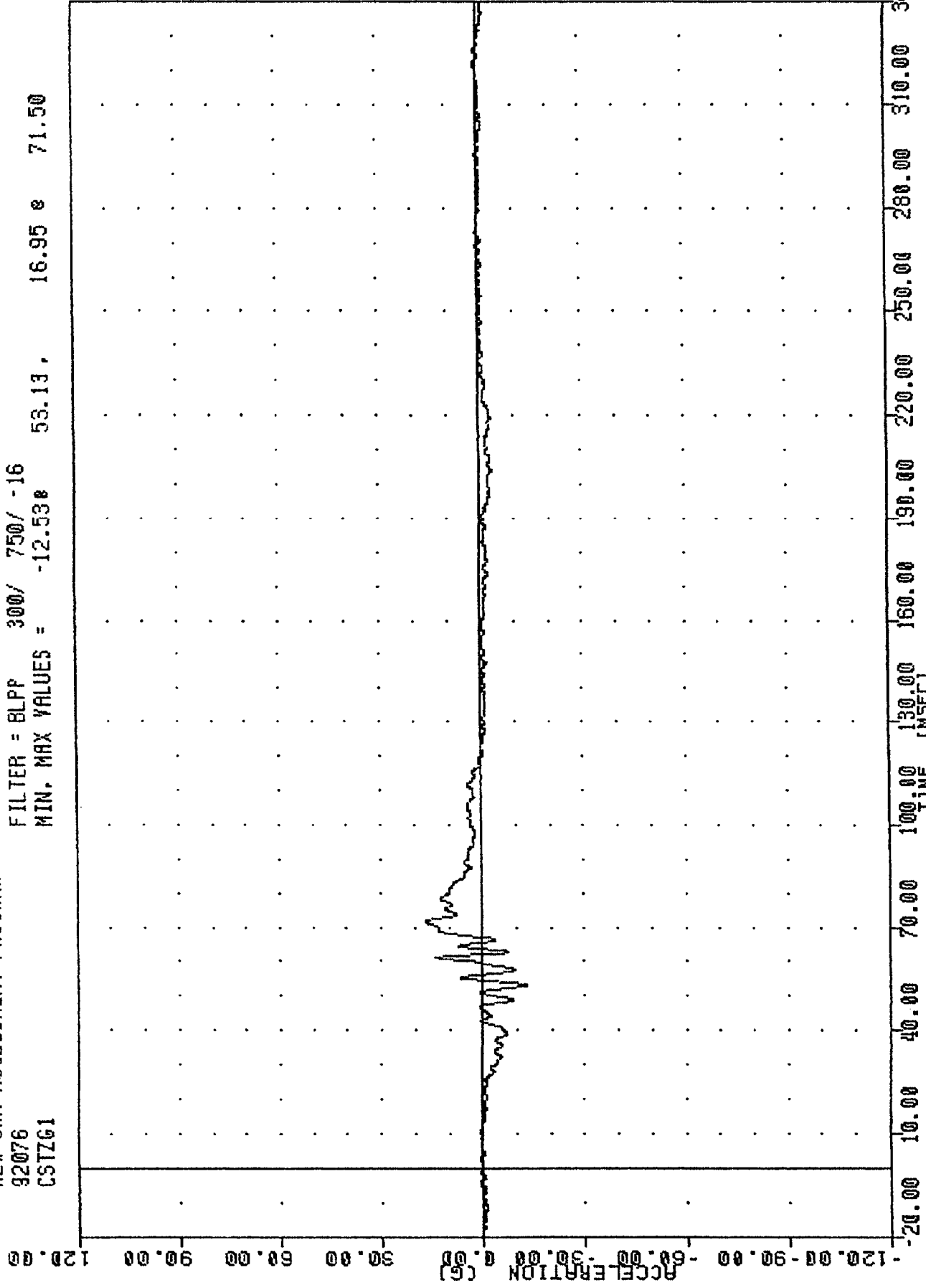
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -5.66 4.76 48.25



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
DRIVER CHEST Y-AXIS ACCELERATION

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 CSTZG1

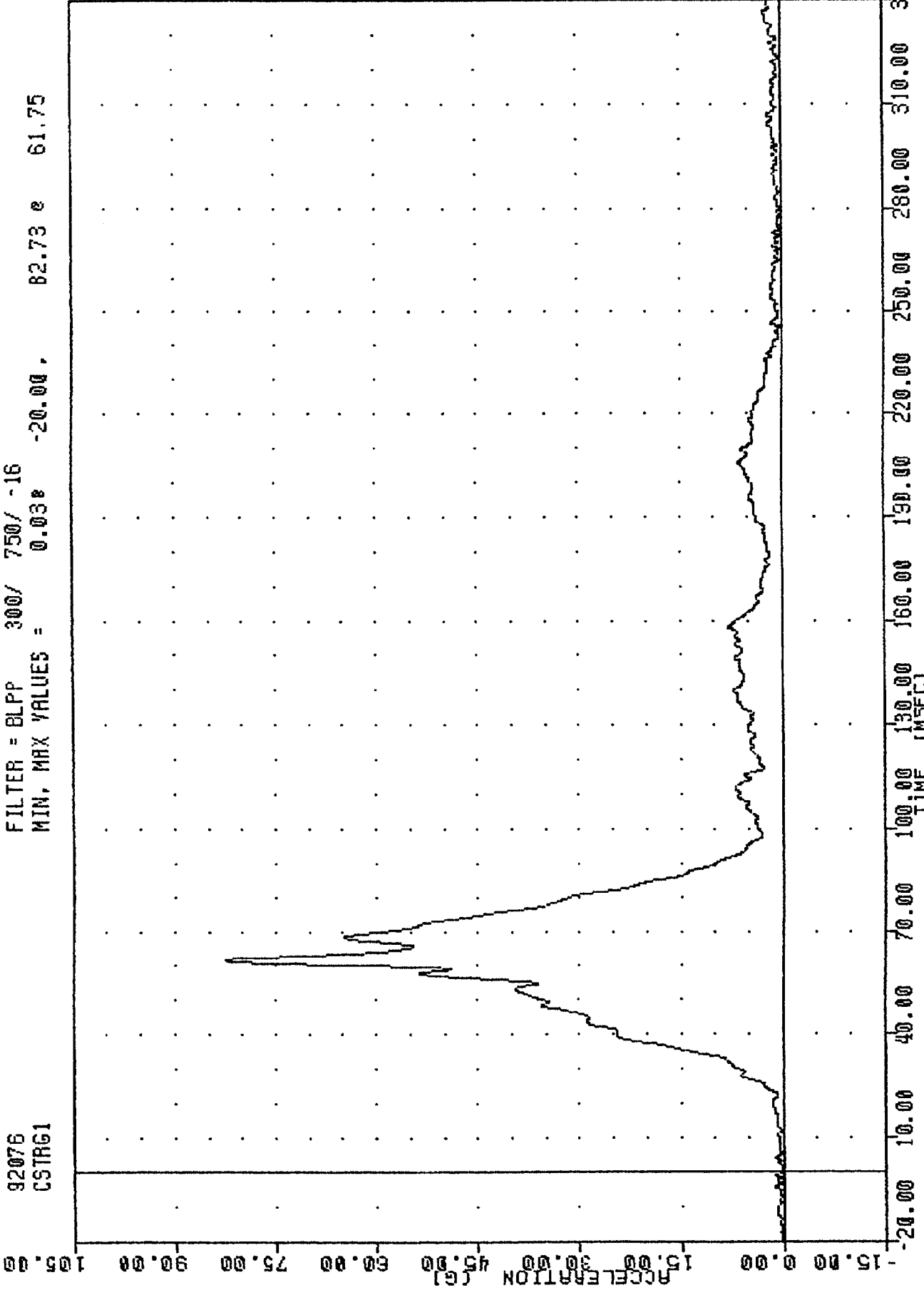
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -12.53% 53.13 , 16.95 % 71.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER CHEST Z-AXIS ACCELERATION

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 CSTRG1

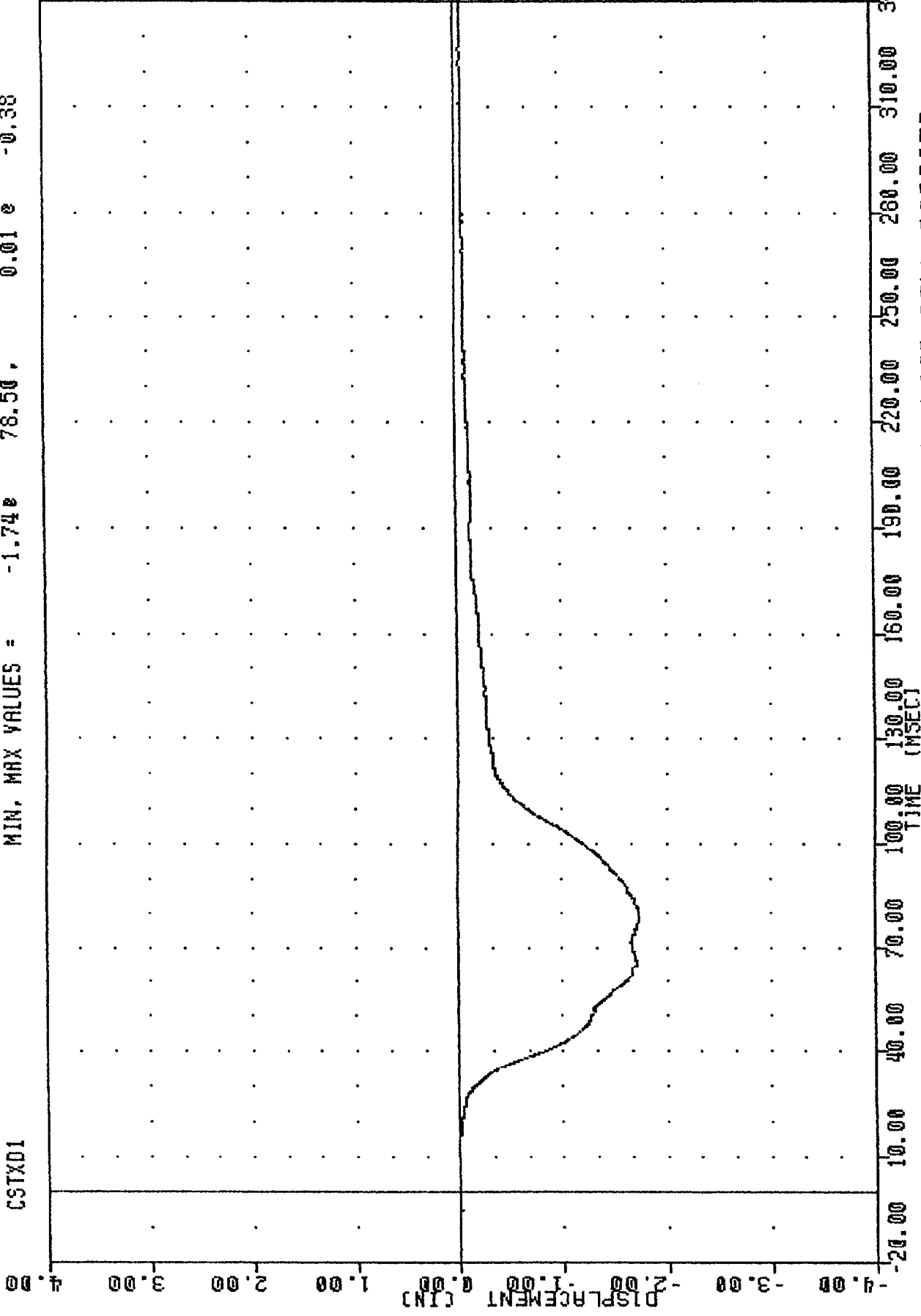
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = 0.038 -20.00, 82.73 e 61.75



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER CHEST RESULTANT ACCELERATION

TRC . 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 CSTXD1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -1.74e 0.01 e -0.38



B-16

920316

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER CHEST DEFECTION

TRC

920316

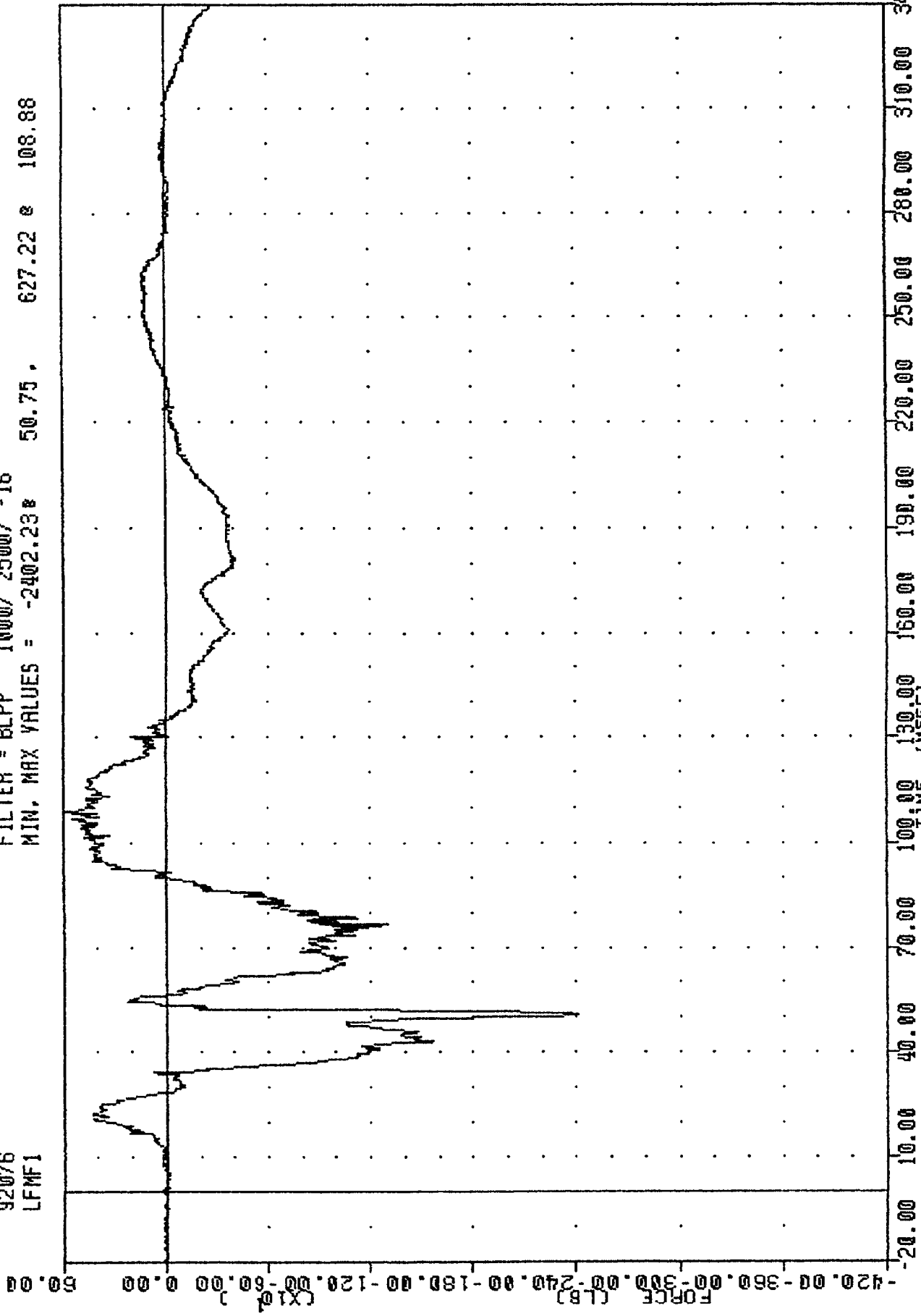
NEW CAR ASSESSMENT PROGRAM

92076

LFMF1

FILTER = BLPP 1000/ 2500/ -16

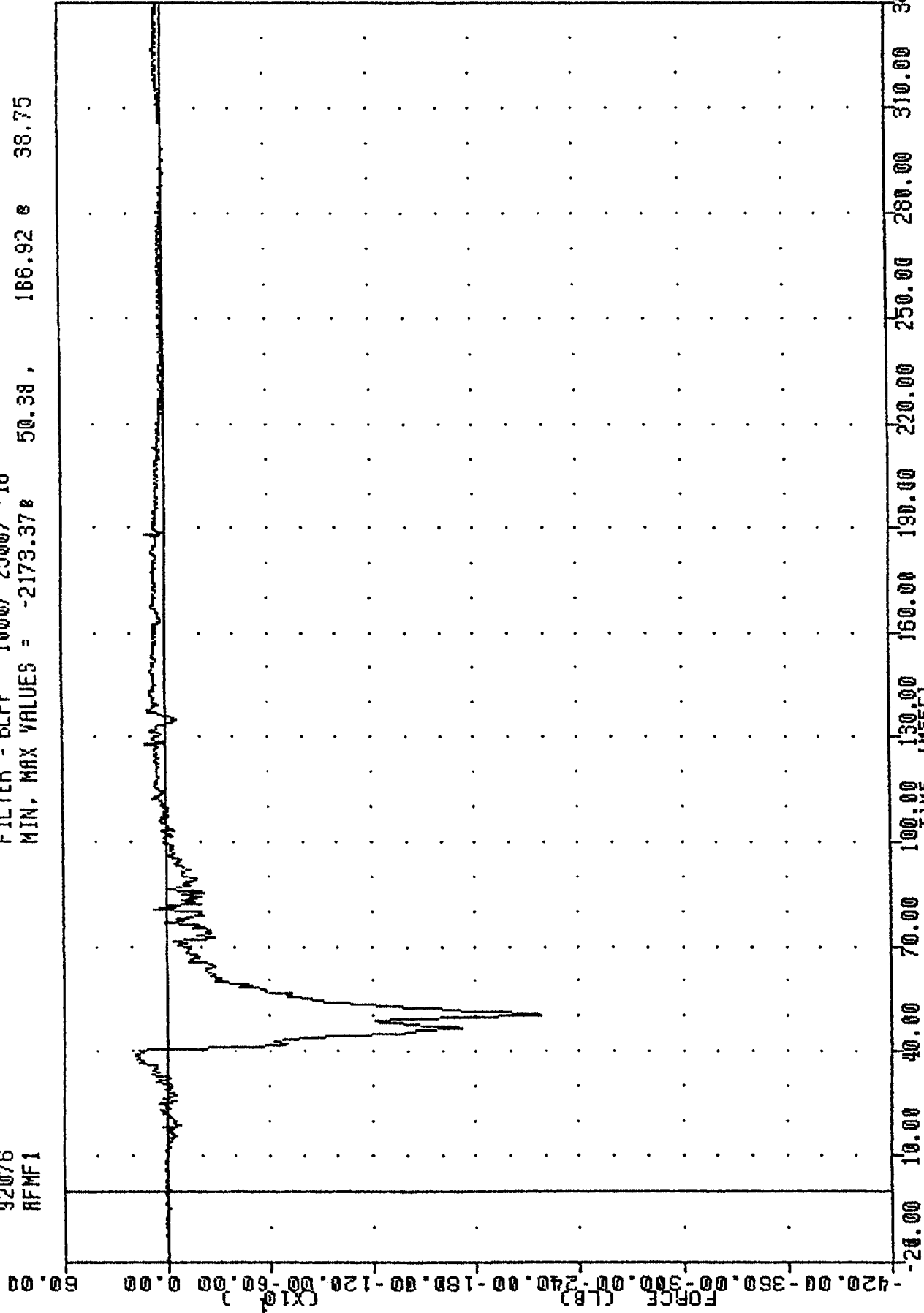
MIN, MAX VALUES = -2402.23 627.22 @ 108.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER LEFT FEMUR FORCE

TRC . 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 RFMF1

FILTER = BLPP 1000/ 2500/ -16  
 MIN. MAX VALUES = -2173.37 50.38 186.92 38.75



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER RIGHT FEMUR FORCE

TRC 920316

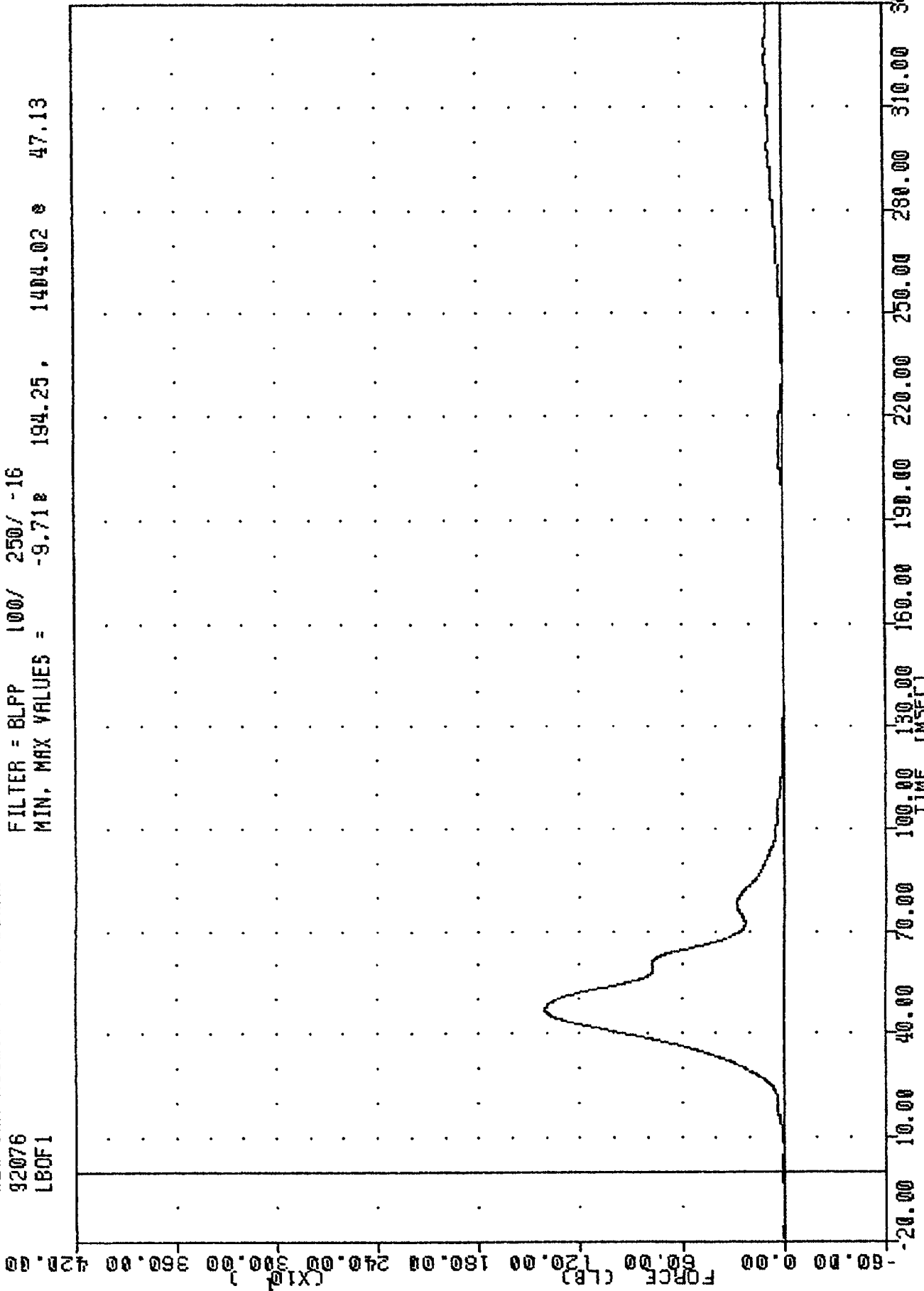
NEW CAR ASSESSMENT PROGRAM

92076

LBOF1

FILTER = BLPP 100/ 250/ -16

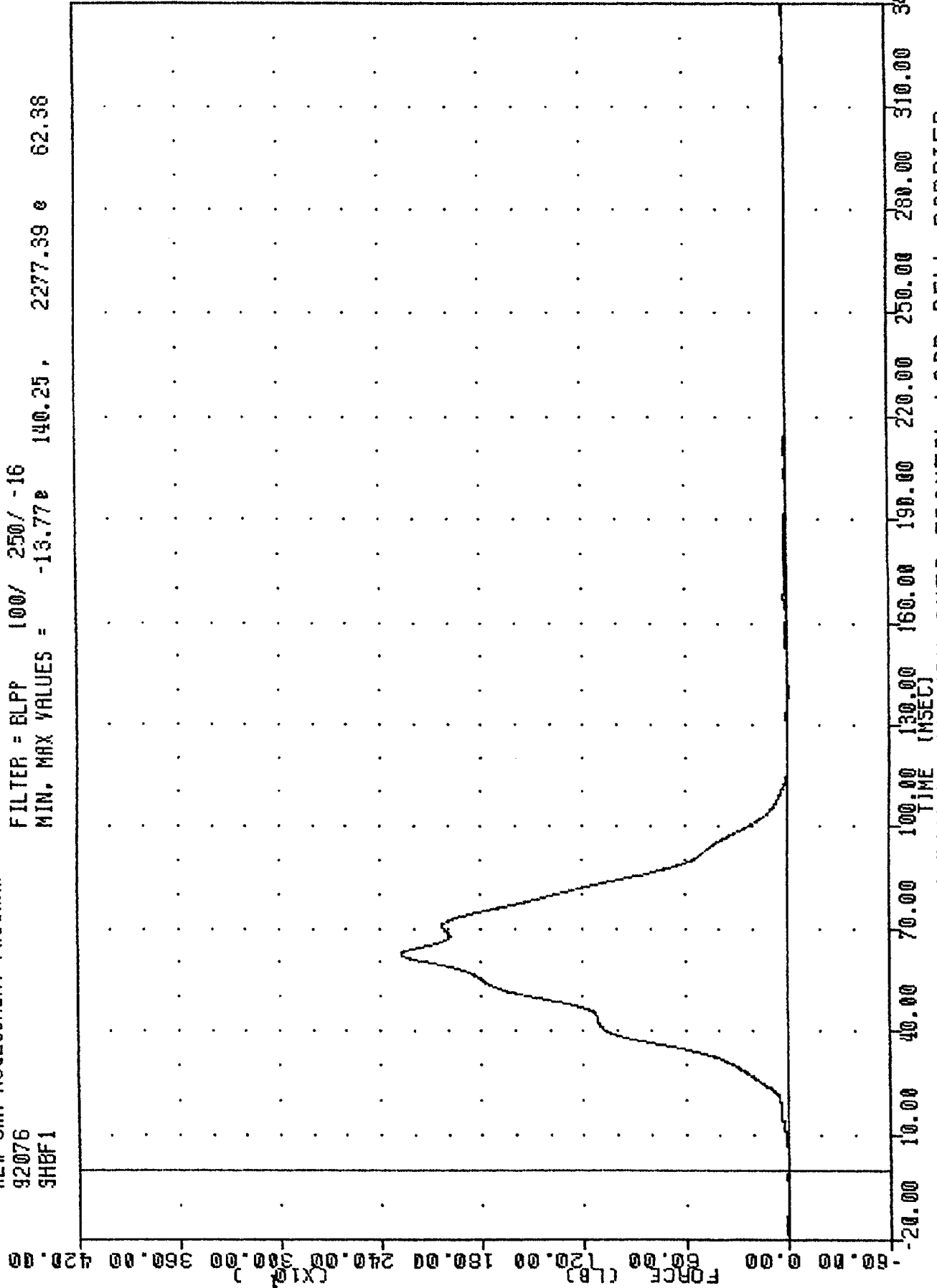
MIN. MAX VALUES = -9.71e 194.25 . 1404.02 e 47.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
DRIVER LAP BELT OUTBOARD FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 SHEF1

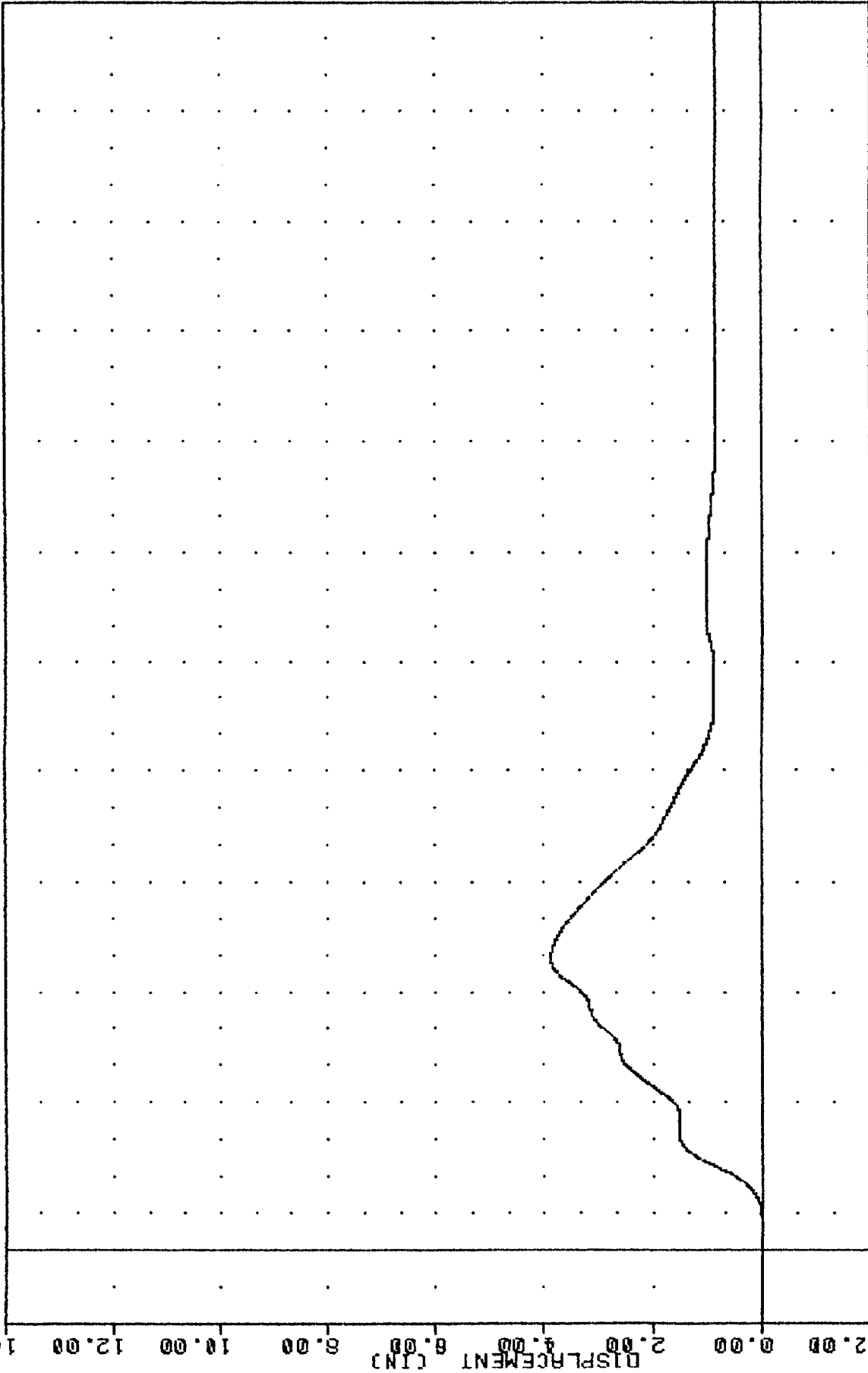
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -13.77e 140.25 , 2277.39 e 62.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER SHOULDER BELT FORCE

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 SHB01

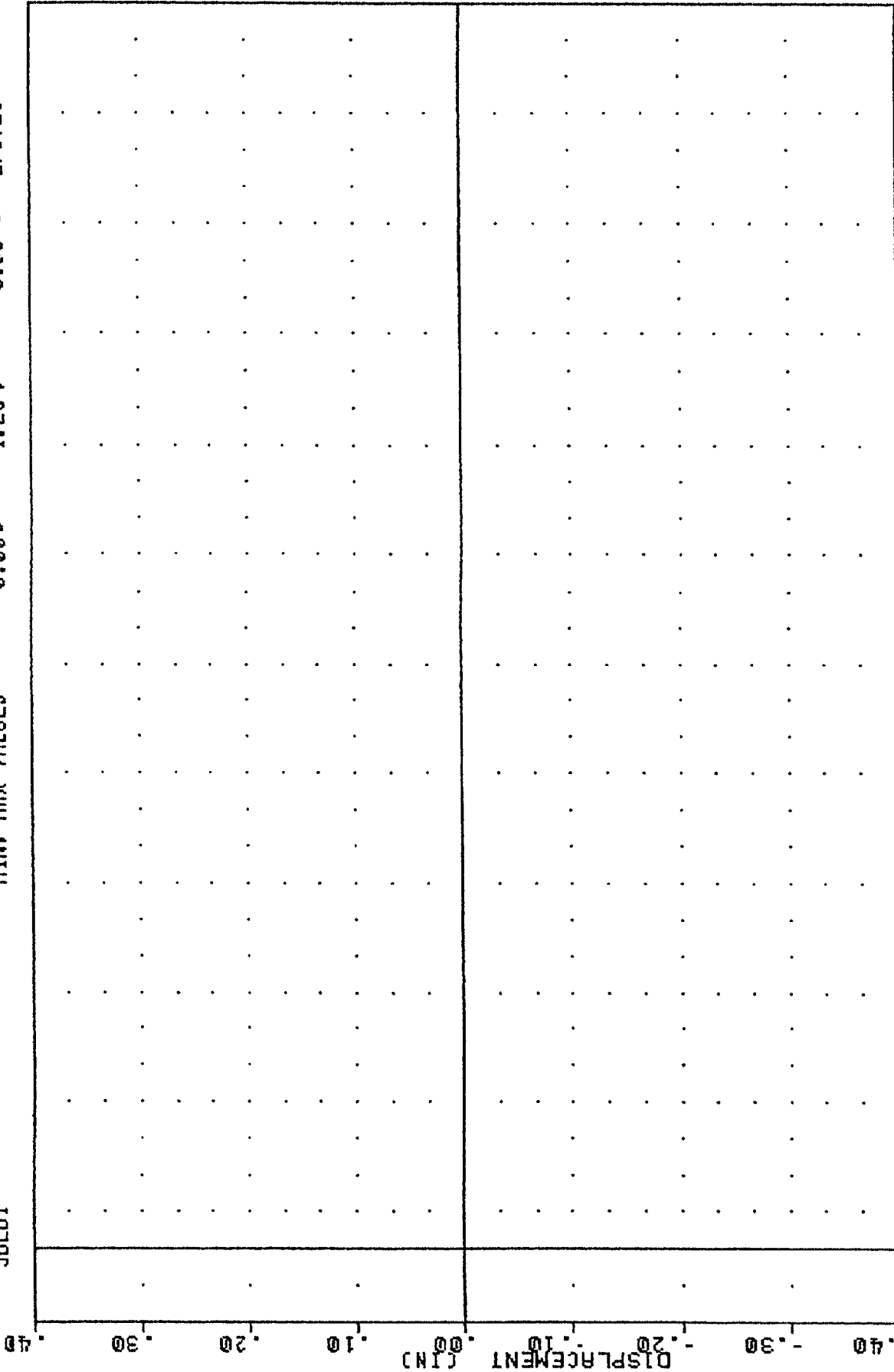
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -0.01E 3.88 e 79.13



920316  
 1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER SHOULDER BELT DISPLACEMENT

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 SBED1

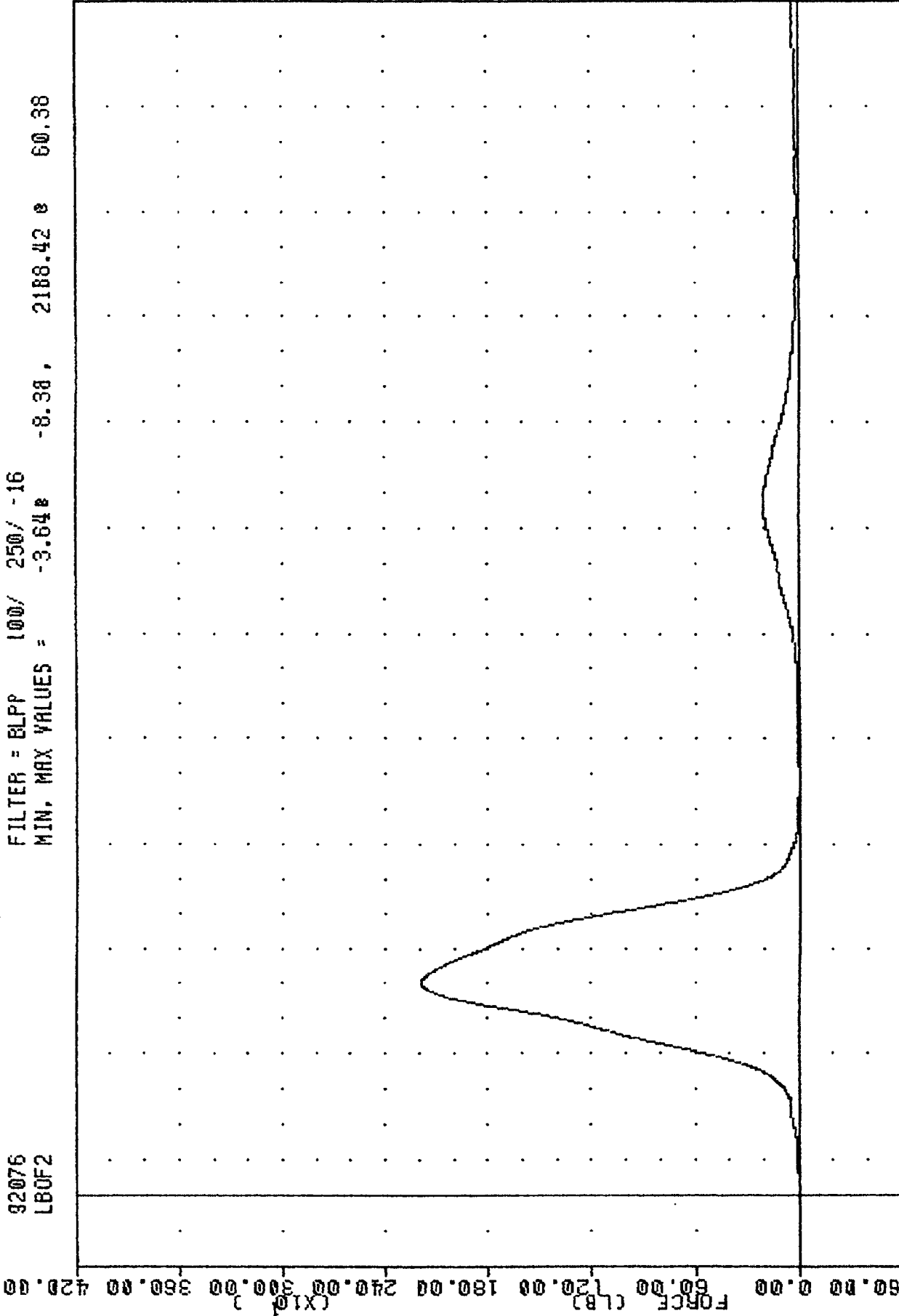
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = 0.00e 1.25, 0.00 e 276.25



920316  
 -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  
 TIME (INSEC)  
 1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 DRIVER SEAT BELT EXTENSION

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 32076  
 LBOF2

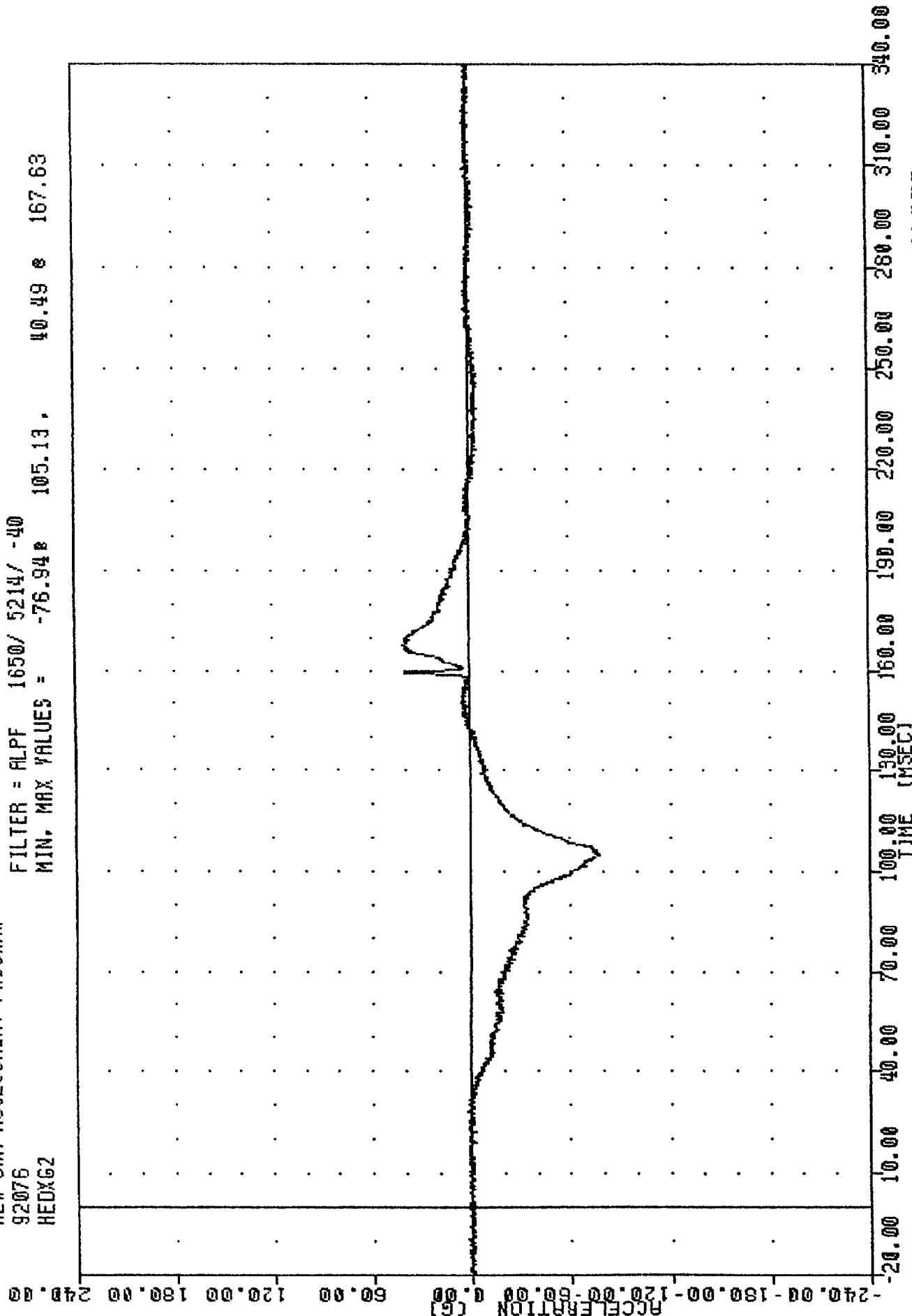
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -3.64 2186.42 8 60.38



920316  
 B-23  
 1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER LAP BELT OUTBOARD FORCE

TRC . 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
HEDXG2

FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -76.94 105.13 . 40.49 167.63



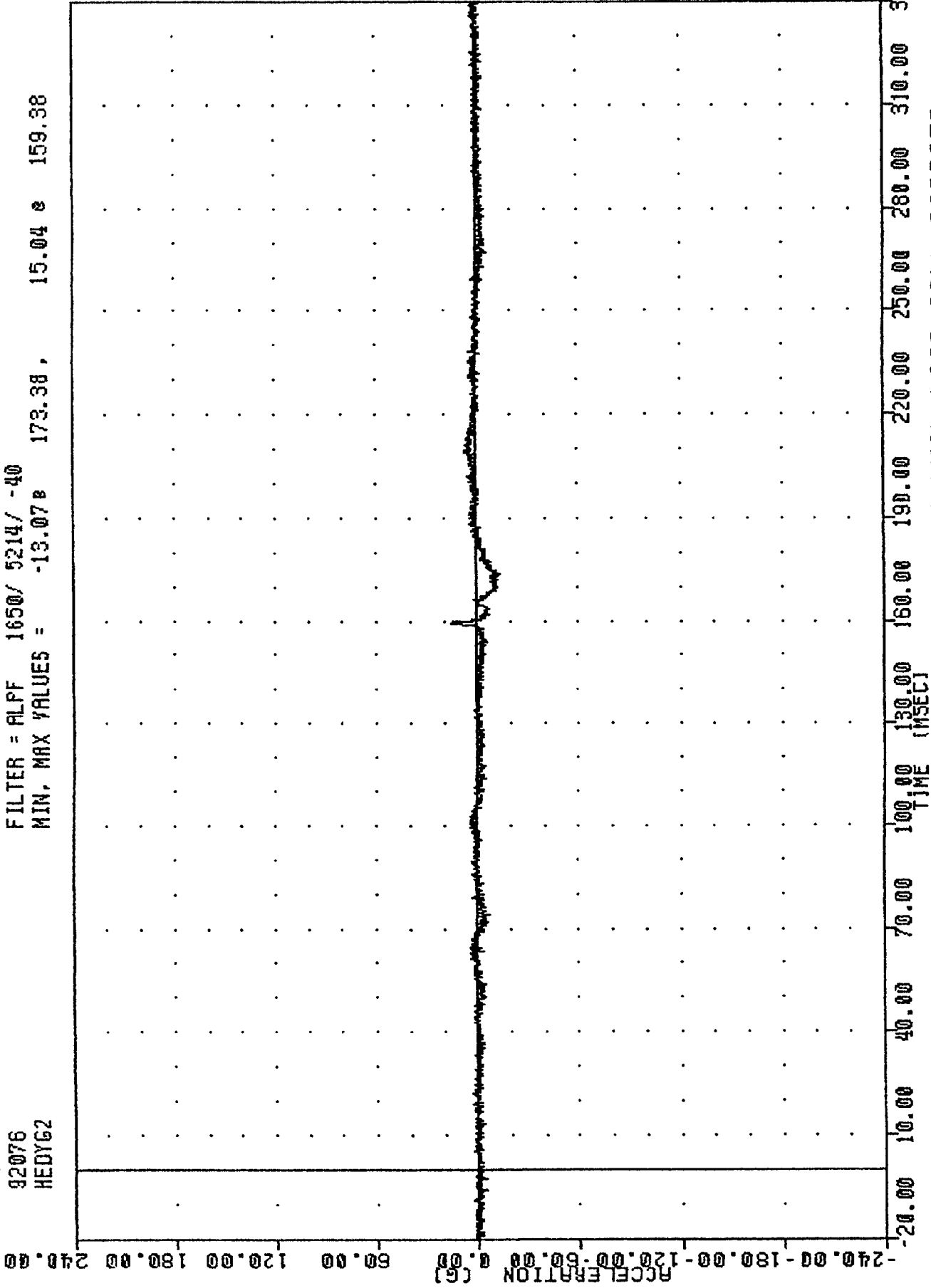
B-24

920316

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
PASSENGER HEAD X-AXIS ACCELERATION

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 HEDYG2

FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -13.07e 173.38 , 15.04 e 159.38



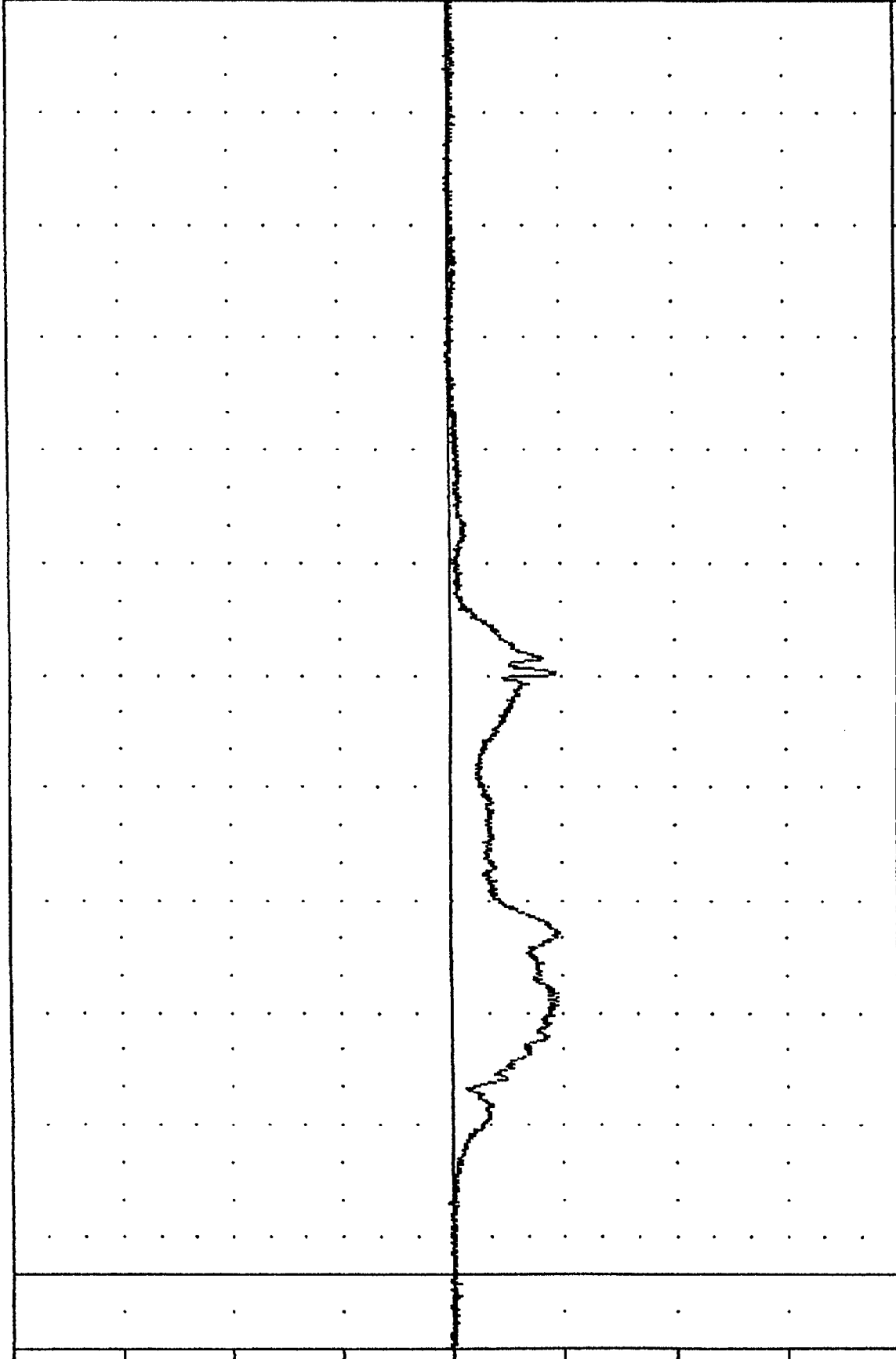
1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER HEAD Y-AXIS ACCELERATION

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
HEZG2

FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -57.93B 91.25, 2.65 @ 19.13

-240.00  
-180.00  
-120.00  
-60.00  
0.00  
60.00  
120.00  
180.00  
240.00

ACCELERATION (G)

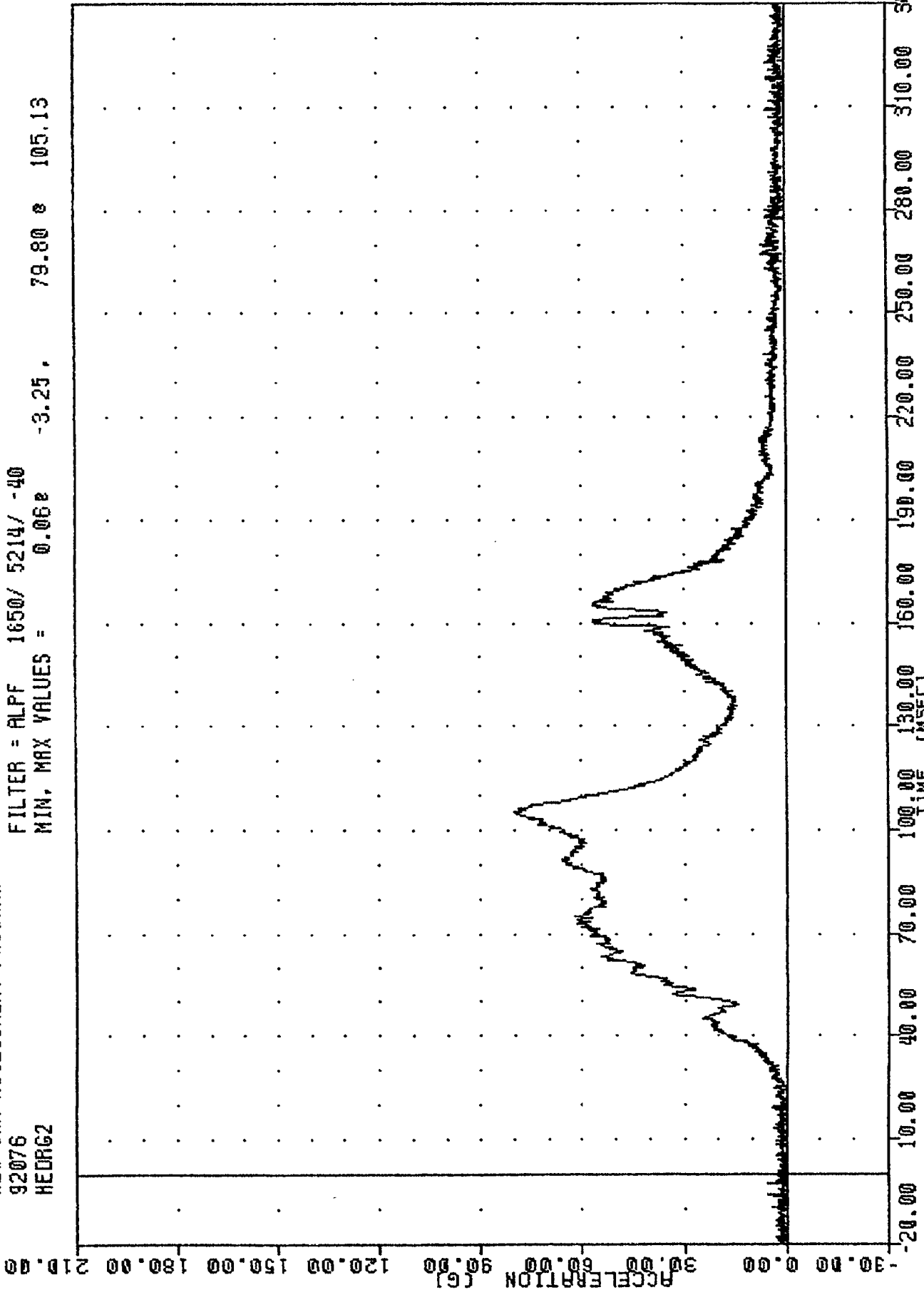


-240.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
TIME (MSEC)

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
PASSENGER HEAD Z-AXIS ACCELERATION

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 HEDRG2

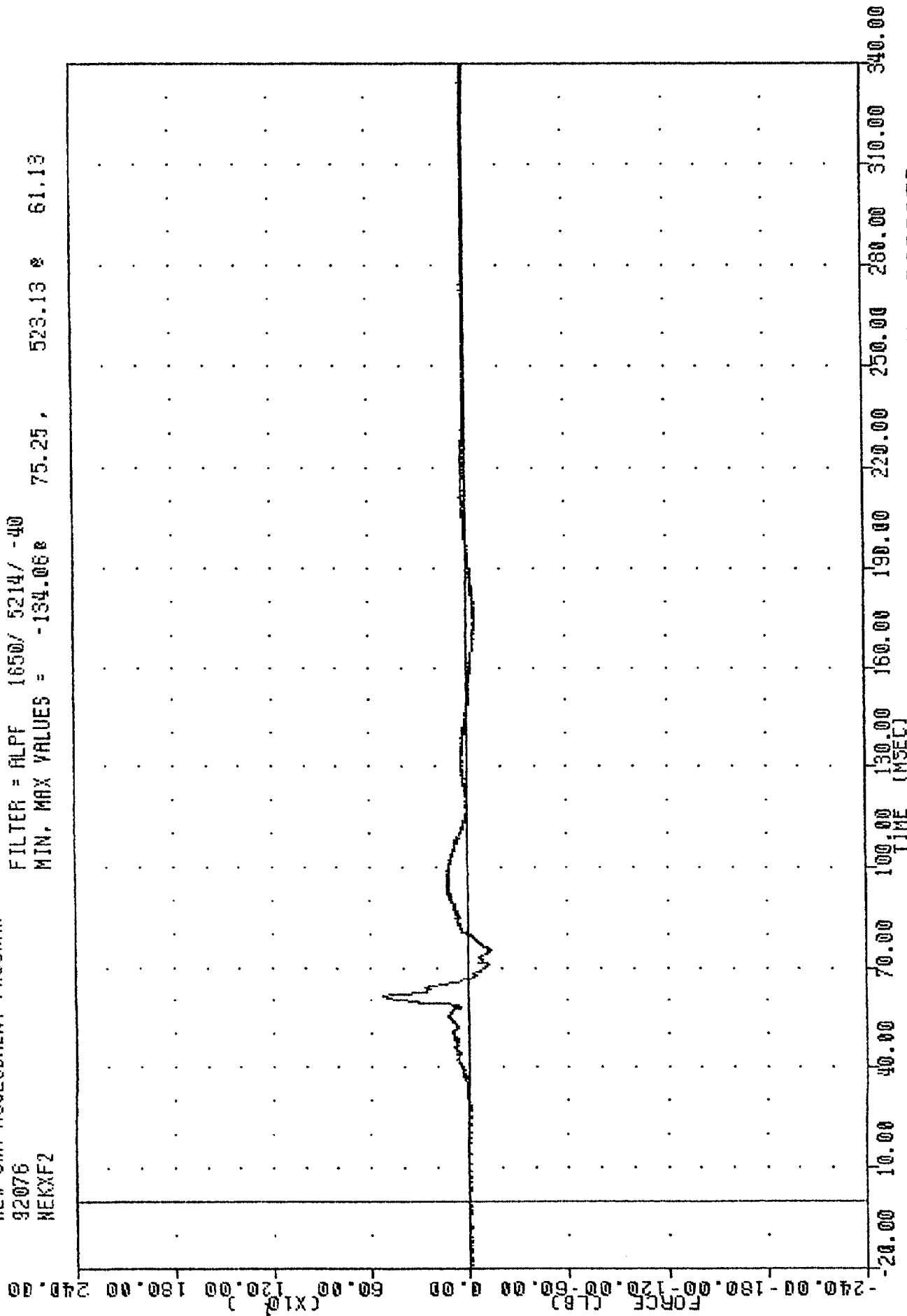
FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = 0.06e -3.25, 79.80 e 105.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER HEAD RESULTANT ACCELERATION

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 HEKXF2

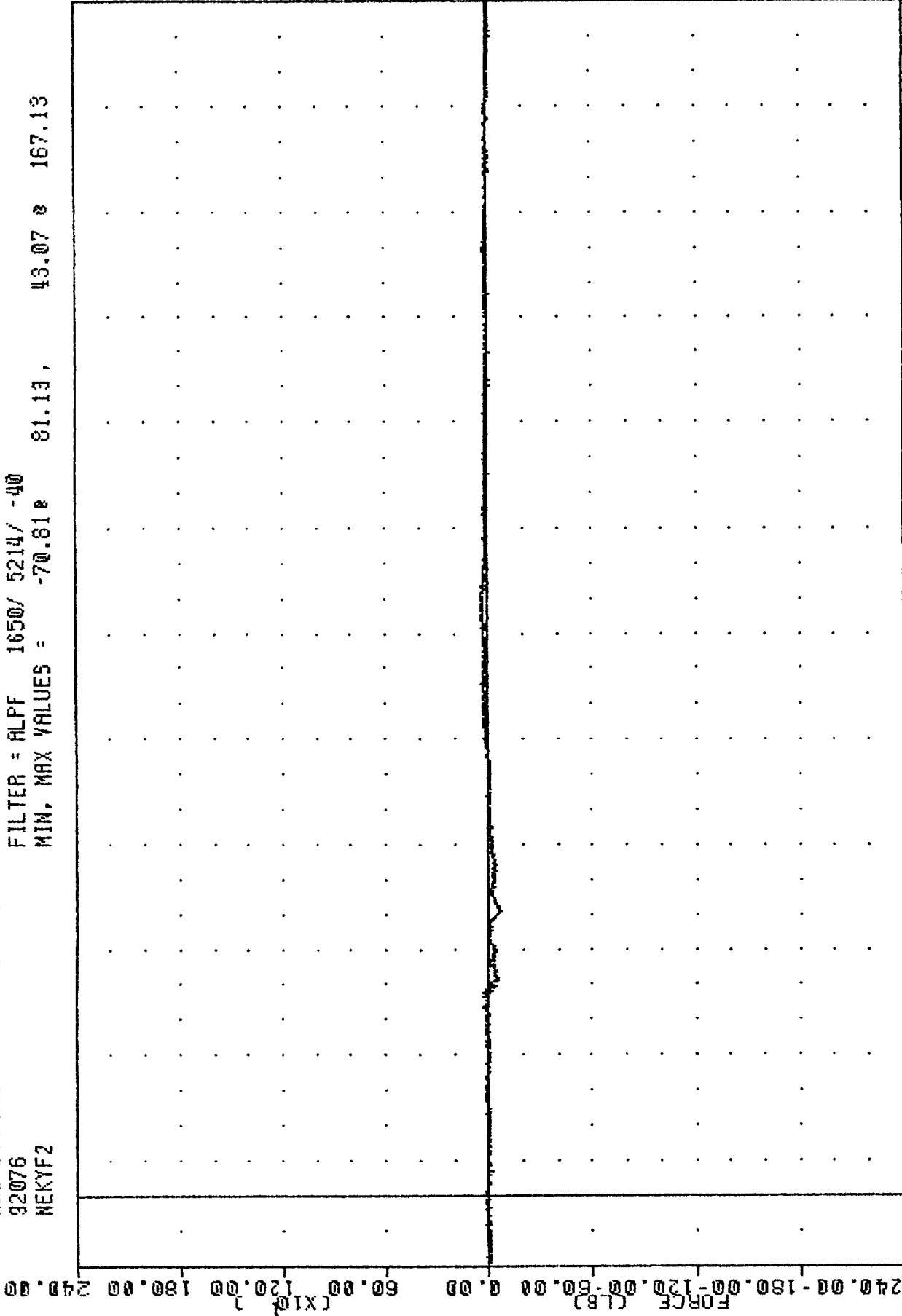
FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -134.06 75.25 , 523.13 61.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER NECK Y-AXIS SHEAR FORCE

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 MEKZF2

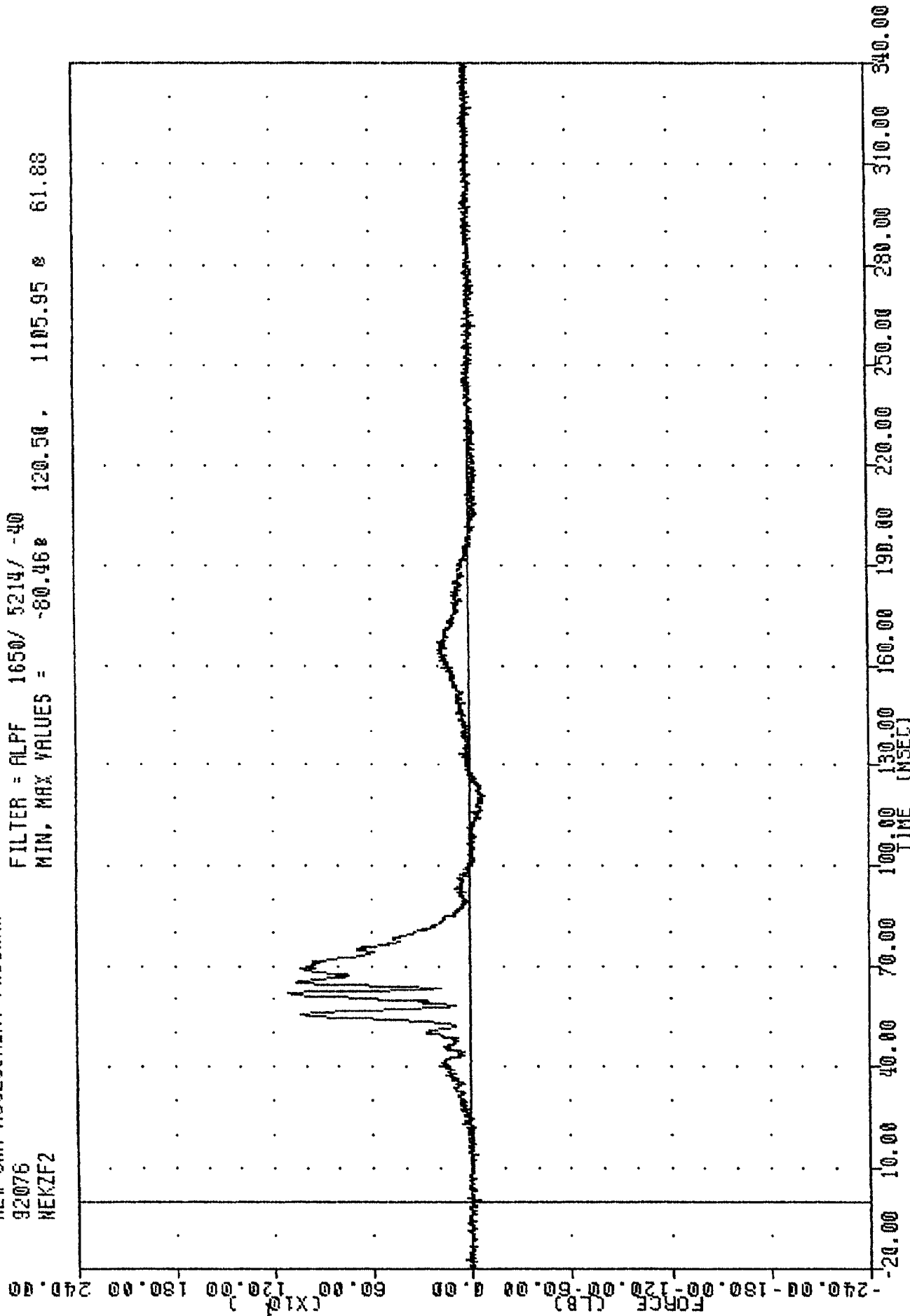
FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = -70.61 81.13, 43.07 167.13



-240.00 180.00 120.00 60.00 0.00 60.00 120.00 180.00 240.00  
 TIME (MSEC)  
 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00  
 1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER NECK Y-AXIS SHEAR FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 HEKZF2

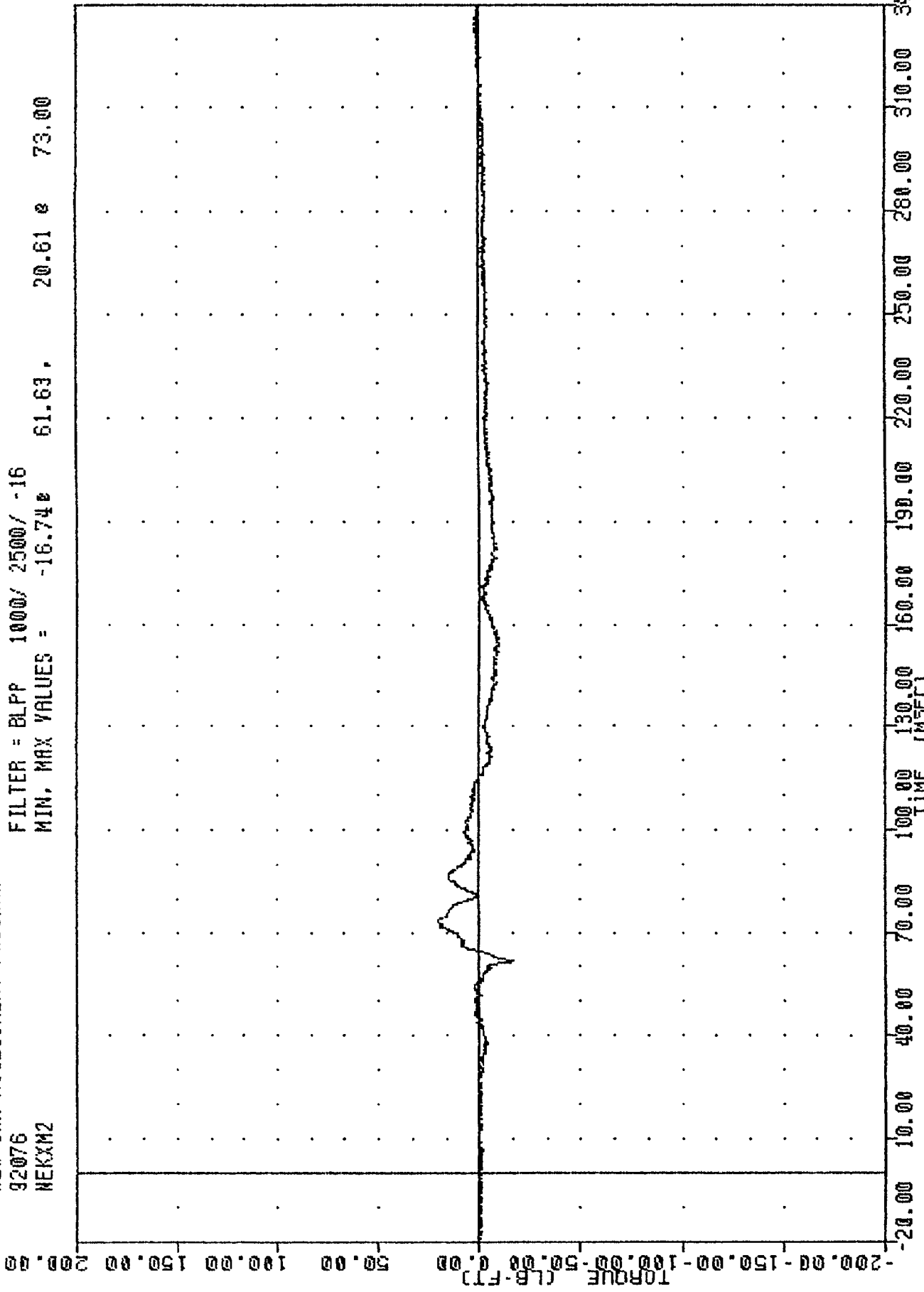
FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -80.46e 120.50, 1105.95 e 61.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER NECK Z-AXIS AXIAL FORCE

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 NEKX2

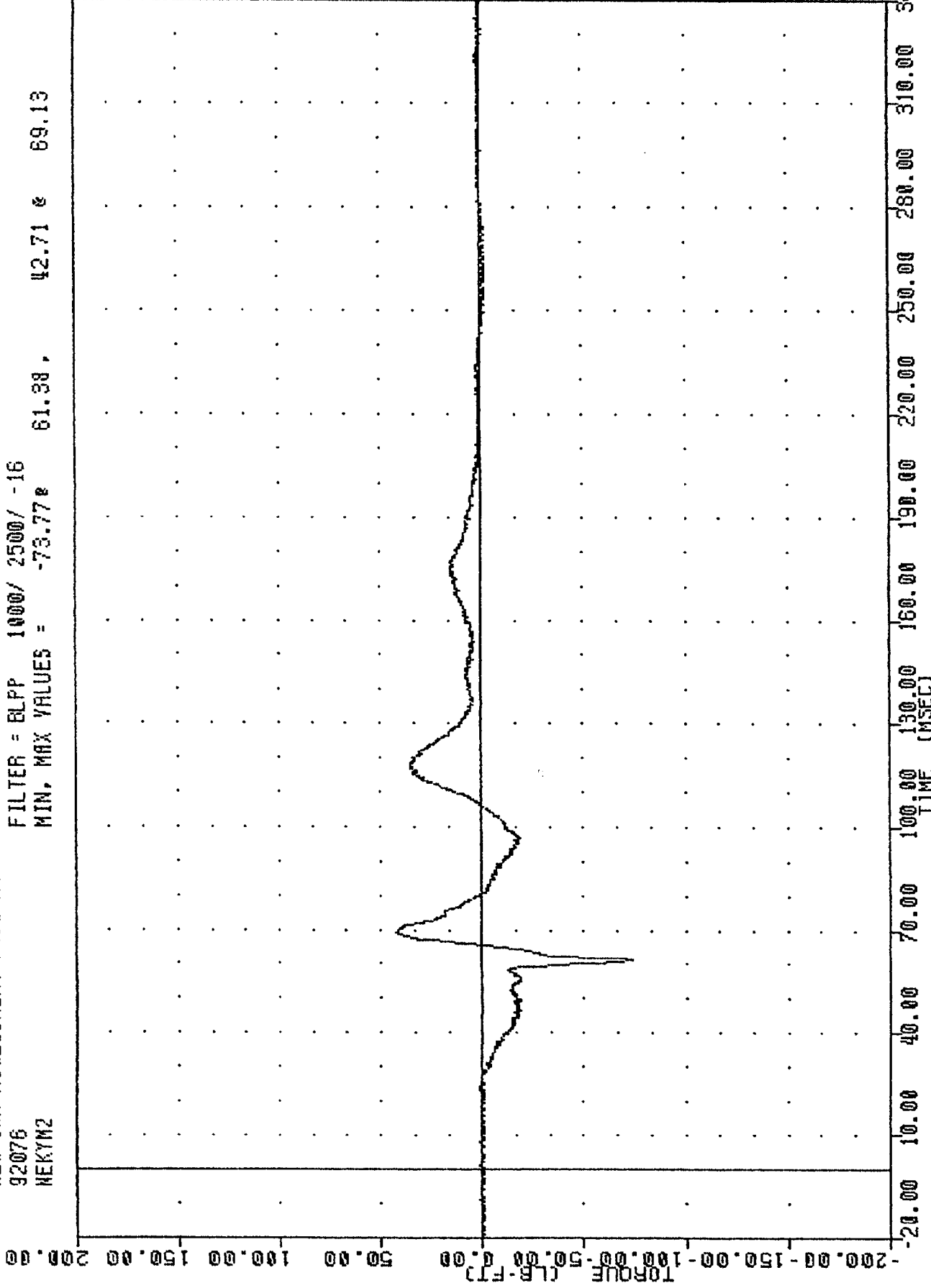
FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -16.74e 61.63, 20.61 e 73.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER NECK MOMENT ABOUT X AXIS

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 NEKYM2

FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -73.77 42.71 61.38 69.13

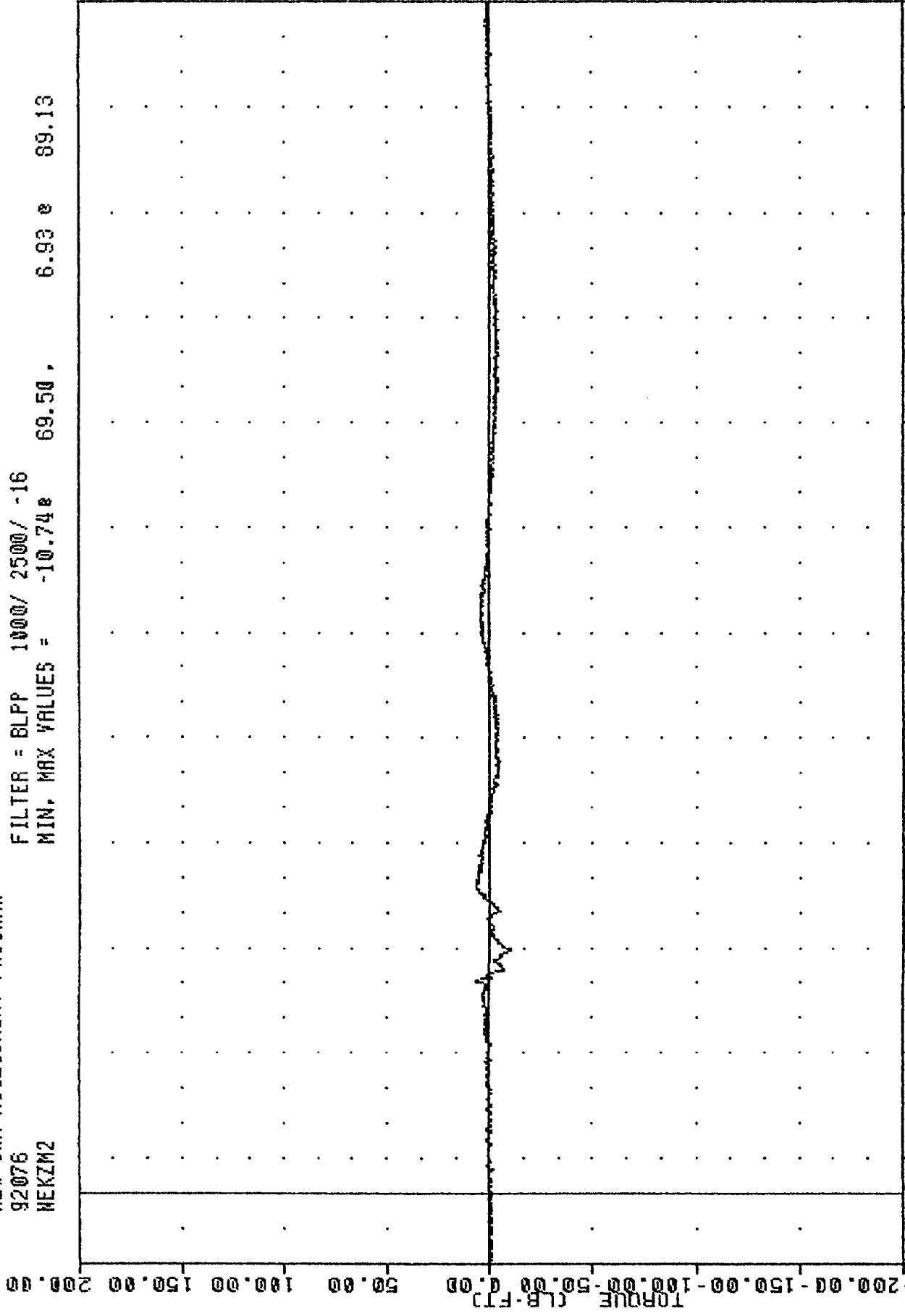


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSIVE NECK MOMENT ABOUT Y-AXIS

TRC  
 92076  
 MEKZM2  
 NEW CAR ASSESSMENT PROGRAM

920316

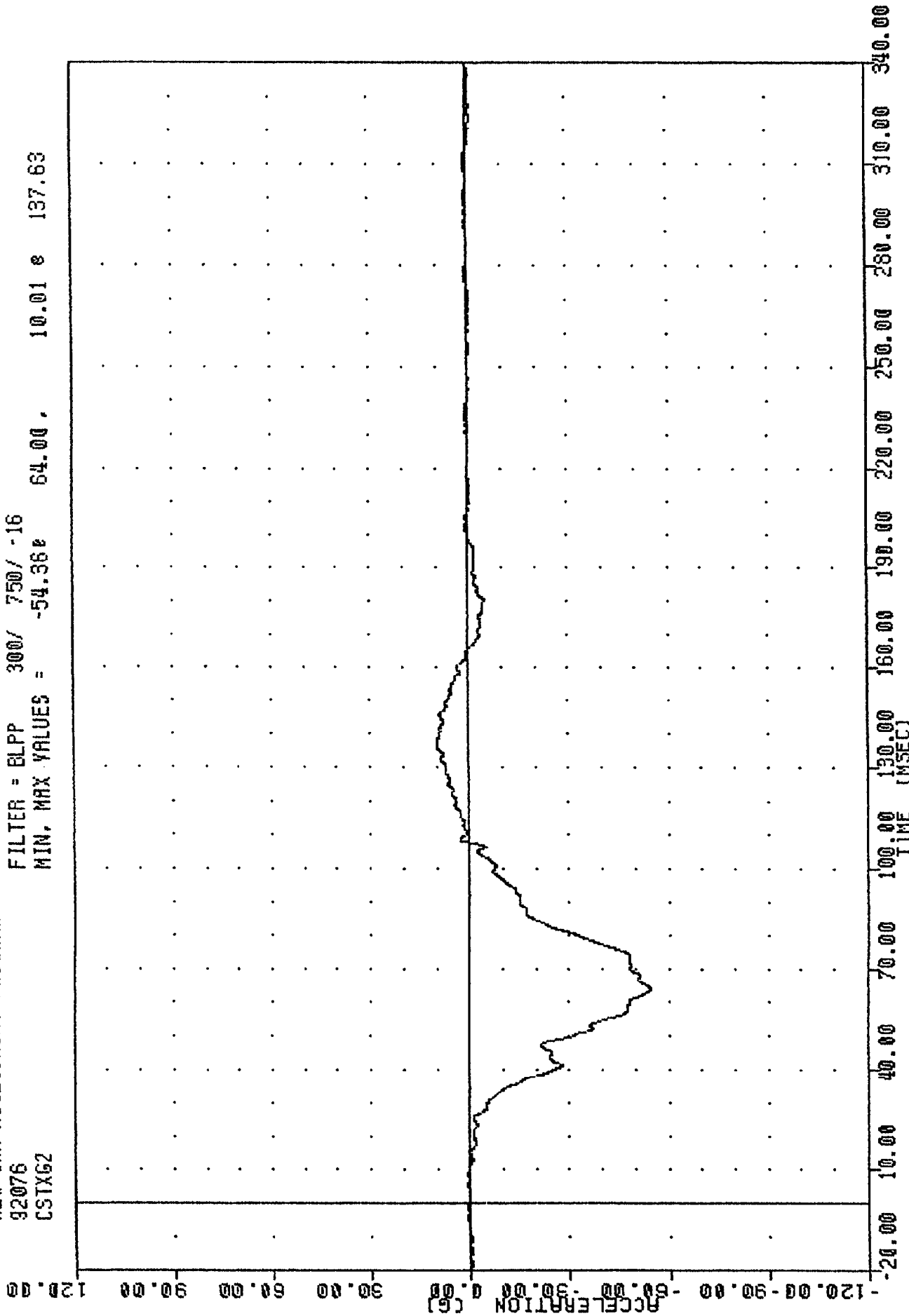
FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -10.74e 69.50, 6.93 e 89.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER NECK MOMENT ABOUT Z AXIS

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 CSTXG2

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -54.36% 64.00, 10.01 % 137.63

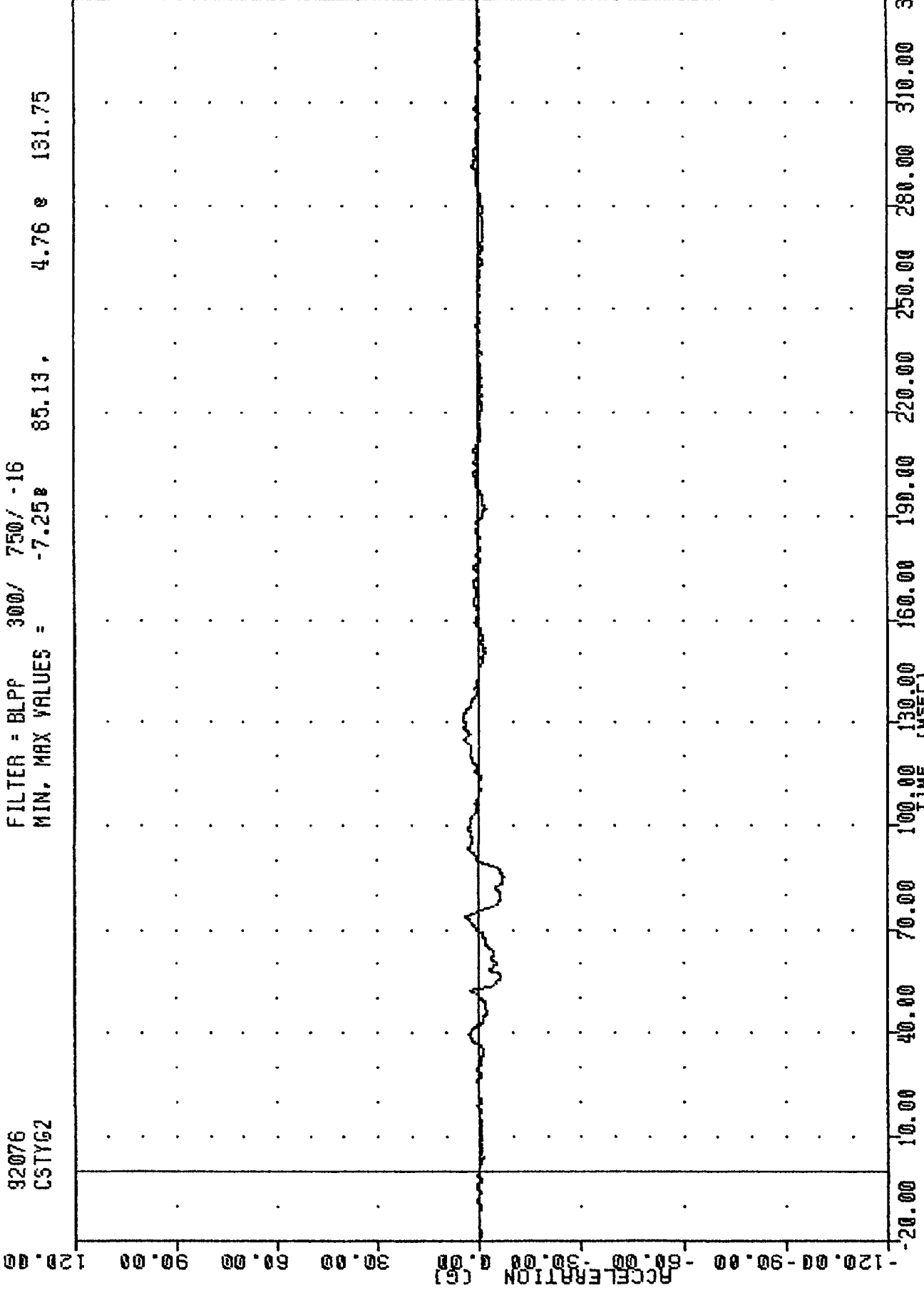


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER CHEST Y-AXIS ACCELERATION

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 CSTYG2

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -7.25e 85.13, 4.76 e 131.75

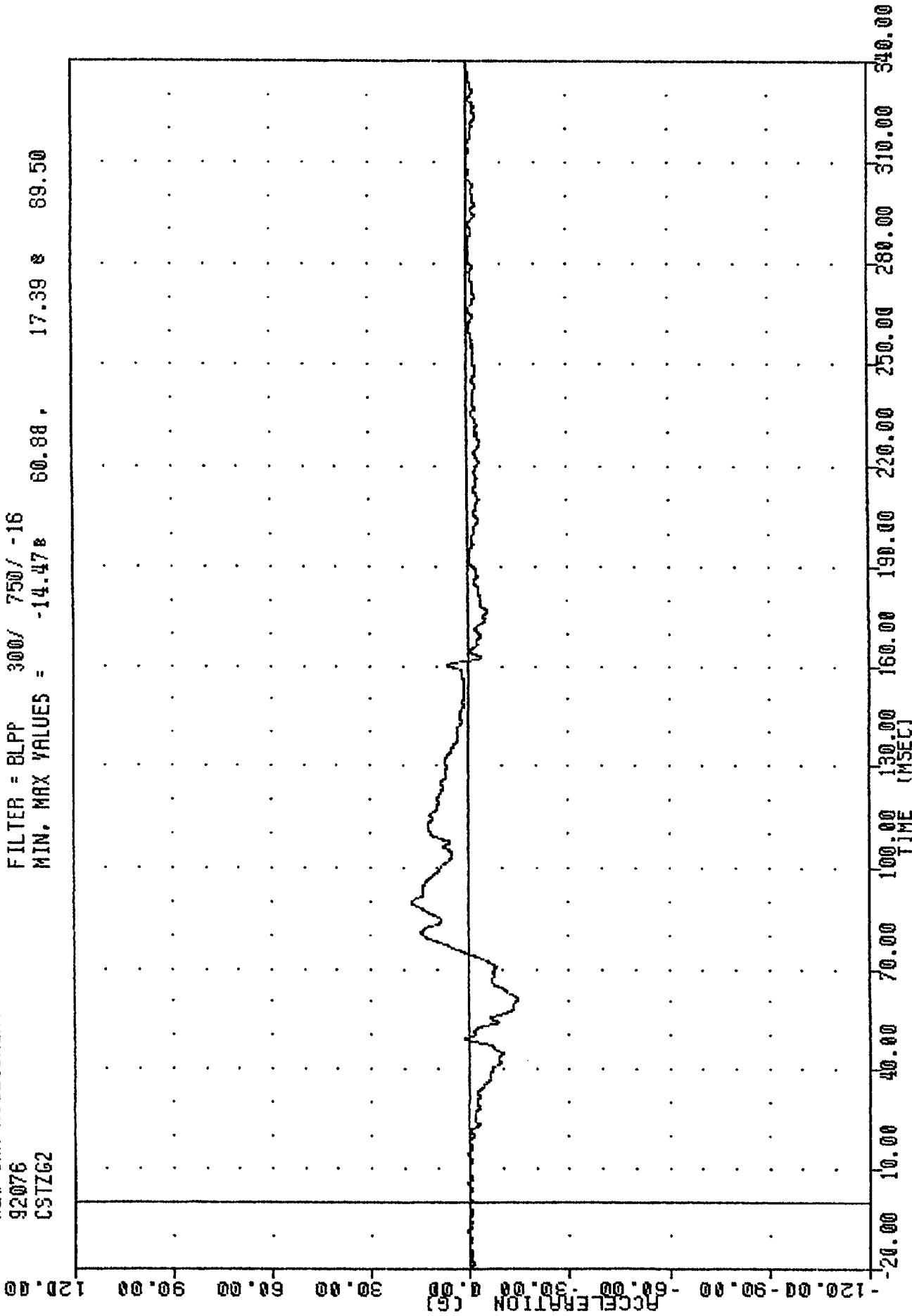
920316



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER CHEST Y-AXIS ACCELERATION

TAC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
CSTZG2

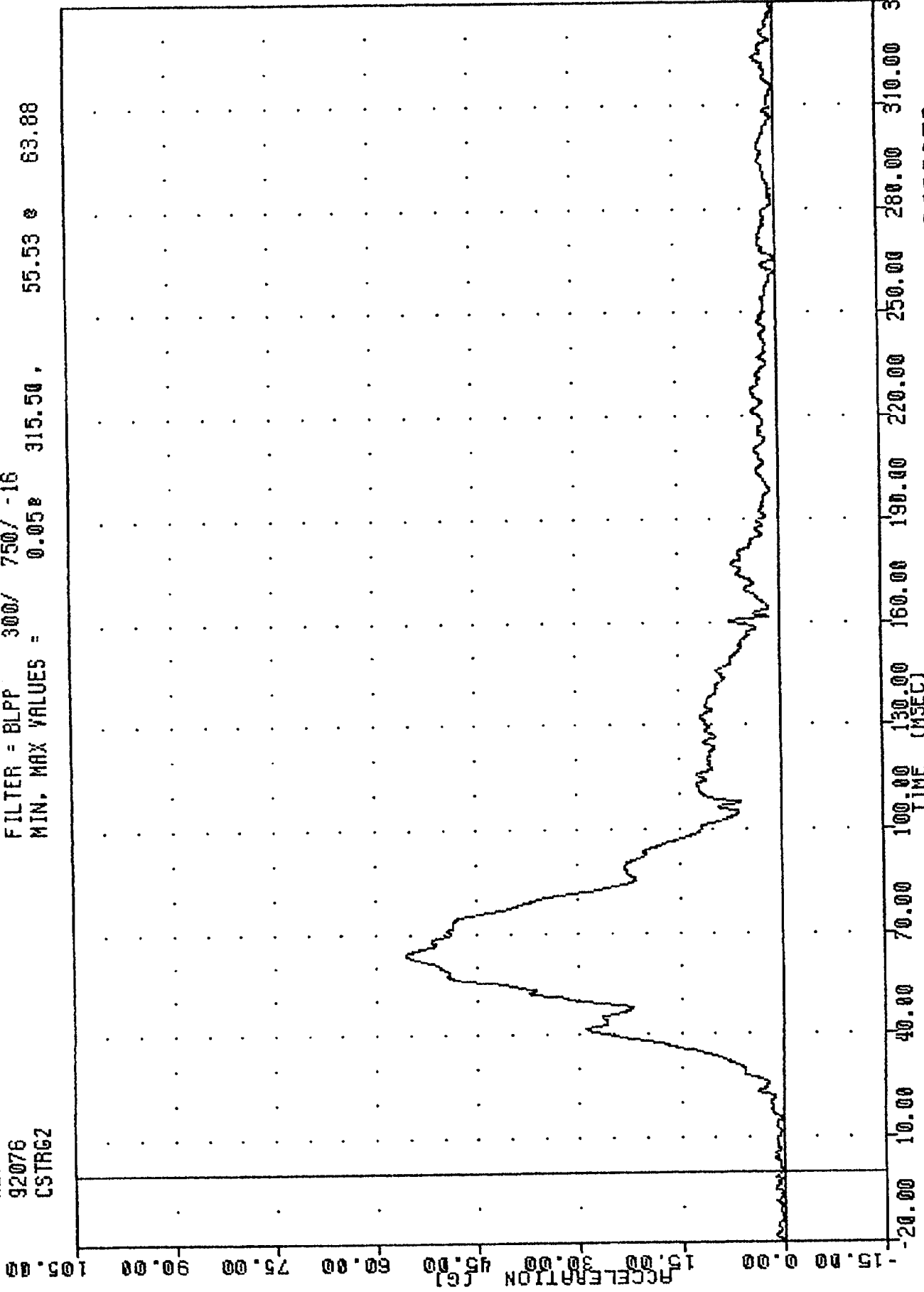
FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = -14.478 60.88 , 17.39 8 89.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
PASSENGER CHEST Z-AXIS ACCELERATION

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 CSTRG2

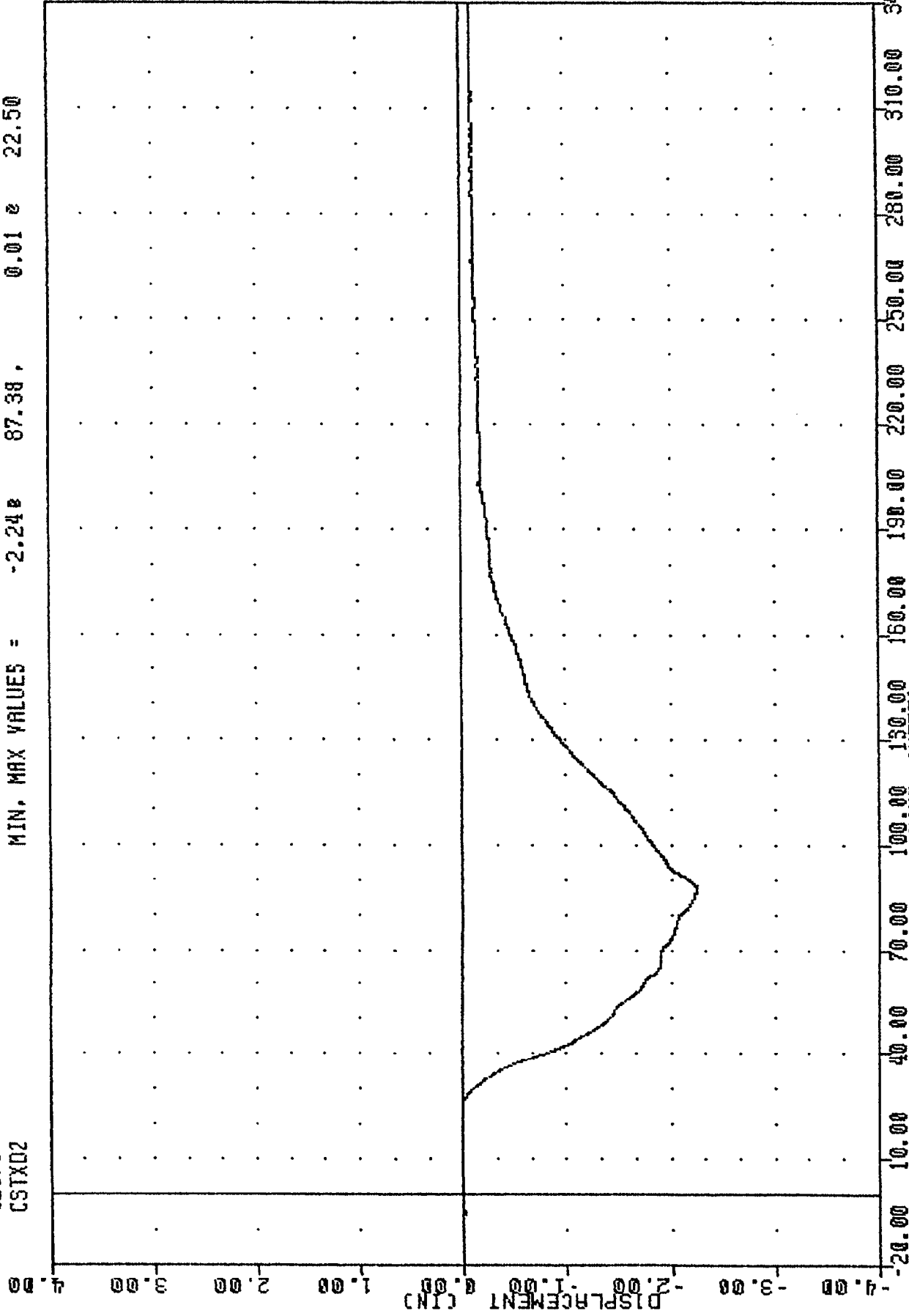
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.05e 315.50, 55.53 e 63.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER CHEST RESULTANT ACCELERATION

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 CSTXD2

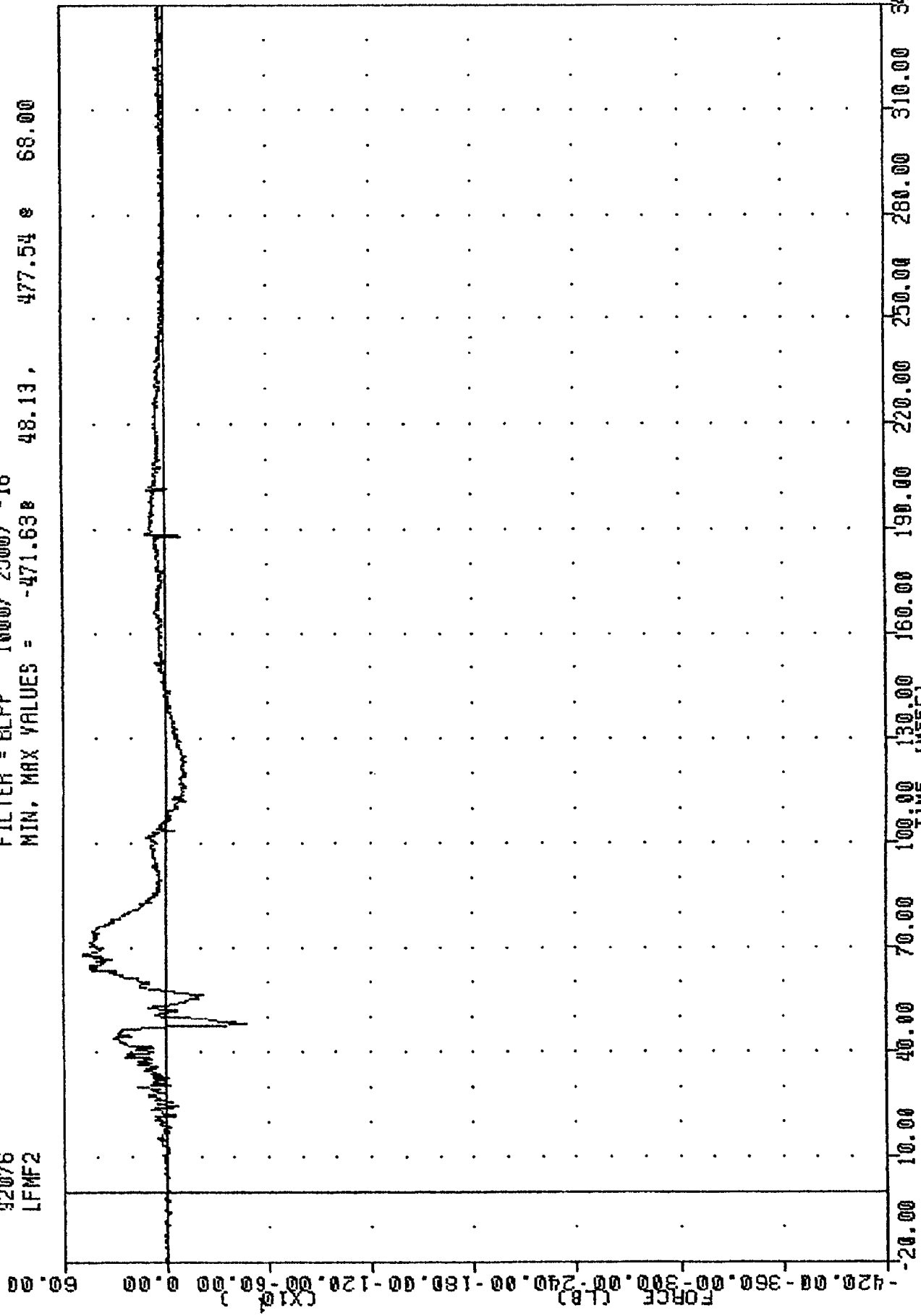
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -2.24 87.38 , 0.01 e 22.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER CHEST DEFLECTION

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LFMF2

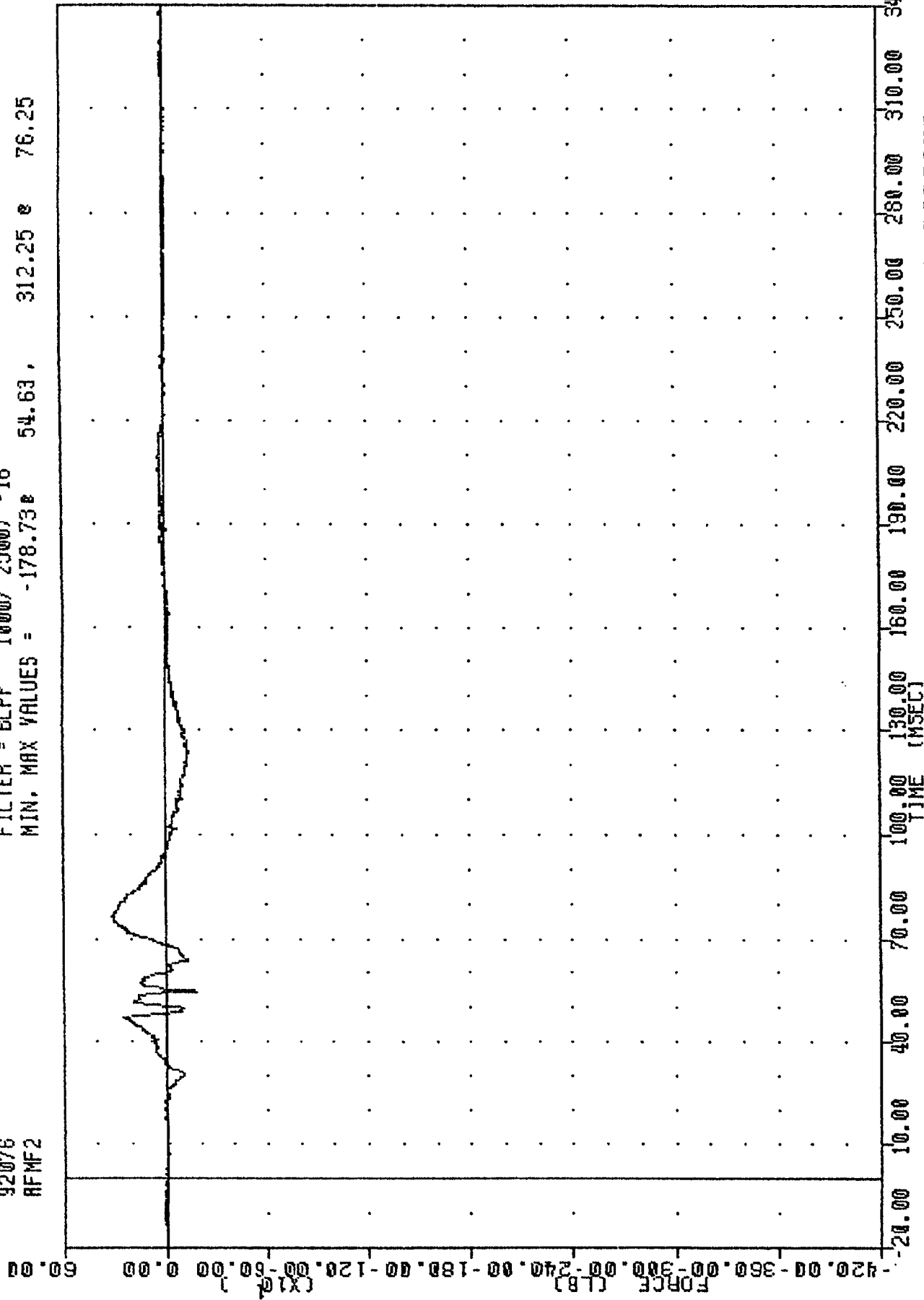
FILTER = BLPP 1000/ 2500/ -16  
 MIN, MAX VALUES = -471.63 48.13, 477.54 e 68.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER LEFT FEMUR FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 AFMF2

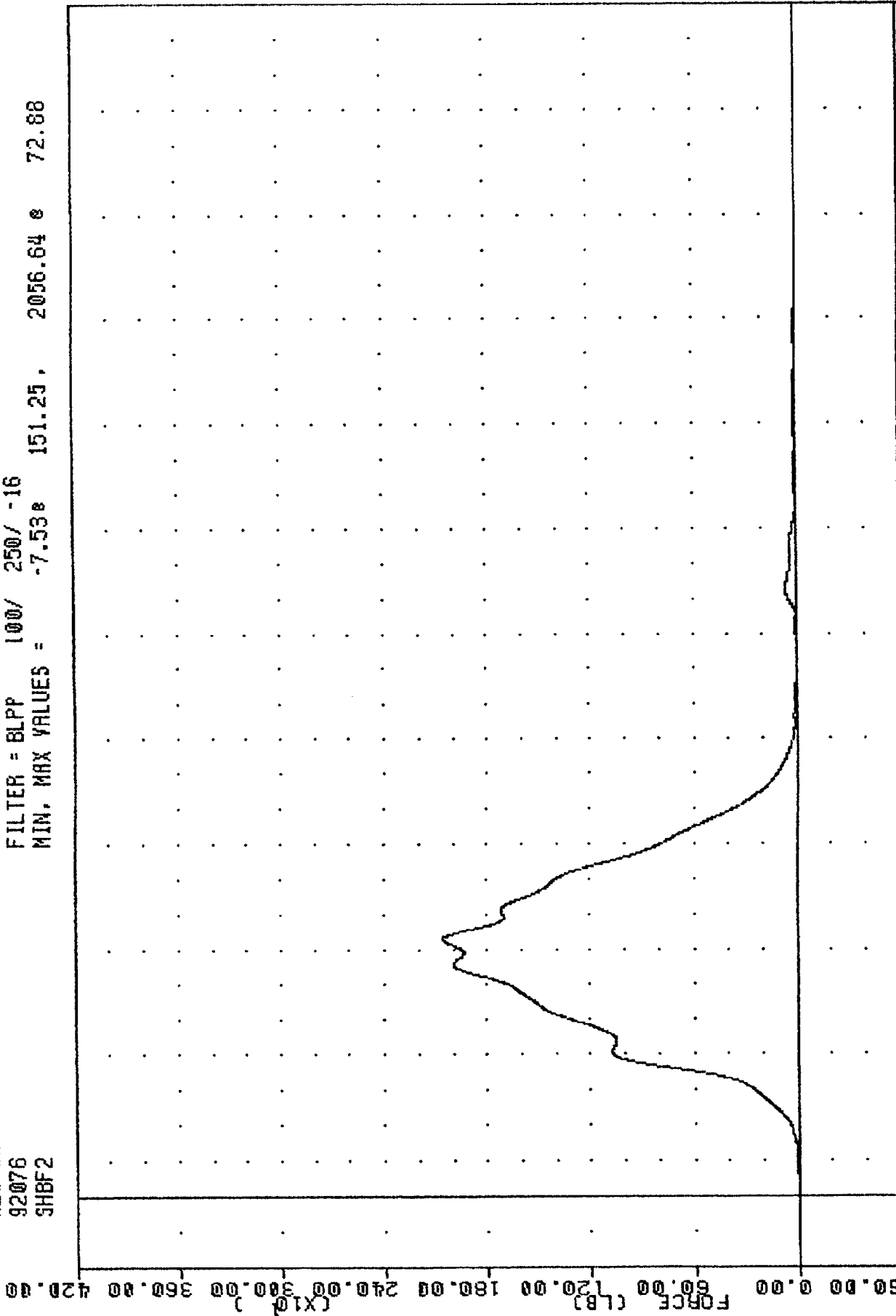
FILTER = BLPP 1000/ 2500/ -16  
 MIN. MAX VALUES = -178.73 54.63 312.25 76.25



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER RIGHT FEMUR FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 9HBF2

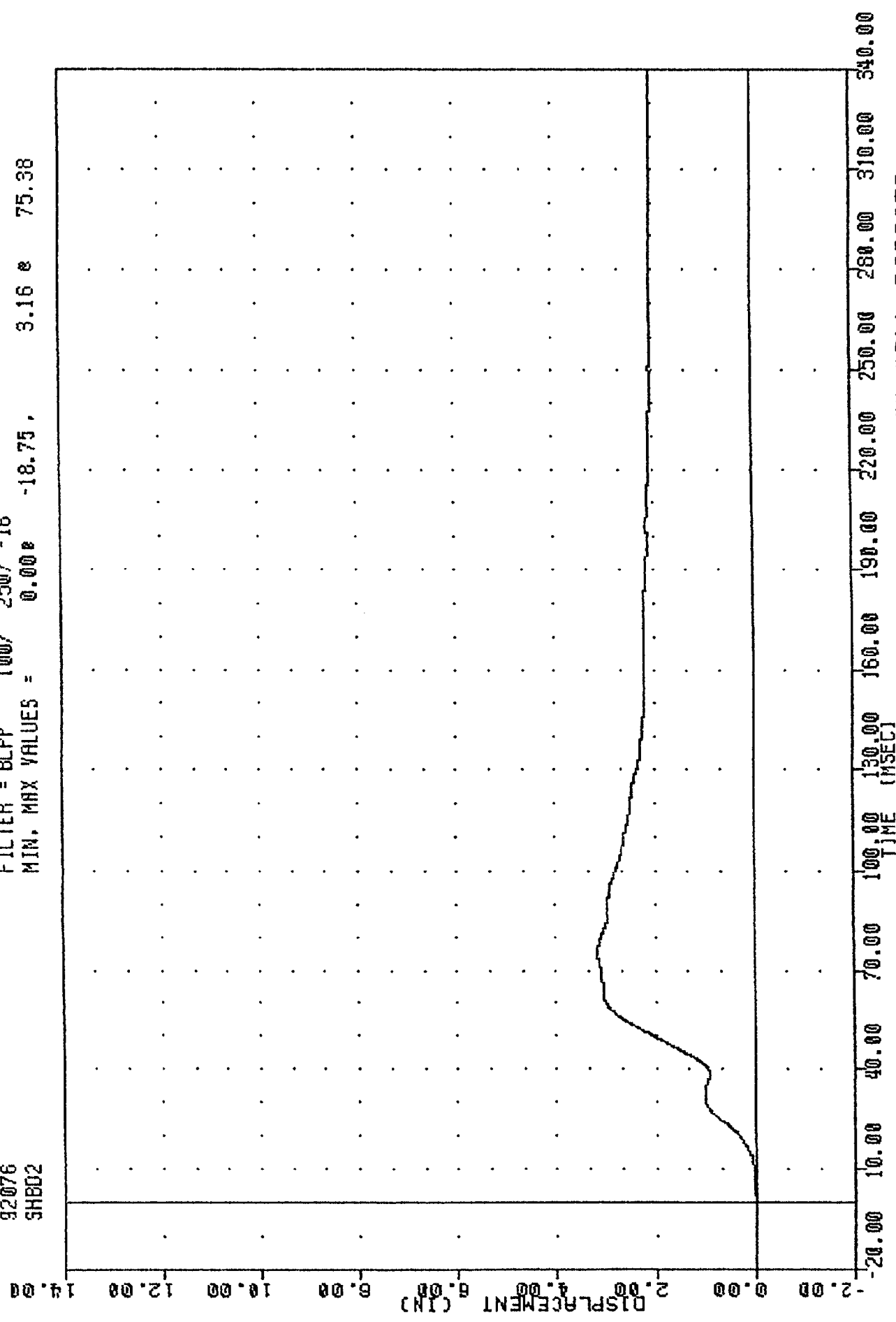
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -7.53e 151.25, 2056.64 e 72.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER SHOULDER BELT FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 SHB02

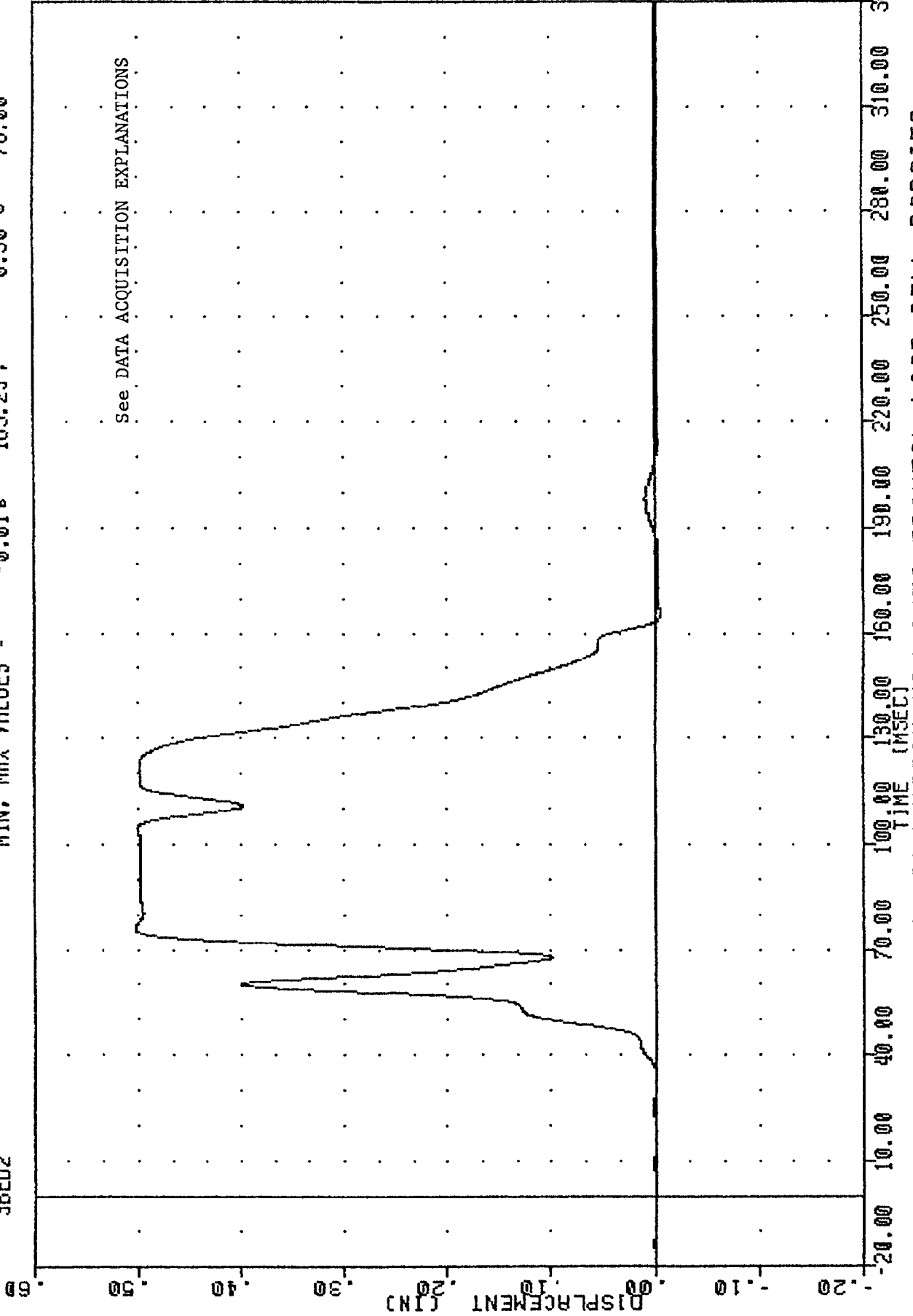
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = 0.00 3.16 e 75.38  
 -18.75 ,



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 PASSENGER SHOULDER BELT DISPLACEMENT

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
SBED2

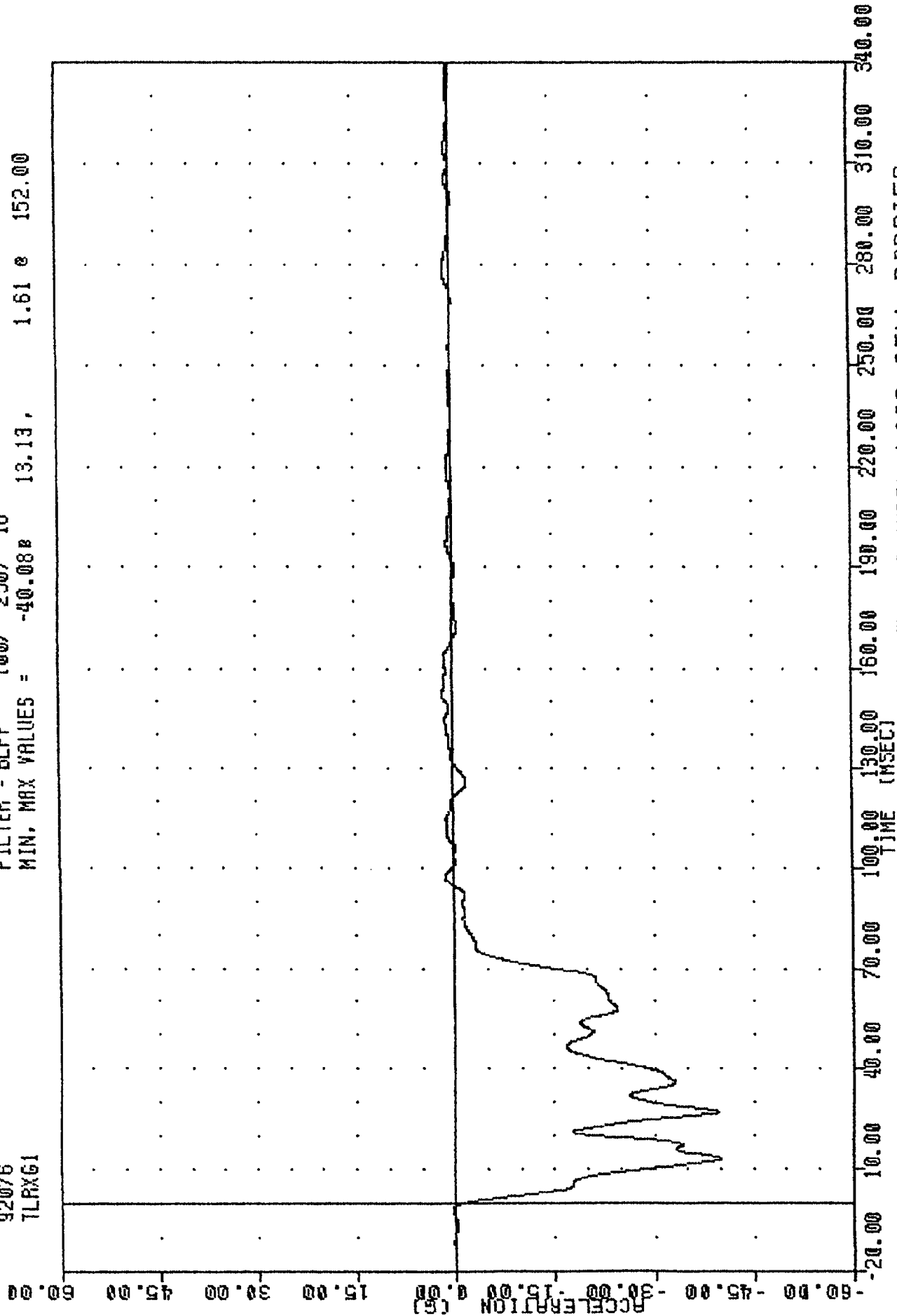
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -0.018 165.25 , 0.50 e 76.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
PASSENGER SEAT BELT EXTENSION

TRC . 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
TLRX61

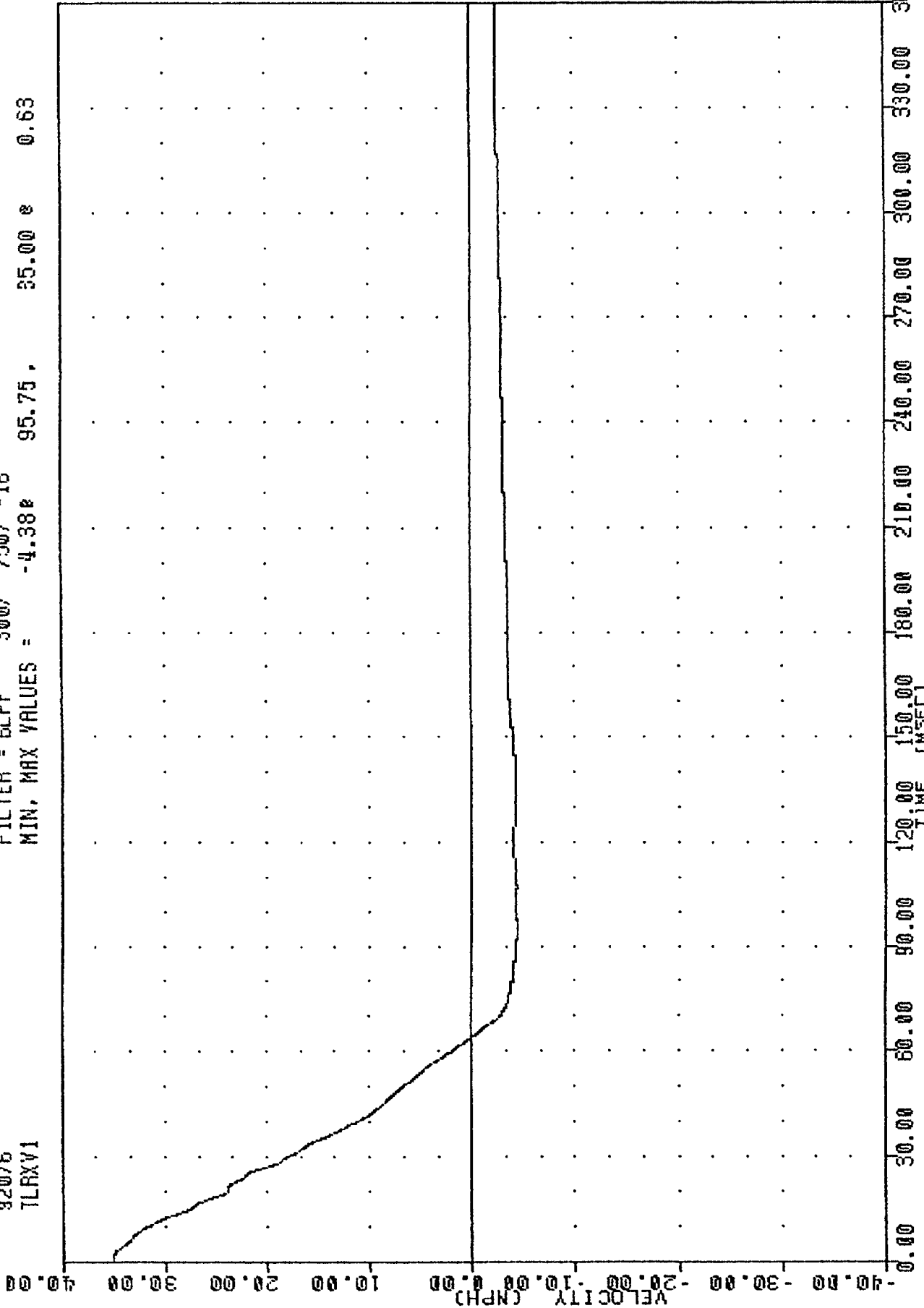
FILTER = 6LPP 100/ 250/ -16  
MIN, MAX VALUES = -40.08 13.13, 1.61 e 152.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
LEFT REAR SEAT X-AXIS ACCELERATION

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 TLRXV1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -4.38 95.75, 35.00 0.63

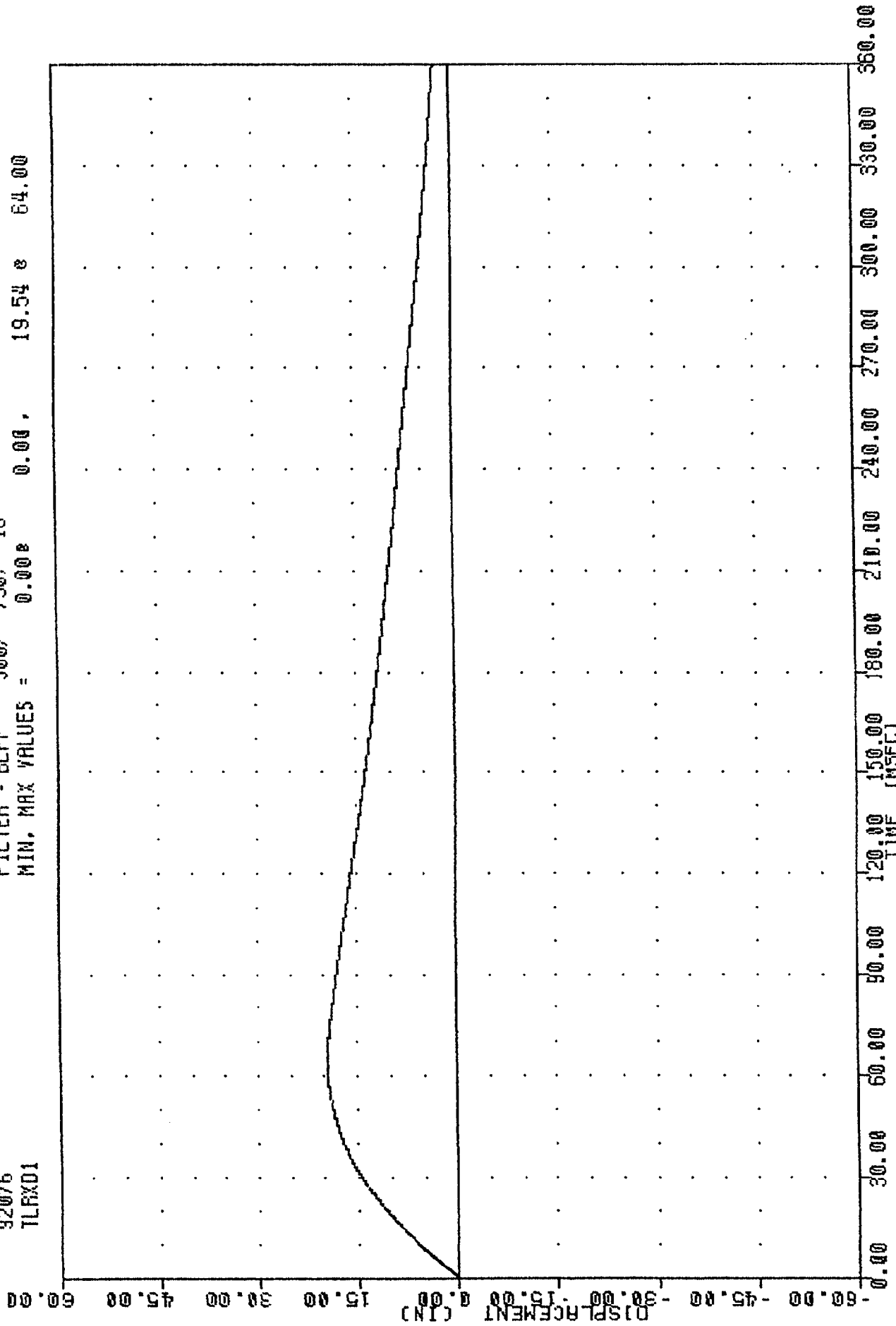


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LEFT REAR SEAT X-AXIS VELOCITY

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 TLRXD1

920316

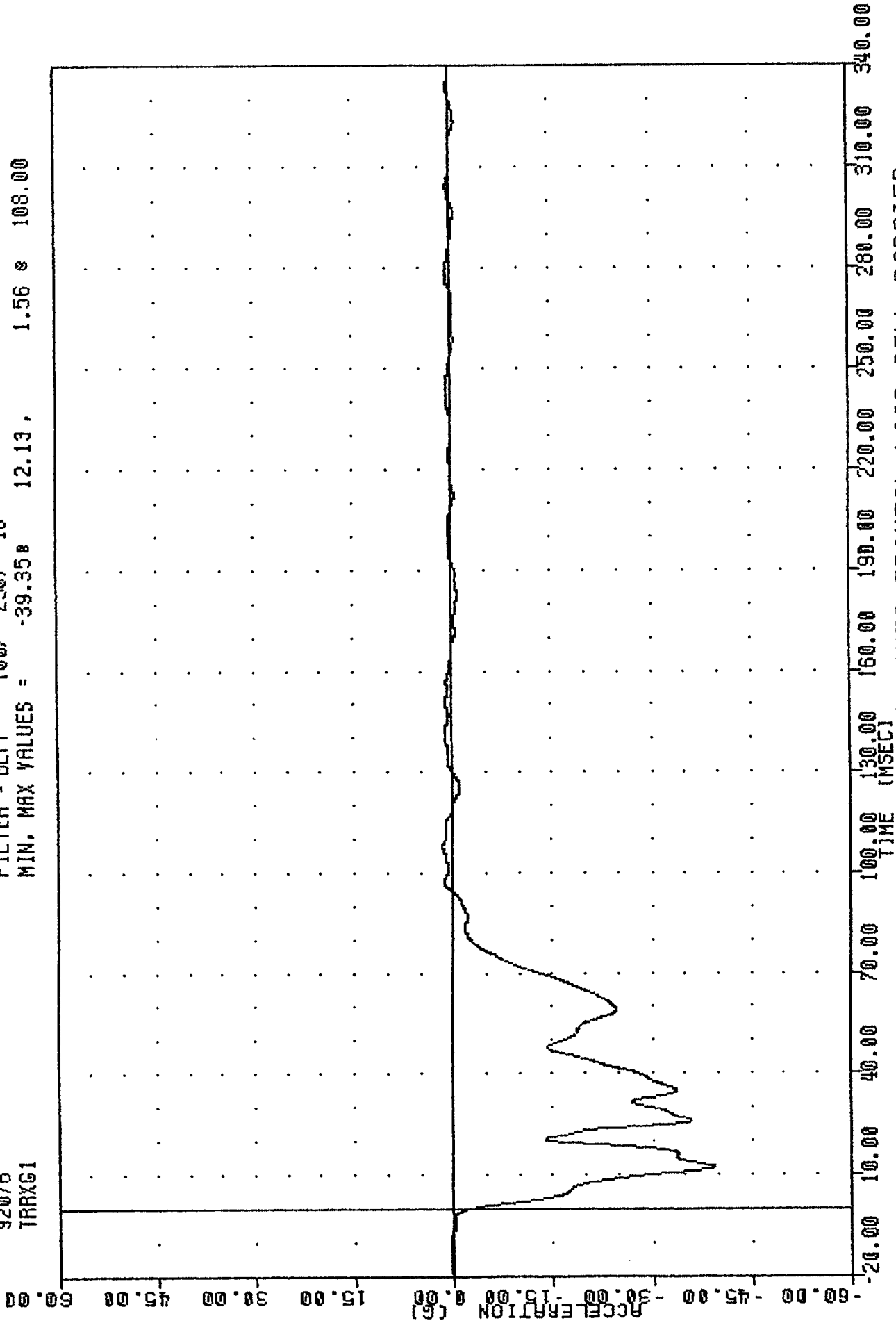
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 0.00 , 19.54 8 64.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LEFT REAR SEAT Y-AXIS DISPLACEMENT

TRC 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
TRRXG1

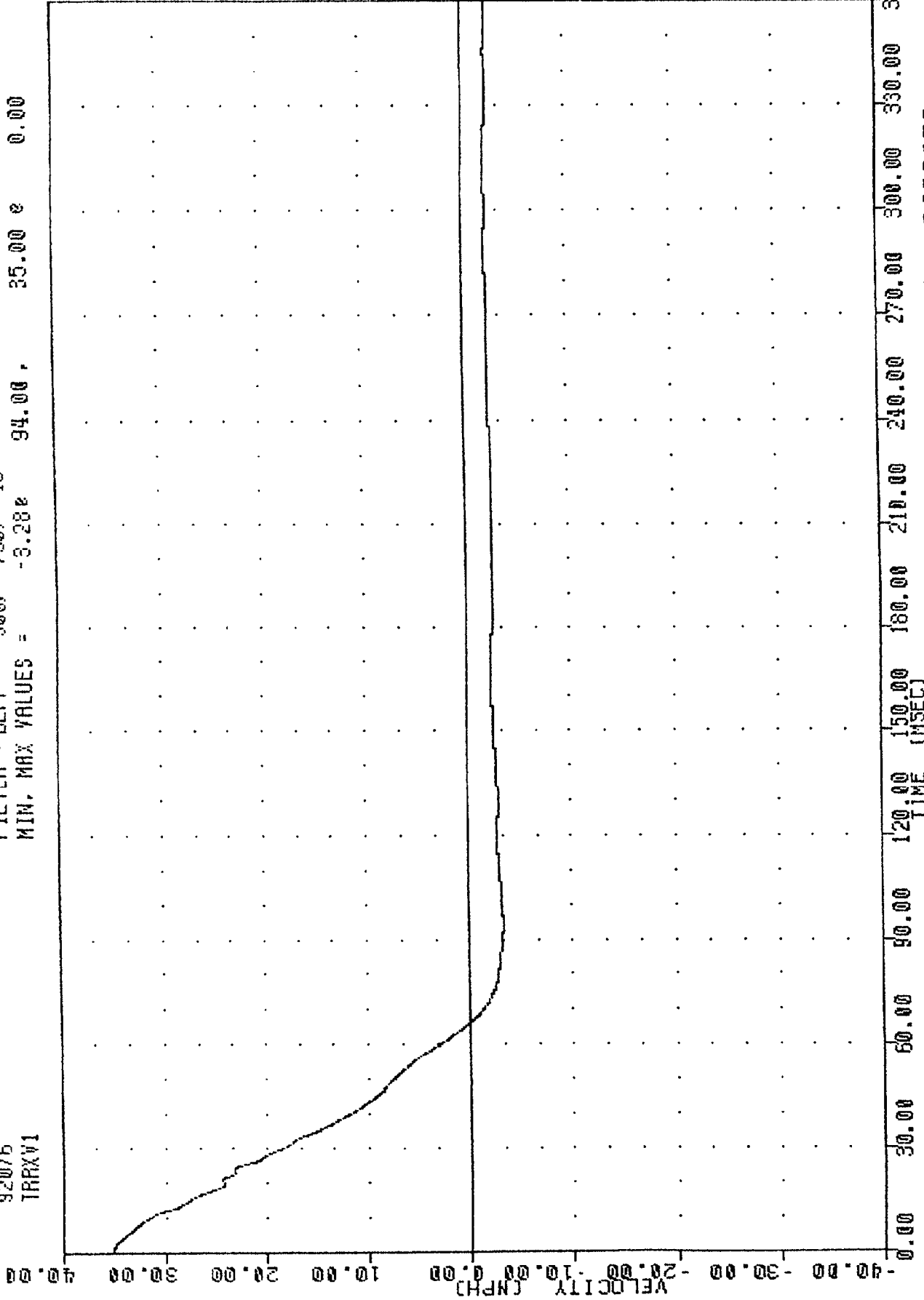
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -39.35 12.13, 1.56 108.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
RIGHT REAR SEAT X-AXIS ACCELERATION

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
TRRXV1

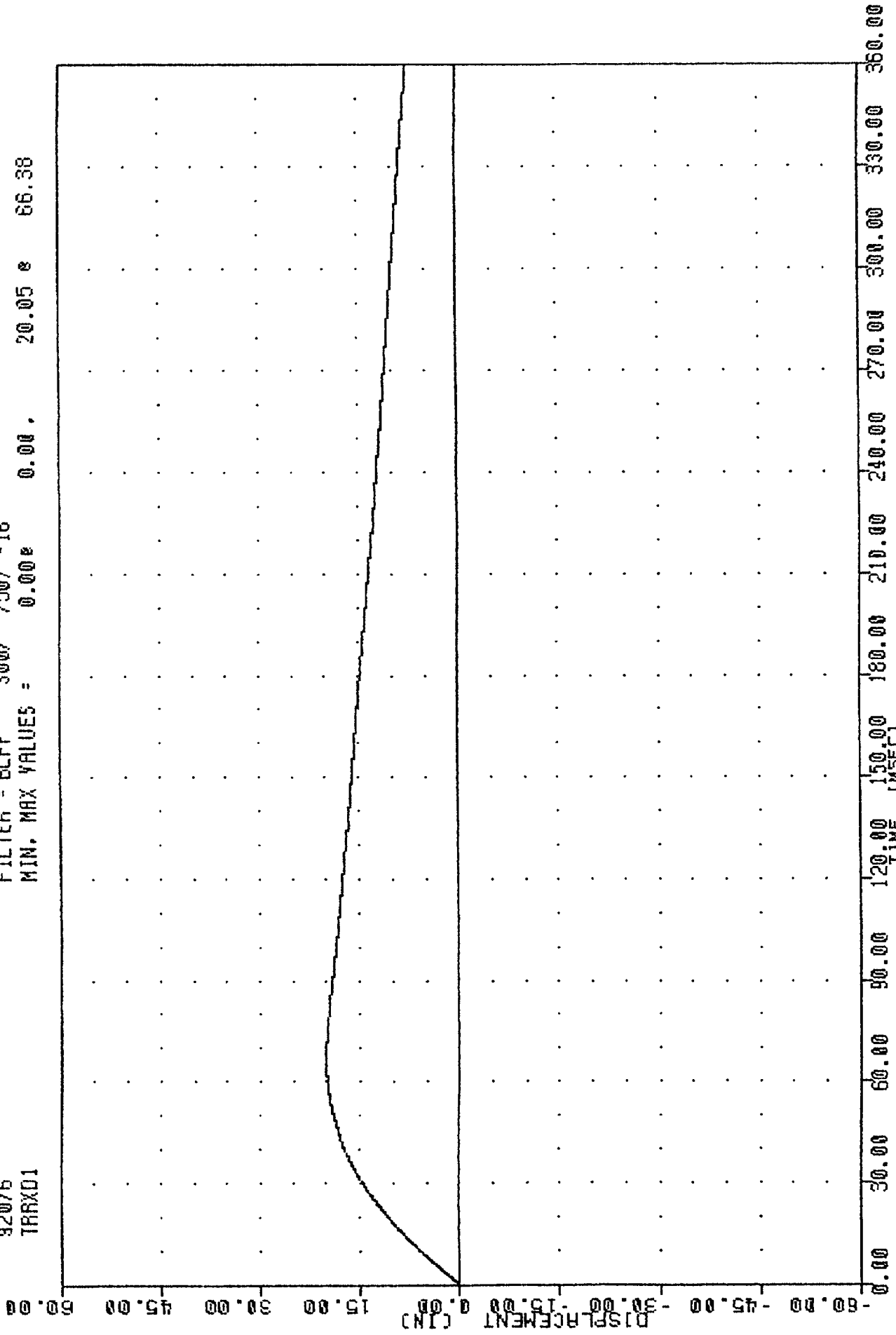
FILTER = BLPP 300/ 750/ -16  
MIN, MAX VALUES = 94.00 , 35.00 e 0.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
RIGHT REAR SEAT X-AXIS VELOCITY

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 TRXD1

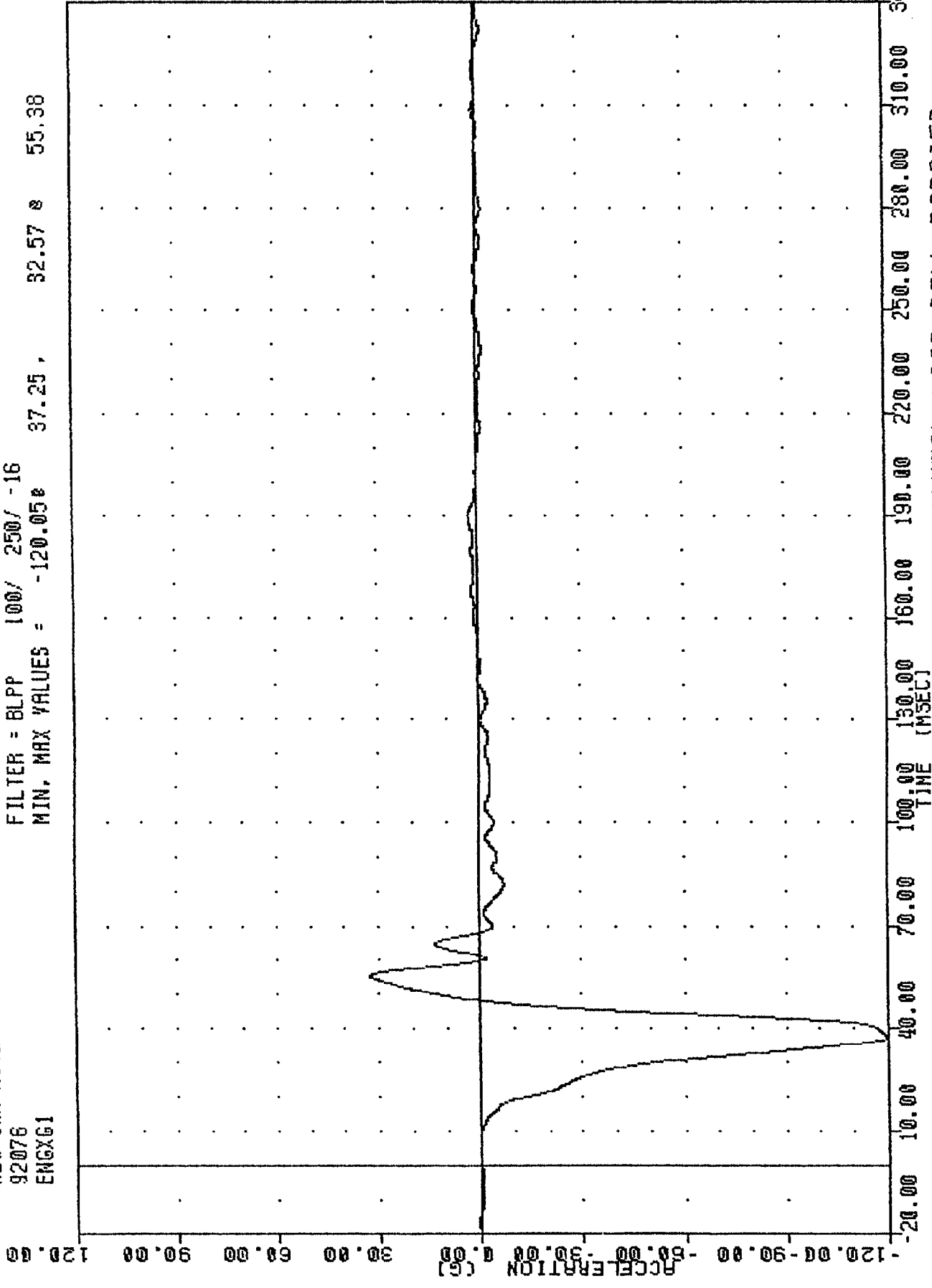
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00e 0.00, 20.05 e 66.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 RIGHT REAR SEAT X-AXIS DISPLACEMENT

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 ENG1

FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -120.05e 37.25 , 32.57 e 55.38

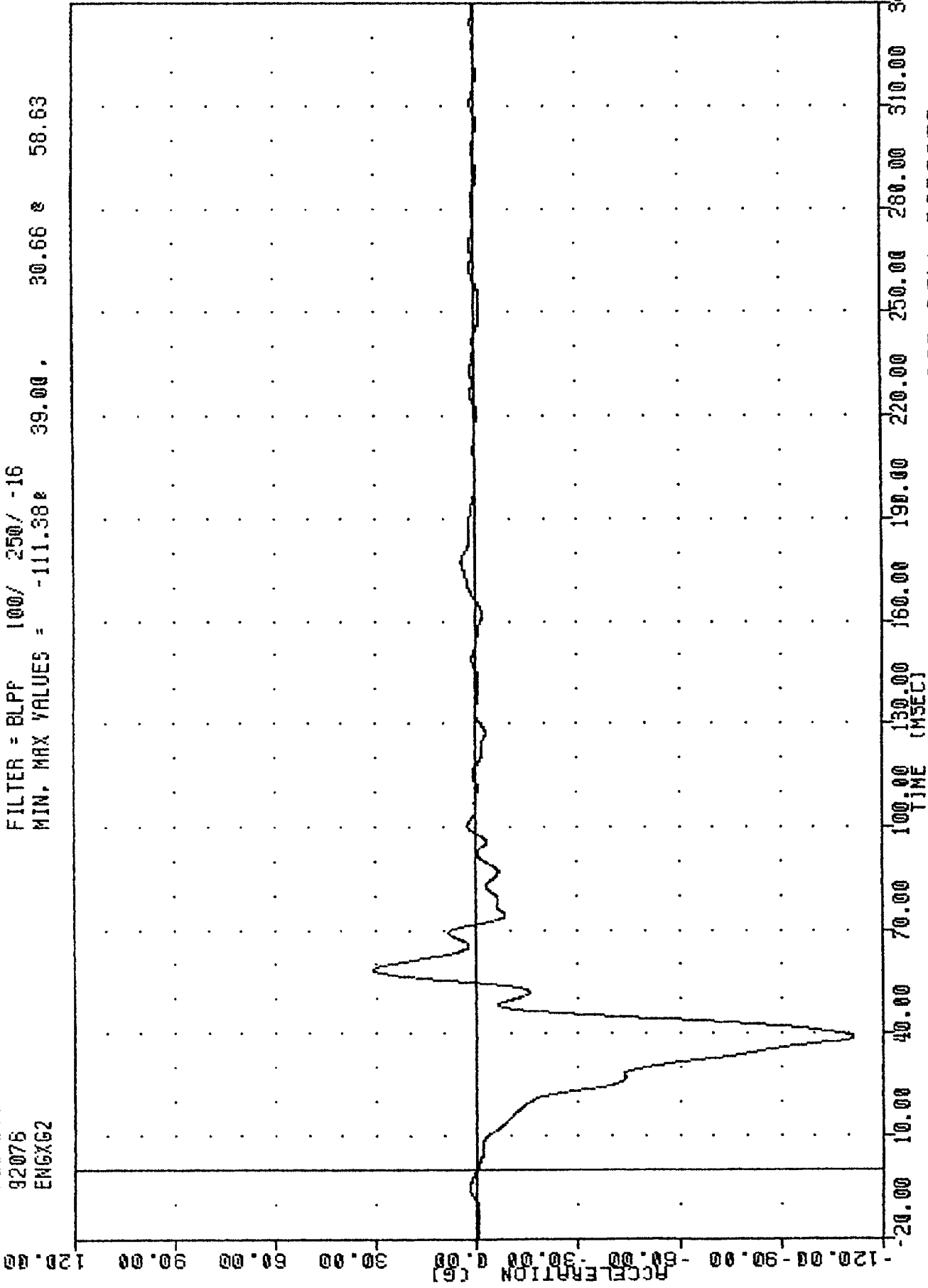


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER

ENGINE TOP X-Axis ACCELERATION

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
ENGXG2

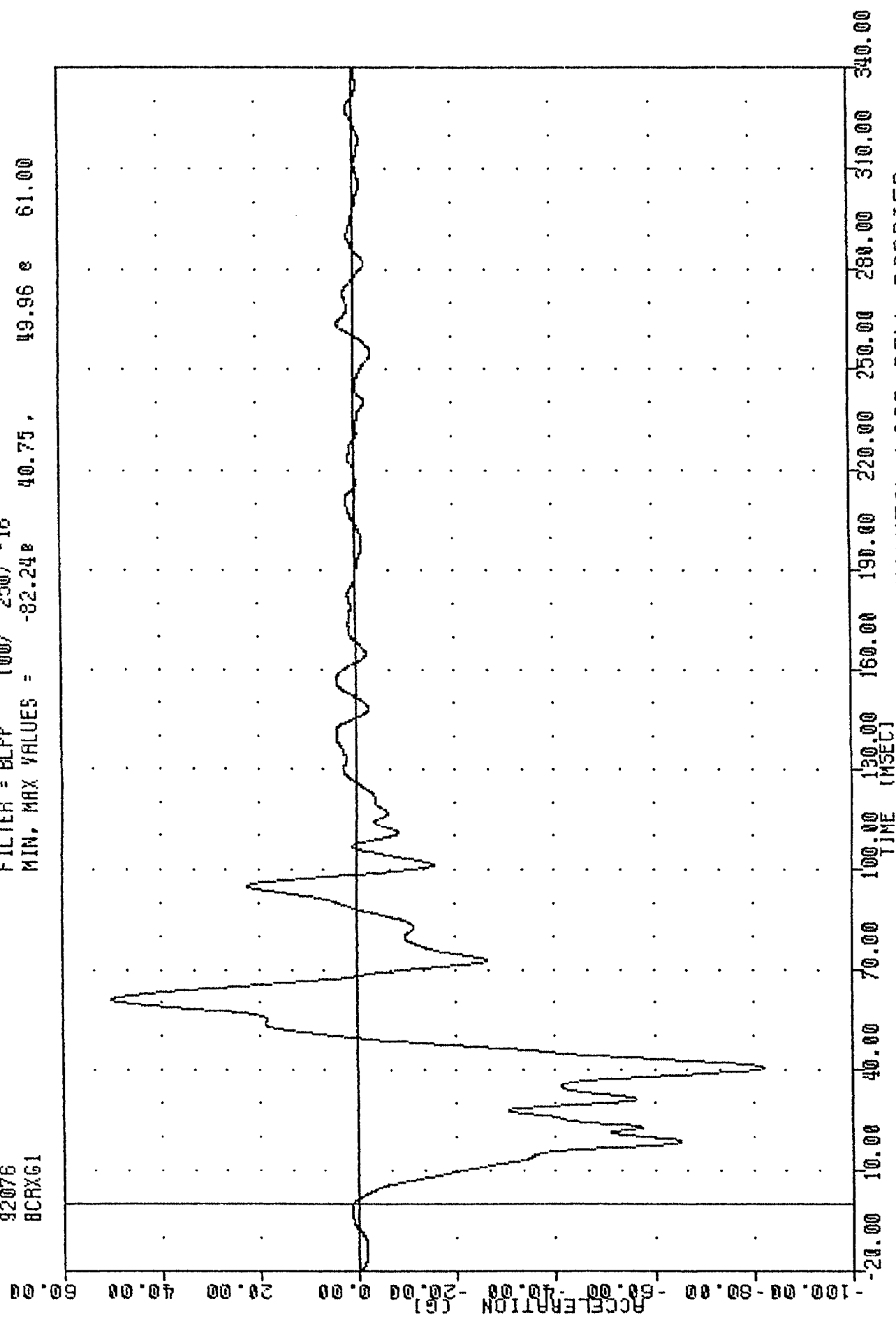
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -111.38 39.00 , 30.66 58.63



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
ENGINE BOTTOM X-AXIS ACCELERATION

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BCXG1

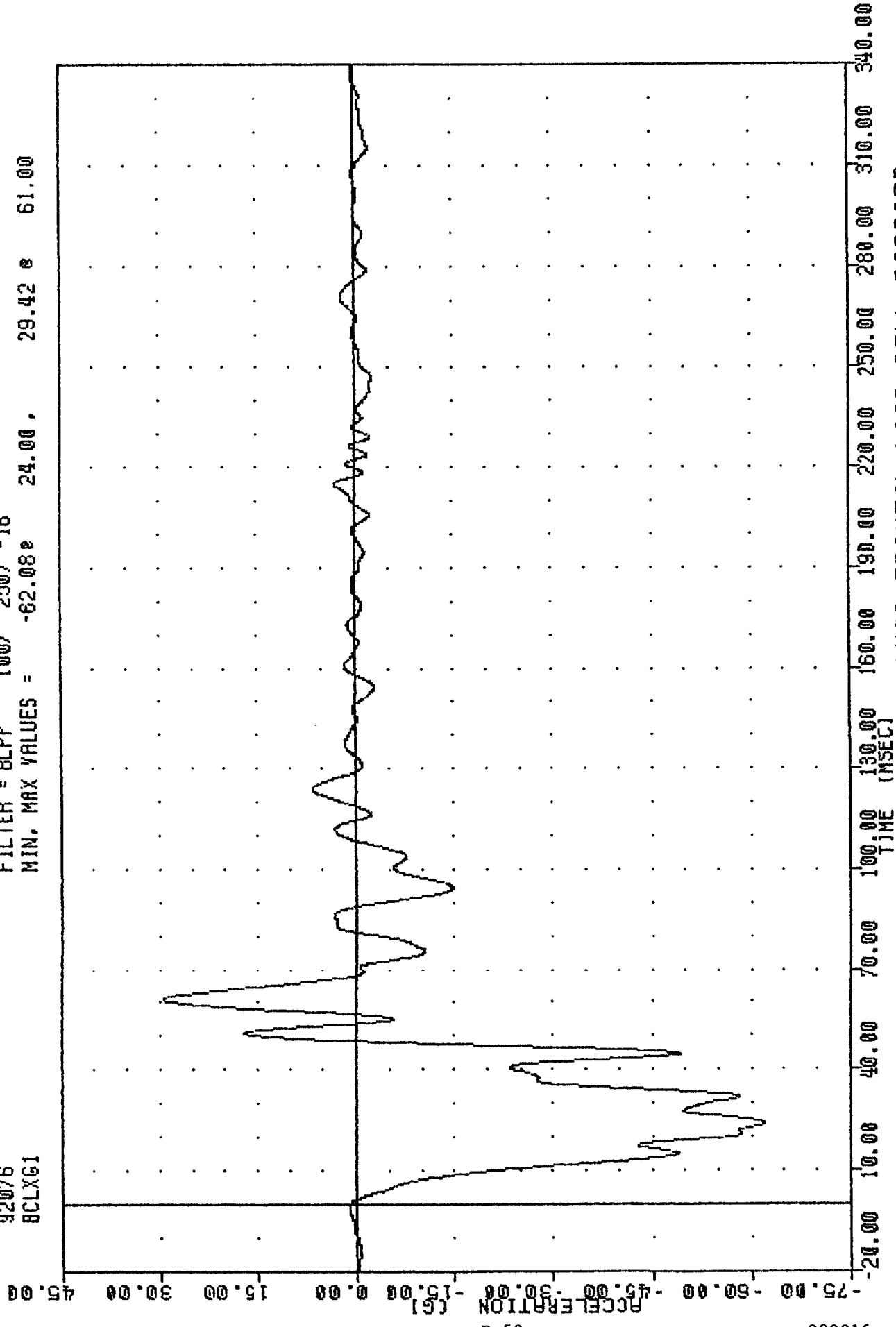
FILTER = BLFF 100/ 250/ -16  
 MIN. MAX VALUES = -82.24B 40.75 , 49.96 e 61.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 RIGHT BRAKE COLLISION X AXIS ACCELERATION

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
BCLXG1

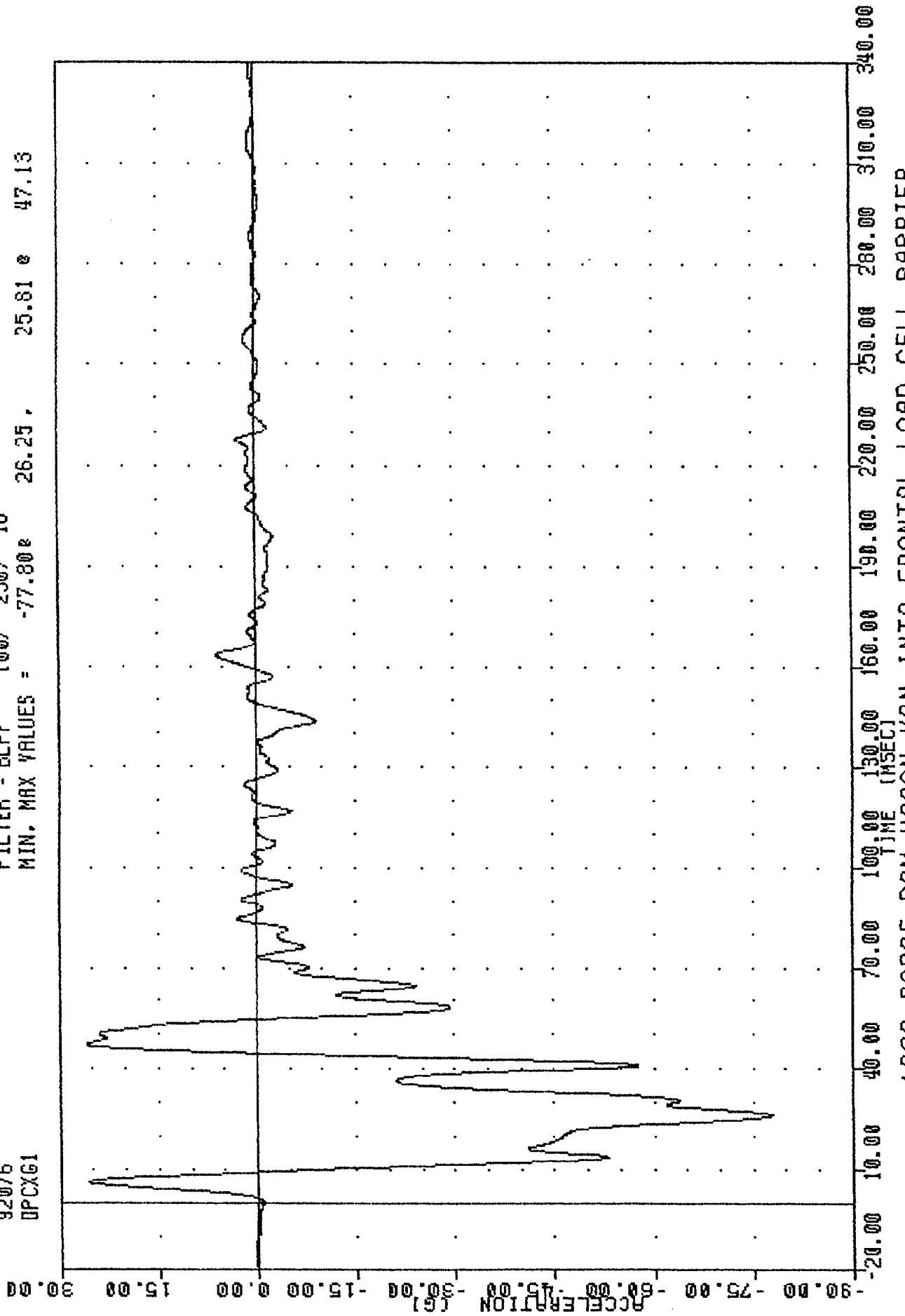
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -62.08e 24.00, 29.42 e 61.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
DPCXG1

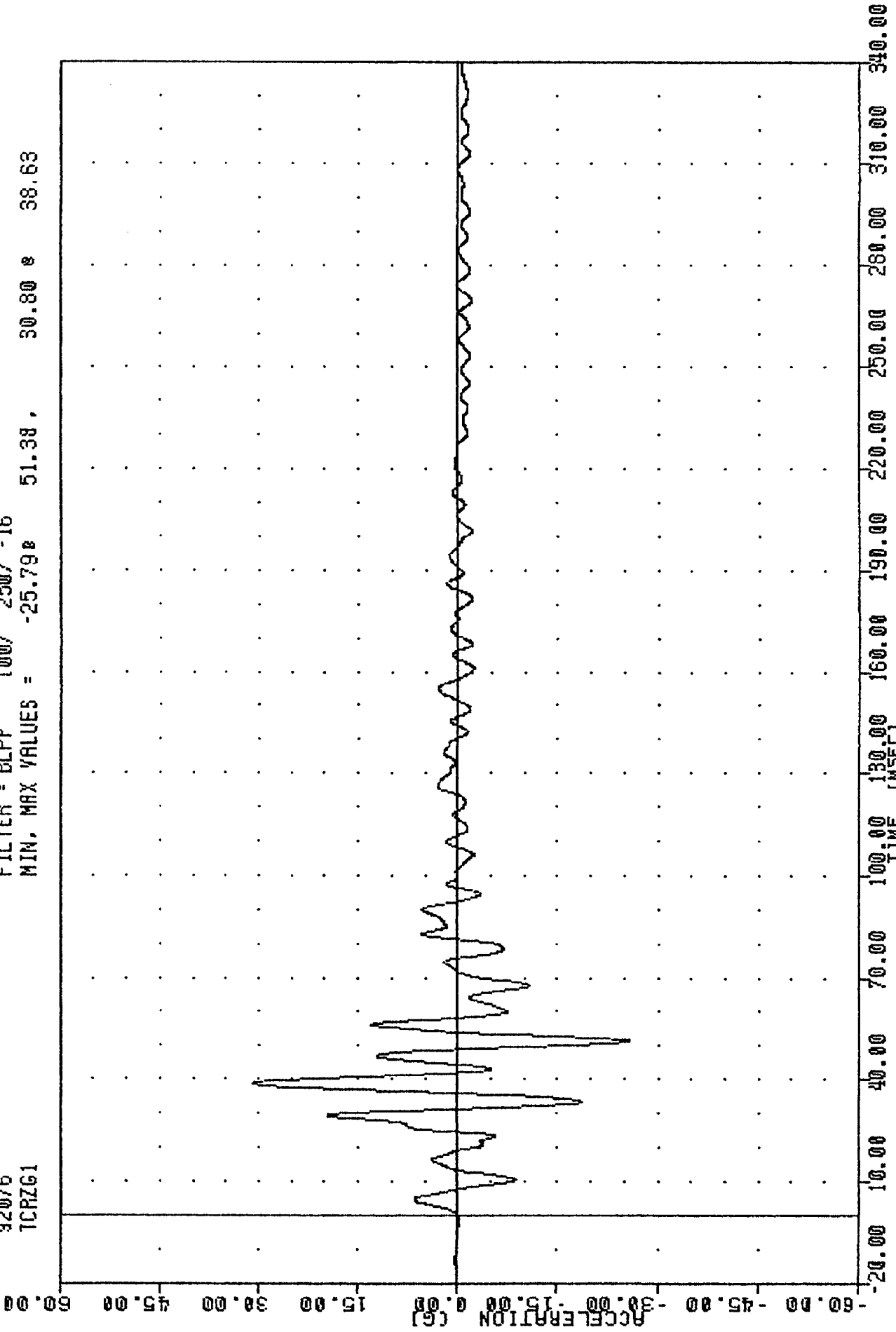
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -77.80e 26.25, 25.81 e 47.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TRC , 920316  
NEW CAR ASSESSMENT PROGRAM  
92076  
TCRZG1

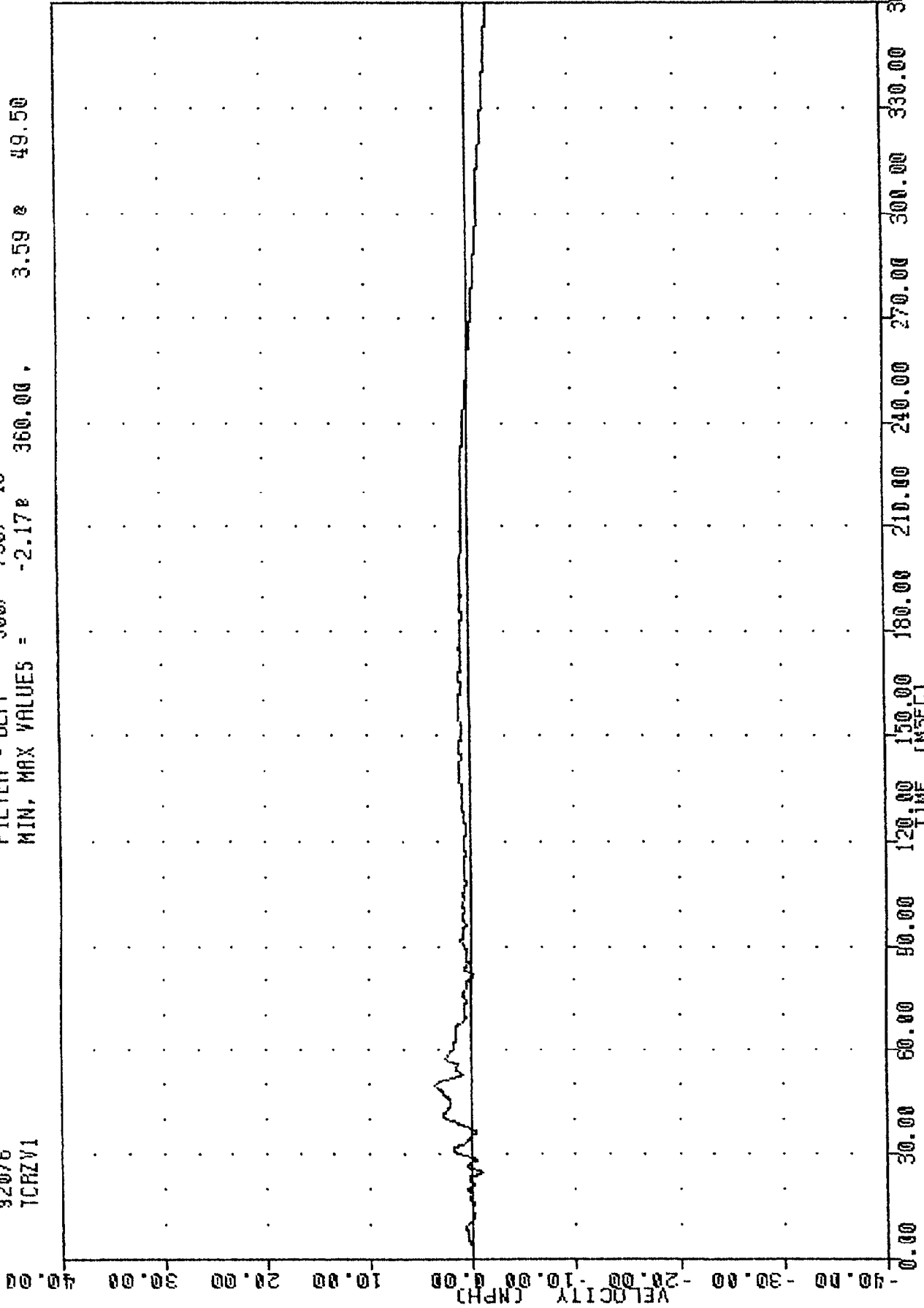
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -25.79 51.38 , 30.80 38.63



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
REAR SEAT CROSSMEMBER Z-AXIS ACCELERATION

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 TCRZV1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -2.17 360.00 3.59 49.50

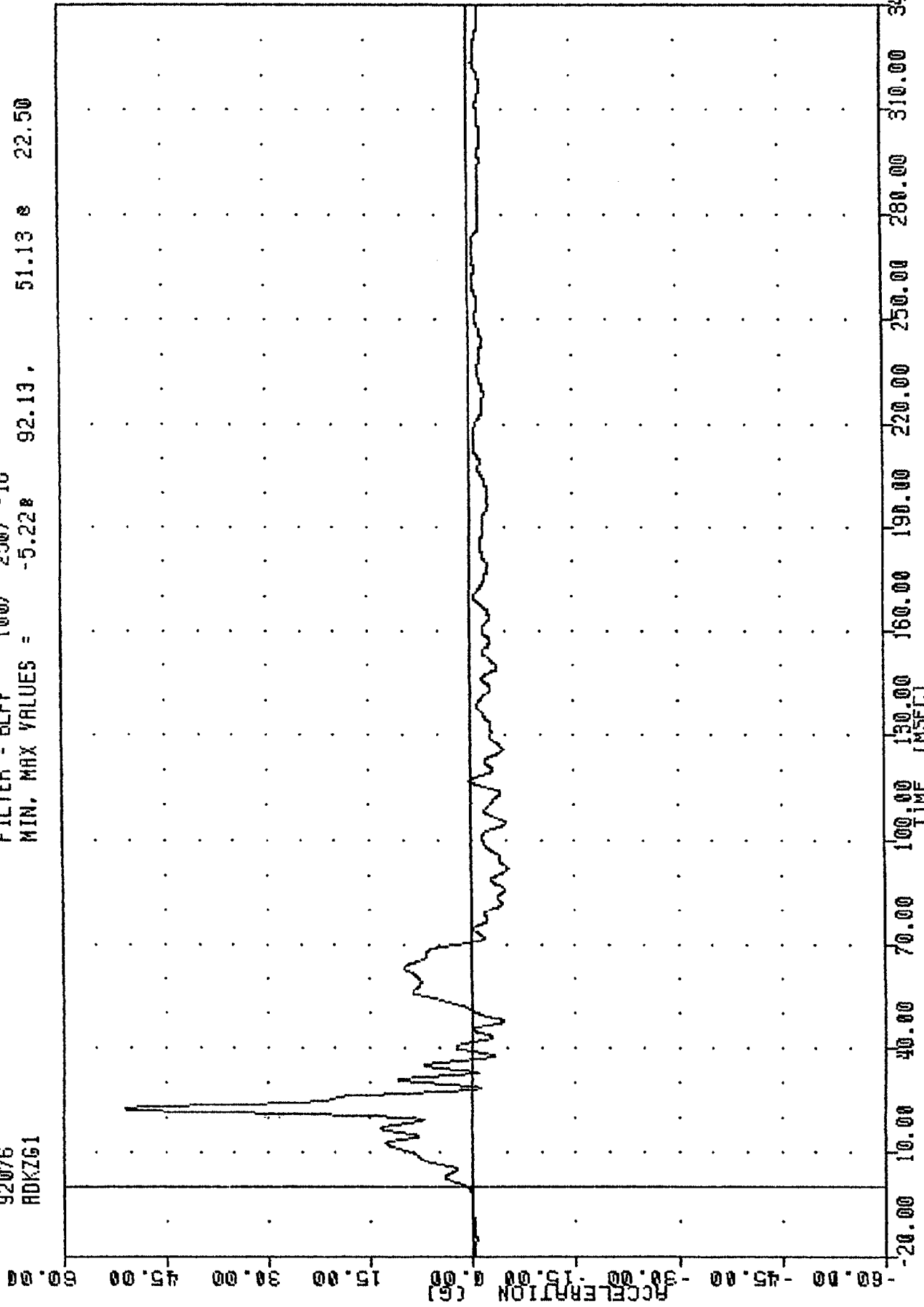


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 REAR SEAT CROSSMEMBER Z-AXIS VELOCITY



TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 ADKZG1

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -5.228 92.13, 51.13 @ 22.50

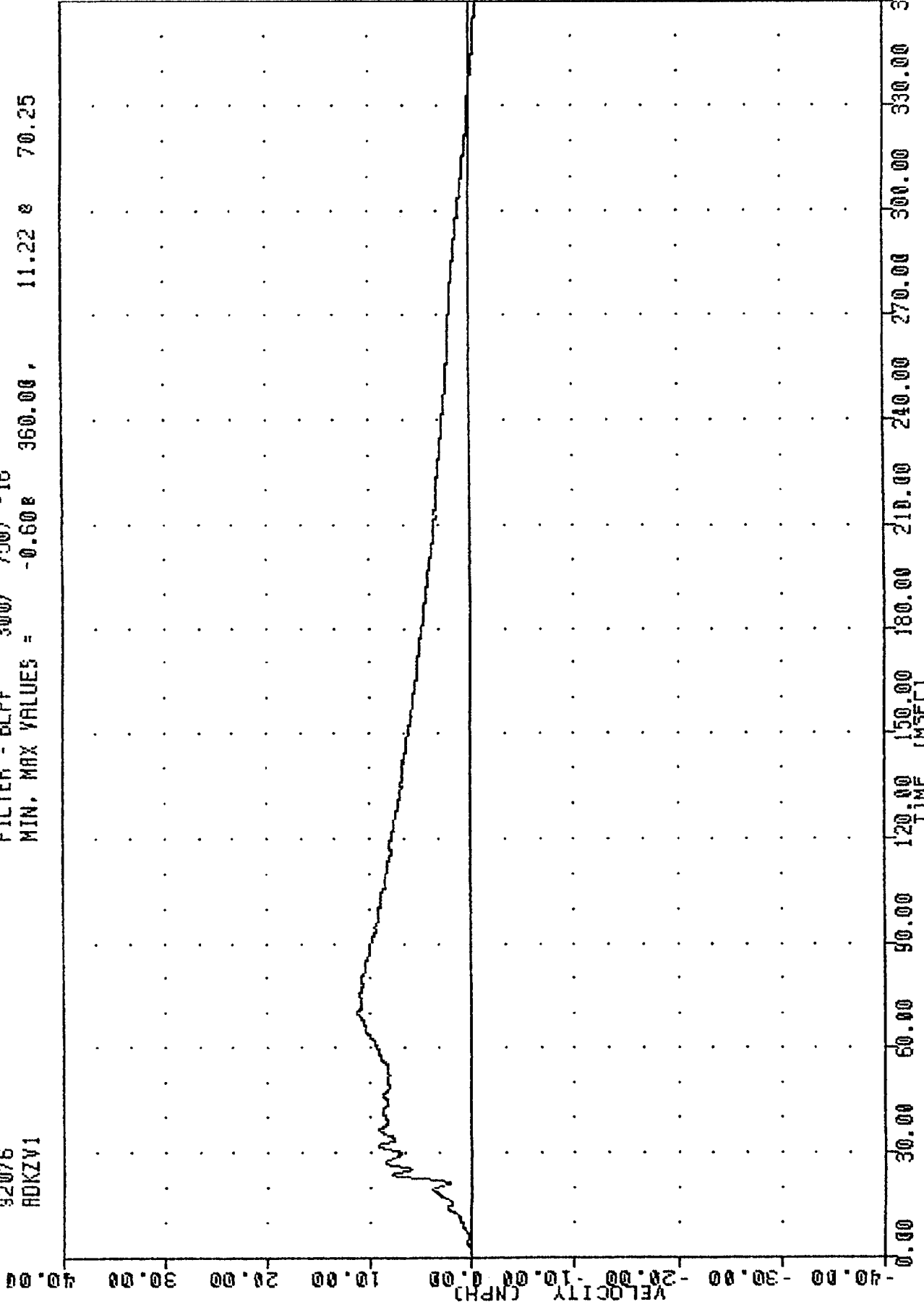


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 VEHICLE REAR CENTER Z-AXIS ACCELERATION

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 ADKZV1

920316

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.60 8 360.00 , 11.22 e 70.25

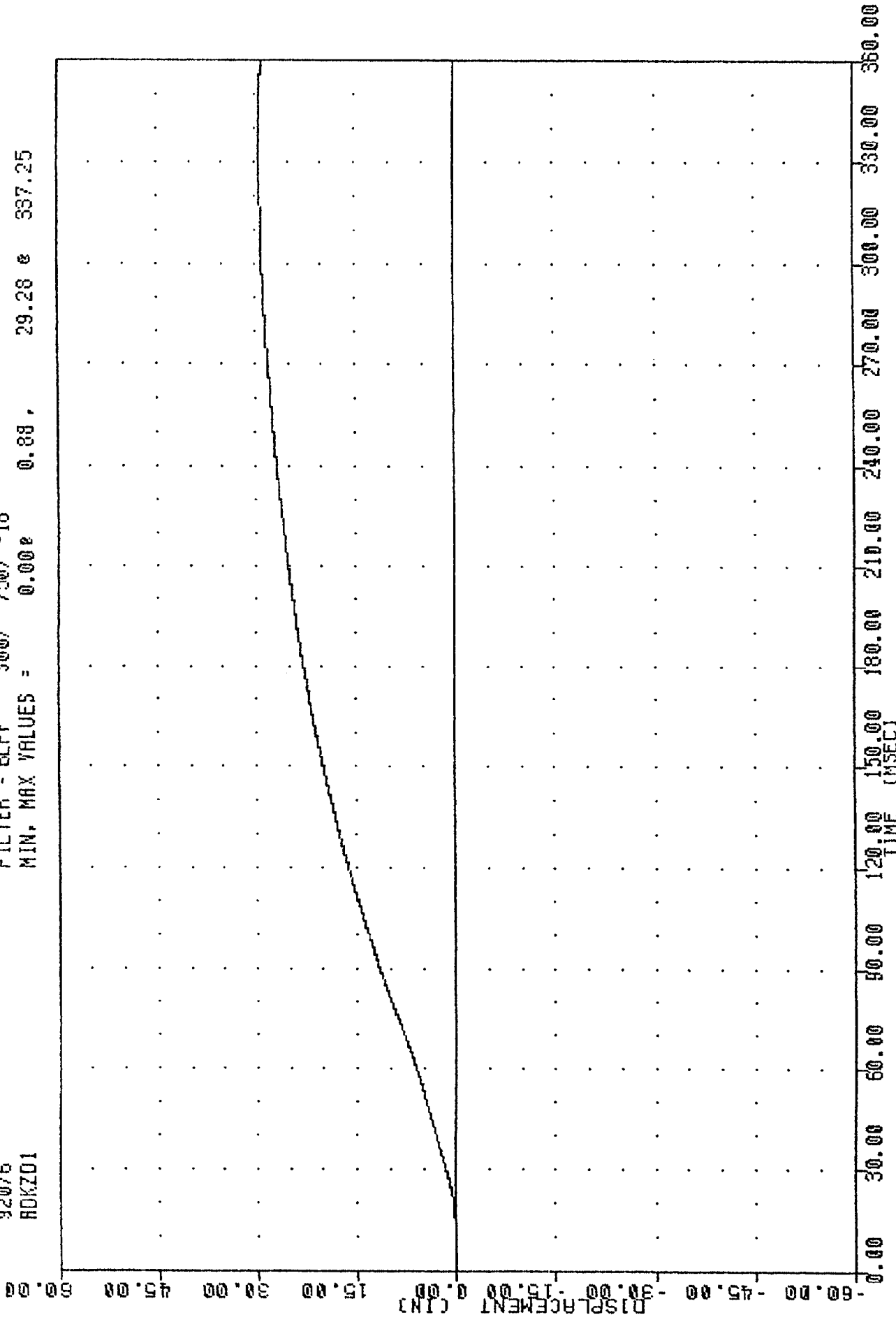


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 VEHICLE REAR CENTER Z-AXIS VELOCITY

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 ROKZ01

, 920316

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00e 0.88, 29.28 e 537.25



B-60

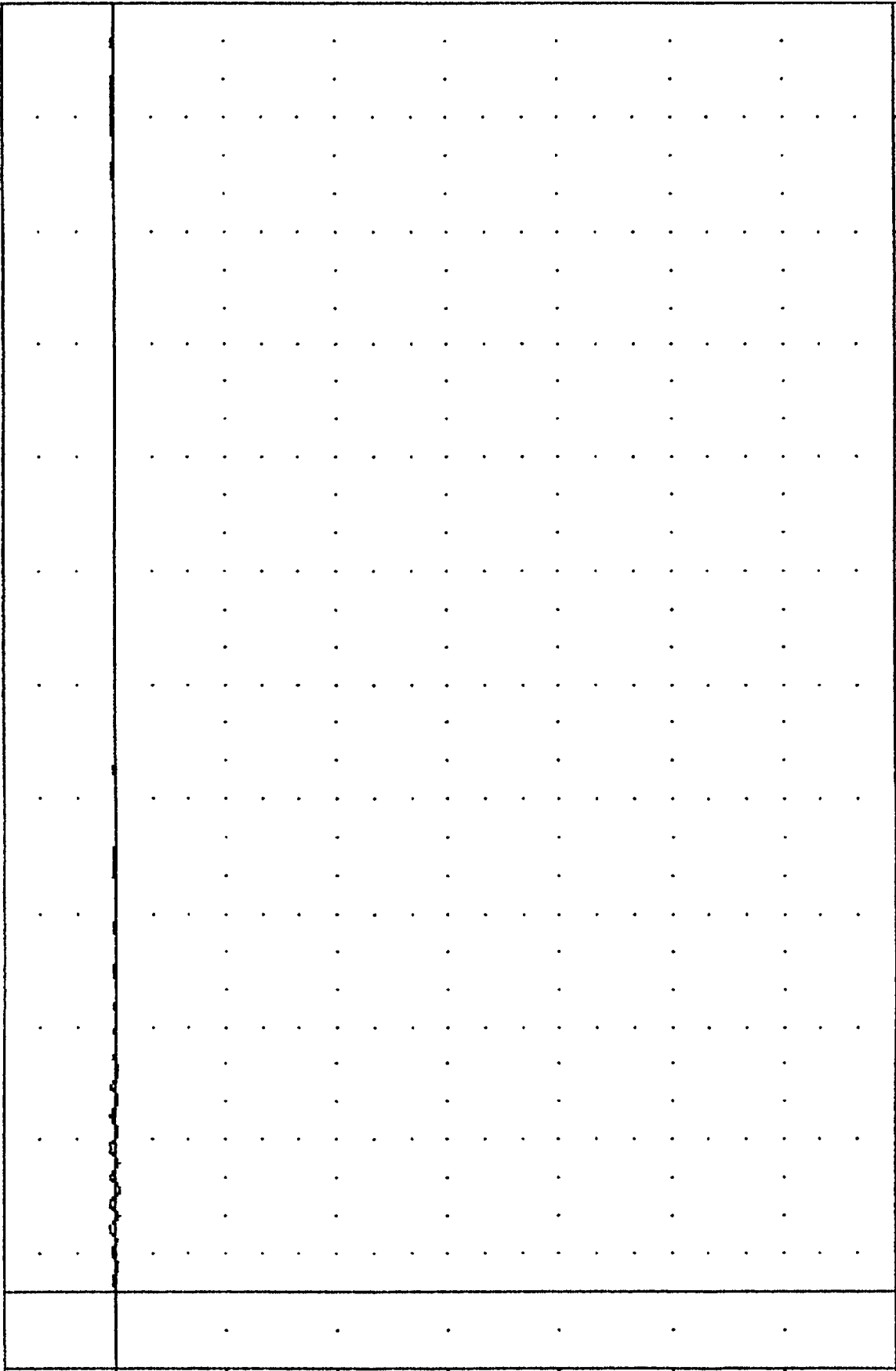
920316

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 VEHICLE REAR CENTER Z-AXIS DISPLACEMENT

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BAIF

FILTER = BLPF 100/ 250/ -16  
 MIN. MAX VALUES = -320.99 26.75 , 270.56 37.63

50.00



19-B

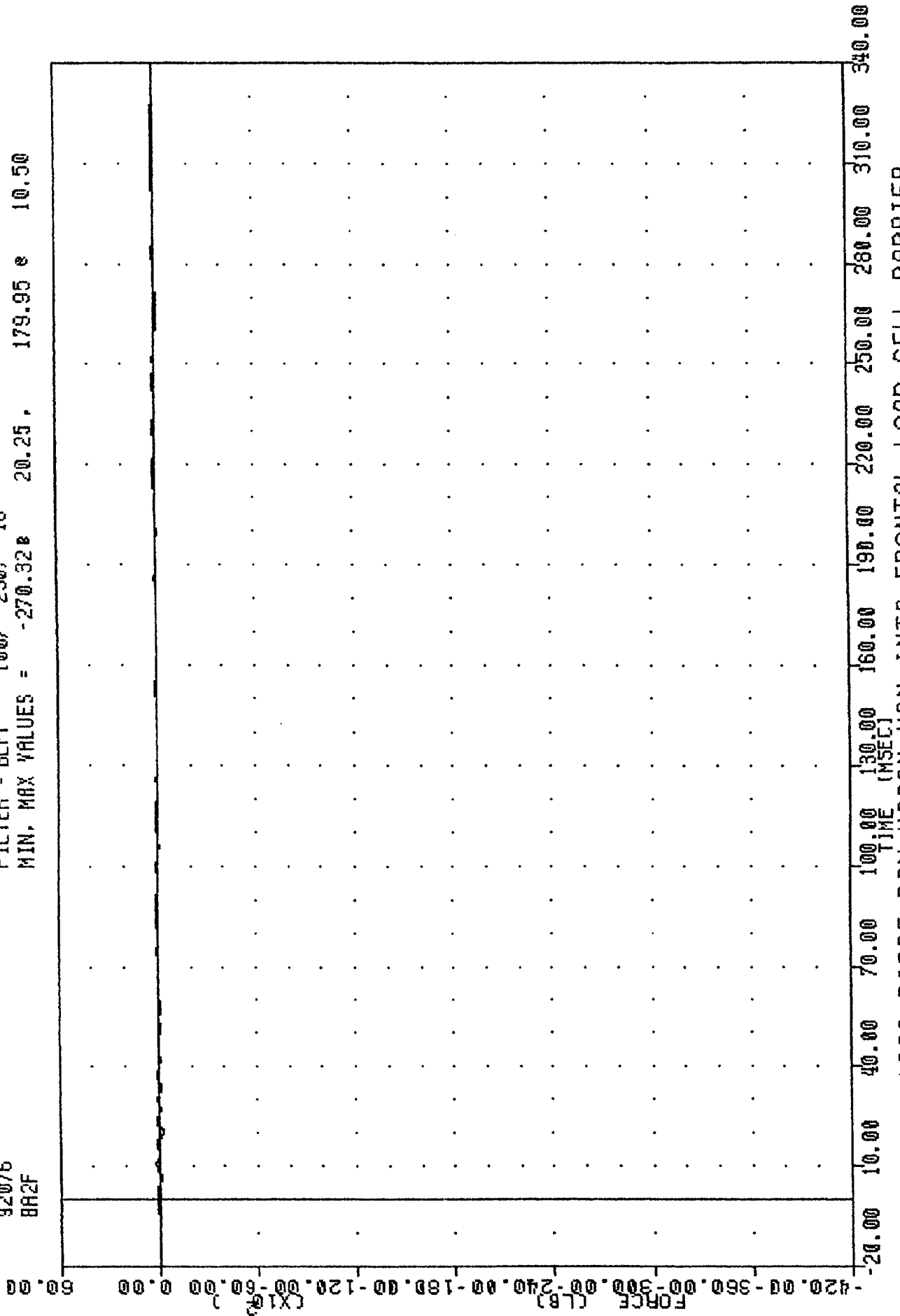
920316

-420.00 -360.00 -300.00 -240.00 -180.00 -120.00 -60.00 0.00 50.00  
 TIME (MSEC) 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION A1 FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92078  
 BAZF

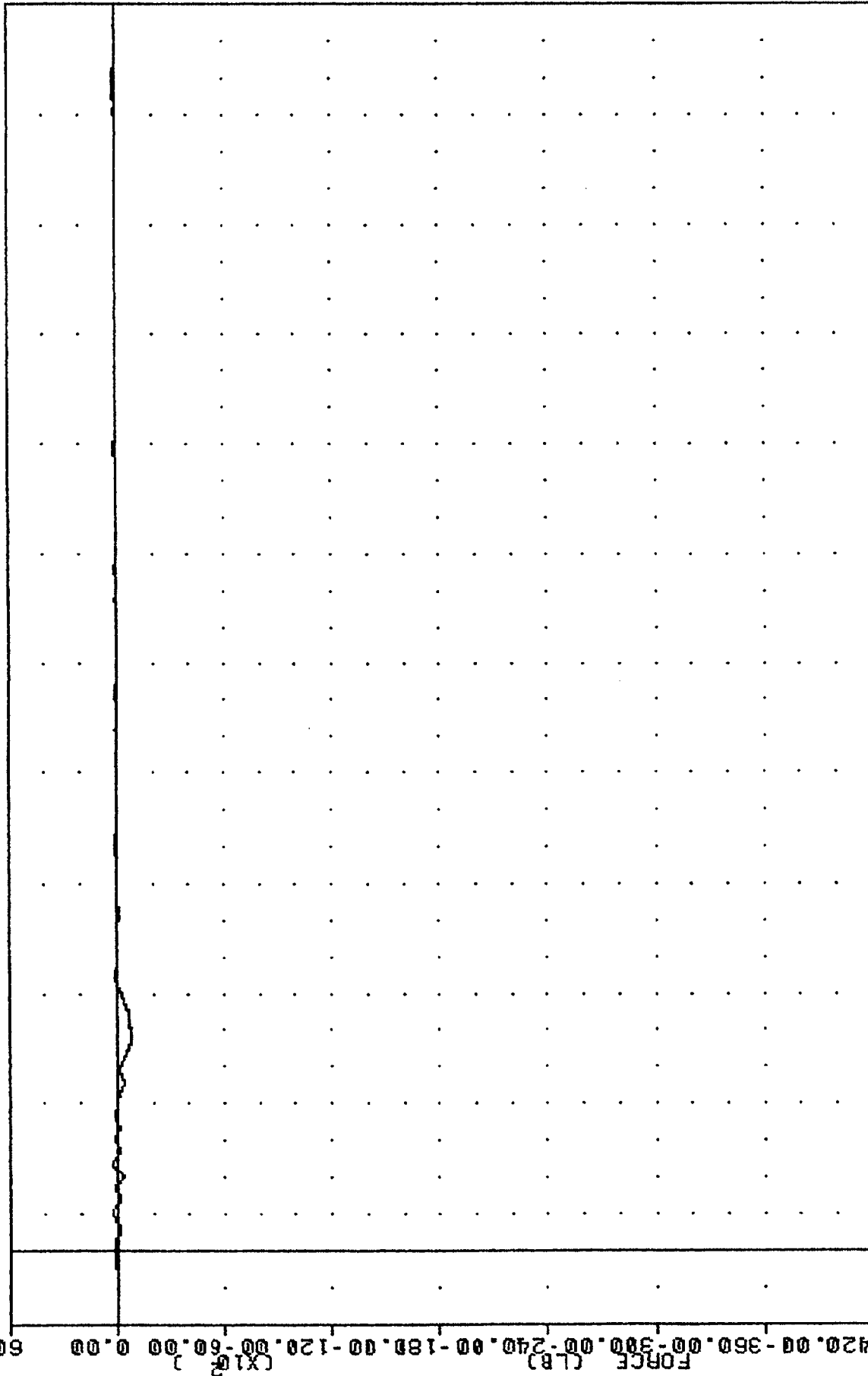
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -270.32B 20.25 . 179.95 e 10.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION A2 FORCE

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BR3F

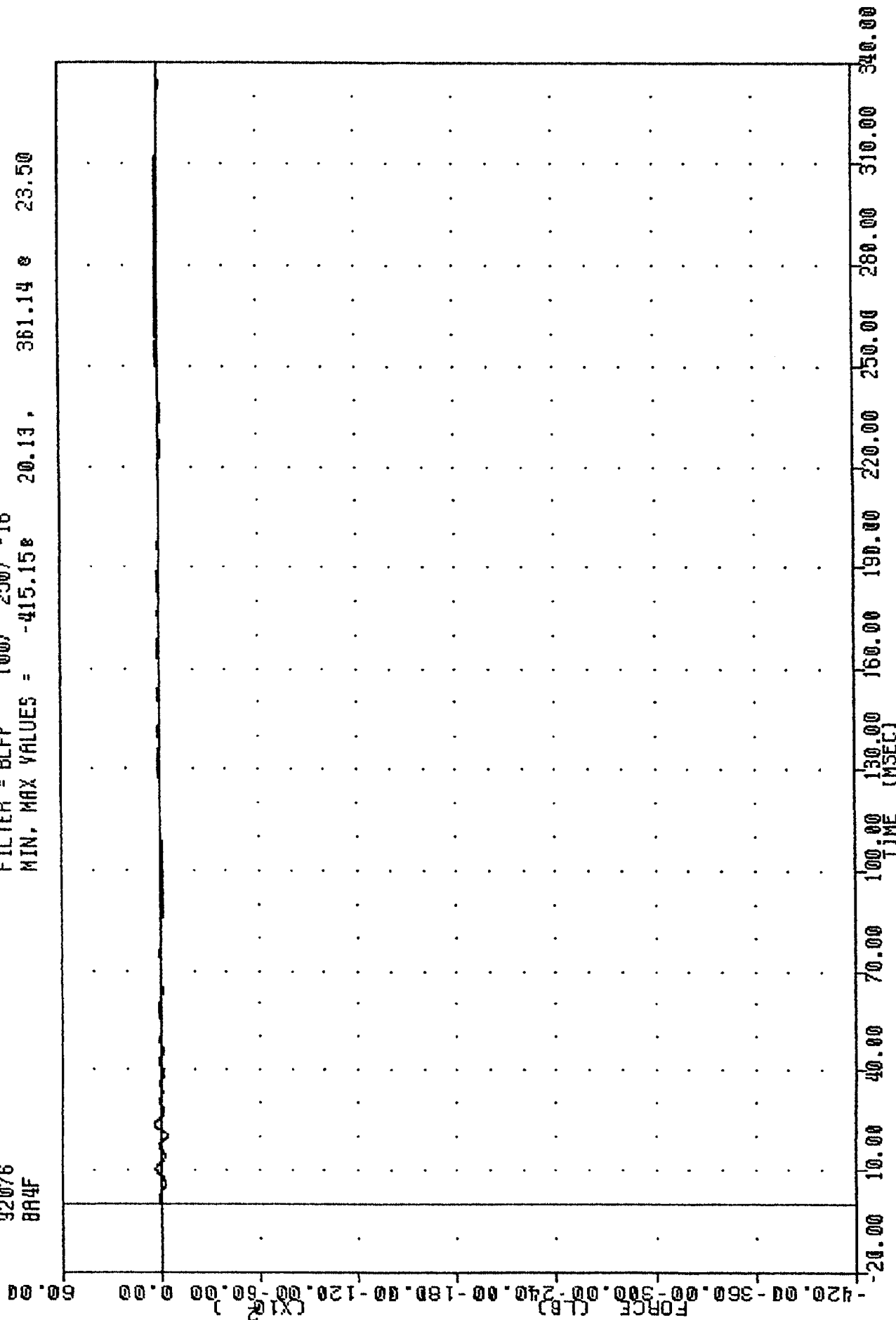
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -824.73 58.13, 234.30 23.63



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION A3 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BR4F

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -415.15e 20.13, 361.14 e 23.50

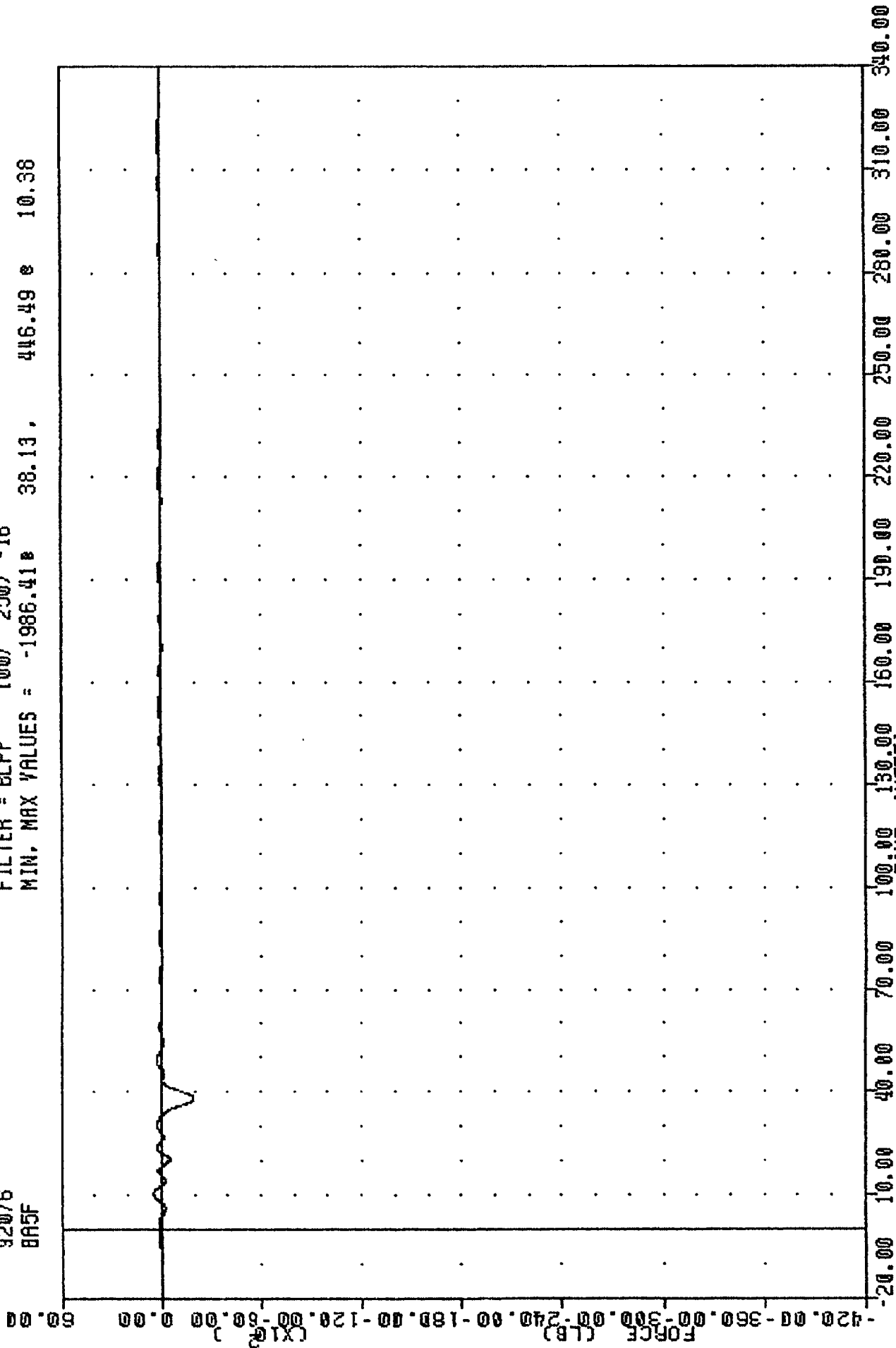


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 44-50RCE

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BA5F

, 920316

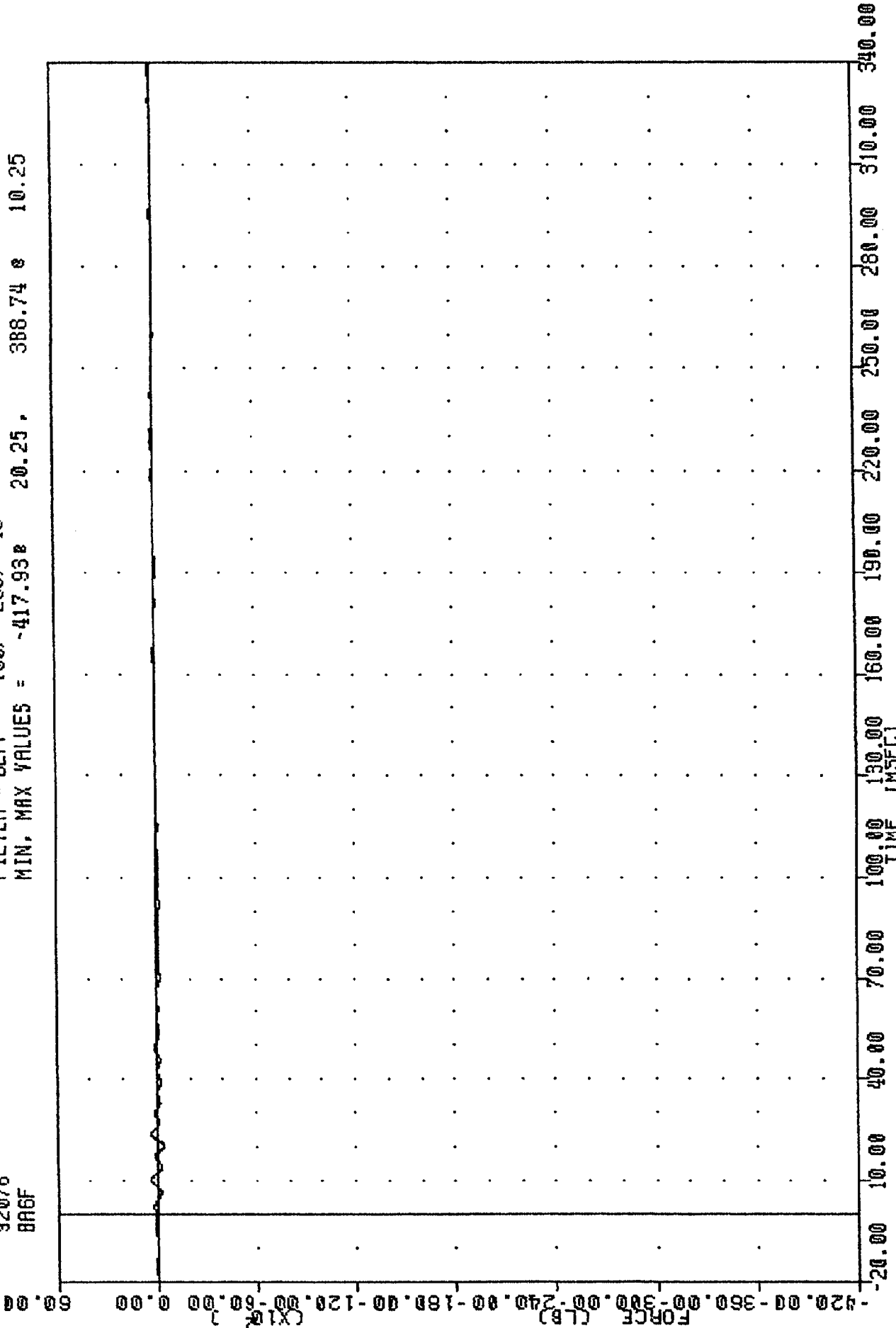
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -1986.41 416.49 e 10.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION A5 FORCE

TRC . 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BR6F

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -417.93 20.25 388.74 10.25

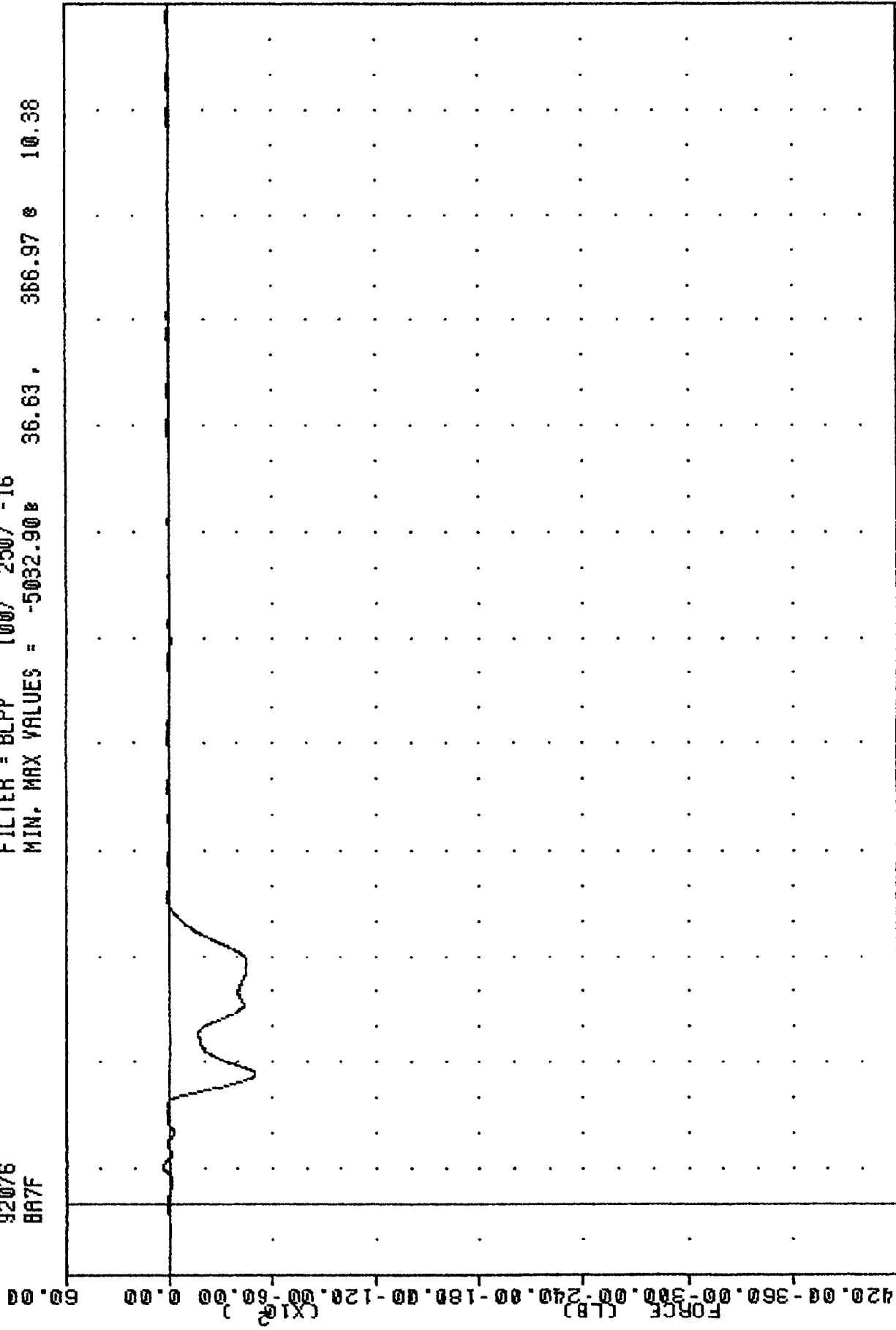


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION AC FORCE

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BA7F

920316

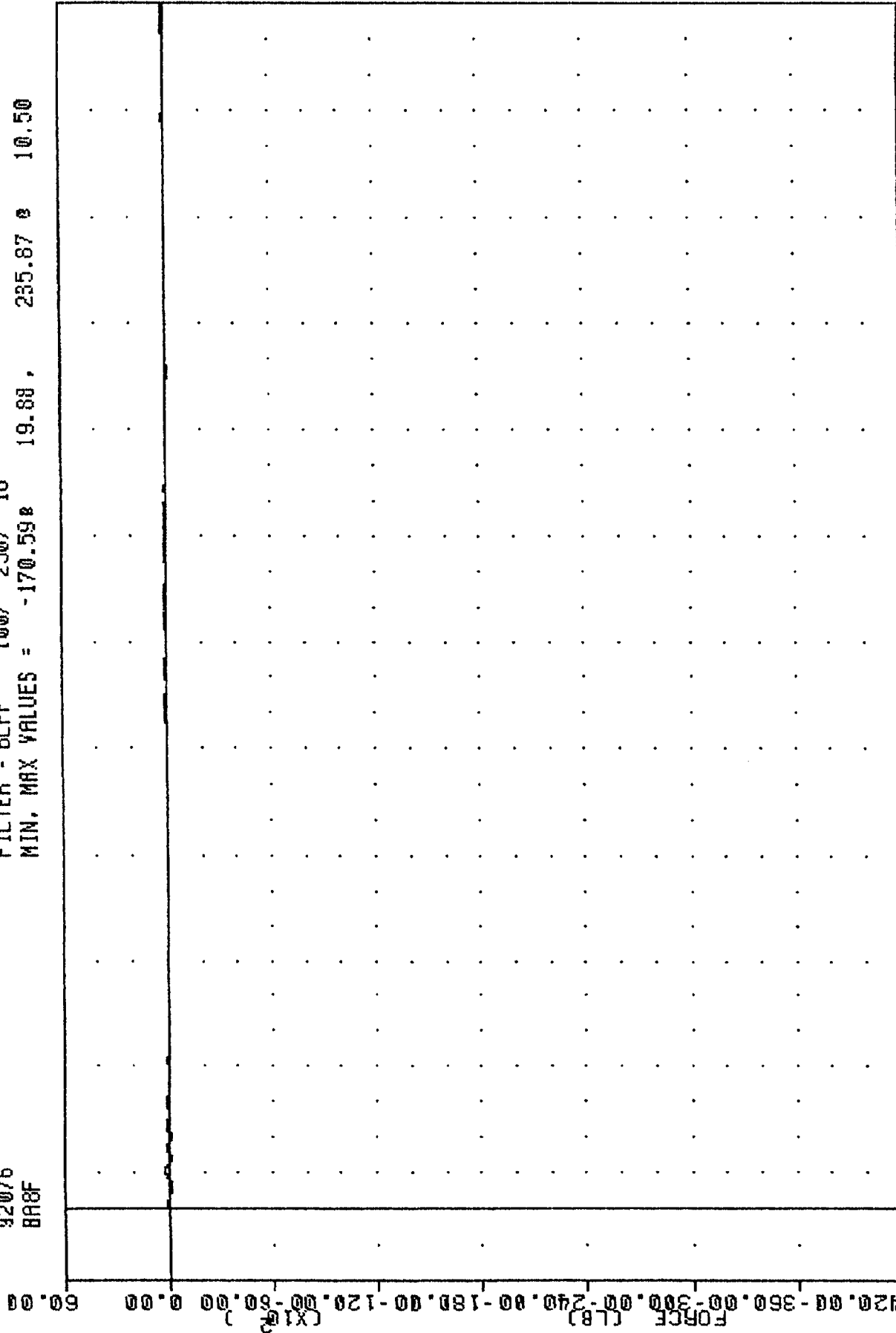
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -5032.90 366.97 e 10.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION A7 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BR8F

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -170.598 19.88 , 235.87 10.50

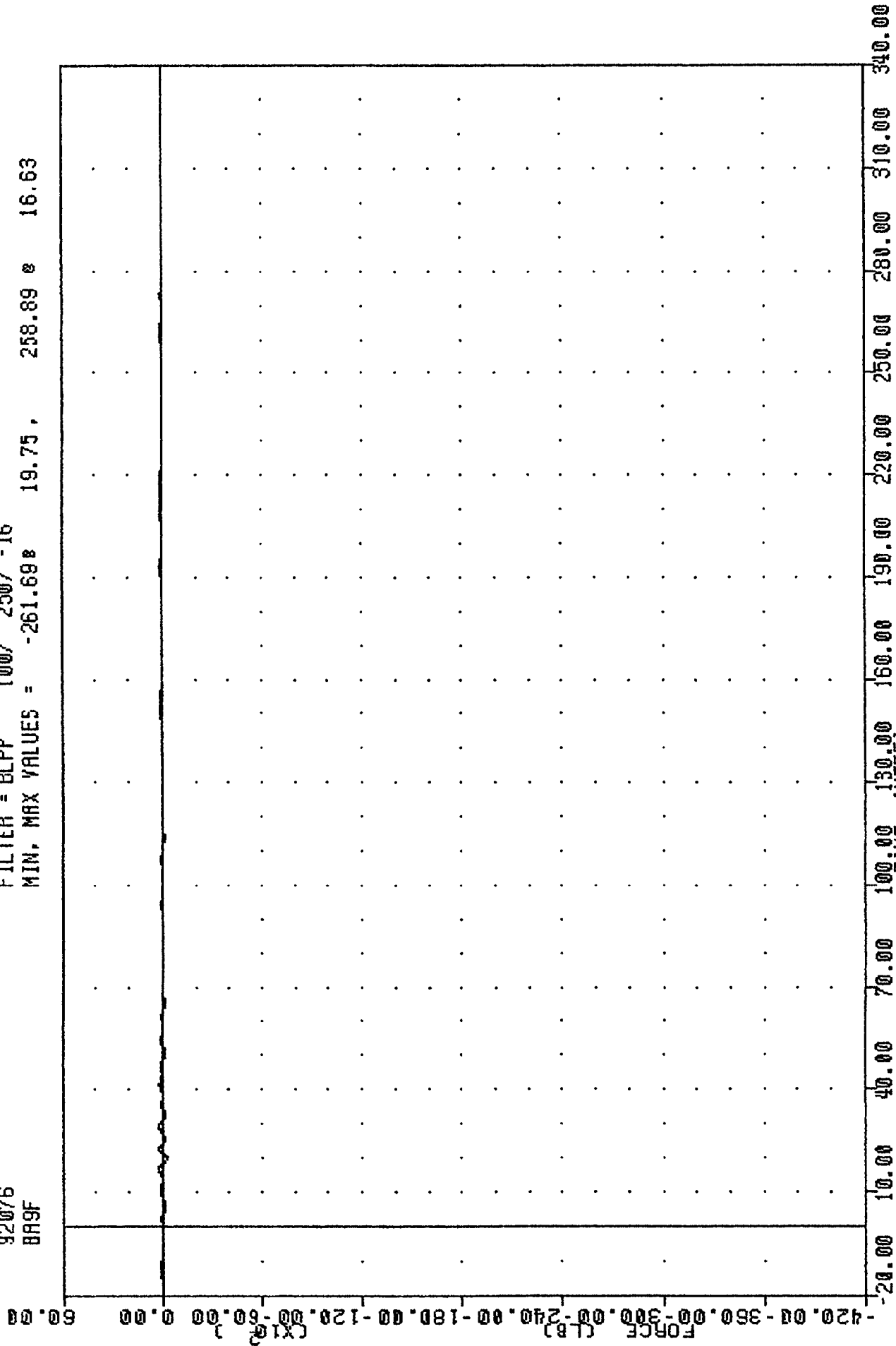


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION AS FORCE

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BR9F

920316

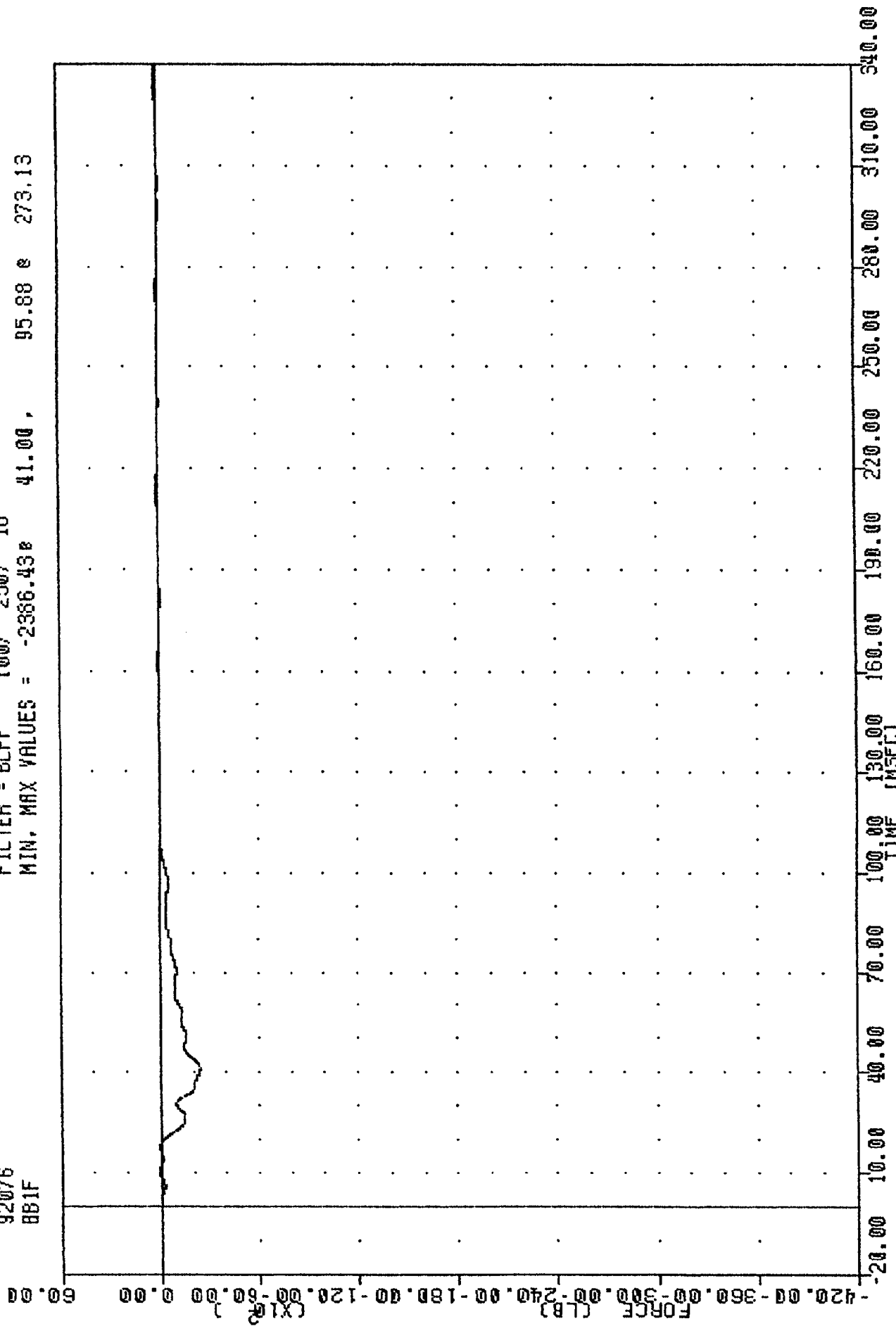
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -261.69 19.75 , 258.89 16.63



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION A9 FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BB1F

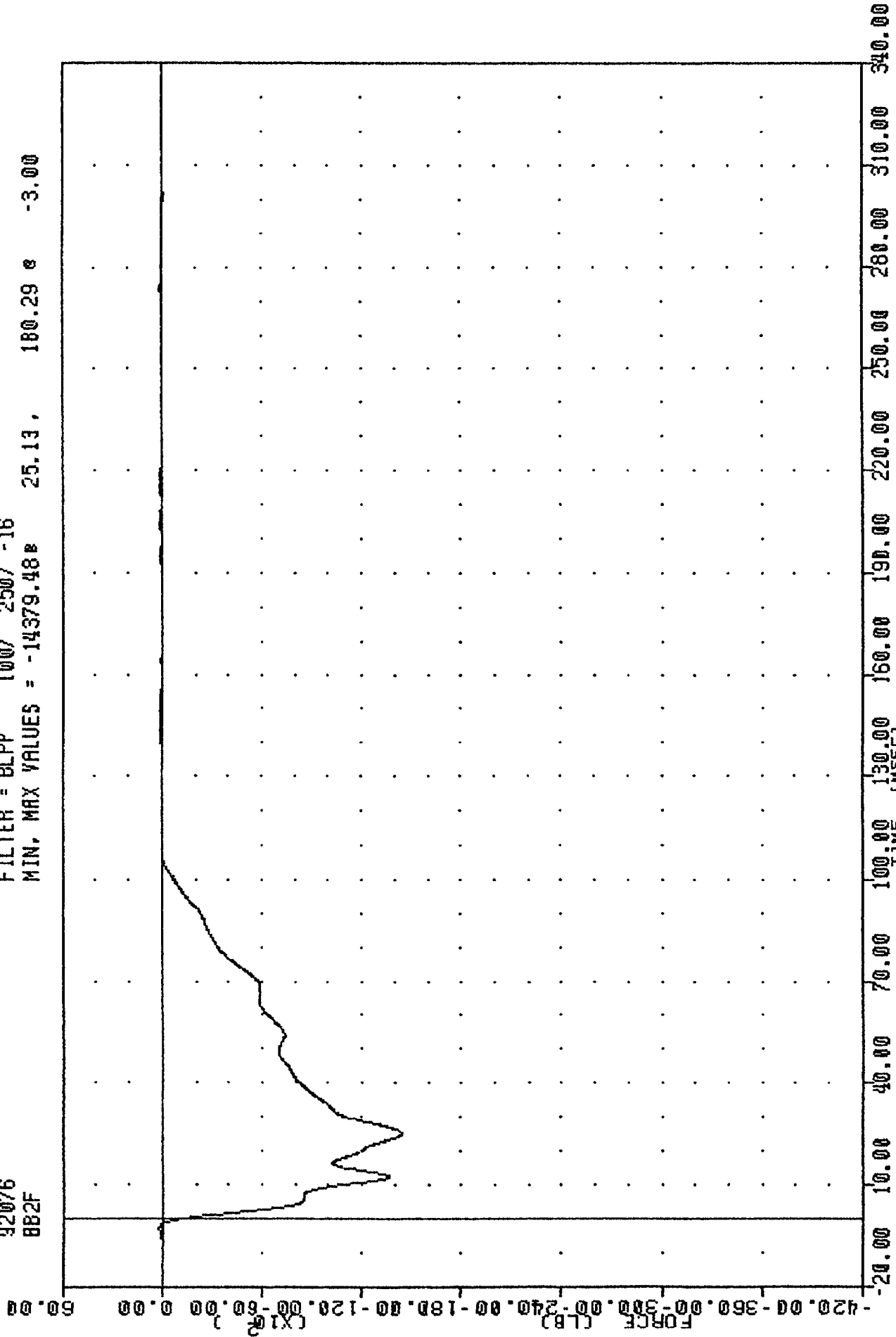
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -2386.438 41.00 , 95.88 e 273.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION B1 FORCE

TRC  
 92076  
 BB2F  
 NEW CAR ASSESSMENT PROGRAM  
 920316

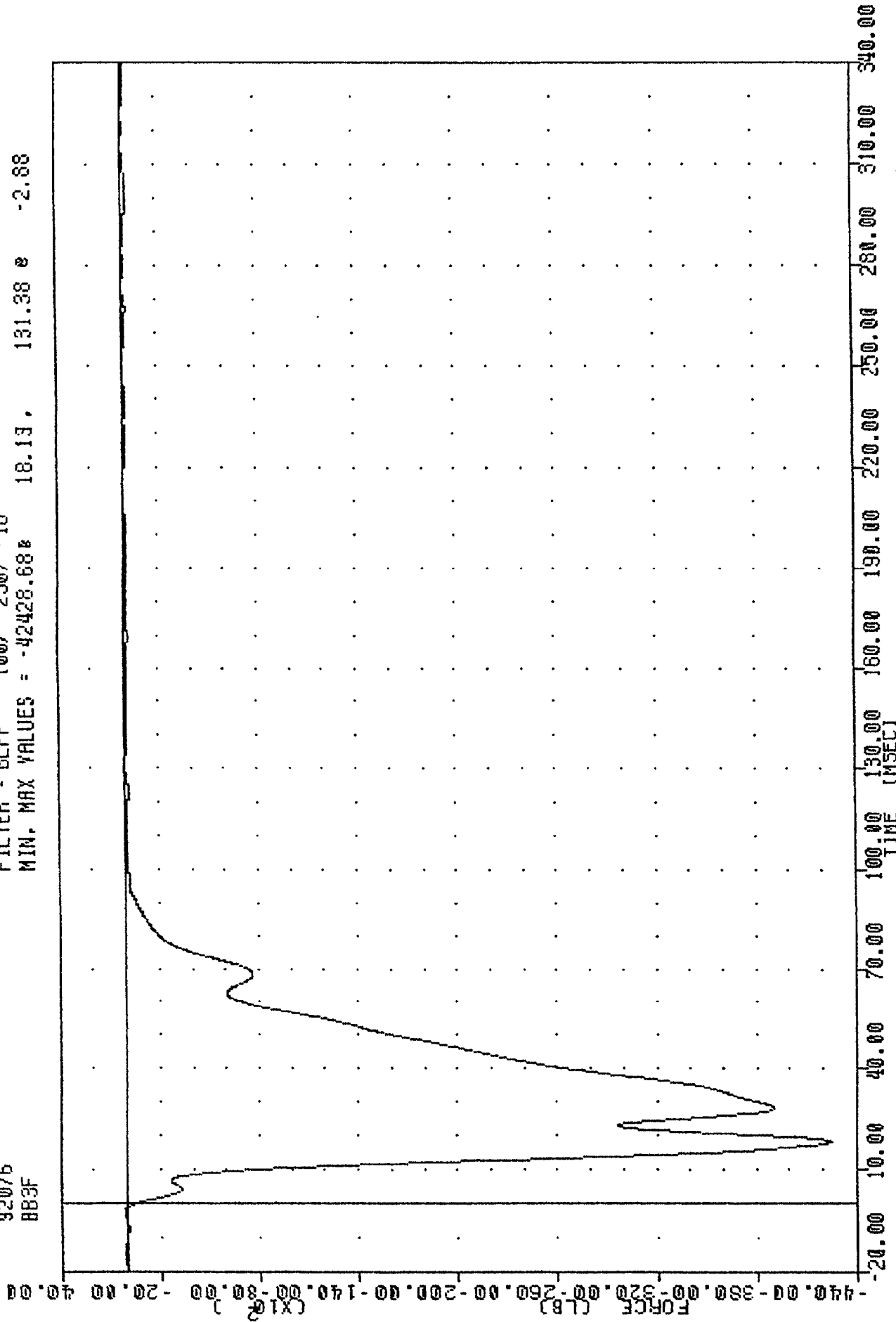
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -14379.48 25.13, 180.29 e -3.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION B2 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BB3F

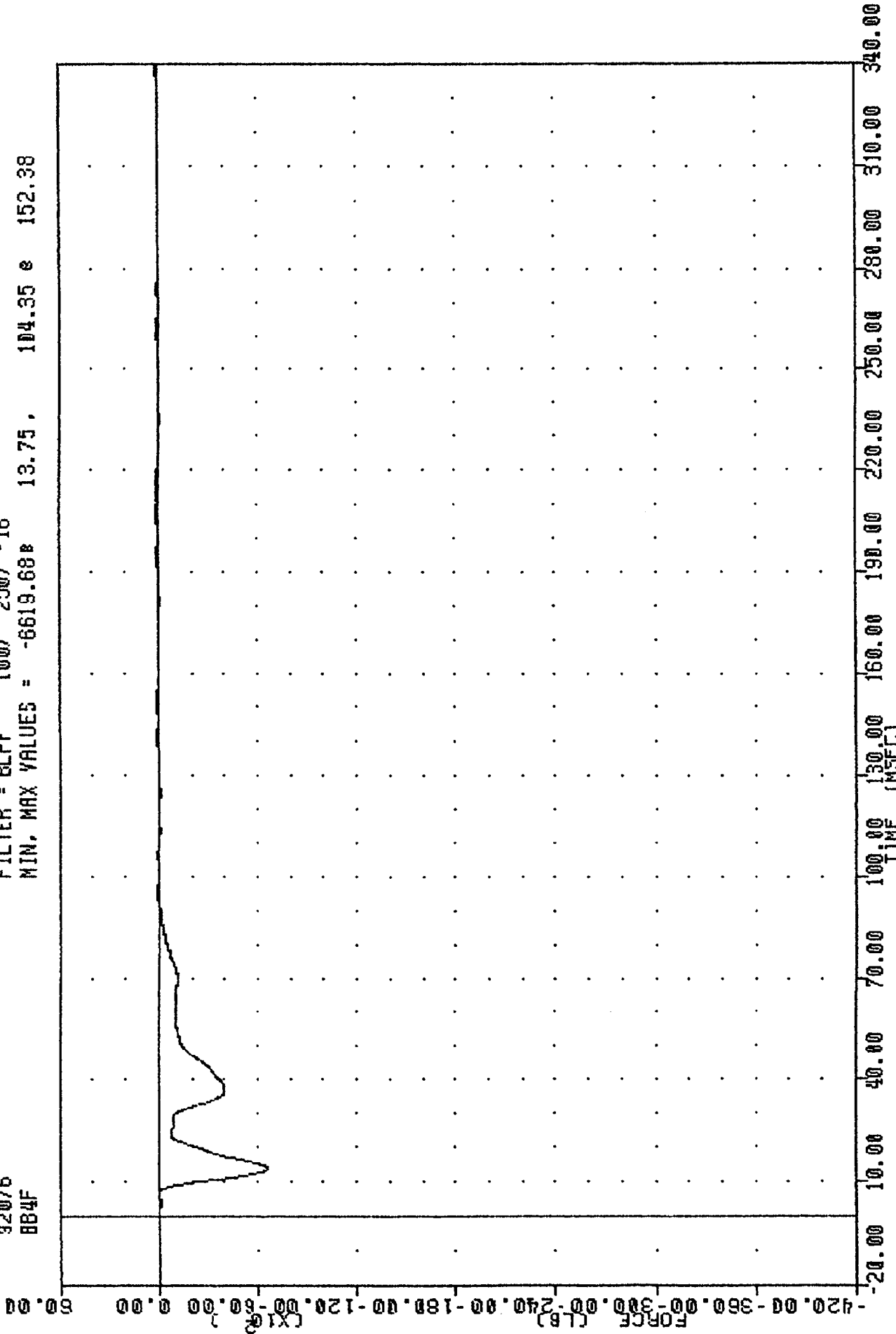
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -42428.68# 18.13, 131.38 e -2.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION B3 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BB4F

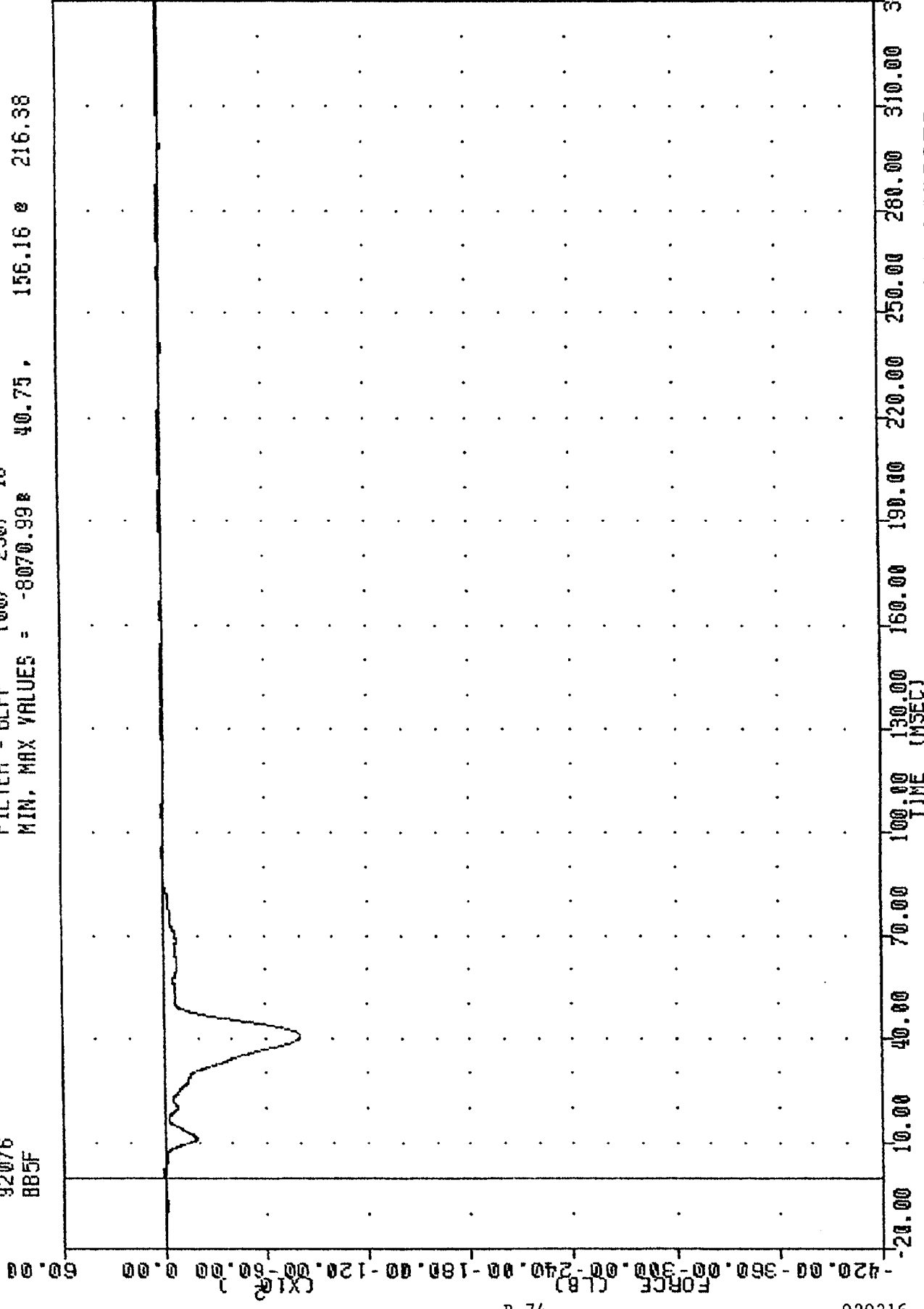
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -6619.688 13.75, 104.35 e 152.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION B4 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BB5F

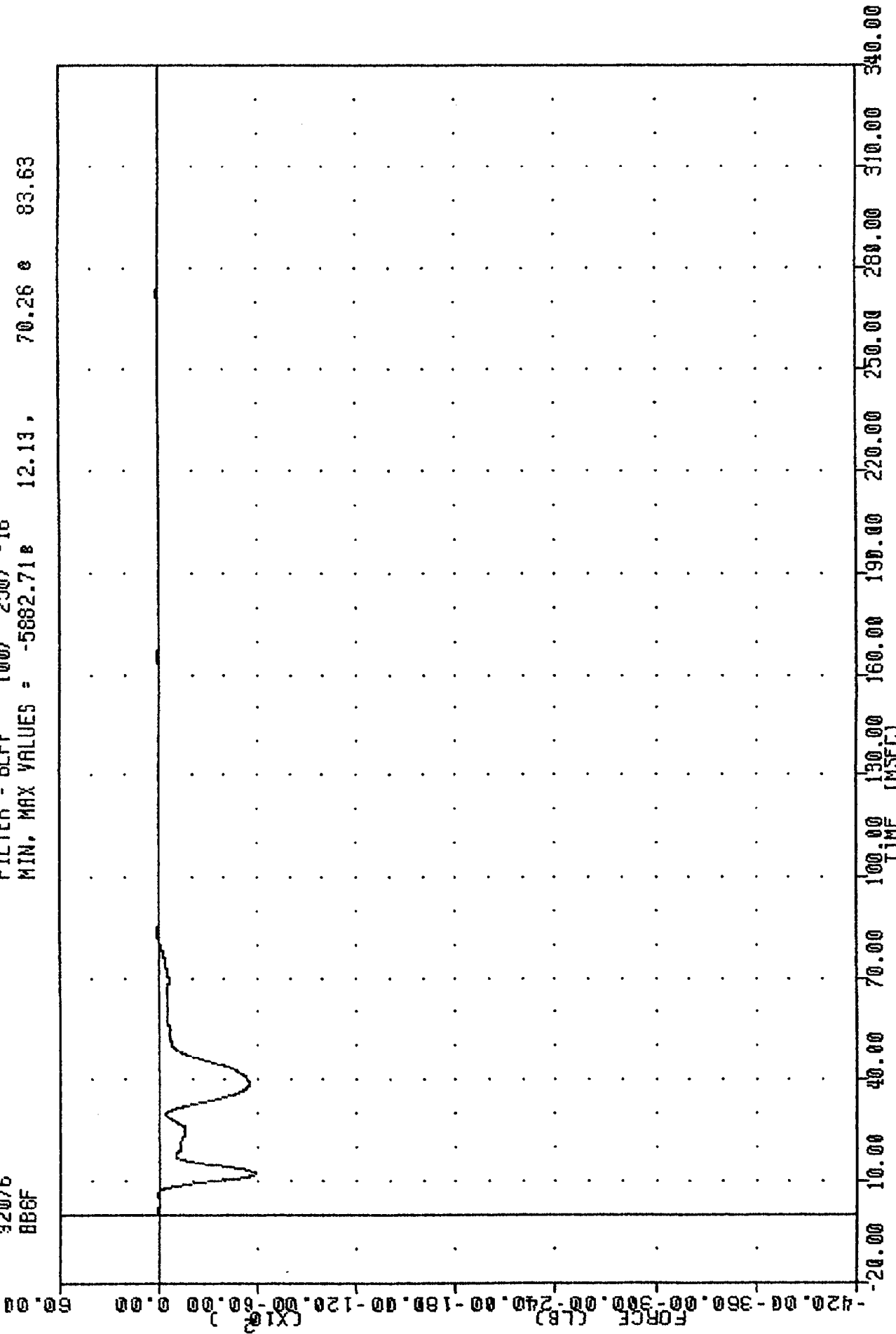
FILTER = BLFF 100/ 250/ -16  
 MIN, MAX VALUES = -8070.99# 40.75, 156.16 e 216.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION B5 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BB6F

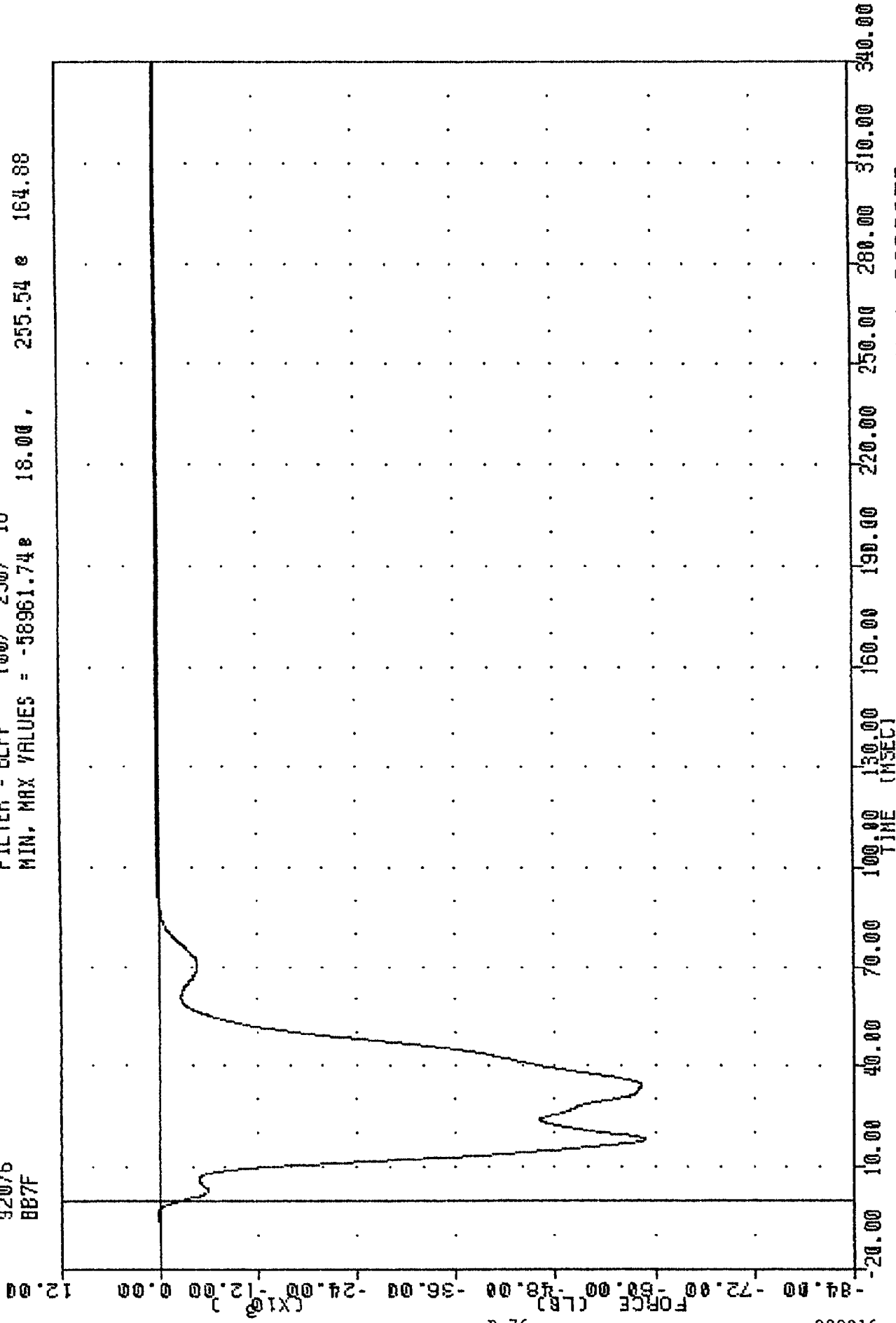
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -5882.71e 12.13, 70.26 e 83.63



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION B6 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BB7F

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -58961.74 e 18.00 , 255.54 e 164.88



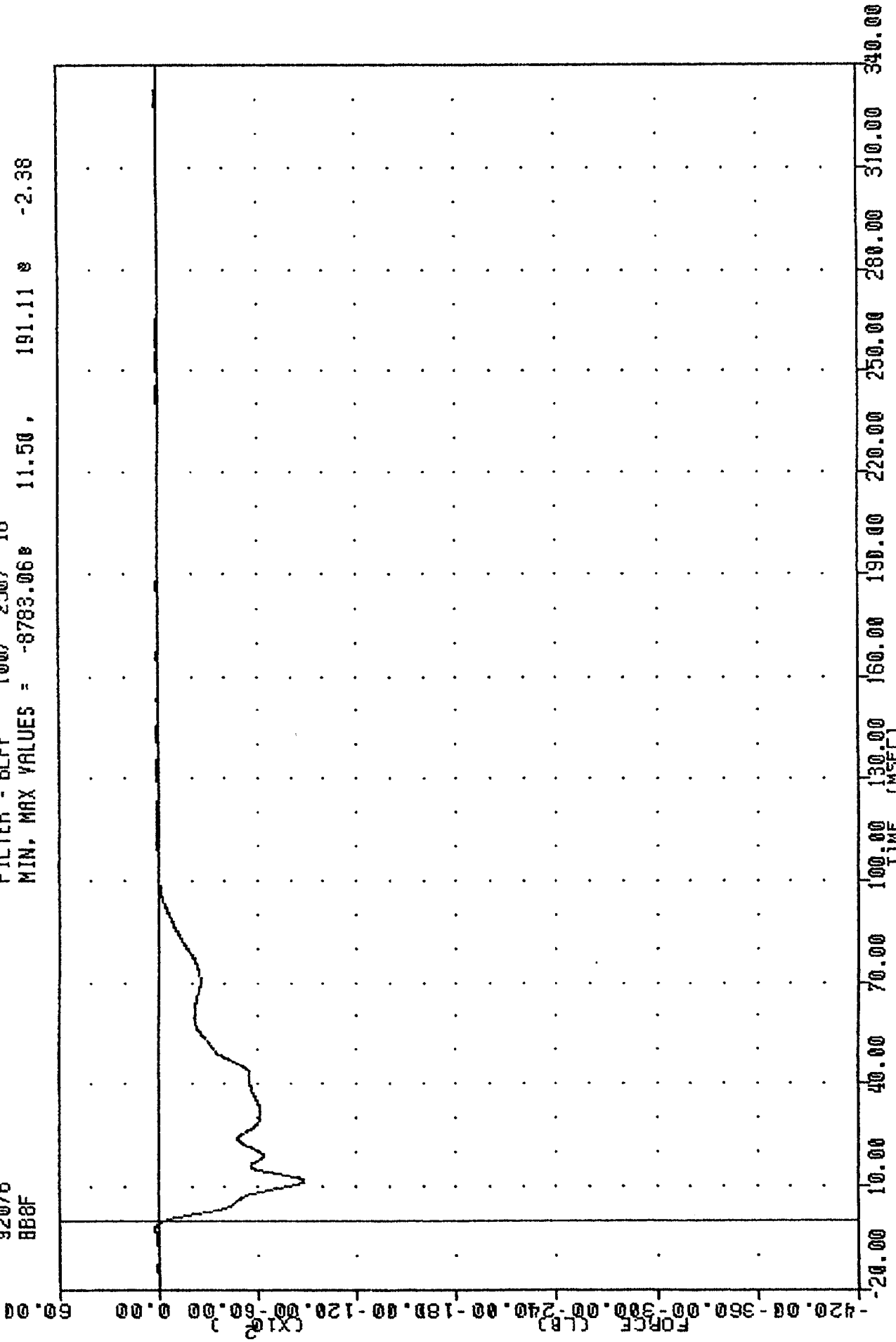
B-76

920316

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION B7 FORCE

TRC , 920316  
 KEY CAR ASSESSMENT PROGRAM  
 92076  
 BB8F

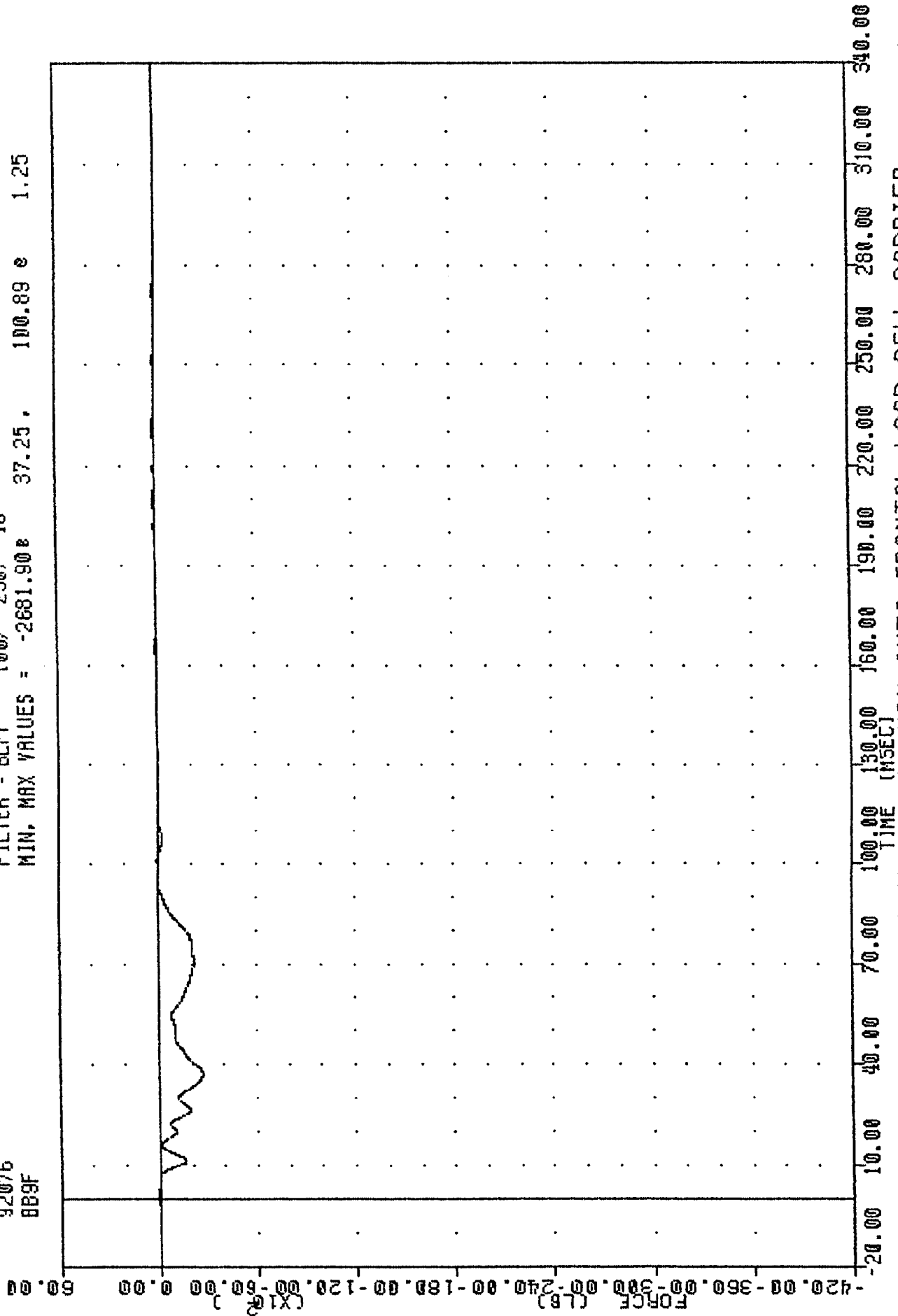
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -8783.068 11.50 , 191.11 8 -2.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 88 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BB9F

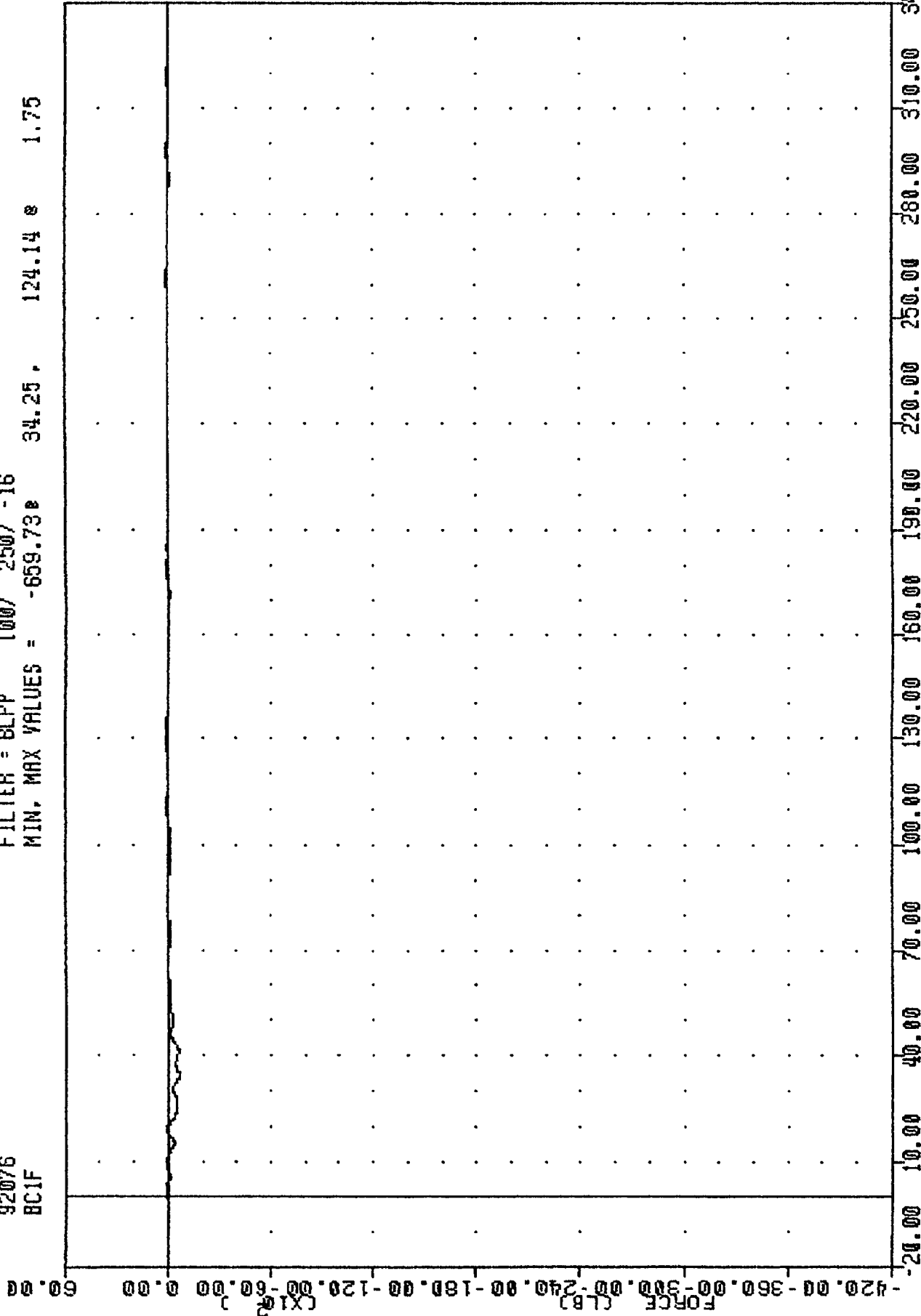
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -2681.90B 37.25 , 100.89 e 1.25



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 89 FORCE

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC1F

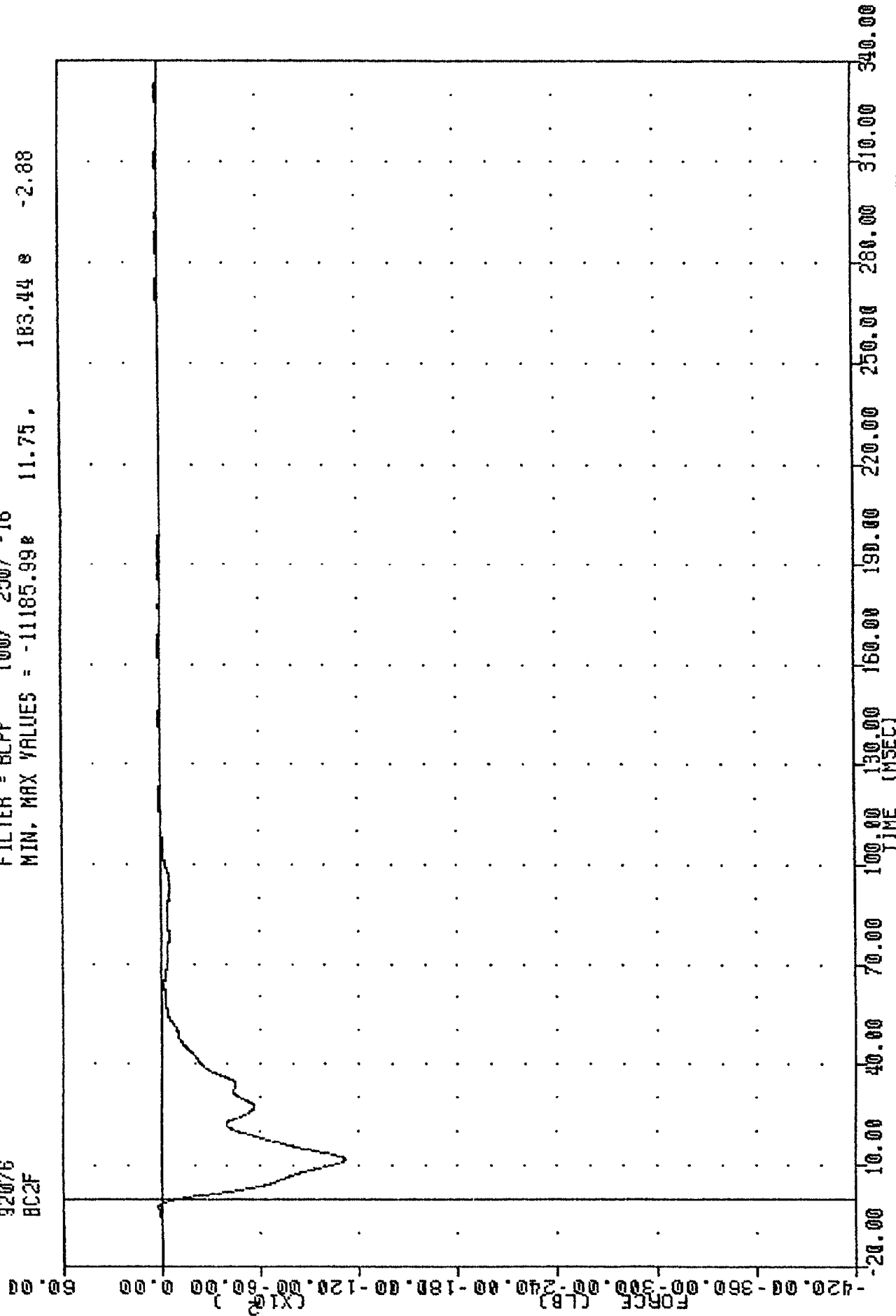
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -659.73e 34.25, 124.14 e 1.75



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION C1 FORCE

TRC . 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC2F

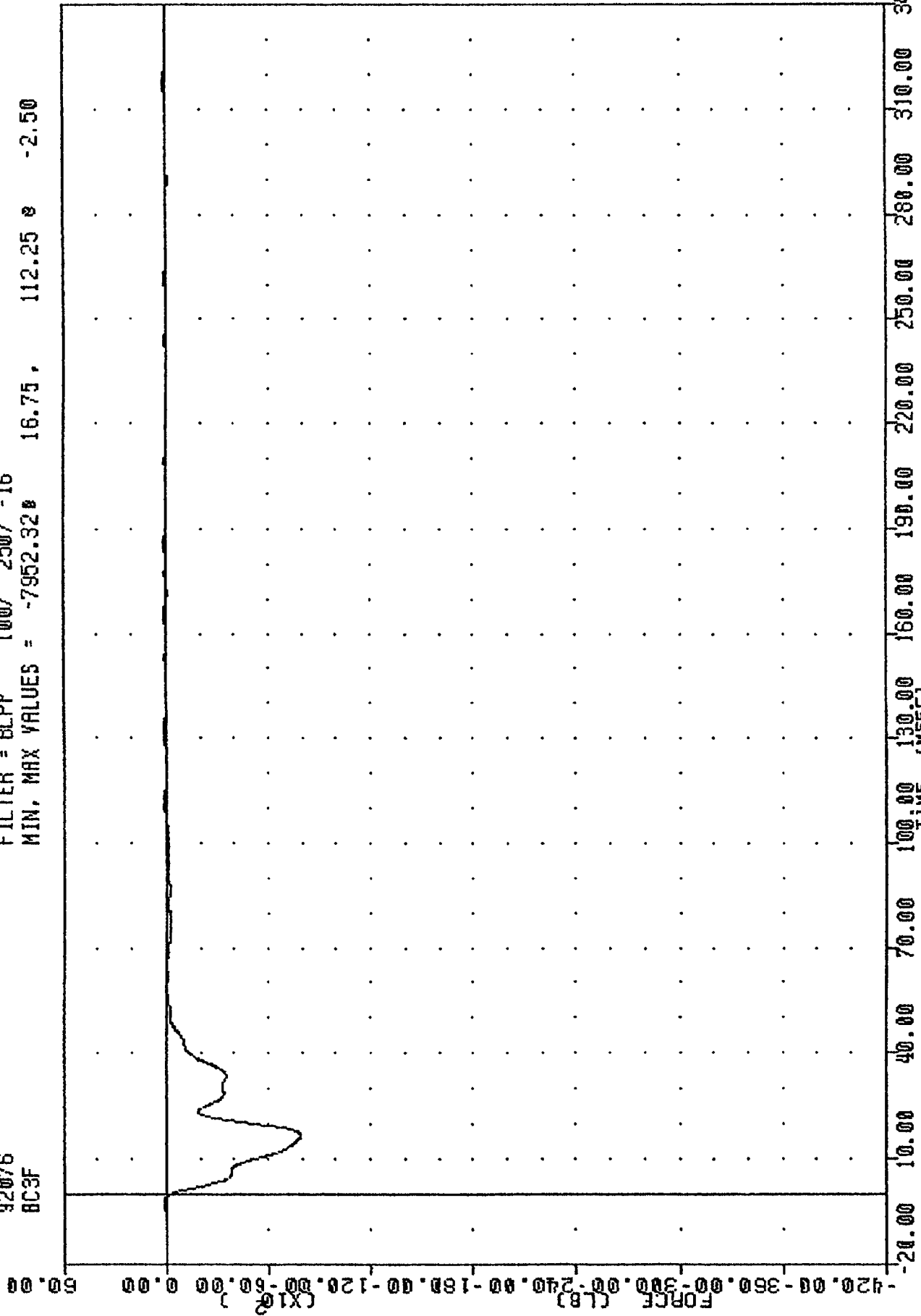
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -11185.99# 11.75, 183.44 # -2.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION C2 FORCE

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC3F

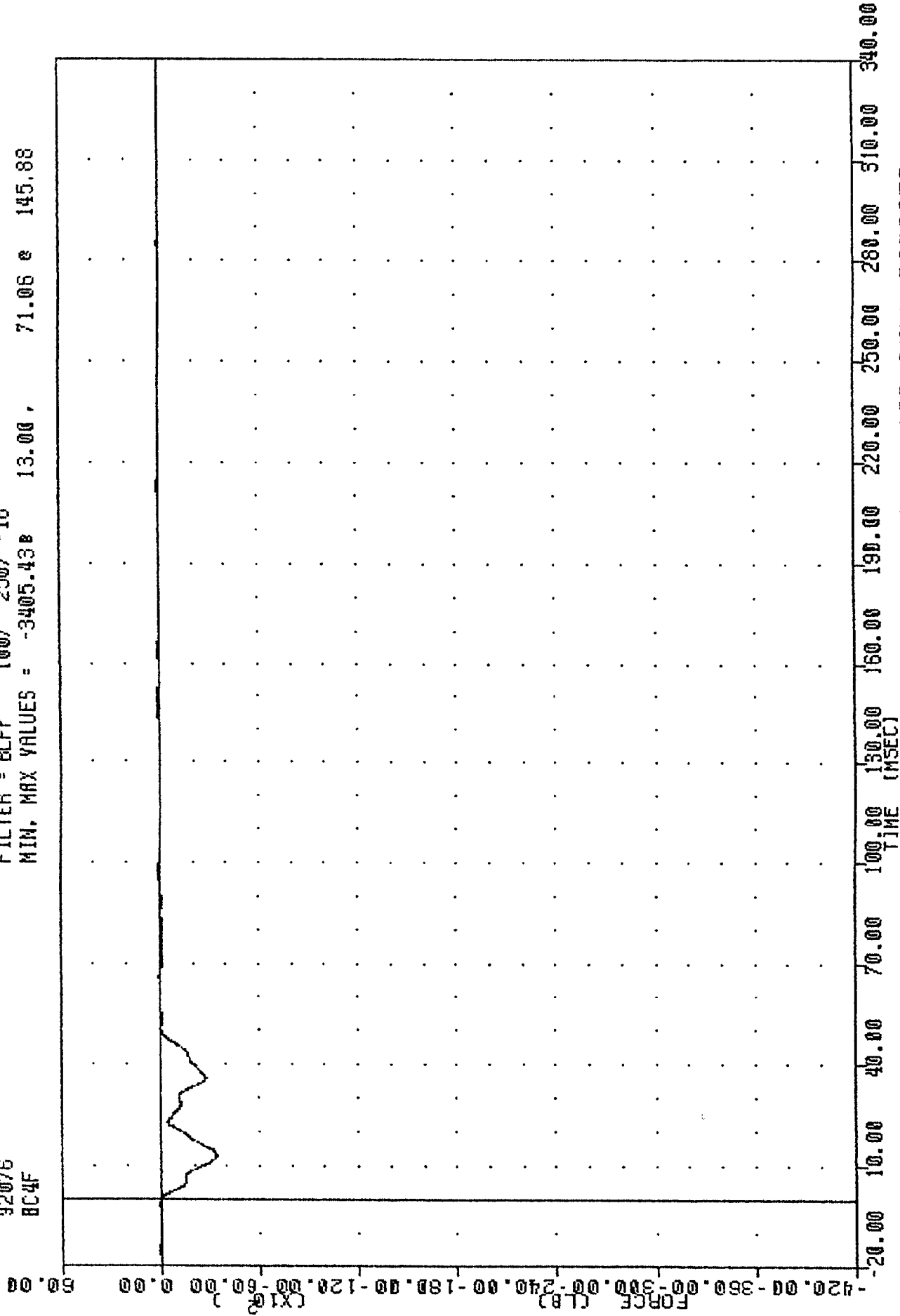
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -7952.32# 16.75, 112.25 e -2.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION C3 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC4F

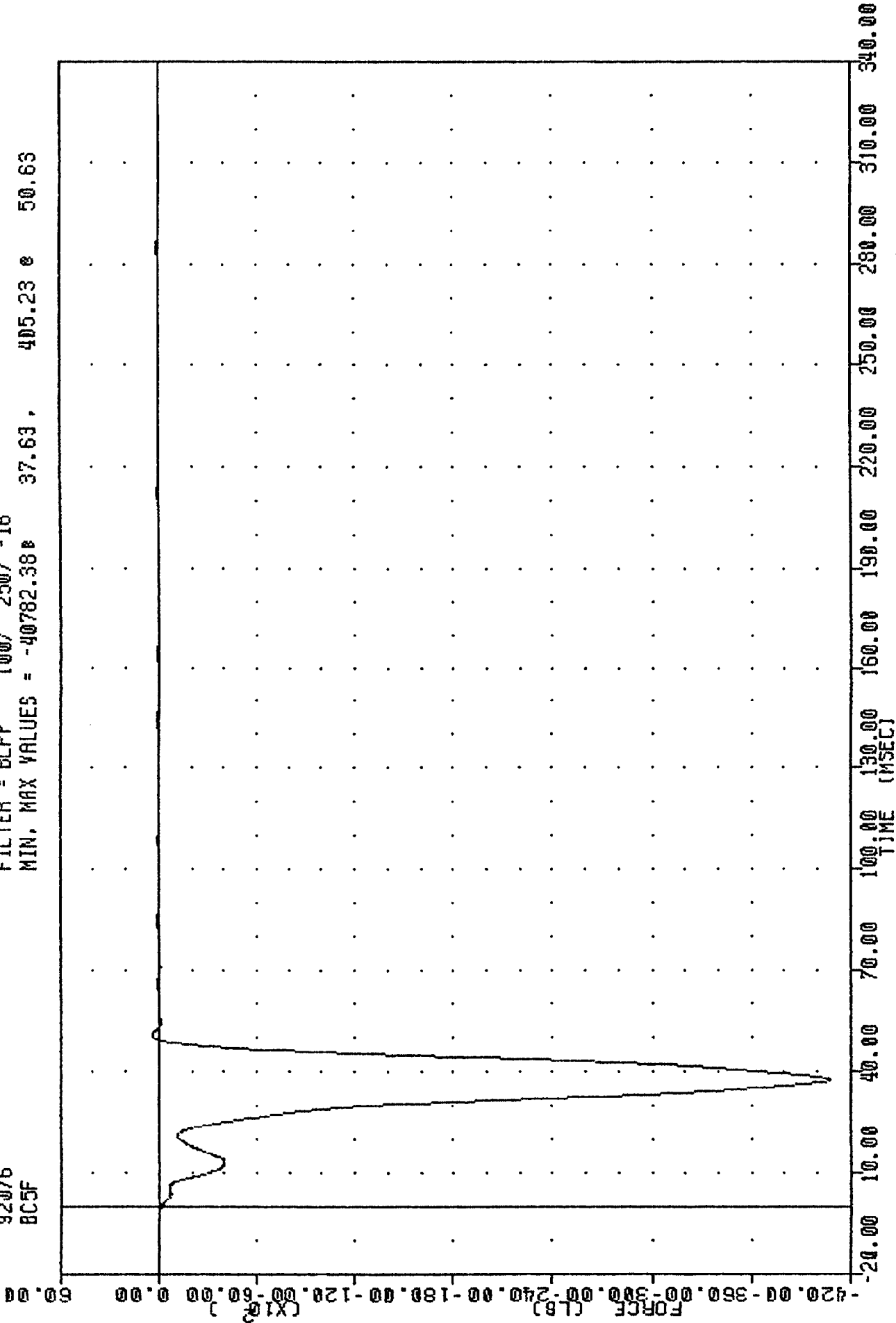
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -3405.43 13.00 , 71.06 e 145.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION C4 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC5F

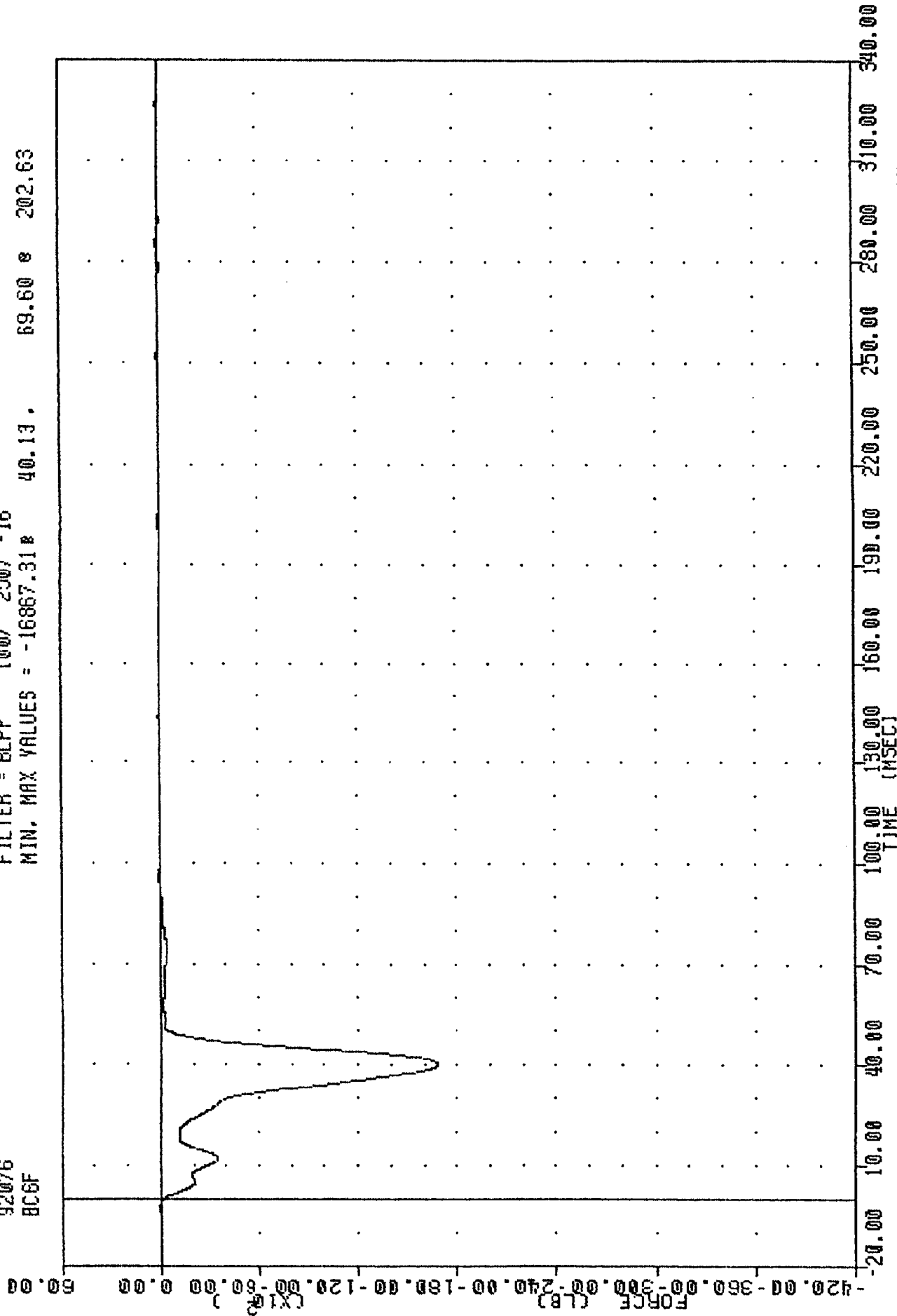
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -40782.38 37.63, 405.23 50.63



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION C5 FORCE

TRC . 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC6F

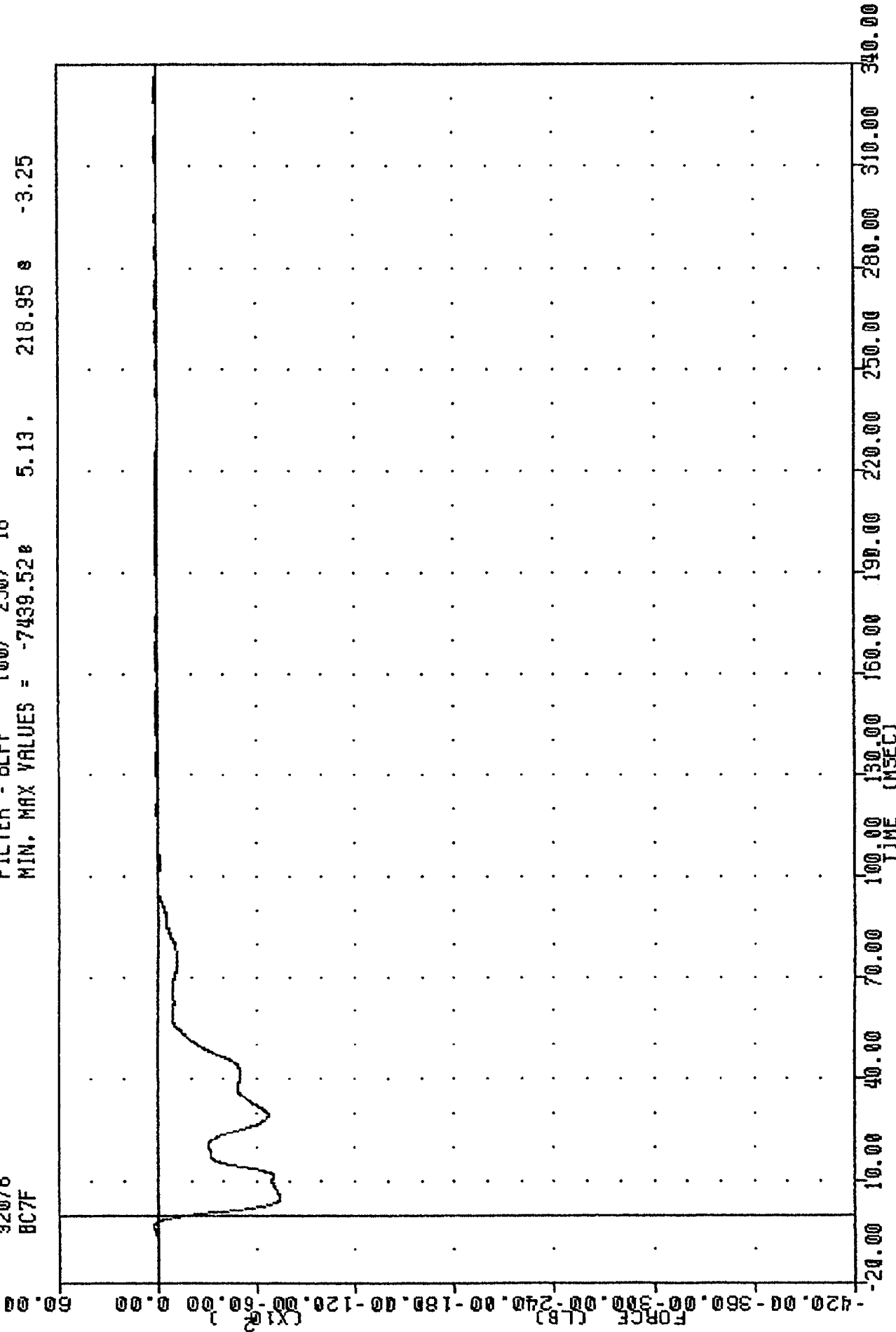
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -16867.31 8 40.13 . 69.60 8 202.63



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION CG FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC7F

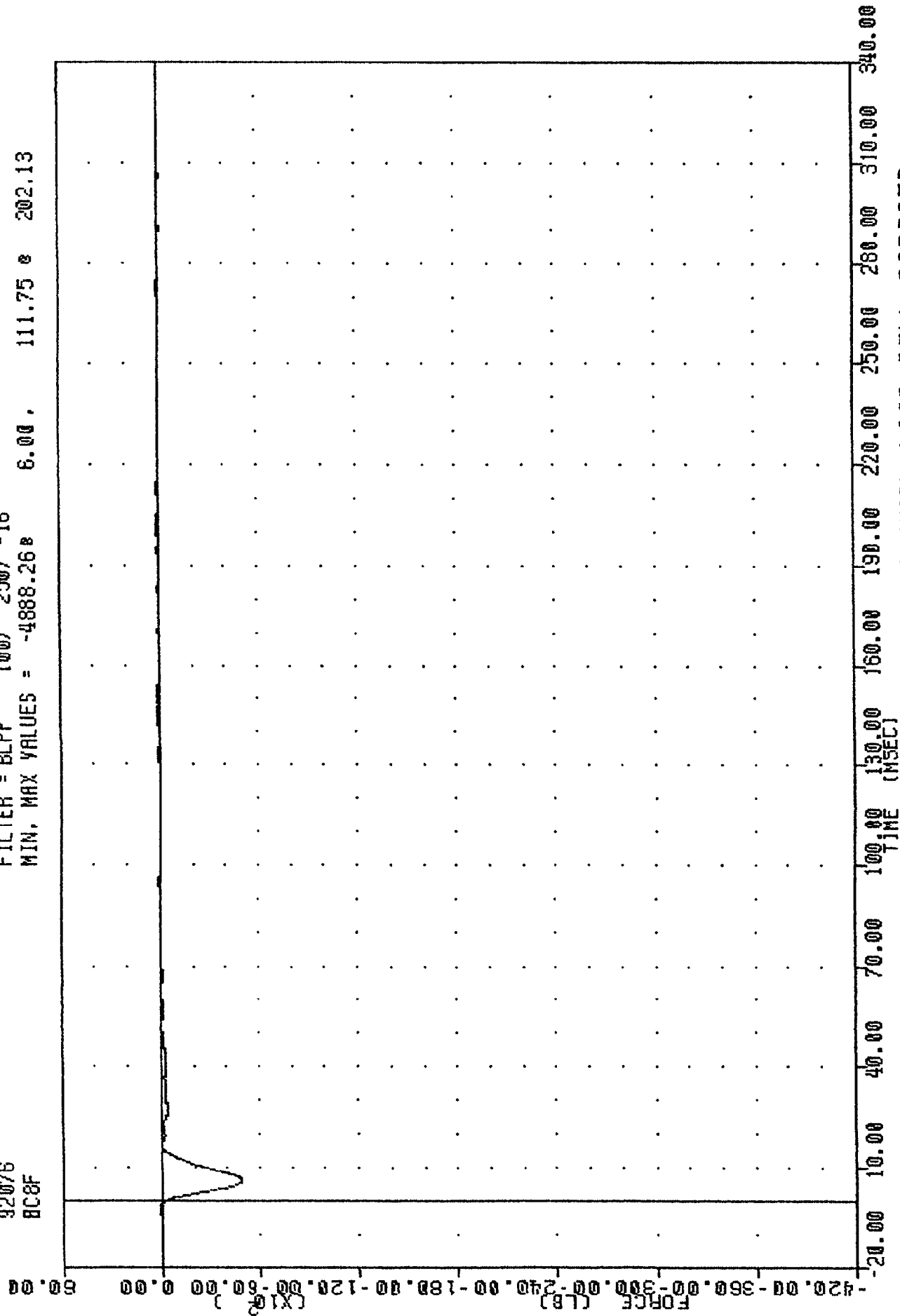
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -7439.52 5.13, 218.95 -3.25



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION C7 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC8F

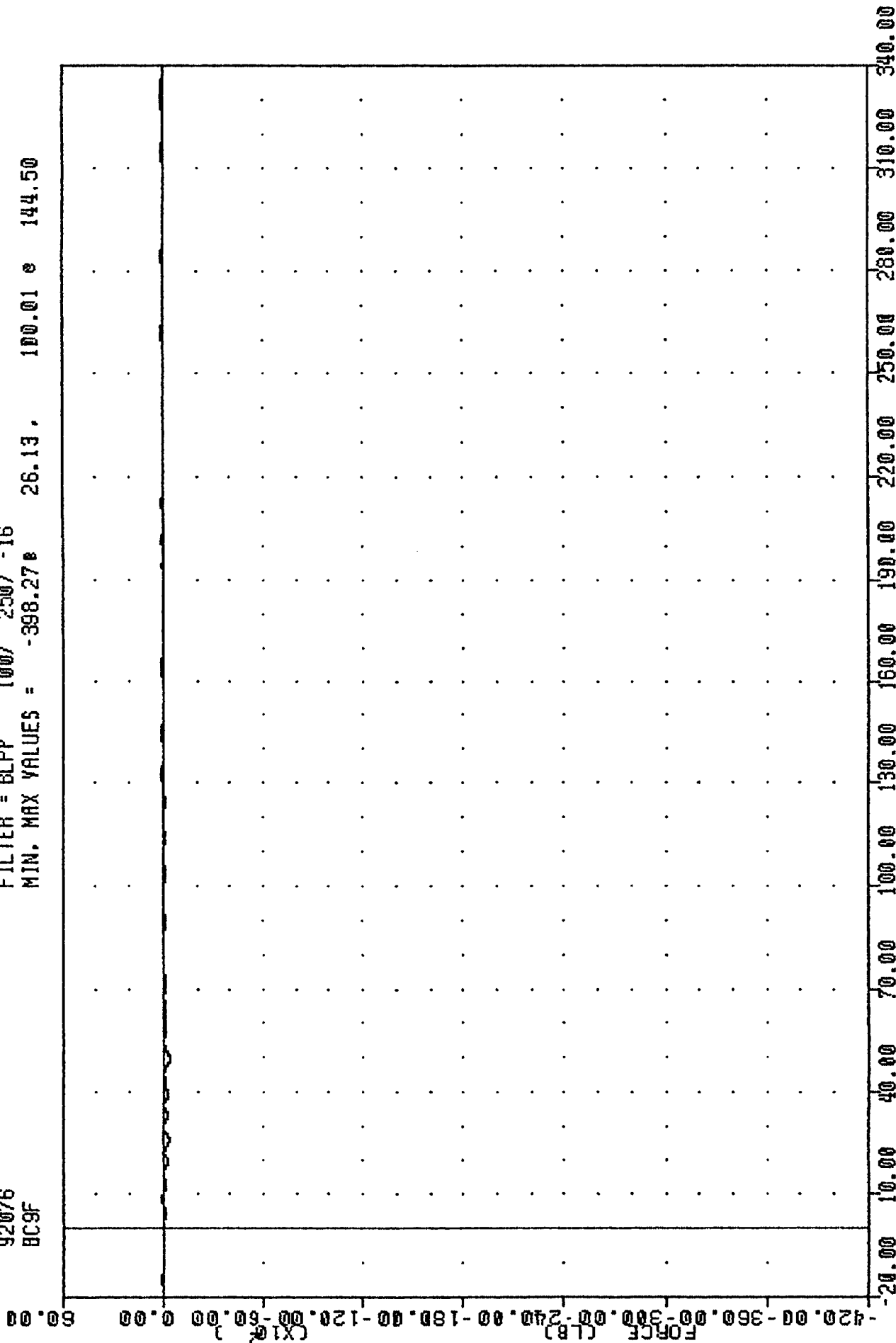
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -4888.26 6.00, 111.75 202.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION CB FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BC9F

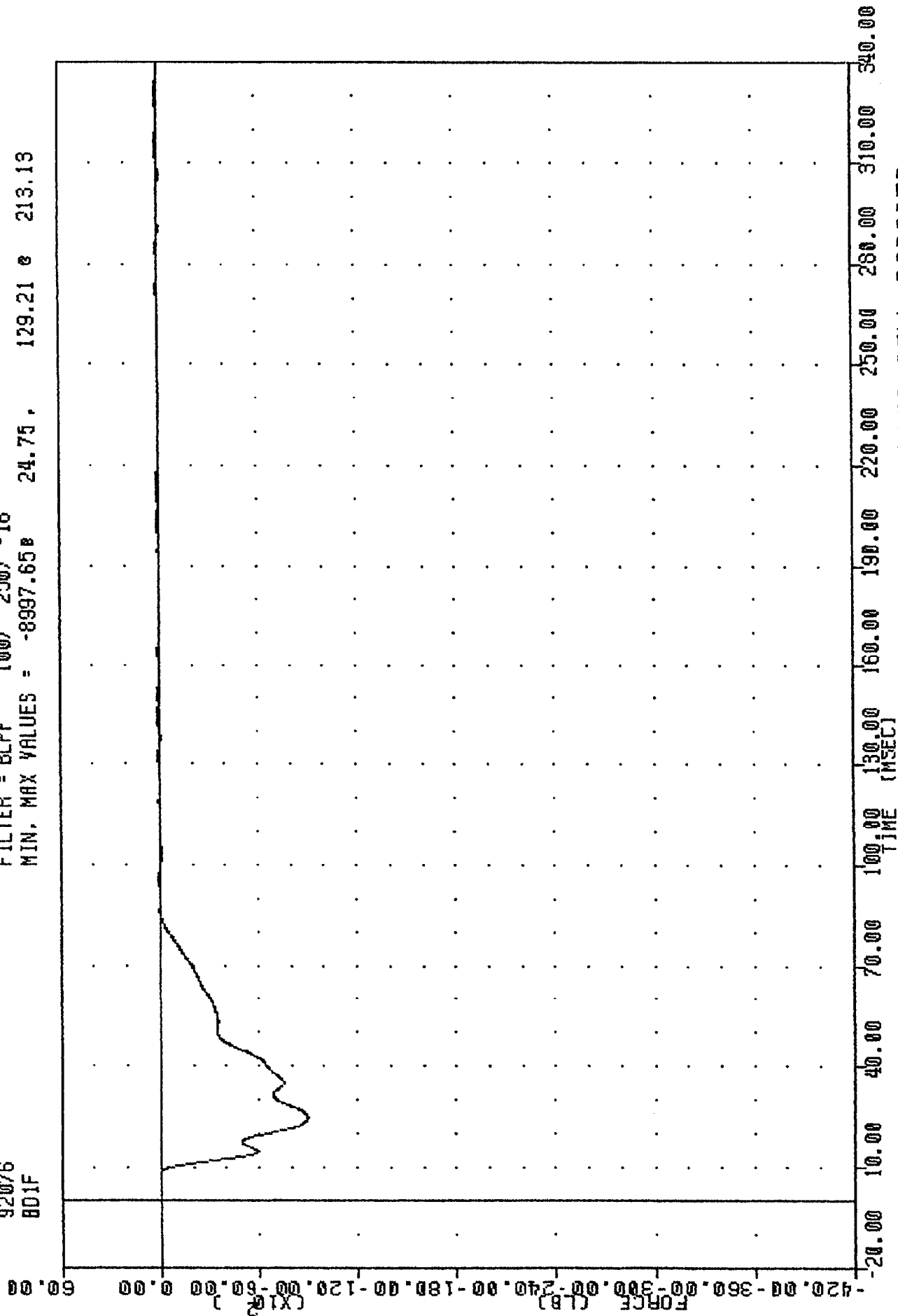
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -398.27 26.13 , 100.01 144.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION C9 FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 801F

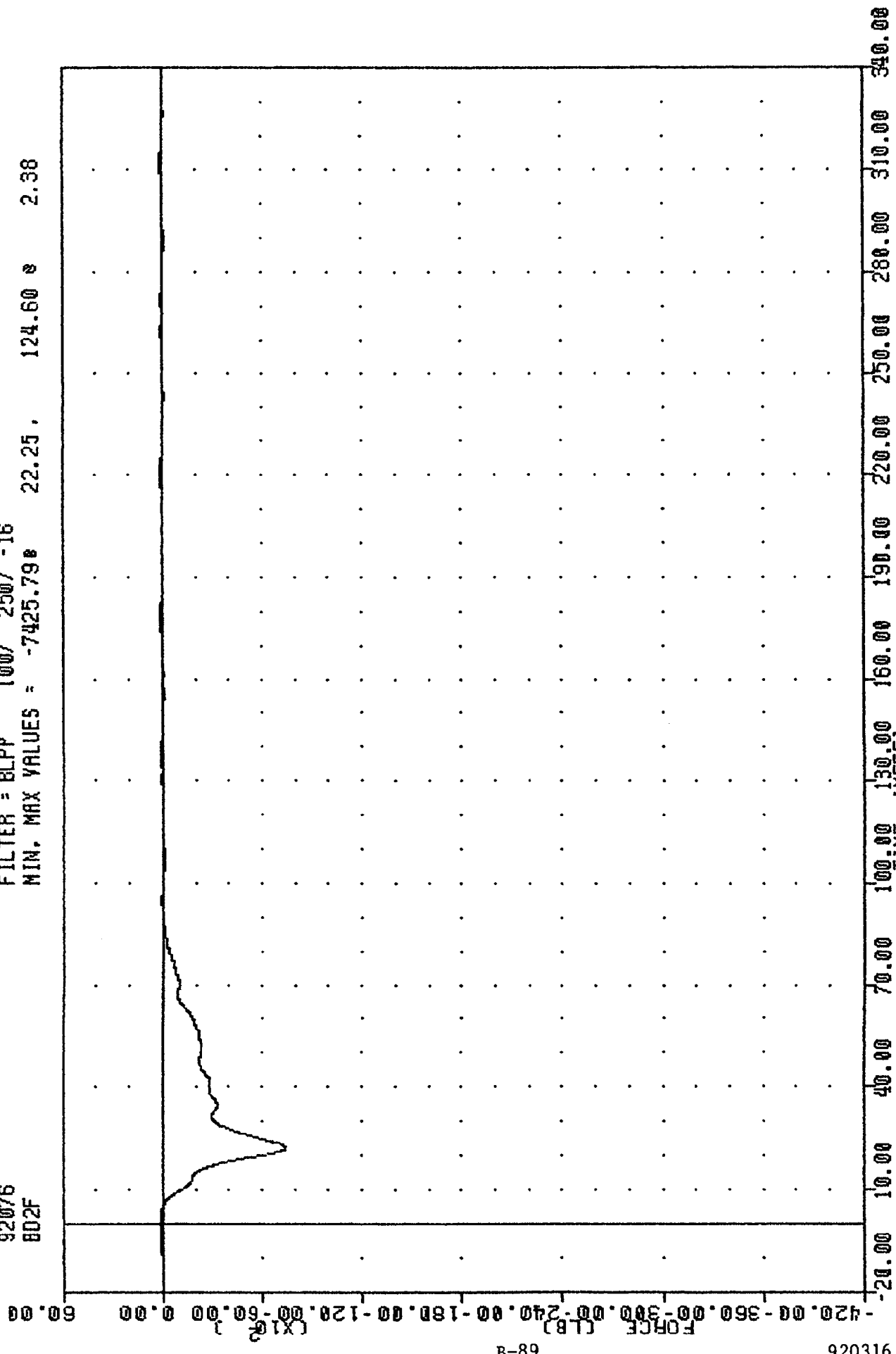
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -8997.65 24.75 129.21 213.13



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 01 FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 8D2F

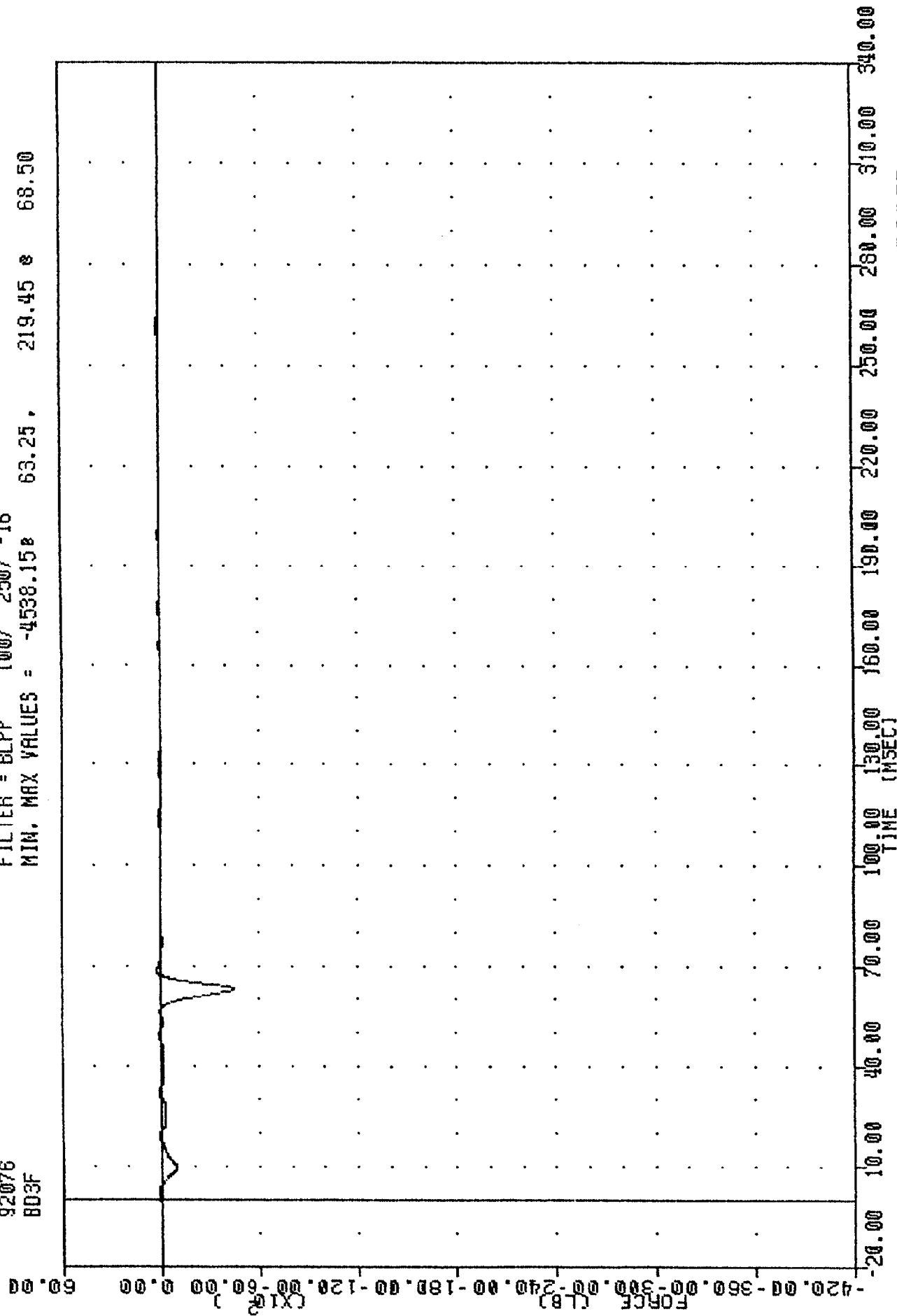
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -7425.79 22.25 124.60 2.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION D2 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 803F

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -4538.15# 63.25 , 219.45 # 68.50



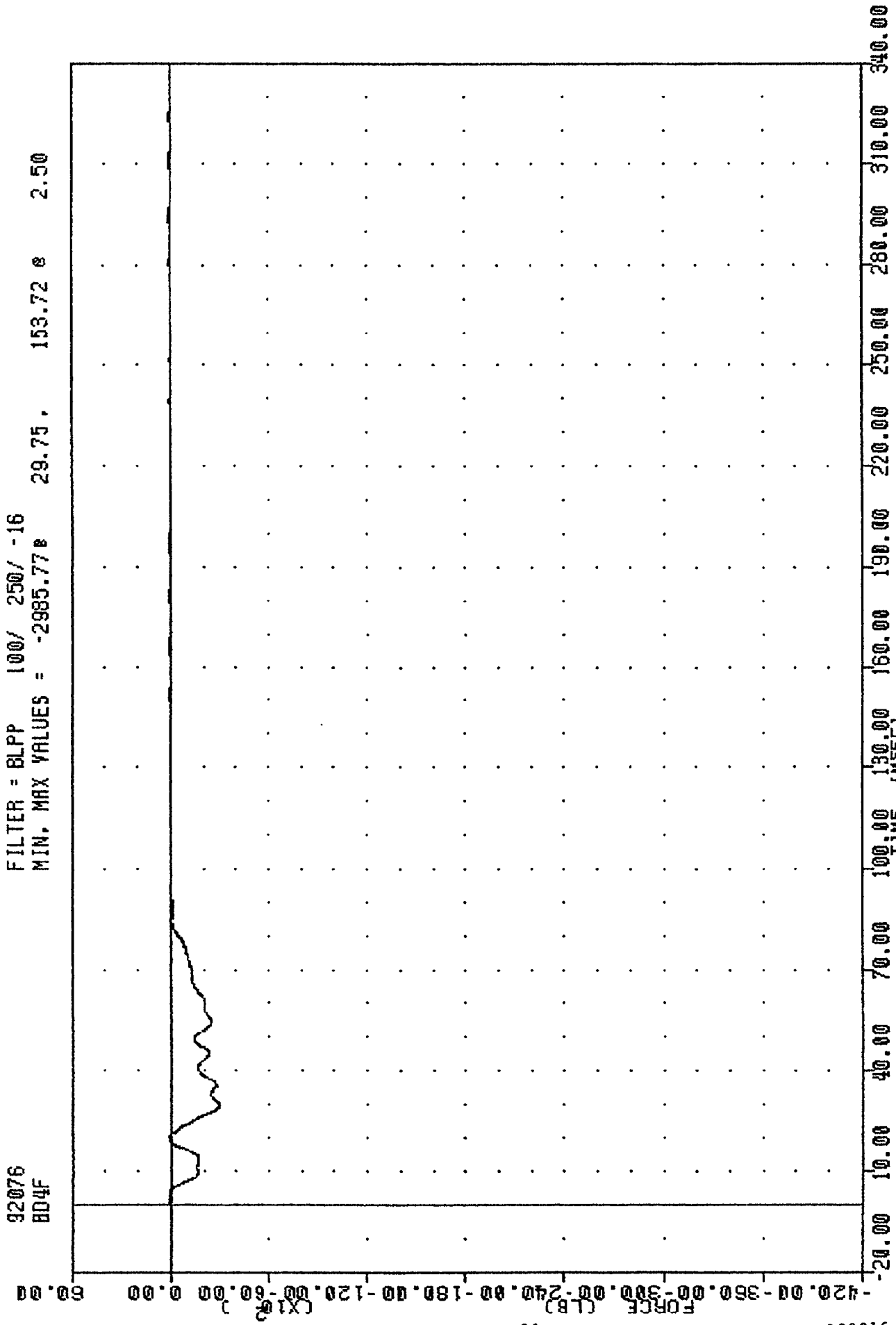
B-90

920316

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 03 FORCE

TRC  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 804F

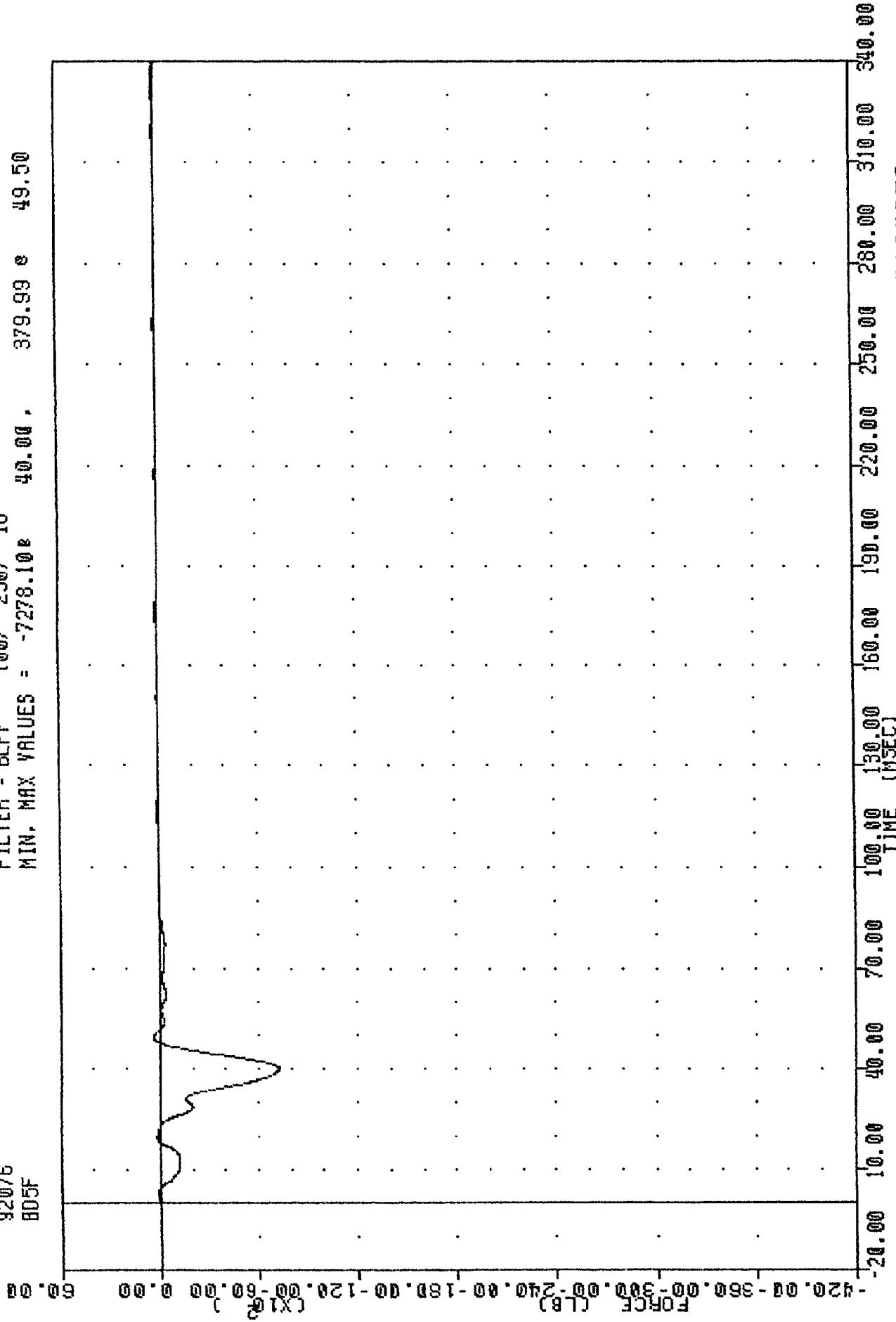
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -2985.77 153.72 29.75 2.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 04 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 805F

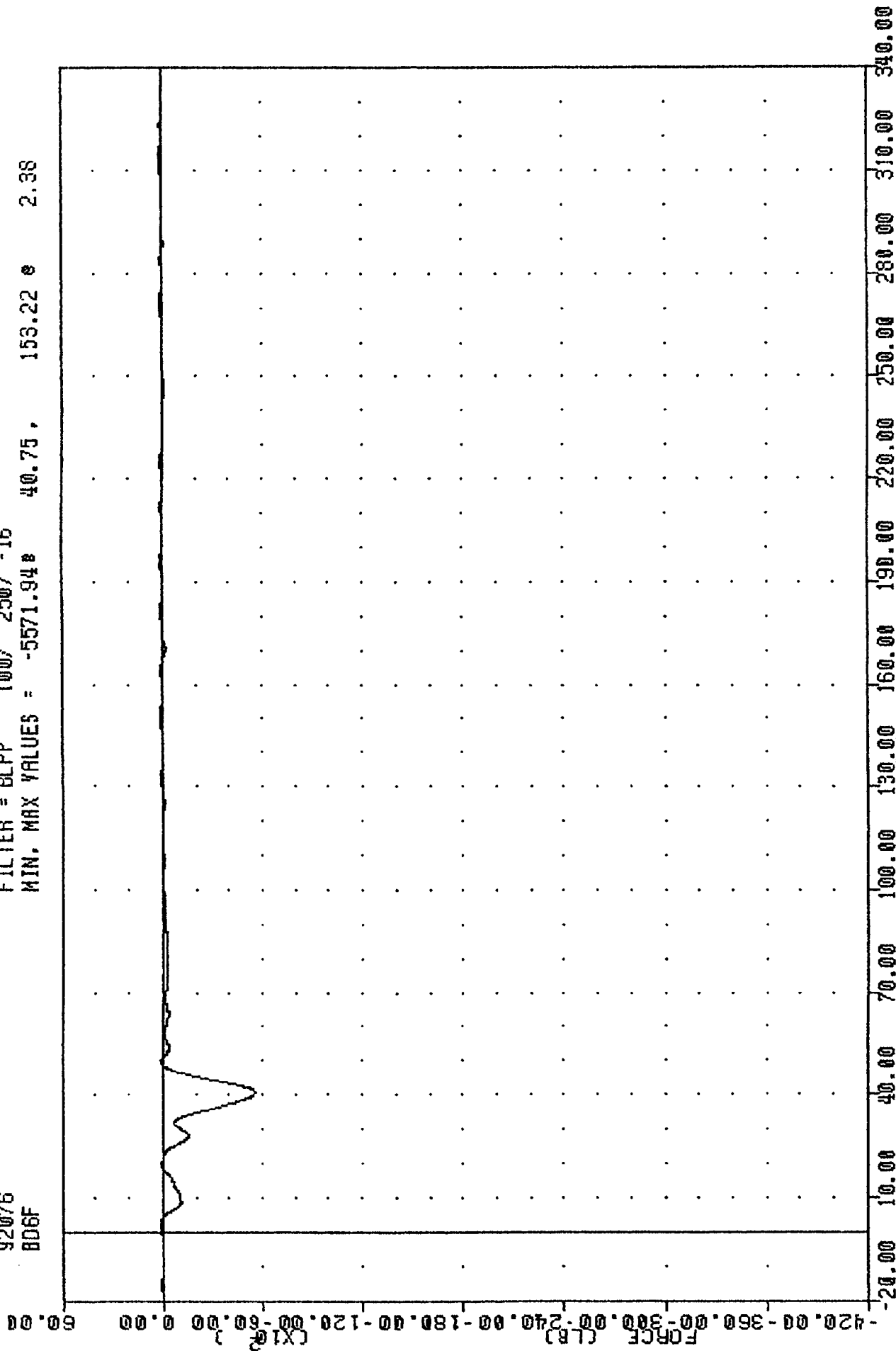
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -7278.10e 40.00 , 379.99 e 49.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 05 FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BD6F

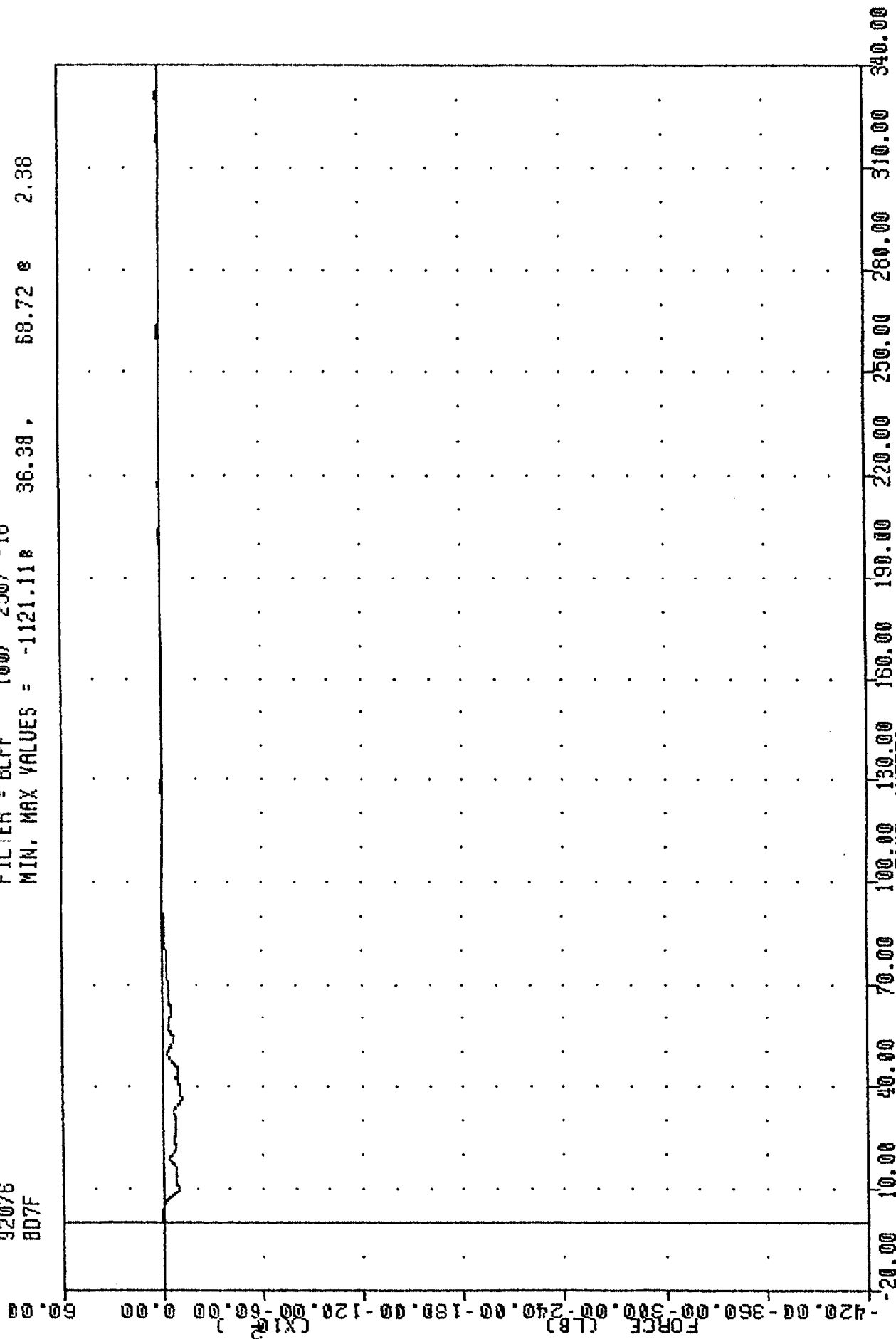
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -5571.94# 40.75, 153.22 # 2.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 06 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 BD7F

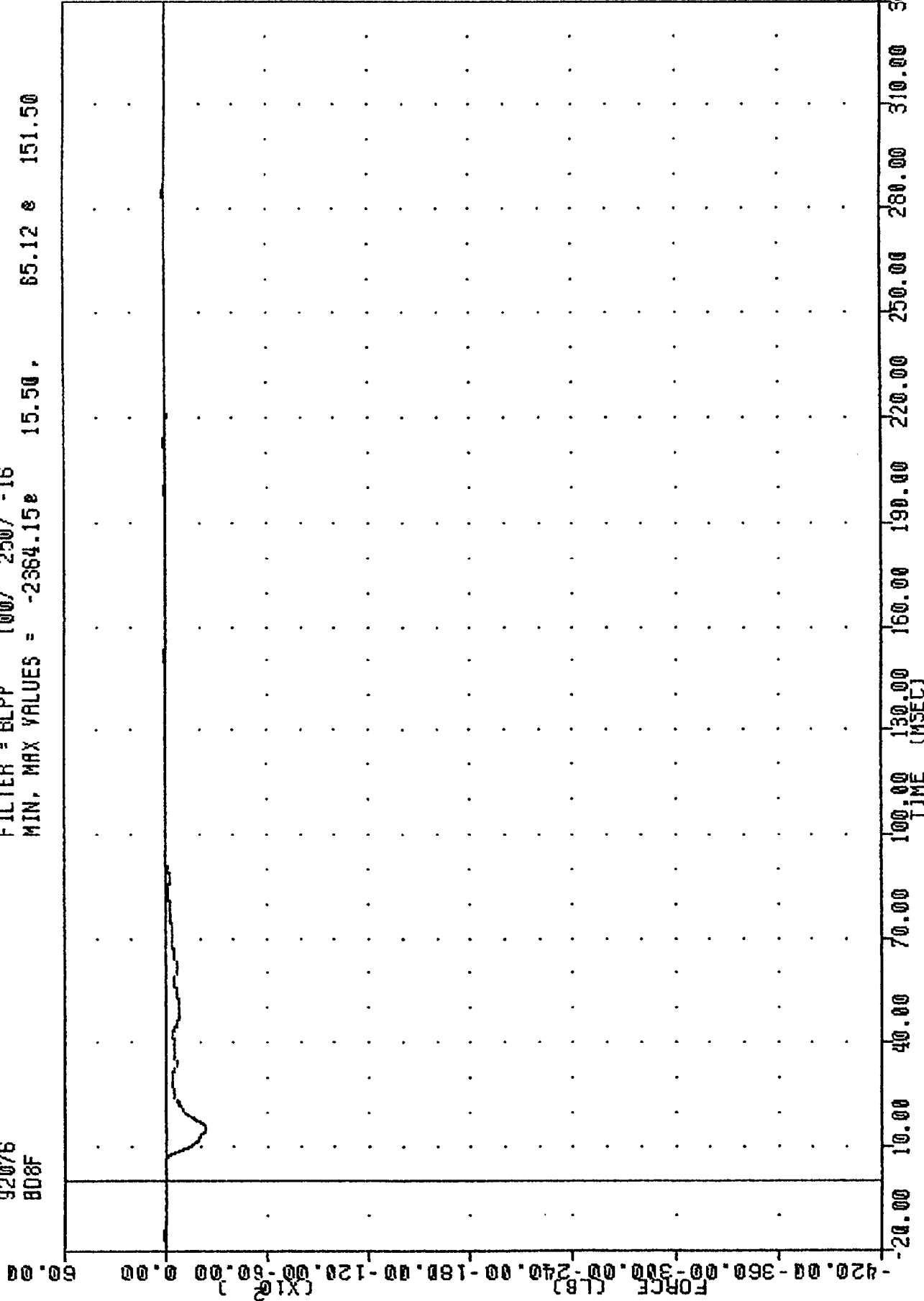
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -1121.118 36.38 , 58.72 2.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 07 FORCE

TRC 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 808F

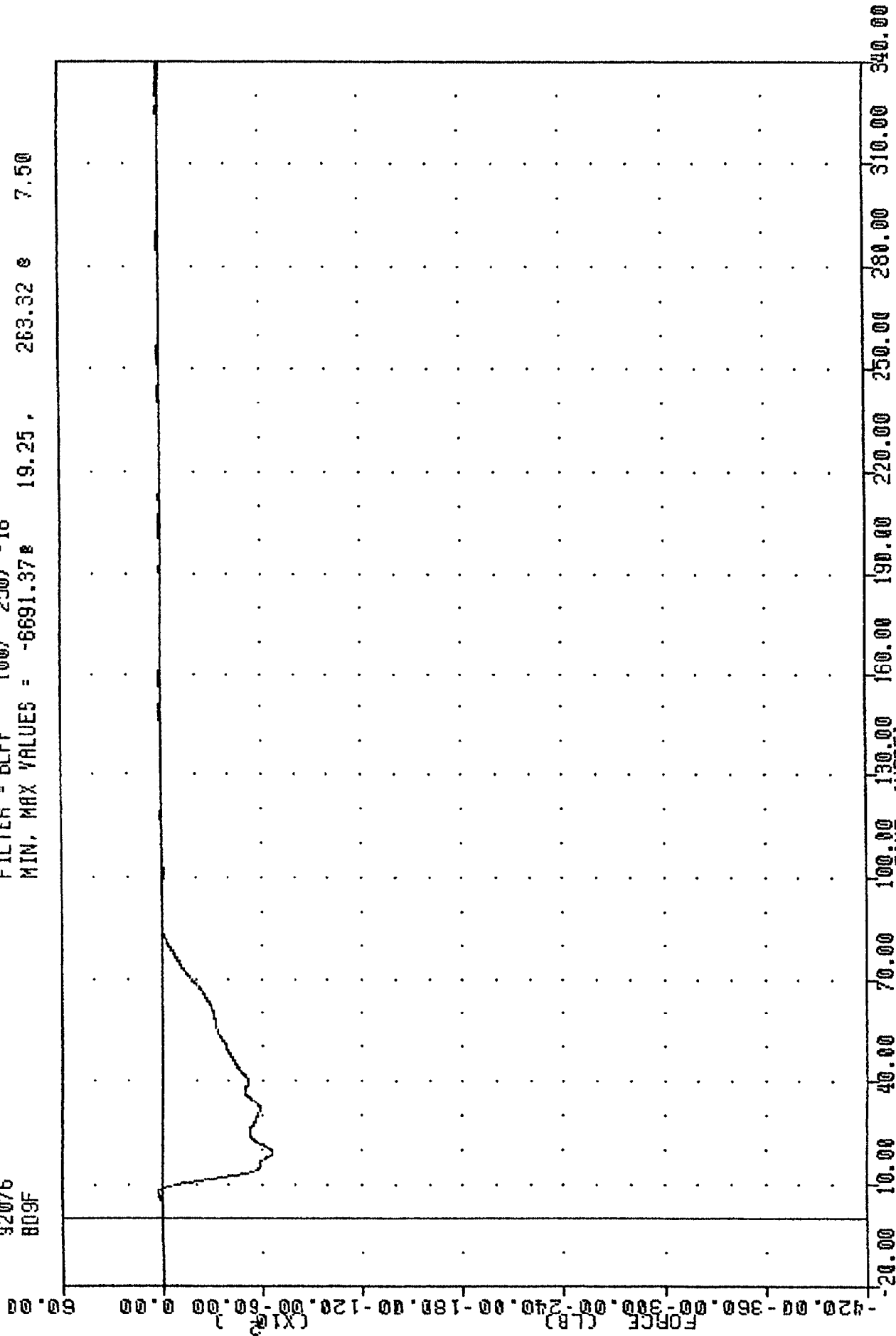
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -2364.15e 15.50, 65.12 e 151.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION D8 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 32076  
 809F

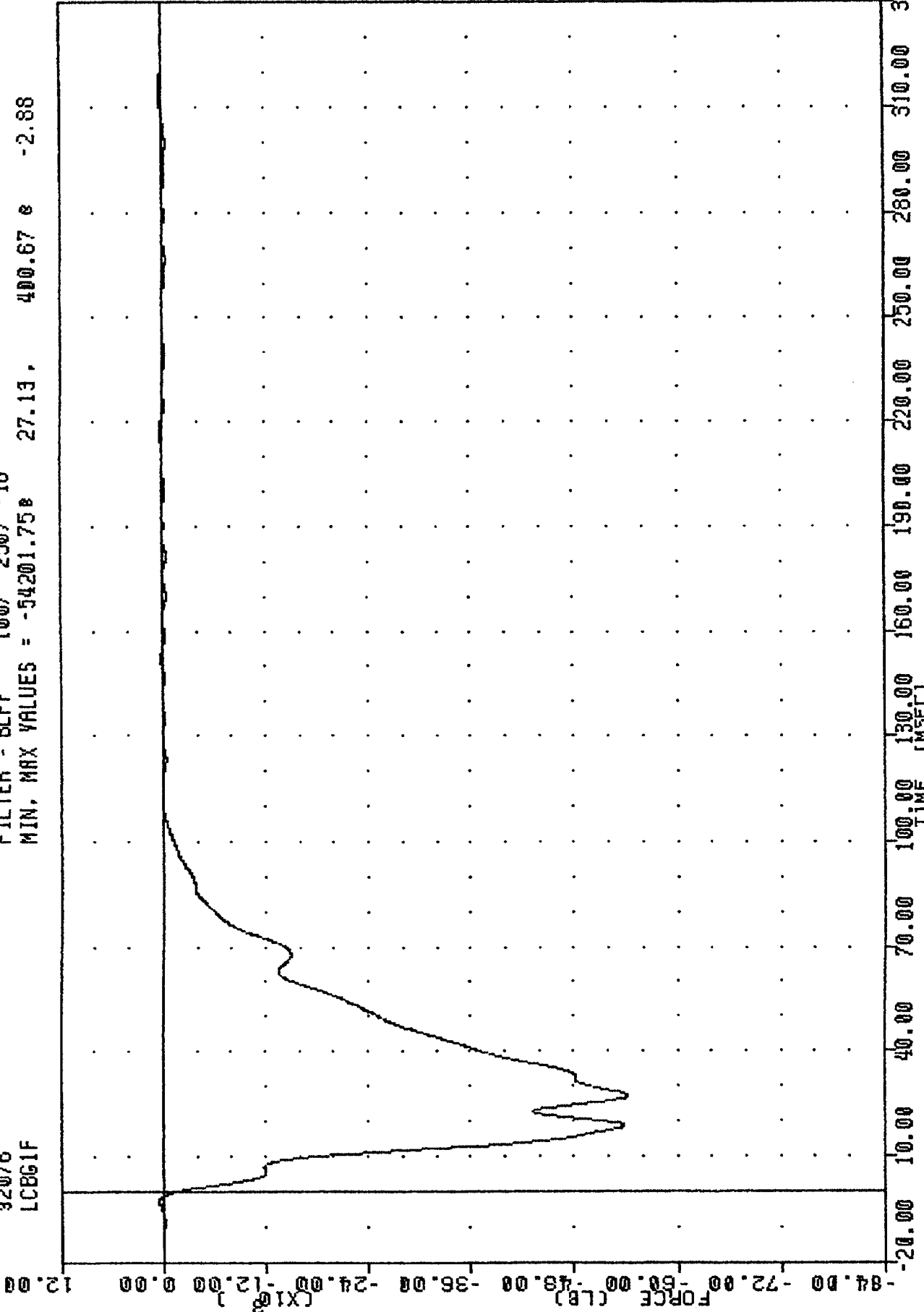
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -6691.37# 19.25, 263.32 # 7.50



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER POSITION 09 FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LCBG1F

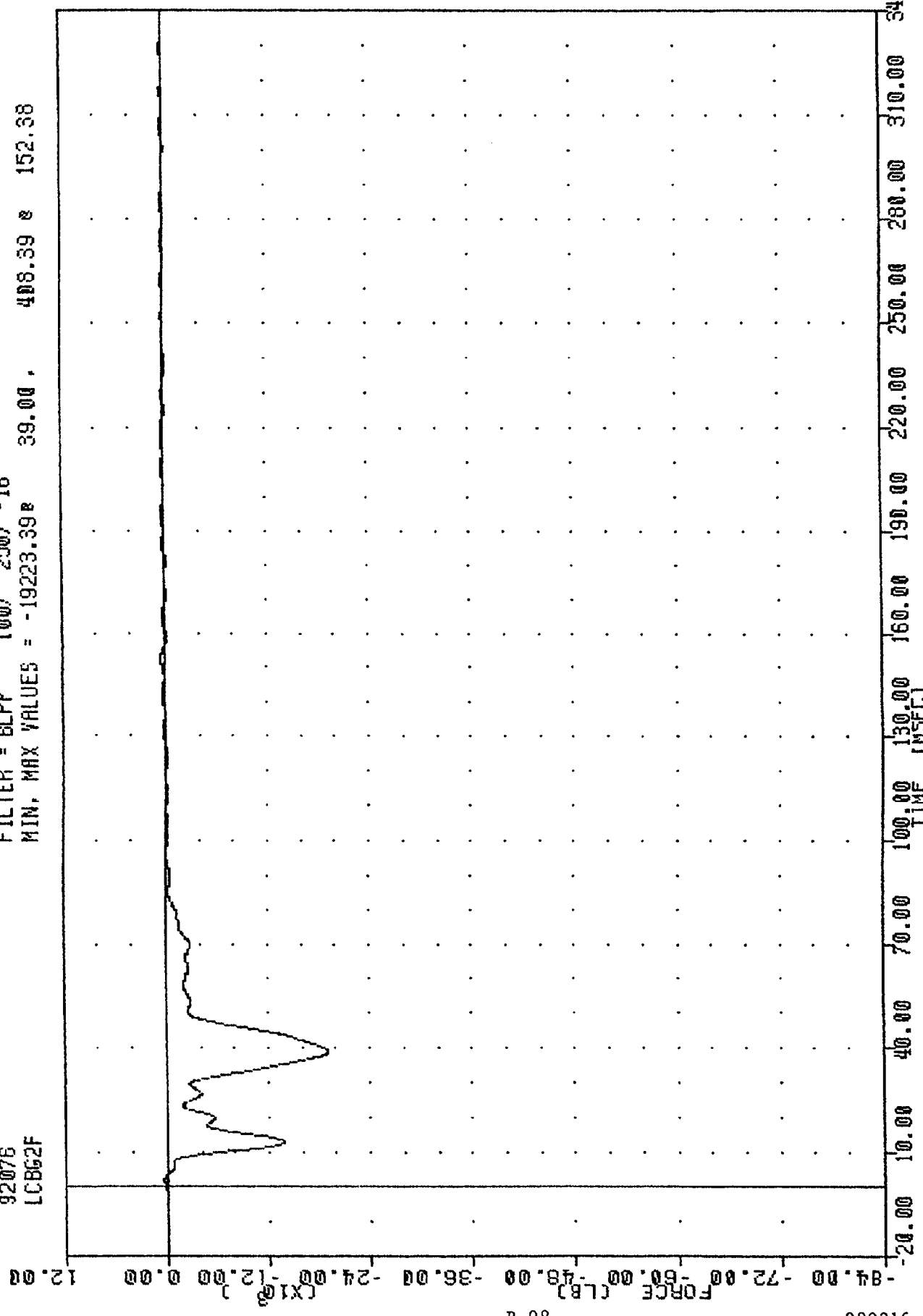
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -54201.75# 27.13, 400.67 # -2.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER GROUP - 1 FORCE TOTAL

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LCBG2F

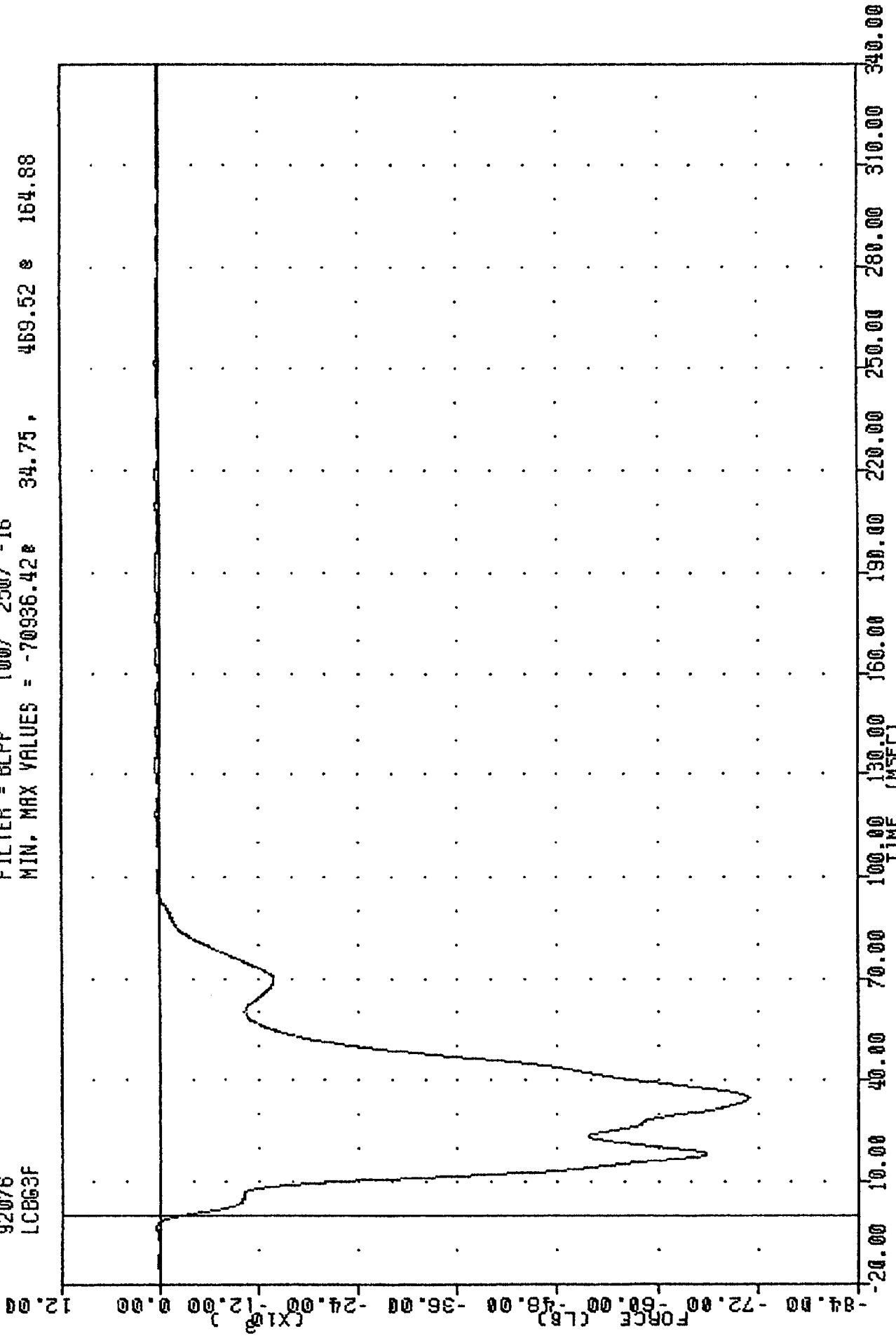
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -19223.39 39.00 , 408.39 152.38



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER GROUP # 2 FORCE TOTAL

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LCBG3F

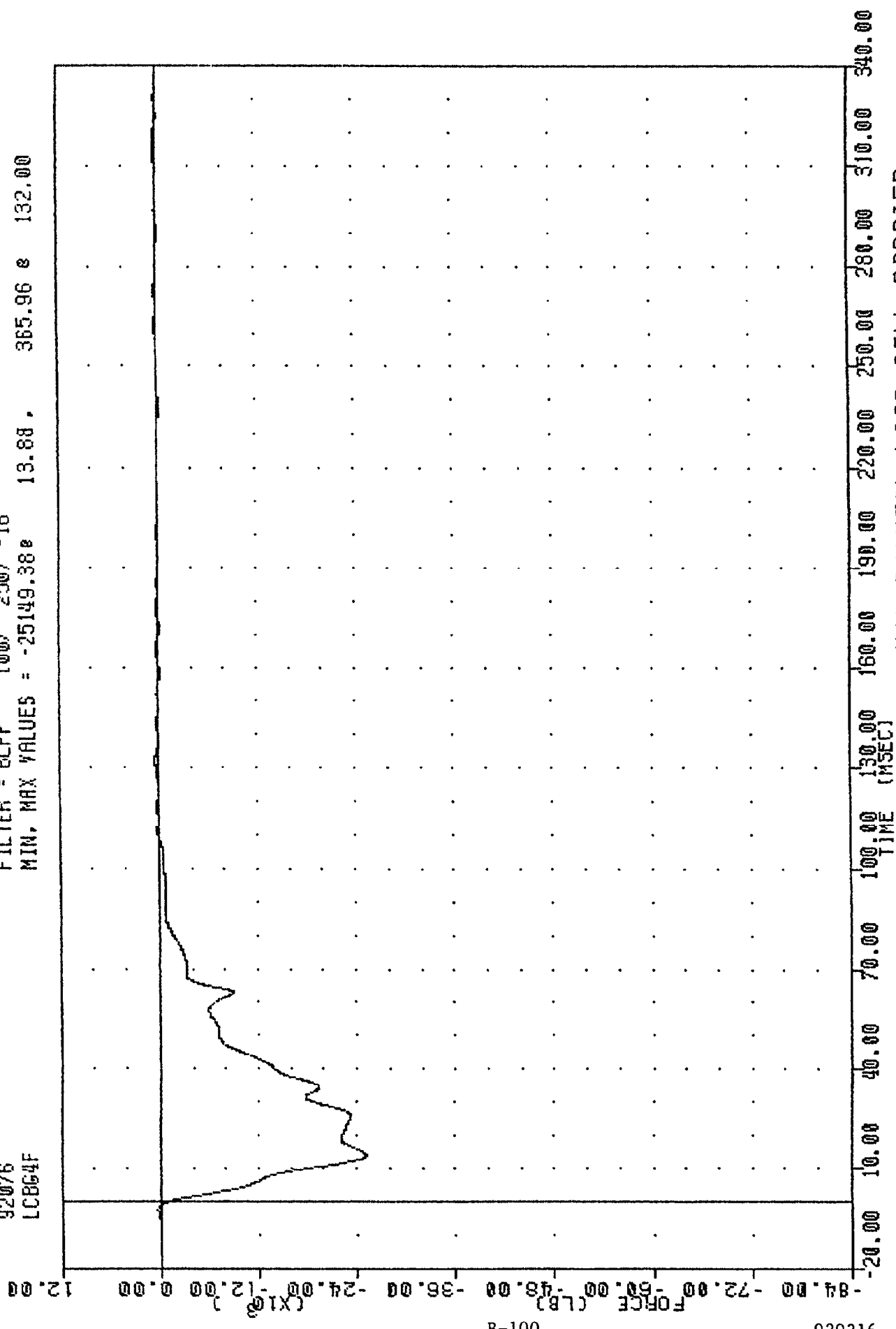
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -70936.42 34.75 , 469.52 164.88



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER GROUP - 3 FORCE TOTAL

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LCBG4F

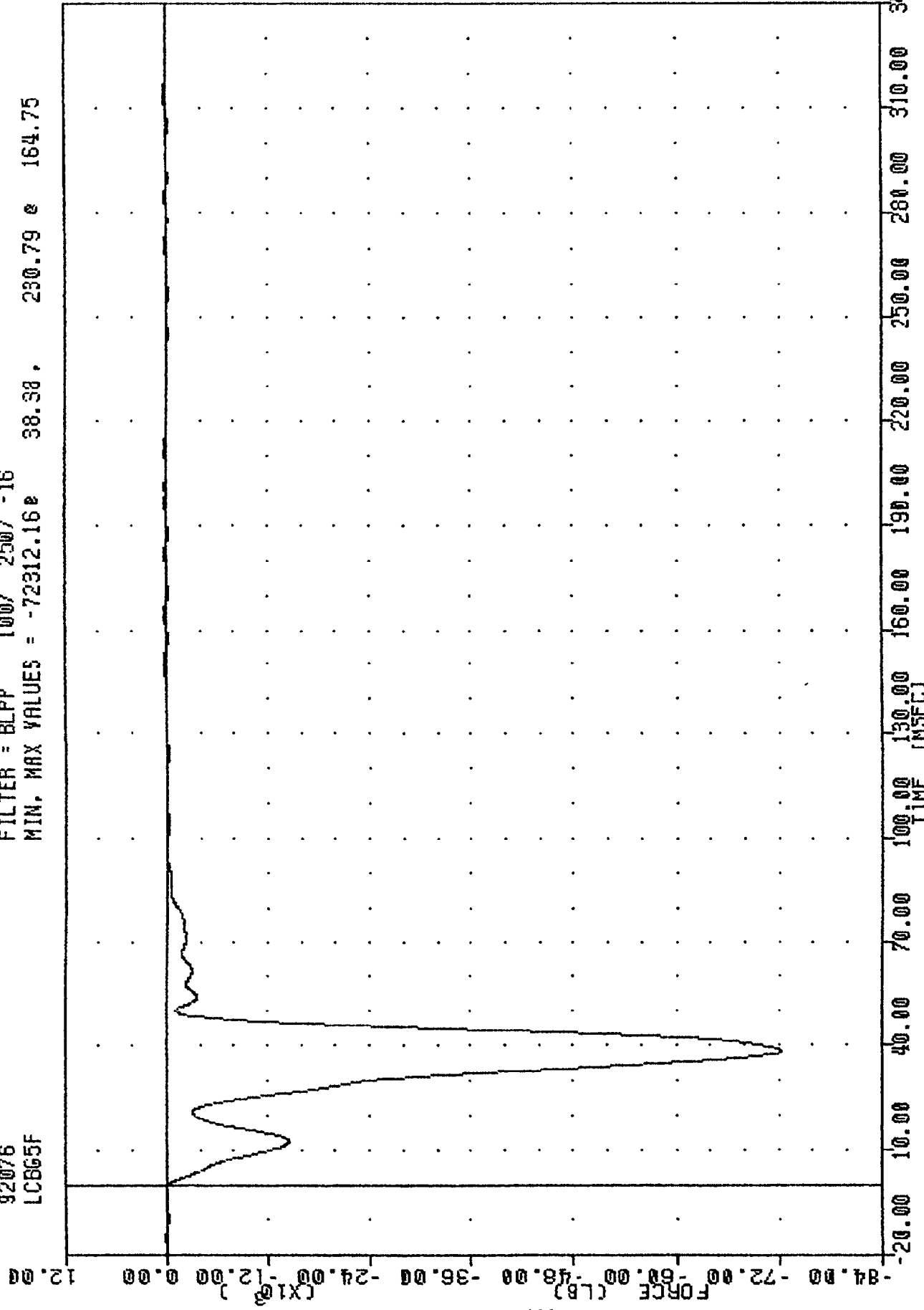
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -25149.38e 13.88 , 365.96 e 132.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER GROUP TOTAL FORCE

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LCB65F

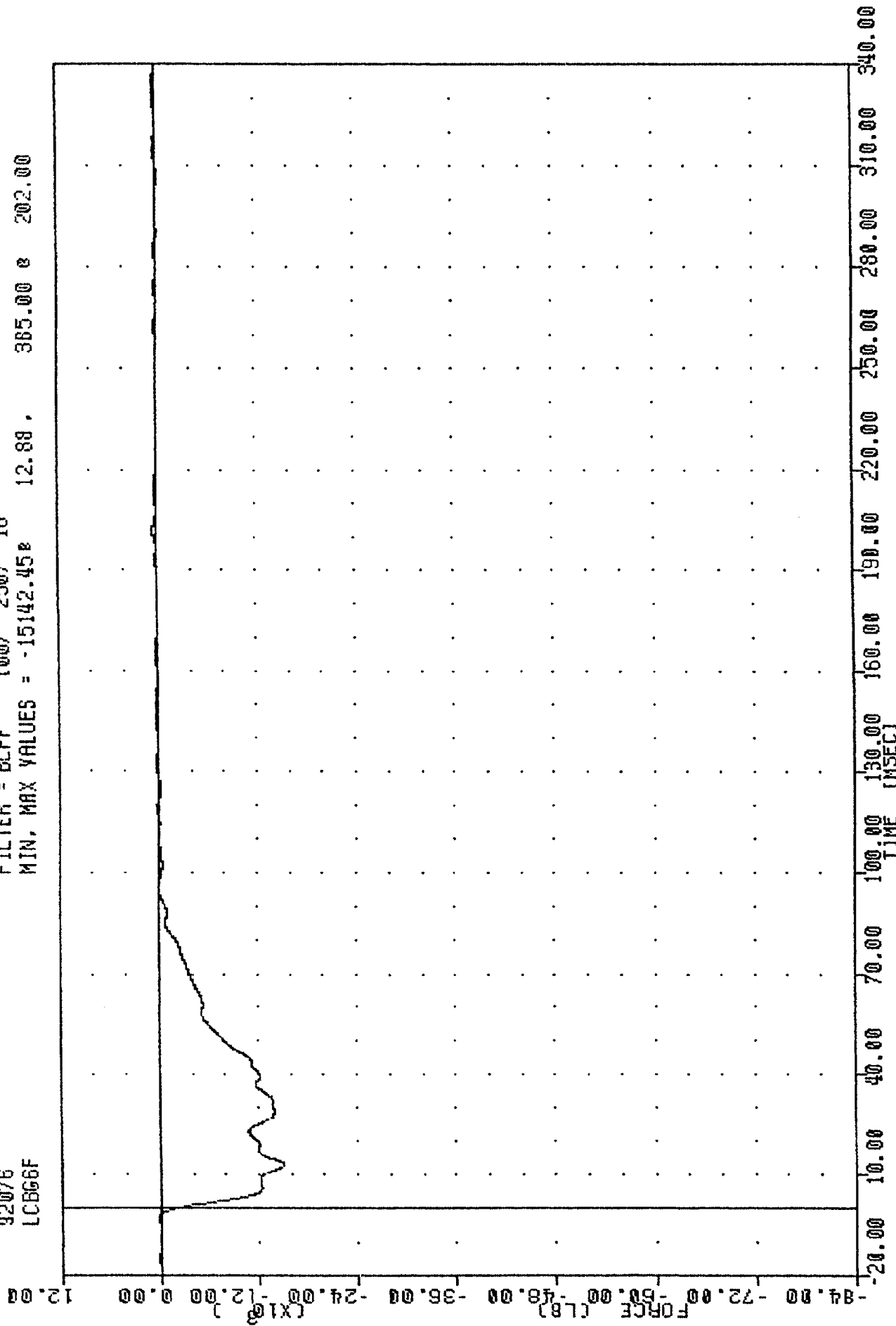
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -72312.16e 38.38, 230.79 e 164.75



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER GROUP - 5 FORCE TOTAL

TRC , 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LCB66F

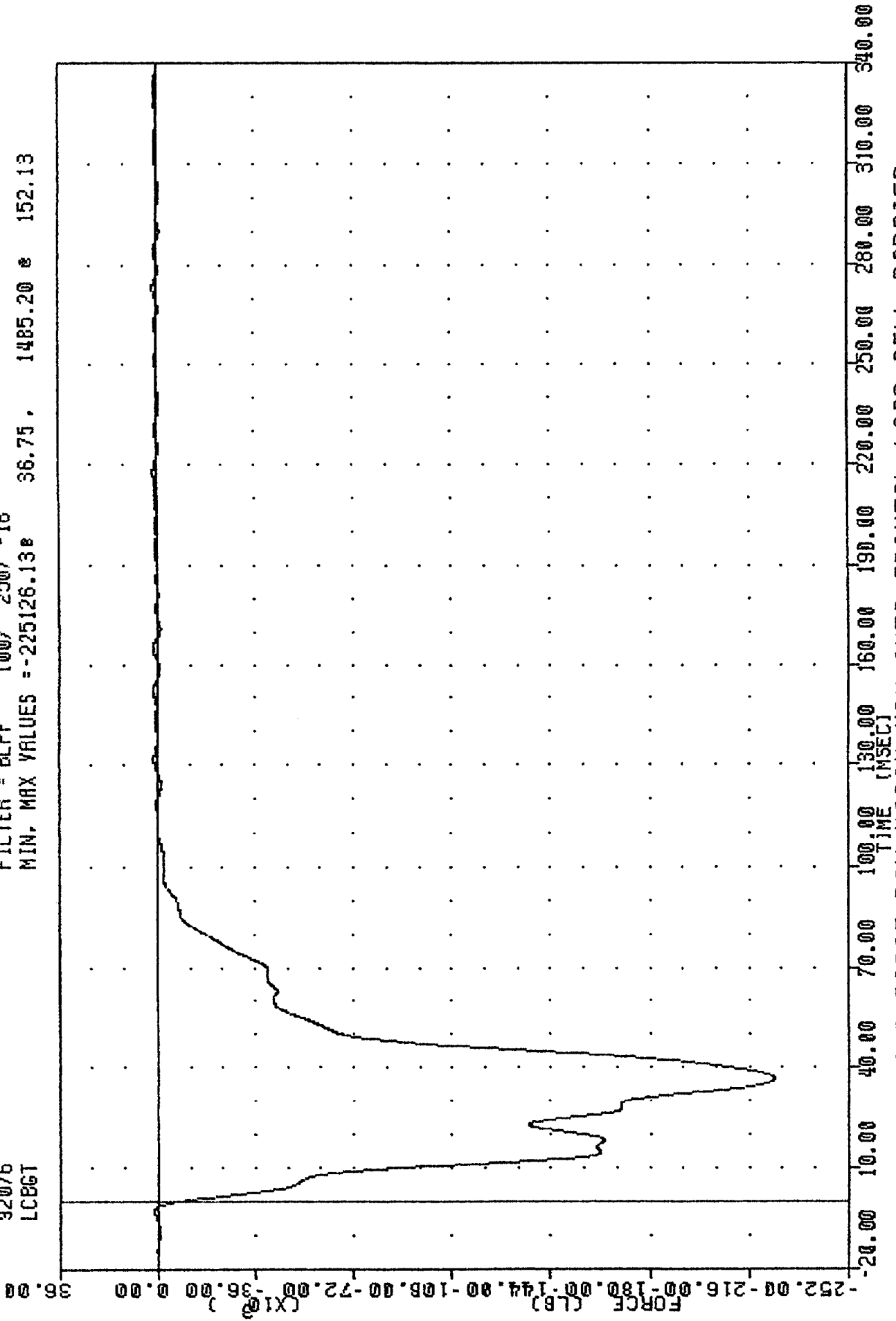
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -15142.45% 12.88 , 385.00 e 202.00



1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 LOAD CELL BARRIER GROUP # 6 FORCE TOTAL

TRC  
 920316  
 NEW CAR ASSESSMENT PROGRAM  
 92076  
 LCBGT

FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -225126.13 36.75, 1485.20 152.13

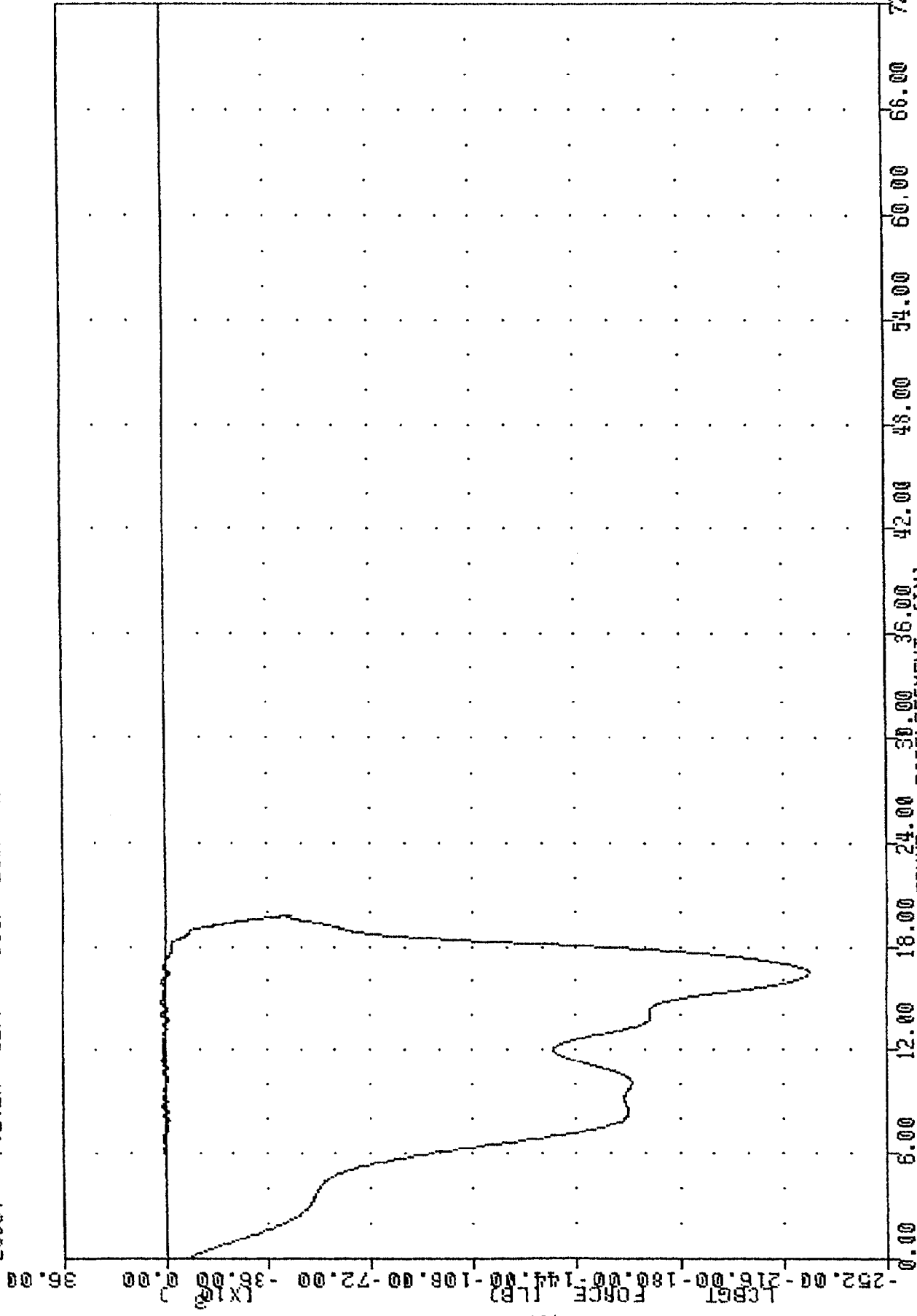


1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 TOTAL LOAD CELL BARRIER FORCE

TRC 1920316 NEW CAR ASSESSMENT PROGRAM 92076  
 CTRXD 300/ 750/ -16 MIN. MAX = 0.00 %  
 LC8GT 100/ 250/ -16 MIN. MAX = -225126.13 %

0.00 %  
 36.75 %  
 19.79 %  
 1485.20 %

65.00  
 152.13



0.00 6.00 12.00 18.00 24.00 30.00 36.00 42.00 48.00 54.00 60.00 66.00 72.00

1992 DODGE RAM WAGON VAN INTO FRONTAL LOAD CELL BARRIER  
 TOTAL LOAD CELL BARRIER FORCE VS VEHICLE X-AXIS DISPLACEMENT

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER OF OHIO  
 HYBRID III EXTERNAL DIMENSIONS  
 192 HUMANOID

10-MAR-92

TRC                    192C7ED1                    572E SN192 EXT. DIMENSION CAL07

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			71.0 DEG. F
RELATIVE HUMIDITY			58.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)		8.9- 9.1 IN	9.0 IN
CHEST CIRCUMFERENCE	(Y)	38.2-39.4 IN	38.7 IN
WAIST CIRCUMFERENCE	(Z)	32.9-34.1 IN	33.4 IN
CHEST DEPTH	(O)	8.4- 9.0 IN	8.6 IN
H-POINT HEIGHT	(C)	3.3- 3.5 IN	3.4 IN
H-POINT FROM SEATBACK	(D)	5.3- 5.5 IN	5.4 IN
SKULL CAP TO BACKLINE	(H)	1.6- 1.8 IN	1.7 IN
TOTAL SITTING HEIGHT	(A)	34.6-35.0 IN	34.8 IN
THIGH CLEARANCE	(F)	5.5- 6.1 IN	5.8 IN
BUTTOCK KNEE LENGTH	(K)	22.8-23.8 IN	23.7 IN
BUTTOCK POPLITEAL LENGTH	(N)	17.8-18.9 IN	18.6 IN
POPLITEAL HEIGHT	(L)	16.9-17.9 IN	17.7 IN
KNEE PIVOT HEIGHT	(M)	19.1-19.7 IN	19.4 IN
FOOT LENGTH	(P)	9.9-10.5 IN	10.2 IN
FOOT BREADTH	(W)	3.6- 4.2 IN	4.0 IN
SHOULDER PIVOT FROM BACKLINE	(E)	3.3- 3.7 IN	3.6 IN
SHOULDER BREADTH	(V)	16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGHT	(B)	19.9-20.5 IN	20.2 IN
ELBOW REST HEIGHT	(J)	7.5- 8.3 IN	8.1 IN
SHOULDER-ELBOW LENGTH	(I)	13.0-13.6 IN	13.4 IN
BACK OF ELBOW TO WRIST PIVOT	(G)	11.4-12.0 IN	11.6 IN

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

10-MAR-92

TRC

19207HD1

572E SN192 HEAD DROP CAL 07

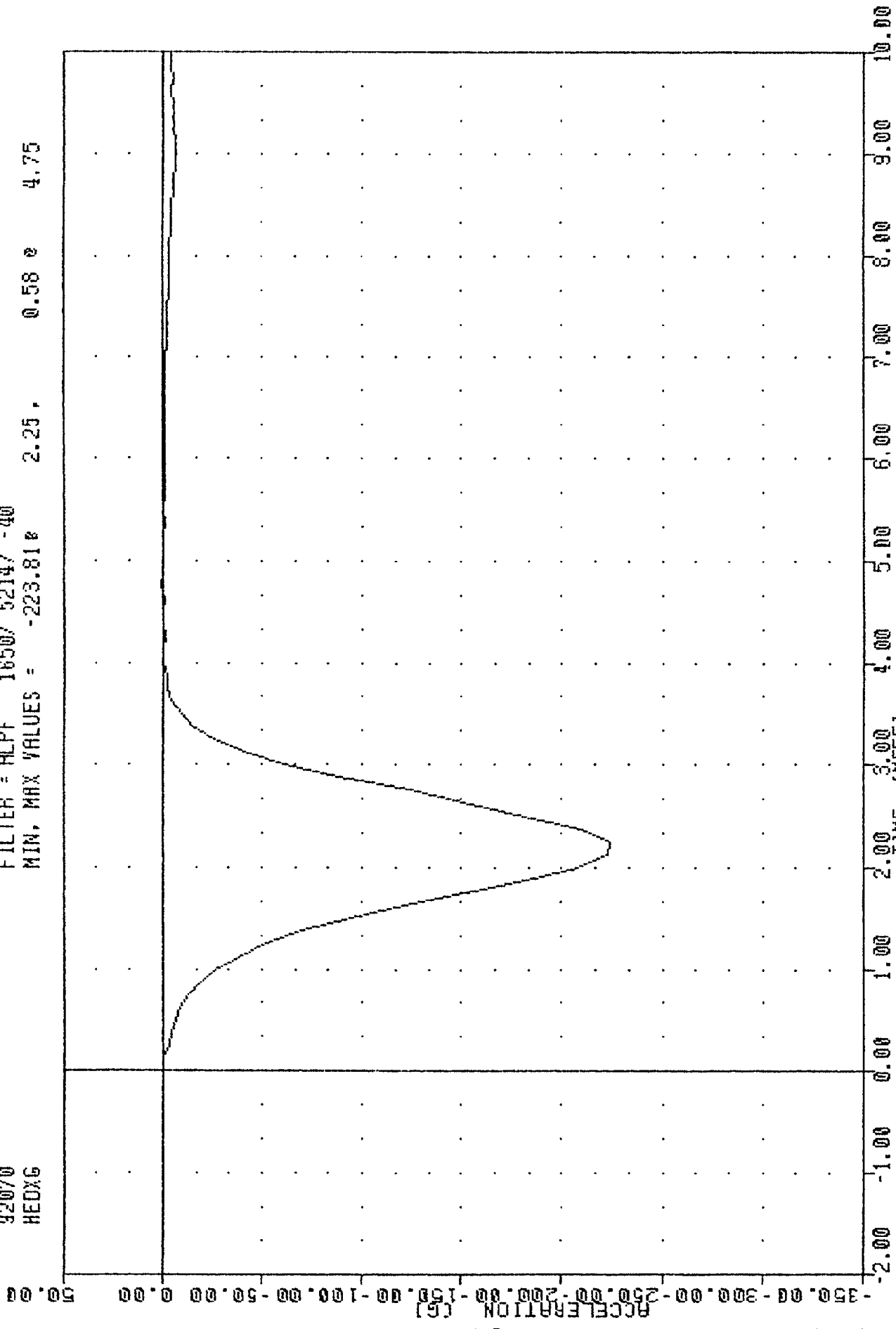
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	58.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	258.85 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.08 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

TAC  
572E SN192 HEAD DROP CAL 07  
92070  
HEADXG

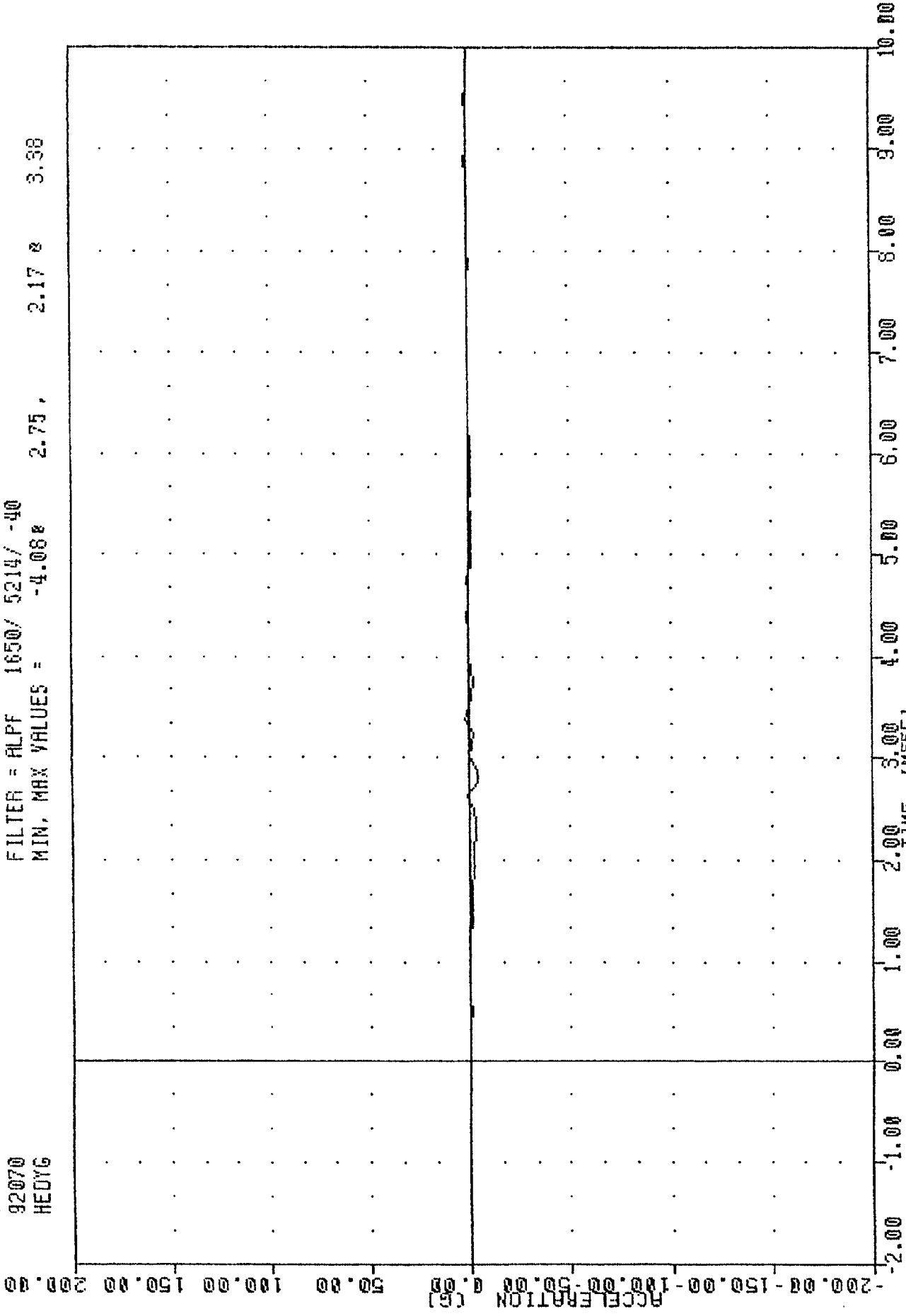
FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -223.81# 2.25 . 0.58 e 4.75



PART 572-E HYBRID III HEAD CALIBRATION  
HEAD ACCELERATION X AXIS

TRC , 192C7HD1  
 572E SN192 HEAD DRGF CAL 07  
 92070  
 HEDYG

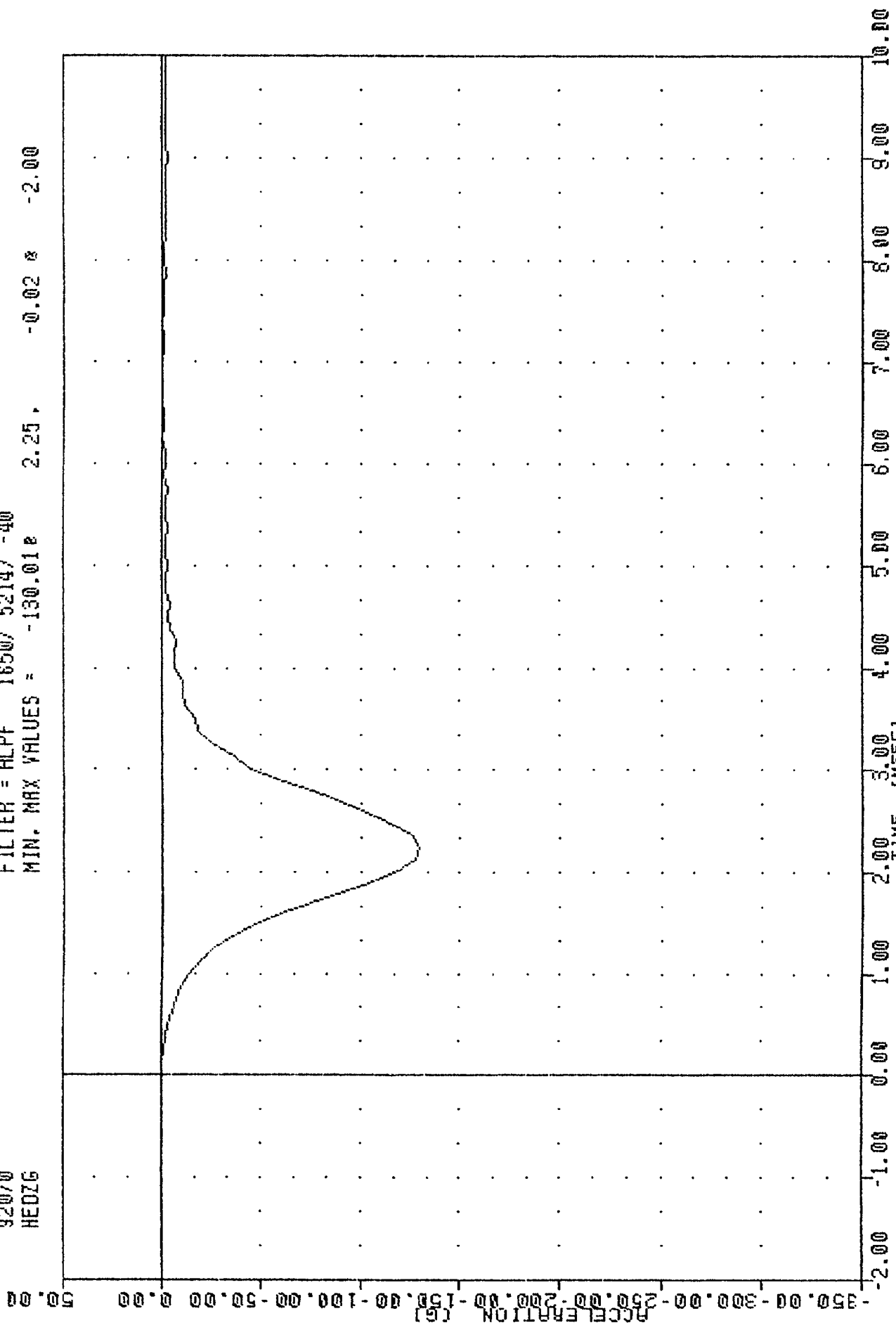
FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -4.08e 2.75, 2.17 e 3.38



PART 572-E HYBRID III HEAD CALIBRATION  
 HEAD ATTEN PART III Y AXI 5

TRC  
 572E SN192 HEAD DROP CAL 07  
 92070  
 HEADZG

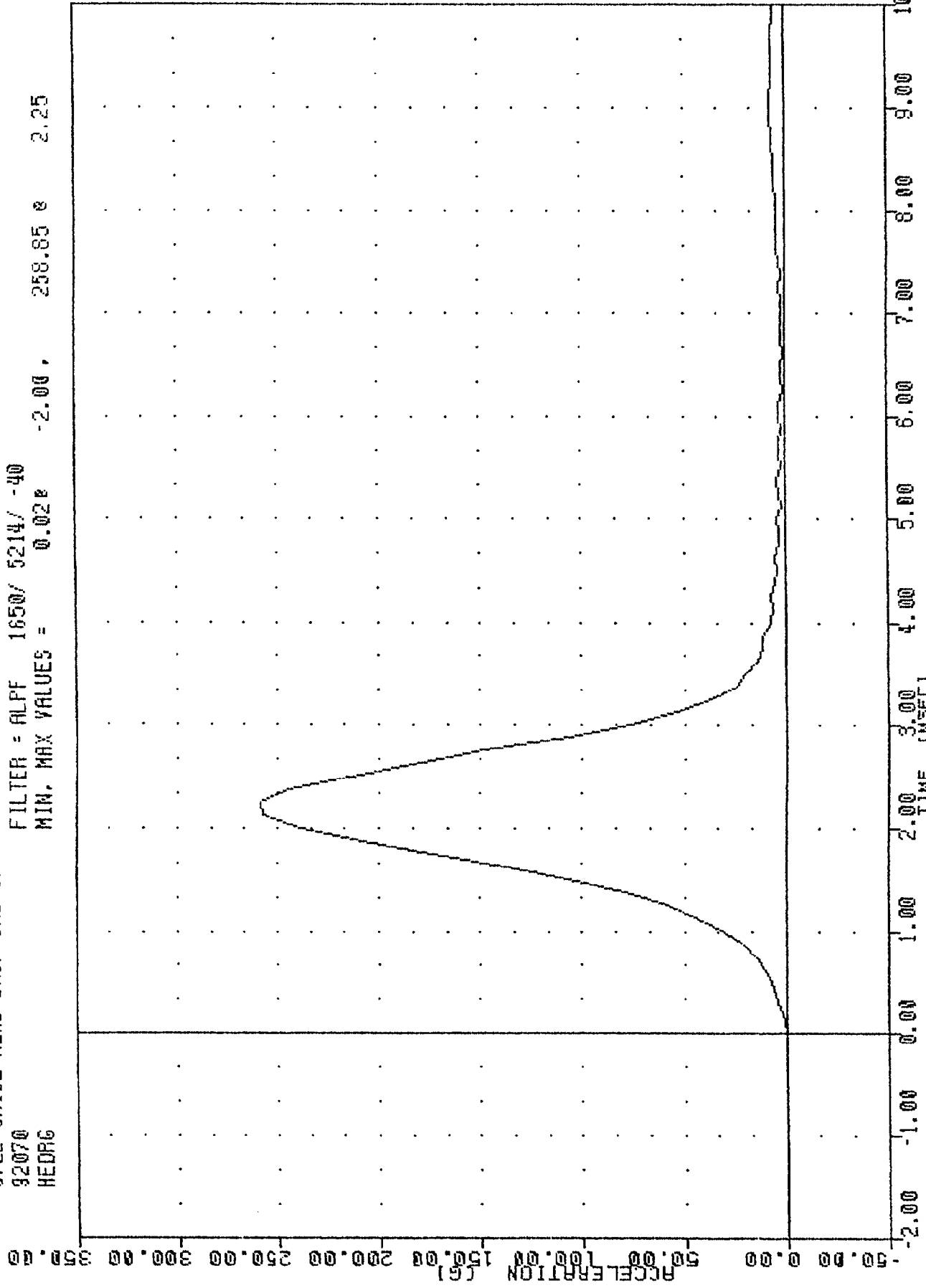
FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = -130.01e 2.25, -0.02 e -2.00



PART 572-E HYBRID III HEAD CALIBRATION  
 HEAD ACCELERATION Z AXIS

TAC  
 572E SM192 HEAD DROP CAL 07  
 92070  
 HEDRG

FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = 0.020 -2.00 , 258.85 0 2.25



PART 572-E HYBRID III HEAD CALIBRATION  
 HEAD RESISTANT ACCELERATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

11-MAR-92

6 AXIS NECK TRANSDUCER  
TRC 192C7NF1

572E SN192 NECK FLEXION CAL07

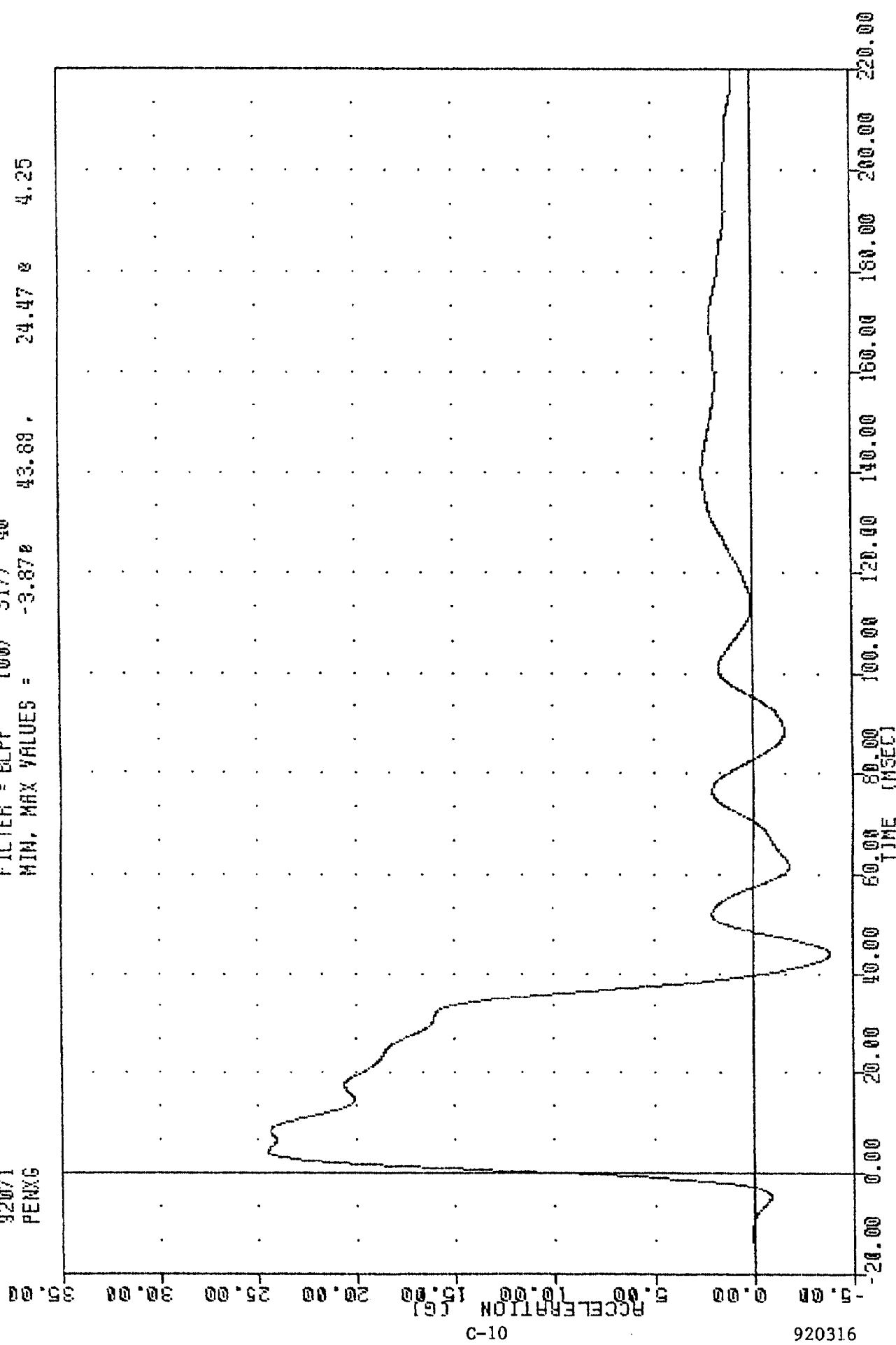
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	59.0 %
IMPACT VELOCITY	22.6-23.4 FT/SEC	23.08 FT/SEC
PENDULUM DECELERATION	10 MS   22.50 - 27.50 G	23.59 G
	20 MS   17.60 - 22.60 G	19.73 G
	30 MS   12.50 - 18.50 G	16.12 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.10 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 42 MS	37.38 MS
D PLANE ROTATION	MAX   64 - 78 DEG.	75.10 DEG.
	TIME   57 - 64 MS	59.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX   65 - 80 FT. LBS	69.96 FT. LBS
	TIME   47 - 58 MS	51.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	113 - 128 MS	117.25 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	97 - 107 MS	101.38 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

TRC , 19207NF1  
 572E SN182 NECK FLEXION CAL07  
 92071  
 PENXG

FILTER = BLPP 100/ 317/ -40  
 MIN, MAX VALUES = -3.870 43.88 , 24.47 & 4.25

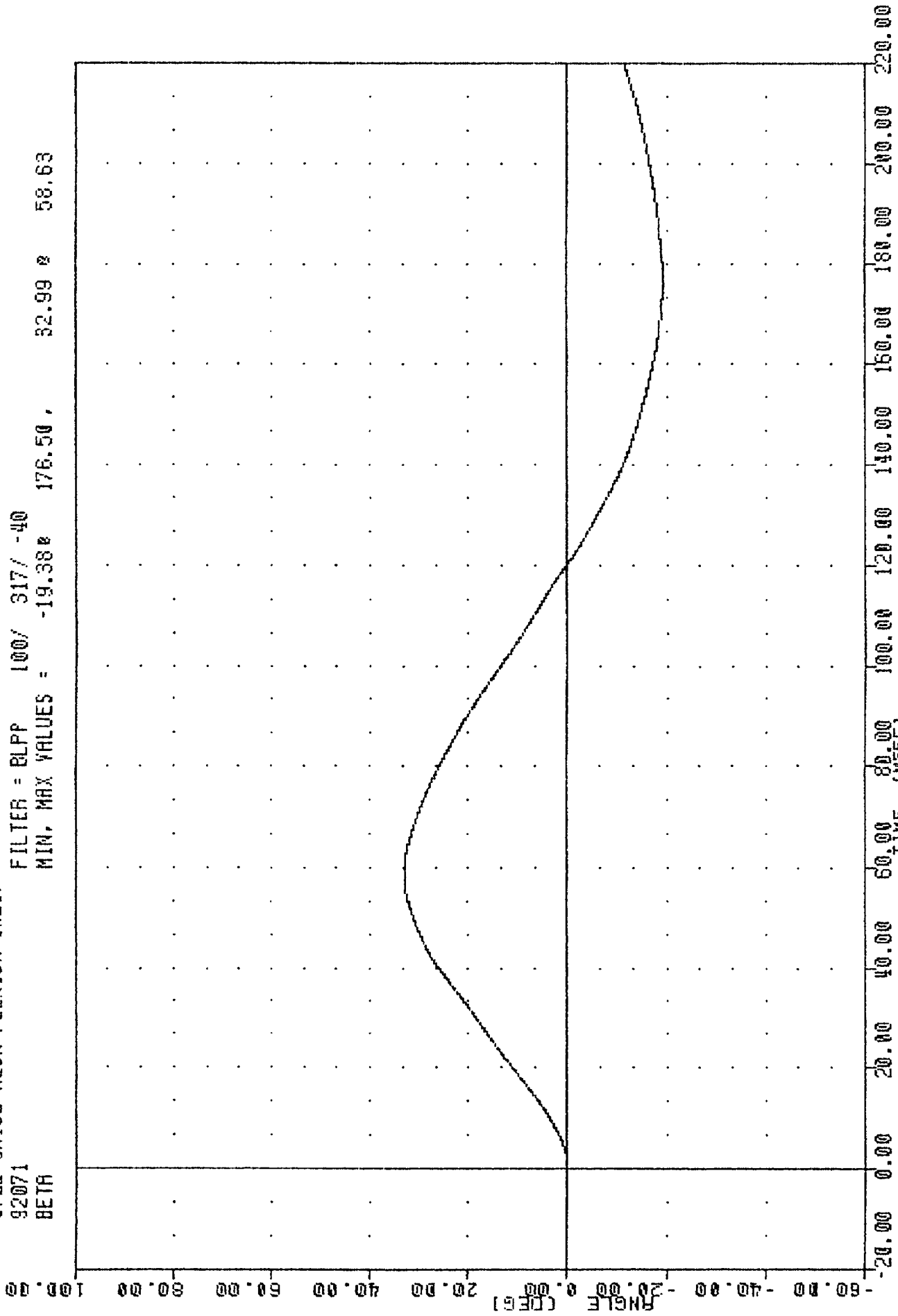


920316

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
 MINIMUM ACCELERATION

TRC  
 572E SN192 NECK FLEXION CAL07  
 92071  
 BETA

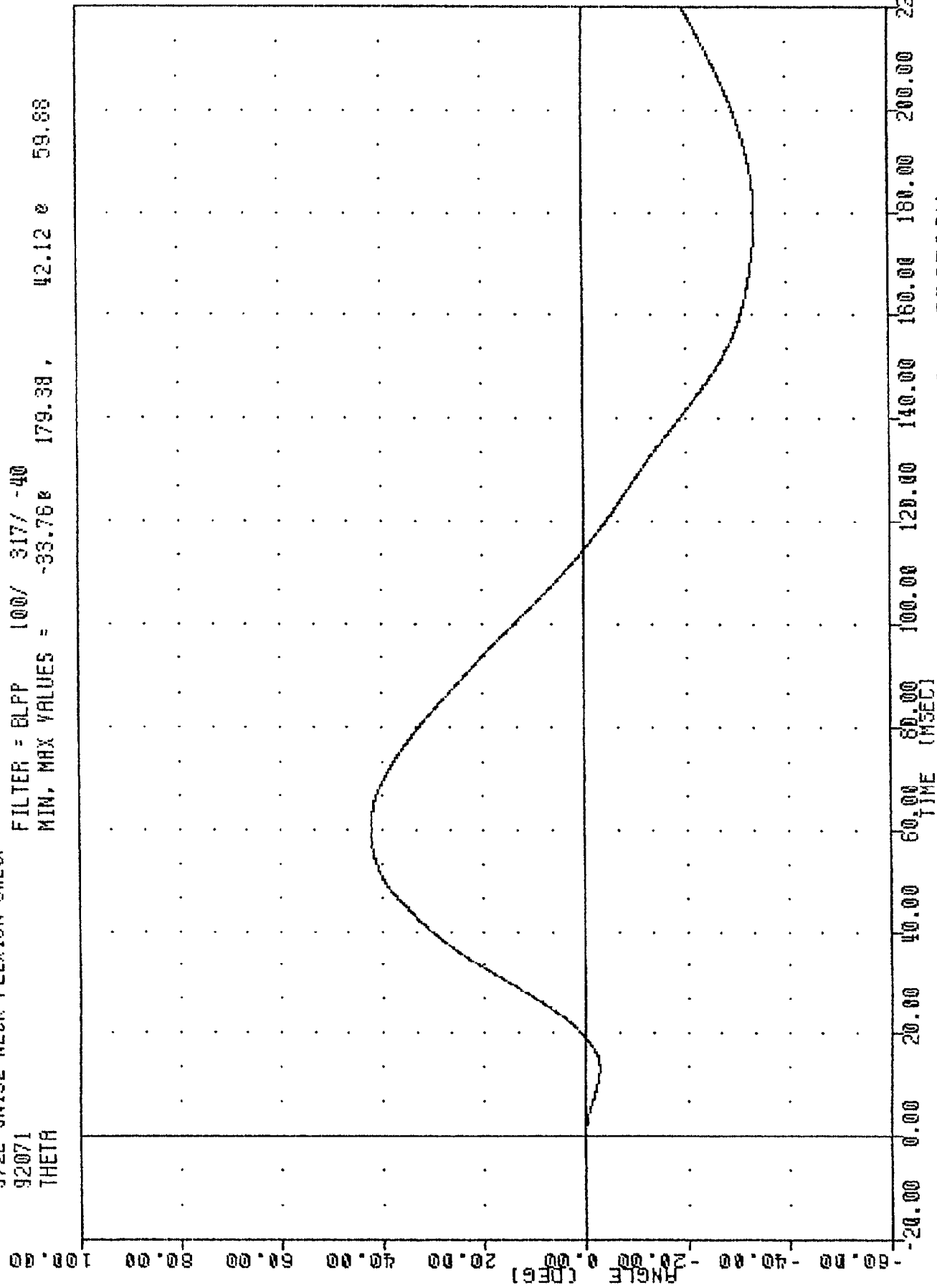
FILTER = BLPP 100/ 317/ -40  
 MIN. MAX VALUES = -19.38e 176.50 , 32.99 e 58.63



PART 572-E HYBRID III NECK FLEXION CALIBRATION  
 ROTATION ABOUT BASE OF NECK

TRC , 19207NF1  
 572E SN192 NECK FLEXION CAL07  
 92071  
 THETA

FILTER = BLPP 100/ 317/ -40  
 MIN, MAX VALUES = -33.78 179.38 , 42.12 e 59.88

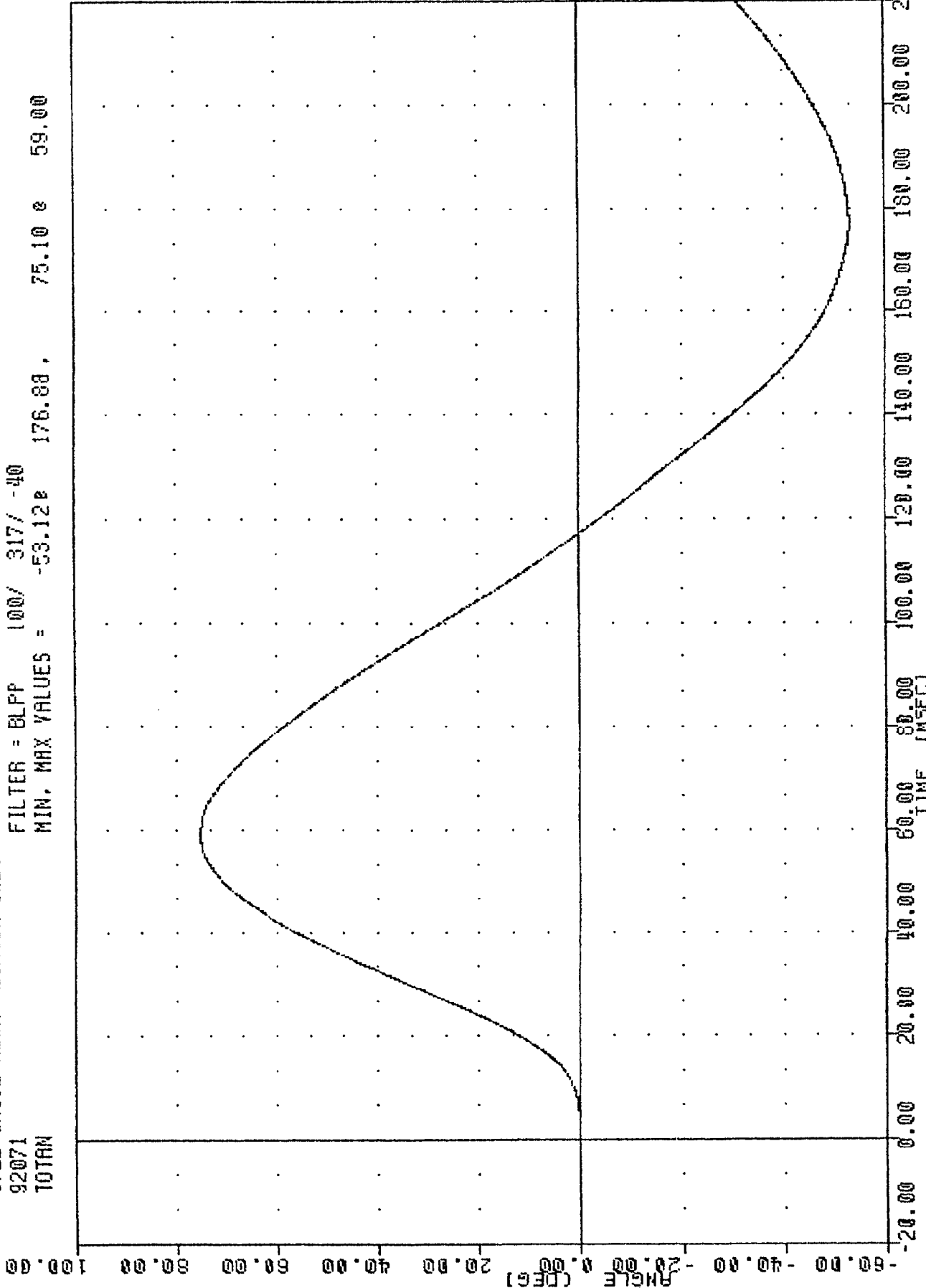


PART 572-E HYBRID III NECK FLEXION CALIBRATION  
 ROTATION HEAD UP OCCUR THE COMPLETE

TRC  
572E SM192 NECK FLEXION CAL07  
92071  
TOTAL

, 192C7NF1

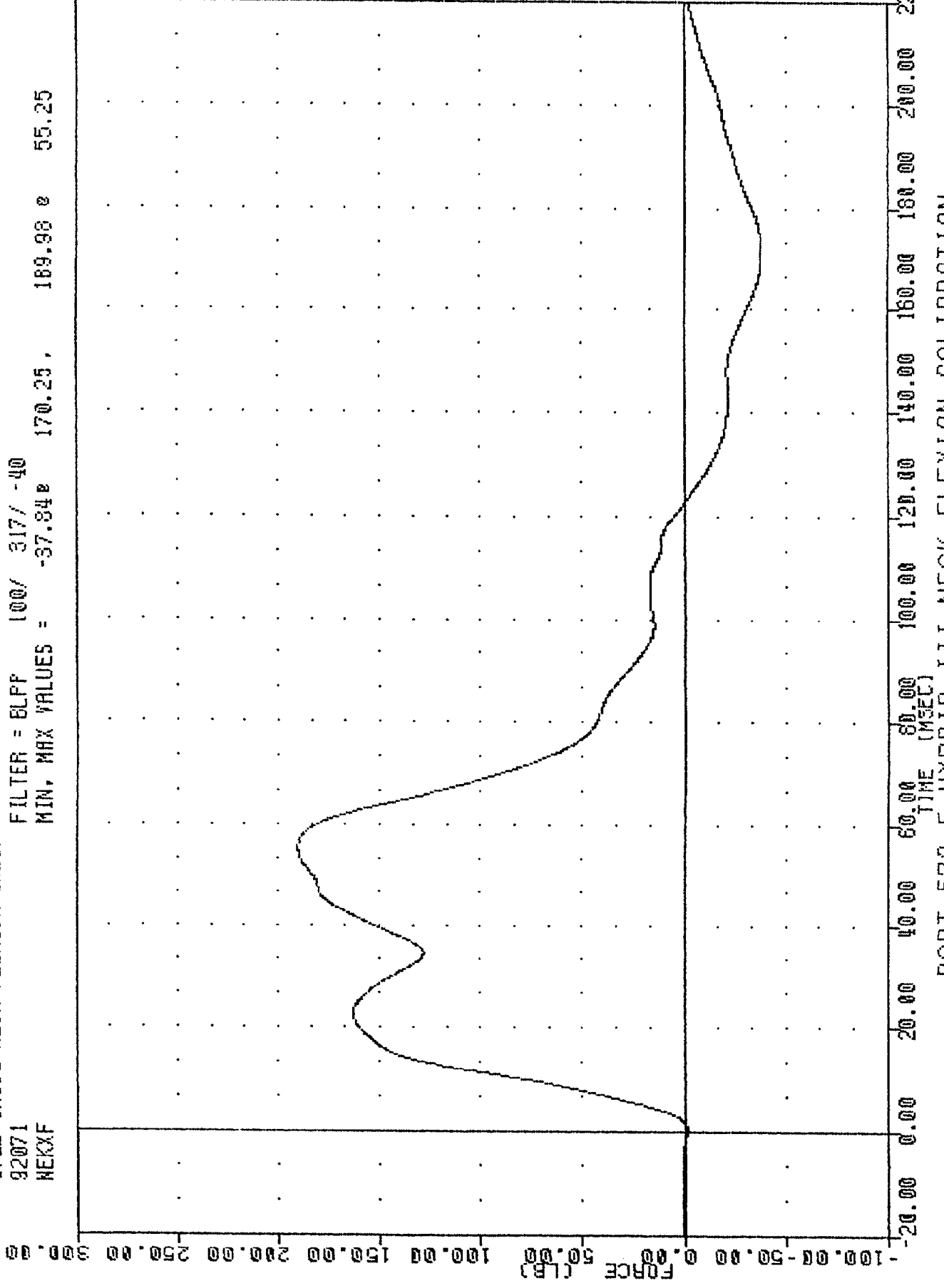
FILTER = BLFF 100/ 317/ -40  
MIN. MAX VALUES = -53.12e 176.88, 75.10 e 59.00



PART 572-E HYBRID III NECK FLEXION CALIBRATION  
TOTAL ROTATION

TRC , 192C7NF1  
 572E SM192 NECK FLEXION CAL07  
 92071  
 NEKXF

FILTER = BLPF 100/ 317/ -40  
 MIN, MAX VALUES = -37.84e 170.25, 169.98 e 55.25

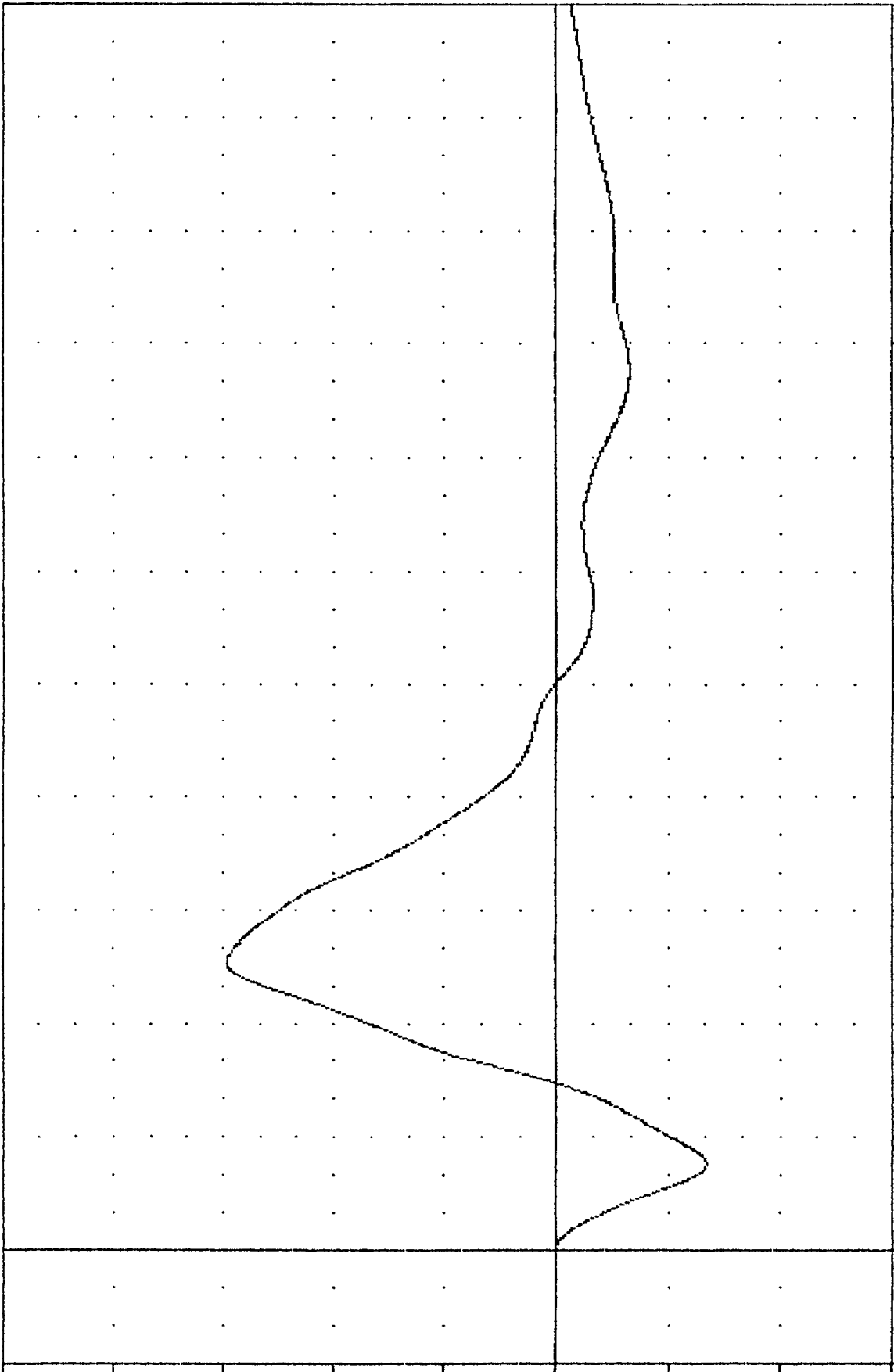


PART 572-E HYBRID III NECK FLEXION CALIBRATION  
 NFR FIMLF AXI

TRC  
 572E SN192 NECK FLEXION CAL07  
 92071  
 MEKYM

FILTER = BLPP 100/ 317/ -40  
 MIN, MAX VALUES = 15.25, 59.19 e 50.75

100.00  
 80.00  
 60.00  
 40.00  
 20.00  
 0.00  
 -20.00  
 -40.00  
 -60.00



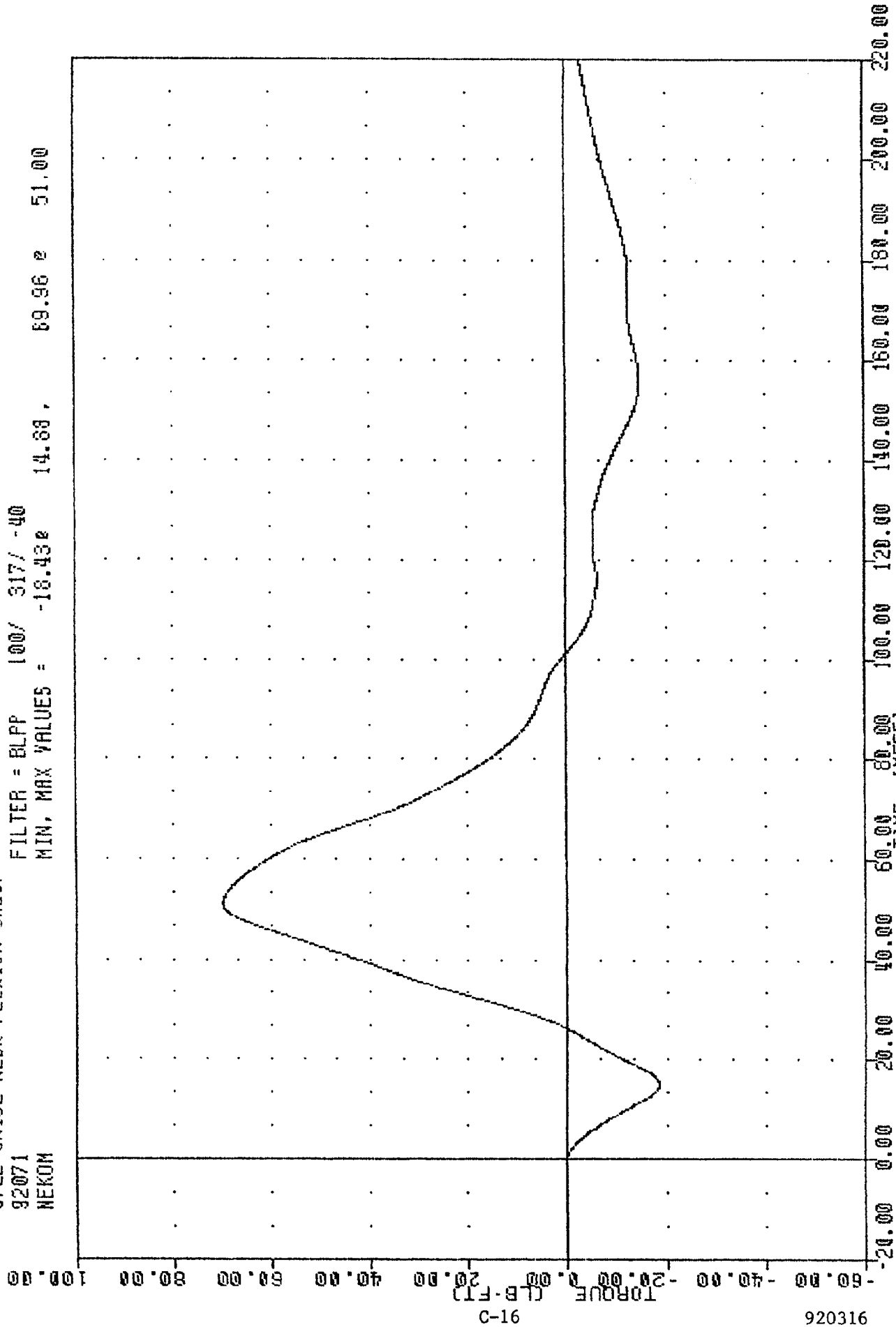
920316

PART 572-E HYBRID III NECK FLEXION CALIBRATION  
 NECK MOMENT Y AXIS

51-3

TAC , 192C7NF1  
 572E SM192 NECK FLEXION CAL07  
 92071  
 NEKOM

FILTER = BLPP 100/ 317/ -40  
 MIN, MAX VALUES = -18.43e 69.96 e 51.00



920316

91-3

PART 572-E HYBRID III NECK FLEXION CALIBRATION

TO THE MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

11-MAR-92

6 AXIS NECK TRANSDUCER  
TRC 192C7NE1

572E SN192 NECK EXT. CAL07

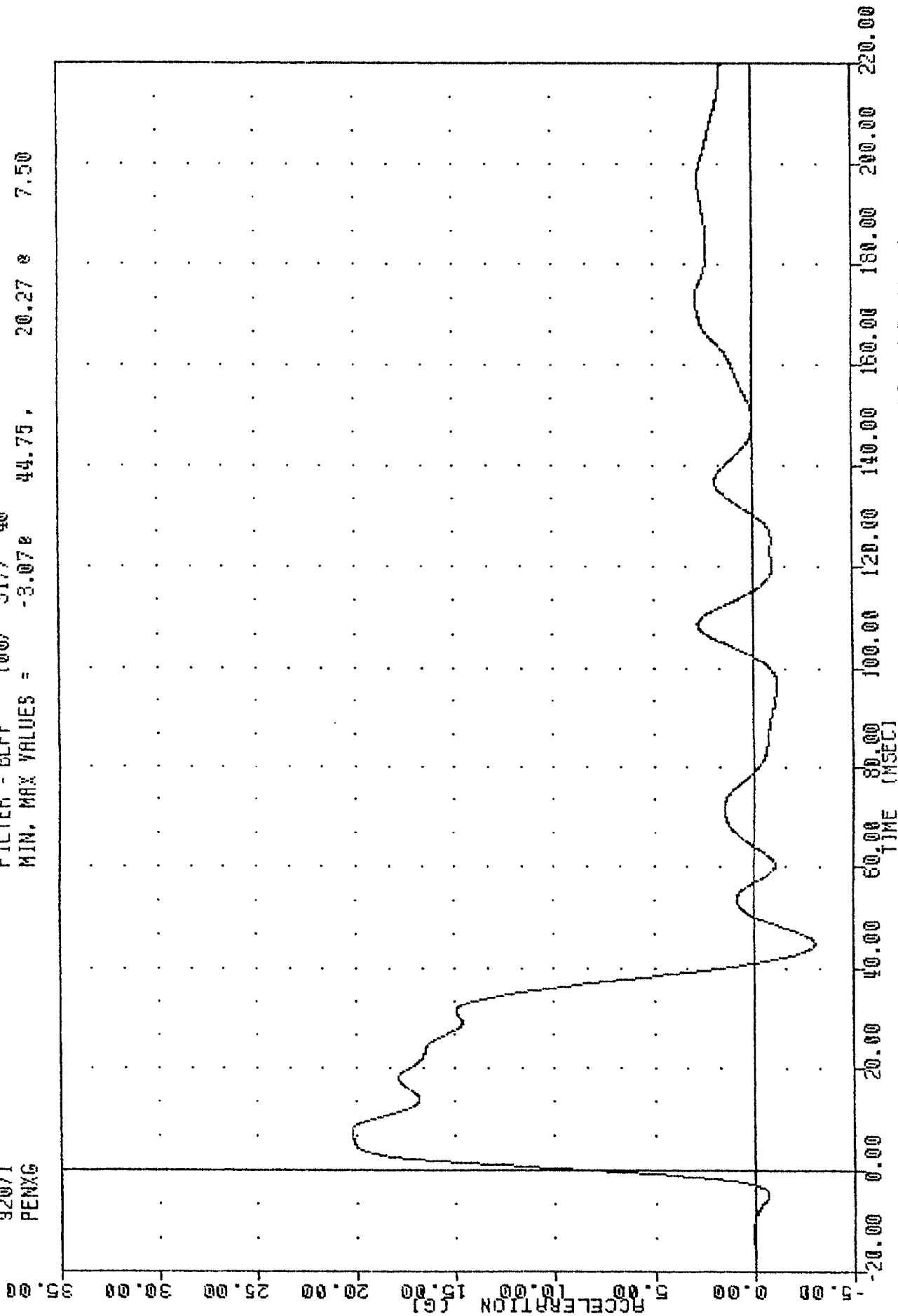
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	59.0 %
IMPACT VELOCITY	19.50-20.30 FT/SEC	19.83 FT/SEC
PENDULUM DECELERATION	10 MS   17.20 - 21.20 G	19.07 G
	20 MS   14.00 - 19.00 G	17.31 G
	30 MS   11.00 - 16.00 G	14.73 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	14.96 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 46 MS	38.25 MS
D PLANE ROTATION	MAX   81 - 106 DEG. TIME   72 - 82 MS	103.47 DEG. 76.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN   -59.0/-39.0 FT. LBS TIME   65 - 79 MS	-54.33 FT. LBS 72.25 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	147 - 174 MS	159.75 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 148 MS	142.50 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

TRC , 192C7NE1  
572E SN192 NECK EXT. CAL07  
92071  
PENXG

FILTER = BLPF 100/ 317/ -40  
MIN. MAX VALUES = -3.07e 20.27 e 7.50



81-C

920316

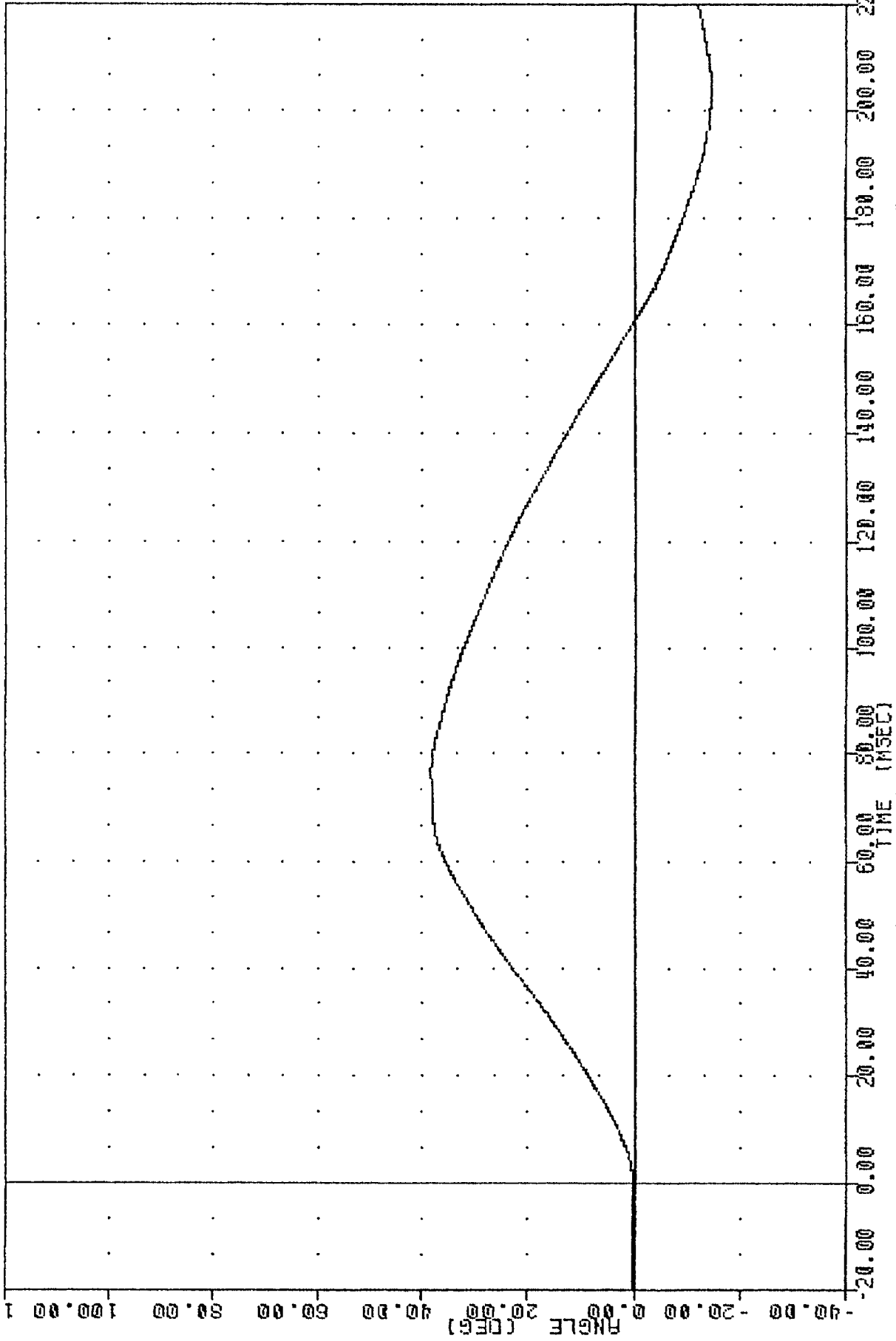
PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
PENDULUM DECELERATION

TRC  
572E SN192 NECK EXT. CAL07  
92071  
BETA

.192C7NE1

FILTER = BLPP 100/ 317/ -40  
MIN, MAX VALUES = -14.55e 204.25, 58.22 e 76.50

920316

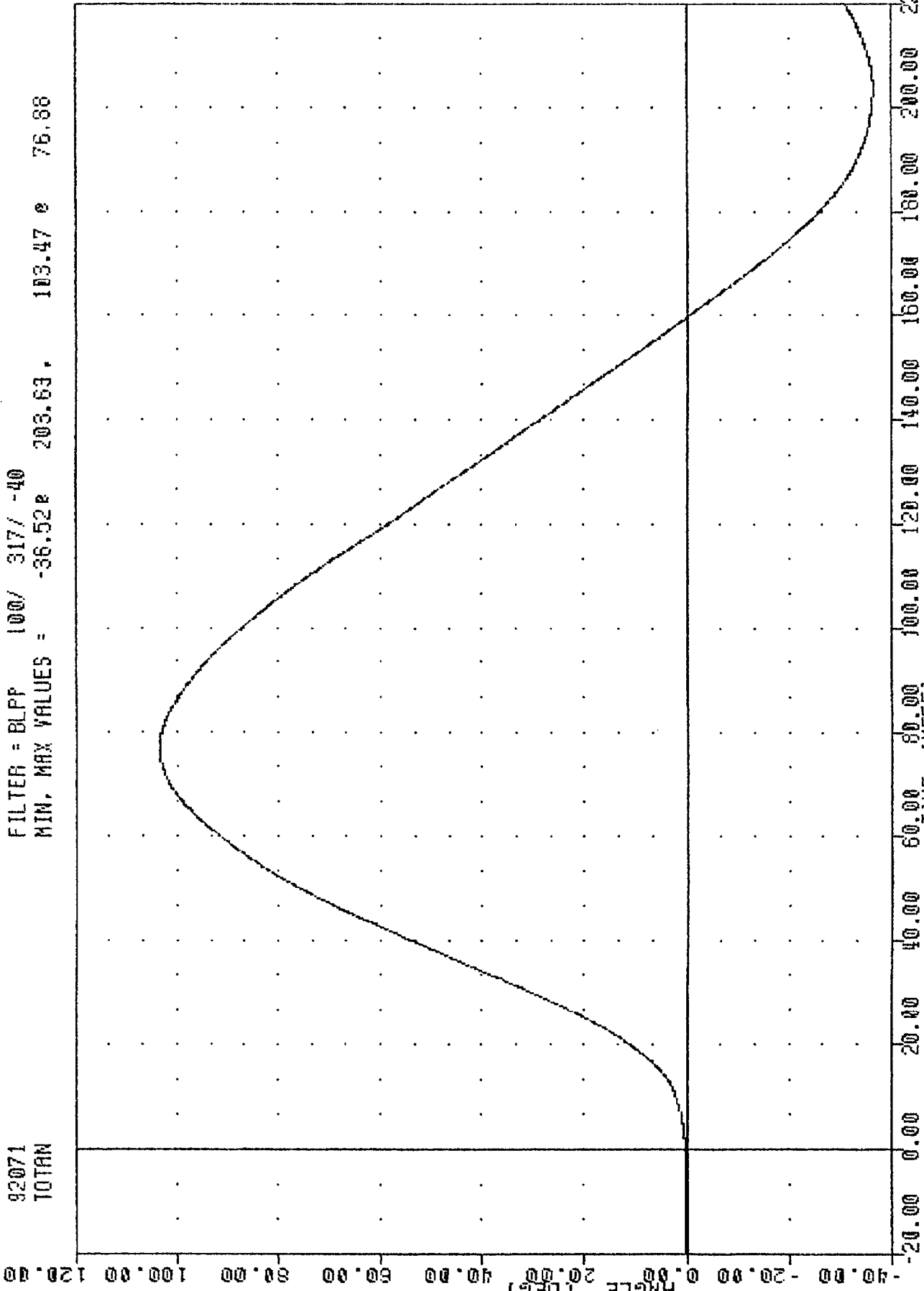


PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
ROTATION ABOUT BASE OF NECK



TRC  
 572E SN192 NECK EXT. CAL07  
 92071  
 TOTAL

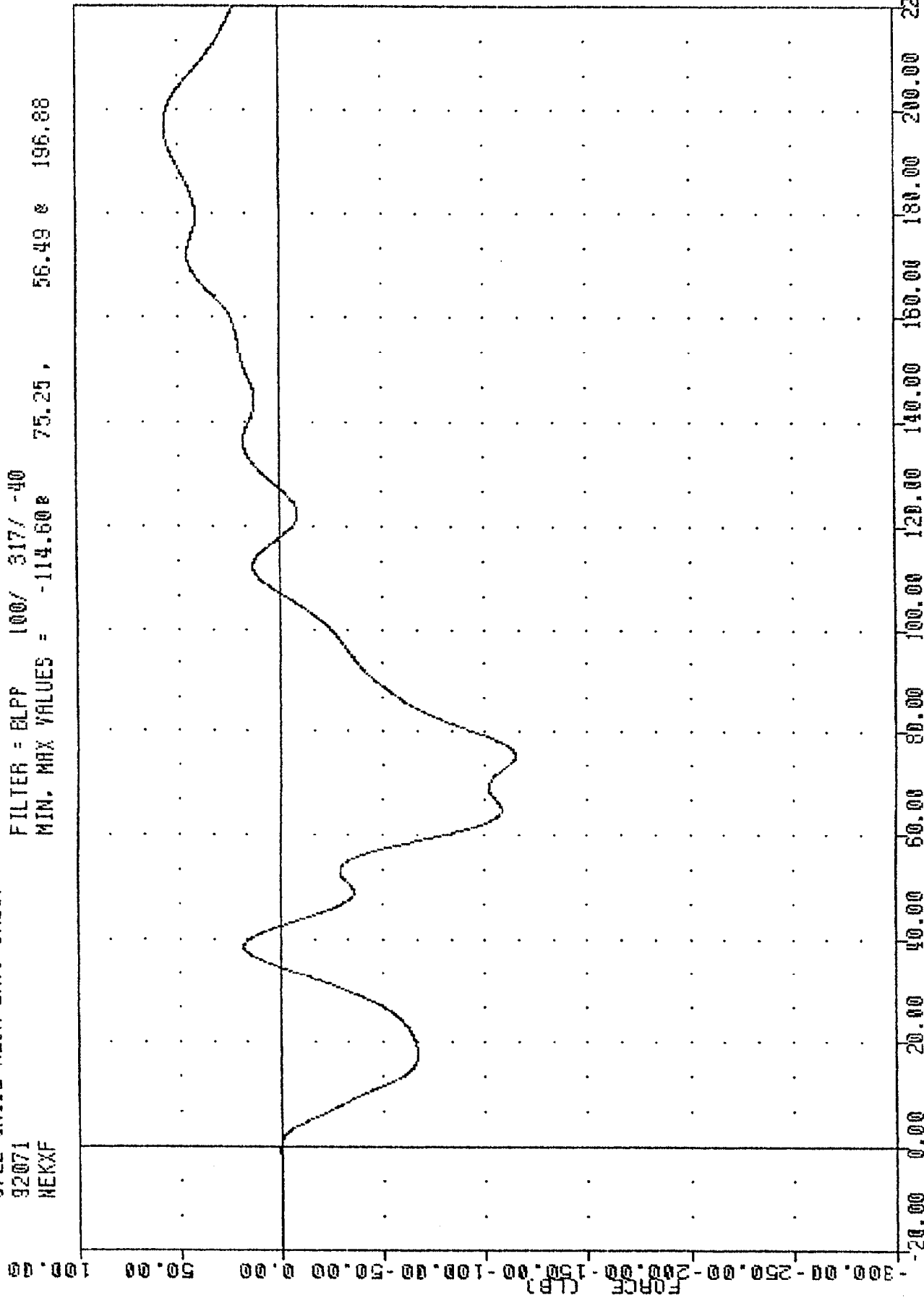
FILTER = BLPP 100/ 317/ -40  
 MIN. MAX VALUES = -36.52e 203.63. 183.47 e 76.88



PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
 TOTAL ROTATION

TRC , 192C7ME1  
572E SN192 NECK EXT. CAL07  
92071  
HEKXF

FILTER = ELPP 100/ 317/ -40  
MIN. MAX VALUES = -114.60e 75.25 , 56.49 e 196.88

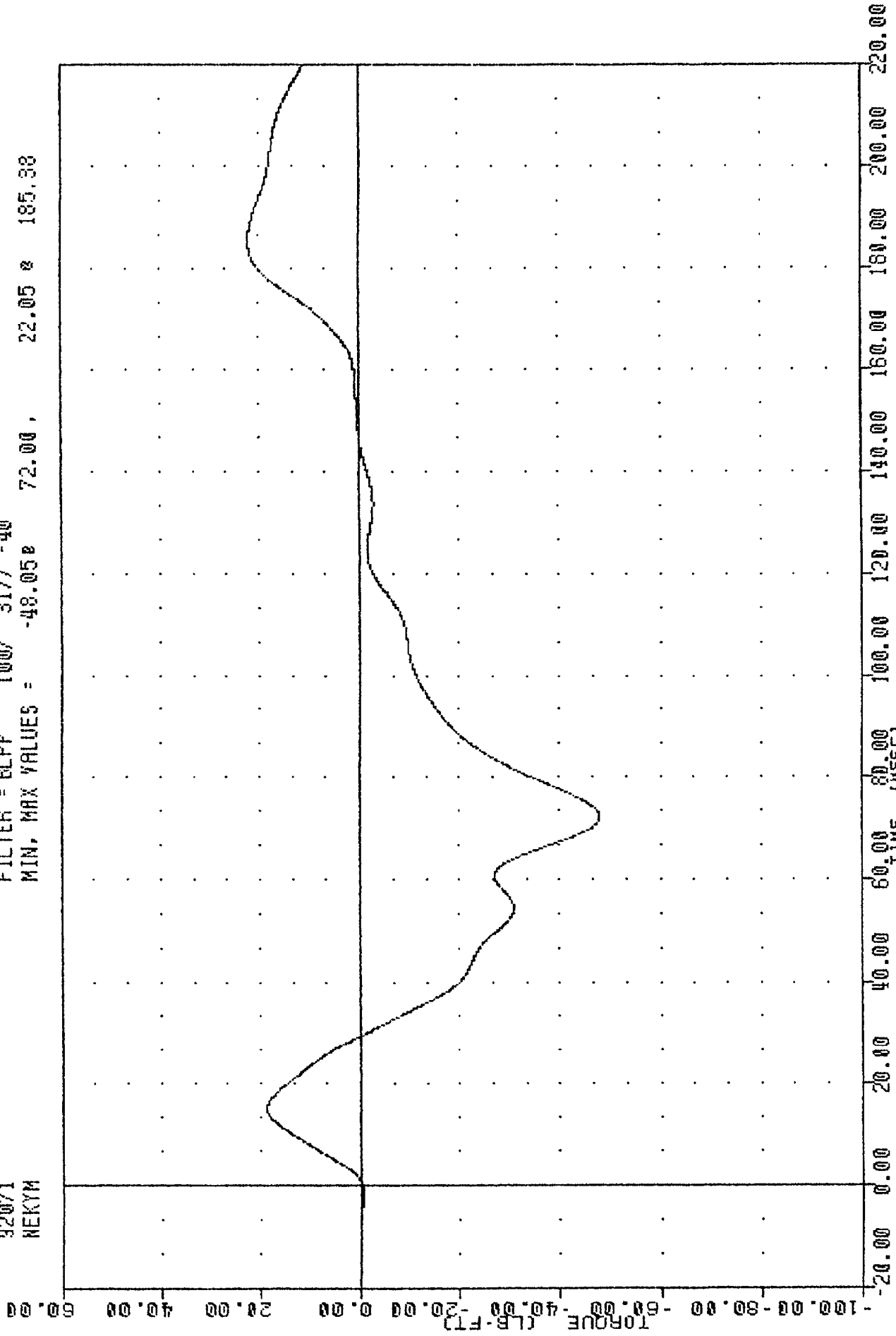


PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
NECK FORCE X AXIS

TRC  
572E SN192 NECK EXT. CAL07  
32071  
NEKYM

, 192C7ME1

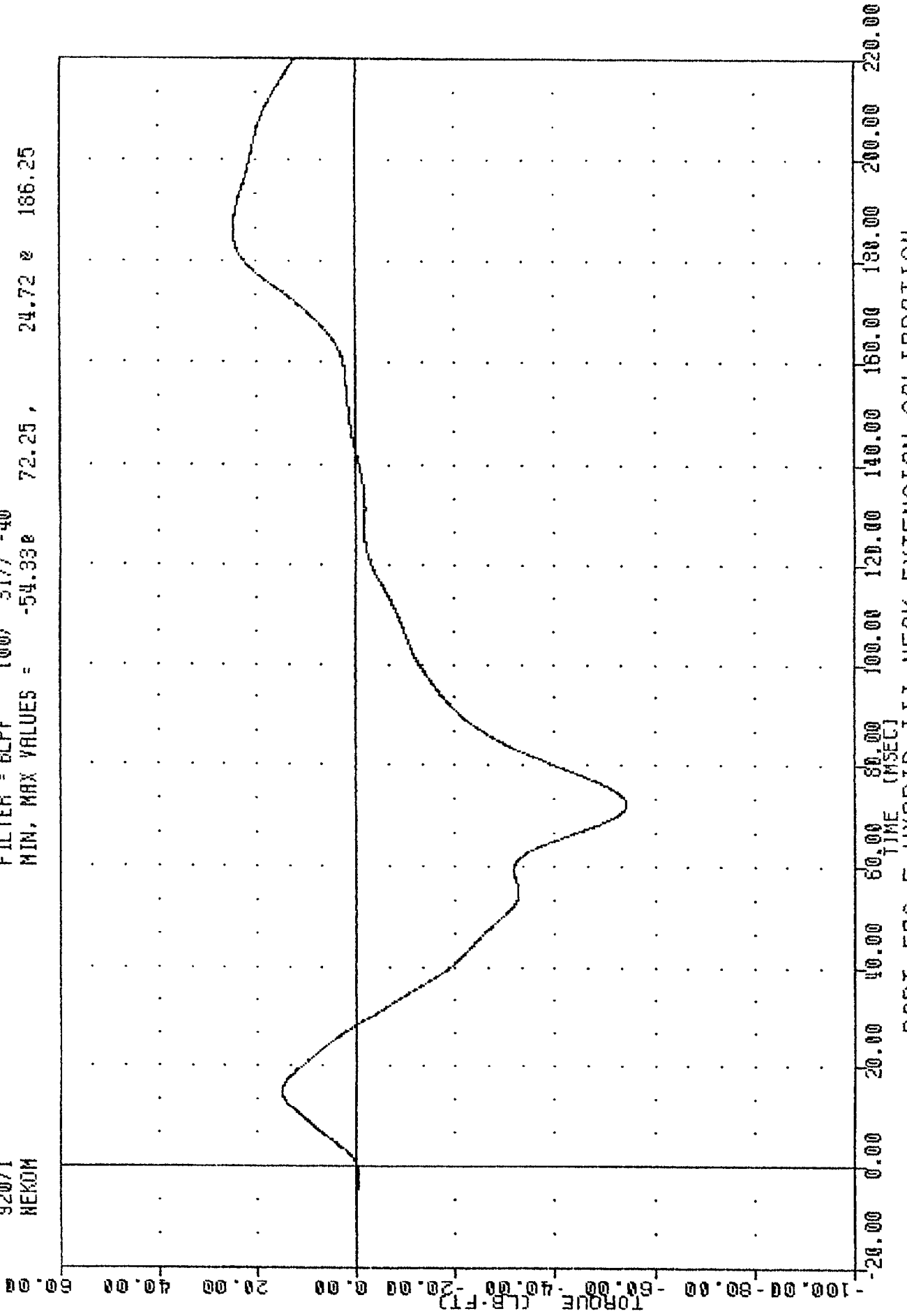
FILTER = BLPP 100/ 317/ -40  
MIN, MAX VALUES = -48.05e 72.00 , 22.05 e 185.98



PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
NECK MOMENT Y AXIS

TRC .192C7NE1  
572E SN192 NECK EXT. CAL07  
92071  
NEKOM

FILTER = BLPP 100/ 317/ -40  
MIN, MAX VALUES = -54.33E 72.25 , 24.72 e 186.25



PART 572-E HYBRID III NECK EXTENSION CALIBRATION



TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

11-MAR-92

TRC

19207TH1

572E SN192 H. S. THORAX CAL07

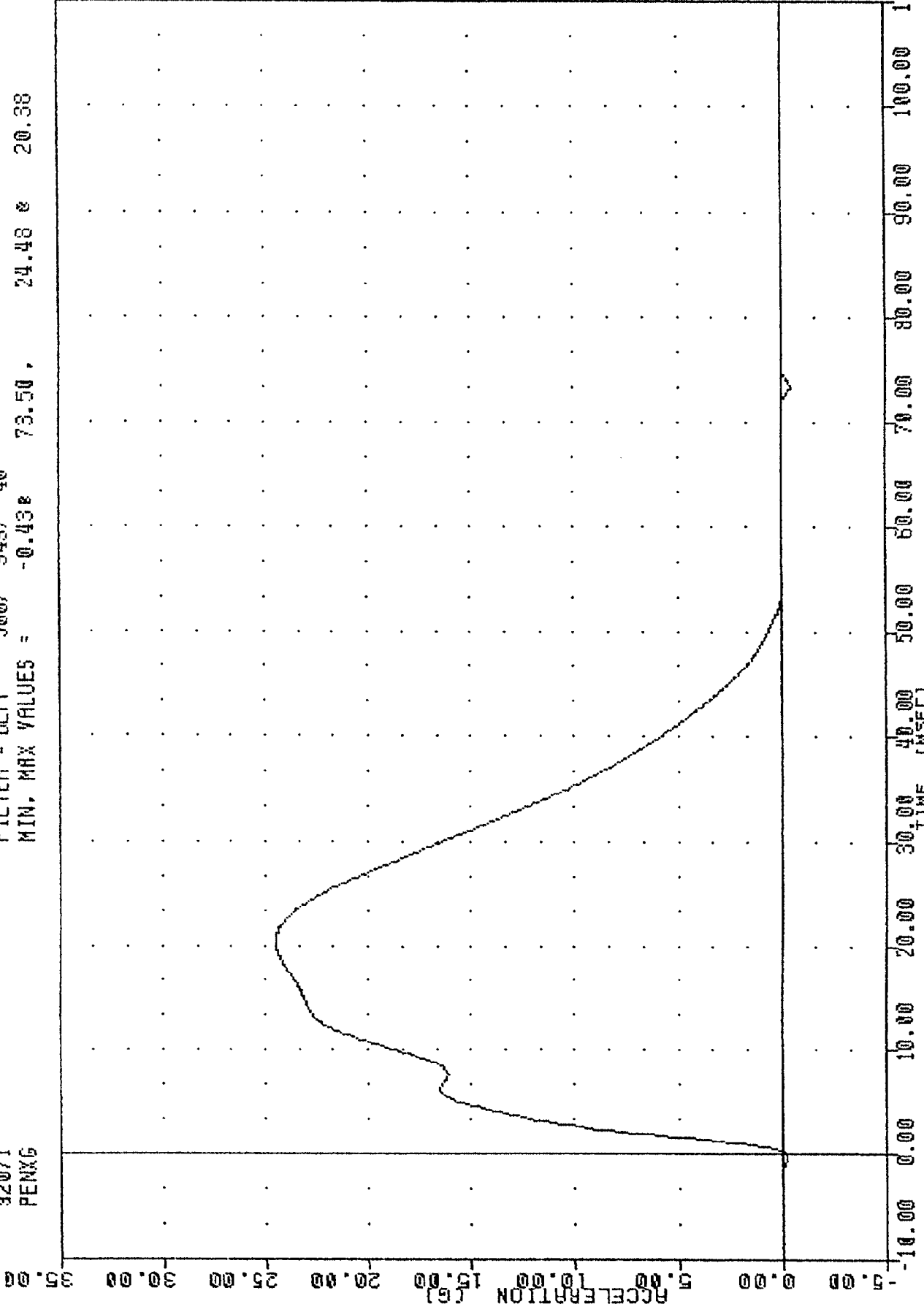
HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	69.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	59.0 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.62 IN
MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1260.5 LBS
INTERNAL HYSTERESIS	69% - 85%	75.1%

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

TRC 192C7TH1  
572E 3N192 H.5. THORAX CAL07  
92071  
PENXG

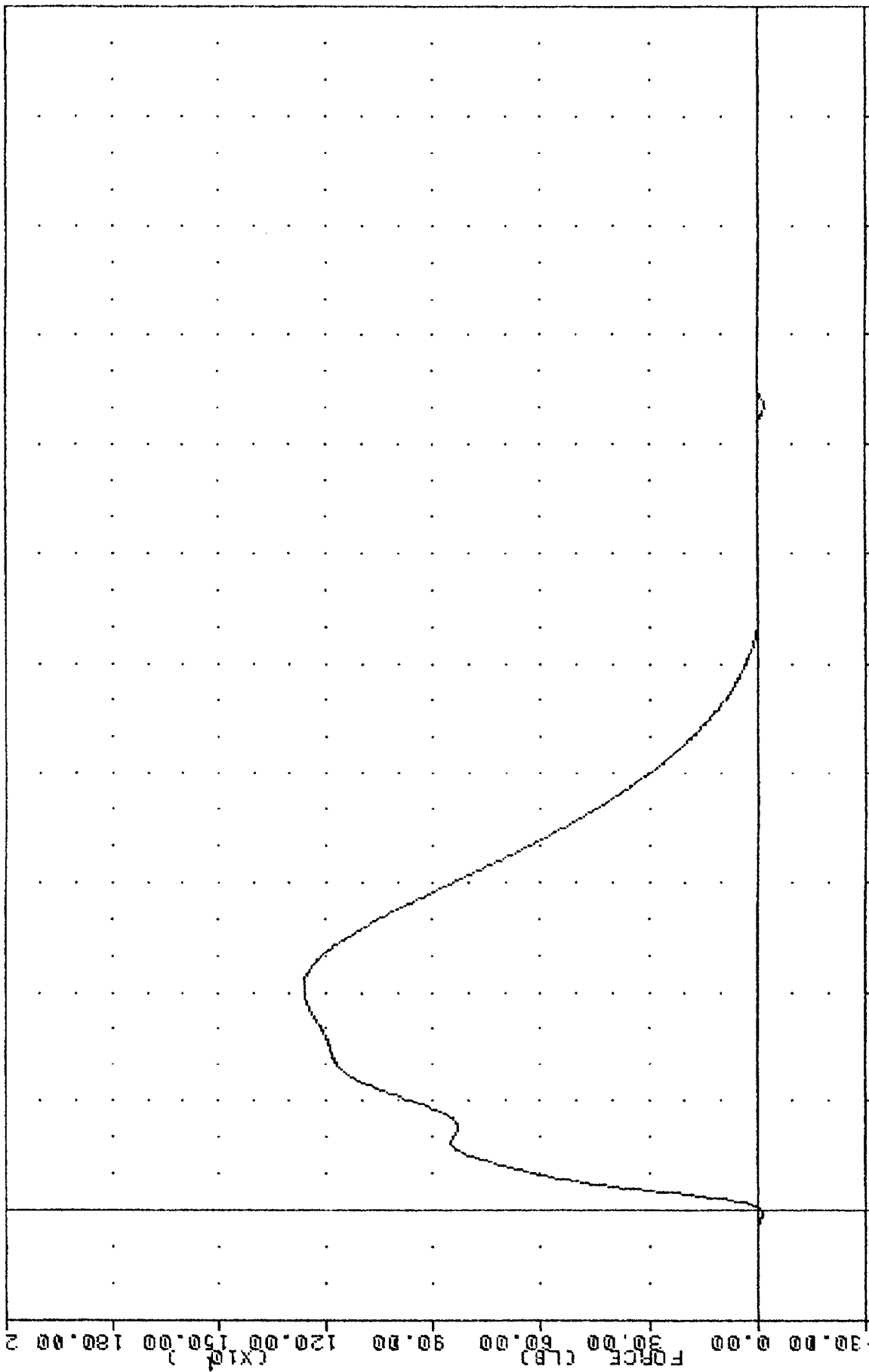
FILTER = BLPP 300/ 949/ -40  
MIN. MAX VALUES = -0.438 73.50 24.48 20.38



PART 572-E HYBRID III THORAX CALIBRATION  
MINIMUM MAX. FILTRATION

TRC  
 572E SN192 H.S. THORAX CAL07  
 92071  
 PENXF

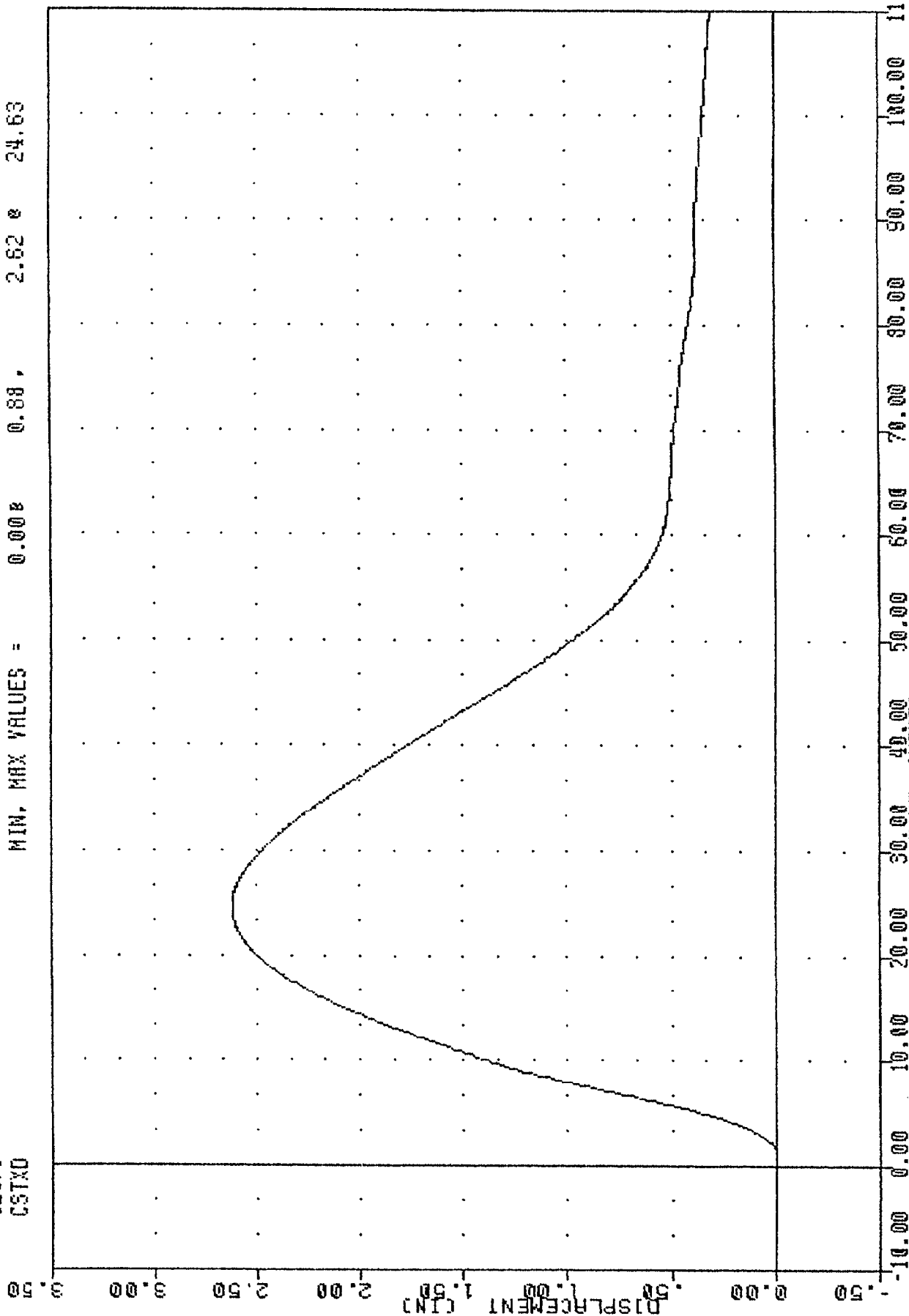
FILTER = BLPP 300/ 949/ -40  
 MIN, MAX VALUES = -22.18e 73.50, 1260.55 e 20.38



PART 572-E HYBRID III THORAX CALIBRATION  
 PENDULUM FORCE

TAC 192C7TH1  
 572E 9N192 H.S. THORAX CAL07  
 92071  
 CSTX0

FILTER = BLPF 300/ 949/ -40  
 MIN, MAX VALUES = 0.000 2.62 e 24.63



82-C

920316

PART 572-E HYBRID III THORAX CALIBRATION  
 SYSTEM DISPLACEMENT

TBC  
CSTXD  
PENXF

192CZTHI  
FILTER = BLPP  
FILTER = BLPP

572E  
300/  
300/

SN192 H.S. THORAX CAL07  
949/ -40 MIN, MAX =  
949/ -40 MIN, MAX =

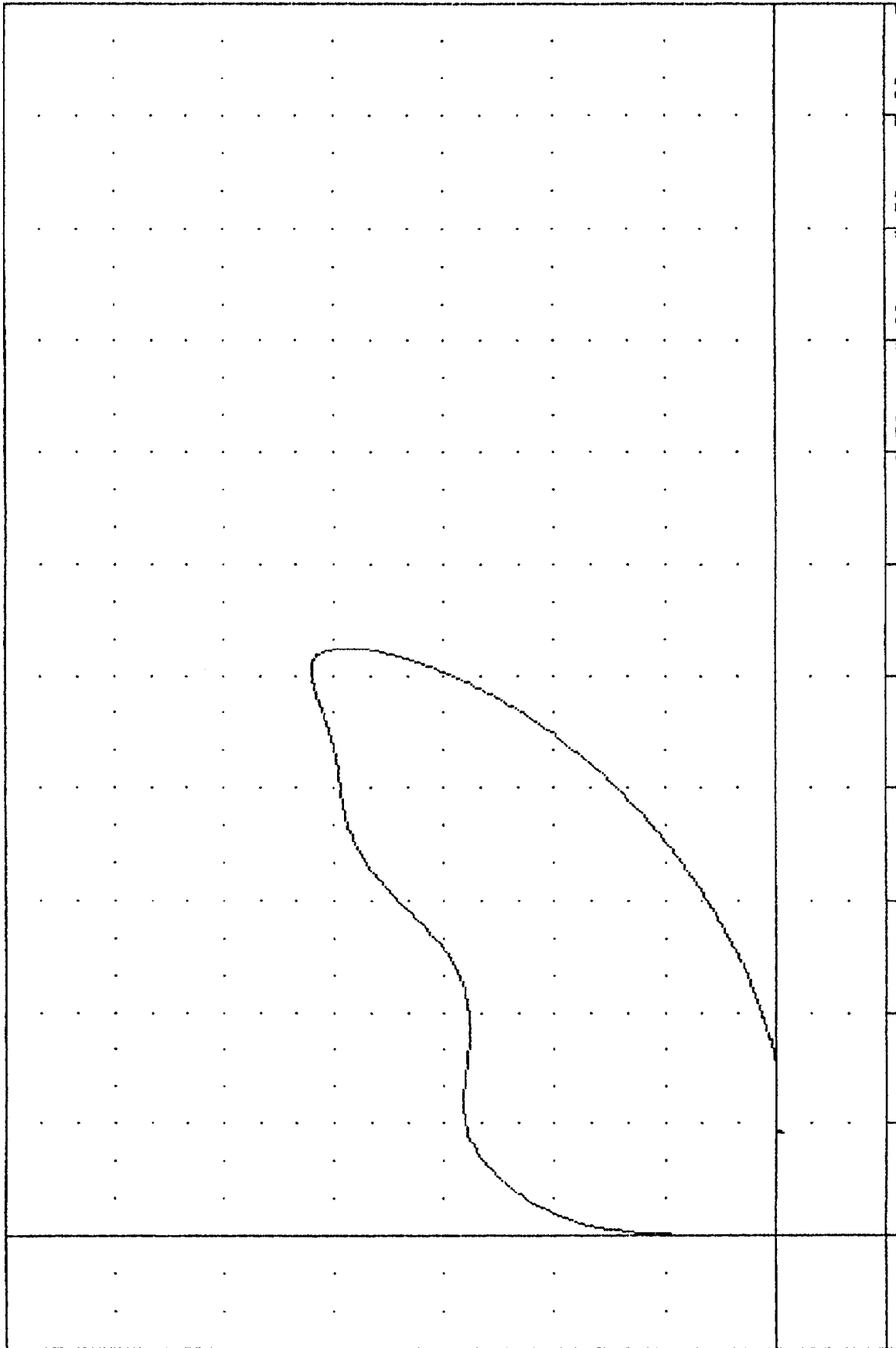
92071  
0.00 #  
-22.18 #

0.88 ;  
73.50 ;

2.62 #  
1260.55 #

24.63  
20.38

920316  
C-29  
PENXF (LBS)  
FORCE (LBS)  
DISPLACEMENT (IN)



PART 572-E HYBRID III THORAX CALIBRATION  
CHEST DISPLACEMENT VS PENDULUM FORCE

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

10-MAR-92

RIGHT KNEE

TRC

192C7RK1

572E SN192 R.KNEE 11LB CAL 07

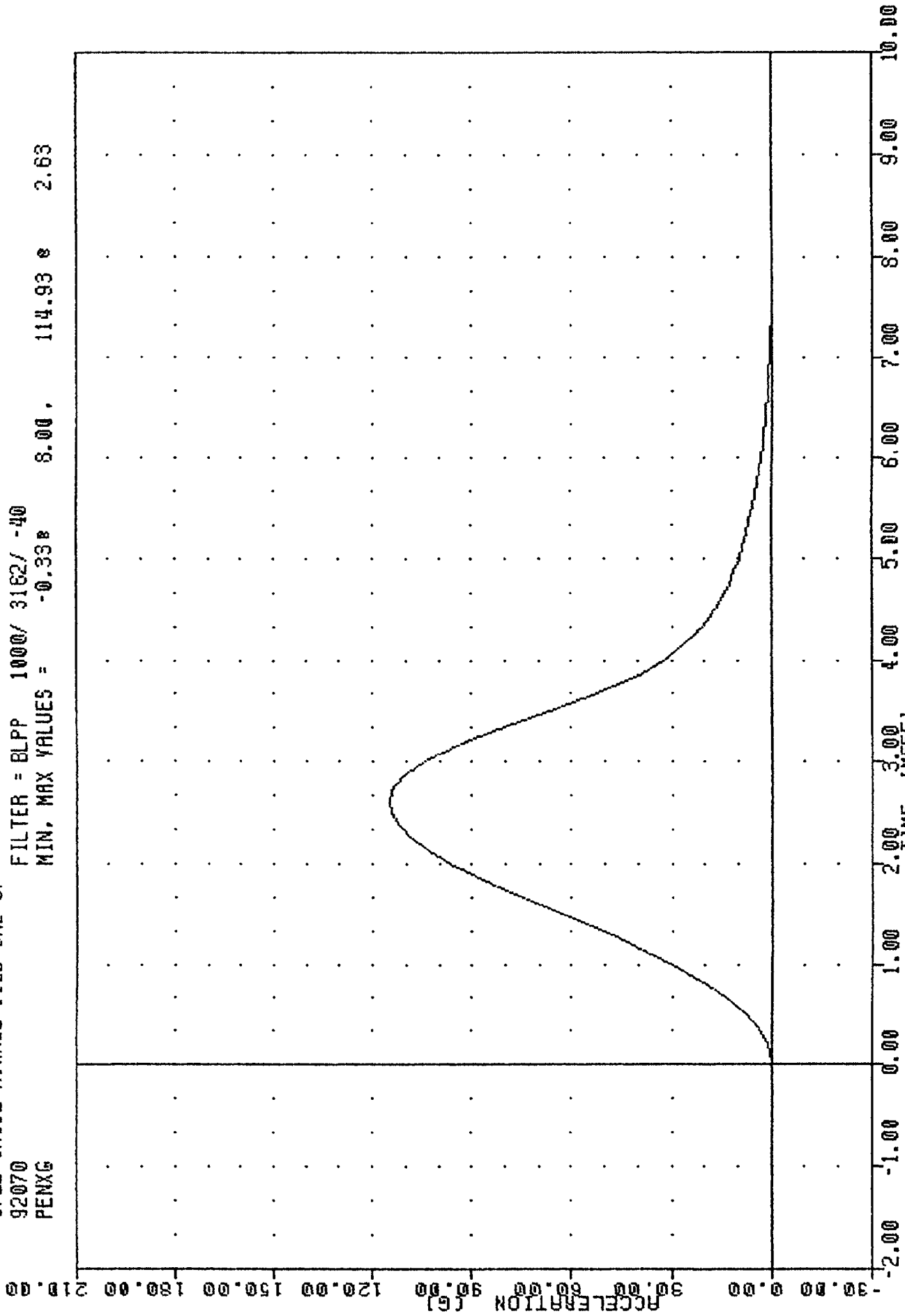
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	58.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1264.22 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN Kevin Watkins

TRC  
 572E SN192 R.KNEE 11LB CAL 07  
 92070  
 PENXG

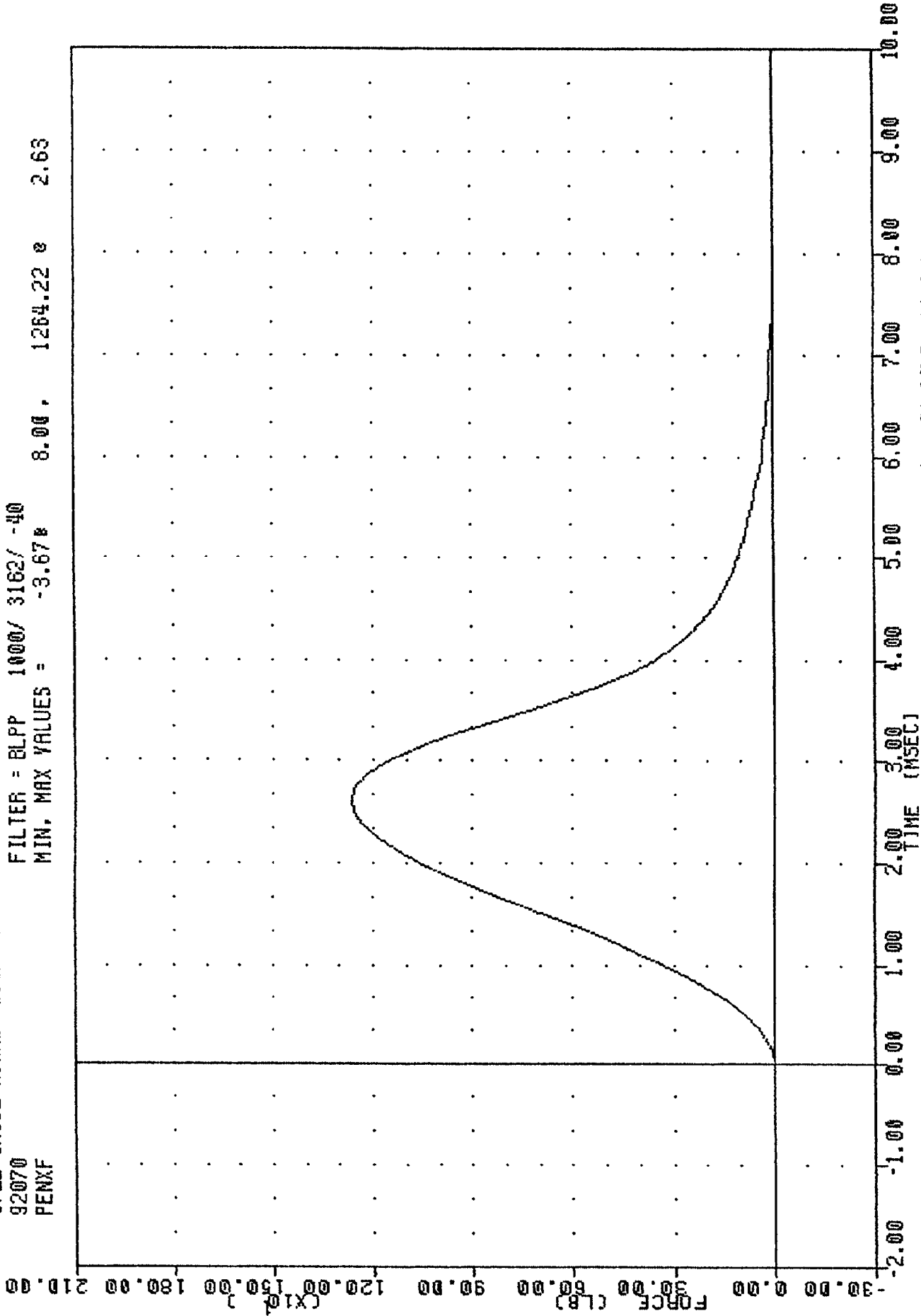
FILTER = BLPP 1000/ 3162/ -40  
 MIN, MAX VALUES = -0.338 8.00, 114.93 e 2.63



PART 572-E HYBRID III RIGHT KNEE CALIBRATION  
 PENDULUM DECELERATION (11 LB PEND.)

TRC , 192C7BK1  
 572E SM152 R.KNEE 11LB CAL 07  
 92070  
 PENXF

FILTER = BLPP 1000/ 3162/ -40  
 MIN, MAX VALUES = -3.67# 8.00 , 1264.22 # 2.63



PART 572-E HYBRID III RIGHT KNEE CALIBRATION  
 PENDULUM FORCE (LBS) (TIME MSEC)

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

10-MAR-92

LEFT KNEE  
TRC

192C7LK1

572E SN192 L.KNEE 11LB CAL 07

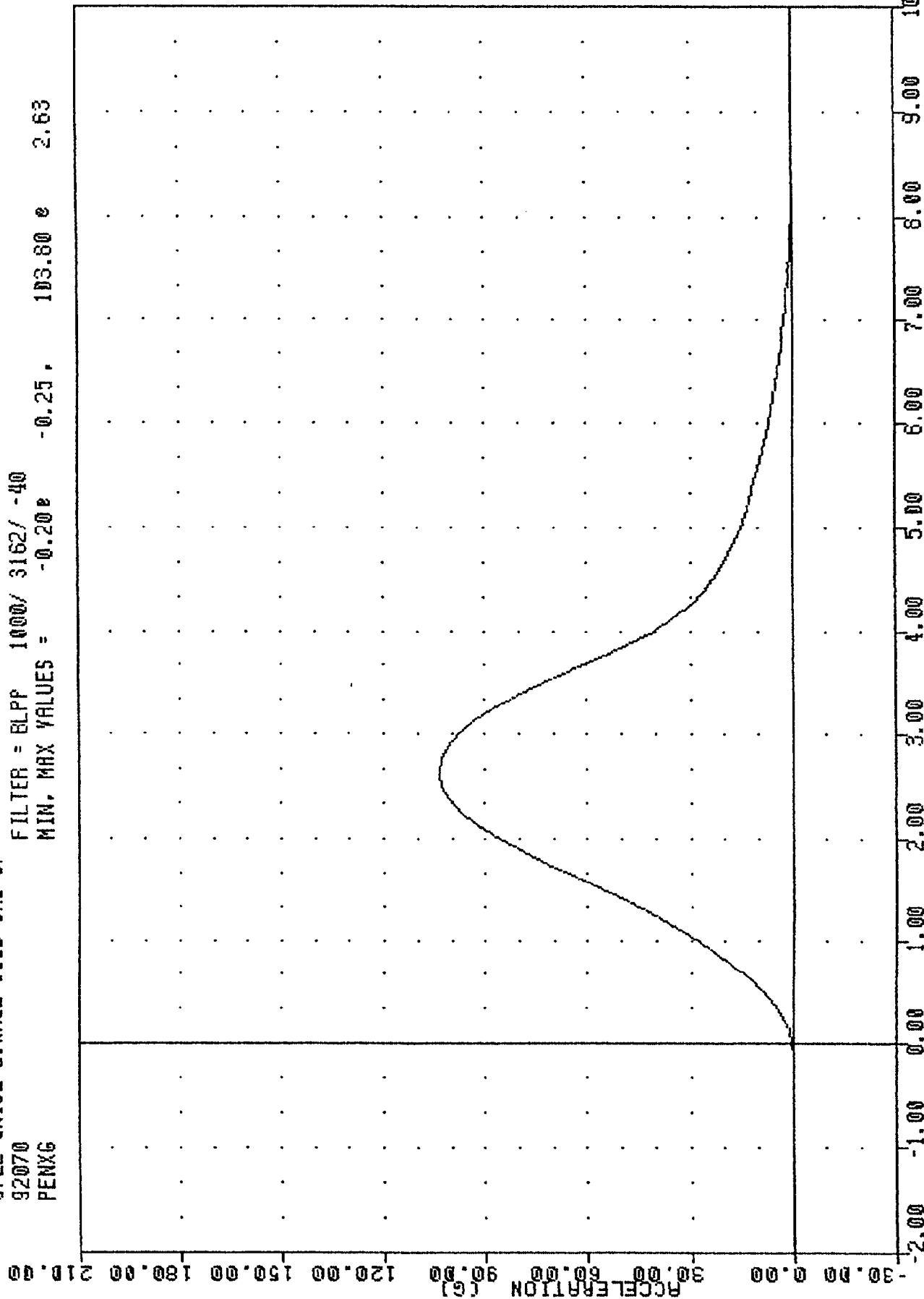
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	58.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1141.77 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN *Kevin Watkins*

TRC  
 572E SN192 L.KNEE 11LB CAL 07  
 92070  
 PENXG

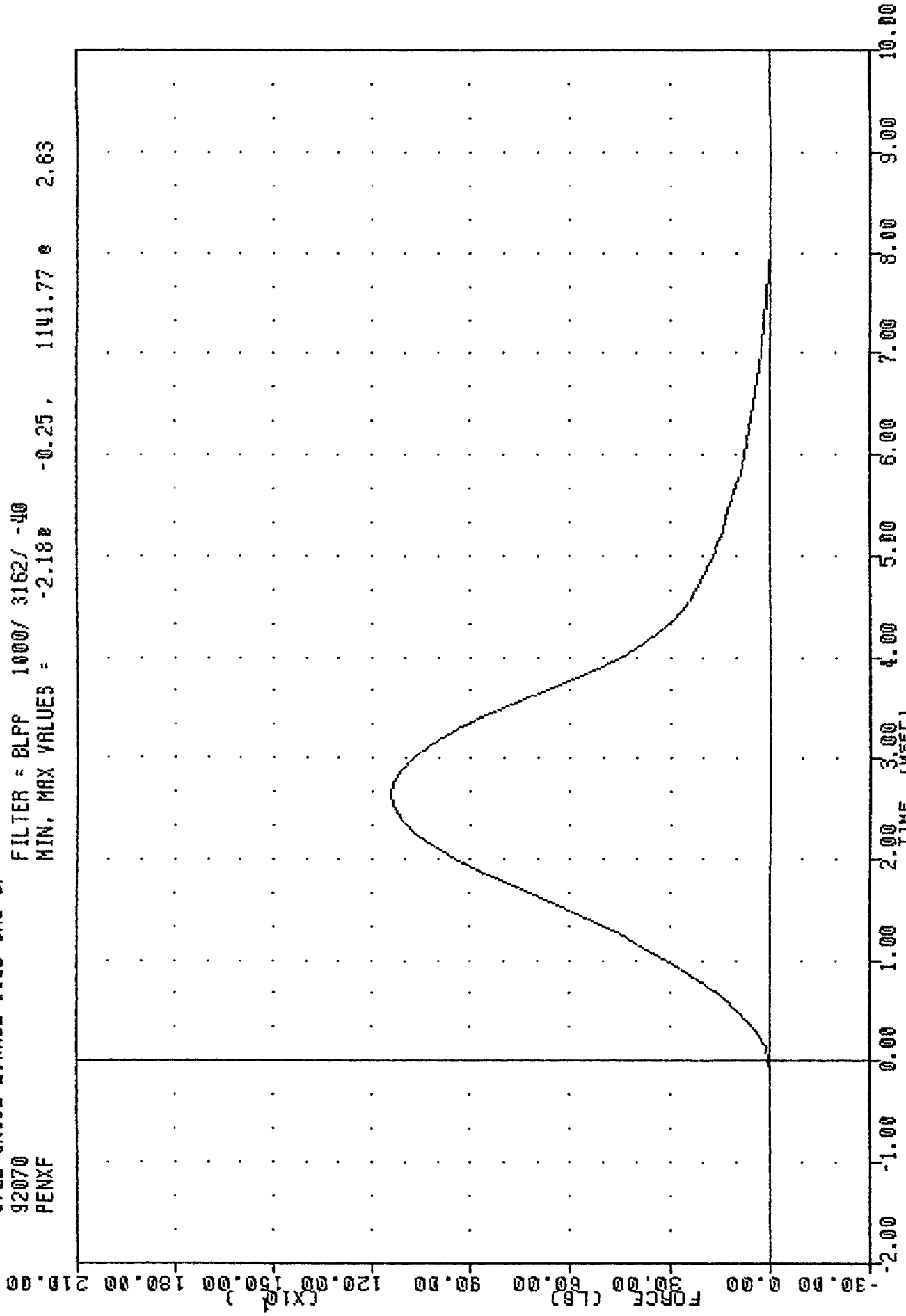
FILTER = BLPP 1000/ 3162/ -40  
 MIN, MAX VALUES = -0.25, 103.80 e 2.63



PART 572-E HYBRID III LEFT KNEE CALIBRATION  
 PENXG DECELERATION CALIBRATION

TRC  
572E SN192 L.KNEE 11LB CAL 07  
92070  
PENXF

FILTER = BLPF 1000/ 3162/ -40  
MIN. MAX VALUES = -2.18e -0.25e 1141.77 e 2.63



PART 572-E HYBRID III LEFT KNEE CALIBRATION  
PENDULUM FORCE (11 LB PEND.)

PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 142

TRANSPORTATION RESEARCH CENTER OF OHIO  
 HYBRID III EXTERNAL DIMENSIONS  
 142 HUMANOID

24-JAN-92

TRC 142C9ED1 572E SN142 EXT. DIMENSION CAL09

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			71.0 DEG. F
RELATIVE HUMIDITY			34.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		16.9-17.1 IN	17.0 IN
LOCATION FOR WAIST CIRCUMFERENCE (BB)		8.9- 9.1 IN	9.0 IN
CHEST CIRCUMFERENCE (Y)		38.2-39.4 IN	38.7 IN
WAIST CIRCUMFERENCE (Z)		32.9-34.1 IN	33.3 IN
CHEST DEPTH (O)		8.4- 9.0 IN	8.6 IN
H-POINT HEIGHT (C)		3.3- 3.5 IN	3.4 IN
H-POINT FROM SEATBACK (D)		5.3- 5.5 IN	5.4 IN
SKULL CAP TO BACKLINE (H)		1.6- 1.8 IN	1.7 IN
TOTAL SITTING HEIGHT (A)		34.6-35.0 IN	34.9 IN
THIGH CLEARANCE (F)		5.5- 6.1 IN	5.7 IN
BUTTOCK KNEE LENGTH (K)		22.8-23.8 IN	23.5 IN
BUTTOCK POPLITEAL LENGTH (N)		17.8-18.8 IN	18.7 IN
POPLITEAL HEIGHT (L)		16.9-17.9 IN	17.8 IN
KNEE PIVOT HEIGHT (M)		19.1-19.7 IN	19.3 IN
FOOT LENGTH (P)		9.9-10.5 IN	10.1 IN
FOOT BREADTH (W)		3.6- 4.2 IN	3.8 IN
SHOULDER PIVOT FROM BACKLINE (E)		3.3- 3.7 IN	3.4 IN
SHOULDER BREADTH (V)		16.6-17.2 IN	16.8 IN
SHOULDER PIVOT HEIGHT (B)		19.9-20.5 IN	20.1 IN
ELBOW REST HEIGHT (J)		7.5- 8.3 IN	8.3 IN
SHOULDER-ELBOW LENGTH (I)		13.0-13.6 IN	13.6 IN
BACK OF ELBOW TO WRIST PIVOT (G)		11.4-12.0 IN	11.5 IN

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

24-JAN-92

TRC

142C9HD1

572E SN142 HEAD DROP CAL 09

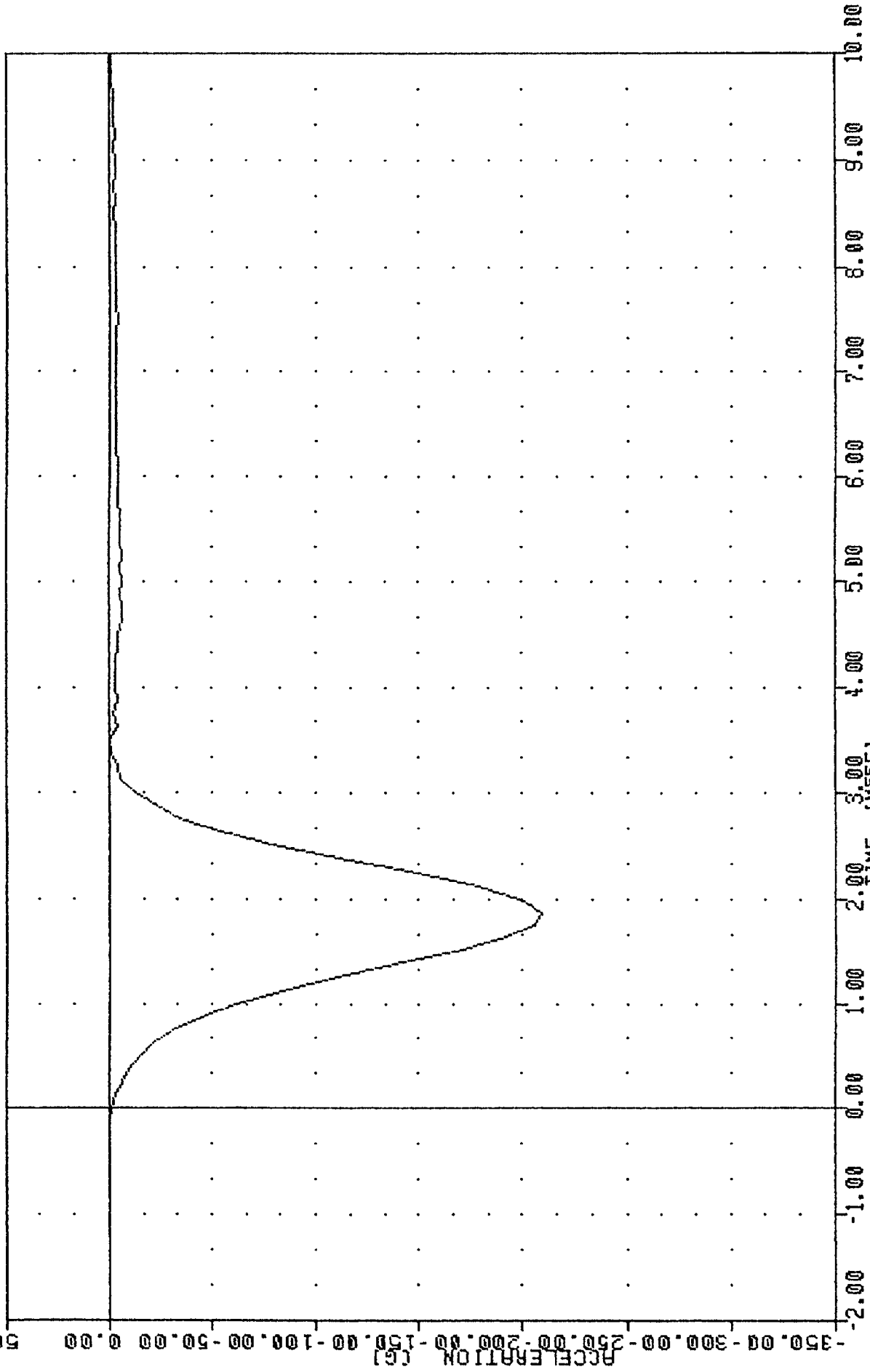
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	34.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	245.29 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.28 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC  
572E SN142 HEAD DROP CAL 09  
92024  
HEDXG

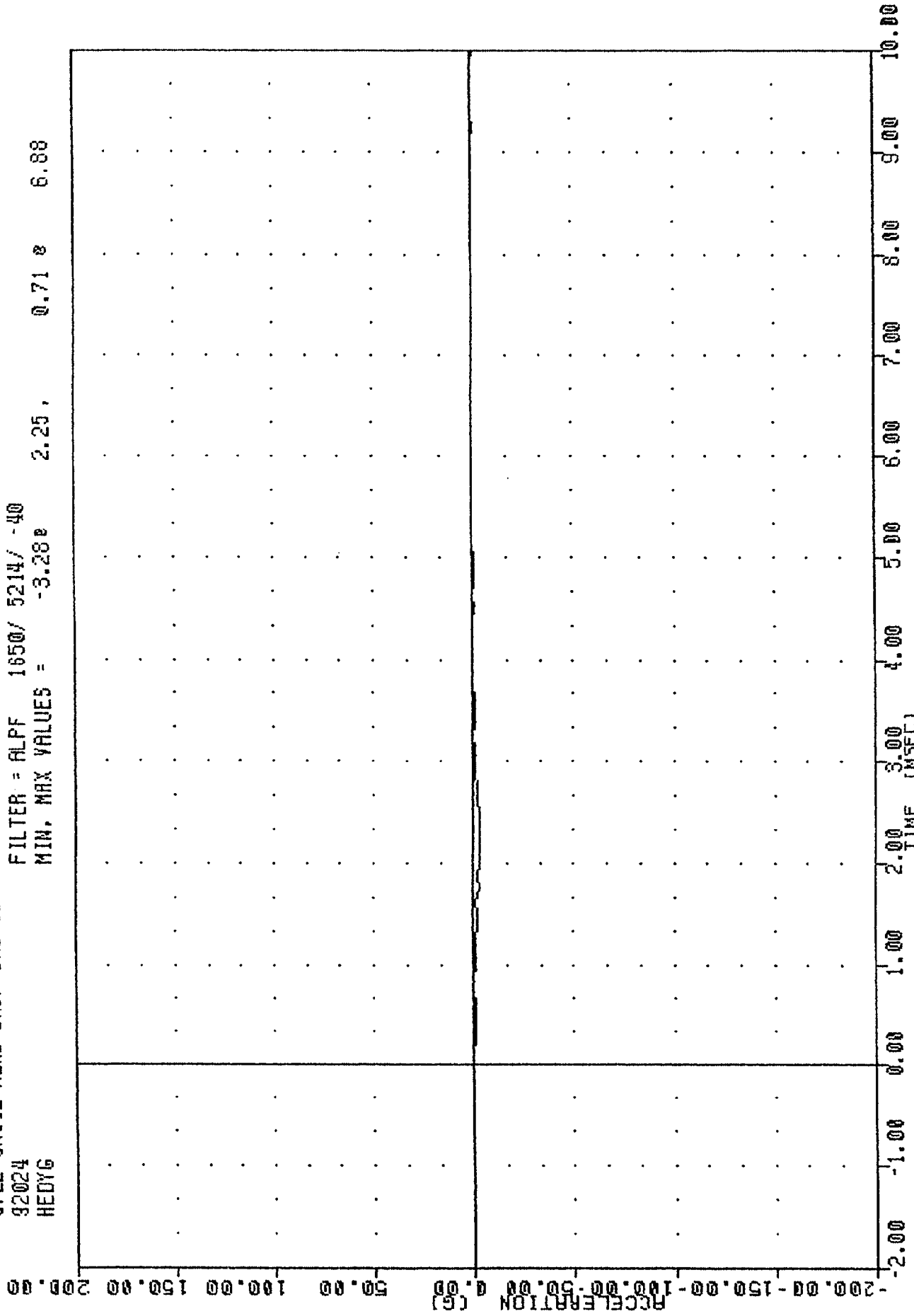
FILTER = ALPF 1650/ 5214/ -40  
MIN. MAX VALUES = -209.22 1.88, 0.14 0 -1.75



PART 572-E HYBRID III HEAD CALIBRATION  
HEAD ACCELERATION X AXIS

TRC  
 572E SN142 HEAD DROP CAL 09  
 92024  
 HEDYG

FILTER = ALPF 1650/ 5214/ -40  
 MIN, MAX VALUES = -3.28e 2.25, 0.71 e 6.88

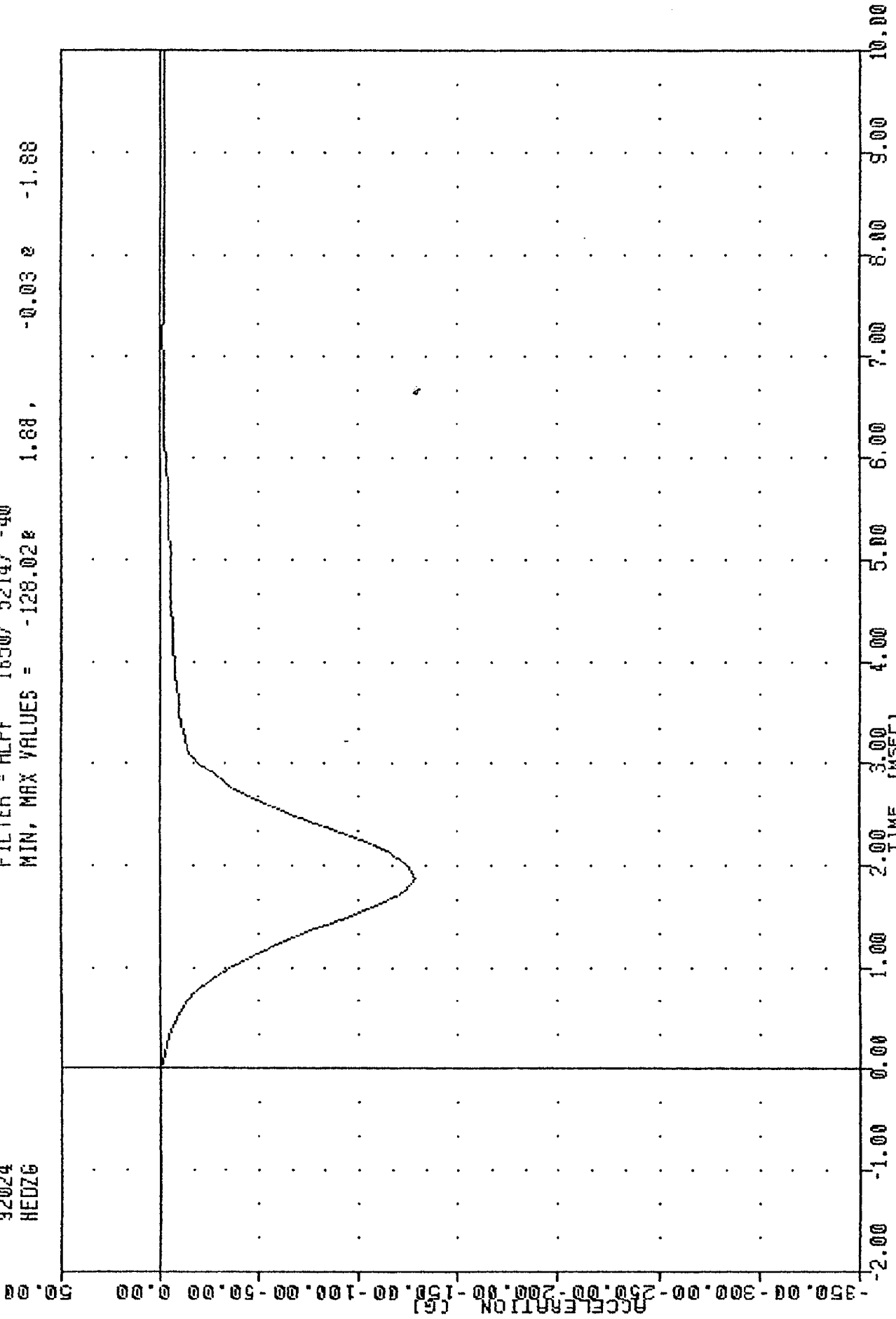


PART 572-E HYBRID III HEAD CALIBRATION

HEAD CALIBRATION MAX

TRC  
572E SN142 HEAD DROP CAL 09  
92024  
HEDZ6

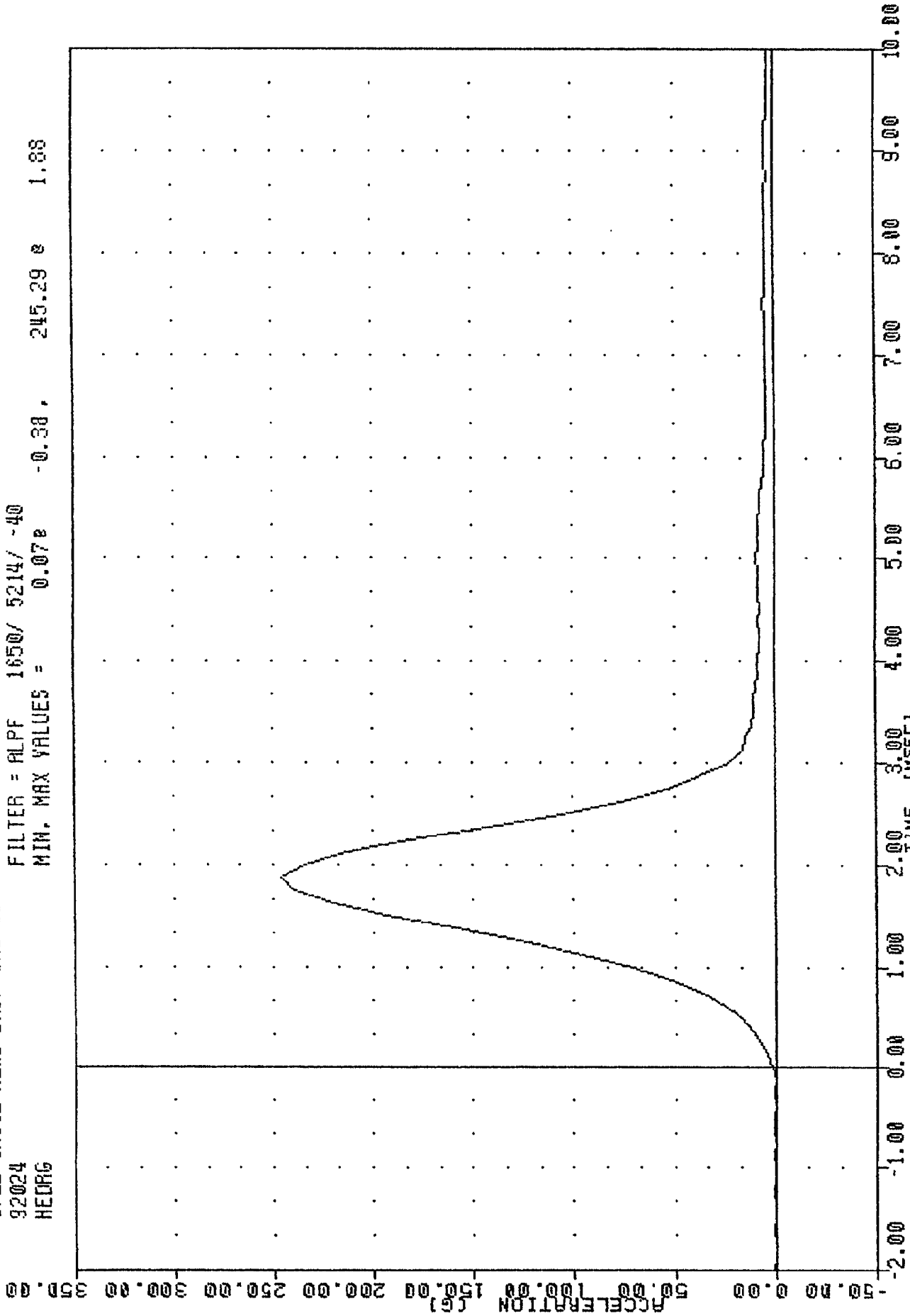
FILTER = ALPF 1650/ 5214/ -40  
MIN, MAX VALUES = -128.02e 1.88, -0.03 e -1.88



PART 572-E HYBRID III HEAD CALIBRATION  
HEAD ACCELERATION Z AXIS

TRC , 14209HD1  
 572E SN142 HEAD DROP CAL 09  
 92024  
 HEADG

FILTER = ALPF 1650/ 5214/ -40  
 MIN. MAX VALUES = 0.07e -0.38, 245.29 e 1.88



PART 572-E HYBRID III HEAD CALIBRATION

HEAD RESULT ACCELERATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

25-JAN-92

6 AXIS NECK TRANSDUCER  
TRC 142C9NF1

572E 8M142 NECK FLEXION CAI 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	29.0 %
IMPACT VELOCITY	22.6-23.4 FT/SEC	23.08 FT/SEC
PENDULUM DECELERATION	10 MS   22.50 - 27.50 G	23.47 G
	20 MS   17.60 - 22.60 G	19.55 G
	30 MS   12.50 - 18.50 G	15.34 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	15.29 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 42 MS	38.63 MS
D PLANE ROTATION	MAX   64 - 78 DEG.	73.99 DEG.
	TIME   57 - 64 MS	60.88 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX   65 - 80 FT.LBS	68.55 FT.LBS
	TIME   47 - 58 MS	51.13 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	113 - 128 MS	116.00 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	97 - 107 MS	105.88 MS

TEST MEETS SPECIFICATIONS

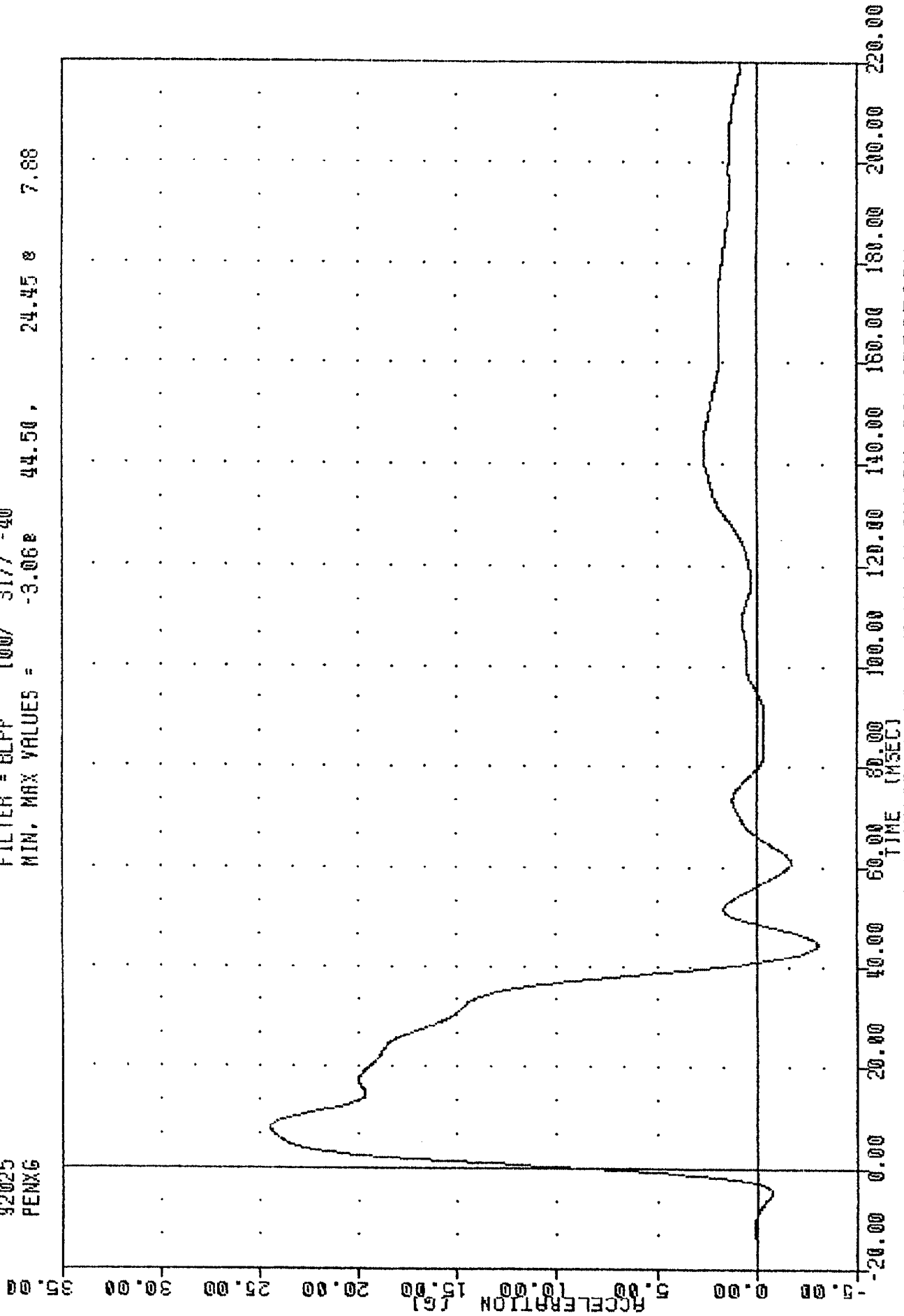
TECHNICIAN

*Chas. Middleton*

TRC  
572E 3N142 NECK FLEXION CALOR  
92025  
PENXG

. 14203NF1

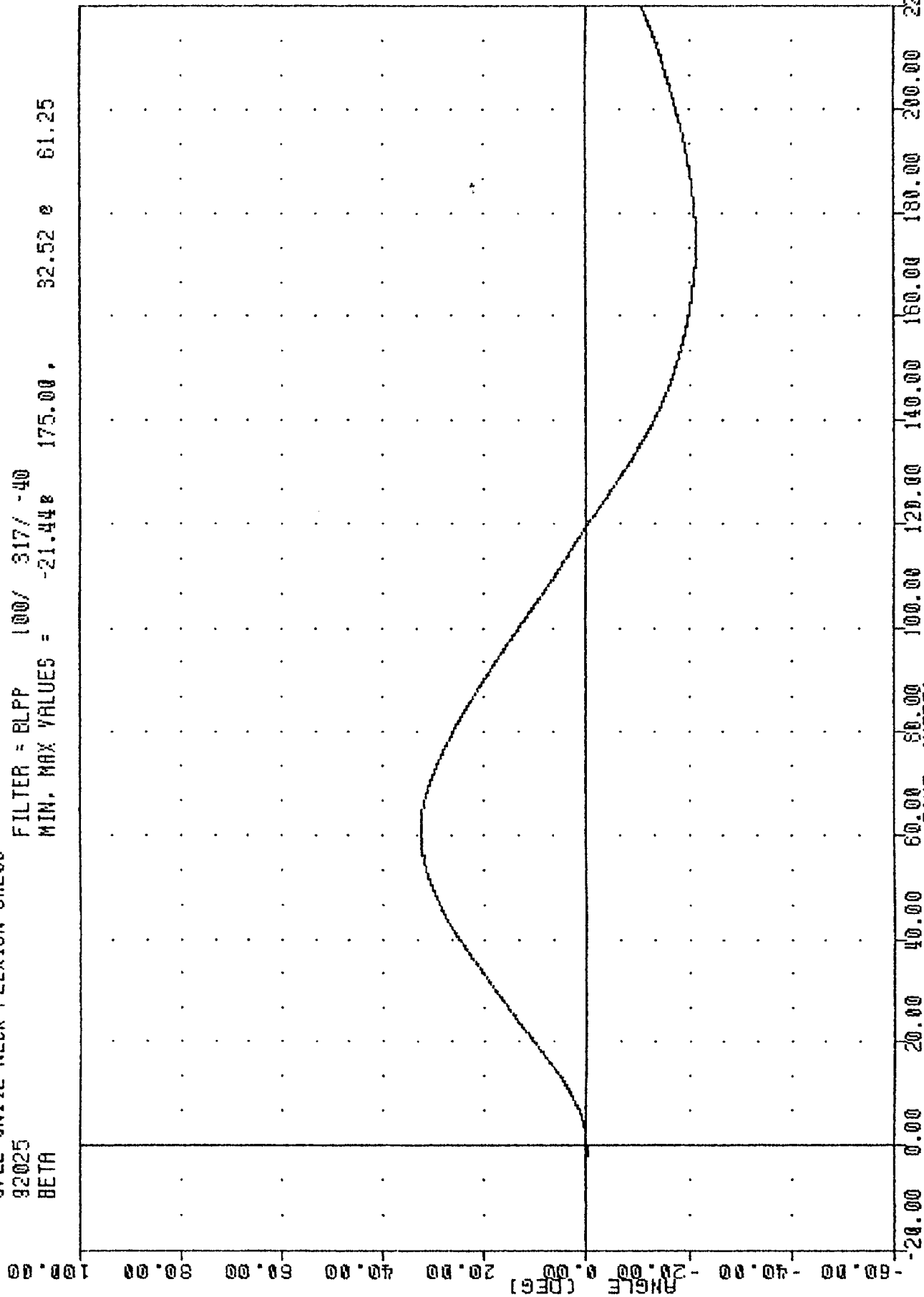
FILTER = BLPP 100/ 317/ -40  
MIN, MAX VALUES = -3.06e 44.50 , 24.45 e 7.88



PART 572-E HYBRID III NECK FLEXION CALIBRATION  
PENXG

TAC  
32025  
572E SM142 NECK FLEXION CAL09  
142C9MF1

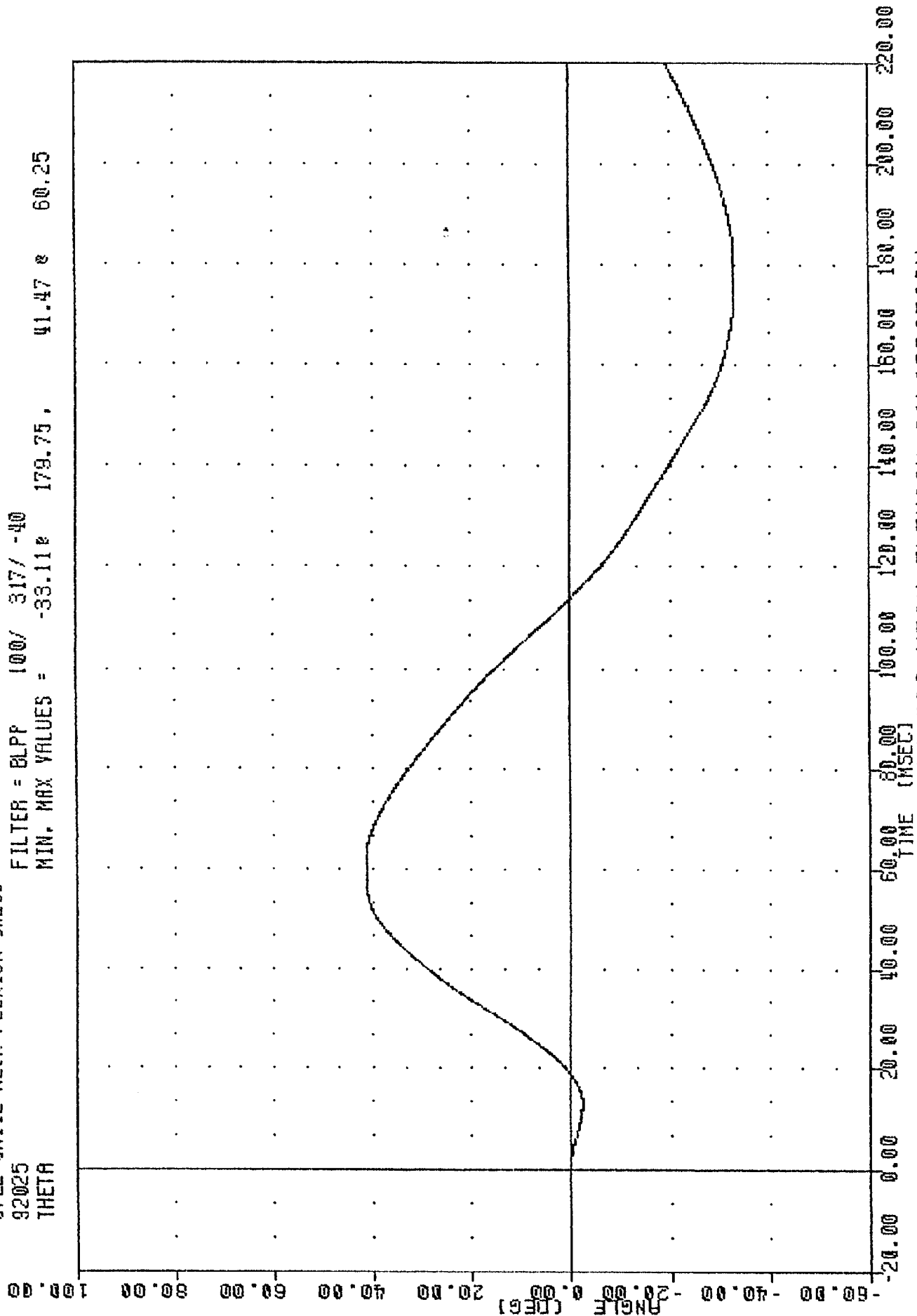
FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -21.448 175.00 , 32.52 61.25



PART 572-E HYBRID III NECK FLEXION CALIBRATION  
ROTATION ABOUT BASE OF NECK

TRC .142C9NF1  
572E SN142 NECK FLEXION CAL09  
92025  
THETA

FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -38.11° 179.75, 41.47 & 60.25



C-46

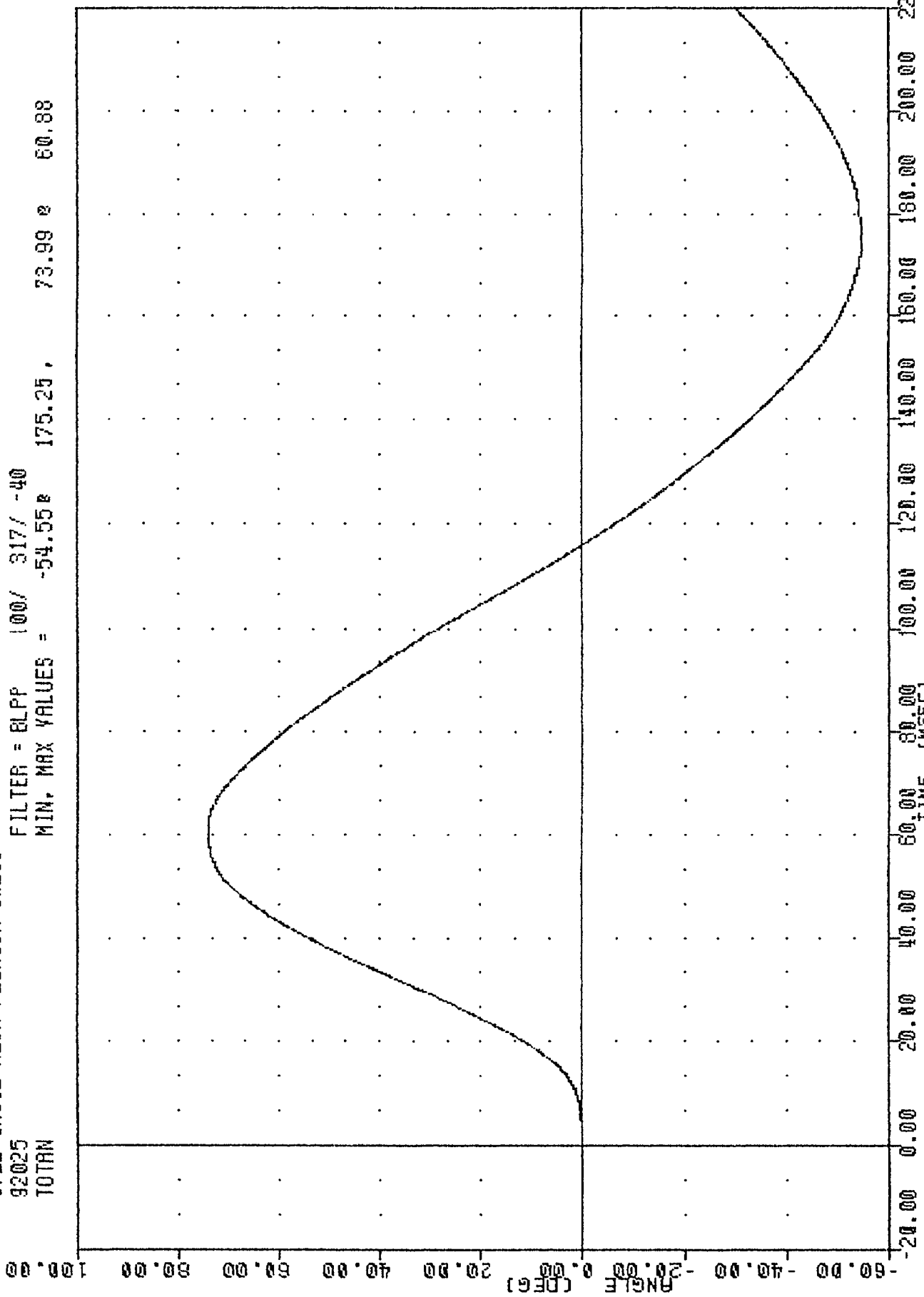
920316

PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

TRC  
 572E 3N142 NECK FLEXION CAL09  
 92025  
 TOTRN

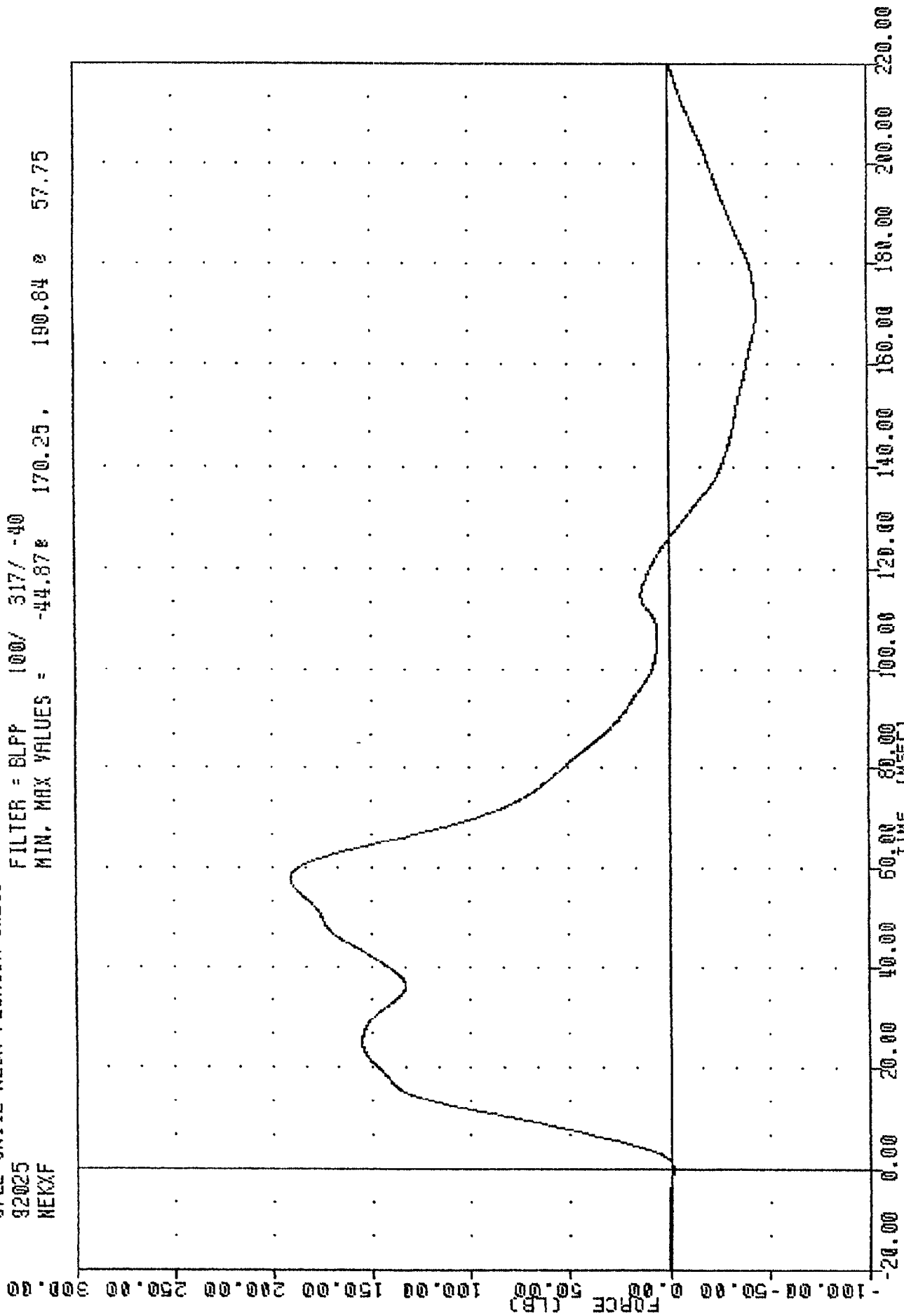
FILTER = ELPP 100/ 317/ -40  
 MIN, MAX VALUES = -54.55 175.25, 73.99 60.88



PART 572-E HYBRID III NECK FLEXION CALIBRATION  
 TOTAL ROTATION

TRC , 142CSNF1  
572E SN142 NECK FLEXION CAL09  
92025  
NEKXF

FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -44.87% 170.25, 190.84 % 57.75



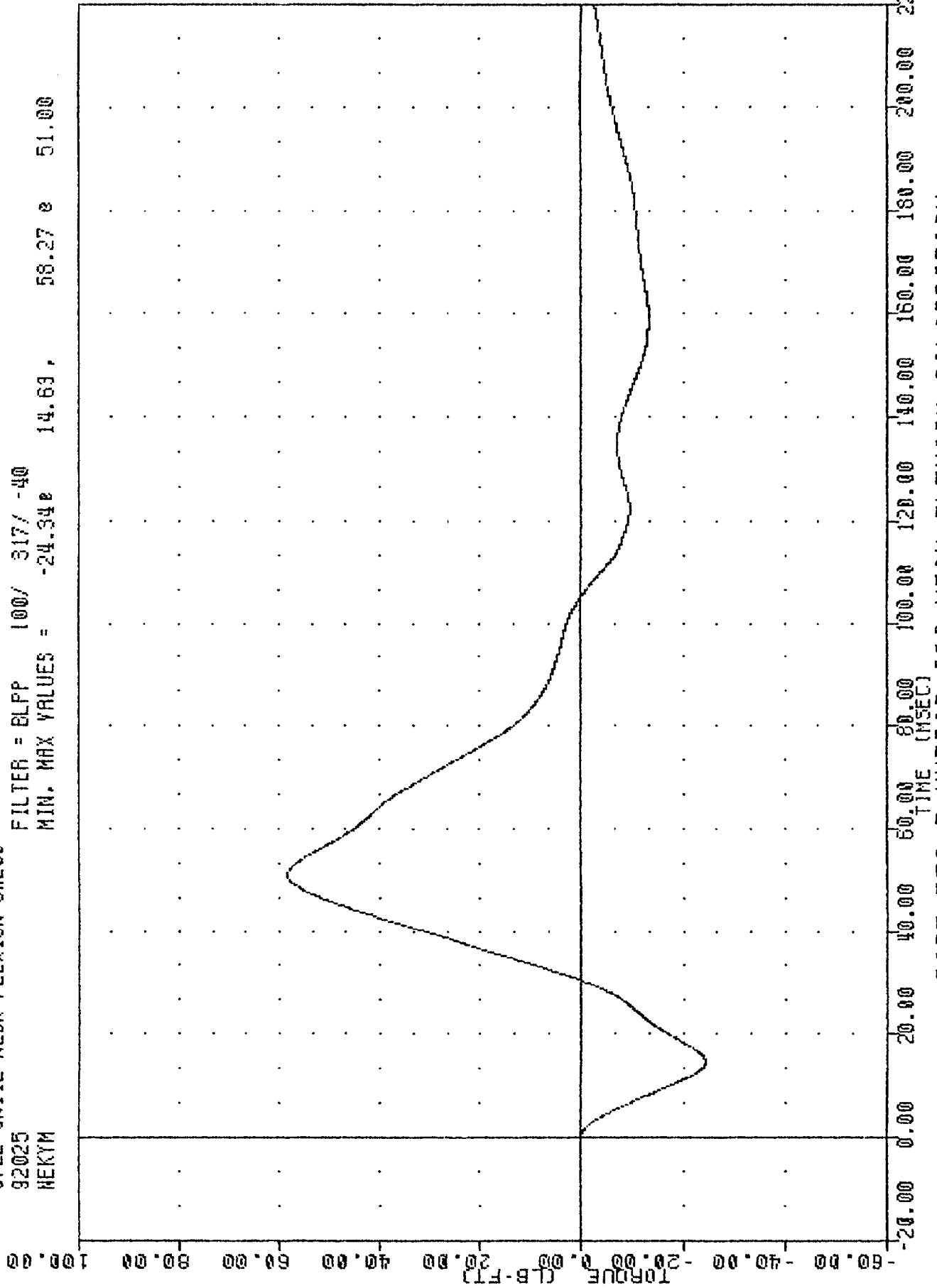
PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE

TRC  
572E SN142 NECK FLEXION CAL08  
92025  
NEKYM

, 142C9NF1

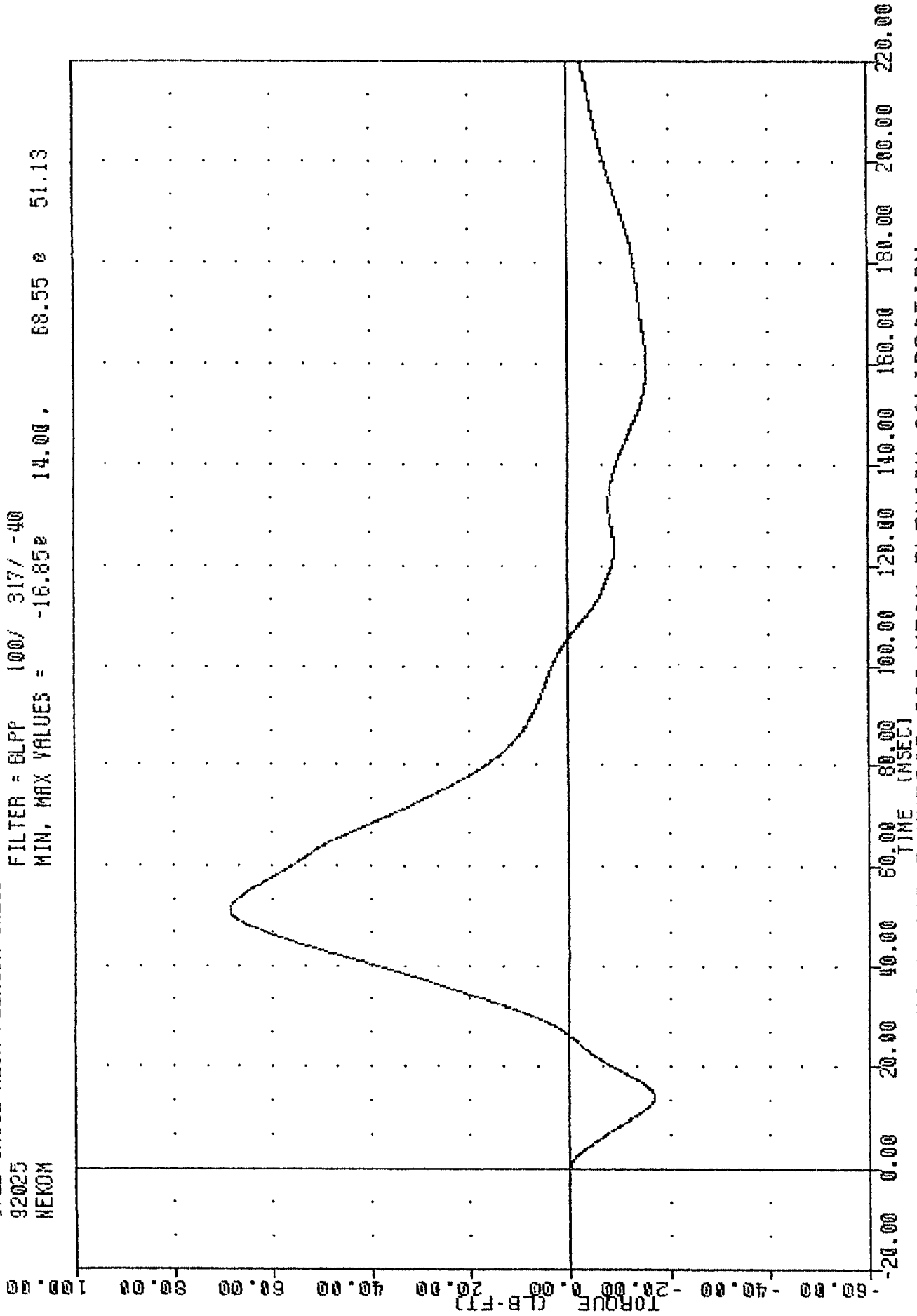
FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -24.34e 14.63, 58.27 e 51.00



PART 572-E HYBRID III NECK FLEXION CALIBRATION  
NECK MOMENT Y AXIS

TRC , 142C9NF1  
572E 5N142 NECK FLEXION CAL09  
92025  
NEKOM

FILTER = BLPP 100/ 317/ -40  
MIN, MAX VALUES = -16.85e 14.00, 68.55 e 51.13



PART 572-E HYBRID III NECK FLEXION CALIBRATION  
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

25-JAN-92

6 AXIS NECK TRANSDUCER  
TRC 142C9NE1

572E SN142 NECK EXT. CAL09

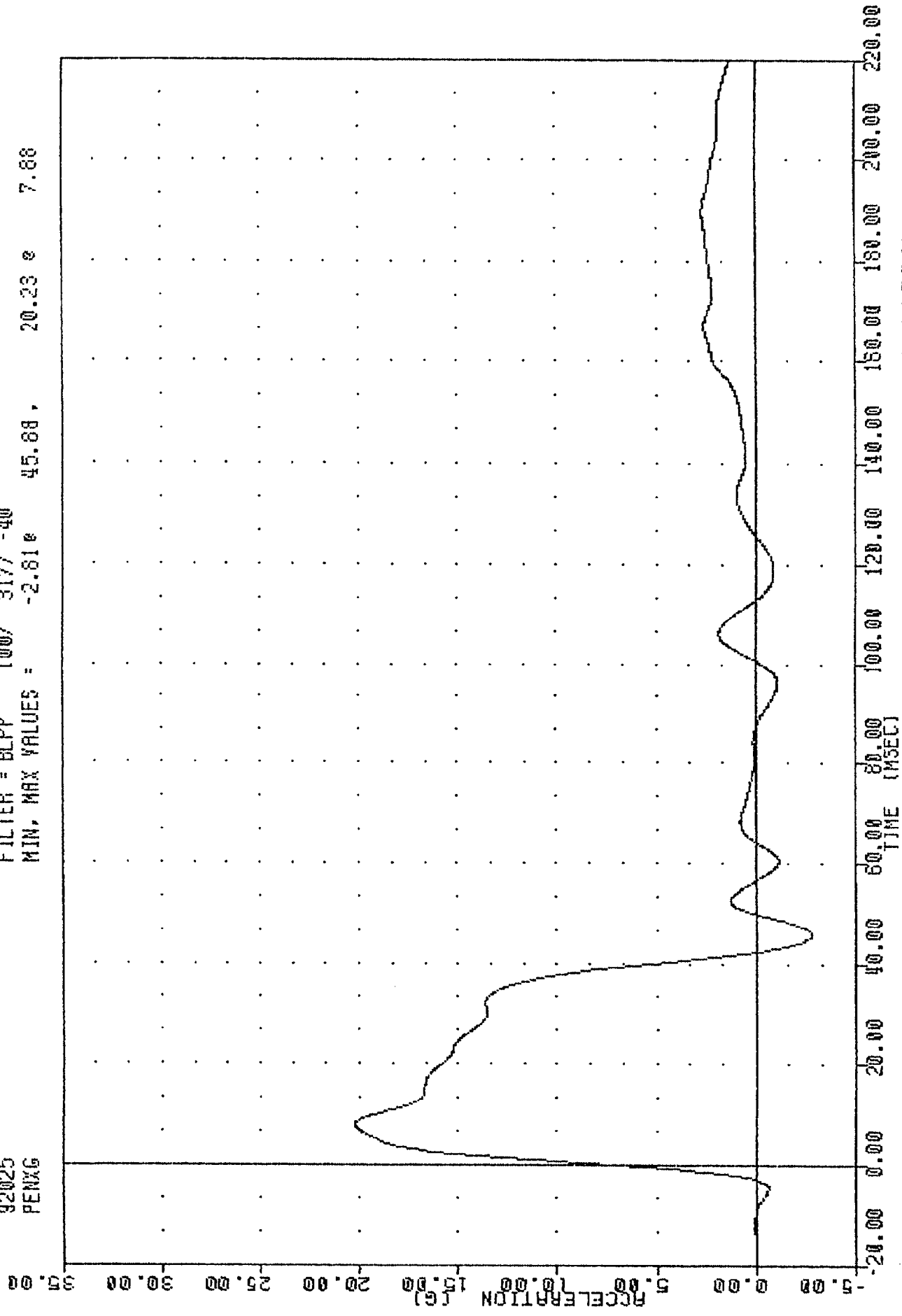
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	29.0 %
IMPACT VELOCITY	19.50-20.30 FT/SEC	19.83 FT/SEC
PENDULUM DECELERATION	10 MS   17.20 - 21.20 G	19.21 G
	20 MS   14.00 - 19.00 G	15.81 G
	30 MS   11.00 - 16.00 G	13.51 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	13.61 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	38 - 46 MS	39.88 MS
D PLANE ROTATION	MAX   81 - 106 DEG.	98.78 DEG.
	TIME   72 - 82 MS	76.13 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN   -59.0/-39.0 FT.LBS	-55.11 FT.LBS
	TIME   65 - 79 MS	70.38 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	147 - 174 MS	154.13 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	120 - 148 MS	140.50 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC  
572E SN142 NECK EXT. CAL09  
92025  
PENXG

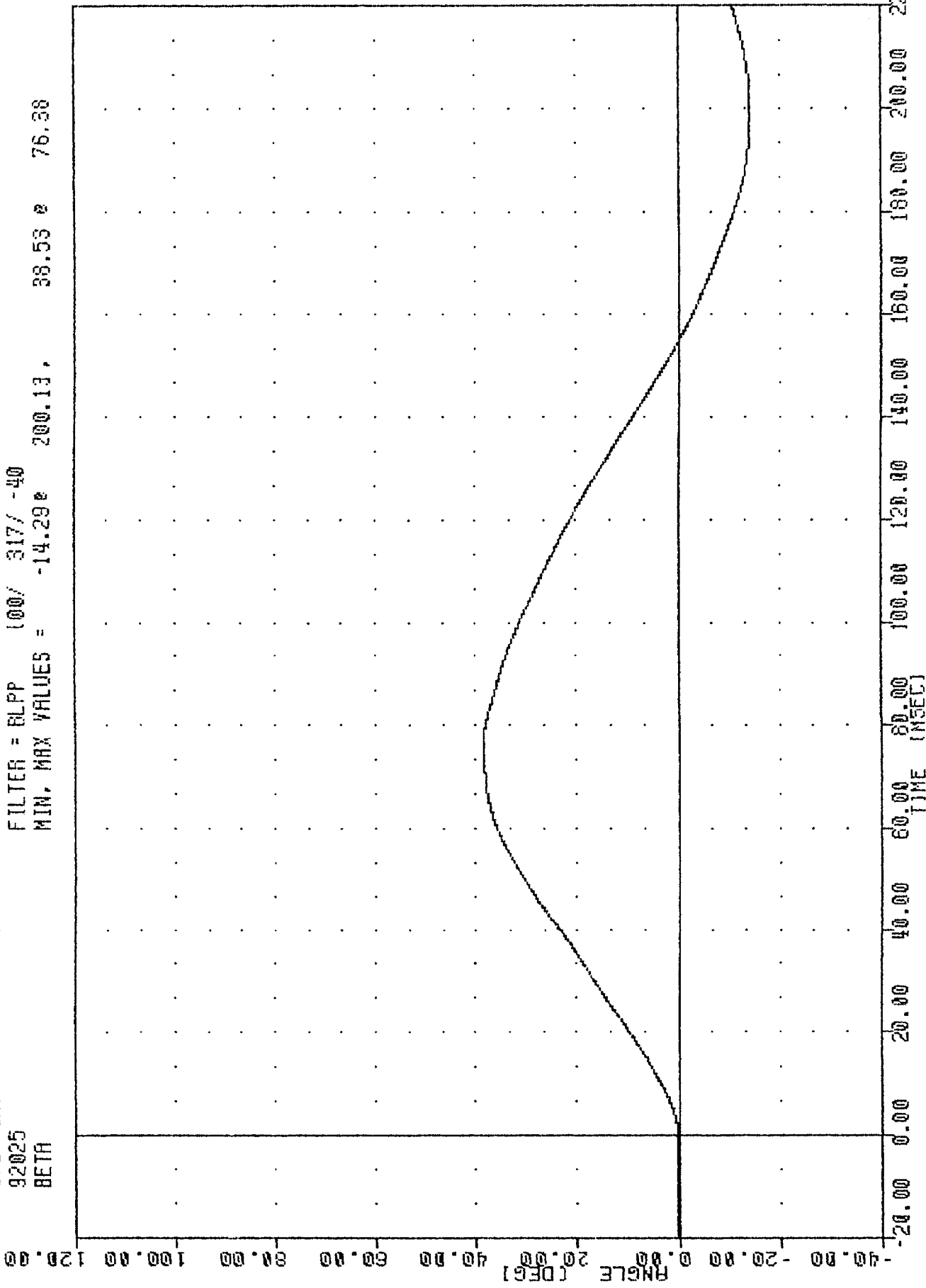
FILTER = BLPP 100/ 317/ -40  
MIN, MAX VALUES = -2.61e 20.23 e 7.88



PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
PENXG PENXG DECELERATION

TRC  
572E SN142 NECK EXT. CAL09  
92025  
BETA

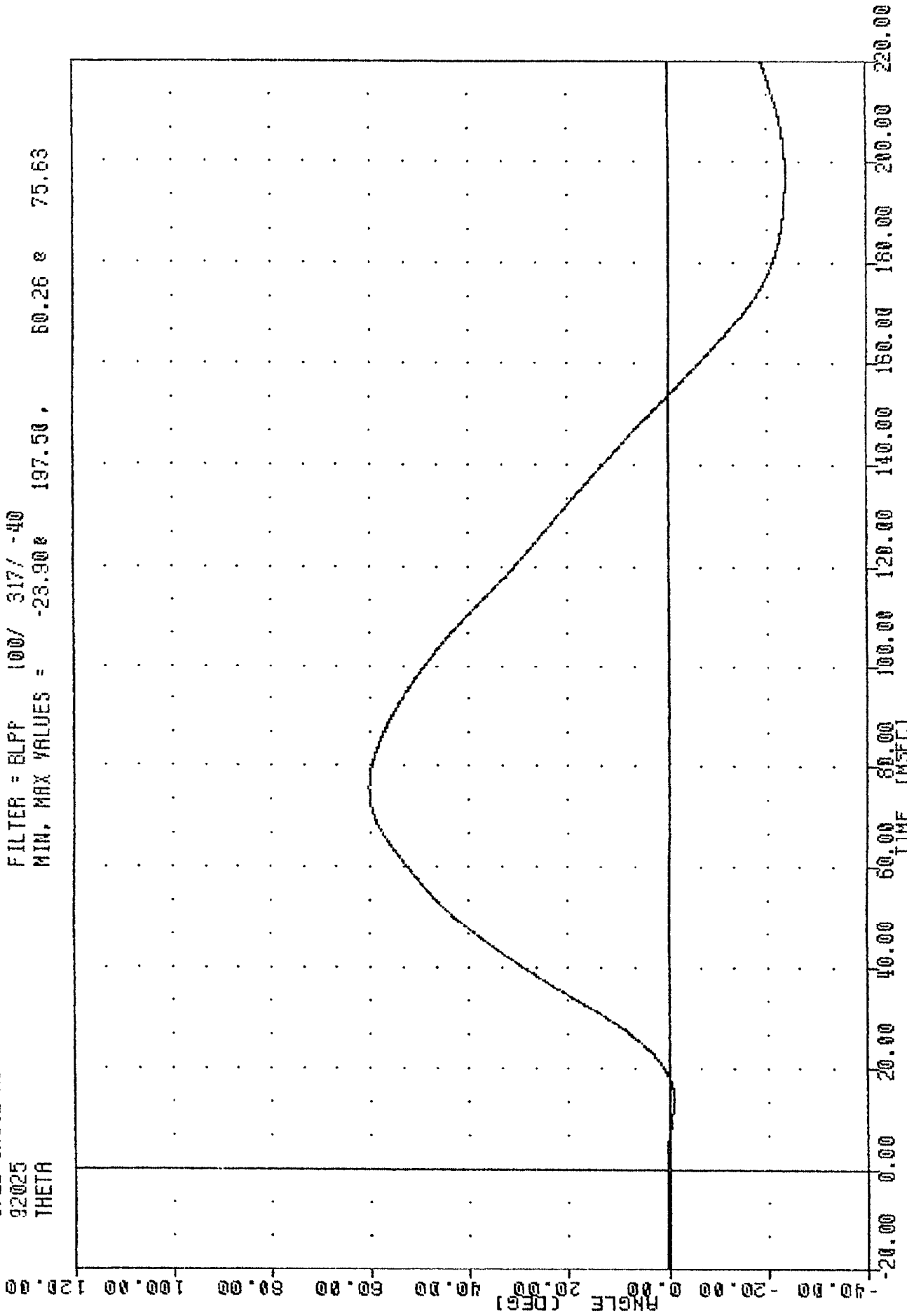
FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -14.29e 200.13, 38.53 e 76.38



PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
ROTATION ABOUT BASE OF NECK

TRC , 142C9ME1  
572E SN142 NECK EXT. CAL09  
92025  
THETA

FILTER = BLPF 100/ 317/ -40  
MIN, MAX VALUES = -23.90e 197.50, 60.26 e 75.63

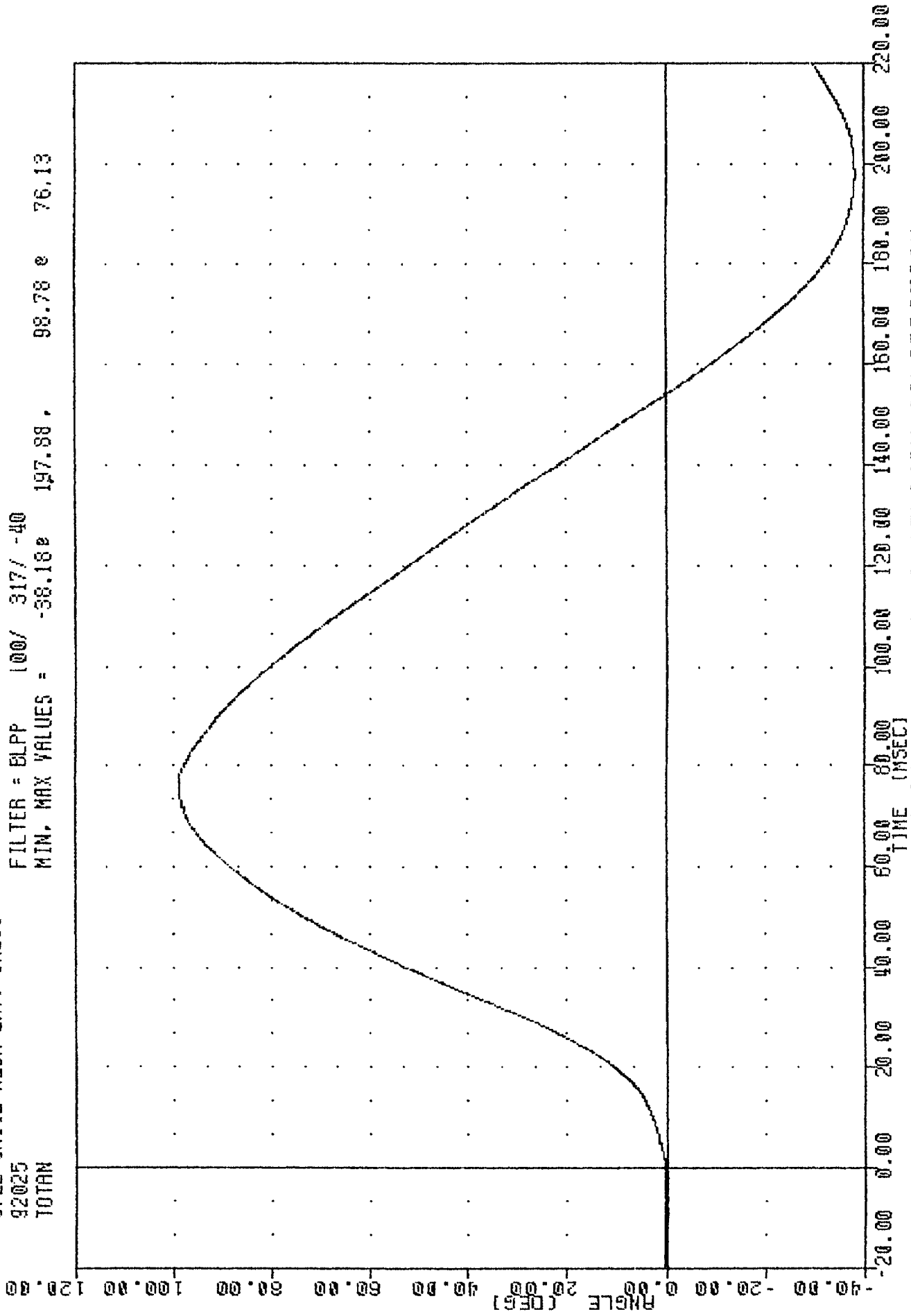


PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
ROTATION ABOUT OCCIPITAL CONDYLE

TRC  
572E SN142 NECK EXT. CAL09  
92025  
TOTAL

, 14209ME1

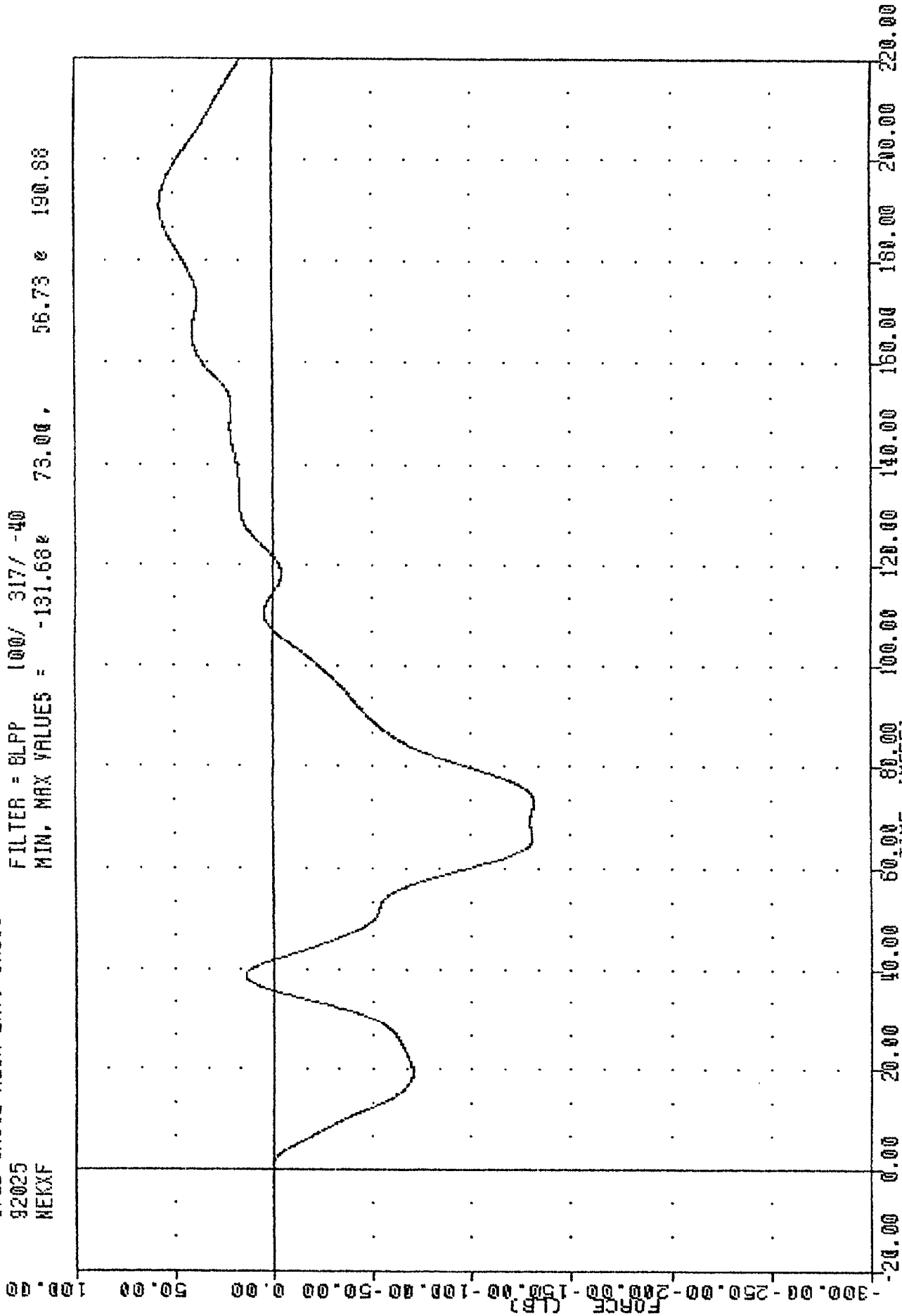
FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -38.18e 98.78 e 76.13



PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
TOTAL ROTATION

TRC  
572E SN142 NECK EXT. CAL09  
92025  
NEKXF

FILTER = 8LPP 100/ 317/ -40  
MIN. MAX VALUES = -131.68e 73.00e 56.73 e 190.88

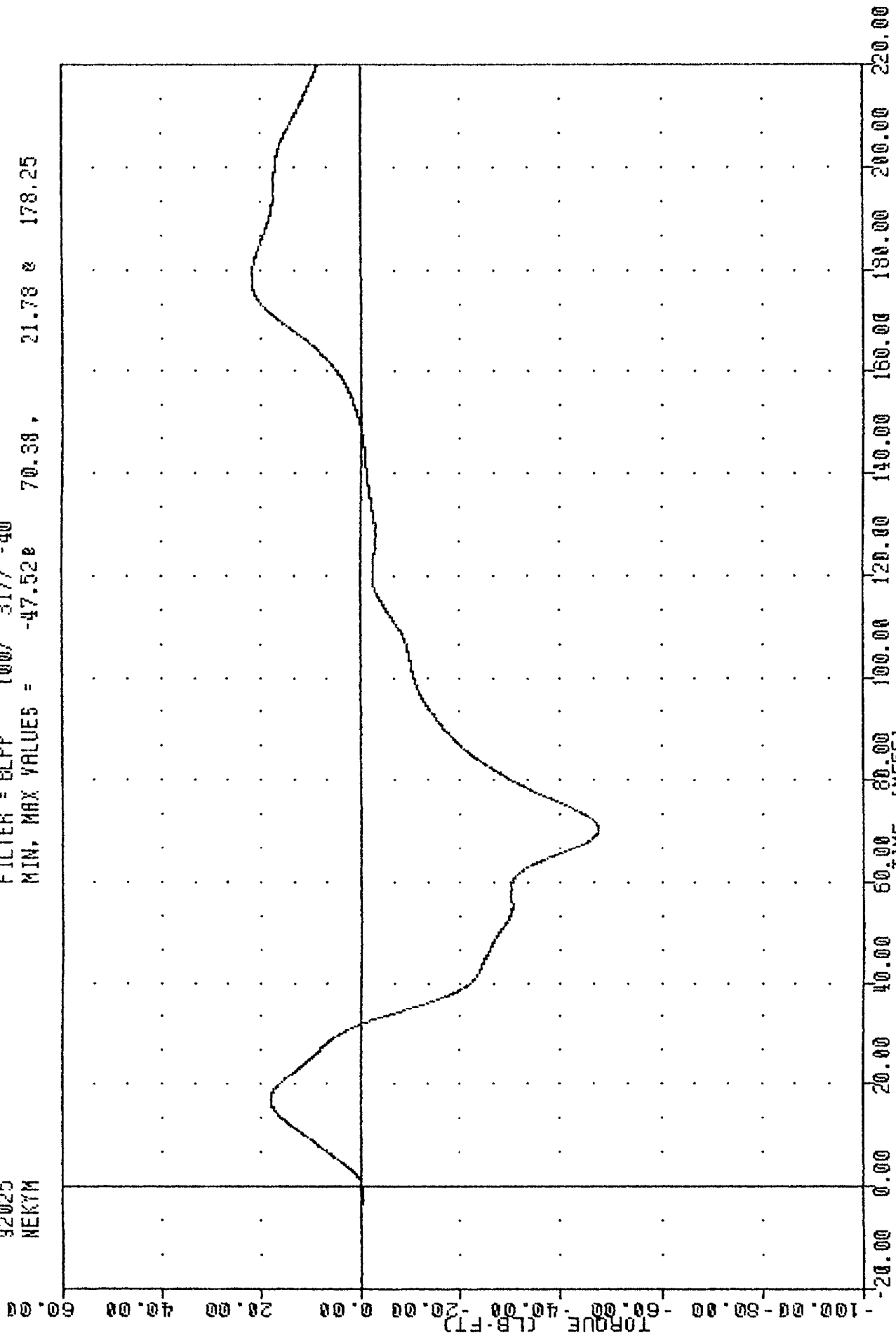


PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

TFC  
572E SN142 NECK EXT. CAL09  
92025  
NEKYM

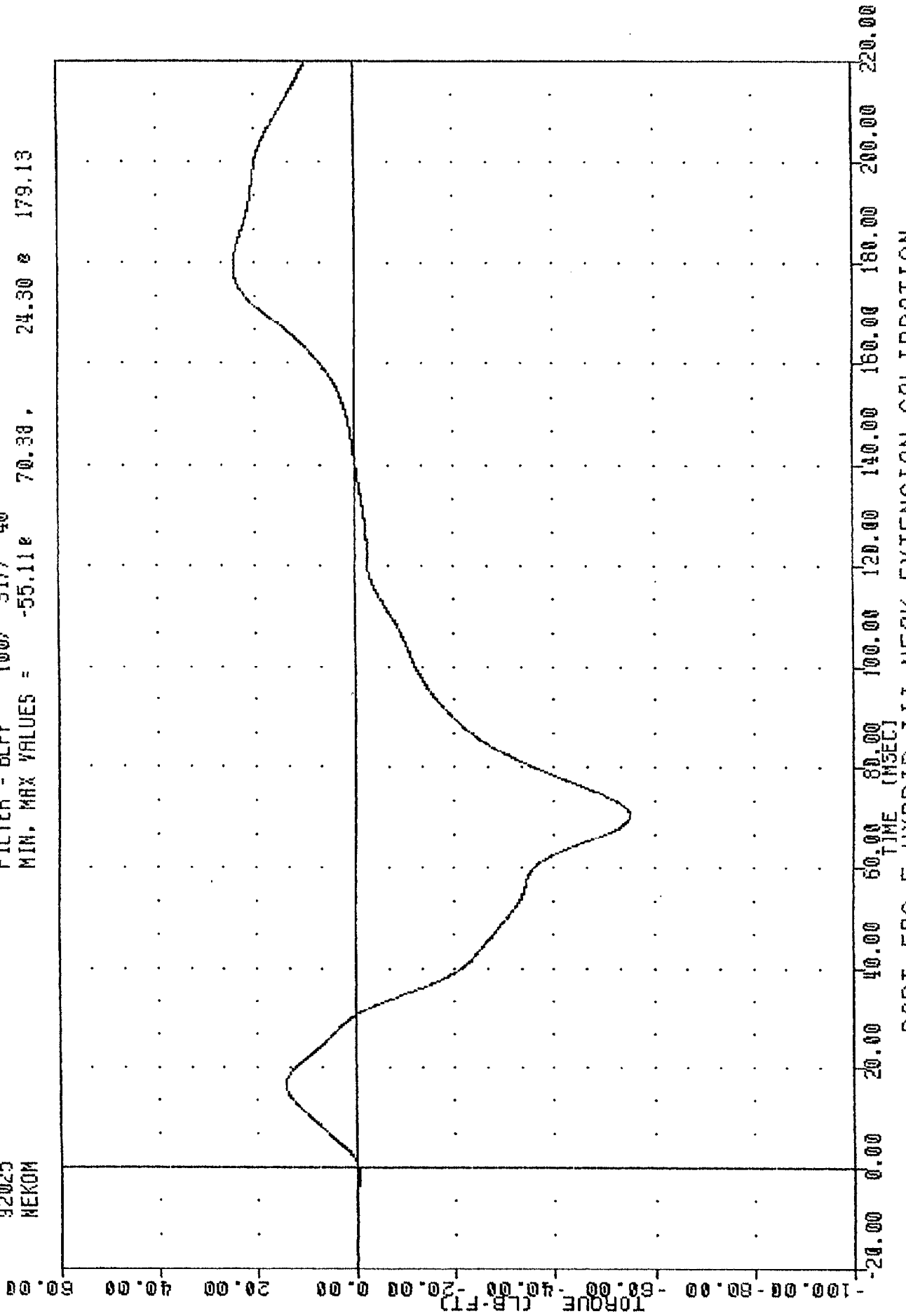
FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -47.52e 70.38, 21.78 e 178.25



PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
NECK MOMENT Y AXIS

TRC  
572E SN142 NECK EXT. CAL09  
92025  
NEKOM

FILTER = BLPP 100/ 317/ -40  
MIN. MAX VALUES = -55.11e 70.30 , 24.30 e 179.13



PART 572-E HYBRID III NECK EXTENSION CALIBRATION  
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

25-JAN-92

TRC

142C9TH1

572E SN142 H.S. THORAX CAL09

HIGH SPEED TEST		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	29.0 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.74 IN
MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1221.8 LBS
INTERNAL HYSTERESIS	69% - 85%	72.3%

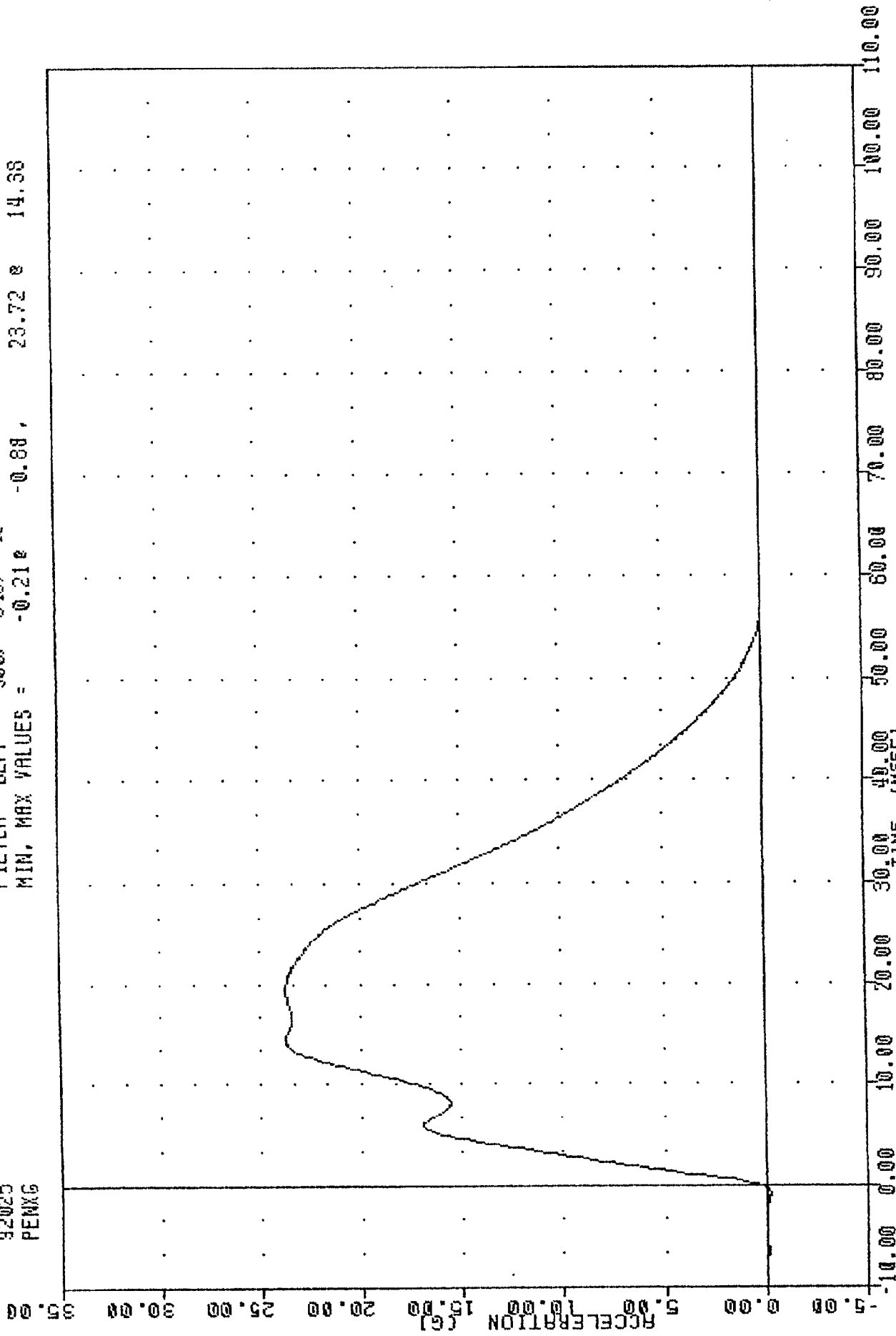
TEST MEETS SPECIFICATIONS

TECHNICIAN

*Chris Middleton*

TRC 142C9TH1  
572E SN142 H.5.THORAX CAL09  
92025  
PENXG

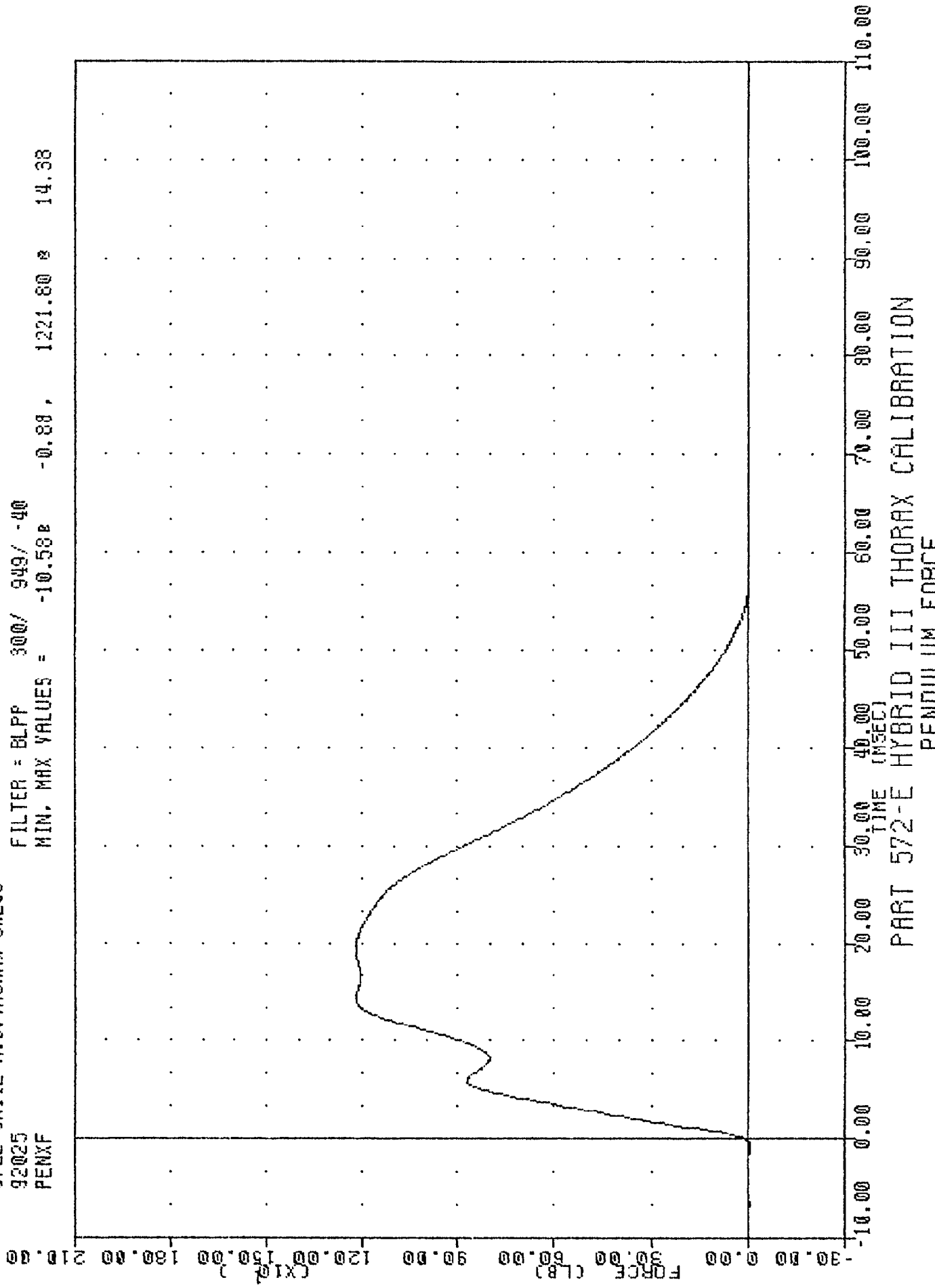
FILTER = BLPF 300/ 949/ -40  
MIN, MAX VALUES = -0.21e -0.88, 23.72 e 14.38



PART 572-E HYBRID III THORAX CALIBRATION  
PENXG

TRC  
 572E SN142 H.S. THORAX CAL09  
 92025  
 PENXF

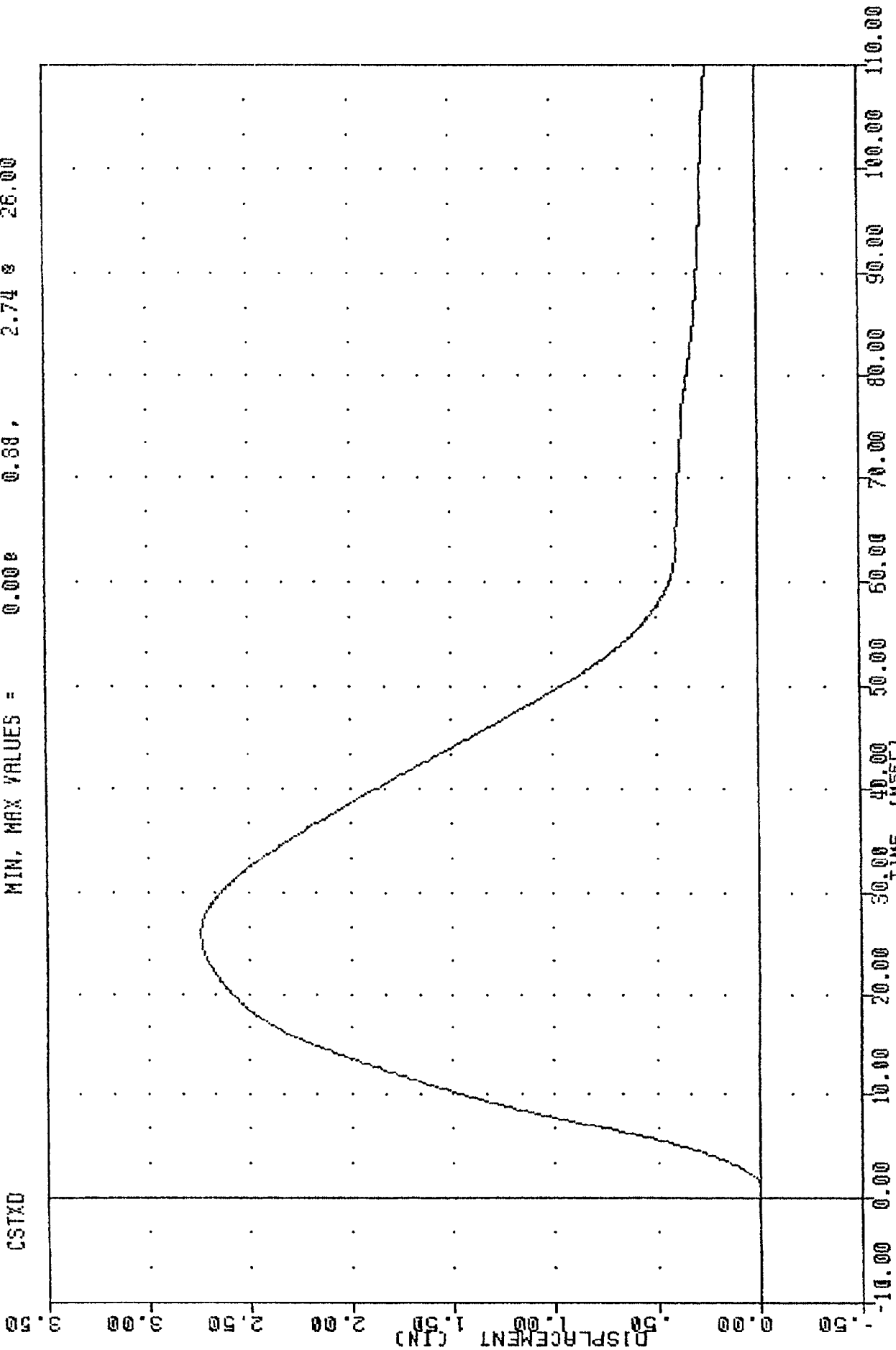
FILTER = BLPP 300/ 949/ -40  
 MIN. MAX VALUES = -10.58E -0.88, 1221.80 E 14.38



PART 572-E HYBRID III THORAX CALIBRATION  
 PENDULUM FORCE

TRC  
572E 3N142 H.S. THORAX CAL09  
92025  
CSTXD

FILTER = 6LPP 300/ 949/ -40  
MIN, MAX VALUES = 0.00e 2.74 e 26.00

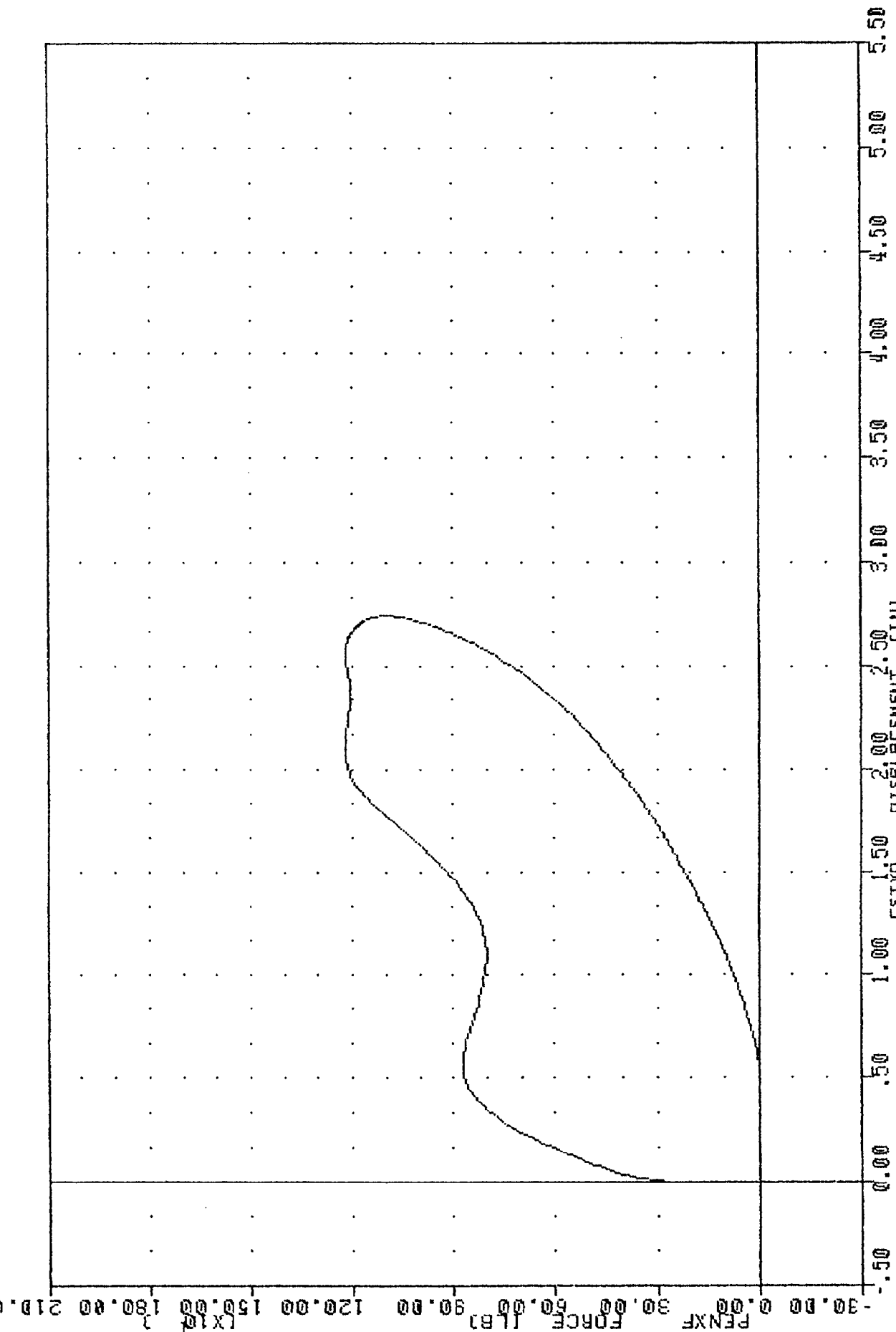


PART 572-E HYBRID III THORAX CALIBRATION  
TERMINUM SPACE

TRC  
 CSTXD  
 FILTER = BLPP  
 FILTER = BLPP

572E SN142 H.S. THORAX CAL09  
 300/ 949/ -40 MIN. MAX =  
 500/ 949/ -40

92025  
 0.00 %  
 -10.58 %  
 0.88 ;  
 -0.88 ;  
 2.74 %  
 1221.80 %  
 26.00  
 14.58



PART 572-E HYBRID III THORAX CALIBRATION  
 CHEST DISPLACEMENT VS PENDULUM FORCE

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

24-JAN-92

LEFT KNEE

TRC

142C9LK1

572E SN142 L.KNEE 11LB CAL 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	34.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1276.08 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

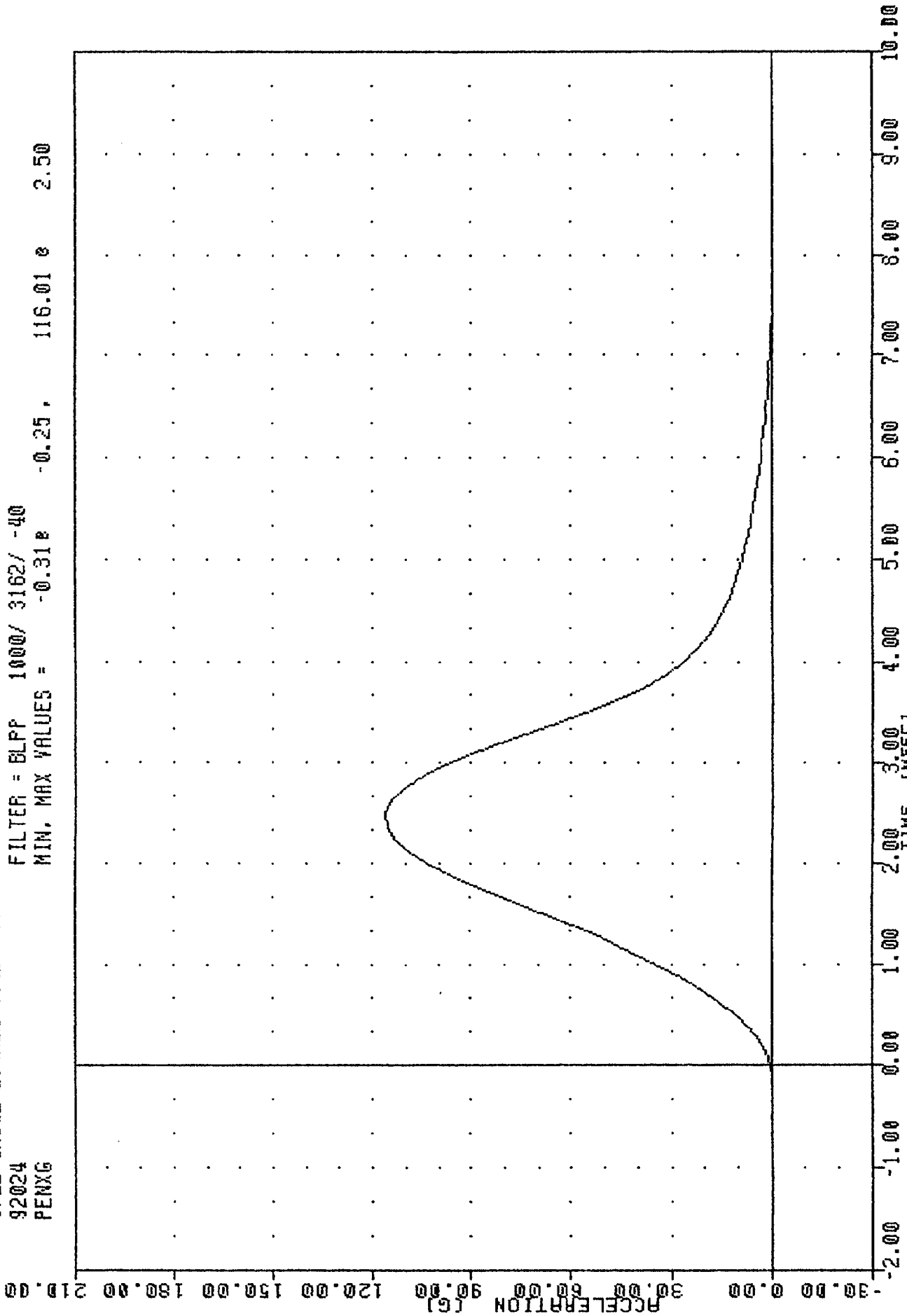
TECHNICIAN

*Chas. Middleton*

TRC  
572E SN142 L.KNEE 11LB CAL 09  
92024  
PENXG

, 14209LK1

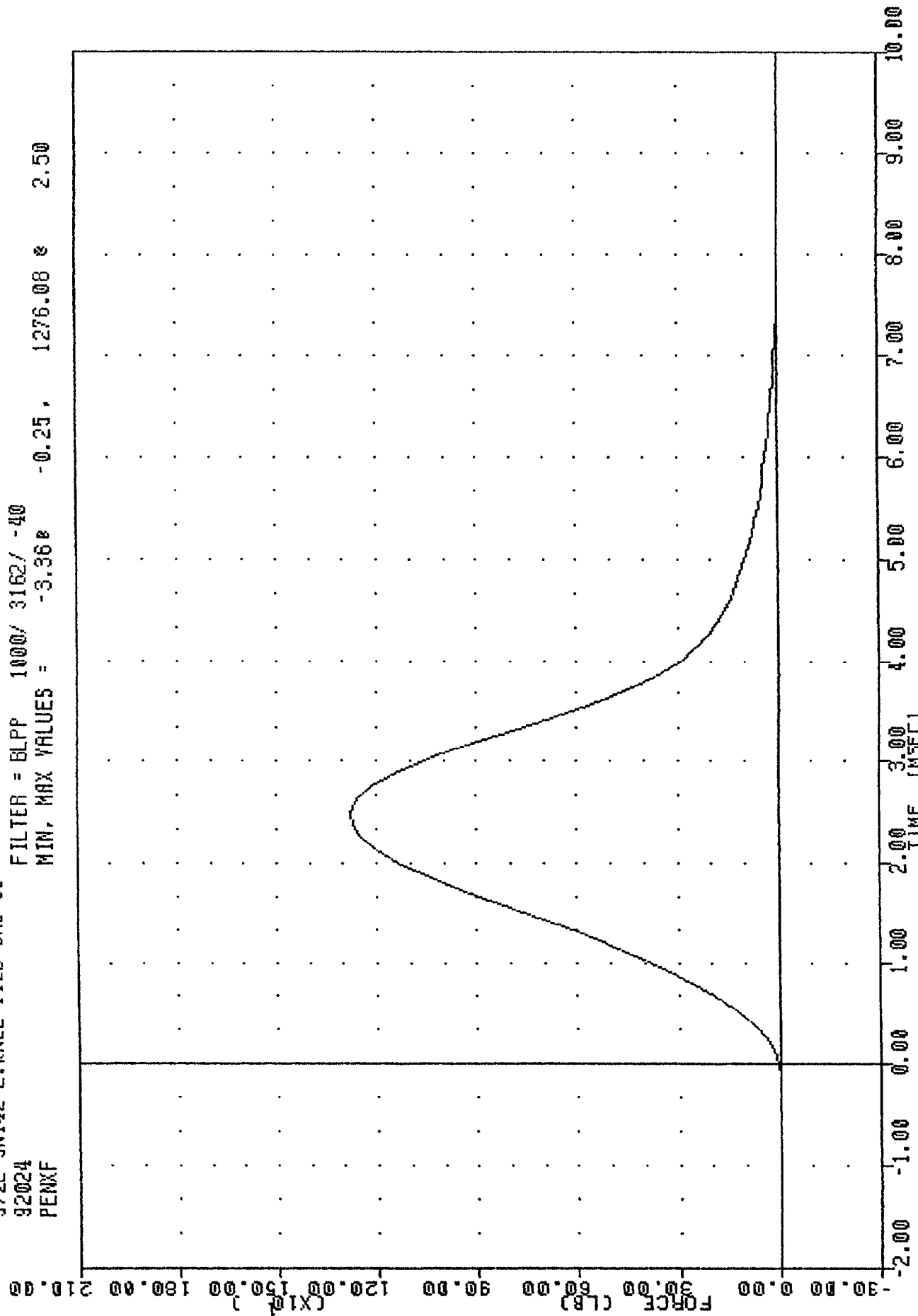
FILTER = BLPP 1000/ 3162/ -40  
MIN. MAX VALUES = -0.312 116.01 2.50



PART 572-E HYBRID III LEFT KNEE CALIBRATION  
PENDULUM DECELERATION (11 LB PEND.)

TRC , 142C9LK1  
572E SN142 L.KNEE 11LB CAL 09  
92024  
PENXF

FILTER = BLPP 1000/ 3162/ -40  
MIN, MAX VALUES = -3.368 -0.25, 1276.08 2.50



PART 572-E HYBRID III LEFT KNEE CALIBRATION  
PENNF. J

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

24-JAN-92

RIGHT KNEE

TRC

142C9RK1

572E SN142 R.KNEE 11LB CAL 09

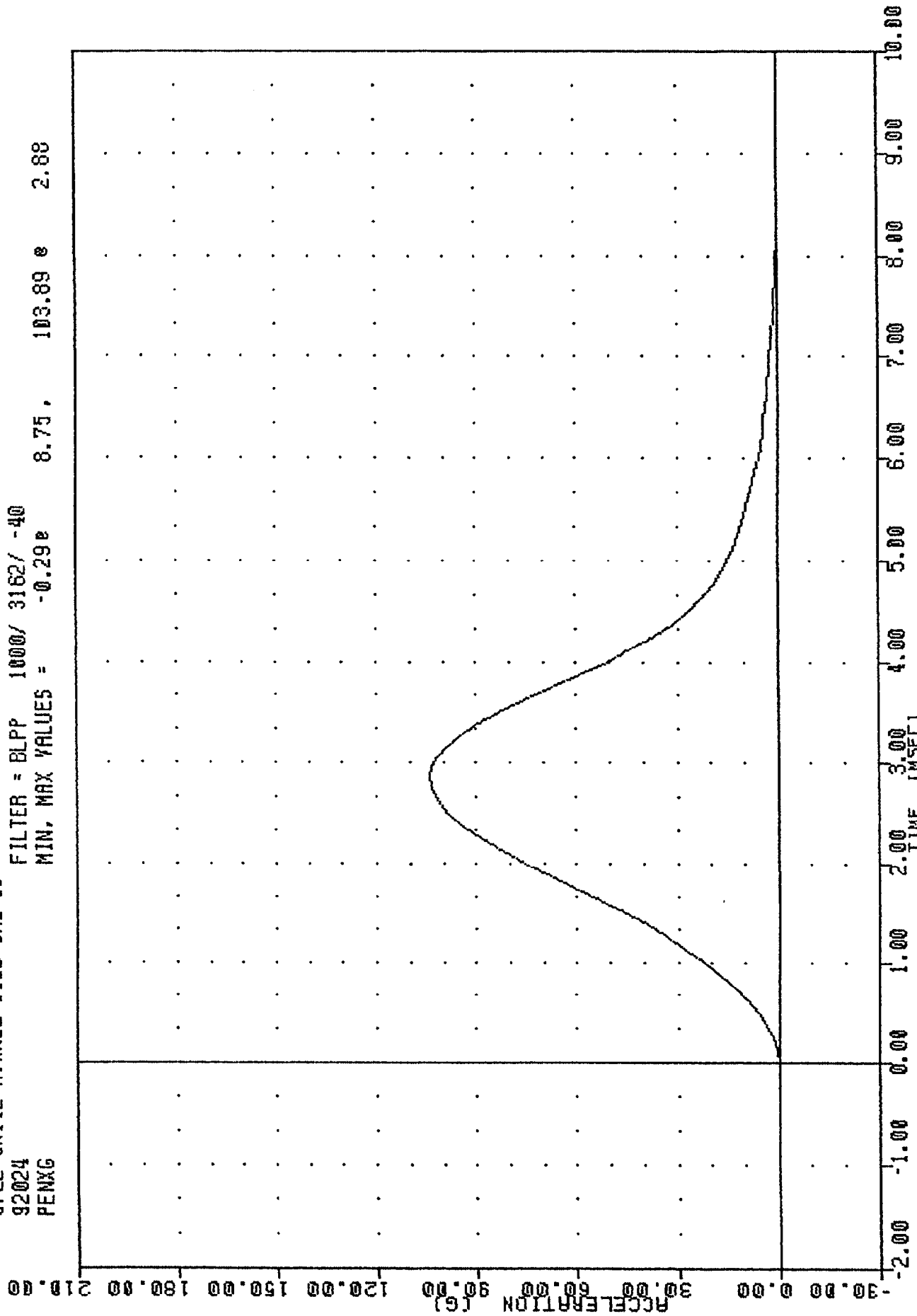
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.0 DEG. F
RELATIVE HUMIDITY	10% - 70%	34.0 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.97 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1142.78 LBS
PROBE WEIGHT	11.0 LBS	

TEST MEETS SPECIFICATIONS

TECHNICIAN *Chas Middleton*

TAC , 142C9RK1  
572E SN142 A.KNEE 11LB CAL 09  
92024  
PENXG

FILTER = BLPP 1000/ 3162/ -40  
MIN, MAX VALUES = -0.29e 8.75, 103.89 e 2.88



89-68

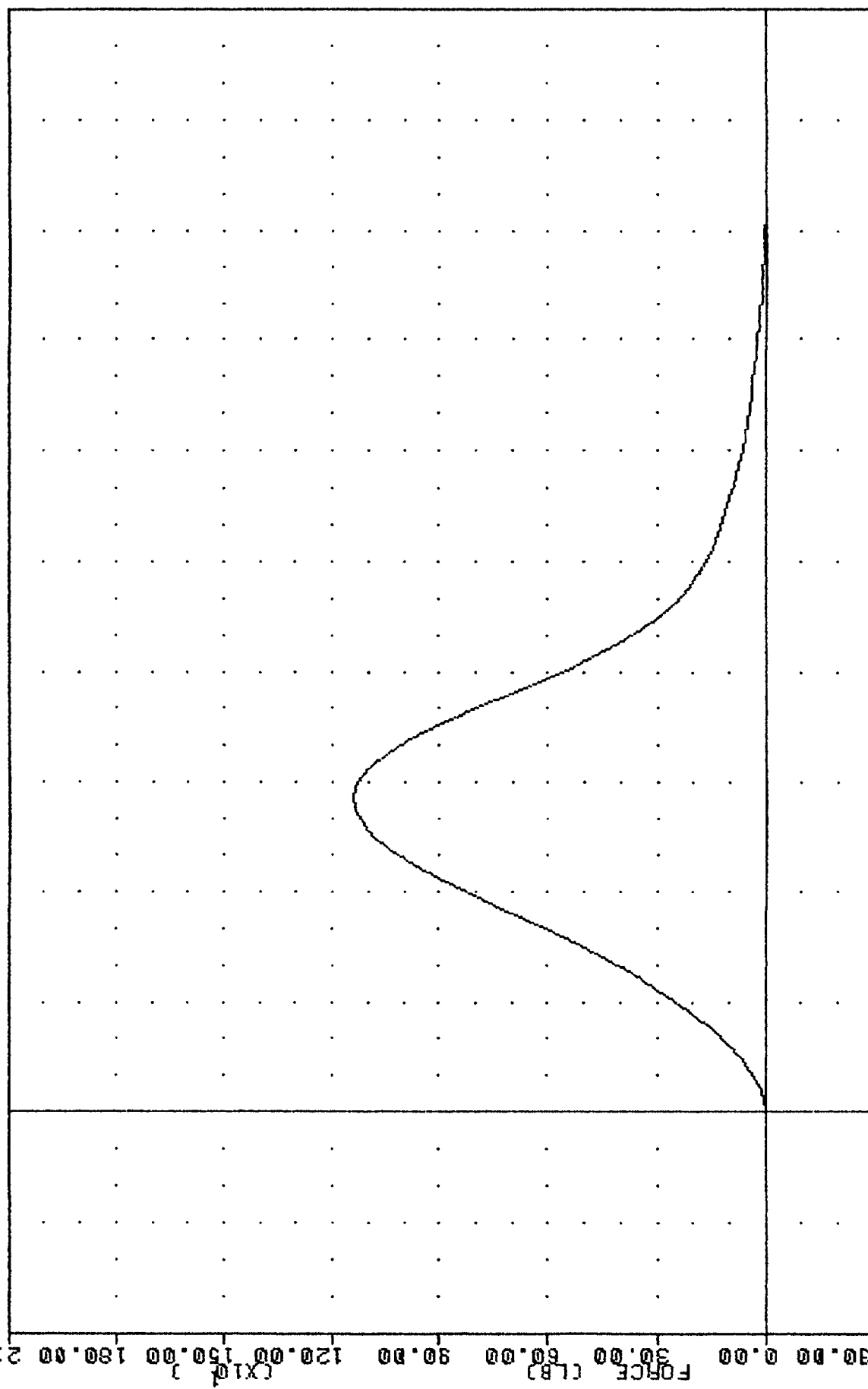
920316

PART 572-E HYBRID III RIGHT KNEE CALIBRATION  
PENXG DECELERATION (11 LB PENXG)

TRC  
572E SN142 R.KNEE 11LB CAL 09  
92024  
PENXF

FILTER = BLPP 1000/ 3162/ -40  
MIN. MAX VALUES = -3.23E 8.75, 1142.78 e 2.68

920316



PART 572-E HYBRID III RIGHT KNEE CALIBRATION  
PENDULUM FORCE (11 LB PEND.)

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUNNY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
HEAD X-AXIS ACCEL.	CY19H	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	DH74J	7264	ENDEVCO	11/07/91	05/07/92
Z-AXIS ACCEL.	AJ9FJ	7264	ENDEVCO	11/19/91	05/19/92
CHEST X-AXIS ACCEL.	DW04J	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	A91CJ	7264	ENDEVCO	11/22/91	05/22/92
Z-AXIS ACCEL.	DK56J	7264	ENDEVCO	11/07/91	05/07/92
LEFT FEMUR FORCE LOAD CELL	613	2430	GSE	11/06/91	05/06/92
RIGHT FEMUR FORCE LOAD CELL	827	2430	GSE	11/06/91	05/06/92
*NECK X-AXIS FORCE LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
Y-AXIS FORCE LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
X-AXIS FORCE LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
*NECK MOMENT ABOUT X-AXIS LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Y-AXIS LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Z-AXIS LOAD CELL	085	1716	DENTON	11/06/91	05/06/92
*CHEST DEFLECTION POTENTIOMETER	87313-96	81422A	VERNITECH	11/15/91	05/15/92
LAP BELT FORCE LOAD CELL	236	3419	LEBOW	10/19/91	04/19/92
SHOULDER BELT FORCE LOAD CELL	612	3419	LEBOW	11/20/91	05/20/92
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A12899	PT-101-40A	CELESCO	11/27/91	05/27/92
SHOULDER BELT STRETCH POTENTIOMETER	2087	2051414101	BOURNES	11/27/91	05/27/92

\*HYBRID III USE ONLY.

DUMMY INSTRUMENT CALIBRATIONS

PASSENGER DUMMY #142

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE LAST	DUE
HEAD X-AXIS ACCEL.	CR59H	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	CR99H	7264	ENDEVCO	11/07/91	05/07/92
Z-AXIS ACCEL.	CH44H	7264	ENDEVCO	11/07/91	05/07/92
CHEST X-AXIS ACCEL.	DA88H	7264	ENDEVCO	11/07/91	05/07/92
Y-AXIS ACCEL.	CL09H	7264	ENDEVCO	11/07/91	05/07/92
Z-AXIS ACCEL.	CH74H	7264	ENDEVCO	11/07/91	05/07/92
LEFT FEMUR FORCE LOAD CELL	829	2430	GSE	11/06/91	05/06/92
RIGHT FEMUR FORCE LOAD CELL	610	2430	GSE	11/06/91	05/06/92
*NECK X-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
Y-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
Z-AXIS FORCE LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
*NECK MOMENT ABOUT X-AXIS LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Y-AXIS LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
MOMENT ABOUT Z-AXIS LOAD CELL	0280	1716	DENTON	11/06/91	05/06/92
*CHEST DEFLECTION POTENTIOMETER	90320B	81422A	VERNITECH	11/15/91	05/15/92
LAP BELT FORCE LOAD CELL	610	3419	LEBOW	11/18/91	05/18/92
SHOULDER BELT FORCE LOAD CELL	A48391	3419	LEBOW	03/16/92	09/16/92
SHOULDER BELT SPOOL-OUT POTENTIOMETER	A48391	PT-101-40A	CELESCO	03/16/92	09/16/92
SHOULDER BELT STRETCH POTENTIOMETER	2690	2051414101	BOURNES	11/27/91	05/27/92

\*HYBRID III USE ONLY.

VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

VEHICLE ACCELEROMETERS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
LEFT SEAT REAR CROSSMEMBER X-AXIS	CK87H	7264	ENDEVCO	01/15/92	07/15/92
RIGHT REAR SEAT CROSSMEMBER X-AXIS	CG67H	7264	ENDEVCO	12/16/91	06/16/92
ENGINE TOP X-AXIS	CH24H	7264	ENDEVCO	12/02/91	06/02/92
ENGINE BOTTOM X-AXIS	CJ21J	7264	ENDEVCO	12/02/91	06/02/92
RIGHT BRAKE CALIPER X-AXIS	CJ30H	7264	ENDEVCO	12/18/91	06/18/92
LEFT BRAKE CALIPER X-AXIS	CC02H	7264	ENDEVCO	01/15/92	07/15/92
INSTRUMENT PANEL CENTER X-AXIS	CR83H	7264	ENDEVCO	12/18/91	06/18/92
REAR SEAT CROSSMEMBER CENTER Z-AXIS	CJ37H	7264	ENDEVCO	01/15/92	07/15/92
VEHICLE REAR CENTER Z-AXIS	CK16H	7264	ENDEVCO	01/12/92	07/12/92

CALIBRATION LABORATORY INSTRUMENTS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE	
				LAST	DUE
NECK BENDING PENDULUM ACCEL.	CC59	7232	ENDEVCO	10/08/91	04/08/92
NECK BENDING ROTARY POTENTIOMETER	NA	35435-1-102	BOURNES	MFR. SPECIFICATION	
NECK BENDING LINEAR POTENTIOMETER	NA	5184-2051846003	BOURNES	10/08/91	04/08/92
THORAX/HYBRID II FEMUR PEND. ACCEL.	CC64	7232	ENDEVCO	10/08/91	04/08/92
LUMBAR FLEXION FORCE GAUGE	NA	DPPH-50	CHATILLON	05/03/89	REPAIRED
LUMBAR FLEXION ROTATION GAUGE	CP17-0601-1	7020	HUMPHREY	MFR. SPECIFICATION	
ABDOMEN COMPRESSION DISPL. GAUGE	4075-172	80294-2051941504	BOURNES	10/08/91	04/08/92
ABDOMEN COMPRESSION FORCE GAUGE	1261	3167	LEBOW	10/08/91	04/08/92
HYBRID III FEMUR PEND. ACCEL.	CG83	7232	ENDEVCO	10/08/91	04/08/92

SIGN CONVENTION  
NHTSA DATA TAPE REFERENCE GUIDE

ACCELEROMETERS:

+X: FORWARD  
+Y: LEFTWARD  
+Z: UPWARD

POTENTIOMETERS:

+CHEST LONGITUDINAL DEFLECTION: OUTWARD  
+CHEST LATERAL DEFLECTION: LEFTWARD  
+SEAT BELT DISPLACEMENT: OUTWARD  
+SEAT BELT EXTENSION: ENLONGATION  
+KNEE SLIDER DISPLACEMENT: DISTANCE BETWEEN FEMUR AND  
TIBIA INCREASED (IN RELATION  
TO A SEATED DUMMY)

LOAD CELLS:

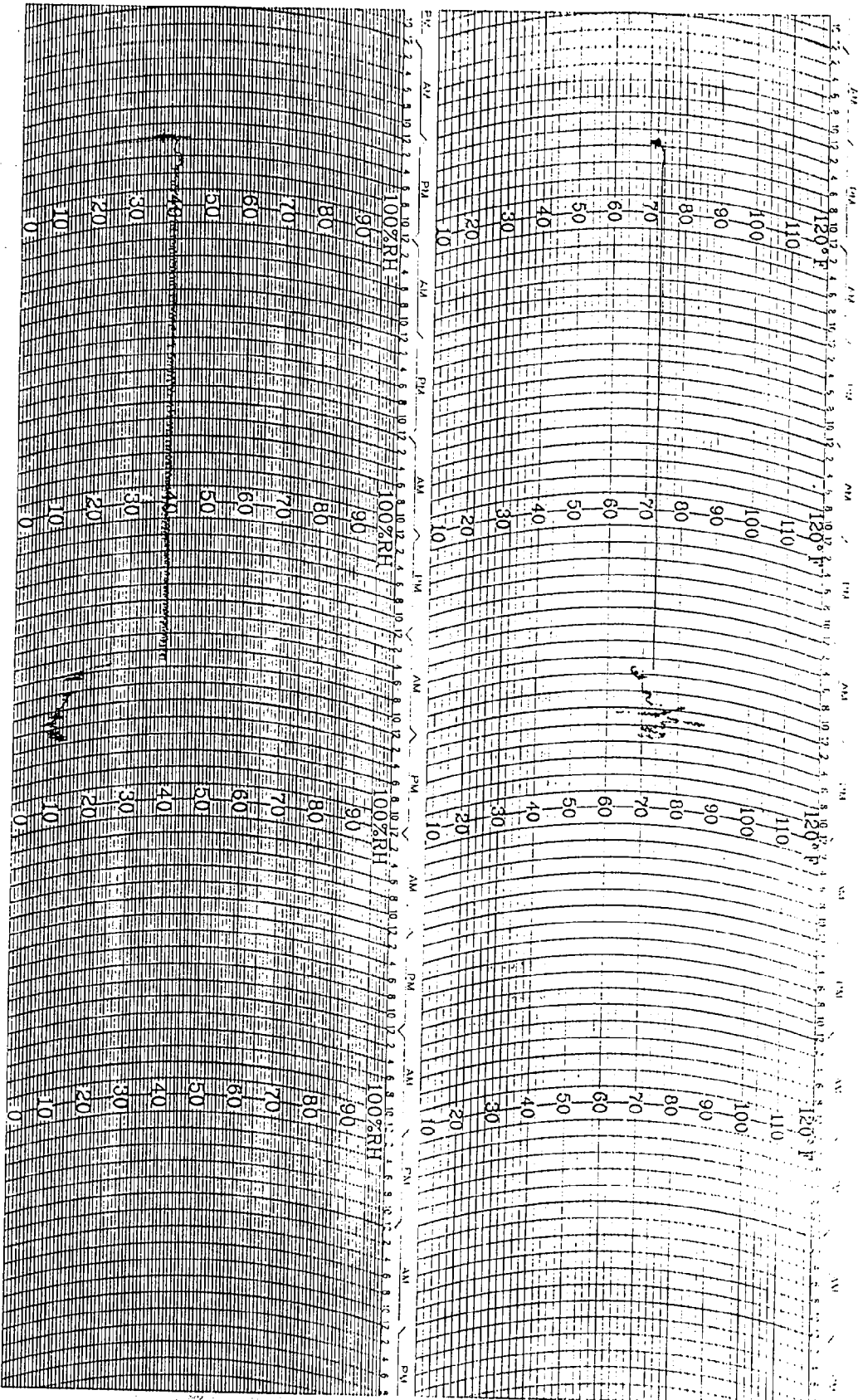
+FEMUR FORCE: TENSION  
+SEAT BELT FORCE: TENSION  
+BARRIER FORCE: TENSION

NECK LOAD CELLS:

+X FORCE: HEAD PUSHED FORWARD  
+Y FORCE: HEAD PUSHED LEFTWARD  
+Z FORCE: HEAD PULLED UPWARD (TENSION ON NECK)  
+X MOMENT: RIGHT EAR ROTATING TOWARD RIGHT SHOULDER  
+Y MOMENT: CHIN ROTATING TOWARD CHEST  
+Z MOMENT: CHIN ROTATING TOWARD LEFT SHOULDER

TIBIA LOAD CELLS:

+X FORCE: TENSION  
+Y FORCE: TENSION  
+Z FORCE: TENSION  
+X MOMENT: BOTTOM OF TIBIA MOVING LEFTWARD  
+Y MOMENT: BOTTOM OF TIBIA MOVING REARWARD



**WeatherMeasure**  
**WEATHERtronics**  
 Division of QUALICORP, Inc.

P.O. BOX 41079  
 SACRAMENTO, CA 95841  
 TELEPHONE: (916) 481-7565

HYGRO-THERMOGRAPH  
 7 DAY

CHART NO. M00194  
 625-N-118  
 ESN 2563

0001 STATION

DATE ON

DATE OFF

FREQUENCY RESPONSE CLASSES

SAE J211 OCT88

TYPICAL TEST MEASUREMENTS

CHANNEL CLASS

Vehicle Structural Accelerations for use in:

Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	180
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Headform Accelerations	1000

APPENDIX E

RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

*Under some conditions, driving with the rear vented windows and/or doors open can permit exhaust fumes to enter the vehicle. As a precaution against carbon monoxide gas, the rear vented windows and doors should be closed whenever the vehicle is operated. If it is necessary to drive with the rear windows and/or doors open, the following precautions should be observed:*

- (a) Close all other windows and adjust heating or cooling system to force outside air into the vehicle by setting the controls in any position except OFF or MAX A/C.*
- (b) Or bring outside air into the vehicle by the side panel air inlets, or fully open door vent windows as far as they will go to force outside air into the front of the vehicle. A partially-open vent window will increase the possibility of entrance of exhaust fumes through the rear vented window openings.*

**Note:** *If passengers are riding in the rear area, the rear vented windows and/or doors should be fully closed at all times.*

#### **Occupant Restraints**

One of the most important safety features in your vehicle is the restraint system. This system includes the front and rear seat belts. Your seat belts can also be used to hold infant and child restraint systems if you will be carrying children too small for adult-size belts.

Please pay close attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

**WARNING:** *In a collision you and your passengers can suffer much greater injuries if you are not properly buckled up. You can strike parts of the inside of the vehicle or other passengers, or you can*

*be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.*

Buckle up even though you are an excellent driver. Even on short trips. Someone else on the road may be a poor driver and cause a collision which involves you. And this can happen far from home or on your own street.

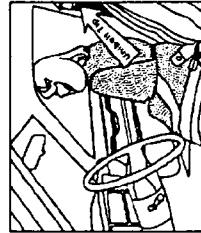
Research has shown that safety belts save lives. And they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Safety belts provide protection against that, and they reduce the risk of injury caused by striking the inside of the vehicle. Everyone in a motor vehicle needs to be buckled up all the time.

### Unibelts

The outboard front and rear seats of your vehicle have combination lap/shoulder belts, or unibelts. The retractor is designed to lock during very sudden stops or impacts. The retractors will also lock if the belt webbing is jerked or pulled rapidly. This feature allows the shoulder part of the belt to move freely with you under normal conditions. But in a collision, the belt will lock and reduce the risk of your striking the inside of the vehicle or being thrown out.

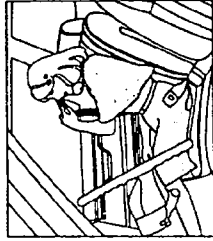
### Seat Belt Operating Instructions

1. Enter the vehicle and close the door. Sit back and adjust the seat.

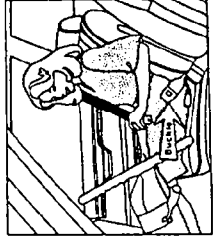


1

2. The latch plate of the belt is above the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.



3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a "click."



**WARNING:** A belt buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.

### WARNING:

- A belt that is too loose will not protect you as well. In a sudden stop you could move too far forward, increasing the possibility of injury. Wear your safety belt snugly.
- A shoulder belt worn under your arm is very dangerous. Your body could fall into the inside surfaces of the vehicle in a crash, increasing head and neck injury. And a belt worn under the arm is very likely to break your

ribs. *Ribs aren't as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.*



4

4. Position the lap belt across your thigh, below your abdomen. If you need the lap portion tighter, pull up a bit on the shoulder part, as shown. A snug belt reduces the risk of sliding under the belt in a collision.

**WARNING:** A lap belt worn too high can increase the risk of internal injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap part of your safety belt as low as possible, and keep it snug.



5

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.

**WARNING:** A twisted belt can't do its job as well. In a collision it could even cut into you. Be sure your belt is not twisted. If your belt can't be untwisted, take it to your dealer and have it fixed.

6. To release the belt, push the red button marked "Press" on the buckle. The belt will automatically retract to its stowed position.

If necessary, slide the latch plate down the webbing to allow the belt to retract fully.

**WARNING:** A frayed or torn belt could rip apart in a collision. It could leave you with no protection. Inspect your belts periodically, checking for cuts, frays, and loose parts. If you have been in a collision, have the belts checked, even though they may not show signs of damage. Have any damaged belt replaced.

### Rear Center Lap Belts

Rear center seating positions have a lap belt only.

To fasten a lap belt, slip the latch plate into the buckle. To lengthen the lap belt, tilt the latch plate and pull. To shorten the belt, pull the loose end of the webbing.

Wear the lap belt snug against the hips. Sit back and erect in the seat, then adjust the belt as tightly as is comfortable.

**WARNING:** A lap belt worn too loose or too high is dangerous.

- A belt worn too loose can allow you to slip down and under the belt in a collision.
- A belt that is too high will apply crash forces to the abdomen, not to the stronger hip bones.

In either case, the risk of internal injuries is greater. Wear a lap belt low and snug.

**WARNING:** Belting two people into one seat belt can lead to greater injury. People belted together can crash into one

*another in an accident, hurting one another badly. Never use a belt for more than one person, no matter what their size.*

#### **Seat Belts and Pregnant Women**

We recommend that pregnant women use seat belts throughout their pregnancies. Keeping the mother safe is the best way to keep the baby safe.

Pregnant women should wear the lap part of the belt across the thighs and as snug against the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

#### **Seat Belt Extender**

If a seat belt is too short, even when fully extended, your dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough.

When it is not required, remove the extender and stow it. Use of the extender when it is not needed may defeat the seat belt locking mechanism.

#### **Child Restraint**

When we say that everyone in your vehicle needs to be buckled up all the time, we mean babies and children, too.

**WARNING:** *In a collision, an unrestrained child, even a tiny baby, can become a missile inside the vehicle. The force required to hold even an infant on your lap can become so great that you could not hold the child, no matter how strong you are. The child and others could be badly injured. Any child riding*