

DOT 1118

VEHICLE BARRIER IMPACT TESTING
WITH HYBRID III DUMMIES IN A
1987 FORD ESCORT 5-DOOR HATCHBACK

PREPARED BY:
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TEST REPORT
DECEMBER 1987 - JANUARY 1988

PREPARED FOR:
U.S DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
400 SEVENTH STREET, S.W.
WASHINGTON, DC 20590

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16. Abstract A 30 mph flat frontal barrier impact test was conducted on a 1987 Ford Escort 5-door hatchback at the Transportation Research Center of Ohio on December 16, 1987, using Hybrid III driver and passenger dummies. The barrier impact velocity was 29.5 mph. The ambient temperature was 62°F.			
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METRIC CONVERSION FACTORS

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

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

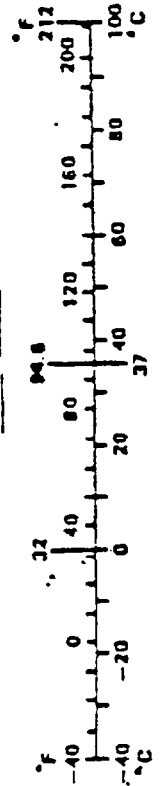


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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

This 30 mph frontal barrier impact test is part of a program to document the response of Hybrid III occupant dummies conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center of Ohio (TRC) under Contract No. DTNH22-85-C-08123. The purpose of this test was to determine Hybrid III dummy response in the subject vehicle, a 1987 Ford Escort 5-door hatchback. The test was conducted in accordance with the FMVSS 208 portions of the Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-06 dated May 15, 1987, except for the use of Hybrid III dummies in place of Part 572 B dummies.

TEST SUMMARY

The 1987 Ford Escort 5-door hatchback was equipped with a 1.6 liter transverse engine, manual transmission, and power brakes. The test weight of the vehicle was 2822 pounds. The Head Injury Criteria (HIC) calculations were less than 1000, the resultant accelerations of the thorax did not exceed 60 g's, and the compressive forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Hybrid III dummies seated in the driver's and right front passenger's seats.

Two Hybrid III, 50th percentile, adult male anthropomorphic test devices (ATDs) were seated in the front outboard designated seating positions. The dummies were positioned according to the dummy placement procedures specified in FMVSS 208 Notice 45.

Both ATDs were instrumented with head and chest triaxial accelerometers oriented to measure accelerations in the longitudinal, lateral, and vertical directions, a chest displacement potentiometer, right and left femur load cells, and neck load cells oriented to measure longitudinal and vertical forces and moment about the lateral axis.

The vehicle was instrumented with seven longitudinal axis accelerometers. Seat belt load cells were installed on each occupant's passive seatbelt.

The crash event was recorded by one (1) real time panning camera and fourteen (14) high speed motion picture cameras operating at approximately 500 frames per second.

The thirty-three (33) channels of data were multiplexed and recorded on a 14-track tape drive. The data was digitally sampled at 8000 samples per second digitally processed per sections 12.8 and 12.9 of the laboratory procedure.

The vehicle was impacted into the rigid, flat frontal barrier at the Transportation Research Center of Ohio on December 16, 1987. The test vehicle's impact speed was 29.5 mph. The vehicle sustained 19.1 inches of static crush.

The camera information is presented in Section 3.0. Appendix A contains the still photographic prints. Appendix B contains the vehicle and dummy data plots. Appendix C contains the pre-test and post-test dummy performance calibrations.

CRASH TEST SUMMARY

TEST NO.: 871216

DATE: December 16, 1987

TIME: 1338 TEMP: 62°F

VEHICLE: 1987 Ford Escort 5-door Hatchback

TEST WEIGHT (LBS): 2822

IMPACT ANGLE (DEG)*: 0

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

MAX CRUSH (IN) STATIC: 19.1

REBOUND (IN): 24.8

DUMMIES: Driver Passenger

TYPE: Hybrid III Hybrid III

LOCATION: Front Left Front Right

RESTRAINT: Two-point passive belt Two-point passive belt

NUMBER OF DATA CHANNELS: 33

NUMBER OF HIGH SPEED CAMERAS: 14 and 1 real-time camera

*With respect to tow track centerline.

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

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford Escort

VIN: 1FAPP2598HT183919

BODY STYLE: 5-door hatchback

MODEL YEAR: 1987

COLOR: Black

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

X Gas, DIESEL, TURBOCHARGE

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

DATA VEHICLE RECEIVED: 12/8/87

ODOMETER READING: 151

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING No

POWER BRAKES Yes

POWER SEATS No

POWER WINDOWS No

TINTED GLASS Yes

RADIO No

CLOCK Yes

OTHER None

AUTOMATIC TRANSMISSION No

AUTOMATIC SPEED CONTROL No

TILTING STEERING WHEEL No

TELESCOPING STEERING WHEEL No

AIR CONDITIONING No

ANTI-SKID BRAKE No

REAR WINDOW DEFROSTER Yes

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 6/87

GVWR: 3165 LBS.

GAWR: FRONT 1811 LBS., REAR 1547 LBS.

TEST VEHICLE INFORMATION, CONTINUED

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 30 psi; REAR 30 psi

RECOMMENDED TIRE SIZE: P165/80R13 LOAD RANGE X B, C, D

TIRES ON VEHICLE (MFG. & LINE, SIZE): Goodyear Corsa GT P165/80R13

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

VEHICLE CAPACITY: TYPES OF SEATS: Front bucket
Rear bench

TYPE OF FRONT SEAT BACKS Manual Adjustable

NUMBER OF OCCUPANTS 2 FRONT 2 REAR 4 TOTAL

CARGO LOAD 150 LBS. TOTAL 750 LBS.

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

RIGHT FRONT 706 lbs. RIGHT REAR 455 lbs.

LEFT FRONT 732 lbs. LEFT REAR 458 lbs.

TOTAL FRONT WEIGHT 1,438 lbs. (61.2% OF TOTAL VEHICLE WEIGHT)

TOTAL REAR WEIGHT 913 lbs. (38.8% OF TOTAL VEHICLE WEIGHT)

TOTAL DELIVERED WEIGHT 2,351 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

RCLW + RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (2351 LBS)

VCW = VEHICLE CAPACITY WEIGHT (750 LBS)

DSC = DESIGNATED SEATING CAPACITY (4)

RCLW = VCW - (150) (DCS) = (150 LBS)

TARGET TEST WEIGHT = UDW + RCLW + (2 DUMMIES X 167 LBS/DUMMY)

= 2351 + 150 + 334 LBS

TARGET TEST WEIGHT = 2835 LBS

TEST VEHICLE INFORMATION, CONTINUED

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 137 LBS. CARGO:

RIGHT FRONT 749 lbs. RIGHT REAR 626 lbs.

LEFT FRONT 790 lbs. LEFT REAR 657 lbs.

TOTAL FRONT WEIGHT 1,539 lbs. (54.5% OF TOTAL VEHICLE WEIGHT)

TOTAL REAR WEIGHT 1,283 lbs. (45.5% OF TOTAL VEHICLE WEIGHT)

TOTAL TEST WEIGHT 2,822 lbs. (0.5% UNDER TARGET WEIGHT)

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 0 lbs.

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES): NONE

DELIVERED ATTITUDE: LF 26.2; RF 26.8; LR 25.4; RR 25.2

PRE-TEST ATTITUDE: LF 25.7; RF 26.4; LR 23.2; RR 23.3

POST-TEST ATTITUDE: LF 27.9; RF 30.0; LR 22.6; RR 22.8

WHEELBASE: 93.8 INCHES

MAX. WIDTH: 64.2 INCHES

CG = 42.6 INCHES REARWARD OF FRONT WHEEL CENTERLINE

TEST VEHICLE INFORMATION, CONTINUED

TEST CONDITIONS

TEST NUMBER: 871216

DATE OF TEST: 12/16/87

TIME OF TEST: 1338

TYPE OF TEST: Frontal Barrier Impact

IMPACT ANGLE: 0°

AMBIENT TEMPERATURE AT IMPACT AREA:

62°F

TEMPERATURE IN OCCUPANT COMPARTMENT:

70°F

DRIVER TEMPERATURE:

70°F

PASSENGER TEMPERATURE:

70°F

IMPACT VELOCITY: PRIMARY = 29.5 MPH

SECONDARY = 29.4 MPH

(SPECIFIED RANGE = 28.9 to 29.9 MPH)

VEHICLE REBOUND AND CRUSH (ALL DIMENSIONS IN INCHES)

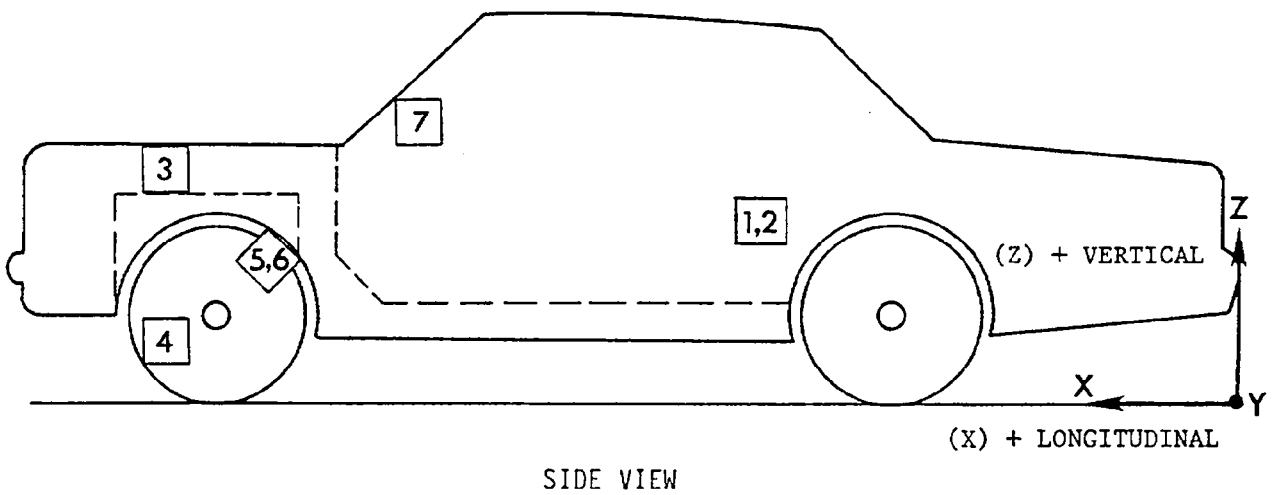
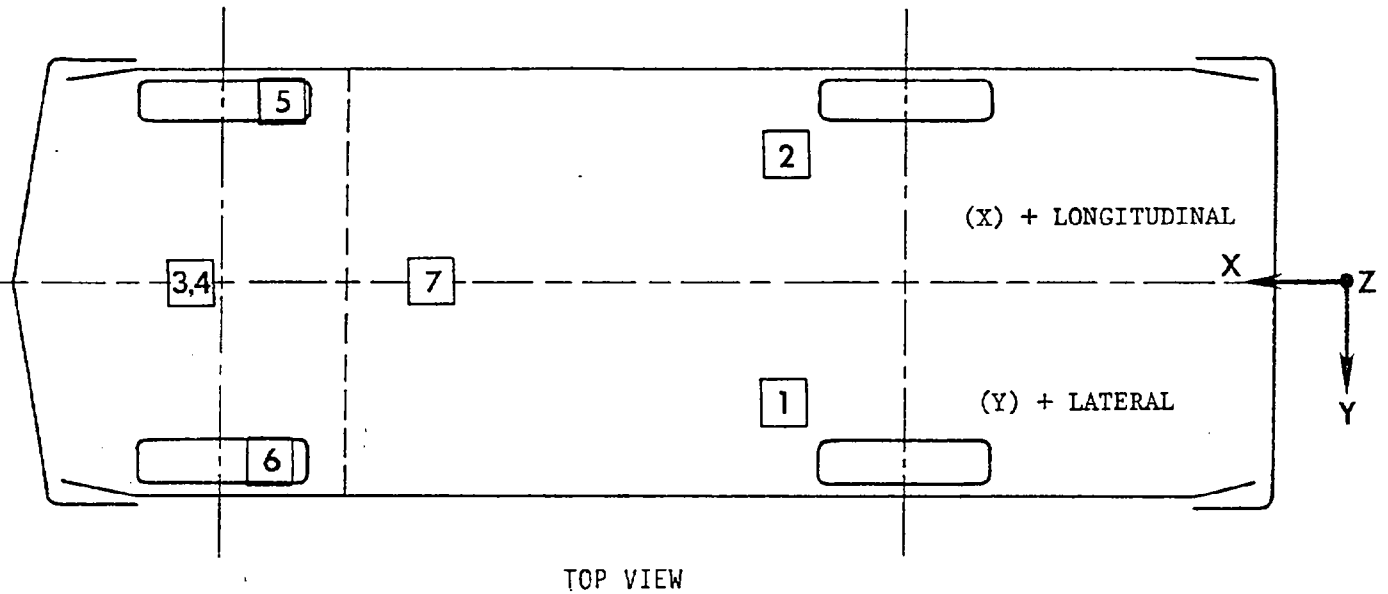
OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 165.1 ;C 168.8 ;R 166.0

POST-TEST: L 147.4 ;C 149.7 ;R 149.6

TOTAL CRUSH: L 17.7 ;C 19.1 ;R 16.4

FOR FRONTAL IMPACT, DISTANCE FROM FRONT OF TEST VEHICLE TO BARRIER AFTER
IMPACT: L: 25.2 ;C: 24.8 ;R: 24.4 :AVG: 24.8

VEHICLE ACCELEROMETER LOCATIONS



TEST NUMBER 871216

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

No.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
						MAX G	MSEC	MAX G	MSEC
1	REAR SEAT CROSSMEMBER AT LEFT SIDE LONGITUDINAL	PRE	63.8	20.8	12.2				
		POST	63.8	20.8	12.5				
						1.3	114.4	27.5	50.5
2	REAR SEAT CROSSMEMBER AT RIGHT SIDE LONGITUDINAL	PRE	63.6	-21.8	12.2				
		POST	63.6	-21.8	12.6				
						1.7	135.0	26.9	54.8
3	TOP OF ENGINE BLOCK LONGITUDINAL	PRE	139.1	0.0	31.4				
		POST	136.3	0.5	30.0				
						18.7	58.5	89.9	38.0
4	BOTTOM OF ENGINE LONGITUDINAL	PRE	139.3	5.2	8.5				
		POST	135.9	4.4	6.9				
						24.6	53.0	82.8	33.3
5	BRAKE CALIPER AT RIGHT SIDE LONGITUDINAL	PRE	135.8	-25.8	8.0				
		POST	132.2	-26.5	7.6				
						25.6	50.3	71.2	29.0
6	BRAKE CALIPER AT LEFT SIDE LONGITUDINAL	PRE	135.9	25.8	8.5				
		POST	132.4	28.2	7.4				
						32.2	53.3	73.5	34.4
7	DASH PANEL LONGITUDINAL	PRE	105.5	-1.0	36.4				
		POST	105.2	-1.0	37.4				
						10.1	113.8	65.9	80.4

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

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

ACCIDENT INVESTIGATION DIVISION DATA

FOR 30 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Ford Escort 5-door Hatchback

VEH. NHTSA NO.: _____; VIN: 1FAPP2598HT183919

MODEL YEAR: 1987; BUILD DATE: 6/87; TEST DATE 12/16/87

VEH. SIZE CATEGORY: Compact; TEST WEIGHT: 2822

VEH. WHEELBASE: 93.8 FRONT OVERHAND: 35.9 MAX. WIDTH: 64.2

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE: 12FDEW2

F (Frontal)

CRUSH DEPTH
DIMENSIONS:

C1 = 17.7 inches

C2 = 17.9 inches

C3 = 18.3 inches

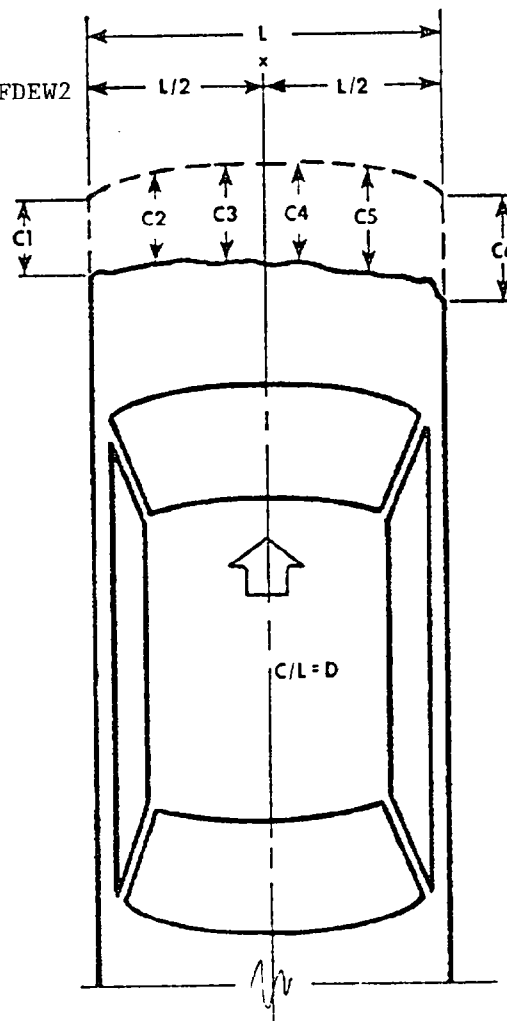
C4 = 18.5 inches

C5 = 17.9 inches

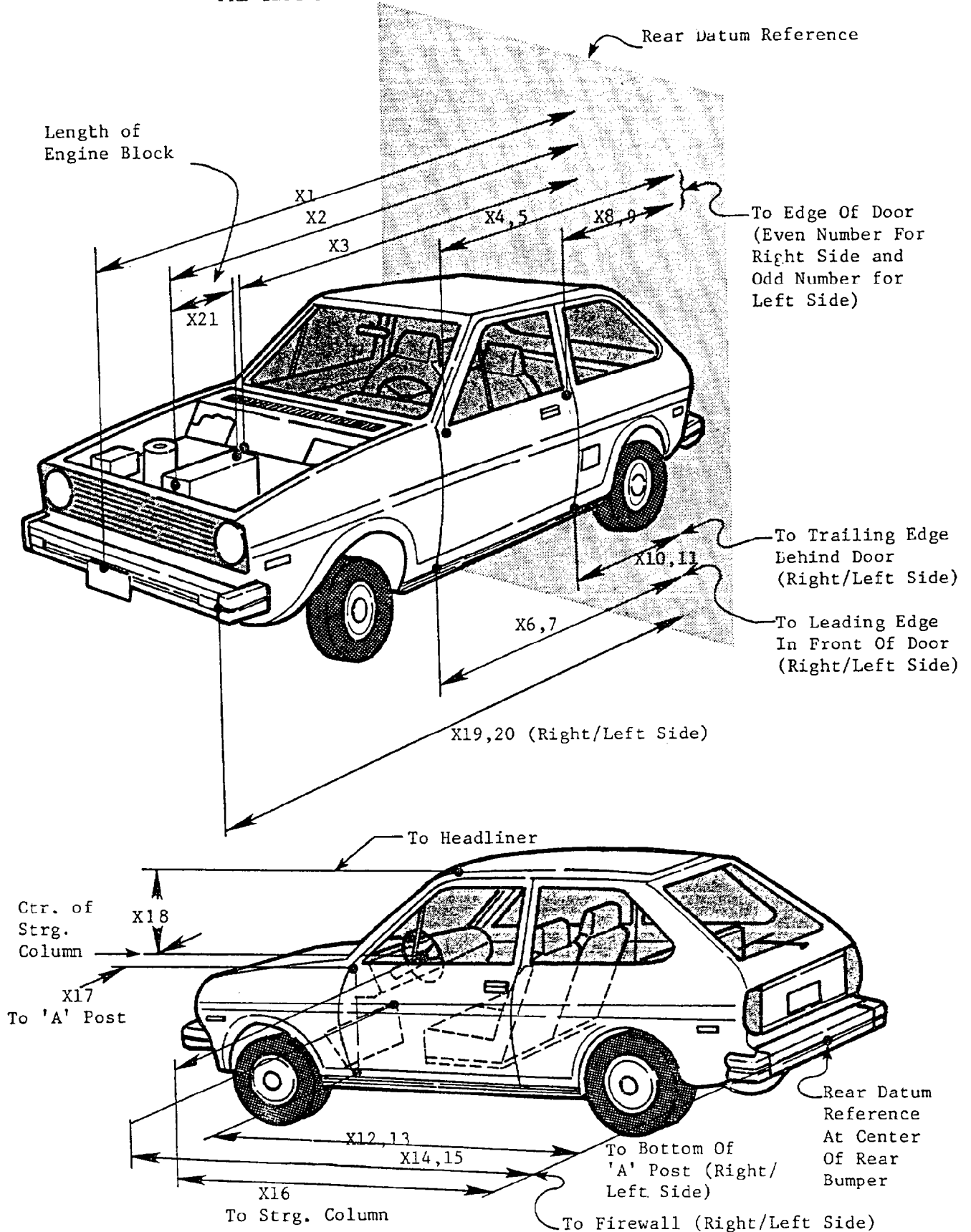
C6 = 16.4 inches

MIDPOINT OF DAMAGE: D = Vehicle Centerline
(Longitudinal)

LENGTH OF DAMAGED
REGION: L = 56.2 inches



PRE-TEST AND POST-TEST MEASUREMENT POINTS



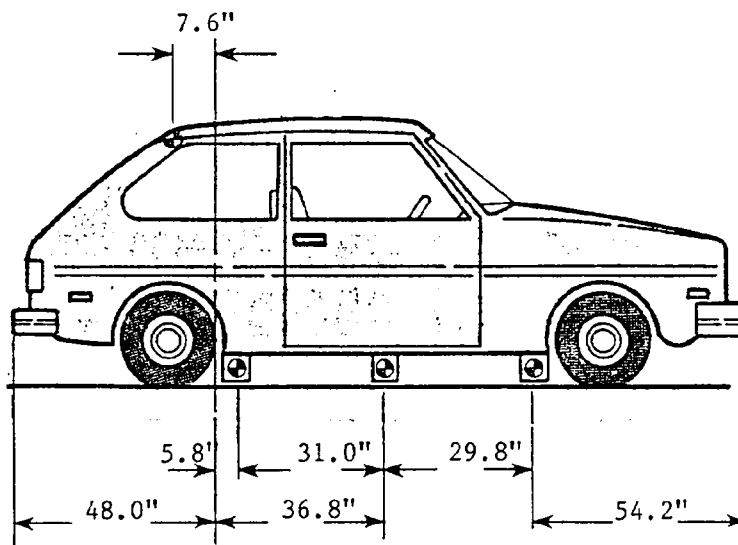
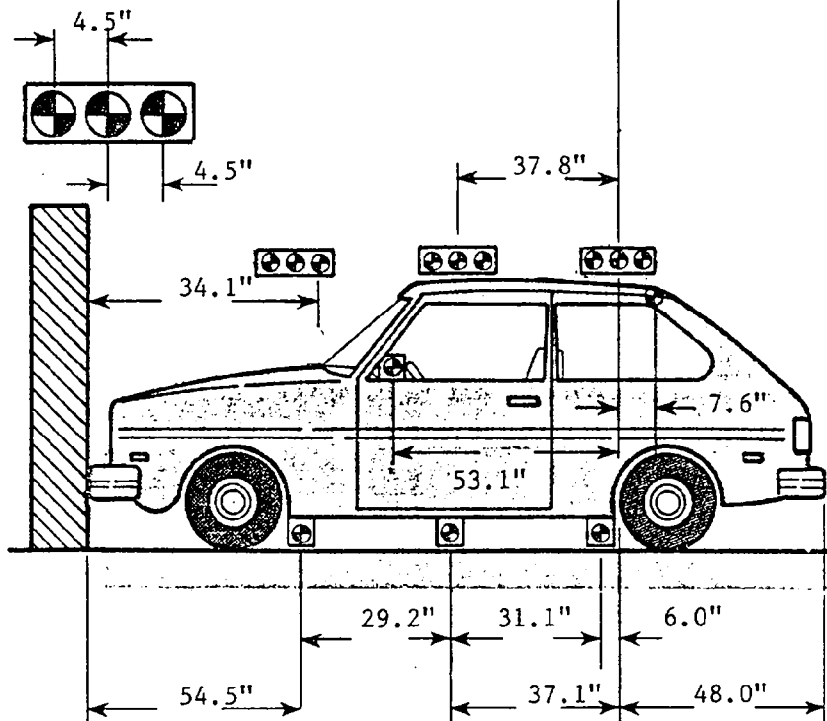
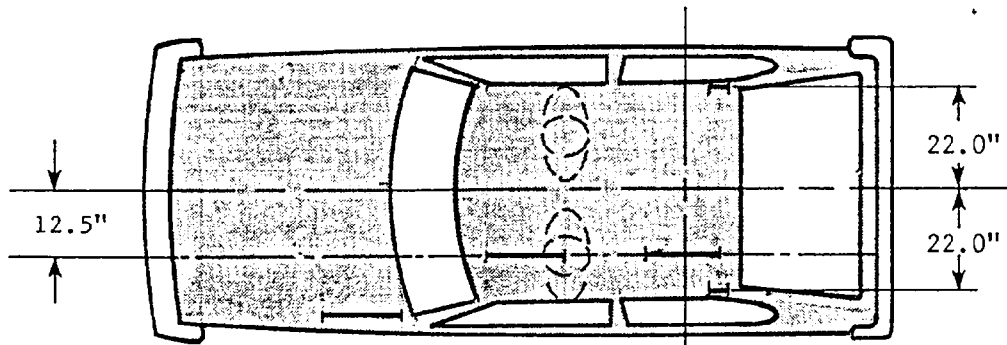
IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL Ford/Escort

TEST NUMBER 871216

NO.	TYPE OF MEASUREMENT	DIMENSIONS IN INCHES		
		PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	168.8	149.7	19.1
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	143.4	139.9	3.5
X3	REAR SURFACE OF VEHICLE TO FIREWALL	125.7	123.7	2.0
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	110.1	110.1	0.0
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	110.1	109.9	0.2
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	110.3	110.5	-0.2
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	110.3	110.0	0.3
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	73.5	73.3	0.2
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	73.5	73.2	0.3
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	73.0	73.0	0.0
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	72.8	73.0	-0.2
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	109.1	108.9	0.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	108.9	108.9	0.0
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	125.4	122.1	3.3
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	124.2	124.8	-0.6
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	94.6	95.2	-0.6
X17	CENTER OF STEERING COLUMN TO "A" POST	13.2	13.1	0.1
X18	CENTER OF STEERING COLUMN TO HEADLINING	16.5	17.2	-0.7
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	166.0	149.6	16.4
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	165.1	147.4	17.7
X21	LENGTH OF ENGINE BLOCK	17.2	17.2	0.0

VEHICLE TARGET LOCATIONS



SECTION 2.0

SUMMARY OF TEST RESULTS

DATA SUMMARY

The driver's Head Injury Criteria, HIC, was 830. The driver's maximum chest deceleration over three milliseconds was 41.7 g. The driver's right and left compressive femur loads were 807.8 pounds and 872.1 pounds, respectively. The driver's maximum chest displacement was 1.7 inches.

The right front passenger's Head Injury Criteria, HIC, was 611. The right front passenger's maximum chest deceleration over three milliseconds was 35.3 g. The right front passenger's right and left compressive femur loads were 976.5 pounds and 654.5 pounds, respectively. The right front passenger's maximum chest displacement was 2.2 inches.

The vehicle's restraint system met the comfort and convenience requirements of FMVSS 208.

DUMMY DATA SUMMARY

DRIVER DUMMY					PASSENGER DUMMY				
SN: 45					SN: 143				
POSITIVE DIRECTION*			NEGATIVE DIRECTION**		POSITIVE DIRECTION*			NEGATIVE DIRECTION**	
MAX	TIME		MAX	TIME	MAX	TIME	MAX	TIME	
HEAD ACCELERATION (g)									
LONGITUDINAL	28.8	185.6	83.4	82.4	86.0	173.8	44.3	97.4	
LATERAL	5.4	80.8	12.0	91.6	6.6	173.2	6.0	226.9	
VERTICAL	2.8	307.8	64.6	74.9	3.3	8.0	50.7	79.4	
RESULTANT	103.1	75.0			89.3	173.8			
HIC	830 from 65.0 to 91.9 msec				611 from 66.4 to 102.4 msec				
NECK LOADS (lbs)									
SHEAR (X)	320.9	78.9	35.8	199.8	333.0	98.0	33.5	180.2	
AXIAL (Z)	442.0	82.0	21.7	108.9	478.0	83.2	7.5	17.5	
NECK MOMENTS (lb-ft)									
ABOUT LATERAL	22.2	100.1	20.9	56.2	61.3	93.2	19.1	224.8	
CHEST ACCELERATION (g)									
LONGITUDINAL	4.3	130.9	42.3	67.2	4.3	240.6	38.7	74.2	
LATERAL	3.6	53.1	6.2	79.4	3.6	53.8	7.1	89.5	
VERTICAL	5.1	68.2	4.6	86.9	13.2	91.1	4.4	187.4	
RESULTANT	42.8	67.2			39.6	74.2			
3 MSEC CLIP	41.7				35.3				
CHEST DISPLACEMENT (in)									
	1.7	86.1	0.0	25.5	2.2	86.5	0.0	0.0	
FEMUR LOADS (lbs)									
LEFT	73.9	117.6	872.1	57.1	47.5	334.5	654.5	83.8	
RIGHT	89.6	129.0	807.8	40.2	23.8	326.1	976.5	71.8	
*LONGITUDINAL:	FORWARD				**LONGITUDINAL:	REARWARD			
LATERAL:	LEFTWARD				LATERAL:	RIGHTWARD			
VERTICAL:	UPWARD				VERTICAL:	DOWNWARD			
DISPLACEMENT:	INWARD				DISPLACEMENT:	OUTWARD			
FORCE:	TENSION				FORCE:	COMPRESSION			

SEAT BELT DATA SUMMARY

<u>LOCATION</u>	<u>SEAT BELT TENSION</u>	
	<u>MAX. LBS.</u>	<u>TIME.MSEC.</u>
DRIVER'S PASSIVE BELT	1945.1	77.9
RIGHT FRONT PASSENGER'S PASSIVE BELT	1946.2	82.6

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head rotated forward impacting the steering wheel as the dummy's chest was restrained by the two-point passive seat belt. The dummy's head rotated rearward into the head restraint as the dummy rebounded into the seatback. The dummy came to rest seated upright in the driver's seat restrained by the two-point passive seat belt.

PASSENGER DUMMY

Upon impact, the passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head rotated forward as the dummy's chest was restrained by the two-point passive seat belt. The dummy's head rotated rearward into the head restraint as the dummy rebounded into the seatback. The dummy came to rest seated upright in the passenger's seat restrained by the two-point passive seat belt.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	PASSENGER
Head	<u>Steering wheel rim and hub</u>	<u>None</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>Easy</u>	<u>Difficult, no tools required</u>
Rear	<u>Easy</u>	<u>Easy</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>None</u>	<u>None</u>
Rear	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

Three cracks on left side of windshield.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY POSITIONING DATA FOR
30 MPH FRONTAL BARRIER IMPACT TEST

PRE-IMPACT DATA:

Make/Model: Ford Escort
Body Style: 5-door Hatchback Model Year: 1987
NHTSA No.: _____ Color: Black

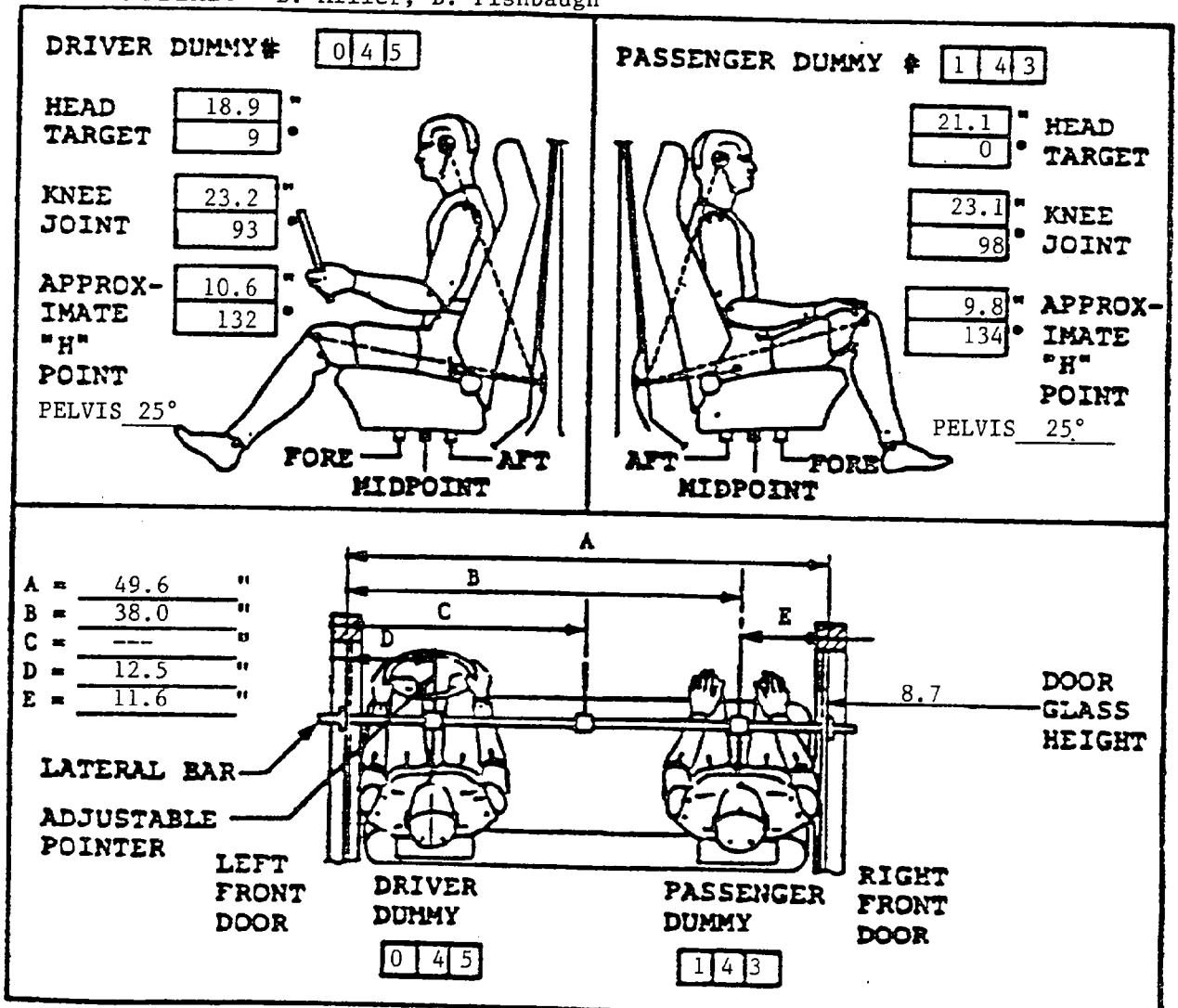
DATA FROM CERTIFICATION LABEL:

Vehicle Manufacturer: Ford Motor Company
Date of Manufacture: 6/87 ; VIN: 1FAPP2598HT183919
GVWR: 3165 lb; GAWR: Front = 1811 lb; Rear = 1547 lb

POST-IMPACT DATA:

Date of Test: 12/16/87 Time: 1040 Temperature 71 °F
Required Impact Velocity Range: 28.9 to 29.9 mph
Impact Velocity: Primary = 29.5 mph Secondary = 29.4 mph
Seat Type: Bucket Adjuster Type: Manual
Bucket Seat Back Type: Adjustable

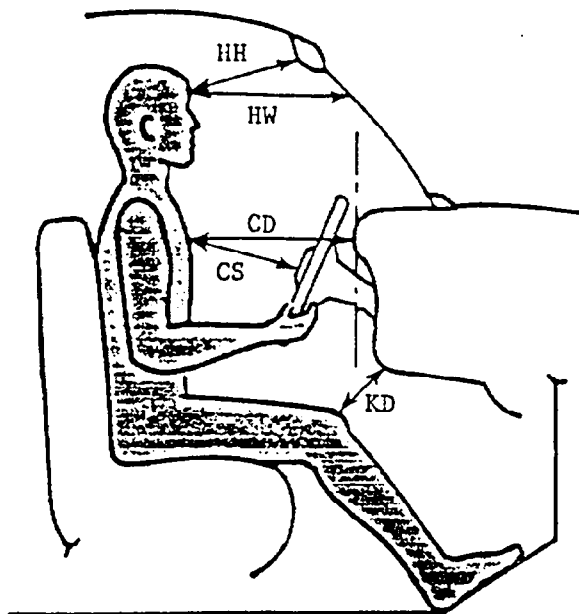
Technicians: B. Miller, B. Fishbaugh



DUMMY IN-VEHICLE POSITION RECORDING SHEET

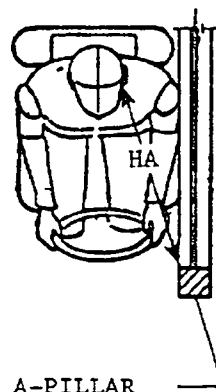
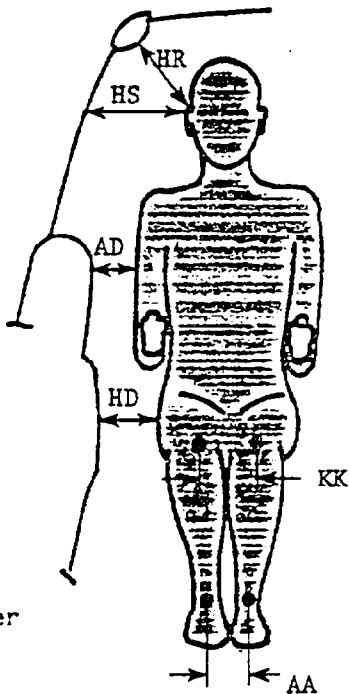
DRIVER PASSENGER
045 143

HH	12.2	13.8
HW	17.8	18.9
CD	18.6	20.1
CS	11.5	---
KDL	2.1	3.2
KDR	2.1	3.1
TA	17°	18°
SA	30°	30°
HA	9.8	11.1



DRIVER PASSENGER
045 143

HR	6.9	5.4
HS	9.5	9.4
AD	3.1	3.6
HD	5.4	4.3
KK	8.0	7.9
AA	9.2	6.4



A-PILLAR

Knee outer bolt head to outer bolt head spacing:

Driver = 10.6

Passenger = 10.6

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

HR = Head to Side Roof

HS = Head to Side Window

AD = Arm to Door

HD = Hip to Door

KK = Knee to Knee

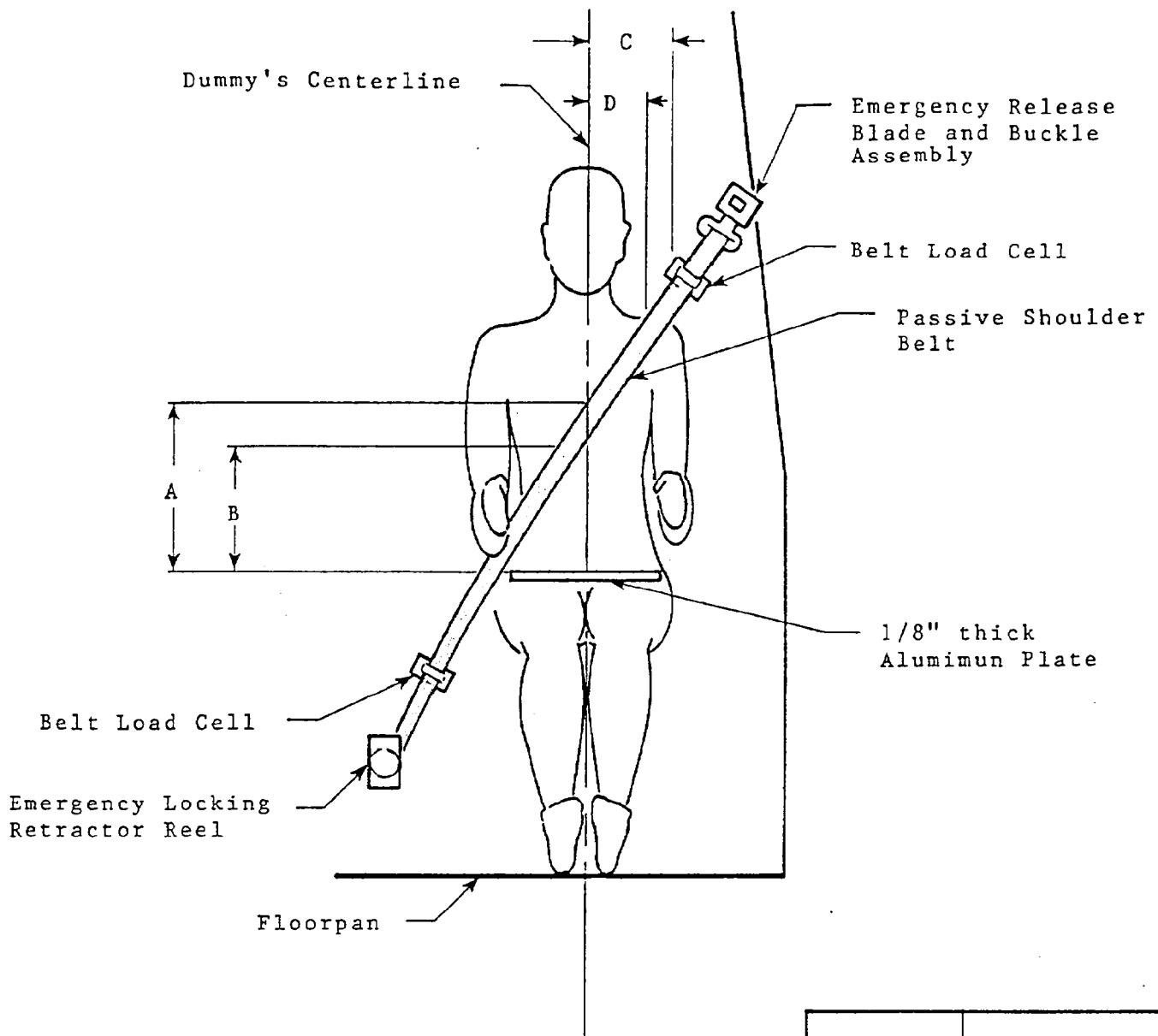
AA = Ankle to Ankle

HA = Head to A Pillar

Torso and seat back angles are relative to vertical.

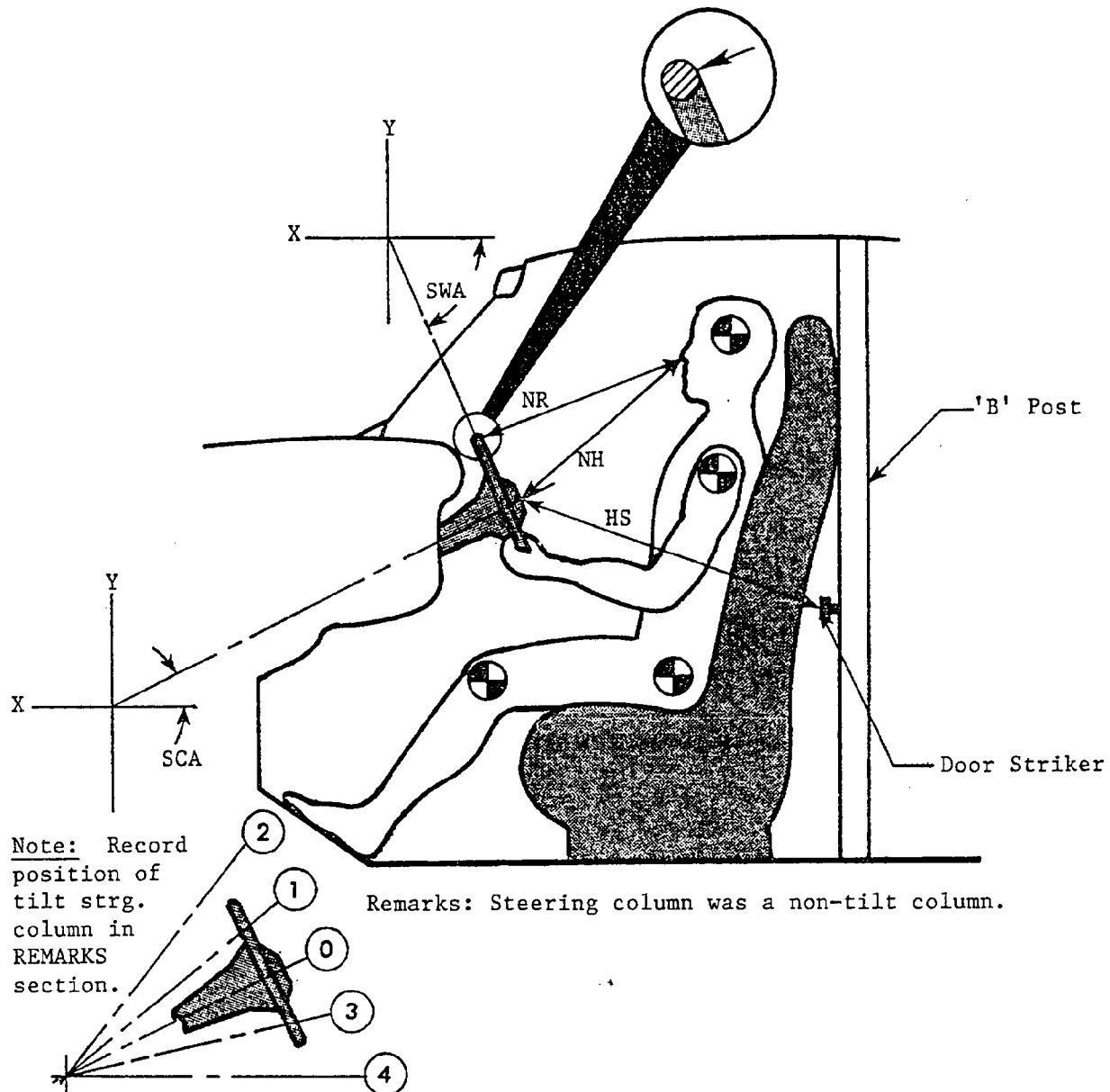
ALL DISTANCE MEASUREMENTS IN INCHES

SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - Top surface of alum. plate to belt upper edge (in)	13.0	13.9
B - Top surface of alum. plate to belt lower edge (in)	10.3	10.5
C - Dummy centerline to outer edge of belt at chest flesh top (in)	4.6	5.4
D - Dummy centerline to inner edge of belt at chest flesh top (in)	1.3	2.8
SHOULDER BELT TENSION (lbs)	NA	NA

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



MEASUREMENTS	
NR - Distance from tip of dummy's nose to top rear surface of steering wheel rim.	14.1
NH - Distance from tip of dummy's nose to center of steering column hub.	14.6
HS - Distance from center of steering column hub to the forward surface of the door lock striker pin.	19.8
SCA - Angle of steering column relative to the horizontal X axis.	26°
SWA - Angle of steering wheel relative to the horizontal X axis.	64°

FMVSS 208 COMFORT AND CONVENIENCE DATA

VEHICLE VIN NO.: 1FAPP2598HT183919

MAKE: Ford MODEL: Escort

VEHICLE BUILD DATE: 6/87 VEHICLE TYPE 5 door hatchback

FRONT OUTBOARD SEATING POSITIONS SEAT BELT TYPE:

(check one): X Automatic belts
 Type 2 lap/shoulder belts
 Other

CONVENIENCE HOOKS: NA, vehicle's restraint system did not include convenience hooks.

WEBBING TENSION - RELIEVING DEVICE:

DO OUTBOARD SEATING POSITION BELTS HAVE TENSION - RELIEVING DEVICES?

No

MAXIMUM SLACK RECOMMENDED IN OWNERS MANUAL: NA INCHES

DOES OWNER'S MANUAL WARN THAT INTRODUCING SLACK BEYOND THE AMOUNT SPECIFIED CAN SIGNIFICANTLY REDUCE THE EFFECTIVENESS OF THE SHOULDER BELT?

NA

IF NO, EXPLAIN

AUTOMATIC BELTS: IS TENSION - RELIEVING DEVICE CANCELLED EACH TIME THE ADJACENT DOOR IS OPENED? NA

IF NO, EXPLAIN:

BELT CONTACT FORCE:

FOR BELTS WITHOUT TENSION-RELIEVING DEVICES: BELT CONTACT FORCE:

0.4 POUNDS

LATCHPLATE ACCESS: NA

RETRACTION: NA

ACCESSIBILITY: NA

LATCH MECHANISM: NA

FMVSS NO. 208 - SEAT BELT WARNING SYSTEM DATA

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

Duration of audible warning signal = 6 sec.

Duration of reminder light operation = 6 sec.

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

Duration of audible warning signal - 0 sec.

(Note: audible warning should not operate)

Duration of reminder light operation = 6 sec.

Wording of visual warning:

Fasten Seat Belt

Fasten Belt

Symbol 101-80 X

FMVSS NO. 208 - LABELING AND DRIVER'S MANUAL DATA

DESCRIBE LOCATION OF LABEL WHICH DESCRIBES MANUFACTURER'S MAINTENANCE OR
REPLACEMENT SCHEDULE FOR CRASH-DEPLOYED OCCUPANT PROTECTION SYSTEM: NA,
vehicle did not contain a crash-deployed occupant protection system.

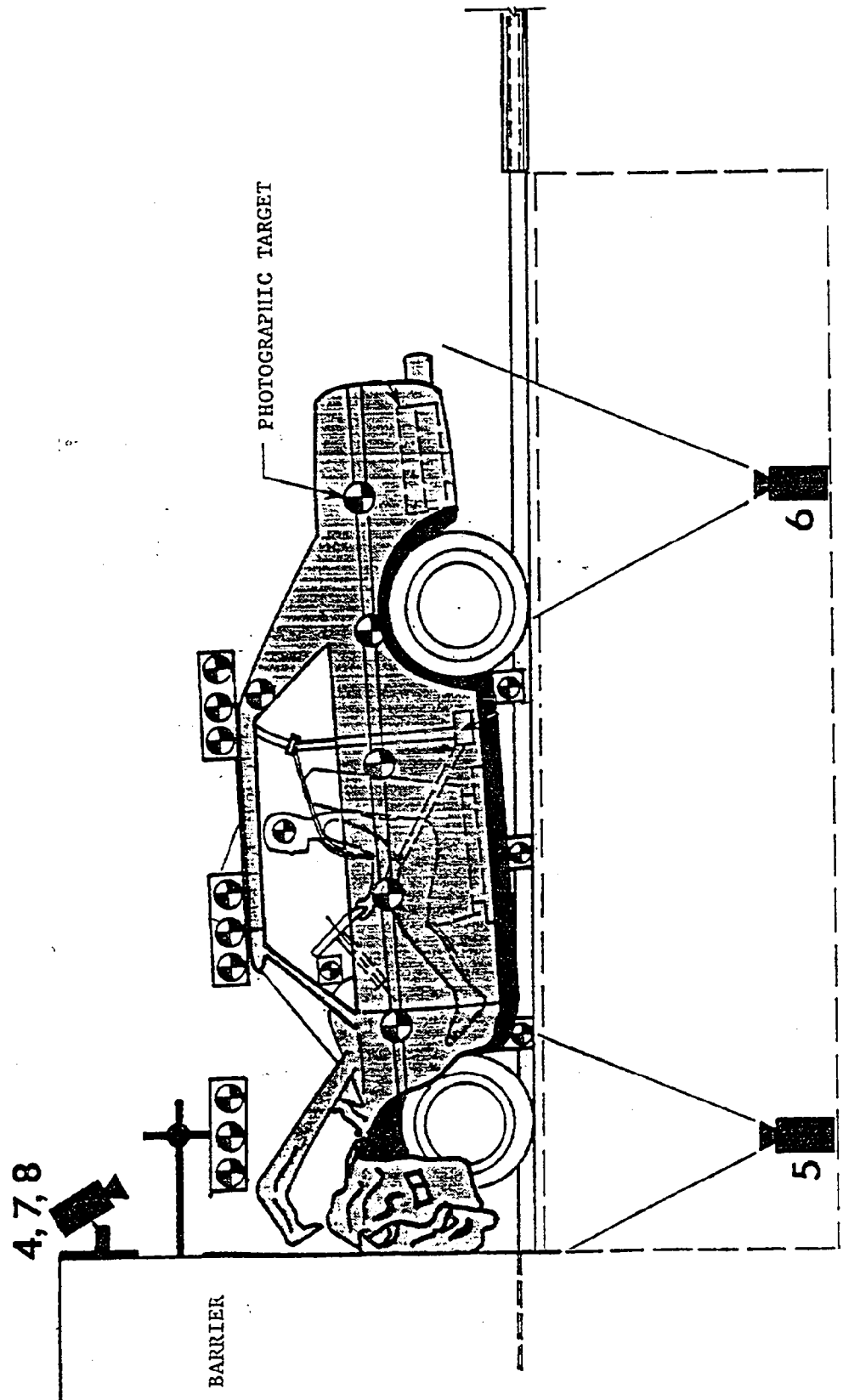
FMVSS NO. 208 - READINESS INDICATOR DATA

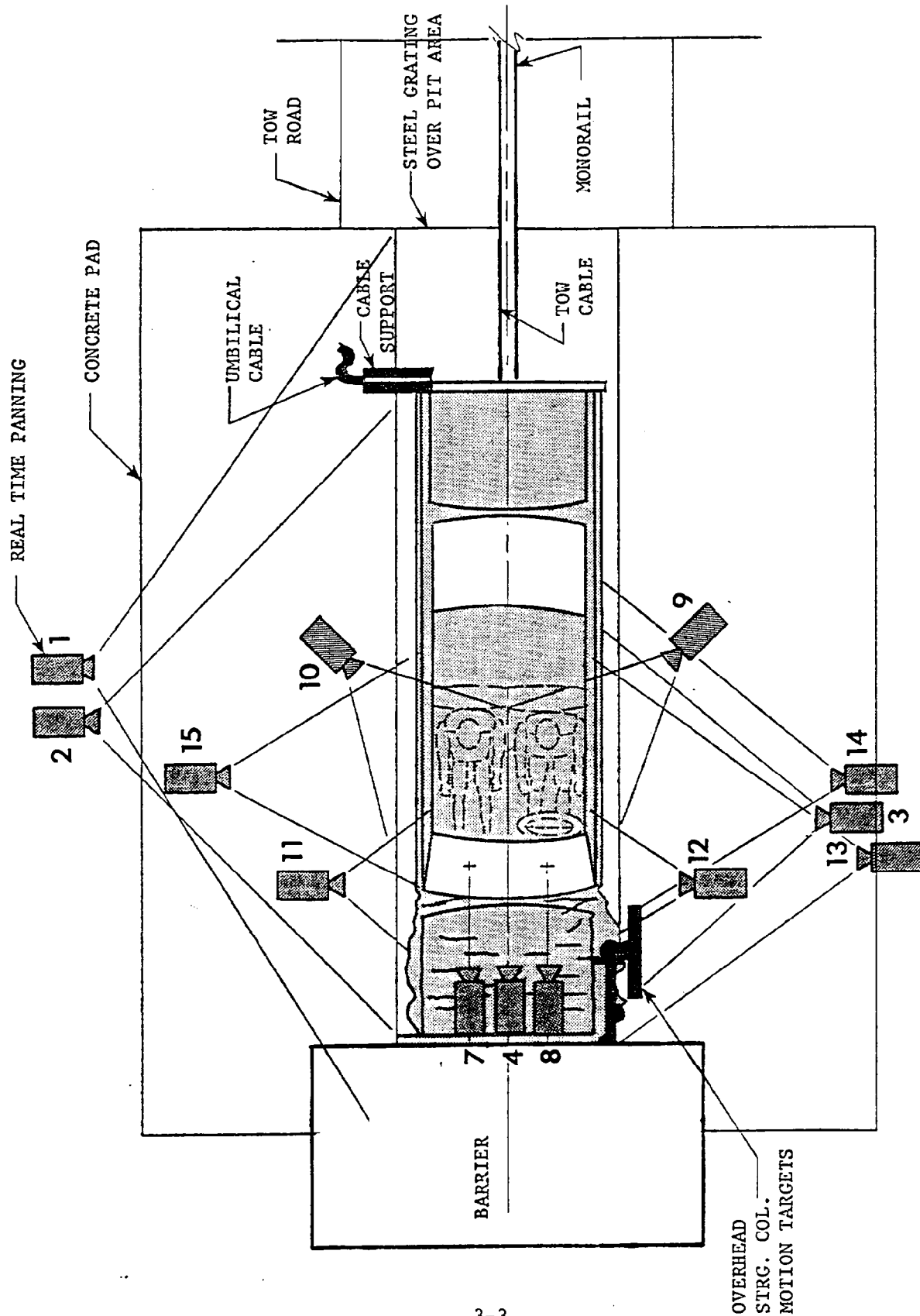
AN OCCUPANT RESTRAINT SYSTEM THAT DEPLOYS IN THE EVENT OF A CRASH SHALL HAVE A MONITORING SYSTEM WITH A READINESS INDICATOR. A TOTALLY MECHANICAL SYSTEM IS EXEMPT FROM THIS REQUIREMENT. NA, vehicle did not contain a crash-deployed occupant protection system.

SECTION 3.0

CAMERA INFORMATION

CAMERA POSITIONS





HIGH SPEED CAMERA LOCATIONS

TEST NO.: 871216		VEHICLE: Ford Escort		FILM PLANE				
CAMERA NO.	VIEW	CAMERA POSITIONS (IN)*			ANGLE** (DEG)	TO HEAD TARGET	LENS (MM)	SPEED (FPS)
		X	Y	Z				
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	-4	263.0	25	505
4	Windshield damage	-6.0	0.0	84.0	40	NA	8.5	502
5	Crush & fluid spillage	-50.5	0.0	-92.4	90	NA	13	1000
6	Fluid spillage	-99.3	0.0	-99.0	90	NA	13	1002
7	Passenger kinematics	-4.5	13.8	93.0	-50	NA	17	500
8	Driver kinematics	-6.8	-14.5	93.0	-50	NA	17	500
9	Driver kinematics	-157.3	116.0	87.0	-27	128.5	25	500
10	Passenger kinematics	-152.1	-116.0	87.0	-26	123.8	25	500
11	Windshield intrusion	-38.1	306.1	44.0	0	NA	50	502
12	Windshield intrusion	-53.0	-309.4	42.3	0	NA	50	502
13	Column movement	-91.5	-286.0	103.0	-14	NA	25	498
14	Column movement	-91.5	-286.0	75.1	-9	NA	25	500
15	Passenger kinematics	-38.8	293.0	45.3	-4	261.3	25	502

*X = Film plane to plane of barrier face

Y = Film plane to monorail centerline

Z = Film plane to ground

**Referenced to horizontal plane

APPENDIX A

PHOTOGRAPHS

1. PRE-TEST FRONT VIEW
2. POST-TEST FRONT VIEW
3. PRE-TEST LEFT SIDE VIEW
4. POST-TEST LEFT SIDE VIEW
5. PRE-TEST RIGHT SIDE VIEW
6. POST-TEST RIGHT SIDE VIEW
7. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
9. PRE-TEST LEFT REAR THREE-QUARTER VIEW
10. POST-TEST LEFT REAR THREE-QUARTER VIEW
11. PRE-TEST REAR VIEW
12. POST-TEST REAR VIEW
13. PRE-TEST WINDSHIELD VIEW
14. POST-TEST WINDSHIELD VIEW
15. PRE-TEST ENGINE COMPARTMENT VIEW
16. POST-TEST ENGINE COMPARTMENT VIEW
17. PRE-TEST FRONT UNDERBODY VIEW
18. POST-TEST FRONT UNDERBODY VIEW
19. PRE-TEST REAR UNDERBODY VIEW
20. POST-TEST REAR UNDERBODY VIEW
21. PRE-TEST DRIVER DUMMY POSITION VIEW
22. POST-TEST DRIVER DUMMY POSITION VIEW
23. PRE-TEST PASSENGER DUMMY POSITION VIEW
24. POST-TEST PASSENGER DUMMY POSITION VIEW
25. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
26. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
27. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
28. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
29. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
30. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
31. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
32. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
33. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 1

APPENDIX A CONTINUED

PHOTOGRAPHS

34. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 2
35. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 3
36. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 4
37. POST-TEST PASSENGER DUMMY HEAD/KNEE CONTACT - VIEW 1
38. POST-TEST PASSENGER DUMMY HEAD/KNEE CONTACT - VIEW 2
39. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW
40. PRE-TEST VEHICLE TIRE LOAD LABEL VIEW

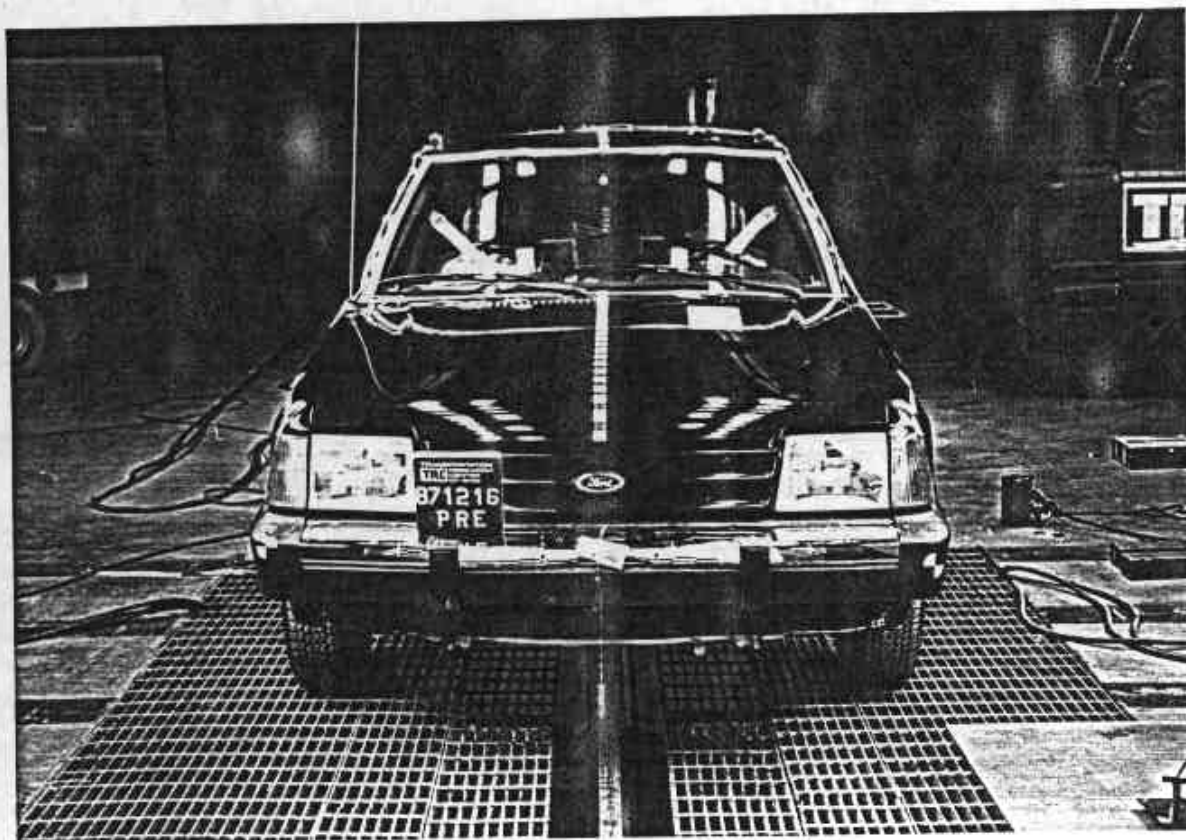


Figure A-1. PRE-TEST FRONT VIEW

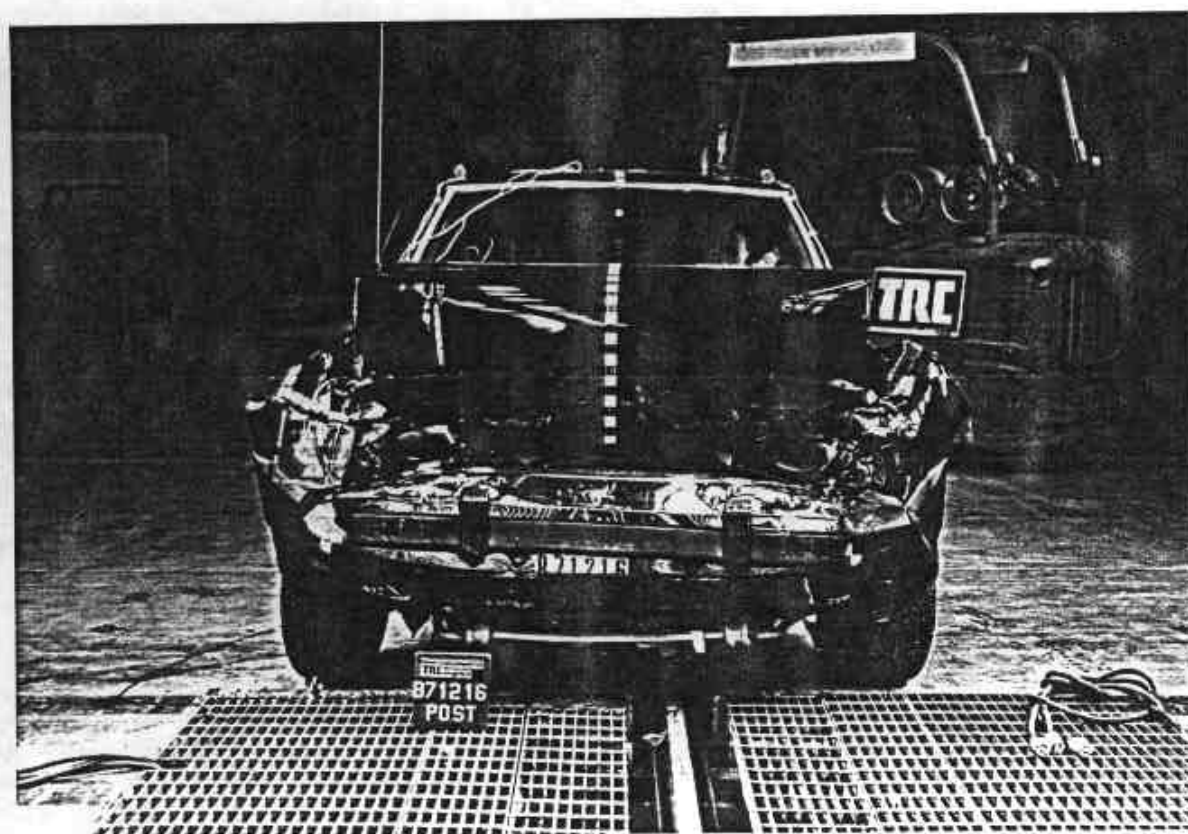


Figure A-2. POST-TEST FRONT VIEW
A-3

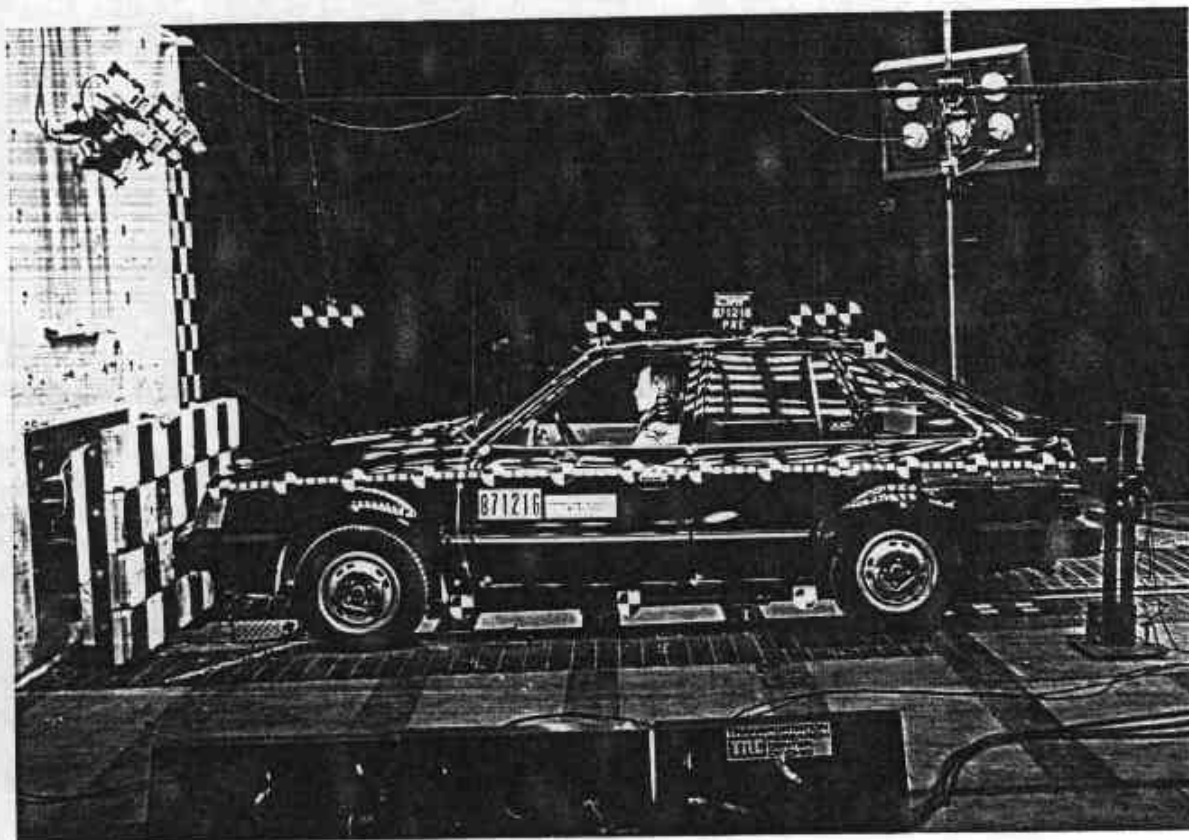


Figure A-3. PRE-TEST LEFT SIDE VIEW

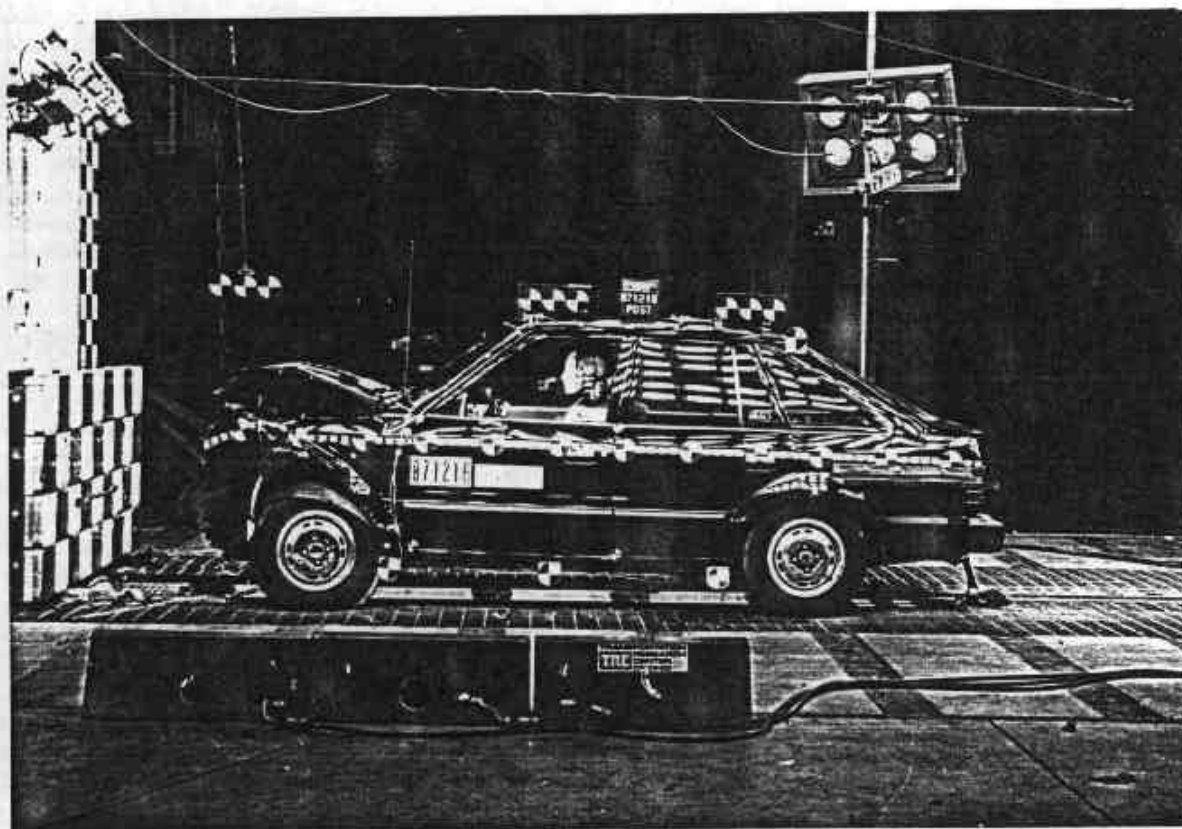


Figure A-4. POST-TEST LEFT SIDE VIEW
A-4

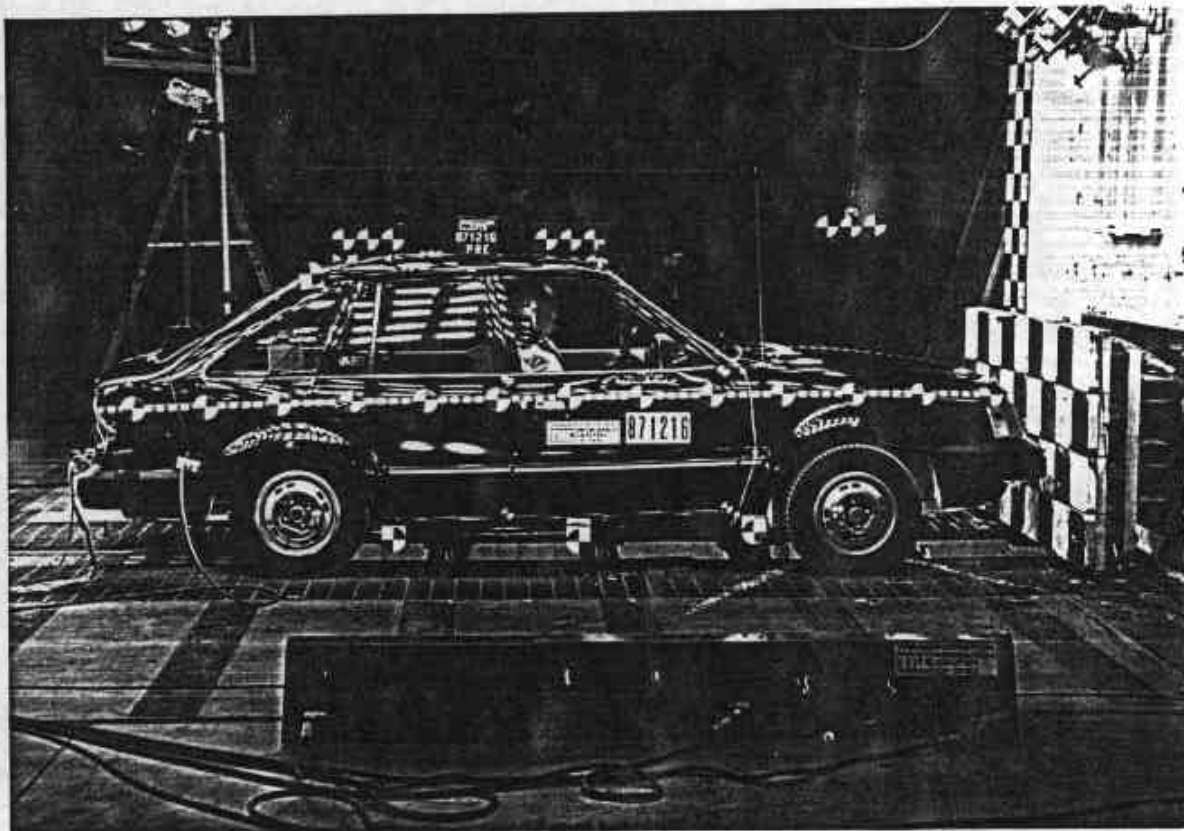


Figure A-5. PRE-TEST RIGHT SIDE VIEW

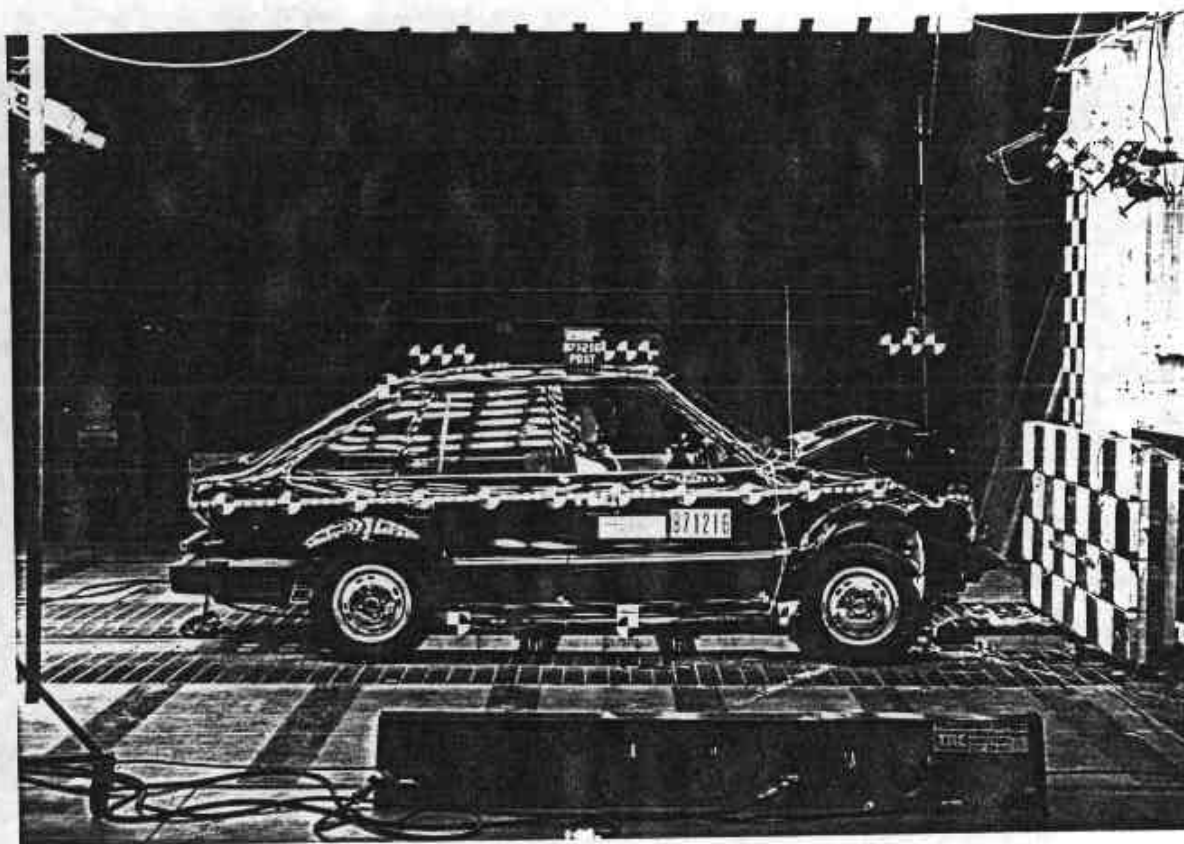


Figure A-6. POST-TEST RIGHT SIDE VIEW
A-5



Figure A-7. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
A-6

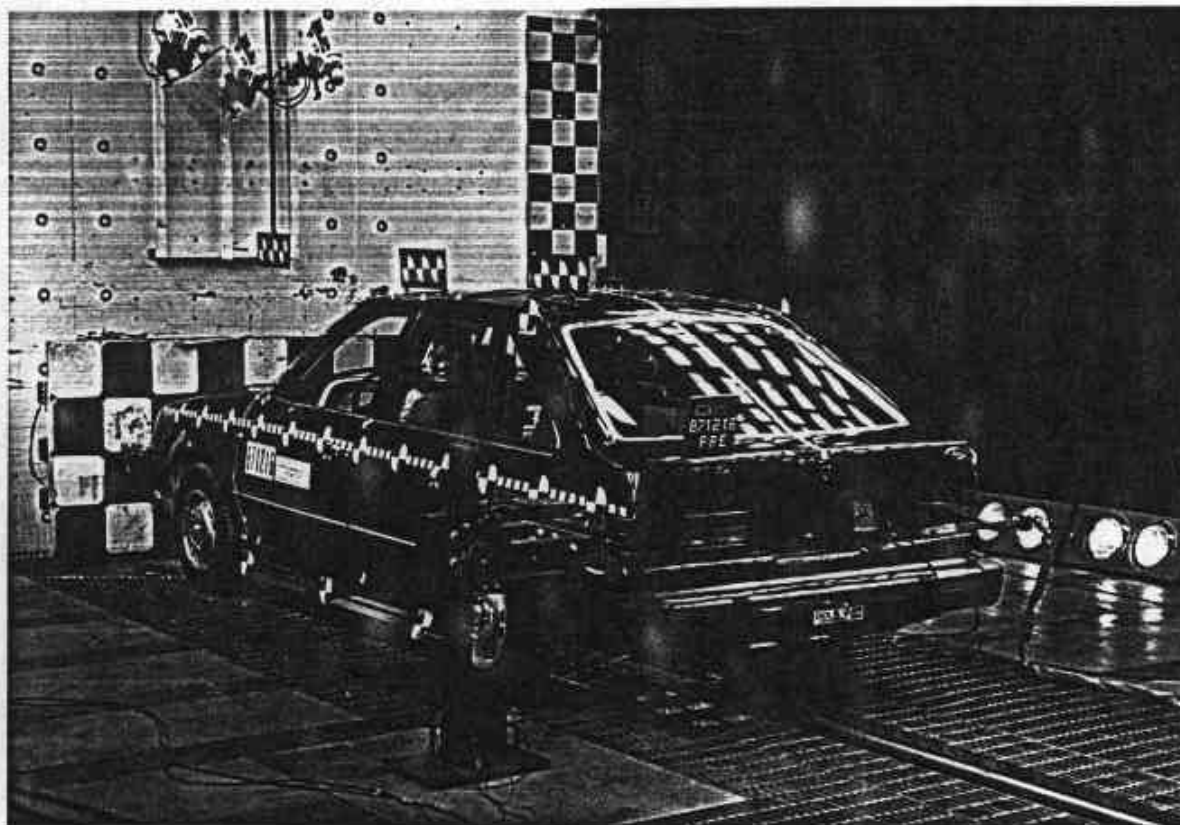


Figure A-9. PRE-TEST LEFT REAR THREE-QUARTER VIEW

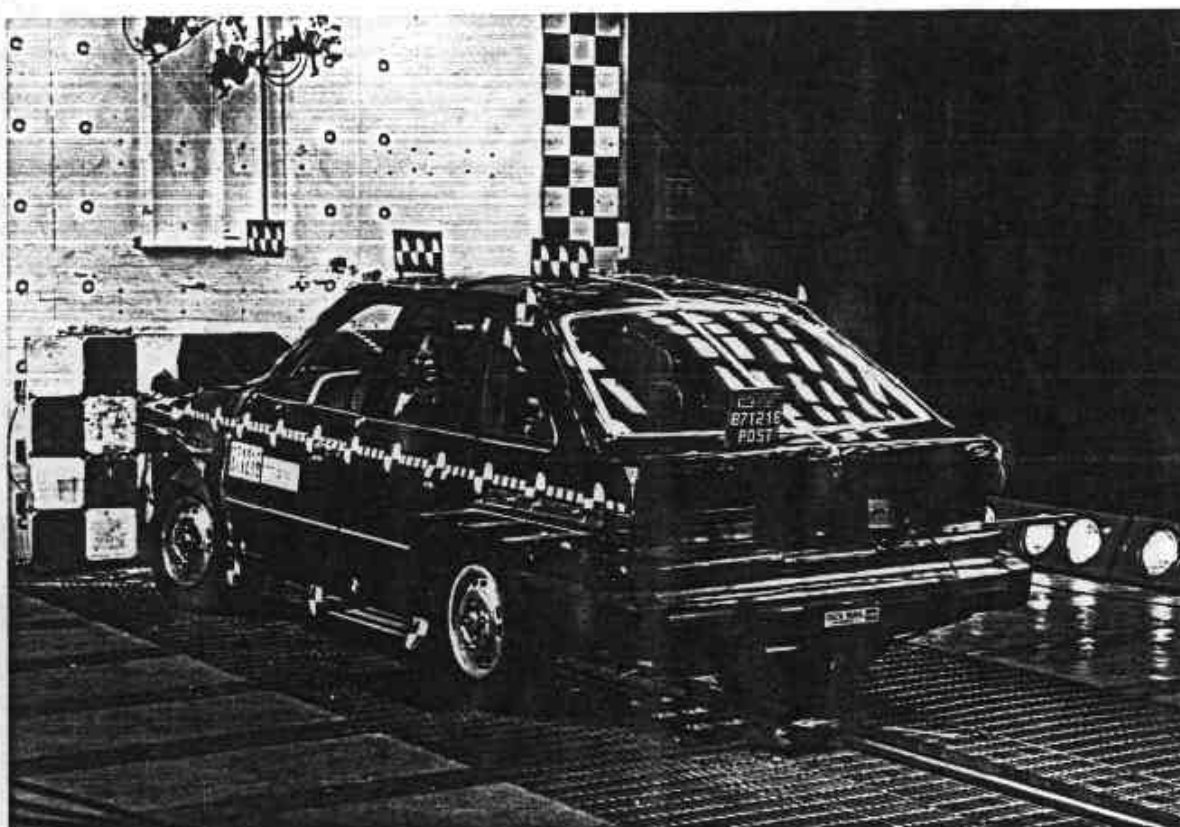


Figure A-10. POST-TEST LEFT REAR THREE-QUARTER VIEW
A-7

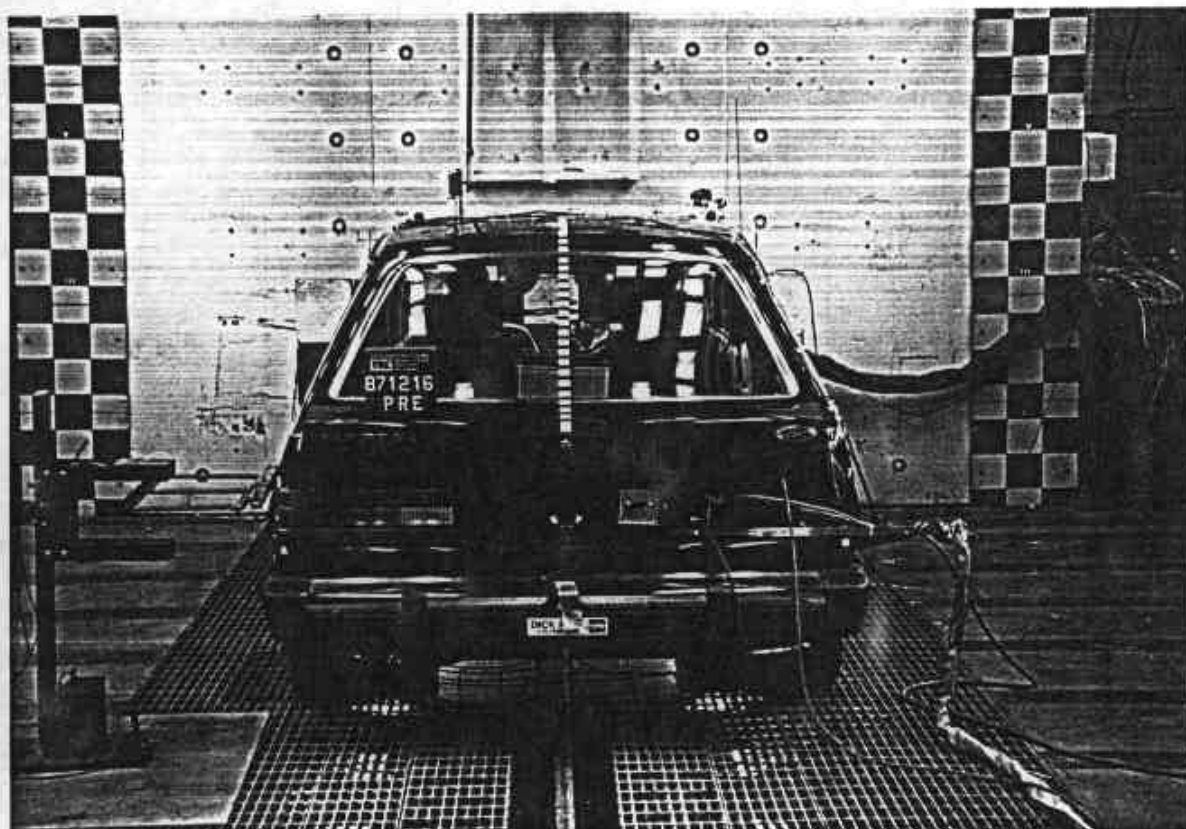


Figure A-11. PRE-TEST REAR VIEW



Figure A-12. POST-TEST REAR VIEW
A-8

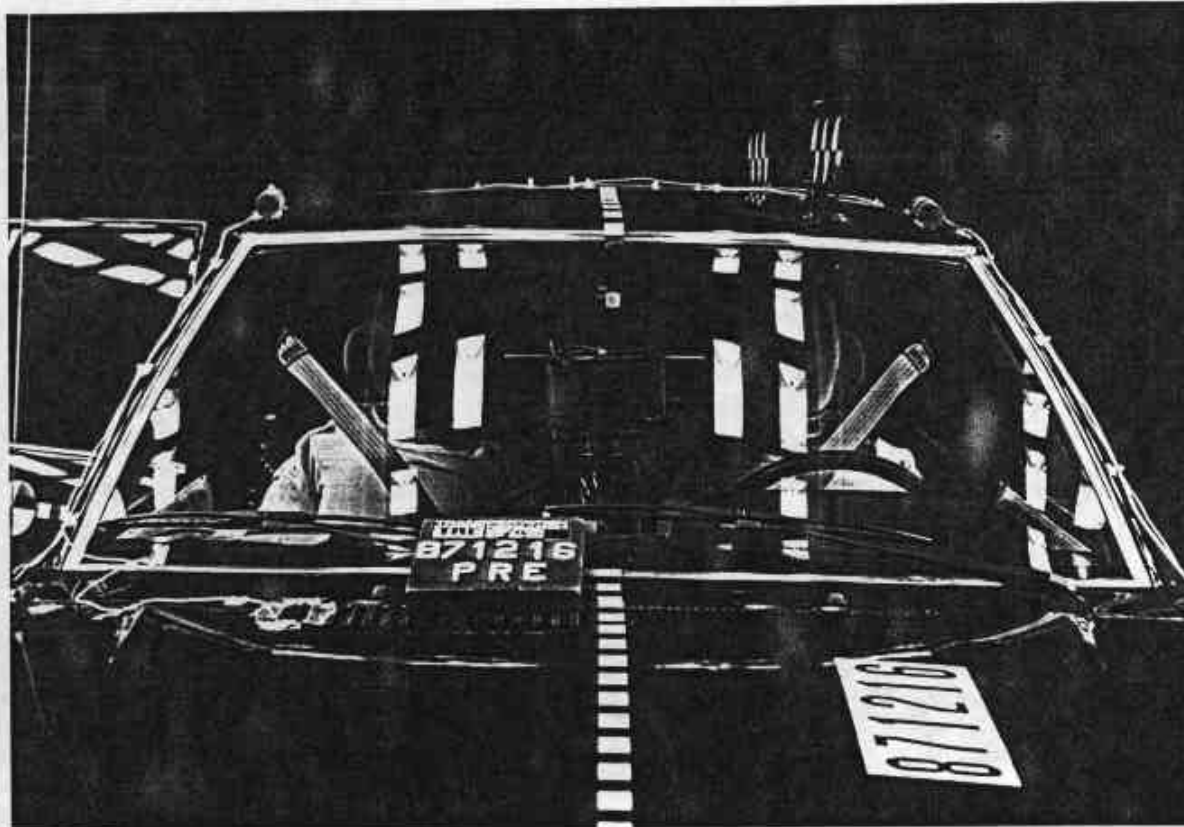


Figure A-13. PRE-TEST WINDSHIELD VIEW

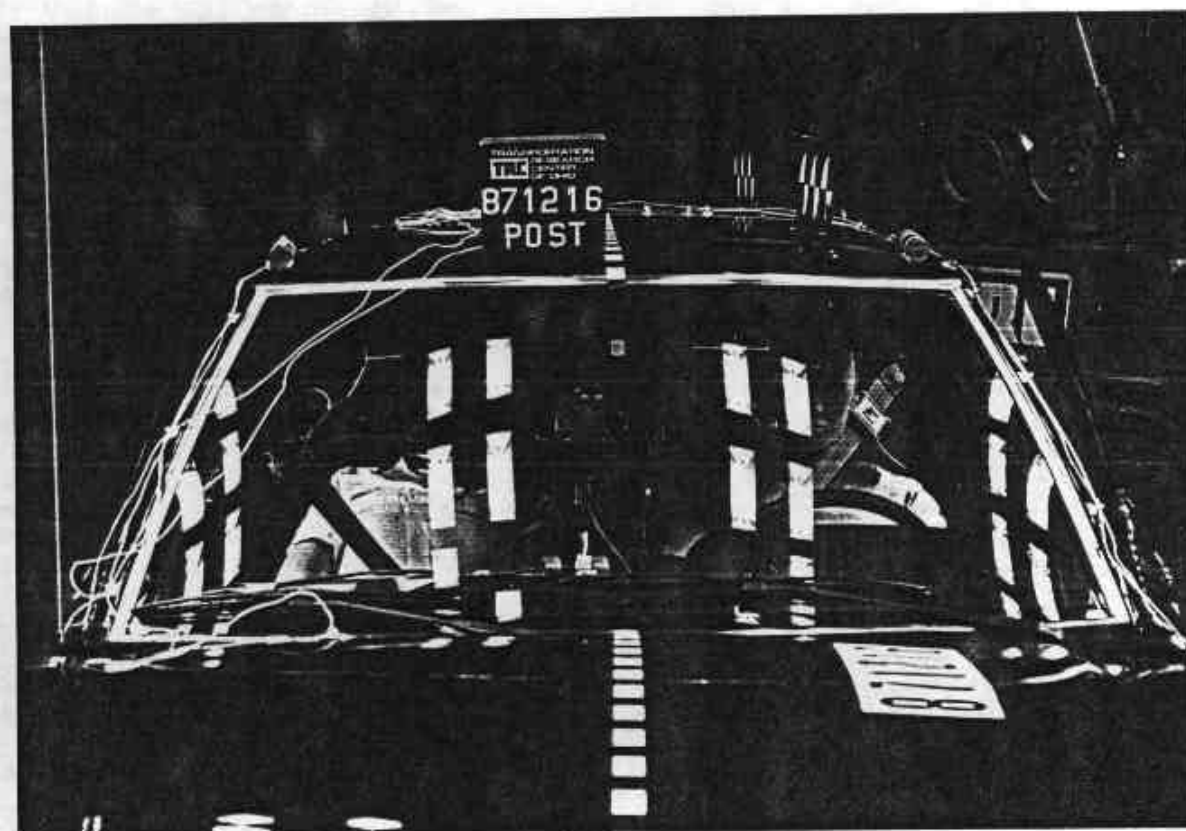


Figure A-14. POST-TEST WINDSHIELD VIEW
A-9

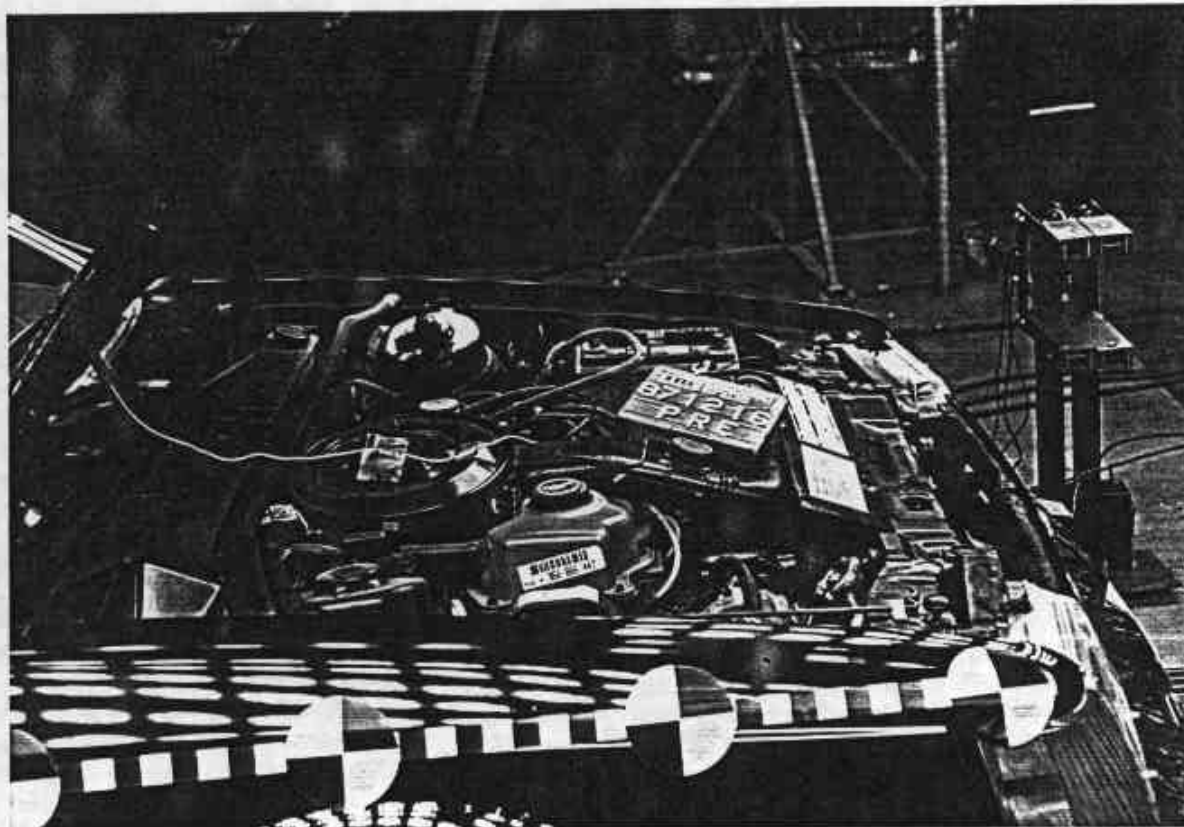


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW

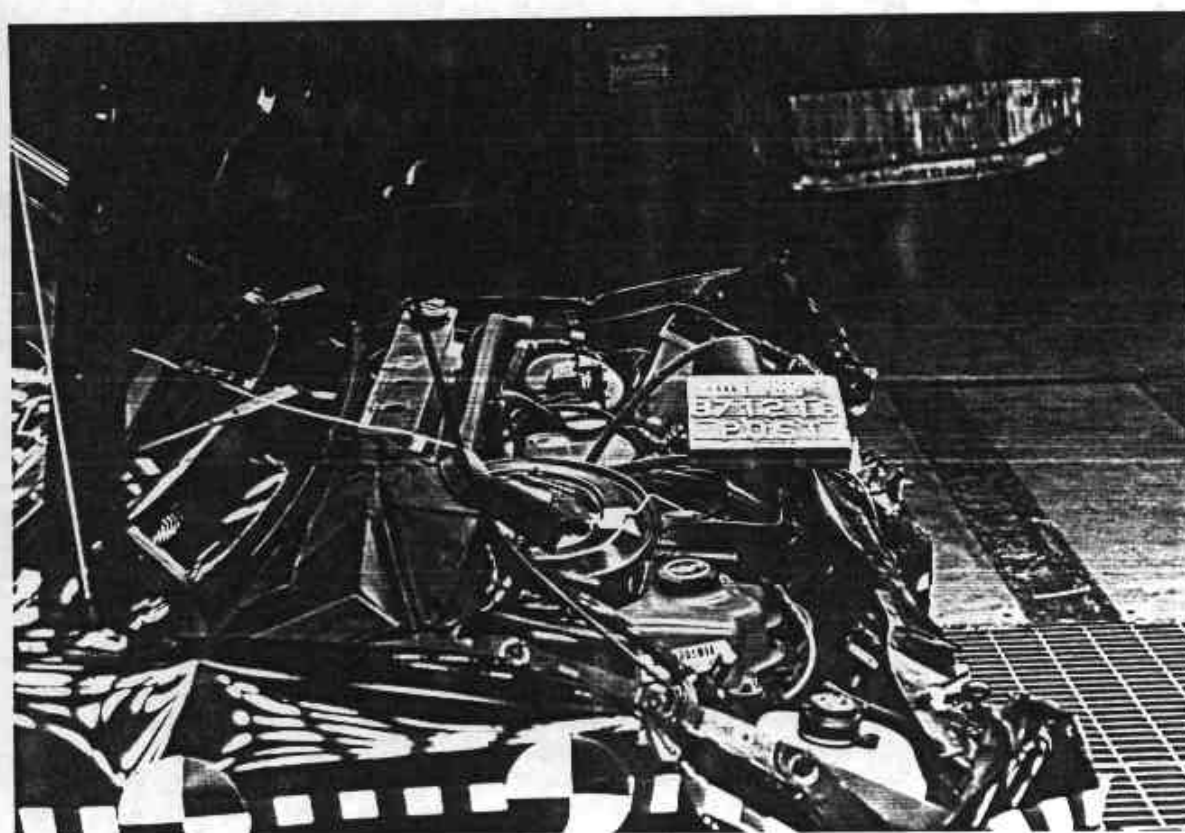


Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW
A-10

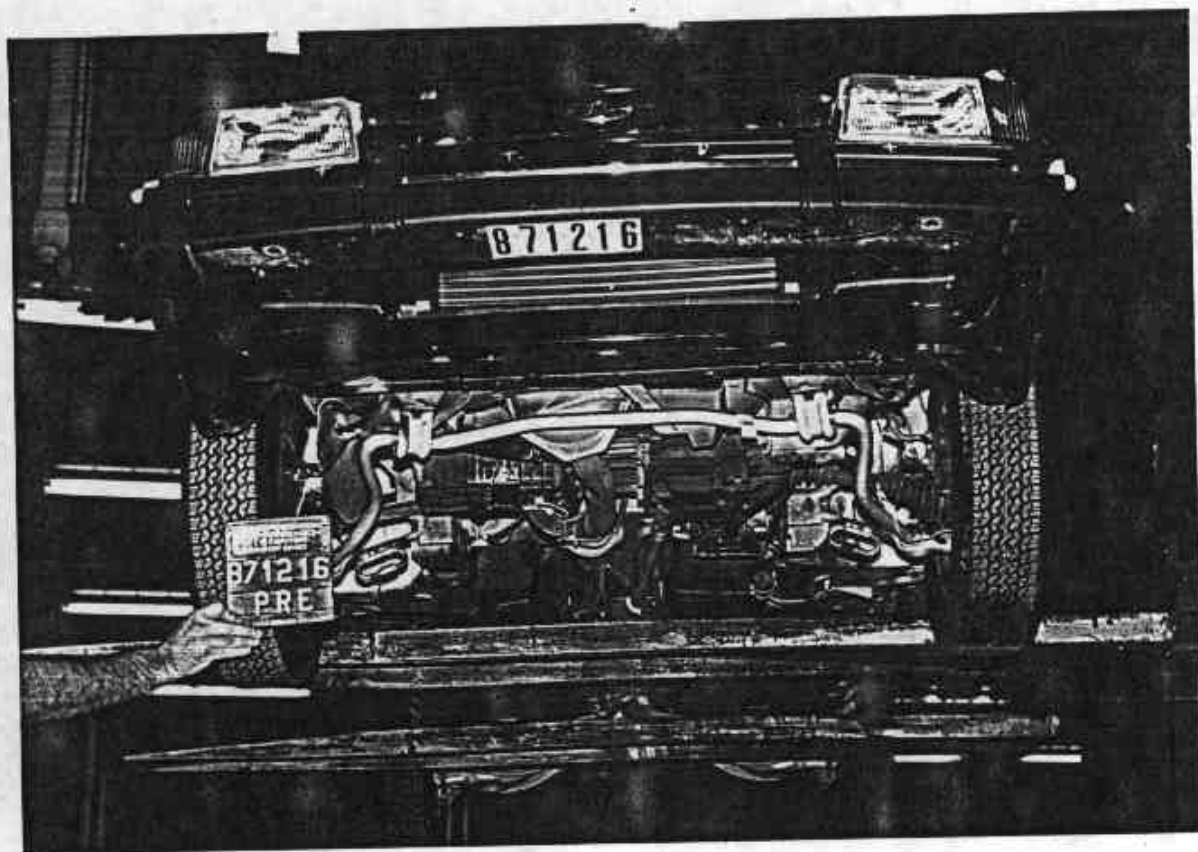


Figure A-17. PRE-TEST FRONT UNDERBODY VIEW

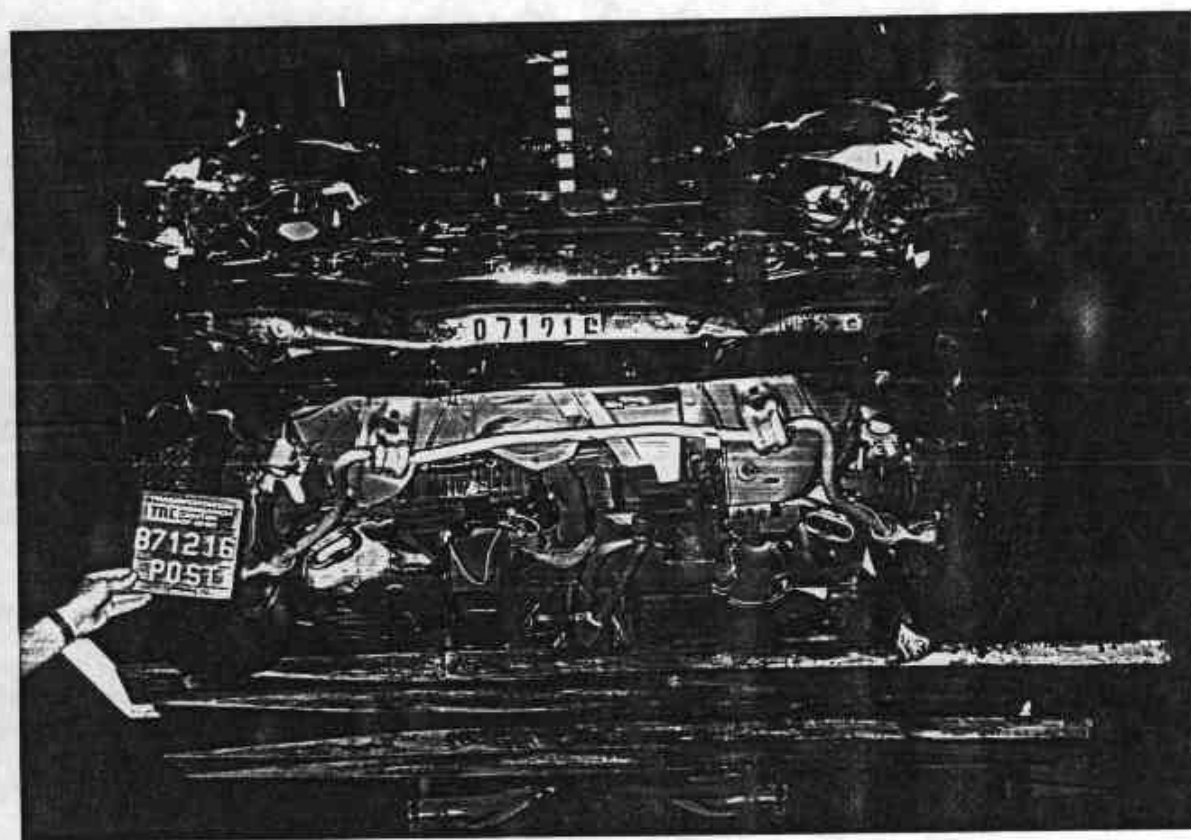


Figure A-18. POST-TEST FRONT UNDERBODY VIEW
A-11

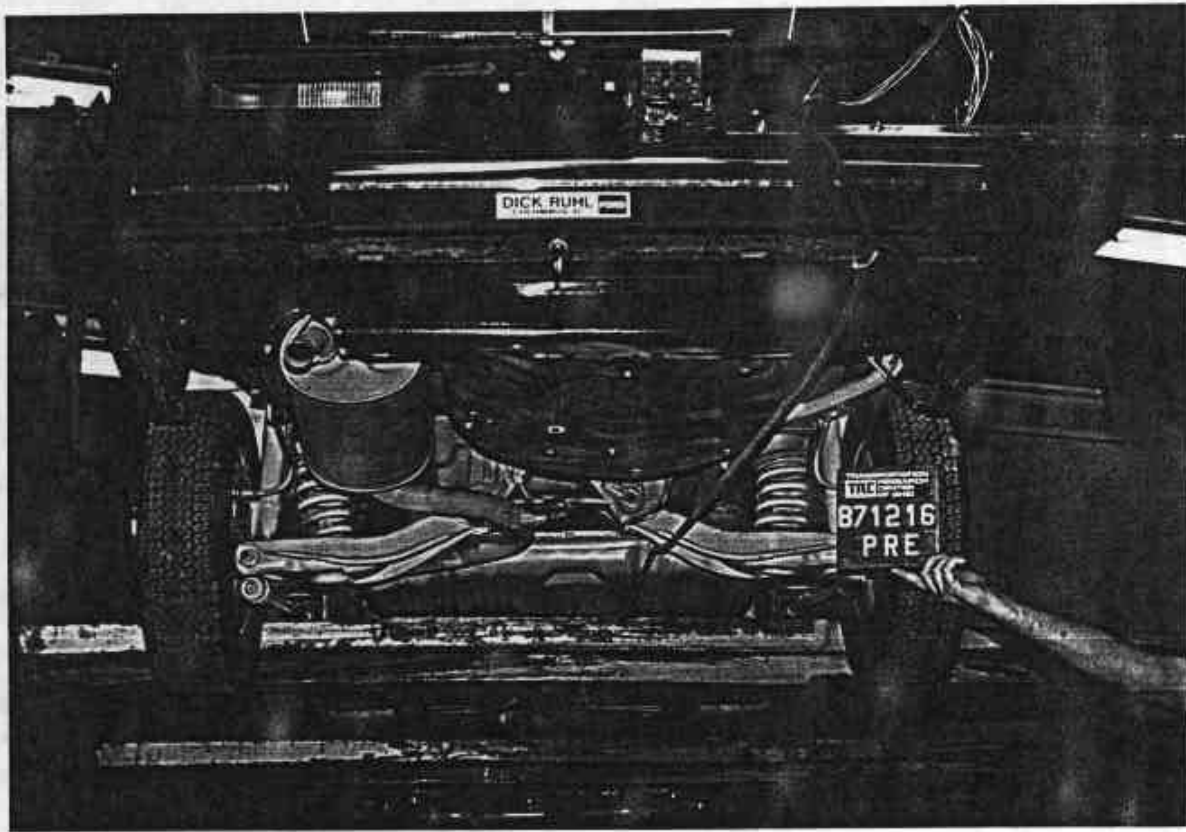


Figure A-19. PRE-TEST REAR UNDERBODY VIEW

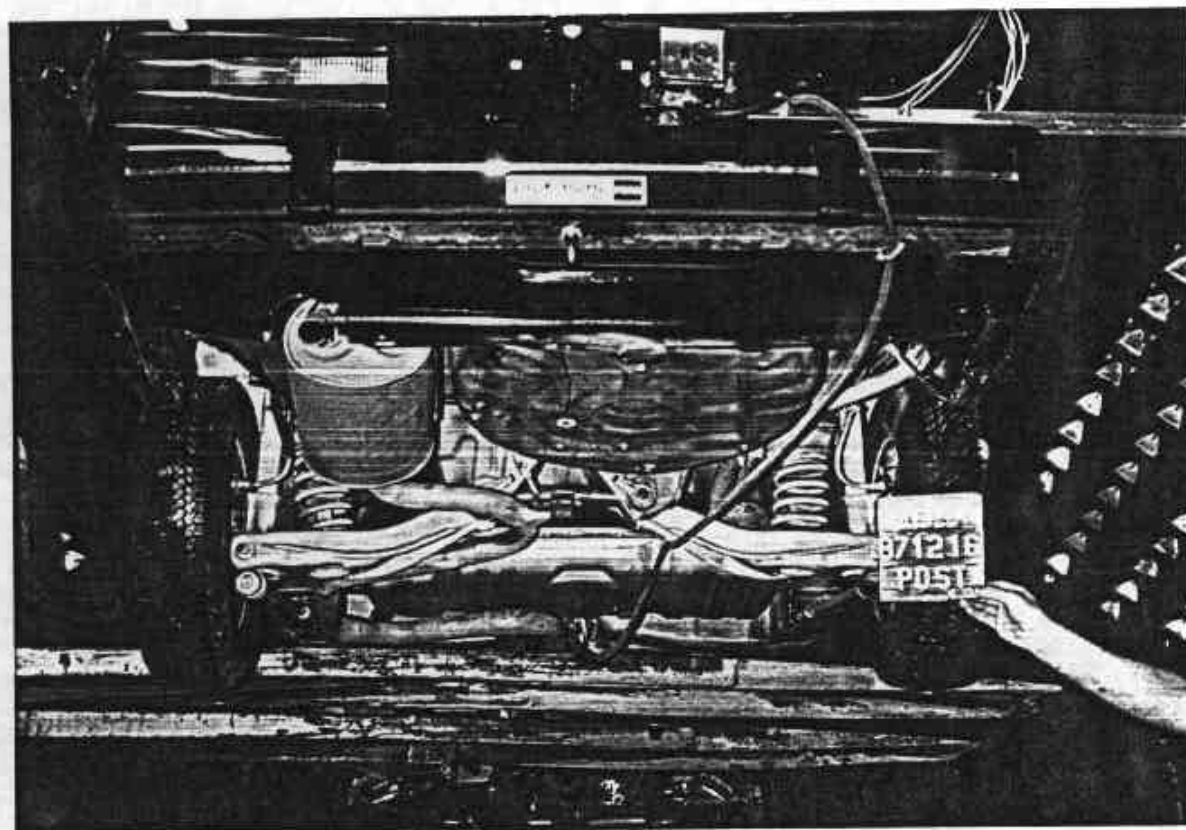


Figure A-20. POST-TEST REAR UNDERBODY VIEW



Figure A-21. PRE-TEST DRIVER DUMMY POSITION VIEW



Figure A-22. POST-TEST DRIVER DUMMY POSITION VIEW
A-13

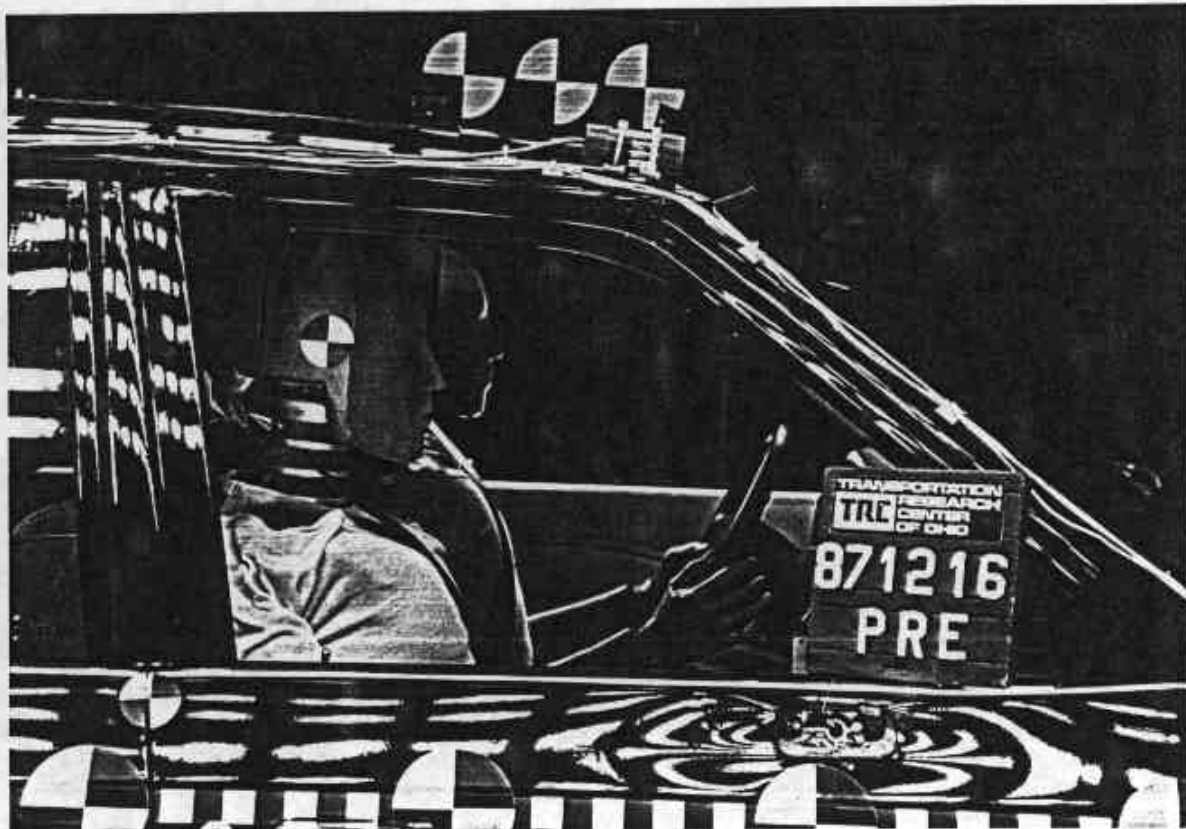


Figure A-23. PRE-TEST PASSENGER DUMMY POSITION VIEW



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

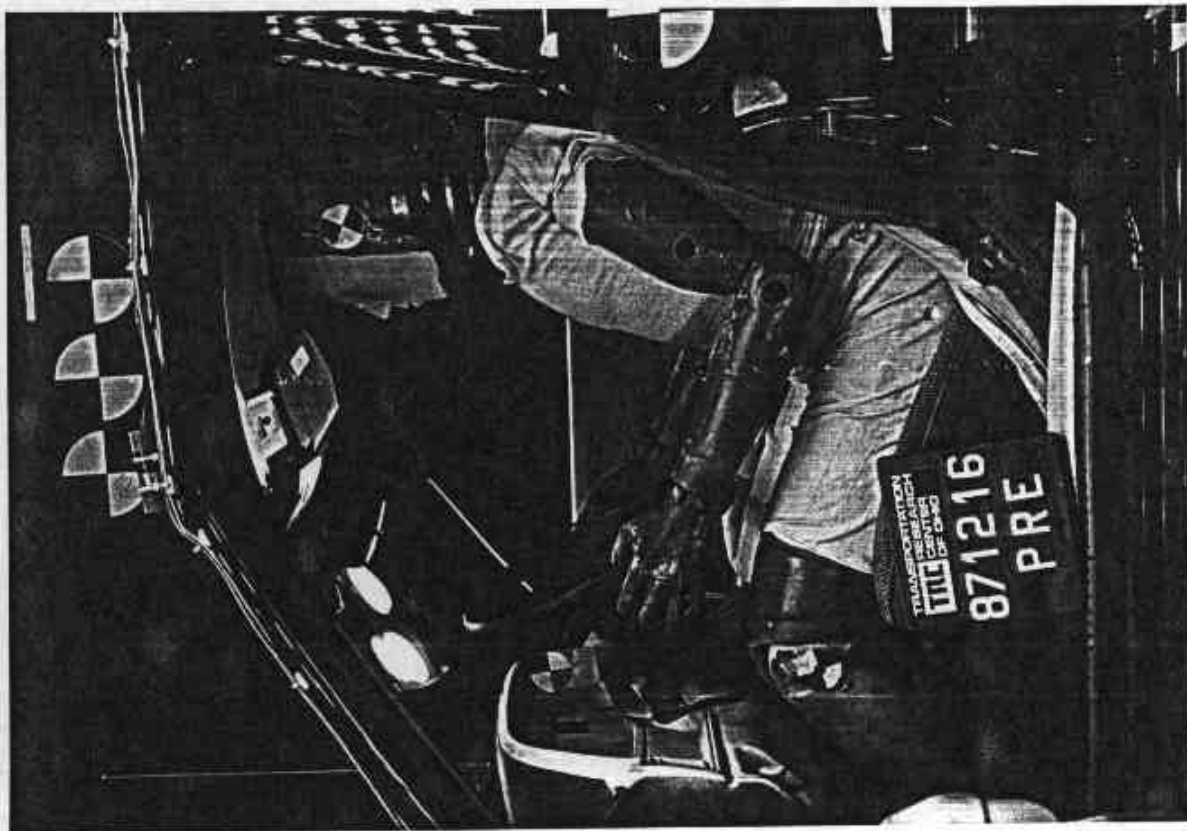


Figure A-25. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

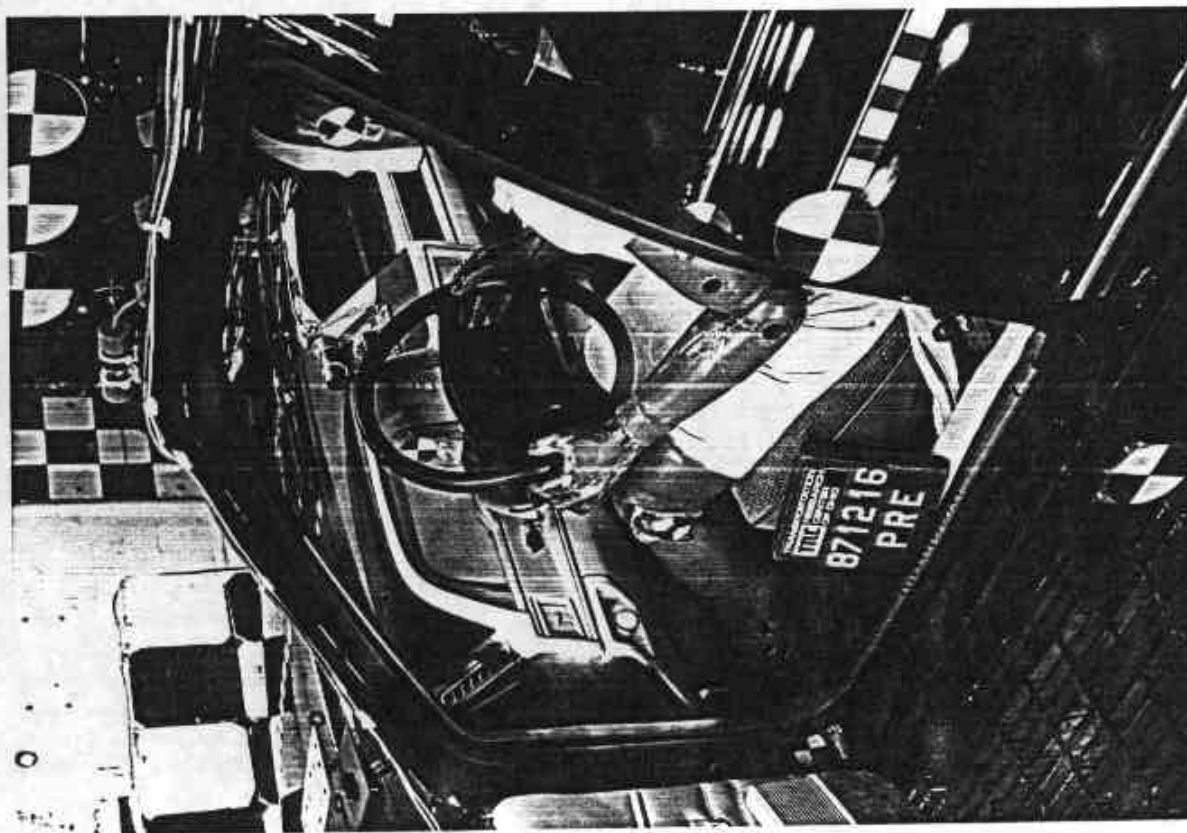


Figure A-26. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

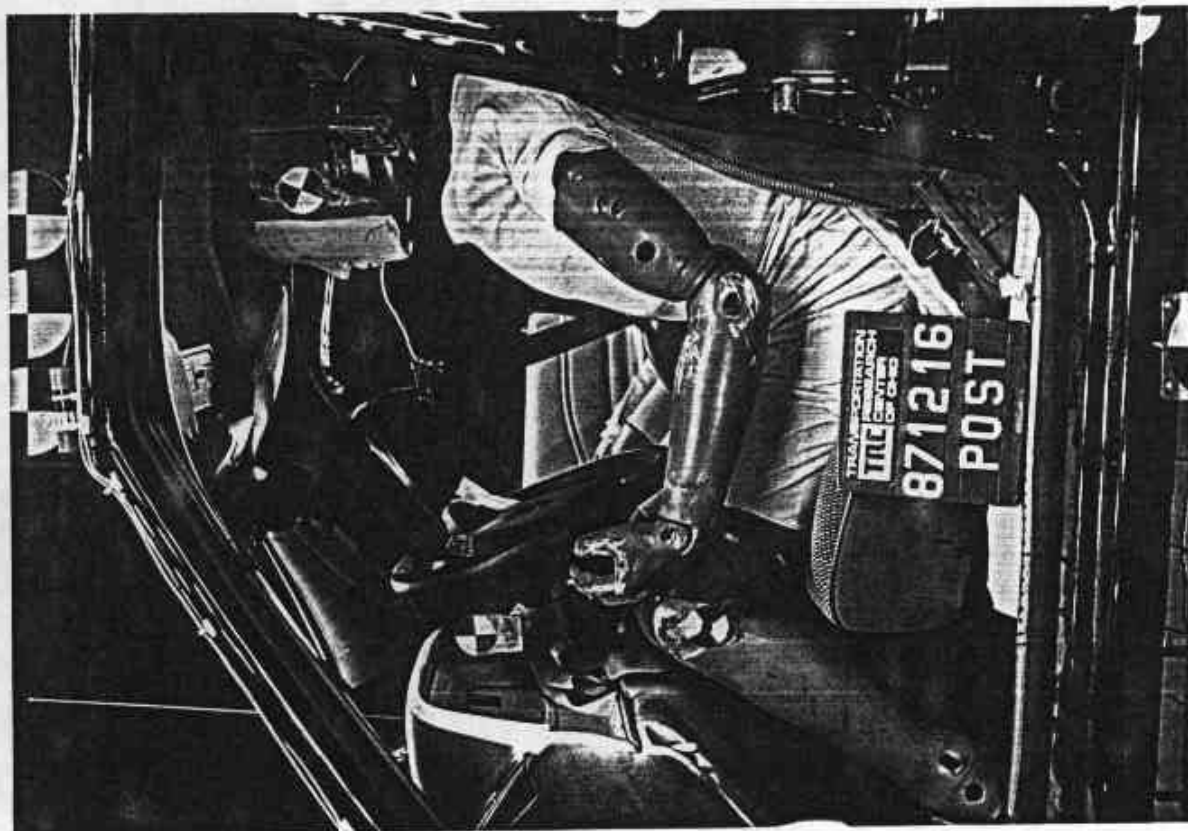


Figure A-27. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

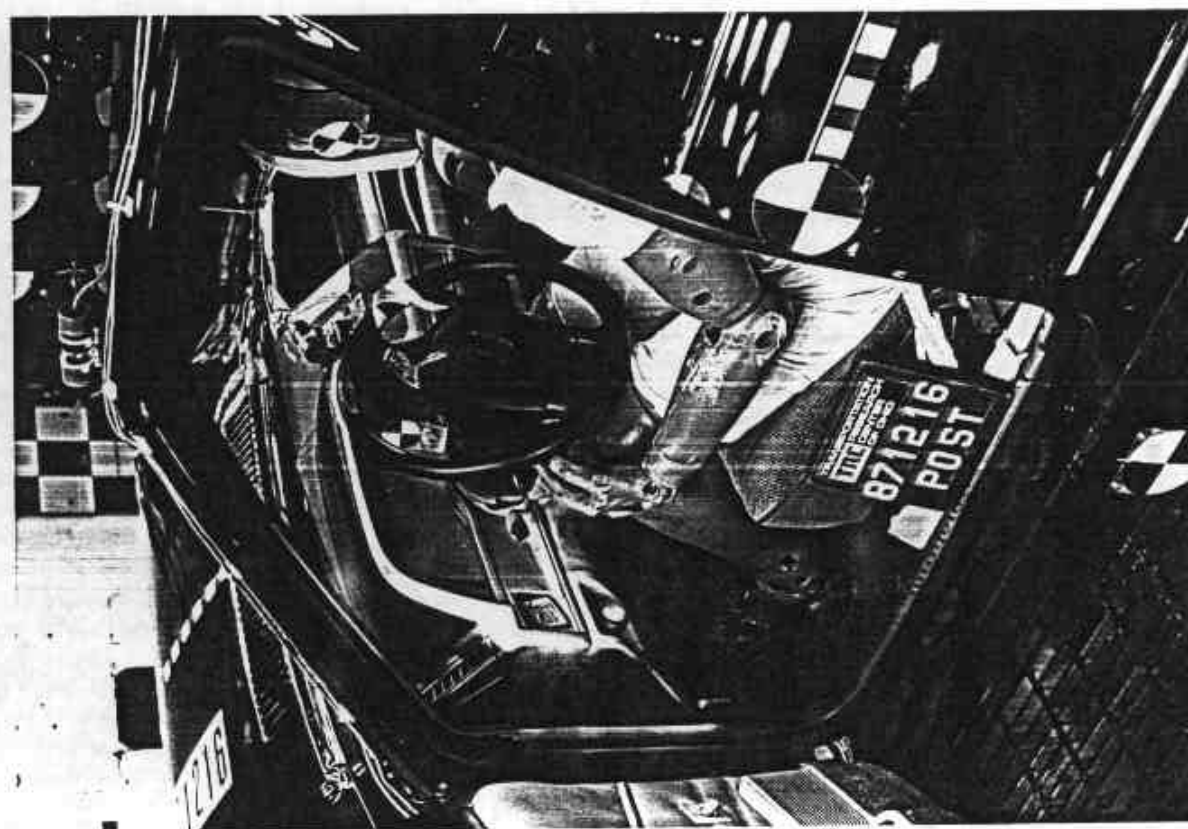


Figure A-28. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

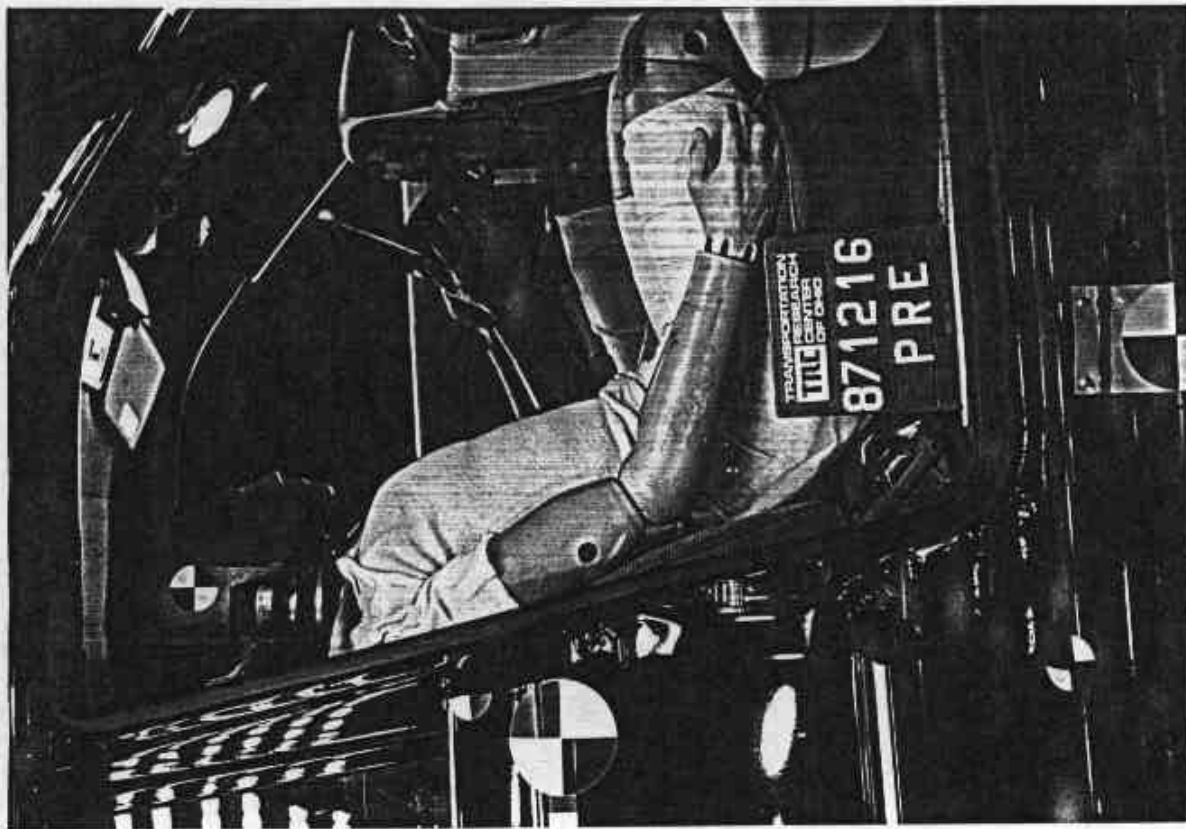


Figure A-29. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

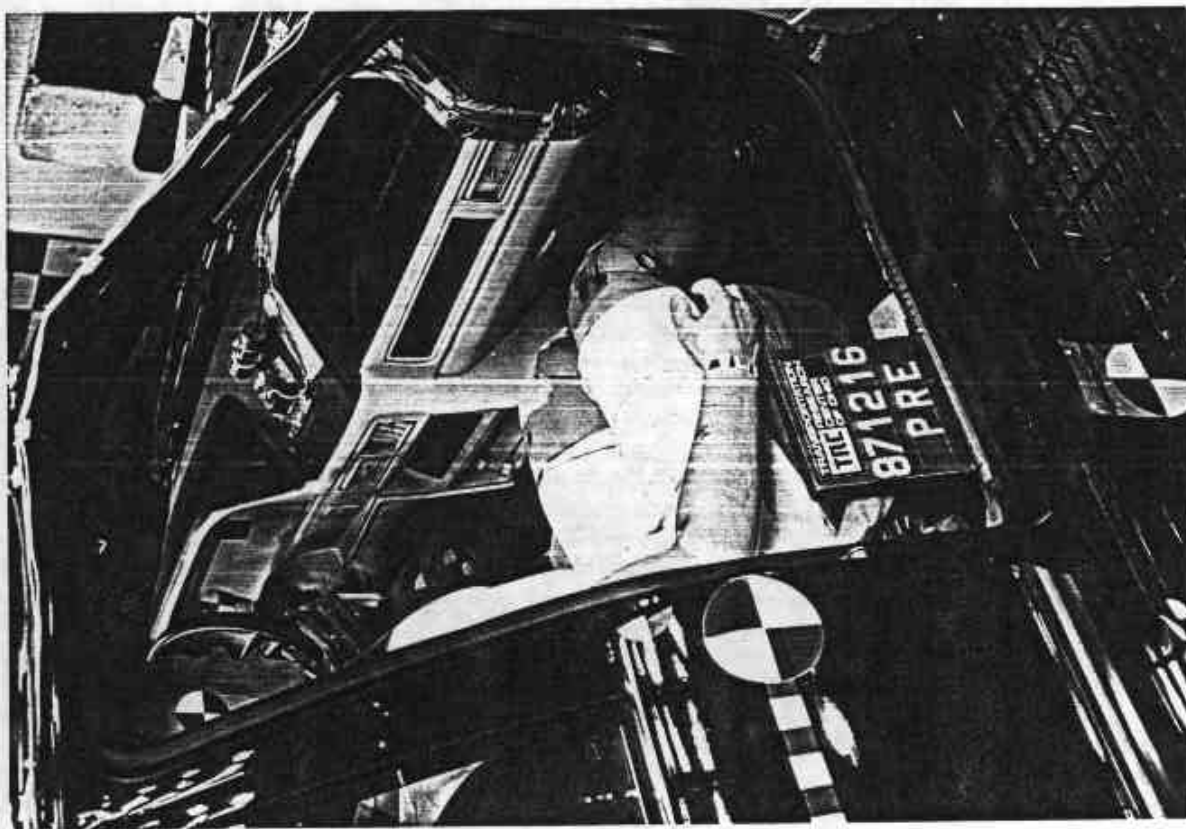


Figure A-30. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

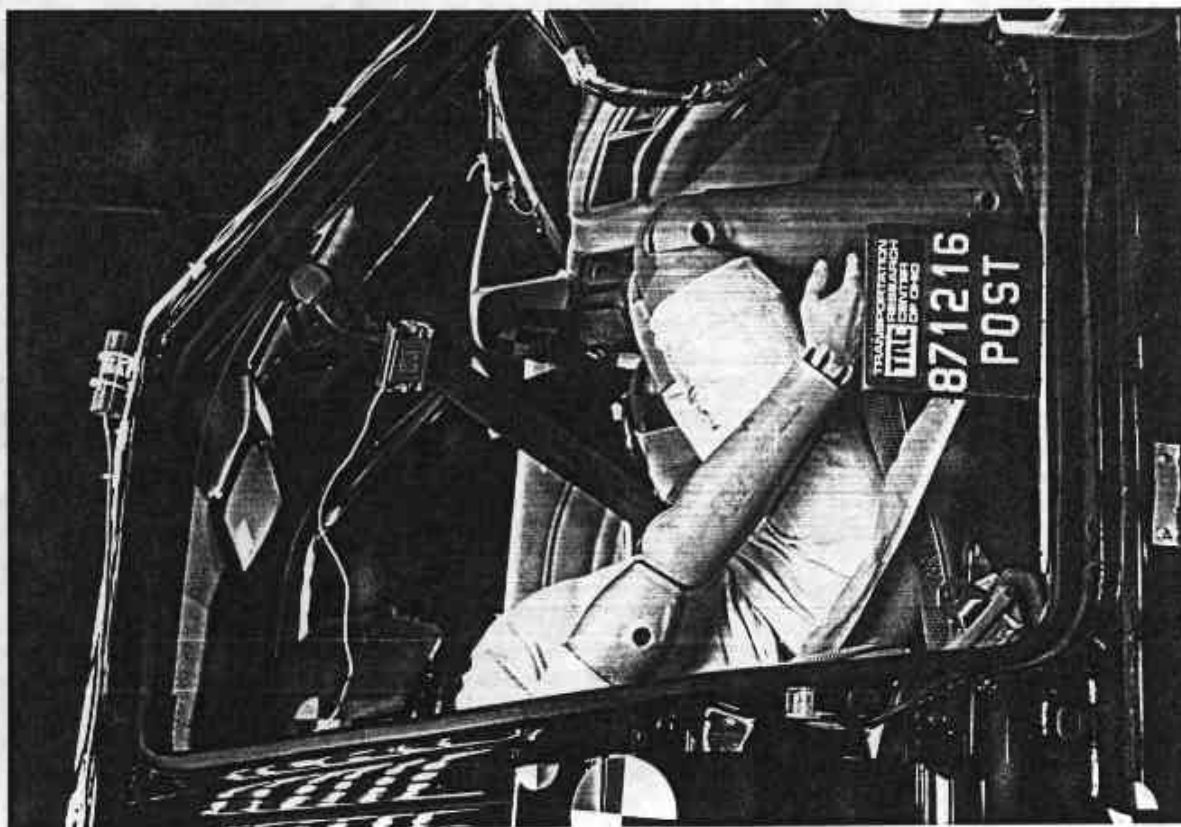


Figure A-31. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

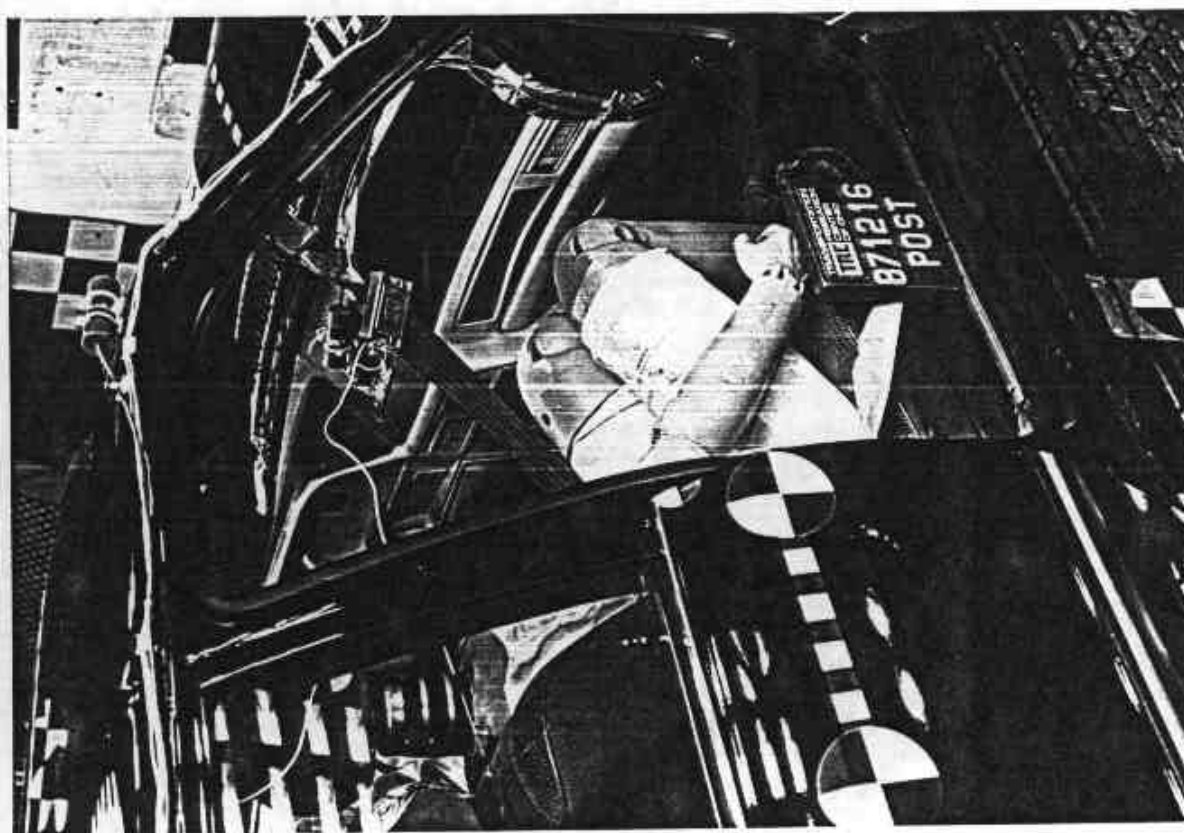


Figure A-32. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2



Figure A-33. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 1



Figure A-34. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 2



Figure A-35. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 3

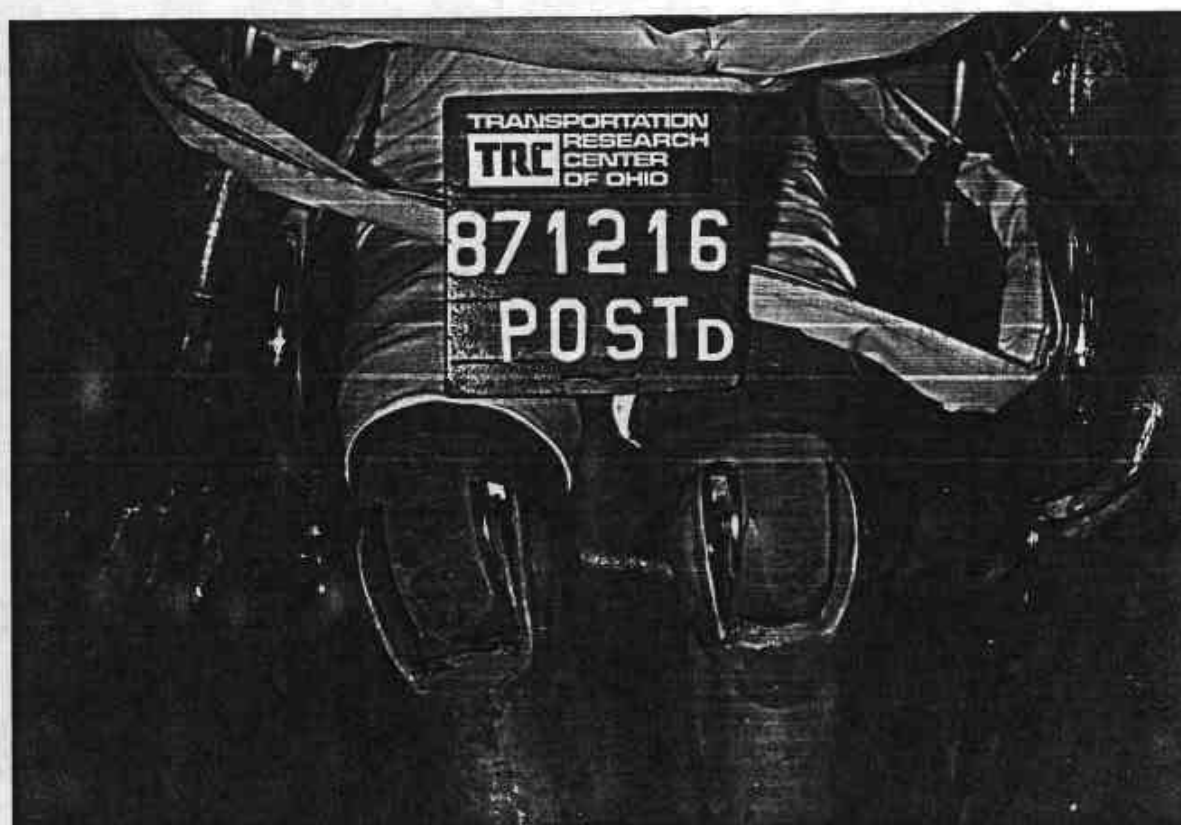


Figure A-36. POST-TEST DRIVER DUMMY HEAD/KNEE CONTACT - VIEW 4

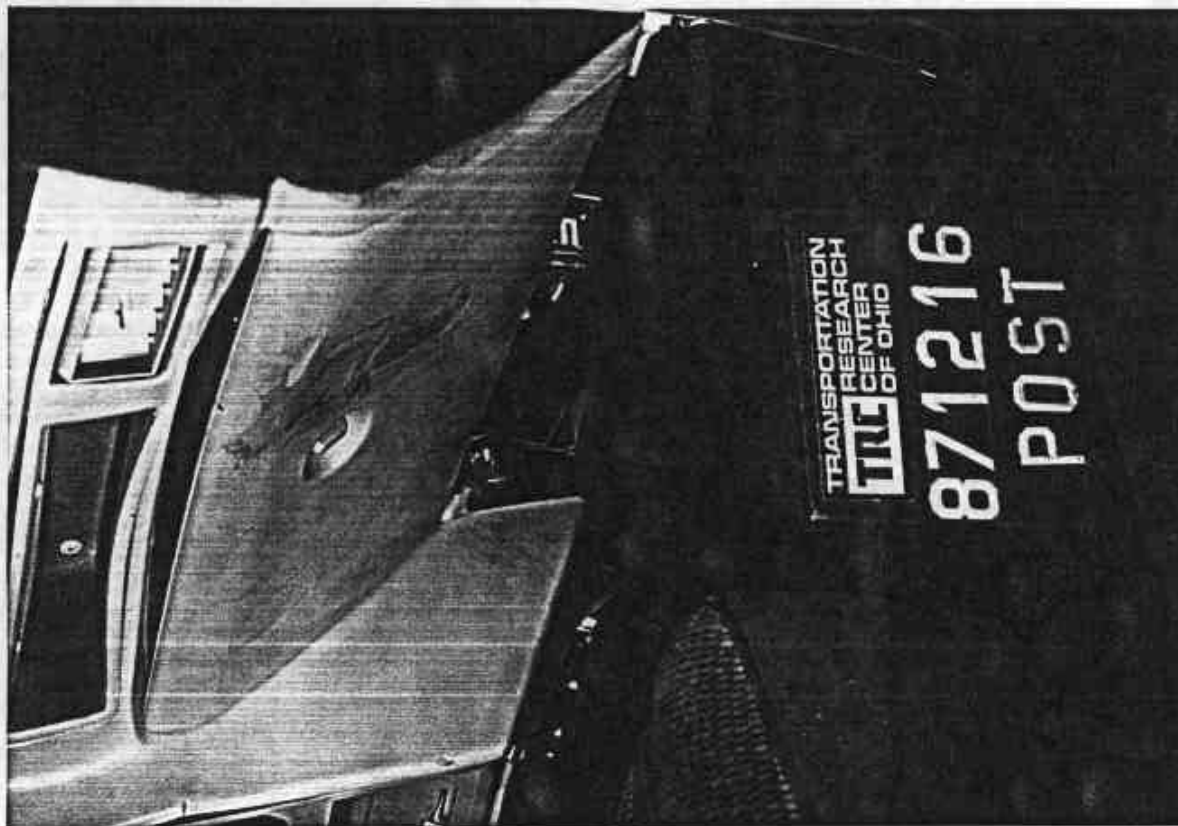


Figure A-37. POST-TEST PASSENGER DUMMY/KNEE CONTACT - VIEW 1

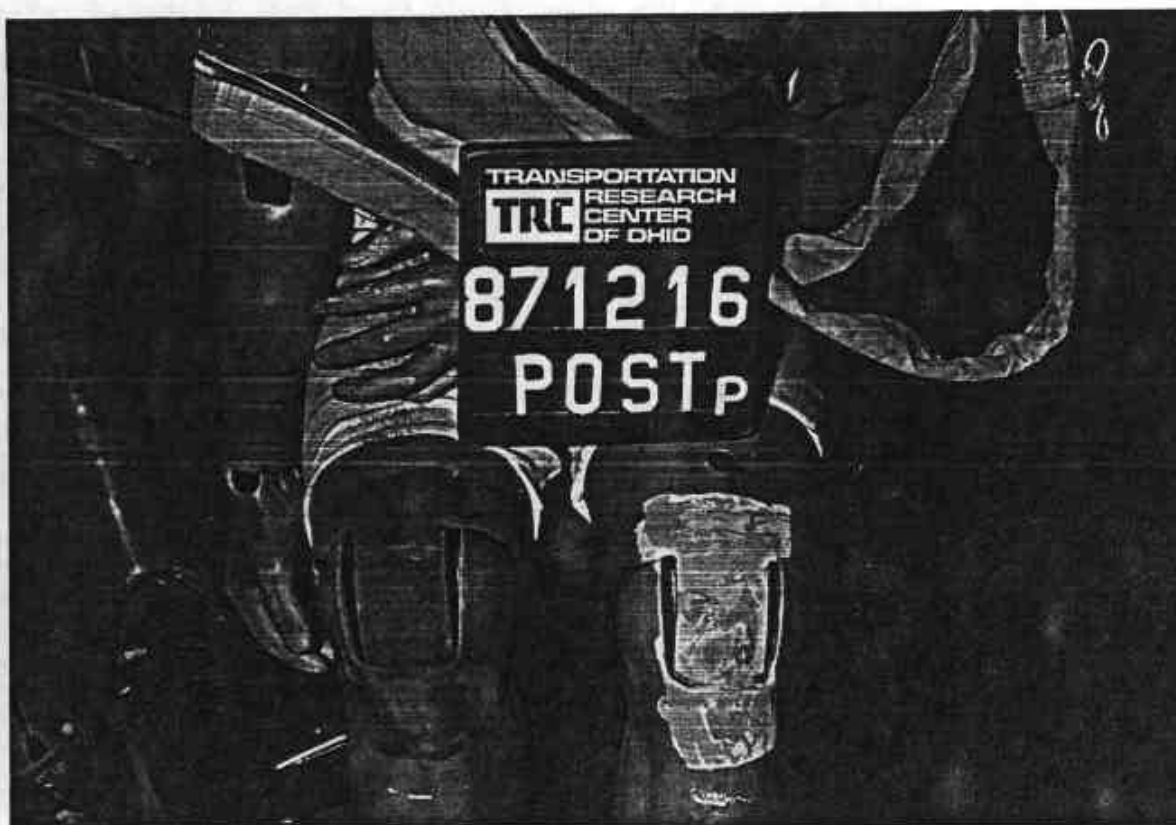


Figure A-38. POST-TEST PASSENGER DUMMY/KNEE CONTACT - VIEW 2

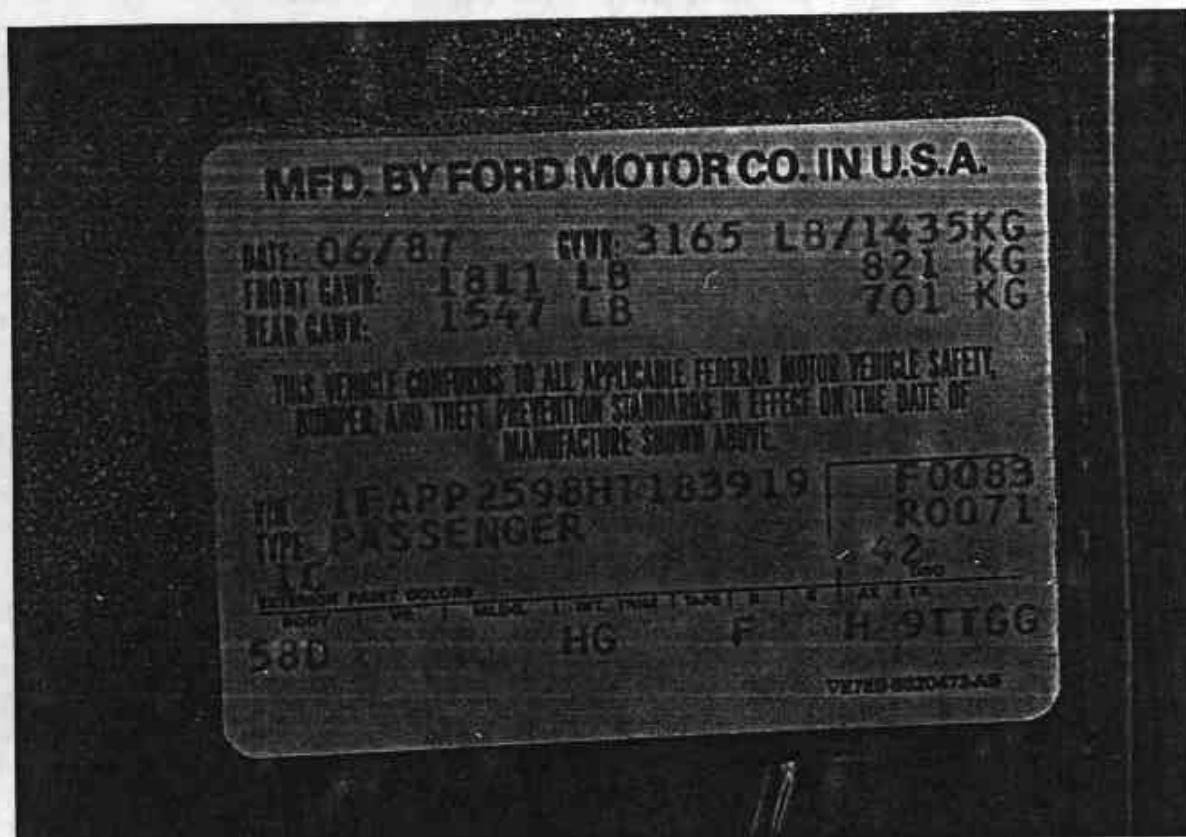


Figure A-39. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW

ESCORT/LYNX		RECOMMENDED TIRE SIZE and INFLATION PRESSURE (COLD)		3	
MODELS	TIRE SIZE (LOAD RANGE C & D TIRES NOT PERMISSIBLE)	LOAD RANGE	FRONT & REAR PRESSURE		
			SEDANS	4 DR. LIFT GATE	
ALL EXCEPT SPORTS OPTION	P165/80R13	STD	30 PSI 207 kPa	30 PSI 207 kPa	
	P175/80R13	STD	35 PSI 240 kPa		
SPORTS OPTION ONLY	P195/60HR15*	STD	30 PSI 207 kPa		
ALL	P155/80D13 TEMPORAL SPARE	STD	35 PSI 240 kPa	35 PSI 240 kPa	
*REPLACE WITH IDENTICAL ORIGINAL EQUIPMENT BRAND (GOODYEAR) SIZE CONSTRUCTION TYPE AND SPEED RATED TIRE—REFER TO OWNER'S GUIDE					
TOTAL LOAD = OCCUPANTS PLUS LUGGAGE					
MODEL	MAXIMUM LOAD	TOTAL OCCUPANTS	DISTRIBUTION		
			FRONT	REAR	LUGGAGE
SEDANS	650 lb/295 kg	4	2	2	50 lb/23 kg
4 DR. LIFT GATE	750 lb/340 kg	4	2	2	150 lb/68 kg
FOR SUSTAINED HIGH SPEED, TRAILER TOWING, RECREATIONAL ACCESSORIES, OR TEMPORAL SPARE INFORMATION—SEE OWNER'S GUIDE					

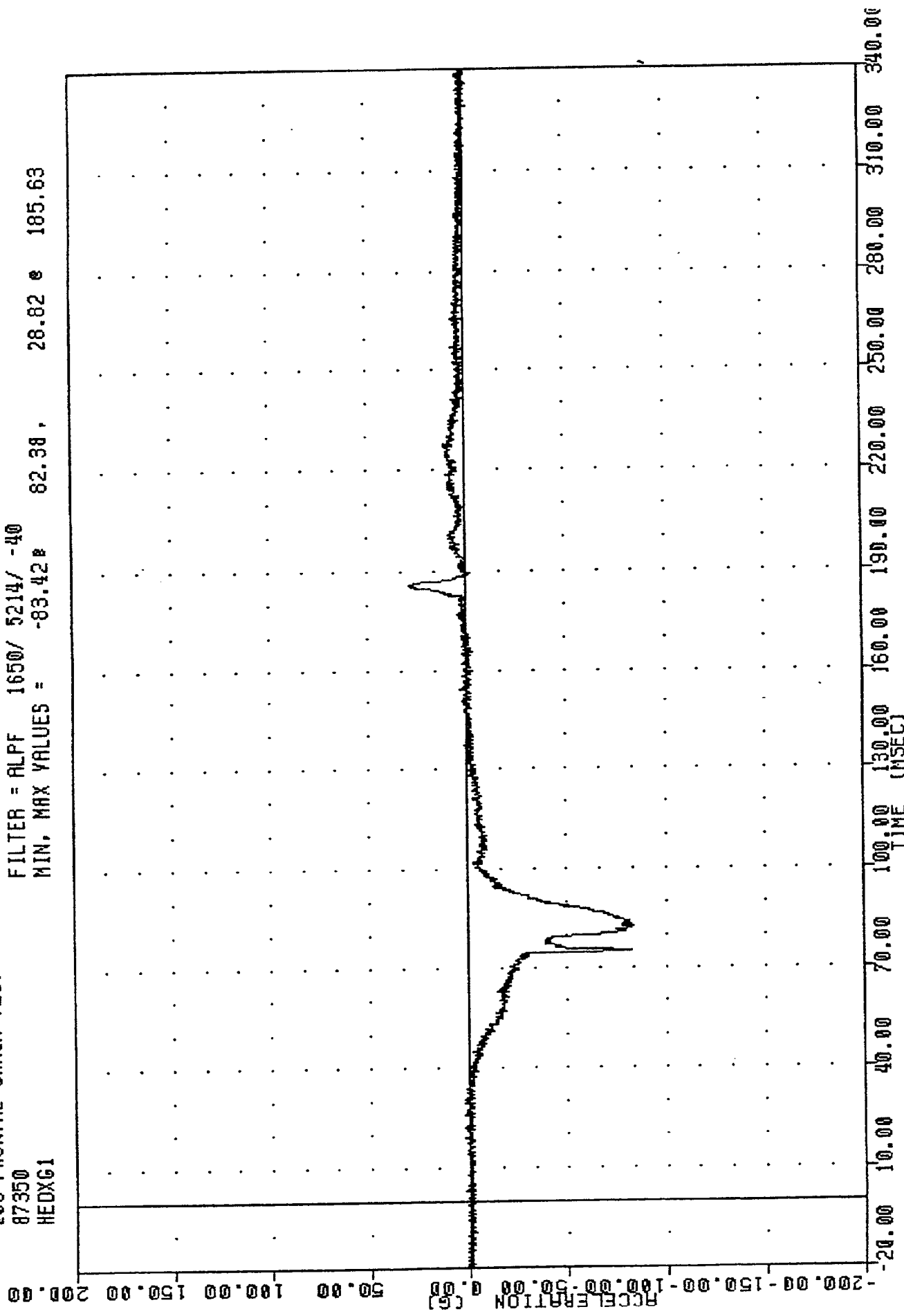
Figure A-40. PRE-TEST VEHICLE TIRE LOAD LABEL VIEW
 A-22

APPENDIX B

DATA PLOTS

TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 HEDXG1

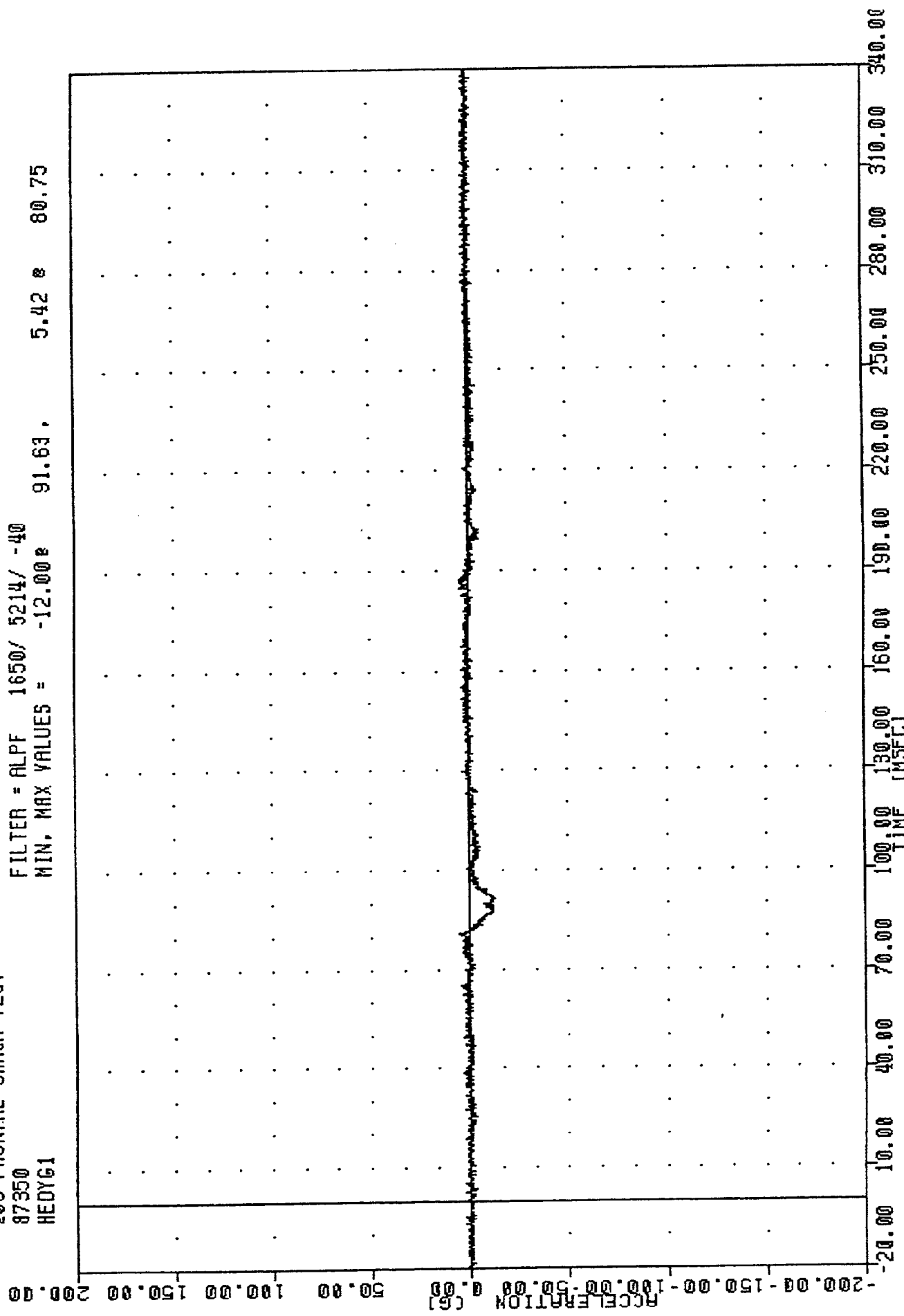
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -83.42 82.38 28.82 185.63



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER HEAD X AXIS ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 HEDYG1

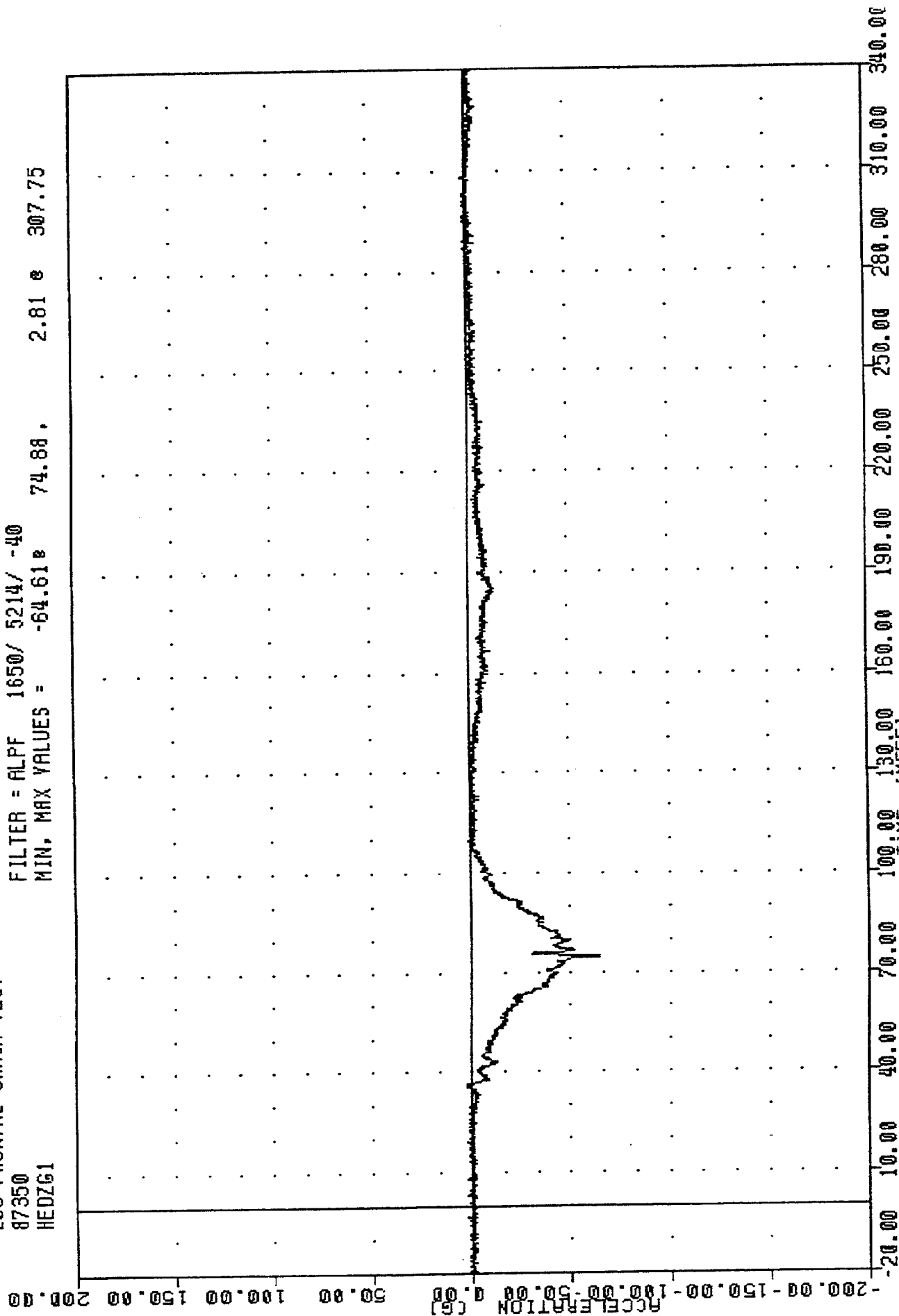
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -12.00 91.63, 5.42 80.75



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER HEAD Y AXIS ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 HEDZG1

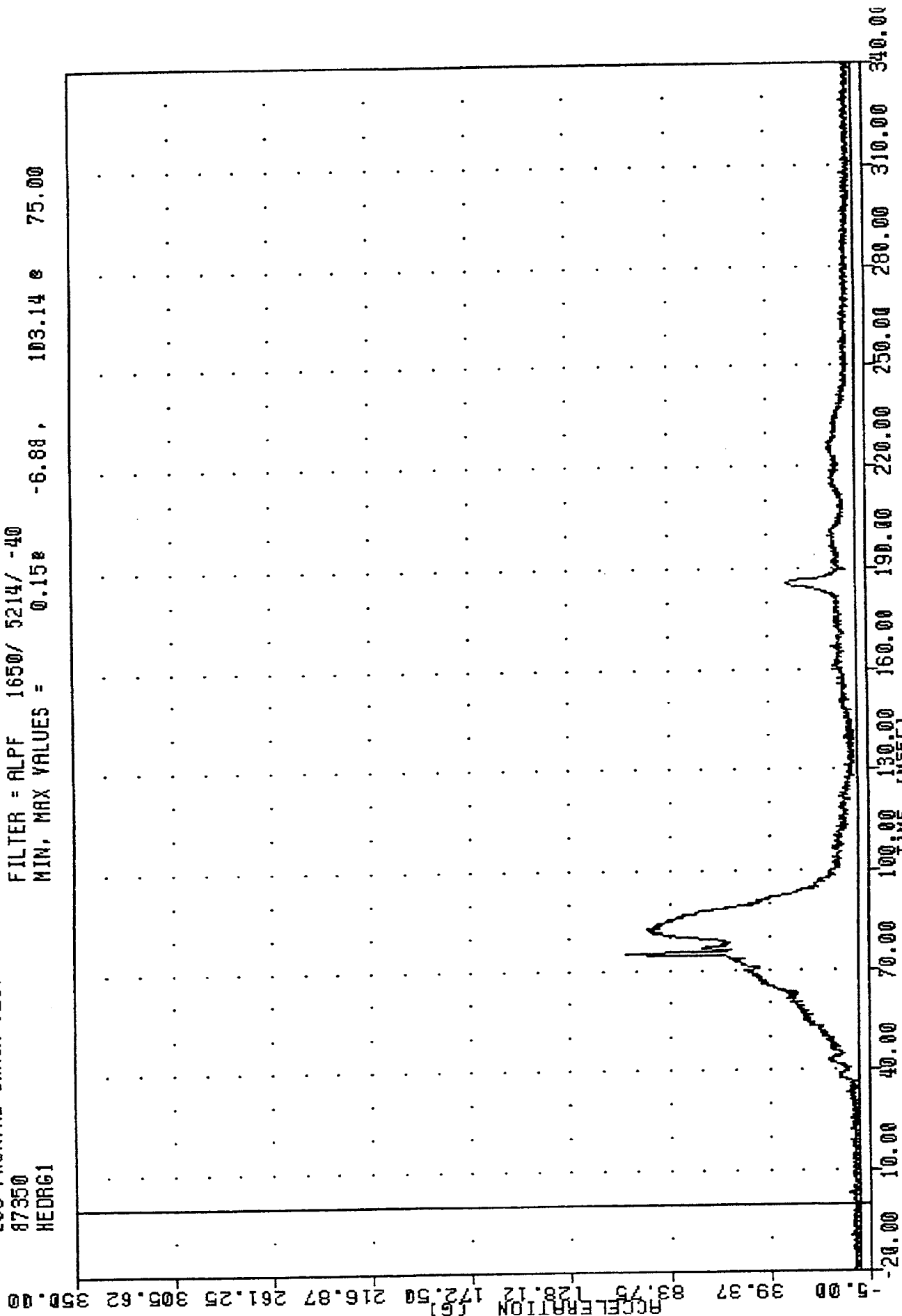
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -64.61e 74.88, 2.81 e 307.75



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER HEAD Z AXIS ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 HEDRG1

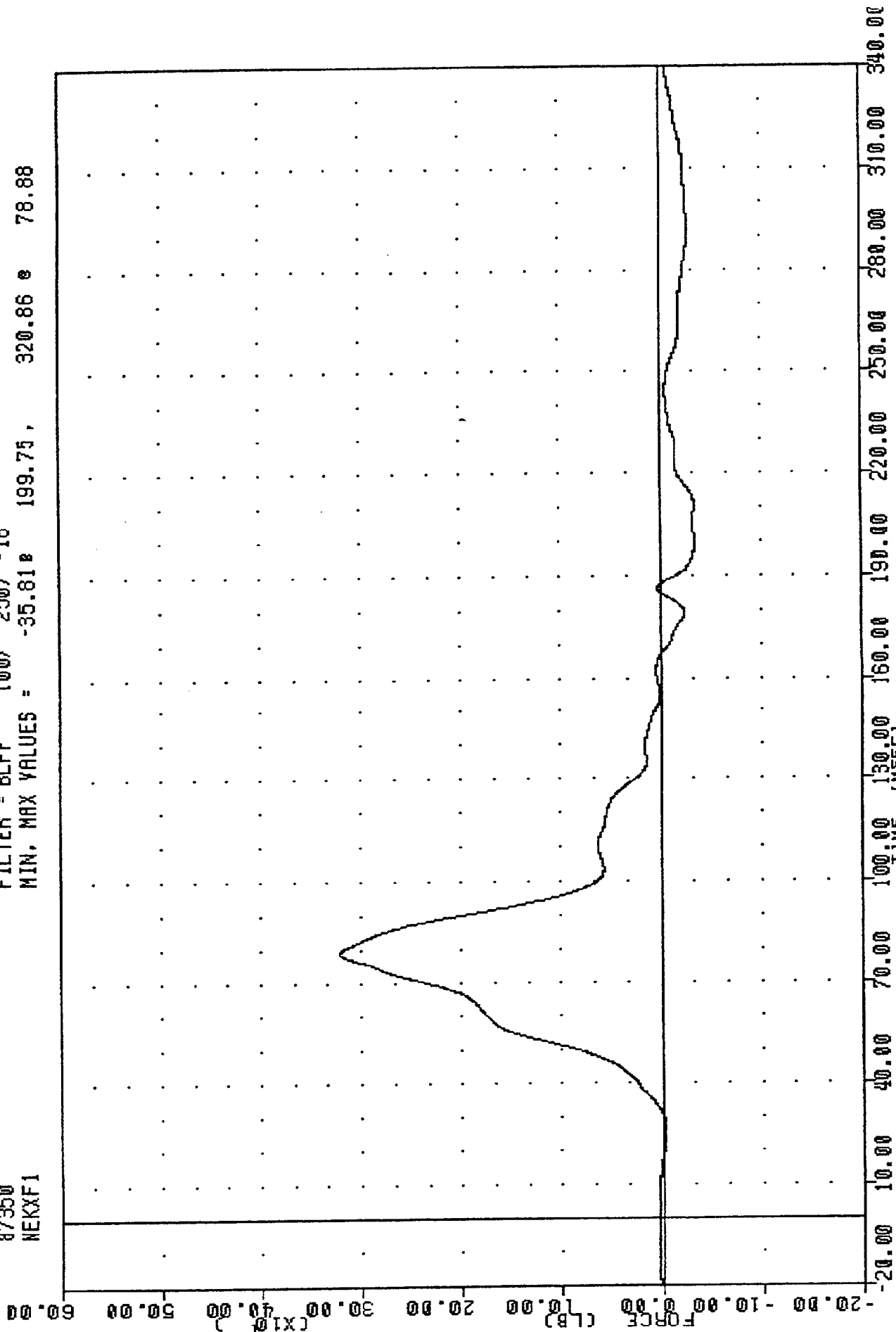
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.158 -6.88, 103.14 & 75.00



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 NEKXF1

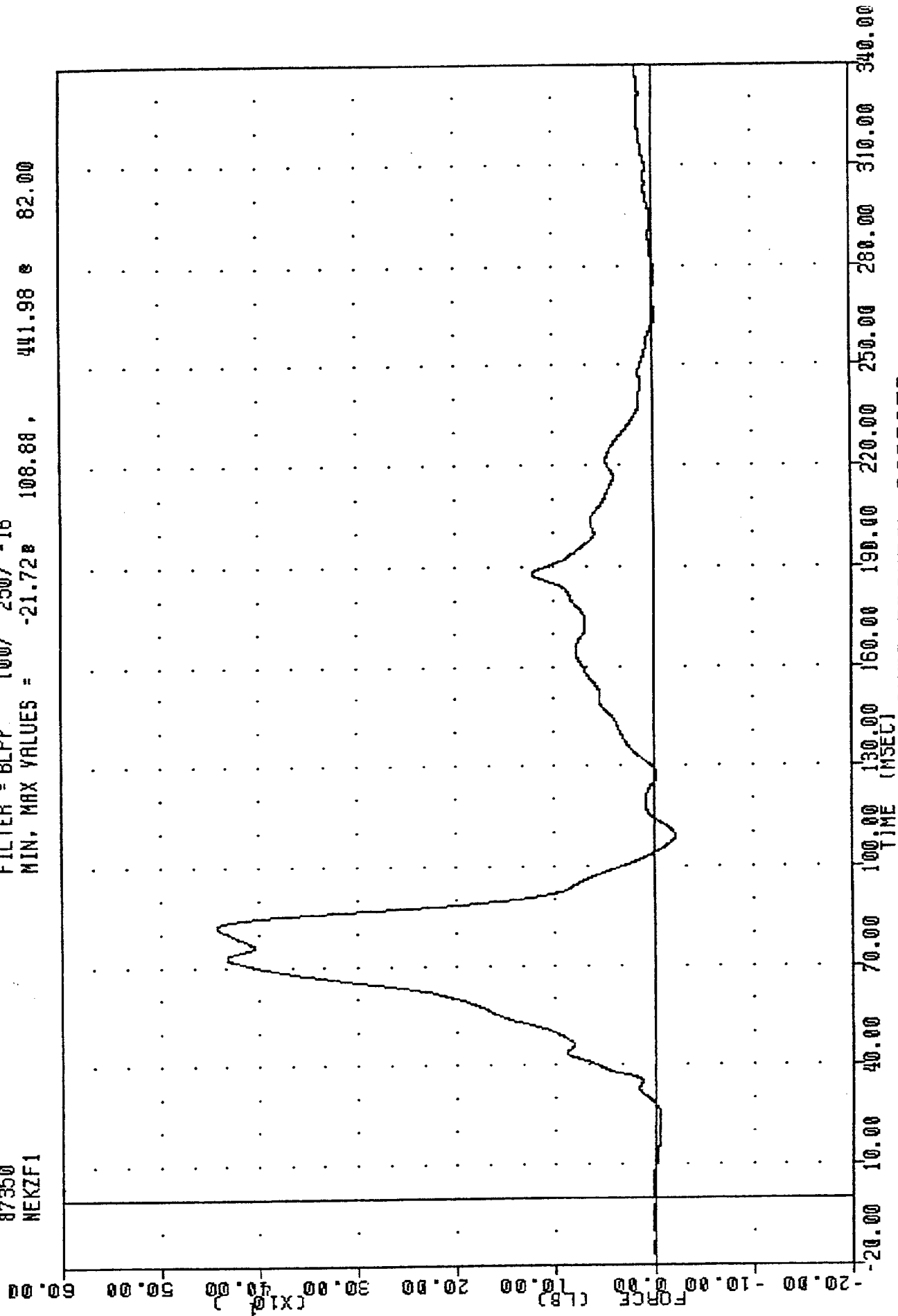
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -35.81 199.75 , 320.86 78.88



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER NECK FORCE X AXIS LBS (SHEAR)

TRC 871216
 208 FRONTAL CRASH TEST
 87350
 NEKZF1

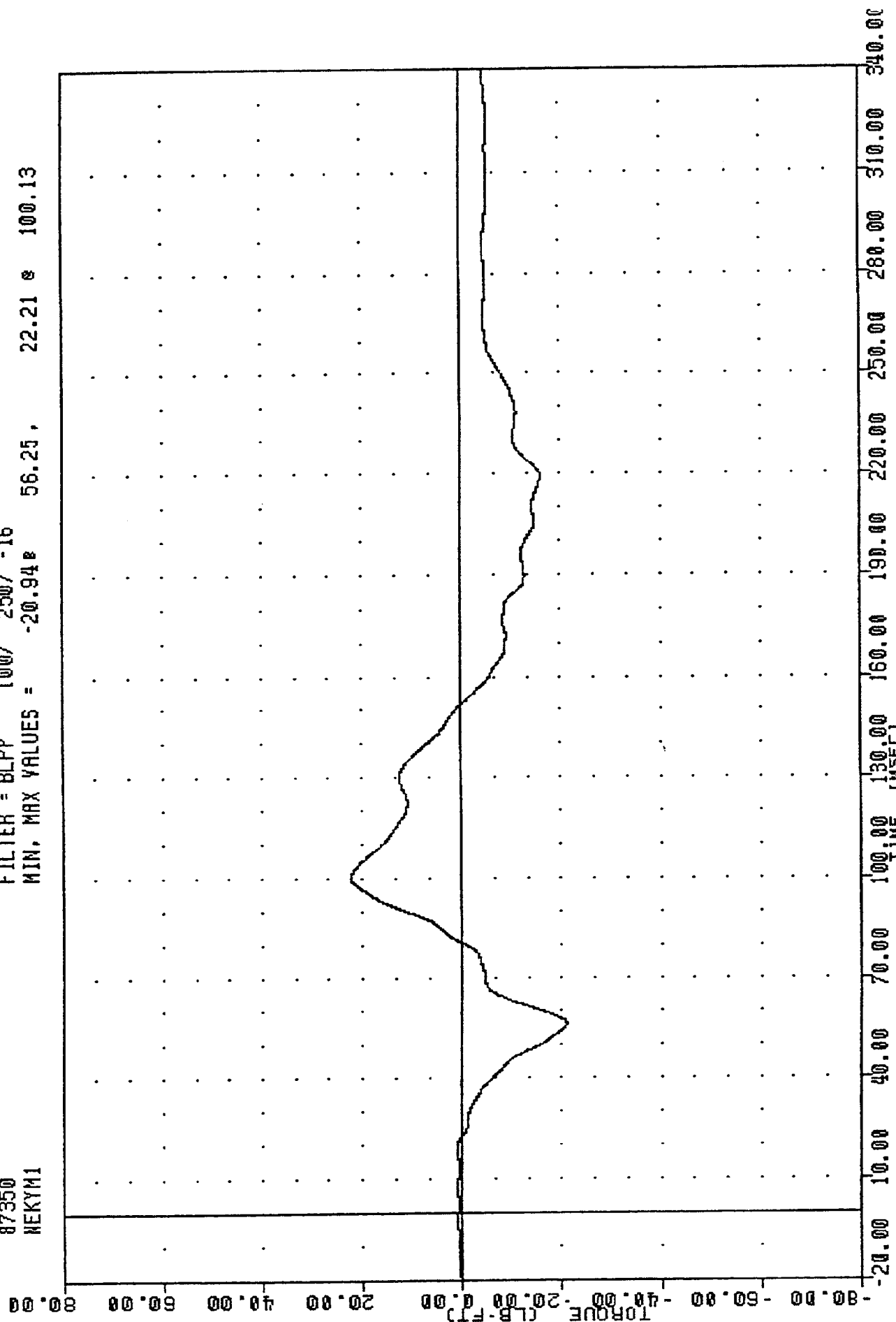
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -21.728 108.88, 441.98 82.00



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER NECK FORCE Z AXIS LBS (AXIAL)

TRC . 871216
 208 FRONTAL CRASH TEST
 87350
 NEKYM1

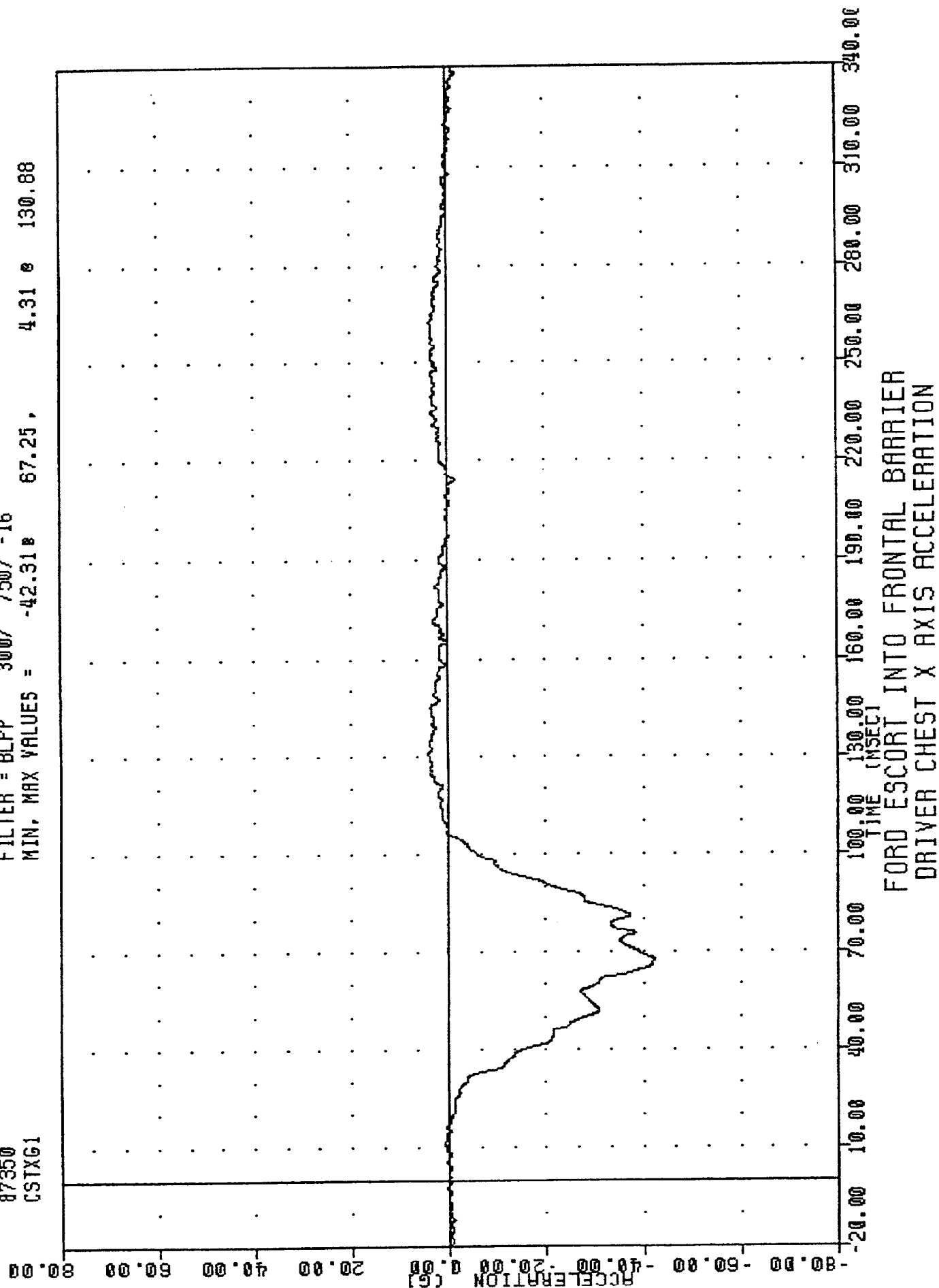
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -20.94 56.25, 22.21 100.13



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER NECK MOMENT Y AXIS FT-LBS

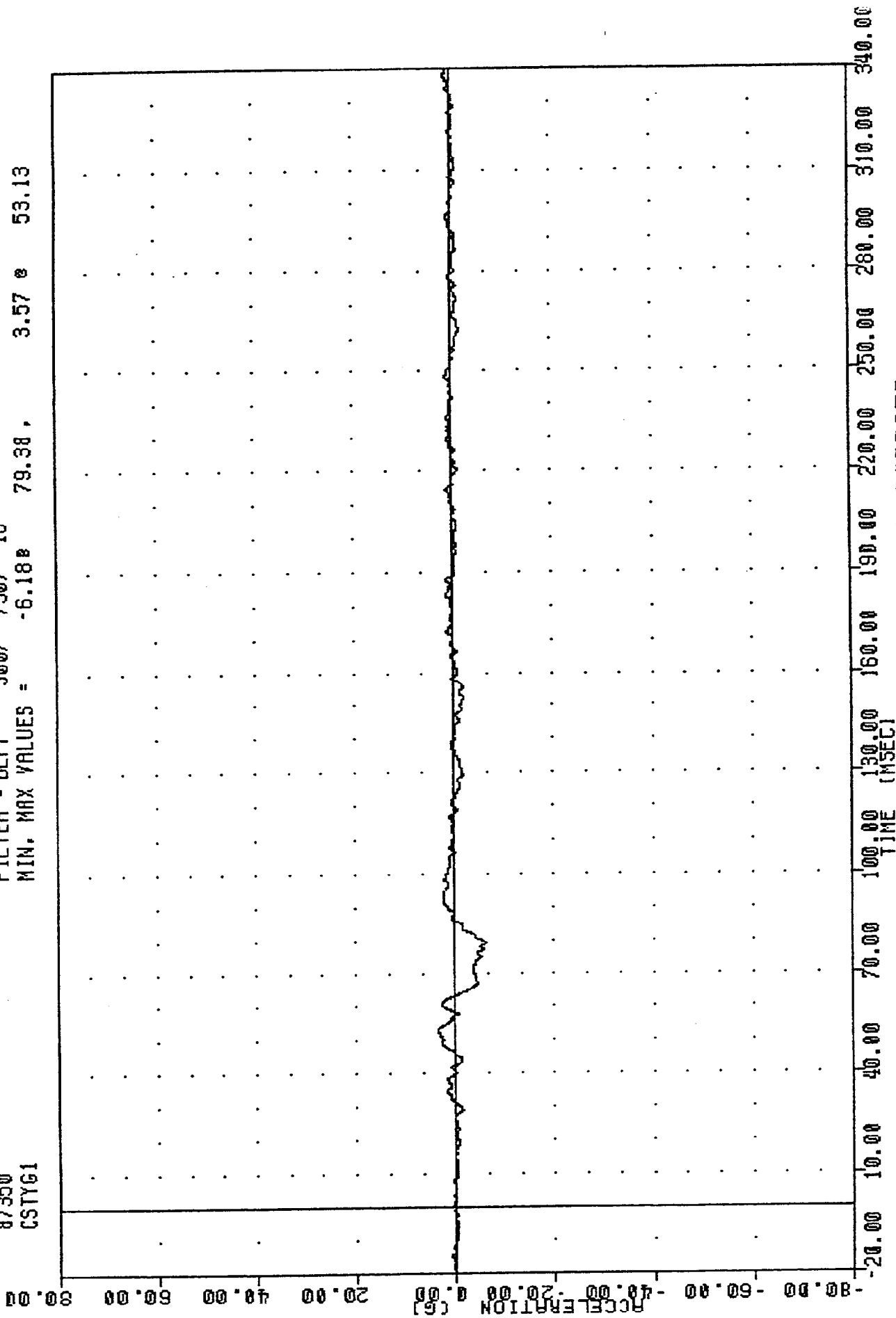
TRC , 871216
208 FRONTAL CRASH TEST
87350
CSTXG1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -42.31 67.25, 4.31 130.88



TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 CSTYG1

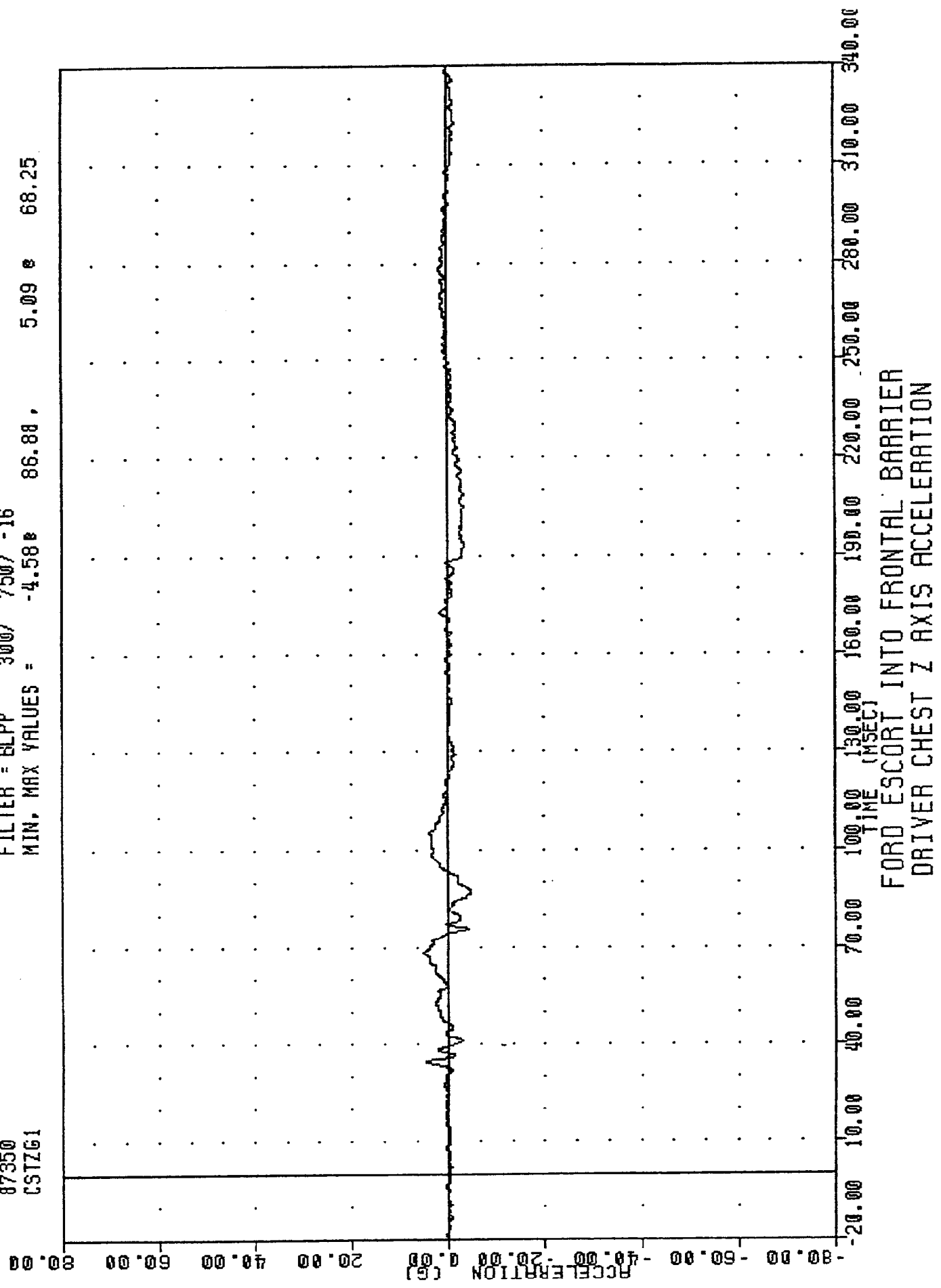
FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -6.18 79.38 , 3.57 53.13



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER CHEST Y AXIS ACCELERATION

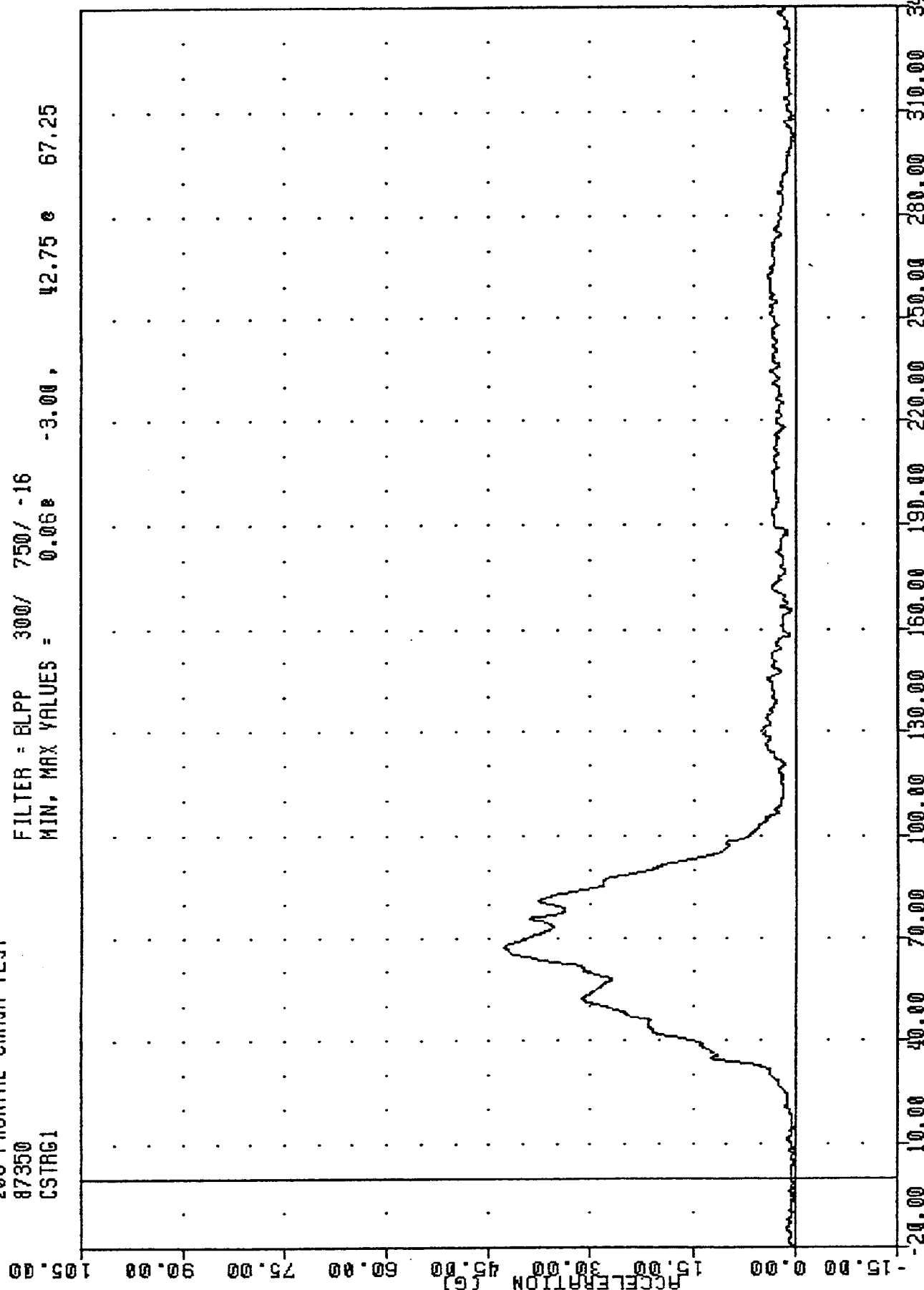
TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 CSTZG1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -4.58 86.88, 5.09 68.25



TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 CSTRG1

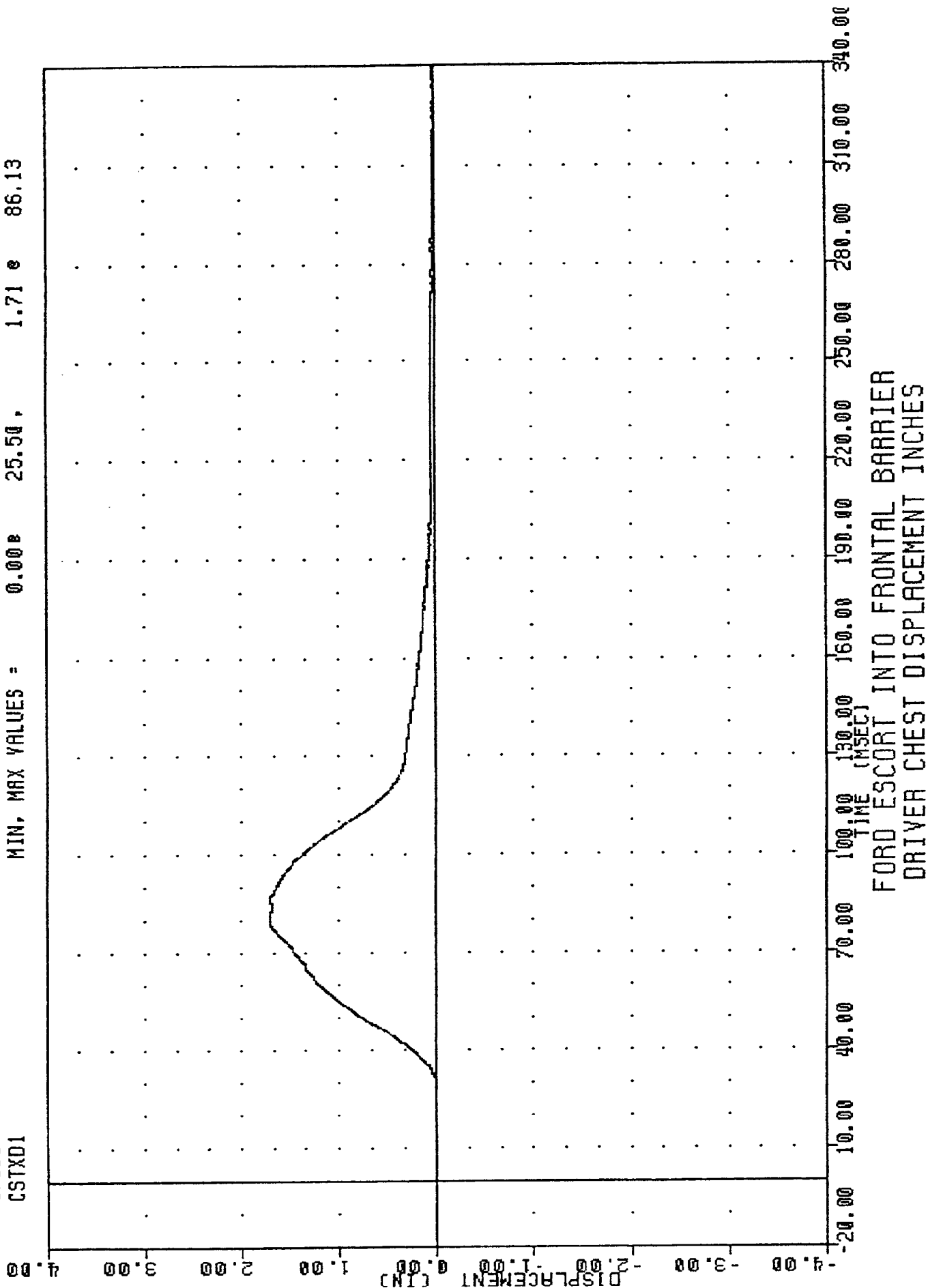
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.068 -3.00, 42.75 e 67.25



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION

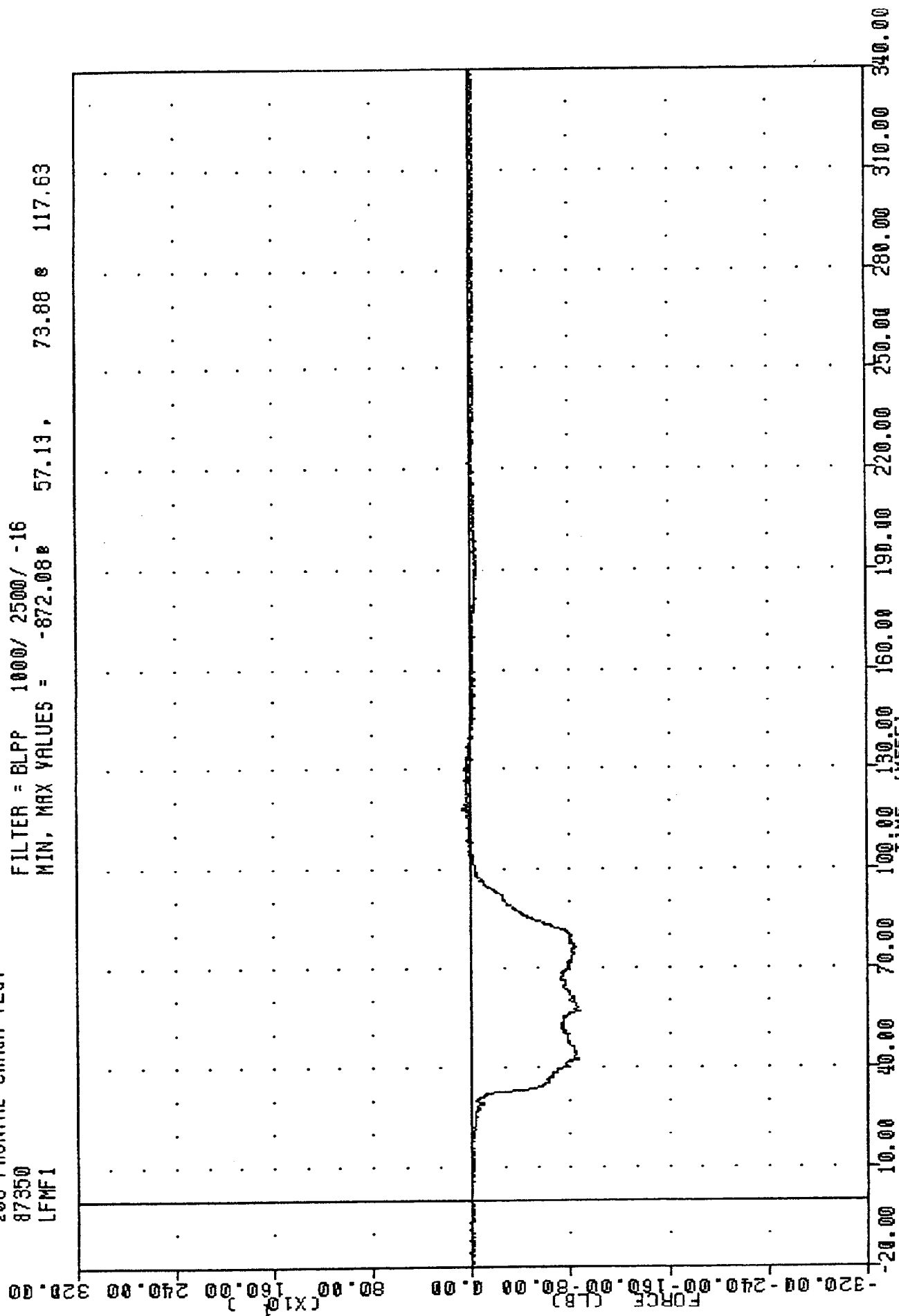
TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 CSTXD1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.00e 25.50, 1.71 e 86.13



TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 LFMF1

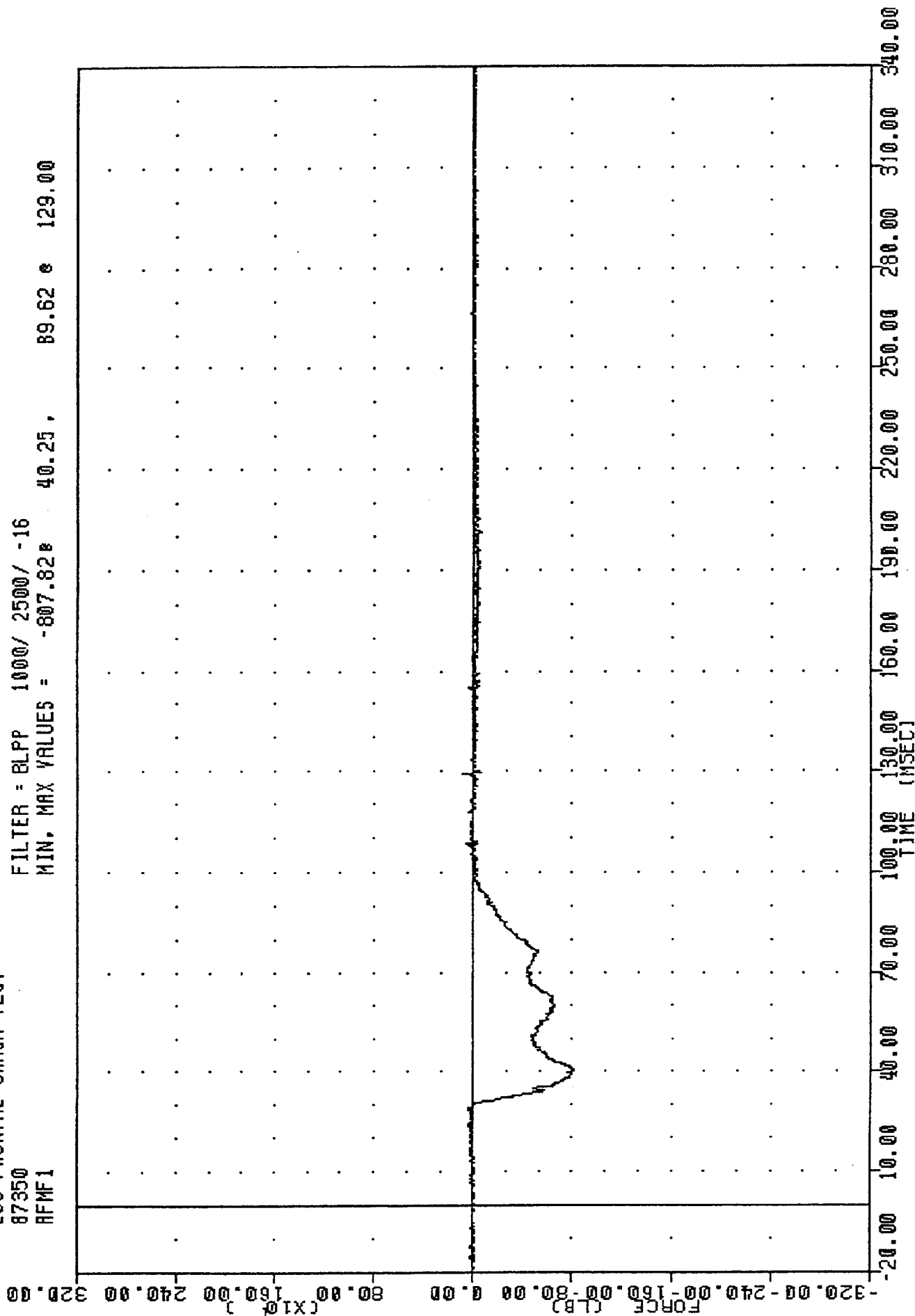
FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -872.08 57.13, 73.88 117.63



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER LEFT FEMUR FORCE LBS

TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 AFMF1

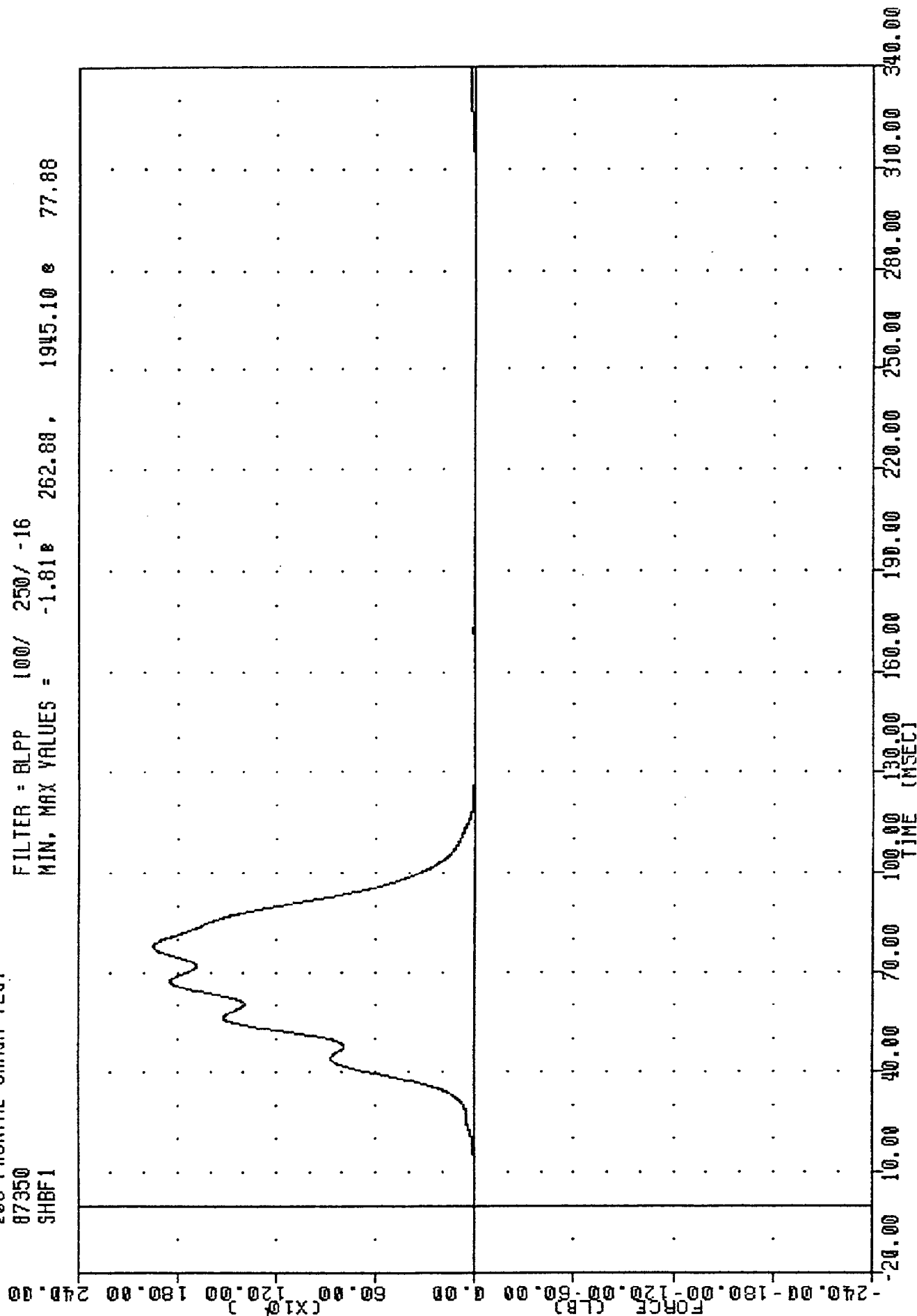
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -807.82 89.62 e 129.00



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER RIGHT FEMUR FORCE LBS

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 SHBF1

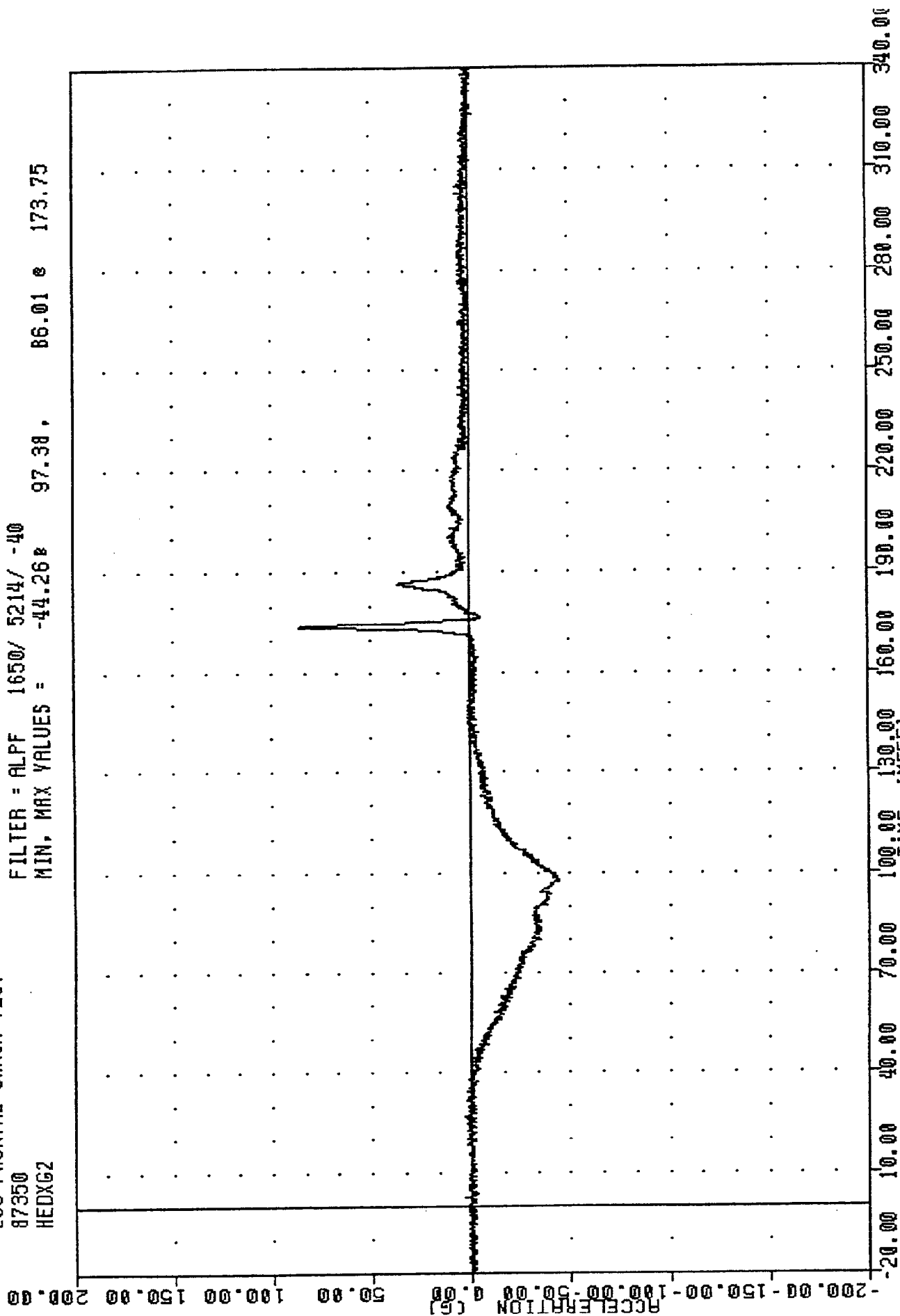
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1.81E 262.88 , 1945.10 e 77.88



FORD ESCORT INTO FRONTAL BARRIER
 DRIVER'S PASSIVE BELT INBOARD FORCE LBS

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 HEDXG2

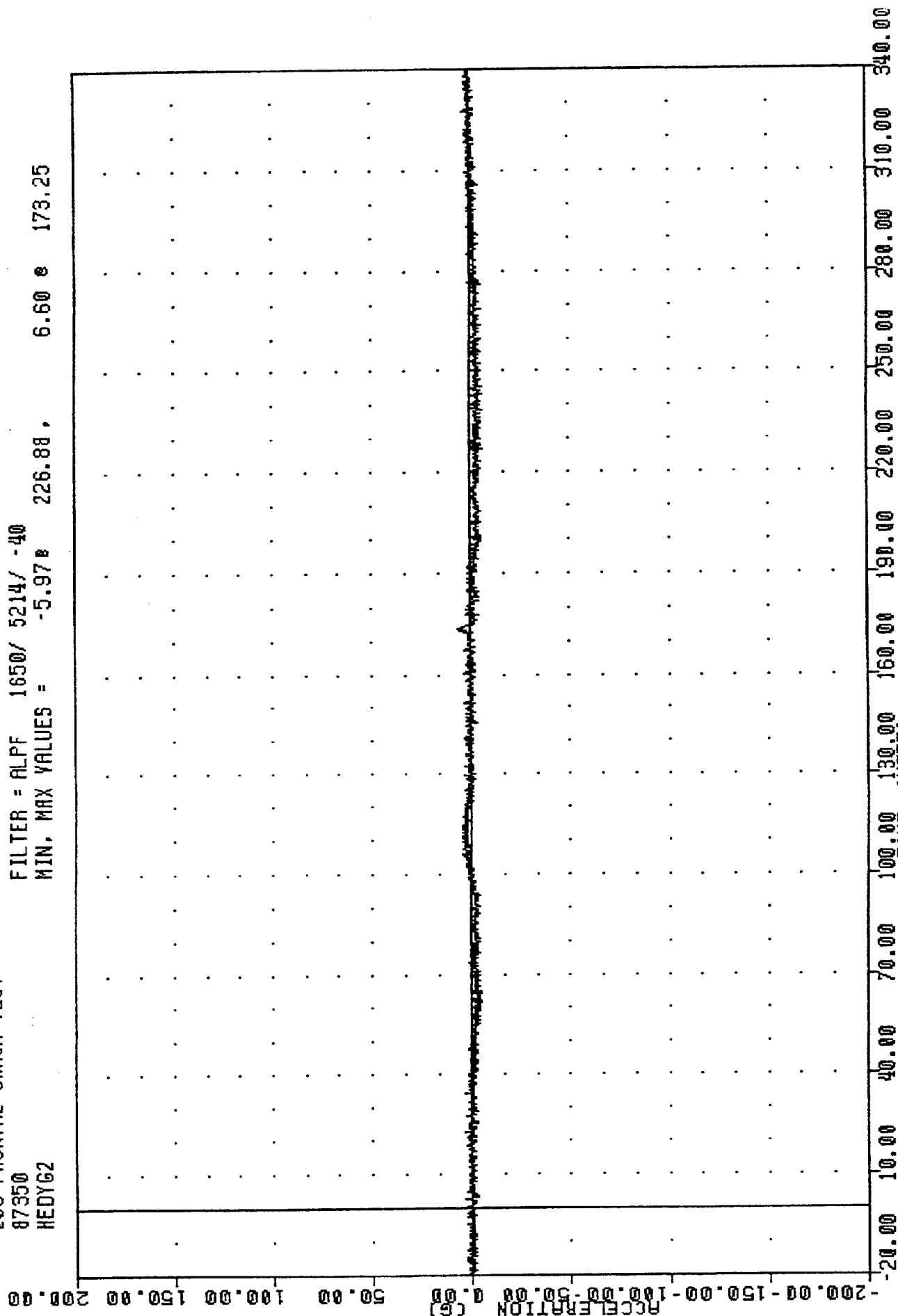
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -44.26 97.38 , 86.01 173.75



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER HEAD X AXIS ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 HEDYG2

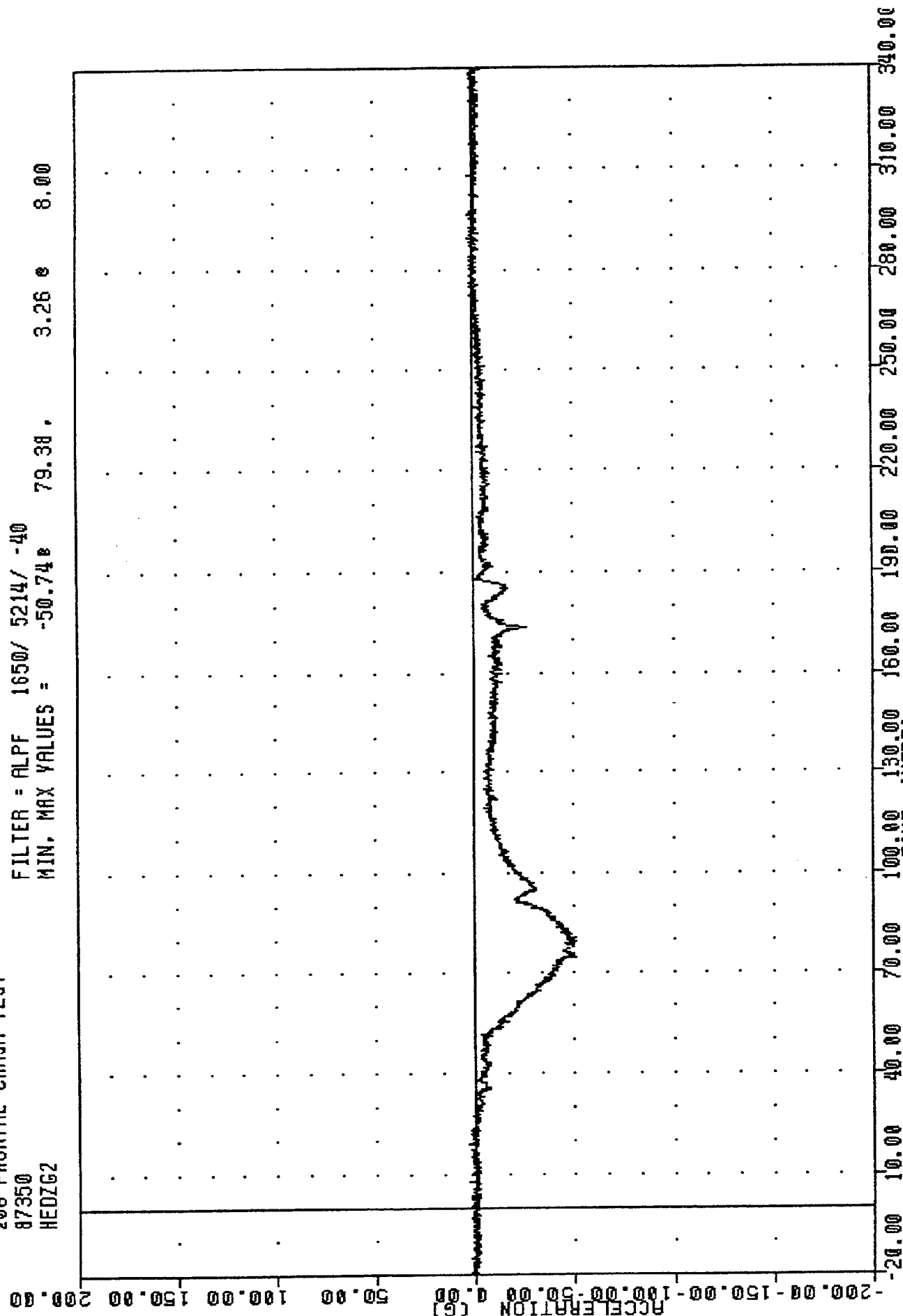
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -5.97 226.88, 6.60 173.25



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER HEAD Y AXIS ACCELERATION

TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 HEDZG2

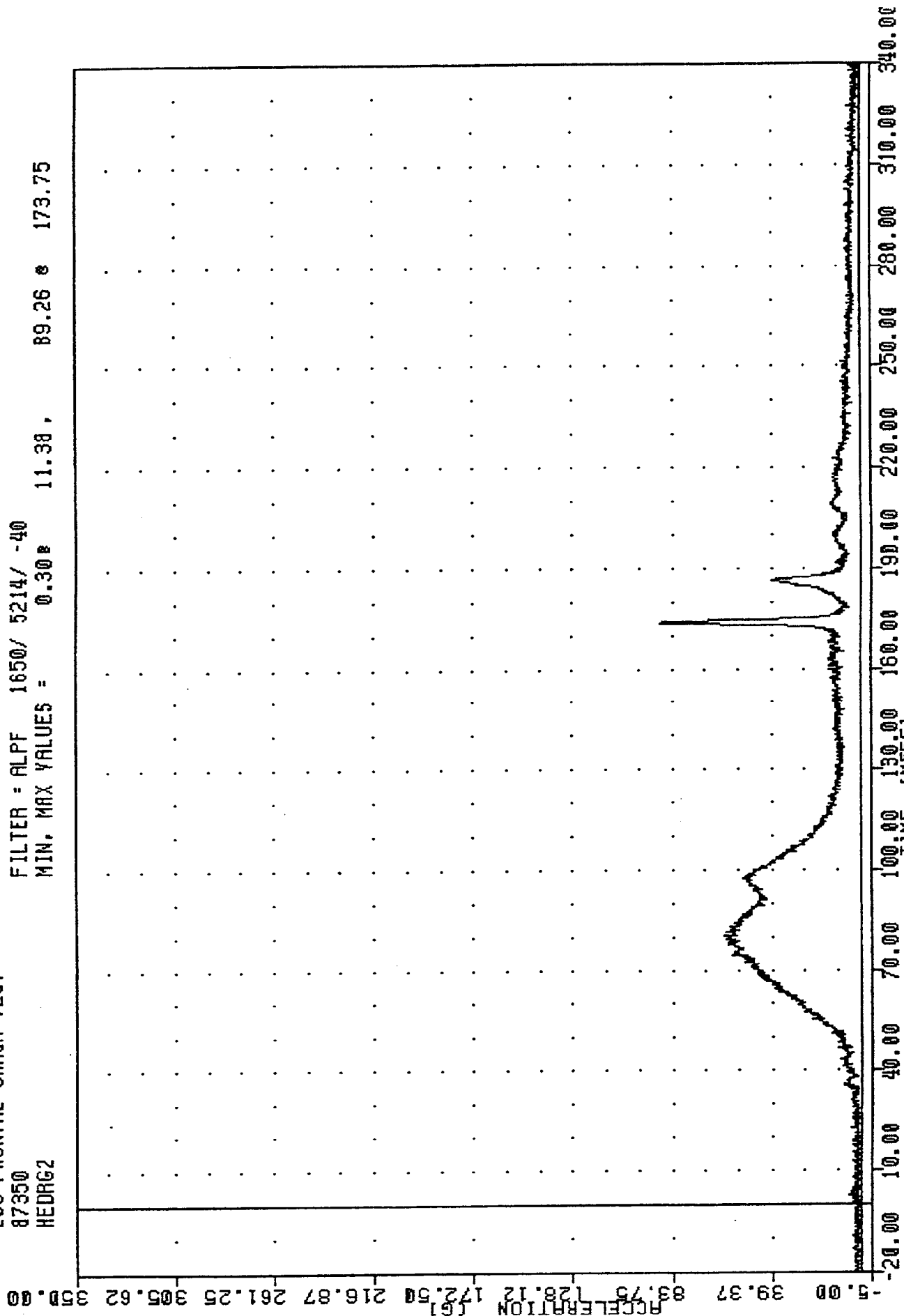
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -50.74 79.38 3.26 8.00



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER HEAD 7 AXIS ACCELERATION

TRC
 208 FRONTAL CRASH TEST
 87350
 HEDRG2

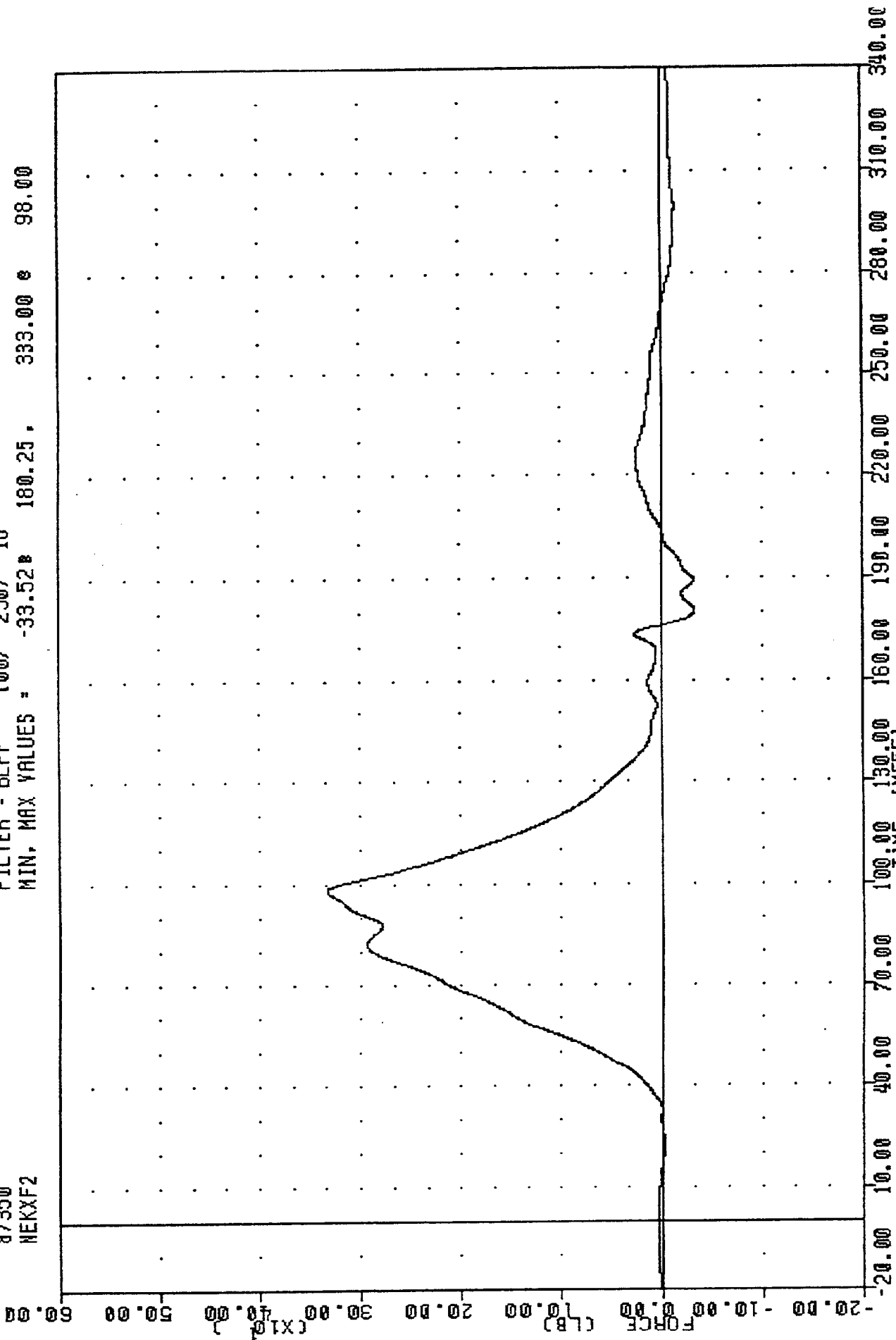
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.308 11.38, 89.26 & 173.75



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER HEAD RESULTANT ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 NEKXF2

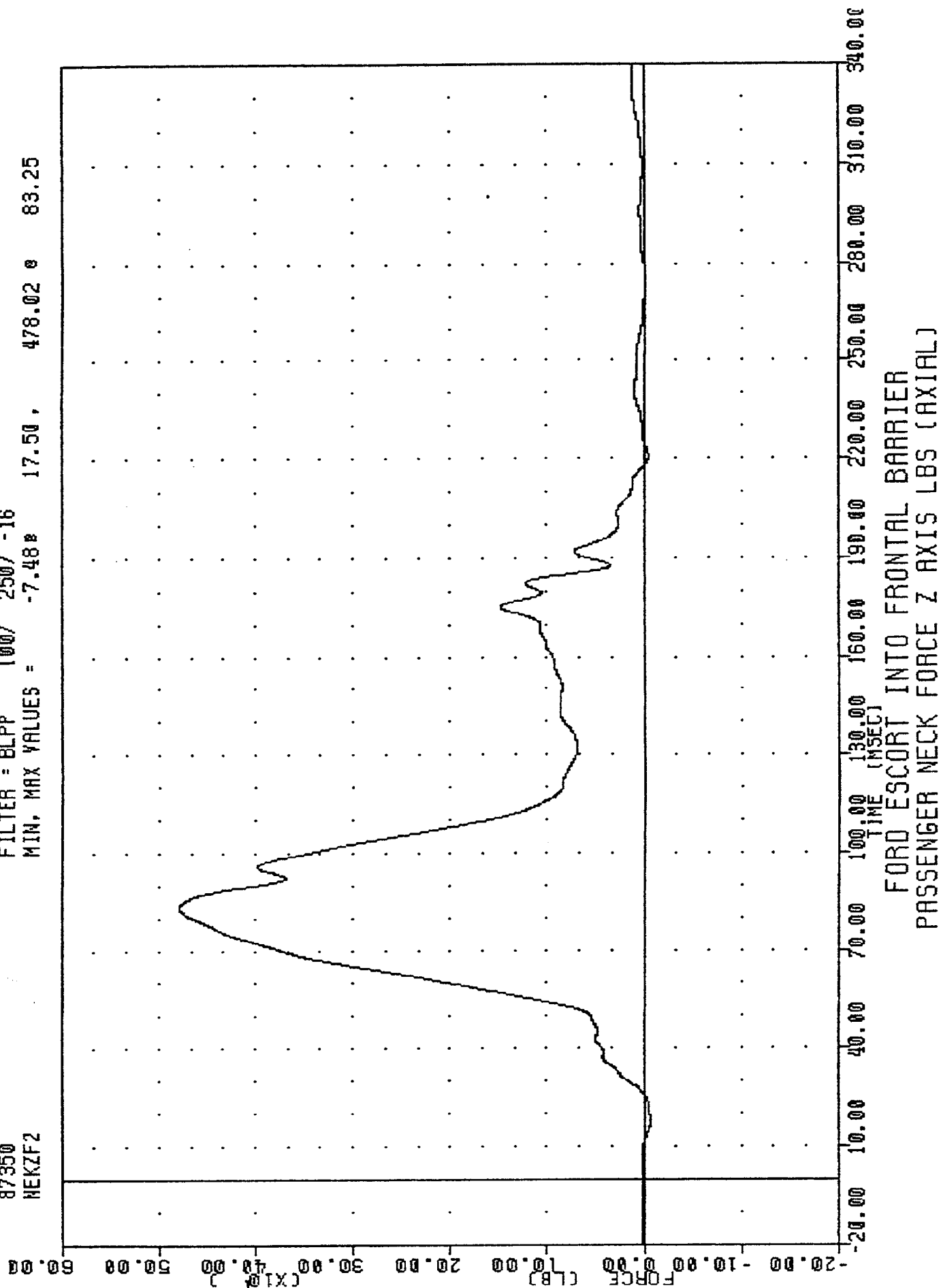
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -33.52* 180.25, 333.00 * 98.00



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER NECK FORCE X AXIS LBS (SHEAR)

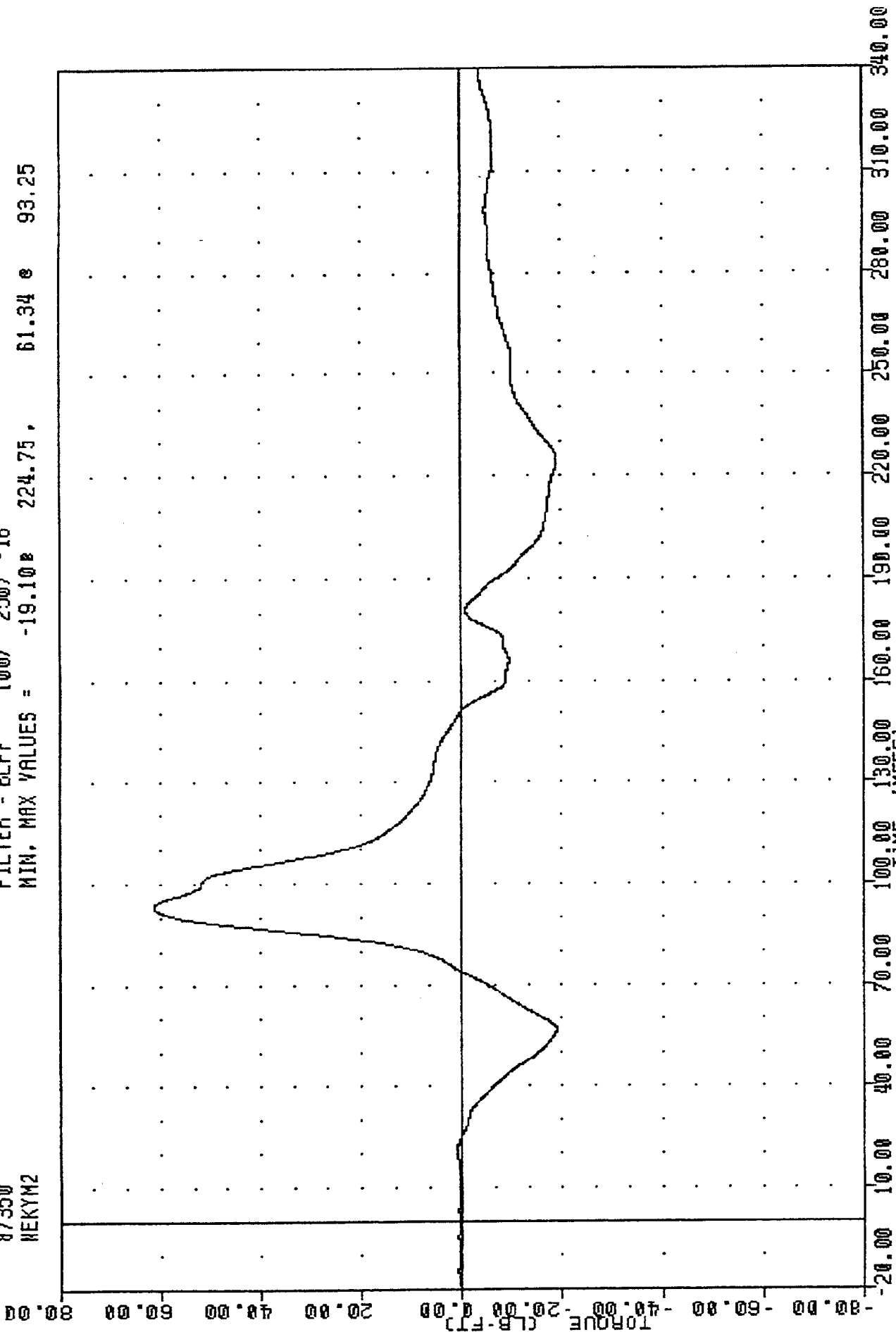
TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 HEKZF2

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -7.48 17.50, 478.02 83.25



1RC , 871216
 208 FRONTAL CRASH TEST
 87350
 HEKYM2

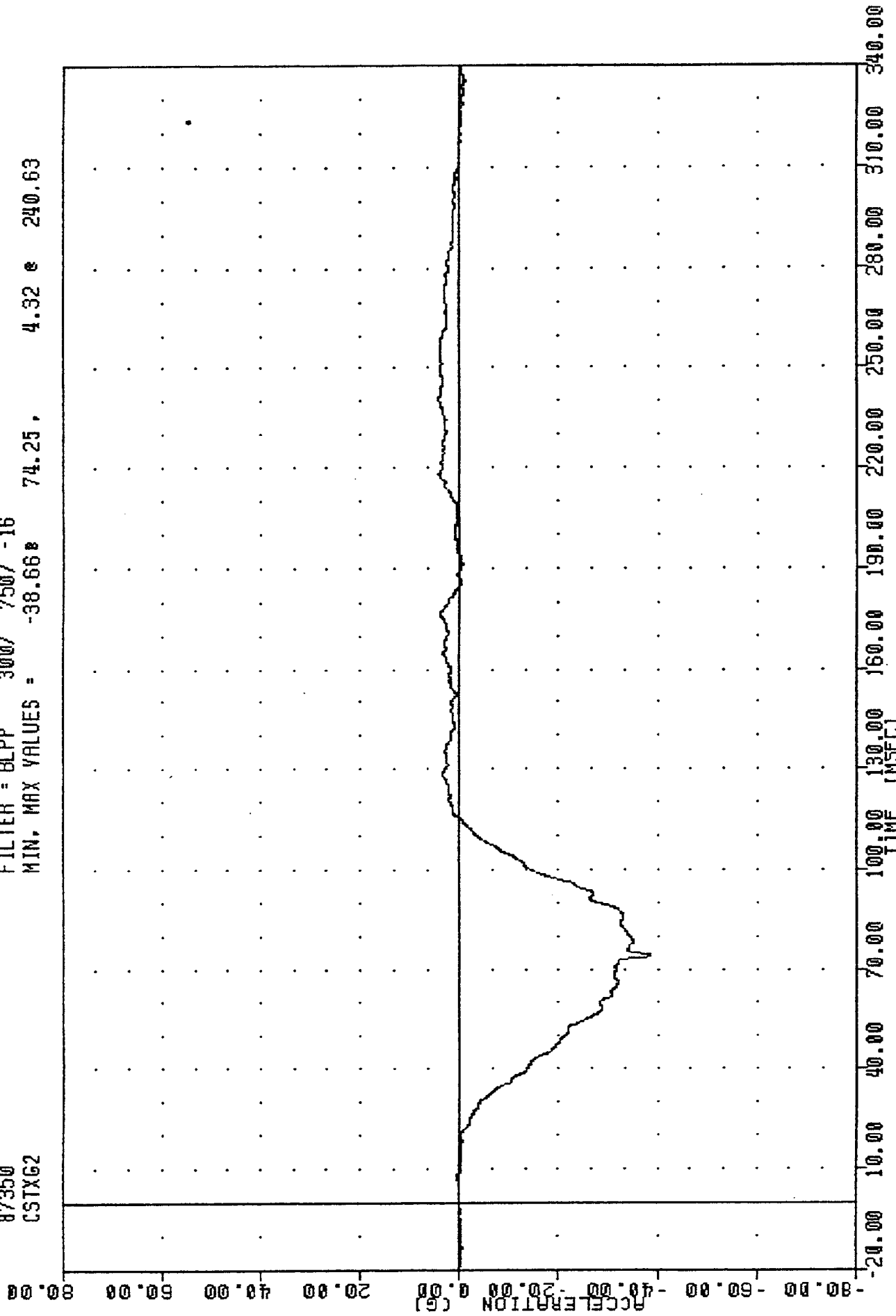
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -19.10 224.75, 61.34 93.25



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER NECK MOMENT Y AXIS FT-LBS

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 CSTXG2

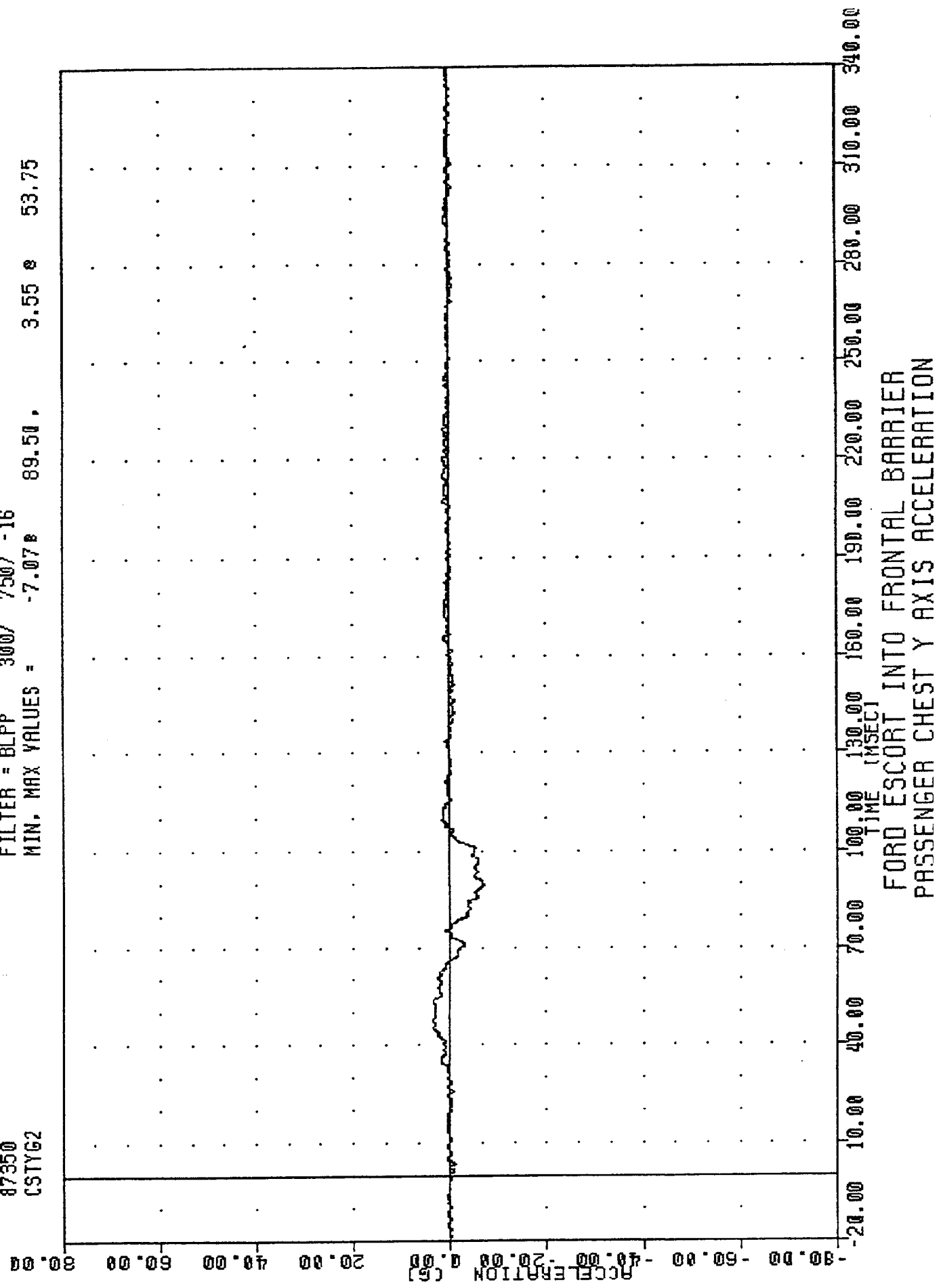
FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -38.66 74.25, 4.32 e 240.63



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER CHEST X AXIS ACCELERATION

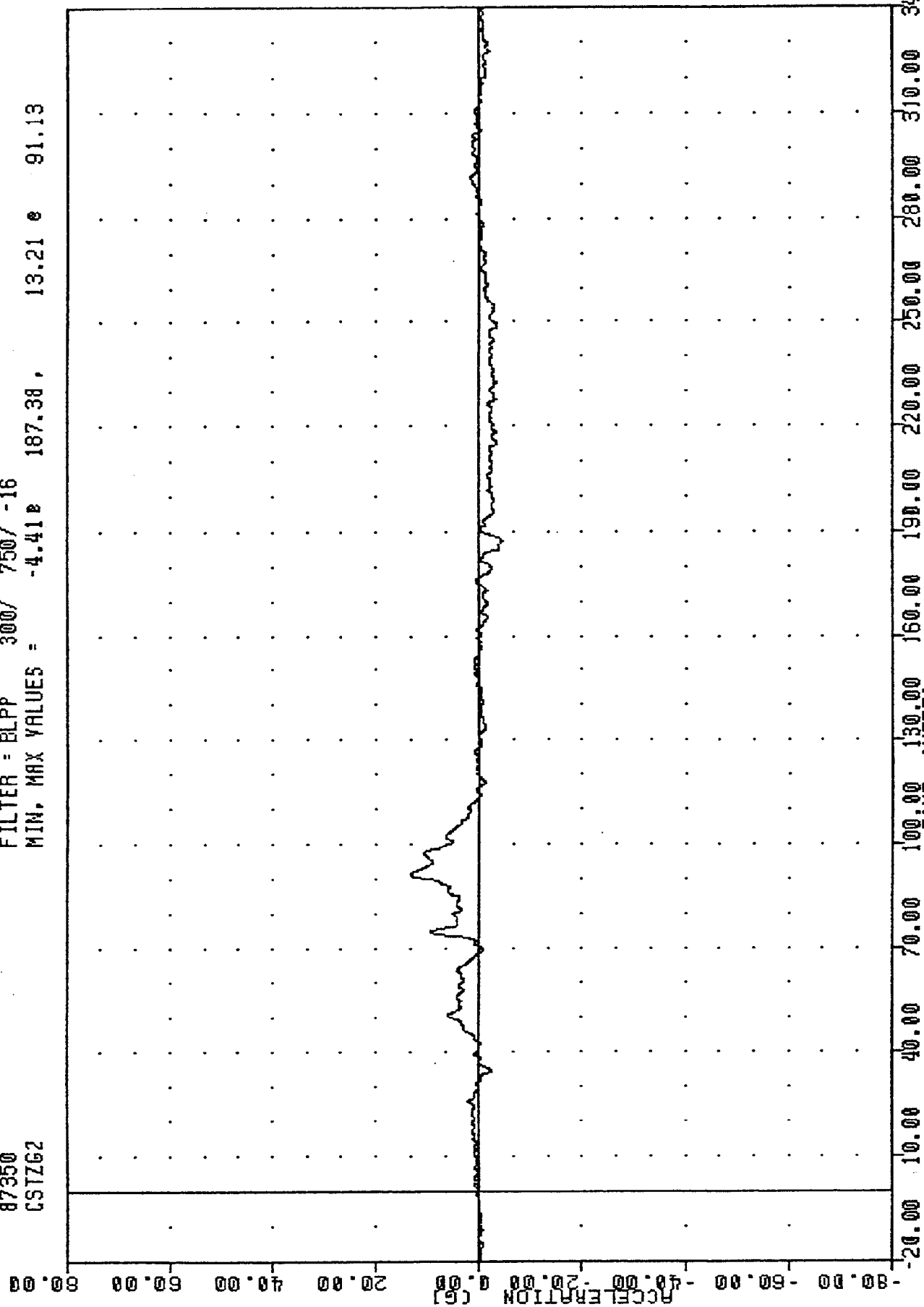
TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 CSTYG2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -7.078 89.50, 3.55 53.75



TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 CSTZG2

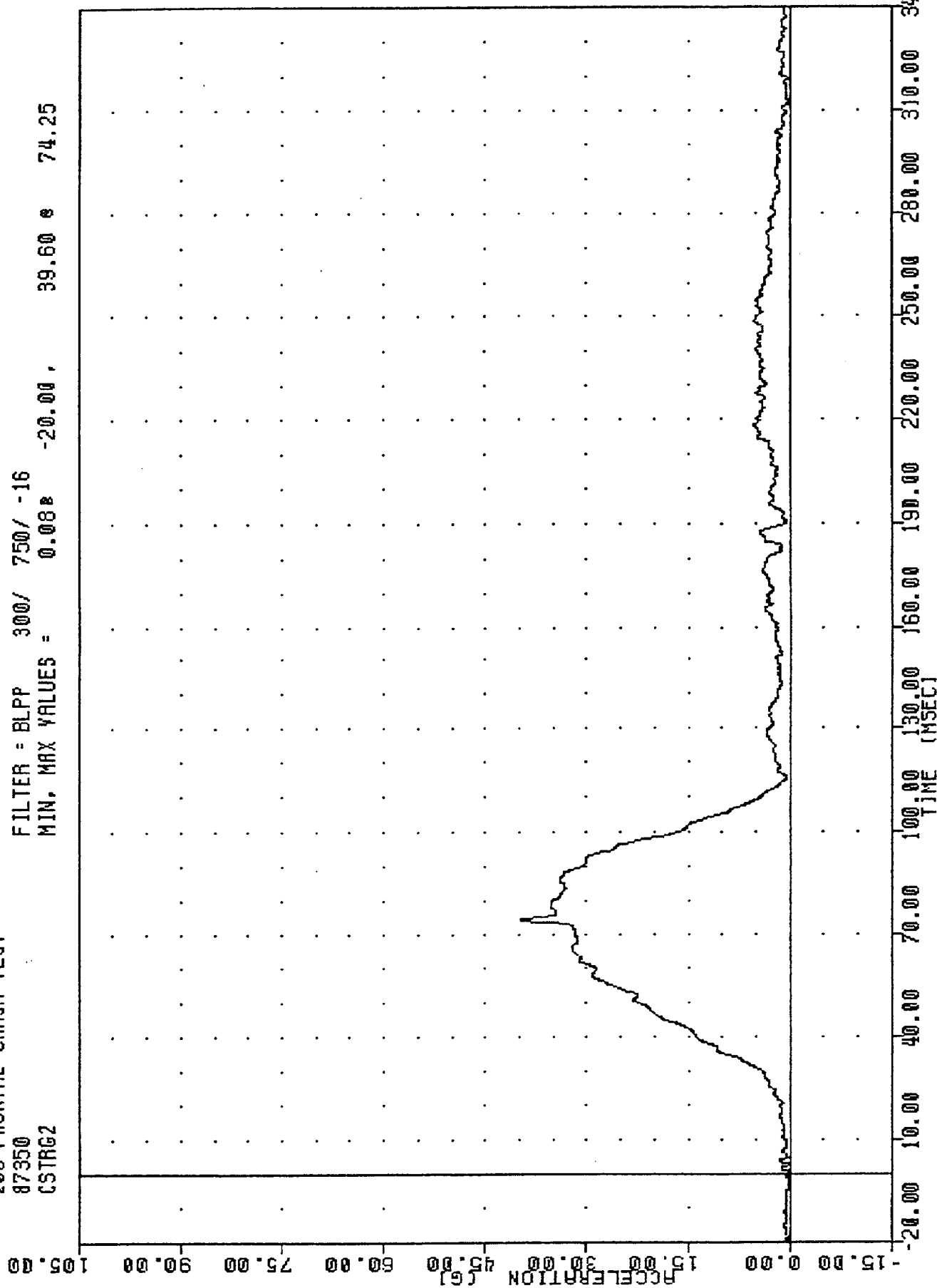
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -4.41e 187.38, 13.21 e 91.13



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER CHEST Z AXIS ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 CSTRG2

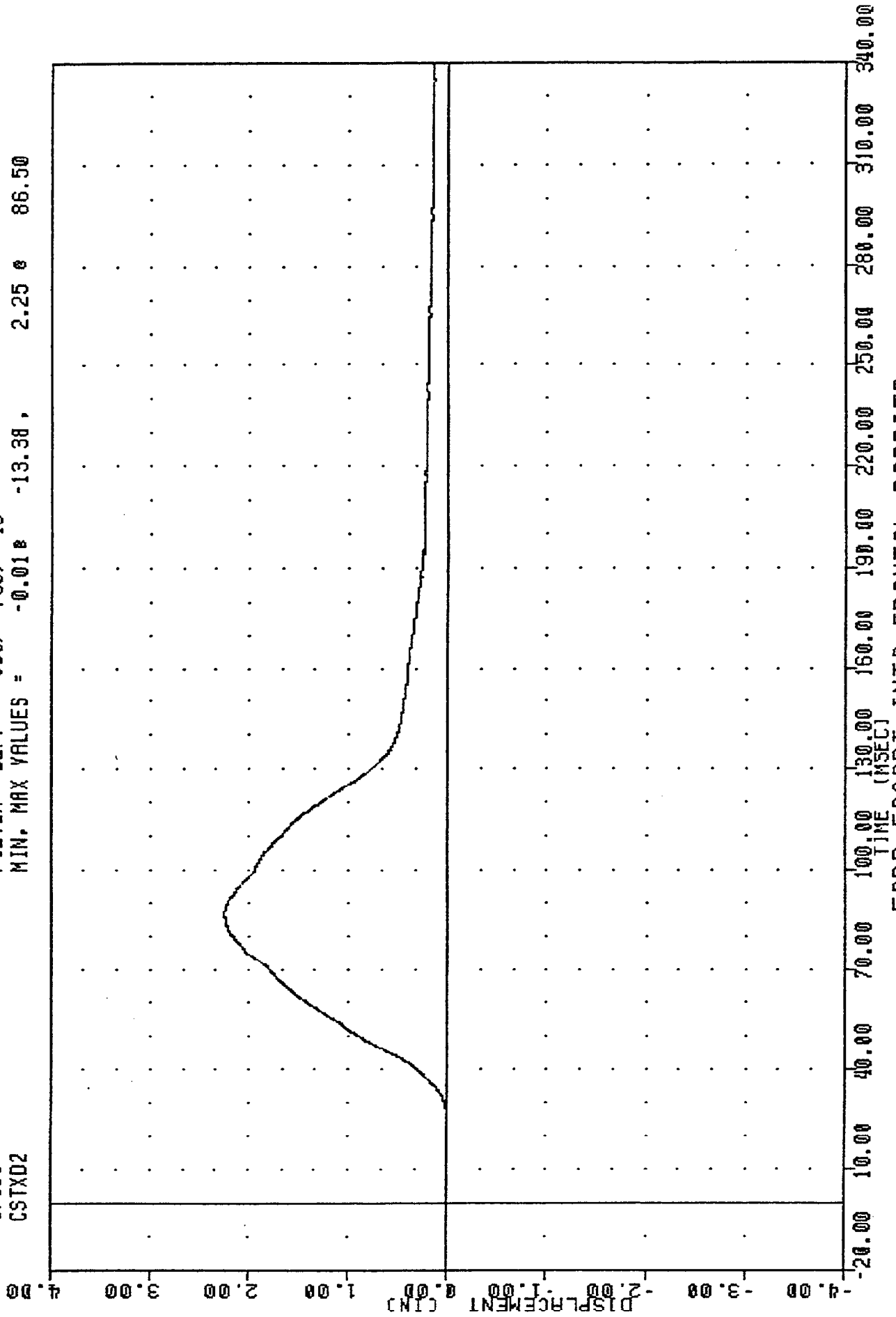
FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.08 39.60 74.25
 -20.00 ,



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER CHEST RESULTANT ACCELERATION

TRC ,871216
 200 FRONTAL CRASH TEST
 87350
 CSTXD2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -0.018 -13.38, 2.25 86.50



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER CHEST DISPLACEMENT INCHES

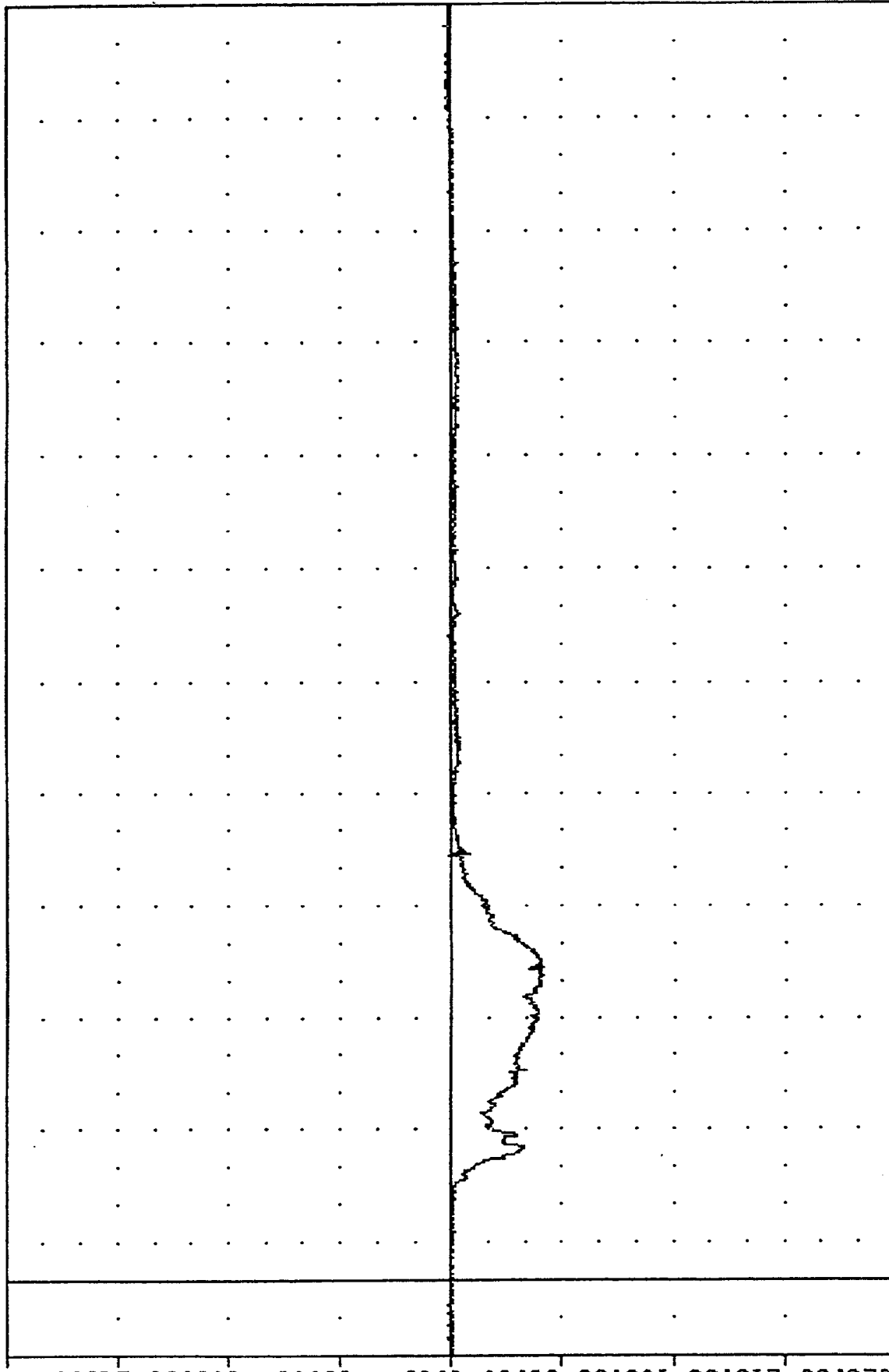
TRC
87350
LFMF2

871216
208 FRONTAL CRASH TEST

FILTER = BLPP 1000/ 2500/ -16

MIN. MAX VALUES = -654.53 83.75, 47.52 334.50

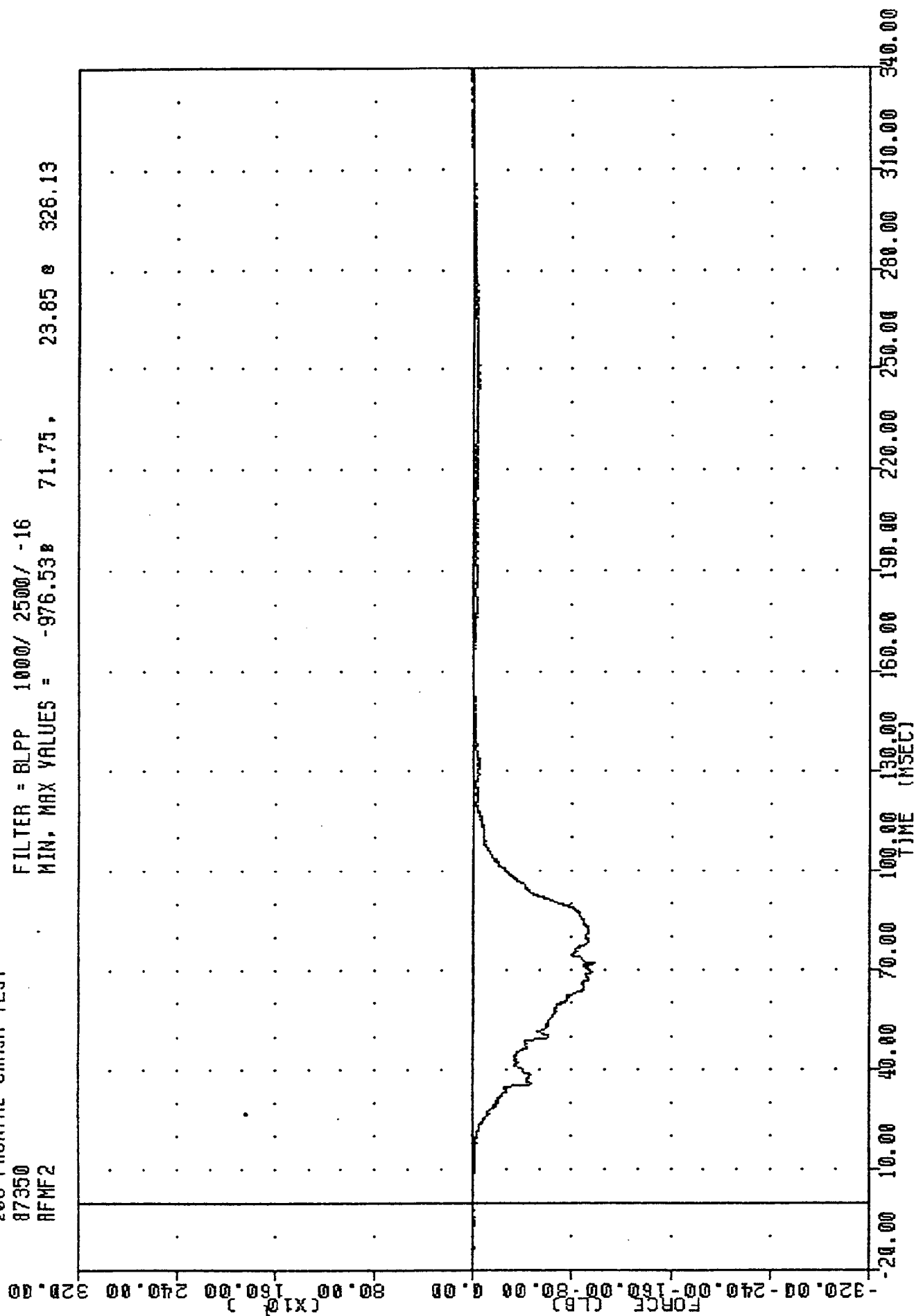
FORCE (LB)
(X10⁴)



FORD ESCORT INTO FRONTAL BARRIER
PASSENGER LEFT FEMUR FORCE LBS

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 AFMF2

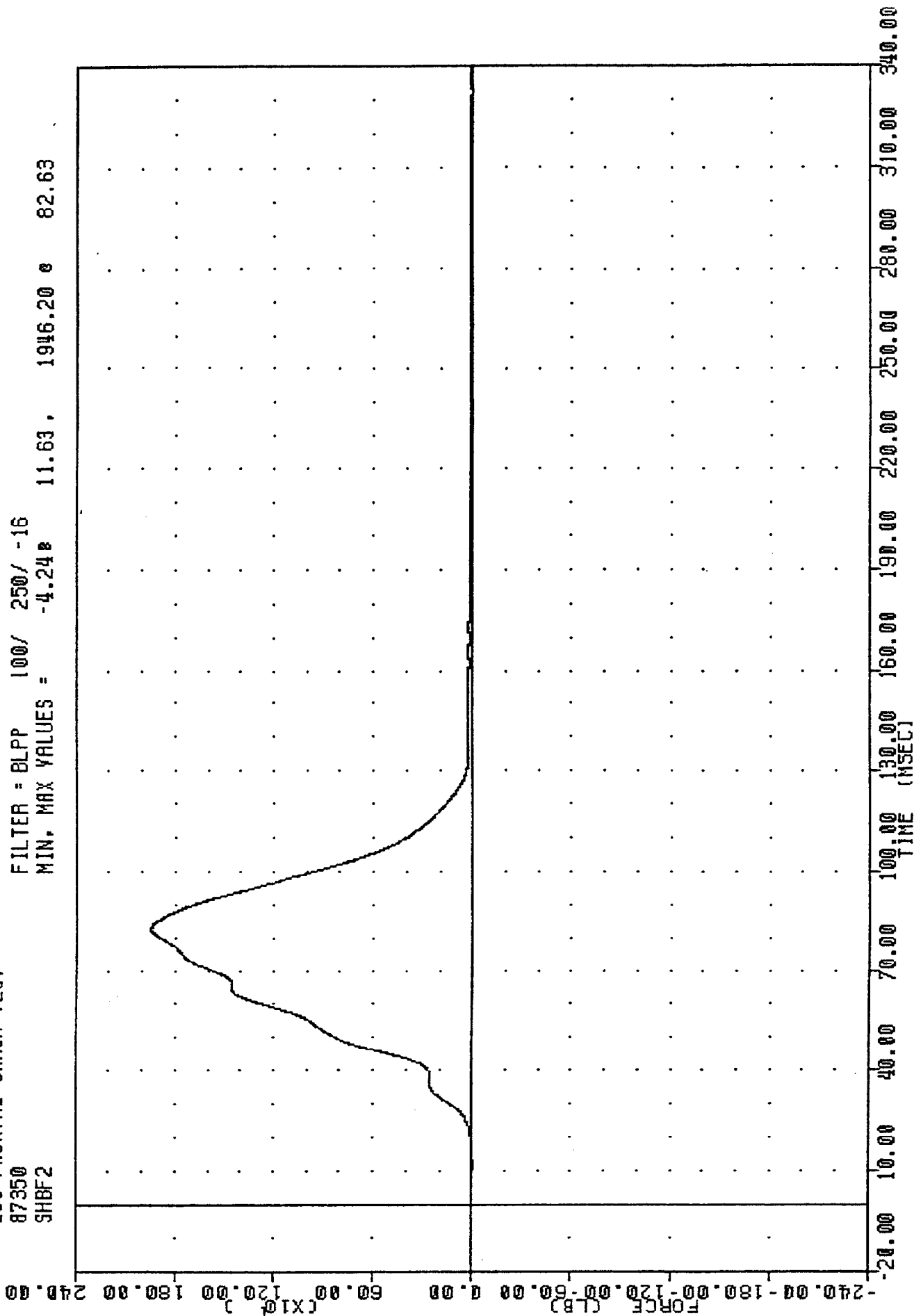
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -976.53 71.75, 23.85 326.13



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER RIGHT FEMUR FORCE LBS

TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 SHBF2

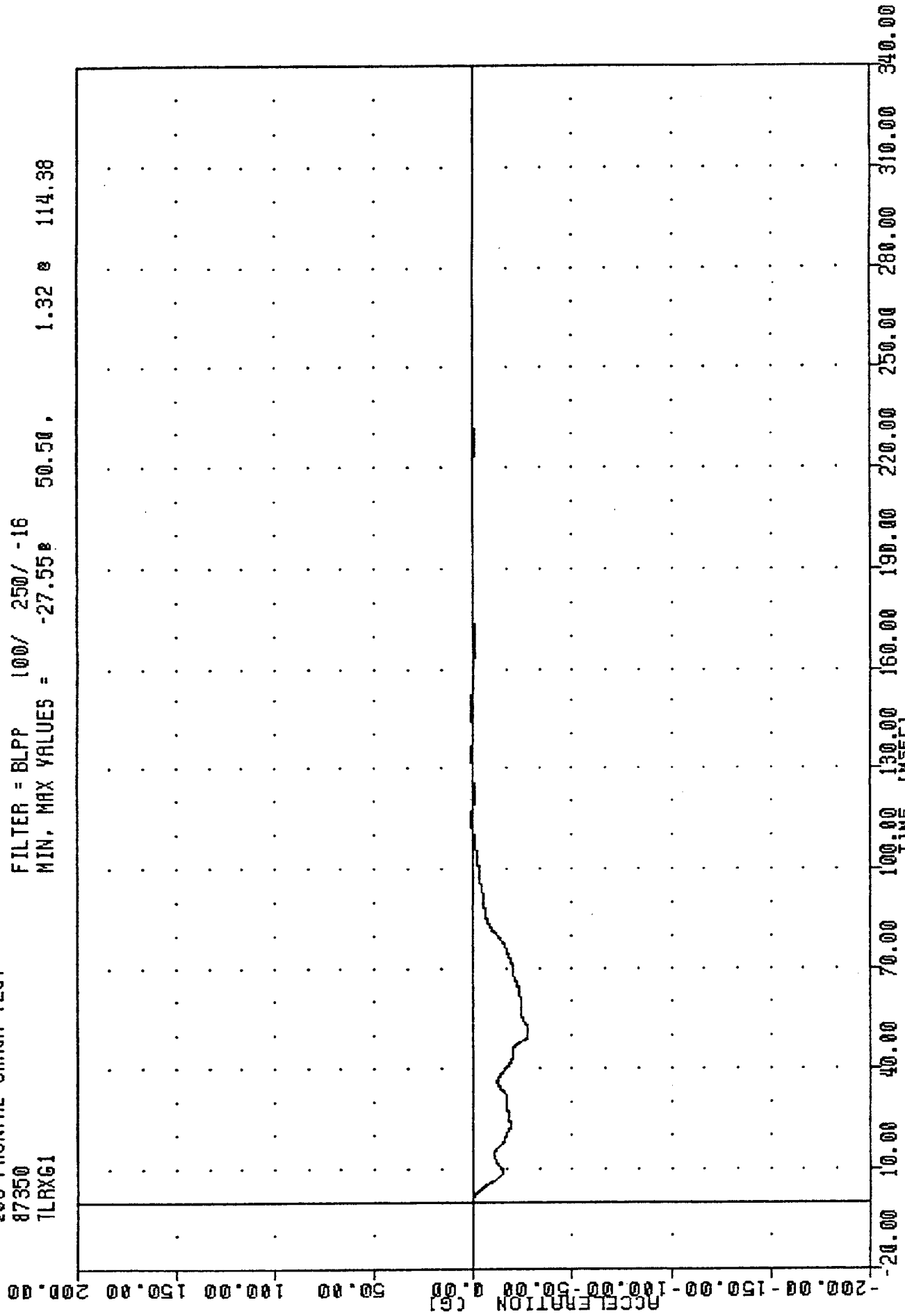
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -4.24 11.63, 1946.20 82.63



FORD ESCORT INTO FRONTAL BARRIER
 PASSENGER'S PASSIVE BELT INBOARD FORCE LBS

TRC
 208 FRONTAL CRASH TEST
 87350
 TLRXG1

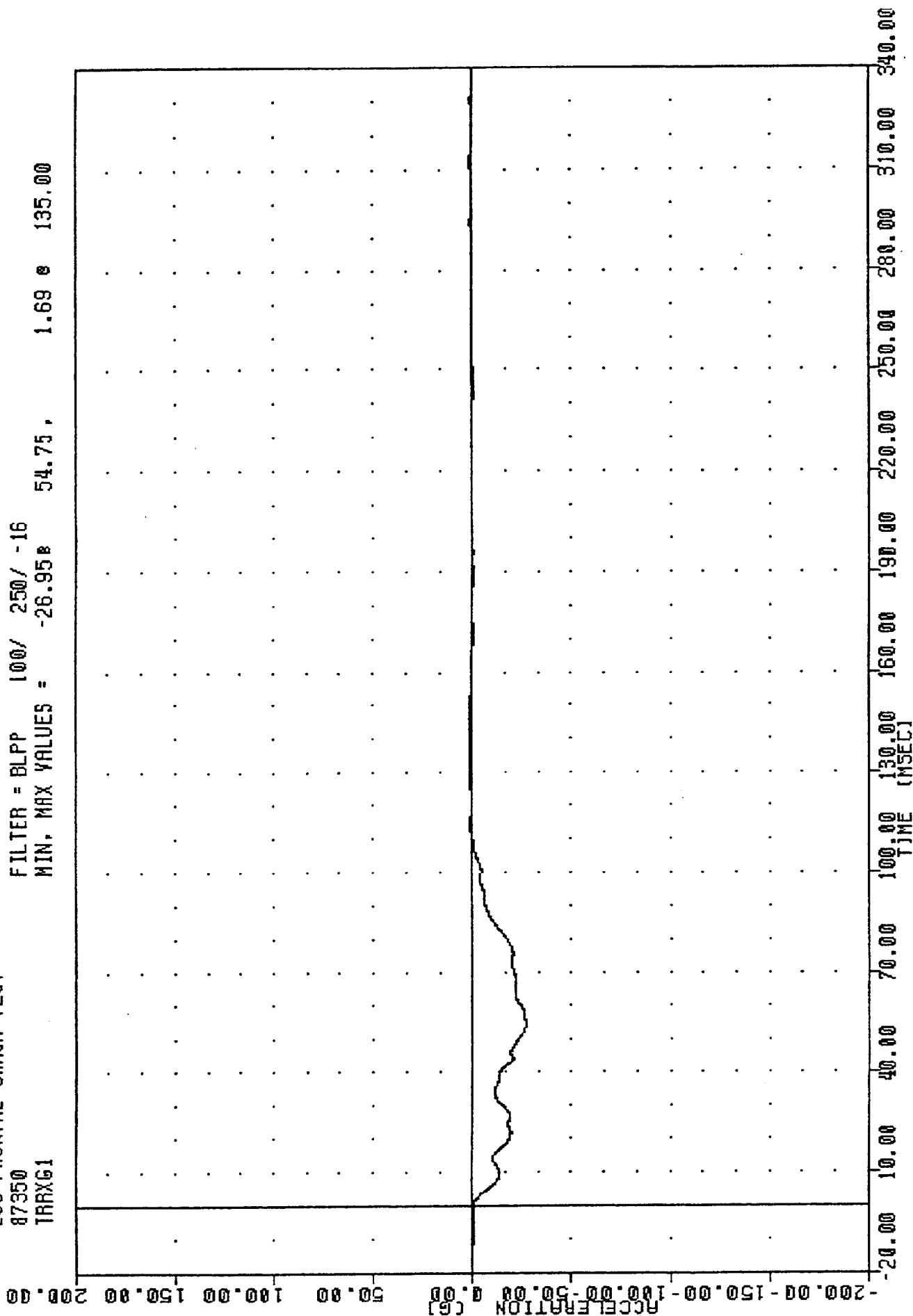
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -27.55 50.50, 1.32 114.38



FORD ESCORT INTO FRONTAL BARRIER
 LEFT REAR SEAT X AXIS ACCELERATION

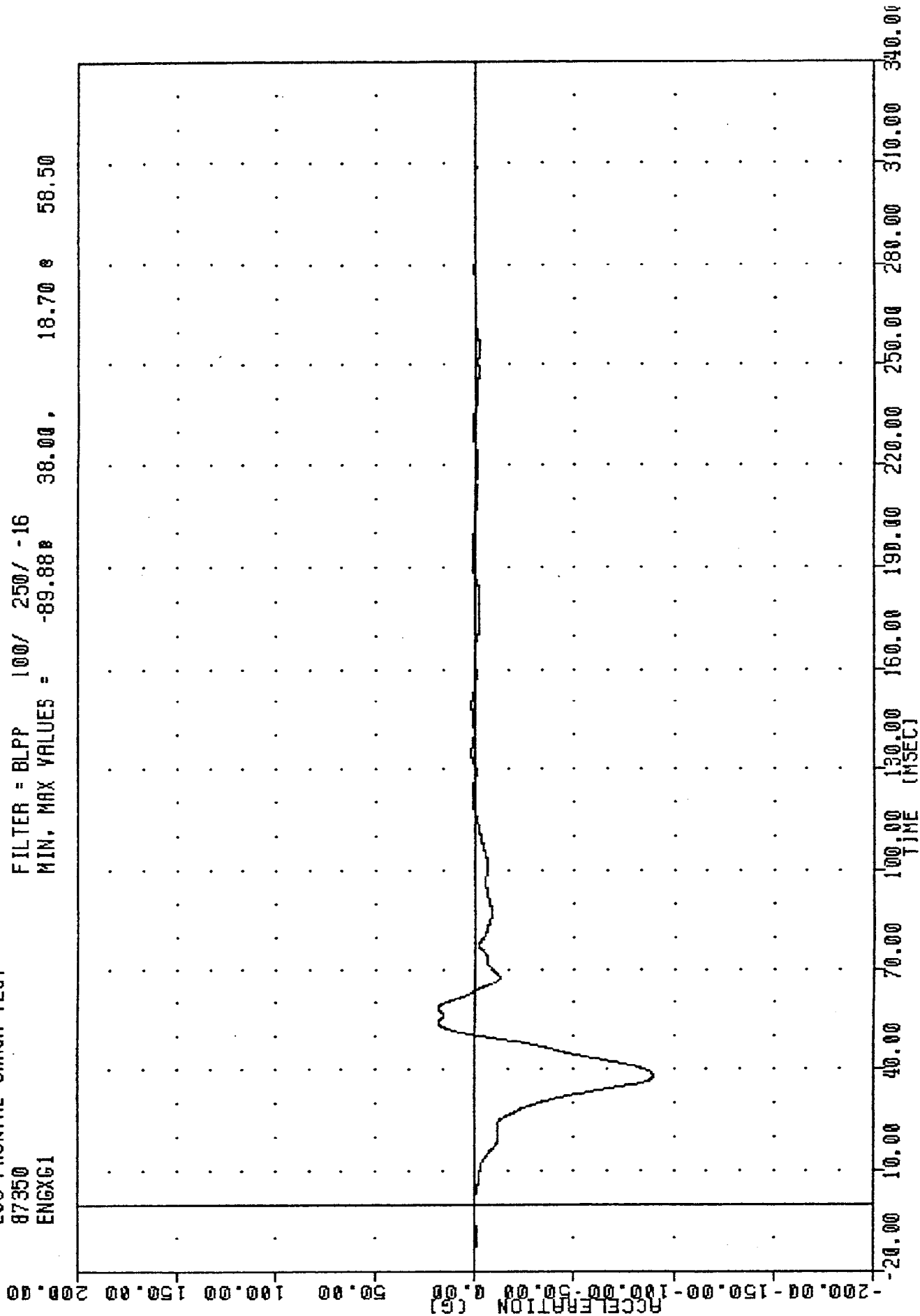
TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 TRXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -26.95 54.75, 1.69 135.00



TAC
 208 FRONTAL CRASH TEST
 87350
 ENGXC1

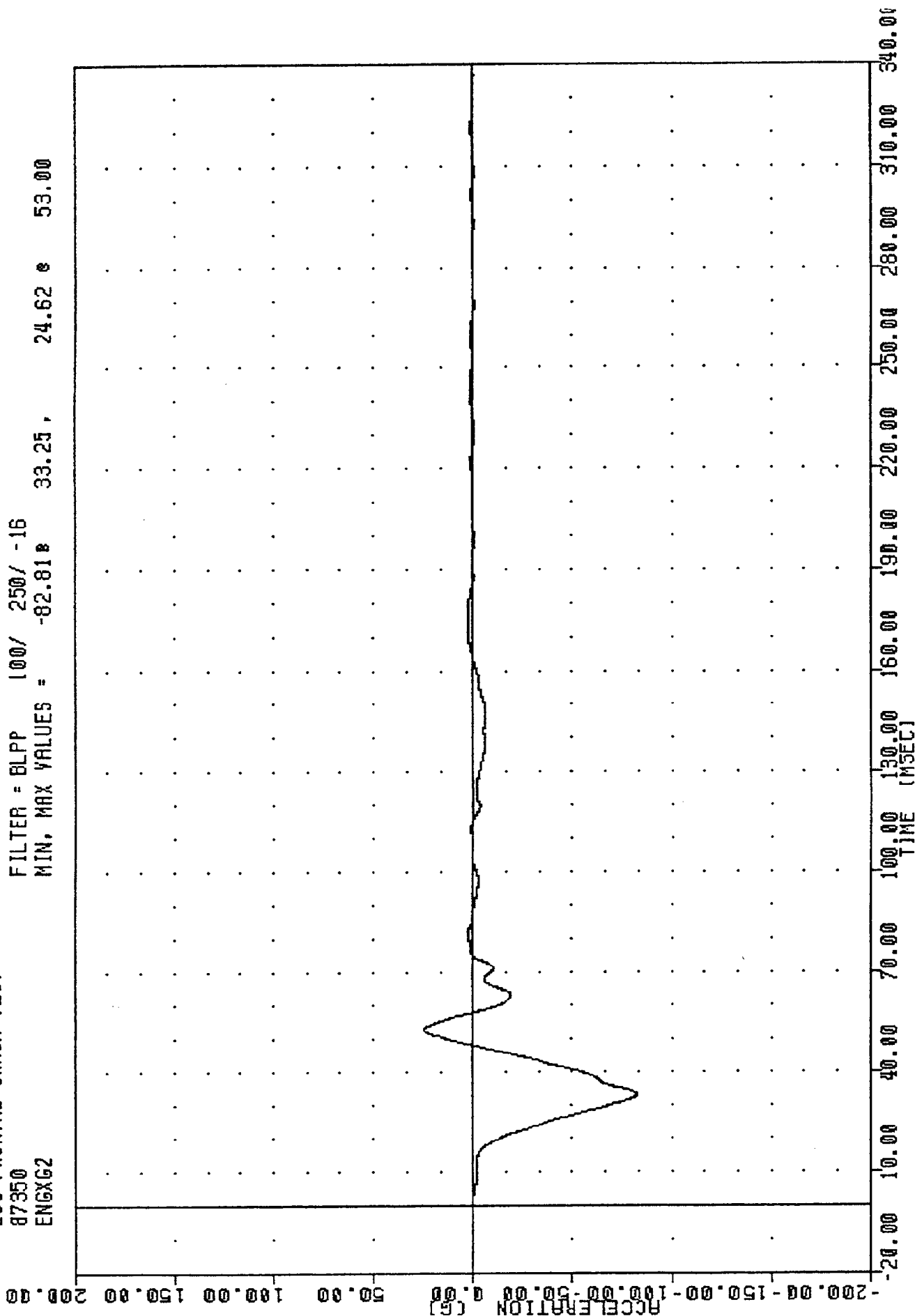
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -89.88 38.00 18.70 58.50



FORD ESCORT INTO FRONTAL BARRIER
 ENGINE UPPER BLOCK X AXIS ACCELERATION

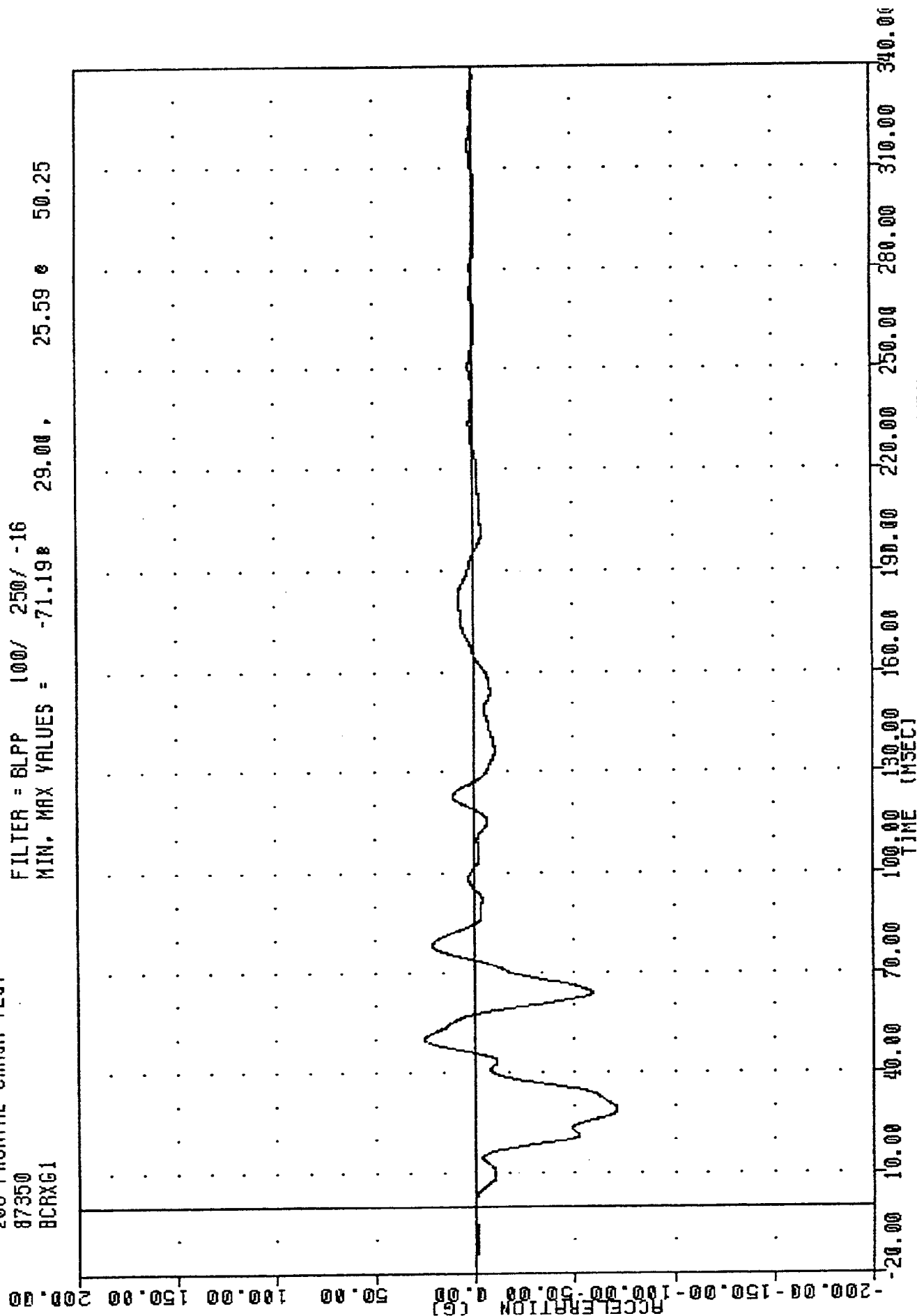
TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 ENGCG2

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -82.818 33.25, 24.62 53.00



TRC , 871216
 200 FRONTAL CRASH TEST
 87350
 BCRXG1

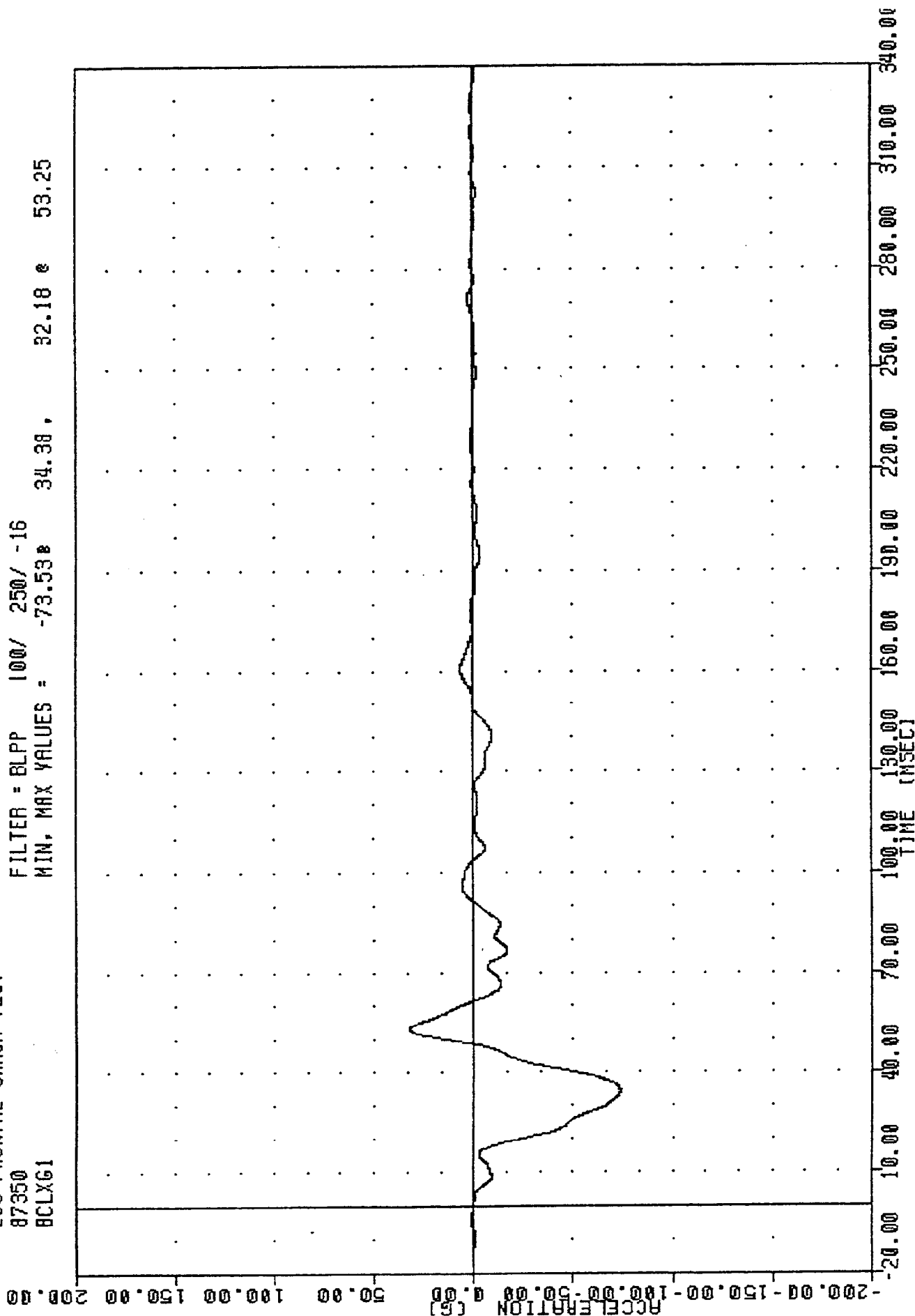
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -71.19 29.00 , 25.59 50.25



FORD ESCORT INTO FRONTAL BARRIER
 RIGHT BRAKE CALIPER X AXIS ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 BCLX61

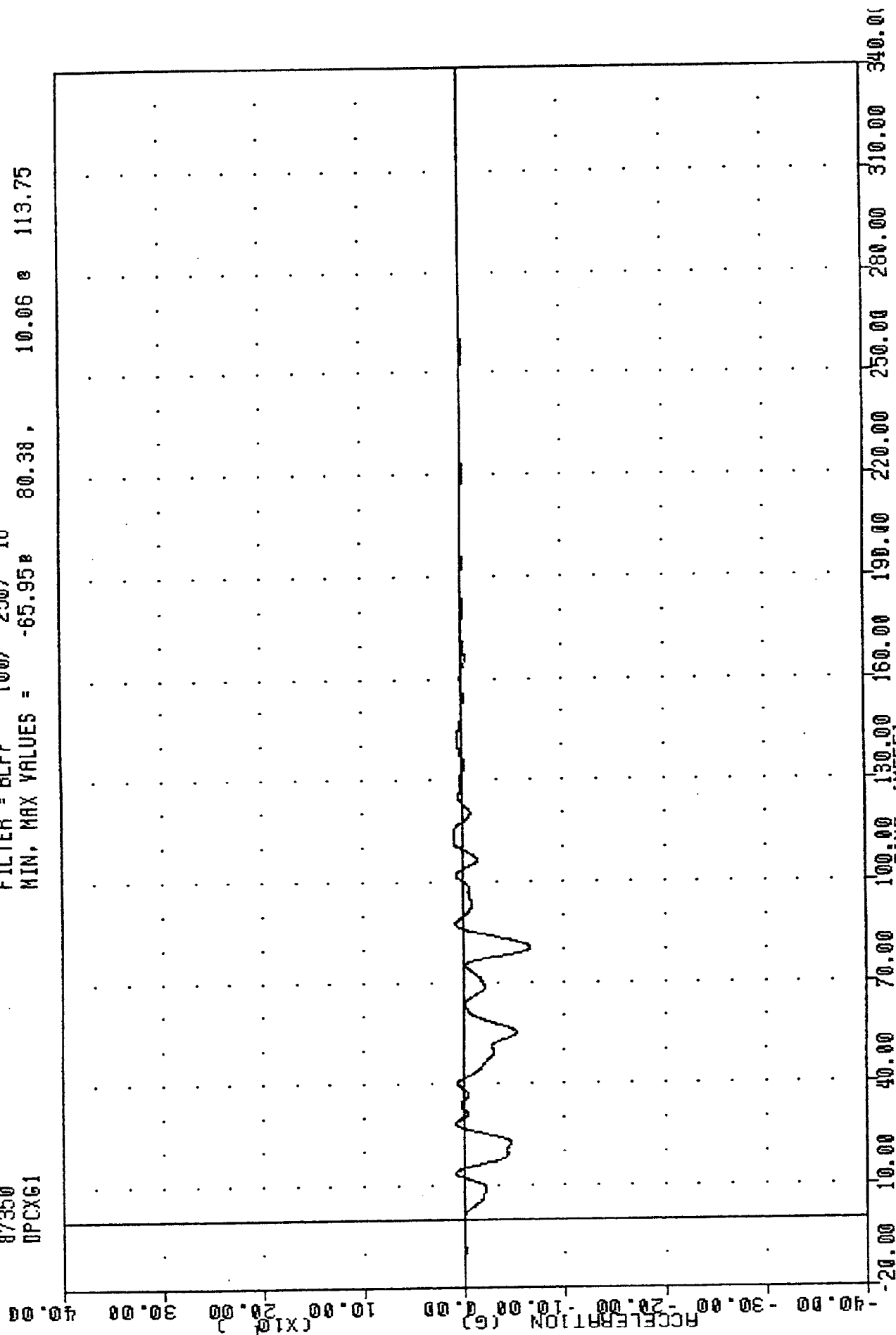
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -73.53 34.38 , 32.18 e 53.25



FORD ESCORT INTO FRONTAL BARRIER
 LEFT BRAKE CALIPER X AXIS ACCELERATION

TRC , 871216
 208 FRONTAL CRASH TEST
 87350
 0PCXG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -65.95 80.38 , 10.06 113.75



FORD ESCORT INTO FRONTAL BARRIER
 DASH PANEL CENTER X AXIS ACCELERATION

APPENDIX C

DUMMY CERTIFICATION INFORMATION

PRE-TEST CALIBRATION

S/N: 45

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

12-DEC-87

VRTC

45C27HD1

HY3 SH45 HEAD DROP CAL 27

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.50 DEG. F
RELATIVE HUMIDITY	10% - 70%	39.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	258.69 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.09 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

12-DEC-87

VRTC

45C27NE1

HY3 SN45 CAL27 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.80 DEG. F
RELATIVE HUMIDITY	10% - 70%	37.00 %
IMPACT VELOCITY	19.50 - 20.30 FPS	19.57 FPS
PENDULUM	10 MS 17.20 - 21.20 G	20.20 G
DECELERATION	20 MS 14.00 - 19.00 G	17.09 G
	30 MS 11.00 - 16.00 G	13.73 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	13.67 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	38.00 MS
D PLANE	MAX 81 - 106 DEG.	102.38 DEG.
ROTATION	TIME 72 - 82 MS	82.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN -59.0/-39.0 FT.LB	-53.75 FT.LBS
	TIME 65 - 79 MS	74.00 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	165.63 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	141.00 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

12-DEC-87

CHRYSLER

45C27NF1

HY3 SN45 CAL27 NECK FLEXION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.20 DEG. F
RELATIVE HUMIDITY	10% - 70%	37.00 %
IMPACT VELOCITY	22.6 - 23.4 FPS	23.17 FPS
PENDULUM	10 MS 22.50 - 27.50 G	24.38 G
DECELERATION	20 MS 17.60 - 22.60 G	20.11 G
	30 MS 12.50 - 18.50 G	16.77 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	16.72 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	38.50 MS
IN PLANE	MAX 64 - 78 DEG.	76.19 DEG.
ROTATION	TIME 57 - 64 MS	64.00 MS
MOMENT ABOUT OCCIPITAL	MAX 65 - 80 FT.LBS	73.47 FT.LBS
CONDYLE	TIME 47 - 58 MS	53.25 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	123.88 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	104.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Pho. Middle

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

14-DEC-87

VRTC

45C27TH1

HY3 SN45 CAL 27 H.S. THORAX 01

	HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	70.40 DEG. F
RELATIVE HUMIDITY	10% - 70%	31.00 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.83 INCHES
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1211.6 POUNDS
INTERNAL HYSTERESIS	69% - 85%	74.8%

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

12-DEC-87

LEFT KNEE
VRTC 45C27LK1

HY3 SN45 L.KNEE 11LB CAL 27

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.40 DEG. F
RELATIVE HUMIDITY	10% - 70%	38.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1397.04 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

12-DEC-87

RIGHT
VRTC

KNEE
45C27RK1

HY3 SN45 R.KNEE 11LB CAL 27

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.40 DEG. F
RELATIVE HUMIDITY	10% - 70%	38.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1362.14 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

PRE-TEST CALIBRATION

S/N: 143

HYBRID III EXTERIOR DIMENSIONS

Dimensional Symbol	Description	Spec Dimension	Dummy Dimension SN 143
A	Sitting Height (Erect)	34.8 ±.2	<u>34.7</u>
B	Shoulder Pivot Height	20.2 ±.3	<u>20.2</u>
C	"H" Point Height	3.4 ref.	<u>3.4</u>
D	"H" Point Location from Back Line	5.4 ref.	<u>5.4</u>
E	Shoulder Pivot Location from Back Line	3.5 ±.2	<u>3.5</u>
F	Thigh Clearance	5.8 ±.3	<u>5.8</u>
G	Back of Elbow to Wrist Pivot	11.7 ±.3	<u>11.5</u>
H	Occiput to Z-Axis	1.7 ±.1	<u>1.7</u>
I	Shoulder - Elbow Length	13.3 ±.3	<u>13.0</u>
J	Elbow Rest Height	7.9 ±.4	<u>8.2</u>
K	Buttock Knee Length	23.3 ±.5	<u>22.9</u>
L	Popliteal Height	17.4 ±.5	<u>17.2</u>
M	Knee Pivot Height	19.4 ±.3	<u>19.2</u>
N	Buttock Popliteal Length	18.3 ±.5	<u>18.6</u>
O	Chest Depth	8.7 ±.3	<u>8.8</u>
P	Foot Length	10.2 ±.3	<u>10.1</u>
V	Shoulder Breadth	16.9 ±.3	<u>16.7</u>
W	Foot Breadth	3.9 ±.3	<u>3.7</u>
Y	Chest Circumference	38.8 ±.6	<u>38.4</u>
Z	Waist Circumference	33.5 ±.6	<u>33.8</u>
AA	Location for Measurement of Chest Circumference	17.0 ±.1	<u>17.0</u>
BB	Location for Measurement of Waist Circumference	9.0 ±.1	<u>9.0</u>

NOTE: The "H" point is located 1.83 inches forward and 2.57 inches down from the center of the pelvis angle reference hole.

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

01-DEC-87

VRTC

143C3HD1

HY3 SN143 HEAD DROP CAL 3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY	10% - 70%	26.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	254.31 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.57 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. M. Mallett

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

02-DEC-87

VRTC

143C3NE1

HY3 SH143 CAL3 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.20 DEG. F
RELATIVE HUMIDITY	10% - 70%	27.00 %
IMPACT VELOCITY	19.50 - 20.30 FPS	19.60 FPS
PENDULUM	10 MS 17.20 - 21.20 G	20.30 G
DECELERATION	20 MS 14.00 - 19.00 G	15.44 G
	30 MS 11.00 - 16.00 G	13.95 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	13.91 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	38.63 MS
D PLANE	MAX 81 - 106 DEG.	102.34 DEG.
ROTATION	TIME 72 - 82 MS	80.25 MS
MOMENT ABOUT OCCIPITAL	MIN -59.0/-39.0 FT.LB	-57.61 FT.LBS
CONDYLE	TIME 65 - 79 MS	74.88 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	165.25 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	146.88 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

02-DEC-87

VRTC

143C3NF1

HY3 SH143 CAL3 NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY		10% - 70%	28.00 %
IMPACT VELOCITY		22.6 - 23.4 FPS	23.11 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	25.51 G
	20 MS	17.60 - 22.60 G	20.70 G
	30 MS	12.50 - 18.50 G	16.27 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.17 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.50 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	76.79 DEG.
	TIME	57 - 64 MS	58.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.LBS	73.55 FT.LBS
	TIME	47 - 58 MS	52.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	120.13 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	104.25 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

02-DEC-67

VRTC

143C3TH1

HY3 SN143 CAL 3 H.S.THORAX 01

	HIGH SPEED TEST	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	69 - 72 DEG. F	71.80 DEG. F

RELATIVE HUMIDITY	10% - 70%	26.00 %

PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC

MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.81 INCHES

MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1227.0 POUNDS

INTERNAL HYSTERESIS	69% - 85%	73.3%

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middleton*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

01-DEC-87

LEFT KNEE
VRTC 143C3LK1

HY3 SN143 L.KNEE 11LB CAL 3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	26.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1159.47 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

01-DEC-87

RIGHT KNEE
VRTC 143C3RK1

HY3 SN143 R.KNEE 11LB CAL 3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY	10% - 70%	26.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.91 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1139.25 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middleton

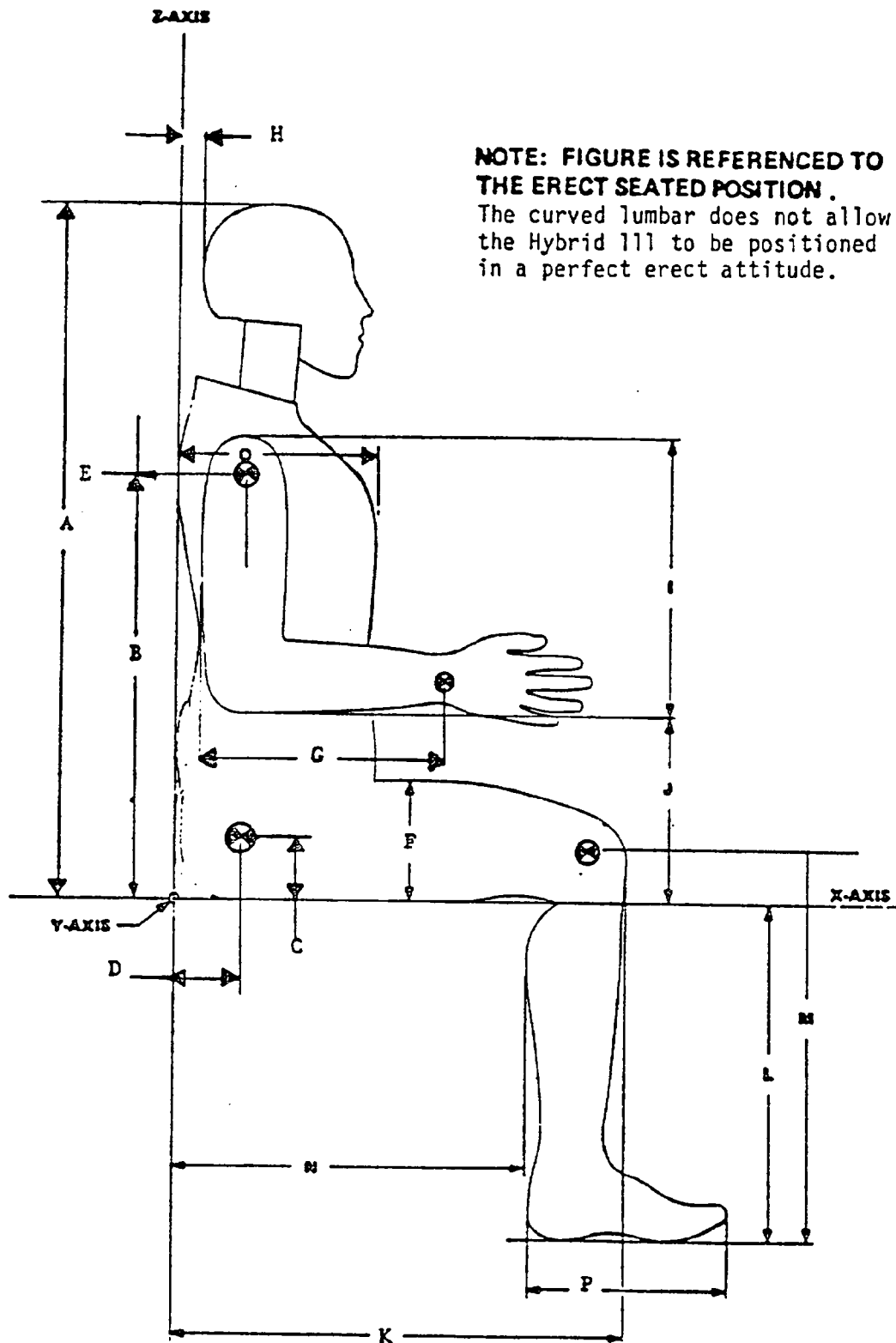
POST-TEST CALIBRATION

S/N:45

HYBRID III EXTERIOR DIMENSIONS

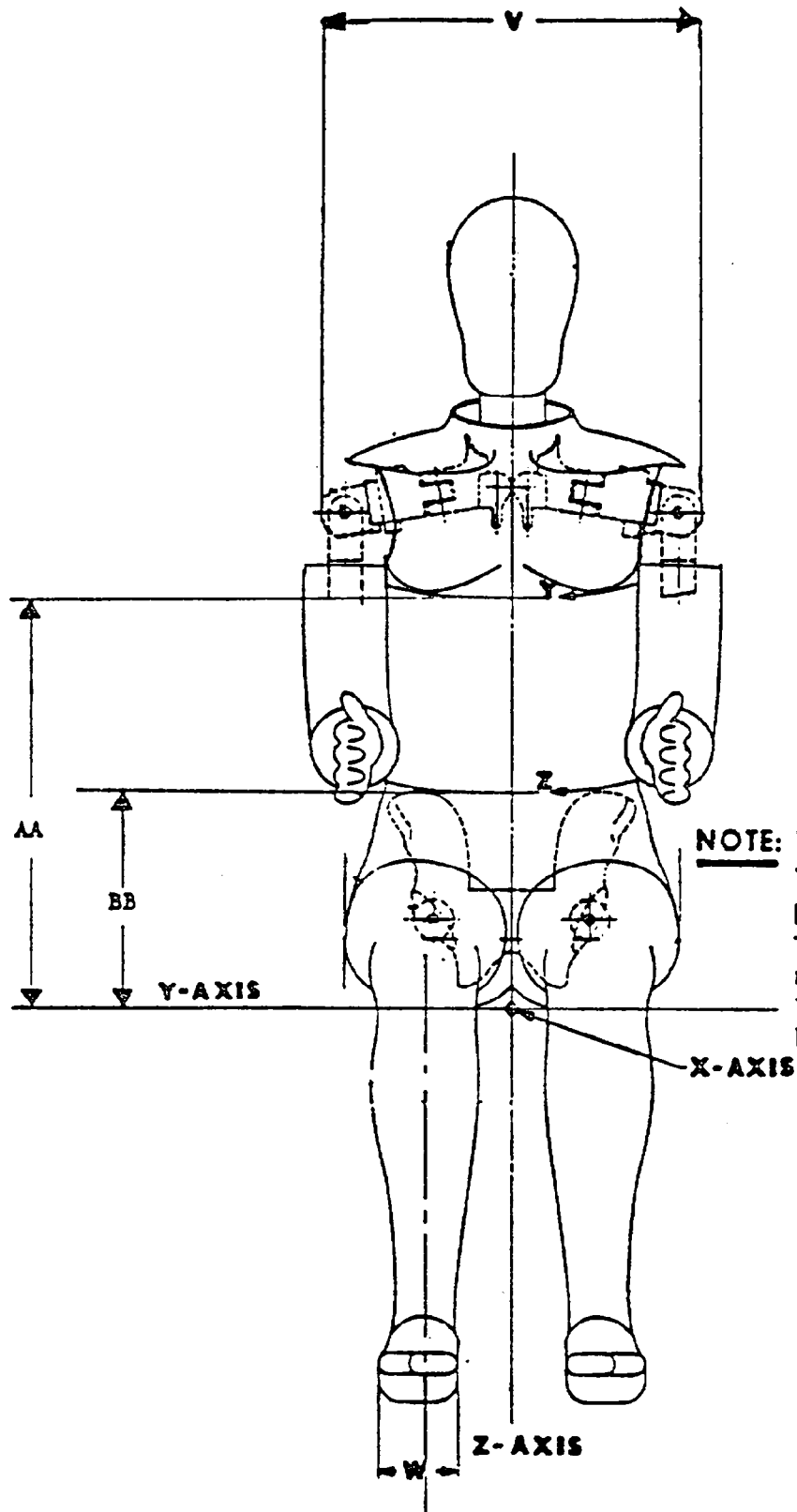
Dimensional Symbol	Description	Spec Dimension	Dummy Dimension SN 45
A	Sitting Height (Erect)	34.8 $\pm$.2	<u>34.6</u>
B	Shoulder Pivot Height	20.2 $\pm$.3	<u>20.0</u>
C	"H" Point Height	3.4 ref.	<u>3.4</u>
D	"H" Point Location from Back Line	5.4 ref.	<u>5.4</u>
E	Shoulder Pivot Location from Back Line	3.5 $\pm$.2	<u>3.7</u>
F	Thigh Clearance	5.8 $\pm$.3	<u>5.8</u>
G	Back of Elbow to Wrist Pivot	11.7 $\pm$.3	<u>11.5</u>
H	Occiput to Z-Axis	1.7 $\pm$.1	<u>1.7</u>
I	Shoulder - Elbow Length	13.3 $\pm$.3	<u>13.6</u>
J	Elbow Rest Height	7.9 $\pm$.4	<u>7.9</u>
K	Buttock Knee Length	23.3 $\pm$.5	<u>23.0</u>
L	Popliteal Height	17.4 $\pm$.5	<u>17.5</u>
M	Knee Pivot Height	19.4 $\pm$.3	<u>19.5</u>
N	Buttock Popliteal Length	18.3 $\pm$.5	<u>17.9</u>
O	Chest Depth	8.7 $\pm$.3	<u>8.6</u>
P	Foot Length	10.2 $\pm$.3	<u>10.2</u>
V	Shoulder Breadth	16.9 $\pm$.3	<u>16.8</u>
W	Foot Breadth	3.9 $\pm$.3	<u>3.9</u>
Y	Chest Circumference	38.8 $\pm$.6	<u>38.8</u>
Z	Waist Circumference	33.5 $\pm$.6	<u>33.6</u>
AA	Location for Measurement of Chest Circumference	17.0 $\pm$.1	<u>17.0</u>
BB	Location for Measurement of Waist Circumference	9.0 $\pm$.1	<u>9.0</u>

NOTE: The "H" point is located 1.83 inches forward and 2.57 inches down from the center of the pelvis angle reference hole.



NOTE: FIGURE IS REFERENCED TO THE ERECT SEATED POSITION.
The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.

HYBRID III Exterior Body Dimensions - Side View



**NOTE: FIGURE REFERENCED
TO THE ERECT SEATED
POSITION .**
The curved lumbar does
not allow the Hybrid III
to be positioned in a
perfect erect attitude.

HYBRID III Exterior Body Dimensions - Front View

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

07-Jan-88

VRTC

45C28HD1

HY3 SN45 HEAD DROP CAL28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.10 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.64 G
PEAK LATERAL ACCELERATION	15 G MAX	-2.22 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Don Mang

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

09-Jan-88

VRTC

45C28NE1

HY3 SN45 CAL28 NECK EXTENSION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.80 DEG. F
RELATIVE HUMIDITY		10% - 70%	14.00 %
IMPACT VELOCITY		19.50 - 20.30 FPS	19.99 FPS
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.47 G
	20 MS	14.00 - 19.00 G	16.21 G
	30 MS	11.00 - 16.00 G	11.11 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	11.30 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	43.38 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	99.12 DEG.
	TIME	72 - 82 MS	81.75 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-59.0/-39.0 FT.LB	-52.42 FT.LBS
	TIME	65 - 79 MS	75.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	169.88 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	143.75 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Don Mow

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

08-Jan-88

VRTC

45C28NF1

HY3 SN45 CAL28 NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY		10% - 70%	16.00 %
IMPACT VELOCITY		22.6 - 23.4 FPS	22.86 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	25.97 G
	20 MS	17.60 - 22.60 G	19.72 G
	30 MS	12.50 - 18.50 G	16.20 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.10 G
DECELERATION-TIME CURVE			
DECAY TIME TO 5 G		34 - 42 MS	37.63 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	75.46 DEG.
	TIME	57 - 64 MS	62.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.LBS	71.55 FT.LBS
	TIME	47 - 58 MS	52.13 MS
ROTATION ANGLE-TIME CURVE			
DECAY TIME TO ZERO		113 - 128 MS	125.75 MS
POSITIVE MOMENT-TIME CURVE			
DECAY TIME TO ZERO		97 - 107 MS	104.63 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Tom May

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

09-Jan-88

VRTC

45C28TH1

HY3 SN45 CAL 28 H.S.THORAX 01

TEST PARAMETER	HIGH SPEED TEST	TEST RESULTS
	SPECIFICATION	
TEMPERATURE	69 - 72 DEG. F	70.80 DEG. F
RELATIVE HUMIDITY	10% - 70%	14.00 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.62 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.79 INCHES
MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1204.7 POUNDS
INTERNAL HYSTERESIS	69% - 85%	73.9%

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Don Mow

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

LEFT KNEE
VRTC 45C28LK1

HY3 SN45 L.KNEE 11LB CAL28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.87 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1381.69 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Jim Mary*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

RIGHT KNEE
VRTC 45C2BRK1

HY3 SN45 R.KNEE 11LB CAL28

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	69.90 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1432.22 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Jim Mung

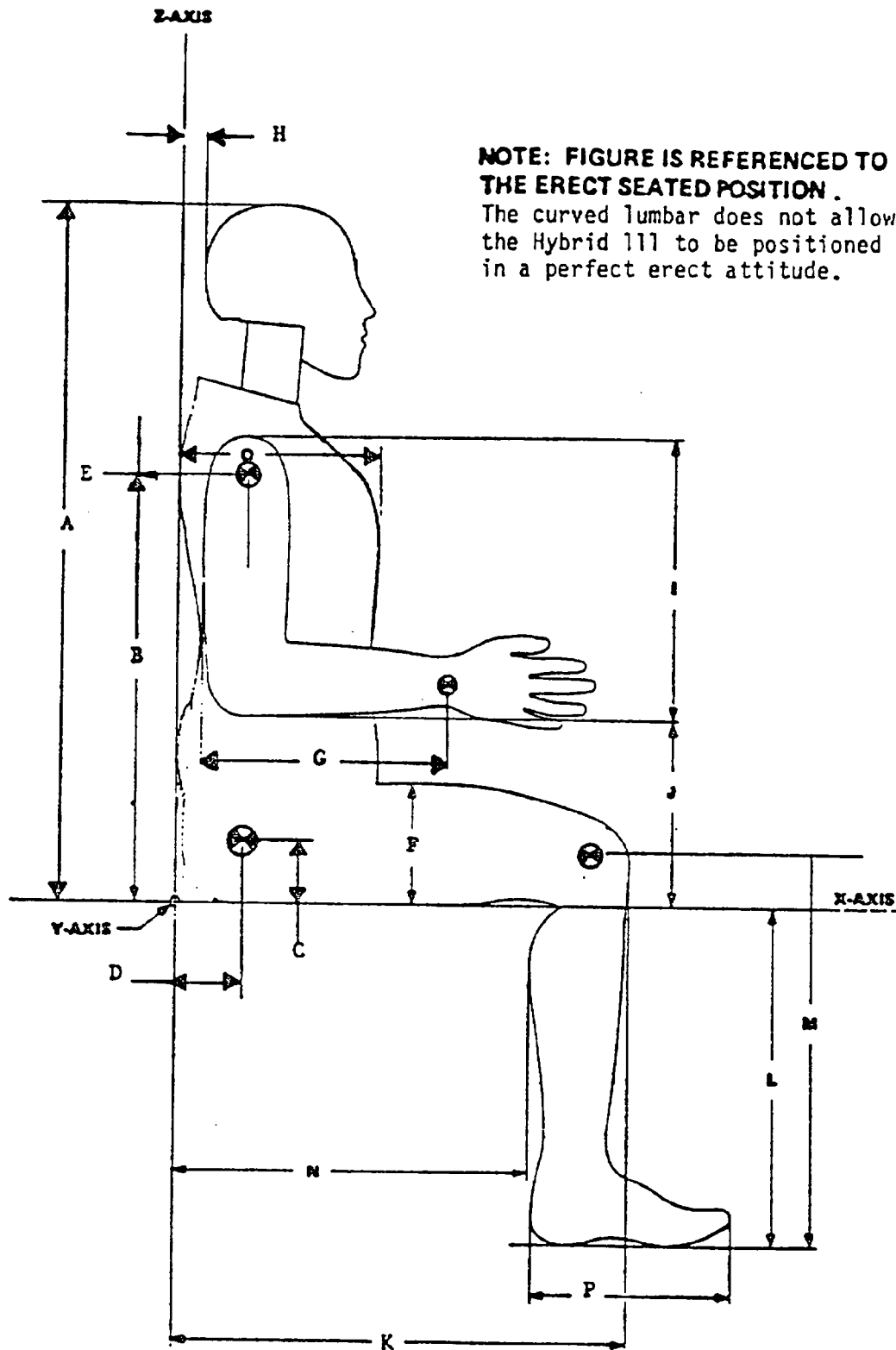
POST-TEST CALIBRATION

S/N: 143

HYBRID III EXTERIOR DIMENSIONS

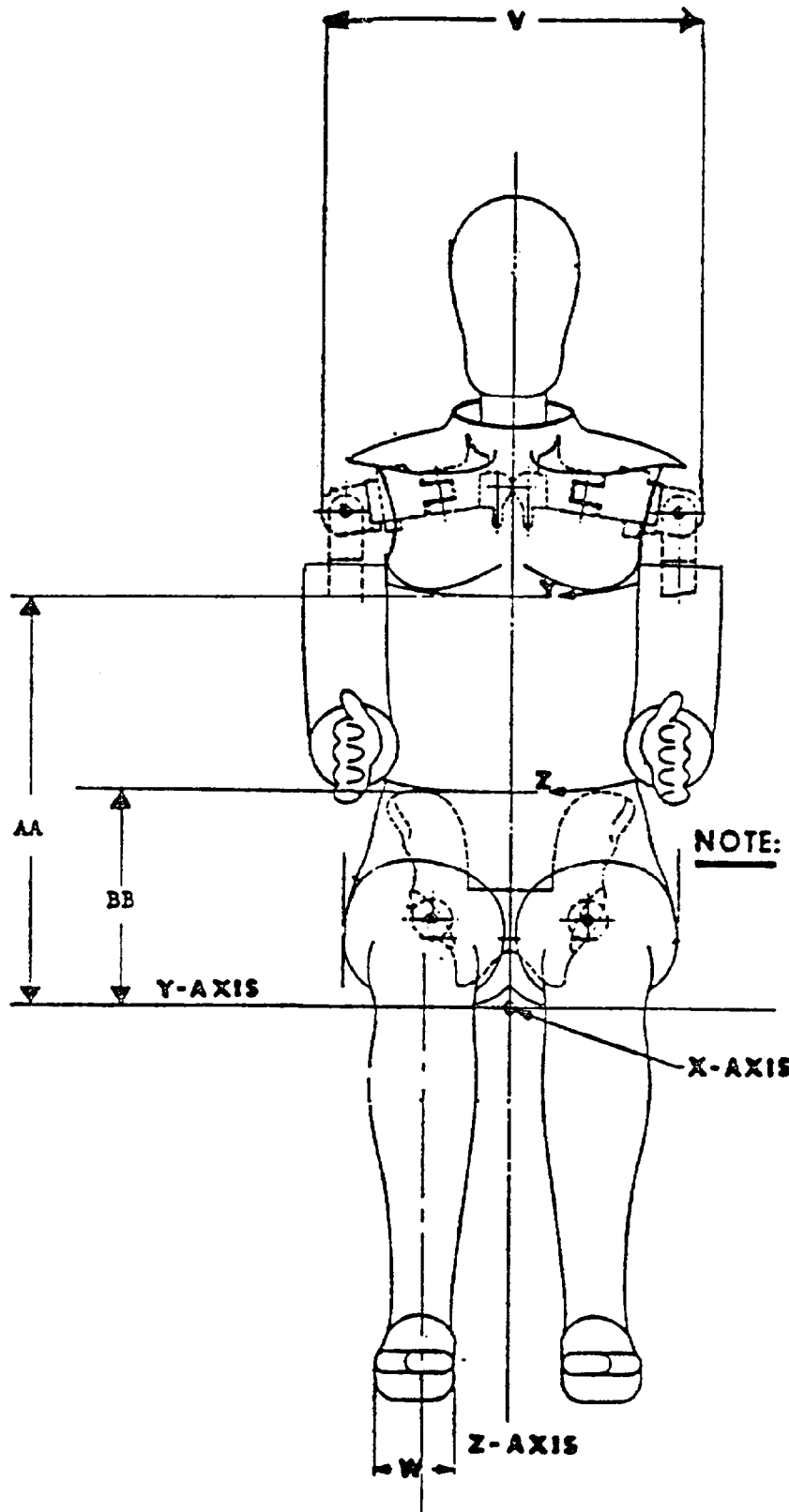
Dimensional Symbol	Description	Spec Dimension	Dummy Dimension SN <u>143</u>
A	Sitting Height (Erect)	34.8 $\pm$.2	<u>34.7</u>
B	Shoulder Pivot Height	20.2 $\pm$.3	<u>20.0</u>
C	"H" Point Height	3.4 ref.	<u>3.4</u>
D	"H" Point Location from Back Line	5.4 ref.	<u>5.4</u>
E	Shoulder Pivot Location from Back Line	3.5 $\pm$.2	<u>3.7</u>
F	Thigh Clearance	5.8 $\pm$.3	<u>5.9</u>
G	Back of Elbow to Wrist Pivot	11.7 $\pm$.3	<u>11.6</u>
H	Occiput to Z-Axis	1.7 $\pm$.1	<u>1.7</u>
I	Shoulder - Elbow Length	13.3 $\pm$.3	<u>13.2</u>
J	Elbow Rest Height	7.9 $\pm$.4	<u>8.1</u>
K	Buttock Knee Length	23.3 $\pm$.5	<u>23.0</u>
L	Popliteal Height	17.4 $\pm$.5	<u>17.4</u>
M	Knee Pivot Height	19.4 $\pm$.3	<u>19.5</u>
N	Buttock Popliteal Length	18.3 $\pm$.5	<u>18.0</u>
O	Chest Depth	8.7 $\pm$.3	<u>8.7</u>
P	Foot Length	10.2 $\pm$.3	<u>10.2</u>
V	Shoulder Breadth	16.9 $\pm$.3	<u>16.8</u>
W	Foot Breadth	3.9 $\pm$.3	<u>4.0</u>
Y	Chest Circumference	38.8 $\pm$.6	<u>38.9</u>
Z	Waist Circumference	33.5 $\pm$.6	<u>33.8</u>
AA	Location for Measurement of Chest Circumference	17.0 $\pm$.1	<u>17.0</u>
BB	Location for Measurement of Waist Circumference	9.0 $\pm$.1	<u>9.0</u>

NOTE: The "H" point is located 1.83 inches forward and 2.57 down down from the center of the pelvis angle reference hole.



NOTE: FIGURE IS REFERENCED TO THE ERECT SEATED POSITION.
The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.

HYBRID III Exterior Body Dimensions - Side View



**NOTE: FIGURE REFERENCED
TO THE ERECT SEATED
POSITION.**
The curved lumbar does
not allow the Hybrid III
to be positioned in a
perfect erect attitude.

HYBRID III Exterior Body Dimensions - Front View

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

06-Jan-88

VRTC

143C4HD1

HY3 SN143 HEAD DROP CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	71.70 DEG. F
RELATIVE HUMIDITY	10% - 70%	15.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	250.53 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.05 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Tom May

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

08-Jan-88

VRTC

143C4NE1

HY3 SN143 CAL4 NECK EXTENSION

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	16.00 %
IMPACT VELOCITY	19.50 - 20.30 FPS	19.51 FPS
PENDULUM	10 MS 17.20 - 21.20 G	19.87 G
DECELERATION	20 MS 14.00 - 19.00 G	16.07 G
	30 MS 11.00 - 16.00 G	12.30 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	12.20 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	42.25 MS
D PLANE	MAX 81 - 106 DEG.	111.37 DEG. **
ROTATION	TIME 72 - 82 MS	75.75 MS
MOMENT ABOUT OCCIPITAL	MIN -59.0/-39.0 FT.LB	-52.40 FT.LBS
CONDYLE	TIME 65 - 79 MS	75.00 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	171.38 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	160.50 MS **

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Don Mow

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

3 AXIS NECK TRANSDUCER

07-Jan-88

VRTC

143C4NF1

HY3 SN143 CAL4 NECK FLEXION

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	70.60 DEG. F
RELATIVE HUMIDITY		10% - 70%	12.00 %
IMPACT VELOCITY		22.6 - 23.4 FPS	23.00 FPS
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	28.84 G **
	20 MS	17.60 - 22.60 G	20.72 G
	30 MS	12.50 - 18.50 G	16.78 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.66 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	34.88 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	79.62 DEG.**
	TIME	57 - 64 MS	61.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.LBS	65.60 FT.LBS
	TIME	47 - 58 MS	55.75 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	122.50 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	102.50 MS

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Don May

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

09-Jan-88

VRTC

143C4TH1

HY3 SN143 CAL 04 H.S.THORAX 01

	HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS
=====		
TEMPERATURE	69 - 72 DEG. F	70.80 DEG. F

RELATIVE HUMIDITY	10% - 70%	14.00 %

PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC

MAXIMUM DEFLECTION	2.50 - 2.86 INCHES	2.87 INCHES *

MAXIMUM RESISTIVE FORCE	1080 - 1245 POUNDS	1233.2 POUNDS

INTERNAL HYSTERESIS	69% - 85%	72.2%

*** TEST DOES NOT MEET SPECIFICATIONS ***

TECHNICIAN

Tom May

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

LEFT KNEE
VRTC 143C4LK1

HY3 SN143 L.KNEE 11LB CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.60 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.95 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1329.89 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN *Em Mory*

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

07-Jan-88

RIGHT KNEE
VRTC 143C4RK1

HY3 SN143 R.KNEE 11LB CAL 4

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.50 DEG. F
RELATIVE HUMIDITY	10% - 70%	13.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	996 - 1566 LBS.	1298.57 LBS.
PROBE WEIGHT	11.0 LBS.	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN

Jim May

40 71°F
10 NM/H
12-16 13:00-

26 72°F
10 NM/H
12-16 11:00-

26 71°F
10 NM/H
12-16 09:00-

26 70°F
10 NM/H
12-16 03:00-

26 71°F
10 NM/H
12-16 15:00-

