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of Transportation
**National Highway
Traffic Safety
Administration**

**DOT HS 807 945
Final Report**

June 1992

Reducing Heavy Truck Aggressiveness Moving Heavy Truck Into a 1986 Ford Taurus 4-Door Sedan at 64.9 KPH

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Technical Report Documentation Page

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16. Abstract This test report documents a crash test that was conducted for research and development in support of reducing heavy truck aggressiveness. This test was conducted with a 1986 Ford Taurus 4-door sedan, VIN 1FABP29U0GG218761, at the Transportation Research Center Inc. on June 5, 1992. The test vehicle was impacted on the front right corner of the vehicle by the heavy truck. The struck vehicle contained ten (10) accelerometers and one instrumented Hybrid III driver dummy.			
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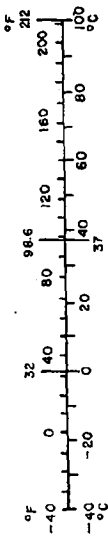
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Approximate Conversions from Metric Measures

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

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



*1 in = 2.54 (exact). 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.

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
1.0	PURPOSE AND TEST SUMMARY	1-1
2.0	VEHICLE, DUMMY, TRUCK AND TEST DATA	2-1
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	DATA PLOTS	B-1
APPENDIX C	DUMMY CERTIFICATION	C-1
APPENDIX D	MISCELLANEOUS TEST INFORMATION	D-1

LIST OF TABLES

<u>NO.</u>	<u>TITLE</u>	<u>PAGE</u>
1	CRASH TEST SUMMARY	2-3
2	TEST VEHICLE INFORMATION	2-4
2A	TRUCK INFORMATION	2-7
3	POST-IMPACT DATA	2-8
4	IMPACTED VEHICLE MEASUREMENTS	2-12
5	VEHICLE ACCELEROMETER LOCATIONS & DATA SUMMARY	2-14
6	HEAVY TRUCK ACCELEROMETER LOCATIONS & DATA SUMMARY	2-16
7	DUMMY DATA SUMMARY	2-17
8	POST-IMPACT DUMMY/VEHICLE DATA	2-19
9	MOTION PICTURE CAMERA INFORMATION	2-26

LIST OF FIGURES

<u>NO.</u>	<u>TITLES</u>	<u>PAGE</u>
1	IMPACT VELOCITY MEASUREMENT SYSTEM	2-9
2	VEHICLE CRUSH	2-10
3	PRE-TEST & POST-TEST MEASUREMENTS	2-11
4	VEHICLE ACCELEROMETER LOCATIONS	2-13
5	HEAVY TRUCK ACCELEROMETER PLACEMENT	2-15
6	DUMMY & SEAT POSITIONING DATA	2-21
7	DUMMY IN-VEHICLE POSITIONING DATA	2-22
8	SEAT BELT POSITIONING DATA	2-23
9	DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA	2-24
10	CAMERA POSITIONS	2-25

LIST OF PHOTOGRAPHS

<u>TITLE</u>	<u>FIGURE</u>
POST-TEST FRONT VIEW	A-1
PRE-TEST LEFT SIDE VIEW	A-2
POST-TEST LEFT SIDE VIEW	A-3
PRE-TEST LEFT REAR THREE-QUARTER VIEW	A-4
POST-TEST RIGHT REAR THREE-QUARTER VIEW	A-5
PRE-TEST REAR VIEW	A-6
POST-TEST REAR VIEW	A-7
PRE-TEST RIGHT SIDE VIEW	A-8
POST-TEST RIGHT SIDE VIEW	A-9
PRE-TEST RIGHT FRONT THREE-QUARTER VIEW	A-10
POST-TEST RIGHT FRONT THREE-QUARTER VIEW	A-11
POST-TEST LEFT FRONT THREE-QUARTER VIEW	A-12
PRE-TEST BUMPER ENGAGEMENT VIEW	A-13
PRE-TEST ENGINE COMPARTMENT VIEW	A-14
POST-TEST ENGINE COMPARTMENT VIEW	A-15
PRE-TEST WINDSHIELD VIEW	A-16
POST-TEST WINDSHIELD VIEW	A-17
PRE-TEST FRONT UNDERBODY VIEW	A-18
POST-TEST FRONT UNDERBODY VIEW	A-19
PRE-TEST REAR UNDERBODY VIEW	A-20
POST-TEST REAR UNDERBODY VIEW	A-21
PRE-TEST TRUCK FRONT VIEW	A-22
POST-TEST TRUCK FRONT VIEW	A-23
POST-TEST TRUCK DAMAGE CLOSE-UP VIEW	A-24
PRE-TEST DUMMY VIEW	A-25
POST-TEST DUMMY VIEW	A-26
PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 1	A-27
POST-TEST VEHICLE INTERIOR AND DUMMY - VIEW 1	A-28
PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 2	A-29
POST-TEST VEHICLE INTERIOR AND DUMMY - VIEW 2	A-30
POST-TEST DUMMY HEAD CONTACT VIEW	A-31
POST-TEST DUMMY KNEE CONTACT - VIEW 1	A-32
POST-TEST DUMMY KNEE CONTACT - VIEW 2	A-33

SECTION 1.0

PURPOSE AND TEST SUMMARY

This test was conducted as research in support of reducing heavy truck aggressiveness. This test was conducted on June 5, 1992.

The stationary vehicle, a 1986 Ford Taurus 4-door sedan, was equipped with a 3.0 liter, 6-cylinder, transverse gasoline engine and a 3-speed automatic transmission. The test weight of the vehicle was 1579 kg. The vehicle was instrumented with eight (8) longitudinal axis accelerometers, one (1) lateral axis accelerometer, one (1) vertical axis accelerometer and two (2) seat belt force load cells. One (1) Part 572E dummy was seated in the left front outboard seating position according to the dummy placement procedure specified in Appendix B and Optional Appendix C of Laboratory Procedure TP-208-08. The dummy was instrumented in the head, chest, and pelvis with longitudinal, lateral, and vertical accelerometers. The dummy was also instrumented with a 6-axis neck load cell, two (2) femur load cells, and a chest deflection potentiometer.

The stationary vehicle was impacted in the right front at 325 degrees by a moving heavy truck at 64.9 kph. The intended impact engagement was the right front corner of the car with the left front corner of the truck.

The moving heavy truck's test weight was 19001 kg. The truck was equipped with a standard truck bumper. The truck was instrumented with two (2) longitudinal and vertical axis accelerometers and one (1) vertical axis accelerometer.

The dummy's head injury criterion, HIC, was 339. The dummy's chest deceleration with 3 milliseconds minimum duration was 57.6 g. The dummy's maximum left and right femur forces were 6204 N and 4491 N, respectively.

The vehicle, dummy, and heavy truck data were multiplexed and recorded on a 14-channel analog tape deck. The analog data was digitally sampled at 8000 samples per second. The data was digitally filtered as per SAE J211 OCT88.

The test was filmed by one (1) real-time panning motion picture camera and five (5) high-speed motion picture cameras operating at approximately 500 frames per second.

Section 2.0 contains the vehicle, dummy, truck, and test data. Appendix A contains the pre- and post-test still photographs. Appendix B contains the final test data plots. Appendix C contains miscellaneous test information.

SECTION 2.0

VEHICLE, DUMMY, TRUCK AND TEST DATA

TEST ANOMALIES

The driver chest X-axis acceleration, CSTXG1, channel contained anomalous spikes from 95 to 105 milliseconds. The spikes affected the driver chest resultant acceleration, CSTRG1, and X-axis velocity, CSTXV1, calculations.

TABLE 1 CRASH TEST SUMMARY

TEST TYPE: Heavy Truck into Stationary Vehicle

TEST DATE: 06/05/92 TEST TIME: 1322 AMBIENT TEMP. (°C): 24

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1986/Ford/Taurus/4-door sedan

VEHICLE TEST WEIGHT (KG): 1579

IMPACT ANGLE (DEG)*: 325

IMPACT VELOCITY (KPH)**: PRIMARY = 64.9 SECONDARY = 64.9

MAXIMUM STATIC CRUSH (MM): 38

DUMMY: Driver #048

TYPE: Part 572E

LOCATION: Left front

RESTRAINT: 3-point unbelt

NUMBER OF DATA CHANNELS: 35

NUMBER OF CAMERAS: HIGH-SPEED 5 REAL-TIME 1

*With respect to tow track centerline.

**Speed trap measurement ($\pm$.08 kph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford/Taurus

VIN: 1FABP29U0GG218761

BODY STYLE: 4-door sedan

MODEL YEAR: 1986

COLOR: Maroon

ENGINE DATA: TYPE: transverse CYLINDERS: 6 DISPLACEMENT: 3.0 liters

TRANSMISSION DATA: 3 SPEED, MANUAL, X AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 65,842

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

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

REMARKS:

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

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 05/86 VIN: 1FABP29U0GG218761

GVWR: 4550 LBS

GAWR: FRONT: 2514 LBS., REAR: 2071 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Mastercraft, P195/70R14

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

SPARE TIRE (MFR., LINE, SIZE): Michelin, Temp, 135/80R14

TYPE OF SEATS: FRONT: Bench
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 1815 MILLIMETERS

WHEELBASE: 2695 MILLIMETERS

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located on the passenger's side C-pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P205/70R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 35 PSI; REAR: 35 PSI

DESIGNATED SEATING CAPACITY: 3 FRONT 3 REAR 6 TOTAL

VEHICLE CAPACITY WEIGHT: 1100 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE: LF 673; RF 674; LR 605; RR 601

PRE-TEST ATTITUDE: LF 661; RF 668; LR 594; RR 594

POST-TEST ATTITUDE: LF 705; RF 738; LR 598; RR 569

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	NA KG	RIGHT REAR	NA KG
LEFT FRONT	NA KG	LEFT REAR	NA KG
TOTAL FRONT WEIGHT	NA KG	(NA % OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	NA KG	(NA % OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	NA KG		
TARGET TEST WEIGHT	1581 KG **		

WEIGHT OF TEST VEHICLE:

RIGHT FRONT	446 KG	RIGHT REAR	340 KG
LEFT FRONT	488 KG	LEFT REAR	305 KG
TOTAL FRONT WEIGHT	934 KG	(59.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	645 KG	(40.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	1579 KG		

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: None

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 1101 MILLIMETERS REARWARD OF FRONT WHEEL CENTERLINE

*The vehicle was not weighed as delivered.

**The target test weight was established during Test 920507.

TABLE 2A TRUCK INFORMATION

WEIGHT DISTRIBUTION

FRONT: 4772 KG

REAR: 14229 KG

AXLE SPACING

FRONT: 3835 MM

REAR: 1308 MM

DISTANCE OF C.G. BEHIND FRONT AXLE: 3363 MM

BUMPER DESCRIPTION: Stock truck bumper

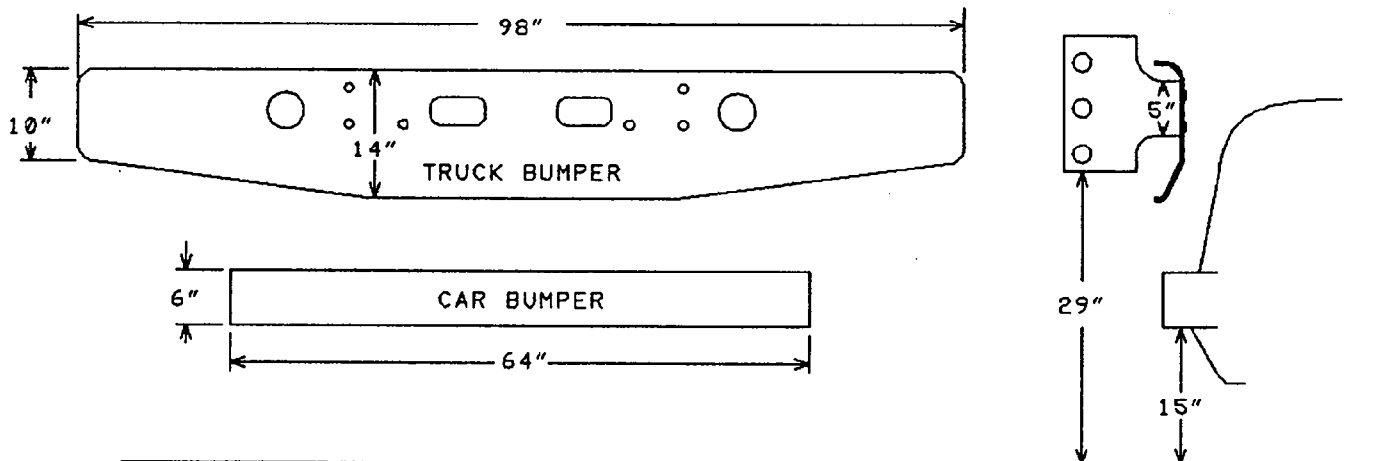


TABLE 3 POST-IMPACT DATA

TEST NUMBER: 920605

TEST DATE: 06/05/92

TEST TIME: 1322

TEST TYPE: Heavy Truck into Stationary Vehicle

IMPACT ANGLE: 325

AMBIENT TEMPERATURE AT IMPACT AREA: 24° C

TEMPERATURE IN OCCUPANT COMPARTMENT: 24° C

IMPACT VELOCITY: PRIMARY = 64.9 KPH
SECONDARY = 64.9 KPH

(SPECIFIED RANGE = 63.6 TO 65.2 KPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 660 MM

EXITING VELOCITY TRAP = 51 MM

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

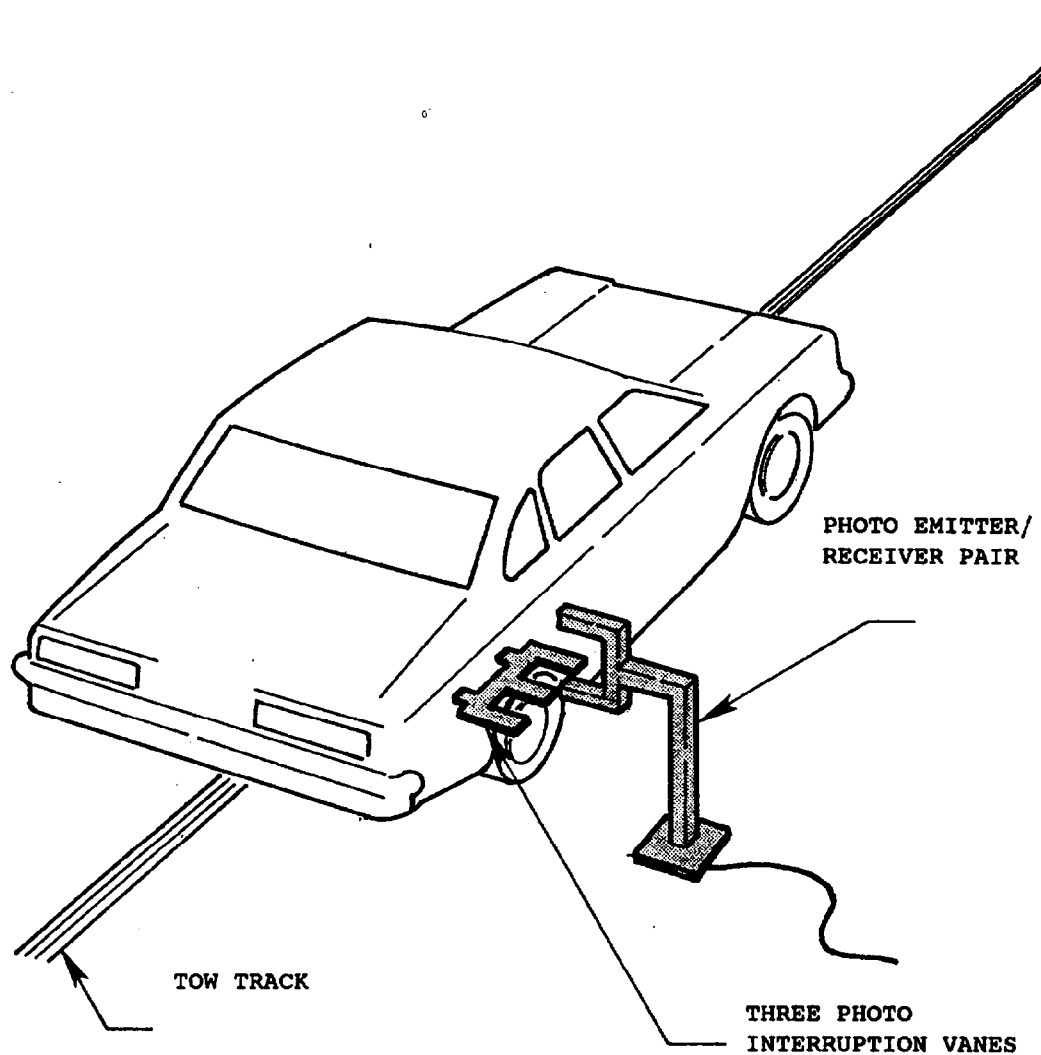
OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 4657; C 4799; R 4655

POST-TEST: L 4636; C 4778; R 4630

TOTAL CRUSH: L 21; C 21; R 25

AVERAGE CRUSH: 22

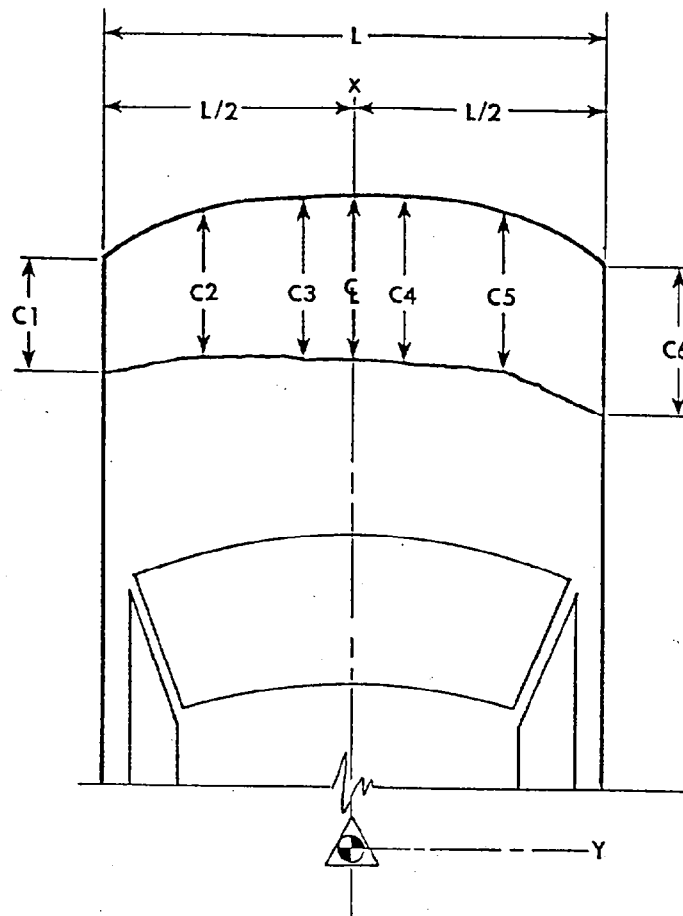
FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver 51 millimeters before impact.

The vanes have 305 millimeter spacing.

FIGURE 2 VEHICLE CRUSH



NOTES: L is pre-test length of contact surface.
 C1 through C6 are spaced equally apart.
 CL is vehicle centerline.
 All measurements are in millimeters.

Vehicle Ford Taurus

PRE-TEST		POST-TEST		CRUSH	
L	<u>1512</u>				
C1	<u>4657</u>	C1	<u>4636</u>	C1	<u>21</u>
C2	<u>4745</u>	C2	<u>4718</u>	C2	<u>27</u>
C3	<u>4785</u>	C3	<u>4766</u>	C3	<u>19</u>
C4	<u>4775</u>	C4	<u>4763</u>	C4	<u>12</u>
C5	<u>4752</u>	C5	<u>4714</u>	C5	<u>38</u>
C6	<u>4655</u>	C6	<u>4630</u>	C6	<u>25</u>
CL	<u>4799</u>	CL	<u>4778</u>	CL	<u>21</u>

FIGURE 3
PRE-TEST AND POST-TEST MEASUREMENT POINTS

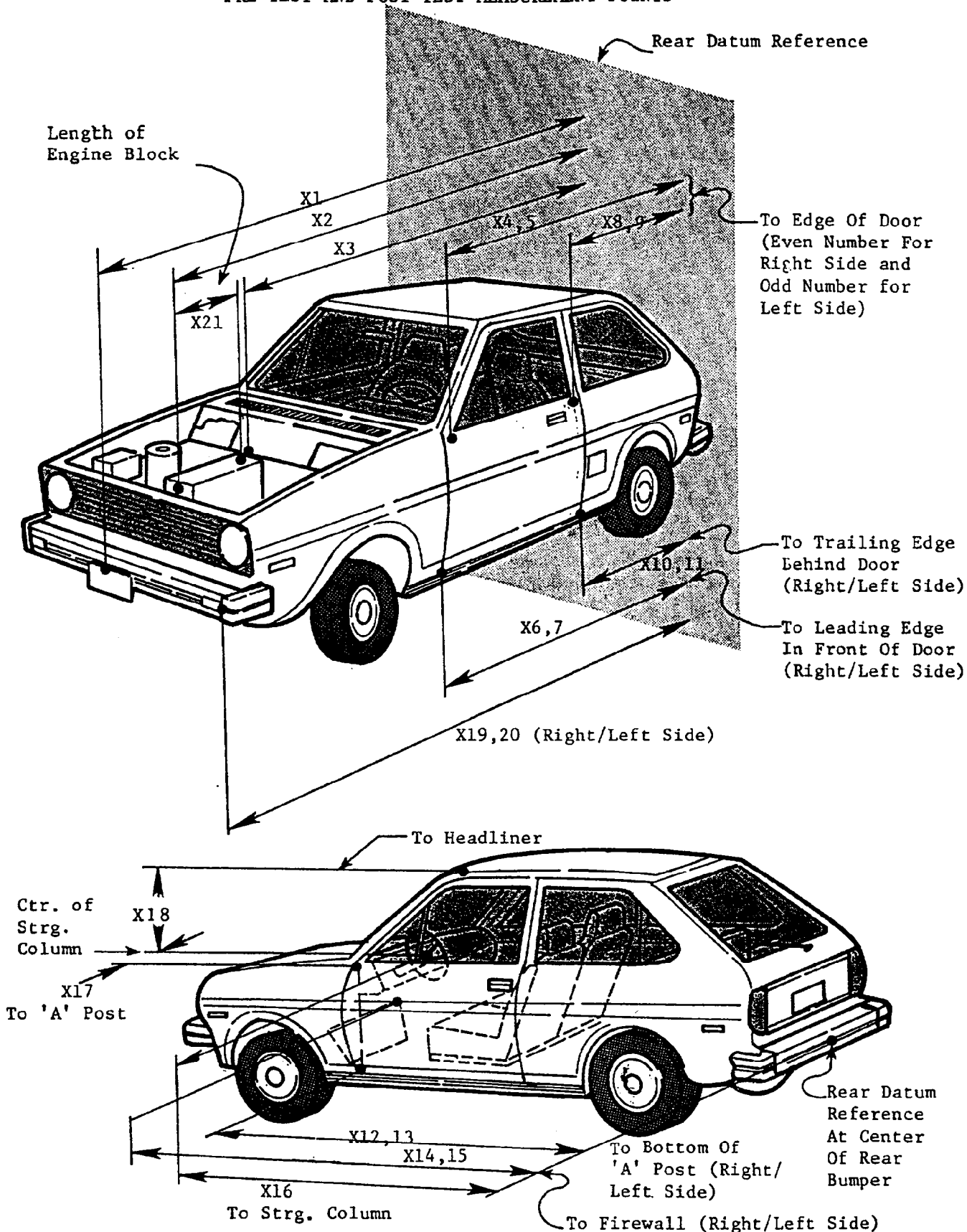


TABLE 4 IMPACTED VEHICLE MEASUREMENTS

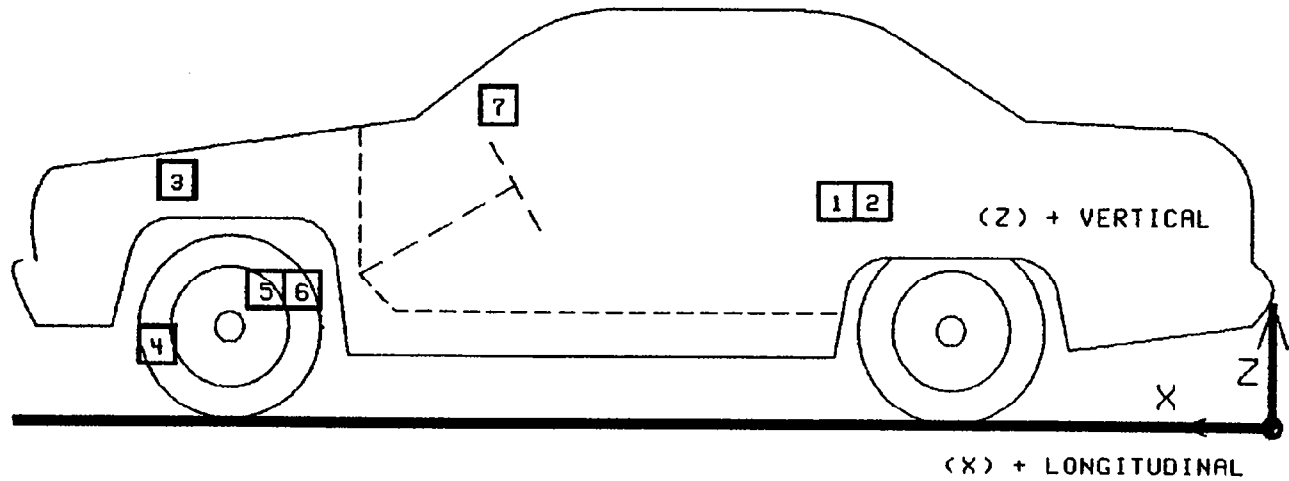
VEHICLE MAKE/MODEL: Ford/Taurus

TEST NUMBER: 920605

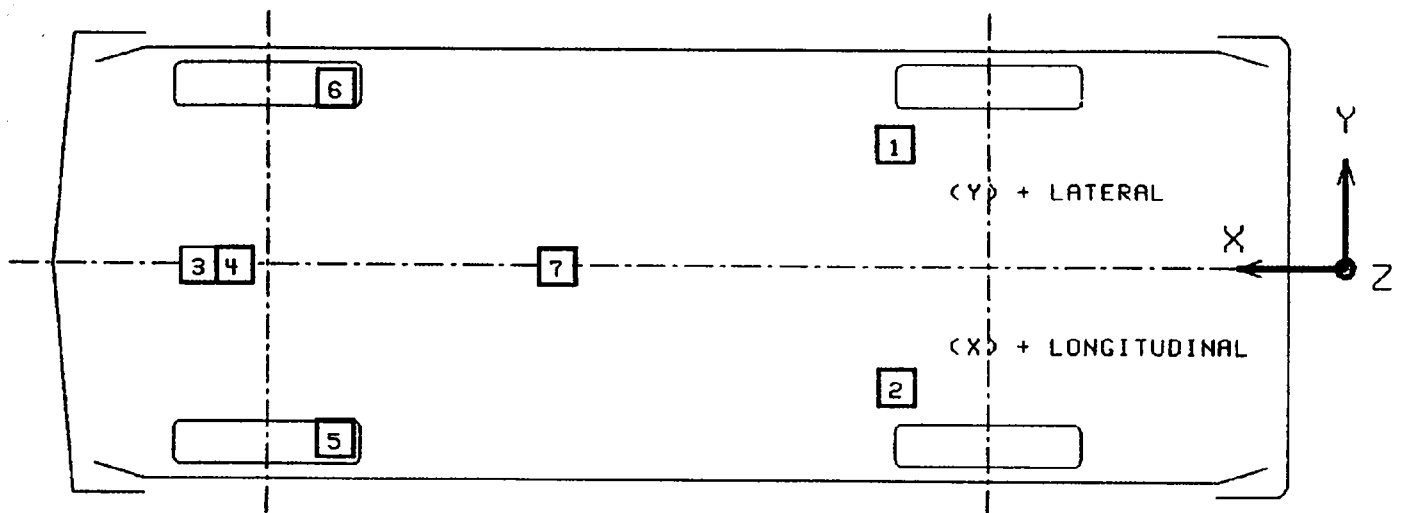
ALL MEASUREMENTS ARE IN MILLIMETERS

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	4799	4778	21
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	4237	4153	84
X3	REAR SURFACE OF VEHICLE TO FIREWALL	3609	3623	-14
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	3302	3239	63
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	3305	3313	-8
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	3241	3237	4
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	3245	3244	1
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	2219	2224	-5
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	2220	2229	-9
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	2197	2204	-7
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	2209	2210	-1
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	3219	3242	-23
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	3240	3223	17
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	3570	3540	30
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	3556	3572	-16
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	2832	2822	10
X17	CENTER OF STEERING COLUMN TO "A" POST	258	255	3
X18	CENTER OF STEERING COLUMN TO HEADLINER	425	461	-36
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	4655	4630	25
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	4657	4636	21
X21	LENGTH OF ENGINE BLOCK	410	410	0

FIGURE 4
VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 5

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920605

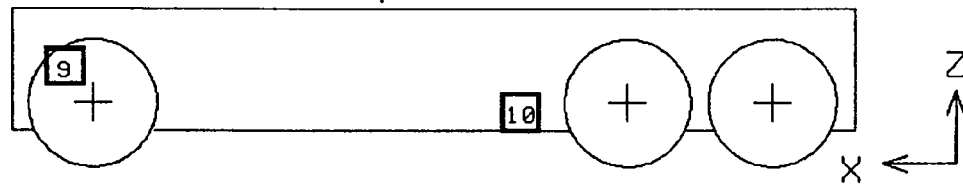
No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G MSEC		MAX G MSEC	
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	1935	600	354	2.4	333.5	25.8	67.5
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	1892	-610	345	3.0	241.9	18.3	70.6
3 ENGINE TOP LONGITUDINAL	4184	-135	722	53.2	79.0	123.4	44.9
4 ENGINE BOTTOM LONGITUDINAL	3913	25	195	25.3	65.1	37.8	50.0
5 RIGHT BRAKE CALIPER LONGITUDINAL	3863	-607	400	11.2	93.4	26.4	74.8
6 LEFT BRAKE CALIPER LONGITUDINAL	3889	687	317	12.0	220.8	48.2	59.8
7 INSTRUMENT PANEL CENTER LONGITUDINAL	3176	0	942	18.0	86.9	37.6	72.9
8 CENTER OF GRAVITY LONGITUDINAL	2226	0	289	2.2	330.3	26.7	66.1
LATERAL				10.0	73.5	3.2	64.6
VERTICAL				25.2	85.5	21.1	65.1
RESULTANT				33.6	65.6		

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS.

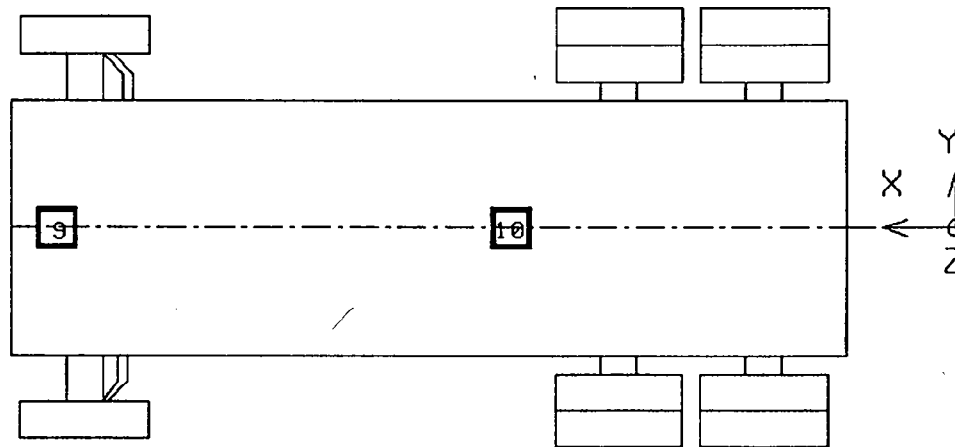
REFERENCE: X: + FORWARD FROM REAR BUMPER
 Y: + LEFTWARD FROM VEHICLE CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL

FIGURE 5

HEAVY TRUCK ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 6

TRUCK ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 920605

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G	MSEC	MAX G	MSEC
9 FRONT FRAME	2527	0	1050				
CROSSMEMBER							
LONGITUDINAL				11.4	69.3	17.5	61.0
LATERAL				9.8	59.6	16.6	48.0
VERTICAL				16.5	67.8	12.0	61.6
RESULTANT				20.3	61.1		
10 CENTER OF GRAVITY	6160	0	658				
LONGITUDINAL				0.6	57.1	3.0	70.0
LATERAL				2.2	97.1	3.7	68.1

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS.

REFERENCE: X: + FORWARD FROM TRAILING EDGE OF TRUCK
 Y: + LEFT FROM TRUCK CENTERLINE
 Z: + UP FROM GROUND LEVEL

TABLE 7

DUMMY DATA SUMMARY

TEST NUMBER 920605

DRIVER DUMMY

SN: 048

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

HEAD ACCELERATION (g)

LONGITUDINAL	5.1	281.5	51.0	133.1
LATERAL	19.5	133.9	7.4	261.5
VERTICAL	3.0	44.3	33.7	110.6
RESULTANT	56.3	133.1		
HIC	339	FROM 112.1 TO 148.1		

NECK FORCE (N)

LONGITUDINAL	848.7	140.4	130.5	278.6
LATERAL	149.6	275.8	716.6	146.6
VERTICAL	1666.7	126.5	177.4	0.6
RESULTANT	1833.1	126.5		

NECK MOMENT (N-M)

ABOUT X	38.8	152.6	7.2	109.3
ABOUT Y	41.1	157.5	52.9	112.9
ABOUT Z	4.7	289.8	13.0	122.3
RESULTANT	54.0	152.5		

CHEST ACCELERATION (g)

LONGITUDINAL	0.5	195.3	---	---
LATERAL	11.8	108.8	3.0	86.1
VERTICAL	12.7	125.4	12.2	91.3
RESULTANT	192.7	99.9		
3 MSEC	57.6			

CHEST DEFLECTION (mm)

LONGITUDINAL	0.3	40.0	37.8	120.8
--------------	-----	------	------	-------

PELVIS ACCELERATION (g)

LONGITUDINAL	3.3	288.6	59.9	88.3
LATERAL	19.6	88.3	6.4	134.9
VERTICAL	19.9	109.4	7.7	290.3
RESULTANT	63.2	88.3		

TABLE 7

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 920605

DRIVER DUMMY

SN: 048

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

FEMUR LOAD (N)

LEFT	366.3	64.9	6204.1	84.4
RIGHT	342.9	76.0	4491.4	88.4

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD
FORCE: TENSION

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD
FORCE: COMPRESSION

TABLE 8 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #048	PASSENGER # NA
HEAD	<u>Steering wheel rim</u>	<u></u>
CHEST	<u>None</u>	<u></u>
ABDOMEN	<u>None</u>	<u></u>
LEFT KNEE	<u>Instrument panel</u>	<u></u>
RIGHT KNEE	<u>Instrument panel</u>	<u></u>

DOOR OPENING:

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

SEAT MOVEMENT:

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

GLAZING DAMAGE:

The entire windshield was cracked on impact.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

The dummy head and torso translated forward and to the right at impact. The dummy's head and torso impacted the steering wheel. The hands and knees impacted the instrument panel. The dummy rebounded into the seat back restrained by the three-point unbelt.

FIGURE 6 DUMMY AND SEAT POSITIONING DATA

PRE-IMPACT DATA:

MAKE/MODEL: Ford/Taurus
 BODY STYLE: 4-door sedan MODEL YEAR: 1986
 COLOR: Maroon

DATA FROM CERTIFICATION LABEL:

VEHICLE MANUFACTURER: Ford Motor Company
 DATE OF MANUFACTURE: 05/86 VIN: 1FABP29U0GG218761
 GVWR: 4550 LBS.; GAWR: FRONT = 2514 LBS.; REAR = 2071 LBS.

POST-IMPACT DATA:

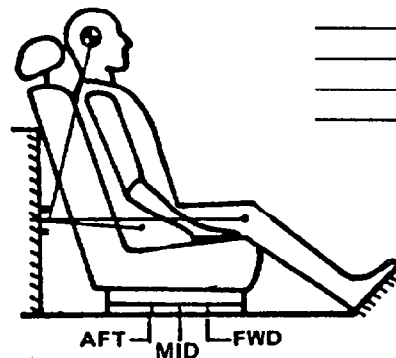
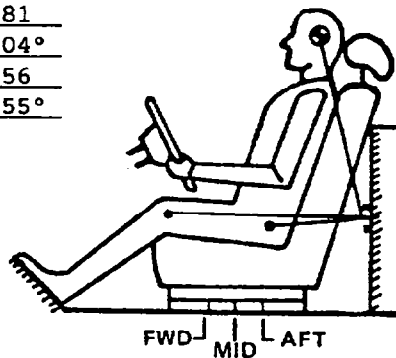
DATE OF TEST: 06/05/92 TIME: 1322 TEMPERATURE: 24° C
 IMPACT VELOCITY: PRIMARY = 64.9 MPH SECONDARY = 64.9 MPH
 REQUIRED IMPACT VELOCITY RANGE: 63.6 TO 65.2 MPH
 SEAT TYPE: Bench ADJUSTER TYPE: Manual
 FRONT SEAT BACK TYPE: Reclining
 TECHNICIANS: S. Ericksen, B. Miller

DRIVER DUMMY # 048 TYPE: IIII

HEAD 470
 TARGET -6°
 KNEE 581
 JOINT 104°
 APPROX- 256
 IMATE 155°
 "H"
 POINT

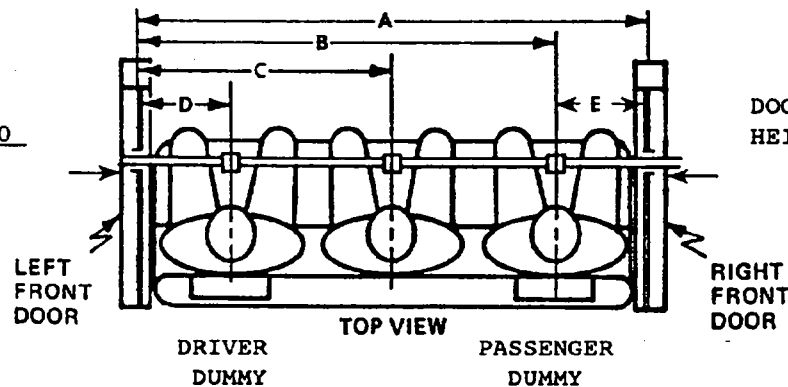
PASSENGER DUMMY # NA TYPE: _____

HEAD _____
 TARGET _____
 KNEE _____
 JOINT _____
 APPROX- _____
 IMATE _____
 "H"
 POINT



A = 1477
 B = NA
 C = NA
 D = 355
 E = NA
 DOOR GLASS
 HEIGHT = 210

DOOR GLASS
 HEIGHT = _____



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

FIGURE 7 DUMMY IN VEHICLE POSITIONING DATA

	DRIVER	PASSENGER
	048	NA
HH	386	
HW	575	
CD	590	
CS	372	
KDL	163	
KDR	162	
TA	17°	
SA	23°	
HSW	497	

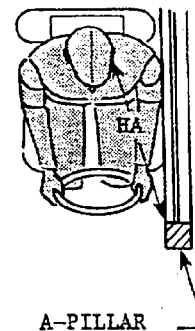
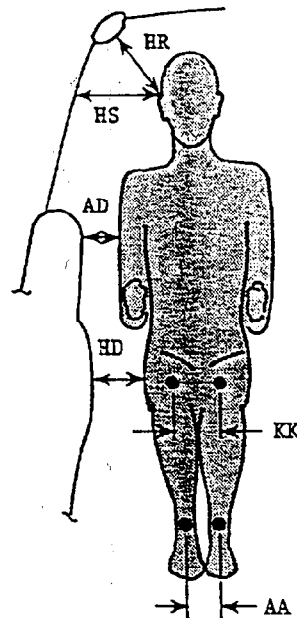
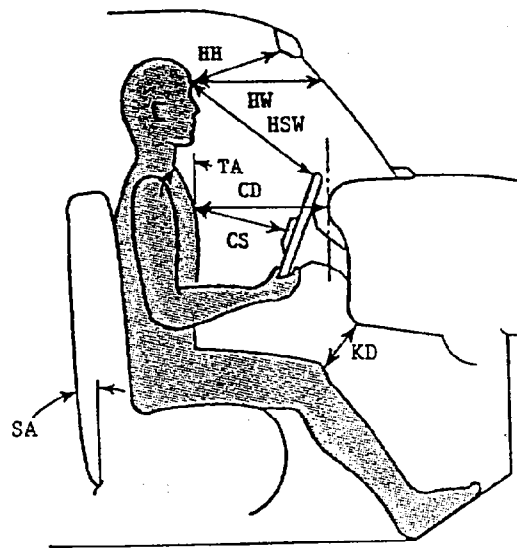
	DRIVER	PASSENGER
	048	NA
HR	162	
HS	260	
AD	115	
HD	196	
KK	225	
AA	275	
HA	590	

KNEE OUTER CLEVIS TO OUTER
CLEVIS SPACING:

DRIVER = 300

PELVIS ANGLE:

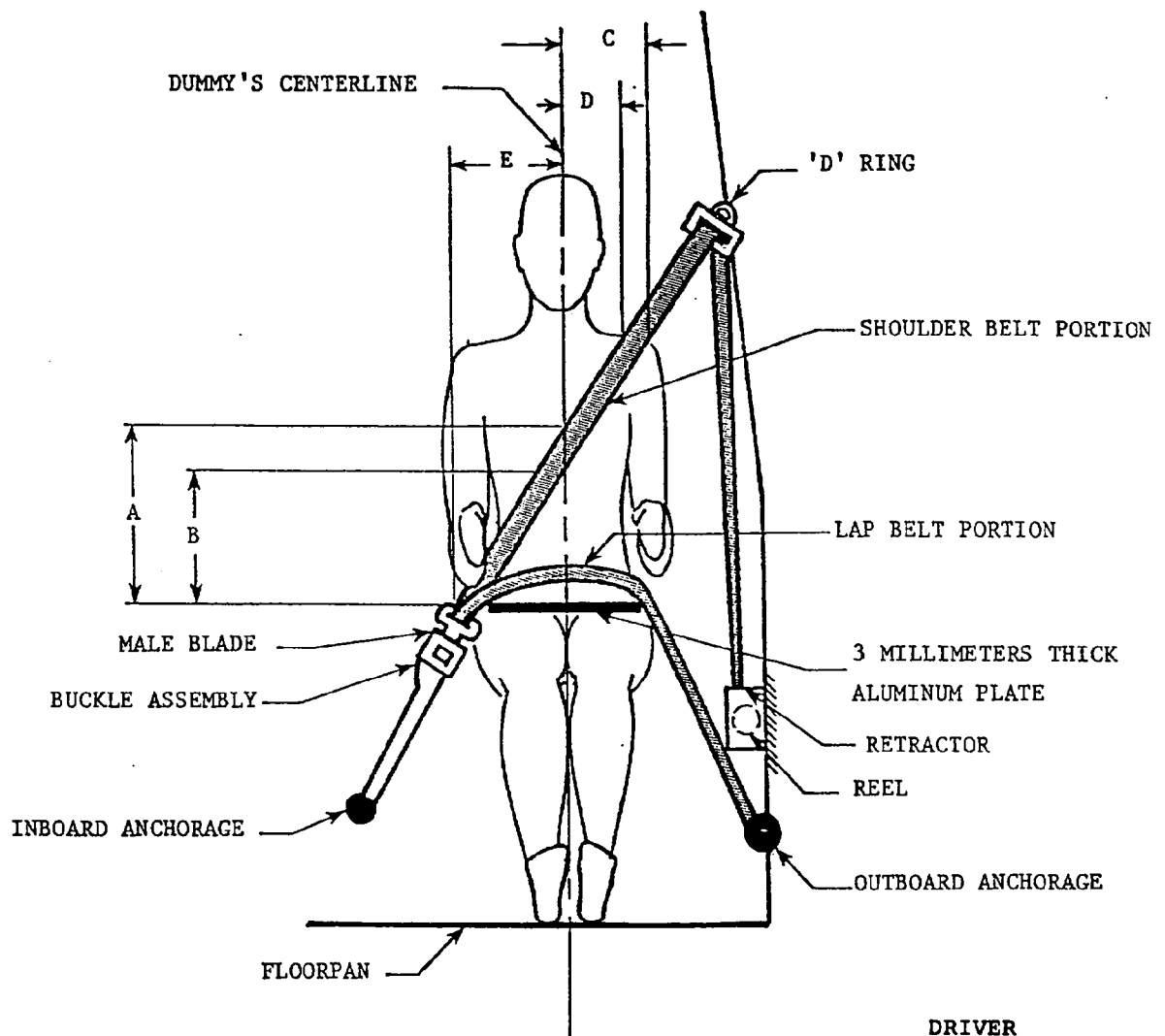
DRIVER = 25°



HH = HEAD TO WINDSHIELD HEADER	HR = HEAD C.G. TARGET TO SIDE ROOF HEADER
HW = HEAD TO WINDSHIELD	HS = HEAD C.G. TARGET TO SIDE WINDOW
CD = CHEST TO DASH	AD = ARM TO DOOR
CS = CHEST TO STEERING WHEEL	HD = HIP TO DOOR
KD = KNEE TO DASH	KK = KNEE TO KNEE
TA = TORSO ANGLE	AA = ANKLE TO ANKLE
SA = SEAT BACK ANGLE	HA = HEAD C.G. TARGET TO A-PILLAR
HSW = HEAD TO STEERING WHEEL	

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

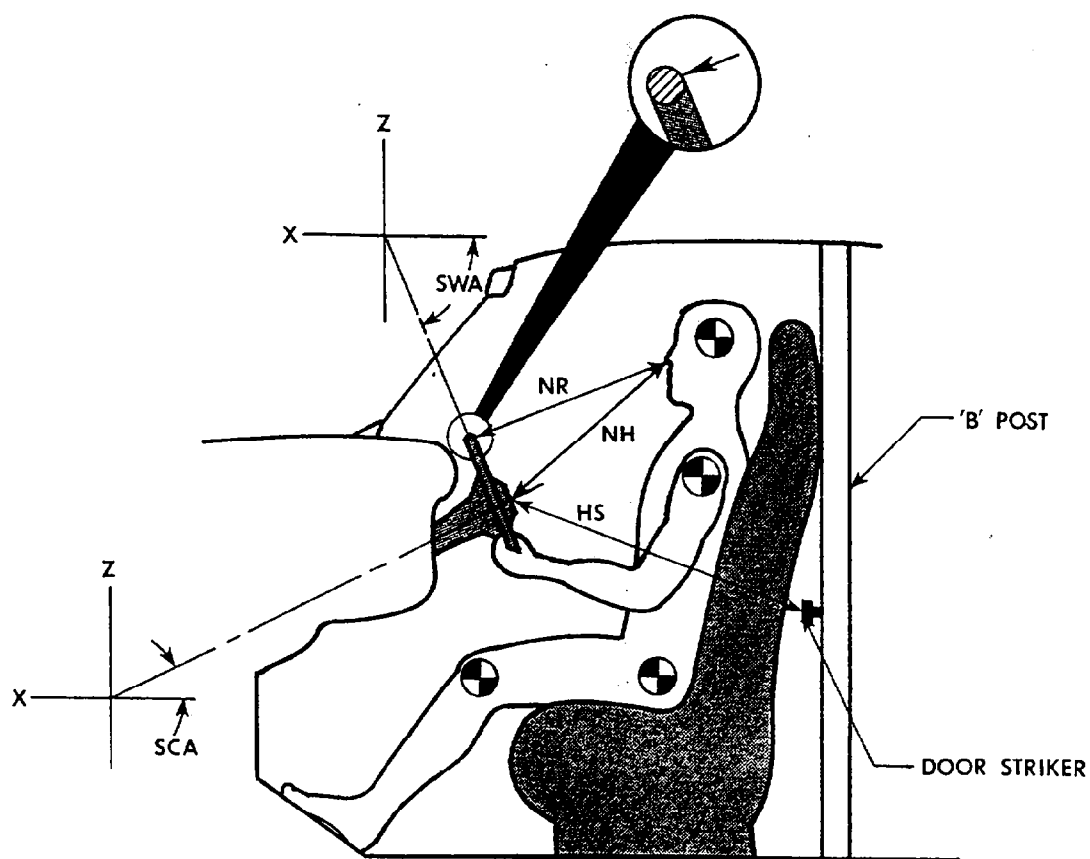
FIGURE 8 SEAT BELT POSITIONING DATA



	DRIVER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	350
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	260
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	119
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	60
E - DUMMY CENTERLINE TO INTERSECTION OF UPPER TORSO BELT AND LAP BELT	205

ALL MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 9 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



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

MEASUREMENTS

NR - DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	464
NH - DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	475
HS - DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	612
SCA - ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	23°
SWA - ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	67°

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 4
CAMERA POSITIONS

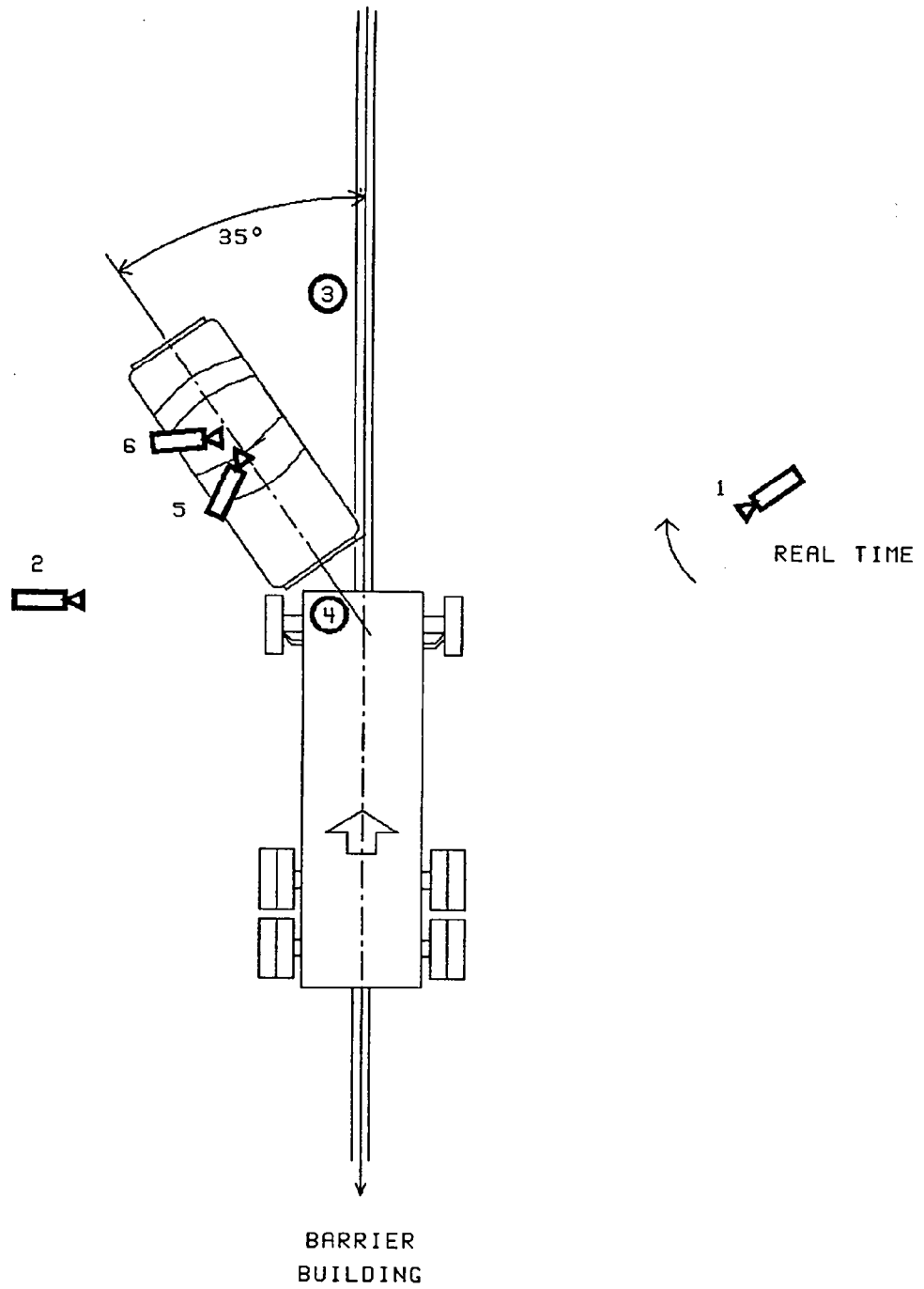


TABLE 9 MOTION PICTURE CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right panning	Bolex	13	24	Real-time documentation
2	Left wide	Photosonic	13	1000	Vehicle dynamics
3	Overhead wide	Photosonic	8	998	Vehicle dynamics
4	Onboard truck	Photosonic	8	995	Dummy kinematics
5	Onboard car front	Photosonic	8	995	Dummy kinematics
6	Onboard car rear	Photosonic	8	1000	Dummy kinematics

APPENDIX A

PHOTOGRAPHS



Figure A-1. POST-TEST FRONT VIEW



Figure A-2. PRE-TEST LEFT SIDE VIEW



Figure A-3. POST-TEST LEFT SIDE VIEW



Figure A-4. PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-5. POST-TEST RIGHT REAR THREE-QUARTER VIEW



Figure A-6. PRE-TEST REAR VIEW



Figure A-7. POST-TEST REAR VIEW



Figure A-8. PRE-TEST RIGHT SIDE VIEW



Figure A-9. POST-TEST RIGHT SIDE VIEW



Figure A-10. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-11. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-12. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-13. PRE-TEST BUMPER ENGAGEMENT VIEW

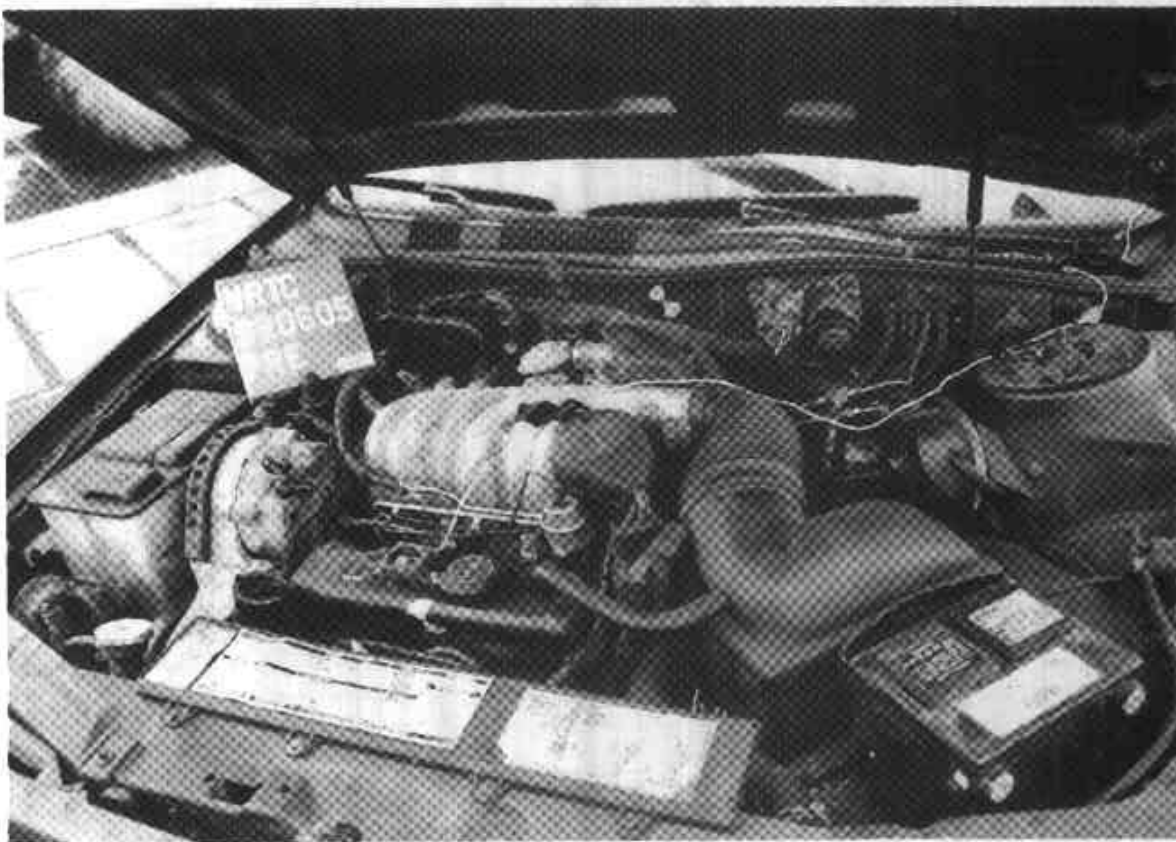


Figure A-14. PRE-TEST ENGINE COMPARTMENT VIEW

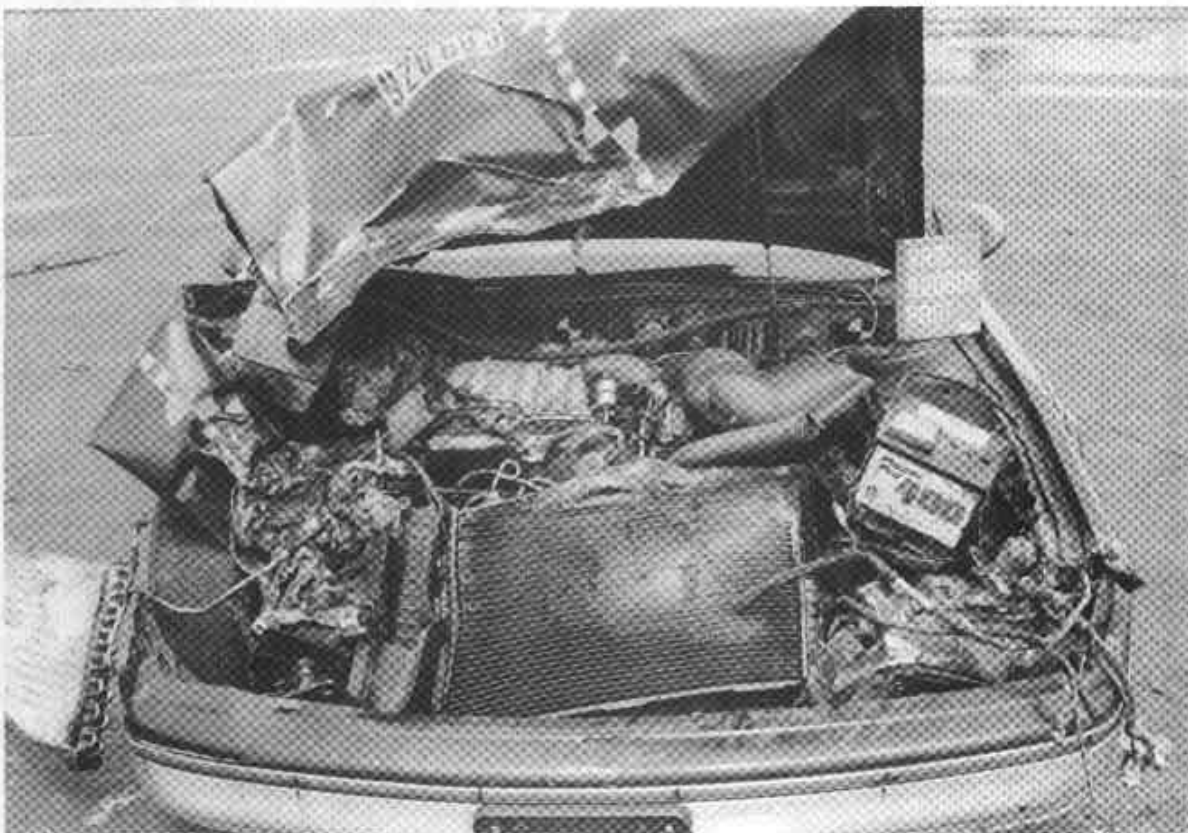


Figure A-15. POST-TEST ENGINE COMPARTMENT VIEW



Figure A-16. PRE-TEST WINDSHIELD VIEW



Figure A-17. POST-TEST WINDSHIELD VIEW

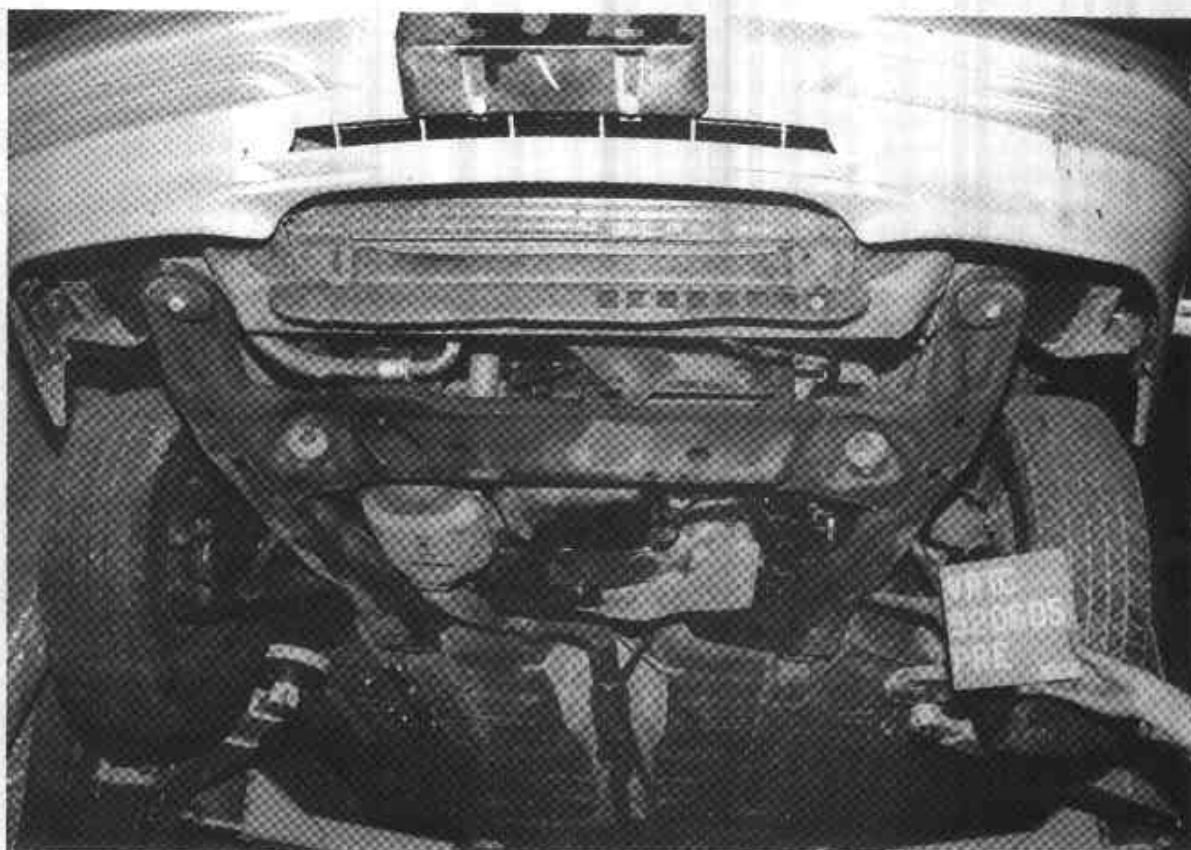


Figure A-18. PRE-TEST FRONT UNDERBODY VIEW

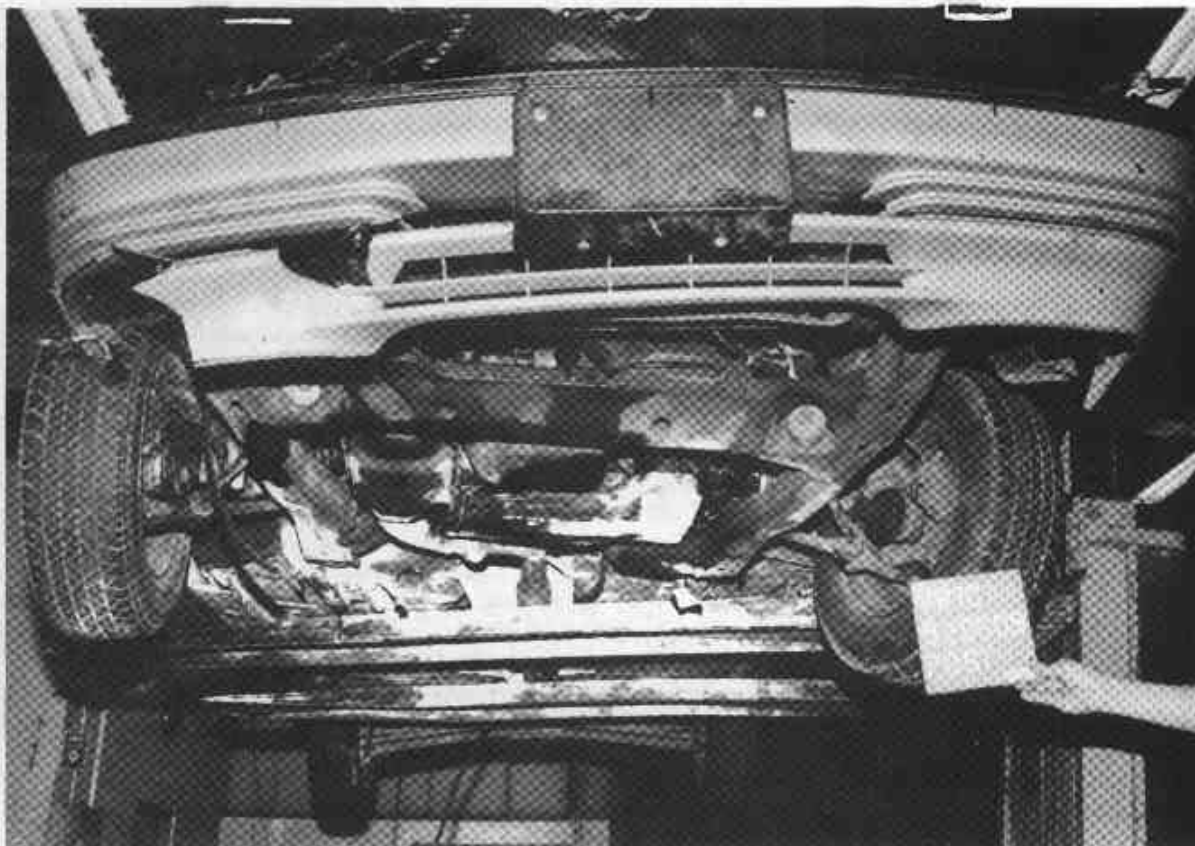


Figure A-19. POST-TEST FRONT UNDERBODY VIEW

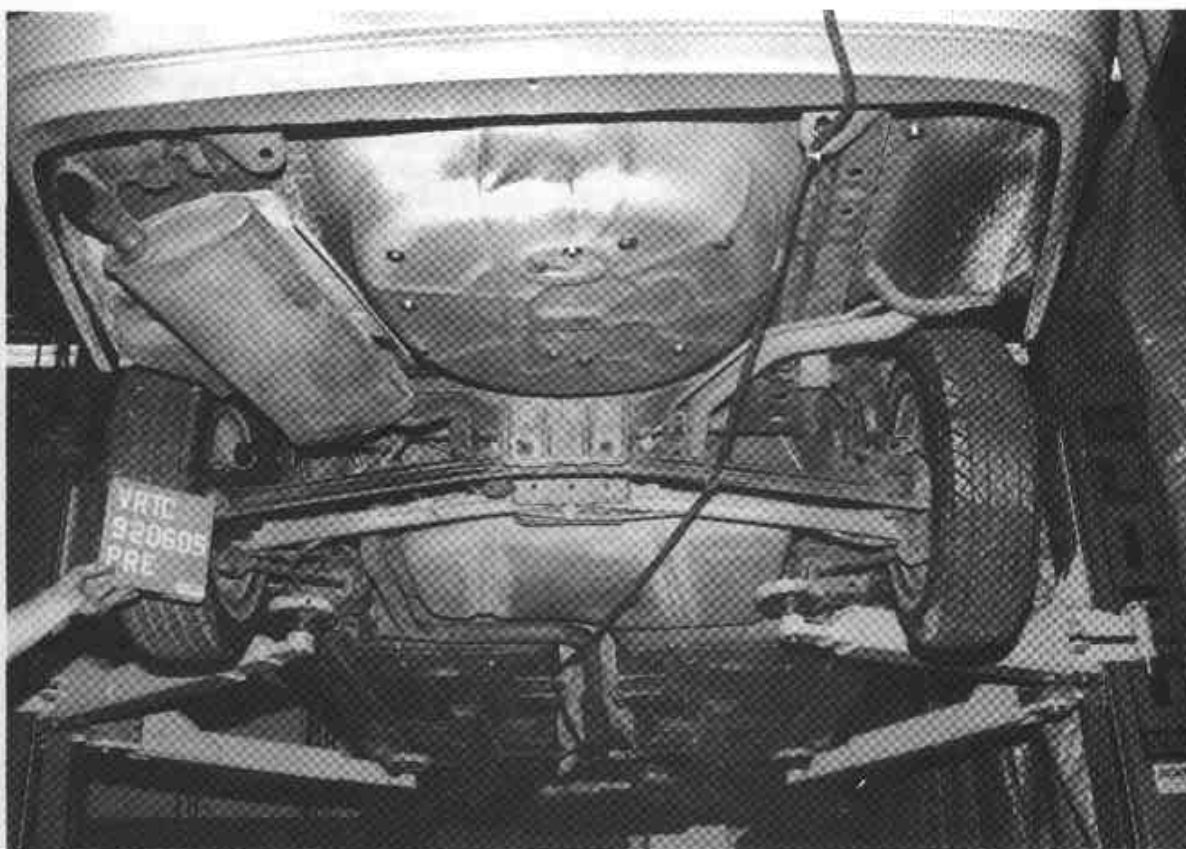


Figure A-20. PRE-TEST REAR UNDERBODY VIEW

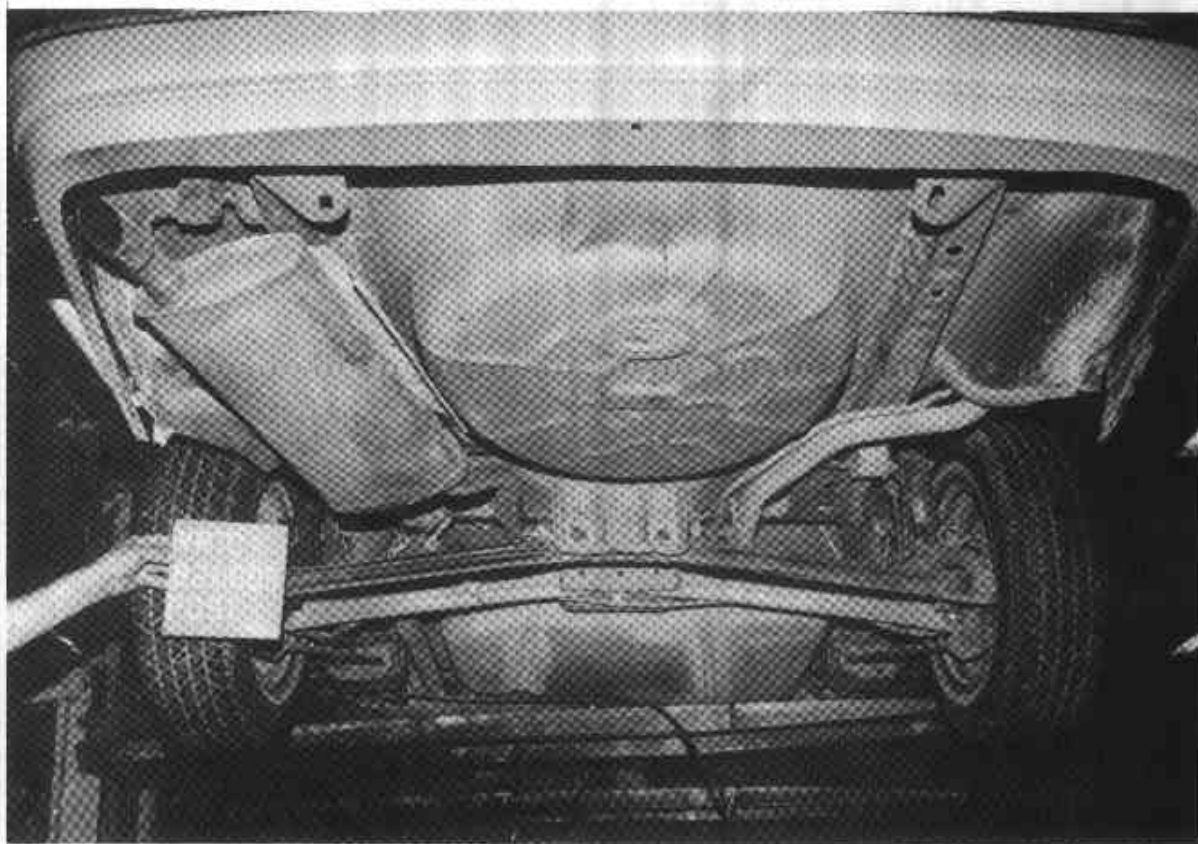


Figure A-21. POST-TEST REAR UNDERBODY VIEW



Figure A-22. PRE-TEST TRUCK FRONT VIEW



Figure A-23. POST-TEST TRUCK FRONT VIEW

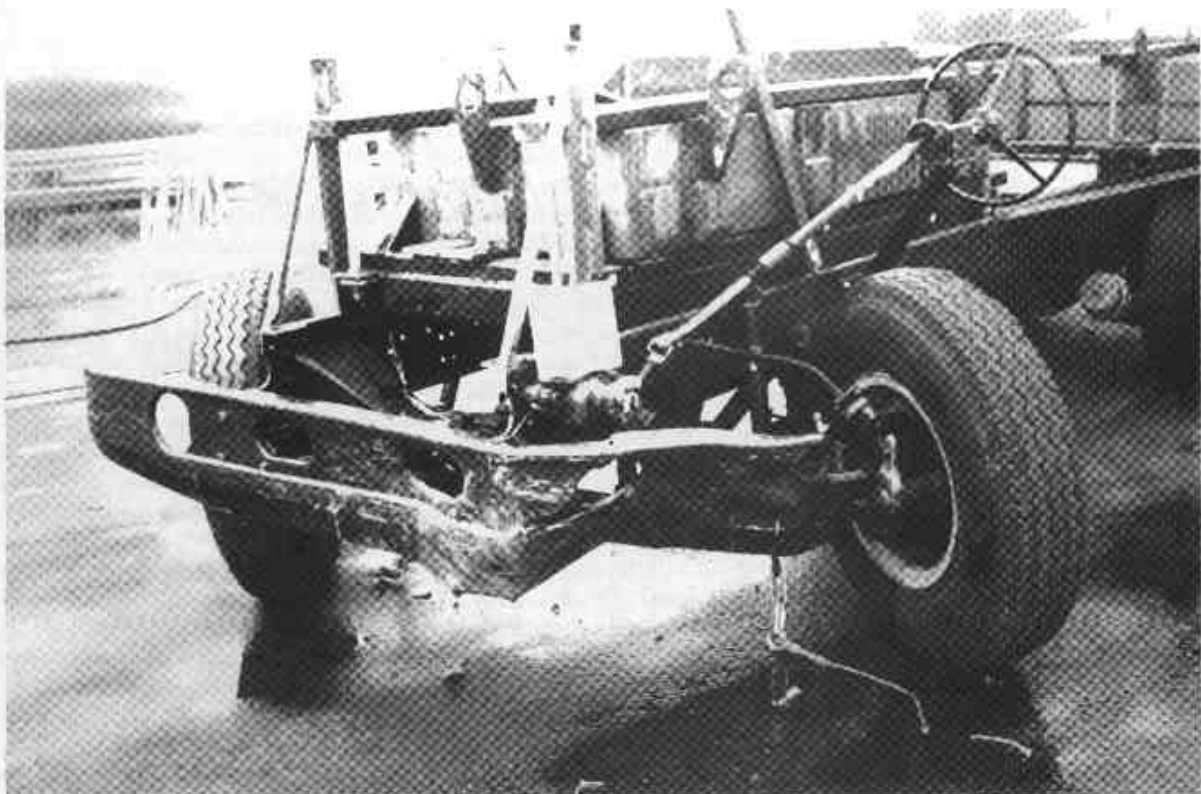


Figure A-24. POST-TEST TRUCK DAMAGE CLOSE-UP VIEW



Figure A-25. PRE-TEST DUMMY VIEW



Figure A-26. POST-TEST DUMMY VIEW



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



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



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



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

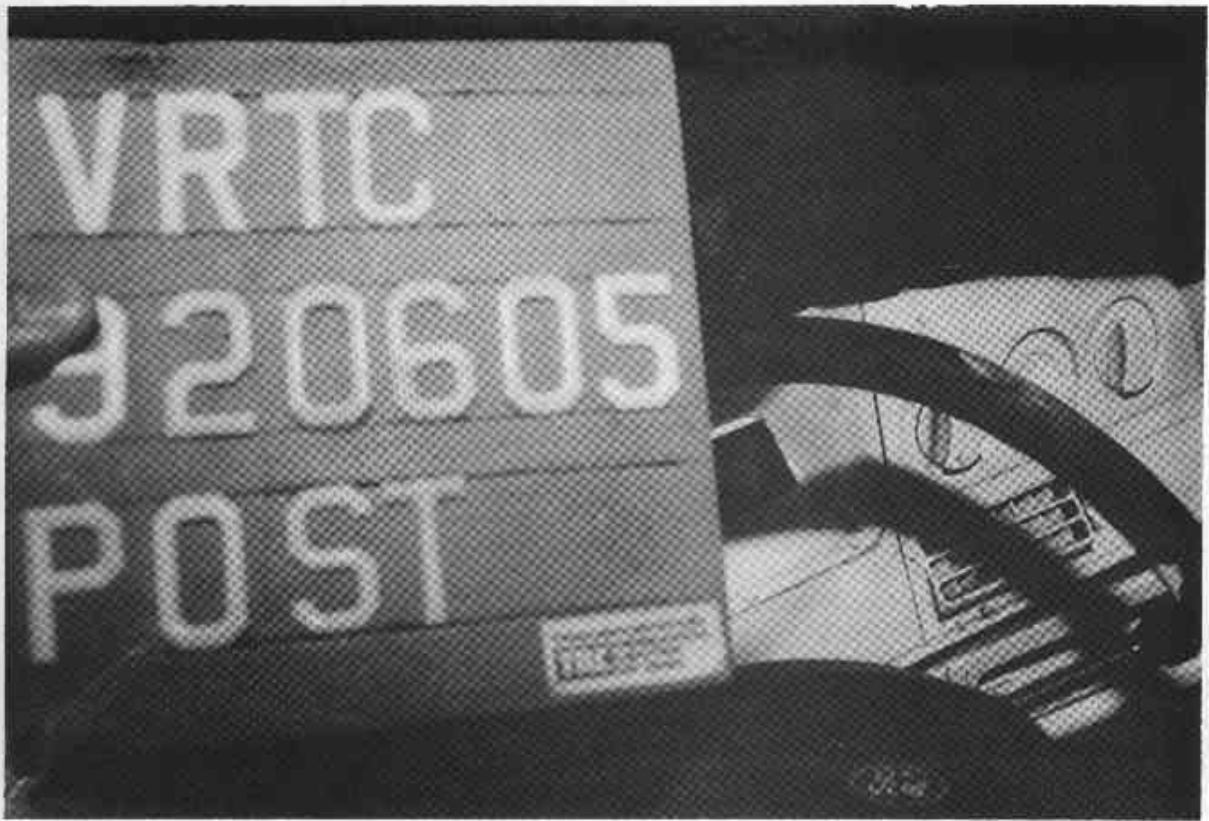


Figure A-31. POST-TEST DUMMY HEAD CONTACT VIEW



Figure A-32. POST-TEST DUMMY KNEE CONTACT - VIEW 1

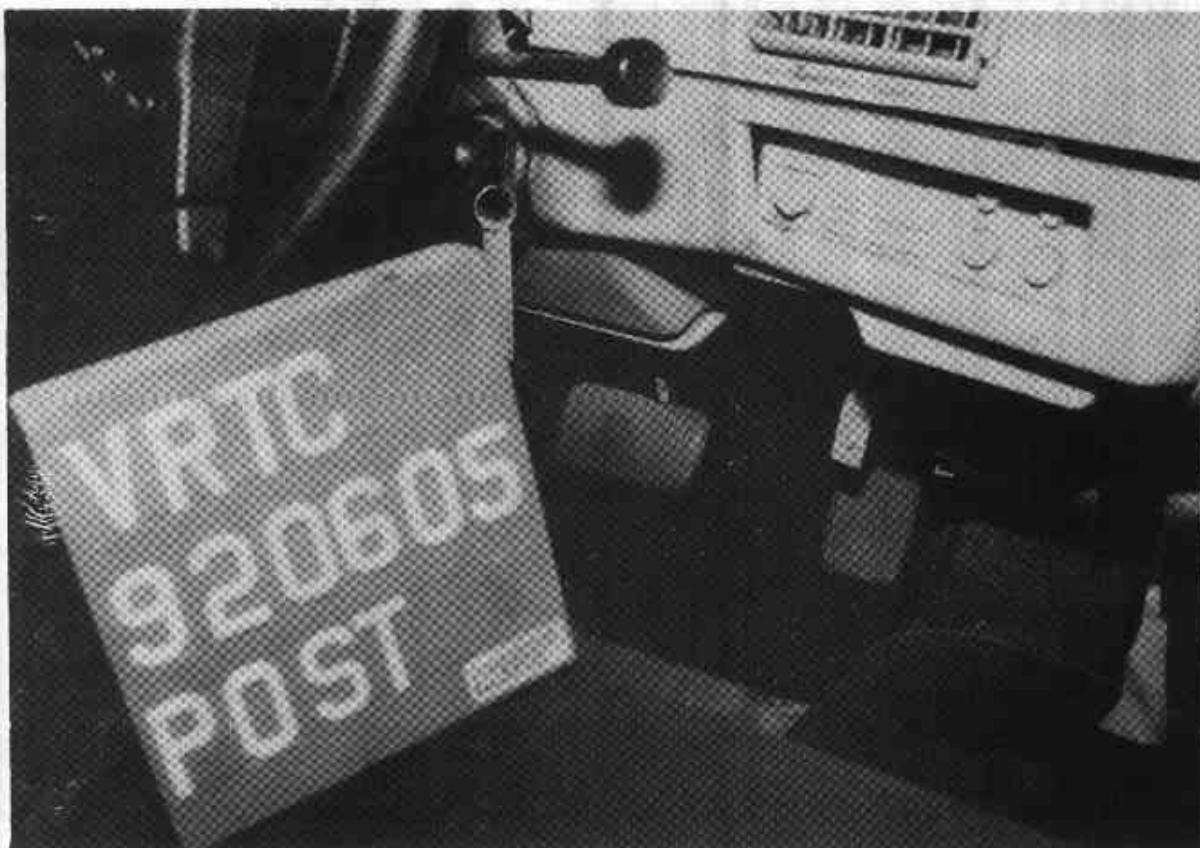


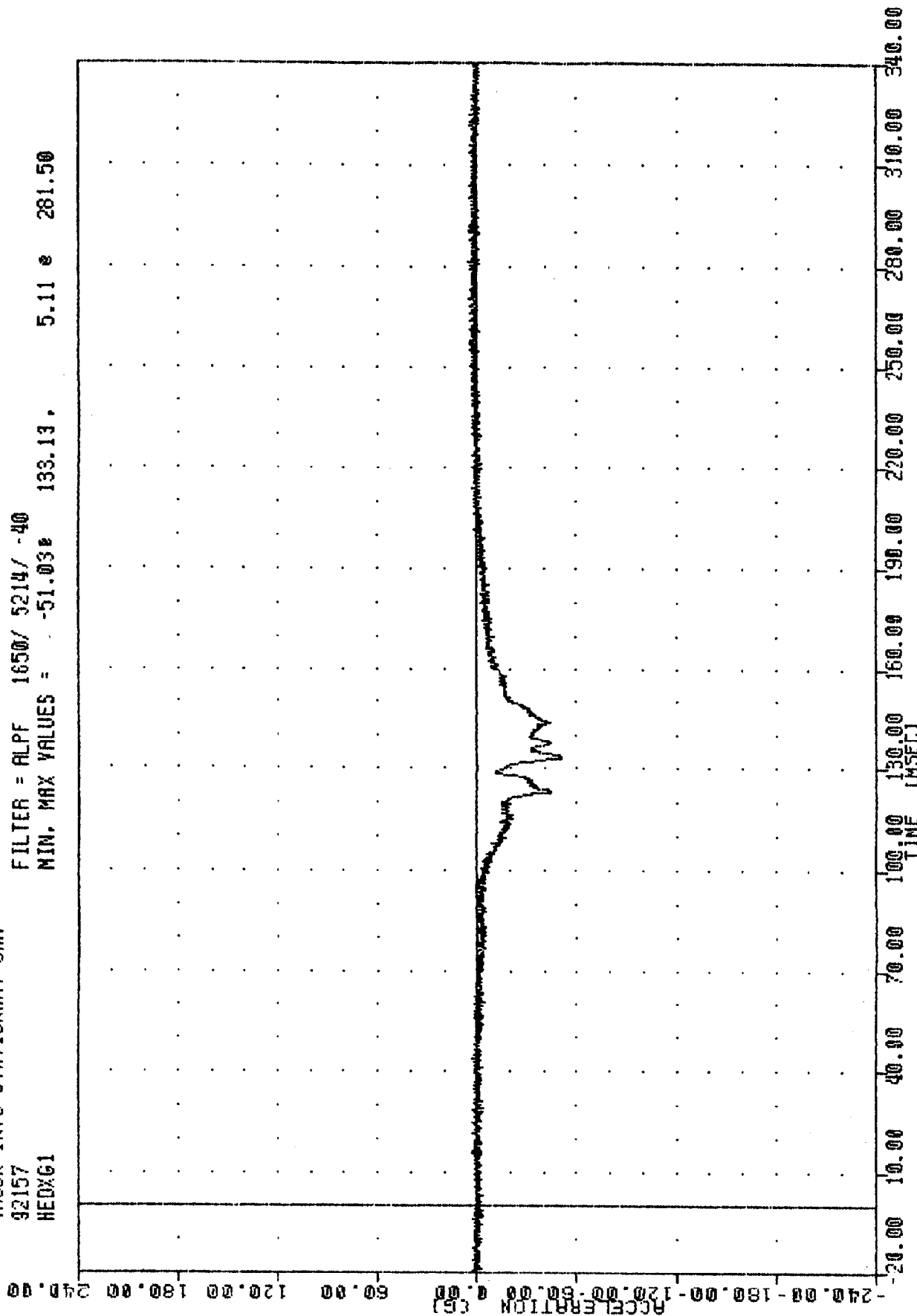
Figure A-33. POST-TEST DUMMY KNEE CONTACT - VIEW 2

APPENDIX B

DATA PLOTS

TRC 920605
TRUCK INTO STATIONARY CAR
92157
HEDXG1

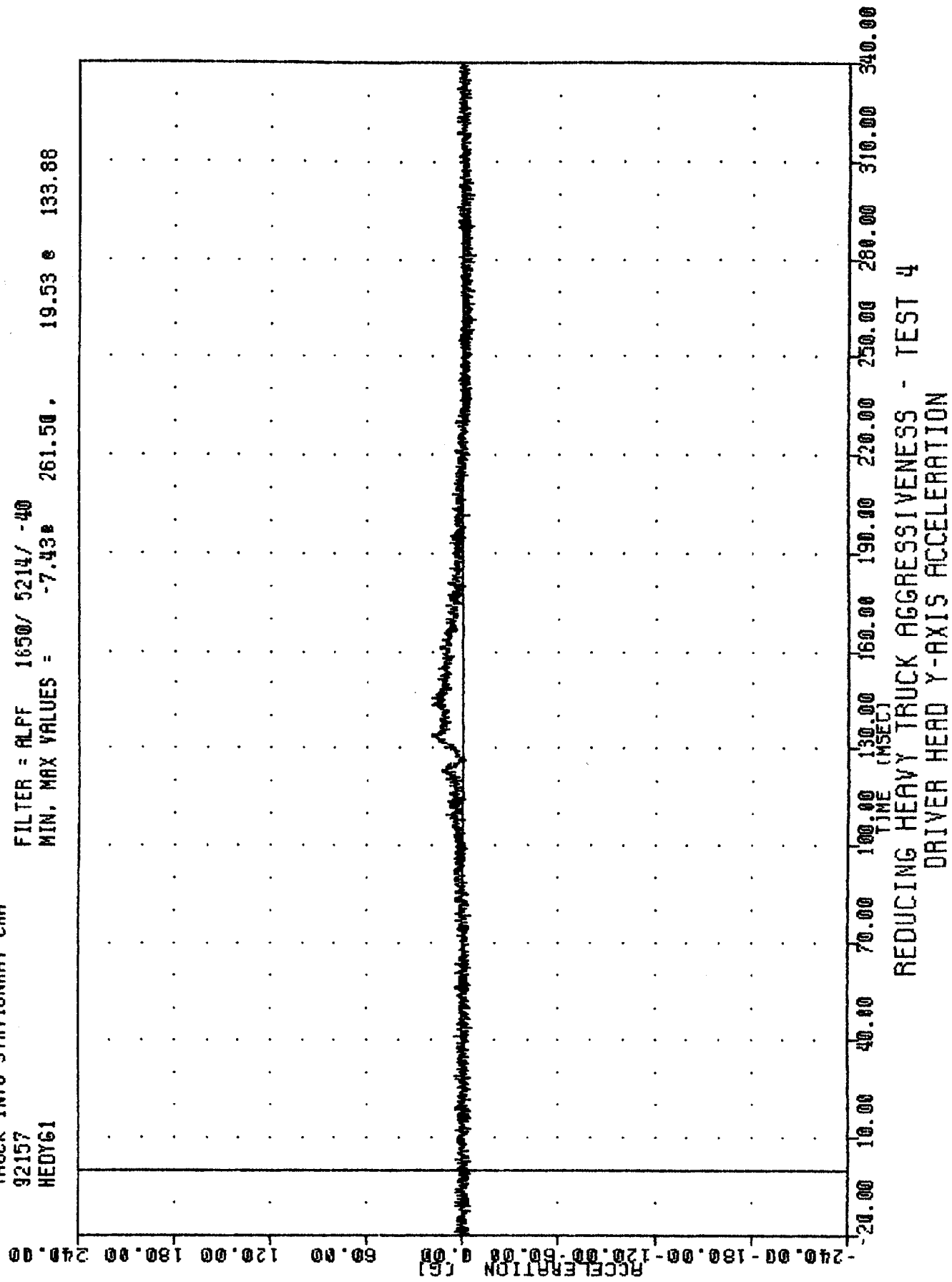
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -51.03 133.13, 5.11 281.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER HEAD X-AXIS ACCELERATION

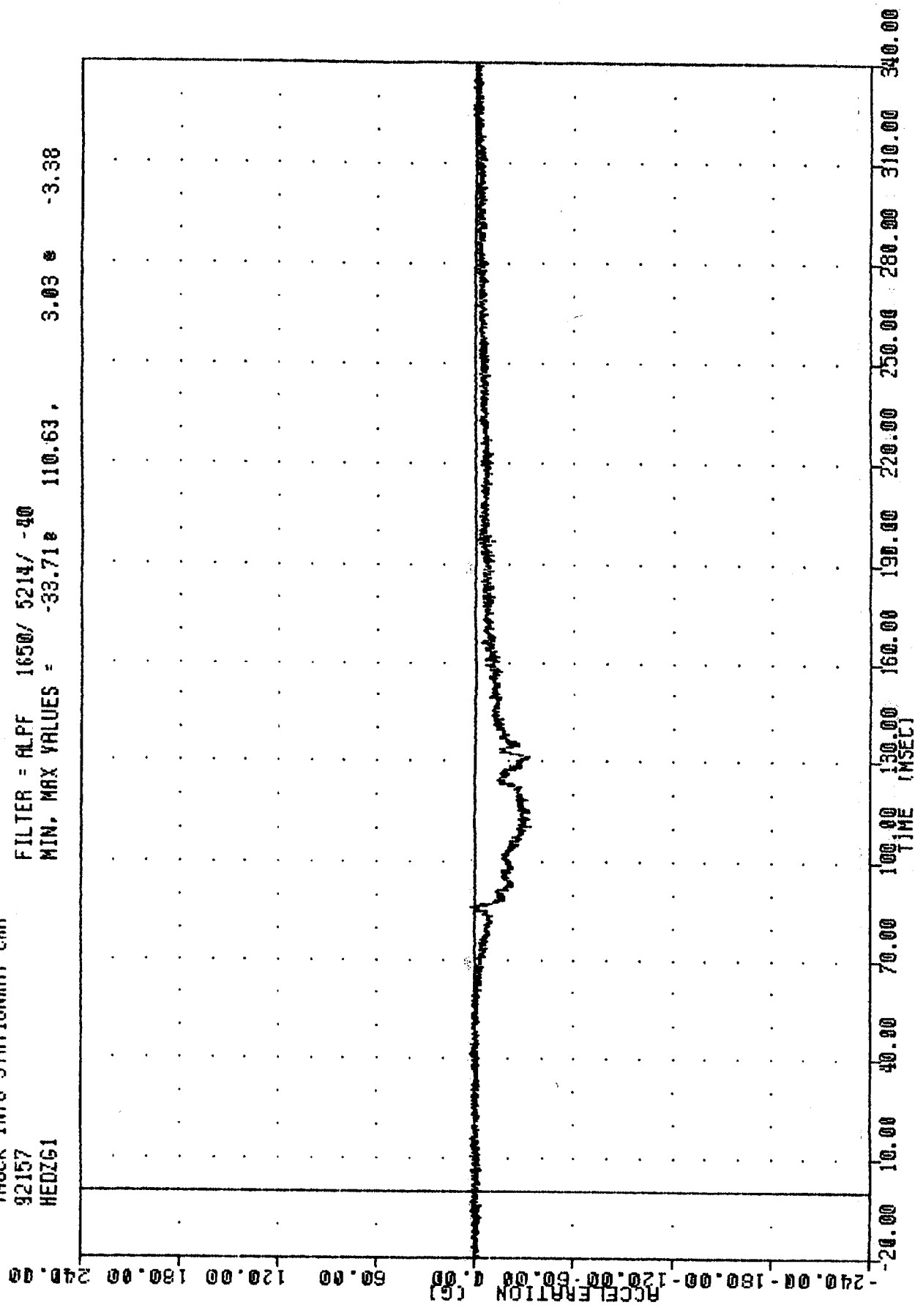
TRC 920605
 TRUCK INTO STATIONARY CAR
 92157
 HEDY61

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -7.43 261.50 19.53 133.88



TRC . 920605
 TRUCK INTO STATIONARY CAR
 92157
 HEDZ61

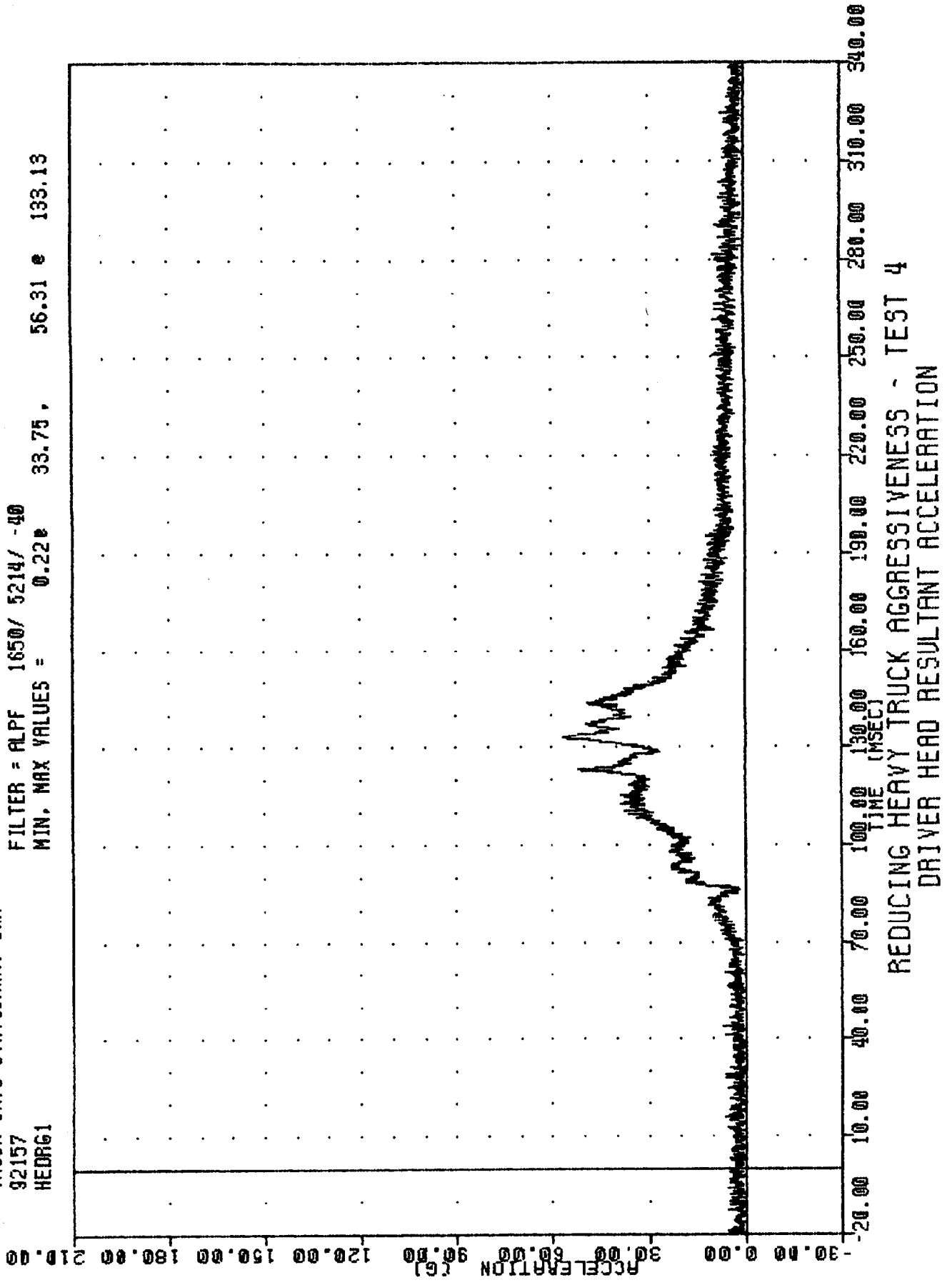
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -33.71e 110.63, 3.03 e -3.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER HEAD Z-AXIS ACCELERATION

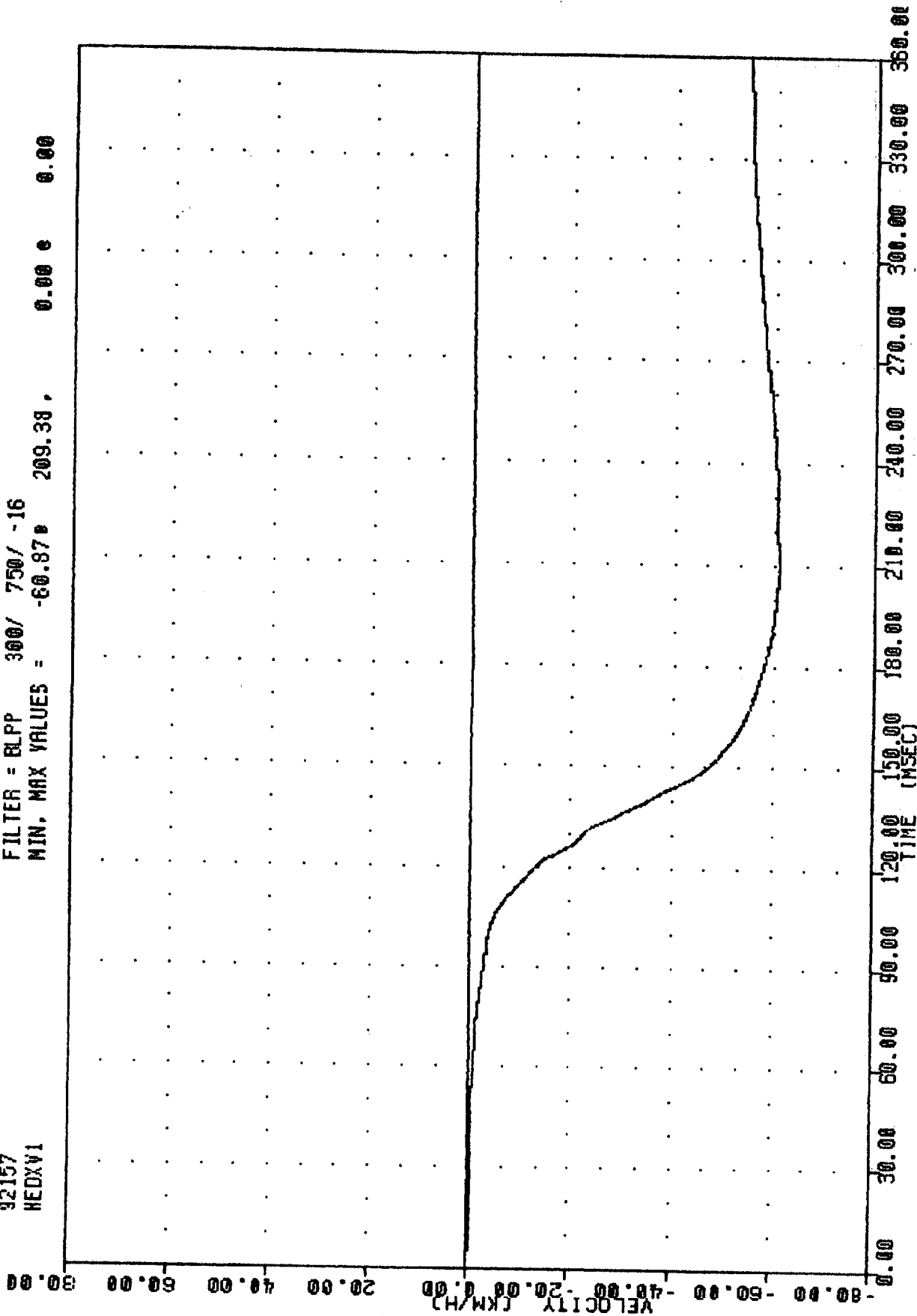
TRC , 920805
 TRUCK INTO STATIONARY CAR
 92157
 HEDRG1

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.22 33.75 , 56.31 133.13



TRC , 920605
TRUCK INTO STATIONARY CAR
92157
HEDXV1

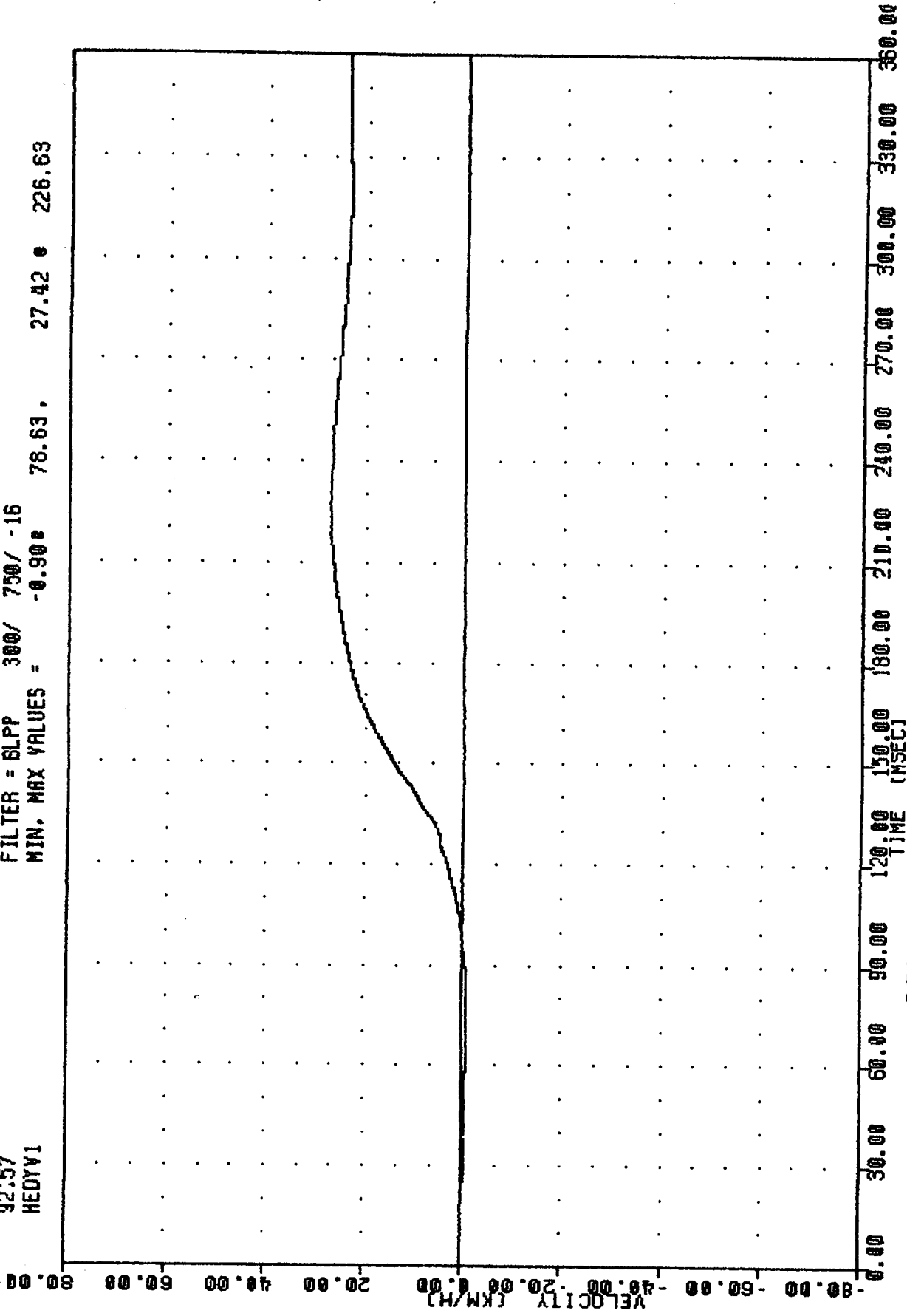
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -60.87 209.38 0.00 0.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER HEAD X-AXIS VELOCITY

TRC 920605
TRUCK INTO STATIONARY CAR
92:57
HEDYV1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -0.90 78.63 27.42 226.63

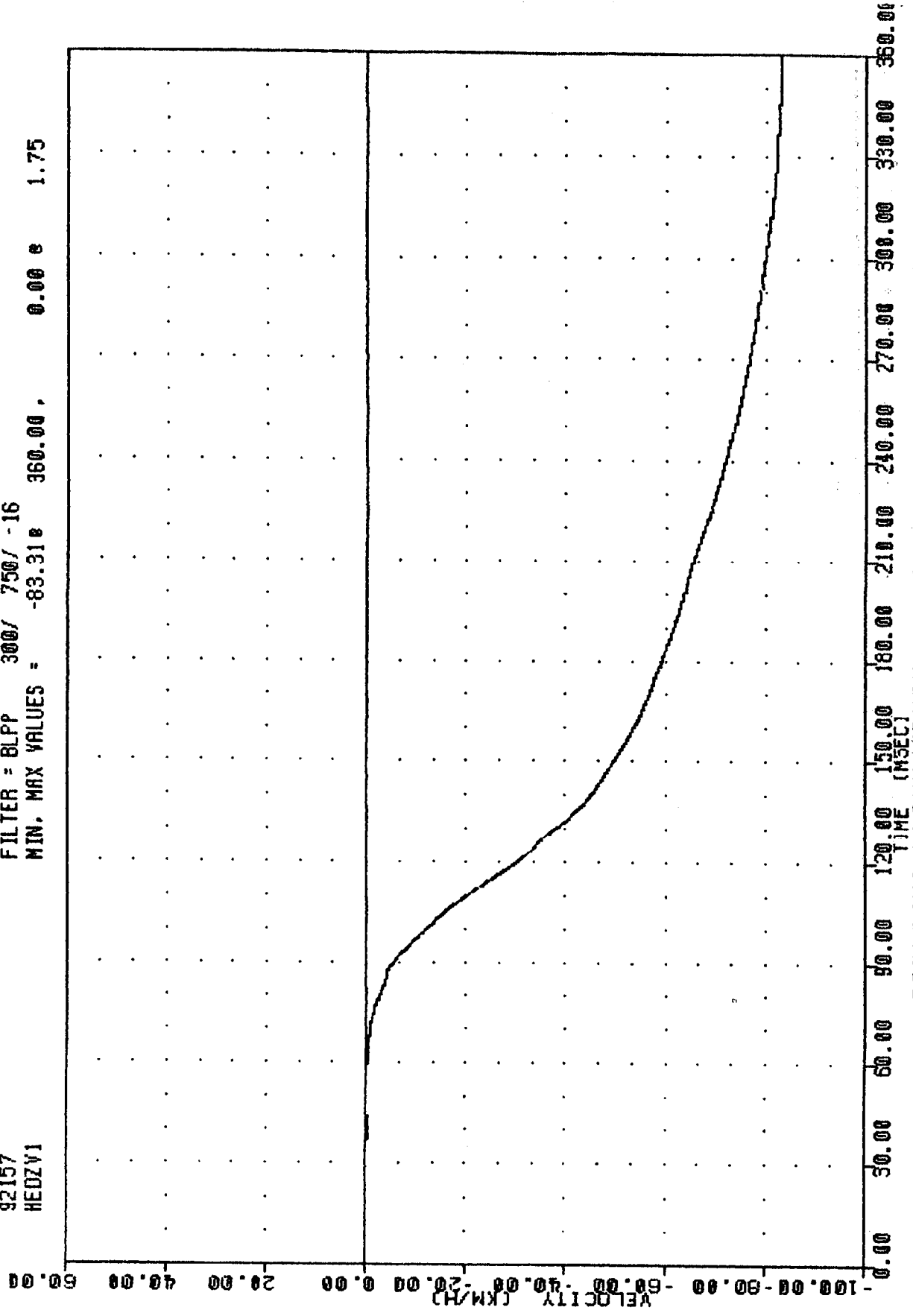


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER HEAD Y-AXIS VELOCITY

TRC
TRUCK INTO STATIONARY CAR
92157
HEADV1

920605

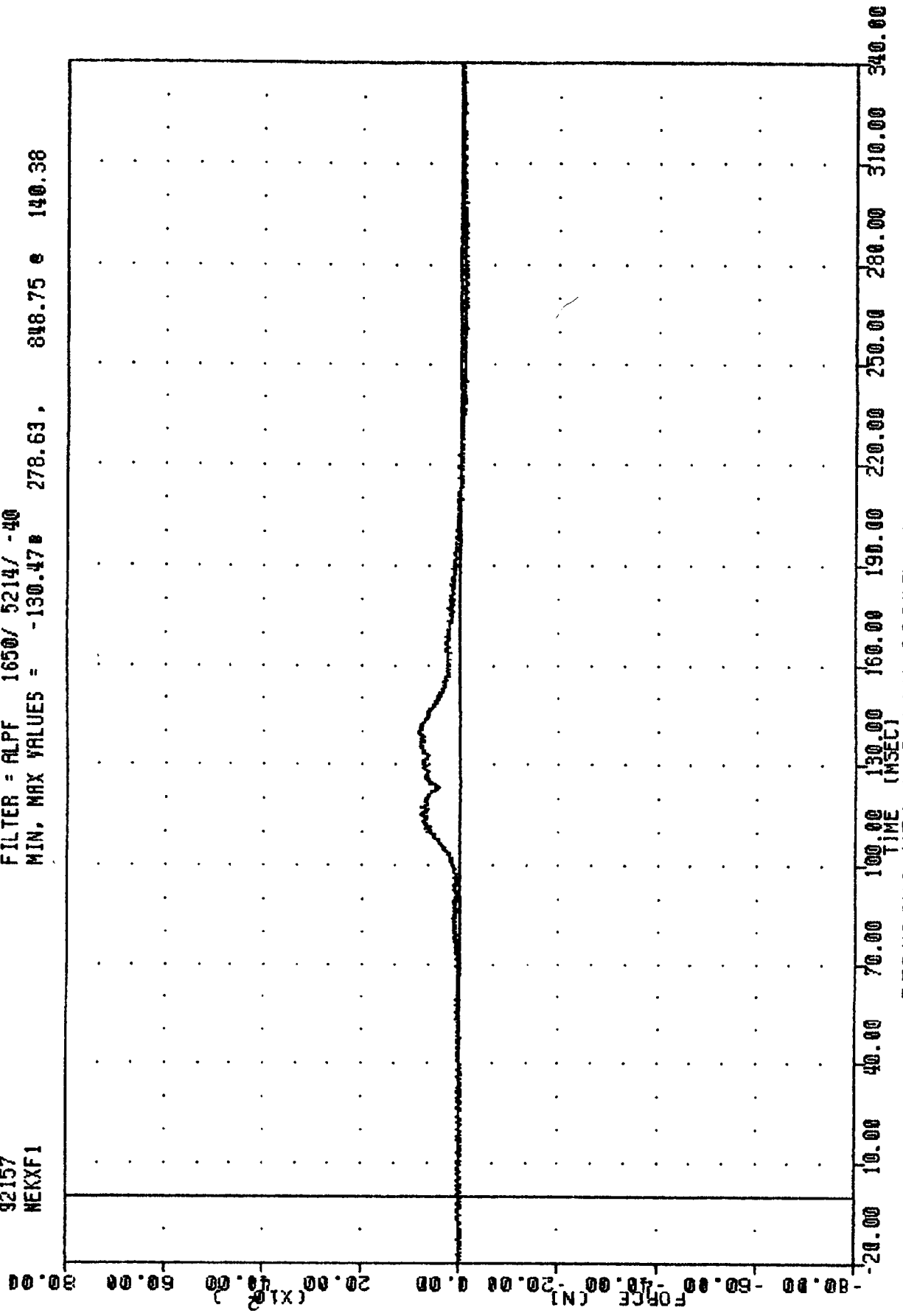
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -83.31e 360.00, 0.00 e 1.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER HEAD Z-AXIS VELOCITY

TAC
TRUCK INTO STATIONARY CAR
92157
NEKXF1

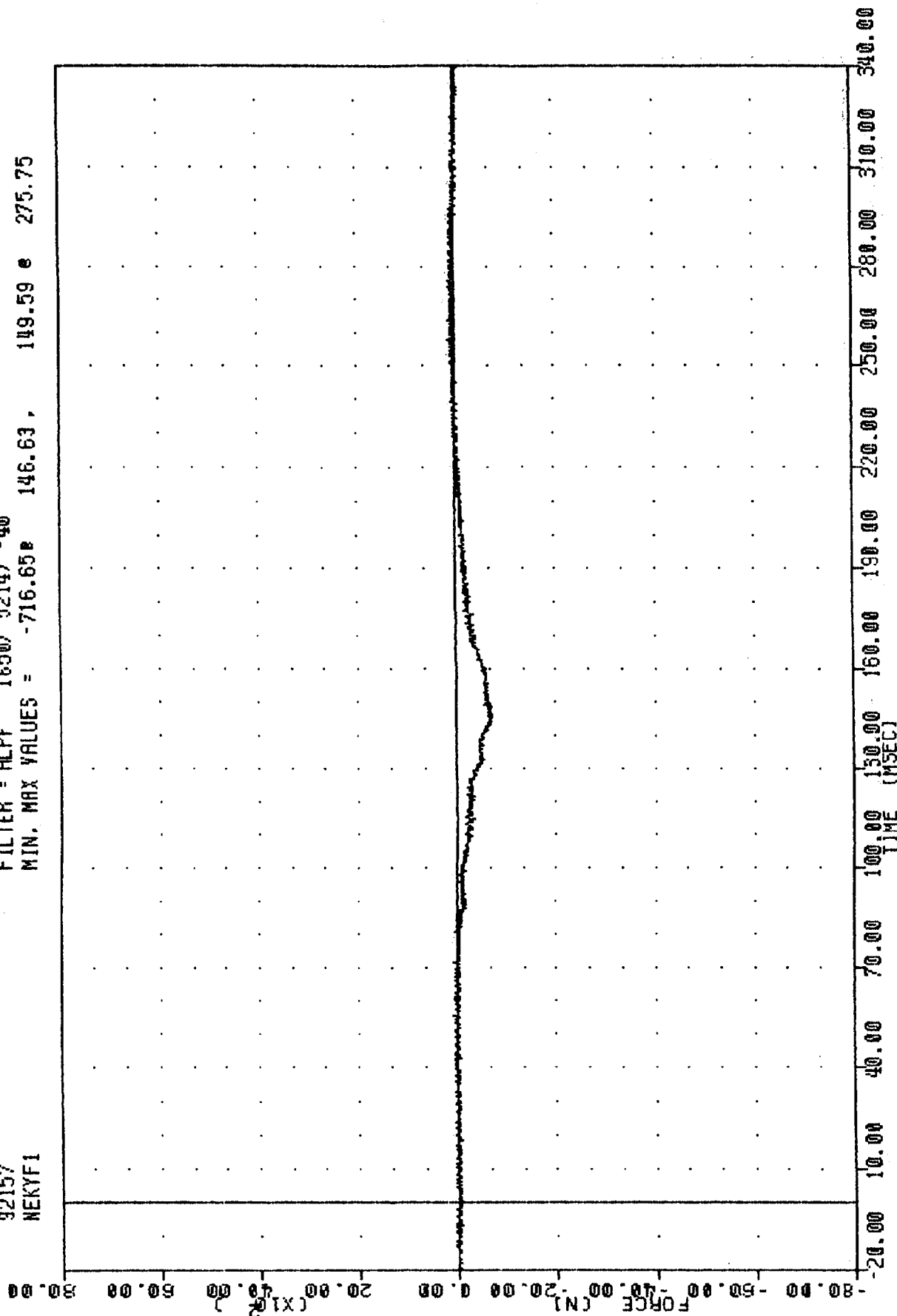
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -130.47 278.63 848.75 140.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER NECK X-AXIS SHEAR FORCE

TRC , 920505
 TRUCK INTO STATIONARY CAR
 92157
 NEKYF1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -716.65 146.63 , 149.59 e 275.75

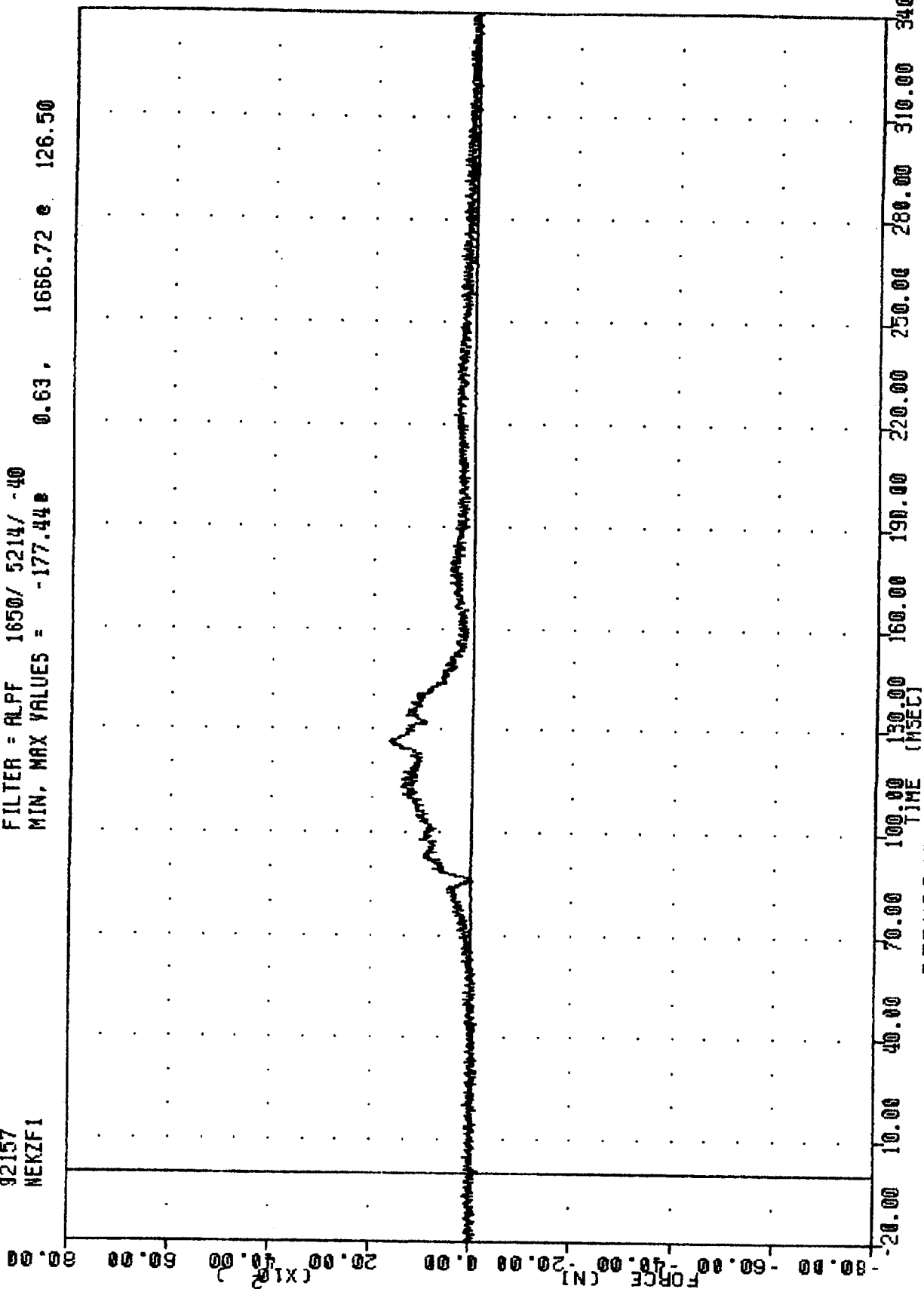


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER NECK Y-AXIS SHEAR FORCE

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
WEKZF1

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -177.44 e

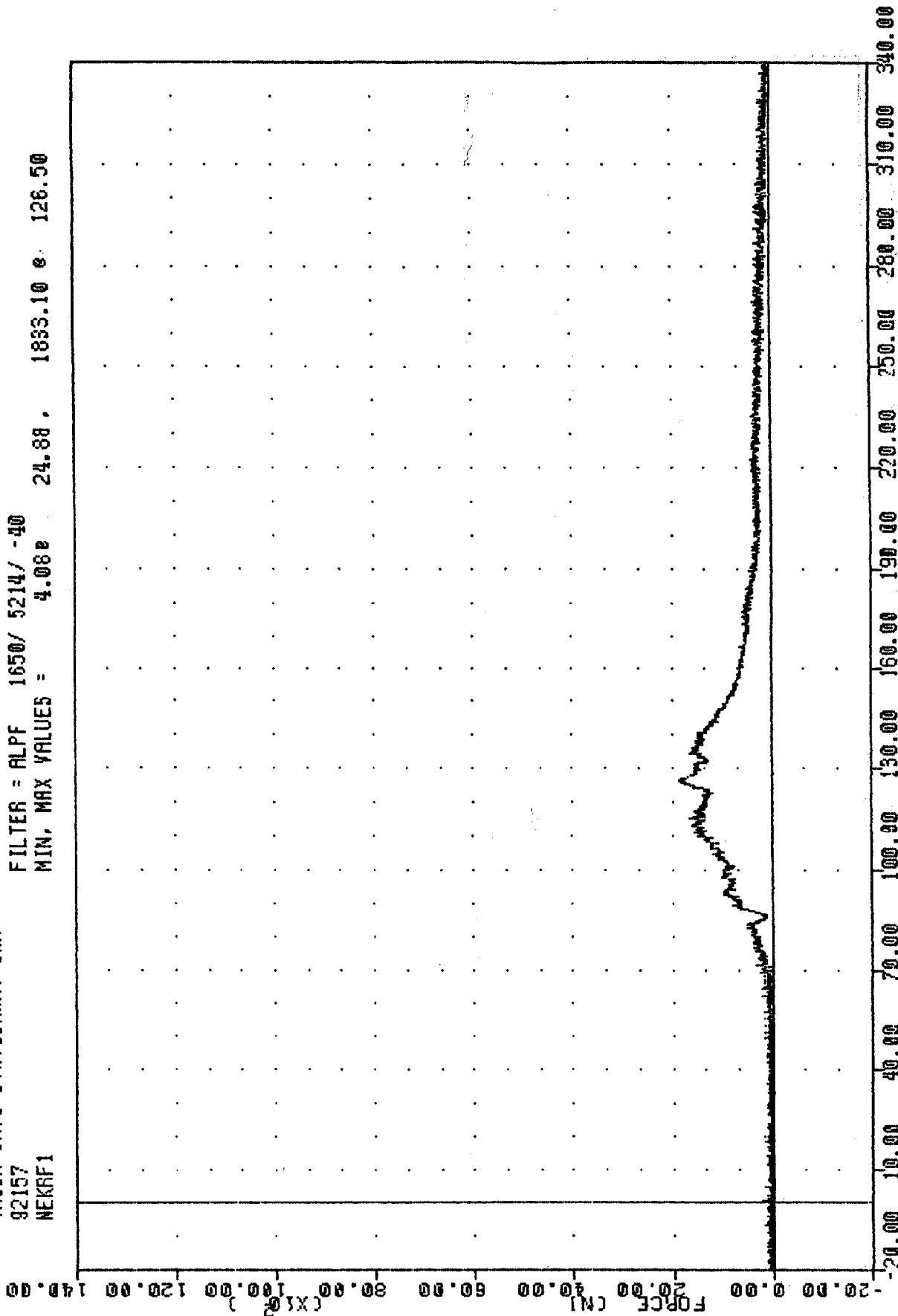
0.63, 1666.72 e 126.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER NECK Z-AXIS AXIAL FORCE

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
NEKRF1

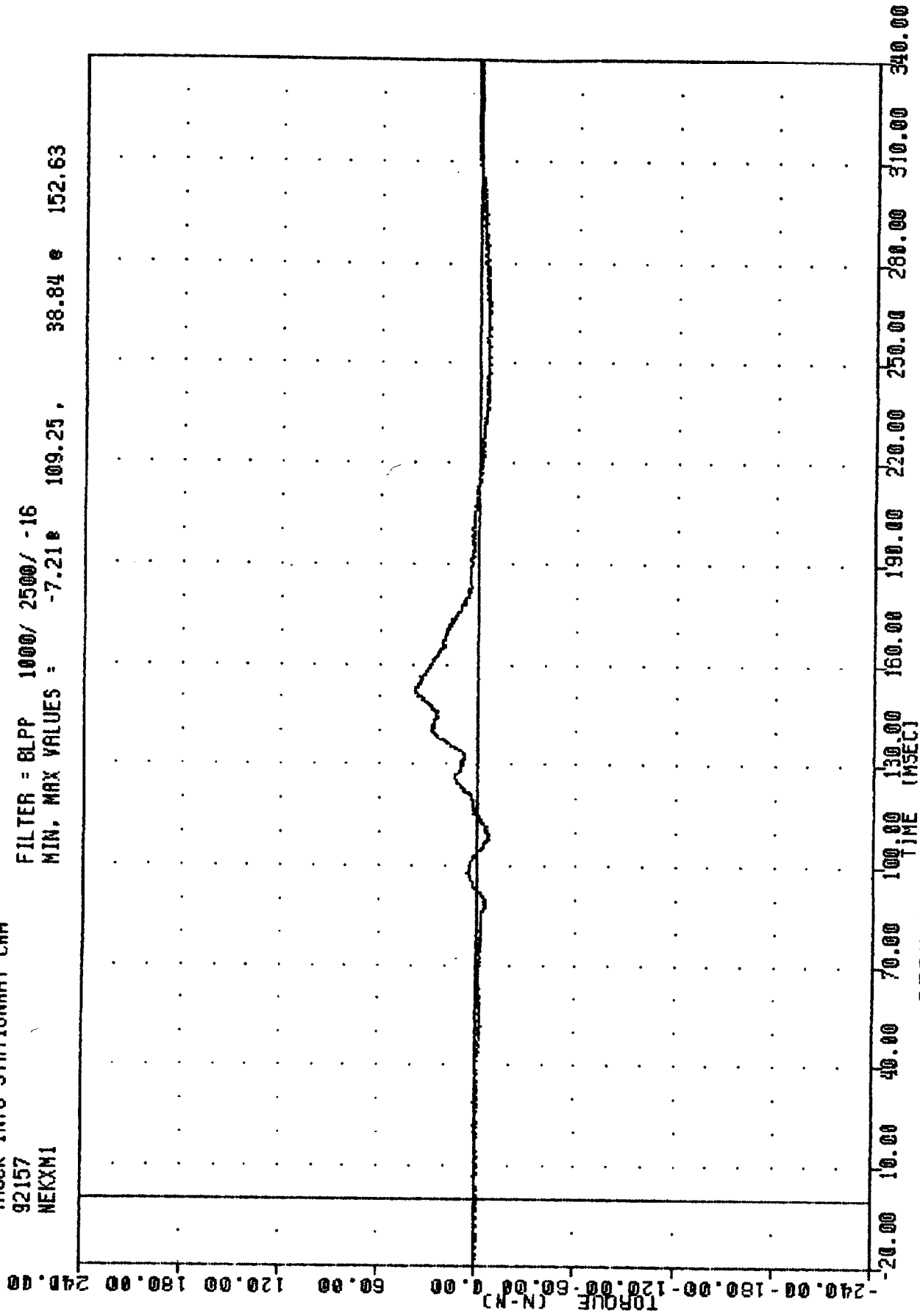
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 4.08e 24.88, 1833.10 e 126.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER NECK RESULTANT FORCE

TRC , 920605
 TRUCK INTO STATIONARY CAR
 92157
 NEXCM1

FILTER = BLPP 1000/ 2500/ -16
 MIN, MAX VALUES = -7.21e 109.25, 38.84 e 152.63

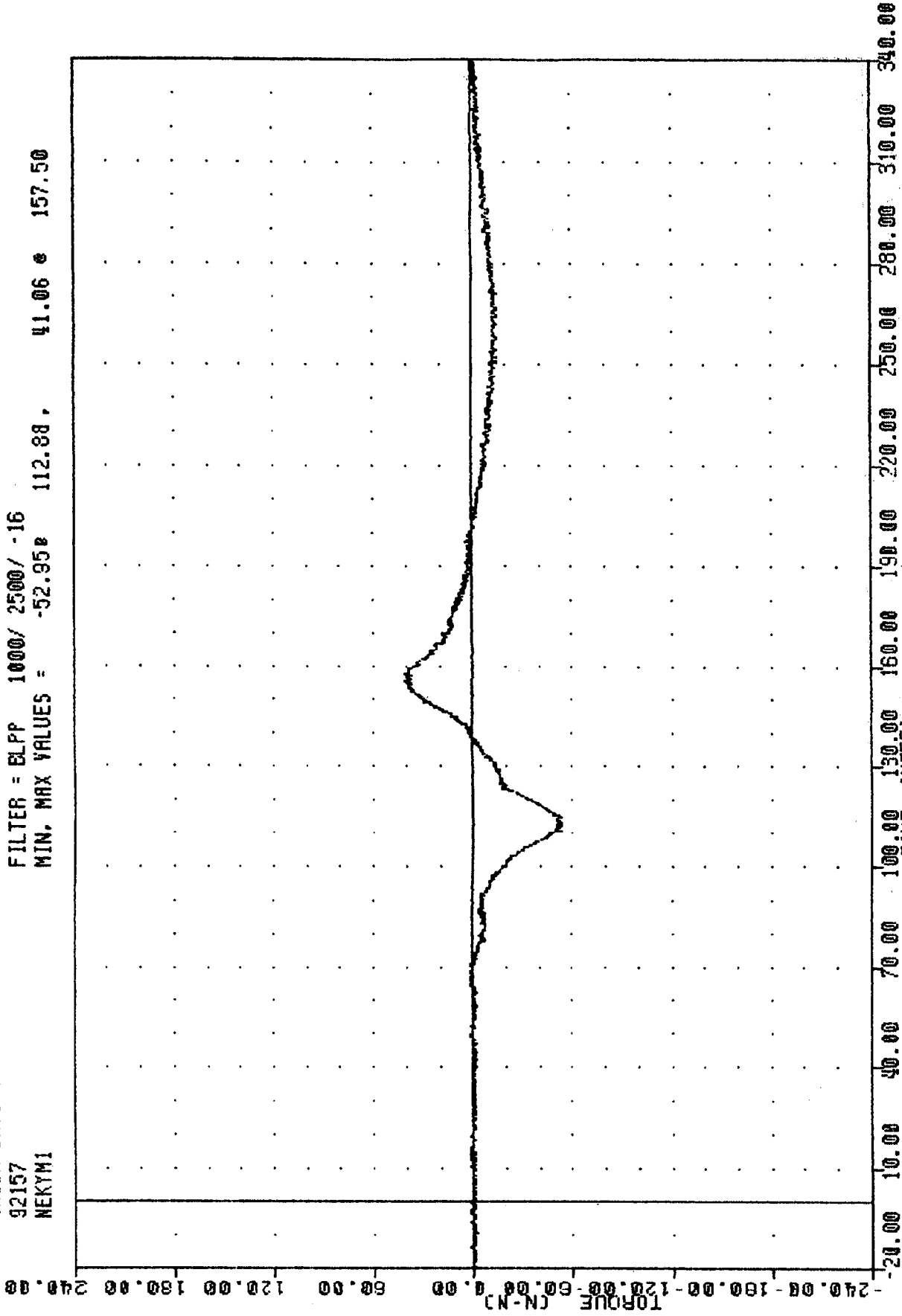


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER NECK MOMENT ABOUT X AXIS

TRC
TRUCK INTO STATIONARY CAR
92157
NEKYM1

, 920605

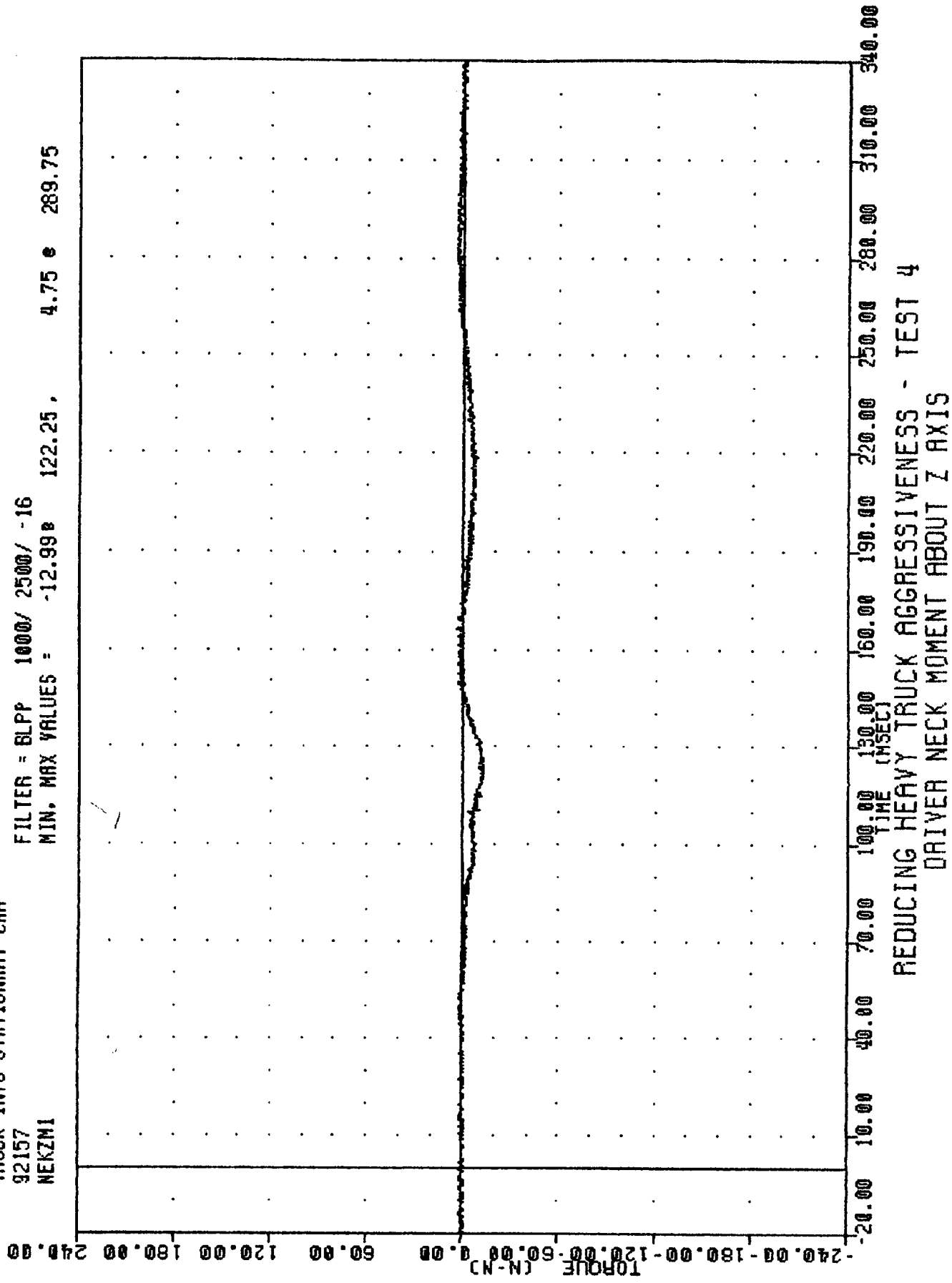
FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -52.95 112.88, 41.06 157.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER NECK MOMENT ABOUT Y AXIS

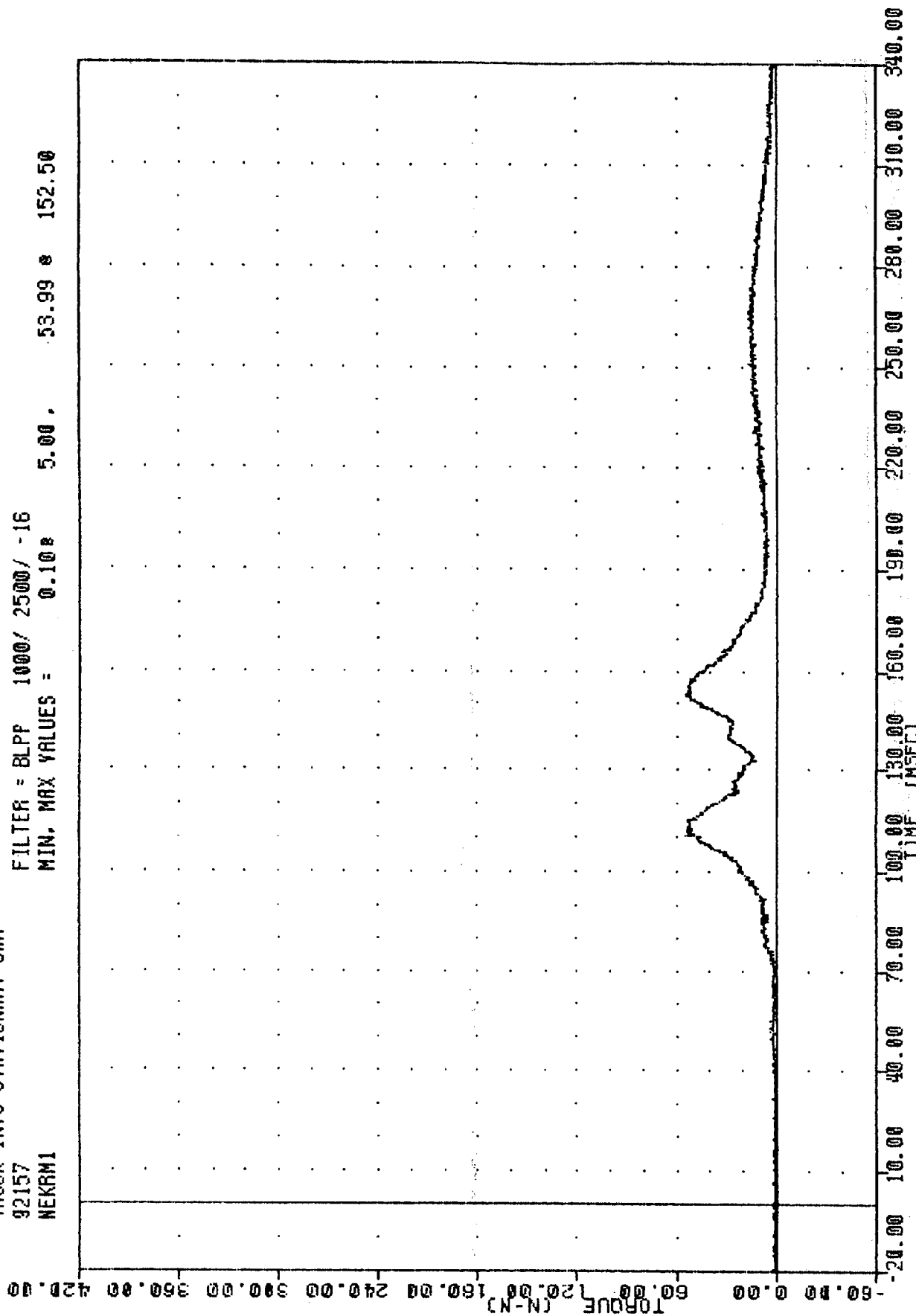
TRC , 920605
TRUCK INTO STATIONARY CAR
92157
NEKZM1

FILTER = BLPP 1000/ 2500/ -16
MIN. MAX VALUES = -12.99 122.25 , 4.75 289.75



TRC , 920605
 TRUCK INTO STATIONARY CAR
 92157
 NEKRM1

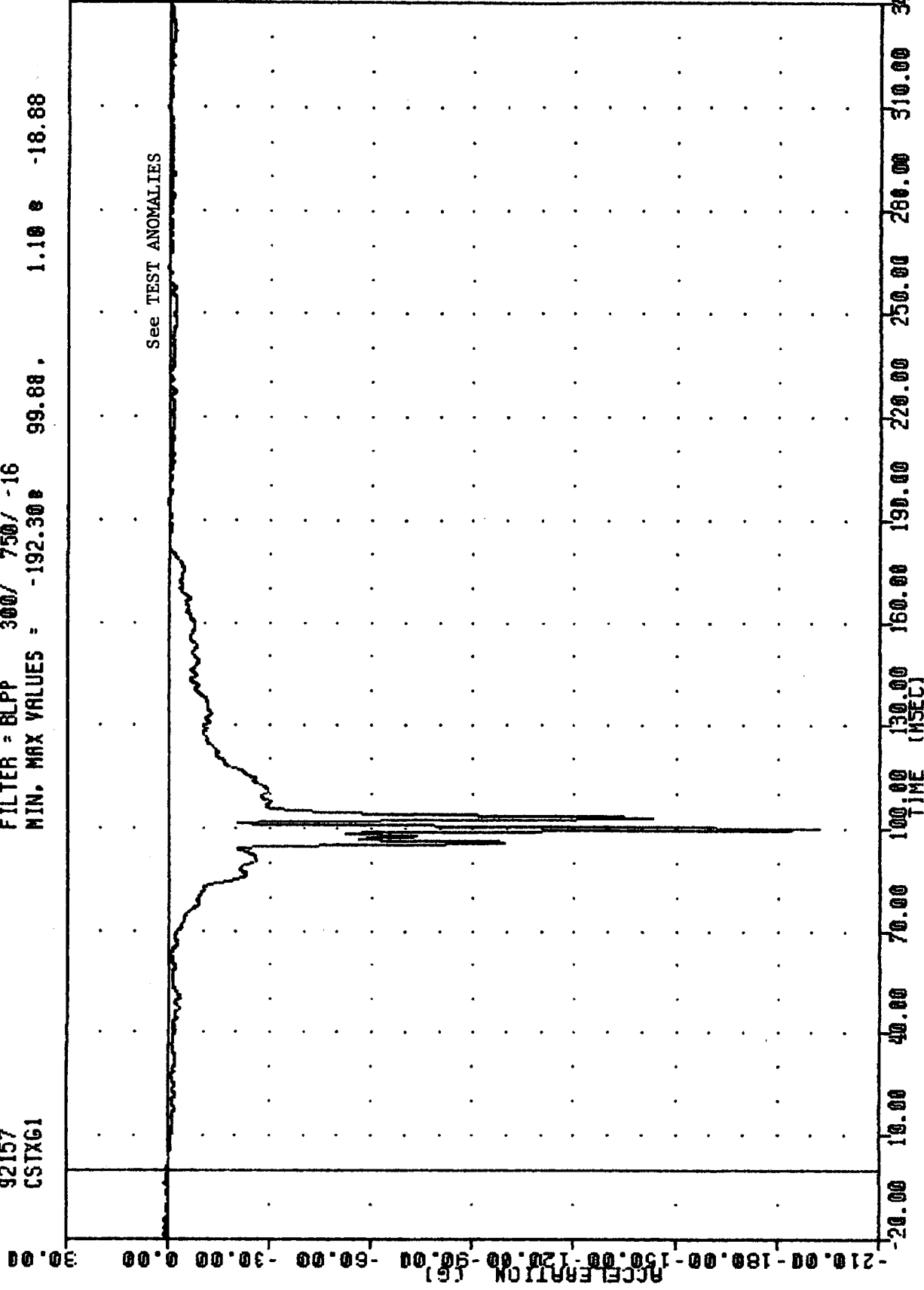
FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = 0.10 53.99 152.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER NECK MOMENT RESULTANT

TRC . 920605
TRUCK INTO STATIONARY CAR
92157
CSTXG1

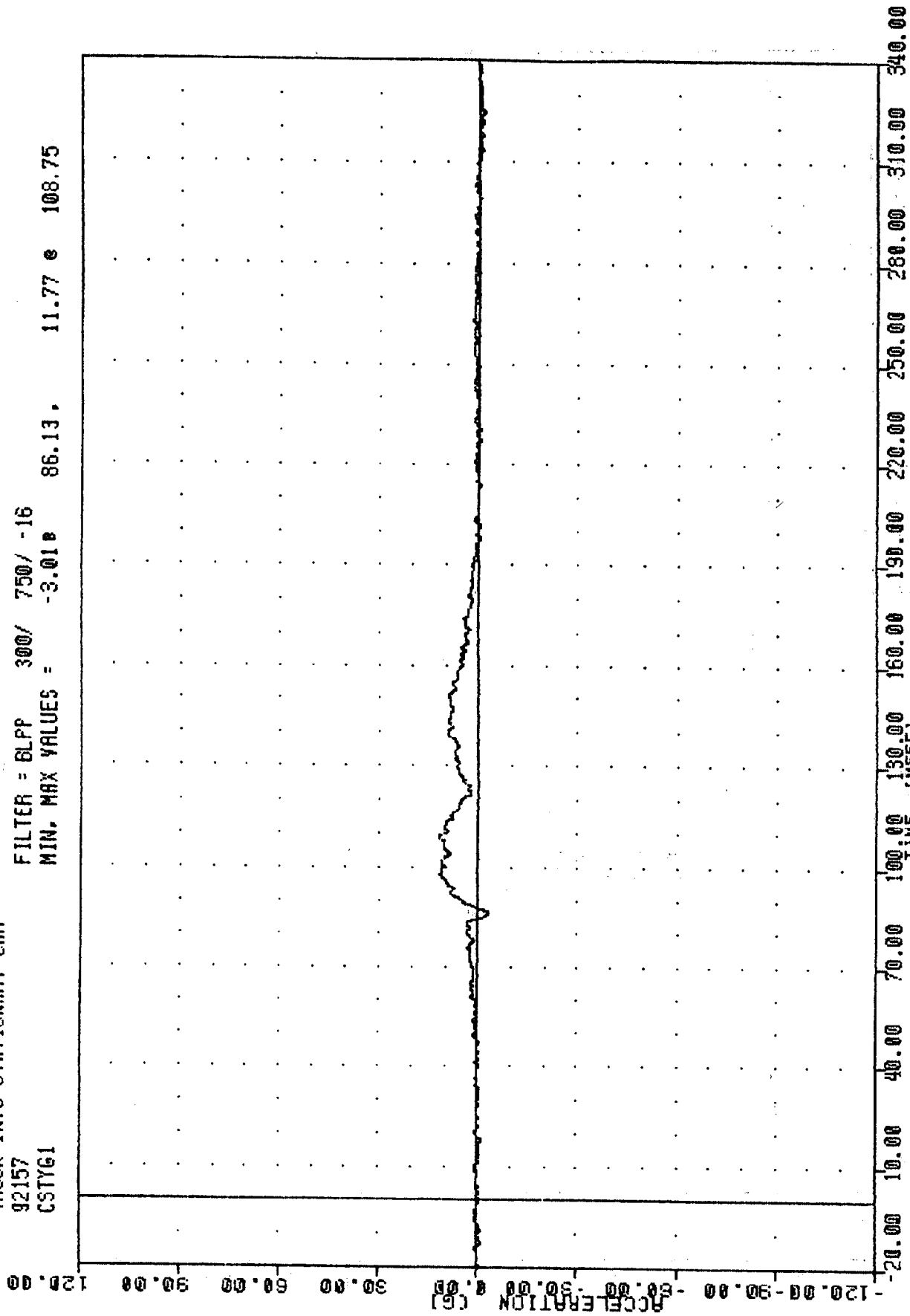
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -192.30 99.88 1.10 e -18.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER CHEST X-AXIS ACCELERATION

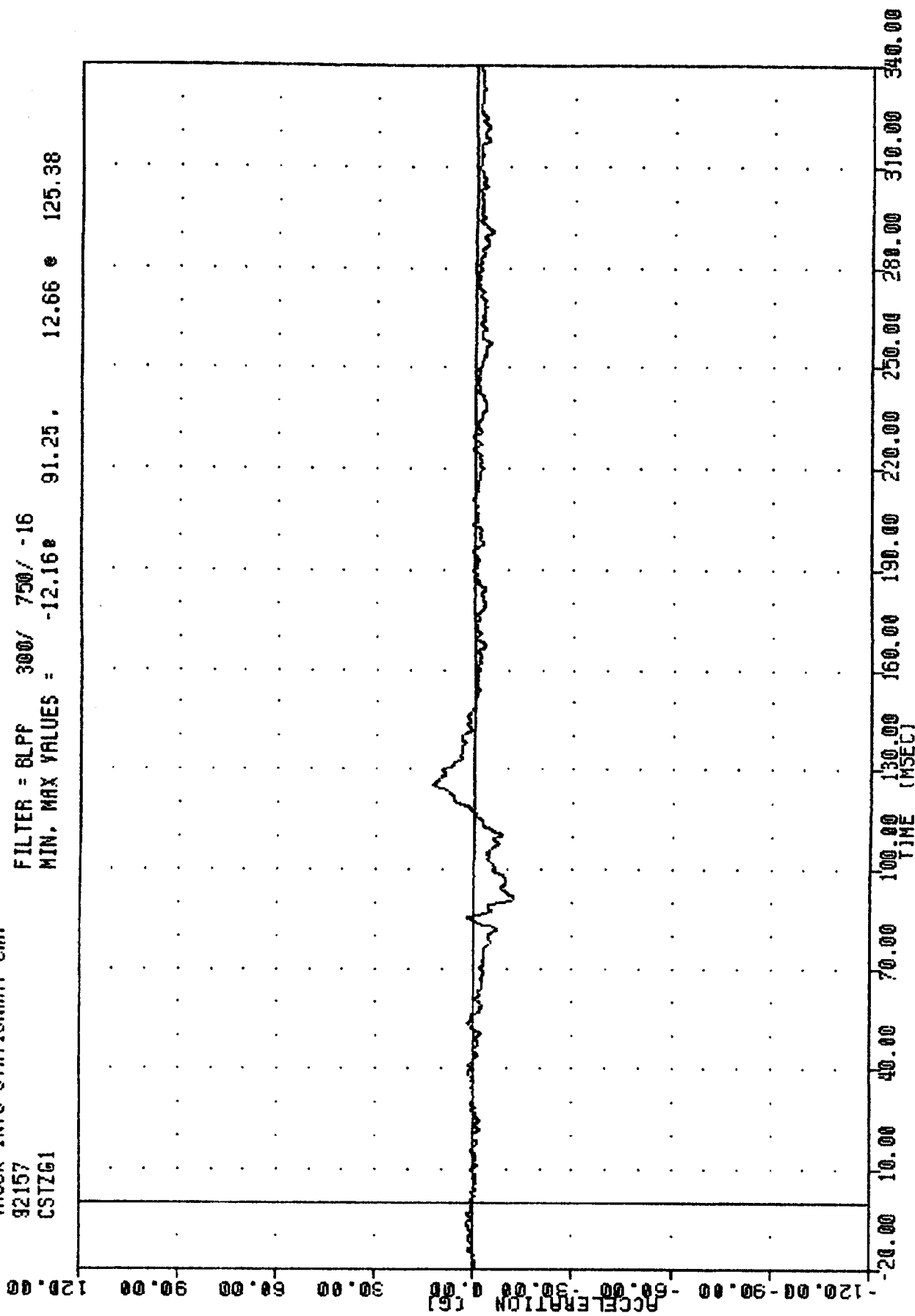
TAC
920605
TRUCK INTO STATIONARY CAR
92157
CSTY61

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -3.01 86.13 11.77 e 108.75



TRC , 920605
TRUCK INTO STATIONARY CAR
92157
CSTZG1

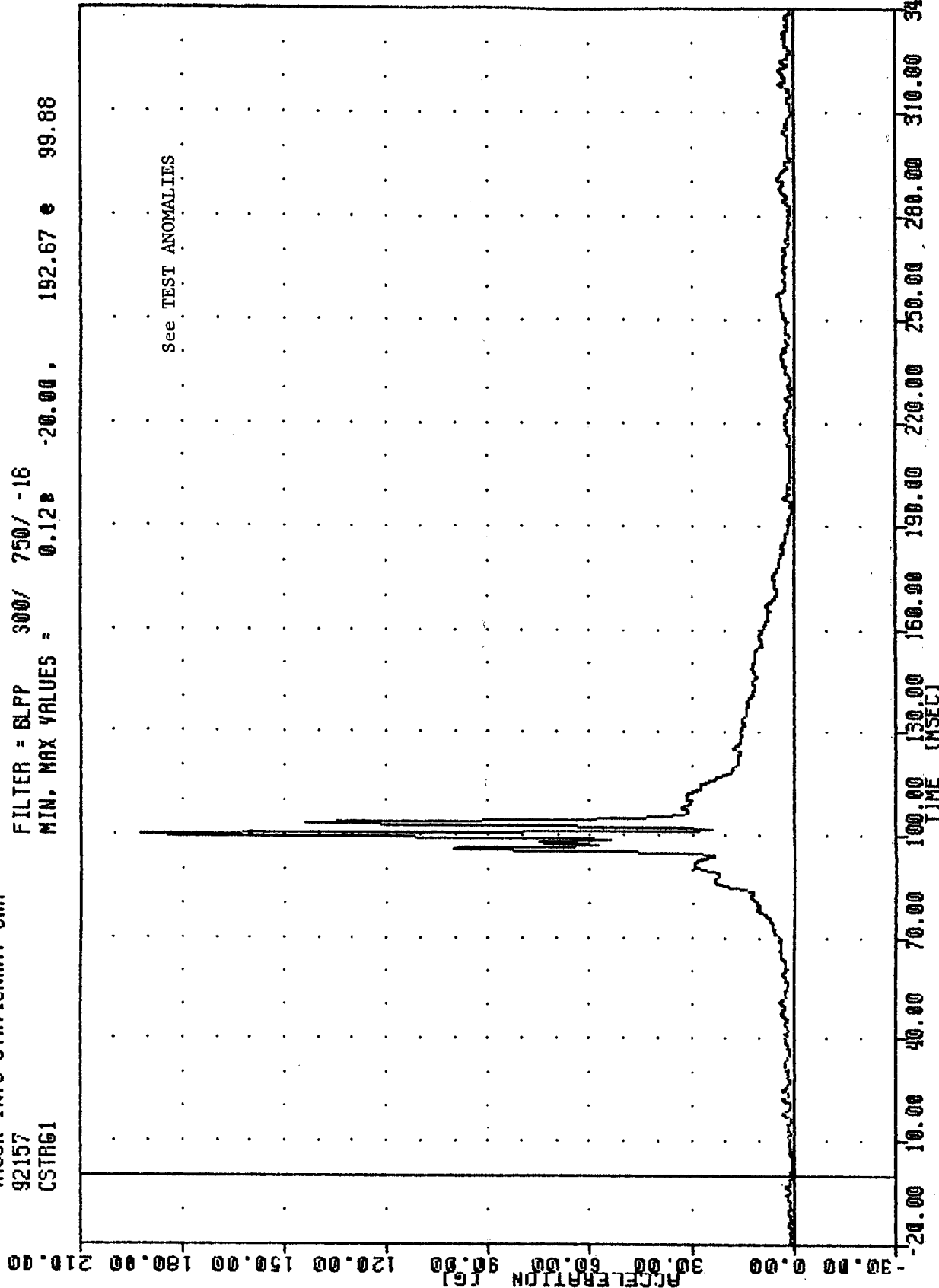
FILTER = 8LPP 300/ 750/ -16
MIN. MAX VALUES = -12.16e 91.25. 12.66 e 125.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER CHEST Z-AXIS ACCELERATION

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
CSTR61

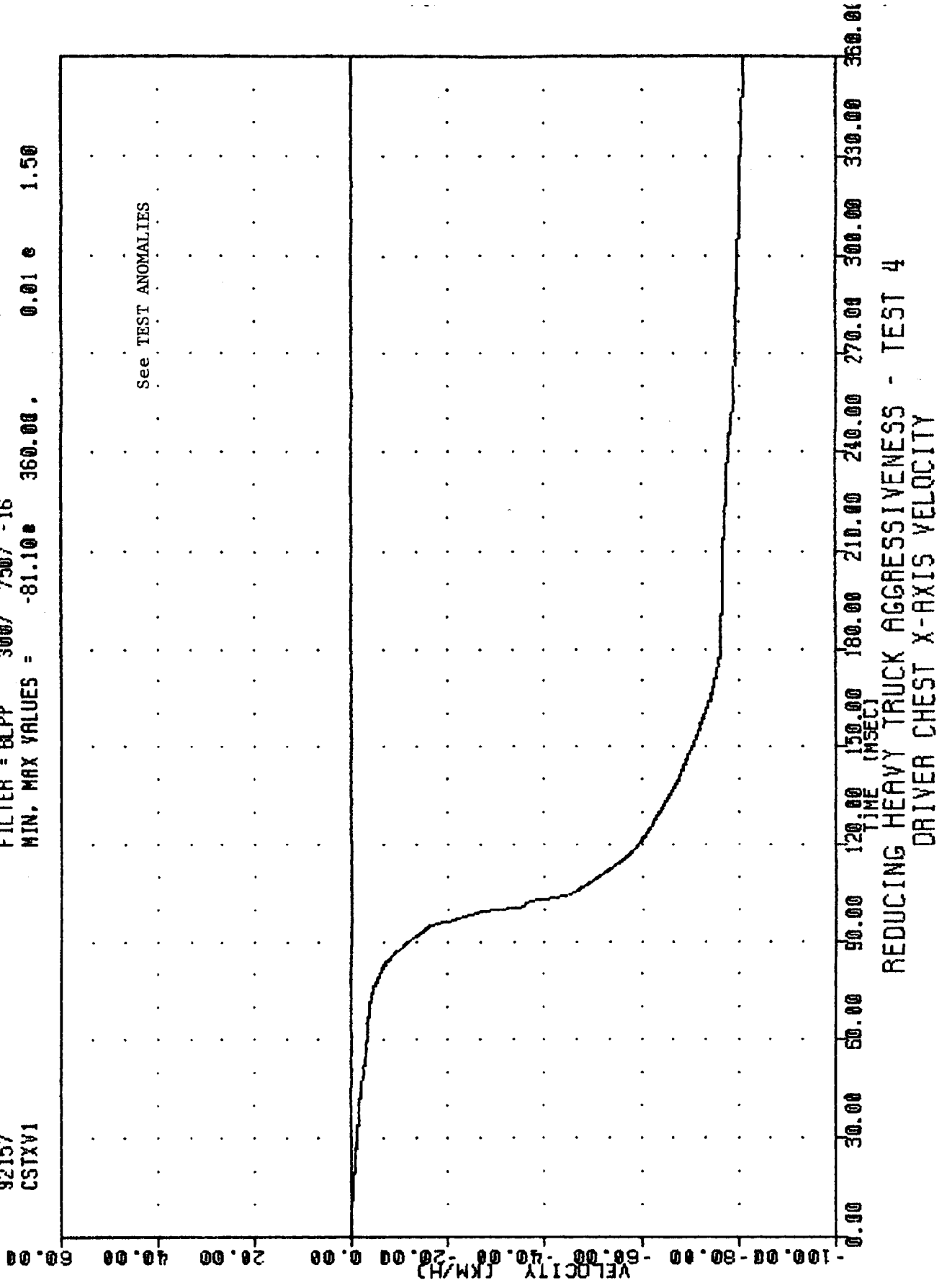
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 0.128 -20.00 . 192.67 e 99.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER CHEST RESULTANT ACCELERATION

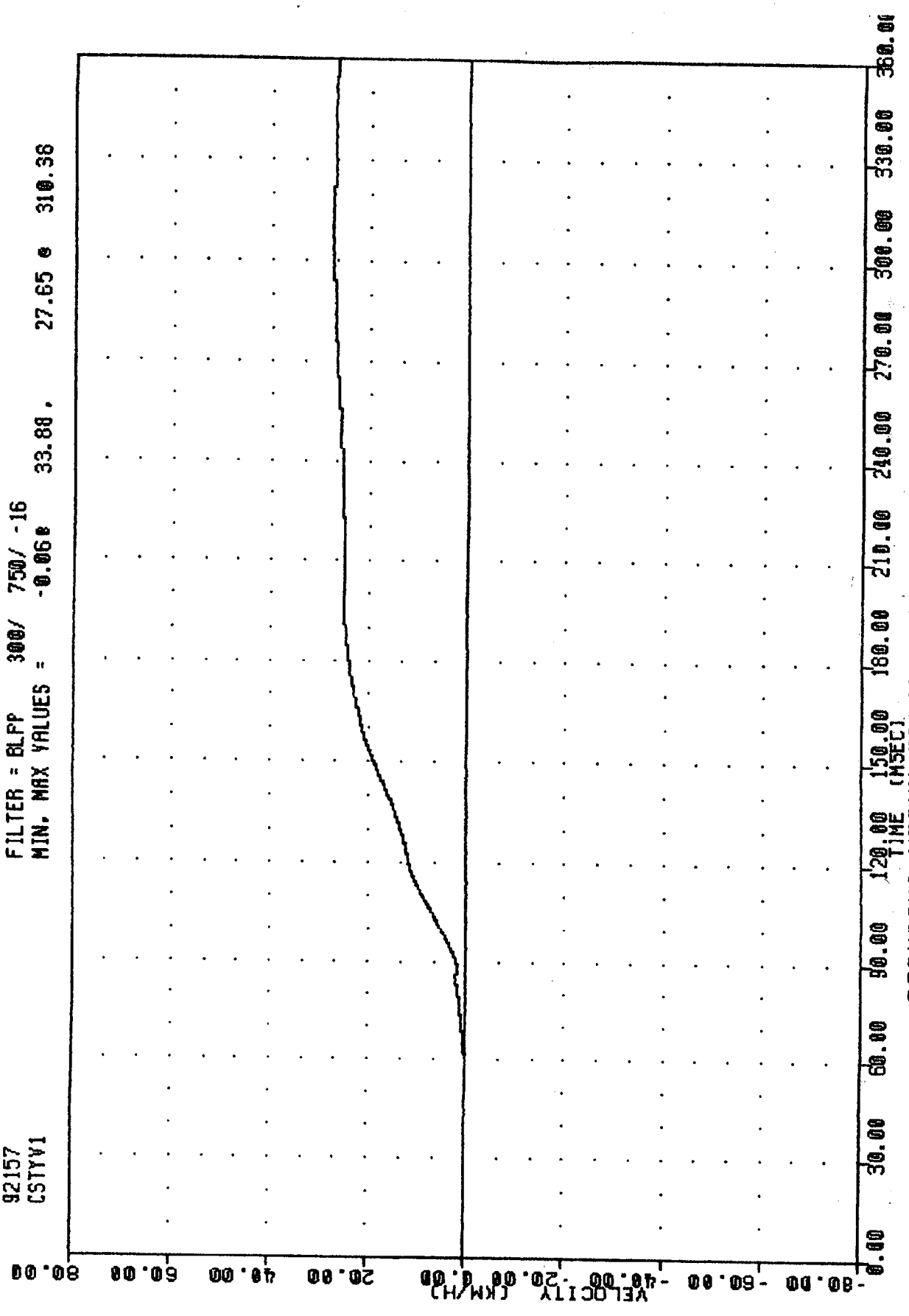
TRC , 920805
 TRUCK INTO STATIONARY CAR
 92157
 CSTXV1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -81.10 360.00, 0.01 e 1.50



TRC , 920505
 TRUCK INTO STATIONARY CAR
 92157
 CSTYV1

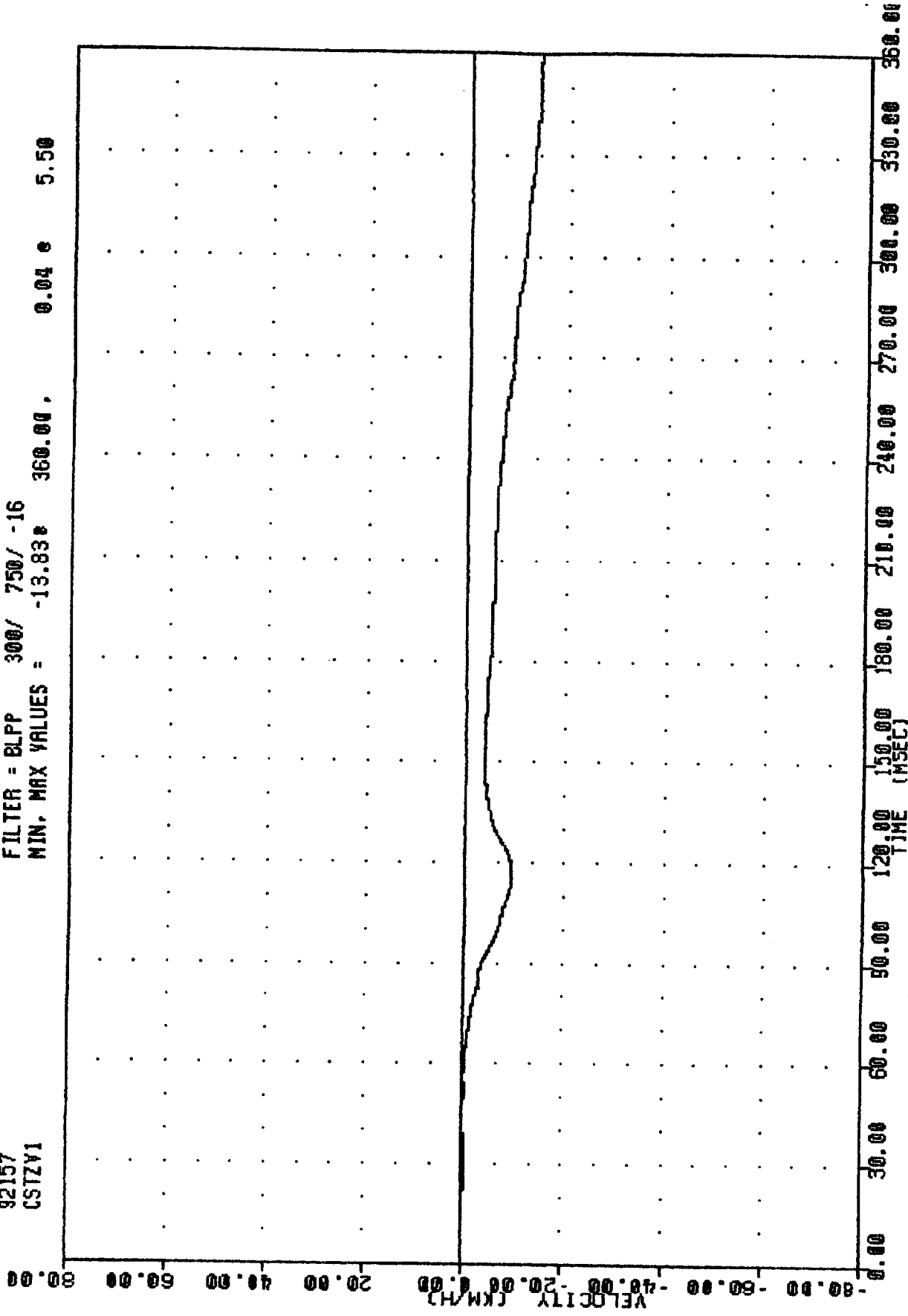
FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -0.068 33.88, 27.65 310.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER CHEST Y-AXIS VELOCITY

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
CSIZV1

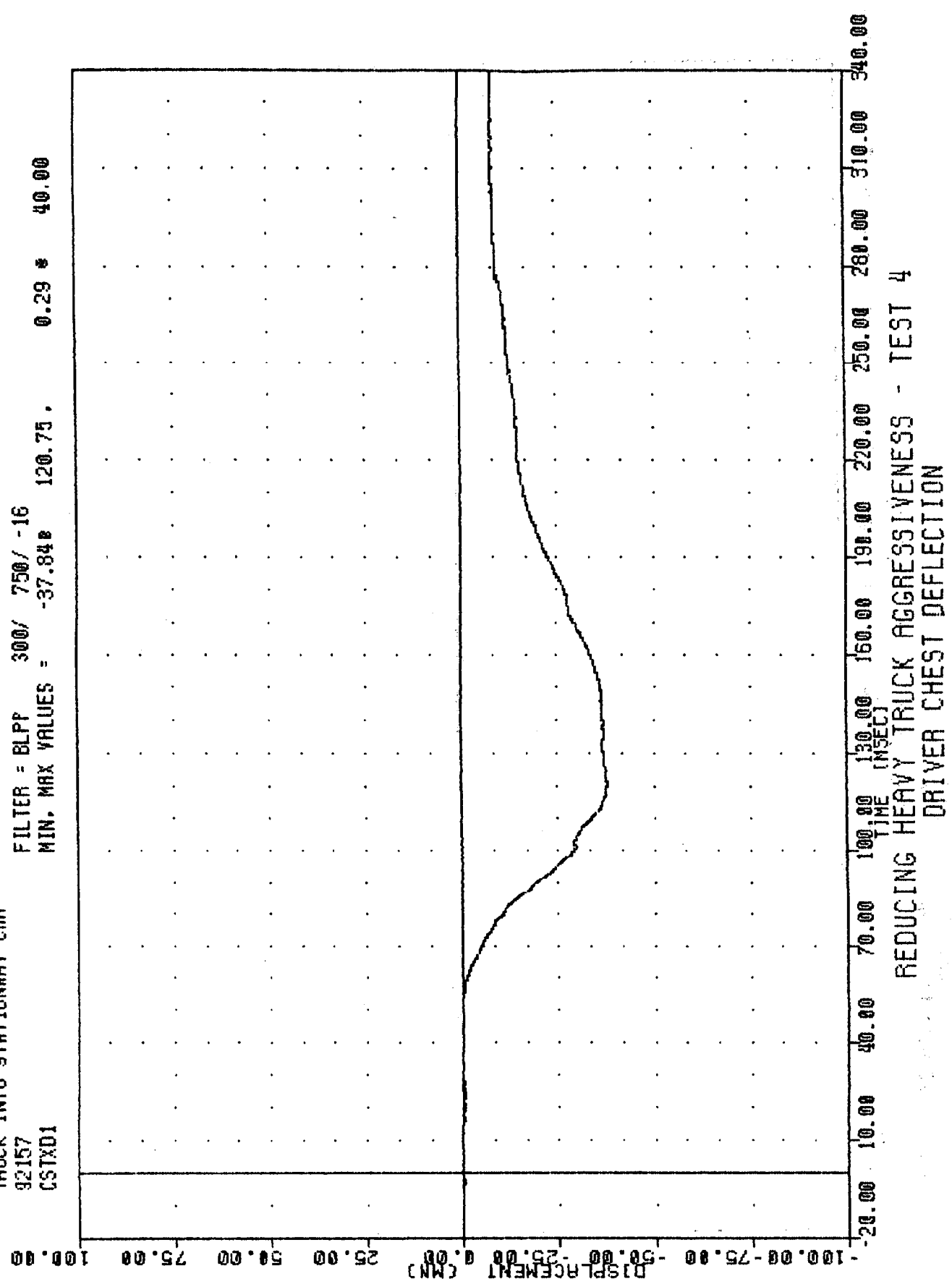
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -13.83 360.00 0.04 5.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER CHEST Z-AXIS VELOCITY

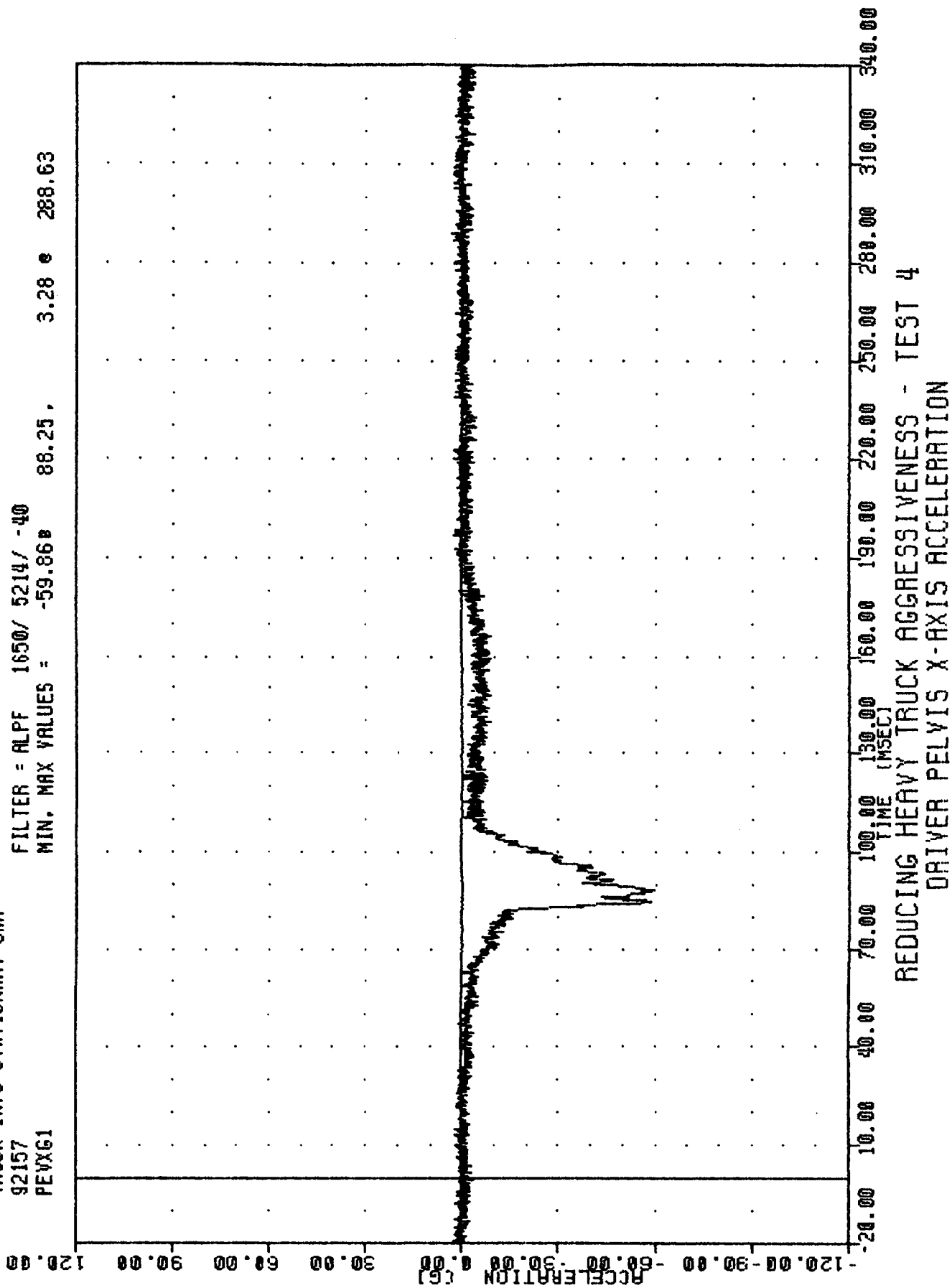
TRC , 920505
 TRUCK INTO STATIONARY CAR
 92157
 CSTXD1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -37.84 120.75 , 0.29 * 40.00



TRC , 920605
TRUCK INTO STATIONARY CAR
92157
PEVXG1

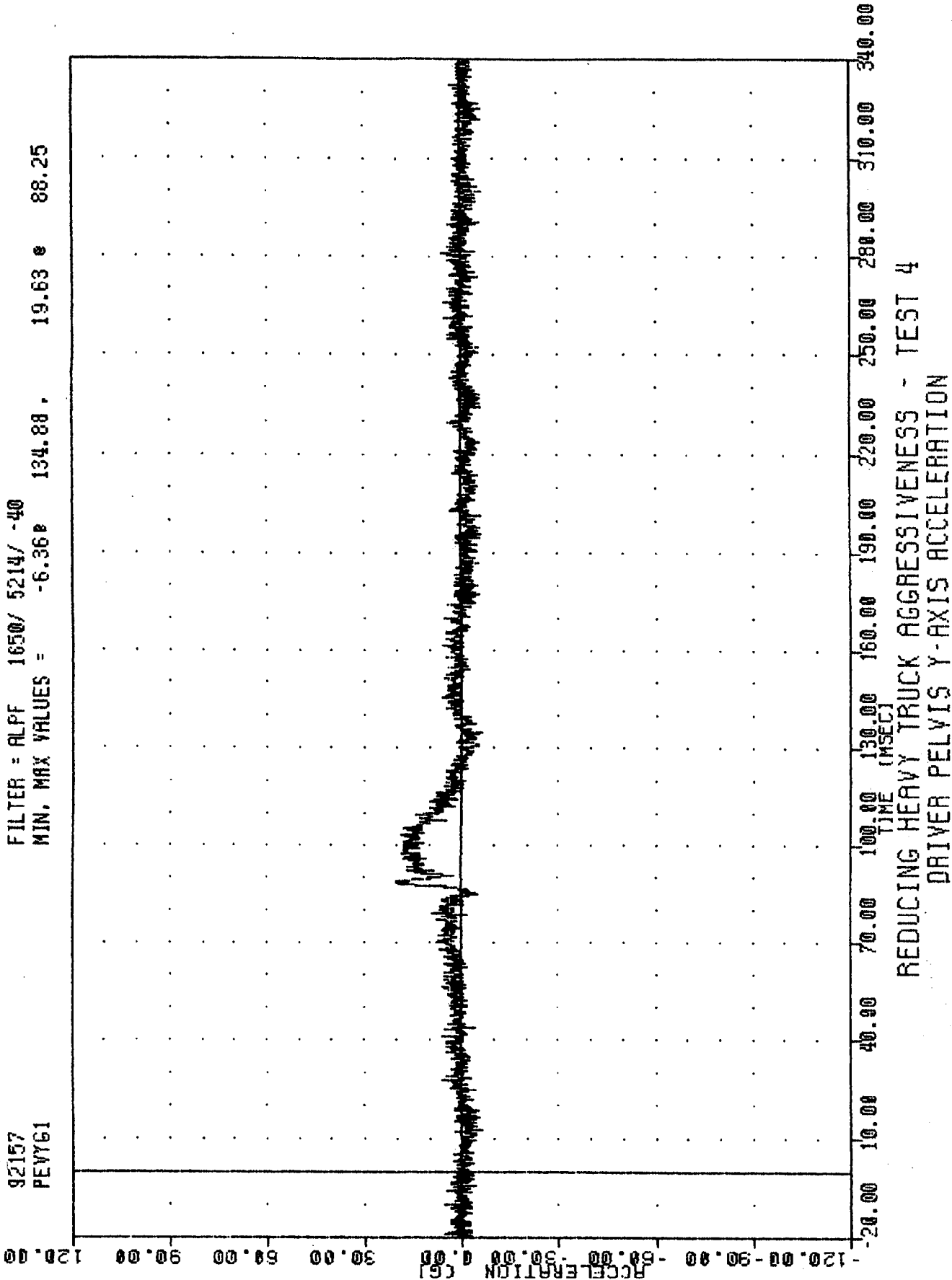
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -59.86 88.25 3.28 288.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER PELVIS X-AXIS ACCELERATION

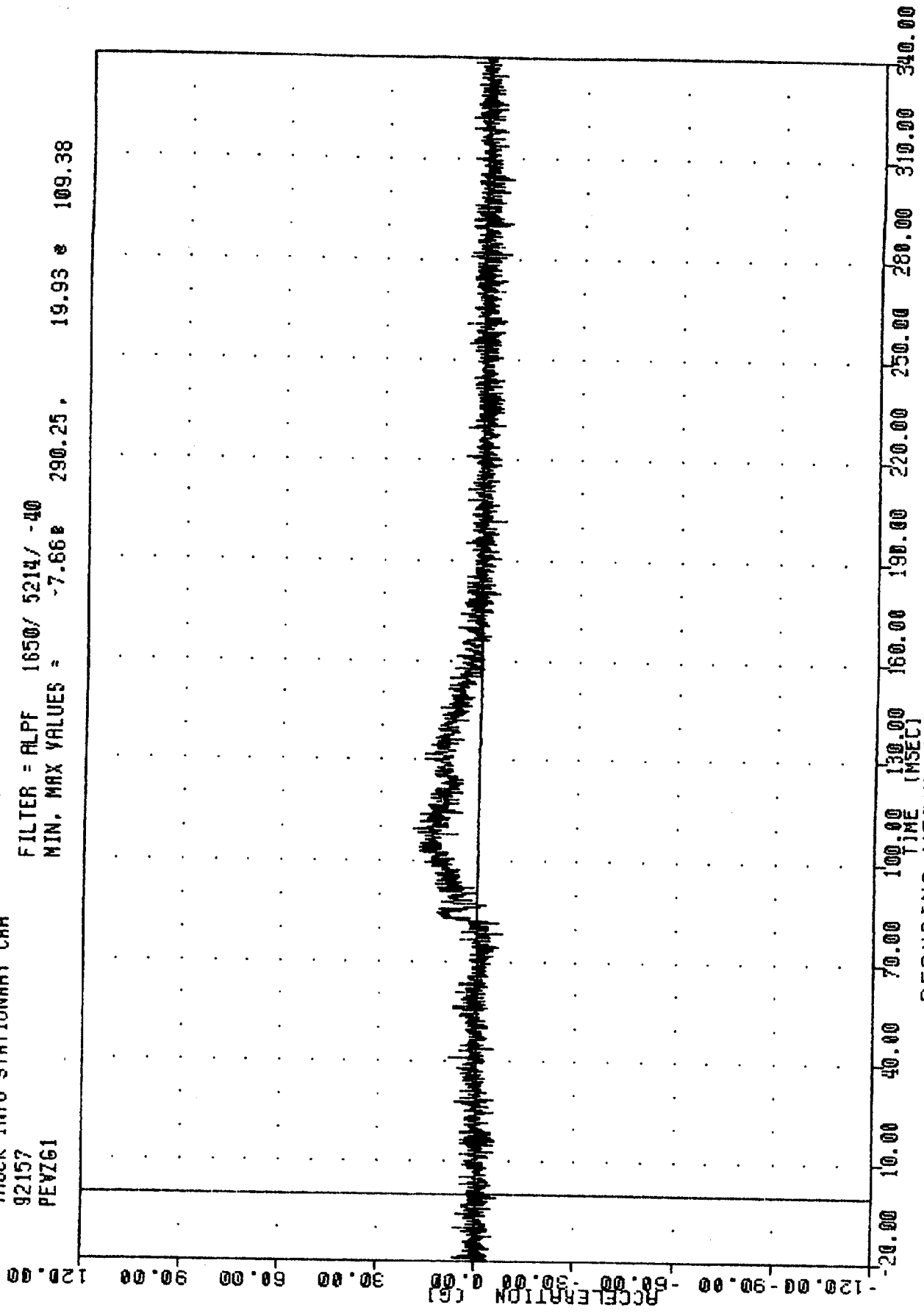
TRC
920605
TRUCK INTO STATIONARY CAR
92157
PEVY61

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -6.36e 134.88, 19.63 e 88.25



TRC , 920605
TRUCK INTO STATIONARY CAR
92157
PEVZ61

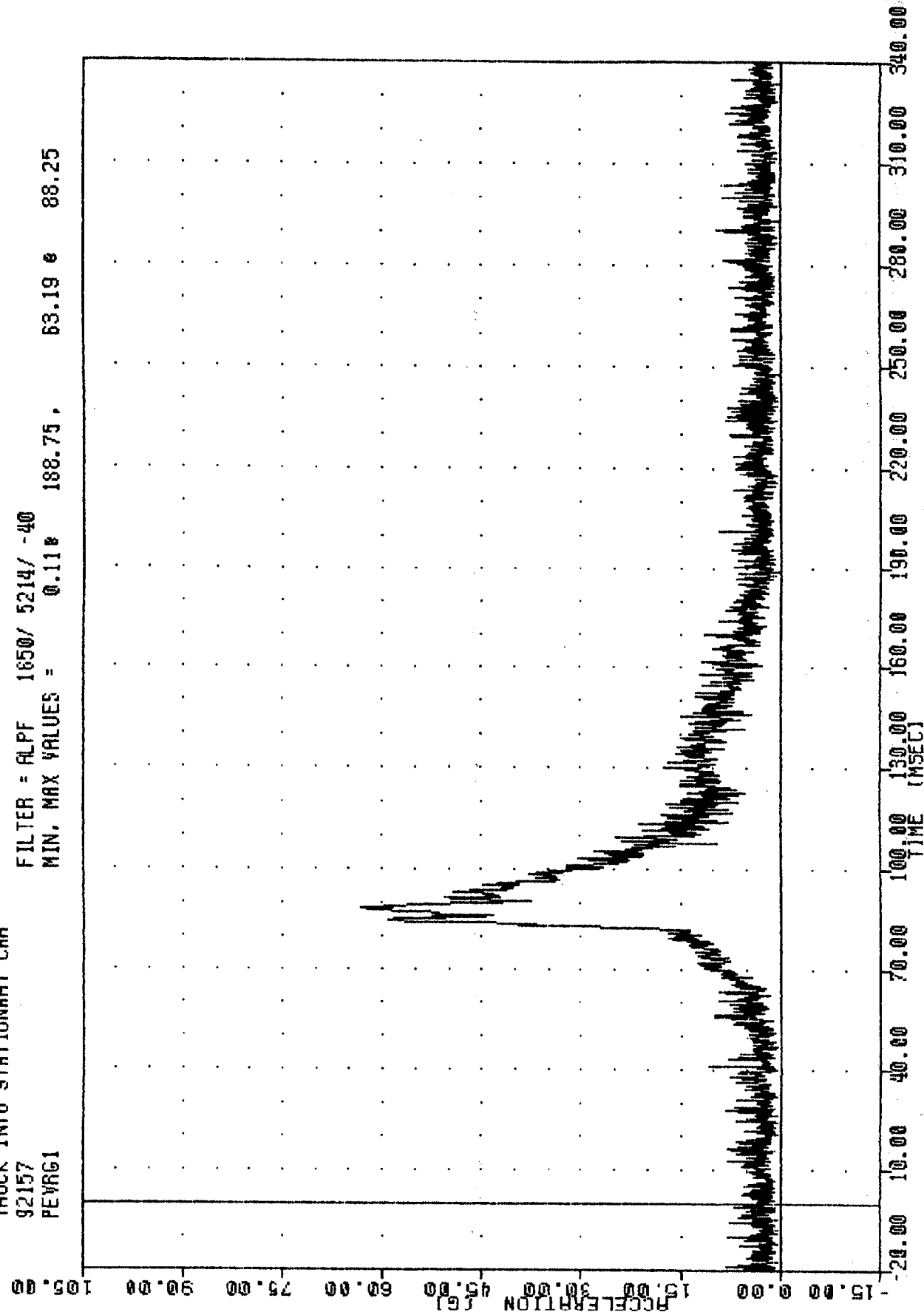
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -7.66 290.25, 19.93 109.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER PELVIS Z-AXIS ACCELERATION

TRC
 92157
 PEVRG1

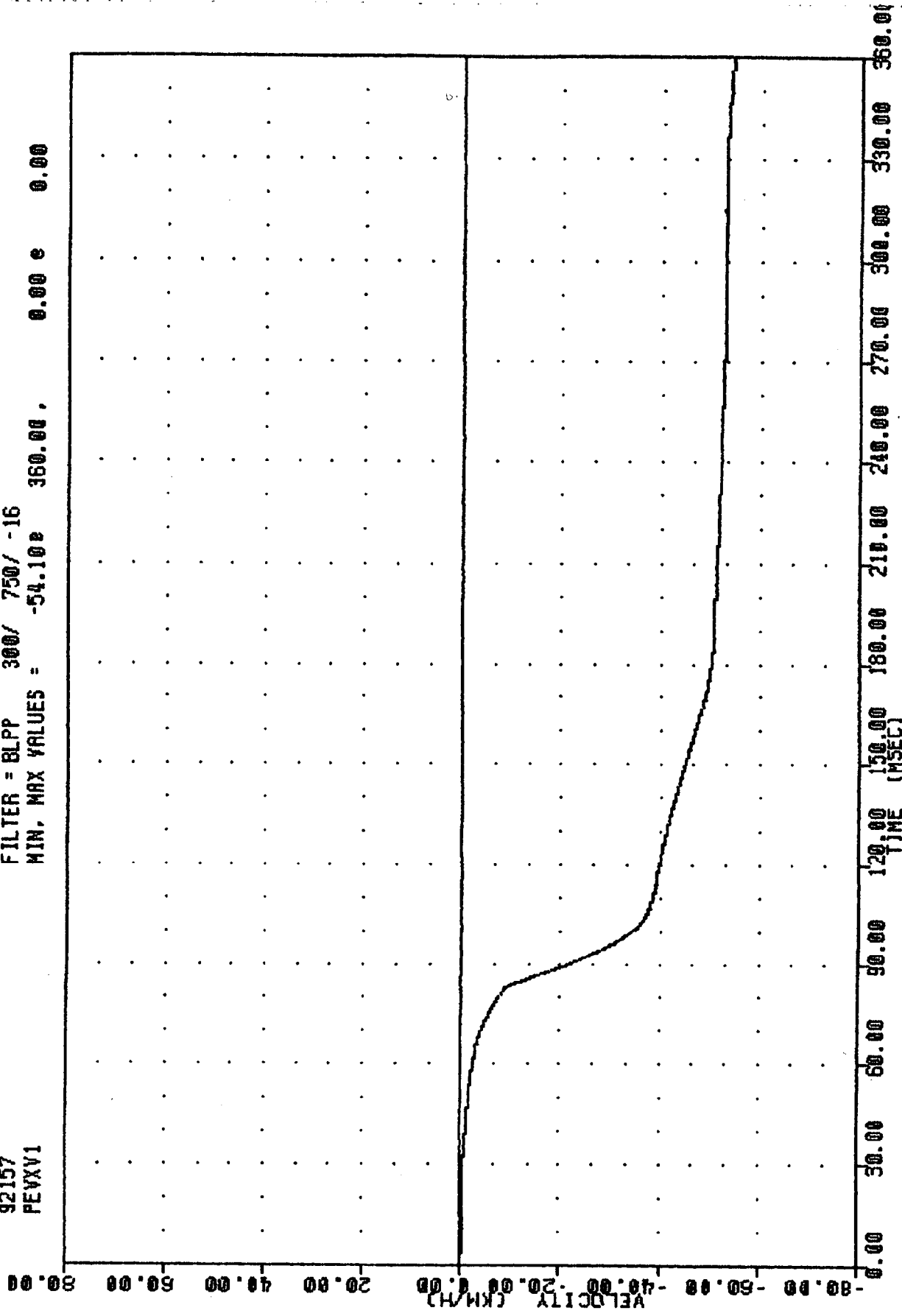
TRUCK INTO STATIONARY CAR
 FILTER = ALPF 1850/ 5214/ -40
 MIN, MAX VALUES = 0.118 188.75, 63.19 e 88.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER PELVIS RESULTANT ACCELERATION

TRC .920605
TRUCK INTO STATIONARY CAR
92157
PEVXV1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -54.100 360.00, 0.00 e 0.00



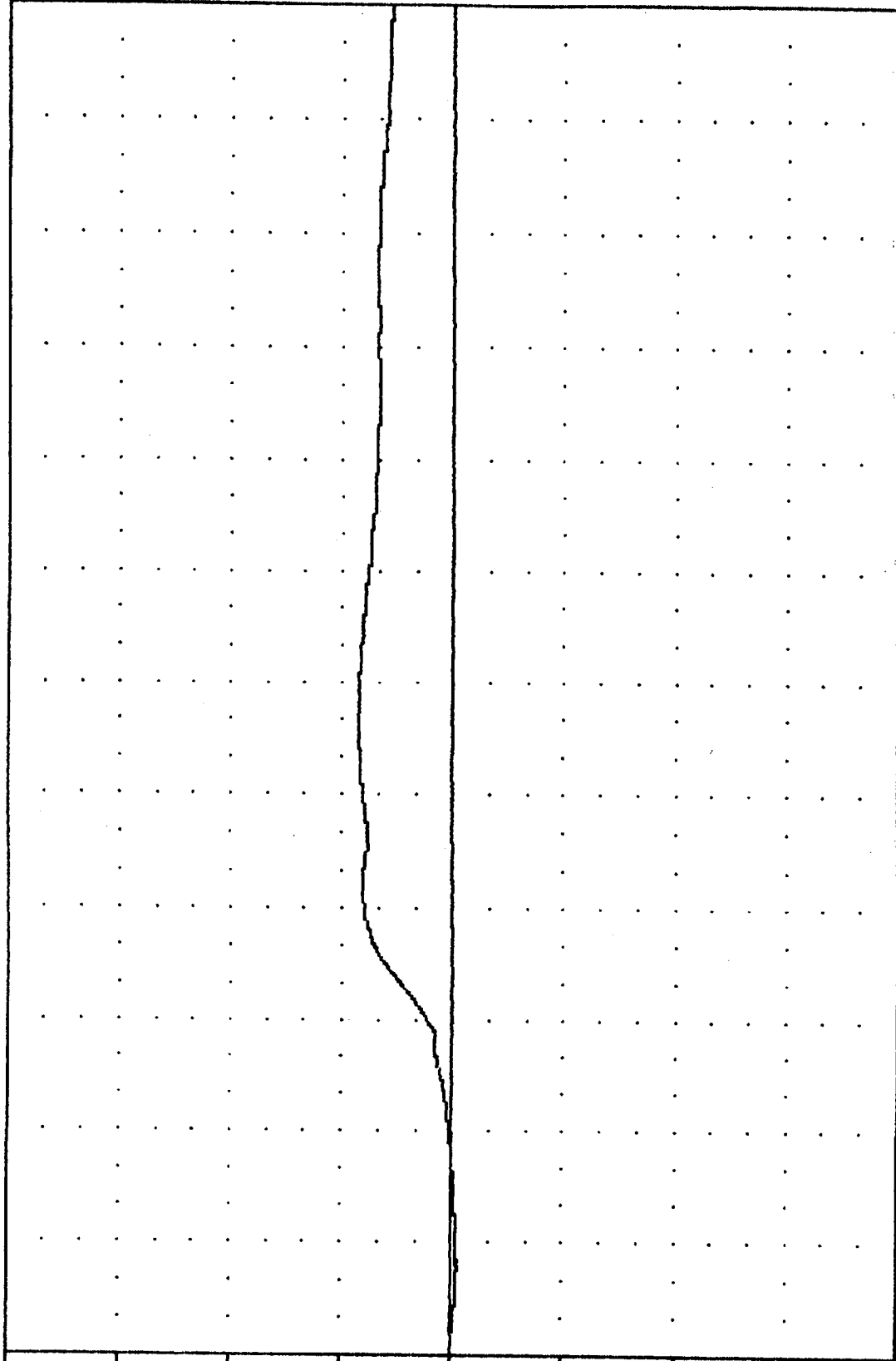
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER PELVIS X-AXIS VELOCITY

TRC
TRUCK INTO STATIONARY CAR
92157
PEVV1

, 920605

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -0.96 23.13. 17.25 173.88

VELOCITY (KM/H)

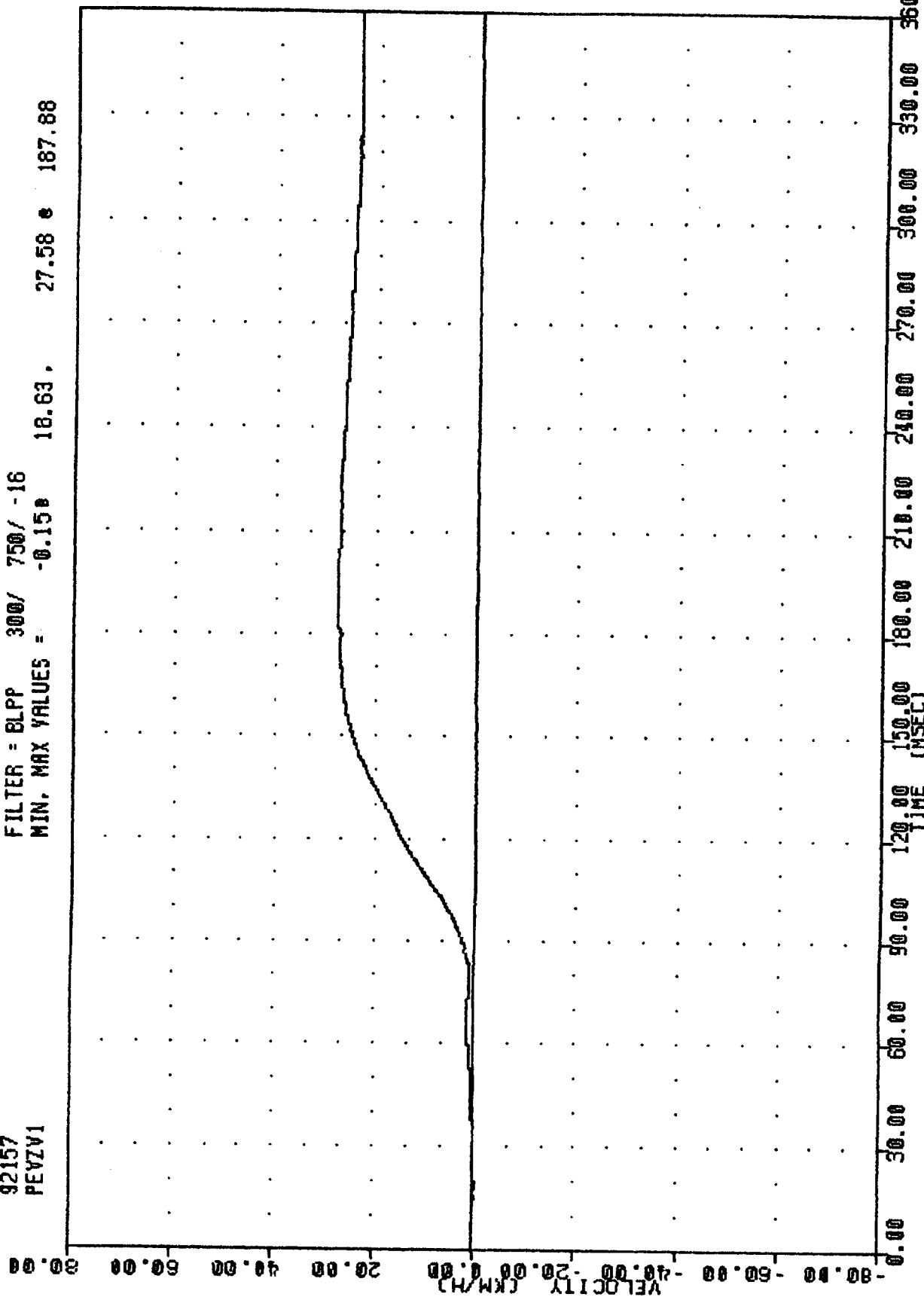


0.00 30.00 60.00 90.00 120.00 150.00 180.00 210.00 240.00 270.00 300.00 330.00 360.00

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER PELVIS Y-AXIS VELOCITY

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
PEZV1

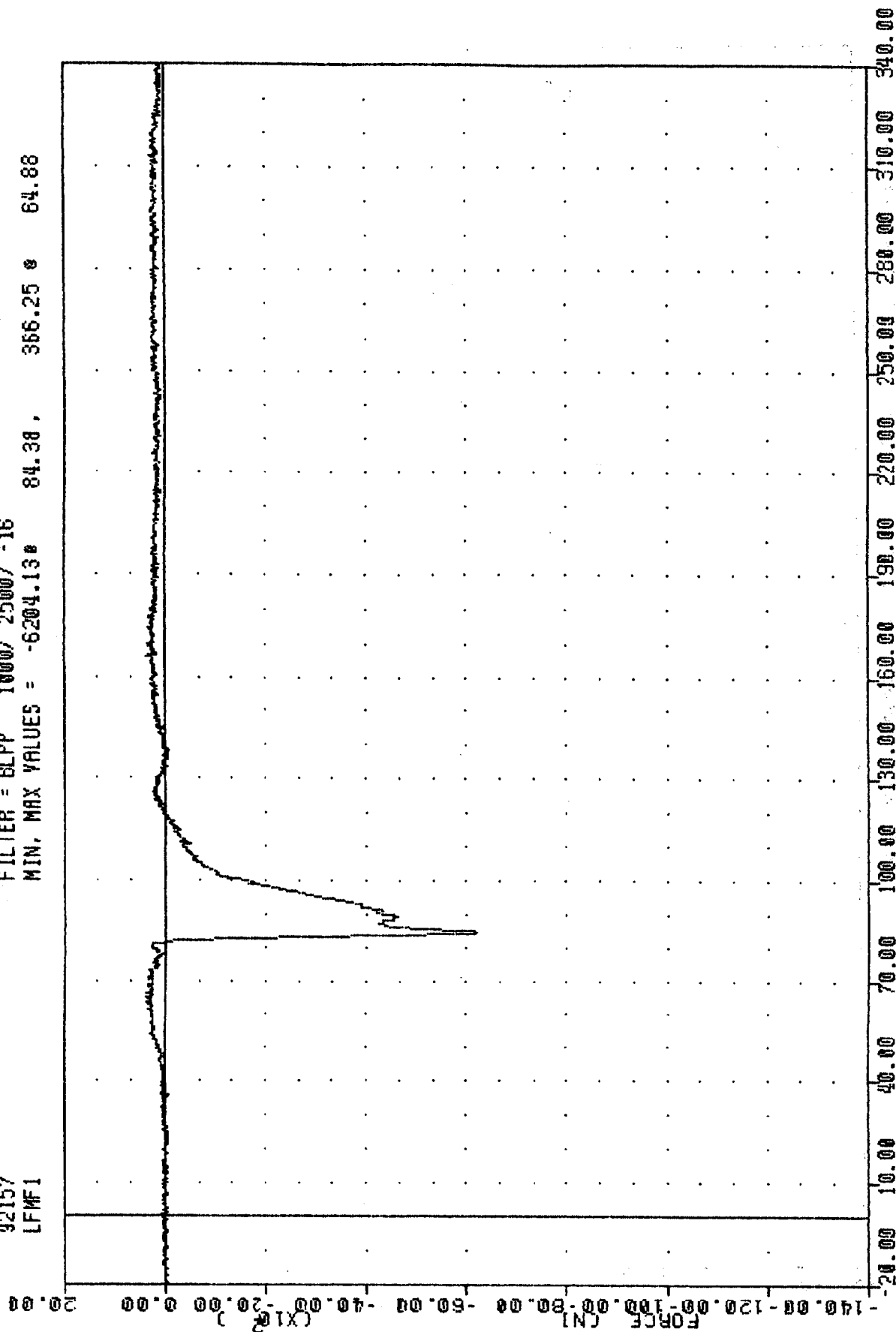
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -0.150 18.63. 27.58 e 187.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER PELVIS Z-AXIS VELOCITY

TRC , 920E05
TRUCK INTO STATIONARY CAR
92157
LFMF1

FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -6204.13 84.38, 356.25 64.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
DRIVER LEFT FEMUR FORCE

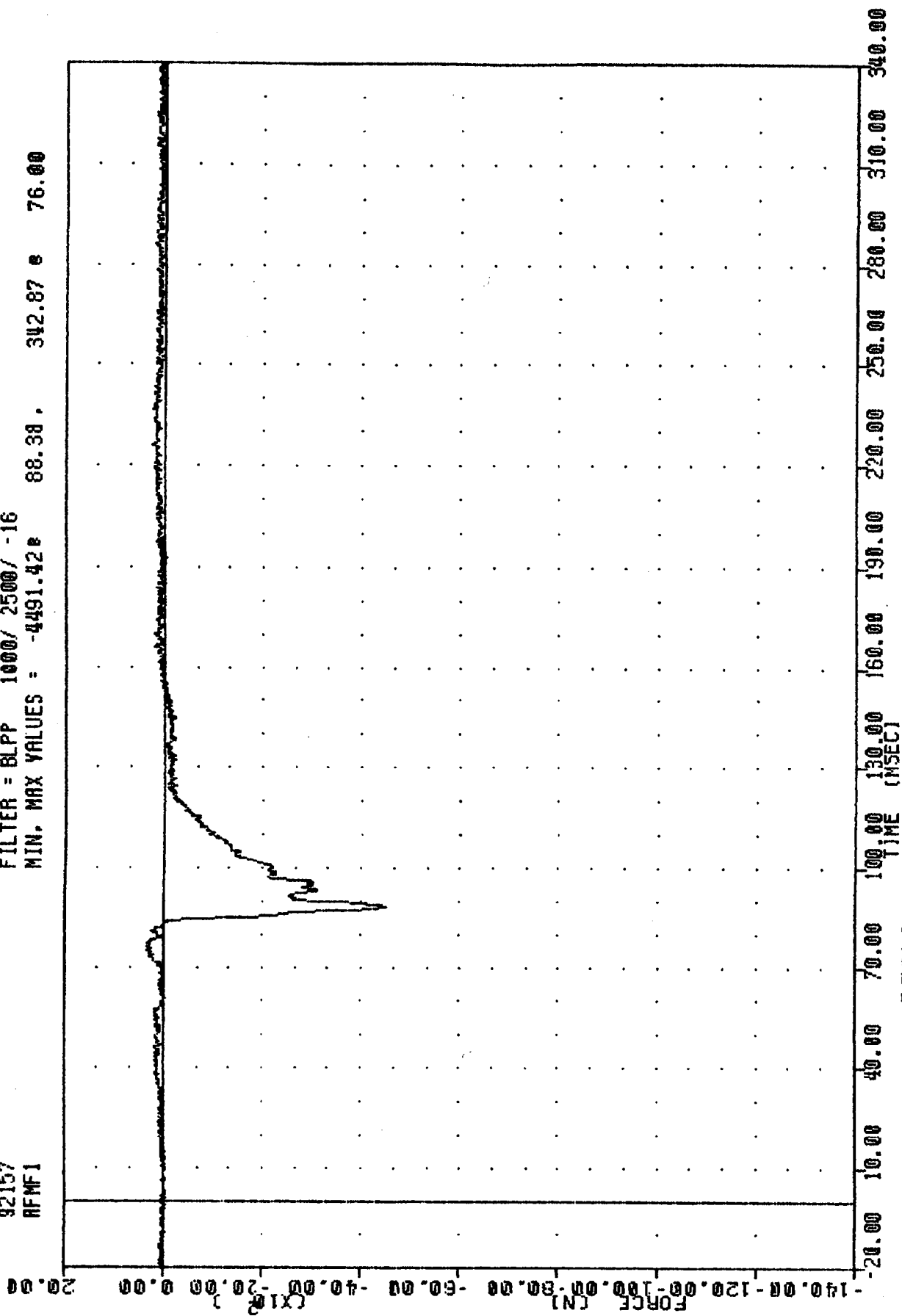
TRC
 TRUCK INTO STATIONARY CAR
 92157
 AFMF1

, 920605

FILTER = BLPP 1000/ 2500/ -16

MIN, MAX VALUES = -4491.428

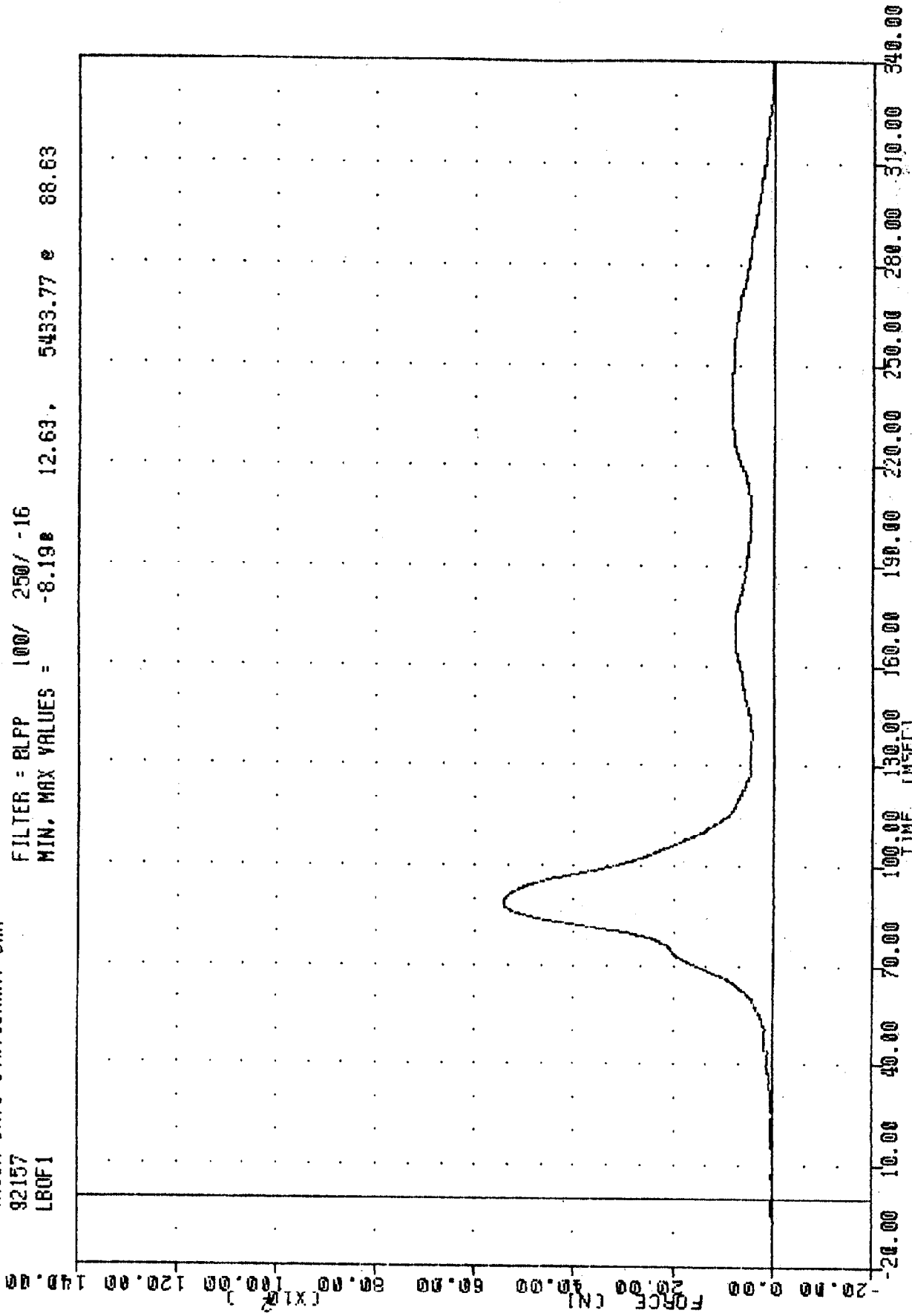
88.38, 342.87 e 76.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER RIGHT FEMUR FORCE

TRC , 920605
 TRUCK INTO STATIONARY CAR
 92157
 LB0F1

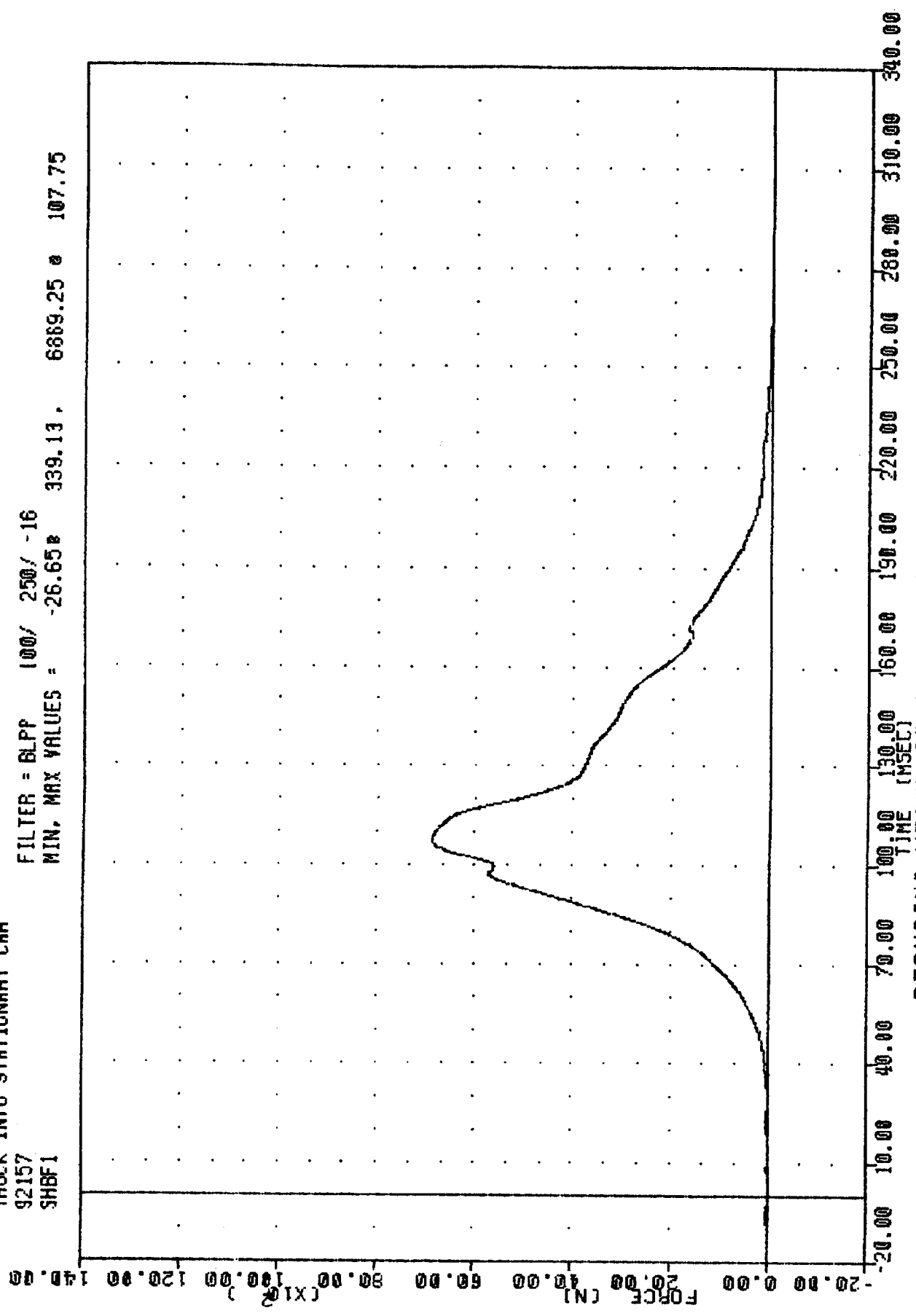
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -8.19 12.63, 5433.77 e 88.63



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER LAP BELT OUTBOARD FORCE

TRC 920805
 TRUCK INTO STATIONARY CAR
 92157
 SHBF1

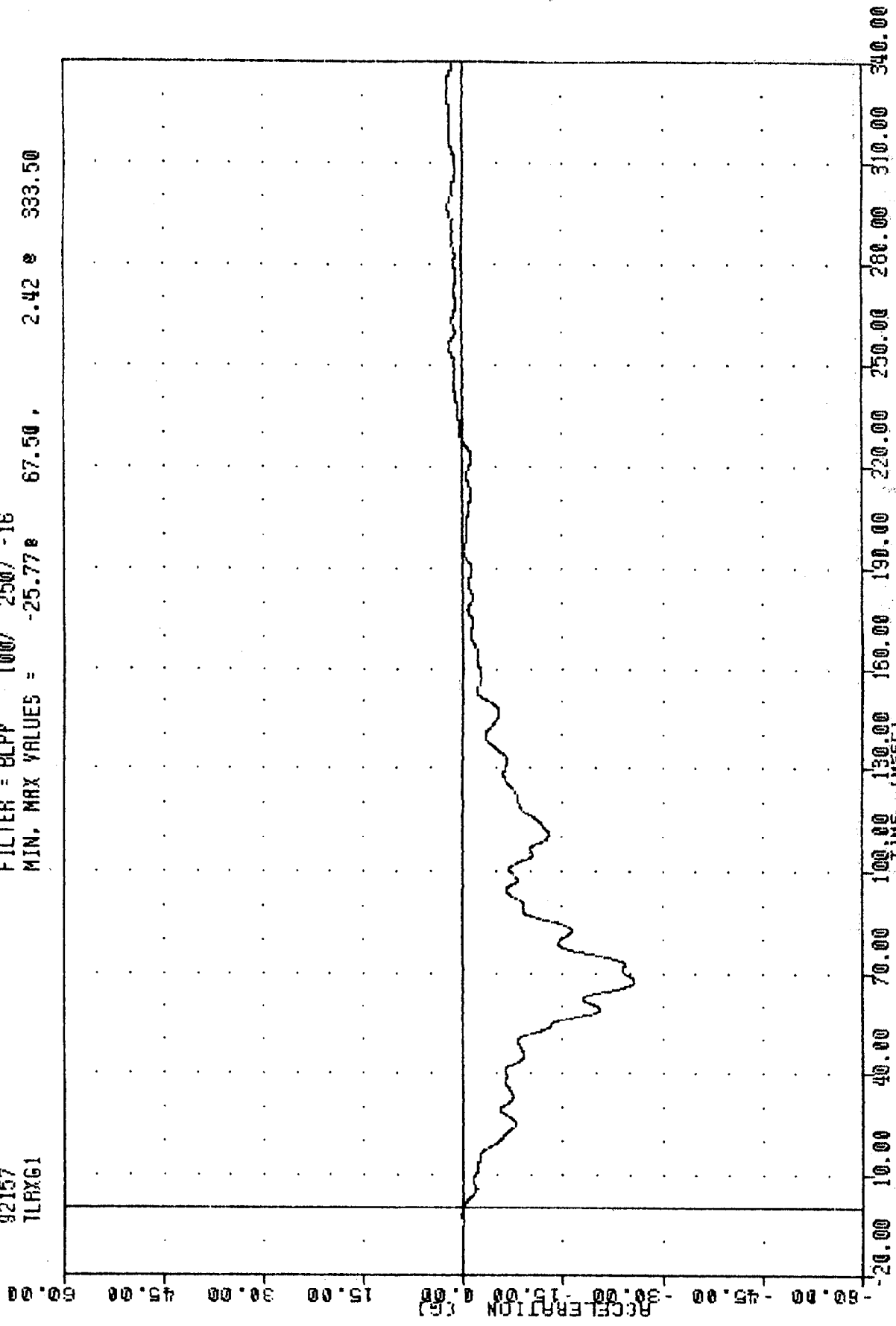
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -26.65 339.13, 6869.25 @ 107.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 DRIVER SHOULDER BELT FORCE

TRC 920605
TRUCK INTO STATIONARY CAR
92157
TLRX61

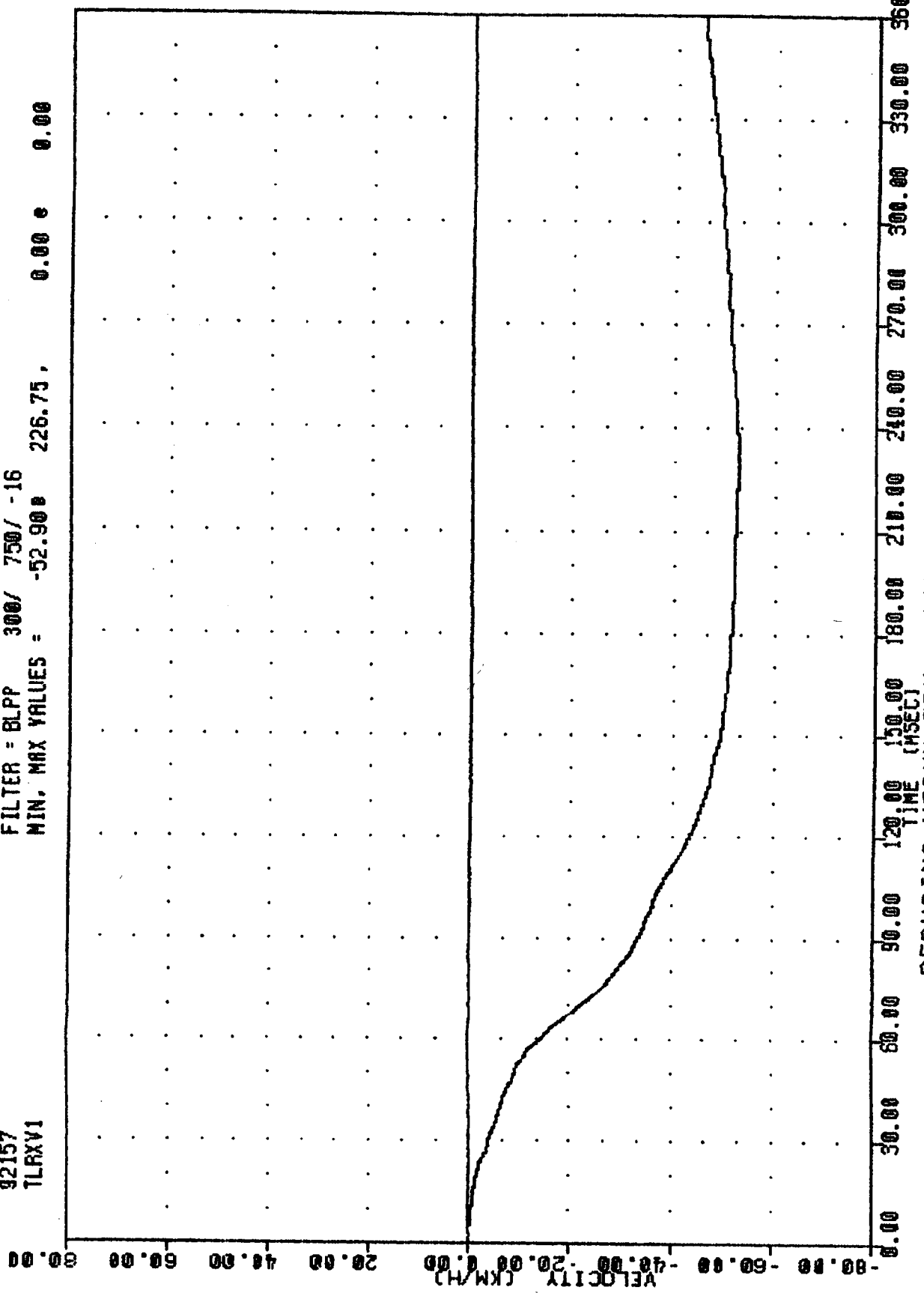
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -25.77e 67.50 , 2.42 e 333.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
LEFT REAR SEAT X-AXIS ACCELERATION

TRC . 920605
TRUCK INTO STATIONARY CAR
92157
TLRXV1

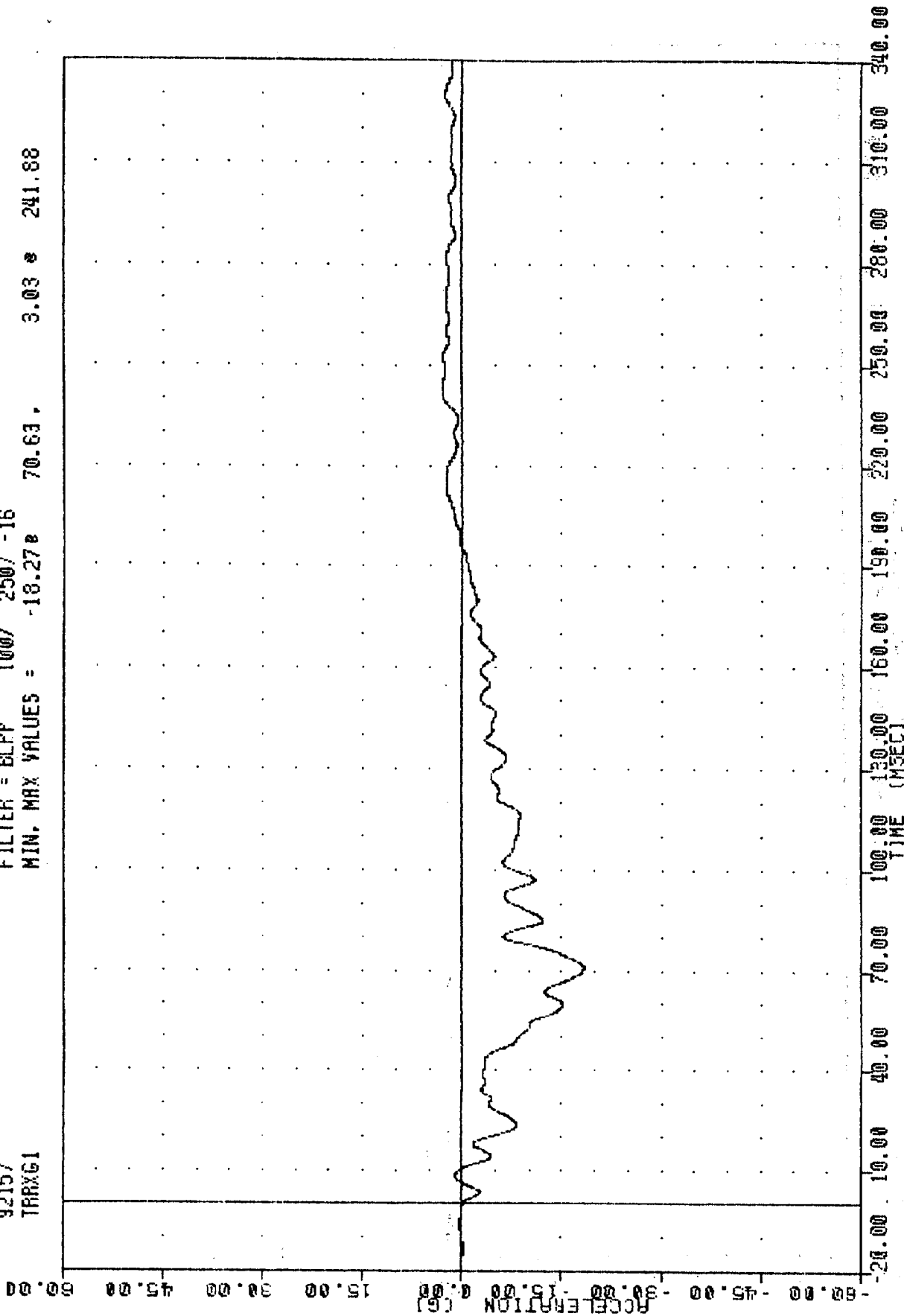
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -52.90 226.75, 0.00 0.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
LEFT REAR SEAT X-AXIS VELOCITY

TRC 920605
TRUCK INTO STATIONARY CAR
92157
TRRXG1

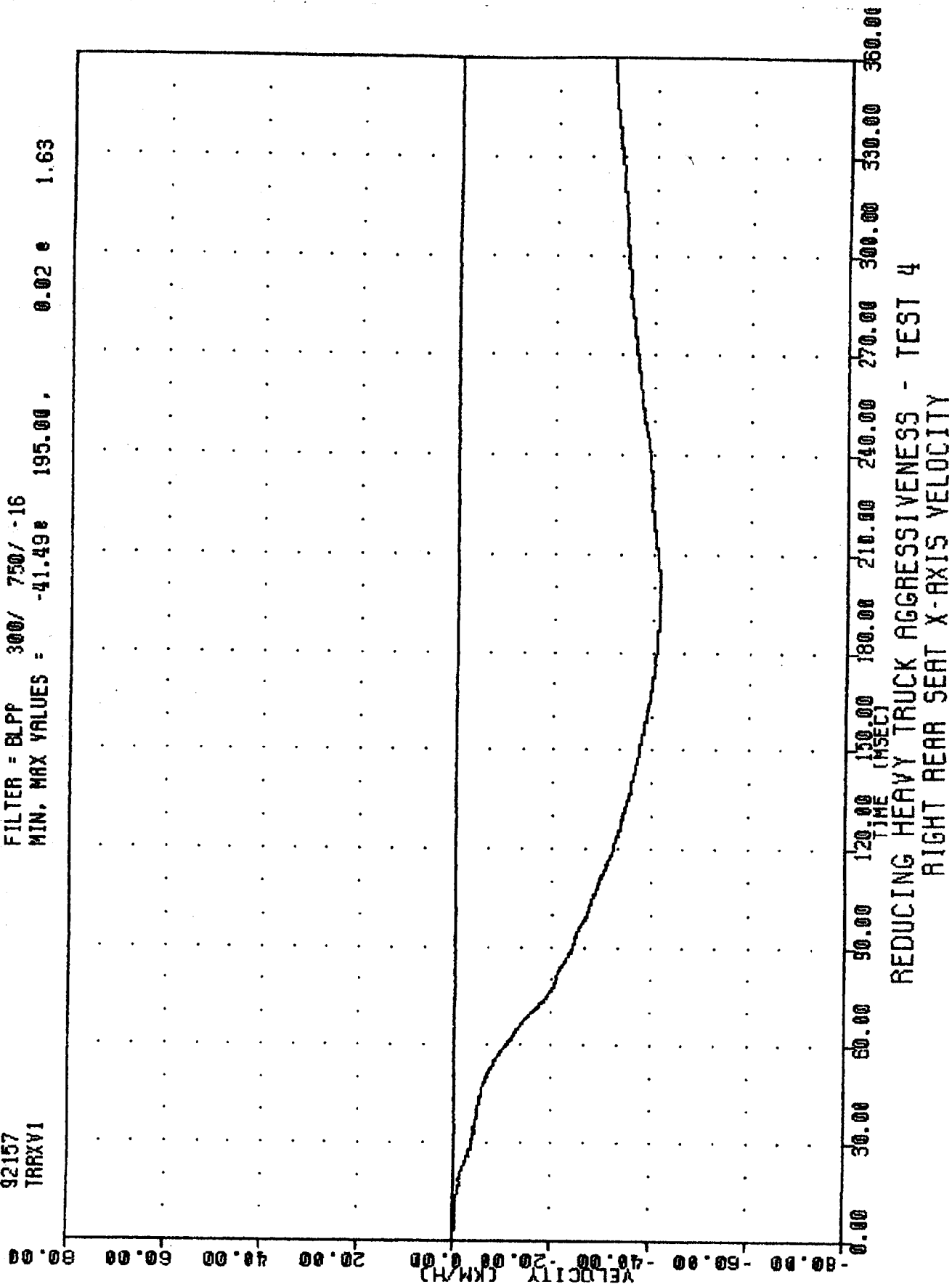
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -18.27 70.63 3.03 241.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
RIGHT REAR SEAT X-AXIS ACCELERATION

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
TRRXV1

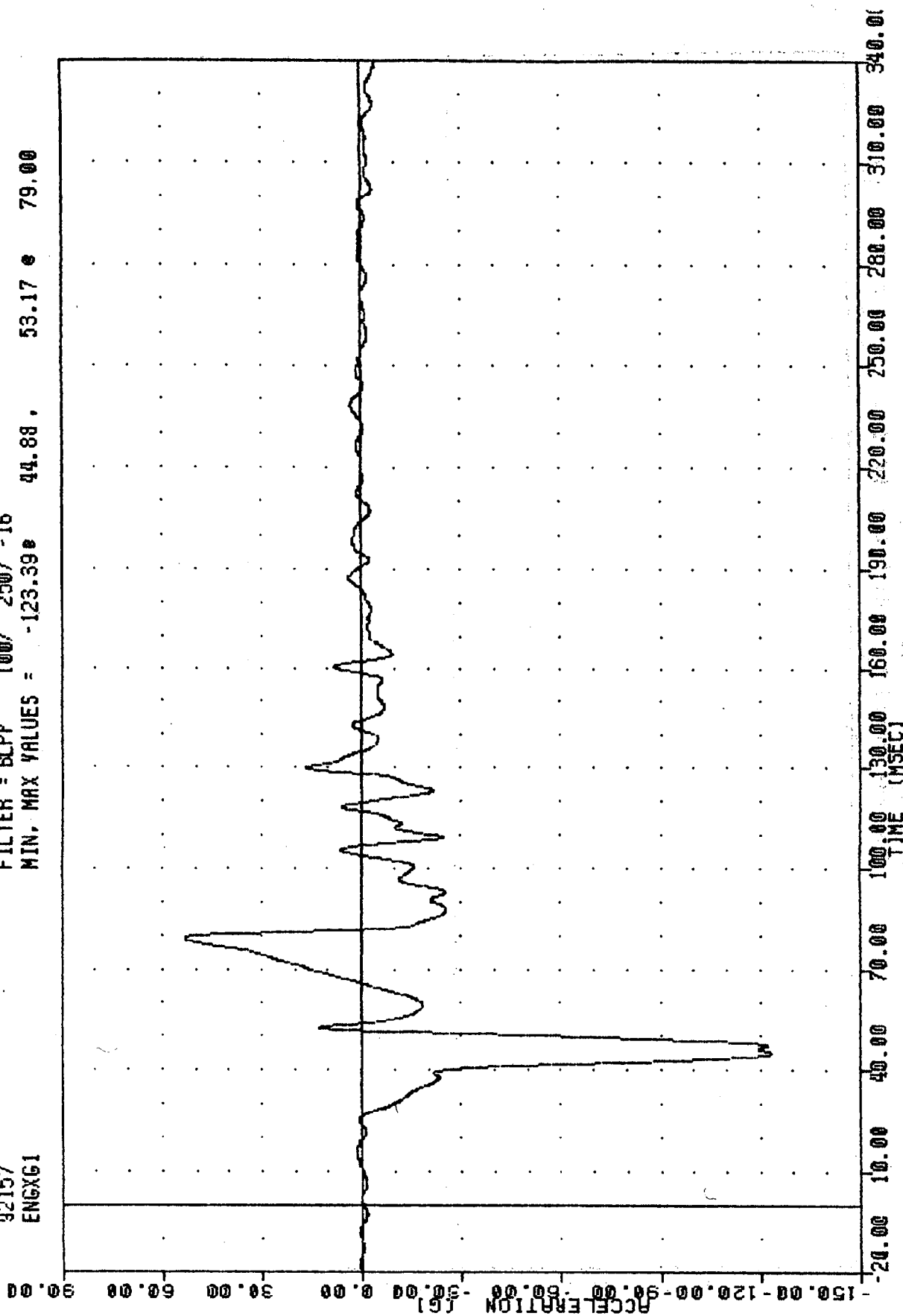
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -41.49 195.00 , 0.02 1.63



TRC
TRUCK INTO STATIONARY CAR
92157
ENGXG1

, 920605

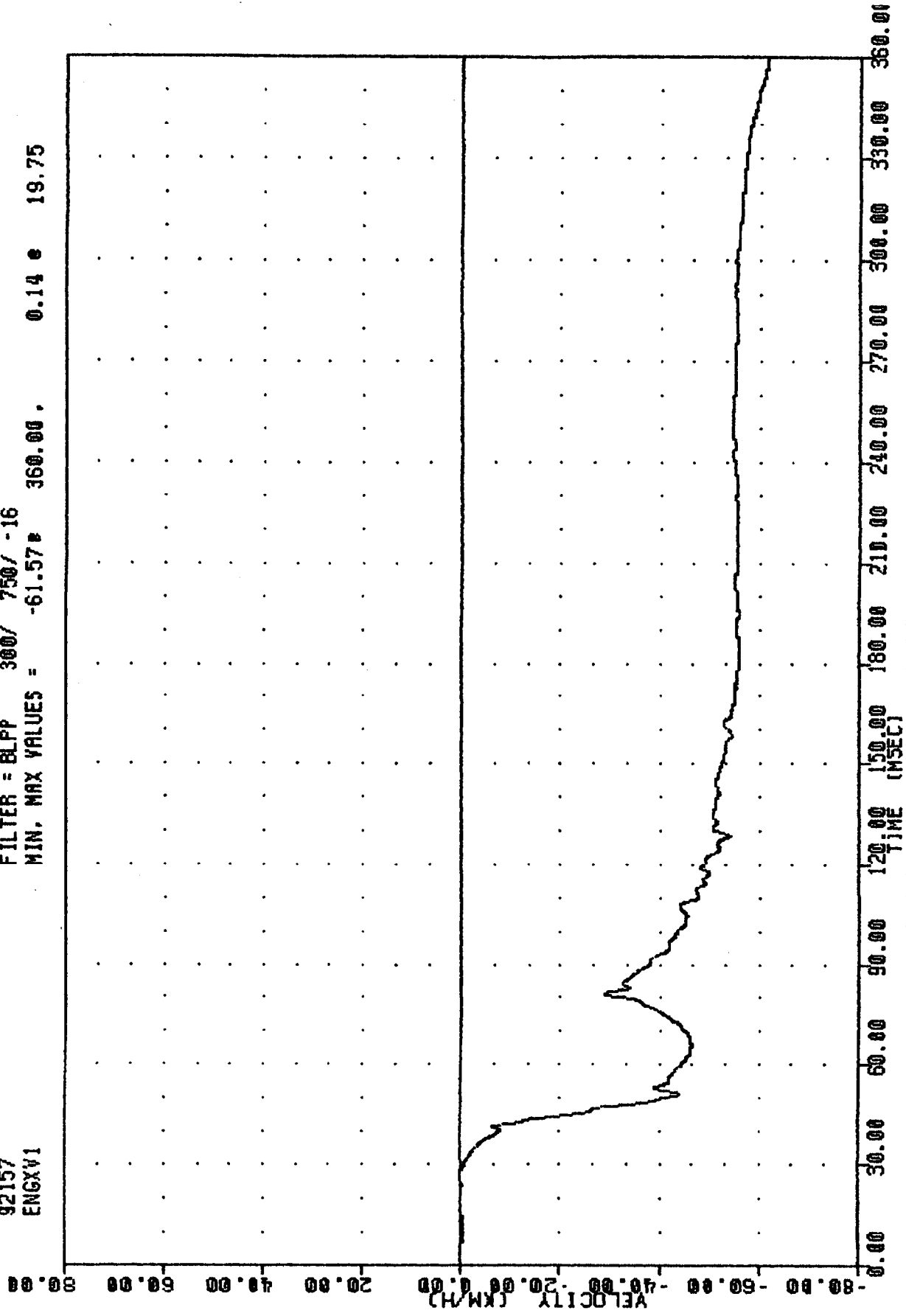
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -123.39 44.88, 53.17 79.00



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
ENGINE TOP X-AXIS ACCELERATION

IRC
TRUCK INTO STATIONARY CAR
92157
ENGXV1

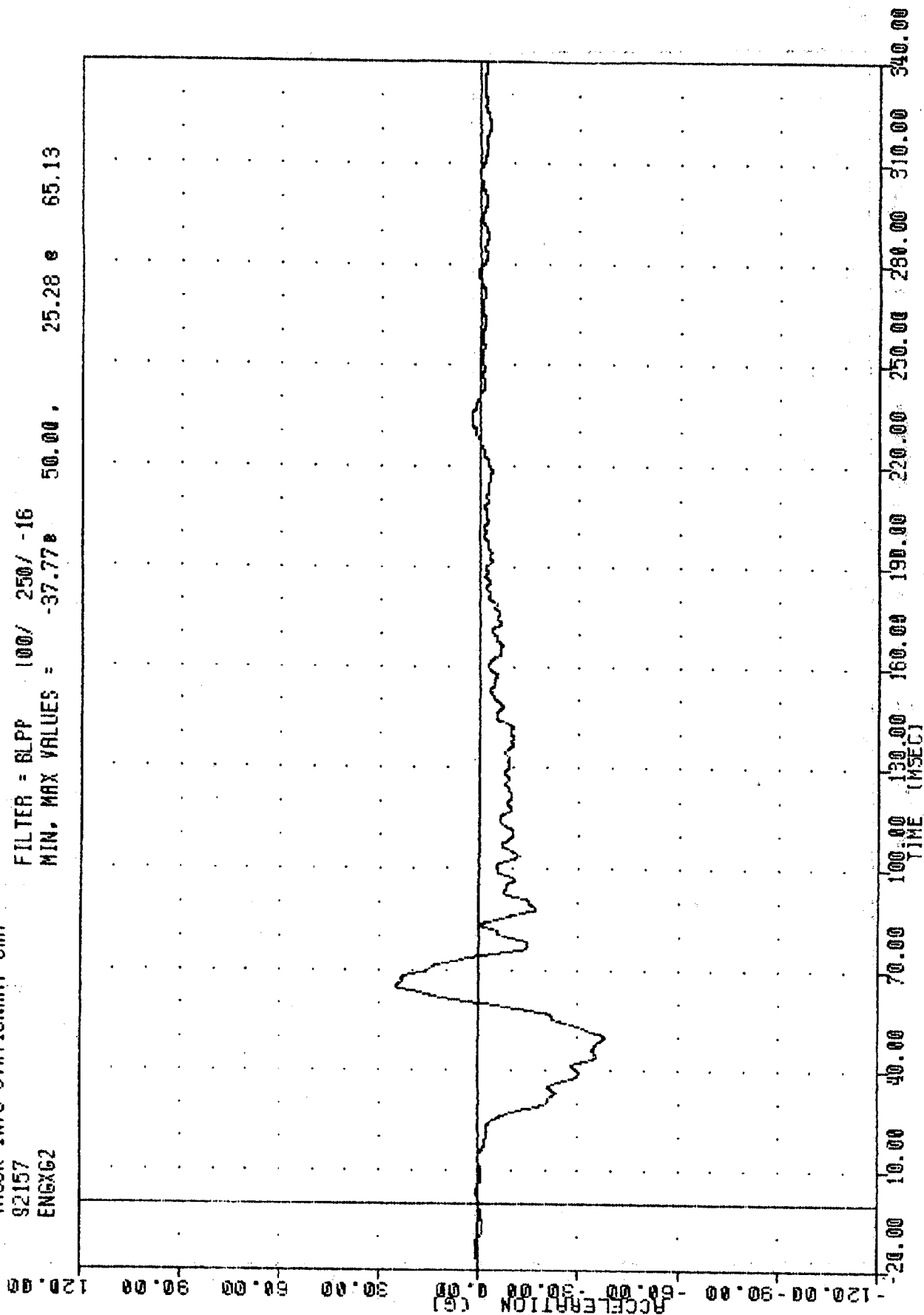
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -61.57 360.00 0.14 e 19.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
ENGINE TOP X-AXIS VELOCITY

TRC 920605
TRUCK INTO STATIONARY CAR
92157
ENGX62

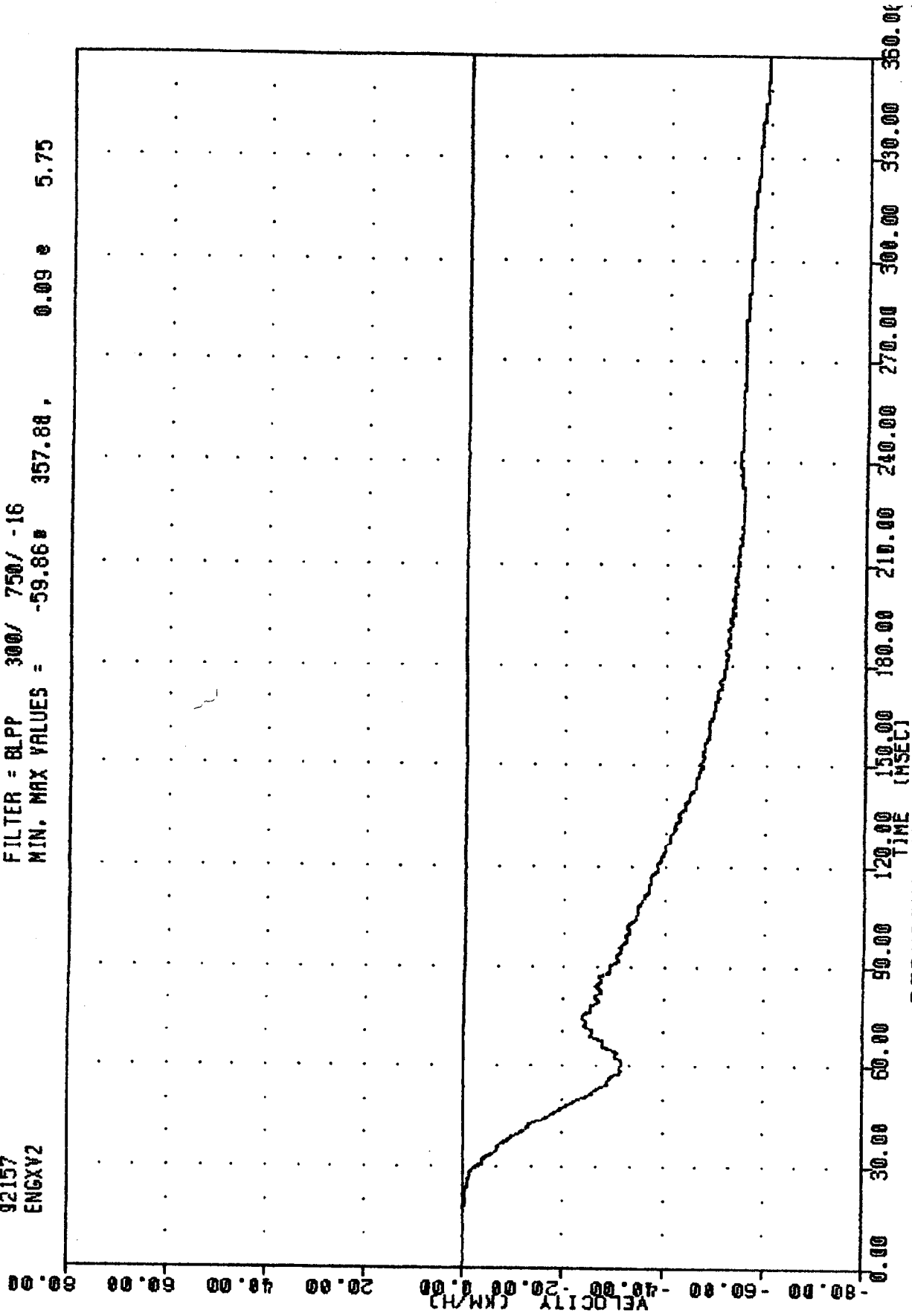
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -37.77 50.00 25.28 65.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
ENGINE BOTTOM X-AXIS ACCELERATION

TRC
TRUCK INTO STATIONARY CAR
92157
ENGXV2

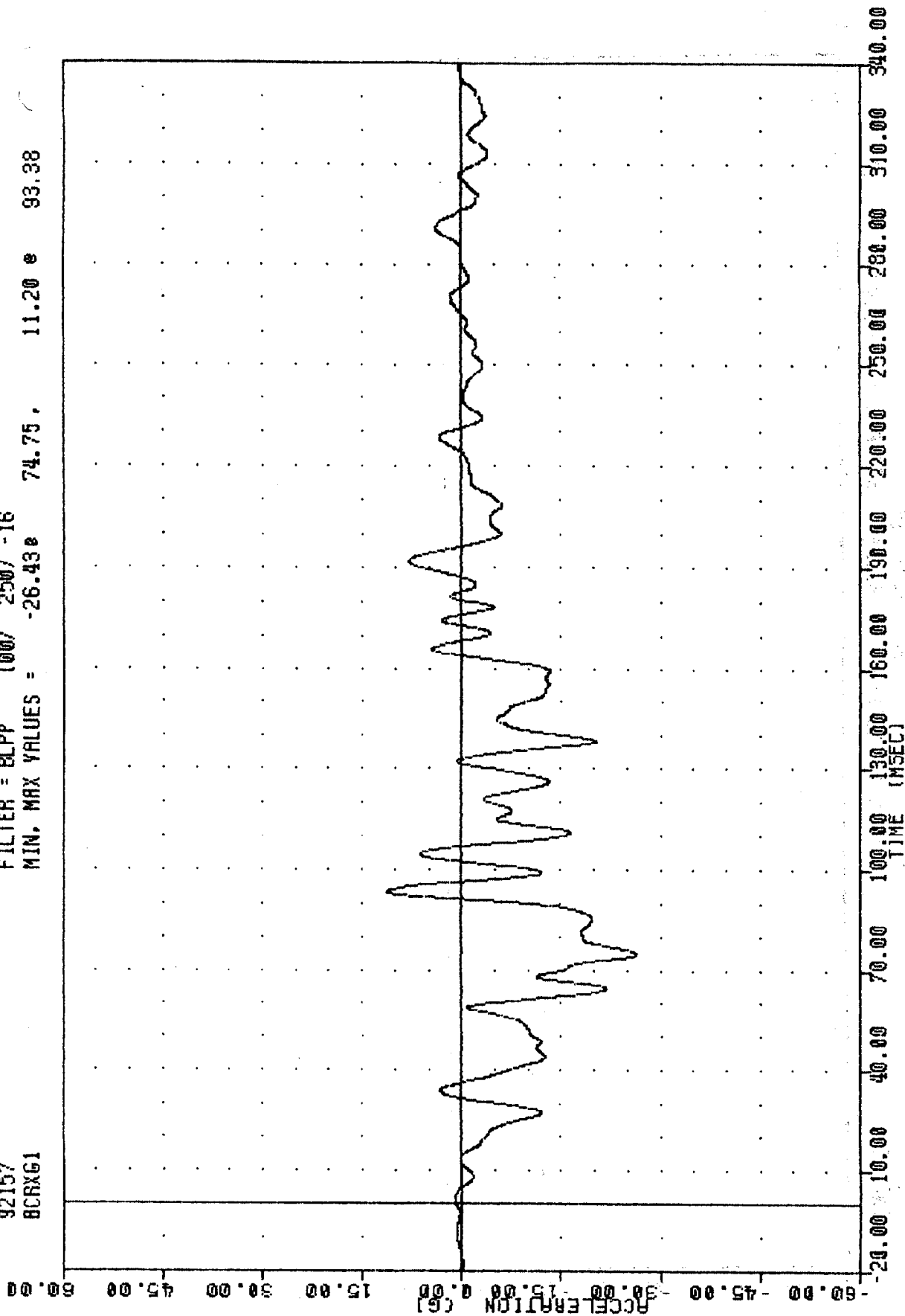
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -59.86 357.88 0.09 5.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
ENGINE BOTTOM X-AXIS VELOCITY

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
BCRXG1

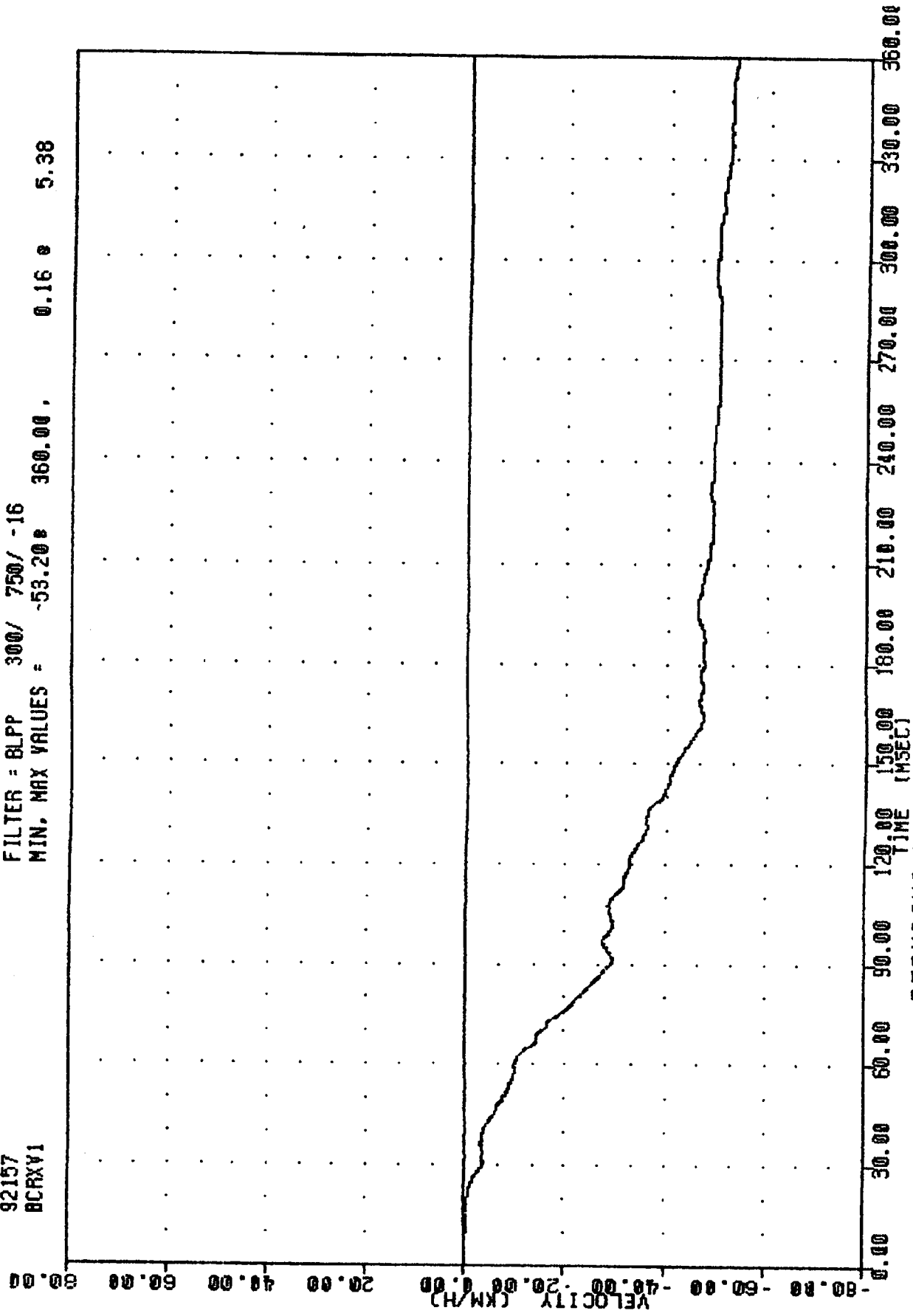
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -26.43e 74.75, 11.20 e 93.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
BCRXV1

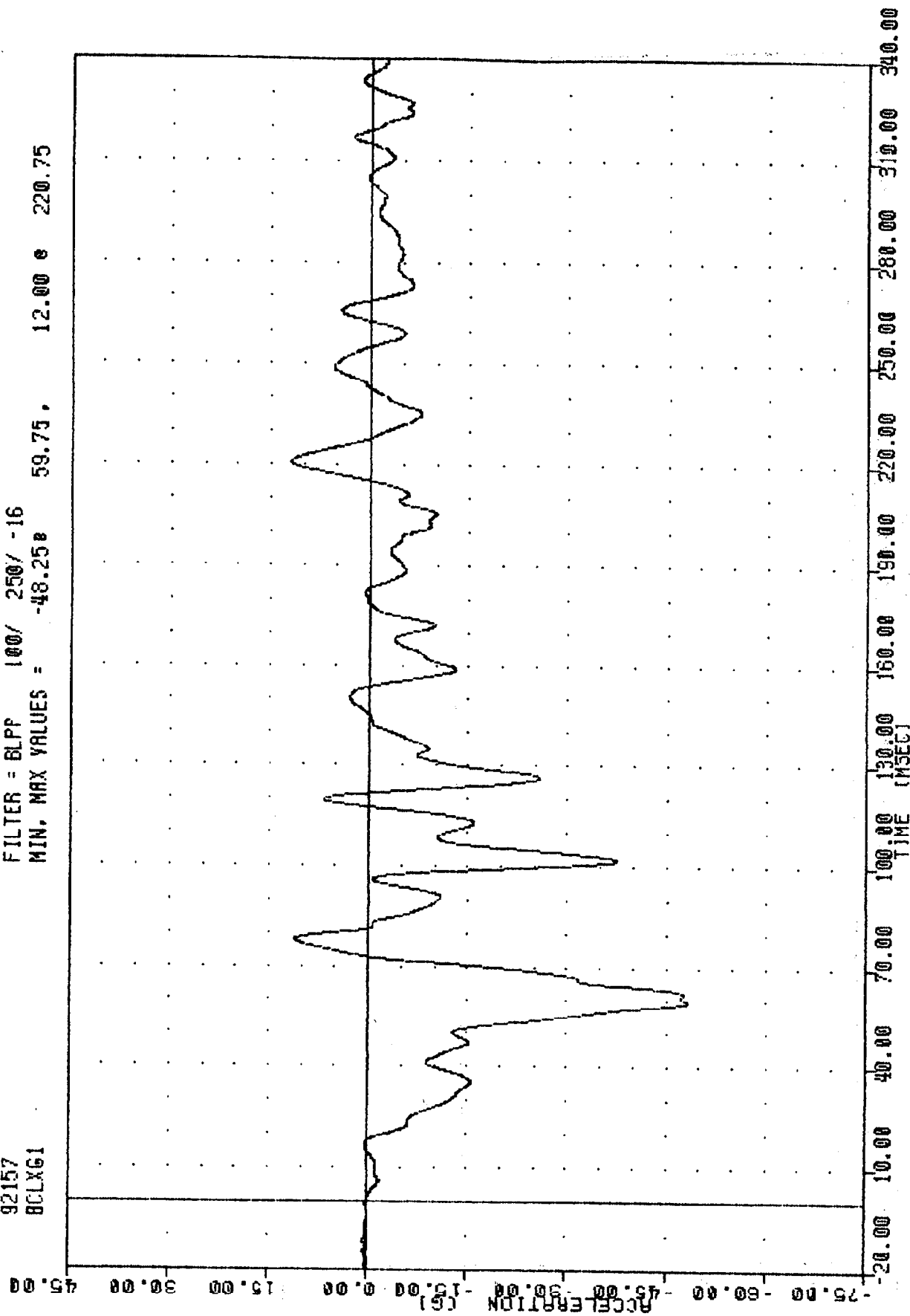
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -53.20 360.00 , 0.16 5.38



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
RIGHT BRAKE CALIPER X-AXIS VELOCITY

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
8CLX61

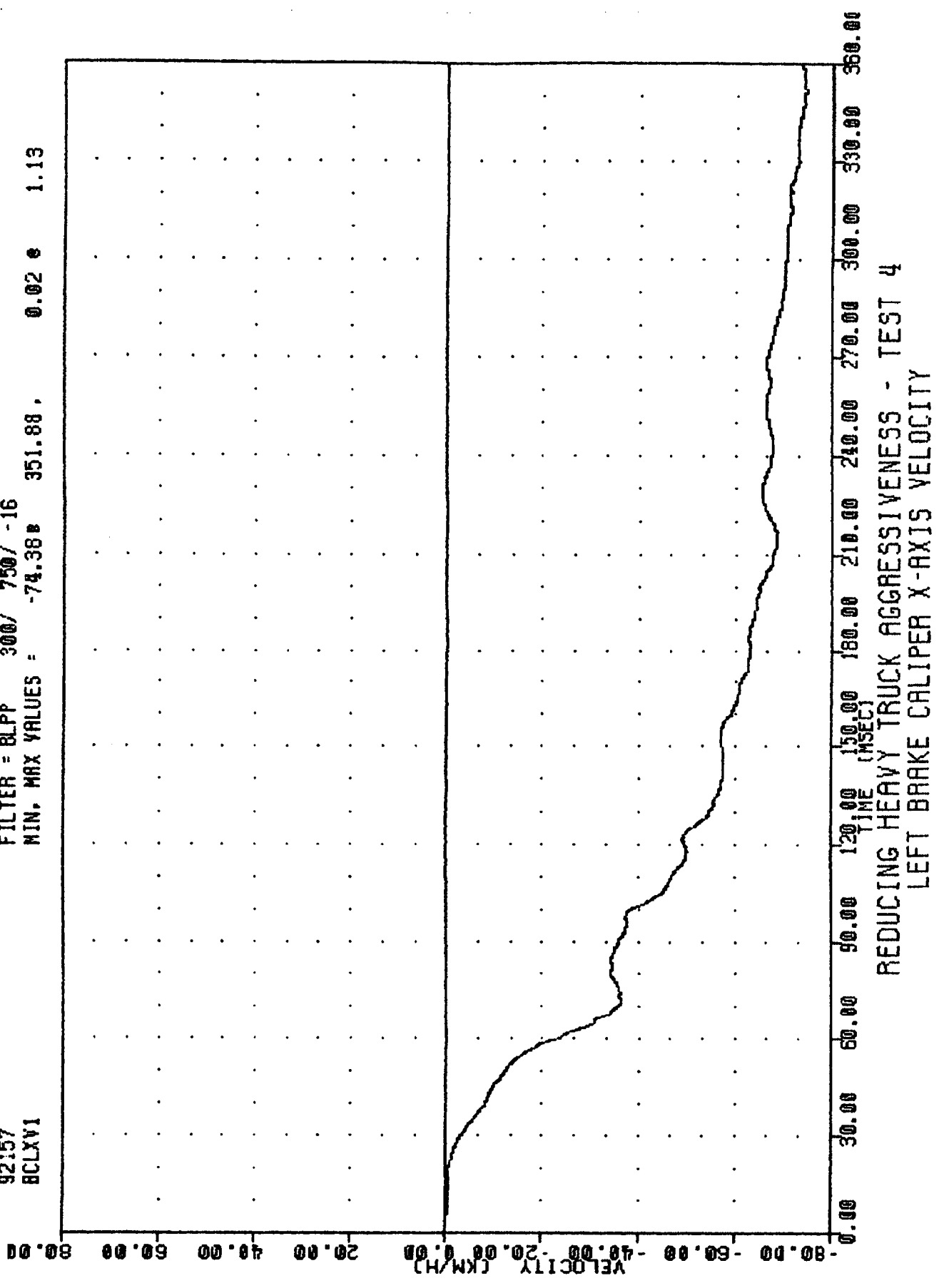
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -48.25e 59.75, 12.00 e 220.75



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
LEFT BRAKE CALIPER X-AXIS ACCELERATION

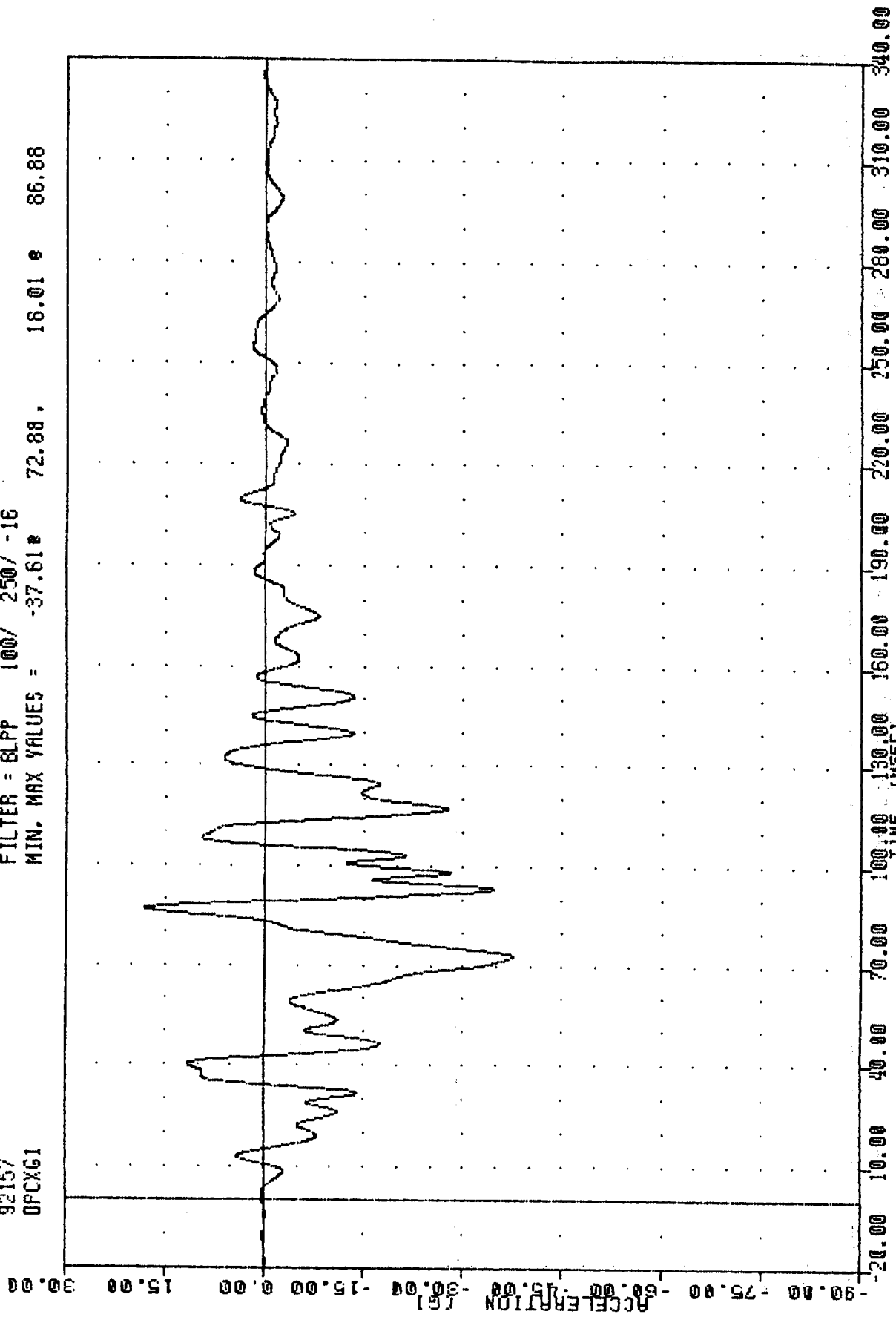
TRC , 920605
TRUCK INTO STATIONARY CAR
92157
BCLXV1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -74.38 351.88 0.02 1.13



TRC . 920605
TRUCK INTO STATIONARY CAR
92157
DPCXG1

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -37.61 72.88 18.01 86.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

TRC
TRUCK INTO STATIONARY CAR
92157
DPCXV1

, 920605

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES =

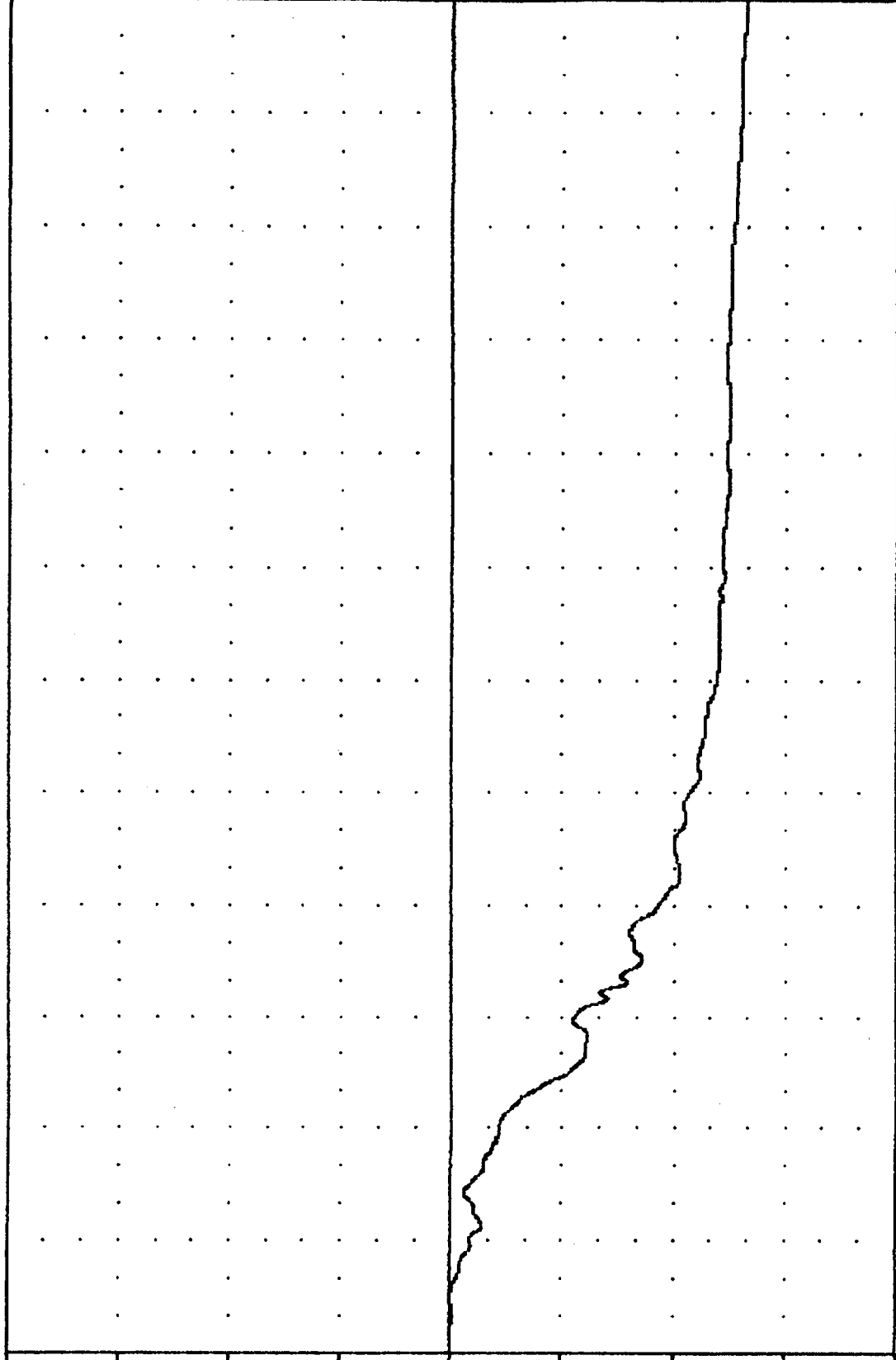
-52.87 360.00,

0.12 e

15.25

VELOCITY (KM/H)

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



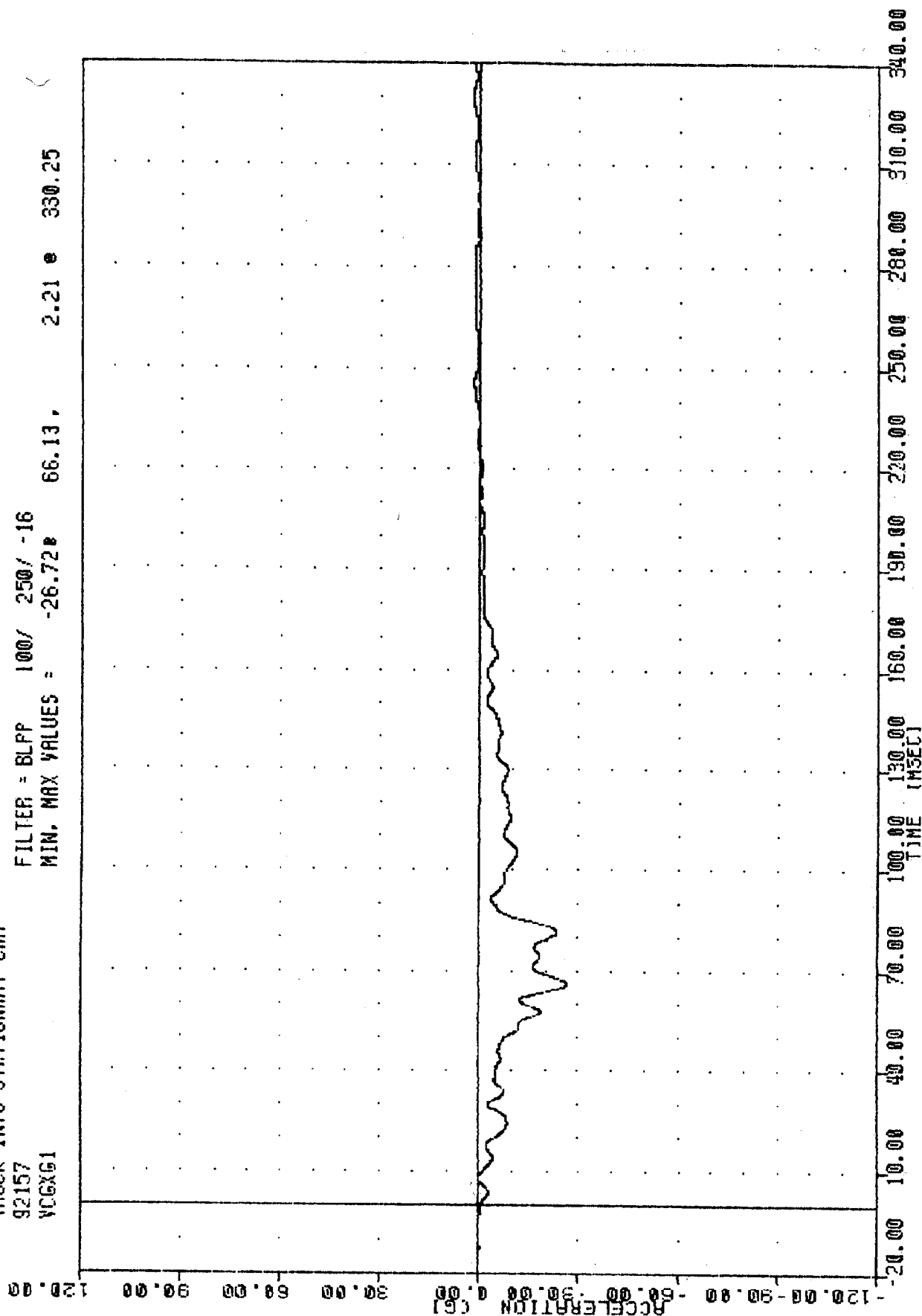
TIME (MSEC)

0.00 30.00 60.00 90.00 120.00 150.00 180.00 210.00 240.00 270.00 300.00 330.00 360.00

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
INSTRUMENT PANEL CENTER X-AXIS VELOCITY

TRC . 920605
TRUCK INTO STATIONARY CAR
92157
VCGXG1

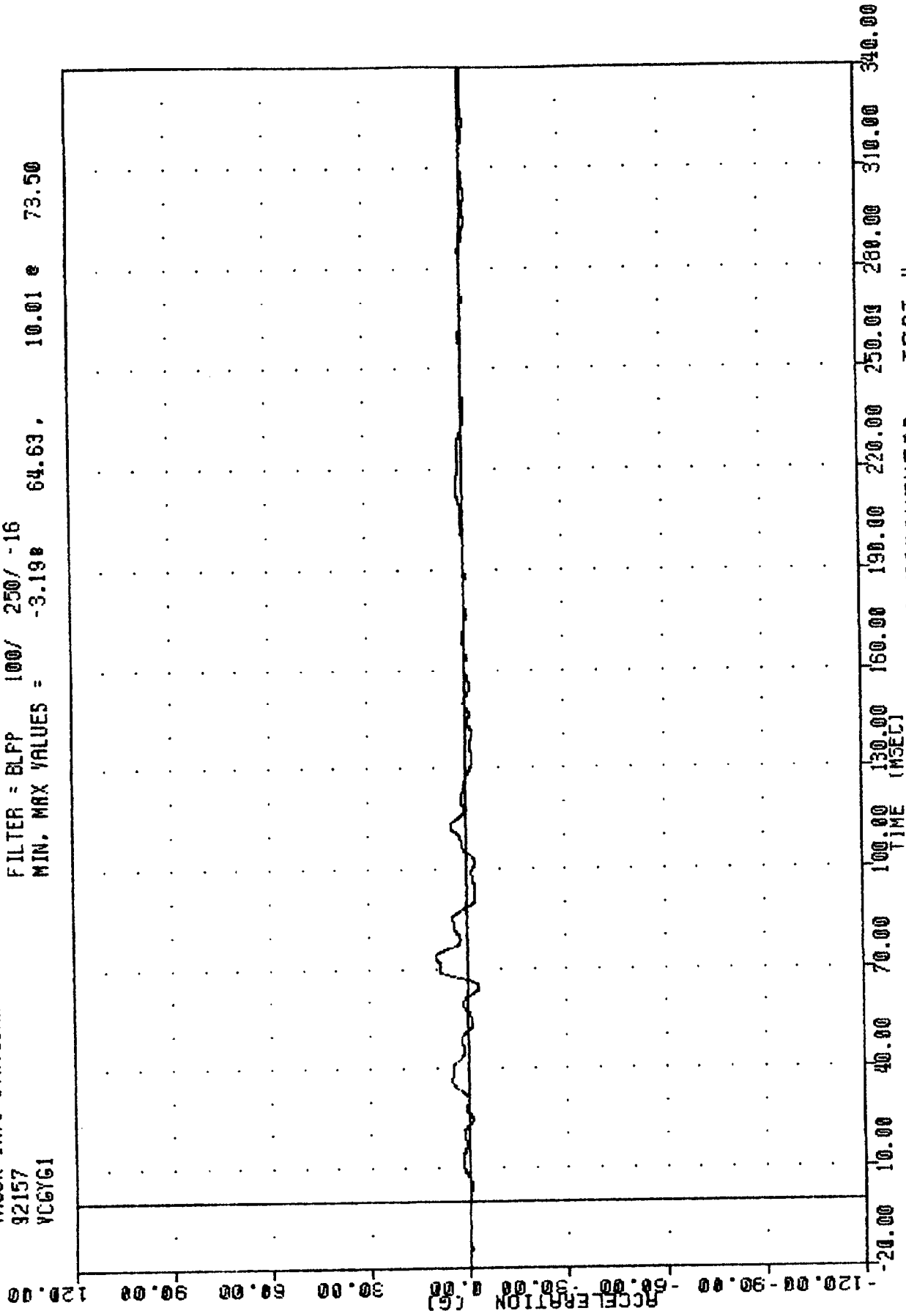
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -26.72 66.13, 2.21 e 330.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
CAR CENTER OF GRAVITY X-AXIS ACCELERATION

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
VCGYG1

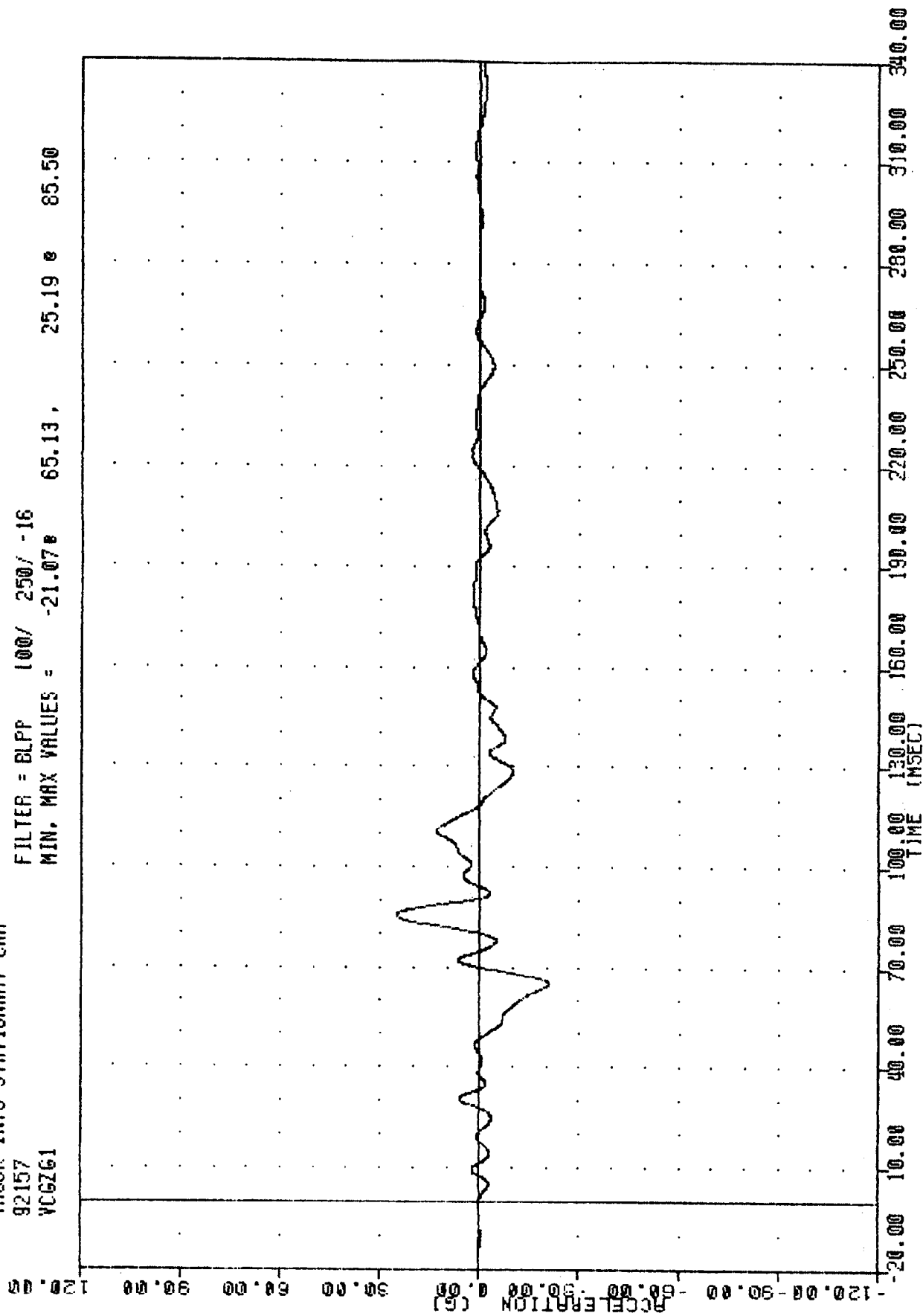
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -3.19e 64.63, 10.01 e 73.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
CAR CENTER OF GRAVITY Y-AXIS ACCELERATION

TRC 920505
TRUCK INTO STATIONARY CAR
92157
VCGZ61

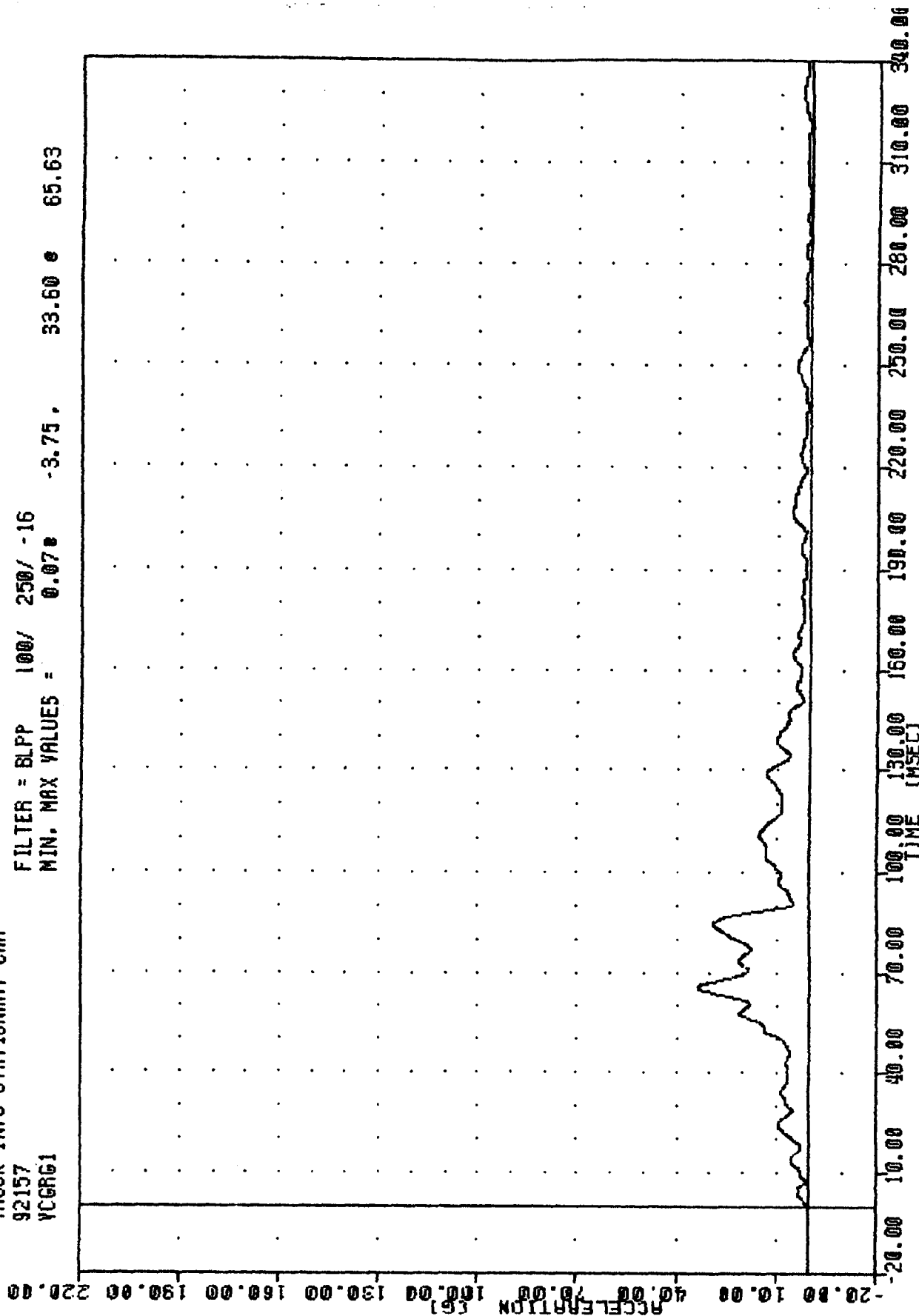
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -21.07 65.13 25.19 85.50



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
CAR CENTER OF GRAVITY Z-AXIS ACCELERATION

TRC , 920605
 TRUCK INTO STATIONARY CAR
 92157
 VCGRG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = 0.07 -3.75 33.60 65.63

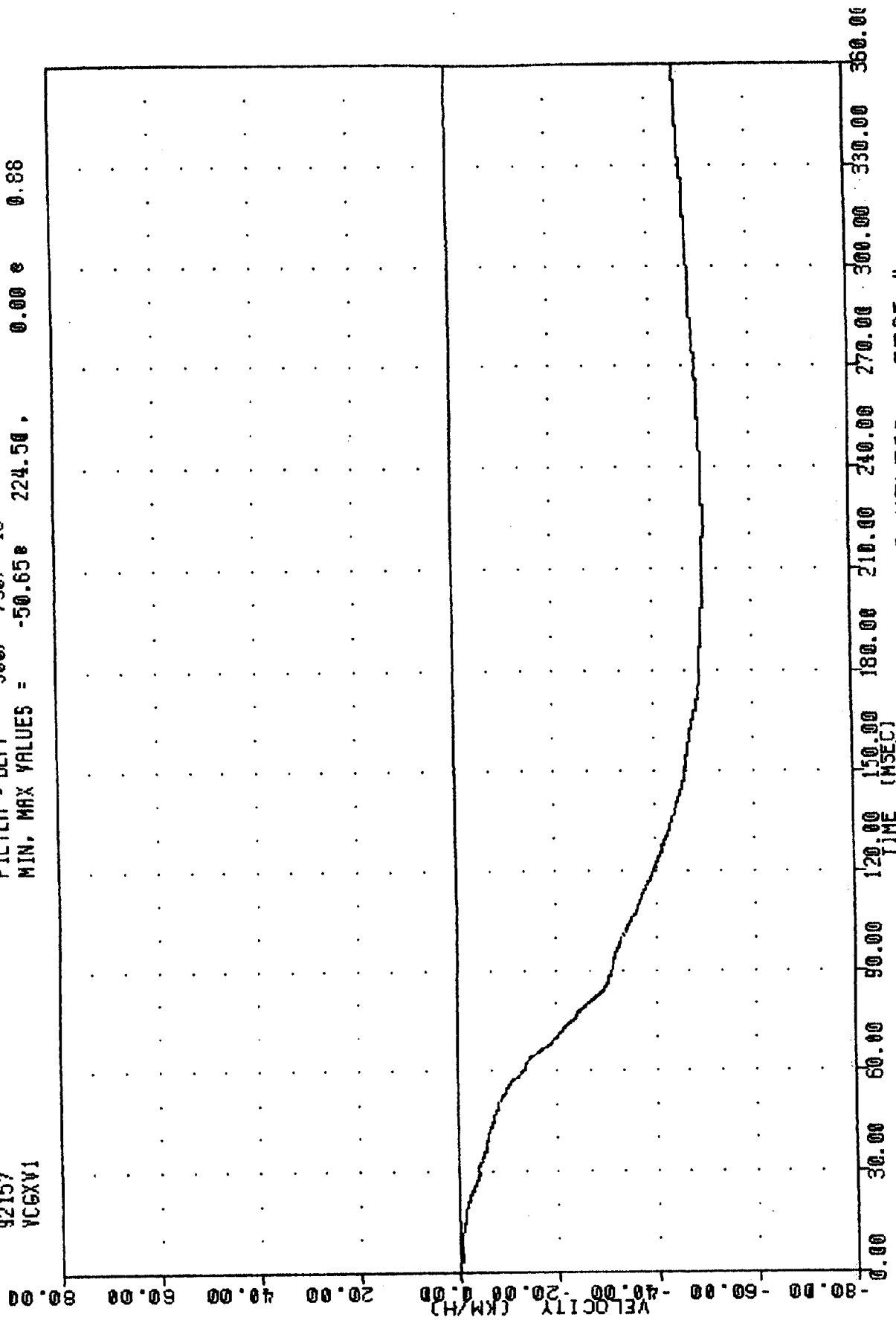


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 CAR CENTER OF GRAVITY RESULTANT ACCELERATION

TRC
TRUCK INTO STATIONARY CAR
92157
YCGXV1

920605

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -50.65 224.50 0.00 0.88



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
CAR CENTER OF GRAVITY X-AXIS VELOCITY

TRC
 TRUCK INTO STATIONARY CAR
 92157
 YC6YV1

FILTER = BLPF 300/ 750/ -16
 MIN, MAX VALUES = -0.06 5.88, 7.41 287.38

30.00

50.00

50.00

40.00

40.00

20.00

20.00

0.00

0.00

-20.00

-20.00

-40.00

-40.00

-60.00

-60.00

-80.00

-80.00

0.00

0.00

30.00

30.00

30.00

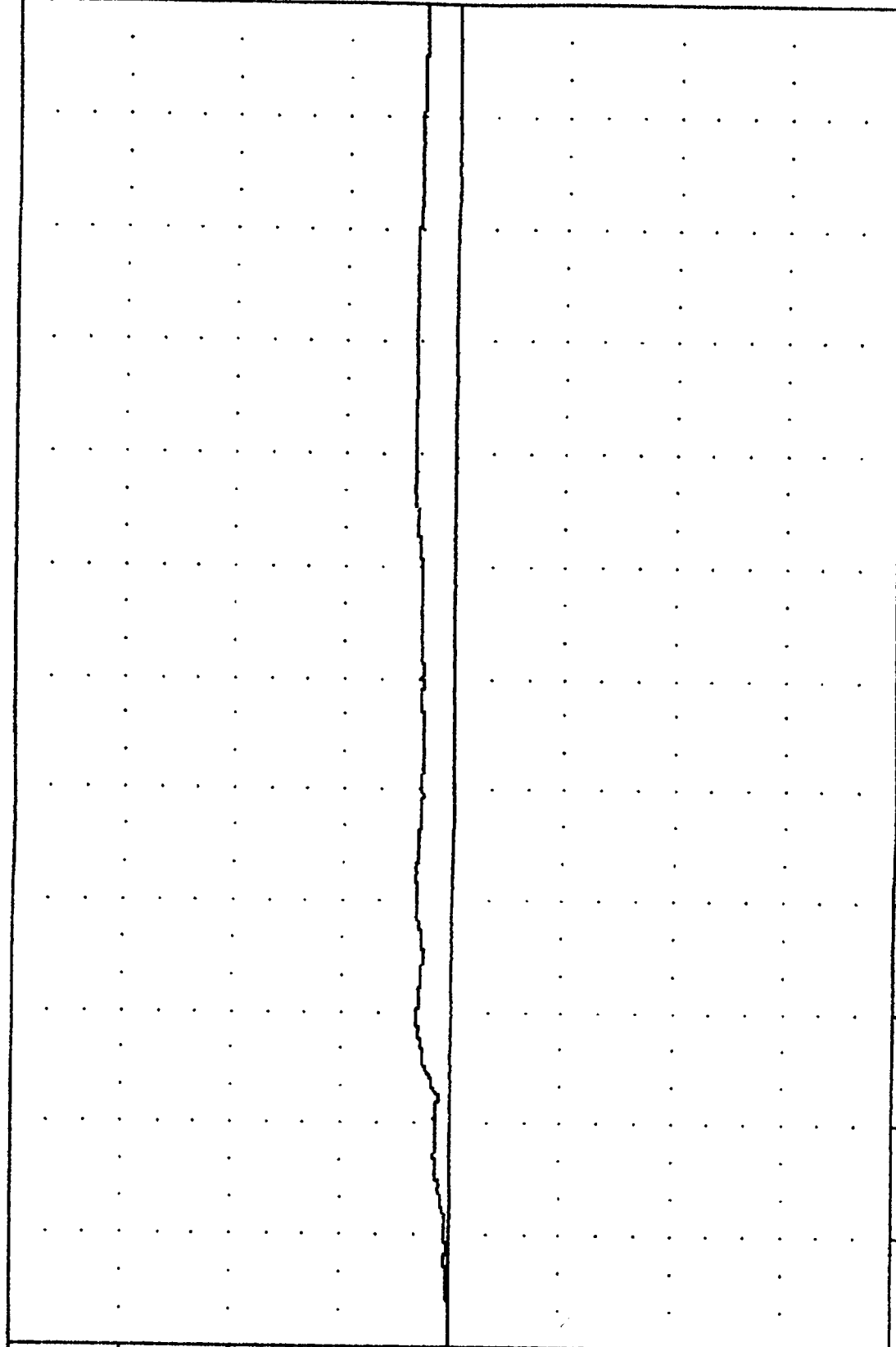
920605

TRUCK INTO STATIONARY CAR

92157

YC6YV1

FILTER = BLPF 300/ 750/ -16
 MIN, MAX VALUES = -0.06 5.88, 7.41 287.38



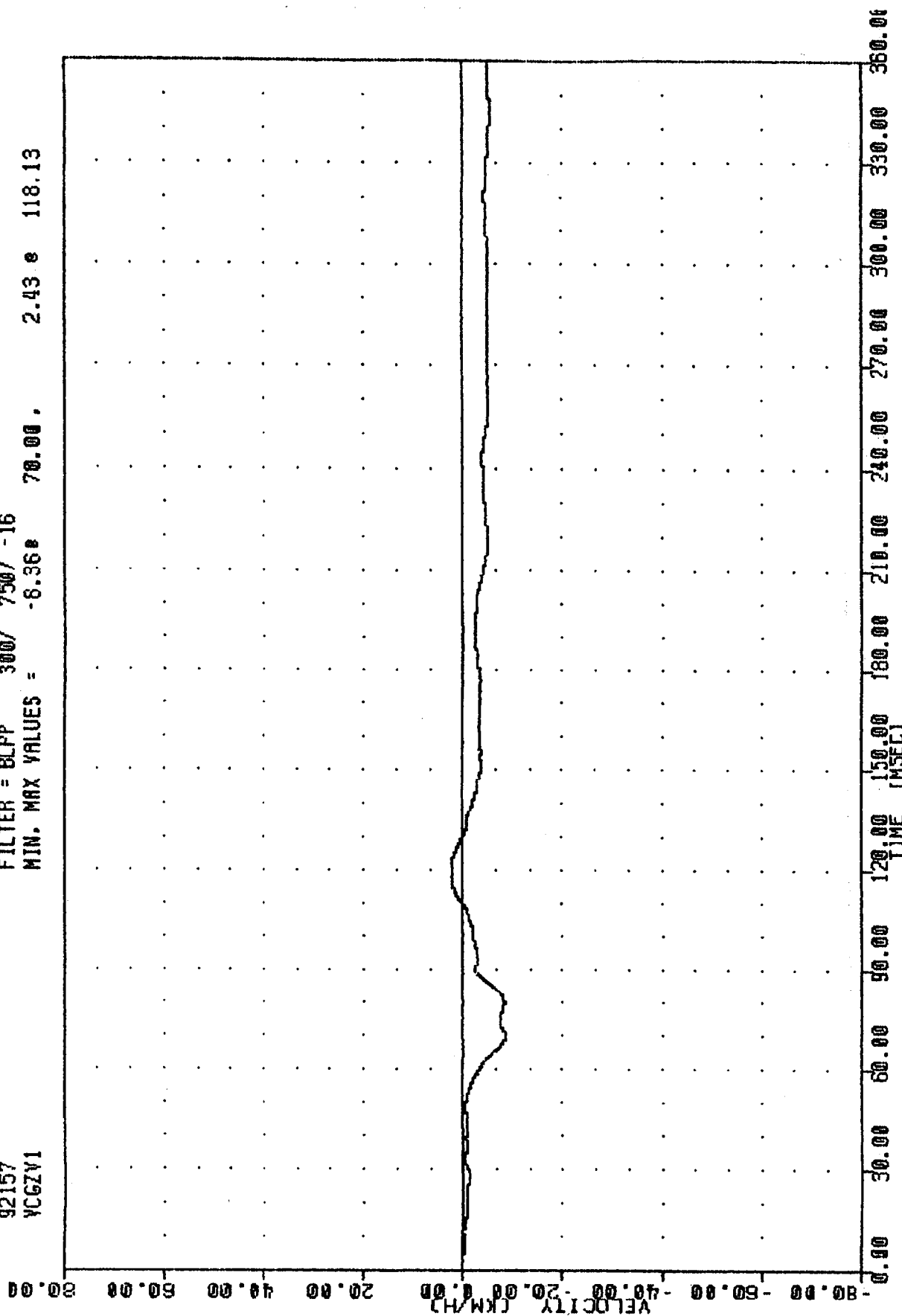
0.00 30.00 60.00 90.00 120.00 150.00 180.00 210.00 240.00 270.00 300.00 330.00 360.00

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 CAR CENTER OF GRAVITY Y-AXIS VELOCITY

TRC
TRUCK INTO STATIONARY CAR
92157
YCCZV1

, 920605

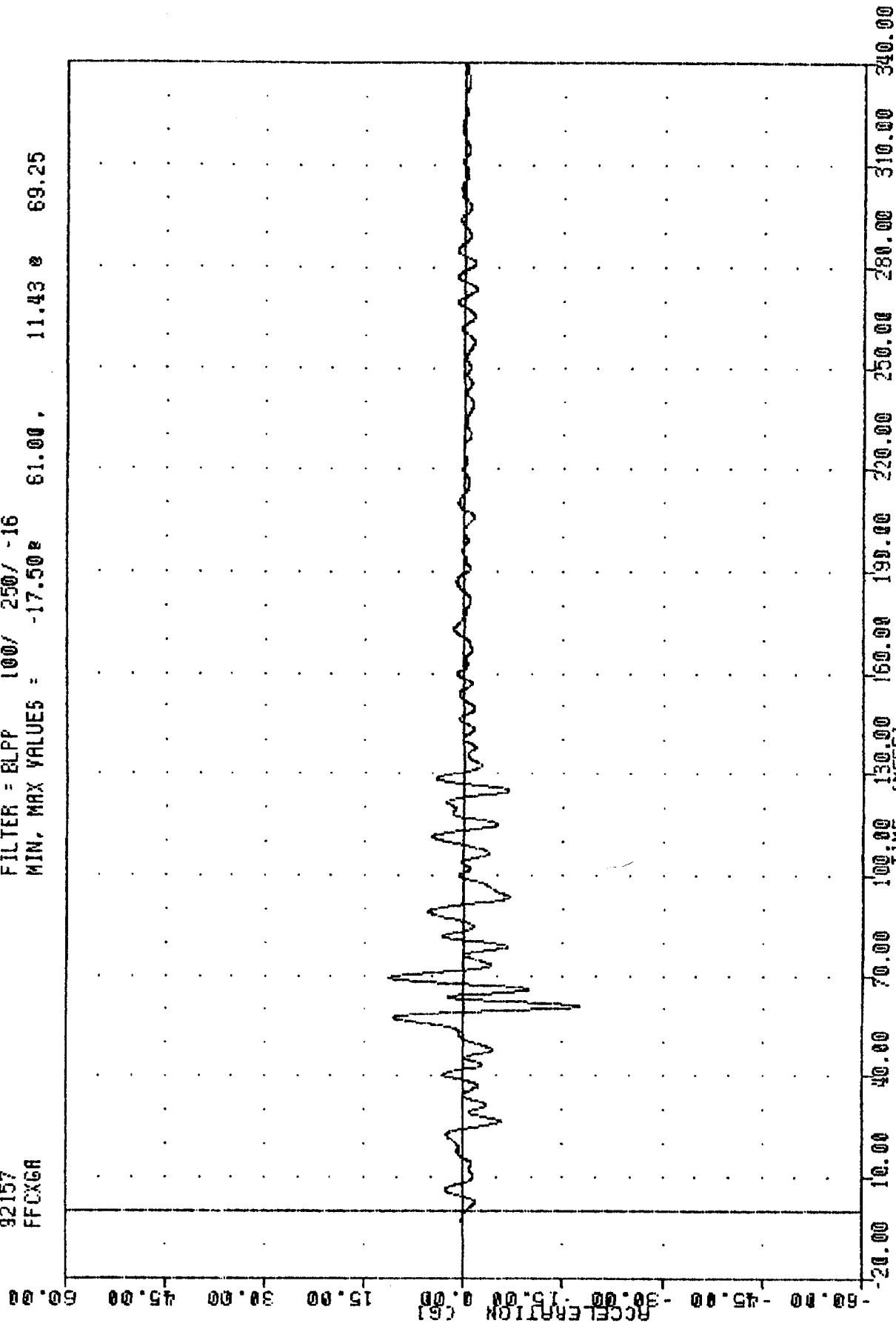
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -6.36 70.00, 2.43 e 118.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
CAR CENTER OF GRAVITY Z-AXIS VELOCITY

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
FFCXGA

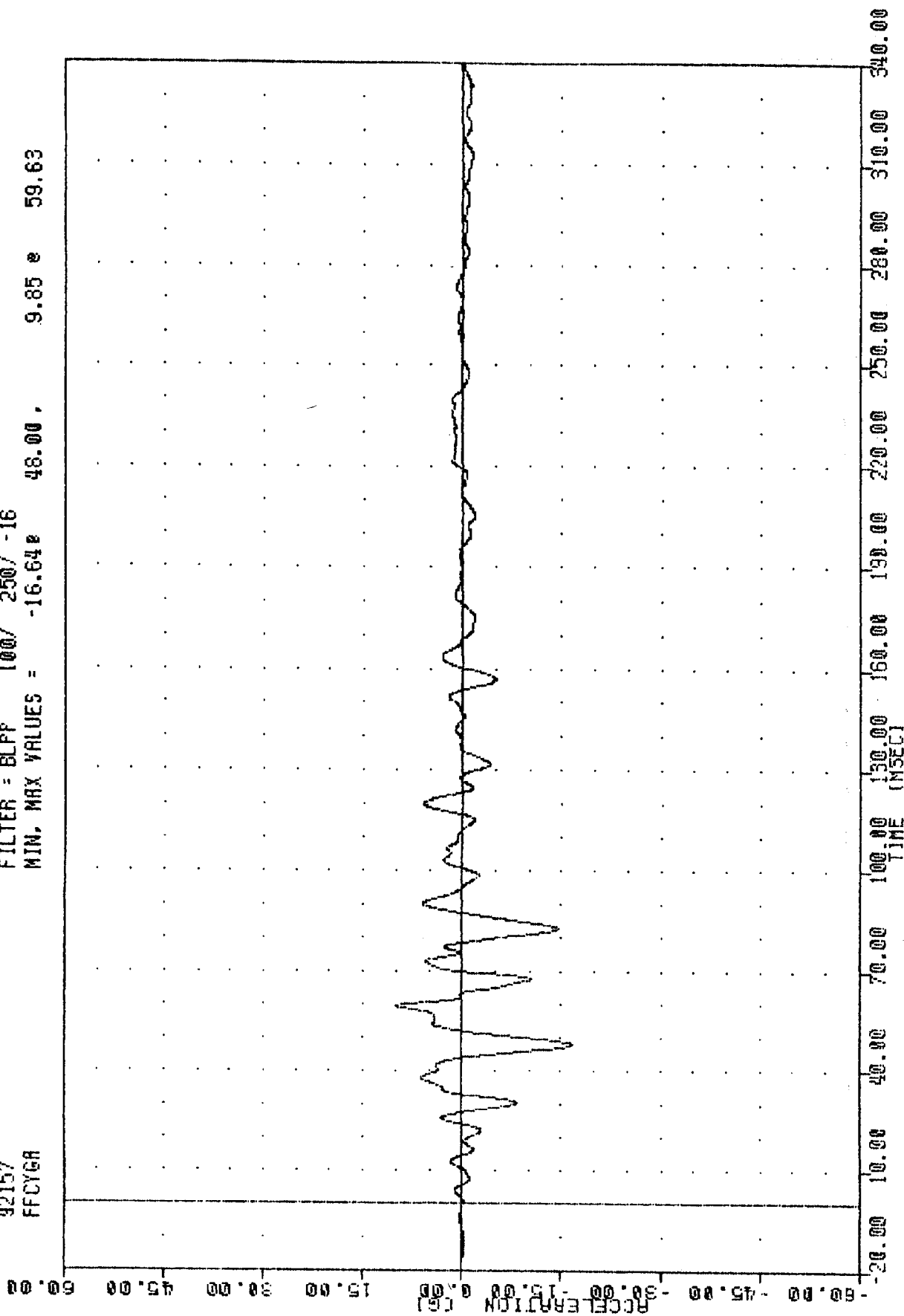
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -17.50 61.00, 11.43 69.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK FRONT FRAME CROSSMEMBER X-AXIS ACCELERATION

TRC . 920605
TRUCK INTO STATIONARY CAR
92157
FFCYGR

FILTER = BLPF 100/ 250/ -16
MIN. MAX VALUES = -16.64e 48.00 , 9.85 e 59.63

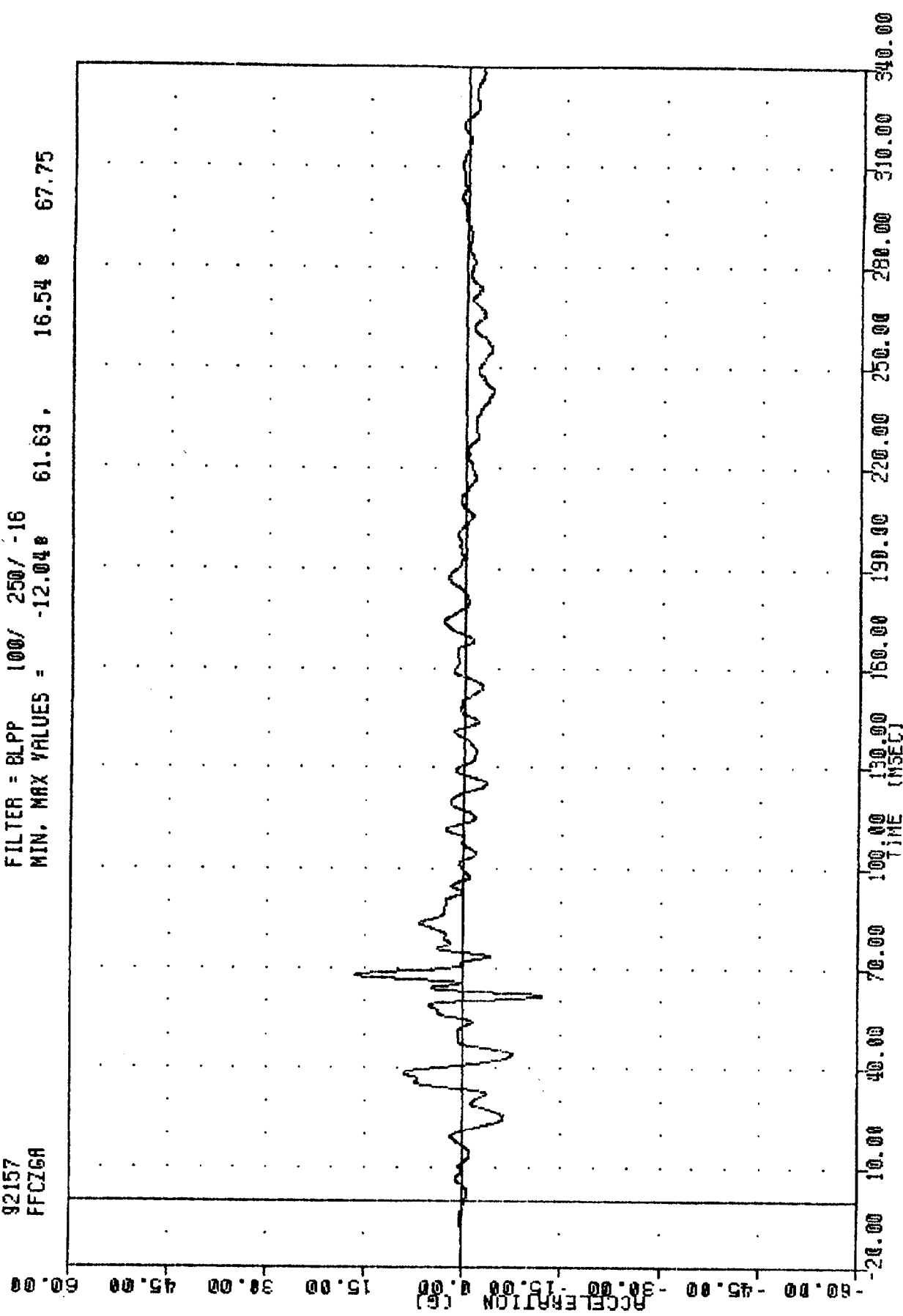


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS ACCELERATION

TRC
TRUCK INTO STATIONARY CAR
92157
FFCZ68

920005

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -12.04 61.63 16.54 67.75

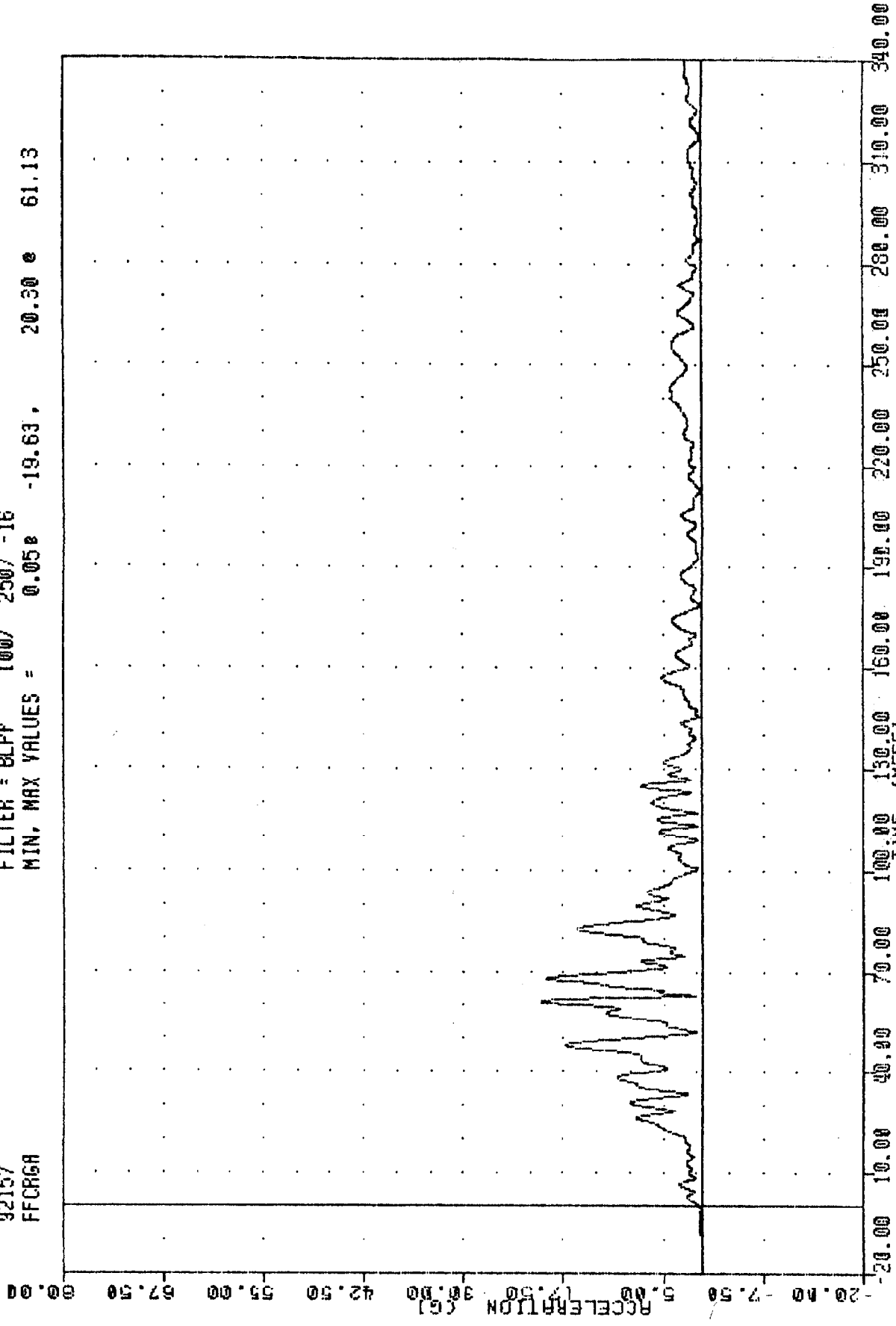


REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK FRONT FRAME CROSSMEMBER Z-AXIS ACCELERATION

TRC
TRUCK INTO STATIONARY CAR
92157
FFORGA

, 920605

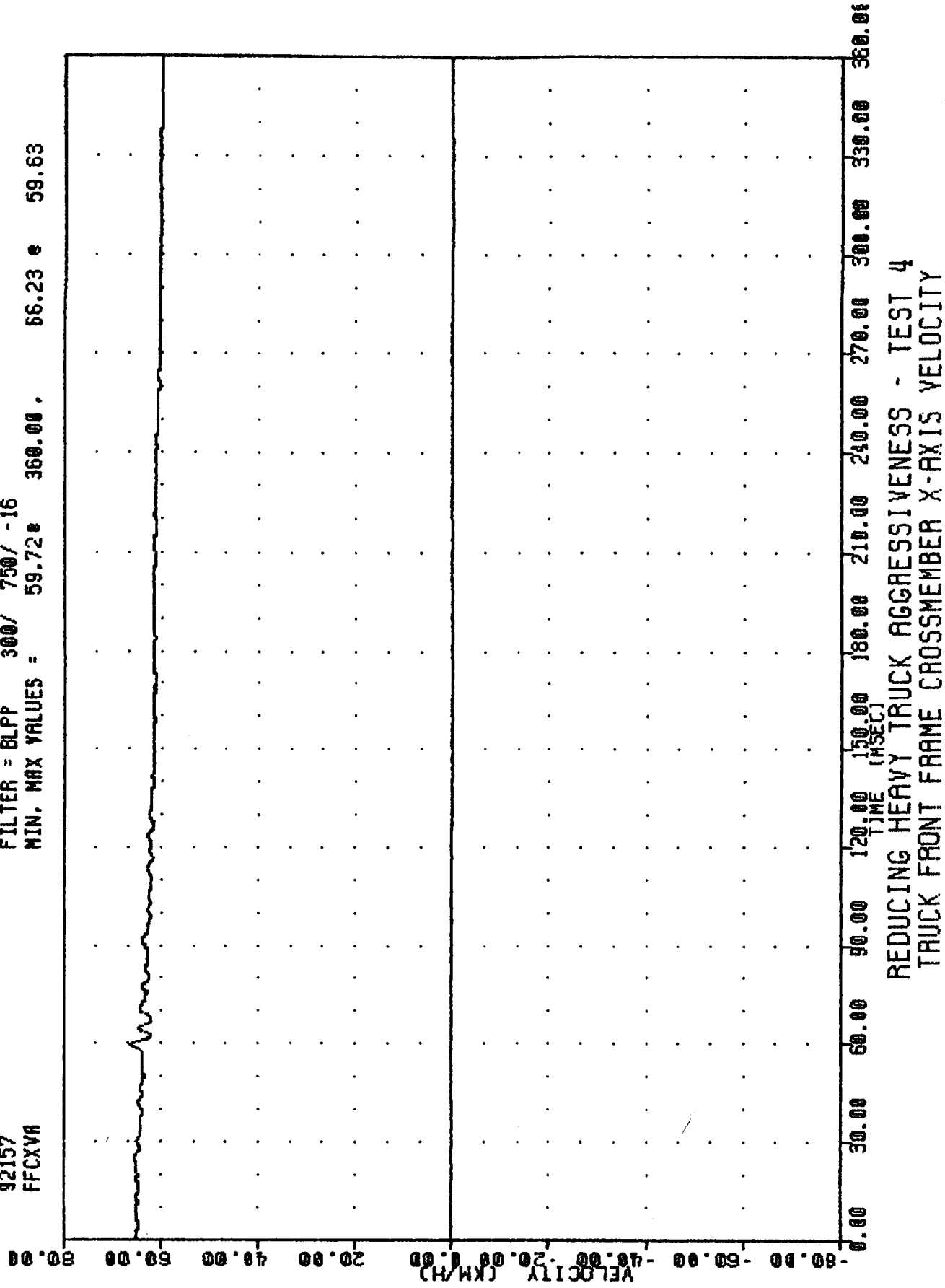
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.058 -19.63, 20.30 e 61.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK FRONT FRAME CROSSMEMBER RESULTANT ACCELERATION

TRC , 920605
TRUCK INTO STATIONARY CAR
92157
FFCXVA

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 59.72 360.00 , 56.23 e 59.63

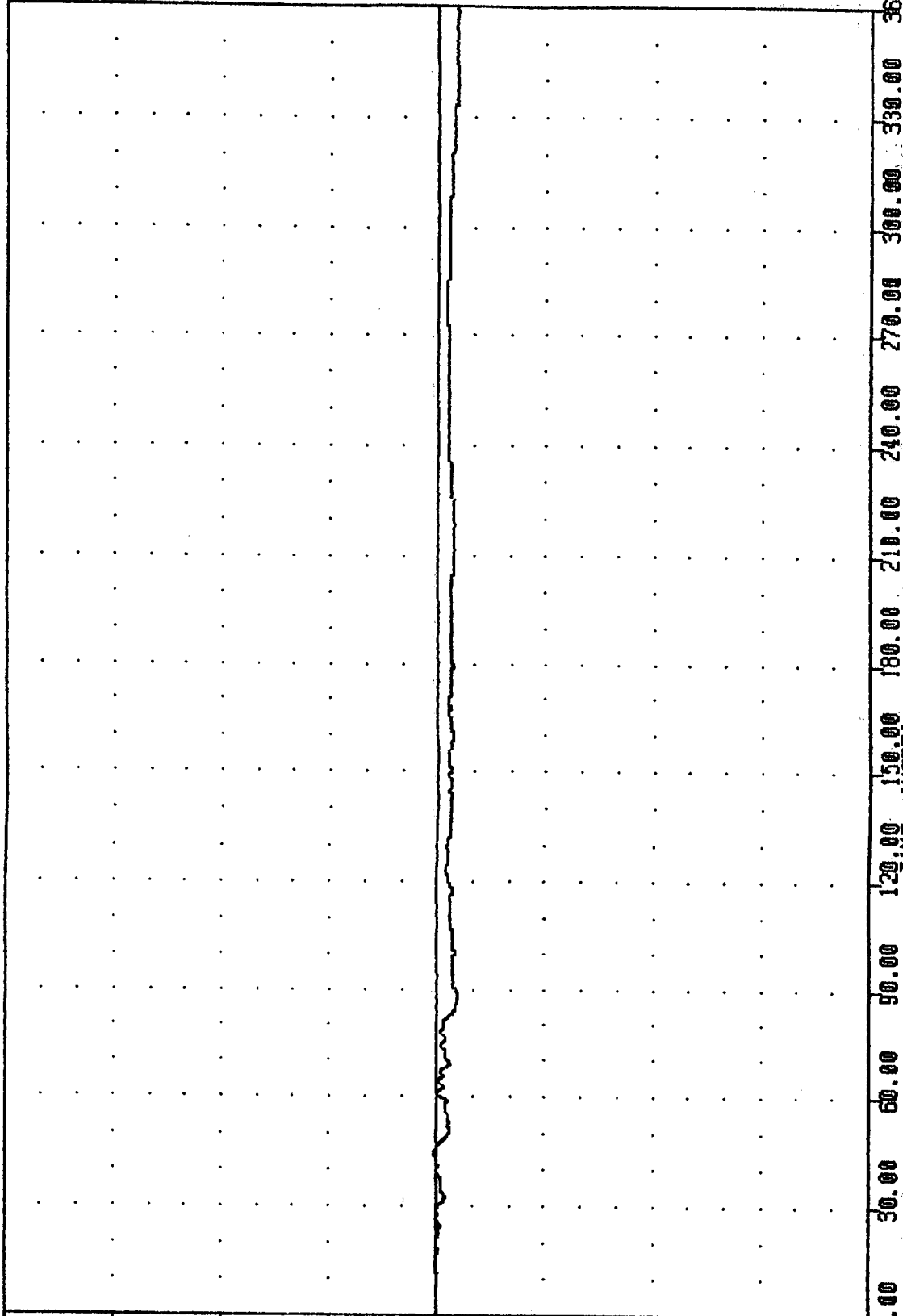


TRC
TRUCK INTO STATIONARY CAR
92157
FFCYV8

920605

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -3.64 88.50 , 0.45 44.38

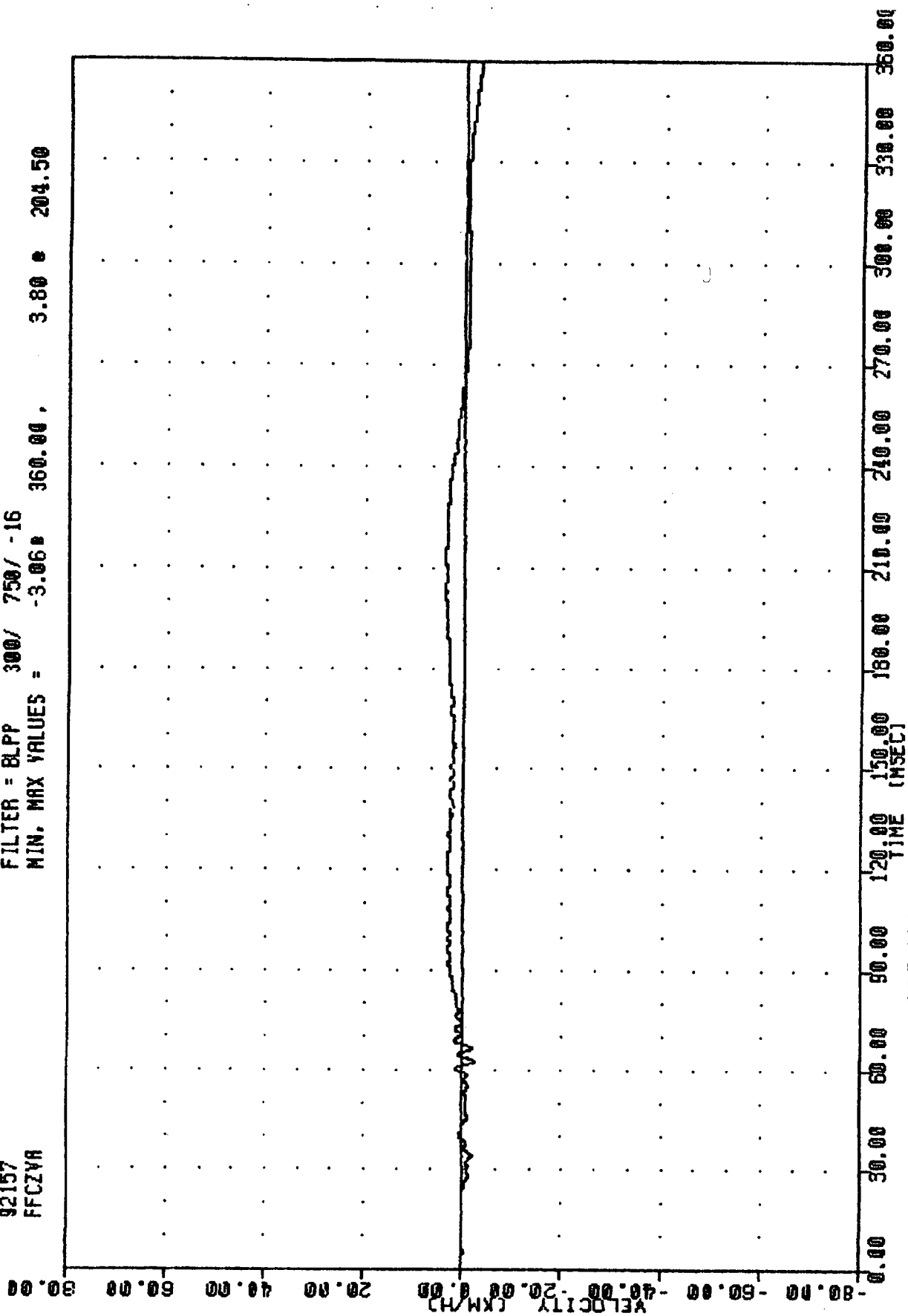
VELOCITY (KM/H)



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS VELOCITY

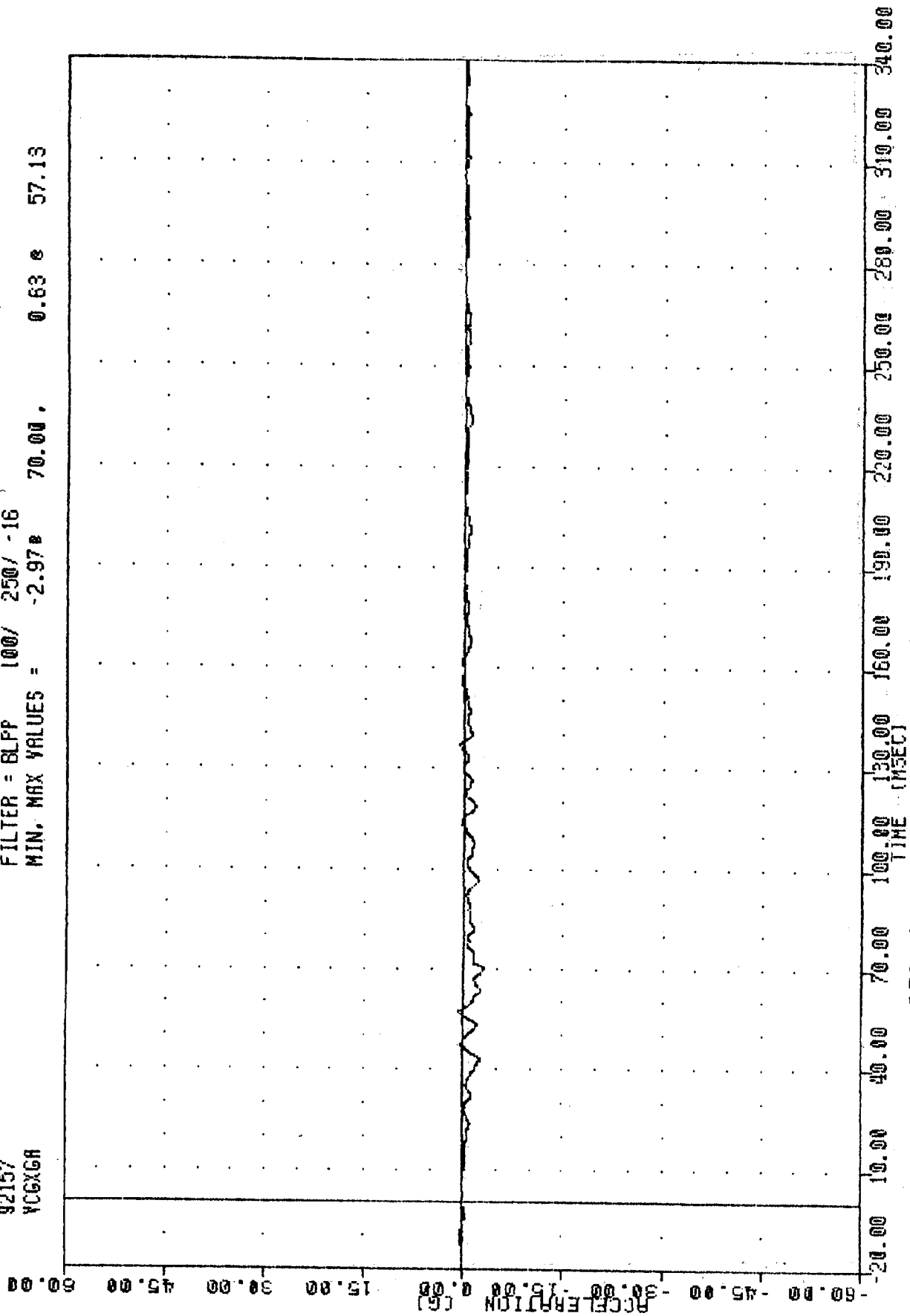
TRC , 920605
TRUCK INTO STATIONARY CAR
92157
FFCZVR

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -3.06 360.00 , 3.80 204.50



TRC , 920605
TRUCK INTO STATIONARY CAR
92157
VCGXGA

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -2.97 70.00, 0.63 57.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK CENTER OF GRAVITY X-AXIS ACCELERATION

TRC , 920605
TRUCK INTO STATIONARY CAR

92157

VCGYGA

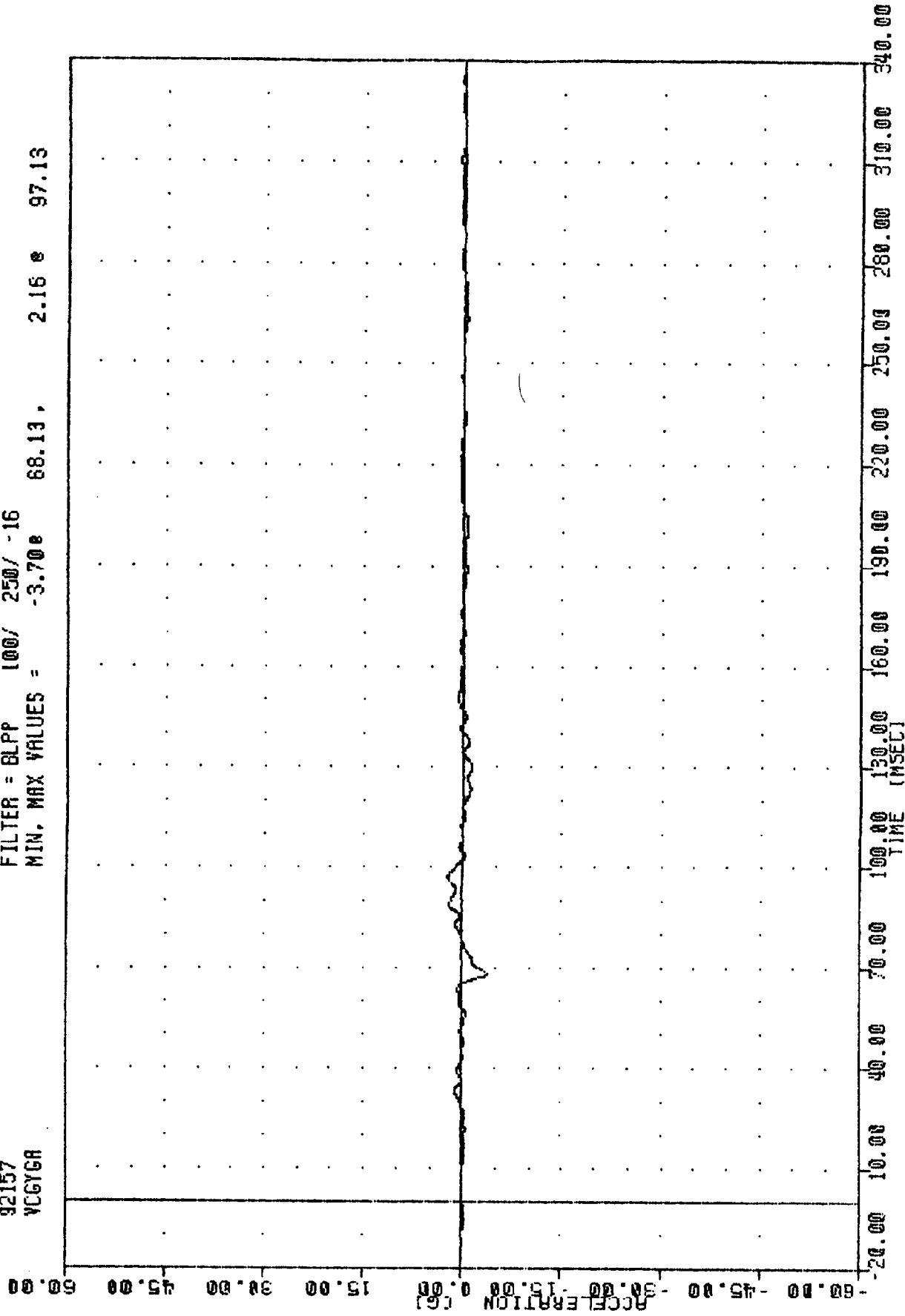
FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -3.70e

88.13,

2.16 e

97.13



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK CENTER OF GRAVITY Y-AXIS ACCELERATION

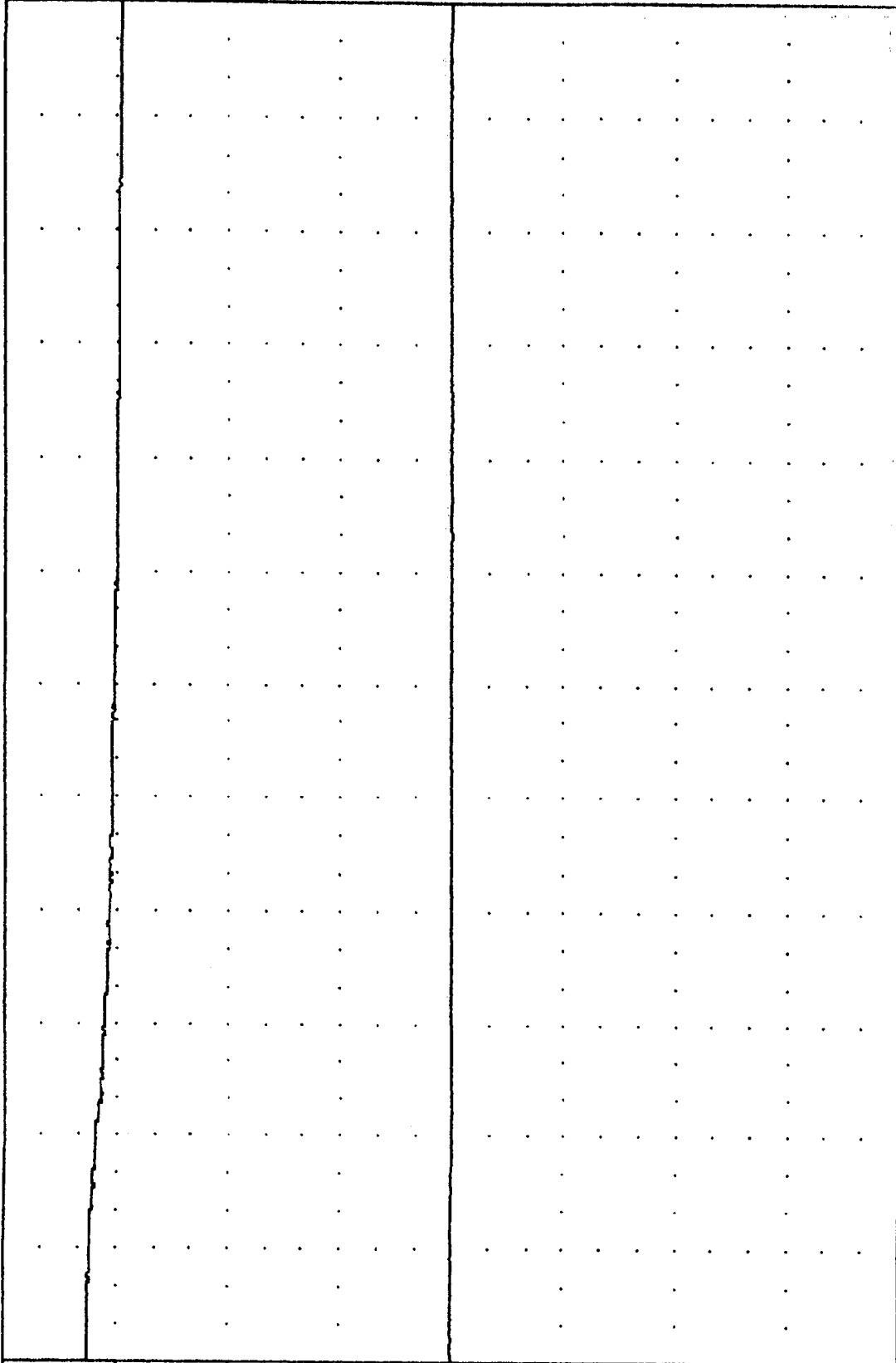
TRC
TRUCK INTO STATIONARY CAR
92157
VCGXVA

. 920605

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 58.97 357.63, 64.96 e 9.88

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

VELOCITY (KM/H)

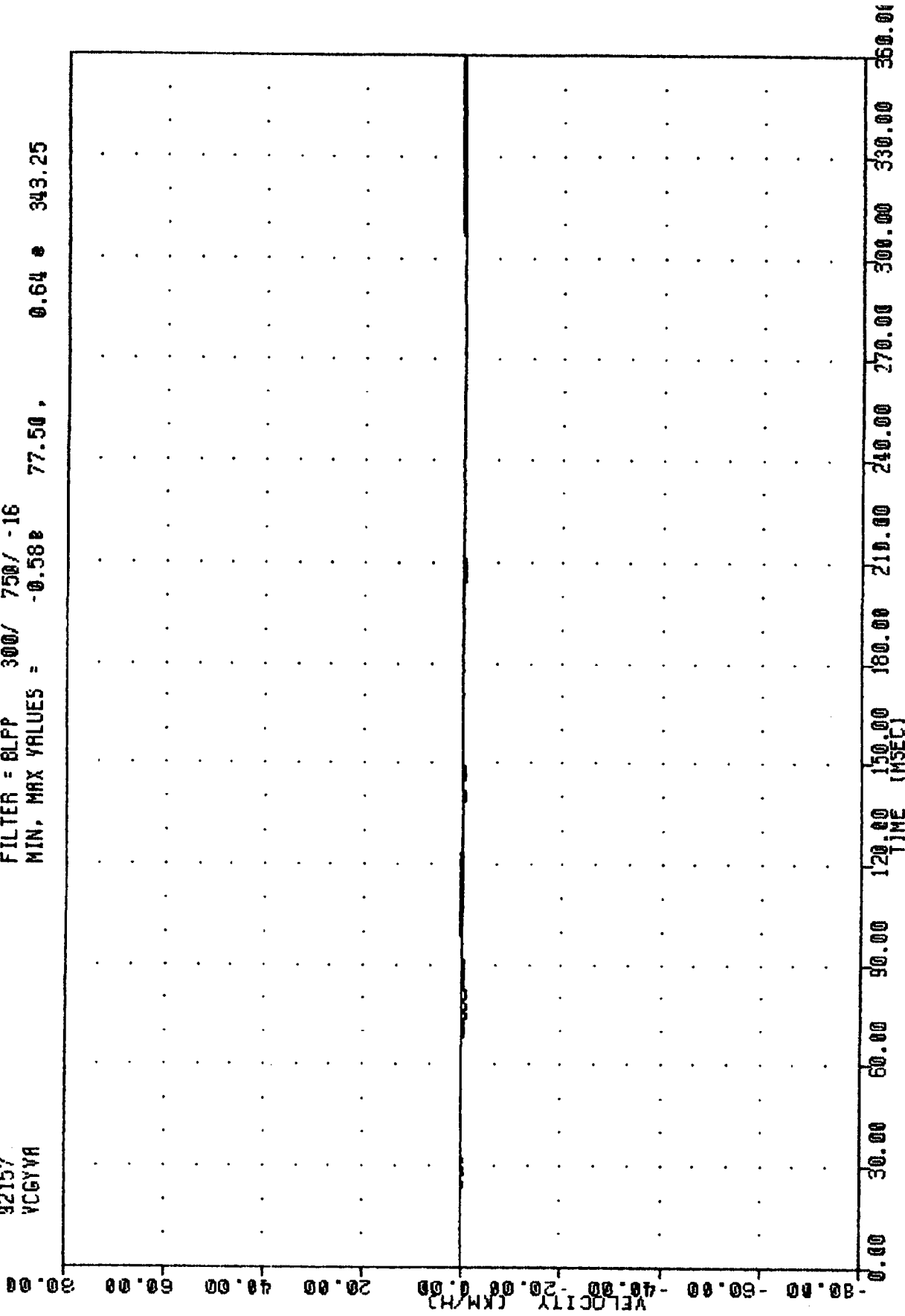


0.00 30.00 60.00 90.00 120.00 150.00 180.00 210.00 240.00 270.00 300.00 330.00 360.00

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
TRUCK CENTER OF GRAVITY X-AXIS VELOCITY

TRC , 920805
 TRUCK INTO STATIONARY CAR
 92157
 VCGYVA

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -0.58 0.64 343.25



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 4
 TRUCK CENTER OF GRAVITY Y-AXIS VELOCITY

APPENDIX C

DUMMY CERTIFICATION

TRANSPORTATION RESEARCH CENTER OF OHIO
HYBRID III EXTERNAL DIMENSIONS
04B HUMANIOD

02-JUN-92

TRC 48C2ED1 572E SN048 EXT. DIMENSION CAL02

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
TEMPERATURE			21.1 DEG. C
RELATIVE HUMIDITY			51.0 %
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429- 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226- 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970-1001 MM	986. MM
WAIST CIRCUMFERENCE (Z)		836- 866 MM	851. MM
CHEST DEPTH (O)		213- 229 MM	218. MM
H-POINT HEIGHT (C)		84- 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135- 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41- 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879- 889 MM	884. MM
THIGH CLEARANCE (F)		140- 155 MM	155. MM
BUTTOCK KNEE LENGTH (K)		579- 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH (N)		452- 478 MM	470. MM
POPLITEAL HEIGHT (L)		429- 455 MM	432. MM
KNEE PIVOT HEIGHT (M)		485- 500 MM	493. MM
FOOT LENGTH (P)		252- 267 MM	259. MM
FOOT BREADTH (W)		91- 107 MM	99. MM
SHOULDER PIVOT FROM BACKLINE (E)		84- 94 MM	91. MM
SHOULDER BREADTH (V)		422- 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506- 521 MM	511. MM
ELBOW REST HEIGHT (J)		191- 211 MM	202. MM
SHOULDER-ELBOW LENGTH (I)		330- 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290- 305 MM	295. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN

[Signature]

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III

01-JUN-92

TRC

48C2HD1

572E SN48 HEAD DROP CAL 02

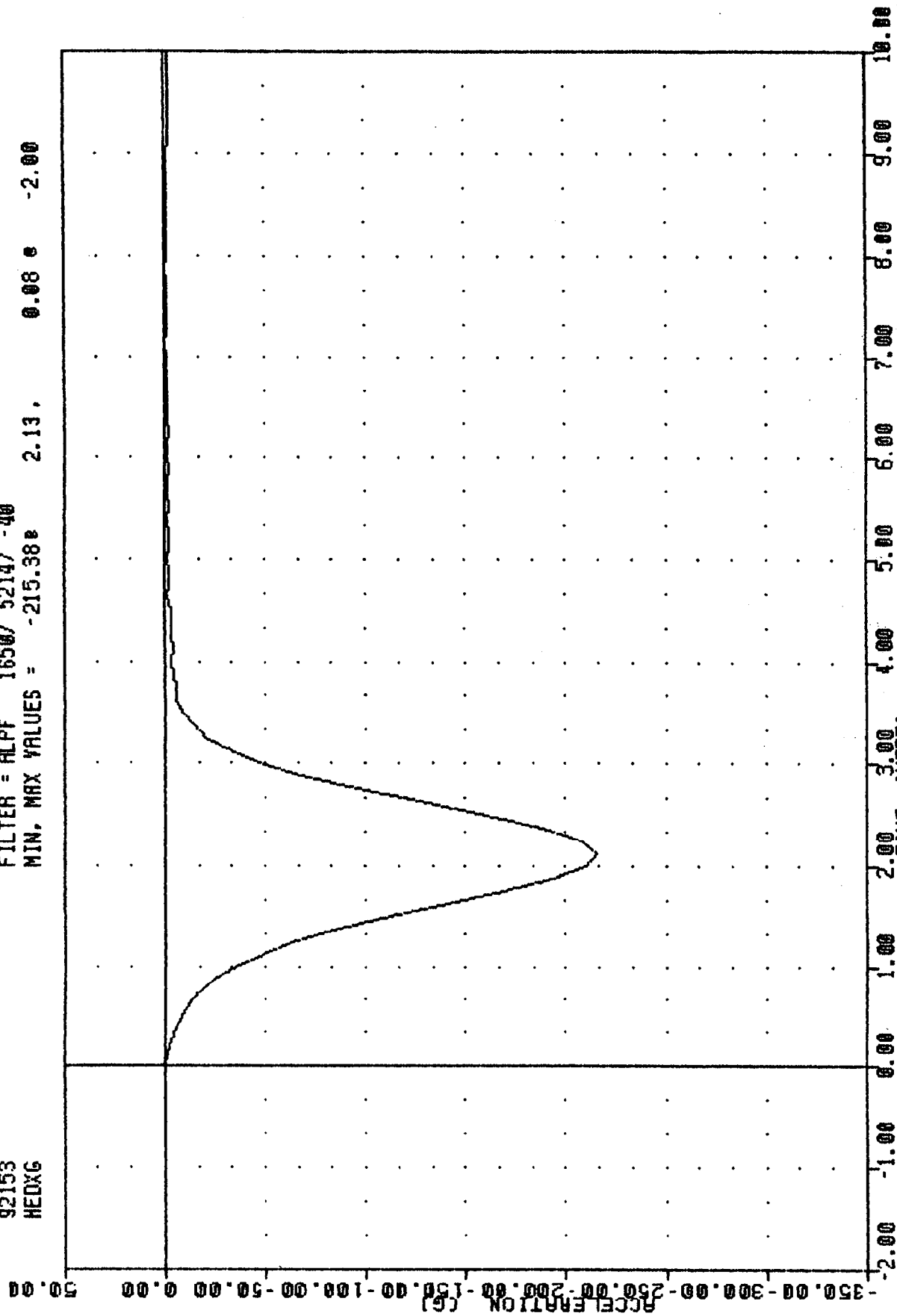
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	246.99 G
PEAK LATERAL ACCELERATION	15 G MAX	-4.49 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN *Rita F. J.*

TRC , 48C2HD1
572E SN48 HEAD DROP CAL 02
92153
HEDXG

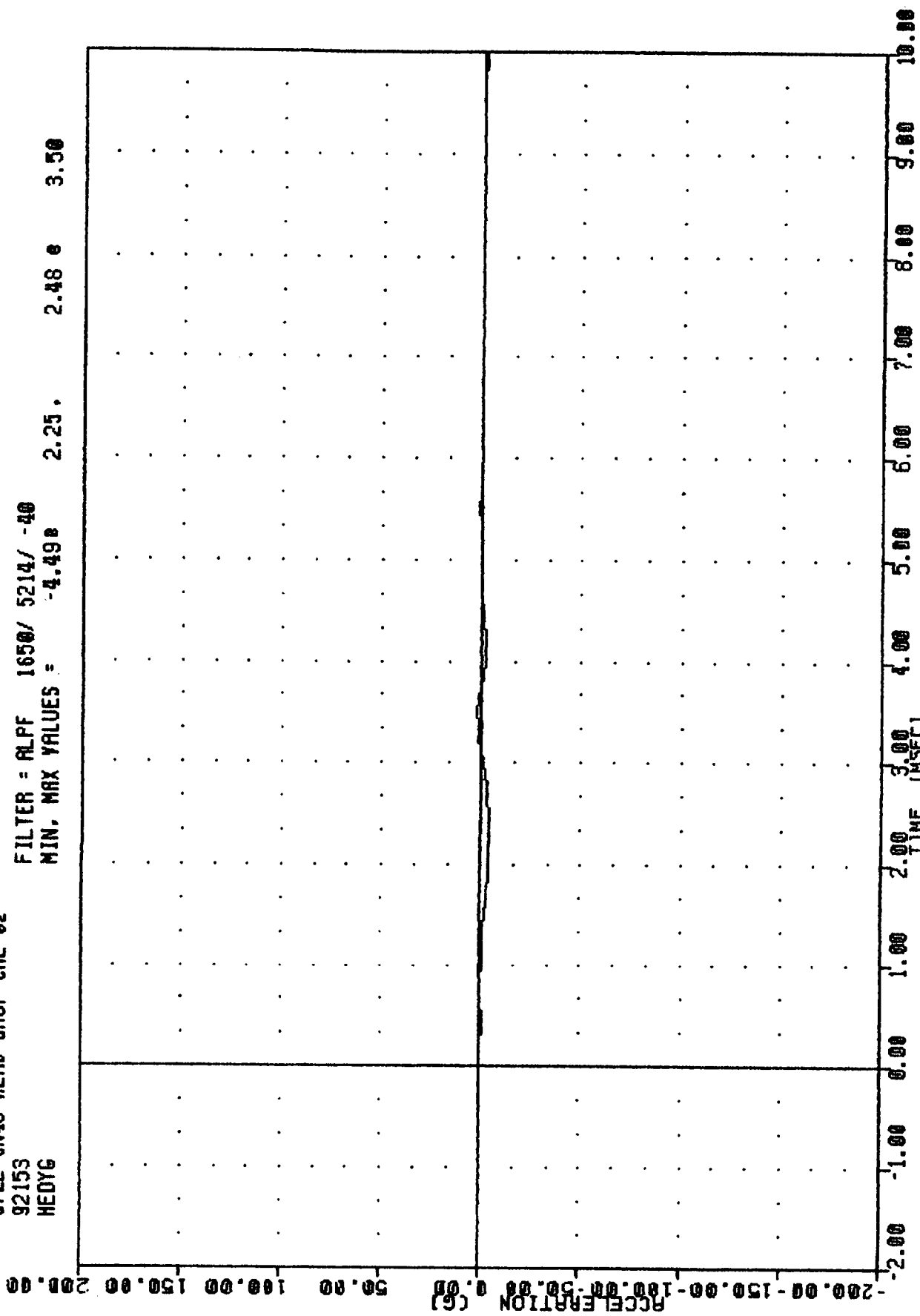
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -215.38 2.13, 0.08 -2.00



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

TRC , 48C2HD1
 572E SN48 HEAD DROP CAL 02
 92153
 MEDYG

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -4.498 2.25 2.48 3.50

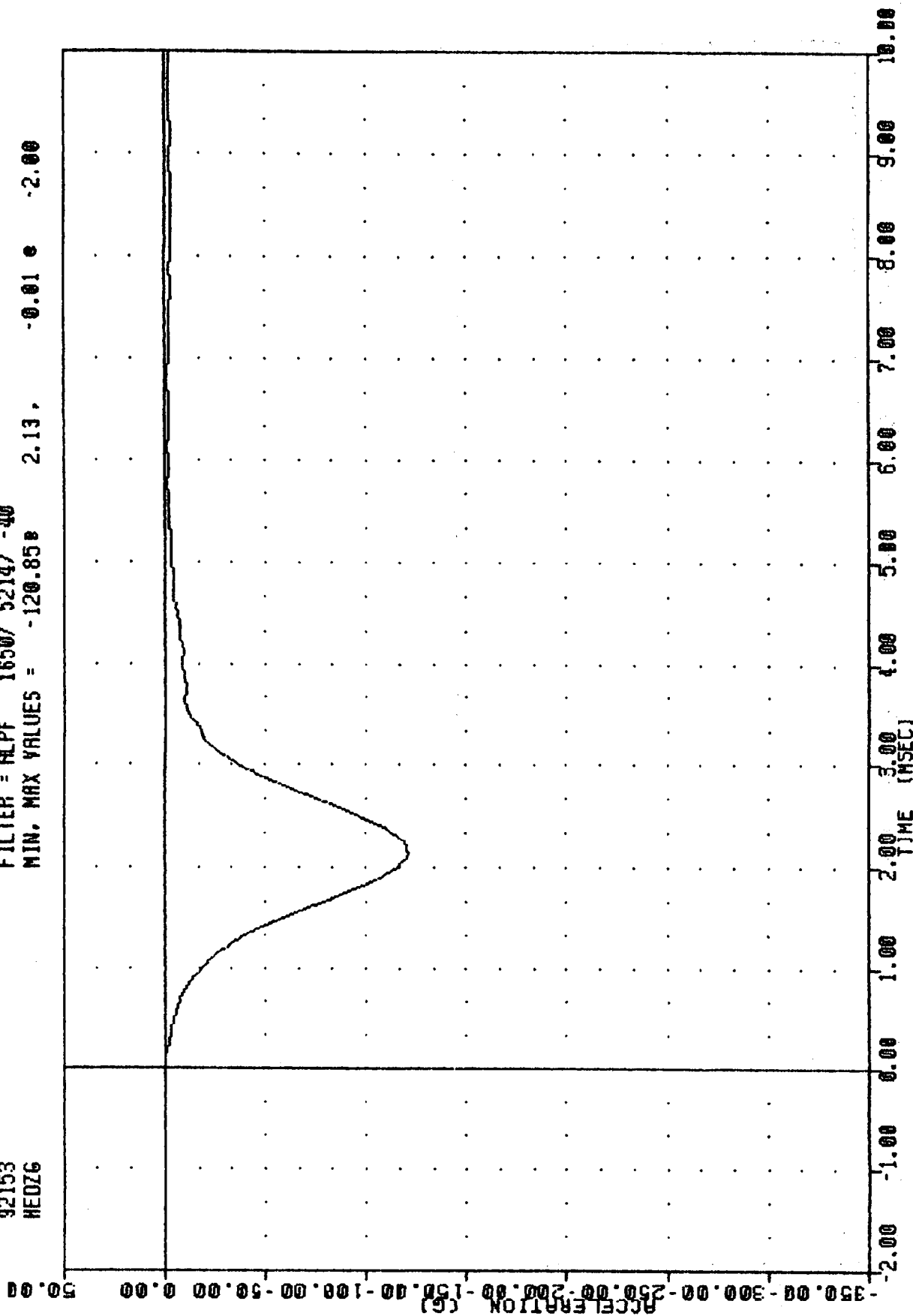


PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION Y AXIS

TRC
572E SN48 HEAD DROP CAL 02
92153
MED26

, 48C2HD1

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -120.85 2.13, -0.01 e -2.00

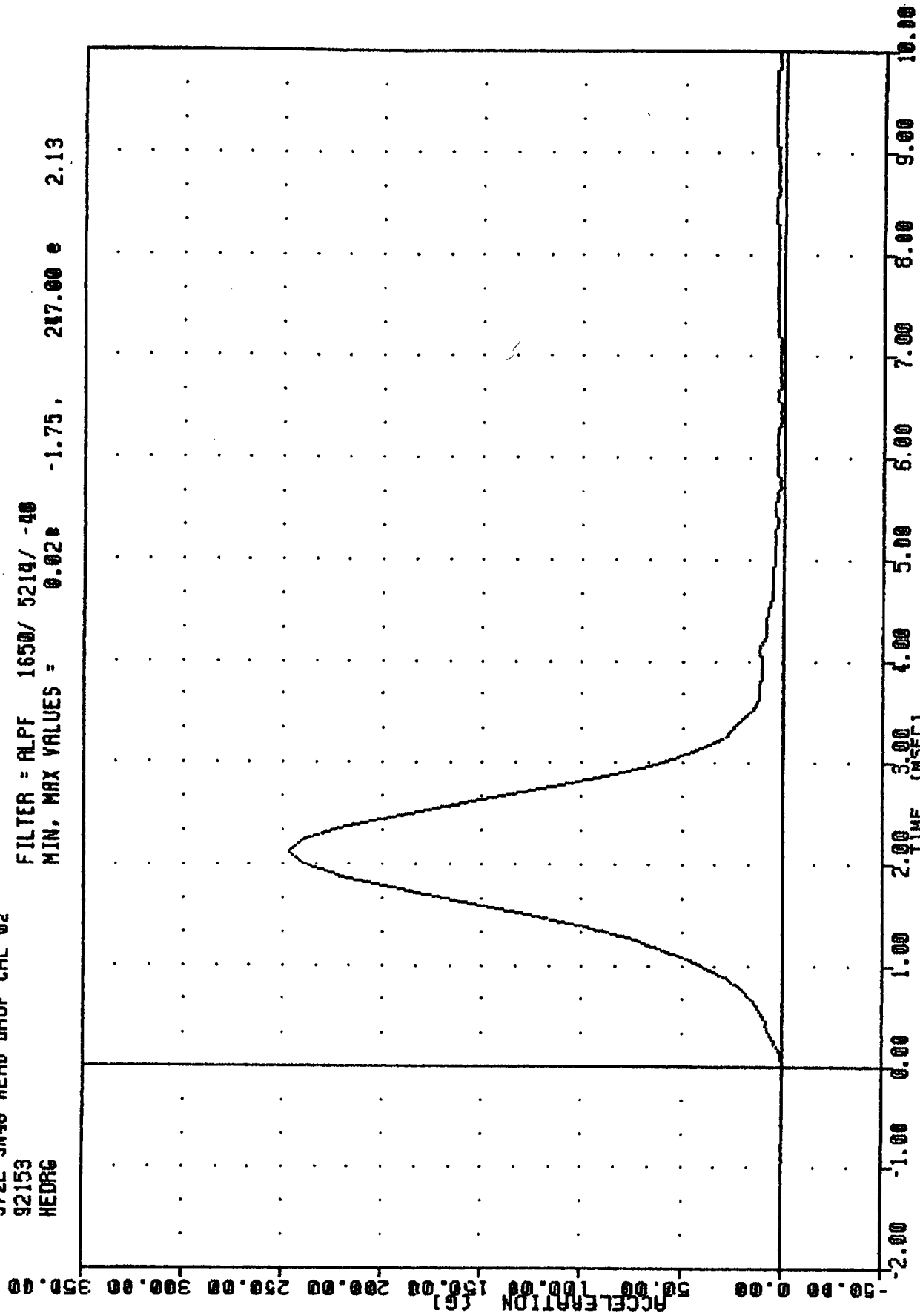


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS

TRC
572E SN48 HEAD DROP CAL 02
92153
HEDRG

48C2HD1

FILTER = ALPF 1650/ 5214/ -48
MIN, MAX VALUES = 0.02 -1.75, 247.00 2.13



PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III

02-JUN-92

6 AXIS NECK TRANSDUCER
TRC 48C2NF1

572E SN48 NECK FLEXION CAL02

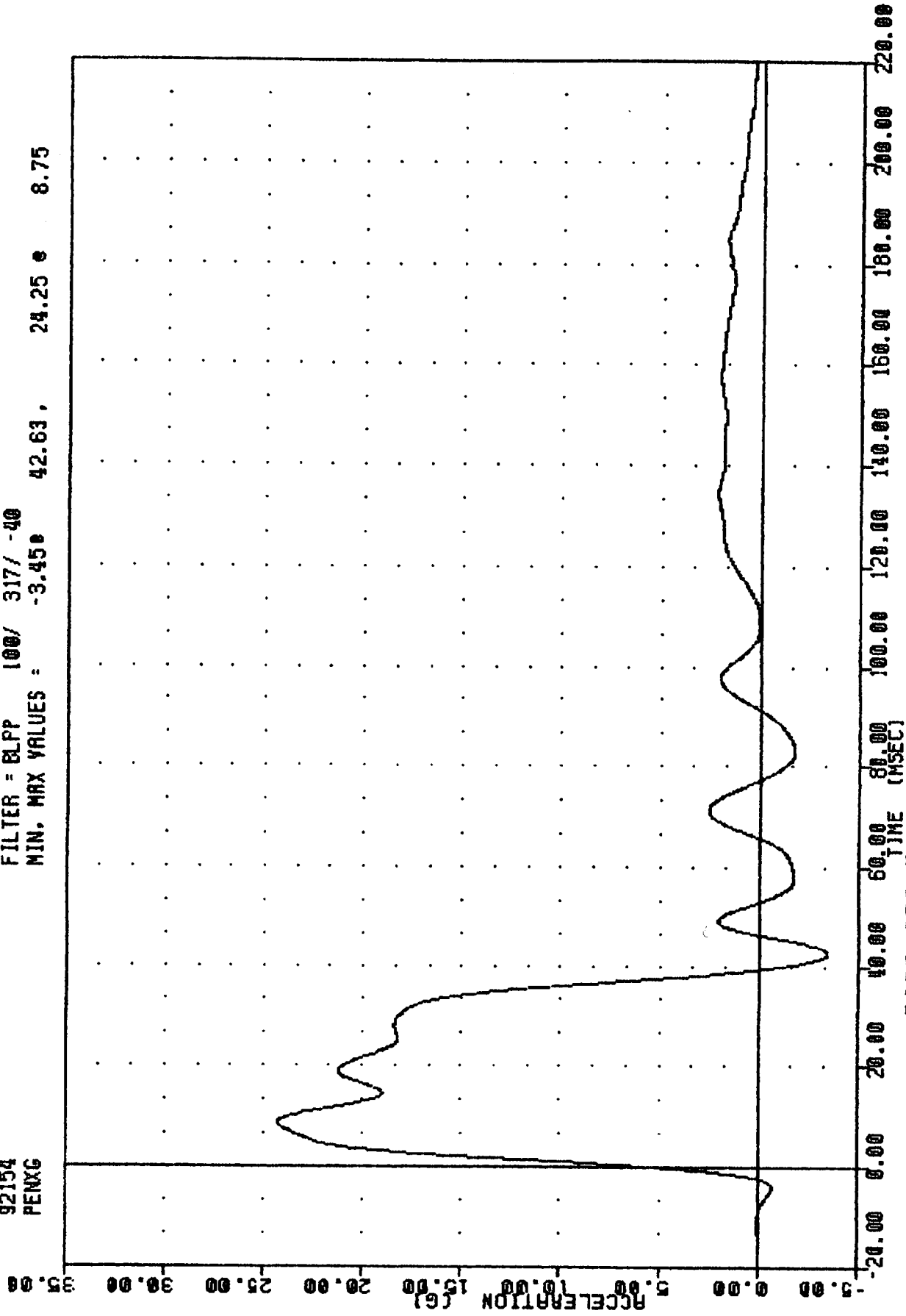
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
IMPACT VELOCITY	6.89 - 7.13 M/SEC	7.03 M/SEC
PENDULUM	10 MS 22.50 - 27.50 G	23.70 G
DECELERATION	20 MS 17.60 - 22.60 G	20.95 G
	30 MS 12.50 - 18.50 G	18.15 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	18.13 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	34 - 42 MS	37.38 MS
D PLANE	MAX 64 - 78 DEG.	67.10 DEG.
ROTATION	TIME 57 - 64 MS	58.63 MS
MOMENT ABOUT OCCIPITAL	MAX 88.2 - 108.5 NM	95.98 NM
CONDYLE	TIME 47 - 58 MS	49.63 MS
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	113 - 128 MS	113.00 MS
POSITIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	97 - 107 MS	97.13 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN PAT FET

TRC , 48C2NF1
 572E SN48 NECK FLEXION CAL02
 92154
 PENXC

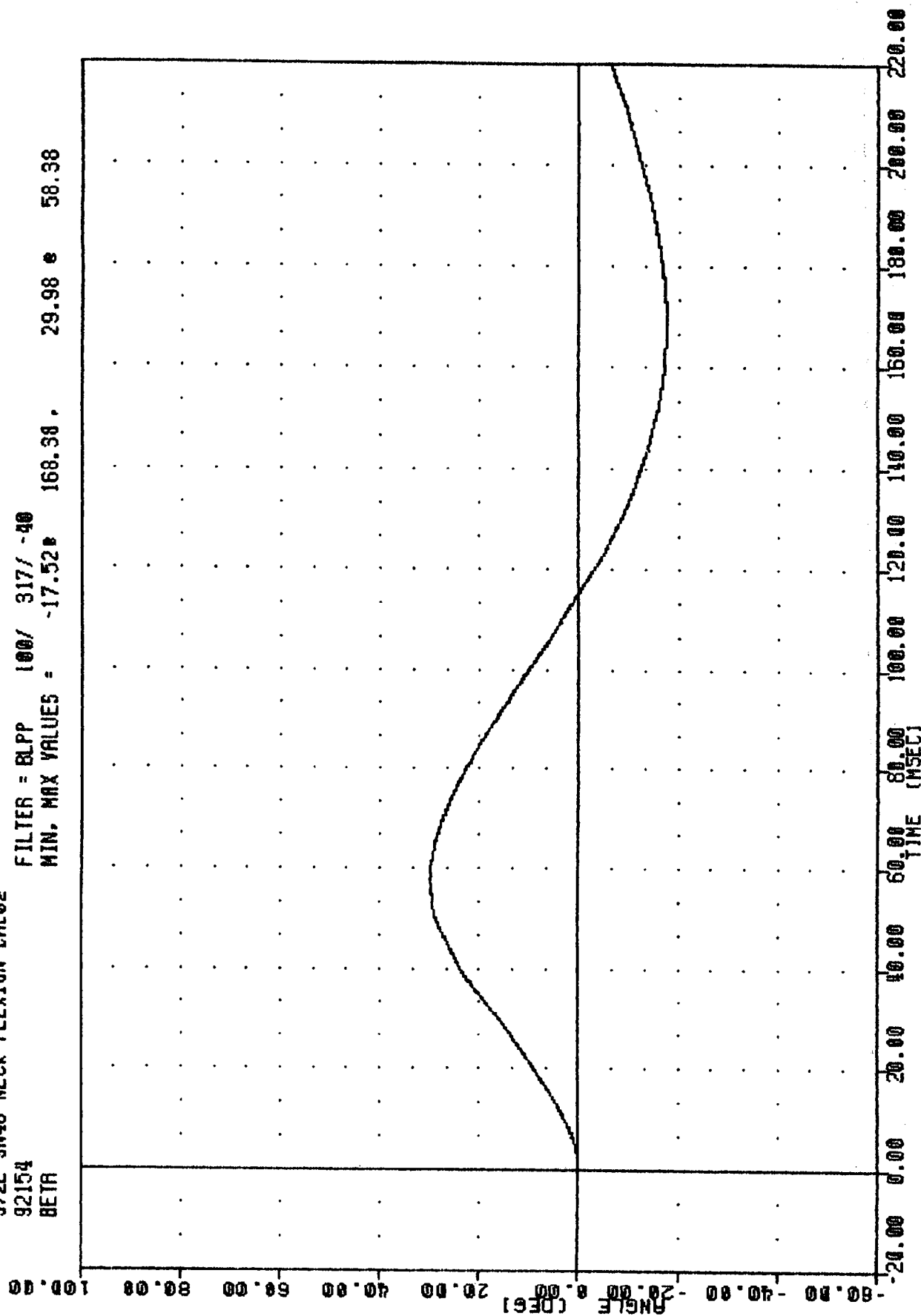
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -3.45 42.63 , 24.25 8.75



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 PENDULUM DECELERATION

TRC , 48C2NF1
 572E SN48 NECK FLEXION CAL02
 92154
 BETA

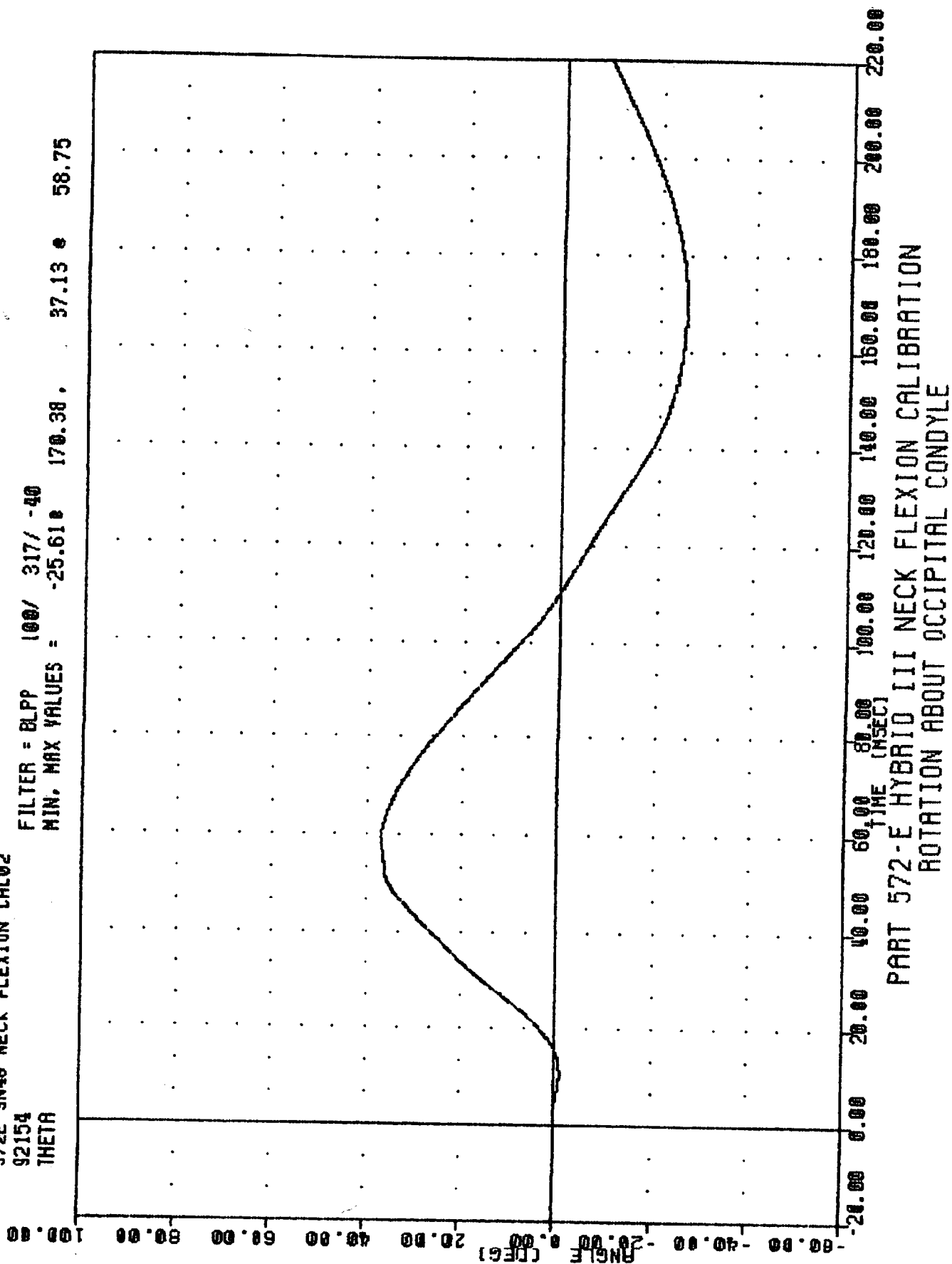
FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -17.52 168.38 , 29.98 58.38



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

TAC
572E SN48 NECK FLEXION CAL02
92154
THETA

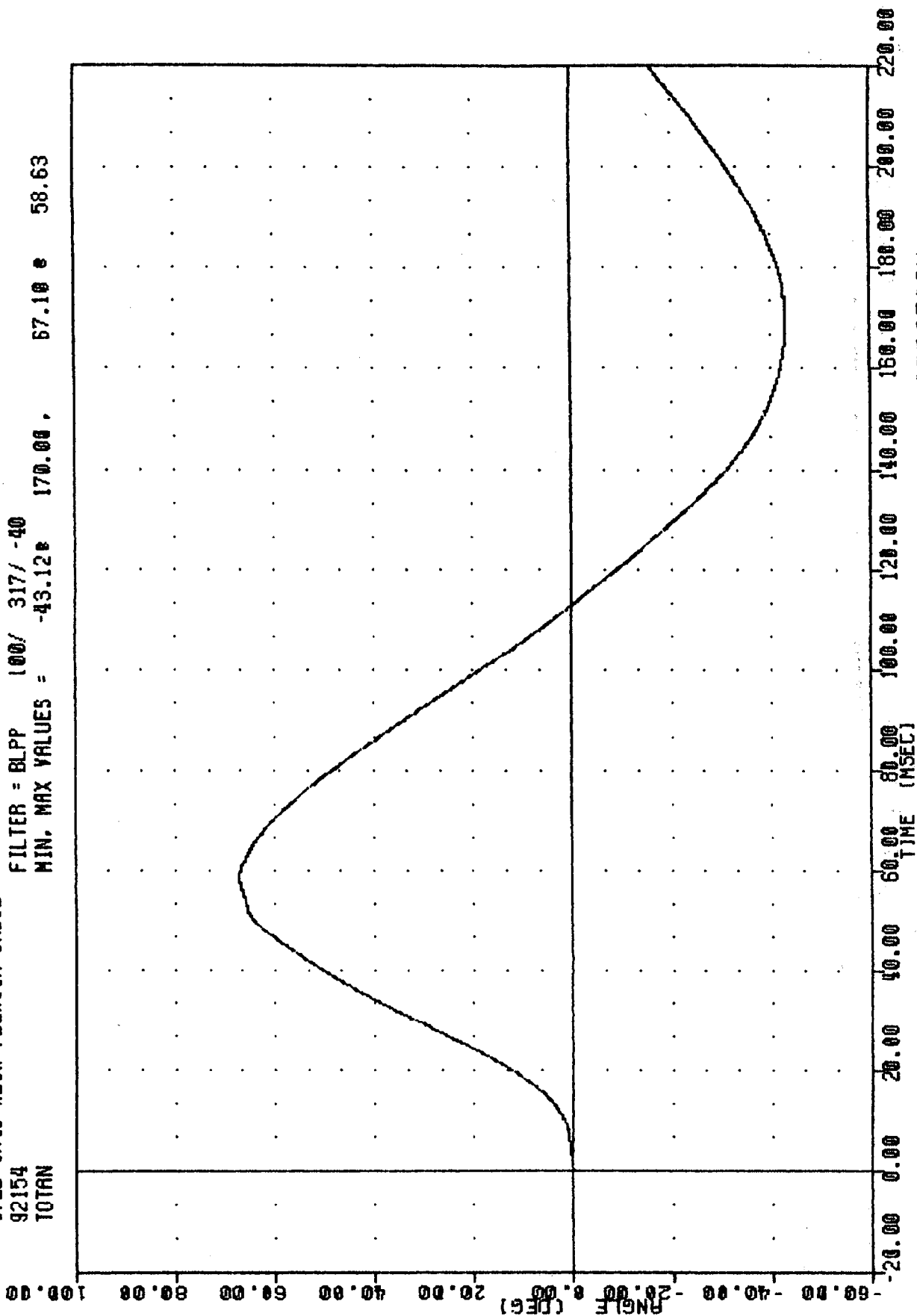
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -25.61° 170.38° 37.13° 58.75



TRC
572E SN48 NECK FLEXION CAL02
92154
TOTAL

, 48C2NF1

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -43.12 170.00 57.10 58.63

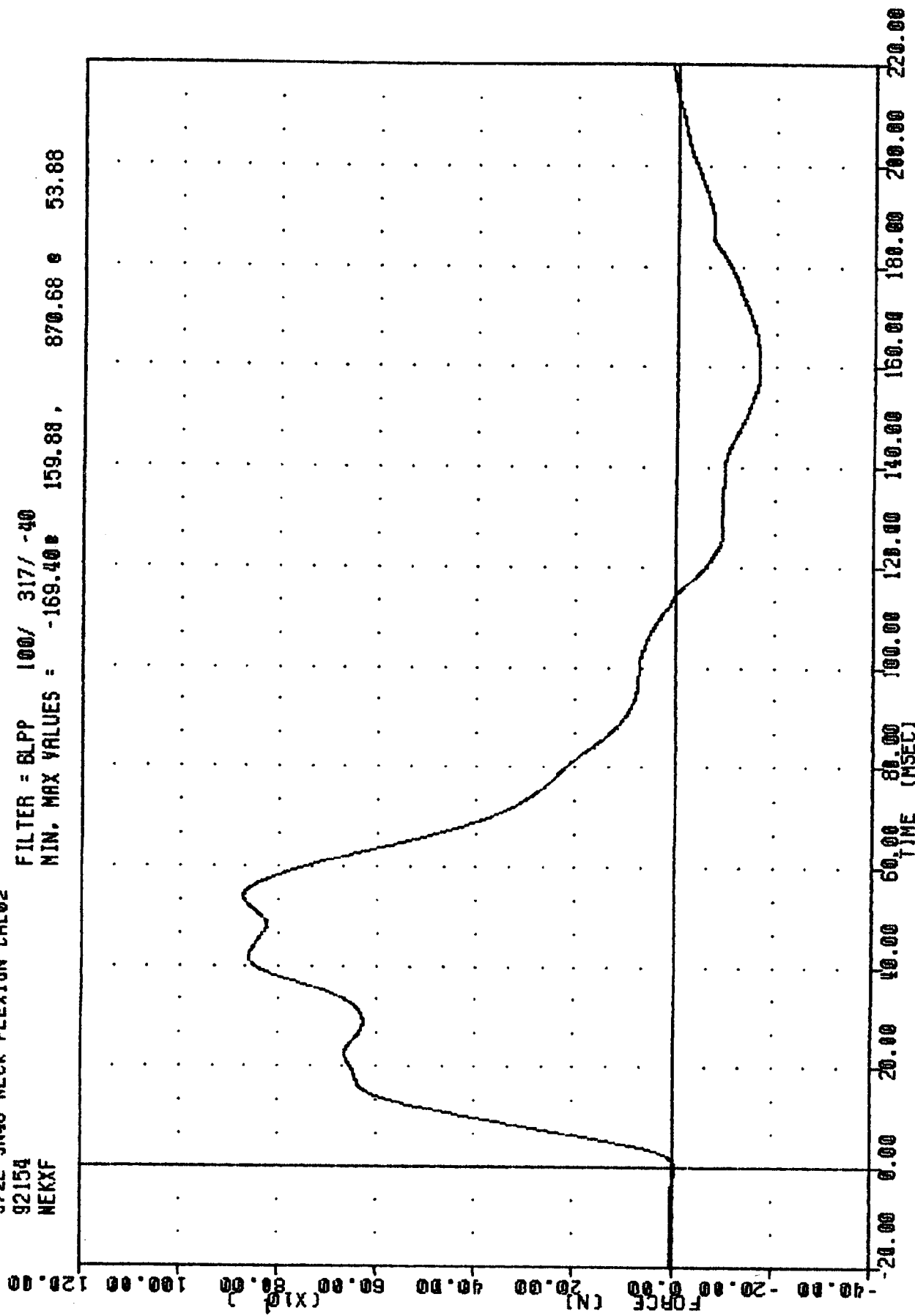


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

TRC
572E SN40 NECK FLEXION CAL02
92154
NEKXF

, 48C2NF1

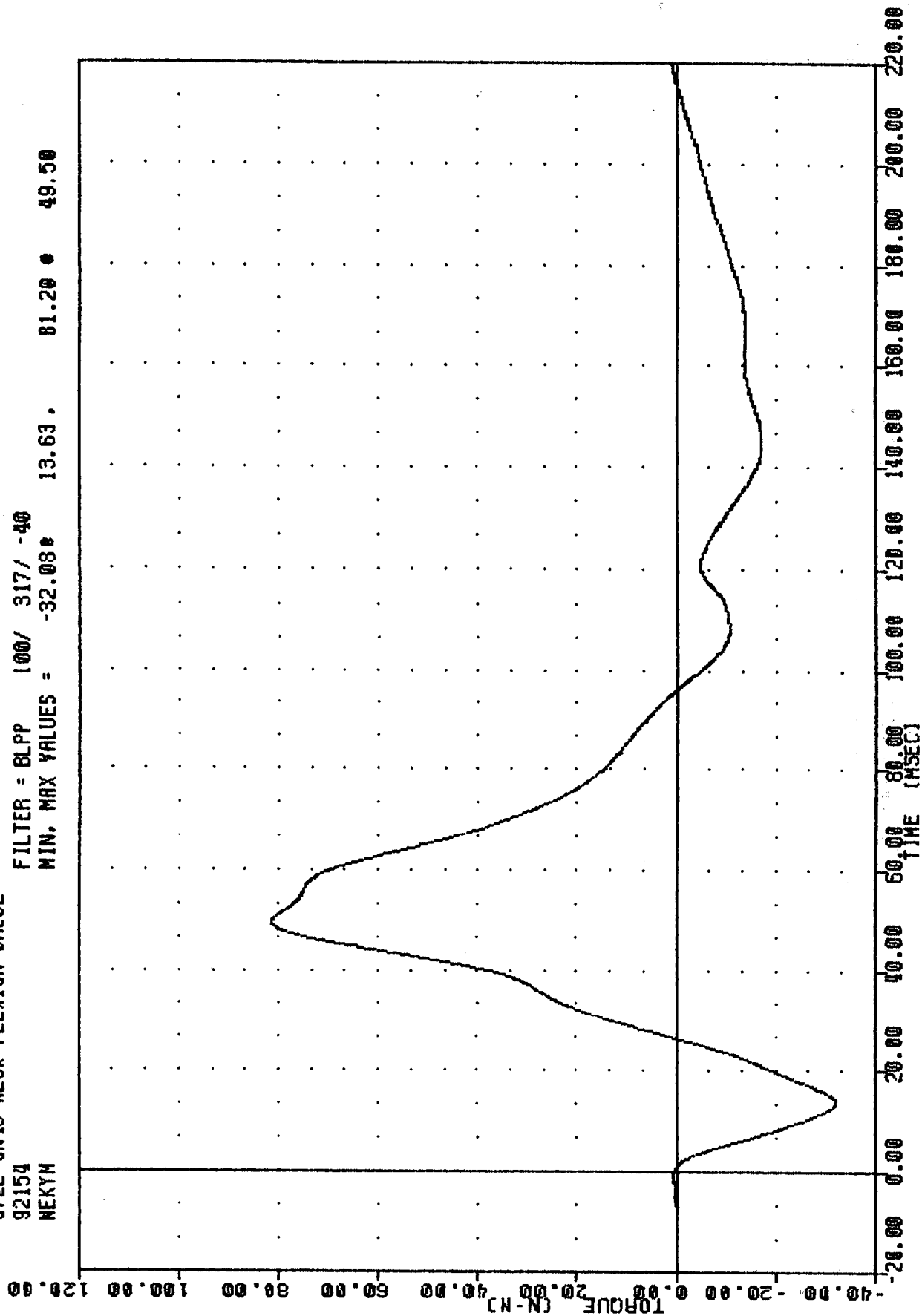
FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -169.40 159.88 870.68 53.88



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

TRC
572E SN40 NECK FLEXION CAL02
92154
NEKYM

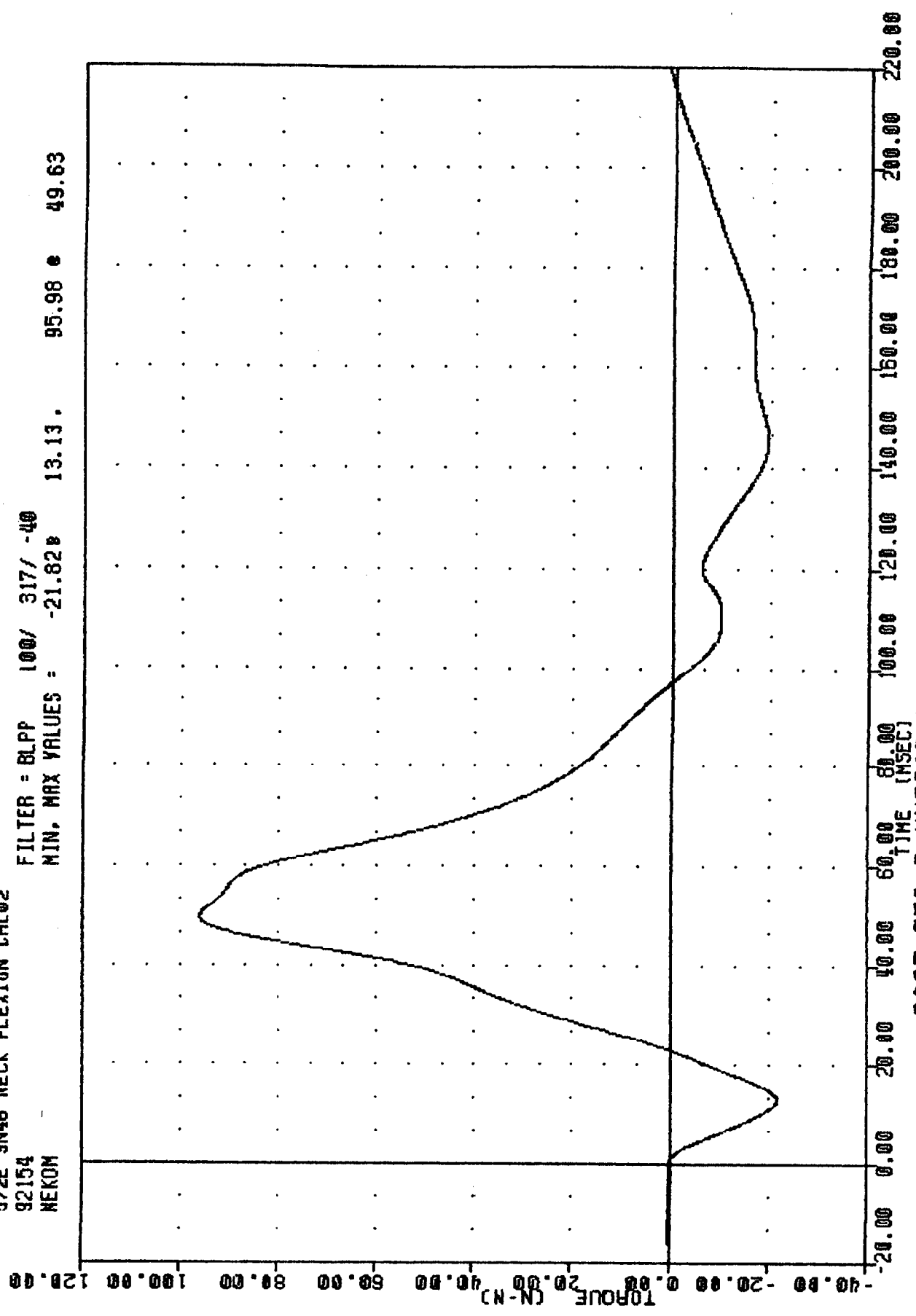
FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -32.08 81.20 49.50



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

TRC , 48C2NF1
 572E SN40 NECK FLEXION CAL02
 92154
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN, MAX VALUES = -21.82 13.13 95.98 49.63



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

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

02-JUN-92

6 AXIS NECK TRANSDUCER
TRC 48C2NE1

572E SN48 NECK EXT. CAL02

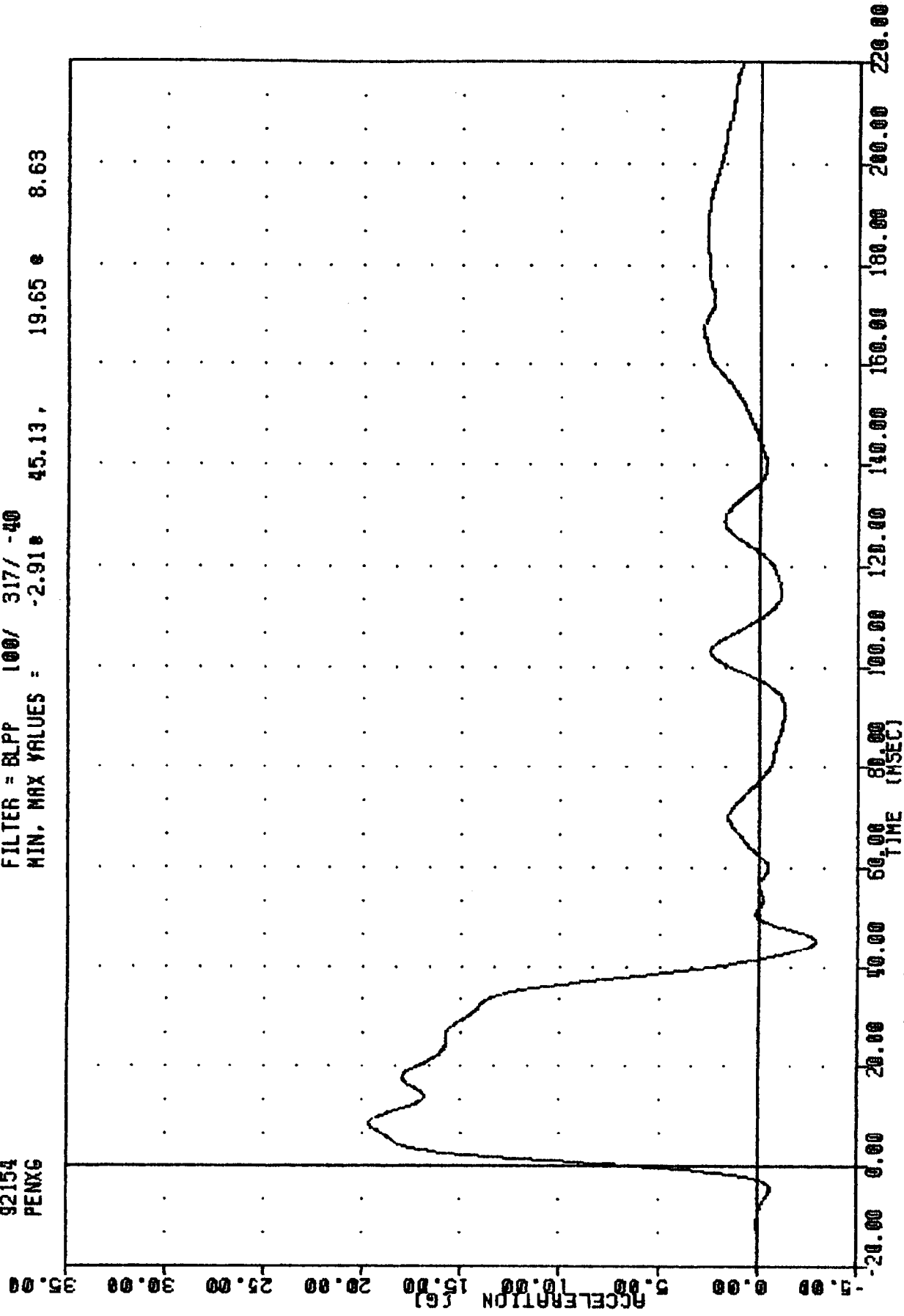
TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	51.0 %
IMPACT VELOCITY		5.95 - 6.19 M/SEC	6.00 M/SEC
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.23 G
	20 MS	14.00 - 19.00 G	17.20 G
	30 MS	11.00 - 16.00 G	14.69 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.64 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.50 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	94.40 DEG.
	TIME	72 - 82 MS	75.50 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-63.50 NM
	TIME	65 - 79 MS	70.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	155.88 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	135.75 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Pat Felt

TRC , 4802ME1
 572E SN48 NECK EXT. CAL02
 92154
 PENX6

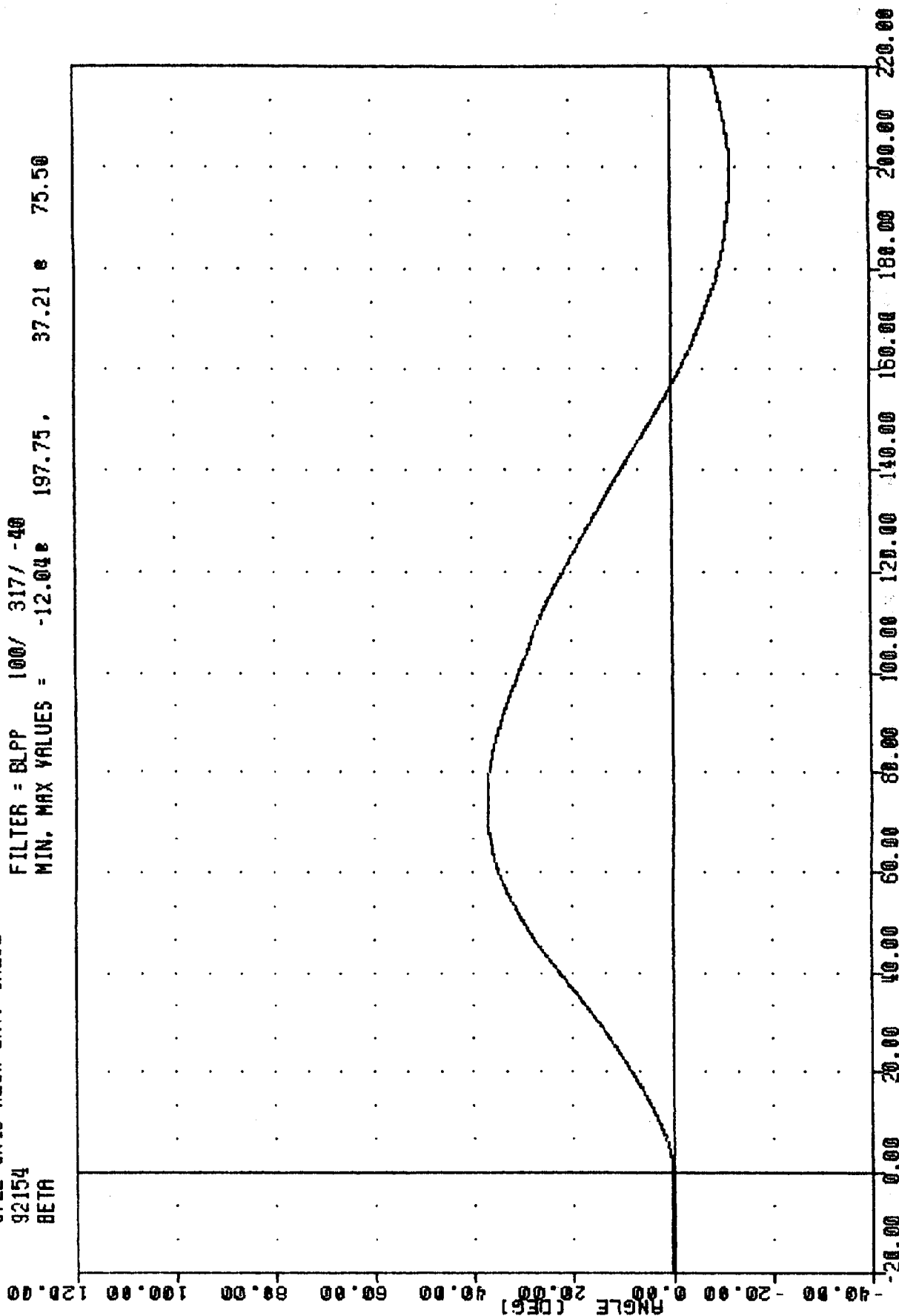
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -2.91 45.13 19.65 8.63



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 PENDULUM DECELERATION

TRC
572E SN48 NECK EXT. CAL02
92154
BETA

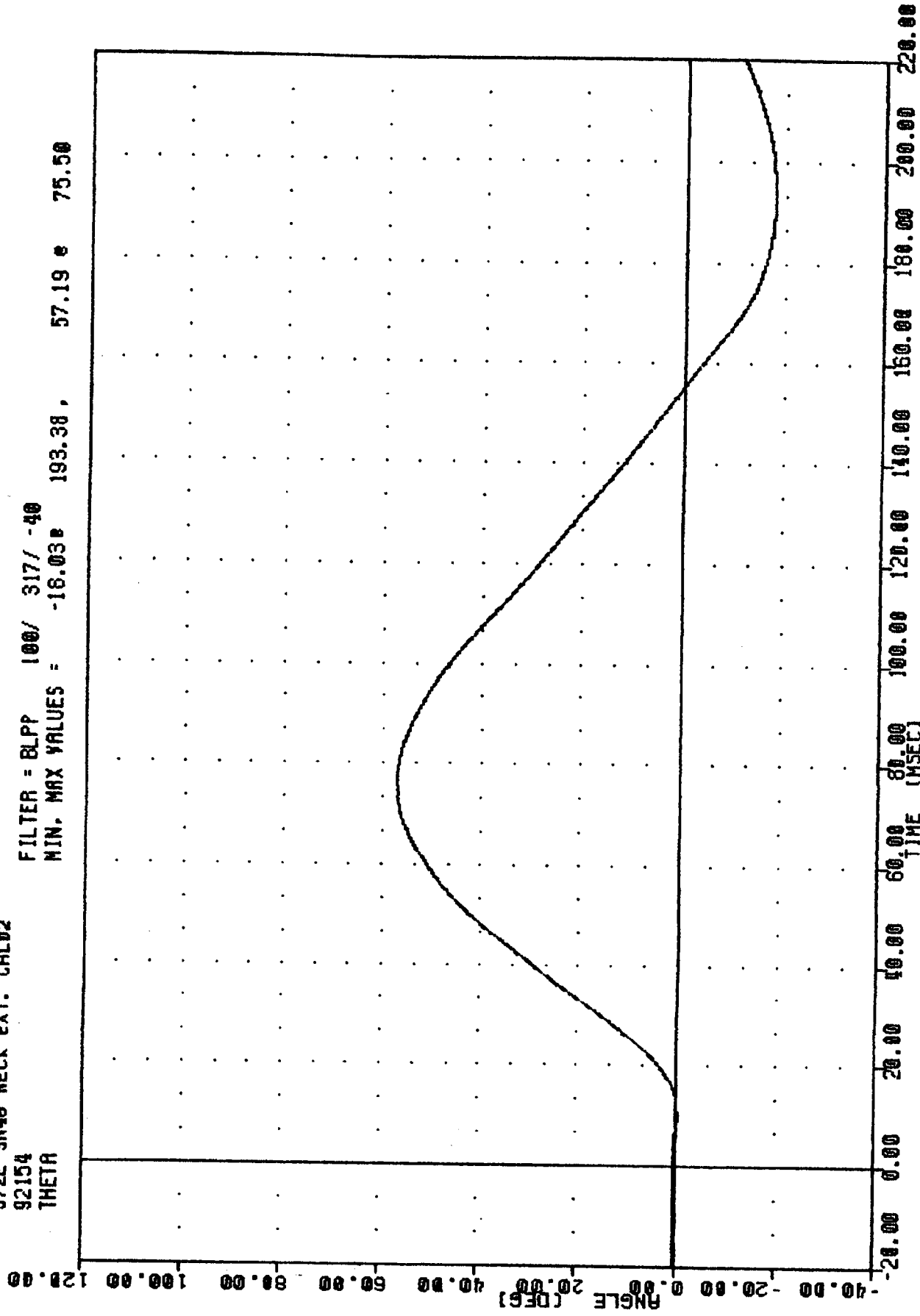
FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -12.04e 197.75, 37.21 e 75.50



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

TRC , 48C2NE1
 672E SN40 NECK EXT. CAL02
 92154
 THETA

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -16.03 193.38 , 57.19 75.50

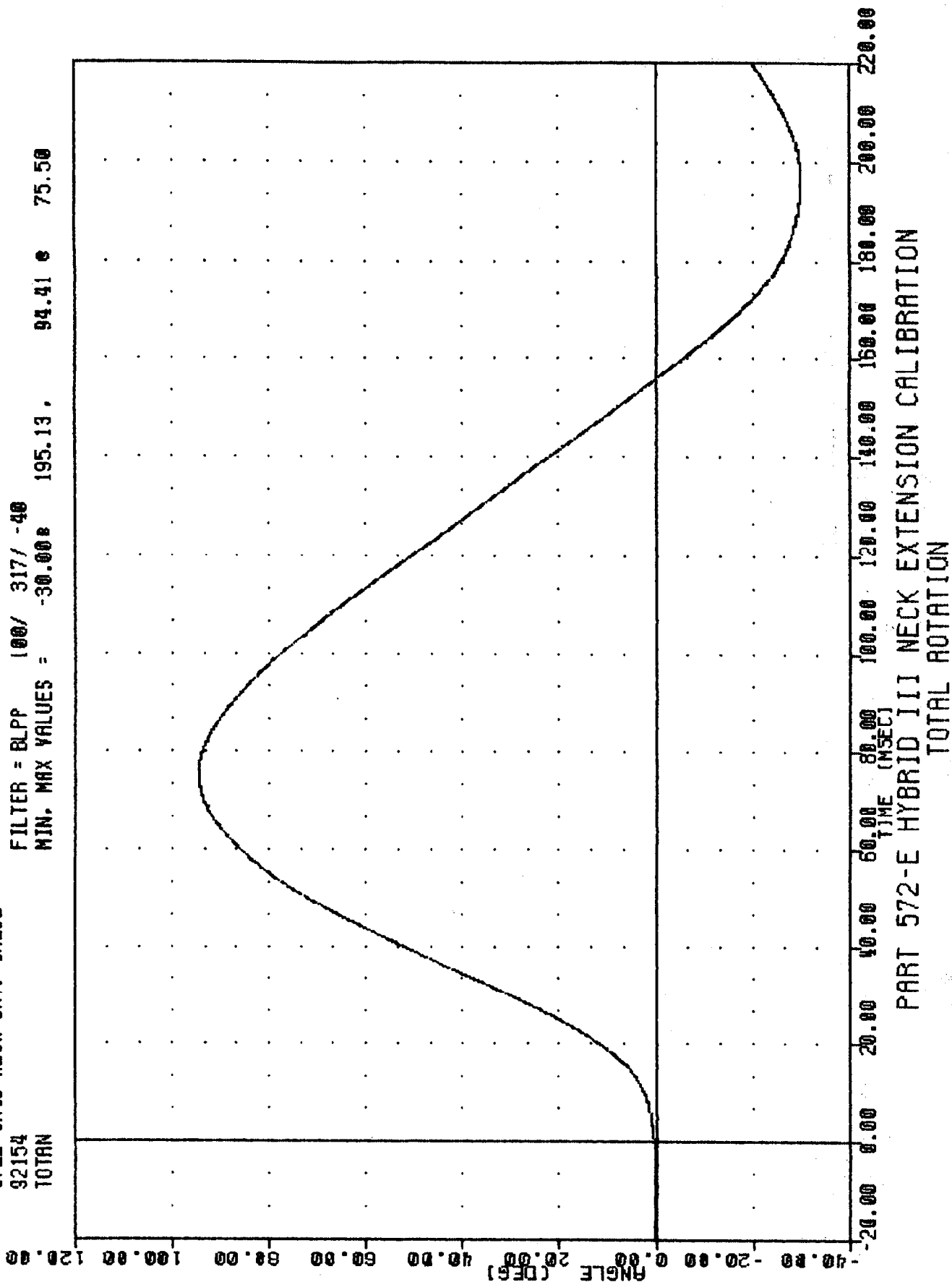


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC
572E SN48 NECK EXT. CAL02
92154
TOTAN

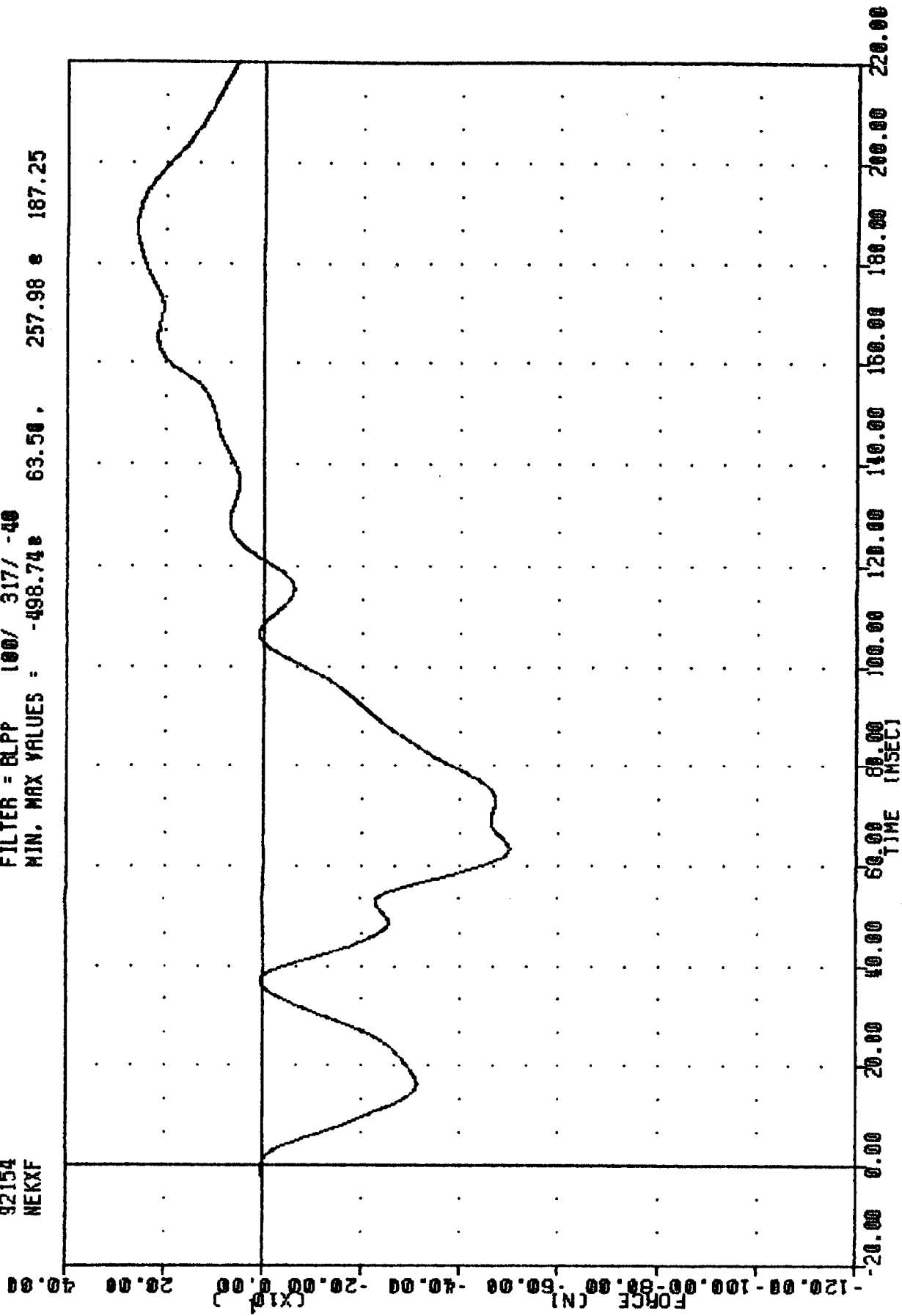
, 48C2NE1

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -30.00 195.13 94.41 75.50



TRC , 48C2NE1
 672E SN40 NECK EXT. CAL02
 92154
 NEKXF

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -498.74 63.50 257.98 187.25

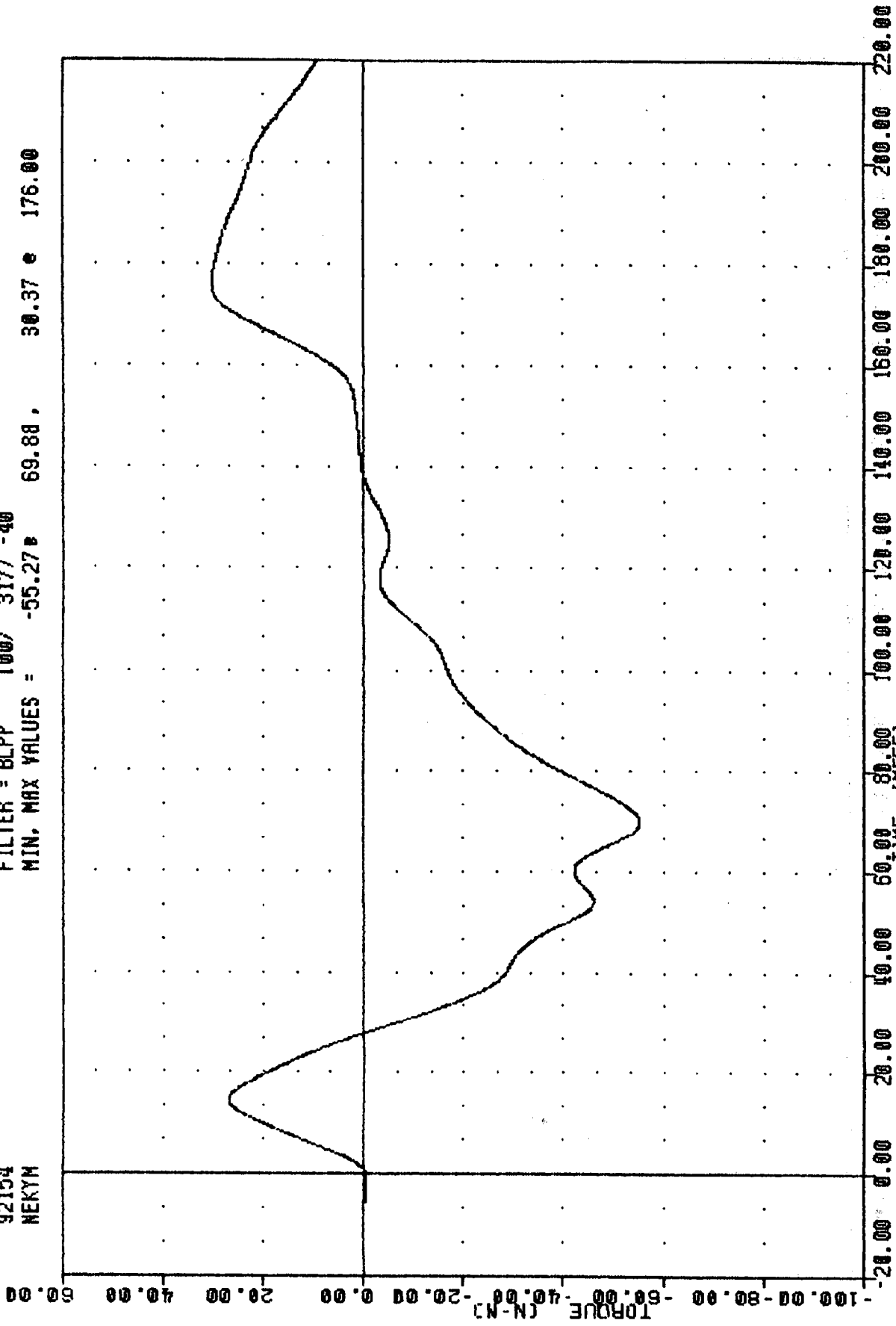


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 NECK FORCE X AXIS

TRC
572E SN40 NECK EXT. CAL02
92154
NEKYM

, 48C2NE1

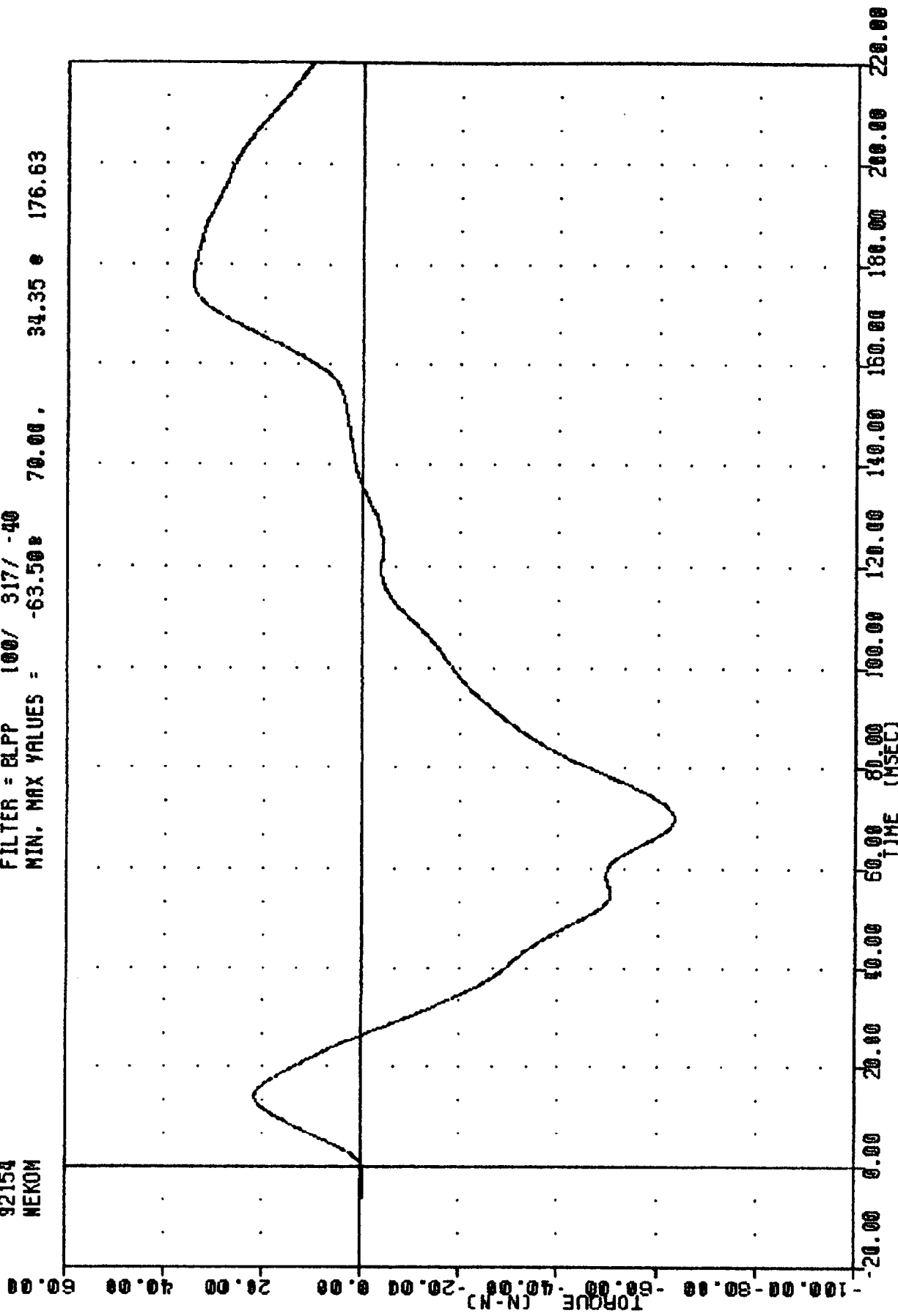
FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -55.27 69.88, 30.37 e 176.00



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

TRC , 48C2NE1
 572E SN48 NECK EXT. CALD2
 92154
 NEKOM

FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -63.50 70.00 34.35 176.63



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

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III

02-JUN-92

TRC

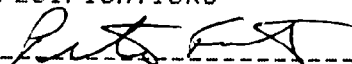
48C2TH1

572E SN48 H.S.THORAX CAL02

TEST PARAMETER	HIGH SPEED TEST	
	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.68 M/SEC
MAXIMUM DEFLECTION	63.5 - 72.6 MM	69.1 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5305. N
INTERNAL HYSTERESIS	69% - 85%	73.6%

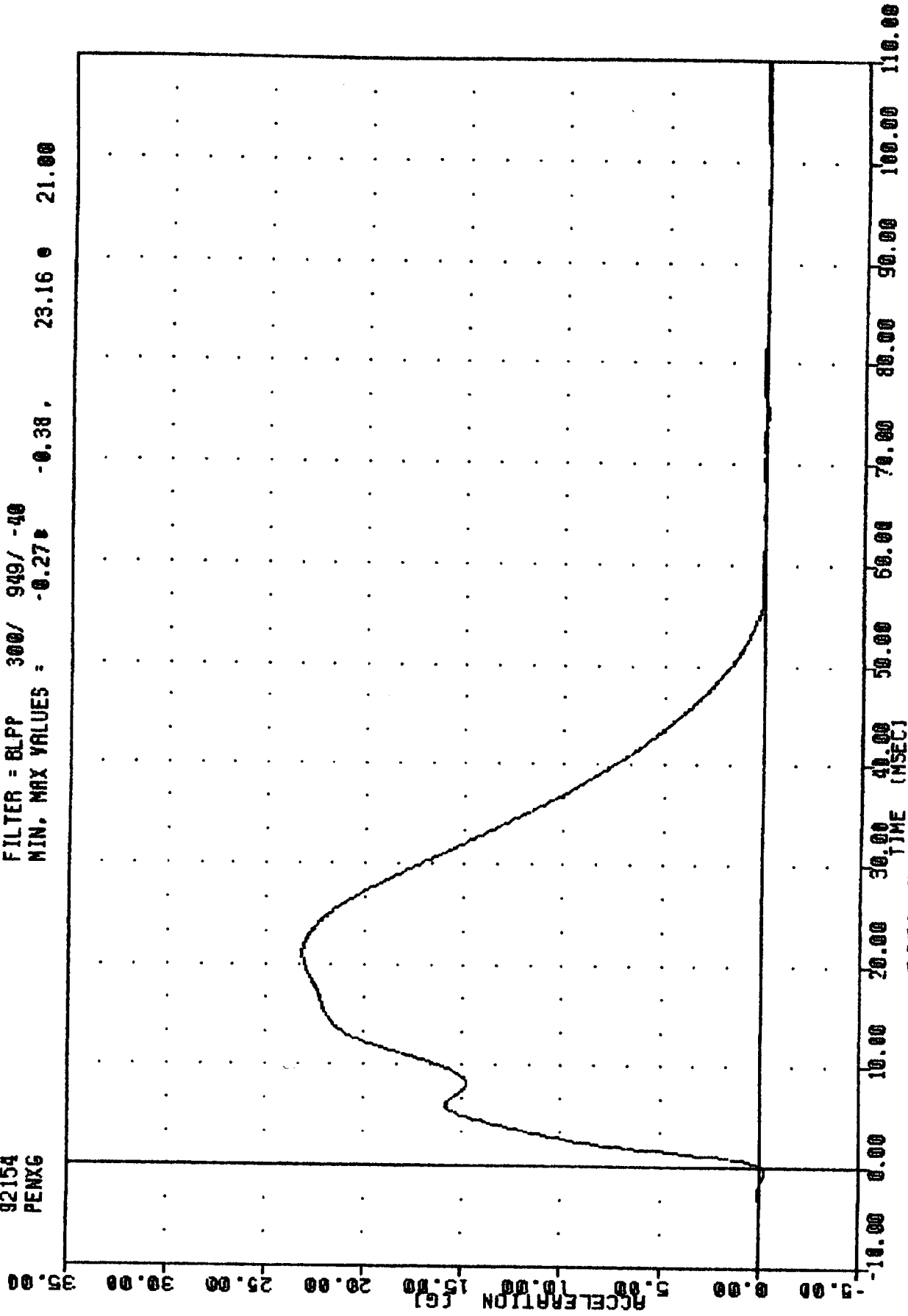
TEST MEETS SPECIFICATIONS

TECHNICIAN



TRC
572E SN40 H.S. THORAX CAL02
92154
PENXG

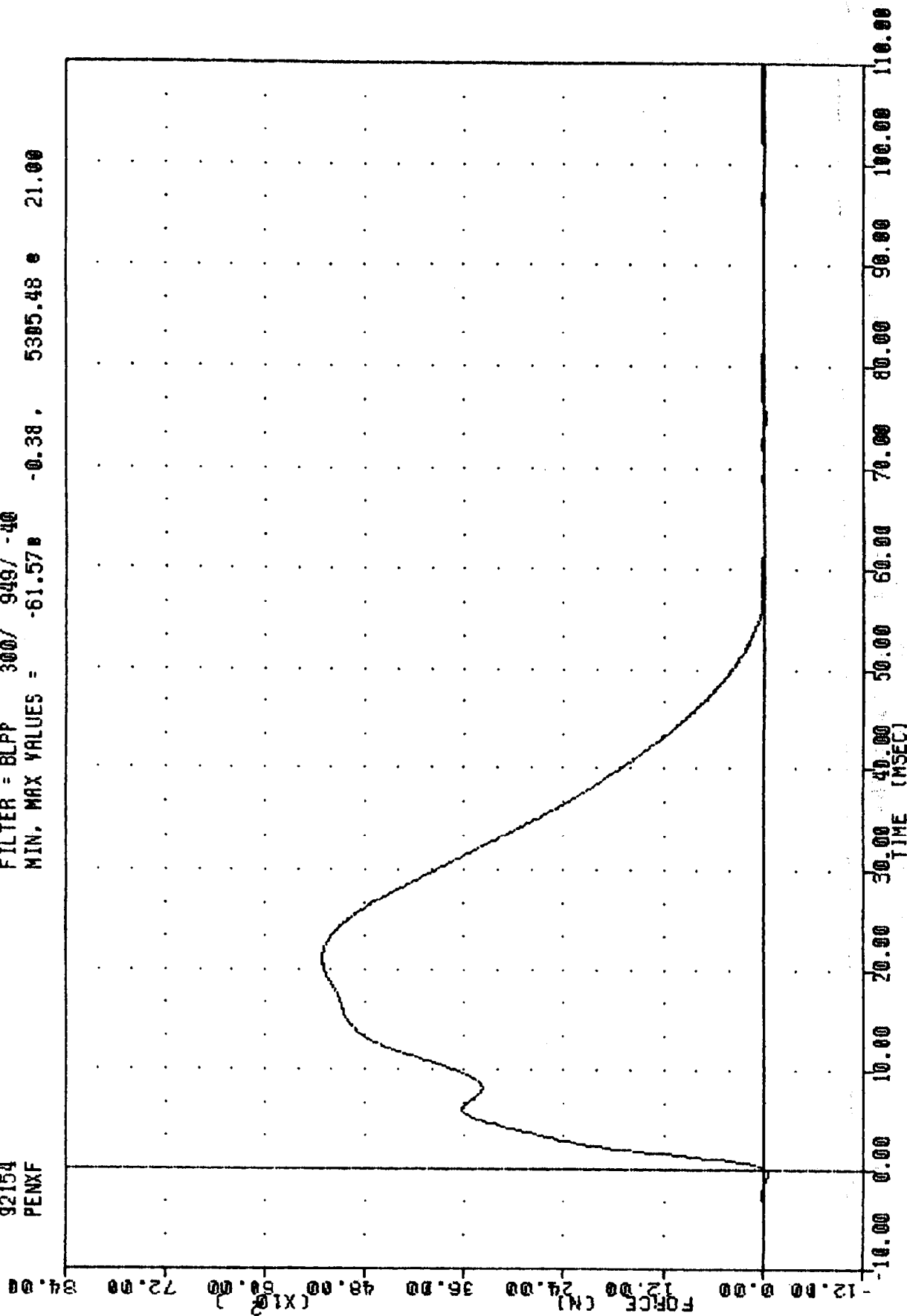
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = -0.27 23.16 21.00



PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

TRC
572E SN48 H.S. THORAX CAL02
92154
PENXF

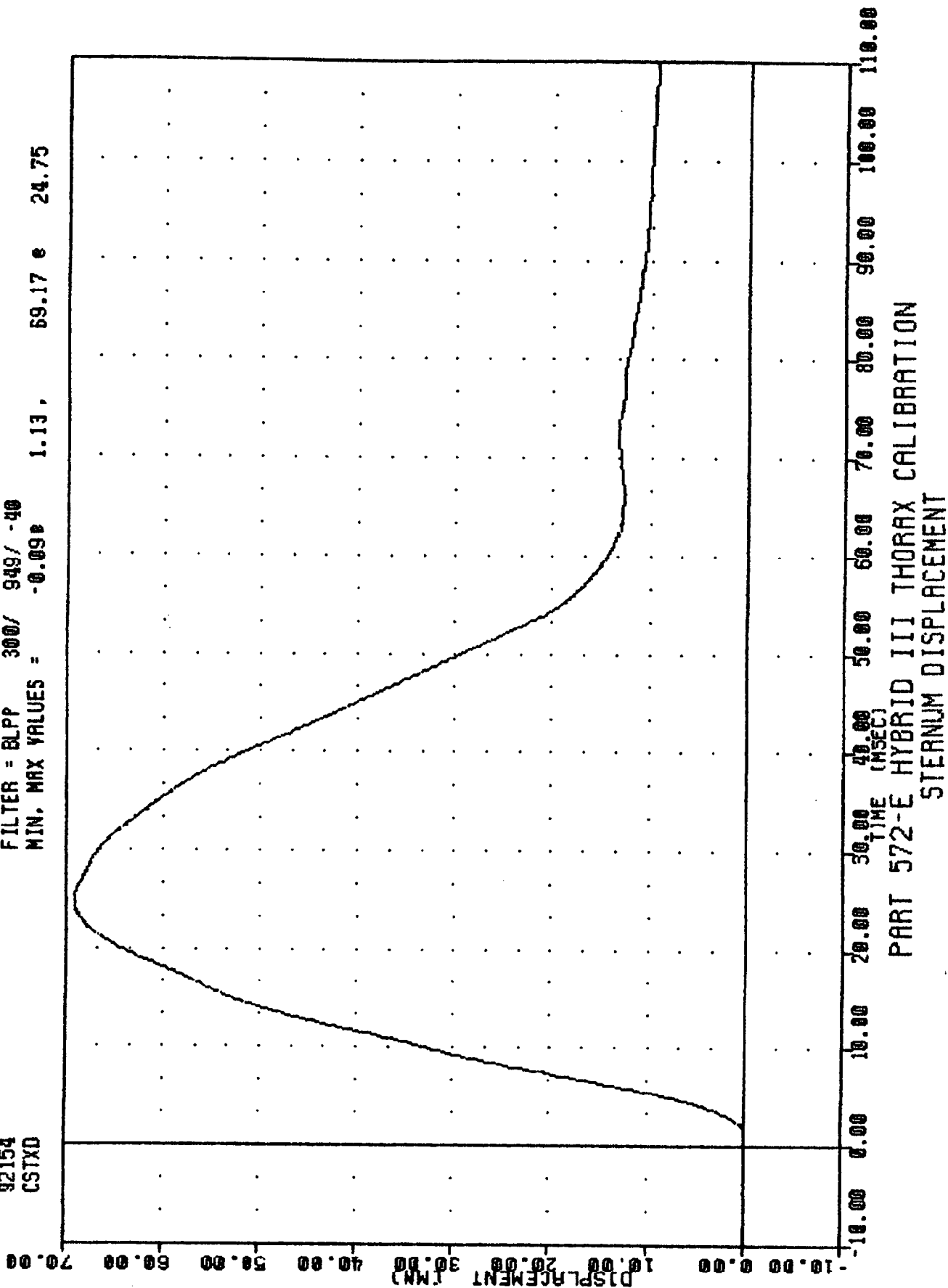
FILTER = BLPP 300/ 949/ -40
MIN. MAX VALUES = -61.57 5385.48 0 21.00
-0.38.



PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

TRC , 48C2TH1
 572E SN48 H.S. THORAX CAL02
 92154
 CSTXD

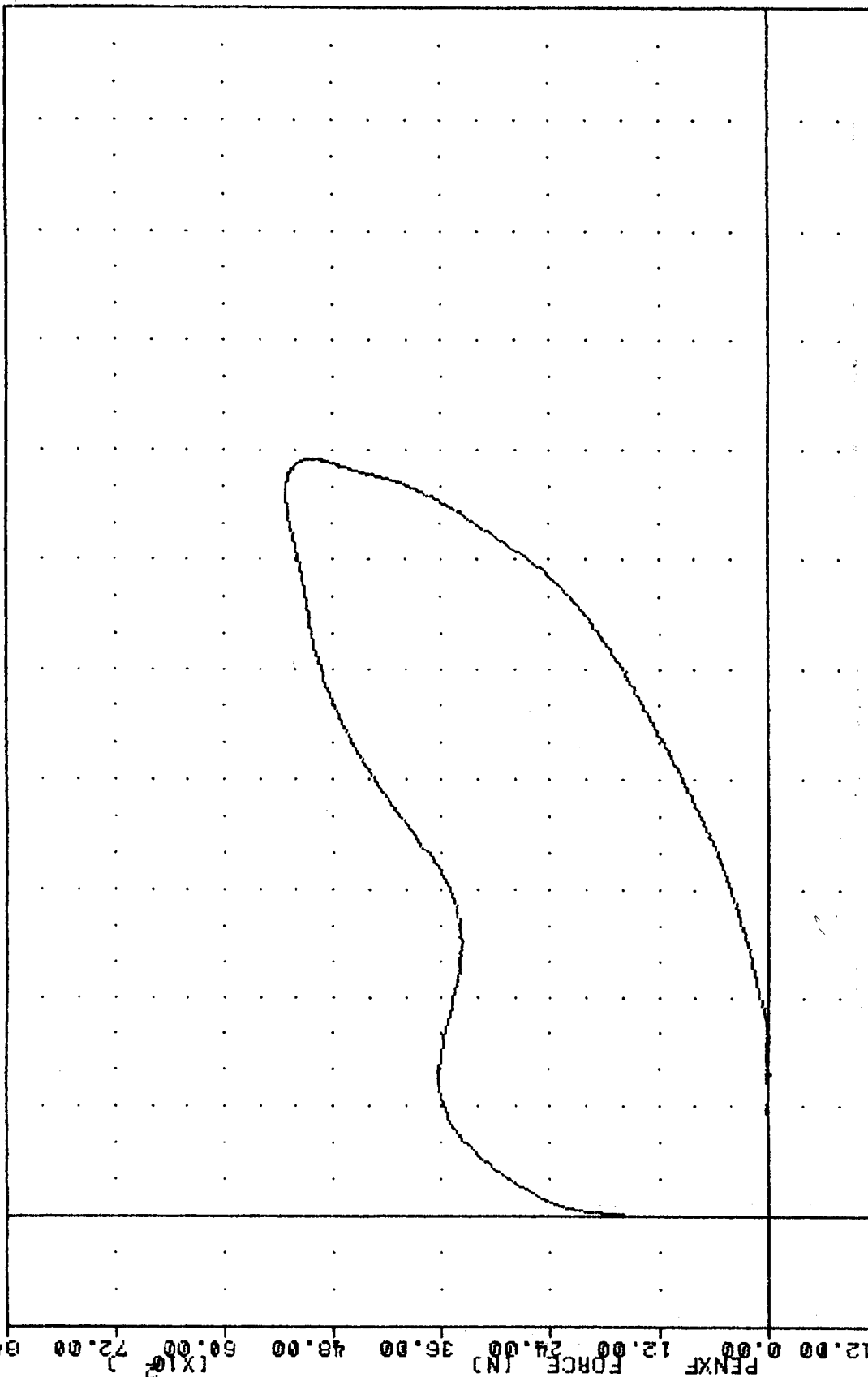
FILTER = BLPP 300/ 949/ -40
 MIN, MAX VALUES = -0.09 1.13, 59.17 e 24.75



PART 572-E HYBRID III THORAX CALIBRATION
 STERNUM DISPLACEMENT

TRC 572E SN48 H.S. THORAX CAL02 92154 69.17 * 24.75
 CSTXD 500/ 949/ -40 MIN. MAX = -0.09 * 5305.48 *
 PENXF 500/ 949/ -40 MIN. MAX = -61.67 * -0.38 *

84.00



-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00

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

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

01-JUN-92

RIGHT KNEE

TRC

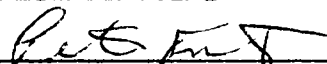
48C2RK1

572E SN48 RIGHT KNEE CAL 02

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714-5783 N	5591.1 N
PROBE WEIGHT	5.0 KG	

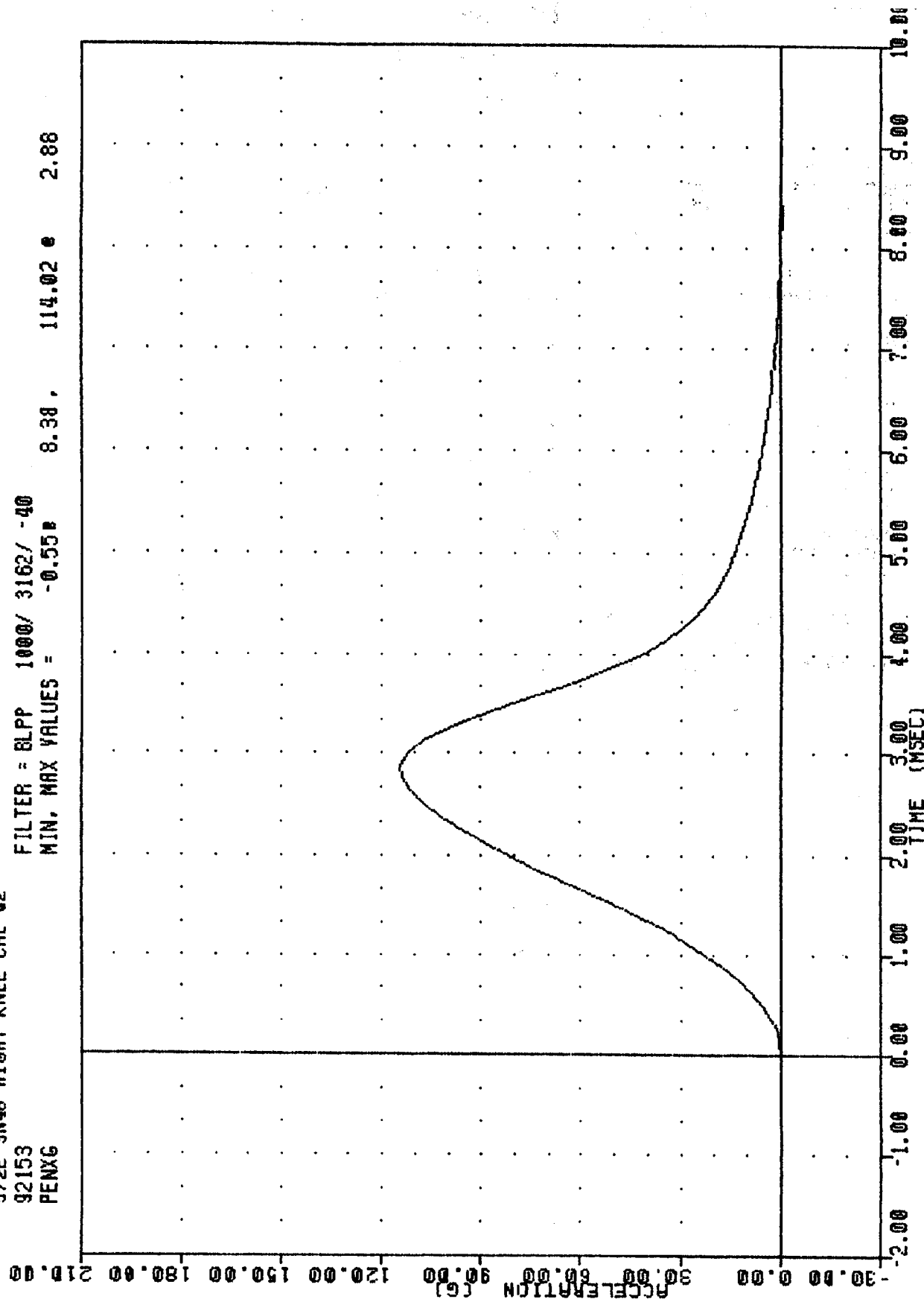
TEST MEETS SPECIFICATIONS

TECHNICIAN



TRC
572E SN48 RIGHT KNEE CAL 02
92153
PENXG

FILTER = 8LPP 1000/ 3162/ -40
MIN, MAX VALUES = -0.55 8.38 114.02 2.88

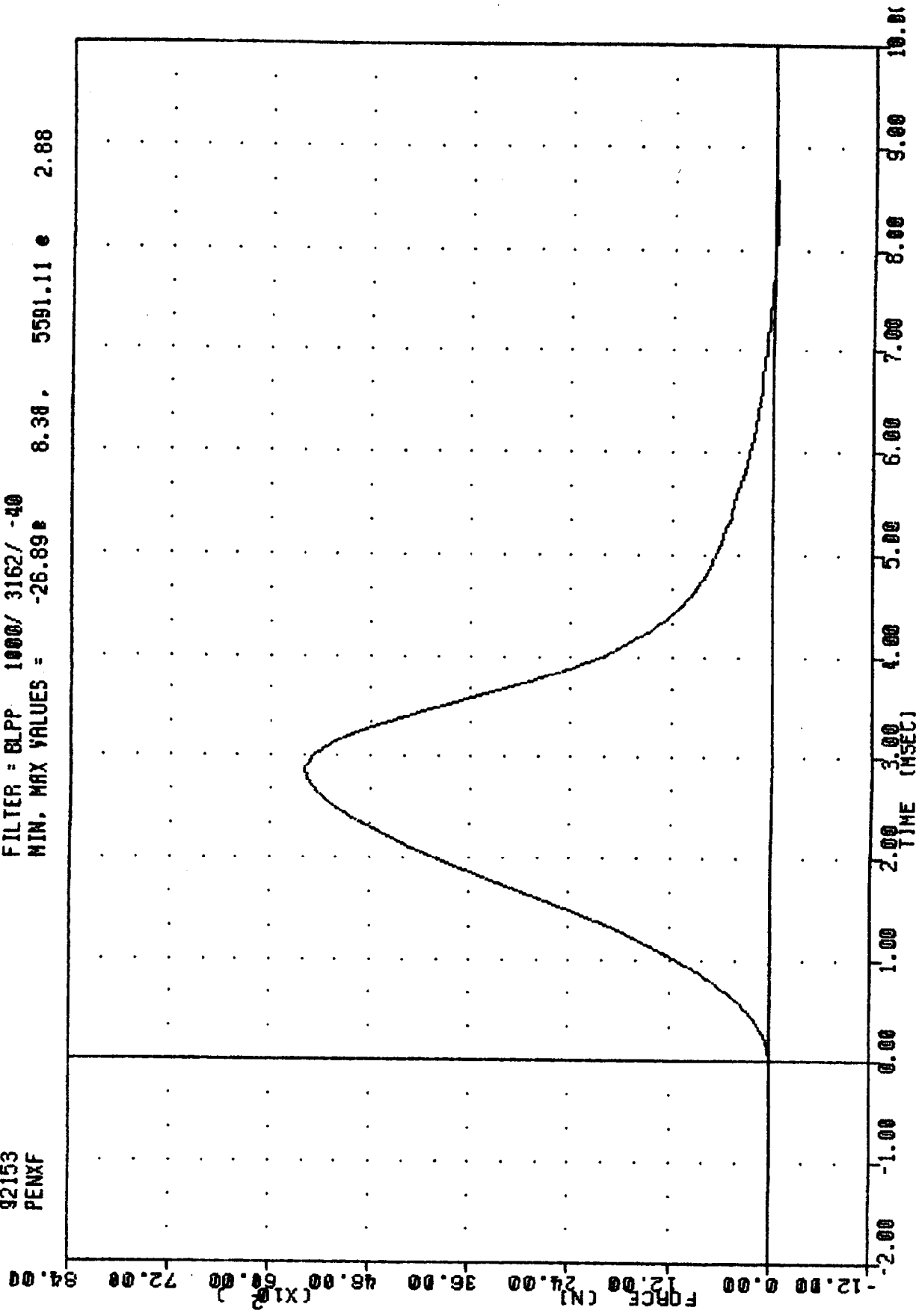


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC
572E SN40 RIGHT KNEE CAL 02
92153
PENXF

48C2RK1

FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -26.89 8.38 5591.11 2.88



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

01-JUN-92

LEFT KNEE
TRC

48C2LK1

572E SN48 LEFT KNEE CAL 02

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	51.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.12 M/SEC
PEAK KNEE IMPACT FORCE	4714-5783 N	5556.8 N
PROBE WEIGHT	5.0 KG	

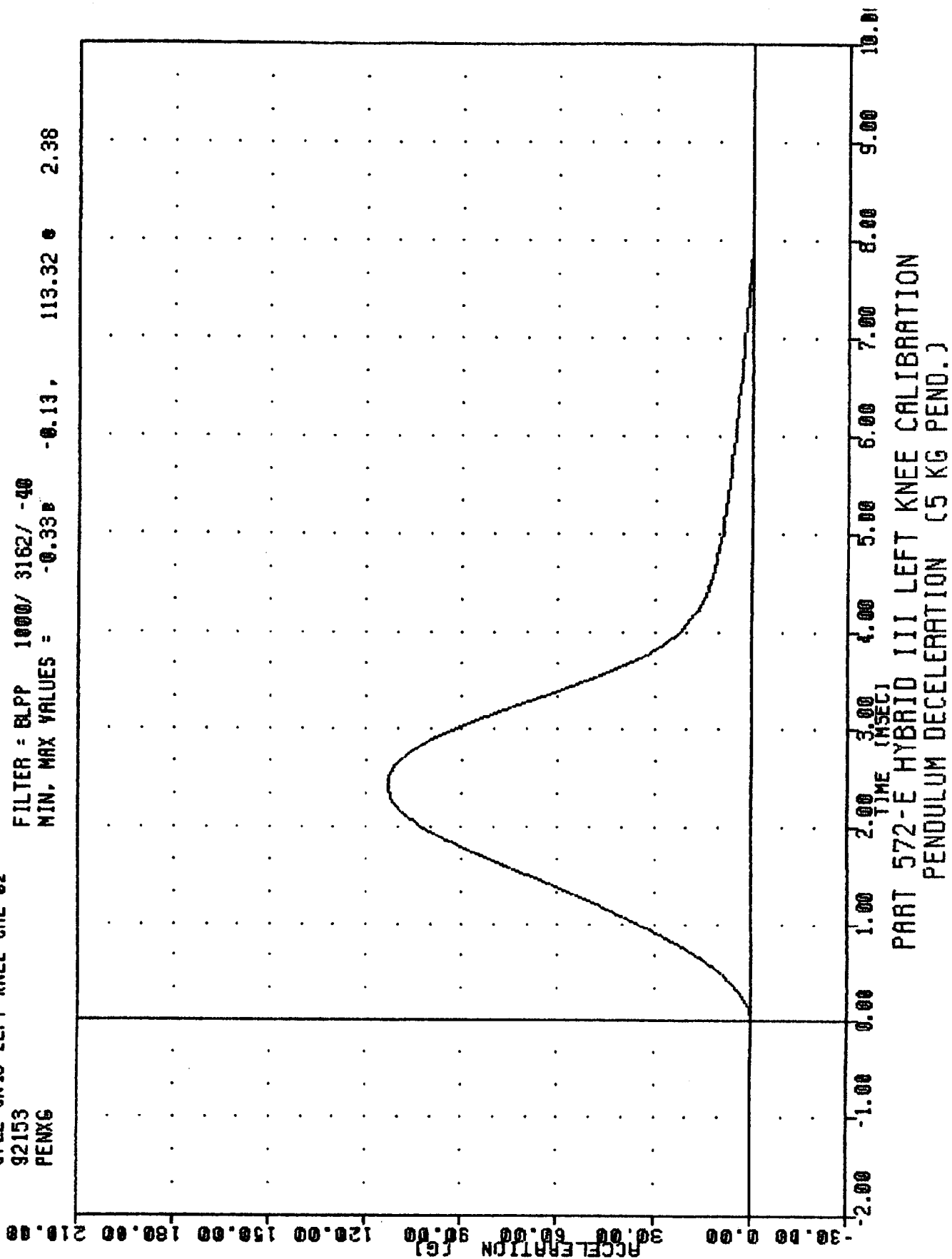
TEST MEETS SPECIFICATIONS

TECHNICIAN

Pete Ford

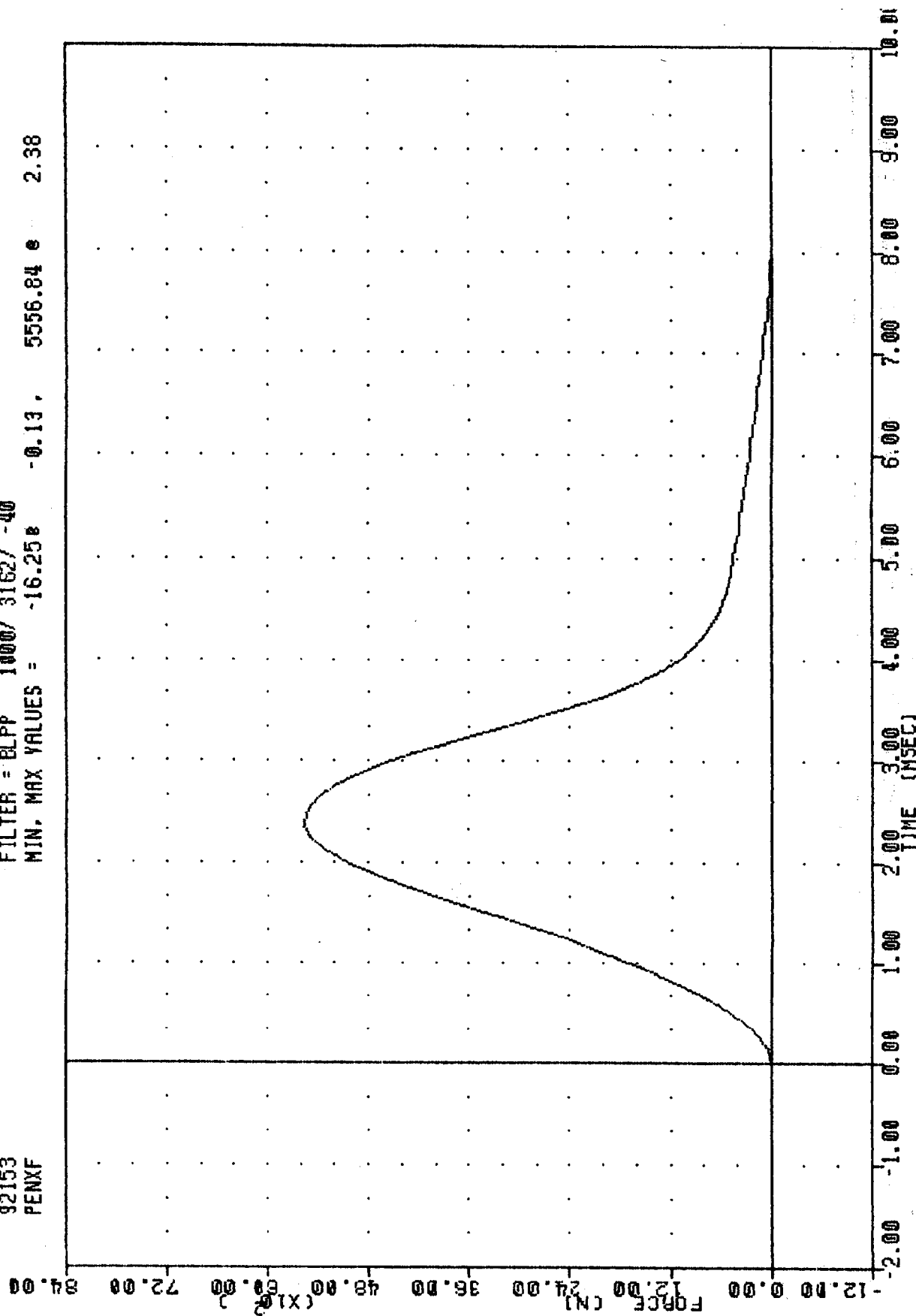
TRC , 48C2LK1
 572E SN40 LEFT KNEE CAL 02
 92153
 PENXG

FILTER = BLPP 1000/ 3162/ -40
 MIN, MAX VALUES = -0.33 0 113.32 0 2.38



TRC
572E SN40 LEFT KNEE CAL 02
92153
PENXF

FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -16.258 -0.13 , 5556.84 e 2.38



PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENTATION PLACEMENT

DUMMY MFR. & S/N: HUMANOID/048

SEATING POSITION: DRIVER

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
HEAD ACCELERATION	X	ENDEVCO	7264	EH78J	REAR
HEAD ACCELERATION	Y	ENDEVCO	7264	DH37J	LEFT
HEAD ACCELERATION	Z	ENDEVCO	7264	DD17J	UP
NECK FORCE	X	DENTON	1716	0106	*
NECK FORCE	Y	DENTON	1716	0106	*
NECK FORCE	Z	DENTON	1716	0106	*
NECK MOMENT	X	DENTON	1716	0106	*
NECK MOMENT	Y	DENTON	1716	0106	*
NECK MOMENT	Z	DENTON	1716	0106	*
CHEST ACCELERATION	X	ENDEVCO	7264	EH92J	FRONT
CHEST ACCELERATION	Y	ENDEVCO	7264	CC24H	LEFT
CHEST ACCELERATION	Z	ENDEVCO	7264	FG28J	UP
CHEST DEFLECTION	X	VERNITECH	81422A	9041	OUTWARD
PELVIS ACCELERATION	X	ENDEVCO	7264	BC75J	REAR
PELVIS ACCELERATION	Y	ENDEVCO	7264	FC43J	LEFT
PELVIS ACCELERATION	Z	ENDEVCO	7264	AP87	UP
LEFT FEMUR FORCE		GSE	2435	014	TENSION
RIGHT FEMUR FORCE		GSE	2430	756	TENSION

*See SIGN CONVENTION sheet for positive sensing orientation of neck load channels.

VEHICLE INSTRUMENTATION INFORMATION

TEST NO. 920605

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
1	LEFT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	7264	AS29	REAR
2	RIGHT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	7264	AR24	REAR
3	ENGINE TOP LONGITUDINAL	X	ENDEVCO	7264	AS76	REAR
4	ENGINE BOTTOM LONGITUDINAL	X	ENDEVCO	7264	BB67	REAR
5	RIGHT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	7264	AY59	REAR
6	LEFT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	7264	AZ31	REAR
7	INSTRUMENT PANEL CENTER					
	LONGITUDINAL	X	ENDEVCO	7264	AS44	REAR
	LAP BELT OUTBOARD FORCE		LEBOW	3419	610	TENSION
	SHOULDER BELT OUTBOARD FORCE		LEBOW	3419	590	TENSION
8	VEHICLE CENTER OF GRAVITY					
	LONGITUDINAL	X	ENDEVCO	7264	AY66	REAR
	LATERAL	Y	ENDEVCO	7264	AS03	RIGHT
	VERTICAL	Z	ENDEVCO	7264	AG24	UP

HEAVY TRUCK ACCELEROMETER INFORMATION

TEST NO. 920605

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
9	FRONT FRAME CROSSMEMBER	X	ENDEVCO	7264	CF11H	FRONT
		Y	ENDEVCO	7264	CL73H	LEFT
		Z	ENDEVCO	7264	CH97H	UP
10	TRUCK CENTER OF GRAVITY	X	ENDEVCO	7264	CJ04H	REAR
		Y	ENDEVCO	7264	CJ37H	RIGHT

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