

HS-806938

DOT 4881

MVMA SIDE IMPACT TESTING

MDB-TO-CAR SIDE IMPACT TEST OF
A 26° CRABBED MOVING DEFORMABLE BARRIER
TO A 1985 FORD LTD
AT 33.5 MPH

PREPARED BY:
TRANSPORTATION RESEARCH CENTER OF OHIO
ST. RT. 33 LOGAN COUNTY
EAST LIBERTY, OHIO 43319

TEST REPORT
TEST NO.: 850819
TEST DATE: AUGUST 19, 1985
TEST CONDITIONS: MODIFIED STRUCTURE, DUMMY
SEATED AGAINST PADDED DOOR PANEL

PREPARED FOR:
MGA RESEARCH CORPORATION
12790 MAIN ROAD
AKRON, NEW YORK 14001-0071

Prepared By: B. L. Wade

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J. F. Shultis

Manager, Impact Laboratory

Transportation Research Center of Ohio

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	metric ton	t
	(2000 lb)			
VOLUME				
tsp	teaspoons	5	milliliters	ml.
Tbsp	tablespoons	15	milliliters	ml.
in ³	cubic inches	16	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	degrees Fahrenheit	5	degrees Celsius	°C
		subtracting 32)		

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	
	(10 000 m ²)			
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
	(1000 kg)			
VOLUME				
ml.	milliliters	0.03	fluid ounces	fl oz
ml.	milliliters	0.06	cubic inches	in ³
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	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F

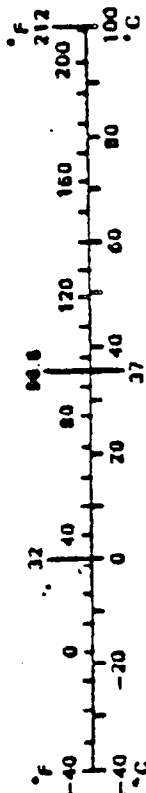


TABLE OF CONTENTS

	<u>Page</u>
1.0 PURPOSE AND INTRODUCTION	1-1
2.0 TEST PARAMETER DATA	2-1
3.0 CRASH TEST DATA	3-1
APPENDIX A DATA PLOT PRESENTATION	A-1
APPENDIX B DUMMY CERTIFICATION	B-1

SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate occupant responses in a vehicle with a modified A-post and B-post structure and a hardboard door panel in a 90° side impact crash test.

INTRODUCTION

A stationary 1985 Ford LTD 4-door sedan was impacted on the right side by a Moving Deformable Barrier (MDB) on August 19, 1985. The test was to simulate an intersection collision with the striking vehicle travelling at 30 mph and the struck vehicle travelling at 15 mph. The orientation angle of the striking vehicle was 90° clockwise with respect to the longitudinal axis of the struck vehicle. The leading edge of contact was to be 37 inches forward of the vehicle center of gravity which is defined by accident investigation to be the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Ford LTD at 33.5 mph with the MDB's wheels crabbed counterclockwise to 26°. The actual test speed was 33.5 mph and the actual leading edge of contact was 38.8 inches forward of the midpoint of the Ford LTD's wheelbase.

The vehicle contained structural modifications in the A-post and B-post areas. The front passenger inner door panel was replaced with a padded panel. A side impact dummy (SID) was seated in the right front passenger seat with its shoulder just touching the padded door panel. Section 2 contains test parameter data. Section 3 contains crash test data. Appendix A contains Data Plots. Appendix B contains Dummy Certification Data.

SECTION 2.0
TEST PARAMETER DATA

This section includes the following information:

1. General Test Vehicle Information
2. Dummy Temperature Control and Positioning Data
3. High Speed Camera Information
4. Transducer Information

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford LTD

VIN: 1FABP39A7FG215186

BODY STYLE: 4-Door Sedan

MODEL YEAR: 1985

NHTSA NO.: DNA

COLOR: Midnight Blue

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT 140 cu. in.

TRANSMISSION DATA: Automatic

DATE VEHICLE RECEIVED: 8/2/85

ODOMETER READING: 432

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	No
OTHER			

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? NO (Test Modifications)
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

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

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 4/85

GVWR: 4225 LBS.,

GAWR: FRONT 2103 LBS., REAR 2255 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 30 psi; REAR 30 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): General Ameriway Radial P195/75R14

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

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

RIGHT FRONT	769	LBS.	RIGHT REAR	702	LBS.
LEFT FRONT	797	LBS.	LEFT REAR	690	LBS.
TOTAL FRONT WEIGHT	1566		LBS. (52.9 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1392		LBS. (47.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2958		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 27 1/16	;LF 26 9/16	;RR 24 5/16	;LR 24 1/4
PRE-TEST ATTITUDE:	RF 26 1/4	;LF 26 1/4	;RR 22 5/8	;LR 23 1/16
POST-TEST ATTITUDE:	RF 27 1/8	;LF 25 7/8	;RR 22 3/4	;LR 22 7/8

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 114 LBS. CARGO:

RIGHT FRONT	836	LBS.	RIGHT REAR	828	LBS.
LEFT FRONT	786	LBS.	LEFT REAR	803	LBS.
TOTAL FRONT WEIGHT	1622		LBS. (49.9% OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1631		LBS. (50.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3253		LBS.		

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

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT 2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS ACTUAL

TEST VOLUME: 14.7 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 16.0 GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No

FUEL INJECTION: No

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? DNA

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: P195/75R14 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Front - Split Bench
Rear - Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 3 FRONT

CARGO LOAD 100 LBS. 3 REAR
6 TOTAL

TOTAL 1000 LBS.

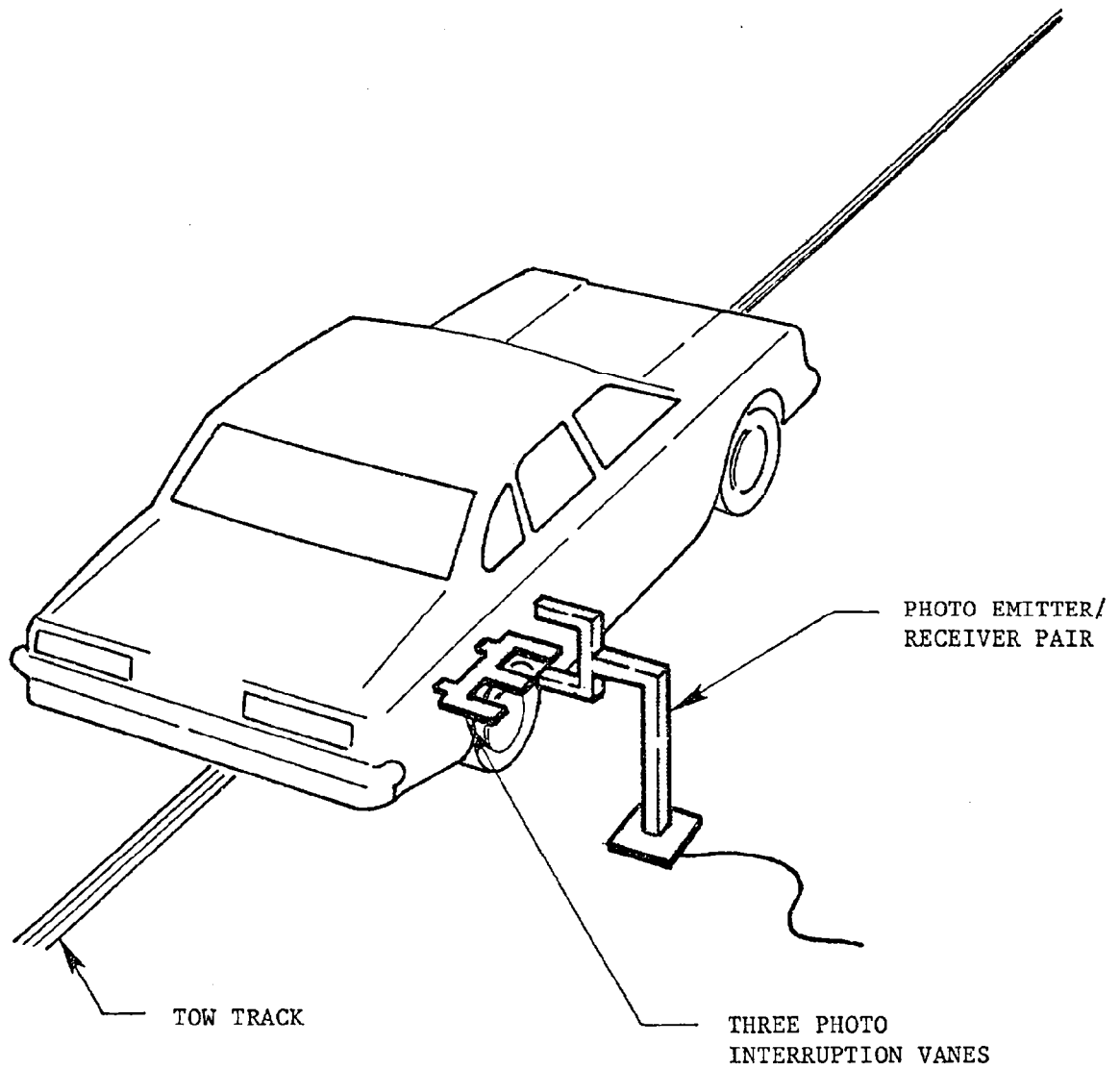
*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2958 + 1 \times 174 + 100 \text{ lbs.} \\ &= 3232 \text{ lbs.}\end{aligned}$$

To achieve test weight, the battery and the exhaust system were removed and 14.7 gallons of Stoddard Solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Force Plate manufactured by K.J. Law Engineers, Inc., Detroit, Michigan.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver 24 inches before impact.

The vanes have one foot spacing.

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperature inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained portably until approximately 1 minute prior to the test.

The following table summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

SIDE IMPACT DUMMY SEATING PROCEDURE

The following is an outline of the Side Impact Dummy Seating Procedure which is currently being developed.

1. The seat is placed in the midpoint of the fore to aft adjustment.
2. The H-point location of the NHTSA Side Impact Dummy (SID) is located by using the SAE three-dimensional H-point machine (SAE J826 APR80 - 50TH Percentile Male Configuration). The H-point machine is positioned in the right front outboard designated seating position such that the midsagittal plane is vertical and longitudinal. The H-point is located and documented using Sections 4 through 6 of SAE Standard J826 APR80.
3. The H-point machine is removed and the SID is positioned in the right front passenger seat such that its right shoulder is either five inches from or against the hardboard or padded inner door panel. The knees are initially set 11 1/2 inches apart, measured between the outer surfaces of the knee pivot bolt heads, if possible. The H-point is then positioned to within 1/2 inch of the coordinates of the H-point machine H-point location found in Step 2 by applying force in the appropriate direction to the dummy's lower torso. If the dummy's upper torso does not rest against the seatback, position the torso without moving the H-point so the upper torso does rest against the seatback. The dummy's feet are then positioned such that the heels rest on the floorpan and the feet are on the toeboard. If the dummy's feet will not reach the toeboard, the feet are positioned such that the feet are at right angles to the lower legs. If wheelhouse projections interfere with the above positioning of the feet, the heel is placed on the floorpan with the foot perpendicular to the lower leg by twisting the foot about the ankle.
4. Prior to the crash test the dummy's longitudinal and lateral head locations are rechecked. The dummy is then visually checked.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Ford LTD

FRONT SEAT TYPE: BENCH
BUCKET
X SPLIT BENCH

ADJUSTER TYPE: X MANUAL
POWER

BUCKET SEAT BACK TYPE: X FIXED
ADJUSTABLE

TECHNICIANS:
 1. J. Clarridge

POSITIONING DATE: August 19, 1985

2. J. Kauffman

AMBIENT TEMP: 72 °F TIME: 9:00

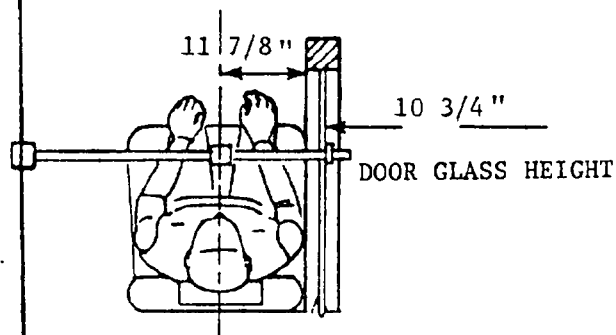
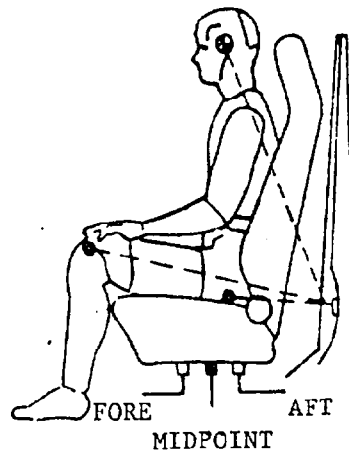
3. _____

FRONT PASSENGER DUMMY # 119

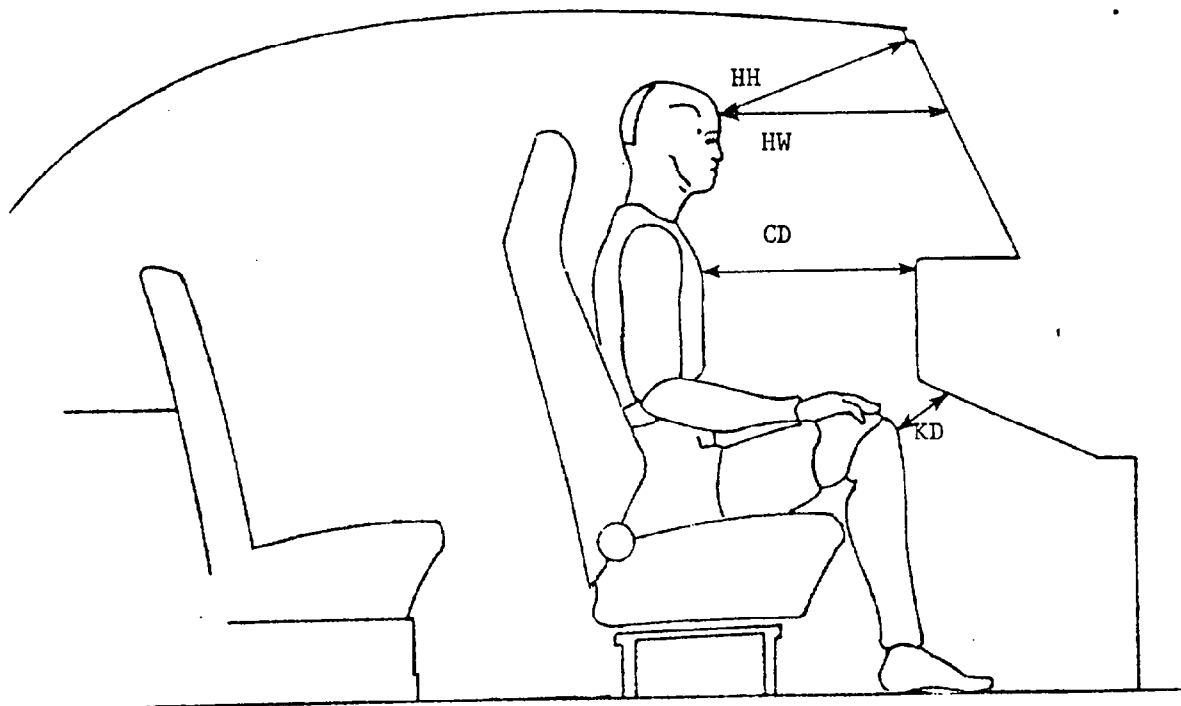
20 1/8" HEAD
4° TARGET*

24 5/16" KNEE
90° JOINT

APPROX.
11 5/16" "H"
115 POINT



*All passenger dummy dimensions referenced to top of front door striker bolt and all angles referenced to vertical.

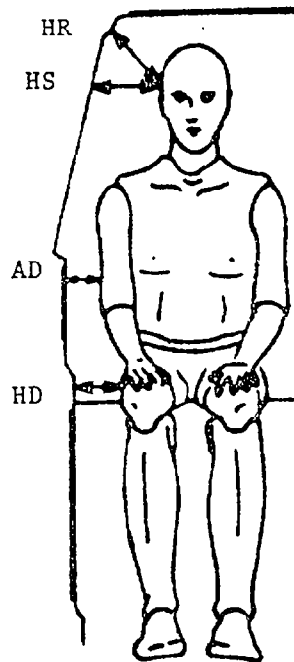


PASSENGER
119

HH	12
HW	18 1/2
CD	20 1/4
KDL	5 9/16
KDR	5 5/8

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSION



PASSENGER
119

HR	7 3/8
HS	9 5/16
AD	0
HD	1/2

ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
7	-6'11 1/2"	-25'10 1/2"	+ 3'3"
6	-23'4 3/4"	+41'6 1/2"	+ 3'1"
4	0	0	+40'
5	+1'	0	+40'

Origin of Coordinate System is Point of Impact

+X = Forward with Respect to Striking Vehicle's Velocity Vector
+Y = Rightward with Respect to Striking Vehicle's Velocity Vector
+Z = Upward with Respect to Striking Vehicle's Velocity Vector

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1		Beaulieu	18 - 86	24	Documentary
2	Panning	Kodak	16	24	Real Time
3	MDB Wide	Photosonic 1B	13	1000	View Impact
4	Overhead Tight	Photosonic 1B	25	988	View Impact
5	Overhead Wide	Photosonic 1B	8	963	Vehicle Crush
6	Right	Photosonic 1B	25	998	Vehicle Crush
7	Left	Photosonic 1B	13	1000	Vehicle Crush
8	Onboard Windshield	Photosonic 1B	8	998	Dummy Kinematics
9	Onboard Roof	Photosonic 1B	8	988	Dummy Kinematics
10	Onboard Door	Photosonic 1B	8	1003	Dummy Kinematics

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM.
 (24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH
 AND CRASH EVENT SPLICED AT START AND END OF FILM.

TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	LOCATION	TYPE OF TRANSDUCER	MFGR	MODEL NUMBER	SERIAL NUMBER
HEDXG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	AY95
HEDYG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	BA26
HEDZG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	AA33
T01XG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AR93
T01YG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AN61
T01YGB	UPPER SPINE	ACCEL.	ENDEVCO	2264	AZ77
T01ZG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AN37
T12XG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	AZ55
T12YG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	BA64
T12YGB	LOWER SPINE	ACCEL.	ENDEVCO	2264	AZ74
T12ZG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	BA30
RURYG2	RIGHT UPPER RIB	ACCEL.	ENDEVCO	2264	AR82
RURYGB	RIGHT UPPER RIB	ACCEL.	ENDEVCO	2264	AZ24
RLRYG2	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AN60
RLRYGB	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AY78
PEVXG2	PELVIS	ACCEL.	ENDEVCO	2264	AR78
PEVYG2	PELVIS	ACCEL.	ENDEVCO	2264	AN01
PEVZG2	PELVIS	ACCEL.	ENDEVCO	2264	AJ35
RRTYD2	RIGHT RIB TO SPINE DISPLACEMENT	LINEAR POT.	BOURNS	5184	4081-191
RFDYG1	RIGHT FRONT DOOR-POSITION 1	ACCEL.	ENDEVCO	2264	AT26
RFDYG2	RIGHT FRONT DOOR-POSITION 2	ACCEL.	ENDEVCO	2264	AS36
RFDYG3	RIGHT FRONT DOOR-POSITION 3	ACCEL.	ENDEVCO	2264	BC29
RFDYG4	RIGHT FRONT DOOR-POSITION 4	ACCEL.	ENDEVCO	7264	AN86
LFSXG	LEFT FRONT SILL	ACCEL.	B & H*	4-202-0001	18840
LFSYG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18236
LFSZG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18837
BCGXG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18851
BCGYG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18859
BCGZG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18836
BRCXG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	19022
BRCYG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	18237

*Bell & Howell

SECTION 3.0
CRASH TEST DATA

The following pages are included in this section:

1. Test conditions
2. Dummy accelerometer data summary
3. Dummy contact points and kinematic summary
4. Vehicle accelerometer locations and data summary
5. Vehicle static crush table and profiles
6. Deformable moving barrier accelerometer locations and data summary
7. Test anomalies

TEST CONDITIONS

TEST NUMBER: 850819

DATE OF TEST: August 19, 1985

TIME OF TEST: 1345

WIND VELOCITY: 3-6 mph 261° SW

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 77° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 78° F

DUMMY TEMPERATURE: 75° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	3253	3232
MDB TEST WEIGHT (LBS.)	2991	2992
MDB VELOCITY (MPH)	33.5	33.5
IMPACT POINT (INCHES)	38.8	37.0

DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:			SID		
SERIAL NO.:			119		
INSTRUMENTATION:					
HEAD ACCEL.:			3		
CHEST ACCEL.:			12		
FEMUR L.C.'S:			0		
OTHER:			3 Pelvis 1 Rib Disp.		

RESTRAINT SYSTEM: Dummy was unrestrained.

SIDE IMPACT DUMMY DATA SUMMARY

	PASSENGER DUMMY			
	POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**	
	MAX	TIME	MAX	TIME
	(g)	(msec)	(g)	(msec)
HEAD ACCELERATION				
LONGITUDINAL	7.61	278.00	16.31	87.25
LATERAL	7.81	30.63	19.07	44.63
VERTICAL	43.92	61.63	5.16	198.63
RESULTANT		45.10 @ 61.63		
HIC	153.14	from 39.12 to 107.88		
DELTA V (MPH)		-11.2 @ 141.63		
CHEST ACCELERATION				
UPPER SPINE				
LONGITUDINAL	12.67	31.88	9.49	67.50
LATERAL (P)***	15.38	58.75	49.46	32.50
LATERAL (R)***	17.92	58.75	48.34	32.50
VERTICAL	5.71	93.13	7.28	57.50
RESULTANT (P)		51.07 @ 32.50		
RESULTANT (R)		49.99 @ 32.50		
DELTA V (MPH)***		-23.44 @ 57.38 (P)		
		-21.63 @ 56.38 (R)		
LOWER SPINE				
LONGITUDINAL	6.46	64.38	18.99	58.75
LATERAL (P)****	6.42	60.00	59.33	31.25
LATERAL (R)	6.11	103.75	60.01	31.25
VERTICAL	2.88	155.63	8.84	58.13
RESULTANT (P)		61.41 @ 31.25		
RESULTANT (R)		62.07 @ 31.25		
DELTA V (MPH)		-25.41 @ 51.75 (P)		
		-25.32 @ 51.25 (R)		
RIGHT UPPER RIB				
LATERAL (P)	9.27	70.00	49.92	24.38
LATERAL (R)	10.01	70.00	51.43	24.38
DELTA V (MPH)		-20.97 @ 67.13 (P)		
		-21.14 @ 66.88 (R)		
RIGHT LOWER RIB				
LATERAL (P)	8.55	63.13	45.97	36.88
LATERAL (R)	6.62	63.13	50.30	36.25
DELTA V (MPH)		-22.44 @ 91.25 (P)		
		-23.90 @ 88.50 (R)		
PELVIS ACCELERATION				
LONGITUDINAL	6.78	162.13	24.78	40.63
LATERAL	9.66	189.75	51.59	36.88
VERTICAL	3.02	22.25	12.00	51.13
RESULTANT		52.25 @ 37.00		
DELTA V (MPH)		-27.17 @ 61.13		

SIDE IMPACT DUMMY DATA SUMMARY CONTD

PASSENGER DUMMY

	<u>POSITIVE</u> <u>DIRECTION*</u>		<u>NEGATIVE</u> <u>DIRECTION**</u>	
	<u>MAX</u> <u>(in)</u>	<u>TIME</u> <u>(msec)</u>	<u>MAX</u> <u>(in)</u>	<u>TIME</u> <u>(msec)</u>
RIB DEFLECTION	---	---χ	1.85	54.63

* LONGITUDINAL: FORWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

**LONGITUDINAL: REARWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

*** For dummy channels, Delta V is the velocity change at the approximate time of separation from the contact area.

**** (P) = Primary Sensor, (R) = Redundant Sensor

χ No positive value in time interval of interest.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER DNA	PASSENGER
Head	_____	<u>Top of door padding</u>
Chest	_____	<u>Door padding</u>
Abdomen	_____	<u>Door padding</u>
Left Knee	_____	<u>Right knee</u>
Right Knee	_____	<u>Door padding</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Normal</u>	<u>Tools required</u>
Rear	<u>Normal</u>	<u>DNA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>No</u>	<u>No</u>
Rear	<u>No</u>	<u>No</u>

GLAZING DAMAGE:

Front windshield was cracked.

All right side door glass except rear

door wing window was shattered.

OTHER NOTABLE IMPACT EFFECTS:

DUMMY KINEMATIC SUMMARY

Upon impact, the dummy's right leg and right side of the torso pushed into the inner door padding. The dummy's head rotated to the right and struck the top of the door padding. The dummy became airborne until the buttocks lodged behind the steering wheel while the upper torso swung up and to the left. The dummy came to rest left of center on the seat and partially reclined to the left.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

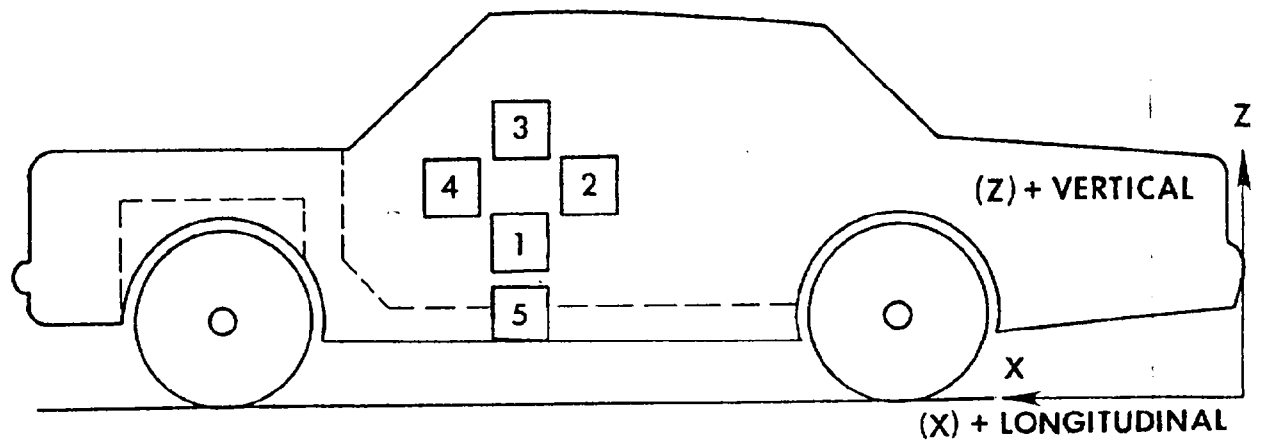
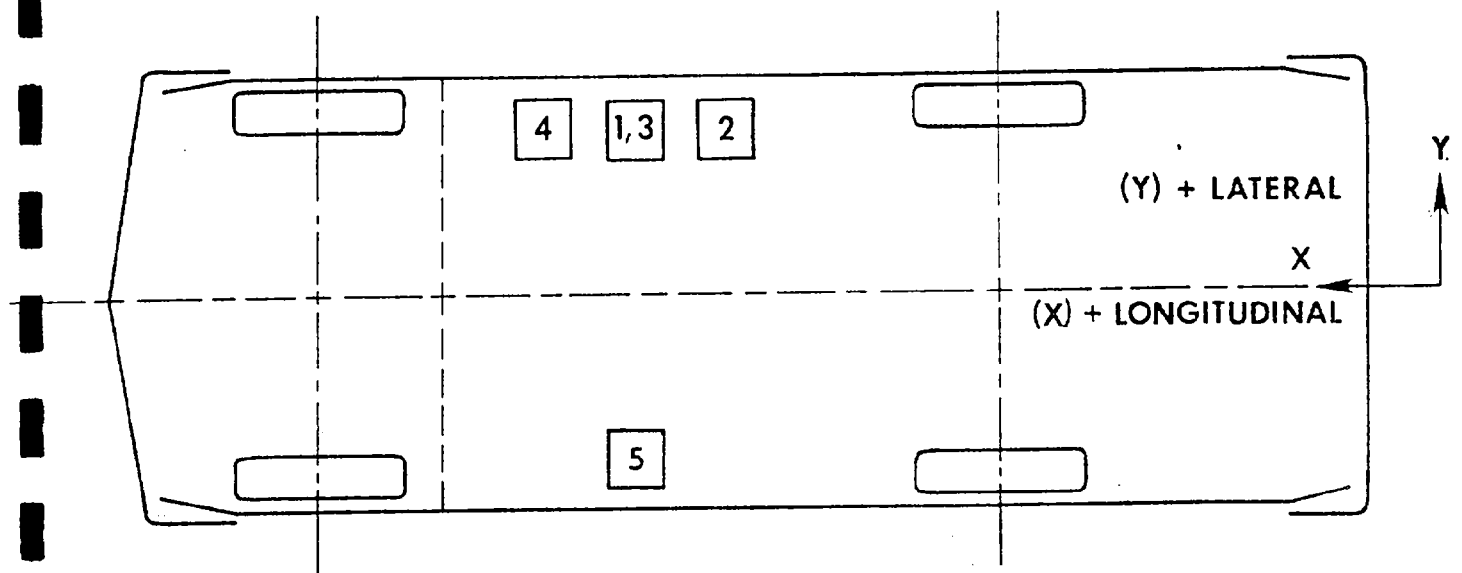
NO.	LOCATION	X*	Y*	Z*	POSITIVE**		NEGATIVE***	
					DIRECTION MAX (g)	TIME (msec)	DIRECTION MAX (g)	TIME (msec)
1	RIGHT FRONT DOOR CENTERLINE (LATERAL)	112.9	28.4	22.8				
	$\Delta V = -21.36$ mph @ 19.88 msec				36.95	28.63	152.86	12.13
2	MIDREAR OF RIGHT FRONT DOOR (LATERAL)	101.7	28.0	24.2				
	$\Delta V = -14.02$ mph @ 8.88 msec				175.29	19.13	129.27	9.75
3	UPPER RIGHT FRONT DOOR CENTERLINE (LATERAL)	113.1	28.1	29.3				
	$\Delta V = -16.92$ mph @ 21.50 msec				95.83	28.75	88.01	13.63
4	MIDFRONT OF RIGHT FRONT DOOR (LATERAL)	122.2	28.6	22.7				
	$\Delta V = -18.62$ mph @ 22.63 msec				89.32	45.00	137.84	11.13
5	LEFT SILL AT FRONT SEAT (LONGITUDINAL)	119.6	25.4	10.5				
	(LATERAL)				1.95	51.13	8.25	27.75
	(VERTICAL)				5.08	60.38	33.39	35.38
	(RESULTANT)				4.90	66.75	8.02	26.13
						33.57	@ 35.38	

* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right),
Z - Ground Level (+ Up)

LONGITUDINAL: FORWARD *LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD LATERAL: LEFTWARD
VERTICAL: DOWNWARD VERTICAL: UPWARD

All measurements of accelerometer locations in inches.

VEHICLE ACCELEROMETER PLACEMENT



VEHICLE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	78	72	66	60	54	48	42	36	30	24	18	12	6	0	6
		PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)														
Axle Height	11.2	X	17.9	17.8	17.8	17.6	17.6	17.6	17.5	17.5	17.5	17.5	17.4	17.4	17.2	X
H-Point	21.8	13.0	13.8	13.8	13.7	13.7	13.6	13.7	13.8	13.9	14.0	14.1	14.2	14.2	14.0	X
Window Sill	35.5	16.1	16.1	16.1	16.2	16.2	16.3	16.4	16.5	16.6	16.8	16.8	16.9	16.8	17.0	17.2
Window Top	54.8	23.9	23.8	23.8	23.9	23.9	24.0	24.1	24.1	24.1	X	X	X	X	X	X

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Axle Height	11.2	X	20.9	21.9	23.0	23.5	24.1	24.1	24.8	25.4	26.2	27.1	27.8	26.0	24.6	X
H-Point	21.8	15.9	23.1	26.8	26.9	25.2	23.4	24.9	26.0	26.0	25.8	25.5	25.2	25.2	23.8	X
Window Sill	35.5	19.4	22.8	26.2	27.4	26.8	23.6	23.2	23.1	23.1	22.9	22.6	22.1	21.2	21.0	20.6
Window Top	54.8	26.4	26.6	26.9	27.2	27.6	27.9	27.8	28.1	28.0	X	X	X	X	X	X

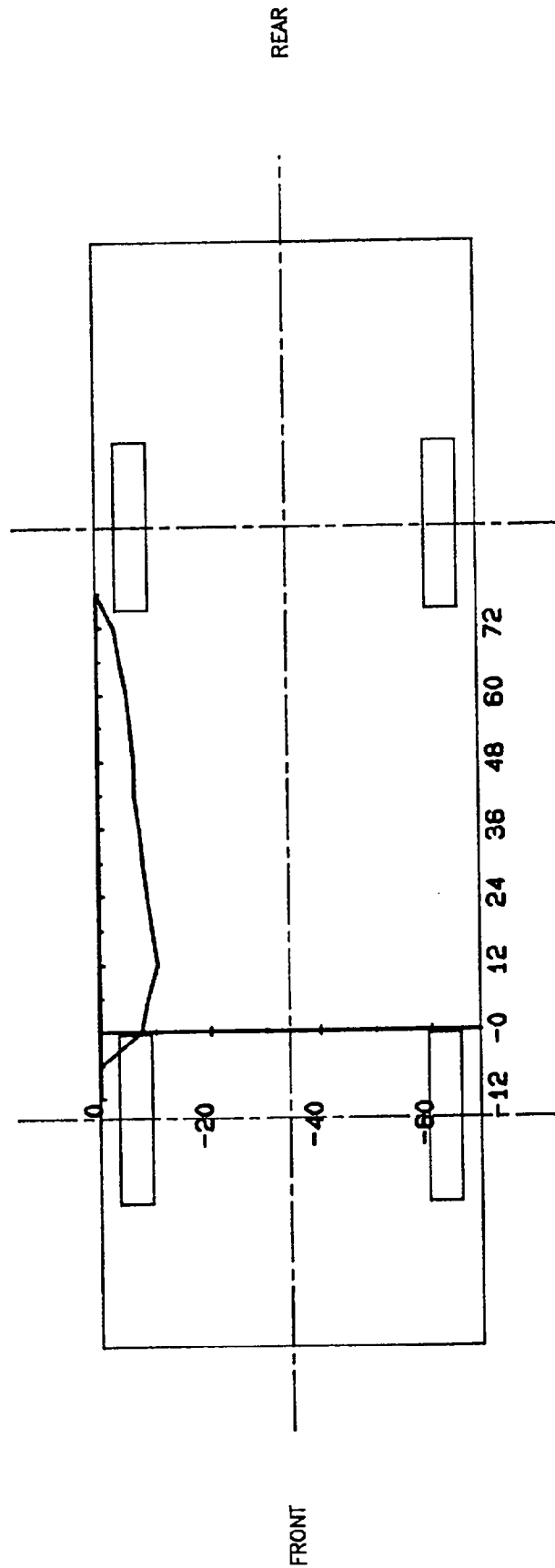
STATIC CRUSH (IN)

Axle Height	11.2	X	3.0	4.1	5.2	5.9	6.5	6.5	7.3	7.9	8.7	9.6	10.4	8.6	7.4	X
H-Point	21.8	2.9	9.3	13.0	13.2	11.5	9.8	11.2	12.2	12.1	11.8	11.4	11.0	11.0	9.8	X
Window Sill	35.3	3.3	6.7	10.1	11.2	10.6	7.3	6.8	6.6	6.5	6.1	5.8	5.2	4.4	3.0	3.4
Window Top	35.5	2.5	2.8	3.1	3.3	3.7	3.4	3.7	4.0	3.9	X	X	X	X	X	X

* Projected impact point is 37 inches forward of passenger side wheelbase midpoint. Column readings are rear to front from left to right.

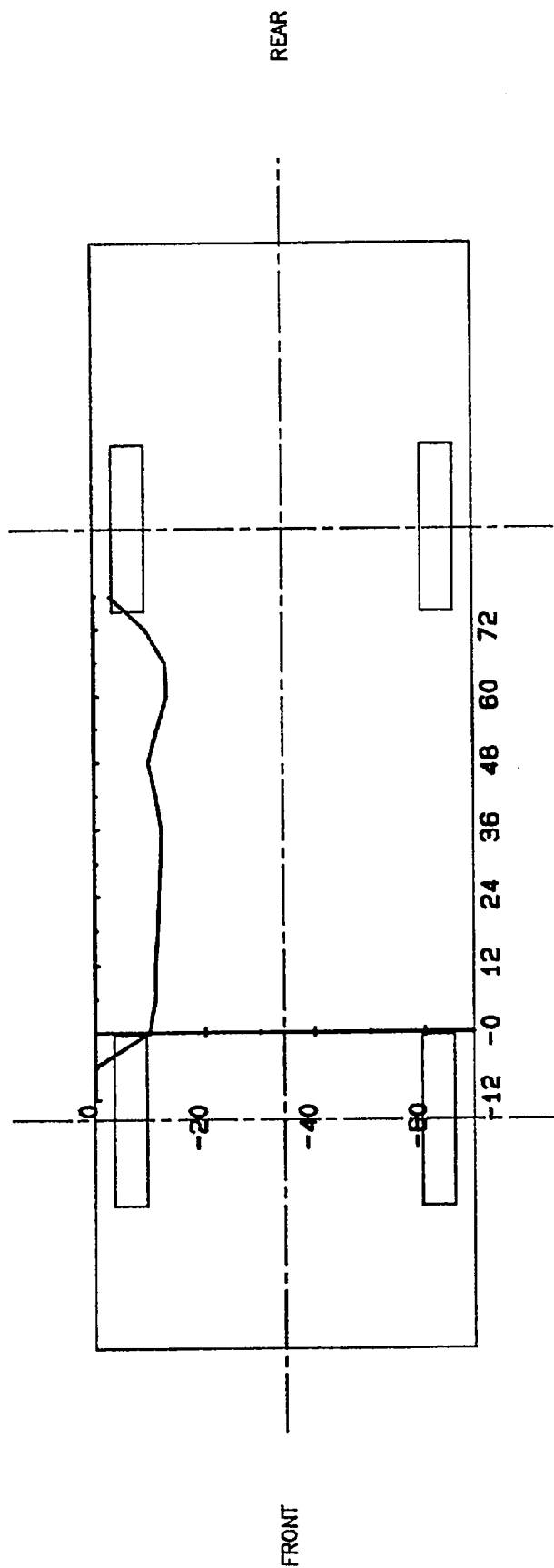
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



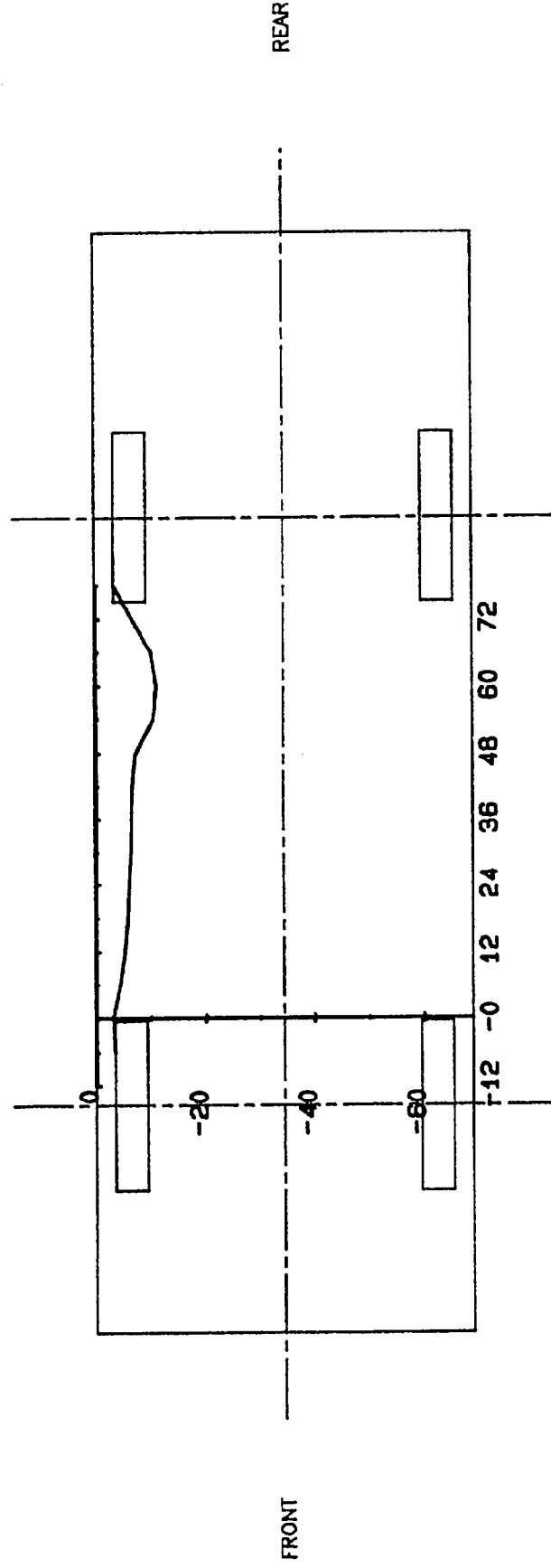
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 11.2" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



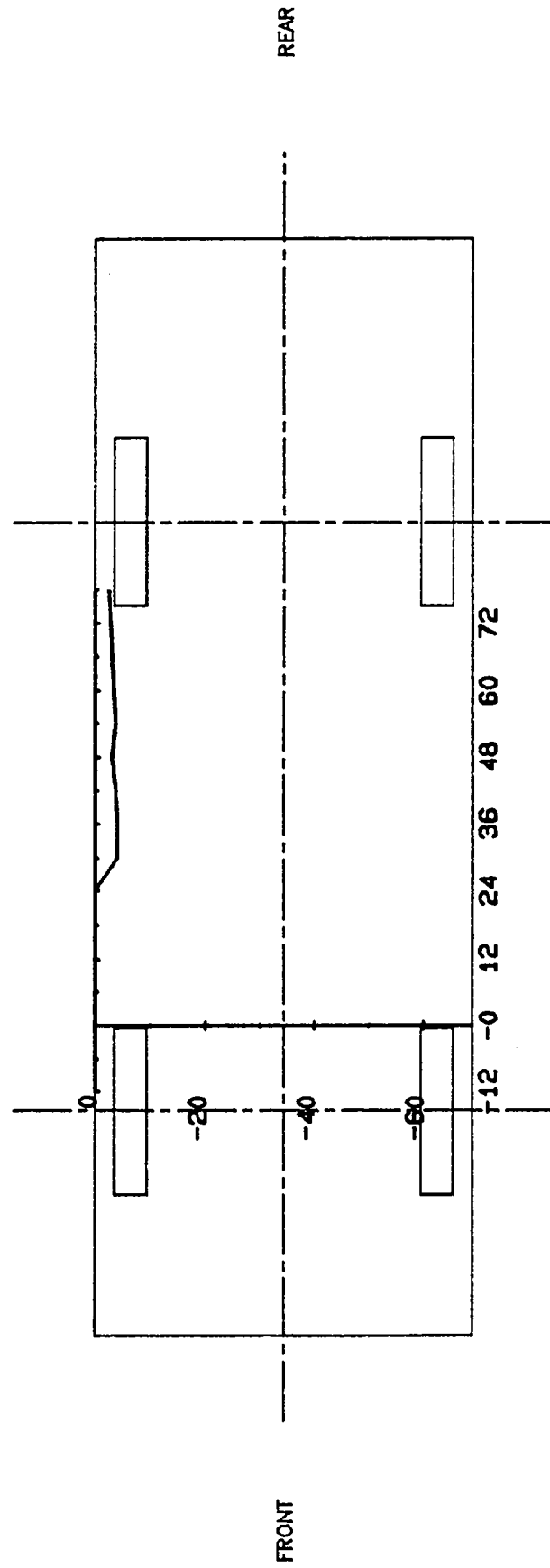
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 21.8" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



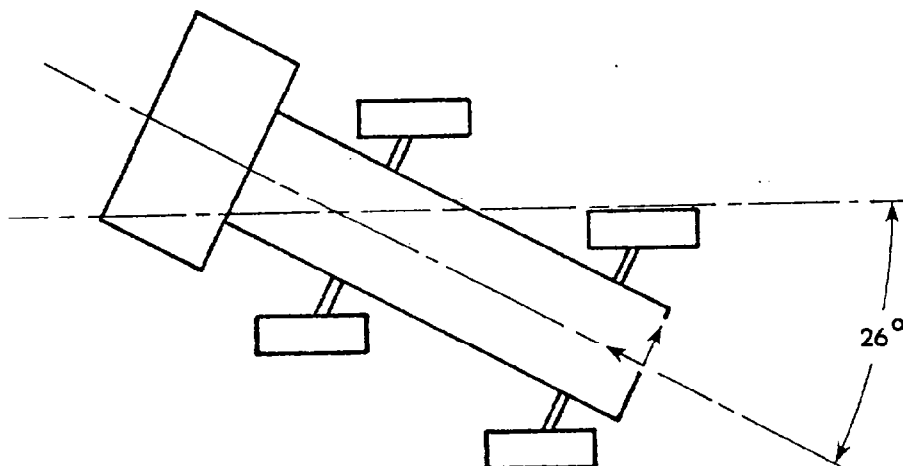
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 35.5" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 54.8" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE** DIRECTION		NEGATIVE*** DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	CENTER OF GRAVITY	73.0	0.9	11.9				
	(LONGITUDINAL)	$\Delta V = -20.18 @ 116.50$			0.40	318.63	17.79	35.25
	(LATERAL)	$\Delta V = 4.87 @ 116.50$			9.00	29.13	5.29	55.13
	(VERTICAL)				12.00	56.75	7.06	31.00
	(RESULTANT)				20.65 @ 30.50			
2	REAR FRAME MEMBER	18.5	-19.2	11.9				
	(LONGITUDINAL)	$\Delta V = -16.00 @ 116.50$			1.12	143.38	14.21	36.75
	(LATERAL)	$\Delta V = -0.72 @ 116.50$			2.84	98.25	4.76	23.25

* Reference: X - Rear Most Point of Frame (+ To Forward), Y - Barrier Centerline (+ To Right), Z - Ground Level (+ To Up)

LONGITUDINAL: FORWARD *LONGITUDINAL: REARWARD
 LATERAL: RIGHTWARD LATERAL: LEFTWARD
 VERTICAL: DOWNWARD VERTICAL: UPWARD

All measurements of accelerometer locations in inches.

APPENDIX A

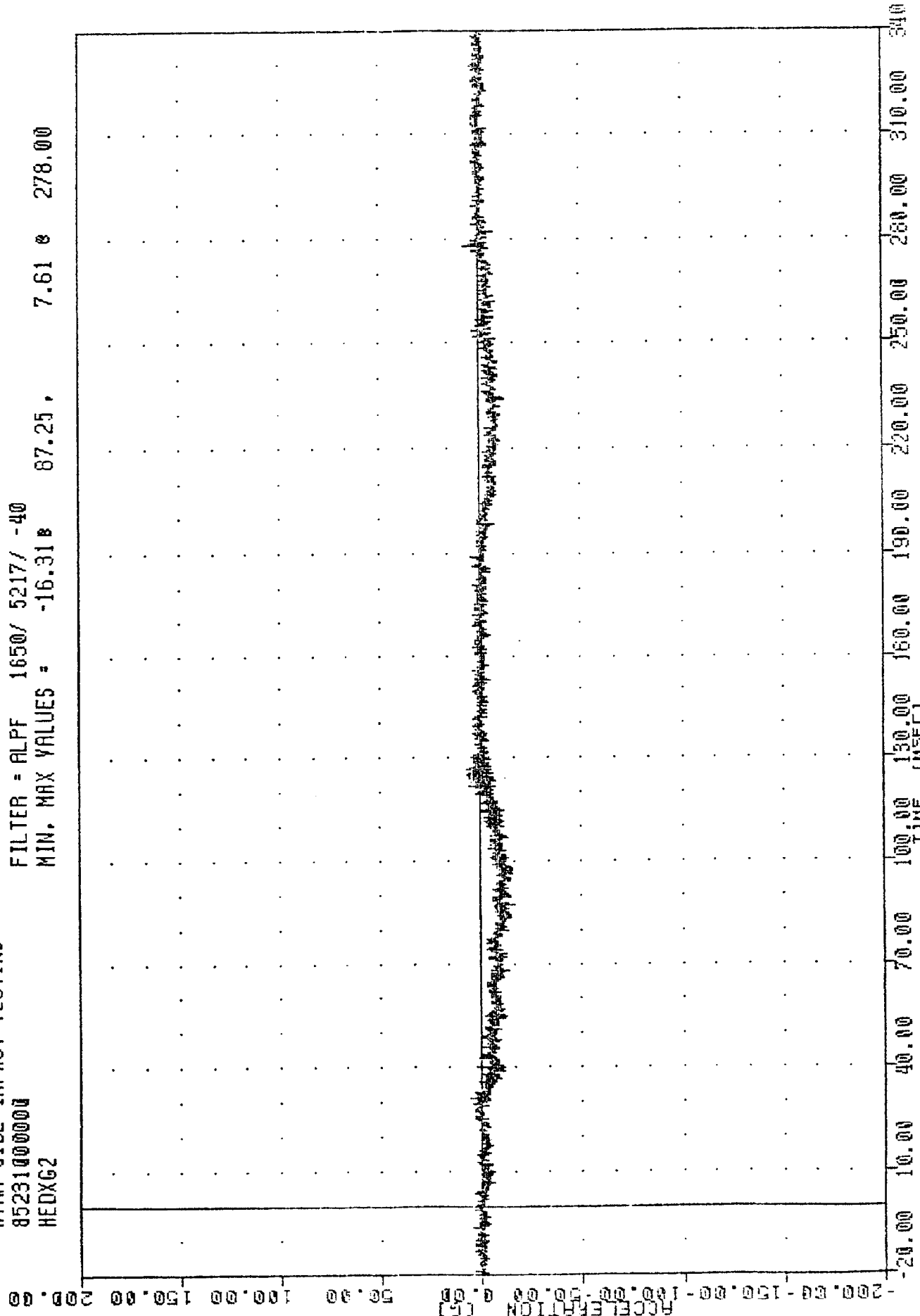
DATA PLOTS

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data were filtered according to SAE J211, except that dummy thorax data were filtered using the HSRI filter.

TRC
 NVMA SIDE IMPACT TESTING
 85231000000
 HEDXG2

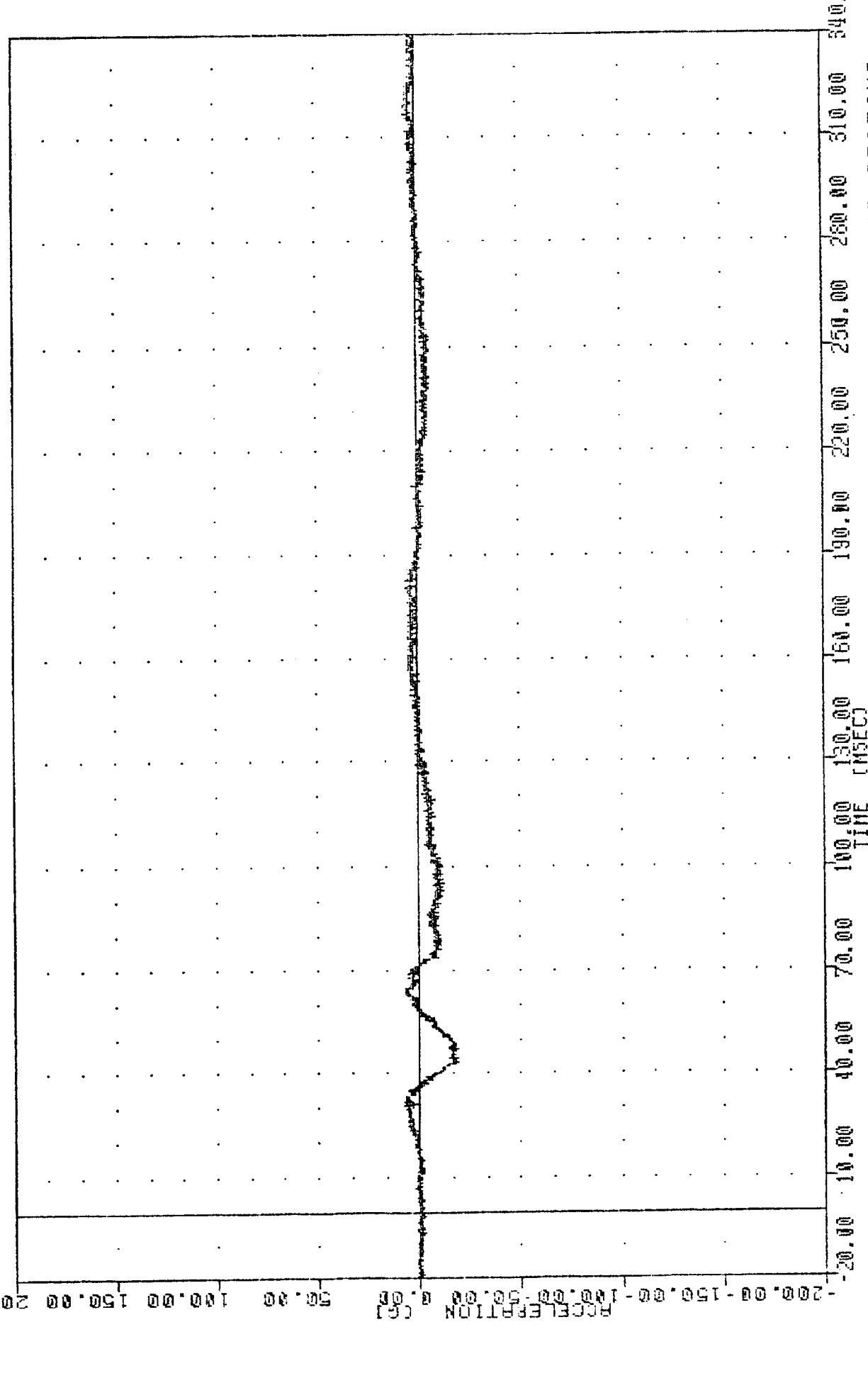
PLOT DATE 26-AUG-85 10:33:34

FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -16.318 87.25, 7.61 278.00



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER HEAD ACCELERATION X AXIS

TRC
 MVMA SIDE IMPACT TESTING
 85231000000
 HEDY62
 PLOT DATE 26-AUG-85 10:33:34
 FILTER = ALPF 1650/ 5217/ -10
 MIN. MAX VALUES = -19.07g 44.63, 7.81 g 30.63

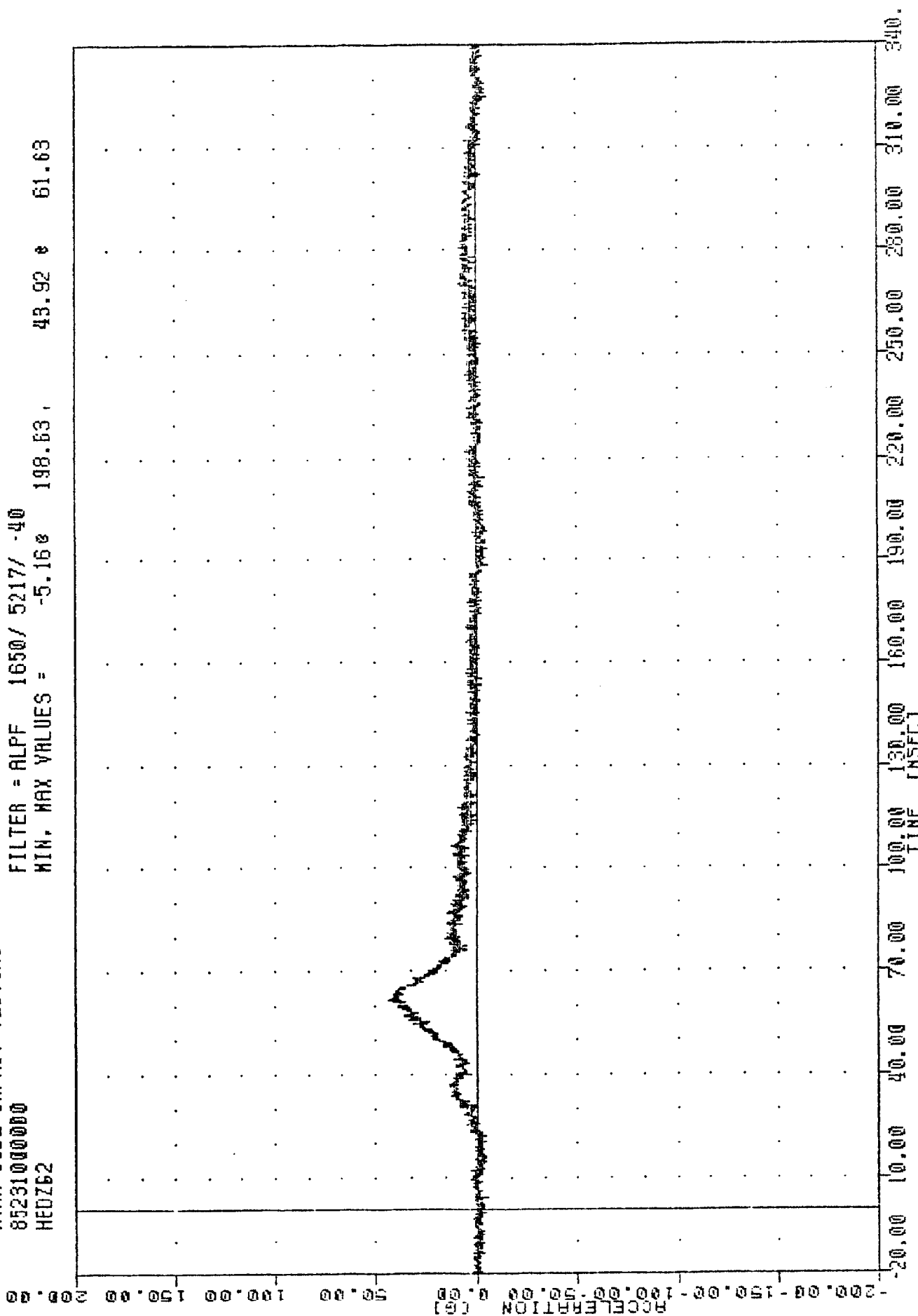


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER HEAD ACCELERATION Y AXIS

TAC
MVMA SIDE IMPACT TESTING
85231000000
HEDZ62

PLOT DATE 26-AUG-85 10:33:34

FILTER = ALPF 1650/ 5217/ -40
MIN, MAX VALUES = -5.16 198.63 43.92 61.63

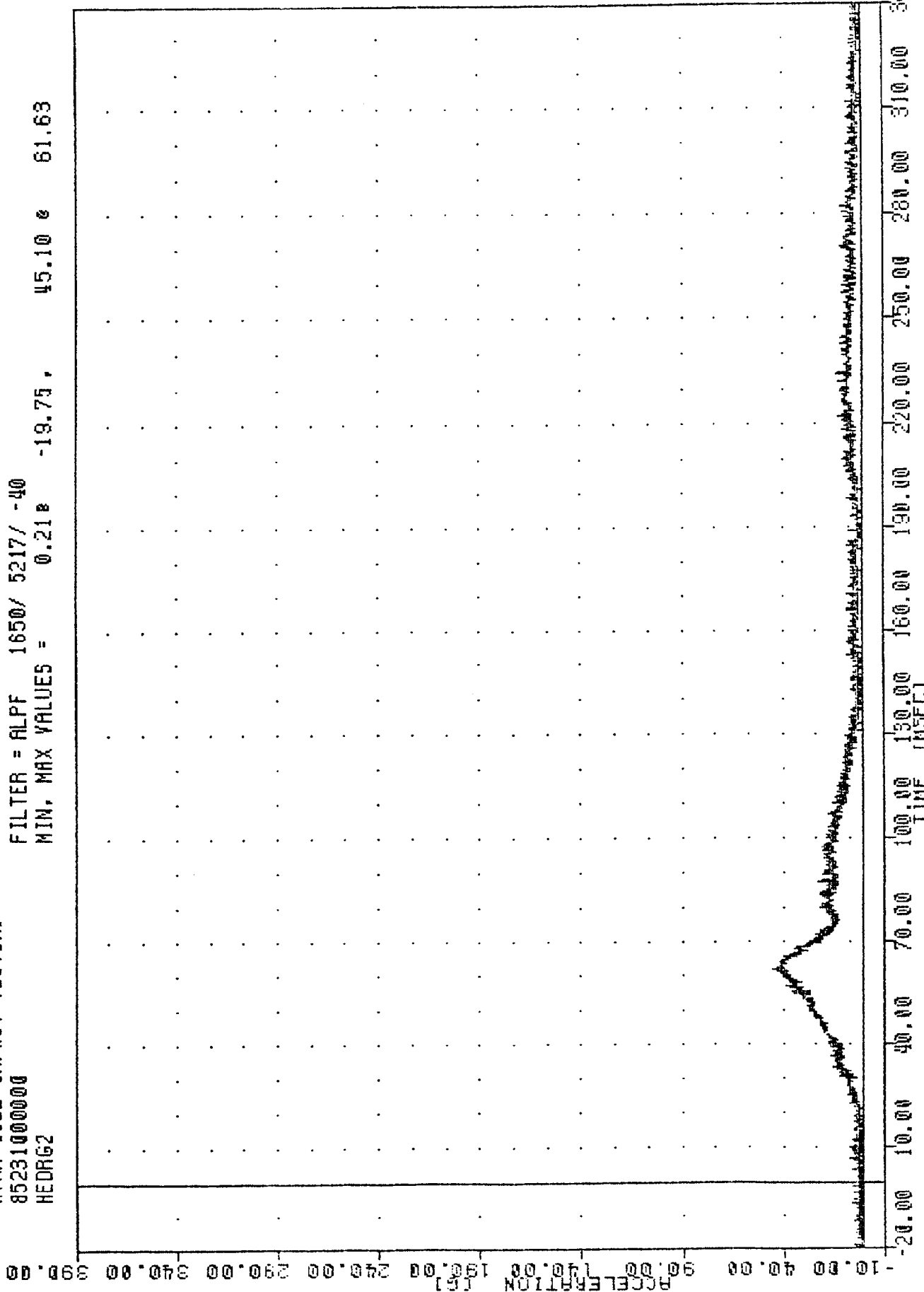


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
PASSENGER HEAD ACCELERATION Z AXIS

TRC , 850819
 NVMA SIDE IMPACT TESTING
 85231000000
 HEDRG2

PLOT DATE 26-AUG-85 10:33:34

FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = 0.218 -19.75, 45.10 & 61.63



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER HEAD RESISTANT ACCELERATION

TRC

850819

PLOT DATE

20 AUG 83

10:59:13

NVMA SIDE IMPACT TESTING

85231000000

HEDYV2

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -13.27 281.38, 1.33 37.88

20.00

10.00

0.00

-10.00

-20.00

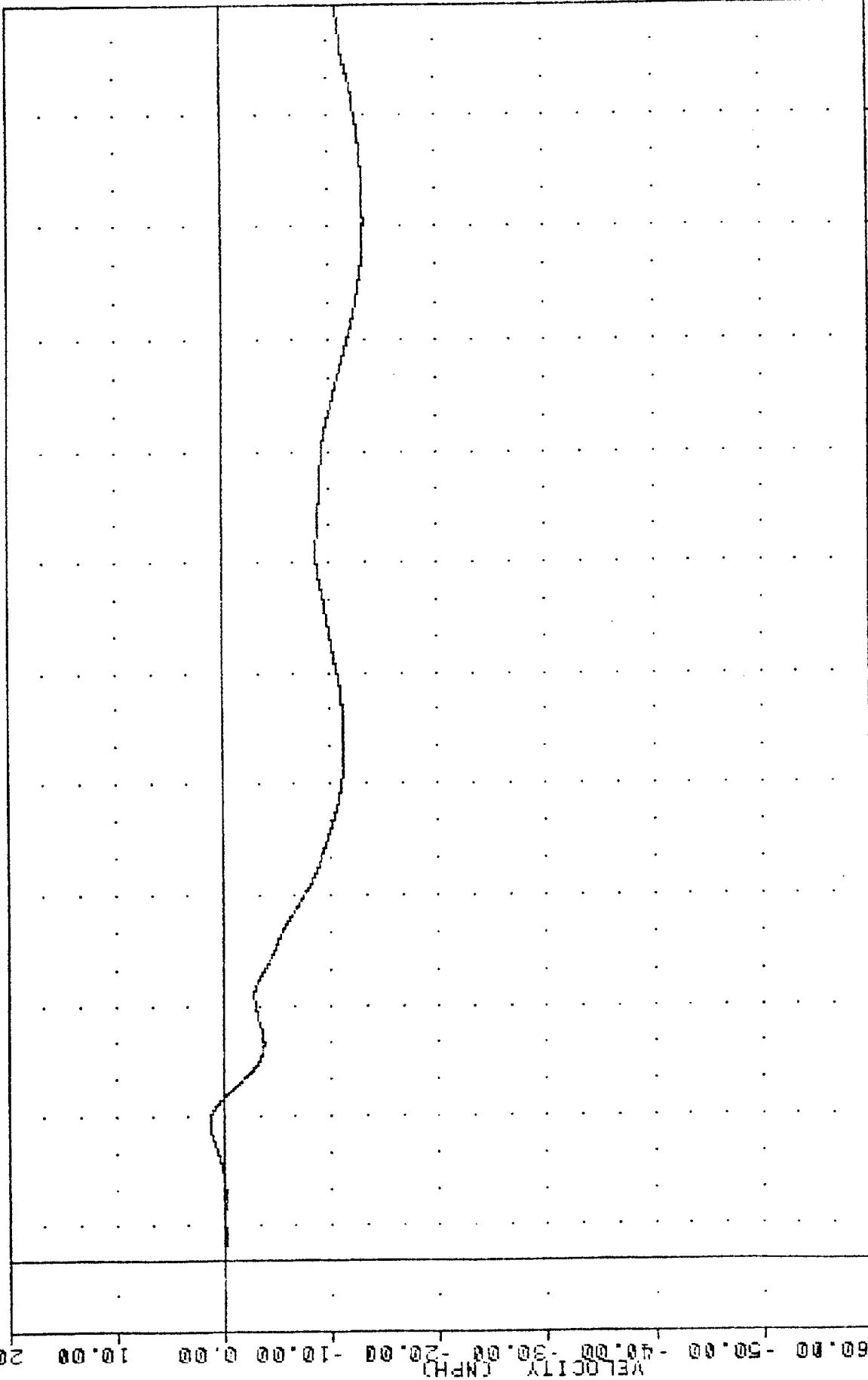
-30.00

-40.00

-50.00

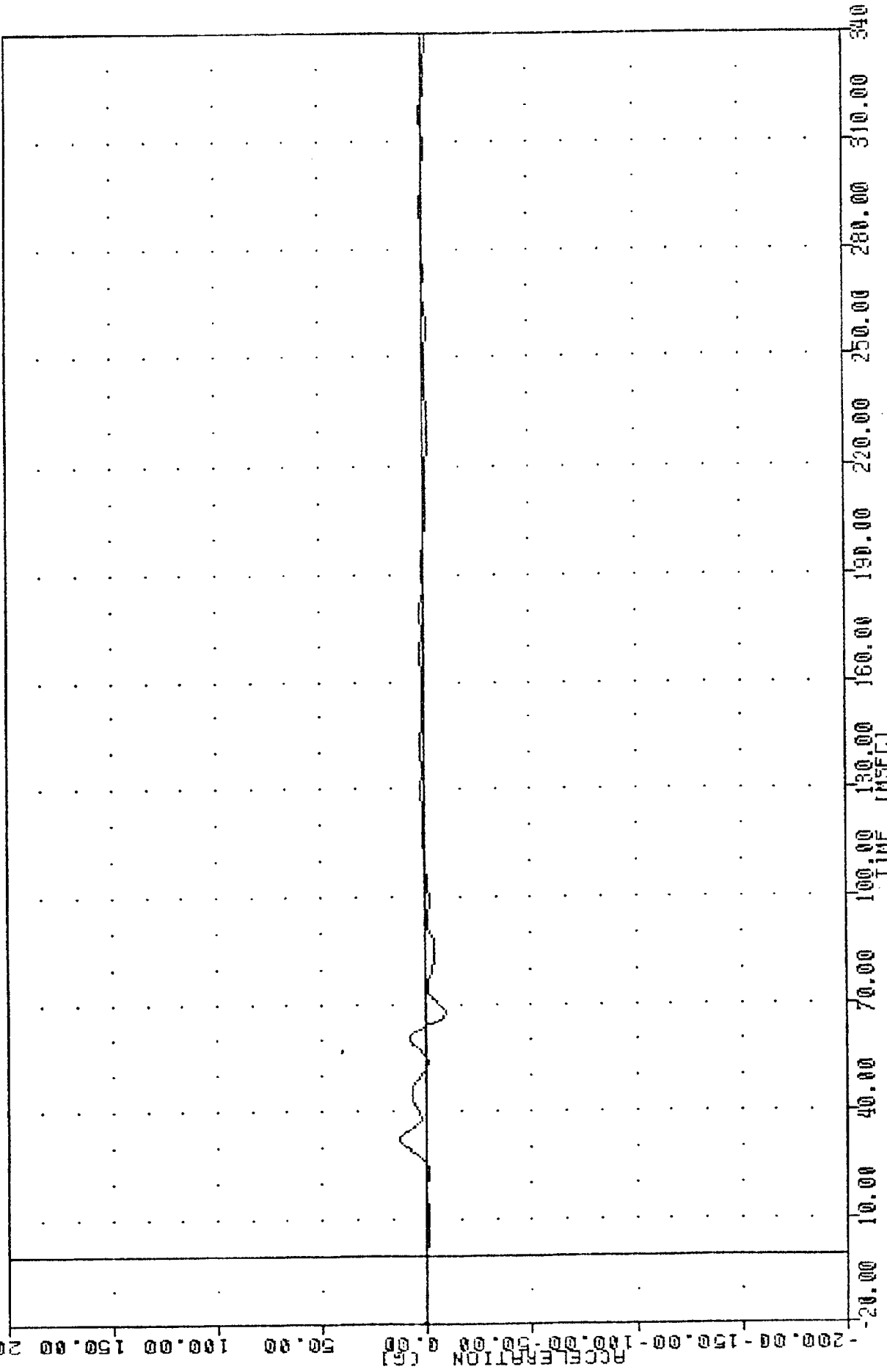
-60.00

9-V



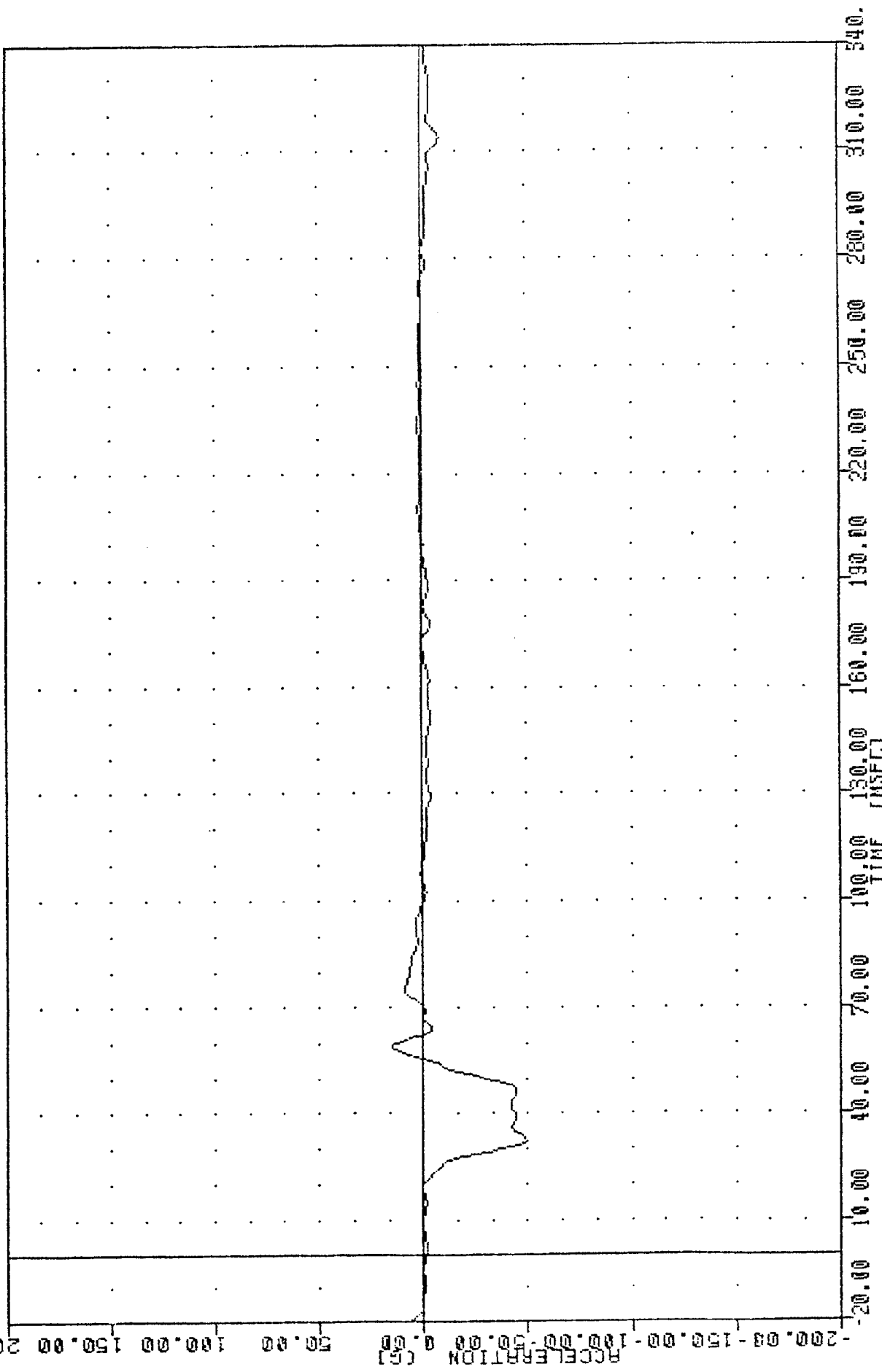
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
HEAD VELOCITY Y AXIS

7-50813
 NVMA SIDE IMPACT TESTING
 85231000000
 T01XG2
 TEST DATE 20-AUG-88 10:35:00
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -9.49g 67.50, 12.67 g 31.88



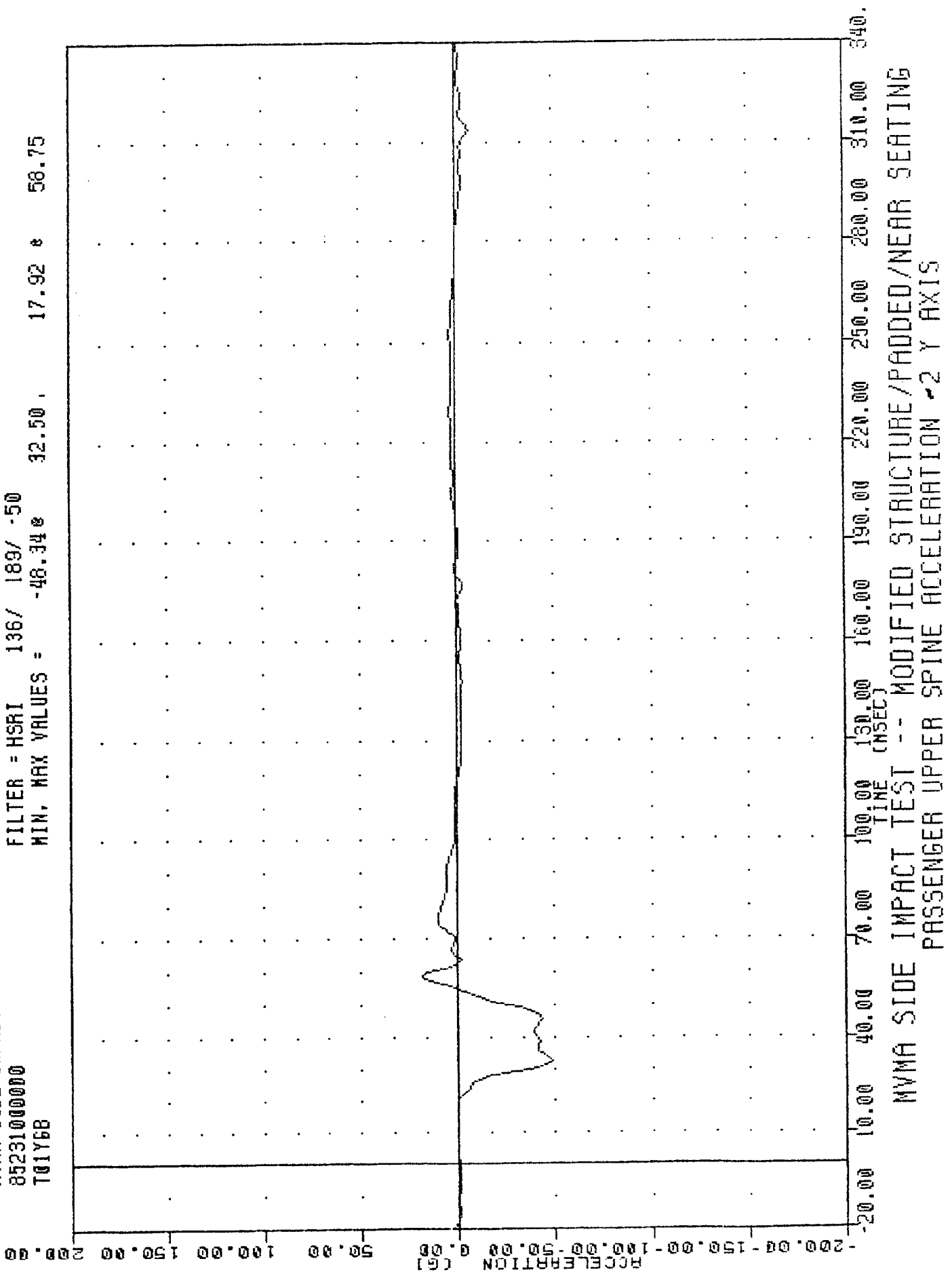
NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER UPPER SPINE ACCELERATION X AXIS

MVMA SIDE IMPACT TESTING
 85231000000
 T01Y62
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -49.46 32.50, 15.38 58.75
 20-AUG-80 10:35:00



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER UPPER SPINE ACCELERATION Y AXIS

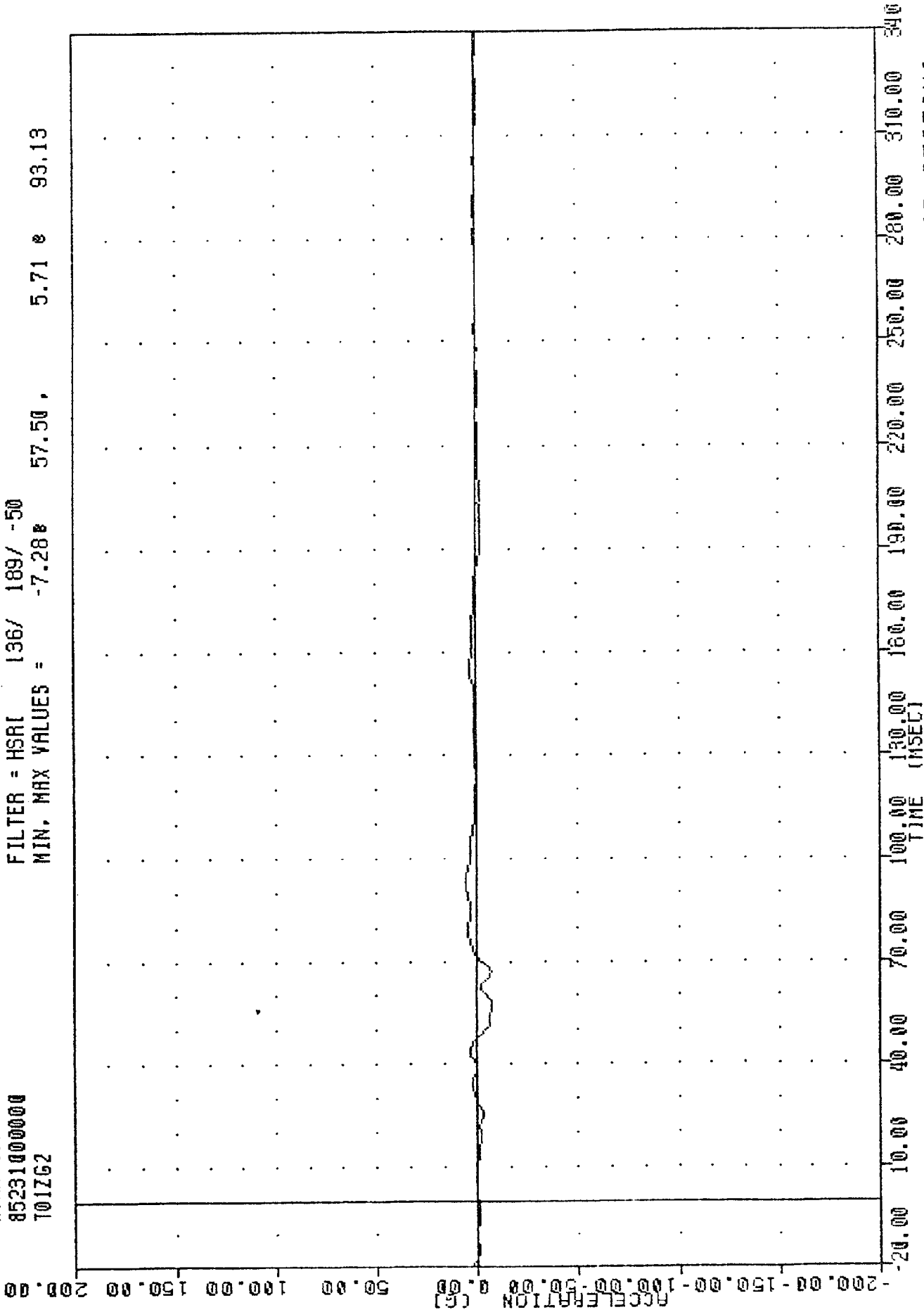
THC 850819 26-AUG-85 10:35:05
 MVMA SIDE IMPACT TESTING
 85231000000
 T01Y6B
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -48.34 32.50 17.92 58.75



TRC 850819
 NVMA SIDE IMPACT TESTING
 85231000000
 T01ZG2

PLUT DATE 28 AUG 83 10:35:00

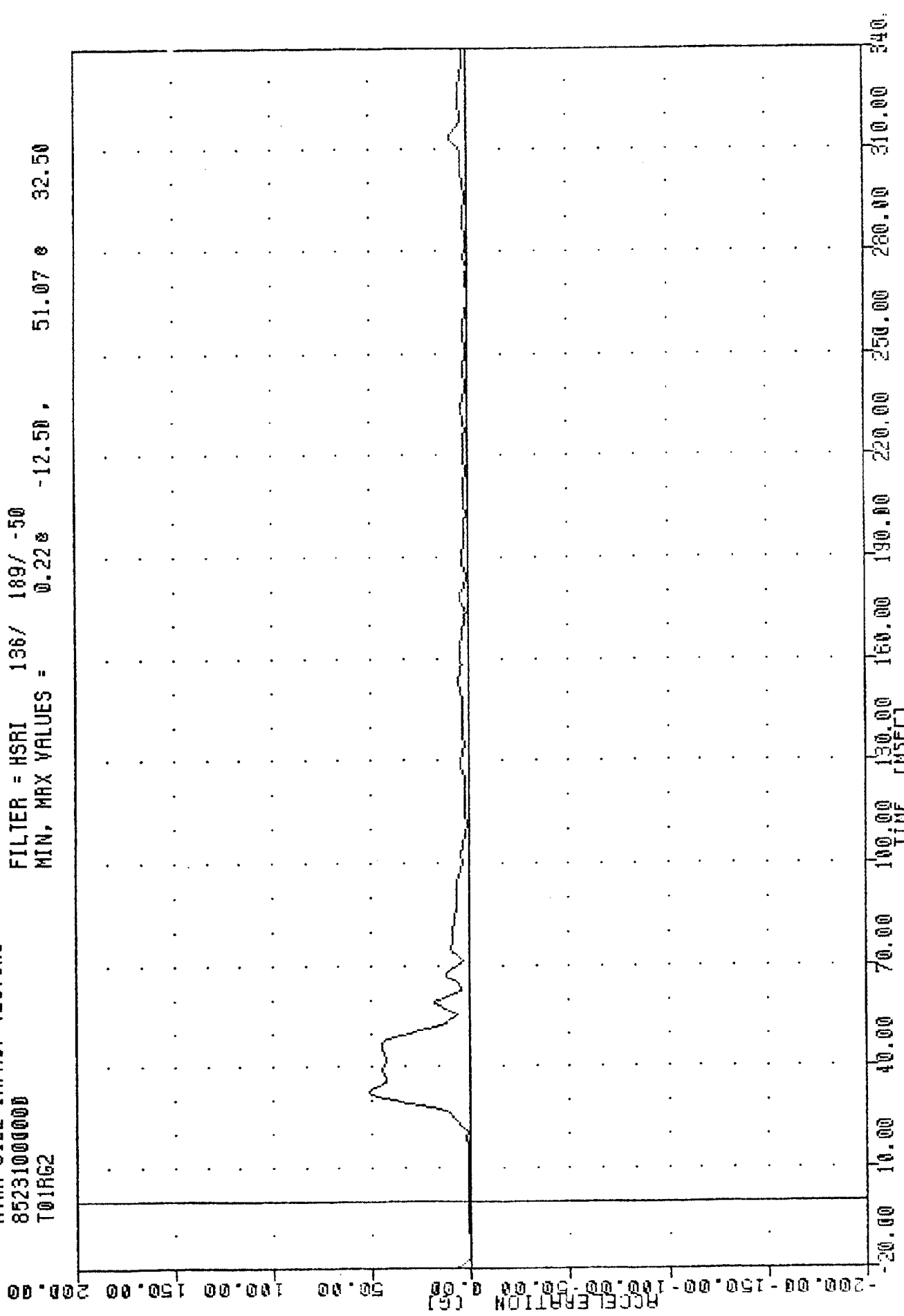
FILTER = HSRL 136/ 189/ -50
 MIN. MAX VALUES = -7.28 57.50, 5.71 93.13



MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER UPPER SPINE ACCELERATION Z AXIS

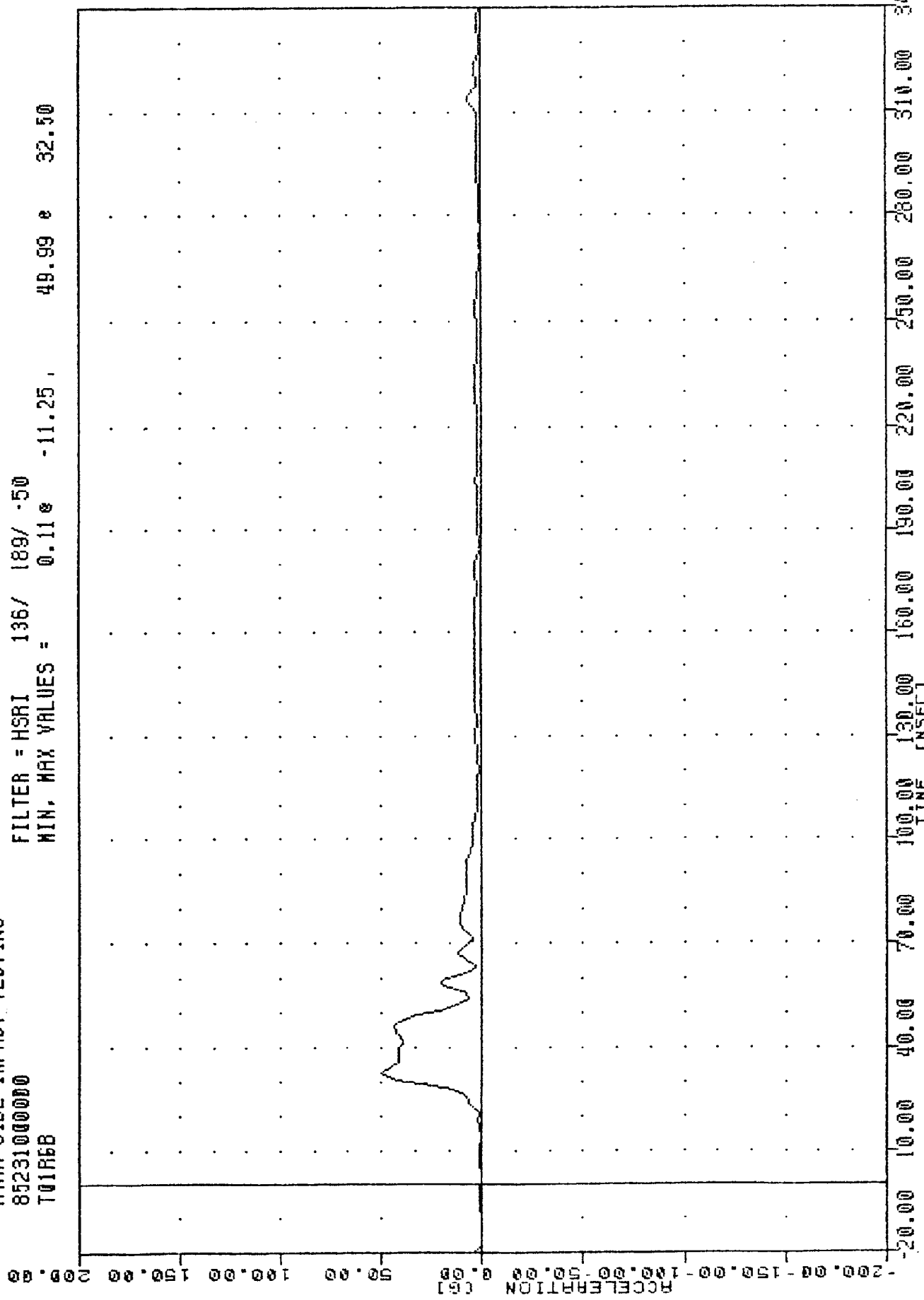
TRC 850819 26-AUG-83 10:35:03
 MVMA SIDE IMPACT TESTING
 85231000000
 T01RG2

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.220 -12.50, 51.07 0 32.50



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER UPPER SPINE RESULTANT ACCELERATION

THL 850819 26-AUG-85 10:35:05
 MVMA SIDE IMPACT TESTING
 85231000000
 T01R6B
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.11g -11.25, 49.99 g 32.50



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER UPPER SPINE RESULTANT ACCELERATION -2

PLT DATE 26 AUG 83 10:59.13

INC 850819

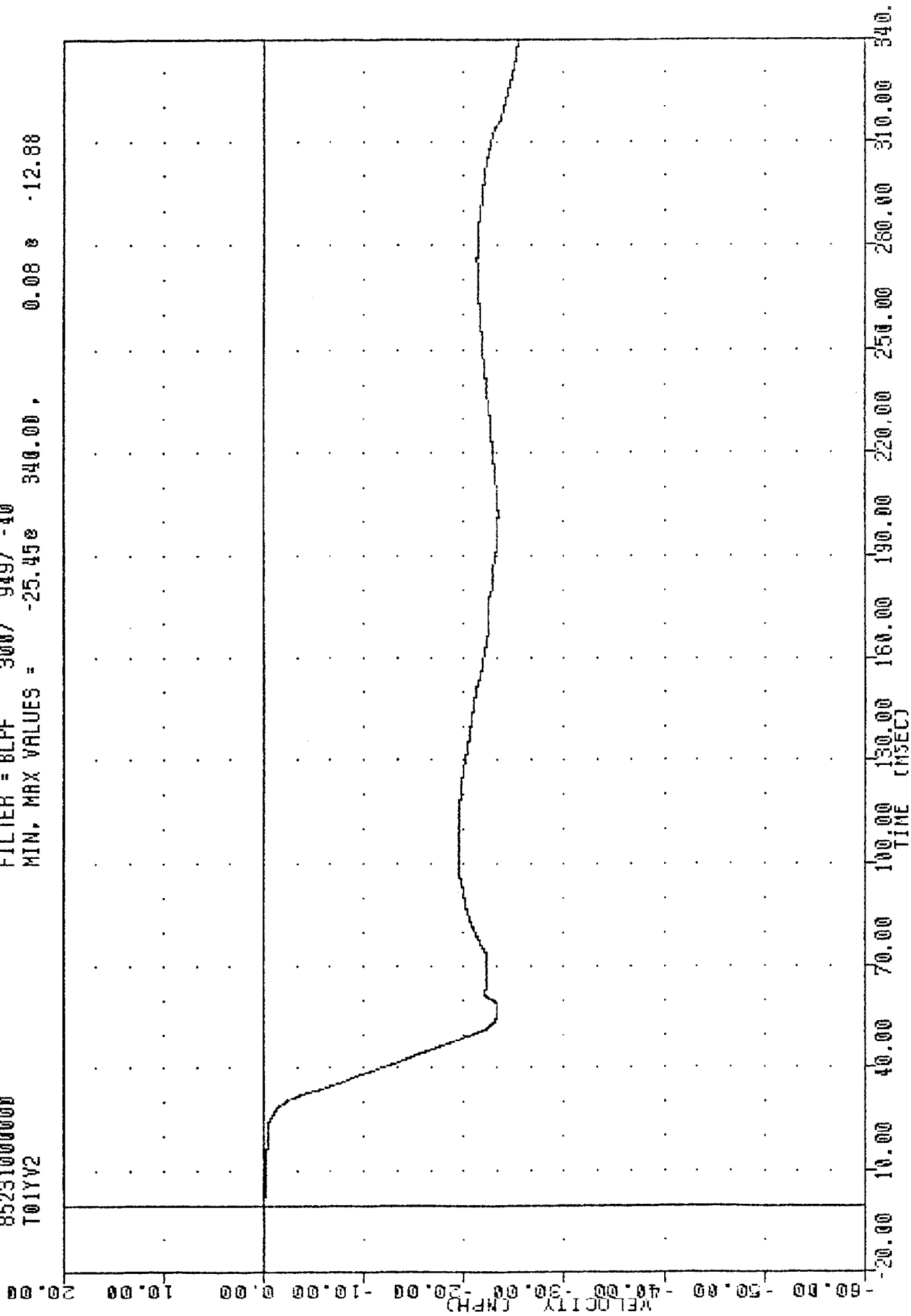
MVNA SIDE IMPACT TESTING

85231000000

T01YV2

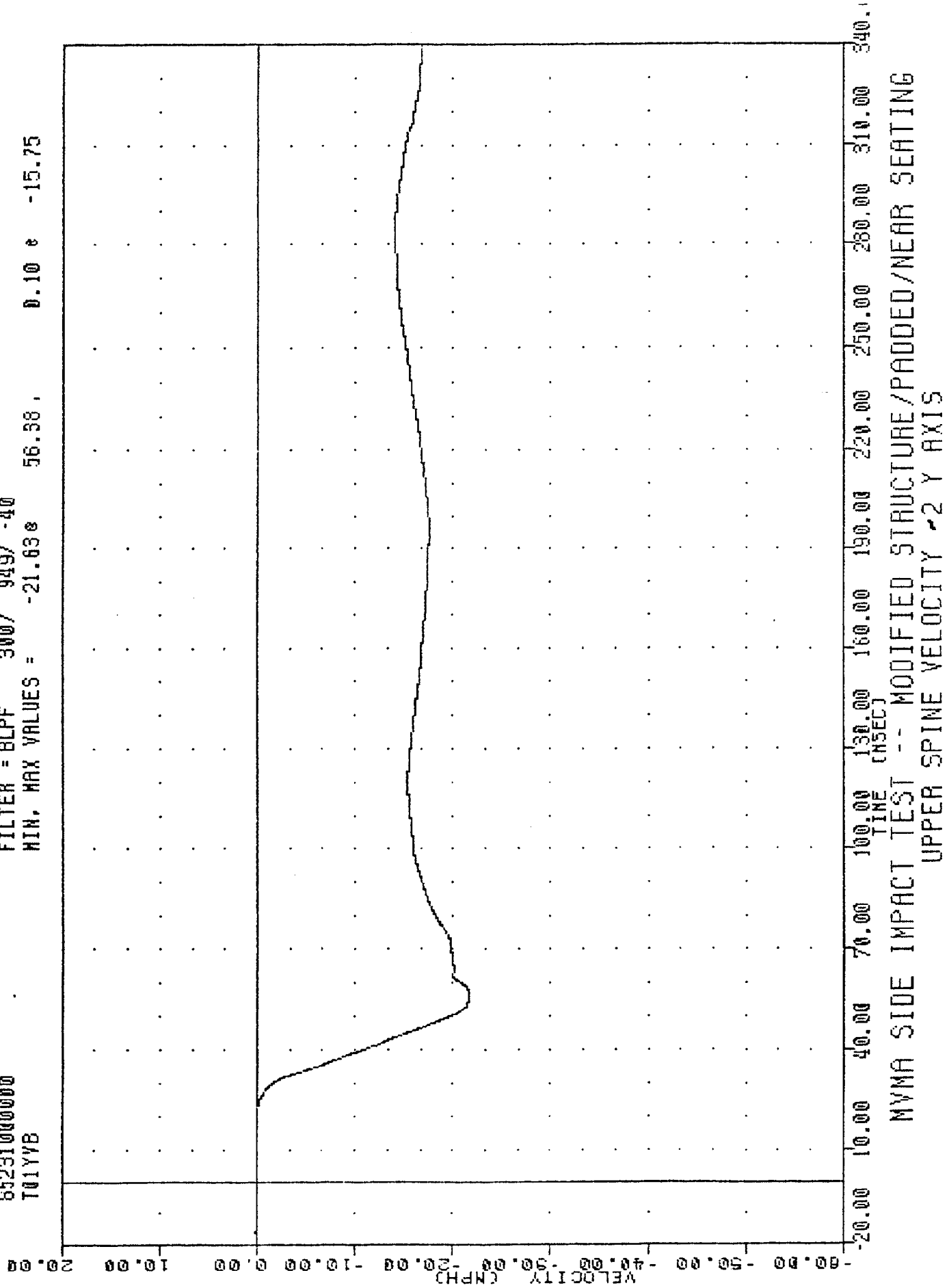
FILTER = BLFF 300/ 949/ -40

MIN, MAX VALUES = -25.450 340.00, 0.08 2 -12.88

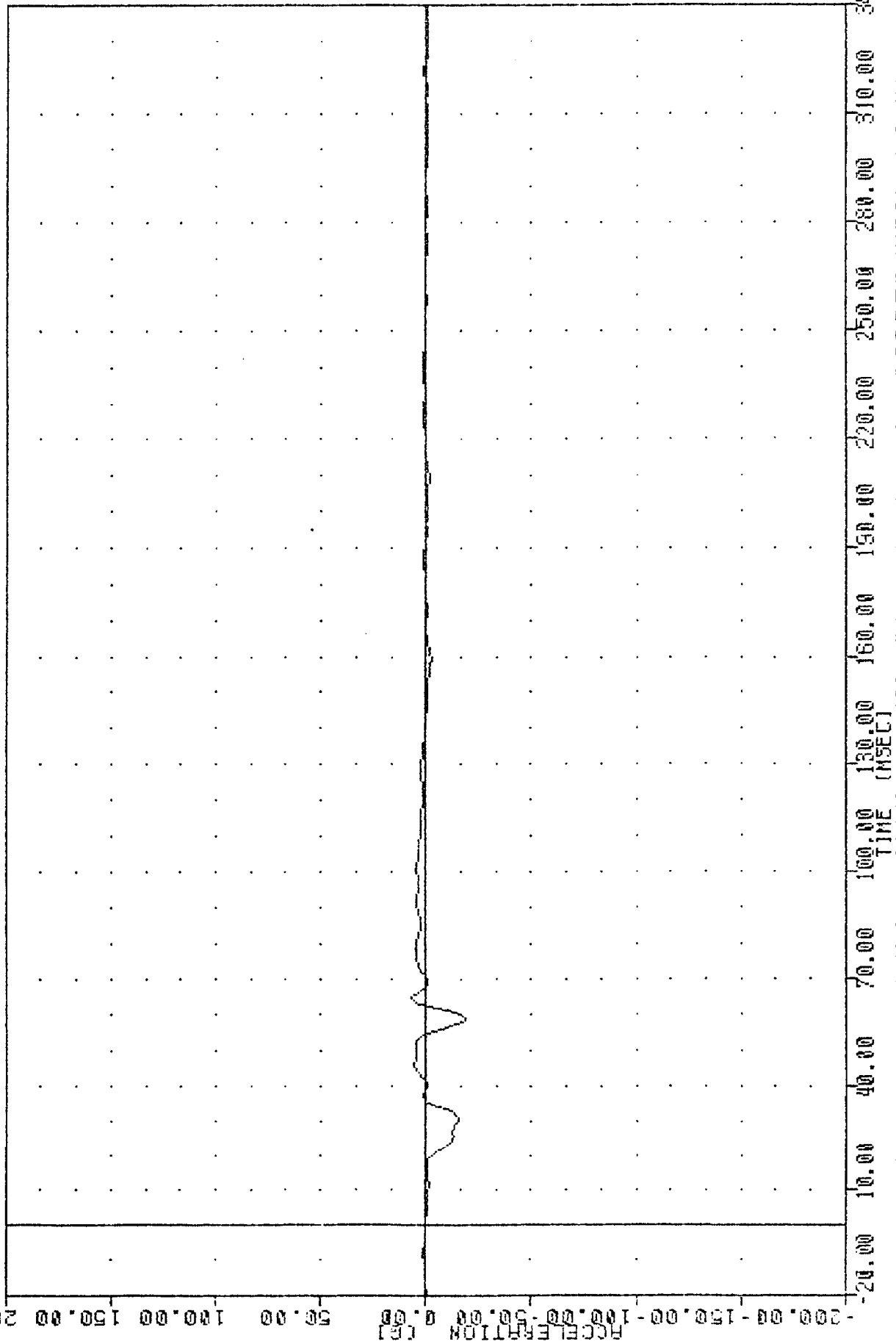


MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
UPPER SPINE VELOCITY Y AXIS

HMC 850813
 MVMA SIDE IMPACT TESTING
 85231000000
 T01YVB
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -21.638 56.38, 0.10 & -15.75
 PLOT DATE 26-AUG-83 10:59:13



85231000000
 112XG2
 NYMA SIDE IMPACT TESTING
 850015
 20 AUG 83
 10:35:03
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -18.99% 58.75, 6.46 @ 64.38



NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER LOWER SPINE ACCELERATION X AXIS

PLT DATE 26 AUG 83 10:35:03

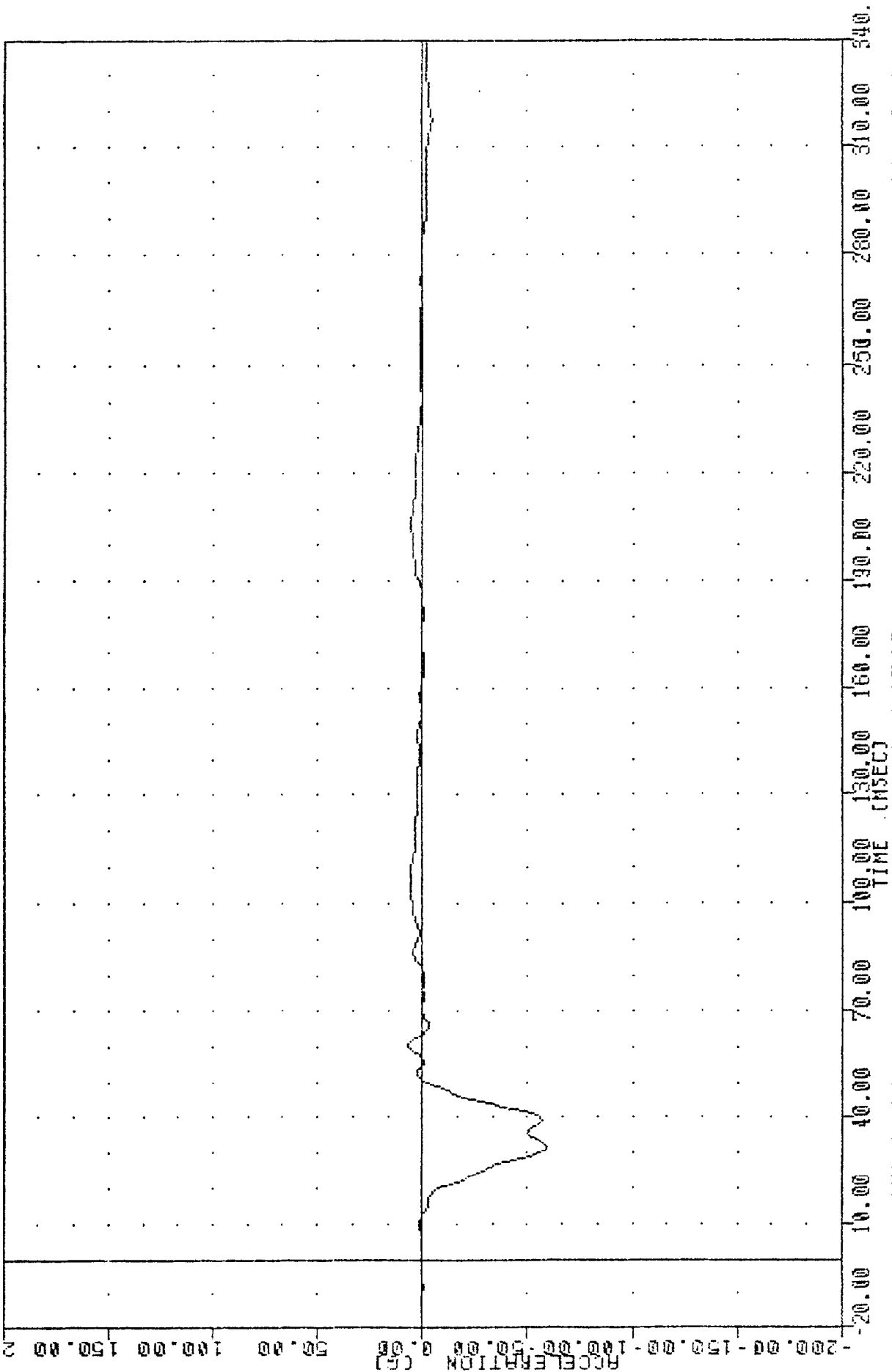
7.550819

MYMA SIDE IMPACT TESTING

85231000000

T12Y62

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -59.33e 31.25, 6.42 e 60.00

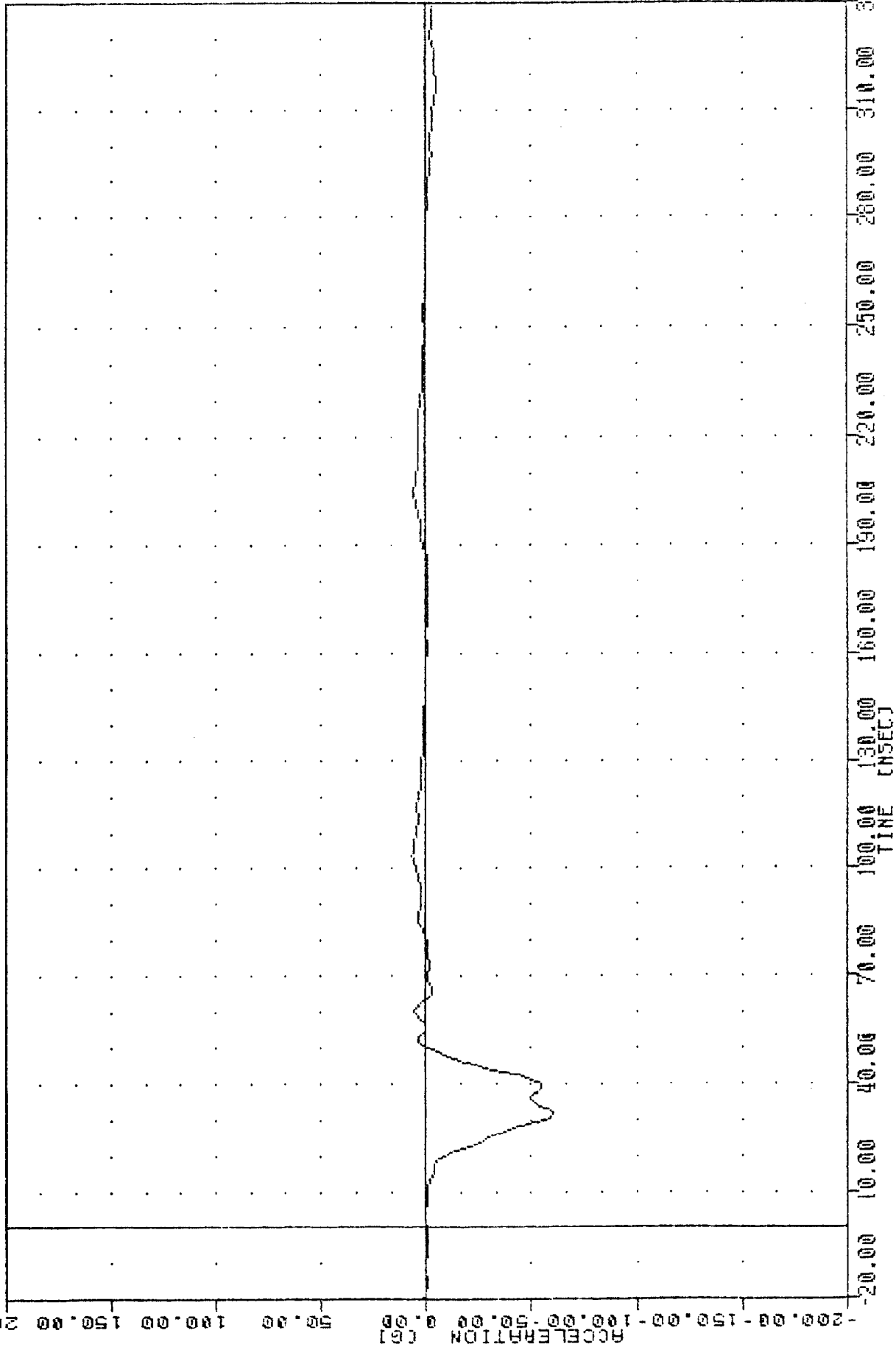


MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
PASSENGER LOWER SPINE ACCELERATION Y AXIS

MVMA SIDE IMPACT TESTING
 85231000000
 T12Y66

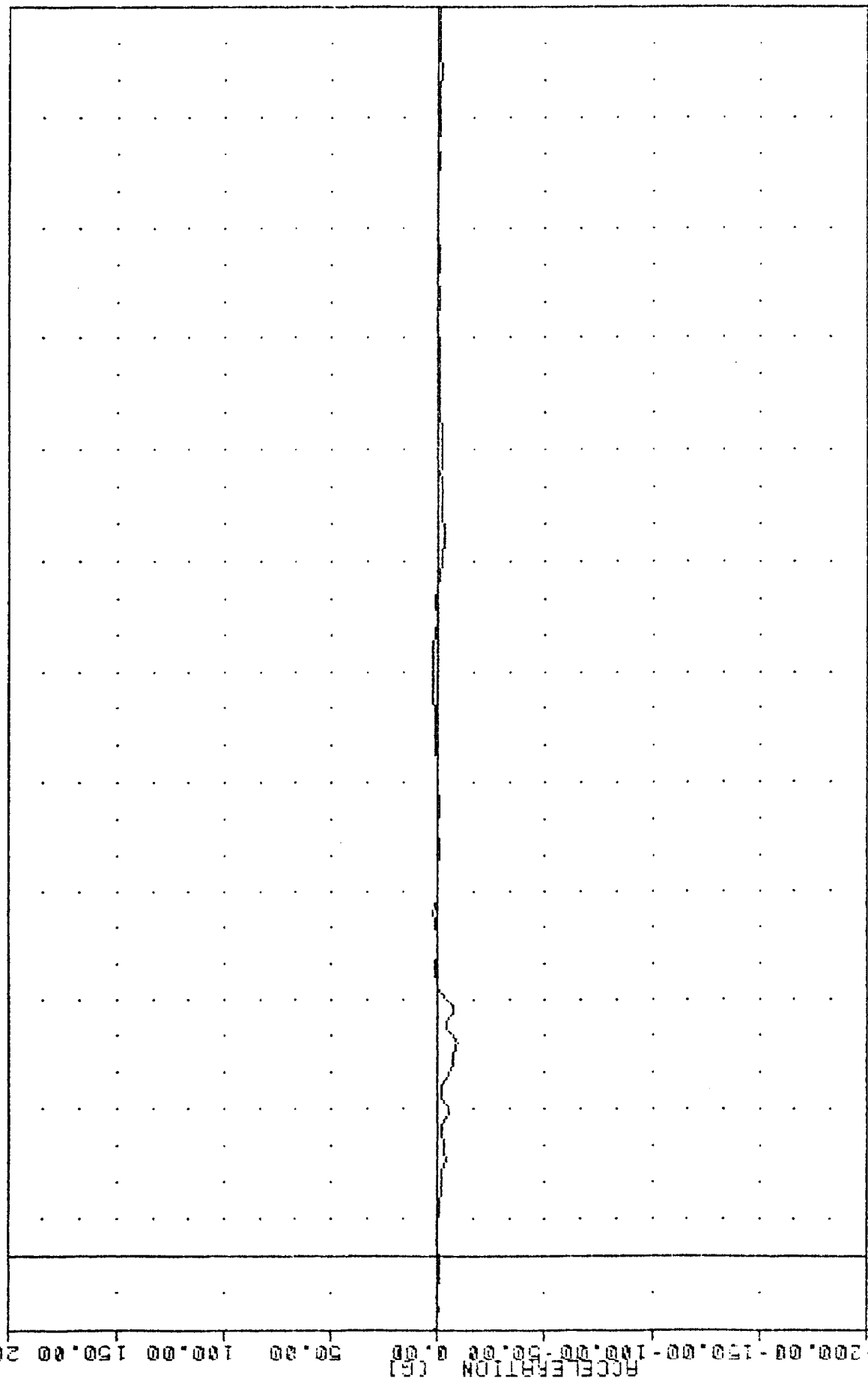
PLUT DATE 26 AUG 83 10:35:03

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -60.01 31.25, 6.11 103.75



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER LOWER SPINE ACCELERATION #2 Y AXIS

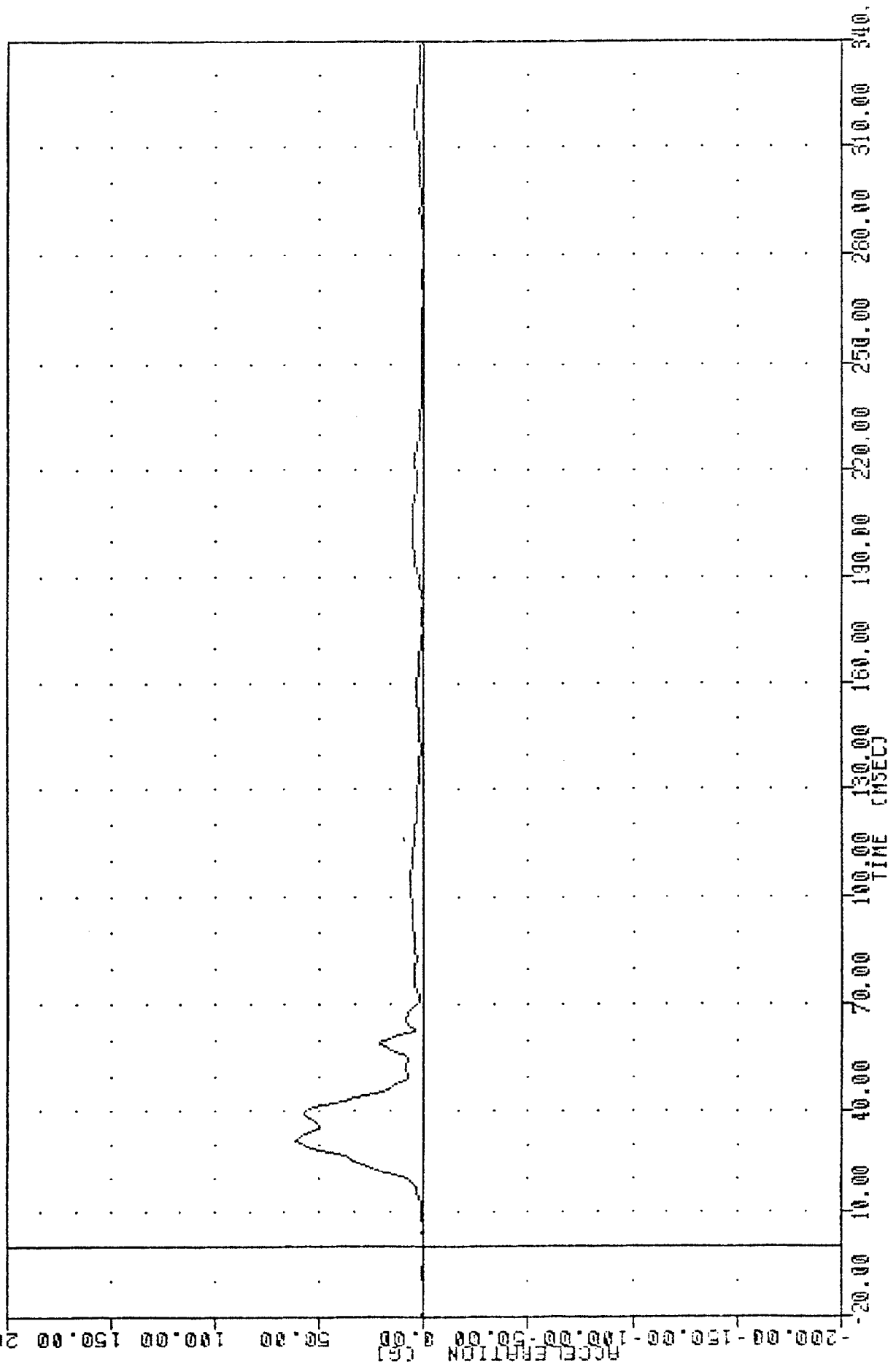
7-350813
 85231000000
 712262
 NYMA SIDE IMPACT TESTING
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -8.848 58.13 2.88 155.63
 20 AUG 83 10:35:03



-20.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER LOWER SPINE ACCELERATION Z AXIS

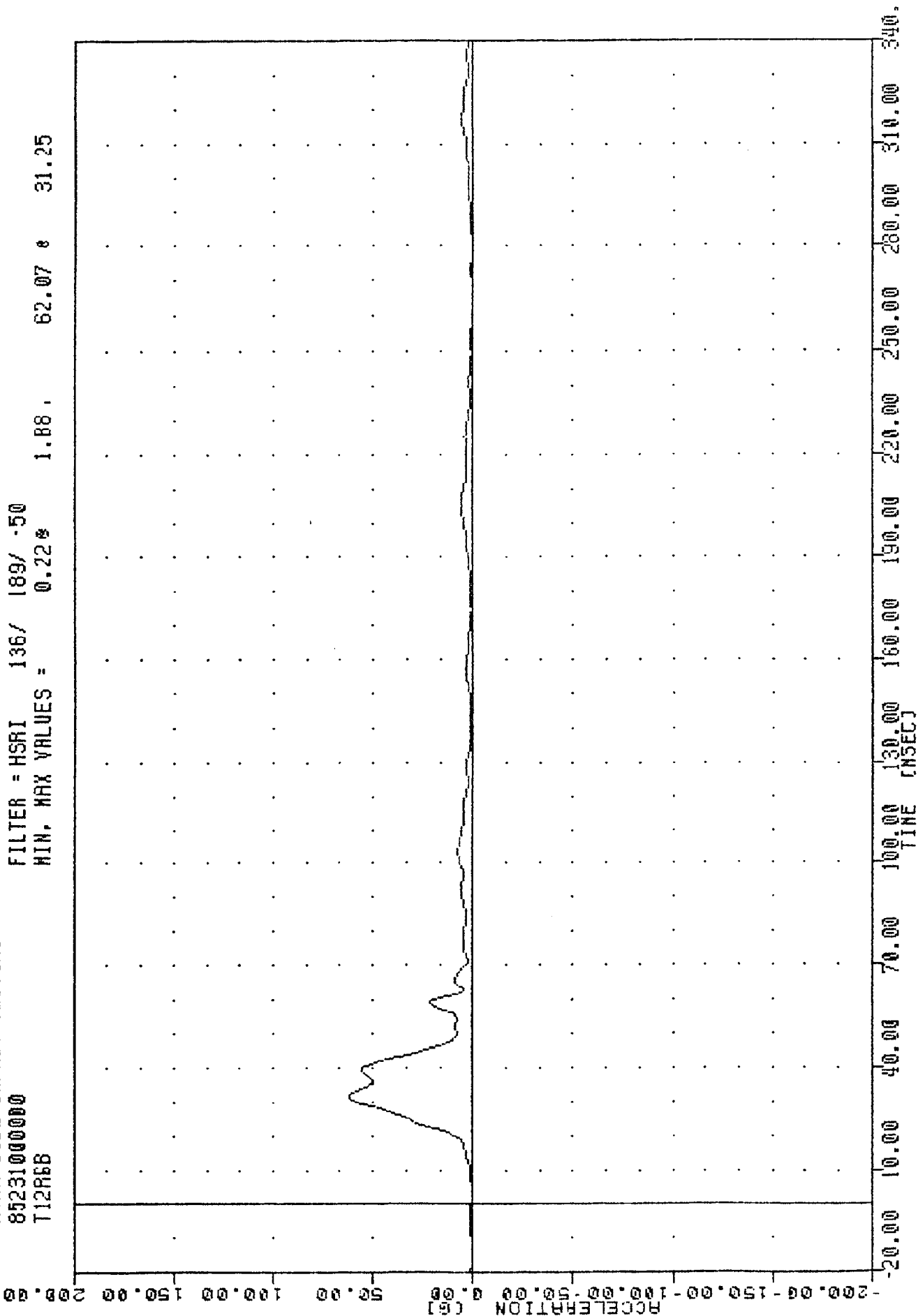
INC 850819
 MVMA SIDE IMPACT TESTING
 85231000000
 T12R62
 PLOT DATE 26-AUG-83 10:35:00
 FILTER = HSRI 136/ 183/ -50
 MIN. MAX VALUES = 0.24e -17.50, 61.41 e 31.25



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION

TRC 850819
 MYMA SIDE IMPACT TESTING
 85231000000
 T12R6B

PLOT DATE 26-HUG-85 10:35:05
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.22g 1.88g 62.07g 31.25

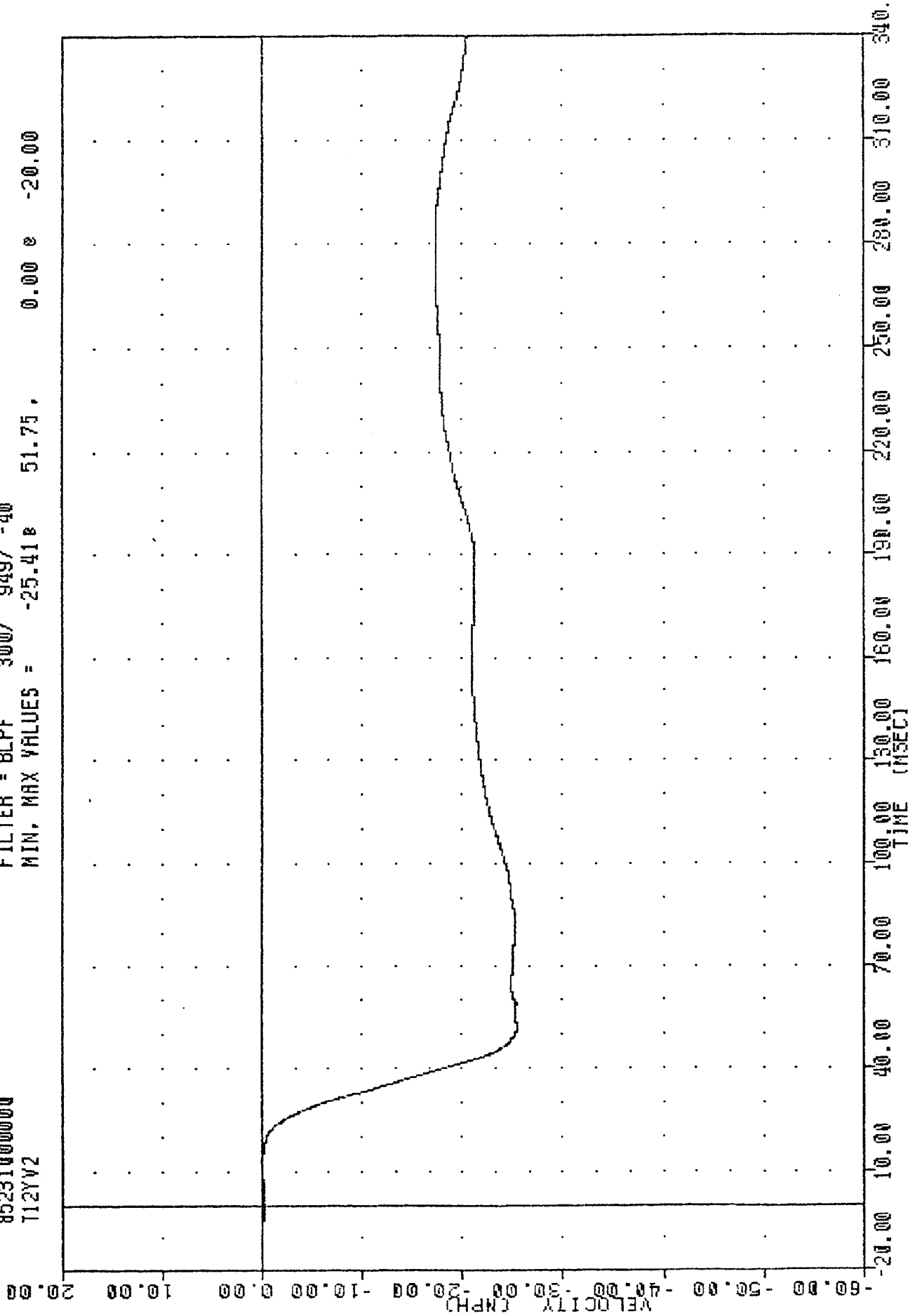


MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION #2

TRC 850819
 NVMA SIDE IMPACT TESTING
 85231000000
 T12YV2

PLUT DATE 25-AUG-83 10:59:13

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -25.41 51.75, 0.00 0 -20.00

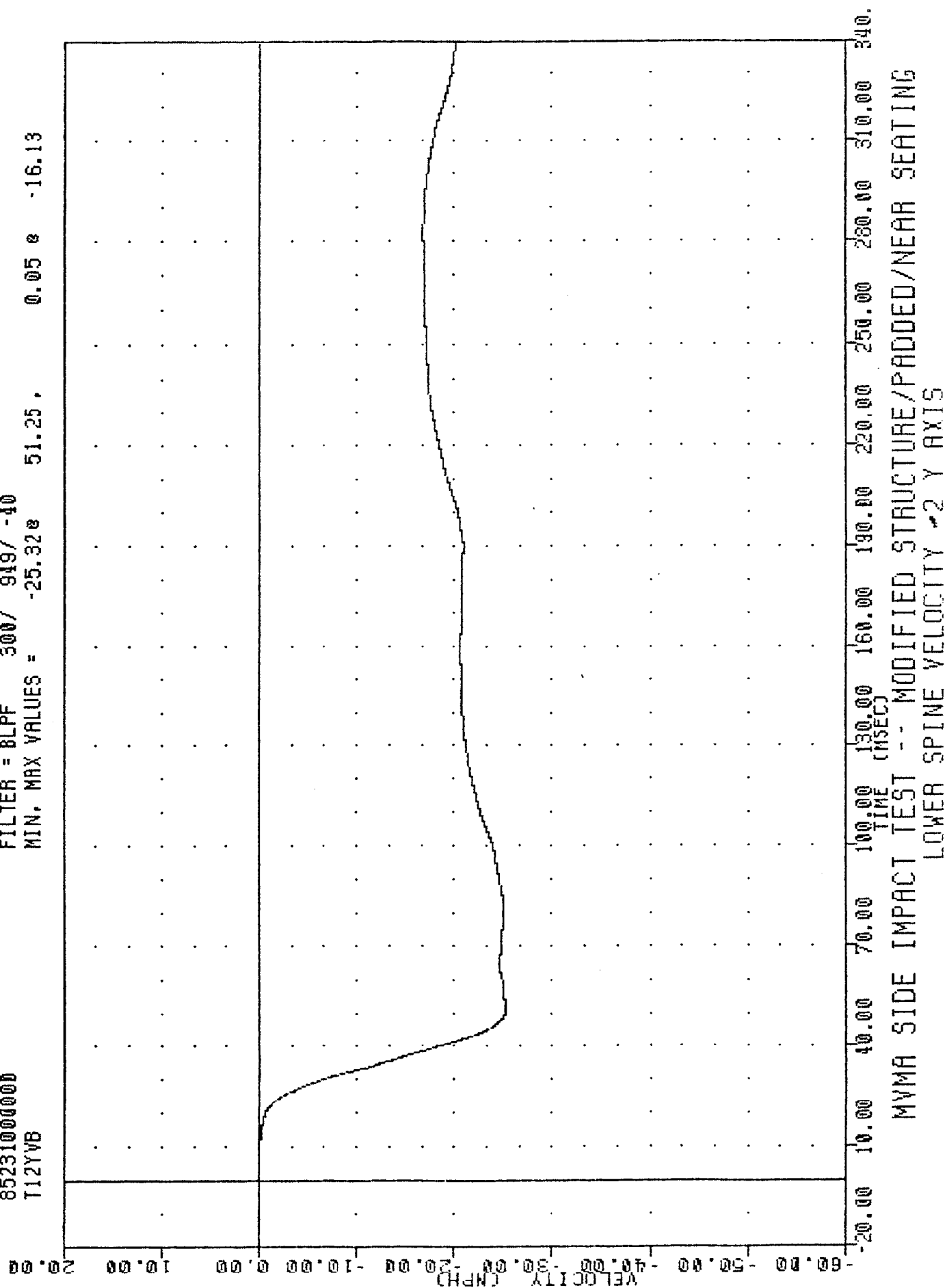


MODIFIED STRUCTURE/PADDED/NEAR SEATING
 LOWER SPINE VELOCITY Y AXIS

TRC
 85231000000
 T12YVB

PLOT DATE 26-AUG-85 10:59:15

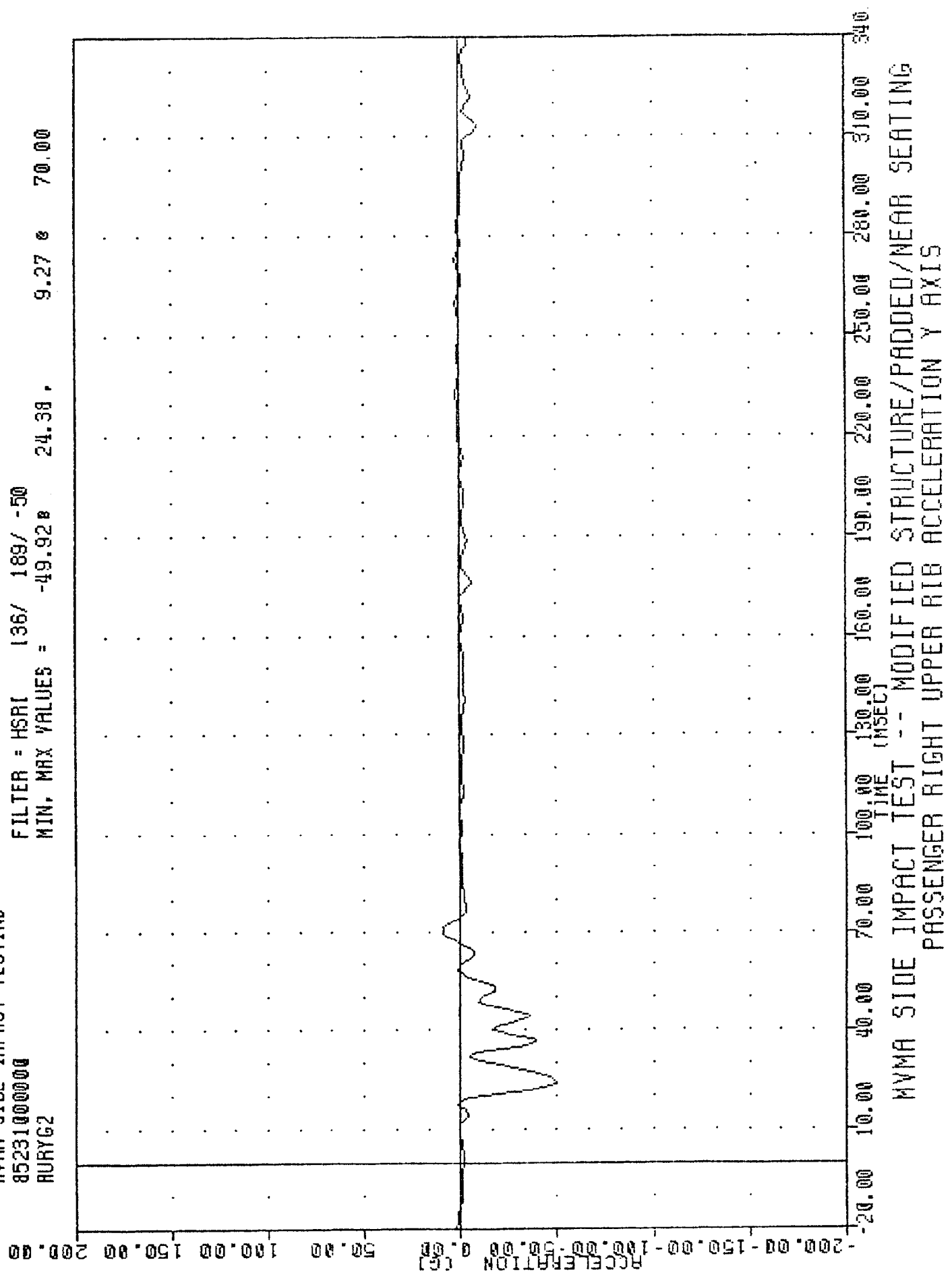
FILTER = 8LPF 300/ 949/ -40
 MIN. MAX VALUES = -25.32 51.25, 0.05 16.13



TRC
 NVMA SIDE IMPACT TESTING
 85231000000
 RURYG2

PLUT DATE 26-AUG-85 10:35:05

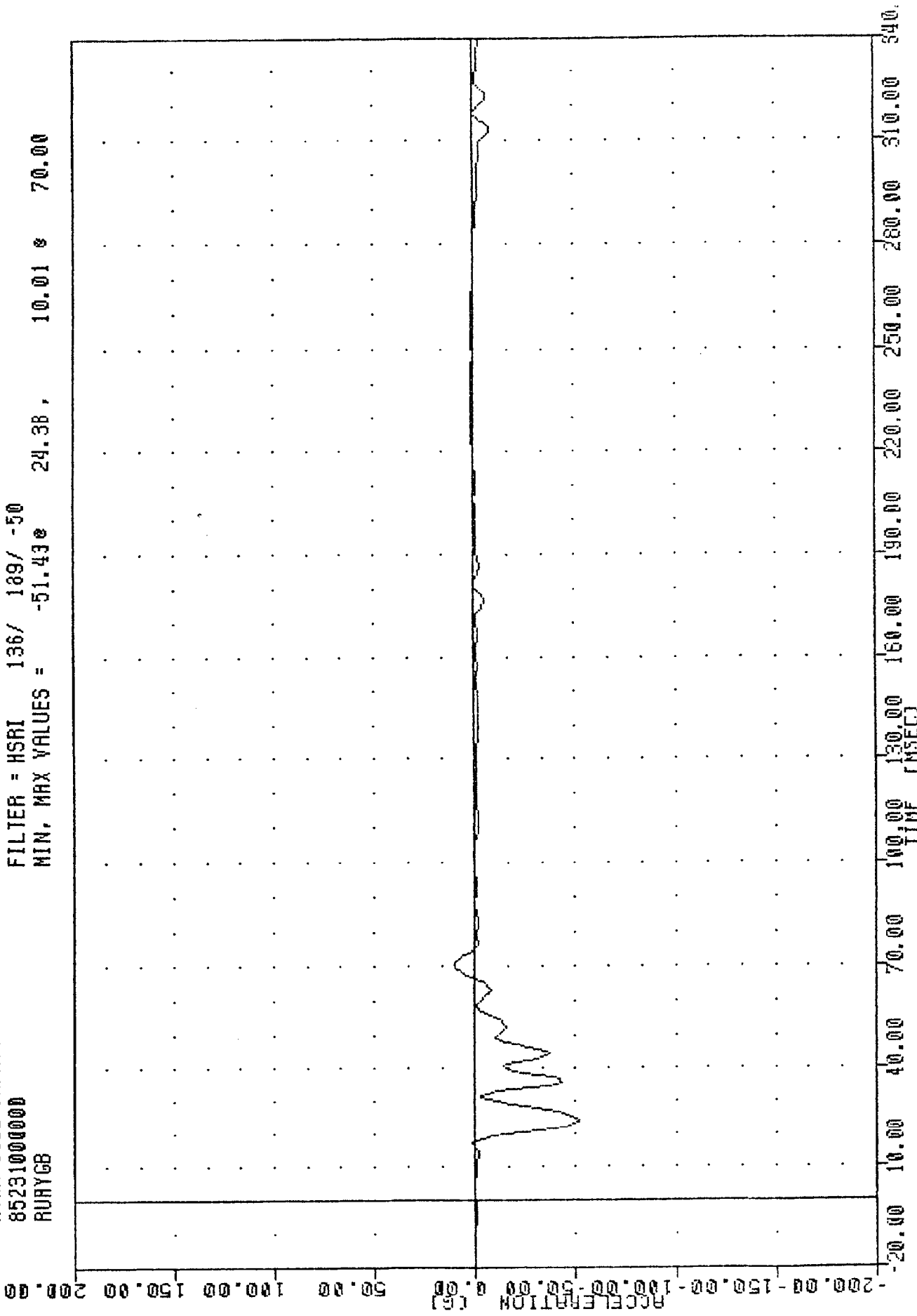
FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -49.92 24.38 9.27 70.00



TRC
 MVMA SIDE IMPACT TESTING
 85231000000
 RURYGB

PLOT DATE 26-AUG-85 10:35:05

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -51.43e 24.38, 10.01 e 70.00

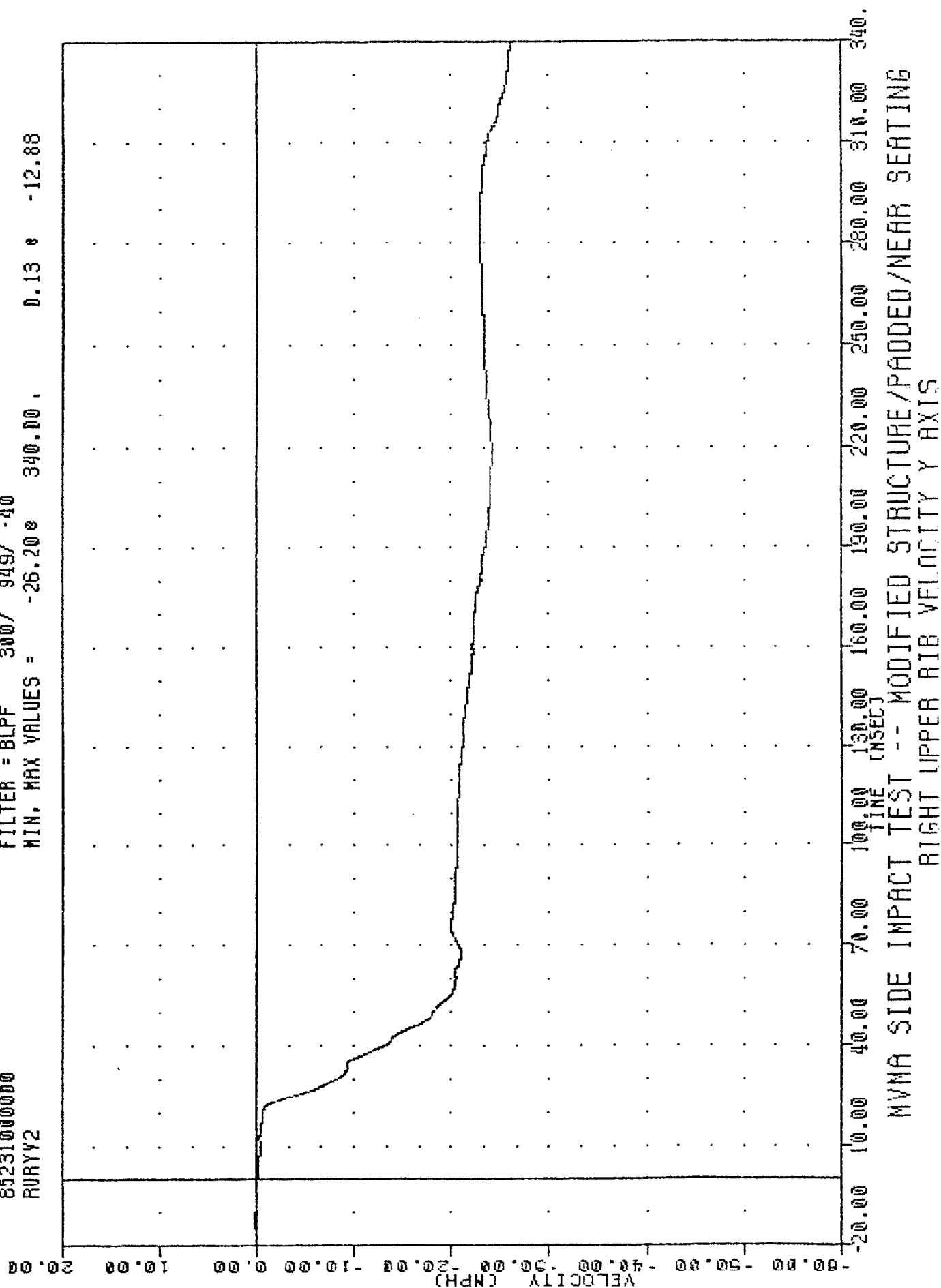


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER RIGHT UPPER RIB ACCELERATION -2 Y AXIS

TAC
MVMA SIDE IMPACT TESTING
85231000000
RURYV2

PLOT DATE 26-AUG-85 10:59:15

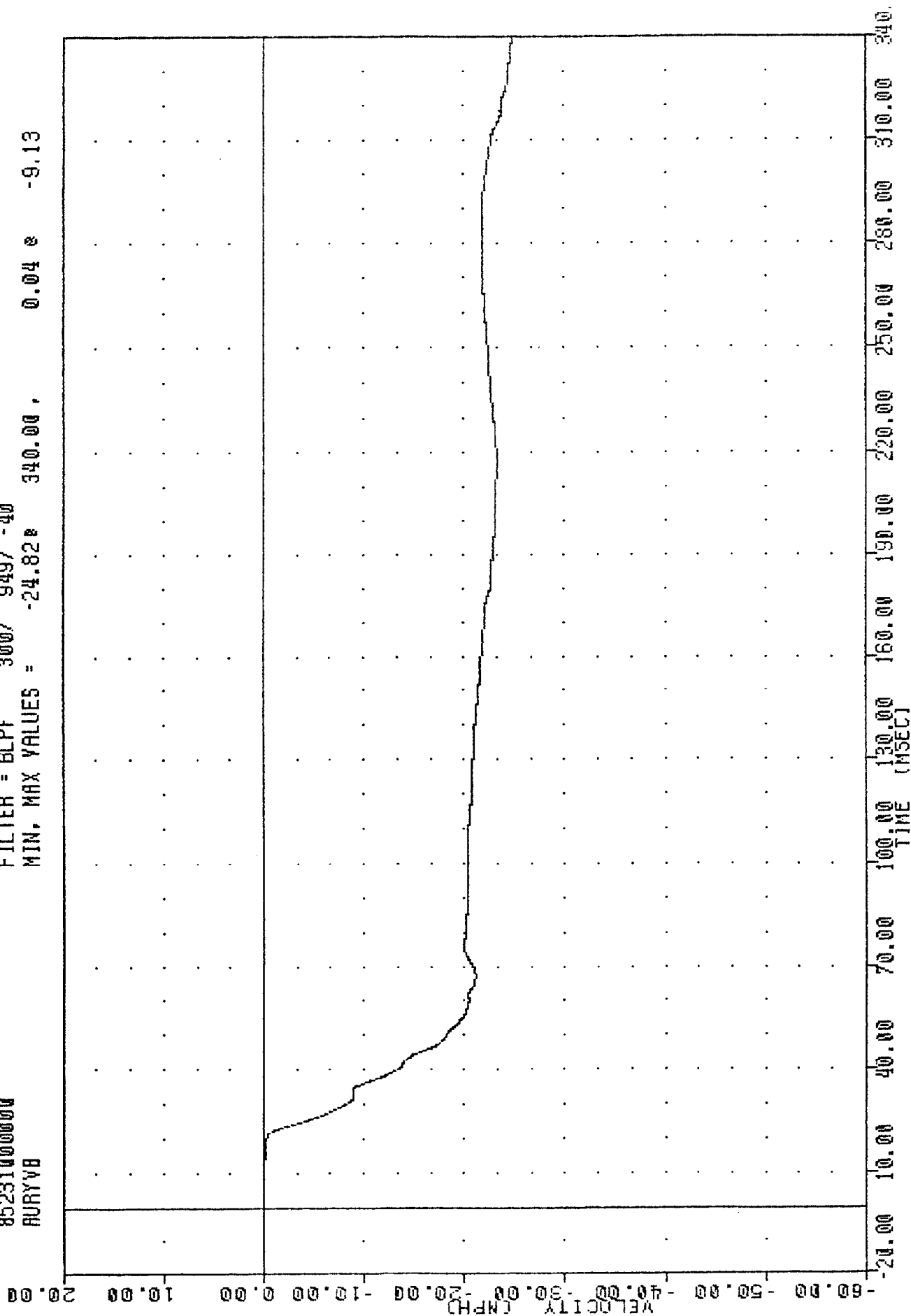
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -25.20e 340.00, 0.13 e -12.88



TRC
 NVMA SIDE IMPACT TESTING
 85231000000
 RURYVB

PLOT DATE 26-AUG-85 10:59:15

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -24.82 340.00, 0.04 -9.13

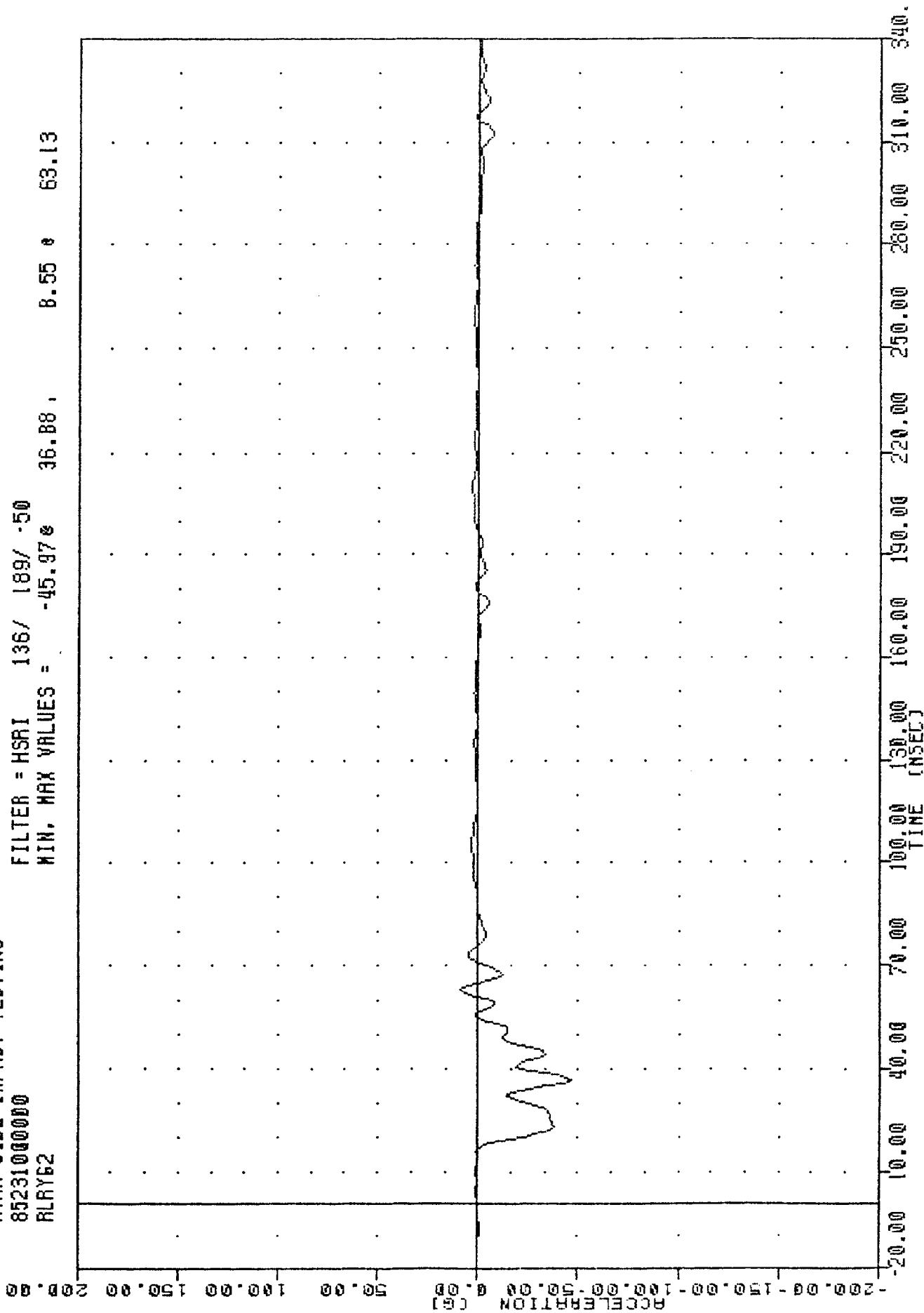


MODIFIED STRUCTURE/PADDED/NEAR SEATING
 RIGHT UPPER RIB VELOCITY -2 Y AXIS

TRC
MVMA SIDE IMPACT TESTING
85231000000
RLRY62

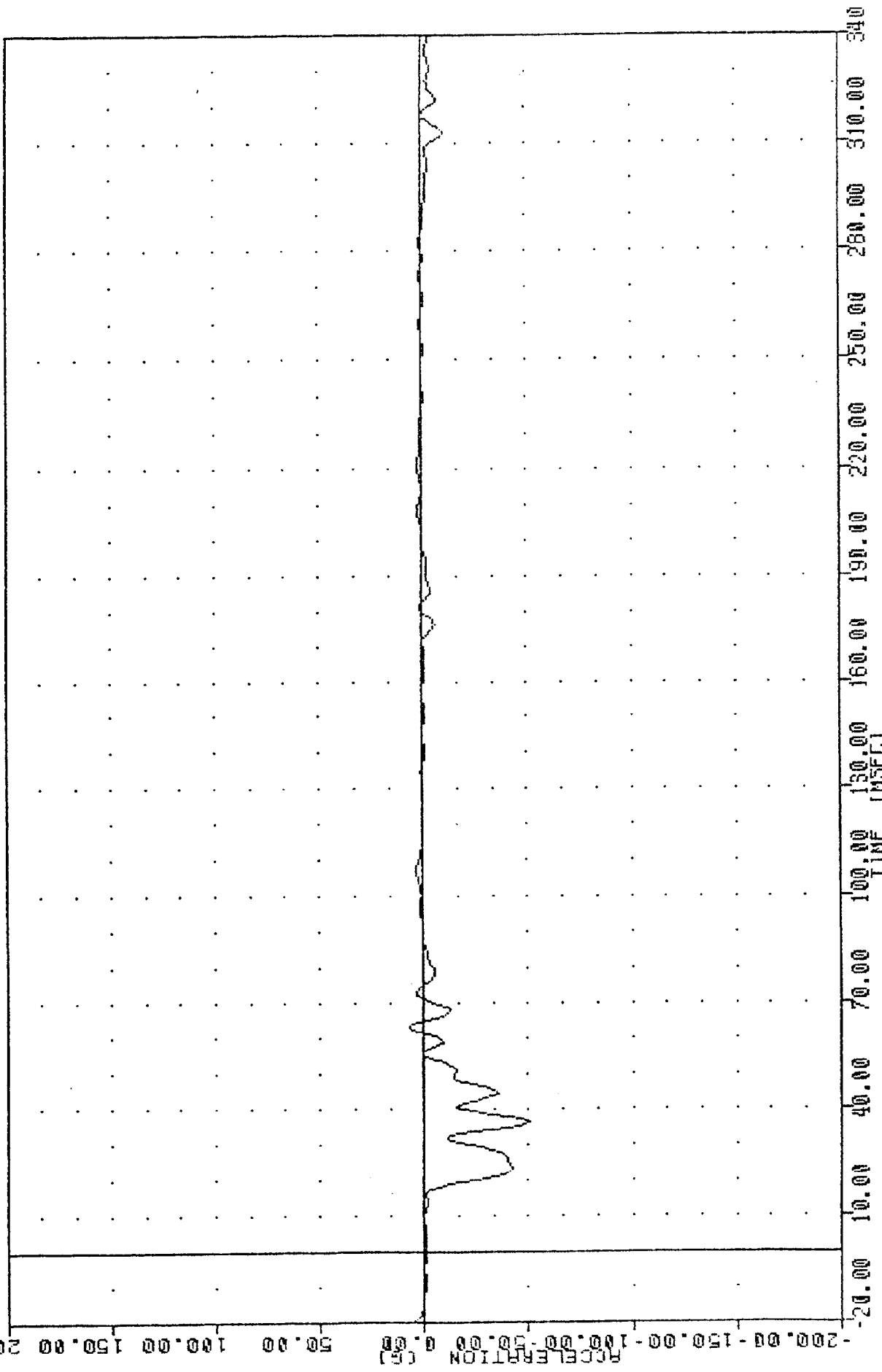
PLUT DATE 26-AUG-85 10:35:05

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -45.97 36.88 8.55 63.13



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
PASSENGER RIGHT LOWER RIB ACCELERATION Y AXIS

INC 85231000000
 NVMA SIDE IMPACT TESTING
 ALRYGB
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -50.30 6.62 63.13
 10:35:03 20 AUG 89 10:35:03

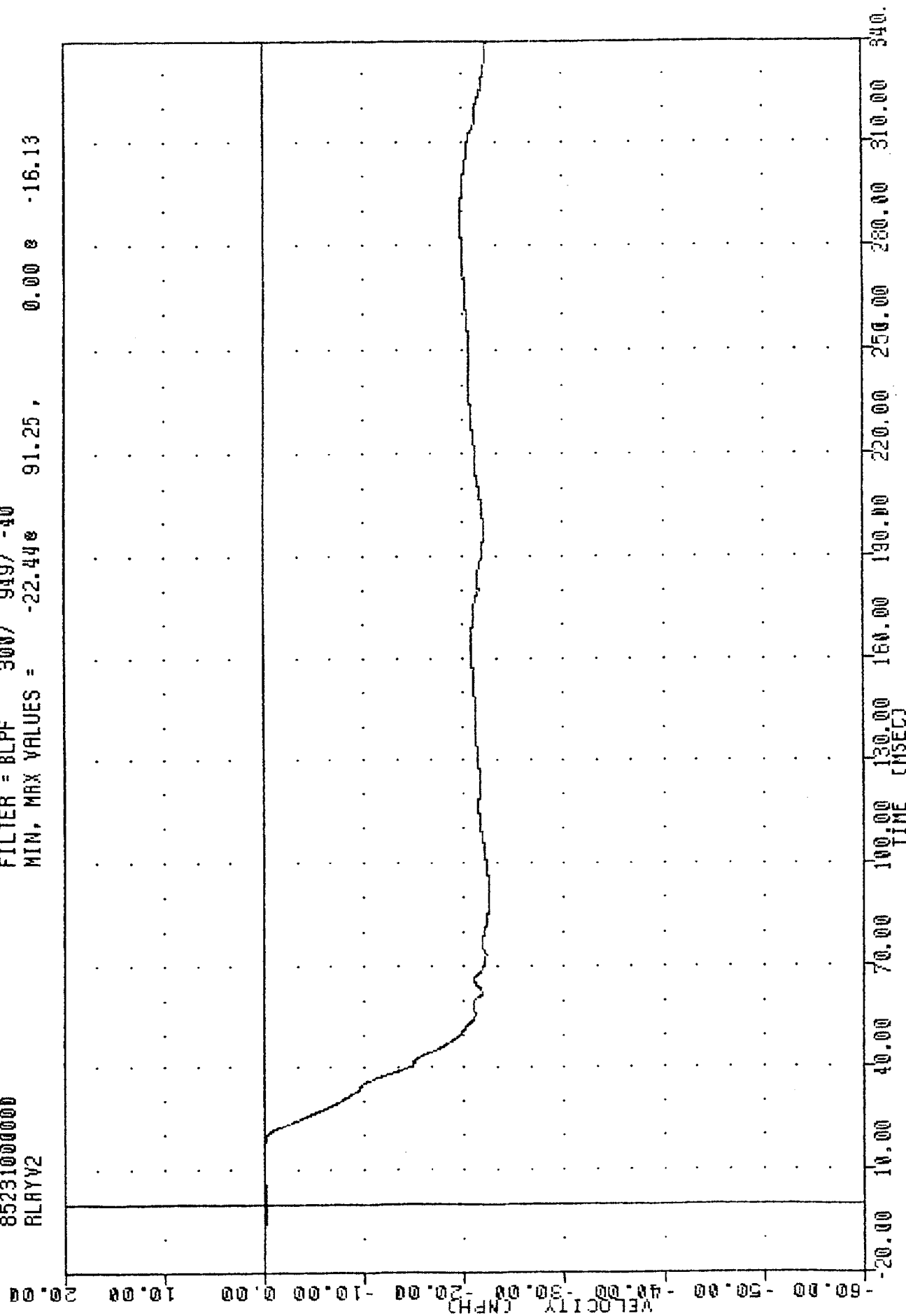


NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER RIGHT LOWER RIB ACCELERATION -2 Y AXIS

TRC
 85231000000
 RLRYV2
 MVNA SIDE IMPACT TESTING
 , 850819

PLOT DATE 26-AUG-85 10:59:15

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -22.44e 91.25, 0.00 e -16.13

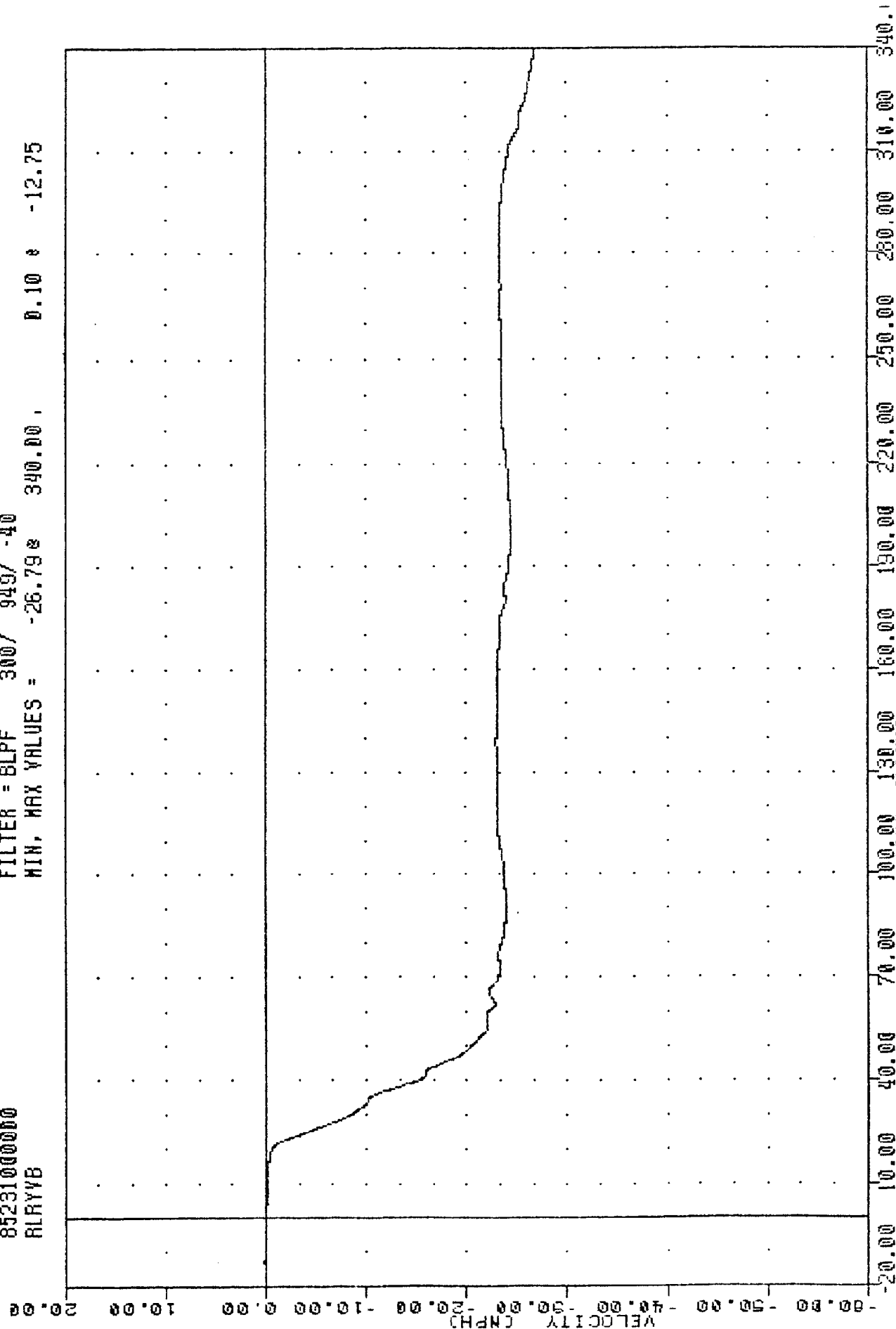


MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 RIGHT LOWER RIB VELOCITY

TRC
 MVMA SIDE IMPACT TESTING
 85231000000
 RLRYVB

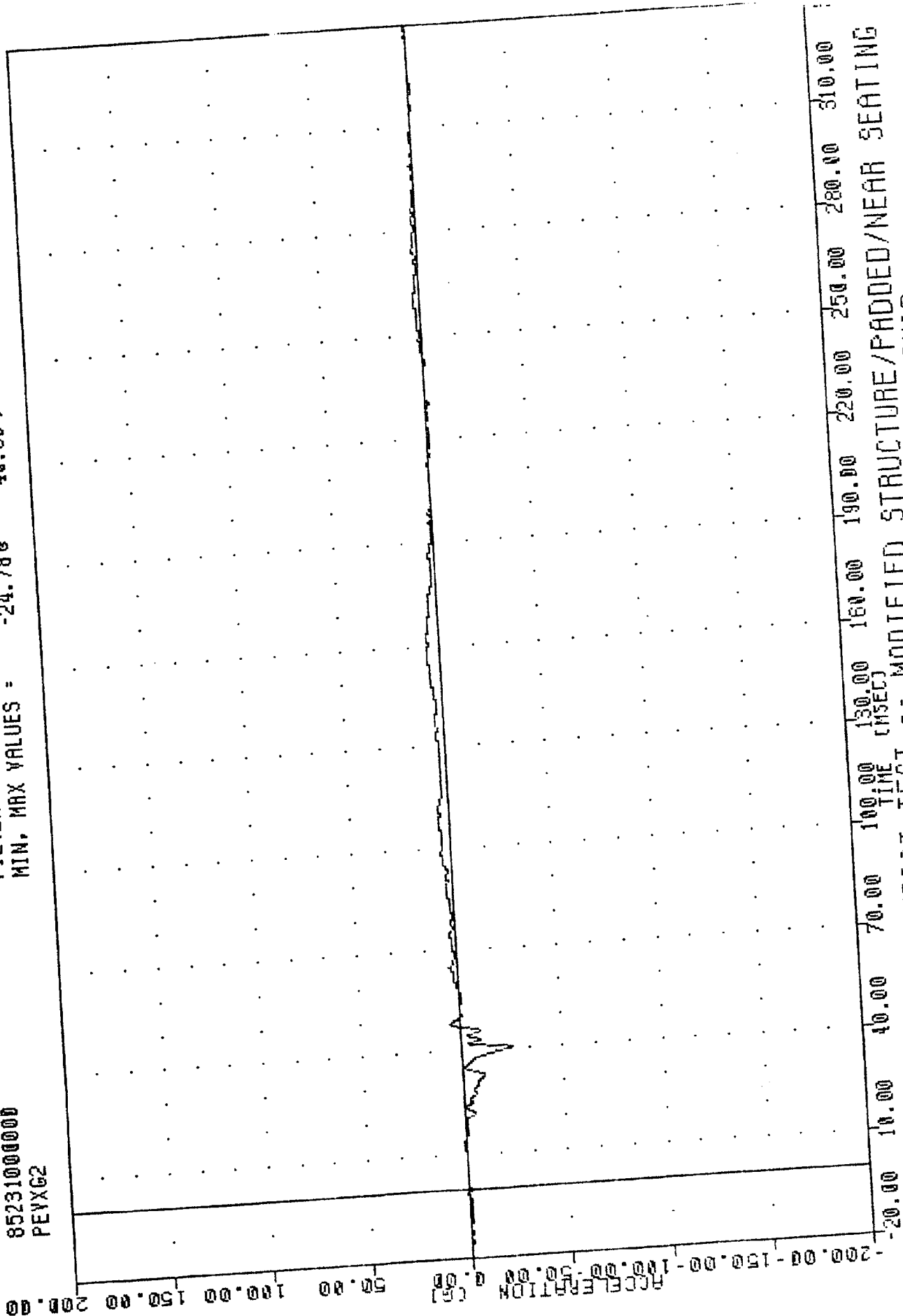
PLOT DATE 26-AUG-85 10:59:15

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -26.798 340.00 , 0.10 & -12.75



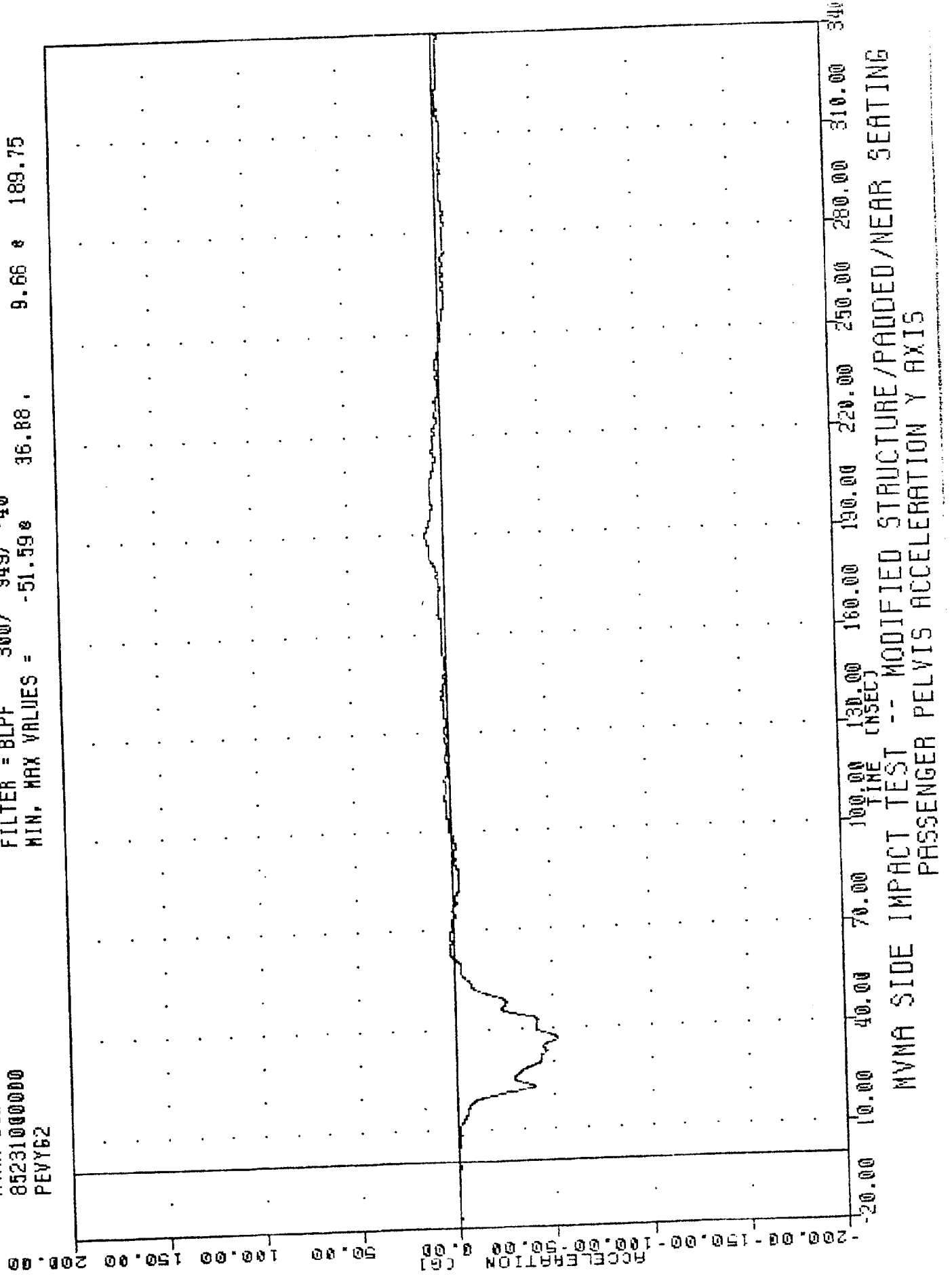
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 RIGHT LOWER RIB VELOCITY #2 Y AXIS

TRC 00811
 MVMA SIDE IMPACT TESTING
 85231000000
 PEVXG2
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -24.78 40.63, 6.78 162.13
 PLOT DATE 20-NOV-88

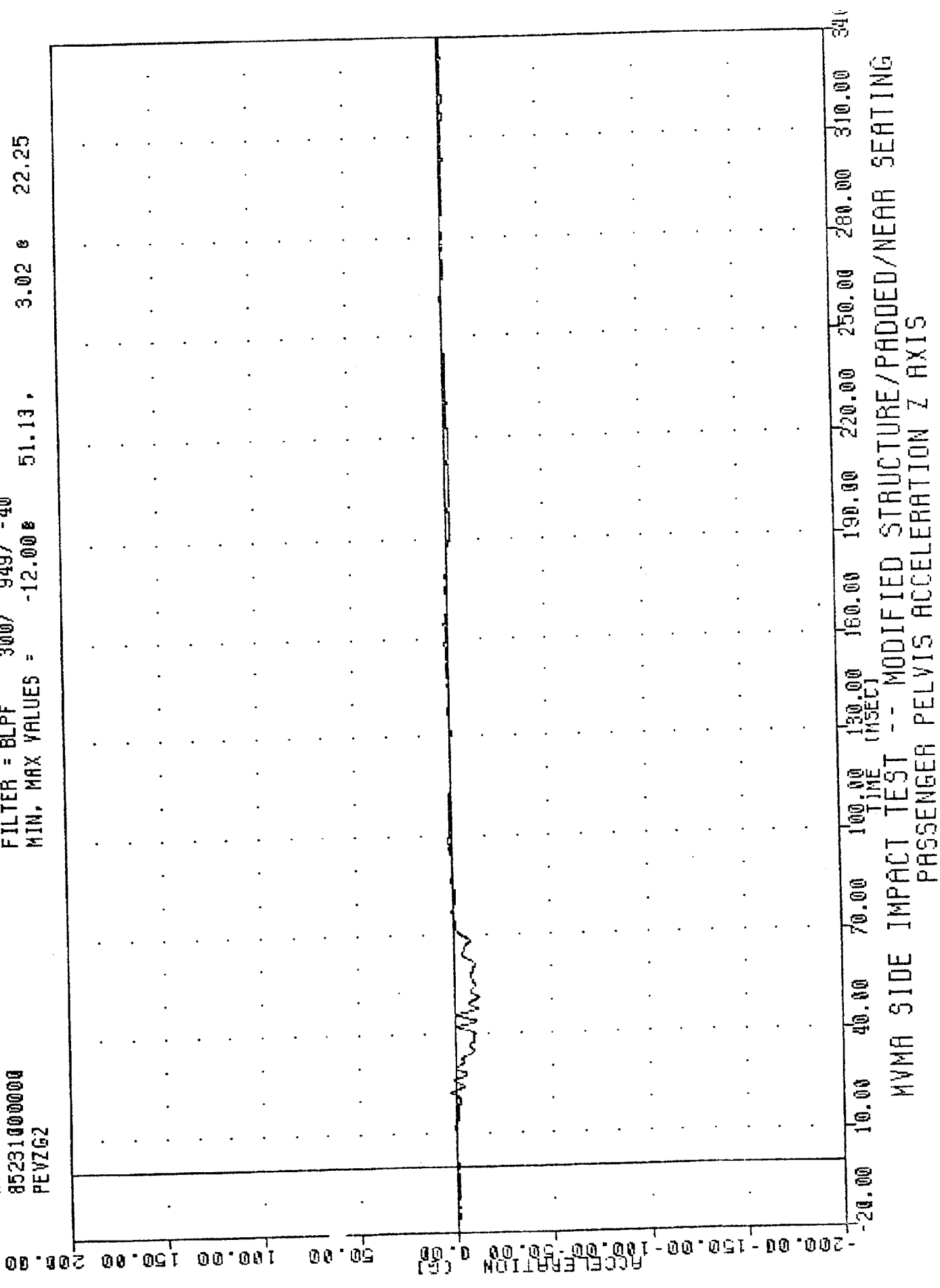


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER PELVIS ACCELERATION X AXIS

THC
 850819
 MVMA SIDE IMPACT TESTING
 85231000000
 PEVY62
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -51.590 36.88 9.66 189.75
 83:



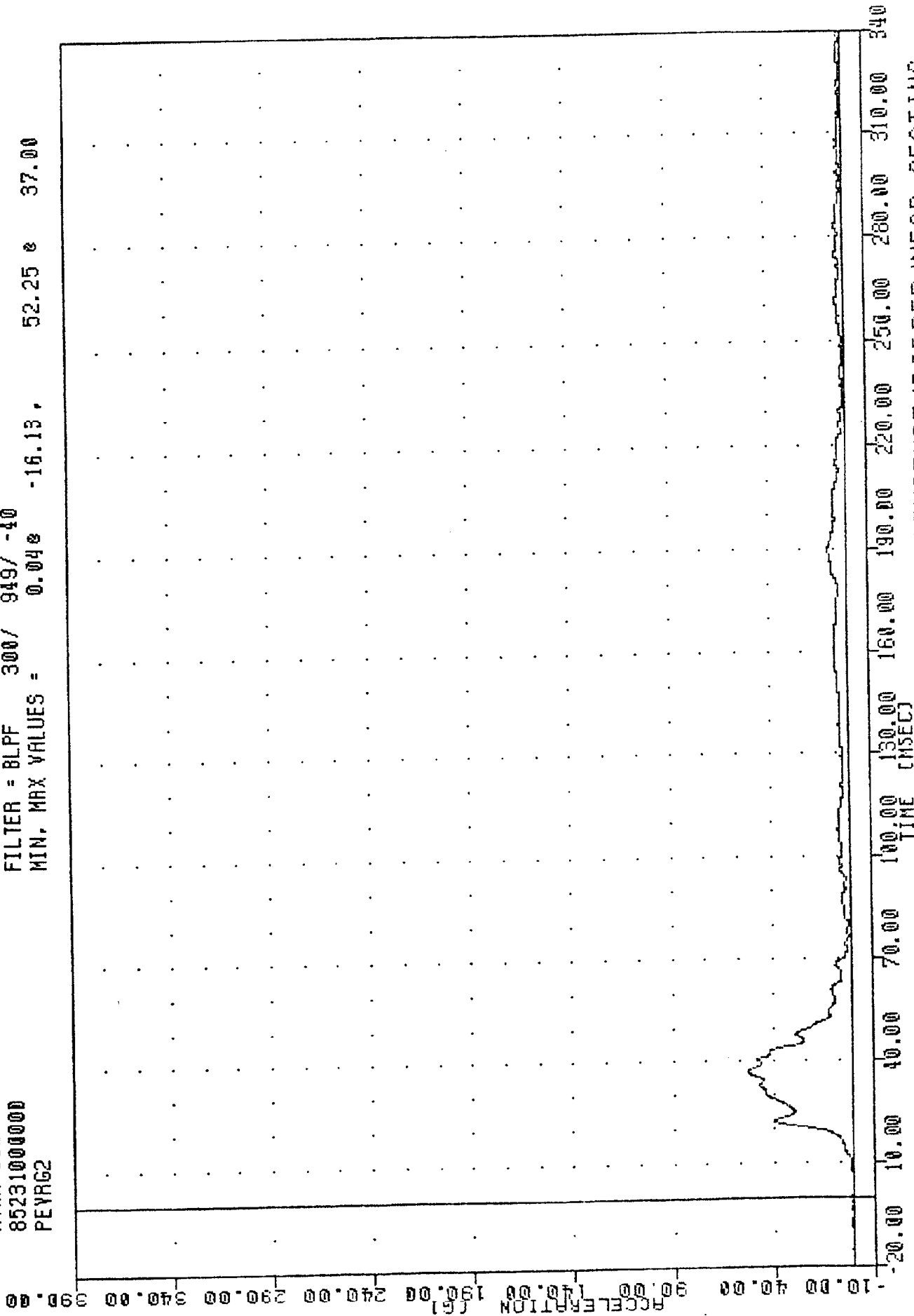
TRC
 NVMA SIDE IMPACT TESTING
 85231000000
 PEVZG2
 850819
 PLOT DATE 26-AUG-80 10:33:34
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -12.00 51.13 3.02 22.25



TRC
 MVMA SIDE IMPACT TESTING
 85231000000
 PEVRG2

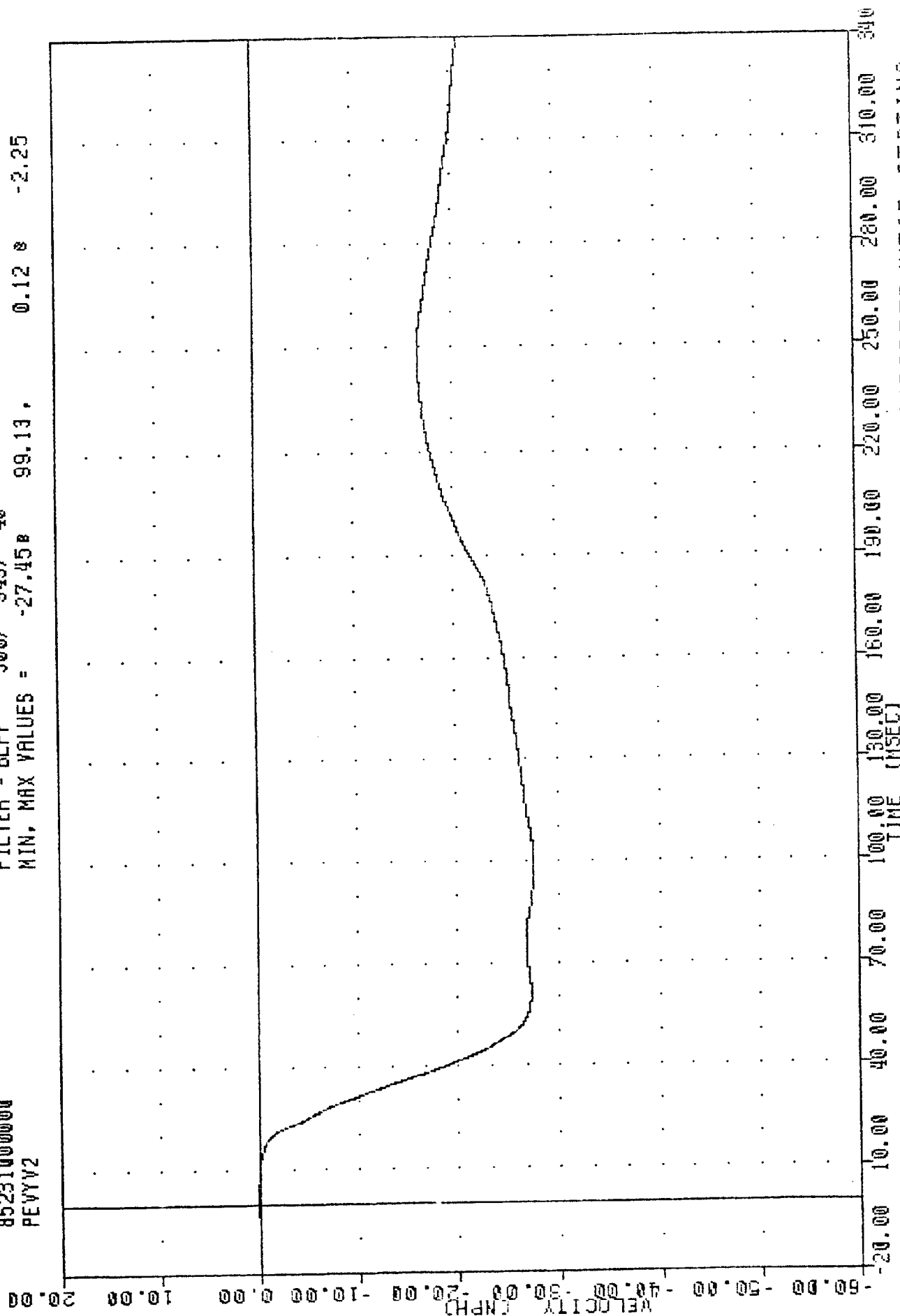
PLOT DATE 26-AUG-85 10:33:34

FILTER = 8LPF 300/ 949/ -40
 MIN, MAX VALUES = 0.048 -16.13, 52.25 & 37.00



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER PELVIS RESULTANT ACCELERATION

MIN, MAX VALUES =	-27.458	99.13	0.128	-2.25
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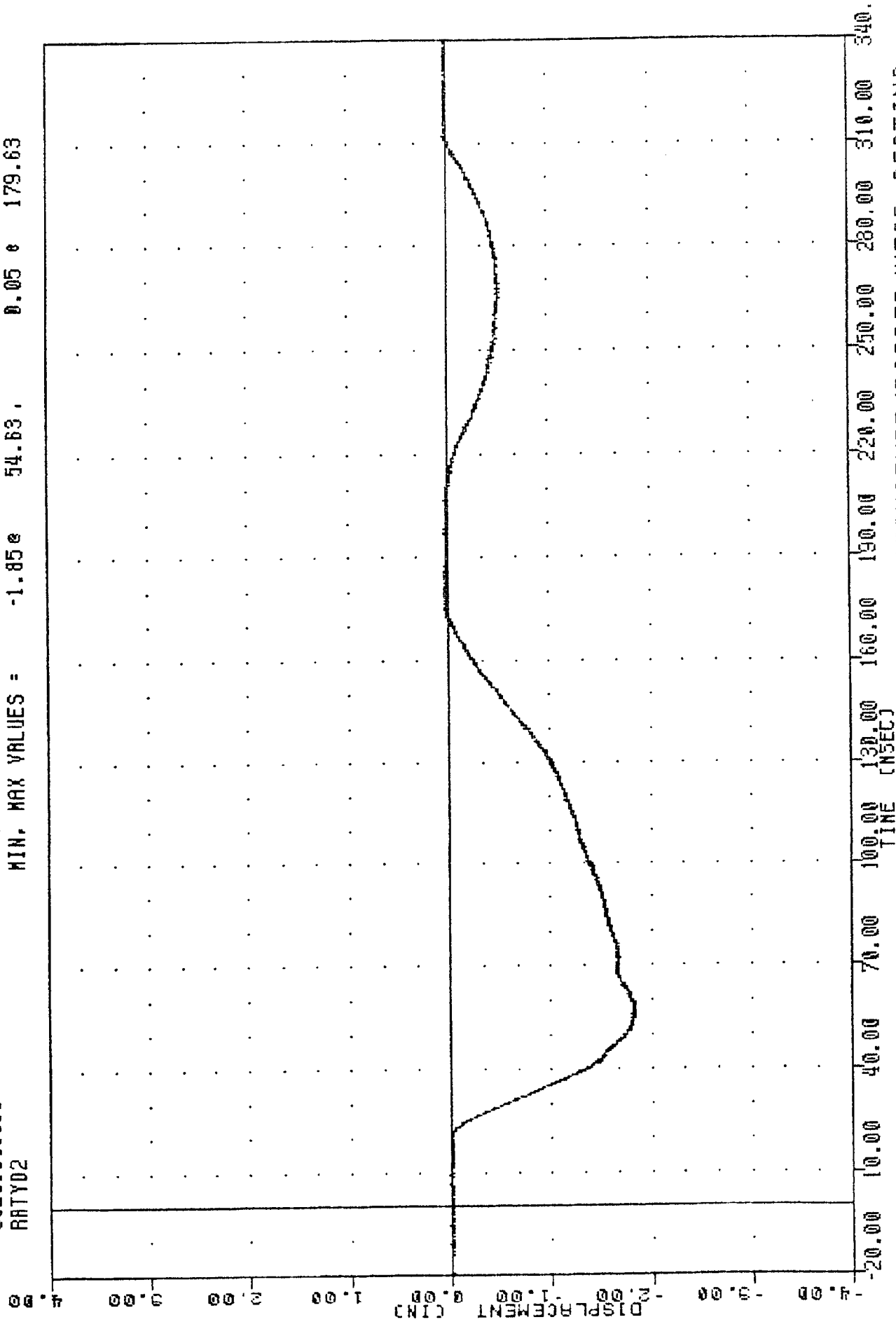


MMVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
TIME (MSEC)
PELVIS VELOCITY Y AXIS

TAC 850819
 MVMA SIDE IMPACT TESTING
 85231000000
 RRTYD2

PLUT DATE 25-HUG-85 10:33:34

FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -1.85e 54.63, 0.05 e 179.63

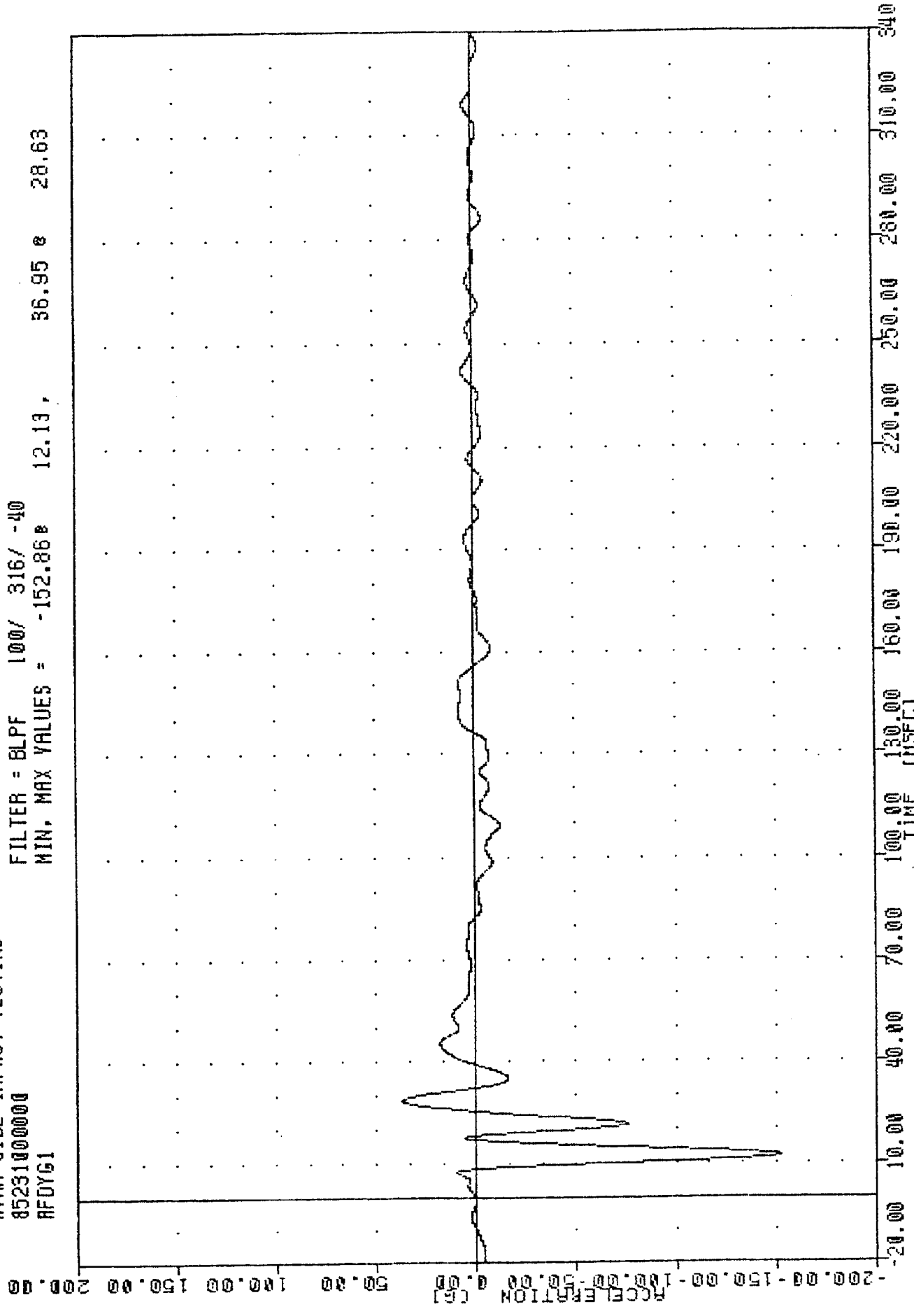


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 PASSENGER RIGHT RIB TO SPINE DISPLACEMENT INCHES

TRC
 NVMA SIDE IMPACT TESTING
 85231000000
 AFDYG1

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -152.86 12.13 36.95 28.63



VEHICLE RIGHT FRONT DOOR (POSITION 1) ACCELERATION Y AXIS

TRC 850819 26-AUG-80 10:59:13

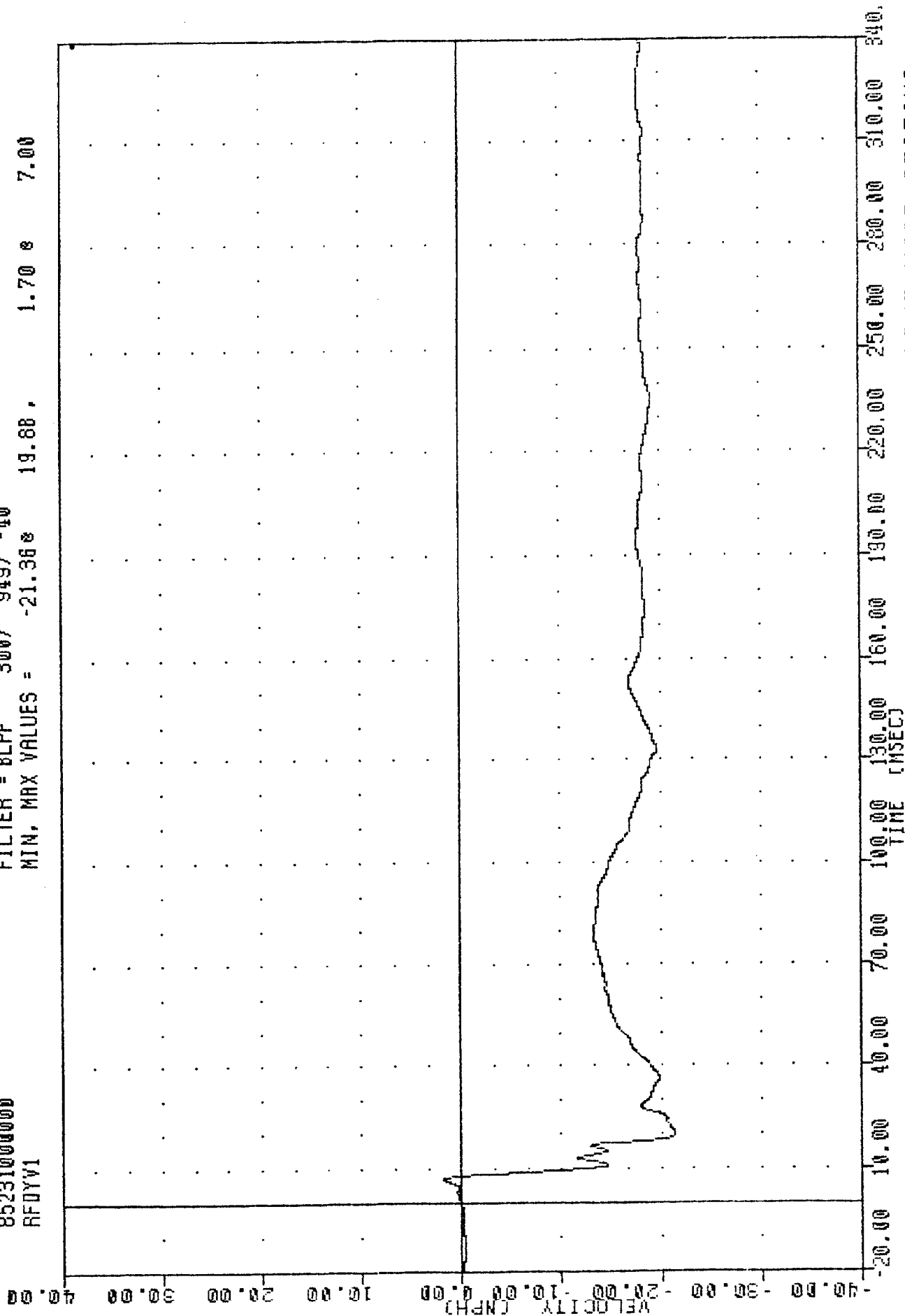
MVMA SIDE IMPACT TESTING

85231000000

RFDYV1

FILTER = 8LPF 300/ 949/ -40

MIN, MAX VALUES = -21.368 19.88, 1.70 8 7.00

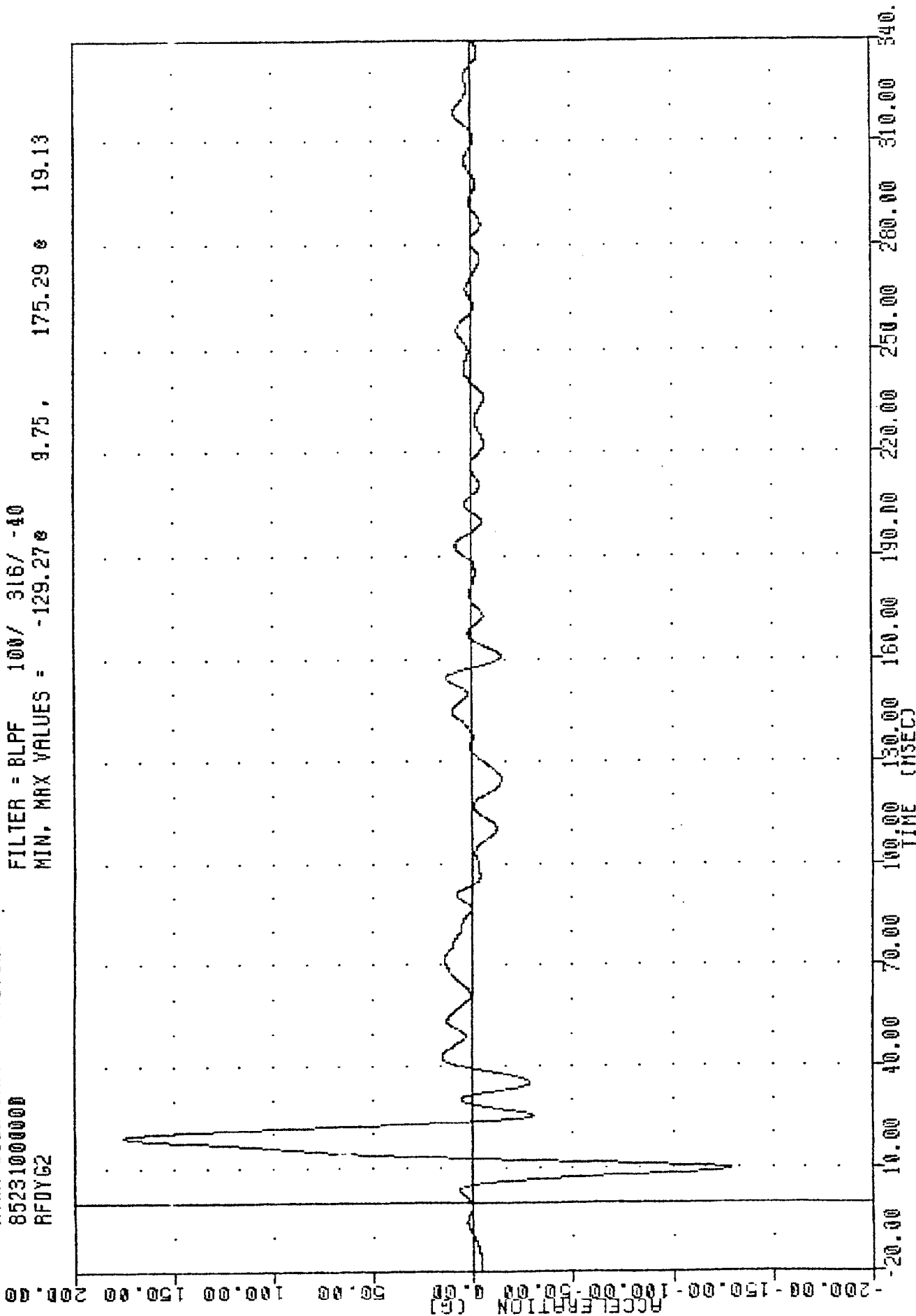


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING

TRC 850819
 MVNA SIDE IMPACT TESTING
 85231000000
 RFDY62

PLOT DATE 26-AUG-83 TV:33:34

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -129.27 9.75, 175.29 19.13



MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 2) ACCELERATION Y AXIS

PLC

7.550819

PLT DATE

20 AUG 83

10:59:13

MVMA SIDE IMPACT TESTING

85231000000

FILTER = BLPF 300/ 949/ -40

RFDYV2

MIN. MAX VALUES =

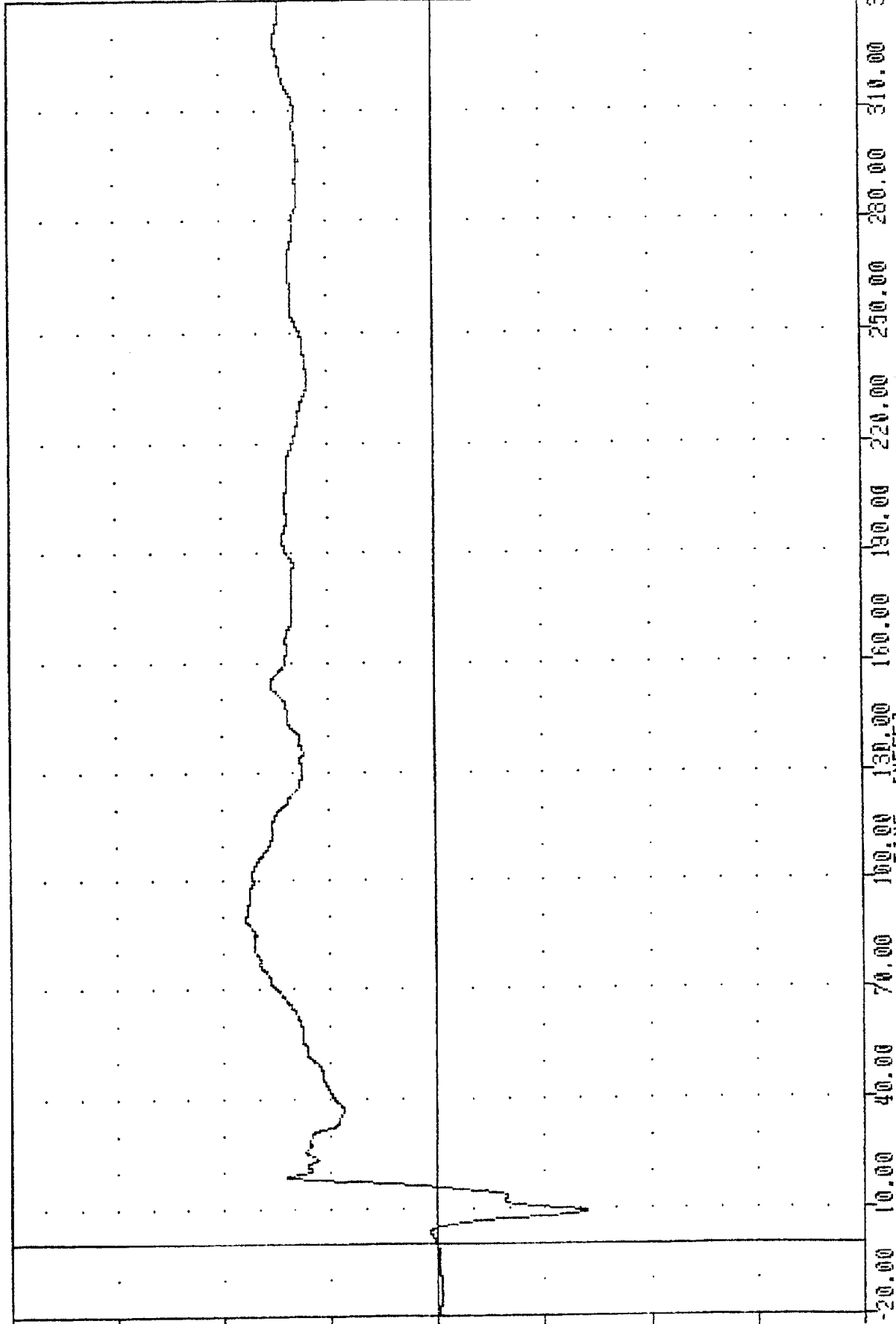
-14.028

8.88

17.84

89.38

VELOCITY (MPH)

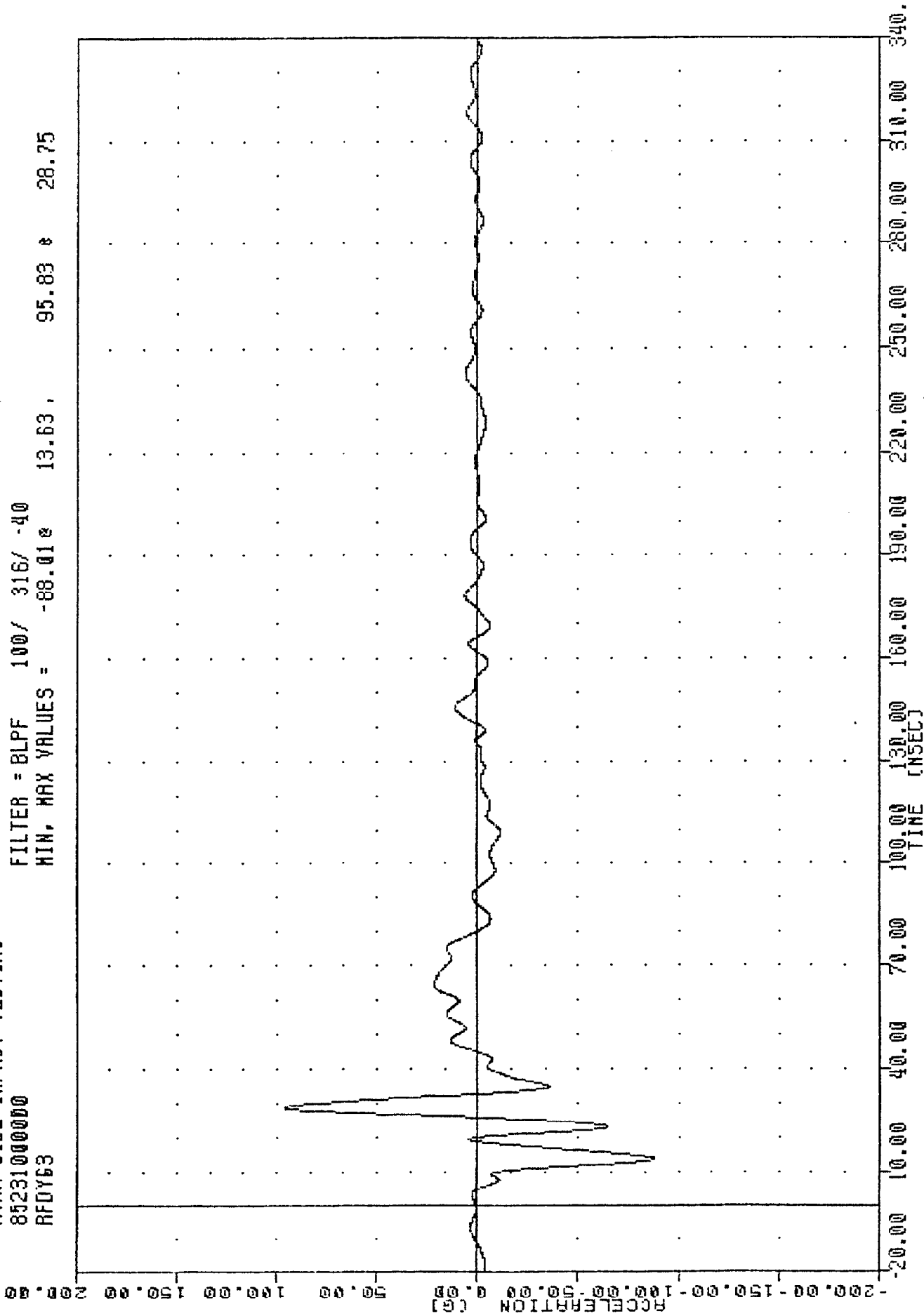


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
RIGHT FRONT DOOR (POSITION 2) VELOCITY Y AXIS

THC
 85231000000
 RFDY63
 MVMA SIDE IMPACT TESTING
 850819

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -88.018 13.63, 95.83 28.75

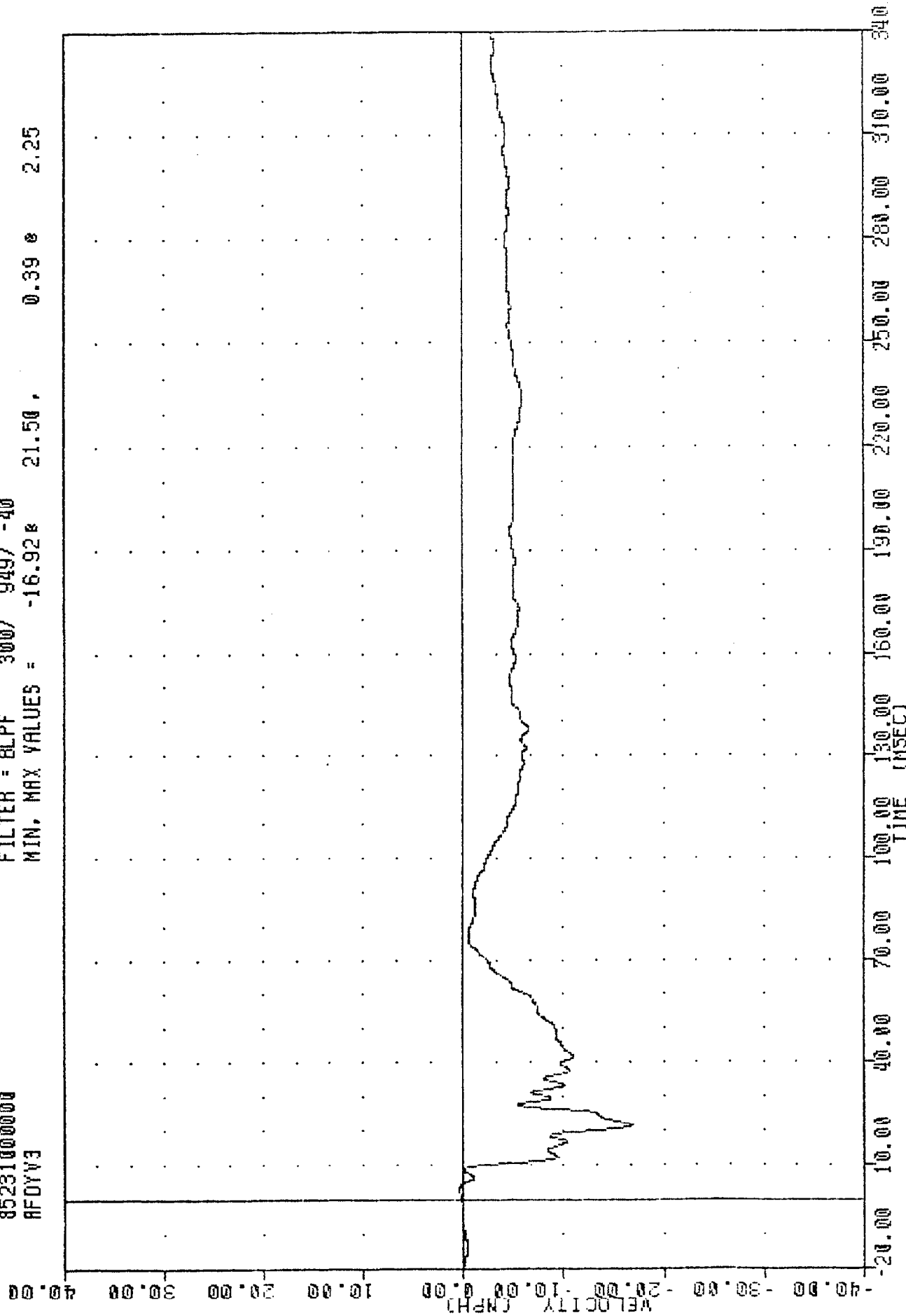


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 3) ACCELERATION Y AXIS

TRC
 NVMA SIDE IMPACT TESTING
 85231000000
 AFDYV3

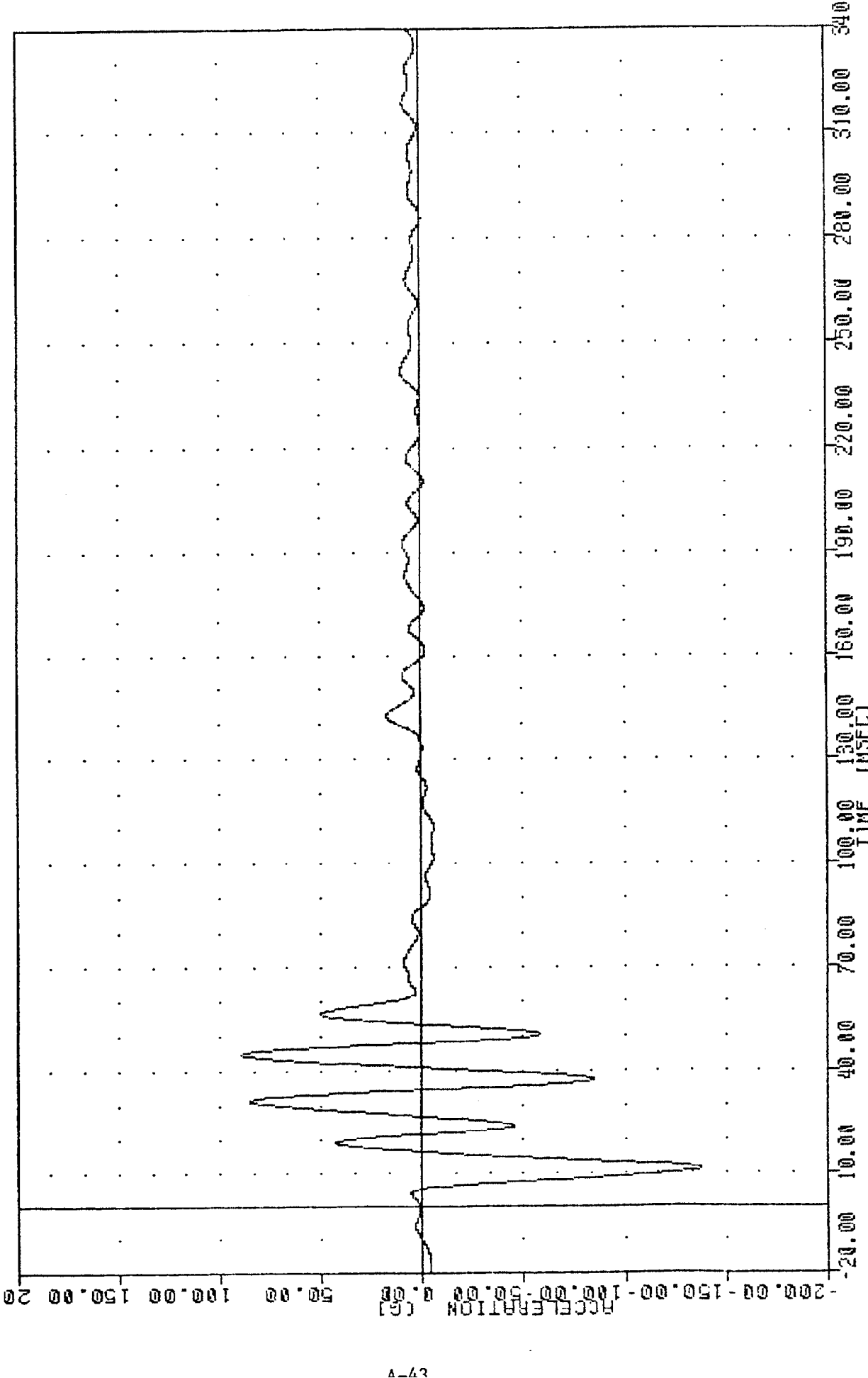
PLOT DATE 28-AUG-85 10:59:15

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -16.92 21.50 0.39 2.25



MODIFIED STRUCTURE/PADDED/NEAR SEATING
 RIGHT FRONT DOOR POSITION 31 VELOCITY Y AXIS

TRC , 850819
 NVMA SIDE IMPACT TESTING
 85231000000
 RFDY64
 PLOT DATE 26-AUG-85 10:33:34
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -137.84 11.13, 89.32 45.00

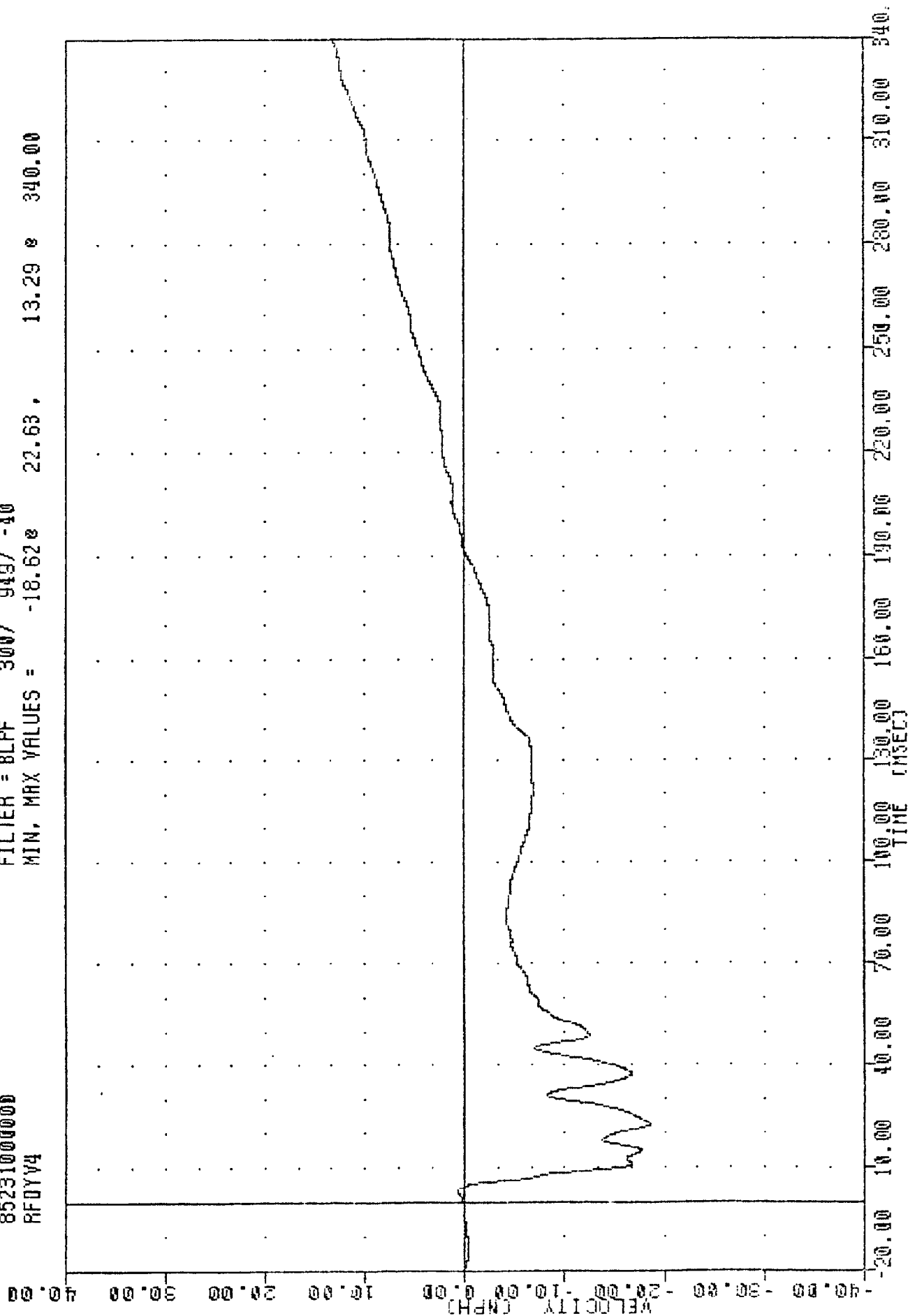


NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 4) ACCELERATION Y AXIS

TRC 850819
 MVMA SIDE IMPACT TESTING
 85231000000
 RFDYV4

PLUT DATE 26-AUG-85 10:59:15

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -18.62e 22.63, 13.29 e 340.00

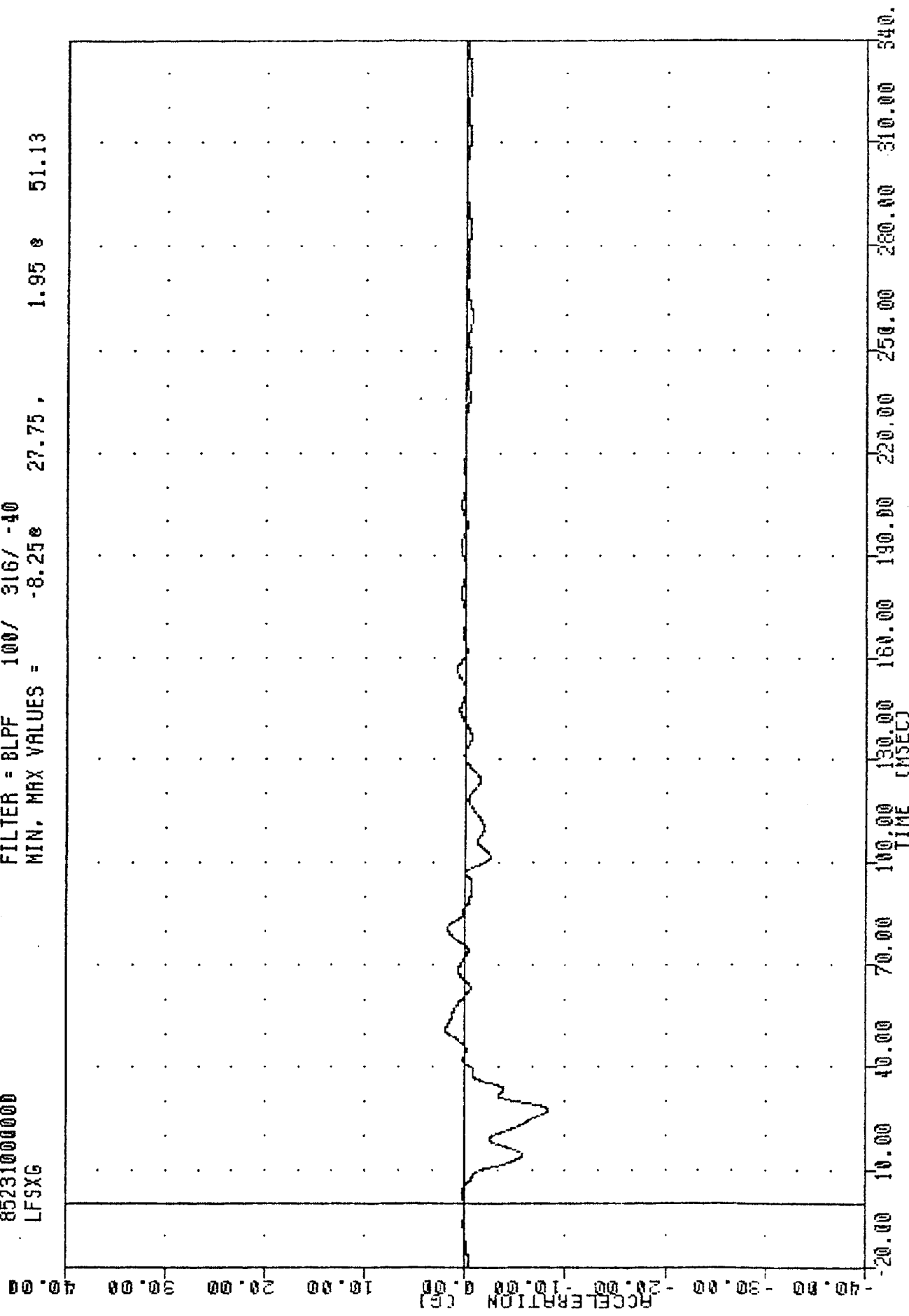


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 RIGHT FRONT DOOR (POSITION 4) VELOCITY Y AXIS

TRC
MVMA SIDE IMPACT TESTING
85231000000
LFSXG

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -8.25e 27.75, 1.95 e 51.13

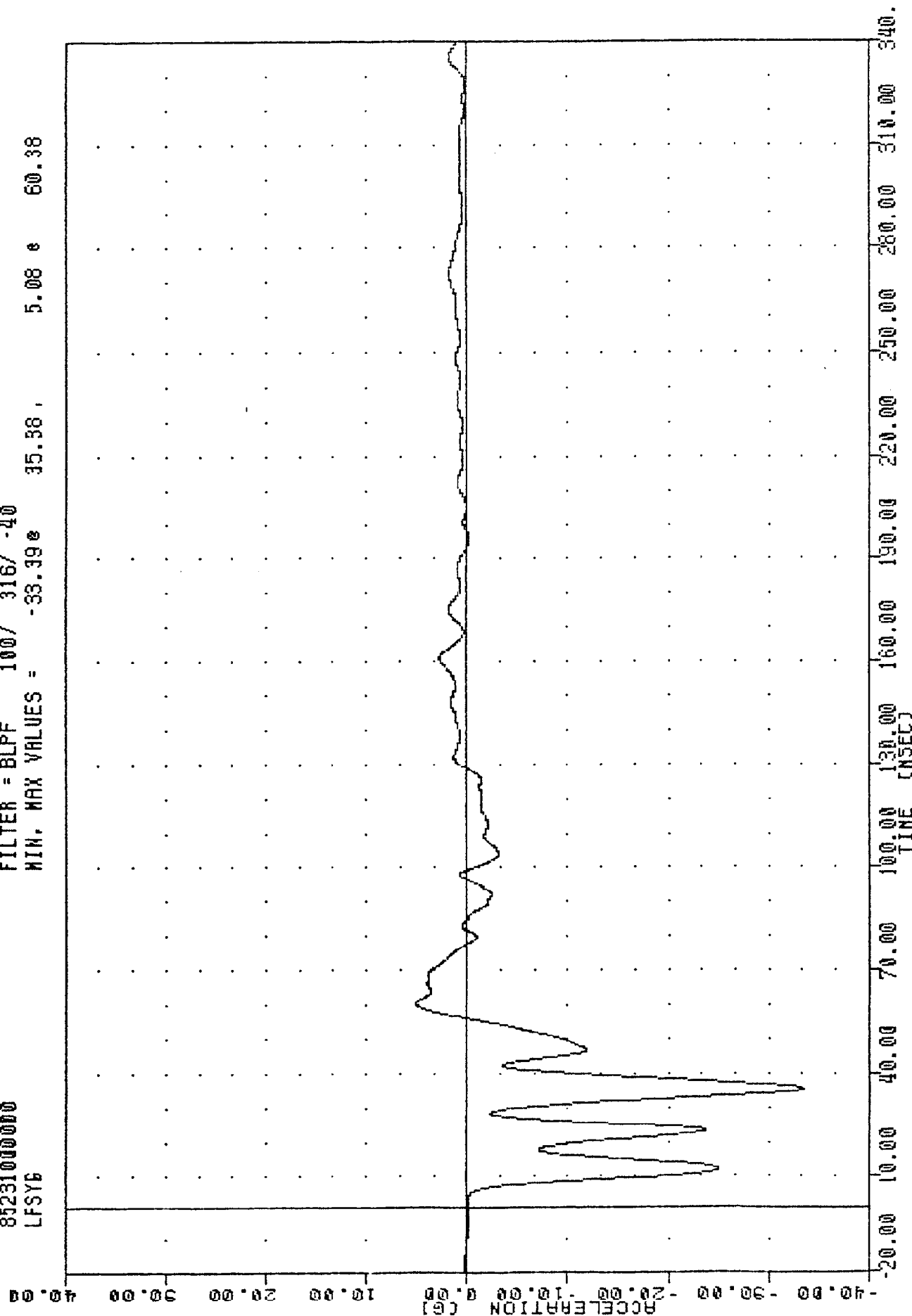


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
VEHICLE LEFT FRONT STILL ACCELERATION X AXIS

TRC , 850819
 MVMA SIDE IMPACT TESTING
 85231000000
 LFSY6

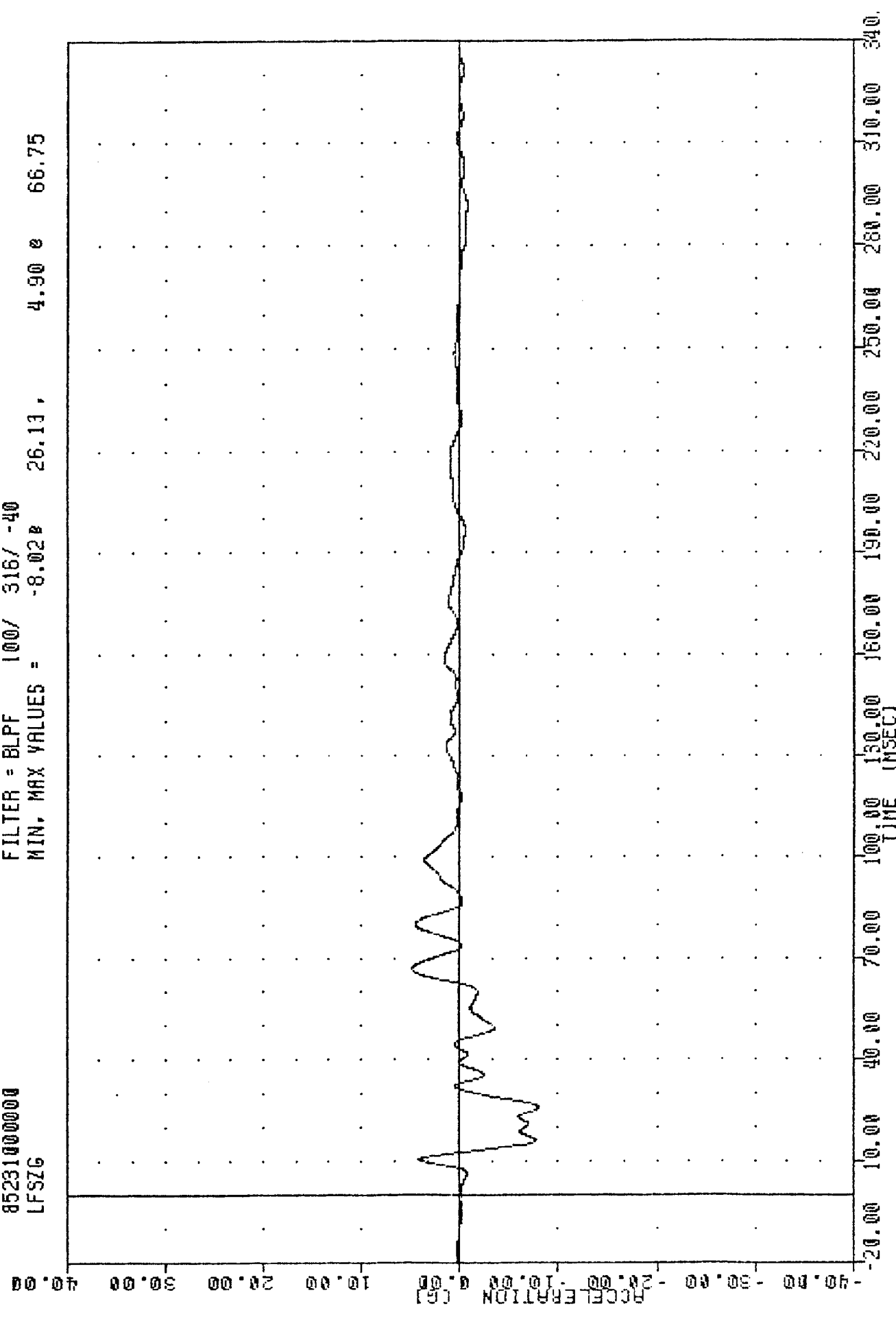
PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -33.39 35.38 5.08 60.38



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

TRC
 NVMA SIDE IMPACT TESTING
 85231000000
 LFSZG
 , 850819
 PLOT DATE 26-AUG-85 10:33:34
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -8.02E 26.13, 4.90E 66.75

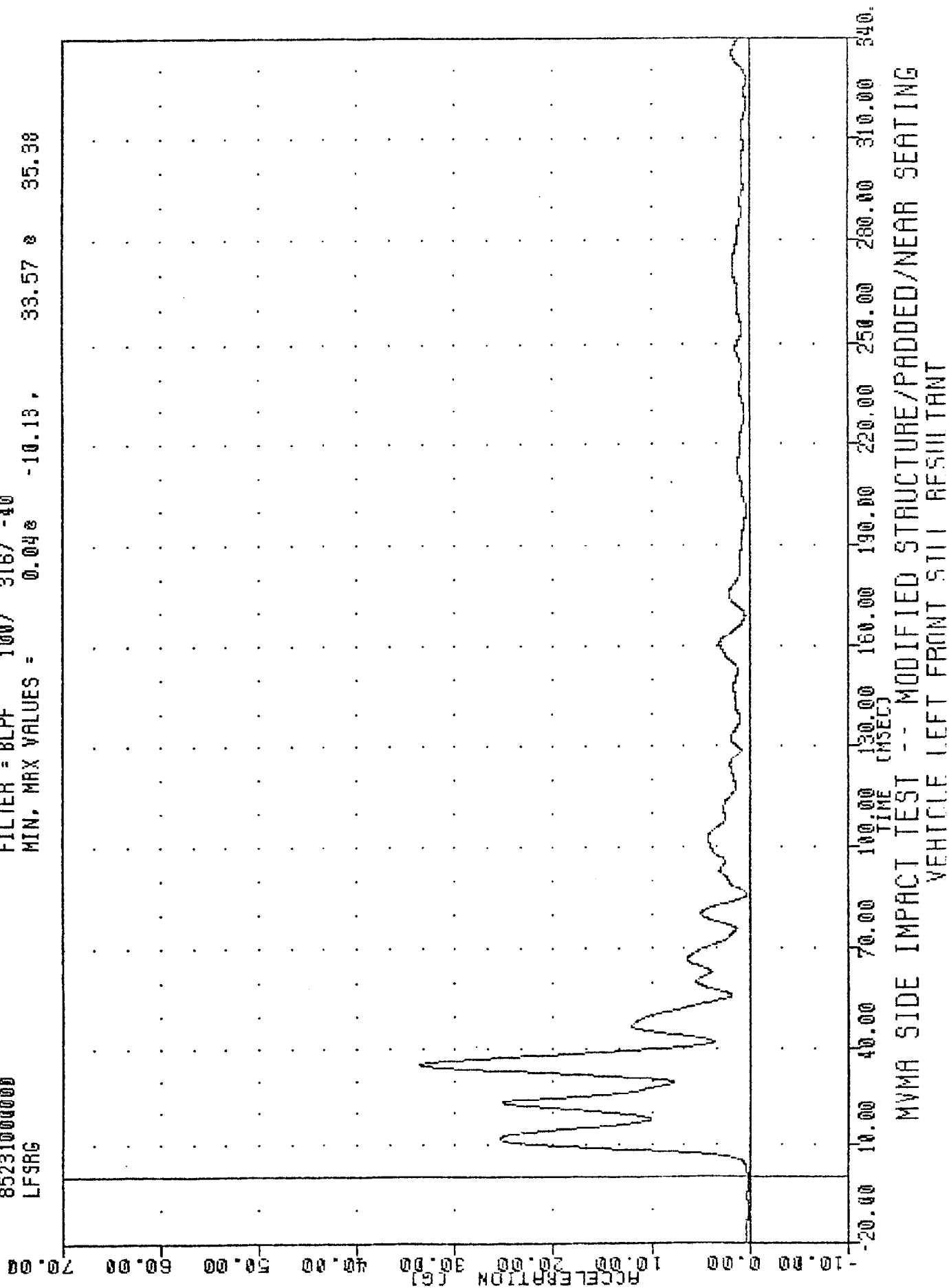


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION Z AXIS

TRC
 MVMA SIDE IMPACT TESTING
 85231000000
 LFSRG

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = 0.048 -10.13, 33.57 & 35.38



TRC

850819

PLOT DATE

26-AUG-83

10:59:13

MVMA SIDE IMPACT TESTING

85231000000

LFSYV

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -14.60e 53.50

0.02 e -12.75

40.00

30.00

20.00

10.00

0.00

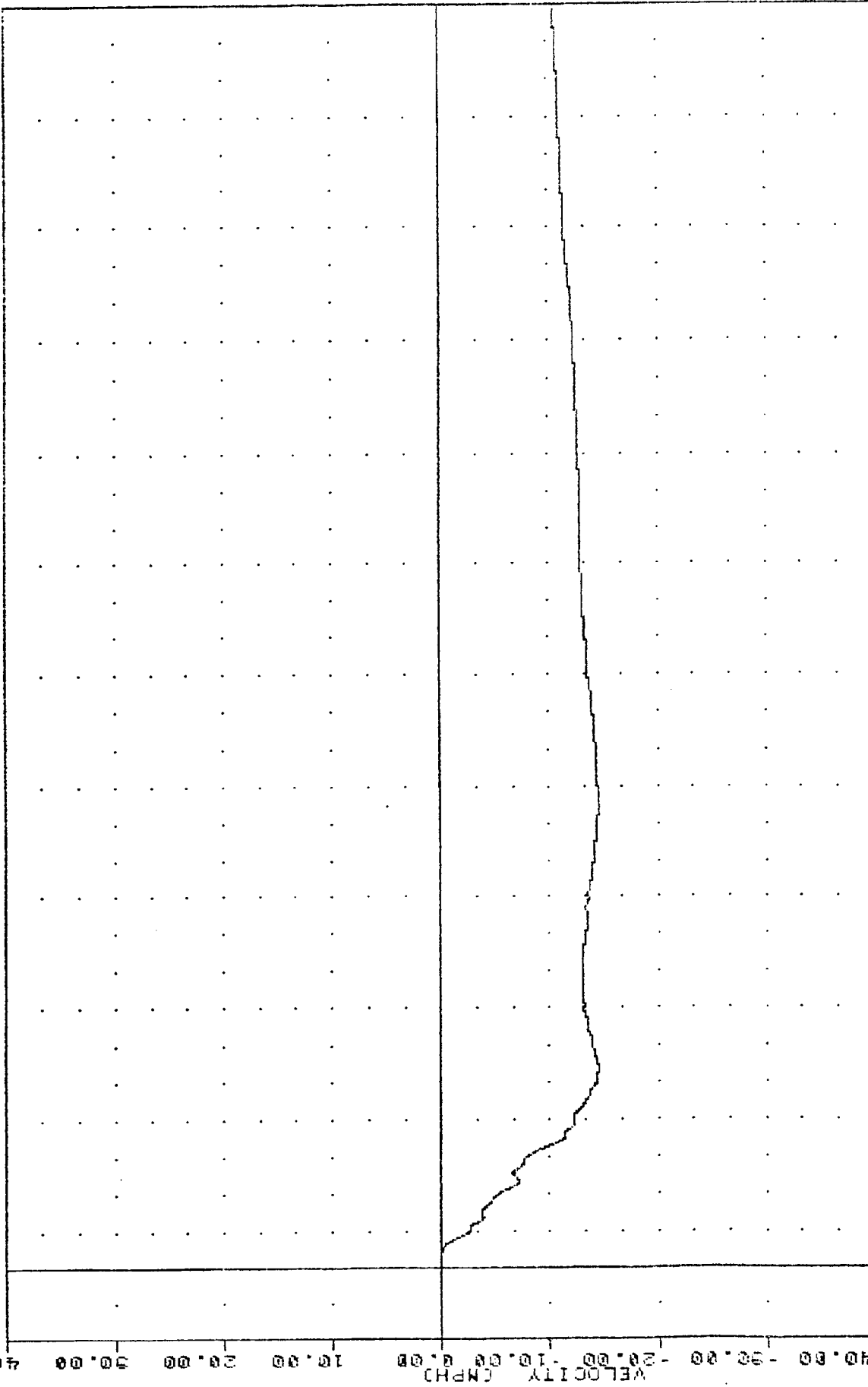
-10.00

-20.00

-30.00

-40.00

07-V



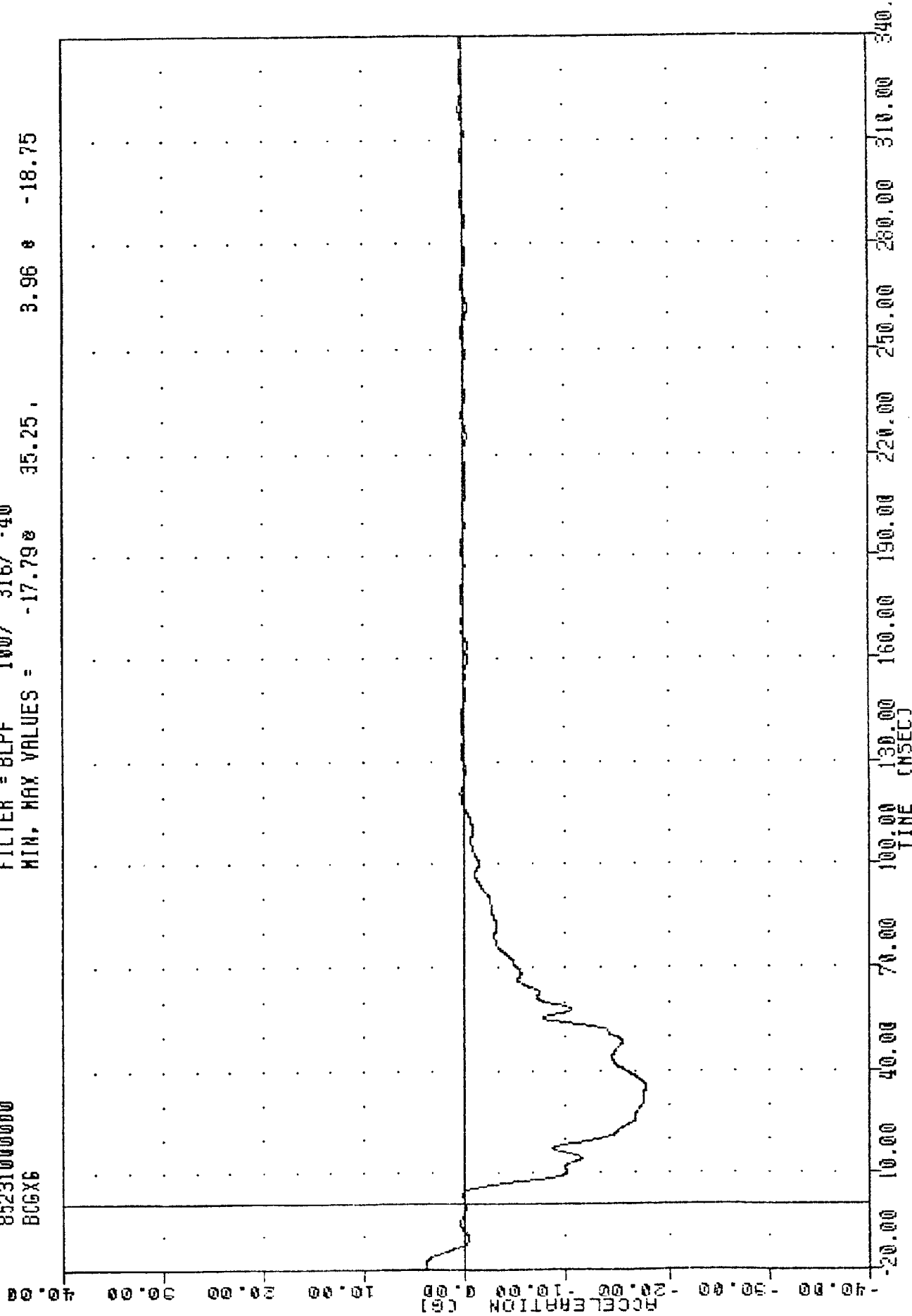
TIME (MSEC)

MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
LEFT FRONT SILL VELOCITY Y AXIS

TAC 850819
 MVMA SIDE IMPACT TESTING
 85231000000
 BCGX6

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -17.79 35.25 3.96 -18.75

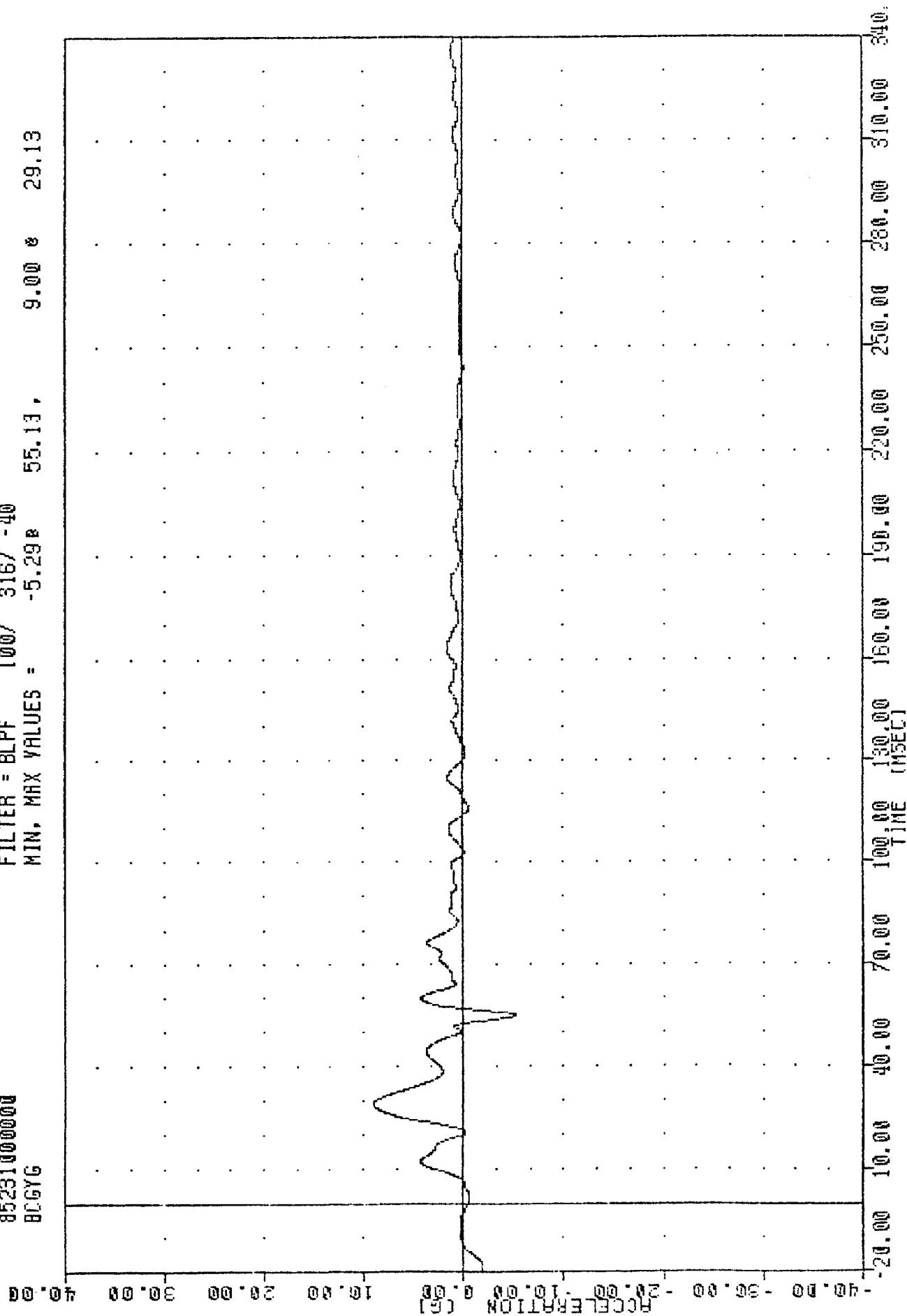


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER CENTER OF GRAVITY X AXIS

IRC
 NVMA SIDE IMPACT TESTING
 85231000000
 BCGYG

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -5.298 55.13, 9.00 29.13

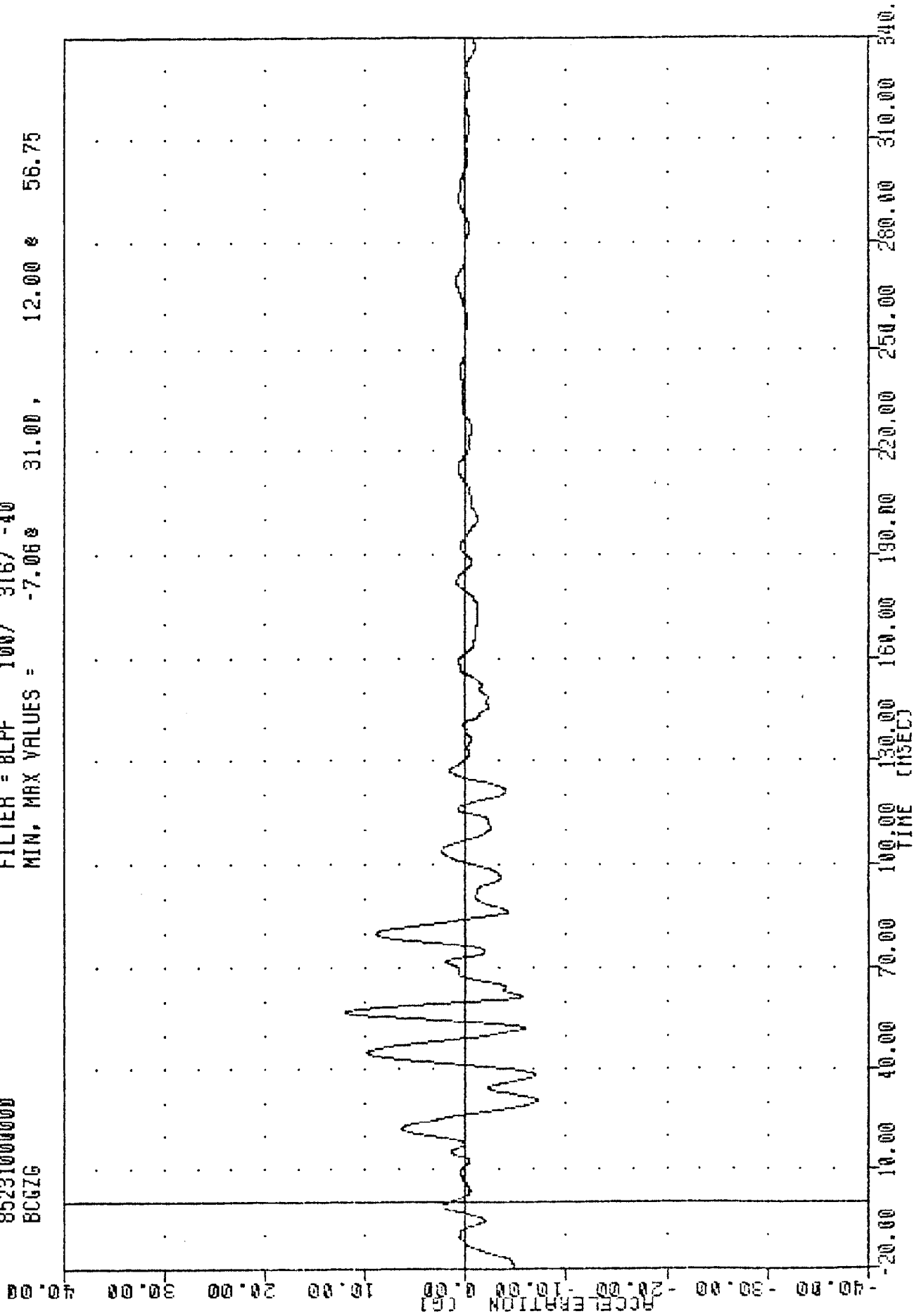


NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER CENTER OF GRAVITY Y AXIS

TRC
 MVMA SIDE IMPACT TESTING
 85231000000
 BCGZG

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -7.06 31.00 , 12.00 56.75

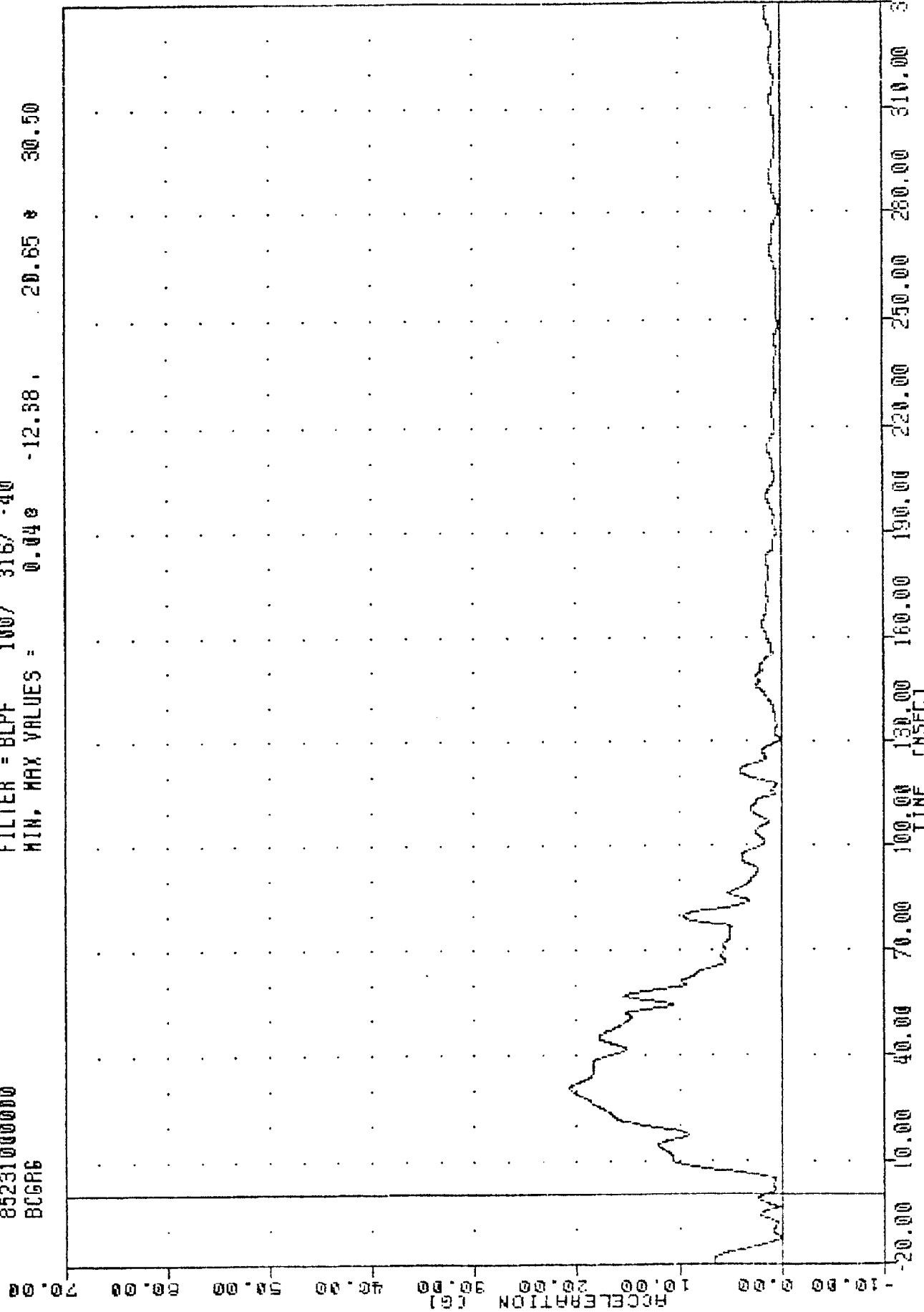


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER CENTER OF GRAVITY Z AXIS

TPC
 850819
 MVMA SIDE IMPACT TESTING
 85231000000
 BCGRB

PLOT DATE 26-AUG-85 10:33:34

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.040 -12.38 20.65 30.50

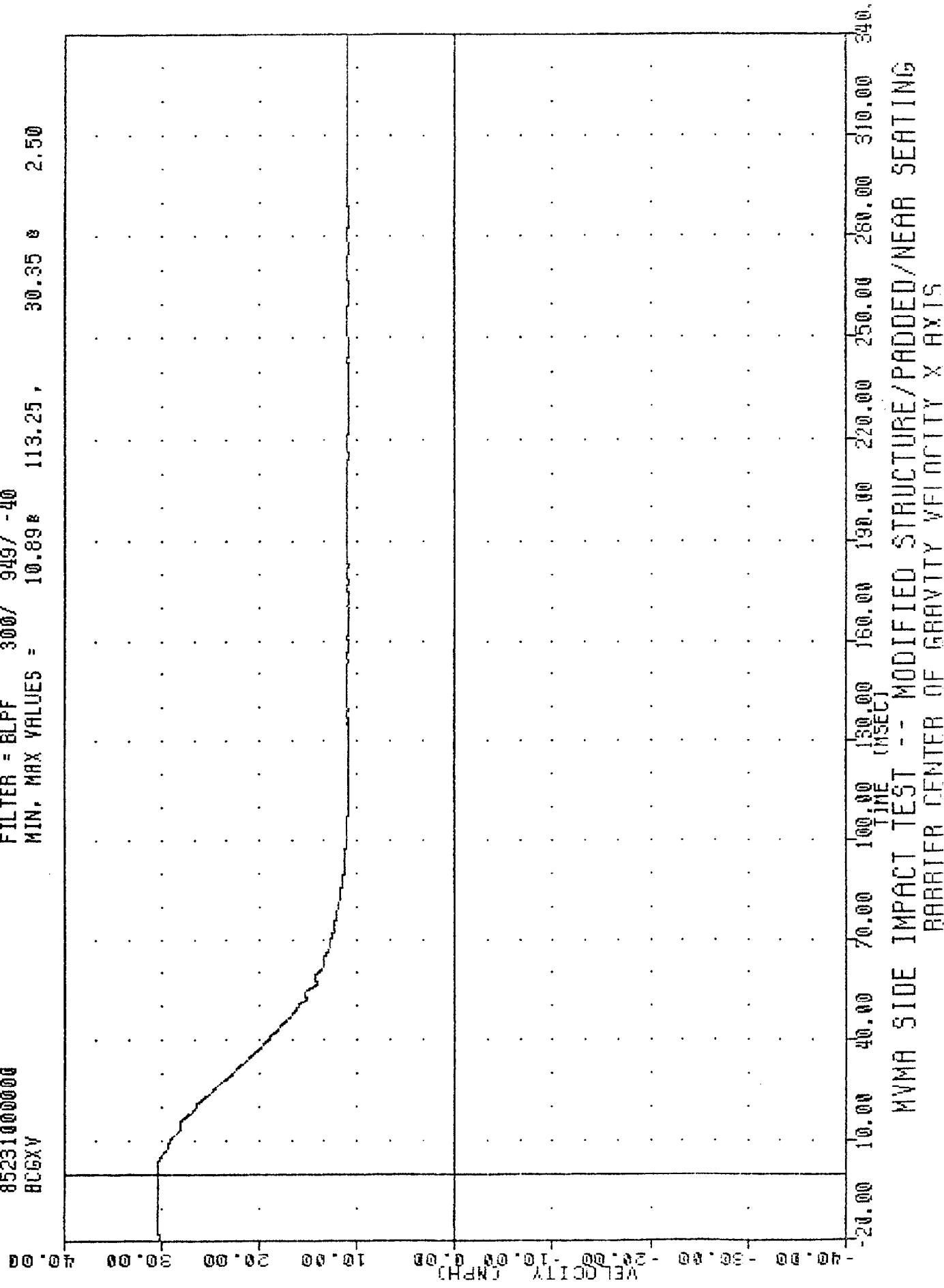


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

TRC
 NYMA SIDE IMPACT TESTING
 85231000000
 BUCXY

PLOT DATE 26-AUG-85 10:59:15

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 10.89 113.25 30.35 2.50



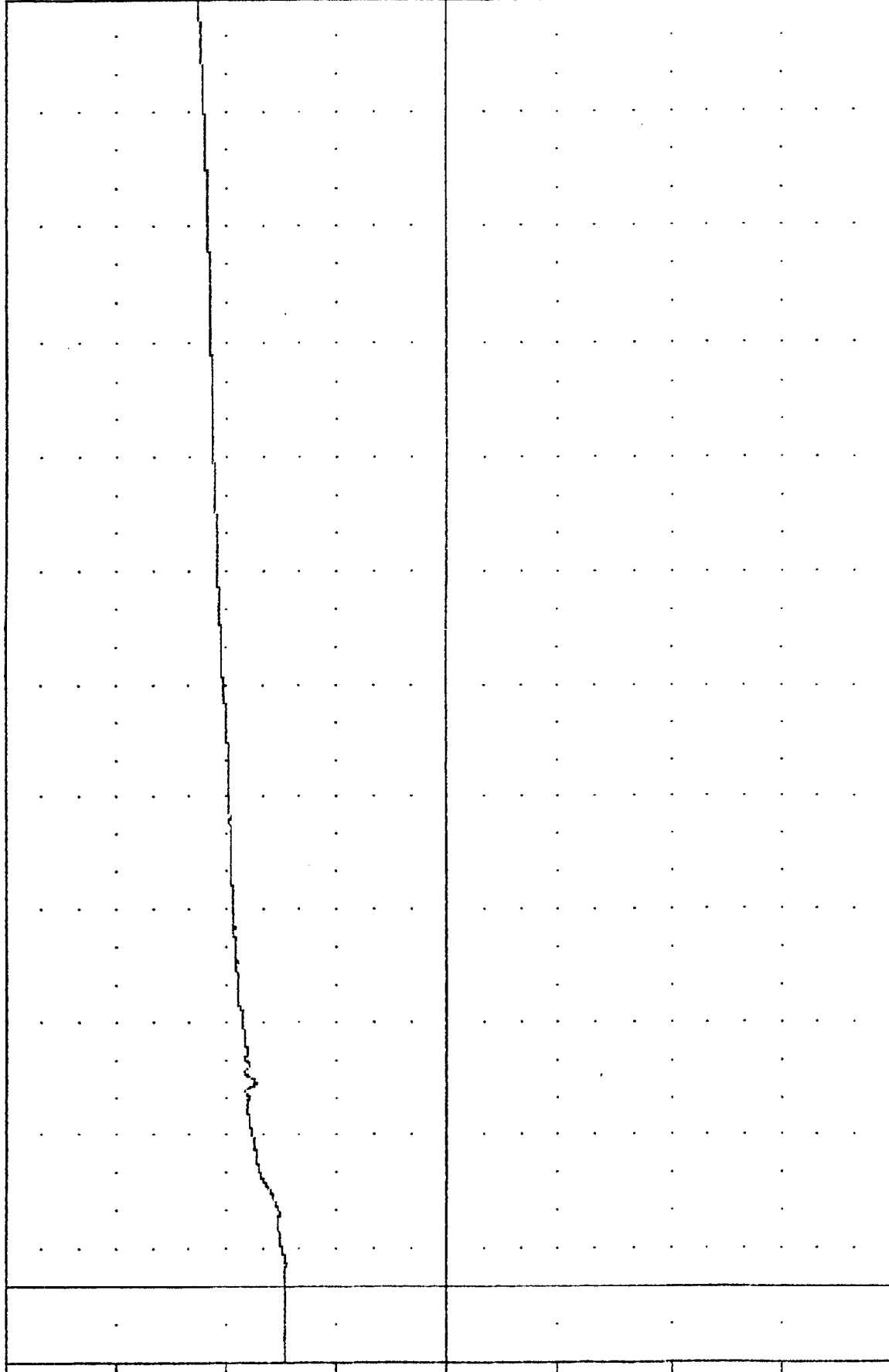
NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER CENTER OF GRAVITY VELOCITY X AXIS

508
 MVNA SIDE IMPACT TESTING
 85231000000
 BCGV

59
 300 / 949 / -40
 MIN. MAX VALUES = 14.57 5.88

22.55 340.00

VELOCITY (MPH)



-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00

MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER CENTER OF GRAVITY VELOCITY Y AXIS

TRC 850819 26-AUG-85 10:33:34

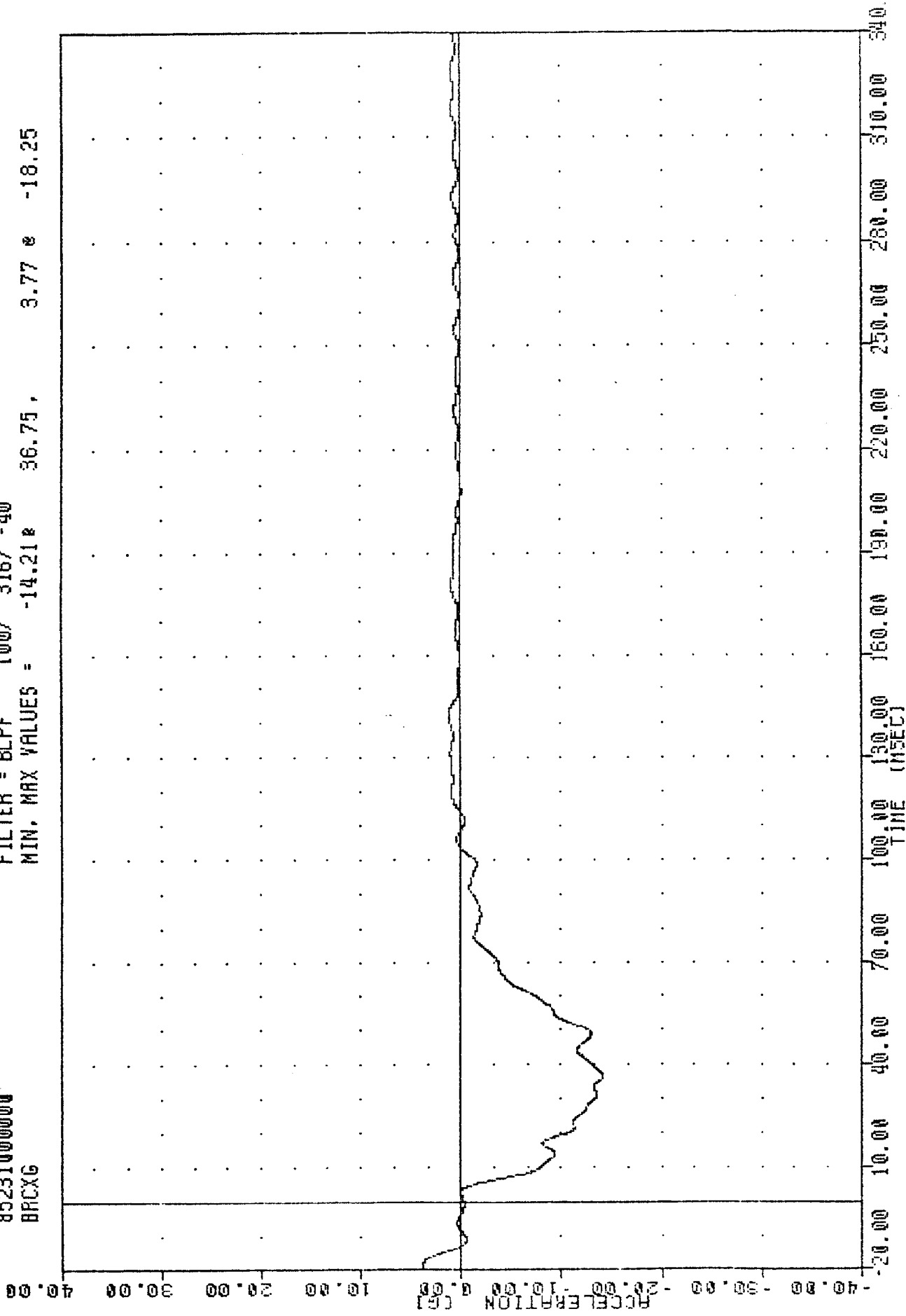
NVMA SIDE IMPACT TESTING

85231000000

BRXG

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -14.21 36.75, 3.77 -18.25

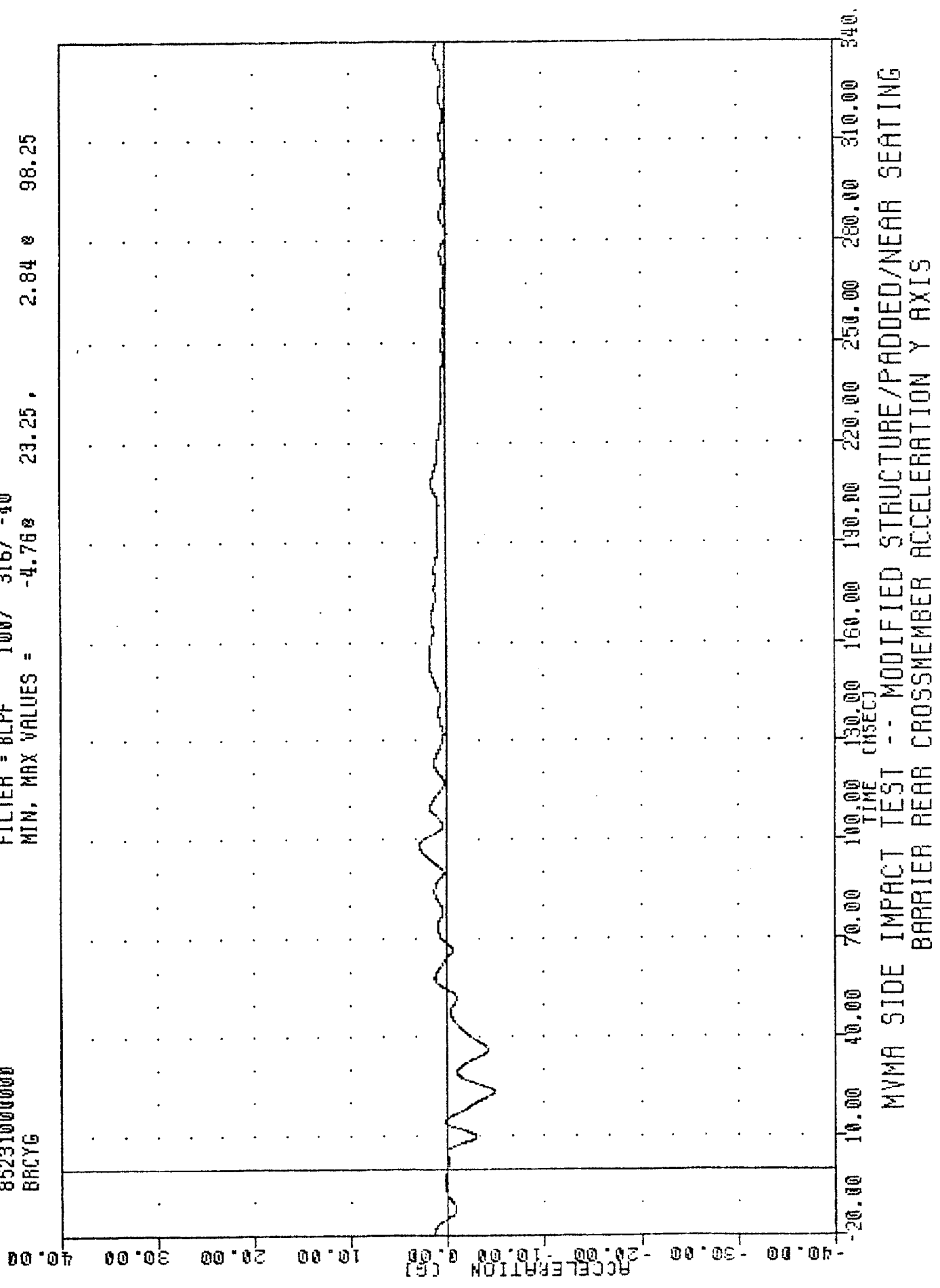


NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
BARRIER REAR CROSSMEMBER ACCELERATION X AXIS

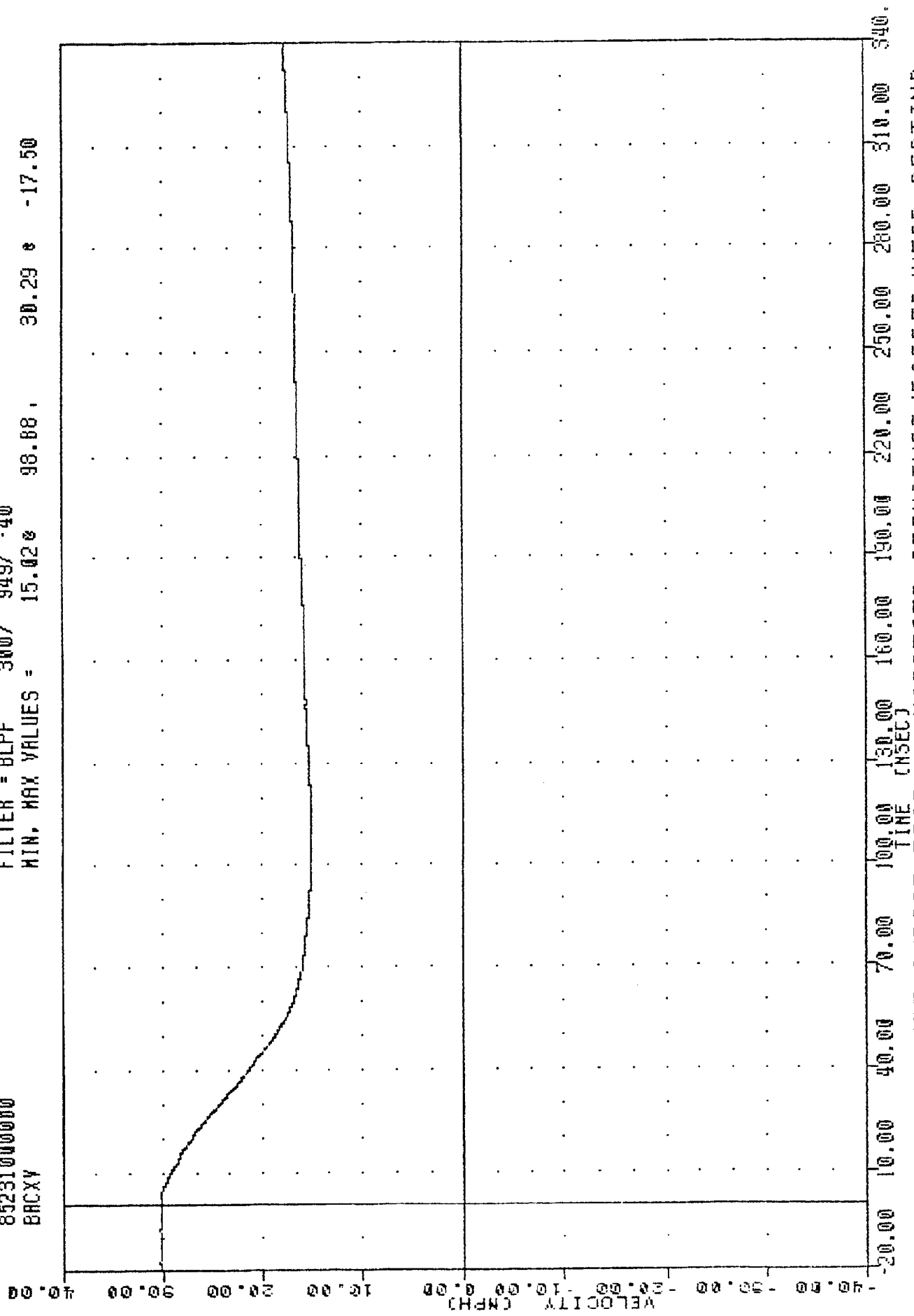
750819 26-AUG-83 10:33:34

MVMA SIDE IMPACT TESTING
85231000000
BRCYG

FILTER = 8LPF 100/ 316/ -40
MIN, MAX VALUES = -4.76 23.25 2.84 98.25

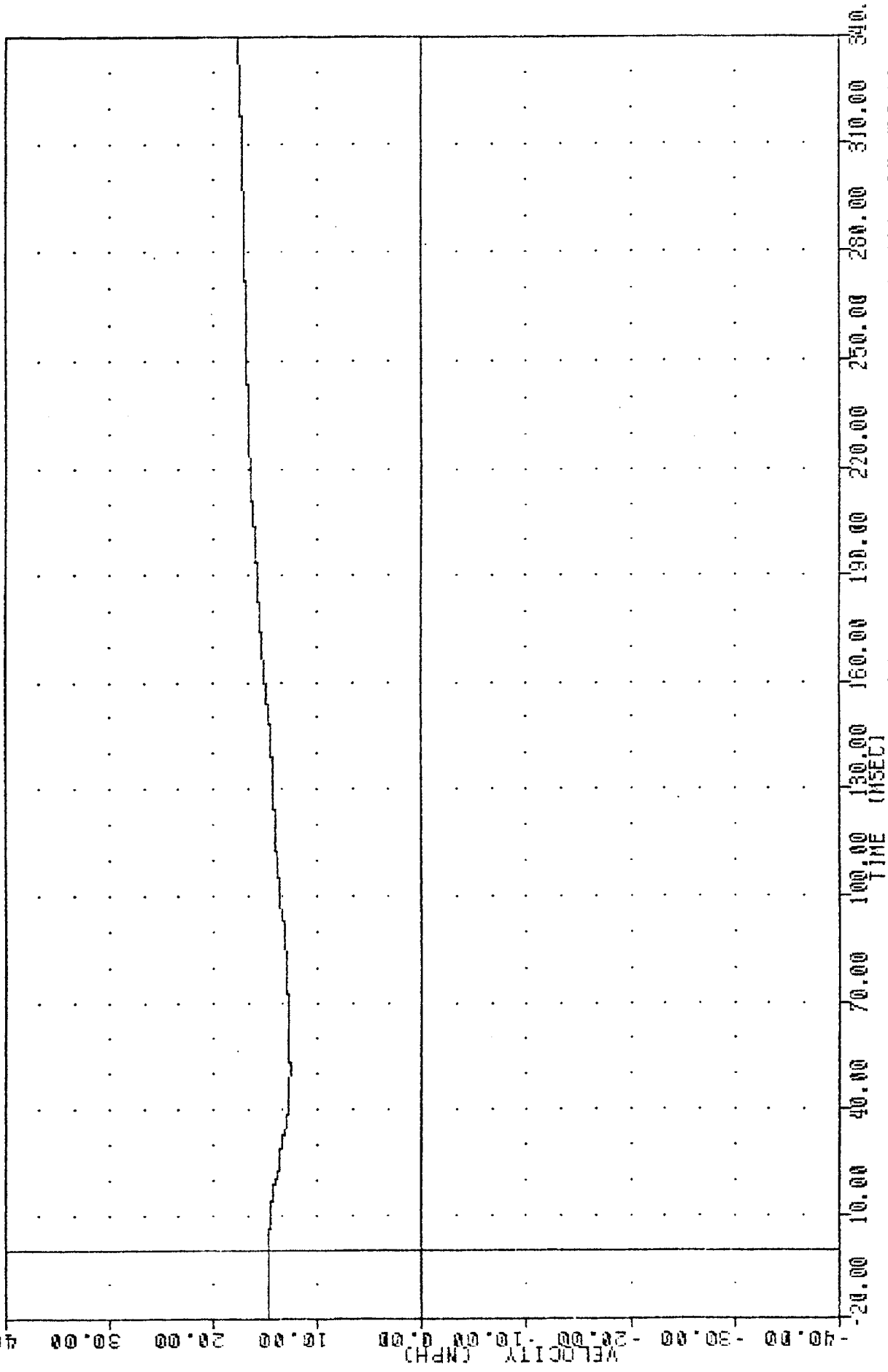


TRC 950810 050810 050810 050810 050810 050810 050810 050810 050810 050810
 MVMA SIDE IMPACT TESTING
 85231000000
 BRXY
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 15.020 98.88 , 30.29 * -17.50



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER REAR CROSSMEMBER VELOCITY X AXIS

756 508 59 AUG 59
 NVMA SIDE IMPACT TESTING
 85231000000
 BRCYV
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 12.63 51.75, 17.69 340.00



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/NEAR SEATING
 BARRIER REAR CROSSMEMBER VELOCITY Y AXIS

APPENDIX B
DUMMY CERTIFICATION

SIDE IMPACT DUMMY CALIBRATION

SIDE IMPACT DUMMY CALIBRATION
DUMMY SERIAL NUMBER 119
CALIBRATION 07

TEST/ DATE	CHANNEL	FILTER CLASS	PEAK ACCELERATION (g)	
			SPECIFICATION*	TEST RESULT
HEAD 8/12/85	HEAD Y-AXIS	1000	150-175	158.77
THORAX 8/12/85	UPPER SPINE Y-AXIS			
	PRIMARY	180	16-24.6	22.14
	REDUNDANT	180	16-24.6	21.91
	LOWER SPINE Y-AXIS			
	PRIMARY	180	17.6-26.4	19.02
	REDUNDANT	180	17.6-26.4	19.19
	RIGHT UPPER RIB Y-AXIS			
	PRIMARY	180	36-50	47.82
	REDUNDANT	180	36-50	48.09
	RIGHT LOWER RIB Y-AXIS			
	PRIMARY	180	36-50	46.49
	REDUNDANT	180	36-50	46.66
PELVIS 8/9/85	PELVIS Y-AXIS	180	50-65	58.02

*Side impact test specifications currently in use by VRTC-NHTSA.

Side Impact Dummy
Damage Checklist

Dummy S/N 119

<u>OK</u>	<u>Damaged</u>	
<u>X</u>	<u> </u>	Outer skin on entire dummy (gashes, rips, etc.)
<u>X</u>	<u> </u>	Head - Gashes, rips, general appearance, etc.
<u>X</u>	<u> </u>	Neck - broken or cracks in rubber
<u>X</u>	<u> </u>	Spine - broken or cracks in rubber
<u>X</u>	<u> </u>	Ribs - check all ribs for damage (bent or broken); damping material separation.
<u>X</u>	<u> </u>	Rib Attach Leather - breaks in leather at ribs
<u>X</u>	<u> </u>	Bourns Pot. - bent shaft - electrical discontinuity
<u>X</u>	<u> </u>	Accelerometer Leads - torn cables
<u>X</u>	<u> </u>	Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
<u>X</u>	<u> </u>	Retrofit Kit (Calspan) - check for bent brackets, sagging rib cage
<u>X</u>	<u> </u>	Thorax support wire and springs - check for damage
<u>X</u>	<u> </u>	Overall smooth stroking of thorax left to right (no interference)
<u>X</u>	<u> </u>	Other

If upon visual examination, damage is apparent in any of these areas, a VRTC representative is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement Approved By:

Signature _____ Date _____

Comments on repair or replacement of parts:

Visual OK

TRC Personnel

Checked By:

Signature Gregg Wills Date 9 Aug 85

VRTC Personnel

Checked and Approved for Testing By:

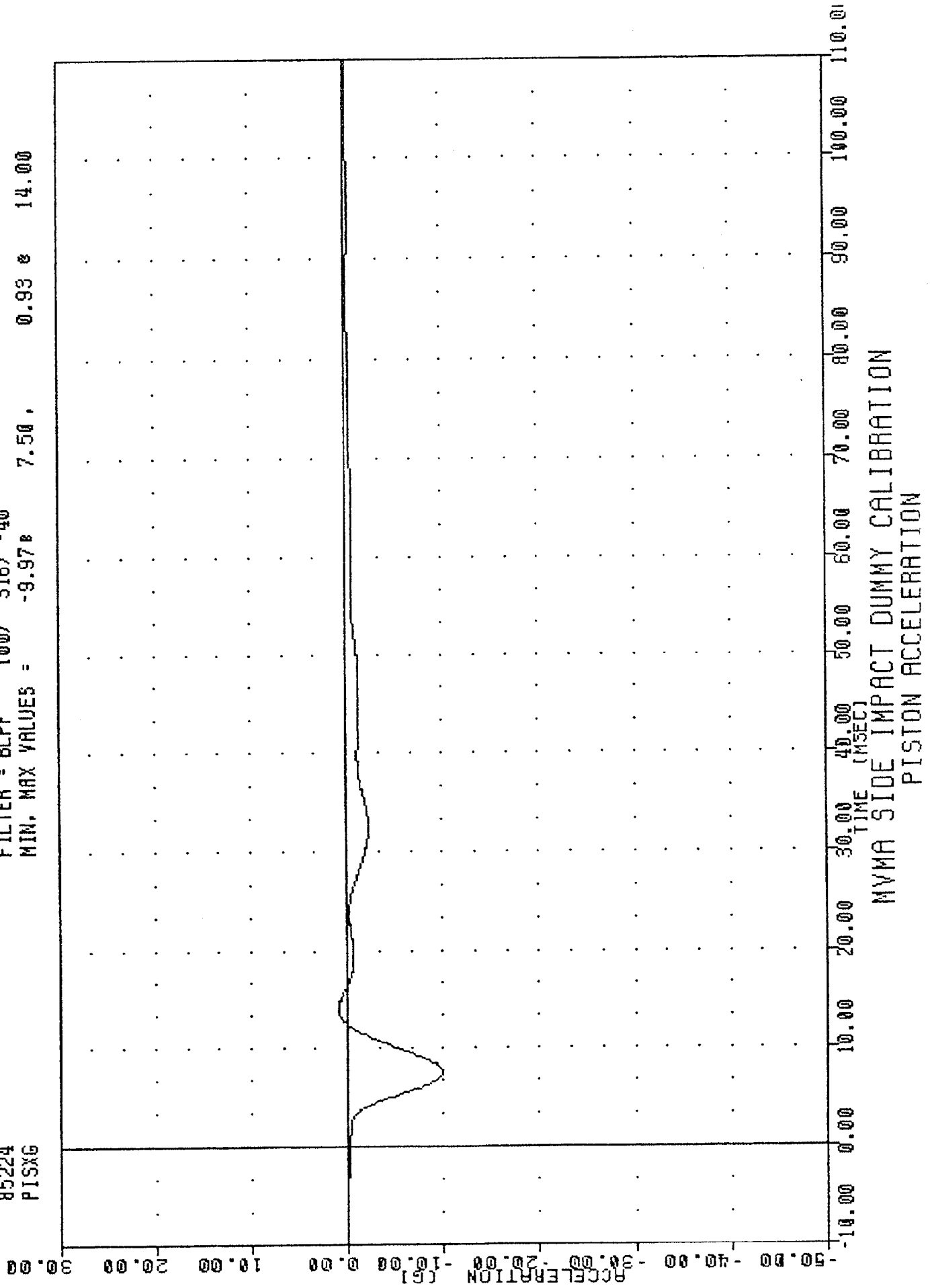
Signature _____ Date R-4

PART 572 CALIBRATION

KVMA
SID 119 HEAD IMPACT CAL 07
85224
PISXG

PLOT DATE 12-AUG-85 12:42:46

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -9.97% 7.50, 0.93% 14.00

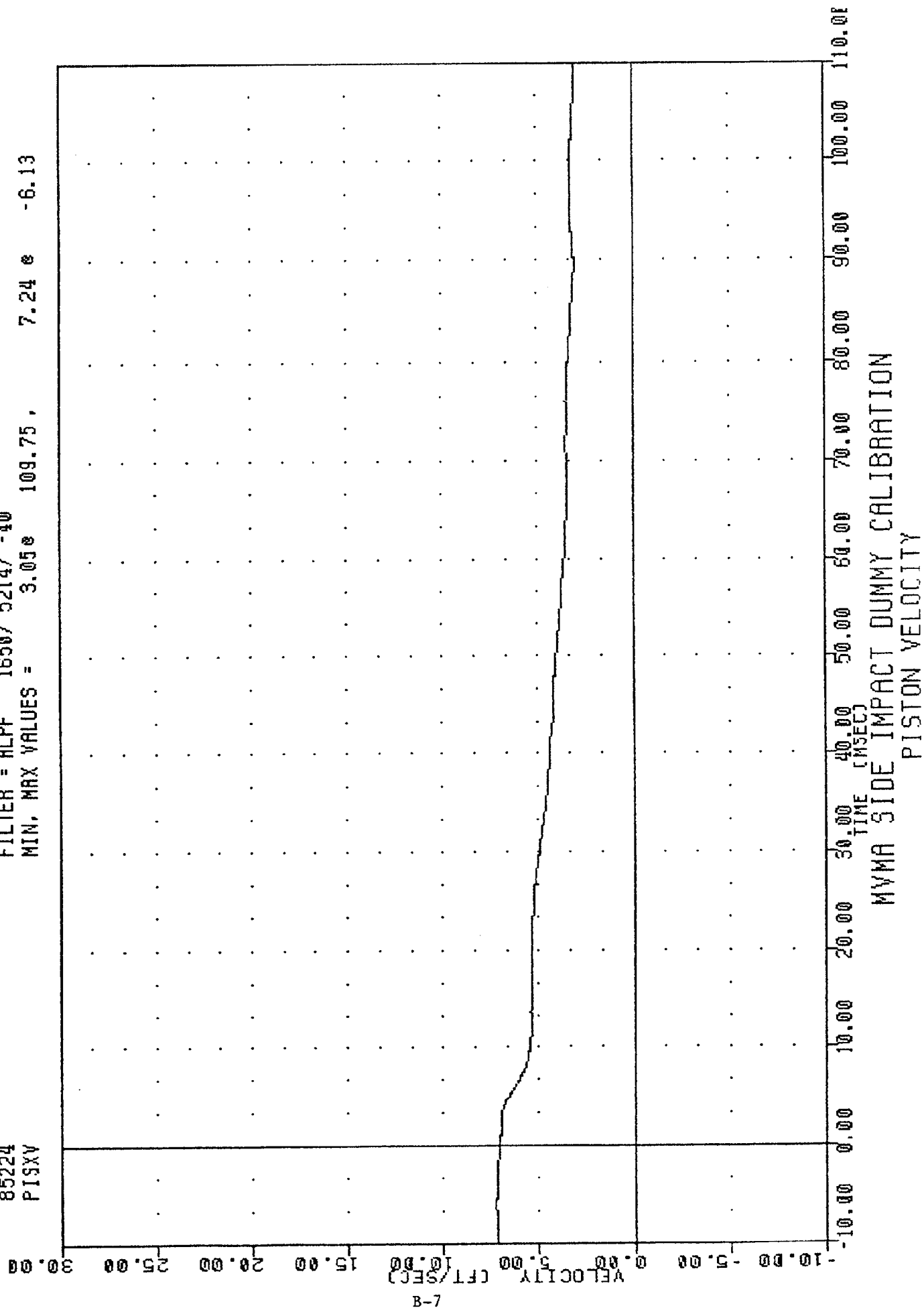


MVNA
SID 119 HEAD IMPACT CAL 07
85224
PI3XV

PLOT DATE 12-AUG-85 12:42:46

FILTER = ALPF 1650/ 5214/ -40

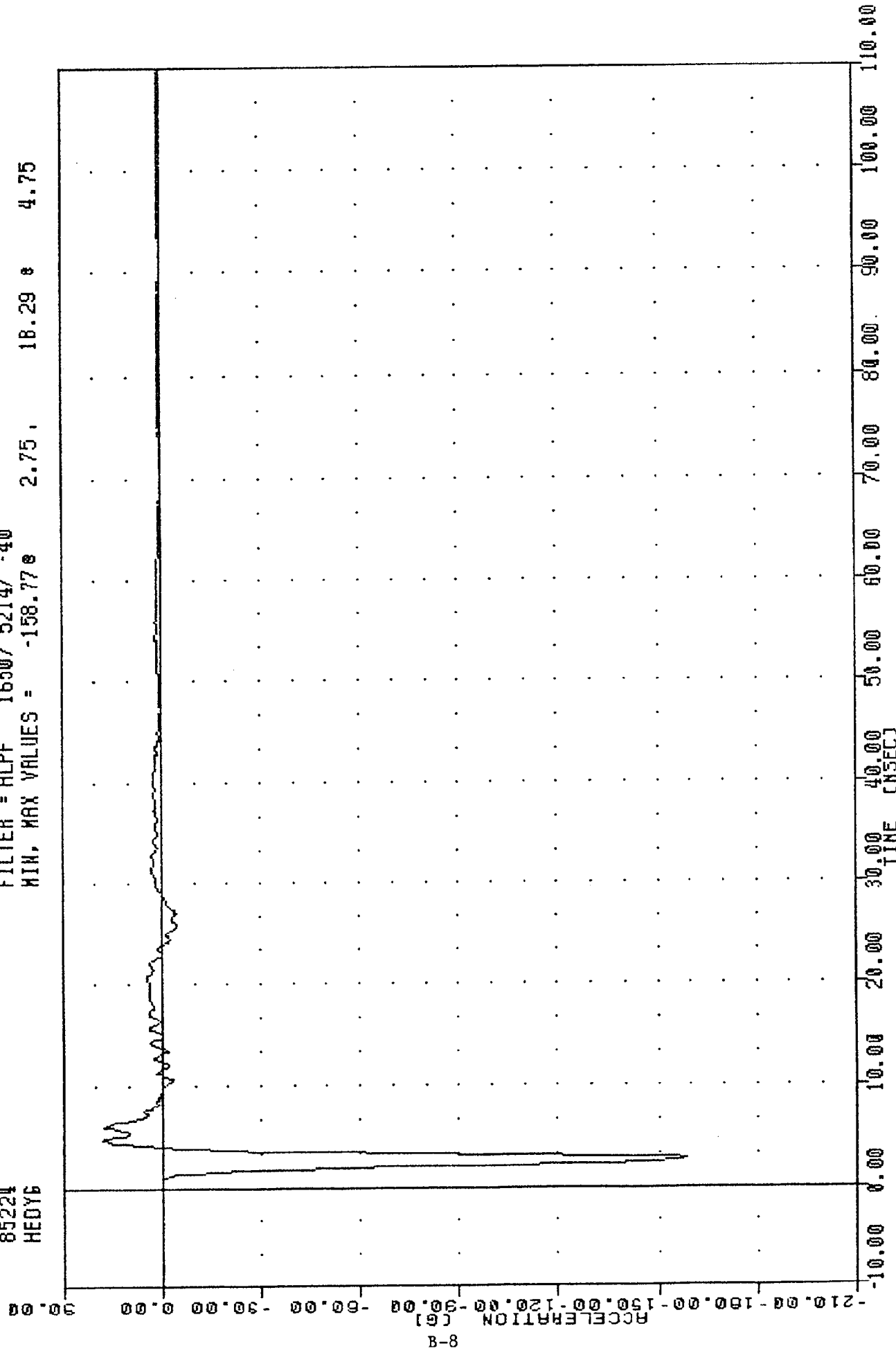
MIN. MAX VALUES = 3.058 109.75 , 7.24 8 -6.13



MVMA
 SID 119 HEAD IMPACT CAL D7
 85224
 HEDYG

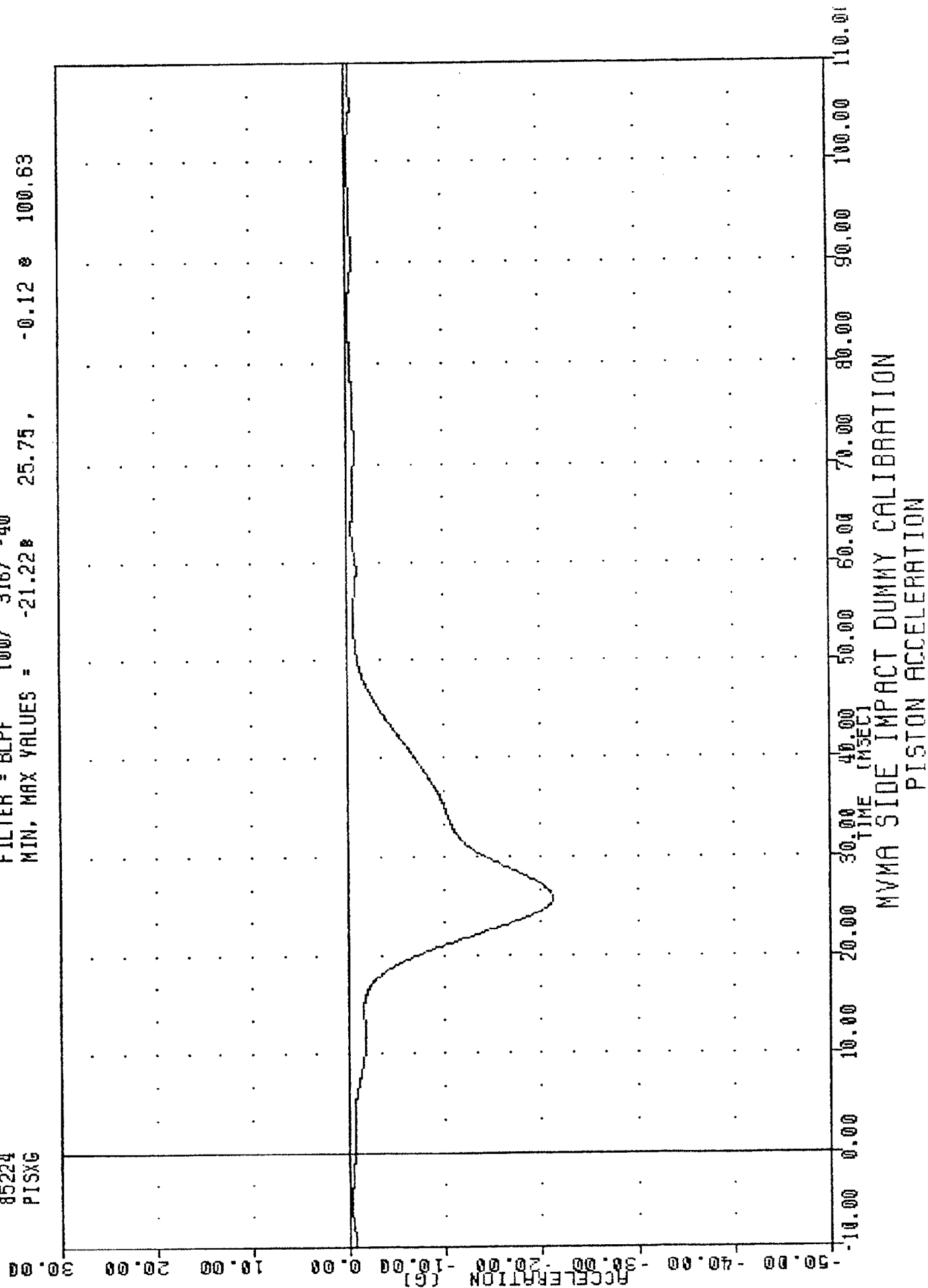
PLOT DATE 12-AUG-85 12:42:46

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -158.77 2.75, 18.29 4.75

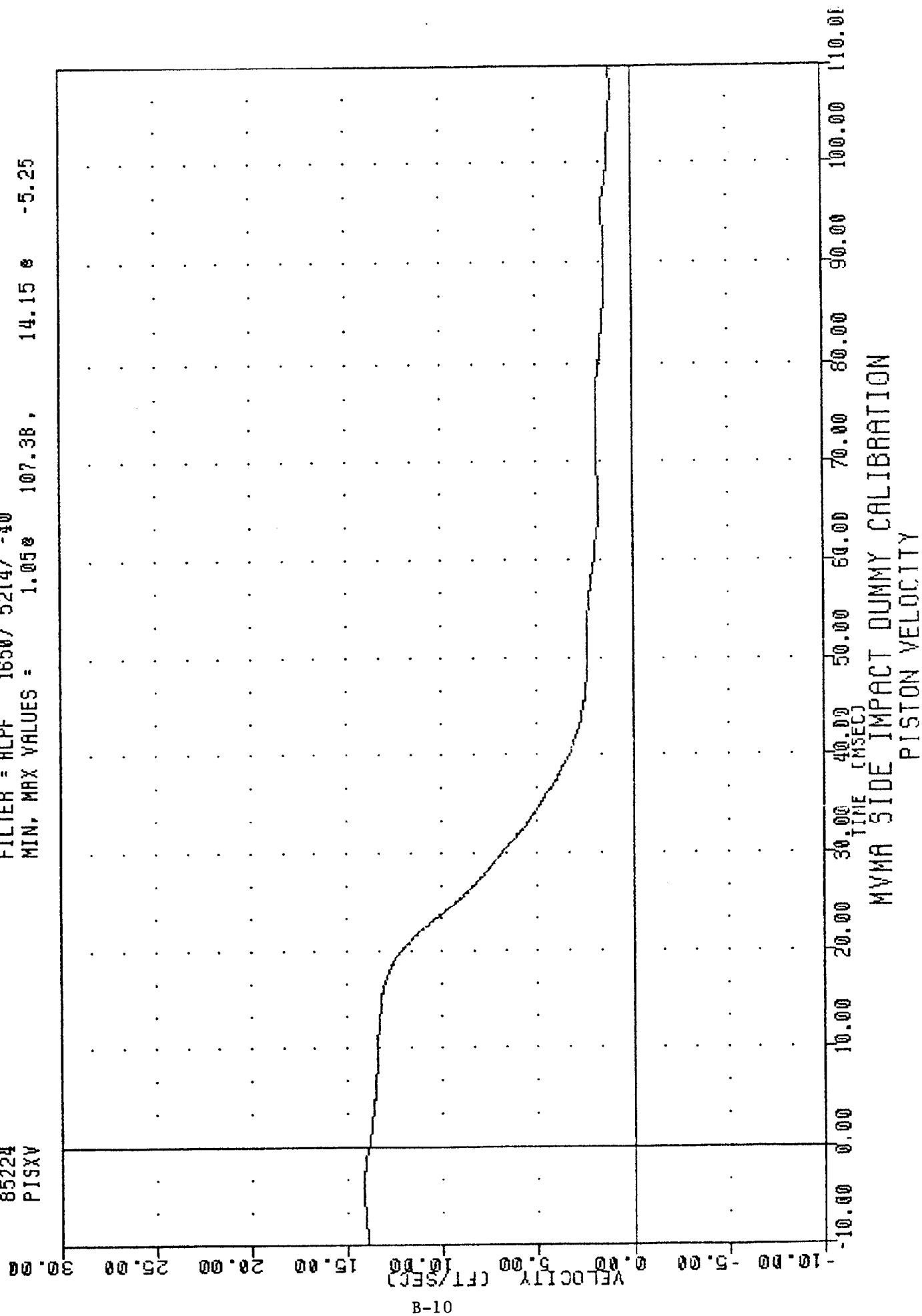


MVMA SIDE IMPACT DUMMY CALIBRATION
 HEAD ACCELERATION Y AXIS

NVMA , ST11907 PLOT DATE 12-AUG-85 10:55:13
 SID 119 THORAX IMPACT CAL 07
 85224
 PISXG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -21.228 25.75, -0.12 100.63



MVNA , ST11907 PLOT DATE 12-AUG-85 10:55:13
 SID 119 THORAX IMPACT CAL 07
 85224
 PISXV
 FILTER = ALPF 1650/ 5214/ -10
 MIN, MAX VALUES = 1.05e 107.38, 14.15 e -5.25



PLOT DATE 12-AUG-85 10:55:13

NVMA , ST11907

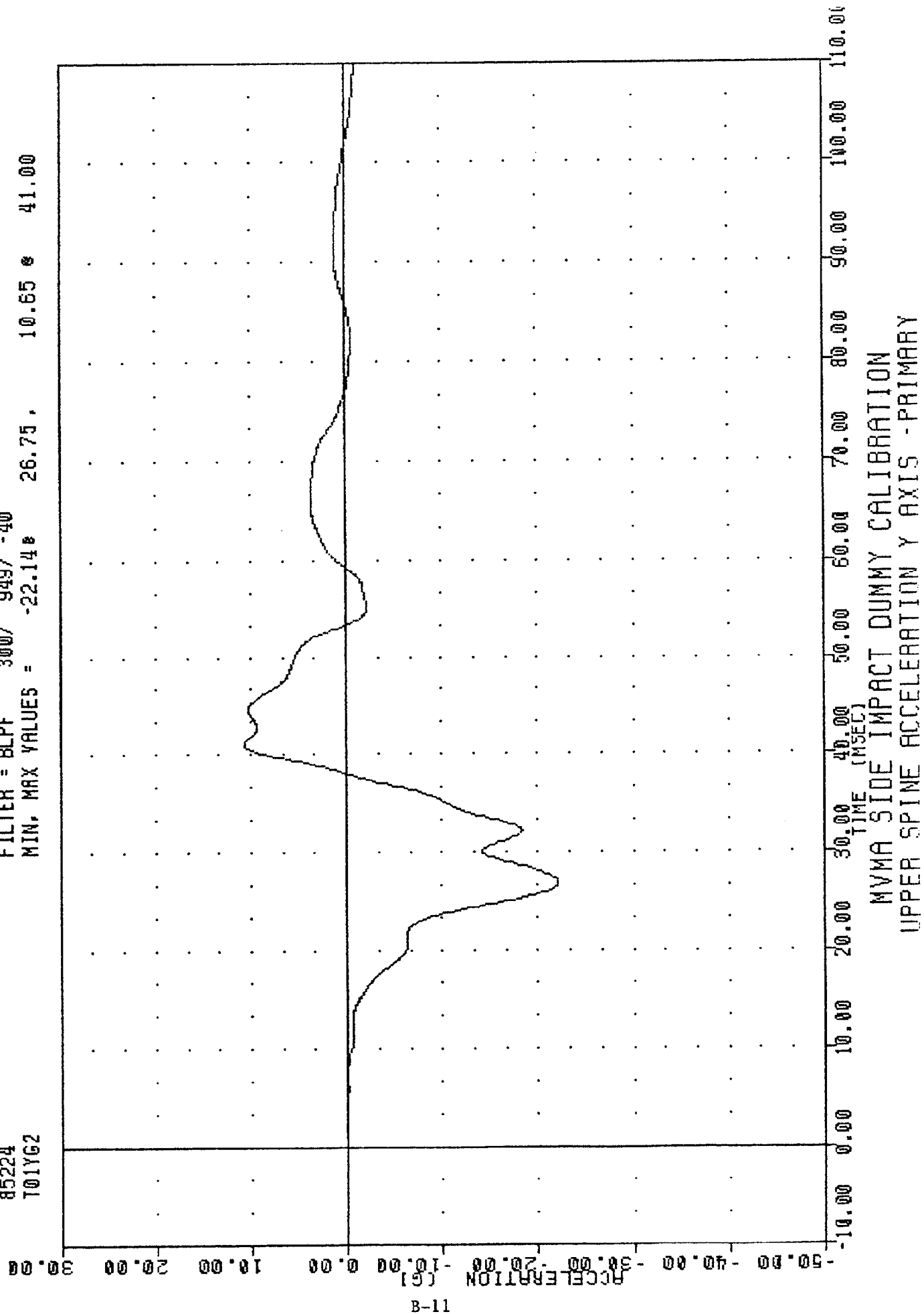
SID 119 THORAX IMPACT CAL 07

85224

FILTER = BLPF 300/ 949/ -40

T01YG2

MIN, MAX VALUES = -22.14 26.75, 10.65 41.00

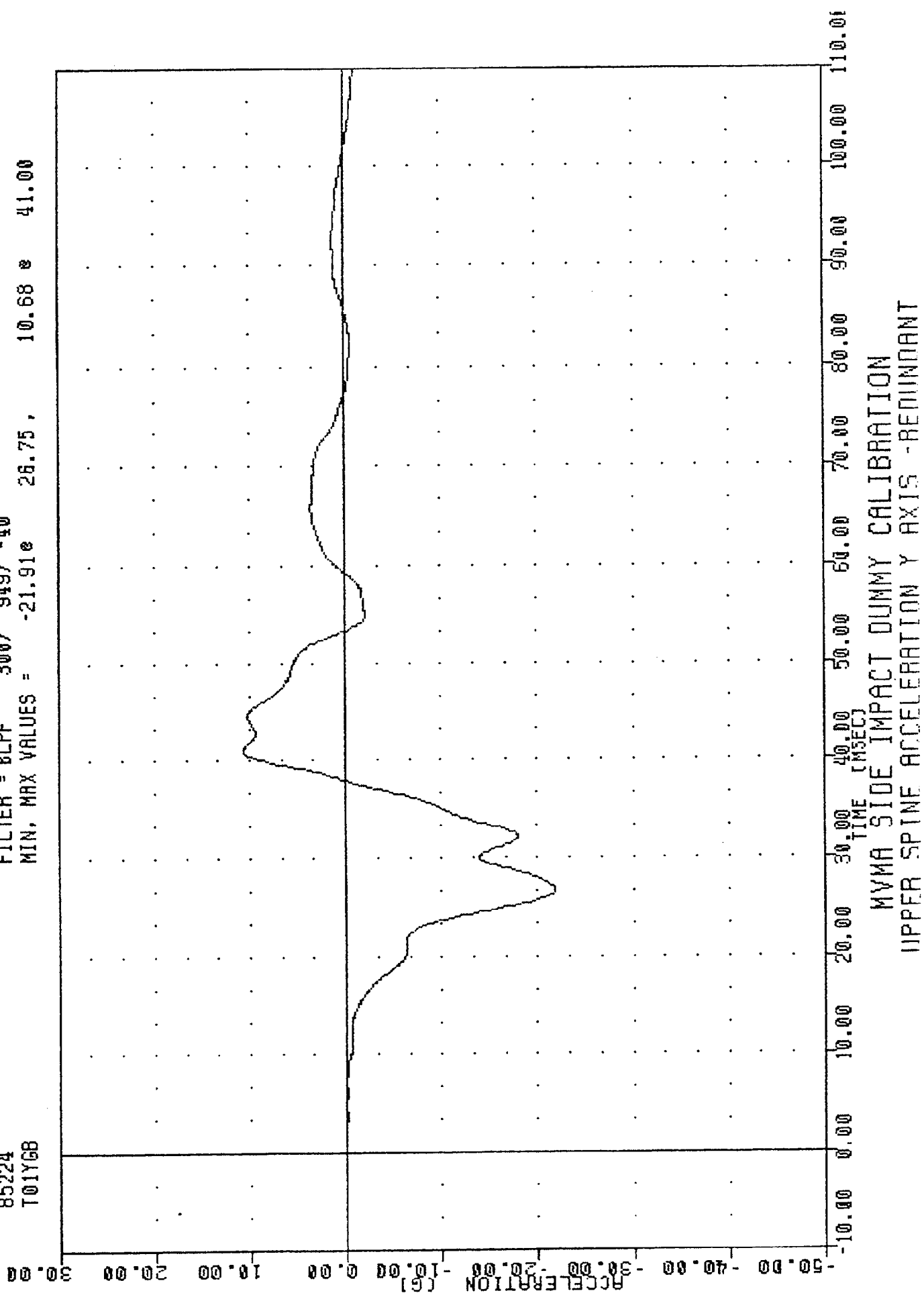


MYNA , ST11907
SID 119 THORAX IMPACT CAL 07
85224
T01YGB

PLOT DATE 12-AUG-85 10:55:13

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -21.91e 26.75, 10.68 e 41.00



PLOT DATE 12-AUG-85 10:55:13

ST11907
SID 118 THORAX IMPACT CAL 07

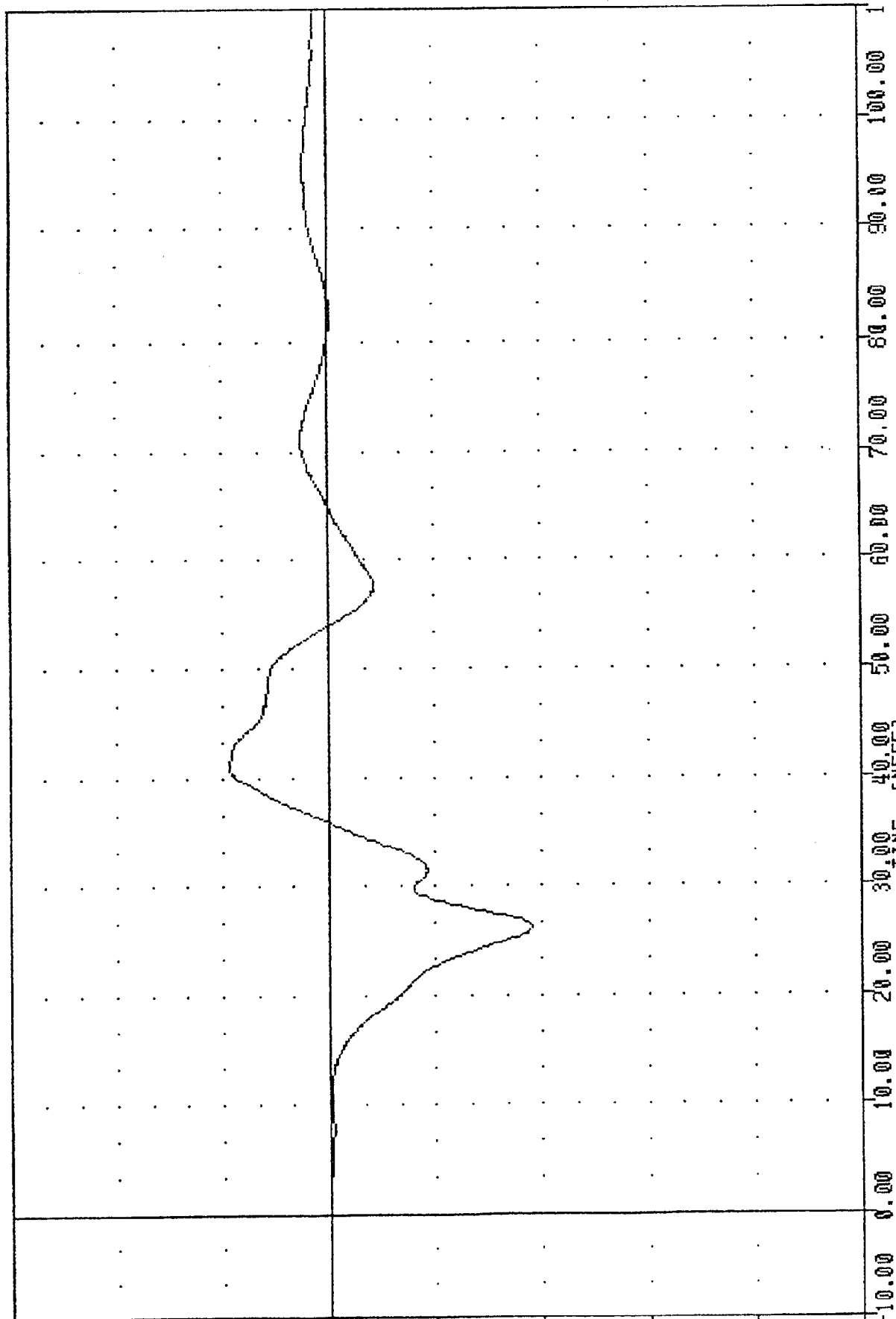
FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -19.030 26.25, 9.34 41.00

85224
T12Y62

ACCELERATION [G]
-50.00
-40.00
-30.00
-20.00
-10.00
0.00
10.00
20.00
30.00

B-13



MYMA SIDE IMPACT DUMMY CALIBRATION
LOWER SPINE ACCELERATION Y AXIS -PRIMARY

PLOT DATE 12-AUG-85 10:55:13

NVMA , ST11907

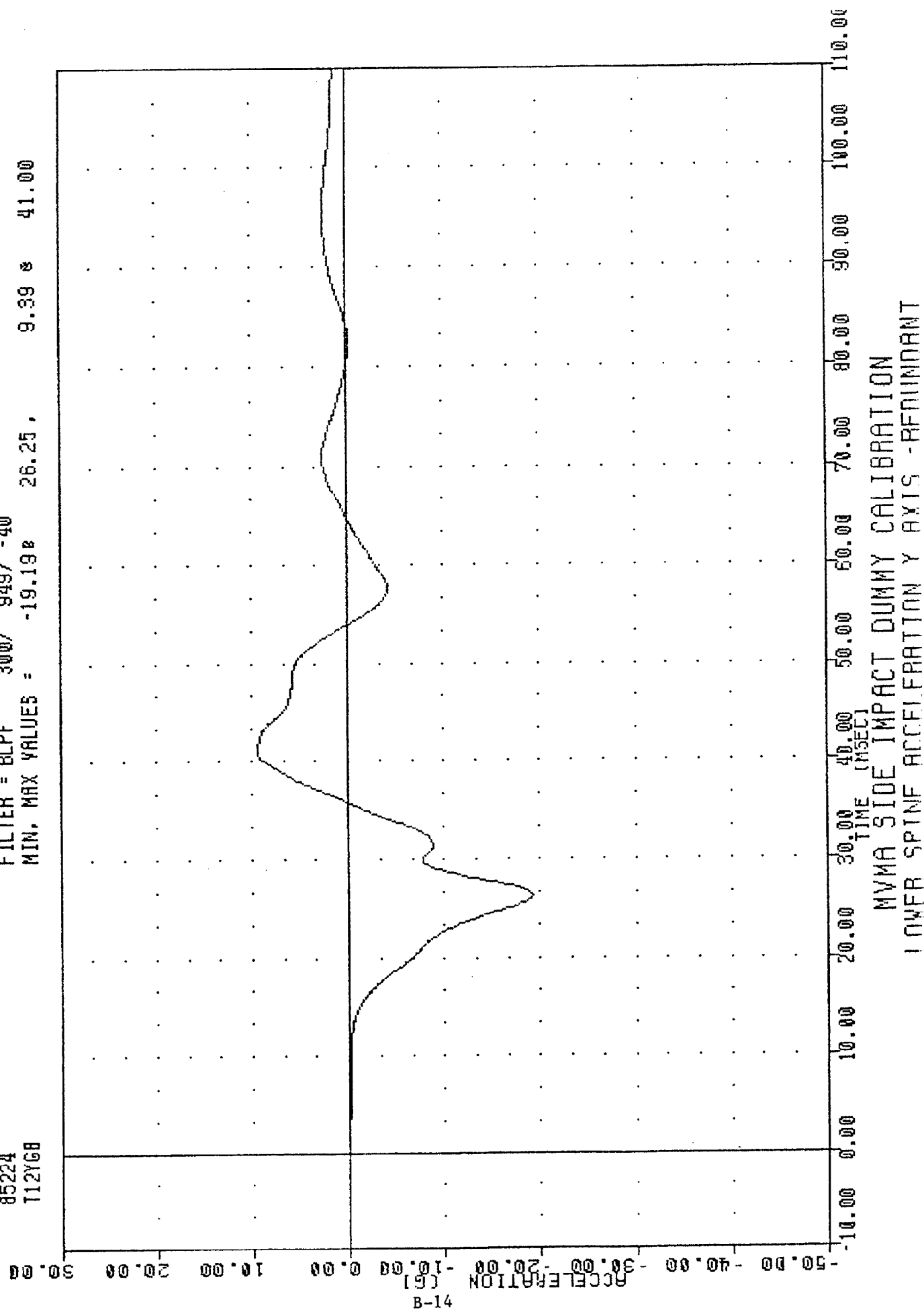
SID 119 THORAX IMPACT CAL 07

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -19.19g 26.25, 9.39 g 41.00

85224

112Y68

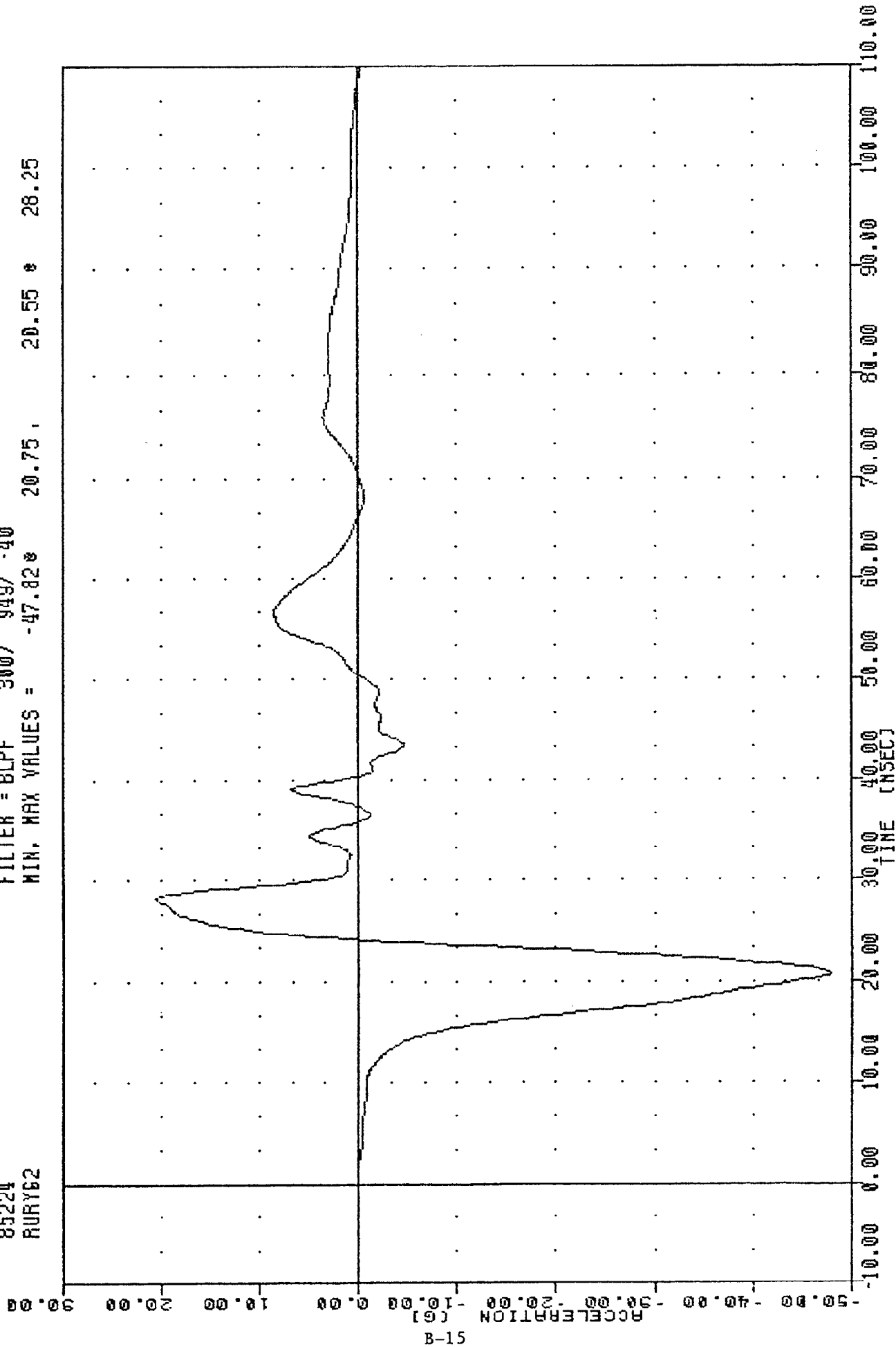


MVMA
SID 118 THORAX IMPACT CAL 07
85224
RURY62

PLOT DATE 12-AUG-85 10:55:13

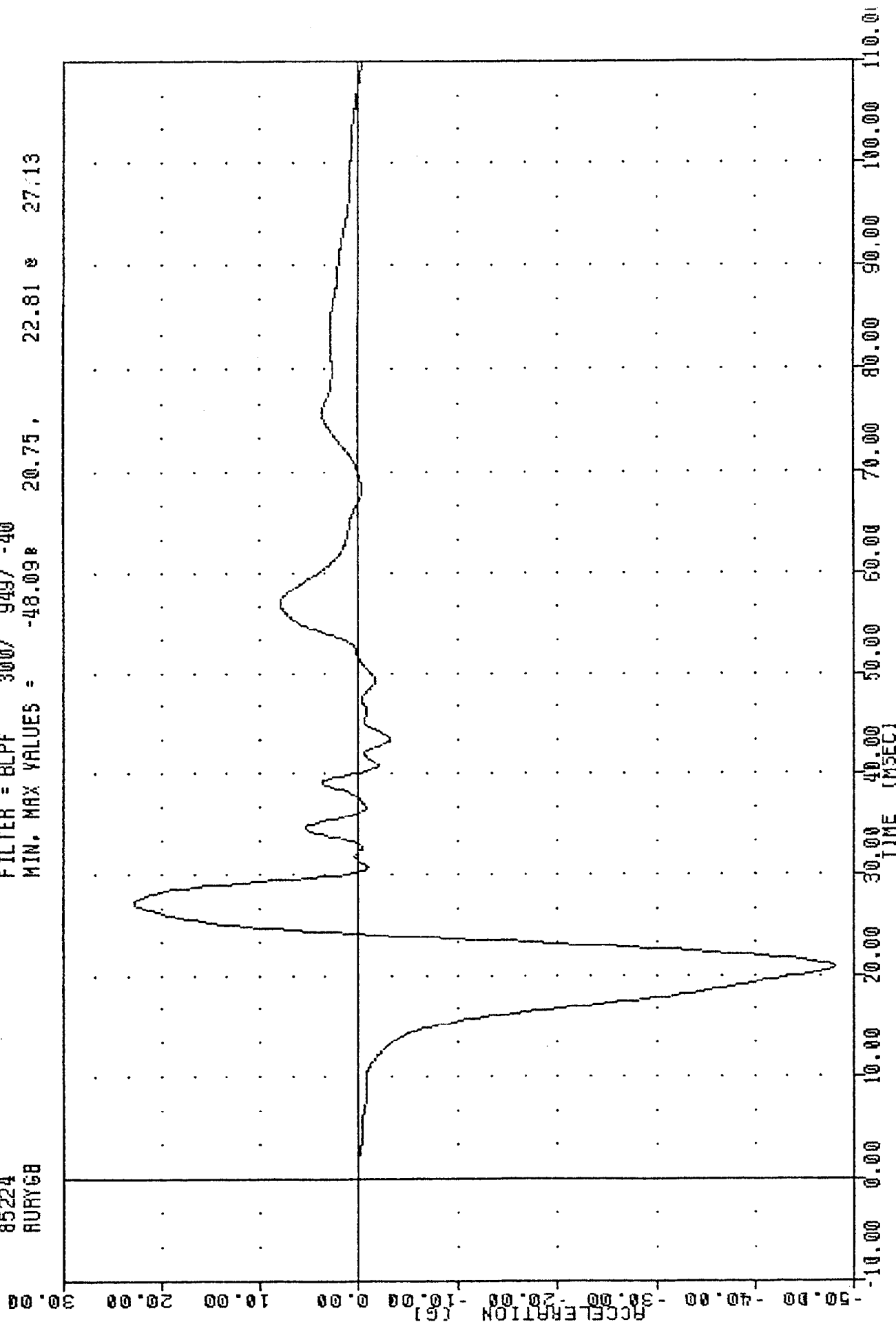
FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -47.82 20.75 , 20.55 28.25



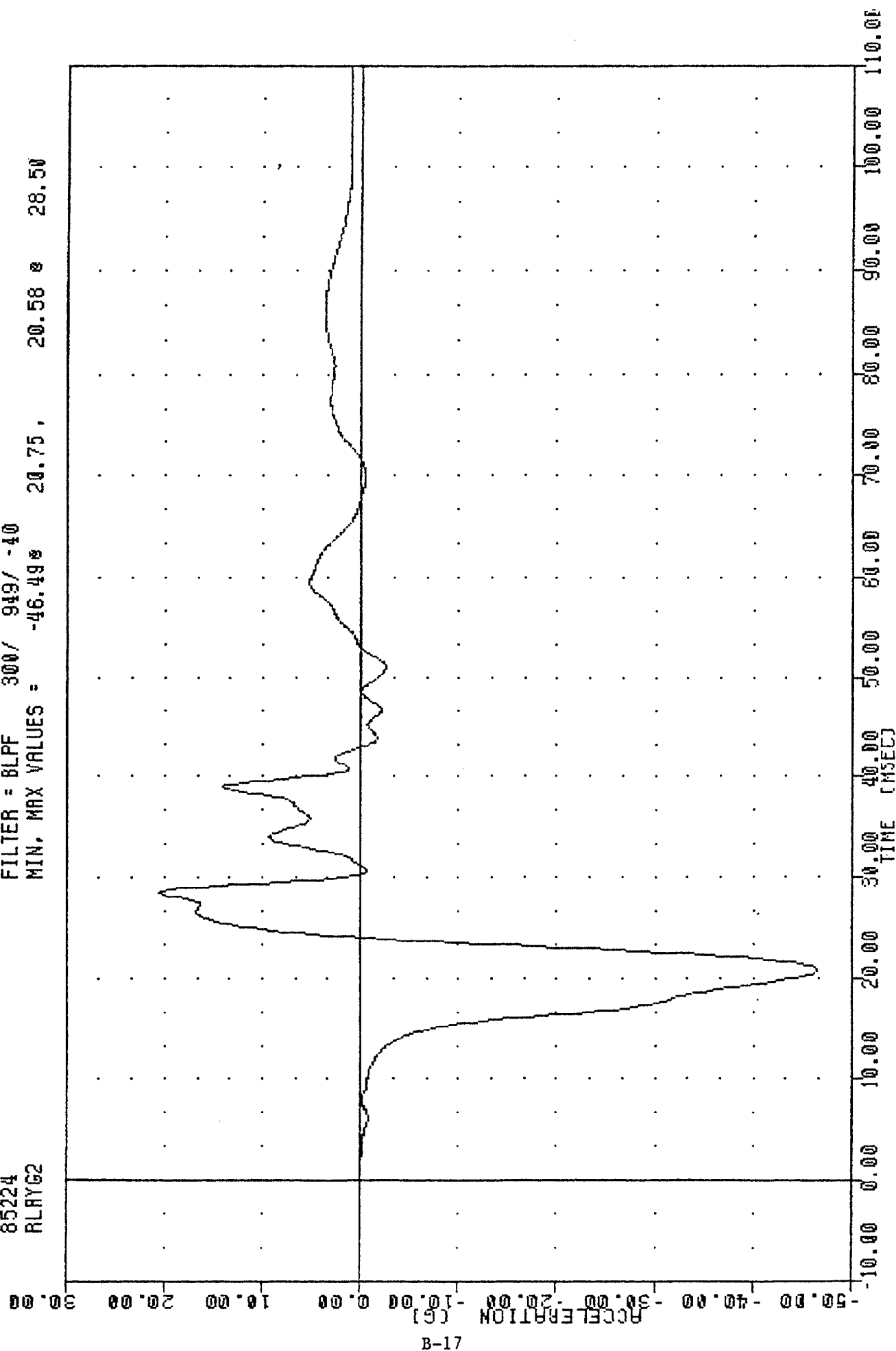
MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT UPPER RIB ACCELERATION Y AXIS -PRIMARY

NVMA ST11907
 SID 119 THORAX IMPACT CAL 07
 85224
 RURYGB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -48.09 20.75, 22.81 27.13
 PLOT DATE 12-AUG-85 10:55:13



NVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT UPPER RIB ACCELERATION Y AXIS -REDUNDANT

ST11907
SID 119 THORAX IMPACT CAL 07
85224
RLAY62
PLOT DATE 12-AUG-85 10:55:13
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -46.49g 20.75, 20.58g 28.50



B-17

MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT LOWER RIB ACCELERATION Y AXIS -PRIMARY

PLOT DATE 12-AUG-85 10:55:13

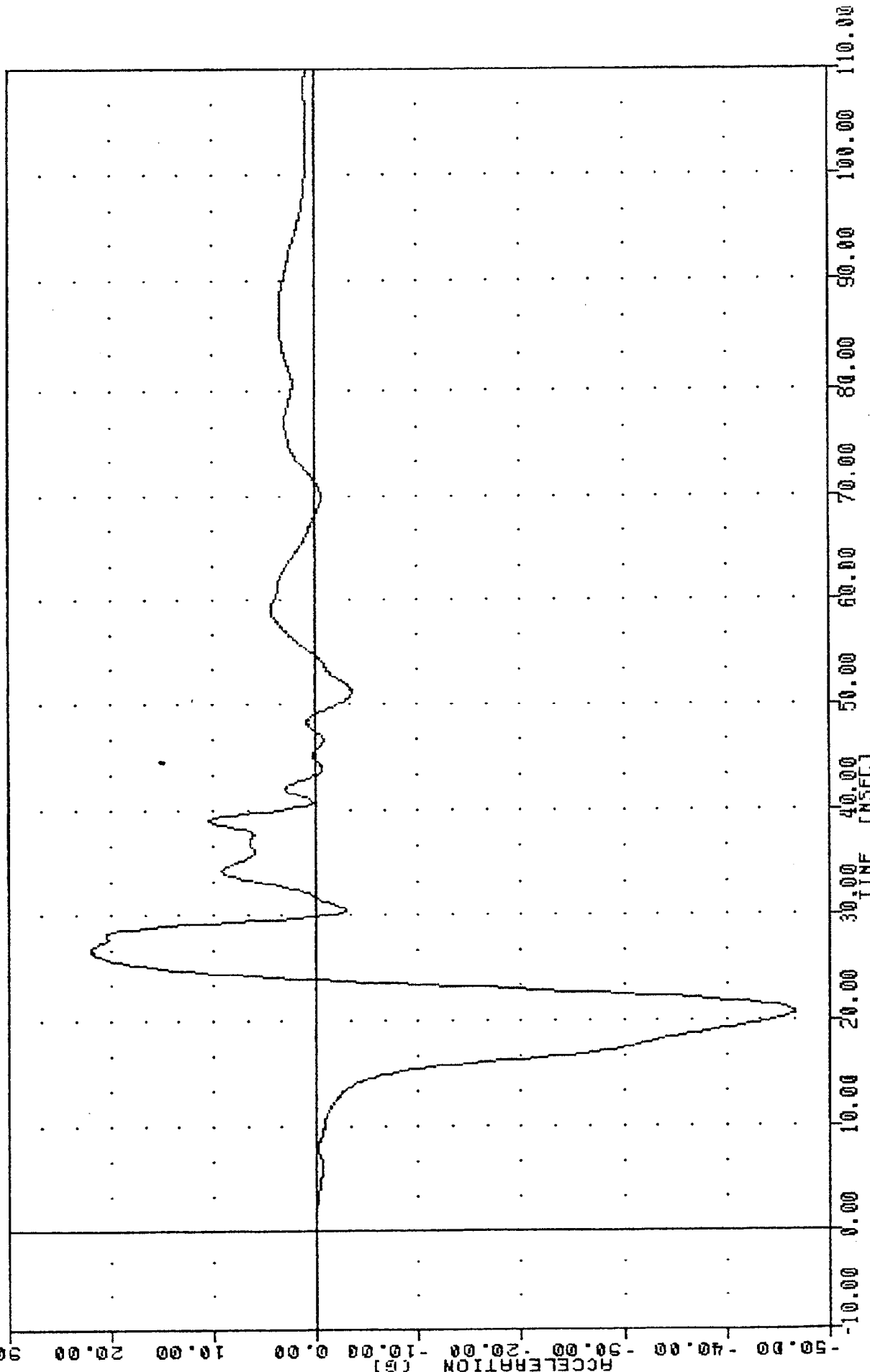
ST11907
SID 119 THORAX IMPACT CAL 07

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -46.66 20.75 21.86 26.75

RLRY6B

81-B

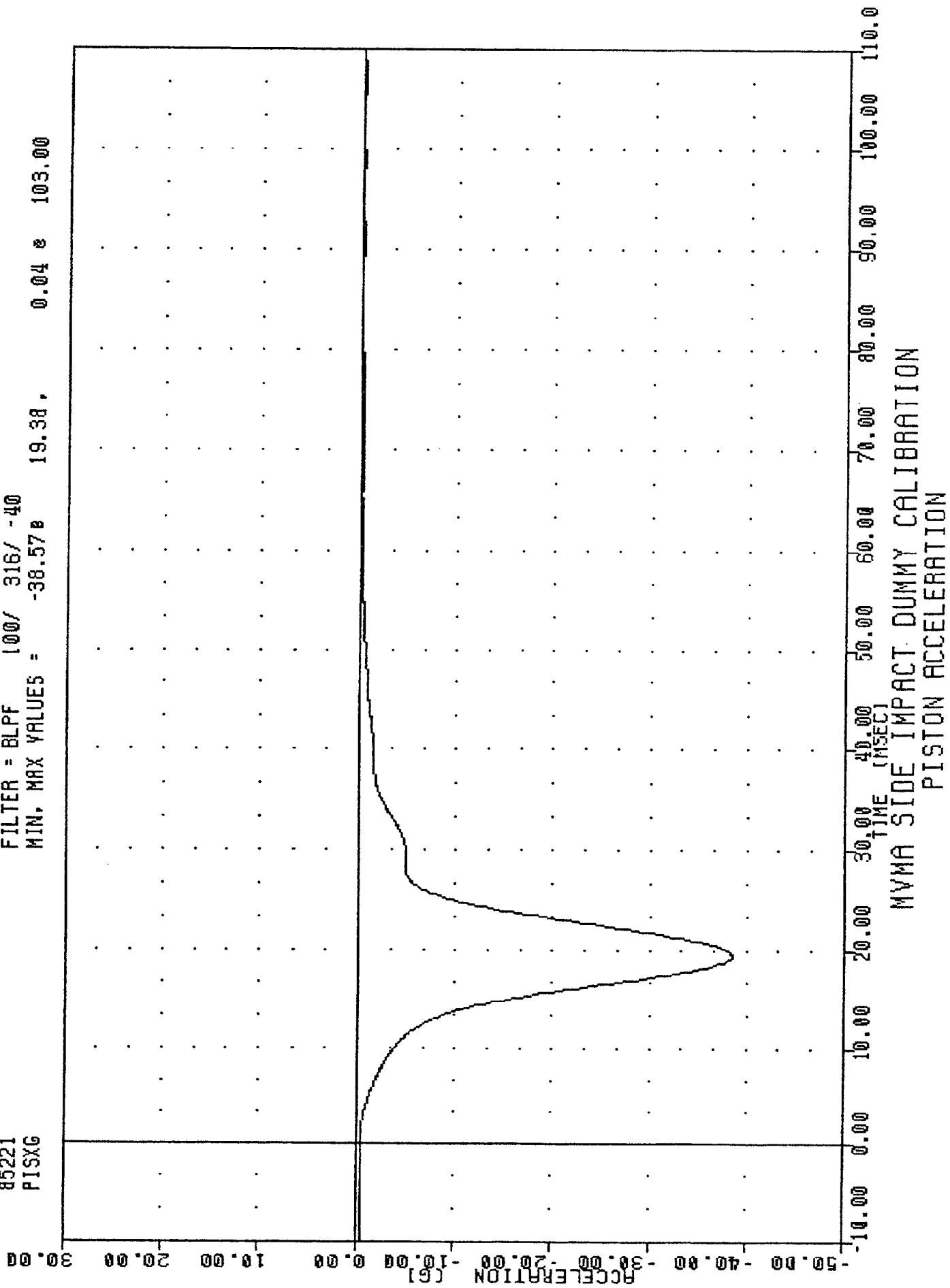


MVMA SIDE IMPACT DUMMY CALIBRATION
RIGHT LOWER RIB ACCELERATION Y AXIS -REDUNDANT

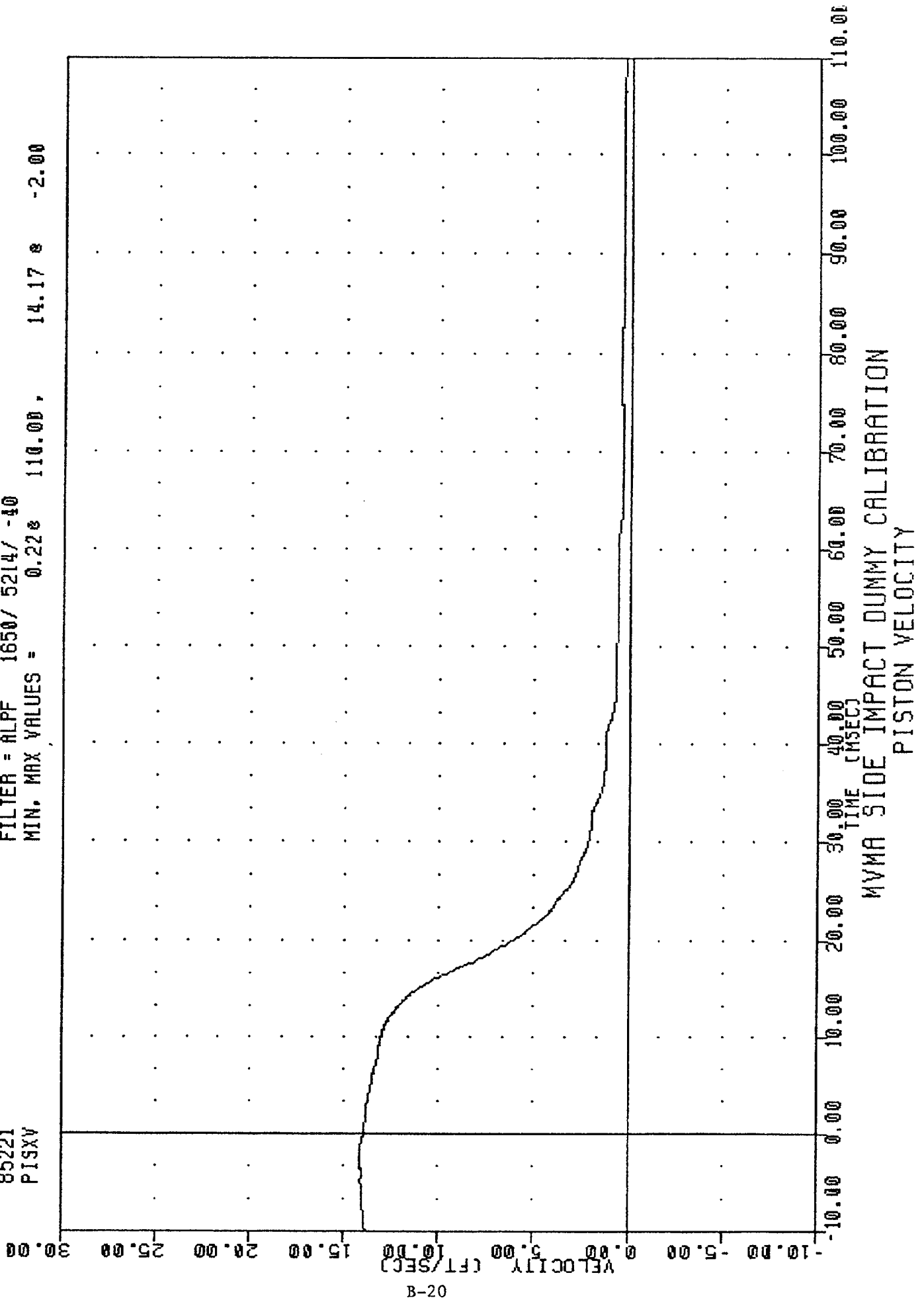
NVMA
SID 119 PELVIC IMPACT CAL 07
85221
PISXG

PLOT DATE 15-AUG-85 15:05:35

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -38.57 19.38 0.04 103.00



MVNA , SP11907 PLOT DATE 9-AUG-85 16:06:44
 SID 119 PELVIC IMPACT CAL 07
 85221
 PISXV
 FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.22e 110.00 , 14.17 e -2.00



MVMA , SP11907 PLOT DATE 9-AUG-85 16:06:44
 SID 119 PELVIC IMPACT CAL 07
 85221
 PEVYG
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -58.02e 16.00 , 10.66 e 21.88

