

HS-806942

DOT 4885

MVMA SIDE IMPACT TESTING

MDB-TO-CAR SIDE IMPACT TEST OF
A 26° CRABBED MOVING DEFORMABLE BARRIER
TO A 1985 FORD LTD
AT 33.6 MPH

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

TEST REPORT
TEST NO.: 851007
TEST DATE: OCTOBER 7, 1985
TEST CONDITIONS: MODIFIED STRUCTURE, DUMMY
SEATED AGAINST HARD BOARD DOOR PANEL

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

Prepared By: B. L. Wade

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know Multiply by	To Find	Symbol
LENGTH			
in	2.5	centimeters	cm
ft	30	centimeters	cm
yd	0.9	meters	m
mi	1.6	kilometers	km
AREA			
in ²	6.5	square centimeters	cm ²
ft ²	0.09	square meters	m ²
yd ²	0.8	square meters	m ²
mi ²	2.6	square kilometers	km ²
	0.4	hectares	ha
MASS (weight)			
oz	28	grams	g
lb	0.45	kilograms	kg
	0.9	metric ton	t

VOLUME			
1sp	5	milliliters	ml.
Tbsp	15	milliliters	ml.
in ³	16	milliliters	ml.
fl oz	30	milliliters	ml.
c	0.24	liters	L
pt	0.47	liters	L
qt	0.95	liters	L
gal	3.8	liters	L
ft ³	0.03	cubic meters	m ³
yd ³	0.76	cubic meters	m ³

TEMPERATURE (exact)			
°F	degrees Fahrenheit	subtracting 32)	°C
	5	degrees Celsius	

Approximate Conversions from Metric Measures

Symbol	When You Know Multiply by	To Find	Symbol
LENGTH			
mm	0.04	inches	in
cm	0.4	inches	in
m	3.3	feet	ft
m	1.1	yards	yd
km	0.6	miles	mi
AREA			
cm ²	0.16	square inches	in ²
m ²	1.2	square yards	yd ²
km ²	0.4	square miles	mi ²
ha	2.5	acres	
MASS (weight)			
g	0.035	ounces	oz
kg	2.2	pounds	lb
t	1.1	short tons	

VOLUME			
ml.	0.03	fluid ounces	fl oz
ml.	0.06	cubic inches	in ³
L	2.1	pints	pt
L	1.06	quarts	qt
L	0.26	gallons	gal
m ³	35	cubic feet	ft ³
m ³	1.3	cubic yards	yd ³

TEMPERATURE (exact)			
°C	degrees Celsius	9/5 (then degrees add 32)	°F
			Fahrenheit

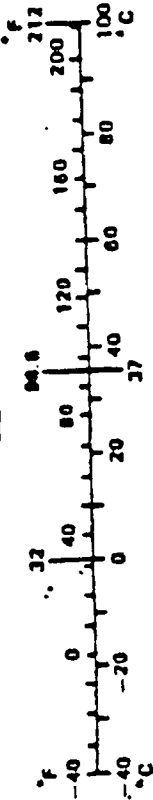


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SECTION 1.0

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 October 7, 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 33.6 mph and the actual leading edge of contact was 36.3 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 hardboard panel. A side impact dummy (SID) was seated in the right front passenger seat with its shoulder just touching the hardboard 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: 1FABP39A6FG215180

BODY STYLE: 4-Door sedan

MODEL YEAR: 1985

NHTSA NO.: DNA

COLOR: Midnight Blue

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT 2300 cc.

TRANSMISSION DATA: Automatic

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 400

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 2130 LBS., REAR 1022 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 32 psi; REAR 32 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Radial P195/75R-14

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 4

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	787	LBS.	RIGHT REAR	702	LBS.
LEFT FRONT	791	LBS.	LEFT REAR	693	LBS.
TOTAL FRONT WEIGHT	1578		LBS. (53.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1395		LBS. (46.9 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2973		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 26 5/8	;LF 26 5/16	;RR 24 5/16	;LR 24
PRE-TEST ATTITUDE:	RF 25 15/16	;LF 26 1/16	;RR 22 13/16	;LR 23 5/16
POST-TEST ATTITUDE:	RF 26 7/8	;LF 25 1/4	;RR 22 7/8	;LR 22 5/8

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 116 LBS. CARGO:

RIGHT FRONT	861	LBS.	RIGHT REAR	820	LBS.
LEFT FRONT	800	LBS.	LEFT REAR	782	LBS.
TOTAL FRONT WEIGHT	1661		LBS. (50.9% OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1602		LBS. (49.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3263		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: 14.9 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 32 psi; REAR 32 psi

RECOMMENDED TIRE SIZE: P195/75R-14 LOAD RANGE X B, C.

VEHICLE CAPACITY: TYPES OF SEATS:

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 3 FRONT

3 REAR

CARGO LOAD 100 LBS.

6 TOTAL

TOTAL 1000 LBS.

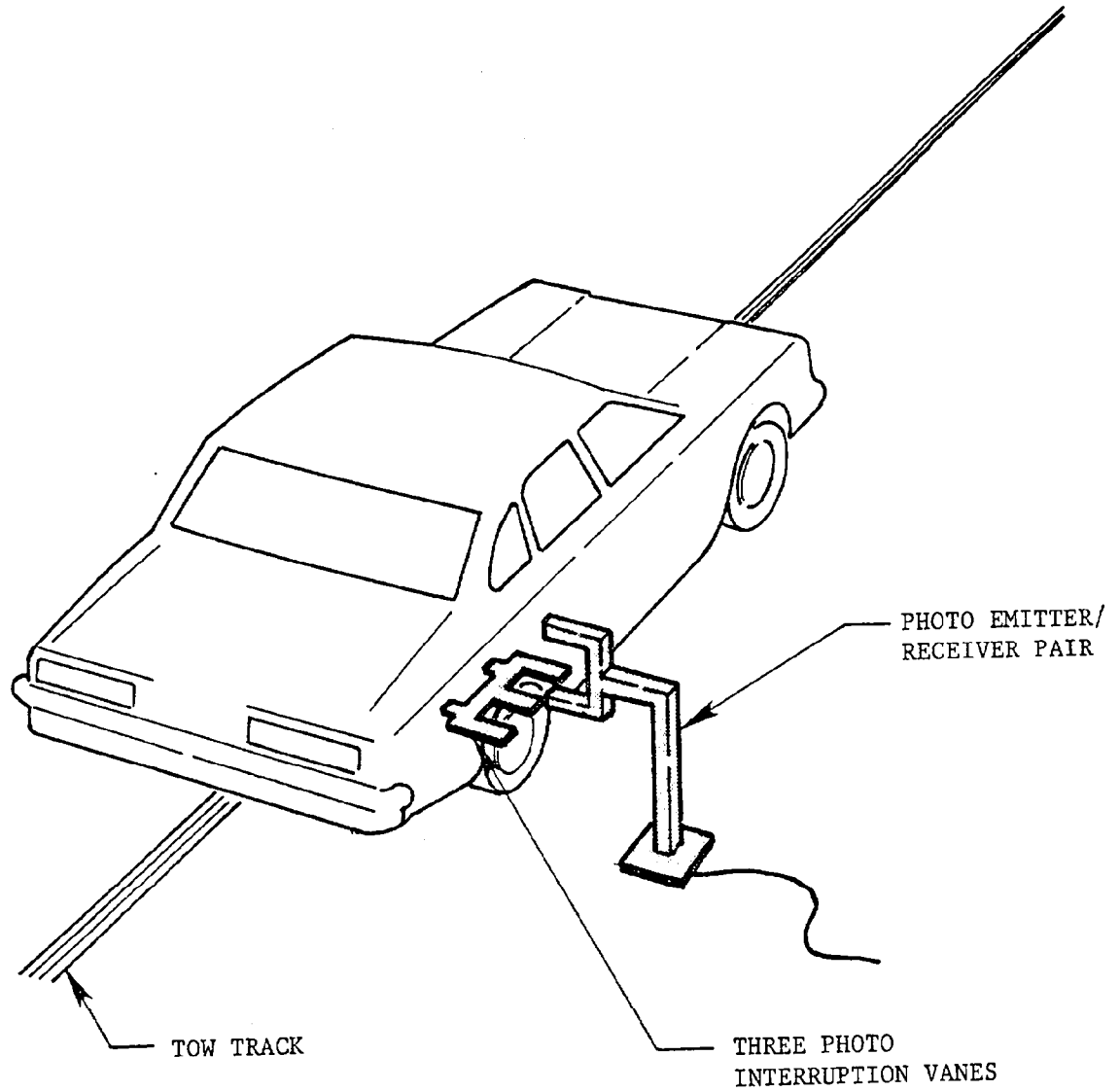
*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight} + \\ &\quad \text{Number of Dummies} \times 174 \text{ lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2973 + 1 \times 174 + 100 \text{ lbs.} \\ &= 3247 \text{ lbs.}\end{aligned}$$

To achieve test weight, the battery and the exhaust system were removed and 14.9 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 is located two 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: X BENCH
 BUCKET
 SPLIT BENCH

ADJUSTER TYPE: X MANUAL
 POWER

BUCKET SEAT BACK TYPE: X FIXED
 ADJUSTABLE

TECHNICIANS:
 1. J. Clarridge

POSITIONING DATE: 10/7/85

2. B. Miller

AMBIENT TEMP: 62 °F TIME: 9:00 AM

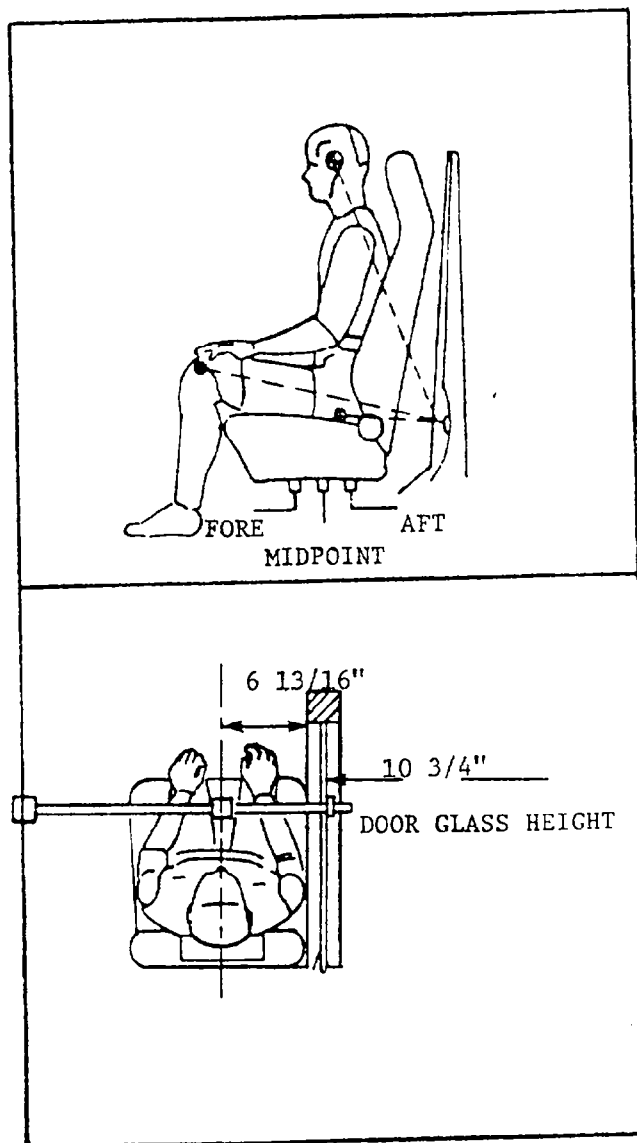
3.

FRONT PASSENGER DUMMY

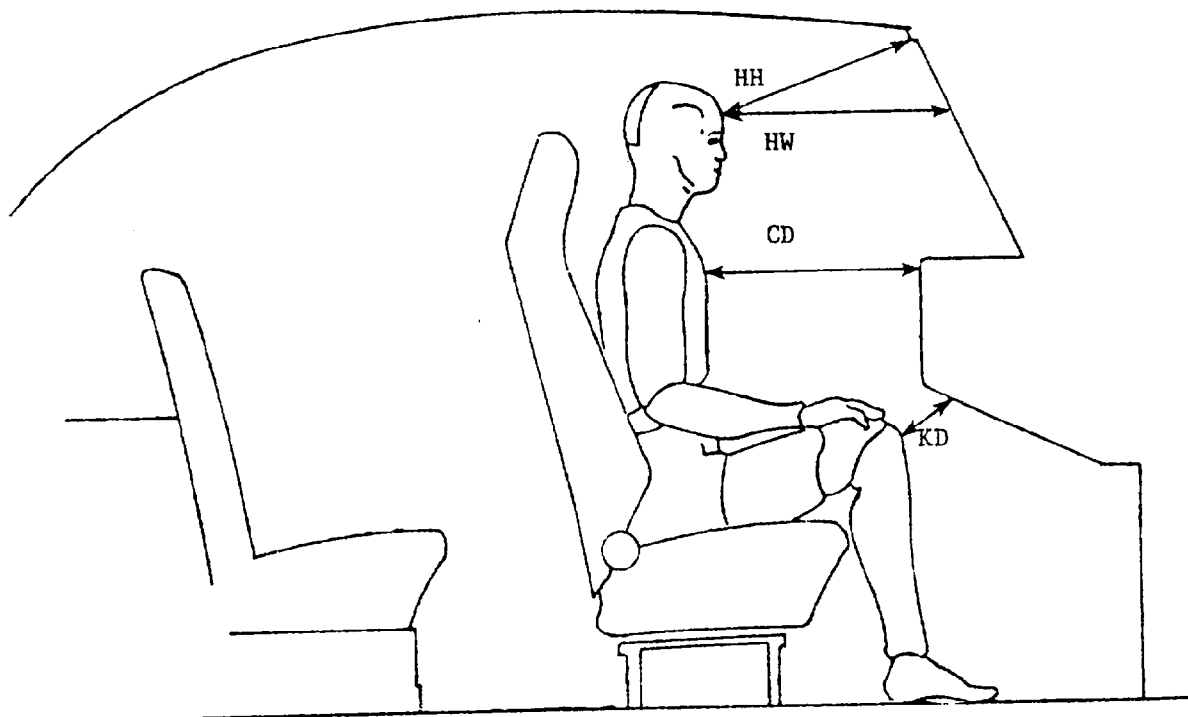
21 1/2 " HEAD
5 " TARGET*

26 5/16 " KNEE
92 " JOINT

APPROX.
11 " "H"
108 " POINT



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

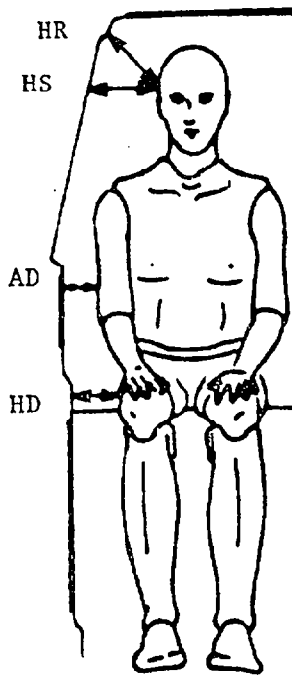


PASSENGER

HH	12 1/8
HW	17
CD	18 5/8
KDL	5 5/8
KDR	5 3/4

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSION



PASSENGER

HR	4 3/8
HS	4 1/2
AD	0
HD	1

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"
5	+1'	0	+40'
4	0	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

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Documentary	Beaulieu	12-120	24	Documentary
2	R. Panning	Kodak	16	24	Real Time
3	Onboard MDB	Photosonic 1B	13	985	View Impact
4	Overhead Tight	Photosonic 1B	25	735	View Impact
5	Overhead Wide	Photosonic 1B	8	905	Vehicle Crush
6	Right	Photosonic 1B	25	995	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	993	Dummy Kinematics
10	Onboard Door	Photosonic 1B	8	1000	Dummy Kinematics

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	7264	AY90
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: 851007

DATE OF TEST: October 7, 1985

TIME OF TEST: 11:58

WIND VELOCITY: 3-6 mph 189°

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 60° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 74° F

DUMMY TEMPERATURE: 70° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	3263	3247
MDB TEST WEIGHT (LBS.)	2991	2992
MDB VELOCITY (MPH)	33.6	33.5
IMPACT POINT (INCHES)	36.3	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.:			016		
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 DIRECTION*		NEGATIVE DIRECTION**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION				
LONGITUDINAL	9.86	28.13	16.52	40.88
LATERAL	12.60	67.88	29.96	44.75
VERTICAL	38.53	61.88	8.92	24.13
RESULTANT	39.28 @ 61.88			
HIC	123.63 from 30.63 to 88.75			
DELTA V (MPH)***	-9.1 @ 138.25			
CHEST ACCELERATION				
UPPER SPINE				
LONGITUDINAL	15.46	33.13	7.18	50.00
LATERAL (P)****	42.21	59.38	61.92	35.63
LATERAL (R)****	42.45	59.38	58.27	35.63
VERTICAL	5.84	93.75	8.43	51.25
RESULTANT (P)****	63.34 @ 35.00			
RESULTANT (R)****	59.81 @ 35.00			
DELTA V (MPH)***	-23.7 @ 55.25 (P)			
	-22.1 @ 54.88 (R)			
LOWER SPINE				
LONGITUDINAL	24.29	43.75	26.34	28.75
LATERAL (P)****	19.05	51.25	93.66	29.38
LATERAL (R)****	20.87	50.63	94.81	29.38
VERTICAL	3.20	75.00	9.51	32.50
RESULTANT (P)****	97.47 @ 29.38			
RESULTANT (R)****	98.59 @ 29.38			
DELTA V (MPH)***	-28.7 @ 47.63 (P)			
	-28.6 @ 47.63 (R)			
RIGHT UPPER RIB				
LATERAL (P)****	9.39	73.13	64.32	23.75
LATERAL (R)****	8.43	73.13	70.93	23.75
DELTA V (MPH)***	-21.0 @ 70.50 (P)			
	-20.7 @ 70.75 (R)			
RIGHT LOWER RIB				
LATERAL (P)****	6.59	62.50	49.38	22.50
LATERAL (R)****	10.38	53.12	54.56	22.50
DELTA V (MPH)***	-22.7 @ 71.25 (P)			
	-23.3 @ 71.25 (R)			
PELVIS ACCELERATION				
LONGITUDINAL	6.02	138.75	32.08	30.50
LATERAL	5.42	155.25	89.58	24.63
VERTICAL	2.07	176.38	25.19	29.38
RESULTANT	91.56 @ 24.75			
DELTA V (MPH)***	-25.7 @ 105.50			

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	0.04	164.13	1.81	54.75

* 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

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	PASSENGER
Head	<u>DNA</u>	<u>Right front window sill</u>
Chest	<u>DNA</u>	<u>Inner door panel</u>
Abdomen	<u>DNA</u>	<u>Inner door panel</u>
Left Knee	<u>DNA</u>	<u>Right knee</u>
Right Knee	<u>DNA</u>	<u>Inner door panel</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>None</u>	<u>None</u>
Rear	<u>None</u>	<u>None</u>

GLAZING DAMAGE:

All right side door glass was shattered.

Right side of windshield was cracked.

OTHER NOTABLE IMPACT EFFECTS:

DUMMY KINEMATIC SUMMARY

During impact, the dummy's right leg and right side of his torso contacted the hardboard inner door panel. As the test progressed, the dummy's head rotated down and to the right and struck the right front window sill while the dummy's pelvis translated across the occupant compartment to the left. The dummy came to rest seated on the driver's side of the seat, leaning against the driver's door with its feet extending across the occupant compartment to the right side of the vehicle.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE** DIRECTION		NEGATIVE*** DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	RIGHT FRONT DOOR CENTERLINE (LATERAL) $\Delta V = -18.6$ mph @ 39.75 msec	112.6	28.6	23.0	17.34	59.38	130.79	12.13
2	MIDREAR OF RIGHT FRONT DOOR (LATERAL) $\Delta V = \text{---}$ mph @ --- msec γ	101.9	28.6	24.4	---	---	---	---
3	UPPER RIGHT FRONT DOOR CENTERLINE (LATERAL) $\Delta V = -15.8$ mph @ 32.88 msec	112.8	28.4	29.4	66.08	27.25	113.10	14.00
4	MIDFRONT OF RIGHT FRONT DOOR (LATERAL) $\Delta V = -19.7$ mph @ 28.75 msec	122.5	28.4	23.1	82.75	34.25	118.67	10.63
5	LEFT SILL AT FRONT SEAT (LONGITUDINAL) (LATERAL) $\Delta V = -14.4$ mph @ 54.00 msec (VERTICAL) (RESULTANT)	119.3	-28.4	10.3	4.57 3.16 4.43	49.38 91.75 11.50 31.09 @ 12.00	7.28 30.81 12.75	28.25 12.13 17.13

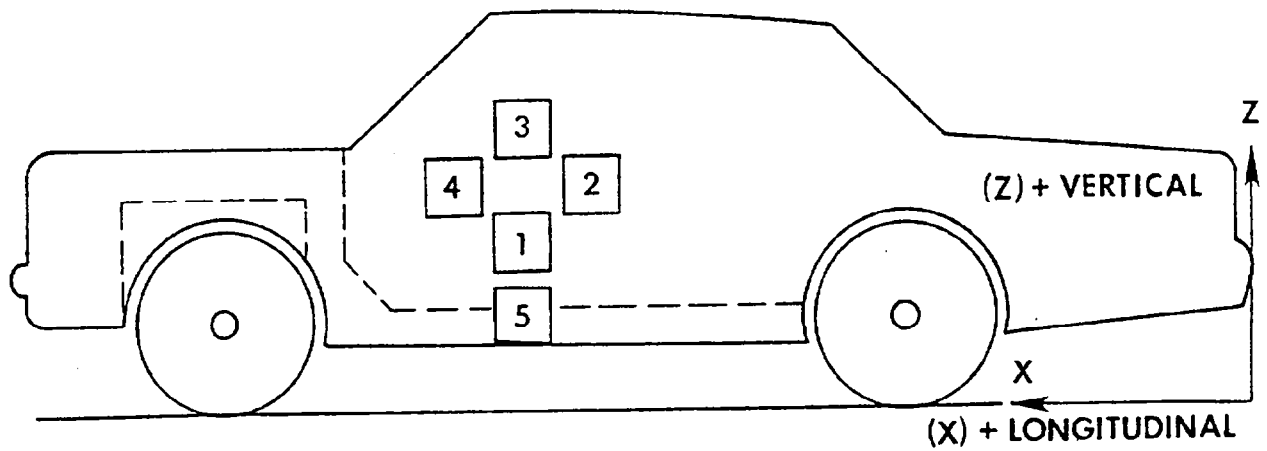
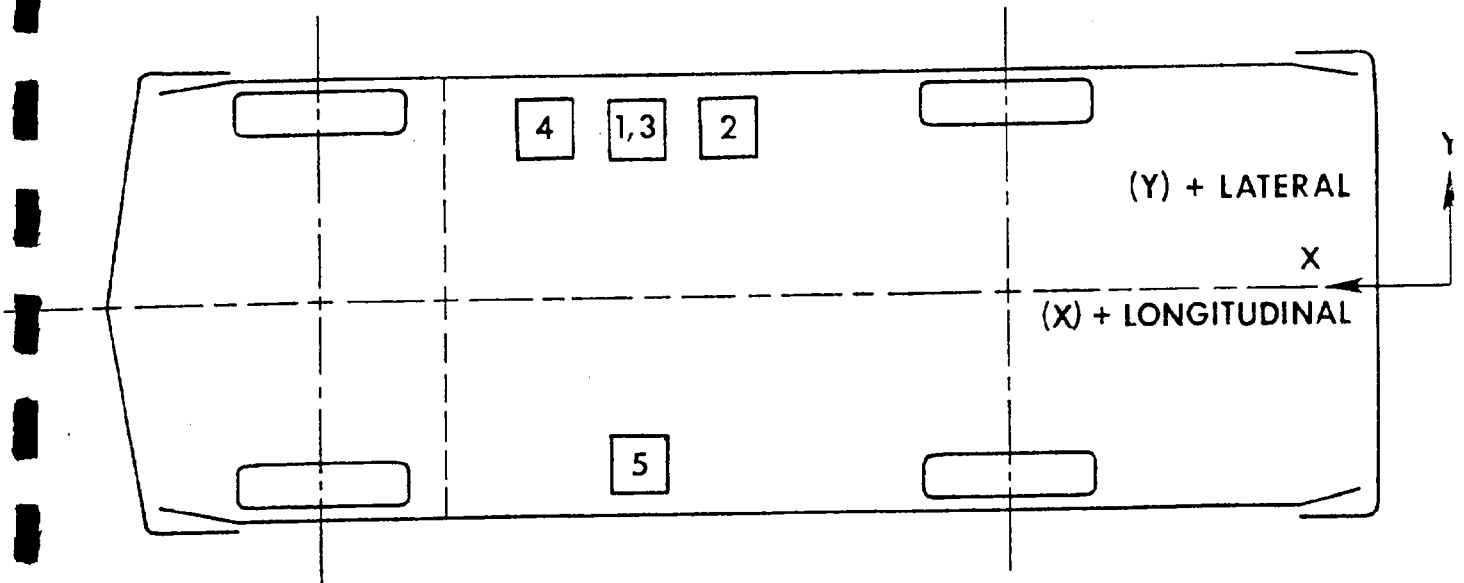
* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right),
Z - Ground Level (+ Up)

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

All measurements of accelerometer locations in inches.

γ SEE TEST ANOMALIES

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	12.0	X	18.2	17.9	17.9	17.8	17.8	17.6	17.6	17.6	17.6	17.5	17.5	17.4	17.4	X
H-Point	22.8	13.1	13.9	13.8	13.8	13.7	13.7	13.8	13.8	13.8	13.9	13.9	14.0	14.1	13.8	X
Window Sill	36.1	16.1	16.1	16.1	16.1	16.1	16.1	16.0	16.1	16.2	16.3	16.3	16.8	16.6	16.8	16.8
Window Top	54.1	23.9	24.0	23.9	23.9	24.1	24.2	24.2	24.3	24.4	X	X	X	X	X	X

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

Axle Height	12.0	X	21.5	21.9	21.9	22.1	22.8	22.9	23.3	23.3	23.9	24.9	25.6	23.5	23.0	X
H-Point	22.8	16.5	24.8	26.5	25.0	24.1	21.8	22.9	23.6	23.8	23.9	24.0	23.6	22.3	18.9	X
Window Sill	36.1	19.4	23.4	26.2	25.8	25.4	22.7	21.9	21.9	22.0	22.1	21.8	21.3	19.9	19.3	19.6
Window Top	54.1	26.4	26.6	26.9	27.1	27.4	27.7	27.6	27.9	28.0	X	X	X	X	X	X

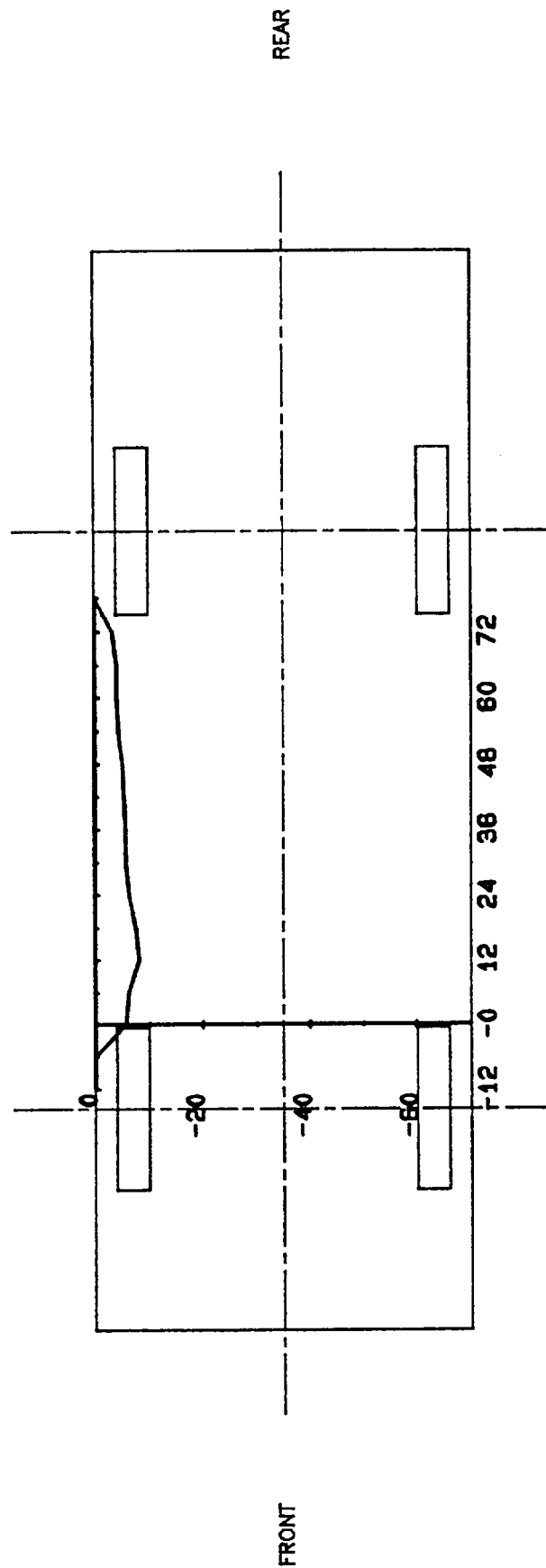
STATIC CRUSH (IN)

Axle Height	12.0	X	3.3	4.0	4.0	4.3	5.0	5.3	5.7	5.7	6.3	7.4	8.1	6.1	5.6	X
H-Point	22.8	3.4	10.9	12.7	11.2	10.4	8.1	9.1	9.8	10.0	10.0	10.1	9.6	8.2	5.1	X
Window Sill	36.1	3.3	7.3	10.1	9.7	9.3	6.6	5.9	5.8	5.8	5.8	5.5	4.5	3.3	2.5	2.8
Window Top	54.1	2.5	2.6	3.0	3.2	3.3	3.5	3.4	3.6	3.6	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.

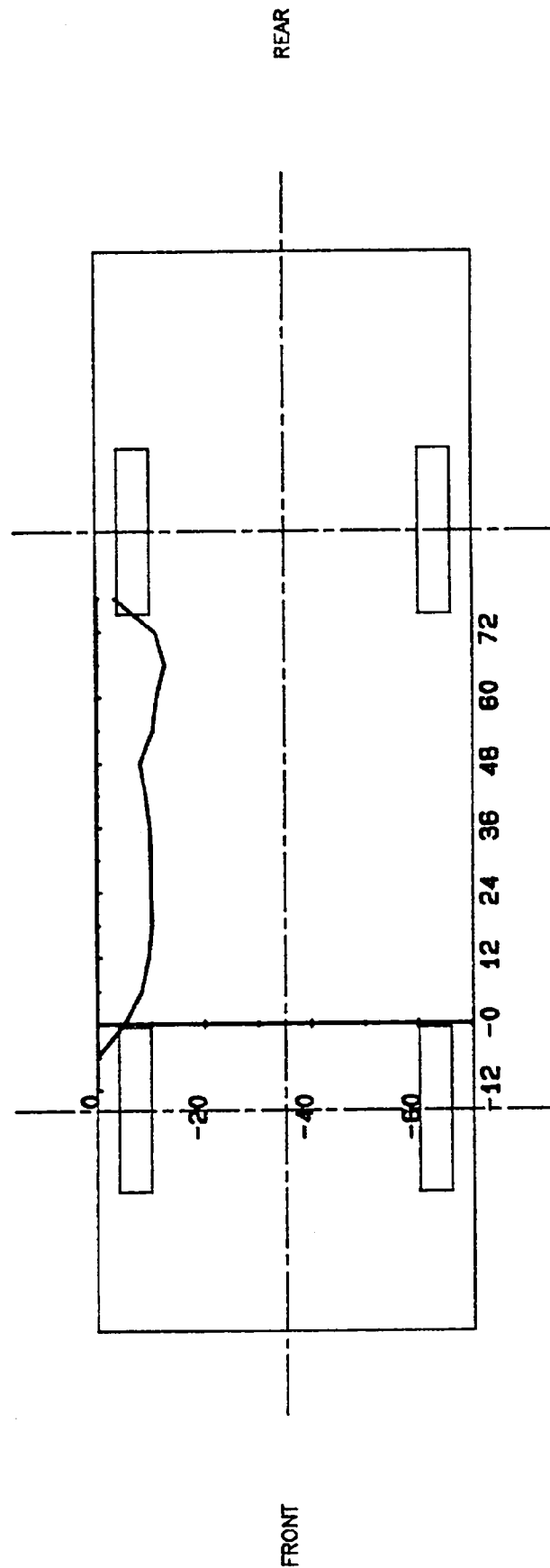
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



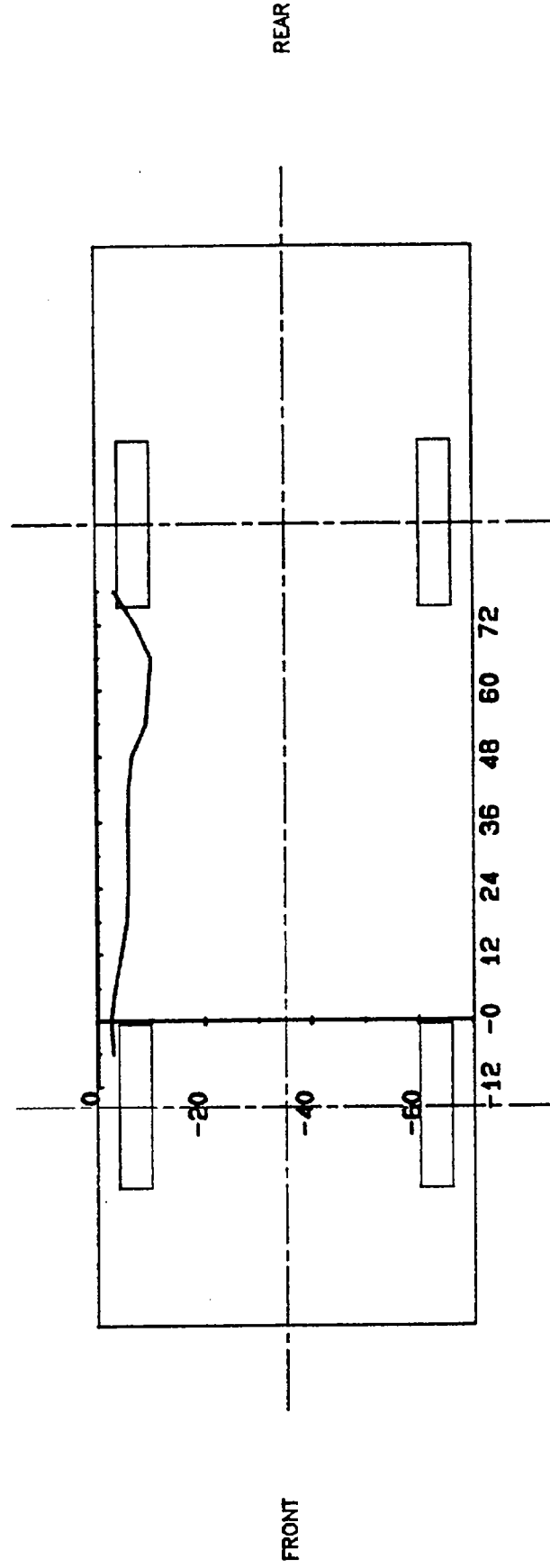
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 12.0" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



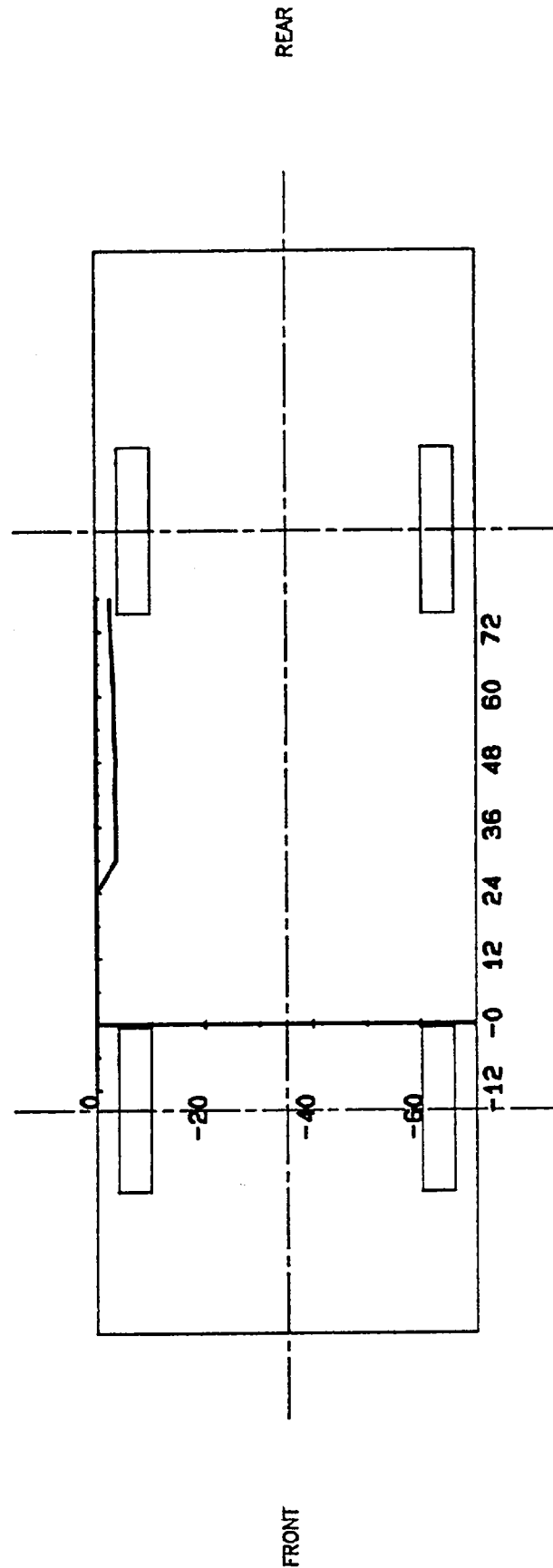
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 22.8" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



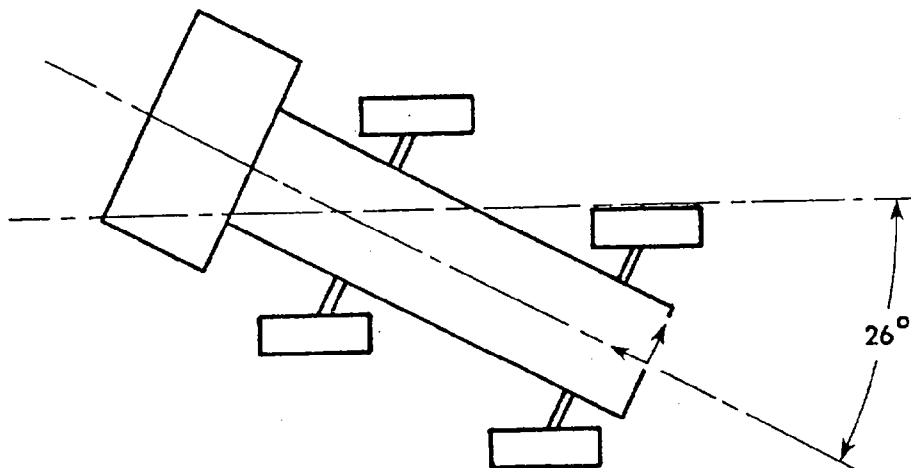
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 36.1 " ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 54.1 " 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)	$\Delta V = -19.7 \text{ mph @ } 134.75 \text{ msec}$			---	---	18.39	32.50
	(LATERAL)	$\Delta V = 5.0 \text{ mph @ } 134.75 \text{ msec}$			5.51	43.13	1.18	298.50
	(VERTICAL)				10.87	23.25	7.65	30.38
	(RESULTANT)					20.13 @	30.88	
2	REAR FRAME MEMBER	18.5	-19.2	11.9				
	(LONGITUDINAL)	$\Delta V = -14.8 \text{ mph @ } 134.75 \text{ msec}$			1.63	308.63	14.18	34.75
	(LATERAL)	$\Delta V = 0.4 \text{ mph @ } 134.75 \text{ msec}$			3.78	105.13	5.30	21.88

* 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.

x There were no positive values in the time interval of interest.

TEST ANOMALIES

The right front door position 2 accelerometer, RFDYG2, did not record data after approximately 15 msec due to a cut cable. As a result, no velocity, RFDYV2 could be calculated for this location.

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.

100



TIME (MSEC)	MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
0.00	NYMA SIDE IMPACT TEST -- PASSENGER HEAD ACCELERATION X AXIS
40.00	
70.00	
100.00	
130.00	

TRC

83100Y

DATE

TIME

PLT

7:10

MVMA SIDE IMPACT TESTING

852800000000

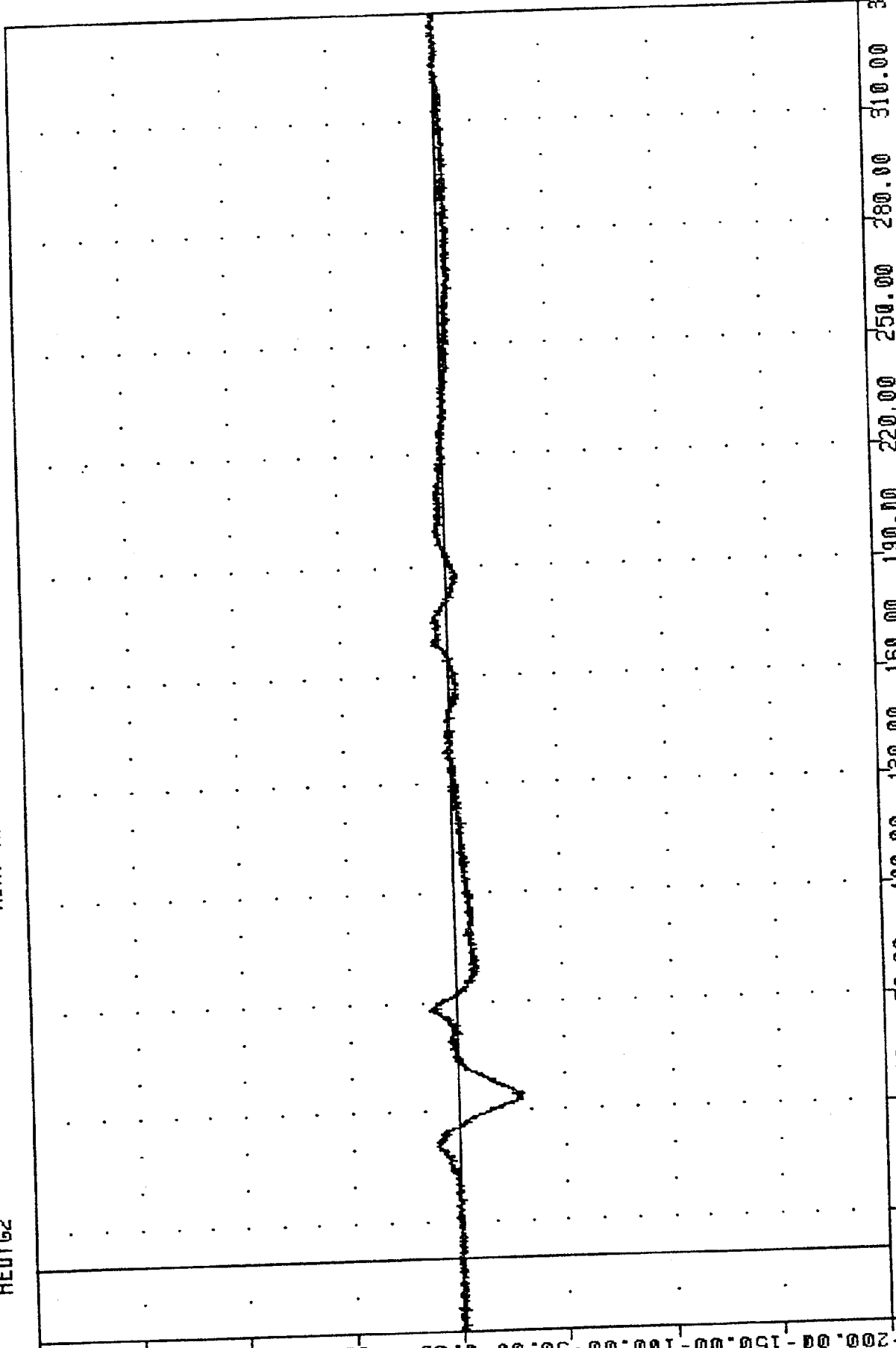
HEDYG2

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -29.96e

44.75, 12.60 e 67.88

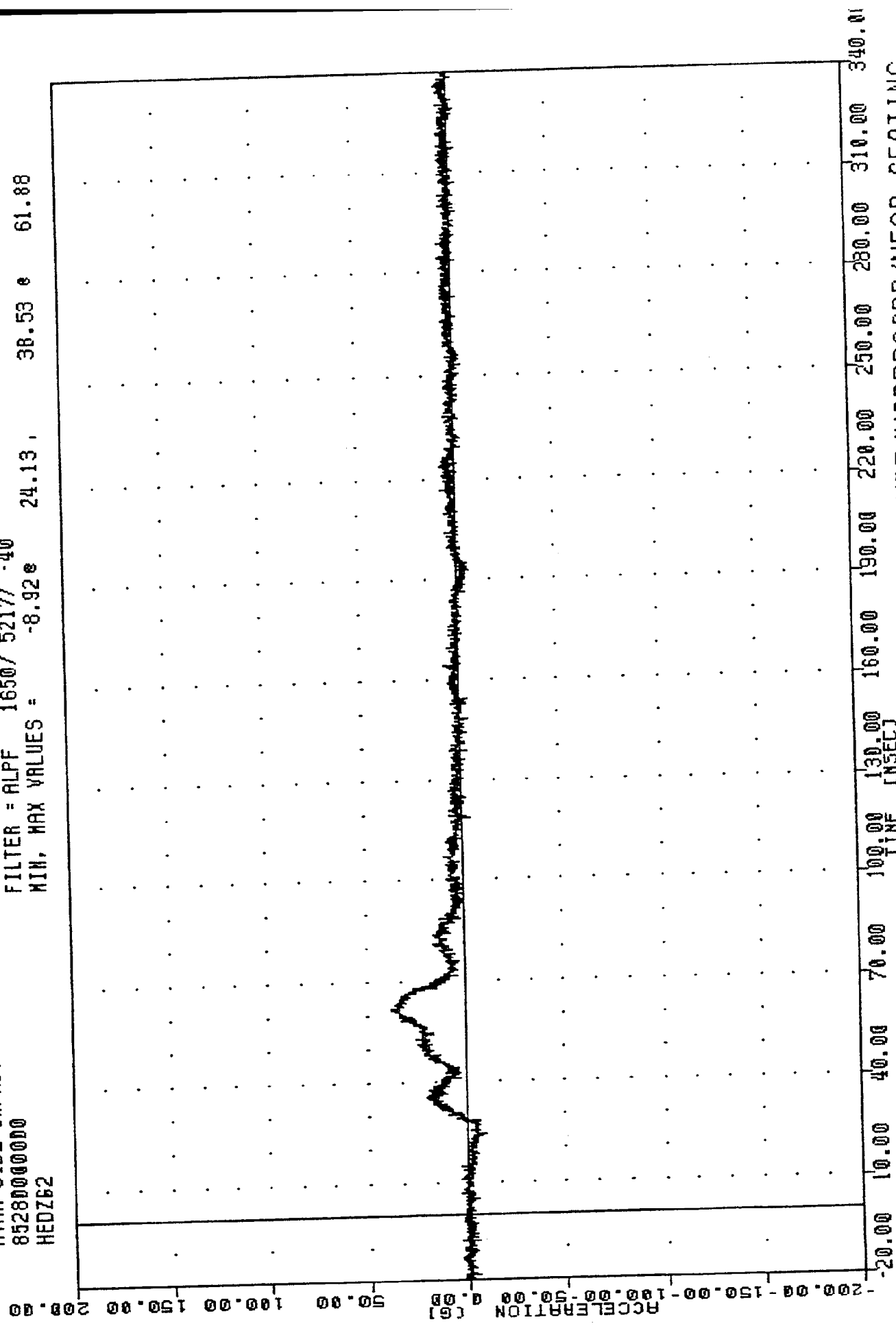
ACCELERATION (G)



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

TRC
 MVMA SIDE IMPACT TESTING
 852800000000
 HEDZ62

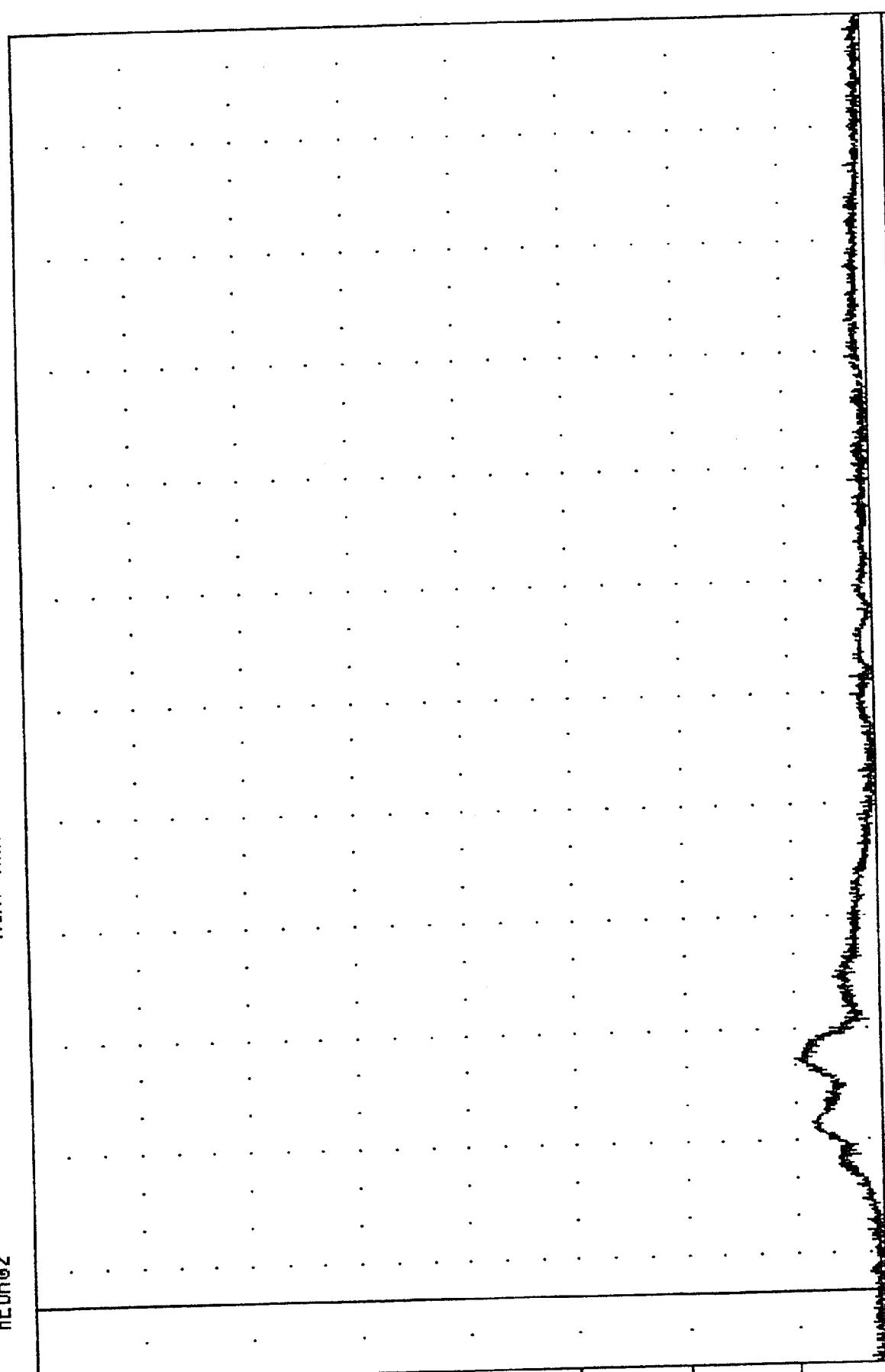
FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -8.92e 24.13, 38.53 e 61.88



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

TRC
 NYMA SIDE IMPACT TESTING
 852800000000
 HEDRG2
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = 0.258 -18.25, 39.28 8 61.88
 PLOT DATE: 7:15

ACCELERATION (G)



-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 PASSENGER HEAD RESULTANT ACCELERATION

TRC

852800000000

NYMA SIDE IMPACT TESTING

852800000000

852800000000

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NYMA SIDE IMPACT TESTING

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NYMA SIDE IMPACT TESTING

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HEDYV2

852800000000

NYMA SIDE IMPACT TESTING

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852800000000

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852800000000

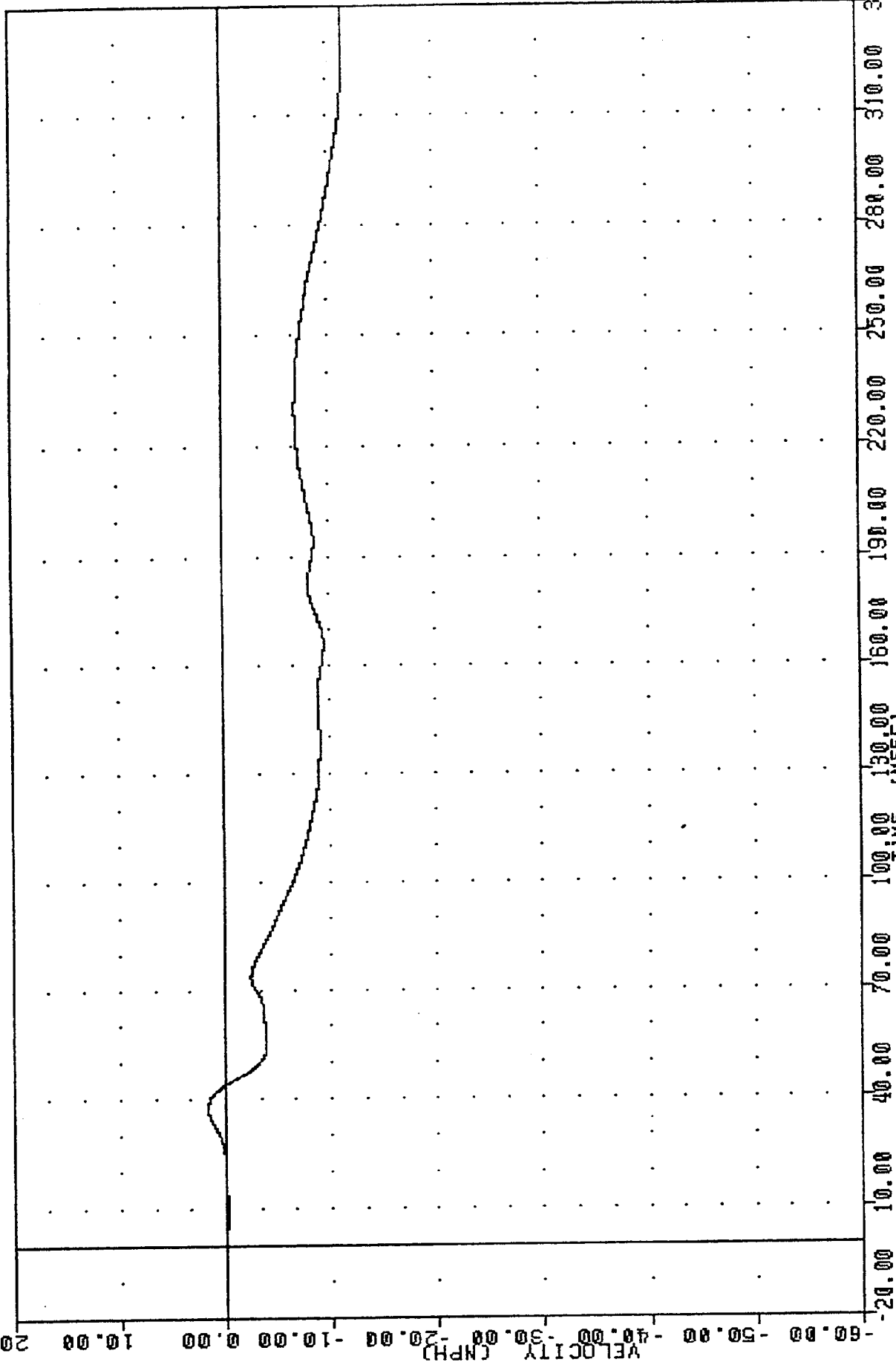
852800000000

852800000000

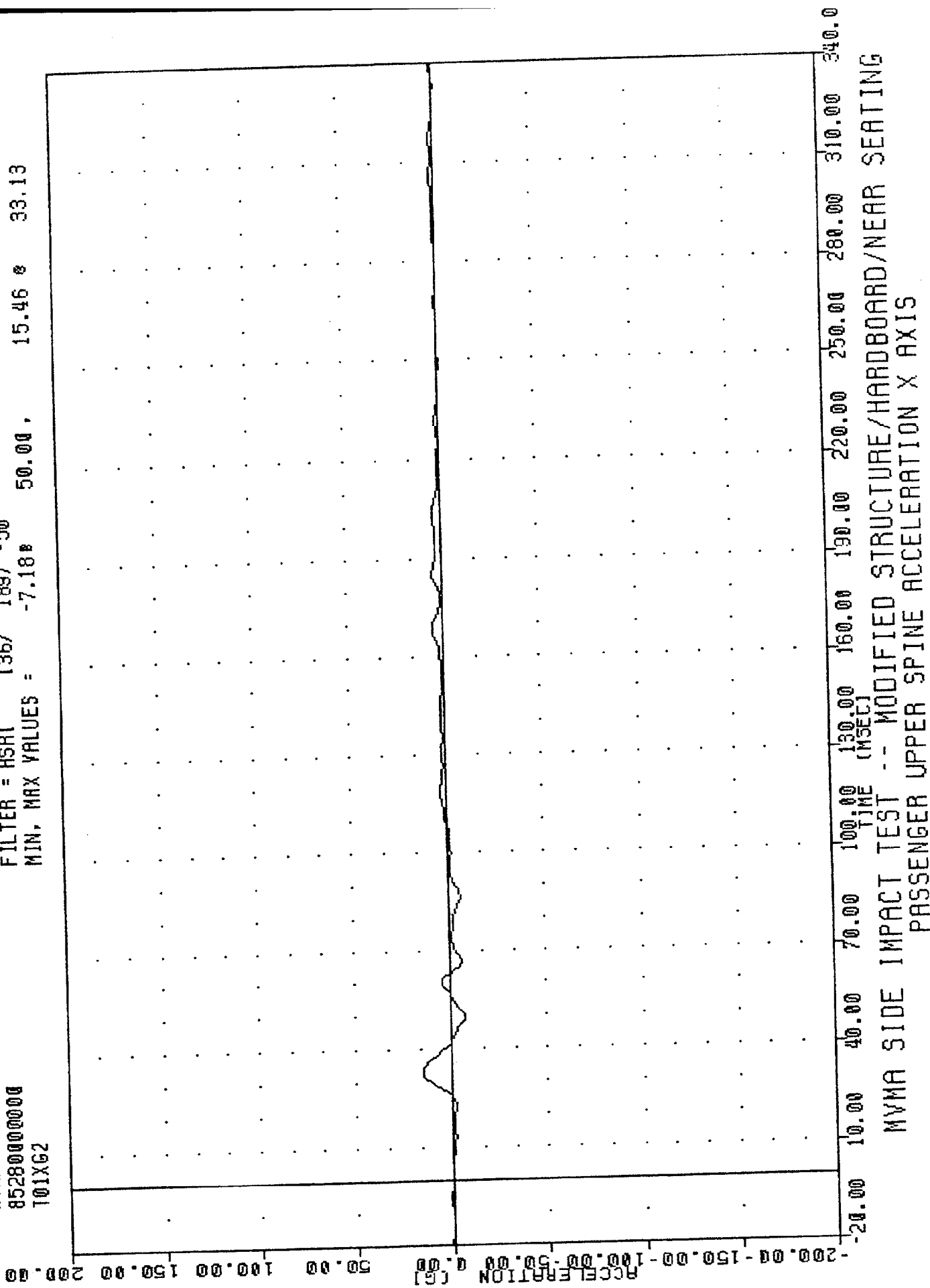
852800000000

852800000000

852800000000

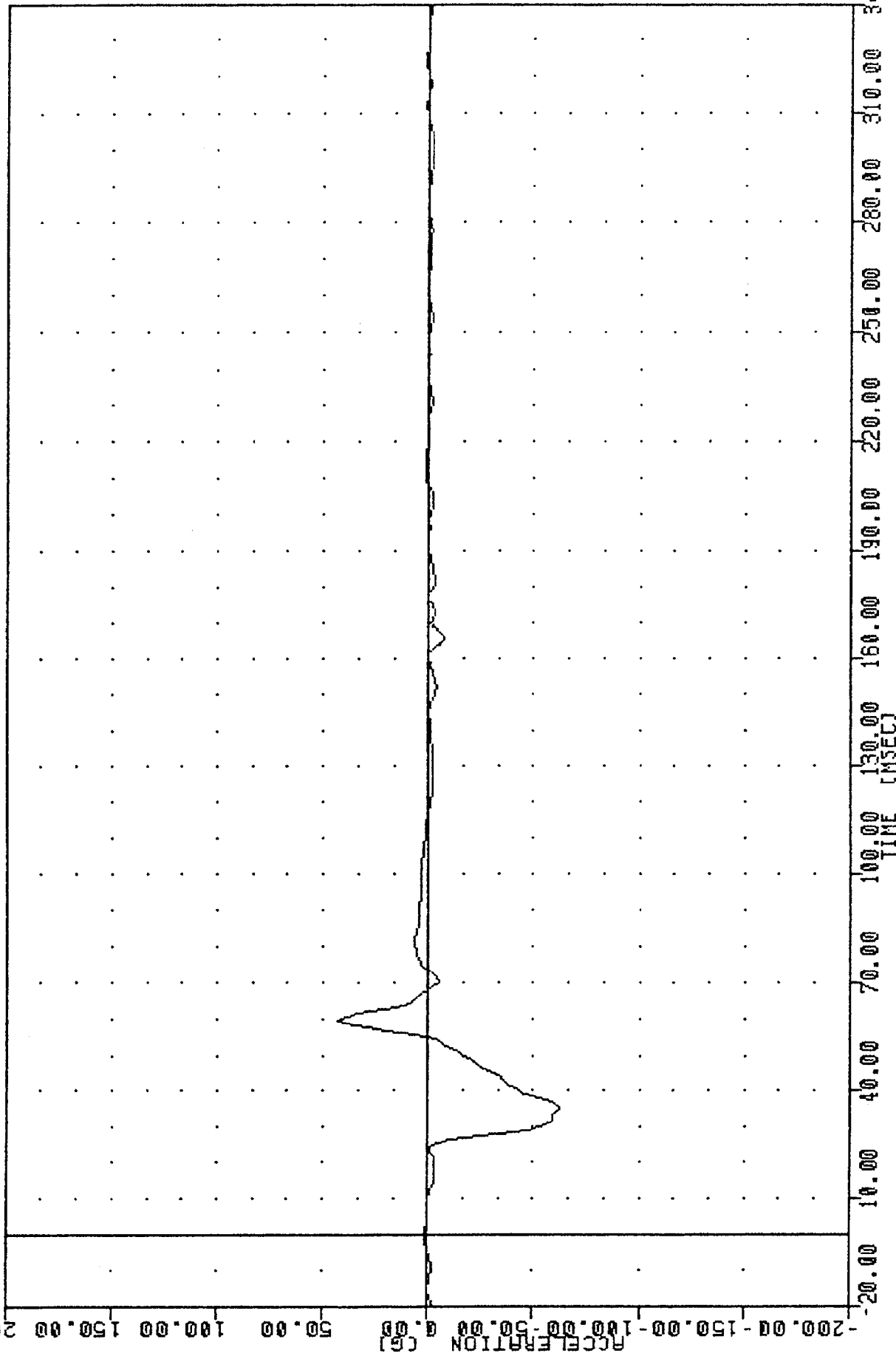


THE 001000 PL 0015:15
 NYMA SIDE IMPACT TESTING
 852800000000
 101XG2
 FILTER = HSR 136/ 189/ -50
 MIN, MAX VALUES = -7.18 50.00 15.46 33.13



MVMA SIDE IMPACT TESTING
 852800000000
 T01YG2

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -61.92 35.63 , 42.21 59.38

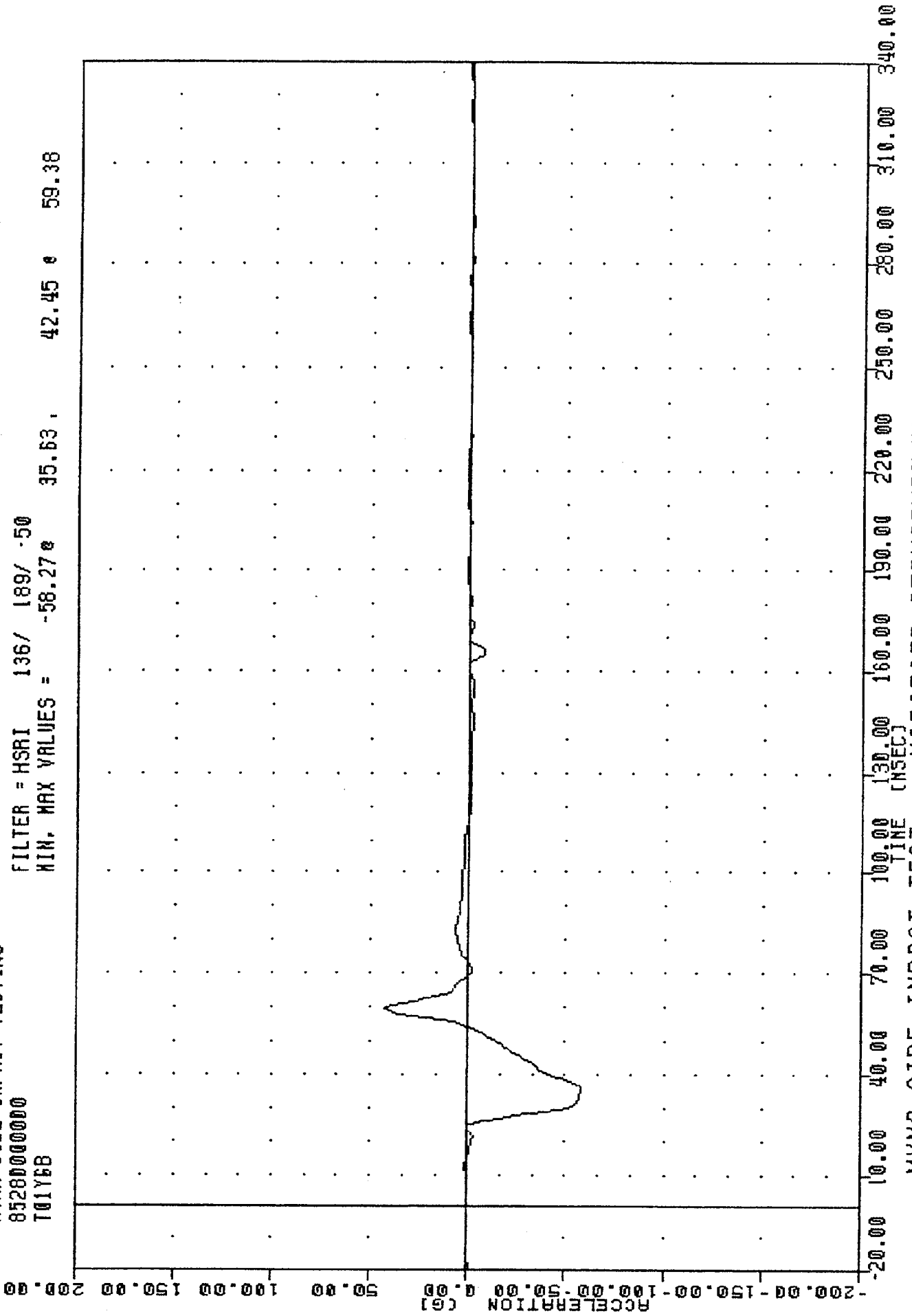


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 PASSENGER UPPER SPINE ACCELERATION Y AXIS

MVMA SIDE IMPACT TESTING
 852800000000
 T01Y6B

P... DATA ... CT-... 5:

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -58.27 35.63 , 42.45 59.38

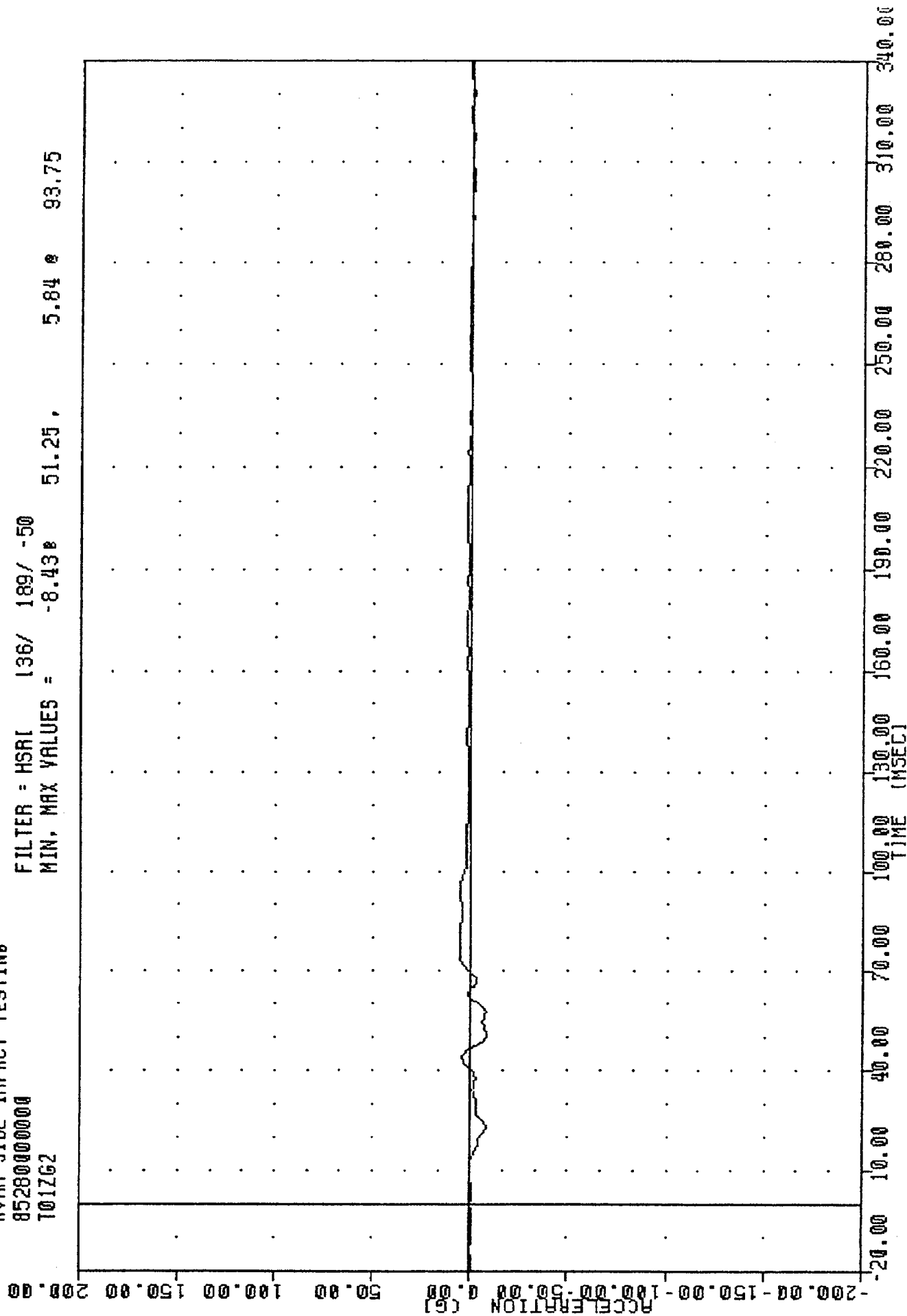


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 PASSENGER UPPER SPINE ACCELERATION -2 Y AXIS

INC 651007
 NVMA SIDE IMPACT TESTING
 852800000000
 101262

PLT DATE 0 OCT 83 15:15

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -8.43 51.25, 5.84 93.75



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

510 DR 15

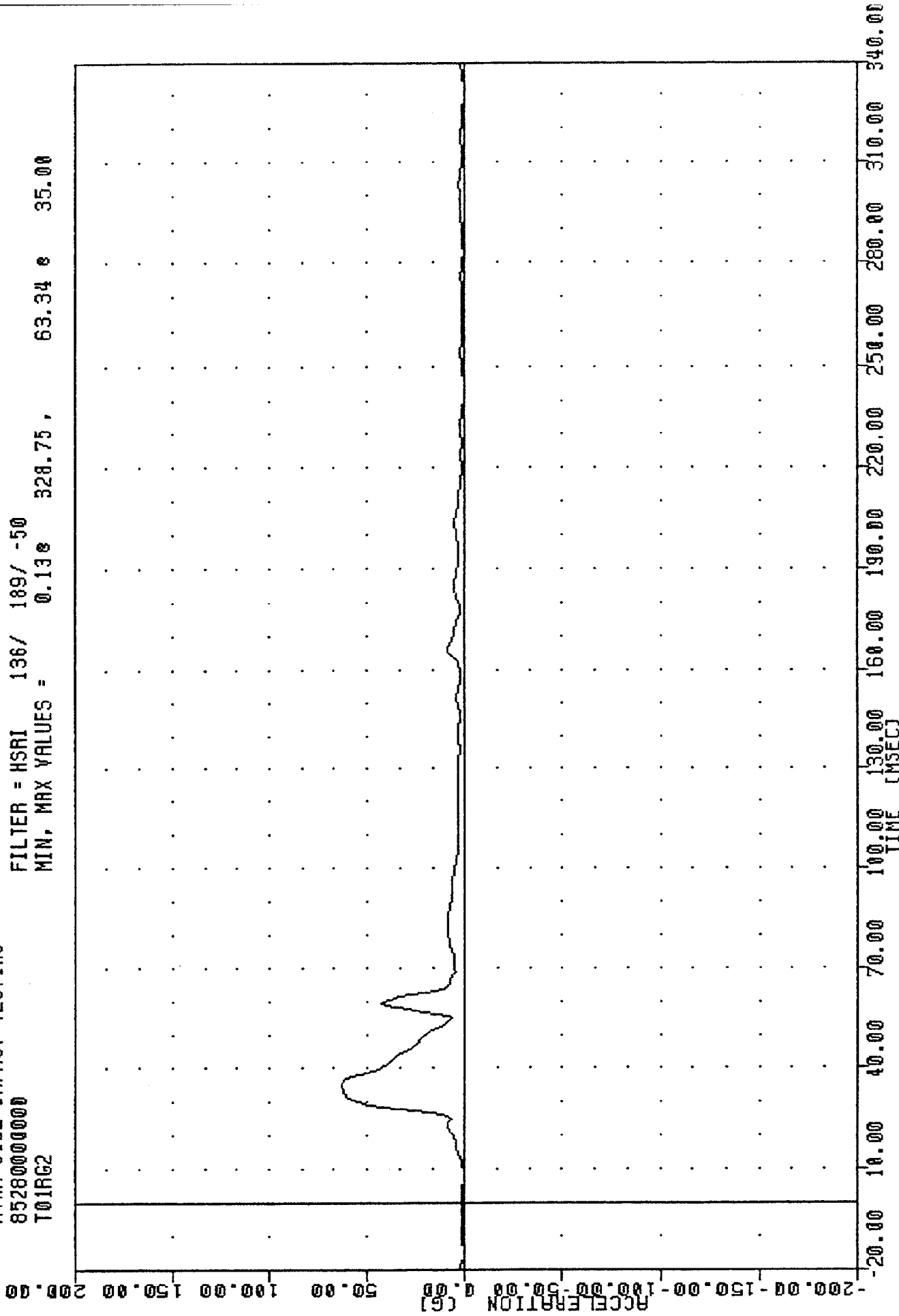
MYNA SIDE IMPACT TESTING

852800000000

T01RG2

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.138 328.75, 63.34 35.00

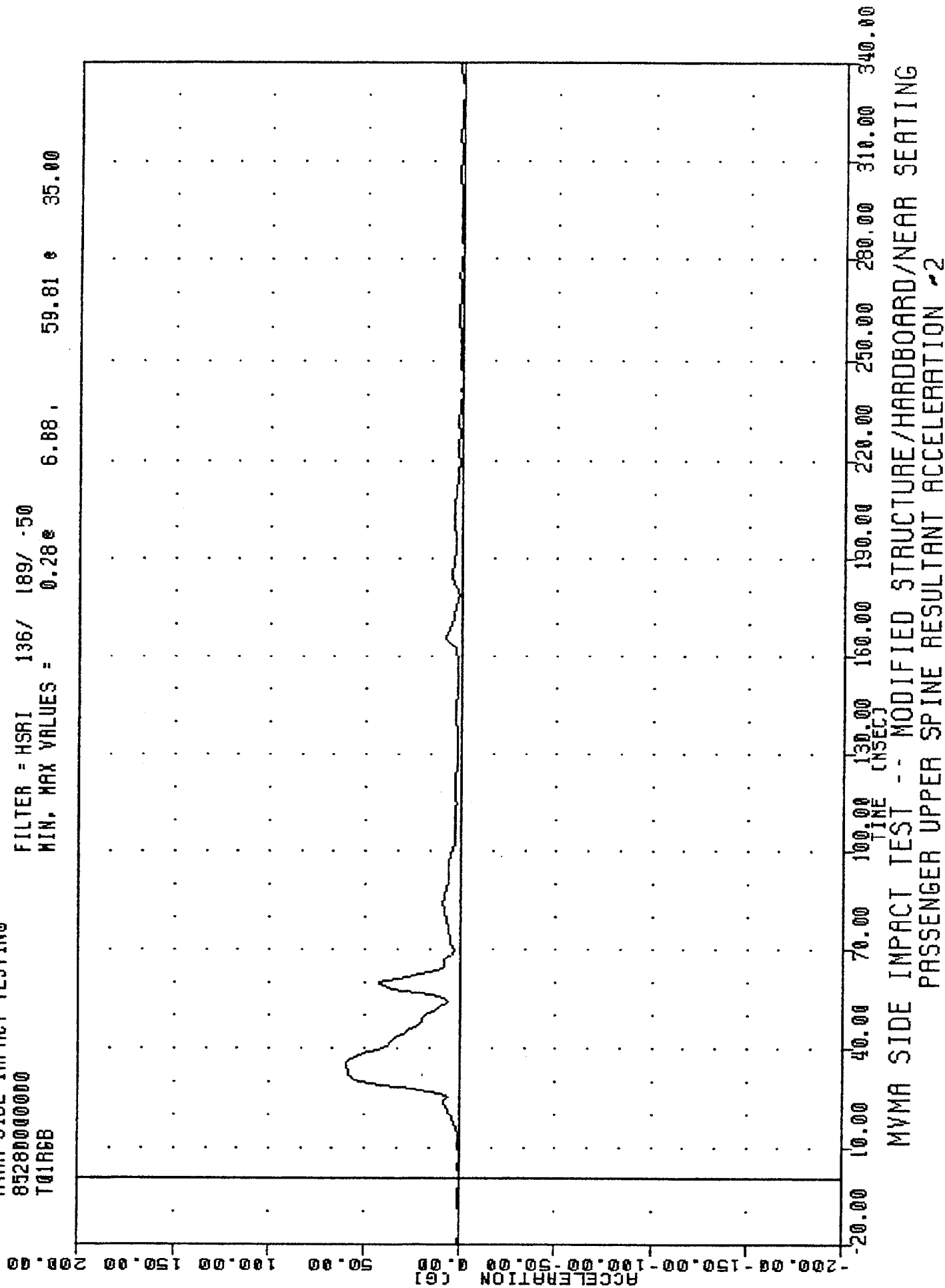


MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
PASSENGER UPPER SPINE RESULTANT ACCELERATION

T 100
 MYMA SIDE IMPACT TESTING
 852800000000
 T01R6B

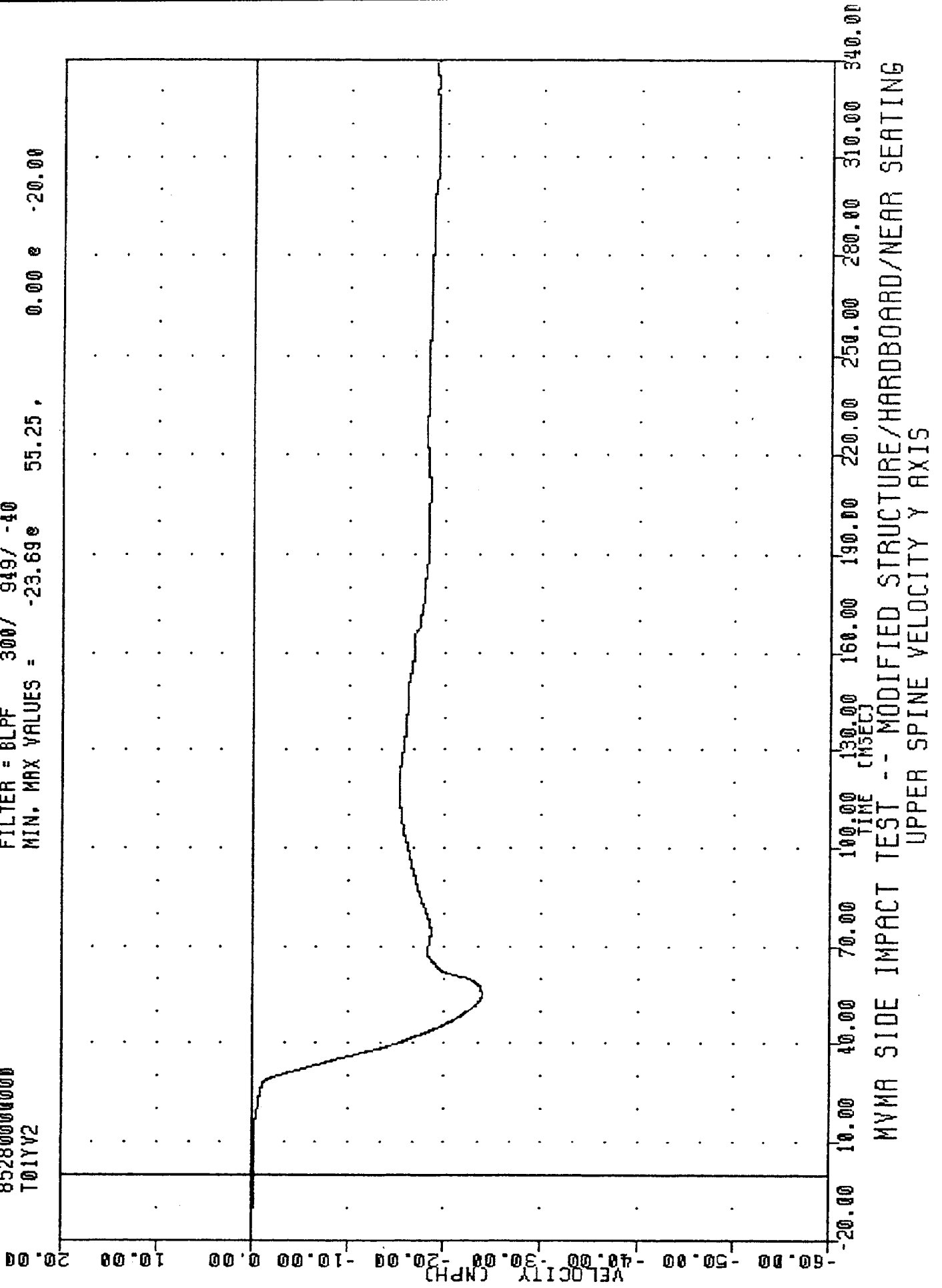
P 15:

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.28 6.88 59.81 35.00



T55
 MYNA SIDE IMPACT TESTING
 852800000000
 T01YV2

051005
 PAGE 3 DRAFT
 15:50
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -23.69e 55.25, 0.00 e -20.00



PAGE 0001 DATA CT-15:
 FILTER = BLPF 300/ 949/ -40
 WIN, MAX VALUES = -22.140

```

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -22.148 54.88 , 0.00 8 -20.00

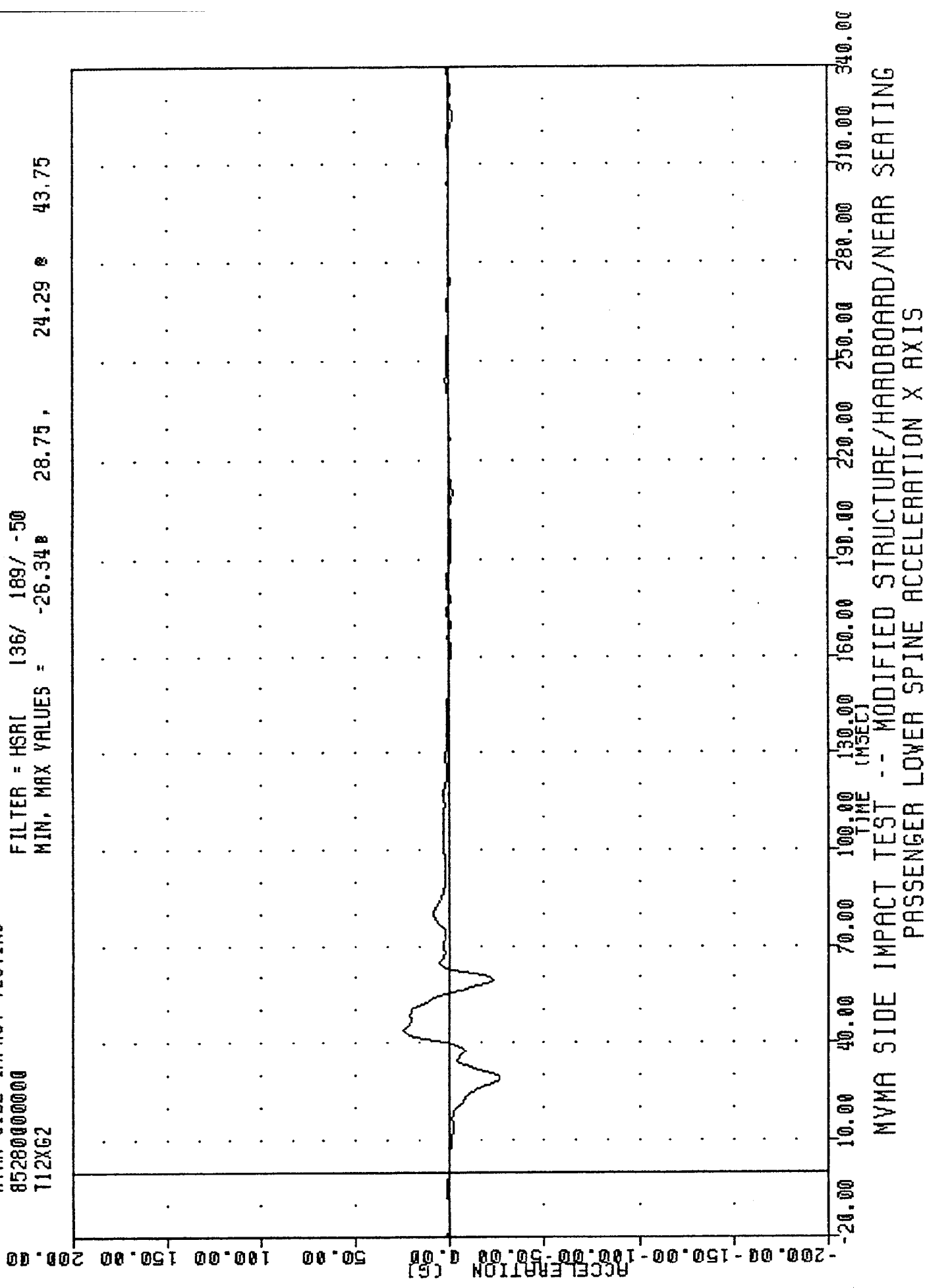
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NVMA SIDE IMPACT TESTING
 852800000000
 112XG2

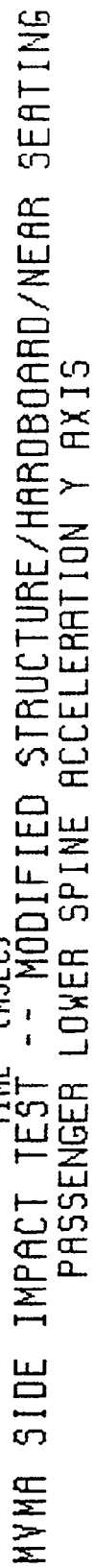
FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -26.34 28.75 , 24.29 43.75

15:

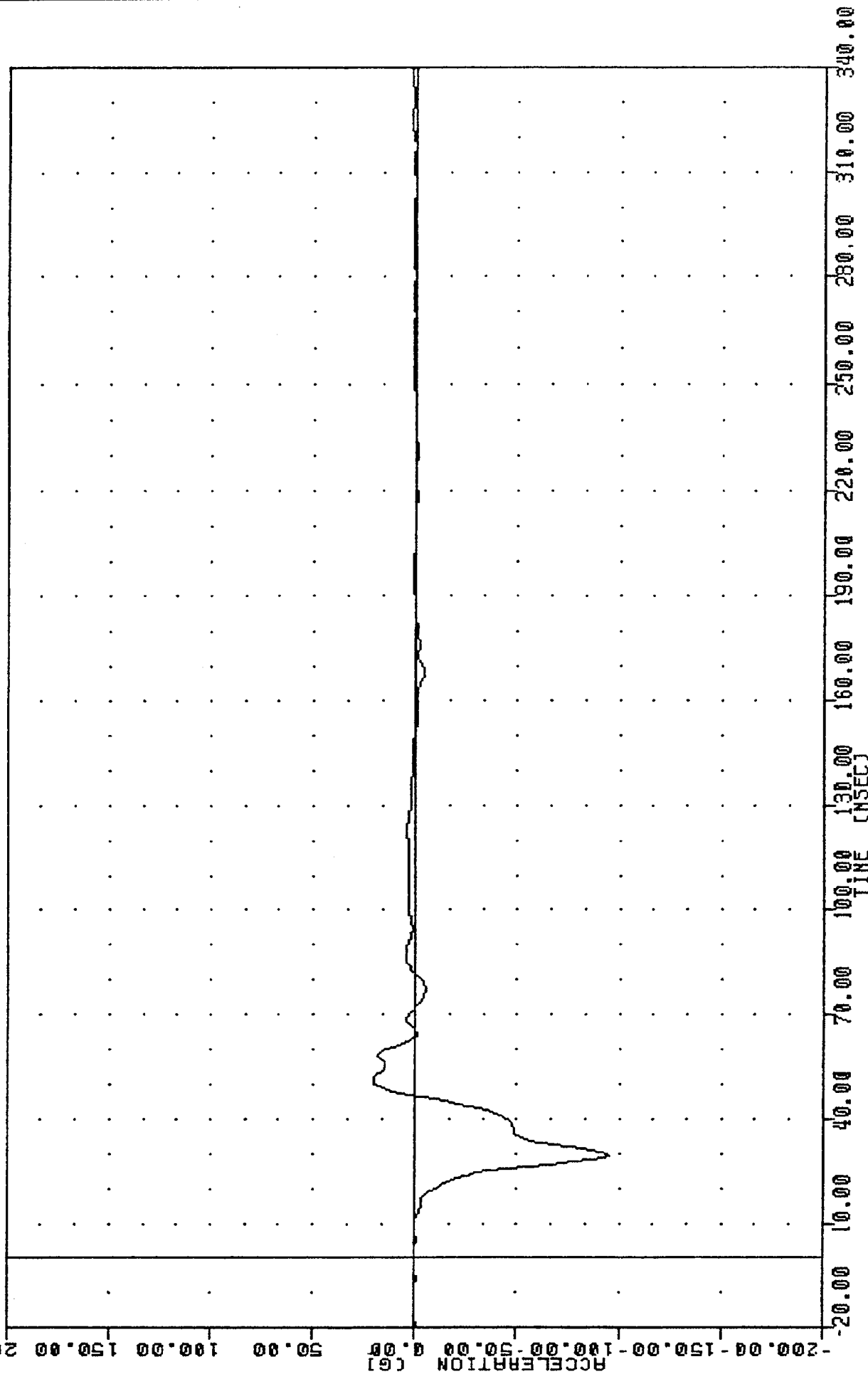


PAGE DR [REDACTED] OCT-1985 15
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -93.68°

FILTER = HSRI	136/	189/	-50
MIN, MAX VALUES =	-93.66	29.38,	19.05
			51.25



T112Y6B
 MVMA SIDE IMPACT TESTING
 852800000000
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -94.81e 29.38, 20.87 e 50.63



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

一、
 二、
 三、

FILTER = HSR1 136/ 189/ -50
MIN, MAX VALUES = -9.512

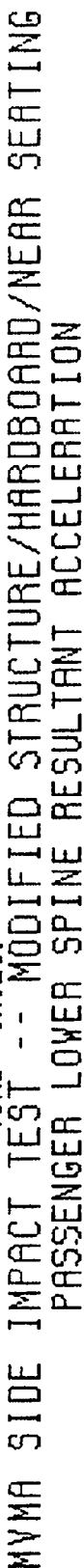
3.2.3



/HARBOARD/NEAR

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.18e

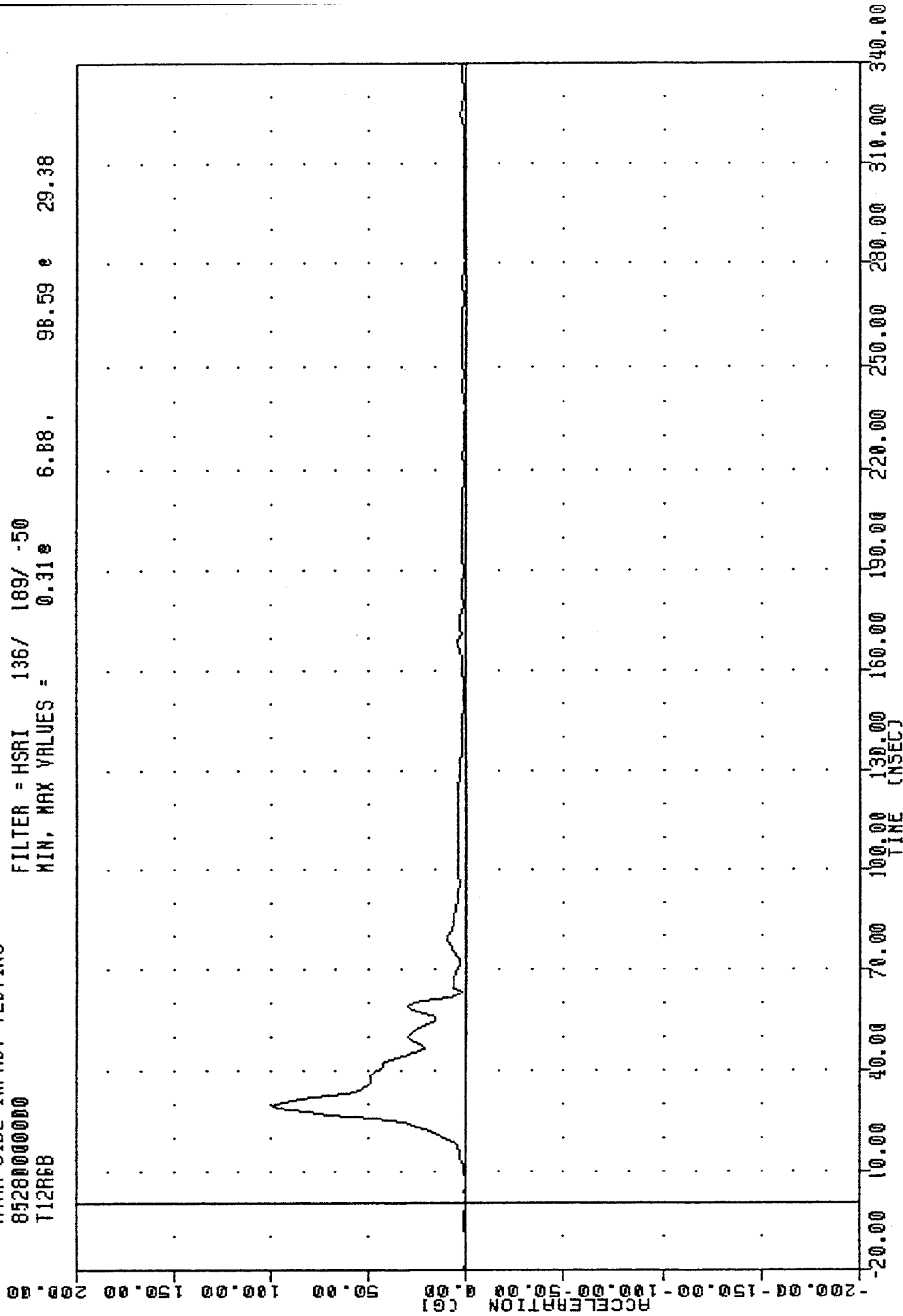
97.47 29.38



MVMA SIDE IMPACT TESTING
 852800000000
 T12R6B

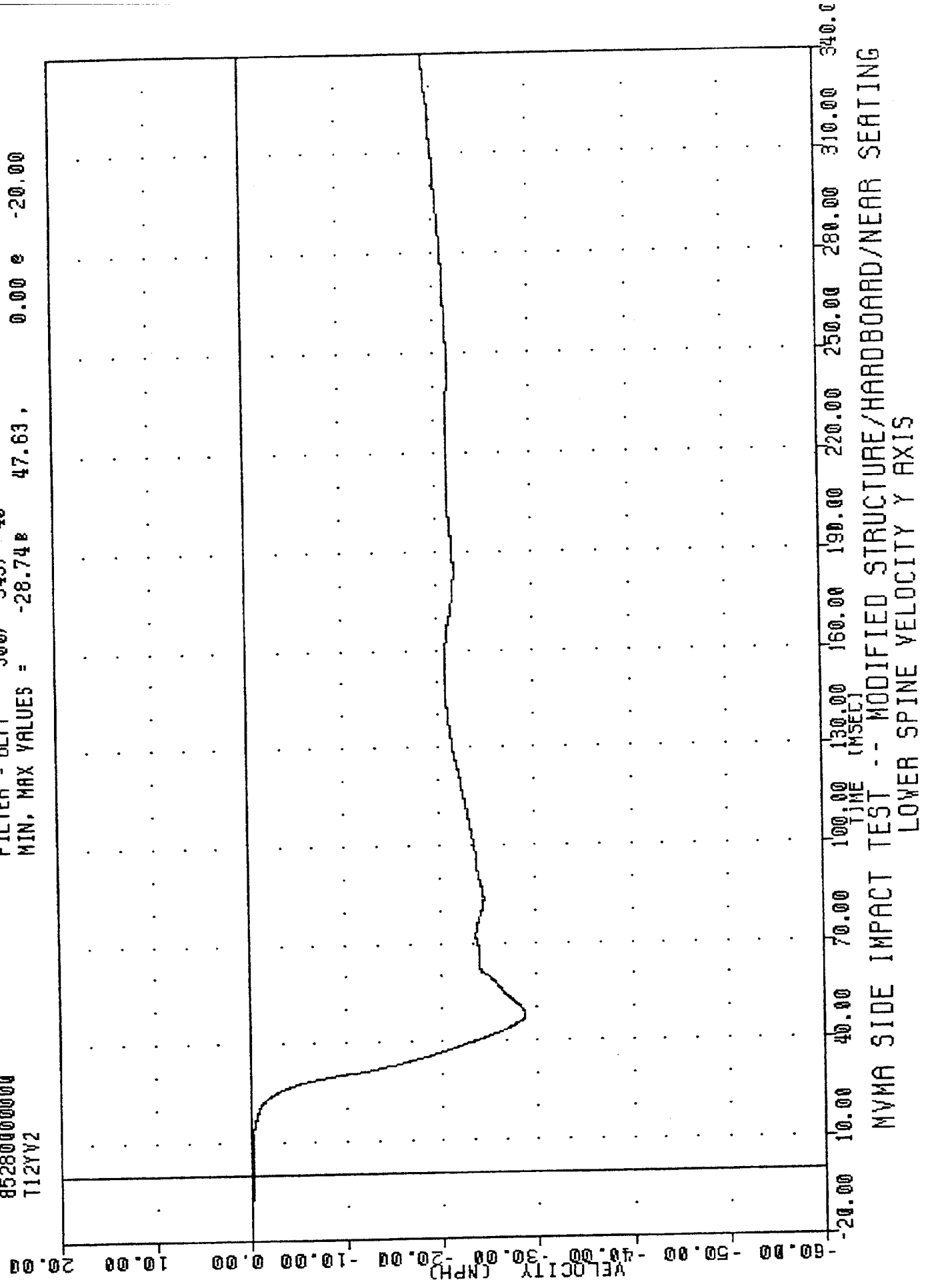
FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.31e 6.88 , 98.59 e 29.38

P 15:15:15

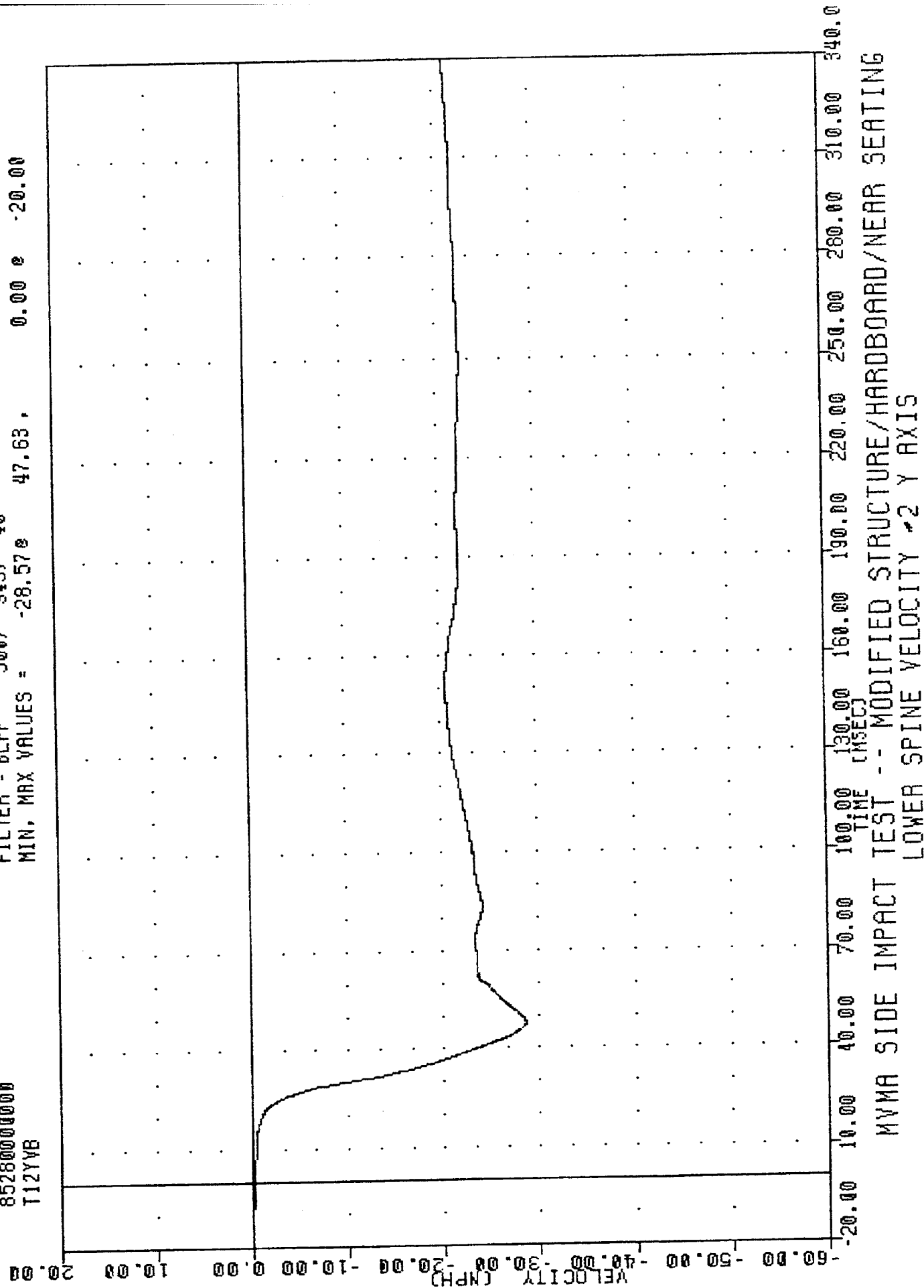


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION -2

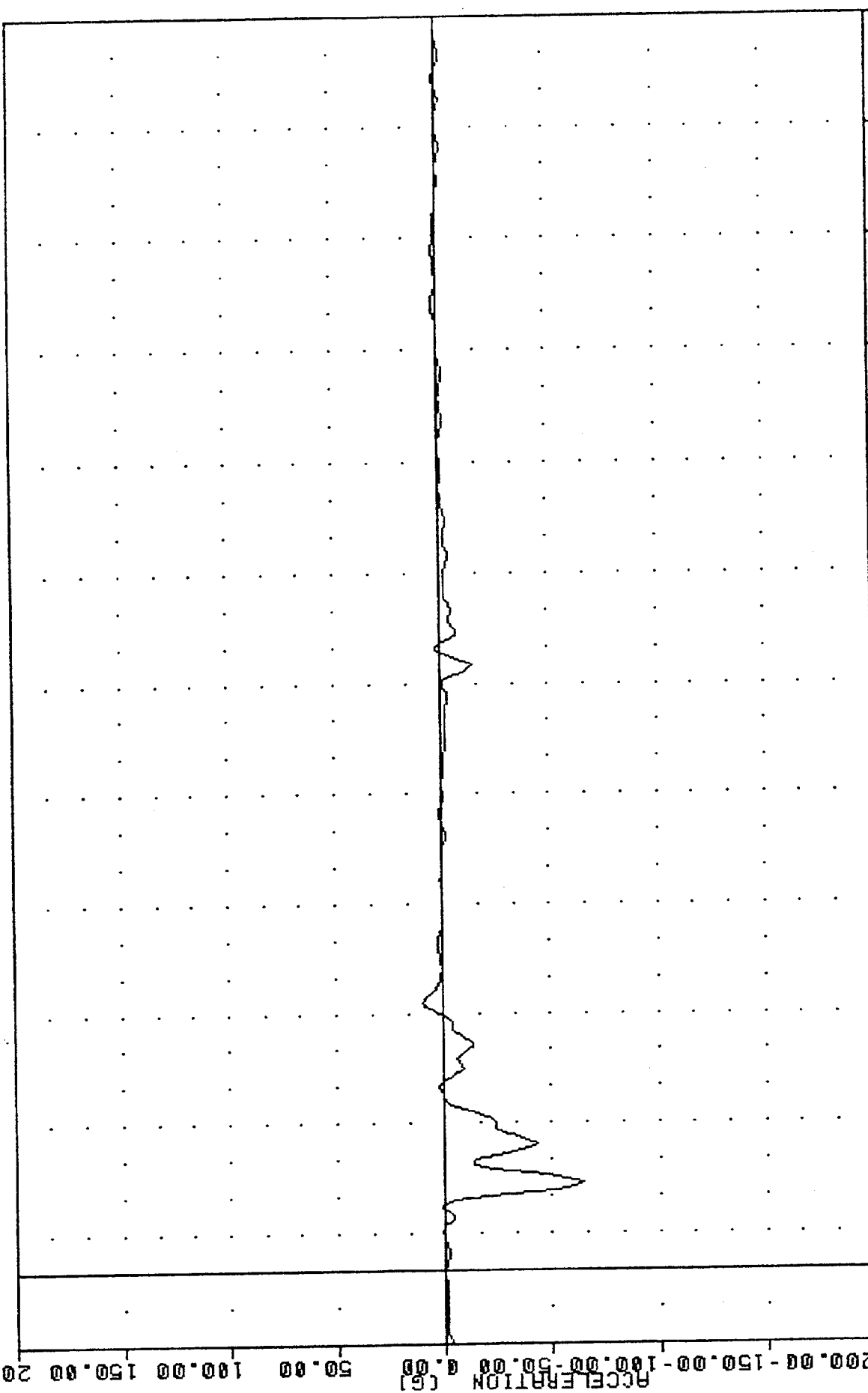
TRC
 NVMA SIDE IMPACT TESTING
 852800000000
 T12YV2
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -28.74 47.63, 0.00 e -20.00
 PLOT DATE 8 OCT 63 14:15:50



TRL 831007
 MVNA SIDE IMPACT TESTING
 852800000000
 T12YVB
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -28.57 47.63, 0.00 20.00
 PLOT DATE 15:

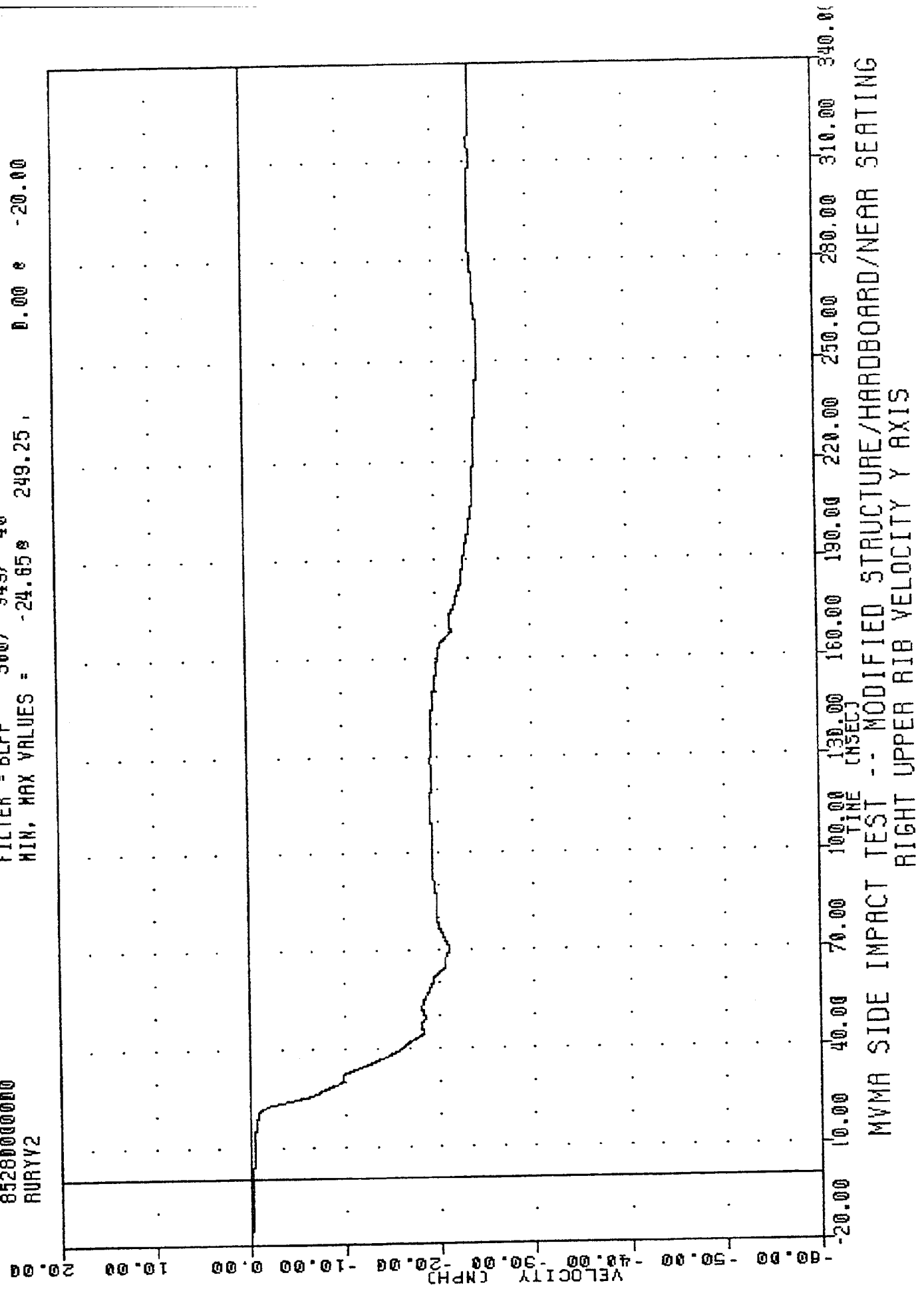


TRC
 852800000000
 RURYG2
 NVMA SIDE IMPACT TESTING
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -64.32 23.75, 9.39 73.13
 TEST DATE 15:

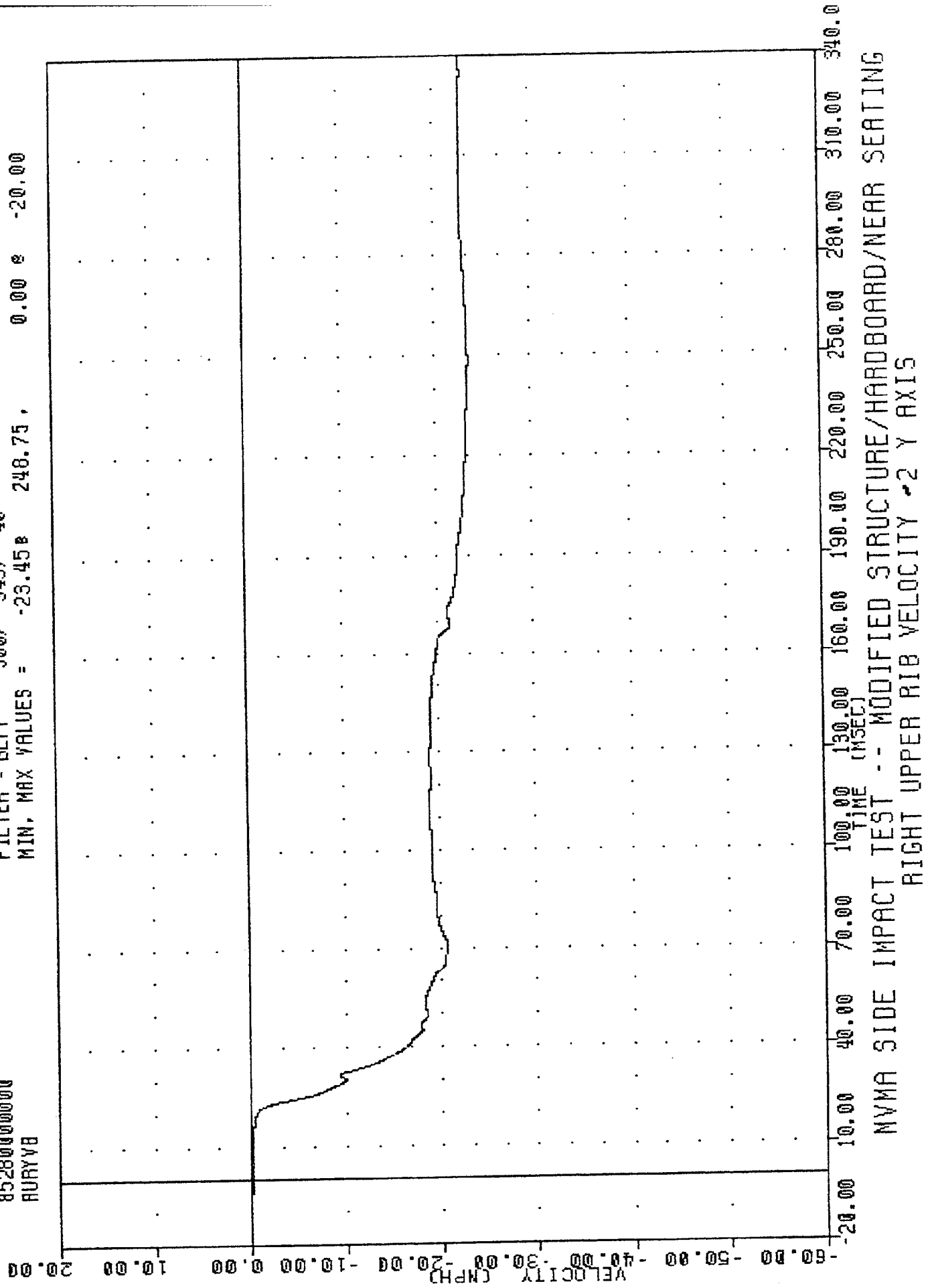


-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00
 ACCELERATION (G)
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (msec)
 NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 PASSENGER RIGHT UPPER RIB ACCELERATION Y AXIS

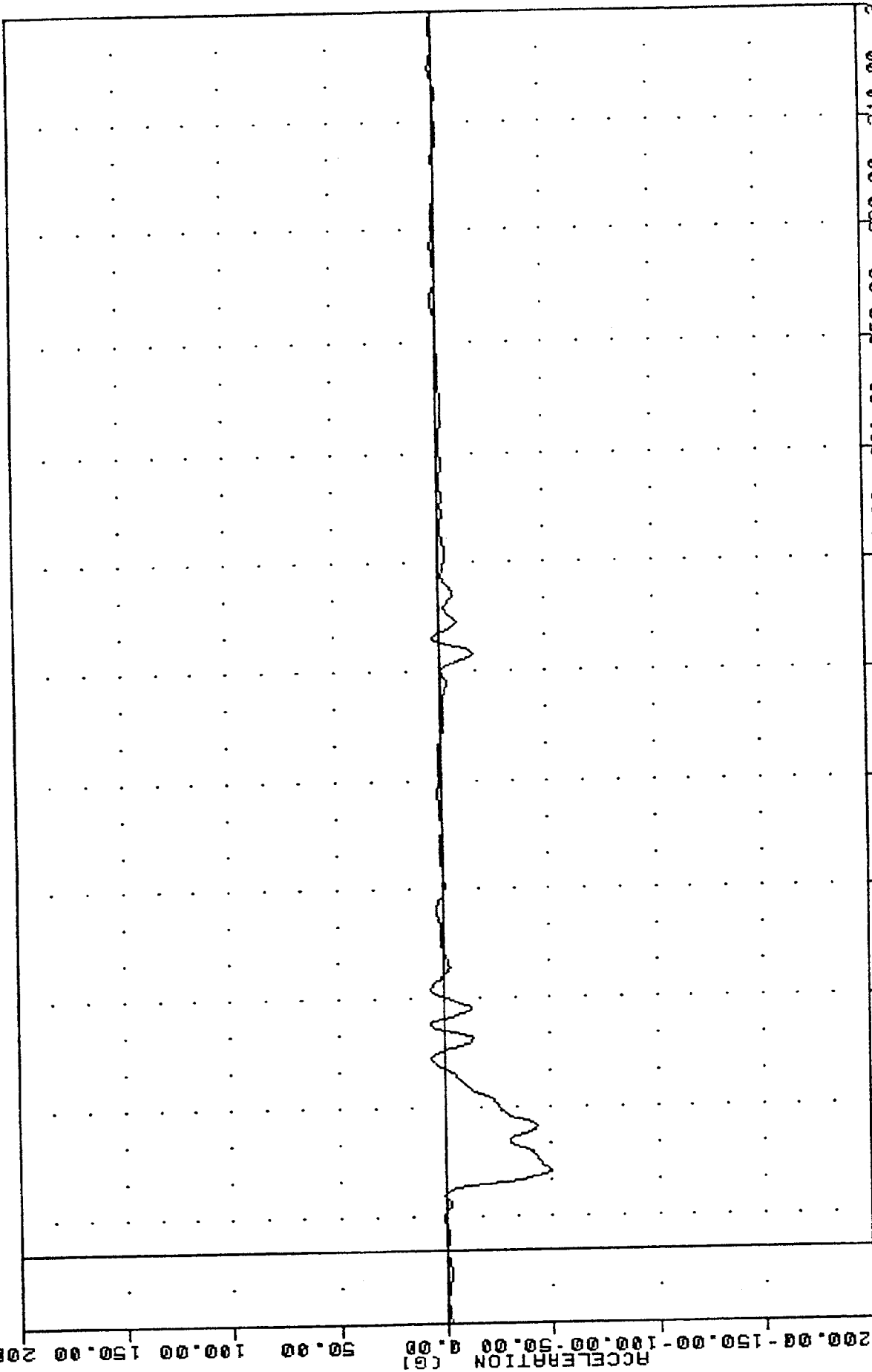
THC
 852800000000
 RURYV2
 MYMA SIDE IMPACT TESTING
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -24.65 249.25 0.00 0.00
 PLOT DATE 0 OCT-90 15:53



TRC
 NYMA SIDE IMPACT TESTING
 852800000000
 RURYVB
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -23.45B 248.75, 0.00 E -20.00
 TEST DATE 15:



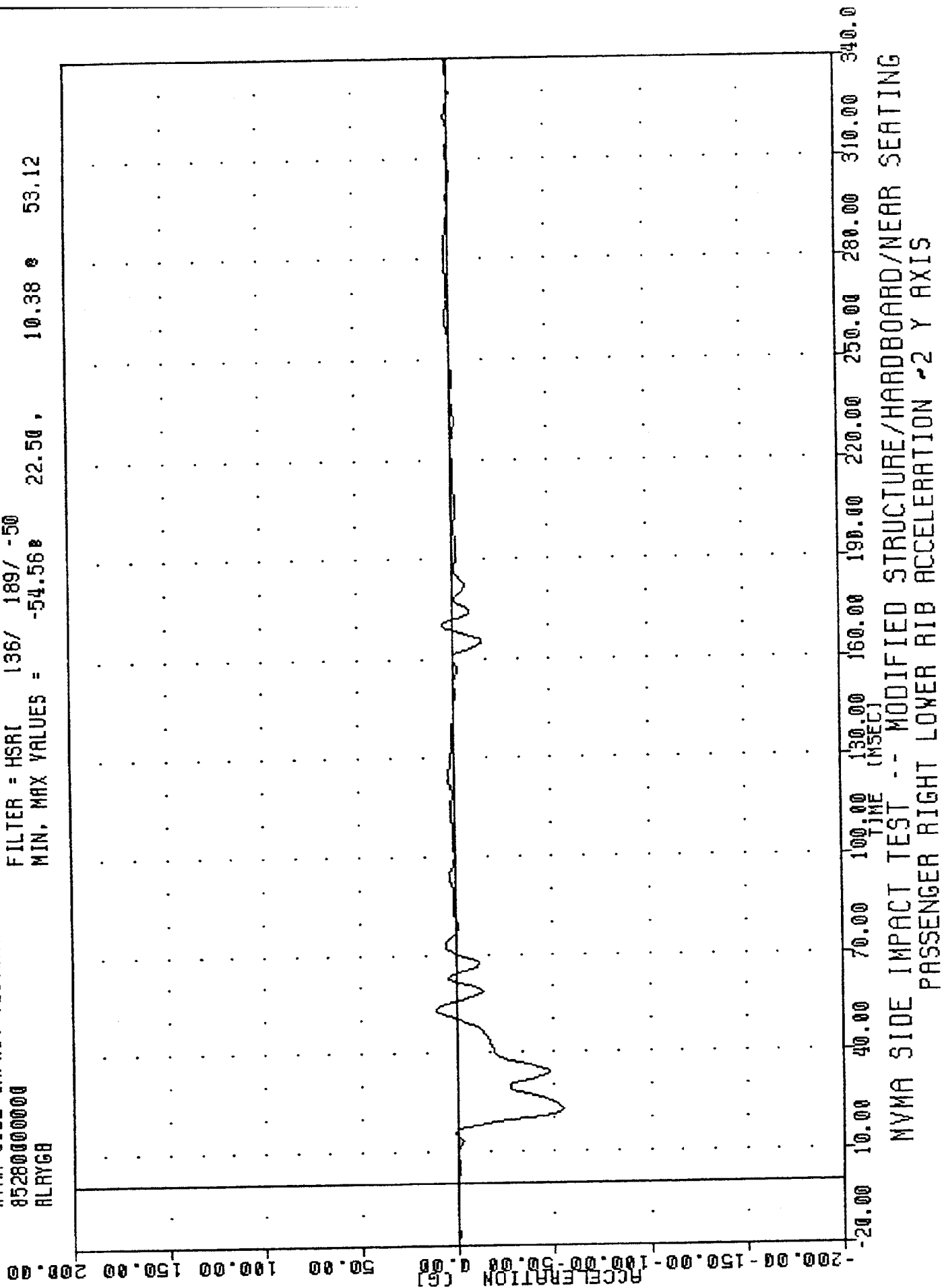
TNC 00100, PLT-00100, 5:10
 MVMA SIDE IMPACT TESTING
 85280000000
 RLRYB2
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -49.38e 22.50, 6.59 e 62.50



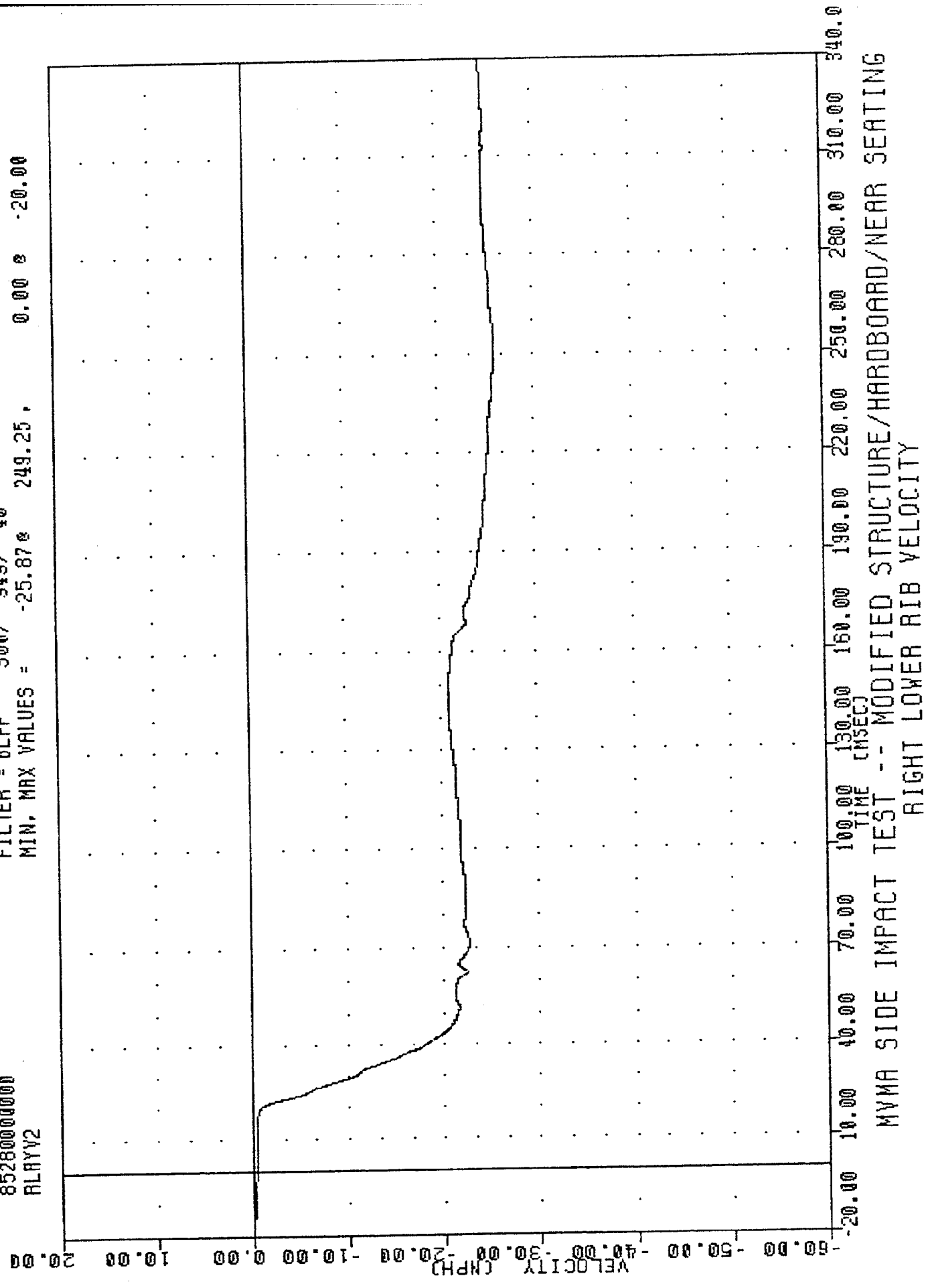
-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00
 ACCELERATION (G)
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (msec)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 PASSENGER RIGHT LOWER RIB ACCELERATION Y AXIS

NYMA SIDE IMPACT TESTING
8528000000
ALRYGB

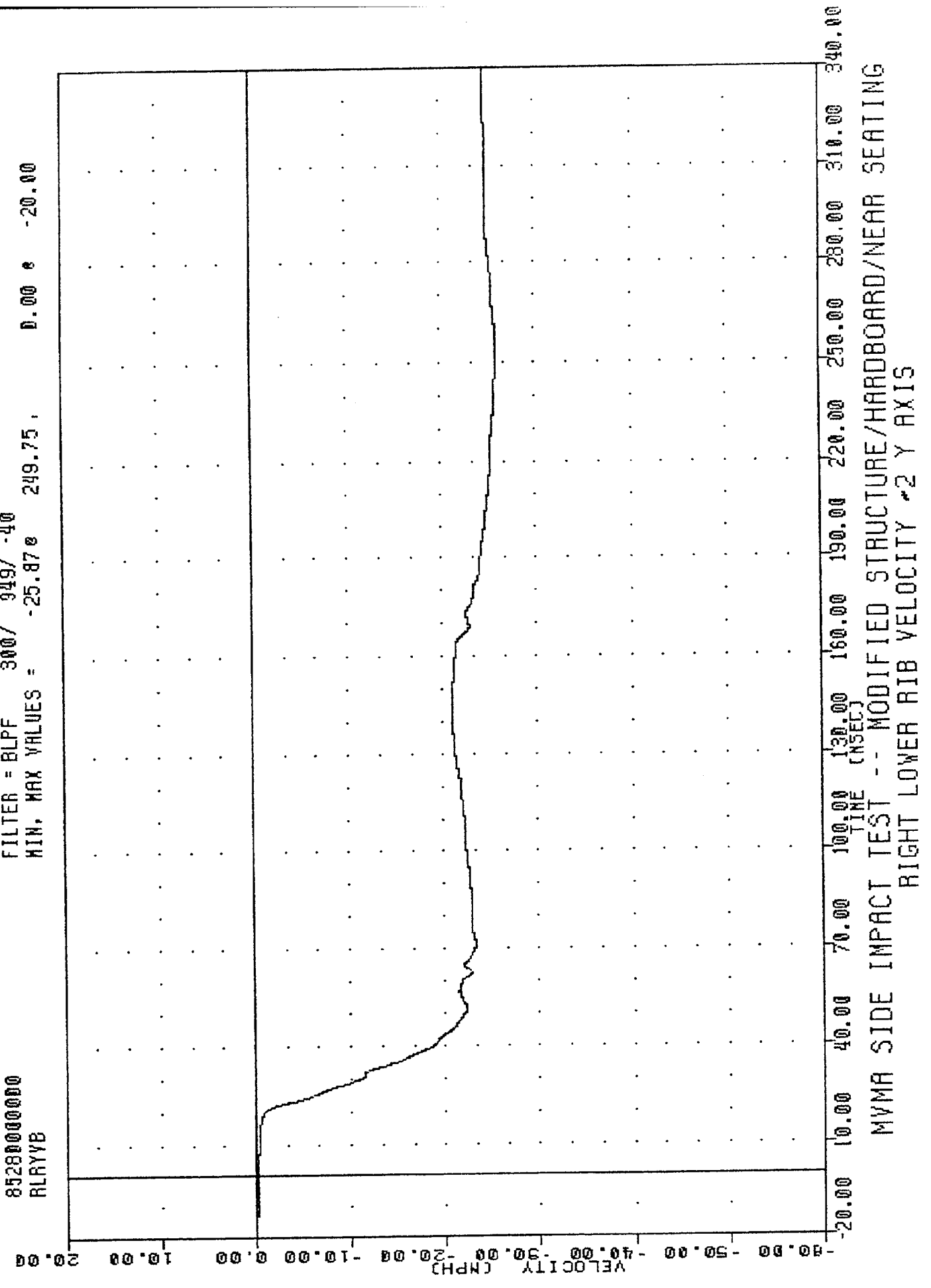
P ~~0000~~ DATE ~~0000~~ CT ~~0000~~ 15:10
 FILTER = HSRI 136/ 189/ -50 22
 MIN, MAX VALUES = -54.56



TRC
 852800000000
 RLAYV2
 MYNA SIDE IMPACT TESTING
 852800000000
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -25.87% 0.00% -20.00
 PLOT DATE: OCT-8 15:00



TMC 031007
 NYMA SIDE IMPACT TESTING
 85280000000
 RLRYB
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -25.87 249.75, 0.00 0 -20.00
 PLT DATE 5:5

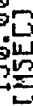


MYNA SIDE I

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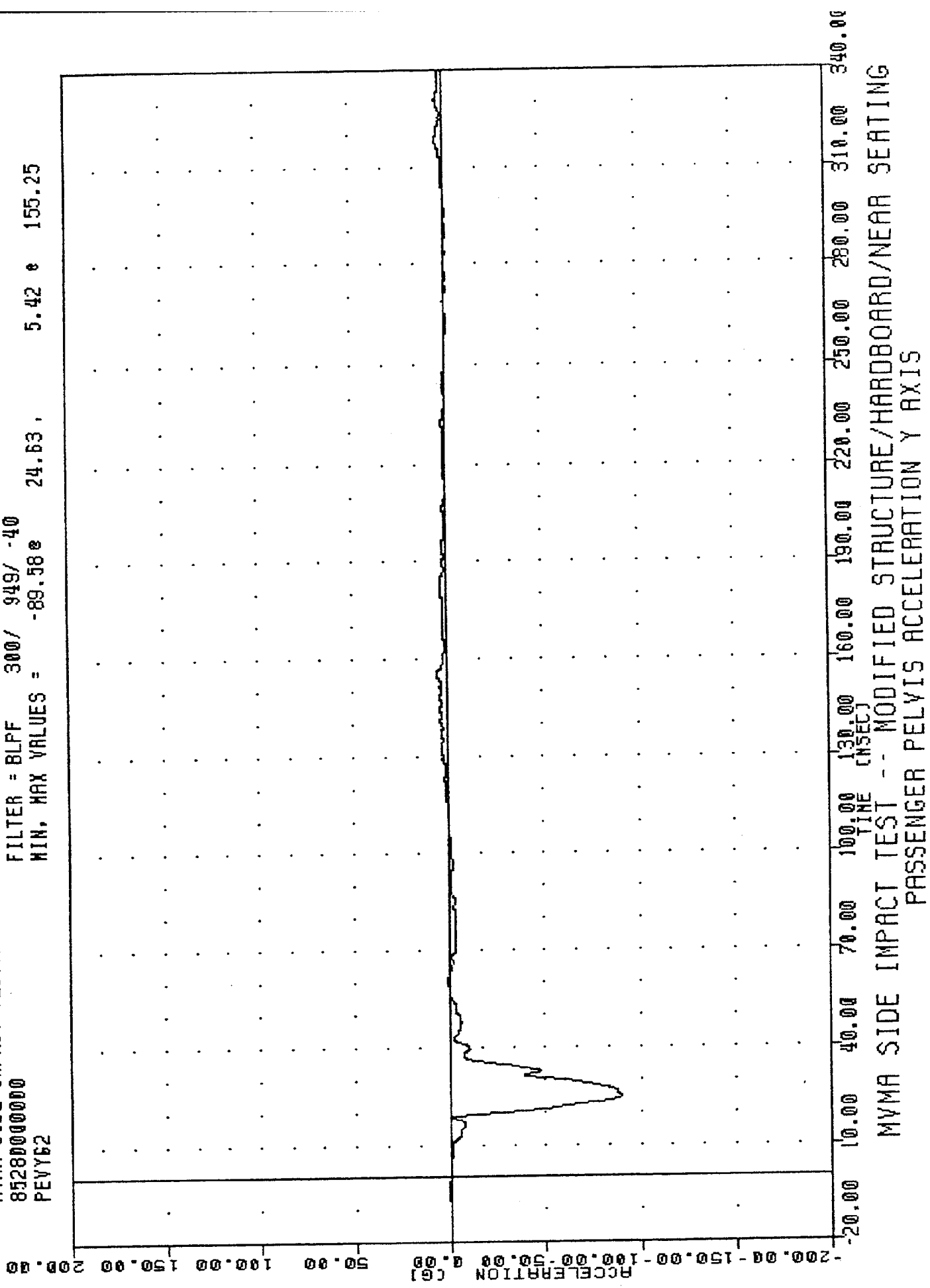
1
1
1

6.02 3 138.75



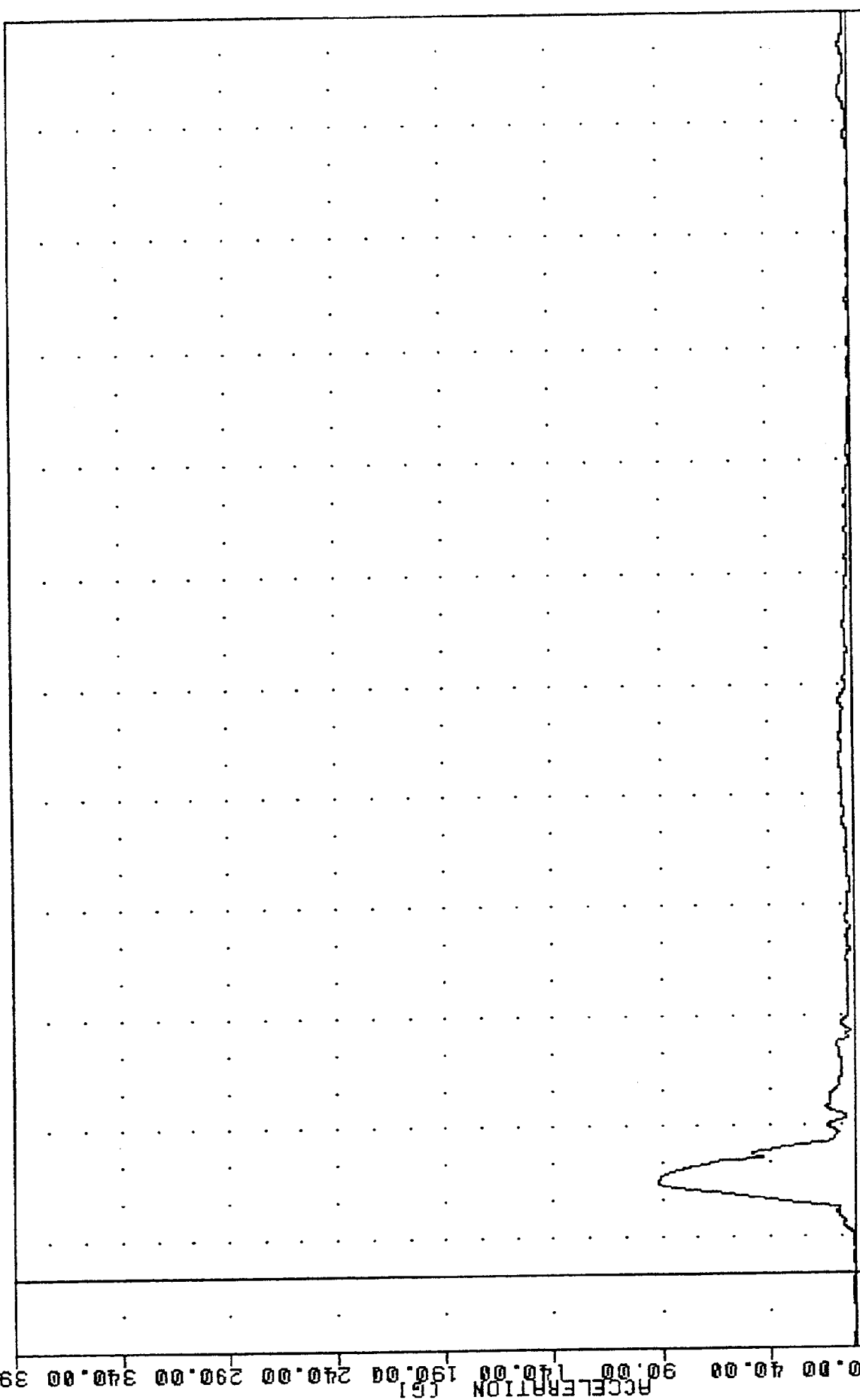
A-31

THE 851000 PL 7:15
 MVMA SIDE IMPACT TESTING
 85280000000
 PEVY62
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -89.58e 24.63, 5.42 e 155.25





INC 7051067
 MVNA SIDE IMPACT TESTING
 852800000000
 PEYRG2
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.050 1.13, 91.56 e 24.75
 17:17:17



-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00
 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 TIME (MSEC)
 MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 PASSENGER PELVIS RESULTANT ACCELERATION

TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - C
 4/17/12
 00:17:12

TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - C
 4/17/12
 00:17:12

TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - G
 04/17/12
 00:17:12

TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - G
 04/17/12
 00:17:12

TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - G
 04/17/12
 00:17:12

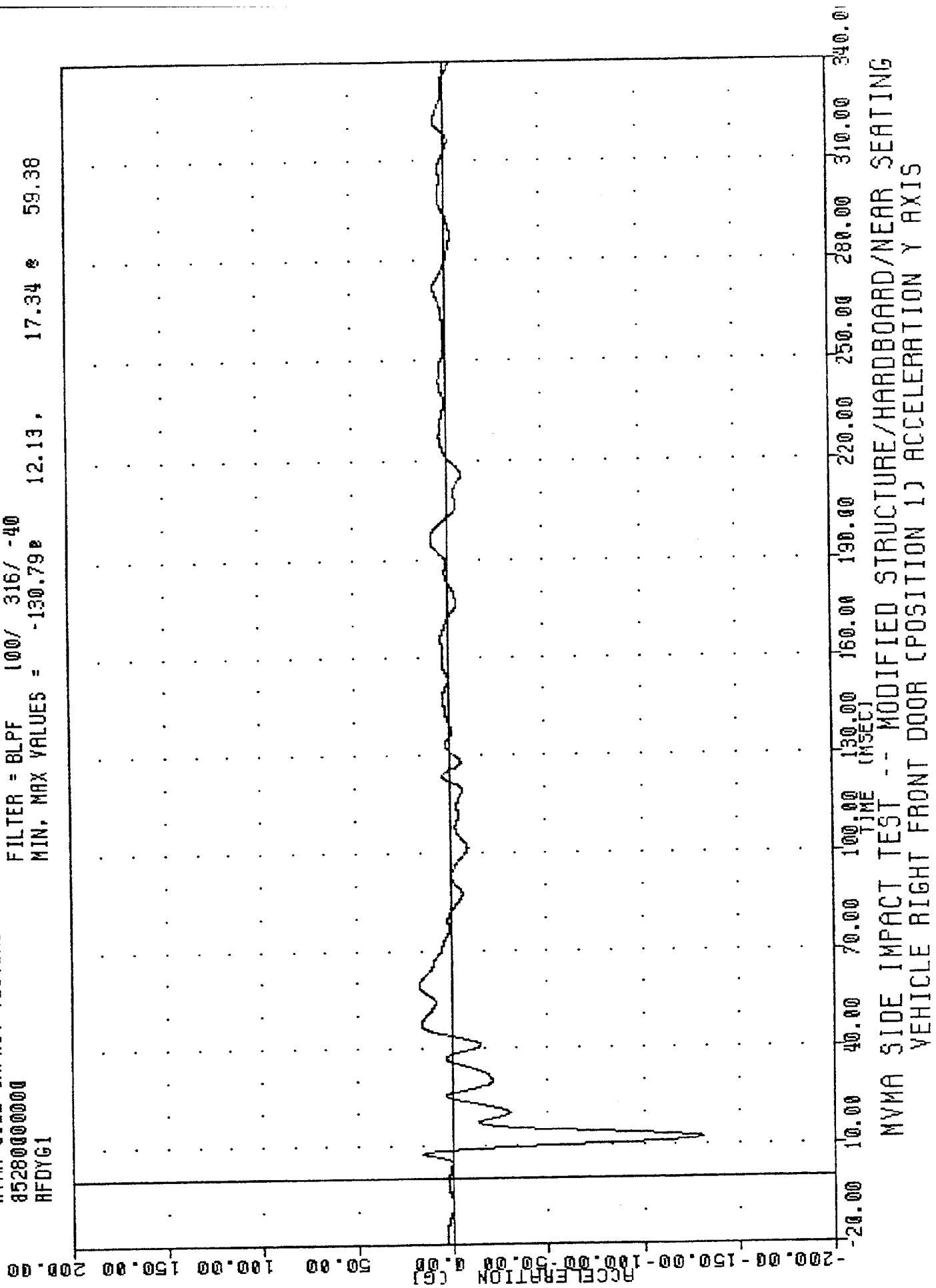
TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - G
 04/17/12
 00:17:12

TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - G
 04/17/12
 00:17:12



TIME 00:10:00
 FROM PLUMB DART
 SUBJECT - G
 04/17/12
 00:17:12

TMC 031007
 NVMA SIDE IMPACT TESTING
 852800000000
 RFDY61
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -130.79 12.13, 17.34 59.38
 PLOT DATE 17:12



TEST NO. 001000 PROJECT-05 DATE 15:50

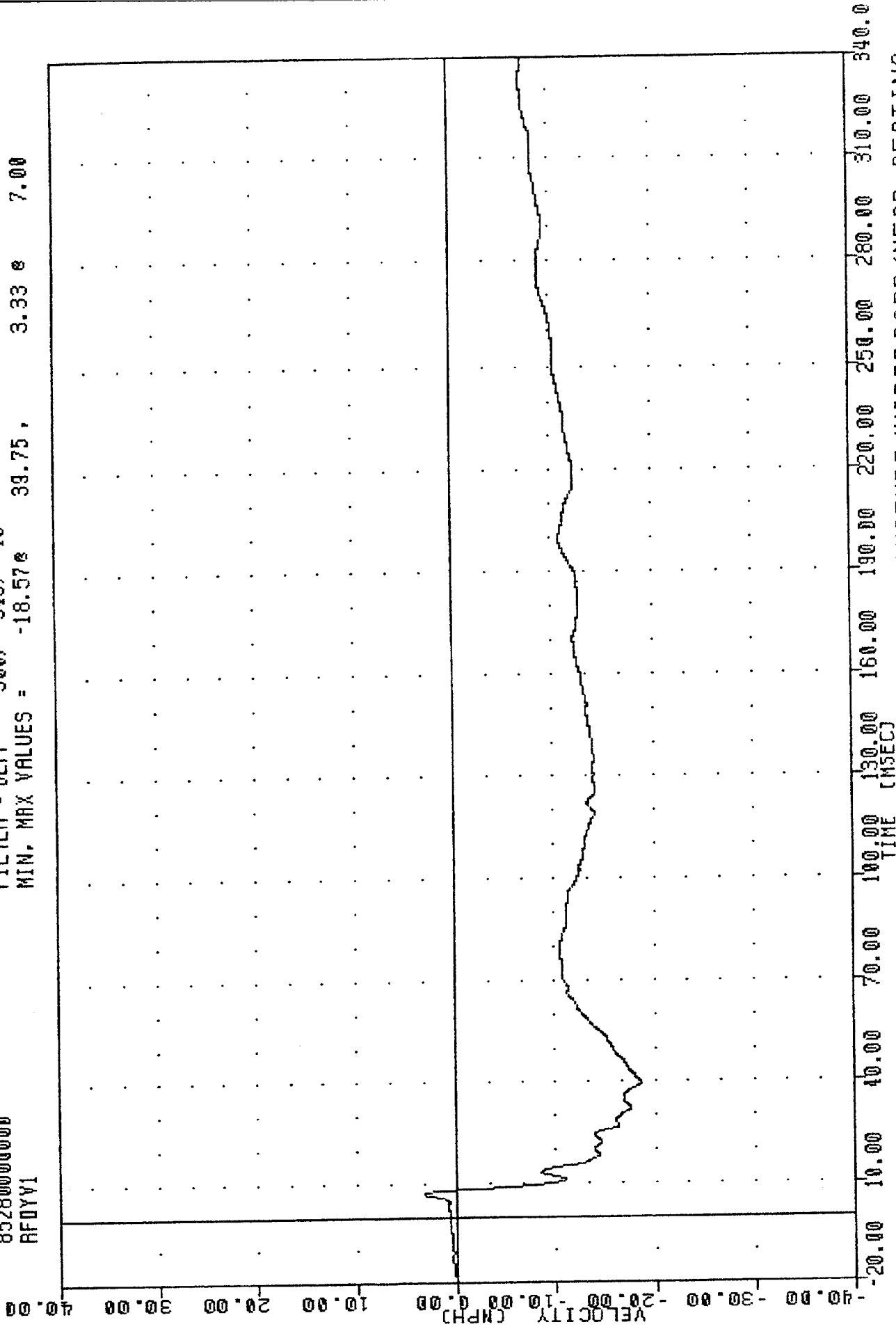
MVMA SIDE IMPACT TESTING

852800000000

RFDYV1

FILTER = 8LPF 300/ 949/ -40

MIN, MAX VALUES = -18.57% 39.75, 3.33 @ 7.00



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
RIGHT FRONT DOOR (POSITION 1) VELOCITY Y AXIS

[illegible][illegible][illegible]

2

2

2

2

2

2

2



2

2

TRC

PLC RATE

8-26T-85

10:17:17

MVMA SIDE IMPACT TESTING

85280000000

RFDY63

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -113.10e 14.00 66.08 e 27.25

ACCELERATION [G]

TIME [MSEC]

TIME

130.00

160.00

190.00

220.00

250.00

280.00

310.00

340.00

370.00

400.00

430.00

460.00

490.00

520.00

550.00

580.00

610.00

640.00

670.00

700.00

730.00

760.00

790.00

820.00

850.00

880.00

910.00

940.00

970.00

1000.00

1030.00

1060.00

1090.00

1120.00

1150.00

1180.00

1210.00

1240.00

1270.00

1300.00

1330.00

1360.00

1390.00

1420.00

1450.00

1480.00

1510.00

1540.00

1570.00

1600.00

1630.00

1660.00

1690.00

1720.00

1750.00

1780.00

1810.00

1840.00

1870.00

1900.00

1930.00

1960.00

1990.00

2020.00

2050.00

2080.00

2110.00

2140.00

2170.00

2200.00

2230.00

2260.00

2290.00

2320.00

2350.00

2380.00

2410.00

2440.00

2470.00

2500.00

2530.00

2560.00

2590.00

2620.00

2650.00

2680.00

2710.00

2740.00

2770.00

2800.00

2830.00

2860.00

2890.00

2920.00

2950.00

2980.00

3010.00

3040.00

3070.00

3100.00

3130.00

3160.00

3190.00

3220.00

3250.00

3280.00

3310.00

3340.00

3370.00

3400.00

3430.00

3460.00

3490.00

3520.00

3550.00

3580.00

3610.00

3640.00

3670.00

3700.00

3730.00

3760.00

3790.00

3820.00

3850.00

3880.00

3910.00

3940.00

3970.00

4000.00

4030.00

4060.00

4090.00

4120.00

4150.00

4180.00

4210.00

4240.00

4270.00

4300.00

4330.00

4360.00

4390.00

4420.00

4450.00

4480.00

4510.00

4540.00

4570.00

4600.00

4630.00

4660.00

4690.00

4720.00

4750.00

4780.00

4810.00

4840.00

4870.00

4900.00

4930.00

4960.00

4990.00

5020.00

5050.00

5080.00

5110.00

5140.00

5170.00

5200.00

5230.00

5260.00

5290.00

5320.00

5350.00

5380.00

5410.00

5440.00

5470.00

5500.00

5530.00

5560.00

5590.00

5620.00

5650.00

5680.00

5710.00

5740.00

5770.00

5800.00

5830.00

5860.00

5890.00

5920.00

5950.00

5980.00

6010.00

6040.00

6070.00

6100.00

6130.00

6160.00

6190.00

6220.00

6250.00

6280.00

6310.00

6340.00

6370.00

6400.00

6430.00

6460.00

6490.00

6520.00

6550.00

6580.00

6610.00

6640.00

6670.00

6700.00

6730.00

6760.00

6790.00

6820.00

6850.00

6880.00

6910.00

6940.00

6970.00

7000.00

7030.00

7060.00

7090.00

7120.00

7150.00

7180.00

7210.00

7240.00

7270.00

7300.00

7330.00

7360.00

7390.00

7420.00

7450.00

7480.00

7510.00

7540.00

7570.00

7600.00

7630.00

7660.00

7690.00

7720.00

7750.00

7780.00

7810.00

7840.00

7870.00

7900.00

7930.00

7960.00

7990.00

8020.00

8050.00

8080.00

8110.00

8140.00

8170.00

8200.00

8230.00

8260.00

8290.00

8320.00

8350.00

8380.00

8410.00

8440.00

8470.00

8500.00

8530.00

8560.00

8590.00

8620.00

8650.00

8680.00

8710.00

8740.00

8770.00

8800.00

8830.00

8860.00

8890.00

8920.00

8950.00

8980.00

9010.00

9040.00

9070.00

9100.00

9130.00

9160.00

9190.00

9220.00

9250.00

9280.00

9310.00

9340.00

9370.00

9400.00

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9520.00

9550.00

9580.00

9610.00

9640.00

9670.00

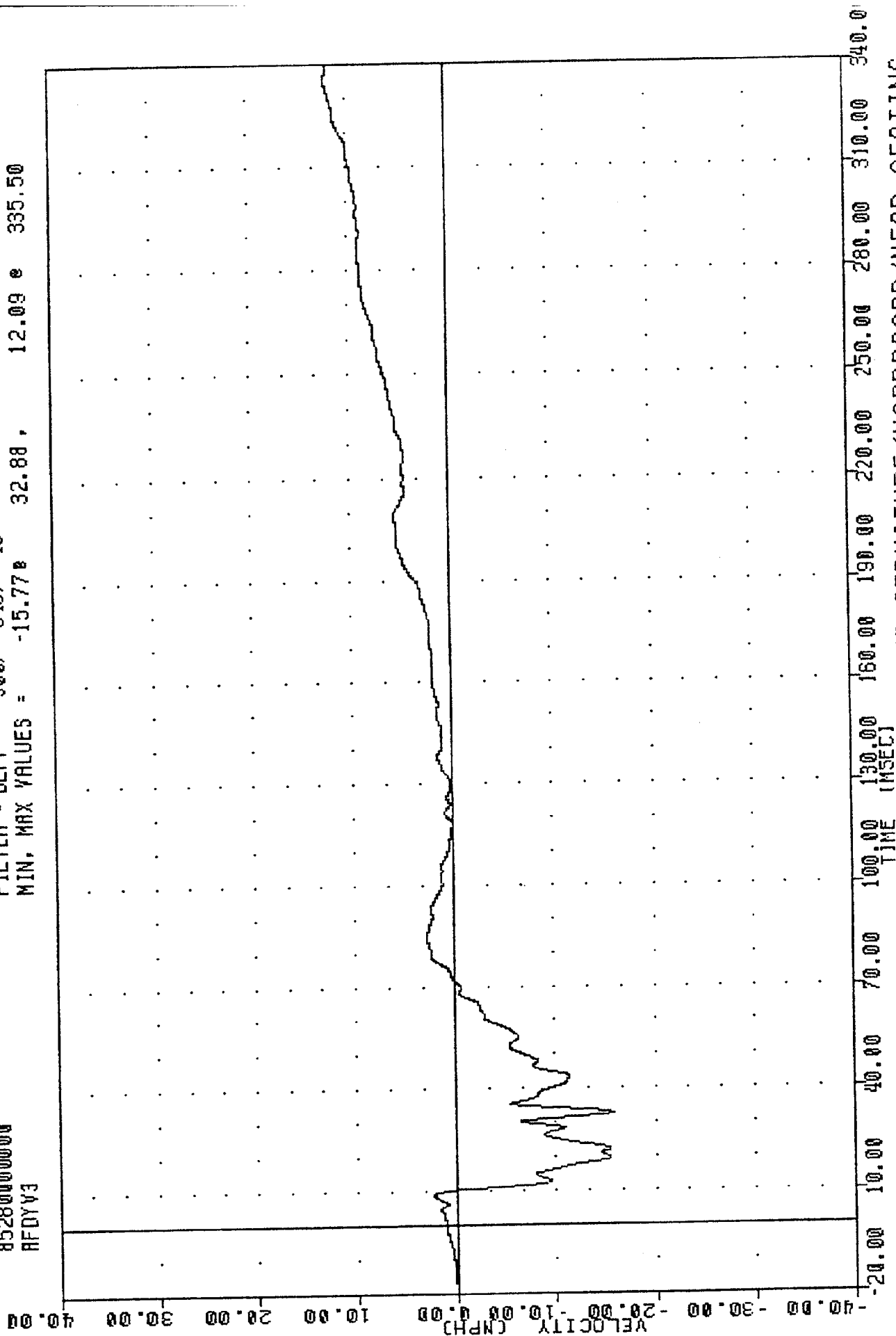
9700.00

9730.00

TAC 1000
 NVMA SIDE IMPACT TESTING
 85280000000
 RFDYV3

PL DATE 11/15/50

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -15.77 32.88, 12.09 e 335.50



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 RIGHT FRONT DOOR (POSITION 3) VELOCITY Y AXIS

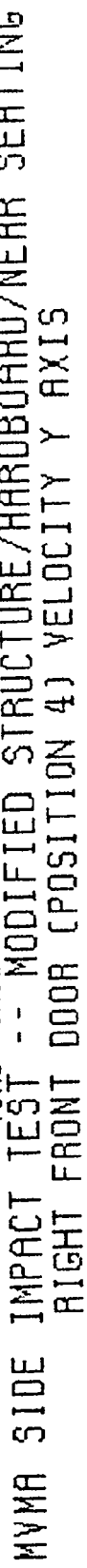
10

REF ID: A66584

10

	29.75.	1.33	3.75
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	29.75.	1.33	3.75
--	--------	------	------



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

FILE

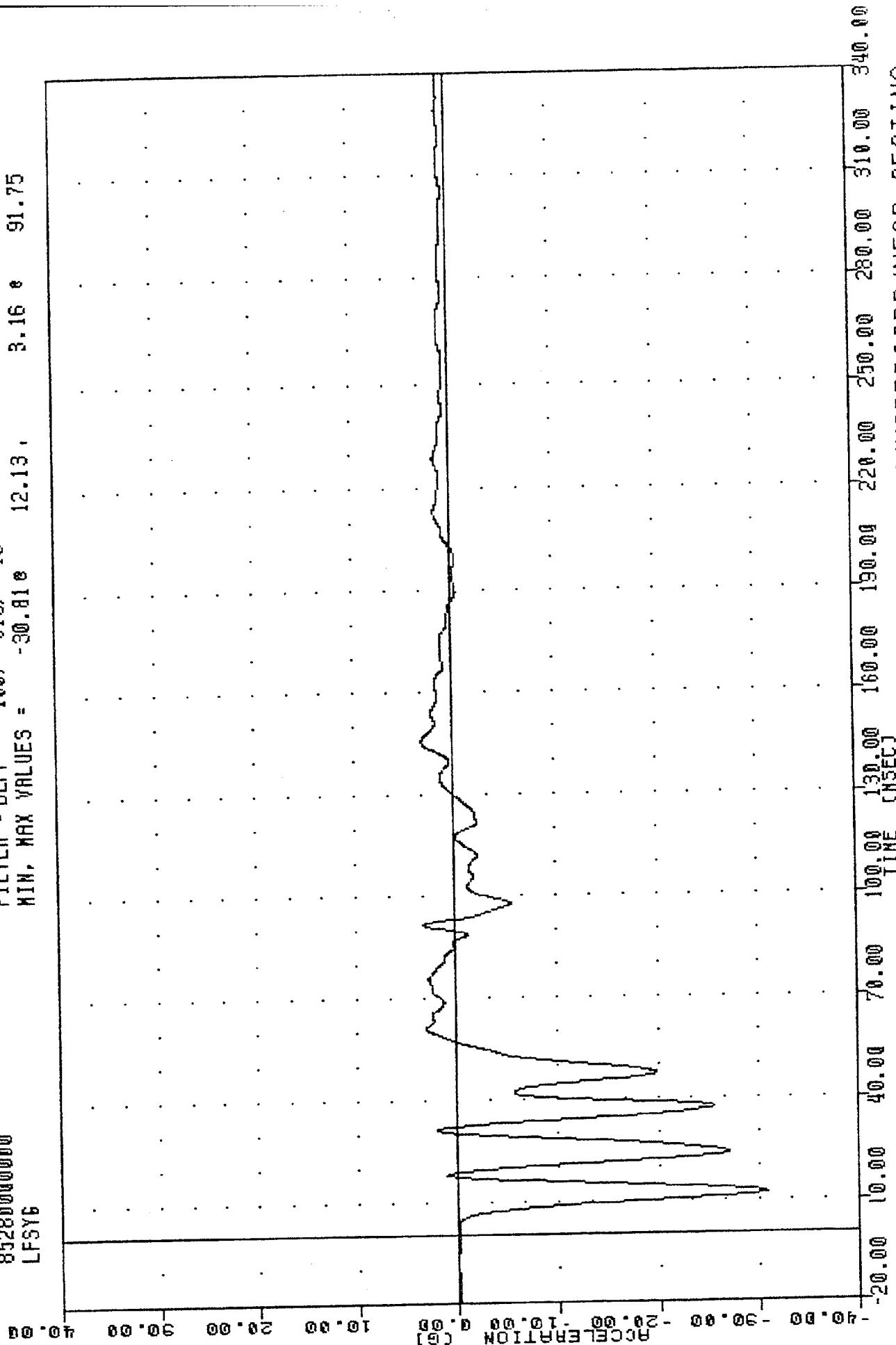
25. 33.6



TIME (MSEC)
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
VEHICLE LEFT FRONT SILL ACCELERATION X AXIS

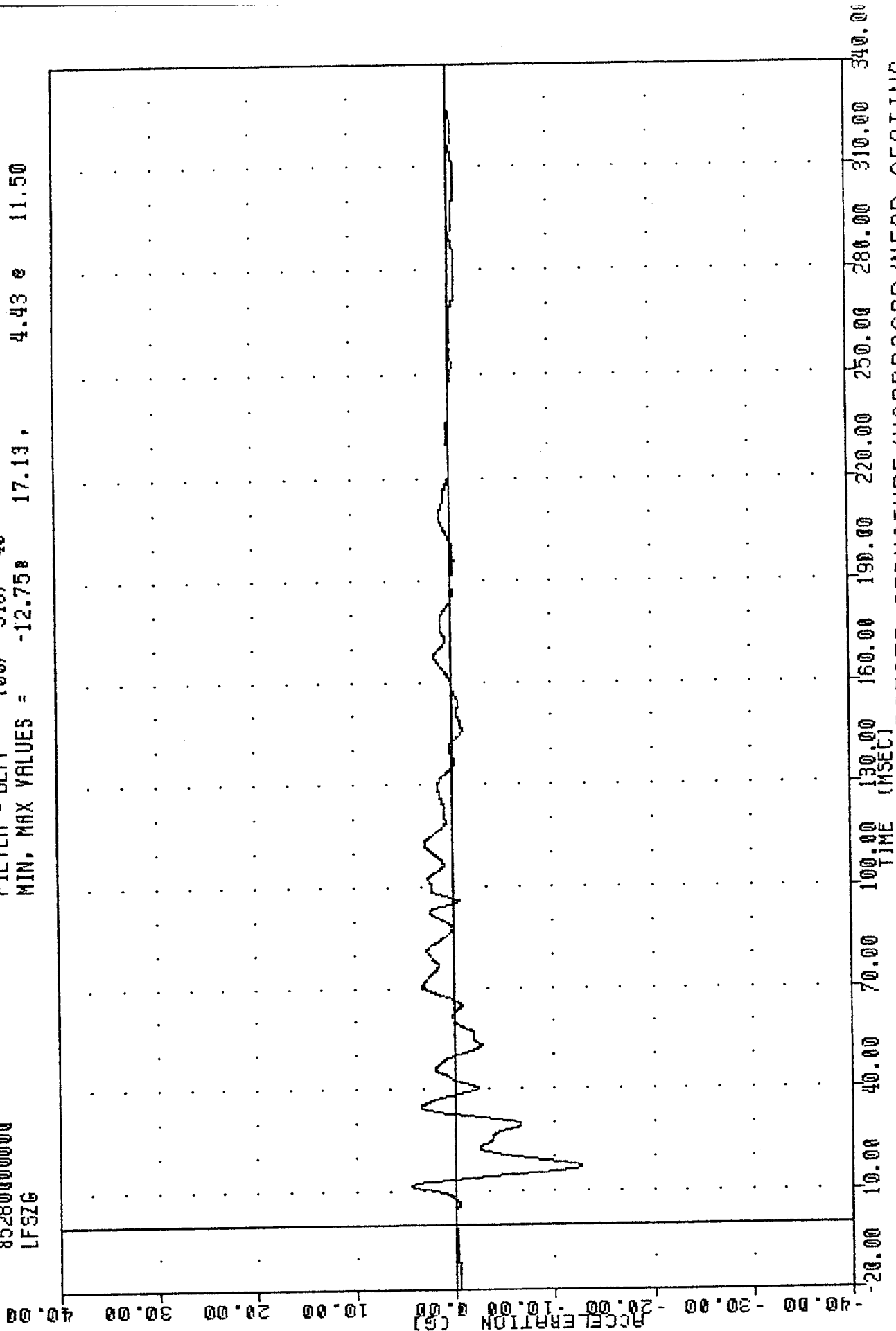
TRC 1007
 MYMA SIDE IMPACT TESTING
 85280000000
 LFSY6

PLATE 85280000000
 11:17:17
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -30.818 12.13 3.16 91.75



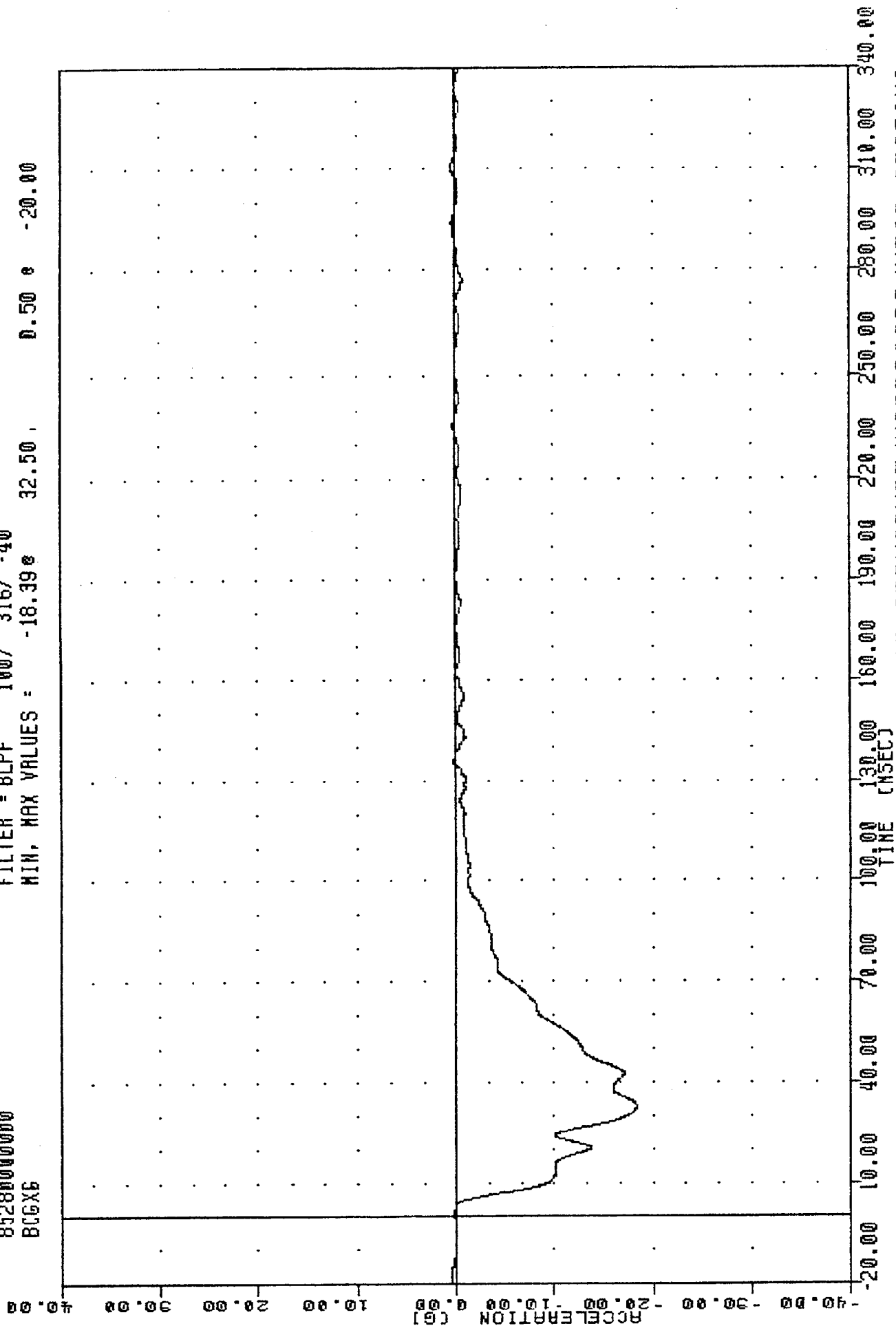
MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

100
 NVMA SIDE IMPACT TESTING
 852800000000
 LFSZG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -12.75 17.13, 4.43 e 11.50
 PLATE DATE 11/17/17



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

TIME, 00:00:00 PLATE 8 T-8 11/11/71
 MVMA SIDE IMPACT TESTING
 85280000000
 BCGX6
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -18.39e 32.50, 0.50 e -20.00



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

[illegible][illegible]

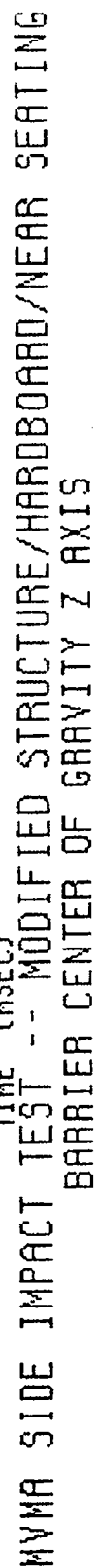
PLANNED DATE

PLANNED DATE

[illegible][illegible]

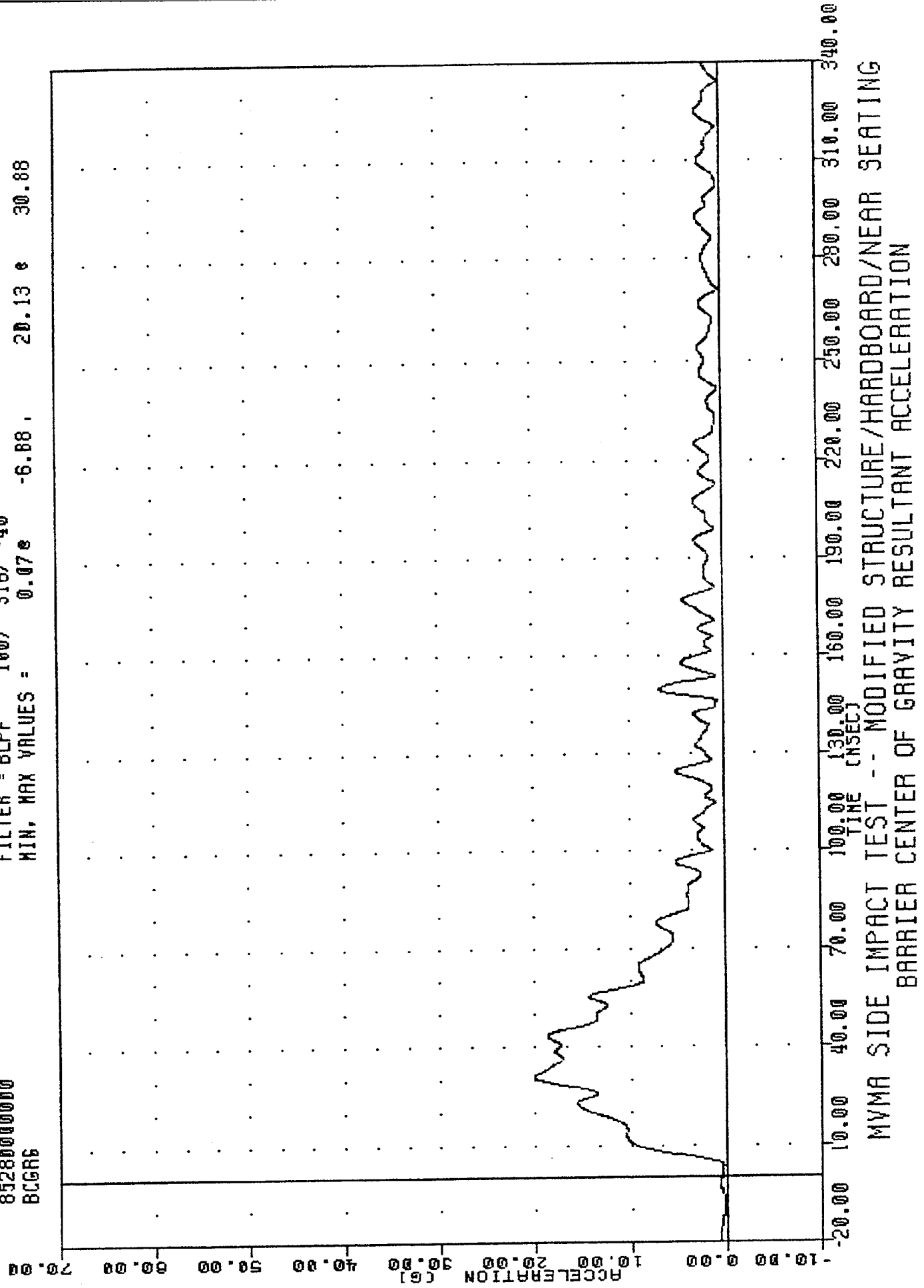
PLANNED DATE

30.38.	10.87	23.25
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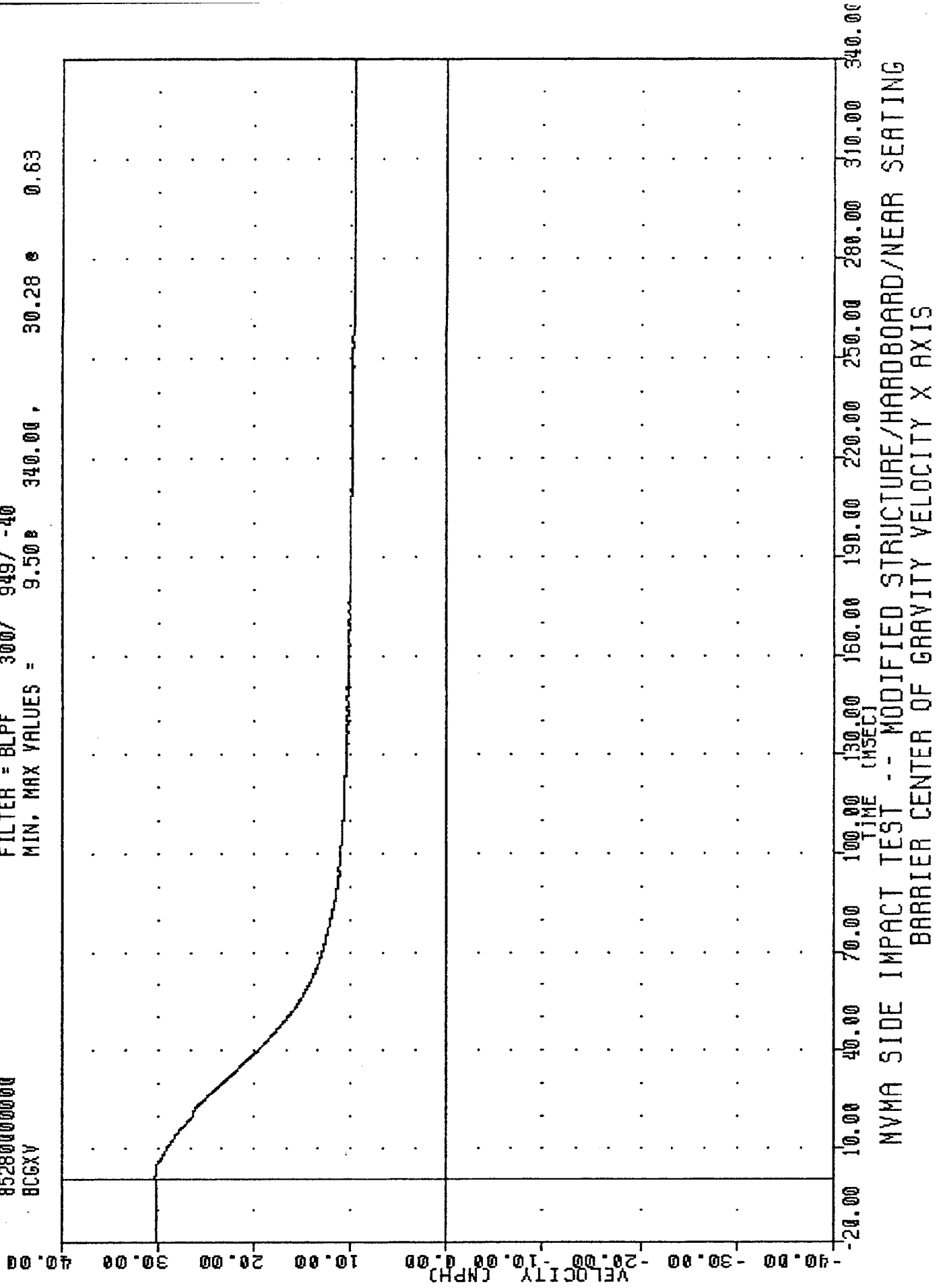
THE , 03100,
 MVMA SIDE IMPACT TESTING
 85280000000
 BCGRB

PLATE 8-8 7:12
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = 0.07e -6.88, 20.13 e 30.88



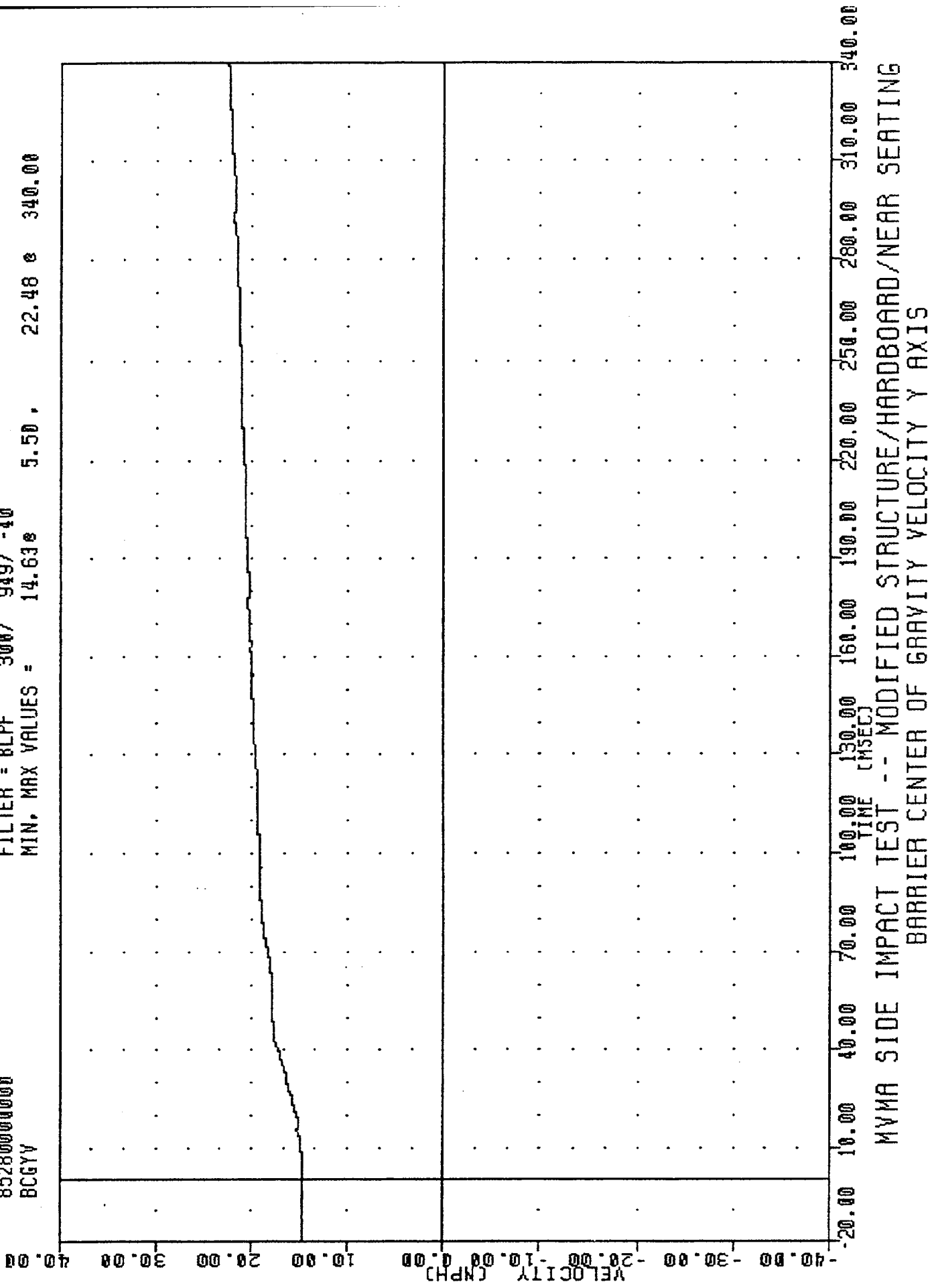
510
 NVMA SIDE IMPACT TESTING
 85280000000
 BCGXV

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 9.50 340.00, 30.28 0.63

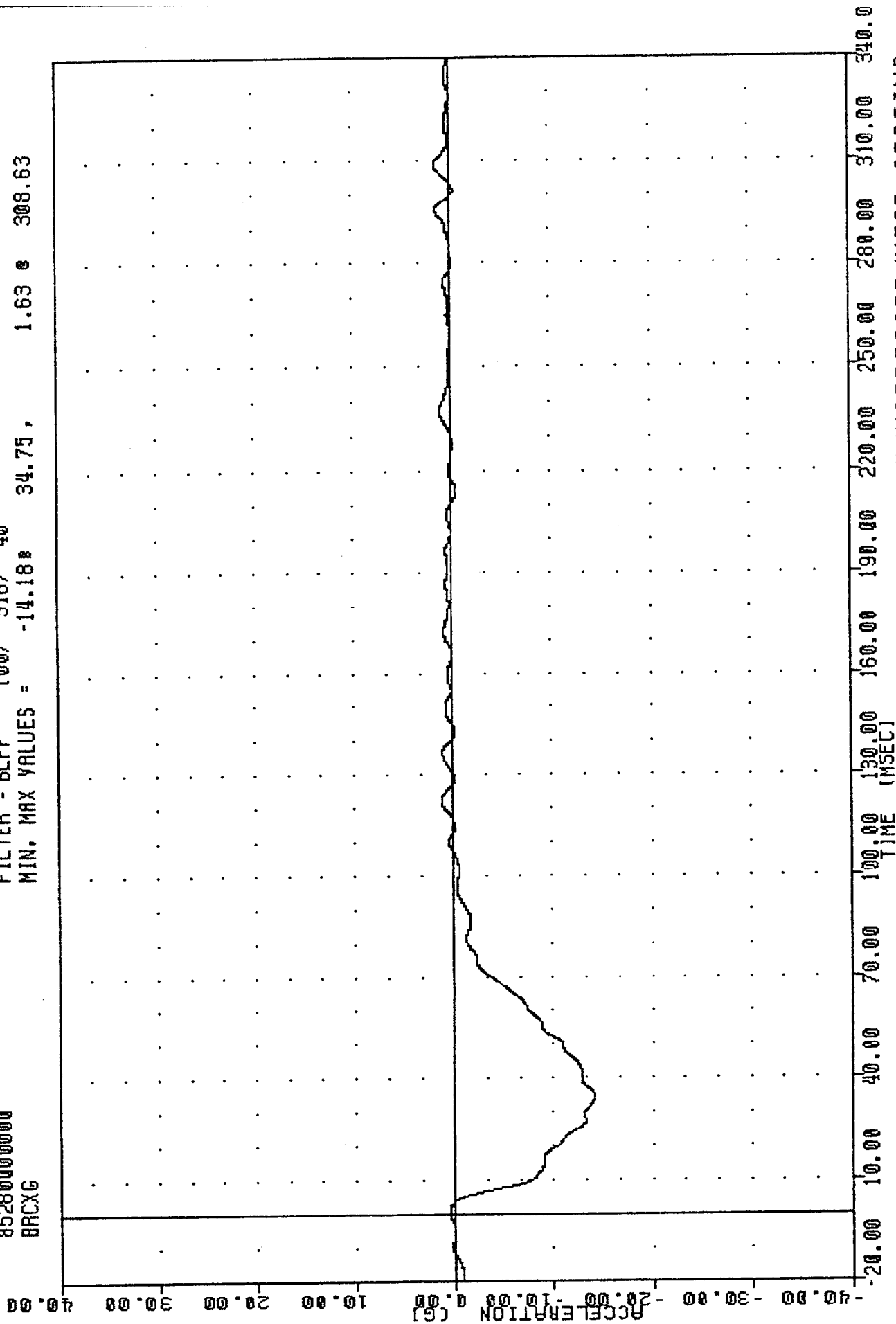


510
 MVMA SIDE IMPACT TESTING
 85280000000
 BCGYV

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 14.638 5.50, 22.48 @ 340.00

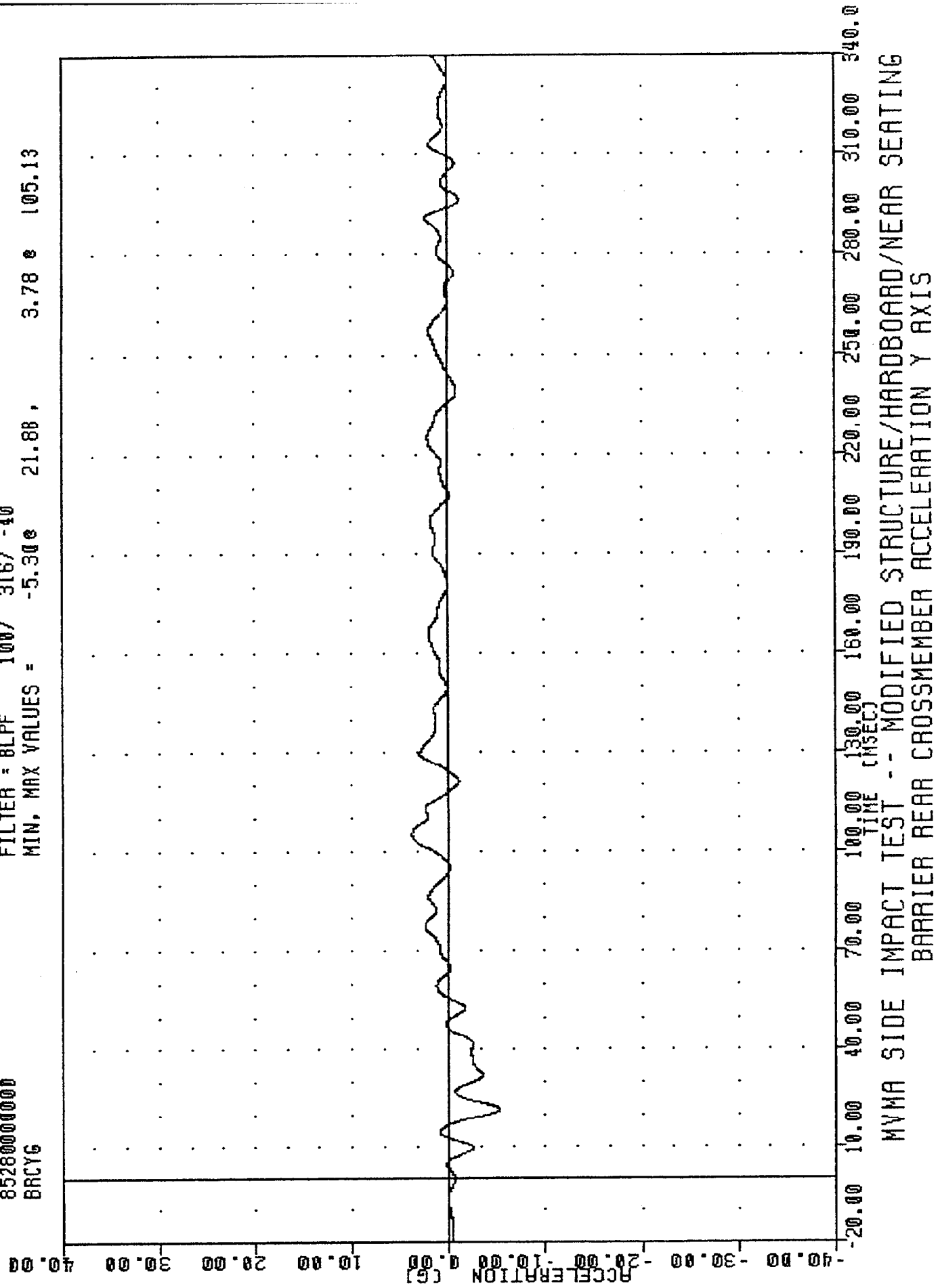


INC 051007
 NYMA SIDE IMPACT TESTING
 852800000000
 BRCXG
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -14.18 34.75, 1.63 308.63
 TEST DATE 17:00



NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
 BARRIER REAR CROSSMEMBER ACCELERATION X AXIS

510
 MYNA SIDE IMPACT TESTING
 852800000000
 BRCYG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -5.30e 21.88, 3.78 e 105.13



TAC

851007

PLUT DATE

0 OCT 83

14:15:53

MYMA SIDE IMPACT TESTING

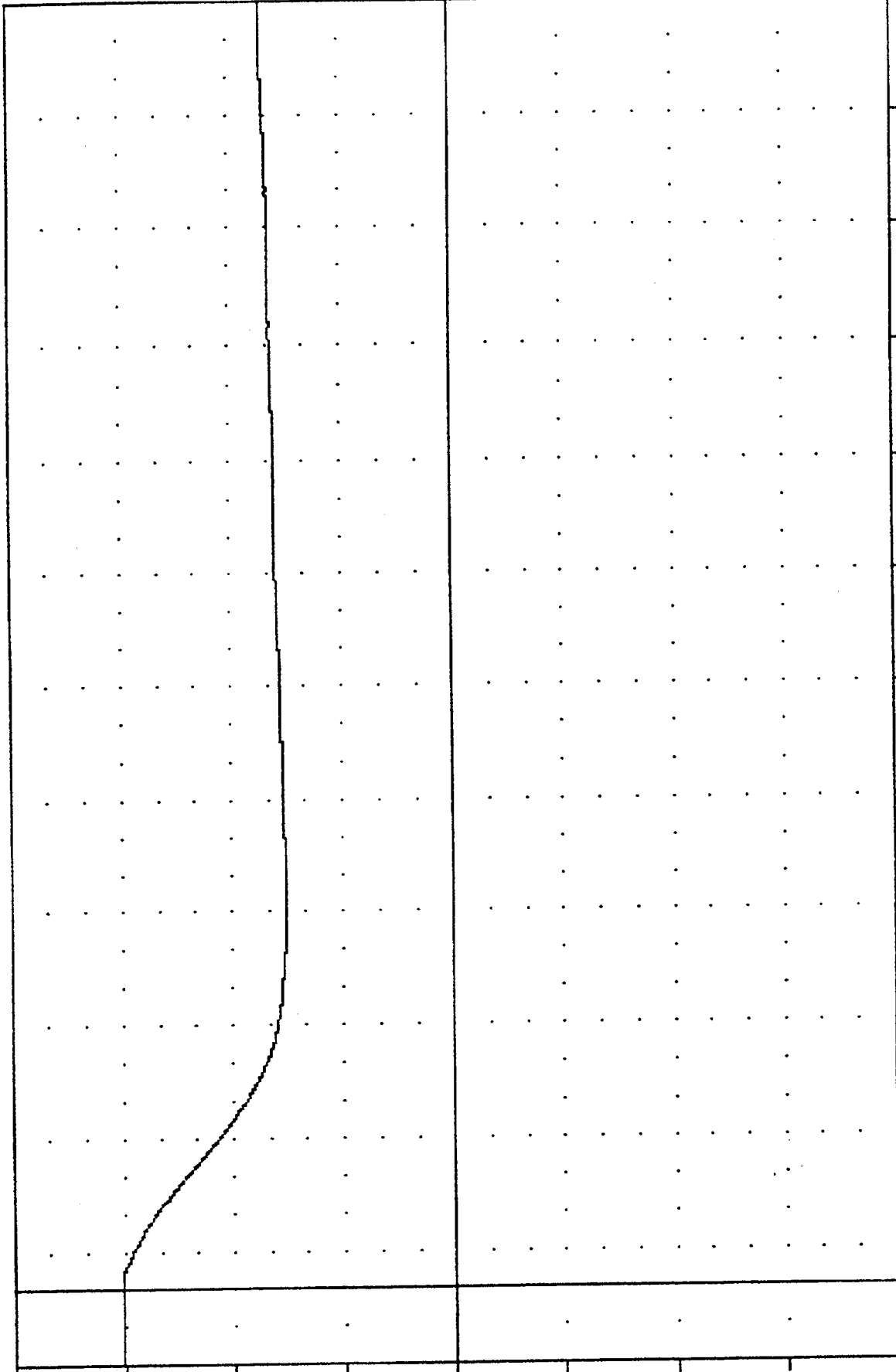
852800000000

BRXY

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = 15.07 104.75 30.23 2.38

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
VELOCITY (MPH)



-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)

MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
BARRIER REAR CROSSMEMBER VELOCITY X AXIS

NOV 05 1985 15:00

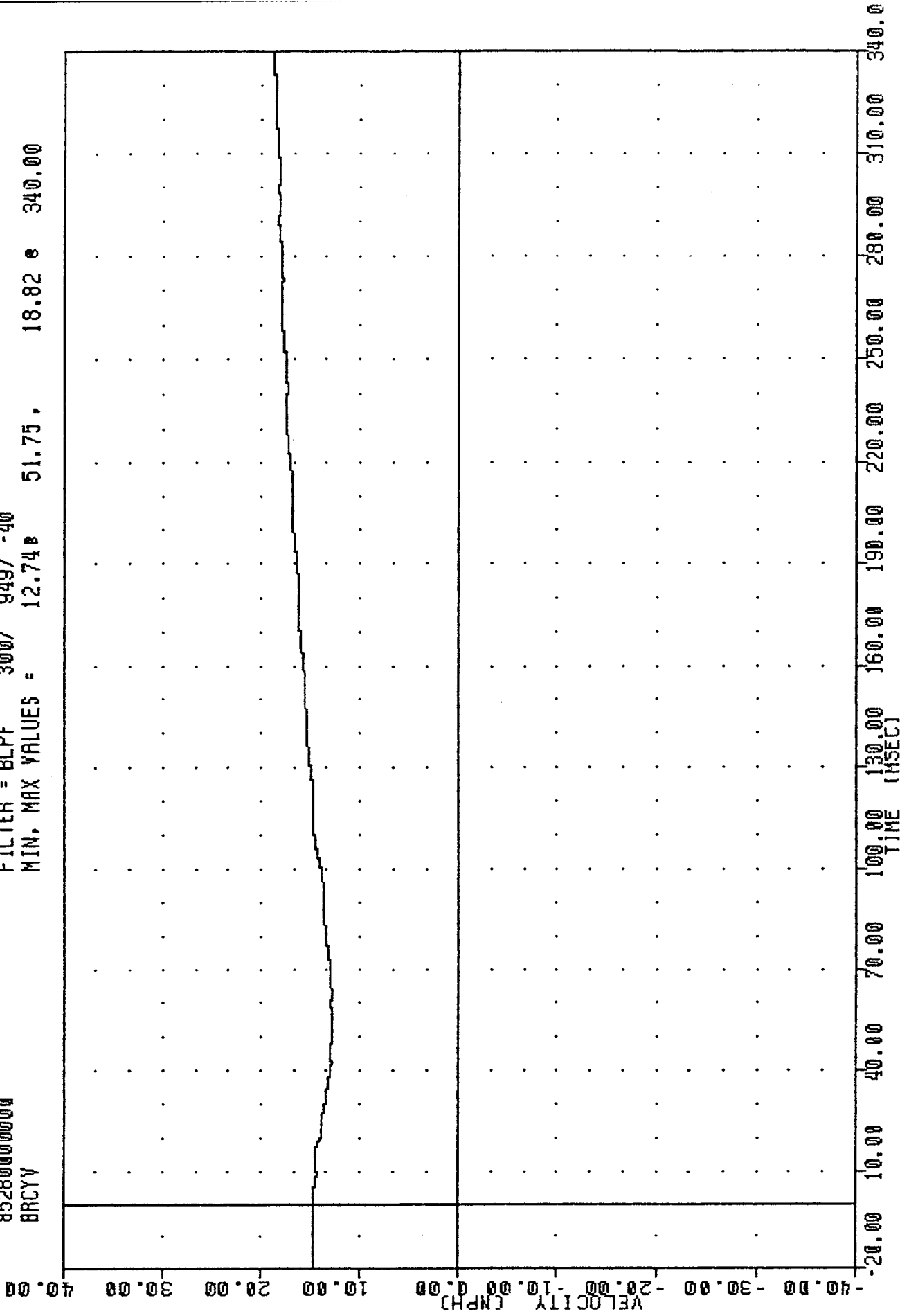
NYMA SIDE IMPACT TESTING

852800000000

BRCYV

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 12.74 51.75, 18.82 e 340.00



NYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/HARDBOARD/NEAR SEATING
BARRIER REAR CROSSMEMBER VELOCITY Y AXIS

APPENDIX B
DUMMY CERTIFICATION

PRE-TEST

SIDE IMPACT DUMMY CALIBRATION

SIDE IMPACT DUMMY CALIBRATION
DUMMY SERIAL NUMBER 016
CALIBRATION 07

TEST/ DATE	CHANNEL	FILTER CLASS	PEAK ACCELERATION (g)	
			SPECIFICATION*	TEST RESULT
HEAD 10/3/85	HEAD Y-AXIS	1000	150-175	160.13
THORAX 10/4/85	UPPER SPINE Y-AXIS			
	PRIMARY	180	16-24.6	23.10
	REDUNDANT	180	16-24.6	22.80
	LOWER SPINE Y-AXIS			
	PRIMARY	180	17.6-26.4	22.55
	REDUNDANT	180	17.6-26.4	22.86
	RIGHT UPPER RIB Y-AXIS			
	PRIMARY	180	36-50	43.16
	REDUNDANT	180	36-50	43.83
	RIGHT LOWER RIB Y-AXIS			
	PRIMARY	180	36-50	40.74
	REDUNDANT	180	36-50	41.16
PELVIS 10/3/85	PELVIS Y-AXIS	180	50-65	43.90

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

Side Impact Dummy
Damage Checklist

Dummy S/N 016

<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>**</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> </u>	<u> </u>	Thorax support wire and springs - check for damage
<u> </u>	<u> </u>	Overall smooth stroking of thorax left to right (no interference)
<u> </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:

Ribs have mild bend on RH side. ** Rib attach material has small cut on
both sides upper.

TRC Personnel

Checked By:

Gregg Will
Signature

2 Oct 75
Date

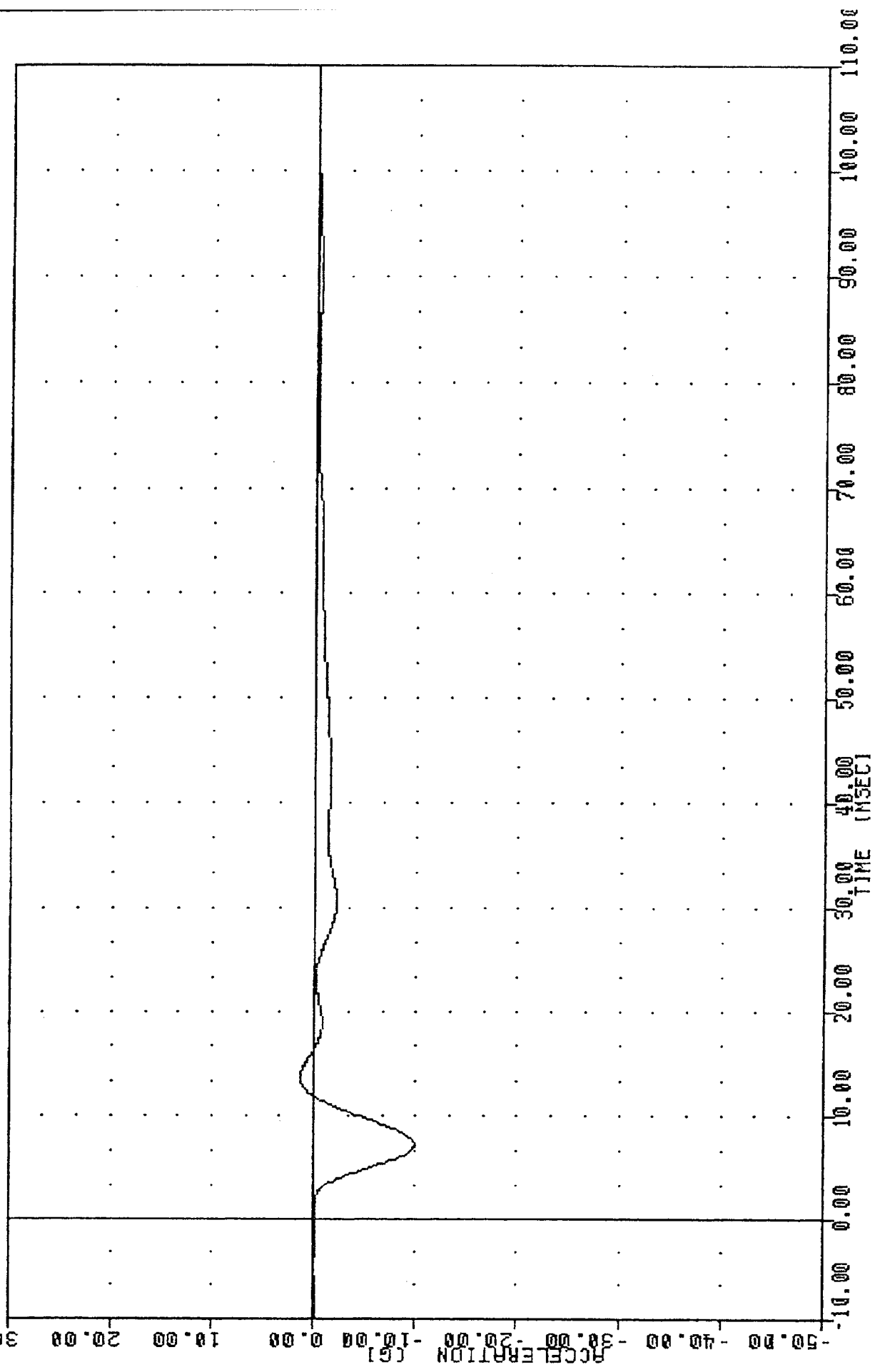
VRTC Personnel

Checked and Approved for Testing By:

Signature

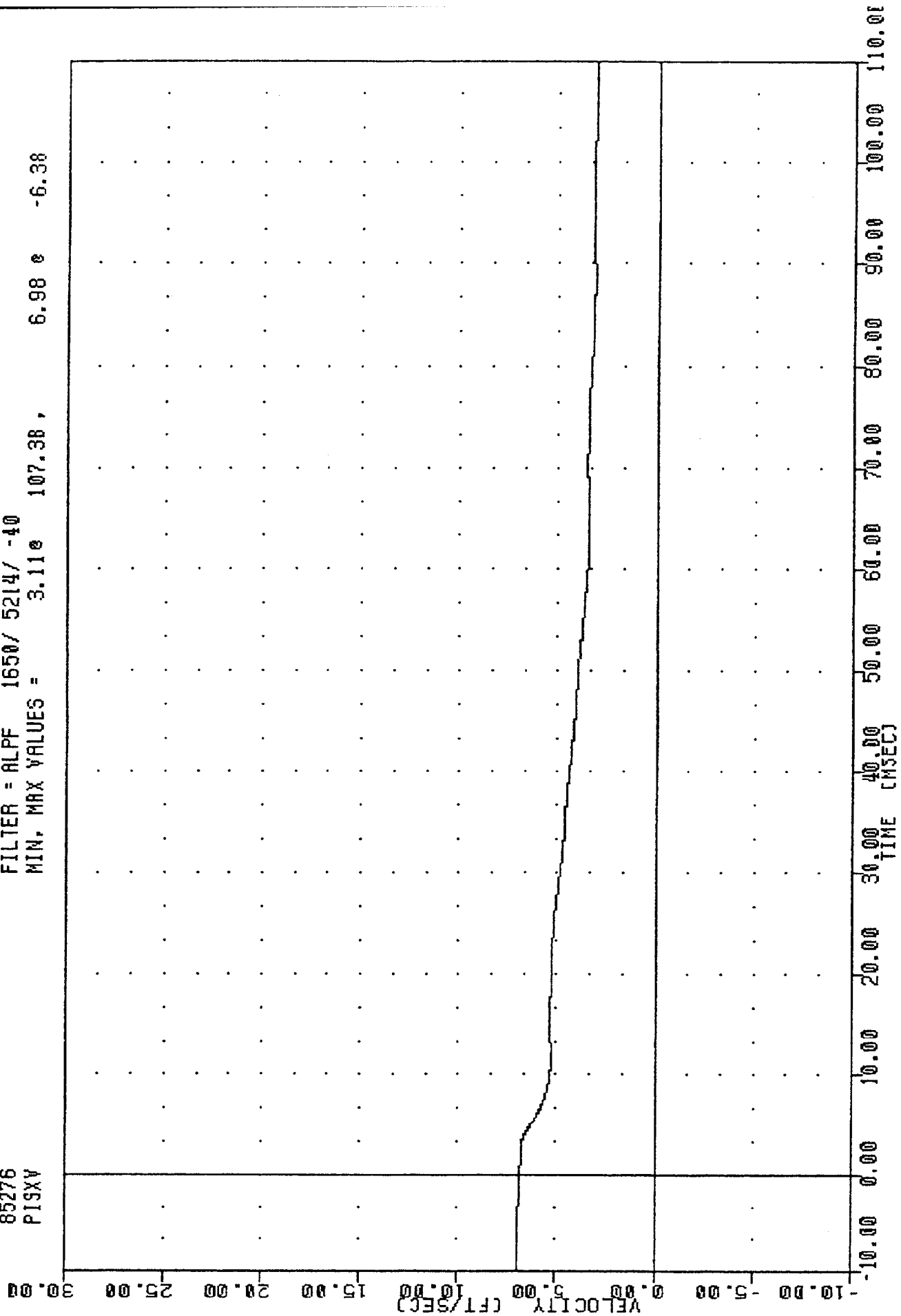
Date
B-4

85276
 SID 016 HEAD IMPACT CAL 07
 PISXG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -9.87e 7.25, 1.29 e 13.63
 PLOT DATE 11-OCT-83 10:11:13



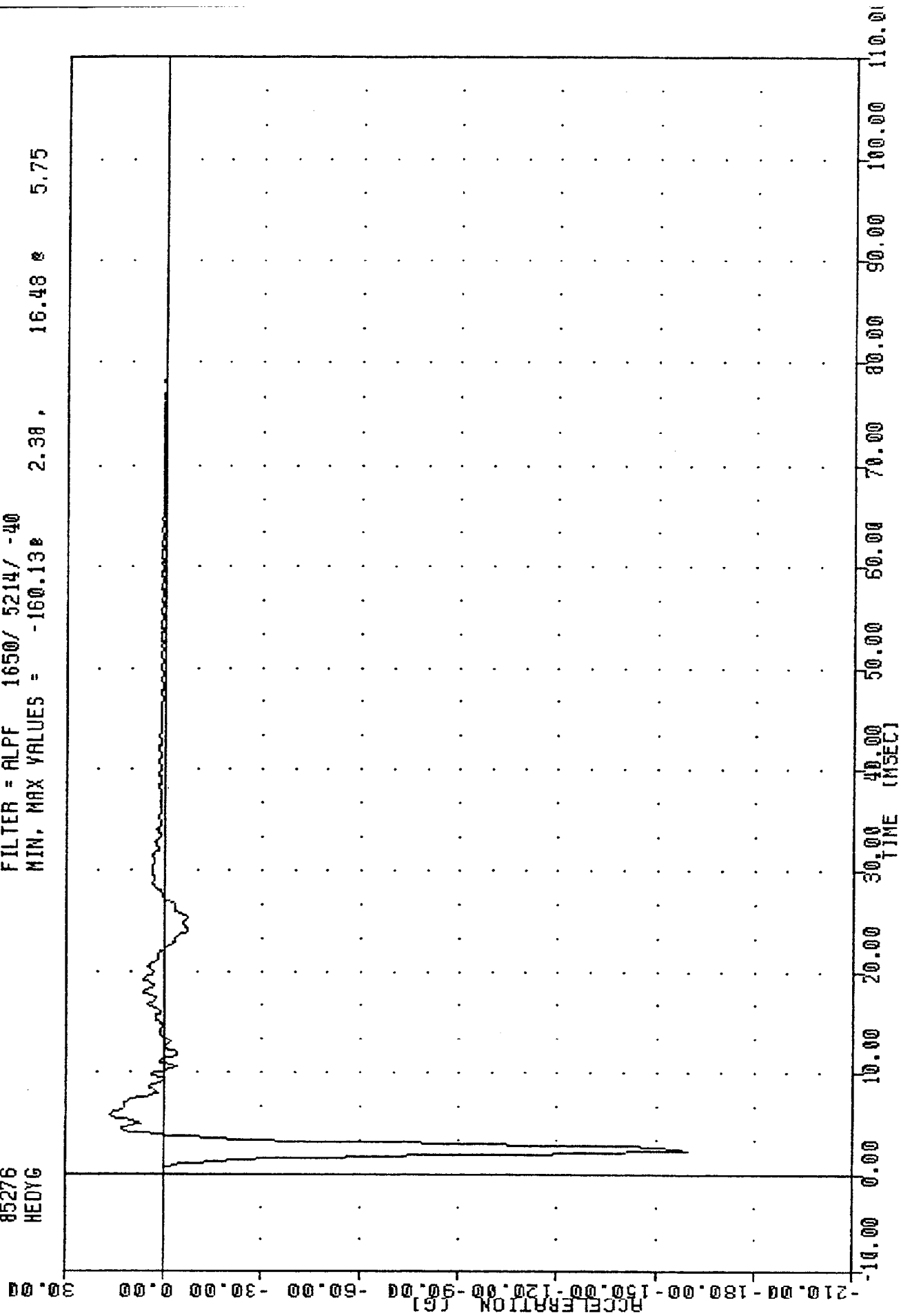
PISTON ACCELERATION

HYMN
 SID 016 HEAD IMPACT CAL 07
 85276
 PISXV
 PLOT DATE 11 OCT 83 10:11:13
 FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 3.11e 107.38, 6.98 e -6.38



PISTON VELOCITY

NVMA
 SID 016 HEAD IMPACT CAL 07
 85276
 HEDYG
 SH01507
 PLUT DATE 11-OCT-85 10:11:13
 FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -160.13 2.38 , 16.48 5.75



HEAD ACCELERATION Y AXIS

73101007 13 OCT 83 0318:53

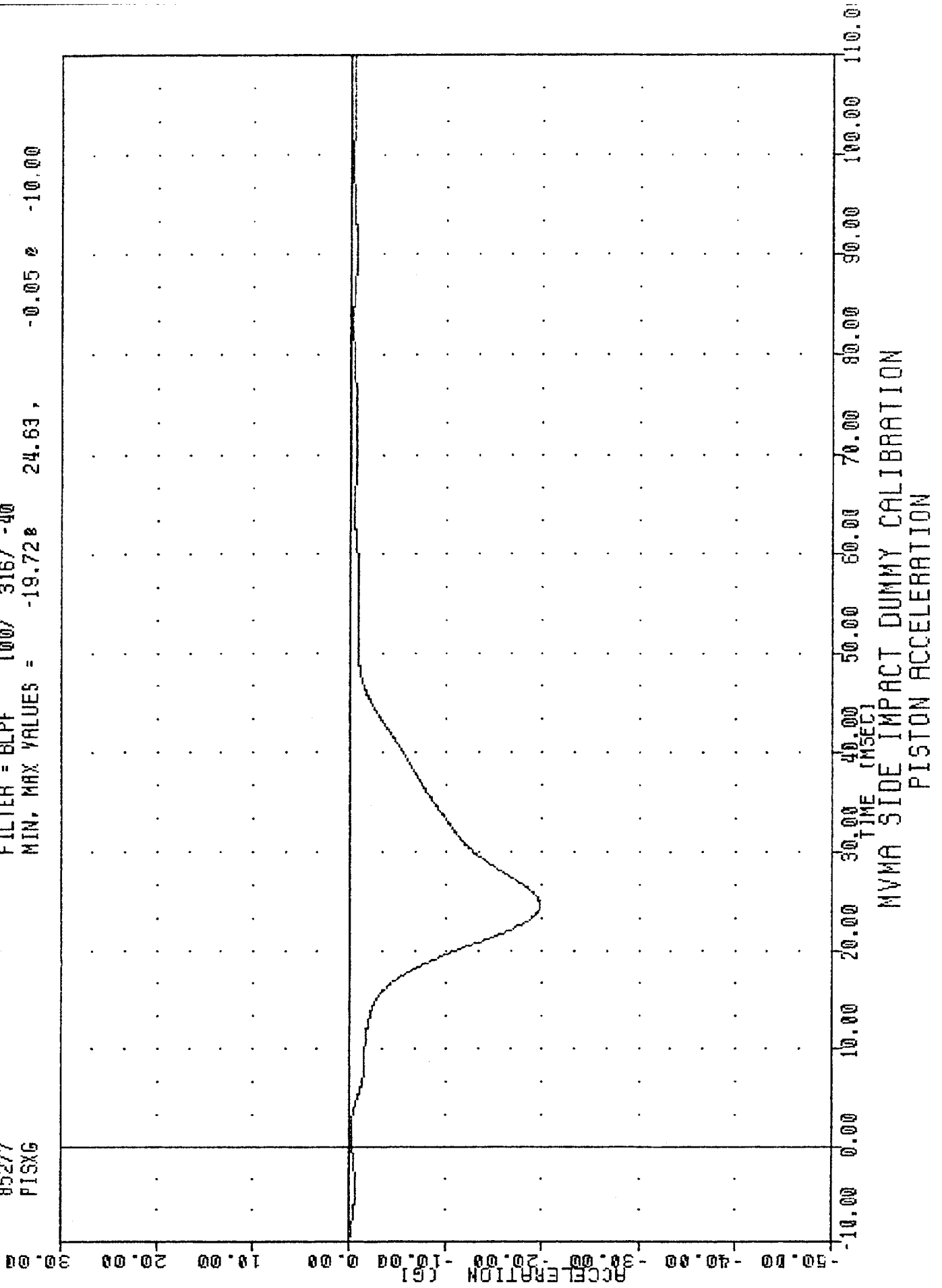
SID 016 THORAX IMPACT CAL 07

85277

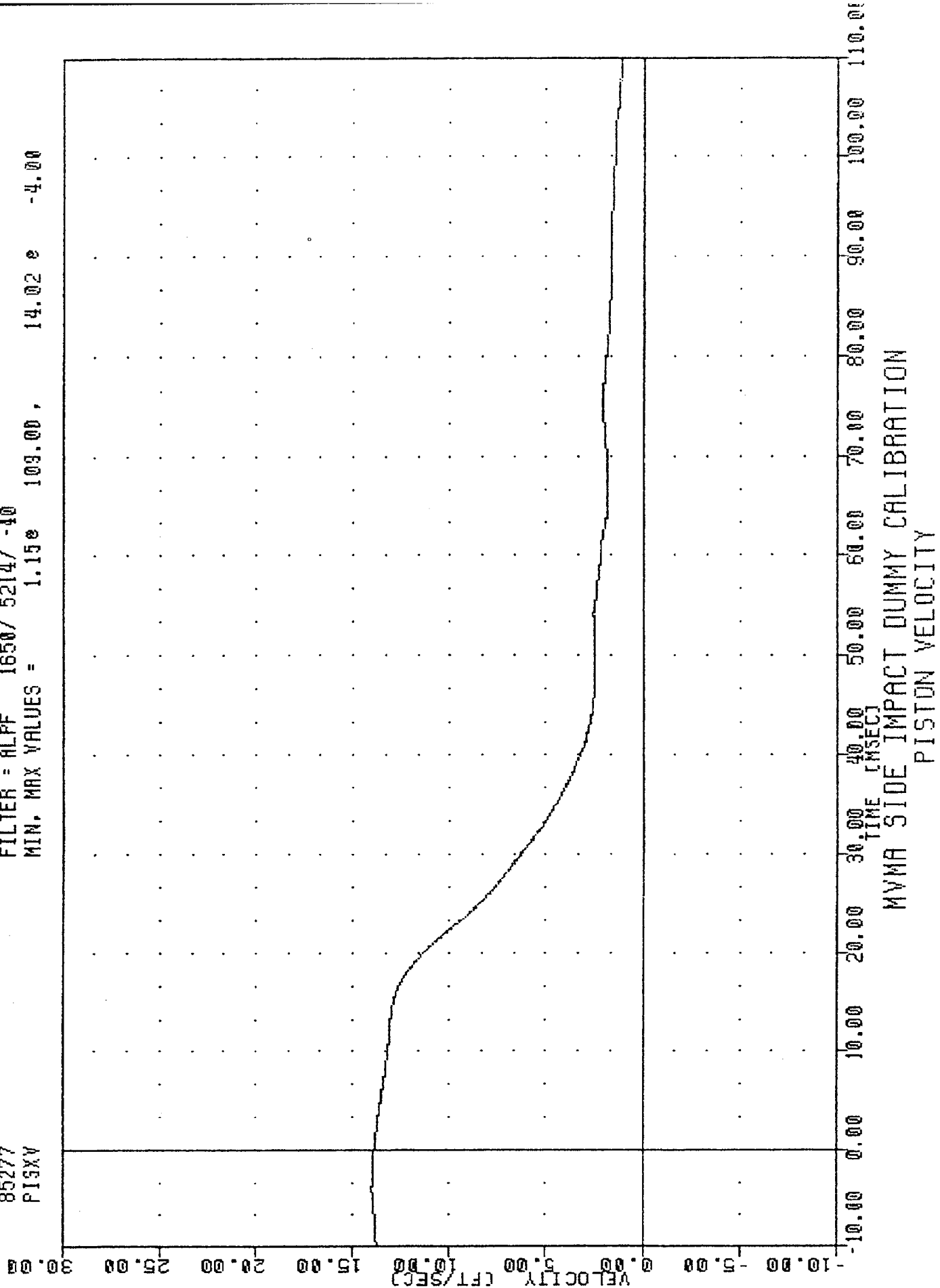
FILTER = BLPF 100/ 316/ -40

PISXG

MIN. MAX VALUES = -19.728 24.63, -0.052 -10.00



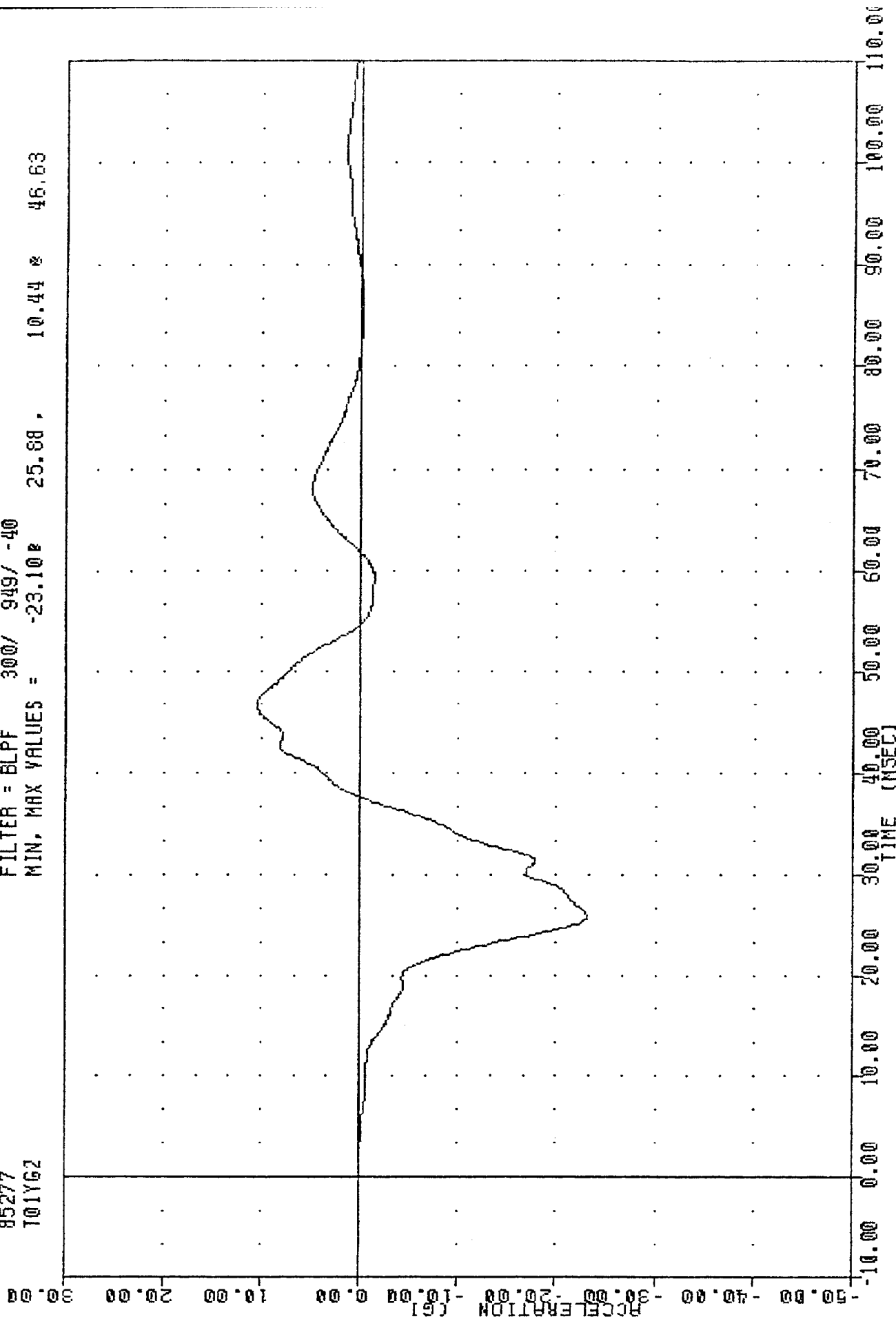
MWMA 3101007
 SID 016 THORAX IMPACT CAL 07
 85277
 PISXV
 FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 1.15e 103.00, 14.02 e -4.00
 PLOT DATE 4 OCT 83 03:18:33



NVMA
 SID 016 THORAX IMPACT CAL 07
 85277
 T01Y62

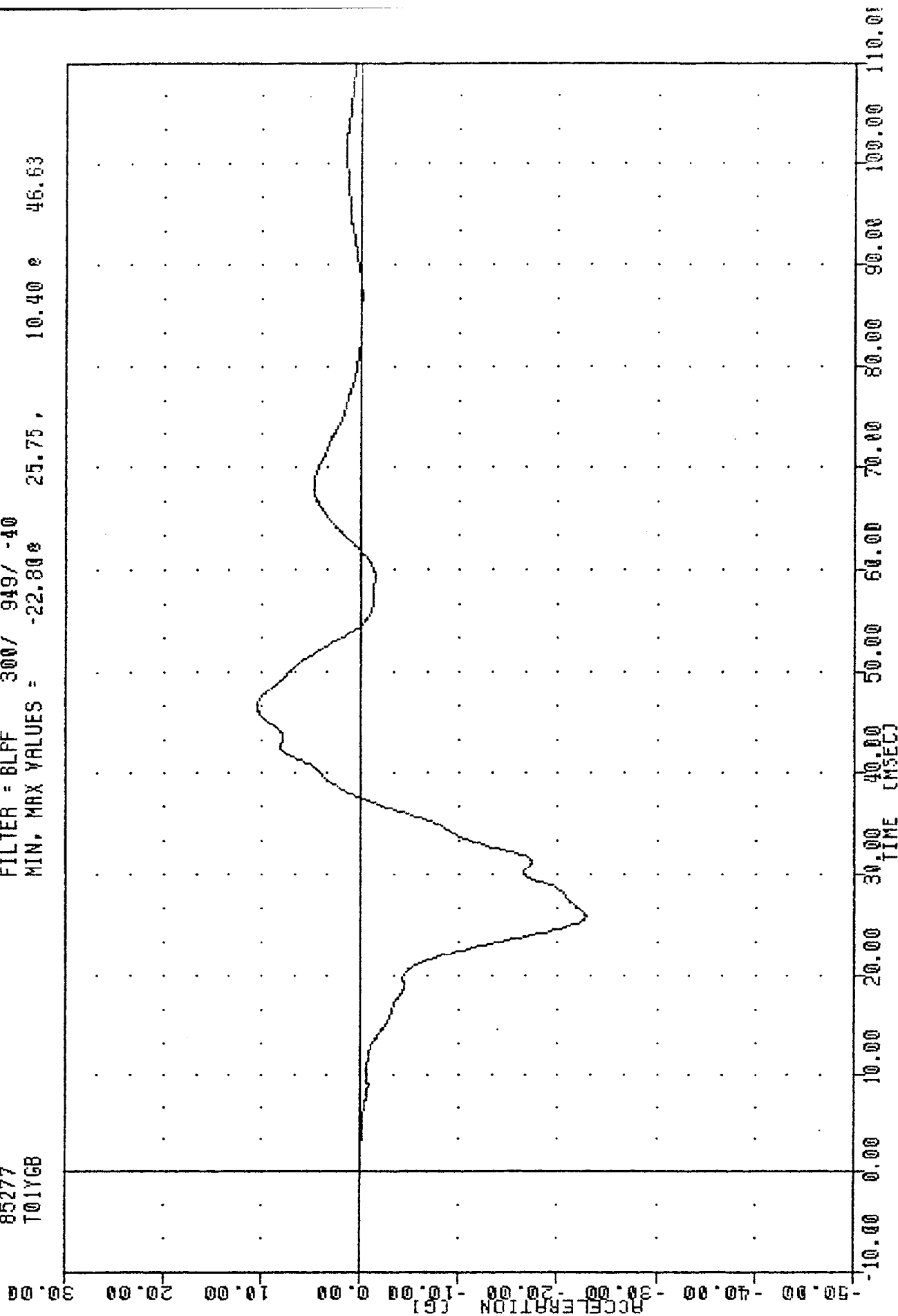
PLOT DATE 4 OCT 03 05:18:33

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -23.10 25.68 , 10.44 46.63



NVMA SIDE IMPACT DUMMY CALIBRATION
 UPPER SPINE ACCELERATION Y AXIS -PRIMARY

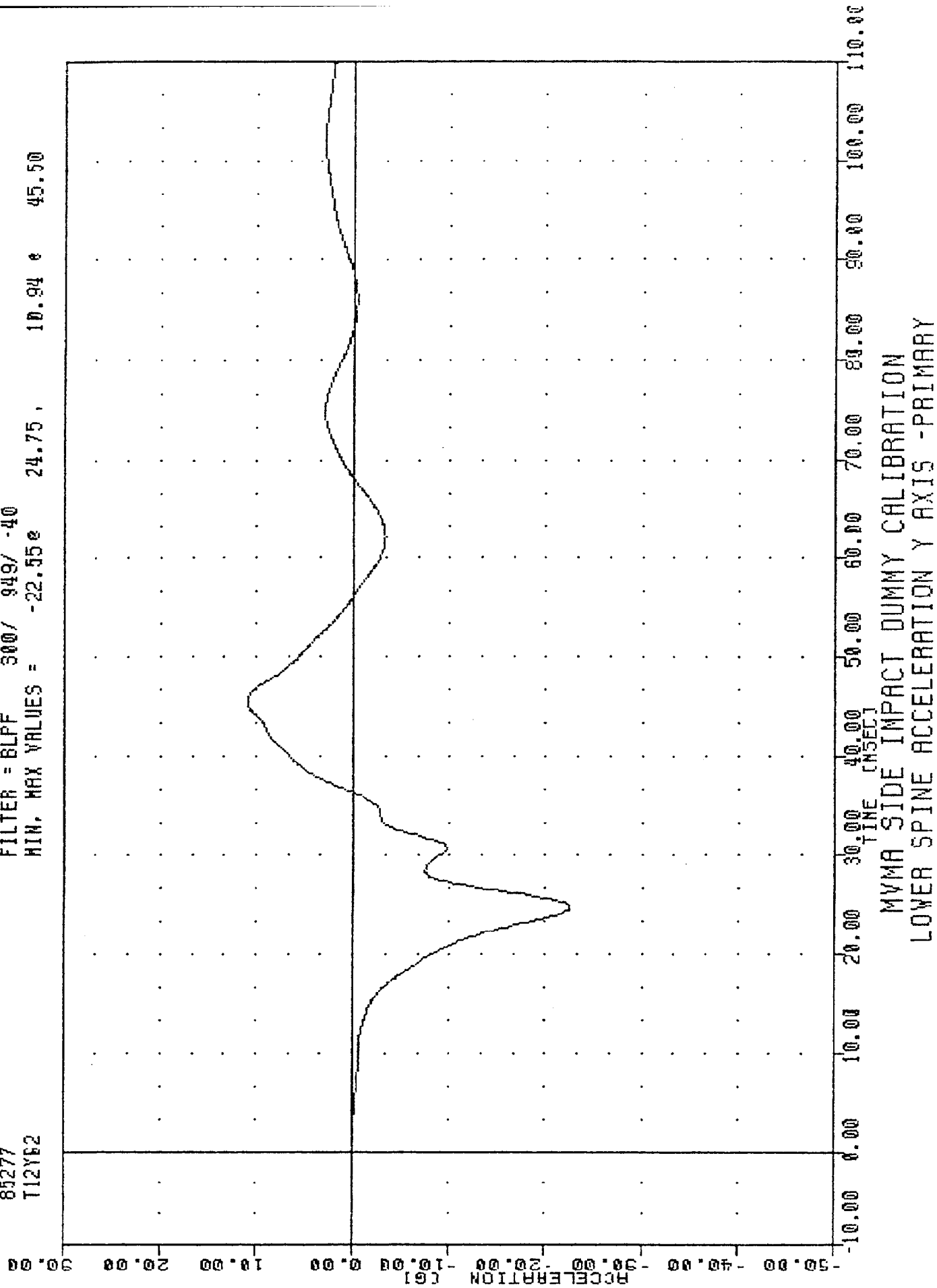
MVMA 73101007
 SID 016 THORAX IMPACT CAL 07
 85277
 T01YGB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -22.80g 25.75, 10.40 e 46.63
 PEUT DRYE 4 OCT 83 09:18:33



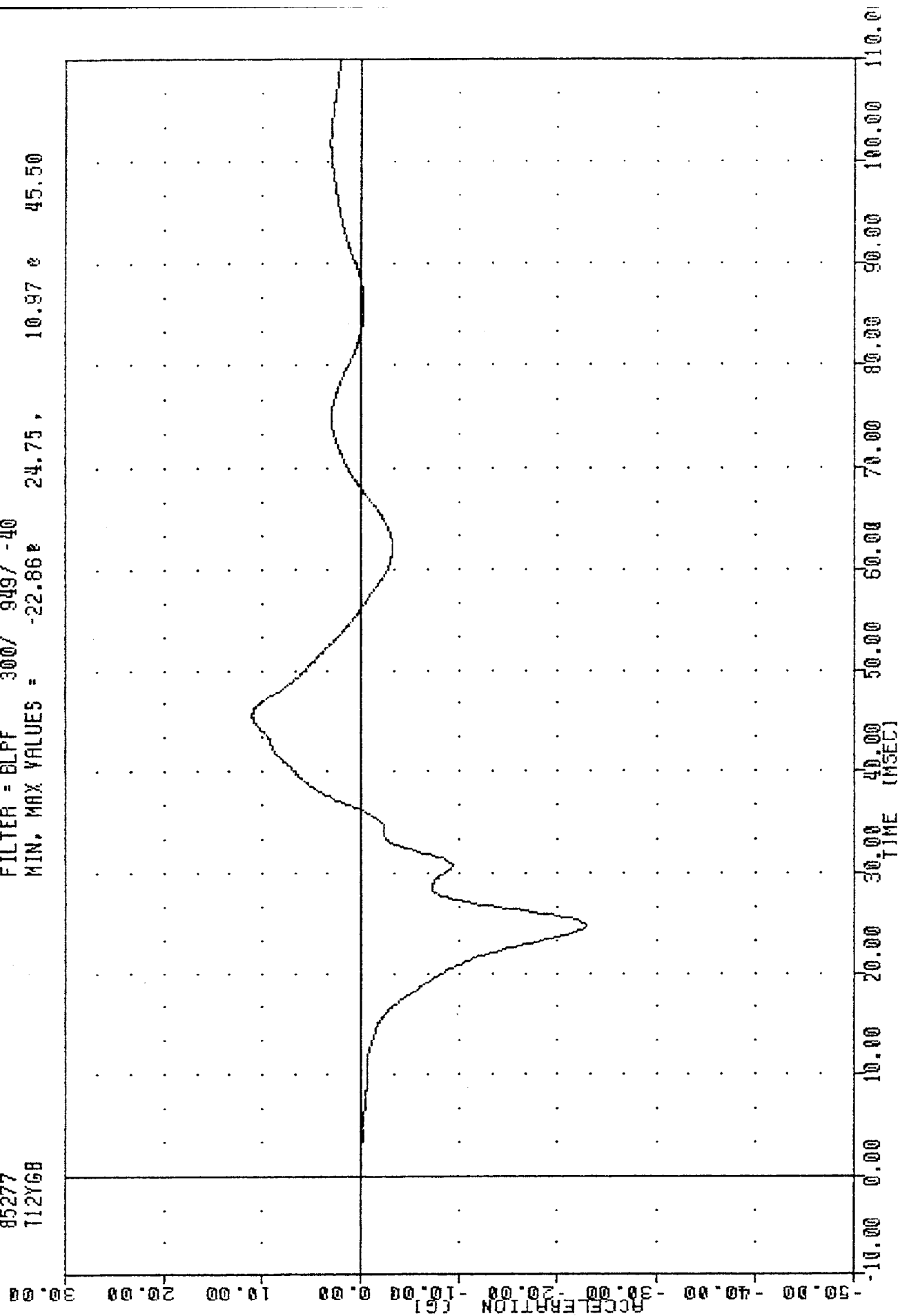
MVMA SIDE IMPACT DUMMY CALIBRATION
 UPPER SPINE ACCELERATION Y AXIS -REDUNDANT

PLUT DATE 4 OCT 83 03:18:53
SID 016 THORAX IMPACT CAL 07
85277
T12YE2

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -22.55e 24.75, 10.94 e 45.50

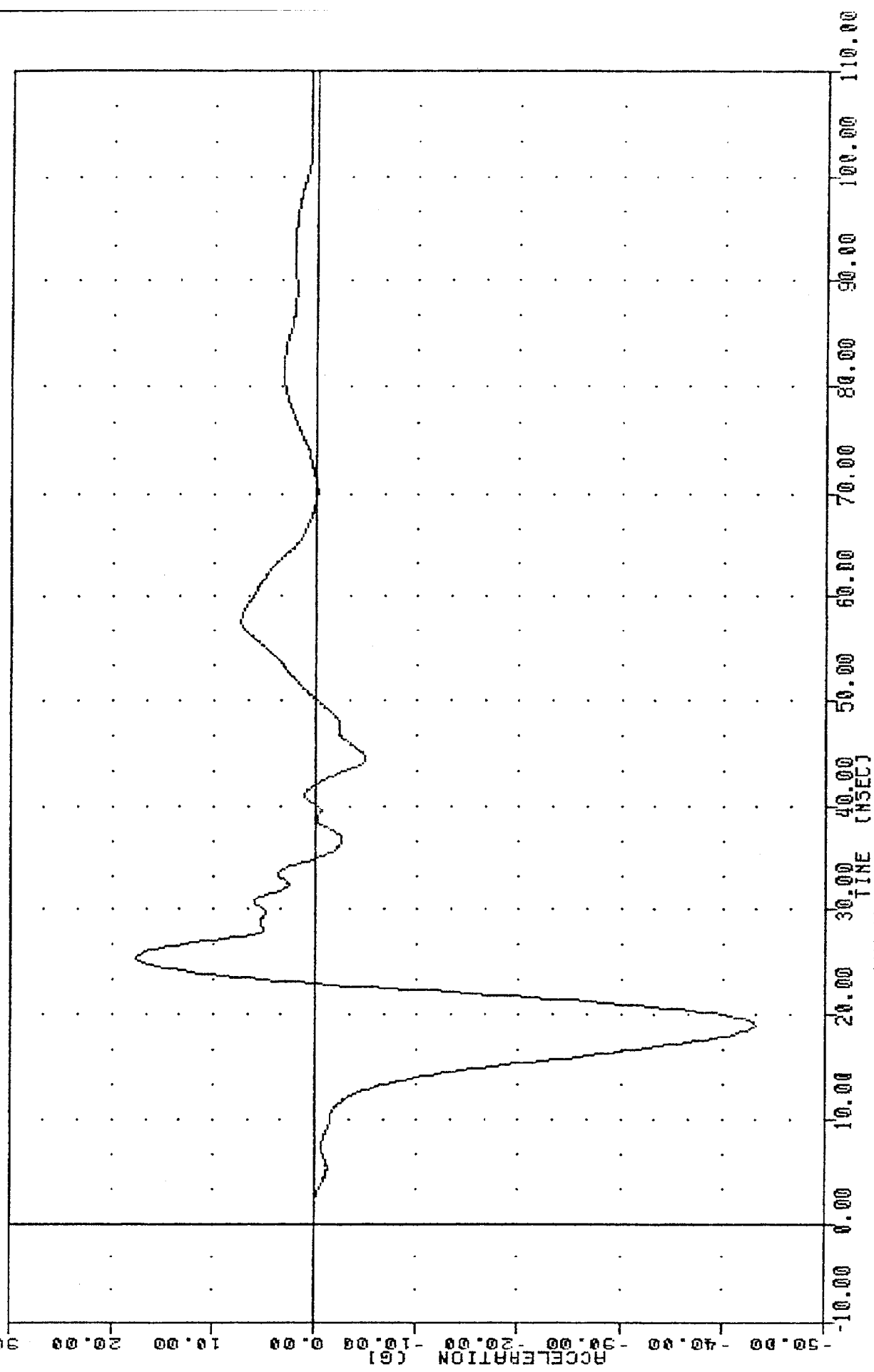


MVMA 3101507
 SID 016 THORAX IMPACT CAL 07
 85277
 112YGB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -22.86 24.75, 10.97 45.50
 PLOT DATE 4-OCT-85 09:18:33



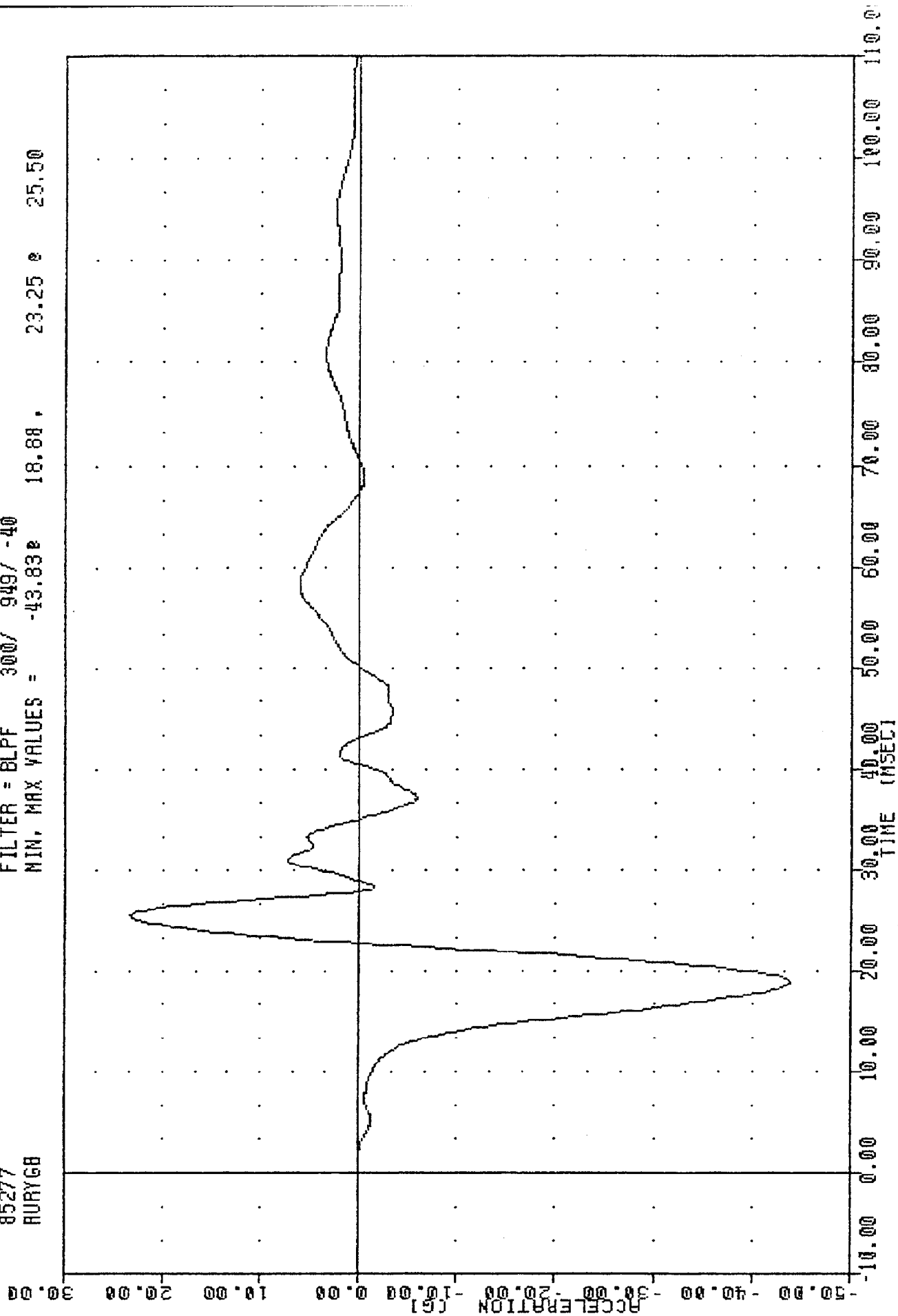
MVMA SIDE IMPACT DUMMY CALIBRATION
 LOWER SPINE ACCELERATION Y AXIS -REDUNDANT

101007 18:53
 SID 016 THORAX IMPACT CAL 07
 85277
 RURY62
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -43.15 19.00 17.63 25.38



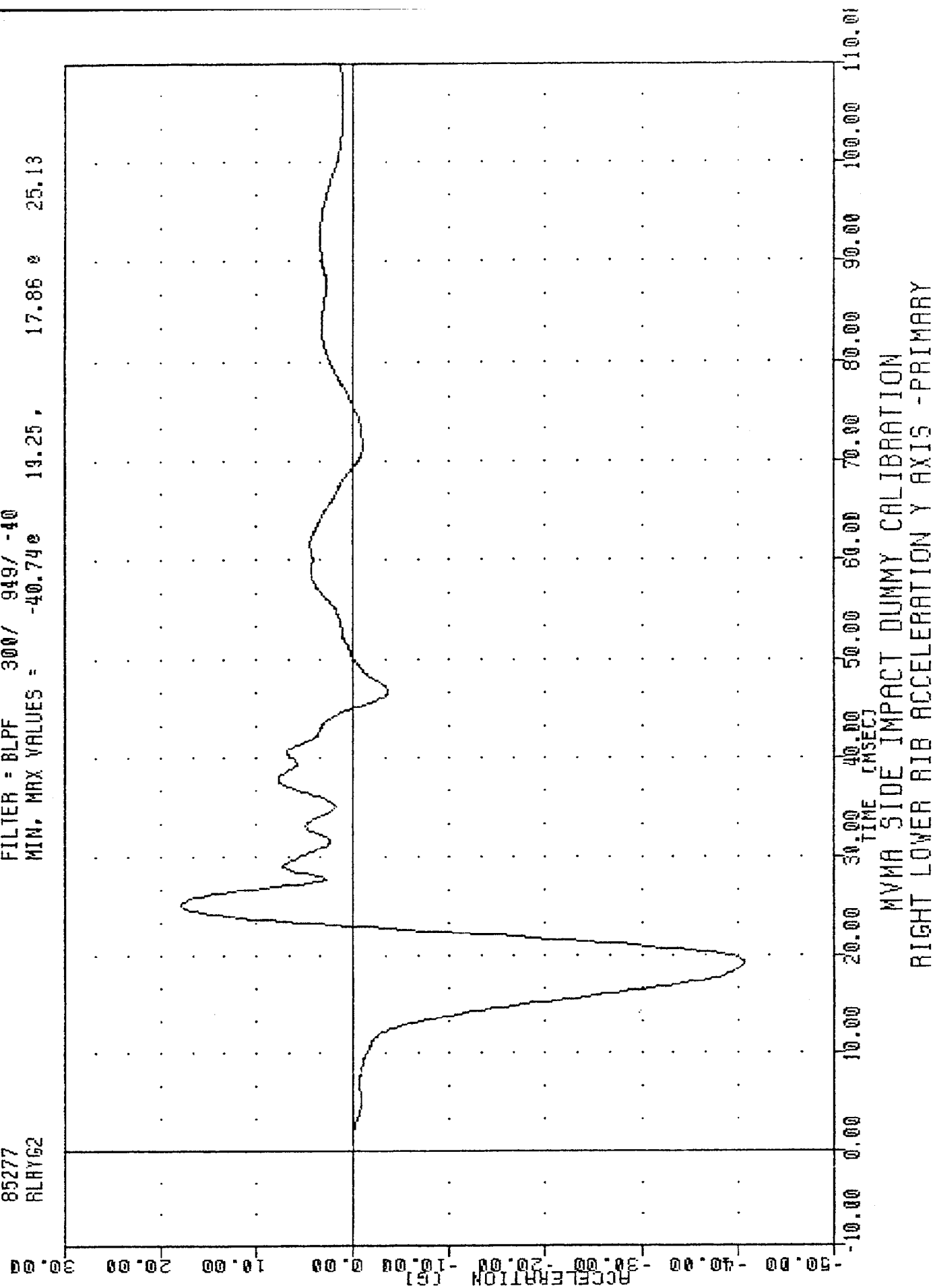
MVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT UPPER RIB ACCELERATION Y AXIS -PRIMARY

MVMA
 SID 016 THORAX IMPACT CAL 07
 85277
 RURYGB
 FLUT DATE 4-OCT-85 09:18:33
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -43.83 18.88 , 23.25 25.50

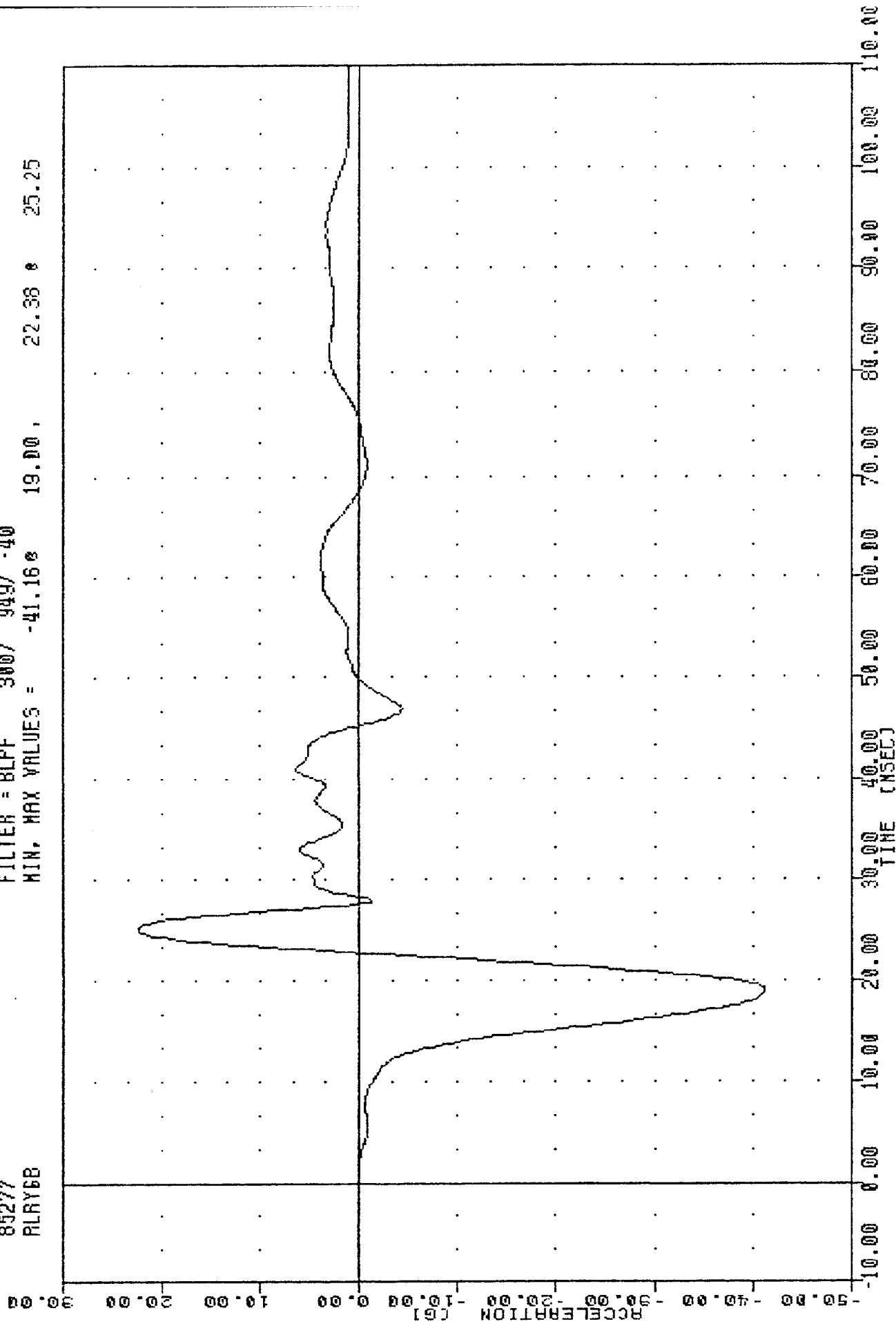


MVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT UPPER RIB ACCELERATION Y AXIS -REDUNDANT

MVNA
 SID 016 THORAX IMPACT CAL 07
 85277
 RLAY62
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -40.74e 13.25, 17.86 e 25.13
 PLOT DATE 03-18-83

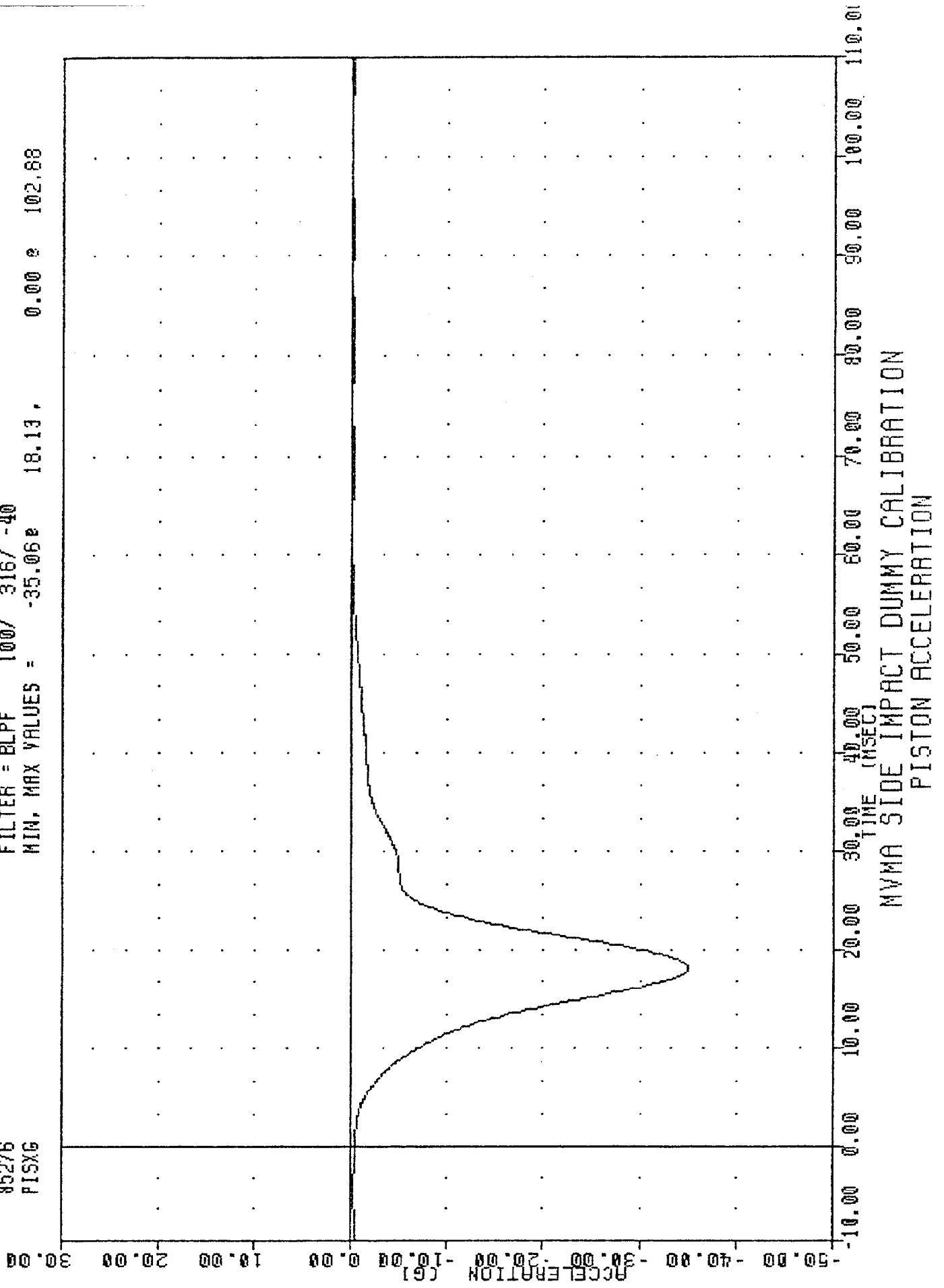


MVMA 5101607
 SID 016 THORAX IMPACT CAL 07
 85277
 RLY6B
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -41.16 19.00, 22.38 25.25
 4-OCT-83 09:18:33

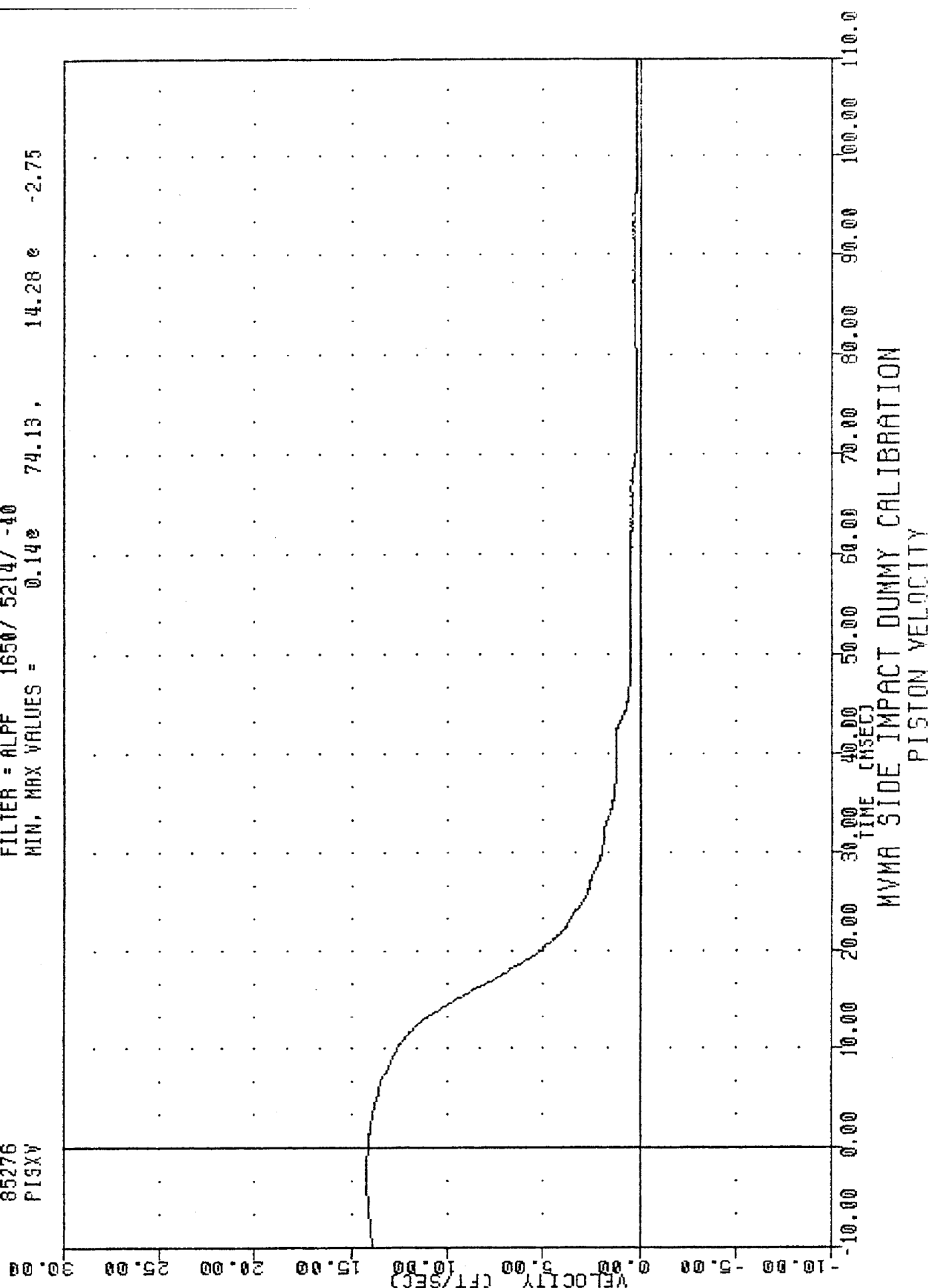


MVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT LOWER RIB ACCELERATION Y AXIS - REDUNDANT

NVMA
 SID 016 PELVIC IMPACT CAL 07
 85276
 PISXG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -35.06e 18.13, 0.00 e 102.88
 PLOT DATE 3-OCT-83 16:02:33



MVNA
 SP01507
 SID 016 PELVIC IMPACT CAL 07
 85276
 PISXY
 PLOT DATE 3-OCT-85 16:02:33
 FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.14e 74.13, 14.28 e -2.75



MVMA SP01607
 SID 016 PELVIC IMPACT CAL 07
 85276
 PEVYB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -43.90e 14.38 5.26 e 28.13
 PLOT DATE 3-OCT-85 16:02:33

