V1884

REPORT NO. TRC-92-N10

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

SAAB AUTOMOBILE AB

1993 SAAB 9000

5-DOOR HATCHBACK

NHTSA NO. MP0501

TRC TEST NO. 930308

PREPARED BY:

TRANSPORTATION RESEARCH CENTER INC.

10820 STATE ROUTE 347

EAST LIBERTY, OHIO 43319

MARCH 31, 1993

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF MARKET INCENTIVES

ROOM NO. 5313 (NRM-22)

400 SEVENTH STREET, S.W.

WASHINGTON, D.C. 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-90-D-22121. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

REPORT PREPARED BY:

Craig A. Markusic Date 4/1/93

Craig A. Markusic, Project Engineer
Transportation Research Center Inc.

REPORT APPROVED BY:

Jeffery W. Sankey Date 4/1/93

Jeffery W. Sankey, Engineering Supervisor
Transportation Research Center Inc.

FINAL REPORT ACCEPTED BY:

JUN 01 1993

Date

Manager, New Car Assessment Program
NHTSA, Office of Market Incentives

JUN 01 1993

Date

Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Market Incentives

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
TRC-92-N10		

4. Title and Subtitle	5. Report Date
NEW CAR ASSESSMENT PROGRAM (NCAP), FRONTAL BARRIER IMPACT TEST OF A 1993 SAAB 9000 5-DOOR HATCHBACK NHTSA NO. MP0501	March 31, 1993
	6. Performing Organization Code TRC
7. Author(s) C. A. Markusic, Project Engineer, TRC	8. Performing Organization Report No. TRC-92-N10
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319	10. Work Unit No. (TRAIS)
	11. Contract or Grant No. DTNH22-90-D-22121
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Market Incentives 400 Seventh St., S.W., Washington, DC 20590	13. Type of Report and Period Covered FINAL REPORT MARCH 1993
	14. Sponsoring agency Code NRM-22

15. Supplemental Notes

16. Abstract

A 56 kph (35 mph) frontal load cell barrier impact test was conducted on a 1993 Saab 9000 5-door hatchback, NHTSA No. MP0501, at Transportation Research Center Inc. on March 8, 1993. This test was conducted to obtain new car assessment and research data indicant of FMVSS 208, 212, 219 (partial), and 301 performance. The barrier impact velocity was 56.3 kph. The vehicle's maximum static crush was 690 millimeters. The ambient temperature was 23° C.

The driver's head injury criteria (HIC) was 480. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47.2 g. The driver's chest maximum deflection was 43 millimeters. The driver's left and right femur maximum axial forces were 3030 N and 5104 N, respectively.

The passenger's head injury criteria (HIC) was 848. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 41.3 g. The passenger's chest maximum deflection was 37 millimeters. The passenger's left and right femur maximum axial forces were 2468 N and 1827 N, respectively.

17. Key Words	18. Distribution Statement
56.3 KPH (35 MPH) Frontal Barrier Impact Test: New Car Assessment Program (NCAP) FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Retention" FMVSS 219 (partial), "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"	Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division Nassif Building, Room 5108 400 Seventh Street, S.W. Washington, DC 20590

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	297	

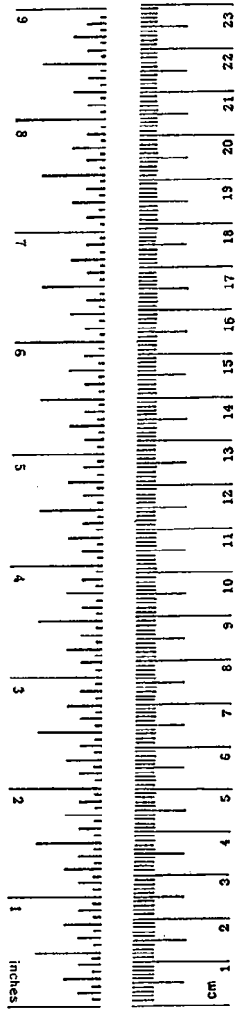
Form DOT F 1700.0 (8-72) Reproduction of completed page authorized

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

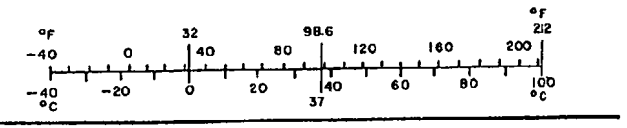
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2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

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



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 (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



930308

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF PHOTOGRAPHS, CONTINUED

SECTION 1.0

PURPOSE AND TEST PROCEDURE

PURPOSE

This 56 kph (35 mph) frontal barrier impact test is part of the New Car Assessment Program (NCAP) conducted for the National Highway Traffic Safety Administration's (NHTSA) Office of Market Incentives by Transportation Research Center Inc. (TRC) under Contract No. DTNH22-90-D-22121.

The purpose of this test was to obtain new car assessment and research data for vehicle crashworthiness and occupant restraint system performance for the subject vehicle, a 1993 Saab 9000 5-door hatchback, NHTSA No. MP0501, at an impact speed in excess of the current 48 kph (30 mph) FMVSS 208 requirements.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Laboratory Indicant Test Procedure, New Car Assessment Program, dated January 1, 1990. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations. The vehicle impacted a frontal load cell barrier instrumented with thirty-six (36) barrier face load cells. The vehicle's specified impact velocity range was 55.5 to 57.1 kph.

The test vehicle contained two (2) Part 572E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendices VII and VIII of the Laboratory Indicant Test Procedure.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. Each Part 572E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection and a six-axis neck load cell to measure longitudinal, lateral, and vertical forces and moments.

The seventy-five (75) data channels were multiplexed and recorded on two (2) 14-track tape drives. The data was digitally sampled at 8000 samples per second and processed per section IP11 of the Laboratory Indicant Test Procedure.

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

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

SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This frontal load cell barrier test was conducted at TRC on March 8, 1993.

The test vehicle, a 1993 Saab 9000 5-door hatchback, NHTSA No. MP0501, was equipped with a 2.3-liter transverse engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 1707 KG. The vehicle's impact speed was 56.3 kph. The vehicle sustained 690 mm of static crush during the impact.

The driver's head injury criteria (HIC) was 480. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 47.2 g. The driver's chest maximum deflection was 43 mm. The driver's left and right femur maximum axial forces were 3030 N and 5104 N, respectively.

The passenger's HIC was 848. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 41.3 g. The passenger's chest maximum deflection was 37 mm. The passenger's left and right femur maximum axial forces were 2468 N and 1827 N, respectively.

The loss of windshield periphery retention length along the lower edge of the windshield was 260 mm extending from 0 to 260 mm from the lower right corner, 100 mm extending from 0 to 100 mm from the lower left corner, and 350 mm extending from 185 to 535 mm from the lower left corner. The loss of windshield periphery retention length along the left A-pillar was 50 mm extending from 0 to 50 mm from the lower left corner.

The right rear corner of the vehicle's hood intruded through the lower right corner of the windshield.

Following the impact, no fluid spilled from the vehicle's fuel system prior to the static rollover test or during any portion of the static rollover test.

DATA ACQUISITION EXPLANATIONS

The driver's head Z-axis accelerometer, HEDZG1, did not return to zero following the impact event. The data acquisition circuit was checked after the impact and appeared normal. No cause could be found for the data not returning to zero. The driver's head resultant calculation was affected by the data not returning to zero.

The following data channels recorded a questionable data spike at one millisecond. All data acquisition circuits were checked following the test and appeared normal. No cause for the data spikes could be found.

NEKXF2, right front passenger's neck X-axis shear force
NEKYF2, right front passenger's neck Y-axis shear force
NEKZF2, right front passenger's neck Z-axis axial force
NEKXM2, right front passenger's neck moment about X-axis
NEKYM2, right front passenger's neck moment about Y-axis
NEKZM2, right front passenger's neck moment about Z-axis
LFMF2, right front passenger's left femur force
RFMF2, right front passenger's right femur force

The engine bottom X-axis accelerometer, ENGXG2, recorded multiple data spikes from 89 milliseconds to 206 milliseconds as a result of the accelerometer mount coming loose from the engine on impact.

The left rear seat X-axis accelerometer recorded questionable data from approximately 70 milliseconds. The data acquisition circuit was checked after the impact and appeared normal. The left rear seat redundant X-axis accelerometer data was used for the velocity and displacement calculations. No cause for the questionable data could be found.

The left brake caliper accelerometer, BCLXG1, did not return to zero following the impact event. The data acquisition circuit was checked after the impact and appeared normal. No cause for the questionable data could be found.

DATA ACQUISITION EXPLANATIONS, CONT'D.

The instrument panel center X-axis accelerometer, DPCXG1, did not return to zero following the impact event. The data acquisition circuit was checked after the impact and appeared normal. No cause for the questionable data could be found.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: MP0501 TEST TYPE: Frontal Load Cell Barrier

TEST DATE: 03/08/93 TEST TIME: 1235 AMBIENT TEMP.: 23° C

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Saab/9000/5-door hatchback

VEHICLE TEST WEIGHT (KG): 1707

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (KPH)**: PRIMARY = 56.3 SECONDARY = 56.3

MAXIMUM STATIC CRUSH (MM): 690

AVERAGE REBOUND (MM): 773

DUMMIES:	Driver #192	Passenger #142
TYPE:	Part 572 E	Part 572 E
LOCATION:	Left front	Right front
RESTRAINT:	Airbag & 3-point unibelt	3-point unibelt

NUMBER OF DATA CHANNELS: 75

NUMBER OF CAMERAS: HIGH-SPEED 16 REAL-TIME 2

*With respect to tow track centerline.
**Speed trap measurement (± .08 kph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Saab Automobile AB

MAKE/MODEL: Saab/9000 VIN: YS3CK68B7P1000767

BODY STYLE: 5-door hatchback MODEL YEAR: 1993

NHTSA NO.: MP0501 COLOR: Black

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT: 2.3-liter

TRANSMISSION DATA: _4_SPEED, ___MANUAL, _X_AUTOMATIC, _X_FWD, ___RWD, ___4WD

DATE VEHICLE RECEIVED: 01/22/93 ODOMETER READING: 145.0

DEALER'S NAME AND ADDRESS: Automanage, Inc.
Tri-County Motor Car Co.
5467 Dixie Highway
Fairfield, OH 45014

ACCESSORIES:

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

REMARKS:

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

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Saab Automobile AB

DATE OF MANUFACTURE: 07/92 VIN: YS3CK68B7P1000767

GVWR: 1920 KG

GAWR: FRONT: 1060 KG, REAR: 980 KG

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Michelin, MXL, 195/65R15

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 300 kPa
REAR: 300 kPa

SPARE TIRE (MFR., LINE, SIZE): Nokia, T115/70R16

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually-adjustable

MAXIMUM WIDTH: 1777 MM

WHEELBASE: 2674 MM

LOCATION OF LABEL STATING TIRE DATA:

The label was located on the left C-pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: 195/65 TR15

RECOMMENDED COLD TIRE PRESSURE: FRONT: 230 kPa; REAR: 230 kPa

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 441 KG

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE:	LF	681;	RF	679;	LR	669;	RR 666
PRE-TEST ATTITUDE:	LF	650;	RF	647;	LR	615;	RR 616
POST-TEST ATTITUDE:	LF	588;	RF	699;	LR	591;	RR 603

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	448 KG	RIGHT REAR	282 KG
LEFT FRONT	448 KG	LEFT REAR	278 KG
TOTAL FRONT WEIGHT	896 KG	(61.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	560 KG	(38.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	1456 KG		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (1456 KG)

VCW = VEHICLE CAPACITY WEIGHT (441 KG)

DSC = DESIGNATED SEATING CAPACITY (5)

RCLW*= VCW - 68 (DSC) = 101 KG

TARGET TEST WEIGHT=UDW + RCLW* + (NO. OF HYBRID III DUMMIES X 76 KG/DUMMY)

TARGET TEST WEIGHT = 1456 + 101 + 152

TARGET TEST WEIGHT = 1709 KG

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 99 KG OF CARGO WEIGHT:

RIGHT FRONT	478 KG	RIGHT REAR	372 KG
LEFT FRONT	488 KG	LEFT REAR	369 KG
TOTAL FRONT WEIGHT	966 KG	(56.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	741 KG	(43.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	1707 KG	(0.1% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE: 0 KG

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 1161 MM REARWARD OF FRONT WHEEL CENTERLINE

*Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 136 KG, whichever is less.

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 930308 NHTSA NO.: MP0501

TEST DATE: 03/08/93 TEST TIME: 1235

TEST TYPE: Frontal load cell barrier IMPACT ANGLE: 0°

AMBIENT TEMPERATURE AT IMPACT AREA: 23° C

TEMPERATURE IN OCCUPANT COMPARTMENT: 21° C

IMPACT VELOCITY: PRIMARY = 56.3 KPH SECONDARY = 56.3 KPH

(SPECIFIED RANGE = 55.5 TO 57.1 KPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 356 MM

EXITING VELOCITY TRAP = 51 MM

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

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 4610; C 4760; R 4612

POST-TEST: L 4015; C 4070; R 4028

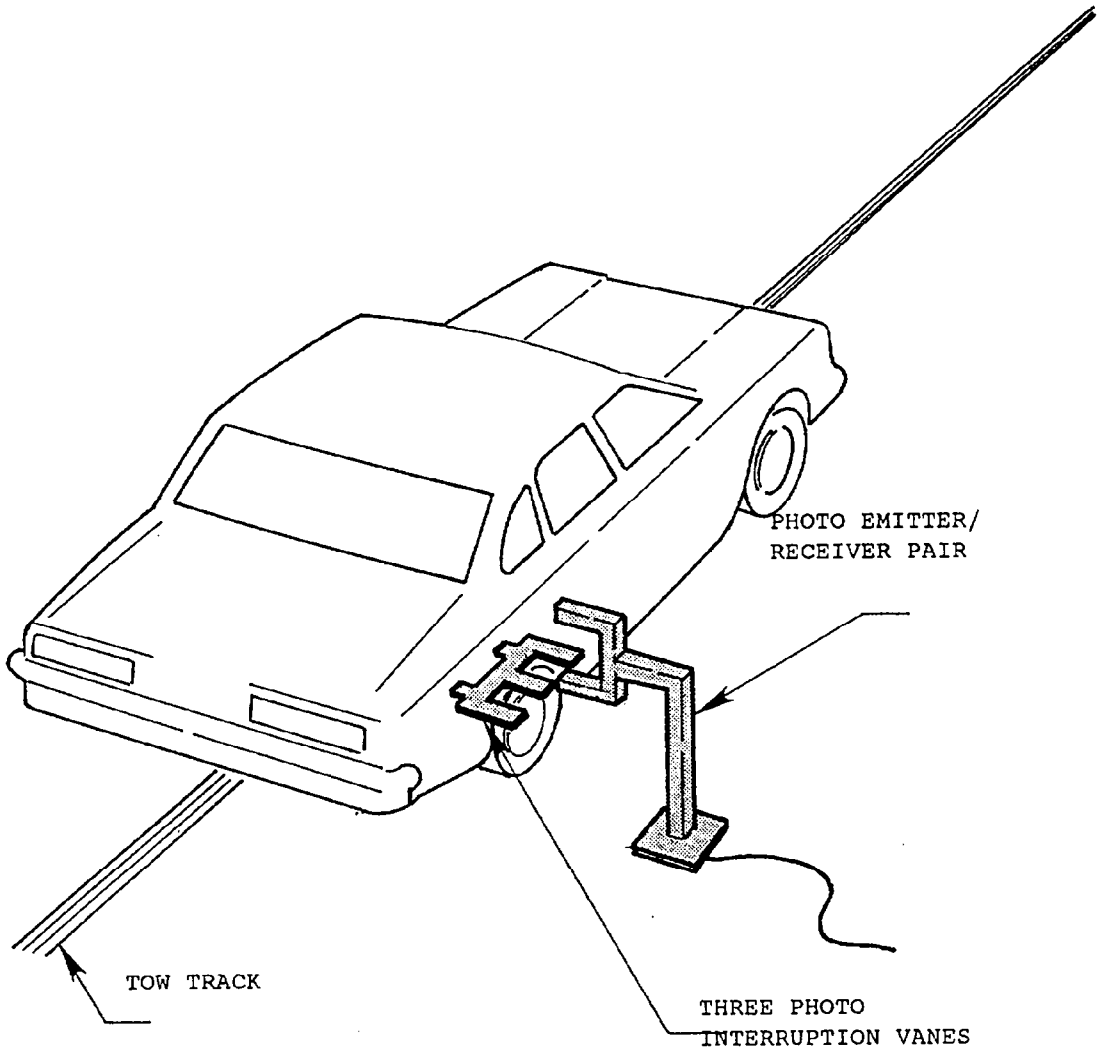
TOTAL CRUSH: L 595; C 690; R 584

AVERAGE CRUSH: 623

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

DISTANCE FROM TEST VEHICLE TO BARRIER: L 790; C 745; R 785; AVG. 773

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



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

The vanes have 305-millimeter spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 56 KPH (35 MPH) FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Saab/9000/5-door hatchback

VEHICLE NHTSA NO.: MP0501 ; VIN: YS3CK68B7P1000767

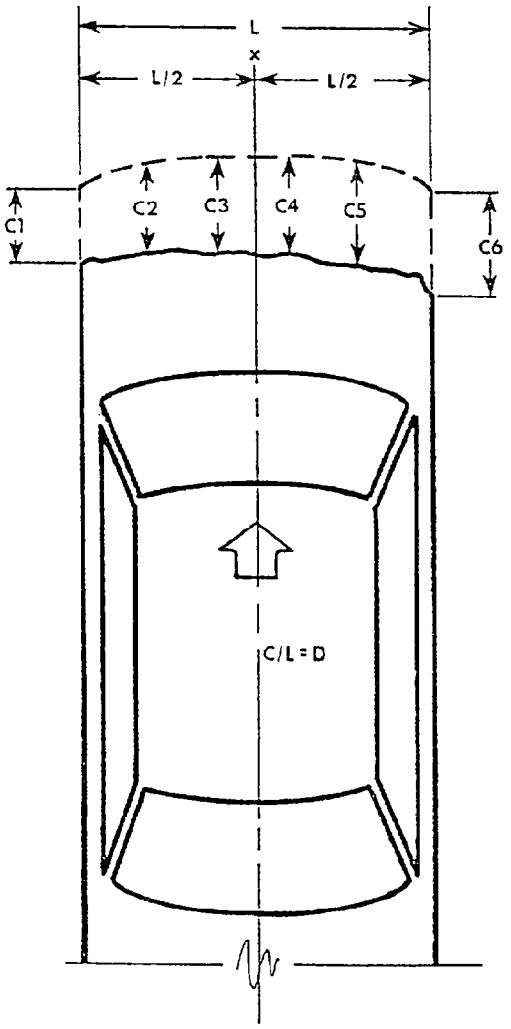
MODEL YEAR: 1993 ; BUILD DATE: 07/92 ; TEST DATE: 03/08/93

VEHICLE SIZE CATEGORY: Large ; TEST WEIGHT: 1707 KG

VEHICLE WHEELBASE: 2674 MM

MAXIMUM WIDTH: 1777 MM

FRONT OVERHANG: 1027 MM



COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW3

CRUSH DEPTH MEASUREMENTS:

C1 = 595 MM

C2 = 638 MM

C3 = 684 MM

C4 = 681 MM

C5 = 628 MM

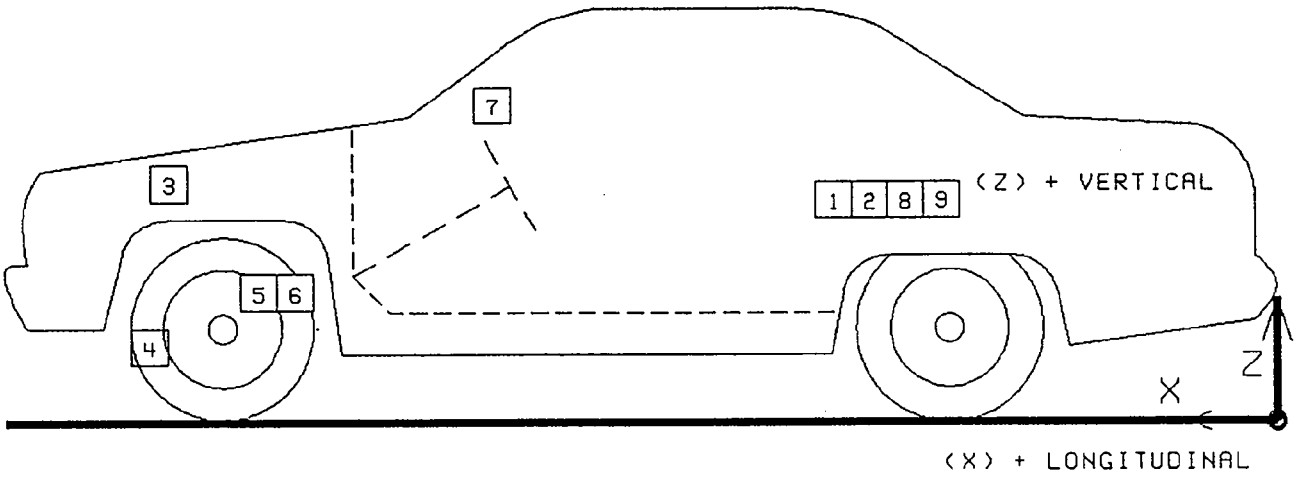
C6 = 584 MM

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE (LONGITUDINAL)

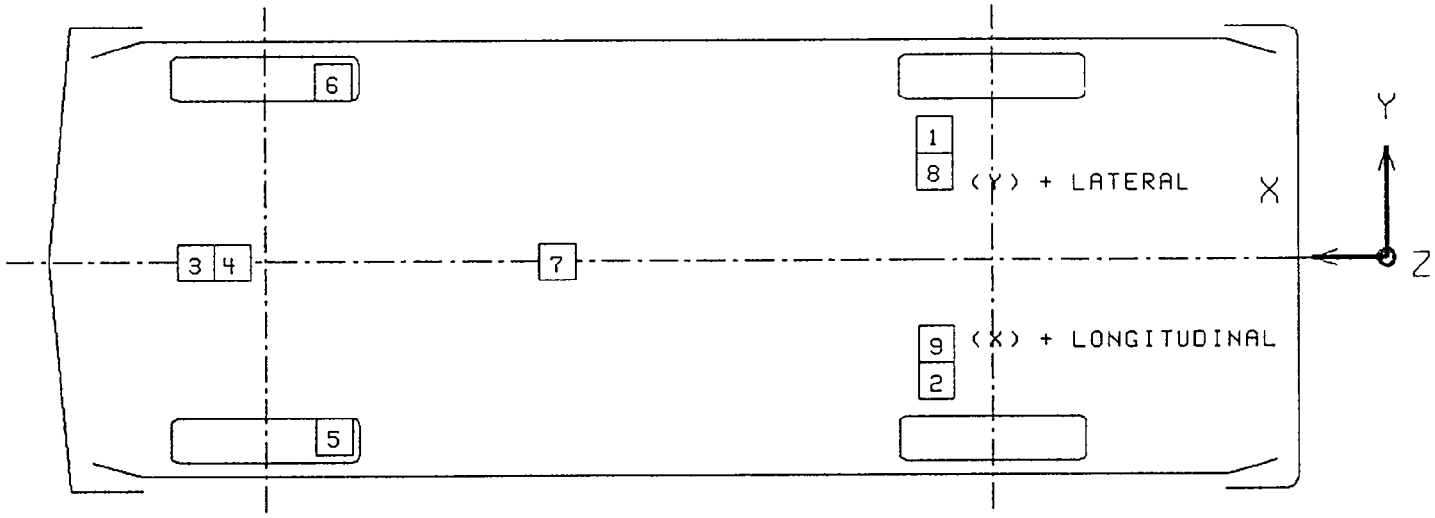
LENGTH OF DAMAGED REGION: L = 1525 MM

FIGURE 3

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930308

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX G	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION MAX G	NEGATIVE DIRECTION MSEC
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	2898	360	366	21.5	151.4Y	24.4	58.5Y
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	2915	-330	363	1.5	132.5	33.3	67.0
3	ENGINE TOP LONGITUDINAL	610	0	755	36.3	50.4	138.4	32.4
4	ENGINE BOTTOM LONGITUDINAL	950	-182	154	25.5	72.5Y	104.8	33.8Y
5	RIGHT BRAKE CALIPER LONGITUDINAL	960	-644	272	27.0	73.3	93.4	56.0
6	LEFT BRAKE CALIPER LONGITUDINAL	960	644	267	18.4	74.1Y	96.7	52.0Y
7	INSTRUMENT PANEL CENTER LONGITUDINAL	1615	0	970	3.4	18.0Y	65.2	56.5Y
8	LEFT REAR SEAT CROSSMEMBER REDUNDANT VERTICAL	2898	400	366	2.2	134.8	31.5	66.1
9	RIGHT REAR SEAT CROSSMEMBER REDUNDANT VERTICAL	2915	-367	363	2.3	132.4	32.9	67.0

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

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

Y See DATA ACQUISITION EXPLANATIONS

TABLE 5 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #192	PASSENGER #142
HEAD	Airbag	Glove box door
CHEST	Airbag	None
ABDOMEN	None	None
LEFT KNEE	Instrument panel	Instrument panel
RIGHT KNEE	Instrument panel	Instrument panel

DOOR OPENING:

	LEFT	RIGHT
FRONT	Difficult, required tools	Easy
REAR	Easy	Easy

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	NA	NA

GLAZING DAMAGE:

The entire windshield was cracked upon impact. The right rear corner of the hood penetrated the right lower corner of the windshield.

OTHER NOTABLE IMPACT EFFECTS:

The left front tire deflated on impact. The glove compartment door came open on impact.

TABLE 6 FMVSS 208 DATA SUMMARY

VEH. YR./MAKE/MODEL/BODY STYLE: 1993/Saab/9000/5-door hatchback

VEH. NHTSA NO.: MP0501 ; TEST DATE: 03/08/93

MAXIMUM ACCELERATIONS (G):	DRIVER DUMMY #192	PASSENGER DUMMY #142
HEAD X-AXIS	-53.4	-111.5
HEAD Y-AXIS	6.4	27.2
HEAD Z-AXIS	-24.6 ϒ	-47.8
HEAD RESULTANT	54.9 ϒ	112.9
CHEST X-AXIS	-48.2	-42.5
CHEST Y-AXIS	5.9	10.8
CHEST Z-AXIS	8.8	9.8
CHEST RESULTANT*	47.2	41.3
CHEST RESULTANT TIME INTERVAL (SEC.)*	.003	.003
HEAD INJURY CRITERIA (HIC) VALUES:		
HIC**	480	848
HIC STARTING TIME (SEC.)	.057	.080
HIC ENDING TIME (SEC.)	.093	.111
AVG. HEAD RESULTANT ACCEL. DURING HIC TIME INTERVAL (G)	44.6	59.5
MAXIMUM CHEST DEFLECTIONS (MM):		
CHEST X-AXIS	43	37
MAXIMUM CHEST DEFLECTION TIME (SEC)	.074	.084
MAXIMUM COMPRESSIVE FEMUR FORCES (N):		
LEFT FEMUR	3030	2468
RIGHT FEMUR	5104	1827
MAXIMUM SEAT BELT FORCES (N):		
LAP BELT	NA	NA
SHOULDER BELT	NA	NA

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

*0.003 SEC. MINIMUM DURATION.

**THE MAXIMUM HIC TIME INTERVAL IS 36 MILLISECONDS.

ϒ See DATA ACQUISITION EXPLANATIONS

TABLE 7 HYBRID III NECK DATA SUMMARY

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1993/Saab/9000/5-door hatchback

VEHICLE NHTSA NO.: MP0501 ; TEST DATE: 03/08/93

MAXIMUM VALUES:	DRIVER DUMMY #192	PASSENGER DUMMY #142
NECK X-AXIS FORCE (N)	-533	957
NECK Y-AXIS FORCE (N)	-144	188
NECK Z-AXIS FORCE (N)	1631	2957
NECK MOMENT ABOUT X AXIS (N-M)	8	11
NECK MOMENT ABOUT Y AXIS (N-M)	45	39
NECK MOMENT ABOUT Z AXIS (N-M)	8	11

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

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag. The driver dummy was restrained by the airbag and the three-point unibelt. The dummy's head rotated slightly rearward as the dummy's upper torso rebounded rearward into the seat back. The dummy's head contacted the head restraint. The driver dummy came to rest in the driver's seat restrained by the three-point unibelt.

RIGHT FRONT PASSENGER DUMMY

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head rotated downward impacting the glovebox door. The right front passenger dummy was restrained by the three-point unibelt. The dummy rebounded rearward into the seat back as the dummy's head rotated rearward into the head restraint. The right front passenger dummy came to rest in the right front passenger's seat restrained by the three-point unibelt.

TABLE 8 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

	DRIVER	PASSENGER
BELT LENGTH DATA:		
BELT LENGTH FROM TRIM PANEL EXIT TO BOLT HOLE ANCHOR POINT FOR CONTINUOUS WEBBING SYSTEMS.	2115	2150
SHOULDER BELT LENGTH AS MEASURED ON PART 572 DUMMY.	910	900
LAP BELT LENGTH AS MEASURED ON PART 572 DUMMY.	635	625
SHOULDER BELT SPOOL-OFF LENGTH:*		
AS DETERMINED BY FILM ANALYSIS	0	0
RETRACTOR LOCK-UP TIME (MS):*		
AS DETERMINED BY SHOULDER BELT SPOOL-OFF	NA	NA

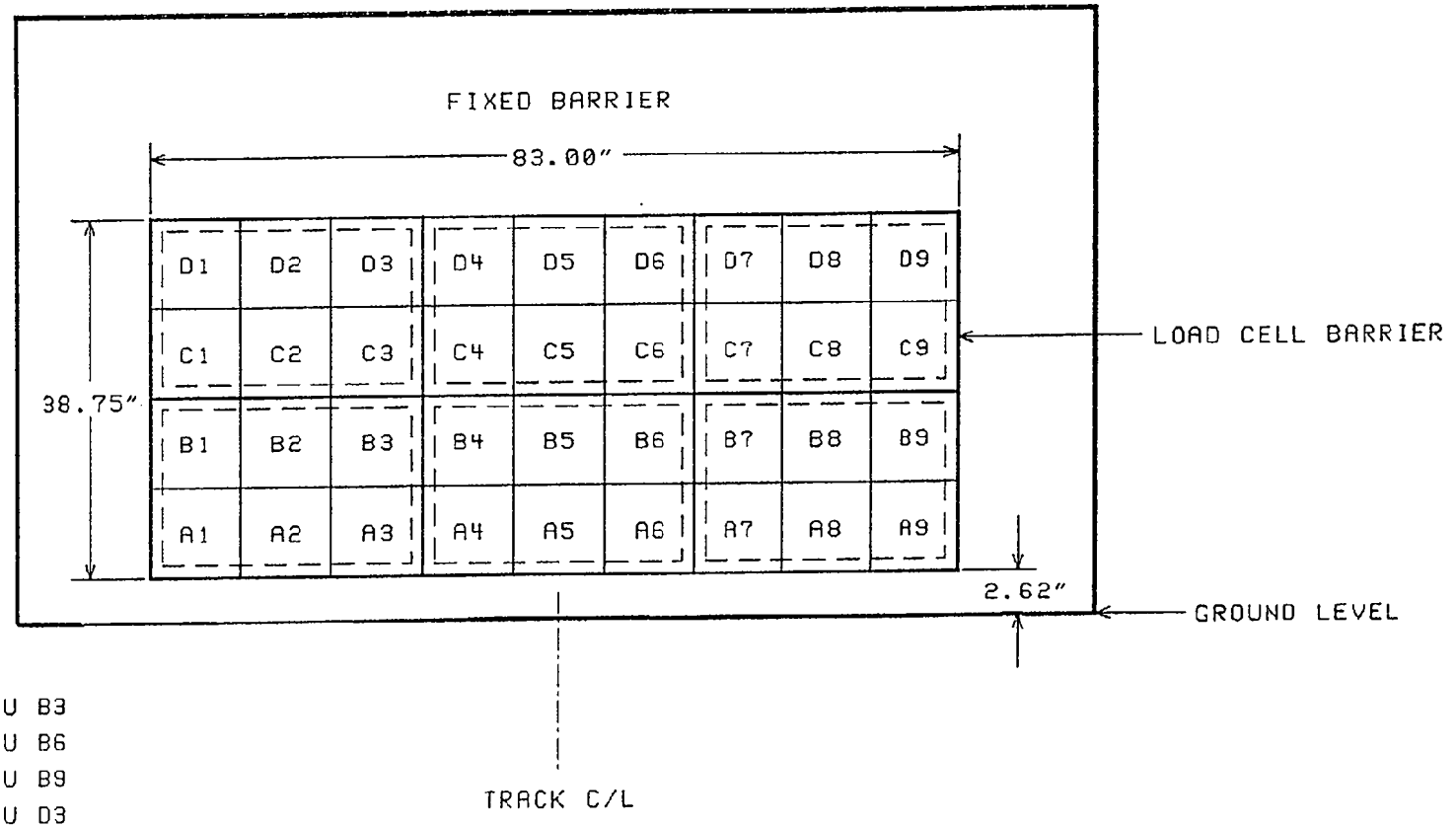
*The seat belts were equipped with pretensioning devices.
ALL MEASUREMENTS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

FIGURE 4

LOAD CELL BARRIER CONFIGURATION

FRONT VIEW

36 LOAD CELLS
4 ROWS
9 COLUMNS



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

TABLE 9

LOAD CELL BARRIER DATA SUMMARY

TEST NUMBER 930308

LOCATION	POSITIVE DIRECTION KN	POSITIVE DIRECTION MSEC	NEGATIVE DIRECTION KN	NEGATIVE DIRECTION MSEC
TOTAL GROUP 1	1.4	260.3	100.4	50.8
TOTAL GROUP 2	1.4	174.8	210.2	58.0
TOTAL GROUP 3	0.9	174.8	144.1	34.8
TOTAL GROUP 4	1.3	174.6	23.2	47.8
TOTAL GROUP 5	1.0	2.5	75.8	32.5
TOTAL GROUP 6	1.8	173.5	97.9	32.3
TOTAL LOAD CELL FORCE	6.7	174.5	523.8	32.4

TENSION IS POSITIVE
COMPRESSION IS NEGATIVE

SECTION 3.0

FMVSS 212, 219 (PARTIAL), AND 301 DATA

FIGURE 5 FMVSS 212 TEST DATA

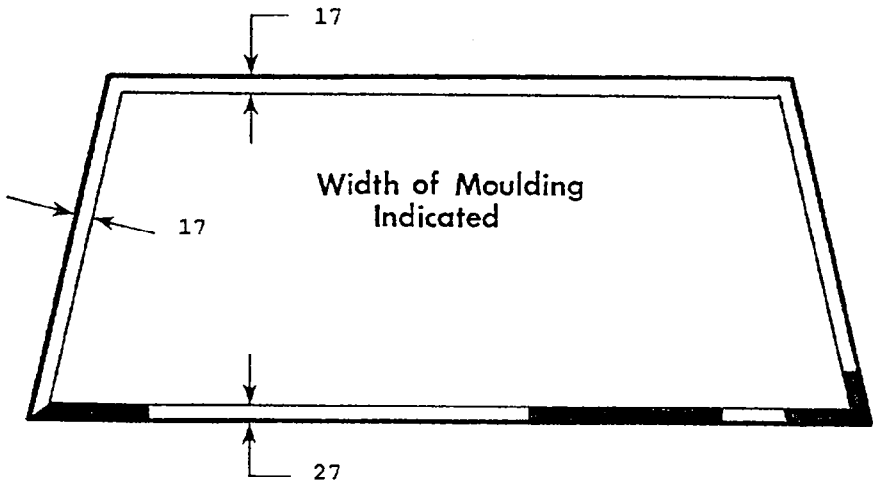
DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:
Plastic trim around outer perimeter, adhesive around inner perimeter.

FMVSS 212 REQUIREMENTS: The post-test periphery retention amount must be at least 75% of the pre-test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

WINDSHIELD PERIPHERY MEASUREMENTS:

	PRE-TEST	POST-TEST	PERCENT RETENTION
RIGHT SIDE	1968	1708	86.8
LEFT SIDE	1968	1468	74.6
TOTAL	3936	3176	80.7

PRE-TEST WINDSHIELD MOUNTING MATERIAL TEMPERATURE: 21° C



FRONT VIEW OF WINDSHIELD*

LOSS OF WINDSHIELD RETENTION LENGTHS:
The loss of windshield periphery retention length along the lower edge of the windshield was 260 mm extending from 0 to 260 mm from the lower right corner, 100 mm extending from 0 to 100 mm from the lower left corner, and 350 mm extending from 185 to 535 mm from the lower left corner. The loss of windshield periphery retention length along the left A-pillar was 50 mm extending from 0 to 50 mm from the lower left corner.
ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.
*INDICATE AREAS OF LOSS OF RETENTION, IF ANY, ON WINDSHIELD DIAGRAM.

FIGURE 6 FMVSS 219 TEST DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165-millimeter diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 13 millimeters from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

WINDSHIELD MEASUREMENTS:

A = 1114

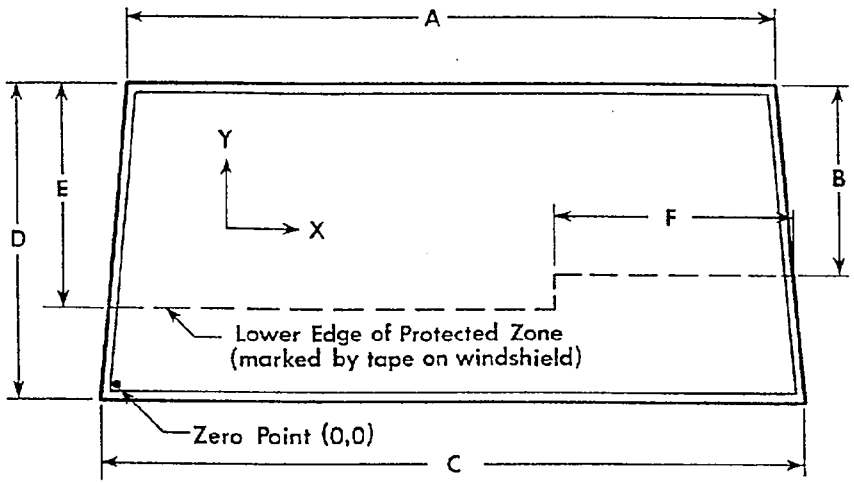
B = 440

C = 1575

D = 730

E = 478

F = 876



FRONT VIEW

METHOD OF ADHERING PROTECTED ZONE TEMPLATE TO WINDSHIELD: NA

AREAS OF WINDSHIELD TEMPLATE PENETRATION GREATER THAN 6.0 MM: NA

	COORDINATES X	Y
1.		
2.		
3.		

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE, THROUGH THE INNER SURFACE OF THE WINDSHIELD:

The right rear corner of the hood penetrated the lower right corner of the windshield	1.	32	55
	2.		
	3.		

ALL MEASUREMENTS ARE IN MILLIMETERS.

TABLE 10 FUEL SYSTEM DATA

MAKE/MODEL: Saab/9000

NHTSA NO.: MP0501

FUEL SYSTEM CAPACITY: 66.0 LITERS (FROM OWNER'S MANUAL)

USABLE CAPACITY: 66.0 LITERS (FURNISHED BY COTR)

TEST VOLUME RANGE: 60.7 LITERS TO 62.0 LITERS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 61.3 LITERS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel tank is located in front of the rear axle. The fuel filler is on the right. The fuel lines run along the right side to the front.

ELECTRIC FUEL PUMP: Yes FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? No

TABLE 11 FMVSS 301 POST-IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: MP0501 ; TEST DATE: 03/08/93

VEHICLE MAKE/MODEL/BODY STYLE: Saab/9000/5-door hatchback

TEST REQUIREMENTS:

Test vehicle fuel tank filled to 92 to 94% of manufacturer's usable capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE:

X FRONTAL (56 KPH)

_____ OBLIQUE (48 KPH) WITH ____° BARRIER FACE
FIRST CONTACTING _____ (DRIVER/PASS.) SIDE.

_____ REAR MOVING BARRIER (48 KPH)

_____ LATERAL MOVING BARRIER (32 KPH)

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

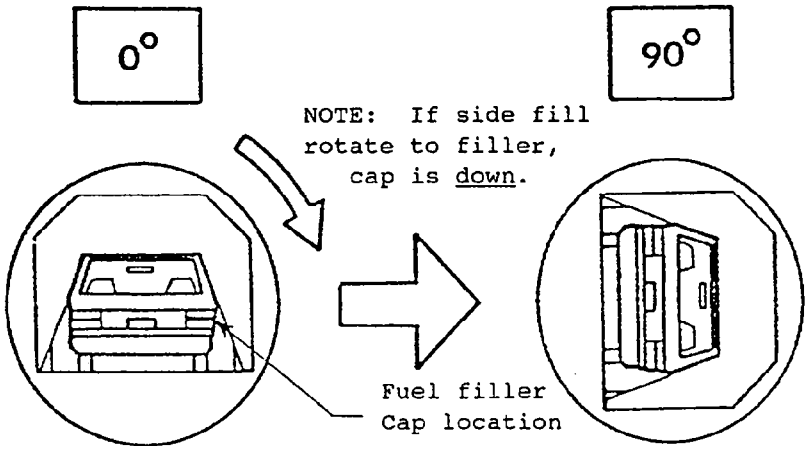
		TEST RESULTS	MAXIMUM ALLOWABLE
1.	FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 G	28 G
2.	5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 G	142 G
3.	NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - - -	0 G	28 G/MN

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: MP0501
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 7 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

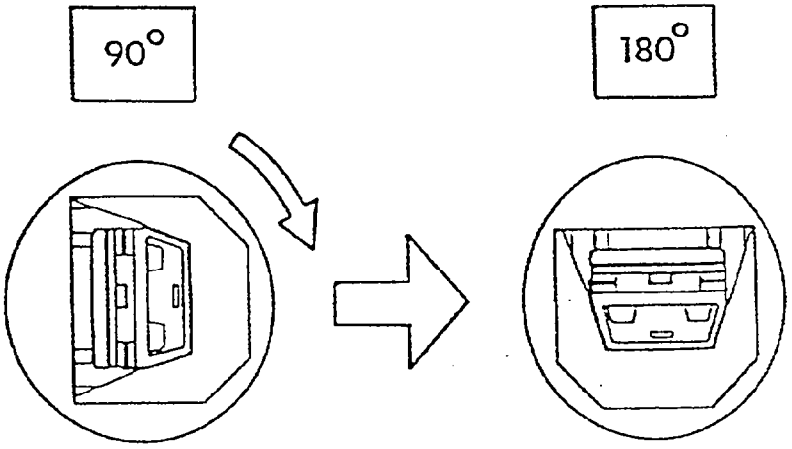
0° TO 90° ROTATION (FUEL FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MP0501
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 14 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

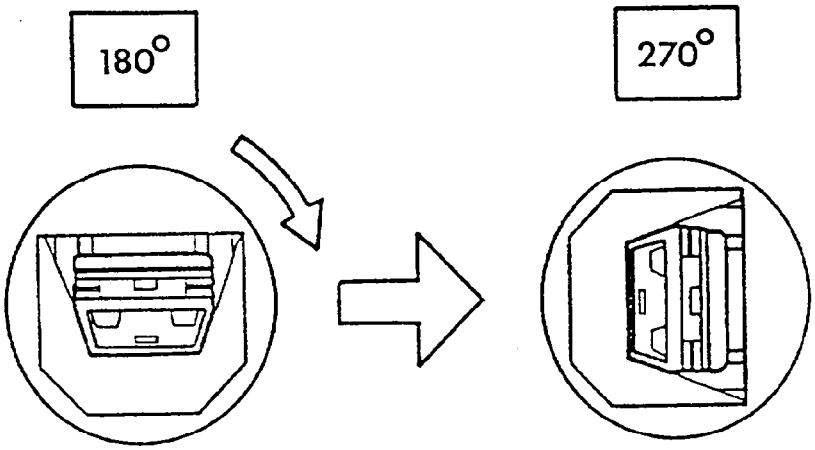
90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MP0501
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 21 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

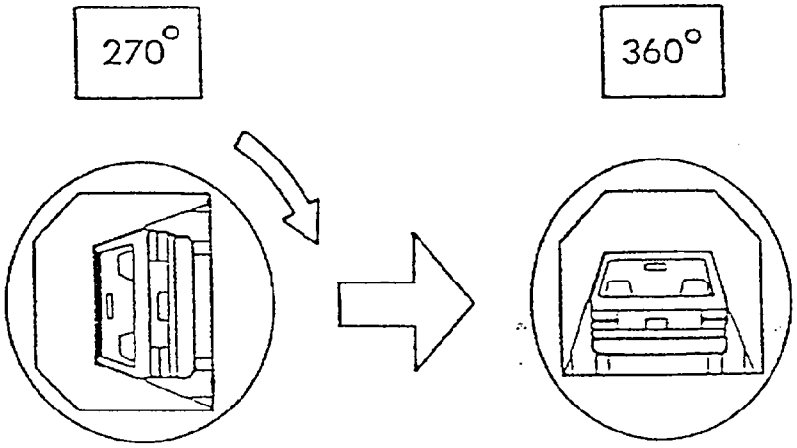
180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 7 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: MP0501
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 28 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - - - -	0 G	142 G
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - - - - - -	0 G	28 G
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - - - - - -	0 G	28 G

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

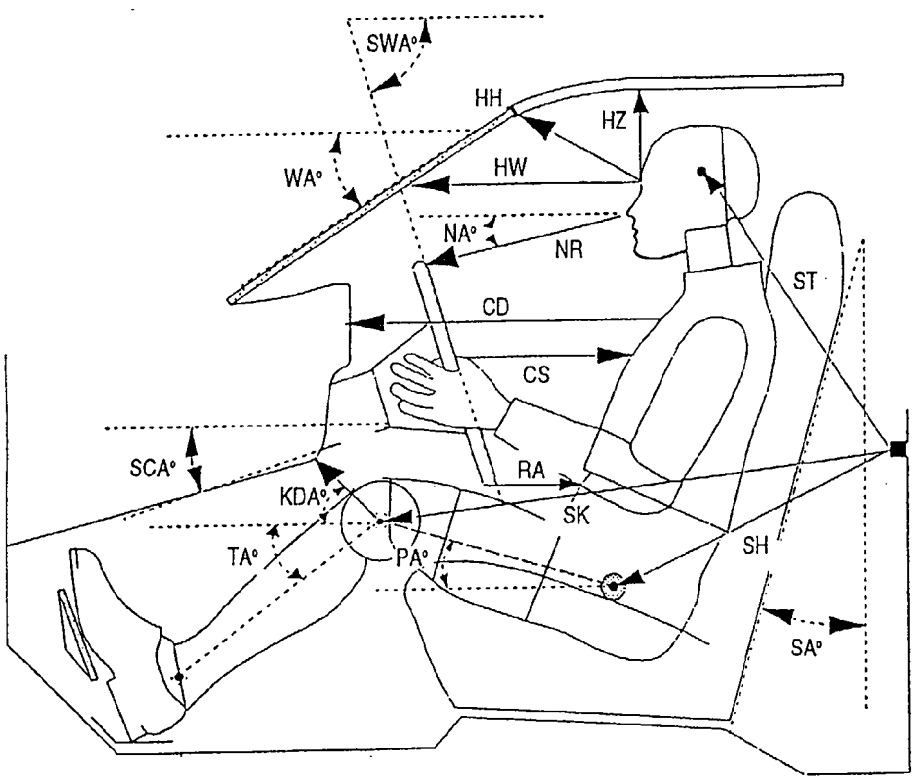
None

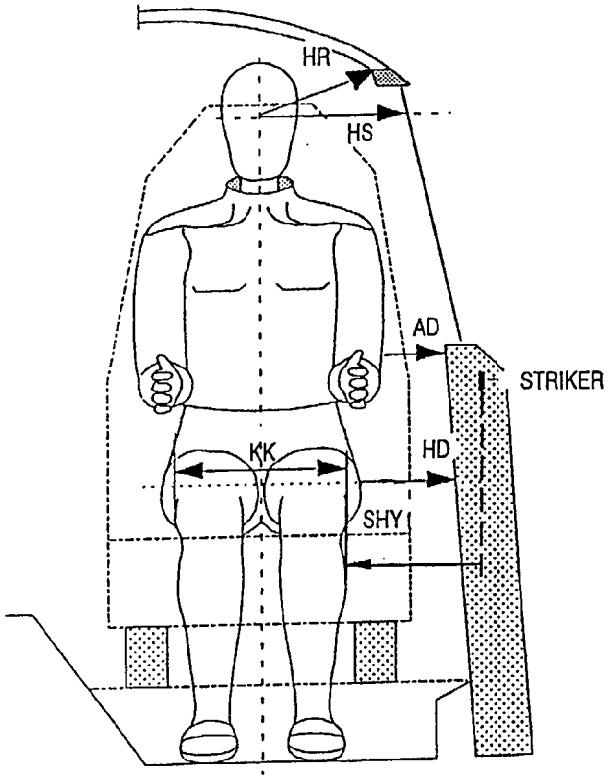
SECTION 4.0

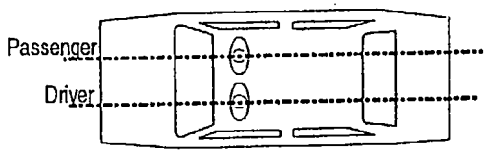
VEHICLE, OCCUPANT, AND CAMERA INFORMATION

FIGURE 8

DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS







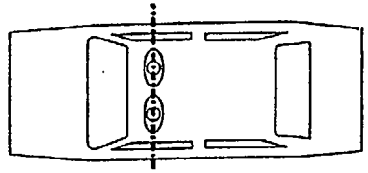
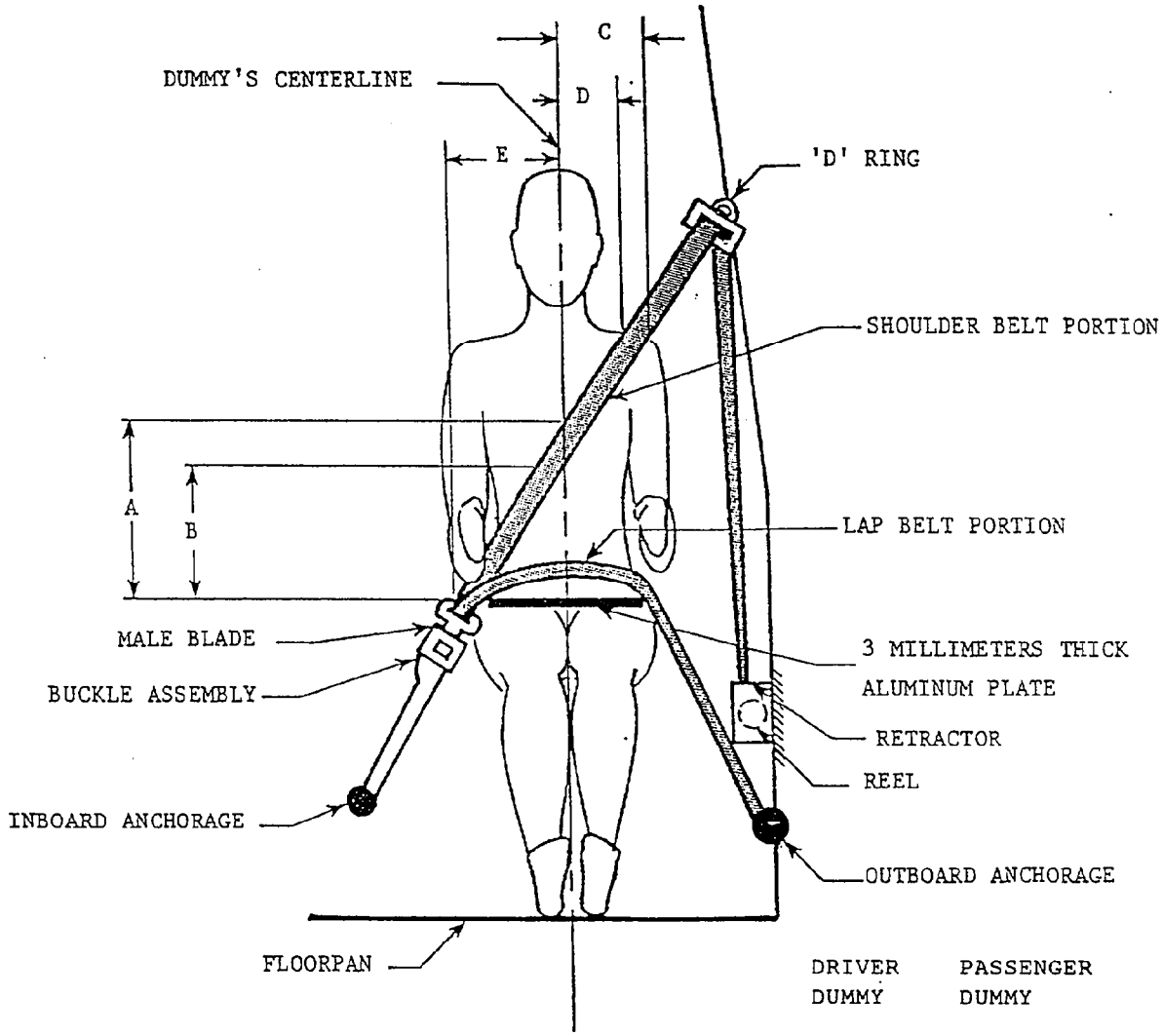


TABLE 12 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

DESIGNATION	TYPE OF MEASUREMENT	DRIVER (SERIAL #192)	PASSENGER (SERIAL #142)
WA°	WINDSHIELD ANGLE	32	NA
SWA°	STEERING WHEEL ANGLE	62	NA
SCA°	STEERING COLUMN ANGLE	29	NA
SA°	SEAT BACK ANGLE	23	23
HZ	HEAD TO ROOF	180	155
HH	HEAD TO HEADER	348	362
HW	HEAD TO WINDSHIELD	519	602
HR	HEAD TO SIDE HEADER	213	203
NR	NOSE TO RIM	441	NA
NA	NOSE TO RIM ANGLE	17	NA
CD	CHEST TO DASH	577	615
CS	STEERING WHEEL TO CHEST	358	NA
RA	RIM TO ABDOMEN	204	NA
KDL	LEFT KNEE TO DASH	144	203
KDR	RIGHT KNEE TO DASH	110	201
KDA	OUTBOARD KNEE TO DASH ANGLE	39	30
PA°	PELVIC ANGLE	25	24
TA°	TIBIAL ANGLE	43	44
KK	KNEE TO KNEE	251	262
ST	STRIKER TO HEAD	418	424
	STRIKER TO HEAD ANGLE	-85	-81
SK	STRIKER TO KNEE	659	616
	STRIKER TO KNEE ANGLE	13	16
SH	STRIKER TO H-POINT	352	337
	STRIKER TO H-POINT ANGLE	49	45
SHY	STRIKER TO H-POINT (Y DIR.)	282	230
HS	HEAD TO SIDE WINDOW	310	295
HD	H-POINT TO DOOR	183	173
AD	ARM TO DOOR	129	122

THE SEAT BACK ANGLE (SA°) IS MEASURED RELATIVE TO VERTICAL, ALL OTHER ANGLES ARE MEASURED RELATIVE TO HORIZONTAL.
ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.
ALL ANGLE MEASUREMENTS ARE IN DEGREES.

FIGURE 9 SEAT BELT POSITIONING DATA



	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	355	377
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	275	299
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	90	99
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	30	45
LAPBELT TENSION (N)	9	9
SHOULDER BELT TENSION (N)	13	13

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 10 CAMERA POSITIONS

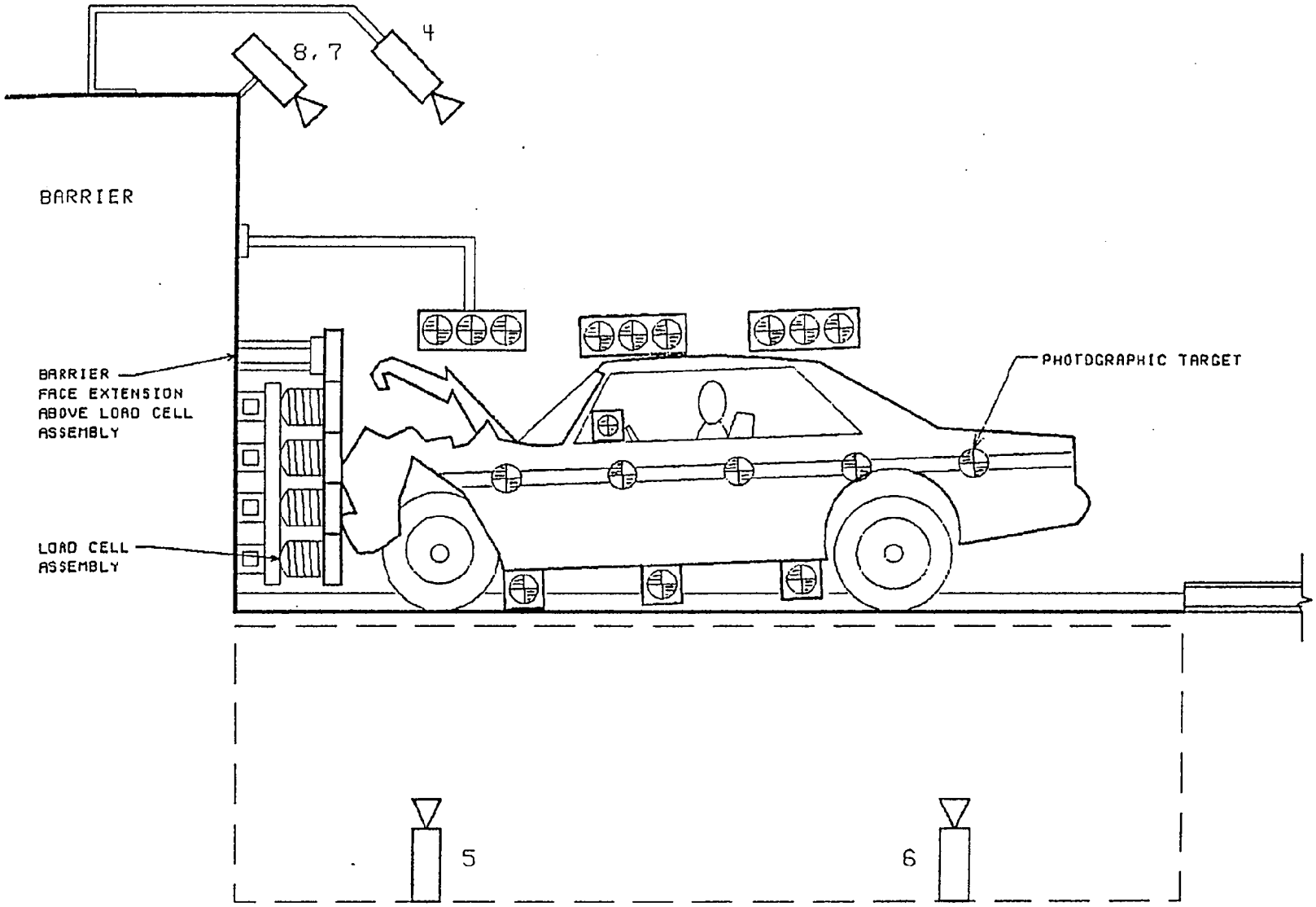


FIGURE 10 CAMERA POSITIONS, CONT'D.

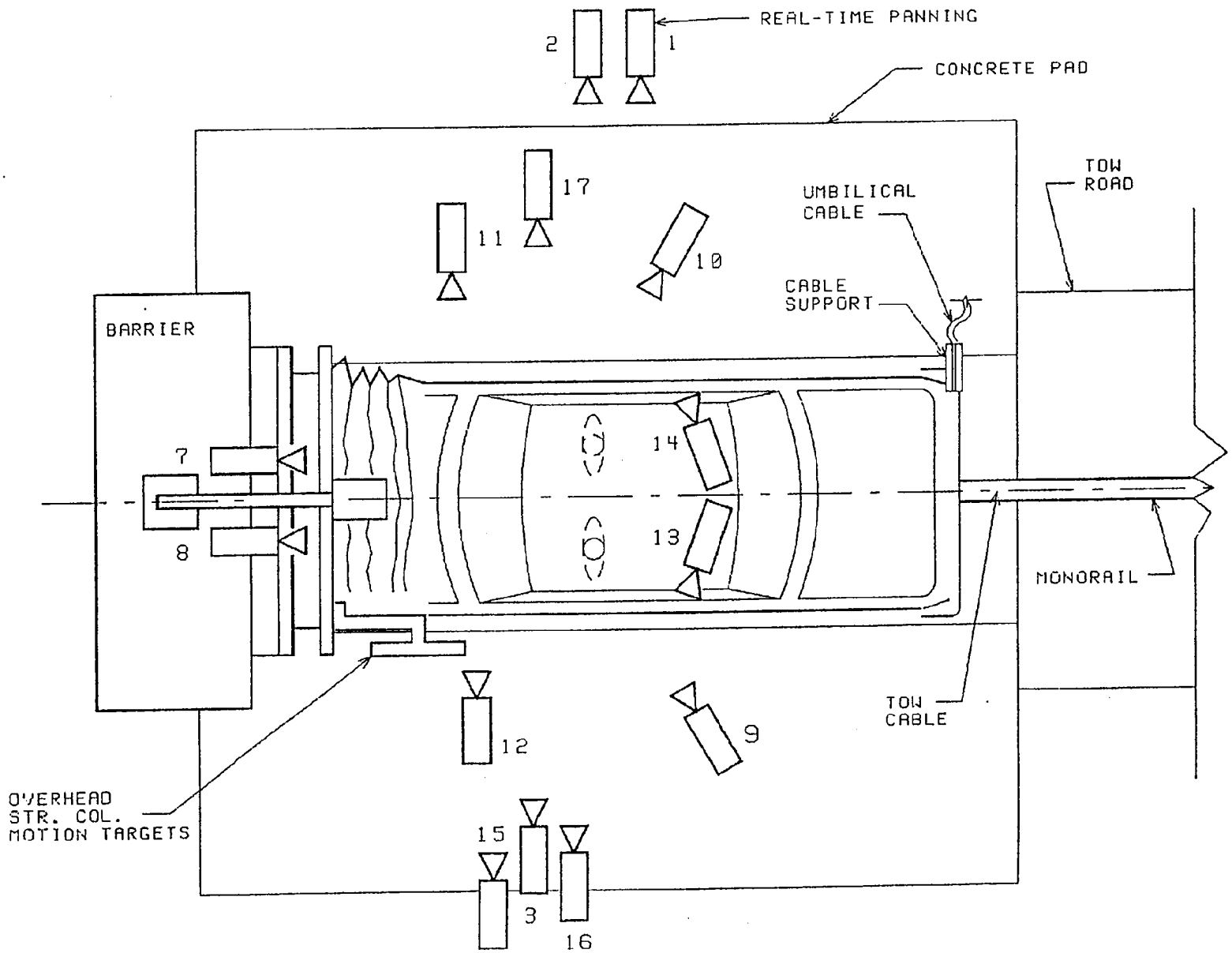


TABLE 13 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 930308 VEHICLE: 1993 Saab 9000 3-door hatchback

CAMERA NO.	VIEW	CAMERA POSITIONS (MM)* X	Y	Z	ANGLE** (DEG)	FILM PLANE TO HEAD TARGET (MM)	LENS (MM)	FILM SPEED (FPS)
1	Real-time panning	-3607	-12802	1549	NA	NA	16	24
2	Vehicle crush	-2065	-6767	942	-2	NA	13	495
3	Dummy kinematics	-1054	7493	1118	-12	6172	25	1022
4	Windshield damage	-925	0	2489	-40	NA	13	498
5	Crush & fluid spillage	-1283	0	-2347	90	NA	13	1000
6	Fluid spillage	-2522	0	-2515	90	NA	13	998
7	Passenger kinematics	-114	-351	2159	-40	NA	17	502
8	Driver kinematics	-173	368	2159	-41	NA	17	508
9	Driver kinematics	-4572	1854	2591	-27	2413	25	500
10	Passenger kinematics	-4674	-1880	2540	-26	2337	25	505
11	Windshield intrusion	-968	-7775	1118	0	NA	50	500
12	Windshield intrusion	-1346	7859	1074	0	NA	50	508
13	Driver seatbelt movement	NA	NA	NA	NA	NA	13	498
14	Passenger seatbelt movement	NA	NA	NA	NA	NA	13	495
15	Column movement	-3048	7264	2616	-14	NA	25	508
16	Column movement	-3048	7264	1908	-9	NA	25	500
17	Passenger kinematics	-986	-5354	1151	7	6528	25	1010

*+X = Film plane forward of barrier face

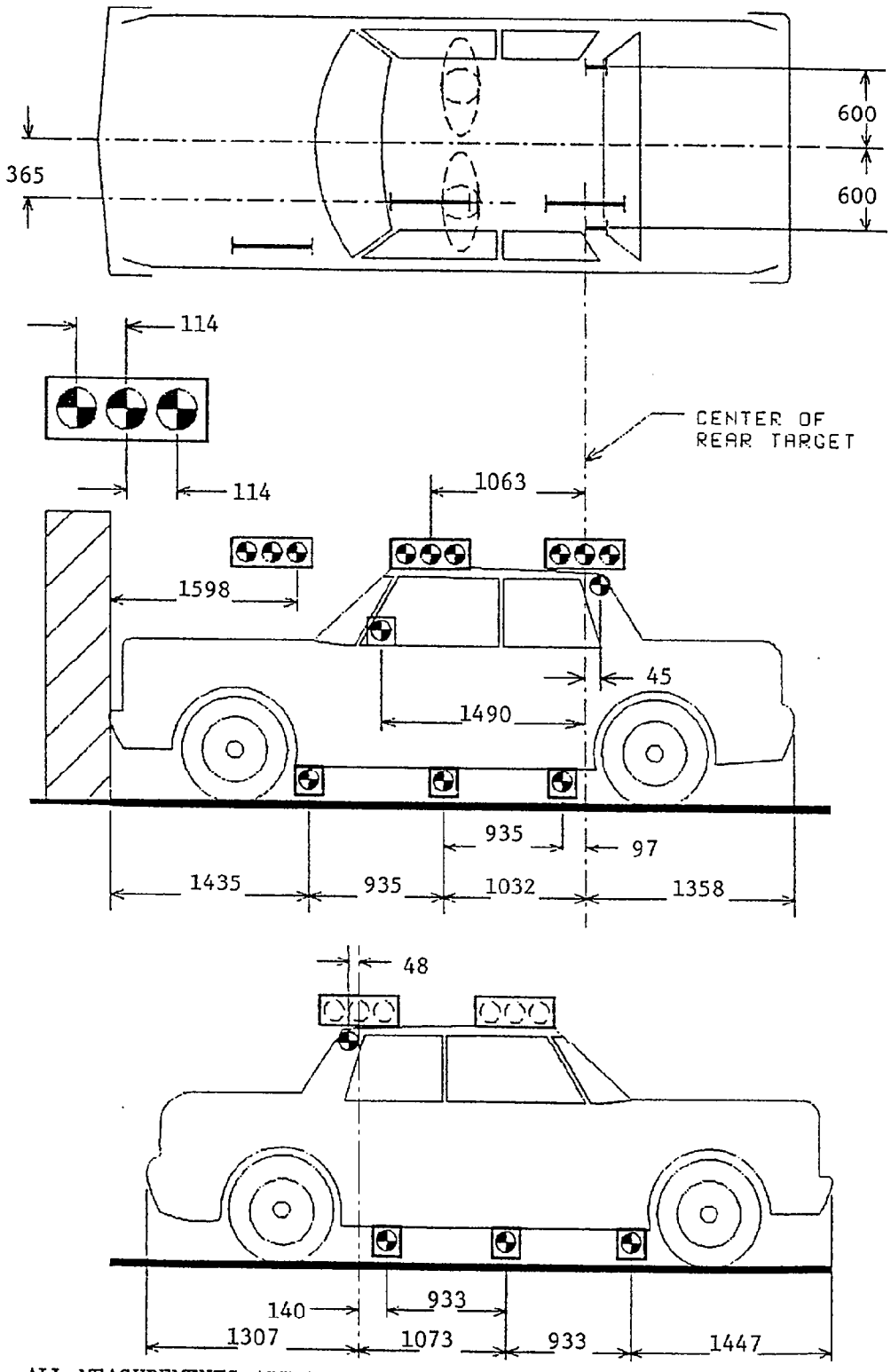
+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

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

FIGURE 11

VEHICLE TARGET LOCATIONS



ALL MEASUREMENTS ARE IN MILLIMETERS.

930308

FIGURE 12

PRE-TEST AND POST-TEST MEASUREMENT POINTS

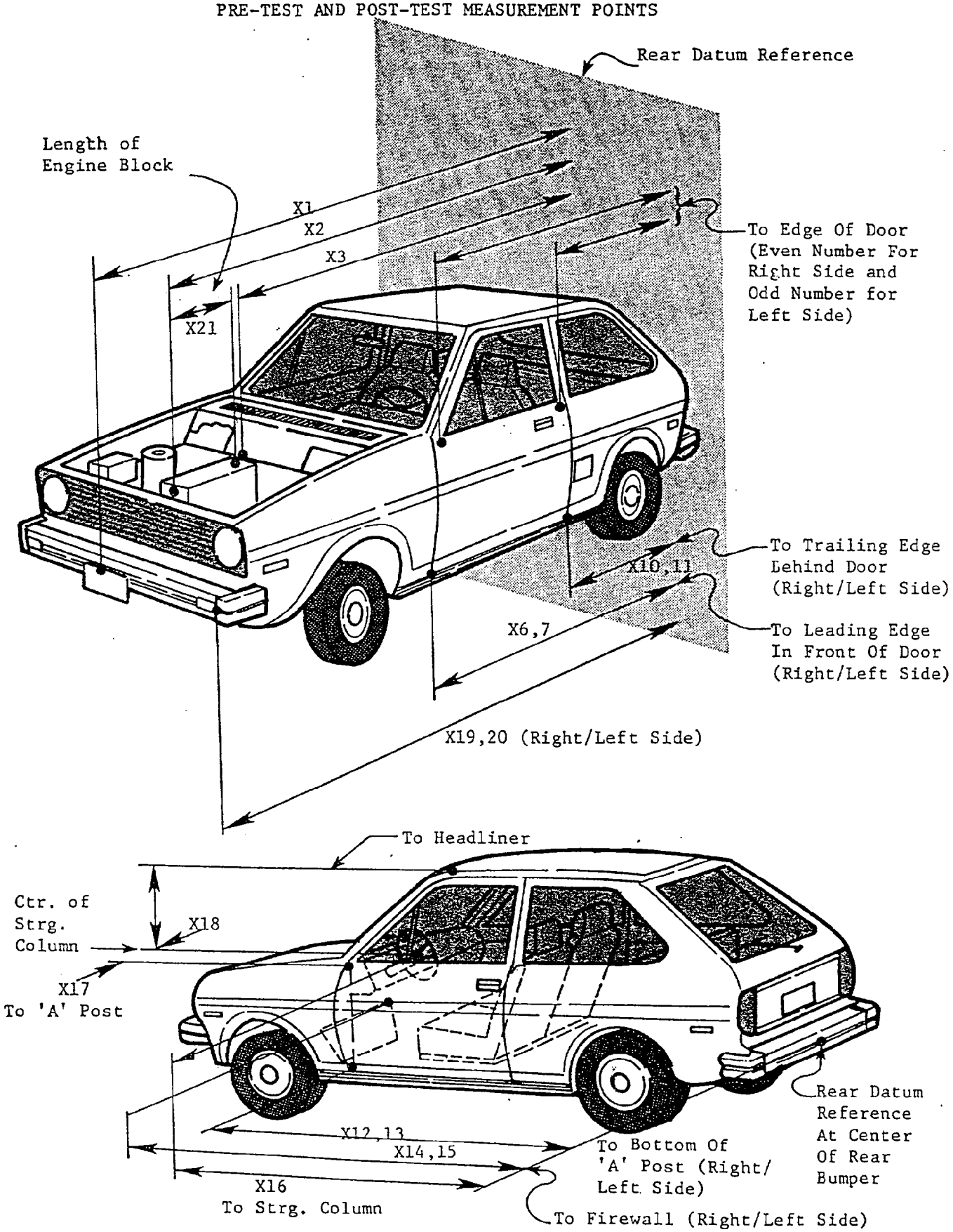


TABLE 14 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Saab/9000 TEST NUMBER: 930308

ALL MEASUREMENTS ARE IN MM

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	4760	4070	690
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	4160	3808	352
X3	REAR SURFACE OF VEHICLE TO FIREWALL	3630	3390	240
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	3224	3198	26
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	3224	3215	9
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	3218	3198	20
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	3221	3205	16
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	2152	2130	22
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	2154	2150	4
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	2185	2162	23
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	2188	2175	13
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	3213	3174	39
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	3213	3196	17
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	3582	3417	165
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	3565	3530	35
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	2785	2758	27
X17	CENTER OF STEERING COLUMN TO "A" POST	280	285	-5
X18	CENTER OF STEERING COLUMN TO HEADLINER	463	403	60
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	4612	4028	584
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	4610	4015	595
X21	LENGTH OF ENGINE BLOCK	495	495	0

APPENDIX A

PHOTOGRAPHS

Intentionally Left Blank

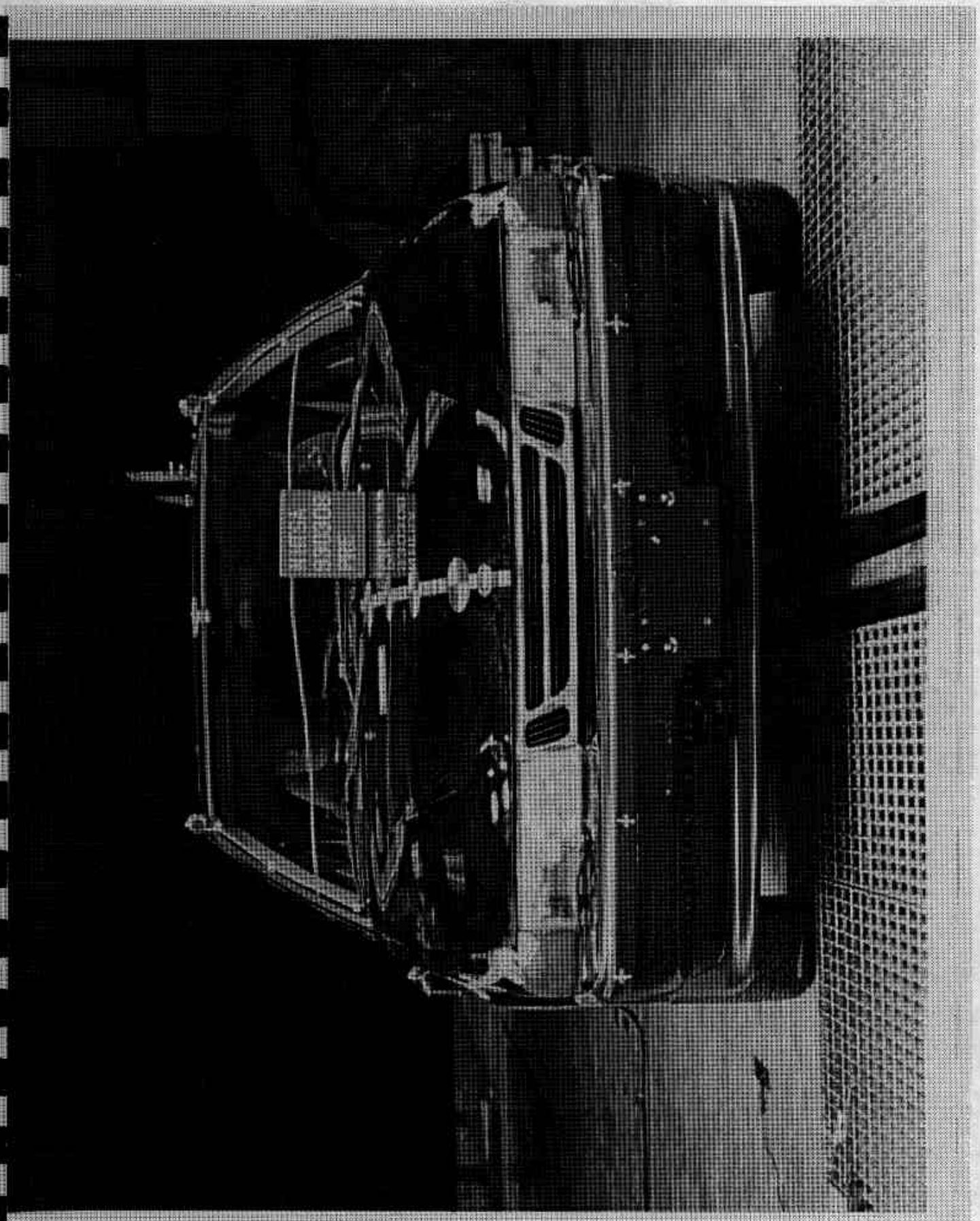


Figure A-1. PRE-TEST FRONT VIEW

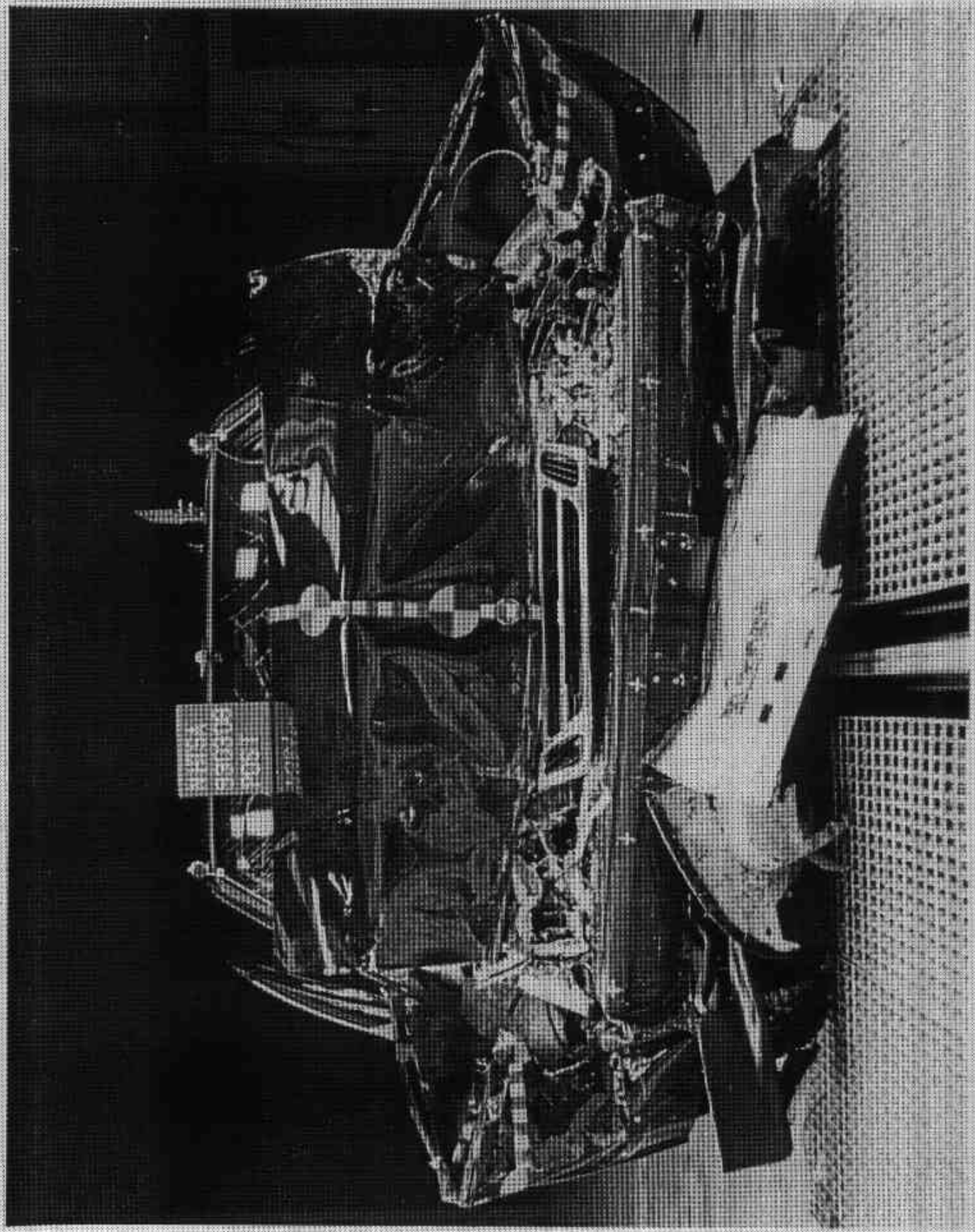


Figure A-2. POST-TEST FRONT VIEW

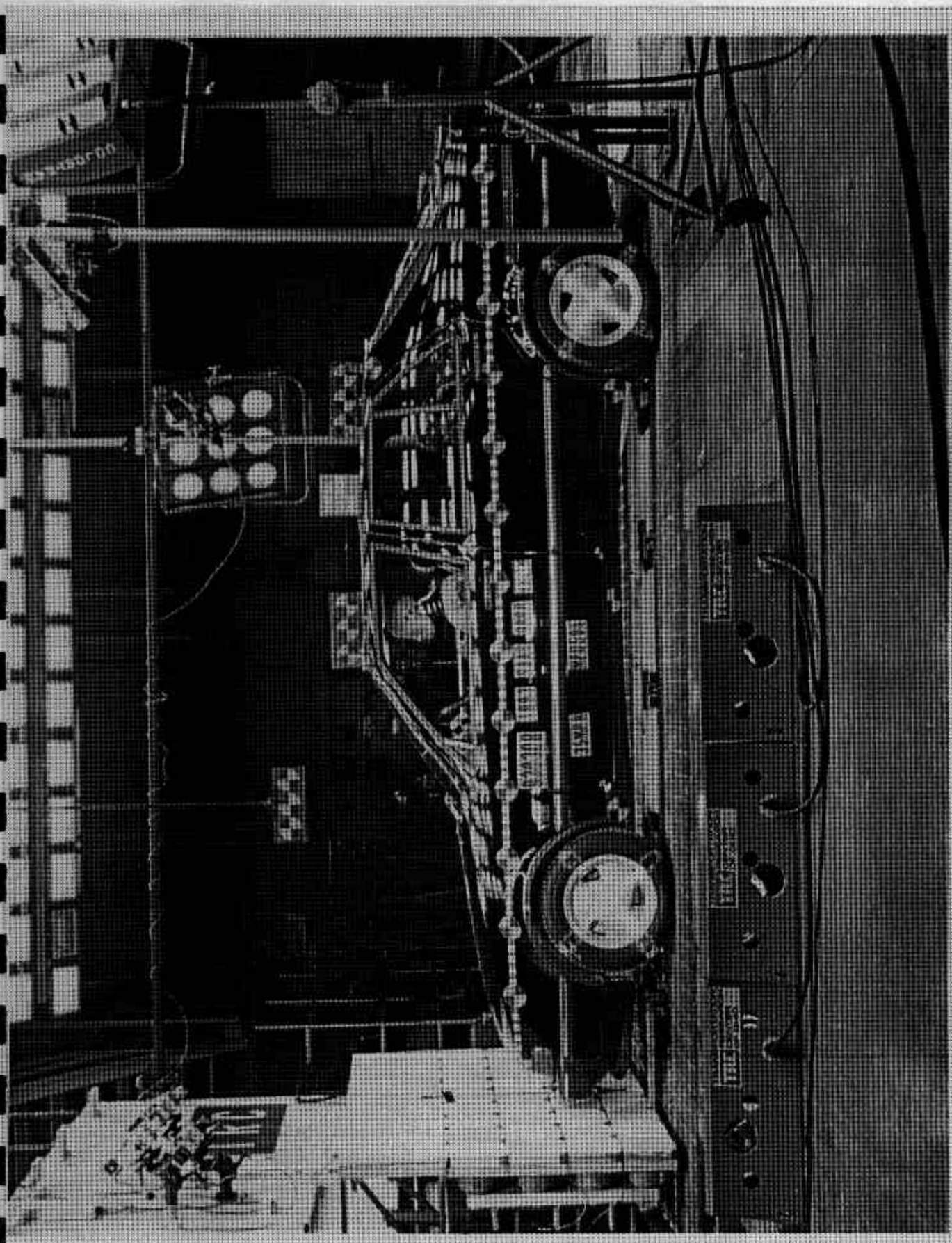


Figure A-3. PRE-TEST LEFT SIDE VIEW

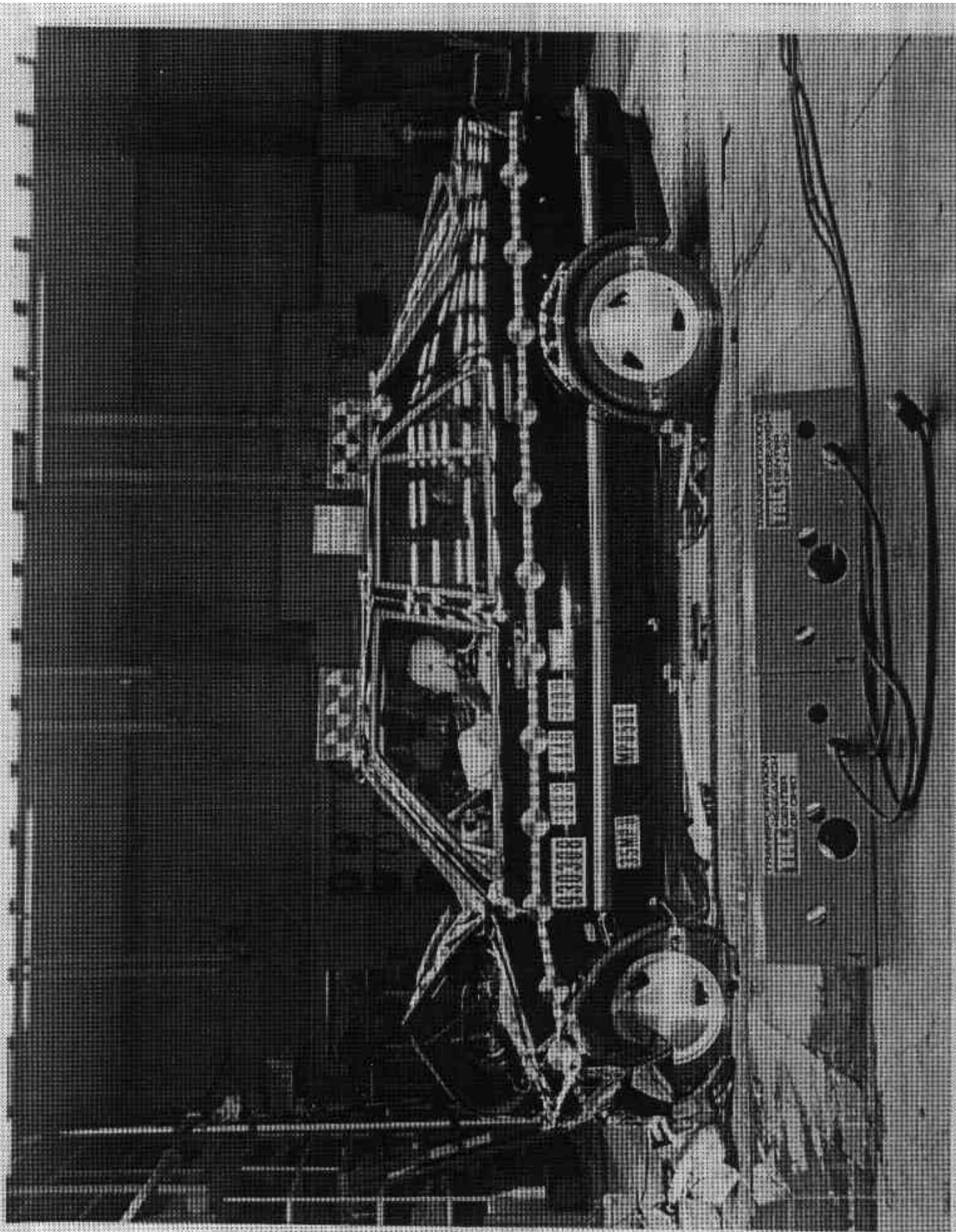


Figure A-4. POST-TEST LEFT SIDE VIEW

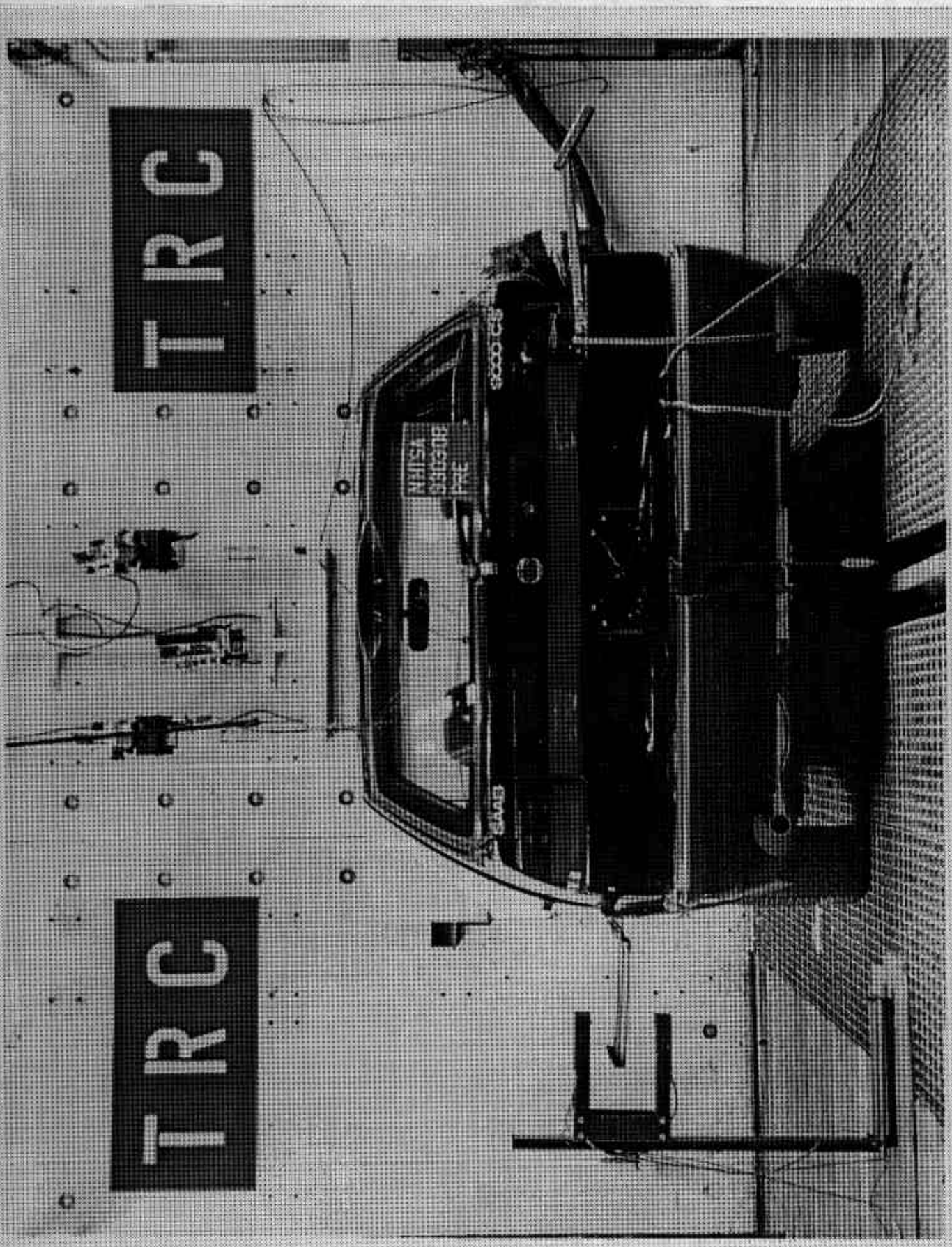


Figure A-5. PRE-TEST REAR VIEW

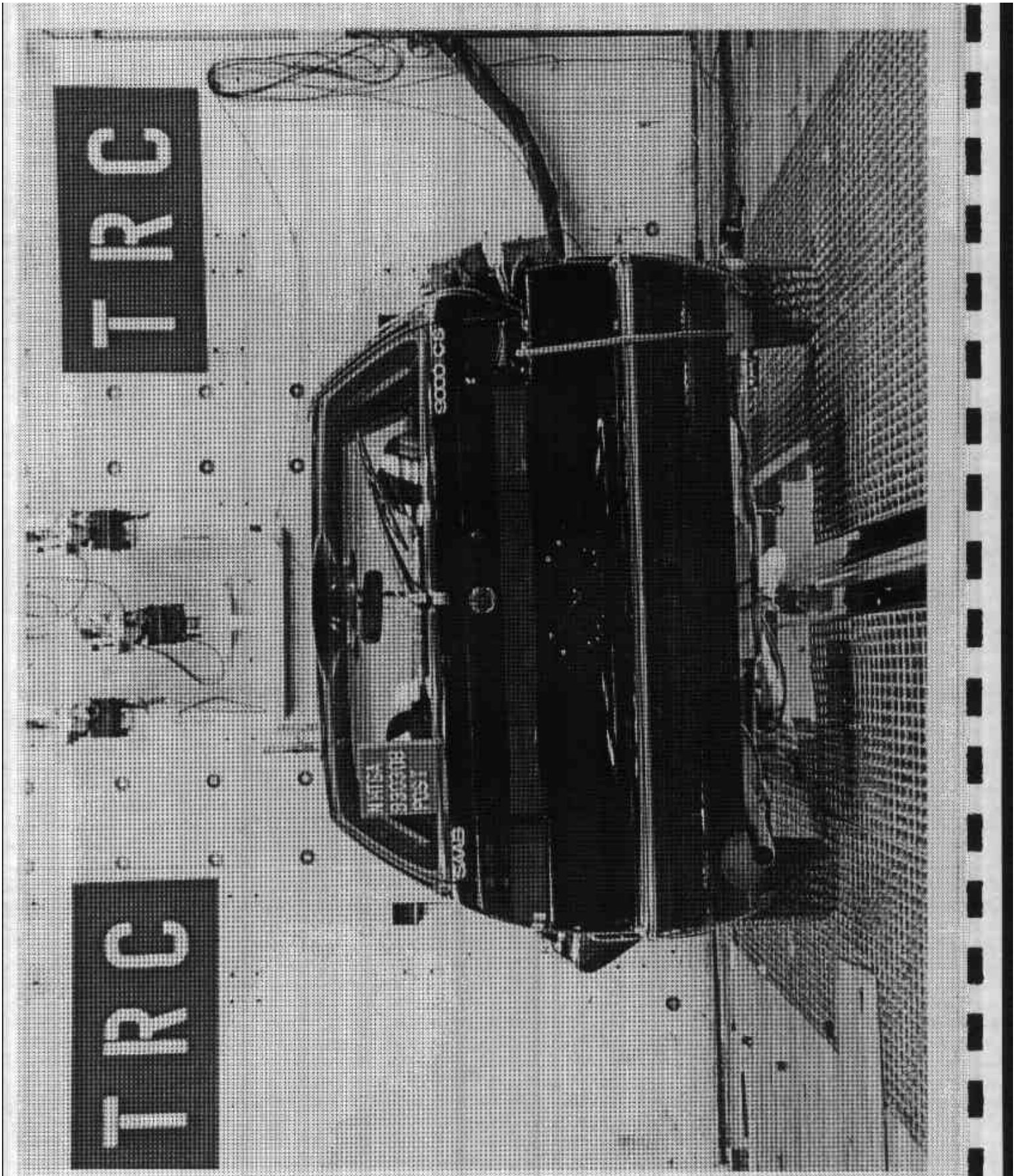


Figure A-6. POST-TEST REAR VIEW

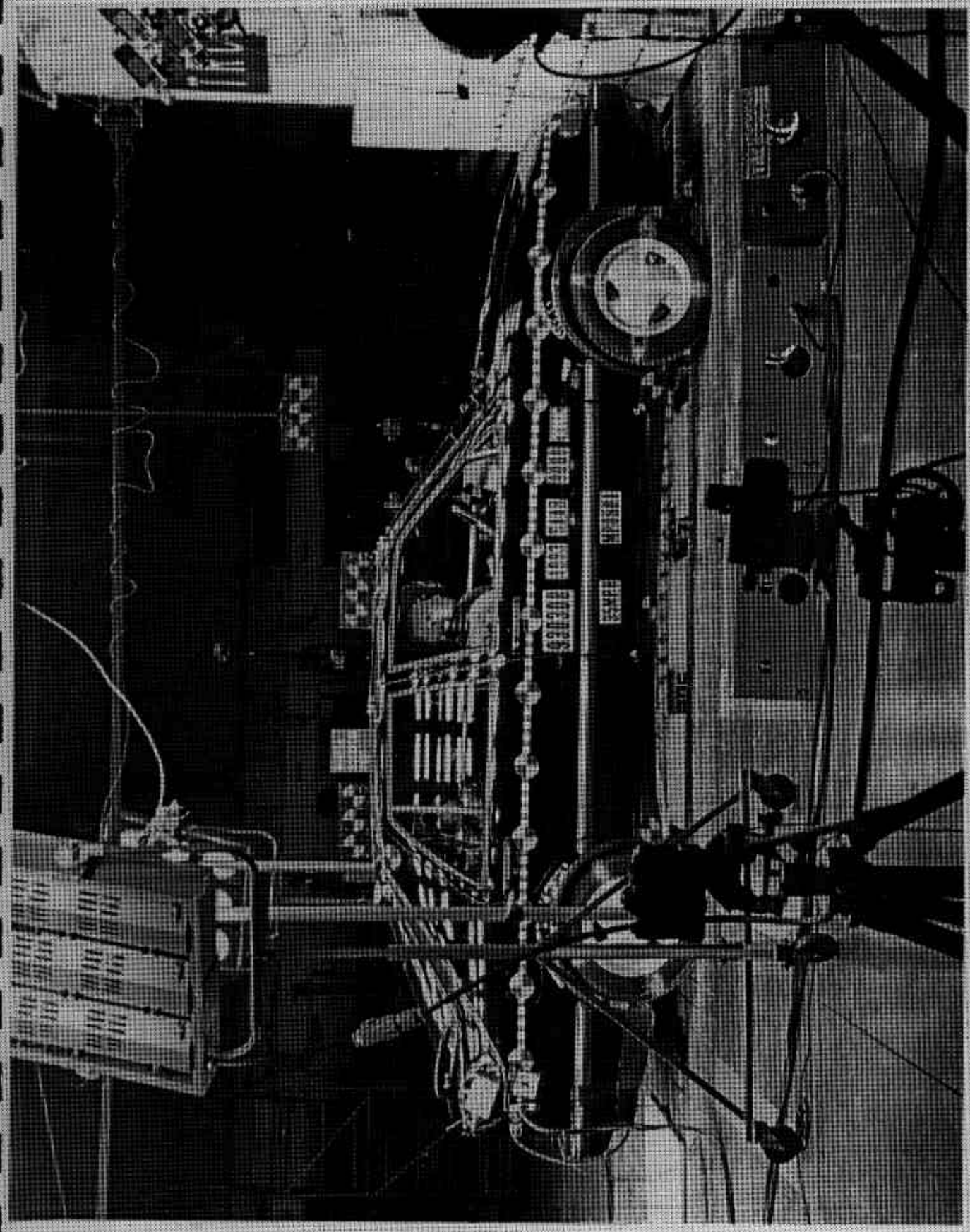


Figure A-7. PRE-TEST RIGHT SIDE VIEW

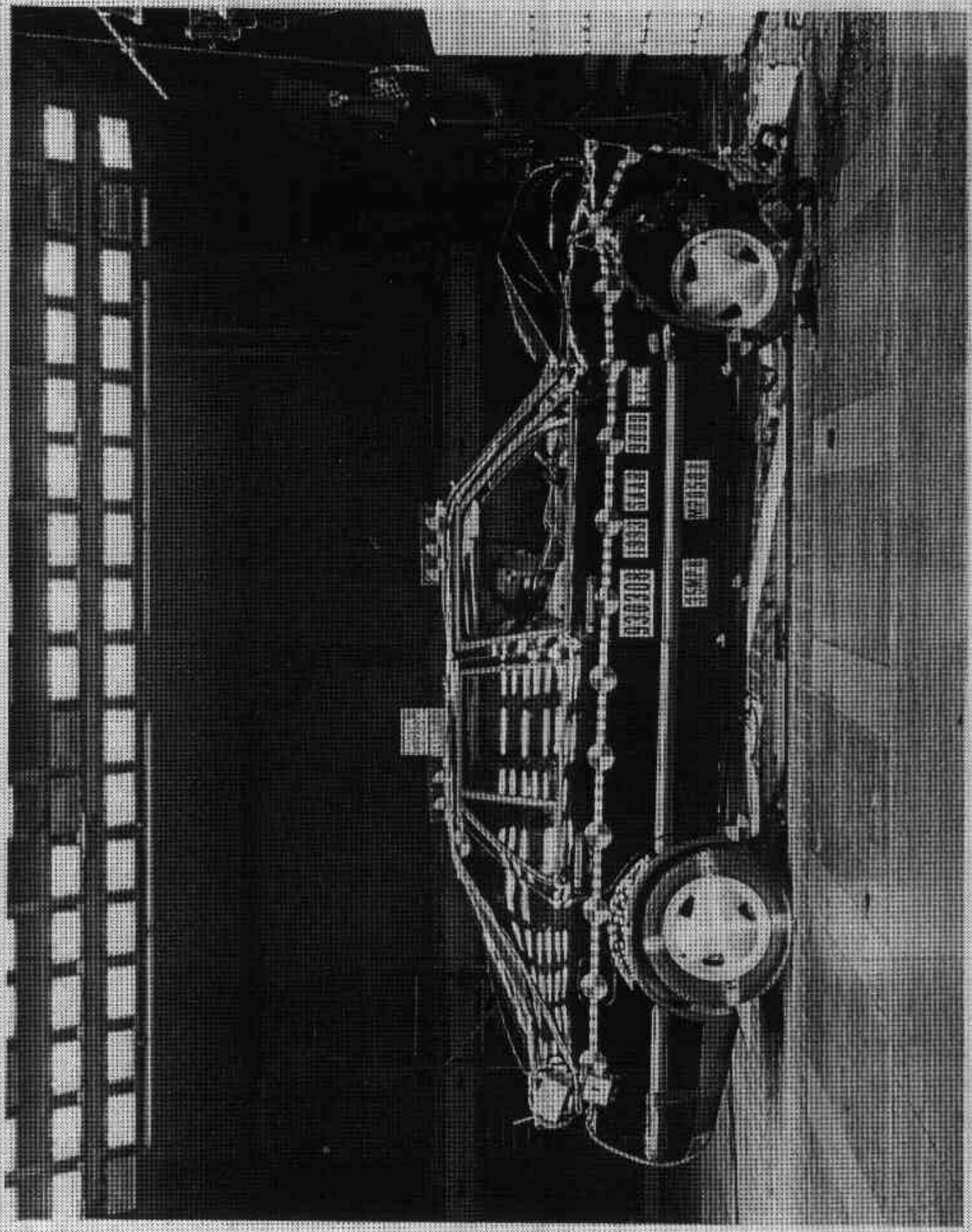


Figure A-8. POST-TEST RIGHT SIDE VIEW

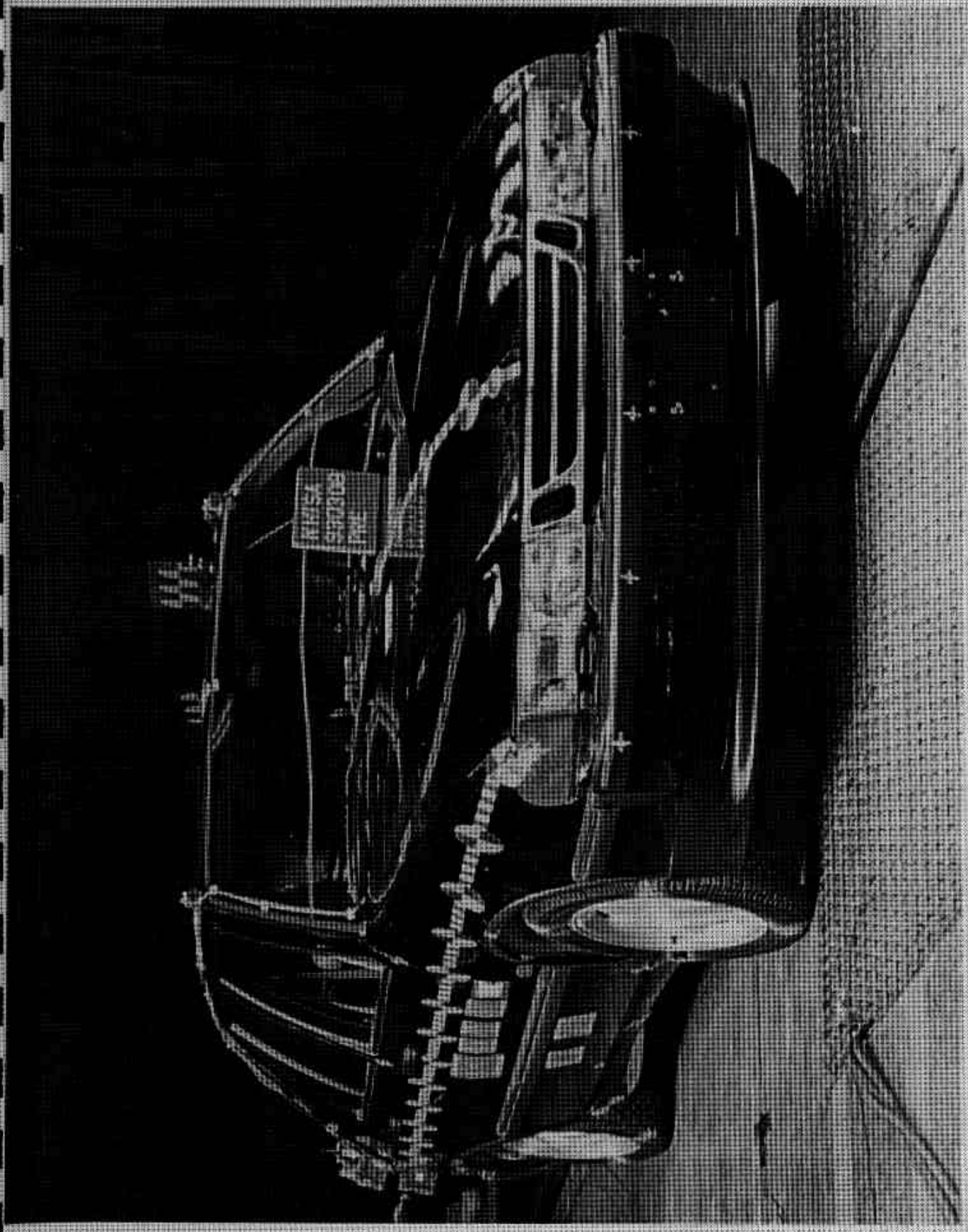


Figure A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

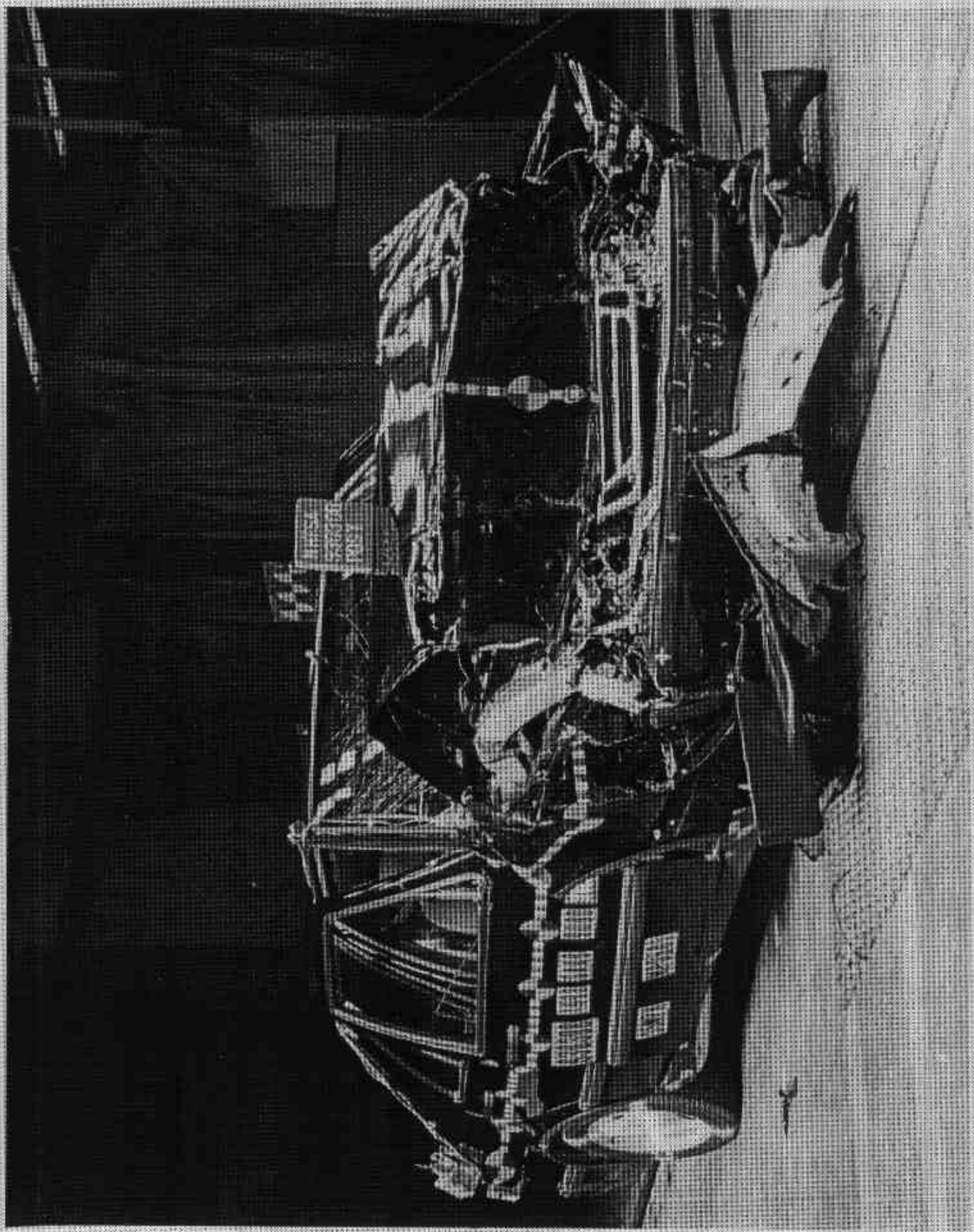


Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

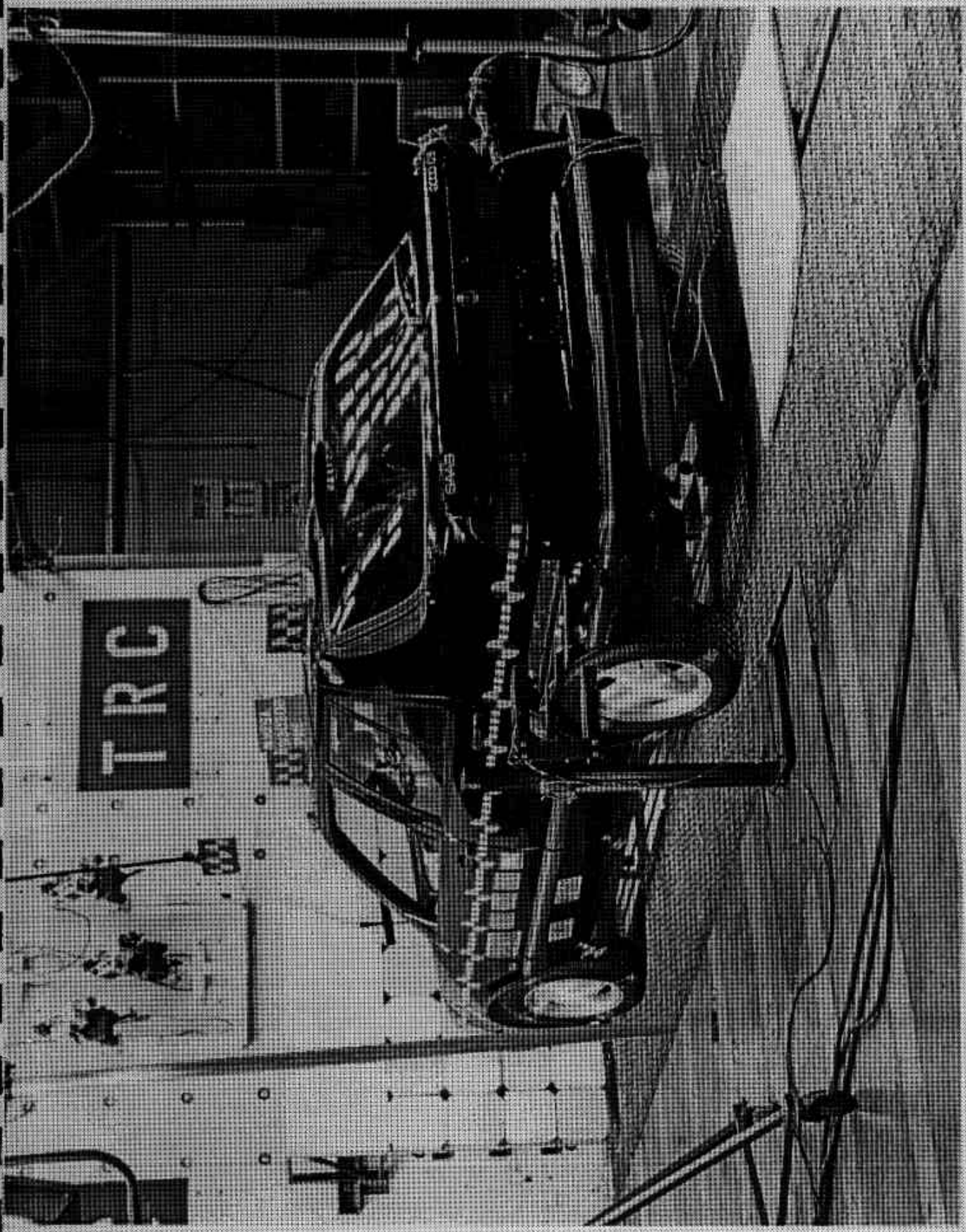


Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW

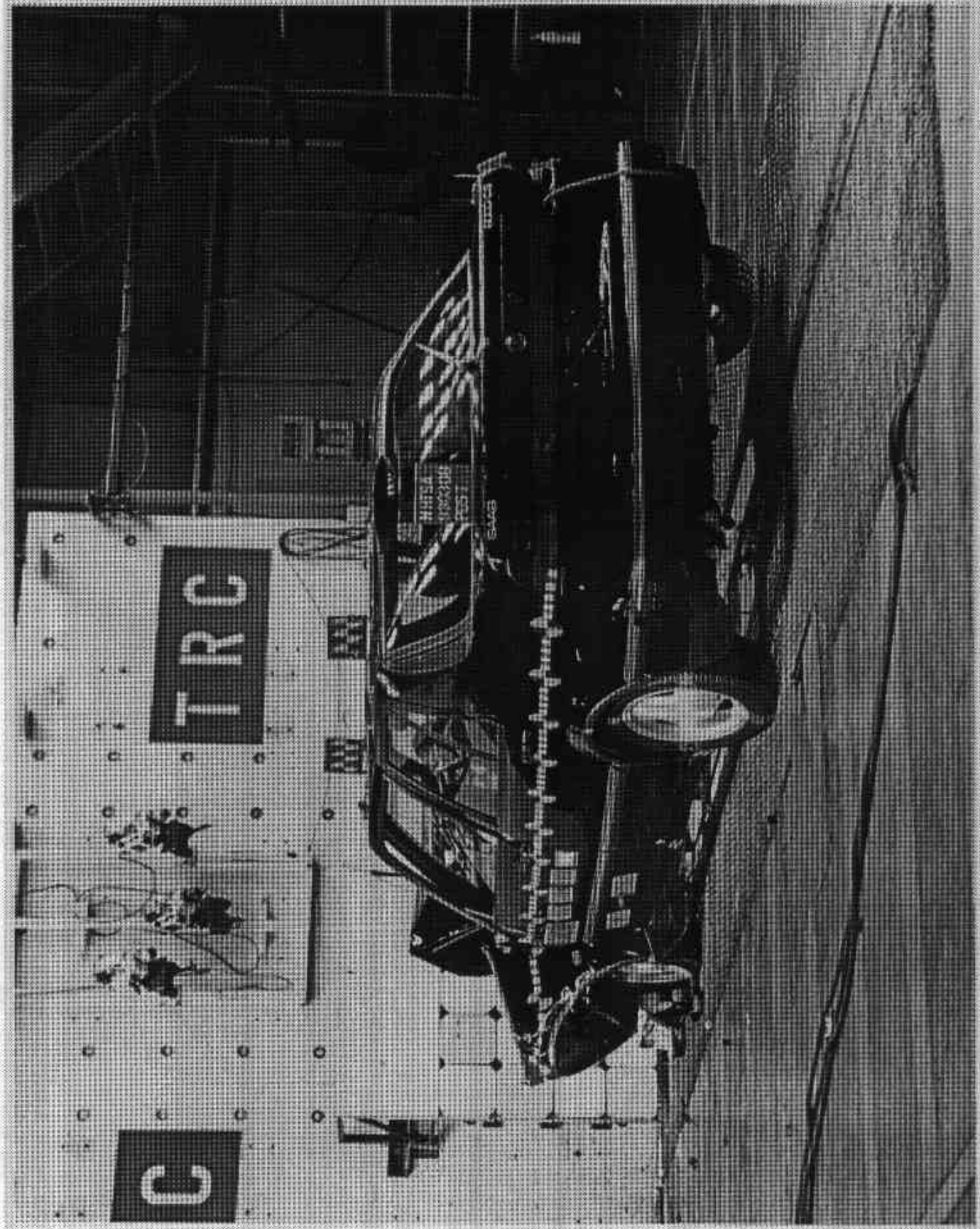


Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

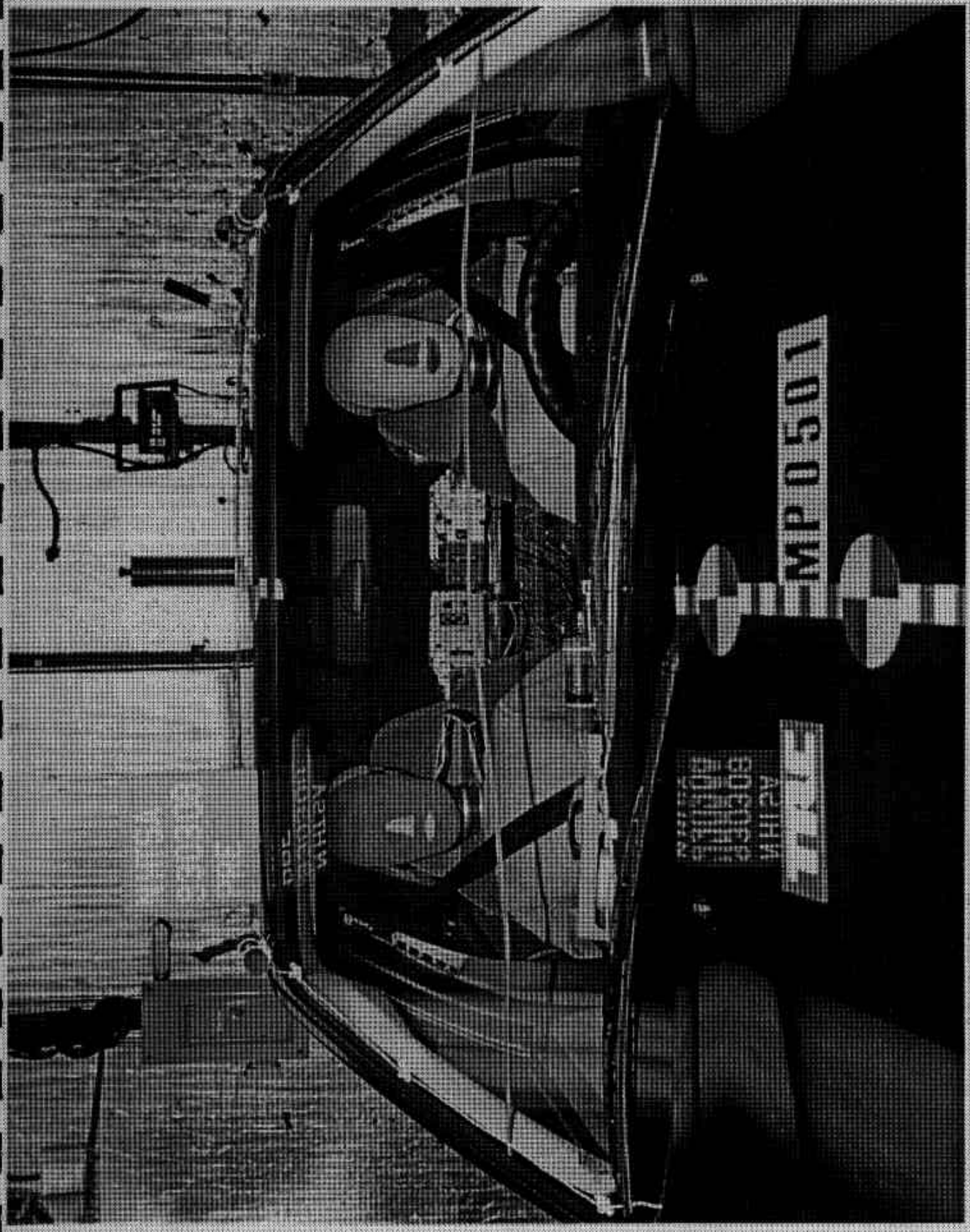


Figure A-13. PRE-TEST WINDSHIELD VIEW

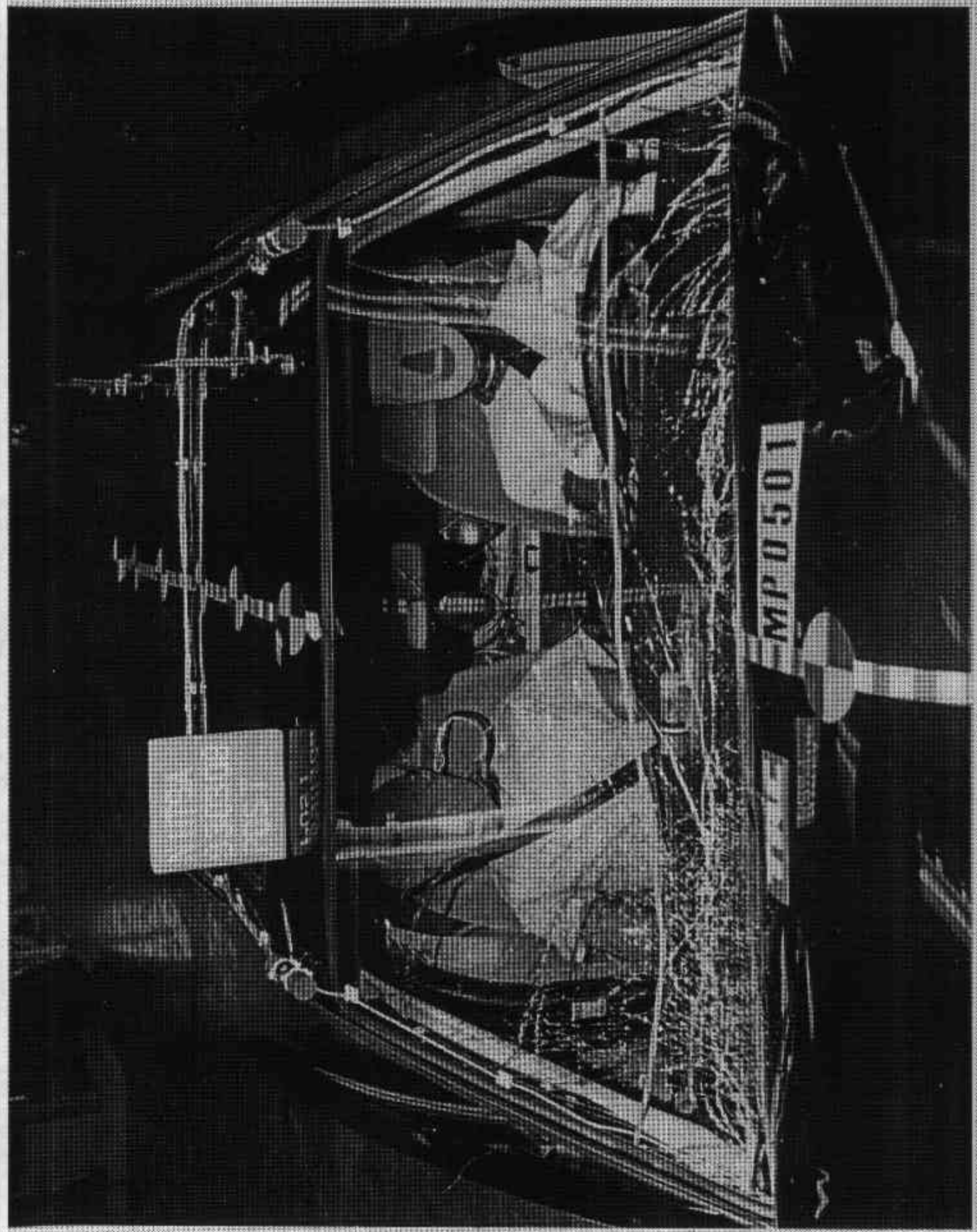


Figure A-14. POST-TEST WINDSHIELD VIEW

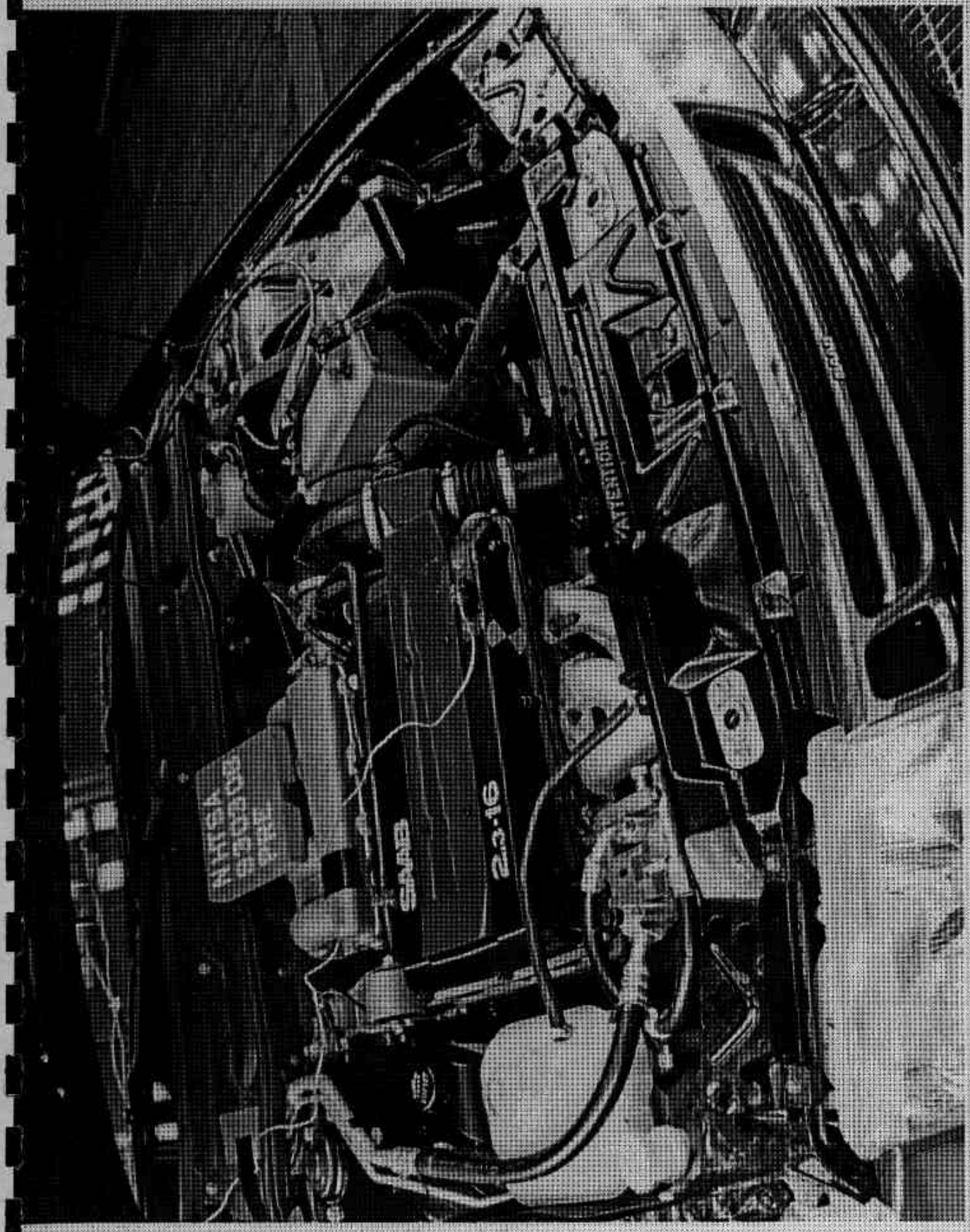


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW

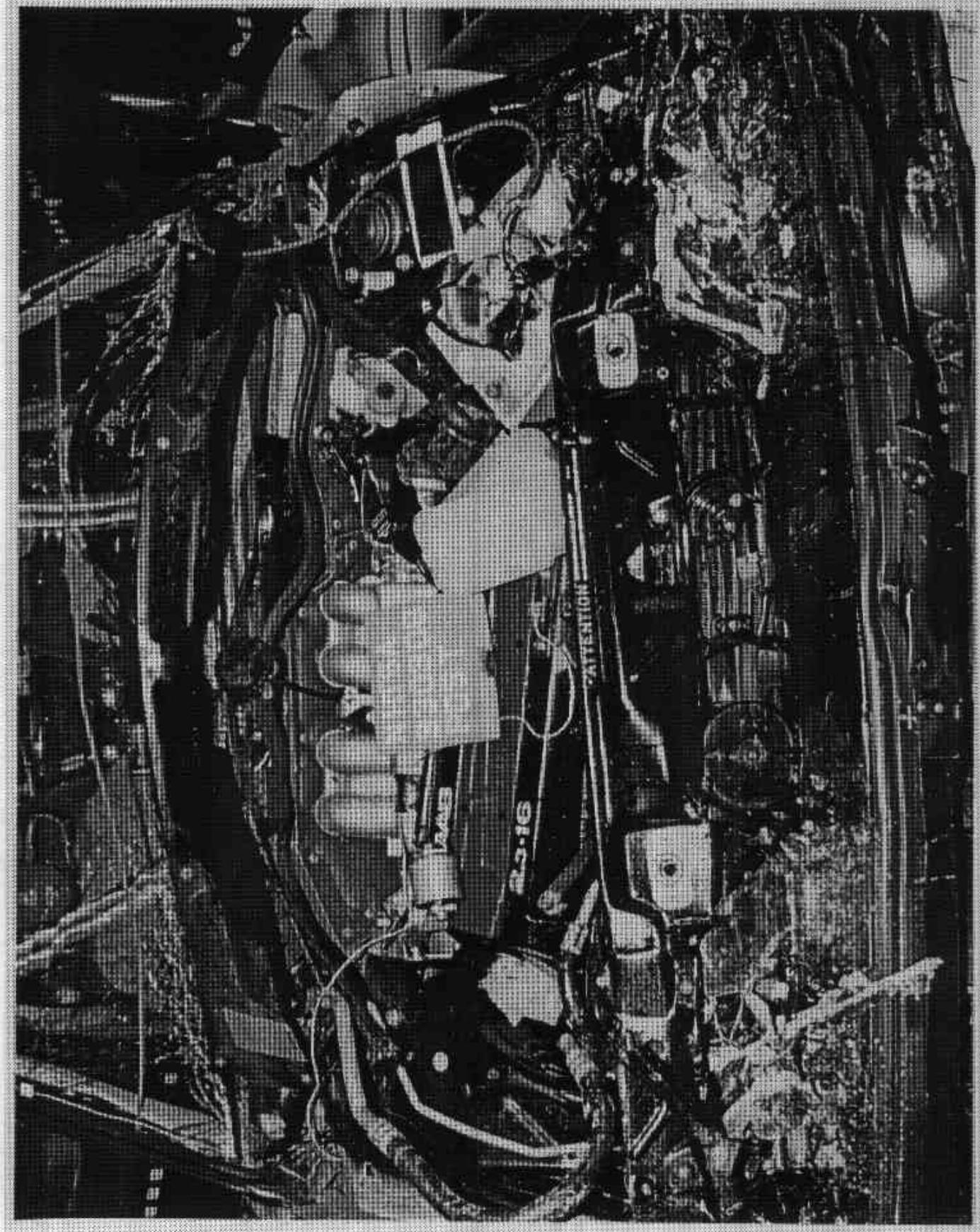


Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW

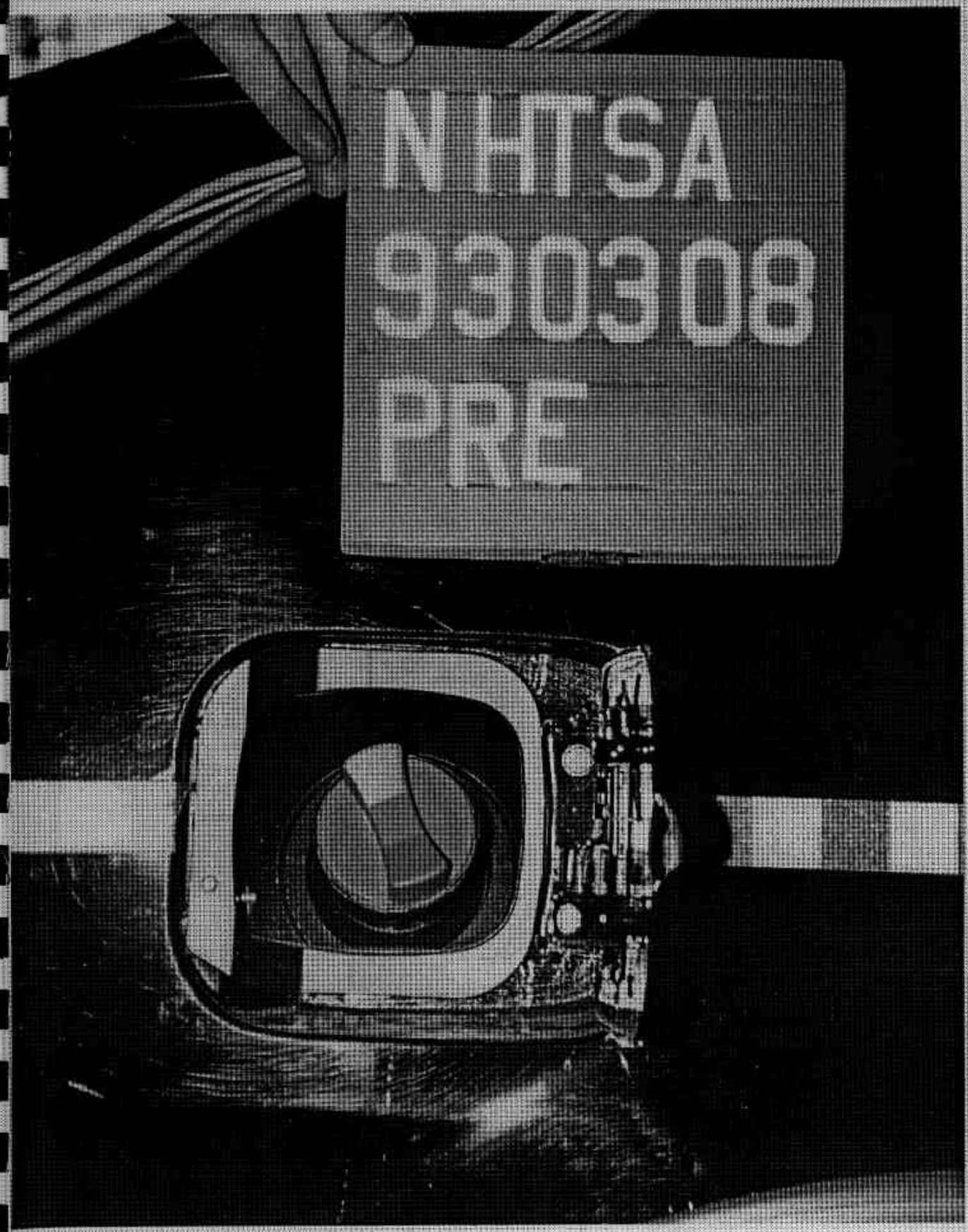


Figure A-17. PRE-TEST FUEL FILLER CAP VIEW

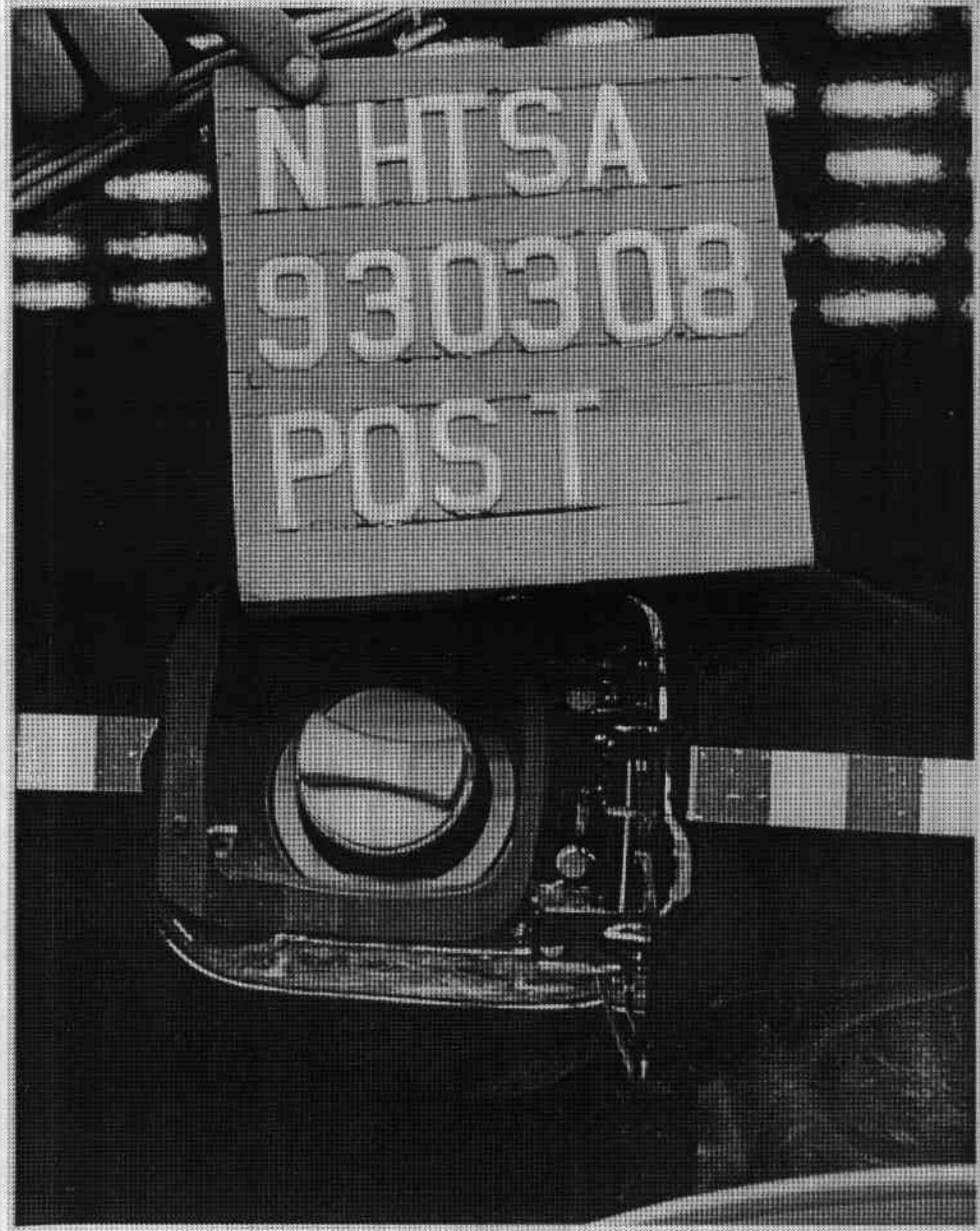


Figure A-18. POST-TEST FUEL FILLER CAP VIEW

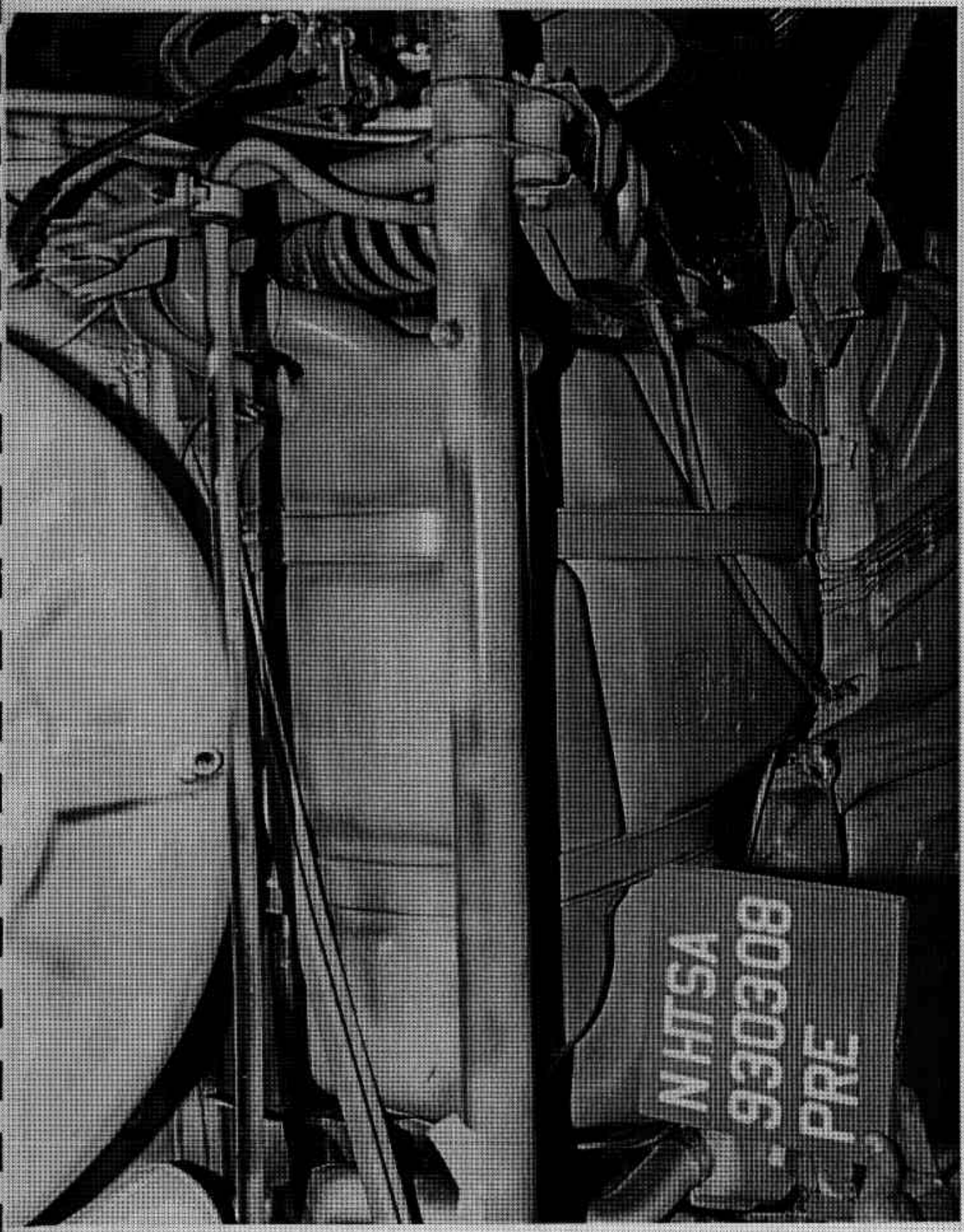


Figure A-19. PRE-TEST FUEL FILLER NECK & FUEL TANK VIEW

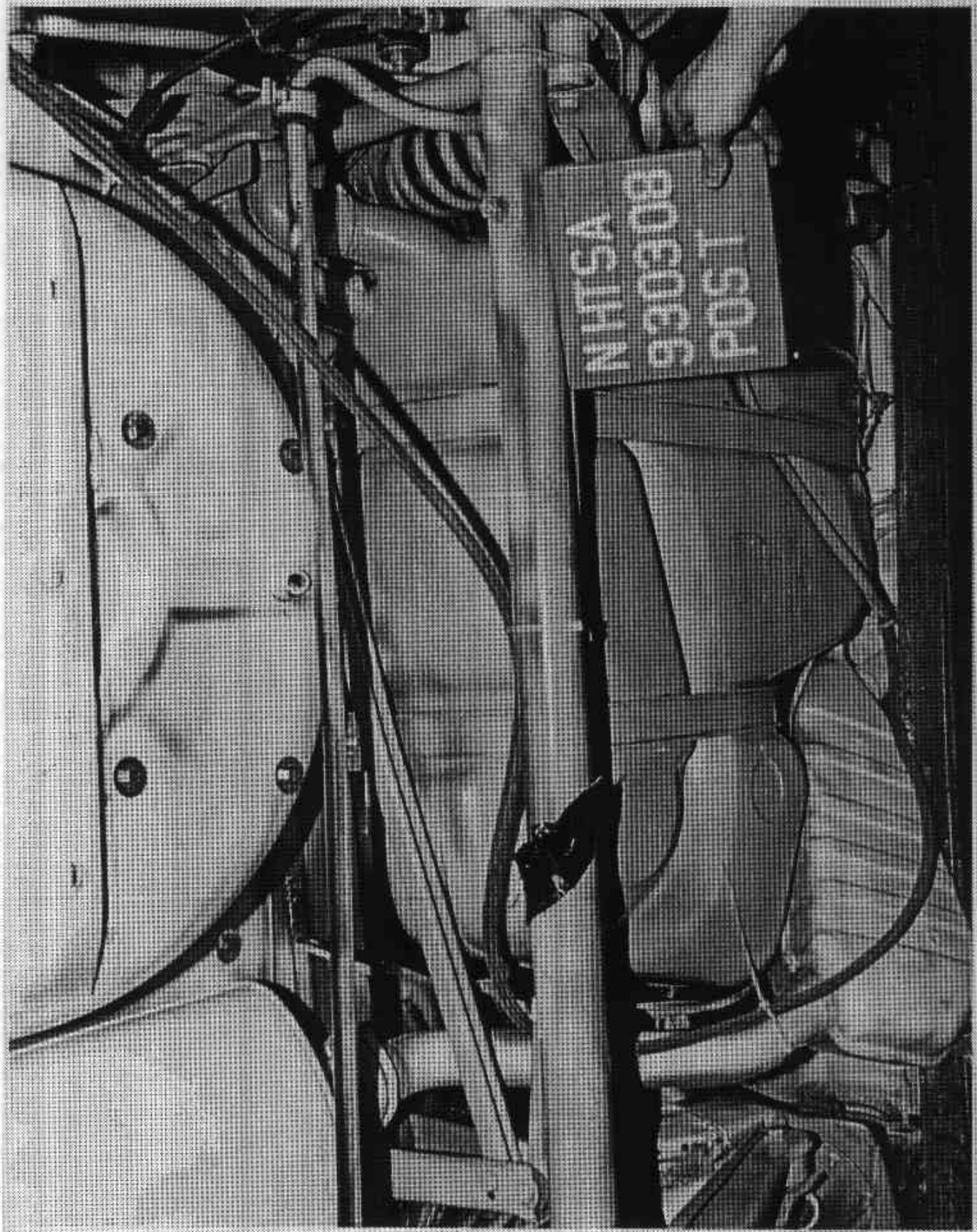


Figure A-20. POST-TEST FUEL FILLER NECK & FUEL TANK VIEW

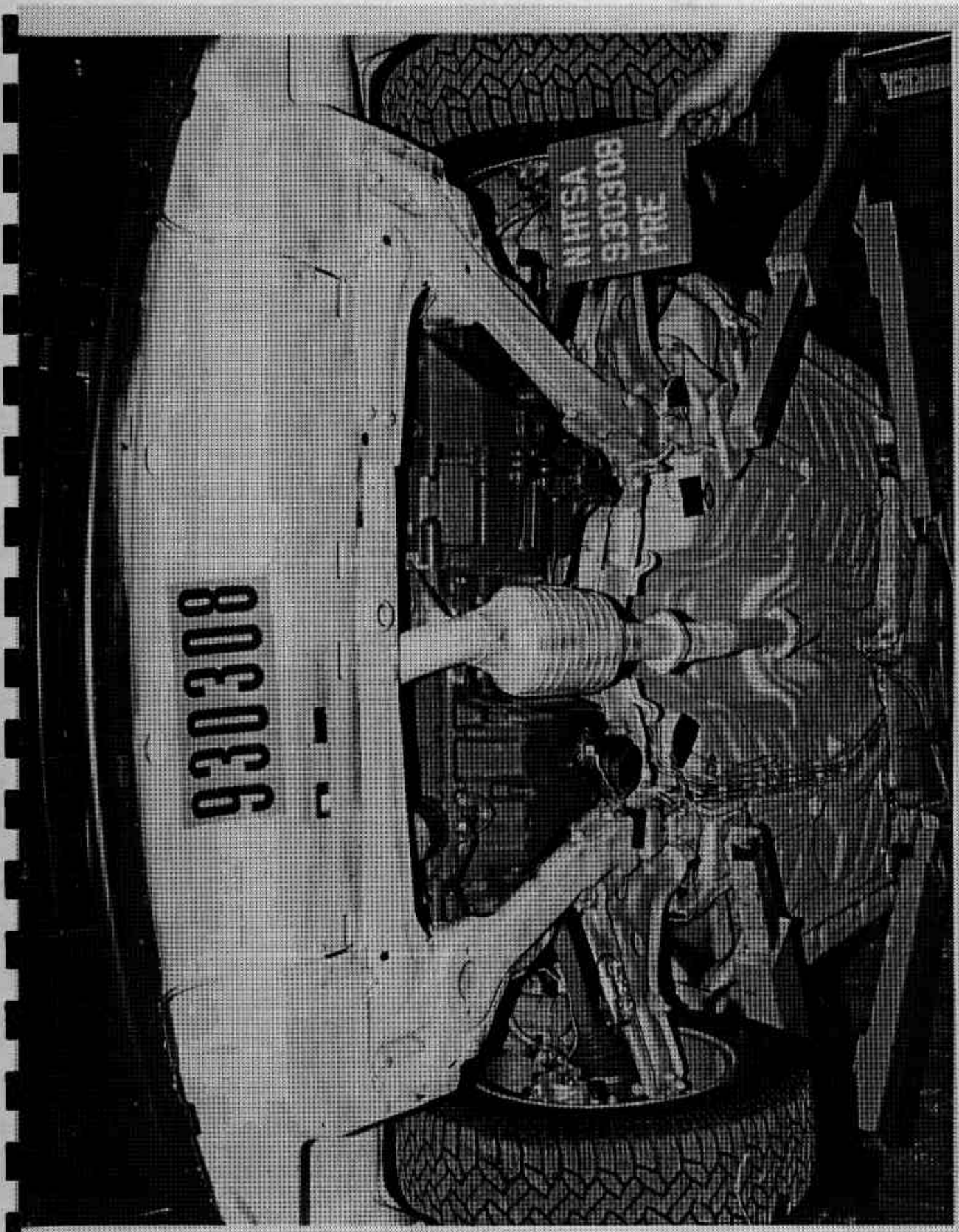


Figure A-21. PRE-TEST FRONT UNDERBODY VIEW

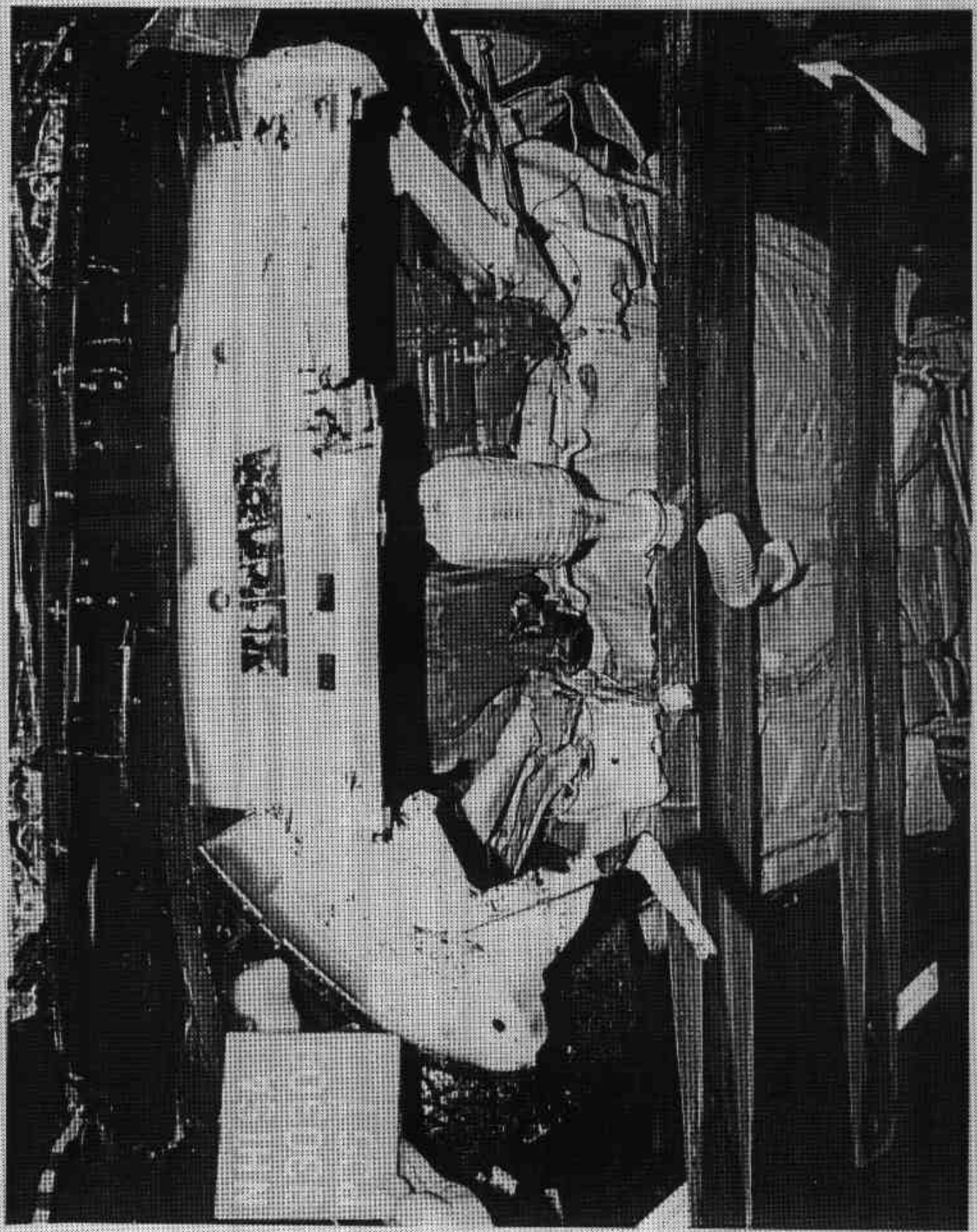


Figure A-22. POST-TEST FRONT UNDERBODY VIEW

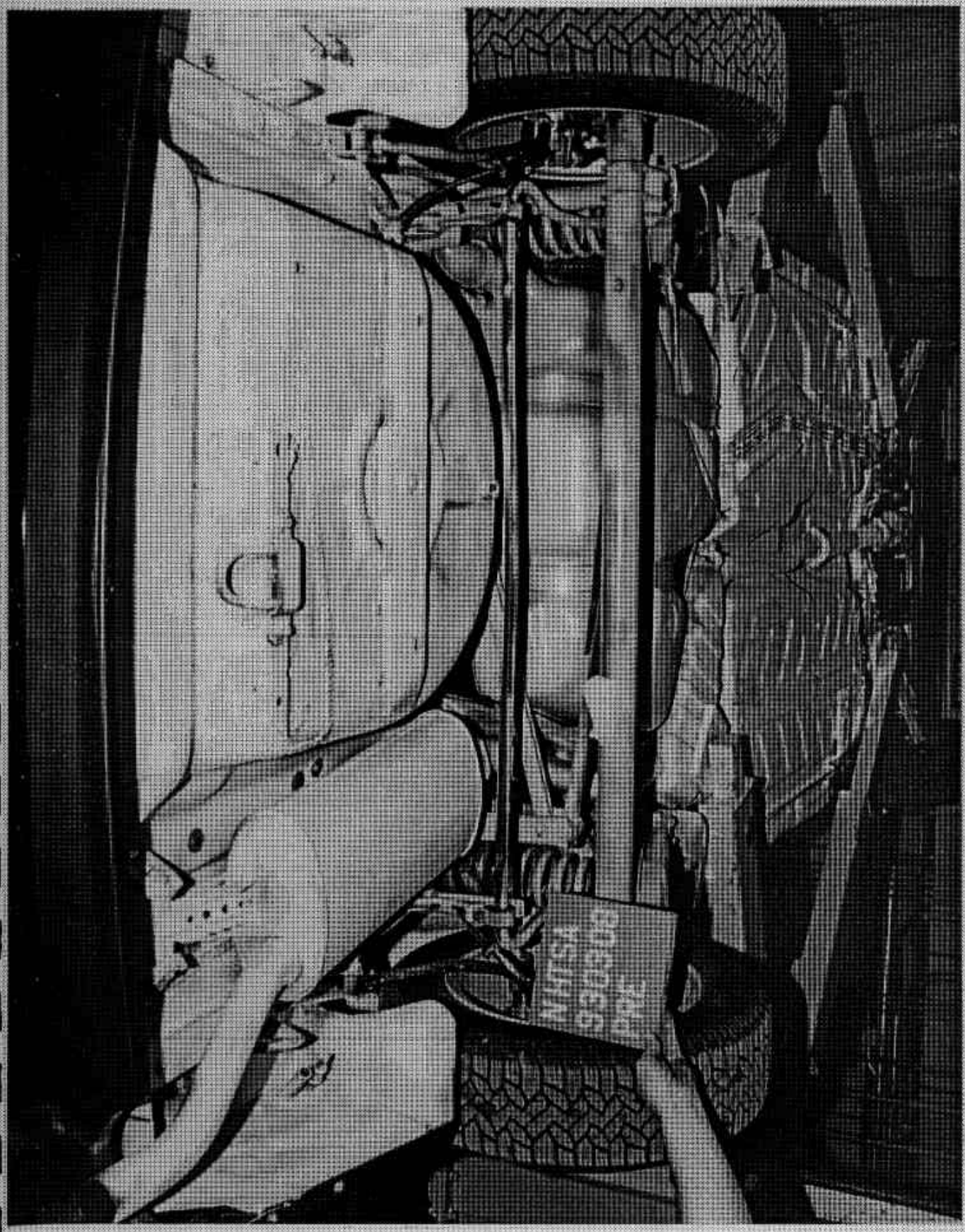


Figure A-23. PRE-TEST REAR UNDERBODY VIEW

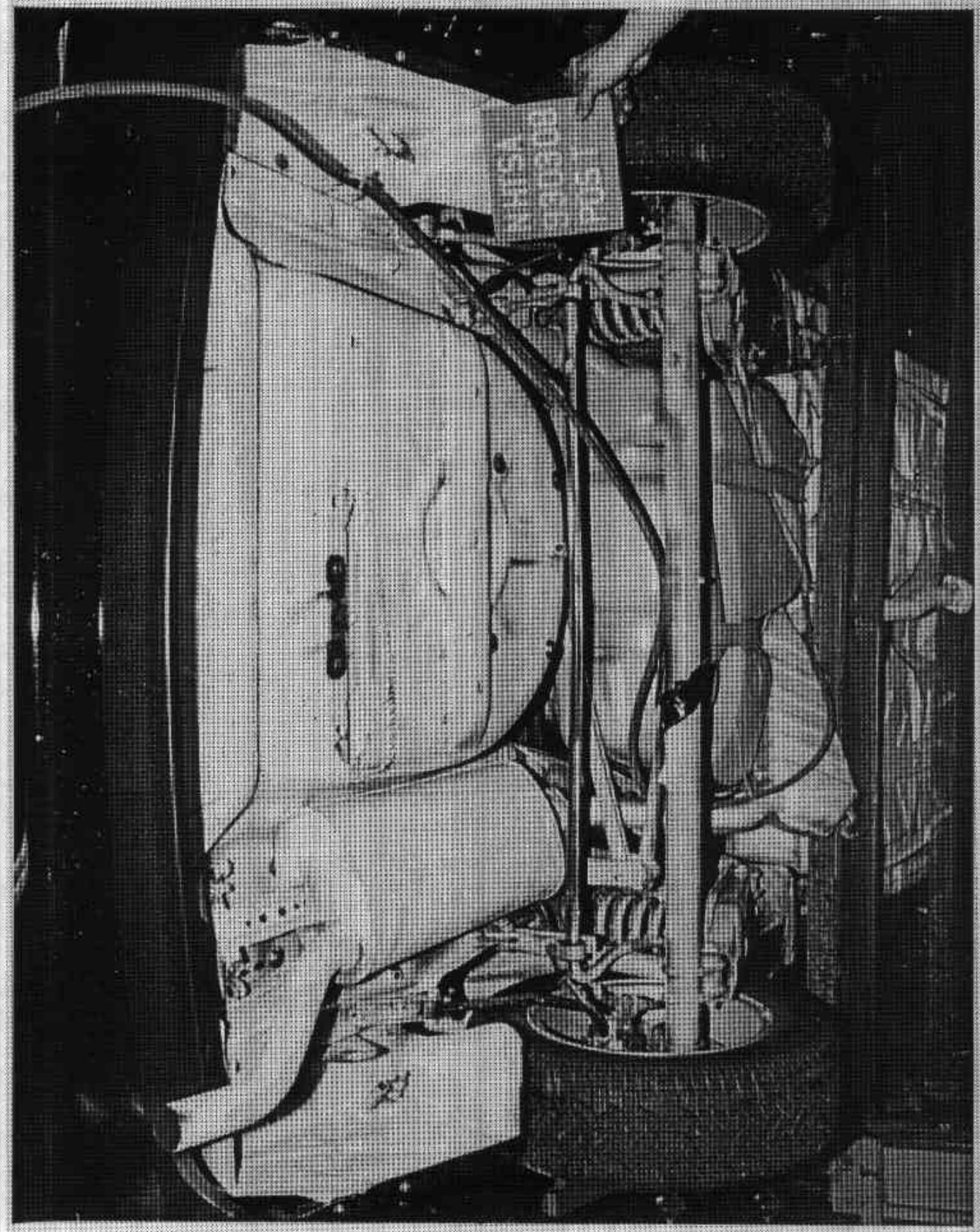


Figure A-24. POST-TEST REAR UNDERBODY VIEW

Figure A-25. PRE-TEST DRIVER DUMMY POSITION VIEW

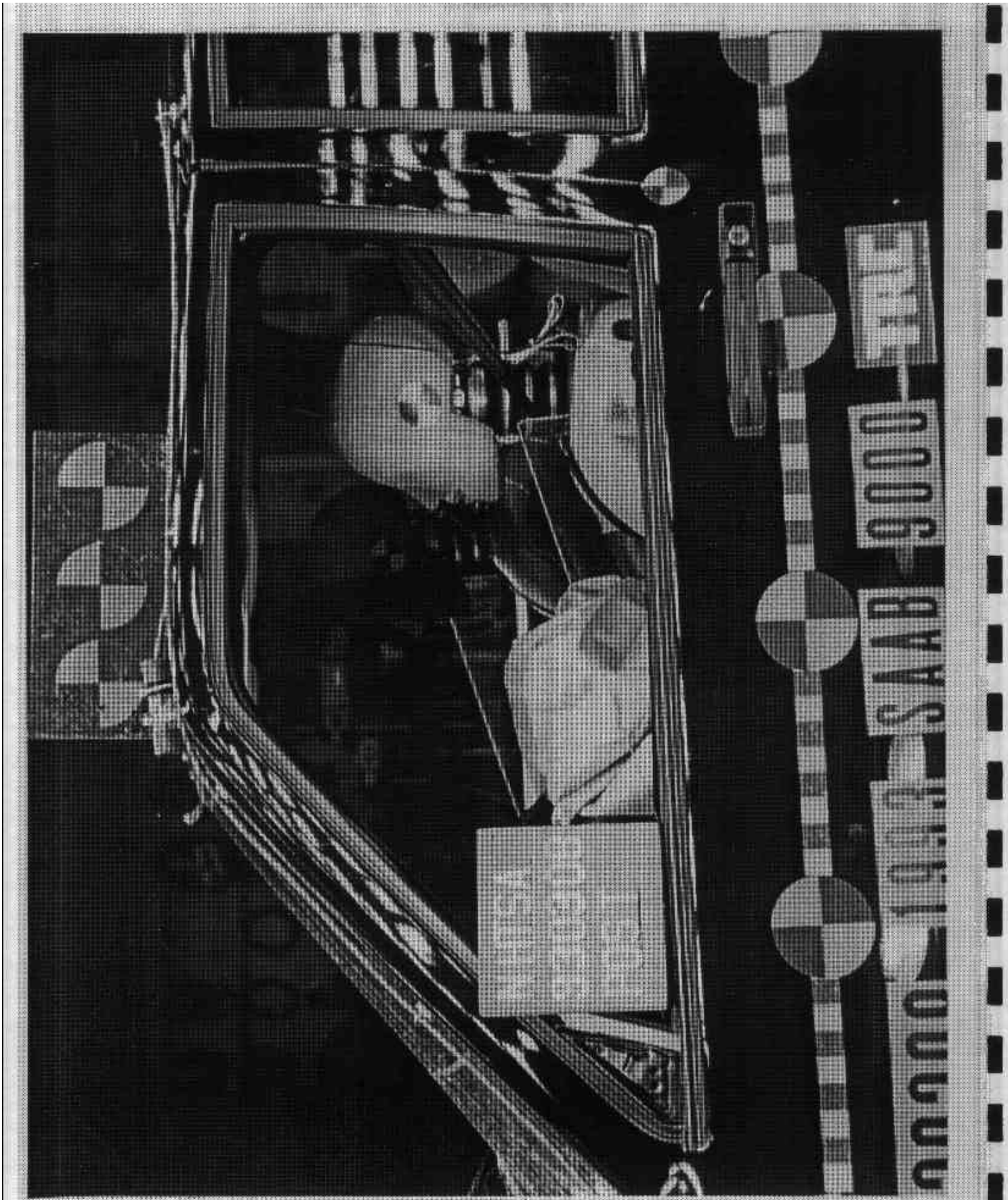


Figure A-26. POST-TEST DRIVER DUMMY POSITION VIEW

Figure A-27. PRE-TEST PASSENGER DUMMY POSITION VIEW

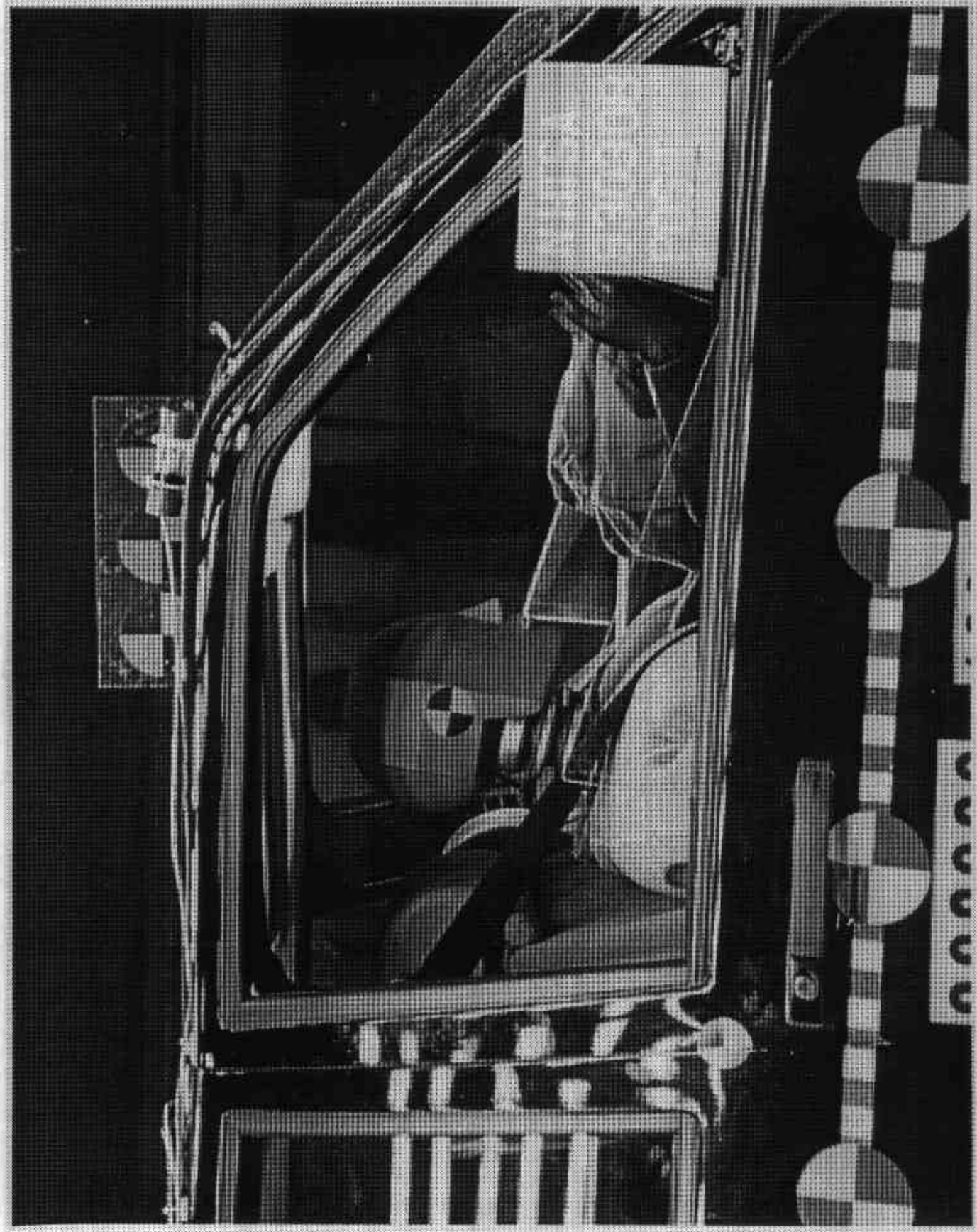


Figure A-28. POST-TEST PASSENGER DUMMY POSITION VIEW

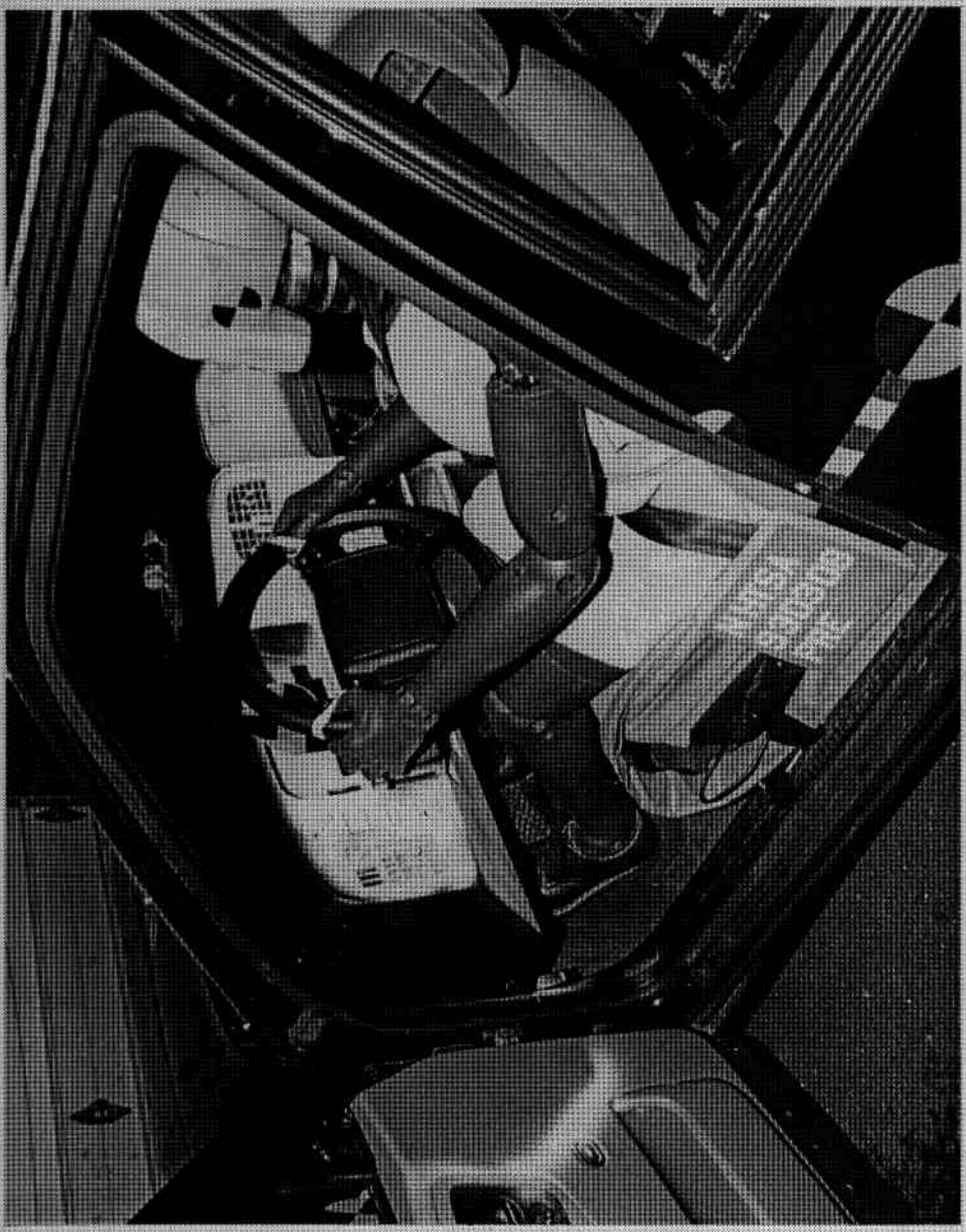


Figure A-29. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

Figure A-30. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1

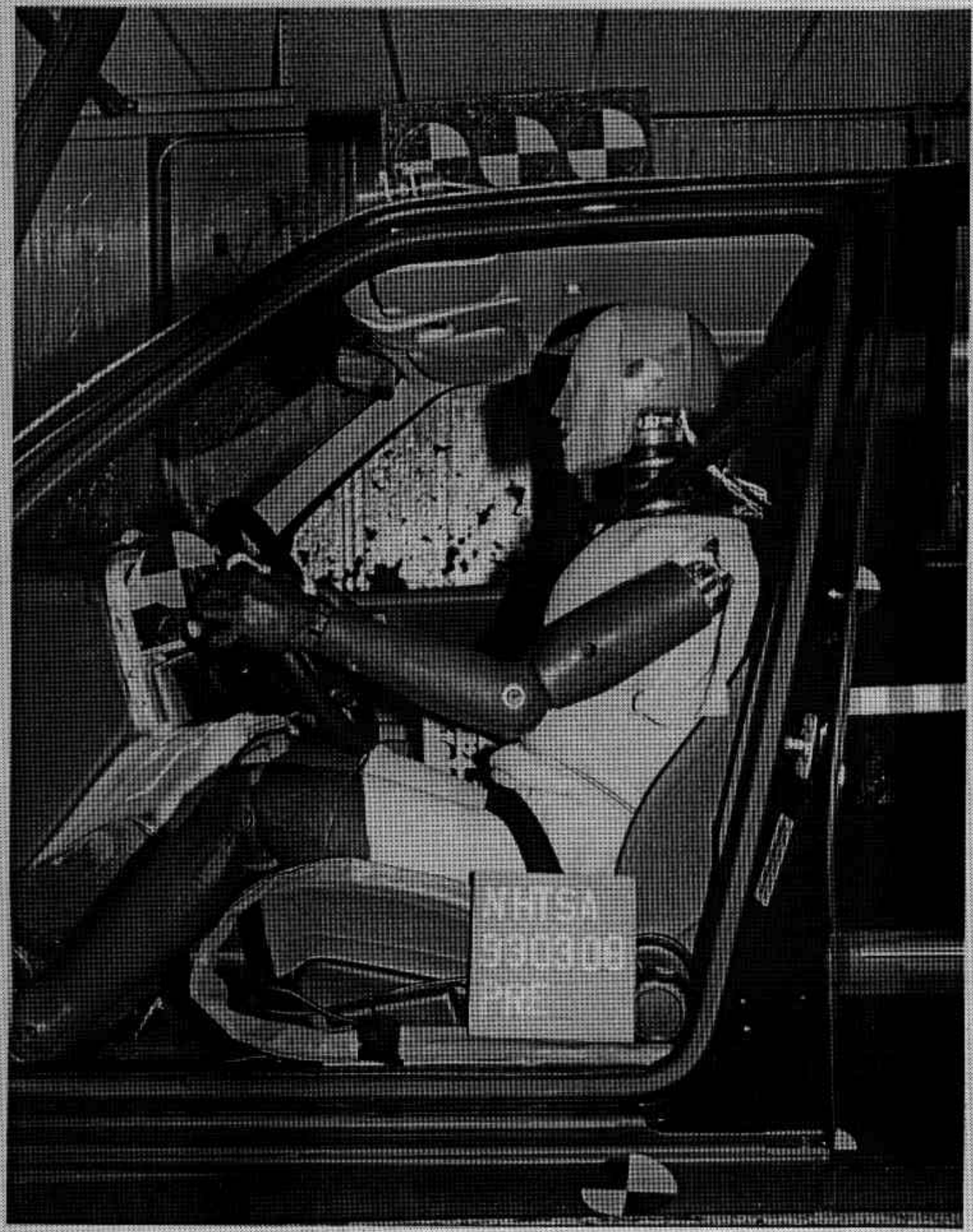


Figure A-31. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

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

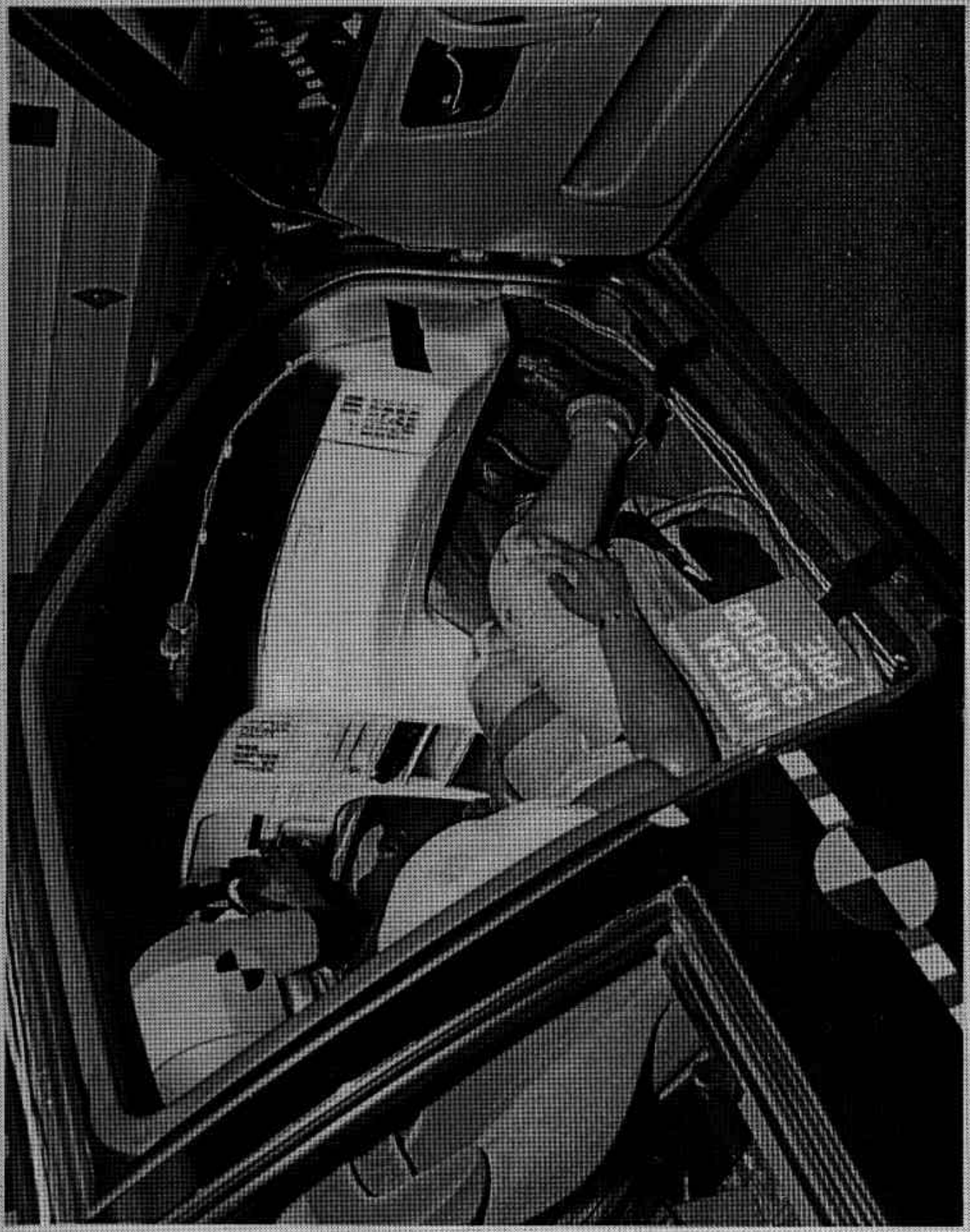


Figure A-33. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

Figure A-34. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

Figure A-35. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

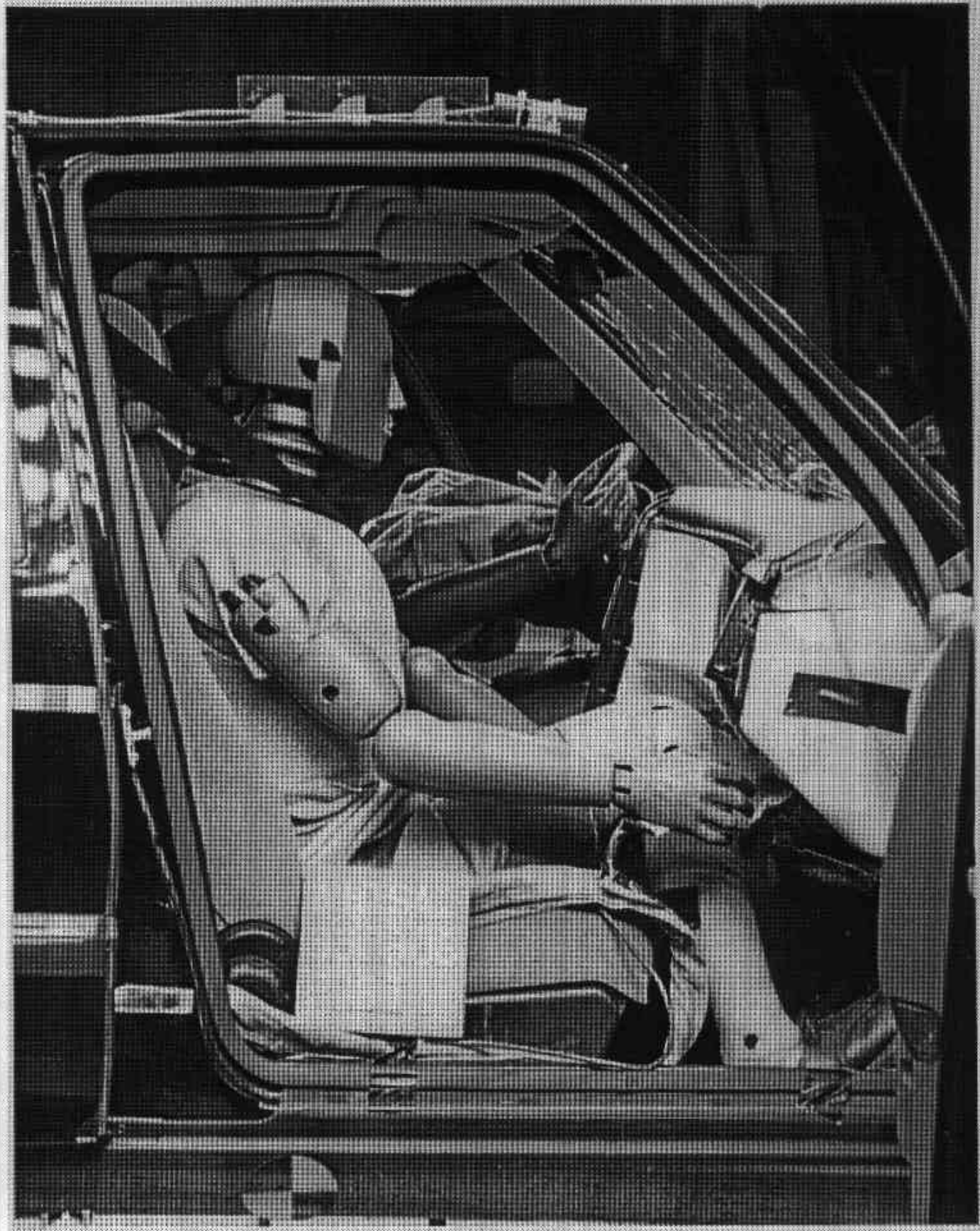


Figure A-36. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

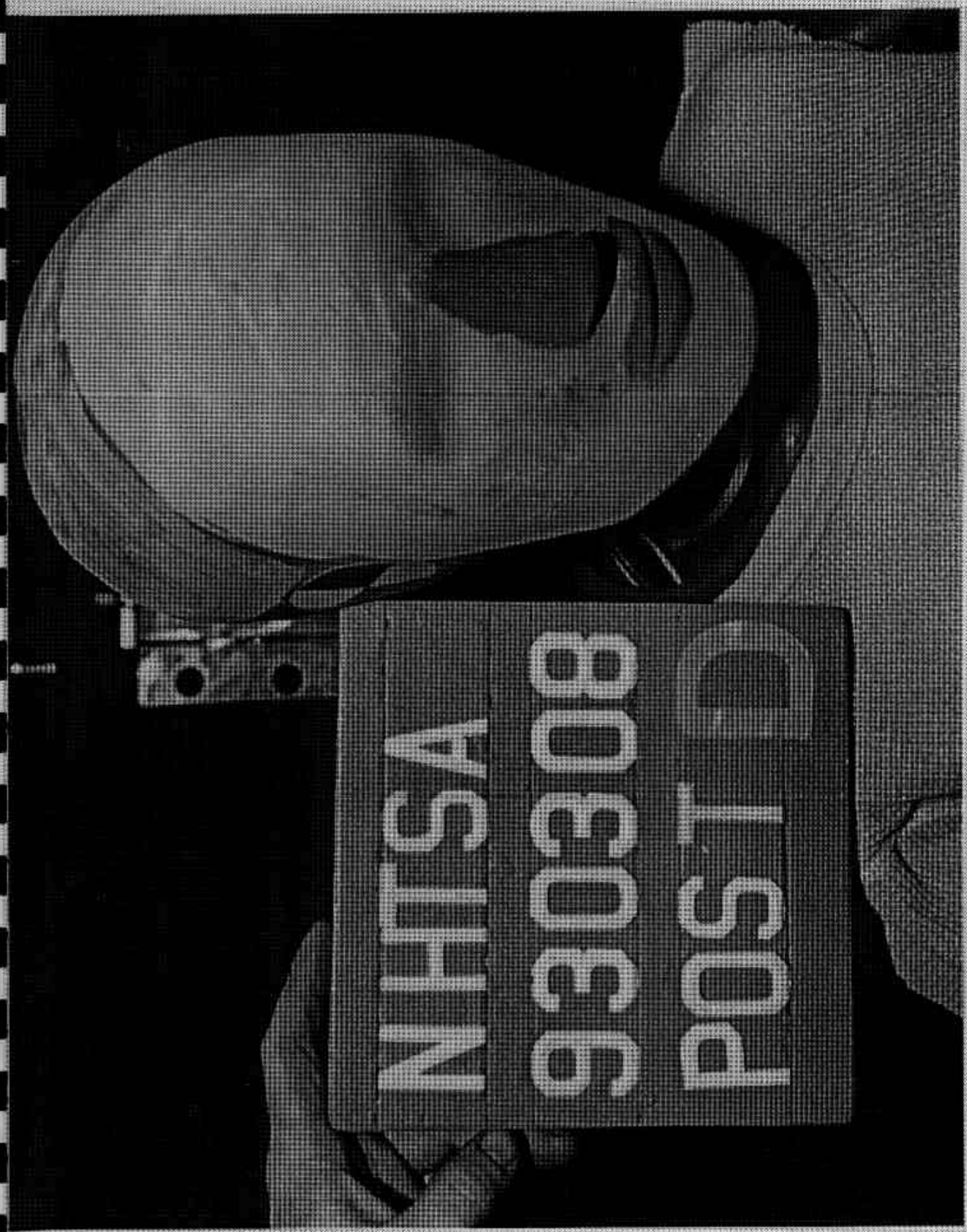


Figure A-37. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

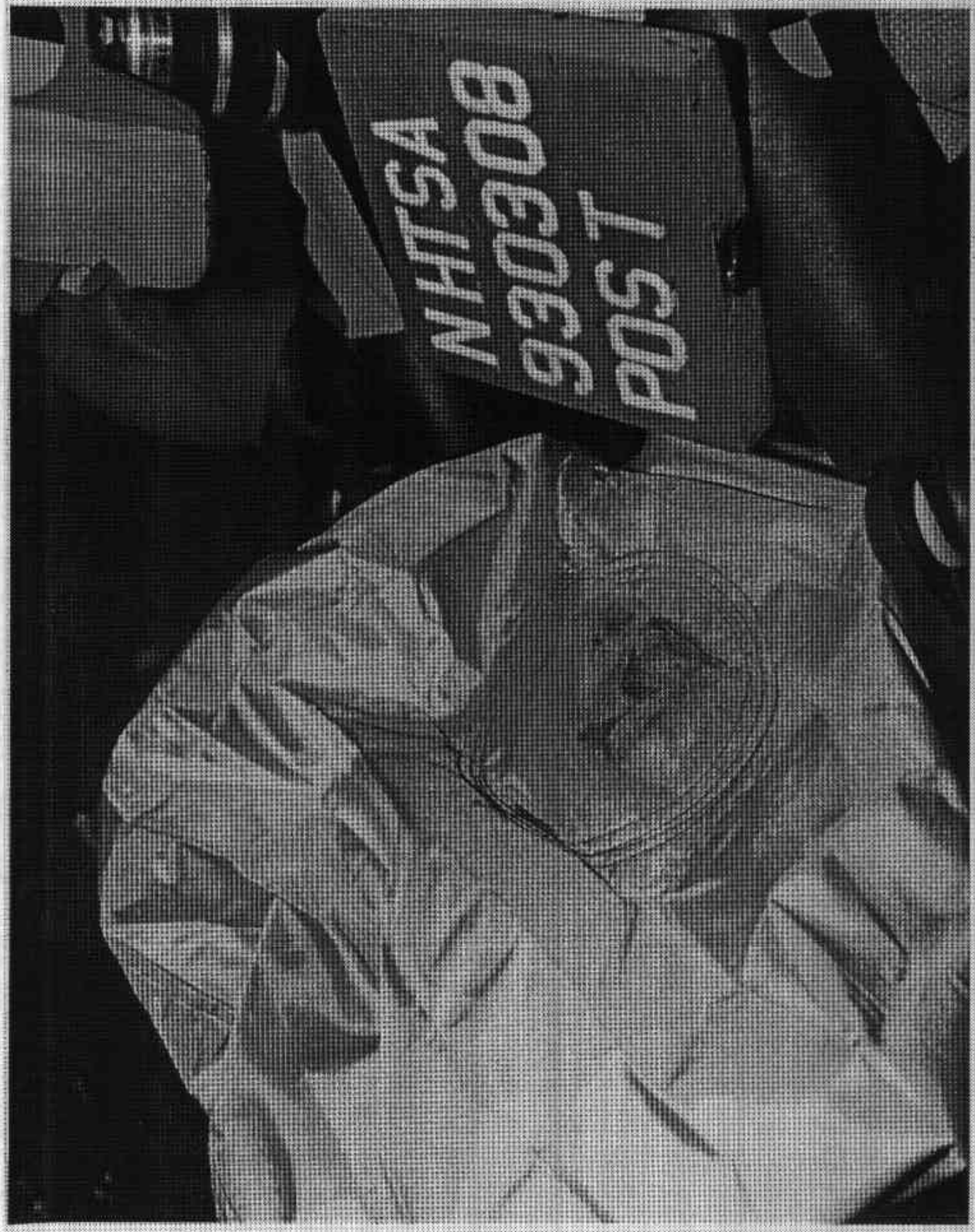


Figure A-38. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

Figure A-39. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

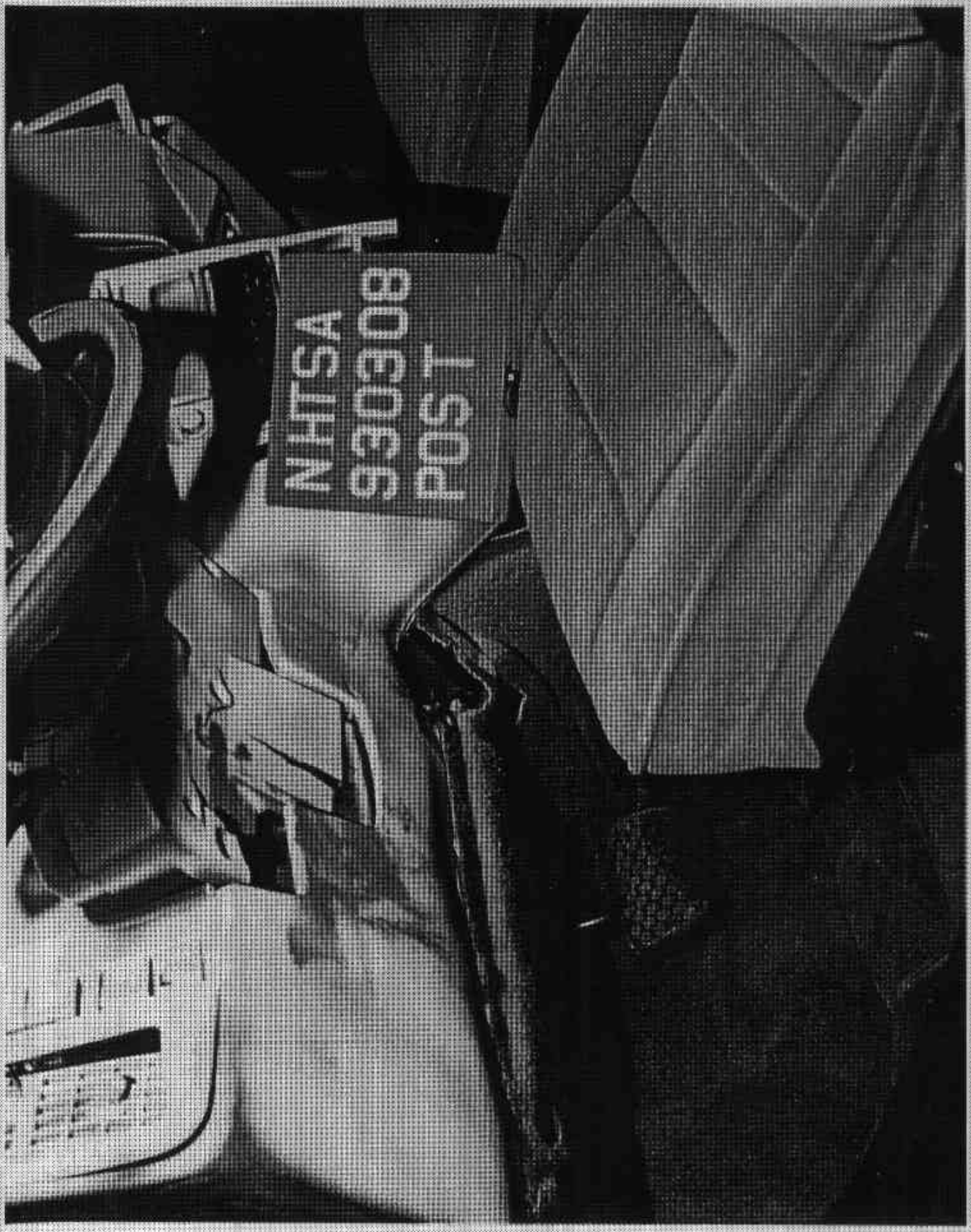


Figure A-40. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

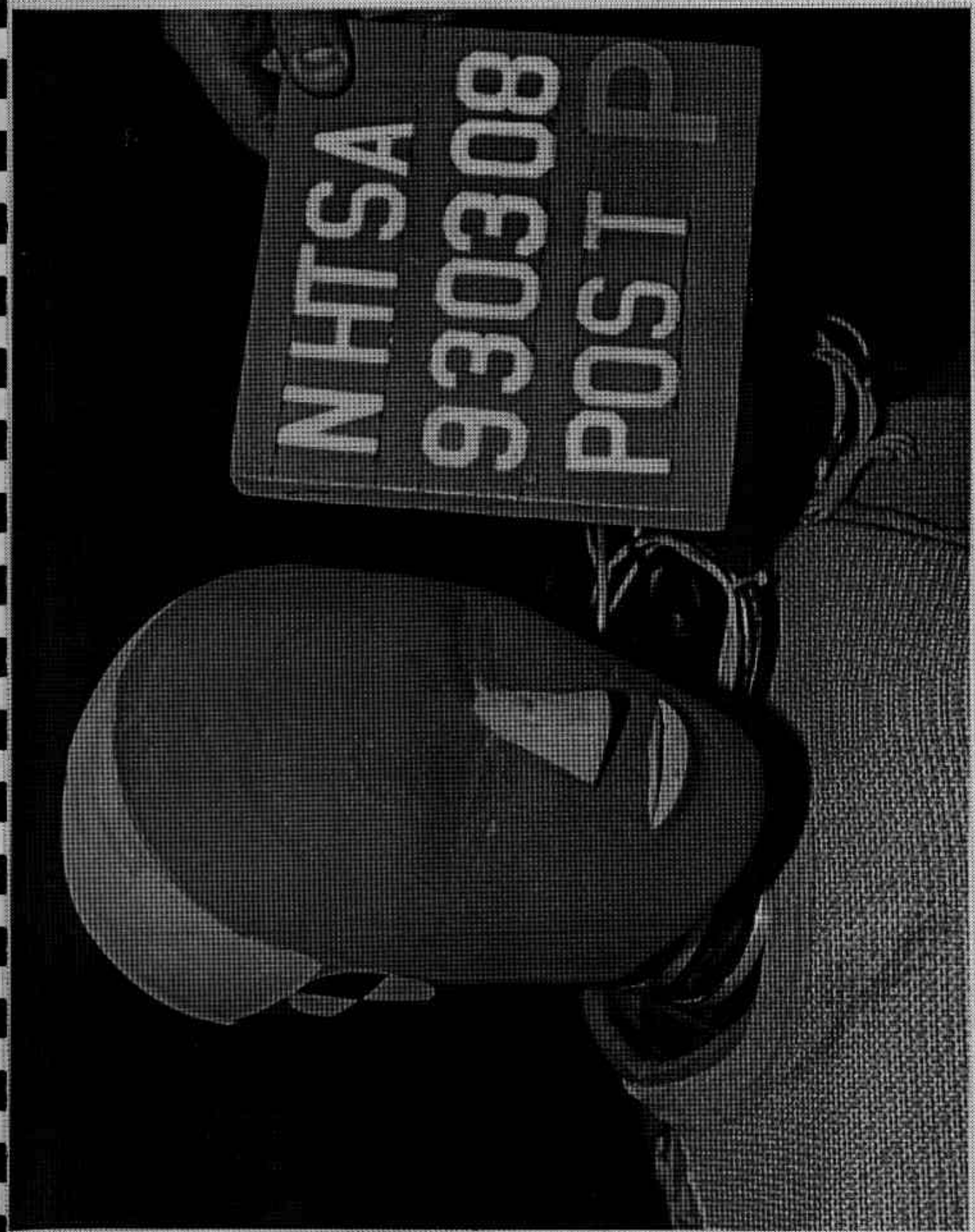


Figure A-41. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 1

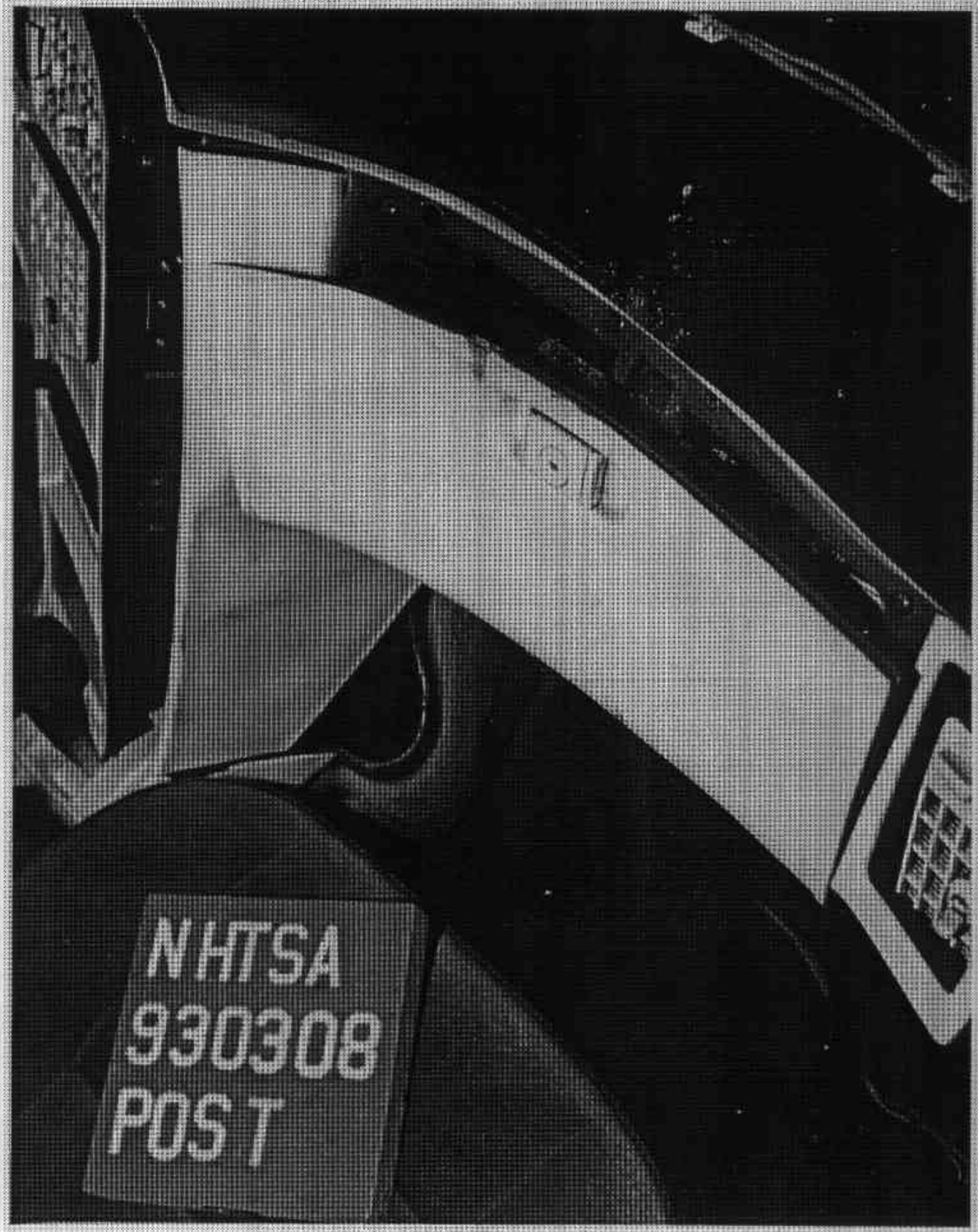


Figure A-42. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 2

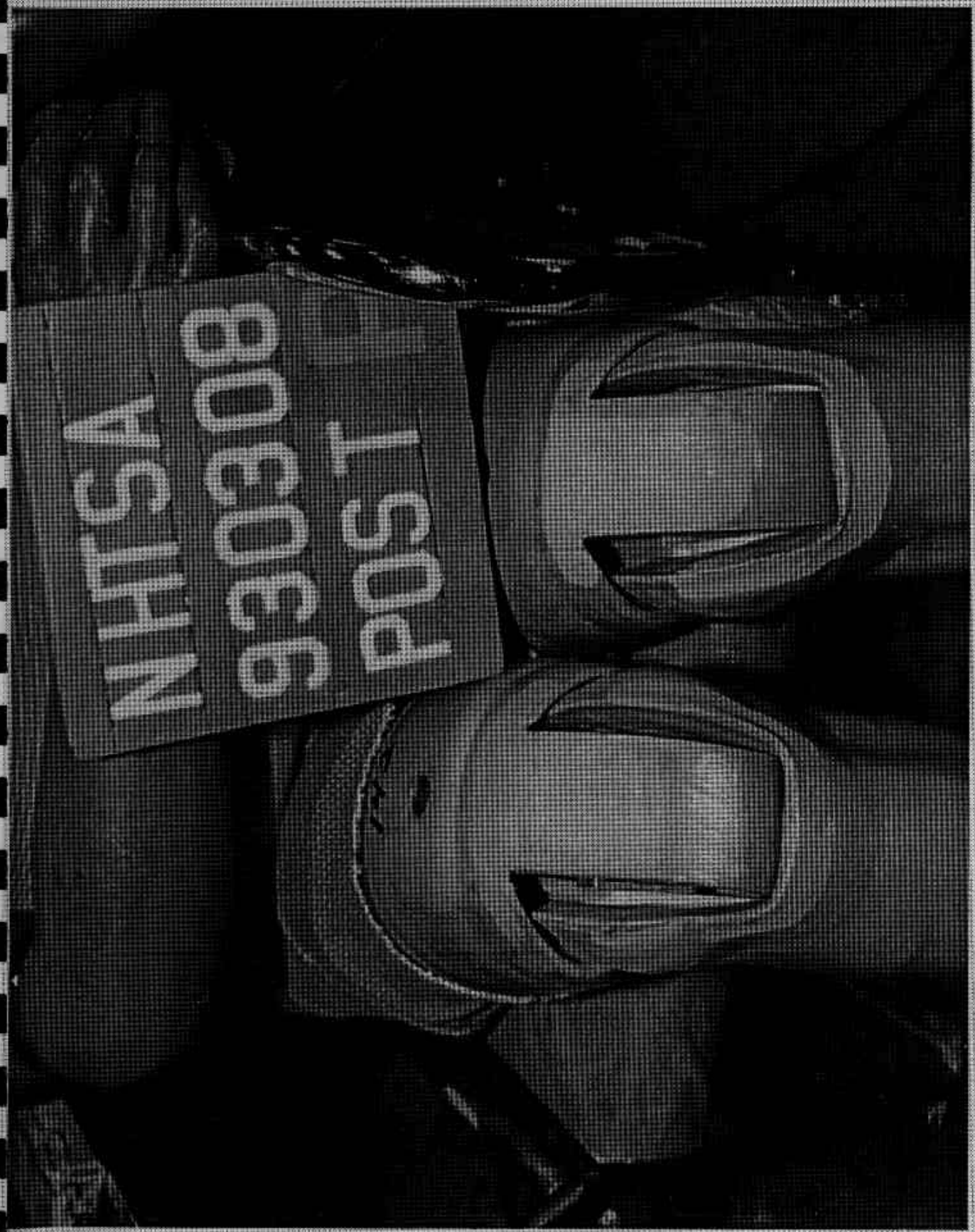


Figure A-43. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

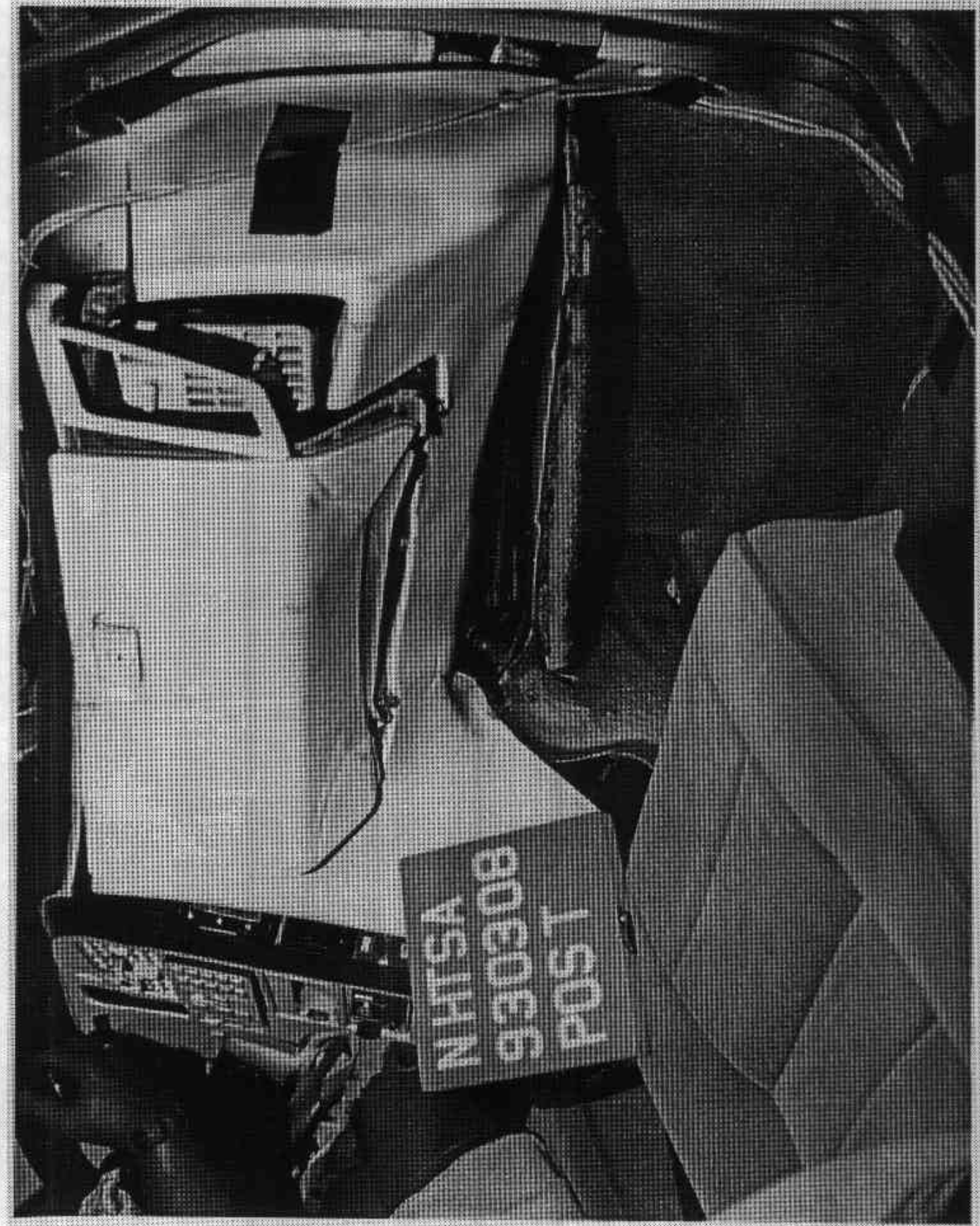


Figure A-44. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

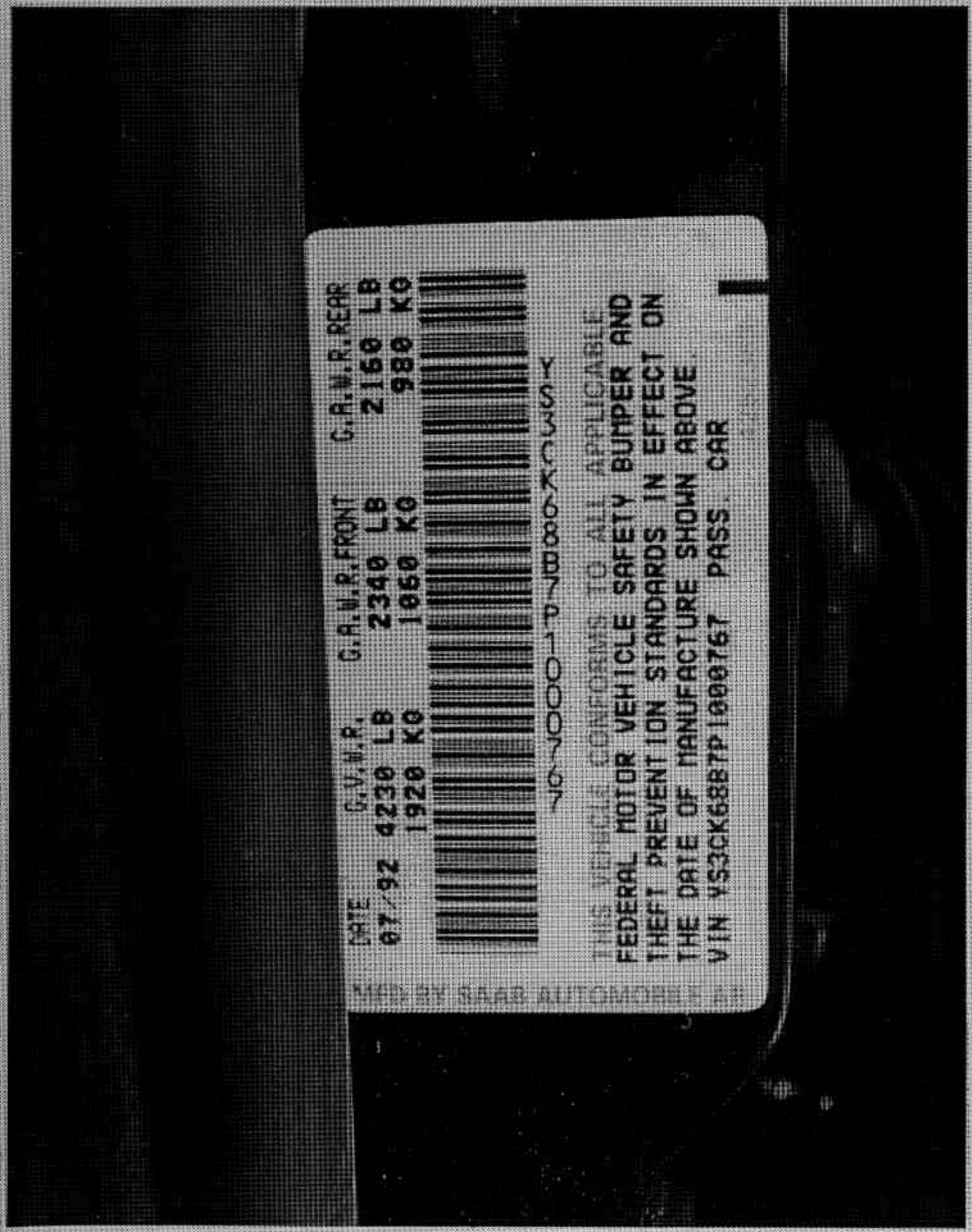


Figure A-45. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW

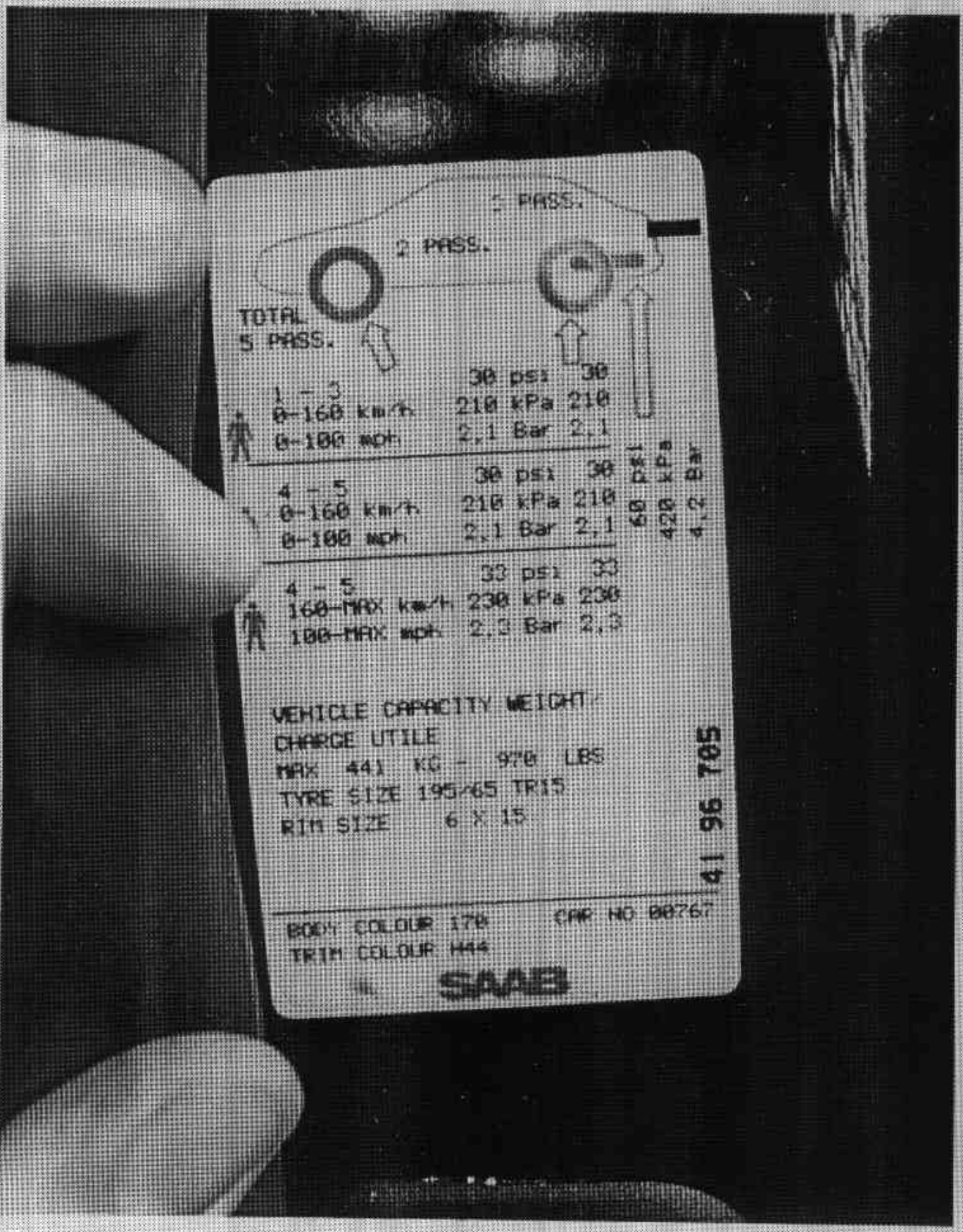


Fig. A-46. PRE-TEST VEHICLE RECOMMENDED TIRE PRESSURE LABEL VIEW

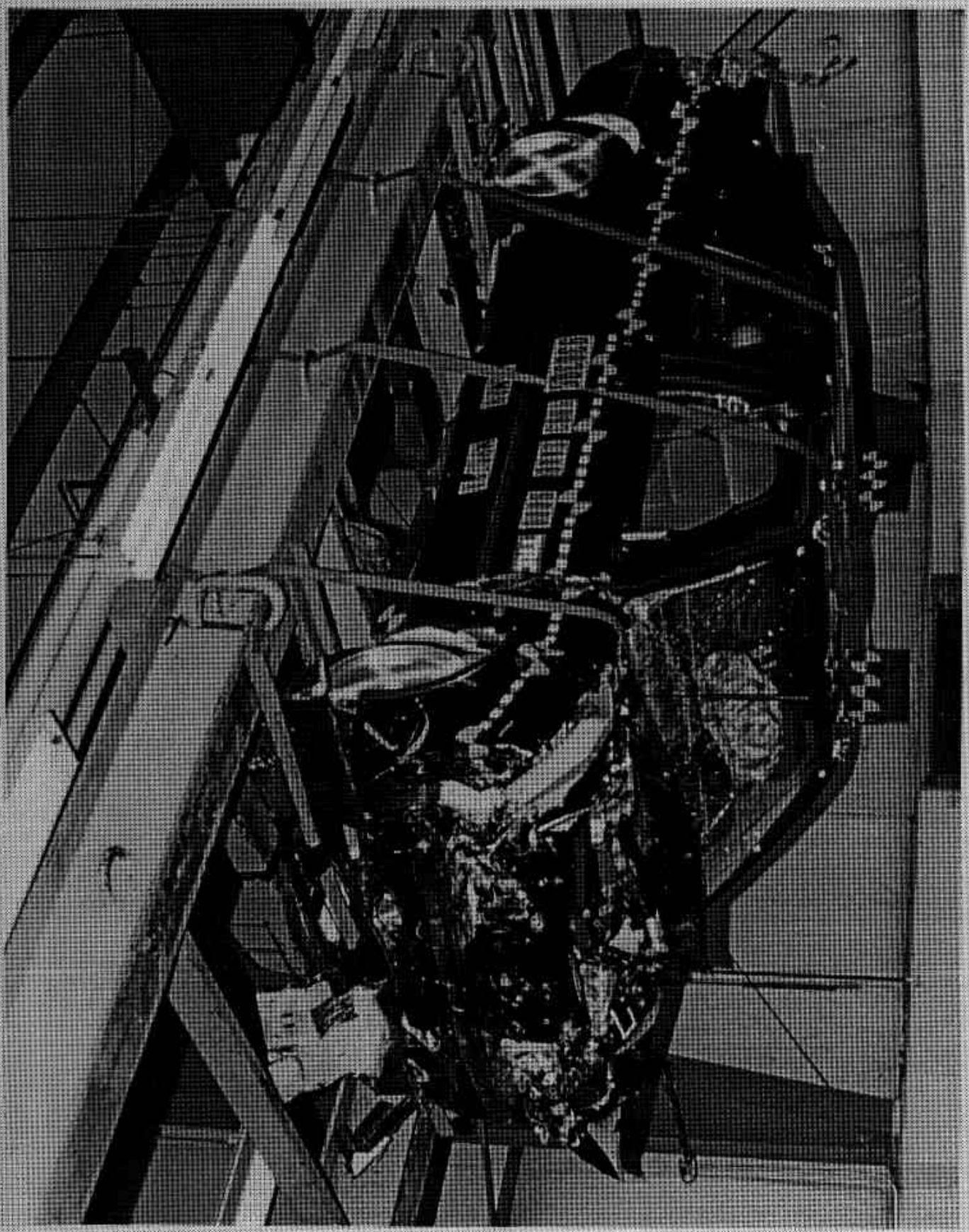


Figure A-47. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW

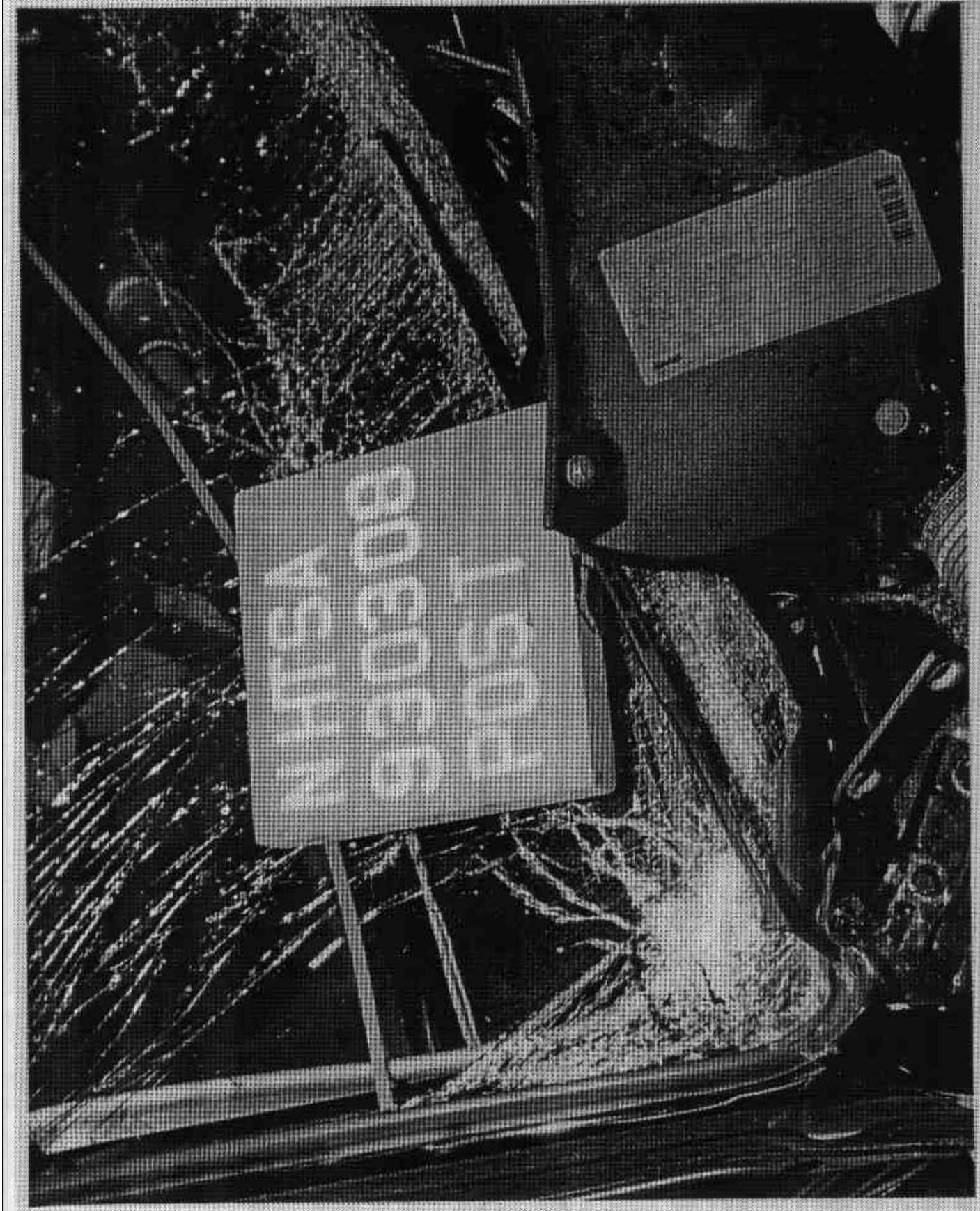
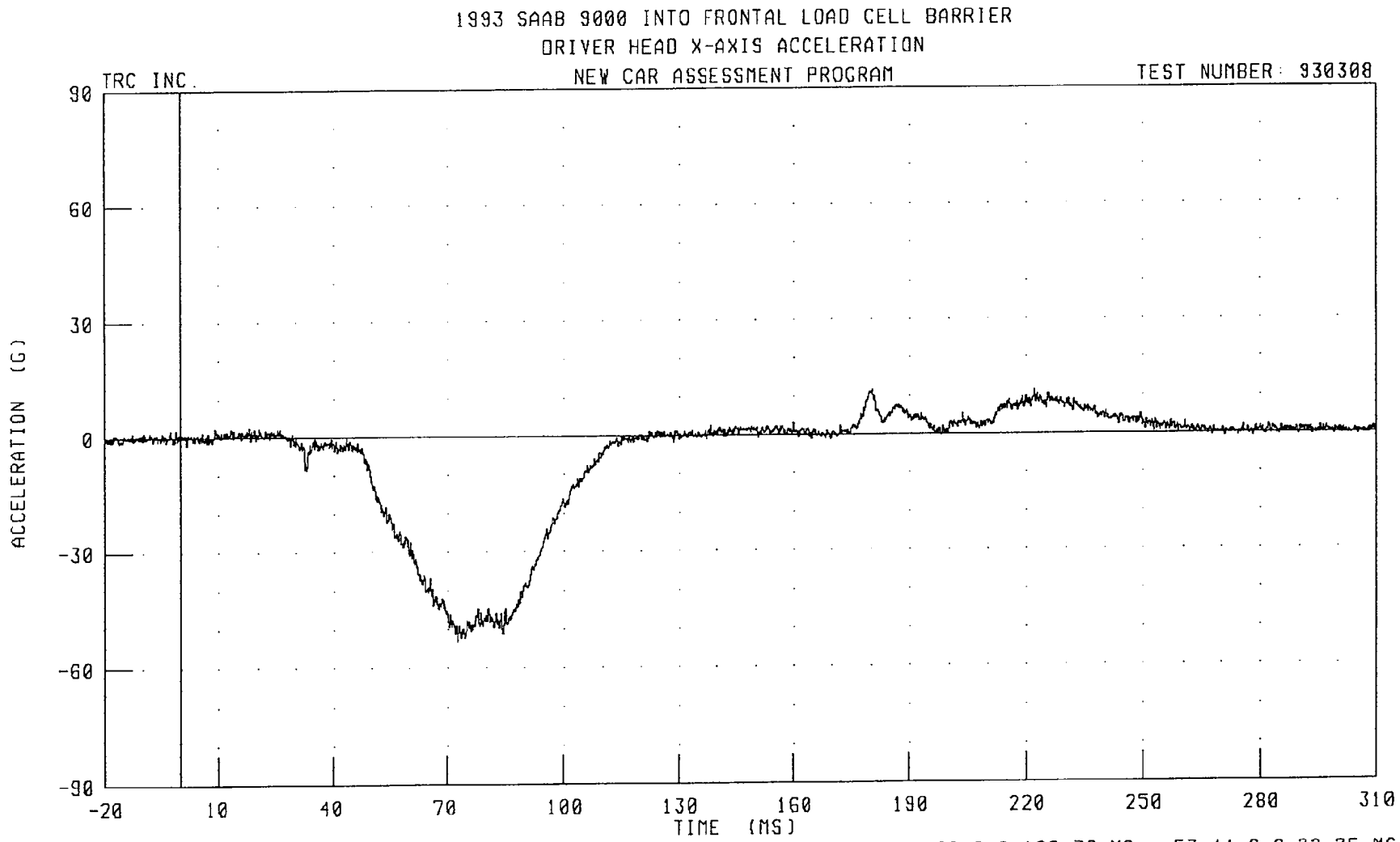


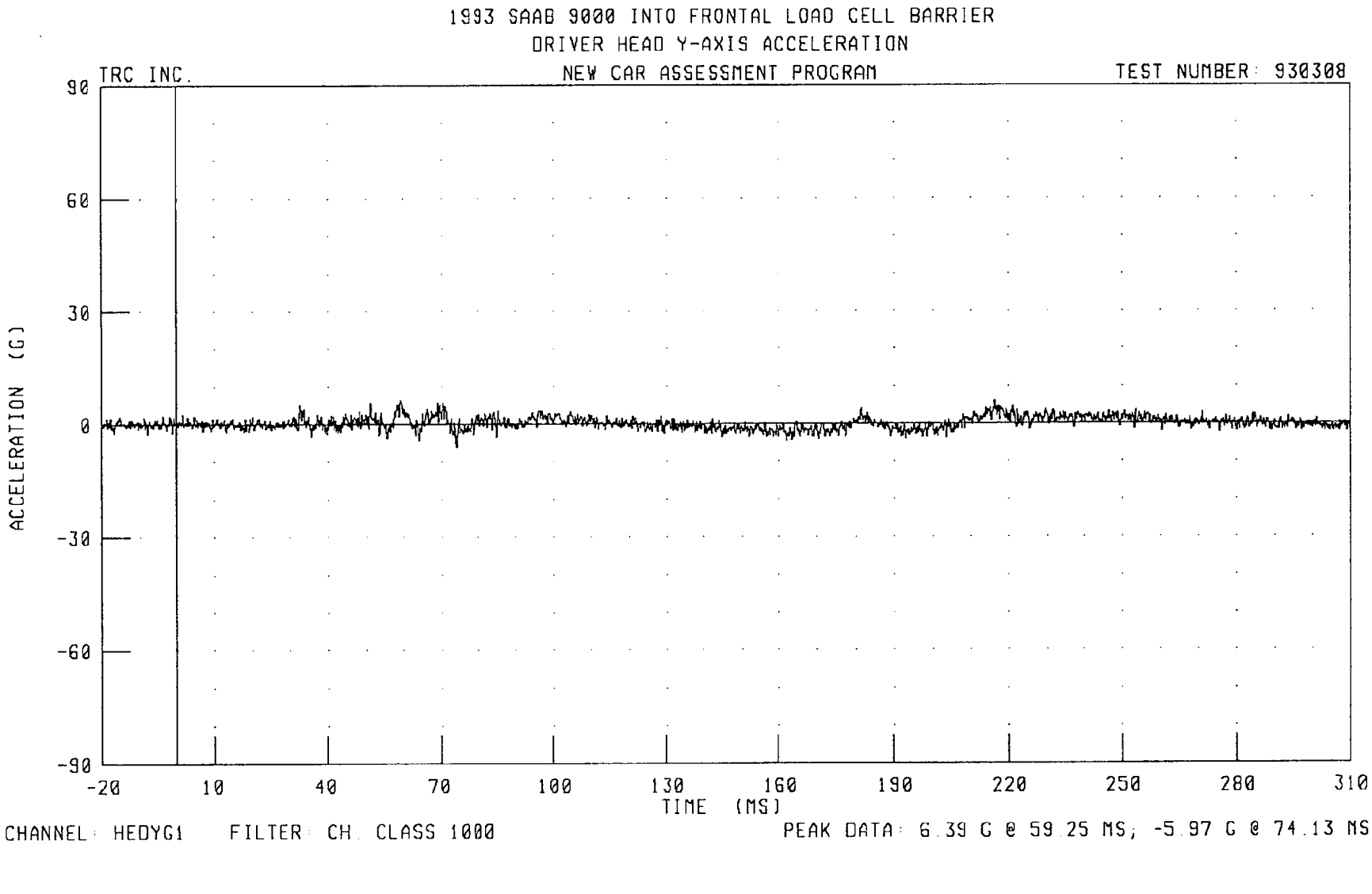
Figure A-48. POST-TEST WINDSHIELD PENETRATION VIEW

APPENDIX B

DATA PLOTS

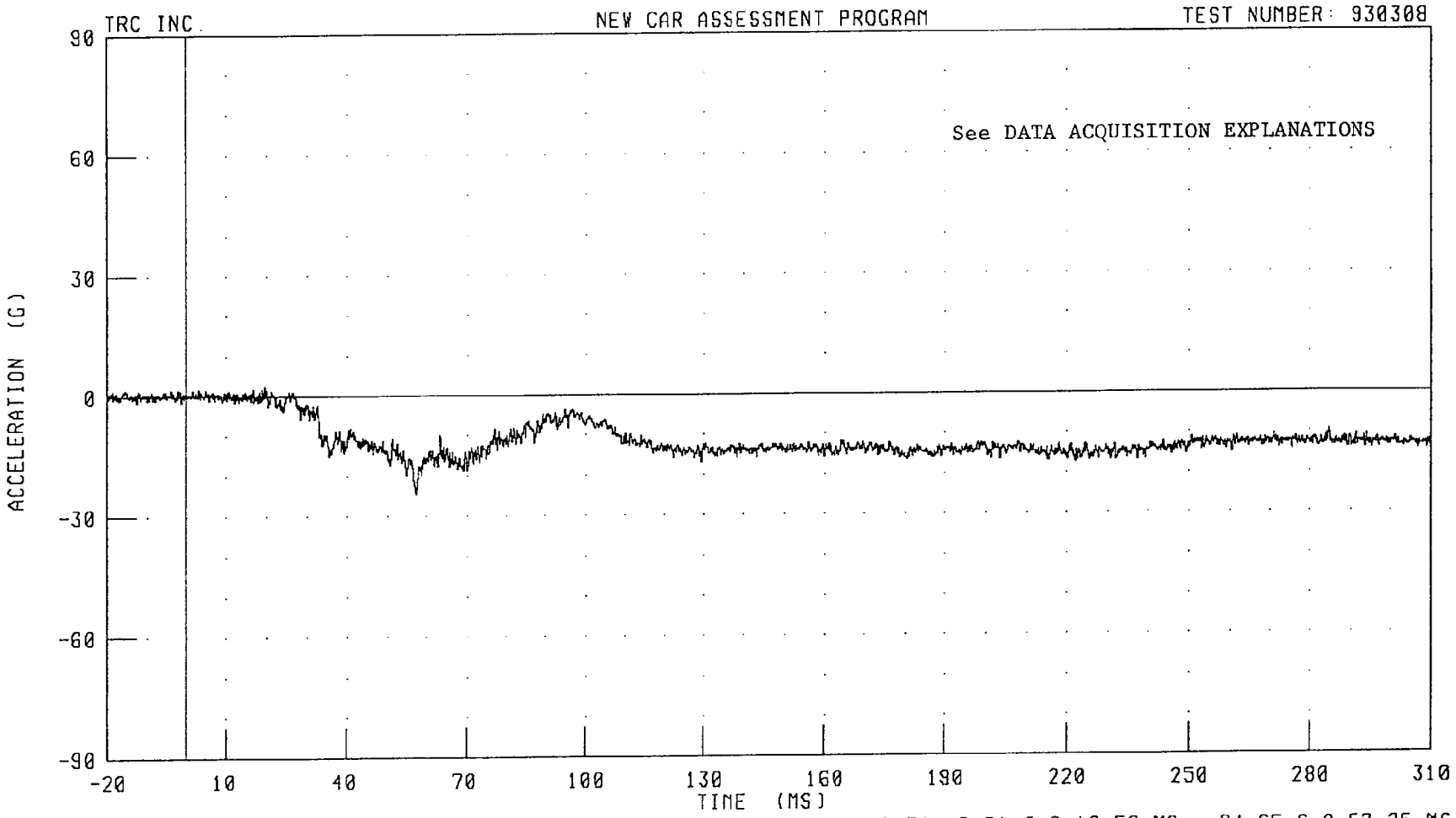

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG1
FILTER: CH CLASS 1000
PEAK DATA: 11.62 G @ 180.38 MS; -53.44 G @ 72.75 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
90
60
30
0
-30
-60
-90
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG1 FILTER: CH CLASS 1000
PEAK DATA: 6.39 G @ 59.25 MS; -5.97 G @ 74.13 MS

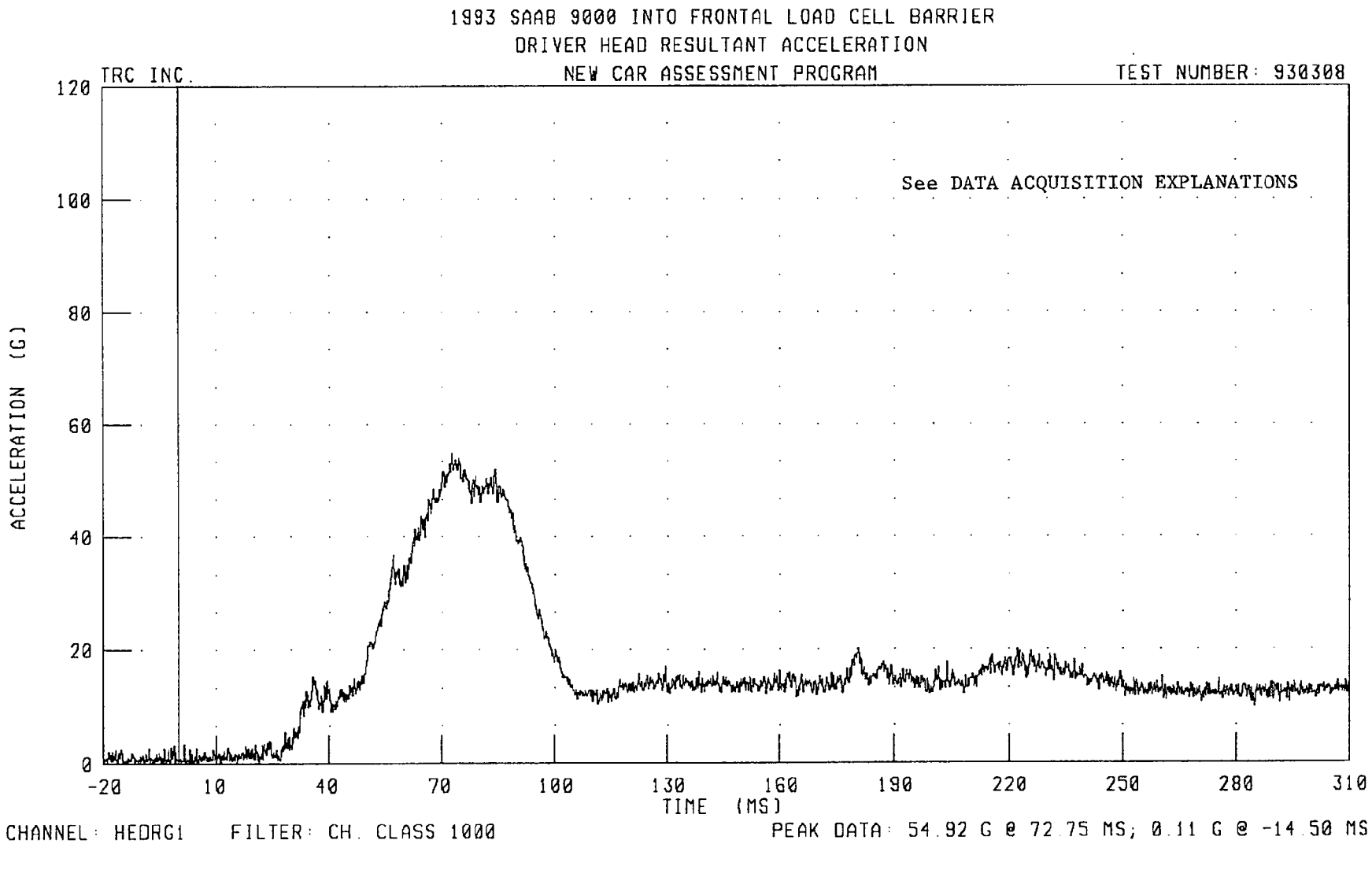
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

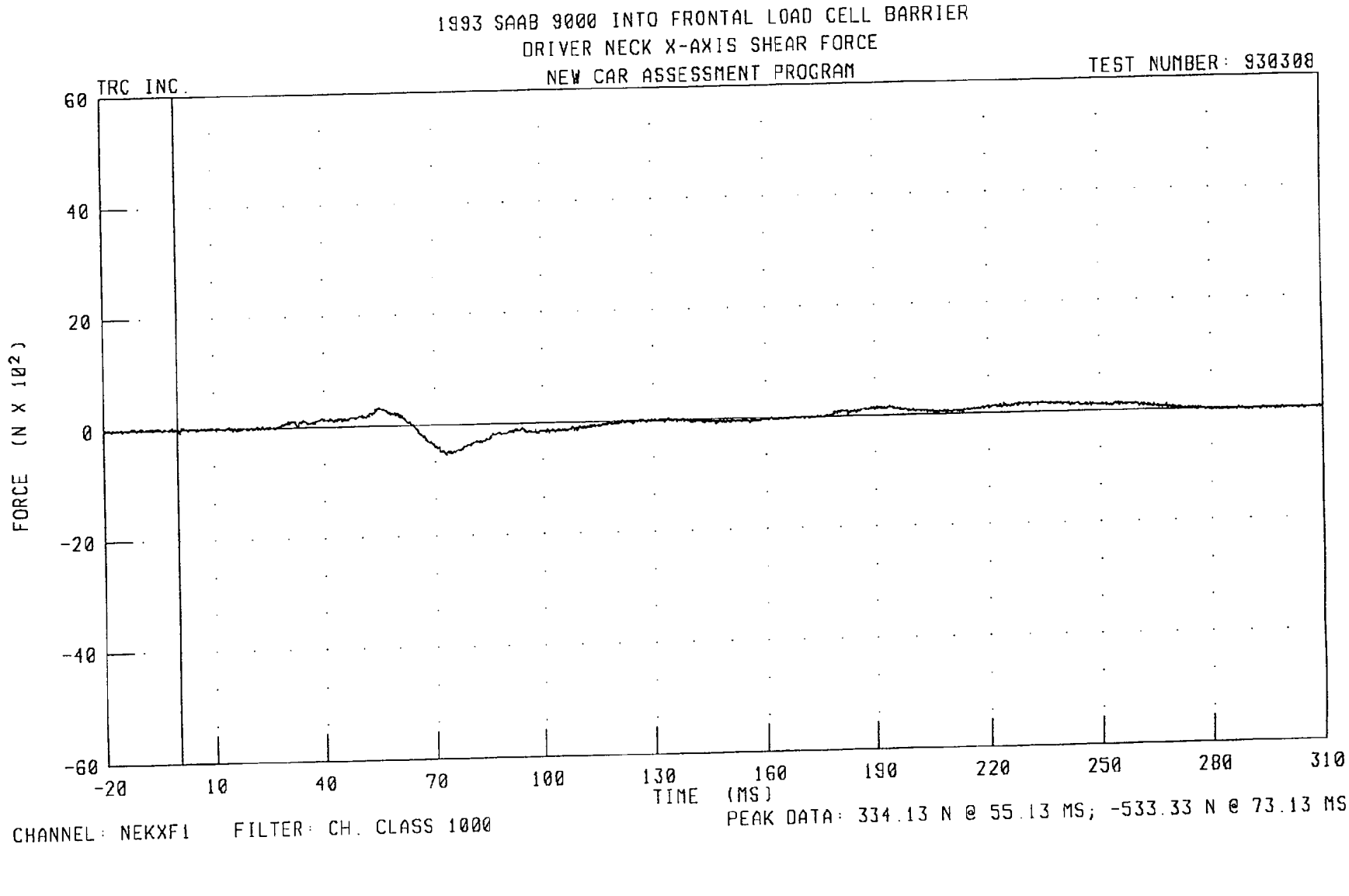


CHANNEL: HEDZG1 FILTER: CH. CLASS 1000 PEAK DATA: 2.31 G @ 19.50 MS; -24.65 G @ 57.25 MS

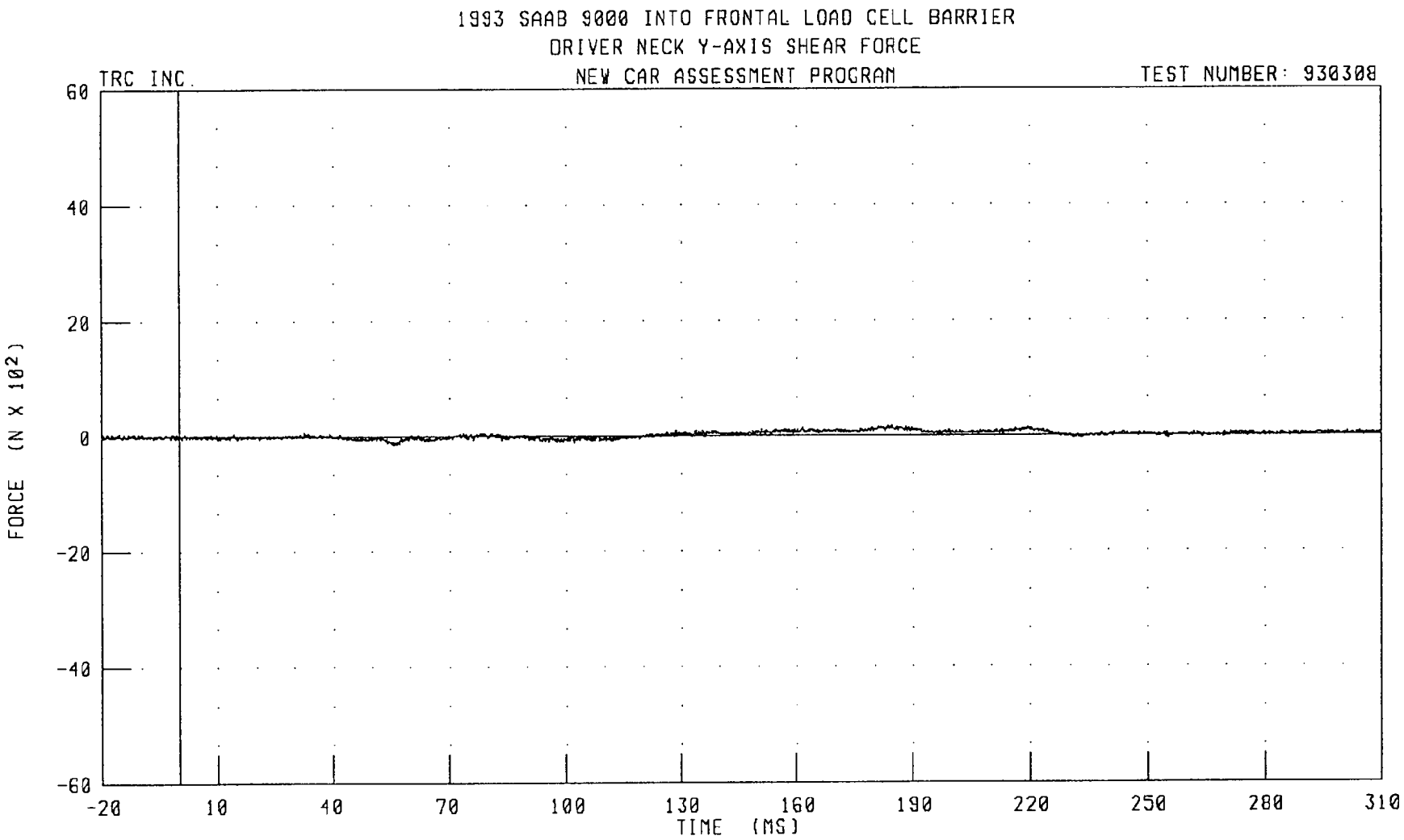
930308

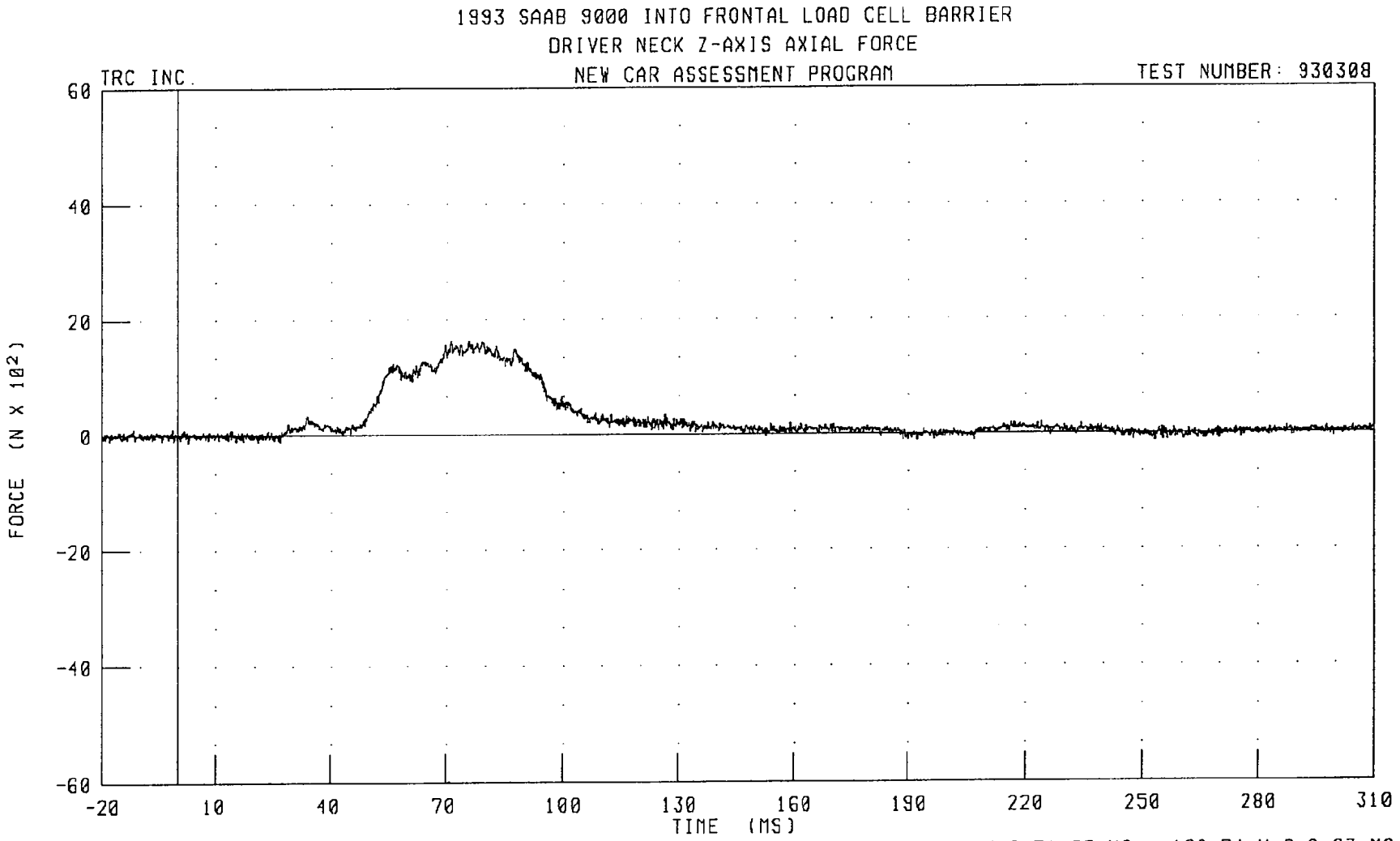

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER HEAD RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG1
FILTER: CH. CLASS 1000
PEAK DATA: 54.92 G @ 72.75 MS; 0.11 G @ -14.50 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
TRC INC.
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXF1
FILTER: CH. CLASS 1000
PEAK DATA: 334.13 N @ 55.13 MS; -533.33 N @ 73.13 MS

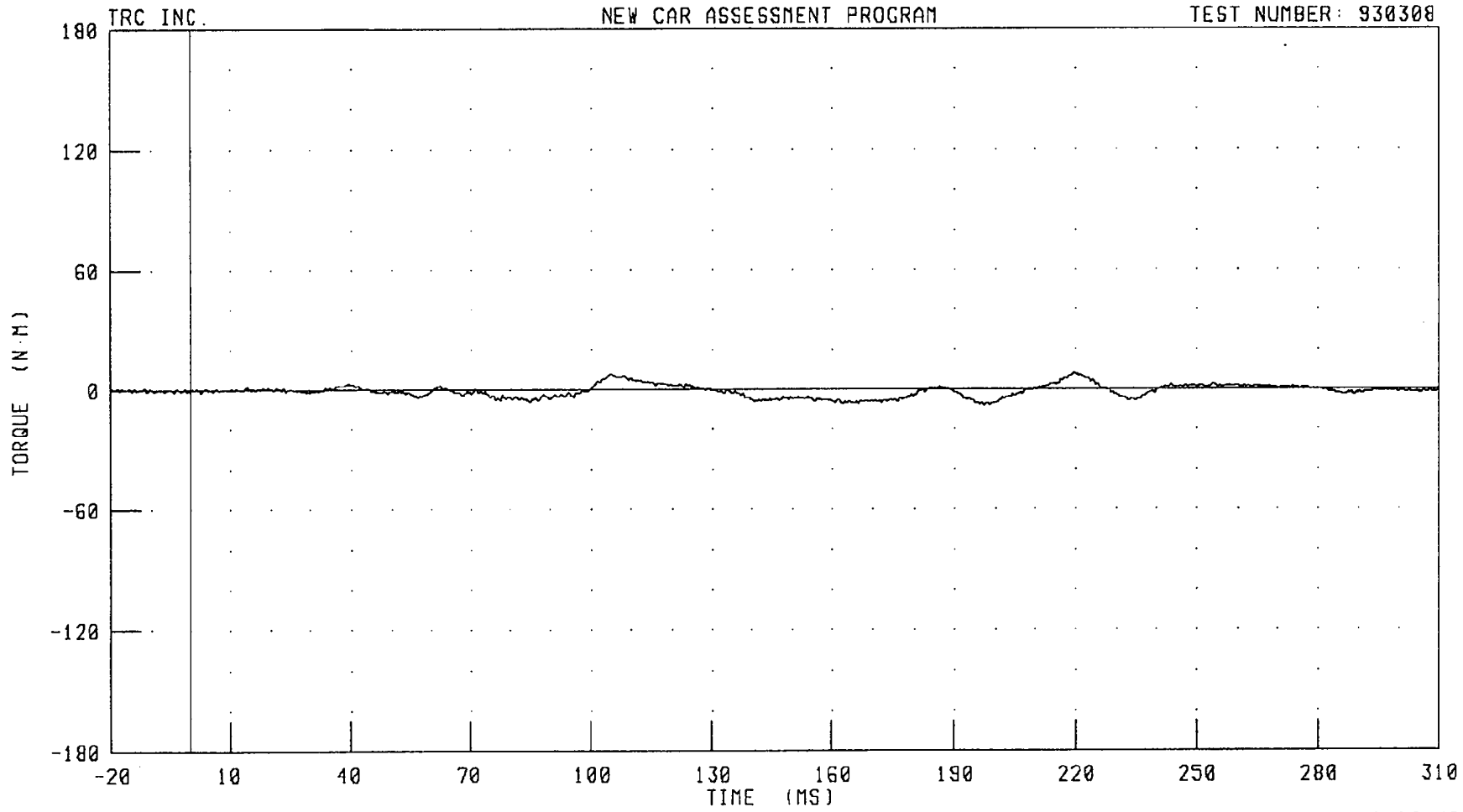
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Y-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYF1
FILTER: CH. CLASS 1000
PEAK DATA: 164.76 N @ 184.38 MS; -144.04 N @ 56.00 MS


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK Z-AXIS AXIAL FORCE
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZF1
FILTER: CH. CLASS 1000
PEAK DATA: 1631.41 N @ 71.25 MS; -128.74 N @ 2.63 MS

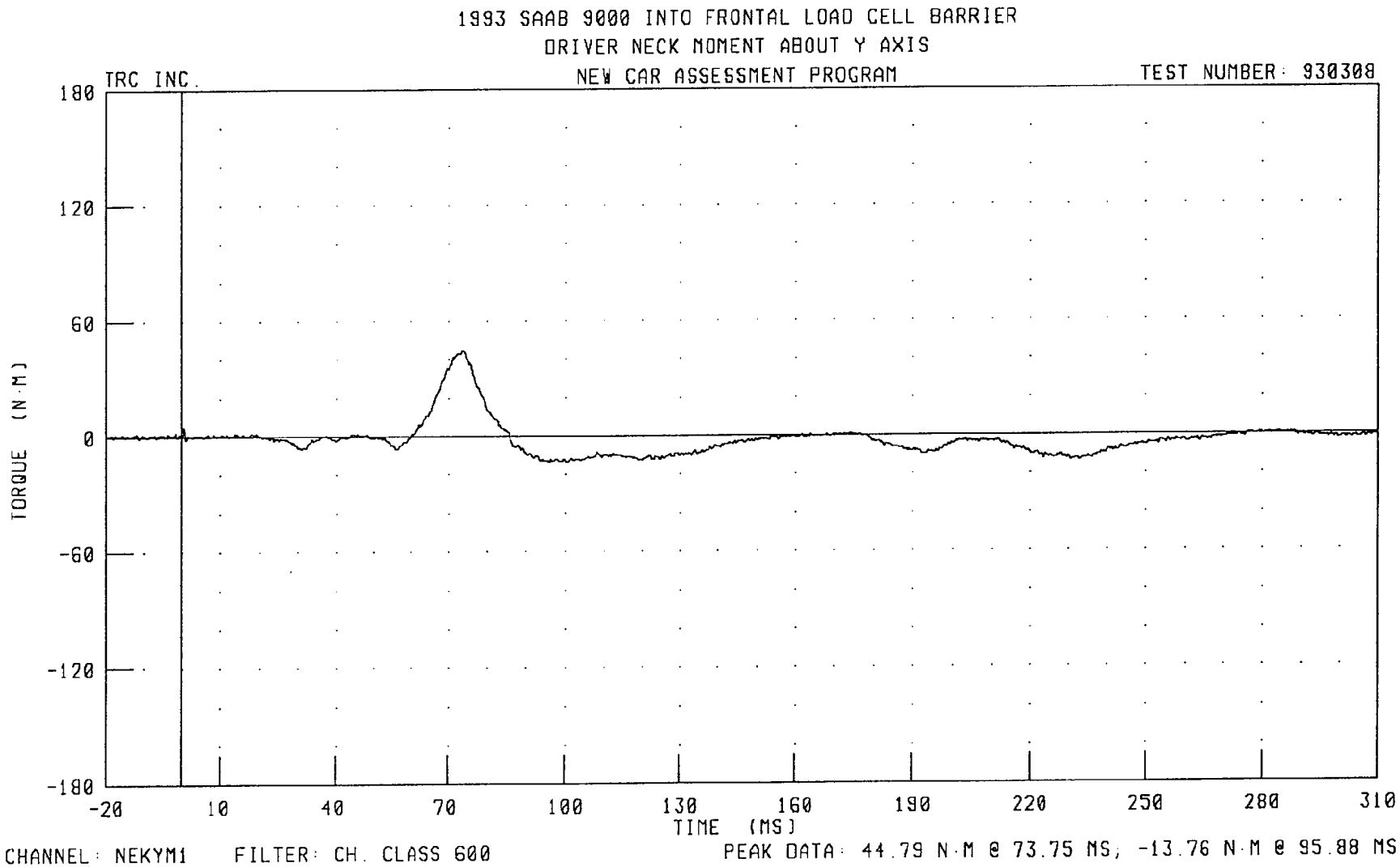
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS

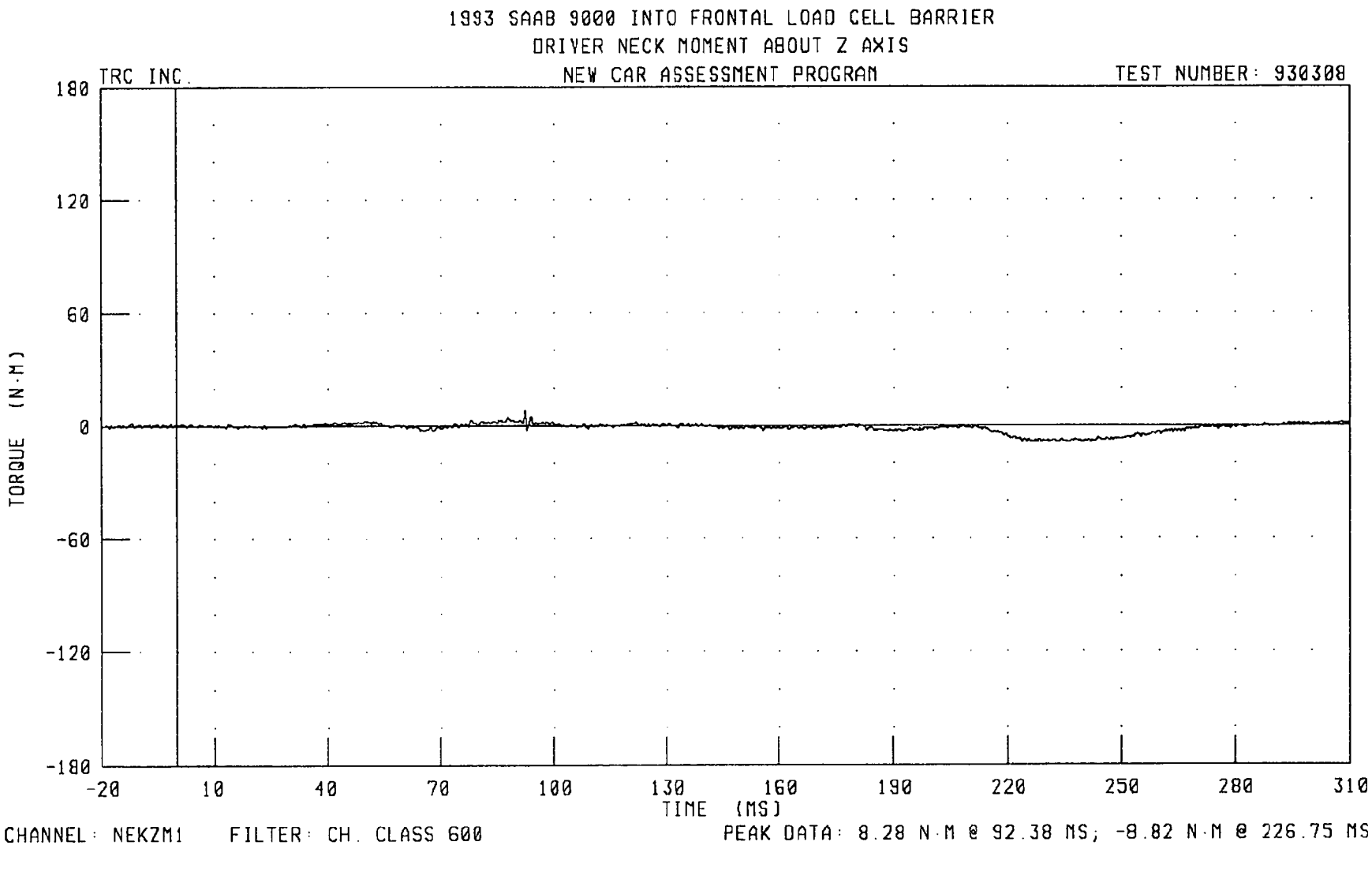


CHANNEL: NEKXMI FILTER: CH. CLASS 600 PEAK DATA: 8.07 N-M @ 219.63 MS; -7.97 N-M @ 197.38 MS

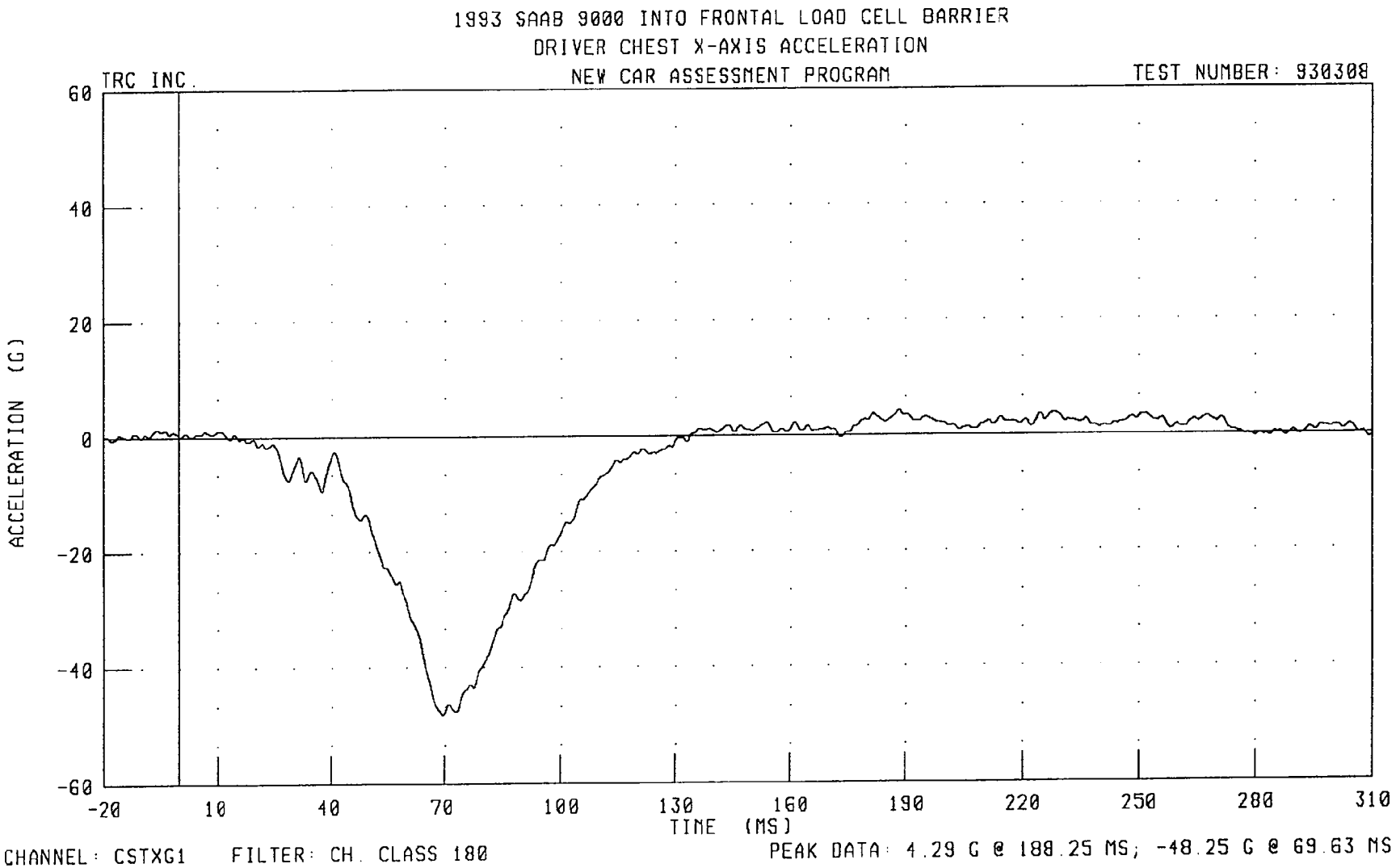
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYM1
FILTER: CH. CLASS 600
PEAK DATA: 44.79 N-M @ 73.75 MS, -13.76 N-M @ 95.88 MS

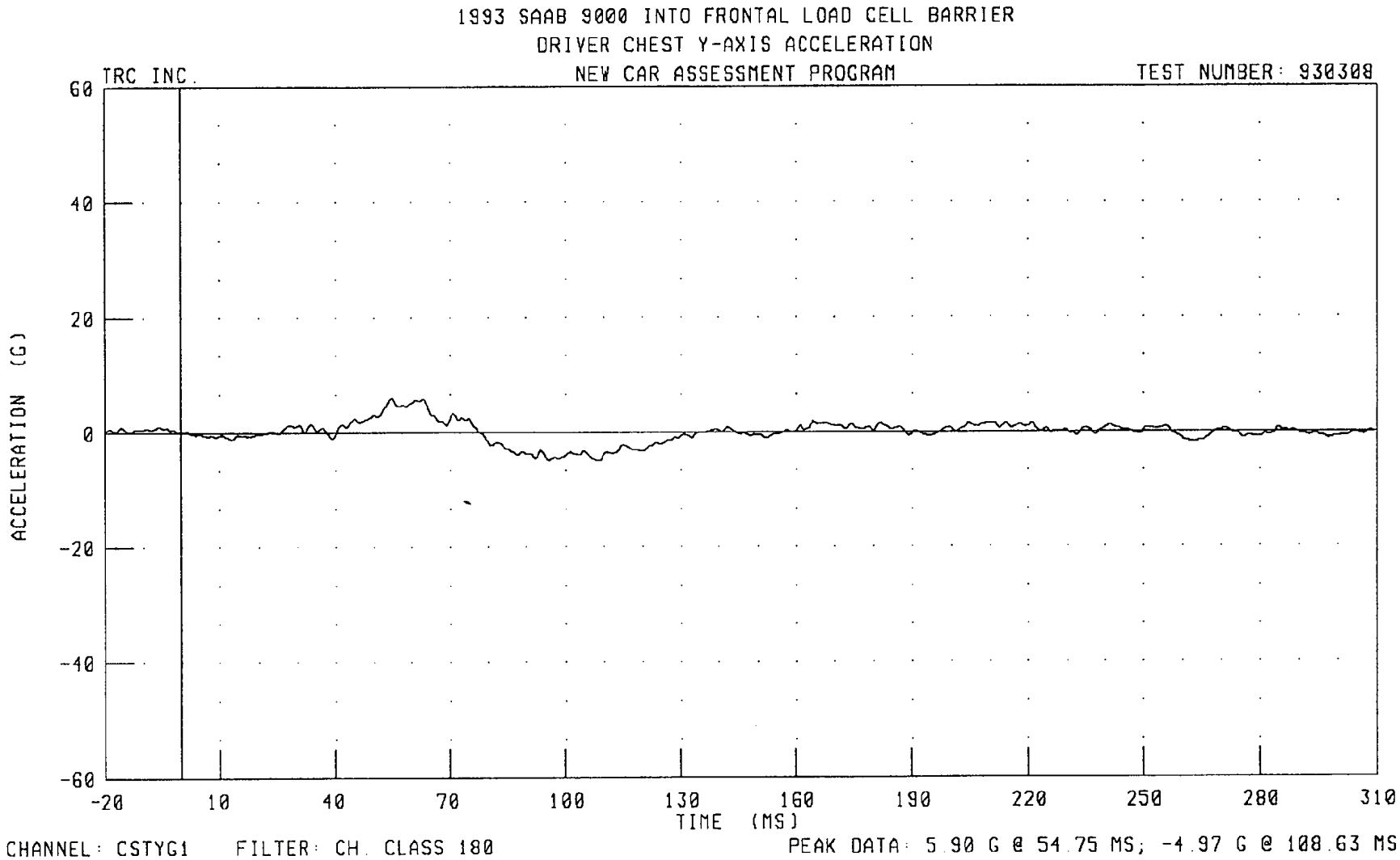
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER NECK MOMENT ABOUT Z AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
180
120
60
0
-60
-120
-180
TORQUE (N-M)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZM1
FILTER: CH. CLASS 600
PEAK DATA: 8.28 N-M @ 92.38 MS; -8.82 N-M @ 226.75 MS

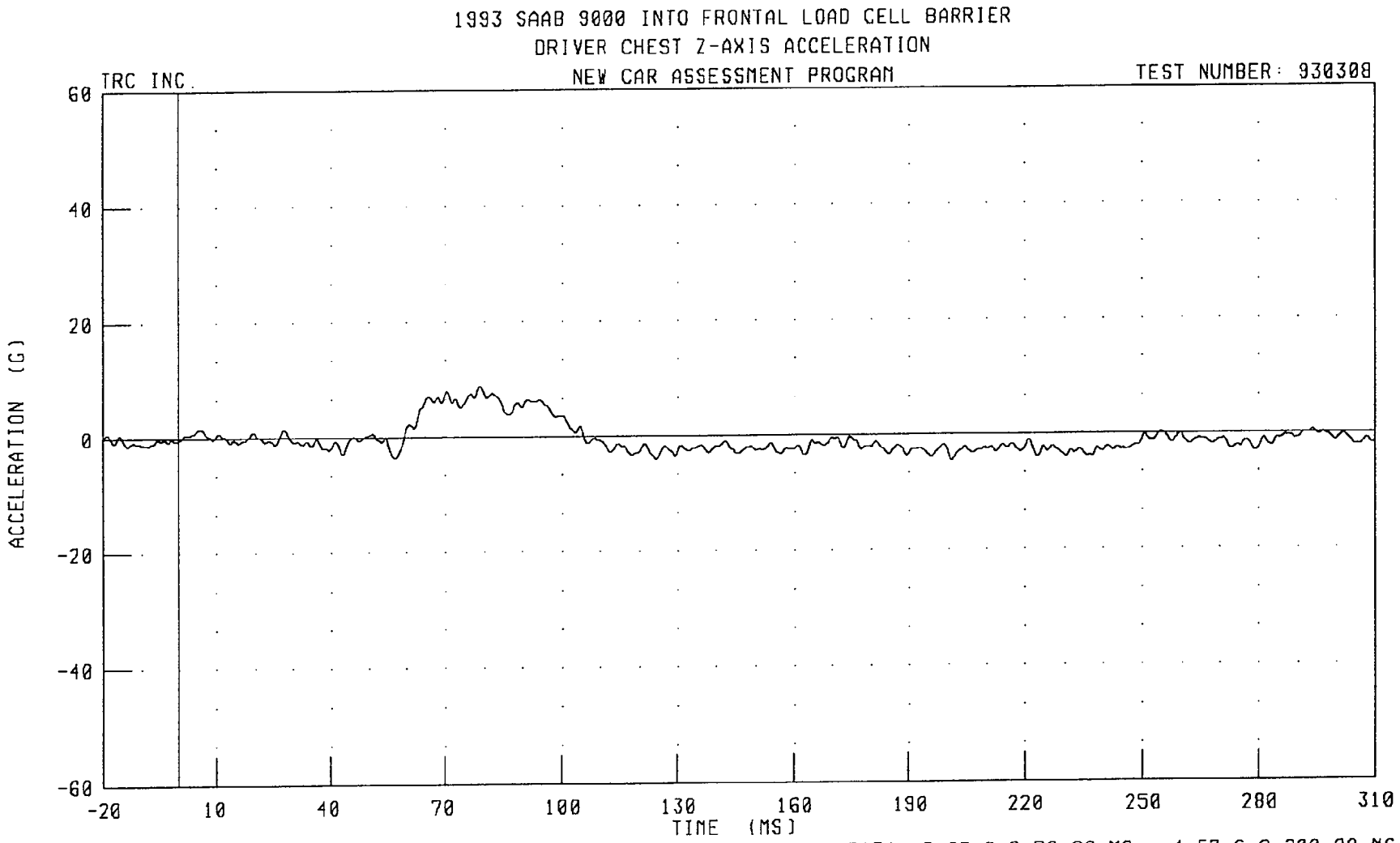
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 4.29 G @ 188.25 MS; -48.25 G @ 69.63 MS

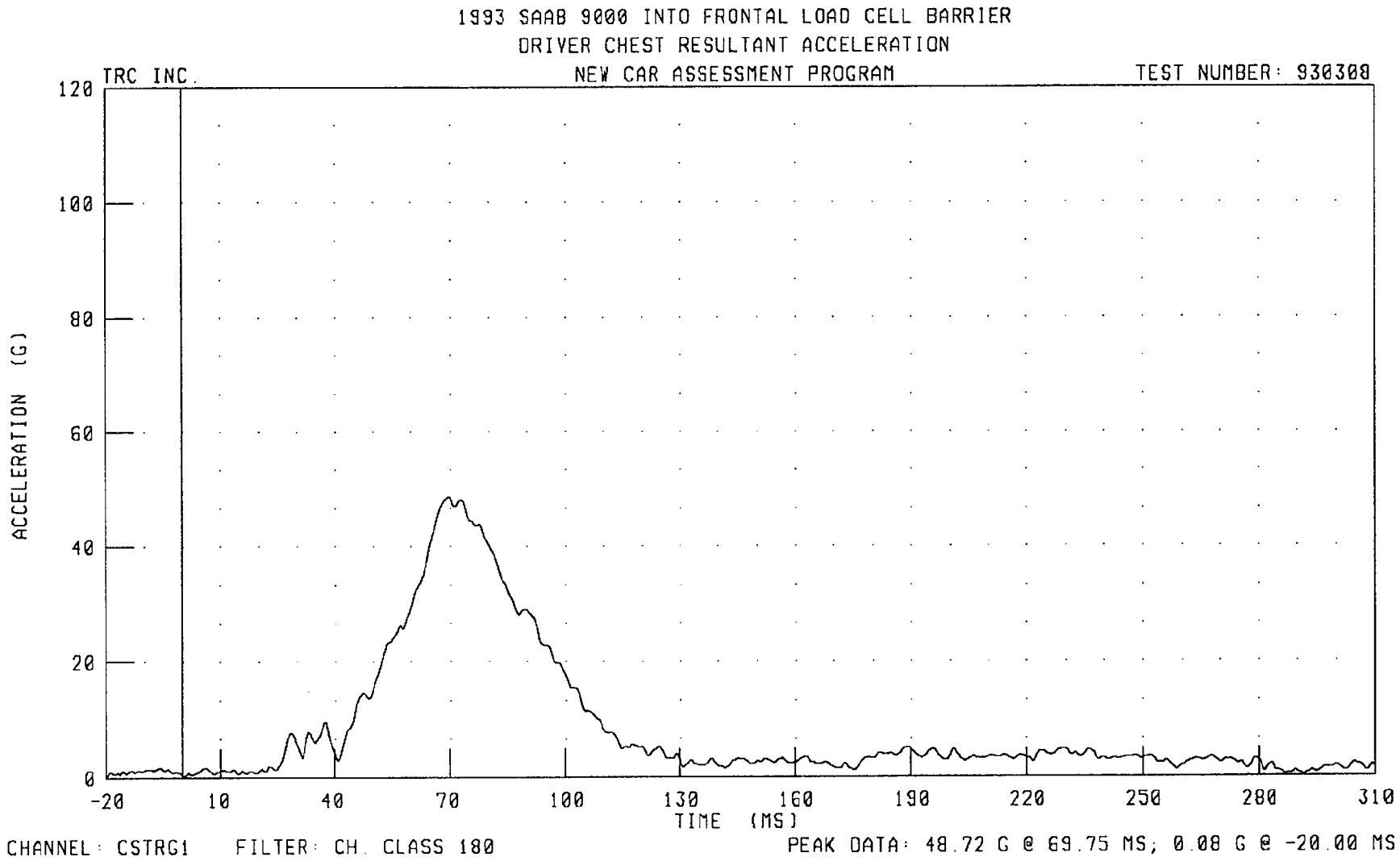
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG1
FILTER: CH. CLASS 180
PEAK DATA: 5.90 G @ 54.75 MS; -4.97 G @ 108.63 MS

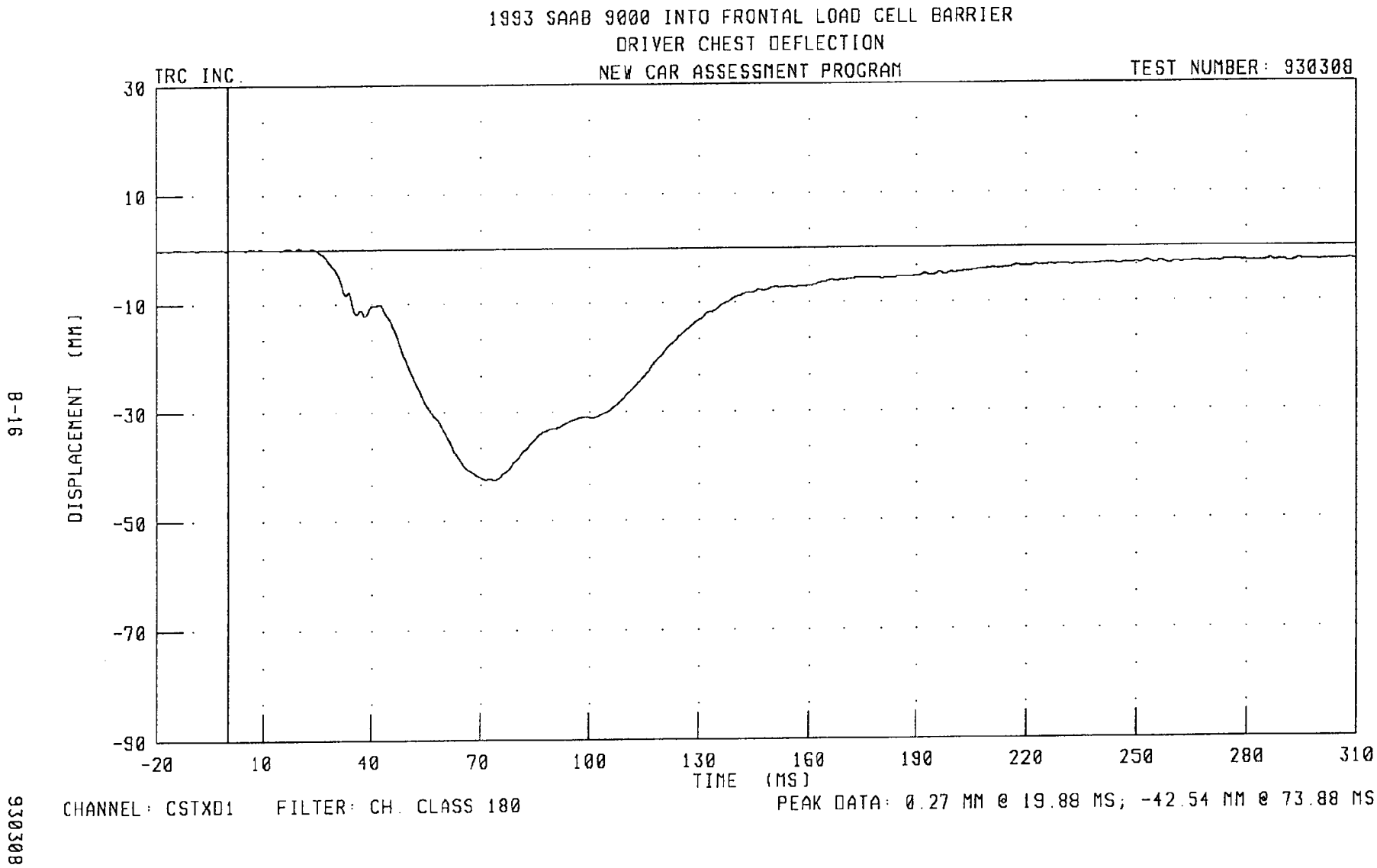
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG1
FILTER: CH. CLASS 180
PEAK DATA: 8.83 G @ 79.00 MS; -4.57 G @ 200.88 MS

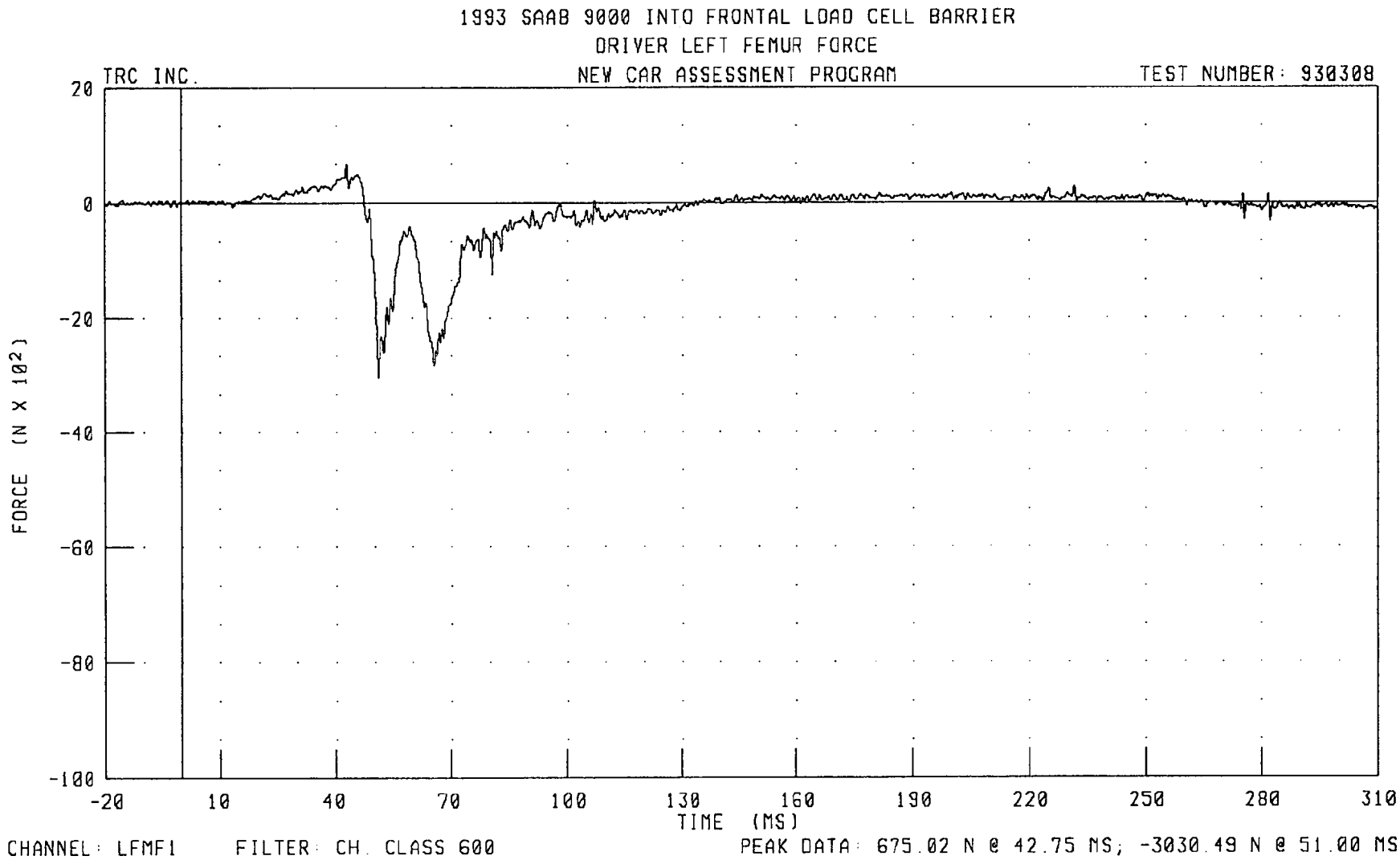
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG1
FILTER: CH. CLASS 180
PEAK DATA: 48.72 G @ 69.75 MS; 0.08 G @ -20.00 MS

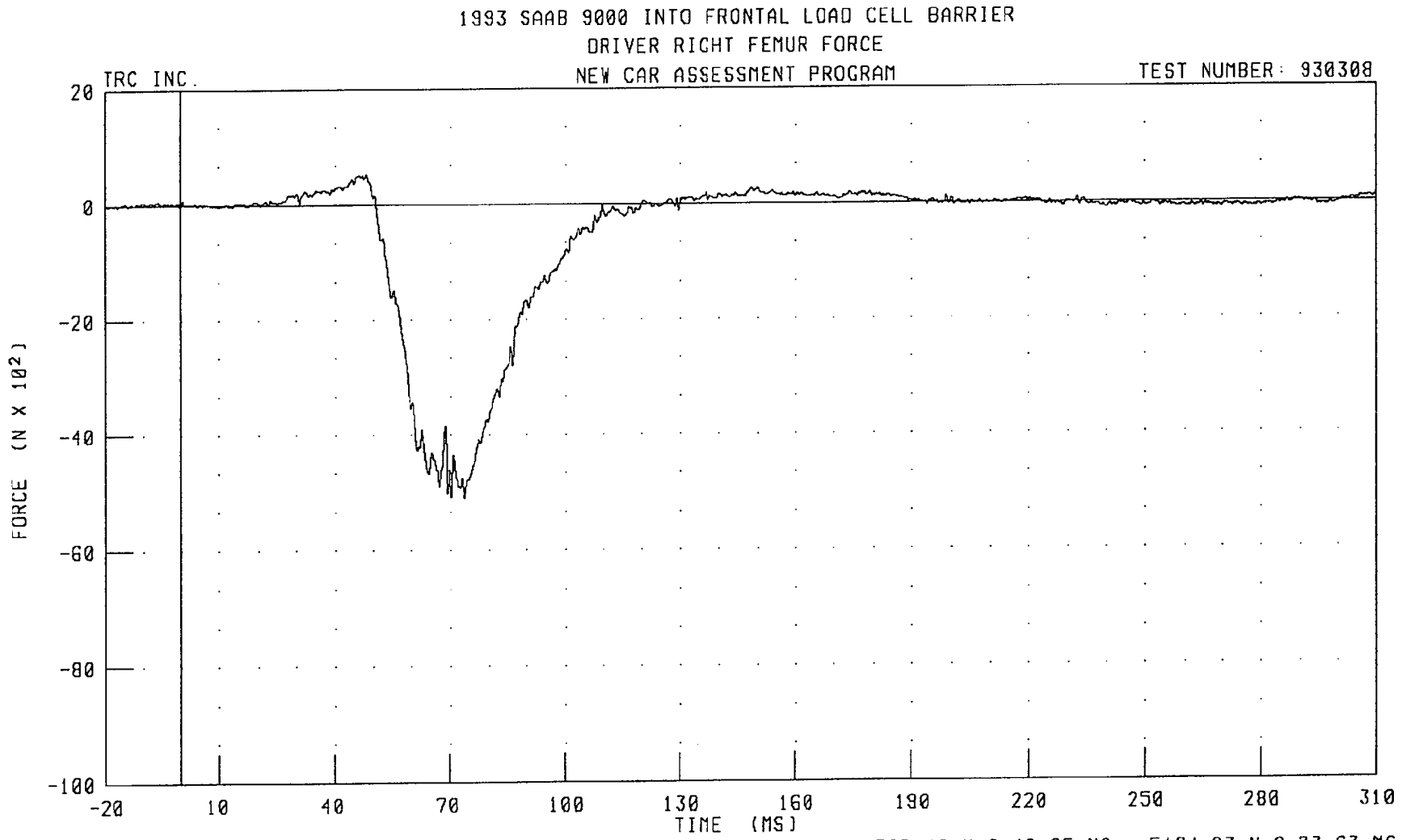
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER CHEST DEFLECTION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
10
-10
-30
-50
-70
-90
DISPLACEMENT (MM)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD1
FILTER: CH. CLASS 180
PEAK DATA: 0.27 MM @ 19.88 MS; -42.54 MM @ 73.88 MS

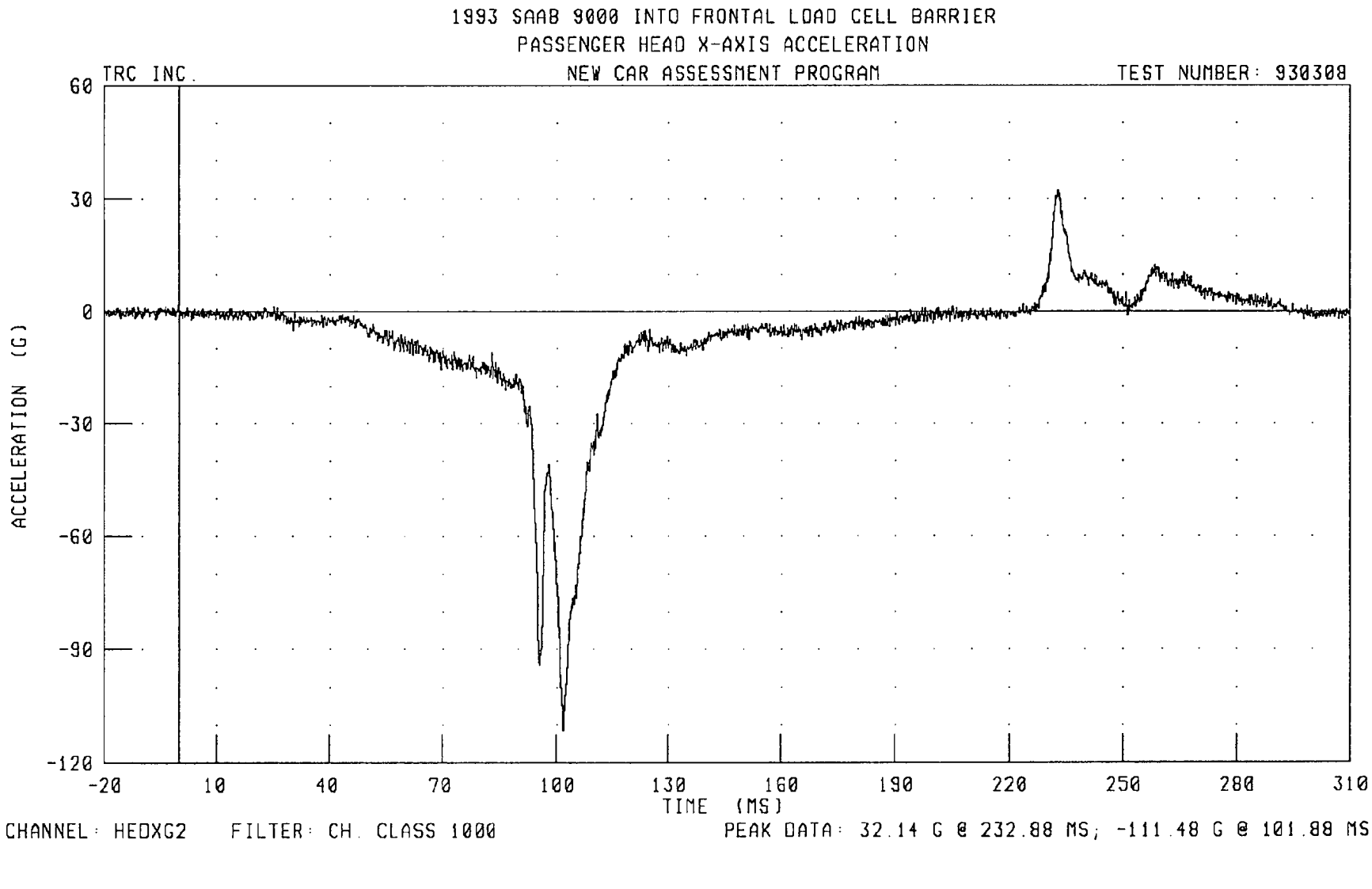
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER LEFT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF1
FILTER: CH. CLASS 600
PEAK DATA: 675.02 N @ 42.75 MS; -3030.49 N @ 51.00 MS

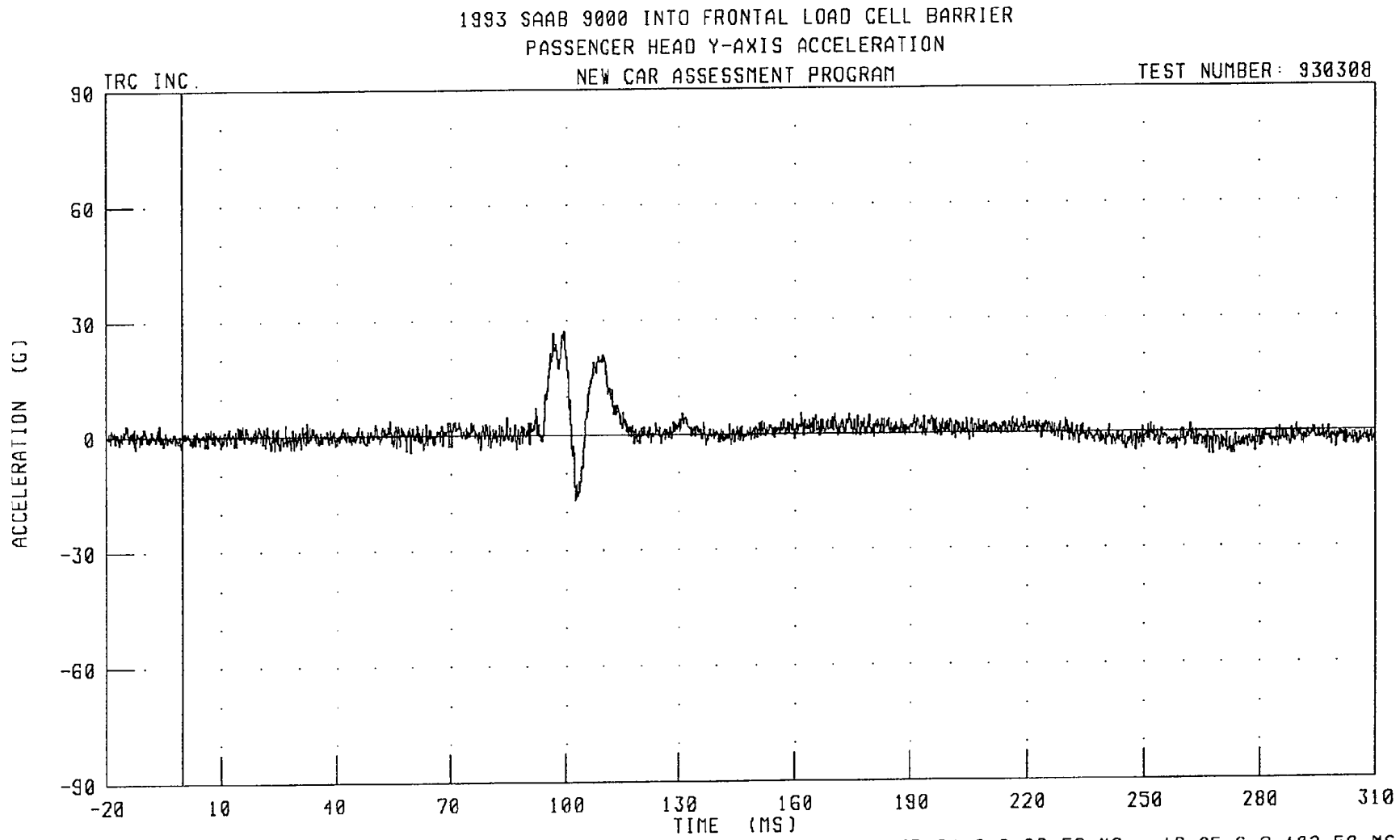
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
DRIVER RIGHT FEMUR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
20
0
-20
-40
-60
-80
-100
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF1
FILTER: CH. CLASS 600
PEAK DATA: 527.49 N @ 48.25 MS; -5104.03 N @ 73.63 MS

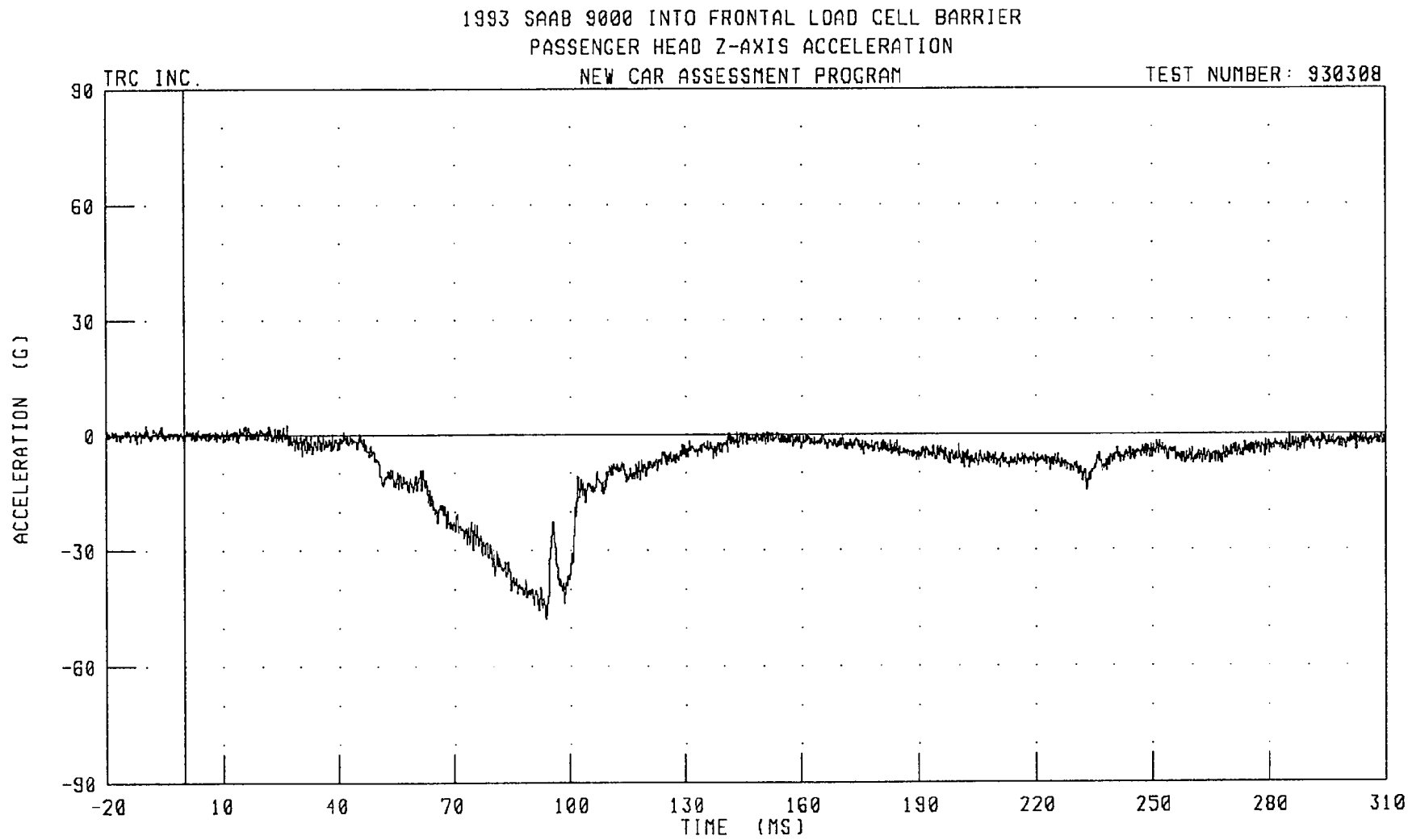
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
30
0
-30
-60
-90
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG2
FILTER: CH. CLASS 1000
PEAK DATA: 32.14 G @ 232.88 MS; -111.48 G @ 101.88 MS

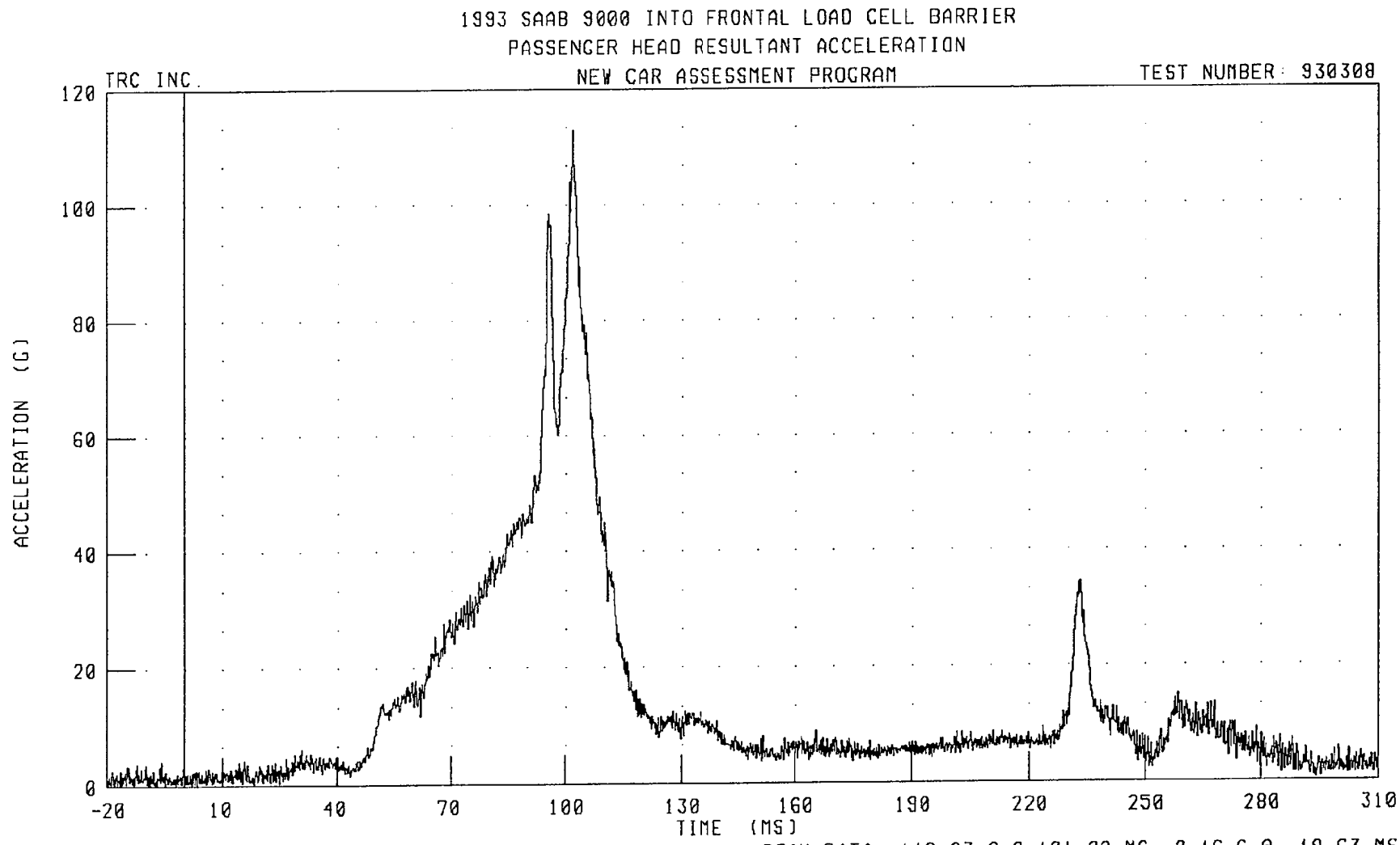
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Y-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG2
FILTER: CH. CLASS 1000
PEAK DATA: 27.24 G @ 99.50 MS; -16.95 G @ 102.50 MS

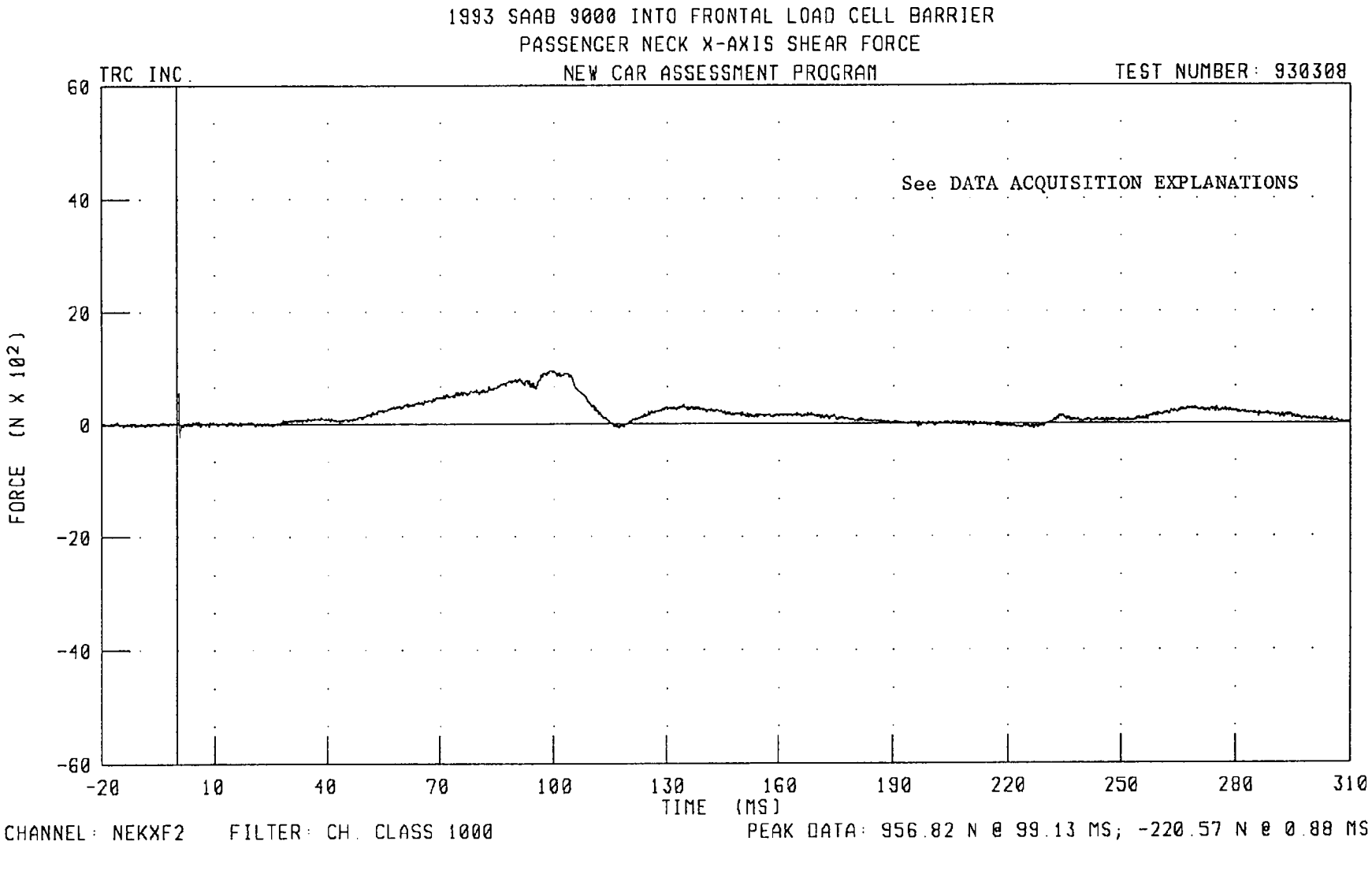
930308

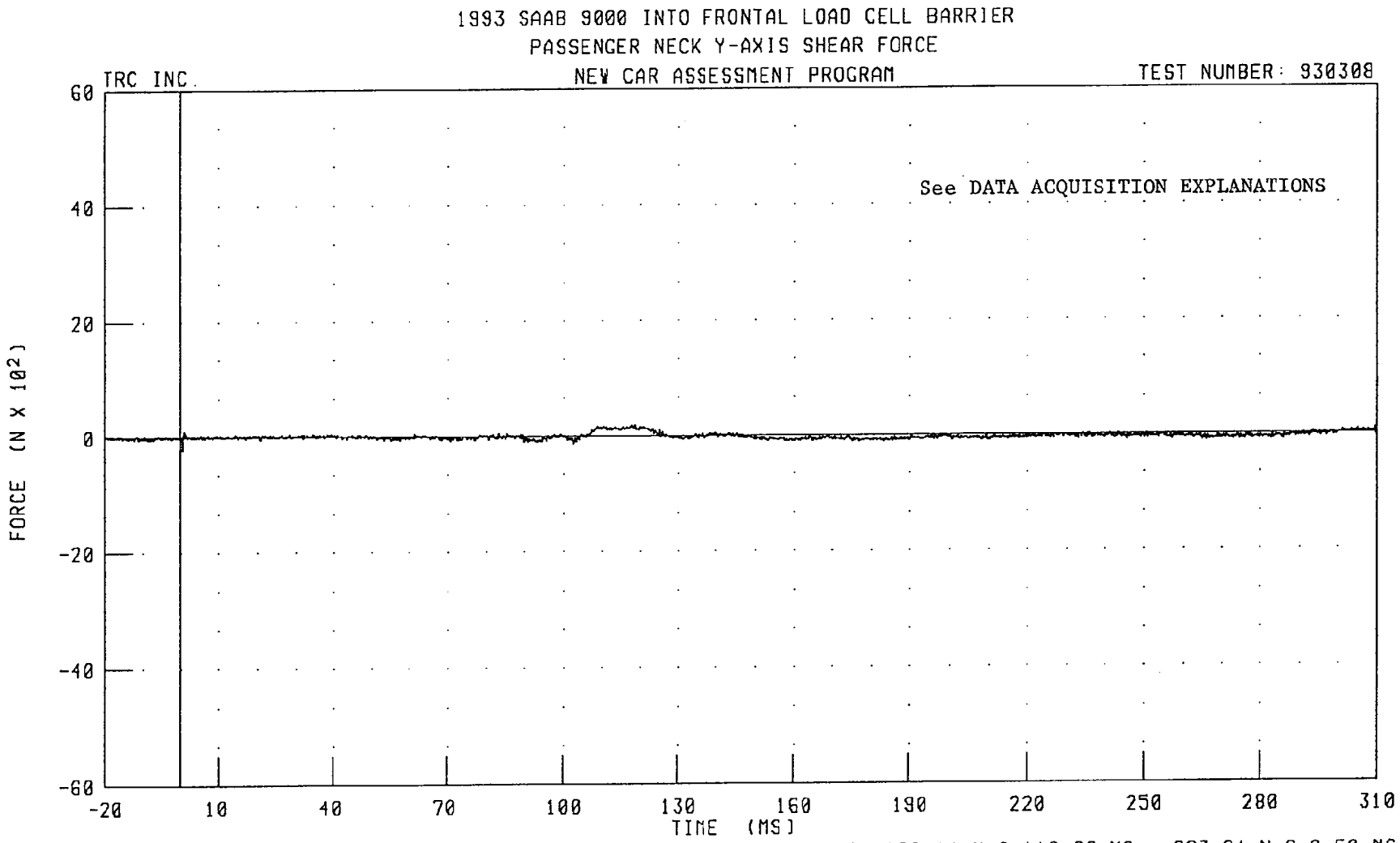

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
ACCELERATION (G)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG2
FILTER: CH. CLASS 1000
PEAK DATA: 2.46 G @ -9.75 MS; -47.80 G @ 93.88 MS

930308

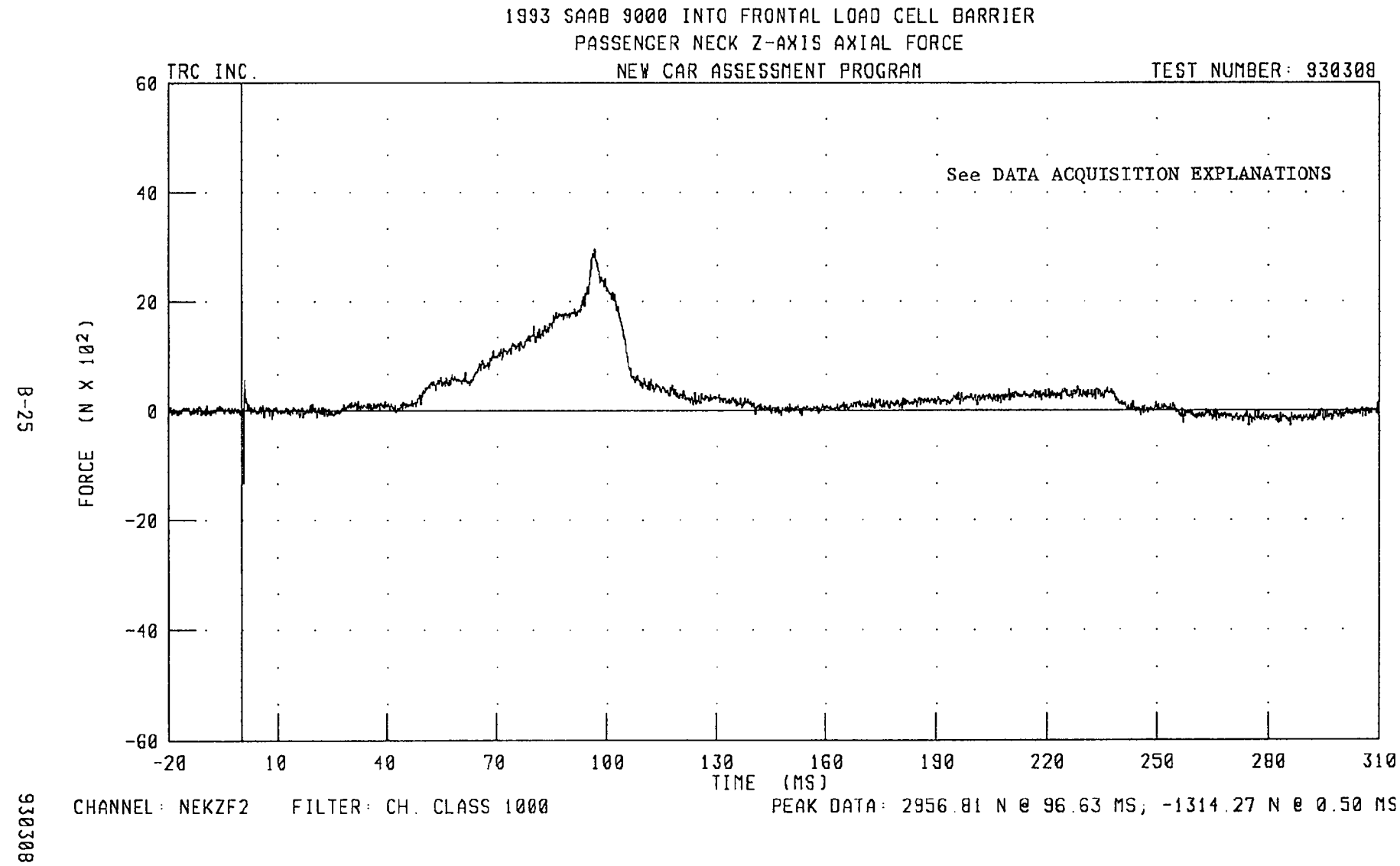

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER HEAD RESULTANT ACCELERATION
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
ACCELERATION (G)
120
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG2
FILTER: CH. CLASS 1000
PEAK DATA: 112.93 G @ 101.88 MS; 0.16 G @ -19.63 MS

930308

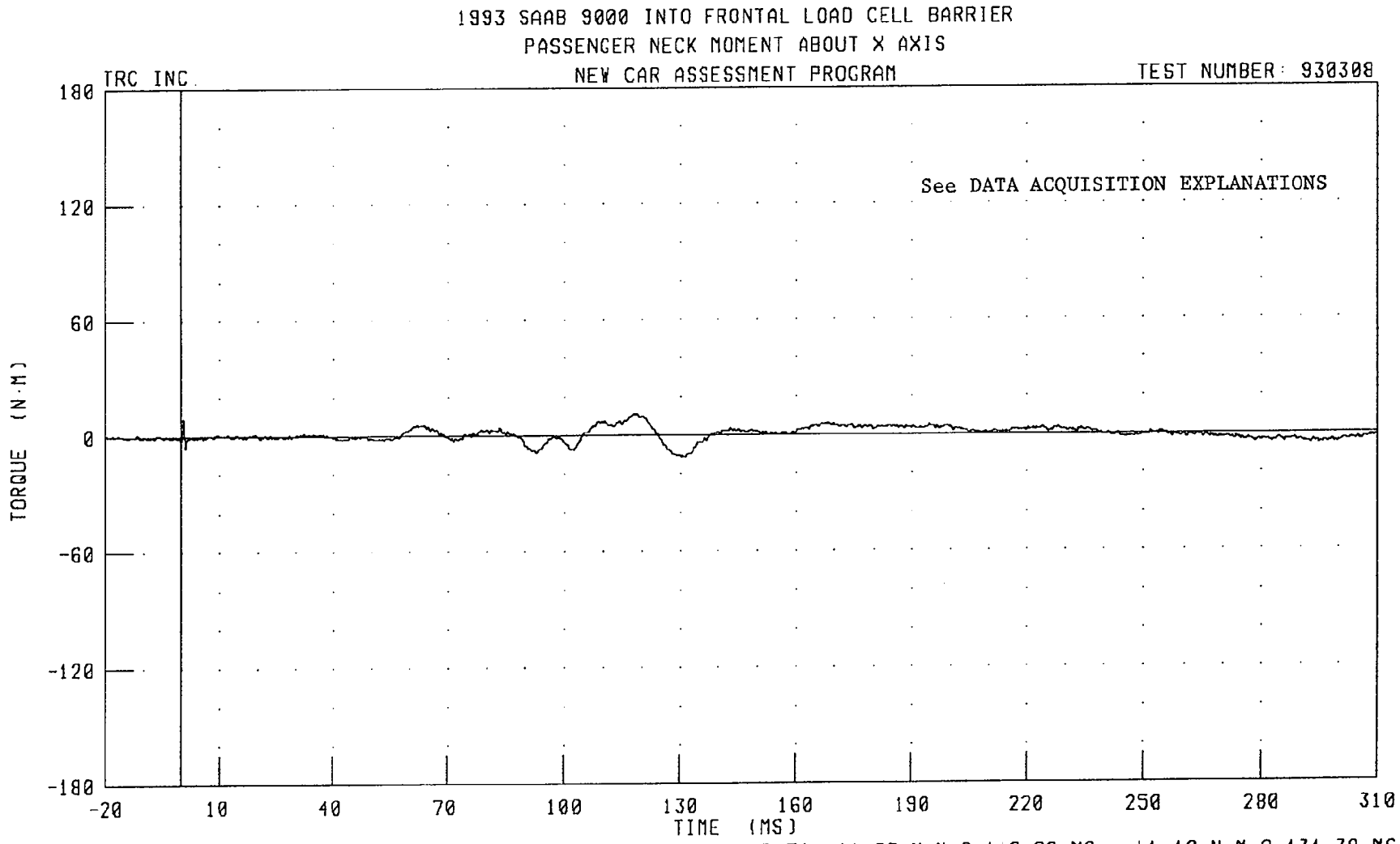

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK X-AXIS SHEAR FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXF2
FILTER: CH. CLASS 1000
PEAK DATA: 956.82 N @ 99.13 MS; -220.57 N @ 0.88 MS


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Y-AXIS SHEAR FORCE
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYF2
FILTER: CH. CLASS 1000
PEAK DATA: 188.14 N @ 118.88 MS; -223.64 N @ 0.50 MS

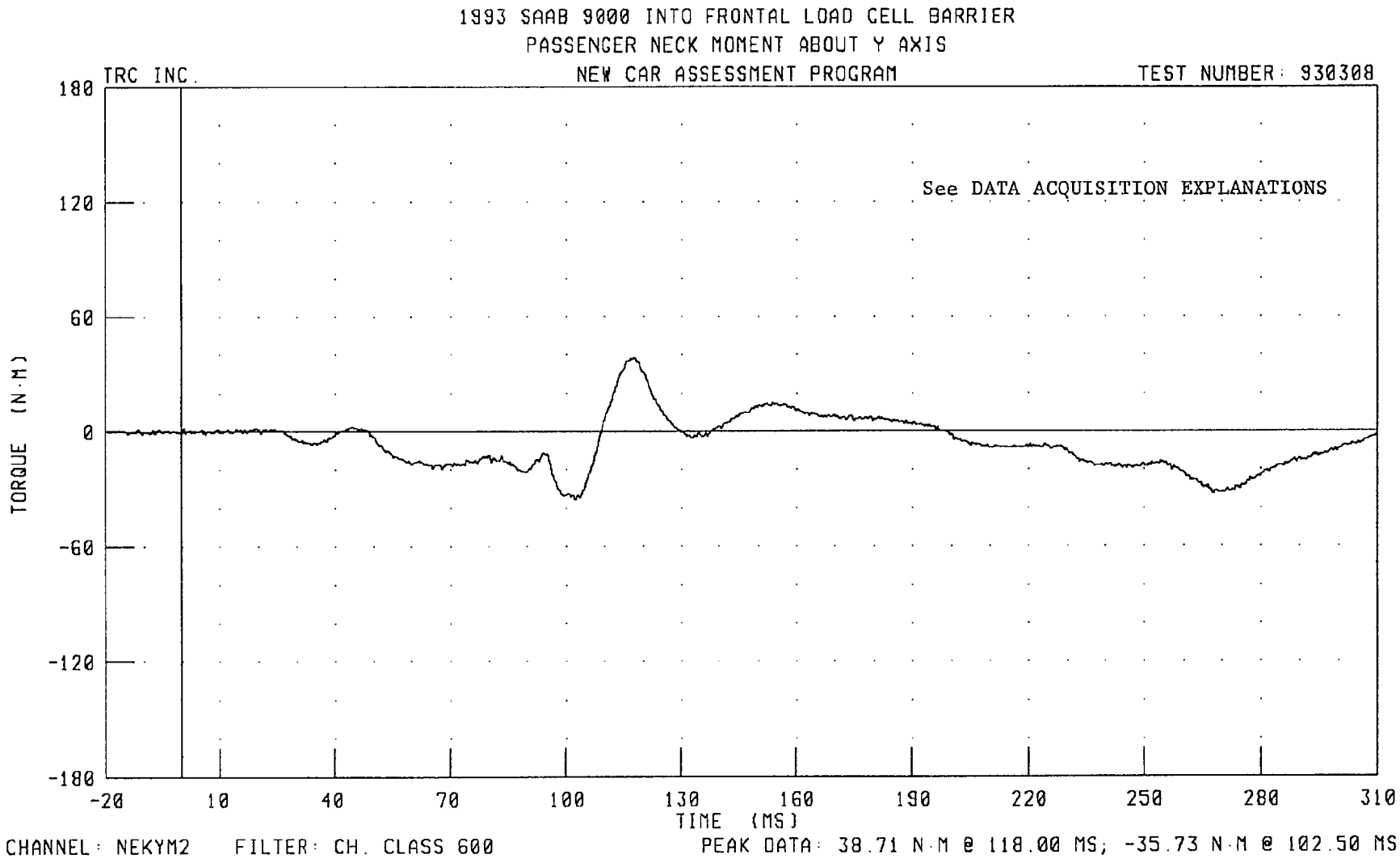
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK Z-AXIS AXIAL FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKZF2
FILTER: CH. CLASS 1000
PEAK DATA: 2956.81 N @ 96.63 MS; -1314.27 N @ 0.50 MS

930308

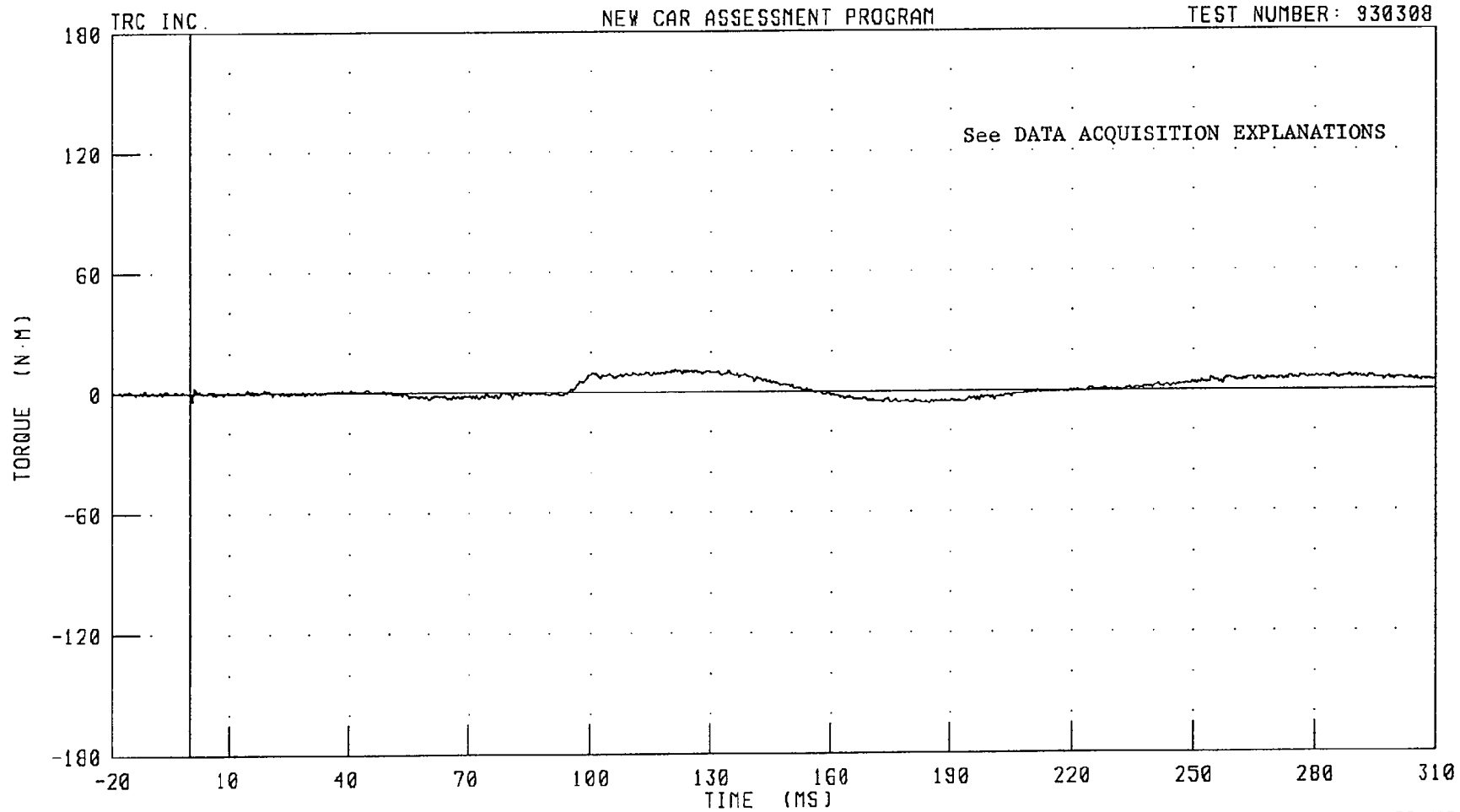

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT X AXIS
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
TORQUE (N-M)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKXM2
FILTER: CH. CLASS 600
PEAK DATA: 11.33 N-M @ 118.88 MS, -11.10 N-M @ 131.38 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Y AXIS
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
TORQUE (N-M)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYM2
FILTER: CH. CLASS 600
PEAK DATA: 38.71 N-M @ 118.00 MS; -35.73 N-M @ 102.50 MS

930308

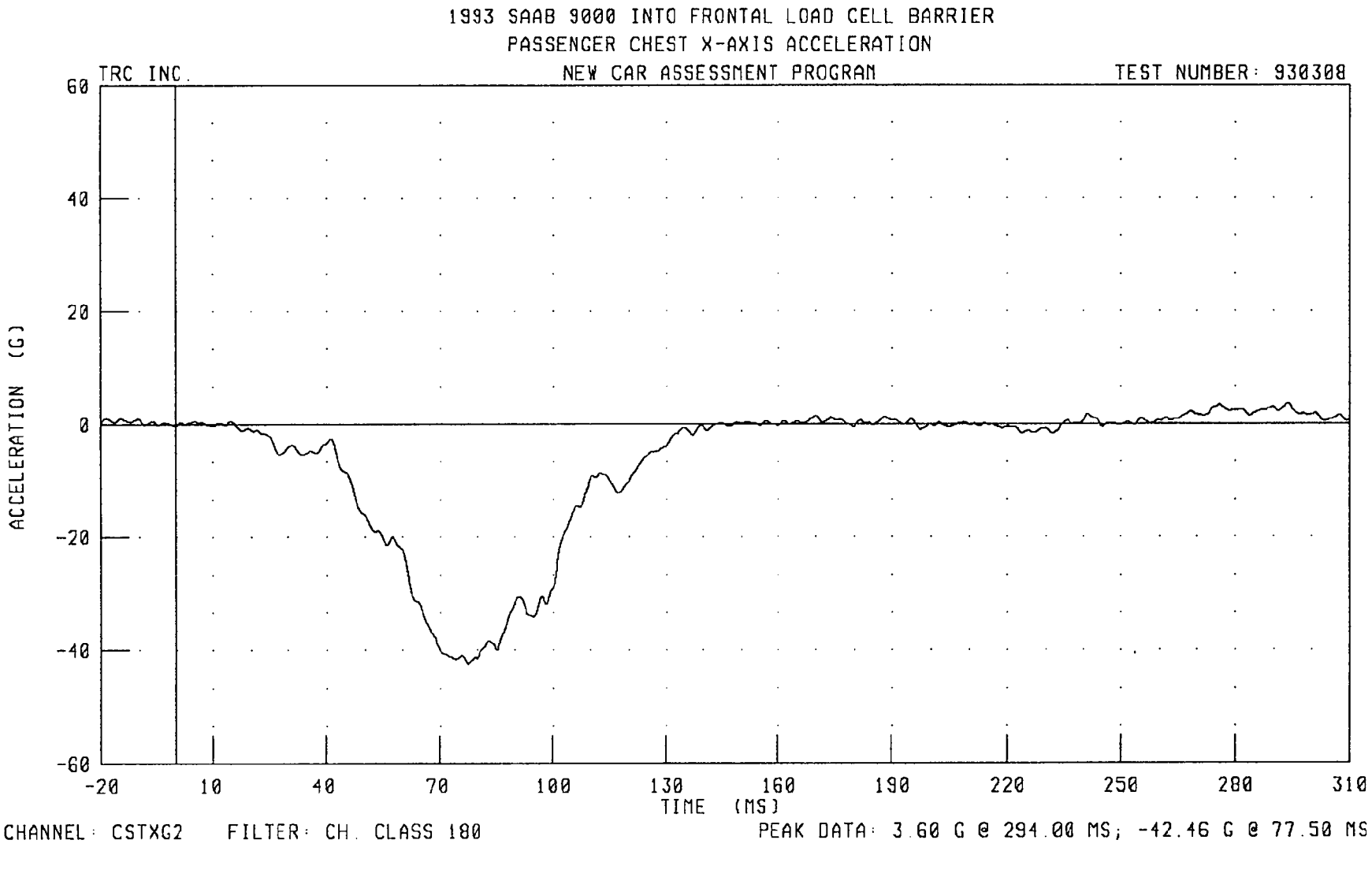
1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER NECK MOMENT ABOUT Z AXIS



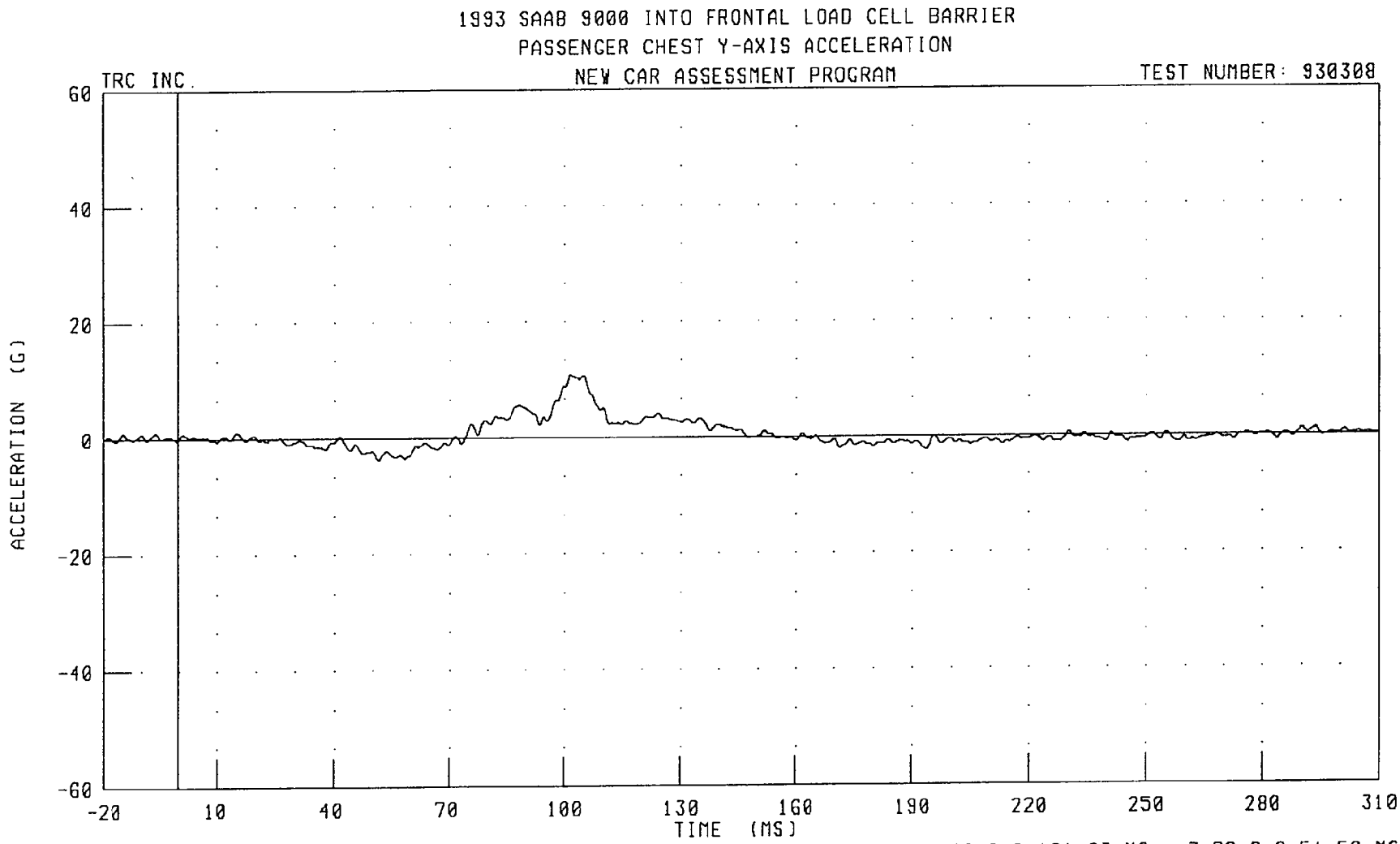
CHANNEL: NEKZM2 FILTER: CH. CLASS 600

PEAK DATA: 11.04 N·M @ 121.25 MS; -5.80 N·M @ 184.63 MS

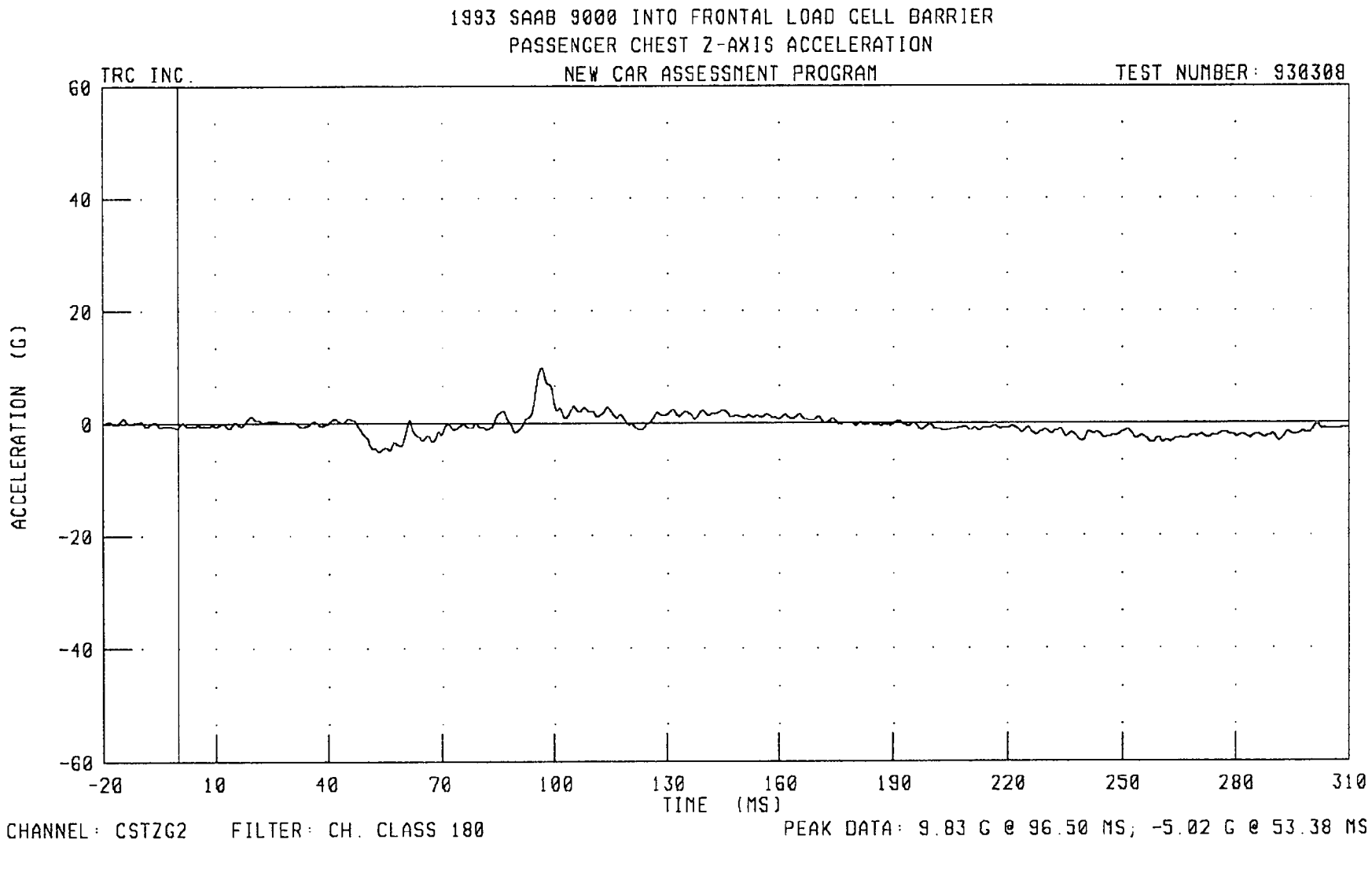
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG2
FILTER: CH. CLASS 180
PEAK DATA: 3.60 G @ 294.00 MS; -42.46 G @ 77.50 MS

930308

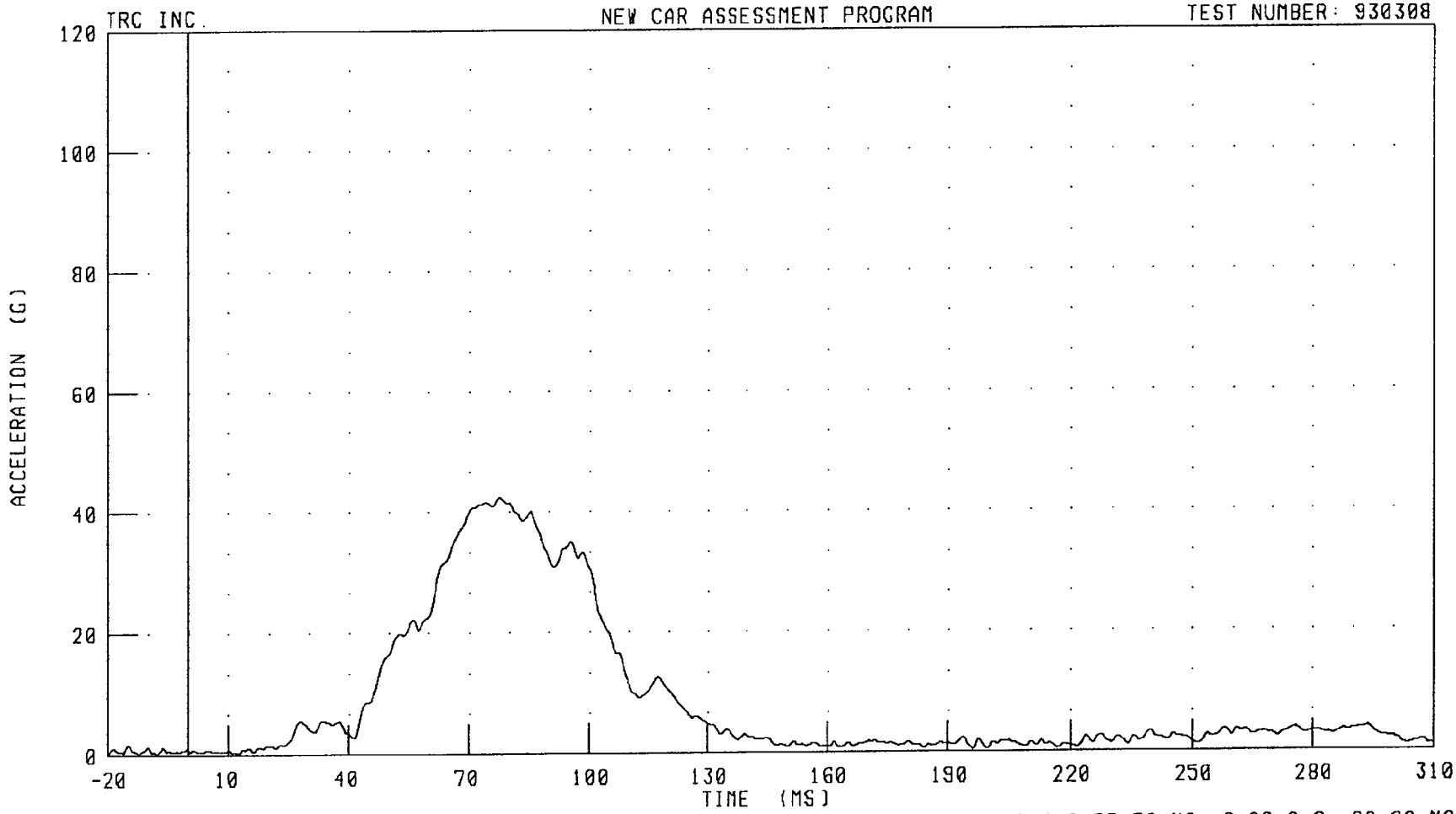

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Y-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG2
FILTER: CH. CLASS 180
PEAK DATA: 10.80 G @ 101.63 MS; -3.76 G @ 51.50 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST Z-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG2
FILTER: CH. CLASS 180
PEAK DATA: 9.83 G @ 96.50 MS; -5.02 G @ 53.38 MS

930308

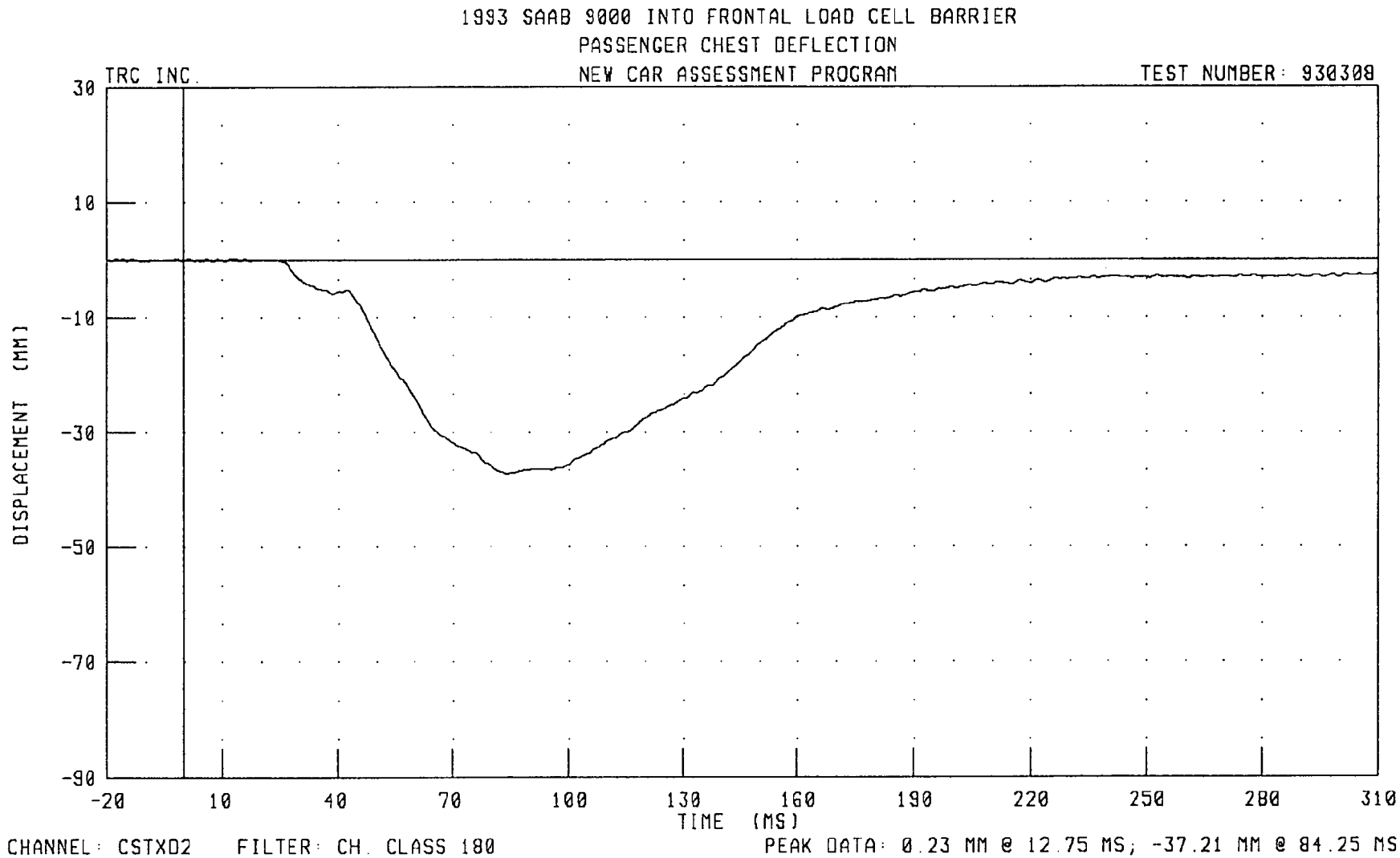
1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST RESULTANT ACCELERATION
NEW CAR ASSESSMENT PROGRAM



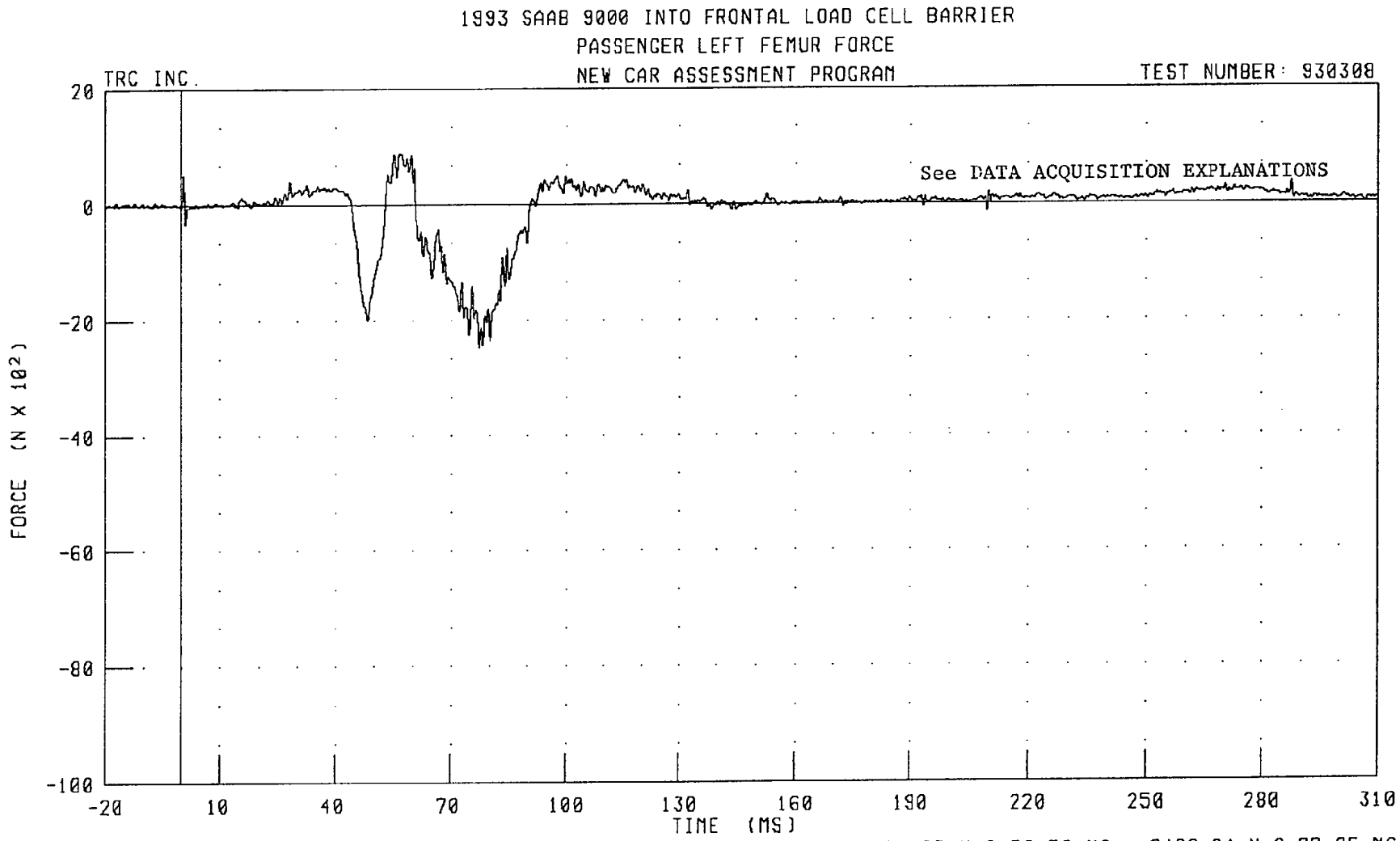
CHANNEL: CSTRG2 FILTER: CH. CLASS 180

PEAK DATA: 42.47 G @ 77.50 MS; 0.06 G @ -20.00 MS

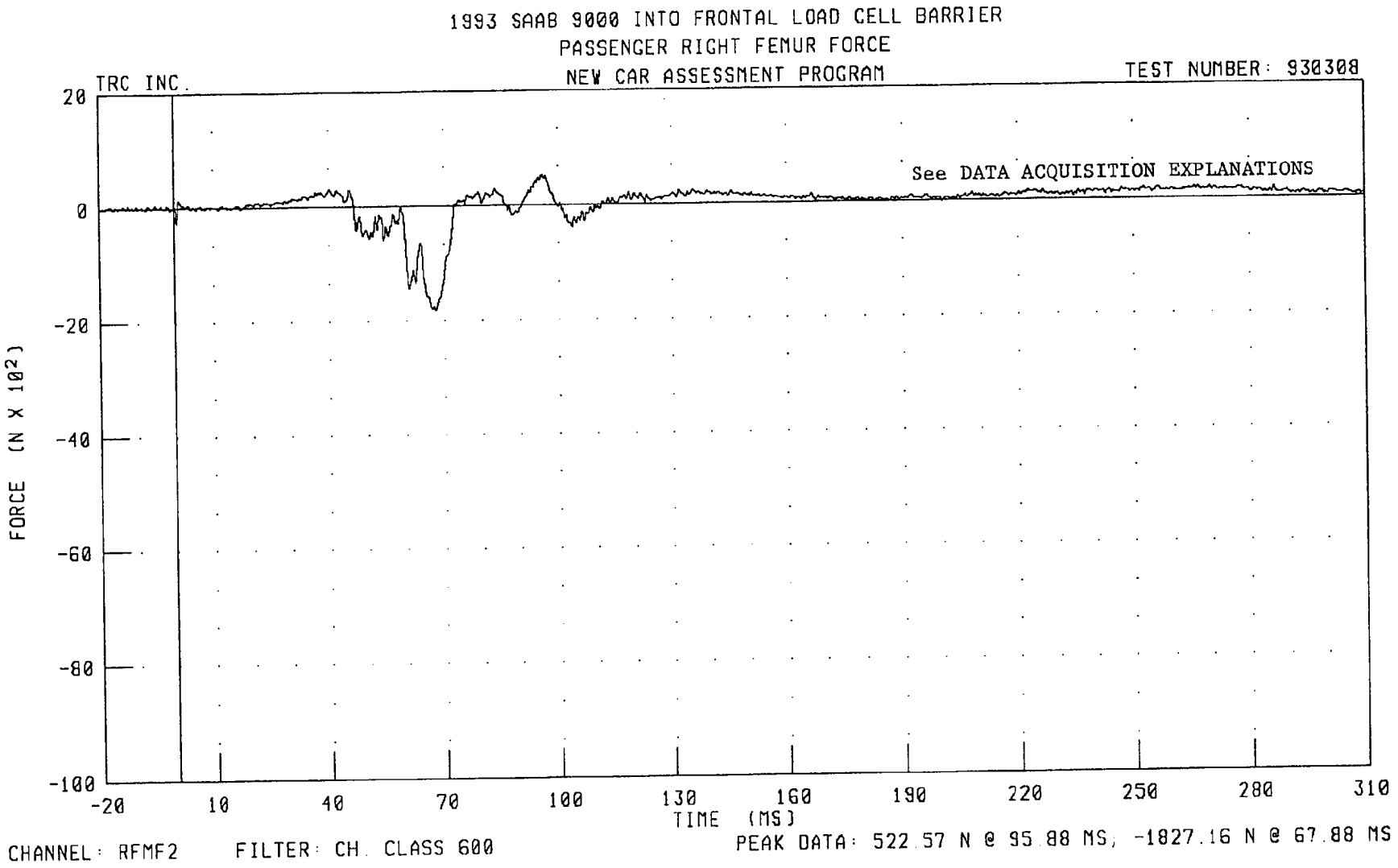
930308

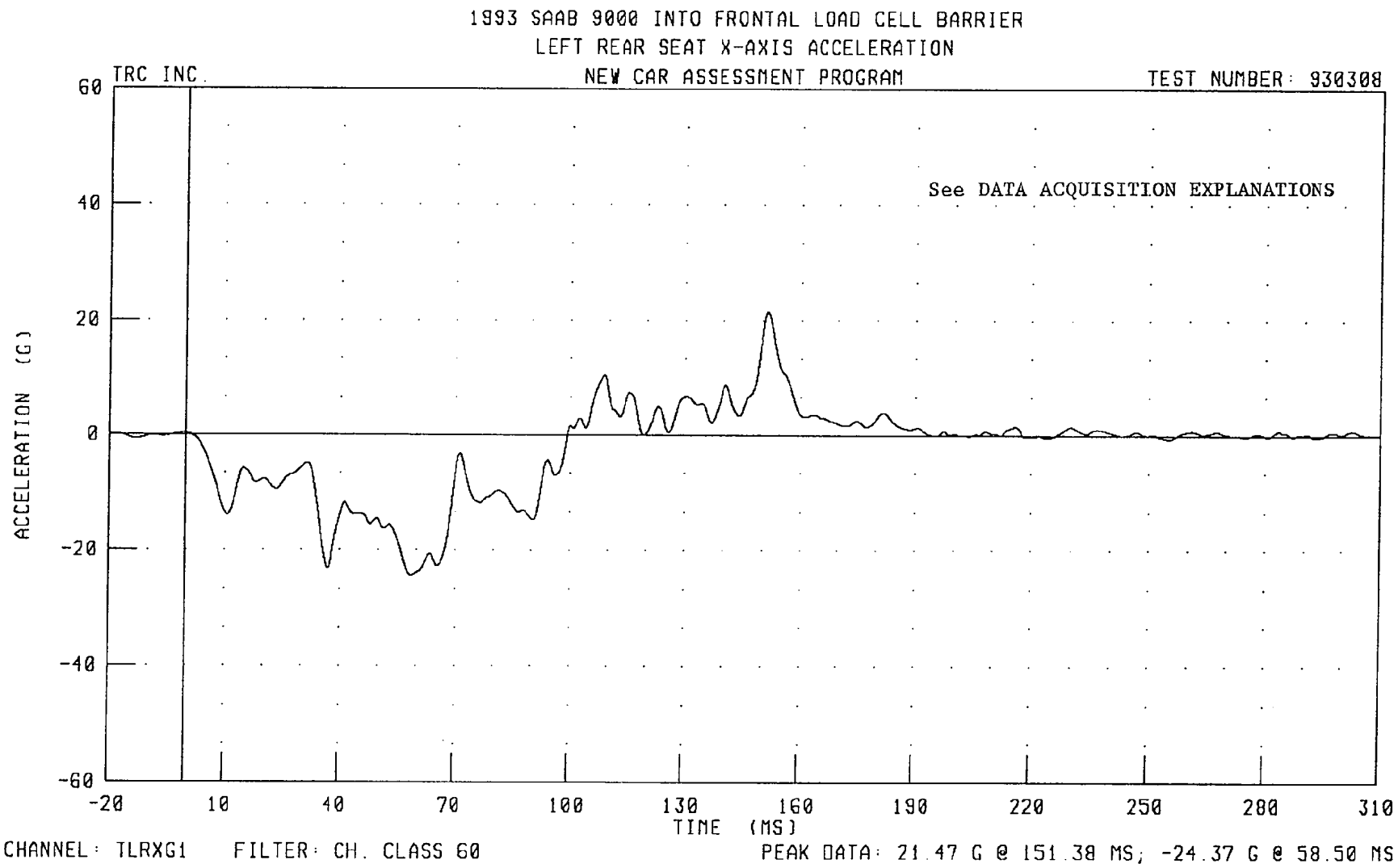

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER CHEST DEFLECTION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
10
-10
-30
-50
-70
-90
DISPLACEMENT (MM)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD2
FILTER: CH. CLASS 180
PEAK DATA: 0.23 MM @ 12.75 MS; -37.21 MM @ 84.25 MS

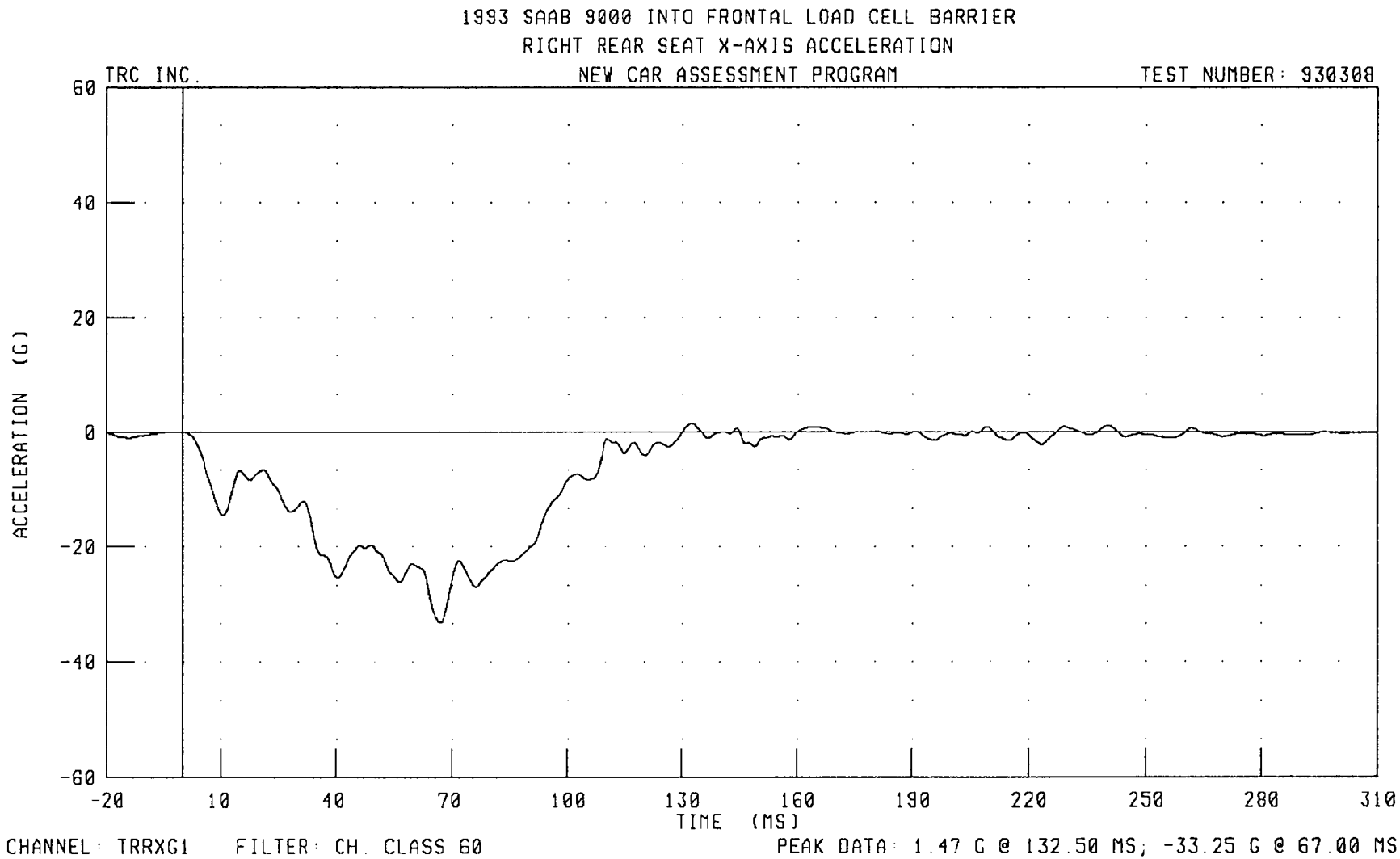
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER LEFT FEMUR FORCE
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
FORCE (N X 10²)
20
0
-20
-40
-60
-80
-100
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF2
FILTER: CH. CLASS 600
PEAK DATA: 884.93 N @ 56.50 MS; -2468.24 N @ 77.25 MS

930308

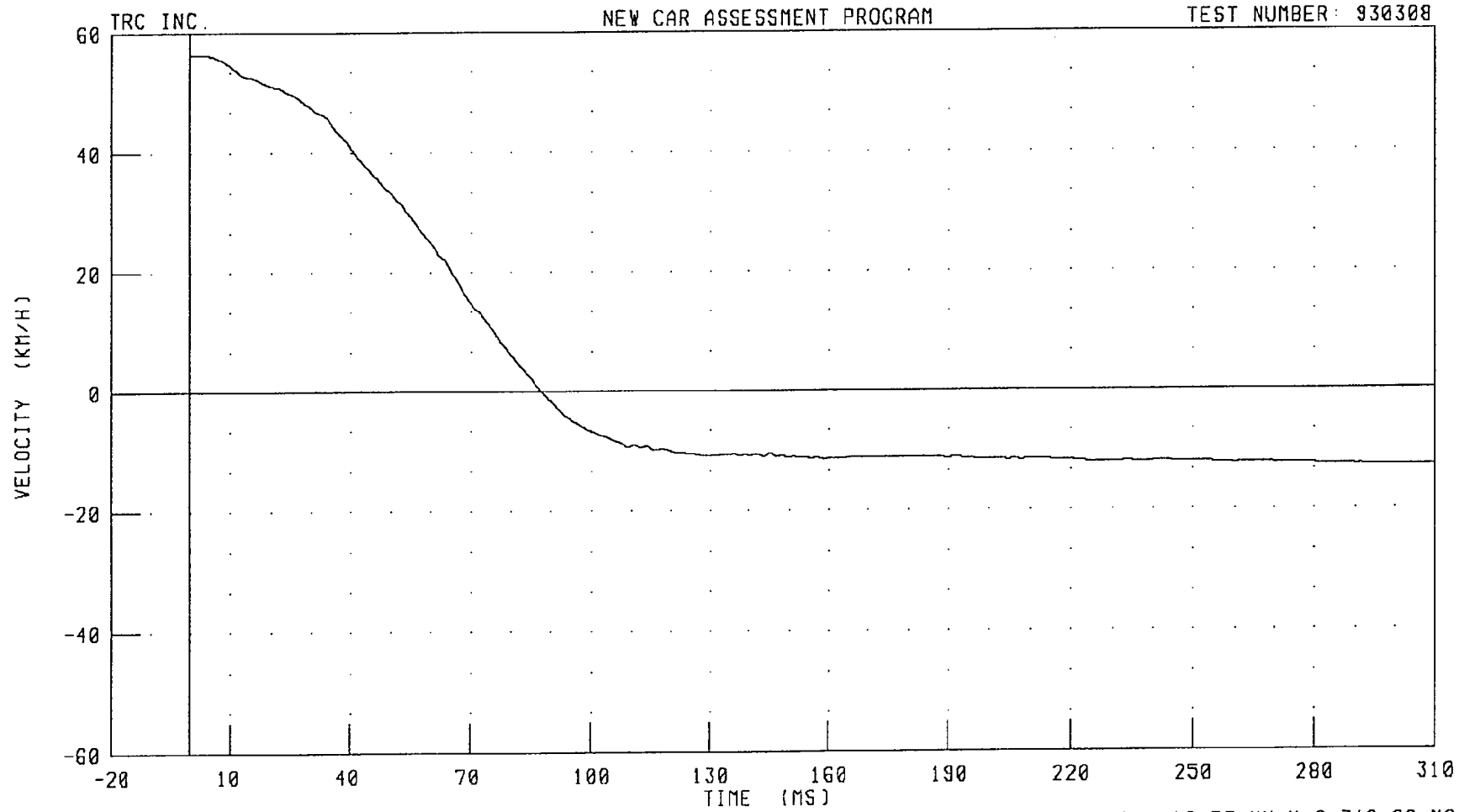

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
PASSENGER RIGHT FEMUR FORCE
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
FORCE (N X 10²)
20
0
-20
-40
-60
-80
-100
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF2
FILTER: CH. CLASS 600
PEAK DATA: 522.57 N @ 95.88 MS, -1827.16 N @ 67.88 MS


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXG1
FILTER: CH. CLASS 60
PEAK DATA: 21.47 G @ 151.38 MS; -24.37 G @ 58.50 MS


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TRRXG1
FILTER: CH. CLASS 60
PEAK DATA: 1.47 G @ 132.50 MS; -33.25 G @ 67.00 MS

930308

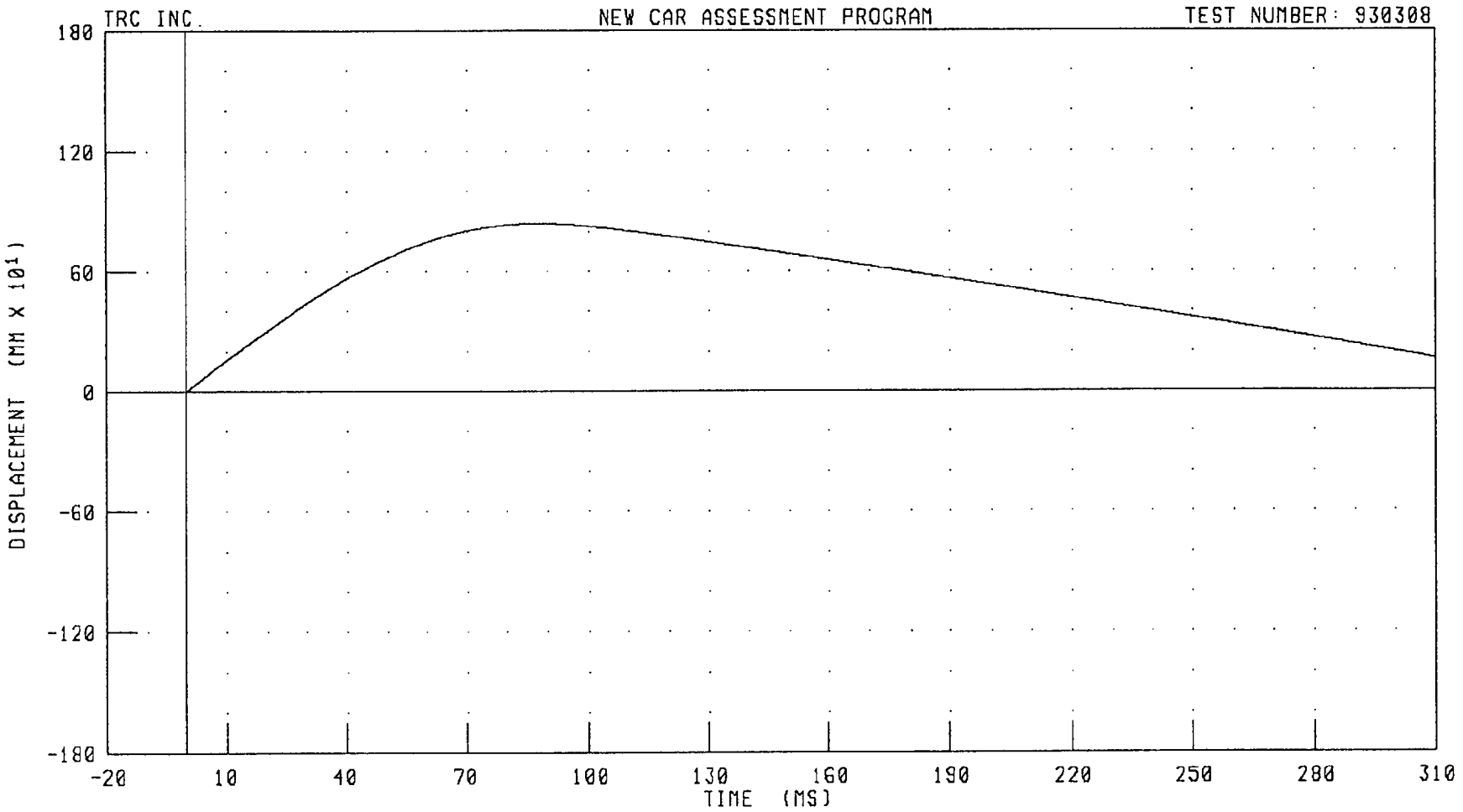
1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS VELOCITY



CHANNEL: TRRXV1 FILTER: CH. CLASS 180 PEAK DATA: 56.30 KM/H @ 0.00 MS; -12.75 KM/H @ 310.00 MS

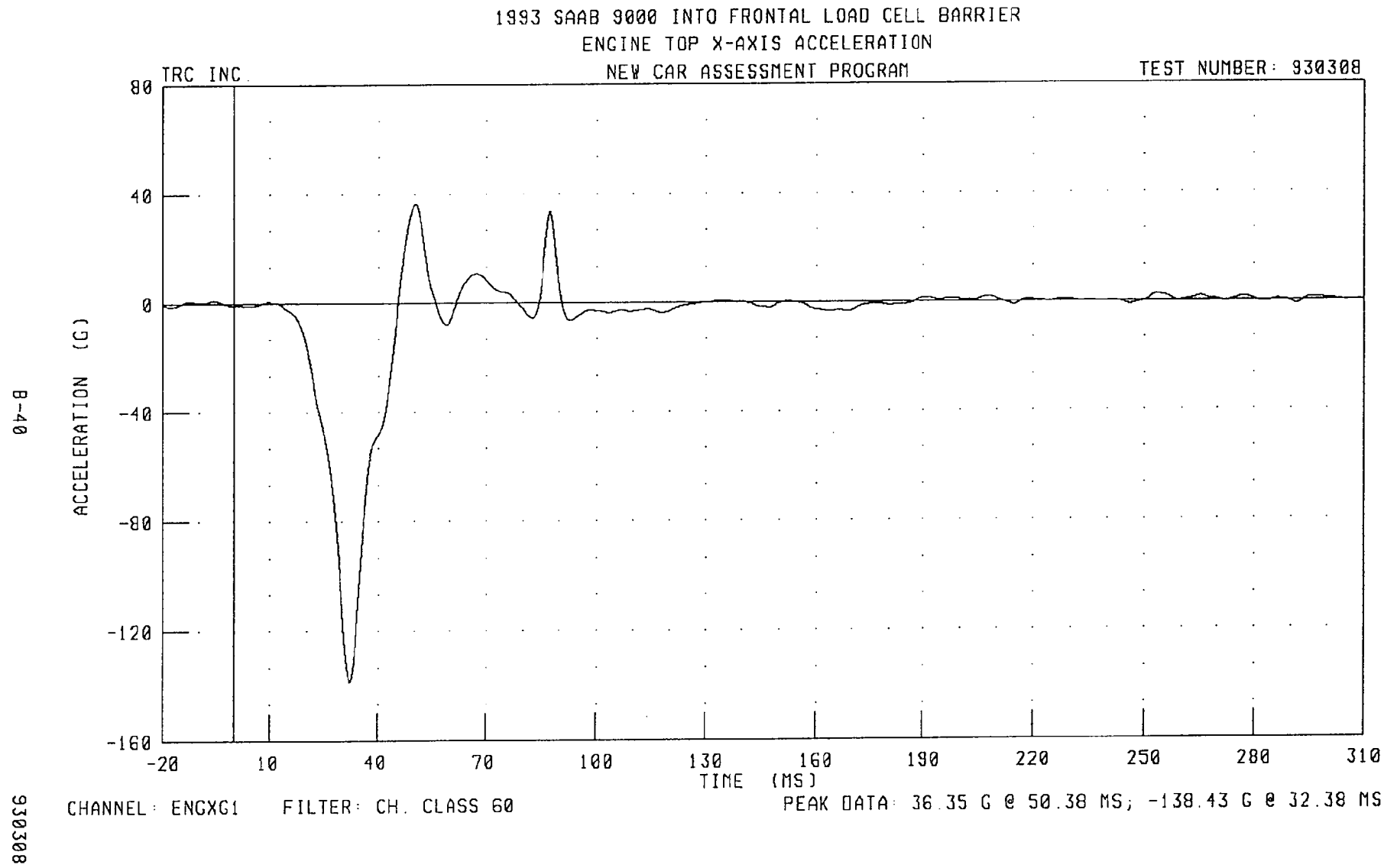
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT X-AXIS DISPLACEMENT

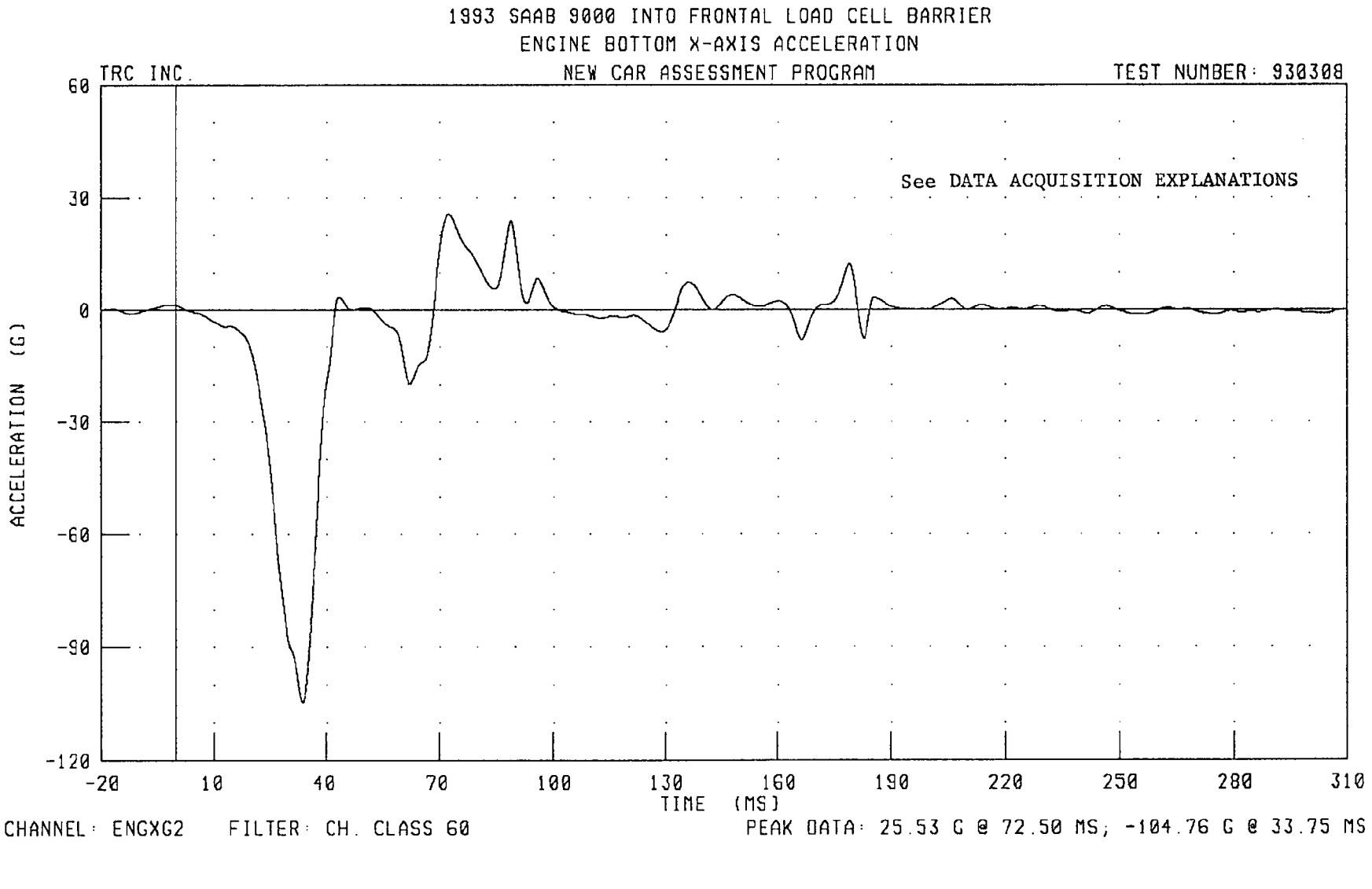


CHANNEL: TRRXD1 FILTER: CH. CLASS 180 PEAK DATA: 838.28 MM @ 87.75 MS; 0.00 MM @ 0.00 MS

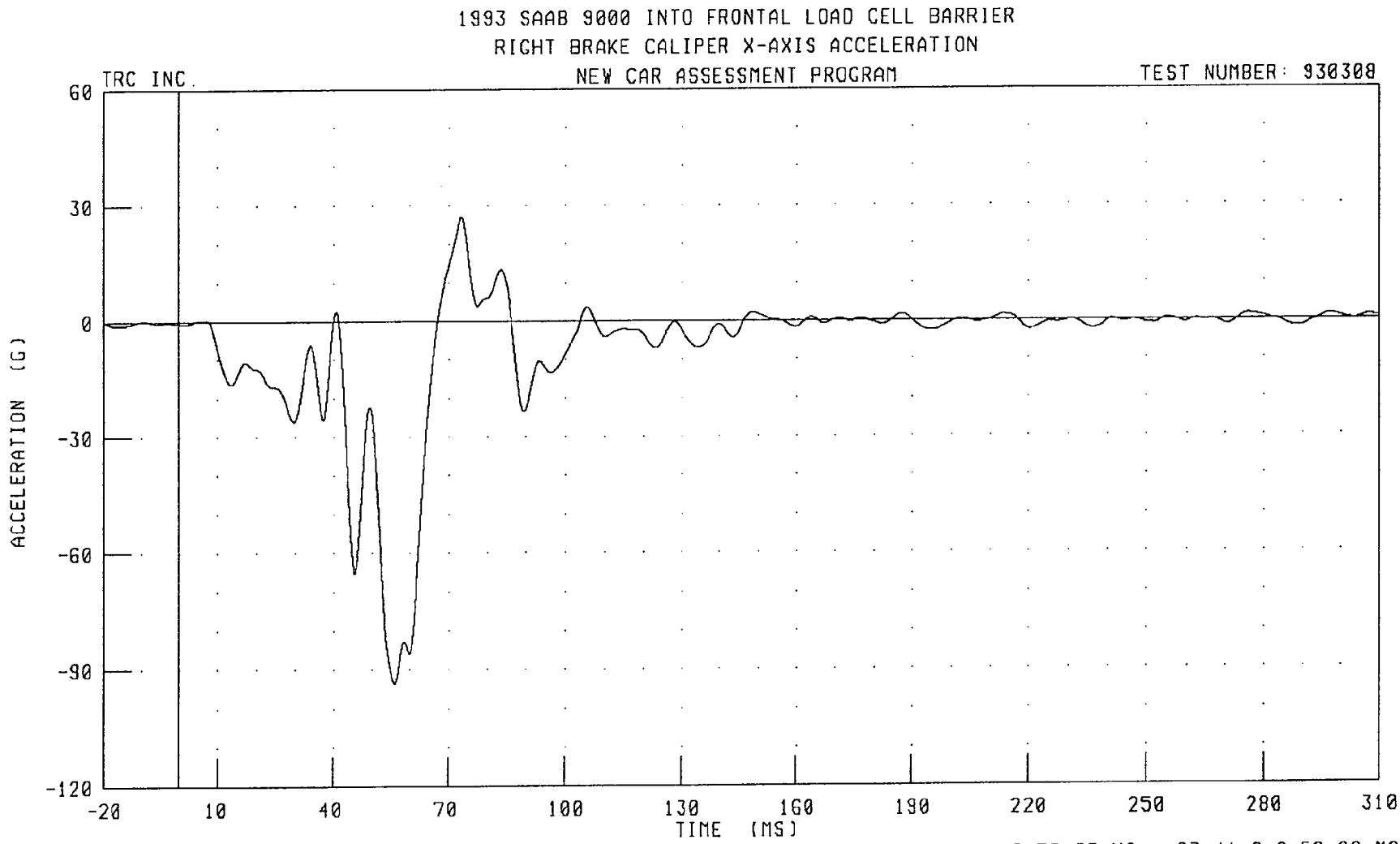
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
ENGINE TOP X-AXIS ACCELERATION
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
80
40
0
-40
-80
-120
-160
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG1
FILTER: CH. CLASS 60
PEAK DATA: 36.35 G @ 50.38 MS; -138.43 G @ 32.38 MS

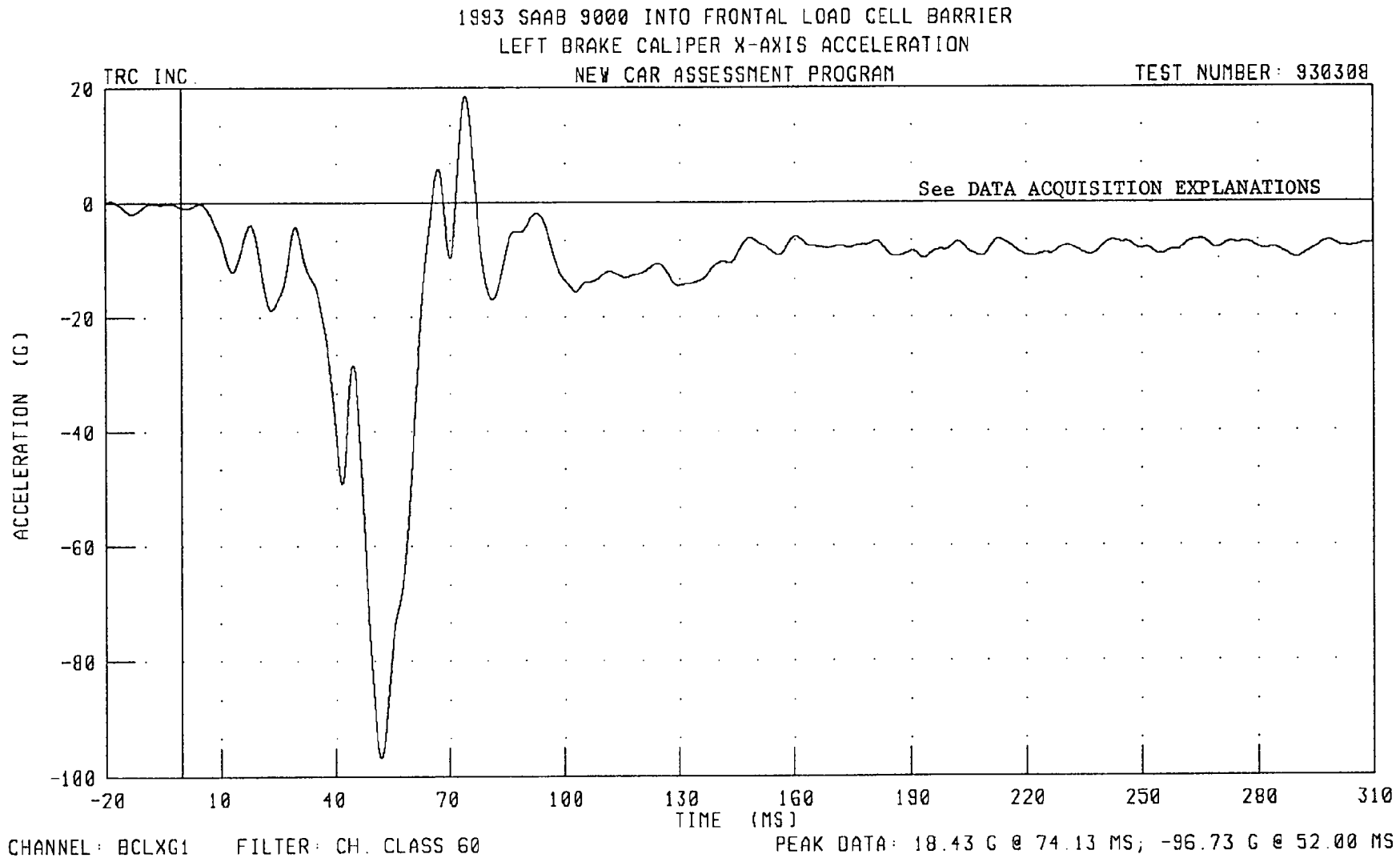
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
ENGINE BOTTOM X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
60
30
0
-30
-60
-90
-120
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG2
FILTER: CH. CLASS 60
PEAK DATA: 25.53 G @ 72.50 MS; -104.76 G @ 33.75 MS

930308

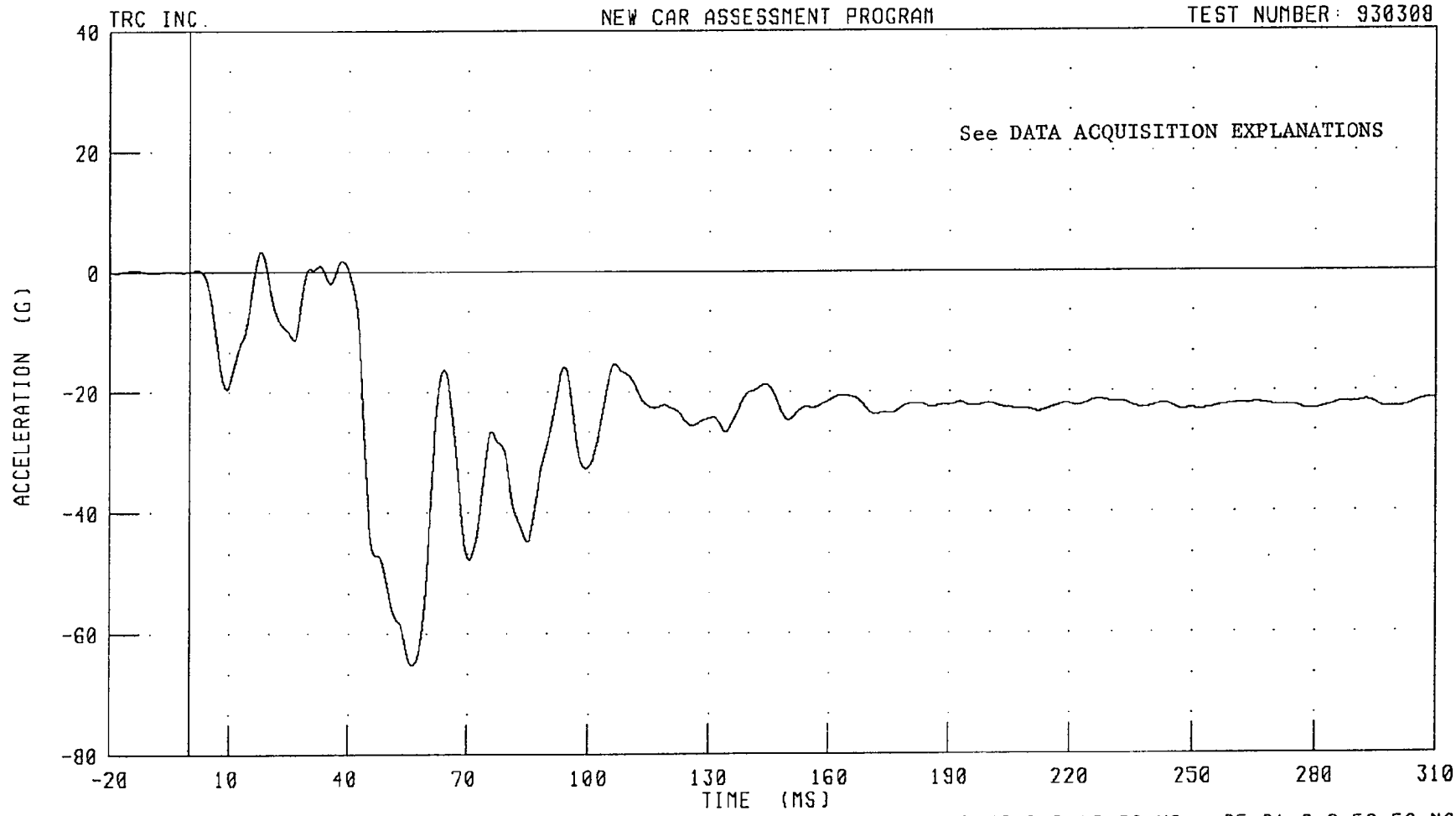

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
30
0
-30
-60
-90
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCRXG1
FILTER: CH. CLASS 60
PEAK DATA: 27.03 G @ 73.25 MS, -93.41 G @ 56.00 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
See DATA ACQUISITION EXPLANATIONS
ACCELERATION (G)
20
0
-20
-40
-60
-80
-100
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BCLXG1
FILTER: CH. CLASS 60
PEAK DATA: 18.43 G @ 74.13 MS; -96.73 G @ 52.00 MS

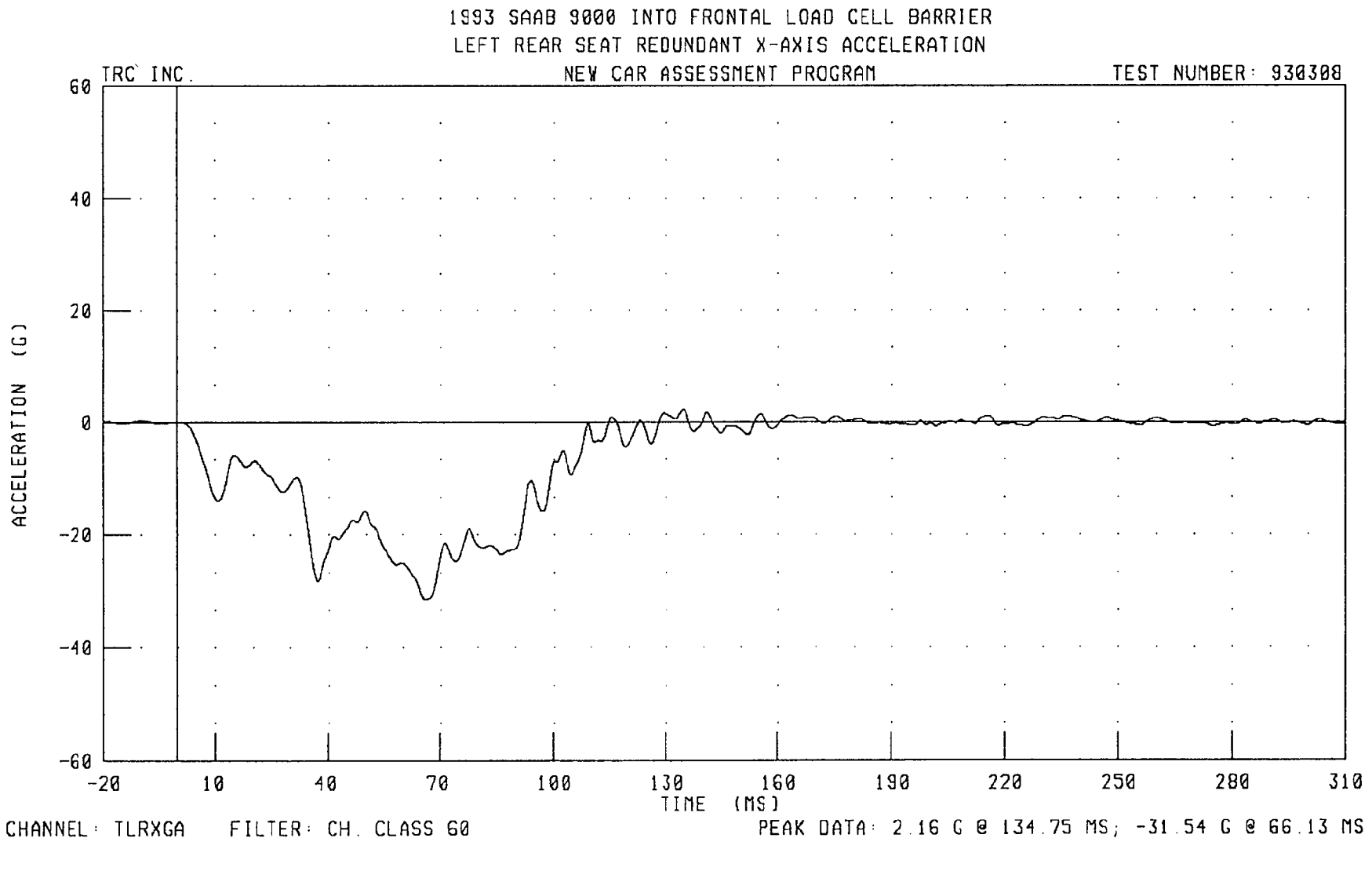
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION
NEW CAR ASSESSMENT PROGRAM

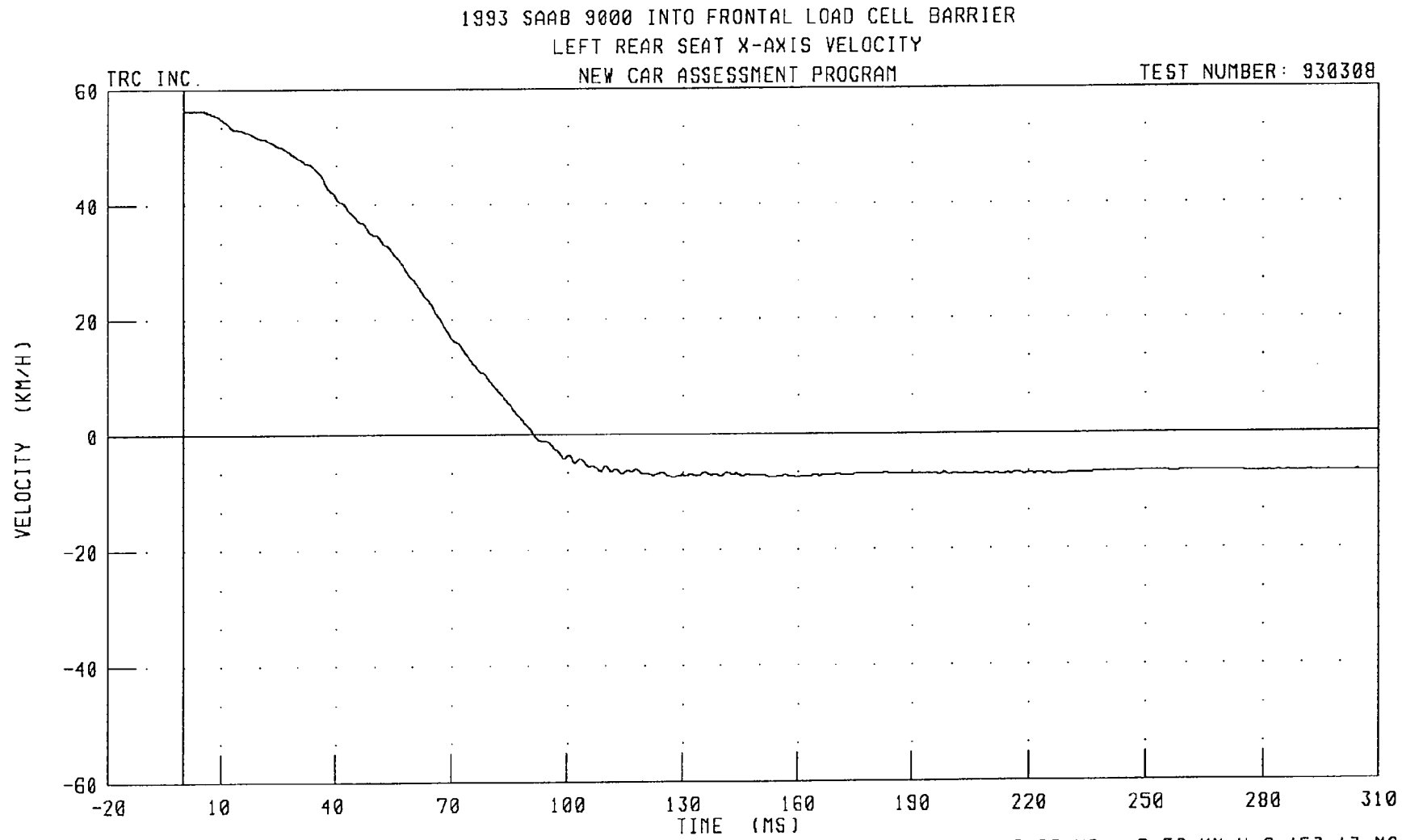


CHANNEL: DPCXG1 FILTER: CH. CLASS 60 PEAK DATA: 3.42 G @ 18.00 MS; -65.21 G @ 56.50 MS

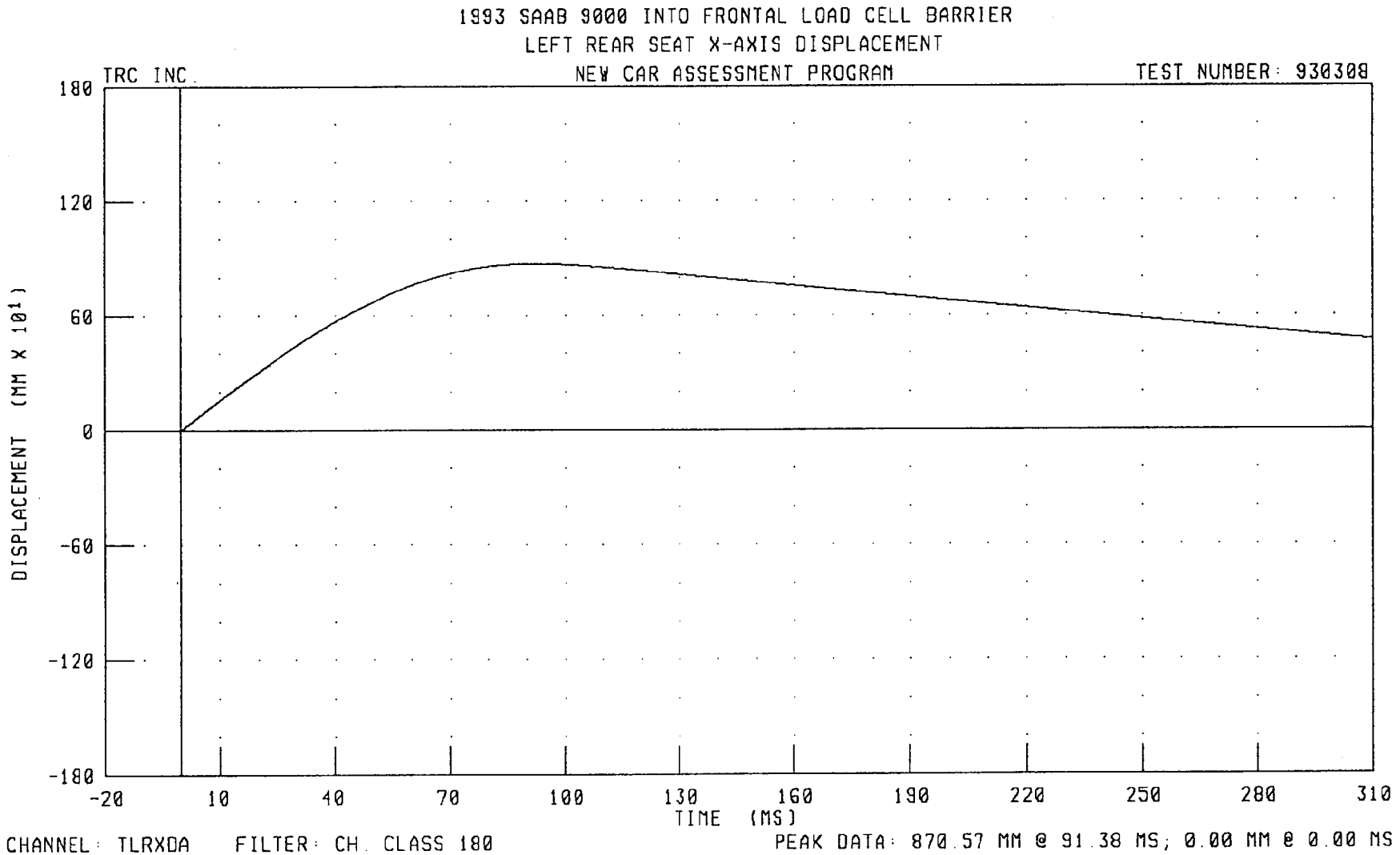
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT REDUNDANT X-AXIS ACCELERATION
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXGA
FILTER: CH. CLASS 60
PEAK DATA: 2.16 G @ 134.75 MS; -31.54 G @ 66.13 MS

930308

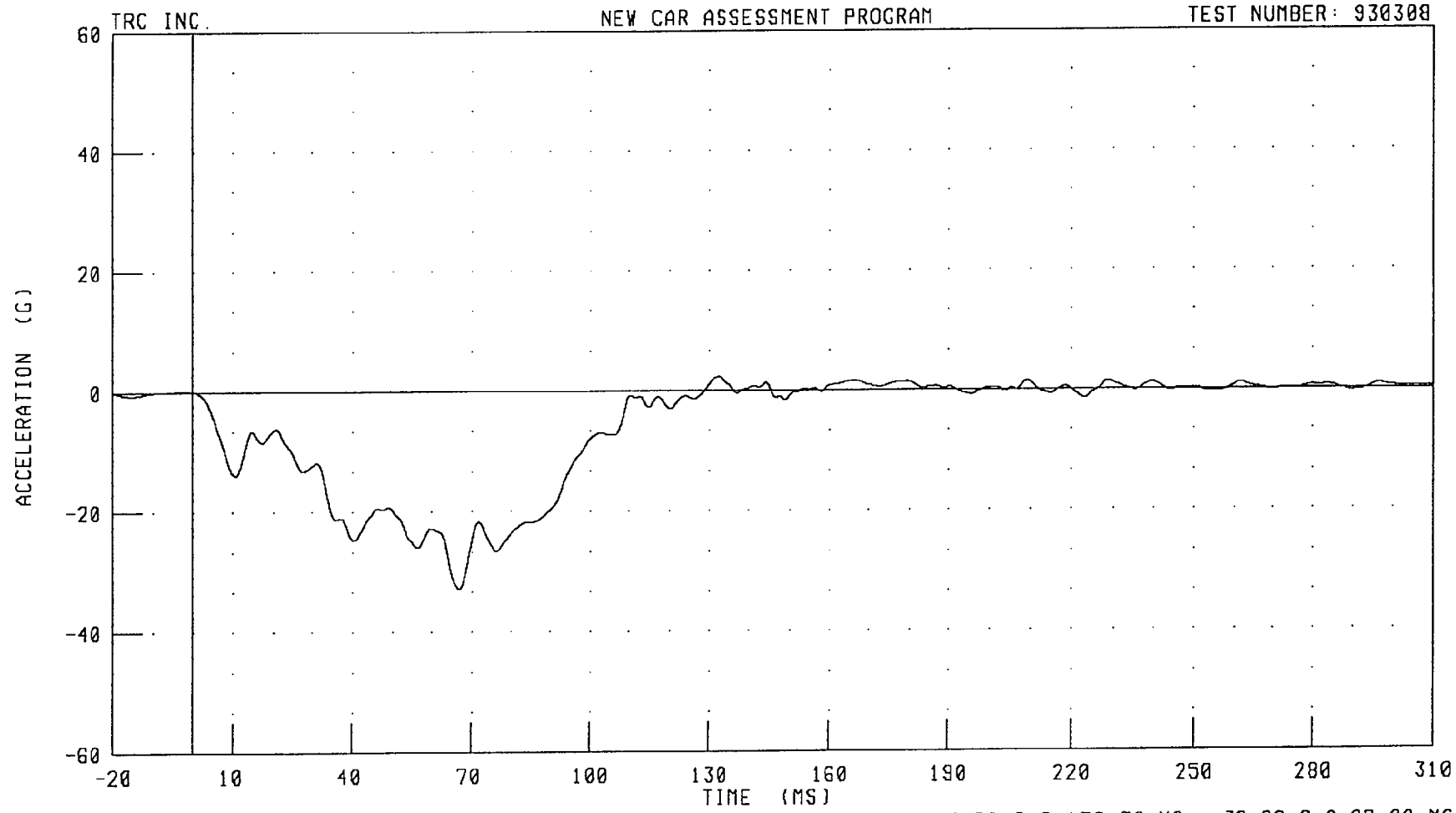

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS VELOCITY
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
VELOCITY (KM/H)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXVA
FILTER: CH. CLASS 180
PEAK DATA: 56.30 KM/H @ 0.00 MS; -7.52 KM/H @ 153.13 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LEFT REAR SEAT X-AXIS DISPLACEMENT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
180
120
60
0
-60
-120
-180
DISPLACEMENT (MM X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXDA
FILTER: CH. CLASS 180
PEAK DATA: 870.57 MM @ 91.38 MS; 0.00 MM @ 0.00 MS

930308

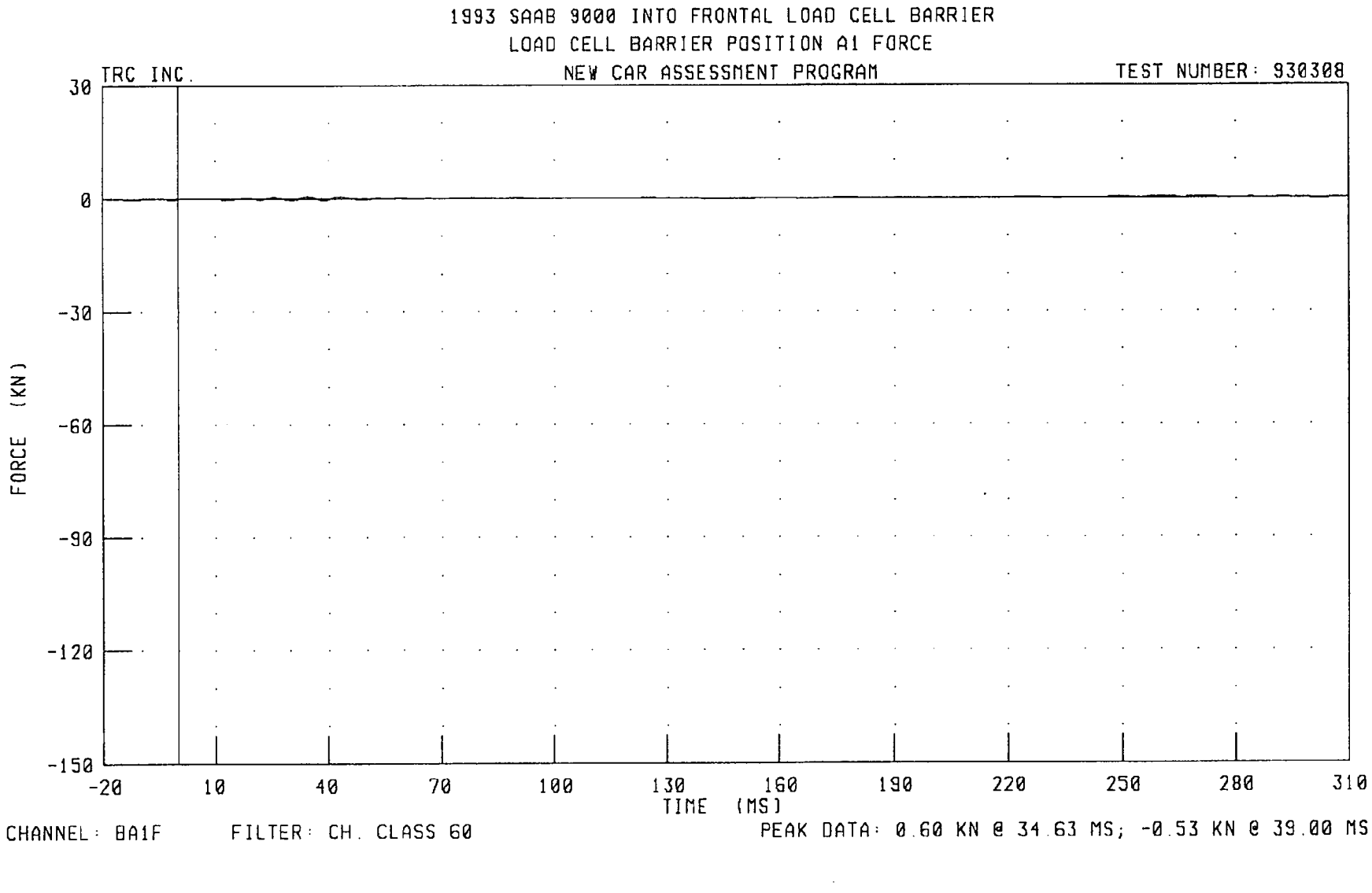
1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
RIGHT REAR SEAT REDUNDANT X-AXIS ACCELERATION



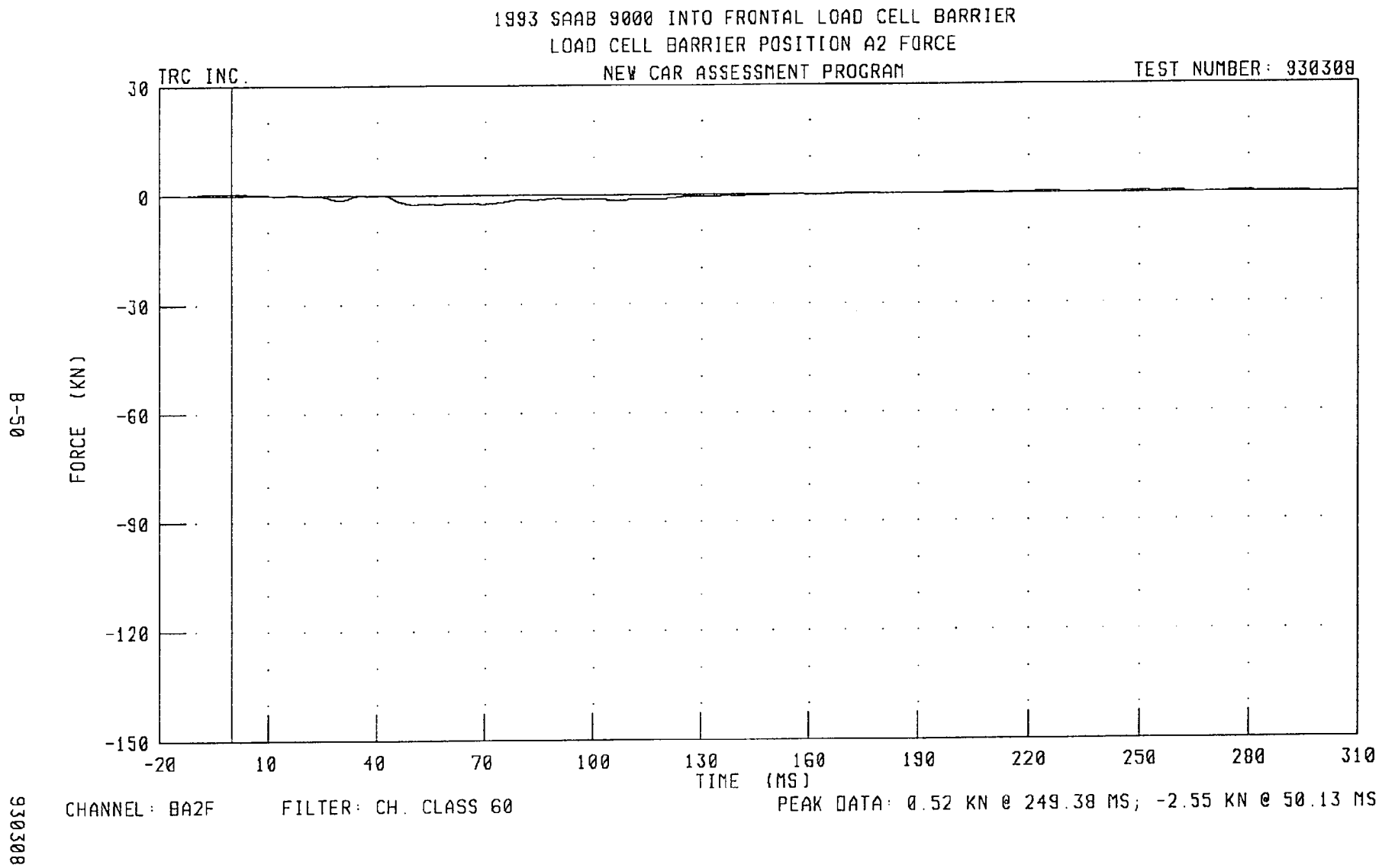
CHANNEL: TRRXGA FILTER: CH. CLASS 60

PEAK DATA: 2.30 G @ 132.38 MS; -32.92 G @ 67.00 MS

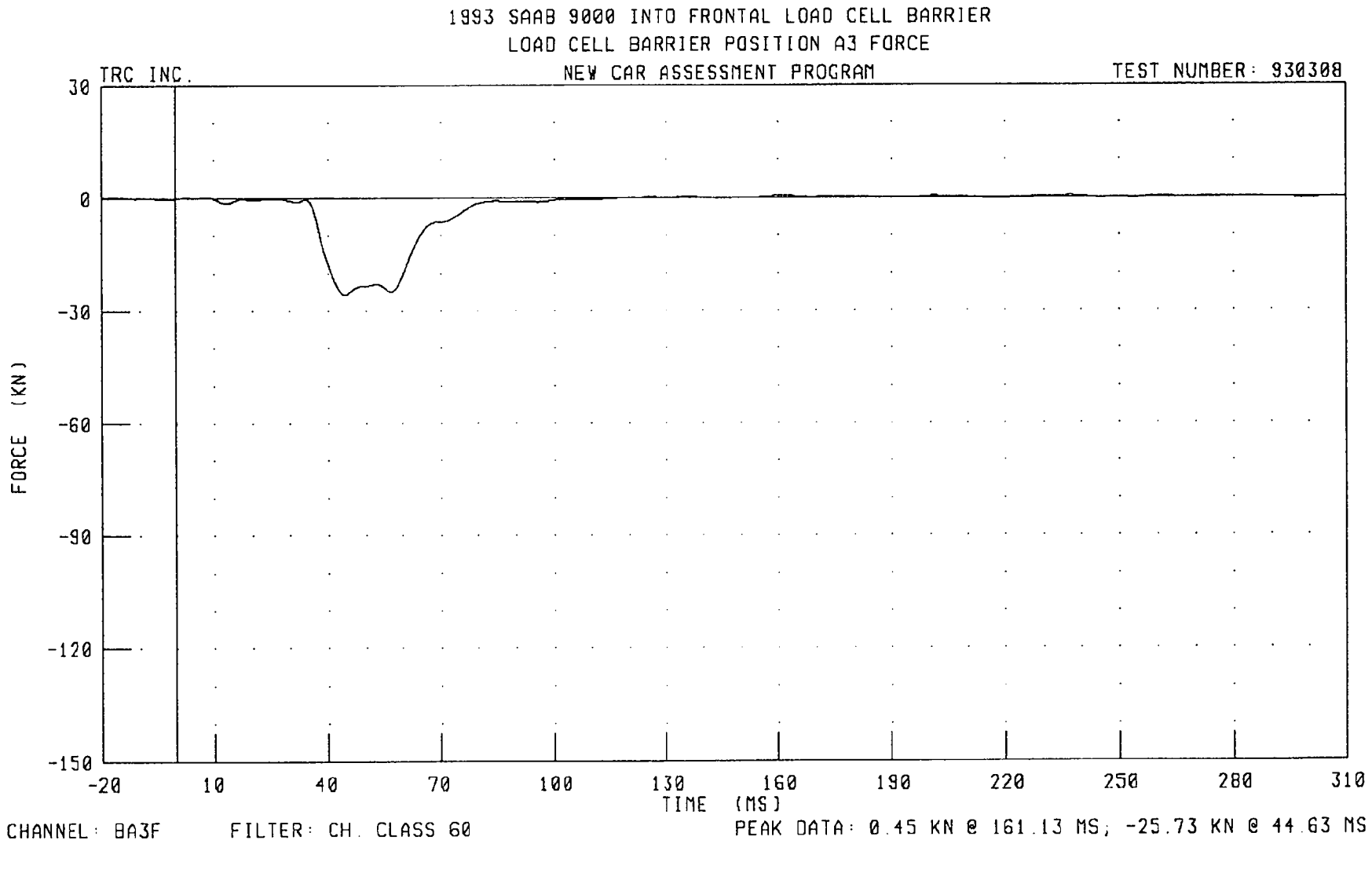
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A1 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA1F
FILTER: CH. CLASS 60
PEAK DATA: 0.60 KN @ 34.63 MS; -0.53 KN @ 39.00 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A2 FORCE
NEW CAR ASSESSMENT PROGRAM
TRC INC.
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA2F
FILTER: CH. CLASS 60
PEAK DATA: 0.52 KN @ 249.38 MS; -2.55 KN @ 50.13 MS

930308

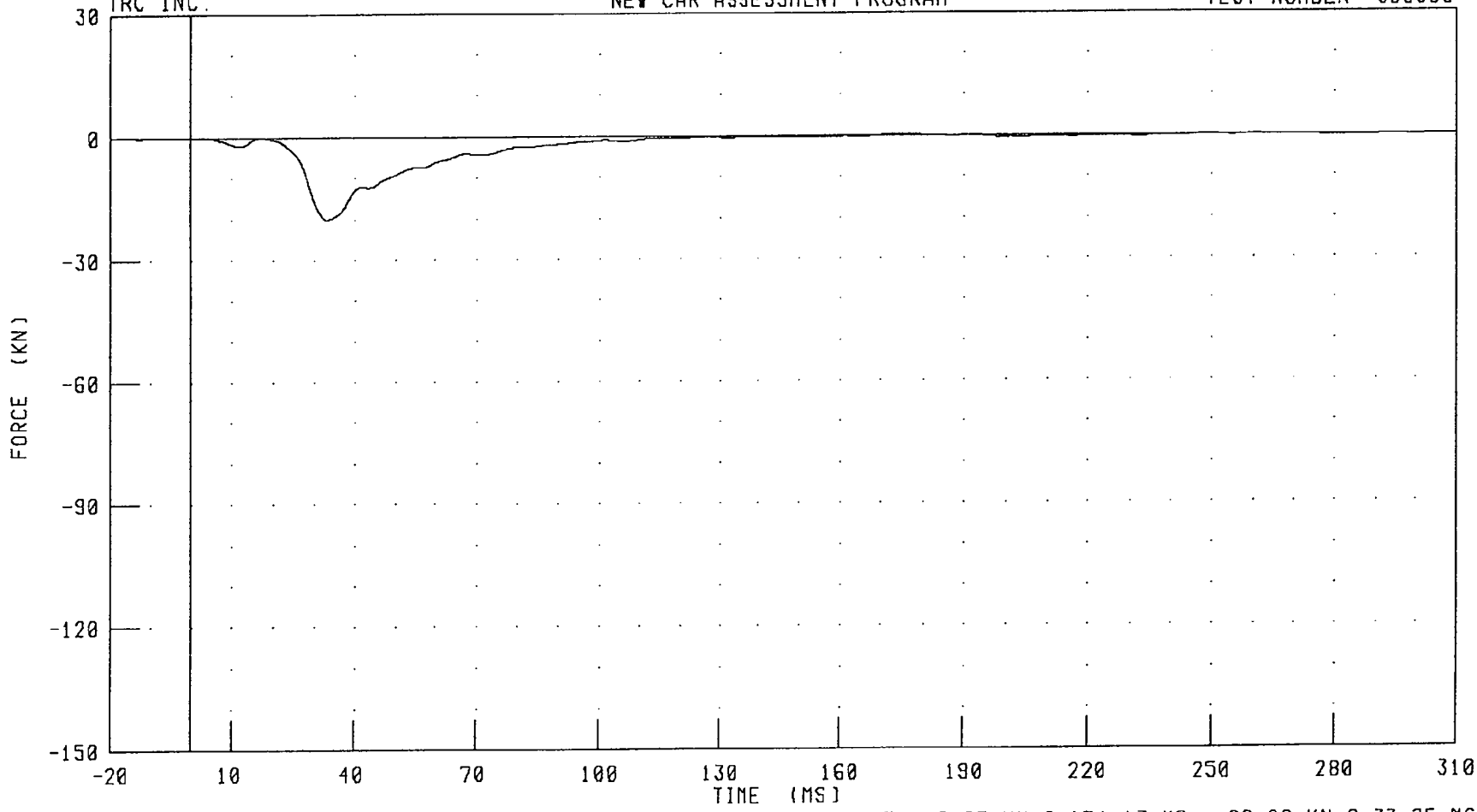

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A3 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA3F
FILTER: CH. CLASS 60
PEAK DATA: 0.45 KN @ 161.13 MS; -25.73 KN @ 44.63 MS

930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A4 FORCE
NEW CAR ASSESSMENT PROGRAM

TRC INC.

TEST NUMBER: 930308

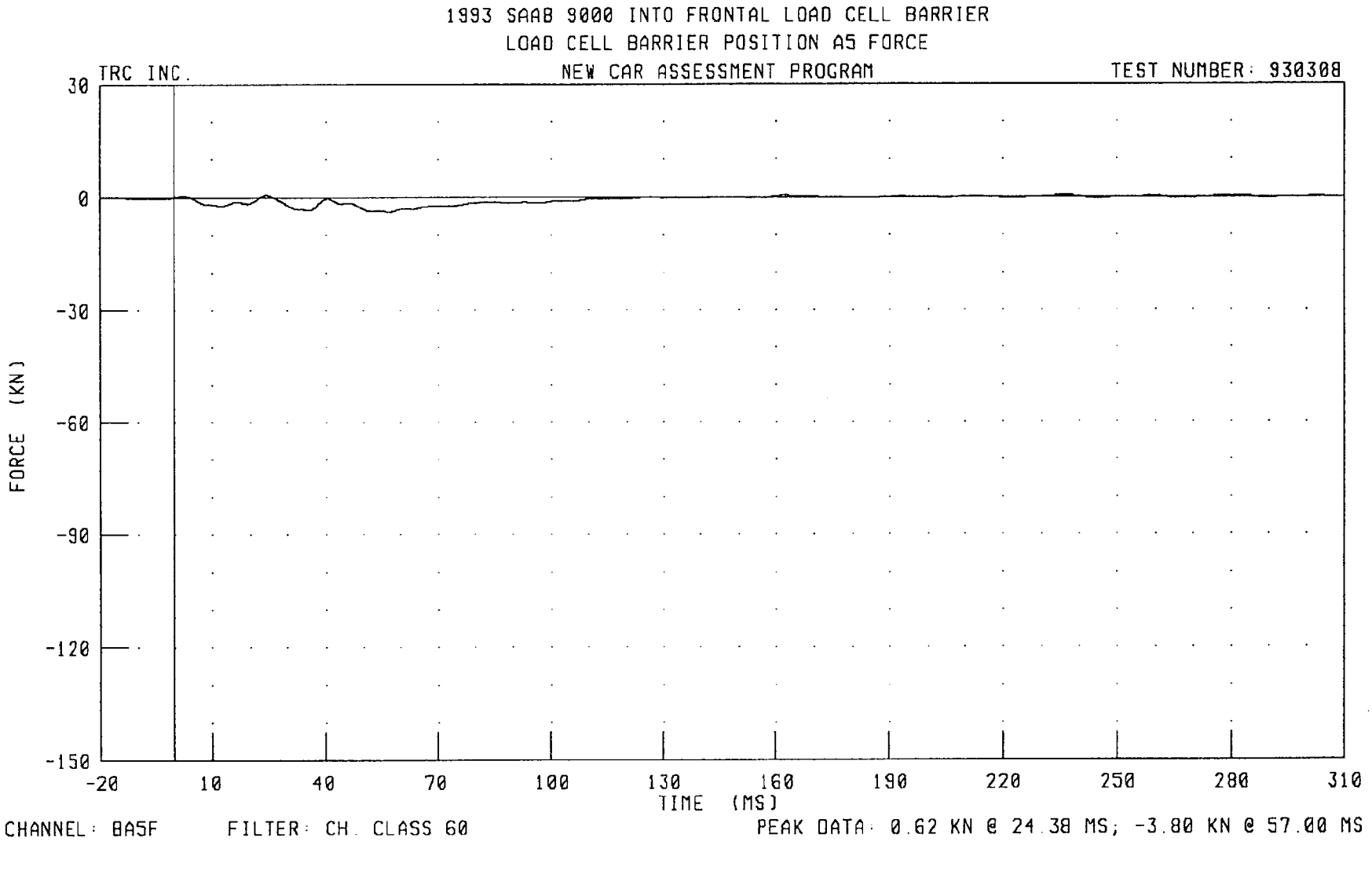


CHANNEL: BA4F FILTER: CH. CLASS 60

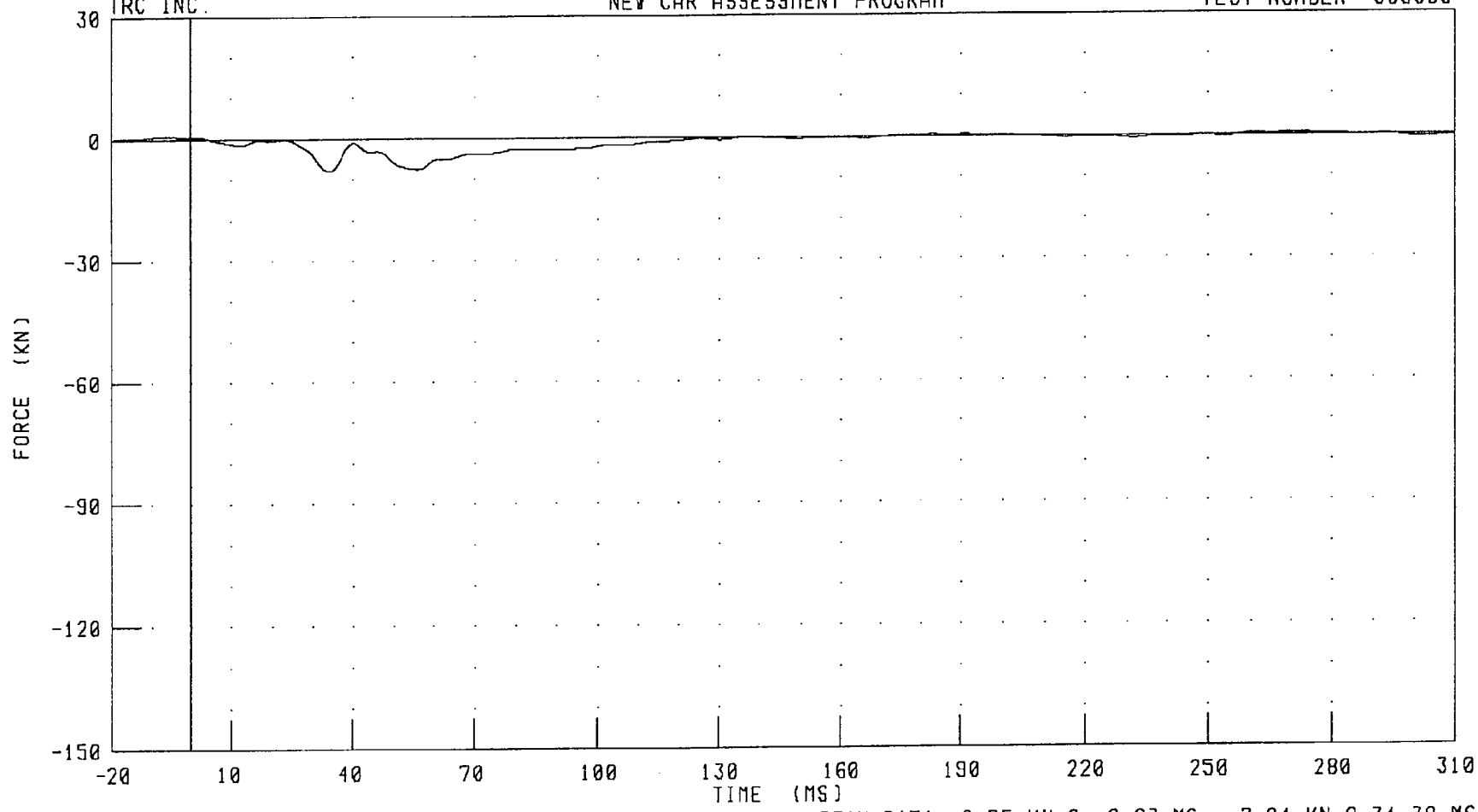
PEAK DATA: 0.27 KN @ 174.13 MS; -20.08 KN @ 33.25 MS

B-52

930308

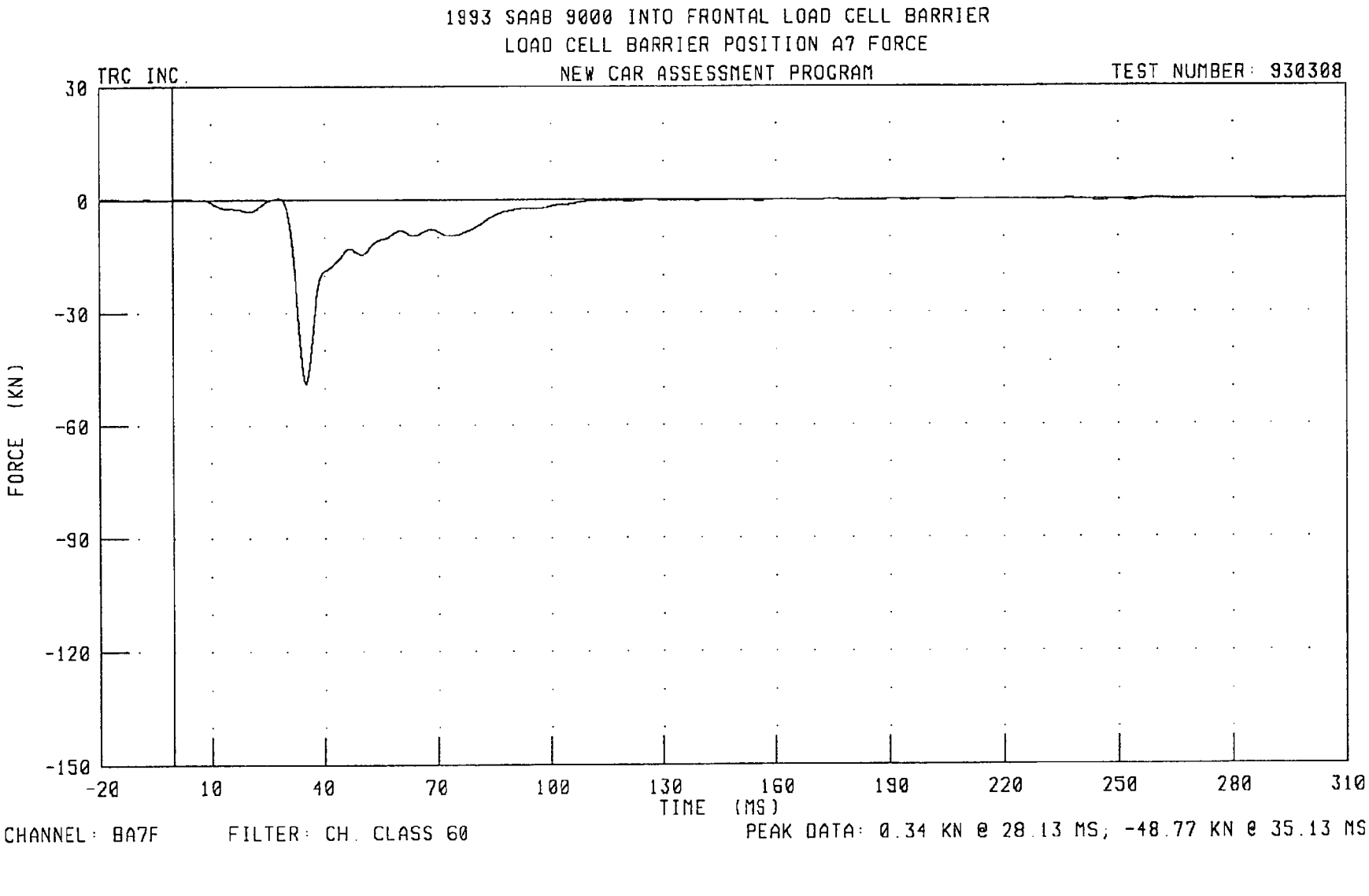

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A5 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: 8A5F
FILTER: CH. CLASS 60
PEAK DATA: 0.62 KN @ 24.38 MS; -3.80 KN @ 57.00 MS

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A6 FORCE
TRC INC. NEW CAR ASSESSMENT PROGRAM TEST NUMBER: 930308



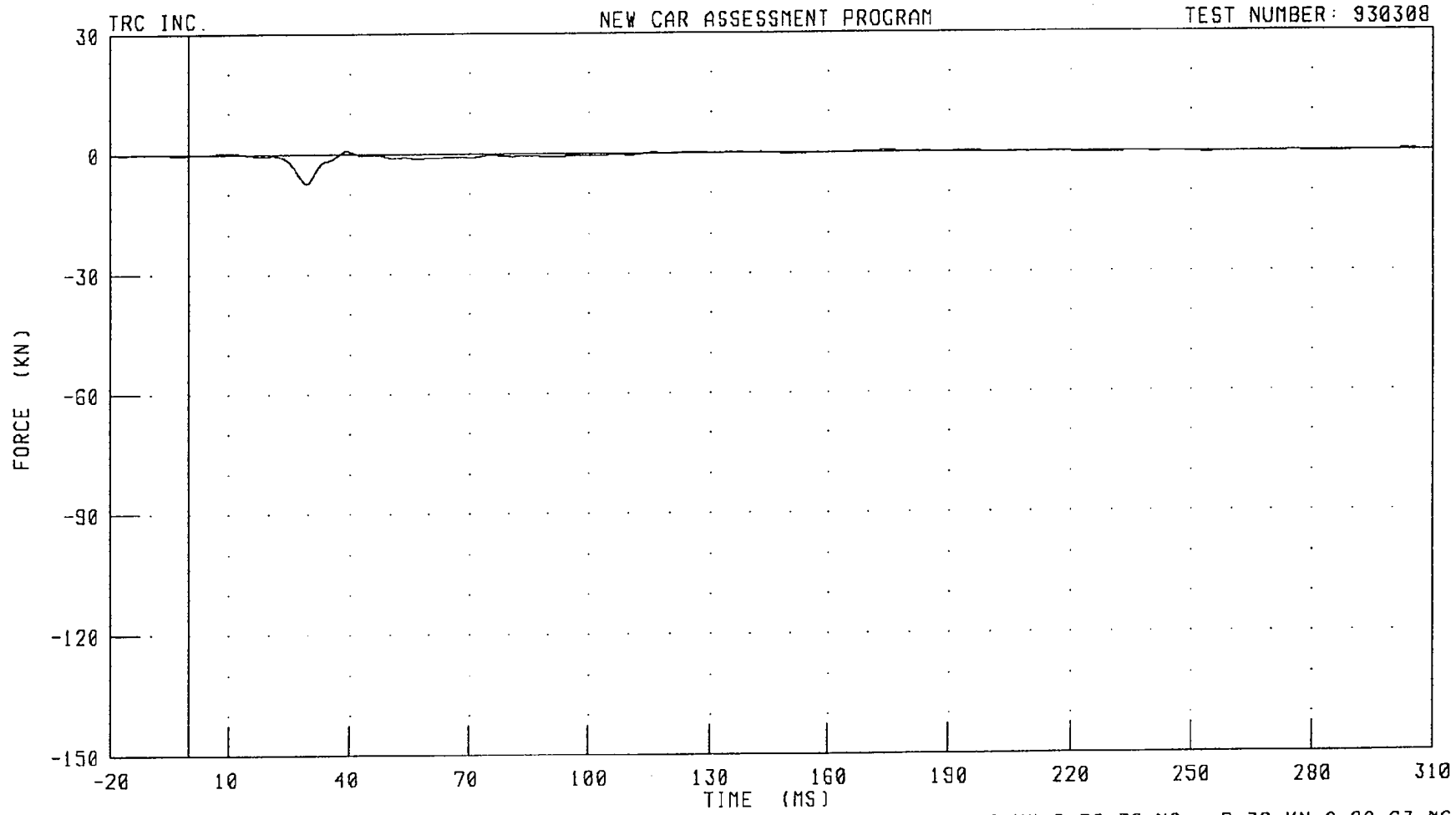
CHANNEL: BA6F FILTER: CH. CLASS 60 PEAK DATA: 0.75 KN @ -6.63 MS; -7.94 KN @ 34.38 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A7 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA7F
FILTER: CH. CLASS 60
PEAK DATA: 0.34 KN @ 28.13 MS; -48.77 KN @ 35.13 MS

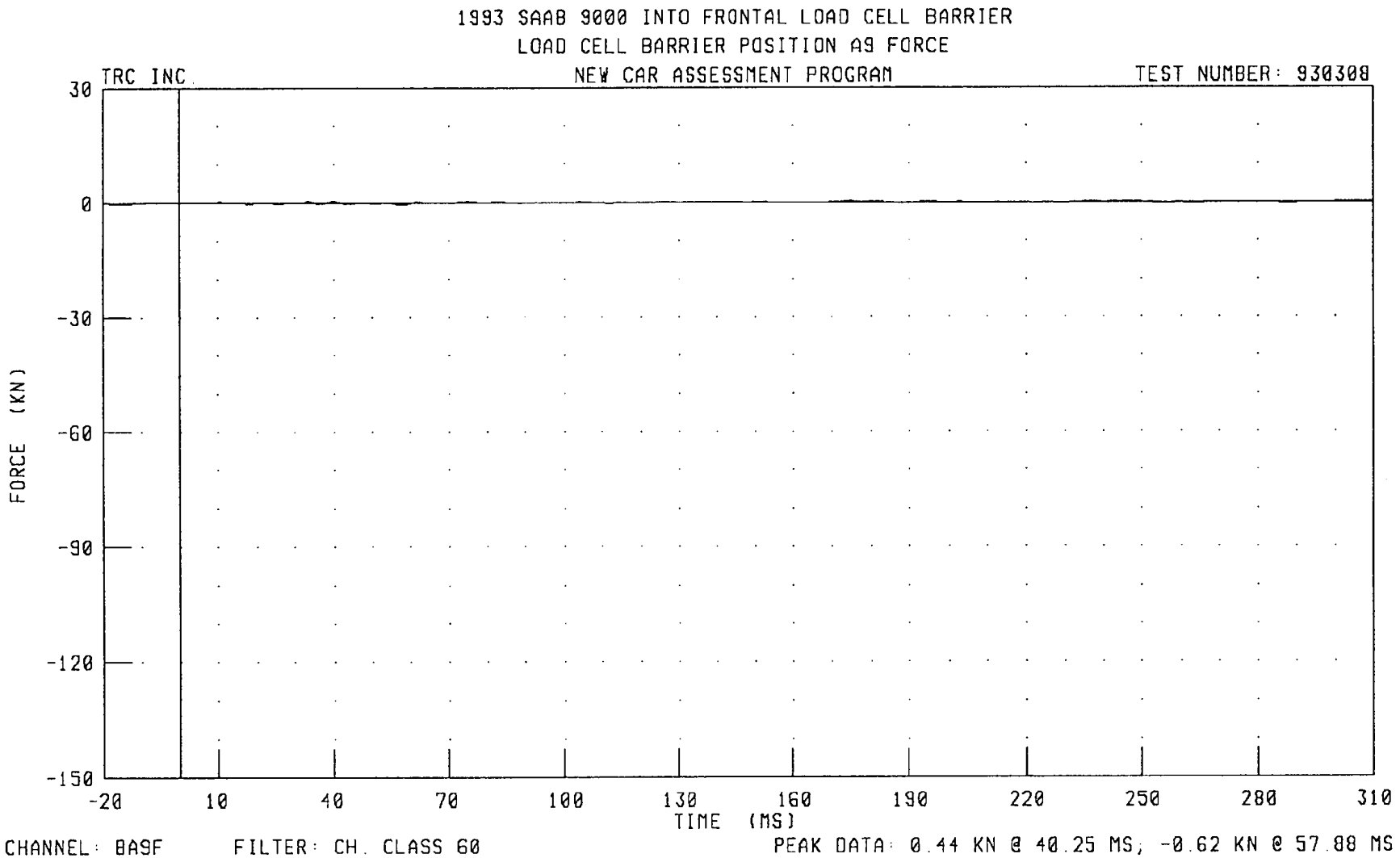
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION A8 FORCE

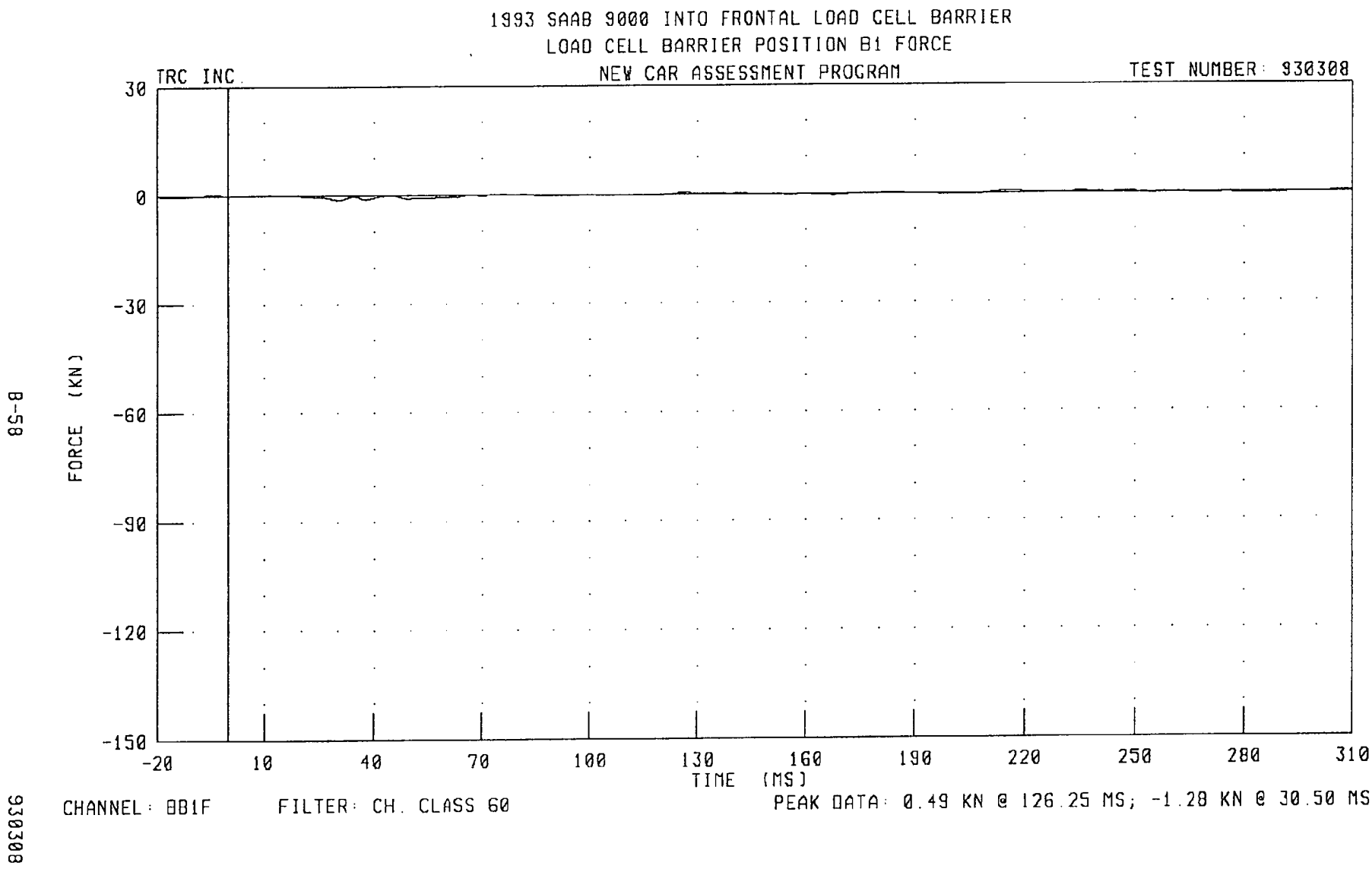


CHANNEL: BA8F FILTER: CH. CLASS 60 PEAK DATA: 0.69 KN @ 39.38 MS; -7.30 KN @ 29.63 MS

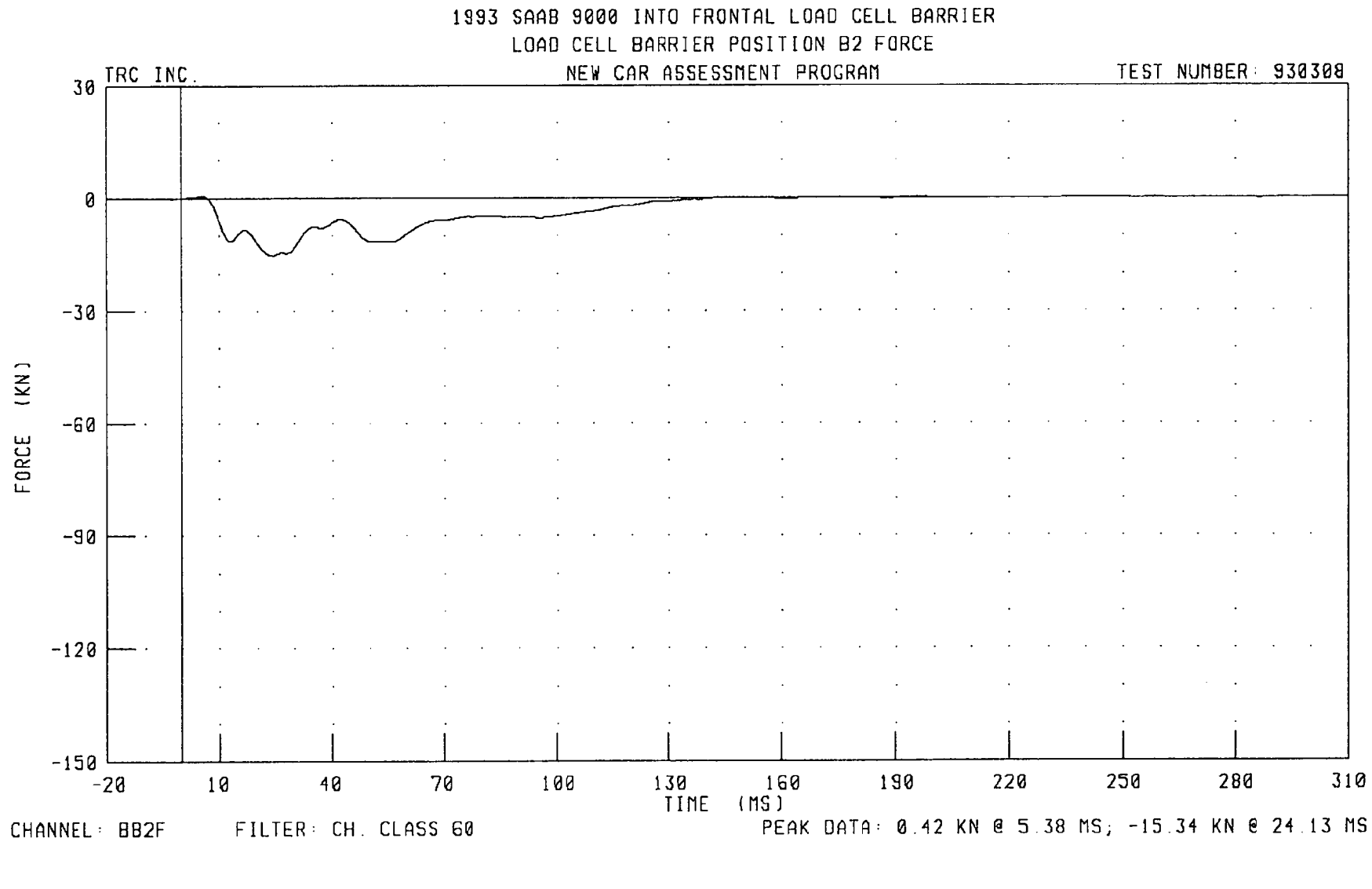
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION AS FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BA9F
FILTER: CH. CLASS 60
PEAK DATA: 0.44 KN @ 40.25 MS, -0.62 KN @ 57.88 MS

930308

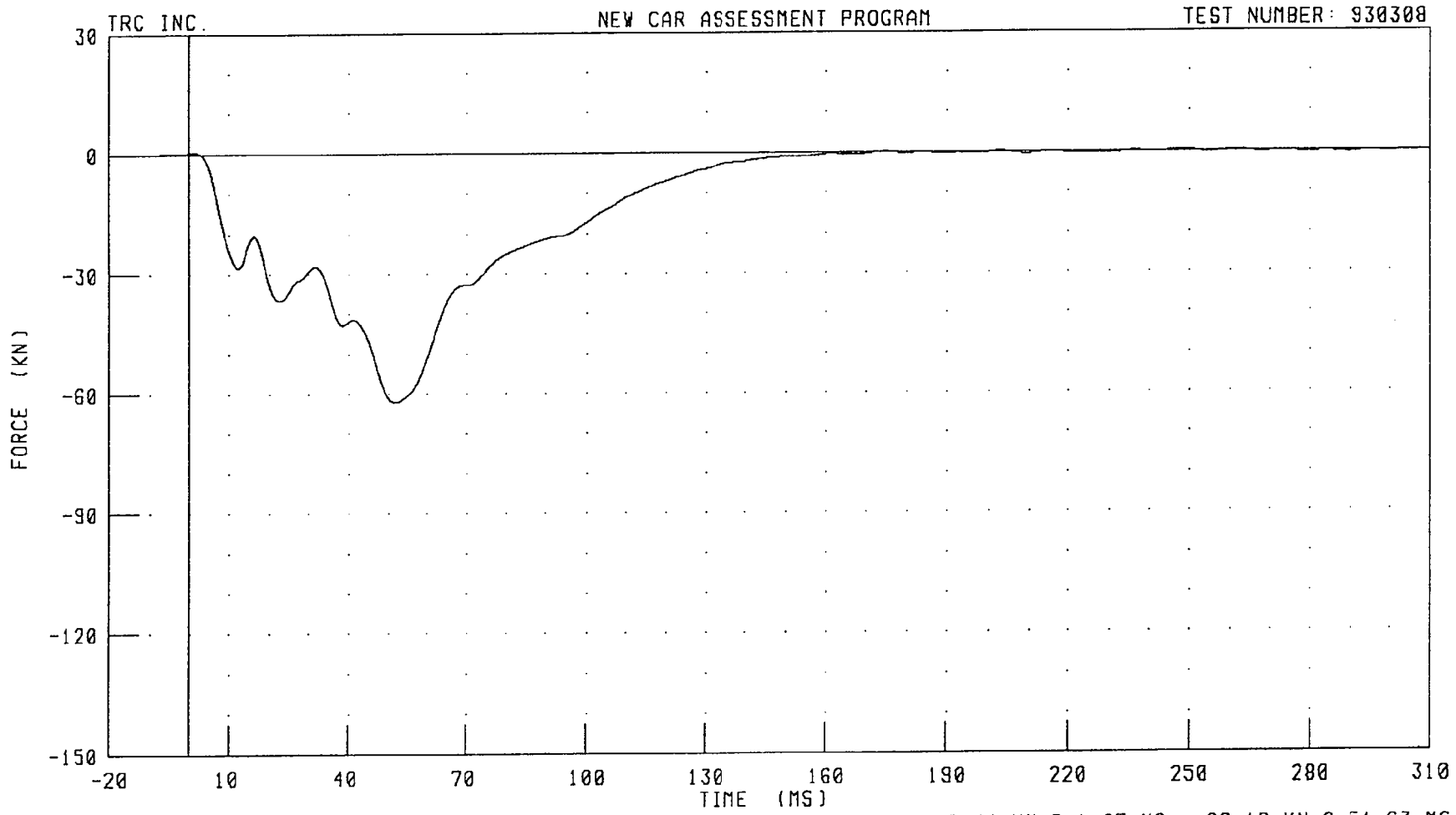

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B1 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: 0B1F
FILTER: CH. CLASS 60
PEAK DATA: 0.49 KN @ 126.25 MS; -1.28 KN @ 30.50 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B2 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BB2F
FILTER: CH. CLASS 60
PEAK DATA: 0.42 KN @ 5.38 MS; -15.34 KN @ 24.13 MS

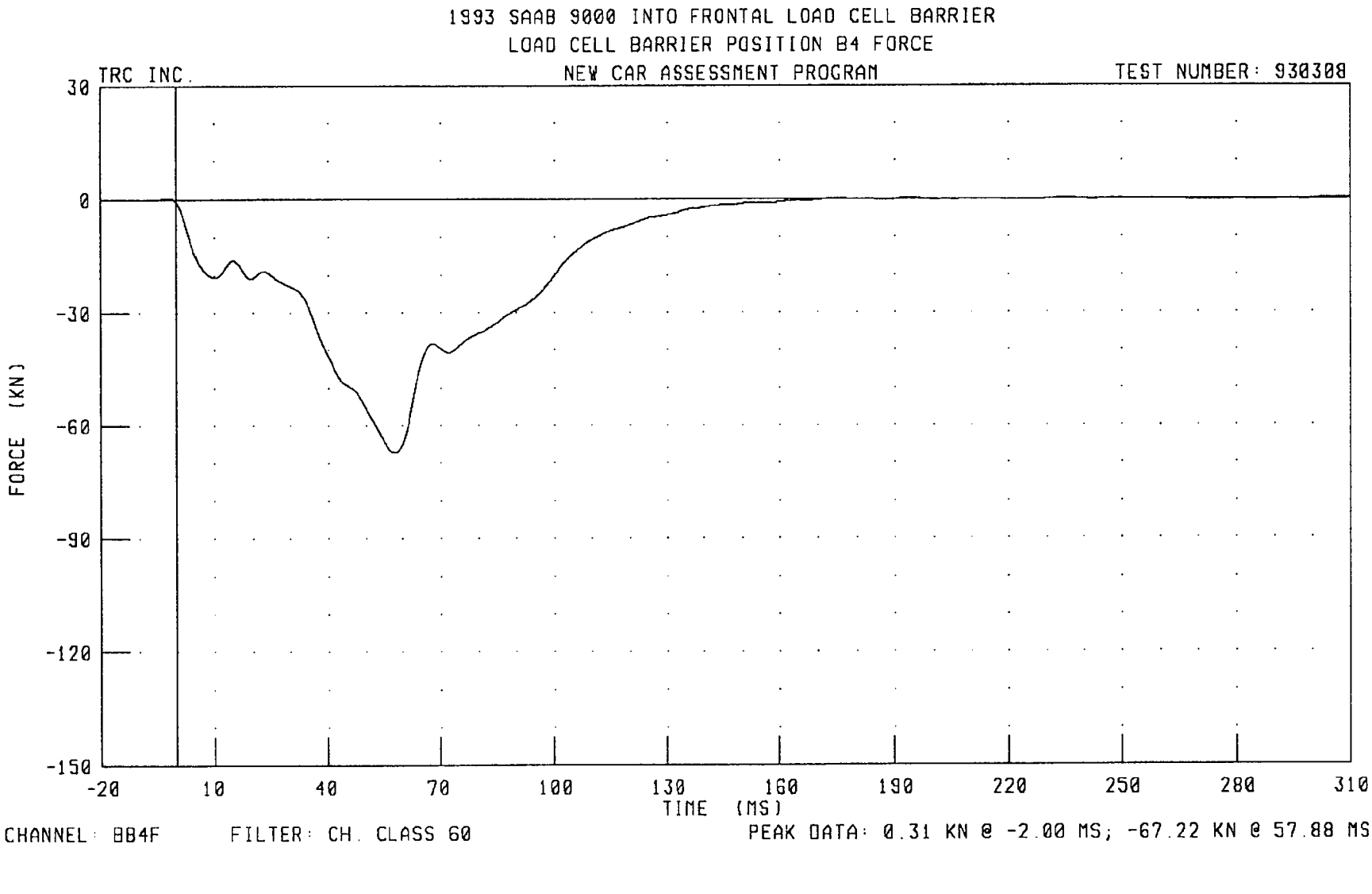
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B3 FORCE

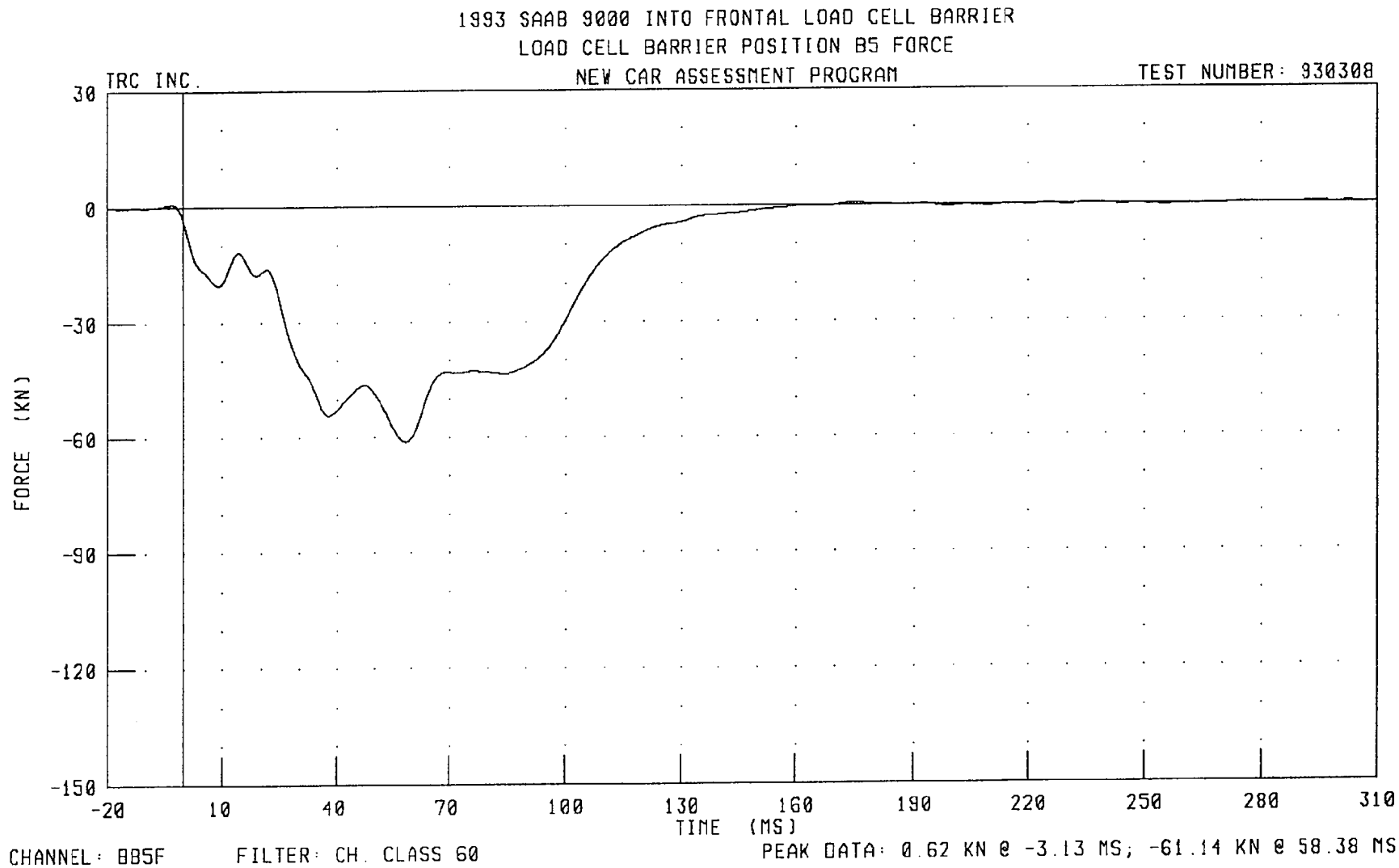


CHANNEL: BB3F FILTER: CH. CLASS 60 PEAK DATA: 0.44 KN @ 1.25 MS; -62.10 KN @ 51.63 MS

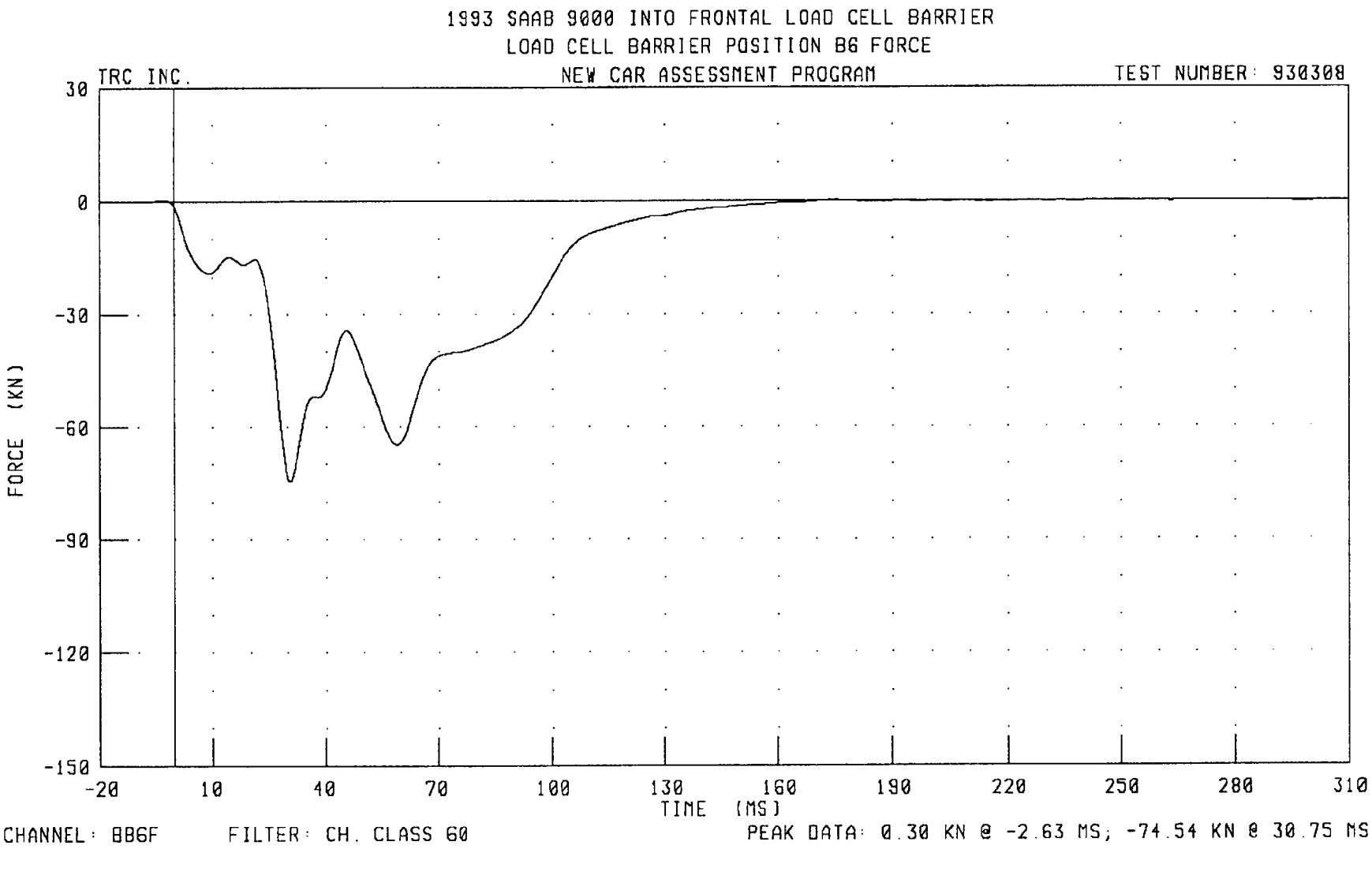
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B4 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: B84F
FILTER: CH. CLASS 60
PEAK DATA: 0.31 KN @ -2.00 MS; -67.22 KN @ 57.88 MS

930308

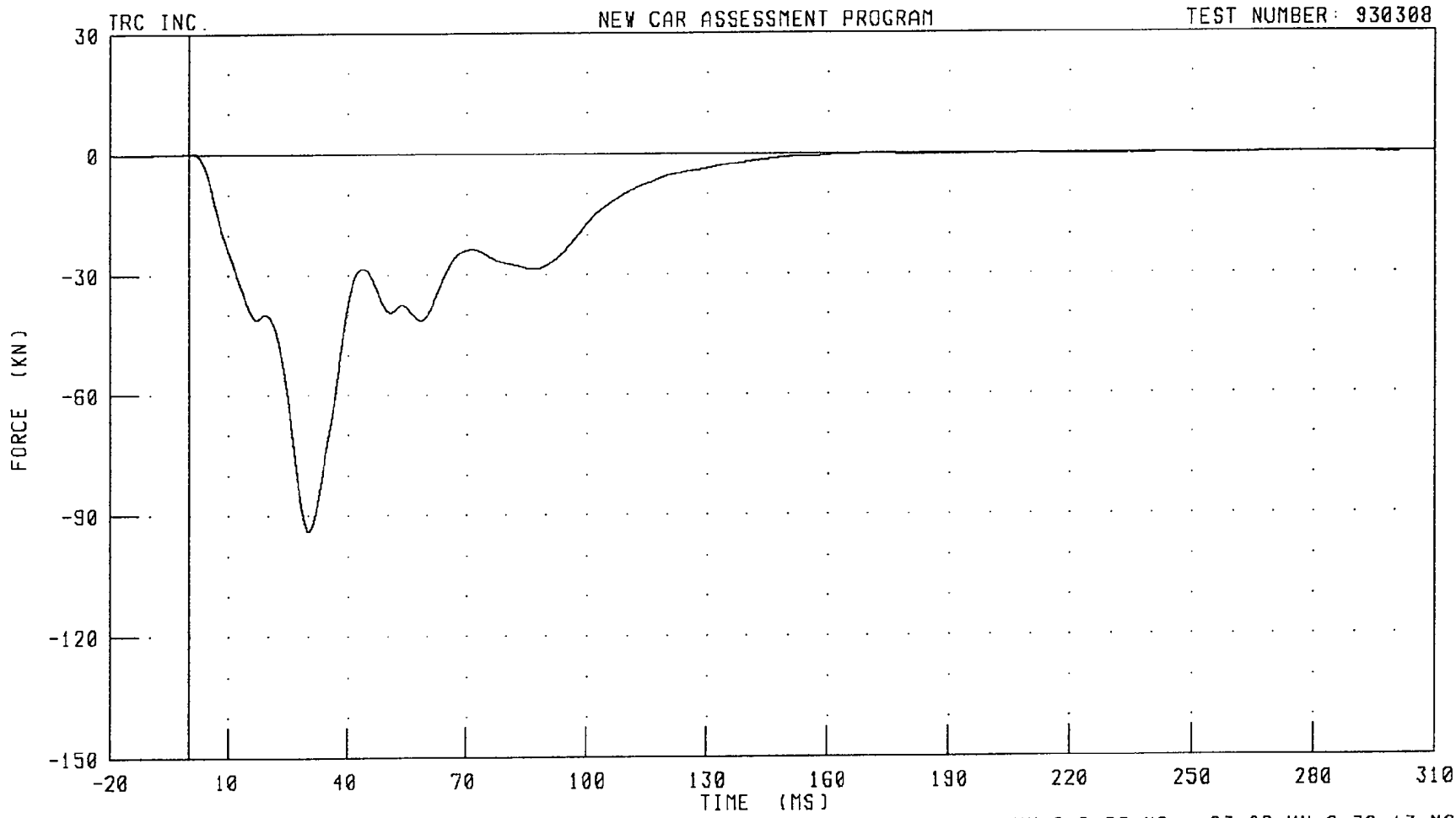

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B5 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: B85F
FILTER: CH. CLASS 60
PEAK DATA: 0.62 KN @ -3.13 MS; -61.14 KN @ 58.38 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B6 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BB6F
FILTER: CH. CLASS 60
PEAK DATA: 0.30 KN @ -2.63 MS; -74.54 KN @ 30.75 MS

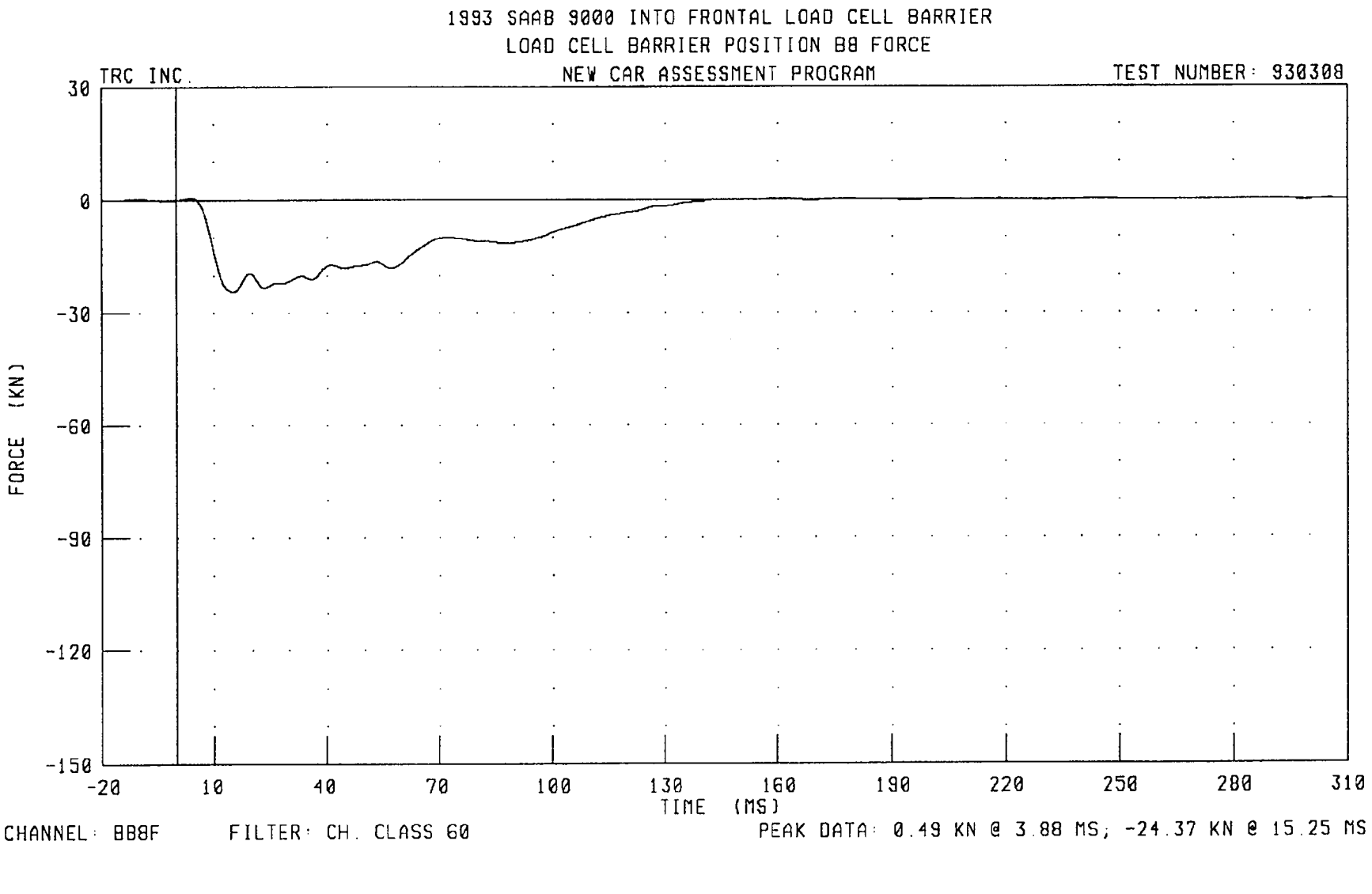
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B7 FORCE



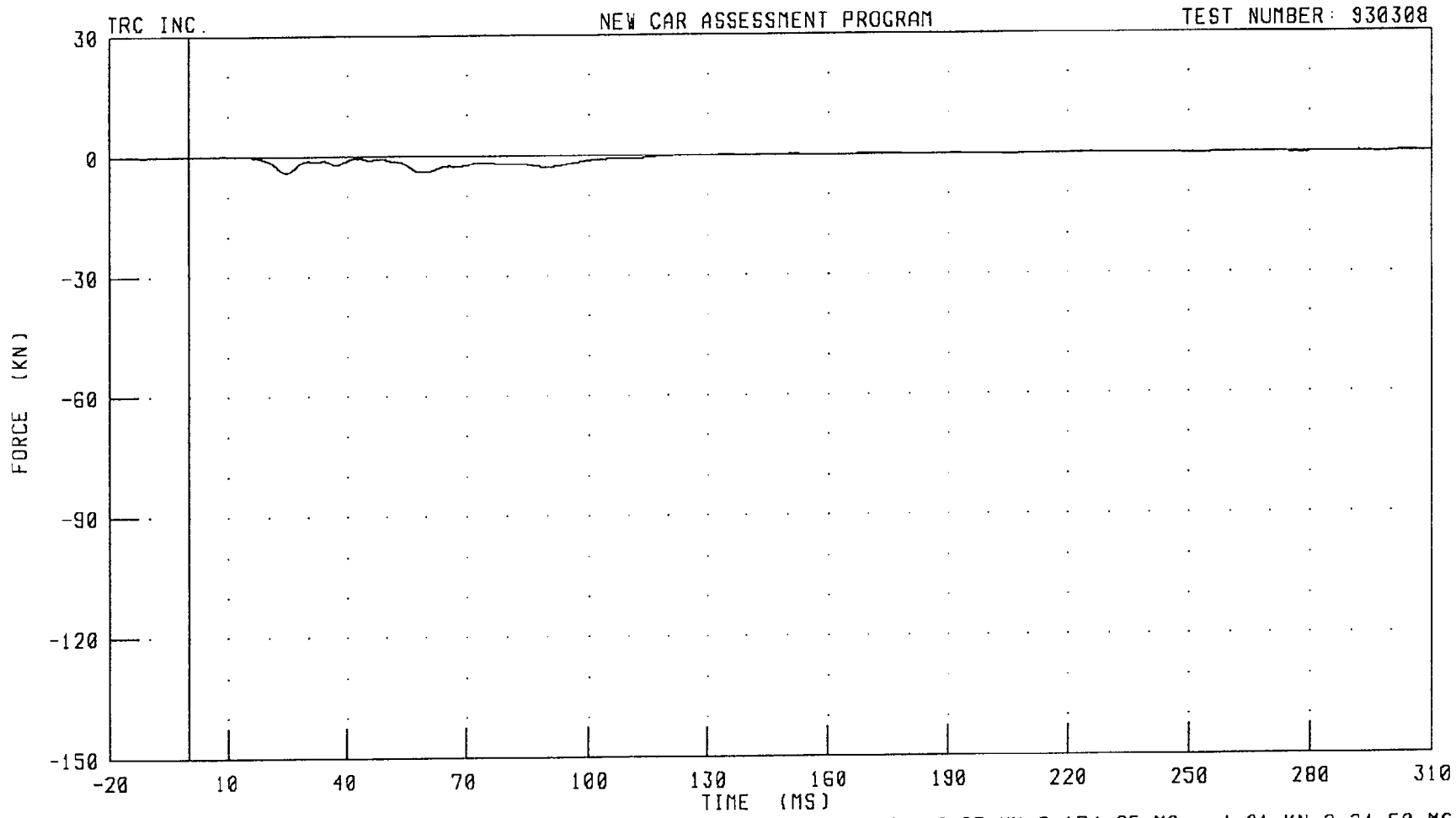
CHANNEL: B87F FILTER: CH. CLASS 60 PEAK DATA: 0.32 KN @ 0.38 MS, -93.99 KN @ 30.13 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B8 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: B8F
FILTER: CH. CLASS 60
PEAK DATA: 0.49 KN @ 3.88 MS; -24.37 KN @ 15.25 MS

930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION B9 FORCE

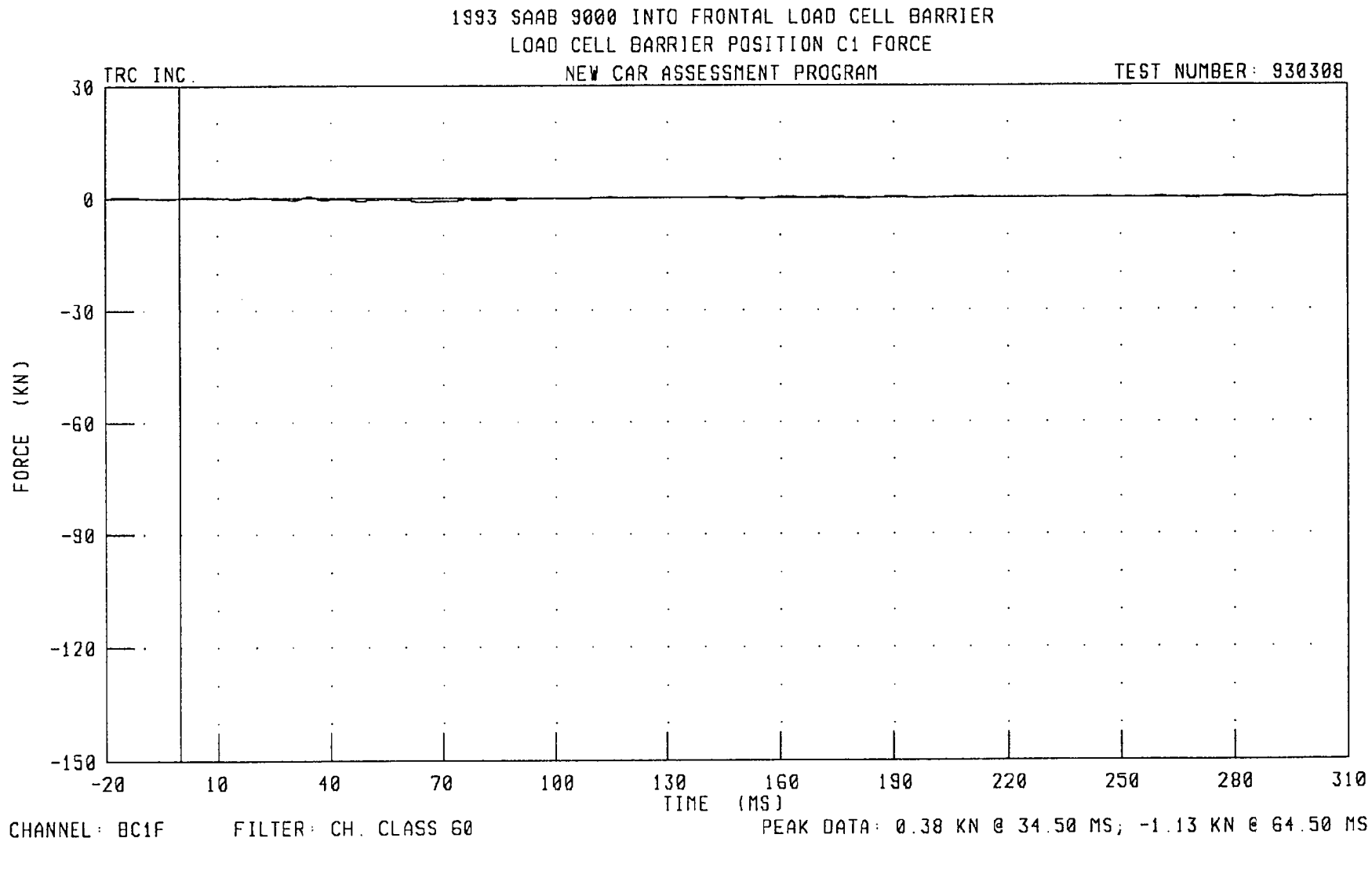


CHANNEL: B89F FILTER: CH. CLASS 60

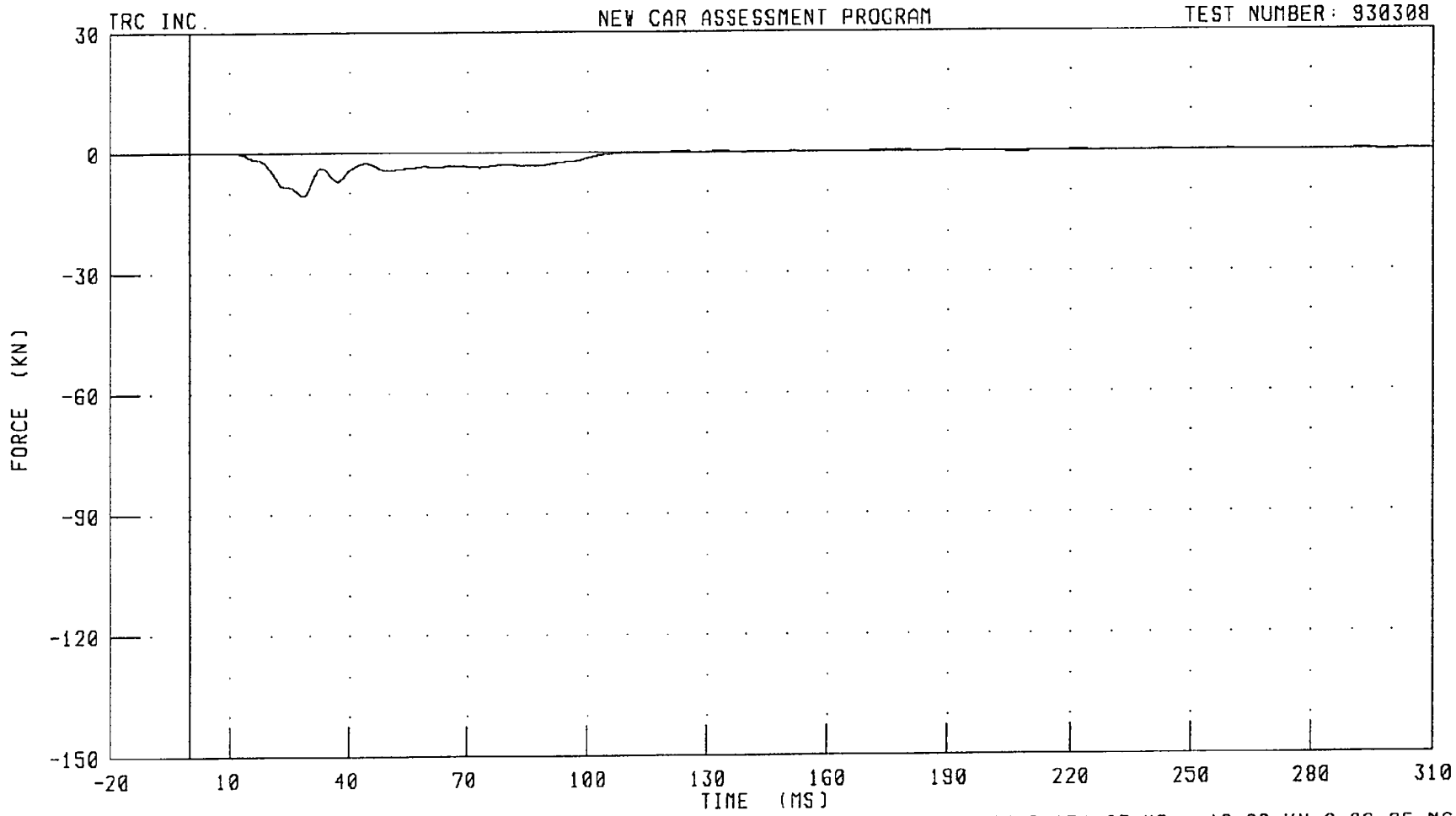
PEAK DATA: 0.25 KN @ 174.25 MS; -4.01 KN @ 24.50 MS

B-66

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C1 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC1F
FILTER: CH. CLASS 60
PEAK DATA: 0.38 KN @ 34.50 MS; -1.13 KN @ 64.50 MS

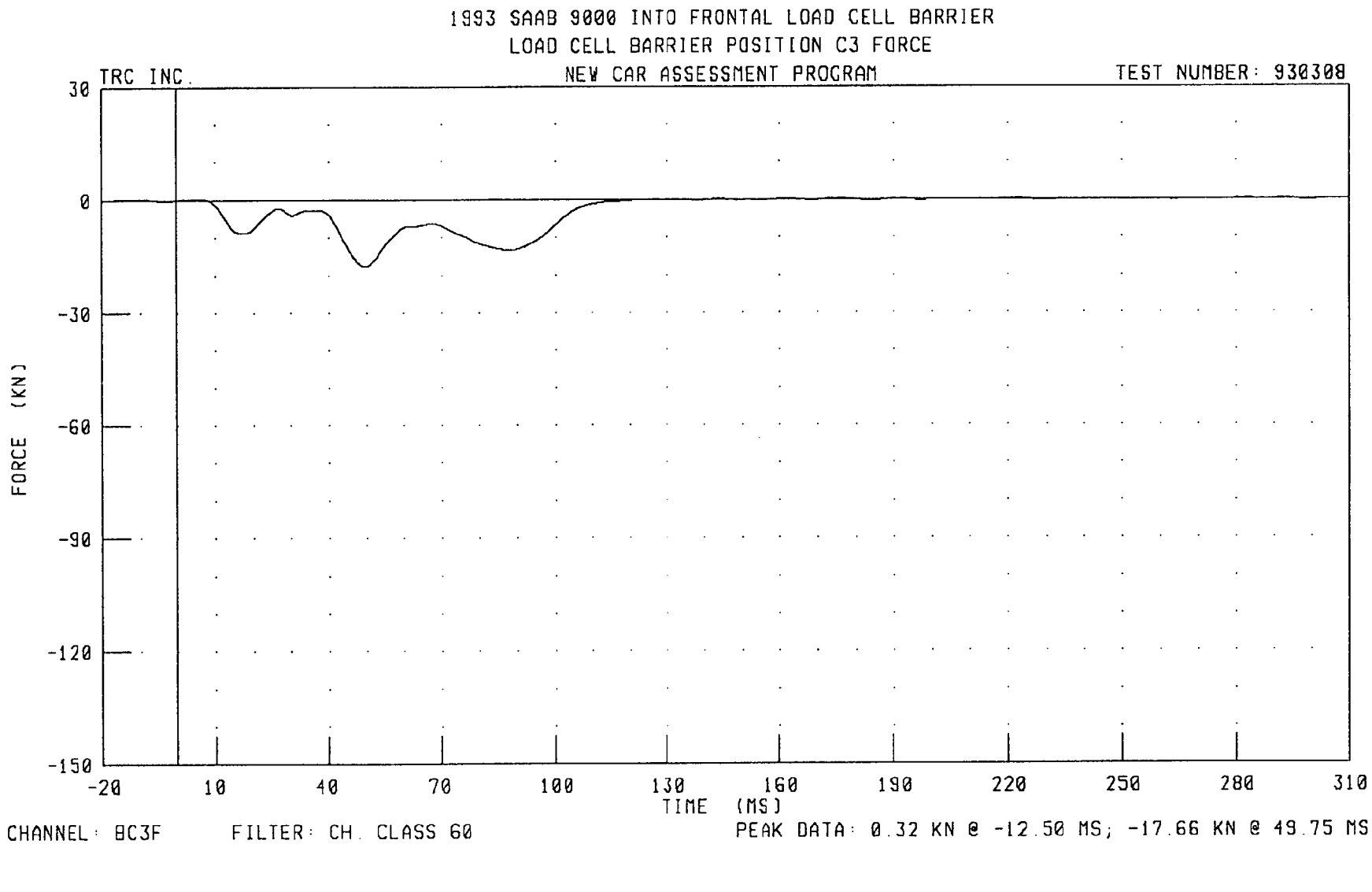
1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C2 FORCE
NEW CAR ASSESSMENT PROGRAM



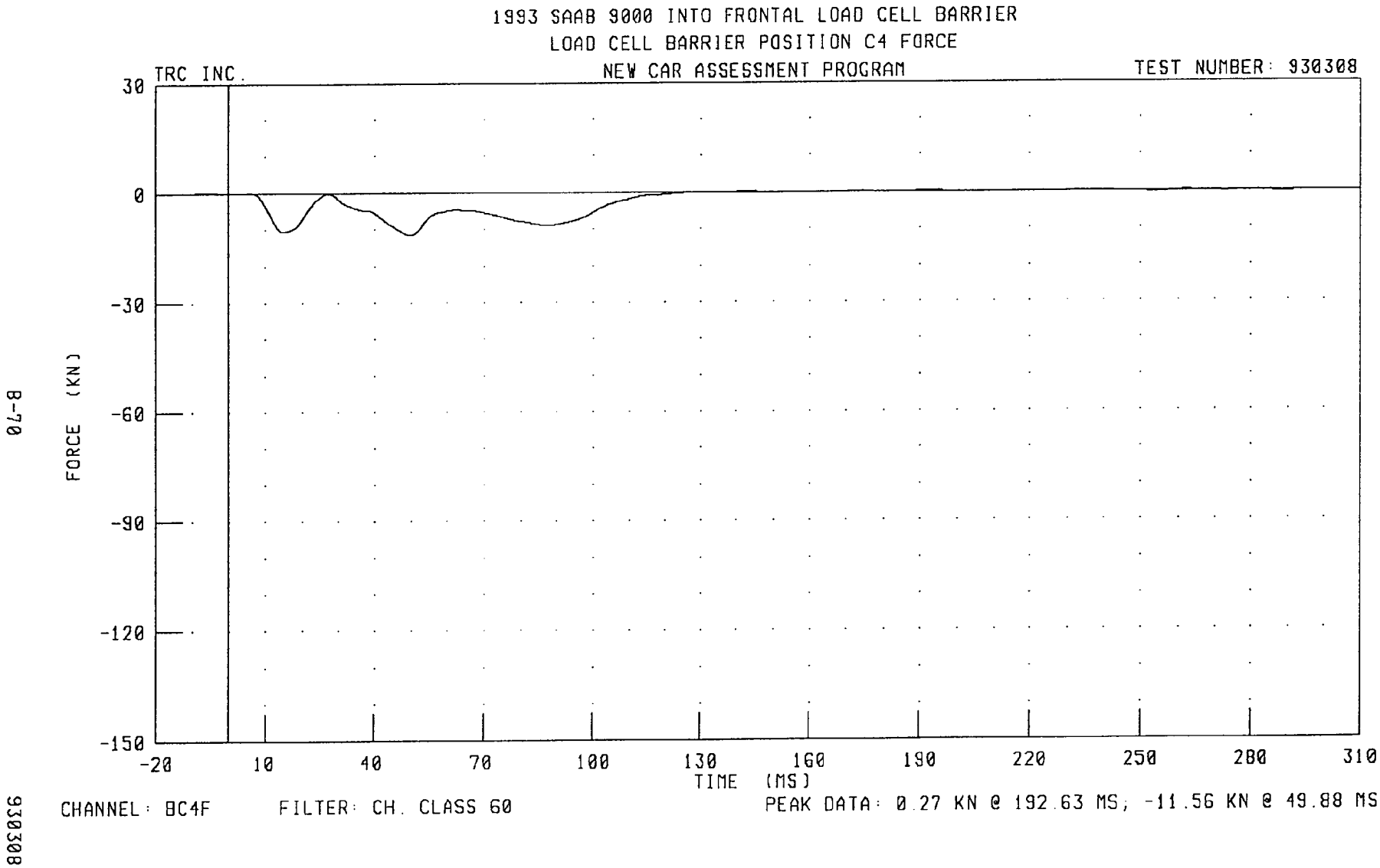
CHANNEL: BC2F FILTER: CH. CLASS 60 PEAK DATA: 0.28 KN @ 174.63 MS, -10.60 KN @ 28.25 MS

B-68

930308

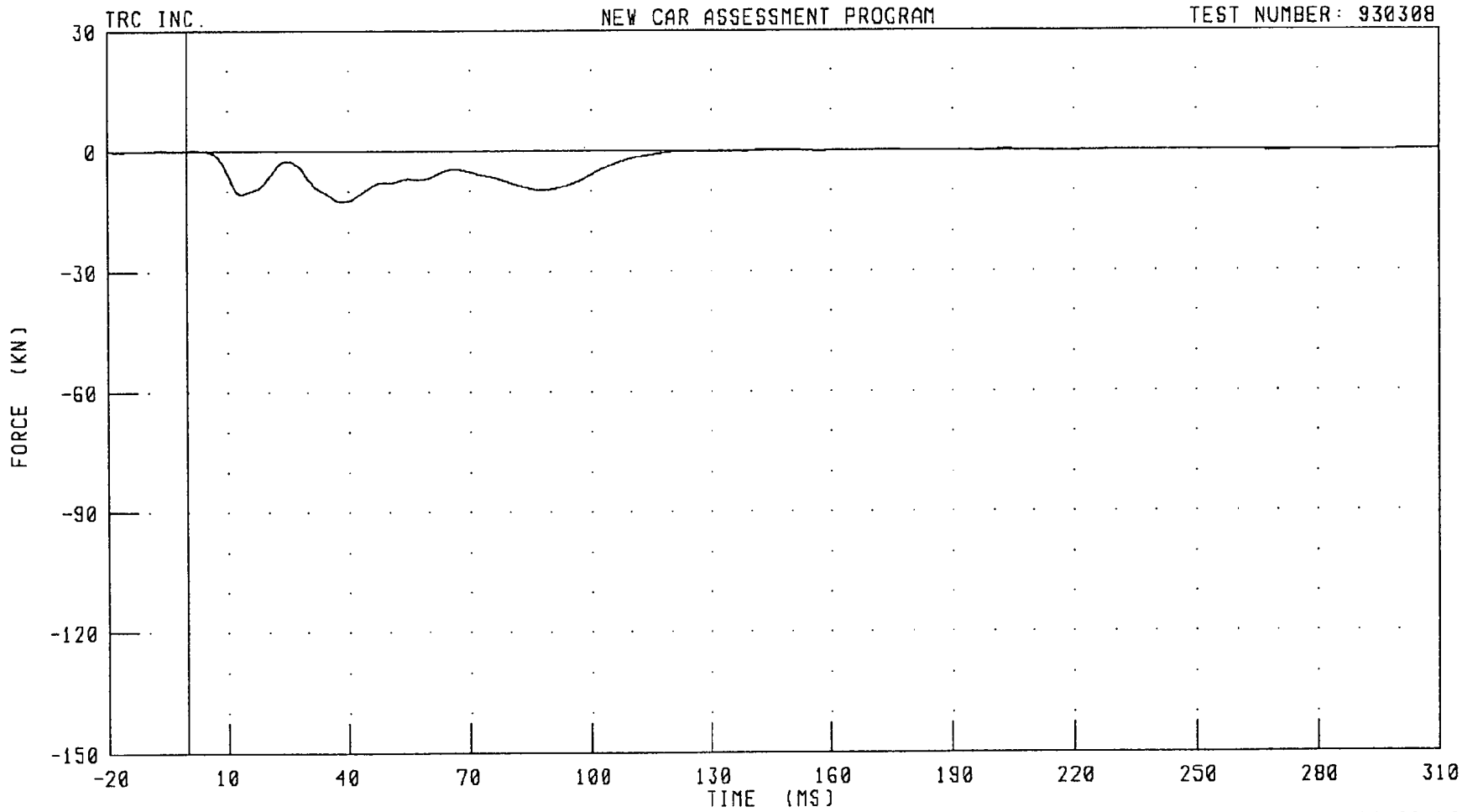

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C3 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC3F
FILTER: CH. CLASS 60
PEAK DATA: 0.32 KN @ -12.50 MS; -17.66 KN @ 49.75 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C4 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC4F
FILTER: CH. CLASS 60
PEAK DATA: 0.27 KN @ 192.63 MS, -11.56 KN @ 49.88 MS

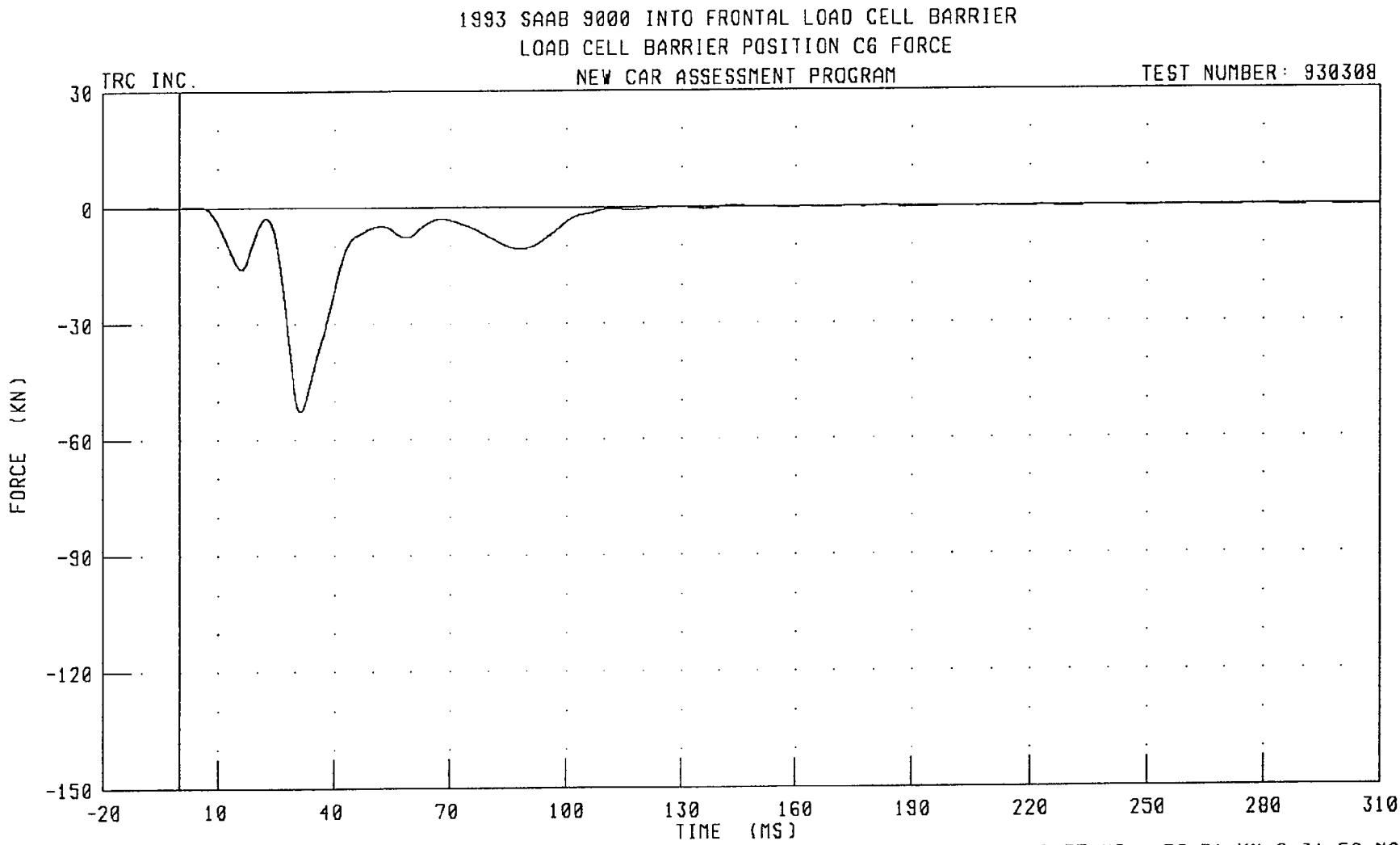
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C5 FORCE

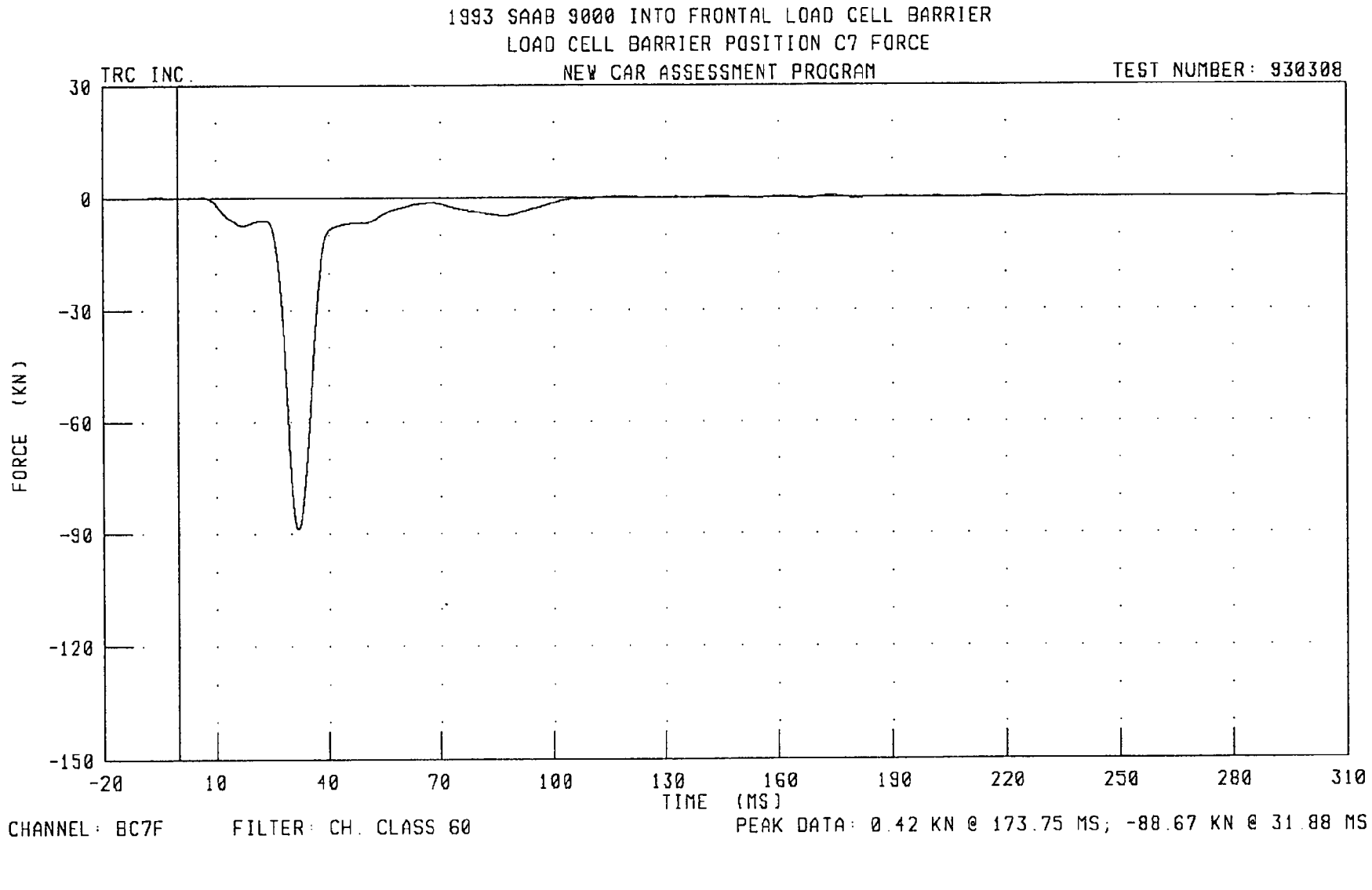


CHANNEL: BC5F FILTER: CH. CLASS 60 PEAK DATA: 0.23 KN @ 174.25 MS; -12.58 KN @ 38.88 MS

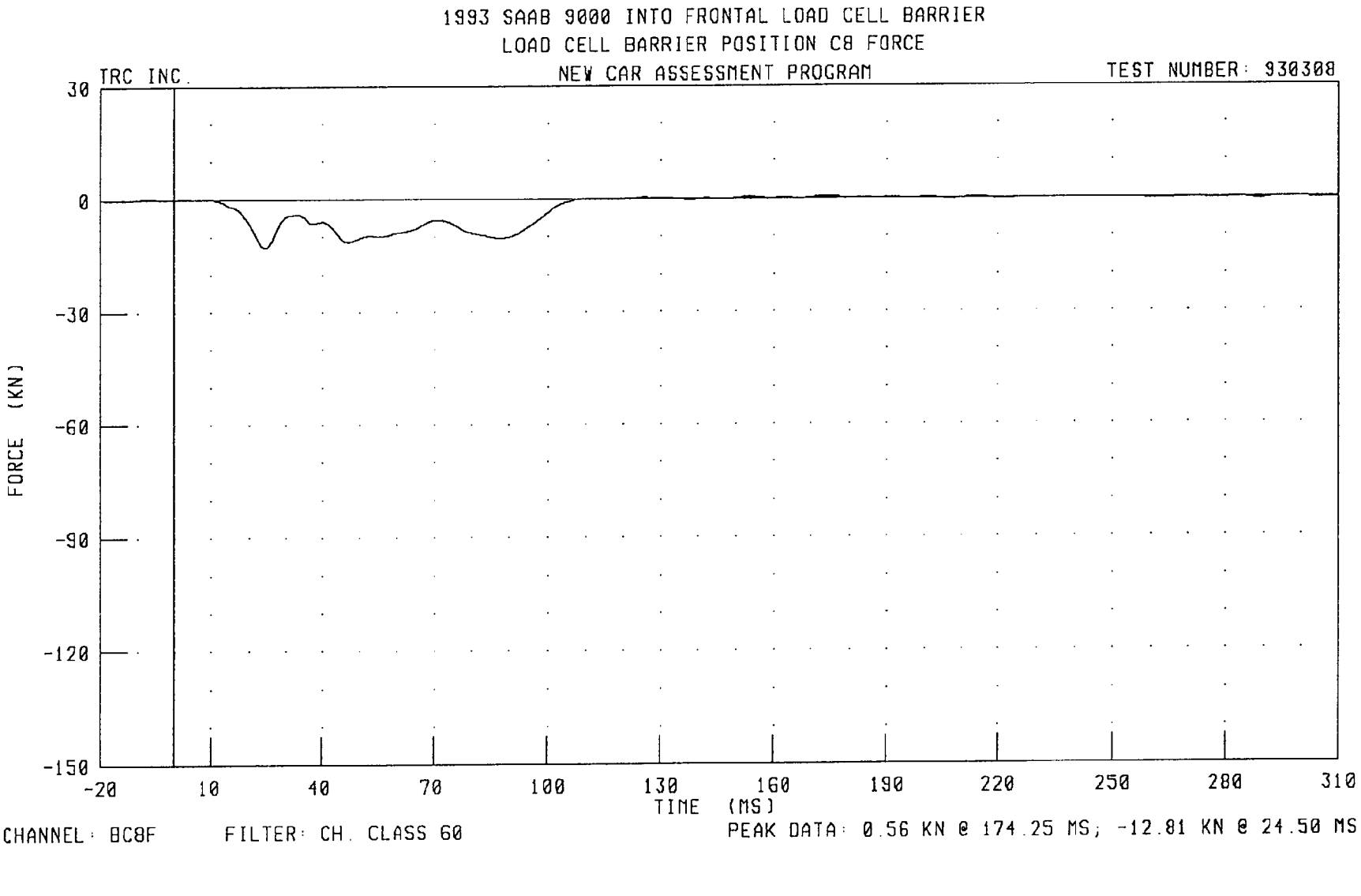
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION CG FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC6F
FILTER: CH. CLASS 60
PEAK DATA: 0.21 KN @ 2.75 MS; -52.71 KN @ 31.50 MS

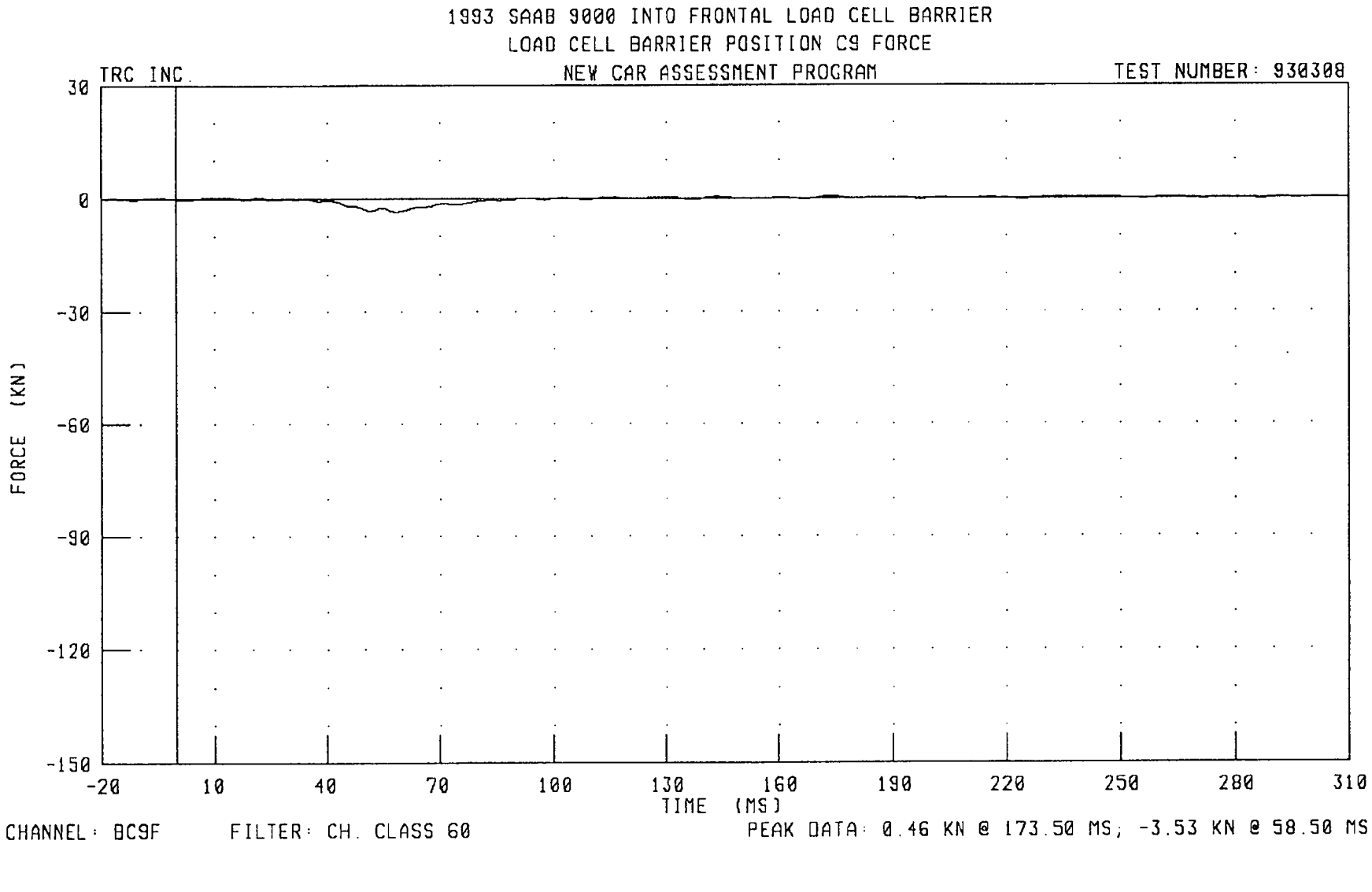
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C7 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC7F
FILTER: CH. CLASS 60
PEAK DATA: 0.42 KN @ 173.75 MS; -88.67 KN @ 31.88 MS

930308

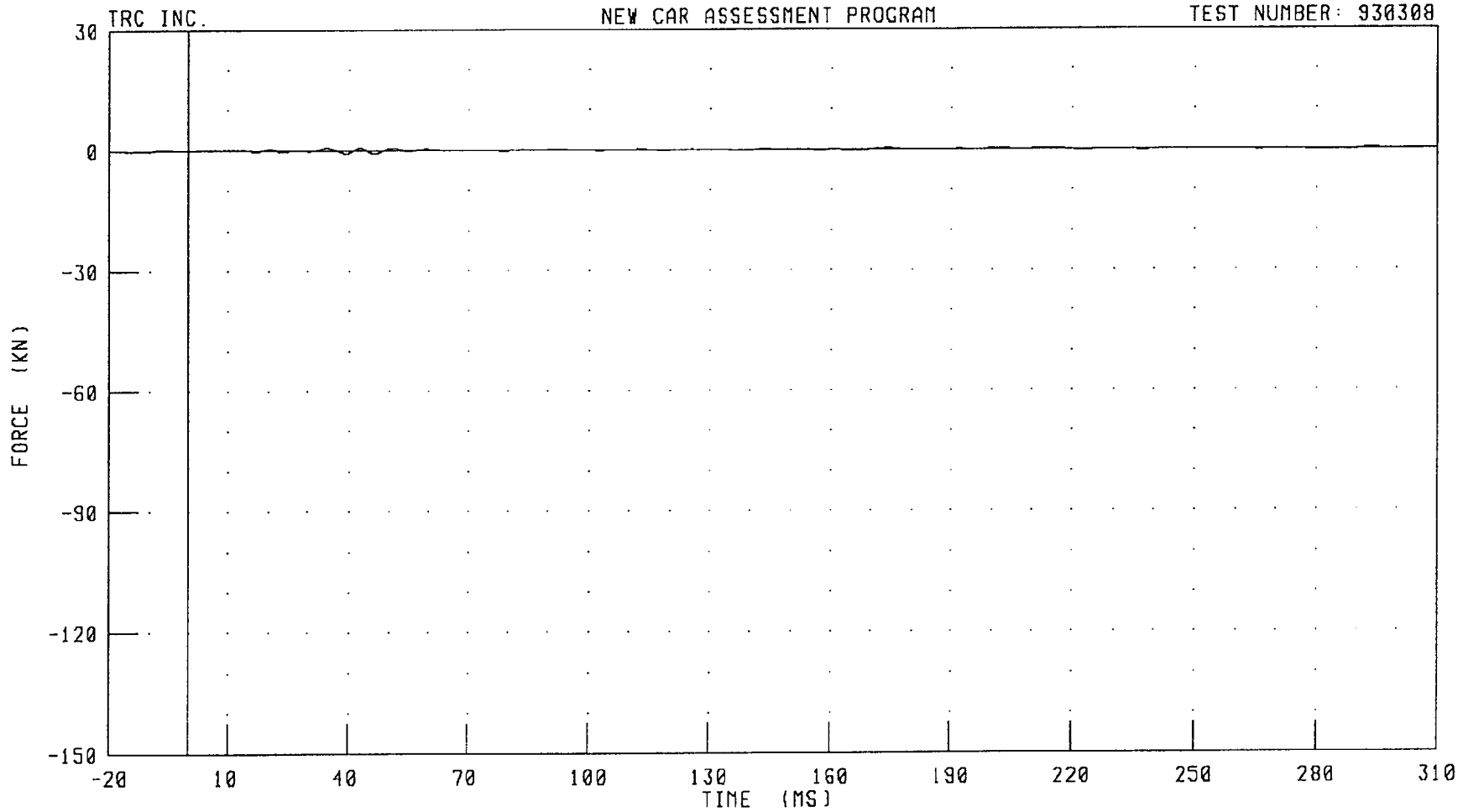

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C8 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC8F
FILTER: CH. CLASS 60
PEAK DATA: 0.56 KN @ 174.25 MS; -12.81 KN @ 24.50 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION C9 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BC9F
FILTER: CH. CLASS 60
PEAK DATA: 0.46 KN @ 173.50 MS; -3.53 KN @ 58.50 MS

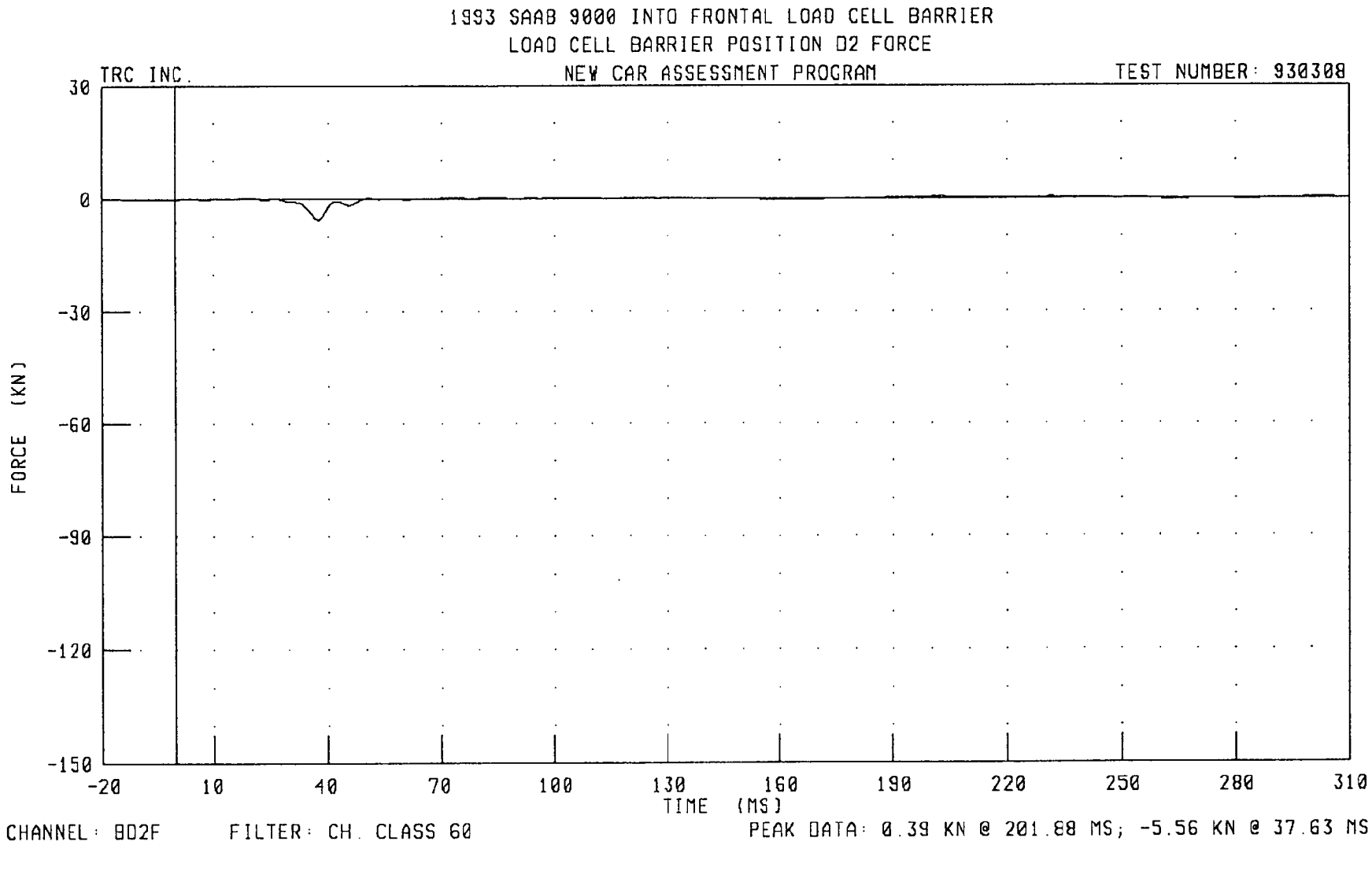
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D1 FORCE



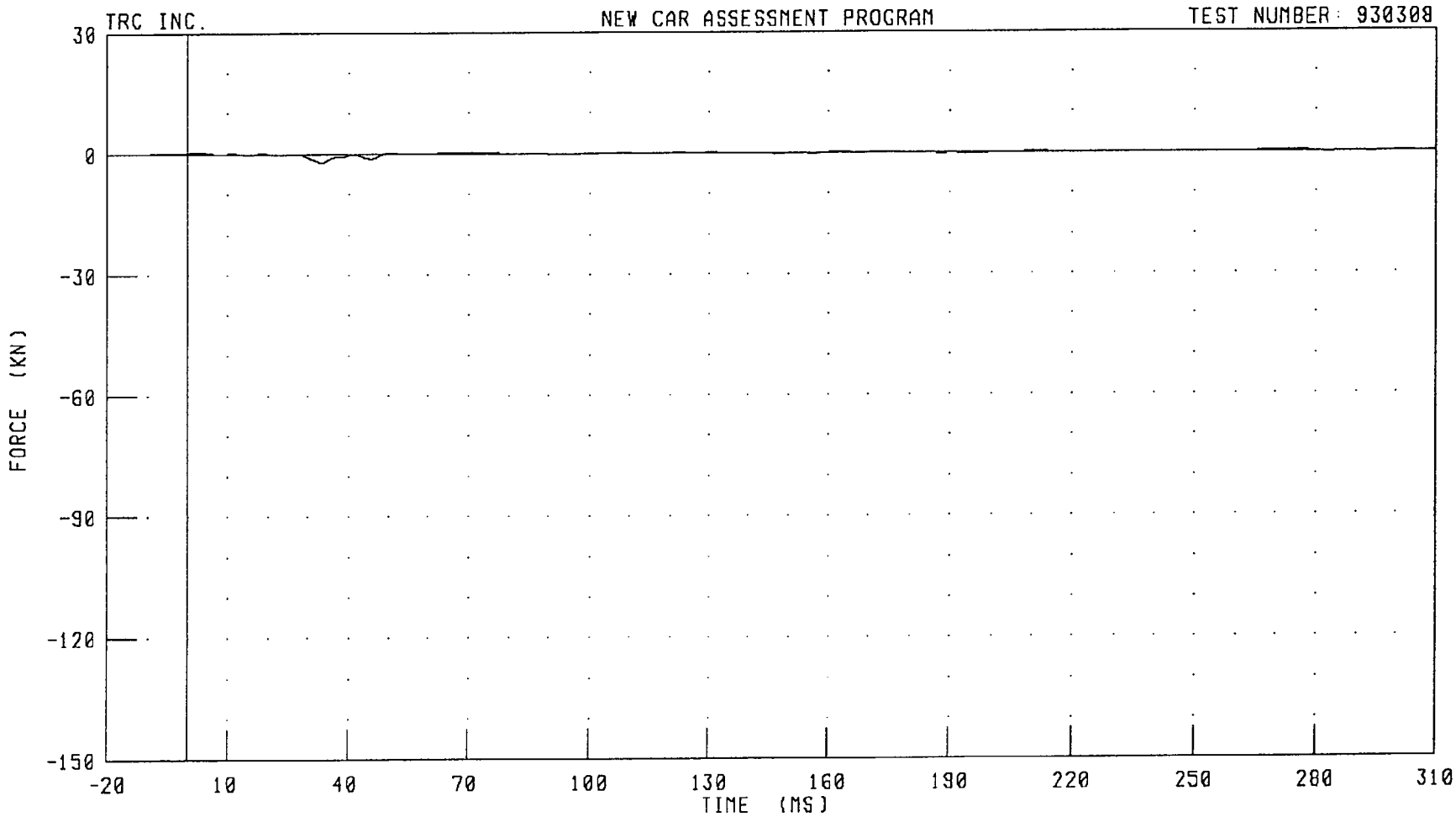
CHANNEL: BD1F FILTER: CH. CLASS 60 PEAK DATA: 0.63 KN @ 42.88 MS; -0.87 KN @ 46.50 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D2 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: 8D2F
FILTER: CH. CLASS 60
PEAK DATA: 0.39 KN @ 201.88 MS; -5.56 KN @ 37.63 MS

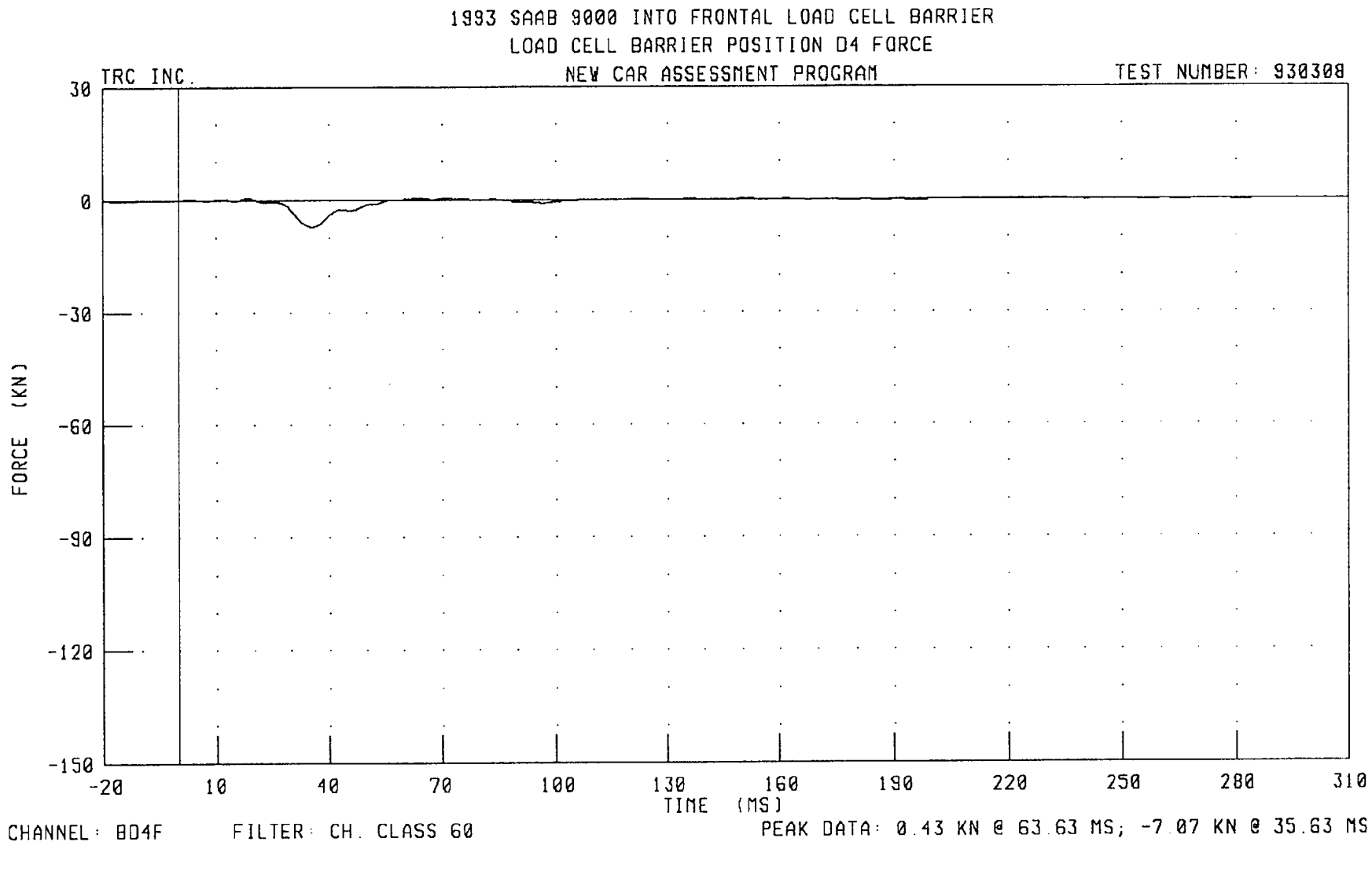
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION 03 FORCE

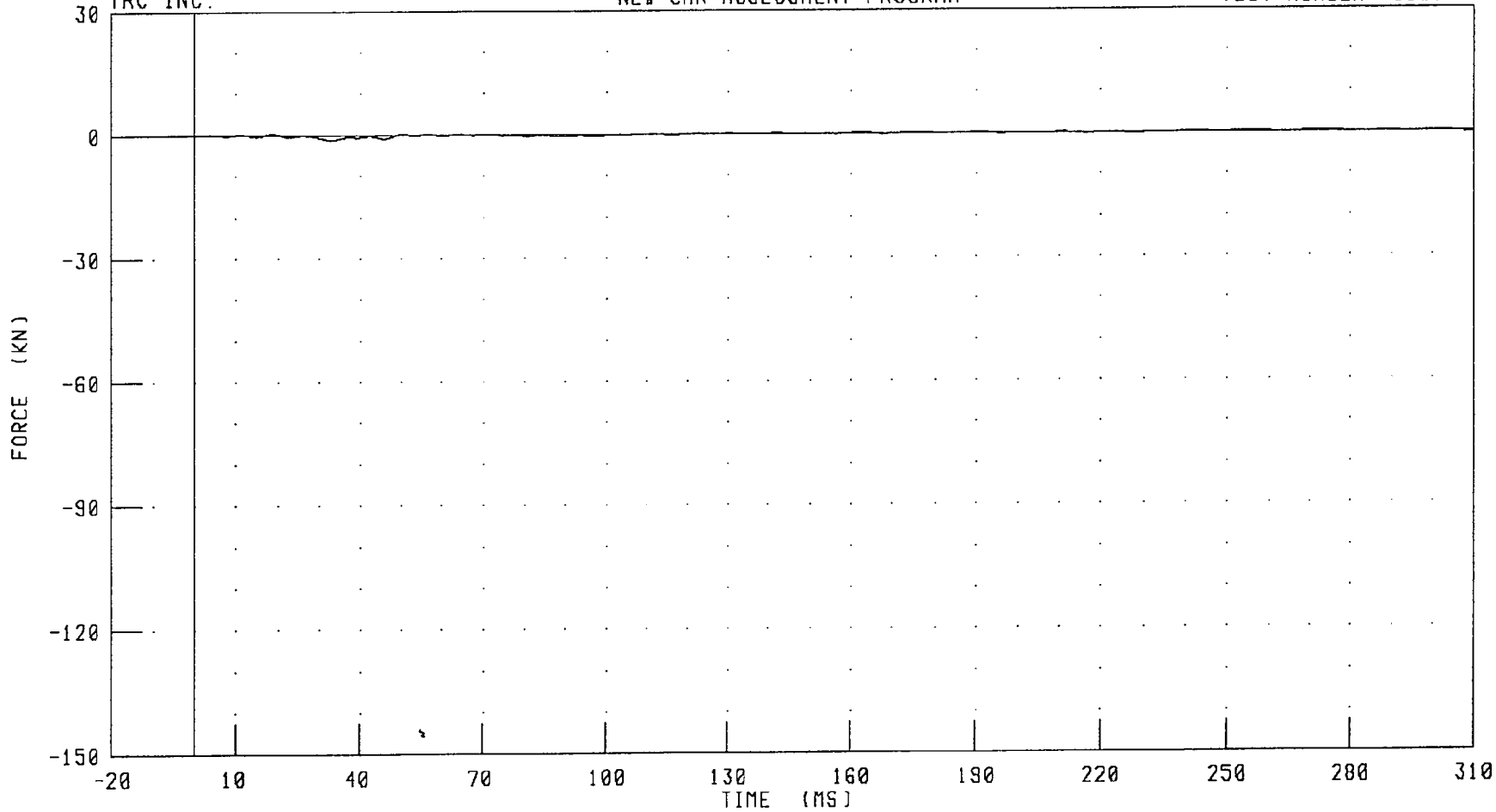


CHANNEL: 8D3F FILTER: CH. CLASS 60 PEAK DATA: 0.44 KN @ 2.63 MS; -2.04 KN @ 33.38 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D4 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BD4F
FILTER: CH. CLASS 60
PEAK DATA: 0.43 KN @ 63.63 MS; -7.07 KN @ 35.63 MS

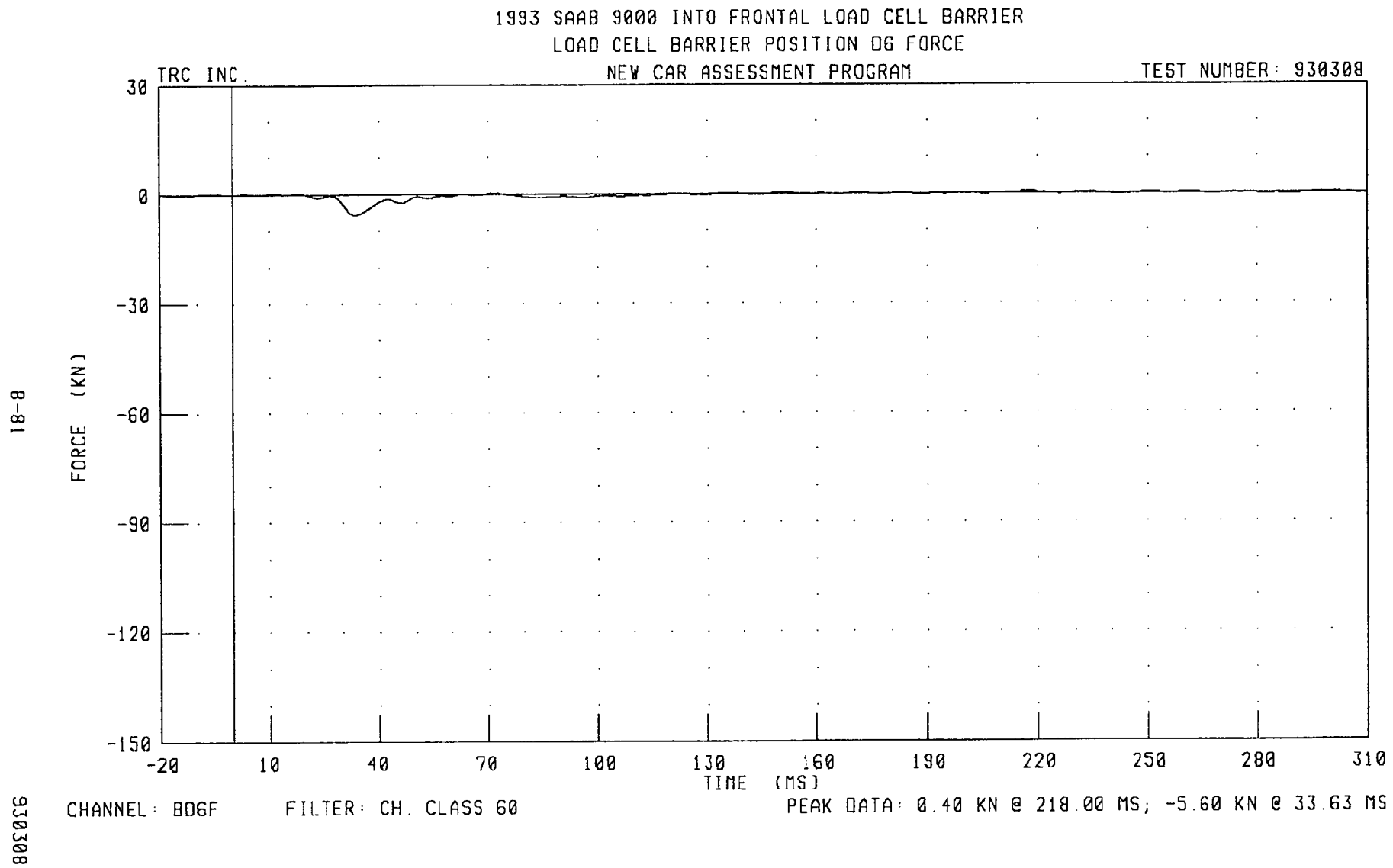
1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D5 FORCE
TRC INC. NEW CAR ASSESSMENT PROGRAM TEST NUMBER: 930308



CHANNEL: BD5F FILTER: CH. CLASS 60 PEAK DATA: 0.38 KN @ 18.75 MS; -1.34 KN @ 32.88 MS

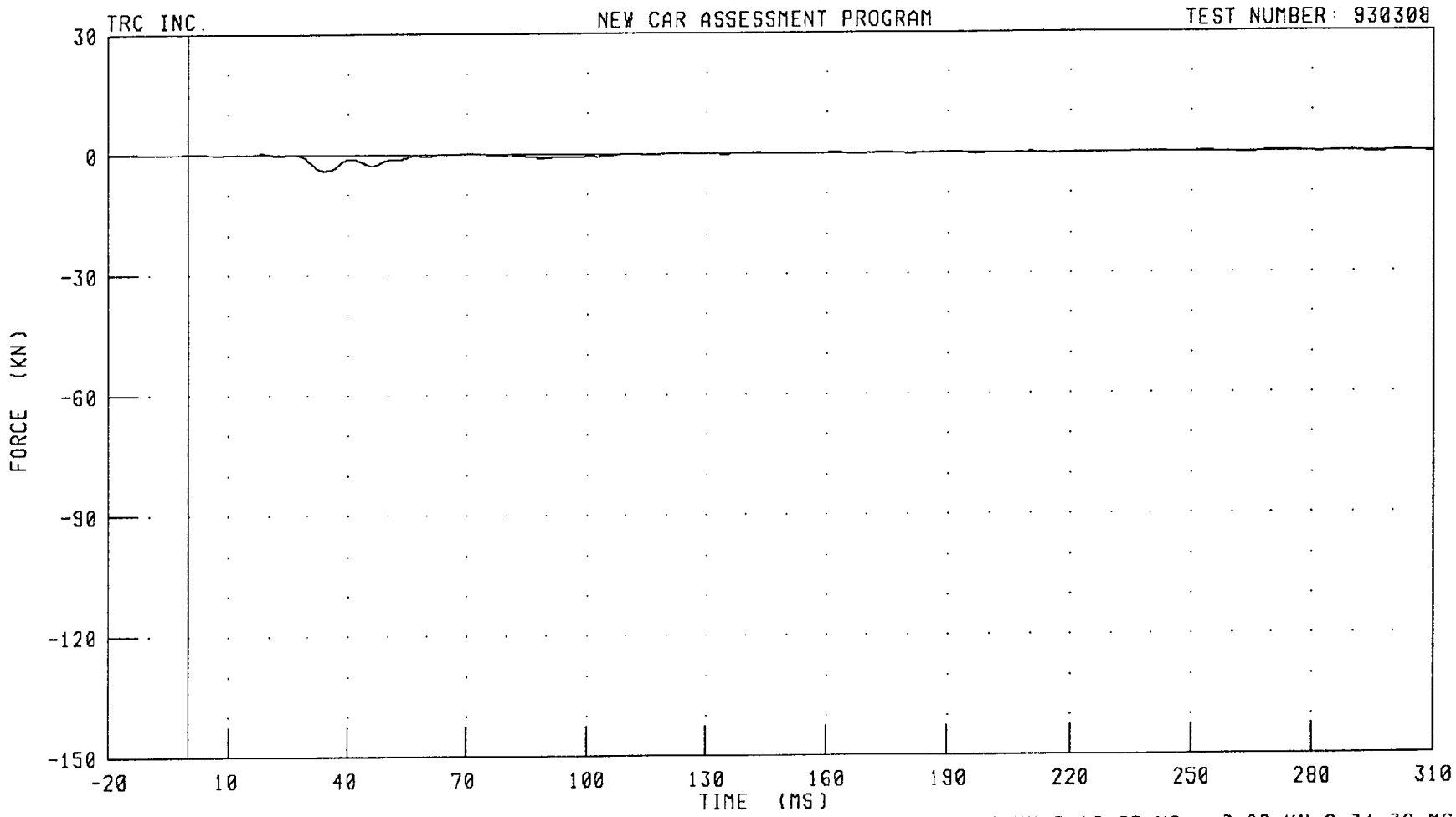
8-8

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION DG FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BDGF
FILTER: CH. CLASS 60
PEAK DATA: 0.40 KN @ 218.00 MS; -5.60 KN @ 33.63 MS

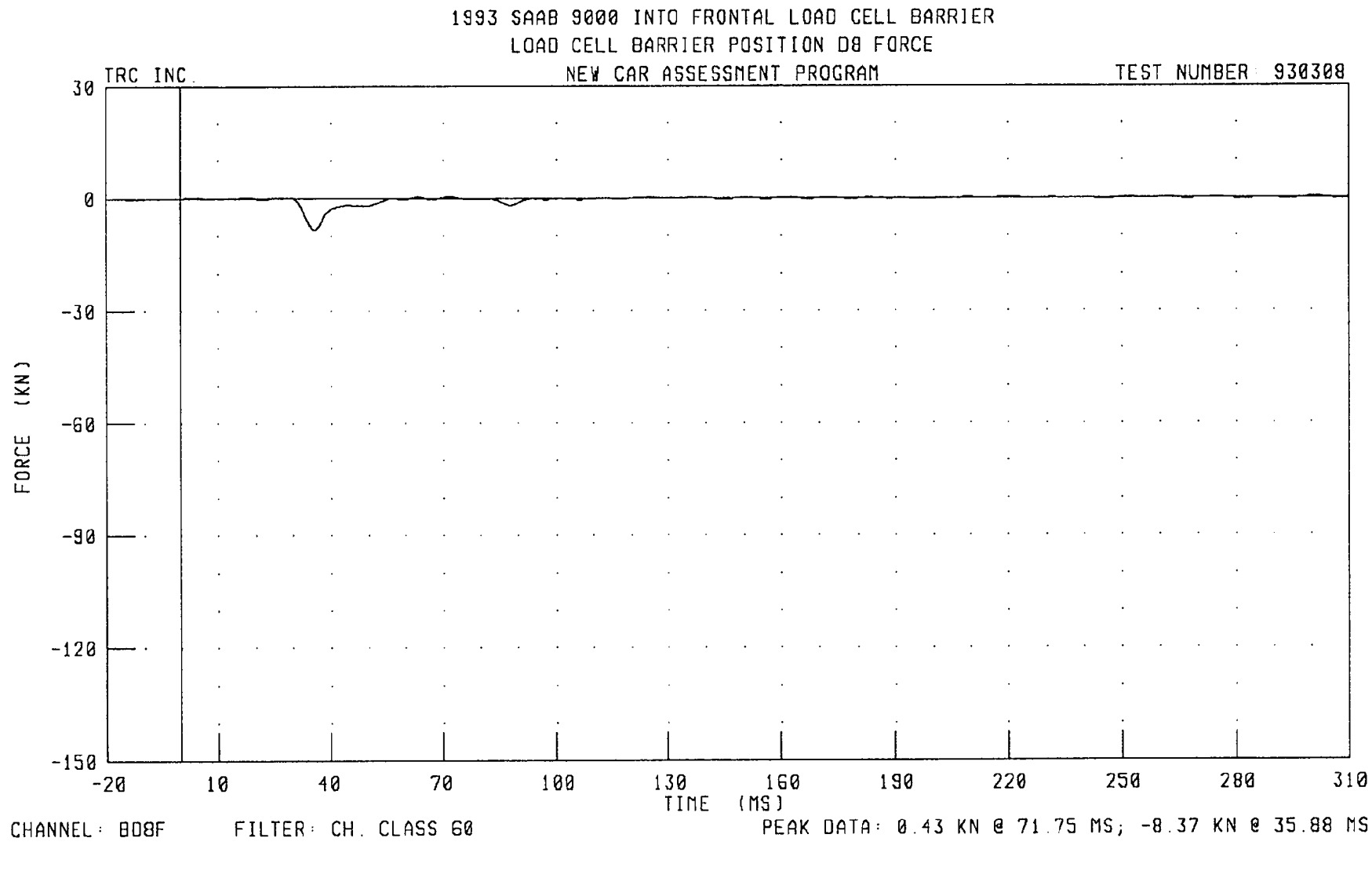
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D7 FORCE



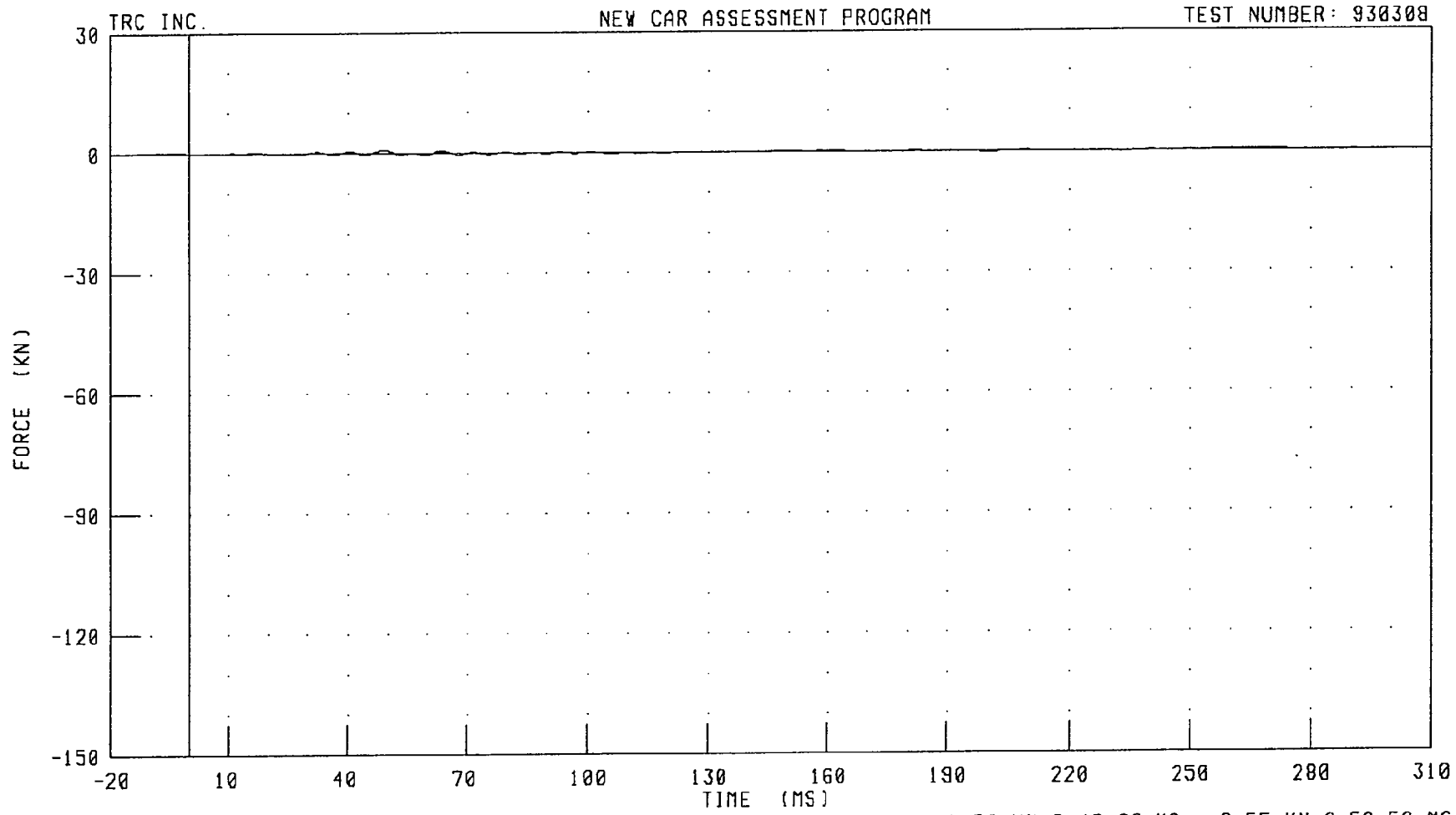
CHANNEL: BD7F FILTER: CH. CLASS 60 PEAK DATA: 0.35 KN @ 18.25 MS; -3.98 KN @ 34.38 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D8 FORCE
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
30
0
-30
-60
-90
-120
-150
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: B08F
FILTER: CH. CLASS 60
PEAK DATA: 0.43 KN @ 71.75 MS; -8.37 KN @ 35.88 MS

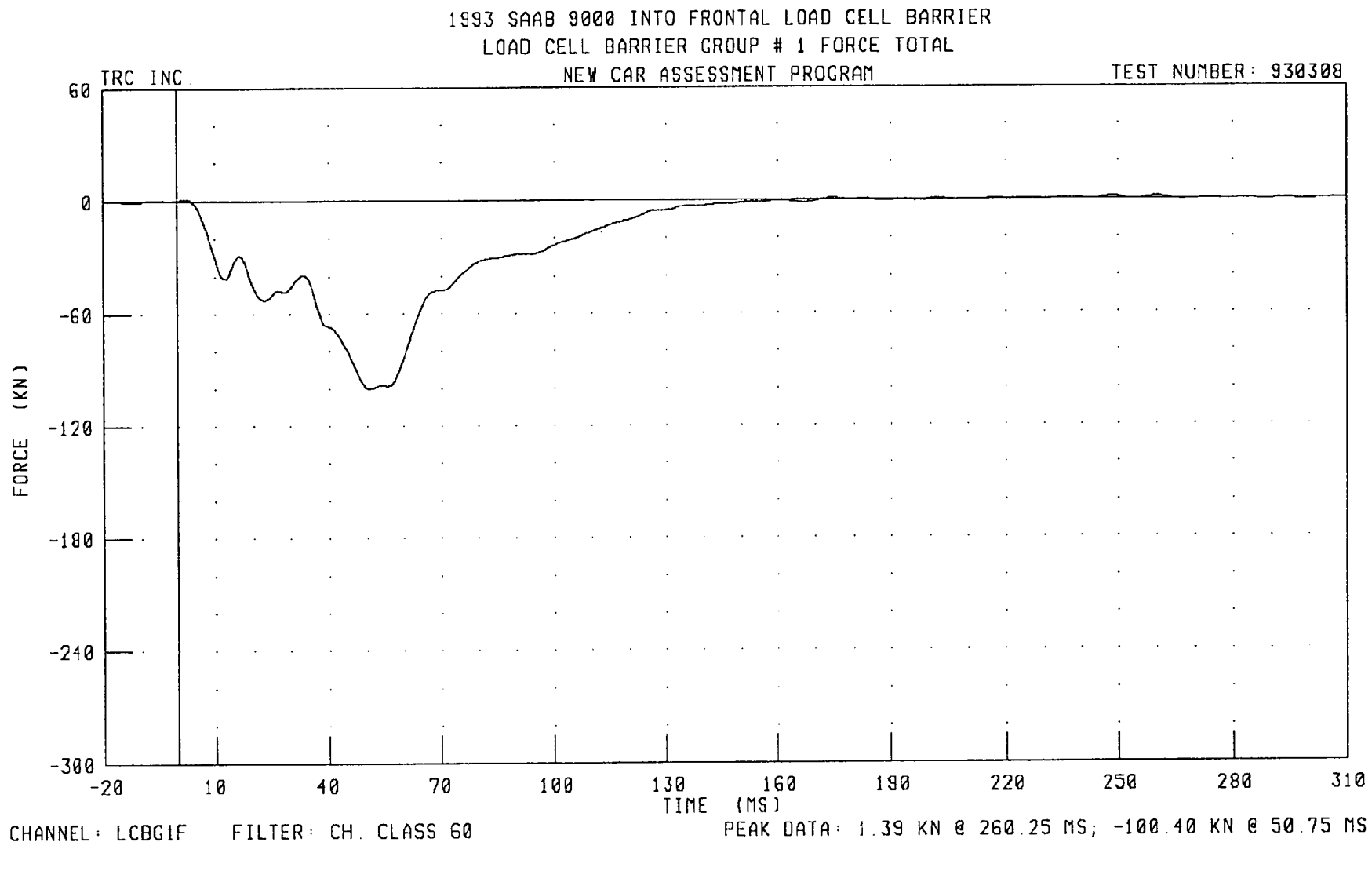
930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER POSITION D9 FORCE
NEW CAR ASSESSMENT PROGRAM



CHANNEL: 8D9F FILTER: CH. CLASS 60 PEAK DATA: 0.76 KN @ 49.00 MS; -0.55 KN @ 59.50 MS

930308

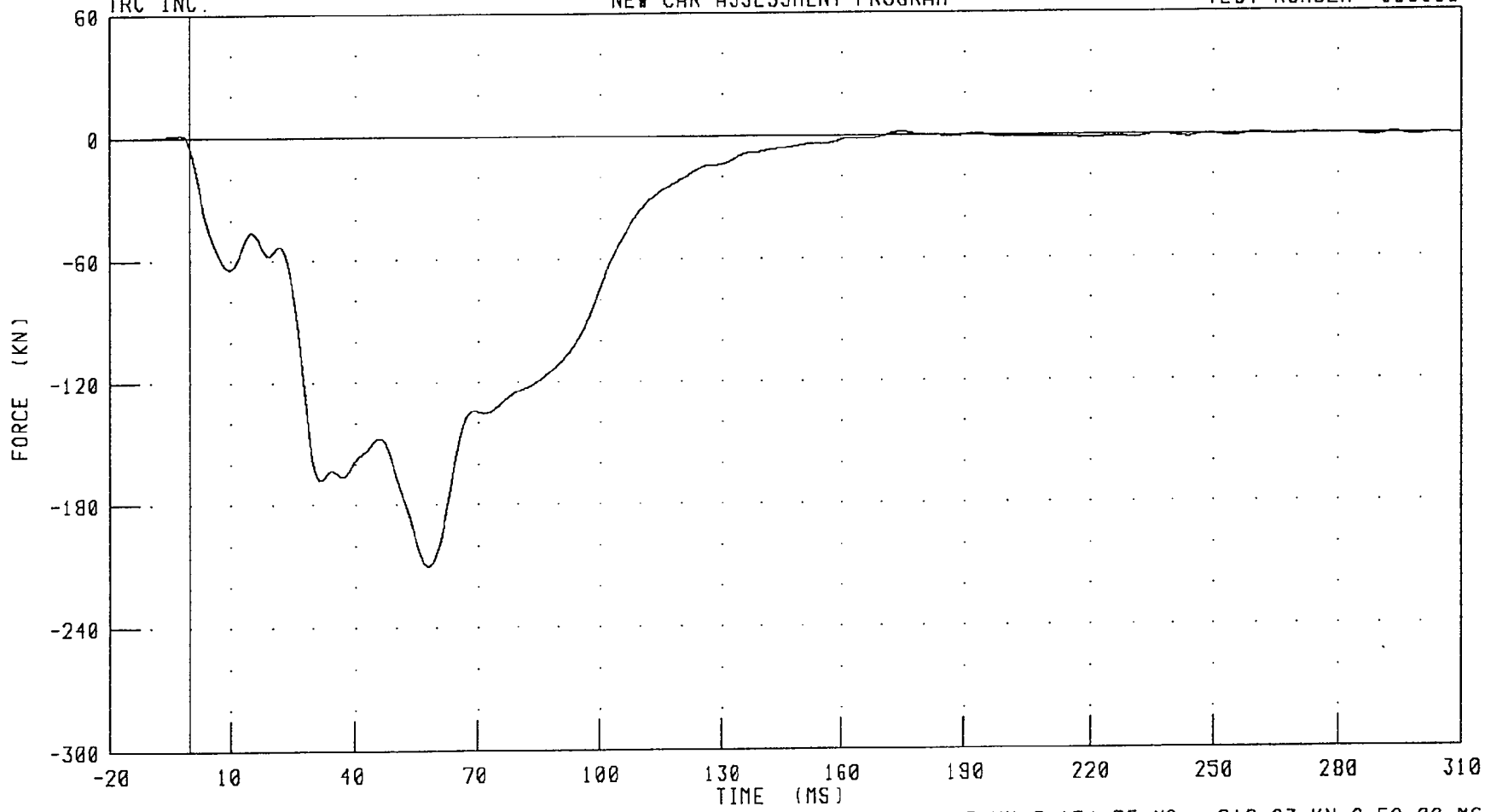

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 1 FORCE TOTAL
TRC INC
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG1F
FILTER: CH. CLASS 60
PEAK DATA: 1.39 KN @ 260.25 MS; -100.40 KN @ 50.75 MS

930308

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 2 FORCE TOTAL
NEW CAR ASSESSMENT PROGRAM

TRC INC.

TEST NUMBER: 930308

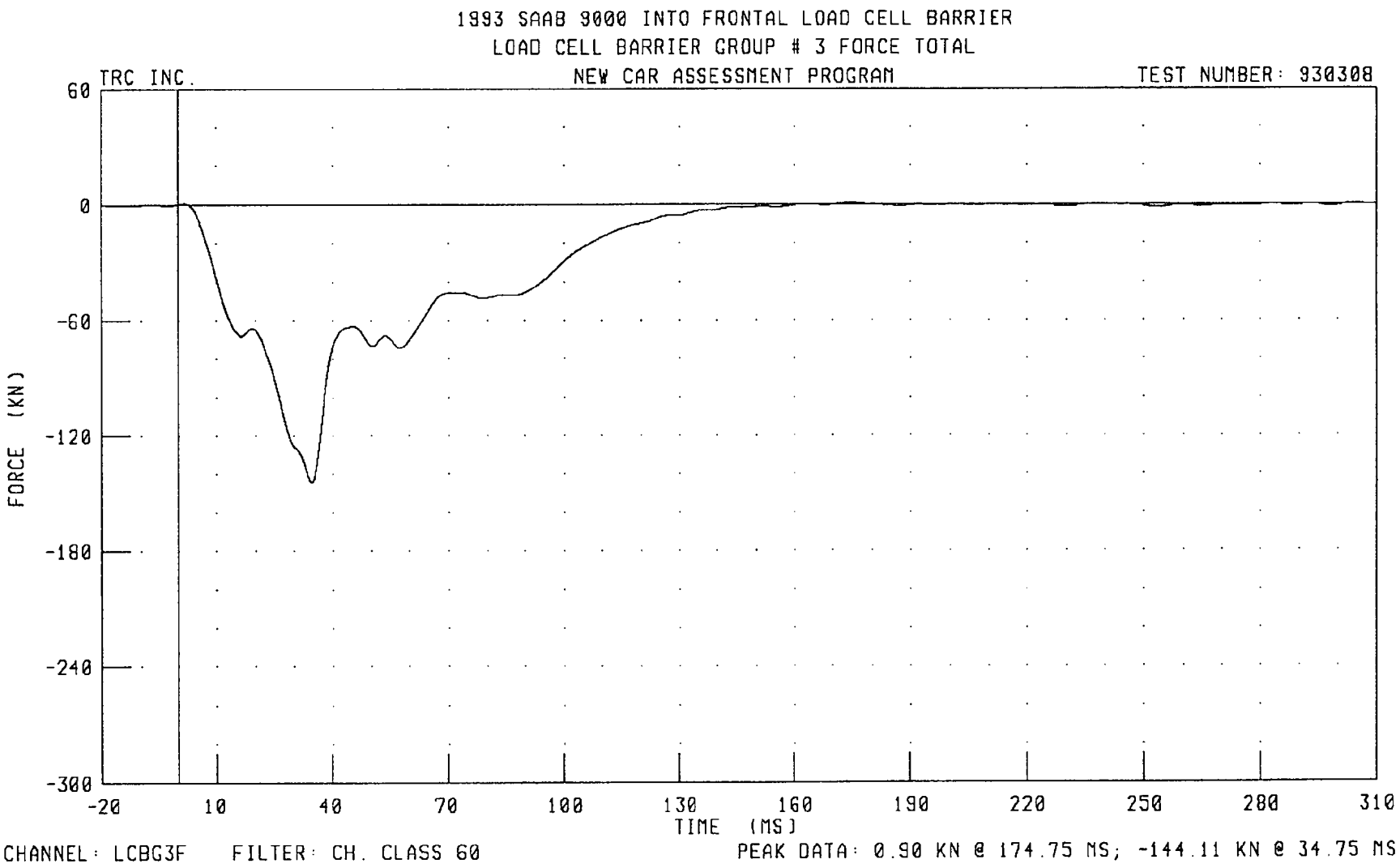


CHANNEL: LCBG2F FILTER: CH. CLASS 60

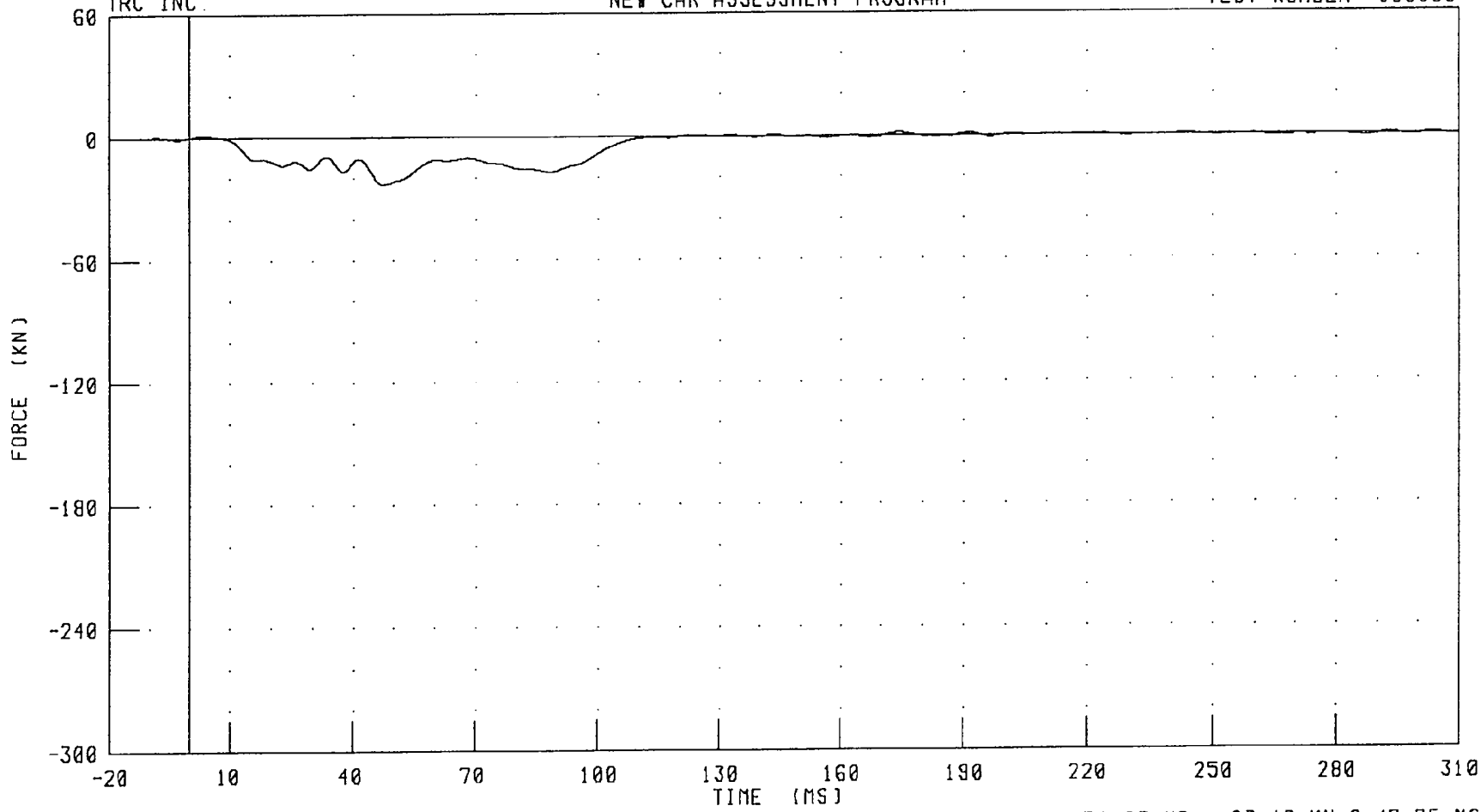
PEAK DATA: 1.45 KN @ 174.75 MS; -210.23 KN @ 58.00 MS

B-86

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 3 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG3F
FILTER: CH. CLASS 60
PEAK DATA: 0.90 KN @ 174.75 MS; -144.11 KN @ 34.75 MS

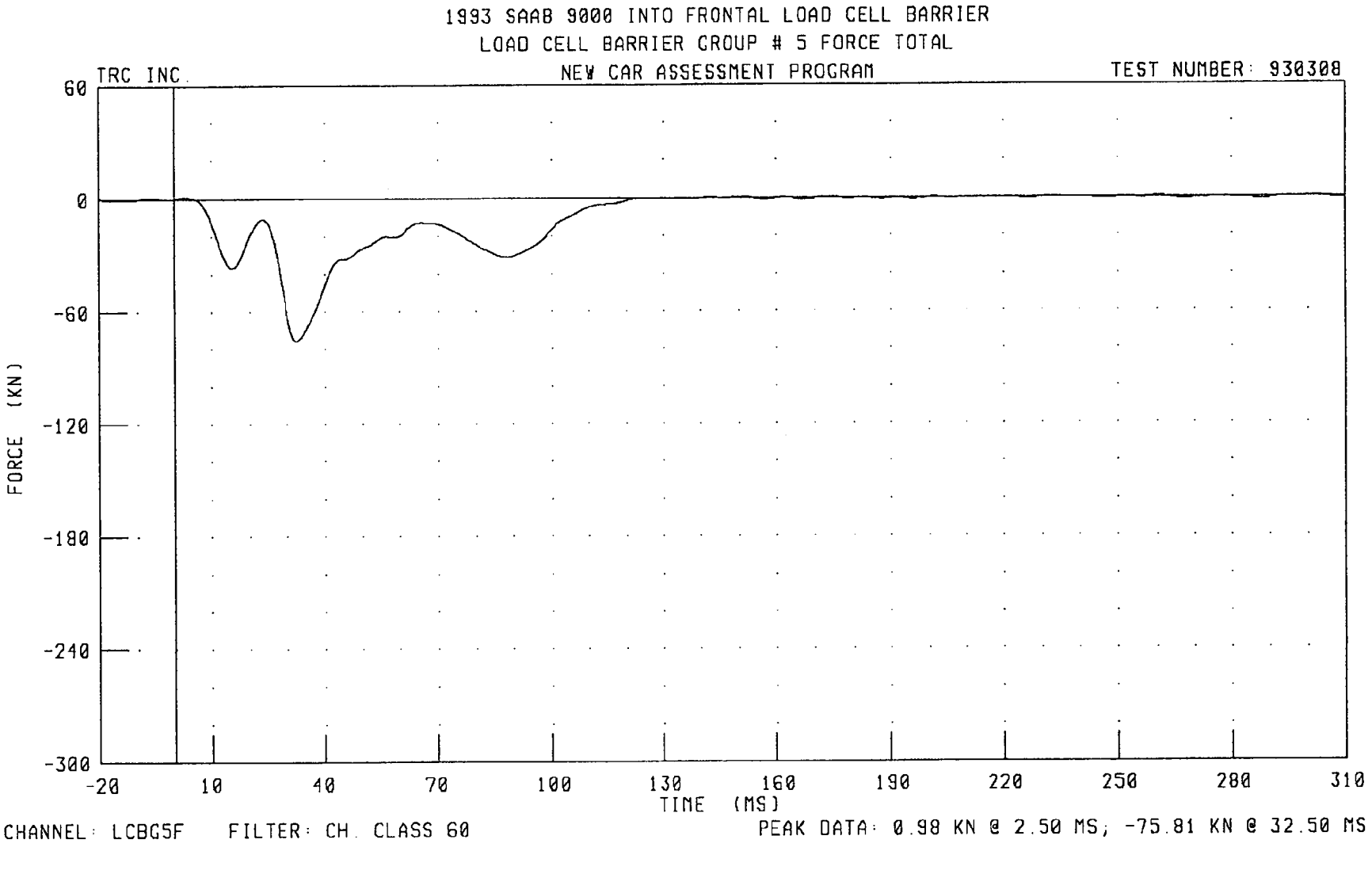
1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 4 FORCE TOTAL
TRC INC. NEW CAR ASSESSMENT PROGRAM TEST NUMBER: 930308

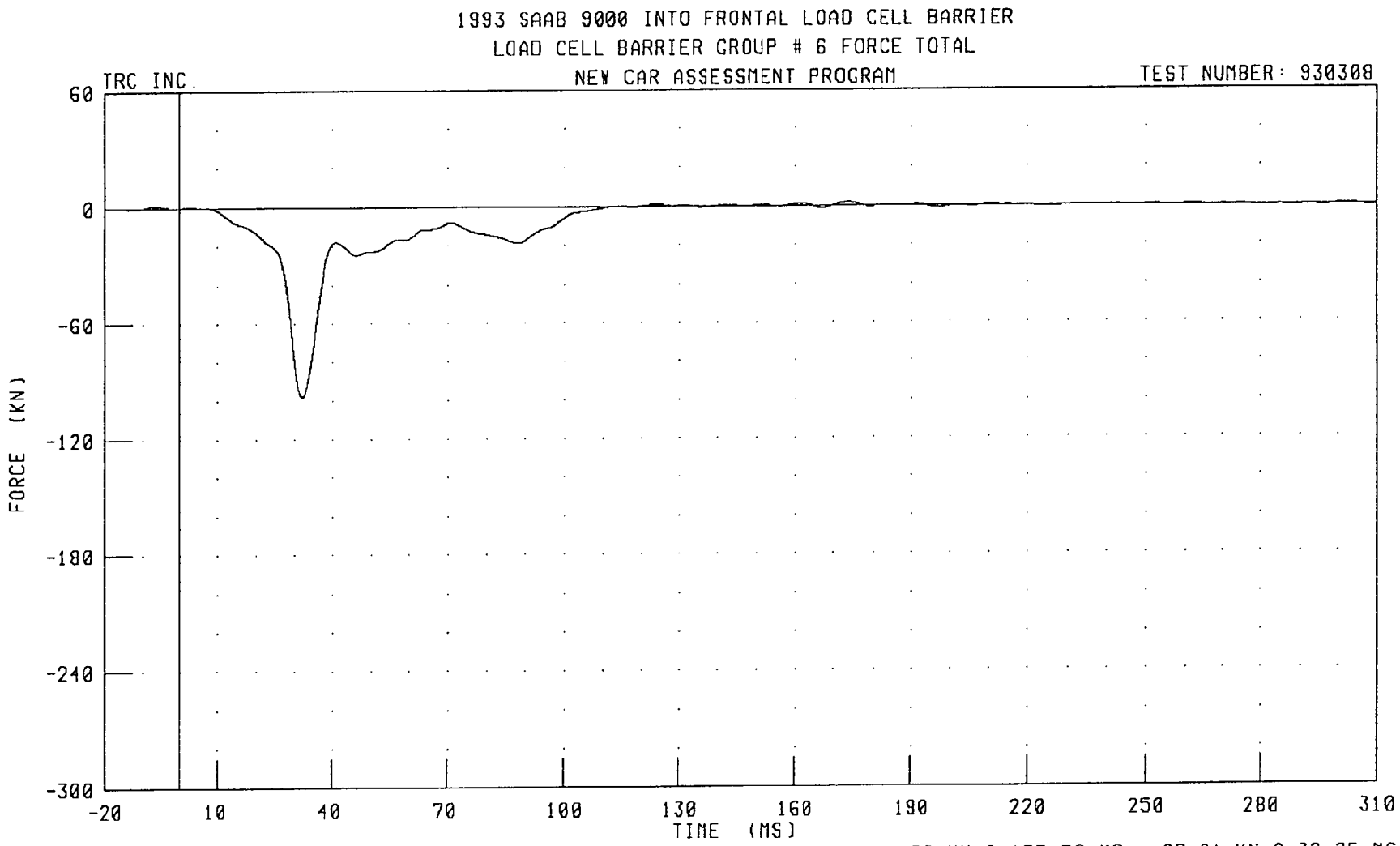


CHANNEL: LCBG4F FILTER: CH. CLASS 60 PEAK DATA: 1.28 KN @ 174.63 MS, -23.19 KN @ 47.75 MS

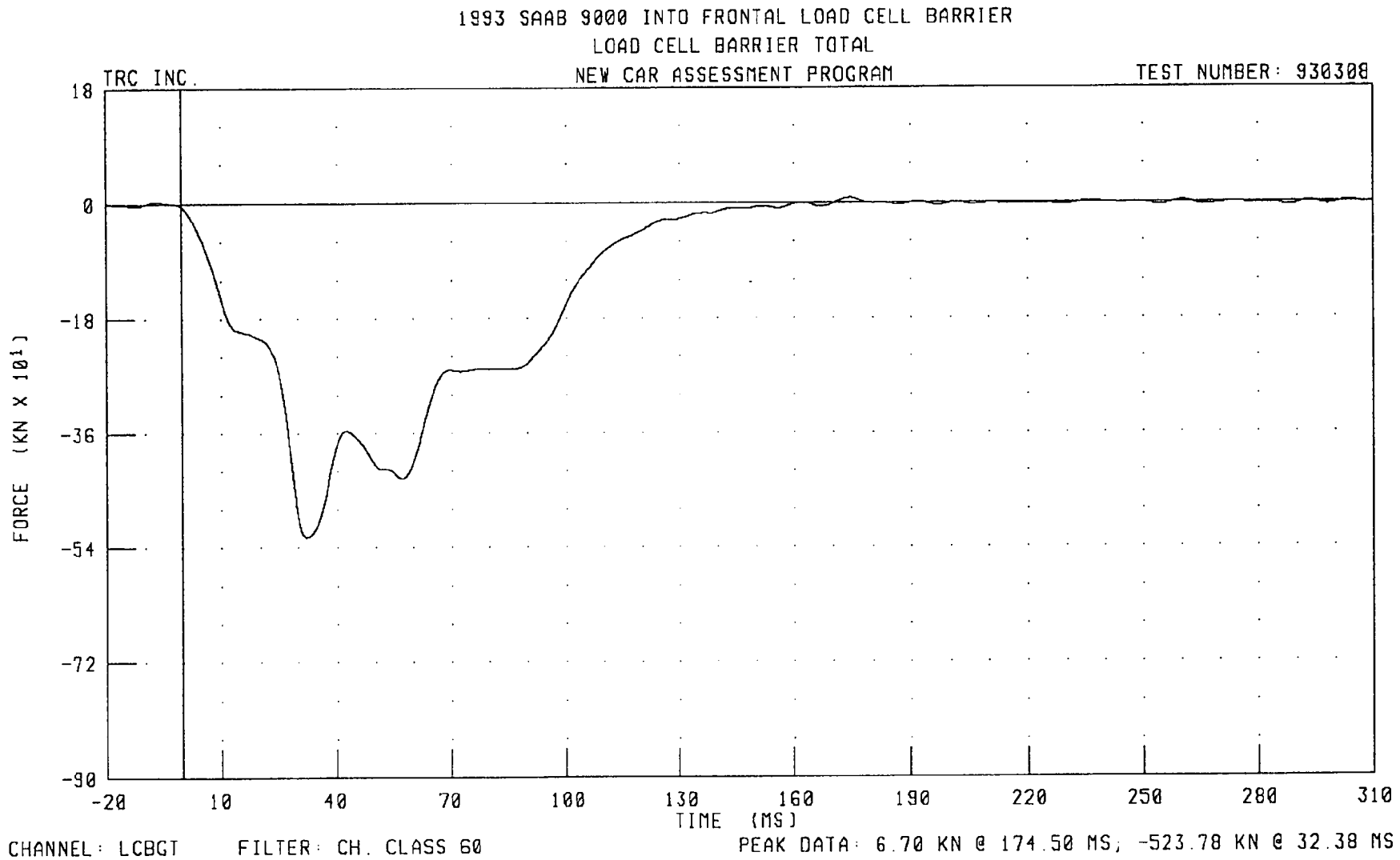
88-8

930308

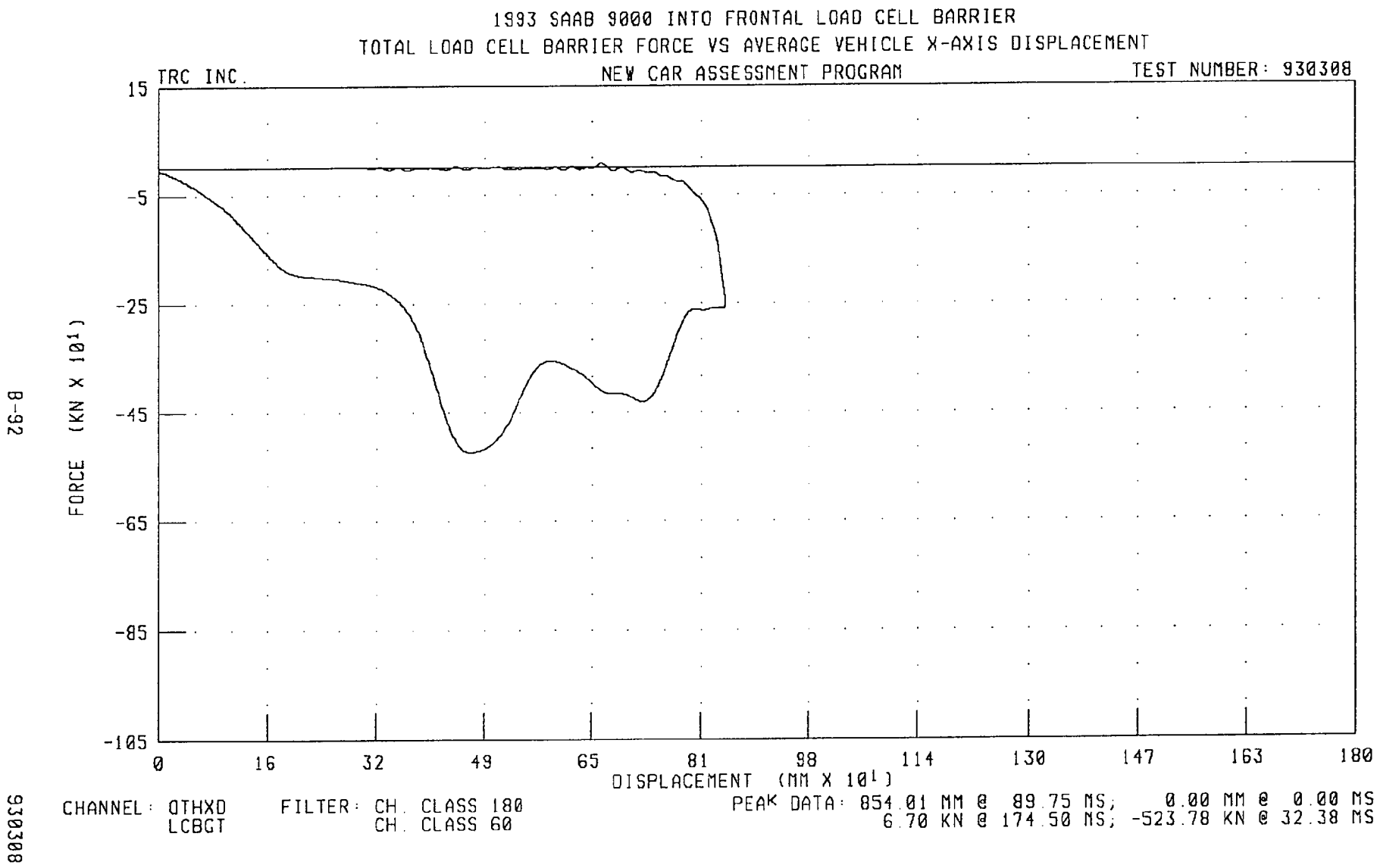

1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 5 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG5F
FILTER: CH. CLASS 60
PEAK DATA: 0.98 KN @ 2.50 MS; -75.81 KN @ 32.50 MS
68-89
930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER GROUP # 6 FORCE TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
60
0
-60
-120
-180
-240
-300
FORCE (KN)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBG6F
FILTER: CH. CLASS 60
PEAK DATA: 1.79 KN @ 173.50 MS; -97.91 KN @ 32.25 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
LOAD CELL BARRIER TOTAL
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
18
0
-18
-36
-54
-72
-90
FORCE (KN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LCBGT
FILTER: CH. CLASS 60
PEAK DATA: 6.70 KN @ 174.50 MS, -523.78 KN @ 32.38 MS

930308


1993 SAAB 9000 INTO FRONTAL LOAD CELL BARRIER
TOTAL LOAD CELL BARRIER FORCE VS AVERAGE VEHICLE X-AXIS DISPLACEMENT
TRC INC.
NEW CAR ASSESSMENT PROGRAM
TEST NUMBER: 930308
15
-5
-25
-45
-65
-85
-105
FORCE (KN X 10¹)
0
16
32
49
65
81
98
114
130
147
163
180
DISPLACEMENT (MM X 10¹)
CHANNEL: OTHXD
LCBGT
FILTER: CH. CLASS 180
CH. CLASS 60
PEAK DATA: 854.01 MM @ 89.75 MS; 0.00 MM @ 0.00 MS
6.70 KN @ 174.50 MS; -523.78 KN @ 32.38 MS

930308

APPENDIX C

DUMMY CERTIFICATION DATA

PRE-TEST CERTIFICATION DATA

DRIVER DUMMY S/N: 192

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
ALDERSON 192

23-FEB-93

TRC 192C12ED1 572E SN192 EXT. DIMENSION CAL12

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE	(AA)	429- 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE	(BB)	226- 231 MM	229. MM
CHEST CIRCUMFERENCE	(Y)	970-1001 MM	983. MM
WAIST CIRCUMFERENCE	(Z)	836- 866 MM	848. MM
CHEST DEPTH	(O)	213- 229 MM	218. MM
H-POINT HEIGHT	(C)	84- 89 MM	86. MM
H-POINT FROM SEATBACK	(D)	135- 140 MM	137. MM
SKULL CAP TO BACKLINE	(H)	41- 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879- 889 MM	884. MM
THIGH CLEARANCE	(F)	140- 155 MM	147. MM
BUTTOCK KNEE LENGTH	(K)	579- 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452- 478 MM	472. MM
POPLITEAL HEIGHT	(L)	429- 455 MM	450. MM
KNEE PIVOT HEIGHT	(M)	485- 500 MM	493. MM
FOOT LENGTH	(P)	252- 267 MM	259. MM
FOOT BREADTH	(W)	91- 107 MM	102. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84- 94 MM	91. MM
SHOULDER BREADTH	(V)	422- 437 MM	427. MM
SHOULDER PIVOT HEIGHT	(B)	506- 521 MM	513. MM
ELBOW REST HEIGHT	(J)	191- 211 MM	206. MM
SHOULDER-ELBOW LENGTH	(I)	330- 345 MM	340. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290- 305 MM	295. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Foust

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

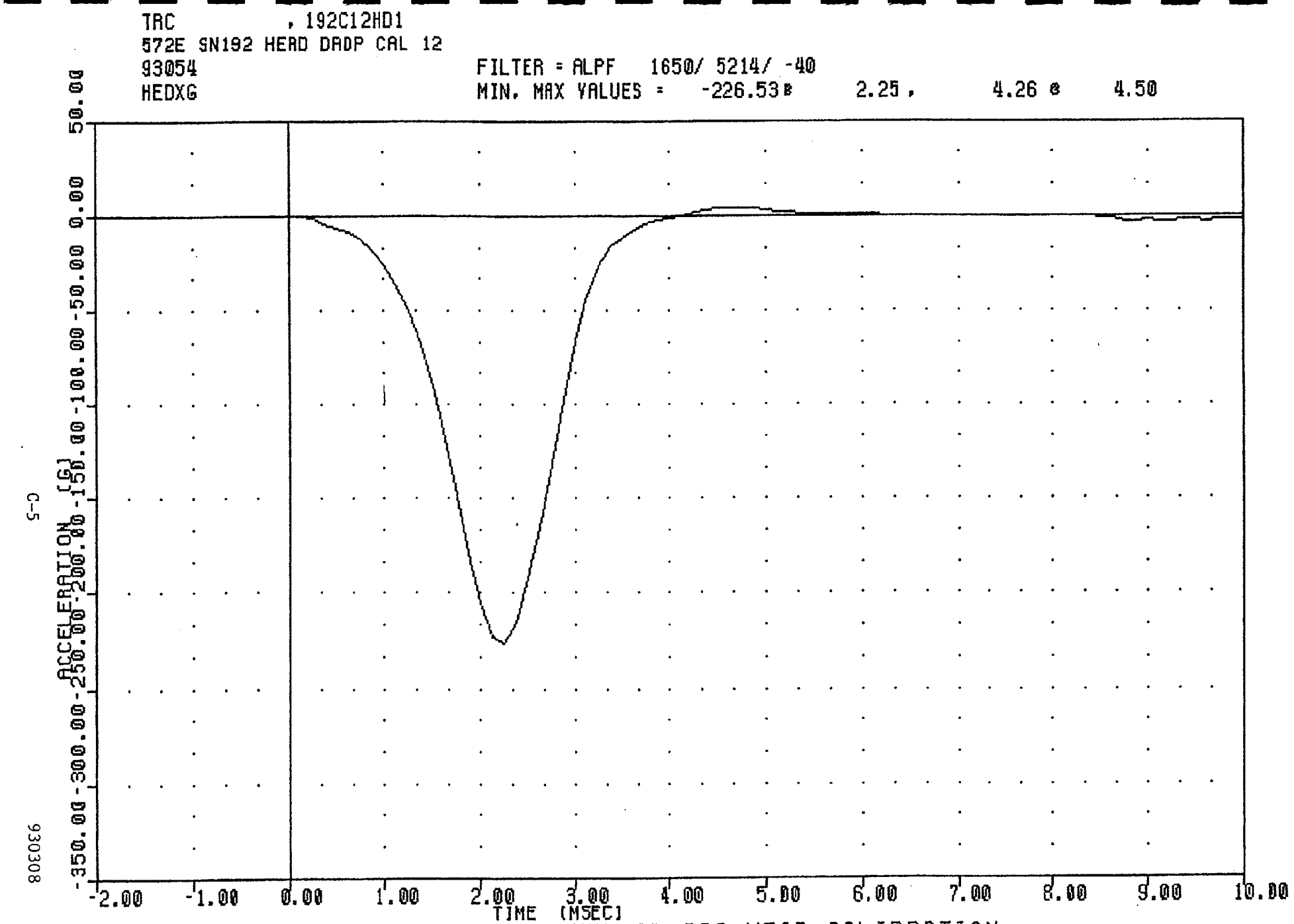
HYBRID III 23-FEB-93

TRC 192C12HD1 572E SN192 HEAD DROP CAL 12

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	47.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	256.00 G
PEAK LATERAL ACCELERATION	15 G MAX	-6.08 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

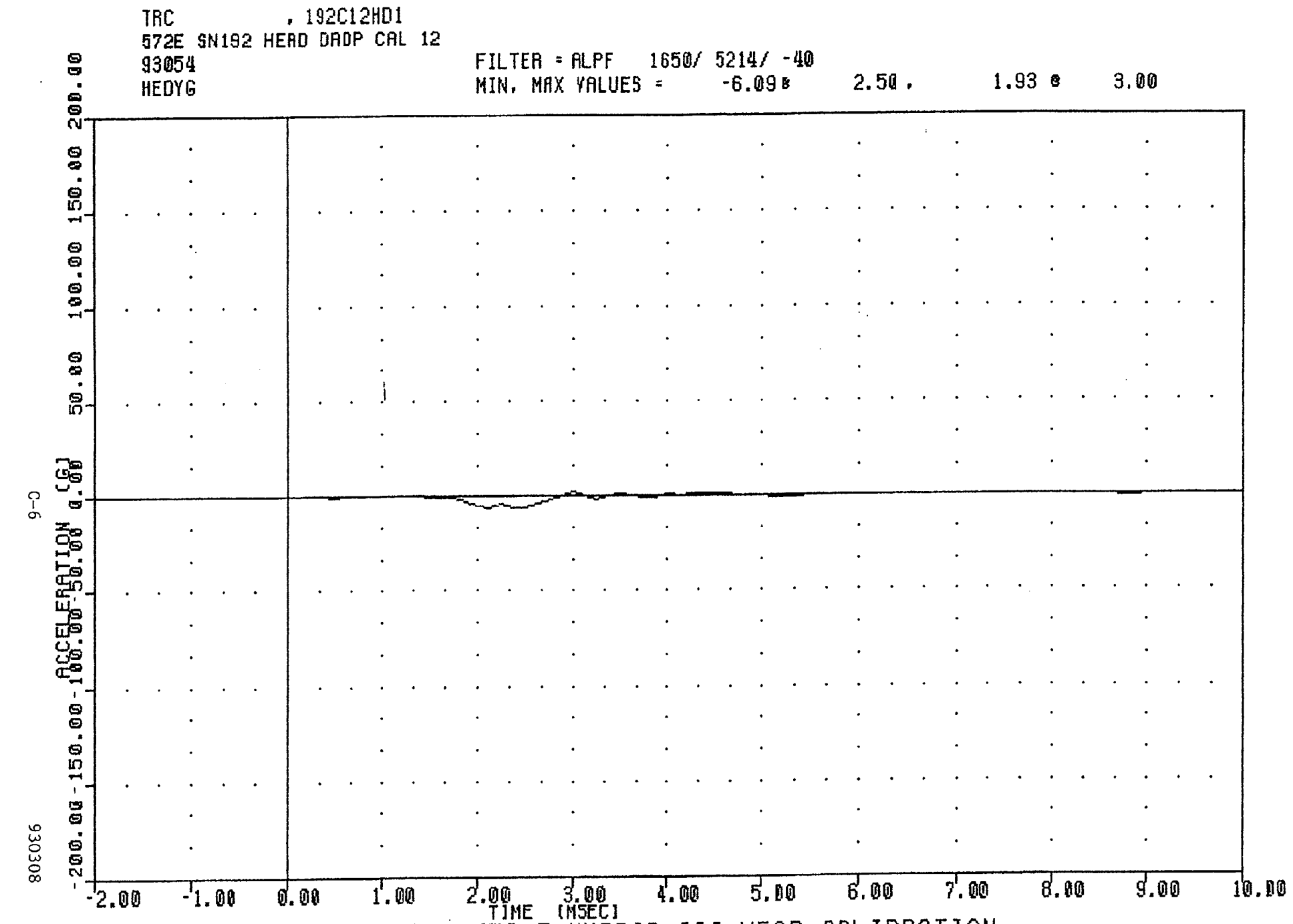
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fount



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

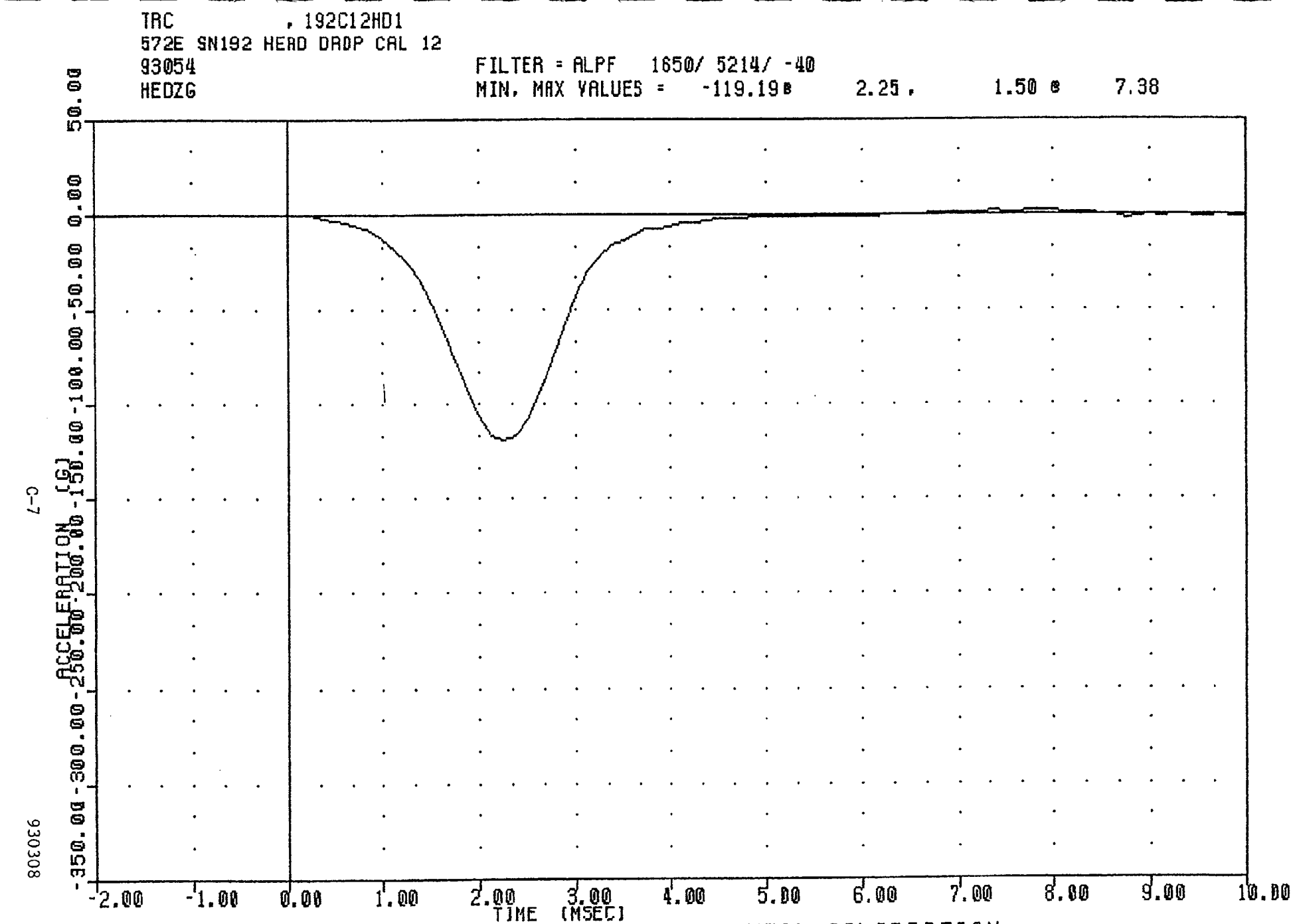
930308



PART 572-E HYBRID III HEAD CALIBRATION

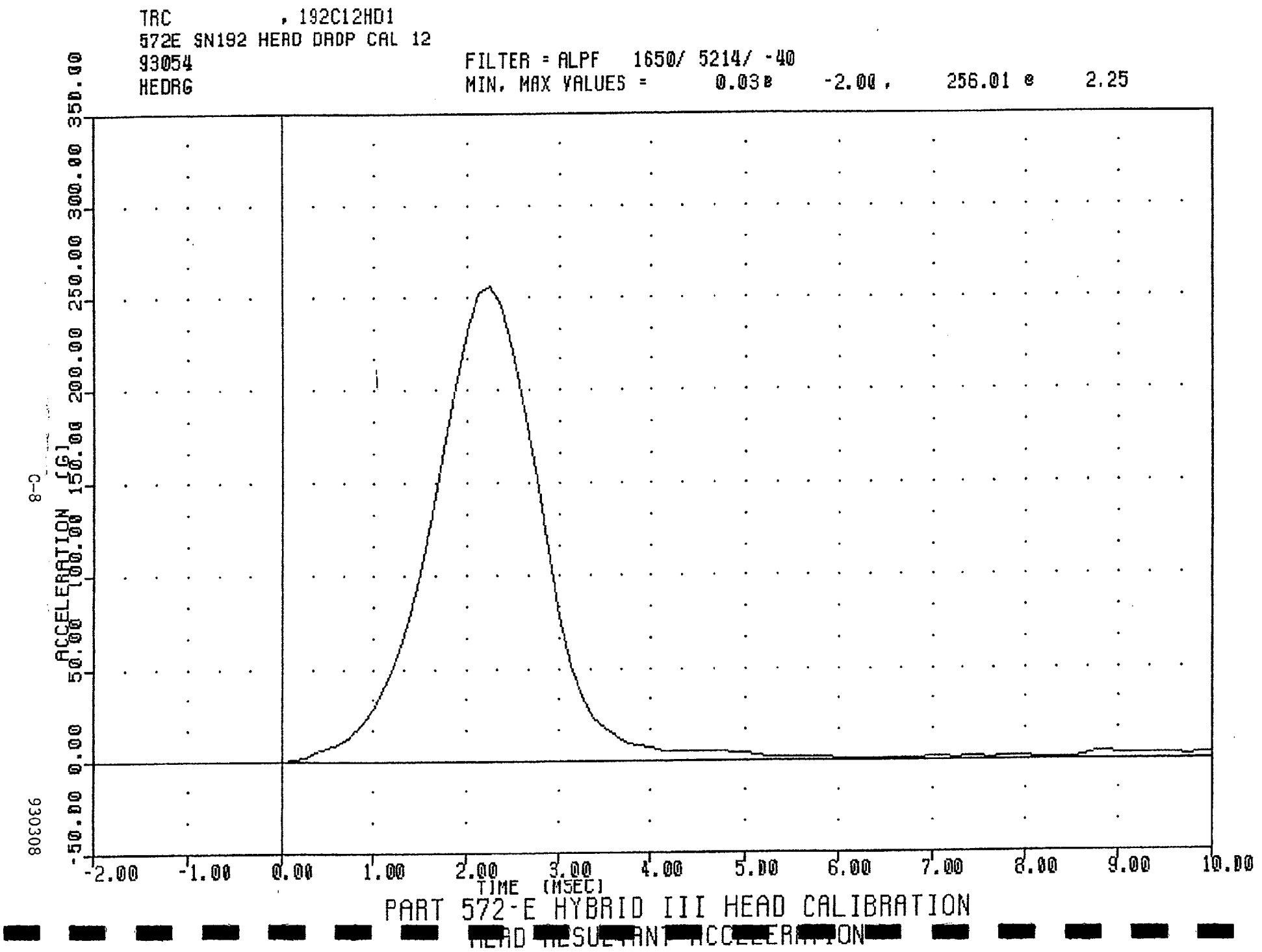
HEAD ACCELERATION X AXIS

930308



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

930308


TRC , 192C12HD1
572E SN192 HEAD DROP CAL 12
93054
HEDRG
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.03 @ -2.00 , 256.01 @ 2.25
ACCELERATION (G)
-50.00 0.00 50.00 100.00 150.00 200.00 250.00 300.00 350.00
-2.00 -1.00 0.00 1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00 10.00
TIME (MSEC)
PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION
C-8
930308

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST

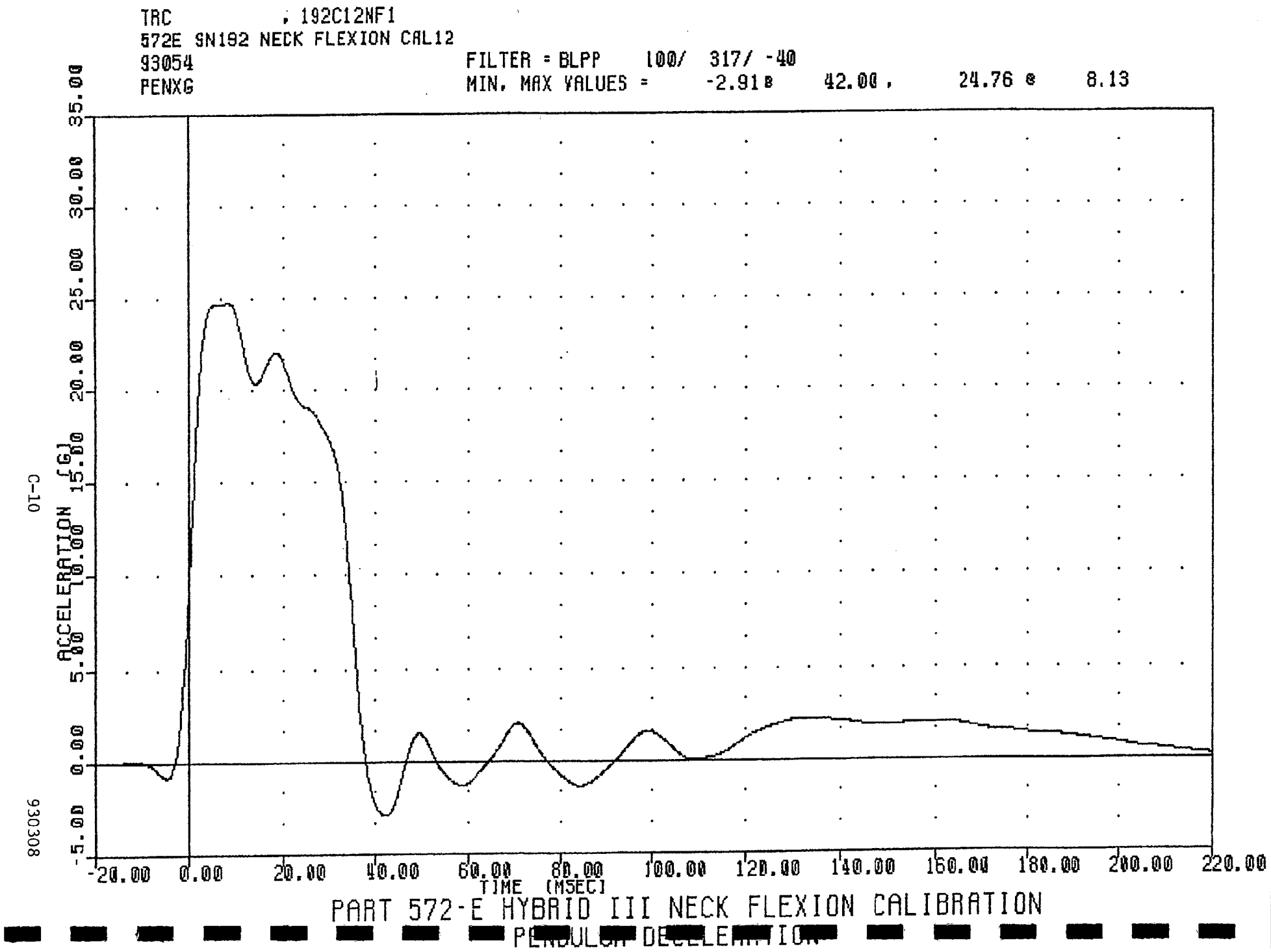
HYBRID III 23-FEB-93

6 AXIS NECK TRANSDUCER
TRC 192C12NF1 572E SN192 NECK FLEXION CAL12

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	37.0 %
IMPACT VELOCITY		6.89 - 7.13 M/SEC	7.03 M/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	23.99 G
	20 MS	17.60 - 22.60 G	21.48 G
	30 MS	12.50 - 18.50 G	17.23 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	17.16 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	35.75 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	67.33 DEG.
	TIME	57 - 64 MS	57.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	89.28 NM
	TIME	47 - 58 MS	47.63 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.25 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97.88 MS

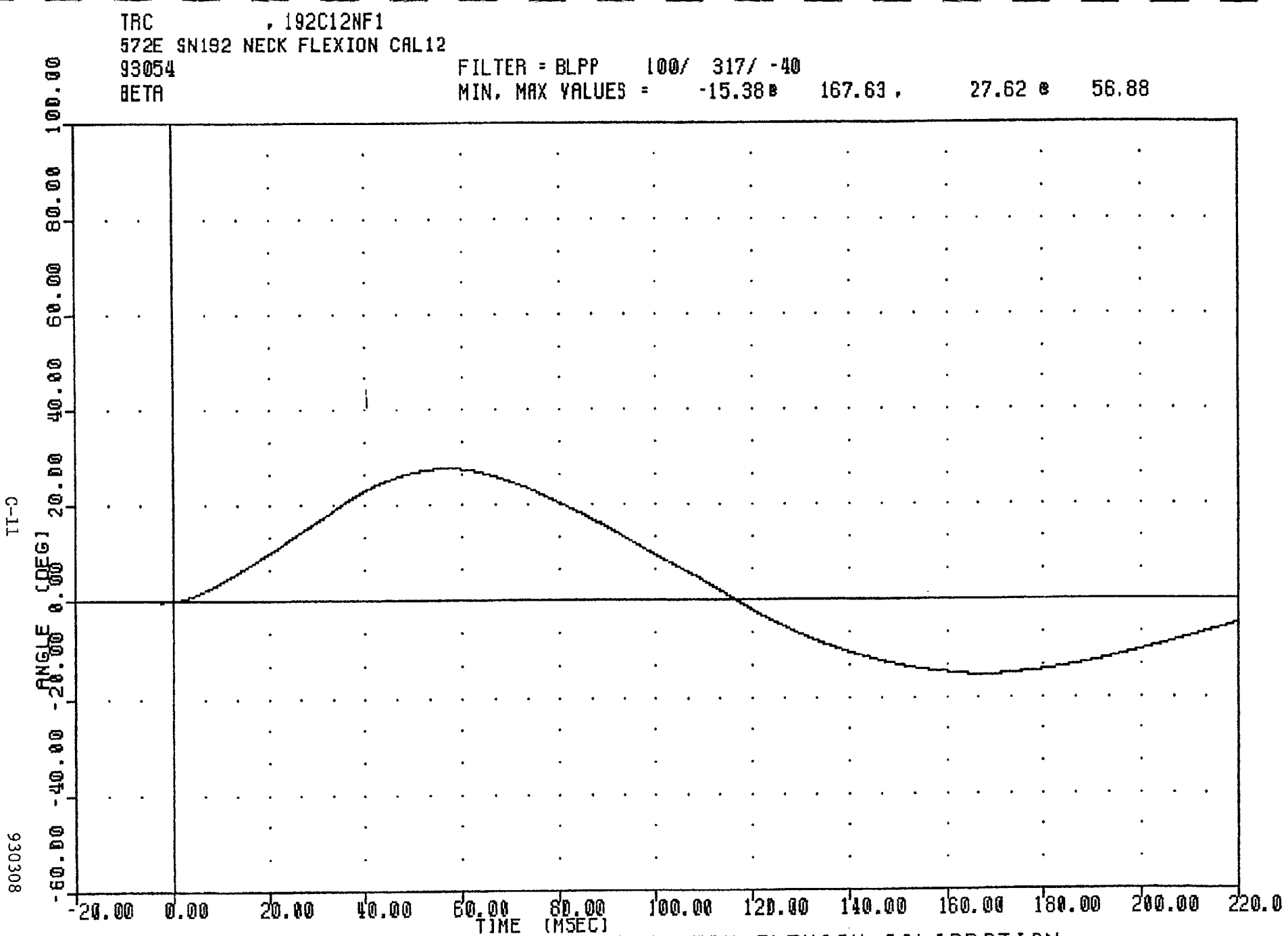
TEST MEETS SPECIFICATIONS

TECHNICIAN Peter Foster



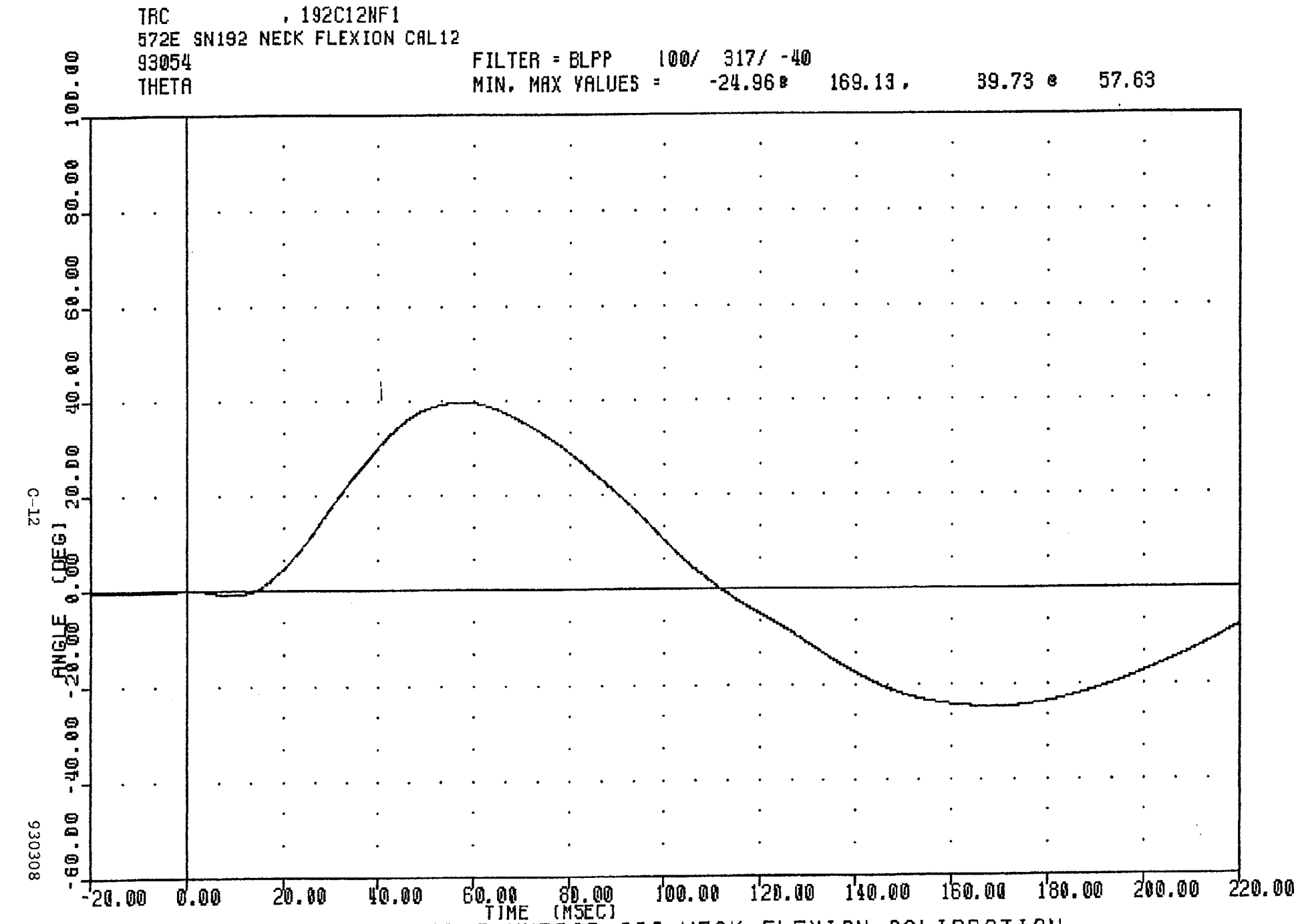
PART 572-E HYBRID III NECK FLEXION CALIBRATION

PENDULUM DECELERATION



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

930308

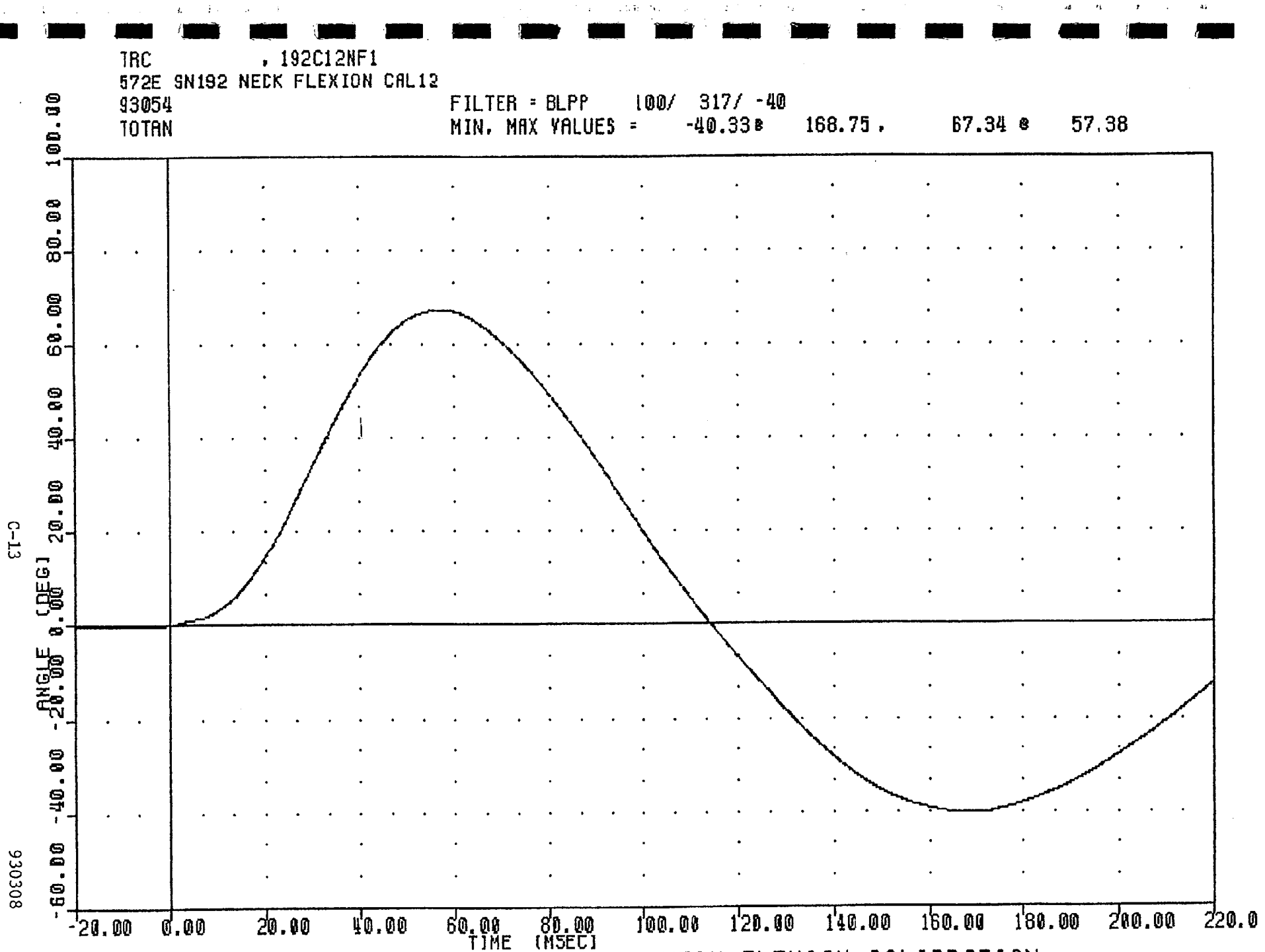


C-12

930308

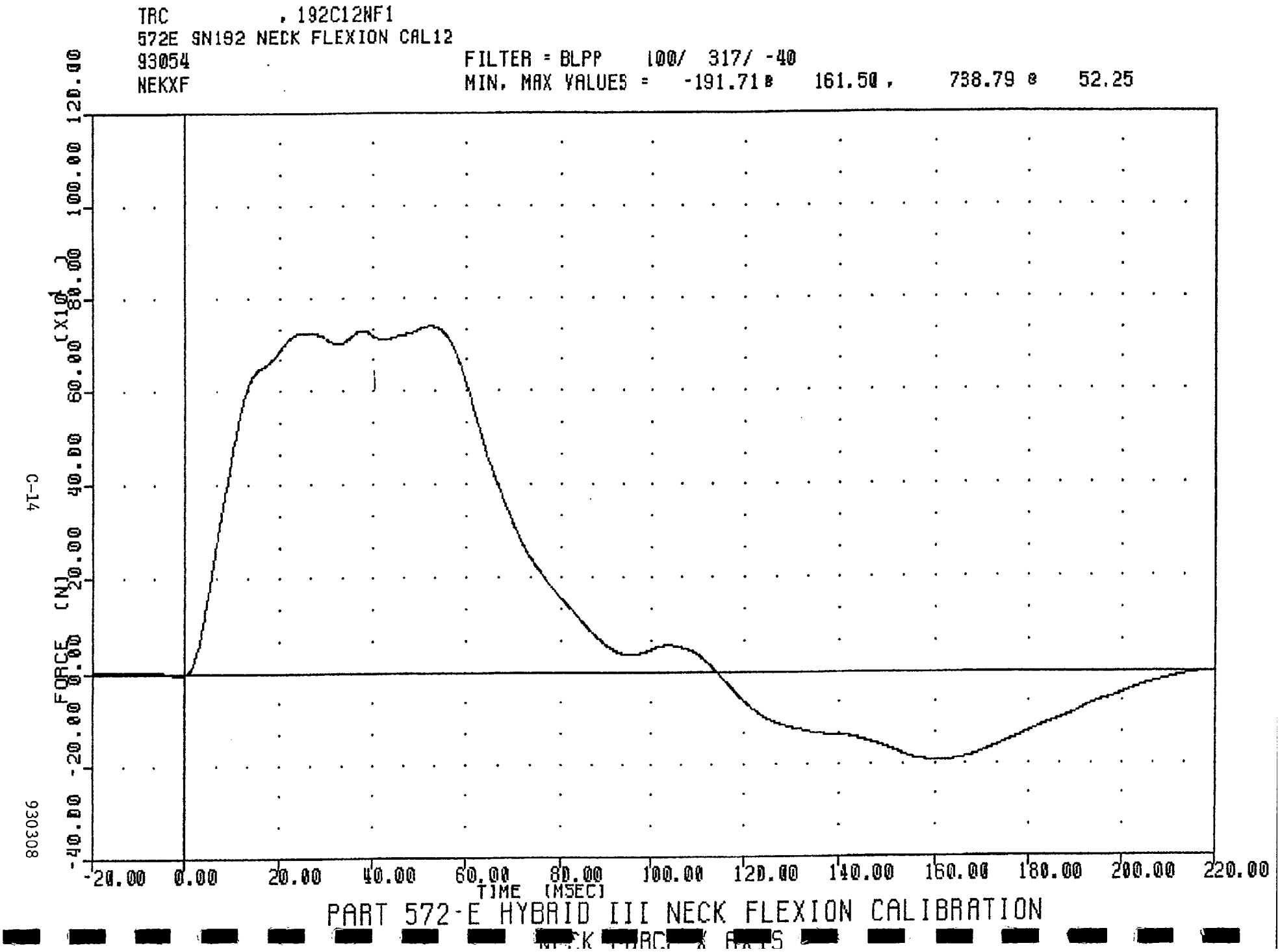
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

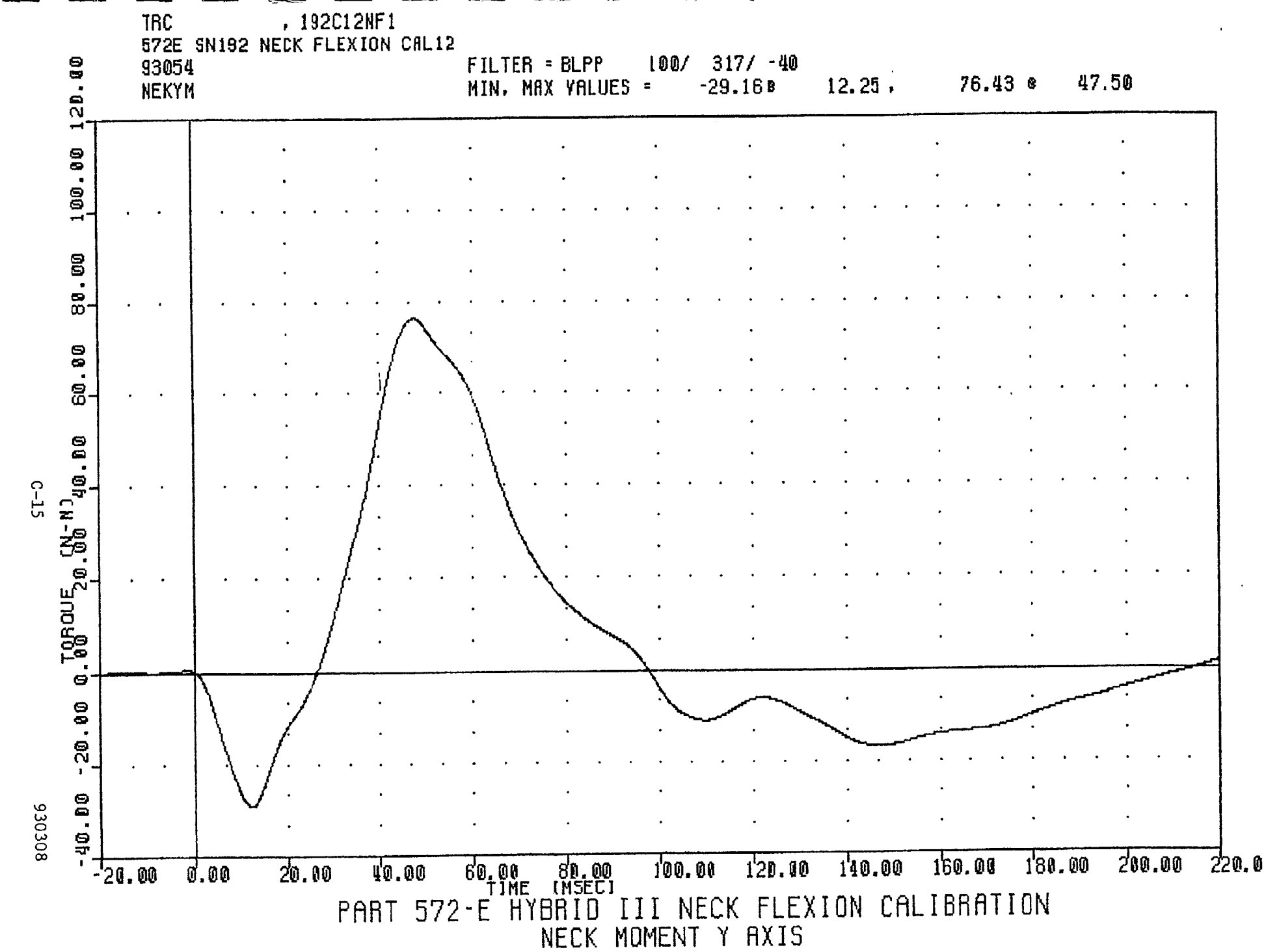


PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

930308

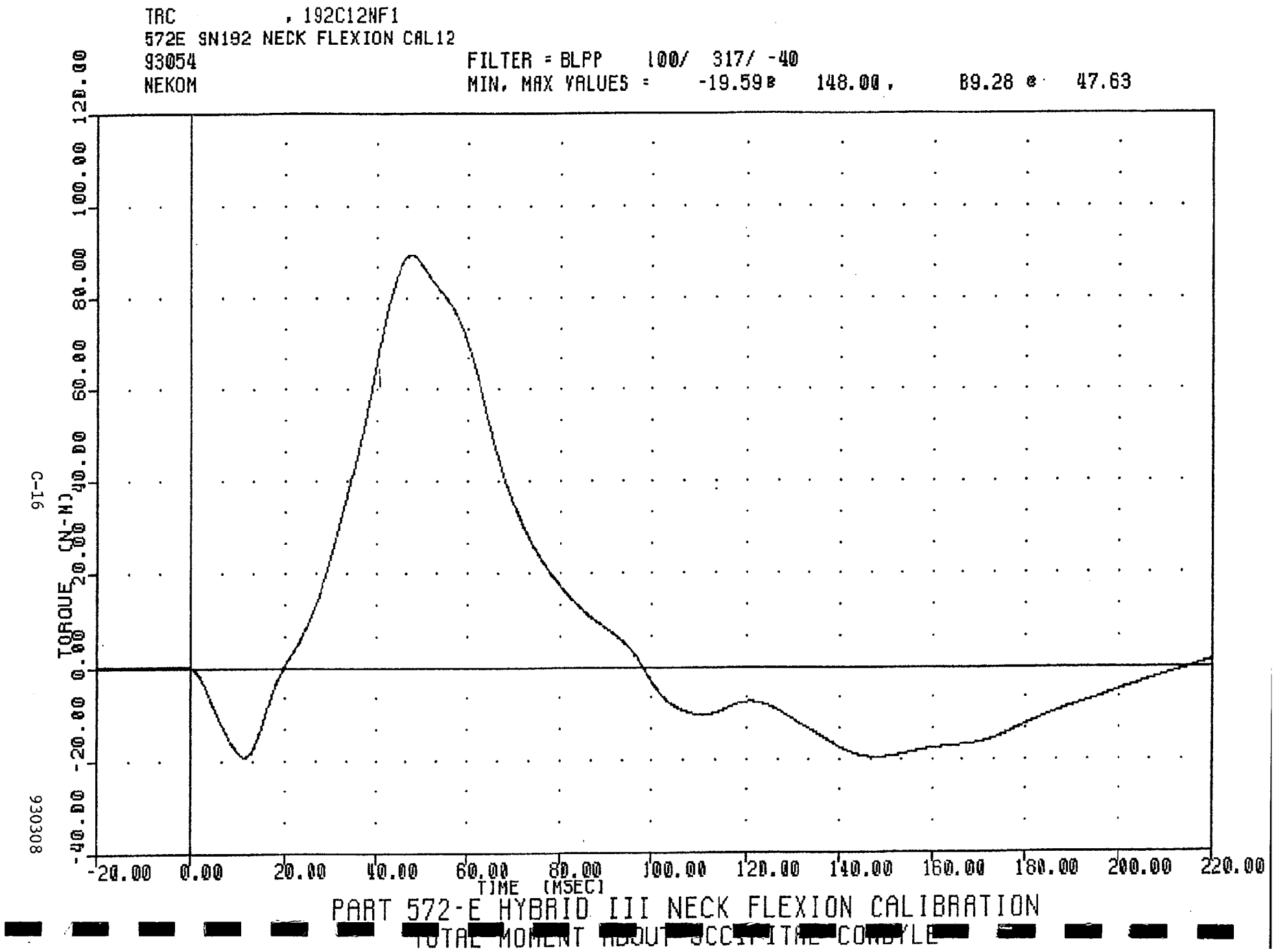


PART 572-E HYBRID III NECK FLEXION CALIBRATION



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

930308


TRC , 192C12NF1
572E SN192 NECK FLEXION CAL12
93054
NEKOM
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -19.59 @ 148.00 , 89.28 @ 47.63
TORQUE (N-M)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-20.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.00
220.00
TIME (MSEC)
PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

930308

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST

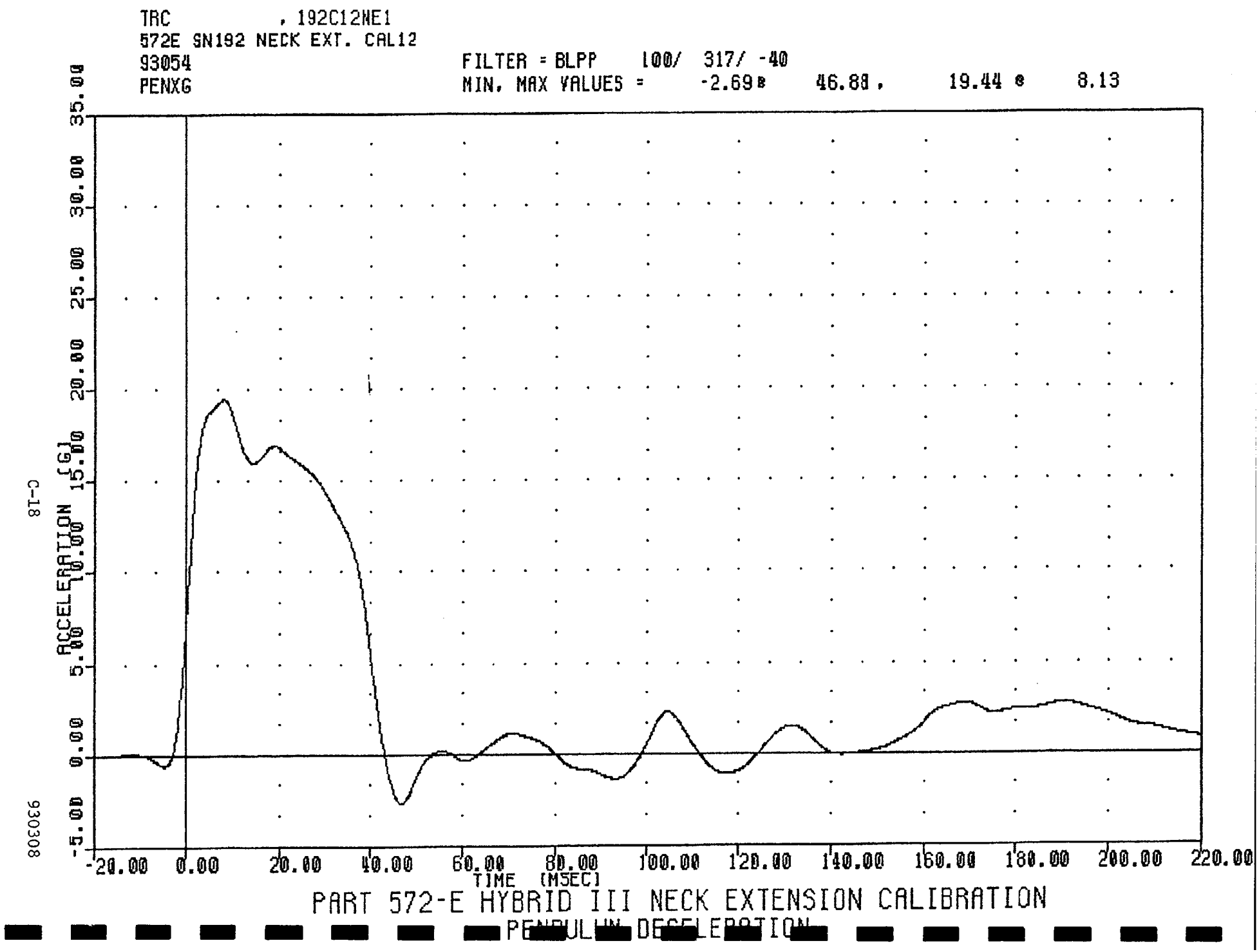
HYBRID III 23-FEB-93

6 AXIS NECK TRANSDUCER
TRC 192C12NE1 572E SN192 NECK EXT. CAL12

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	37.0 %
IMPACT VELOCITY		5.95 - 6.19 M/SEC	6.05 M/SEC
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.66 G
	20 MS	14.00 - 19.00 G	16.80 G
	30 MS	11.00 - 16.00 G	14.36 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.30 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	40.00 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	90.81 DEG.
	TIME	72 - 82 MS	75.50 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-59.10 NM
	TIME	65 - 79 MS	70.25 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	156.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	138.50 MS

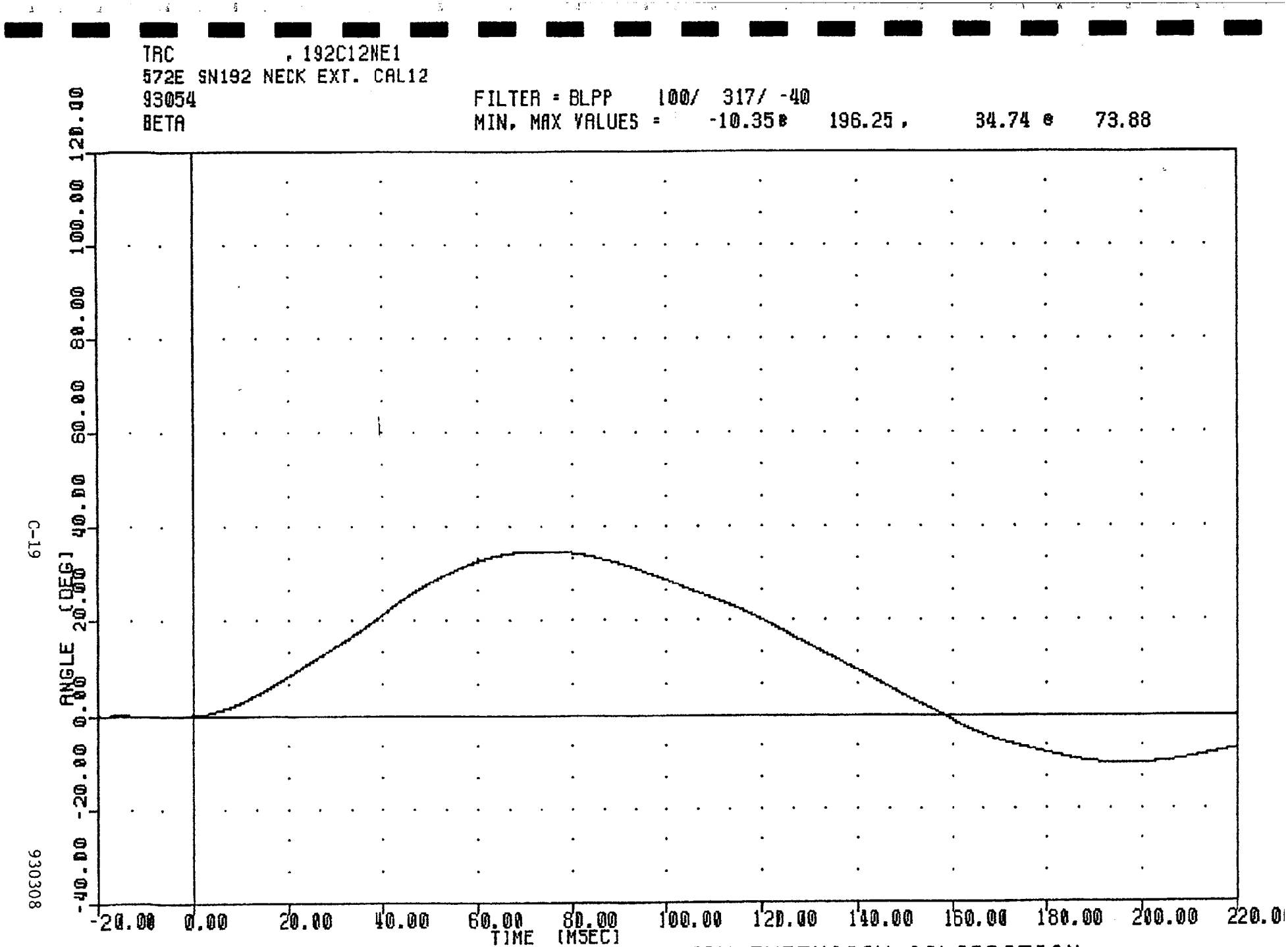
TEST MEETS SPECIFICATIONS

TECHNICIAN Peter Foster



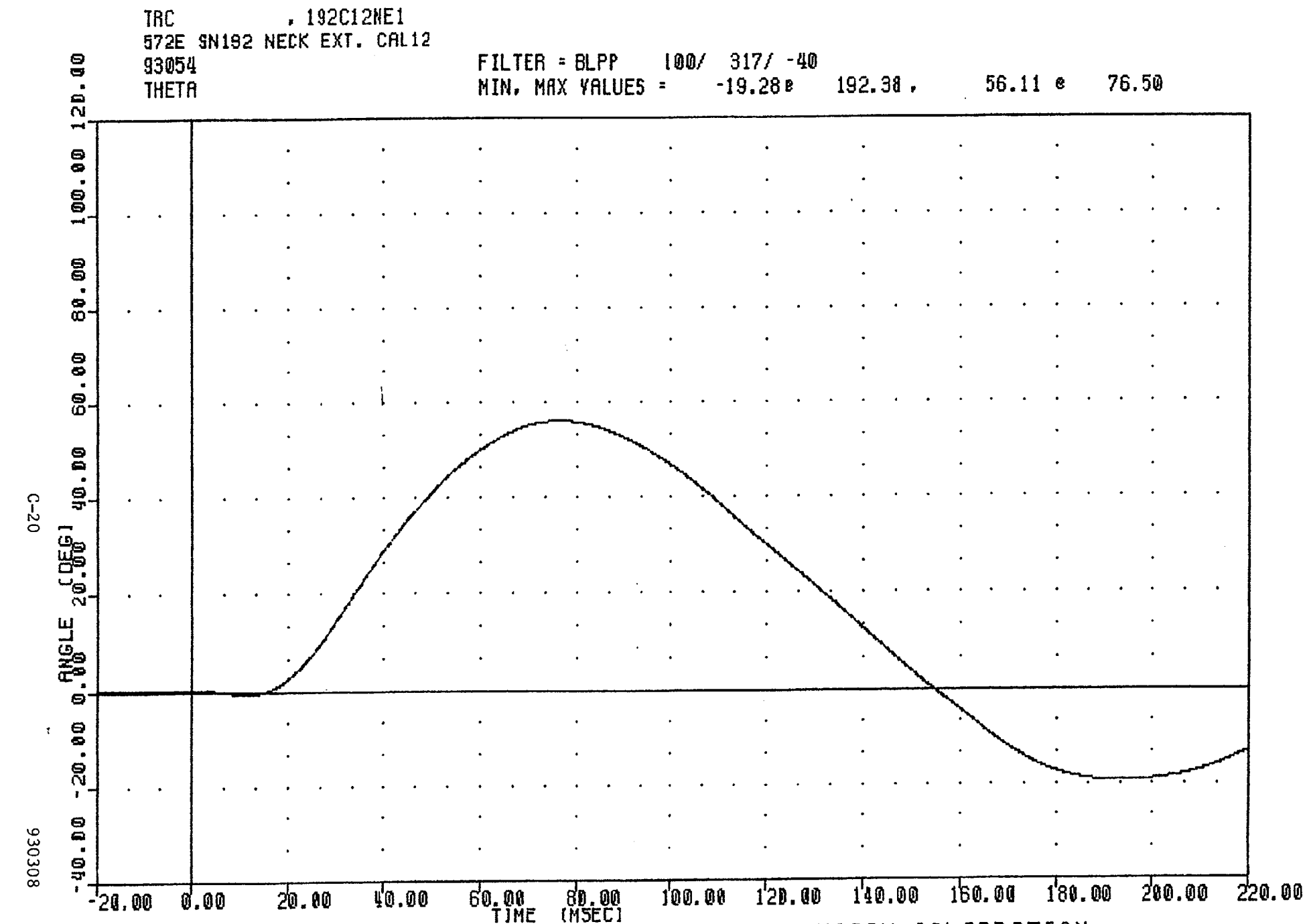
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

PENDULUM DECELERATION



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

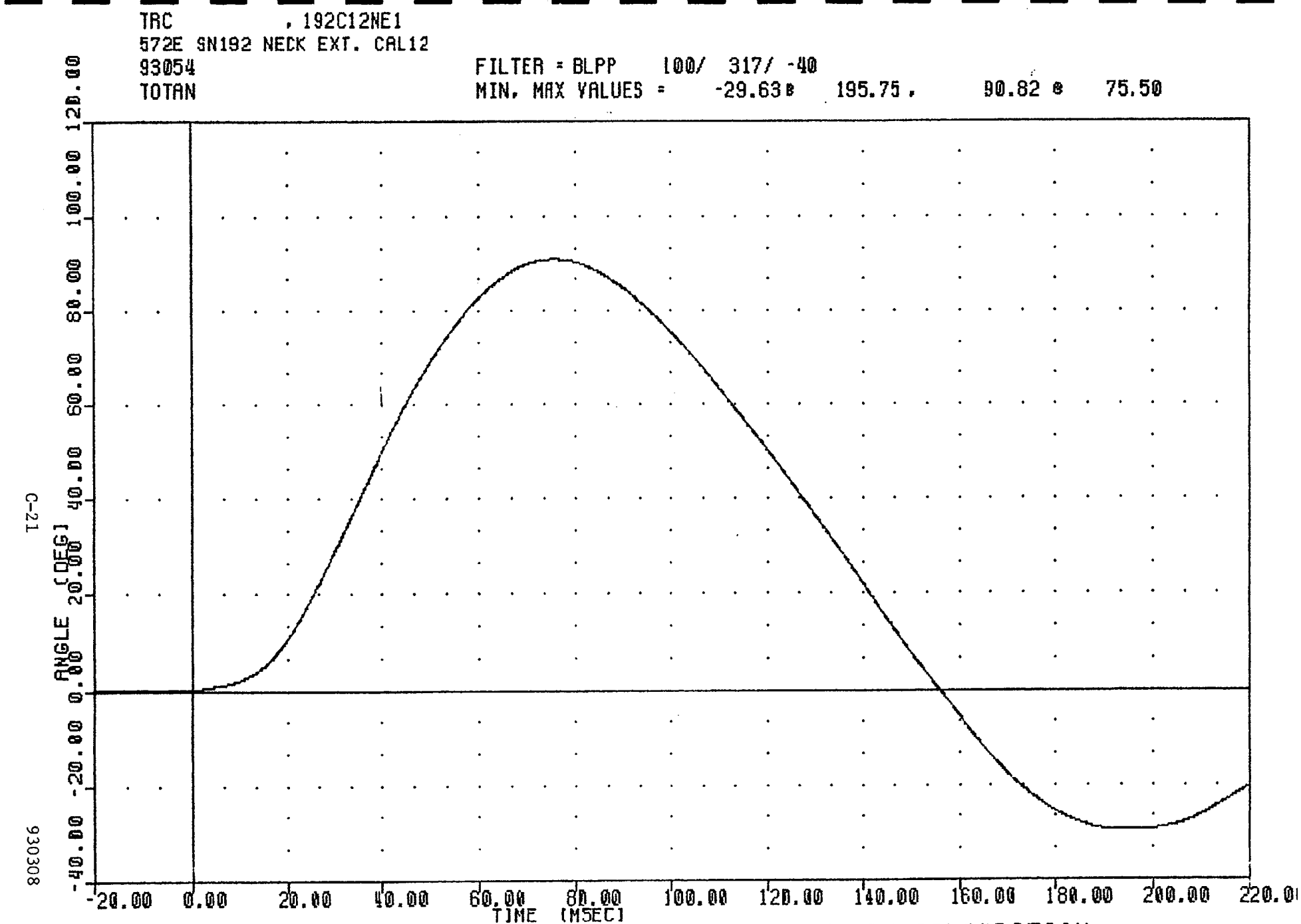
930308



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

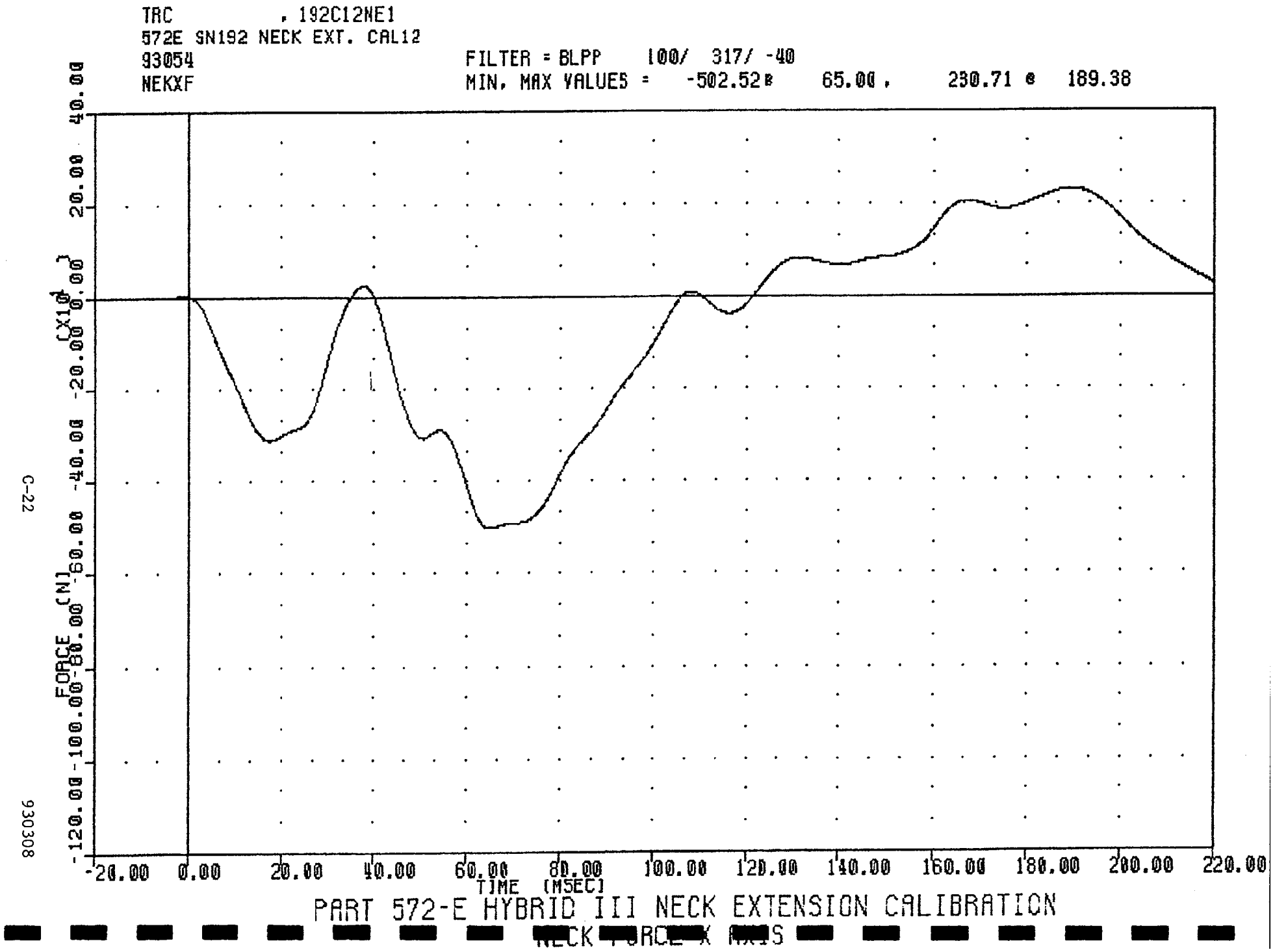
[redacted]

930308

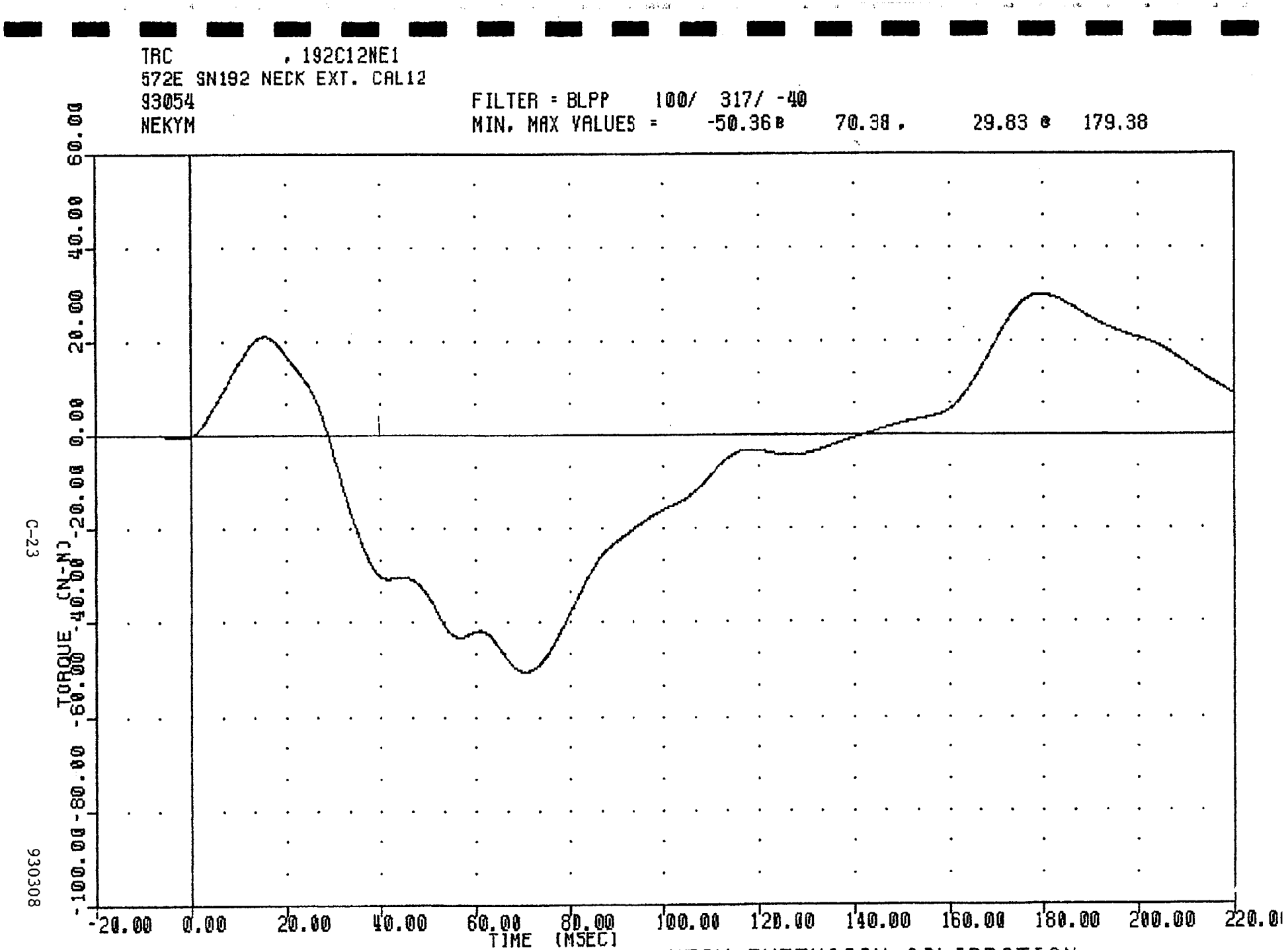


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION

930308

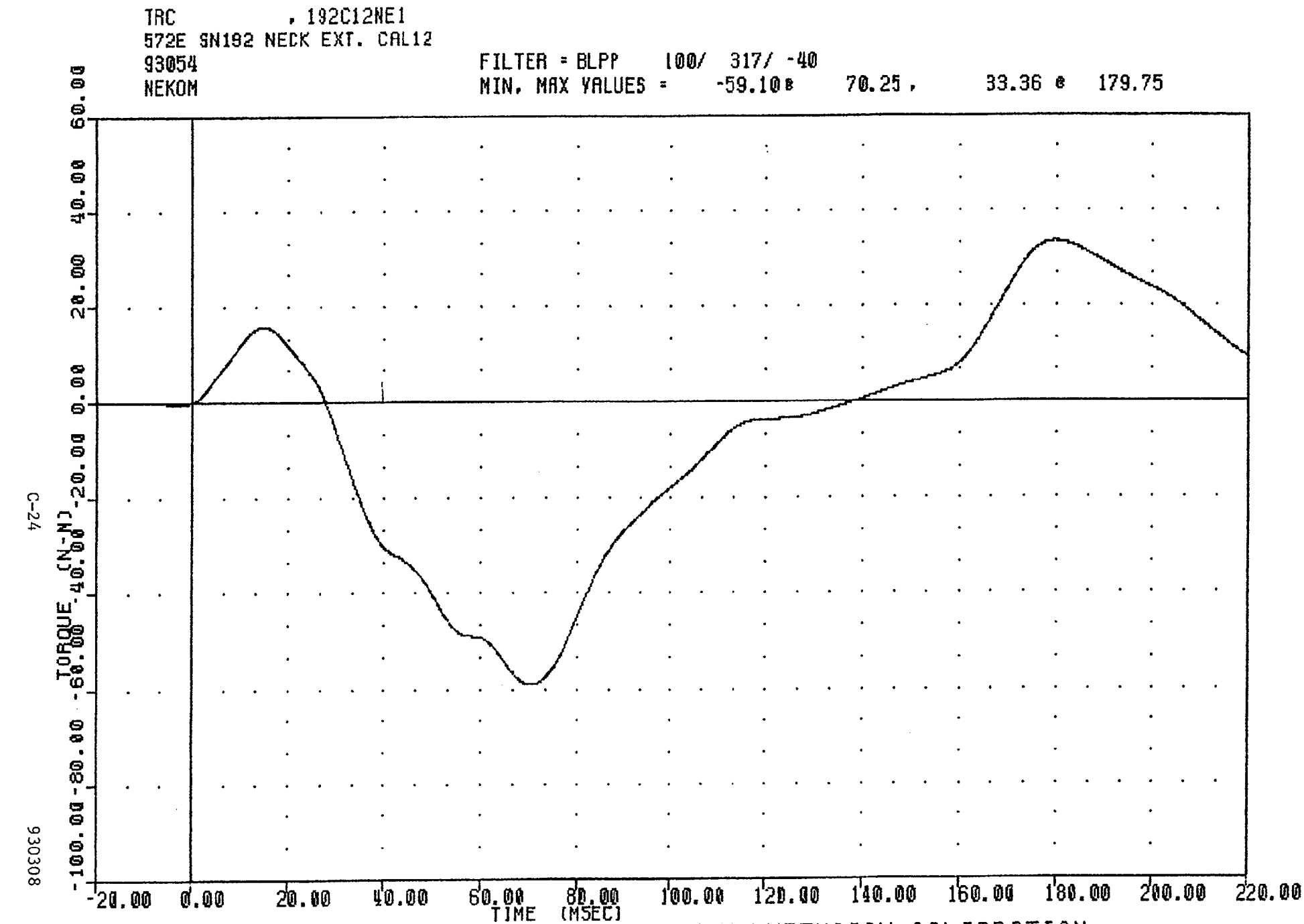

TRC , 192C12NE1
572E SN192 NECK EXT. CAL12
93054
NEKXF
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -502.52 @ 65.00 , 230.71 @ 189.38
FORCE (N) (X10^1)
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
-100.00
-120.00
-20.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.00
220.00
TIME (MSEC)
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS

930308



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

930308



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

930308

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

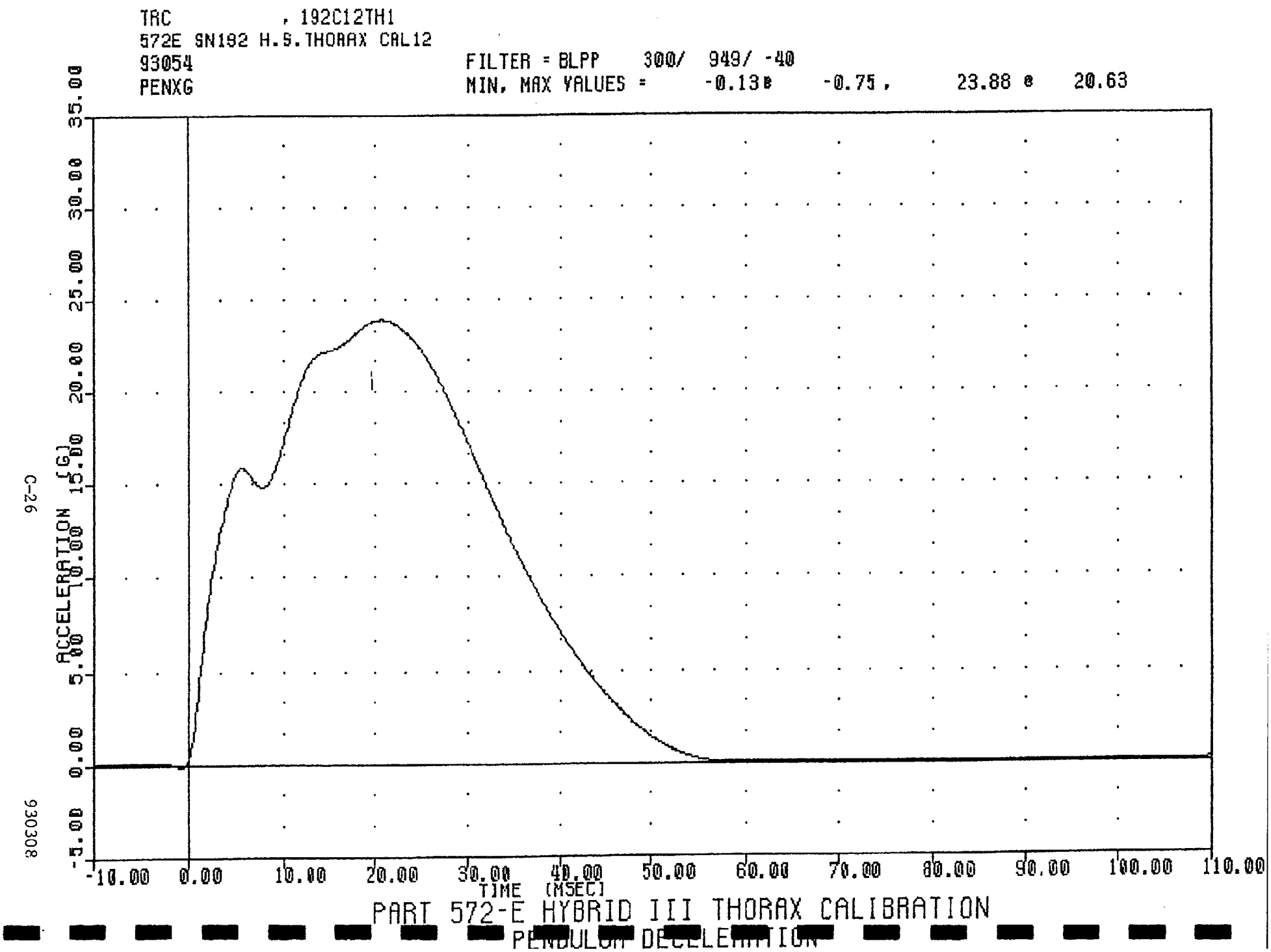
HYBRID III 23-FEB-93

TRC 192C12TH1 572E SN192 H.S.THORAX CAL12

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	47.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.63 M/SEC
MAXIMUM DEFLECTION	63.5 - 72.6 MM	70.8 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5471. N
INTERNAL HYSTERESIS	69% - 85%	72.8%

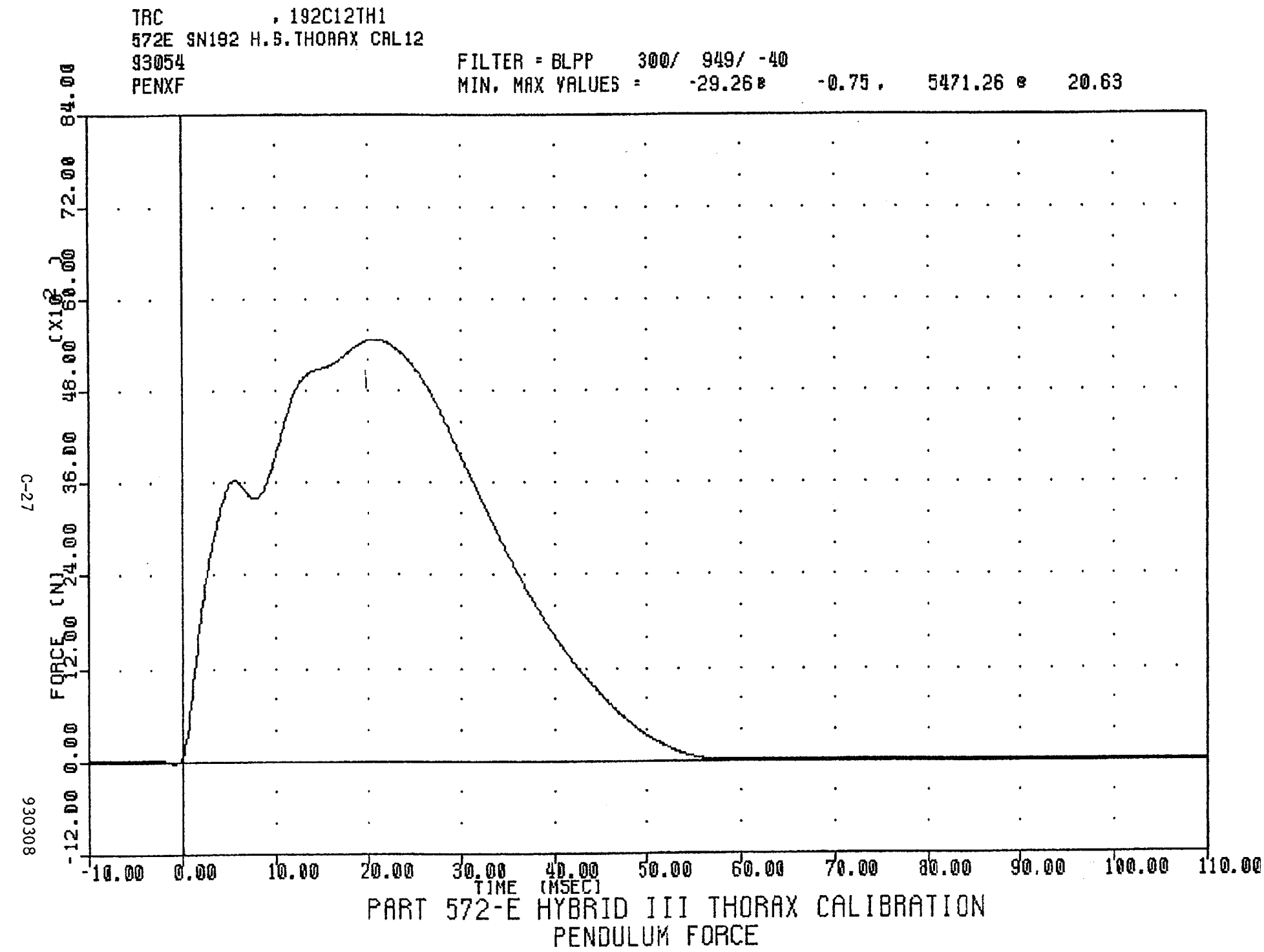
TEST MEETS SPECIFICATIONS

TECHNICIAN Rita Fonte

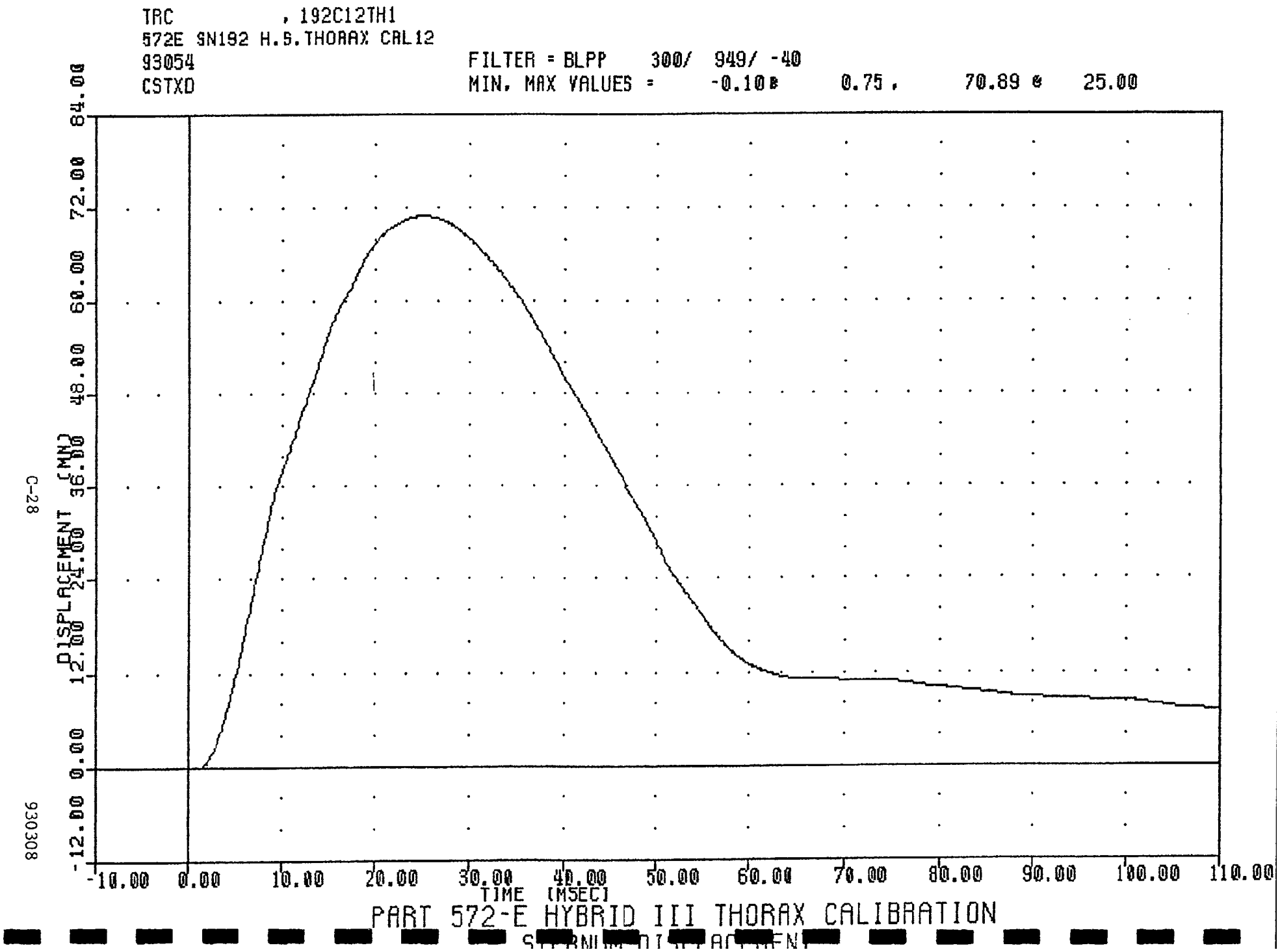


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

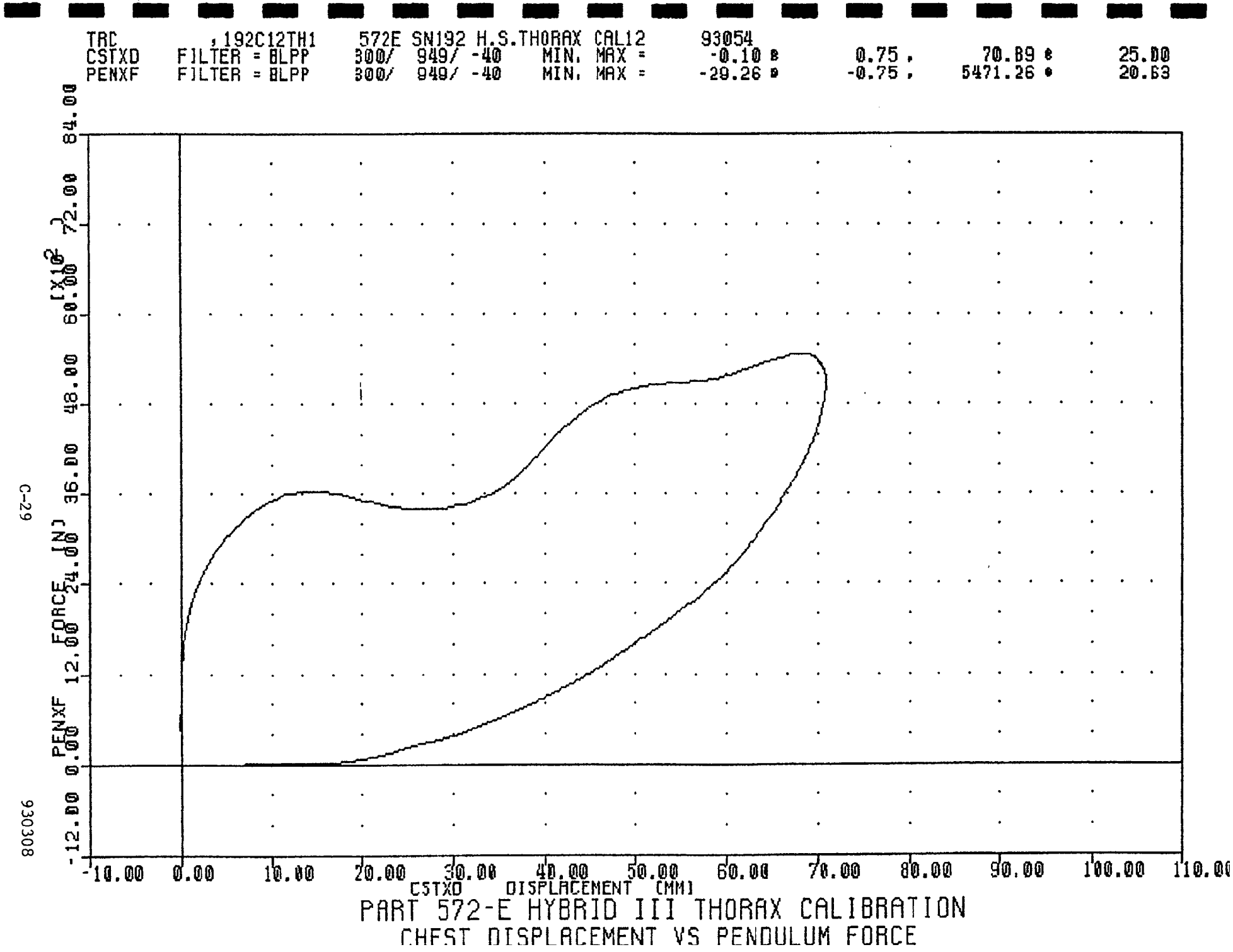
930308



PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE


TRC , 192C12TH1
572E SN192 H.S.THORAX CAL12
93054
CSTXD
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = -0.10 @ 0.75 , 70.89 @ 25.00
DISPLACEMENT (MM)
84.00
72.00
60.00
48.00
36.00
24.00
12.00
0.00
-12.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
TIME (MSEC)
PART 572-E HYBRID III THORAX CALIBRATION

930308


TRC ,192C12TH1 572E SN192 H.S.THORAX CAL12 93054
CSTXD FILTER = BLPP 300/ 949/ -40 MIN, MAX = -0.10 @ 0.75 , 70.89 @ 25.00
PENXF FILTER = BLPP 300/ 949/ -40 MIN, MAX = -29.26 @ -0.75 , 5471.26 @ 20.63
84.00
72.00
60.00
48.00
36.00
24.00
12.00
0.00
-12.00
[X10^2]
PENXF FORCE [N]
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
CSTXD DISPLACEMENT [MM]
PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE
C-29
930308

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

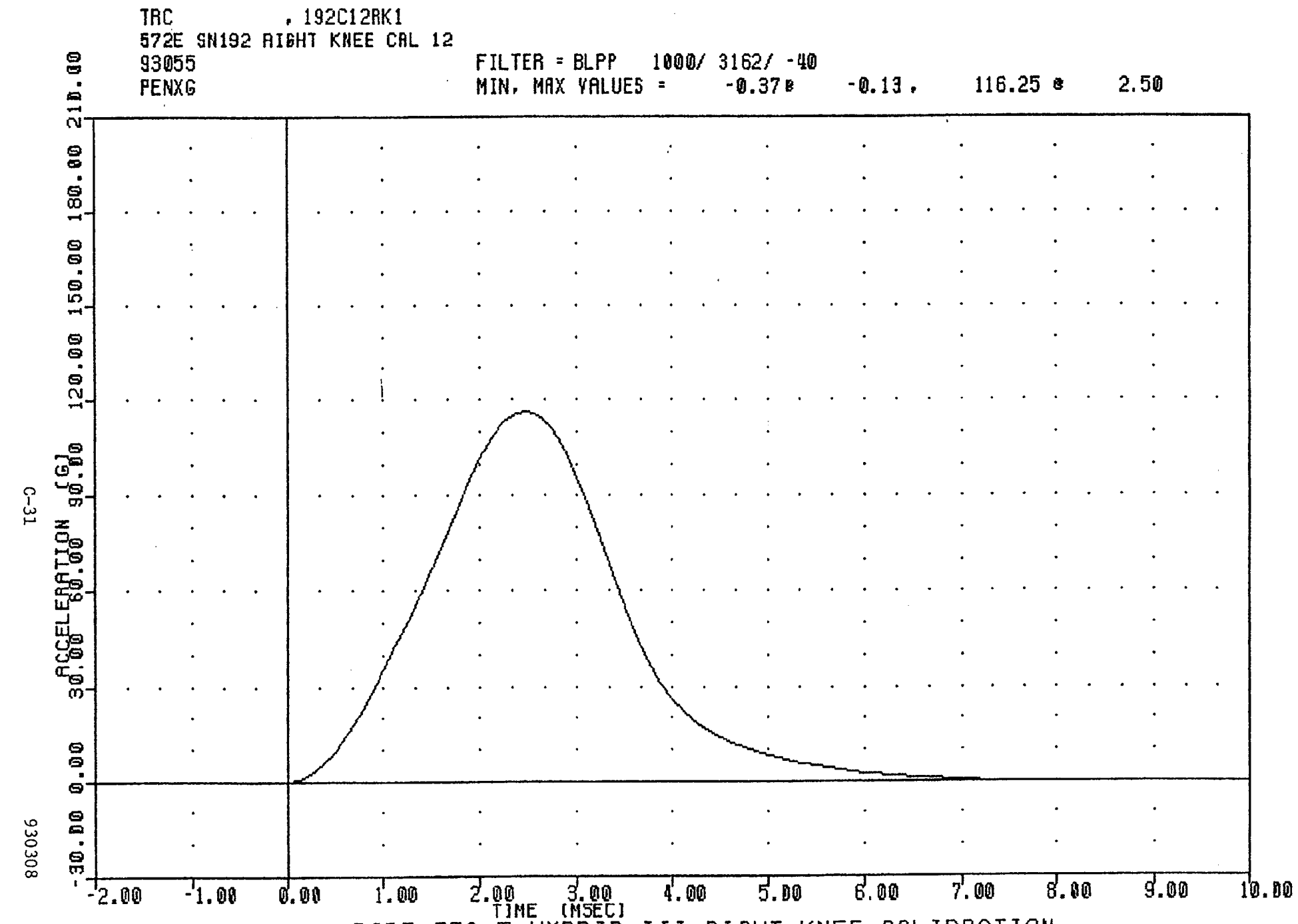
HYBRID III 24-FEB-93

RIGHT KNEE
TRC 192C12RK1 572E SN192 RIGHT KNEE CAL 12

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	30.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714 - 5783 N	5687.6 N
PROBE WEIGHT	5.0 KG	

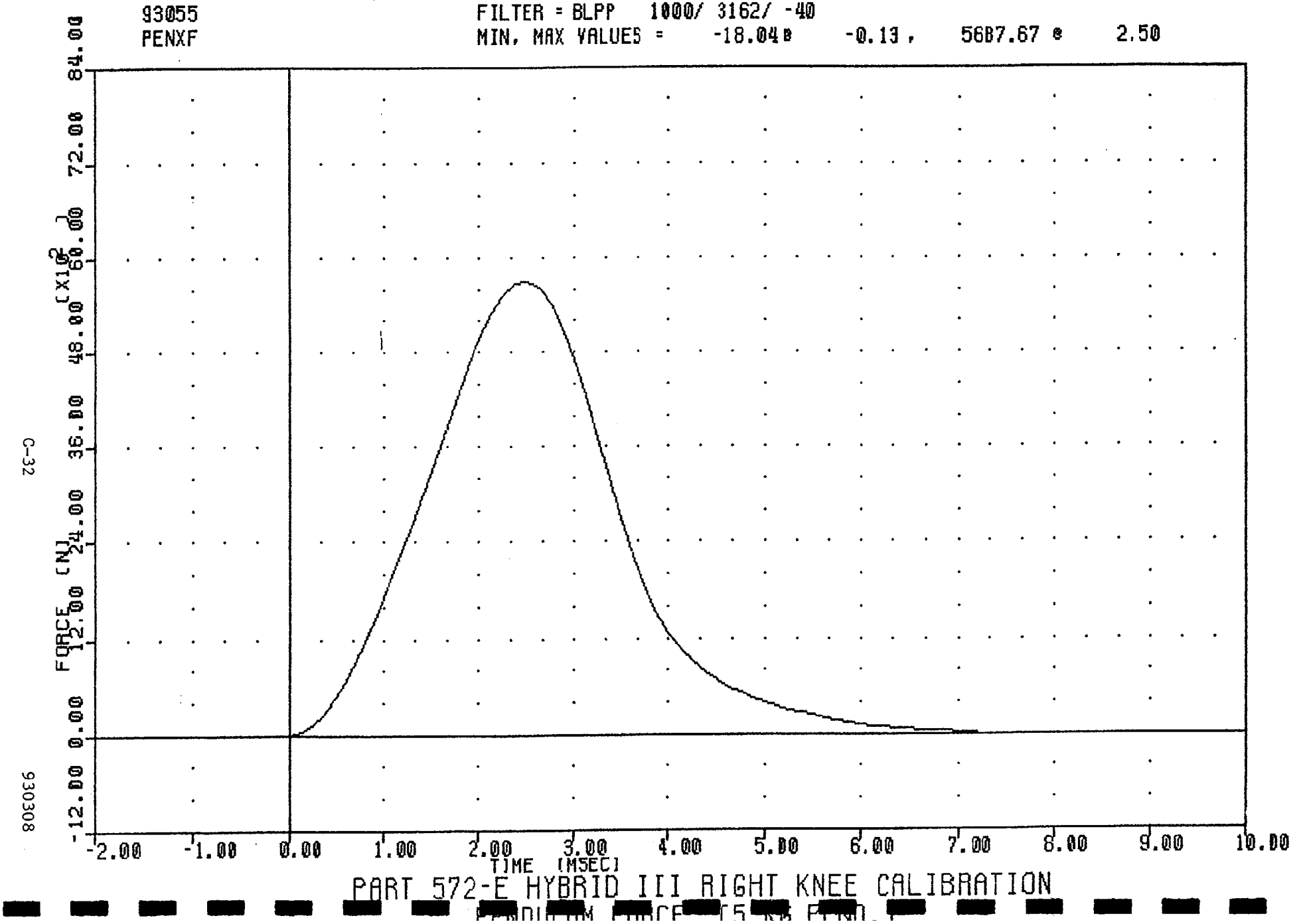
TEST MEETS SPECIFICATIONS

TECHNICIAN



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

930308


TRC , 192C12RK1
572E SN192 RIGHT KNEE CAL 12
93055
PENXF
FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -18.04 @ -0.13 , 5687.67 @ 2.50
FORCE [N]
[X10^2]
84.00
72.00
60.00
48.00
36.00
24.00
12.00
0.00
-12.00
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
TIME [MSEC]
PART 572-E HYBRID III RIGHT KNEE CALIBRATION

930308

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

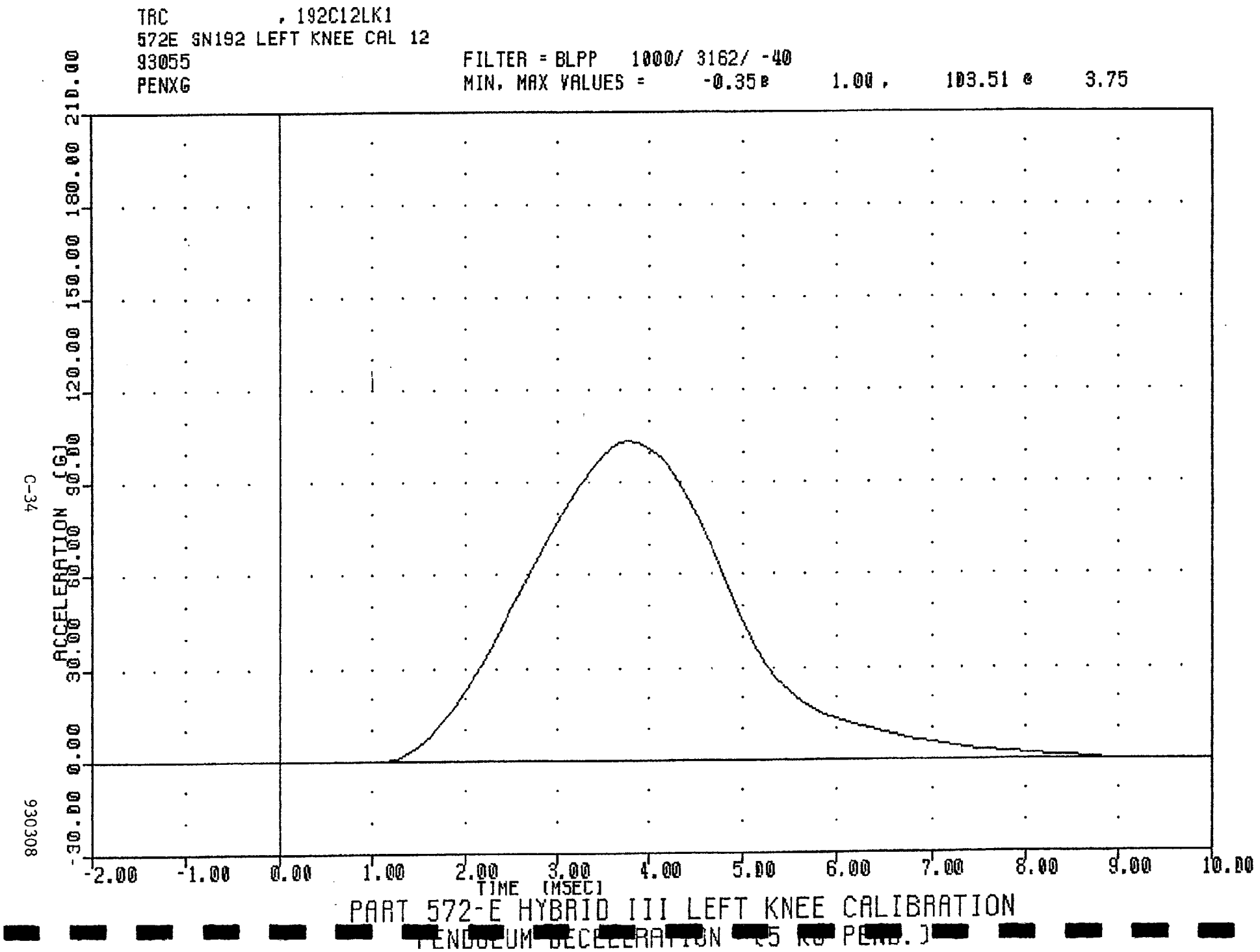
HYBRID III 24-FEB-93

LEFT KNEE
TRC 192C12LK1 572E SN192 LEFT KNEE CAL 12

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	30.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714 - 5783 N	5064.5 N
PROBE WEIGHT	5.0 KG	

TEST MEETS SPECIFICATIONS

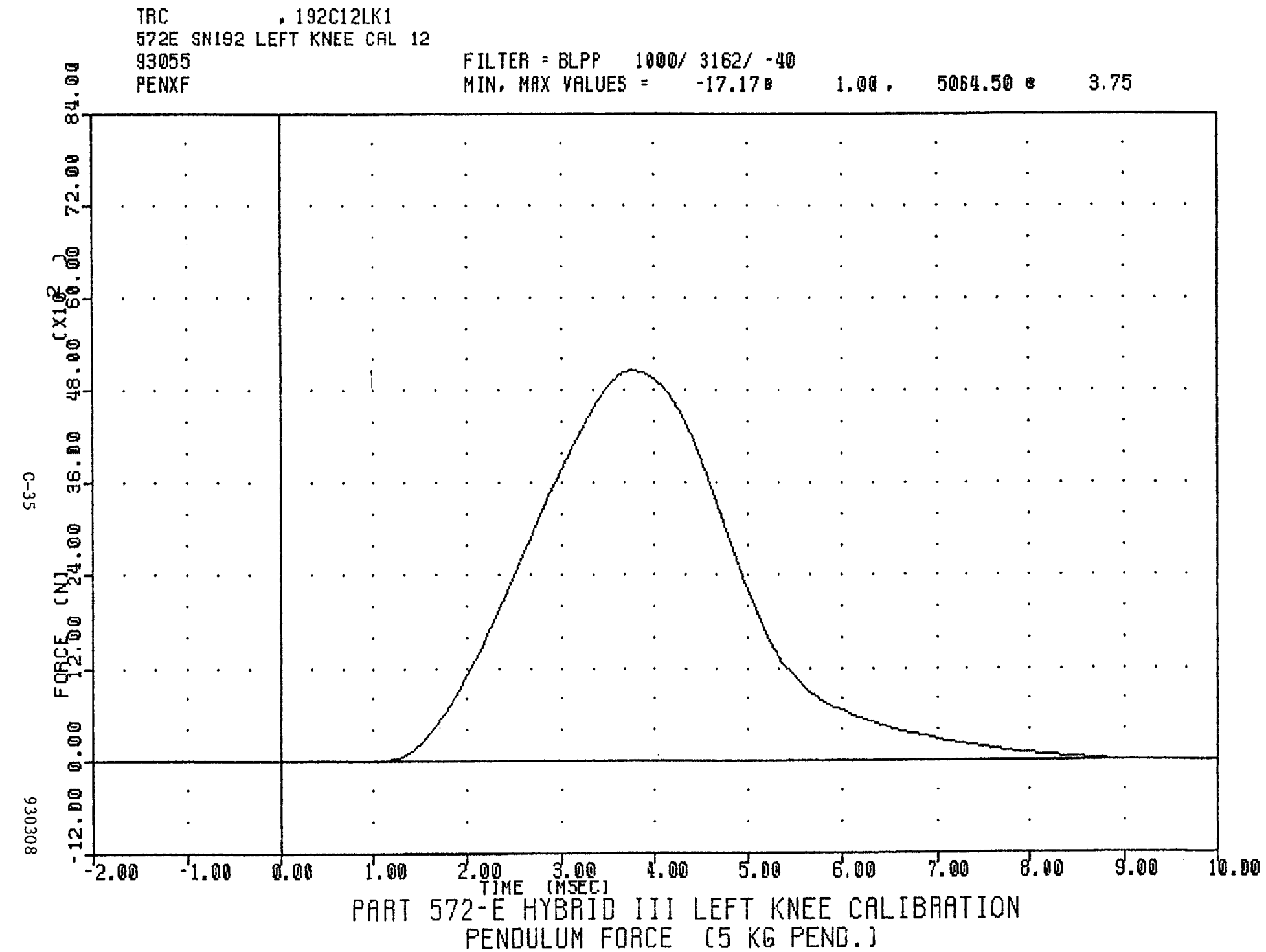
TECHNICIAN Peter Foster



PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

930308



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

930308

PRE-TEST CERTIFICATION DATA

PASSENGER DUMMY S/N: 142

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
HUMANOID 142

23-FEB-93

TRC 142C14ED1 572E SN142 EXT. DIMENSION CAL14

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE	(AA)	429- 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE	(BB)	226- 231 MM	229. MM
CHEST CIRCUMFERENCE	(Y)	970-1001 MM	983. MM
WAIST CIRCUMFERENCE	(Z)	836- 866 MM	846. MM
CHEST DEPTH	(D)	213- 229 MM	218. MM
H-POINT HEIGHT	(C)	84- 89 MM	86. MM
H-POINT FROM SEATBACK	(D)	135- 140 MM	137. MM
SKULL CAP TO BACKLINE	(H)	41- 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879- 889 MM	886. MM
THIGH CLEARANCE	(F)	140- 155 MM	145. MM
BUTTOCK KNEE LENGTH	(K)	579- 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH	(N)	452- 478 MM	475. MM
POPLITEAL HEIGHT	(L)	429- 455 MM	452. MM
KNEE PIVOT HEIGHT	(M)	485- 500 MM	490. MM
FOOT LENGTH	(P)	252- 267 MM	257. MM
FOOT BREADTH	(W)	91- 107 MM	97. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84- 94 MM	86. MM
SHOULDER BREADTH	(V)	422- 437 MM	427. MM
SHOULDER PIVOT HEIGHT	(B)	506- 521 MM	511. MM
ELBOW REST HEIGHT	(J)	191- 211 MM	211. MM
SHOULDER-ELBOW LENGTH	(I)	330- 345 MM	345. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290- 305 MM	292. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Foust

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

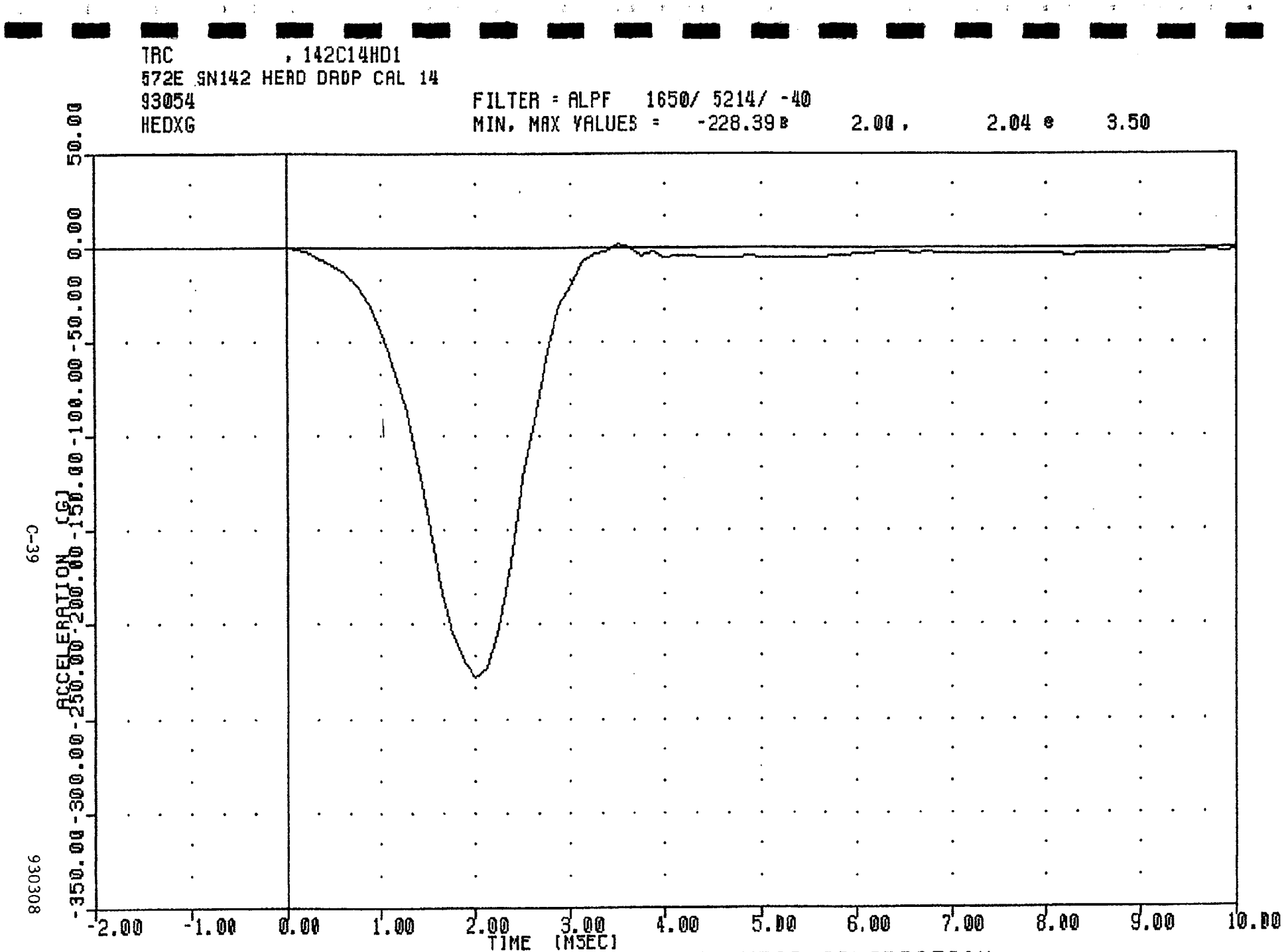
HYBRID III 23-FEB-93

TRC 142C14HD1 572E SN142 HEAD DROP CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	47.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	265.09 G
PEAK LATERAL ACCELERATION	15 G MAX	2.36 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

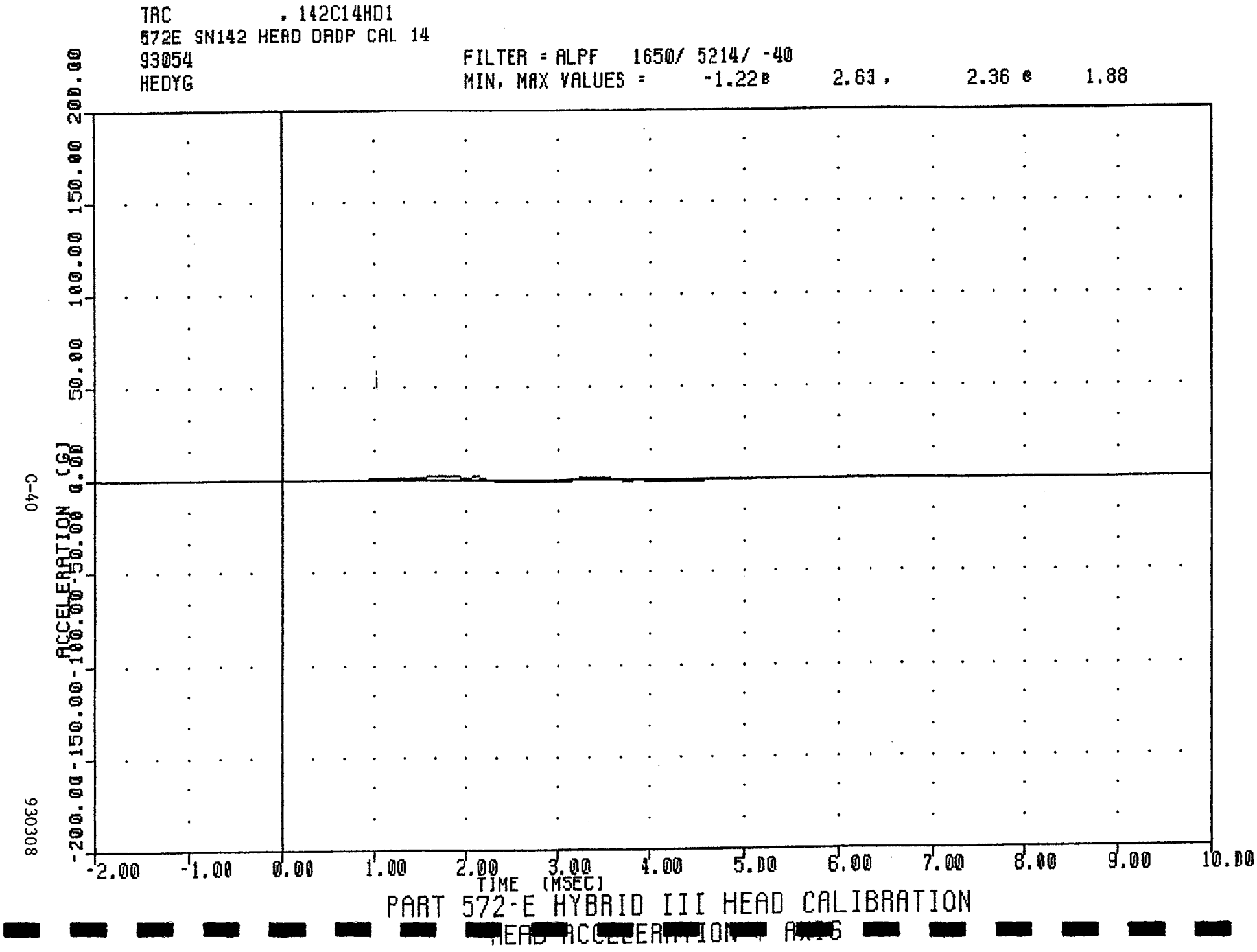
TEST MEETS SPECIFICATIONS

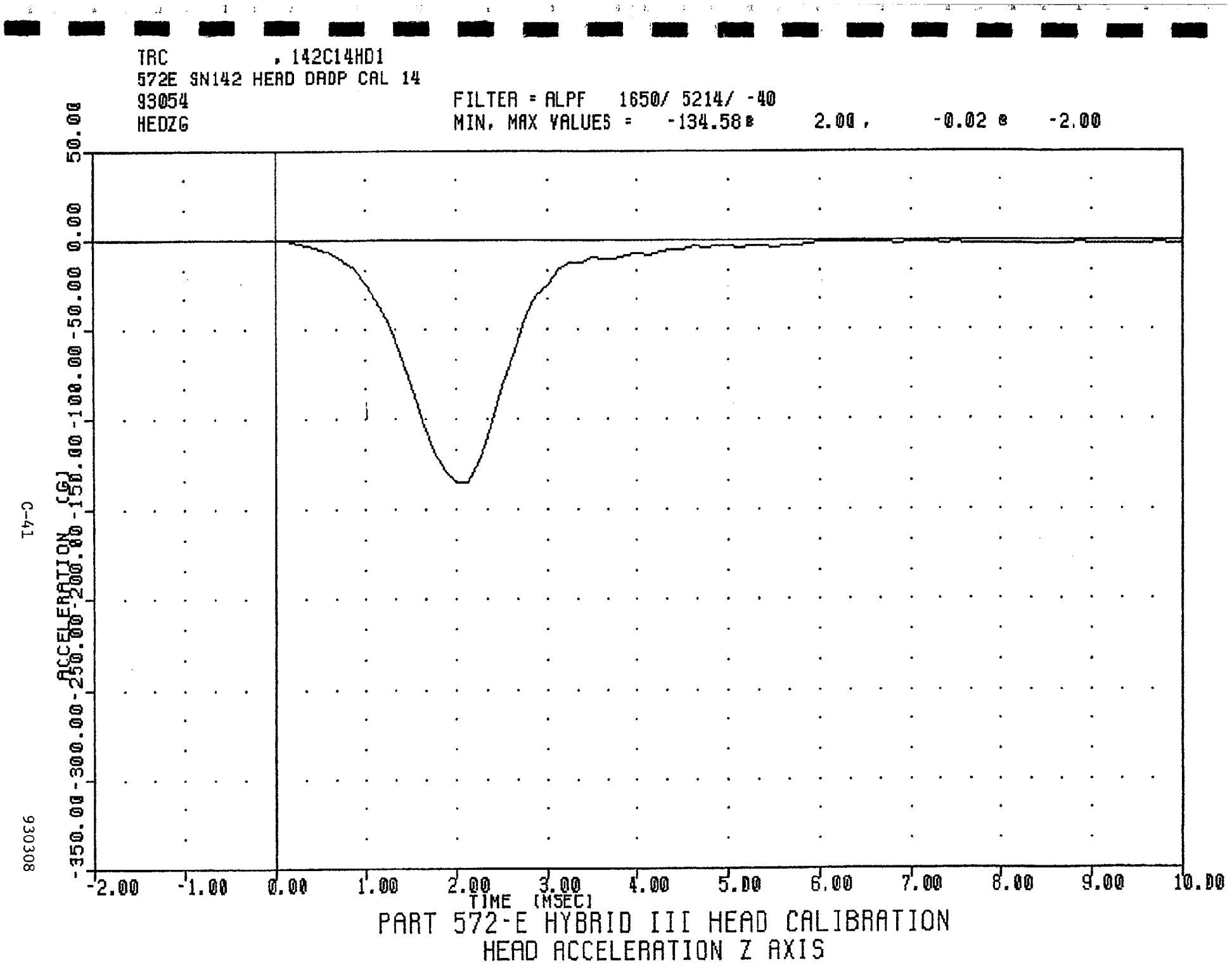
TECHNICIAN_____



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

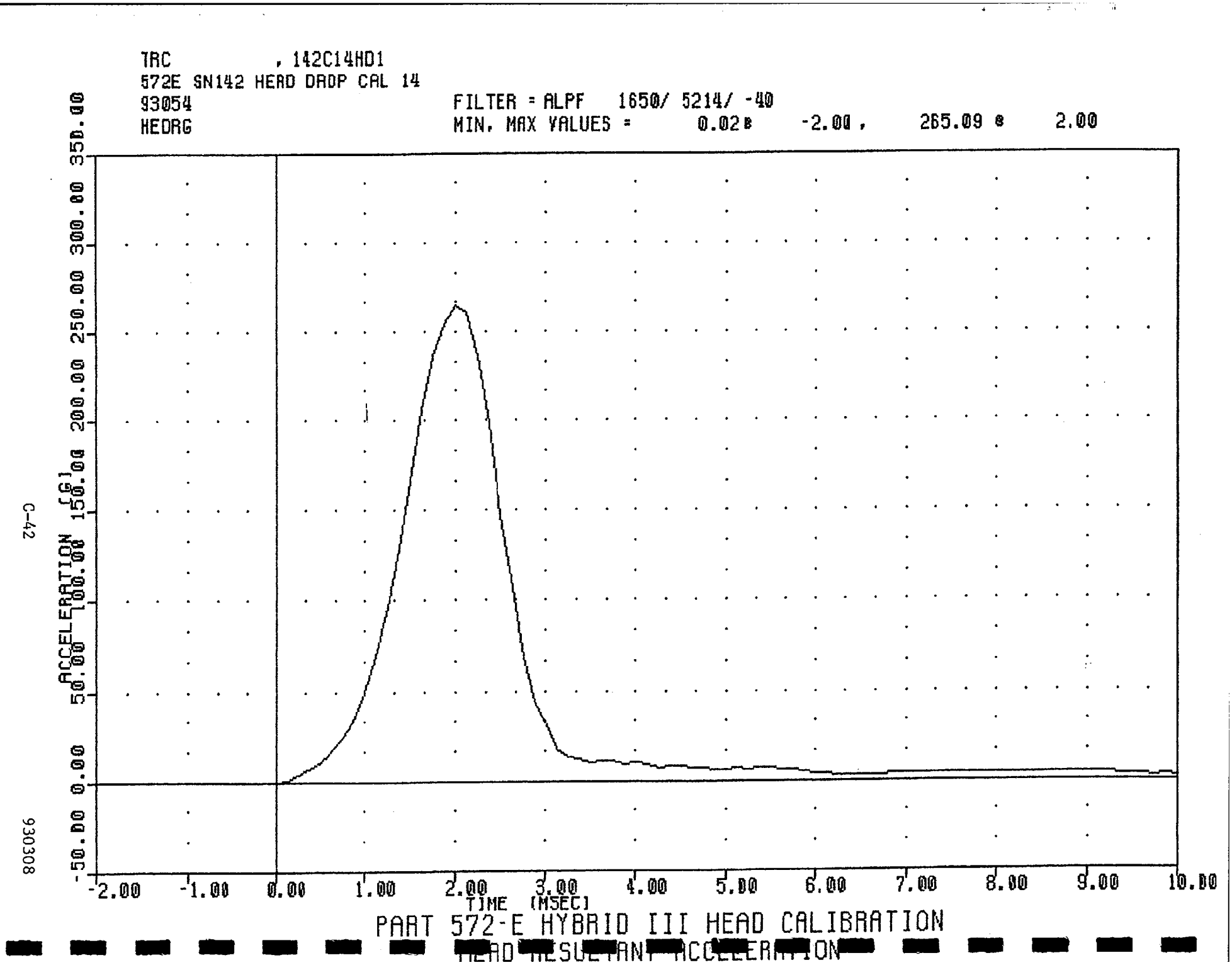
930308


TRC , 142C14HD1
572E SN142 HEAD DROP CAL 14
93054
HEDYG
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -1.22 B 2.63 , 2.36 @ 1.88
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
ACCELERATION (G)
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
TIME (MSEC)
PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION - AXIS



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

930308


TRC , 142C14HD1
572E SN142 HERD DROP CAL 14
93054
HEDRG
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.02 @ -2.00 , 265.09 @ 2.00
ACCELERATION (G)
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
TIME (MSEC)
PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST

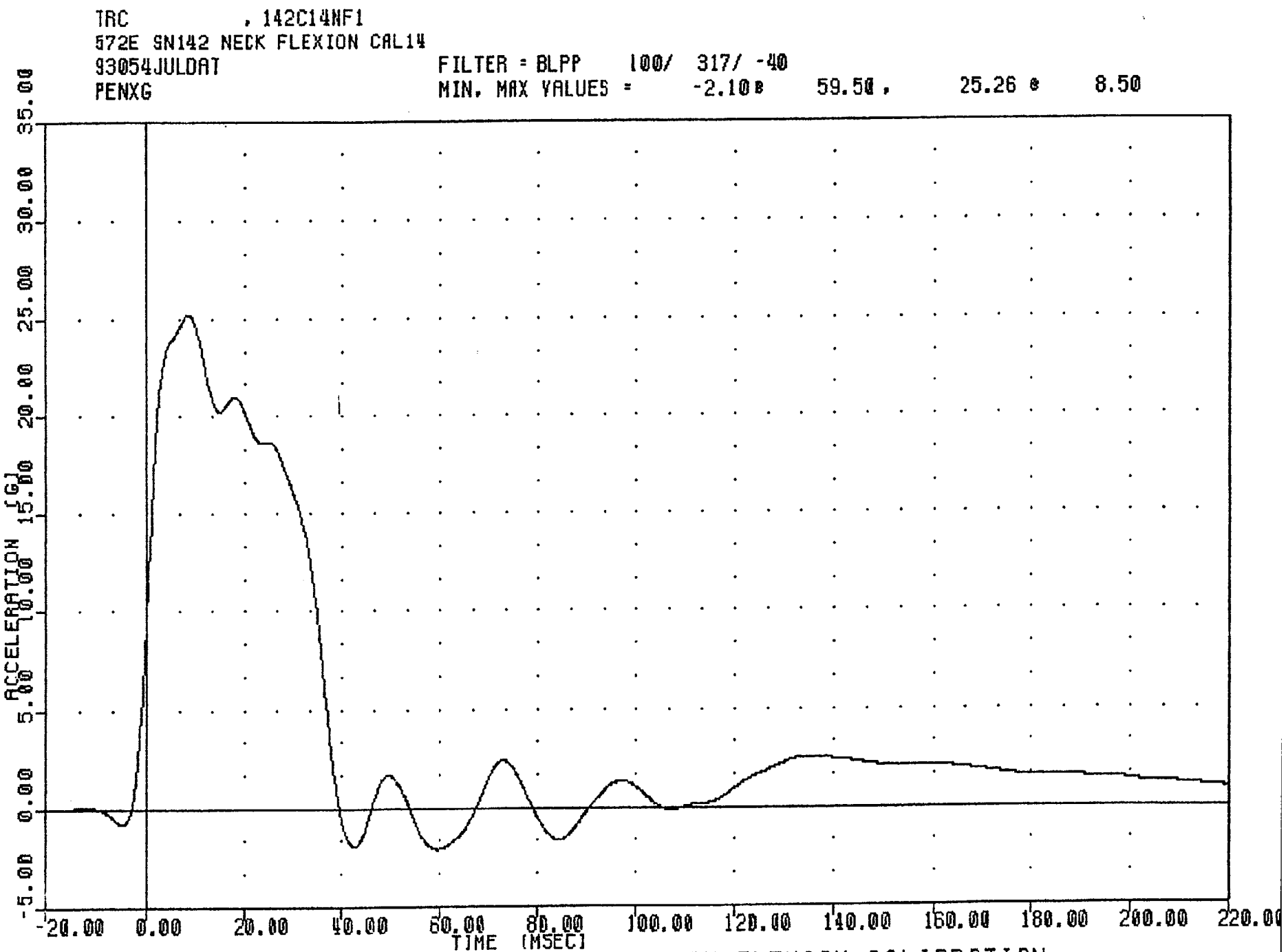
HYBRID III 23-FEB-93

6 AXIS NECK TRANSDUCER
TRC 142C14NF1 572E SN142 NECK FLEXION CAL14

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	46.0 %
IMPACT VELOCITY		6.89 - 7.13 M/SEC	7.03 M/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	24.62 G
	20 MS	17.60 - 22.60 G	20.19 G
	30 MS	12.50 - 18.50 G	16.11 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	16.03 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	36.75 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	74.09 DEG.
	TIME	57 - 64 MS	59.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	97.12 NM
	TIME	47 - 58 MS	51.50 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	115.88 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	100.88 MS

TEST MEETS SPECIFICATIONS

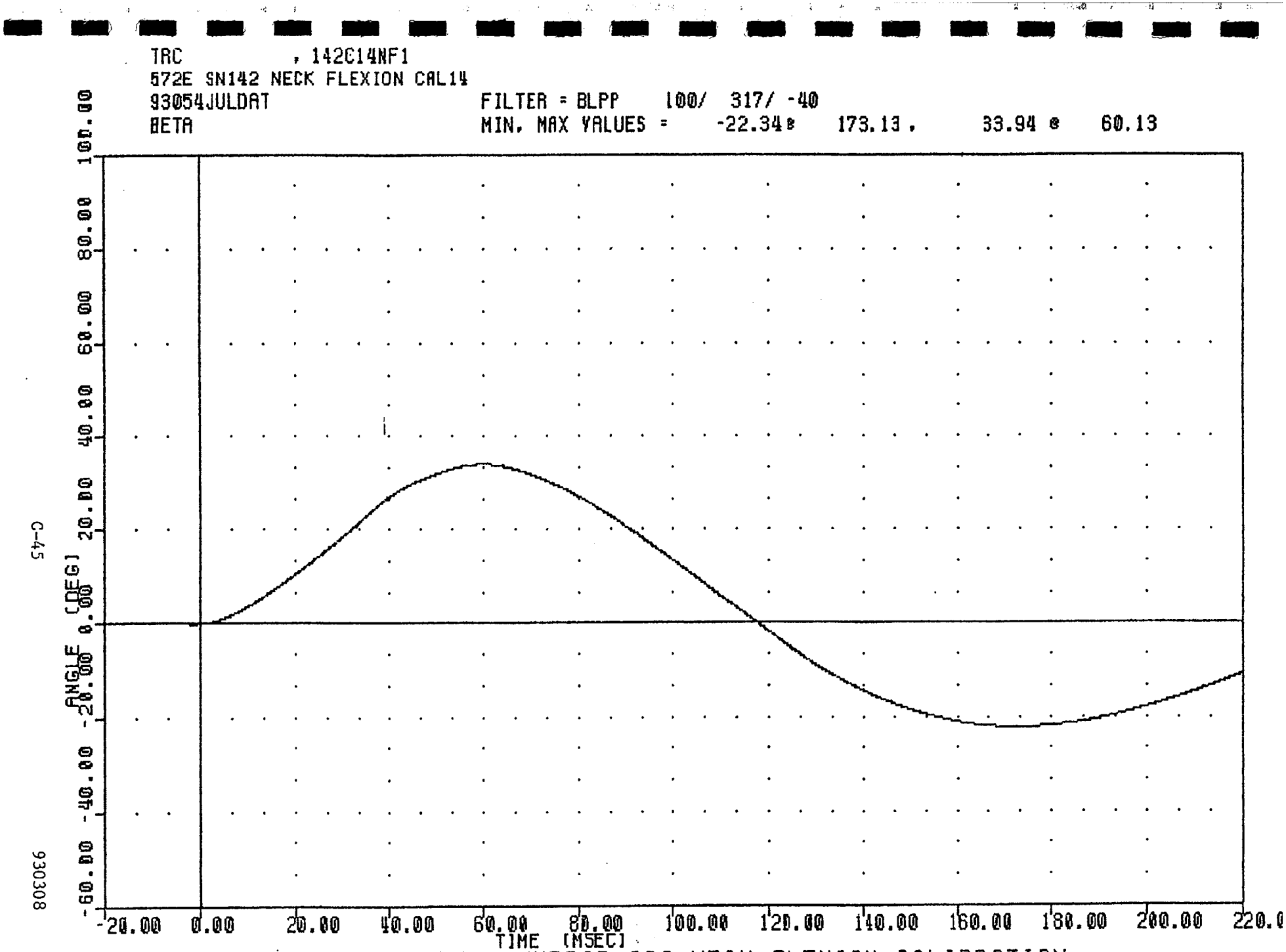
TECHNICIAN Pete Fonte



PART 572-E HYBRID III NECK FLEXION CALIBRATION

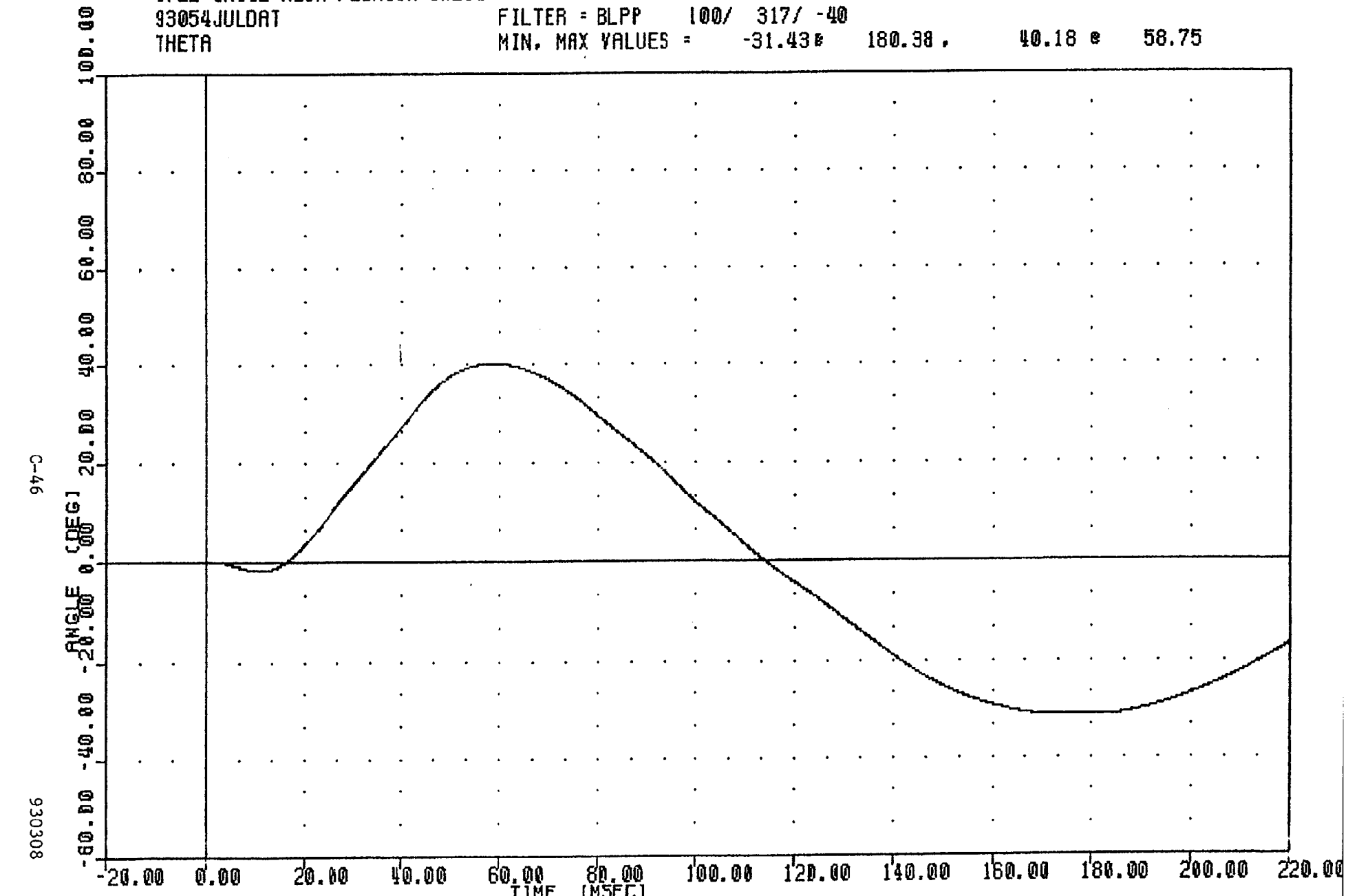
PENDULUM DECELERATION

930308



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

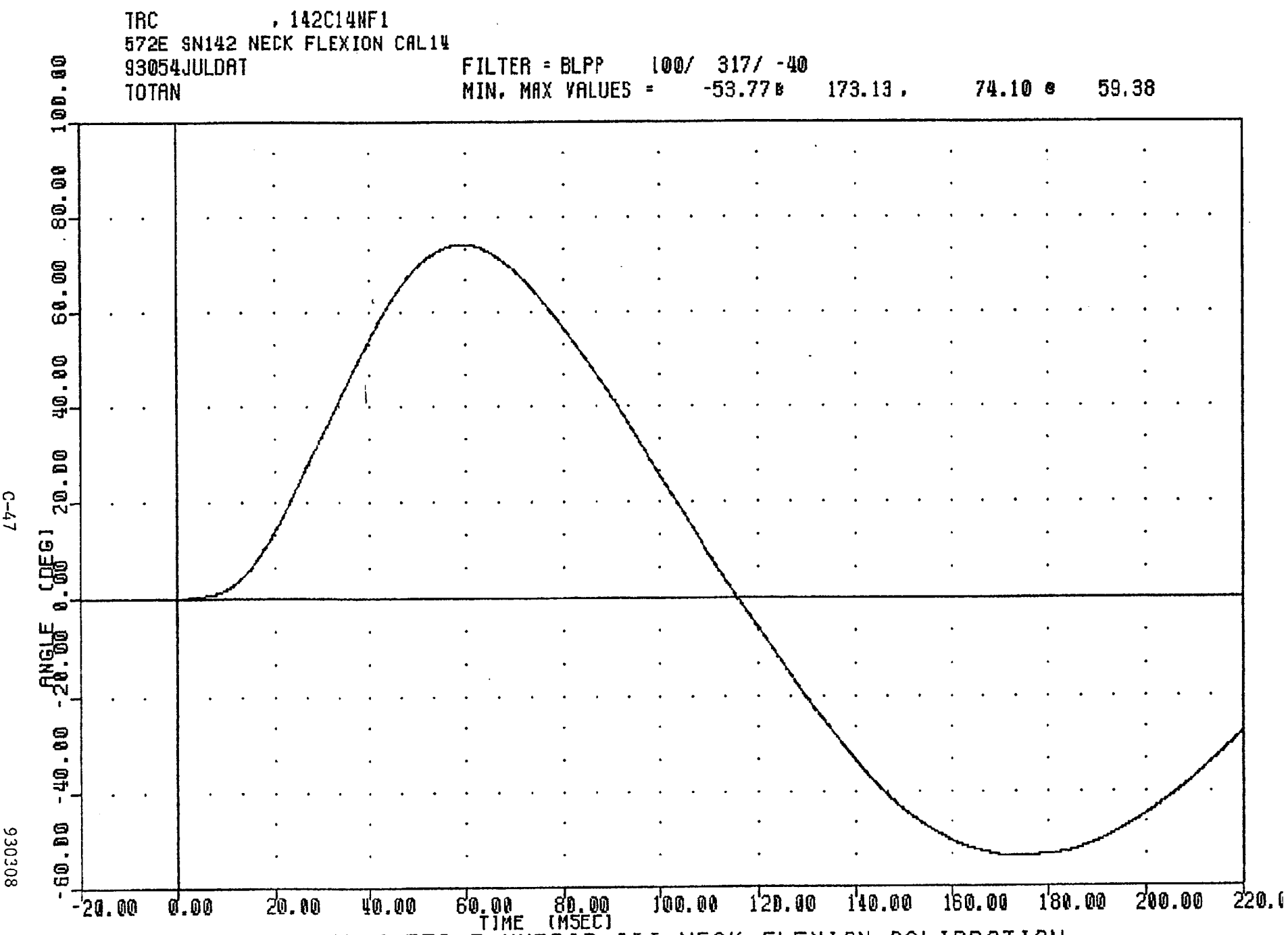
930308



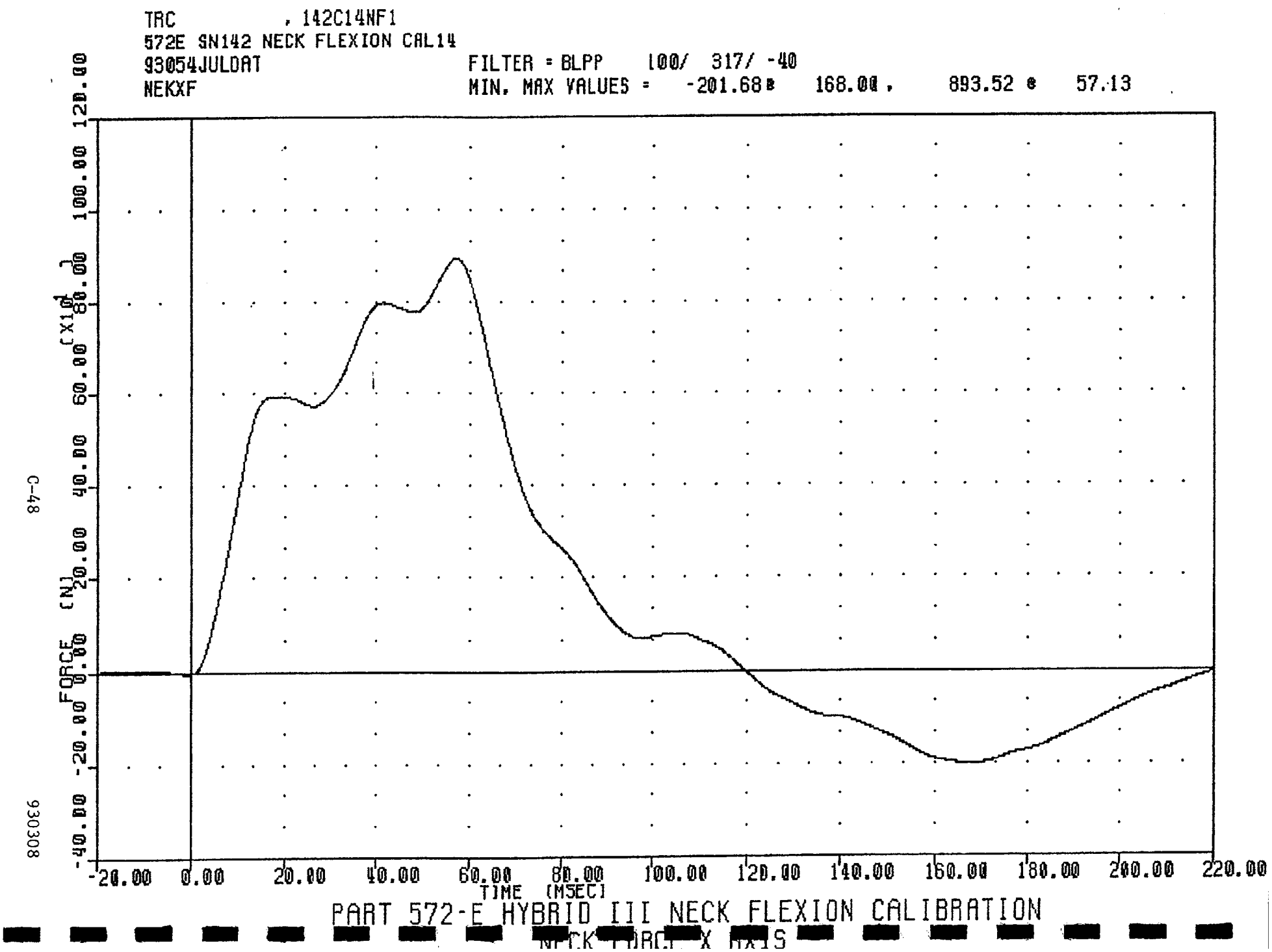
PART 572-E HYBRID III NECK FLEXION CALIBRATION

ROTATION ABOUT OCCIPITAL CONDYLE

930308



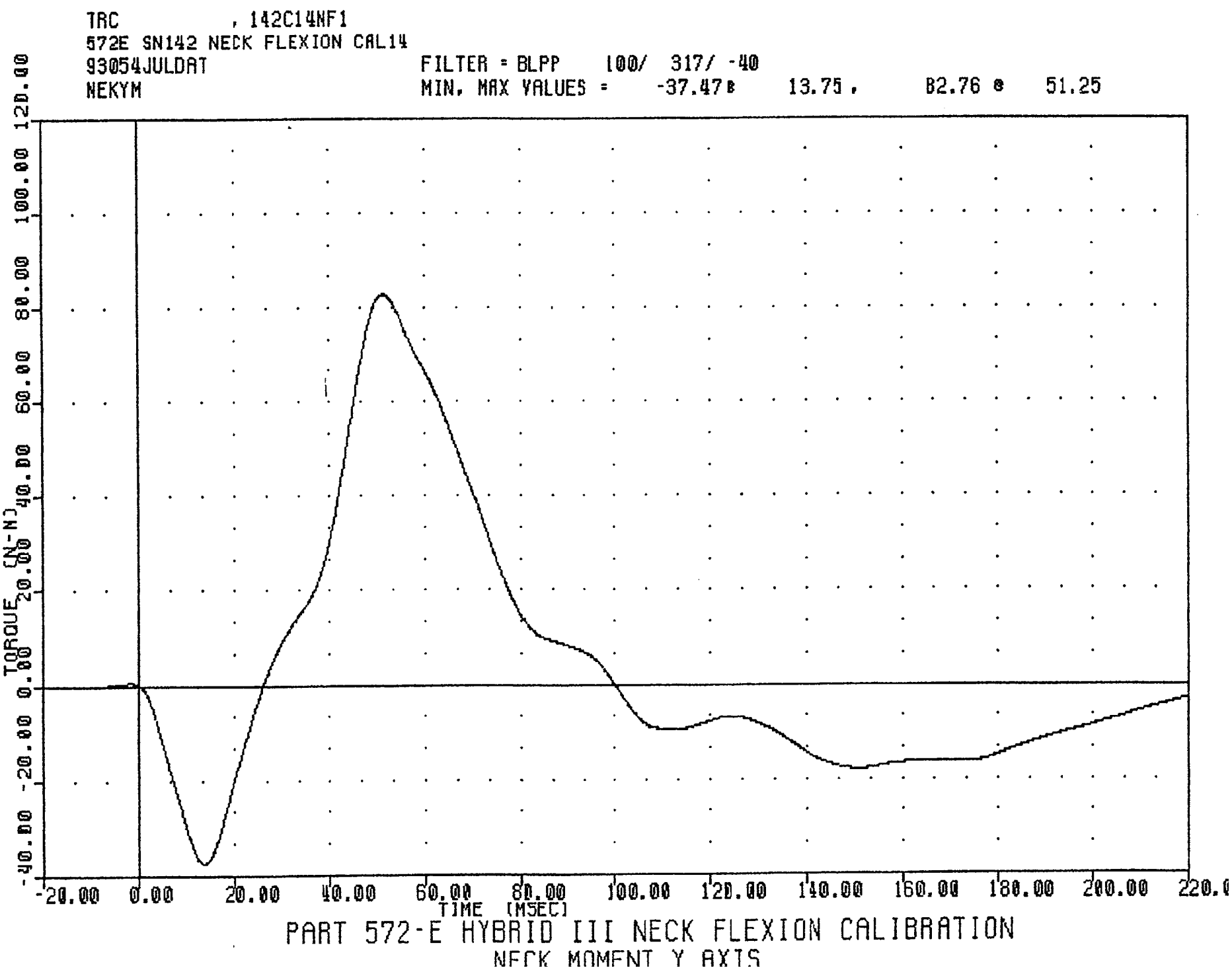
PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION



PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK FORCE X AXIS

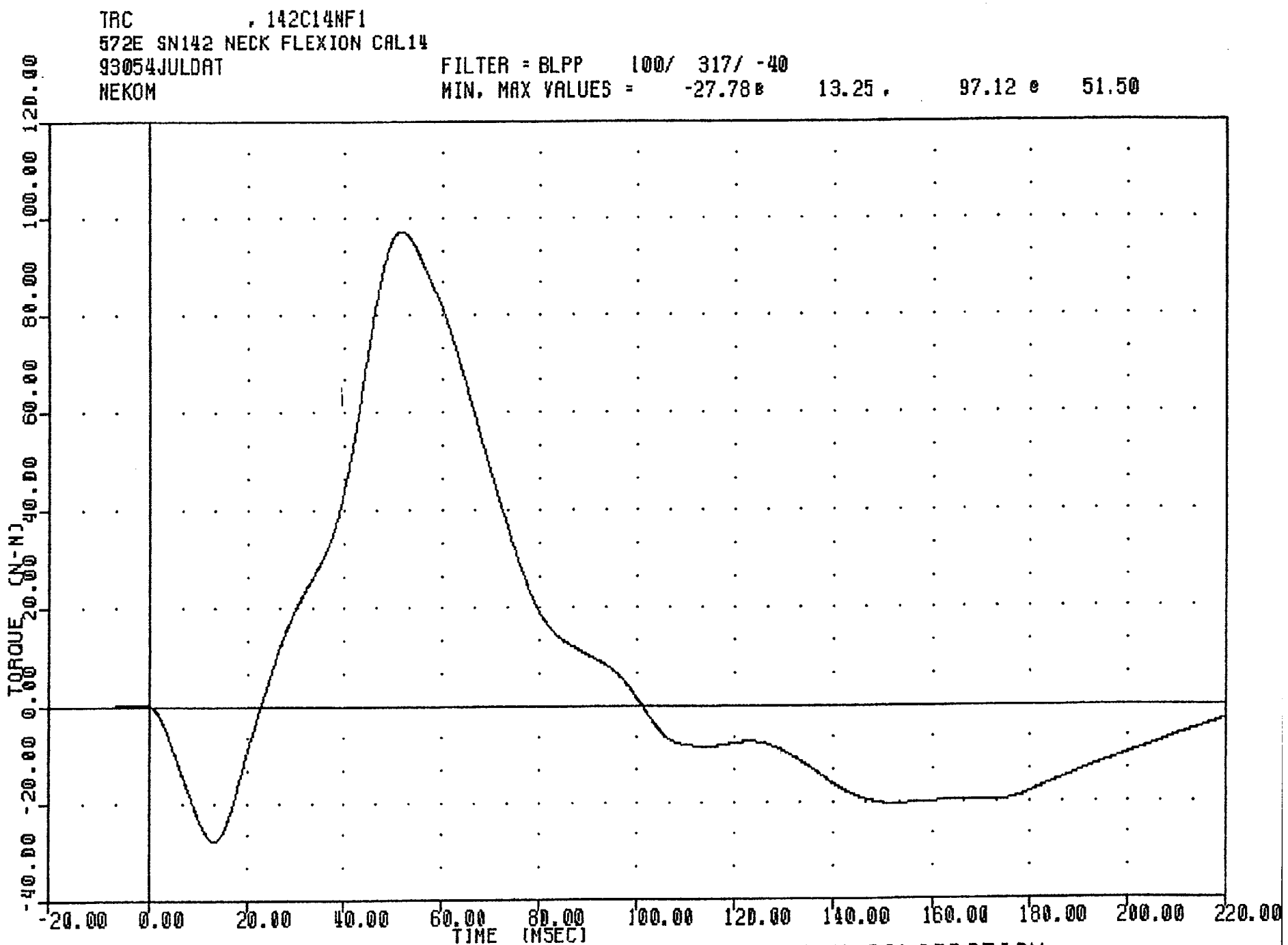
930308



PART 572-E HYBRID III NECK FLEXION CALIBRATION

NECK MOMENT Y AXIS

930308



PART 572-E HYBRID III NECK FLEXION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

930308

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST

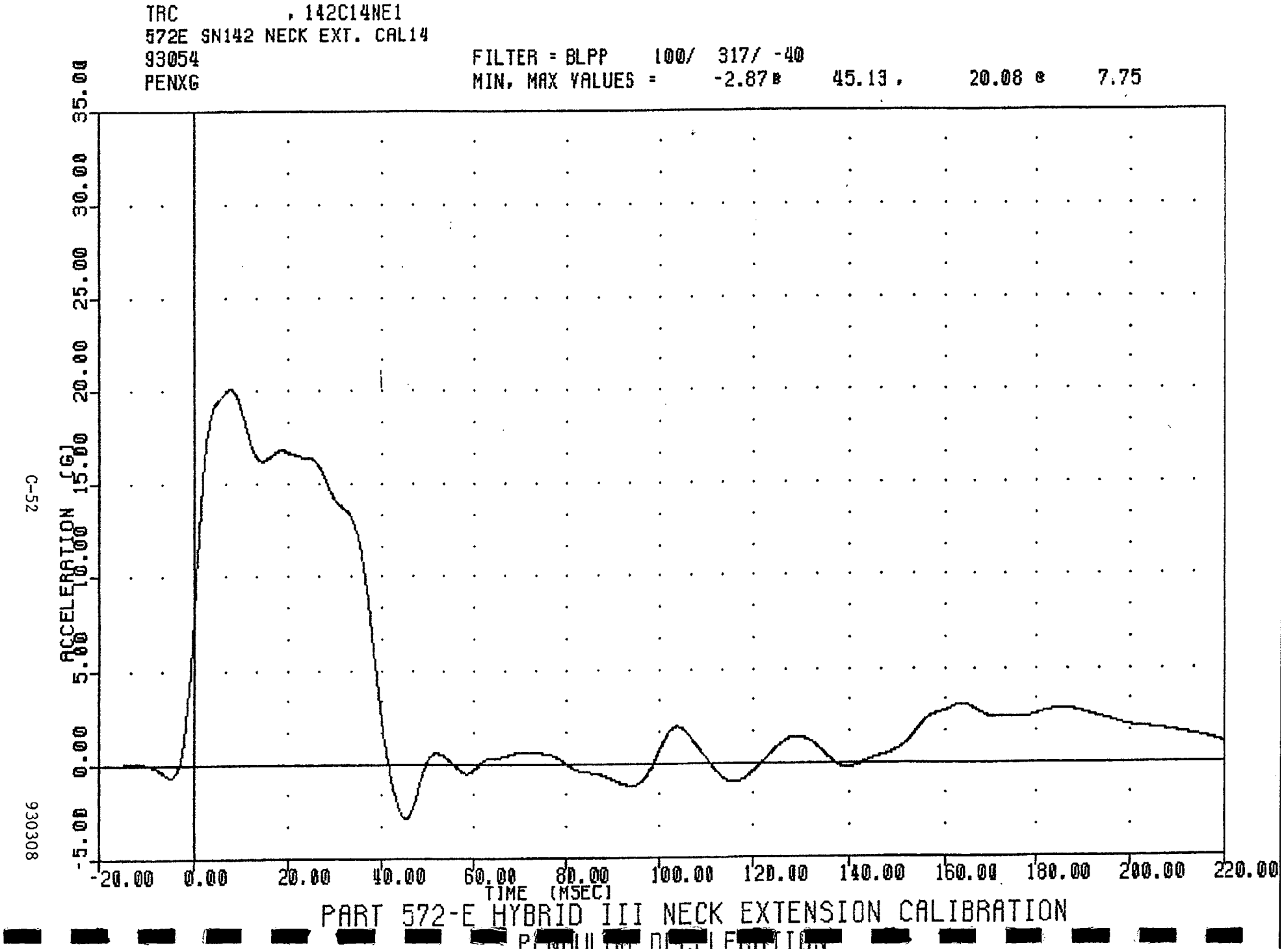
HYBRID III 23-FEB-93

6 AXIS NECK TRANSDUCER
TRC 142C14NE1 572E SN142 NECK EXT. CAL14

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY		10% - 70%	47.0 %
IMPACT VELOCITY		5.95 - 6.19 M/SEC	6.05 M/SEC
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	19.06 G
	20 MS	14.00 - 19.00 G	16.73 G
	30 MS	11.00 - 16.00 G	14.21 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.15 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.50 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	98.10 DEG.
	TIME	72 - 82 MS	73.63 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-76.37 NM
	TIME	65 - 79 MS	68.88 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	151.25 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	135.38 MS

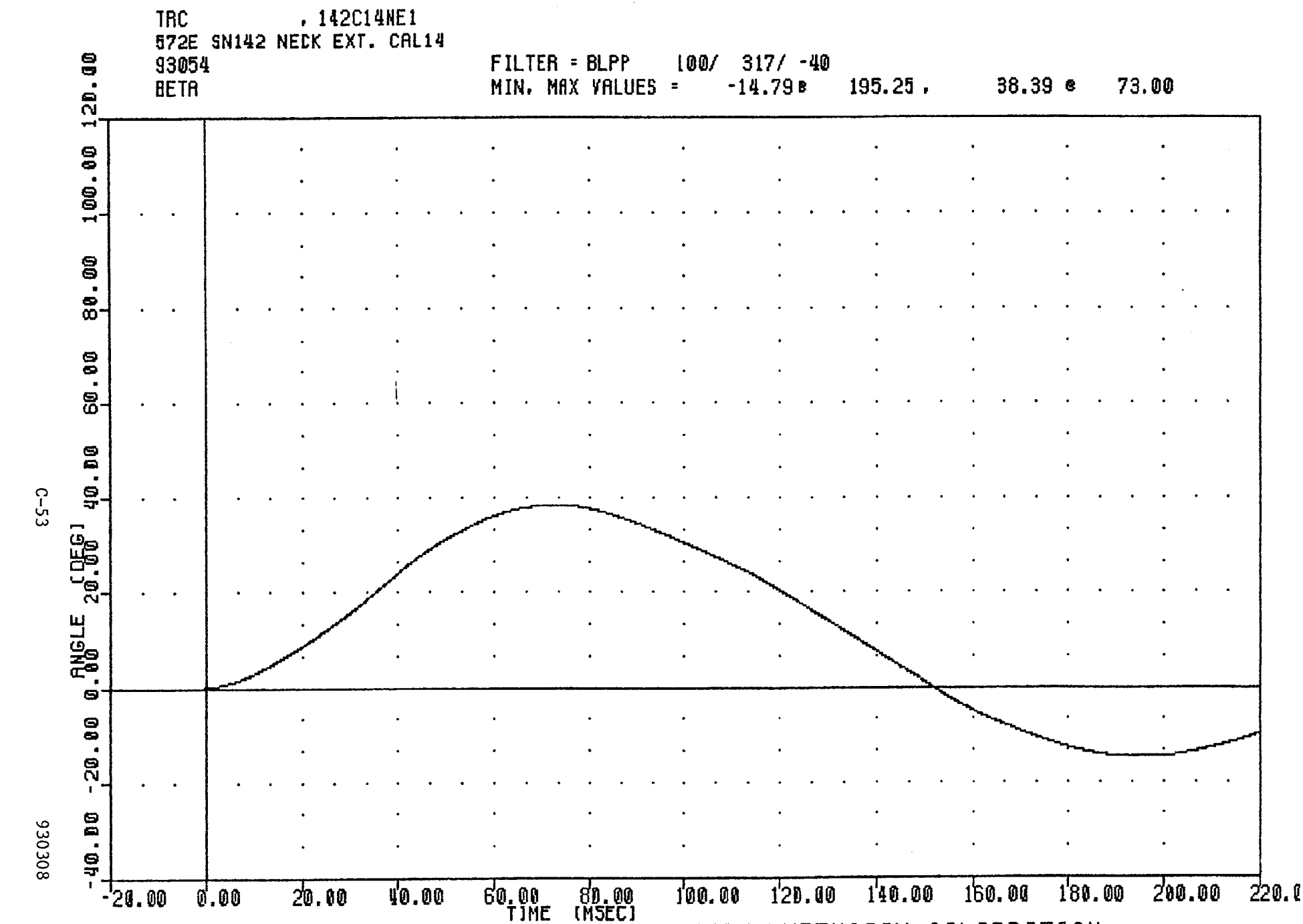
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fonte

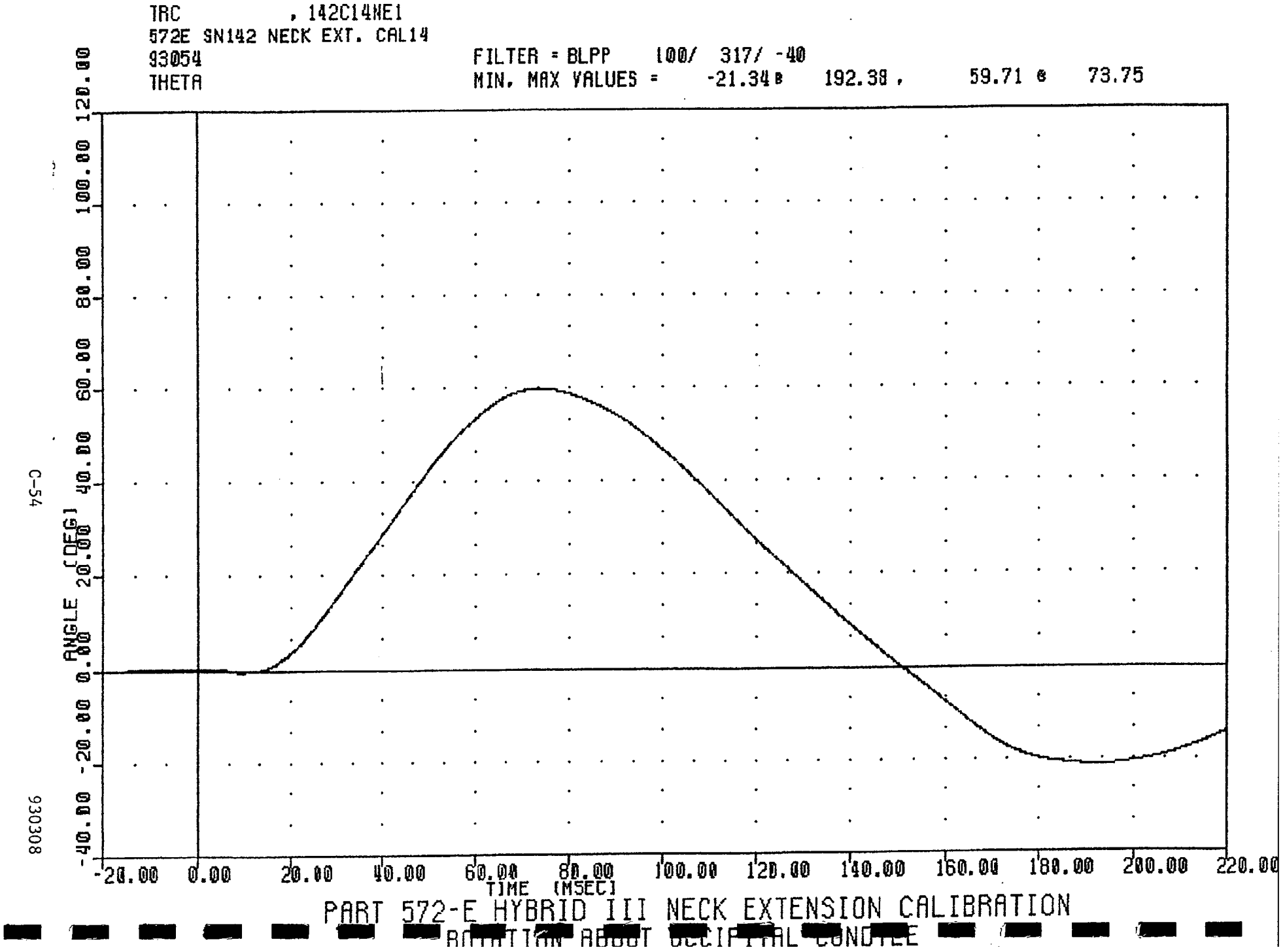


PART 572-E HYBRID III NECK EXTENSION CALIBRATION

930308



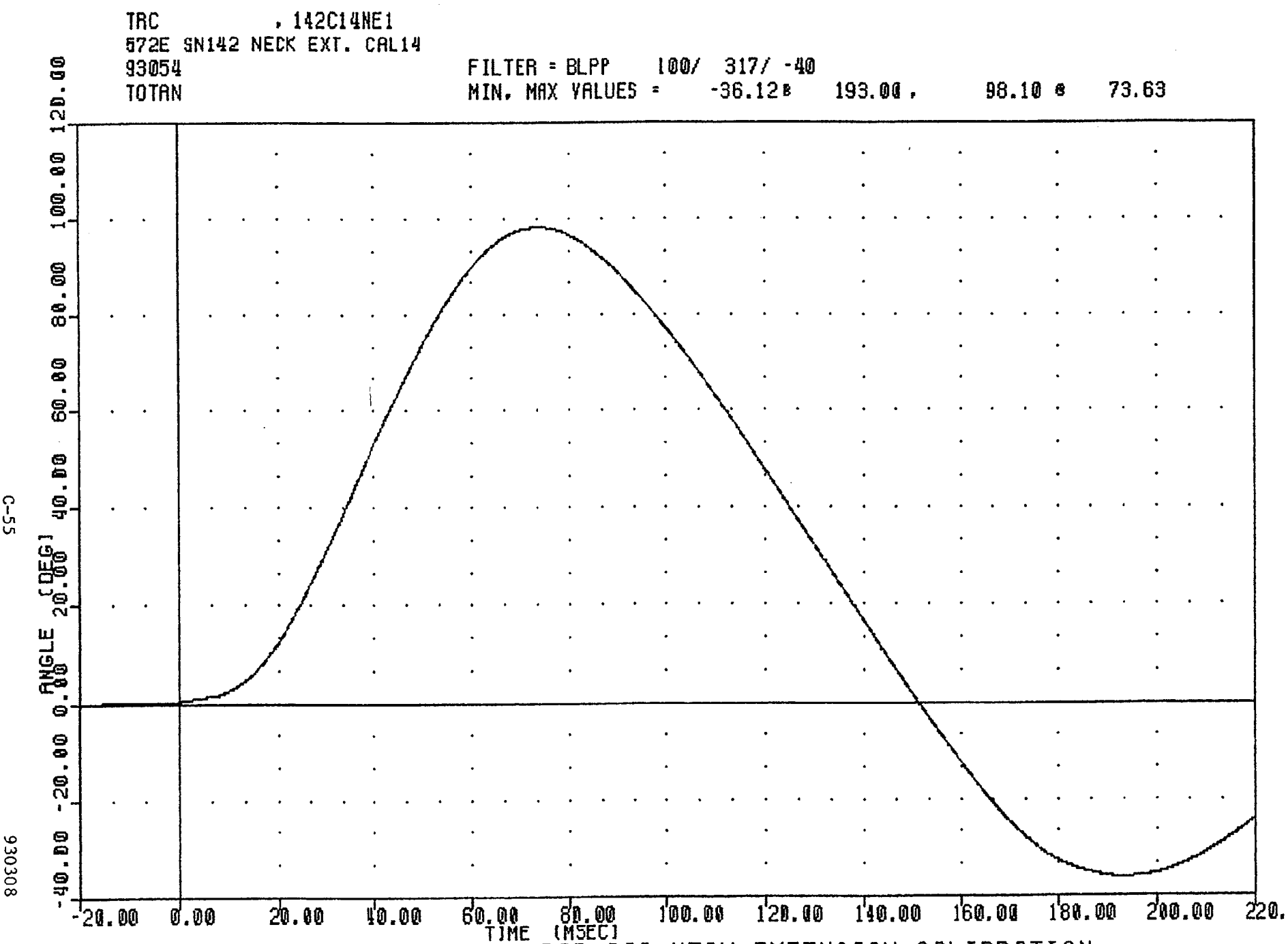
PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

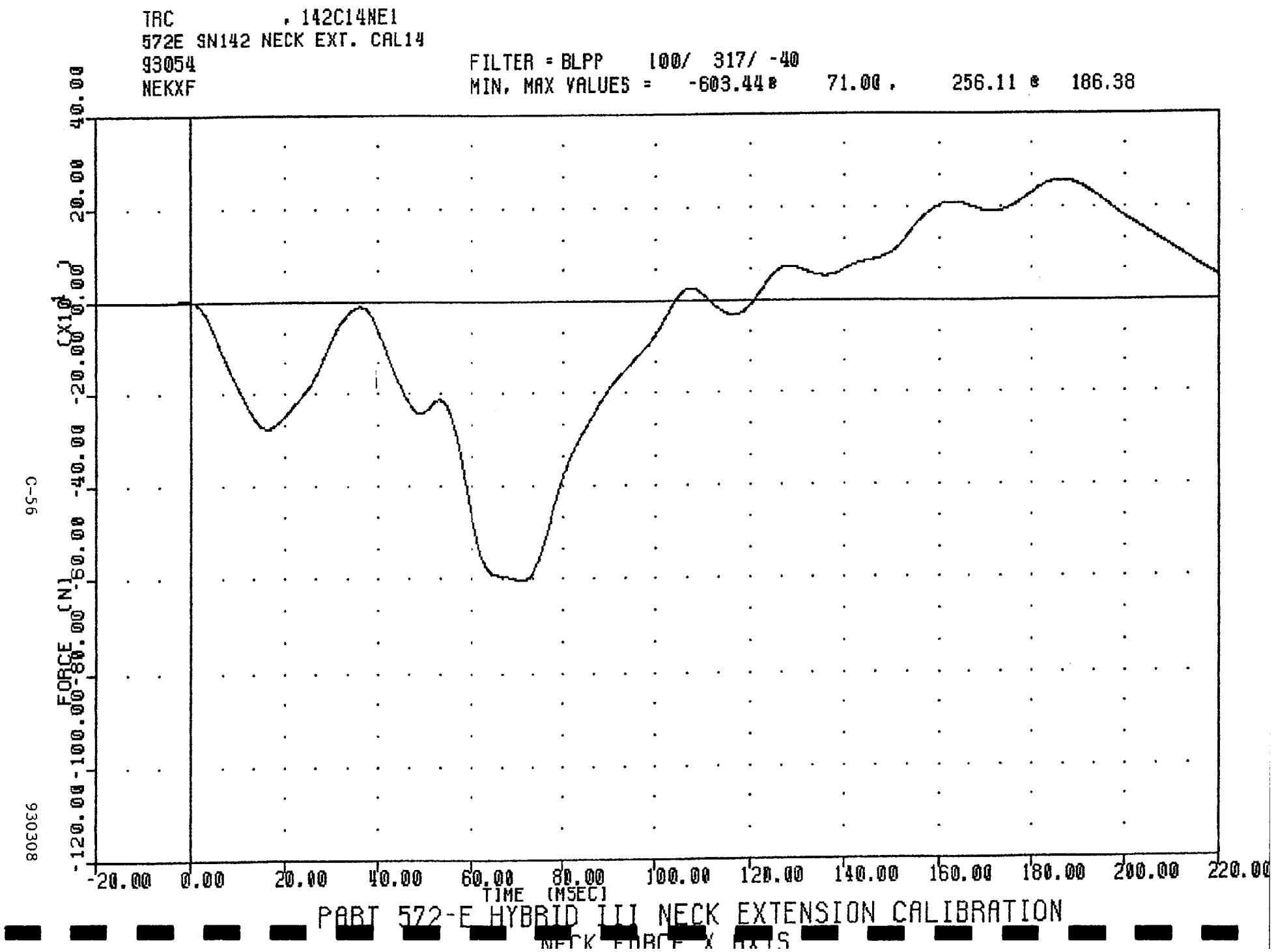
[redacted] ROTATION ABOUT OCCIPITAL CONDYLE

930308



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL ROTATION

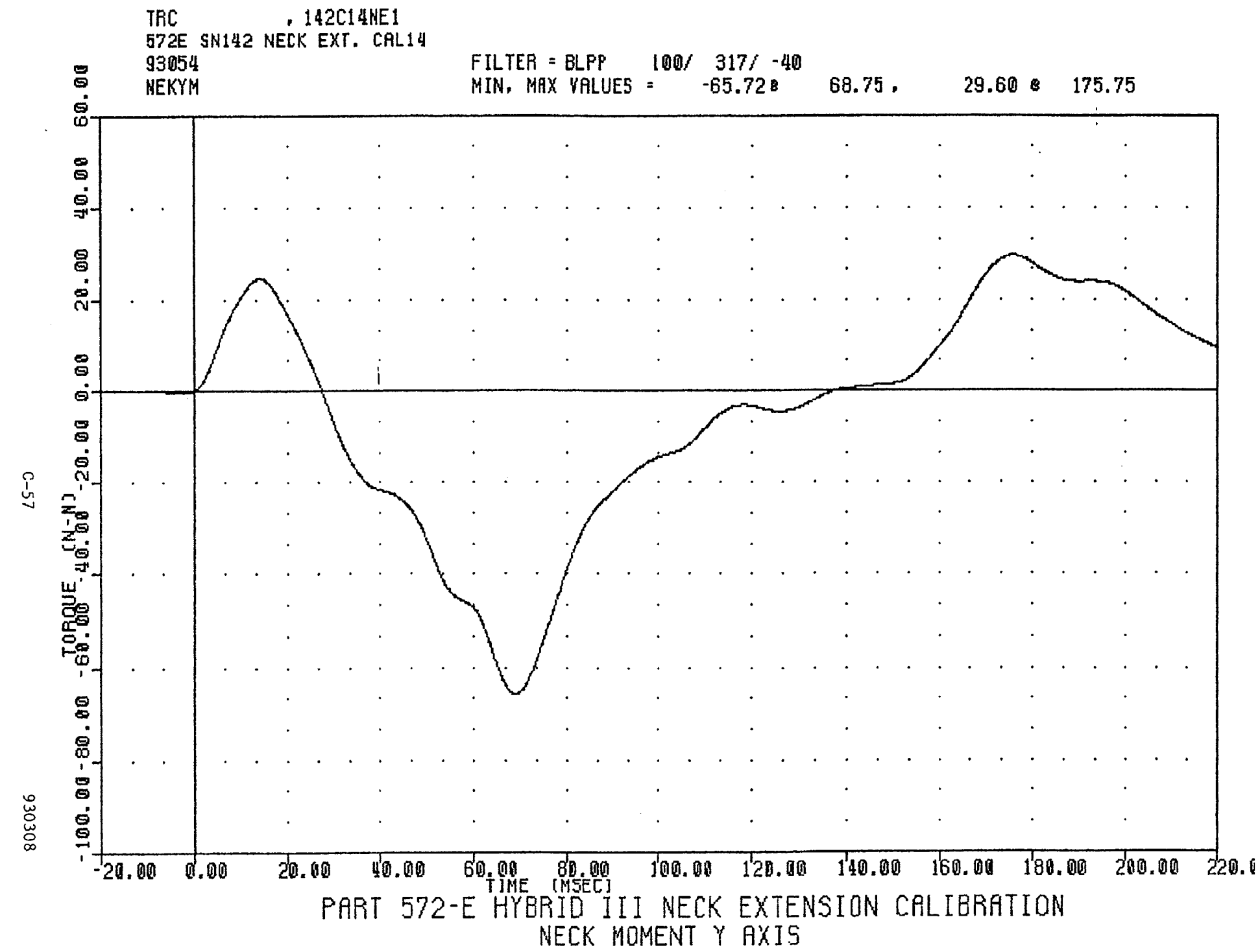
930308



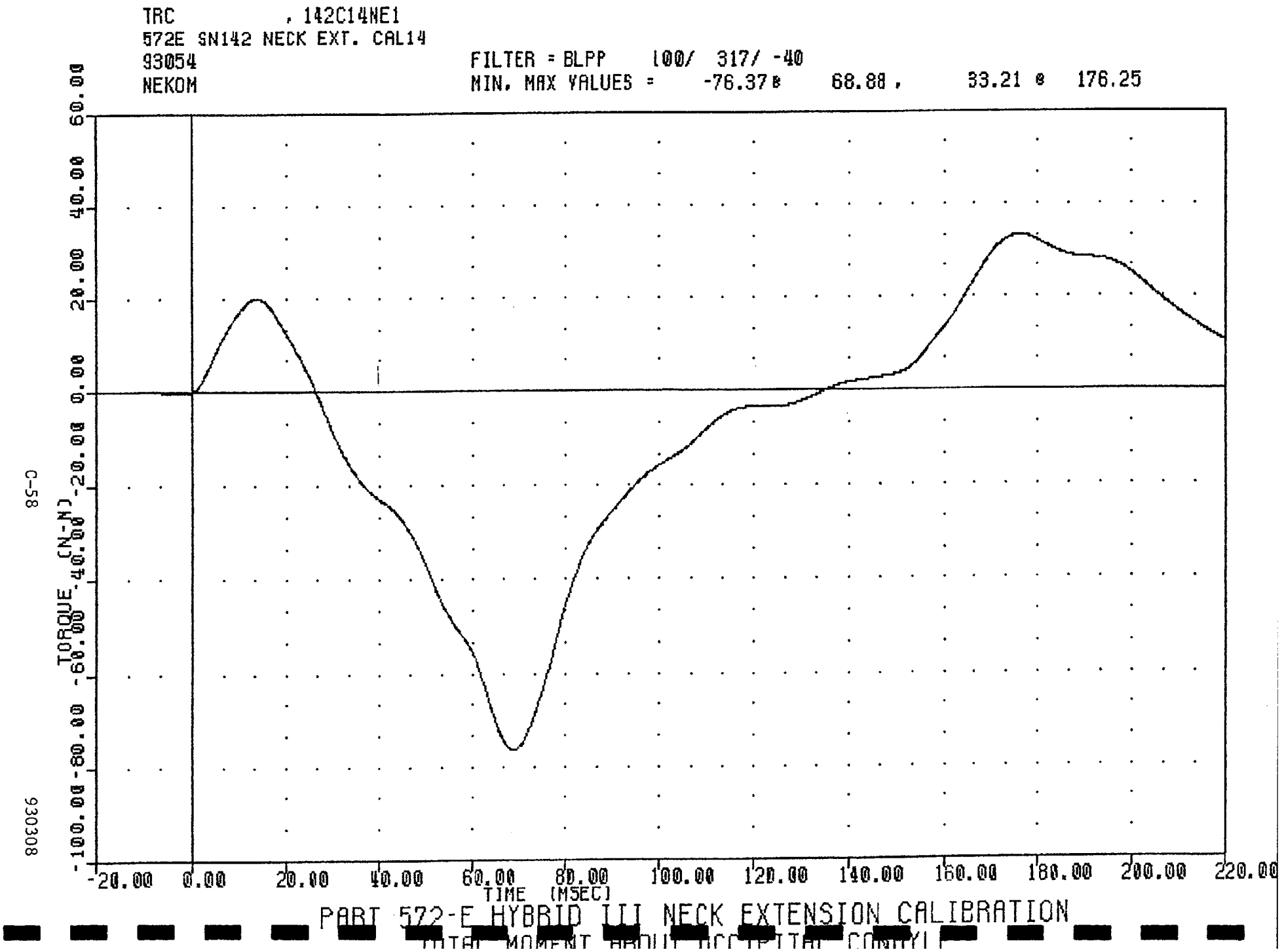
PART 572-E HYBRID III NECK EXTENSION CALIBRATION

NECK FORCE X AXIS

930308



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



PART 572-E HYBRID III NECK EXTENSION CALIBRATION

TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

930308

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

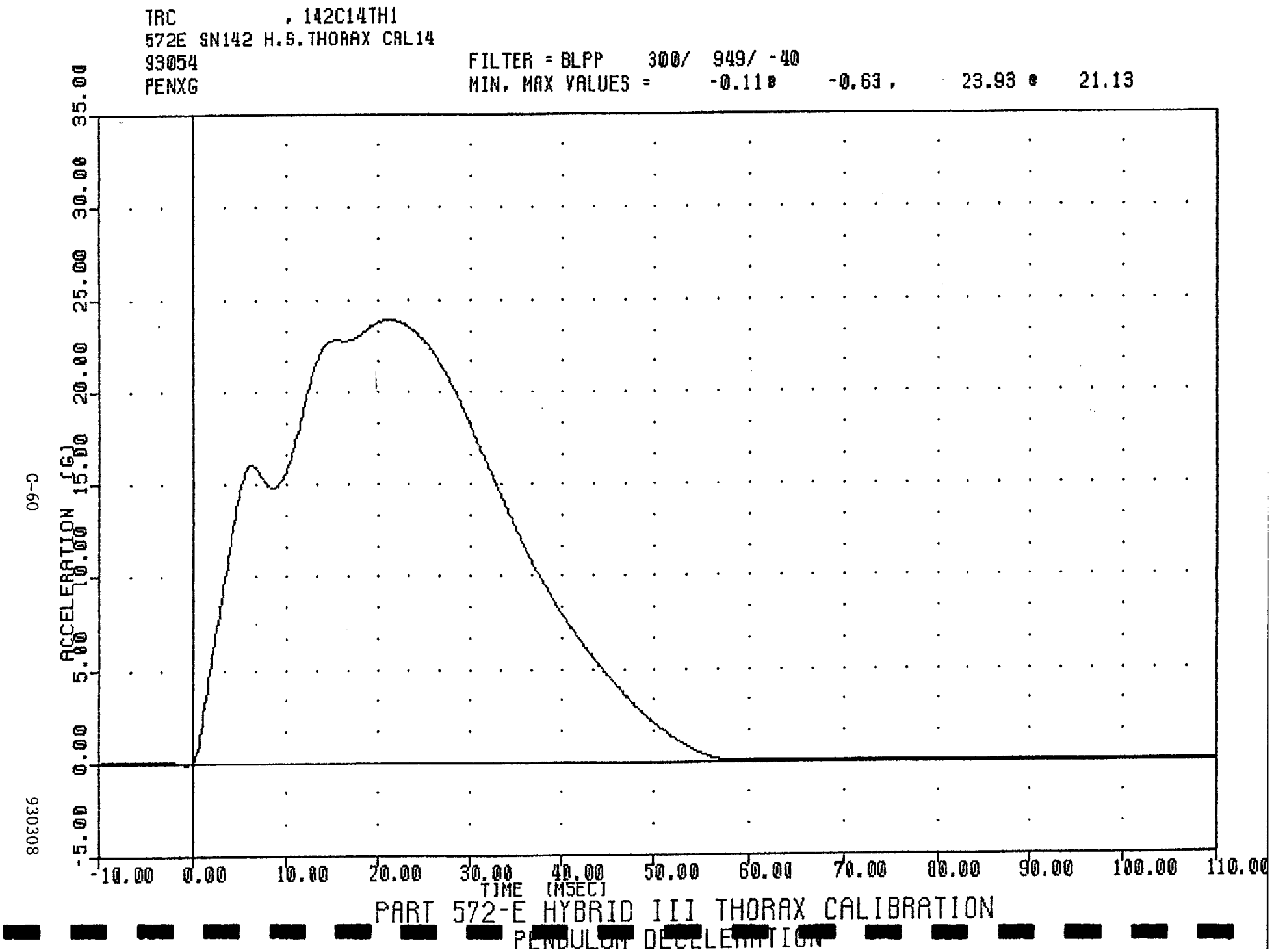
HYBRID III 23-FEB-93

TRC 142C14TH1 572E SN142 H.S.THORAX CAL14

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	46.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.68 M/SEC
MAXIMUM DEFLECTION	63.5 - 72.6 MM	72.0 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5482. N
INTERNAL HYSTERESIS	69% - 85%	69.9%

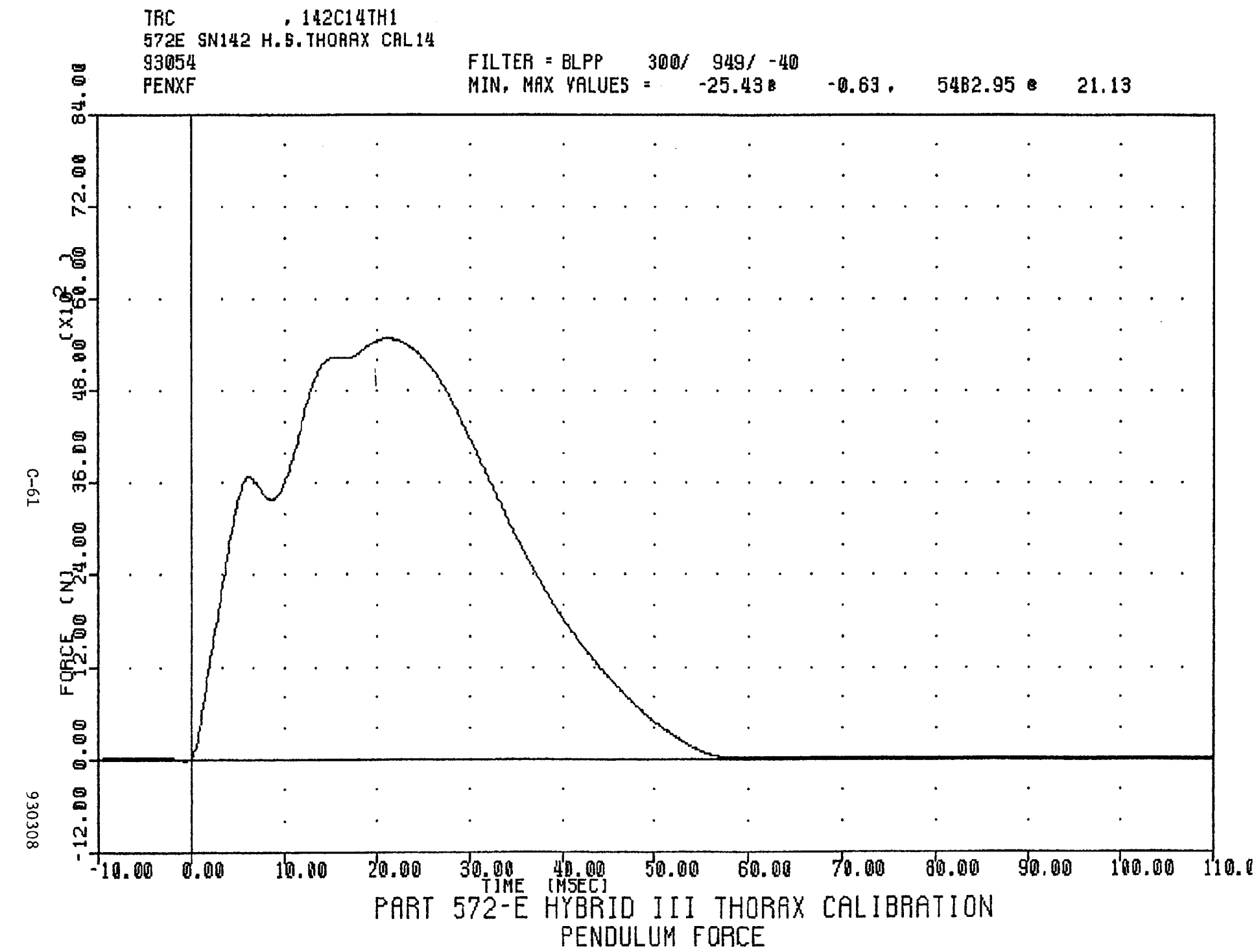
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Foust



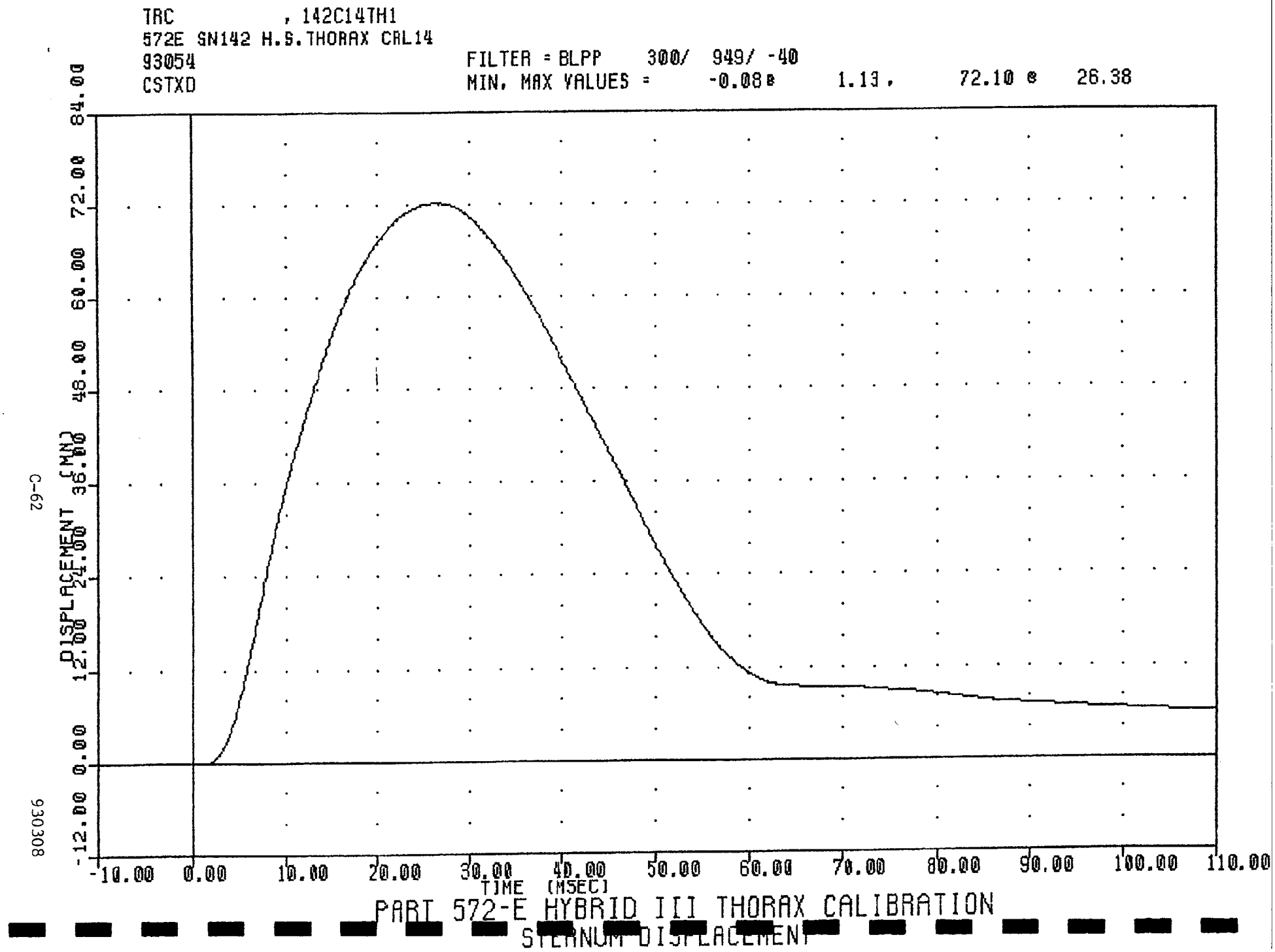
PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

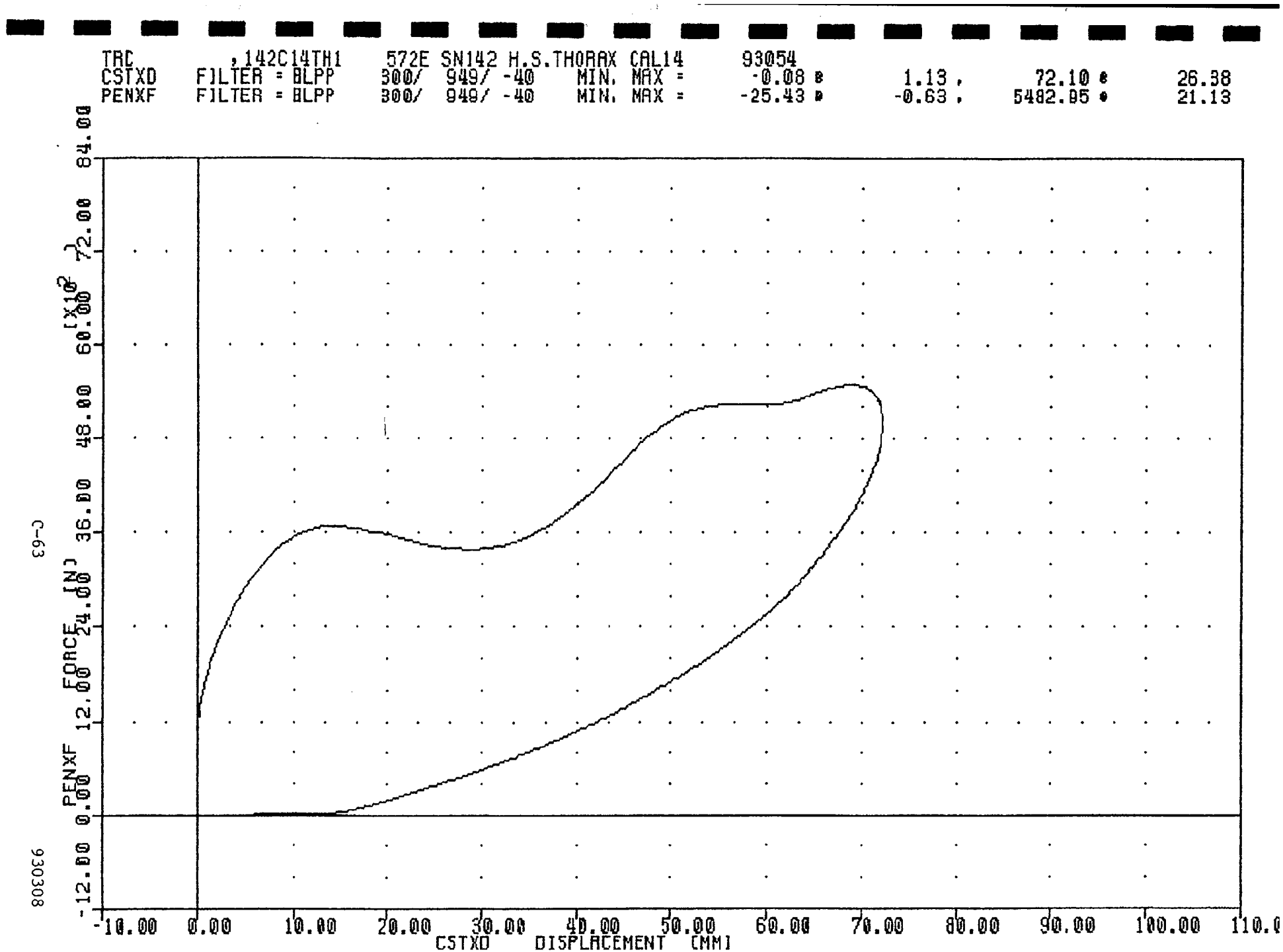
930308



PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE

930308


TRC , 142C14TH1
572E SN142 H.S.THORAX CAL14
93054
CSTXD
FILTER = BLPP 300/ 949/ -40
MIN, MAX VALUES = -0.08 @ 1.13 , 72.10 @ 26.38
DISPLACEMENT (MM)
84.00
72.00
60.00
48.00
36.00
24.00
12.00
0.00
-12.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
TIME (MSEC)
PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT



PART 572-E HYBRID III THORAX CALIBRATION

CHEST DISPLACEMENT VS PENDULUM FORCE

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

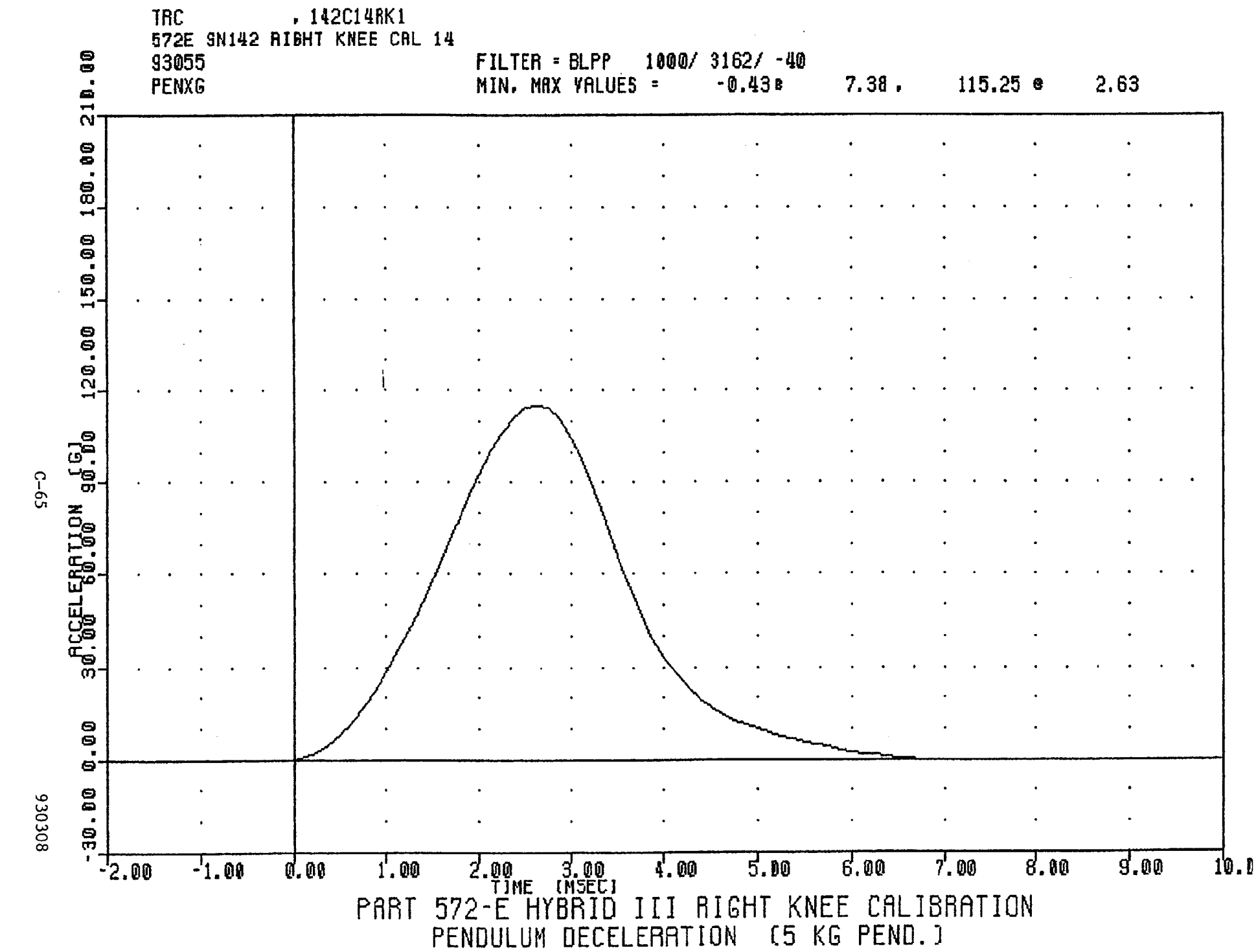
HYBRID III 24-FEB-93

RIGHT KNEE
TRC 142C14RK1 572E SN142 RIGHT KNEE CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	30.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714 - 5783 N	5638.7 N
PROBE WEIGHT	5.0 KG	

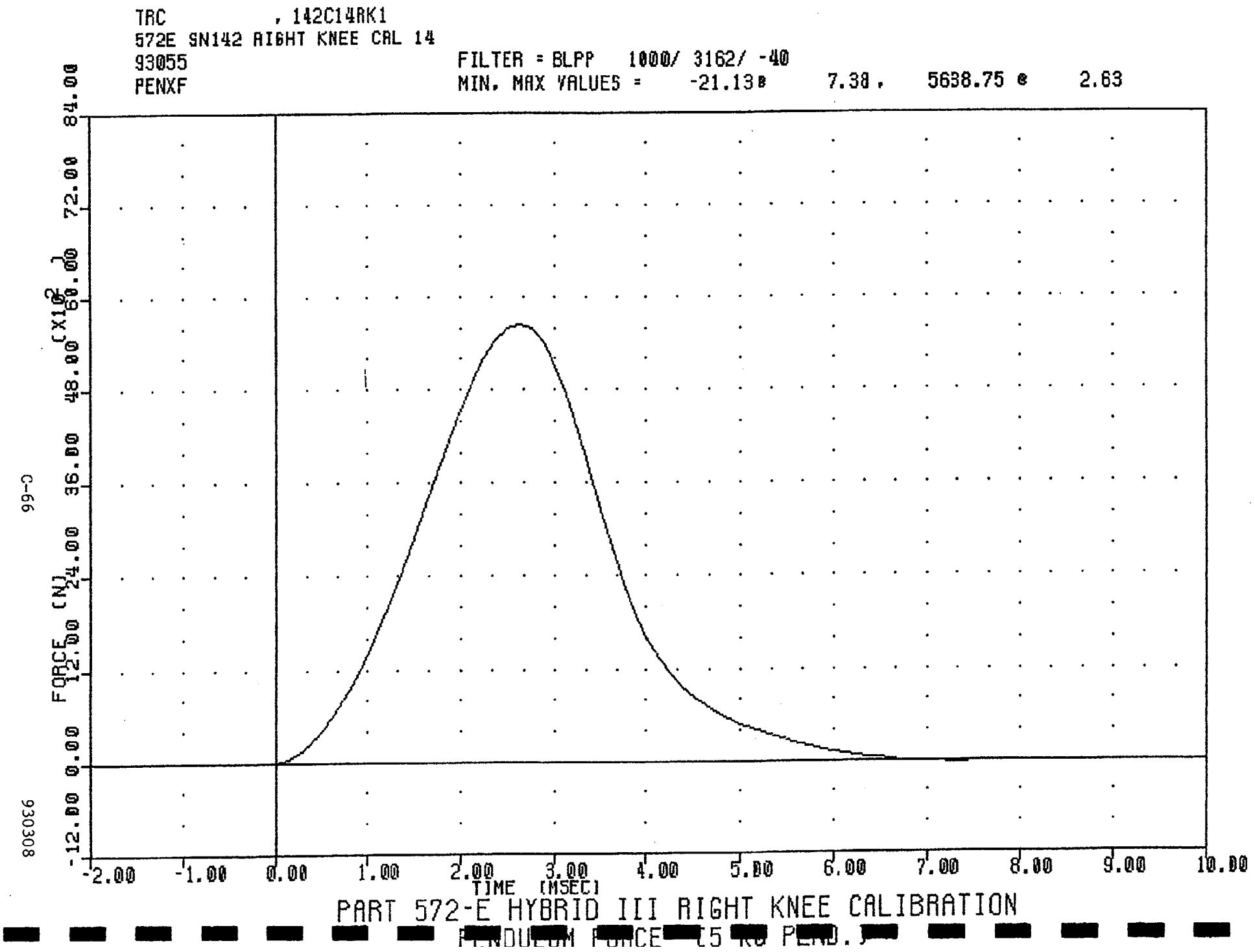
TEST MEETS SPECIFICATIONS

TECHNICIAN Pete Fonta



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

930308



PART 572-E HYBRID III RIGHT KNEE CALIBRATION

PENDULUM FORCE [illegible] PEND.

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

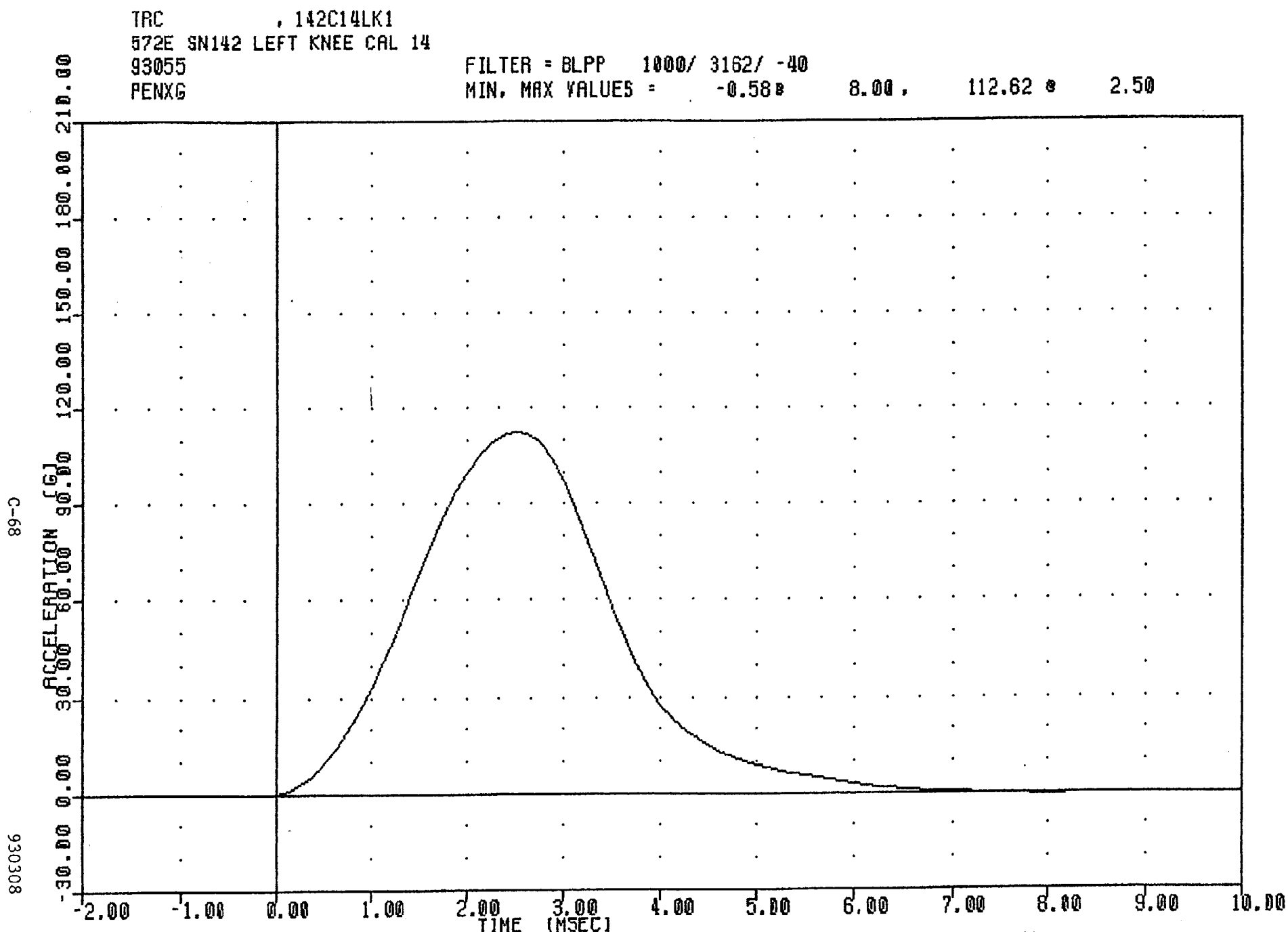
HYBRID III 24-FEB-93

LEFT KNEE
TRC 142C14LK1 572E SN142 LEFT KNEE CAL 14

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	30.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714 - 5783 N	5510.3 N
PROBE WEIGHT	5.0 KG	

TEST MEETS SPECIFICATIONS

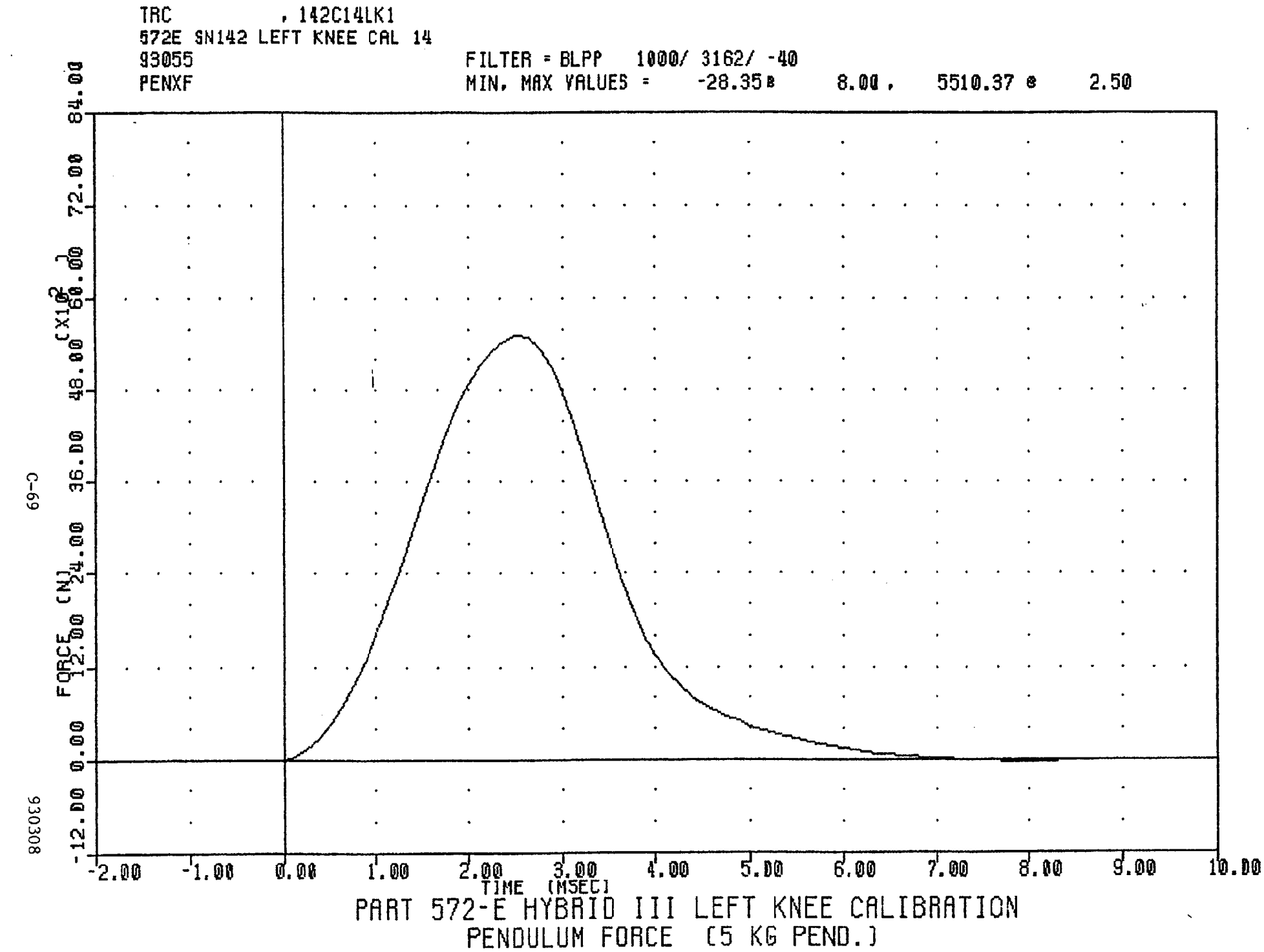
TECHNICIAN Peter Eash



PART 572-E HYBRID III LEFT KNEE CALIBRATION

PENDULUM DECELERATION (5 KG PEND.)

930308



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

930308

APPENDIX D

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENT CALIBRATIONS

DRIVER DUMMY #192

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE LAST	DUE
HEAD X-AXIS ACCEL.	CY19H	7264	ENDEVCO	01/22/93	07/22/93
Y-AXIS ACCEL.	DH74J	7264	ENDEVCO	01/22/93	07/22/93
Z-AXIS ACCEL.	CW16H	7264	ENDEVCO	01/22/93	07/22/93
CHEST X-AXIS ACCEL.	DW04J	7264	ENDEVCO	01/22/93	07/22/93
Y-AXIS ACCEL.	DA15H	7264	ENDEVCO	01/22/93	07/22/93
Z-AXIS ACCEL.	DK56J	7264	ENDEVCO	01/22/93	07/22/93
LEFT FEMUR FORCE LOAD CELL	889	2430	GSE	01/26/93	07/26/93
RIGHT FEMUR FORCE LOAD CELL	827	2430	GSE	01/26/93	07/26/93
*NECK X-AXIS FORCE LOAD CELL	085	1716	DENTON	01/26/93	07/26/93
Y-AXIS FORCE LOAD CELL	085	1716	DENTON	01/26/93	07/26/93
X-AXIS FORCE LOAD CELL	085	1716	DENTON	01/26/93	07/26/93
*NECK MOMENT ABOUT X-AXIS LOAD CELL	085	1716	DENTON	01/26/93	07/26/93
MOMENT ABOUT Y-AXIS LOAD CELL	085	1716	DENTON	01/26/93	07/26/93
MOMENT ABOUT Z-AXIS LOAD CELL	085	1716	DENTON	01/26/93	07/26/93
*CHEST DEFLECTION POTENTIOMETER	87313-96	81422A	VERNITECH	01/27/93	07/27/93

*HYBRID III USE ONLY.

DUMMY INSTRUMENT CALIBRATIONS

PASSENGER DUMMY #142

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE LAST	DUE
HEAD X-AXIS ACCEL.	CR59H	7264	ENDEVCO	01/25/93	07/25/93
Y-AXIS ACCEL.	CR99H	7264	ENDEVCO	01/25/93	07/25/93
Z-AXIS ACCEL.	CH44H	7264	ENDEVCO	01/25/93	07/25/93
CHEST X-AXIS ACCEL.	DA88H	7264	ENDEVCO	01/25/93	07/25/93
Y-AXIS ACCEL.	DT02JT	7264	ENDEVCO	01/25/93	07/25/93
Z-AXIS ACCEL.	CH74H	7264	ENDEVCO	01/25/93	07/25/93
LEFT FEMUR FORCE LOAD CELL	829	2430	GSE	01/26/93	07/26/93
RIGHT FEMUR FORCE LOAD CELL	610	2430	GSE	01/26/93	07/26/93
*NECK X-AXIS FORCE LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
Y-AXIS FORCE LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
Z-AXIS FORCE LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
*NECK MOMENT ABOUT X-AXIS LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
MOMENT ABOUT Y-AXIS LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
MOMENT ABOUT Z-AXIS LOAD CELL	0280	1716	DENTON	01/27/93	07/27/93
*CHEST DEFLECTION POTENTIOMETER	90320B	81422A	VERNITECH	01/27/93	07/27/93

*HYBRID III USE ONLY.

VEHICLE AND CALIBRATION LABORATORY INSTRUMENT CALIBRATIONS

VEHICLE ACCELEROMETERS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE LAST	DUE
LEFT REAR SEAT CROSSMEMBER X-AXIS	CW79H	7264	ENDEVCO	11/20/92	05/20/93
LEFT REAR SEAT CROSSMEMBER X-AXIS REDUN	CN83H	7264	ENDEVCO	11/20/92	05/20/93
RIGHT REAR SEAT CROSSMEMBER X-AXIS	DG40J	7264	ENDEVCO	01/20/93	07/20/93
RIGHT REAR SEAT CROSSMEMBER X-AXIS REDUN	CH35H	7264	ENDEVCO	10/16/92	04/16/93
ENGINE TOP X-AXIS	BY03J	7264	ENDEVCO	11/20/92	05/20/93
ENGINE BOTTOM X-AXIS	CW63H	7264	ENDEVCO	01/13/92	04/13/93
RIGHT BRAKE CALIPER X-AXIS	DA06H	7264	ENDEVCO	11/20/92	05/20/93
LEFT BRAKE CALIPER X-AXIS	CH22H	7264	ENDEVCO	01/20/93	07/22/93
INSTRUMENT PANEL CENTER X-AXIS	BW77J	7264	ENDEVCO	11/23/92	05/23/93

CALIBRATION LABORATORY INSTRUMENTS

	SERIAL NO.	MODEL NO.	MFR.	CALIBRATION DATE LAST	DUE
NECK BENDING PENDULUM ACCEL.	CC44	7232	ENDEVCO	10/06/92	04/06/93
NECK BENDING ROTARY POTENTIOMETER	NA	35435-1-102	BOURNES	MFR. SPECIFICATION	
NECK BENDING LINEAR POTENTIOMETER	NA	5184-2051846003	BOURNES	10/06/92	04/06/93
THORAX/HYBRID II FEMUR PEND. ACCEL.	CC64	7232	ENDEVCO	10/06/92	04/06/93
LUMBAR FLEXION FORCE GAUGE	NA	DPPH-50	CHATILLON	05/03/89	REPAIRED
LUMBAR FLEXION ROTATION GAUGE	CP17-0601-1	7020	HUMPHREY	MFR. SPECIFICATION	
ABDOMEN COMPRESSION DISPL. GAUGE	4075-172	80294-2051941504	BOURNES	10/06/92	04/06/93
ABDOMEN COMPRESSION FORCE GAUGE	1261	3167	LEBOW	10/06/92	04/06/93
HYBRID III FEMUR PEND. ACCEL.	CG83	7232	ENDEVCO	10/06/92	04/06/93

SIGN CONVENTION

NHTSA DATA TAPE REFERENCE GUIDE

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

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

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

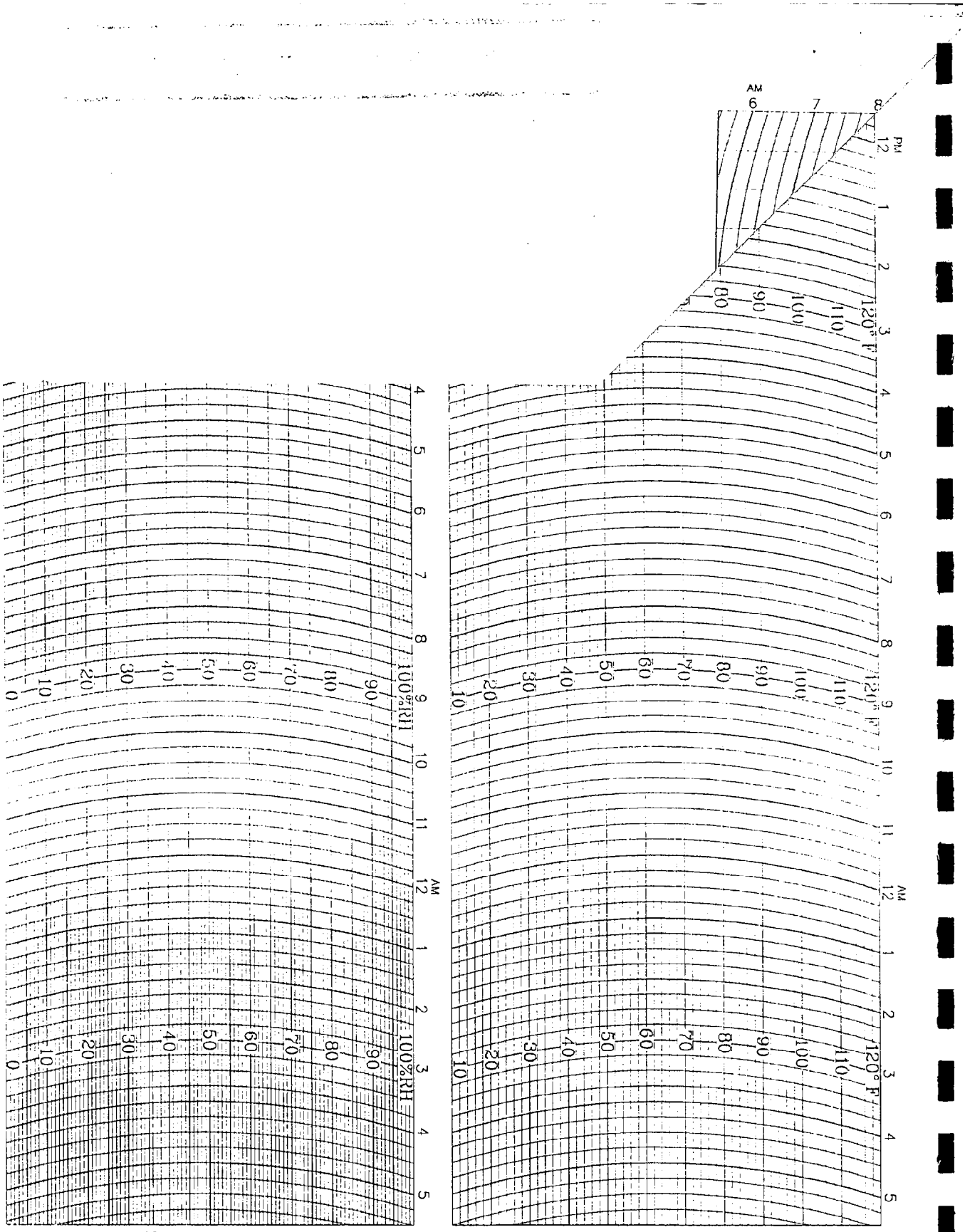
NECK LOAD CELLS:	+X FORCE:	HEAD PUSHED FORWARD
	+Y FORCE:	HEAD PUSHED LEFTWARD
	+Z FORCE:	HEAD PULLED UPWARD (TENSION ON NECK)
	+X MOMENT:	RIGHT EAR ROTATING TOWARD RIGHT SHOULDER
	+Y MOMENT:	CHIN ROTATING TOWARD CHEST
	+Z MOMENT:	CHIN ROTATING TOWARD LEFT SHOULDER

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

FREQUENCY RESPONSE CLASSES

SAE J211 OCT88

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



WeatherMeasure
WEATHERtronics
Division of QUALIMETRICS, Inc.
P.O. BOX 41039
SACRAMENTO, CA 95841
PHONE: (916) 923-0055

HYGROTHERMOGRAPH
1 DAY

CHART NO. M699123
C311-D-HF
ECN 2717
6-9-87

STATION_____DATE ON_____DATE OFF_____

APPENDIX E

RESTRAINT SYSTEM INSTRUCTIONS FROM OWNER'S MANUAL

Seat belt system

All vehicle occupants must wear seatbelts and, in the case of infants and small children, be placed in approved child restraint devices, for best protection in the event of a collision or a sudden stop. The seat belts are the single most effective safety device in your car.

Many jurisdictions require restraint system use by law. Please observe the following warnings:

WARNING!

- Persons who are not properly restrained with a fastened safety belt assembly are much more likely to suffer serious bodily injury in the event of a collision. This is equally true for rear seat passengers as for front seat passengers.
- Make sure seat belts are securely and properly latched.
- All vehicle occupants, including pregnant women, should wear their safety belts for maximum protection in the event of a collision. The lap belt or lapbelt portion of the lap/shoulder belt should be fitted snugly and as low as possible around the hips, not the waist, on each vehicle occupant including pregnant women. Shoulder belts should also be properly adjusted for minimum slack. Heavy overcoats should be removed prior to fastening the safety belt. Failure to properly utilize or adjust the safety belts may increase the chance and/or severity of injury in the event of a collision.
- Each seating position in the vehicle is equipped with one safety belt assembly which consists of one buckle and one tongue. Each safety belt assembly is designed to be used by one occupant and care should be taken to ensure that the correct buckle and tongue are used together.
- Accident statistics indicate properly restrained children are safer in the rear seat than in the front seat.
- For young children, infant and child restraints should be obtained and used in accordance with the instructions provided by the manufacturer of the infant and child restraint and the instruction under infant and Child Restraints. Child restraint use is required by law in most states and provinces.

Lap/shoulder belts

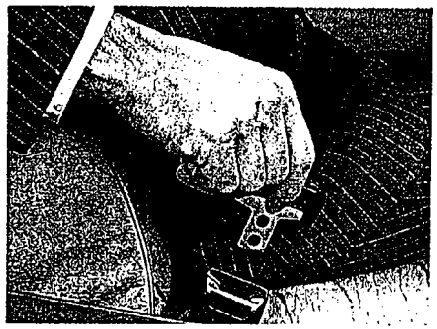
The two front and two rear outboard seating positions are equipped with inertia reel type lap/shoulder belts. These seat belts are designed to permit freedom of movement under most normal driving conditions and will lock in response to hard braking and impacts. Also, the seat belts will lock when the webbing is pulled rapidly or if the vehicle is on a steep incline. The front seat belts are equipped with emergency tensioners which will tension the belt in a frontal collision (see section on the Supplementary Restraint System).

To fasten the seat belt: first, adjust your seat (front seats only); second, pull the lap/shoulder belt from the retractor so the shoulder portion of the belt crosses your outside shoulder and chest; and third, insert the belt tongue into the proper buckle until it latches.

The bottom anchorage points for the front-seat belts are fitted to the seats and therefore move with the seat when the legroom is being adjusted.

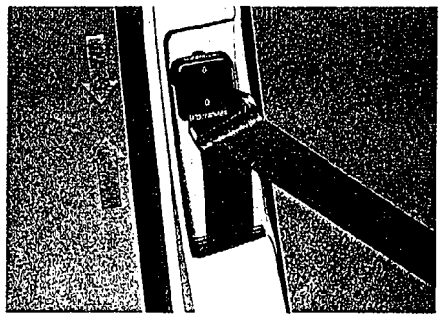
The height of the front seat belt–guides on the door pillars are adjustable in order to increase the comfort and fit of the shoulder portions of the front seat belts. They should normally be placed in the upmost position as this affords the greatest protection for most adult occupants.

Front seat belt

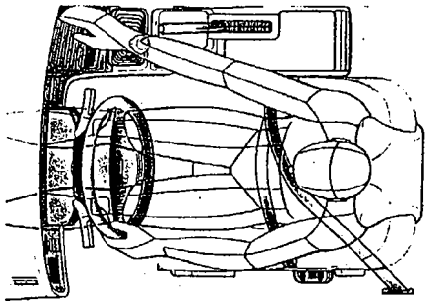


SG 383

Belt guide on door pillar (top position - NORMAL)



SG 639



Seat belt correctly fitted

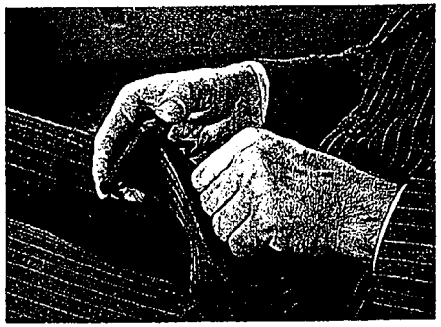
On shorter persons, the shoulder portion of the seat belts may run too close to the neck and the belt guides should then be lowered until the shoulder portion of the belts are between the outside shoulder and the neck. To alter the height of the guides, squeeze the sliding piece as indicated by the arrows in the picture and move it to the desired position. Check to ensure that the guide is securely locked in position.

For maximum protection, adjust the lap portion of the seat belt low across the hips and the shoulder belt well in on the shoulder but not too close to the neck. Make sure the belt is not twisted or rubbing against any sharp edges and that there is not unnecessary slack in the seat belt.

To release the buckle, press the red button marked PRESS and remove the seat belt tongue. Gently guide the seat belt back to its stowed position to minimize the possibility of it striking you or part of the vehicle.

WARNING!

Use the shoulder belt portion of the seat belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Be sure the lap portion of the belt is fitted snugly and as low as possible around the hips, not on the waist. Remove heavy overcoats prior to fastening the shoulder and lap belt portion. Failure to follow these precautions could increase the chance and/or severity of injury in an accident.



Lengthening the lap belt SG 385

Rear center seat lap seat belt

The rear center seat lap seat belt does not contain an inertia reel retractor and must be adjusted manually. If required, lengthen the seat belt before fastening it by holding the buckle at right angles to the seat belt webbing and then pulling the seat belt webbing out. Tighten the belt snugly around the hips, as low as possible, by pulling the free end of the seat belt. To release the belt, press the red button on the buckle lock. When in use, the rear center lap seat belt should be shortened and fastened.

WARNING!

All safety belt assemblies including retractors and attaching hardware must be inspected after any collision. Saab recommends that all safety belt assemblies in use during a collision be replaced unless the collision was minor and a qualified technician finds that the belts show no damage and continue to operate properly. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted. The front seat belts must be replaced if the Supplementary Restraint System's driver-side airbag deploys.

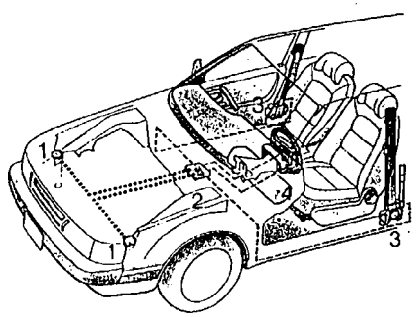
Seat Belt Reminder System

This vehicle is equipped with a seat belt reminder system as required by Federal Motor Vehicle Safety Standard 208, Occupant Crash Protection. The purpose of this standard is to reduce the number and severity of traffic accident injuries by promoting increased usage of seat belt systems. The vehicle may be started whether or not the seat belts are fastened. A seat belt warning light on the overhead panel will glow for

about 8 seconds. The warning chime will sound until this light goes out or until the front occupants' seat belts are fastened, whichever occurs first.

WARNING!

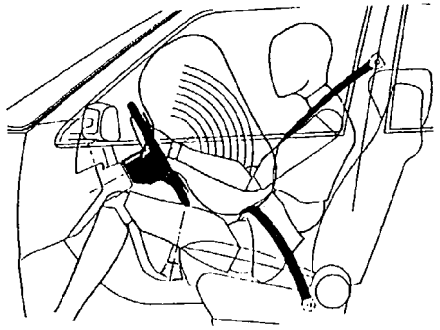
- No alterations or additions should be made to this belt system.
- The webbing must not be bleached or redyed.
- Each belt is meant for one person only. The belts at outboard seating positions must be used as a lap/shoulder restraint only.
- Fully reclining the seat back increases the risk of sliding under the seat belts in the event of a frontal collision.
- Make sure that the belts do not become trapped when the rear-seat cushion is tipped forward or folded back.



Supplementary Restraint System

1 Front sensors
2 Electronic unit with safety sensor
3 Emergency belt tensioners
4 Steering wheel with airbag

Airbag deployment



SG1104

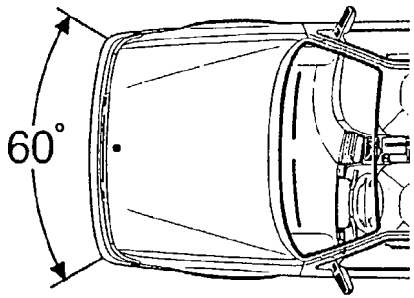
Supplementary Restraint System (SRS)

Your vehicle is equipped with a sophisticated Supplementary Restraint System (SRS) which consists of a driver's-side airbag mounted in the hub of the steering wheel, emergency tensioners in the front seat belts, and padded knee bolsters for both front-seat occupants.

The system is referred to as **supplemental** because it is designed to be used with safety belts to give you greater protection against head and chest injuries in frontal collisions than safety belts alone.

SRS Technical Description

The SRS consists of a sensor system which initiates the inflation of an airbag in the steering wheel pad when one of the two front sensors and the safety sensor have been activated in a front end collision. The emergency belt tensioners for the front passengers are also connected to the sensor system. See p. 29 for important belt usage instructions.



SG 849

The SRS is activated when a severe impact of at least 16 g occurs to the front end of the car in an arc of 60°. It takes 20–30 milliseconds for the airbag to be inflated by the inert non–toxic gas generated by the system. The bag will deflate after deployment at a controlled rate.

No attempts should be made to adjust the steering wheel, install a steering wheel of another type or modify the steering wheel.

The electronic unit is self–diagnosing and continuously monitors the SRS. If an intermittent or persistent fault should occur in the electronic unit or in components connected to it, this is indicated by the red symbol SRS lighting up in the Pictogram in the instrument cluster. This illumination may be a blinking or a steady glow.

A fault in the system should be checked and corrected immediately by a Saab dealer, who has the special tool for retrieving fault codes stored in the electronic unit.

In order to ensure that the system remains functional, the electronic unit must be inspected every 10 years by an authorized Saab dealer.

WARNING!

Safety belts must be worn by all vehicle occupants to reduce the risk of injury in an accident.

There are several very important reasons to use safety belts with the SRS. First, the seat belt properly positions the driver during the airbag inflation (the driver's seat should always be adjusted to provide a view of the instrument cluster). Also, the emergency tensioners will only provide supplemental protection to the front seat passengers if the seat belts are worn. Second, safety belts provide occupant restraint and reduce the risk of harm in rollover, side and rear impacts or collisions in which the SRS is not designed to deploy. Third, the SRS only deploys in moderate to severe frontal collisions. Safety belts reduce the risk of harm in less severe frontal crashes as well. Fourth, safety belts reduce the risk of ejection, and reduce the risk of injury. And fifth, safety belts, unlike the airbag and emergency tensioners, can provide occupants restraint for more than one impact in a multi-collision accident.

The Supplementary Restraint System can be identified by the letters SRS embossed on the center hub of the steering wheel and a SRS warning light in the pictogram of the instrument cluster (see page 9). In the event of a fault in the system, the warning lamp will flash for approximately 10 minutes and then remain lit with a steady glow.

WARNING!

If the SRS warning light does not go off or stays on and blinks when driving, the vehicle should be checked and repaired at a Saab dealer immediately. When the light is on or blinking the SRS may not be activated in the event of a head–on accident.

For purposes of testing the SRS, the SRS lamp lights for about 6 seconds when the ignition key is turned to the start or drive position. It then goes out if there are no faults in the system. After a collision causing deployment of the airbag, the SRS lamp flashes for 5 seconds and then remains lit with a steady glow.

NOTE

Illumination of the SRS lamp does not indicate imminent deployment of the airbag.

WARNING!

- Never remove and replace fuse 13 when the ignition switch is in the drive, check mode or starting position. Failure to heed this warning will cause the SRS warning lamp to illuminate. Although this action, by itself, will not prevent the SRS from activating, the illuminated warning light subsequently will not be able to indicate a more serious fault in the SRS which may prevent the SRS from activating. Whenever the warning lamp illuminates, the vehicle needs to be checked and corrected immediately by a Saab dealer.
- Do not attempt any service, repair, or modification of the Supplemental Restraint System. Tampering could cause activation of the system and the risk of personal injury. For servicing of the SRS, see your authorized Saab dealership. The SRS must be checked after ten years.
  In the U.S, if you are involved in an accident that results in the deployment of the SRS, Saab Cars USA would appreciate your cooperation in reporting the deployment to your dealer and/or Saab Cars USA's Customer Assistance Center (800–955–9007).
- After an airbag deployment, the airbag surface may contain deposits of sodium hydroxide, a by-product of the gas generated during deployment. Because sodium hydroxide is irritating to the skin, wash thoroughly with lukewarm water and a mild soap.
- Airbags and emergency belt tensioners that have been activated during an accident must be replaced and must only be replaced by an authorized dealer.
- No modifications must be made to the steering wheel or to the padded cover of the airbag. Do not install any fabric over the pad or attach any badges or emblems. No modifications of any kind may be made to wiring of the airbag or the automatic belt tensioners.
- Improper installation may result in inadvertent activation or rendering the system useless. Only trained personnel should work on or replace an automatic belt tensioner or airbag.
- Emergency belt tensioners and airbags must be set off before the car is scrapped or if the components (airbag, emergency belt tensioners) are removed for scrapping. Your Saab dealer has instructions and tools to perform such operations.
- When welding, disconnect the battery and the SRS electronic unit. When processing the car through a paint oven after painting, the electronic unit must be disconnected and removed from the car.
- The Supplementary Restraint System requires special equipment for testing and repairs. No attempts at repair or alterations to the airbag system should be made except by properly trained technicians. If in doubt on any matter concerning the SRS, seat belts or their use, please consult your dealer.

Child safety

WARNING!

For maximum protection in the event of a collision or sudden stop, always protect your infant or small child occupant of your vehicle with a suitable safety seat designed especially for them and which conforms to applicable motor vehicle safety standards. Follow seat manufacturer's installation and use instructions and obey all warnings supplied with the infant and child safety seats. Failure to follow each of these manufacturer warnings and instructions for ANY infant or child restraint system could increase the chance or severity of an injury in the event of a collision or sudden stop. Do not hold an infant or small child while the vehicle is in motion. Do not permit children to sit in the vehicle where they cannot be properly restrained.

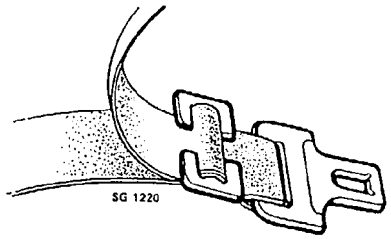
930308

WARNING!

All child safety restraint systems are designed to be secured in vehicle seats by lap belts or the lap portion of a lap/shoulder belt system. Child safety seats positioned on the front passenger seat must not be attached to the seat adjustment controls (in particular, the seat/legroom adjustment bar). Using a child restraint system without properly securing it to the vehicle could increase the risk of personal injury to the child occupying it in a collision or sudden stop, or, if improperly installed, the restraint could endanger other occupants of the vehicle.

Saab recommends using infant and child safety seats in rear seats rather than in the front seat to reduce the chance or severity of personal injury in the event of a collision or a sudden stop.

If the child safety seat is designed to be restrained solely by a lap belt, use the seat in the center rear seating position.



Locking clip for the 3-point belt

WARNING!

Restraining the seat with a 3–point belt (lap/shoulder combination) may require a special locking clip (contact the seat manufacturer) to restrict belt movement and prevent the seat from tipping over. Refer to the manufacturer's instructions to determine clip necessity and availability.

Before placing the child in the safety seat, fasten and tighten the lap belt. Forcibly tilt the seat from side to side, and also pull the seat forward to determine if the lap belt holds it securely in place. If belt slippage occurs, the child seat should be properly installed in a different seating position in the vehicle, repeating the above procedure for the new position.

A child should never be allowed to ride unrestrained in a vehicle. For children who are too large for child safety seats, (see instructions with your child seat to determine maximum recommended size), the lap belts in the center rear seats can be used. Lap/shoulder belts in other seats may be used if the lap belt portion fits snugly and low on the hips and the shoulder belt does not contact or rest in front of the face, chin neck or throat.

WARNING!

Children should not be seated in the right front, left rear, or right rear seats unless they can be positioned so that the shoulder strap does not contact or rest in front of the face, chin, neck or throat. Failure to follow this precaution can increase the chance or severity of injury in the event of a collision or sudden stop.

Child restraint anchorages (Canada only)

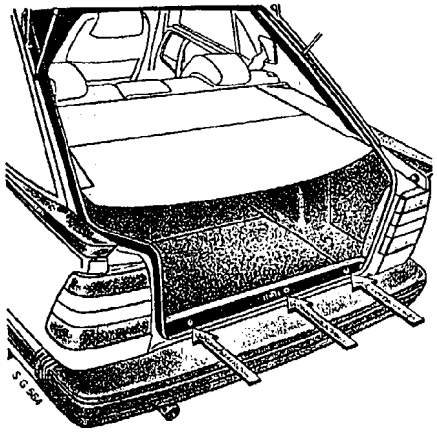
On Canadian models, one child tether anchorage kit is provided with the vehichle. Please refer to the following installation instructions.

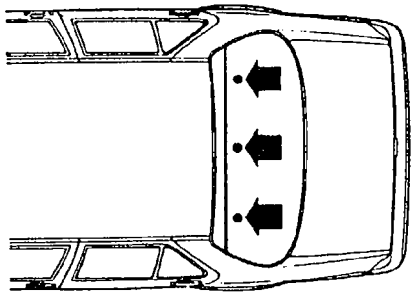
Five-door models

1 Remove the three covering plugs from the rectangular holes in the luggage compartment sill.

2 Fasten the anchor bolts with their shackles in the holes. Spacers are not required.
Bolt dimension: M8 x 30

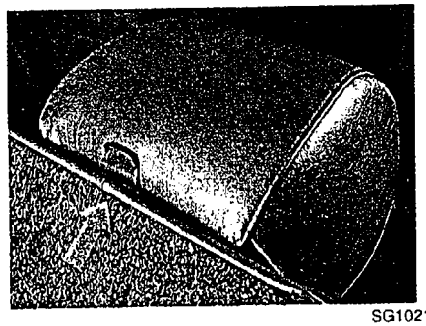
Child restraint anchorages (five–door models)





Child restraint anchorages in rear shelf (four–door models) SG851

Removing the head restraint



SG1021

Four-door models

1 Disengage the head restraint by pulling the catch upwards. Remove the head restraints by pulling upwards (outboard seating positions only).

2 Remove the covering plug(s) from the hole(s) in the parcel shelf.

3 Fasten the anchor bolt in the hole using the specially designed spacer.

Bolt dimension:
M8 x 30 Spacer dimension: 20 mm Ø (hole 12 mm Ø), thickness 10 mm.

WARNING!

Child restraint anchorages are designed to withstand only those loads imposed by correctly fitted child restraints. Under no circumstances are they to be used for adult seat belts or harnesses.