V2406

Report Numbers: 208-TRC-96-006
212-TRC-96-006
301-TRC-96-006

Vehicle Safety Compliance Testing for Occupant Crash Protection, Windshield Mounting, Windshield Zone Intrusion, and Fuel System Integrity

Isuzu Motors

1996 Isuzu Rodeo

4-door MPV

NHTSA Number: CT5701

TRC Test Number: 960207

Transportation Research Center Inc.
10820 State Route 347
East Liberty, Ohio 43319

February 29, 1996

Final Report

Prepared For:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance (NEF-30)
400 Seventh Street, S.W., Room No. 6115
Washington, DC 20590

Rec'd 3/28/96

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15. Supplemental Notes

16. Abstract

A 30 mph flat frontal barrier impact test was conducted on a 1996 Isuzu Rodeo 4-door MPV, NHTSA No. CT5701, at Transportation Research Center Inc. on February 7, 1996. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standards: FMVSS 208, "Occupant Crash Protection"; 212, "Windshield Mounting"; 219 (partial), "Windshield Zone Intrusion"; and 301 "Fuel System Integrity." The barrier impact velocity was 29.3 mph. The vehicle's maximum static crush was 16.5 inches. The ambient temperature was 74° F.

The driver's Head Injury Criteria (HIC) was 122. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 36.1 g. The driver's chest deflection was 2.0 inches. The driver's left and right femur maximum axial forces were 2037 pounds and 1205 pounds, respectively.

The passenger's HIC was 334. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.2 g. The passenger's chest deflection was 1.4 inches. The passenger's left and right femur maximum axial forces were 1838 pounds and 1378 pounds, respectively.

17. Key Words	18. Distribution Statement
Frontal Impact 30 mph Vehicle Safety Compliance Testing: FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"	Copies of this report are available from: NHTSA Technical Reference Division Nassif Building, Room 5108 400 Seventh Street, S.W. Washington, DC 20590

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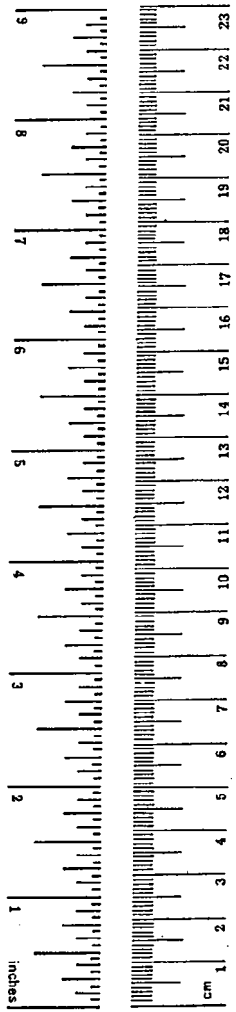
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

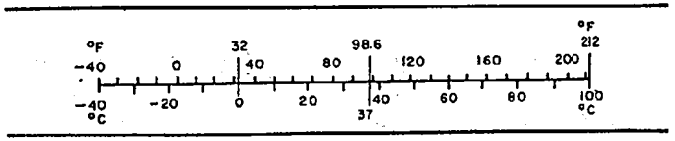
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	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



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Section 1.0

Purpose and Test Procedure

Purpose

This 30 mph flat frontal barrier impact test is part of the Federal Motor Vehicle Safety Standards (FMVSS) 208, 212, 219 (partial), and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center Inc. (TRC) under Contract No. DTNH22-93-D-01089. The purpose of this test was to determine if the subject vehicle, a 1996 Isuzu Rodeo 4-door MPV, NHTSA No. CT5701, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," in the flat frontal barrier impact mode.

Test Procedure

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-09. Data was obtained relative to FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with seven (7) accelerometers to measure longitudinal axis accelerations and one (1) accelerometer to measure vertical axis acceleration. The vehicle's specified impact velocity range was 28.9 to 29.9 mph. The vehicle impacted a flat frontal barrier.

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

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, chest deflection potentiometers, upper and lower tibia load cells to measure forces and moments, and with left and right femur load cells to measure axial forces.

The forty-six (46) data channels were digitally sampled at 12,500 samples per second and processed per Sections 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208, 212, 219 (partial) and 301 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the manufacturer's vehicle information.

Section 2.0

Frontal Barrier Impact Test Summary

Test Results Summary

This flat frontal barrier test was conducted at TRC on February 7, 1996.

The test vehicle, a 1996 Isuzu Rodeo 4-door MPV, NHTSA No. CT5701, appeared to comply with the performance requirements of FMVSS 208, 212, 219 (partial), and 301 in the flat frontal barrier impact mode. The Head Injury Criteria (HIC) calculations were less than 1000, the chest resultant accelerations did not exceed 60 g's, the chest deflections did not exceed 3.0 inches, and the compressive forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Part 572 E dummies seated in the front outboard designated seating positions. The vehicle's restraint system met the applicable comfort and convenience requirements. The windshield periphery retention was 100 percent. There was no penetration into any portion of the windshield. No fluid spilled from the vehicle's fuel system following the impact or during the static rollover test.

The test vehicle was equipped with airbags at the driver's and right front passenger's seating position. The vehicle's test weight was 4122 pounds. The vehicle's impact speed was 29.3 mph. The vehicle's maximum static crush was 16.5 inches.

The driver's HIC was 122. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 36.1 g. The driver's chest deflection was 2.0 inches. The driver's left and right femur maximum compressive forces were 2037 pounds and 1205 pounds, respectively.

The right front passenger's HIC was 334. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 51.2 g. The passenger's chest deflection was 1.4 inches. The right front passenger's left and right femur maximum compressive forces were 1838 pounds and 1378 pounds, respectively.

There was no loss of windshield periphery retention and no penetration through 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.

Table 1 Crash Test Summary

NHTSA number:	CT5701
Test type:	Frontal barrier impact
Test date:	02/07/96
Test time:	1741
Ambient temperature at impact area:	74° F
Vehicle year/make/ model/body style:	1996/Isuzu/Rodeo/4-door MPV
Vehicle test weight:	4122 lb
Impact angle[1]:	0°
Impact velocity[2]:	
Primary:	29.3 mph
Secondary:	29.3 mph
Maximum static crush:	16.5 in
Average rebound:	17.1 in
Number of cameras:	
Real-time:	2
High-speed:	14
Door opening data:	
Left-front:	Easy
Right-front:	Easy

[1] With respect to tow track centerline.
[2] Speed trap measurement (± .05 mph accuracy)

Table 1 Crash Test Summary, Cont'd.

Dummies:	Driver #314	Passenger #229
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag	Airbag
Number of data channels:	19	19
Front seat data:		
Seat track failure:	None	None
Seat back failure:	None	None
Visible dummy contact points:		
Head:	Airbag, sun visor, head liner, and head restraint	Airbag, sun visor, and head restraint
Chest:	Airbag	Airbag
Abdomen:	None	None
Left knee:	Lower instrument panel	Glove box
Right knee:	Lower instrument panel	Glove box

Table 2 Test Vehicle Information

Vehicle year/make/ model/body style:	1996/Isuzu/Rodeo/4-door MPV			
Color:	Silver			
VIN:	4S2CK58E8T4303355			
NHTSA number:	CT5701			
Engine data:				
Placement:	Longitudinal/inline			
Cylinders:	4			
Displacement:	2.6 liters			
Transmission data:	_5_ speed,	_X_ manual,	__ automatic,	__ overdrive
Final drive:	__ fwd,	_X_ rwd,	__ 4wd	
Date vehicle received:	01/29/96			
Odometer reading:	75			
Dealer's name and address:	Ricart Isuzu 667 S. Hamilton Rd. Columbus, OH 43213			

Accessories:

Power steering	Yes	Automatic transmission	No
Power brakes	Yes	Automatic speed control	No
Power seats	No	Tilting steering wheel	No
Power windows	No	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	Yes
Clock	Yes	Rear window defroster	Yes
Power door locks	No	Other:	None

Certification data from vehicle's label:

Vehicle manufactured by:		Isuzu Motors Limited
Date of manufacture:		01/96
VIN:		4S2CK58E8T4303355
GVWR:		4550 lb
GAWR:	Front:	2100 lb
	Rear:	2700 lb

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P225/75R16
Spare tire:	Standard
Type of front seats:	Bucket

Tire & capacity data from vehicle's label:

Recommended tire size:	P255/75R16
Recommended cold tire pressure:	
Front:	29 psi
Rear:	32 psi
Designated Seating Capacity:	
Front	NA
Rear	NA
Total	NA
Vehicle Capacity Weight:	NA

Test vehicle attitudes:

Delivered attitude:	LF:	34.2 in.	RF:	34.0 in	LR:	34.4 in	RR: 34.0 in
Fully loaded attitude:	LF:	33.5 in	RF:	33.3 in	LR:	33.5 in	RR: 33.1 in
Pre-test attitude:	LF:	33.5 in	RF:	33.3 in	LR:	33.5 in	RR: 33.4 in

Table 2 Test Vehicle Information, Cont'd.

Weight of test vehicle as received (with maximum fluids):

Right front	858	lb	Right rear	979	lb
Left front	894	lb	Left rear	970	lb
Total front weight	1752	lb	(47.3% of total vehicle weight)		
Total rear weight	1949	lb	(52.7% of total vehicle weight)		
Total delivered weight	3701	lb			

Calculation of test vehicle's target test weight:

RCLW[1] = Rated Cargo and Luggage Weight

GVWR = Gross Vehicle Weight Rating (4550 lb)

UDW = Unloaded Delivered Weight (3701 lb)

VCW = Vehicle Capacity Weight = GVWR - UDW = 4550 - 3701 = 849

DSC[2] = Designated Seating Capacity (5)

RCLW[1] = GVWR - UDW - 150 (DSC) = 4550 - 3701 - 150(5) = 99

Target test weight = UDW + RCLW[1] + (Number of Hybrid III dummies x 167 lb per dummy)

Target test weight = 3701 + 99 + 334 = 4134 lb

Weight of test vehicle with required dummies and 87 lb of cargo weight:

Right front	947	lb	Right rear	1084	lb
Left front	999	lb	Left rear	1092	lb
Total front weight	1946	lb	(47.2% of total vehicle weight)		
Total rear weight	2176	lb	(52.8% of total vehicle weight)		
Total test weight	4122	lb	(0.3% under target test weight)		

Weight of ballast secured in vehicle cargo area: None

Components removed to meet target test weight: Rear seat, spare tire, rear carpet

CG rearward of front wheel centerline: 57.4 in

Vehicle Wheelbase: 108.8 in

[1] Cargo weight for multipurpose passenger vehicles, trucks, and buses is the vehicle's calculated cargo and luggage weight or 300 pounds, whichever is less.

[2] The designated seating capacity is determined by counting the number of seat belts installed in the vehicle.

Table 3 Post-Impact Data

Test number:	960207
NHTSA number:	CT5701
Test date:	02/07/96
Test time:	1741
Test type:	Frontal barrier impact
Impact angle:	0°
Ambient temperature at impact area:	74° F
Temperature in occupant compartment:	67° F

Impact velocity:

Primary:	29.3 mph
Secondary	29.3 mph
Specified range:	29.0 to 30.0 mph

Distance from vehicle to barrier:

Entering velocity trap:	14.0 in
Exiting velocity trap:	2.0 in

Test vehicle static crush:

Overall length of test vehicle:

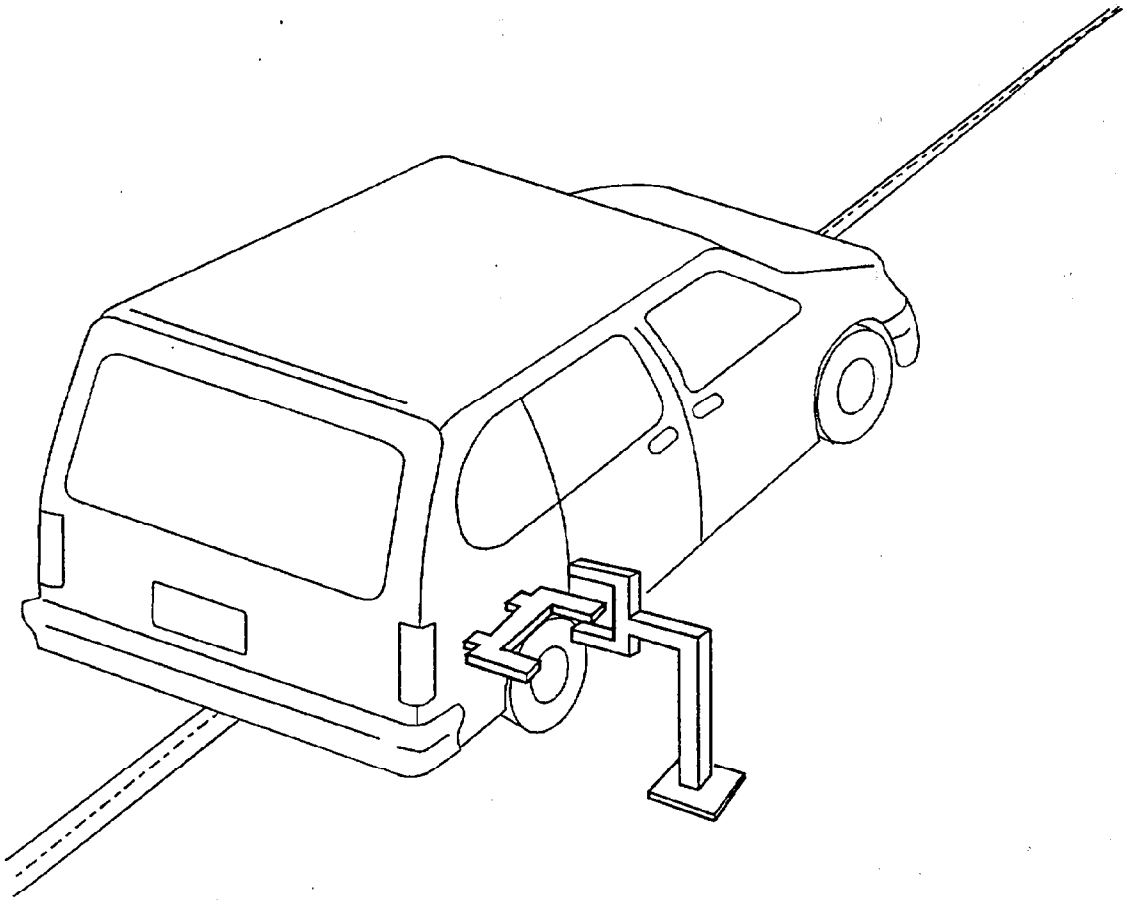
Pre-test:	L:	181.0 in	C:	184.0 in	R:	181.0 in
Post-test:	L:	168.2 in	C:	167.5 in	R:	167.3 in
Total crush:	L:	12.8 in	C	16.5 in	R:	13.7 in
Average crush:	14.3 in					

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L:	16.3 in	C:	16.9 in	R:	18.2 in
Average rebound:	17.1 in					

Figure 1 Impact Velocity Measurement System

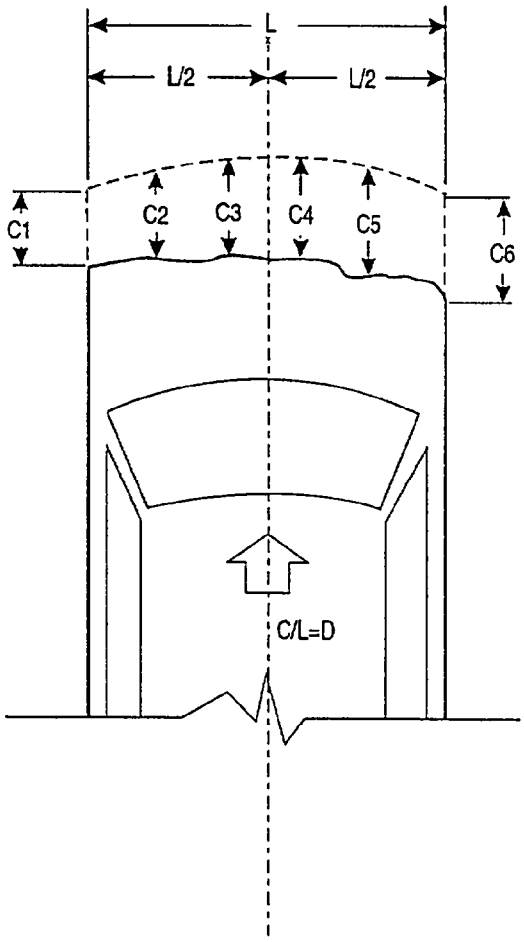


The final vane clears emitter/receiver two inches before impact.

The vanes have a one-foot spacing.

Figure 2 Accident Investigation Division Data for 30 mph Frontal Barrier Impact

NHTSA number:	CT5701
Test date:	02/07/96
Vehicle year/make/ model/body style:	1996/Isuzu/Rodeo/4-door MPV
Vehicle size category:	Special purpose
VIN:	4S2CK58E8T4303355
Build date:	01/96
Test weight:	4122 lb
Vehicle wheelbase:	108.8 in
Maximum width:	65.5 in
Front overhang:	28.5 in



Collision Deformation

Classification (CDC) Code: 12FDEW2

Crush depth measurements:	C1:	12.8 in
	C2:	14.9 in
	C3:	15.6 in
	C4:	15.6 in
	C5:	15.2 in
	C6:	13.7 in

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged region: L: 56.0 in

Table 4 Post-test Airbag Data

NHTSA number:	CT5701
Test date:	02/07/96
Technician:	Looker
Vehicle year/make/ model/body style:	1996/Isuzu/Rodeo/4-door MPV

A. Number of airbag vent holes:

Driver:	2
Passenger:	2

B. Size of airbag vent holes:

Driver:	2.0 in dia.
Passenger:	2.3 in dia.

C. Total airbag vent area:

Driver:	6.3 in^2
Passenger:	8.3 in^2

D. Deflated airbag length and width dimensions or, if round, diameter

Driver:	Length	NA
	Width	NA
	Diameter	24.0 in
Passenger:	Length:	28.0 in
	Width:	27.0 in
	Diameter:	NA

Table 4 Post-test Airbag Data, Cont'd.

E. Is the airbag tethered?

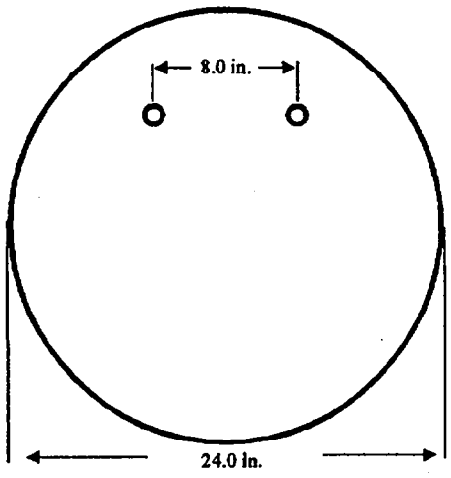
Driver: Yes

If yes, record length of tether: 10.8 in

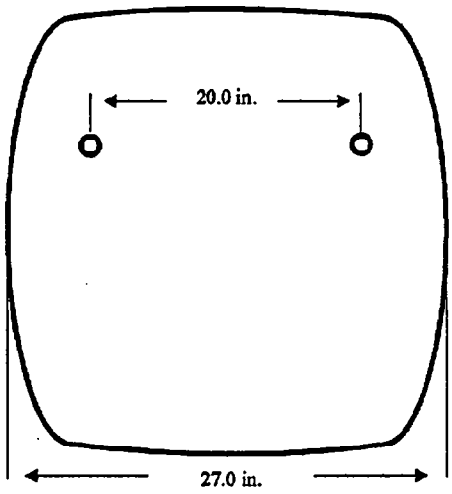
Passenger: No

If yes, record length of tether: NA

Driver's airbag:



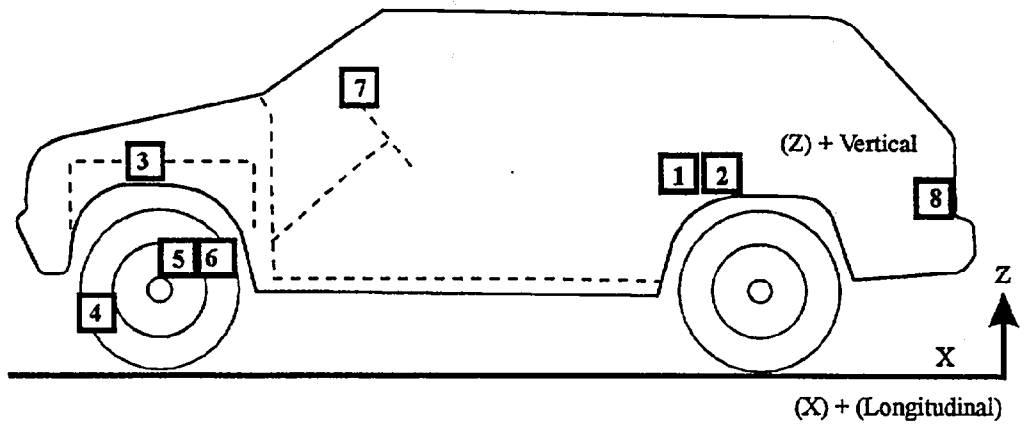
Passenger's airbag:



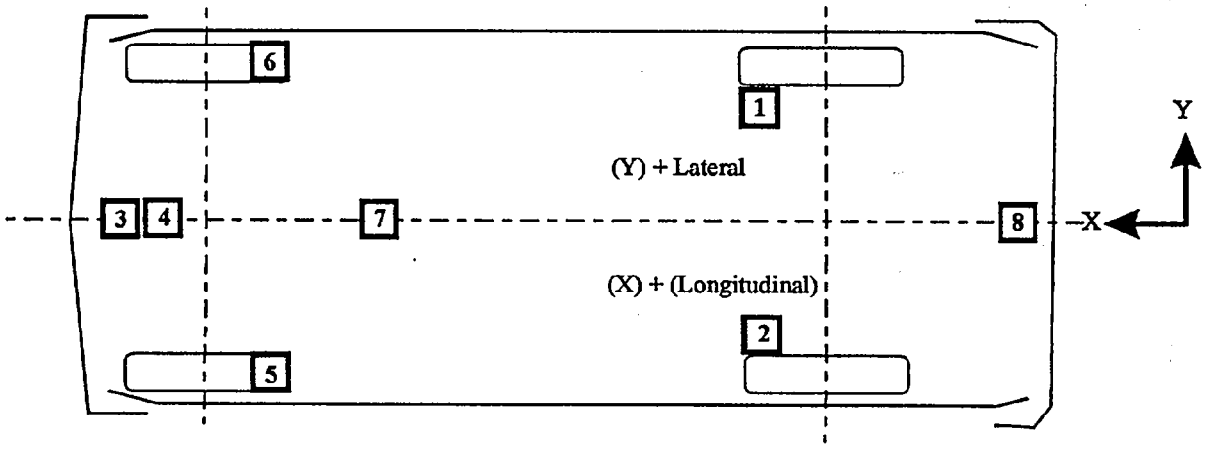
F. Airbag and gas generator part numbers and manufacturer's names.

Driver:	Manufacturer:	Herst, Morton International, Inc.
	Airbag:	0001731 P51501
	Inflator:	MTG-6 BAM-PT_1-0363 Herg: 1995 B.C.
Passenger:	Manufacturer:	Herst, Morton International, Inc.
	Airbag:	NA
	Inflator:	API BAM-PT_1-0525 Herg: 1995 B.C.

Figure 3 Vehicle Accelerometer Placement



Side View



Bottom View

Table 5 Vehicle Accelerometer Locations and Data Summary

TEST NUMBER: 960207 No. LOCATION		X	Y	Z	POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT REAR SEAT	PRE	75.9 in	16.9 in	23.3 in				
CROSSMEMBER	POST	75.3 in	16.9 in	24.0 in				
LONGITUDINAL					1.7 g	@ 124.4 ms	42.9 g	@ 20.2 ms
2 RIGHT REAR SEAT	PRE	76.0 in	-17.2 in	23.3 in				
CROSSMEMBER	POST	75.7 in	-17.2 in	25.0 in				
LONGITUDINAL					1.4 g	@ 123.7 ms	41.8 g	@ 18.5 ms
3 ENGINE TOP	PRE	162.1 in	0.0 in	36.8 in				
	POST	155.9 in	-0.8 in	39.0 in				
LONGITUDINAL					20.7 g	@ 53.3 ms	116.7 g	@ 35.0 ms
4 ENGINE BOTTOM	PRE	152.5 in	2.0 in	13.8 in				
	POST	150.6 in	2.0 in	14.8 in				
LONGITUDINAL					12.8 g	@ 53.5 ms	105.5 g	@ 36.5 ms
5 RIGHT BRAKE CALIPER	PRE	153.6 in	-23.8 in	13.6 in				
	POST	147.3 in	-23.8 in	12.2 in				
LONGITUDINAL					56.9 g	@ 33.7 ms	94.3 g	@ 24.6 ms
6 LEFT BRAKE CALIPER	PRE	153.8 in	23.8 in	13.3 in				
	POST	145.9 in	23.8 in	12.2 in				
LONGITUDINAL					49.5 g	@ 34.2 ms	82.7 g	@ 27.0 ms
7 INSTRUMENT PANEL	PRE	133.7 in	0.0 in	46.3 in				
CENTER	POST	134.0 in	0.0 in	45.0 in				
LONGITUDINAL					24.9 g	@ 46.4 ms	65.8 g	@ 31.3 ms
8 VEHICLE REAR CENTER	PRE	17.5 in	0.0 in	28.0 in				
	POST	18.0 in	0.0 in	32.5 in				
VERTICAL					31.8 g	@ 32.2 ms	21.4 g	@ 58.2 ms

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

Section 3.0

FMVSS 208, 212, 219 (partial), and 301 Data

Table 6 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-34.0 g	-7.6 g	-19.7 g	38.2 g	-37.4 g	-6.2 g	-12.8 g
Passenger	-44.1 g	14.2 g	-34.6 g	57.0 g	-48.6 g	3.8 g	-19.5 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	2037 lbf	1205 lbf
Passenger	1838 lbf	1378 lbf

Head Injury Criteria[1]

	HIC	Time t_1	Time t_2
Driver	122	50.32 ms	86.32 ms
Passenger	334	50.64 ms	86.64 ms

Chest Maximum Resultant Acceleration[2]

	Acceleration	Time t_1	Time t_2
Driver	36.1 g	86.9 ms	89.9 ms
Passenger	51.2 g	67.6 ms	70.6 ms

Maximum Chest Deflection

Driver	2.0 in
Passenger	1.4 in

[1] As defined in FMVSS No. 208

[2] Defined as equal to or exceeding 0.003 sec. duration

Dummy Kinematic Summary

Driver Dummy

Upon impact, the driver dummy translated forward across the seat. The dummy's head contacted the visor and its knees contacted the lower instrument panel. The dummy's hands and forearms contacted the upper instrument panel and its head and chest contacted the airbag. The dummy was restrained by the airbag and the lower instrument panel. The dummy's upper body rotated forward then rearward as the dummy rebounded rearward into the seat back. The dummy then came to rest, seated in the driver's seat.

Right Front Passenger Dummy

Upon impact, the right front passenger dummy translated forward across the seat and its knees contacted the lower instrument panel. The dummy's head contacted the visor then its head and chest contacted the airbag. The dummy was restrained by the airbag and the lower instrument panel. The dummy's head rotated forward then rearward as the dummy rebounded rearward into the seat back. The dummy came to rest, seated in the right front passenger's seat.

Table 7 FMVSS 208 Seat Belt Comfort and Convenience Test Summary

Front Outboard Designated Seating Positions

NHTSA number: CT5701

Vehicle model year/make/model/body style: 1996/Isuzu/Rodeo/4-door MPV

Date of comfort/convenience check: 02/06/96

Technician performing check: Looker

GVWR: 4550 lb

Automatic seat belts installed in any vehicle, other than a walk-in van-type vehicle which has a gross vehicle weight rating of 10,000 pounds or less, and is manufactured on or after September 1, 1986, shall meet the requirements for convenience hooks, webbing tension-relieving devices, and belt contact force.

Manual seat belts installed for compliance with this standard in front outboard designated seating positions of any vehicle, other than a walk-in van-type vehicle which has a gross vehicle rating of 10,000 pounds or less, and is manufactured after September 1, 1989, shall meet the requirements for belt contact force, plate access, retraction and seat belt guides, and hardware.

Vehicle Equipment:

The vehicle's front outboard seating positions were equipped with manual Type 2 seat belts which must comply with the dynamic test requirements of S5.1; requirements for webbing tension-relieving devices (S7.4.2), belt contact force (S7.4.3), latchplate access (S7.4.4), retraction (S7.4.5), and seat belt guides and hardware (S7.4.6) apply.

Convenience Hooks (S7.4.1):

Not applicable, the vehicle was not equipped with automatic seat belts.

Table 7 FMVSS 208 Seat Belt Comfort and Convenience Test Summary

Front Outboard Designated Seating Positions, Cont'd.

NHTSA number: CT5701

Vehicle model year/make/model/body style: 1996/Isuzu/Rodeo/4-door MPV

Date of comfort/convenience check: 02/06/96

Technician performing check: Looker

GVWR: 4550 lb

Webbing Tension-Relieving Device (S7.4.2):

The front outboard seating position assemblies do not have webbing tension-relieving devices.

Belt Contact Force (S7.4.3):

The belt contact force on the chest of the test dummy is 0.6 pound.

Latchplate Access (S7.4.4):

The seat belt latchplates, in their normal stowed position, are within the reach envelope.

The clearance test block moves unhindered to the latchplate or buckle.

Retraction (S7.4.5):

The seat belt automatically retracts when the seat belt latchplate is released.

The stowed seat belt webbing and hardware are not pinched when the door is closed.

Table 7 FMVSS 208 Seat Belt Comfort and Convenience Test Summary

Front Outboard Designated Seating Positions, Cont'd.

NHTSA number: CT5701

Vehicle model year/make/model/body style: 1996/Isuzu/Rodeo/4-door MPV

Date of comfort/convenience check: 02/06/96

Technician performing check: Looker

GVWR: 4550 lb

Seat Belt Guides and Hardware (S7.4.6):

The seat cushion is not removable.

The seat back does not serve a function other than seating.

The seat is not removable.

The seat is movable but the space formerly occupied by the seat cannot be used for a secondary function.

Note: If the seat or seat cushion is removable or if the seat is movable so the space formerly occupied by the seat can be used for a secondary function, the seat belt guides and hardware requirements do not apply.

The webbing is not designed to pass through the seat cushion or between the cushion and seat back.

The restraint system does not include webbing guides.

The seat belt receptacles were accessible without moving the center arm rest for access.

Table 8 FMVSS 208 Equipment Data

FMVSS 208 Seat Belt Warning System Data

With an occupant in the driver's position and the unibelt in stowed position and ignition switch placed in the "start/on" position, the reminder light operates continuously. The duration of the audible warning signal is 6 s.

With an occupant in the driver's position and the unibelt in use and the ignition switch placed in the "start/on" position the duration of audible warning signal is 0 s and the duration of the reminder light operation is 0 s.

NOTE: the audible warning should not operate.

The visual seat belt warning is the symbol from Table 2 of FMVSS 101.

Table 8 FMVSS 208 Equipment Data, Cont'd.

FMVSS 208 Labeling and Driver's Manual Data

The labels which describe the manufacturer's maintenance or replacement schedule for the crash-deployed occupant protection system were located on the driver's and passenger's sun visors.

The system does not need regular maintenance.

Appropriate instructions concerning maintenance and/or replacement of this system were provided in the owner's manual on page 3-16.

A description of the functional operation of the system was provided in the owner's manual on page 3-17.

A reference to the instructions and description of the system was included on the label.

An owner's manual was provided.

The owner's manual contained appropriate information concerning maintenance and/or replacement and a description of the functional operation of the systems on page 3-16.

Table 8 FMVSS 208 Equipment Data, Cont'd.

FMVSS 208 Readiness Indicator Data

The vehicle contained a crash-deployed occupant protection system which was not totally mechanical. The readiness indicator was a light stating "SRS" located on the lower center portion of the instrument cluster.

The readiness indicator was located on the instrument cluster and is clearly visible to the driver.

A list of the elements in the occupant restraint system, being monitored by the readiness indicator was provided in the owner's manual on page 3-15.

FMVSS 208 Rear Outboard Seating Position Seat Belts

All rear outboard seating positions had Type 2 seat belts.

Figure 4 FMVSS 212 Test Data

Details of windshield mounting such as retention method, trim type, etc.:

Plastic trim around outer perimeter and adhesive around inner perimeter.

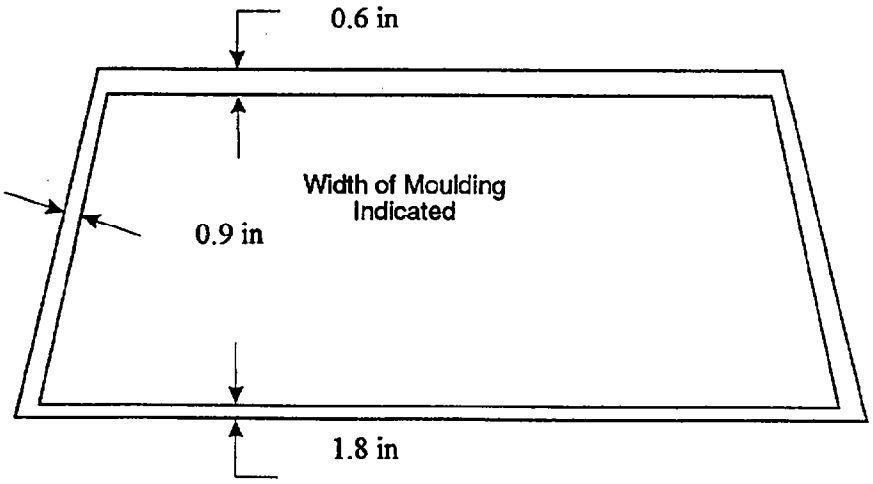
Clips or brackets used to retain windshield: None

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	78.4 in	78.4 in	100.0
Left side	78.4 in	78.4 in	100.0
Total	156.8 in	156.8 in	100.0

Pre-test windshield mounting material temperature: 68° F



Front view of windshield[1]

Loss of windshield retention lengths: None

[1] Indicate areas of loss of retention, if any, on windshield diagram.

Figure 5 FMVSS 219 Test Data

Protected zone lower edge requirement:

The lower edge of the protected zone is determined by placing a 6.5-inch diameter rigid sphere weighing 15 pounds 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 0.5 inch 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: 47.6 in

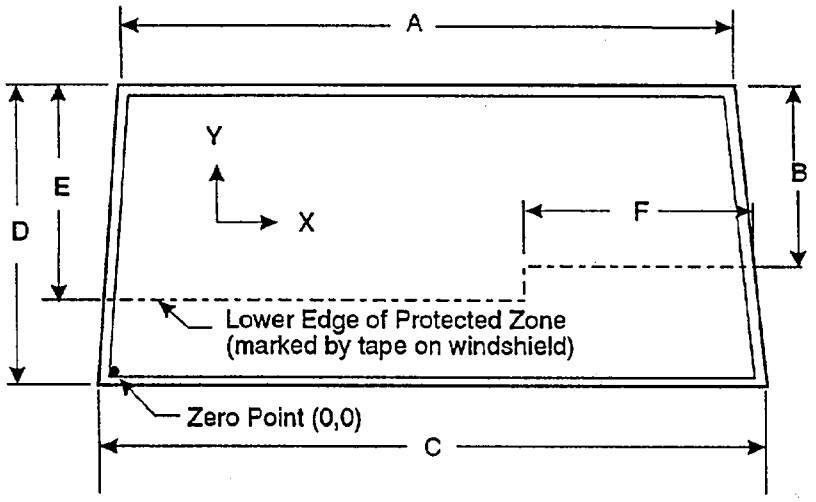
B: 14.1 in

C: 57.8 in

D: 29.1 in

E: 18.5 in

F: 21.6 in



FRONT VIEW

Method of adhering protected zone template to windshield:
NA

Areas of windshield template penetration greater than 0.25 in:
NA

Coordinates	X	Y
1.		
2.		
3.		

Areas of windshield penetration, below the protected zone, through the inner surface of the windshield:
None

1.
2.
3.

Table 9 Fuel System Data

Vehicle year/make/ model/body style:	1996/Isuzu/Rodeo/4-door MPV
NHTSA number:	CT5701
Fuel system capacity:	21.9 gal (from owner's manual)
Usable capacity:	21.2 gal (furnished by COTR)
Test volume range:	19.5 gal to 19.9 gal (92-94% of usable)
Actual test volume:	19.7 gal (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistoke
Test fluid color:	purple
Type of fuel pump:	electric

The electric fuel pump did not operate with ignition switch "on" and the engine not operating.

Details of fuel system: The fuel tank was located behind the rear axle. The fuel filler neck was located on the right side. The fuel lines run along the right side to the front.

Table 10 FMVSS 301 Post-Impact Test Data

NHTSA number: CT5701

Test date: 02/07/96

Vehicle year/make/
model/body style: 1996/Isuzu/Rodeo/4-door MPV

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 (30 mph)

____ Oblique (30 mph) with __° barrier face first contacting (driver's/passenger's) side

____ Rear moving barrier (30 mph)

____ Lateral moving barrier (20 mph)

Fuel system fluid spillage measurements:

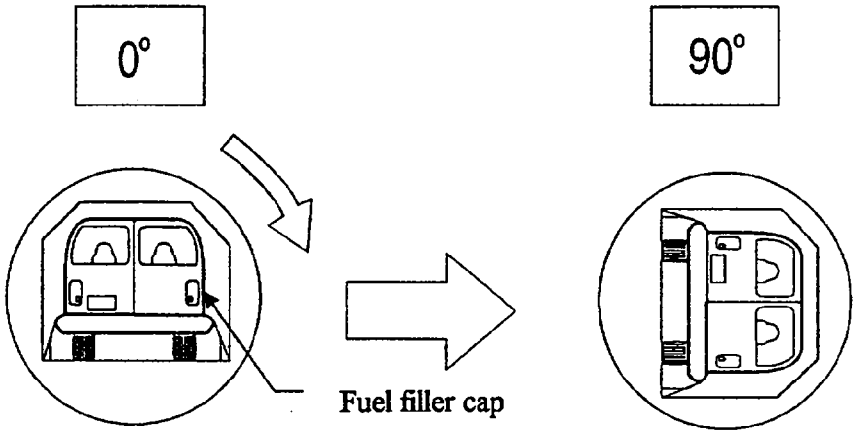
		Test Results	Maximum Allowable
1.	From impact until vehicle motion ceases	0 oz	1 oz
2.	5-Minute period after vehicle motion ceases	0 oz	5 oz
3.	Next 25 minutes after 5-minute period	0 oz	1 oz/1 min

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data

NHTSA number: CT5701

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90°	=	2	minutes,	0	seconds
FMVSS 301 position hold time	=	5	minutes,	0	seconds
Total	=	7	minutes,	0	seconds
Next whole minute interval	=	7	minutes		

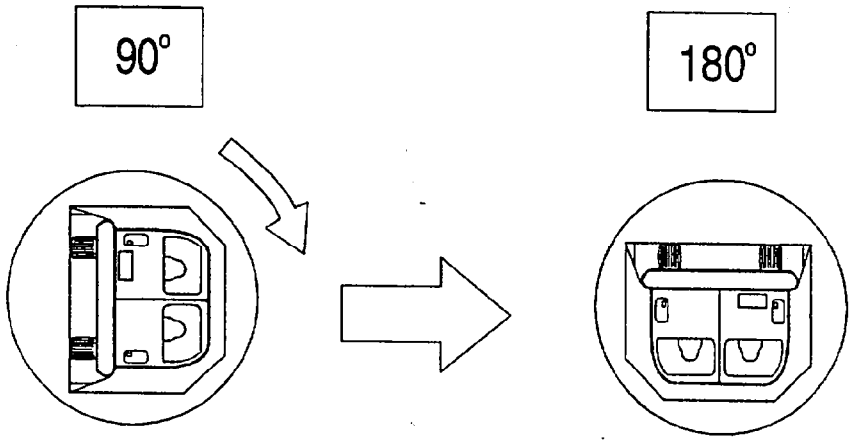
Fuel system fluid spillage measurements:

0° to 90° rotation (fuel filler cap down)	Test Results	Maximum Allowable
1. First five minutes from onset of rotation	0 oz	5 oz
2. Sixth minute from onset of rotation	0 oz	1 oz
3. Seventh minute from onset of rotation	0 oz	1 oz

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90°	=	2	minutes,	0 seconds
FMVSS 301 position hold time	=	5	minutes,	0 seconds
Total	=	7	minutes,	0 seconds
Next whole minute interval	=	14	minutes	

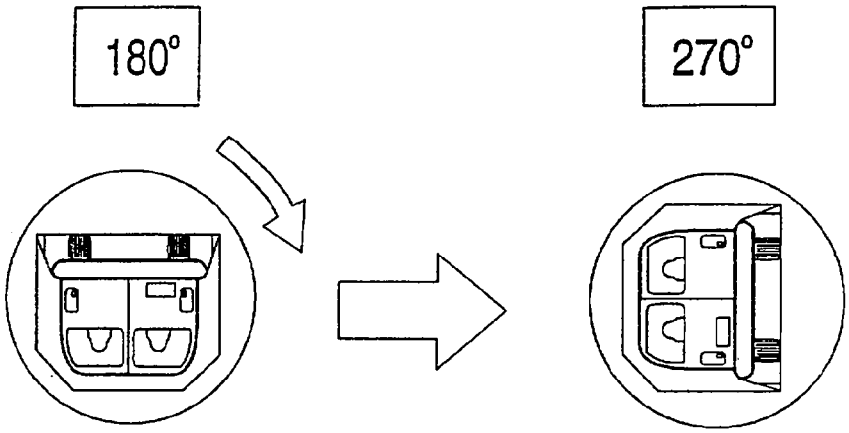
Fuel system fluid spillage measurements:

90° to 180° rotation	Test Results	Maximum Allowable
1. First five minutes from onset of rotation	0 oz	5 oz
2. Sixth minute from onset of rotation	0 oz	1 oz
3. Seventh minute from onset of rotation	0 oz	1 oz

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90°	=	2	minutes,	0 seconds
FMVSS 301 position hold time	=	5	minutes,	0 seconds
Total	=	7	minutes,	0 seconds
Next whole minute interval	=	21	minutes	

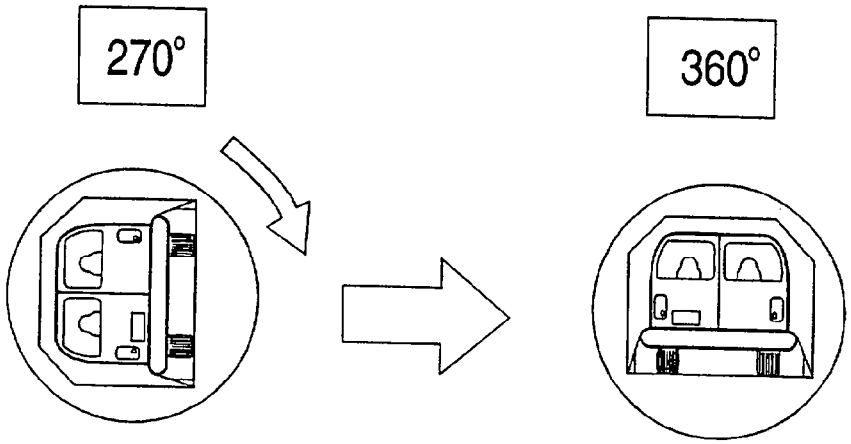
Fuel system fluid spillage measurements:

180 to 270° rotation	Test Results	Maximum Allowable
1. First five minutes from onset of rotation	0 oz	5 oz
2. Sixth minute from onset of rotation	0 oz	1 oz
3. Seventh minute from onset of rotation	0 oz	1 oz

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90°	=	2	minutes,	0 seconds
FMVSS 301 position hold time	=	5	minutes,	0 seconds
Total	=	7	minutes,	0 seconds
Next whole minute interval	=	28	minutes	

Fuel system fluid spillage measurements:

270° to 360° rotation	Test Results	Maximum Allowable
1. First five minutes from onset of rotation	0 oz	5 oz
2. Sixth minute from onset of rotation	0 oz	1 oz
3. Seventh minute from onset of rotation	0 oz	1 oz

Fuel system fluid spillage location(s): None

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 7 Pre-test and Post-test Measurement Points

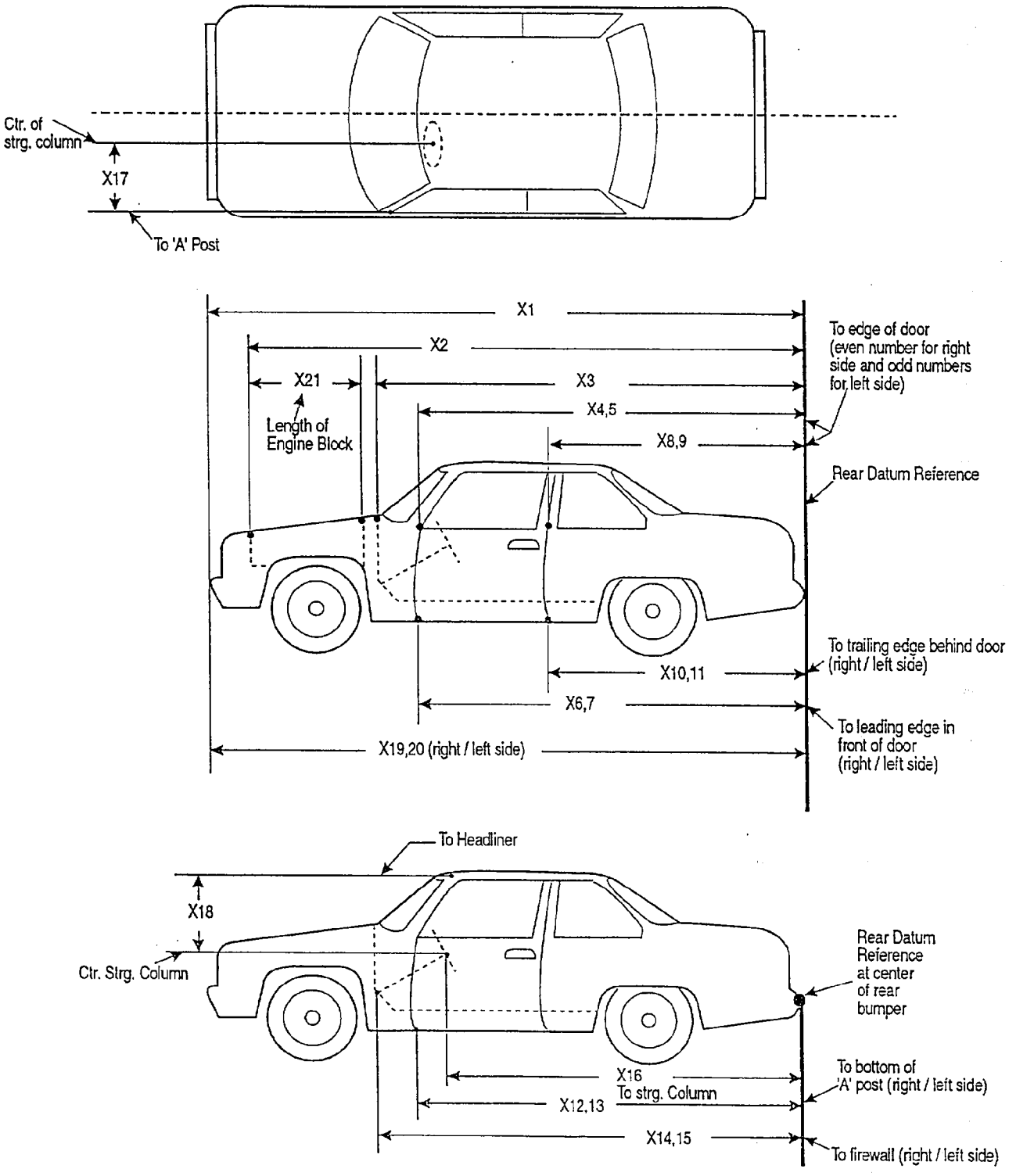


Table 11 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1996/Isuzu/Rodeo/4-door MPV

Test Number: 960207

No.	Type of measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	184.0 in	167.5 in	16.5 in
X2	Rear surface of vehicle to front of engine block	165.0 in	156.5 in	8.5 in
X3	Rear surface of vehicle to firewall	144.8 in	143.9 in	0.9 in
X4	Rear surface of vehicle to upper leading edge of right door	135.0 in	135.6 in	-0.6 in
X5	Rear surface of vehicle to upper leading edge of left door	135.1 in	135.8 in	-0.7 in
X6	Rear surface of vehicle to lower leading edge of right door	135.0 in	134.4 in	0.6 in
X7	Rear surface of vehicle to lower leading edge of left door	135.3 in	134.2 in	1.1 in
X8	Rear surface of vehicle to upper trailing edge of right door	89.8 in	90.9 in	-1.1 in
X9	Rear surface of vehicle to upper trailing edge of left door	89.9 in	90.6 in	-0.7 in
X10	Rear surface of vehicle to lower trailing edge of right door	89.8 in	89.1 in	0.7 in
X11	Rear surface of vehicle to lower trailing edge of left door	90.1 in	89.0 in	1.1 in
X12	Rear surface of vehicle to bottom of "A" post on right side	133.1 in	134.0 in	-0.9 in
X13	Rear surface of vehicle to bottom of "A" post on left side	133.0 in	133.3 in	-0.3 in
X14	Rear surface of vehicle to firewall - right side	144.5 in	142.4 in	2.1 in
X15	Rear surface of vehicle to firewall - left side	143.6 in	143.6 in	0.0 in
X16	Rear surface of vehicle to steering wheel center	116.0 in	119.0 in	-3.0 in
X17	Center of steering column to "A" post	10.3 in	12.2 in	-1.9 in
X18	Center of steering column to headliner	18.0 in	16.8 in	1.2 in
X19	Rear surface of vehicle to right side of front bumper	181.0 in	167.3 in	13.7 in
X20	Rear surface of vehicle to left side of front bumper	181.0 in	168.2 in	12.8 in
X21	Length of engine block	20.0 in	20.0 in	0.0 in

Figure 8 Vehicle Target Locations

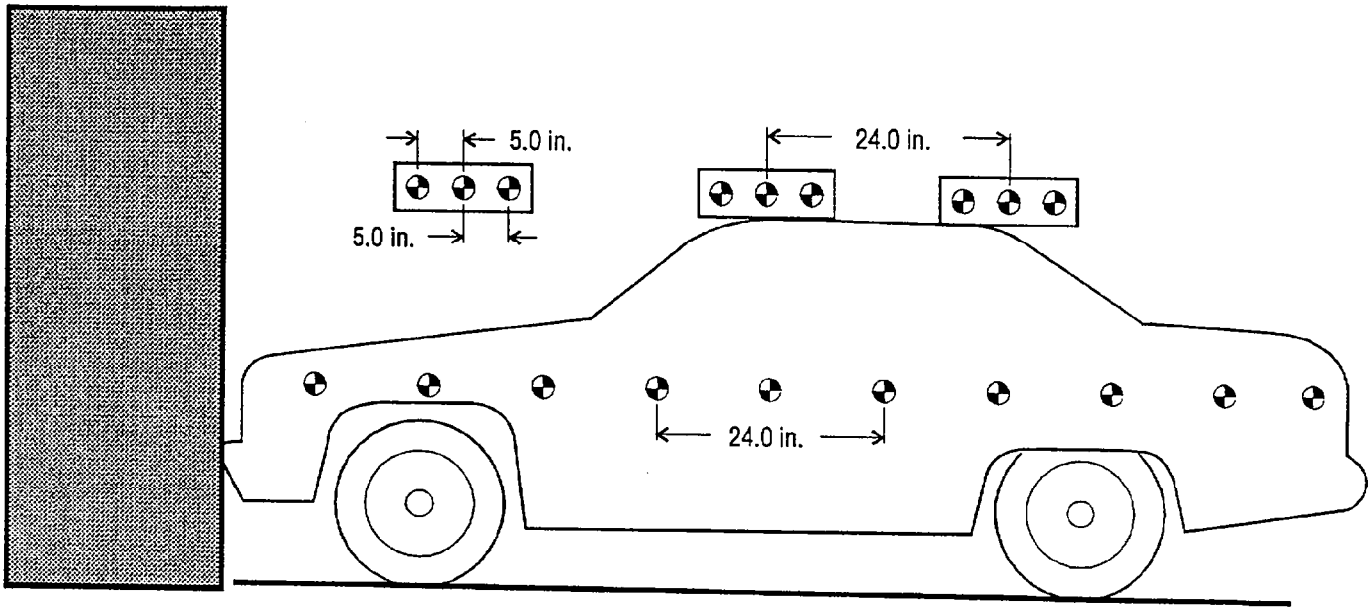


Figure 9 Dummy Measurement Locations for Front Seat Occupants

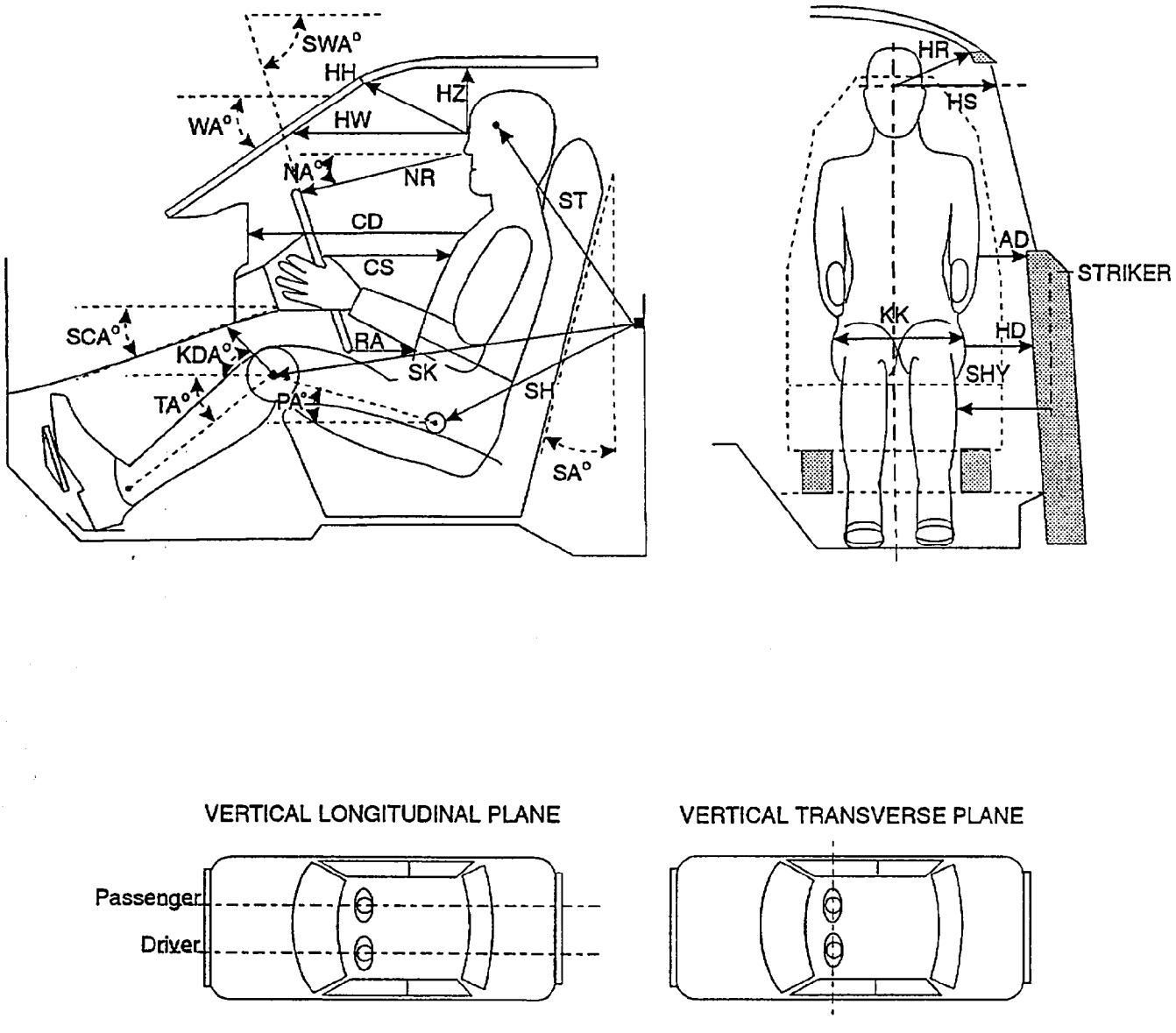


Table 12 Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #314)	Passenger (Serial #229)
WA	Windshield angle	36°	NA
SWA	Steering wheel angle	26°	NA
SCA	Steering column angle	65°	NA
SA	Seat back angle	23°	23°
HZ	Head to roof	7.8 in	7.3 in
HH	Head to header	15.7 in	15.3 in
HW	Head to windshield	20.9 in	20.5 in
HR	Head to side header	8.8 in	7.0 in
NR	Nose to rim	16.1 in	NA
NA	Nose to rim angle	14°	NA
CD	Chest to dash	20.5 in	21.5 in
CS	Steering wheel to chest	12.7 in	NA
RA	Rim to abdomen	7.8 in	NA
KDL	Left knee to dash	6.6 in	6.1 in
KDR	Right knee to dash	6.3 in	6.5 in
KDA	Outboard knee to dash angle	22°	22°
PA	Pelvic angle	21°	24°
TA	Tibial angle	44°	41°
KK	Knee to knee	11.8 in	10.5 in
ST[1]	Striker to head	23.9 in	24.1 in
	Striker to head angle	-74°	-75°
SK[1]	Striker to knee	26.9 in	27.4 in
	Striker to knee angle	-5°	-4°
SH[1]	Striker to H-point	12.0 in	12.0 in
	Striker to H-point angle	11°	12°
SHY	Striker to H-point (Y dir.)	7.8 in	8.1 in
HS	Head to side window	11.9 in	12.3 in
HD	H-point to door	5.5 in	5.5 in
AD	Arm to door	3.2 in	3.8 in

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

[1] A negative angle indicates the measurement point was located above the striker.

Figure 10 Camera Positions

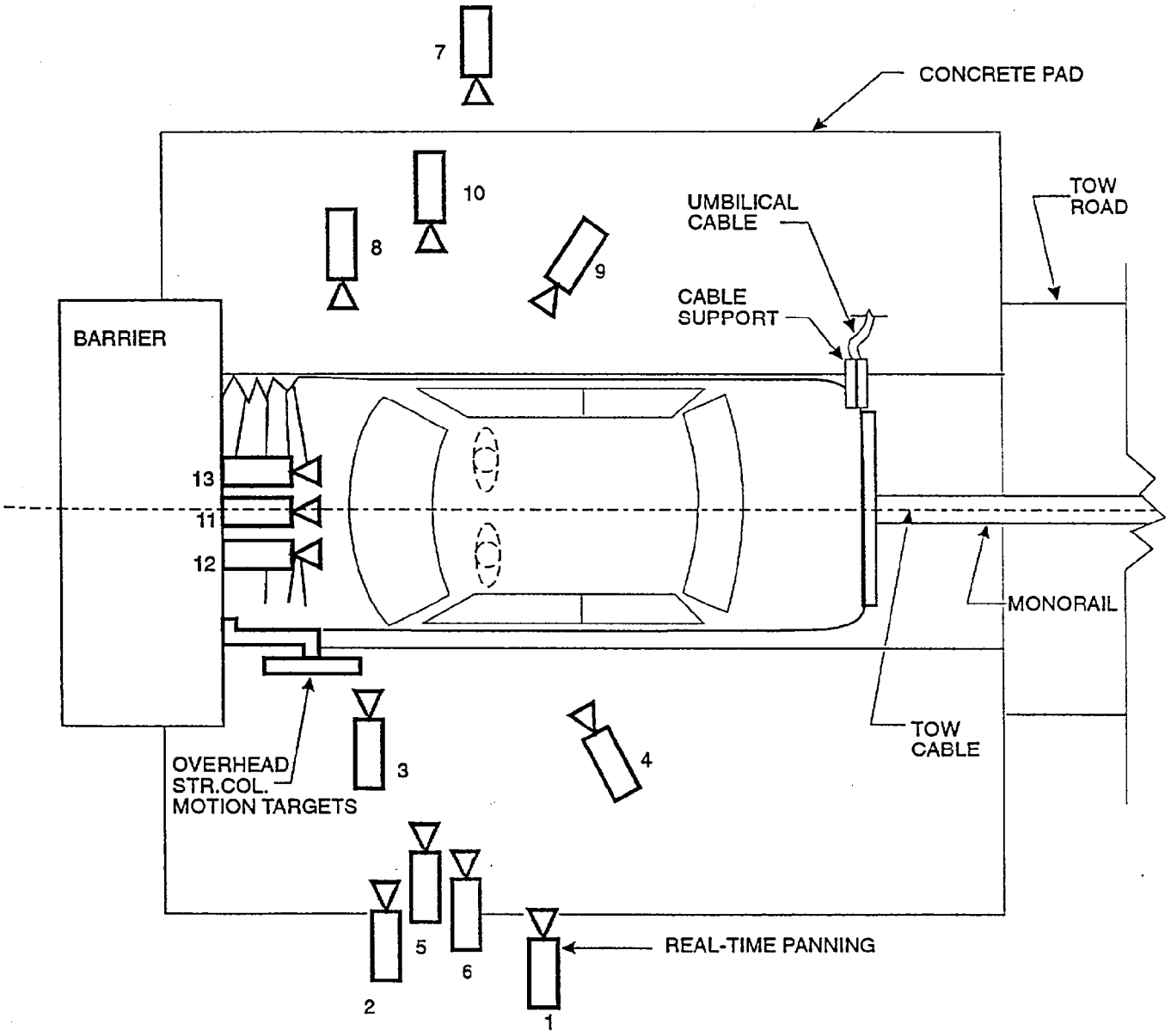


Figure 10 Camera Positions, Cont'd.

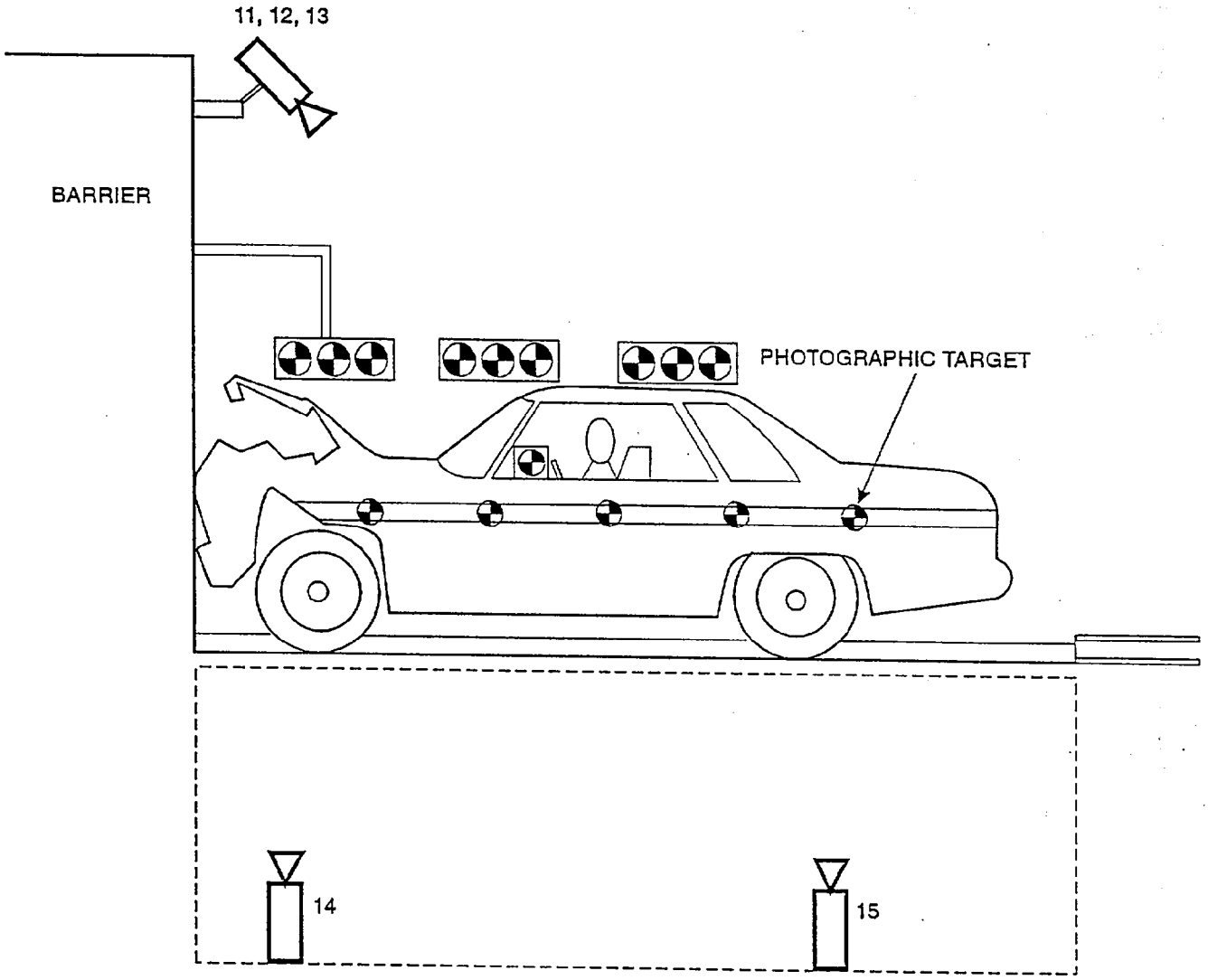


Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1996/Isuzu/Rodeo/4-door MPV

Test number: 960207

Camera Number	View	Camera Positions[1] X	Y	Z	Camera Angle[2]	Film Plane to Head Target	Camera Lens	Film Speed
1	Real-time panning	-142.0 in	504.0 in	61.0 in	NA	NA	16 mm	24 frames/s
2	Left vehicle crush	-41.5 in	295.0 in	44.0 in	-4°	276.0 in	25 mm	995 frames/s
3	Left windshield intrusion	-53.0 in	309.4 in	42.3 in	0°	NA	50 mm	1008 frames/s
4	Driver kinematics	-157.3 in	116.0 in	87.0 in	-27°	85.0 in	25 mm	1005 frames/s
5	Steering column motion	-76.0 in	286.0 in	103.0 in	-14°	NA	25 mm	998 frames/s
6	Steering column motion	-76.0 in	286.0 in	75.1 in	-9°	NA	25 mm	1005 frames/s
7	Right overall	-81.3 in	-266.4 in	37.1 in	-2°	NA	13 mm	992 frames/s
8	Right windshield intrusion	-38.1 in	-306.1 in	44.0 in	0°	NA	50 mm	998 frames/s
9	Passenger kinematics	-152.1 in	-116.0 in	87.0 in	-26°	80.0 in	25 mm	988 frames/s
10	Passenger kinematics	-38.8 in	-293.0 in	45.3 in	-4°	300.0 in	25 mm	1002 frames/s
11	Windshield front view	-6.0 in	0.0 in	88.0 in	-40°	NA	13 mm	1005 frames/s
12	Driver - front view	-6.8 in	14.5 in	93.0 in	-50°	NA	17 mm	995 frames/s
13	Passenger - front view	-4.5 in	-13.8 in	93.0 in	-50°	NA	17 mm	1005 frames/s
14	Pit - front position	-50.5 in	0.0 in	-92.4 in	90°	NA	13 mm	998 frames/s
15	Pit - rear position	-99.3 in	0.0 in	-99.0 in	90°	NA	13 mm	1008 frames/s
16	Real-time documentation	NA	NA	NA	NA	NA	12-120 mm	24 frames/s

[1] +X: Film plane forward of barrier face
+Y: Film plane to left of monorail centerline
+Z: Film plane above ground level

[2] +Angle: Film plane angled upward from horizontal plane

Appendix A

Photographs

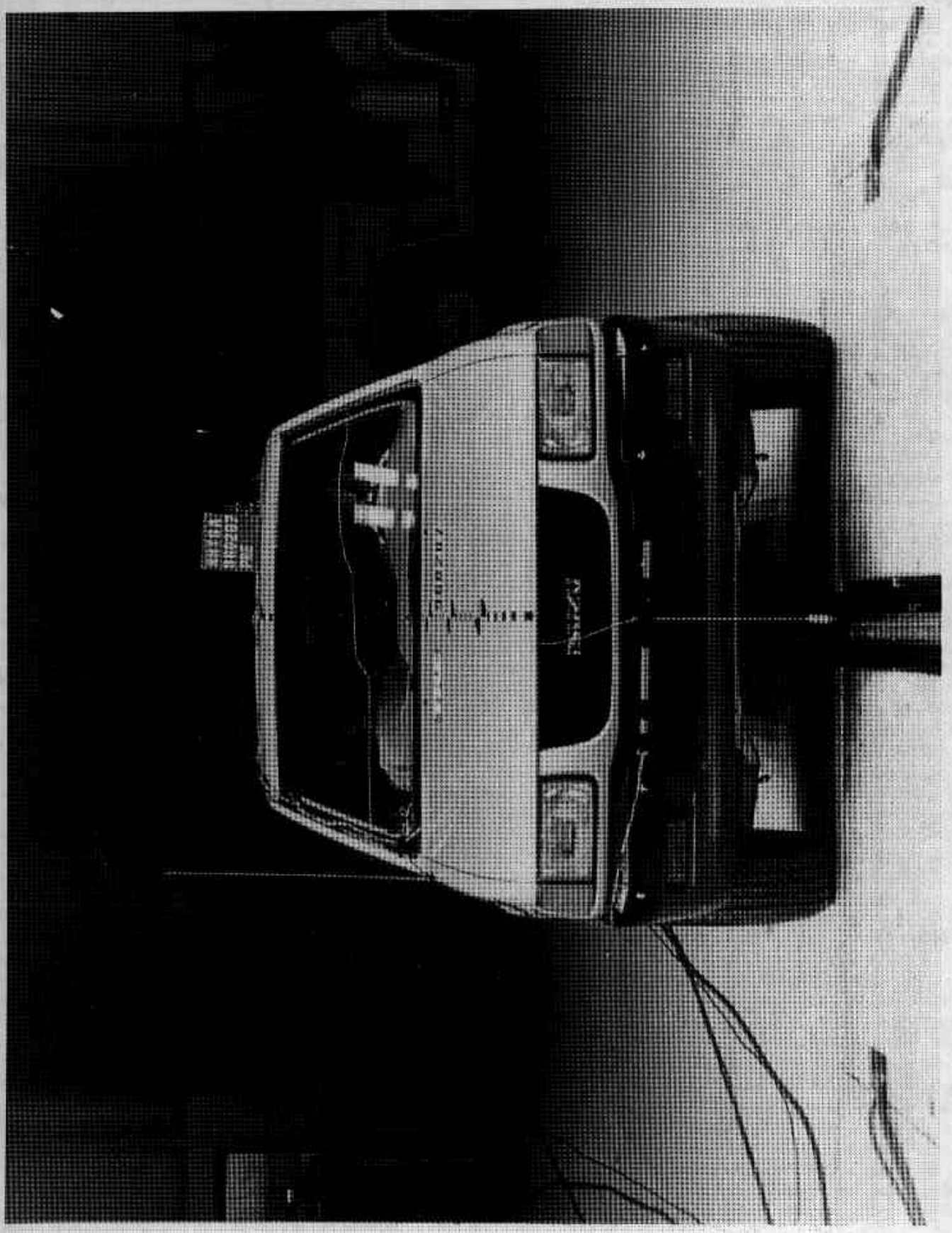


Figure A-1. Pre-Test Front View

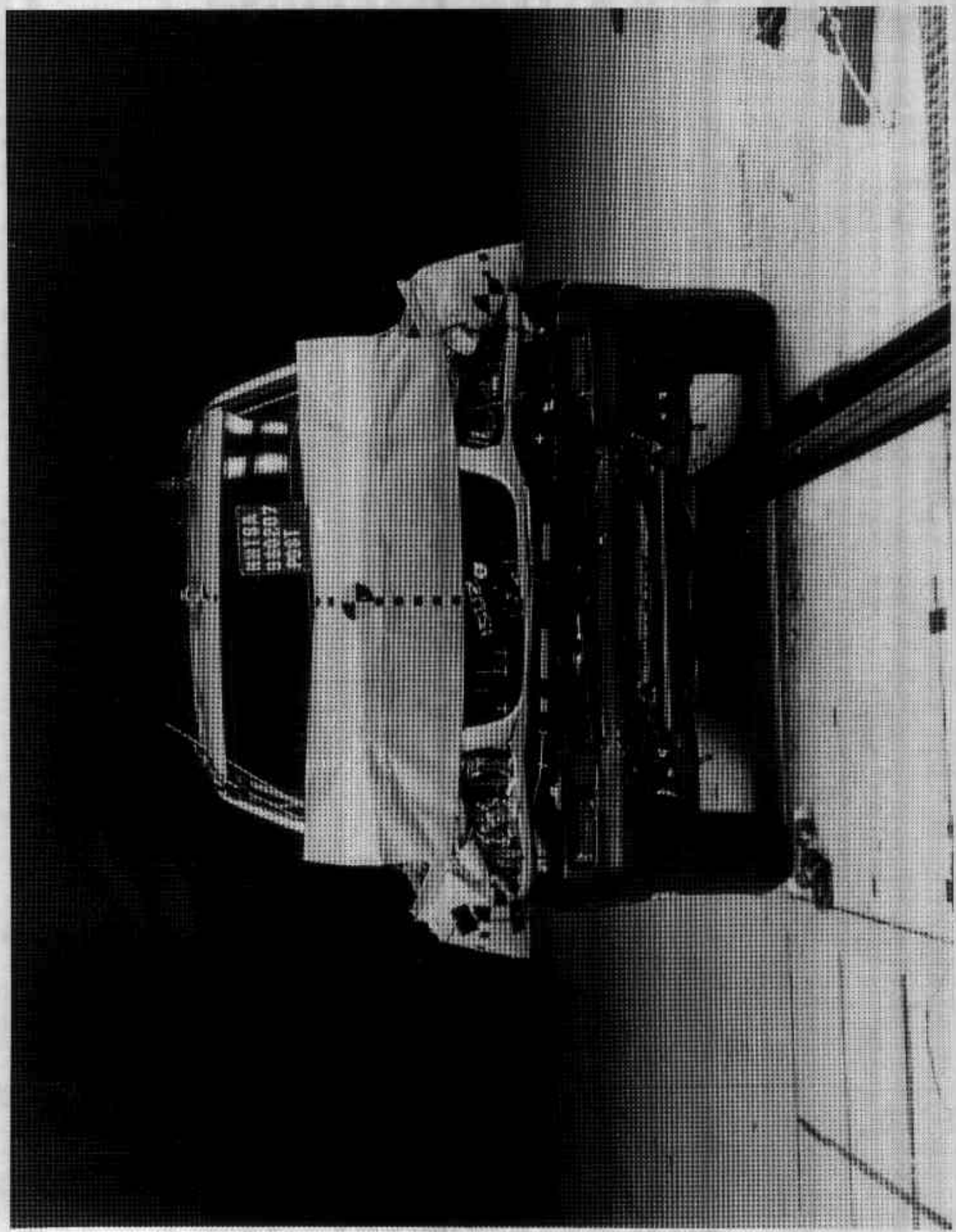


Figure A-2. Post-Test Front View

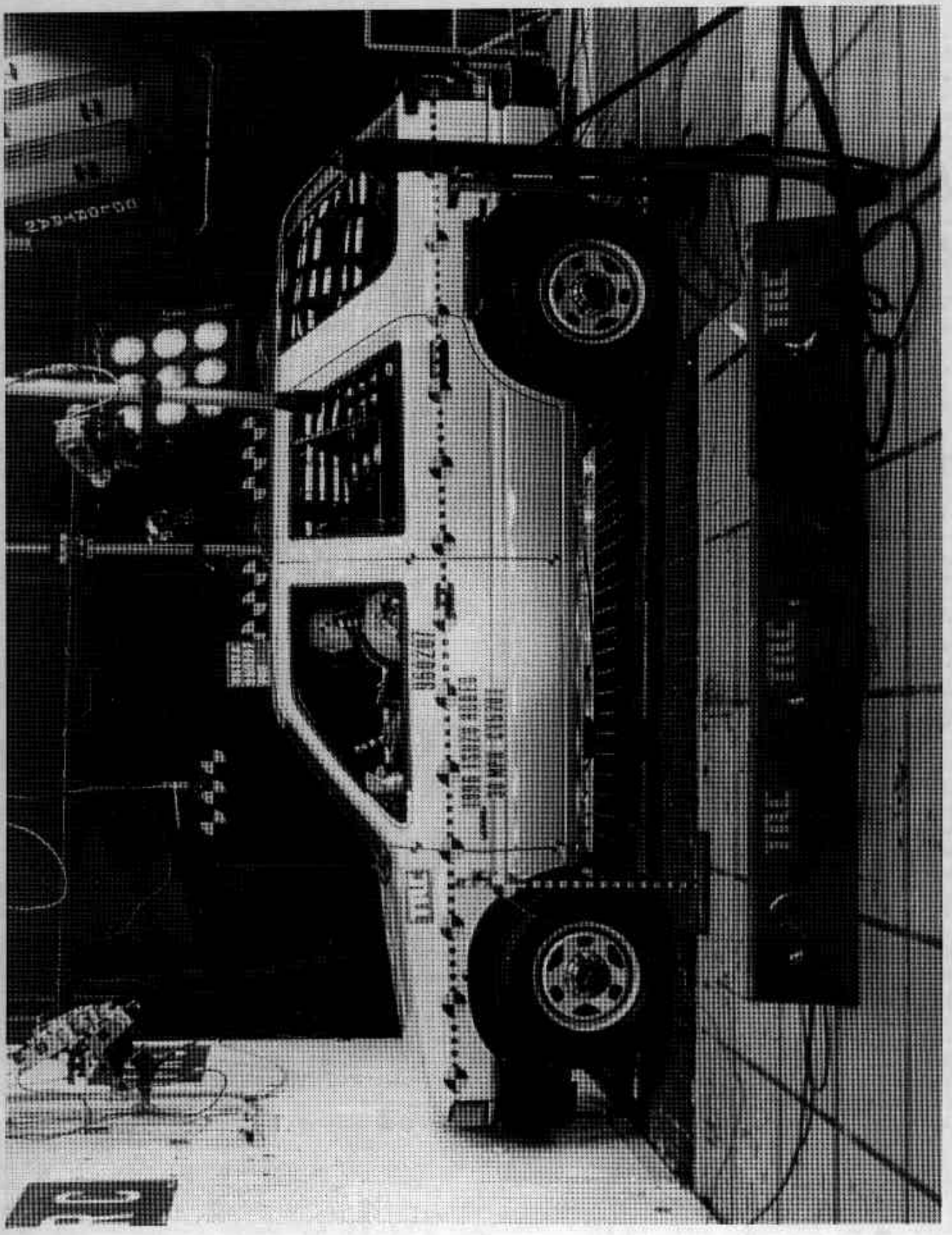


Figure A-3. Pre-Test Left Side View

Figure A-4. Post-Test Left Side View

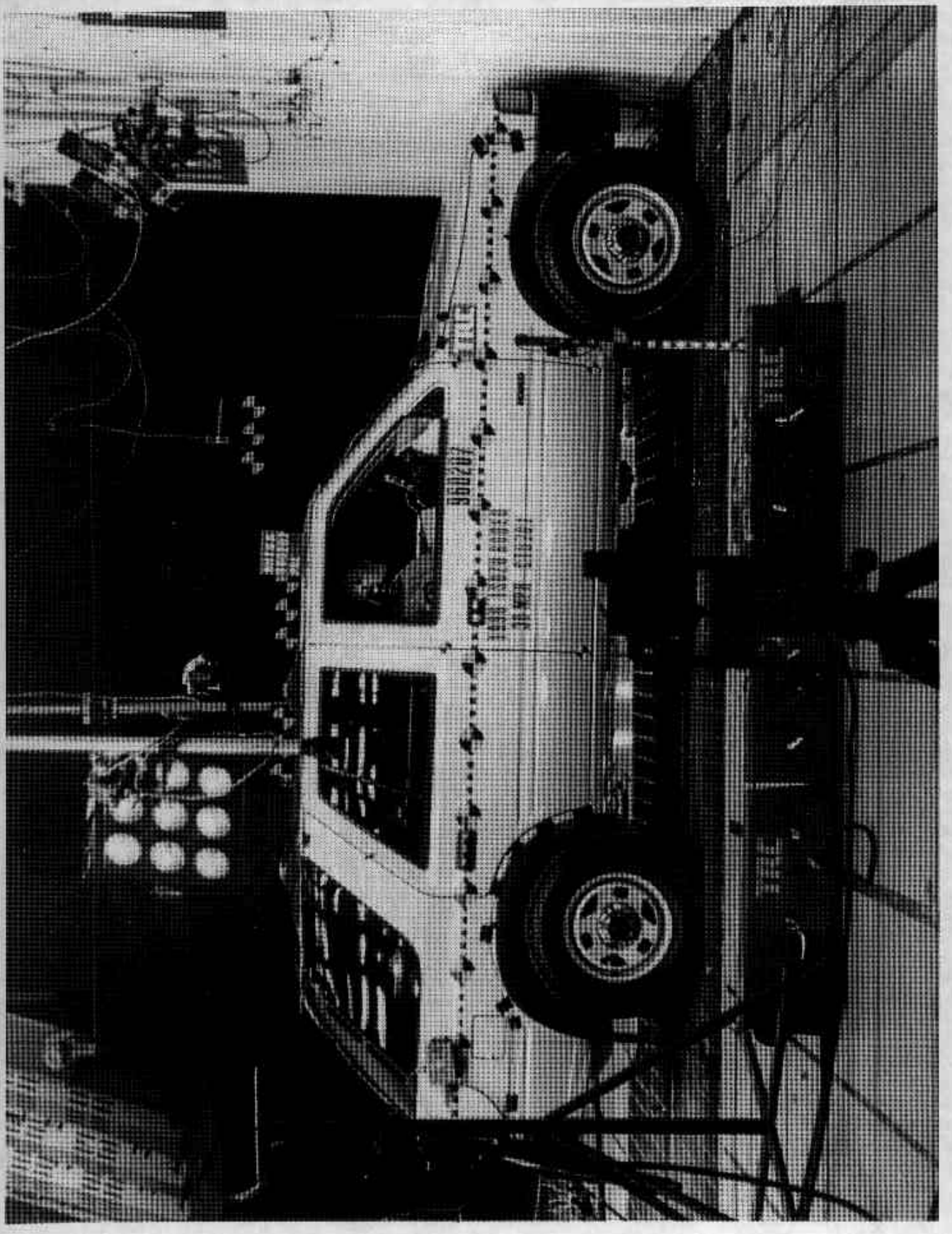


Figure A-5. Pre-Test Right Side View

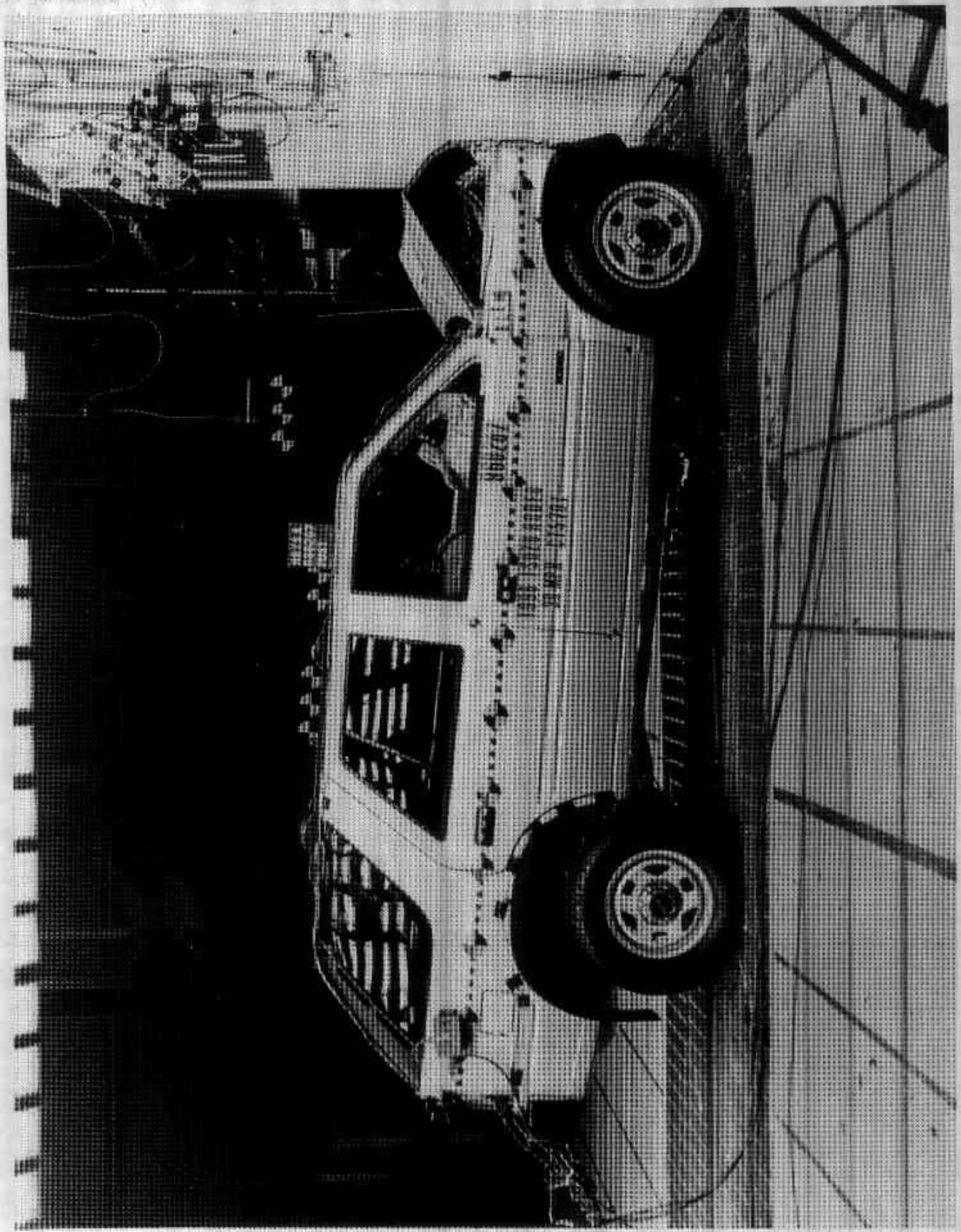


Figure A-6. Post-Test Right Side View

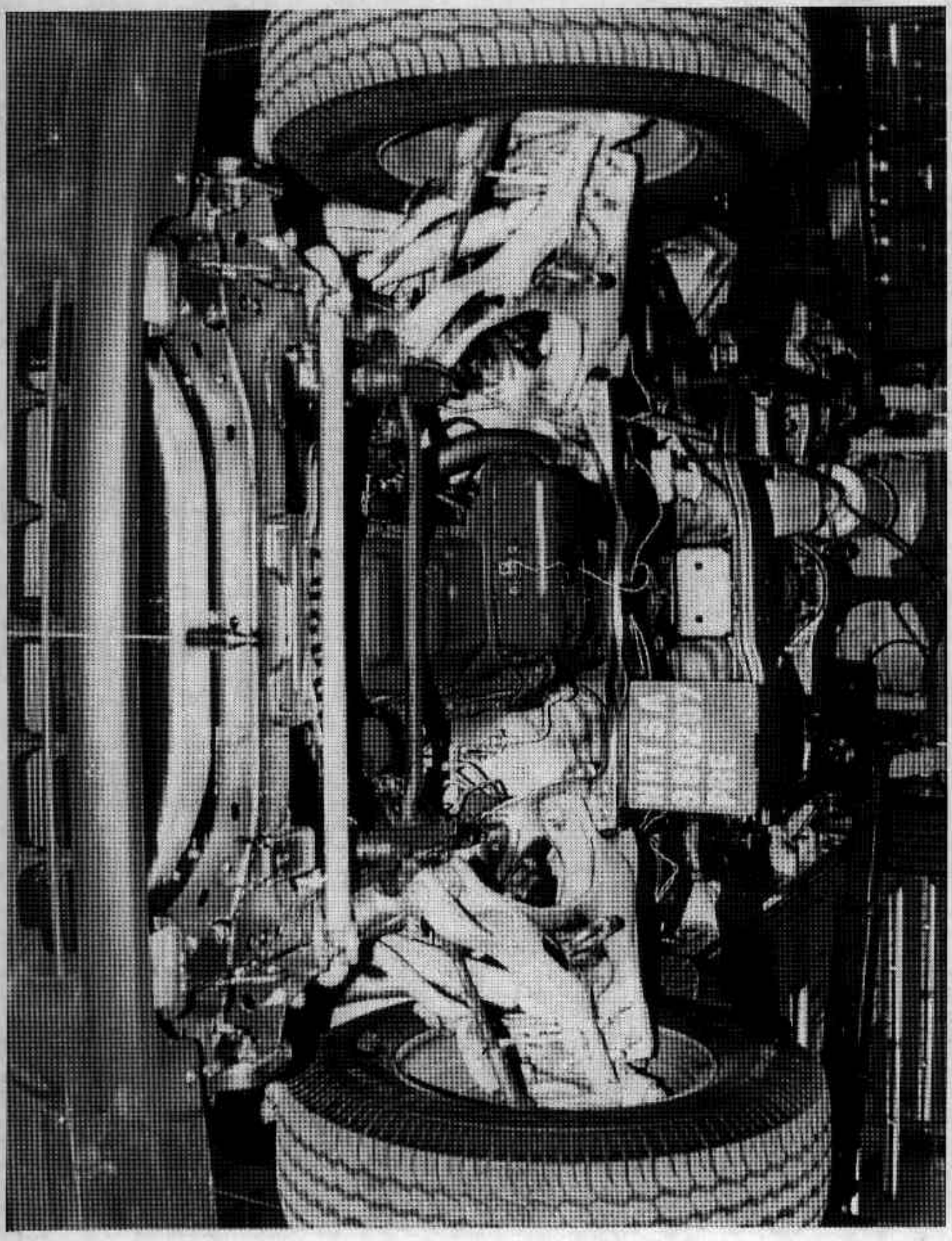


Figure A-7. Pre-Test Front Underbody View

Figure A-8. Post-Test Front Underbody View

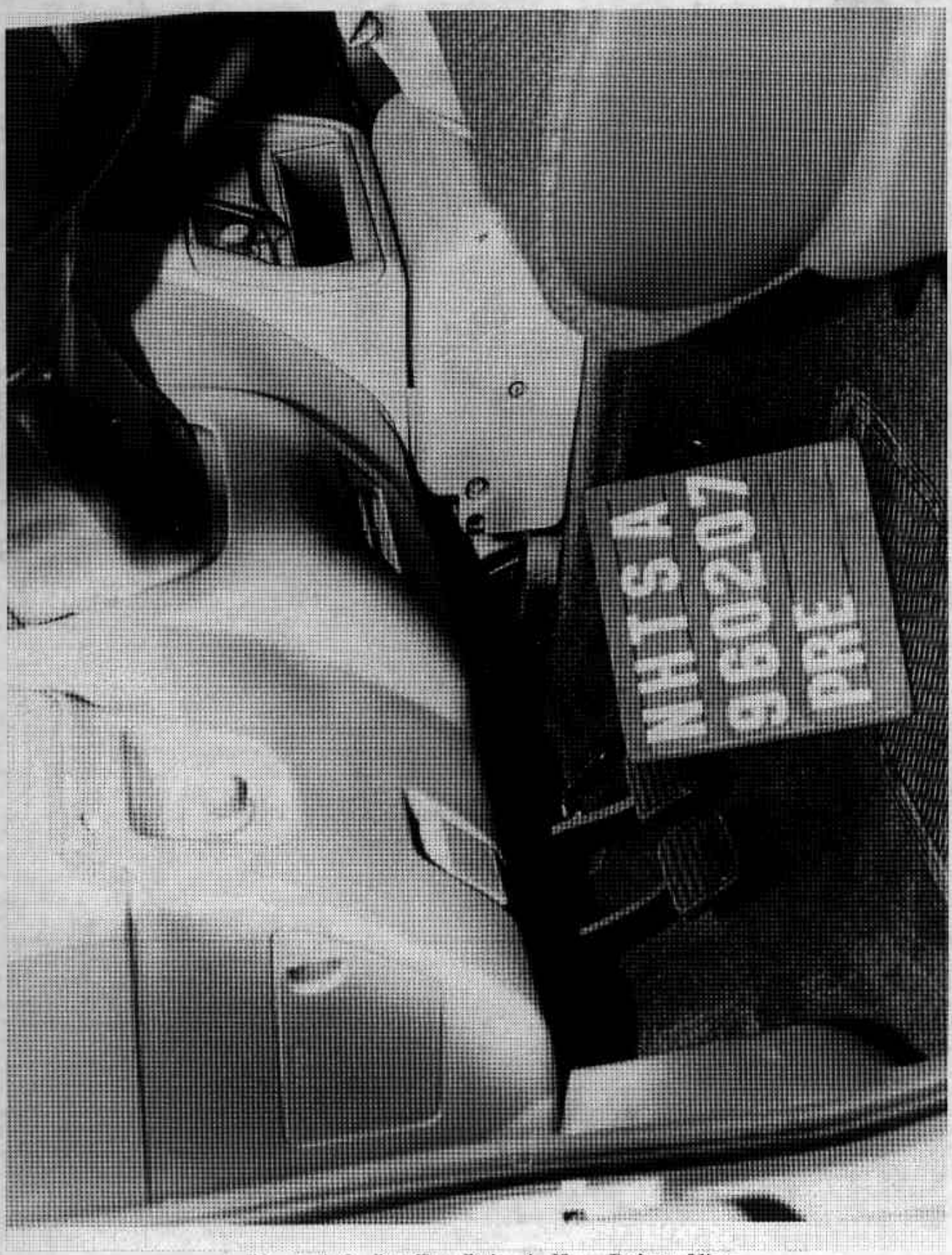


Figure A-9. Pre-Test Driver's Knee Bolster View

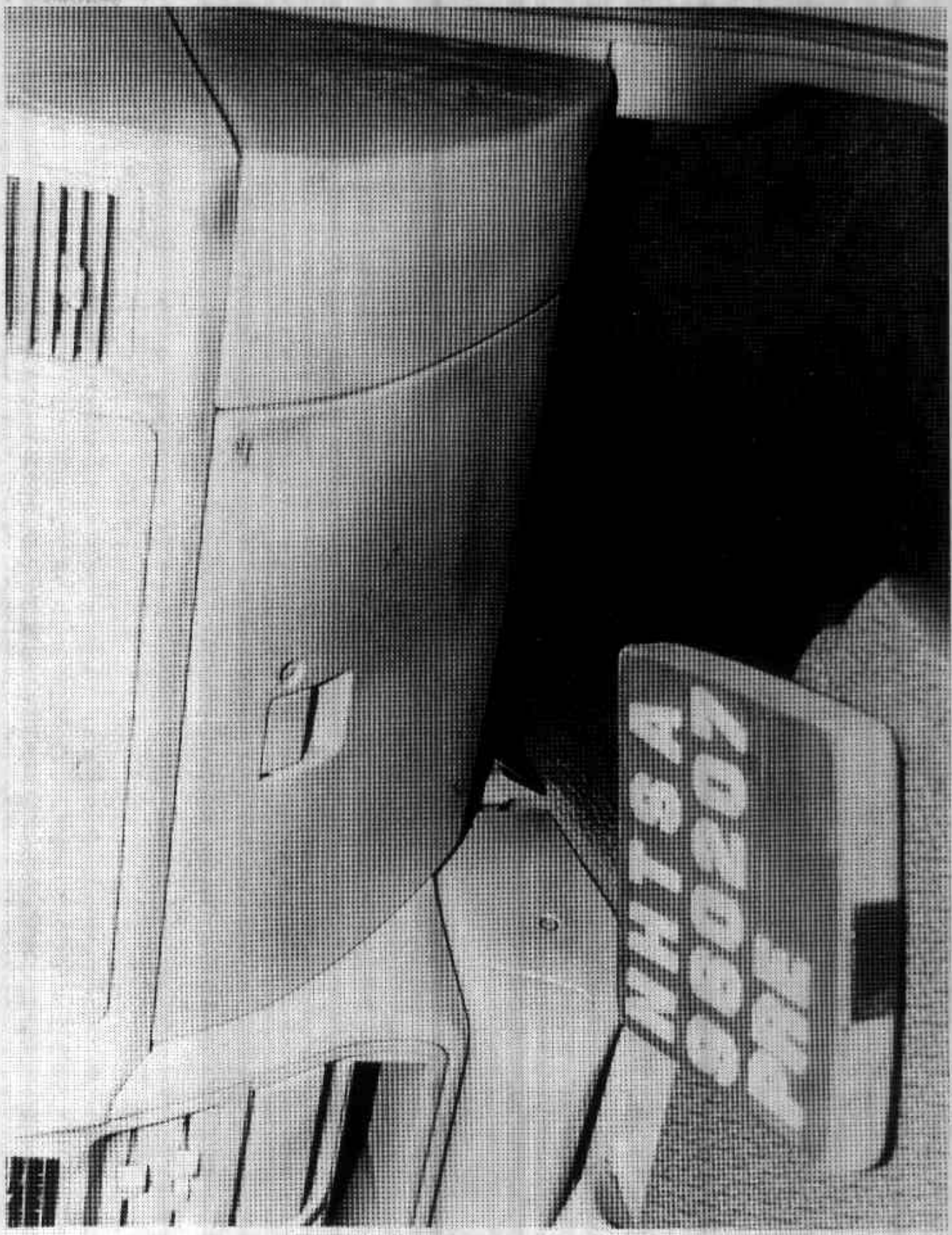


Figure A-10. Pre-Test Passenger's Knee Bolster View

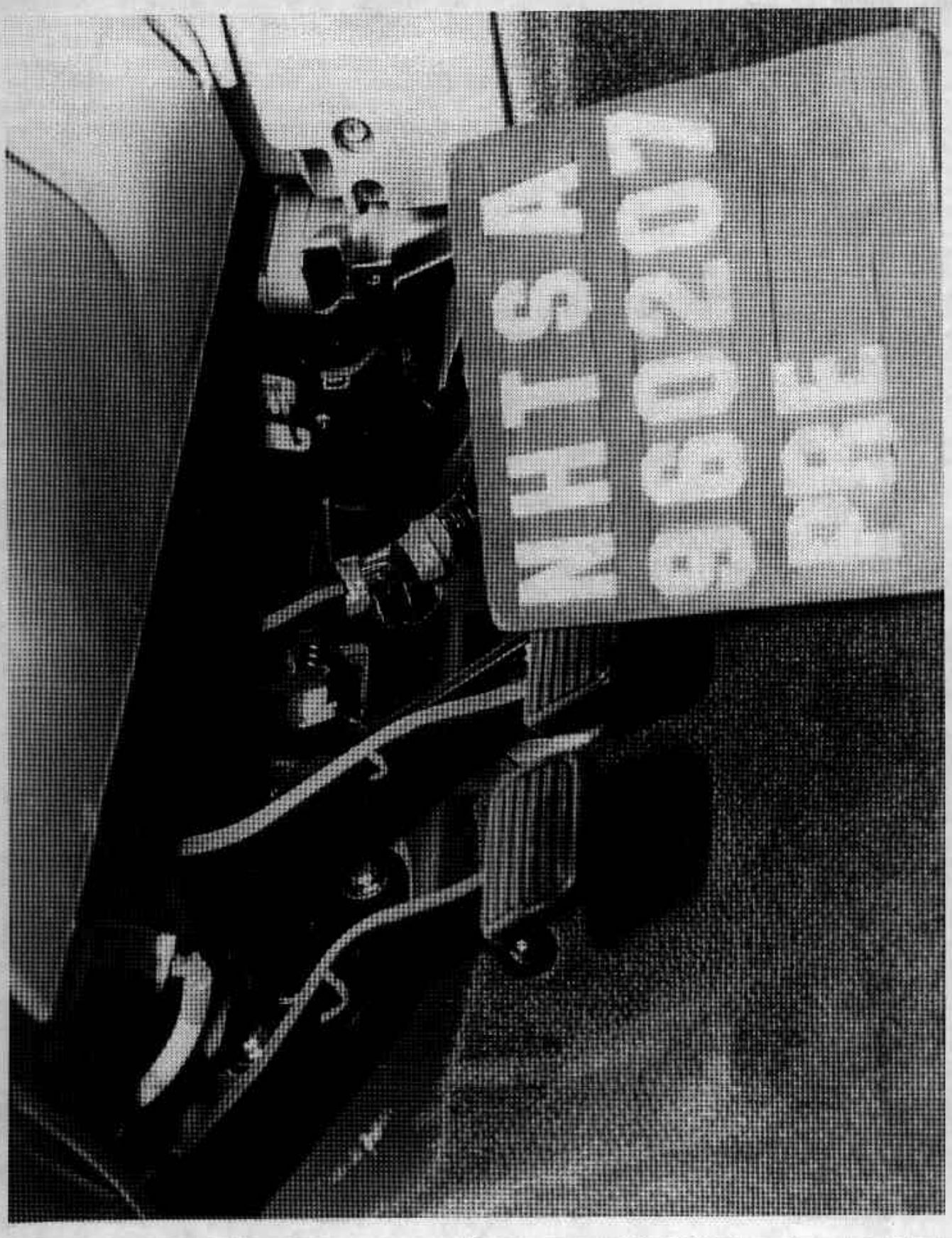


Figure A-11. Pre-Test Steering Column at Firewall View - Interior

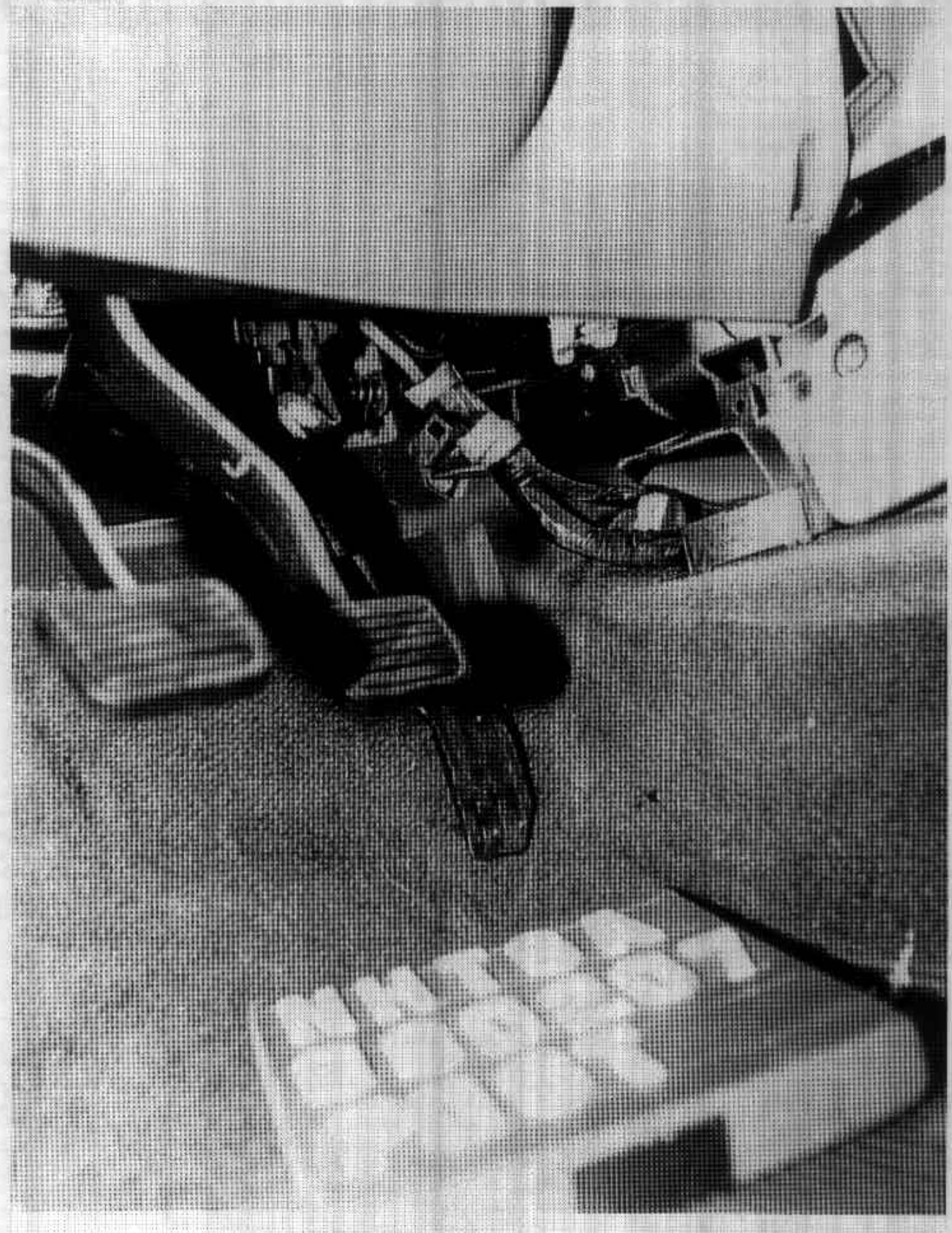


Figure A-12. Post-Test Steering Column at Firewall View - Interior

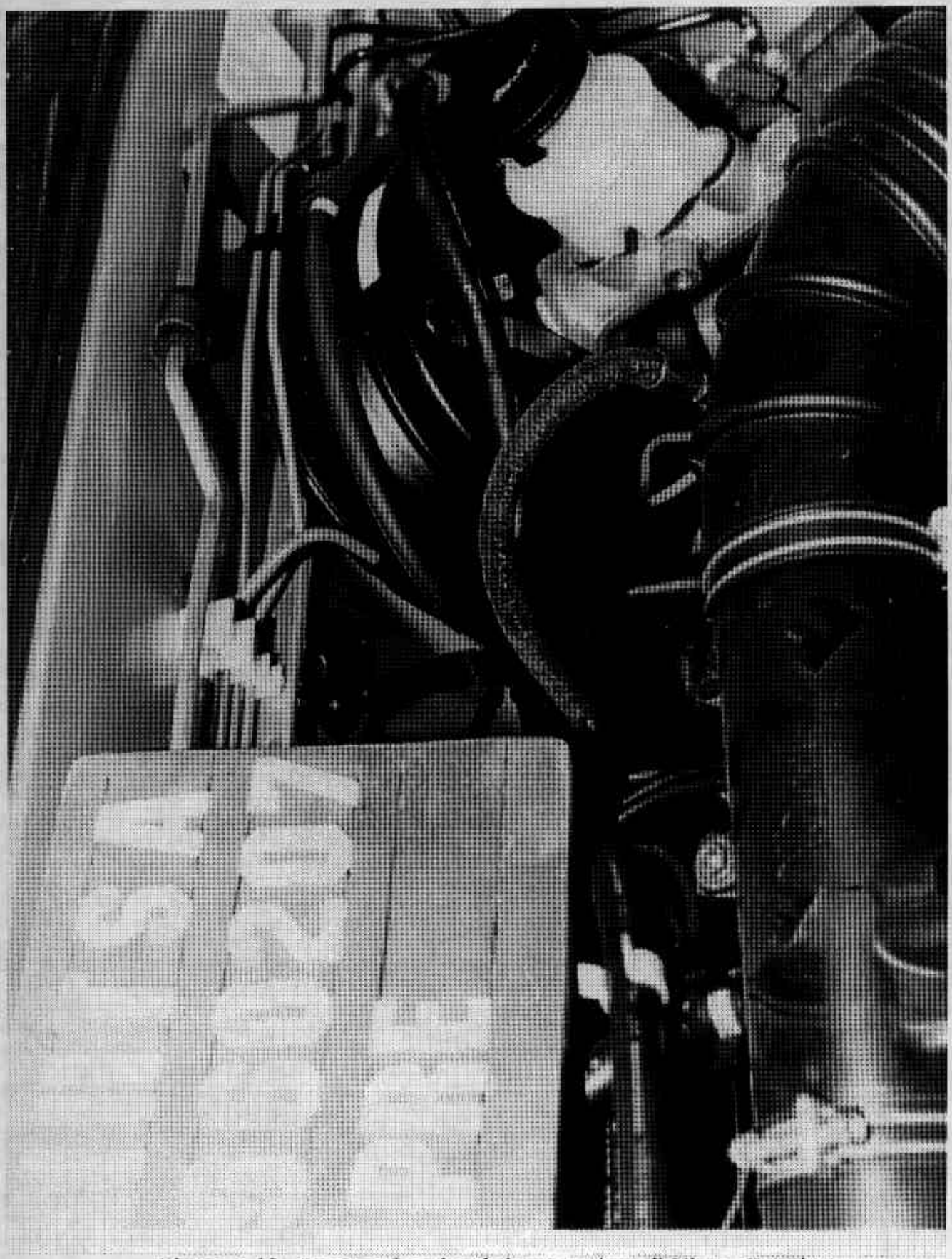


Figure A-13. Pre-Test Steering Column at Firewall View - Exterior

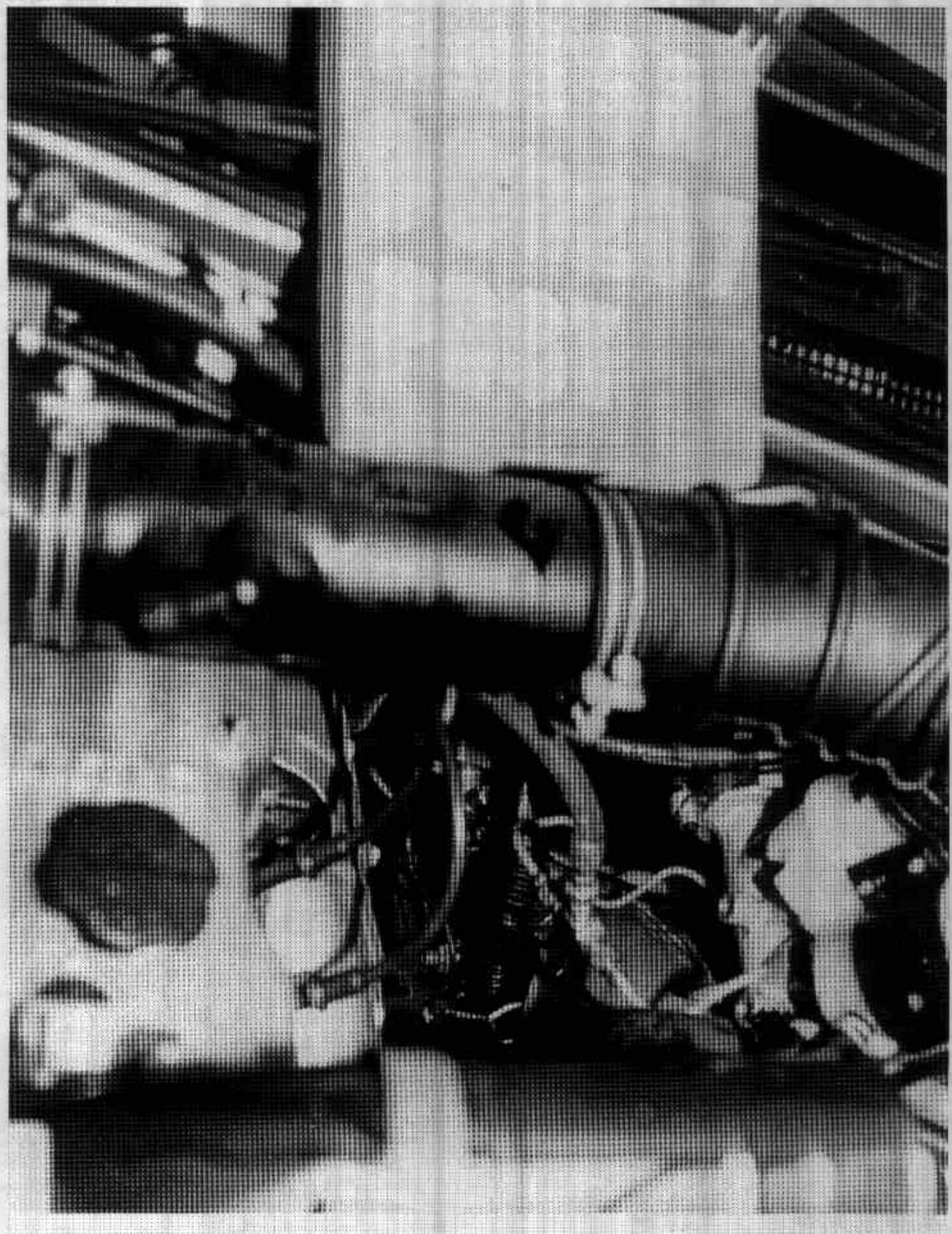


Figure A-14. Post-Test Steering Column at Firewall View - Exterior

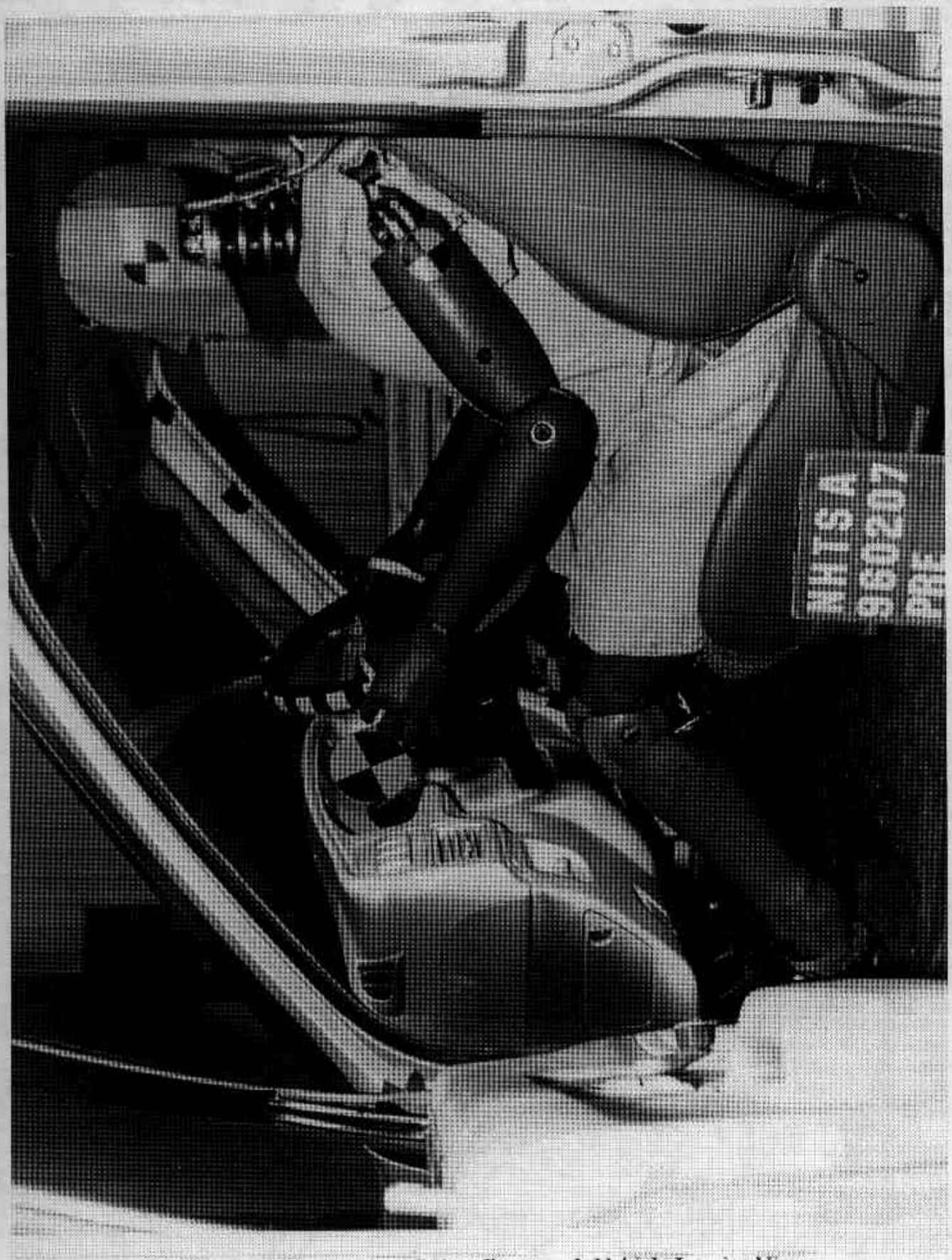


Figure A-15. Pre-Test Driver Dummy & Vehicle Interior View

Figure A-16. Post-Test Driver Dummy & Vehicle Interior View

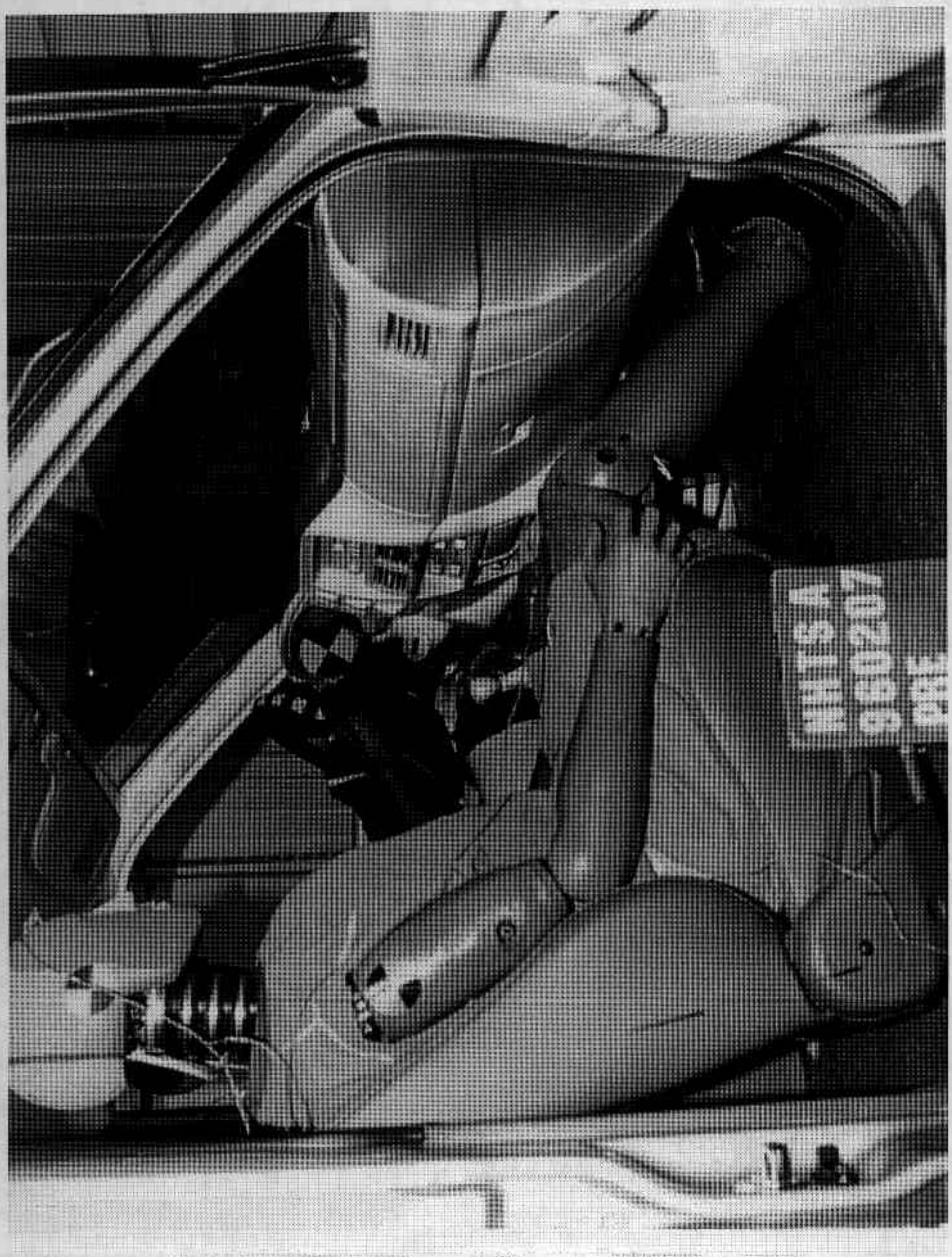


Figure A-17. Pre-Test Passenger Dummy & Vehicle Interior View

Figure A-18. Post-Test Passenger Dummy & Vehicle Interior View

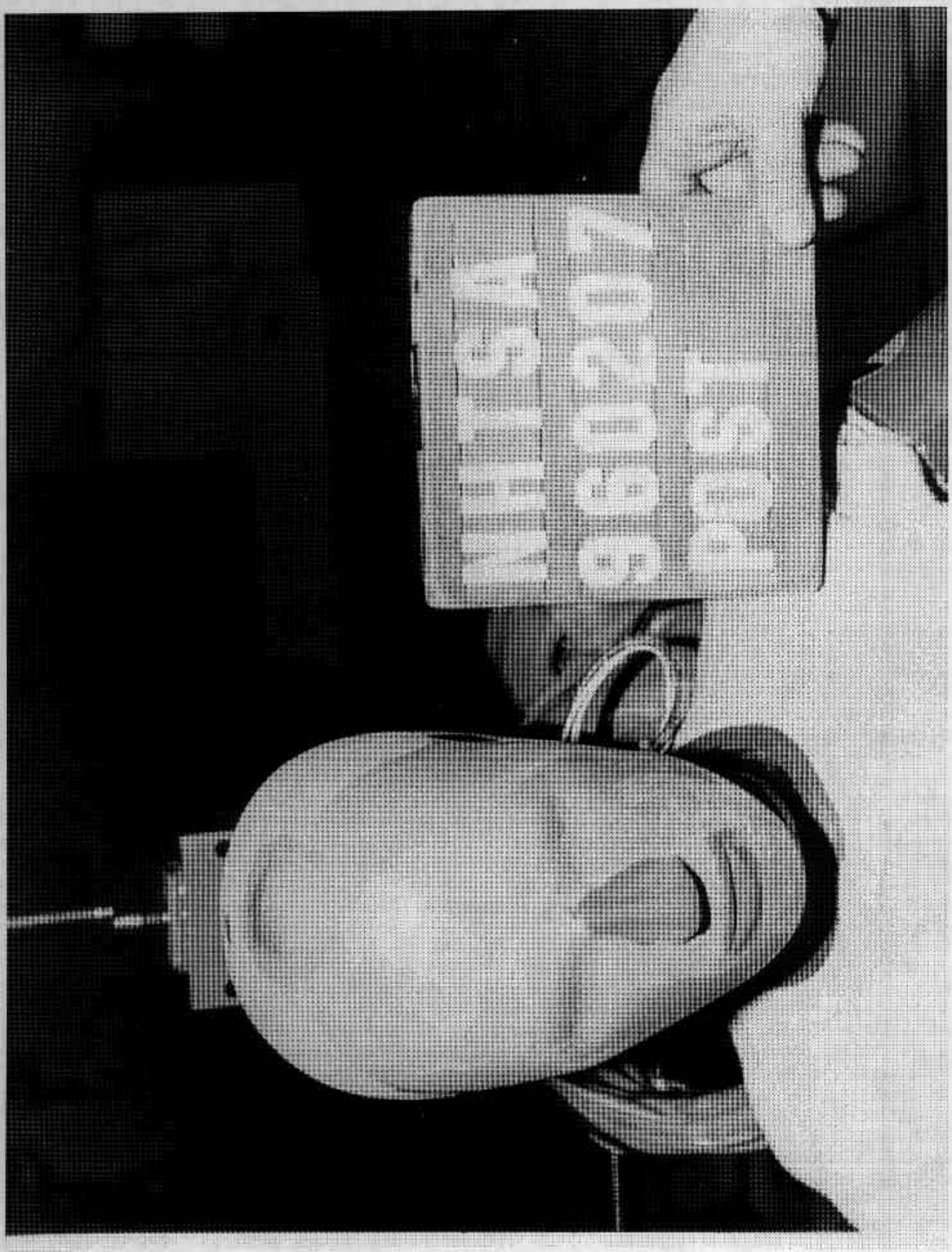


Figure A-19. Post-Test Driver Dummy Head Contact - View 1

Figure A-20. Post-Test Driver Dummy Head Contact - View 2

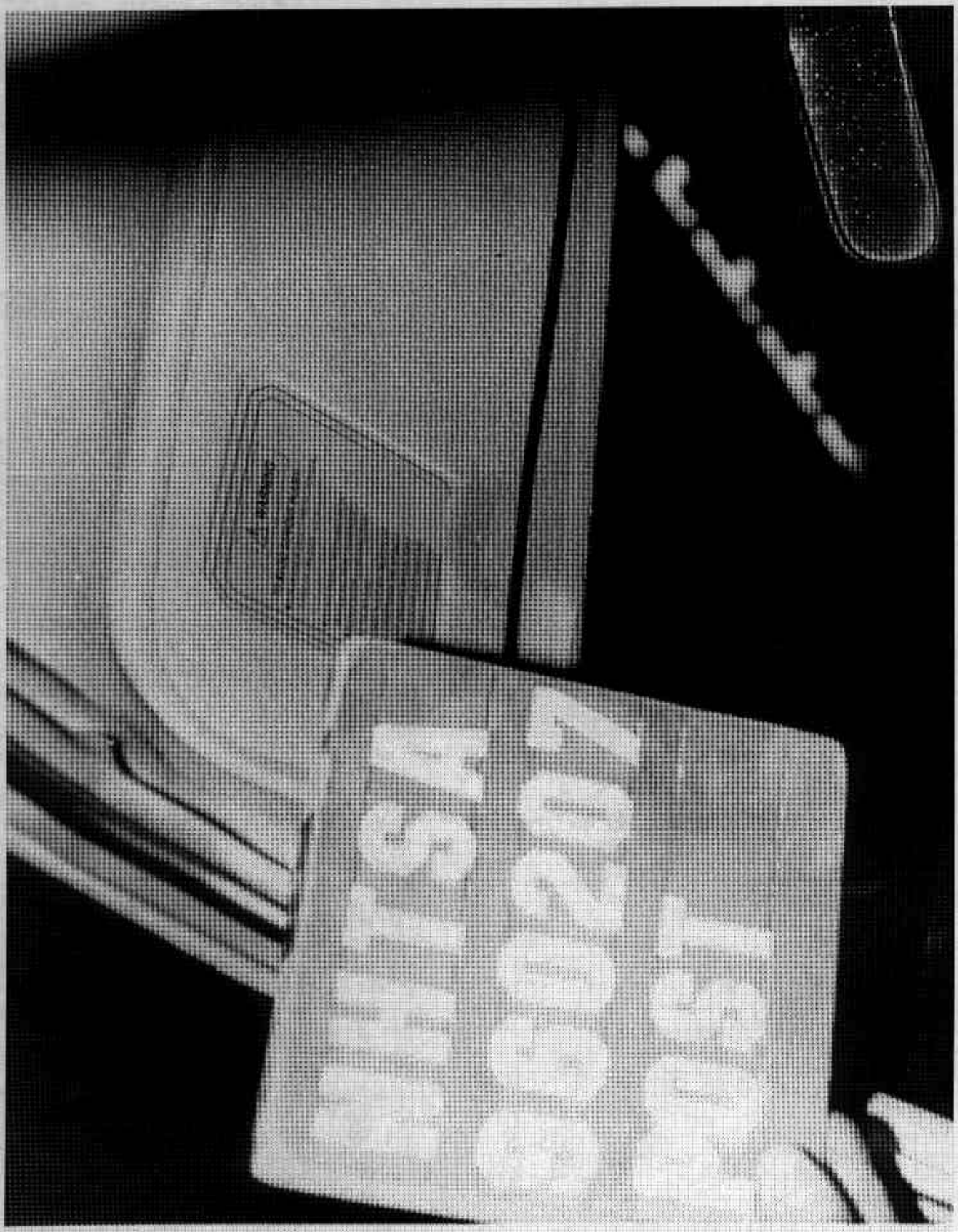


Figure A-21. Post-Test Driver Dummy Head Contact - View 3

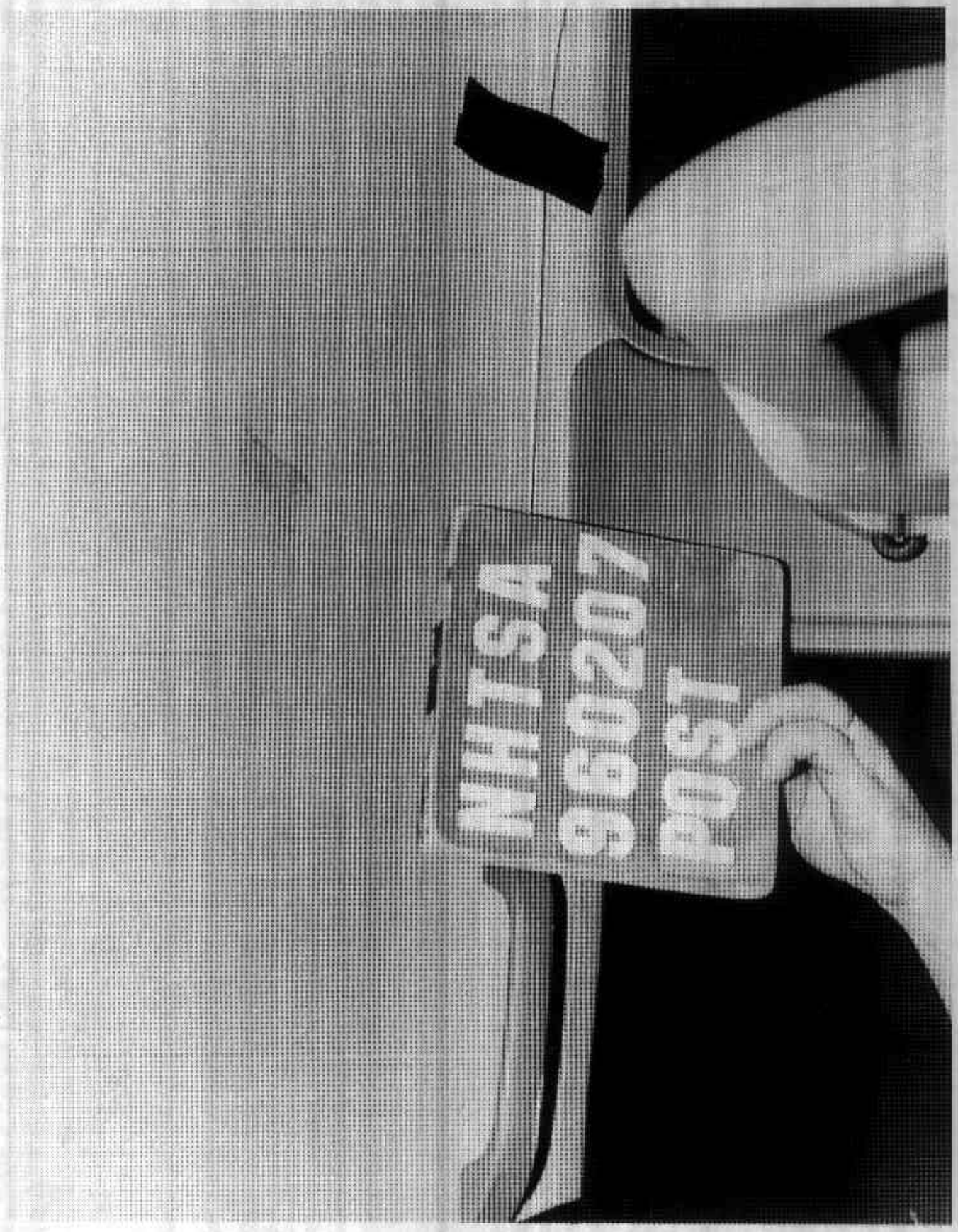


Figure A-22. Post-Test Driver Dummy Head Contact - View 4

Figure A-23. Post-Test Driver Dummy Head Contact - View 5

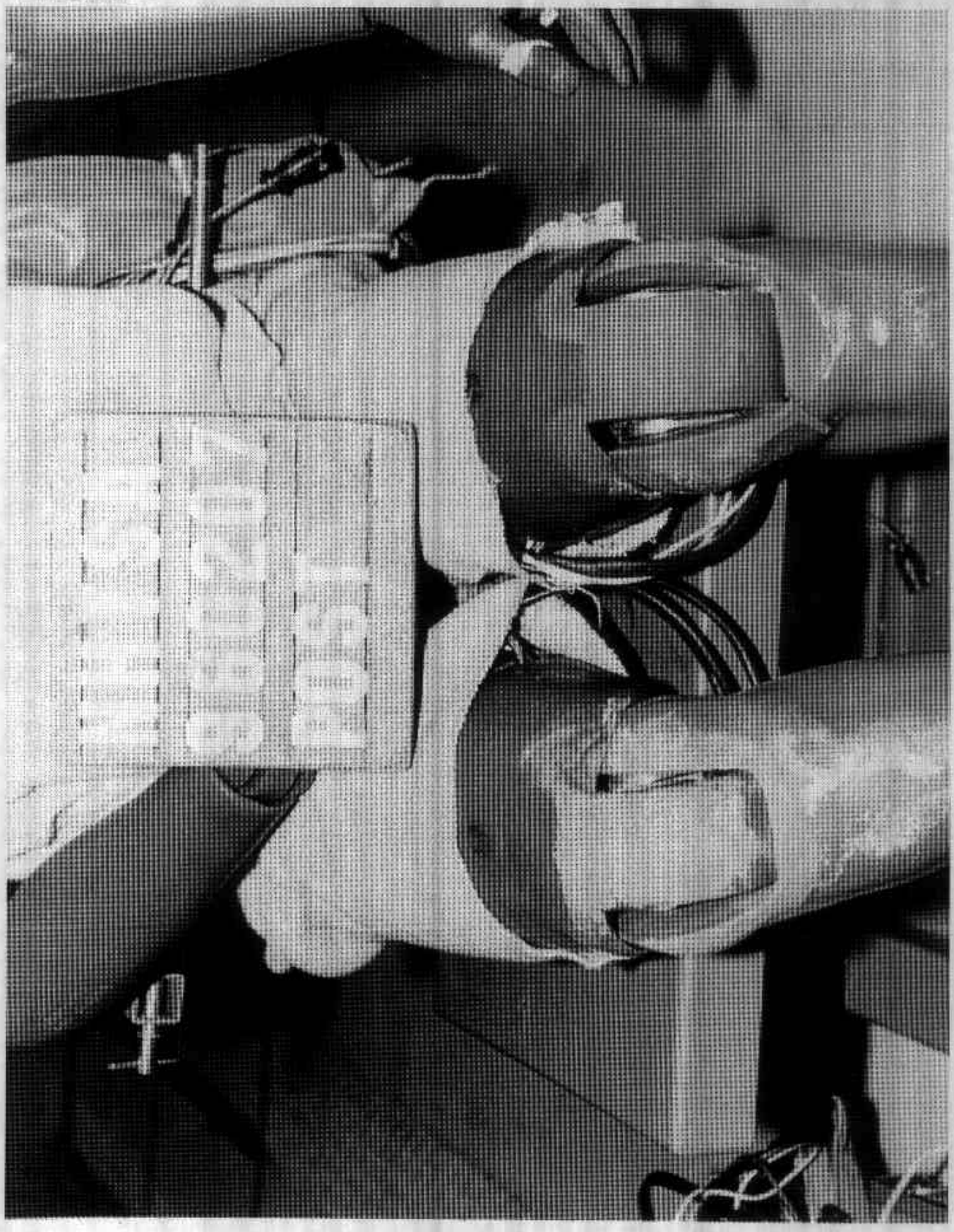


Figure A-24. Post-Test Driver Dummy Knee Contact - View 1

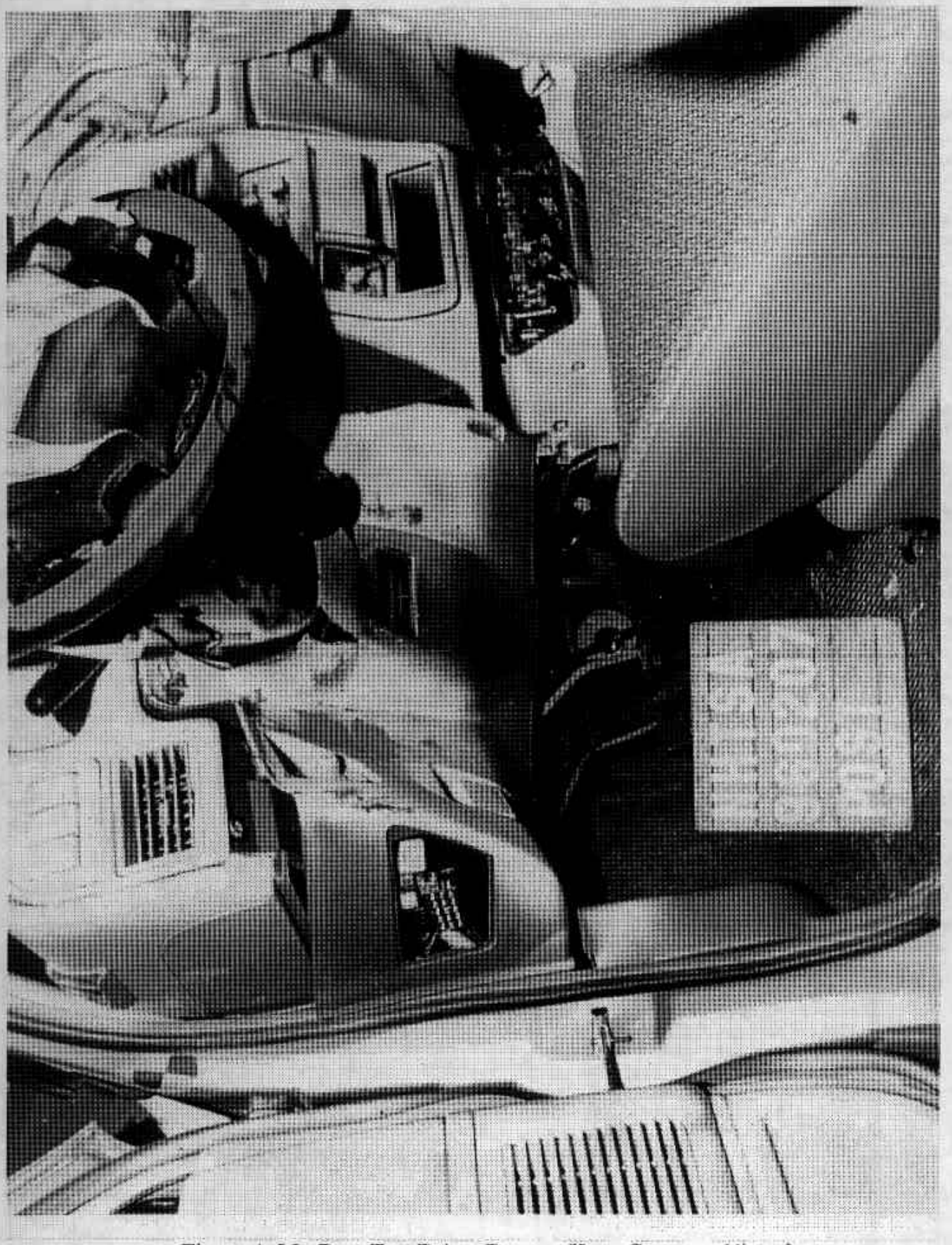


Figure A-25. Post-Test Driver Dummy Knee Contact - View 2

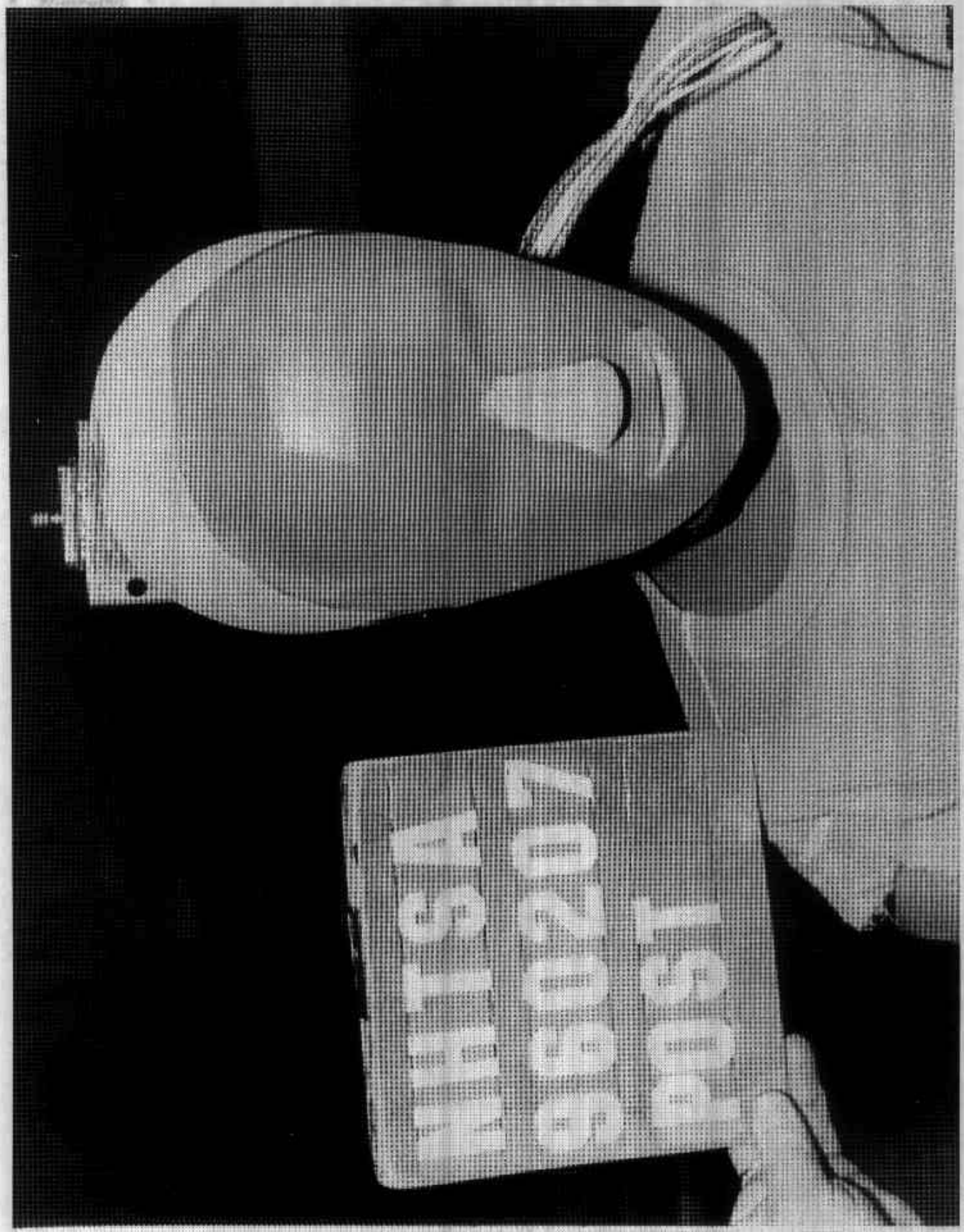


Figure A-26. Post-Test Passenger Dummy Head Contact - View 1

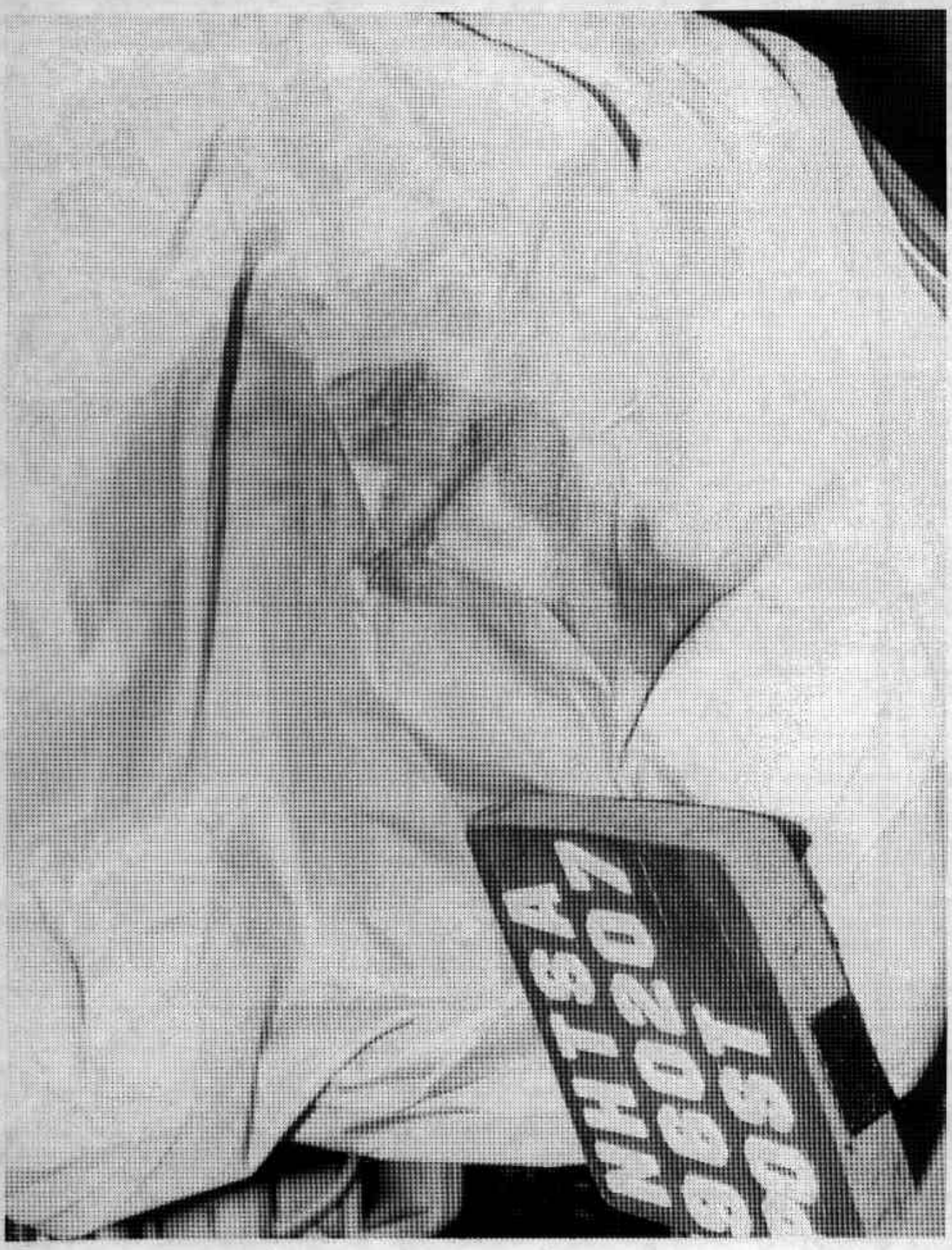


Figure A-27. Post-Test Passenger Dummy Head Contact - View 2

Figure A-28. Post-Test Passenger Dummy Head Contact - View 3

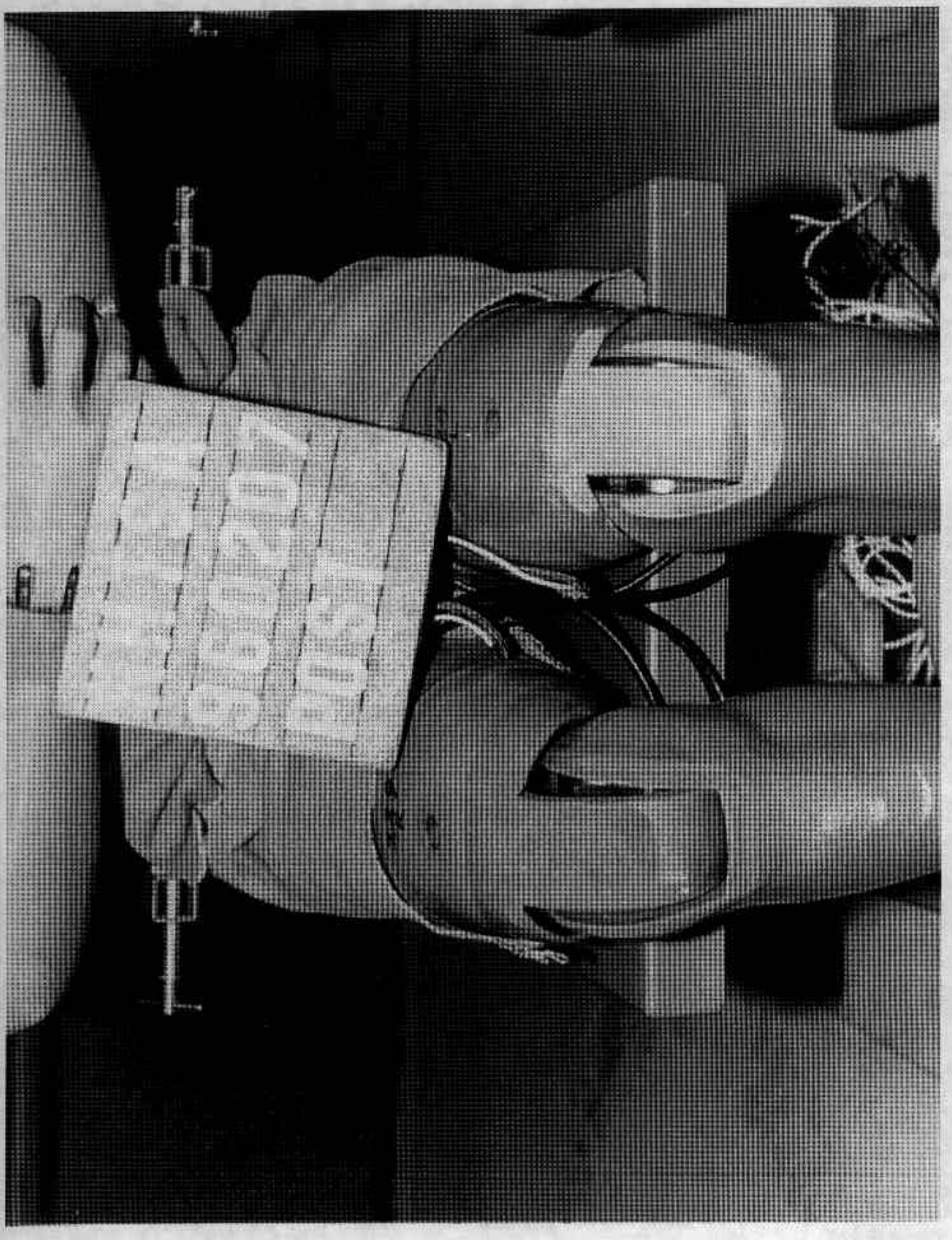


Figure A-29. Post-Test Passenger Dummy Knee Contact - View 1

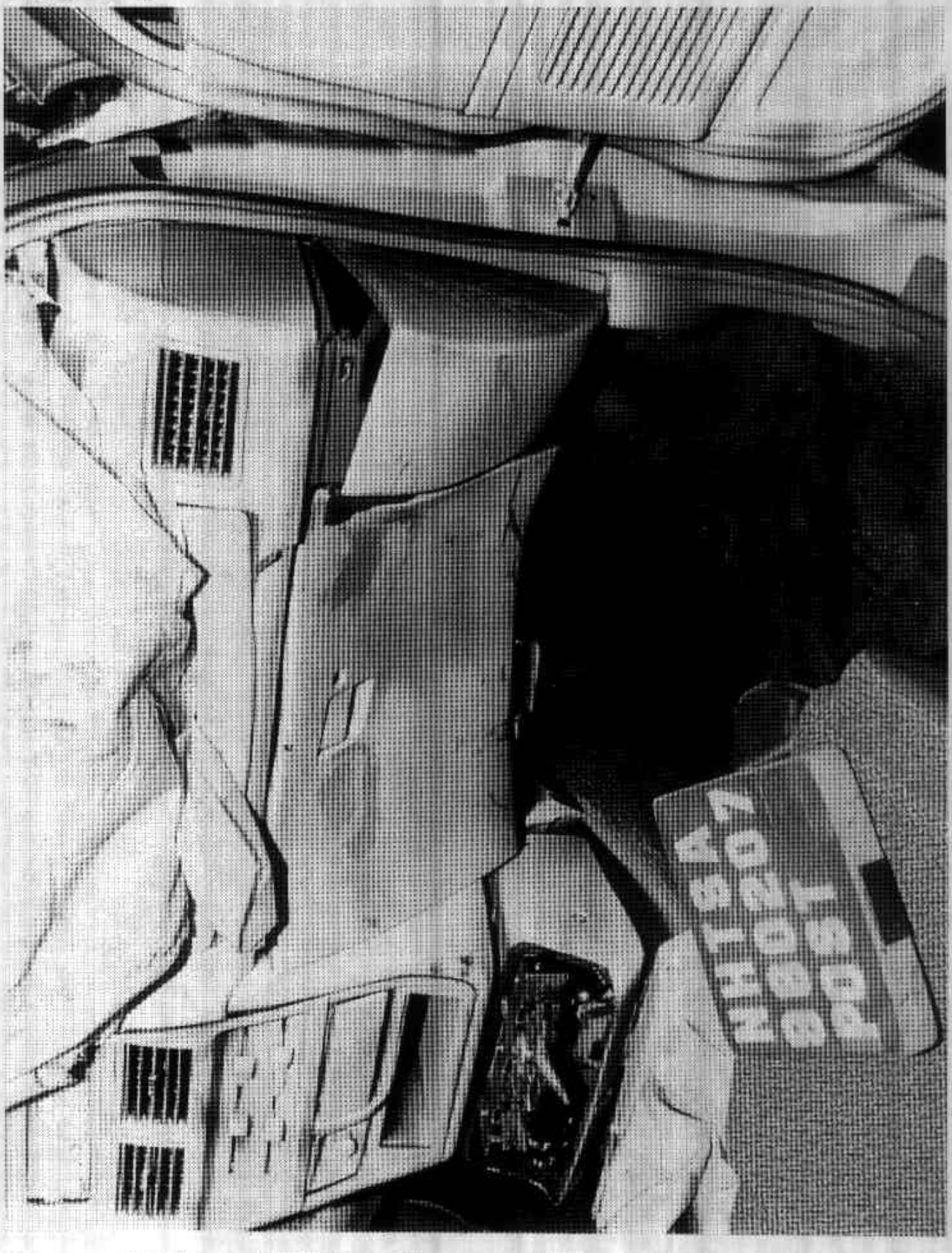


Figure A-30. Post-Test Passenger Dummy Knee Contact - View 2

Figure A-31. Pre-Test Vehicle Certification Label View

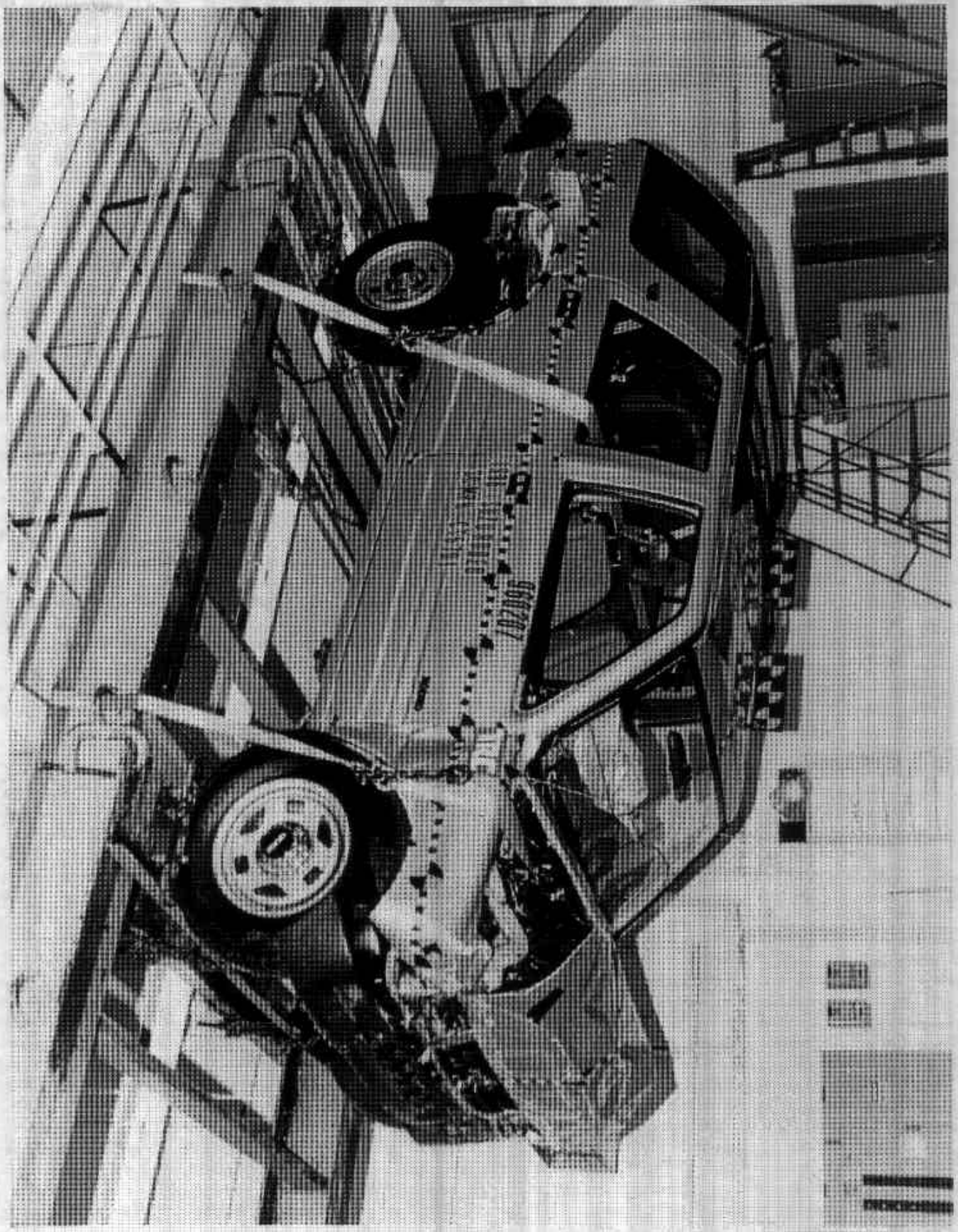
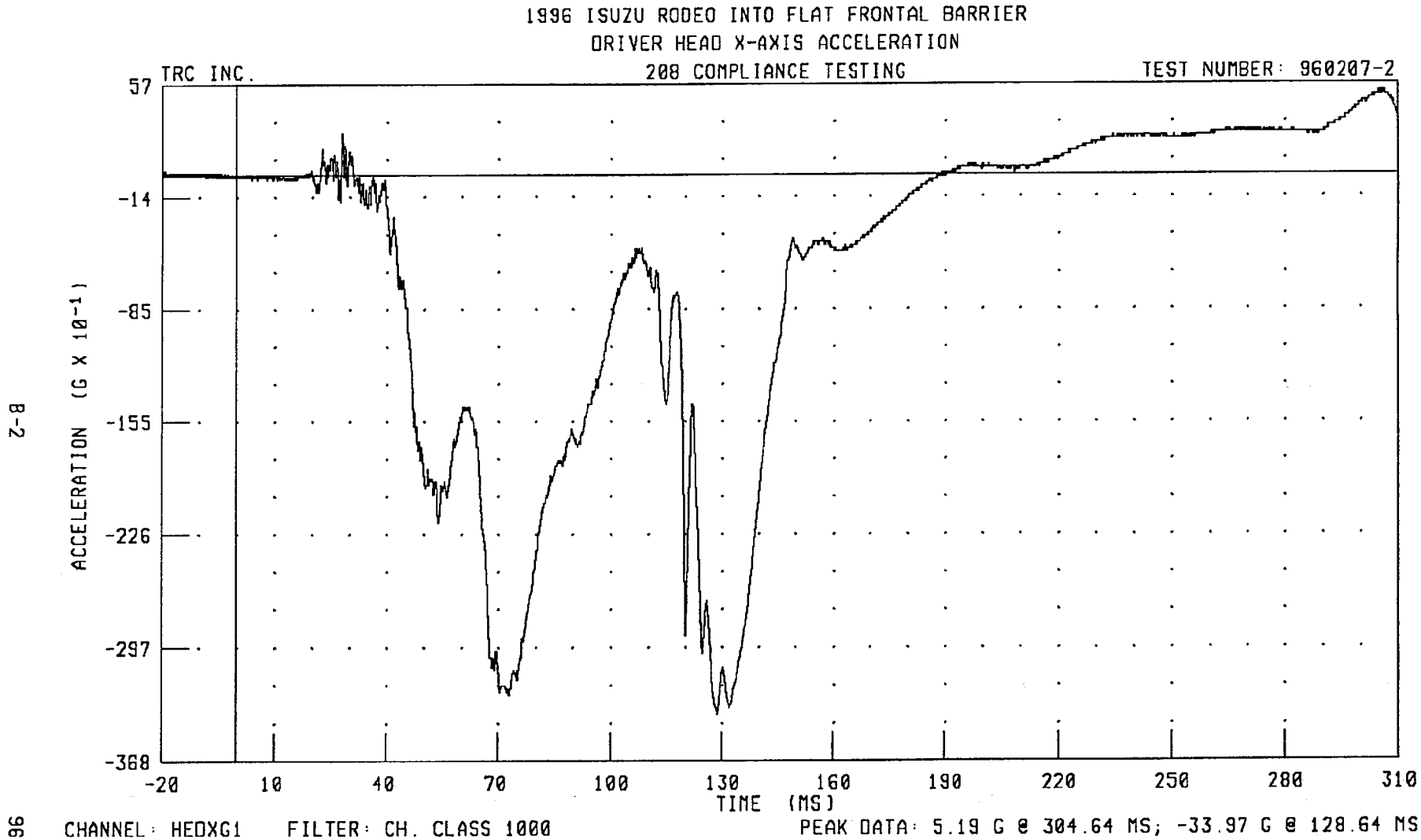


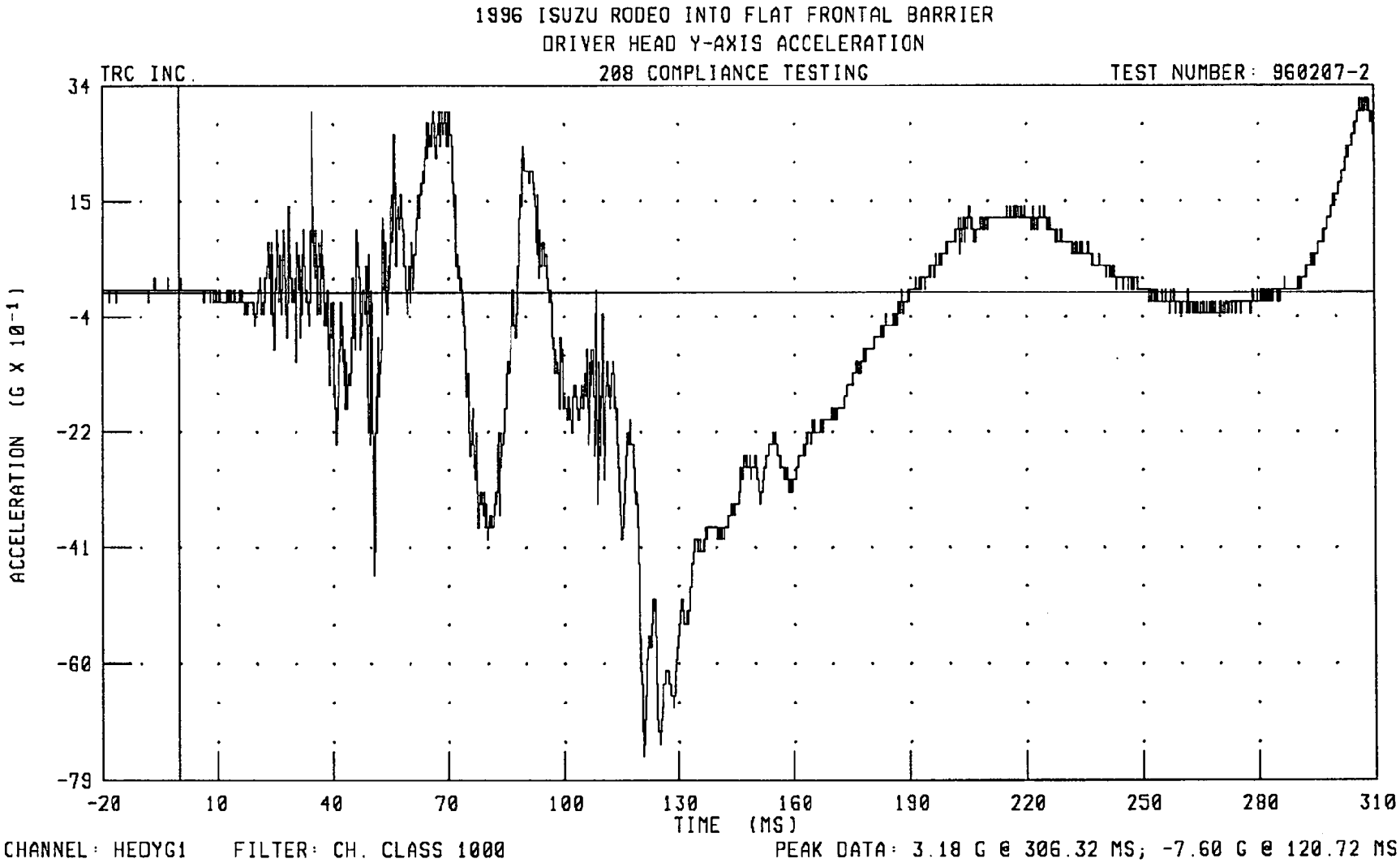
Figure A-32. Post-Test Vehicle on Static Rollover Device

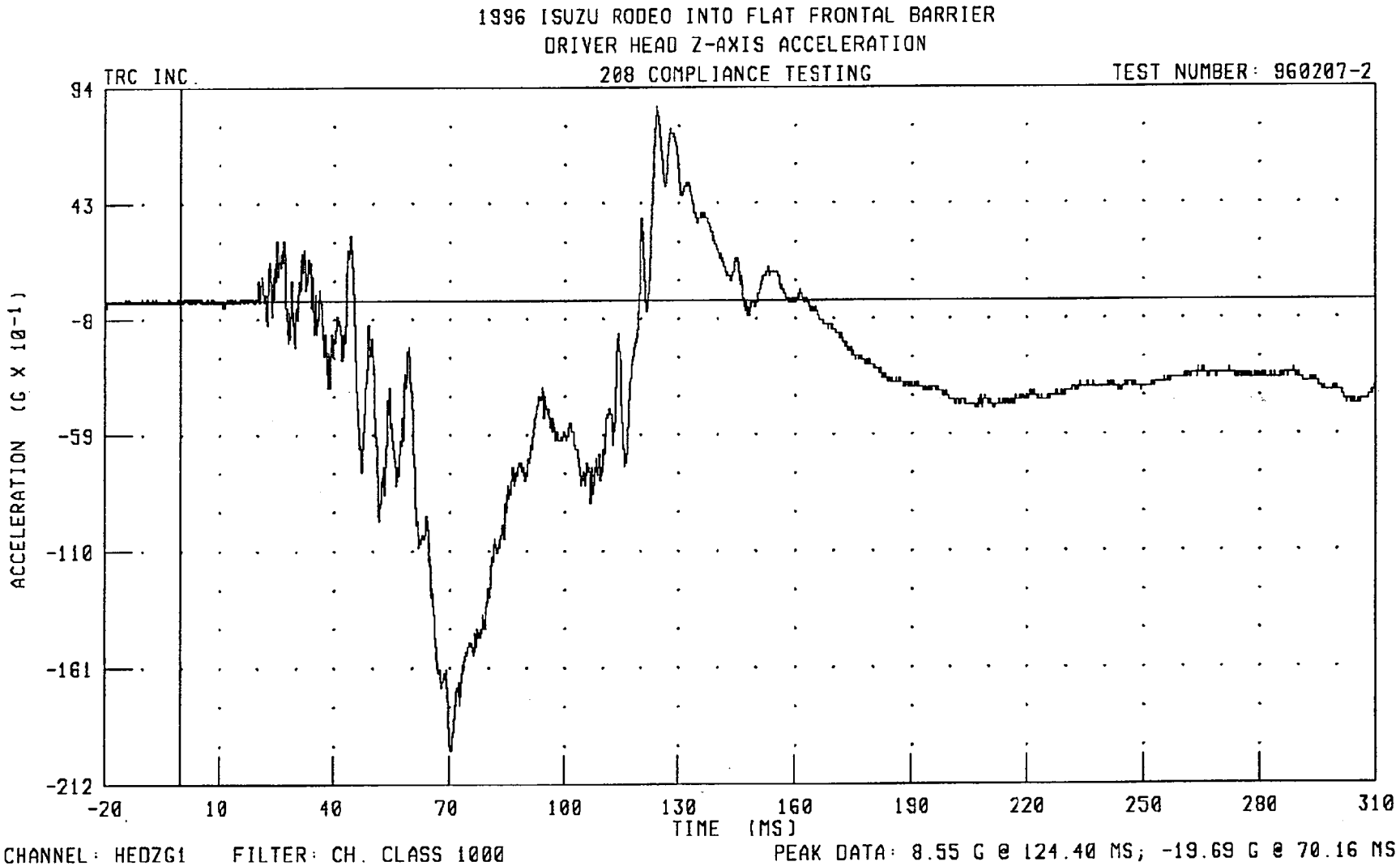
Appendix B

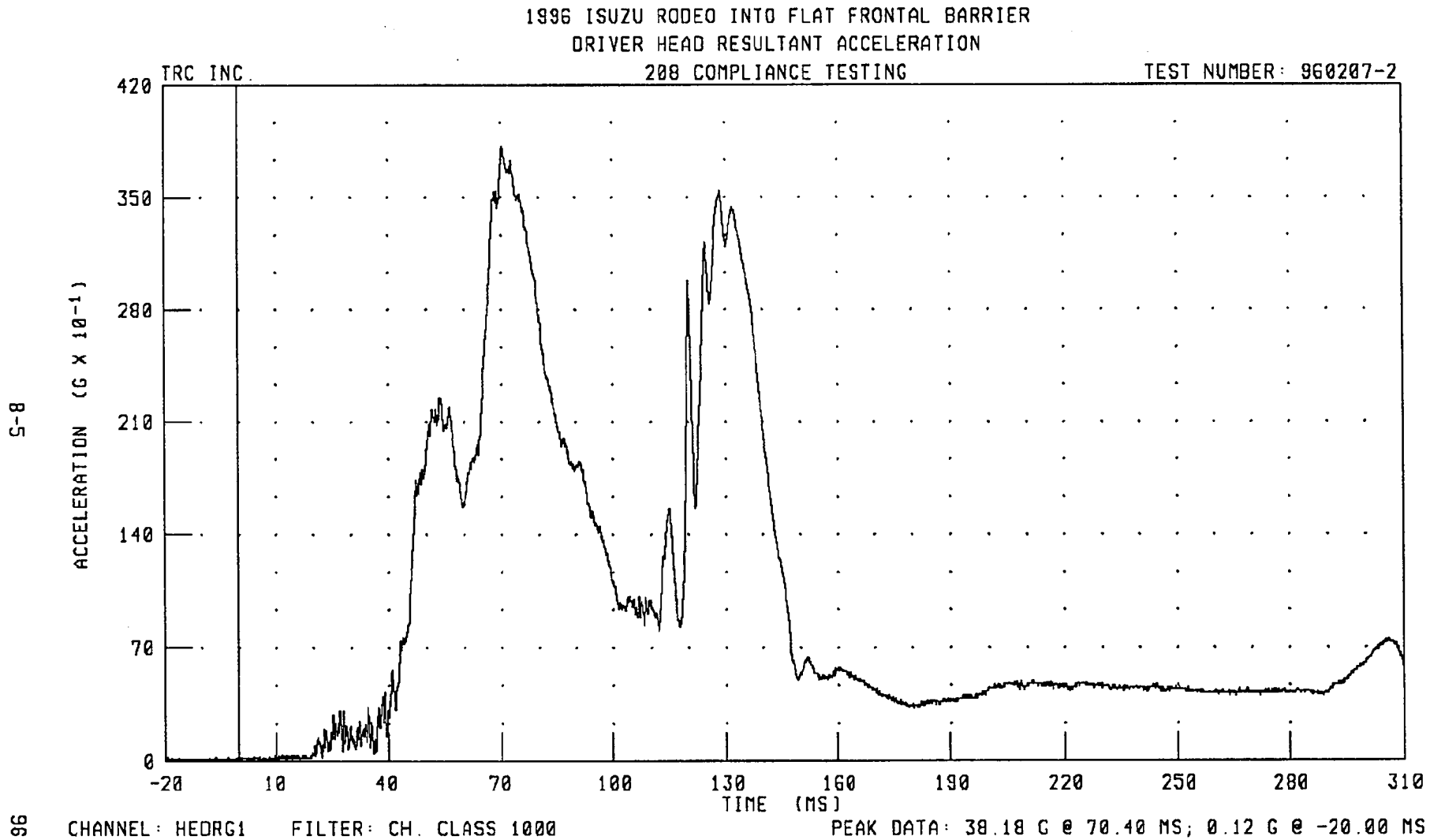
Data Plots

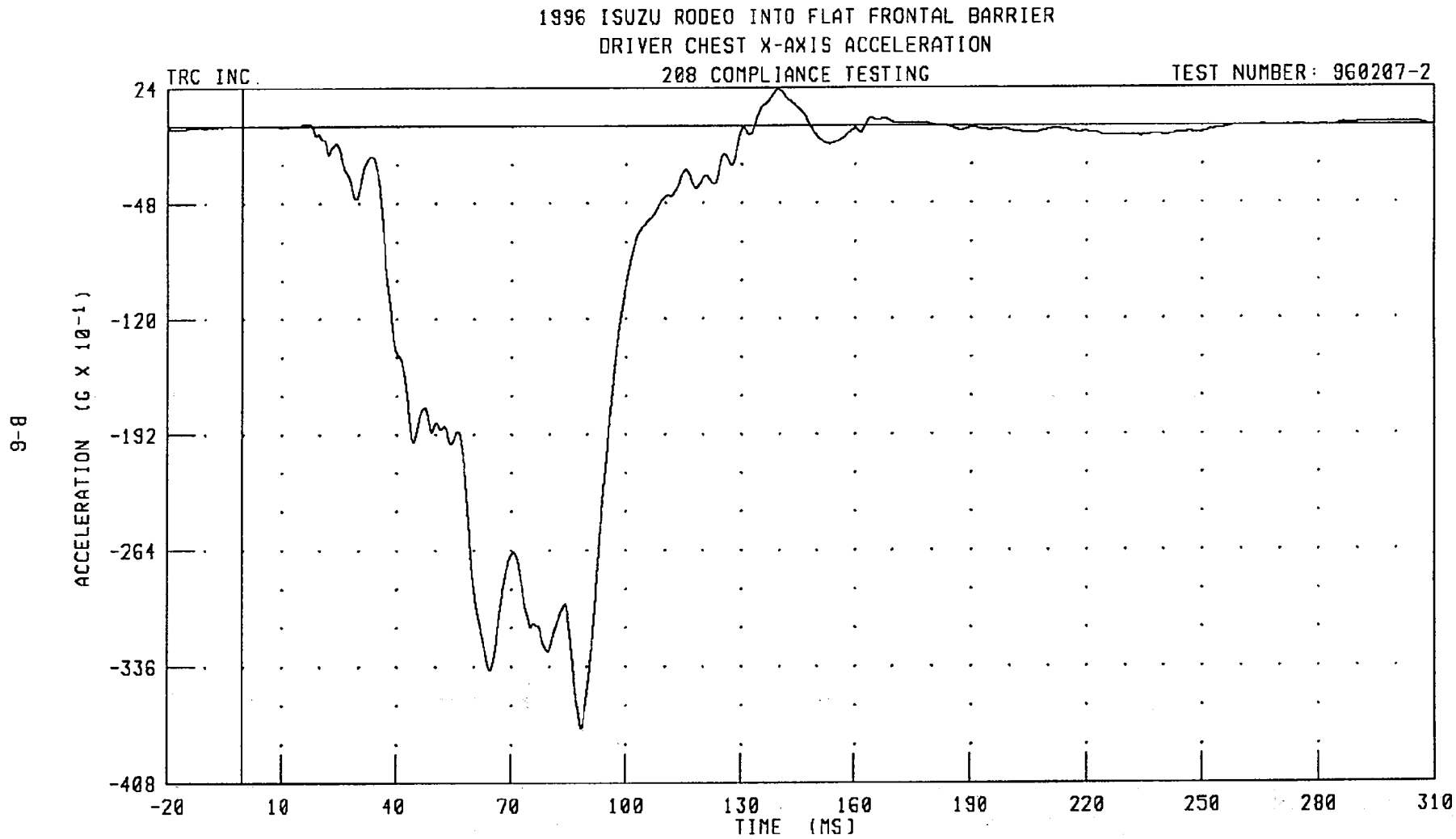

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
ORIVER HEAD X-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
57
-14
-85
-155
-226
-297
-368
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG1
FILTER: CH. CLASS 1000
PEAK DATA: 5.19 G @ 304.64 MS; -33.97 G @ 128.64 MS

960207

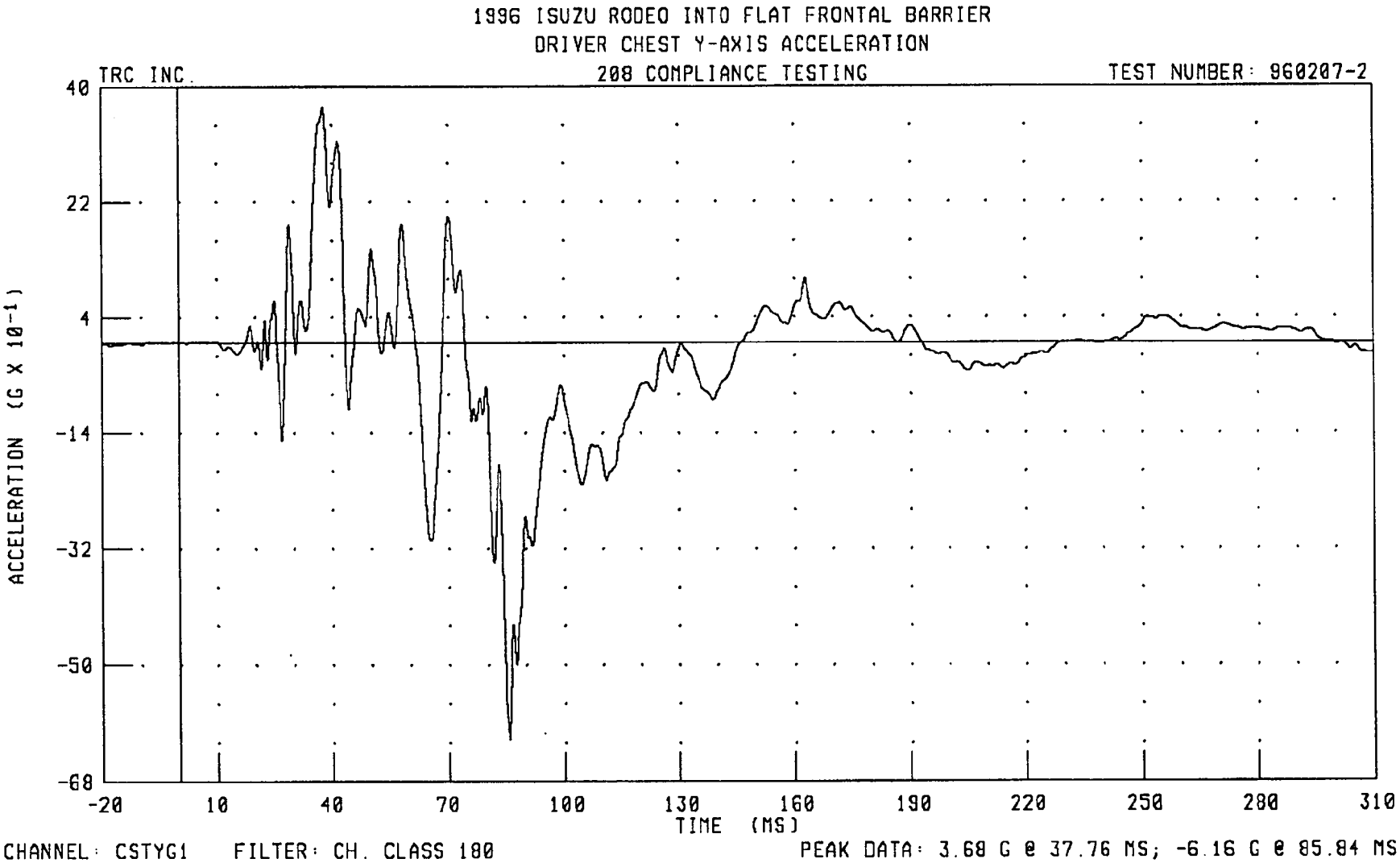

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
34
15
-4
-22
-41
-60
-79
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG1
FILTER: CH. CLASS 1000
PEAK DATA: 3.18 G @ 306.32 MS; -7.60 G @ 120.72 MS

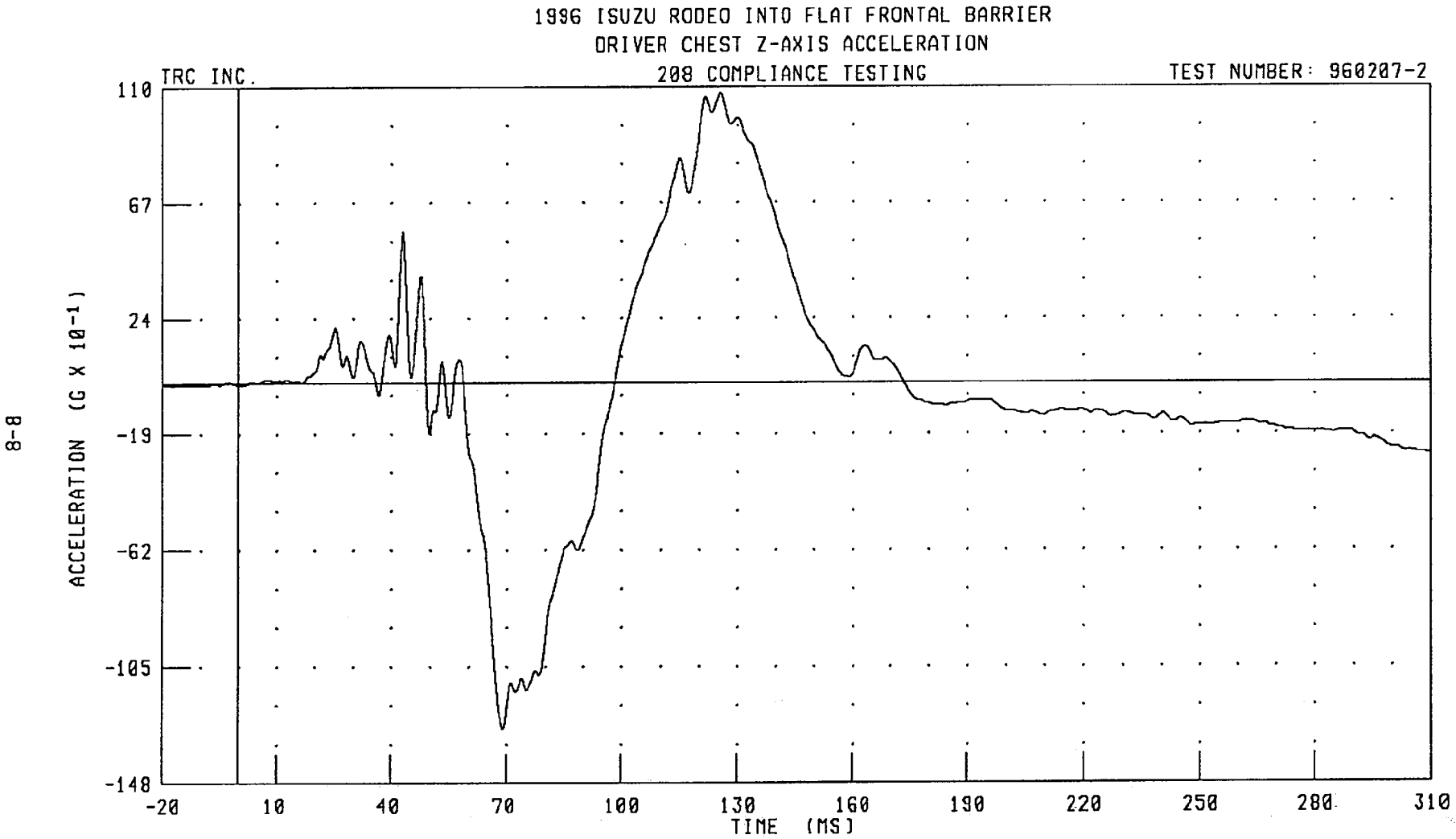

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
94
43
-8
-59
-110
-161
-212
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG1
FILTER: CH. CLASS 1000
PEAK DATA: 8.55 G @ 124.40 MS; -19.69 G @ 70.16 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER HEAD RESULTANT ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
ACCELERATION (G X 10-1)
420
350
280
210
140
70
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG1
FILTER: CH. CLASS 1000
PEAK DATA: 38.18 G @ 70.40 MS; 0.12 G @ -20.00 MS

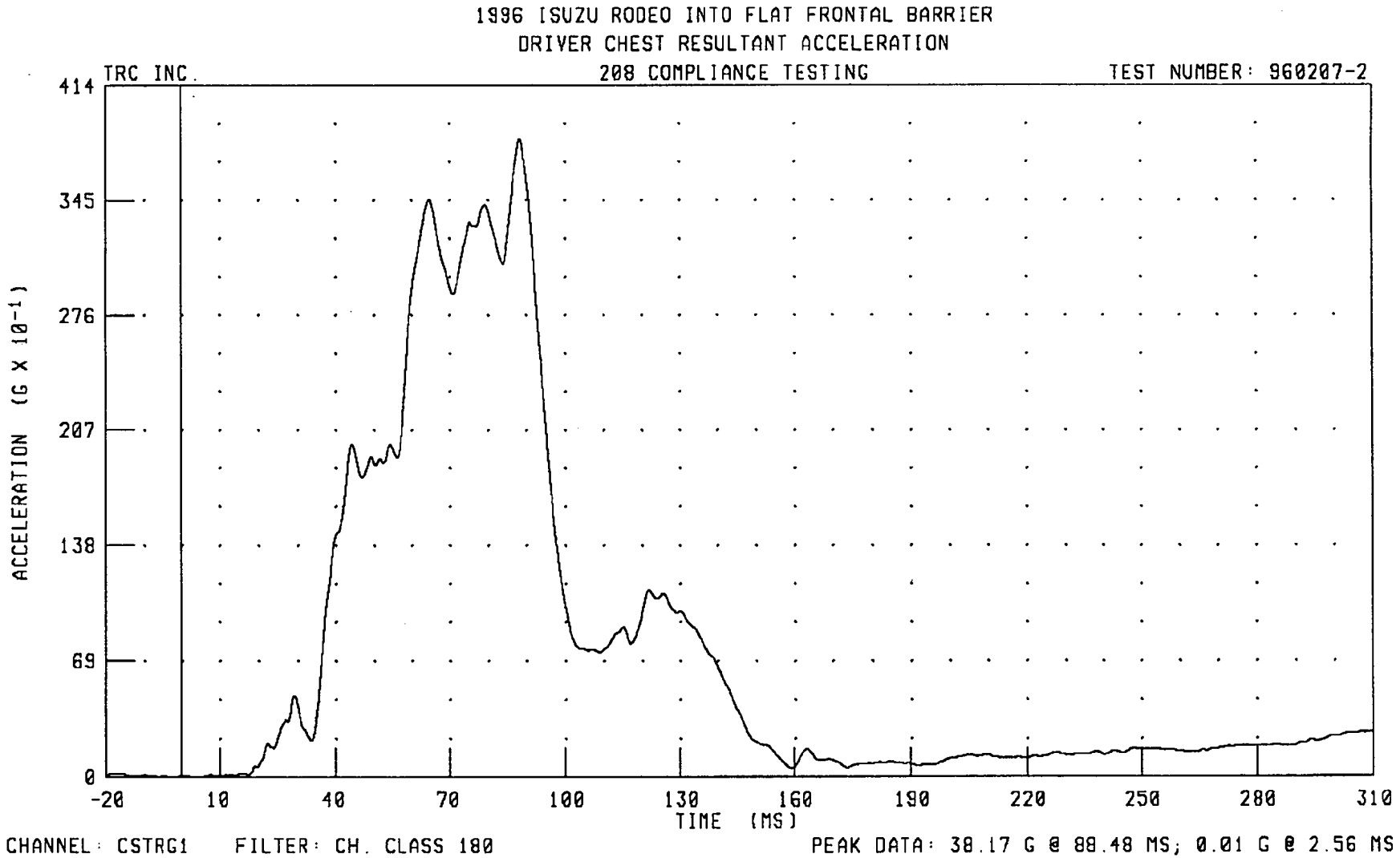

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
24
-48
-120
-192
-264
-336
-408
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG1
FILTER: CH. CLASS 180
PEAK DATA: 2.26 G @ 139.44 MS; -37.42 G @ 88.48 MS

960207

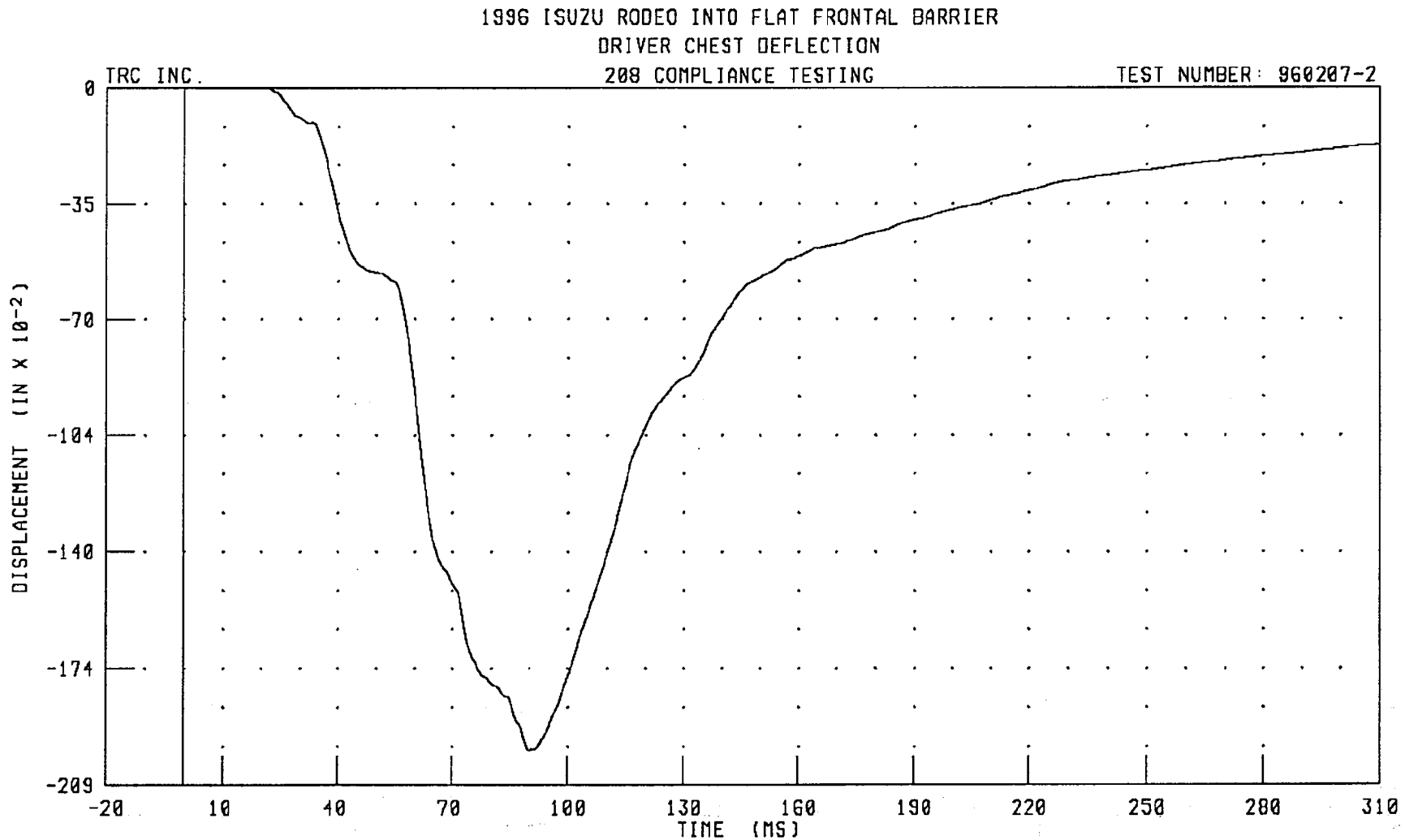

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
ACCELERATION (G X 10-1)
40
22
4
-14
-32
-50
-68
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG1
FILTER: CH. CLASS 180
PEAK DATA: 3.68 G @ 37.76 MS; -6.16 G @ 85.84 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER CHEST Z-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
110
67
24
-19
-62
-105
-148
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG1
FILTER: CH. CLASS 180
PEAK DATA: 10.77 G @ 125.52 MS; -12.80 G @ 69.12 MS

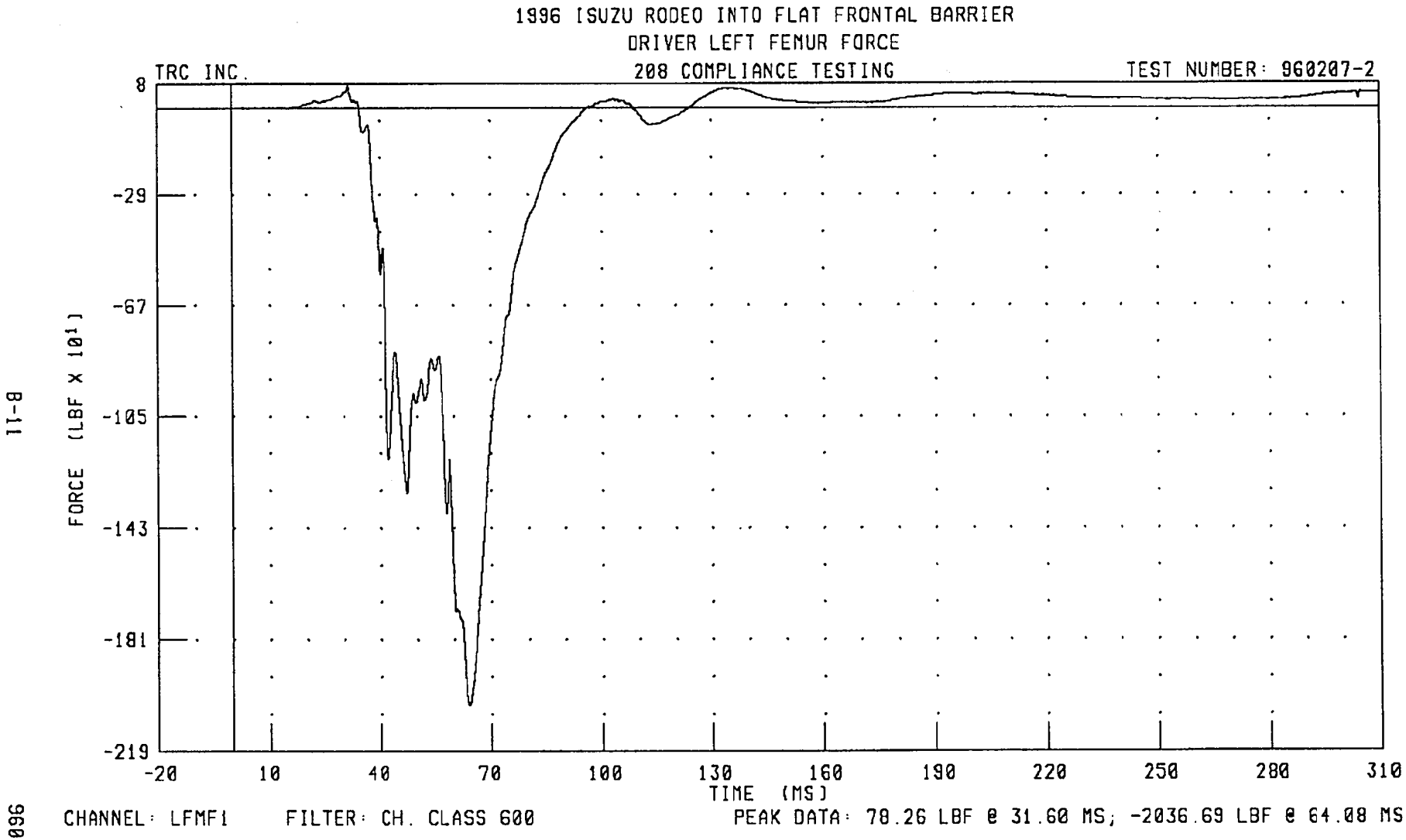
960207

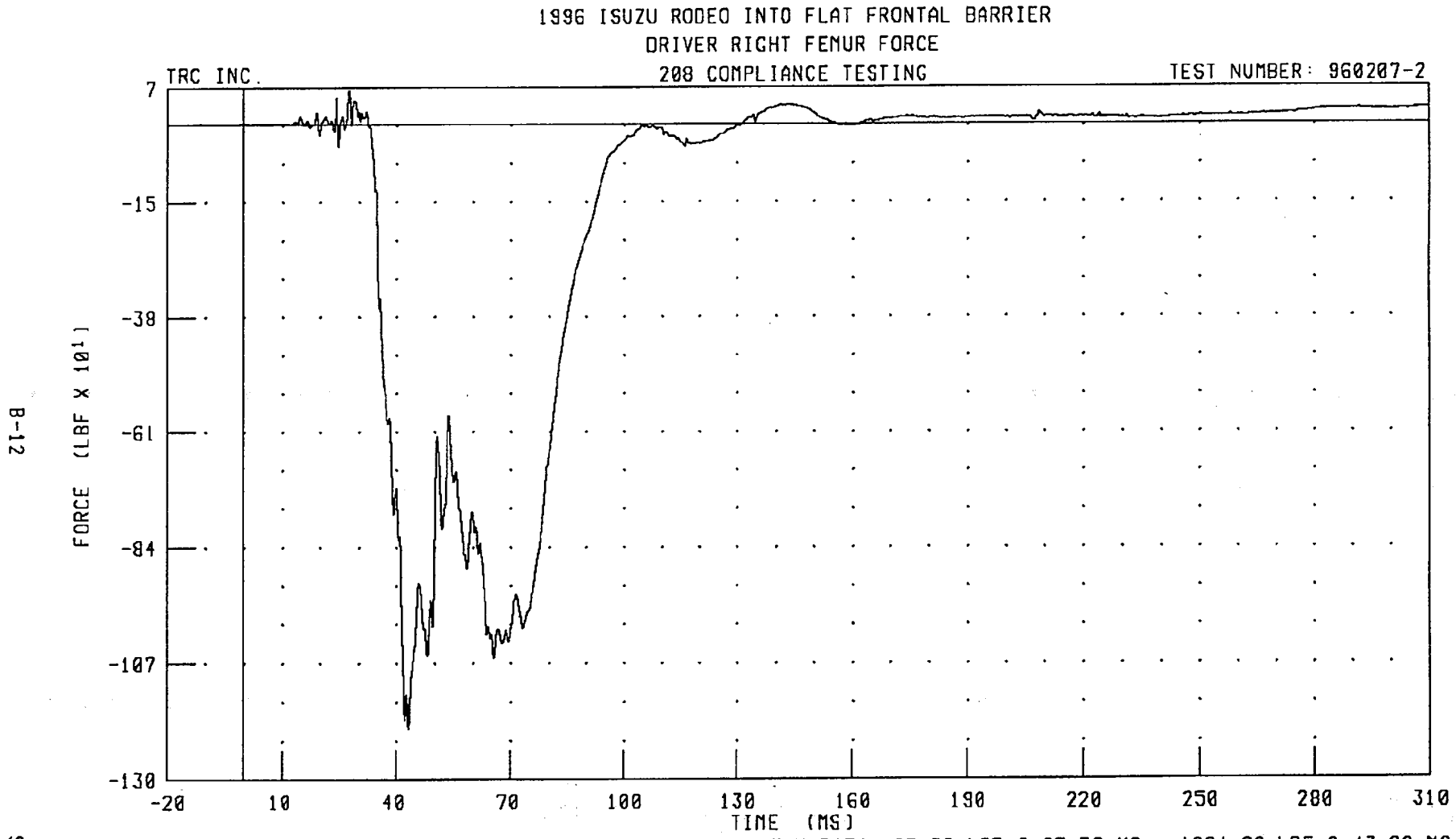

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
414
345
276
207
138
69
0
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG1
FILTER: CH. CLASS 180
PEAK DATA: 38.17 G @ 88.48 MS; 0.01 G @ 2.56 MS

960207

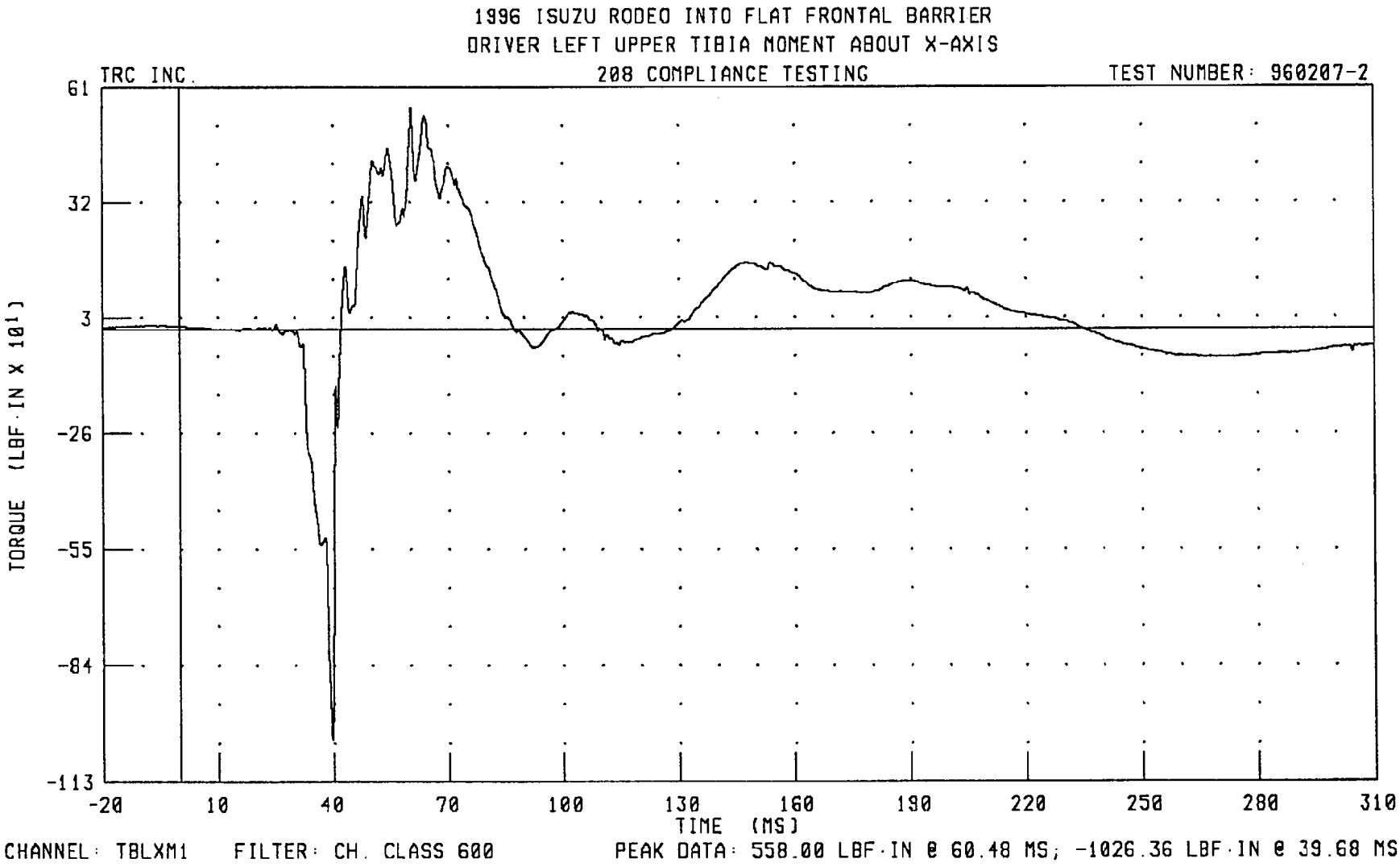

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER CHEST DEFLECTION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
0
-35
-70
-104
-140
-174
-209
DISPLACEMENT (IN X 10-2)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD1
FILTER: CH. CLASS 180
PEAK DATA: 0.00 IN @ 21.04 MS; -1.99 IN @ 90.16 MS

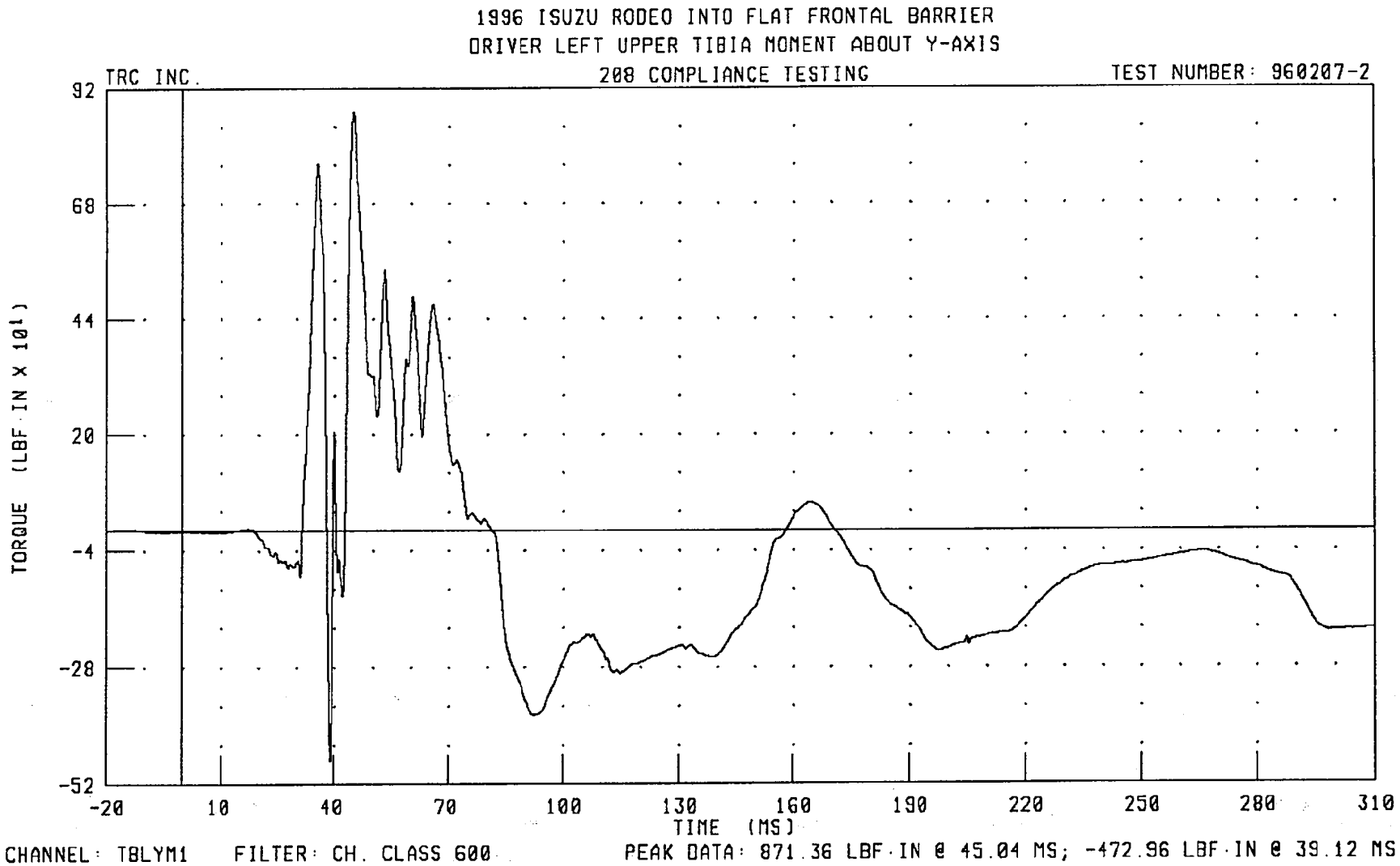
960207

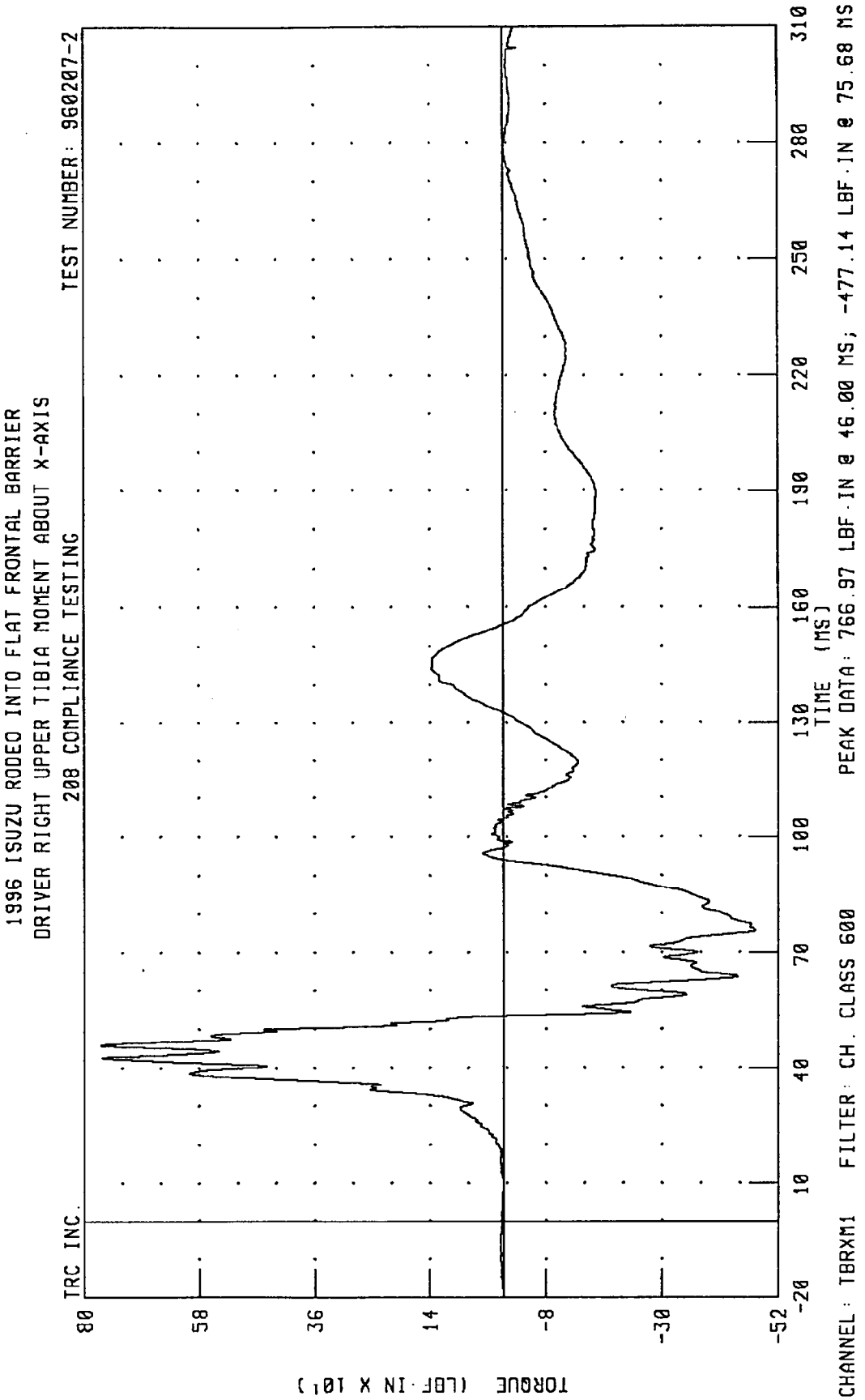

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER LEFT FEMUR FORCE
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
8
-29
-67
-105
-143
-181
-219
FORCE (LBF X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF1
FILTER: CH. CLASS 600
PEAK DATA: 78.26 LBF @ 31.60 MS; -2036.69 LBF @ 64.08 MS

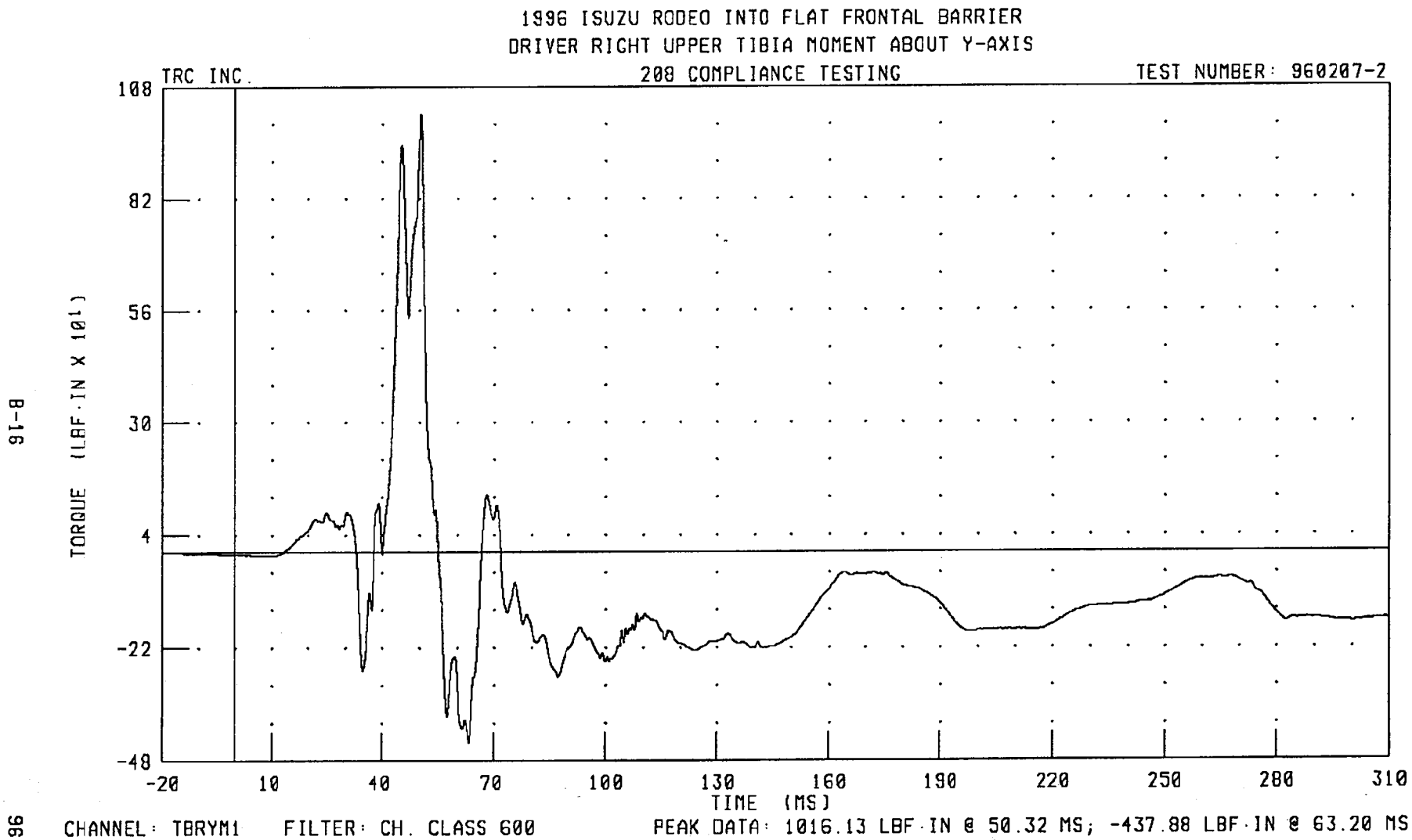

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
7
-15
-38
-61
-84
-107
-130
FORCE (LBF X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF1
FILTER: CH. CLASS 600
PEAK DATA: 67.39 LBF @ 27.52 MS; -1204.96 LBF @ 43.28 MS

960207

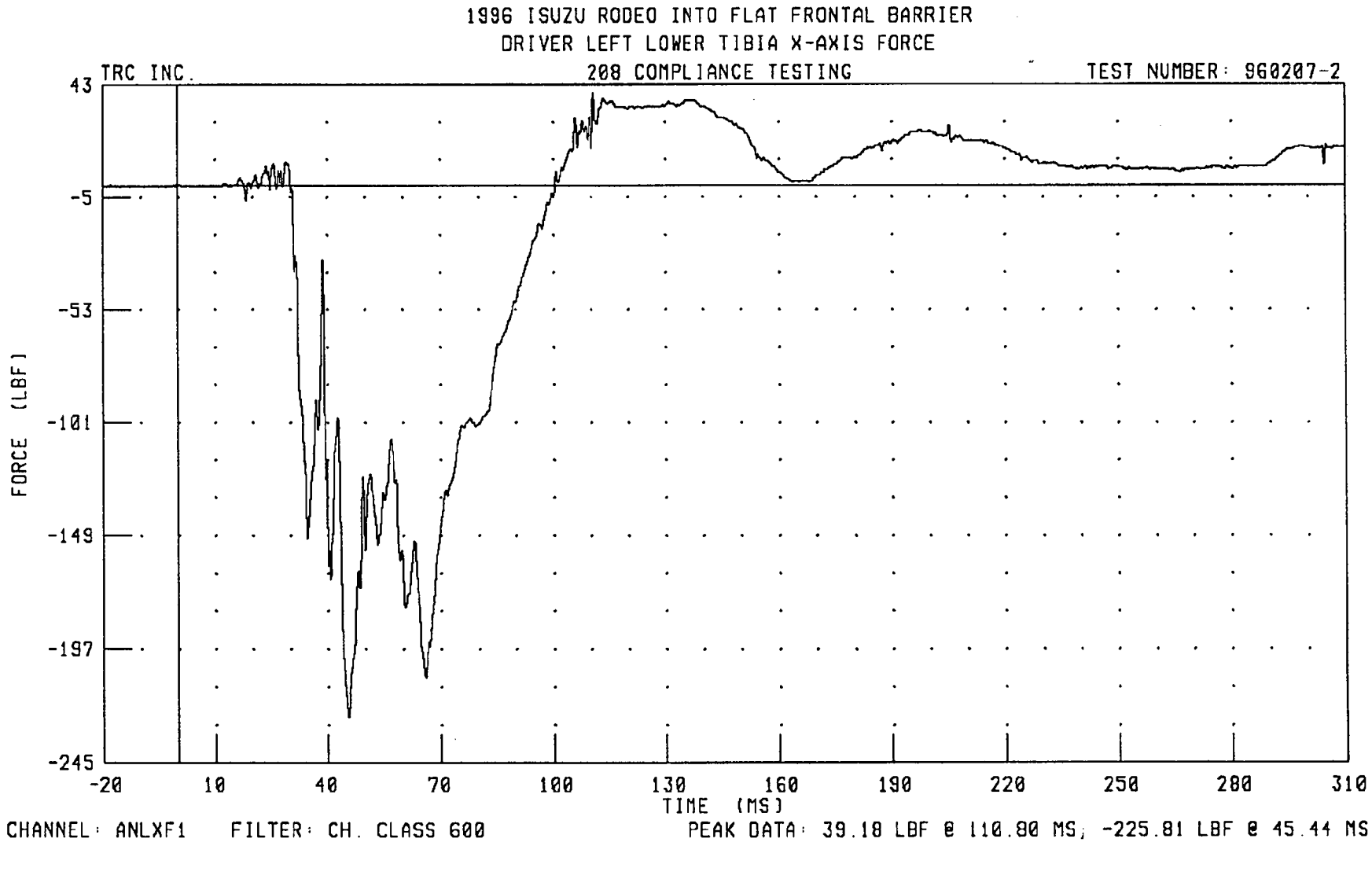

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER LEFT UPPER TIBIA MOMENT ABOUT X-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
61
32
3
-26
-55
-84
-113
TORQUE (LBF·IN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBLXM1
FILTER: CH. CLASS 600
PEAK DATA: 558.00 LBF·IN @ 60.48 MS; -1026.36 LBF·IN @ 39.68 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER LEFT UPPER TIBIA MOMENT ABOUT Y-AXIS
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
TORQUE (LBF·IN X 10¹)
92
68
44
20
-4
-28
-52
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBLYM1
FILTER: CH. CLASS 600
PEAK DATA: 871.36 LBF·IN @ 45.04 MS; -472.96 LBF·IN @ 39.12 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT X-AXIS
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
TRC INC.
80
58
36
14
-8
-30
-52
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
TORQUE (LBF·IN X 10¹)
CHANNEL: TBRXM1 FILTER: CH. CLASS 600 PEAK DATA: 766.97 LBF·IN @ 46.00 MS; -477.14 LBF·IN @ 75.68 MS

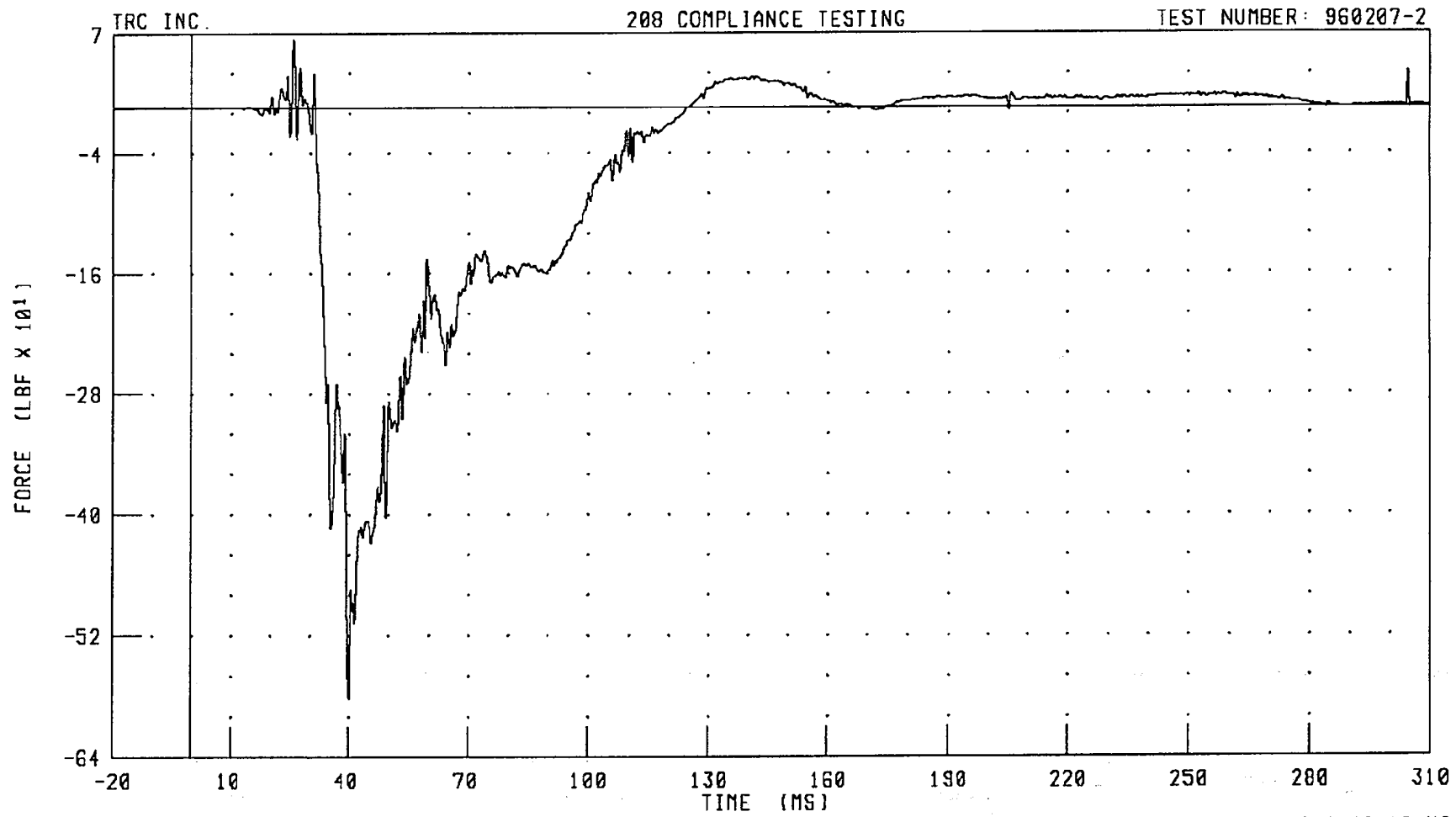

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER RIGHT UPPER TIBIA MOMENT ABOUT Y-AXIS
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
TORQUE (LBF·IN X 10¹)
108
82
56
30
4
-22
-48
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBRYM1
FILTER: CH. CLASS 600
PEAK DATA: 1016.13 LBF·IN @ 50.32 MS; -437.88 LBF·IN @ 63.20 MS

960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER LEFT LOWER TIBIA X-AXIS FORCE
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
43
-5
-53
-101
-149
-197
-245
FORCE (LBF)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLXF1
FILTER: CH. CLASS 600
PEAK DATA: 39.18 LBF @ 110.80 MS; -225.81 LBF @ 45.44 MS

960207

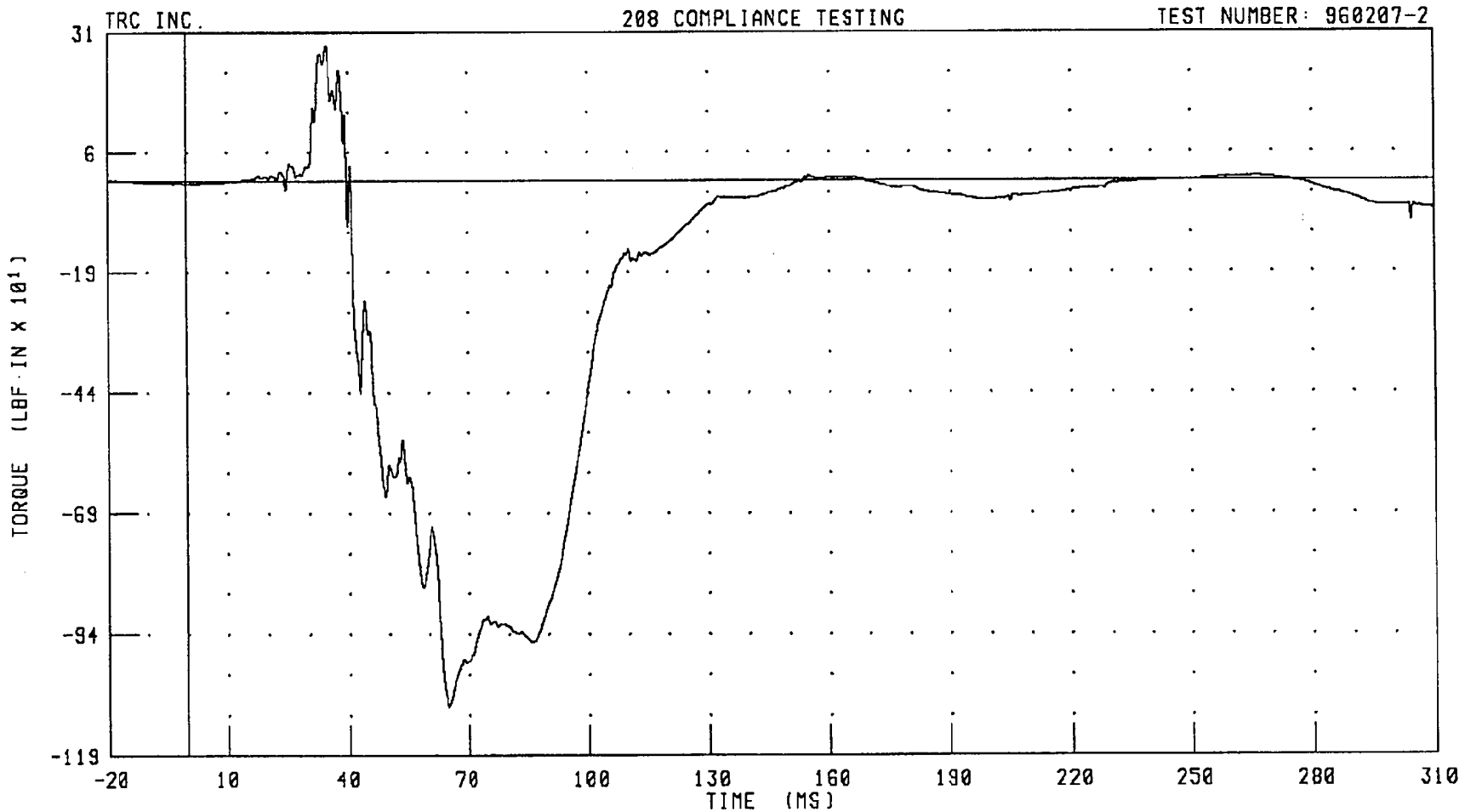
1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER LEFT LOWER TIBIA Z-AXIS FORCE



CHANNEL: ANLZF1 FILTER: CH. CLASS 600 PEAK DATA: 67.41 LBF @ 25.84 MS; -588.52 LBF @ 40.16 MS

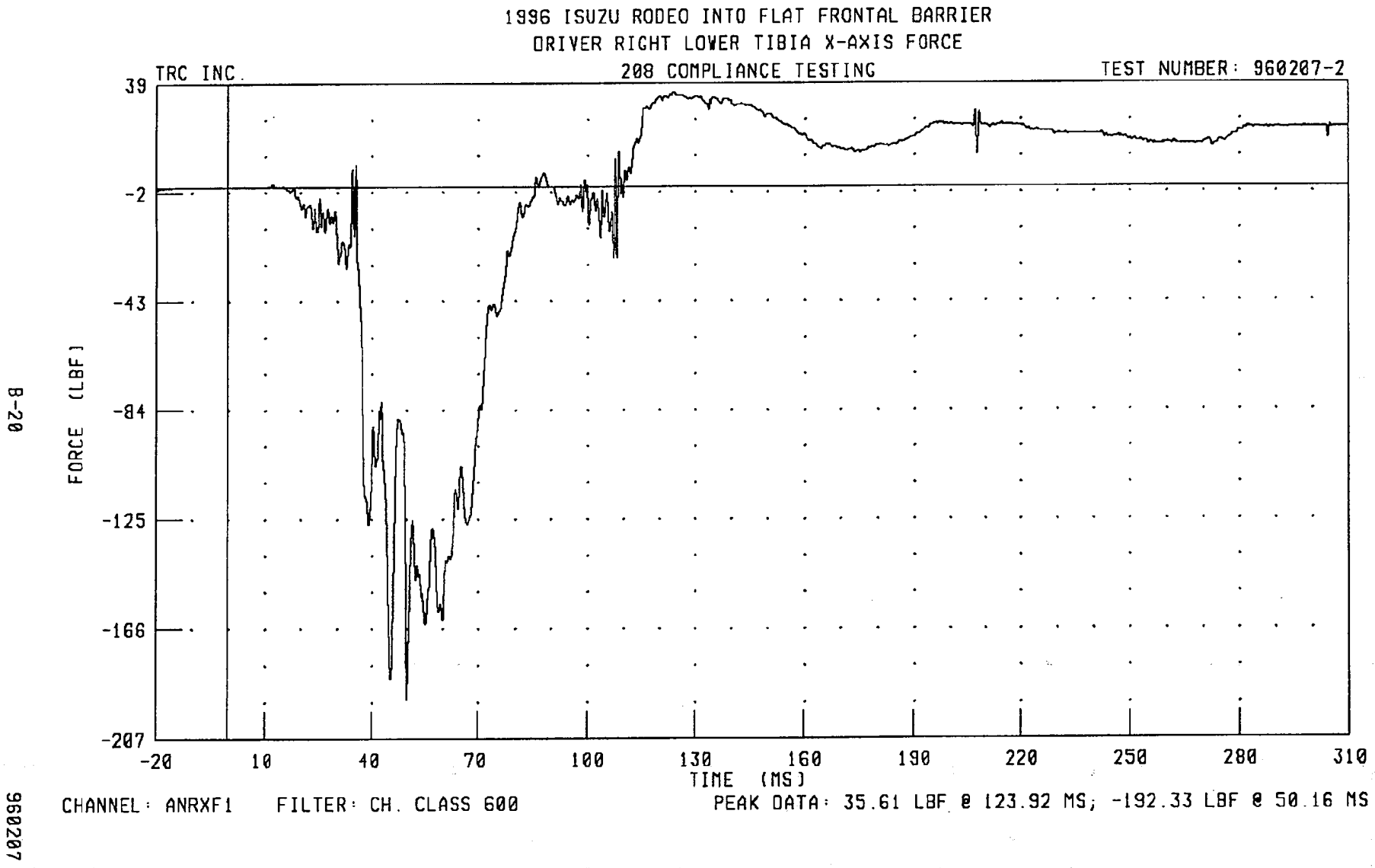
960207

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER LEFT LOWER TIBIA MOMENT ABOUT Y-AXIS

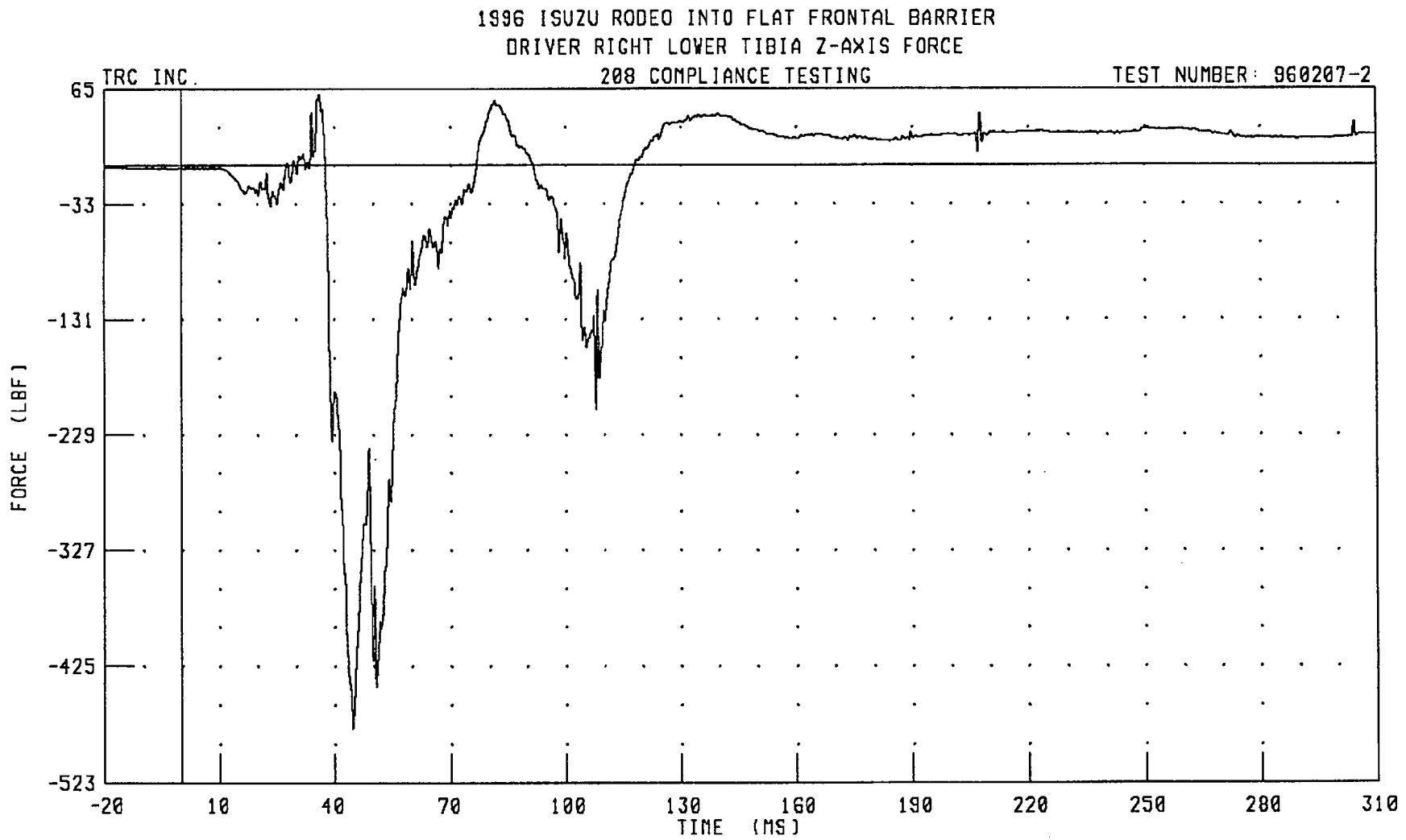


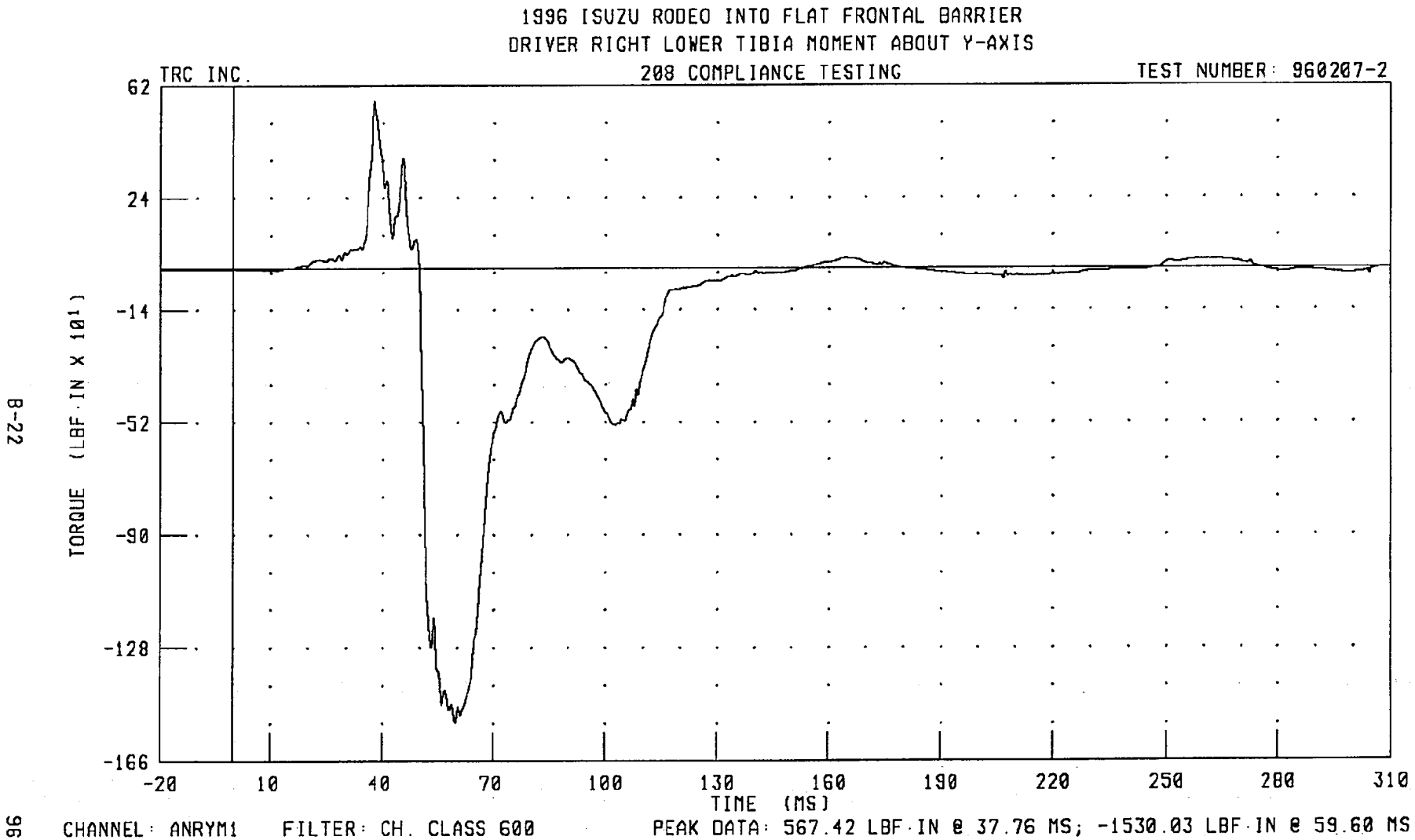
CHANNEL: ANLYM1 FILTER: CH. CLASS 600 PEAK DATA: 281.99 LBF·IN @ 34.64 MS; -1089.03 LBF·IN @ 65.04 MS

960207

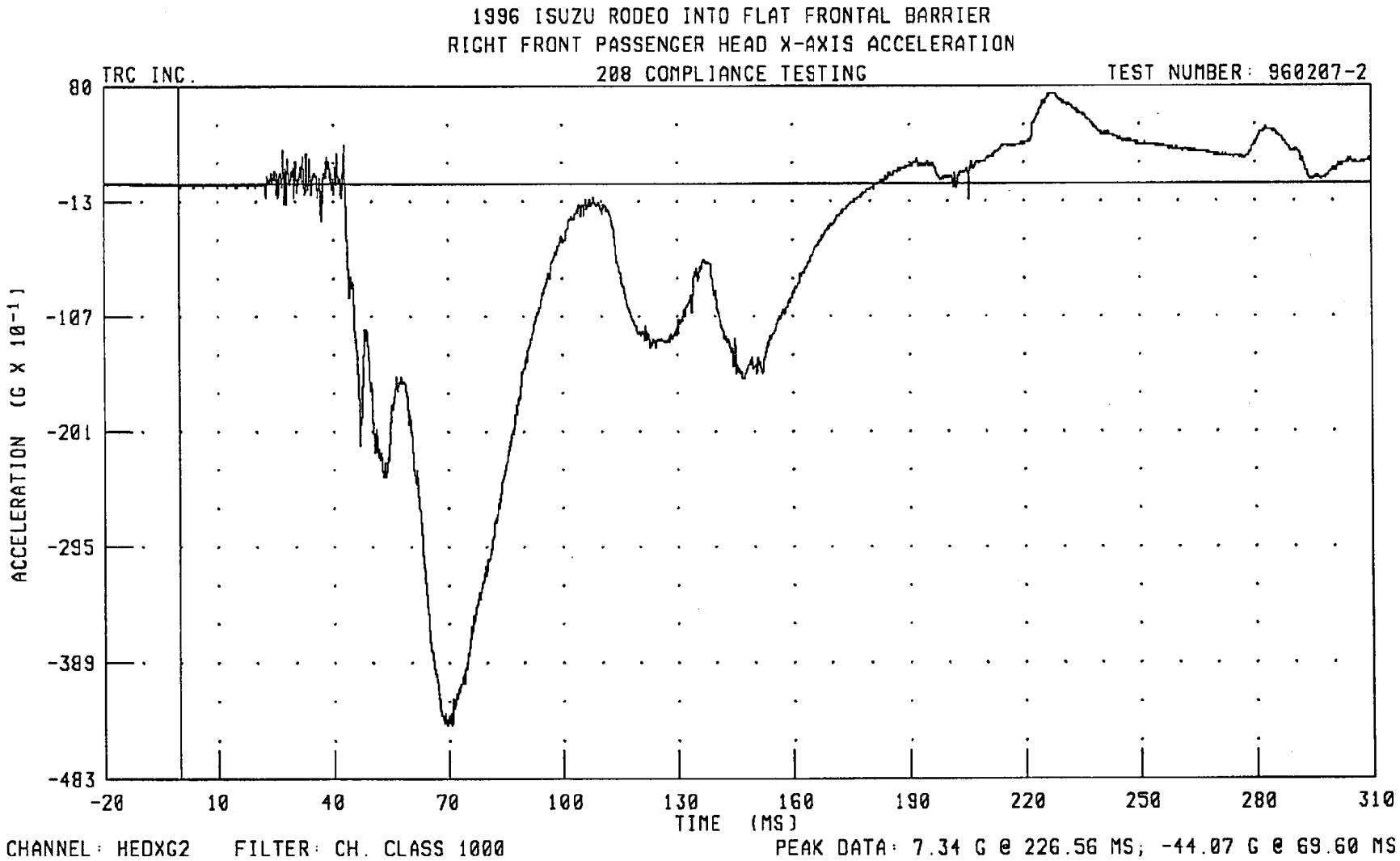

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER RIGHT LOWER TIBIA X-AXIS FORCE
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
39
-2
-43
-84
-125
-166
-207
FORCE (LBF)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRXF1
FILTER: CH. CLASS 600
PEAK DATA: 35.61 LBF @ 123.92 MS; -192.33 LBF @ 50.16 MS

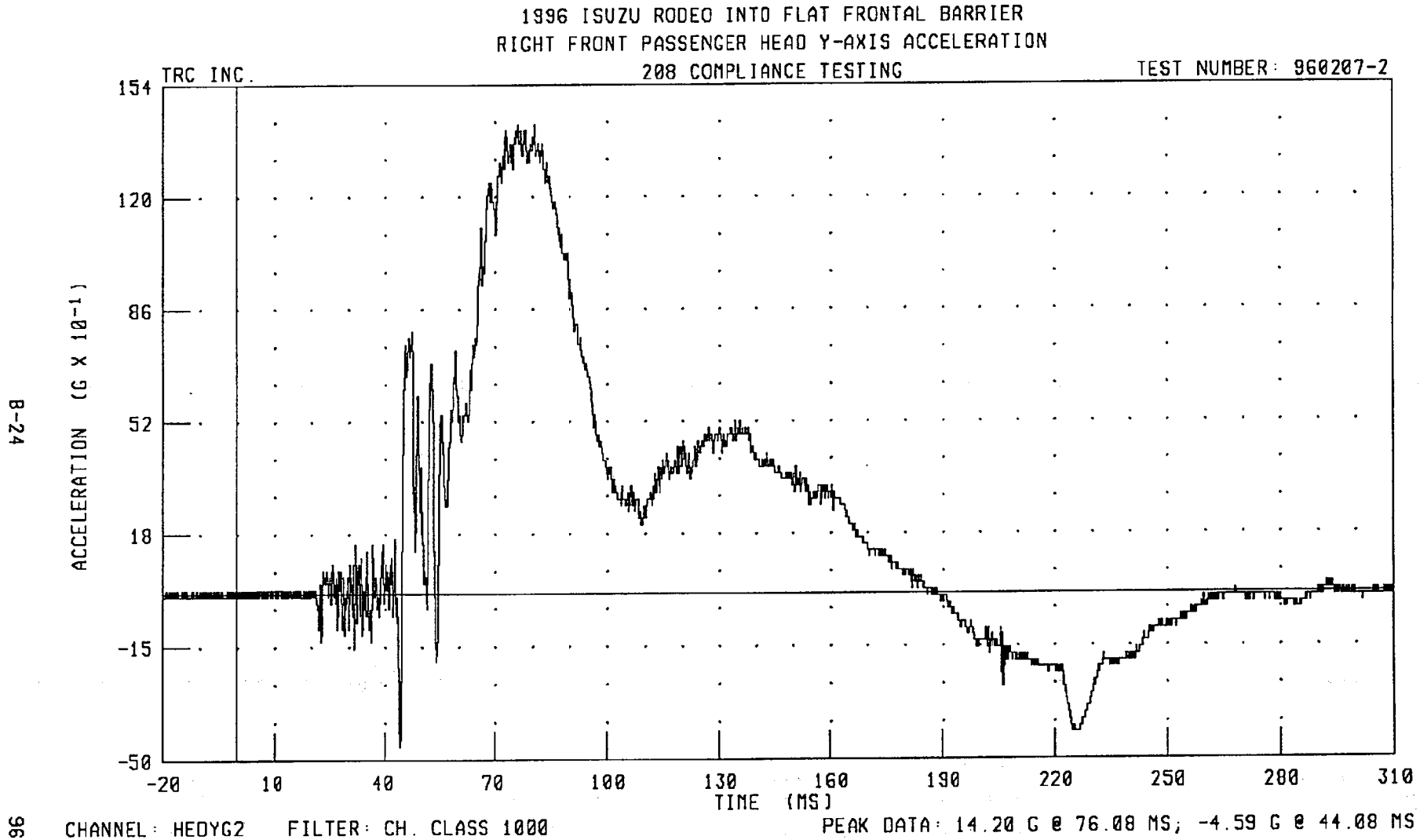
960207

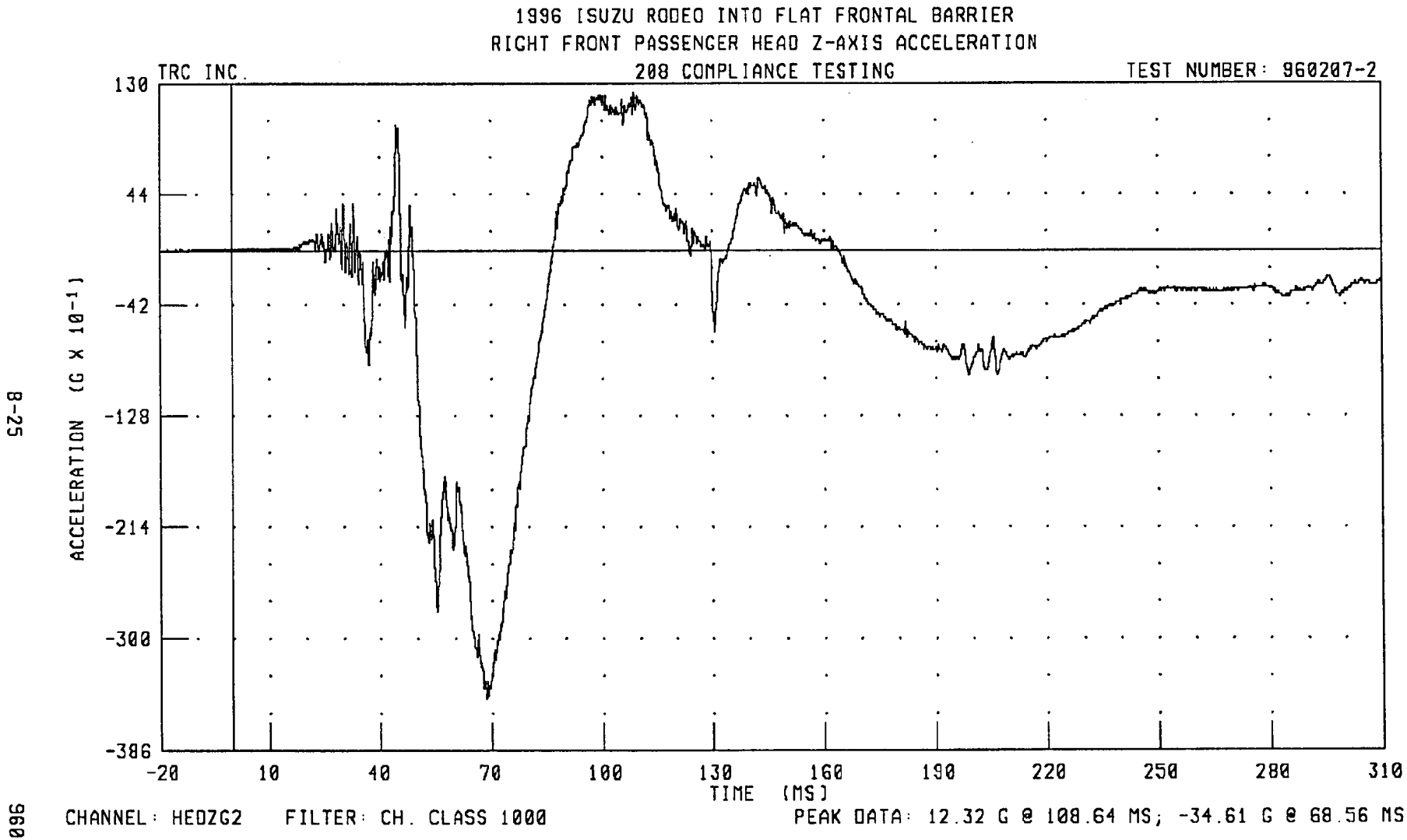

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER RIGHT LOWER TIBIA Z-AXIS FORCE
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
65
-33
-131
-229
-327
-425
-523
FORCE (LBF)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRZF1
FILTER: CH. CLASS 600
PEAK DATA: 59.61 LBF @ 36.32 MS; -477.71 LBF @ 44.64 MS

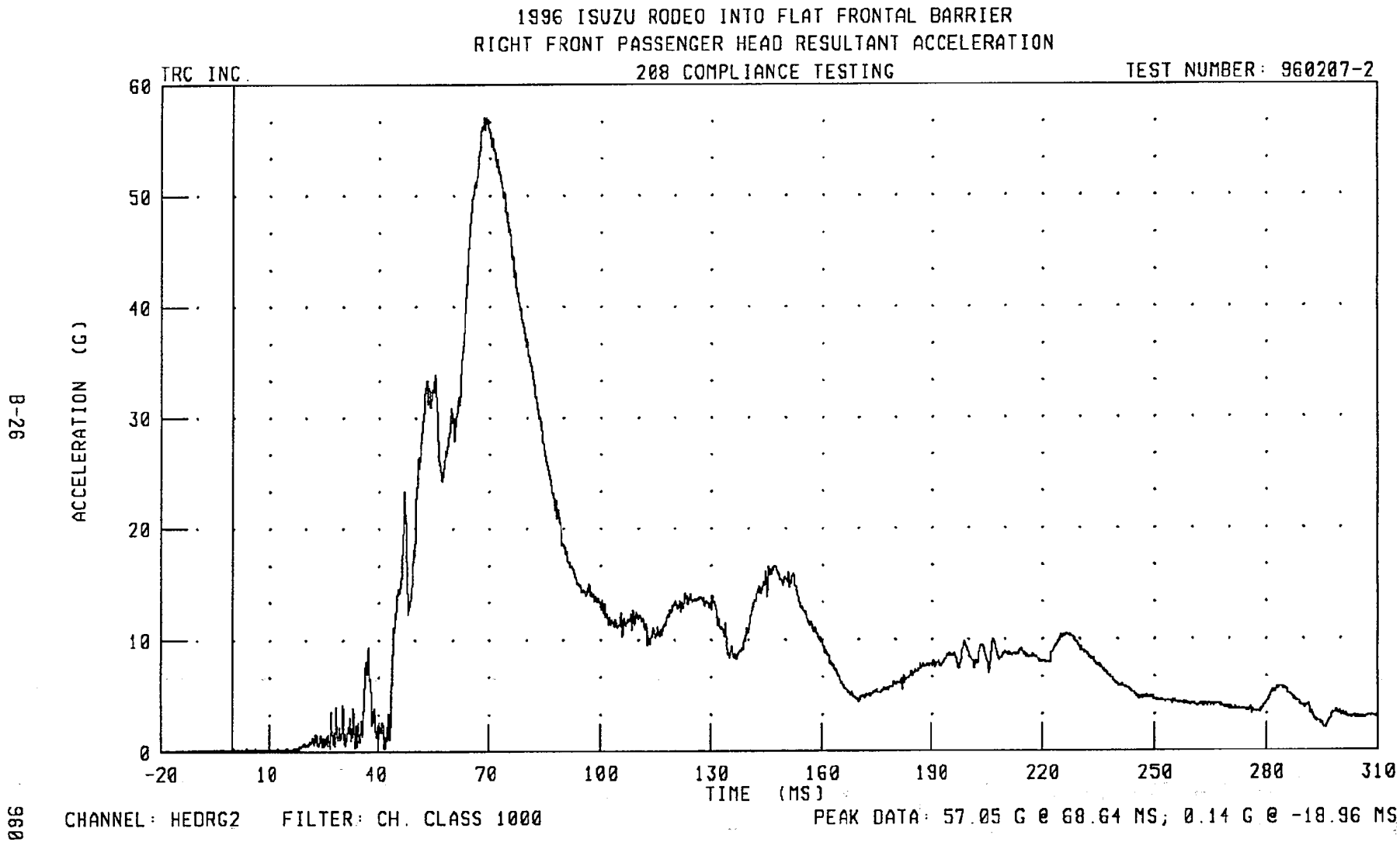

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DRIVER RIGHT LOWER TIBIA MOMENT ABOUT Y-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
62
24
-14
-52
-90
-128
-166
TORQUE (LBF·IN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRYM1
FILTER: CH. CLASS 600
PEAK DATA: 567.42 LBF·IN @ 37.76 MS; -1530.03 LBF·IN @ 59.60 MS

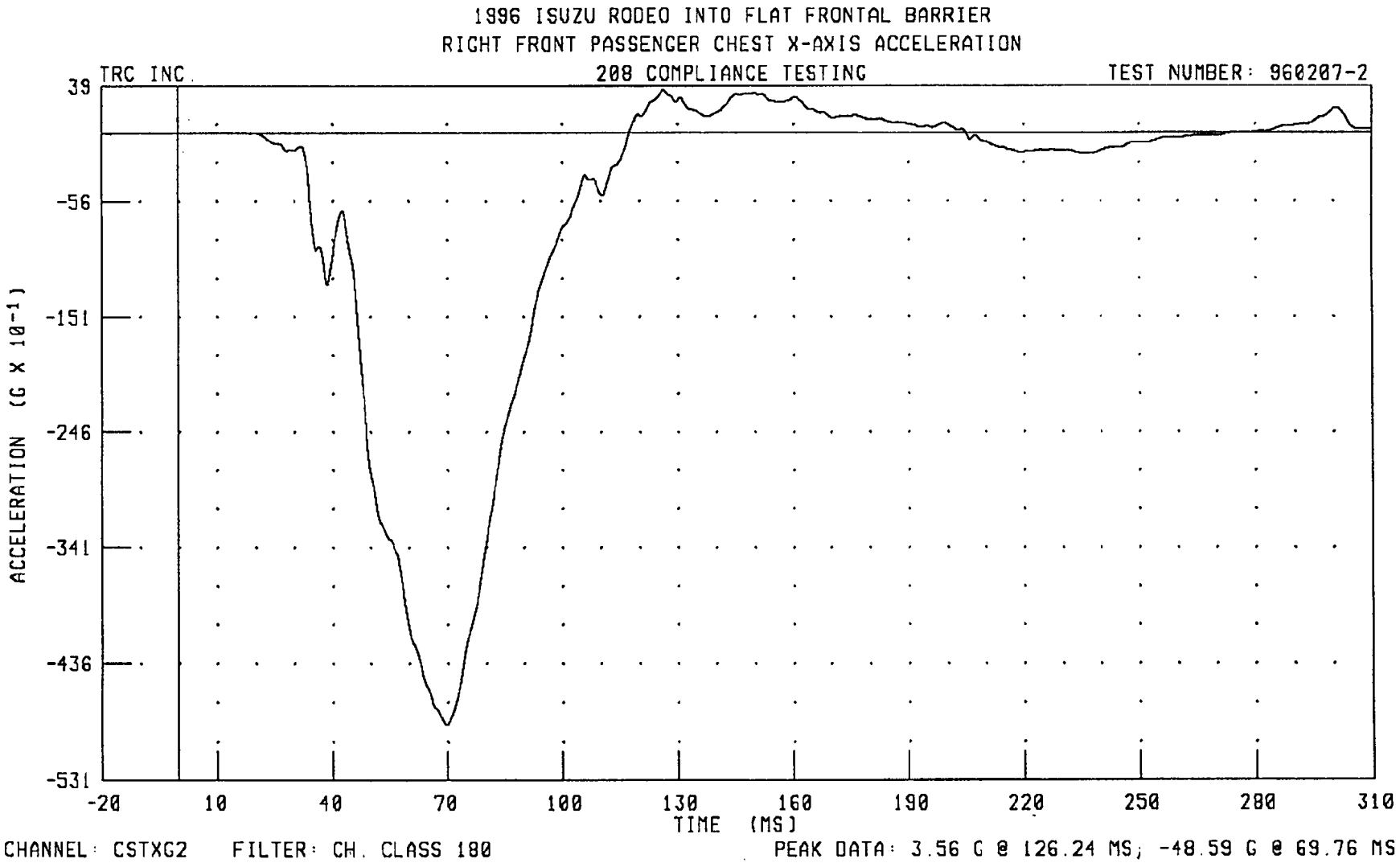
960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
80
-13
-107
-201
-295
-389
-483
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG2
FILTER: CH. CLASS 1000
PEAK DATA: 7.34 G @ 226.56 MS; -44.07 G @ 69.60 MS

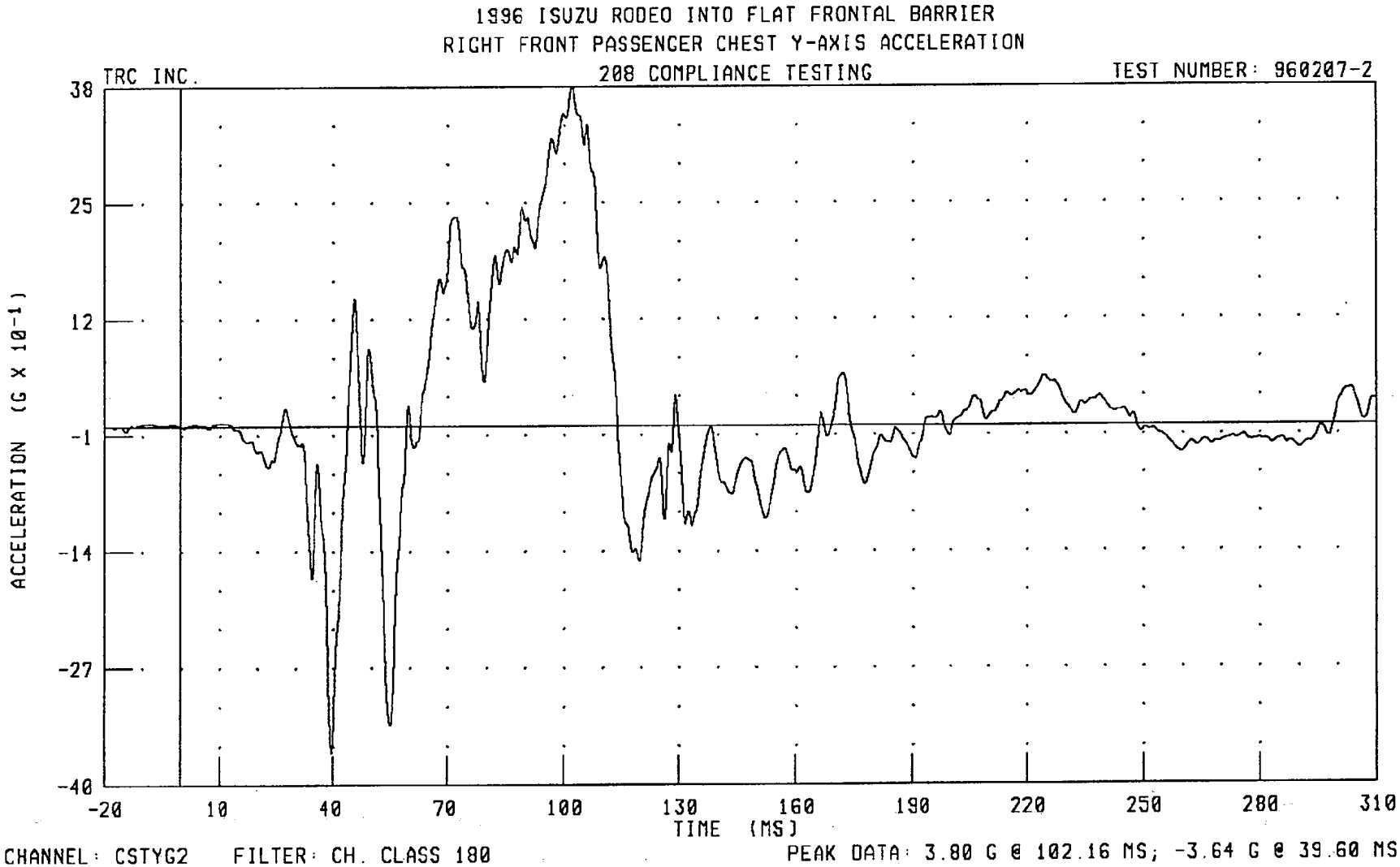

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
ACCELERATION (G X 10-1)
154
120
86
52
18
-15
-50
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG2
FILTER: CH. CLASS 1000
PEAK DATA: 14.20 G @ 76.08 MS; -4.59 G @ 44.08 MS

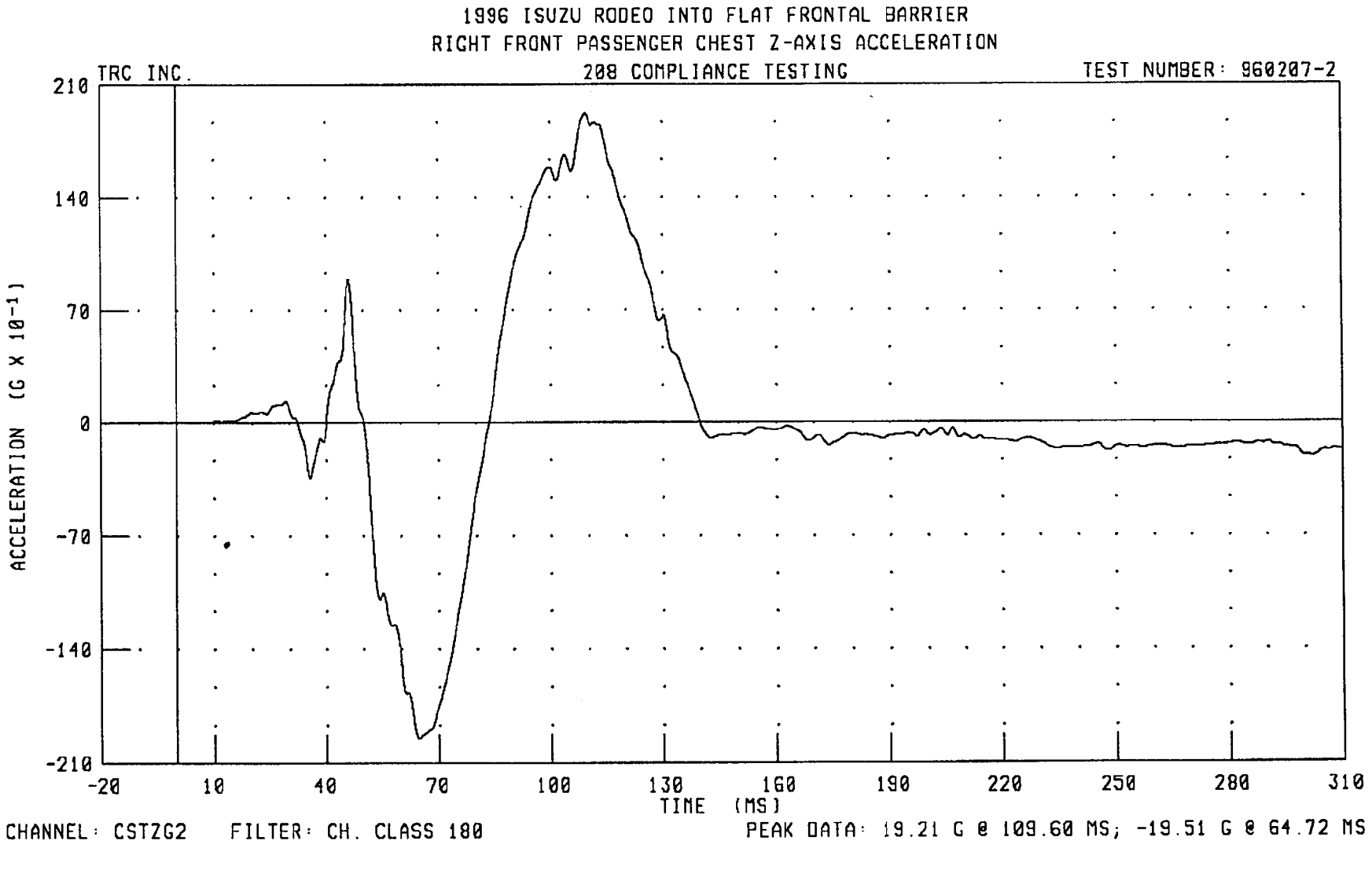

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
130
44
-42
-128
-214
-300
-386
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG2
FILTER: CH. CLASS 1000
PEAK DATA: 12.32 G @ 108.64 MS; -34.61 G @ 68.56 MS

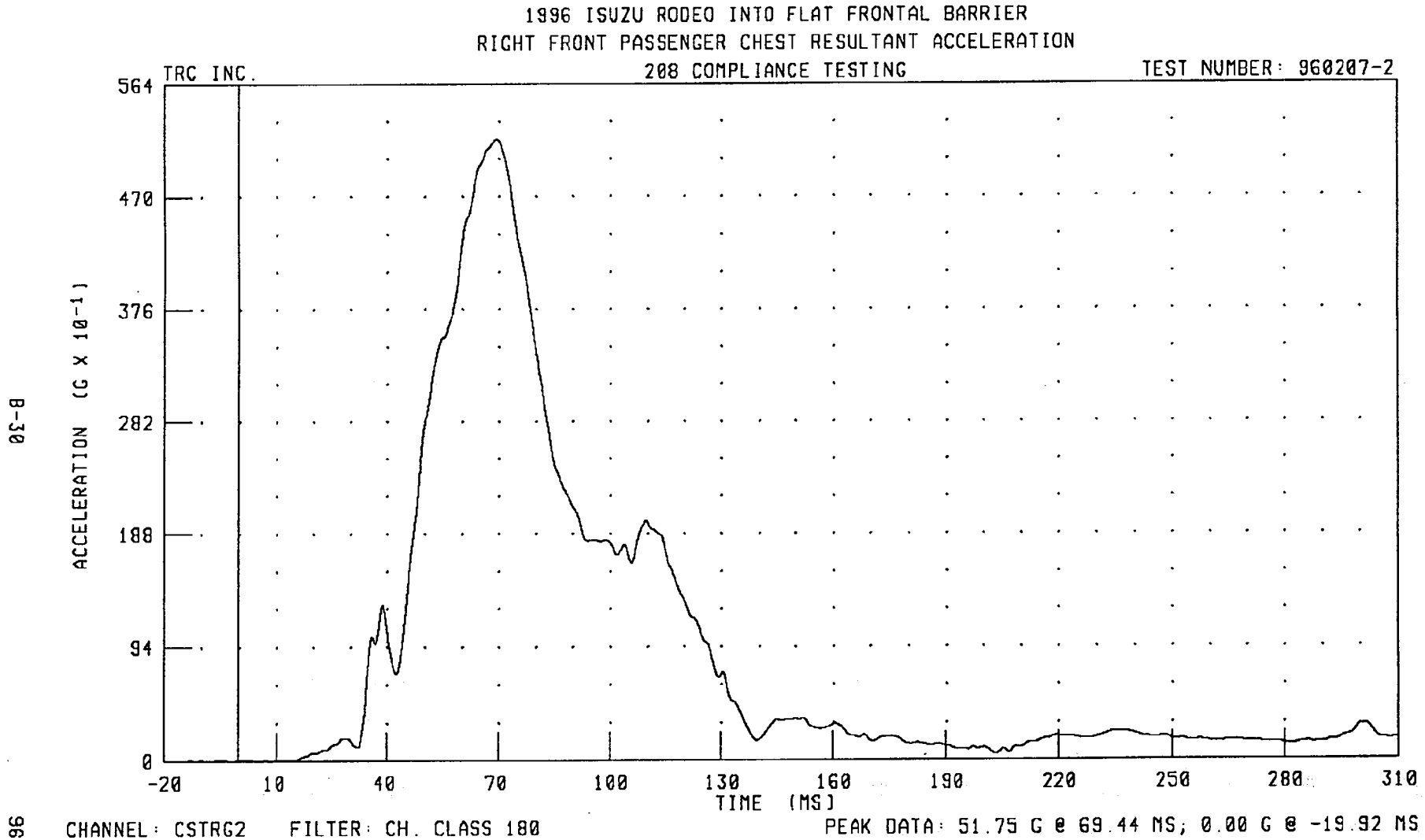

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
ACCELERATION (G)
60
50
40
30
20
10
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG2
FILTER: CH. CLASS 1000
PEAK DATA: 57.05 G @ 68.64 MS; 0.14 G @ -18.96 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
39
-56
-151
-246
-341
-436
-531
ACCELERATION (G X 10⁻¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG2
FILTER: CH. CLASS 180
PEAK DATA: 3.56 G @ 126.24 MS; -48.59 G @ 69.76 MS

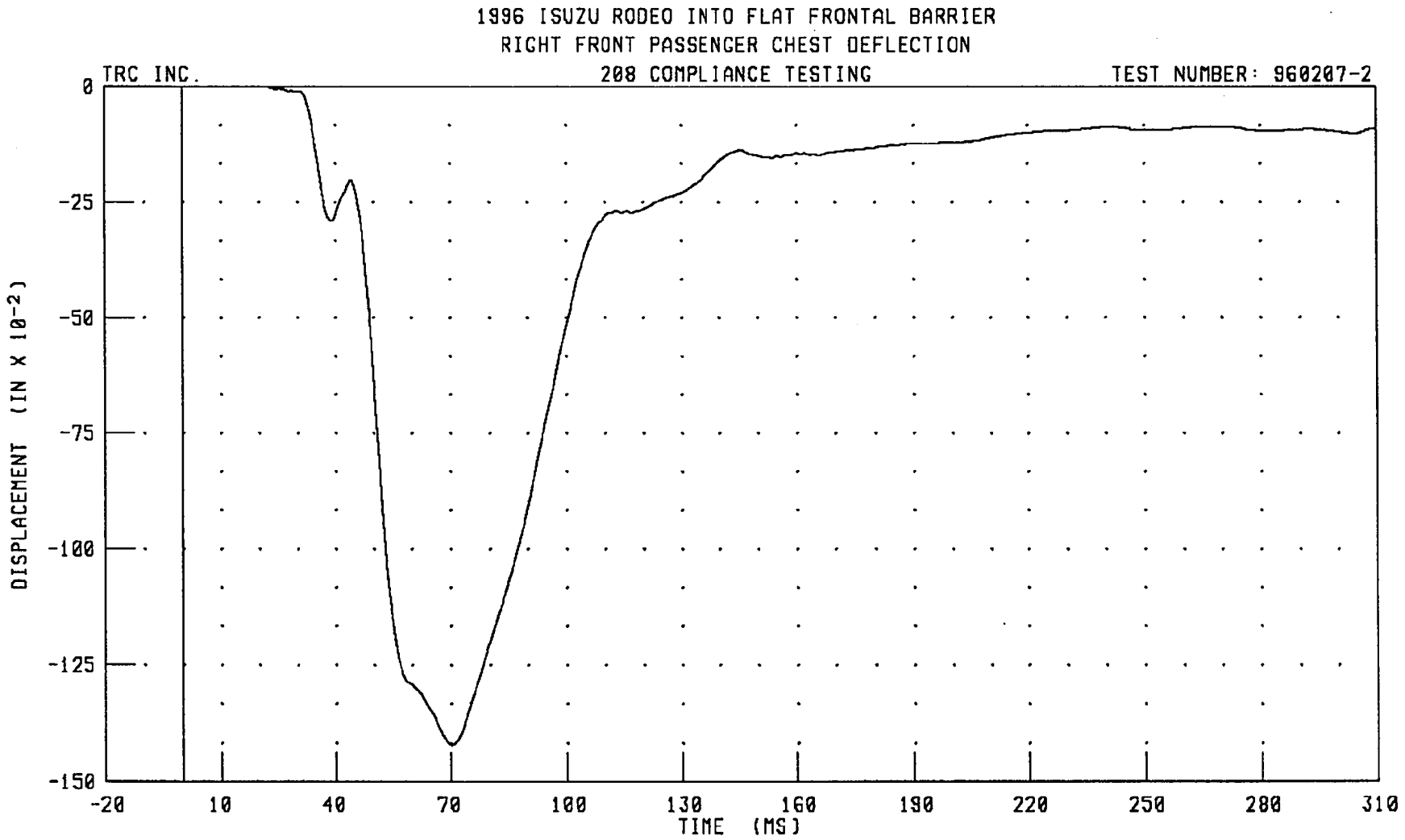
960207

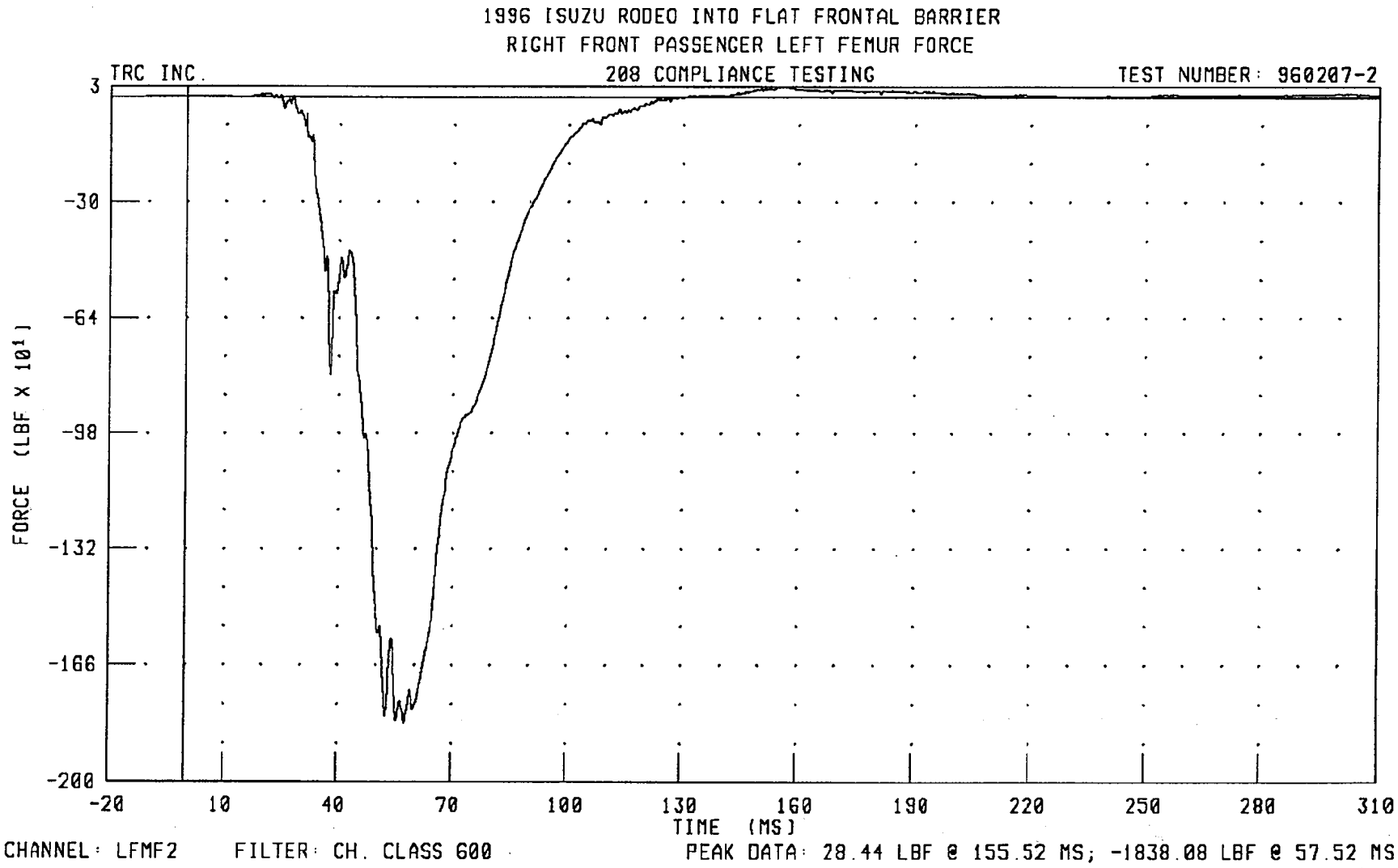

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
ACCELERATION (G X 10-1)
38
25
12
-1
-14
-27
-40
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG2
FILTER: CH. CLASS 180
PEAK DATA: 3.80 G @ 102.16 MS; -3.64 G @ 39.60 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
ACCELERATION (G X 10⁻¹)
210
140
70
0
-70
-140
-210
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG2
FILTER: CH. CLASS 180
PEAK DATA: 19.21 G @ 109.60 MS; -19.51 G @ 64.72 MS

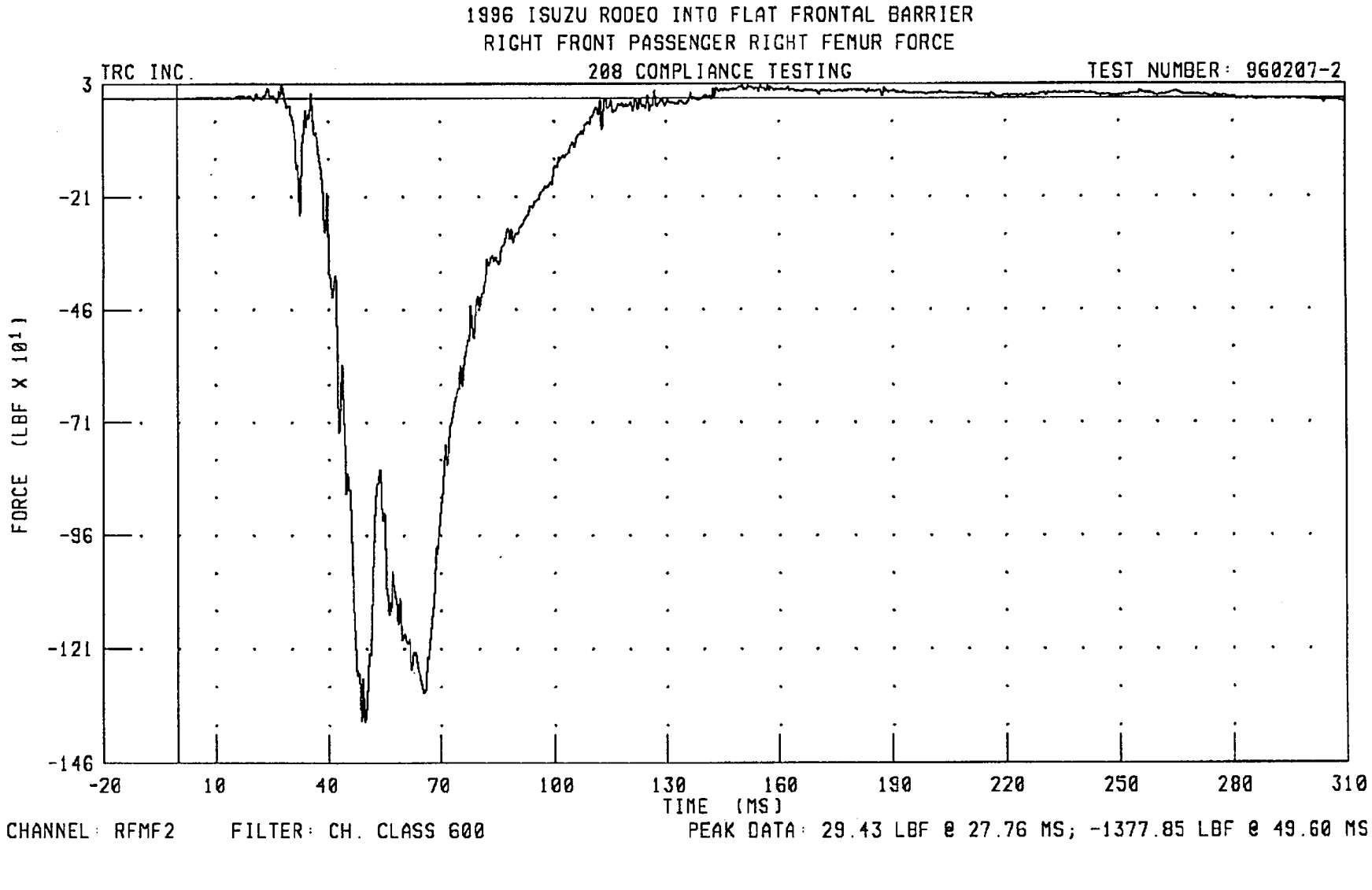

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
564
470
376
282
188
94
0
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG2
FILTER: CH. CLASS 180
PEAK DATA: 51.75 G @ 69.44 MS; 0.00 G @ -19.92 MS

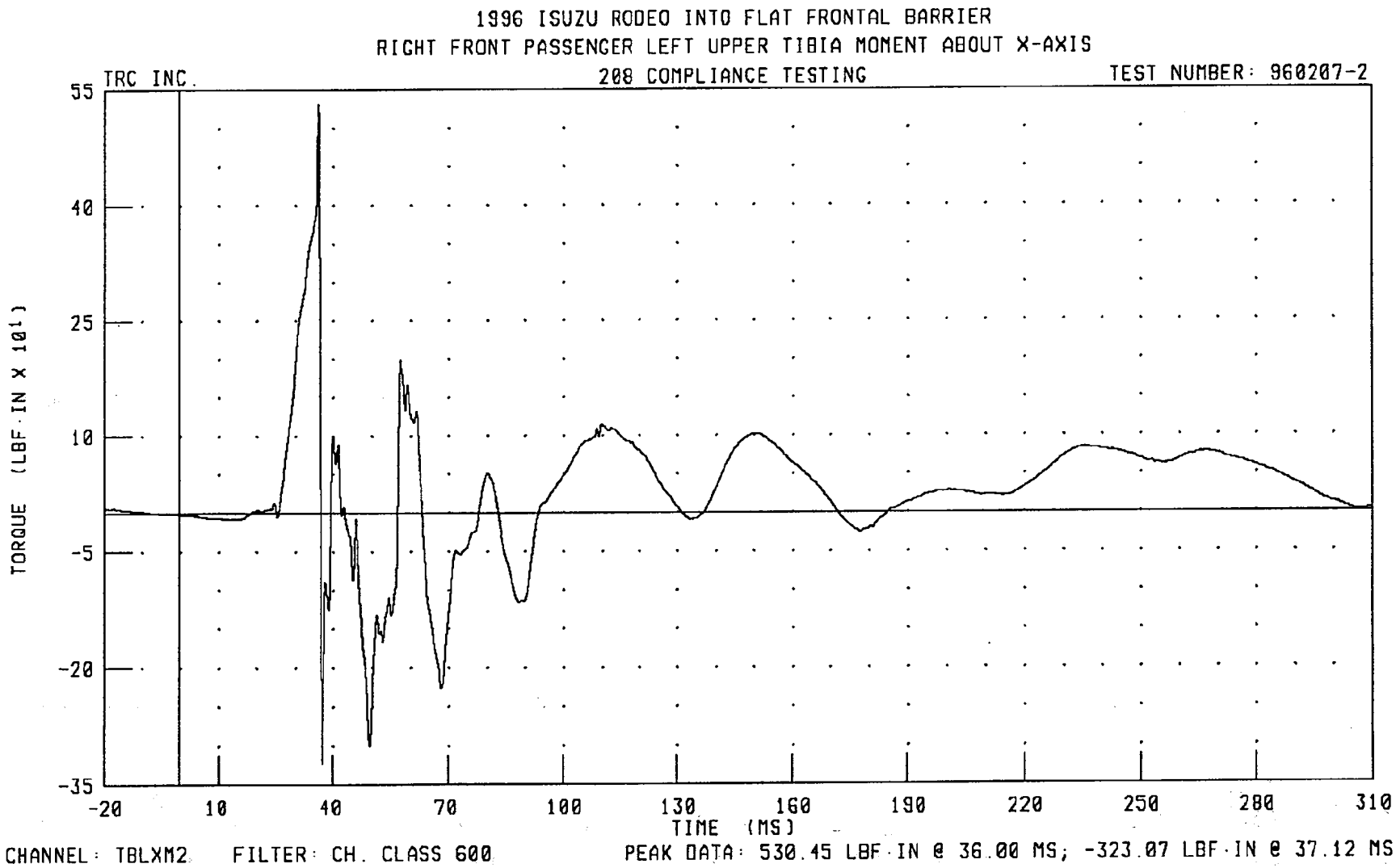
960207

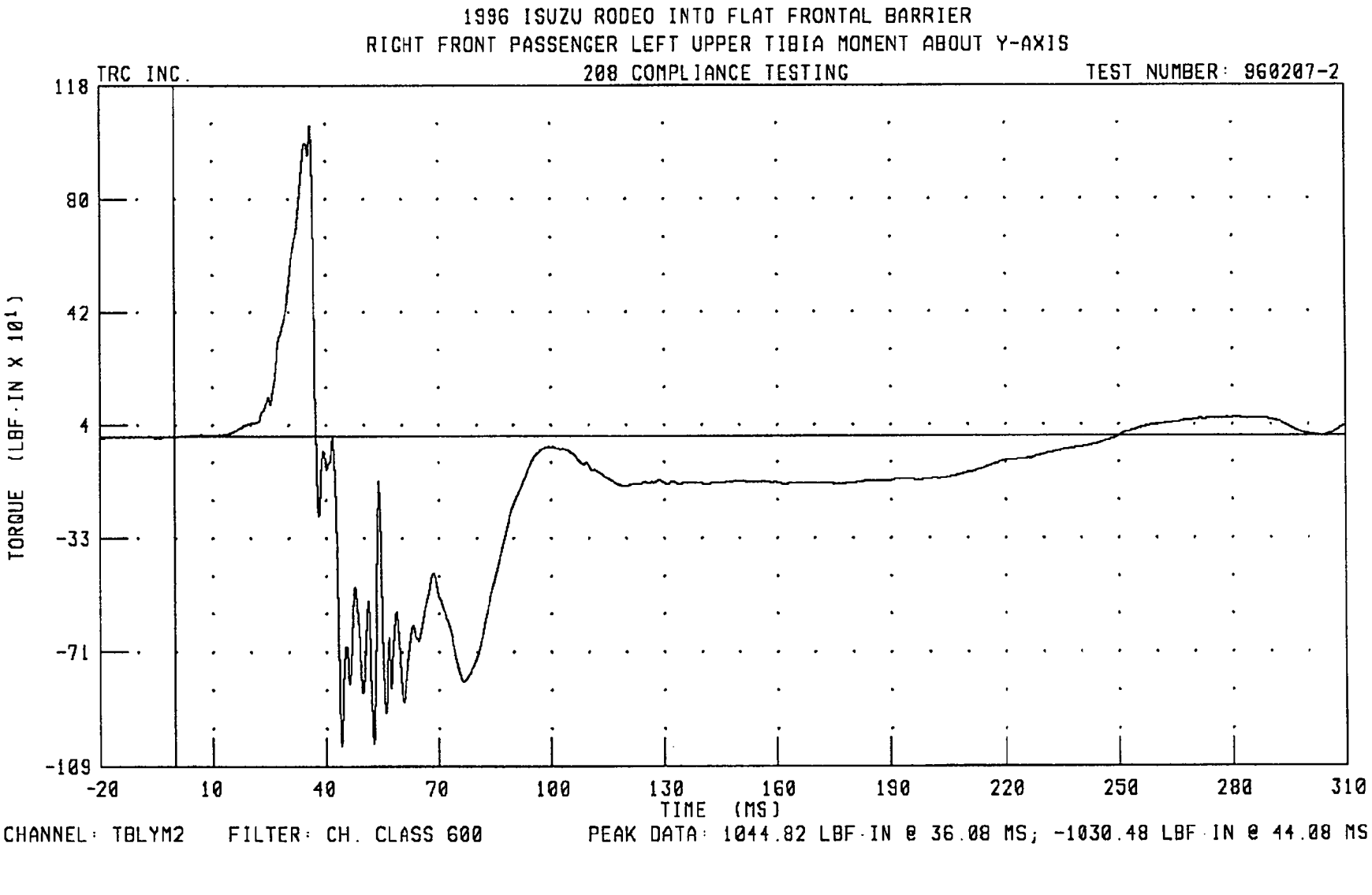

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST DEFLECTION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
0
-25
-50
-75
-100
-125
-150
DISPLACEMENT (IN X 10-2)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD2
FILTER: CH. CLASS 180
PEAK DATA: 0.00 IN @ -17.04 MS; -1.42 IN @ 70.24 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT FEMUR FORCE
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
3
-30
-64
-98
-132
-166
-200
FORCE (LBF X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF2
FILTER: CH. CLASS 600
PEAK DATA: 28.44 LBF @ 155.52 MS; -1838.08 LBF @ 57.52 MS

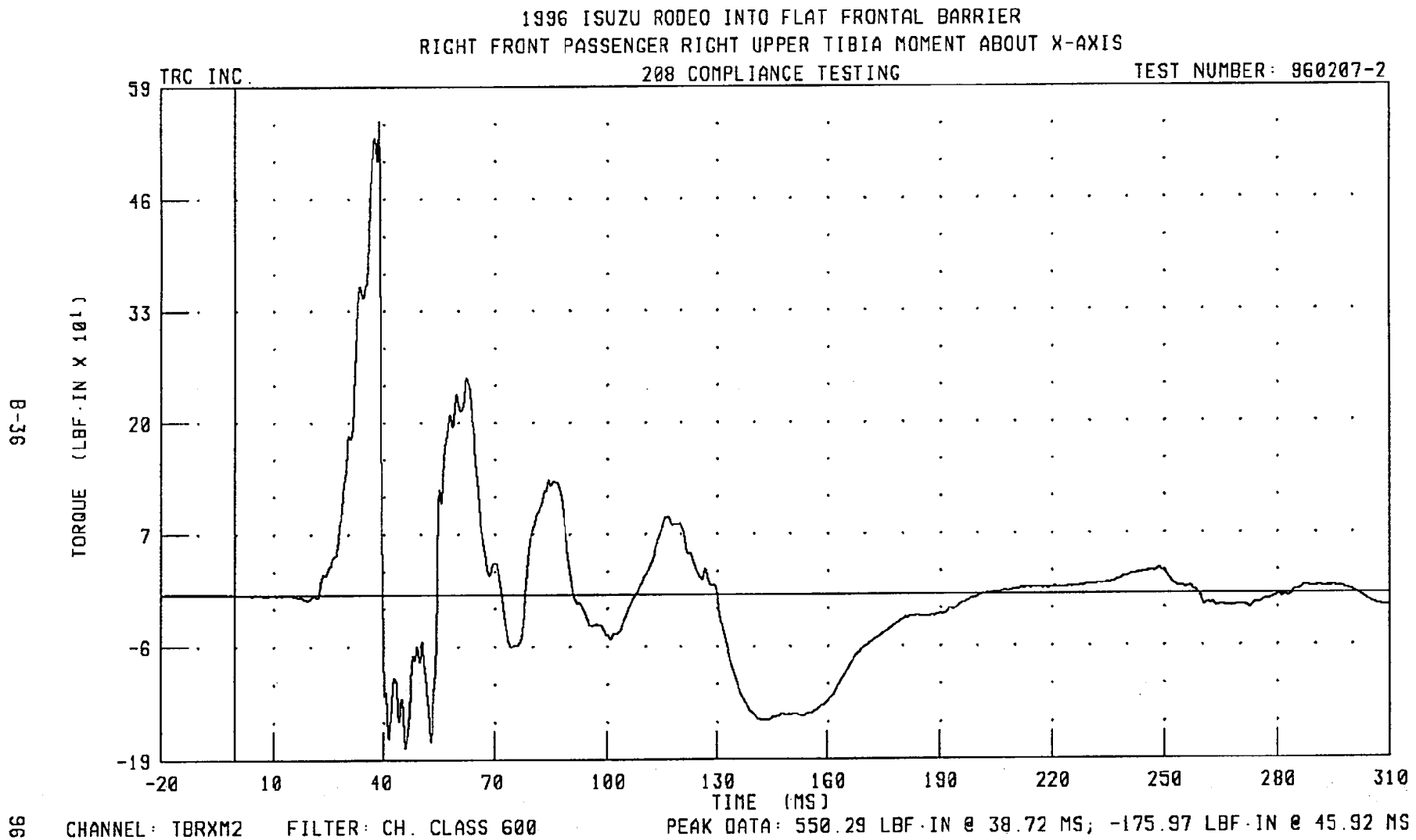
960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
3
-21
-46
-71
-96
-121
-146
FORCE (LBF X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF2
FILTER: CH. CLASS 600
PEAK DATA: 29.43 LBF @ 27.76 MS; -1377.85 LBF @ 49.60 MS

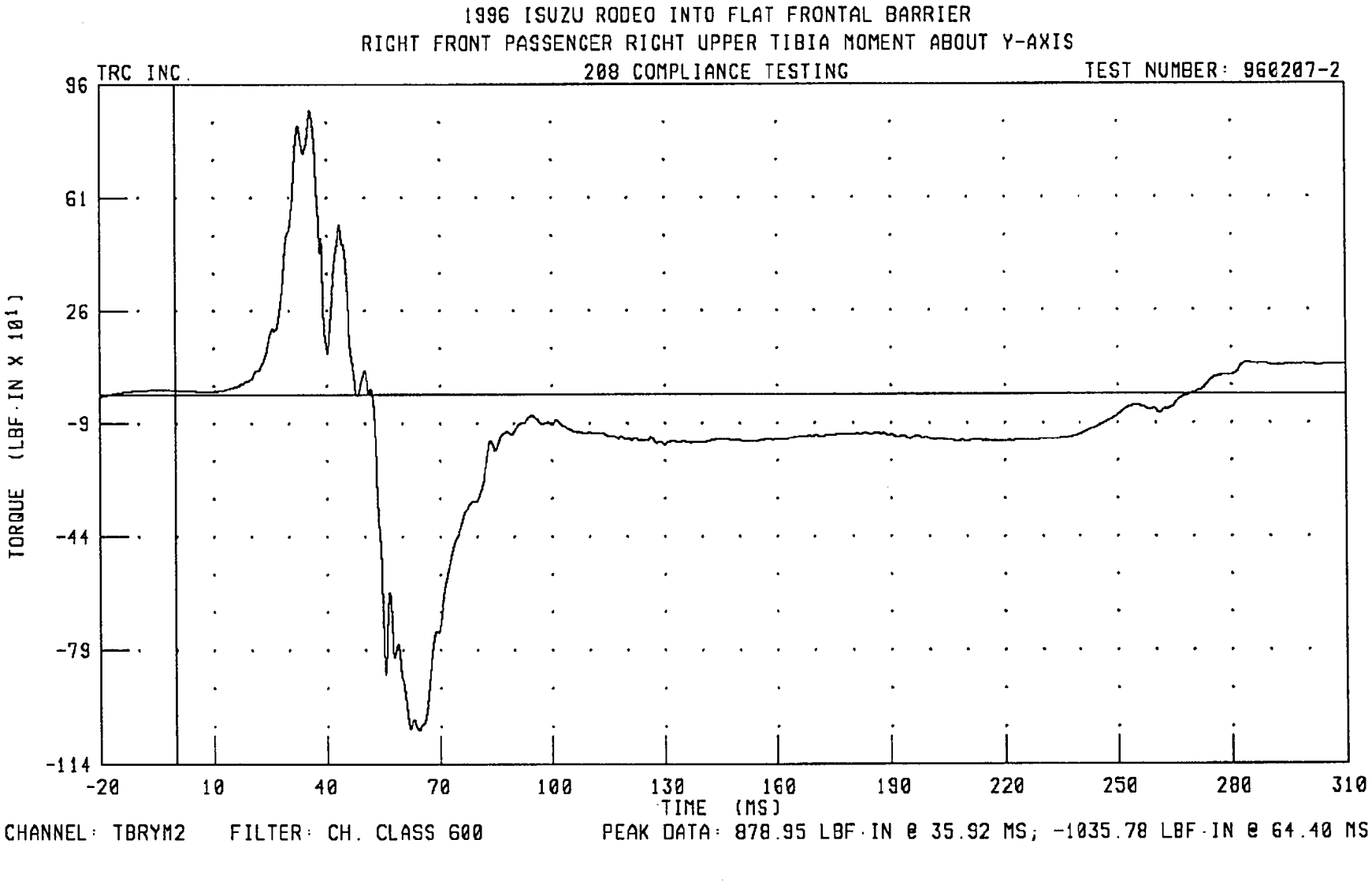

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT UPPER TIBIA MOMENT ABOUT X-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
TORQUE (LBF·IN X 10¹)
55
40
25
10
-5
-20
-35
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBLXM2
FILTER: CH. CLASS 600
PEAK DATA: 530.45 LBF·IN @ 36.00 MS; -323.07 LBF·IN @ 37.12 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT UPPER TIBIA MOMENT ABOUT Y-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
118
80
42
4
-33
-71
-109
TORQUE (LBF-IN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBLYM2
FILTER: CH. CLASS 600
PEAK DATA: 1044.82 LBF-IN @ 36.08 MS; -1030.48 LBF-IN @ 44.08 MS

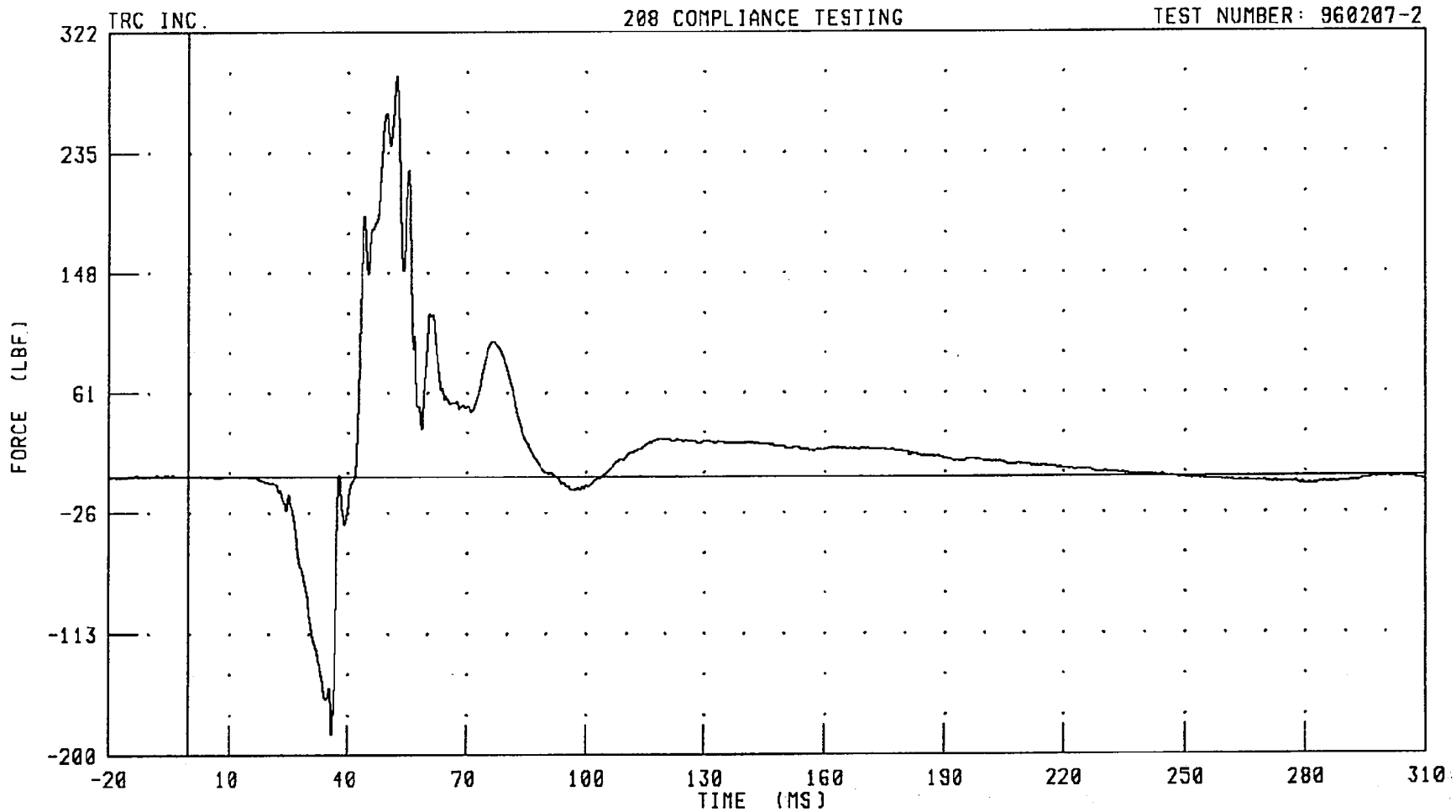
960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT X-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
59
46
33
20
7
-6
-19
TORQUE (LBF·IN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBRXM2
FILTER: CH. CLASS 600
PEAK DATA: 550.29 LBF·IN @ 38.72 MS; -175.97 LBF·IN @ 45.92 MS

960207

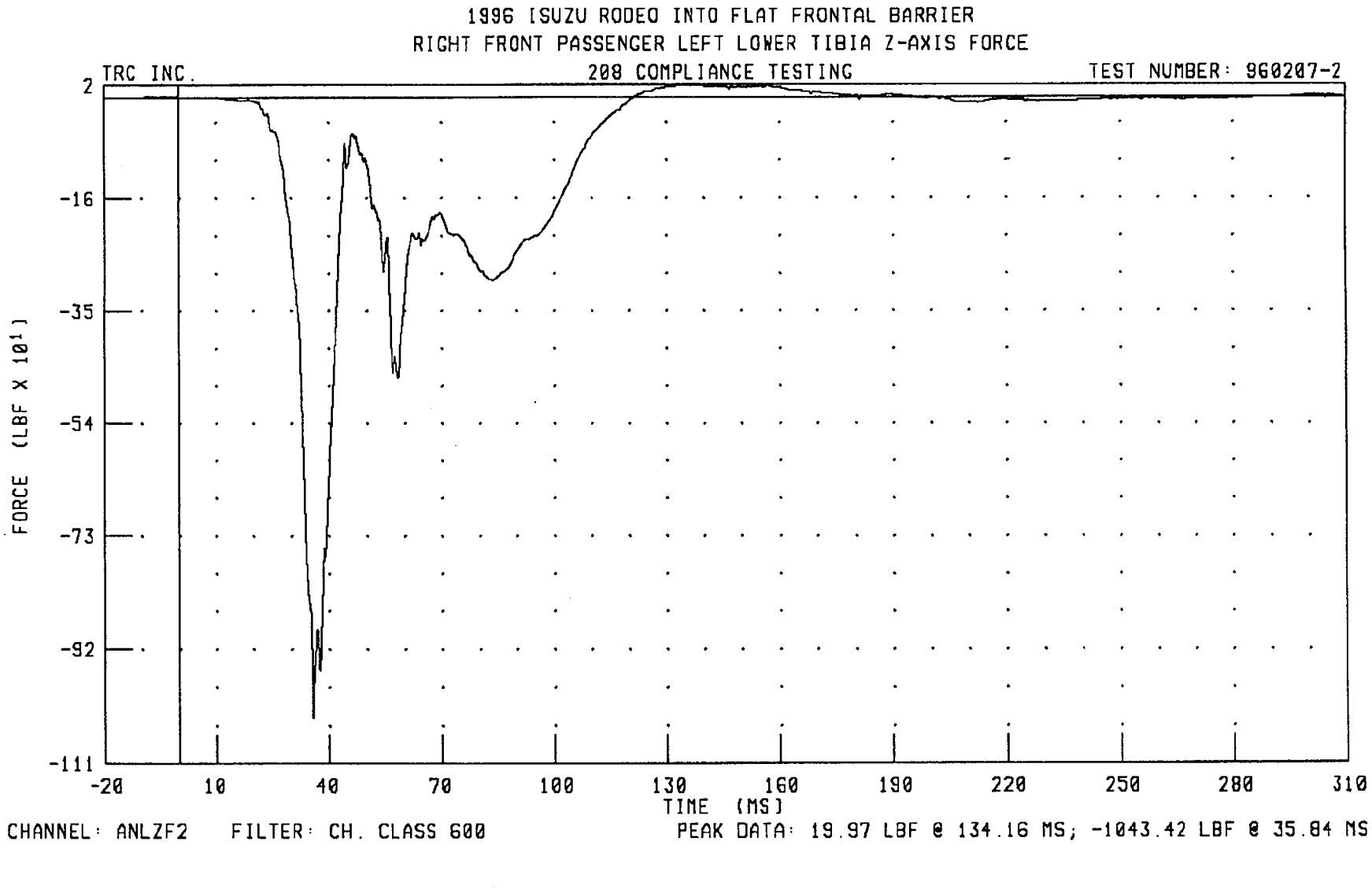

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT UPPER TIBIA MOMENT ABOUT Y-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
TORQUE (LBF-IN X 10¹)
96
61
26
-9
-44
-79
-114
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TBRYM2
FILTER: CH. CLASS 600
PEAK DATA: 878.95 LBF-IN @ 35.92 MS; -1035.78 LBF-IN @ 64.40 MS

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT LOWER TIBIA X-AXIS FORCE

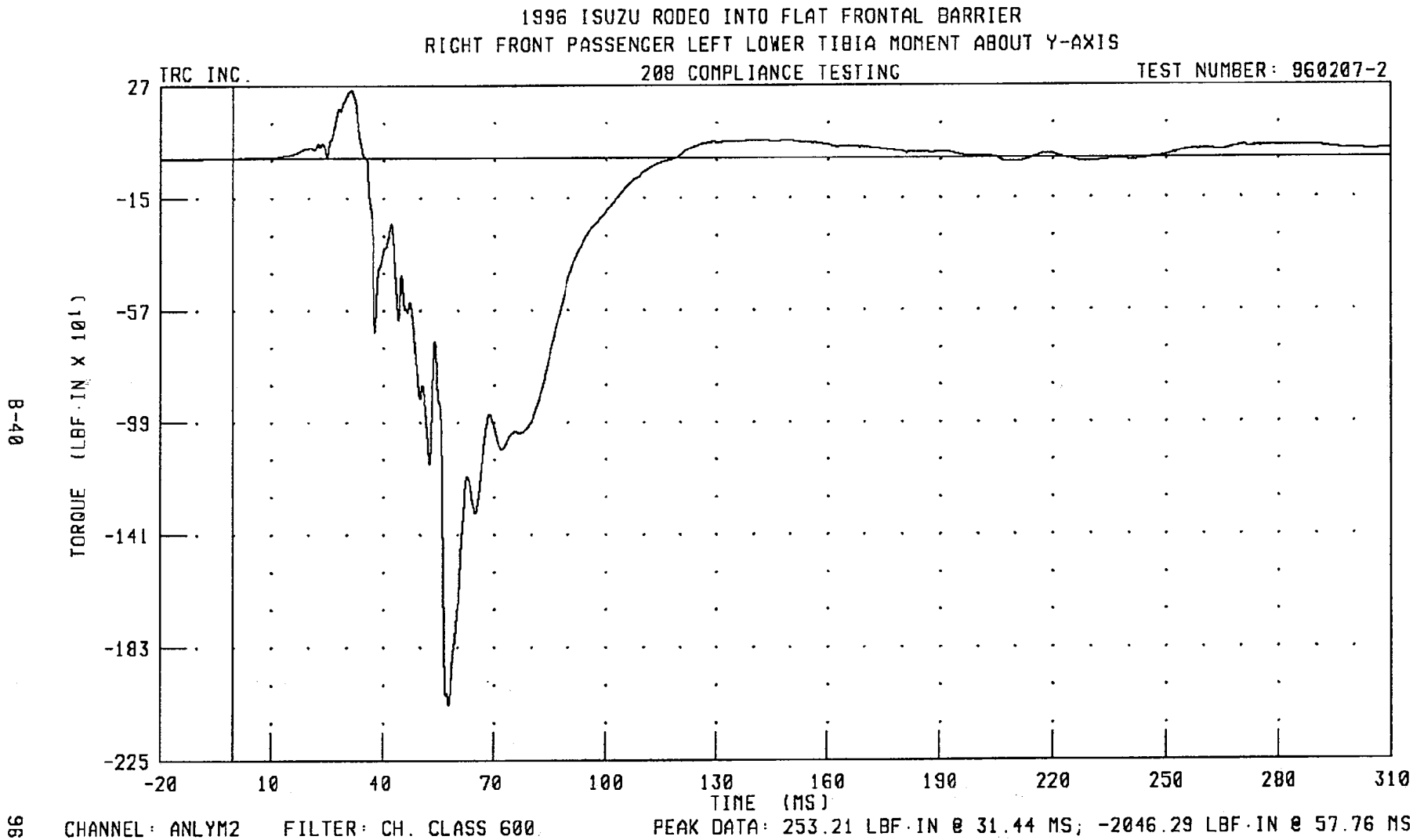


CHANNEL: ANLXF2 FILTER: CH. CLASS 600
PEAK DATA: 290.16 LBF @ 52.24 MS; -185.19 LBF @ 35.84 MS

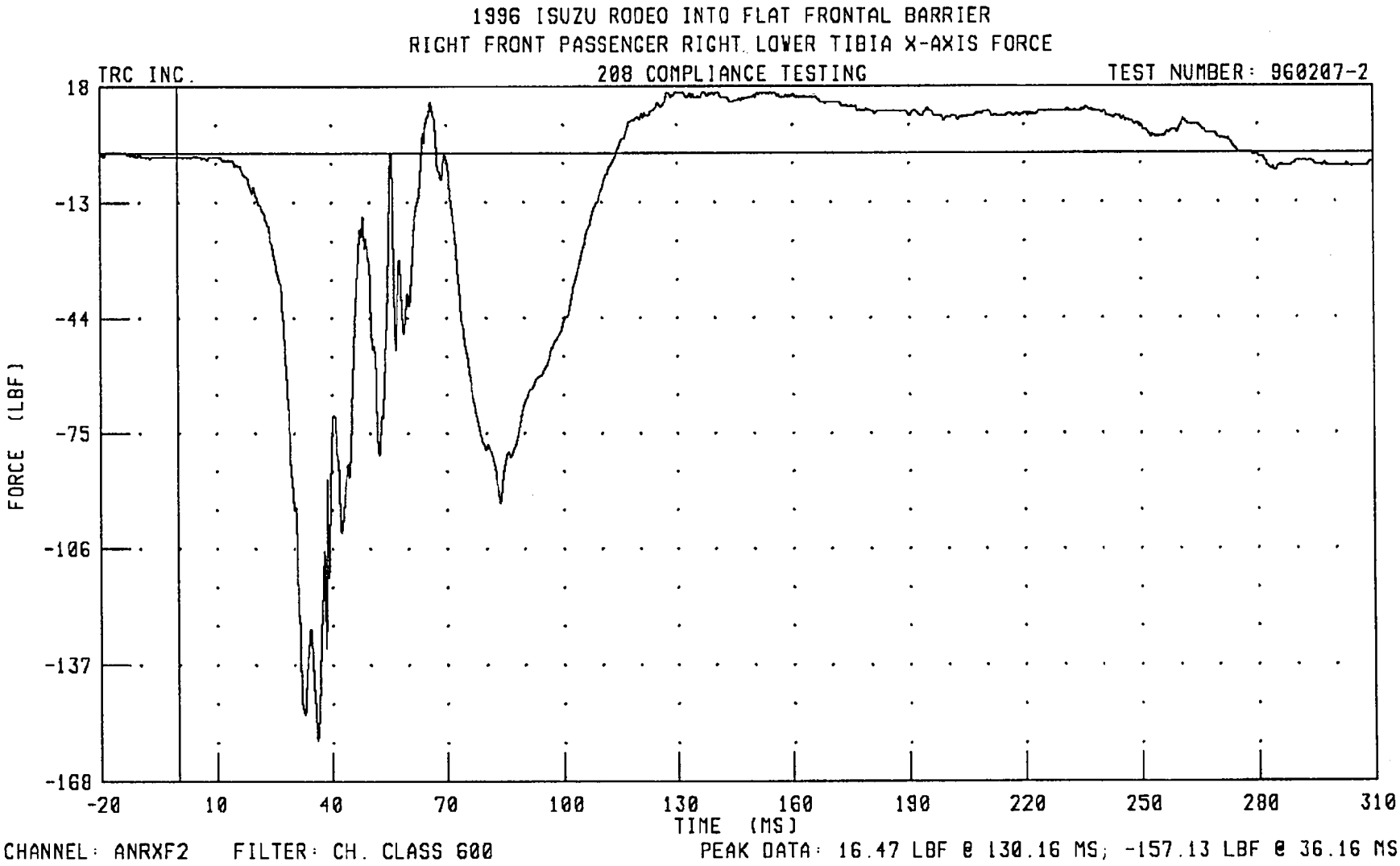
960207

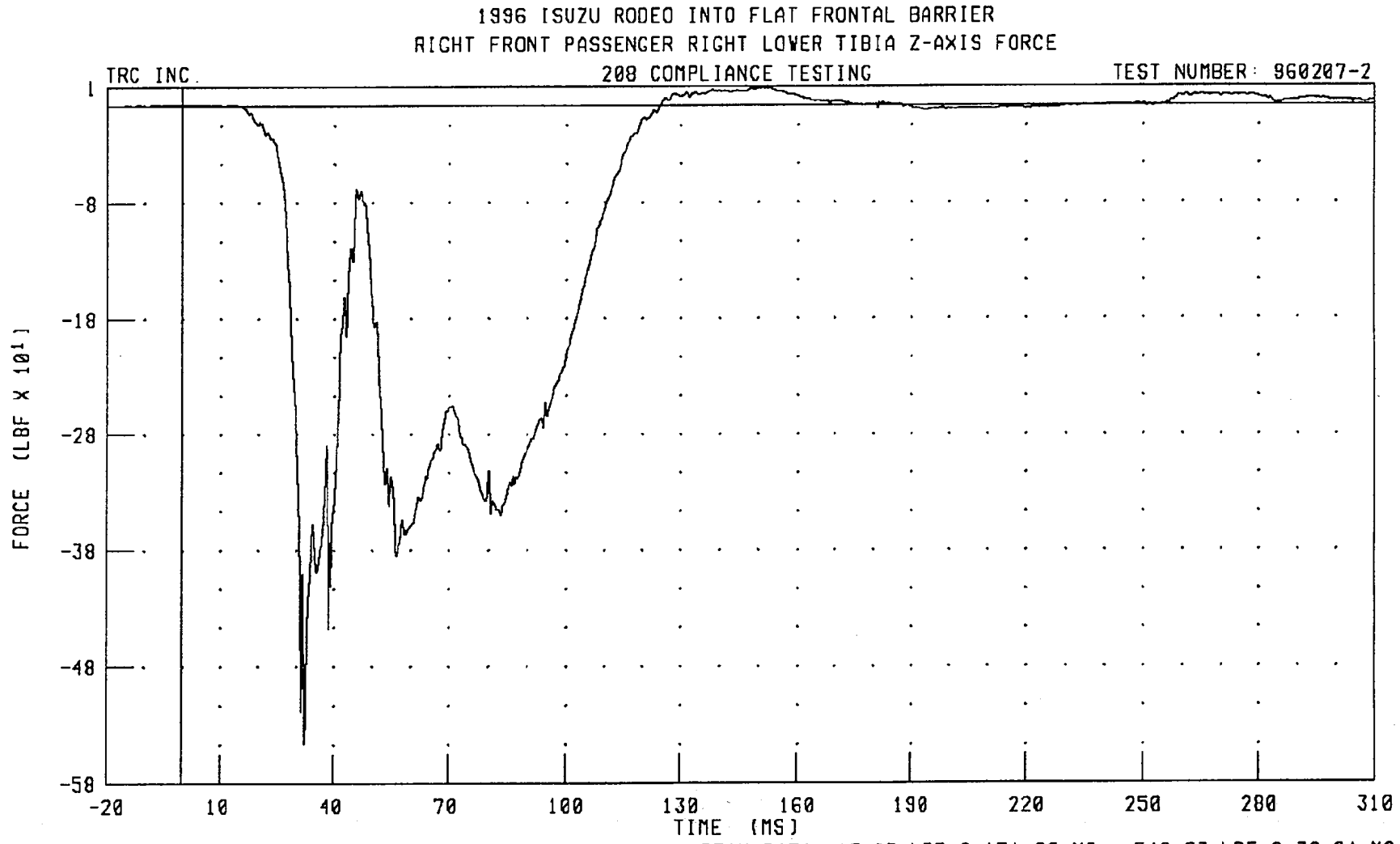

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT LOWER TIBIA Z-AXIS FORCE
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
FORCE (LBF X 10¹)
2
-16
-35
-54
-73
-92
-111
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLZF2
FILTER: CH. CLASS 600
PEAK DATA: 19.97 LBF @ 134.16 MS; -1043.42 LBF @ 35.84 MS

960207

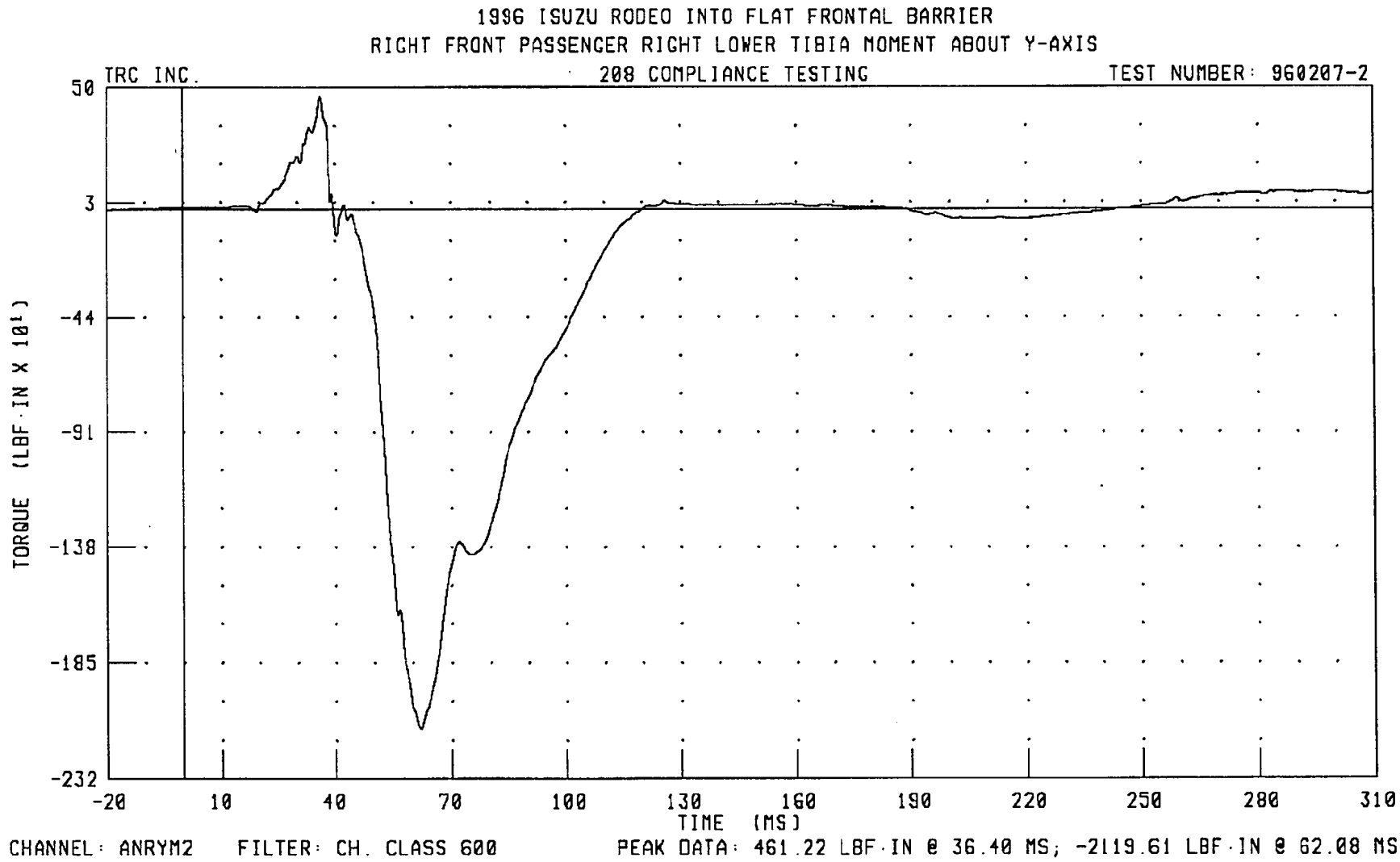

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT LOWER TIBIA MOMENT ABOUT Y-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
27
-15
-57
-99
-141
-183
-225
TORQUE (LBF·IN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANLYM2
FILTER: CH. CLASS 600
PEAK DATA: 253.21 LBF·IN @ 31.44 MS; -2046.29 LBF·IN @ 57.76 MS

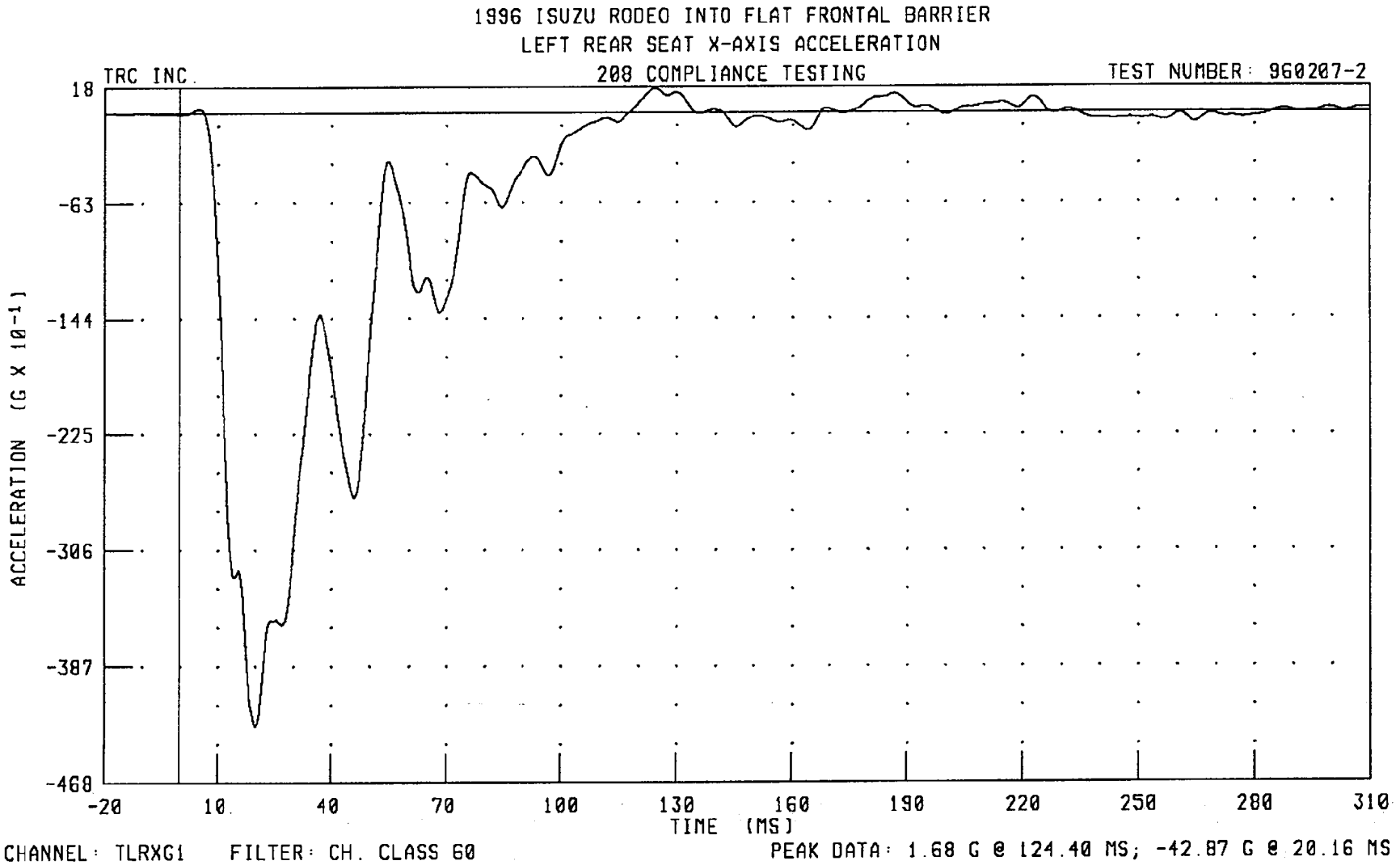
960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT LOWER TIBIA X-AXIS FORCE
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
18
-13
-44
-75
-106
-137
-168
FORCE (LBF)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRXF2
FILTER: CH. CLASS 600
PEAK DATA: 16.47 LBF @ 130.16 MS; -157.13 LBF @ 36.16 MS

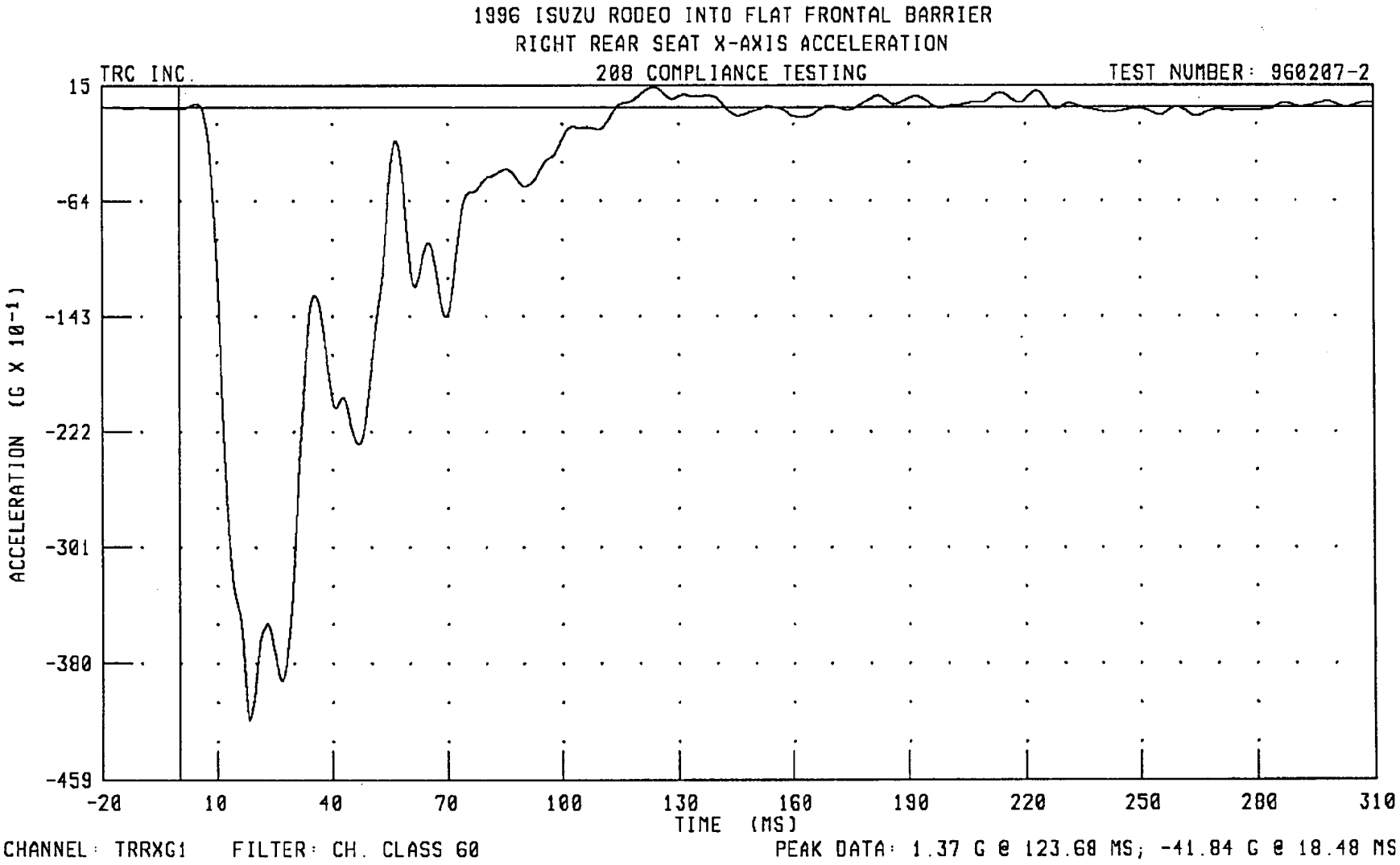

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT LOWER TIBIA Z-AXIS FORCE
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
1
-8
-18
-28
-38
-48
-58
FORCE (LBF X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRZF2
FILTER: CH. CLASS 600
PEAK DATA: 15.03 LBF @ 151.92 MS; -549.83 LBF @ 32.24 MS

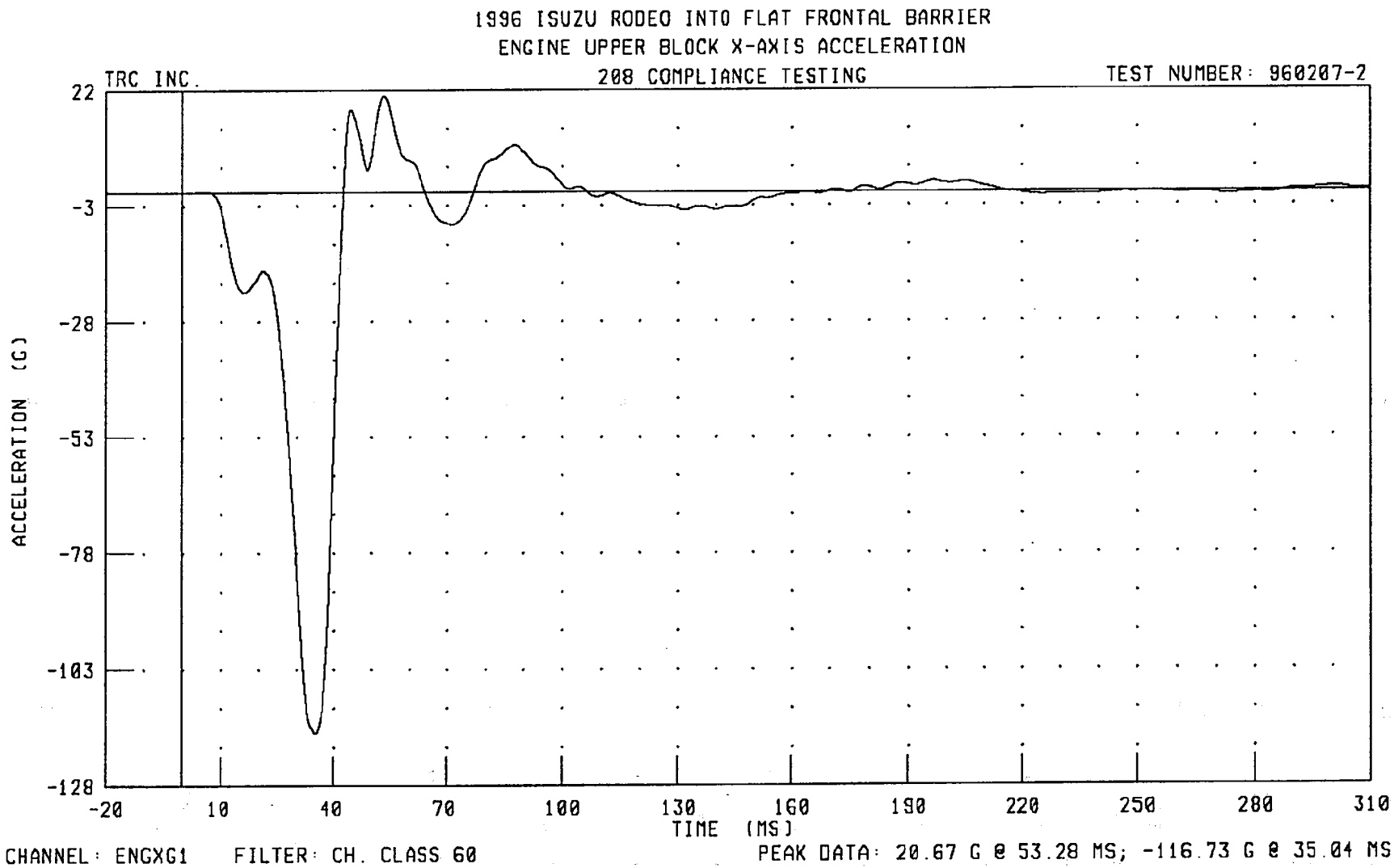
960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT LOWER TIBIA MOMENT ABOUT Y-AXIS
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
50
3
-44
-91
-138
-185
-232
TORQUE (LBF·IN X 10¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ANRYM2
FILTER: CH. CLASS 600
PEAK DATA: 461.22 LBF·IN @ 36.40 MS; -2119.61 LBF·IN @ 62.08 MS

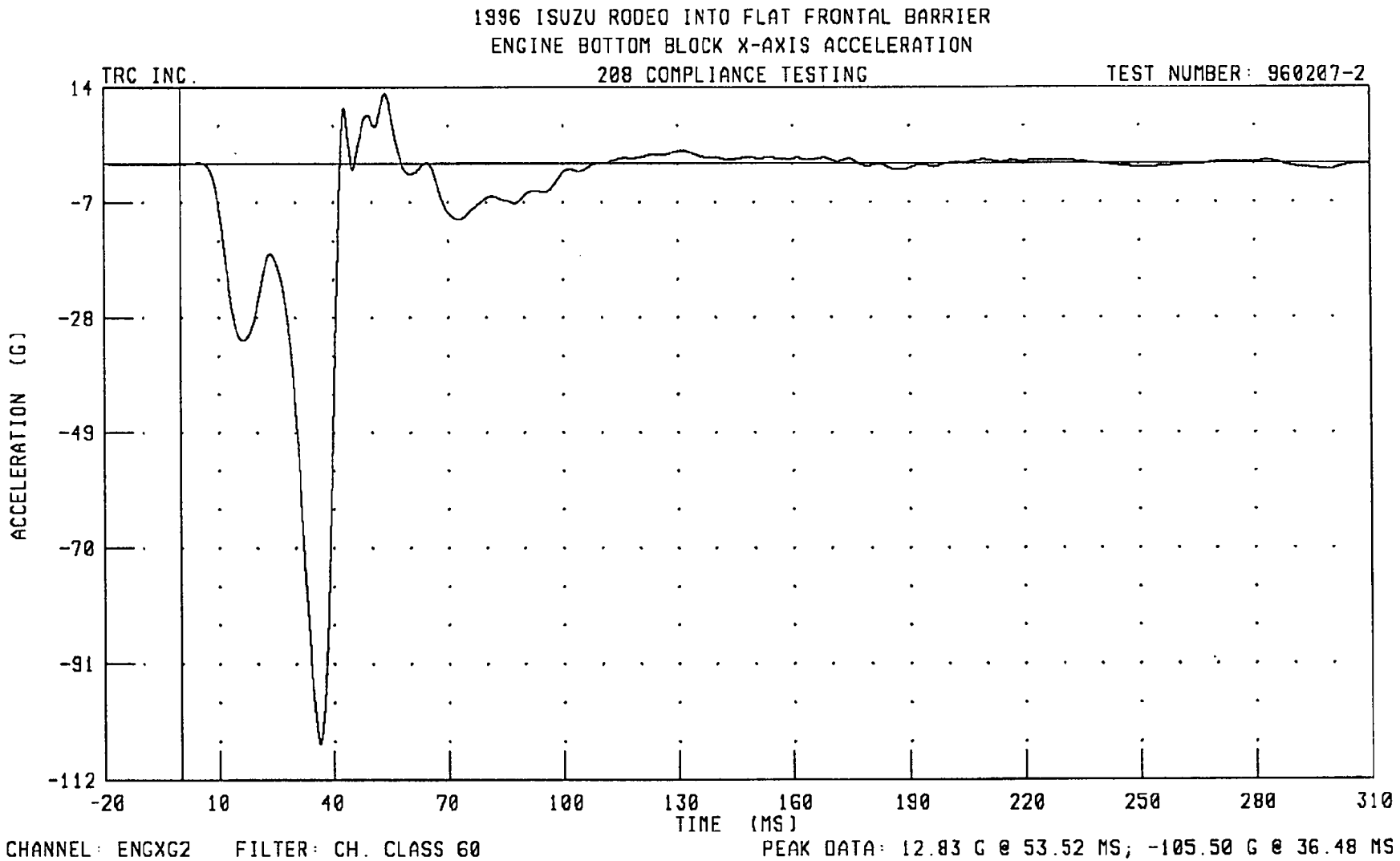

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
18
-63
-144
-225
-306
-387
-468
ACCELERATION (G X 10-1)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TLRXG1
FILTER: CH. CLASS 60
PEAK DATA: 1.68 G @ 124.40 MS; -42.87 G @ 20.16 MS

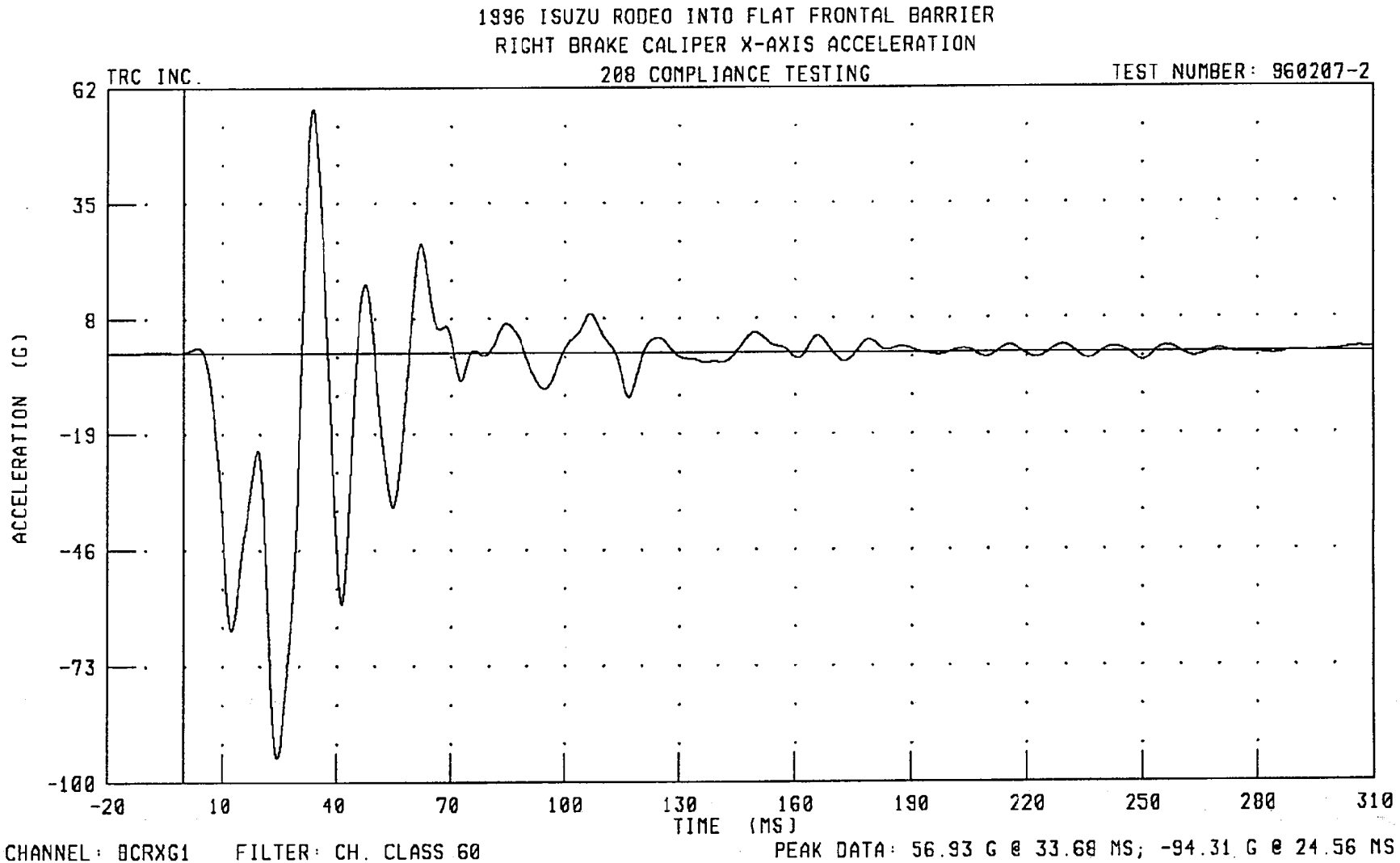
960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
15
-64
-143
-222
-301
-380
-459
ACCELERATION (G X 10⁻¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TRRXG1
FILTER: CH. CLASS 60
PEAK DATA: 1.37 G @ 123.68 MS; -41.84 G @ 18.48 MS

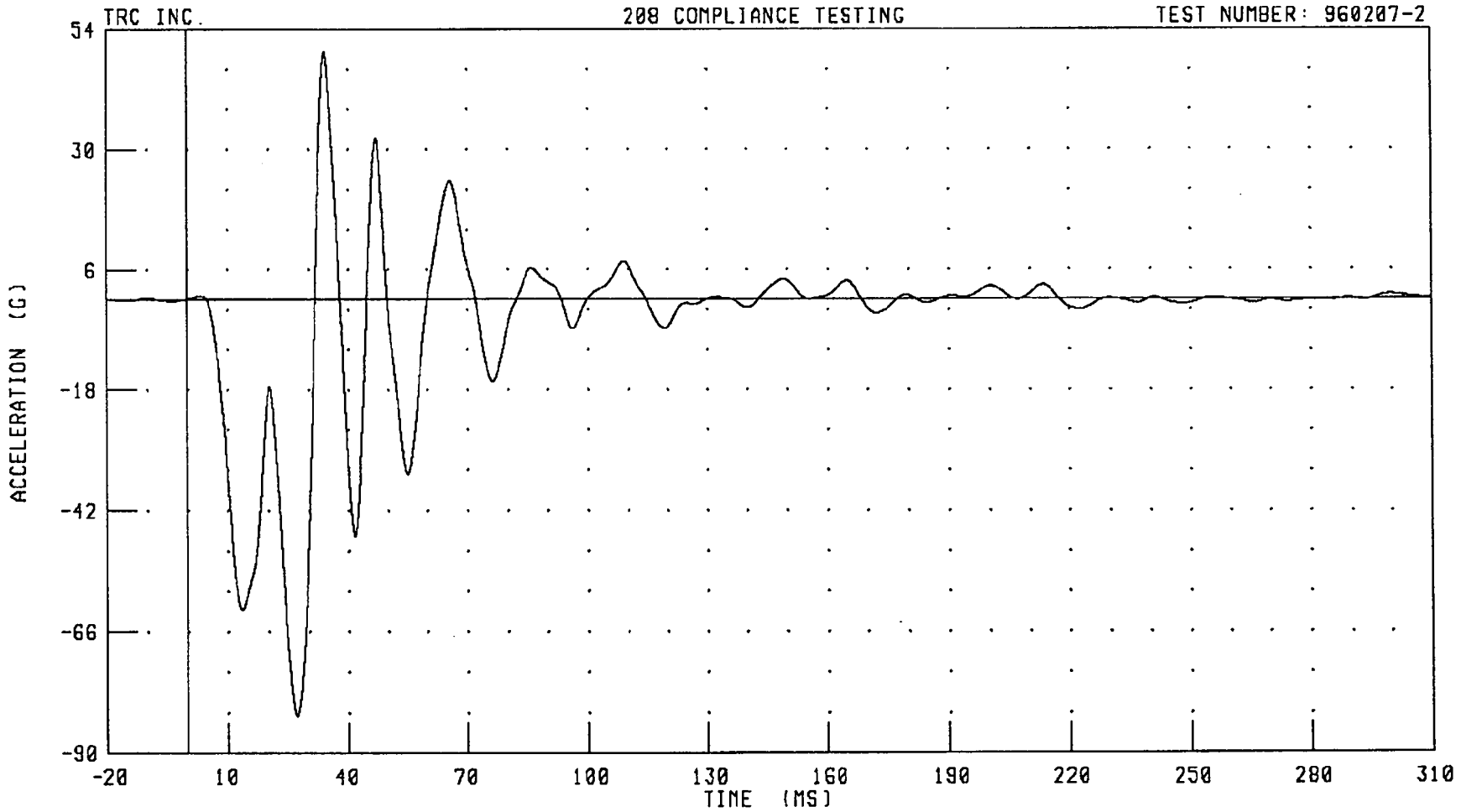

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
ENGINE UPPER BLOCK X-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
22
-3
-28
-53
-78
-103
-128
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG1
FILTER: CH. CLASS 60
PEAK DATA: 20.67 G @ 53.28 MS; -116.73 G @ 35.04 MS

960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
ENGINE BOTTOM BLOCK X-AXIS ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
14
-7
-28
-49
-70
-91
-112
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG2
FILTER: CH. CLASS 60
PEAK DATA: 12.83 G @ 53.52 MS; -105.50 G @ 36.48 MS

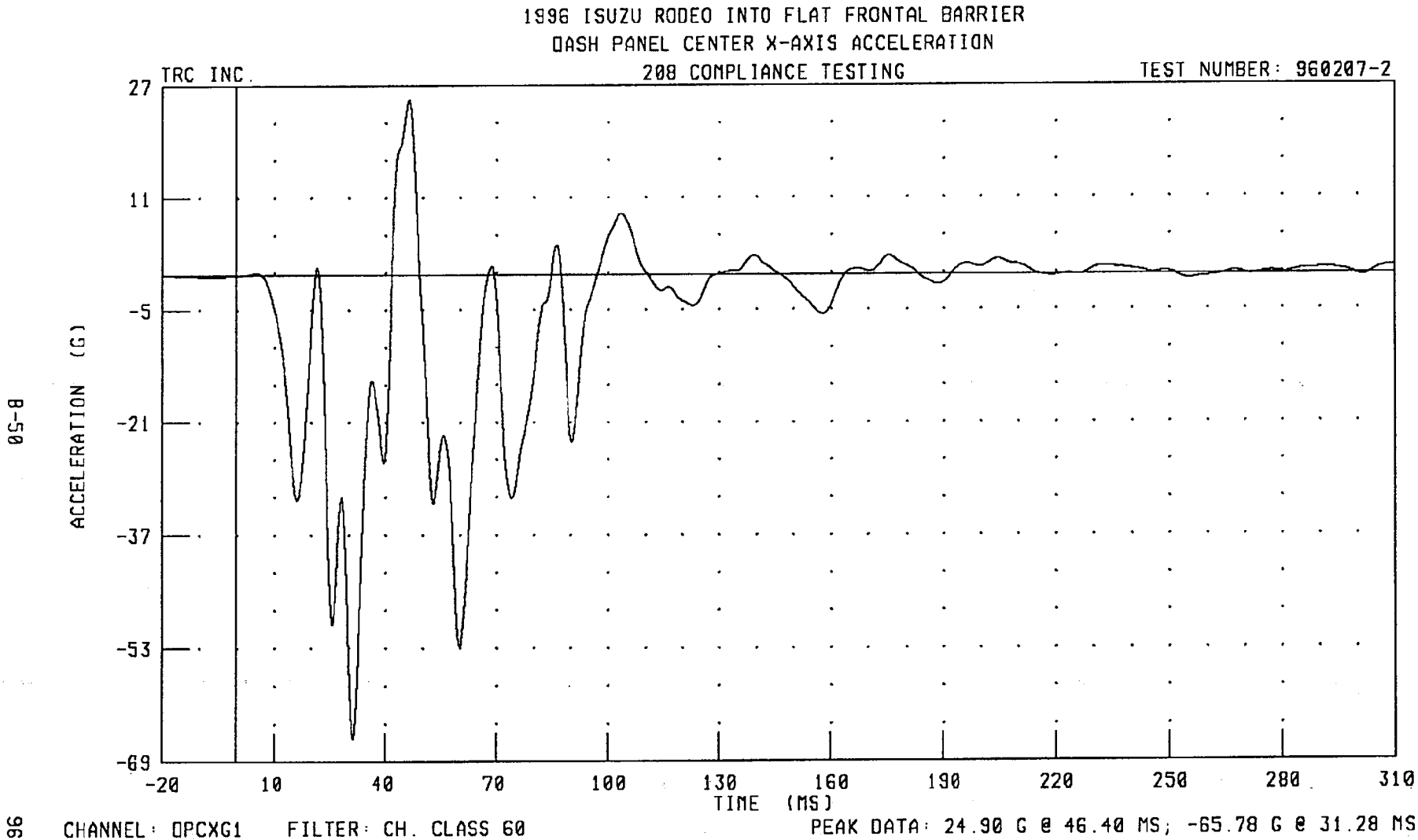

1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
RIGHT BRAKE CALIPER X-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
62
35
8
-19
-46
-73
-100
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: 8CRXG1
FILTER: CH. CLASS 60
PEAK DATA: 56.93 G @ 33.68 MS; -94.31 G @ 24.56 MS

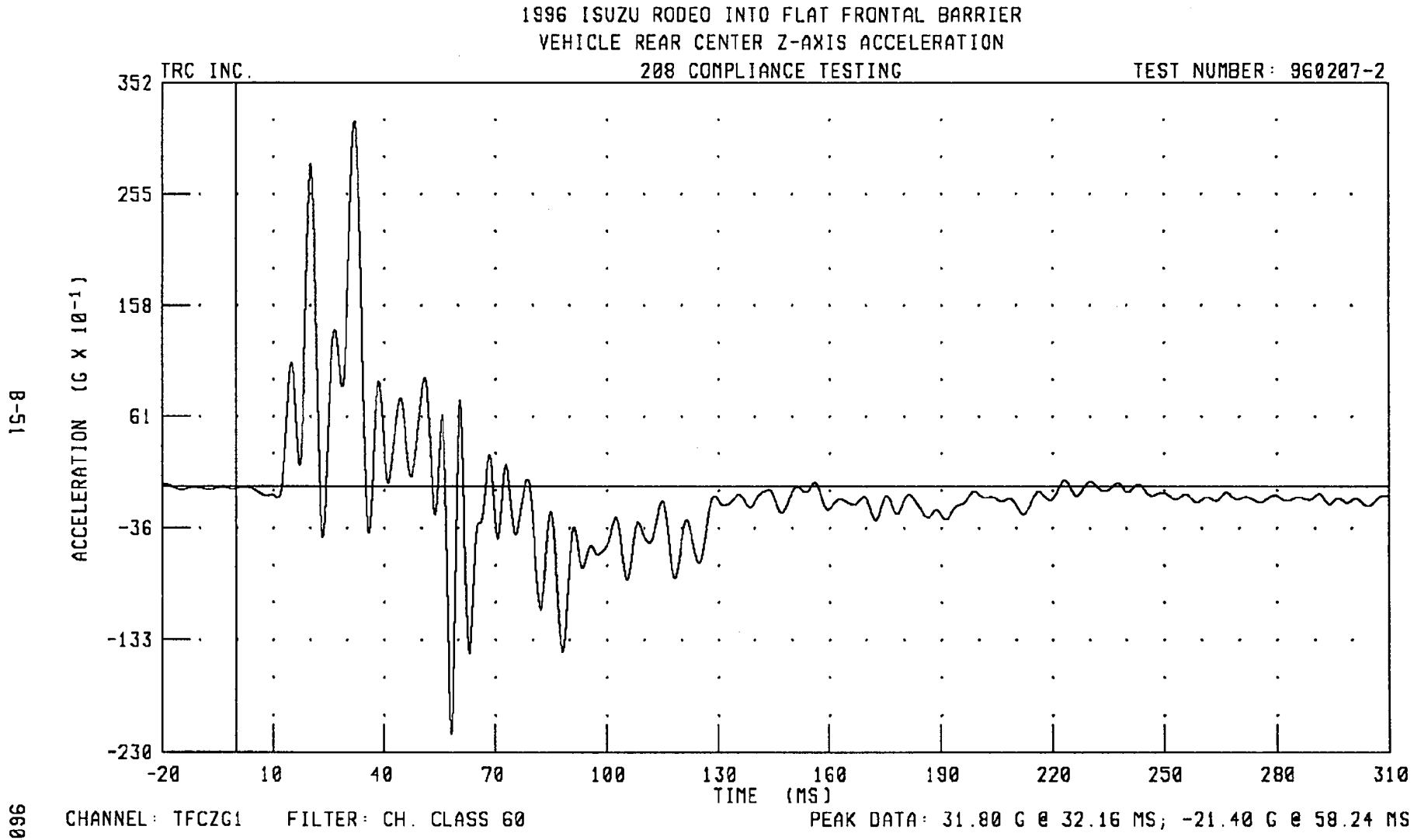
1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION
208 COMPLIANCE TESTING



CHANNEL: BCLXG1 FILTER: CH. CLASS 60 PEAK DATA: 49.47 G @ 34.24 MS; -82.72 G @ 26.96 MS

960207


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
DASH PANEL CENTER X-AXIS ACCELERATION
208 COMPLIANCE TESTING
TRC INC.
TEST NUMBER: 960207-2
27
11
-5
-21
-37
-53
-69
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: DPCXG1
FILTER: CH. CLASS 60
PEAK DATA: 24.90 G @ 46.40 MS; -65.78 G @ 31.28 MS


1996 ISUZU RODEO INTO FLAT FRONTAL BARRIER
VEHICLE REAR CENTER Z-AXIS ACCELERATION
TRC INC.
208 COMPLIANCE TESTING
TEST NUMBER: 960207-2
352
255
158
61
-36
-133
-230
ACCELERATION (G X 10⁻¹)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TFCZG1
FILTER: CH. CLASS 60
PEAK DATA: 31.80 G @ 32.16 MS; -21.40 G @ 58.24 MS

960207

Appendix C

Manufacturer's Vehicle Information

1. Please inform OVSC whether the air bag restraint system at the driver's and passenger's seating positions are certified to meet the requirements of S4.1.2.1. If it is, please inform OVSC whether the air bag restraint provided at the driver's and passenger's seating positions is certified to meet the requirements of S4.1.2(c)(1) or S4.1.2.1(c)(2) for FMVSS No. 208.

   If the air bag restraints were installed to meet the requirements of S4.1.2.1(c)(1), please provide a copy of the certification test reports for each of the test configurations required by that section of the standard (i.e., moving barrier lateral impact and dynamic rollover) and a copy of the certification test reports for the frontal/angular barrier impact test required by S4.1.2.1.

   If the manual 3-point safety belts are provided with the driver's and passenger's air bag restraint in order to meet the requirements of S4.1.2.1(c)(2), please provide certification test reports for each of the test configurations required by that section of the standard (i.e., frontal/angular barrier impact test of the automatic restraint system with the manual safety belt unfastened and frontal/angular barrier impact test of the automatic restraint system with the manual safety belt fastened).

   Answer

   The vehicle meets the requirements of S4.1.2.1.
   Isuzu chose to meet the optional requirement of S4.1.2.1(c)(2).
   Attachment I are the certification test reports of this vehicle.

   Among the certification tests, the frontal barrier impact test that is conducted with both air bags and seatbelts in place is run at the impact speed of 35 mph. The right and left oblique angular barrier impact tests are conducted using a 1995 MY test vehicle equipped with both driver and passenger air bags. The data can be used for 1996 MY as well because there has been no safety-related change from 1995 to 1996 model years.

2. If the air bag restraints at the driver's and passenger's seating positions were not installed to meet the requirements of S4.1.2.1, please inform OVSC whether the 3-point manual belts provided in the front outboard seating positions were installed to meet the requirements of S4.1.2.3 as referenced by S4.2.2.

   If the manual belts provided at the front outboard seating positions were installed in accordance with S4.1.2.3, please provide a copy of your certification test reports for the requirements specified (frontal crash test requirements of S5.1) in S4.6 of the standard.

   Answer

   Not Applicable

3. If the vehicle uses a pressure vessel to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of S9.1.

Answer

Not Applicable

4. If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of S9.2.

Answer

An explosive device is used in the inflator for the air bag on this vehicle. Attachment II shows an engineering analysis that demonstrates the compliance of the explosive device with S9.2

5. State for any safety belt system in this vehicle whether or not it is equipped with a tension-relieving device. Provide a copy of the information furnished in accordance with S7.4.2 if the tension-relieving device is used.

Answer

The safety belt system of this vehicle is not equipped with any tension-relieving device.

6. FMVSS No. 208, S8.1.5, allows the manufacturer the option of having movable vehicle windows and vents placed in the closed position. State whether the vehicle's movable windows and vents were opened or closed for the certification tests.

Answer

Each of the front side windows are open and all other windows are closed during the certification tests of this vehicle.

7. FMVSS No. 208, S5.1, provides a manufacturer with the option of using either a Part 572(B) or Part 572(E) test dummy. Please inform OVSC which test dummy was used in each seat for each certification test.
Submit dummy placement measurements, including diagrams or photographs which show exactly where measurements were taken. Enclosed is a diagram of some of OVSC's dummy measurements.
Where possible, use the dimension shown in the diagram to provide the individual dummy placement measurements.

   State whether the vehicle has a foot rest for the driver.

   If the vehicle can be equipped with a split front bench seat, state whether the driver dummy was located so that the midsagittal plane was centered on the steering wheel rim or the center of the seat cushion. Also, state whether the passenger dummy was located so that the midsagittal plane was centered the same distance from the longitudinal centerline of the vehicle as the driver dummy or in the center of the seat cushion.

   Answer

   A Part 572(E) test dummy is placed in each front outboard seating position for certification tests. The placement measurements of this test dummy are included in Attachment I. The places where the measurements were taken, however, are different from those attached to your letter.

   Isuzu Rodeo have a foot rest for the driver.
   It's front seating position consists of only bucket seats.
   No bench seat option is available.

8. Provide the seat positioning, steering column positioning, and fuel tank data on the enclosed form.

   Answer

   The required information is given in Attachment III.

9. If the vehicle is equipped with adjustable seat belt anchorages, provide the manufacturer's nominal design position for a 50th percentile adult male occupant.

   Answer

   The Isuzu Rodeo is not equipped with adjustable seatbelt anchorages.

10. Provide the speed at impact, vehicle test weight, and resulting injury criteria (i.e., HIC, chest acceleration, chest compression for the Part 572(E) dummy and femur loads) recorded for all certification tests conducted to meet the requirements of S4.1.2.1 or S4.1.2.3.

    In addition, include each dummy's head and chest acceleration versus time plots and femur load versus time plots for the full frontal barrier impact tests.

    Answer

    Please see the summary of the certification test for this vehicle in Attachment IV. Each dummy's head and chest acceleration versus time plots and femur load versus time plots are included in Attachment I.

11. When vehicle components must be removed to obtain the proper test weight, what components do you recommend for removal and in what priority order do you recommend removal ?

    Answer

    In our certification test for this vehicle, we remove, if necessary, the rear seat, the carpet in the rear seating position, and the rear glass hatchgate in that priority order.

12. Please provide FMVSS No. 204, "Steering Control Rearward Displacement," certification data. Include a copy of the test report and any engineering analysis forming the basis of the certification.
    The report should document the vehicle test weight, impact velocity, and the horizontal and vertical displacements of the steering control.
    Pre and post test photographs are also requested.

    Discuss the test procedure detailing the vehicle preparation and the measurement technique used to determine the steering control rearward displacement.

    Provide diagram of the steering control system and describe how the components of the steering control system work to provide energy management in a frontal impact.

Answer

This vehicle's certification test report under FMVSS 204 "Steering Control Rearward Displacement" is shown in Attachment V. This test is conducted using a 1995 MY vehicle. The data can be used for 1996 MY as well because there has been no safety-related change from 1995 to 1996 model years. This test report also details the vehicle preparation and the techniques for measuring the steering control rearward displacement.

Diagrams of the steering control system and the system for energy management in a frontal impact are shown in Attachment VI.

13. Inform OVSC if these vehicles have built-in child restraints either as standard equipment or optional equipment. If they do, identify the type of restraint (i.e., 5-point harness, T-shield, or other), and provide a copy of the certification test reports and any engineering analysis forming the basis for certification to FMVSS No. 213, "Child Restraint Systems."

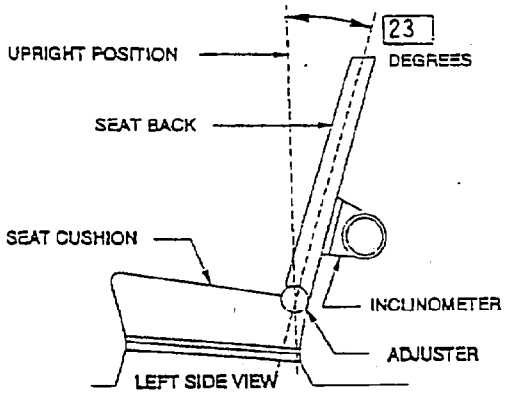
Answer

Not Applicable

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 1996 ISUZU
Vehicle Model & Body Style: Rodeo 4-Door Utility

1. NOMINAL DESIGN RIDING POSITION - -
For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable. Indicate, if applicable, how the detents are numbered (Is the first detent "0" of "1"?). Indicate if the seat back angle is measured with the dummy in the seat.



Seat back angle for driver's seat = 23 degrees.
(This is the torso angle)

Measurement Instructions: Bucket Seat Only
Adjust the seat back into the 4th latch detent rearward from the first latch detent "1st".

Seat back angle for passenger's seat = 23 degrees.
(This is the torso angle)

Measurement Instructions:
Same as driver's seat.

2. SEAT FORE & AFT POSITIONS - -
Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, indicate how the detents are numbered (Is the first detent "0" or "1"?). Provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat: Bucket Seat Only
Adjust the seat into the 9th latch detend forward from the rearmost detend "1st".

Positioning of the passenger's seat (if applicable):
Same as driver's seat.

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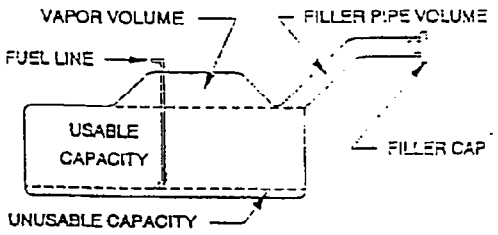
3. FUEL TANK CAPACITY DATA - -

3.1 A. "Usable Capacity" of standard equipment fuel tank = 21.2 gallons.

B. "Usable Capacity" of optional equipment fuel tank = _____ gallons. N/A

C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 = 20.6 gallons.



VEHICLE FUEL TANK ASSEMBLY

Operational Instructions:
Operate the engine until it stops.

Add the stoddard solvent to the fuel tank.

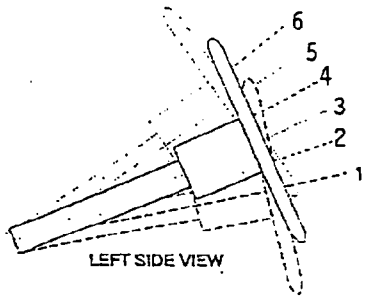
Then operate the engine until the entire fuel system is filled with the stoddard solvent.

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 20.8 gallons

3.3 Is vehicle equipped with electric fuel pump? X YES ___ NO
If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.
The engine control key is in "ON" position and engine is running.

4. STEERING COLUMN ADJUSTMENTS - -

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.



STEERING COLUMN ASSEMBLY

Operational Instructions:
The steering wheel has six(6) adjustment positions.

The 3rd position upward from the lowest position (1st) is the geometric center of full range of adjustment.

The adjustment release lever is on the left side of the steering column and can be unlocked when the lever is lifted.