V2432

Report Numbers: TRC-95-V005

Rear Impact Full-Scale Crash Testing for Upgrade of FMVSS 301 Test Procedure

Deformable Impactor into Rear of
1996 Suzuki Sidekick
at 80 kph with 70% Right Side Overlap
TRC Test Number: 960314

Prepared by:
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10820 State Route 347
East Liberty, OH 43319

April 11, 1996
Final Report

Prepared for:
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This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTRS57-95-C-00011.

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15. Supplemental Notes

16. Abstract

An 80 kph deformable impactor rear crash test with 70% overlap was conducted on a 1996 Suzuki Sidekick at Transportation Research Center Inc. on March 14, 1996. This test was conducted to determine vehicle and occupant response in the rear 70% right side overlap test mode. The test vehicle's weight was 1370 kg. The impactor's velocity was 81.6 kph. The impactor's weight was 1344 kg. The vehicle's maximum crush was 828 millimeters. The ambient temperature was 17° C.

The driver's Head Injury Criteria (HIC) was 389. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 39.5 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum axial forces were 2168 N and 1664 N, respectively.

The passenger's HIC was 569. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 39.7 g. The passenger's chest maximum deflection was 7 mm. The passenger's left and right femur maximum axial forces were 2409 N and 1759 N, respectively.

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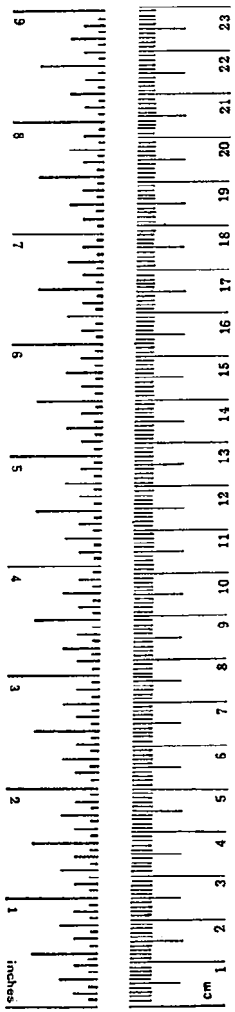
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

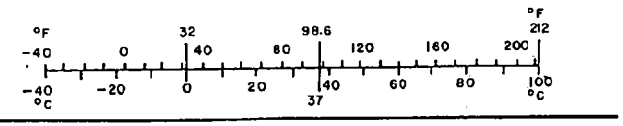
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	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 crash test was conducted to determine vehicle and occupant response in the 80 kph rear impact with 70% right side overlap test mode. The test was performed on a 1996 Suzuki Sidekick 2-door multipurpose passenger vehicle (mpv).

Test Procedure

This test was conducted per Contract No. DTRS57-95-C-00011, Technical Task Directive No. 1, "Rear Impact Full-Scale Crash Testing for Upgrade of FMVSS 301 Test Procedure."

The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations.

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 C of the Laboratory Test Procedure TP-208-09. Each dummy was restrained by a three-point unibelt.

The deformable impactor was instrumented with five (5) force load cells to measure longitudinal axis forces on the barrier face. The deformable barrier face was positioned 229 mm from ground level.

The impactor's specified velocity range was 80.1 to 81.8 kph.

Both dummies were instrumented with head center of gravity and Position 1, 2, and 3 accelerometers to measure longitudinal, lateral, and vertical accelerations; neck upper and lower 6-axis load cells to measure longitudinal, lateral, and vertical force and moments; chest and pelvis accelerometers to measure longitudinal, lateral, and vertical axis accelerations; and with left and right femur load cells to measure axial forces. Each Part 572 E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection. The driver dummy's lap and shoulder belt were each instrumented with a load cell.

The seventy-six (76) 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 TP-208-09.

The crash event was recorded by thirteen (13) high-speed motion picture cameras.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 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 dummy calibration information. Appendix D contains miscellaneous test information

Section 2.0

Rear Deformable Barrier Impact Test Summary

Test Results Summary

This 80 kph rear crash test with 70% right side overlap was conducted at TRC on March 14, 1996.

The test vehicle, a 1996 Suzuki Sidekick 2-door mpv, was equipped with airbags and three-point unibelts at the driver's and right front passenger's seating positions. The vehicle's test weight was 1370 kg. The vehicle's maximum static crush was 828 mm.

The driver's HIC was 389. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 39.5 g. The driver's chest maximum deflection was 3 mm. The driver's left and right femur maximum compressive forces were 2168 N and 1664 N, respectively.

The right front passenger's HIC was 569. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 39.7 g. The right front passenger's chest maximum deflection was 7 mm. The right front passenger's left and right femur maximum compressive forces were 2409 N and 1759 N, respectively.

A large amount of fuel system spillage occurred at impact and continued for the next thirty minutes immediately following the impact. The static rollover test was not conducted.

Data Acquisition Explanations

The following data channels recorded a questionable data spike at 190 milliseconds:

NEKZF2 - right front passenger upper neck Z-axis axial force load cell

NEKYM2 - right front passenger upper neck moment about Y-axis load cell

NKLXF2 - right front passenger lower neck X-axis shear force load cell

NKLYF2 - right front passenger lower neck Y-axis shear force load cell

NKLZF2 - right front passenger lower neck Z-axis axial force load cell

NKLXM2 - right front passenger lower neck moment about X-axis load cell

NKLYM2 - right front passenger lower neck moment about Y-axis load cell

NKLZM2 - right front passenger lower neck moment about Z-axis load cell

LFMF2 - right front passenger left femur Z-axis axial force load cell

RFMF2 - right front passenger left femur Z-axis axial force load cell

The rear package shelf X-axis accelerometer, TCRXG, exceeded the data channel's full scale limit at 12 milliseconds.

Table 1 Crash Test Summary

Test type:	80 kph rear impact with 70% right side overlap
Test date:	03/14/96
Test time:	1407
Ambient temperature at impact area:	17° C
Vehicle year/make/ model/body style:	1996/Suzuki/Sidekick/2-door mpv
Vehicle test weight:	1370 kg
Impact angle[1]:	180°
Impact velocity[2]:	
Primary:	81.6 kph
Secondary[3]:	81.6 kph
Maximum static crush:	828 mm
Number of cameras:	
High-speed:	13
Door opening data:	
Left-front:	Difficult
Right-front:	Difficult

[1] With respect to tow track centerline.
[2] Speed trap measurement (± .08 kph accuracy)
[3] The secondary light trap failed.

Table 1 Crash Test Summary, Cont'd.

Dummies:	Driver #35	Passenger #34
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag/3-point unibelt	3-point unibelt
Number of data channels:	30	30
Front seat data:		
Seat track failure:	None	None
Seat back failure:	Seat back deformed	Seat back deformed
Visible dummy contact points:		
Head:	Head restraint and rear seat back	Head restraint and rear seat back
Chest:	None	None
Abdomen:	None	None
Left knee:	Steering wheel	None
Right knee:	Steering wheel	None

Table 2 Test Vehicle Information

Vehicle year/make/ model/body style:	1996/Suzuki/Sidekick/2-door mpv			
Color:	White			
VIN:	2S3TA02COT6400106			
Engine data:				
Placement:	Lateral/transverse			
Cylinders:	4			
Displacement:	1.6 liters			
Transmission data:	_5_speed,	_X_manual,	__automatic,	__overdrive
Final drive:	__fwd,	__rwd,	_X_4wd	
Date vehicle received:	02/29/96			
Odometer reading:	72			
Dealer's name and address:	Columbus Auto Group, Inc. DBA Eastside Suzuki Inc. 5880 Scarborough Blvd. Columbust, OH 43232-4746			

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	No
Radio	No	Anti-skid brake	No
Clock	No	Rear window defroster	No
Power door locks	No		

Certification data from vehicle's label:

Vehicle manufactured by:		CAMI-Automotive, Inc.
Date of manufacture:		07/95
VIN:		2S3TA02COT6400106
GVWR:		1499 kg
GAWR:	Front:	710 kg
	Rear:	900 kg

Table 2 Test Vehicle Information, Cont'd.

Size of tires on vehicle:	P205/75R15
Spare tire:	P205/75R15
Type of front seats:	Bucket

Tire & capacity data from vehicle's label:

Recommended tire size:	P205/75R15
Recommended cold tire pressure:	
Front:	160 kPa
Rear:	160 kPa
Designated Seating Capacity:	
Front	NA
Rear	NA
Total	NA
Vehicle Capacity Weight:	NA

Test vehicle attitudes:

Delivered attitude:	LF: 767 mm	RF: 770 mm	LR: 791 mm	RR: 790 mm
Pre-test attitude:	LF: 732 mm	RF: 736 mm	LR: 777 mm	RR: 769 mm
Post-test attitude:	LF: 731 mm	RF: 753 mm	LR: 839 mm	RR: 1032 mm

Table 2 Test Vehicle Information, Cont'd.

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

Right front	303	kg	Right rear	253	kg
Left front	298	kg	Left rear	251	kg
Total front weight	601	kg	(54.4% of total vehicle weight)		
Total rear weight	504	kg	(45.6% of total vehicle weight)		
Total delivered weight	1105	kg			

Calculation of test vehicle's target test weight:

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (1105 kg)

VCW[1] = Vehicle Capacity Weight = NA

DSC = Designated Seating Capacity (NA)

RCLW = VCW - 150 (DSC) = 136

Target test weight = UDW + RCLW[1] + (Number of Hybrid III dummies x 76 kg per dummy)

Target test weight = 1105 + 136 + 152 = 1393 kg

Weight of test vehicle with required dummies and 113 kg of cargo weight:

Right front	383	kg	Right rear	294	kg
Left front	391	kg	Left rear	302	kg
Total front weight	774	kg	(56.5% of total vehicle weight)		
Total rear weight	596	kg	(43.5% of total vehicle weight)		
Total test weight	1370	kg	(2.0% over target test weight)		

Weight of ballast secured in vehicle cargo area: 0

Components removed to meet target test weight: None

CG rearward of front wheel centerline: 957 mm

Vehicle Wheelbase: 2200 mm

[1] From vehicle's tire load label.

Table 3 Post-Impact Data

Test number:	960314
Test date:	03/14/96
Test time:	1407
Test type:	80 kph rear impact with 70% right side overlap
Impact angle:	180°
Ambient temperature at impact area:	17° C
Temperature in occupant compartment:	20° C

Impact velocity:

Primary:	81.6 kph
Secondary	81.6 kph
Specified range:	78.5 to 81.5 kph

Distance from vehicle to barrier:

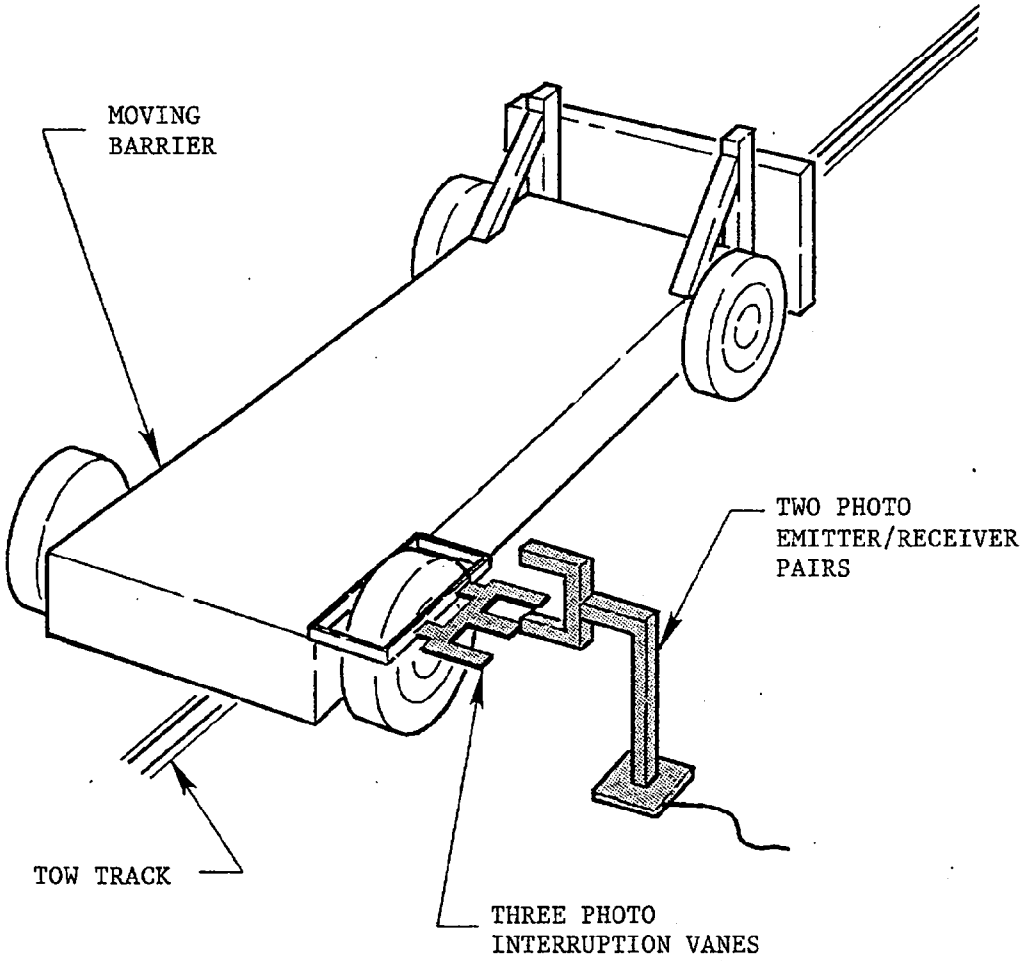
Entering velocity trap:	356 mm
Exiting velocity trap:	51 mm

Test vehicle static crush:

Overall length of test vehicle:

Pre-test:	L:	3510 mm	C:	3558 mm	R:	3512 mm
Post-test:	L:	3285 mm	C:	3002 mm	R:	2668 mm
Total crush:	L:	225 mm	C	556 mm	R:	844 mm
Average crush:	542 mm					

Figure 1 Impact Velocity Measurement System

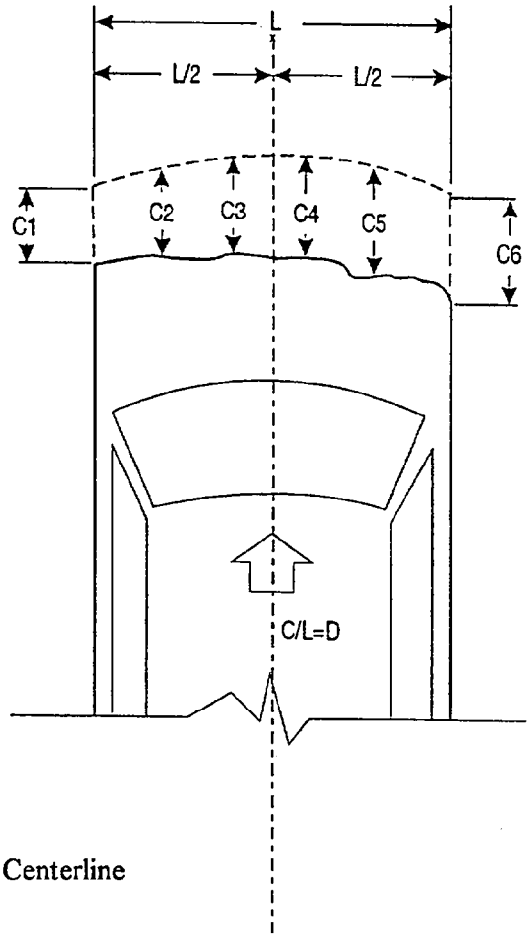


The final vane clears the final emitter/receiver pair 51 millimeters before impact.

The vanes have 305-millimeter spacing.

Figure 2 Accident Investigation Division Data

Test date:	03/14/96
Vehicle year/make/ model/body style:	1996/Suzuki/Sidekick/2-door mpv
VIN:	2S3TA02COT6400106
Build date:	07/95
Test weight:	1370 kg
Vehicle wheelbase:	2200 mm
Maximum width:	1630 mm
Front overhang:	676 mm



Collision Deformation

Classification (CDC) Code: 06BDEW5

Crush depth measurements:	C1: 221 mm
	C2: 358 mm
	C3: 463 mm
	C4: 596 mm
	C5: 718 mm
	C6: 828 mm
Midpoint of damage:	D: Vehicle Longitudinal Centerline
Length of damaged region:	L: 1524 mm

Section 3.0

FMVSS 301 Data

Table 4 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	54.1 g	15.4 g	-40.8 g	61.0 g	40.3 g	7.5 g	-8.7 g
Passenger	77.8 g	16.0 g	-35.1 g	82.9 g	75.0 g	7.6 g	16.6 g

Maximum Femur Compressive Force

	Left Femur	Right Femur
Driver	2168 N	1664 N
Passenger	2409 N	1759 N

Head Injury Criteria[1]

	HIC	Time t_1	Time t_2
Driver	389	78.7 ms	104.6 ms
Passenger	569	72.1 ms	90.2 ms

Head Maximum Resultant Acceleration[2]

	Acceleration	Time t_1	Time t_2
Driver	60.4 g	89.4 ms	92.6 ms
Passenger	79.0 g	81.4 ms	84.4 ms

Chest Maximum Resultant Acceleration[2]

	Acceleration	Time t_1	Time t_2
Driver	39.5 g	64.0 ms	68.4 ms
Passenger	39.7 g	45.2 ms	48.1 ms

Maximum Chest Deflection

Driver	3 mm
Passenger	7 mm

[1] As defined in FMVSS No. 208
[2] Defined as equal to or exceeding 0.003 sec. duration

Table 5 Fuel System Data

Vehicle year/make/model/body style:	1996/Suzuki/Sidekick/2-door mpv
Fuel system capacity:	42.0 (from owner's manual)
Usable capacity:	41.6 liters (furnished by COTR)
Test volume range:	38.3 liters to 39.1 liters (92-94% of usable)
Actual test volume:	38.7 liters (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
Does the electric fuel pump operate with ignition switch "on" and the engine not operating.	No
Details of fuel system:	The fuel tank is located behind the rear axle. The fuel filler neck is located on the right side. The fuel lines run along the right side to the front.

Table 6 FMVSS 301 Post-Impact Test Data

Test date: 03/14/96

Vehicle year/make/model/body style: 1996/Suzuki/Sidekick/2-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:

____ Frontal (48 kph)

____ Oblique (48 kph) with __° barrier face first contacting (driver's/passenger's) side

__X__ Rear moving barrier (80 kph)

____ Lateral moving barrier (32 kph)

Fuel system fluid spillage measurements:

		Test Results	Maximum Allowable
1.	From impact until vehicle motion ceases	See Note[1]	28 g
2.	5-Minute period after vehicle motion ceases	2674 g	140 g
3.	Next 25 minutes after 5-minute period	7349 g	28 g/1 min

Fuel system fluid spillage location(s): Fuel tank

[1] A large amount of fuel system fluid occurred from the time of impact until motion ceased.

Section 4.0

Vehicle, Moving Deformable Barrier, Occupant, and Camera Measurements

Figure 3 Pre-test and Post-test Measurement Points

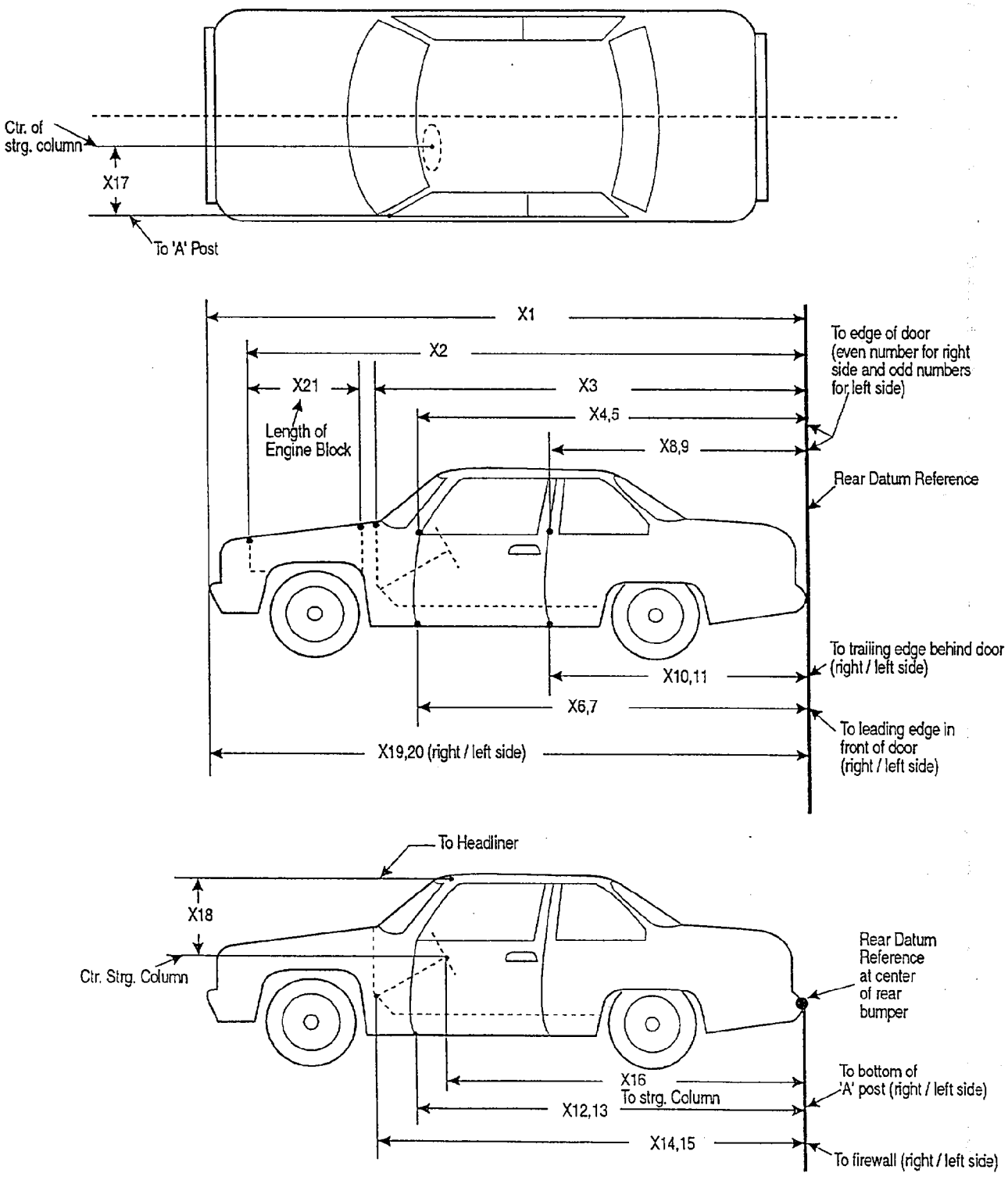


Table 7 Impacted Vehicle Measurements

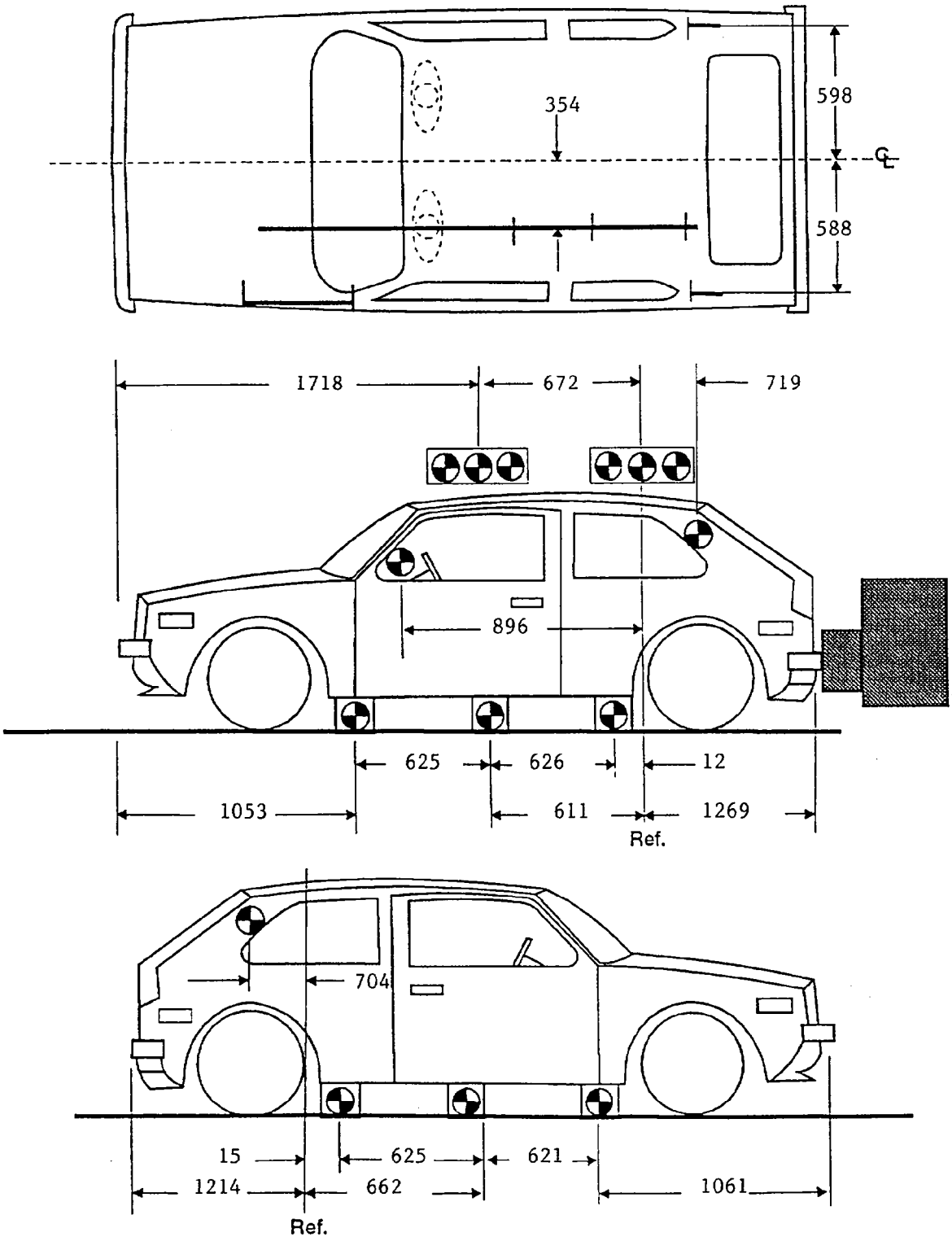
Vehicle year/make/model/body style: 1996/Suzuki/Sidekick/2-door mpv Test Number: 960314

No.	Type of measurement	Pre-test	Post-test	Diff.
X1	Total length of vehicle at centerline	3558 mm	3002 mm	556 mm
X2	Rear surface of vehicle to front of engine block	503 mm	517 mm	-14 mm
X3	Rear surface of vehicle to firewall	1037 mm	1043 mm	-6 mm
X4	Rear surface of vehicle to upper leading edge of right door	1224 mm	1215 mm	9 mm
X5	Rear surface of vehicle to upper leading edge of left door	1221 mm	1220 mm	1 mm
X6	Rear surface of vehicle to lower leading edge of right door	1248 mm	1247 mm	1 mm
X7	Rear surface of vehicle to lower leading edge of left door	1242 mm	1250 mm	-8 mm
X8	Rear surface of vehicle to upper trailing edge of right door	2373 mm	2359 mm	14 mm
X9	Rear surface of vehicle to upper trailing edge of left door	2369 mm	2365 mm	4 mm
X10	Rear surface of vehicle o lower trailing edge of right door	2287 mm	2283 mm	4 mm
X11	Rear surface of vehicle to lower trailing edge of left door	2282 mm	2282 mm	0 mm
X12	Rear surface of vehicle to bottom of "A" post on right side	1255 mm	1265 mm	-10 mm
X13	Rear surface of vehicle to bottom of "A" post on left side	1259 mm	1260 mm	-1 mm
X14	Rear surface of vehicle to firewall - right side	992 mm	993 mm	-1 mm
X15	Rear surface of vehicle to firewall - left side	991 mm	989 mm	2 mm
X16	Rear surface of vehicle to steering wheel center	1615 mm	1615 mm	0 mm
X17	Center of steering column to "A" post	231 mm	231 mm	0 mm
X18	Center of steering column to headliner	522 mm	531 mm	-9 mm
X19	Rear surface of vehicle to right side of front bumper	3512 mm	2668 mm	844 mm
X20	Rear surface of vehicle to left side of front bumper	3510 mm	3285 mm	225 mm
X21	Length of engine block	420 mm	420 mm	0 mm

Table 8 Vehicle Measurements

No.	Description of Measurement	Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	3558	3002	556
X2	Front Surface of Vehicle to Bottom of "A" Post of Right Side	1255	1265	-10
X3	Front Surface of Vehicle to Bottom of "A" Post of Left Side	1259	1260	-1
X4	Front Surface of Vehicle to Right Side of Rear Bumper	3512	2668	844
X5	Front Surface of Vehicle to Left Side of Rear Bumper	3510	3285	225
X6	Right Front Sill to Ground Plane	244	303	-59
X7	Left Front Sill to Ground Plane	246	294	-48
X8	Right Rear Sill to Ground Plane	273	355	-82
X9	Left Rear Sill to Ground Plane	277	347	-70
X10	Wheelbase of Vehicle - Left Side	2200	2122	78
X11	Width of Vehicle at Maximum Width Point	1630	1738	-108
X12	Front Surface of Vehicle to Engine Target	503	517	-14
X13	Front Surface of Vehicle to Compartment Target	1718	1702	16
X14	Front Surface of Vehicle to Rear Bumper Target	3478	2944	534
X15	Wheelbase of Vehicle - Right Side	2200	1888	312

Figure 4 Vehicle Target Locations



(Dimensions in Millimeters)

Table 9 Test Vehicle Rear Profile Data

X-axis measurements referenced to a plane 430 millimeters forward of the front bumper support brackets. Y-axis measurements are left and right of the original vehicle centerline. Y-axis measurements (6 points) should divide the width of the car and be clearly indicated on the form. Z-axis (height) measurements are from the ground.

Pre-Test Profile

		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	3904	3922	3922	3924	3920	3891
	Y	751	455	150	141	480	748
	Z	467	468	462	458	470	462
Top of rear bumper	X	3915	3951	3946	3954	3953	3924
	Y	764	455	148	148	453	752
	Z	644	633	633	633	640	644
Center of trunk	X	3824	3826	3839	3821	3837	3831
	Y	648	456	221	174	423	626
	Z	864	860	845	880	864	869

Post-Test Profile

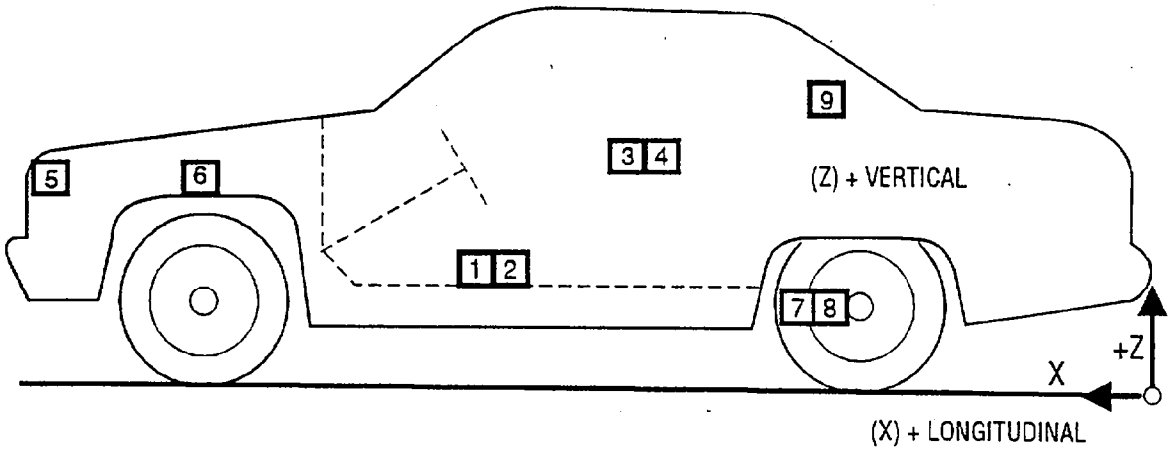
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	3704	3549	3435	3357	3199	3065
	Y	740	448	150	140	480	720
	Z	410	453	482	493	538	580
Top of rear bumper	X	3694	3593	3483	3358	3235	3096
	Y	760	450	145	150	455	753
	Z	595	621	653	677	700	748
Center of trunk	X	3629	3530	3408	3383	3346	3359
	Y	584	383	185	205	430	627
	Z	756	837	962	951	776	702

Table 9 Test Vehicle Rear Profile Data, Cont'd.

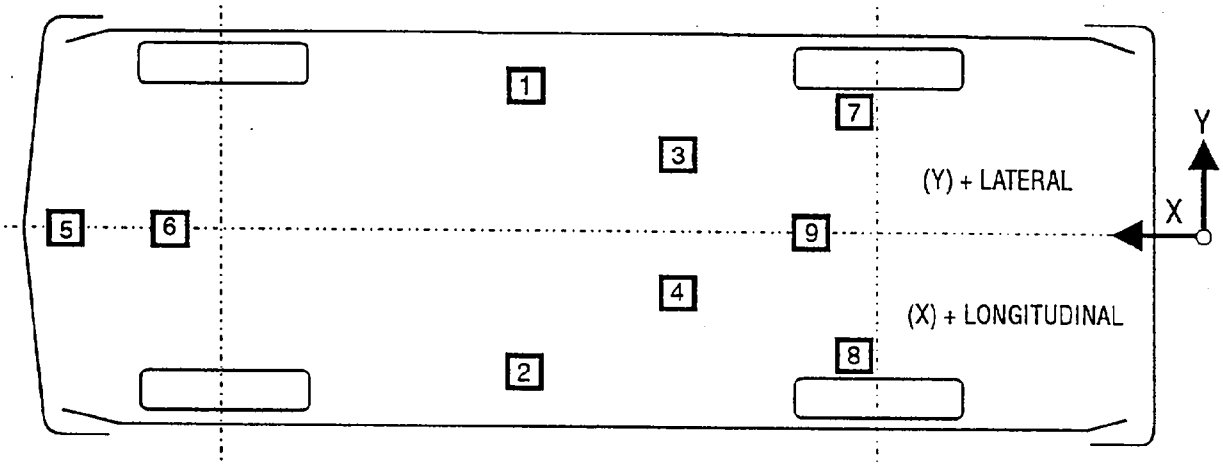
		Change					
		Vehicle Left			Vehicle Right		
		pt. 1	pt. 2	pt. 3	pt. 4	pt. 5	pt. 6
Bottom of rear bumper	X	200	373	487	567	721	826
	Y	-11	-7	0	1	0	28
	Z	-57	-15	20	35	68	118
Top of rear bumper	X	221	358	463	596	718	828
	Y	-4	-5	-3	-2	-2	-1
	Z	-49	-12	20	44	60	104
Center of trunk	X	195	296	431	438	491	472
	Y	-64	-73	-36	31	7	1
	Z	-108	-23	117	71	88	167

+X: Rearward from a reference plane 430 mm forward of the vehicle front bumper
+Y: Left from vehicle longitudinal centerline
+Z: Up from ground

Figure 5 Vehicle Accelerometer Mounting Locations



SIDE VIEW



BOTTOM VIEW

Table 10 Pre- and Post-Test Position of Vehicle Accelerometer Mounting Locations

Accelerometer Description		X, Y, Z Location[1]		
		X	Y	Z
Left front seat outboard mounting rail	Pre	1863 mm	615 mm	438 mm
	Post	1855 mm	615 mm	440 mm
	Change	8 mm	0 mm	2 mm
Right front seat outboard mounting rail	Pre	1852 mm	-615 mm	435 mm
	Post	1841 mm	-615 mm	450 mm
	Change	11 mm	0 mm	15 mm
Left front seat back (mid-point of seat)	Pre	2307 mm	354 mm	980 mm
	Post	2230 mm	354 mm	1150 mm
	Change	77 mm	0 mm	170 mm
Right front seat back (mid-point of seat)	Pre	2308 mm	-354 mm	987 mm
	Post	2200 mm	-354 mm	1100 mm
	Change	108 mm	0 mm	113 mm
Radiator support	Pre	280 mm	-50 mm	878 mm
	Post	270 mm	-50 mm	895 mm
	Change	10 mm	0 mm	17 mm
Top of engine	Pre	607 mm	-12 mm	865 mm
	Post	616 mm	-12 mm	960 mm
	Change	-9 mm	0 mm	95 mm
Left rear wheel axle	Pre	2830 mm	360 mm	320 mm
	Post	2750 mm	395 mm	276 mm
	Change	80 mm	35 mm	-44 mm
Right rear wheel axle	Pre	2836 mm	-395 mm	320 mm
	Post	2640 mm	-395 mm	231 mm
	Change	196 mm	0 mm	-89 mm
Rear package shelf (top of rear seat back)	Pre	3250 mm	0 mm	675 mm
	Post	2797 mm	20 mm	744 mm
	Change	453 mm	20 mm	69 mm

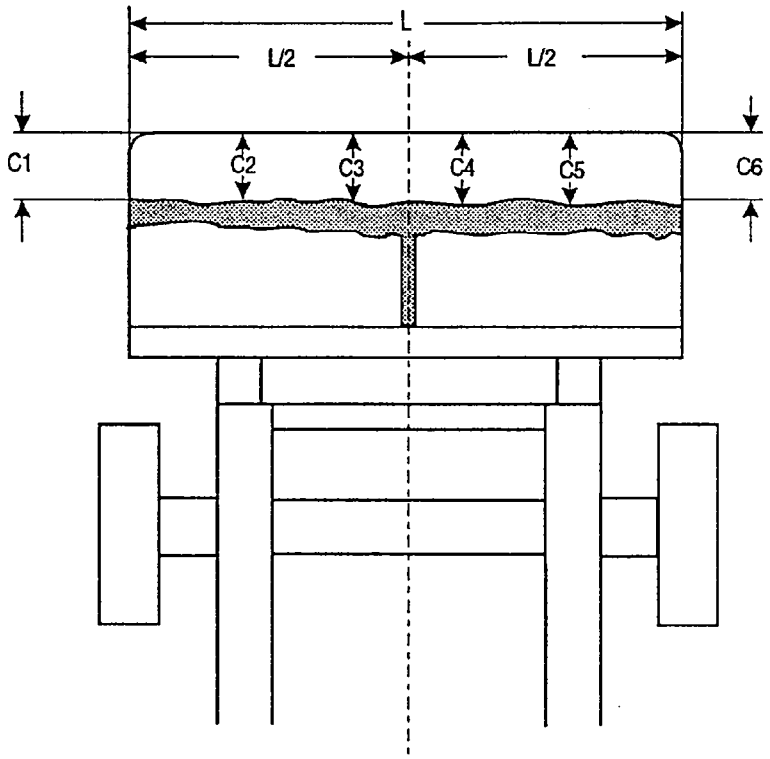
[1] Reference Point: X - vertical plane at front bumper
Y - vehicle centerline
Z - ground

Table 11 Moving Deformable Barrier Face Static Crush

Location	Height	Zero distance at barrier centerline[1]																
		813	711	610	508	406	305	203	102	0	102	203	305	406	508	610	711	813
Pre-test profile (distance in millimeters from reference plane[2])																		
Top of face	762	330	335	328	330	330	330	328	326	330	330	331	330	328	327	329	330	330
Mid-face	508	331	331	328	330	330	330	329	326	329	330	329	325	327	326	329	330	330
Bumper	381	248	229	228	229	227	228	226	226	228	228	227	224	225	226	228	228	244
Post-test profile (distance in millimeters from reference plane[2])																		
Top of face	762	533	514	500	492	480	464	442	432	433	445	396	358	336	334	334	330	331
Mid-face	508	624	556	549	530	499	475	452	439	404	372	352	329	326	327	327	324	324
Bumper	381	549	495	473	452	428	401	384	386	335	307	282	257	226	197	172	145	142
Static crush (mm)																		
Top of face	762	203	179	172	162	150	134	114	106	103	115	65	28	8	7	5	0	1
Mid-face	508	293	225	221	200	169	145	123	113	75	42	23	4	-1	1	-2	-6	-6
Bumper	381	301	266	245	223	201	173	158	160	107	79	55	33	1	-29	-56	-83	-102

[1] Column readings are left to right across barrier face from left to right.
[2] Reference plane is the rear surface of the deformable barrier face.
All measurements are in millimeters.

Figure 6 Moving Deformable Barrier Face Crush



Notes: L is pre-test length of contact surface.
C1 through C6 are spaced equally apart.
CL is moving barrier centerline.

	Pre-test	Post-test	Crush
L	1676 mm		
C1	248 mm	549 mm	301 mm
C2	229 mm	452 mm	223 mm
C3	226 mm	384 mm	158 mm
C4	227 mm	282 mm	55 mm
C5	226 mm	197 mm	-29 mm
C6	244 mm	142 mm	-102 mm
CL	228 mm	335 mm	107 mm

Figure 7 Dummy Measurement Locations for Front Seat Occupants

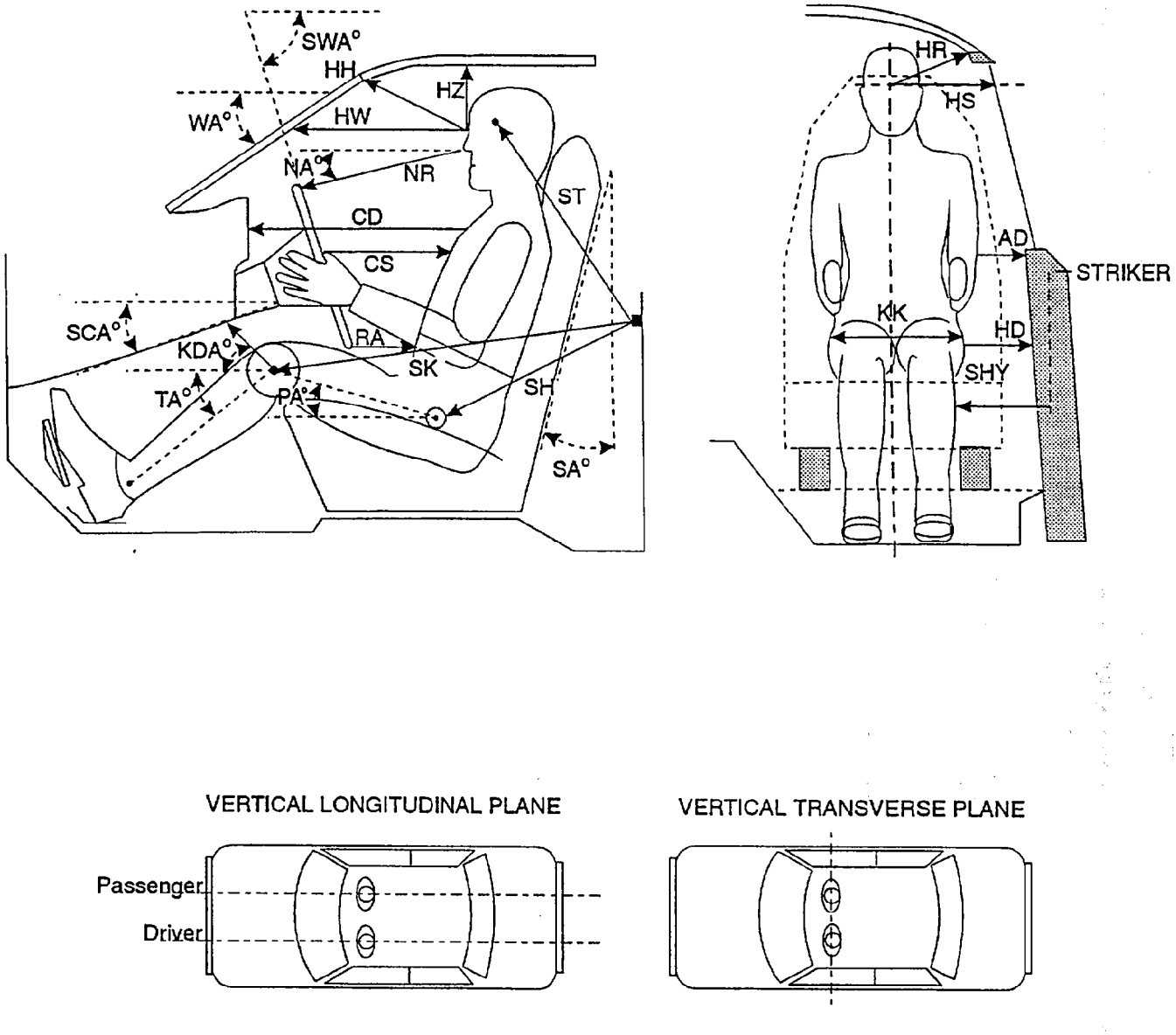
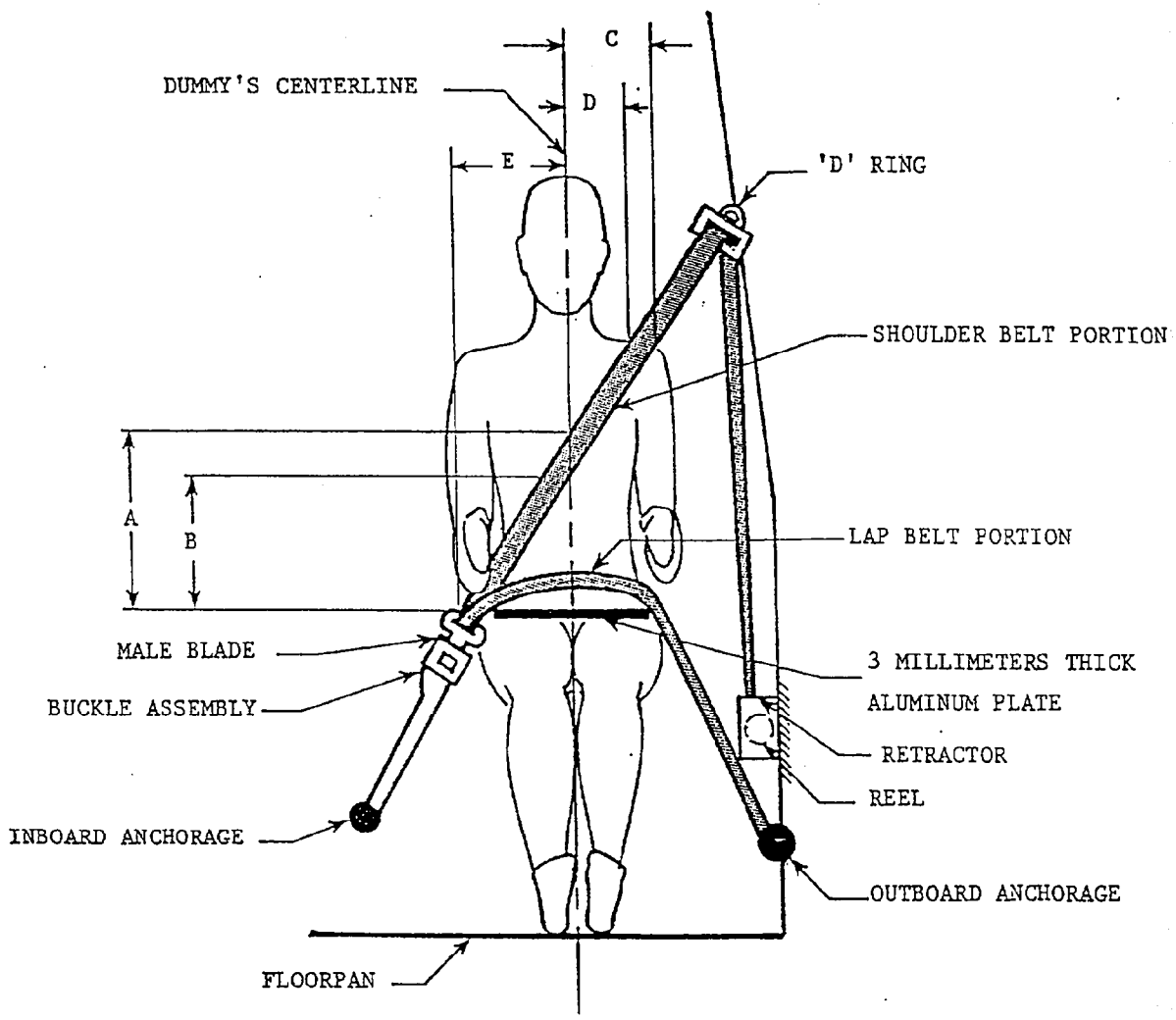


Table 12 Dummy Measurement Data For Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #35)	Passenger (Serial #34)
WA	Windshield angle	45°	NA
SWA	Steering wheel angle	60°	NA
SCA	Steering column angle	30°	NA
SA	Seat back angle	21°	21°
HZ	Head to roof	248 mm	262 mm
HH	Head to header	544 mm	528 mm
HW	Head to windshield	654 mm	647 mm
HR	Head to side header	218 mm	235 mm
NR	Nose to rim	481 mm	NA
NA	Nose to rim angle	14°	NA
CD	Chest to dash	578 mm	574 mm
CS	Steering wheel to chest	376 mm	NA
RA	Rim to abdomen	215 mm	NA
KDL	Left knee to dash	162 mm	165 mm
KDR	Right knee to dash	163 mm	170 mm
KDA	Outboard knee to dash angle	29°	44°
PA	Pelvic angle	21°	24°
TA	Tibial angle	42°	38°
KK	Knee to knee	304 mm	270 mm
ST[1]	Striker to head	573 mm	585 mm
	Striker to head angle	-78°	-75°
SK[1]	Striker to knee	645 mm	685 mm
	Striker to knee angle	3°	0°
SH[1]	Striker to H-point	255 mm	285 mm
	Striker to H-point angle	20°	11°
SHY	Striker to H-point (Y dir.)	174 mm	170 mm
HS	Head to side window	254 mm	255 mm
HD	H-point to door	117 mm	125 mm
AD	Arm to door	55 mm	68 mm

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

Figure 8 Seat Belt Positioning Data



		Driver	Passenger
A	Top surface of aluminum plate to belt upper edge	418 mm	361 mm
B	Top surface of aluminum plate to belt lower edge	364 mm	275 mm
C	Dummy centerline to outer edge of belt at chest flesh top	78 mm	129 mm
D	Dummy centerline to inner edge of belt at chest flesh top	18 mm	68 mm
E	Dummy centerline to intersection of upper torso belt and lap belt	252 mm	255 mm

Figure 9 Camera Positions

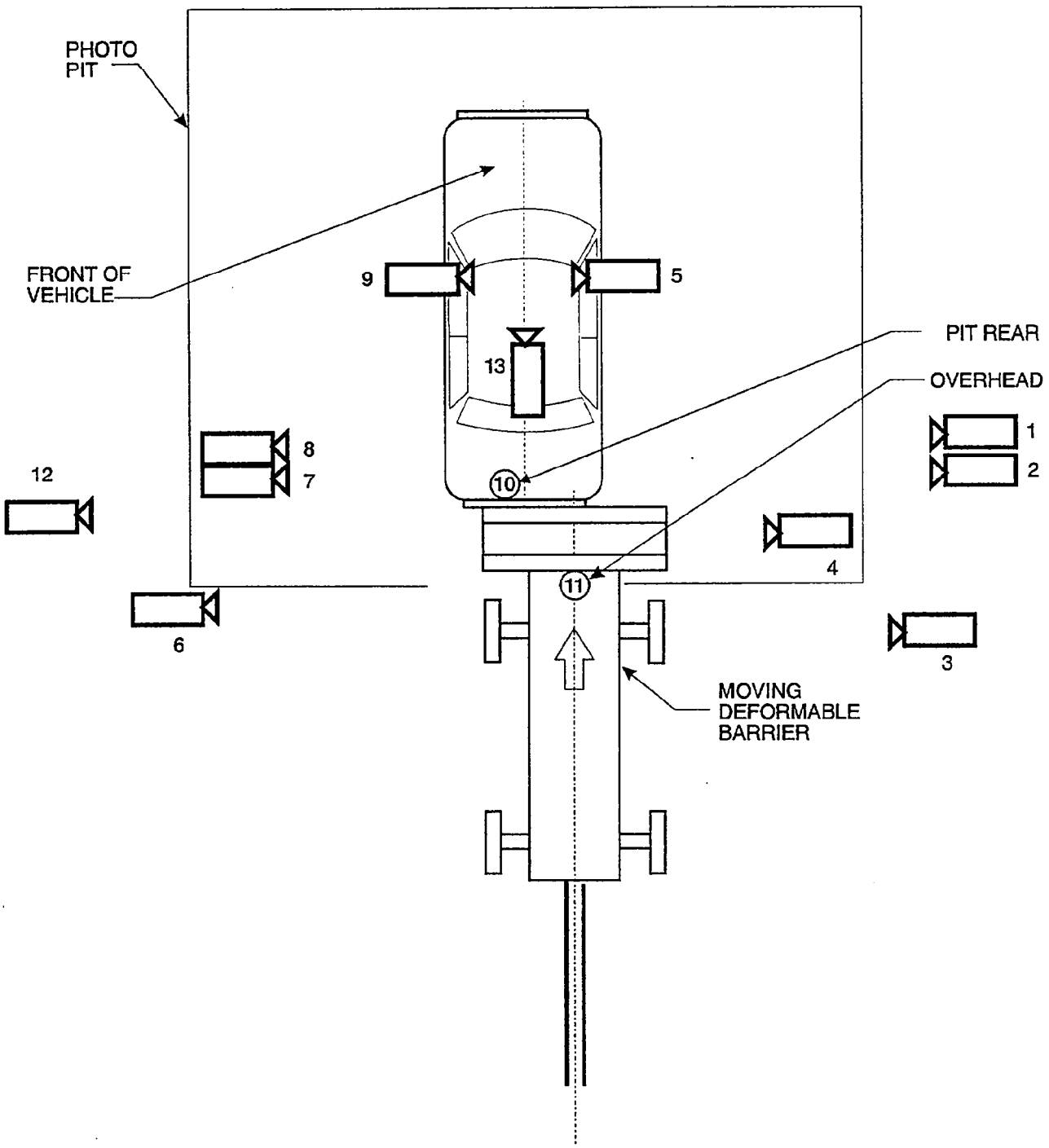


Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1996/Suzuki/Sidekick/2-door mpv

Test number: 960314

Camera Number	View	Camera Positions[1] X	Y	Z	Angle of Inclination[2]	Angle of Rotation[3]	Camera Lens	Film Speed
1	Right side vehicle	7,772 mm	6,934 mm	838 mm	0°	0°	25 mm	995 frames/s
2	Right side overall	813 mm	6,274 mm	1,092 mm	0°	0°	13 mm	1000 frames/s
3	Right MDB	-1,372 mm	10,236 mm	914 mm	0°	0°	25 mm	1000 frames/s
4	Right close-up	305 mm	4,877 mm	1,092 mm	-3°	0°	17 mm	998 frames/s
5	Right front passenger onboard	NA	NA	NA	NA	NA	8 mm	995 frames/s
6	Left side MDB	-787 mm	-10,160 mm	838 mm	0°	0°	25 mm	995 frames/s
7	Left side close-up	432 mm	-7,442 mm	991 mm	-3°	0°	17 mm	1005 frames/s
8	Left side vehicle	2,565 mm	-11,227 mm	1,168 mm	-2°	0°	25 mm	998 frames/s
9	Driver onboard	NA	NA	NA	NA	NA	8 mm	1005 frames/s
10	Underbody vehicle	NA	NA	NA	90°	0°	17 mm	1000 frames/s
11	Overhead	0 mm	0 mm	10,668 mm	90°	0°	13 mm	998 frames/s
12	Left side overall	1,041 mm	-12,675 mm	1,092 mm	0°	0°	13 mm	NA[4] frames/s
13	Seat back view	0 mm	0 mm	10,668 mm	NA	NA	35 mm	815 frames/s

[1] +X: Forward from impact point MDB face
+Y: Rightward from monorail centerline
+Z: Upward from ground level

[2] +Angle of Inclination: Camera lens (upward from horizontal)

[3] +Angle of Rotation: Camera lens toward barrier from line perpendicular to monorail centerline

[4] Camera did not run during test

Appendix A

Photographs

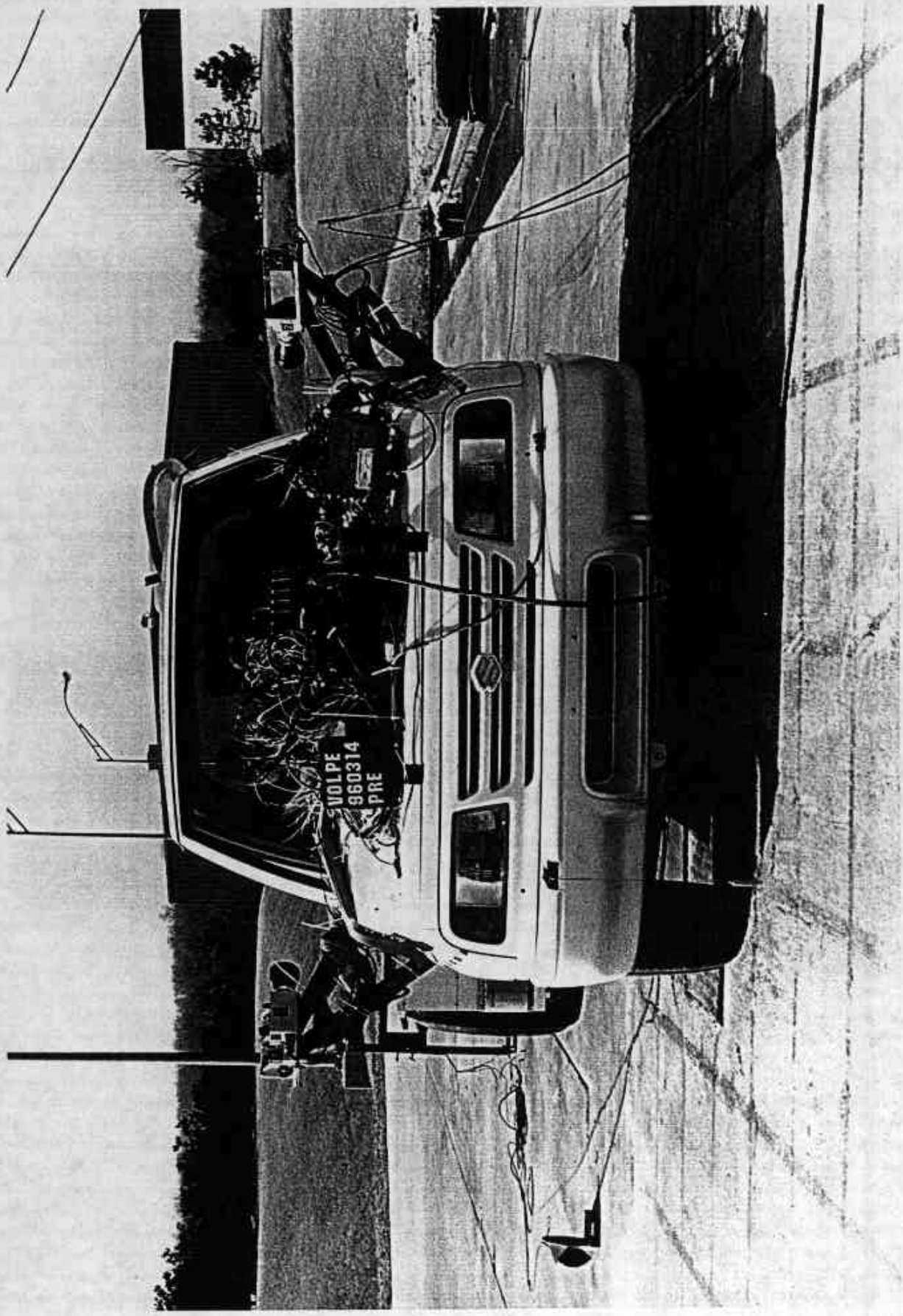


Figure A-1 Pre-Test Front View

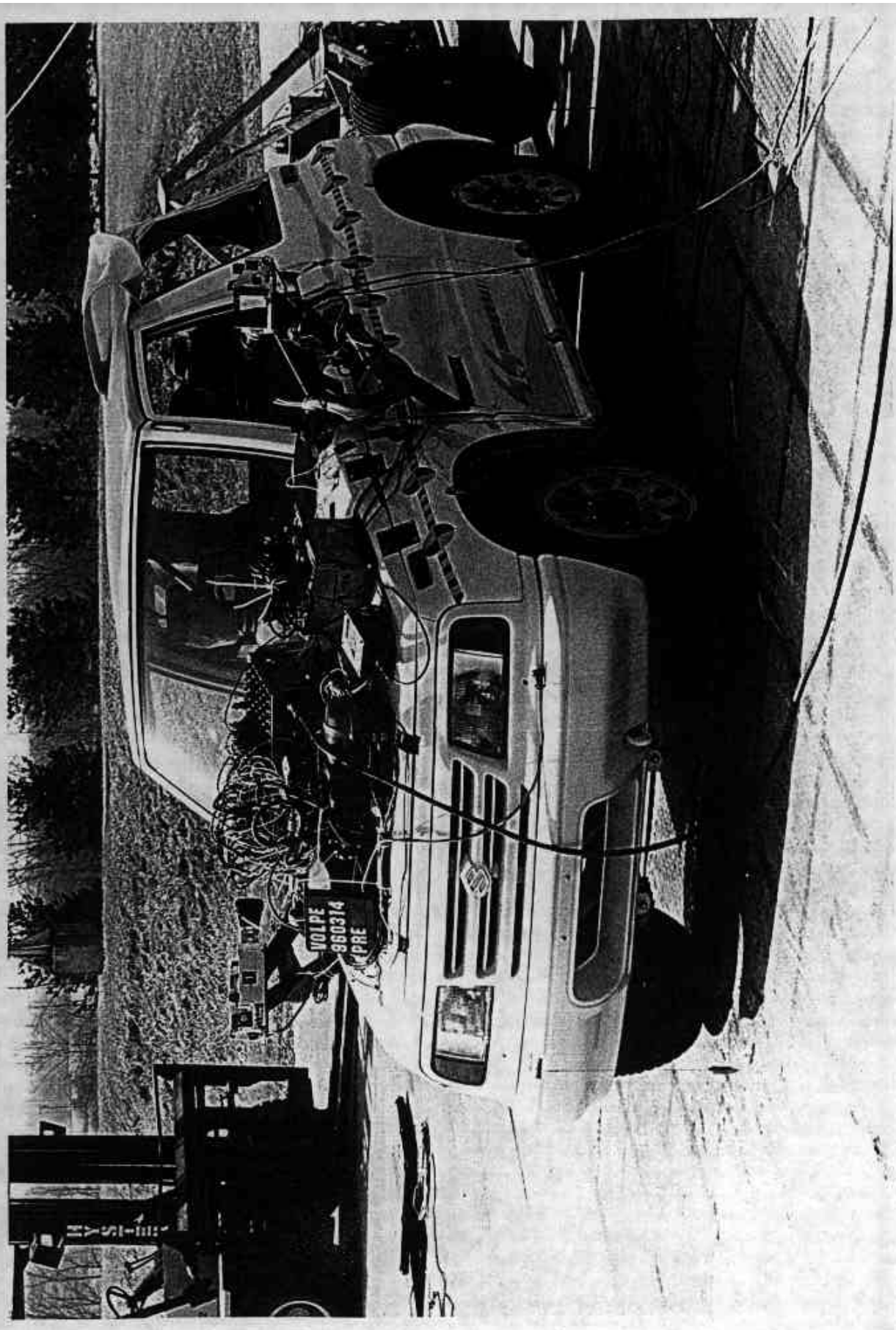


Figure A-2 Pre-Test Left Front Three-Quarter View

Figure A-3 Post-Test Left Front Three-Quarter View

Figure A-4 Pre-Test Left Side View

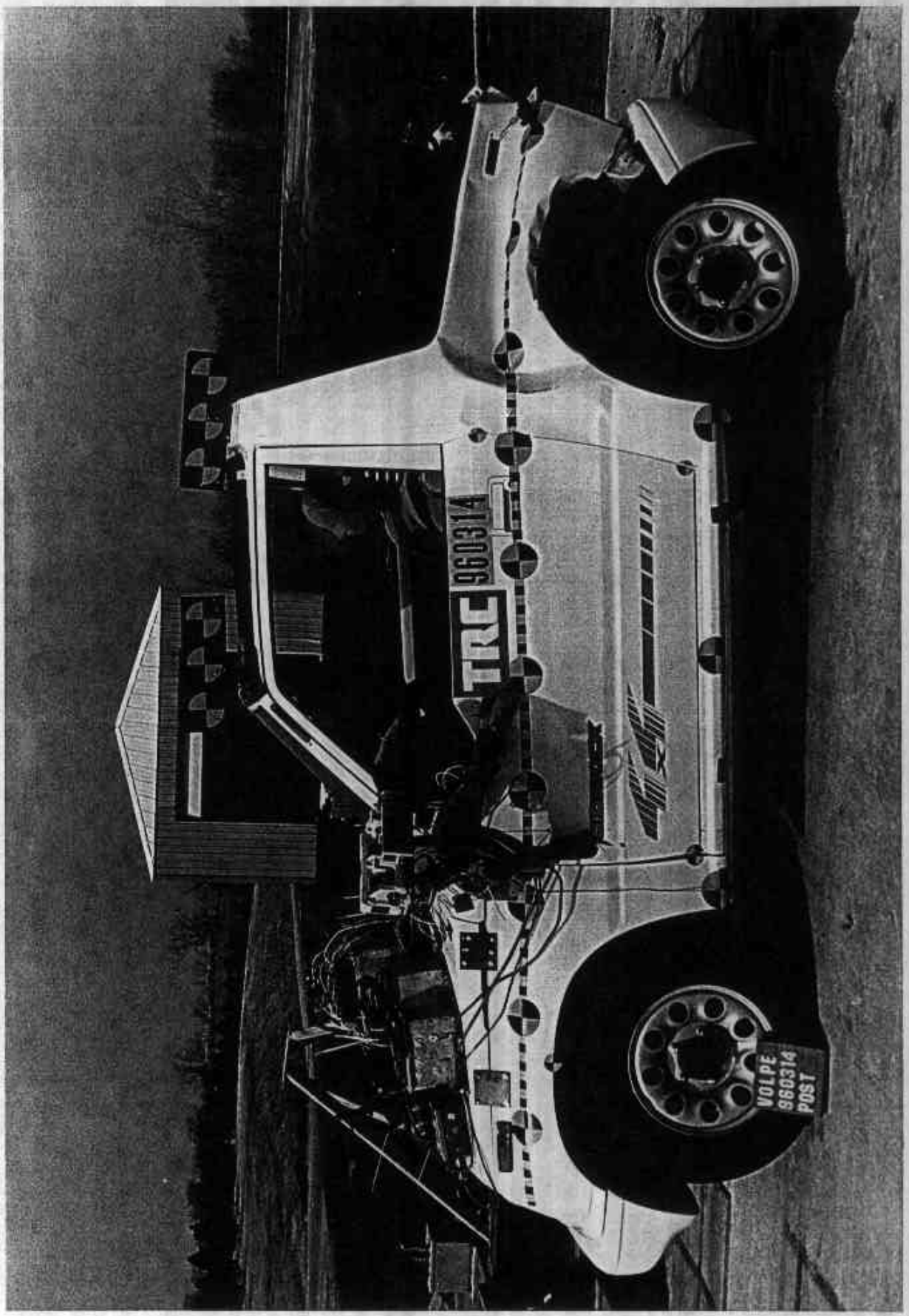


Figure A-5 Post-Test Left Side View

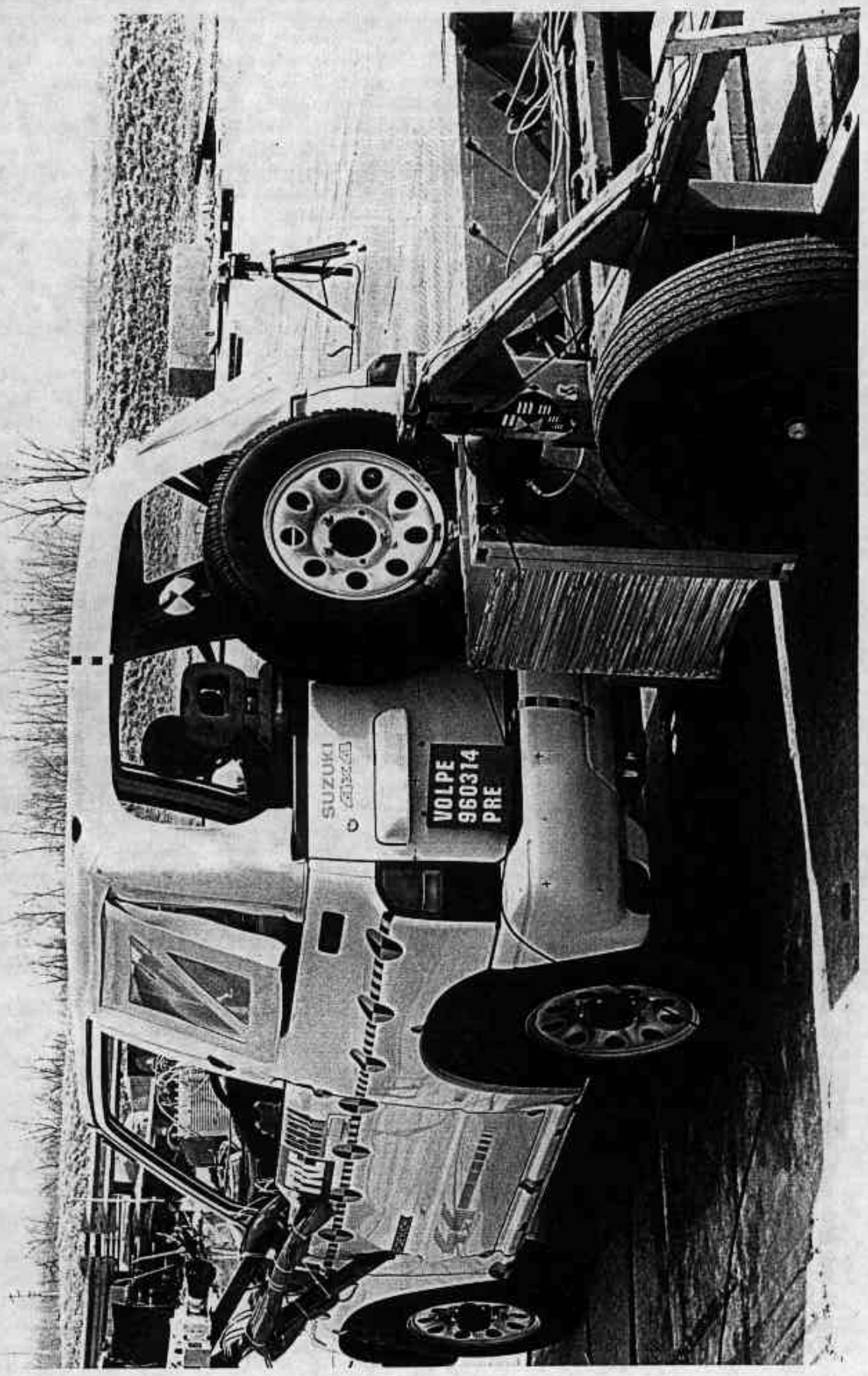


Figure A-6 Pre-Test Left Rear Three-Quarter View

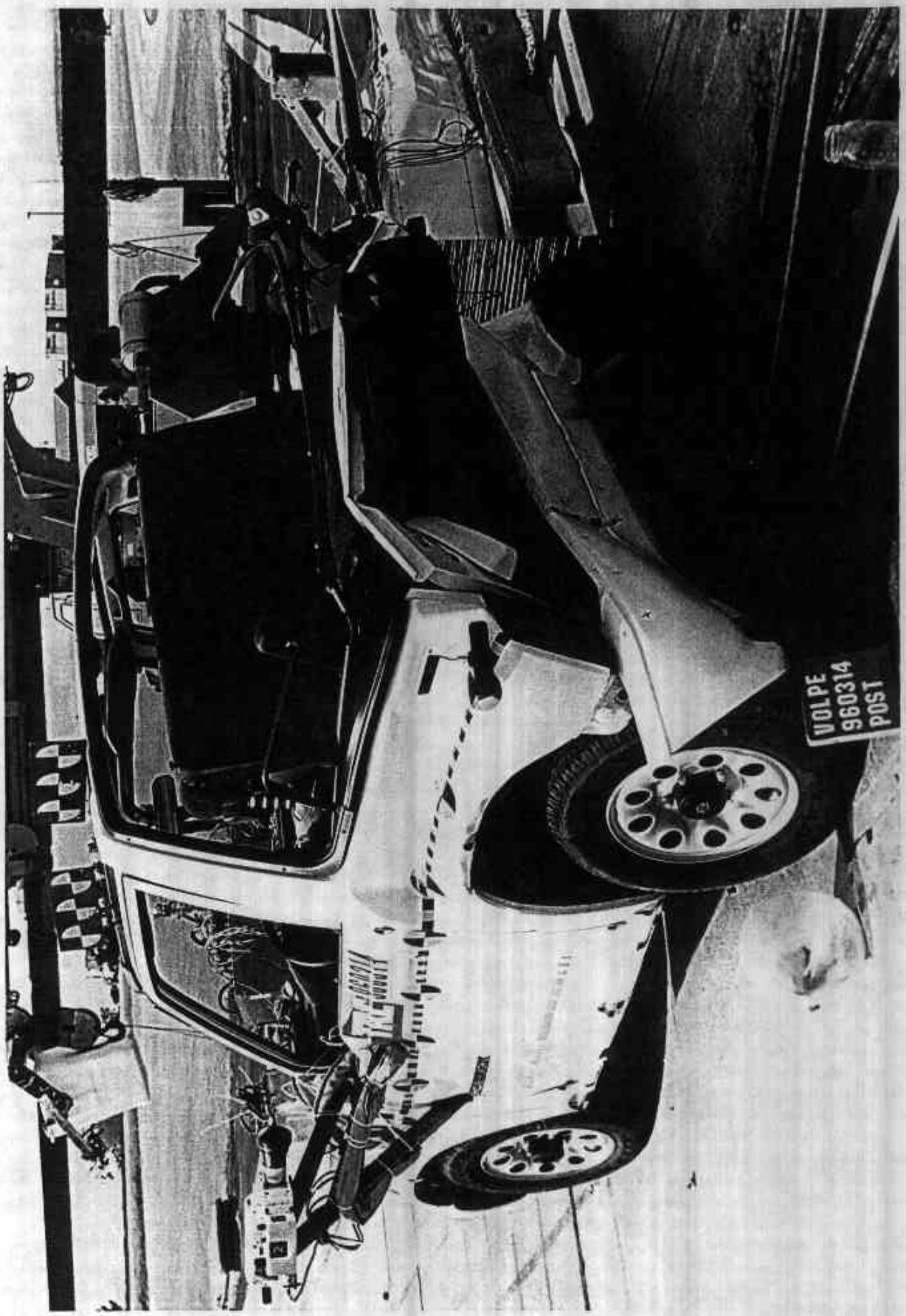


Figure A-7 Post-Test Left Rear Three-Quarter View

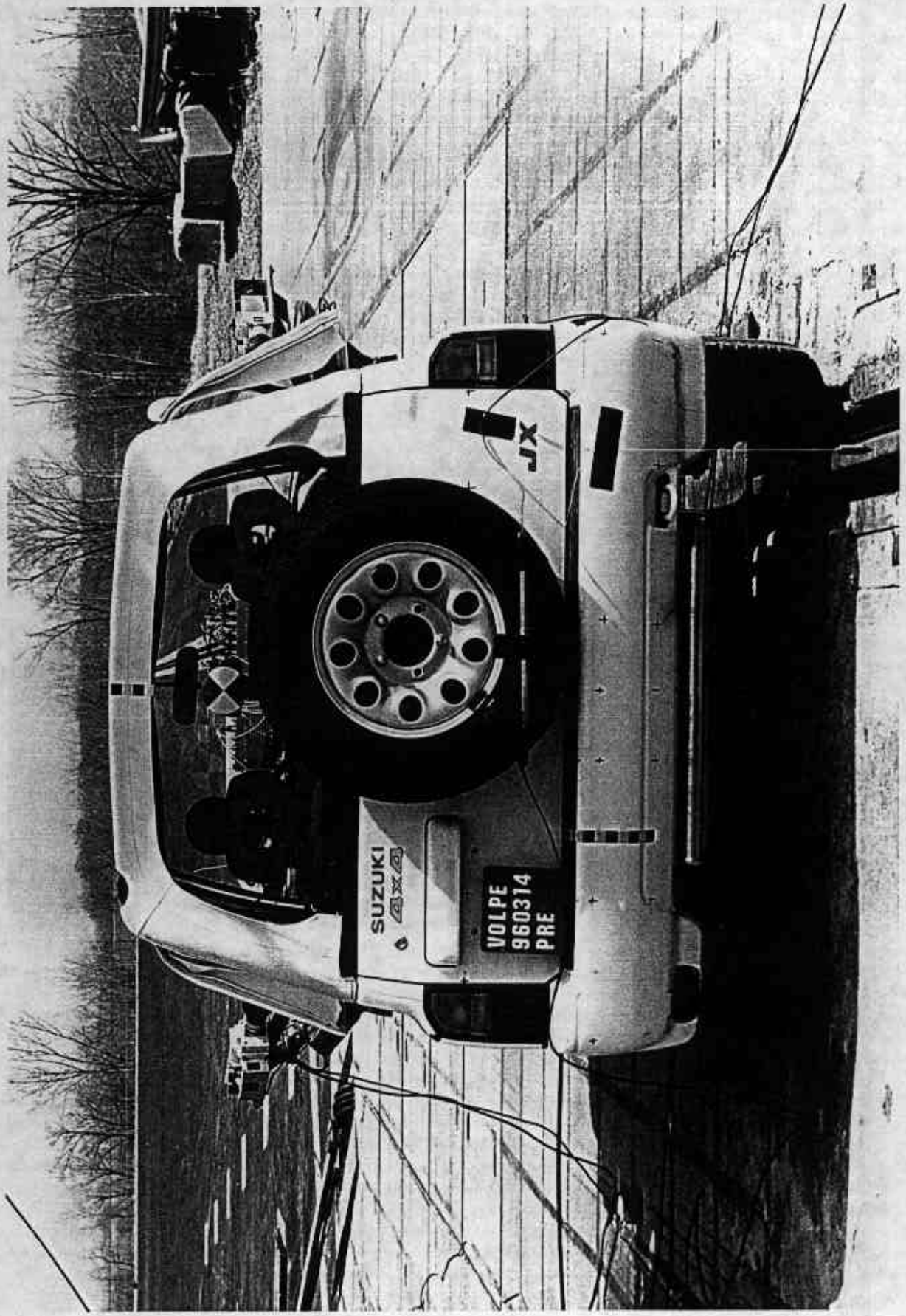


Figure A-8 Pre-Test Rear View

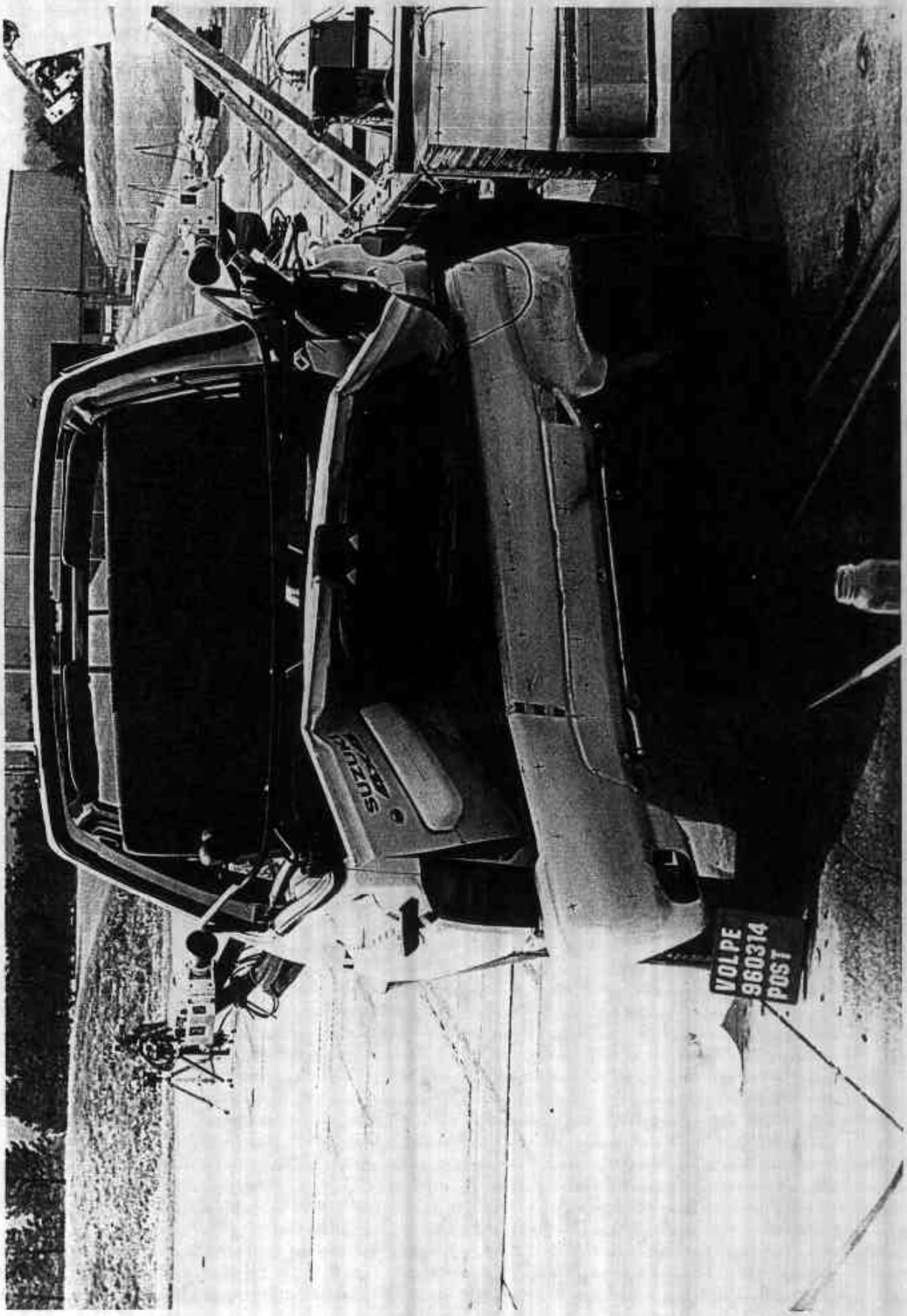


Figure A-9 Post-Test Rear View

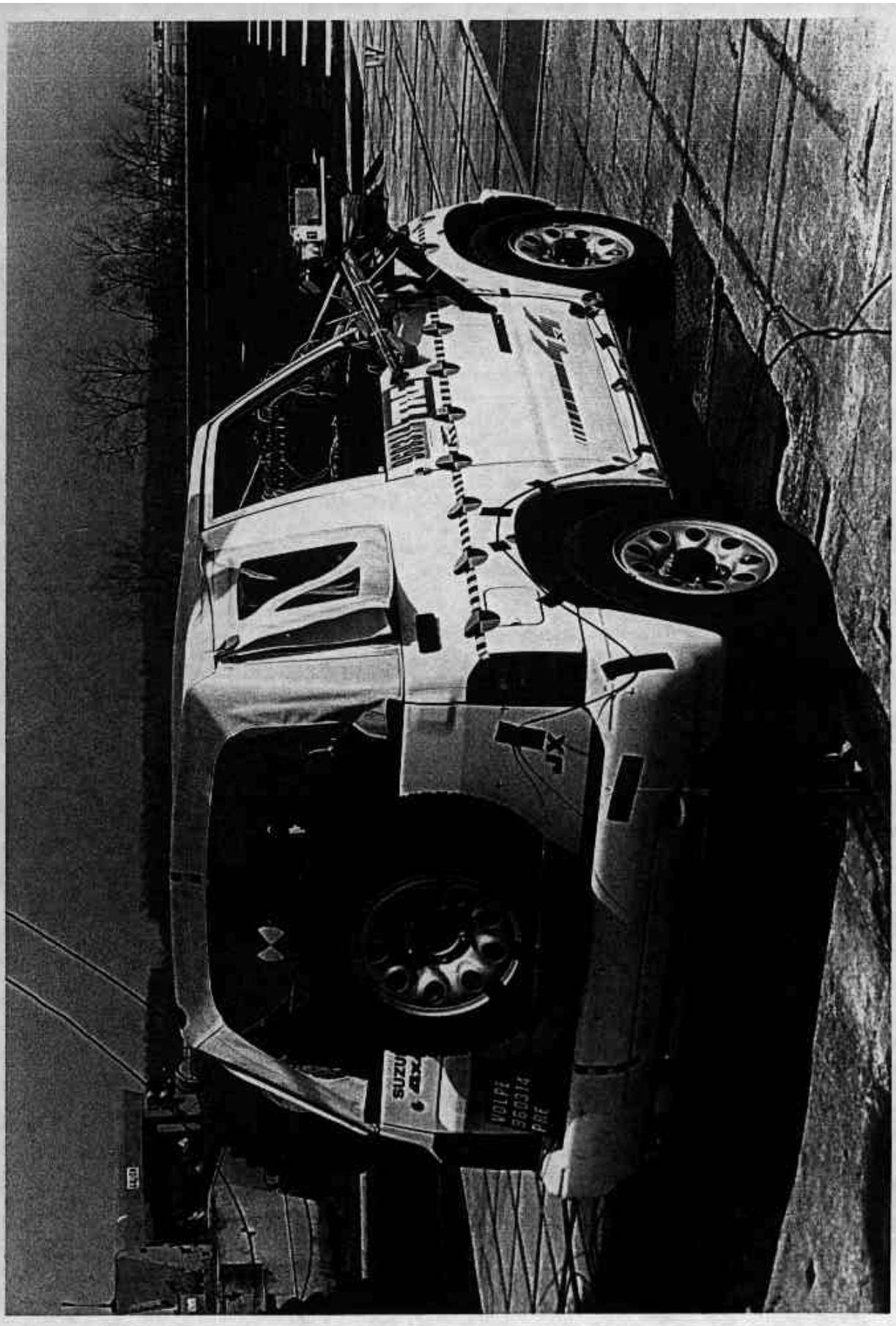


Figure A-10 Pre-Test Right Rear Three-Quarter View

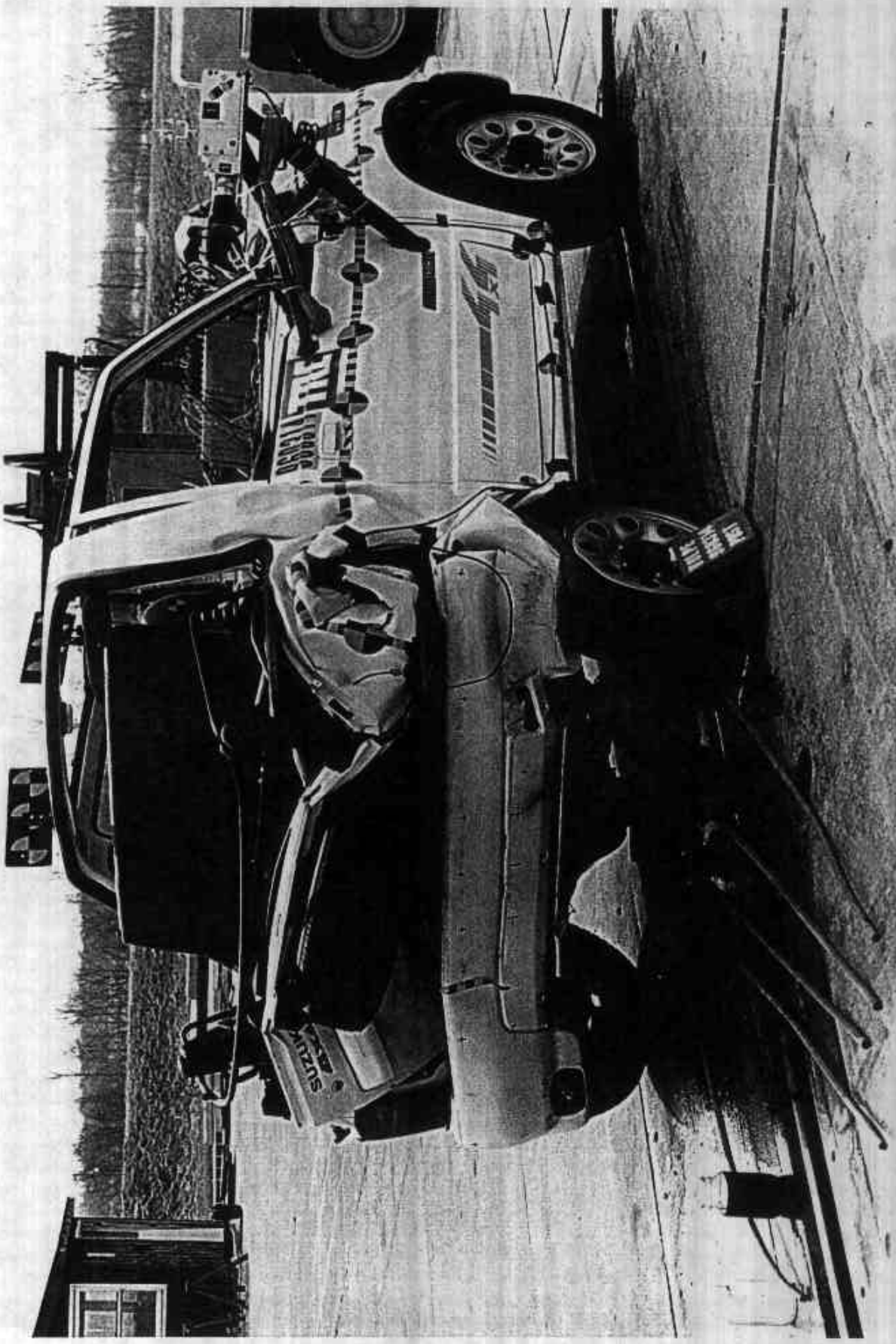


Figure A-11 Post-Test Right Rear Three-Quarter View

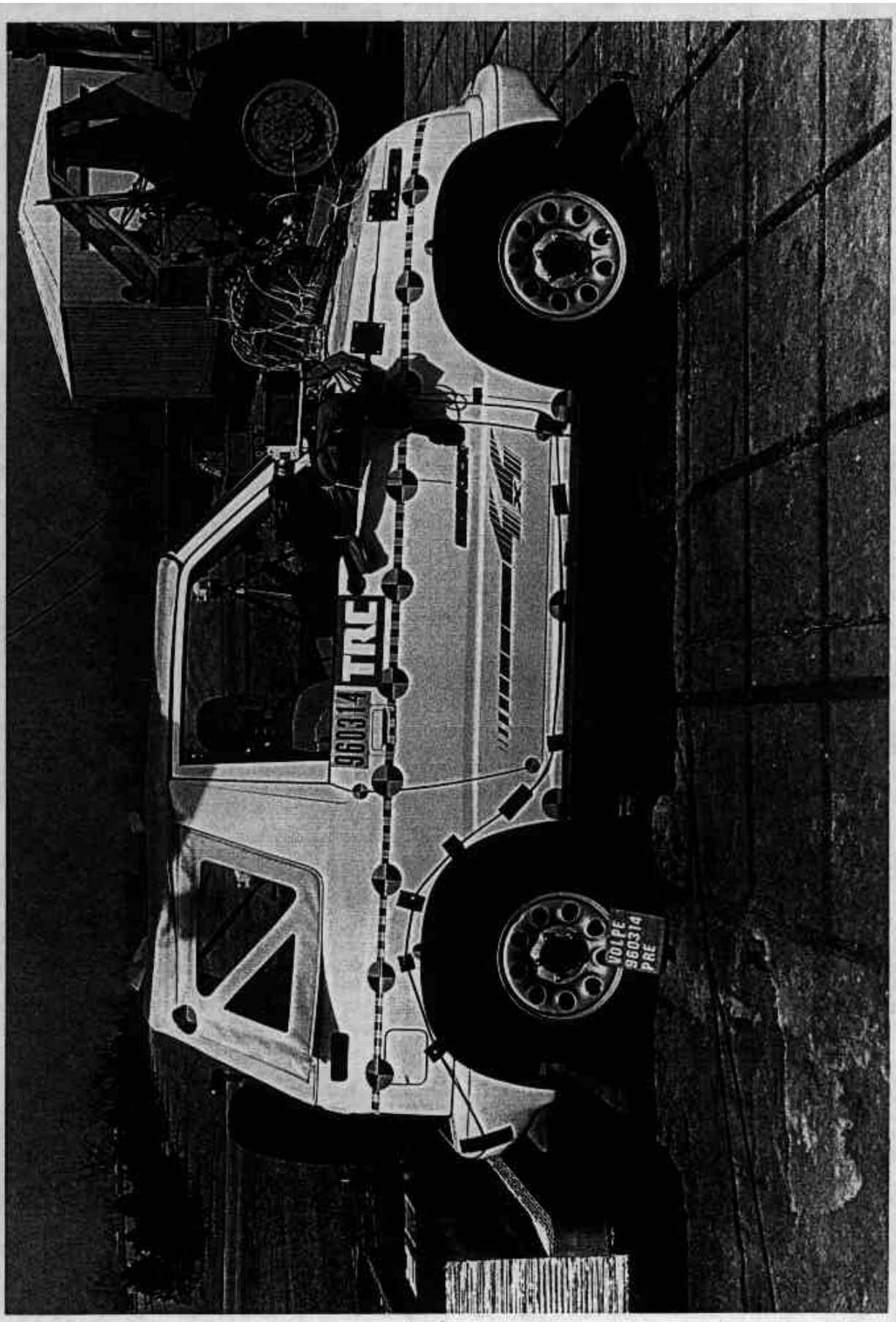


Figure A-12 Pre-Test Right Side View

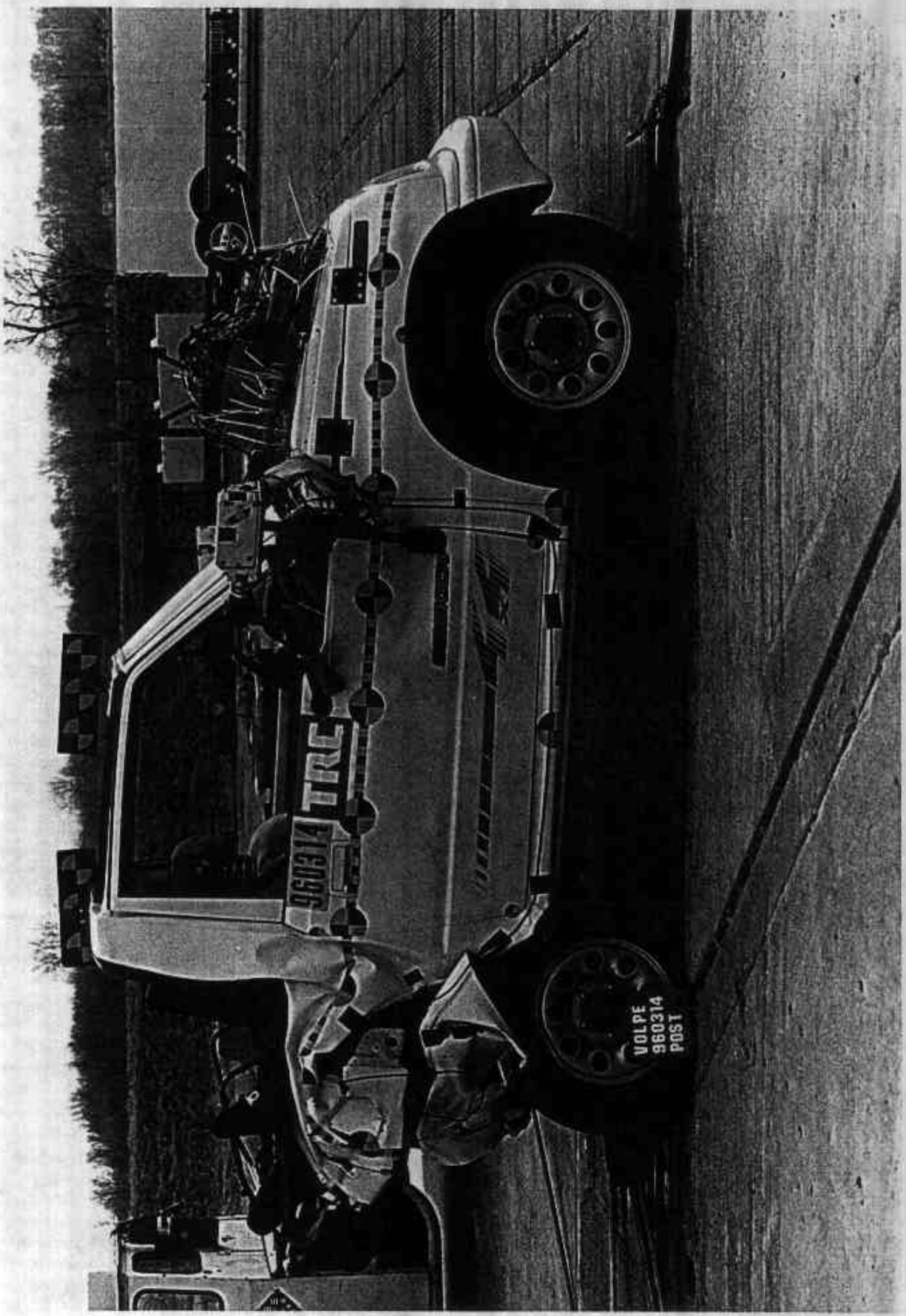


Figure A-13 Post-Test Right Side View

Figure A-14 Pre-Test Right Front Three-Quarter View

Figure A-15 Post-Test Right Front Three-Quarter View

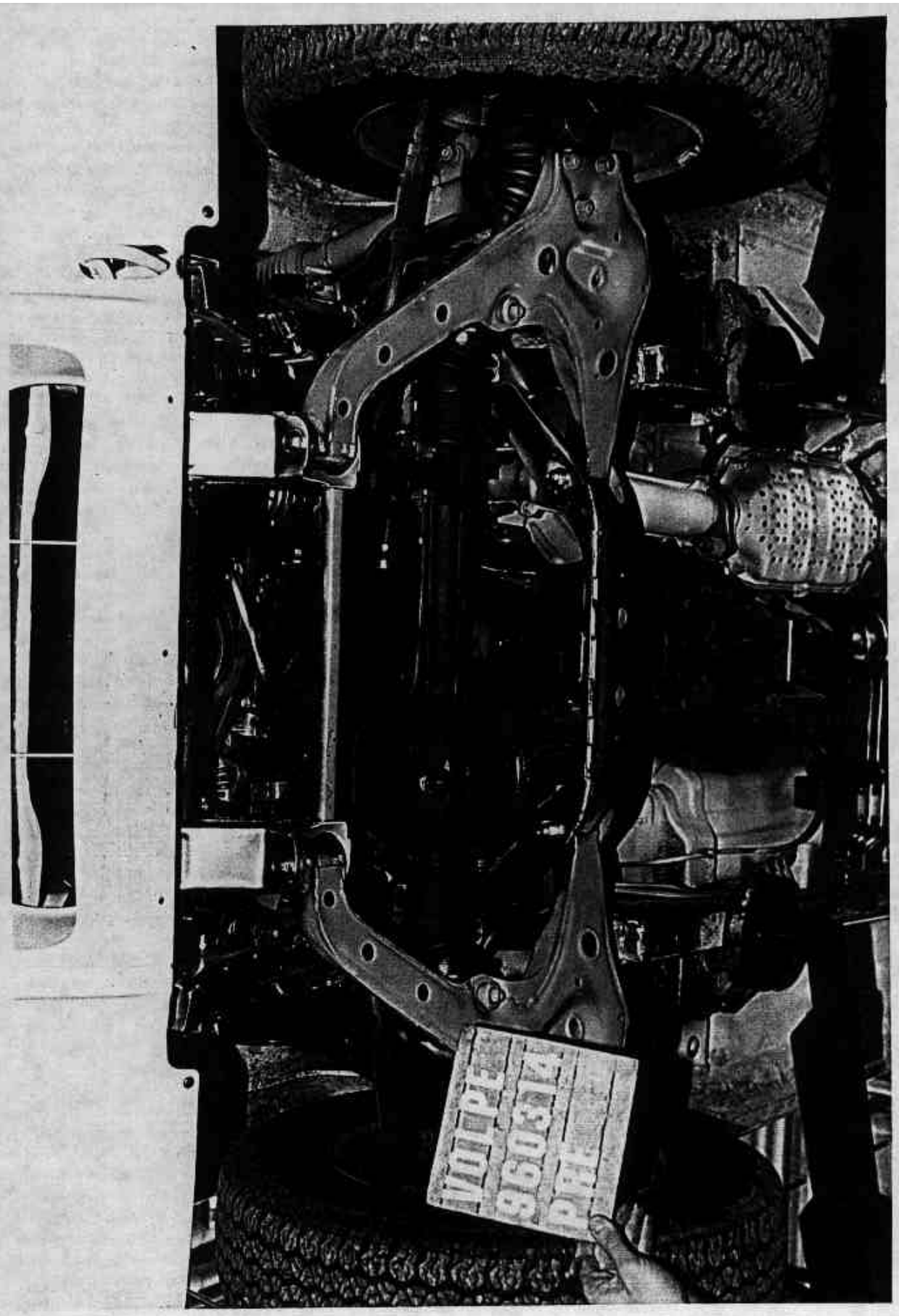


Figure A-16 Pre-Test Front Underbody View

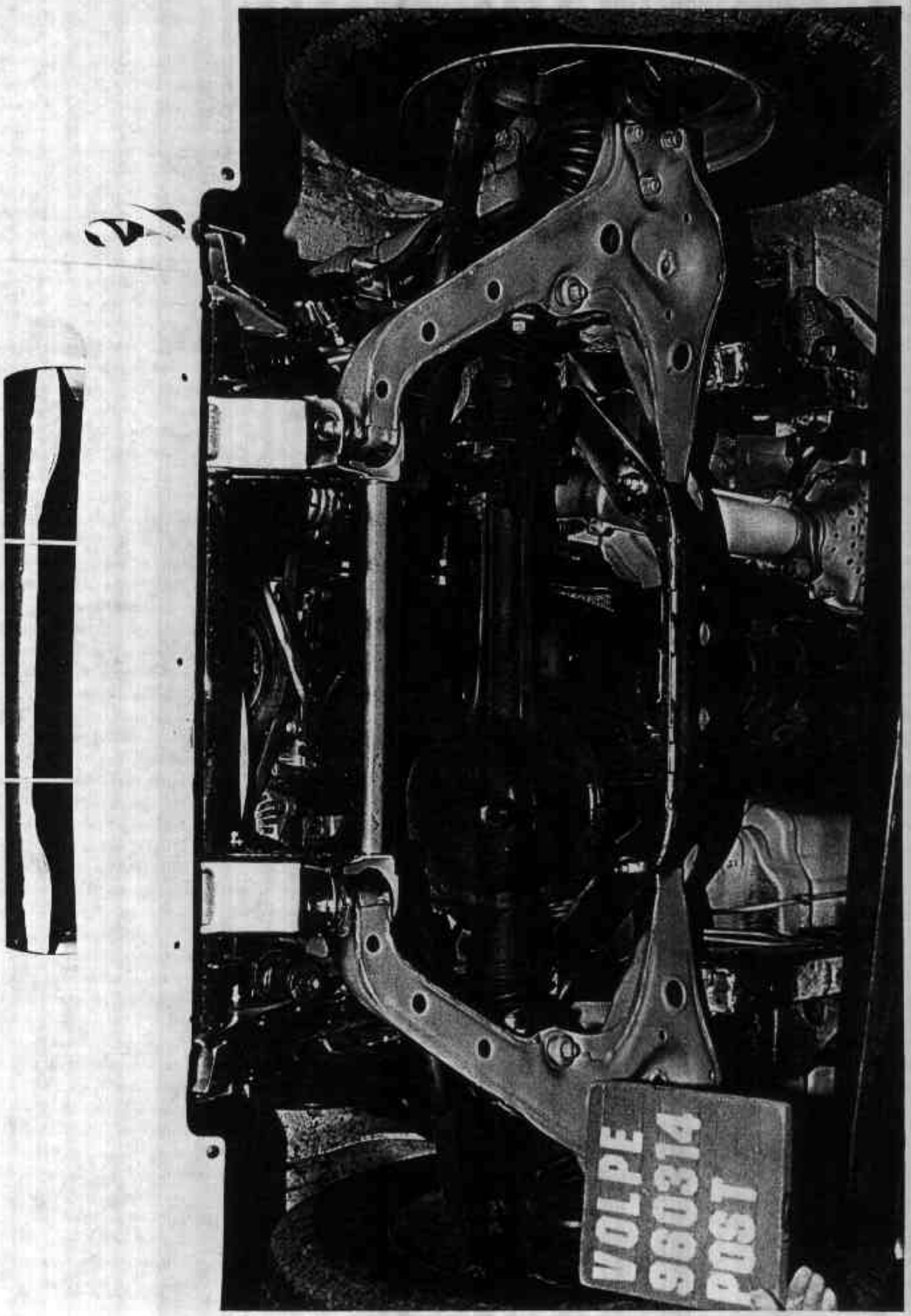


Figure A-17 Post-Test Front Underbody View

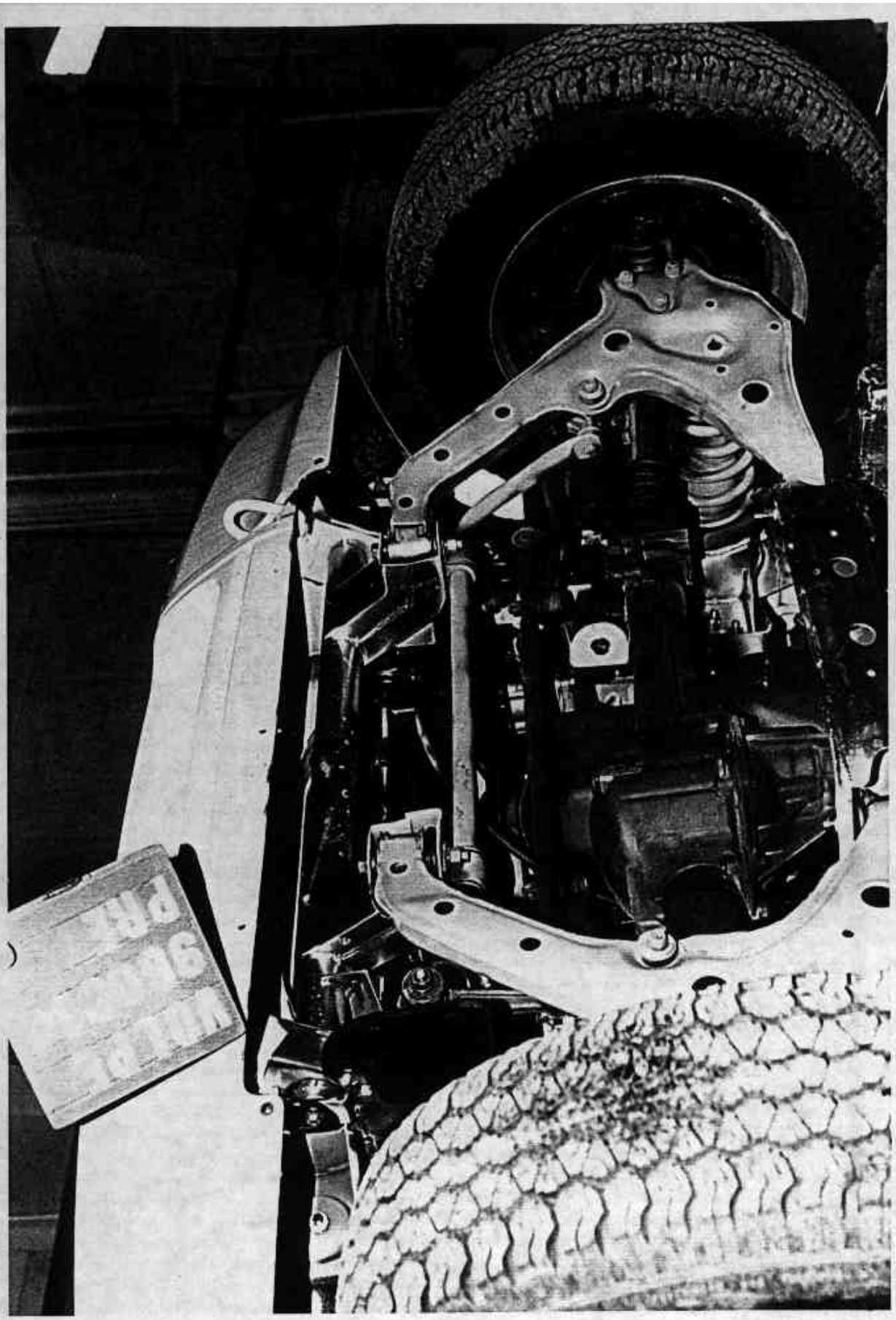


Figure A-18 Pre-Test Right Front Underbody View

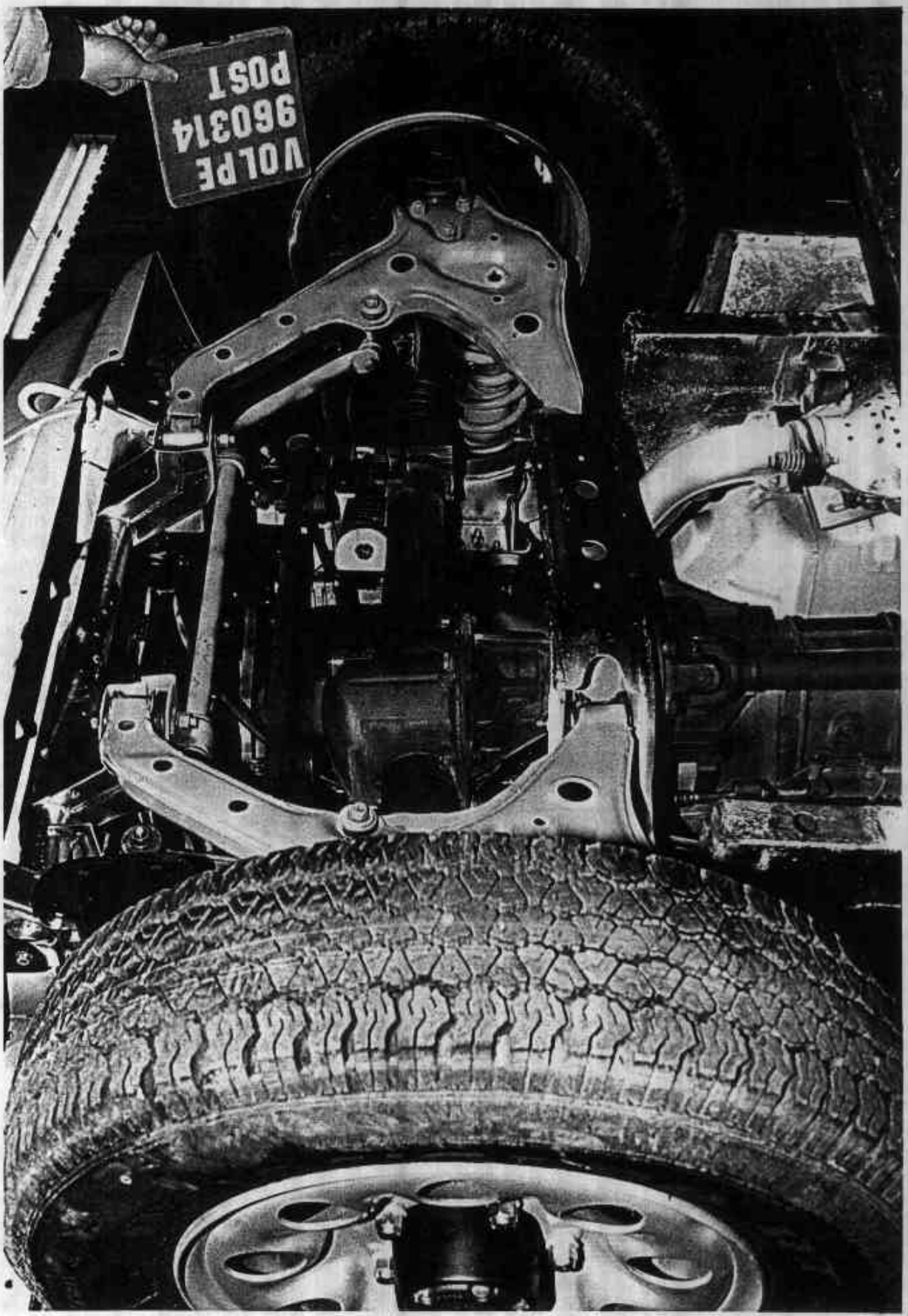


Figure A-19 Post-Test Right Front Underbody View

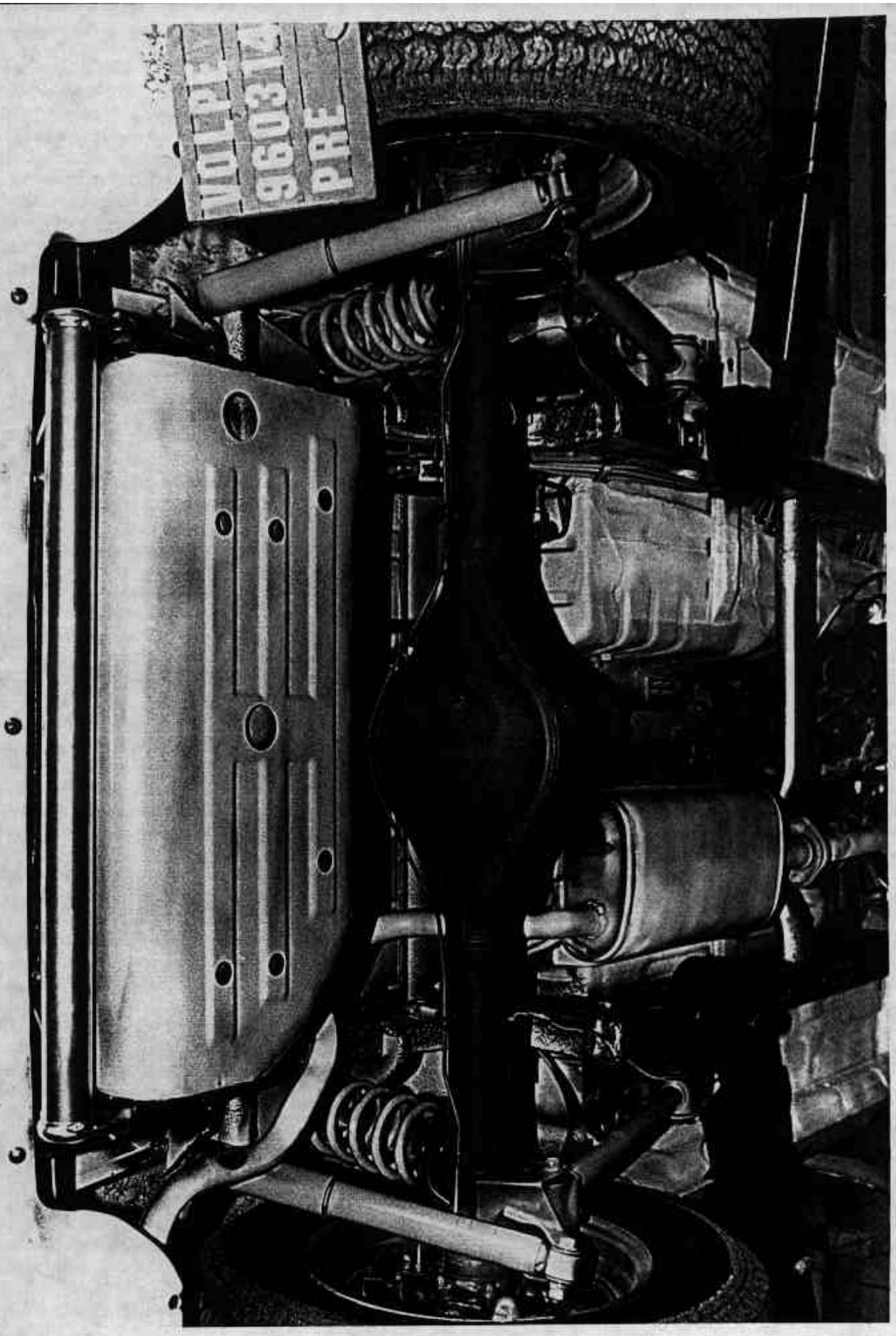


Figure A-20 Pre-Test Rear Underbody View

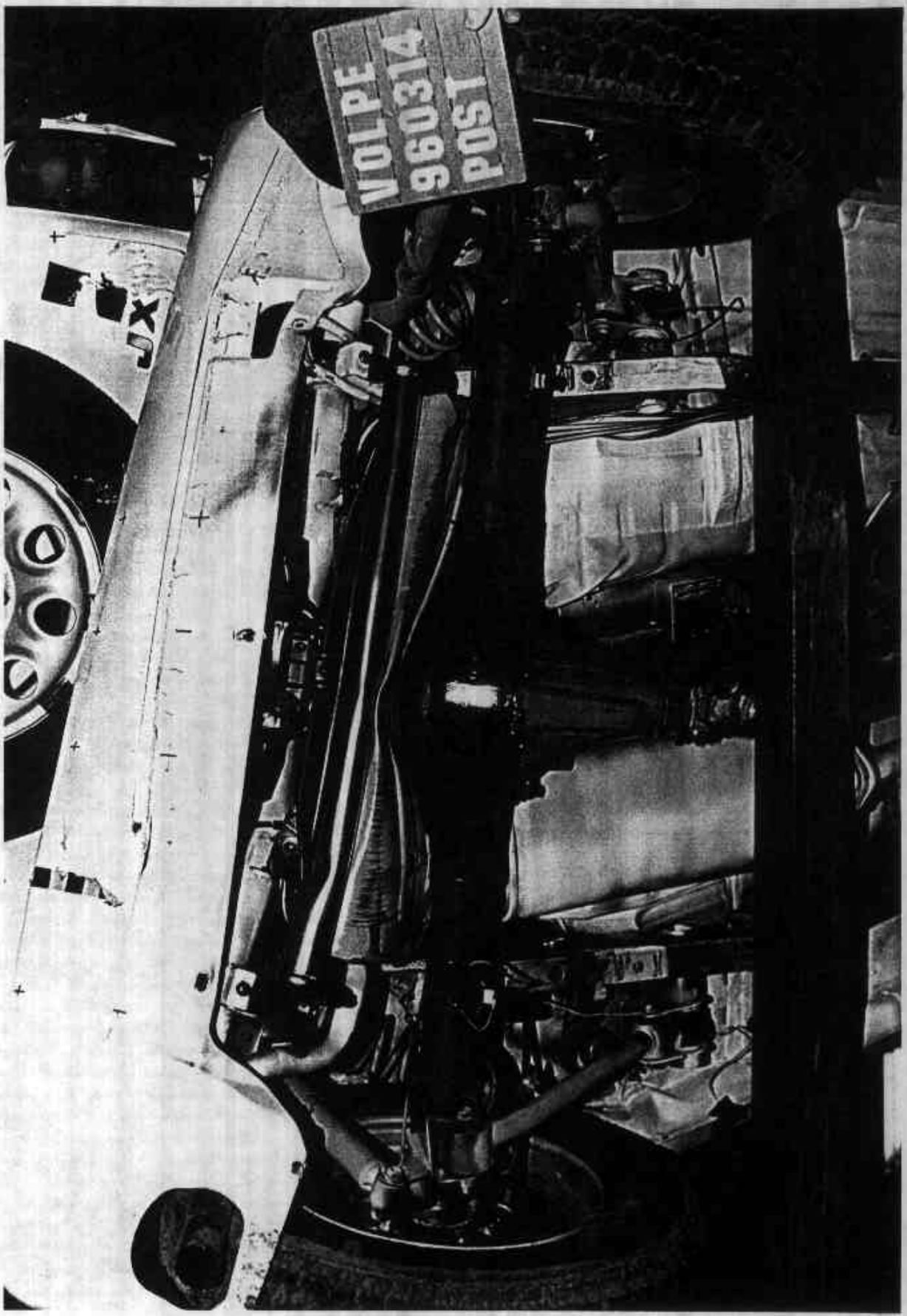


Figure A-21 Post-Test Rear Underbody View

Figure A-22 Pre-Test Windshield View

Figure A-23 Post-Test Windshield View

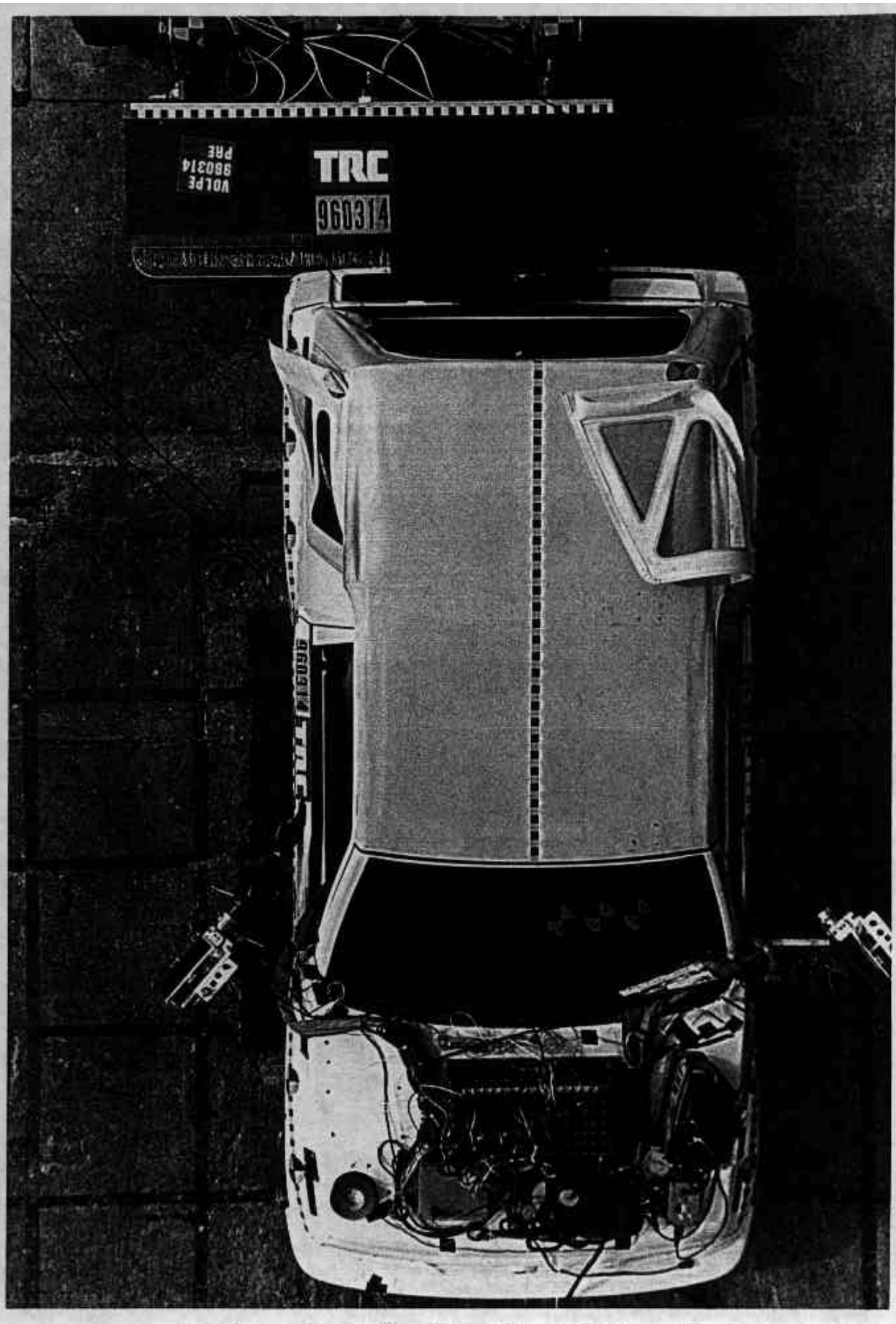


Figure A-24 Pre-Test Barrier to Vehicle Alignment Overhead - View 1

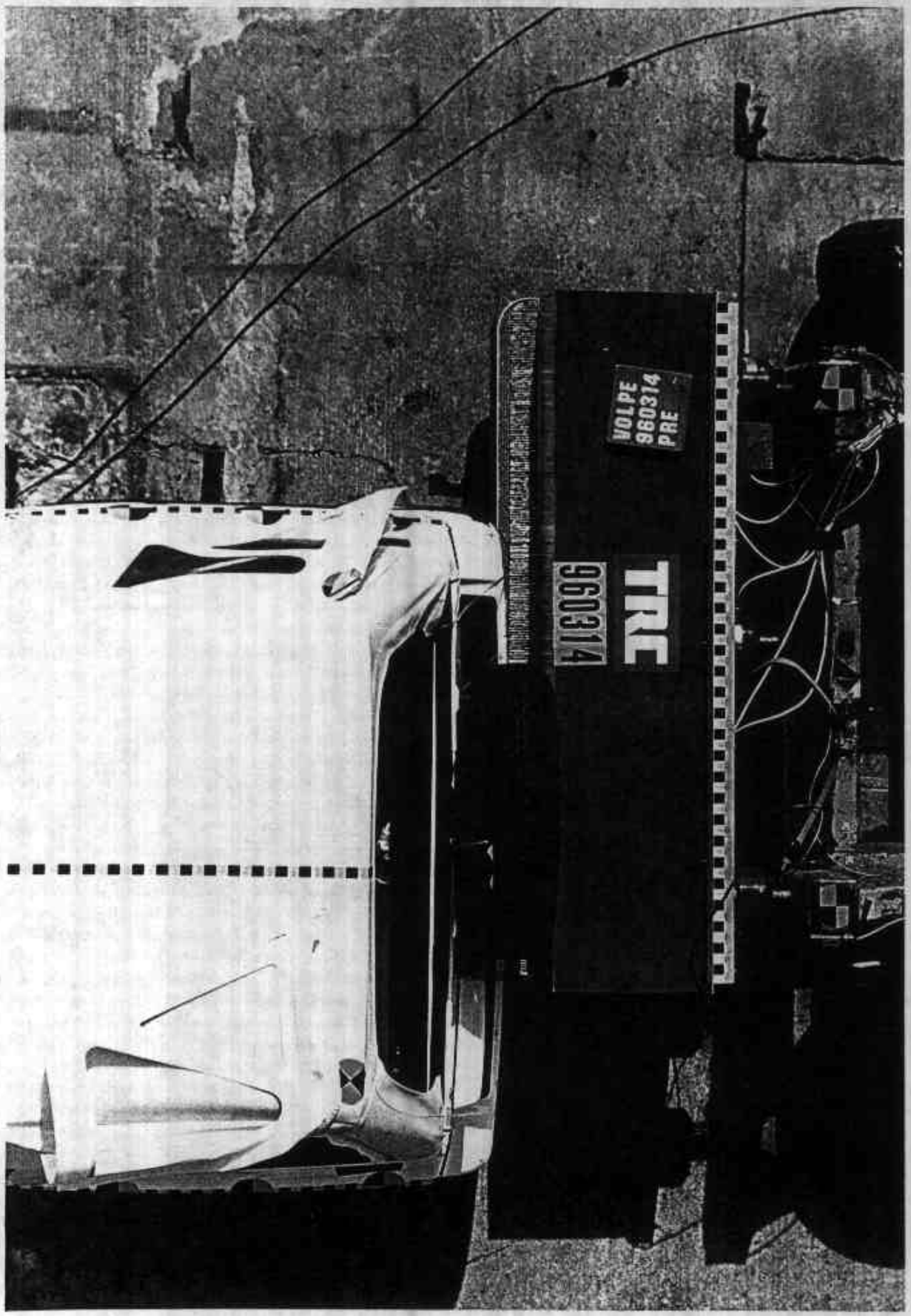


Figure A-25 Pre-Test Barrier to Vehicle Alignment Overhead - View 2

Figure A-26 Pre-Test Driver Dummy Position View

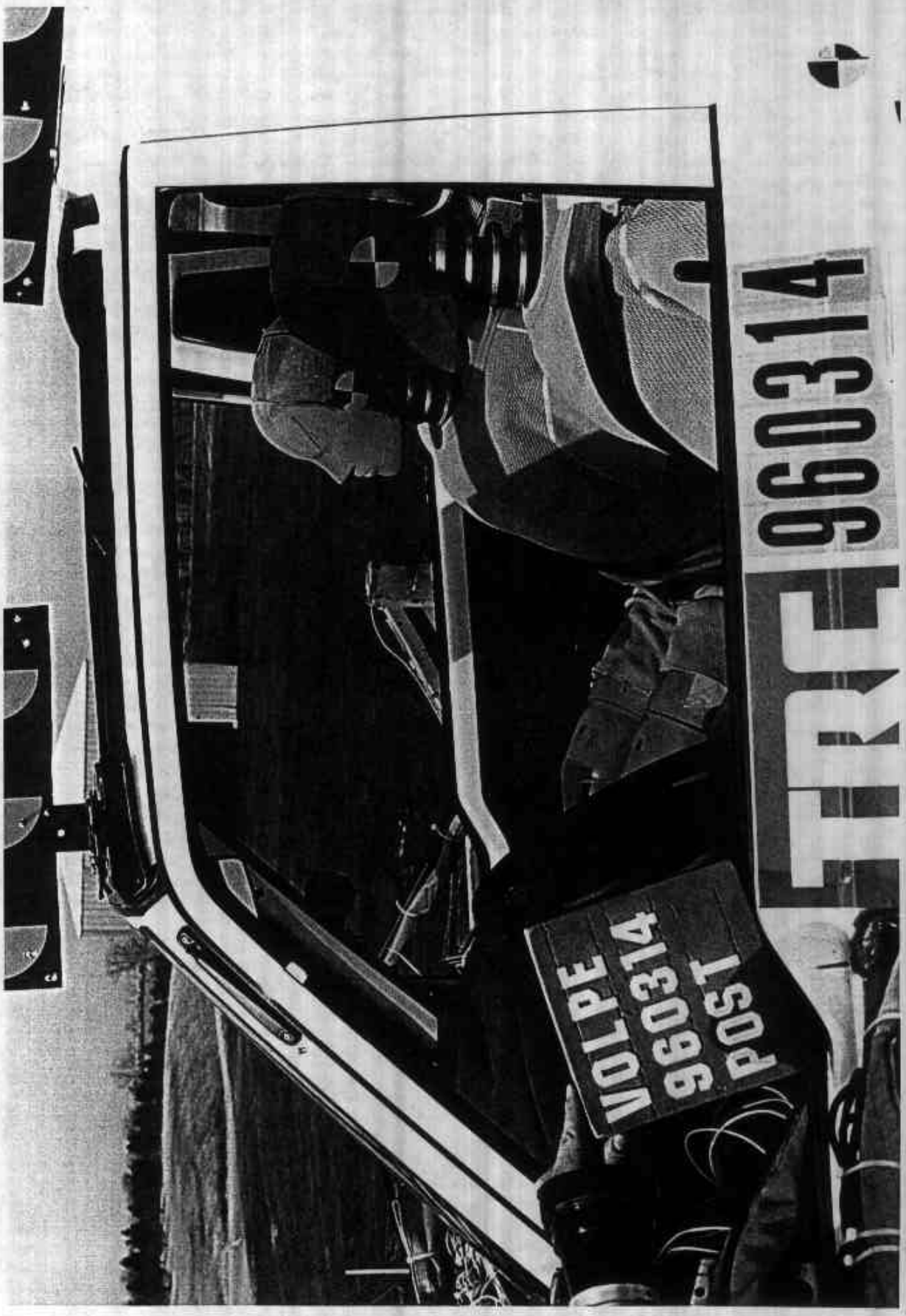


Figure A-27 Post-Test Driver Dummy Position View

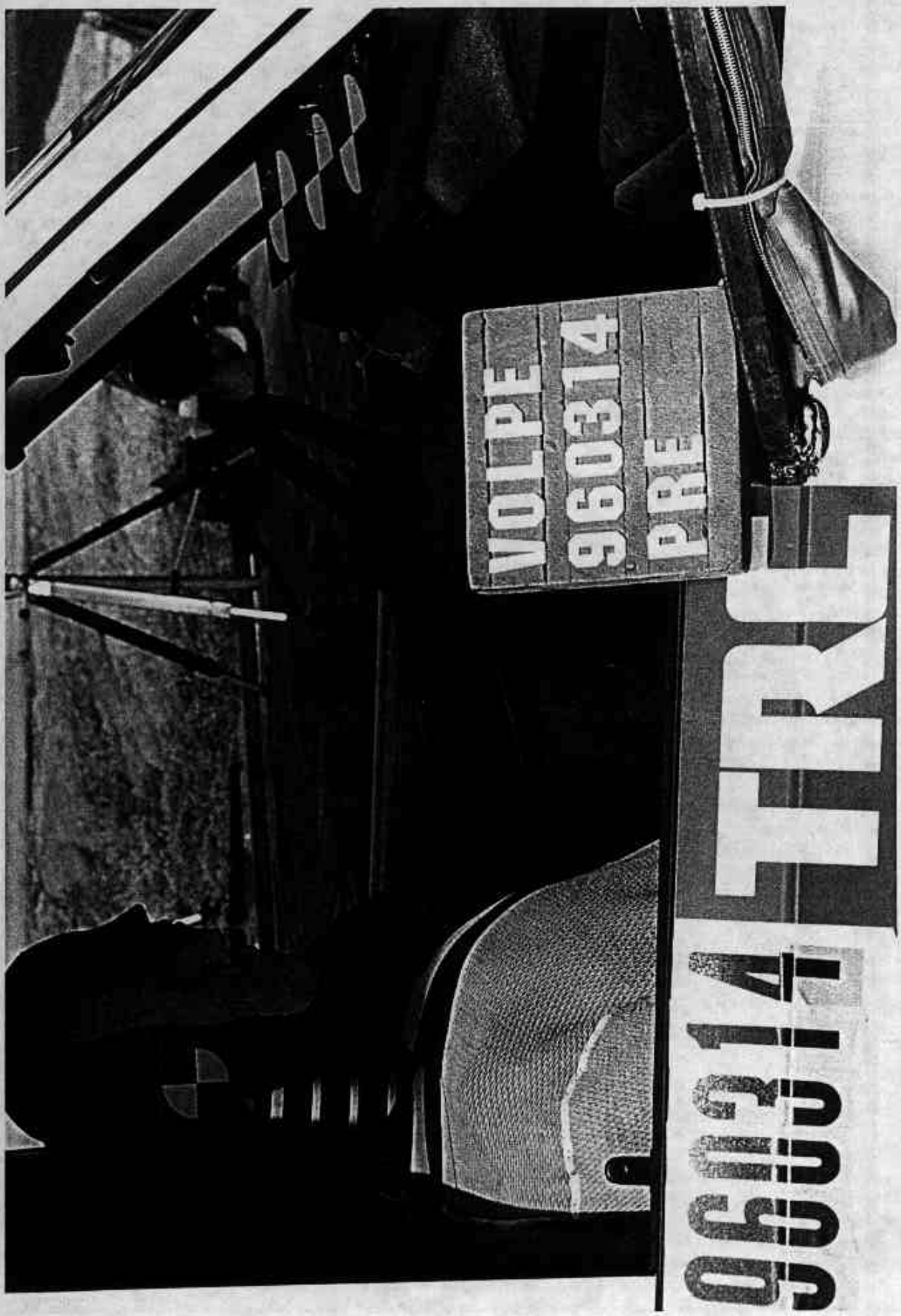


Figure A-28 Pre-Test Passenger Dummy Position View

Figure A-29 Post-Test Passenger Dummy Position View

Figure A-30 Pre-Test Driver Dummy & Vehicle Interior - View 1

Figure A-31 Post-Test Driver Dummy & Vehicle Interior - View 1

Figure A-32 Pre-Test Driver Dummy & Vehicle Interior - View 2

Figure A-33 Post-Test Driver Dummy & Vehicle Interior - View 2

Figure A-34 Pre-Test Passenger Dummy & Vehicle Interior - View 1

Figure A-35 Post-Test Passenger Dummy & Vehicle Interior - View 1

Figure A-36 Pre-Test Passenger Dummy & Vehicle Interior - View 2

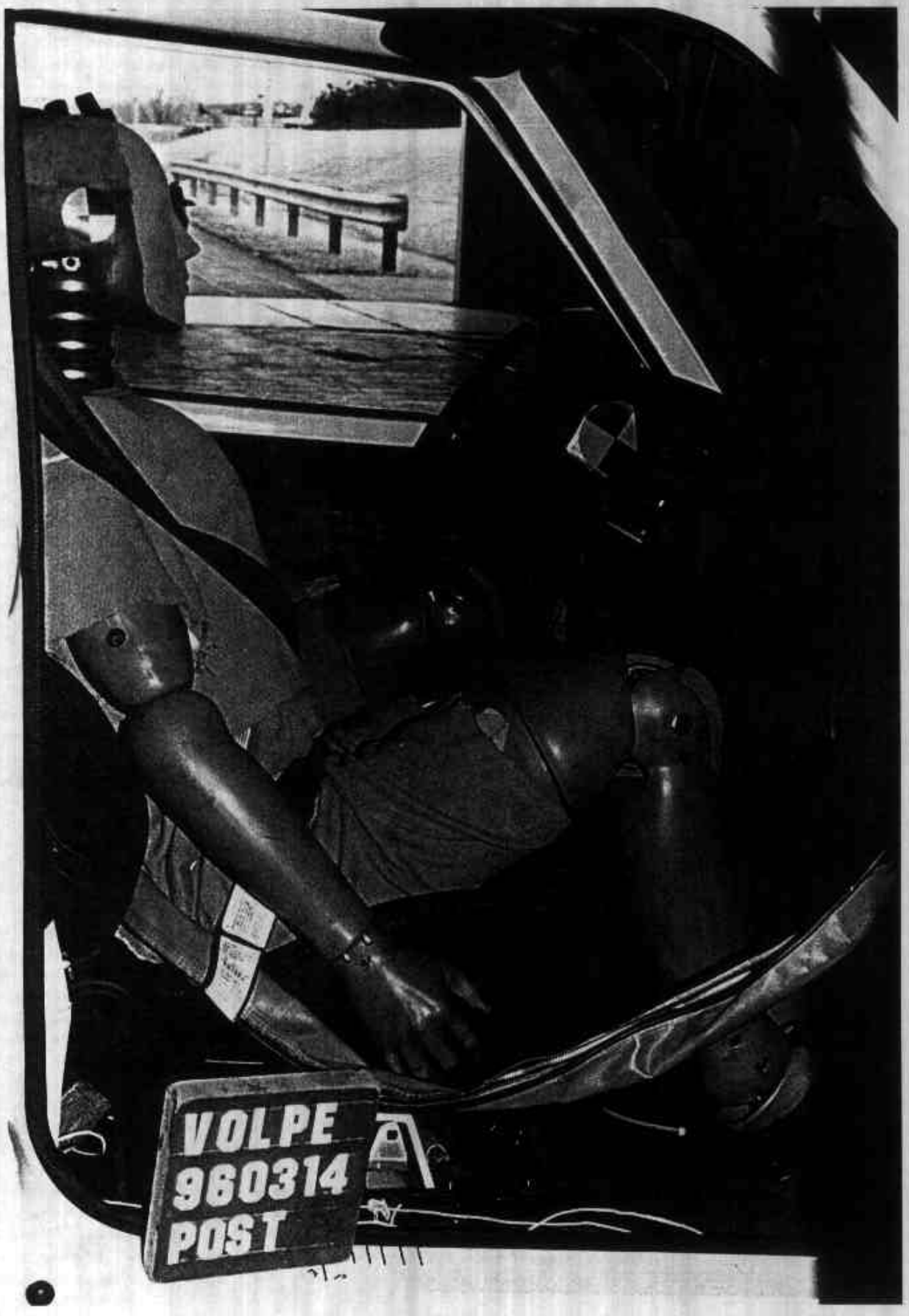


Figure A-37 Post-Test Passenger Dummy & Vehicle Interior - View 2

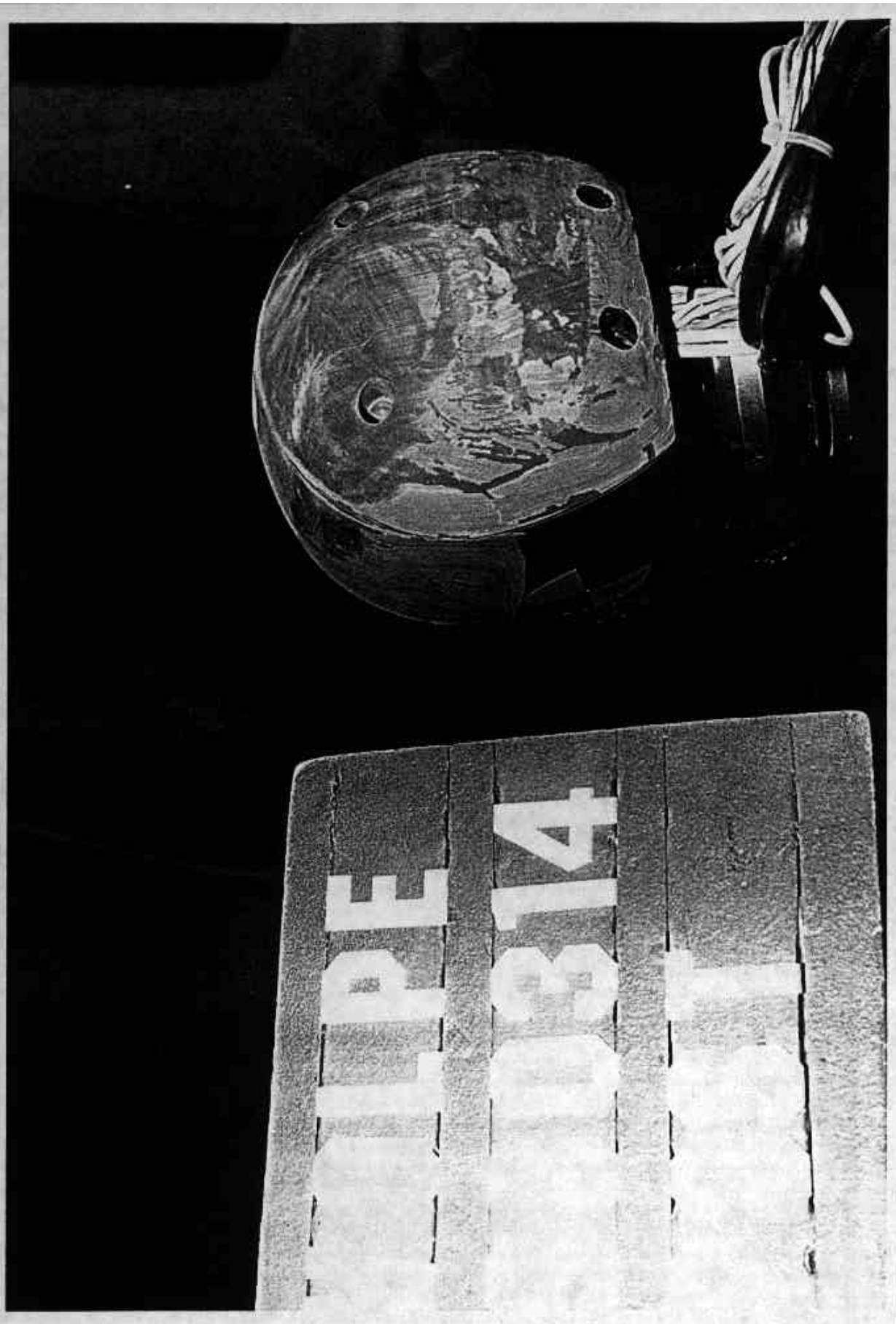


Figure A-38 Post-Test Driver Dummy Head Contact - View 1

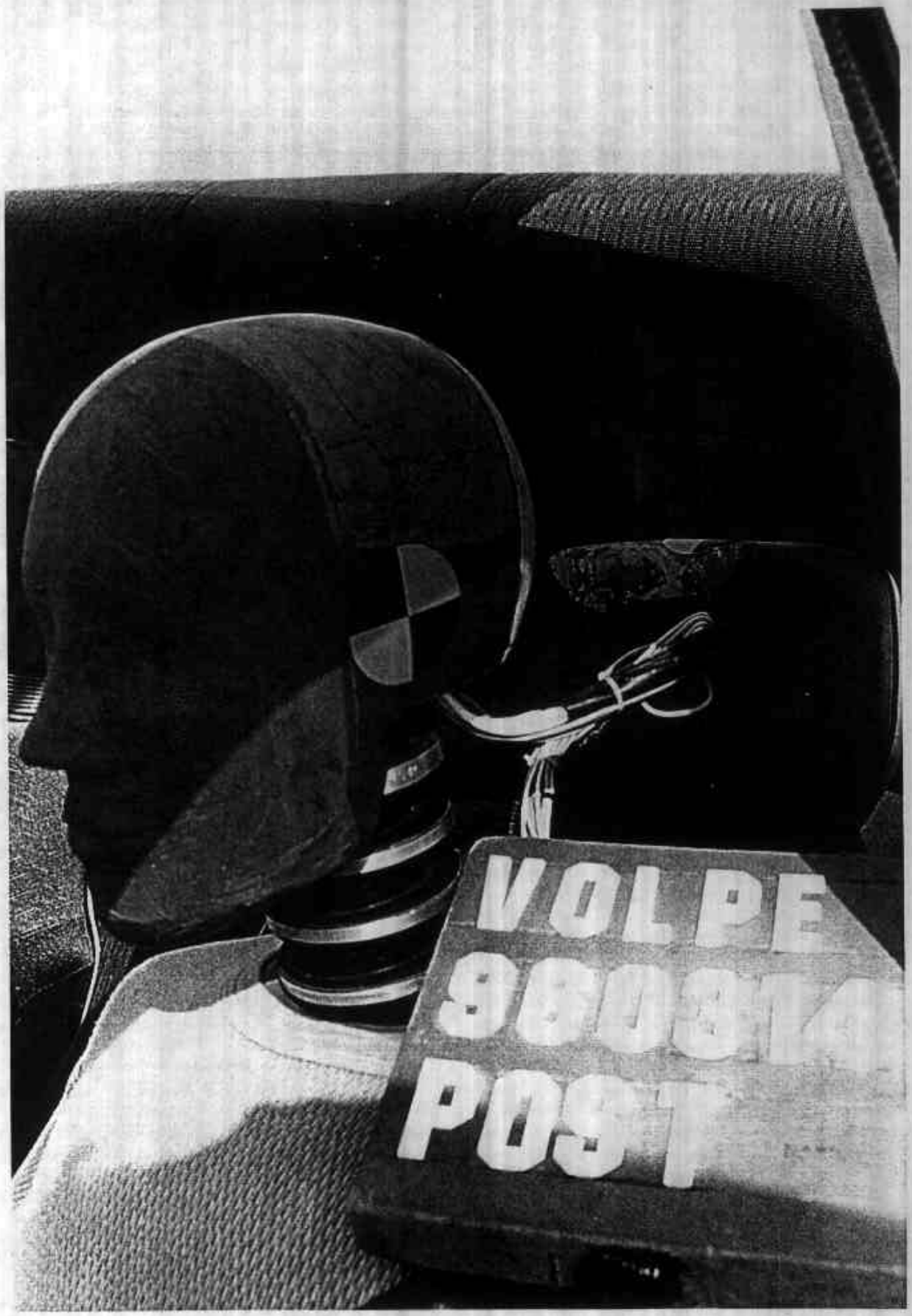


Figure A-39 Post-Test Driver Dummy Head Contact - View 2

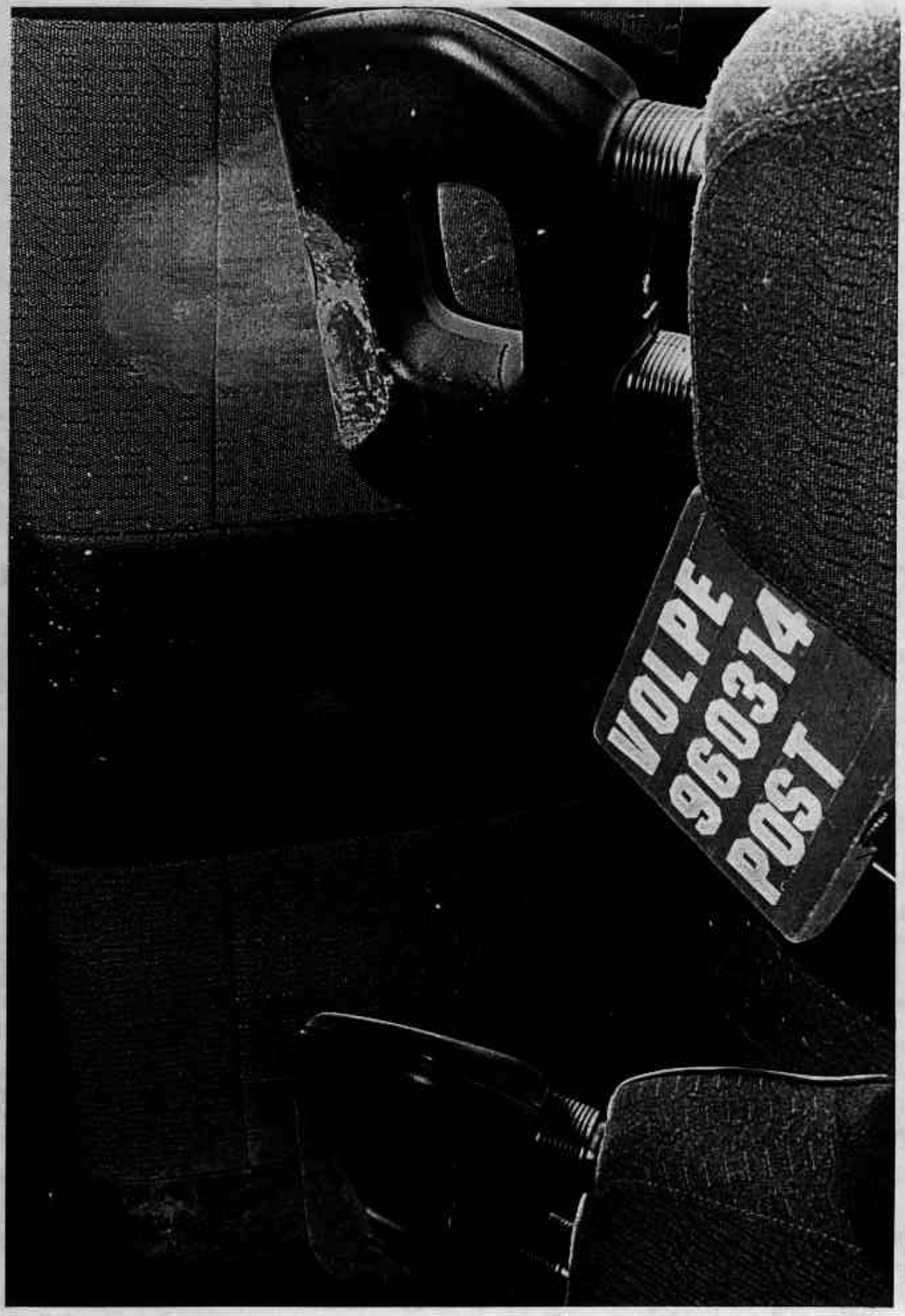


Figure A-40 Post-Test Driver Dummy Head Contact - View 3

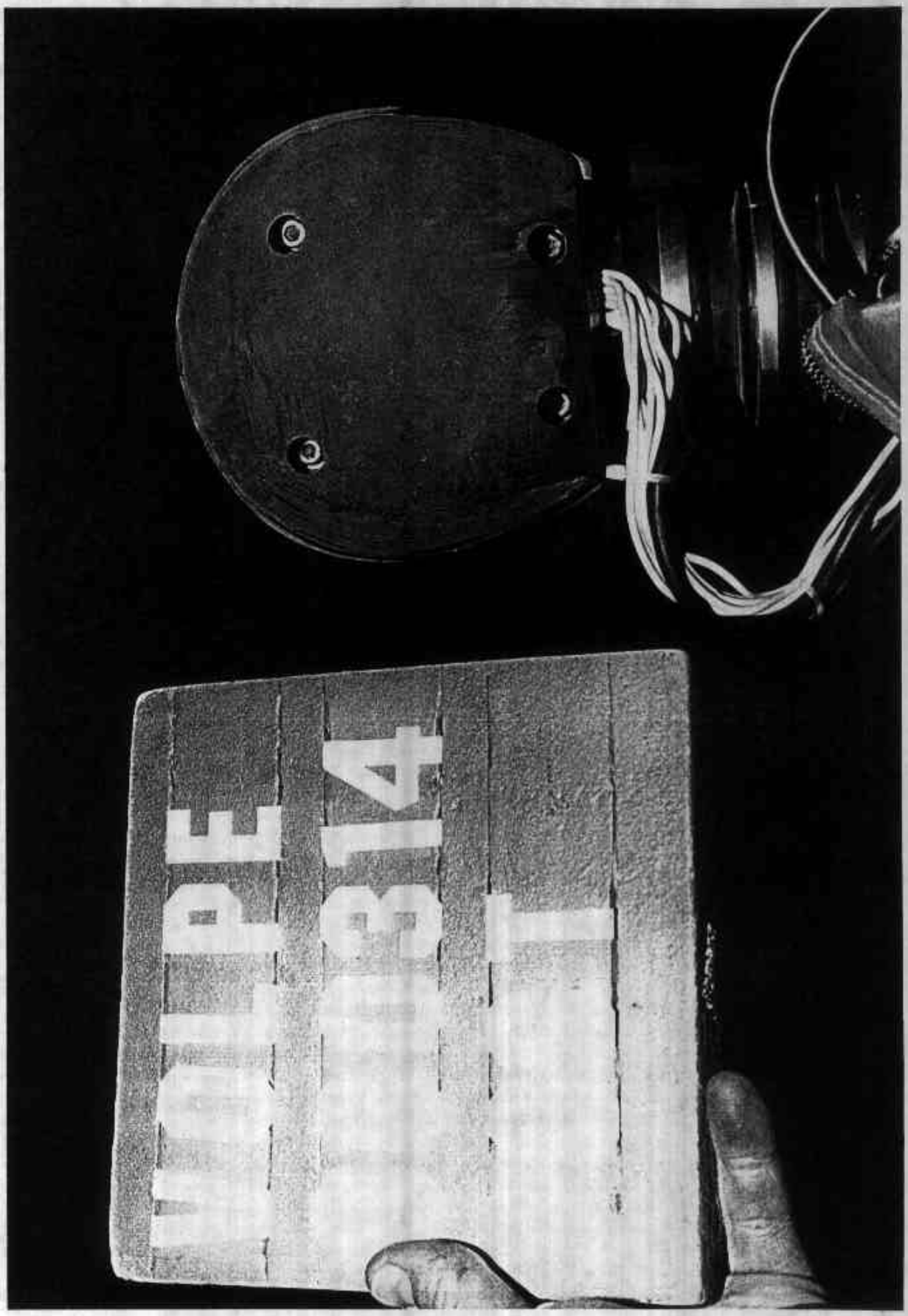


Figure A-41 Post-Test Passenger Dummy Head Contact - View 1

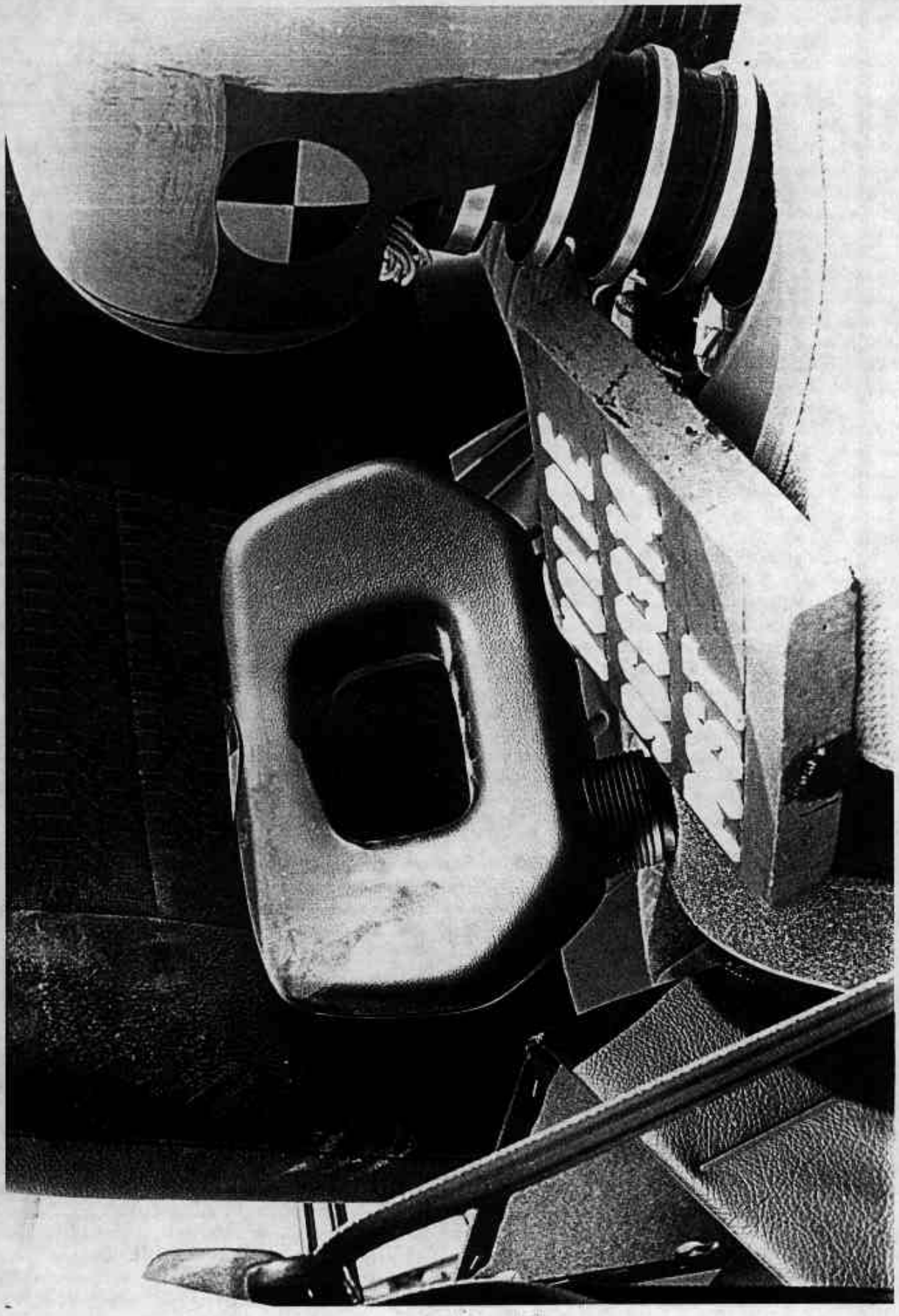


Figure A-42 Post-Test Passenger Dummy Head Contact - View 2

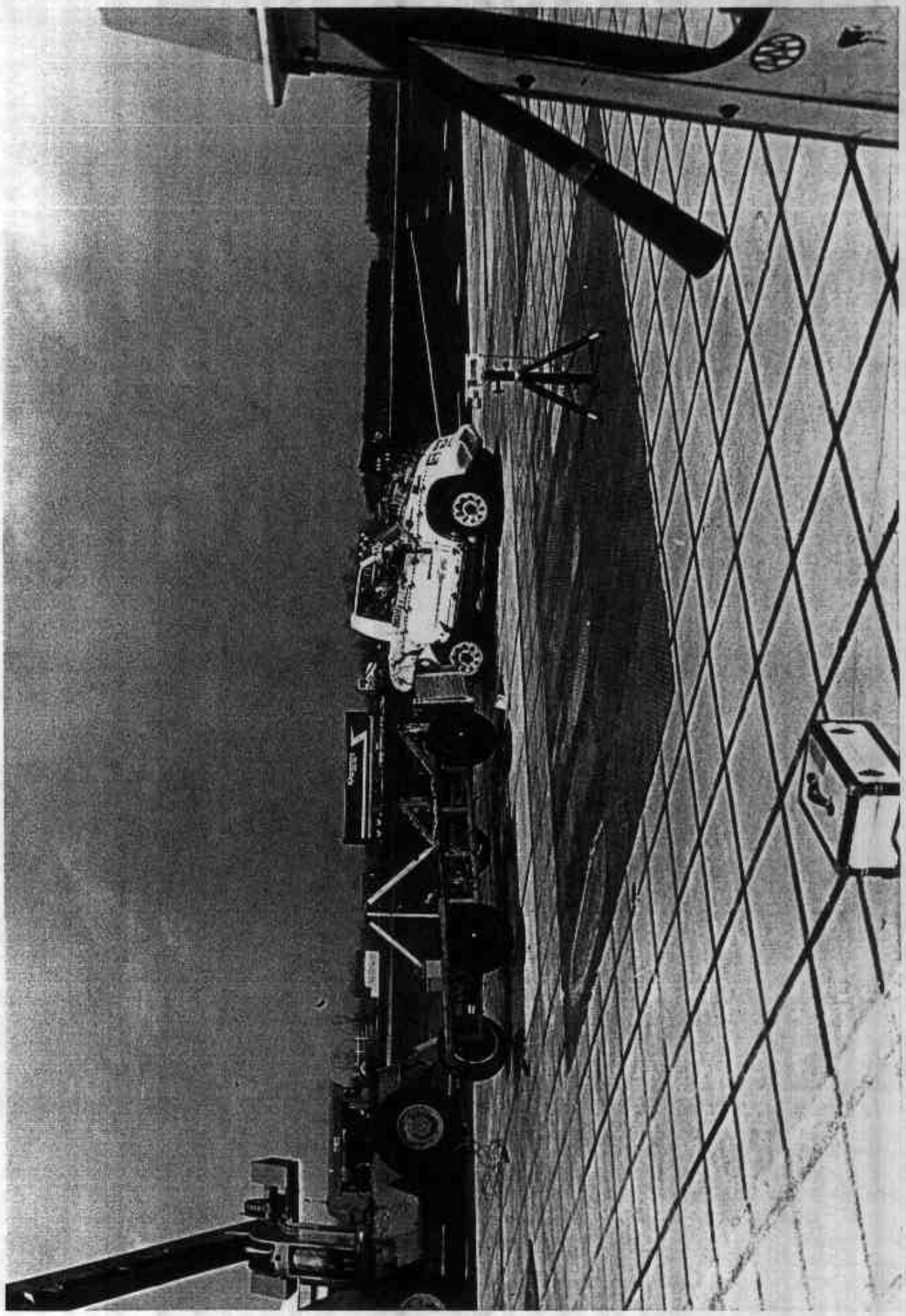


Figure A-43 Impact Event

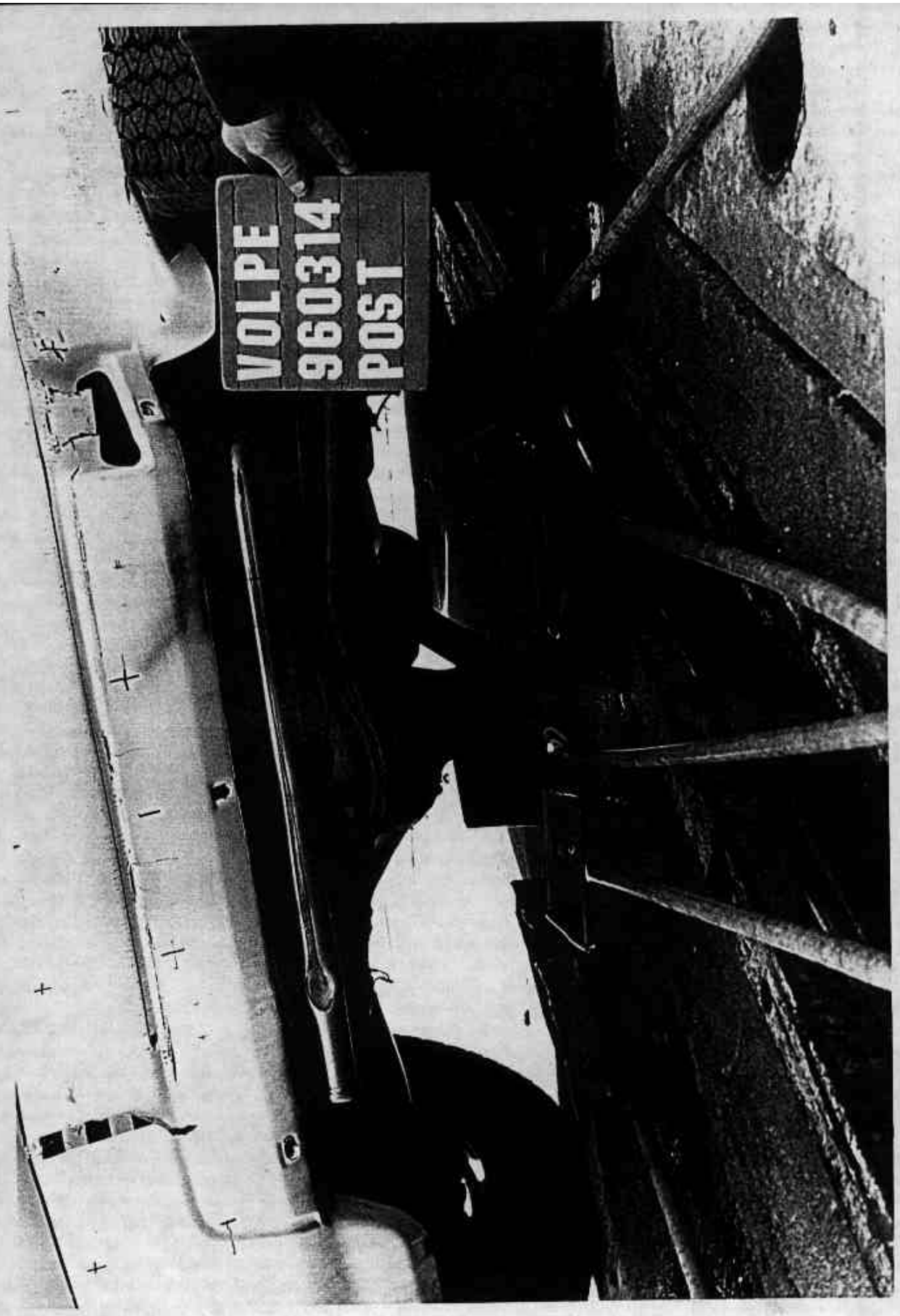
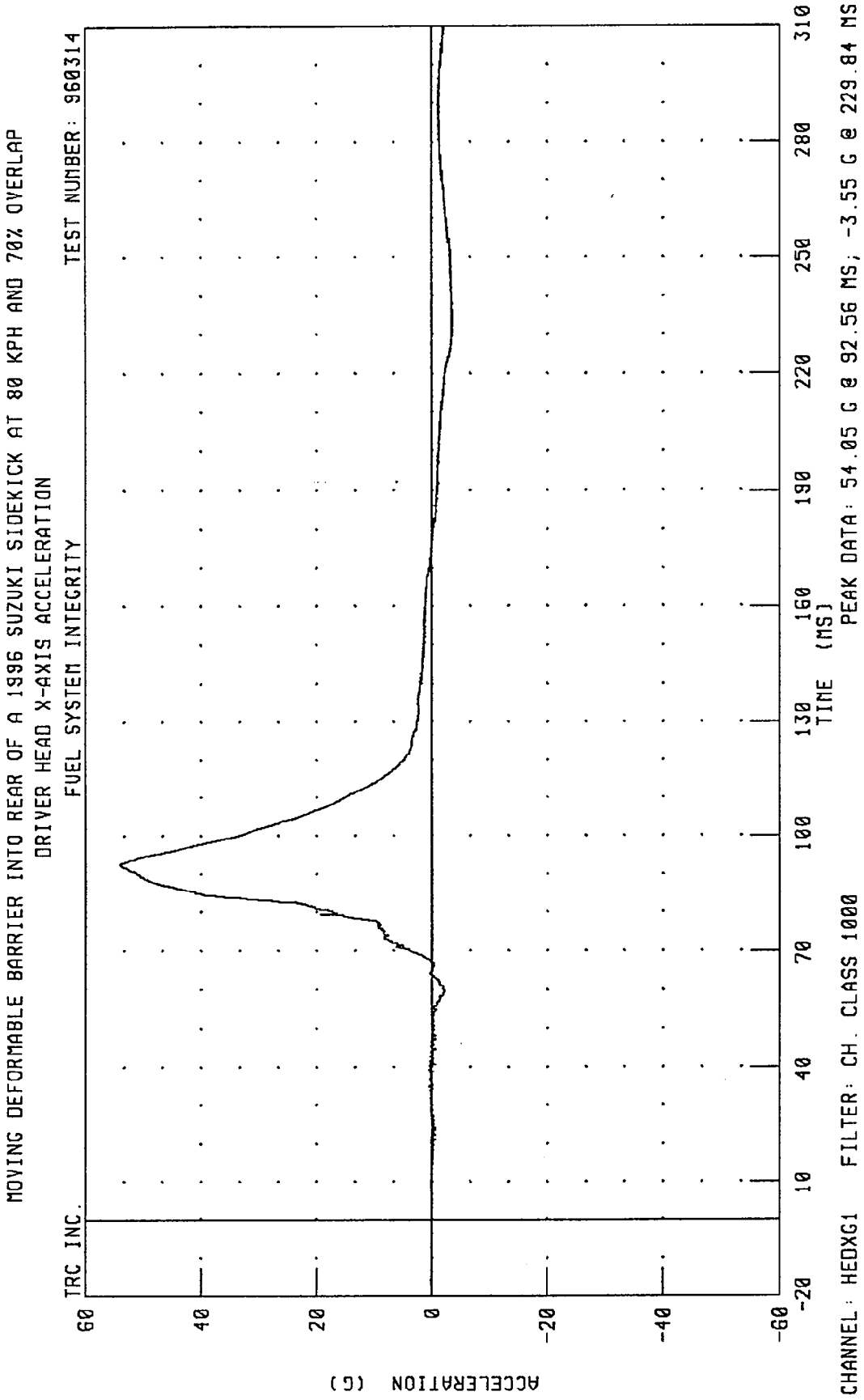


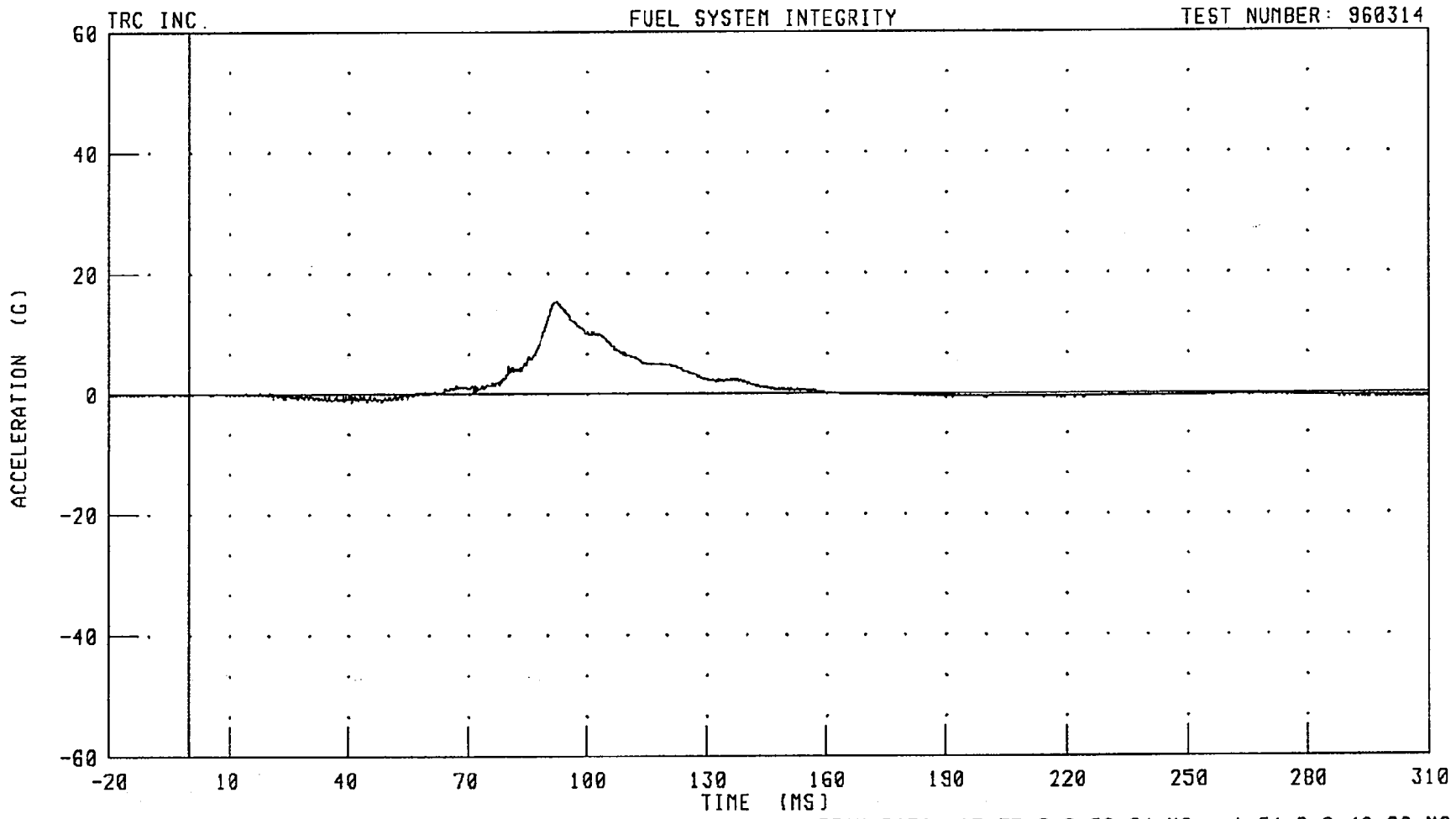
Figure A-44 Post-Test Vehicle Fuel System Fluid Spillage

Appendix B

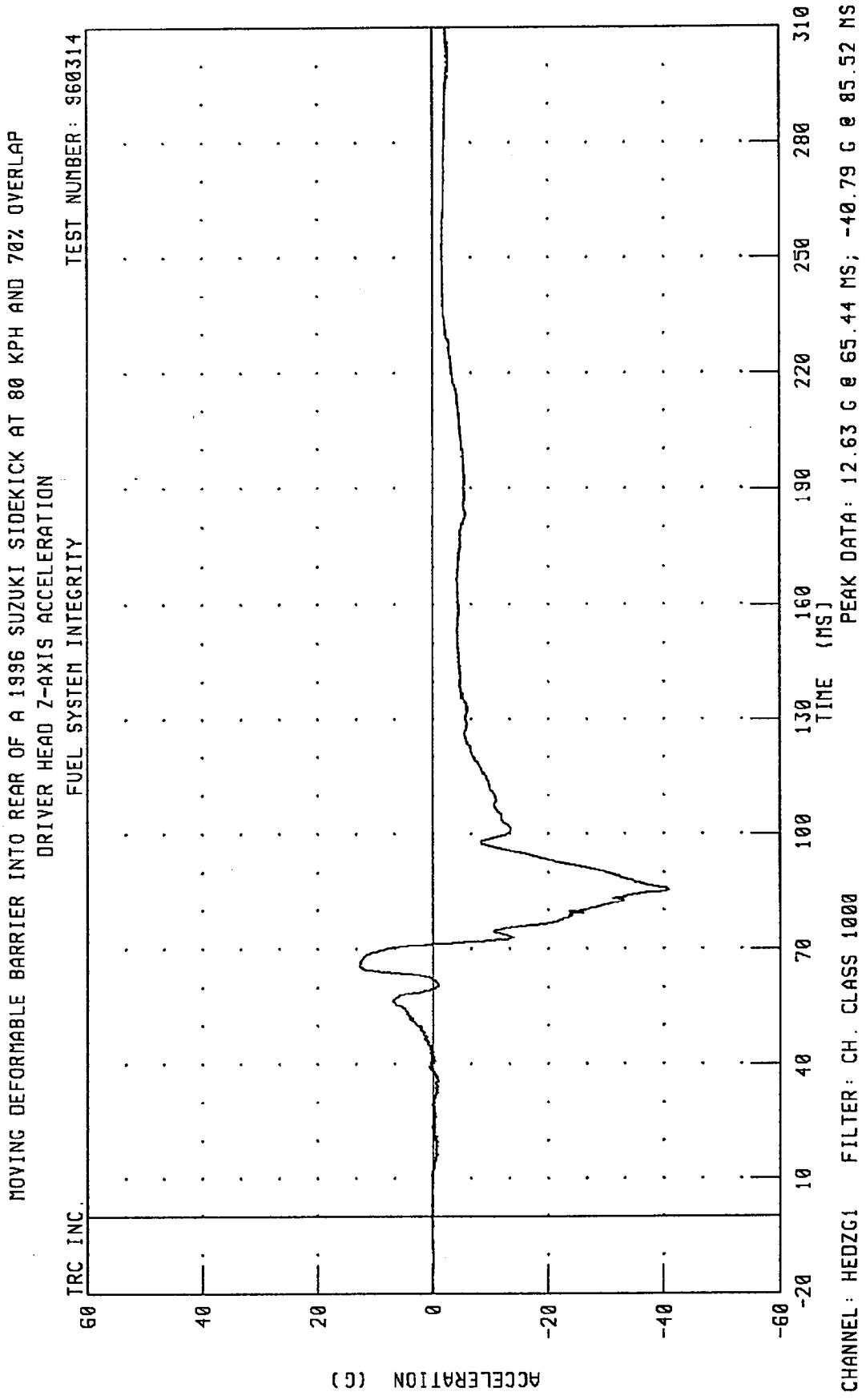
Data Plots

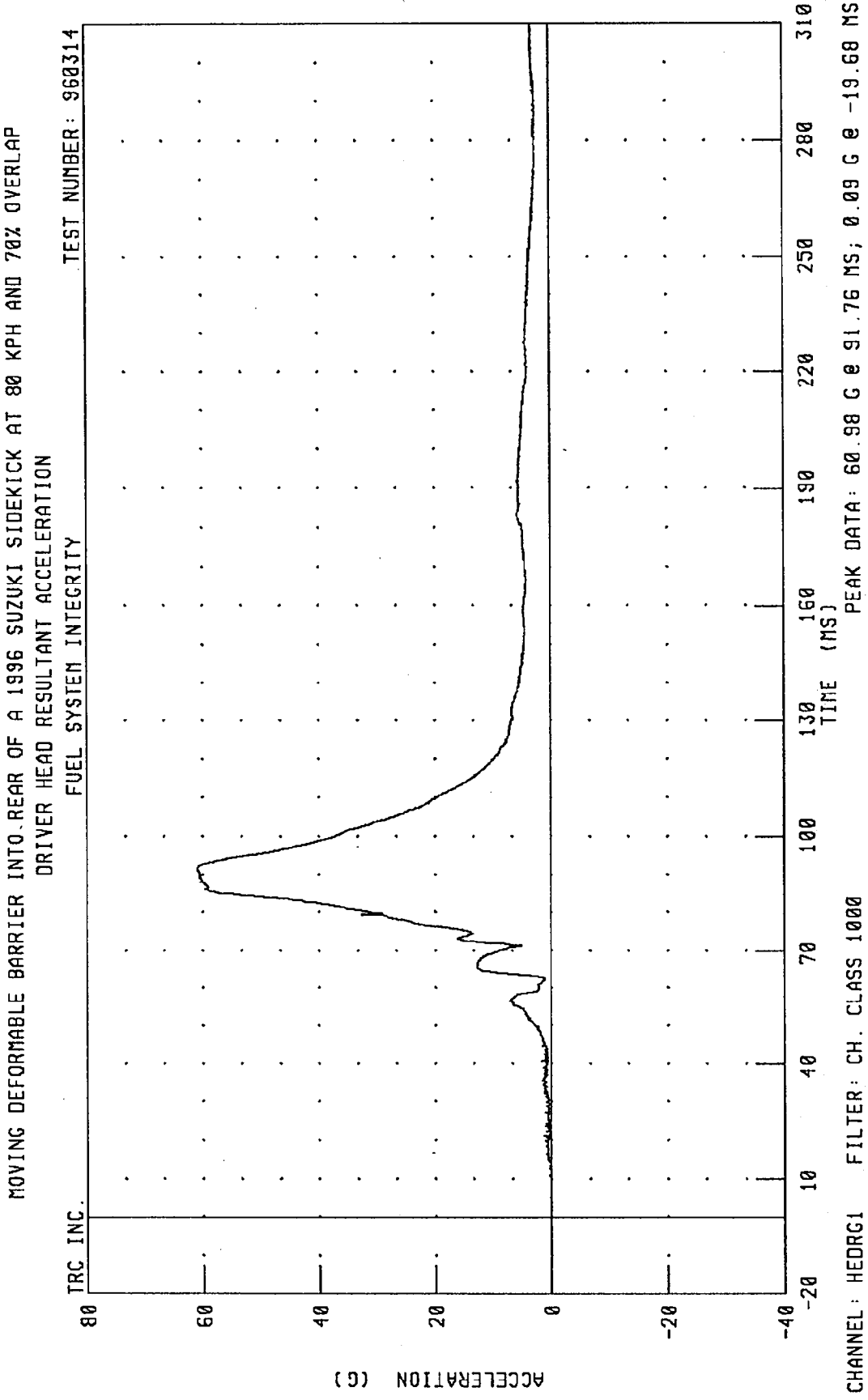

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDXG1 FILTER: CH. CLASS 1000
PEAK DATA: 54.05 G @ 92.56 MS; -3.55 G @ 229.84 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD Y-AXIS ACCELERATION

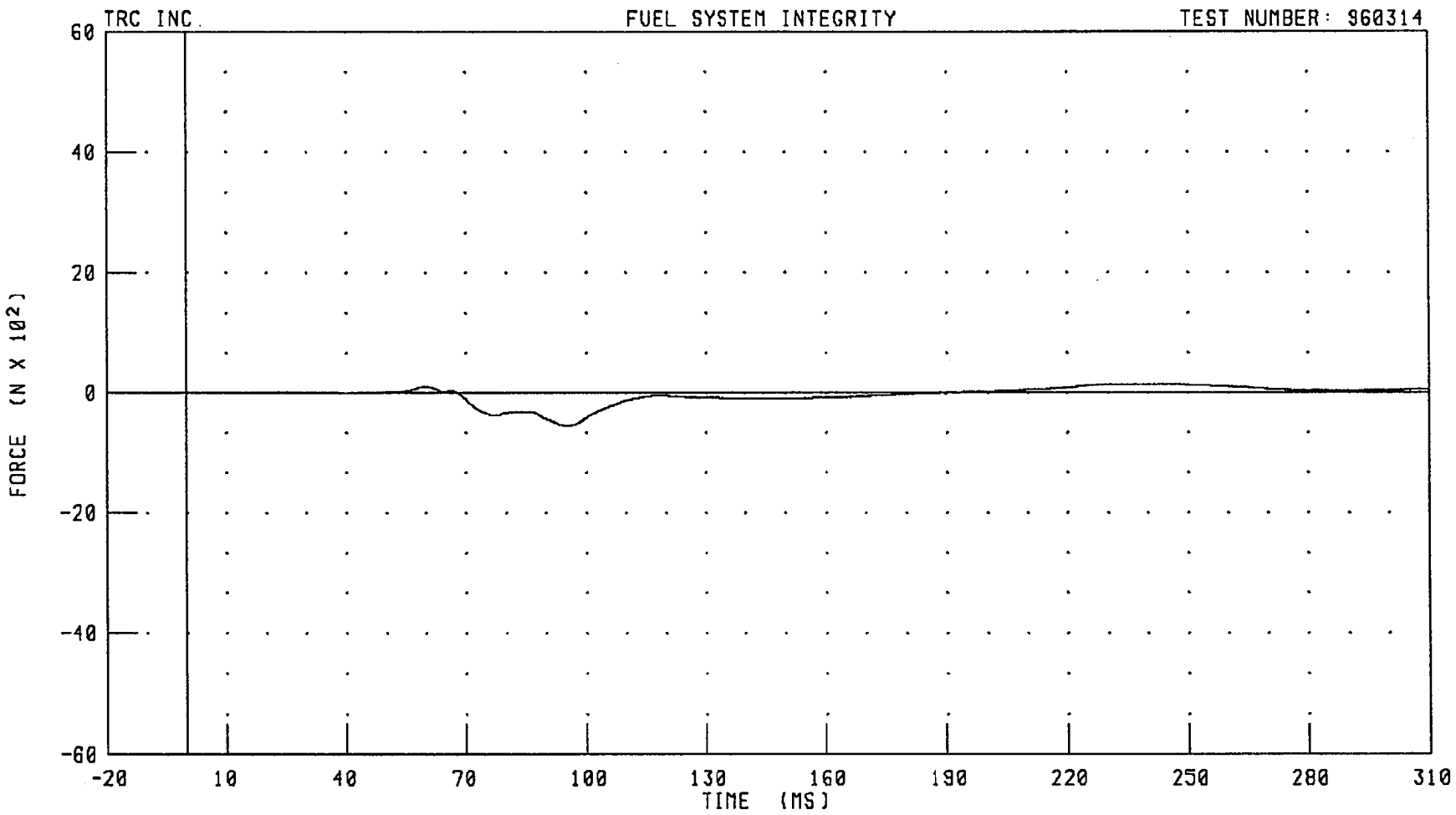


960314


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD Z-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TRC INC.
TEST NUMBER: 960314
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG1 FILTER: CH. CLASS 1000
PEAK DATA: 12.63 G @ 65.44 MS; -40.79 G @ 85.52 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD RESULTANT ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
80
60
40
20
0
-20
-40
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 60.98 G @ 91.76 MS; 0.09 G @ -19.68 MS
CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK X-AXIS SHEAR FORCE



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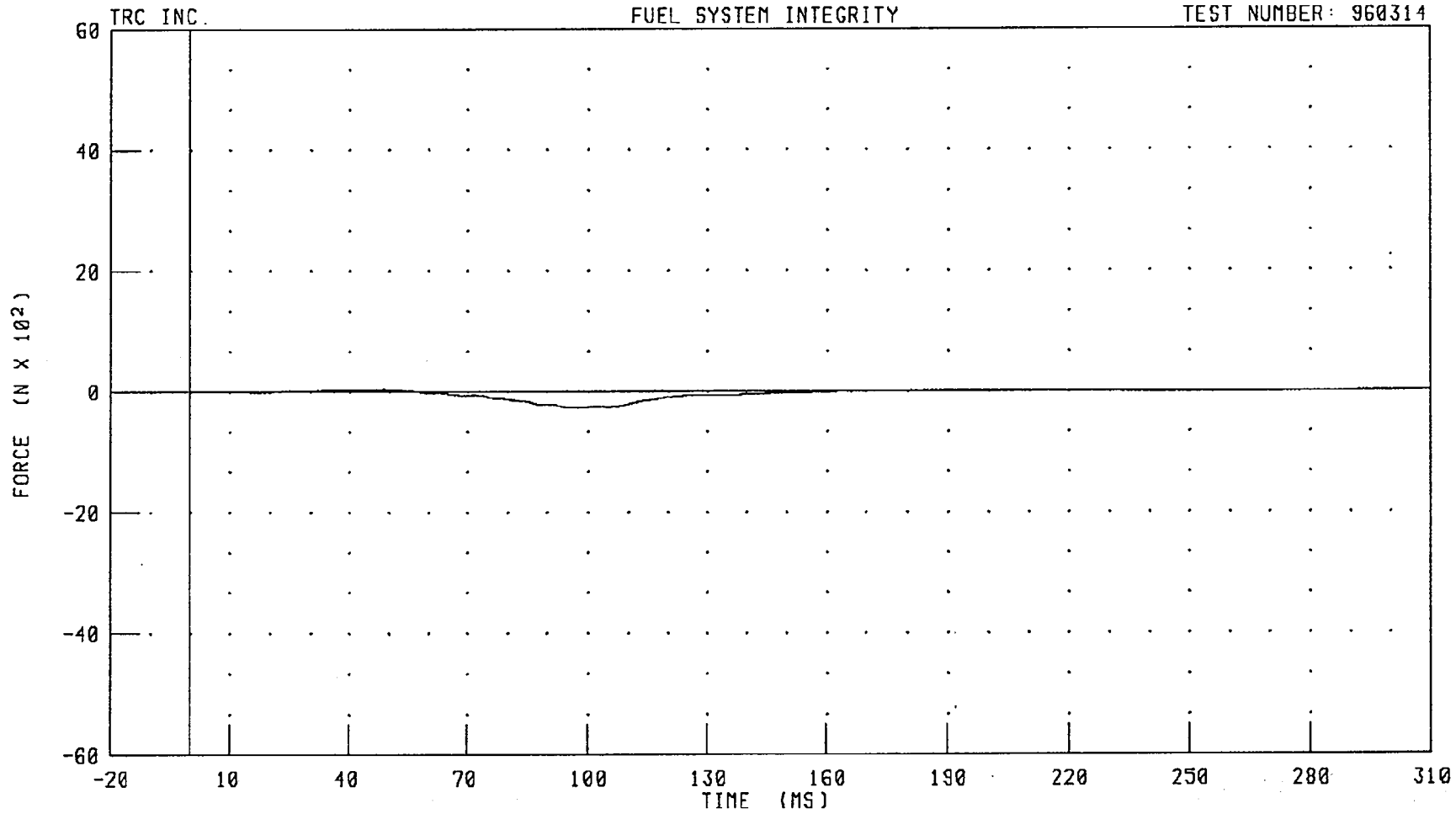
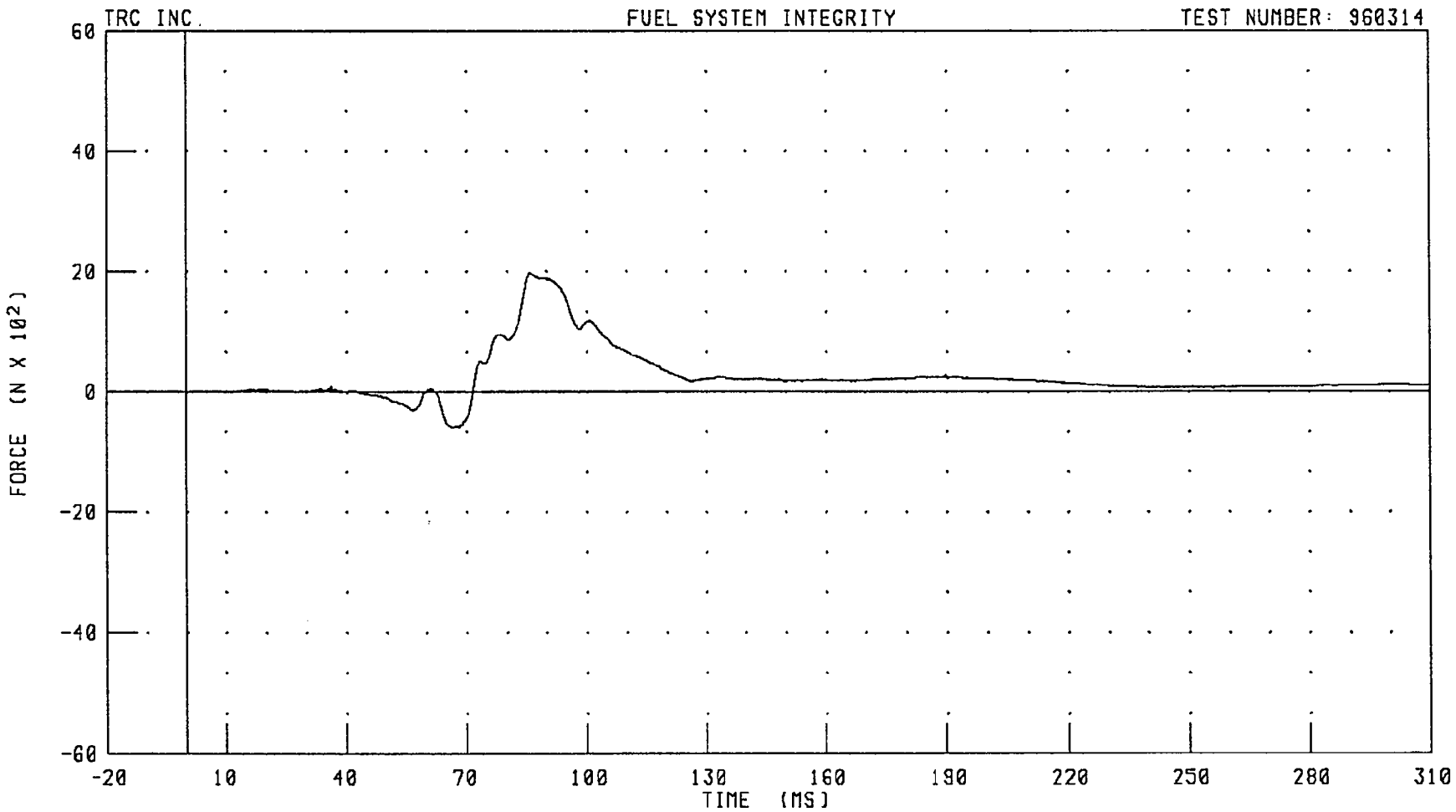
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK Y-AXIS SHEAR FORCE



CHANNEL: NEKYF1 FILTER: CH. CLASS 1000 PEAK DATA: 47.31 N @ 48.72 MS; -274.30 N @ 95.28 MS

960314

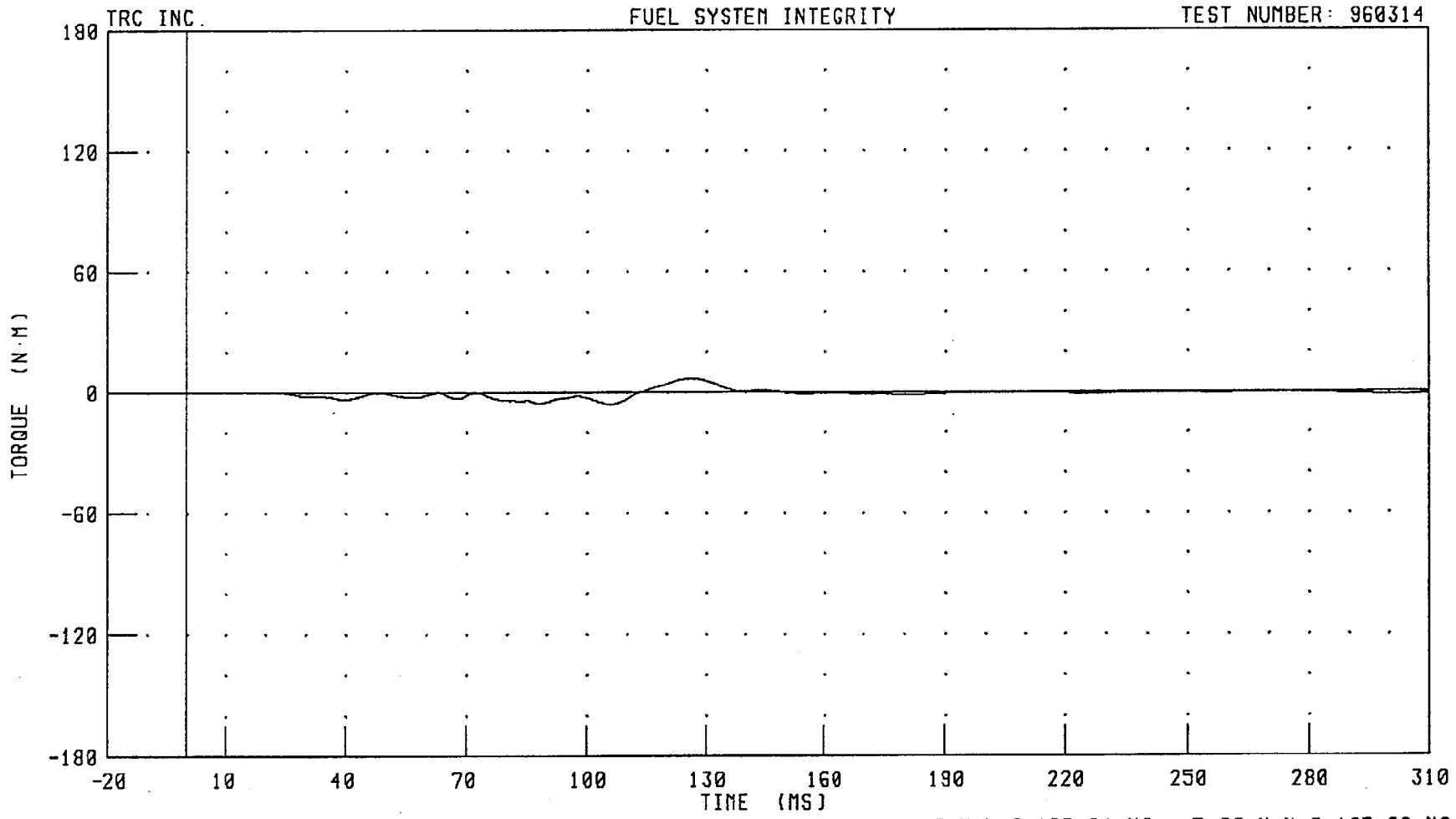
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK Z-AXIS AXIAL FORCE



CHANNEL: NEKZF1 FILTER: CH. CLASS 1000 PEAK DATA: 1980.00 N @ 86.08 MS; -606.68 N @ 66.56 MS

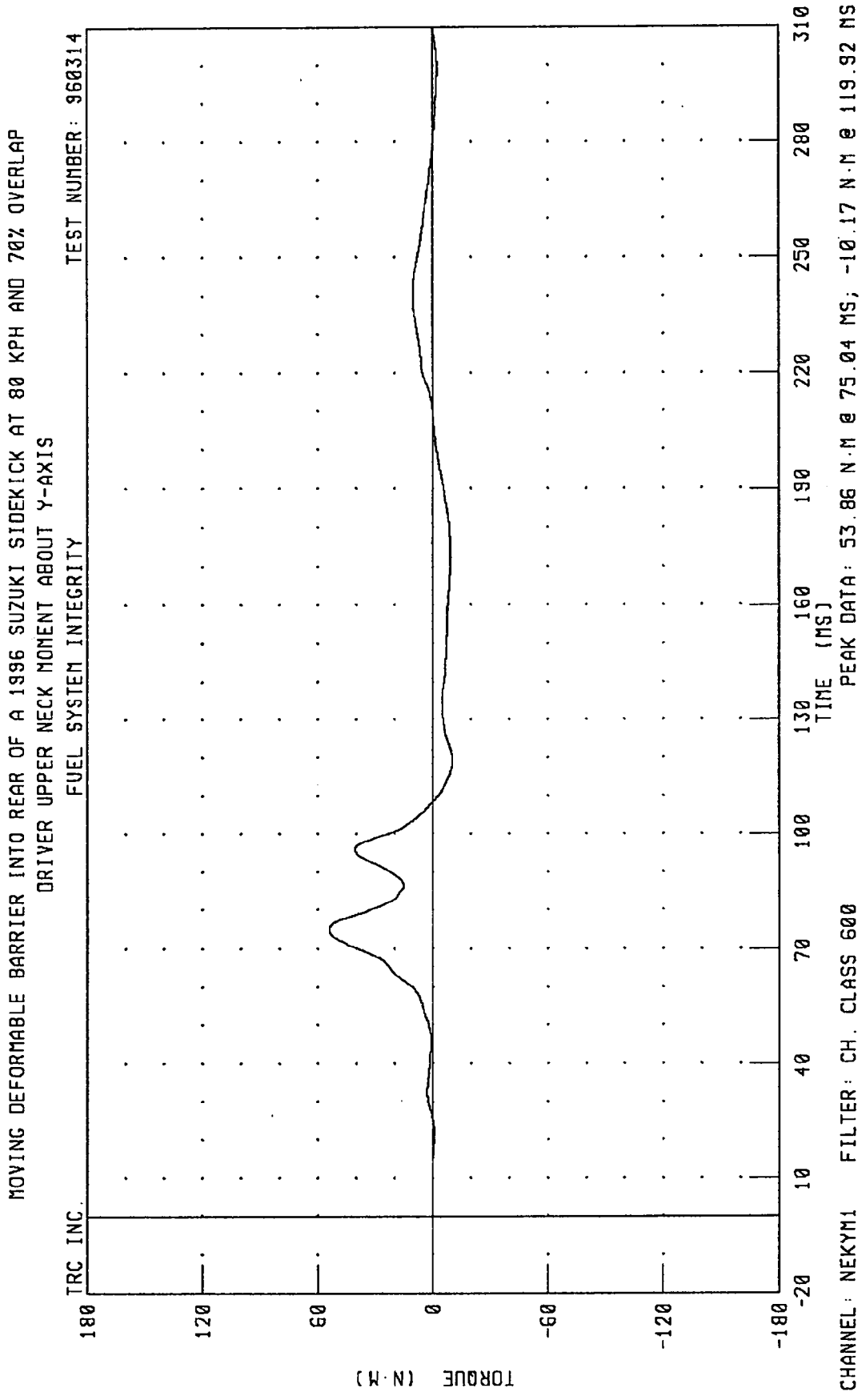
960314

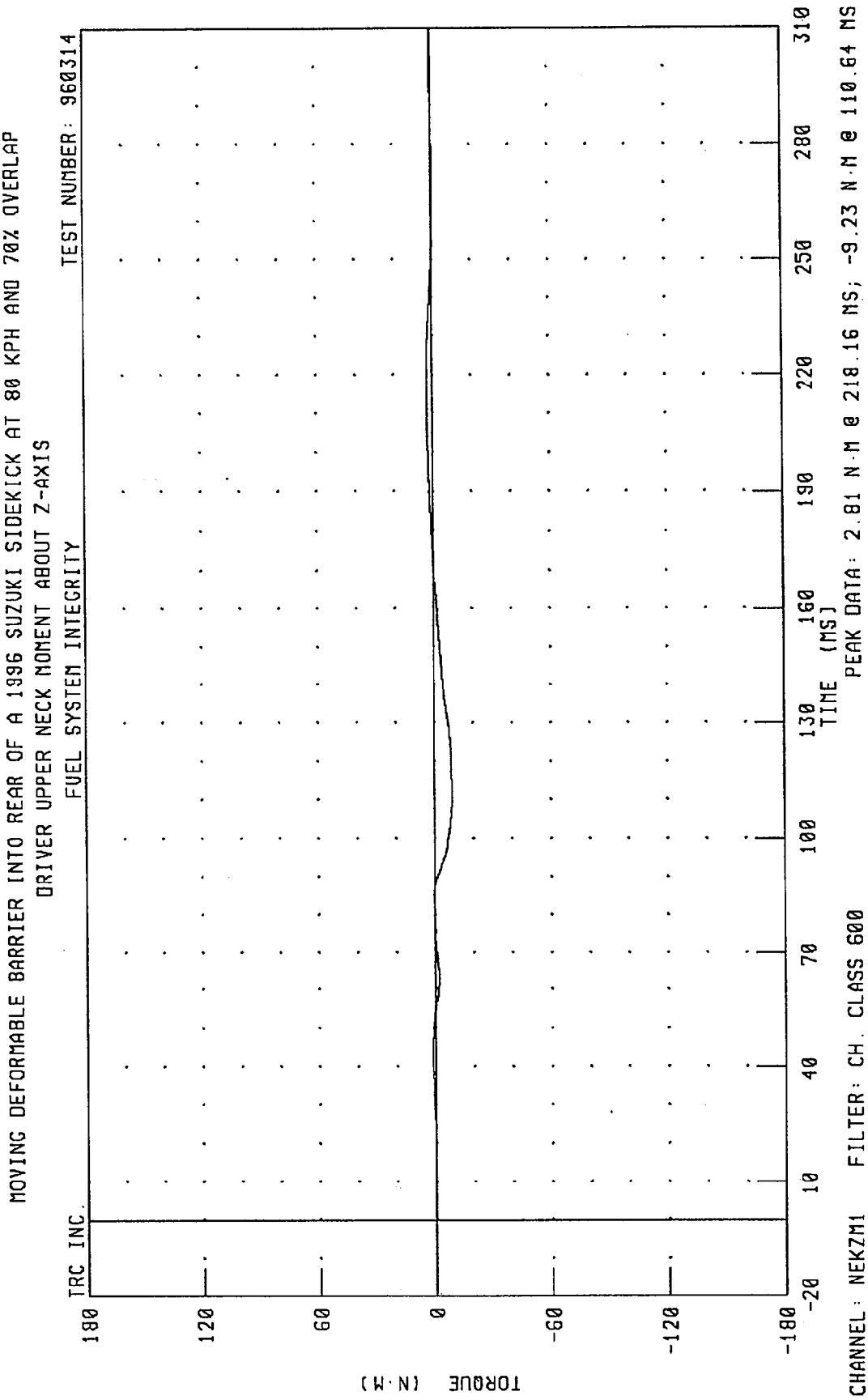
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK MOMENT ABOUT X-AXIS

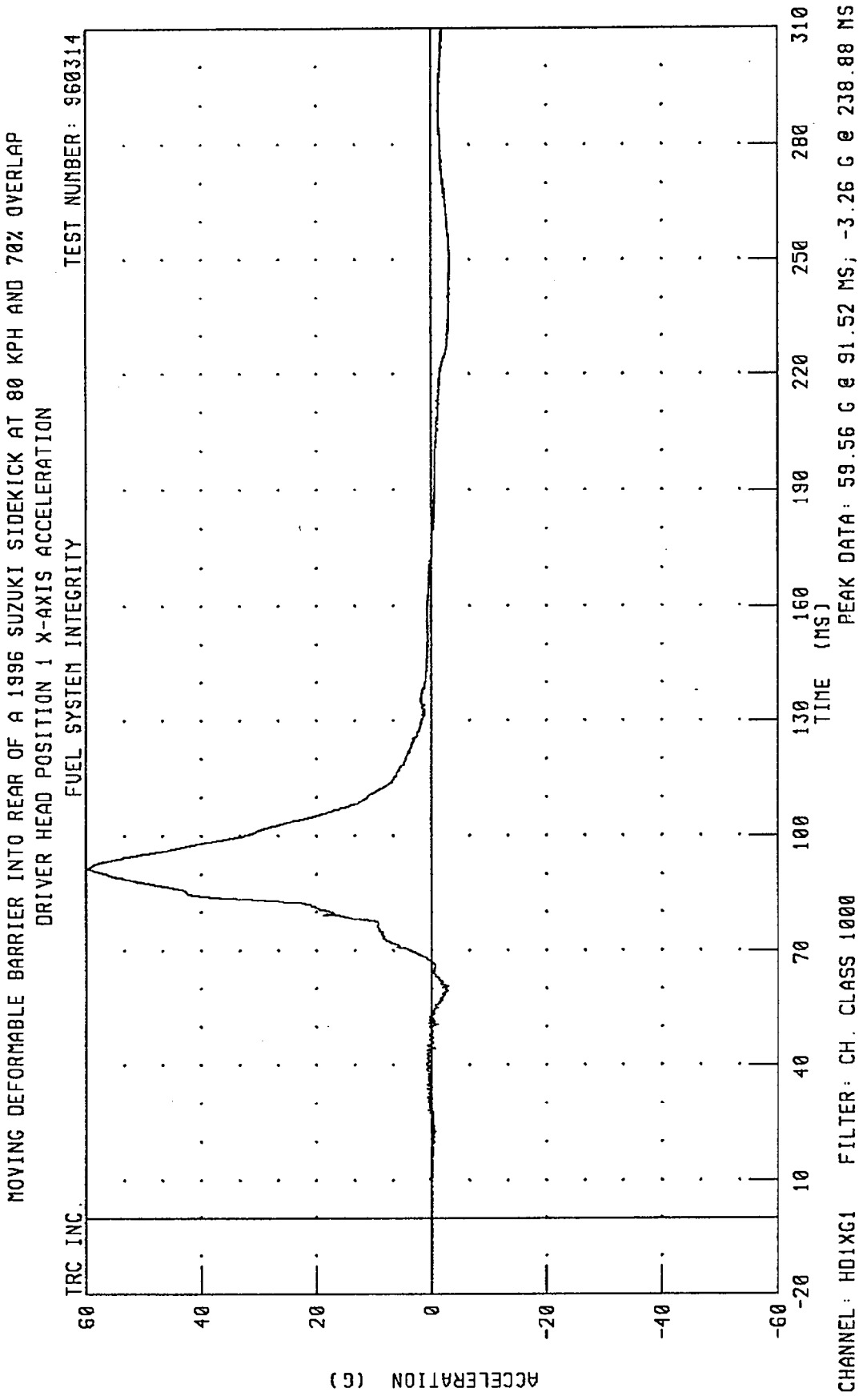


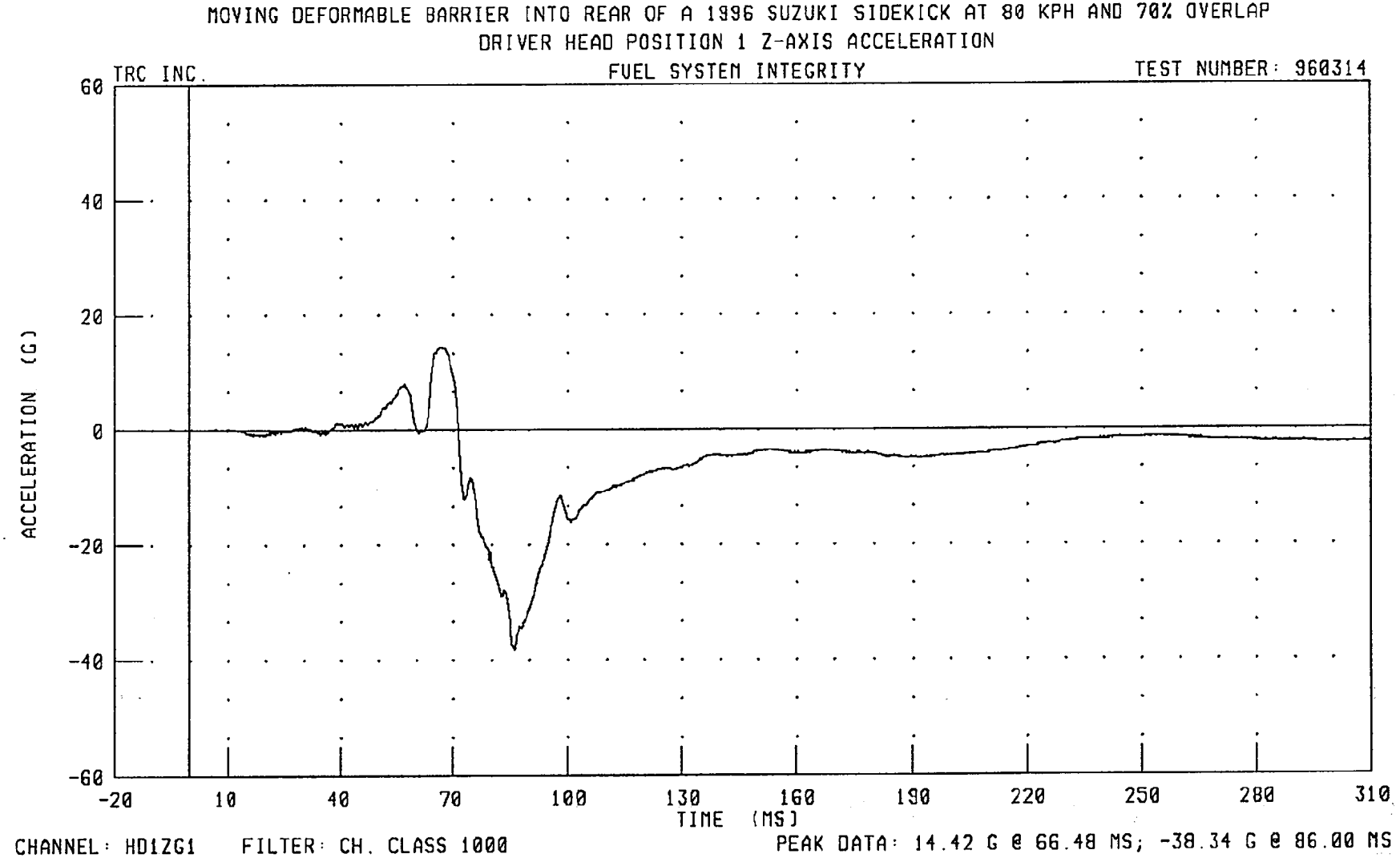
CHANNEL: NEKXM1 FILTER: CH. CLASS 600 PEAK DATA: 6.65 N-M @ 125.84 MS; -5.98 N-M @ 105.60 MS

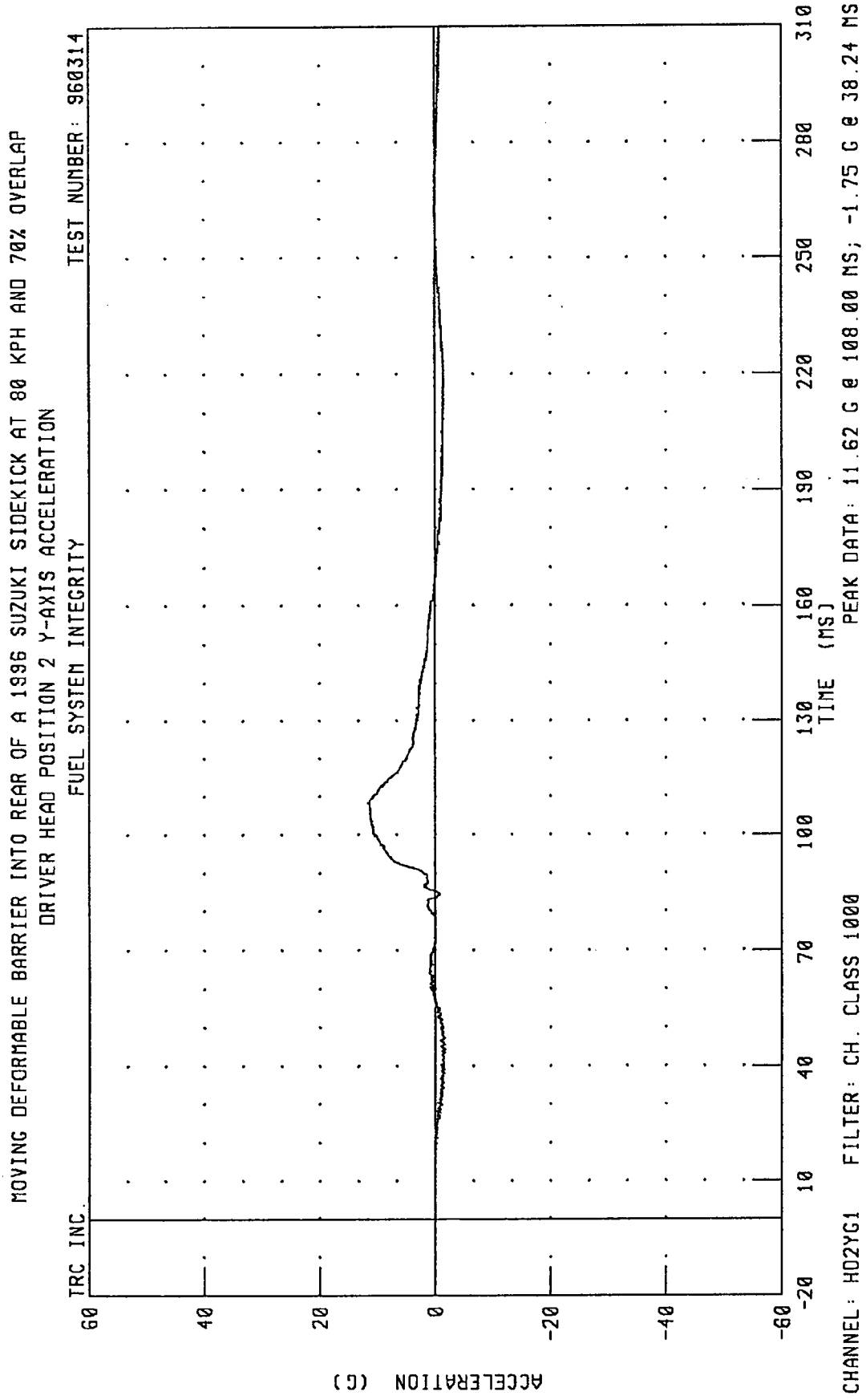
960314

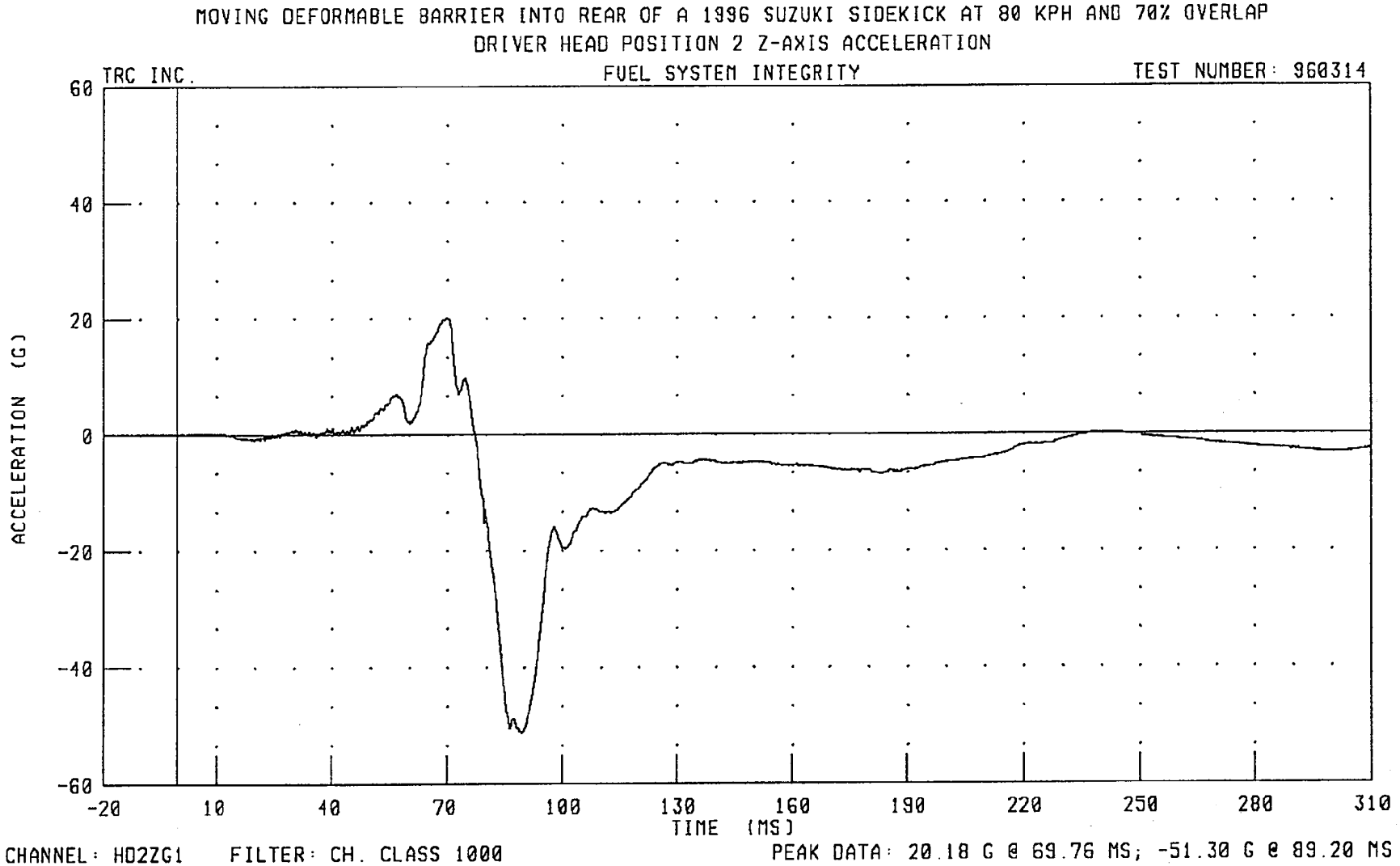

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK MOMENT ABOUT Y-AXIS
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
TORQUE (N·M)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NEKYM1 FILTER: CH. CLASS 600
PEAK DATA: 53.86 N·M @ 75.04 MS; -10.17 N·M @ 119.92 MS

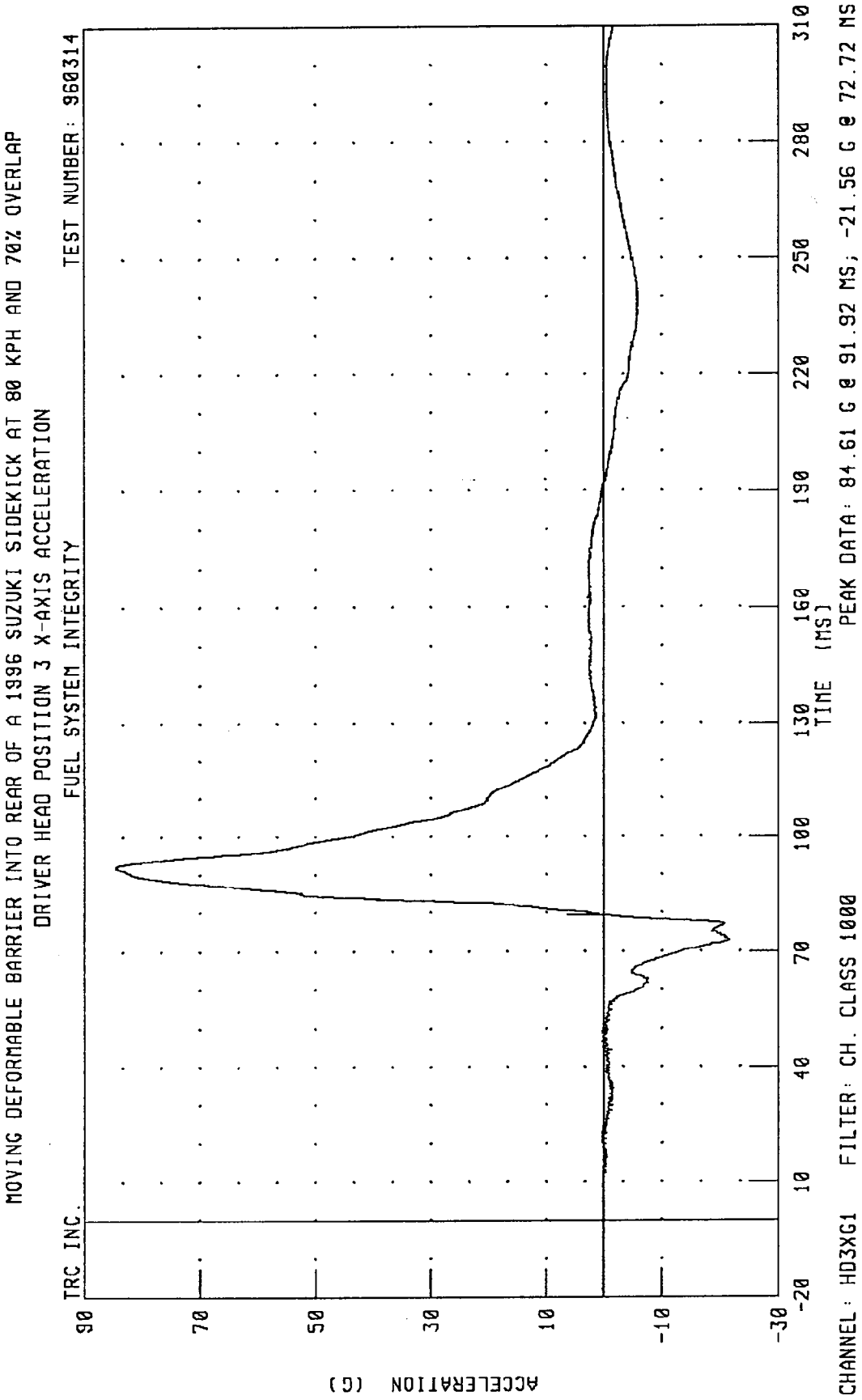

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER UPPER NECK MOMENT ABOUT Z-AXIS
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
TORQUE (N·M)
190
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 2.81 N·M @ 218.16 MS; -9.23 N·M @ 110.64 MS
CHANNEL: NEKZM1 FILTER: CH. CLASS 600


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 1 X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HD1XG1 FILTER: CH. CLASS 1000
PEAK DATA: 59.56 G @ 91.52 MS; -3.26 G @ 238.88 MS

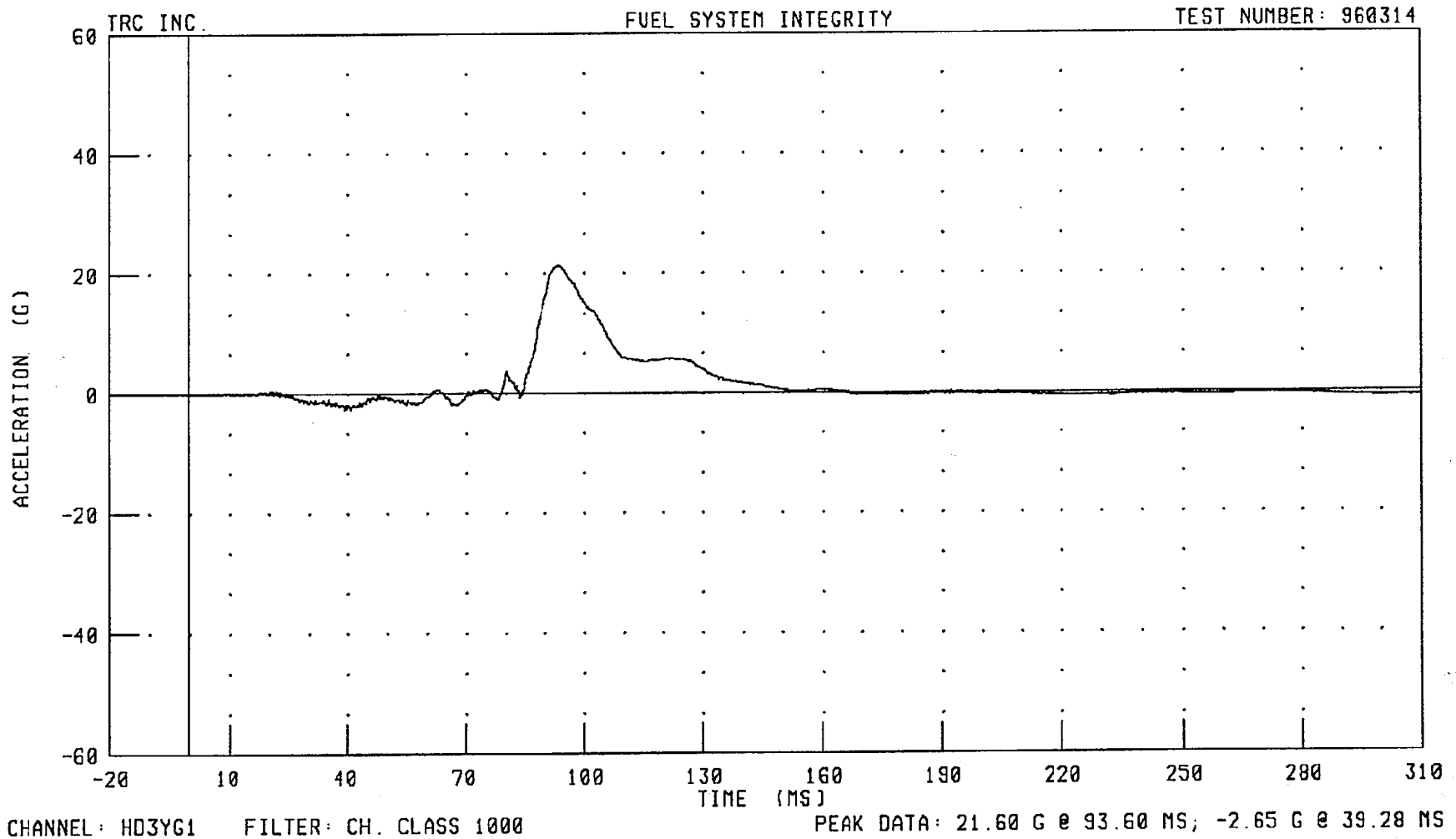


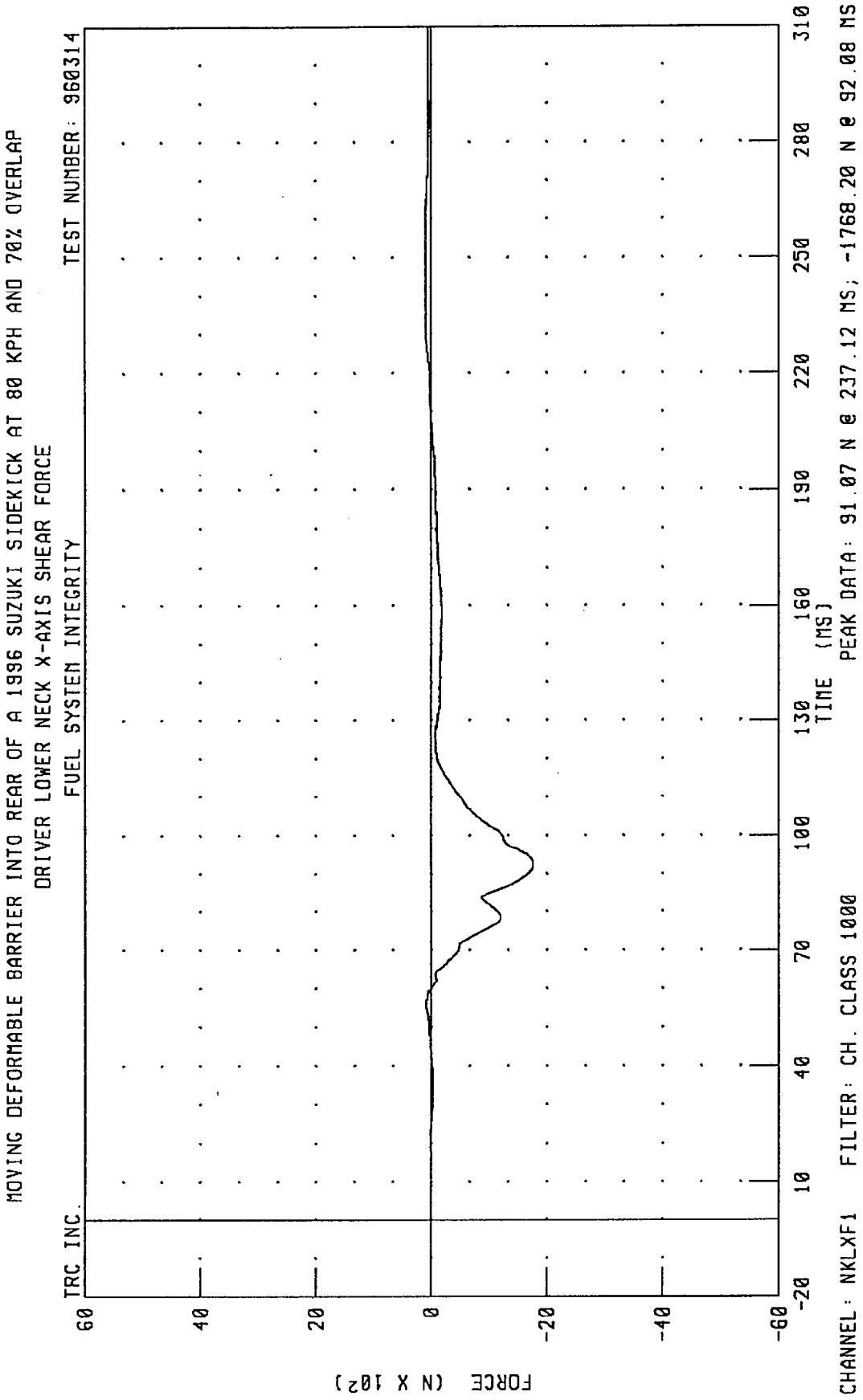

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 2 Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: H02YG1 FILTER: CH. CLASS 1000
PEAK DATA: 11.62 G @ 108.00 MS; -1.75 G @ 38.24 MS

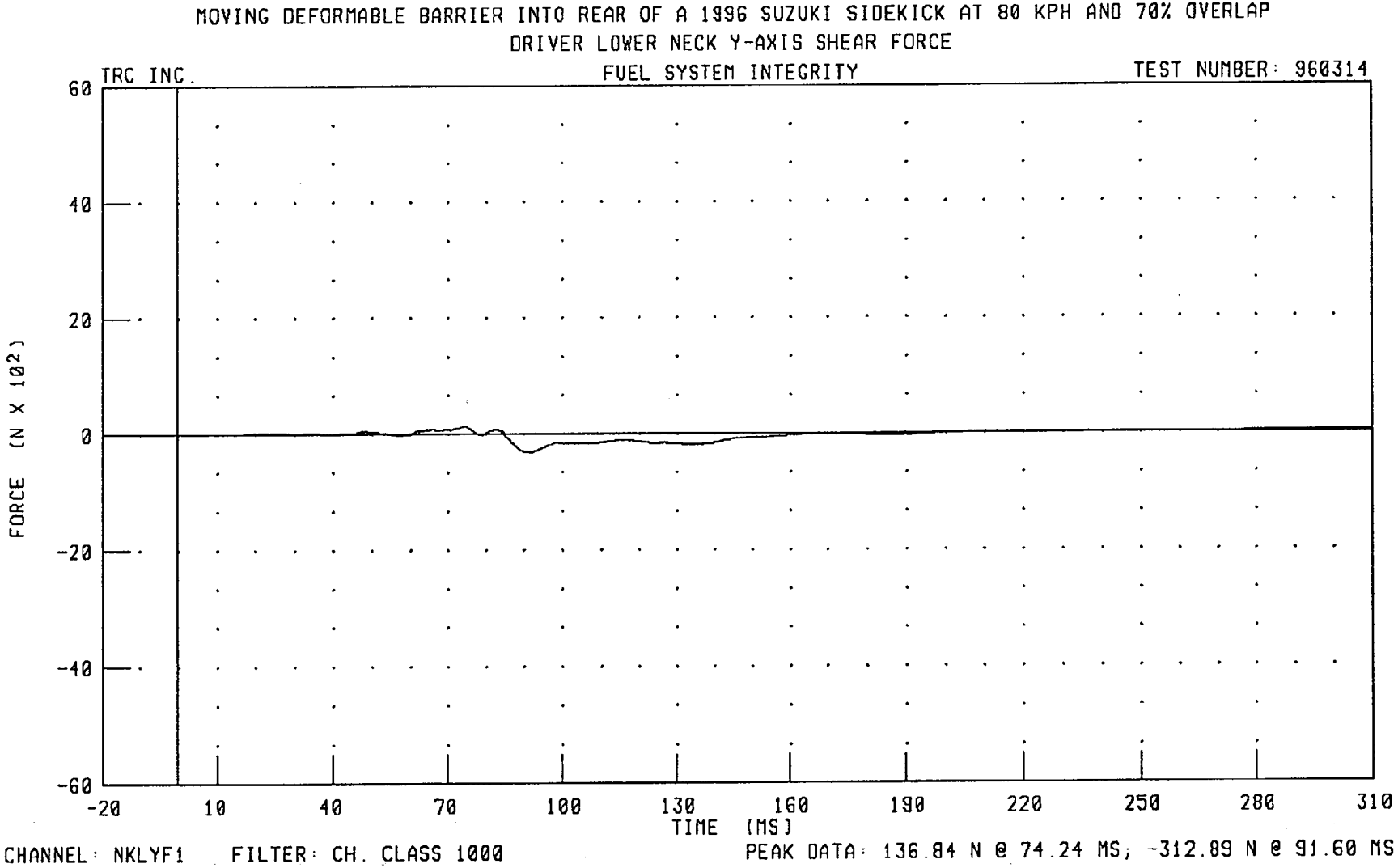

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 2 Z-AXIS ACCELERATION
TRC INC.
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HD2ZG1
FILTER: CH. CLASS 1000
PEAK DATA: 20.18 G @ 69.76 MS; -51.30 G @ 89.20 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 3 X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TRC INC.
TEST NUMBER: 960314
ACCELERATION (G)
90
70
50
30
10
-10
-30
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HD3XG1 FILTER: CH. CLASS 1000
PEAK DATA: 84.61 G @ 91.92 MS; -21.56 G @ 72.72 MS

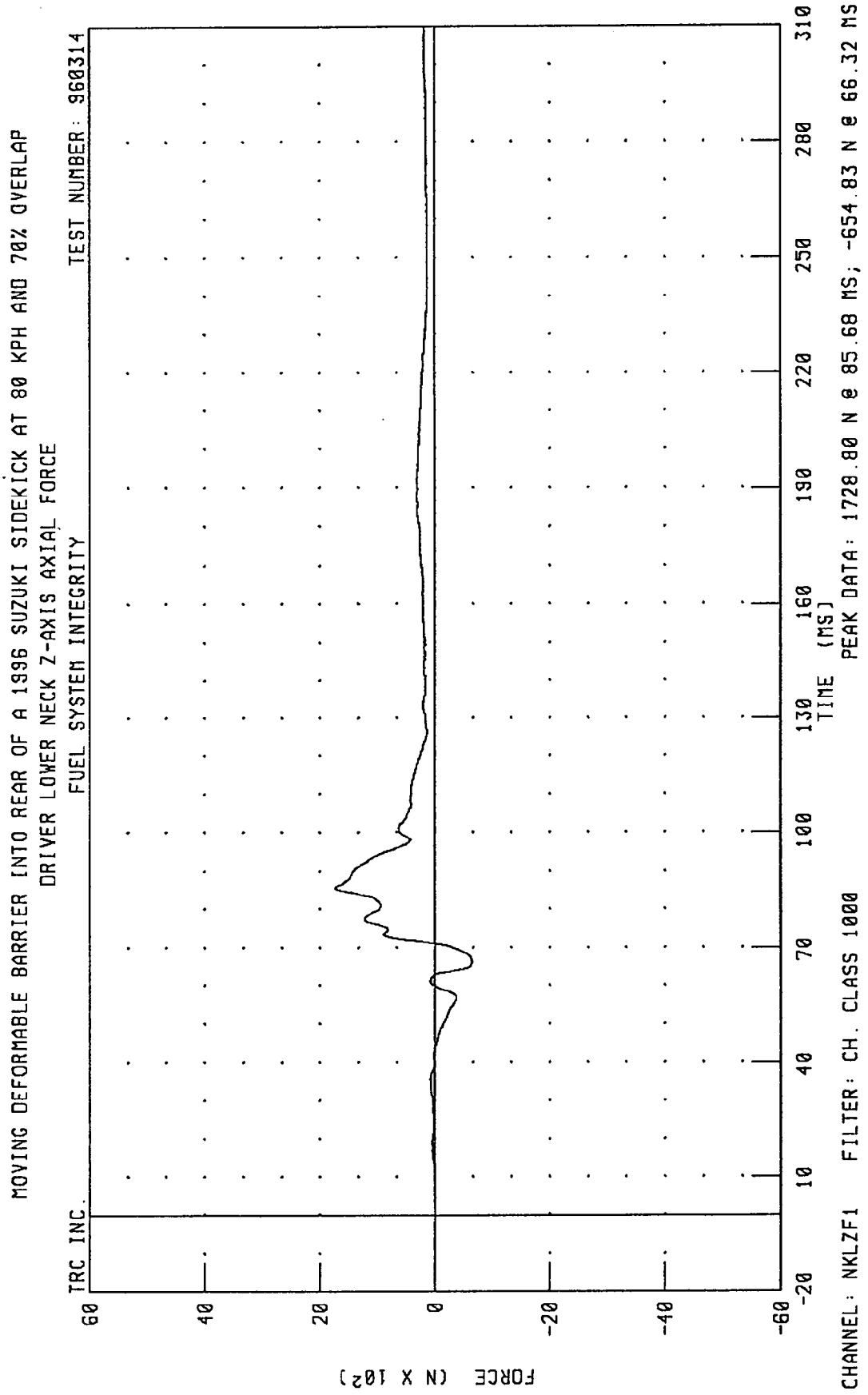
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER HEAD POSITION 3 Y-AXIS ACCELERATION



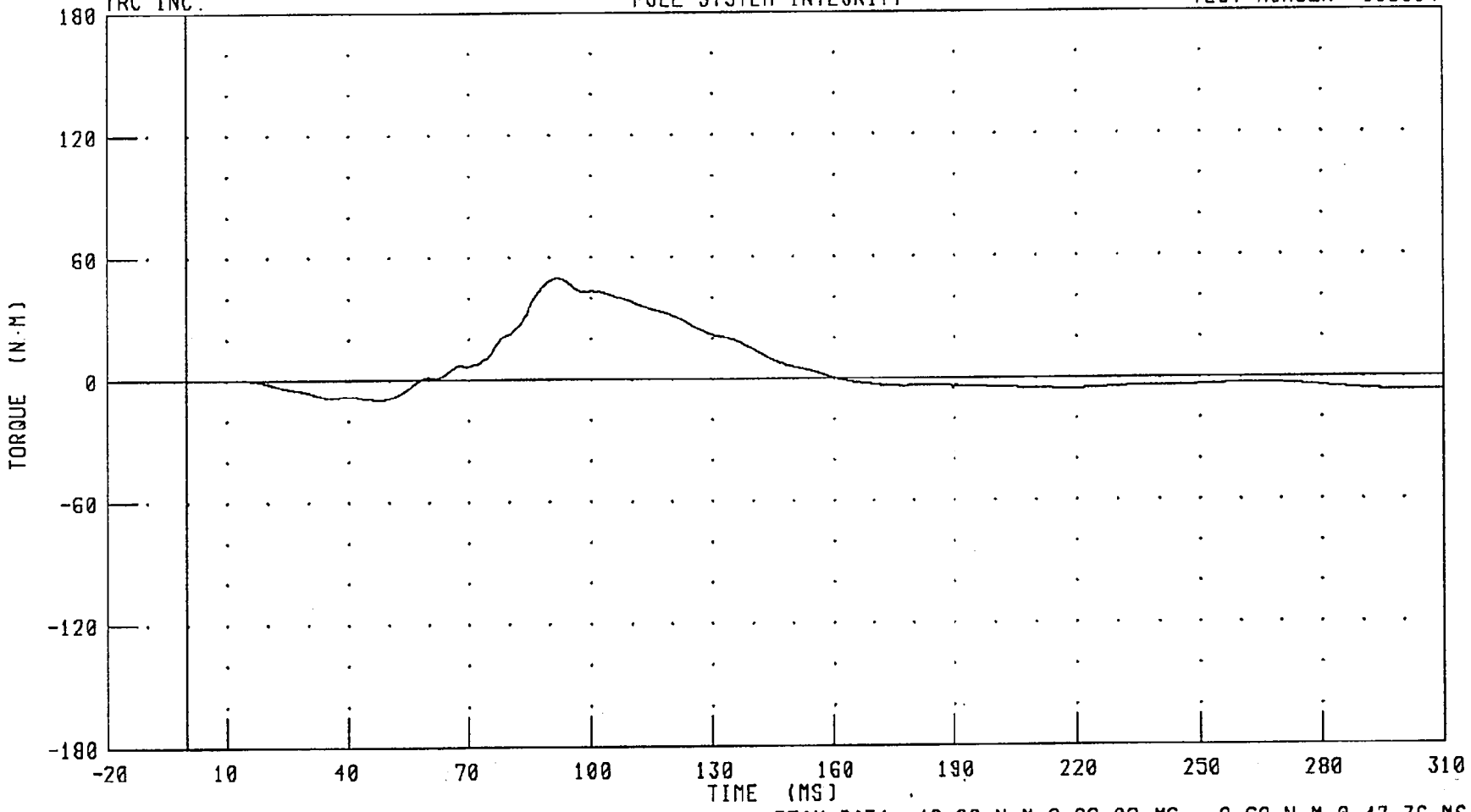

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK X-AXIS SHEAR FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 91.07 N @ 237.12 MS; -1768.20 N @ 92.08 MS
CHANNEL: NKLXF1 FILTER: CH. CLASS 1000


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK Y-AXIS SHEAR FORCE
TRC INC.
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
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: NKLYF1
FILTER: CH. CLASS 1000
PEAK DATA: 136.84 N @ 74.24 MS; -312.89 N @ 91.60 MS

960314

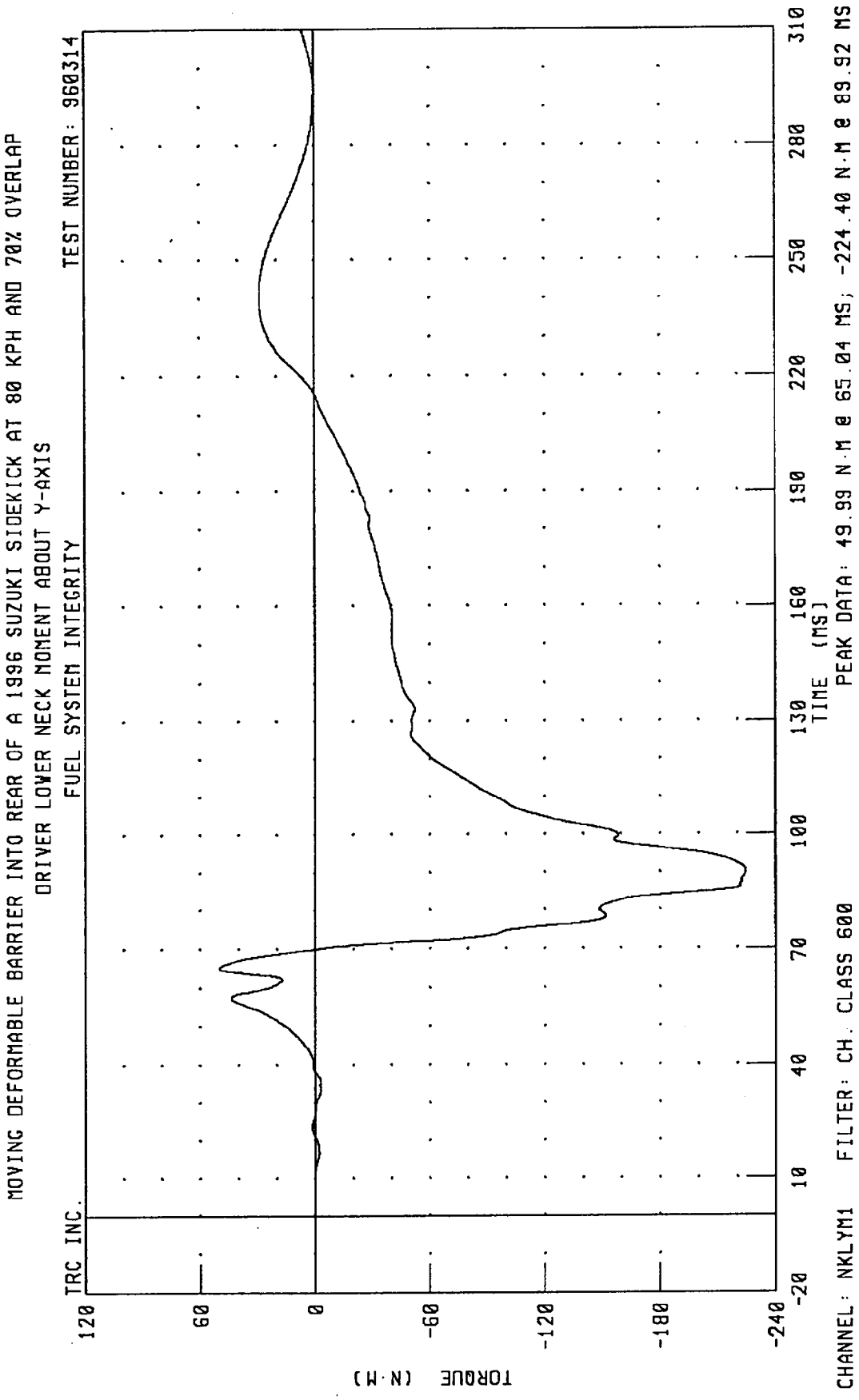

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK Z-AXIS AXIAL FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NKLZF1 FILTER: CH. CLASS 1000
PEAK DATA: 1728.80 N @ 85.68 MS; -654.83 N @ 66.32 MS

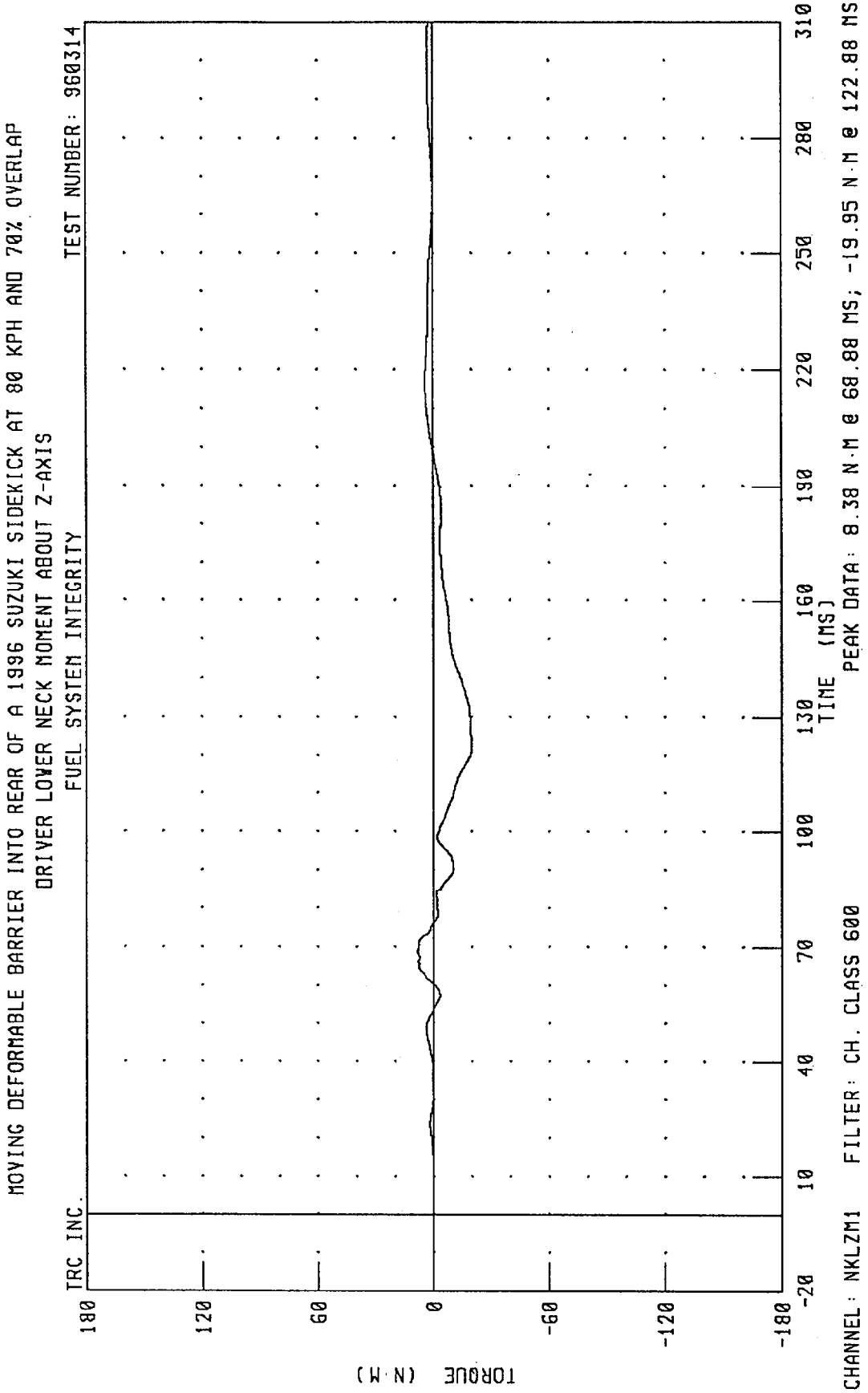
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT X-AXIS
TRC INC. FUEL SYSTEM INTEGRITY TEST NUMBER: 960314

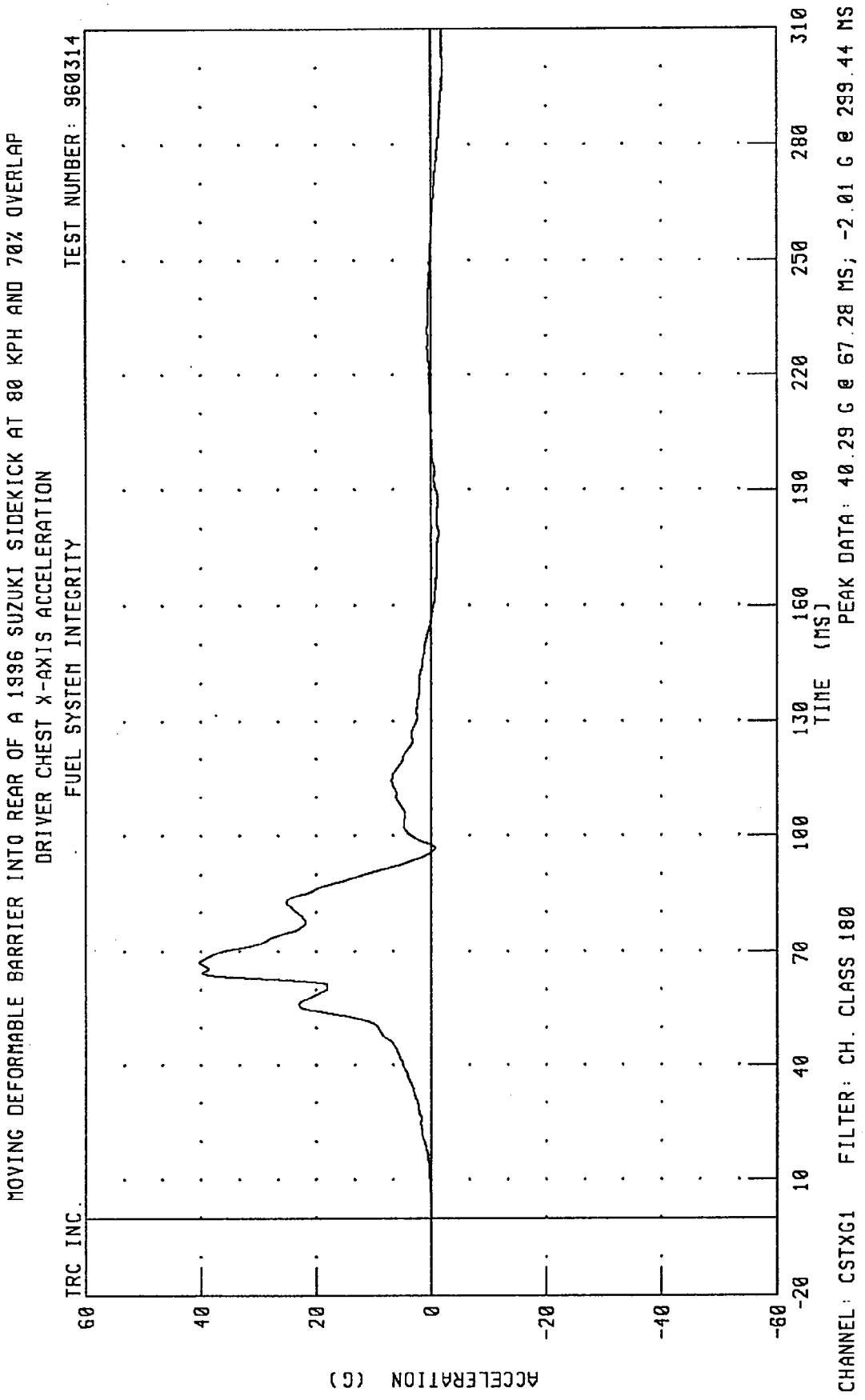


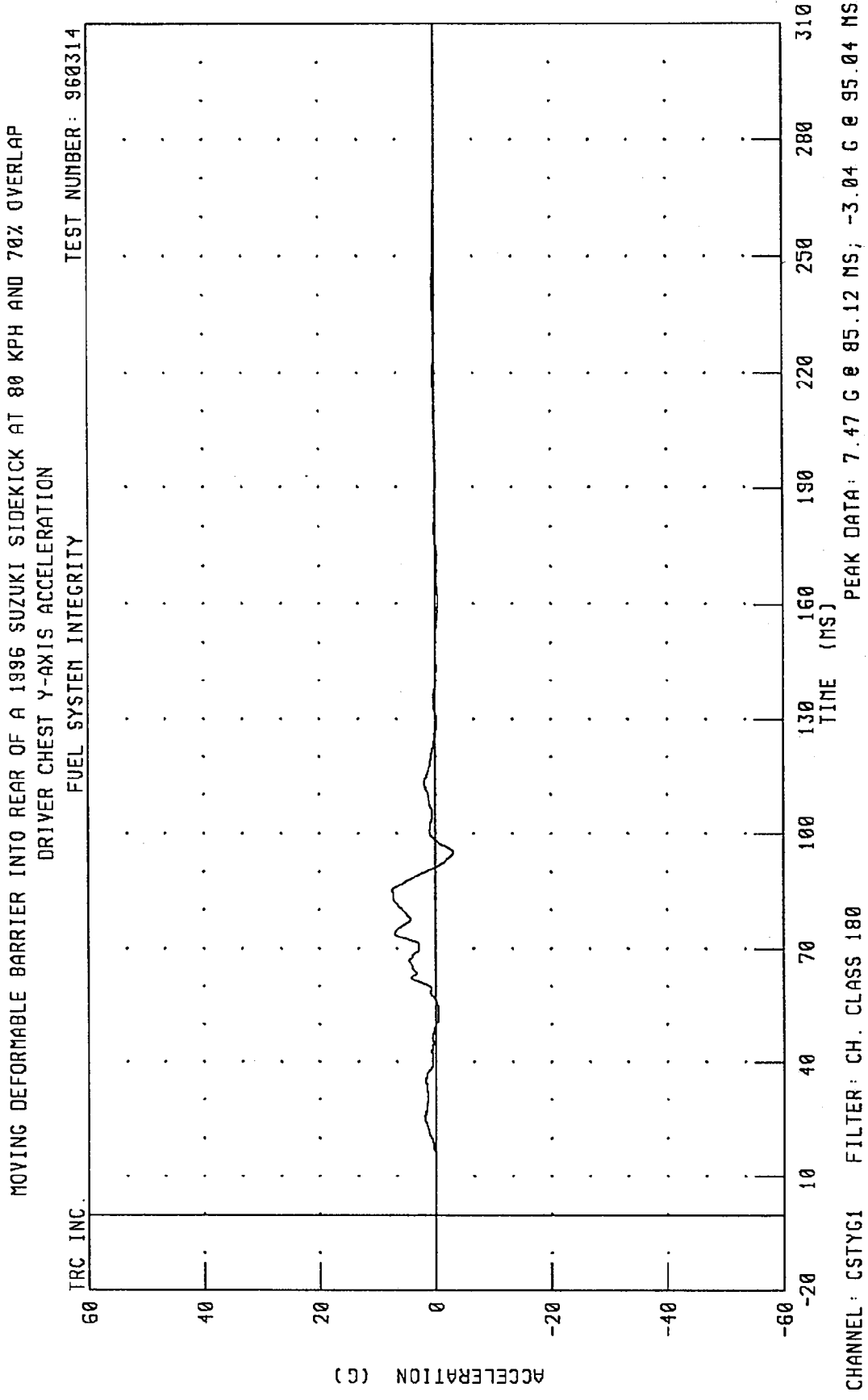
CHANNEL: NKLXM1 FILTER: CH. CLASS 600
PEAK DATA: 49.68 N·M @ 92.08 MS; -9.68 N·M @ 47.36 MS

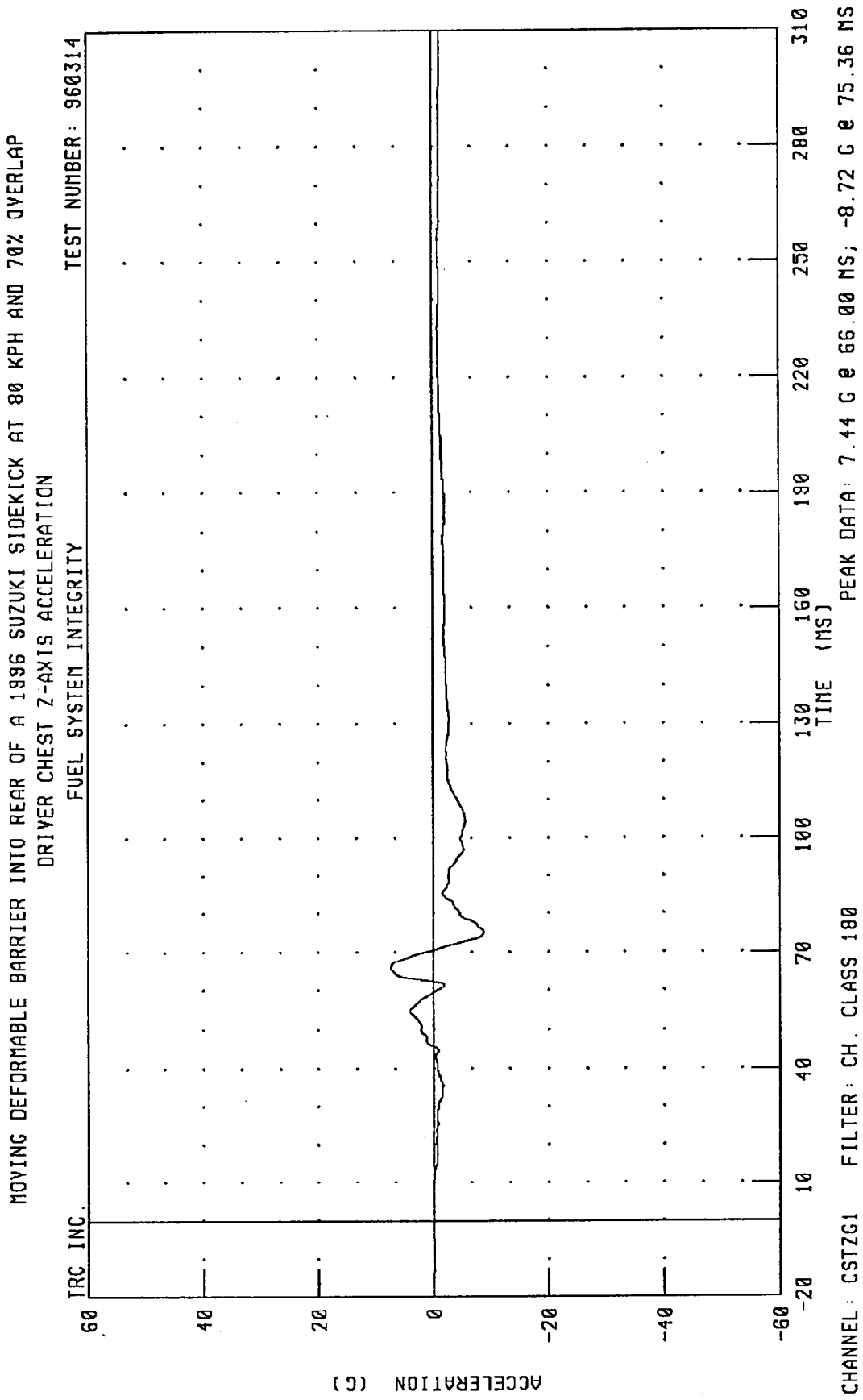
960314 AS664091


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT Y-AXIS
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
TORQUE (N·M)
120
60
0
-60
-120
-180
-240
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NKLYM1 FILTER: CH. CLASS 600
PEAK DATA: 49.99 N·M @ 65.04 MS; -224.40 N·M @ 89.92 MS

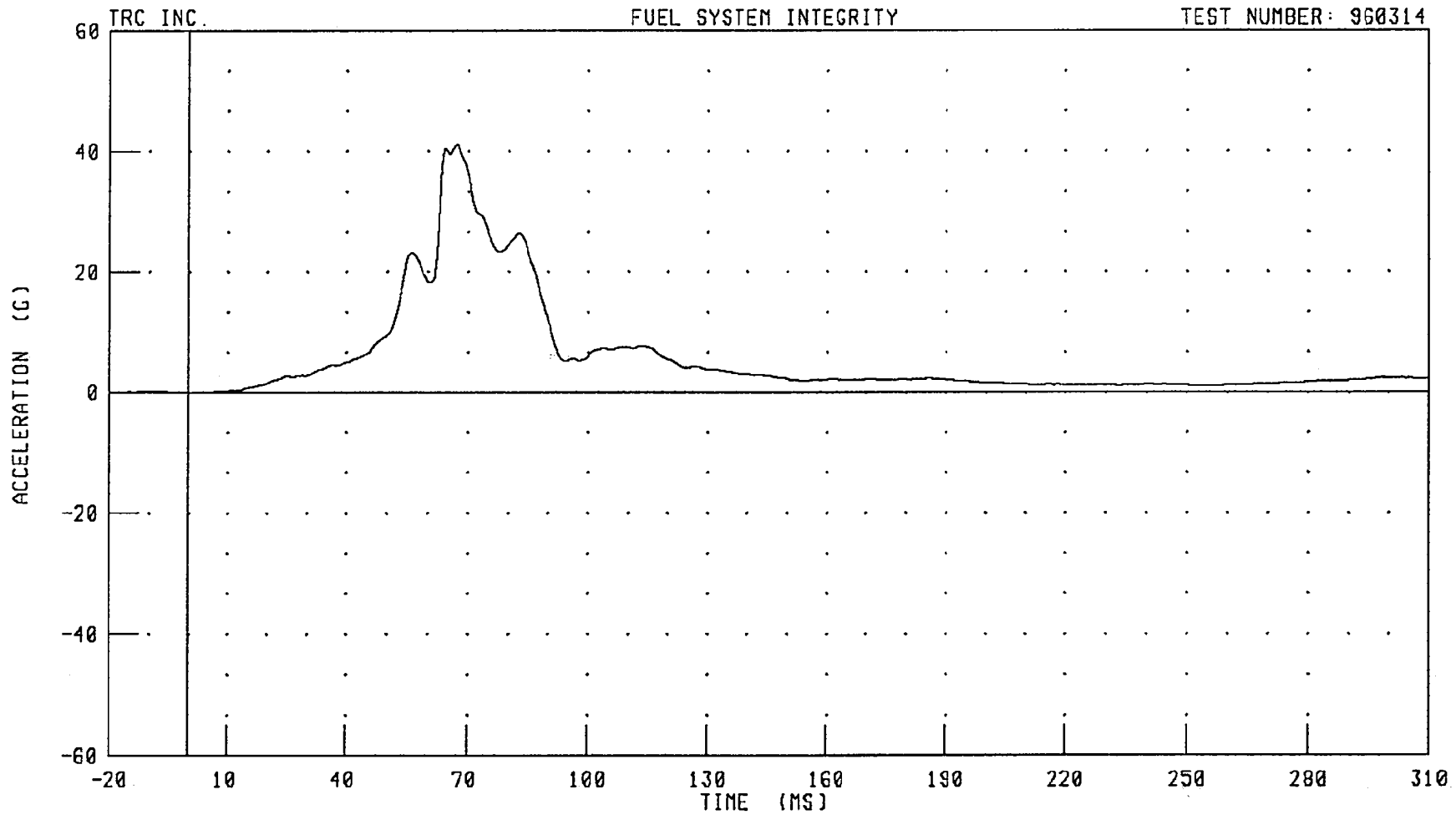

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LOWER NECK MOMENT ABOUT Z-AXIS
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
TORQUE (N·M)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 8.38 N·M @ 68.88 MS; -19.95 N·M @ 122.88 MS
CHANNEL: NKLZM1 FILTER: CH. CLASS 600


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER CHEST X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXG1 FILTER: CH. CLASS 180
PEAK DATA: 40.29 G @ 67.28 MS; -2.01 G @ 299.44 MS

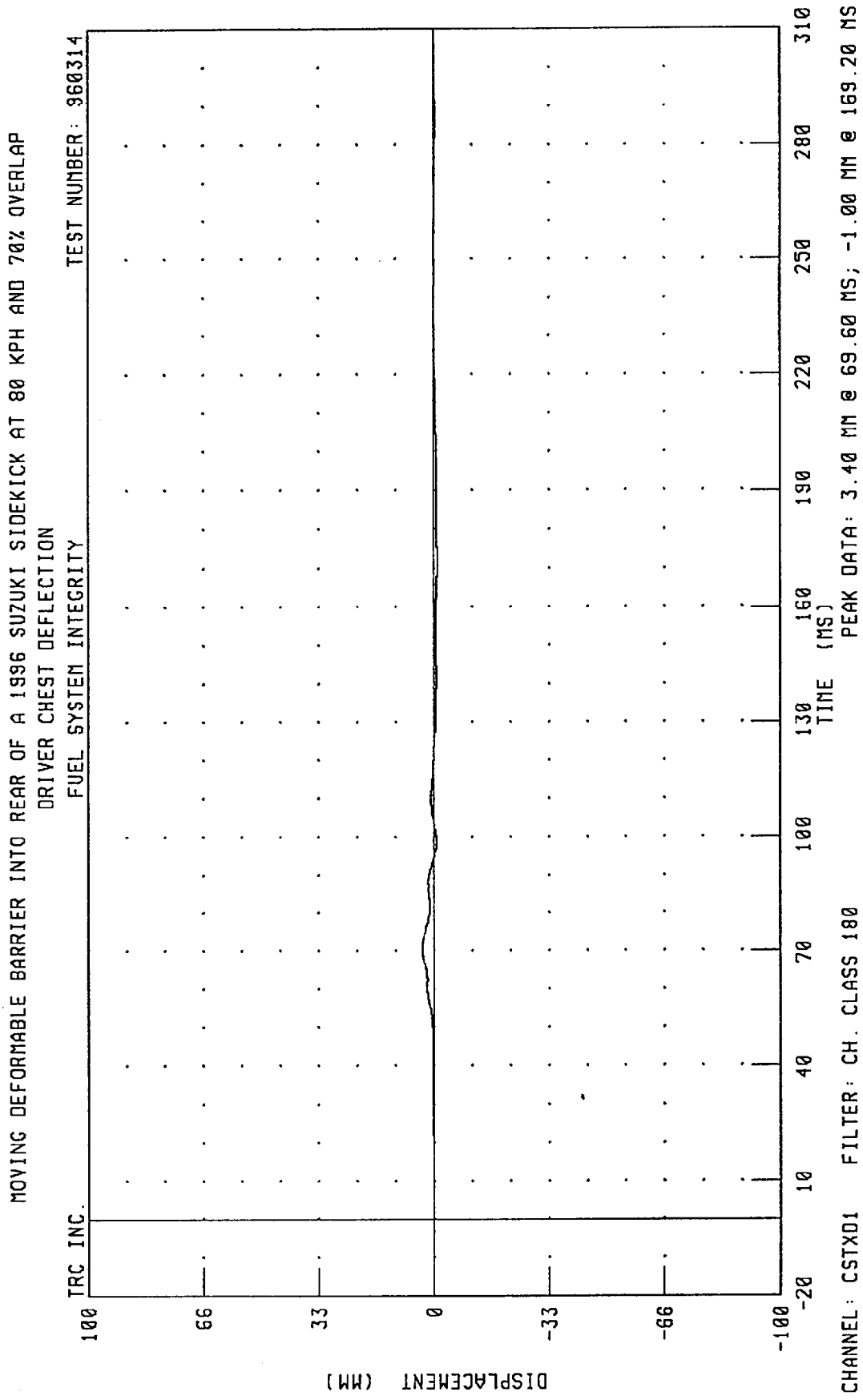

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER CHEST Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG1 FILTER: CH. CLASS 180
PEAK DATA: 7.47 G @ 85.12 MS; -3.04 G @ 95.04 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER CHEST Z-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTZG1 FILTER: CH. CLASS 180
PEAK DATA: 7.44 G @ 66.00 MS; -8.72 G @ 75.36 MS

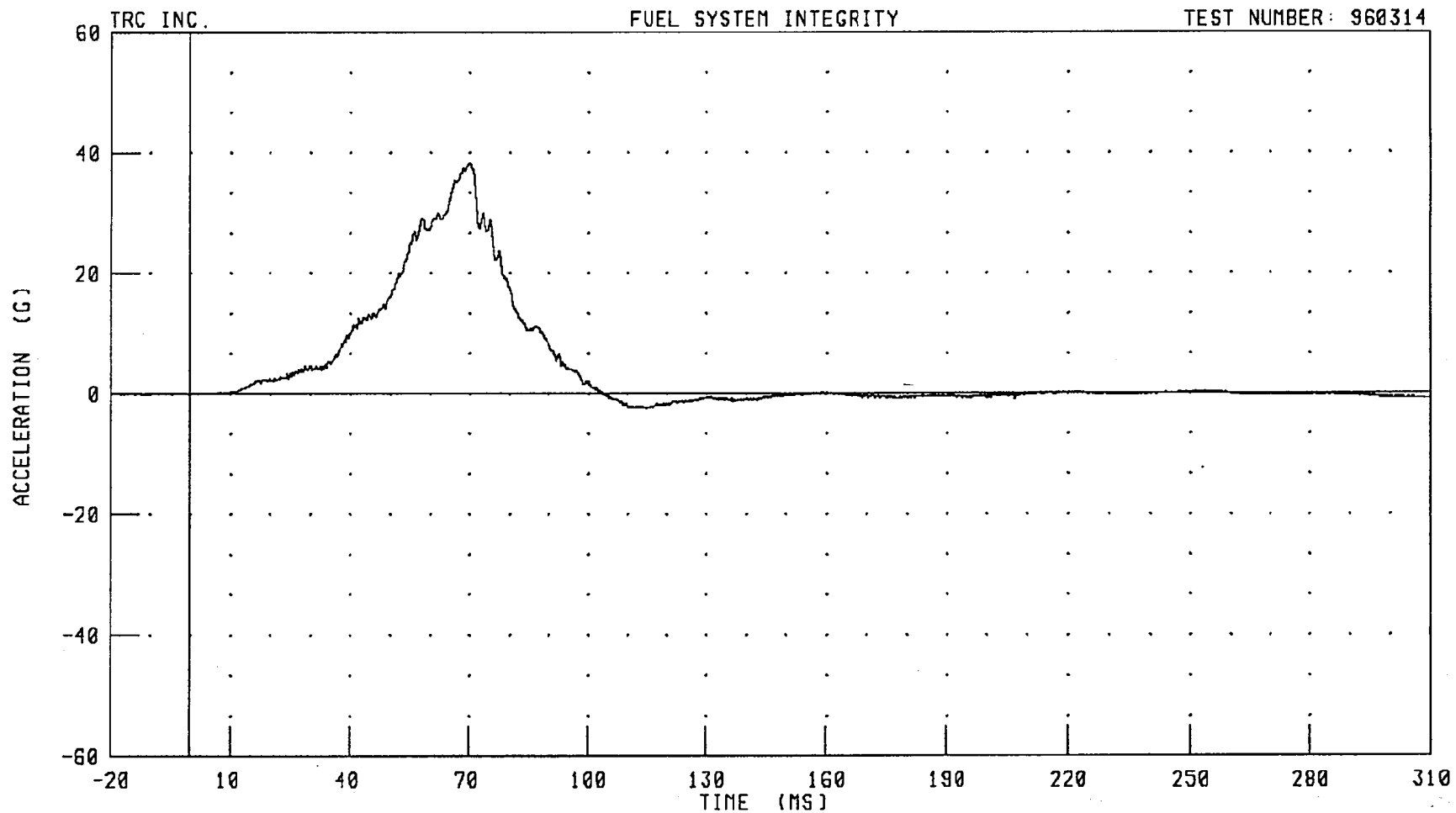
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER CHEST RESULTANT ACCELERATION



CHANNEL: CSTRG1 FILTER: CH. CLASS 180 PEAK DATA: 41.14 G @ 67.20 MS; 0.00 G @ -20.00 MS

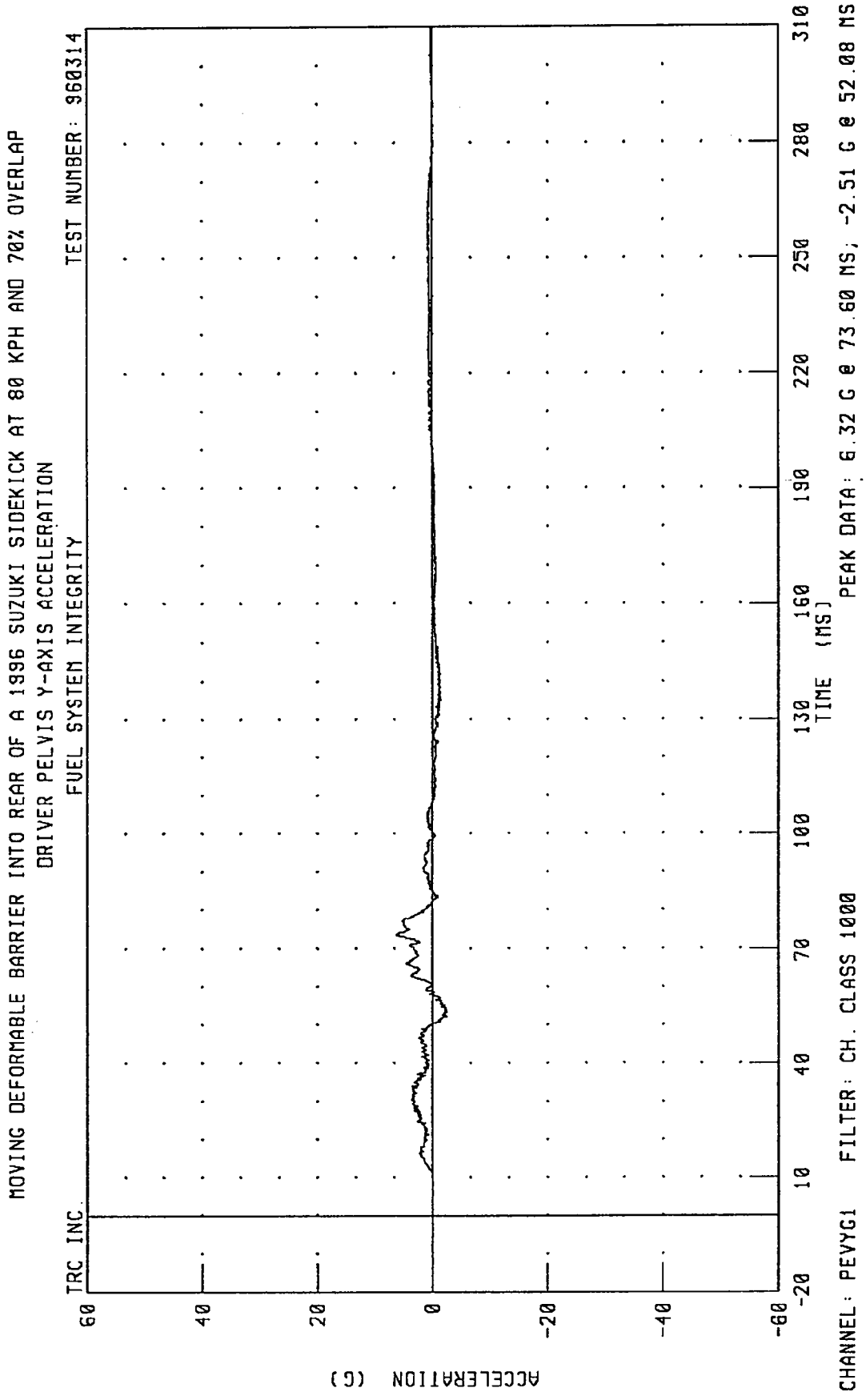

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER CHEST DEFLECTION
FUEL SYSTEM INTEGRITY
TRC INC.
TEST NUMBER: 960314
DISPLACEMENT (MM)
100
66
33
0
-33
-66
-100
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTXD1 FILTER: CH. CLASS 180
PEAK DATA: 3.40 MM @ 69.60 MS; -1.00 MM @ 169.20 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER PELVIS X-AXIS ACCELERATION

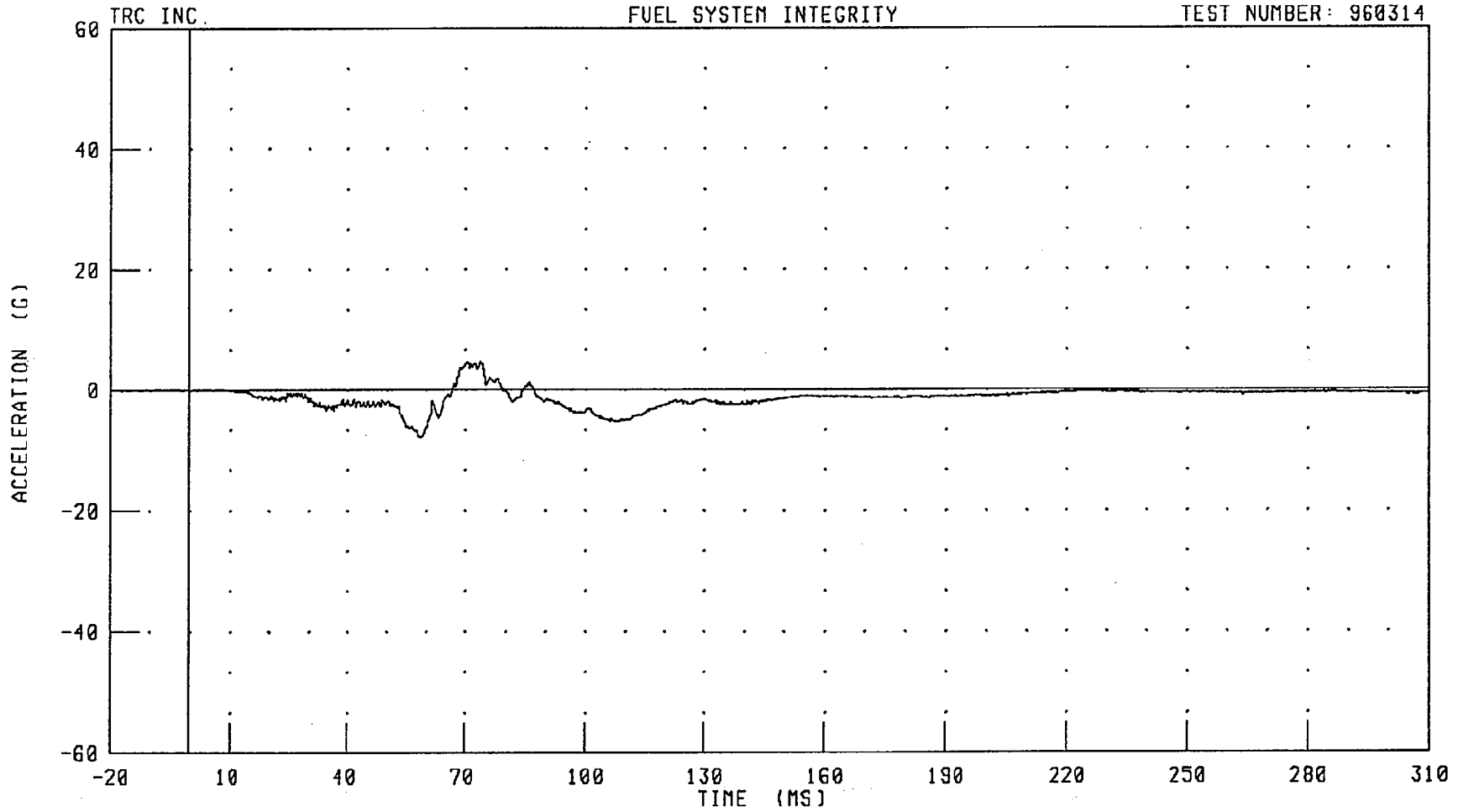


CHANNEL: PEVXG1 FILTER: CH. CLASS 1000 PEAK DATA: 38.22 G @ 70.08 MS; -2.54 G @ 114.80 MS

960314


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER PELVIS Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 6.32 G @ 73.60 MS; -2.51 G @ 52.08 MS
CHANNEL: PEVYG1 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER PELVIS Z-AXIS ACCELERATION



960314

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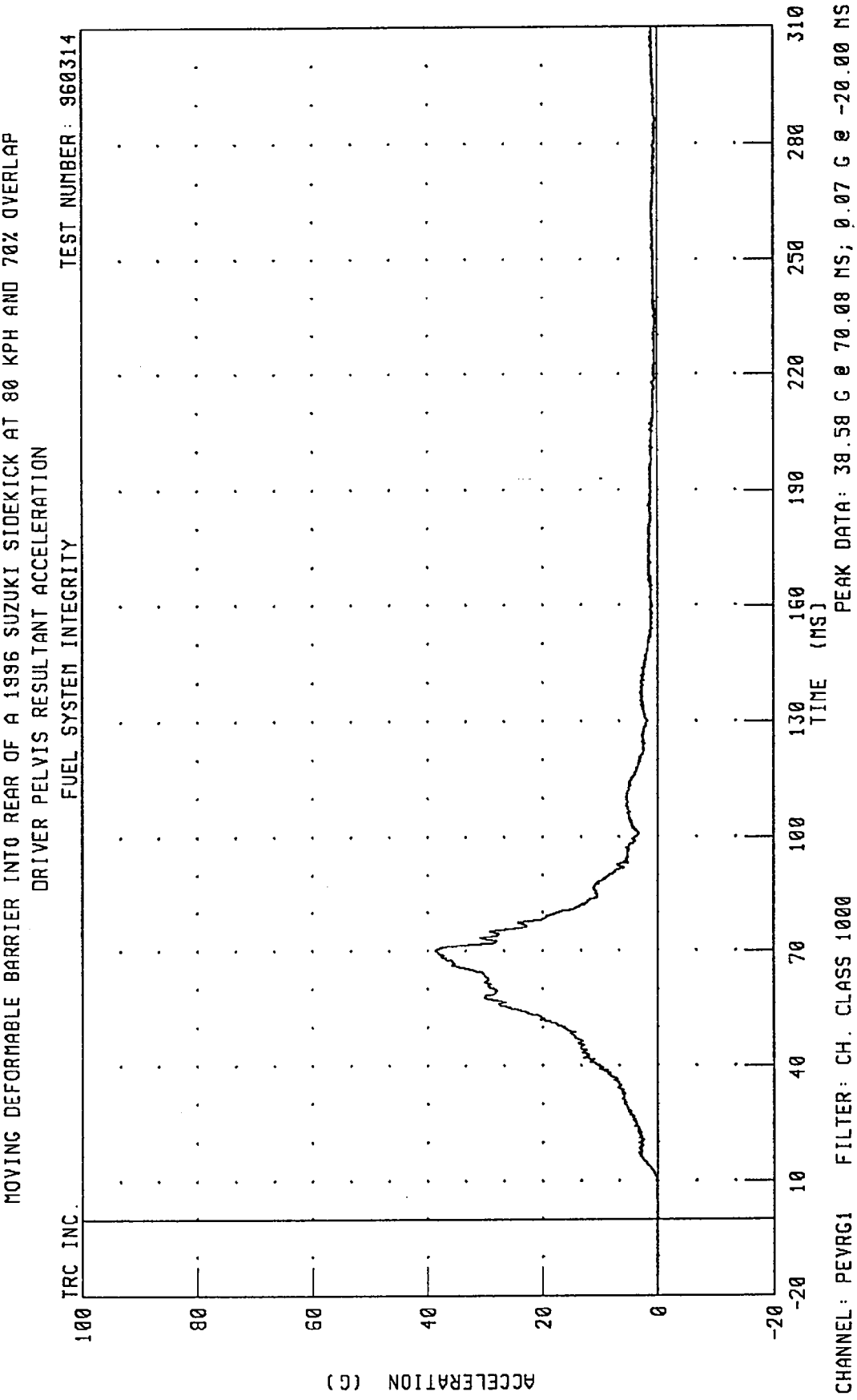
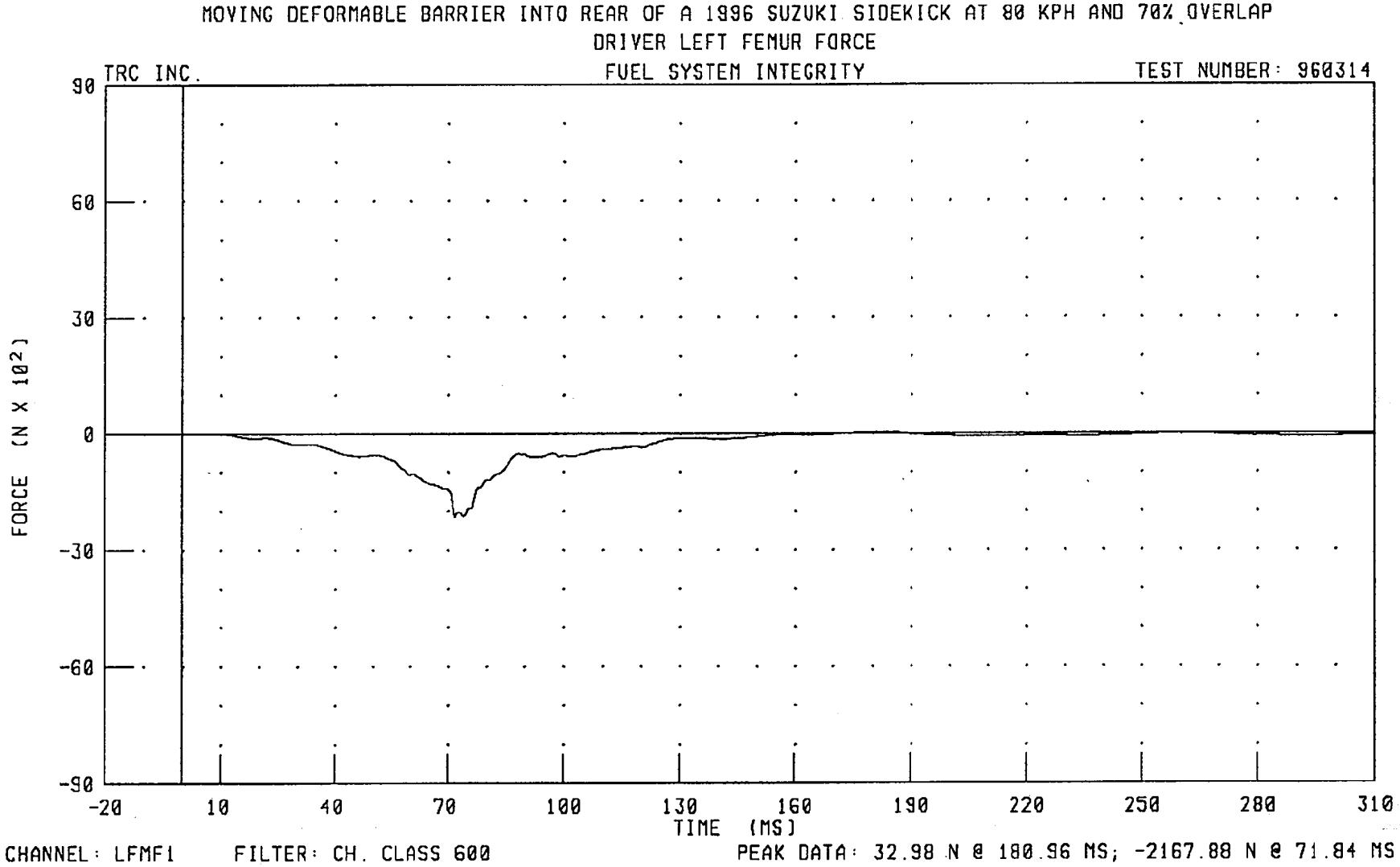
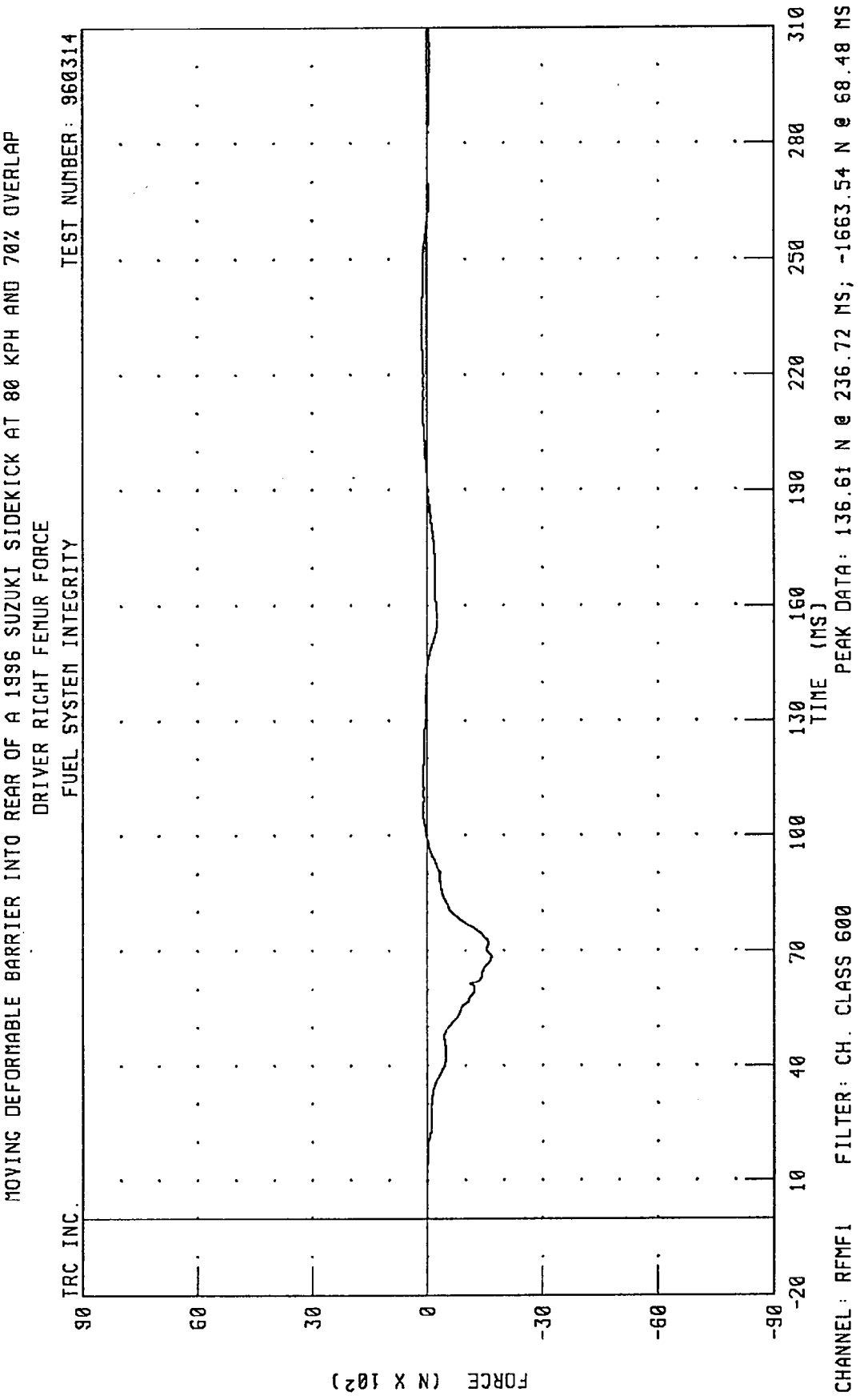
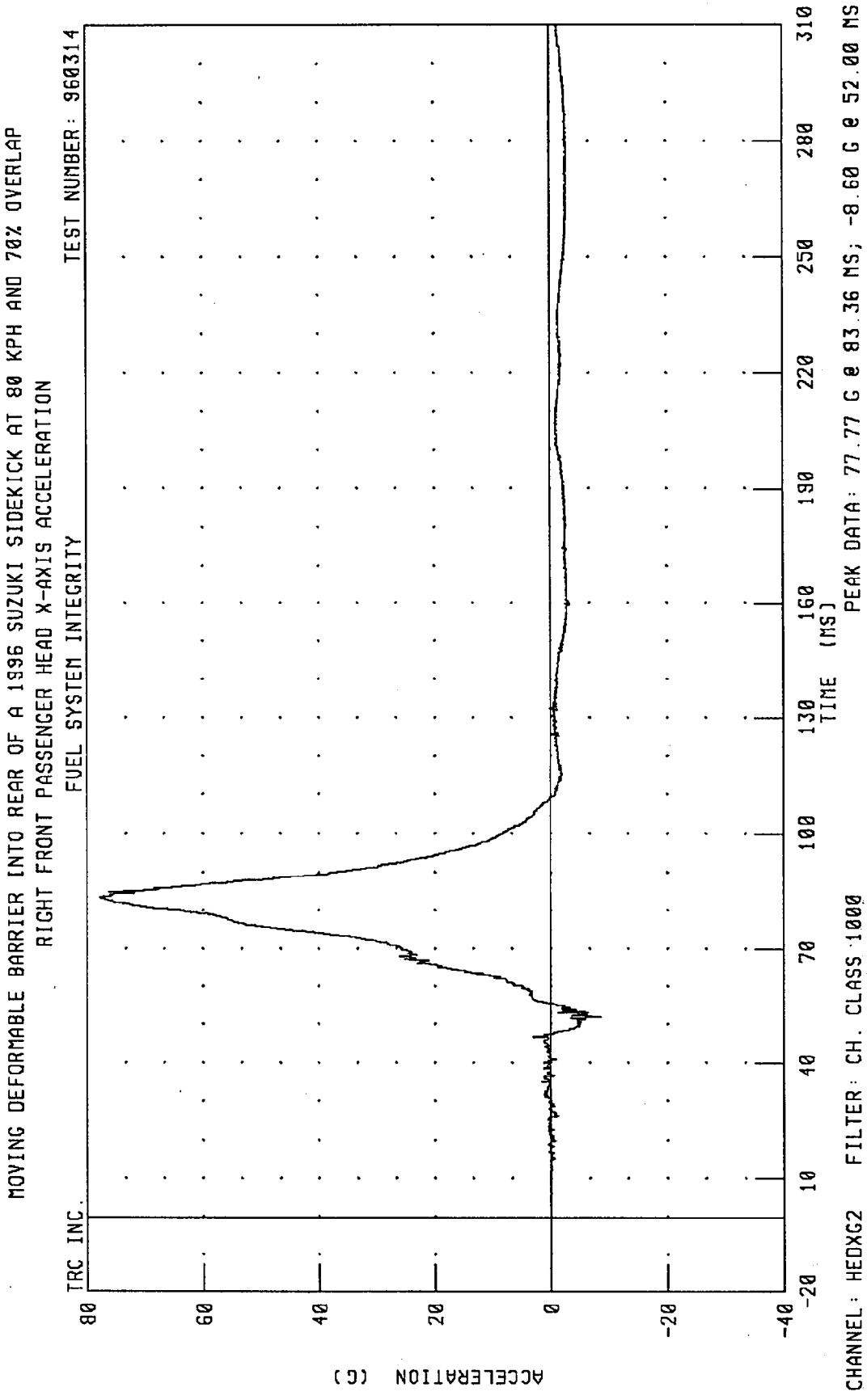
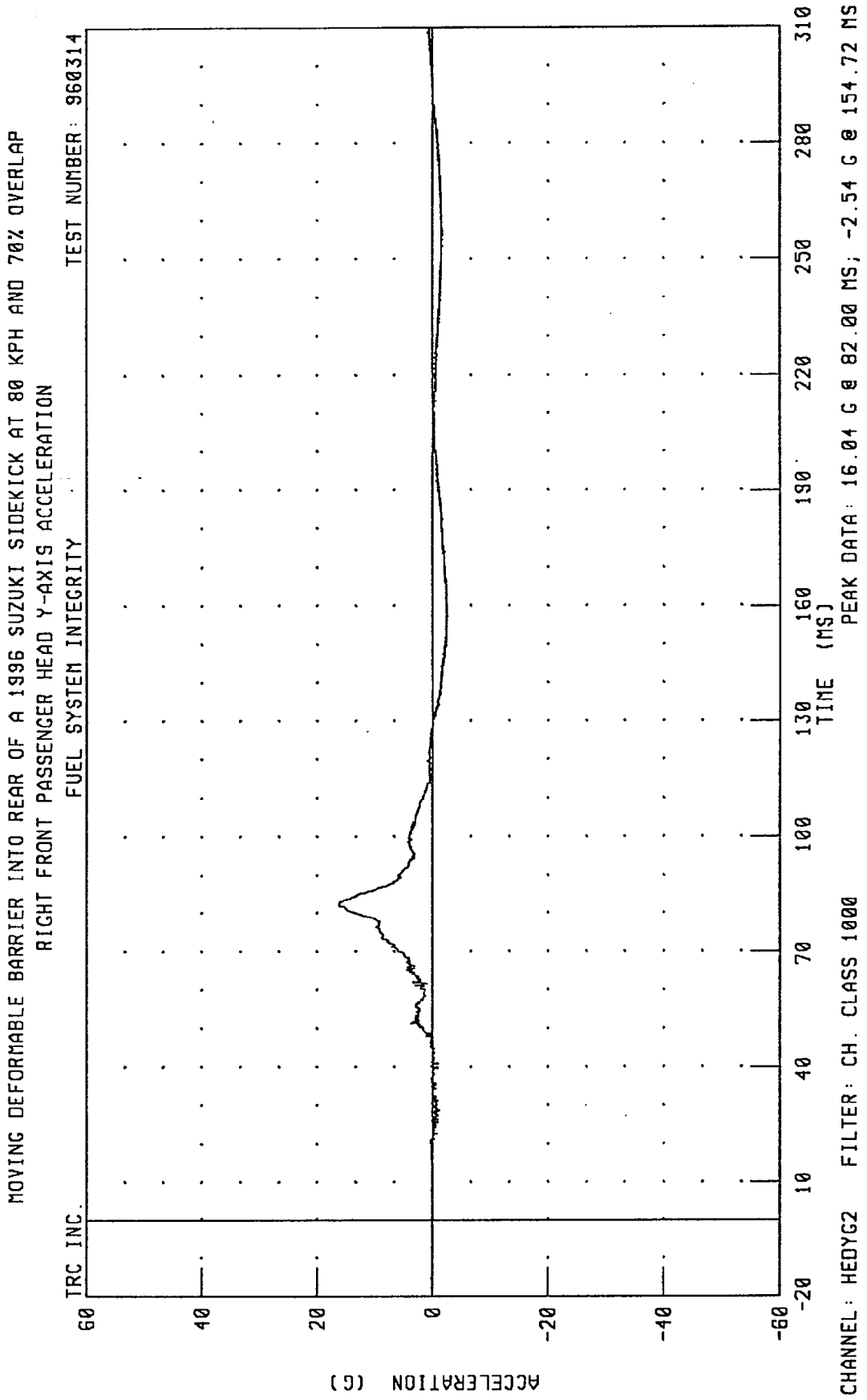
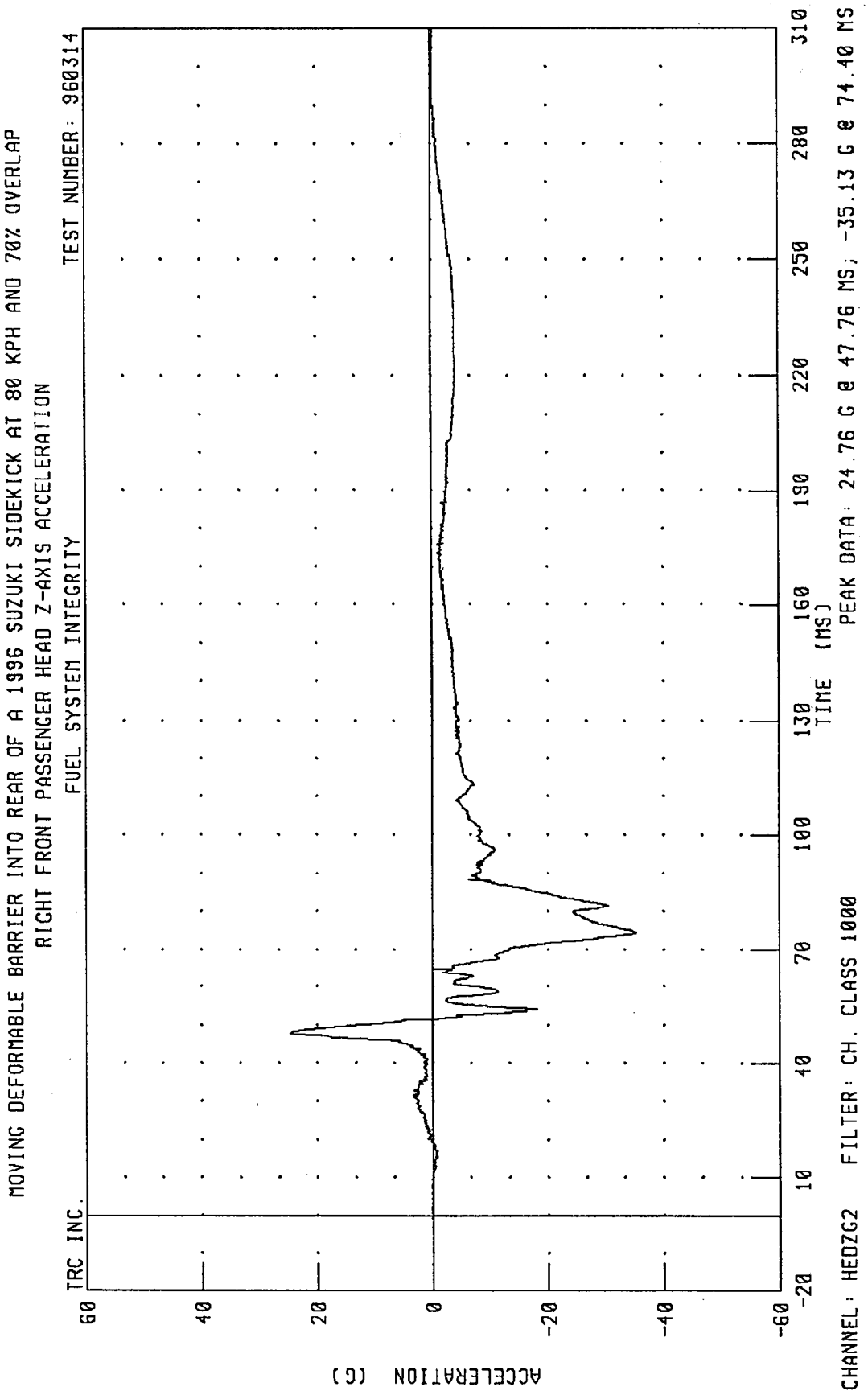

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER PELVIS RESULTANT ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVRG1 FILTER: CH. CLASS 1000
PEAK DATA: 38.58 G @ 70.08 MS; 0.07 G @ -20.00 MS

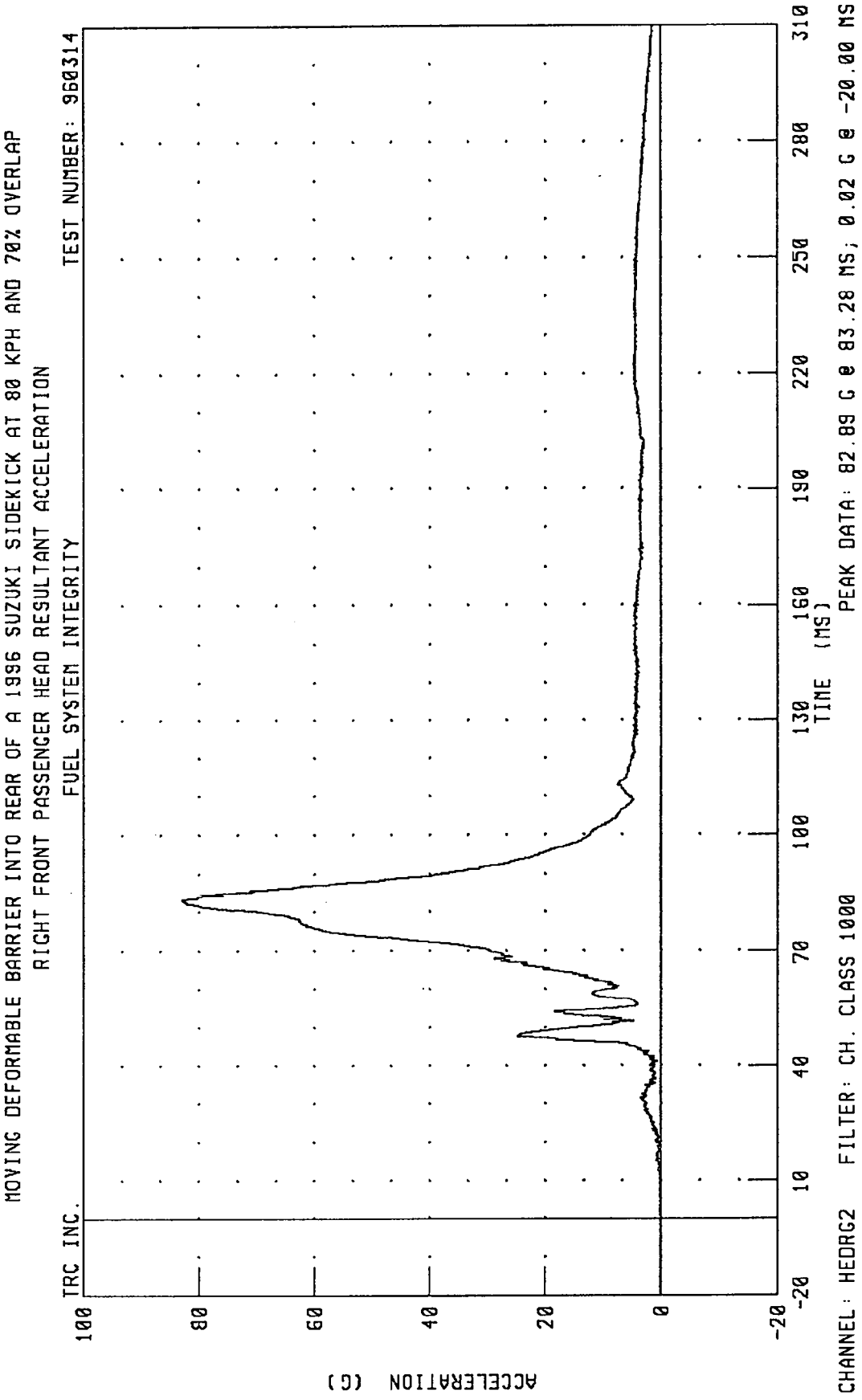

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LEFT FEMUR FORCE
TRC INC.
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
90
60
30
0
-30
-60
-90
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: LFMF1
FILTER: CH. CLASS 600
PEAK DATA: 32.98 N @ 180.96 MS; -2167.88 N @ 71.84 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER RIGHT FEMUR FORCE
FUEL SYSTEM INTEGRITY
TRC INC.
TEST NUMBER: 960314
FORCE (N X 10²)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF1 FILTER: CH. CLASS 600
PEAK DATA: 136.61 N @ 236.72 MS; -1663.54 N @ 68.48 MS

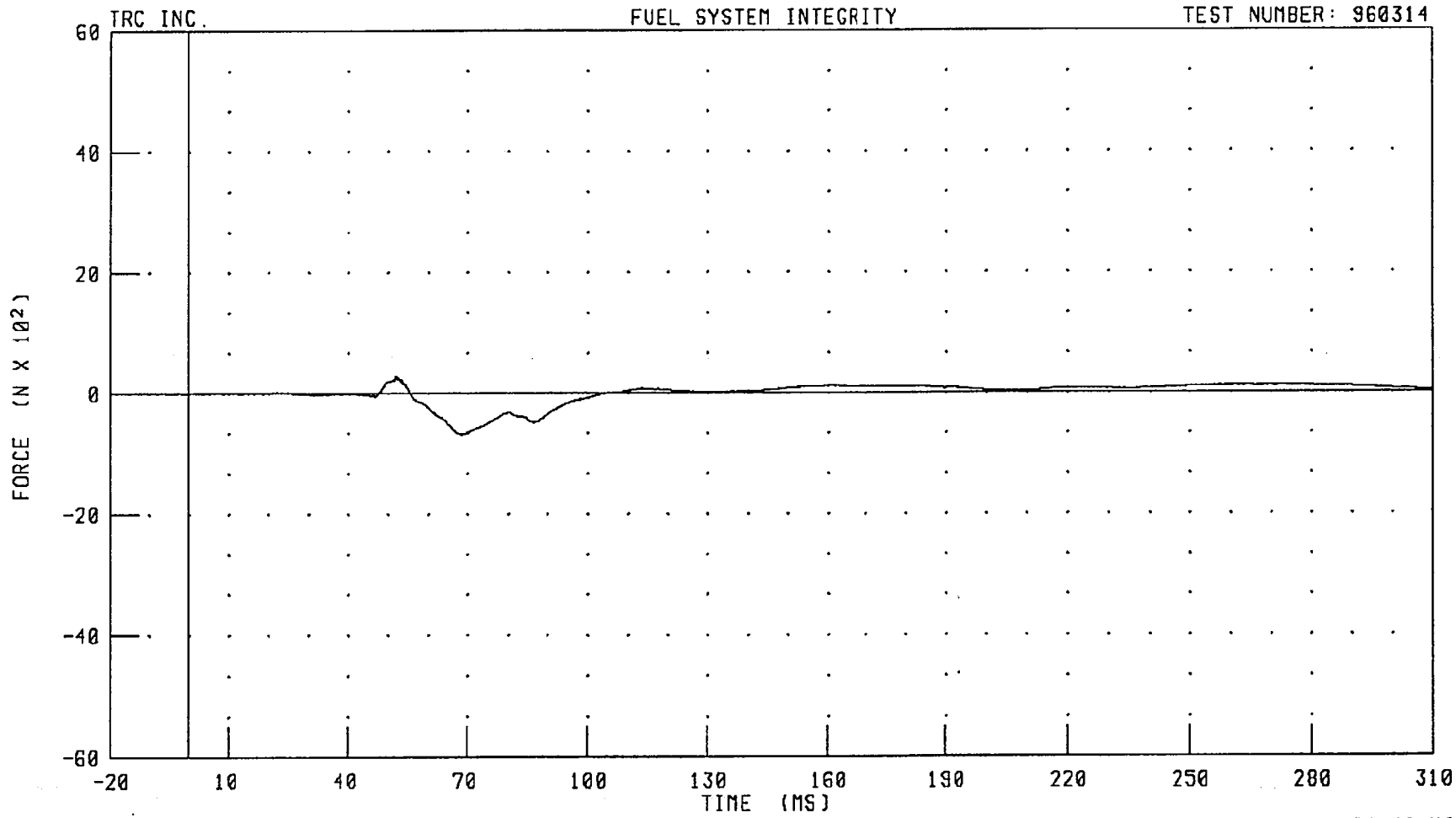

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
80
60
40
20
0
-20
-40
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 77.77 G @ 83.36 MS; -8.60 G @ 52.00 MS
CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

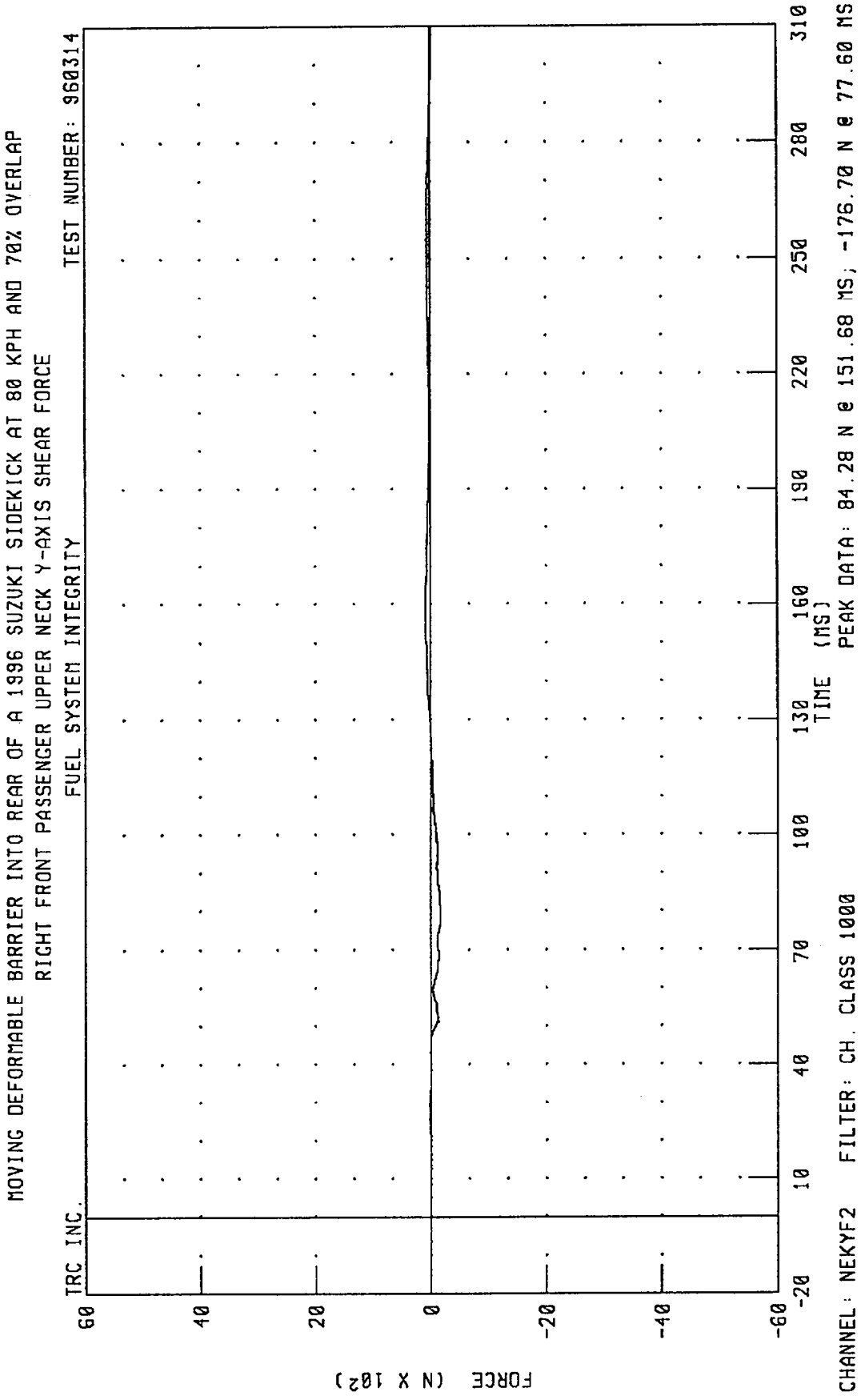

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TRC INC.
TEST NUMBER: 960314
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDYG2 FILTER: CH. CLASS 1000
PEAK DATA: 16.01 G @ 82.00 MS; -2.54 G @ 154.72 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDZG2 FILTER: CH. CLASS 1000
PEAK DATA: 24.76 G @ 47.76 MS; -35.13 G @ 74.40 MS

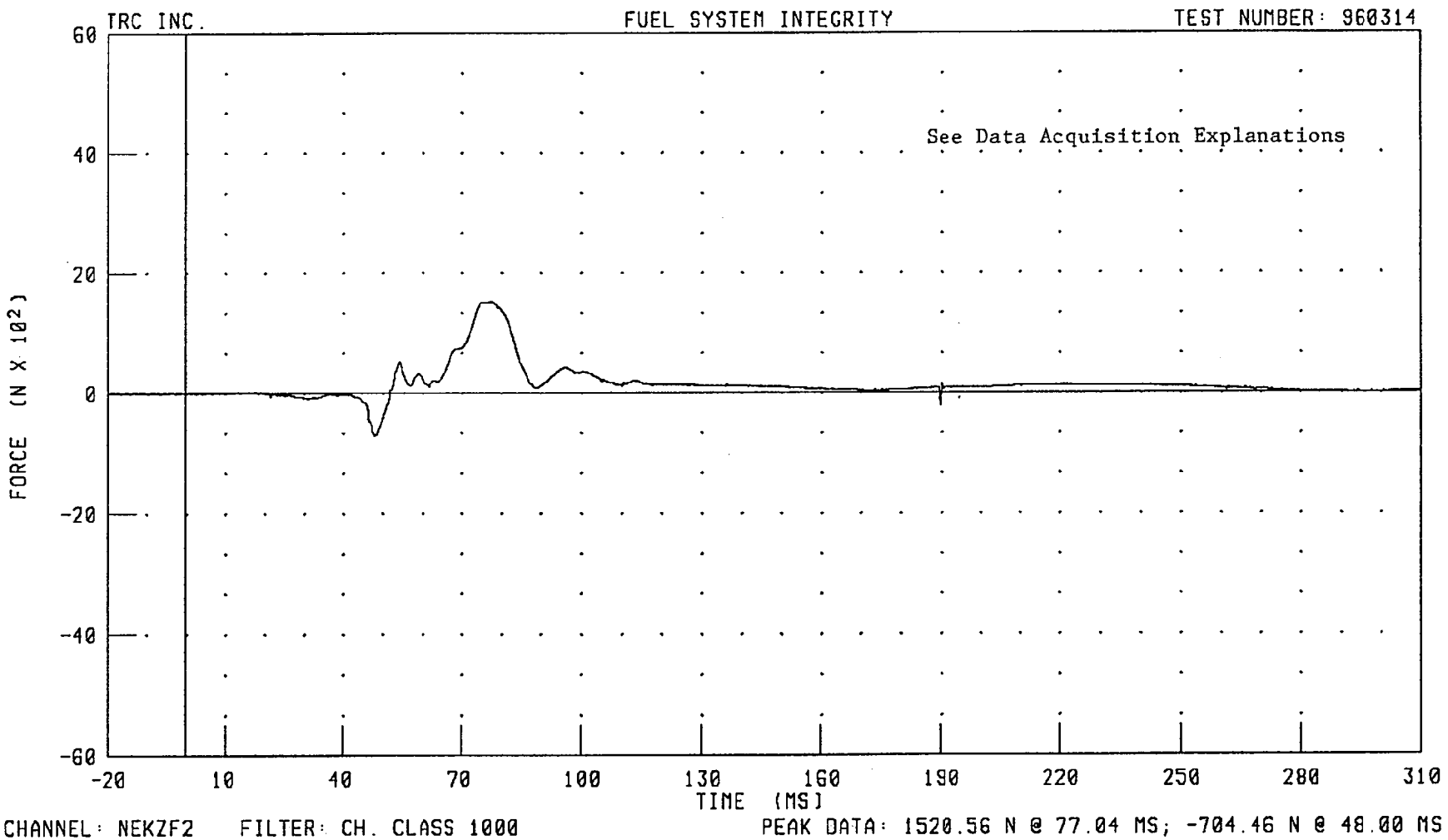

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
FUEL SYSTEM INTEGRITY
TRC INC.
TEST NUMBER: 960314
ACCELERATION (G)
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: HEDRG2 FILTER: CH. CLASS 1000
PEAK DATA: 82.89 G @ 83.28 MS; 0.02 G @ -20.00 MS

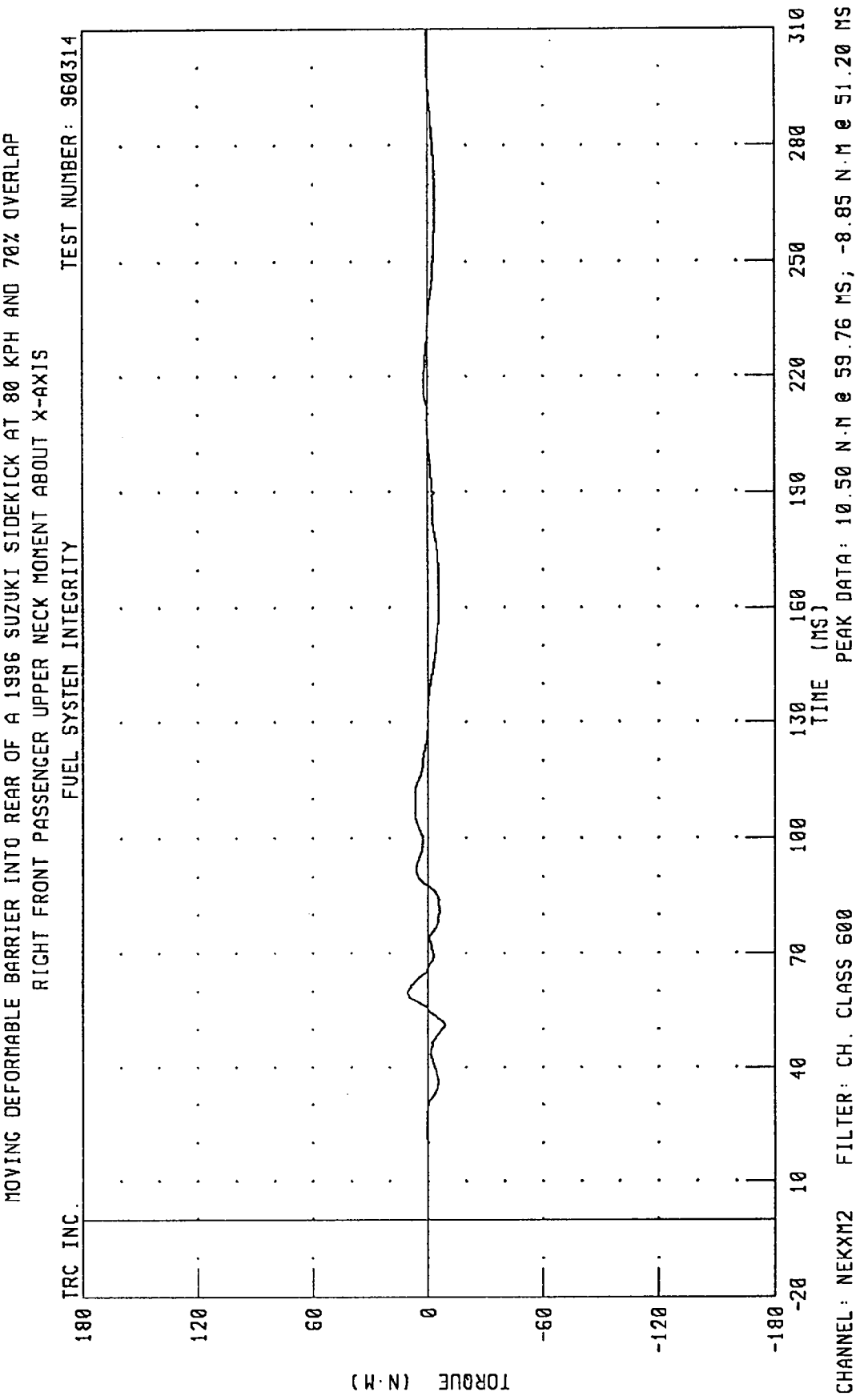
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK X-AXIS SHEAR FORCE



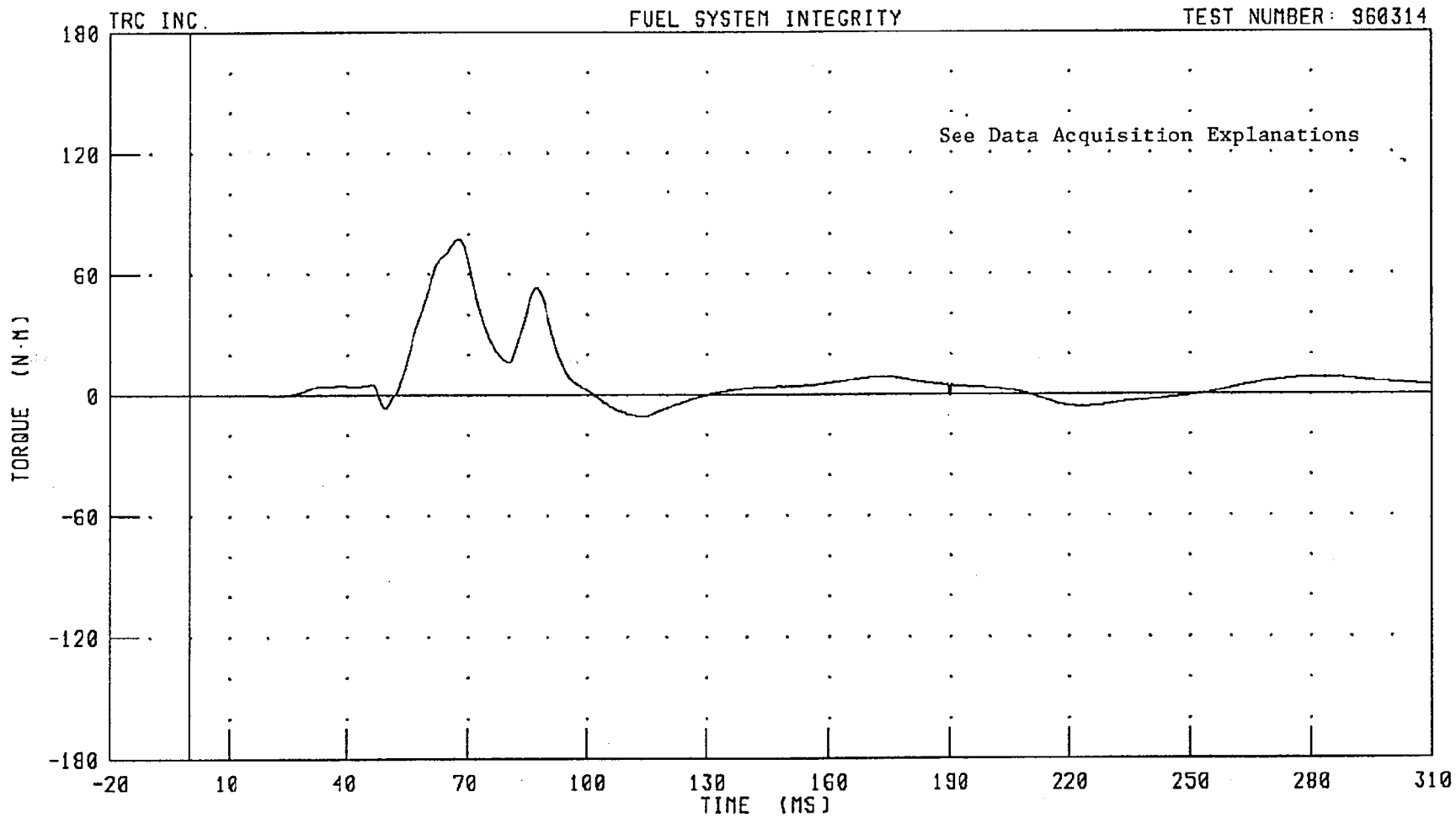

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK Y-AXIS SHEAR FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
60
40
20
0
-20
-40
-60
FORCE (N X 10²)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 84.28 N @ 151.68 MS; -176.70 N @ 77.60 MS
CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK Z-AXIS AXIAL FORCE




MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT X-AXIS
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
TORQUE (N·M)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 10.50 N·M @ 59.76 MS; -8.85 N·M @ 51.20 MS
CHANNEL: NEKXM2 FILTER: CH. CLASS 600

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Y-AXIS



CHANNEL: NEKYM2 FILTER: CH. CLASS 600

PEAK DATA: 77.45 N·M @ 67.68 MS; -10.82 N·M @ 114.08 MS

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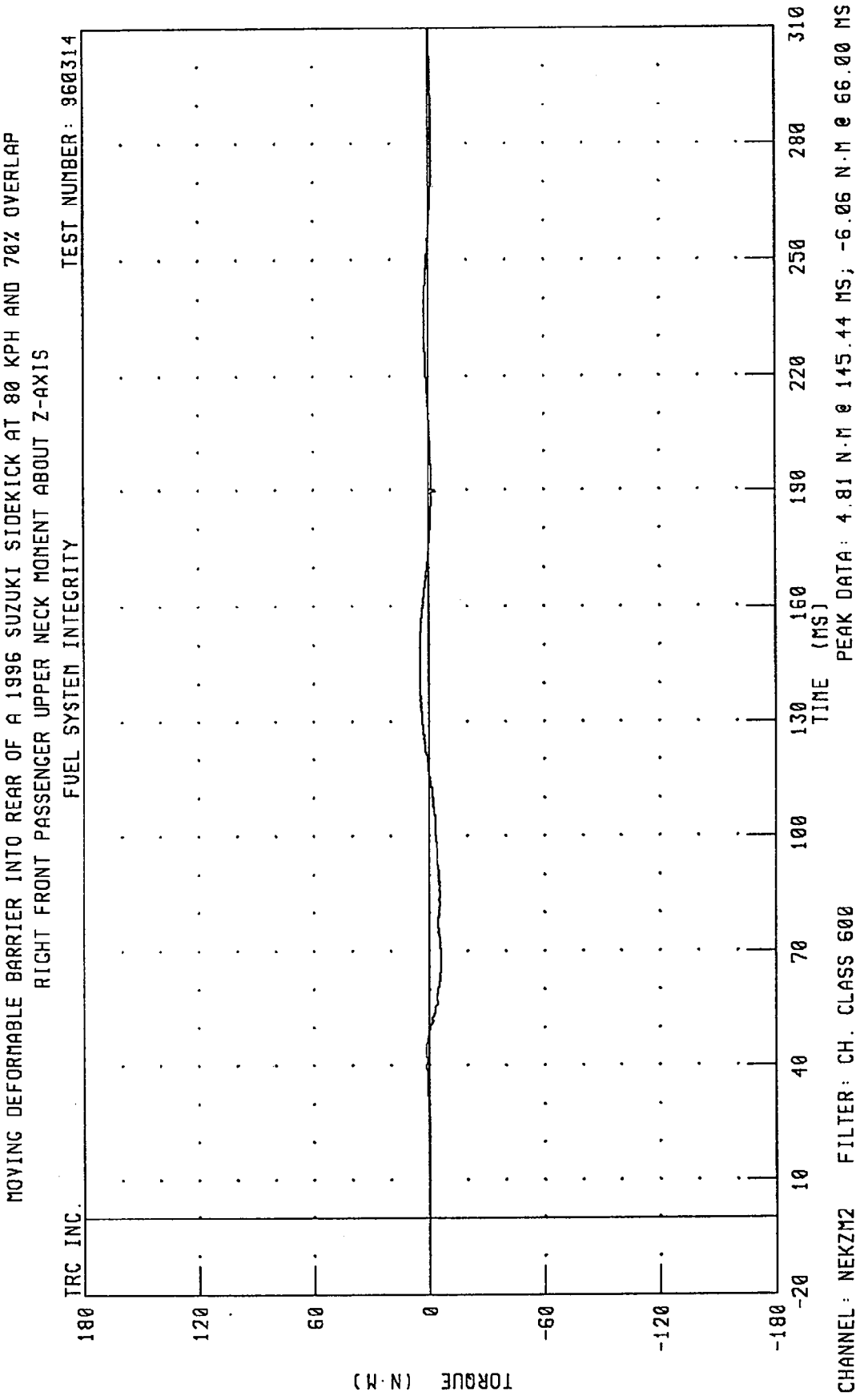
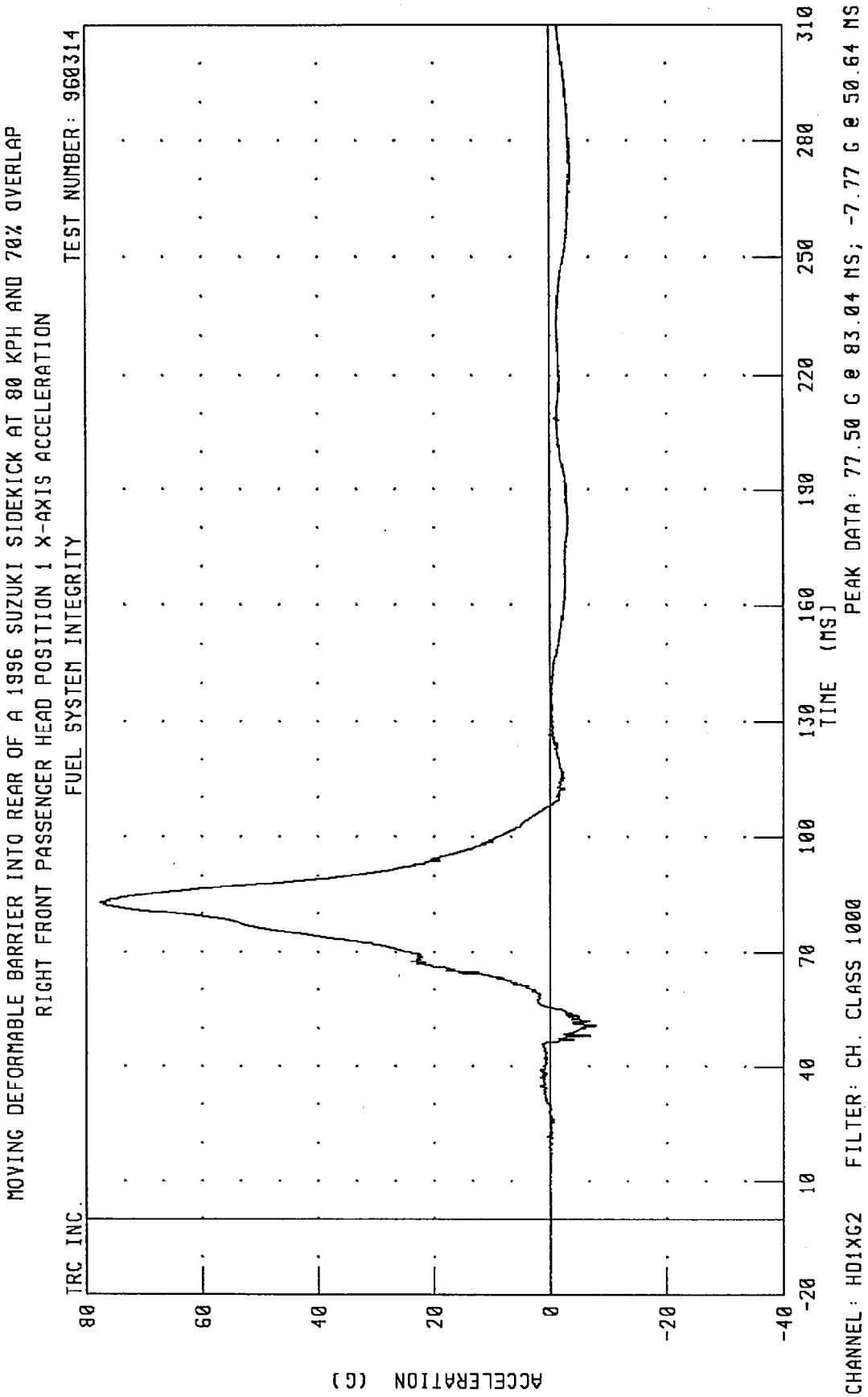
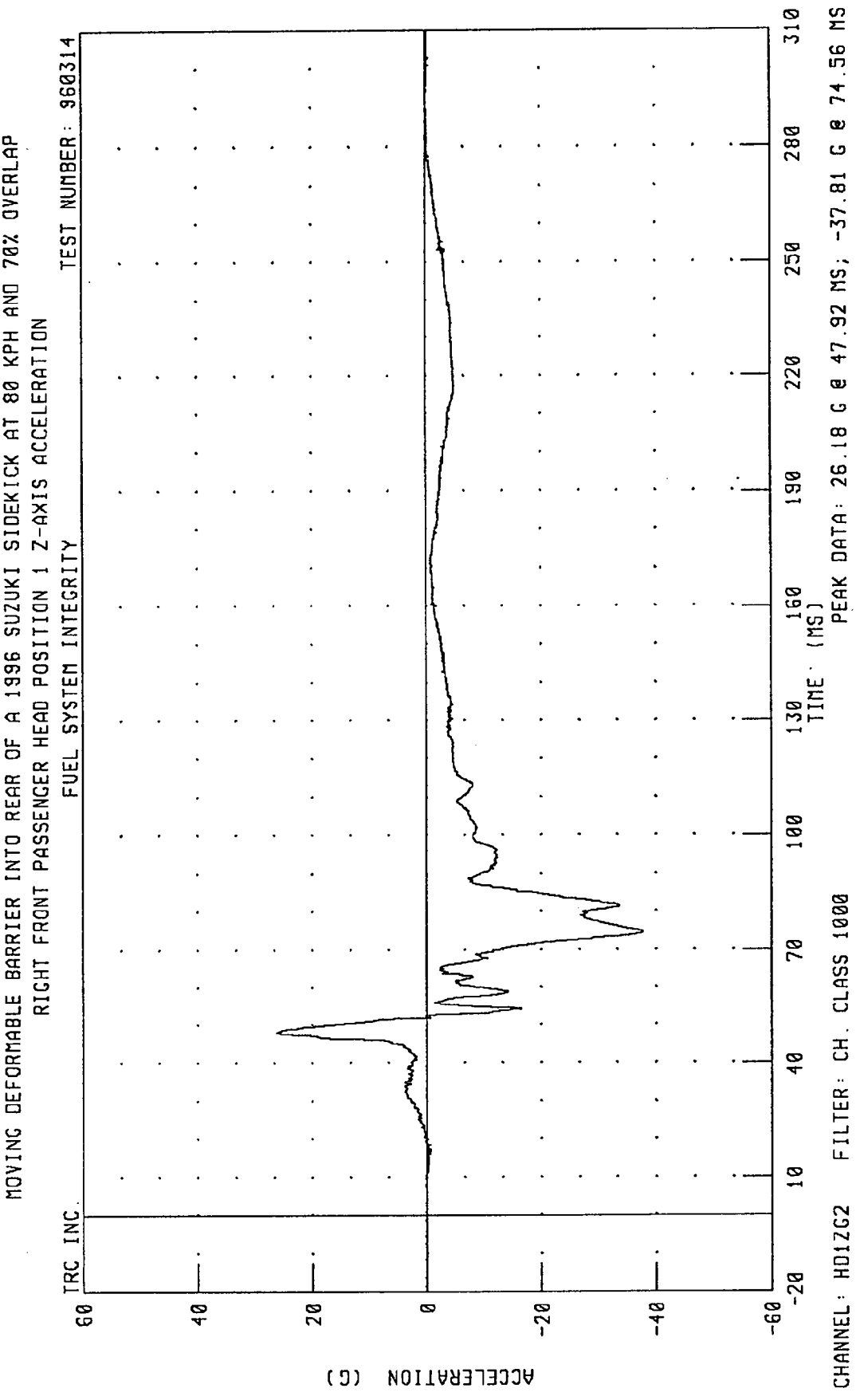
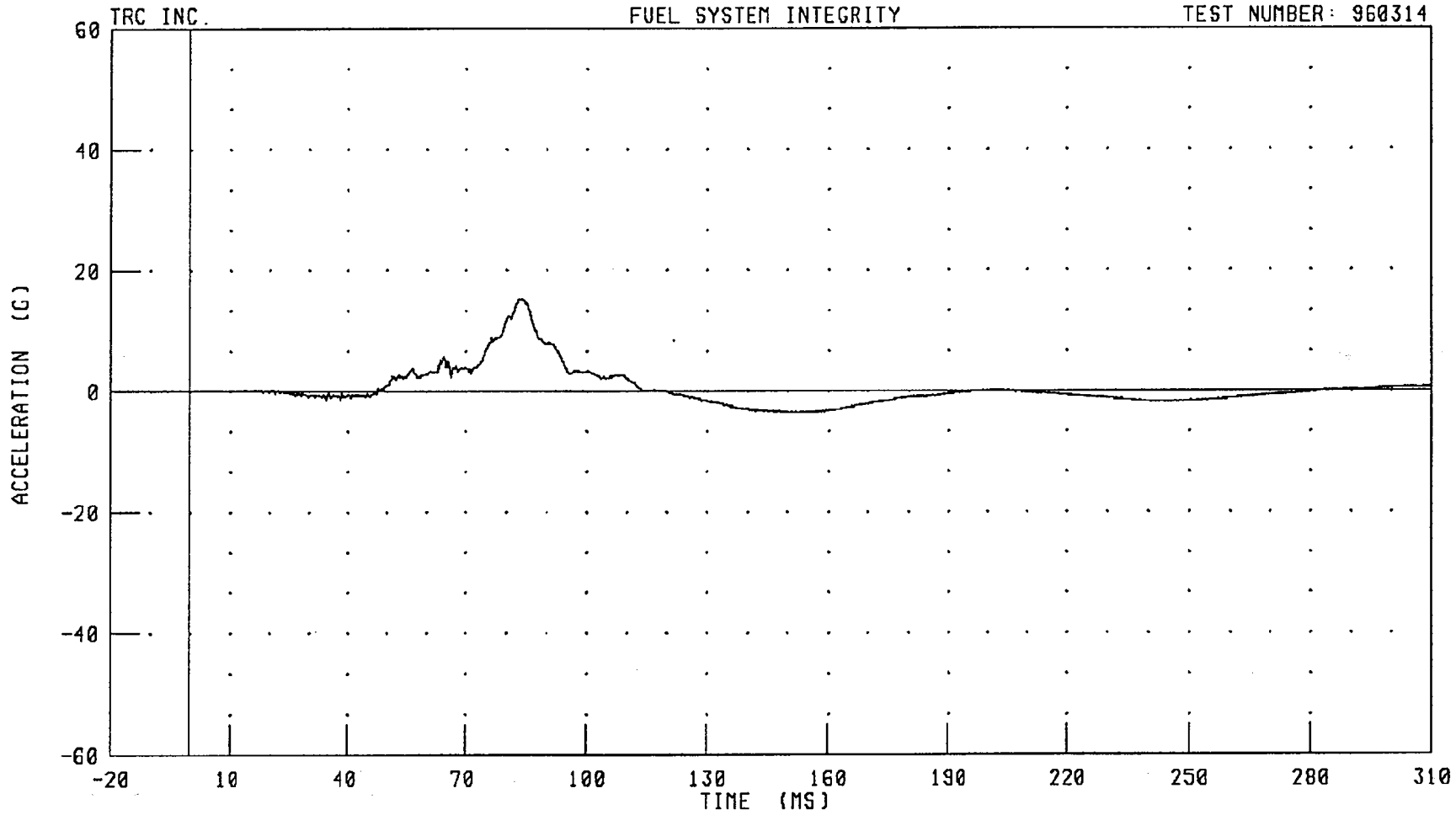

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER UPPER NECK MOMENT ABOUT Z-AXIS
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
TORQUE (N·M)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 4.81 N·M @ 145.44 MS; -6.06 N·M @ 66.00 MS
CHANNEL: NEKZM2 FILTER: CH. CLASS 600


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 1 X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
80
60
40
20
0
-20
-40
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 77.50 G @ 83.04 MS; -7.77 G @ 50.64 MS
CHANNEL: HD1XG2 FILTER: CH. CLASS 1000


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 1 Z-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 26.18 G @ 47.92 MS; -37.81 G @ 74.56 MS
CHANNEL: HD1ZG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 2 Y-AXIS ACCELERATION



CHANNEL: HD2YG2 FILTER: CH. CLASS 1000 PEAK DATA: 15.24 G @ 83.04 MS; -3.60 G @ 146.96 MS

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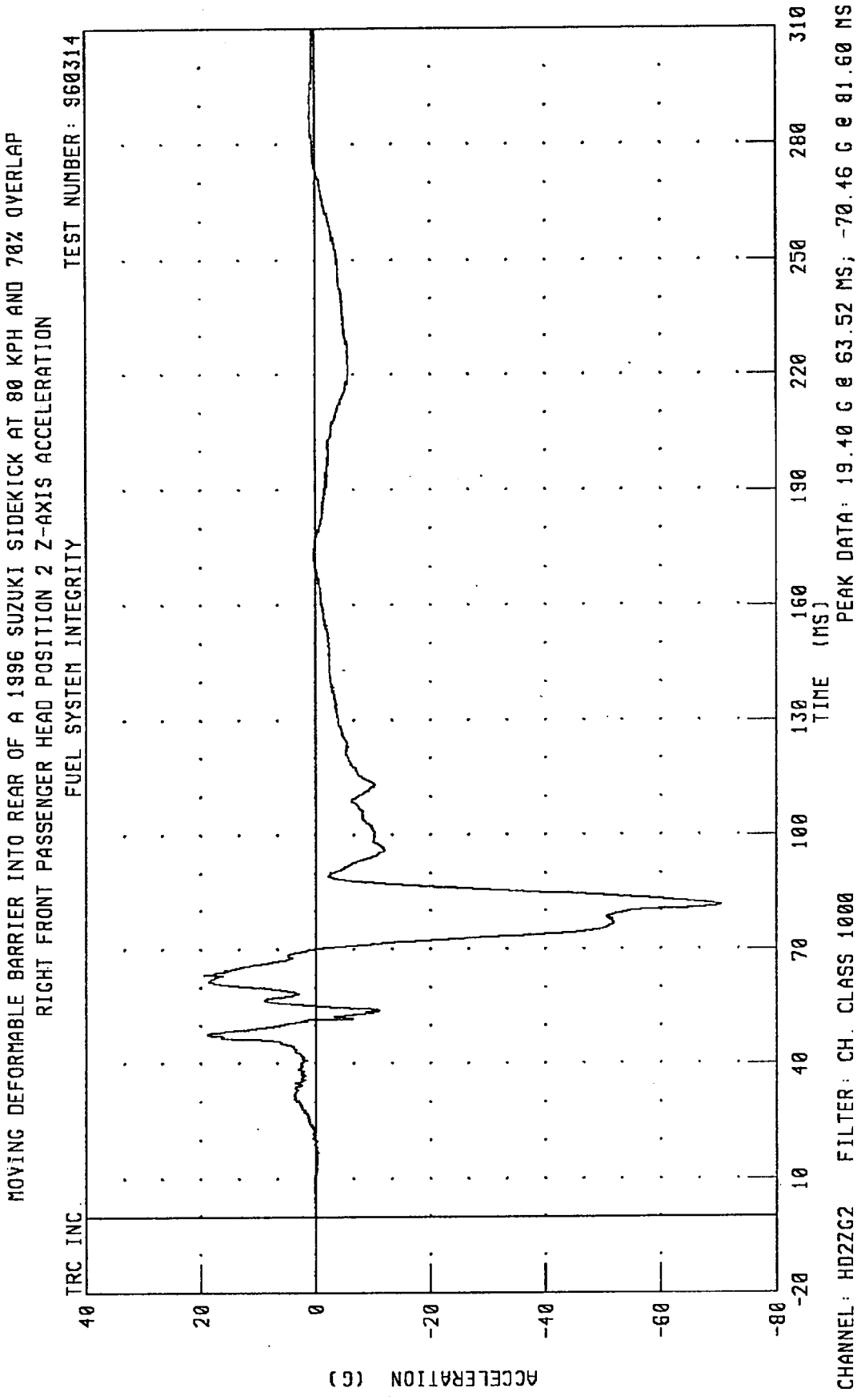
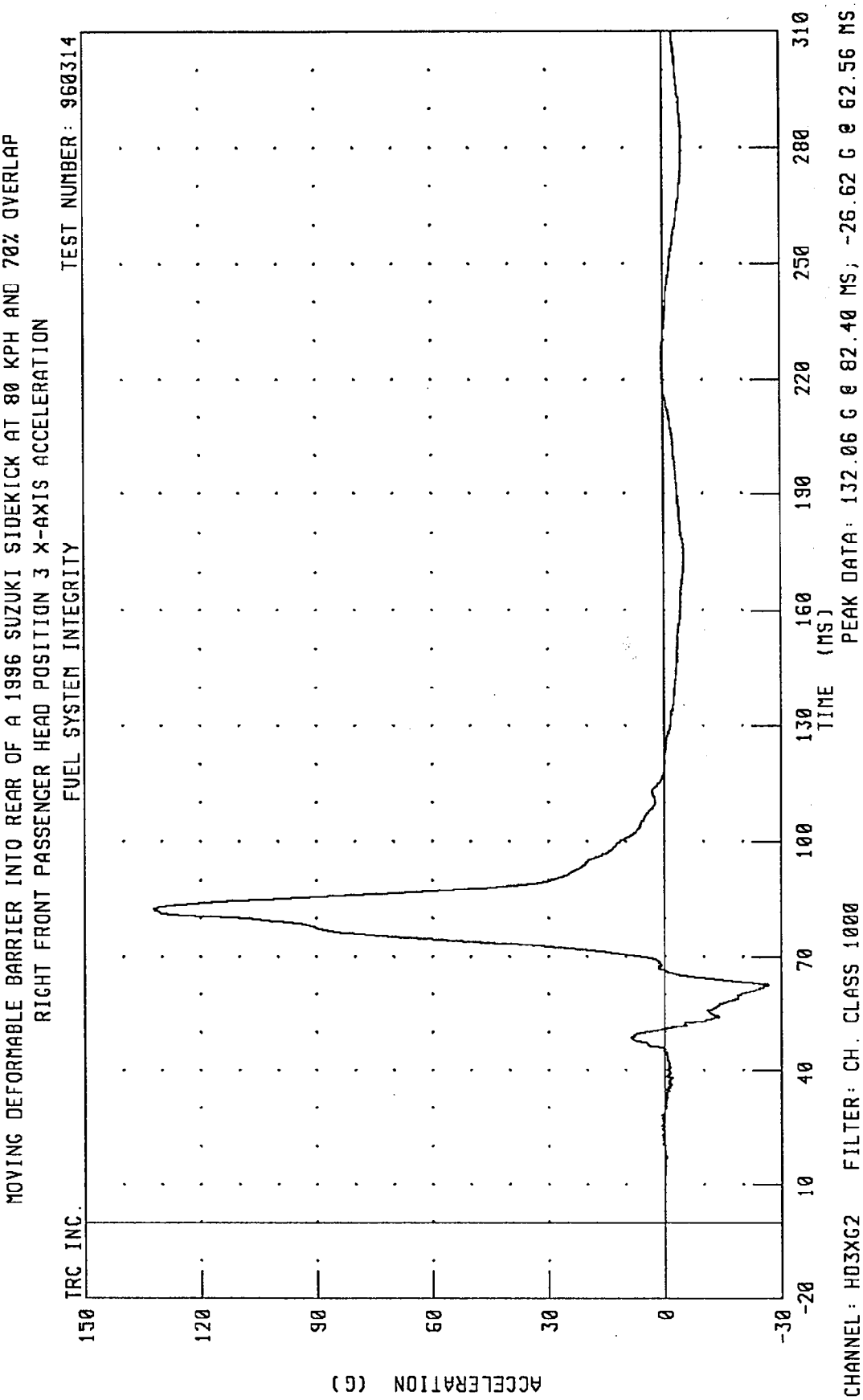
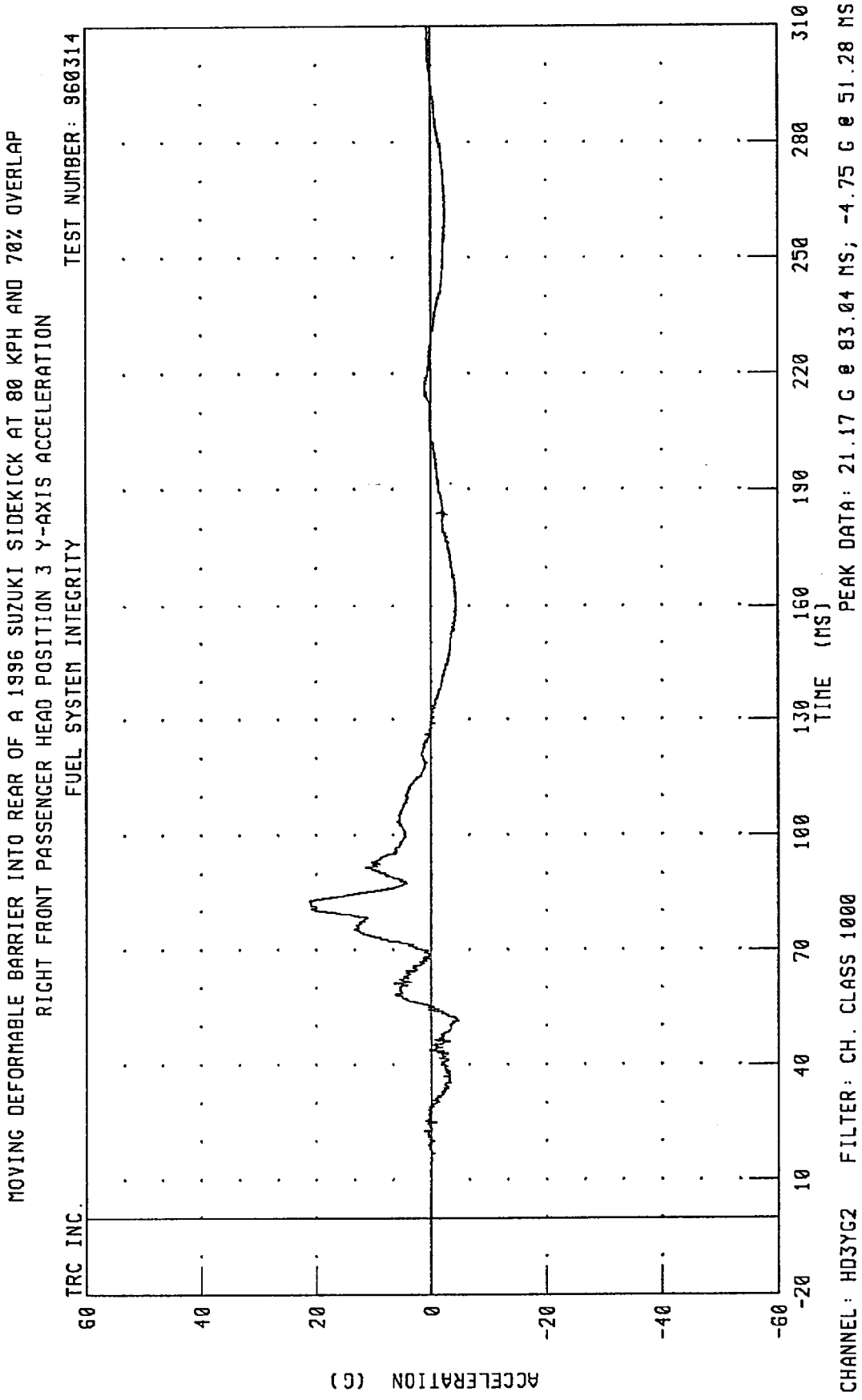
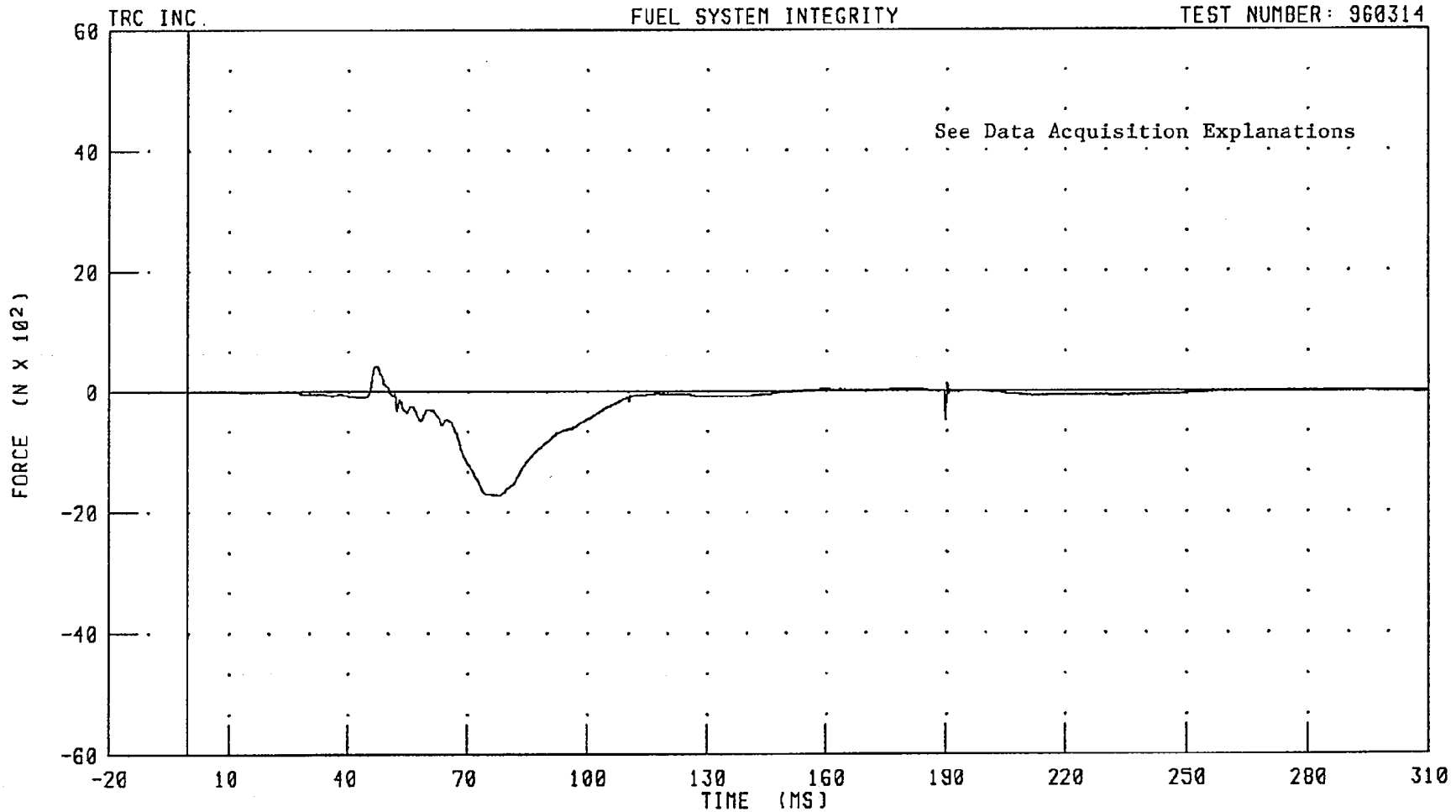

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 2 Z-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
40
20
0
-20
-40
-60
-80
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 19.40 G @ 63.52 MS; -70.46 G @ 81.60 MS
CHANNEL: HD2ZG2 FILTER: CH. CLASS 1000


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 3 X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 132.06 G @ 82.40 MS; -26.62 G @ 62.56 MS
CHANNEL: HD3XG2 FILTER: CH. CLASS 1000


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER HEAD POSITION 3 Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 21.17 G @ 83.04 MS; -4.75 G @ 51.28 MS
CHANNEL: HD3YG2 FILTER: CH. CLASS 1000

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK X-AXIS SHEAR FORCE



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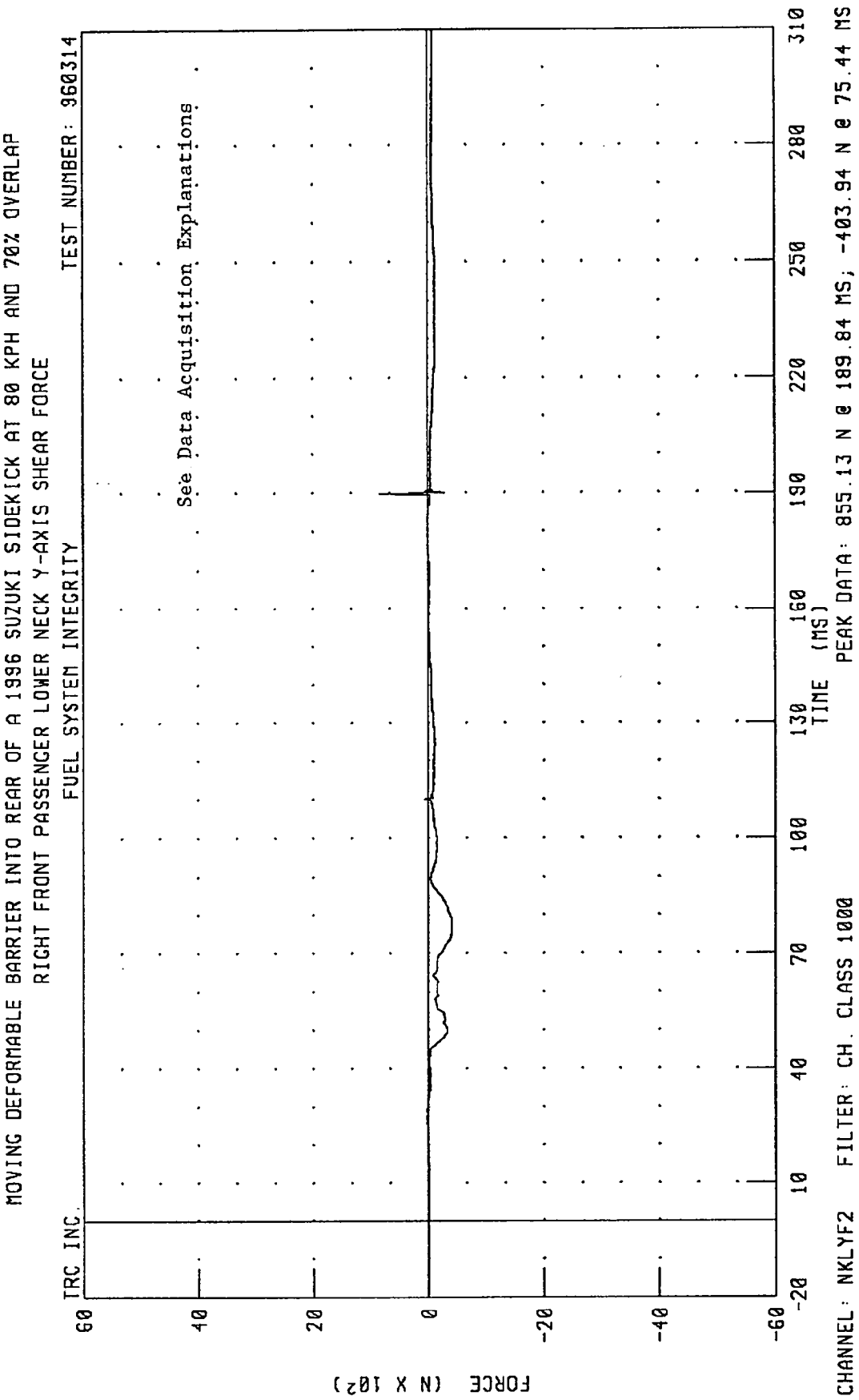
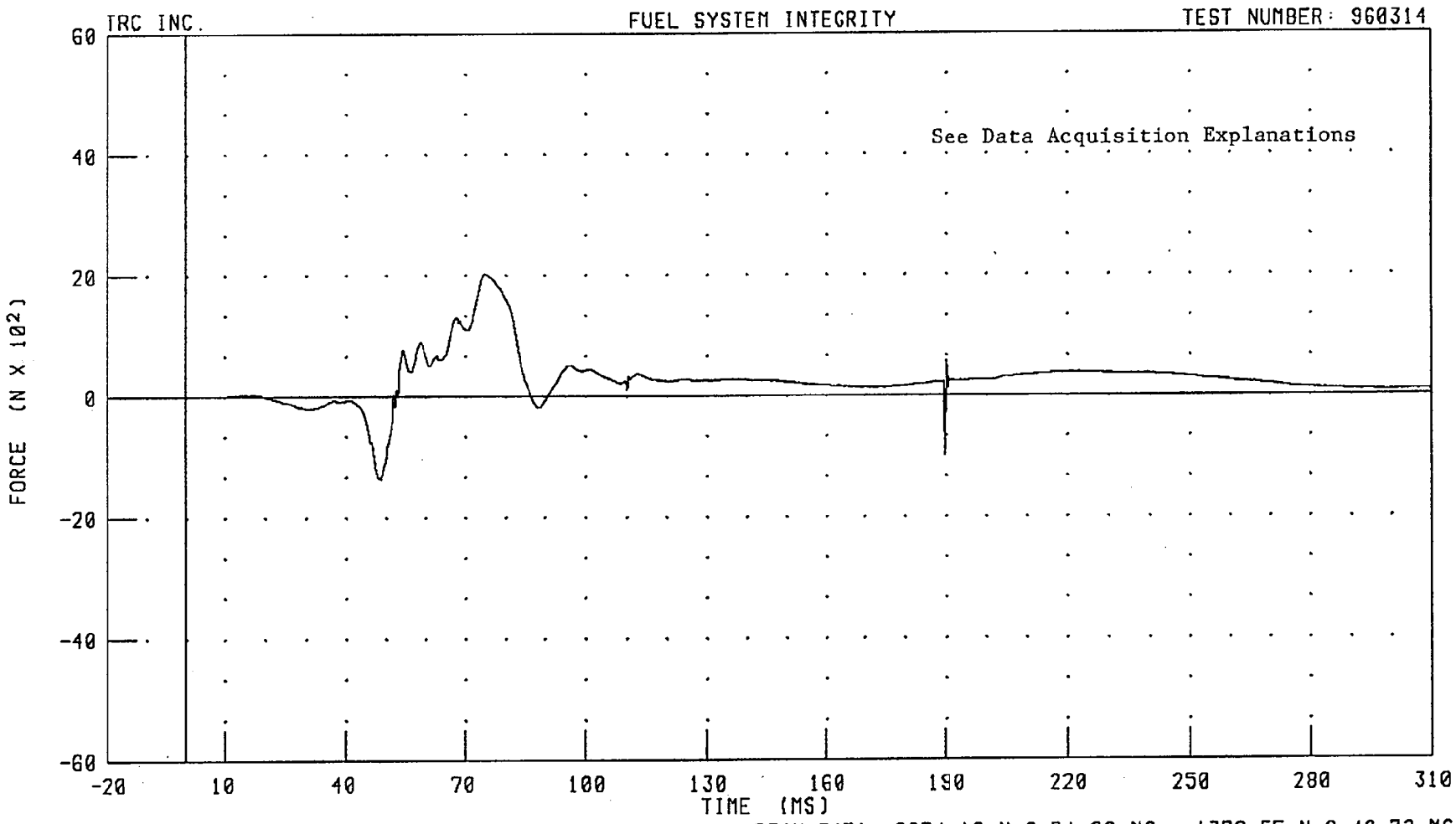
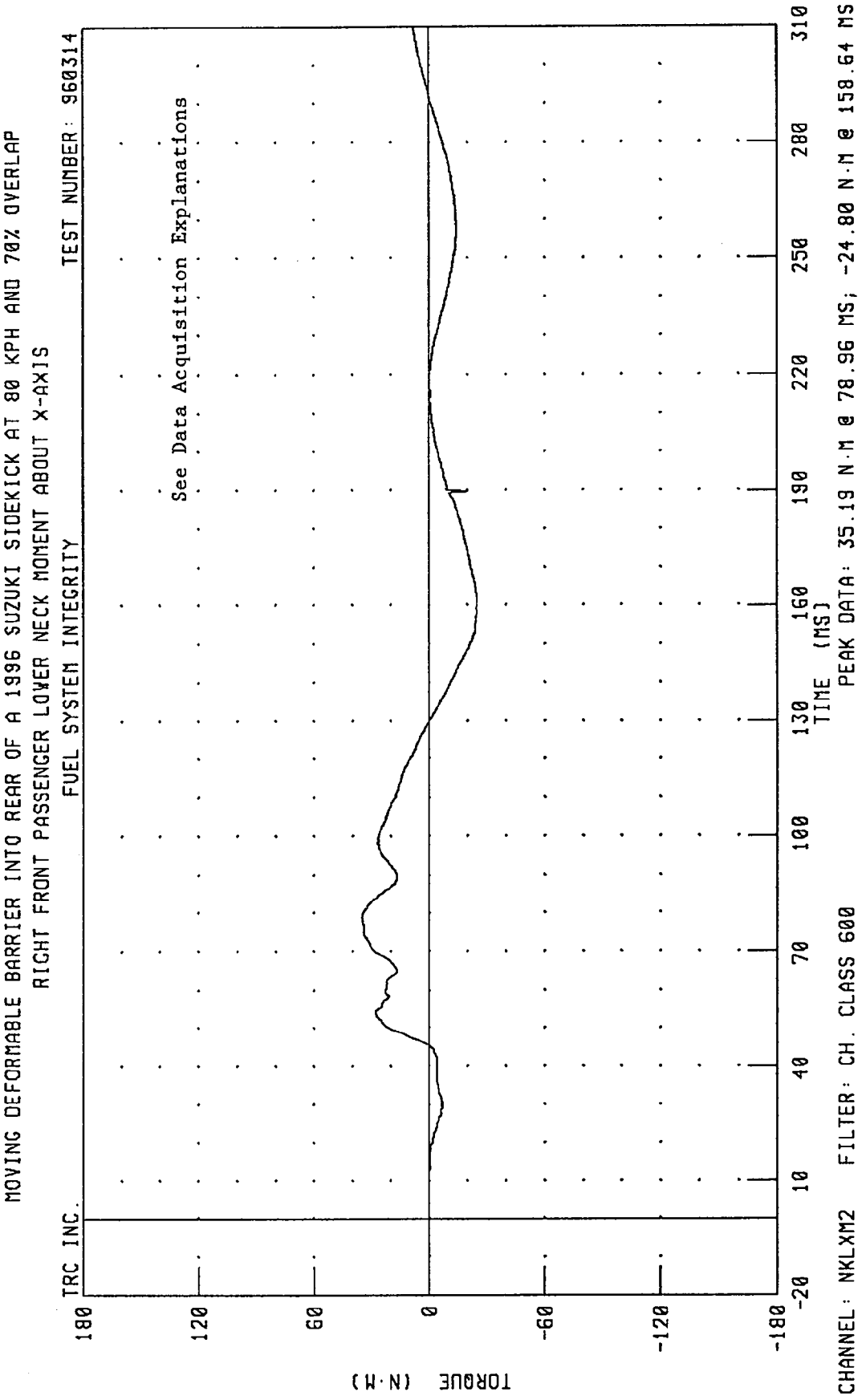

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK Y-AXIS SHEAR FORCE
TEST NUMBER: 960314
FUEL SYSTEM INTEGRITY
See Data Acquisition Explanations
TRC INC.
FORCE (N X 10²)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 855.13 N @ 189.84 MS; -403.94 N @ 75.44 MS
CHANNEL: NKLYF2 FILTER: CH. CLASS 1000

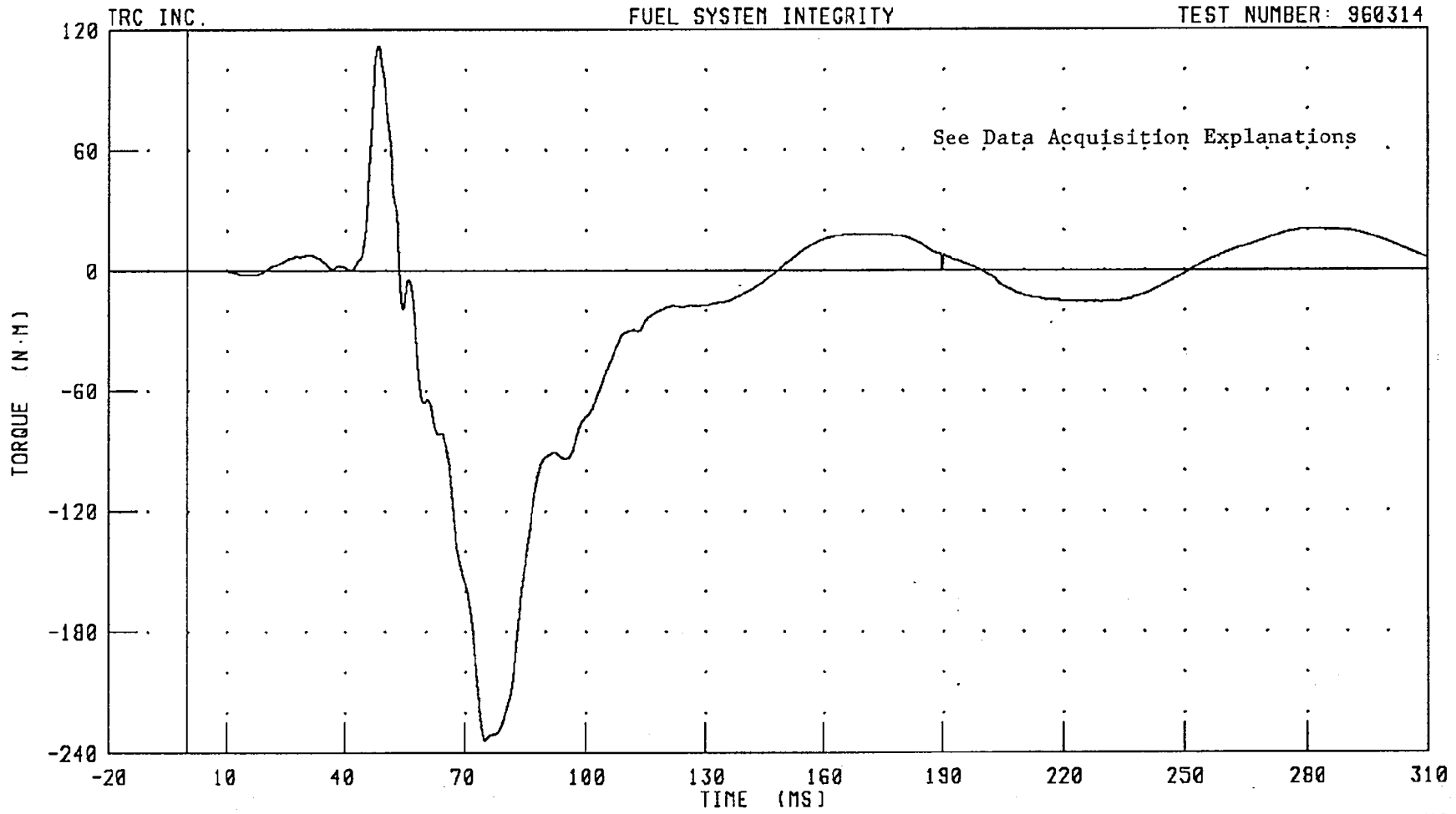
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK Z-AXIS AXIAL FORCE



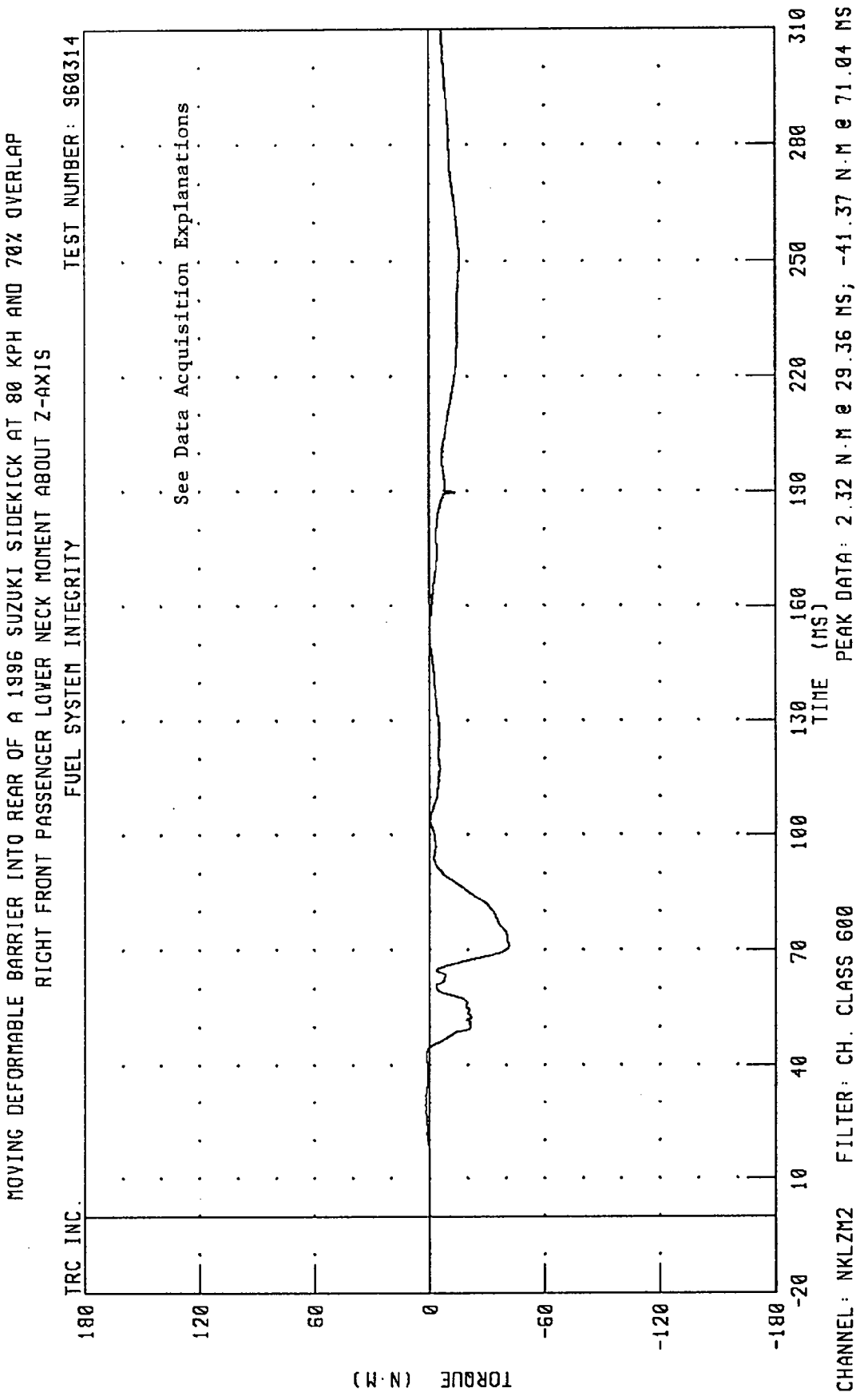
CHANNEL: NKLZF2 FILTER: CH. CLASS 1000 PEAK DATA: 2034.18 N @ 74.96 MS; -1370.55 N @ 48.72 MS

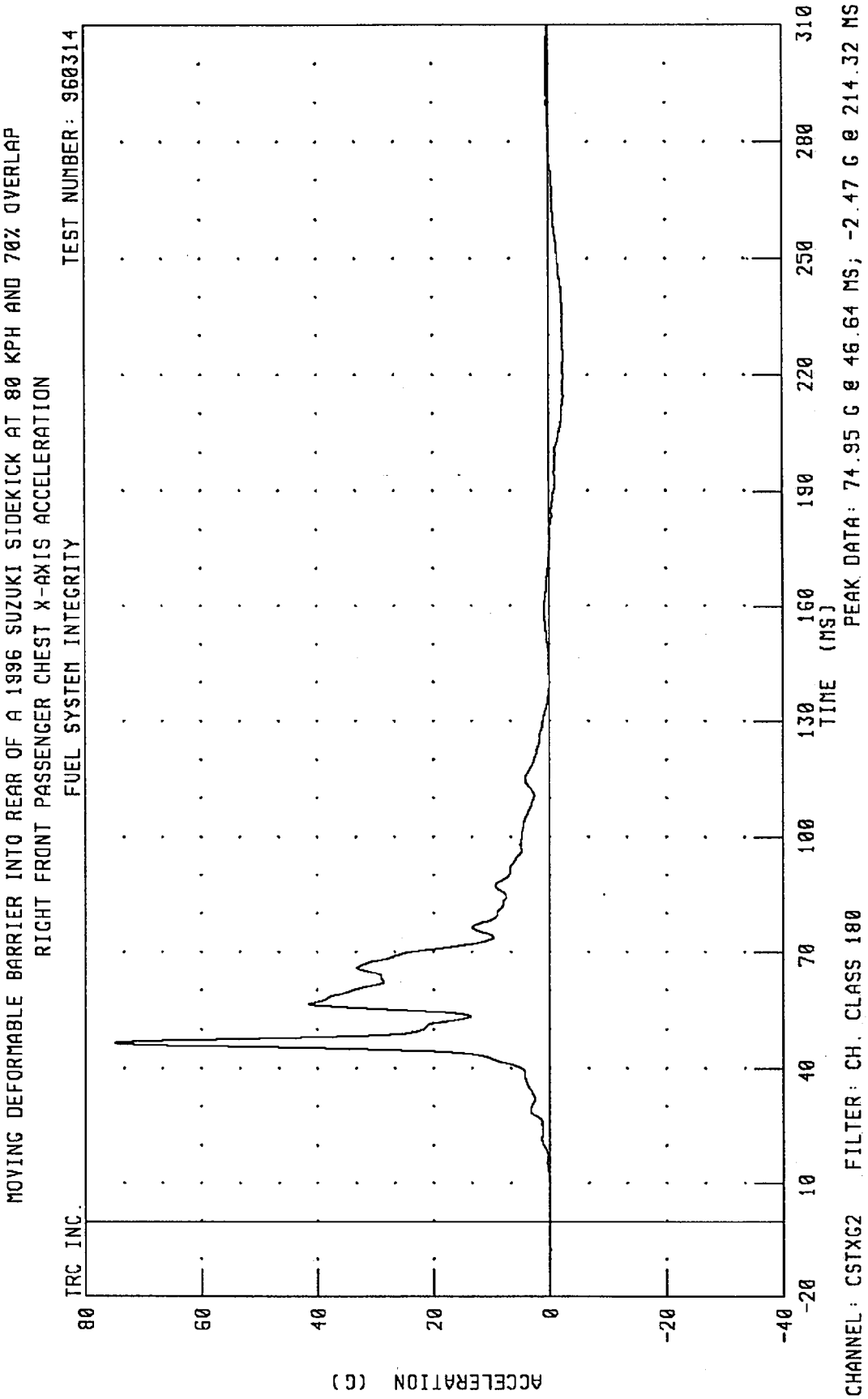

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT X-AXIS
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
See Data Acquisition Explanations
TORQUE (N·M)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: NKLXM2 FILTER: CH. CLASS 600
PEAK DATA: 35.19 N·M @ 78.96 MS; -24.80 N·M @ 158.64 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Y-AXIS



CHANNEL: NKLYM2 FILTER: CH. CLASS 600 PEAK DATA: 111.99 N·M @ 48.40 MS; -233.72 N·M @ 74.96 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER LOWER NECK MOMENT ABOUT Z-AXIS
TRC INC.
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
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: NKLZM2 FILTER: CH. CLASS 600
PEAK DATA: 2.32 N·M @ 29.36 MS; -41.37 N·M @ 71.04 MS



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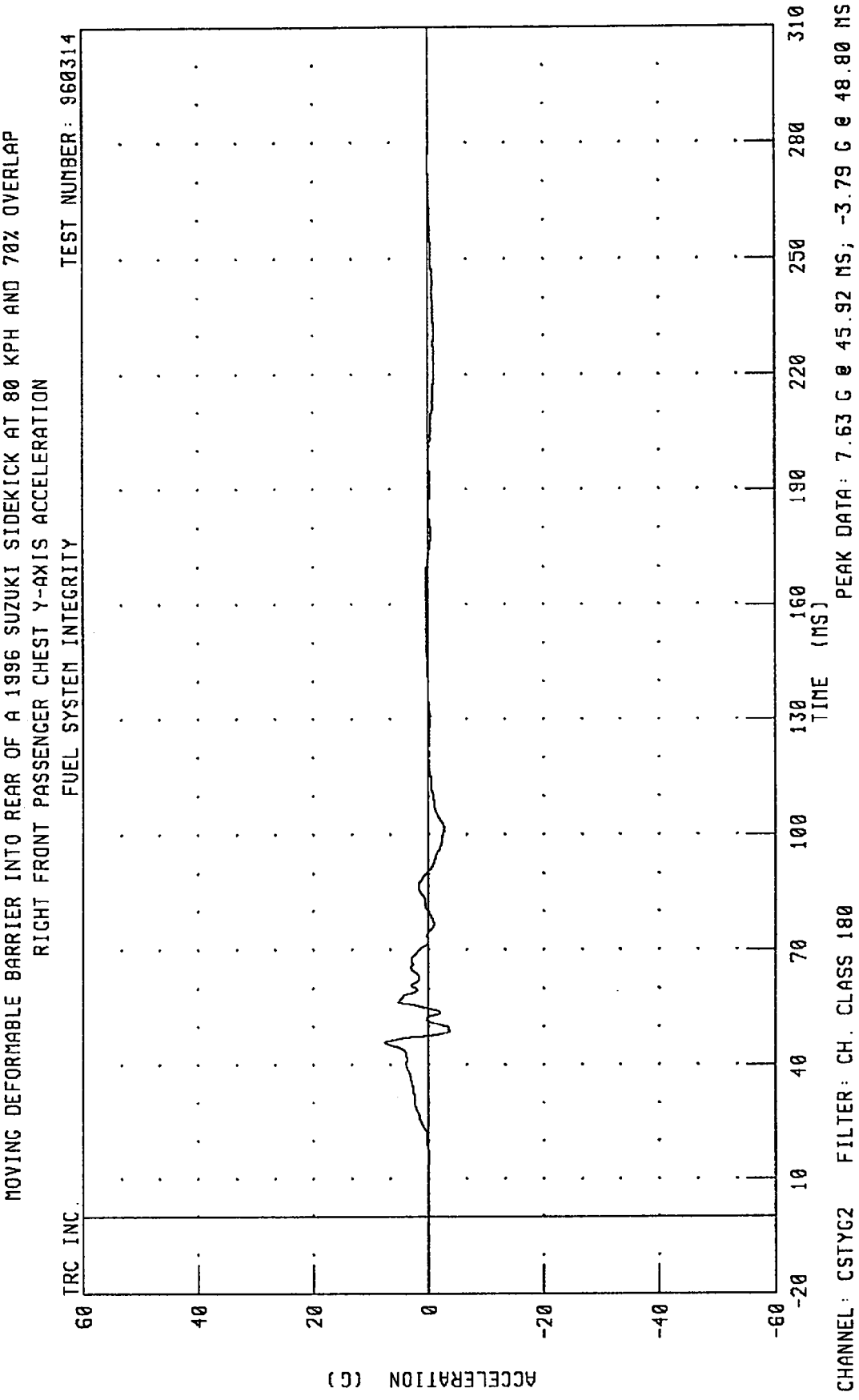
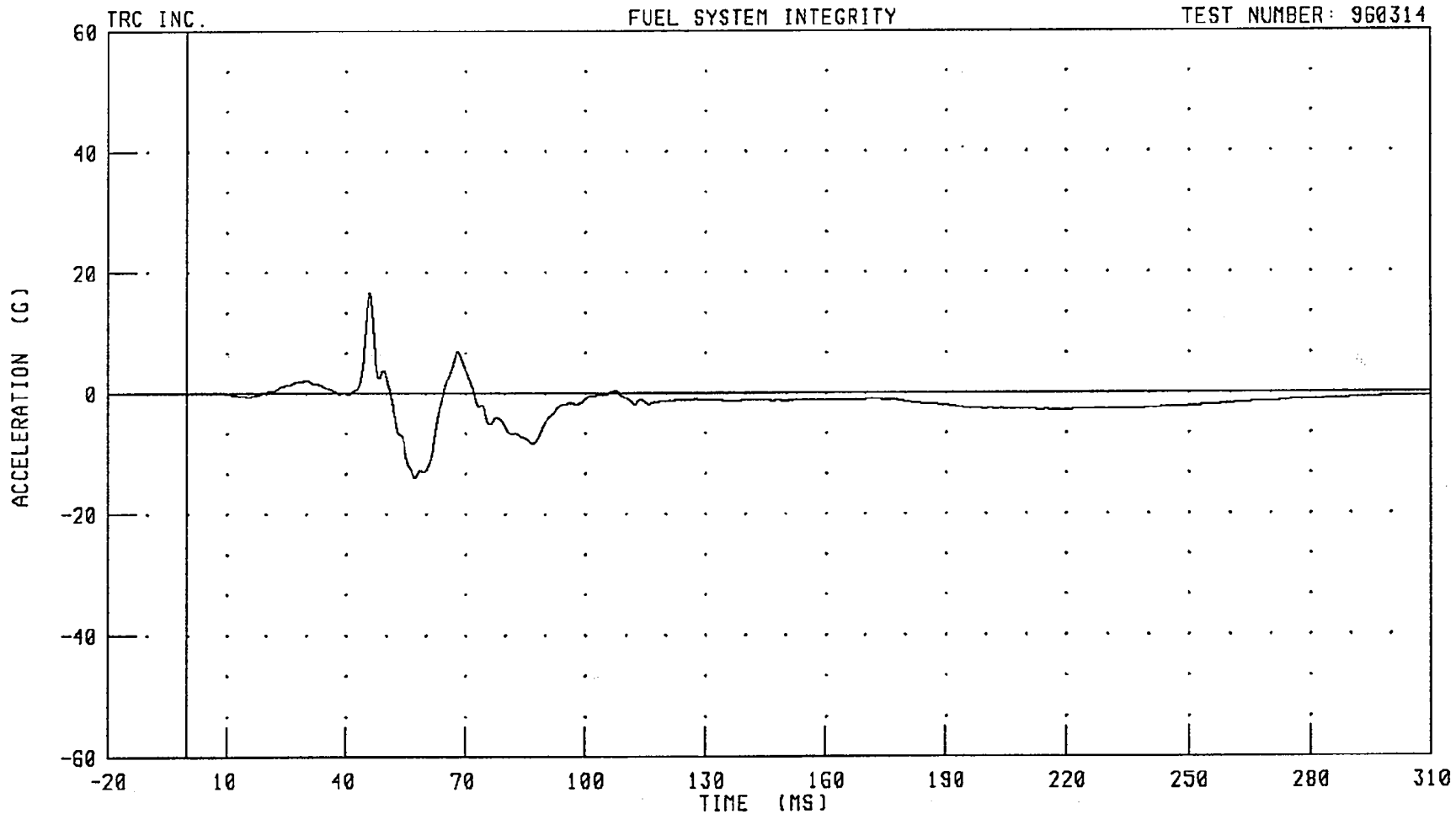

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTYG2 FILTER: CH. CLASS 180
PEAK DATA: 7.63 G @ 45.92 MS; -3.79 G @ 48.80 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION



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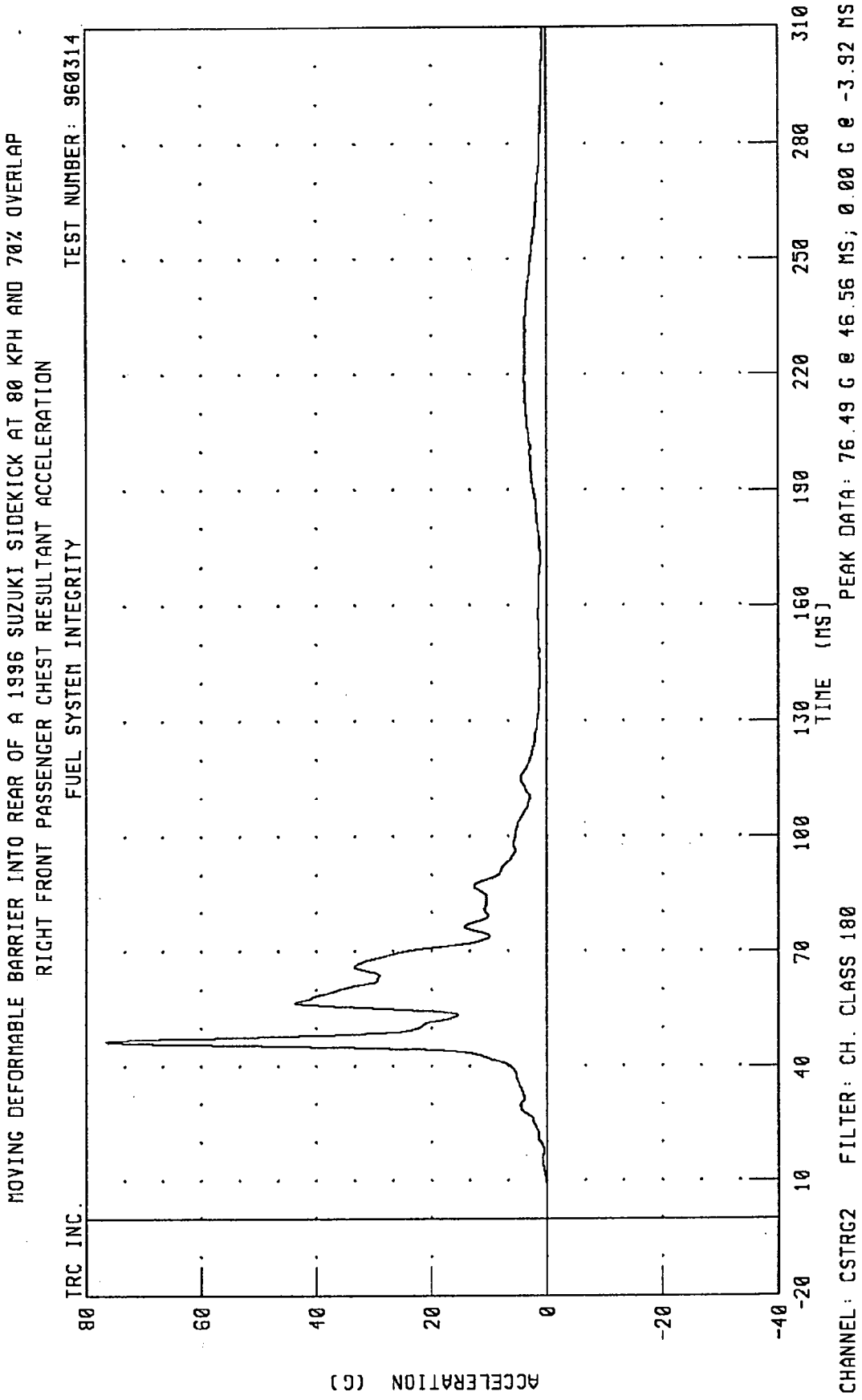
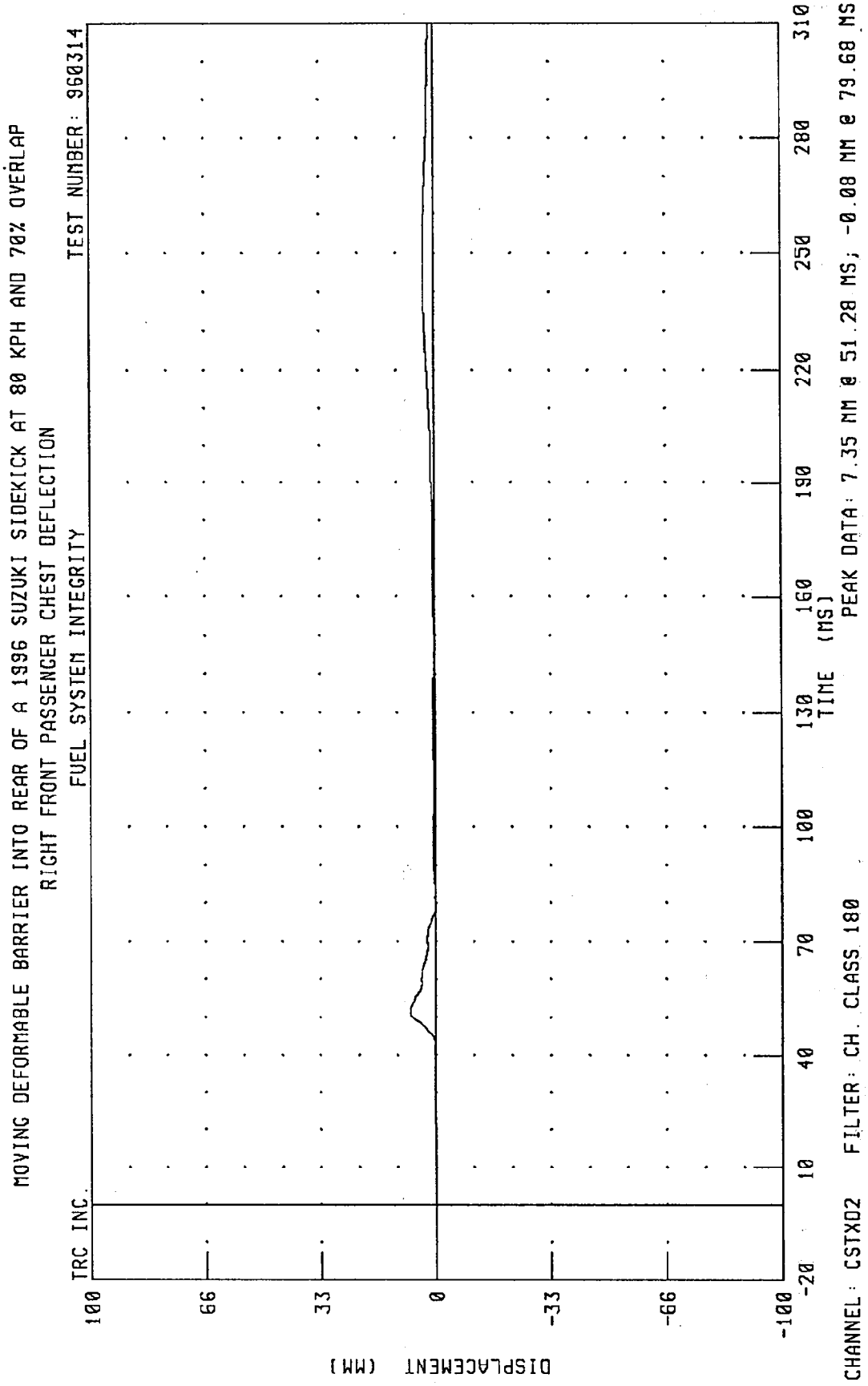
AS664129


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
80
60
40
20
0
-20
-40
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: CSTRG2 FILTER: CH. CLASS 180
PEAK DATA: 76.49 G @ 46.56 MS; 0.00 G @ -3.92 MS



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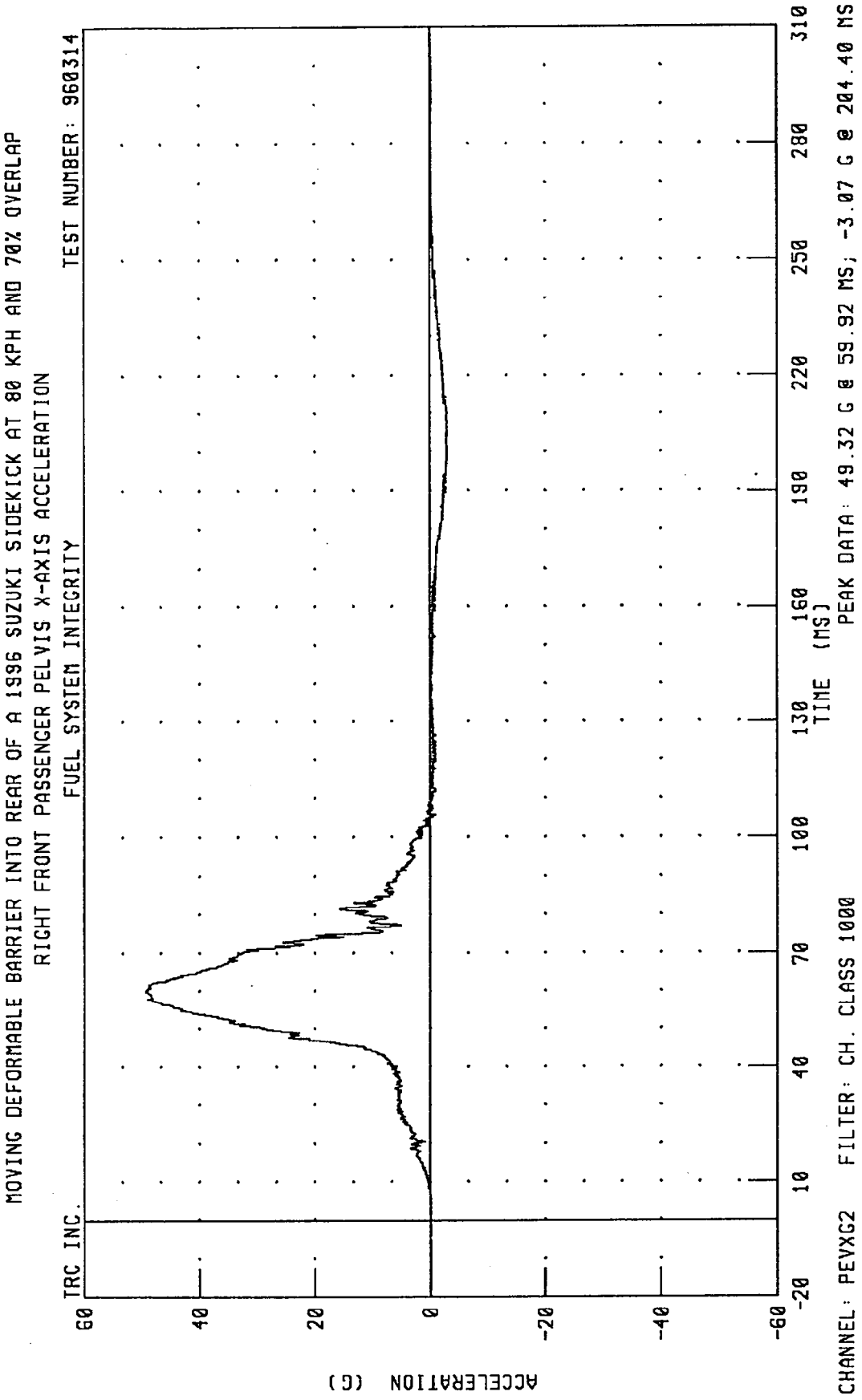
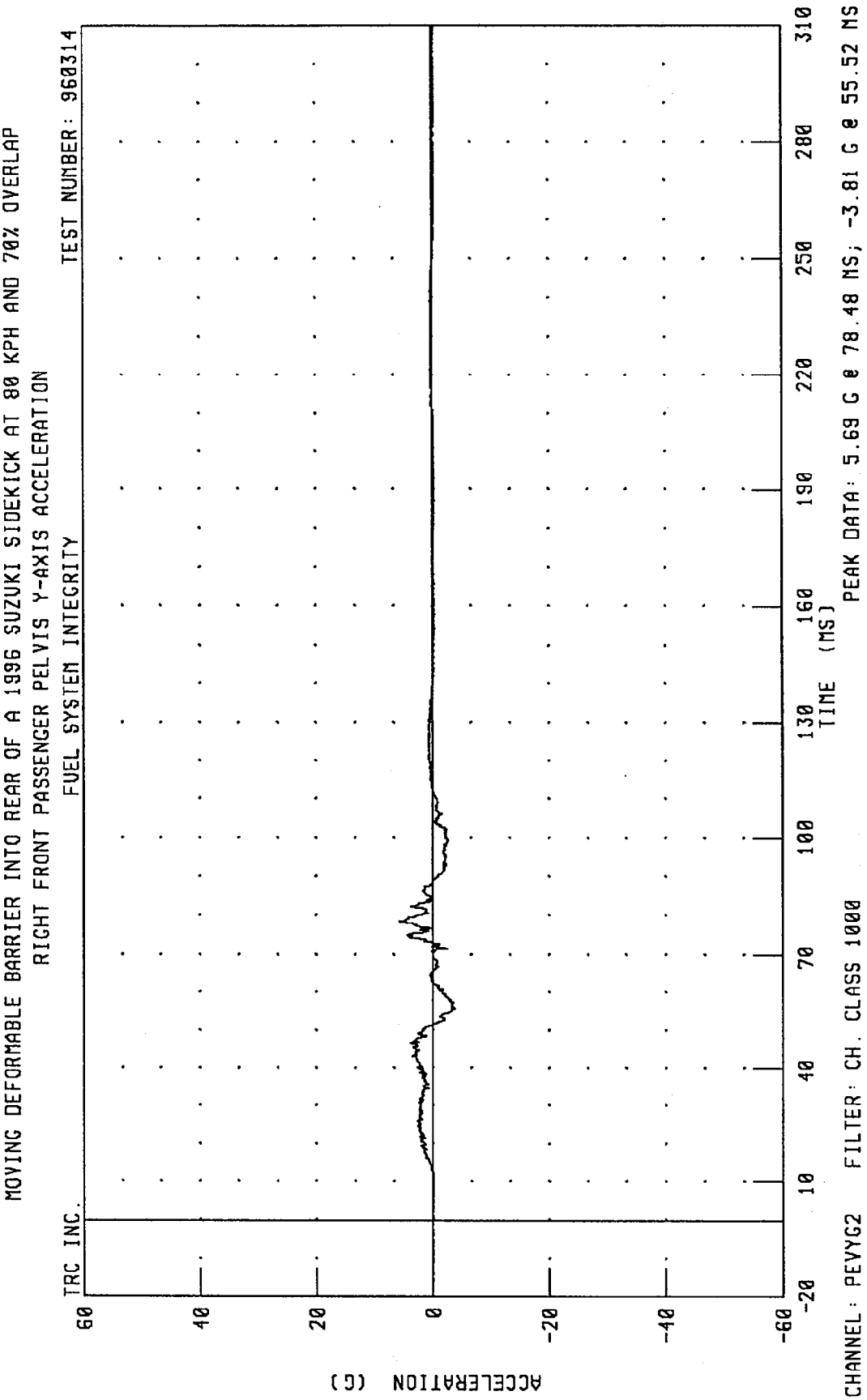
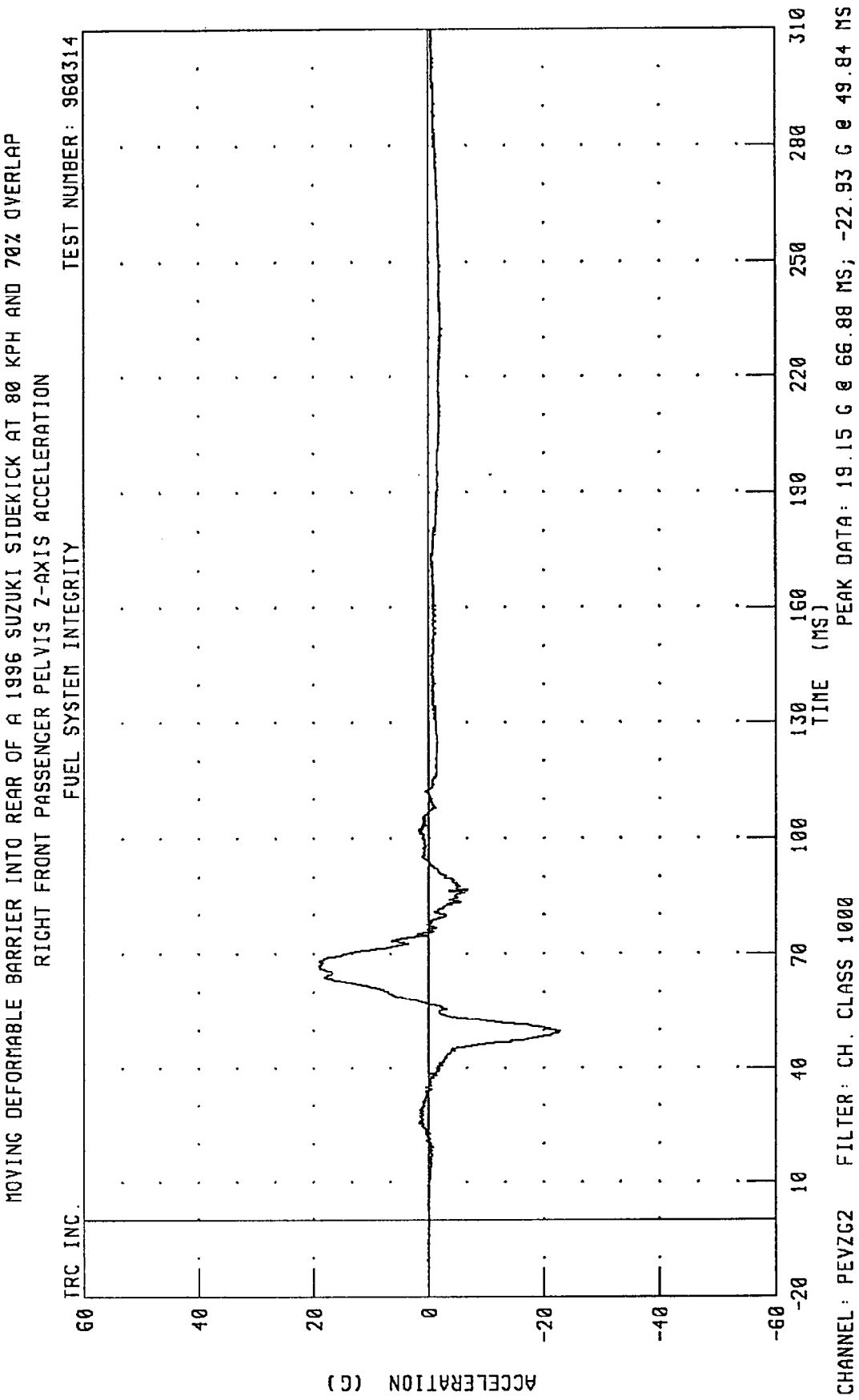
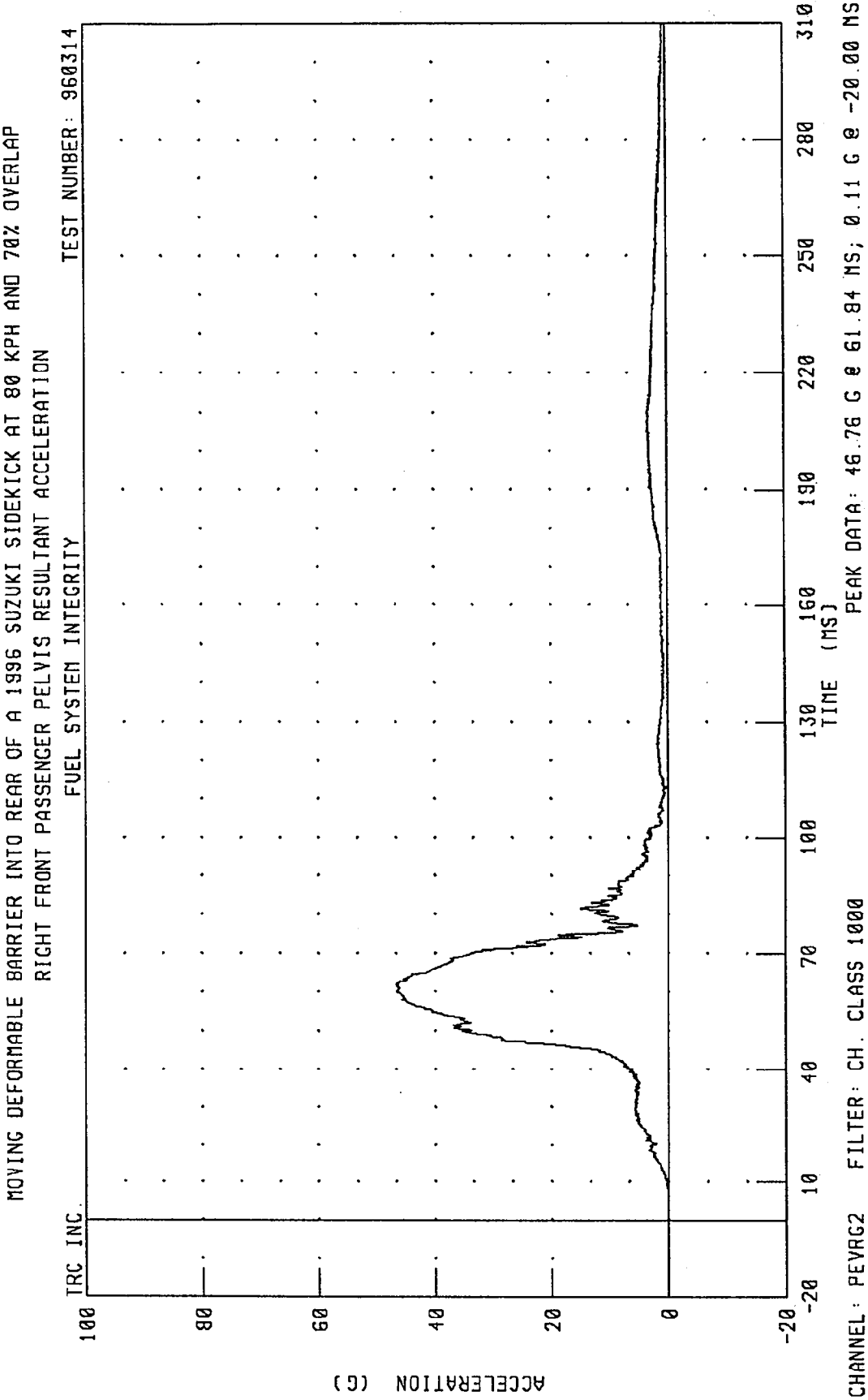
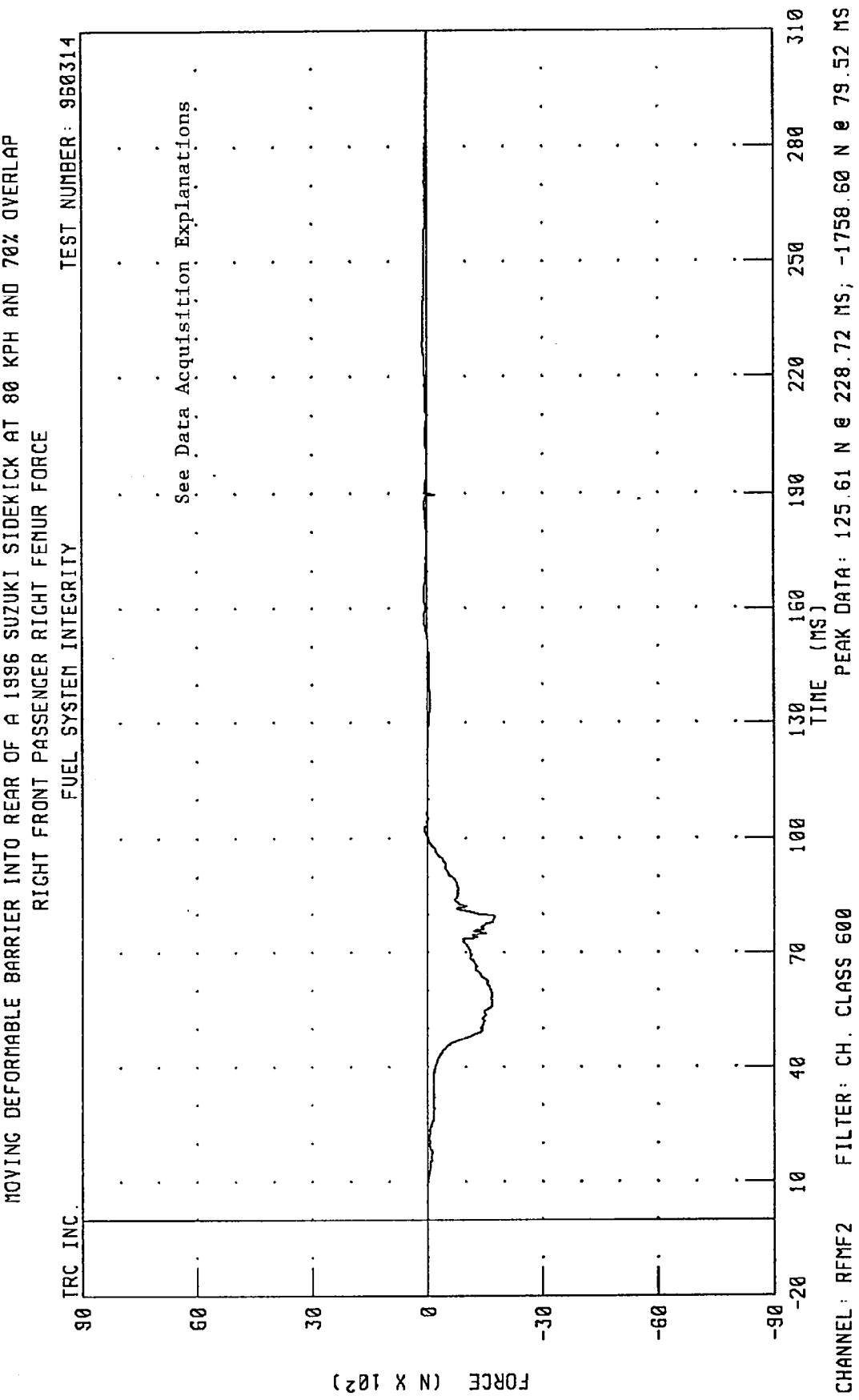
AS664131

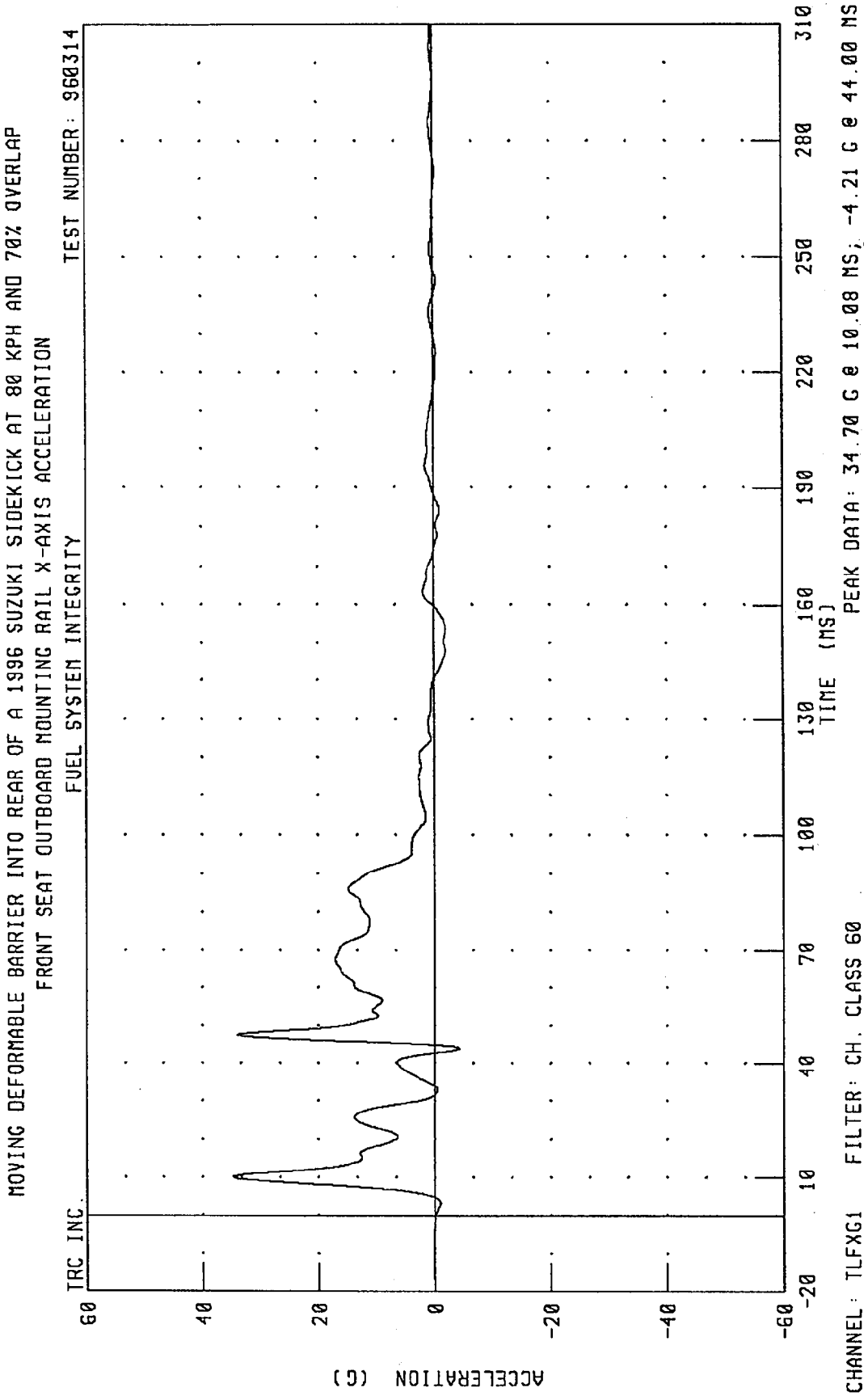

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVXG2 FILTER: CH. CLASS 1000
PEAK DATA: 49.32 G @ 59.92 MS; -3.07 G @ 204.40 MS

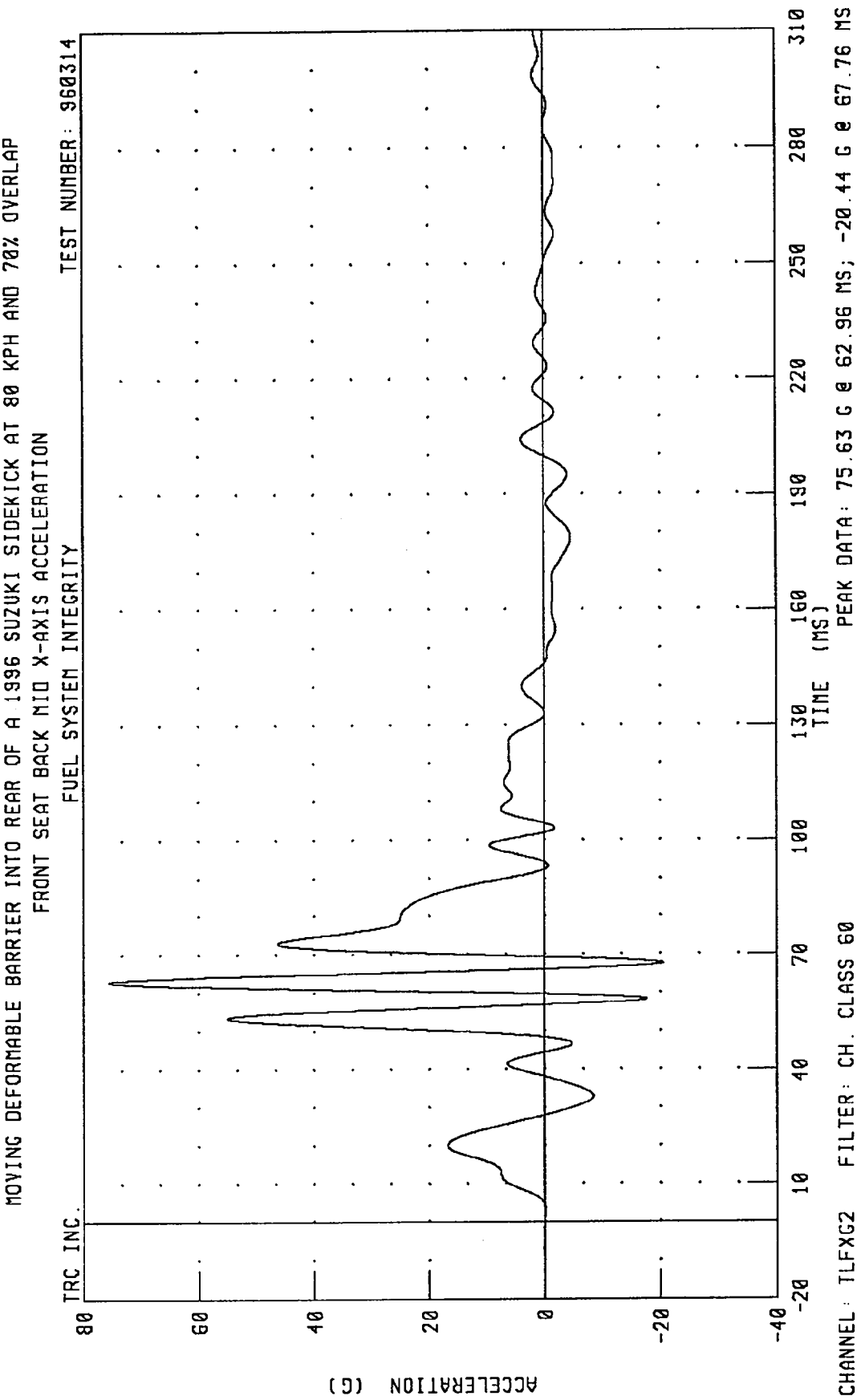

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS Y-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 5.69 G @ 78.48 MS; -3.81 G @ 55.52 MS
CHANNEL: PEVYG2 FILTER: CH. CLASS 1000

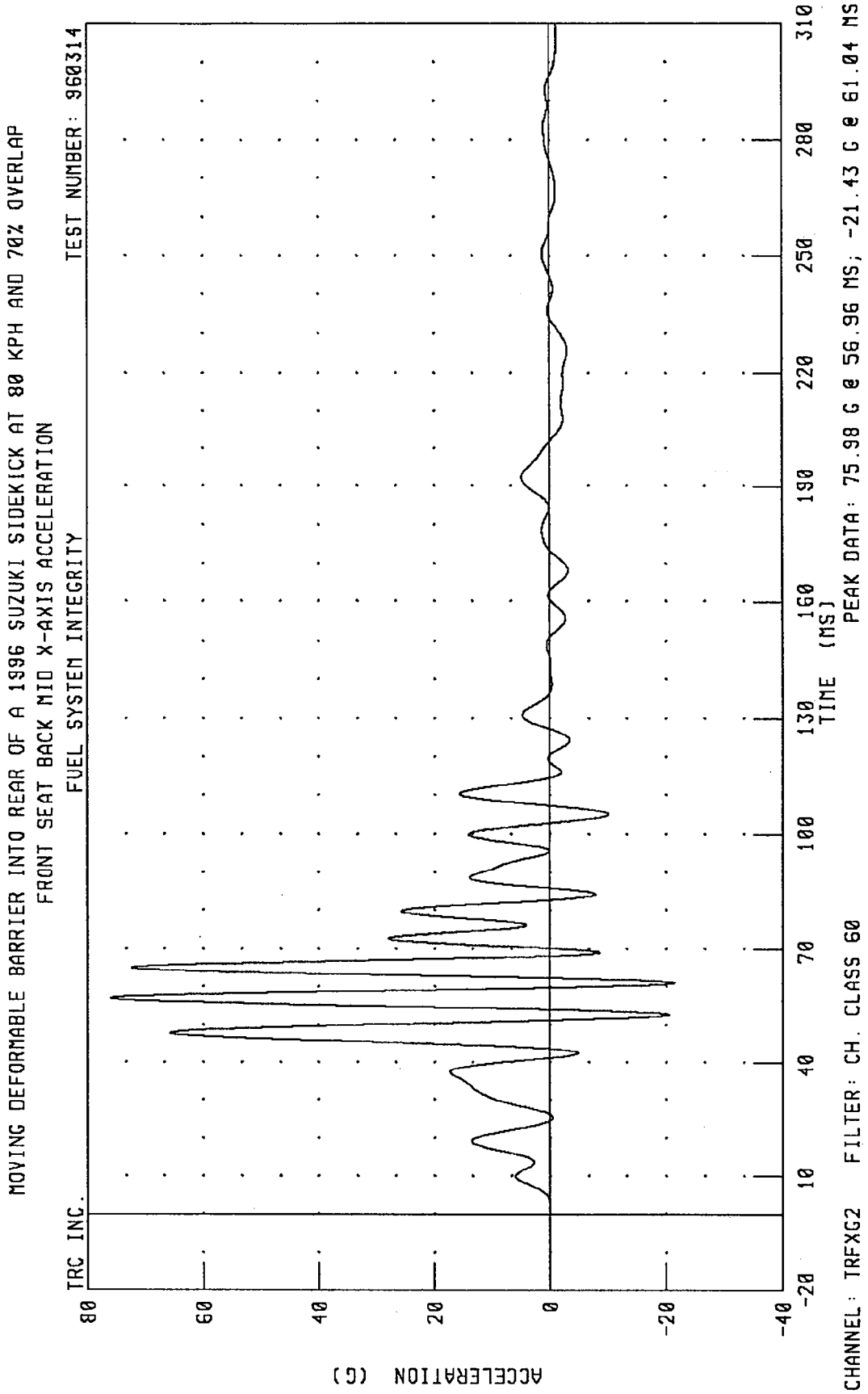

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS Z-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
60
40
20
0
-20
-40
-60
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 19.15 G @ 66.88 MS; -22.93 G @ 49.84 MS
CHANNEL: PEVZG2 FILTER: CH. CLASS 1000

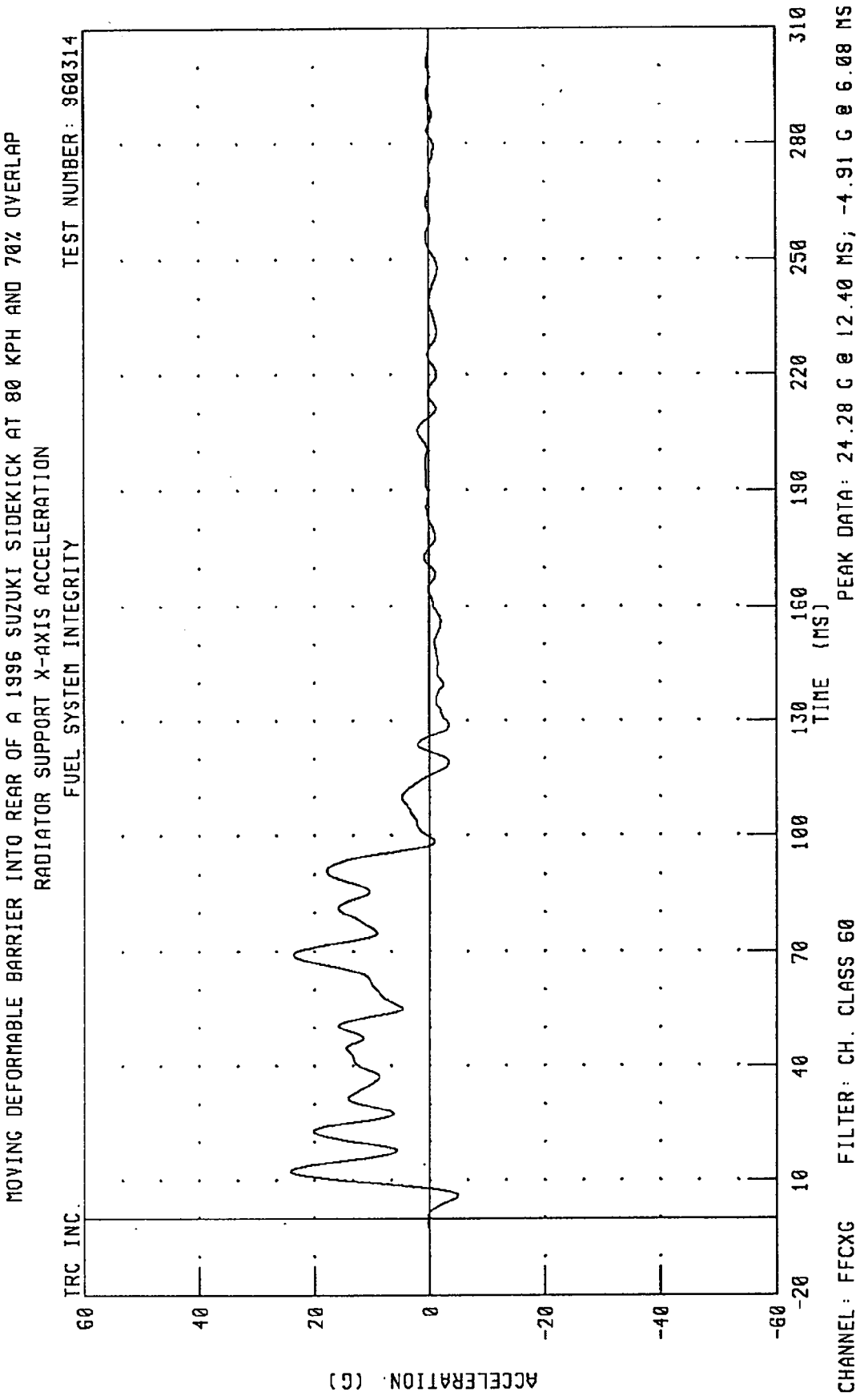

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER PELVIS RESULTANT ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
100
80
60
40
20
0
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: PEVRG2 FILTER: CH. CLASS 1000
PEAK DATA: 46.76 G @ 61.84 MS; 0.11 G @ -20.00 MS

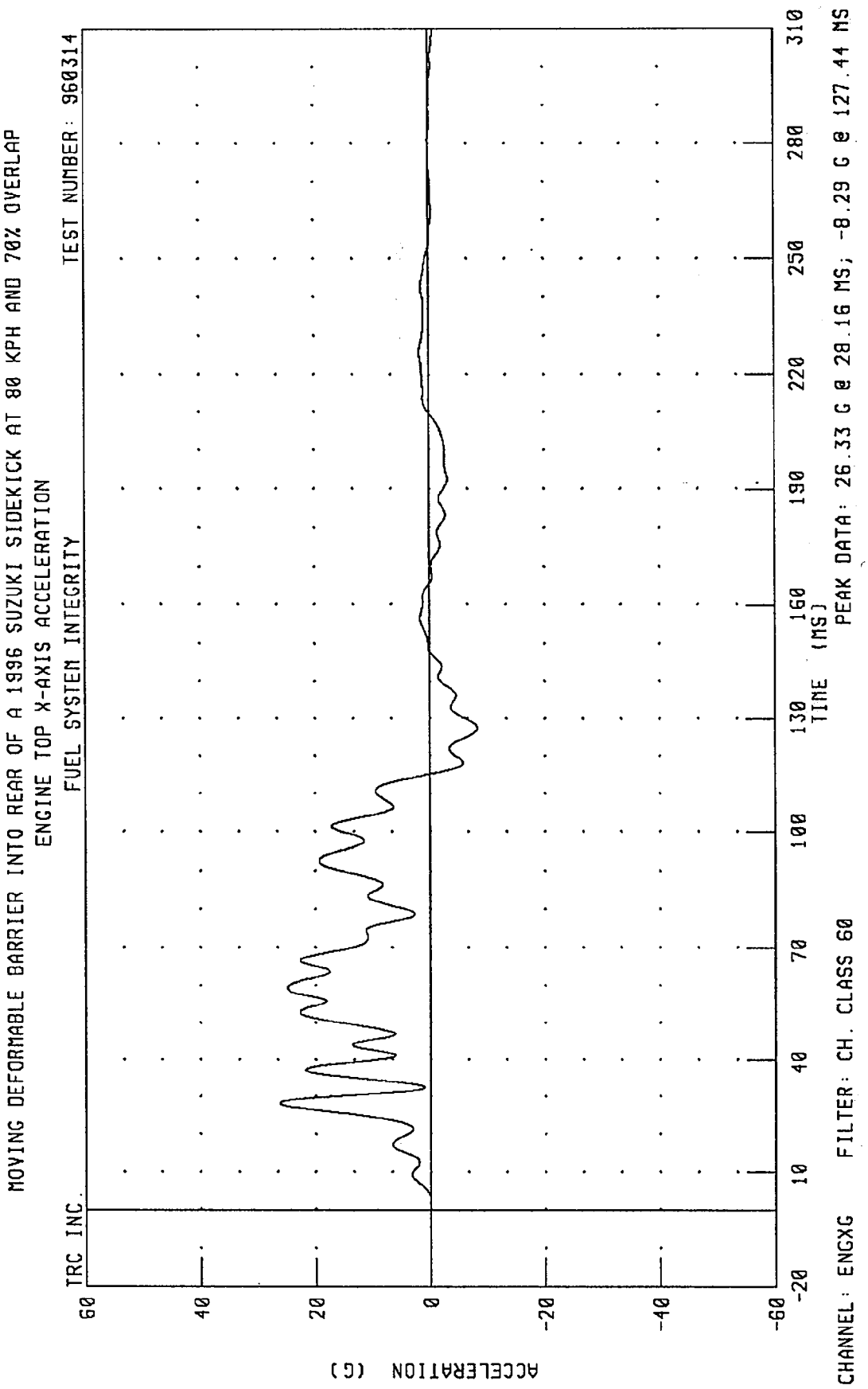

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
See Data Acquisition Explanations
TRC INC.
FORCE (N X 10²)
90
60
30
0
-30
-60
-90
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: RFMF2 FILTER: CH. CLASS 600
PEAK DATA: 125.61 N @ 228.72 MS; -1758.60 N @ 79.52 MS

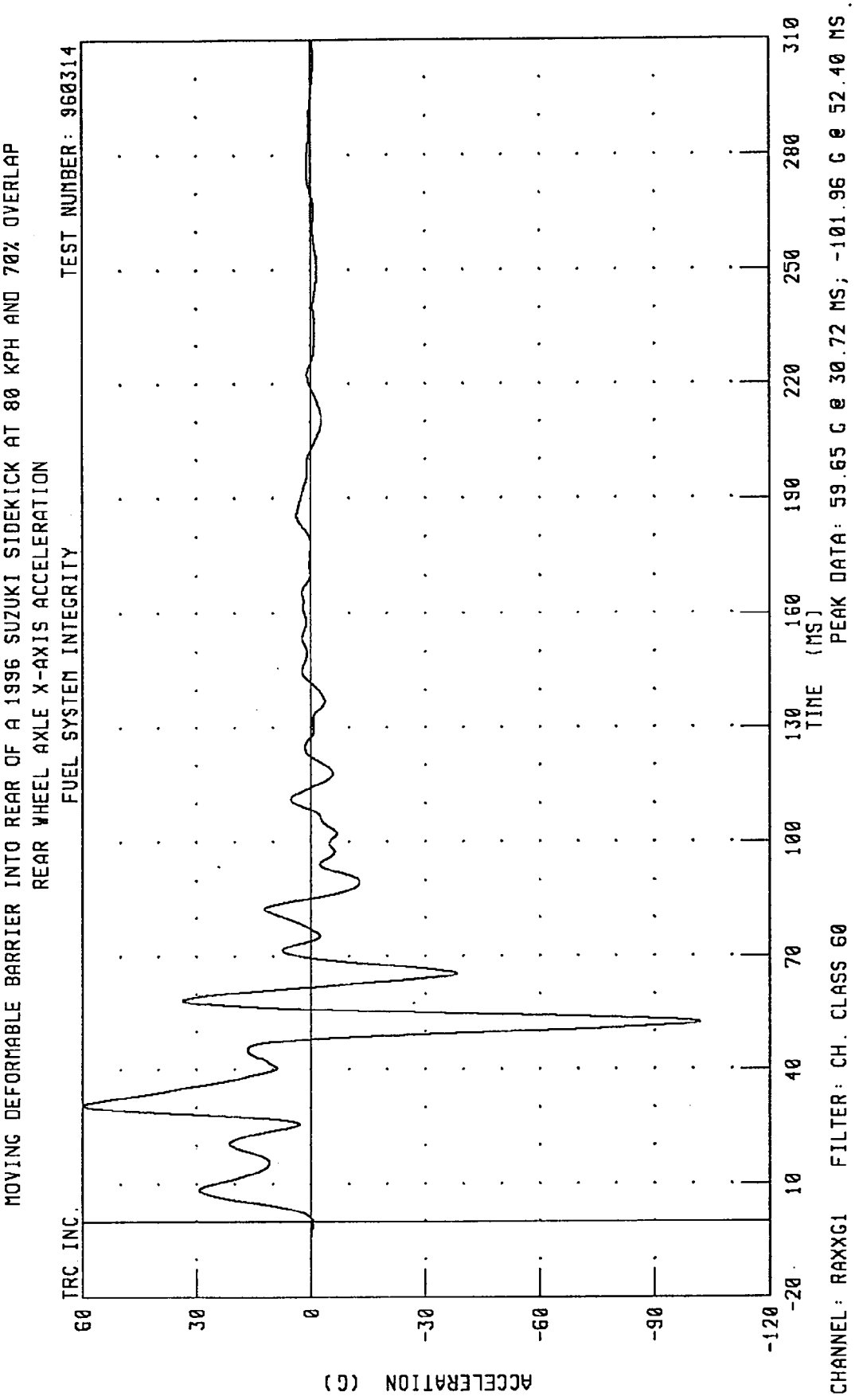

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
FRONT SEAT OUTBOARD MOUNTING RAIL X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 34.70 G @ 10.08 MS; -4.21 G @ 44.00 MS
CHANNEL: TLFXG1 FILTER: CH. CLASS 60

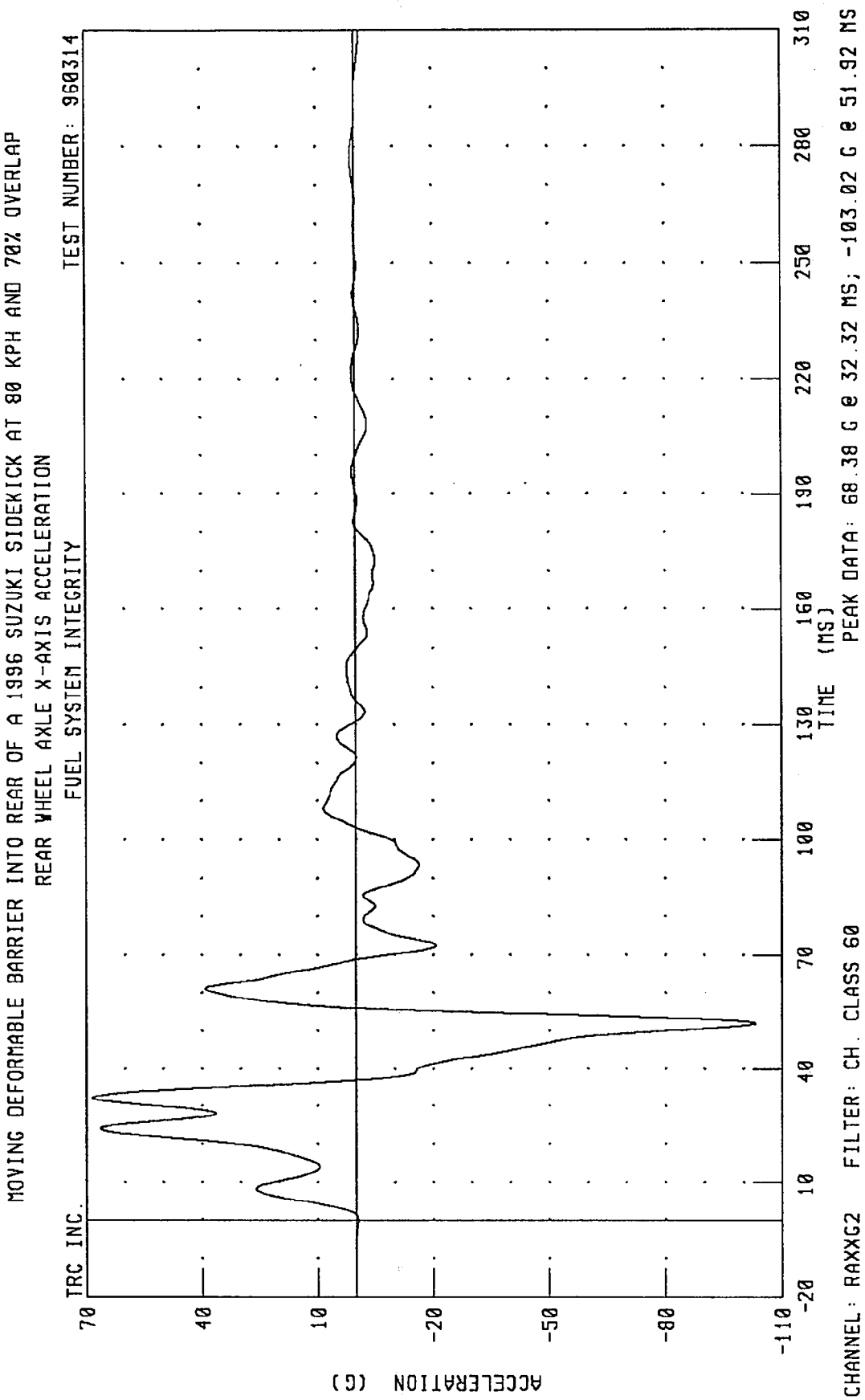

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
FRONT SEAT BACK MID X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
80
60
40
20
0
-20
-40
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 75.63 G @ 62.96 MS; -20.44 G @ 67.76 MS
CHANNEL: TLFXG2 FILTER: CH. CLASS 60

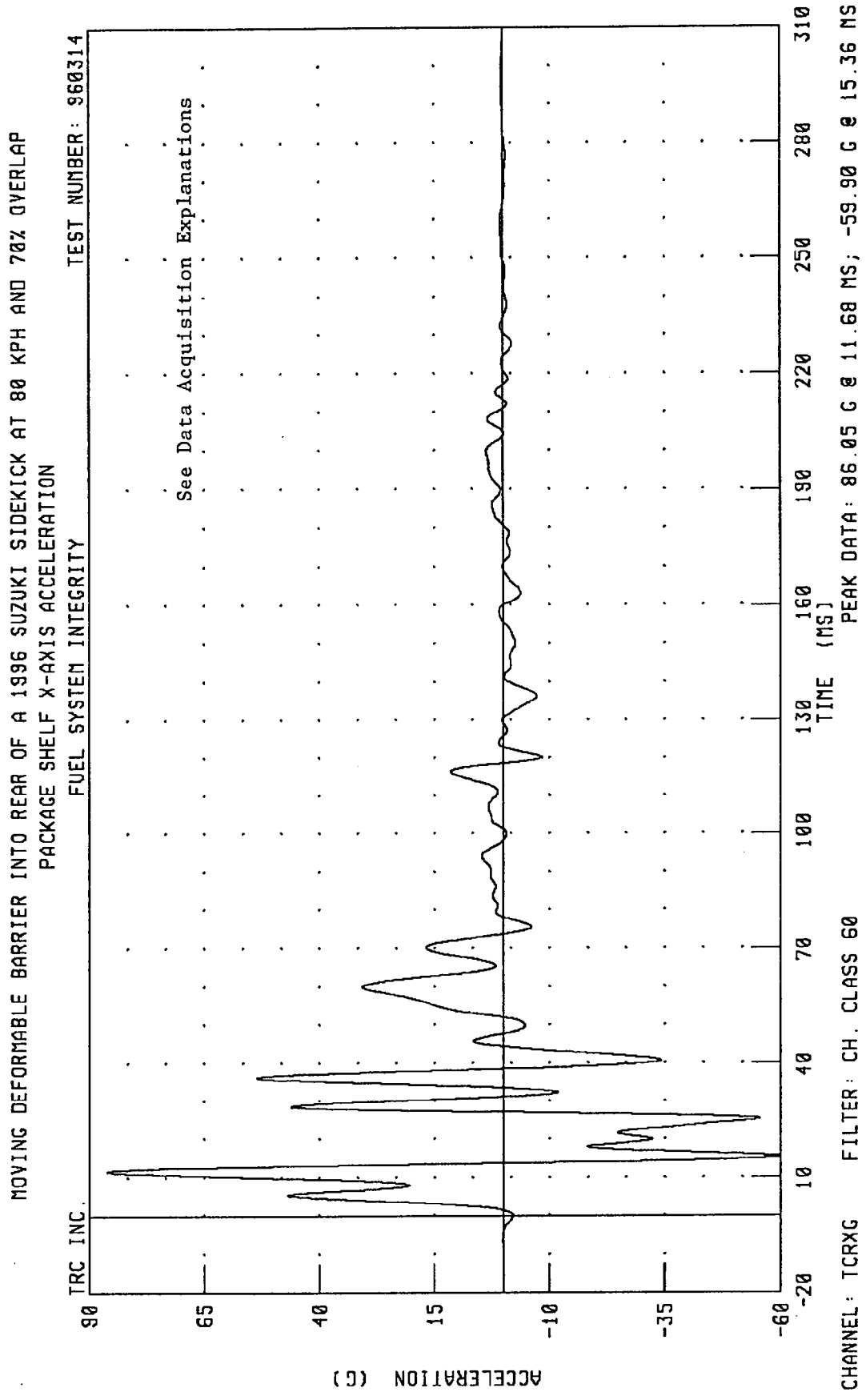

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
FRONT SEAT BACK MID X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TRC INC.
TEST NUMBER: 960314
ACCELERATION (G)
80
60
40
20
0
-20
-40
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 75.98 G @ 56.96 MS; -21.43 G @ 61.04 MS
CHANNEL: TRFXG2 FILTER: CH. CLASS 60


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
RADIATOR SUPPORT X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 24.28 G @ 12.40 MS; -4.91 G @ 6.08 MS
CHANNEL: FFCXG FILTER: CH. CLASS 60

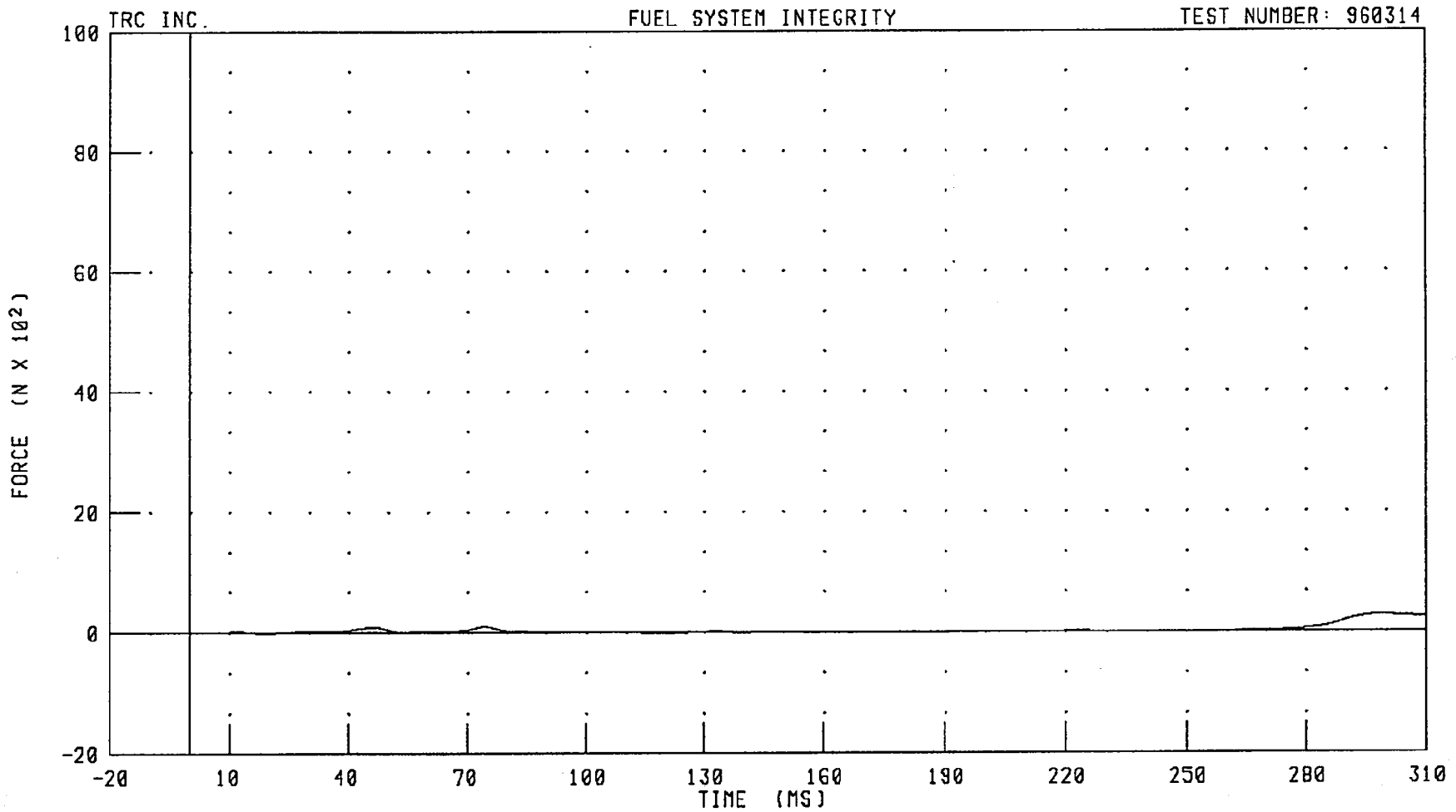

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
ENGINE TOP X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
60
40
20
0
-20
-40
-60
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: ENGXG FILTER: CH. CLASS 60
PEAK DATA: 26.33 G @ 28.16 MS; -8.29 G @ 127.44 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
REAR WHEEL AXLE X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
60
30
0
-30
-60
-90
-120
ACCELERATION (G)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 59.65 G @ 30.72 MS; -101.96 G @ 52.40 MS
CHANNEL: RAXXG1 FILTER: CH. CLASS 60


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
REAR WHEEL AXLE X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
ACCELERATION (G)
70
40
10
-20
-50
-80
-110
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 68.38 G @ 32.32 MS; -103.02 G @ 51.92 MS
CHANNEL: RAXXG2 FILTER: CH. CLASS 60


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
PACKAGE SHELF X-AXIS ACCELERATION
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
See Data Acquisition Explanations
TRC INC.
ACCELERATION (G)
90
65
40
15
-10
-35
-60
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: TCRXG FILTER: CH. CLASS 60
PEAK DATA: 86.05 G @ 11.68 MS; -59.90 G @ 15.36 MS

MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER SHOULDER BELT FORCE



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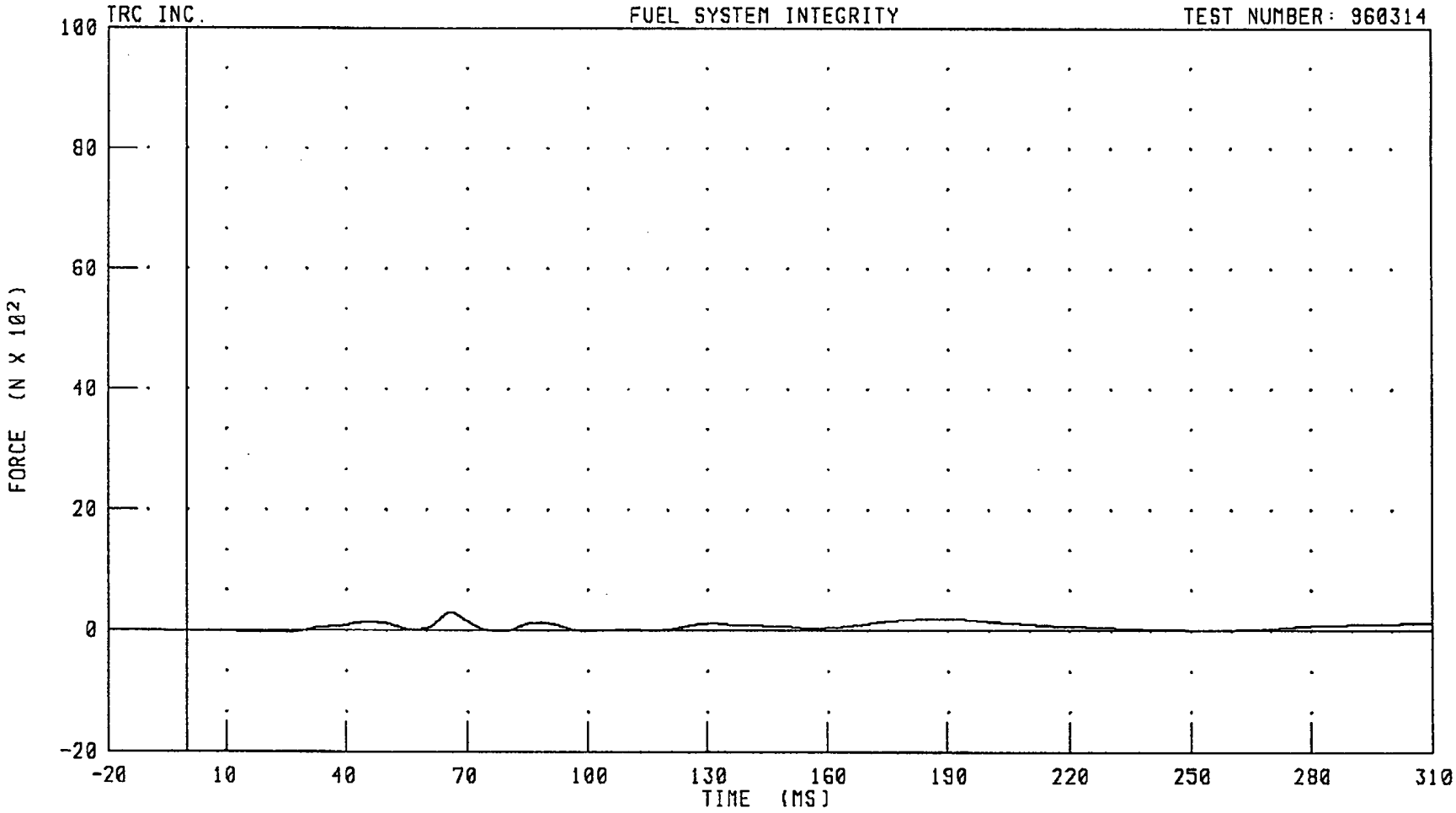
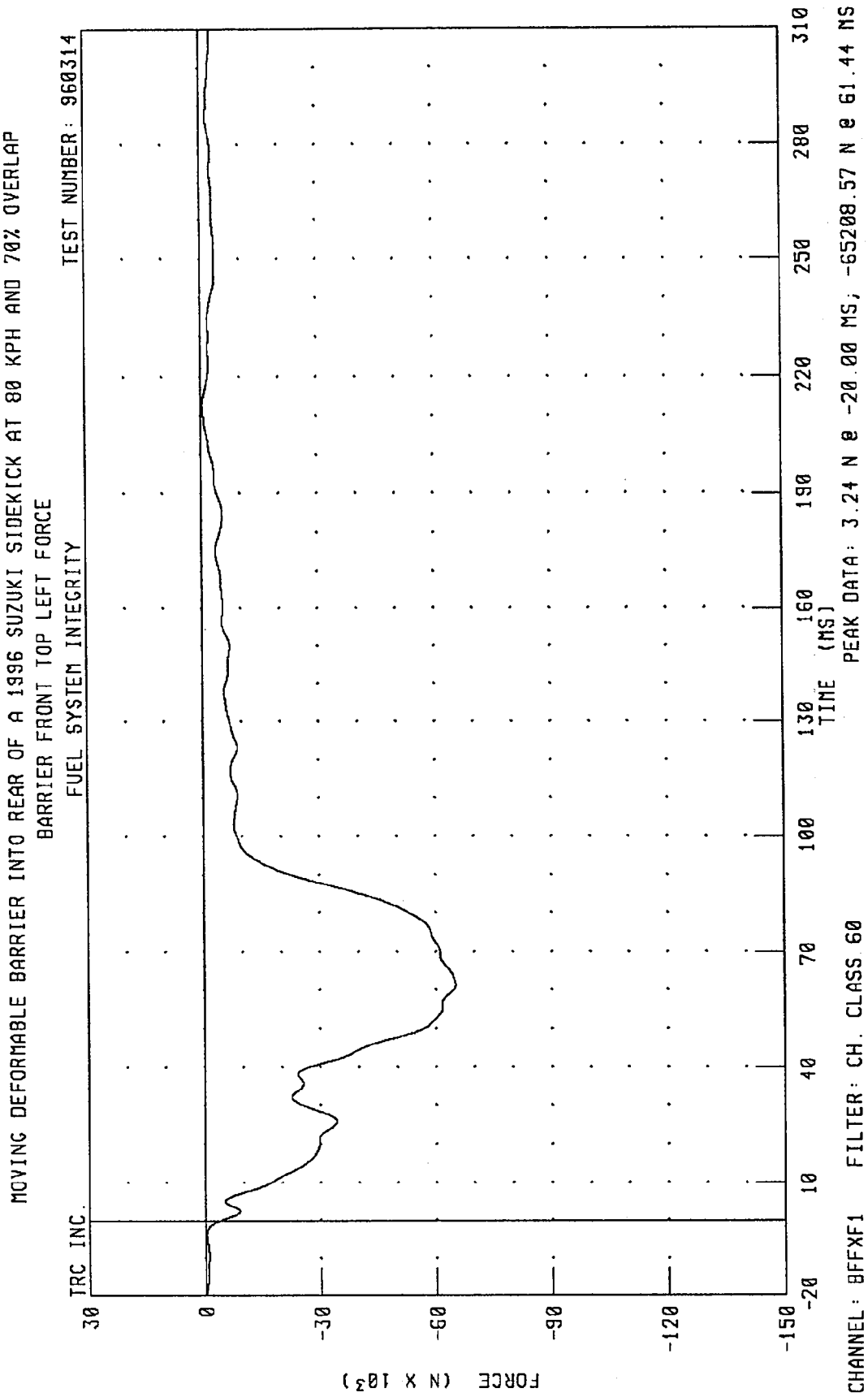
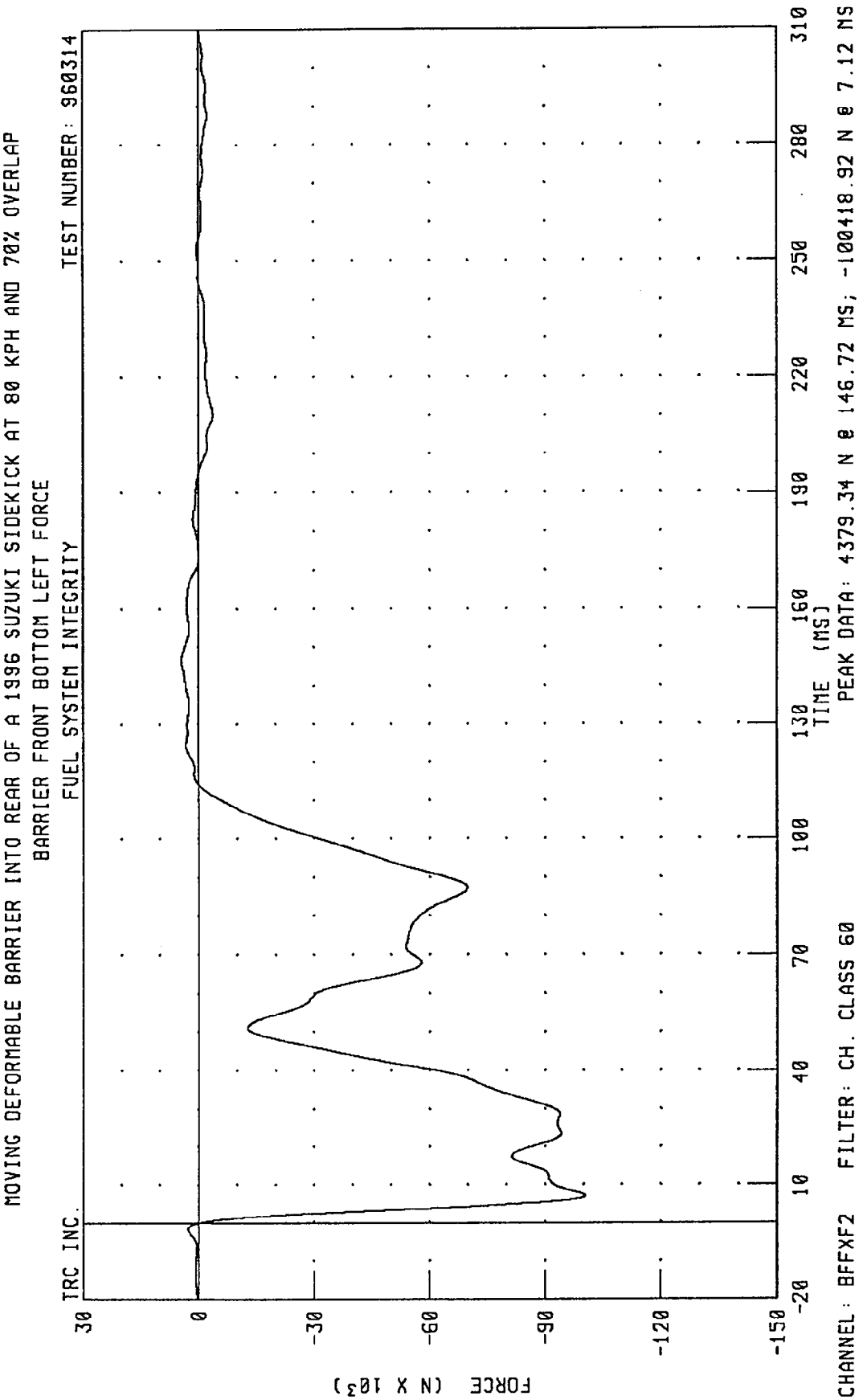
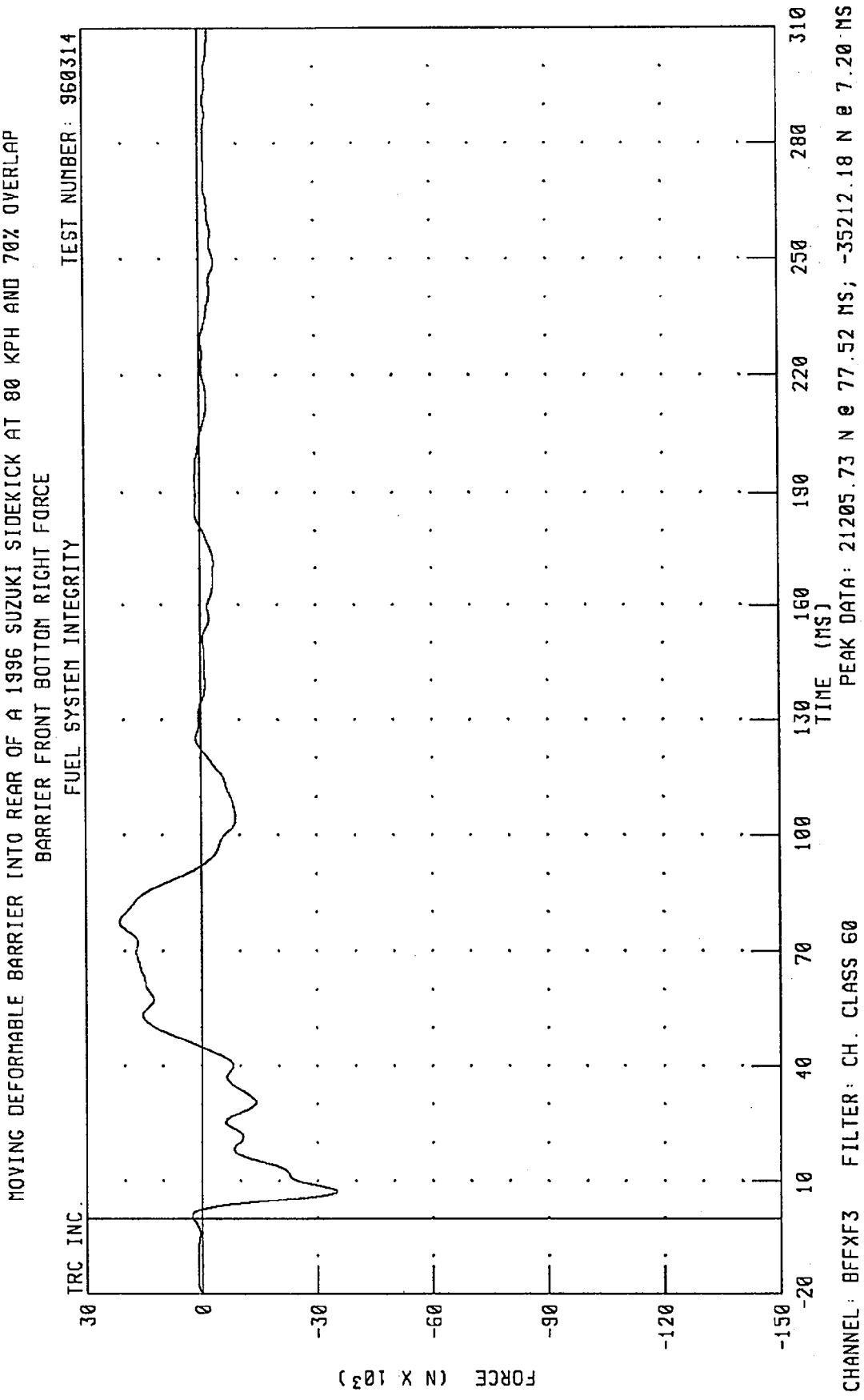
MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
DRIVER LAP BELT OUTBOARD FORCE

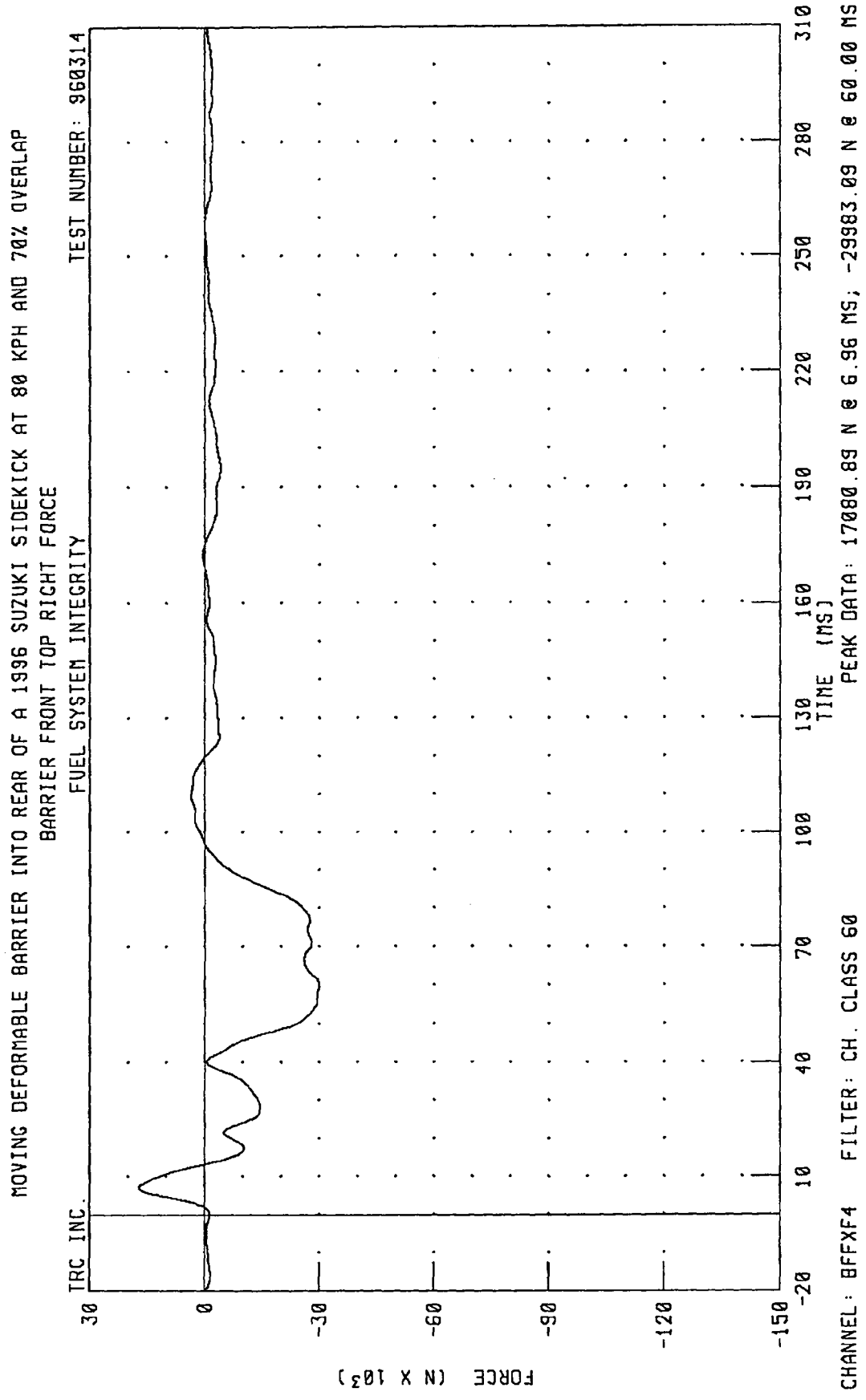


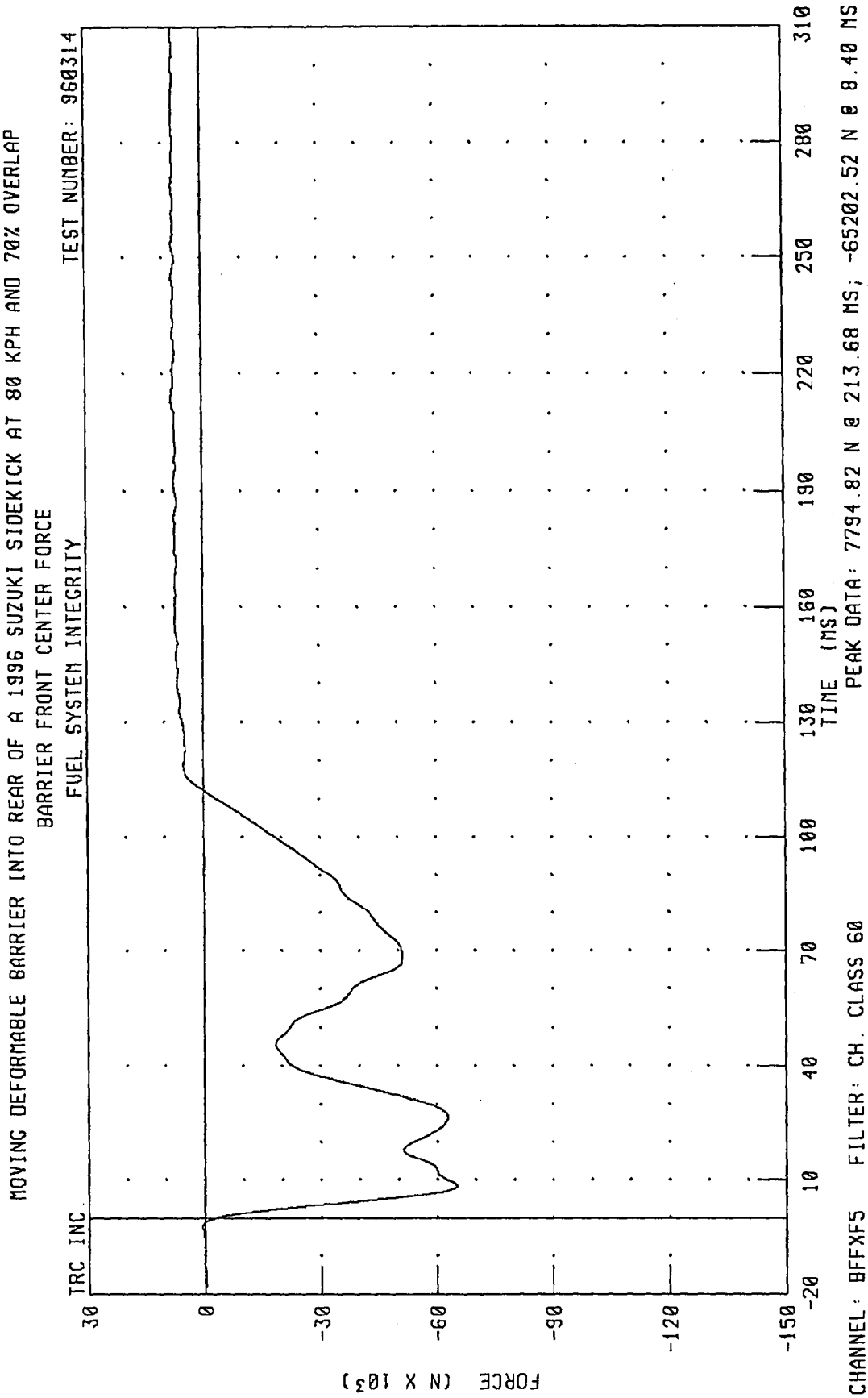
CHANNEL: LBOF1 FILTER: CH. CLASS 60 PEAK DATA: 297.95 N @ 65.92 MS; -34.81 N @ 23.76 MS


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
BARRIER FRONT TOP LEFT FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
30
0
-30
-60
-90
-120
-150
FORCE (N X 10³)
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 3.24 N @ -20.00 MS; -65208.57 N @ 61.44 MS
CHANNEL: BFFXF1 FILTER: CH. CLASS 60


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
BARRIER FRONT BOTTOM LEFT FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
FORCE (N X 10³)
30
0
-30
-60
-90
-120
-150
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 4379.34 N @ 146.72 MS; -100418.92 N @ 7.12 MS
CHANNEL: BFFXF2 FILTER: CH. CLASS 60


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
BARRIER FRONT BOTTOM RIGHT FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
FORCE (N X 10³)
30
0
-30
-60
-90
-120
-150
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
PEAK DATA: 21205.73 N @ 77.52 MS; -35212.18 N @ 7.20 MS
CHANNEL: BFFXF3 FILTER: CH. CLASS 60


MOVING DEFORMABLE BARRIER INTO REAR OF A 1996 SUZUKI SIDEKICK AT 80 KPH AND 70% OVERLAP
BARRIER FRONT TOP RIGHT FORCE
FUEL SYSTEM INTEGRITY
TEST NUMBER: 960314
TRC INC.
FORCE (N X 10³)
30
0
-30
-60
-90
-120
-150
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: BFFXF4 FILTER: CH. CLASS 60
PEAK DATA: 17080.89 N @ 6.96 MS; -29983.09 N @ 60.00 MS



Appendix C

Dummy Calibration Information

Pre-Test Calibration

Serial Number 35

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
35 VECTOR

TRC INC. TEST NO: 35C1ED1 11-JUL-95
572E SN35 EXT.DIMENSION CAL01

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	988. 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	886. MM
THIGH CLEARANCE	(F)	140 - 155 MM	152. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	475. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	442. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	500. MM
FOOT LENGTH	(P)	252 - 267 MM	254. MM
FOOT BREADTH	(W)	91 - 107 MM	94. MM
SHOULDER PIVOT FROM BACKLINE	(E)	84 - 94 MM	91. MM
SHOULDER BREADTH	(V)	422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT	(B)	506 - 521 MM	511. MM
ELBOW REST HEIGHT	(J)	191 - 211 MM	203. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	297. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN Richard Le Von

RUN NUMBER: 071295.1437

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

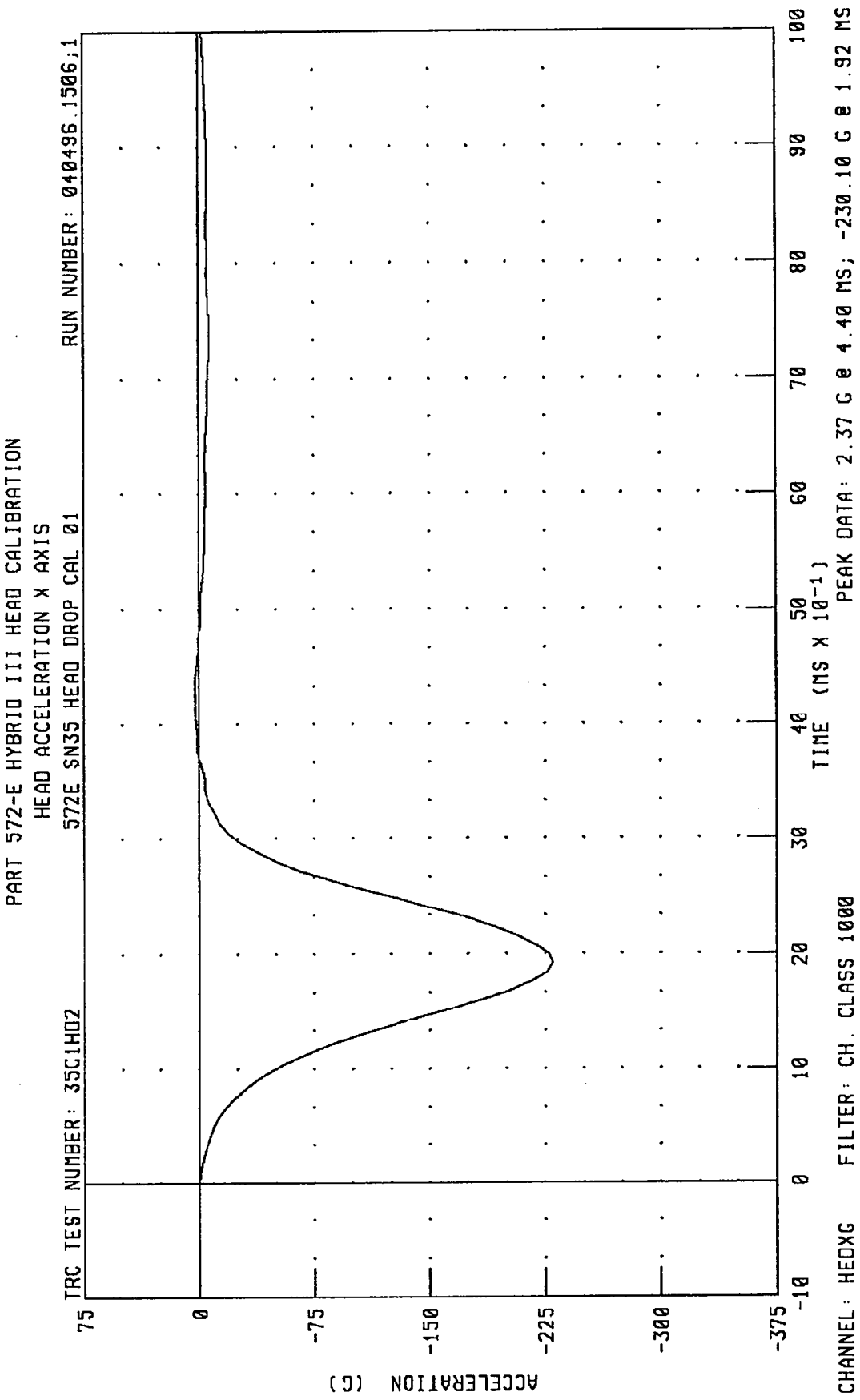
HYBRID III 09-NOV-95

TRC INC. TEST NO: 35C1HD2 572E SN35 HEAD DROP CAL 01

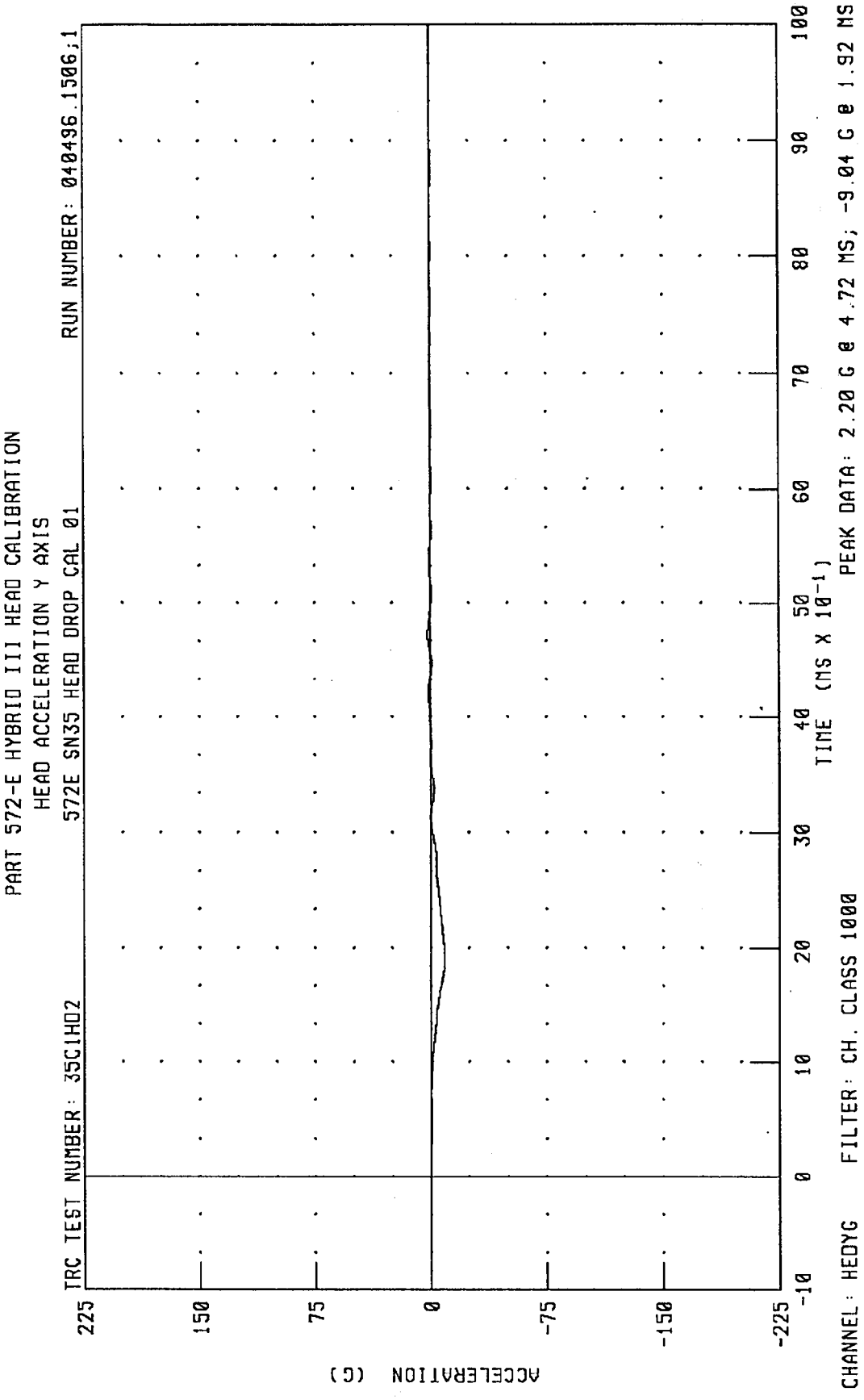
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	30.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	262.44 G
PEAK LATERAL ACCELERATION	15 G MAX	-9.03 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

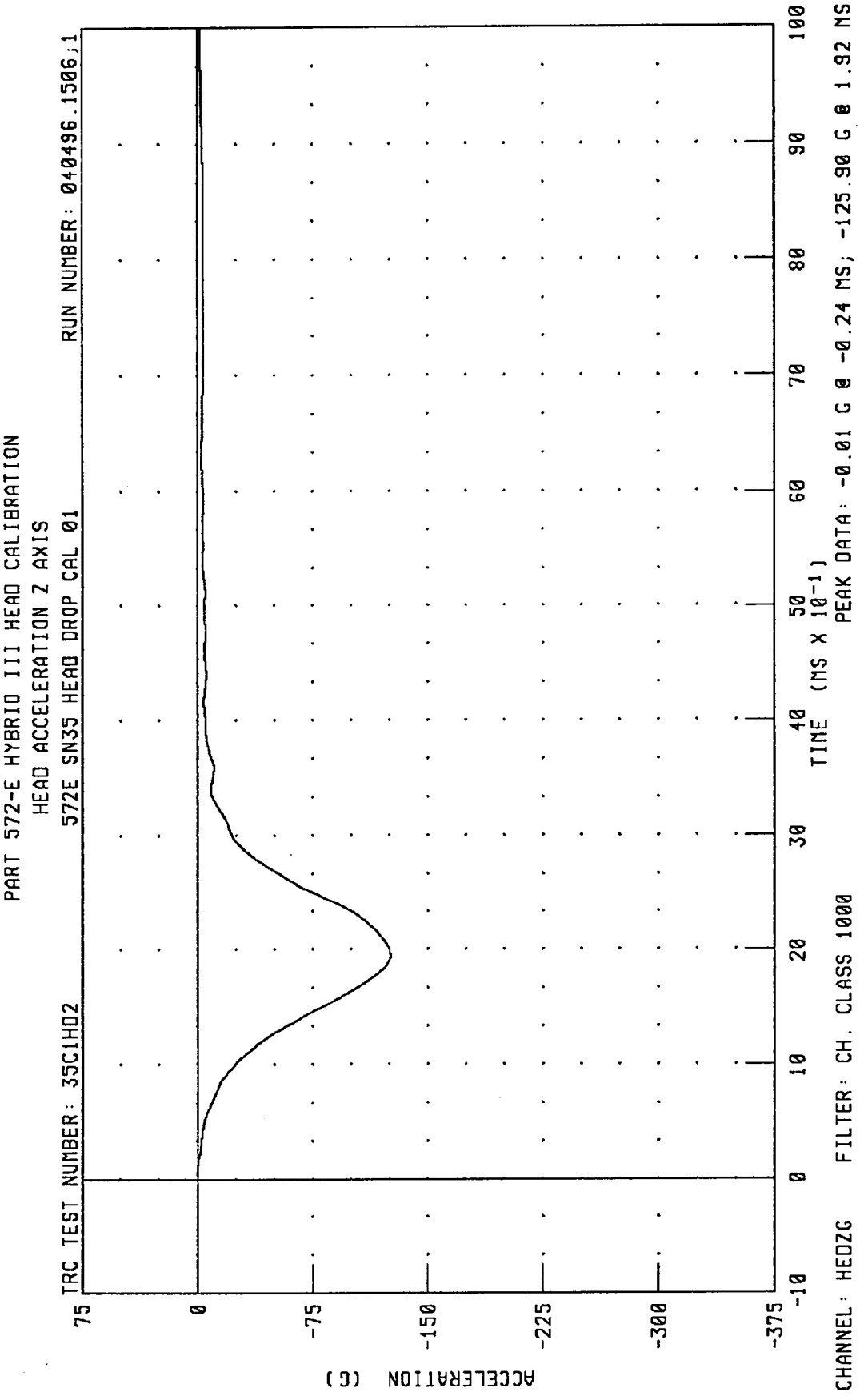
TECHNICIAN Richard LeVon RUN NUMBER: 110995.1358;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
572E SN35 HEAD DROP CAL 01
RUN NUMBER: 040496.1506;1
TRC TEST NUMBER: 35C1H02
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDXG
FILTER: CH. CLASS 1000
PEAK DATA: 2.37 G @ 4.40 MS; -230.10 G @ 1.92 MS

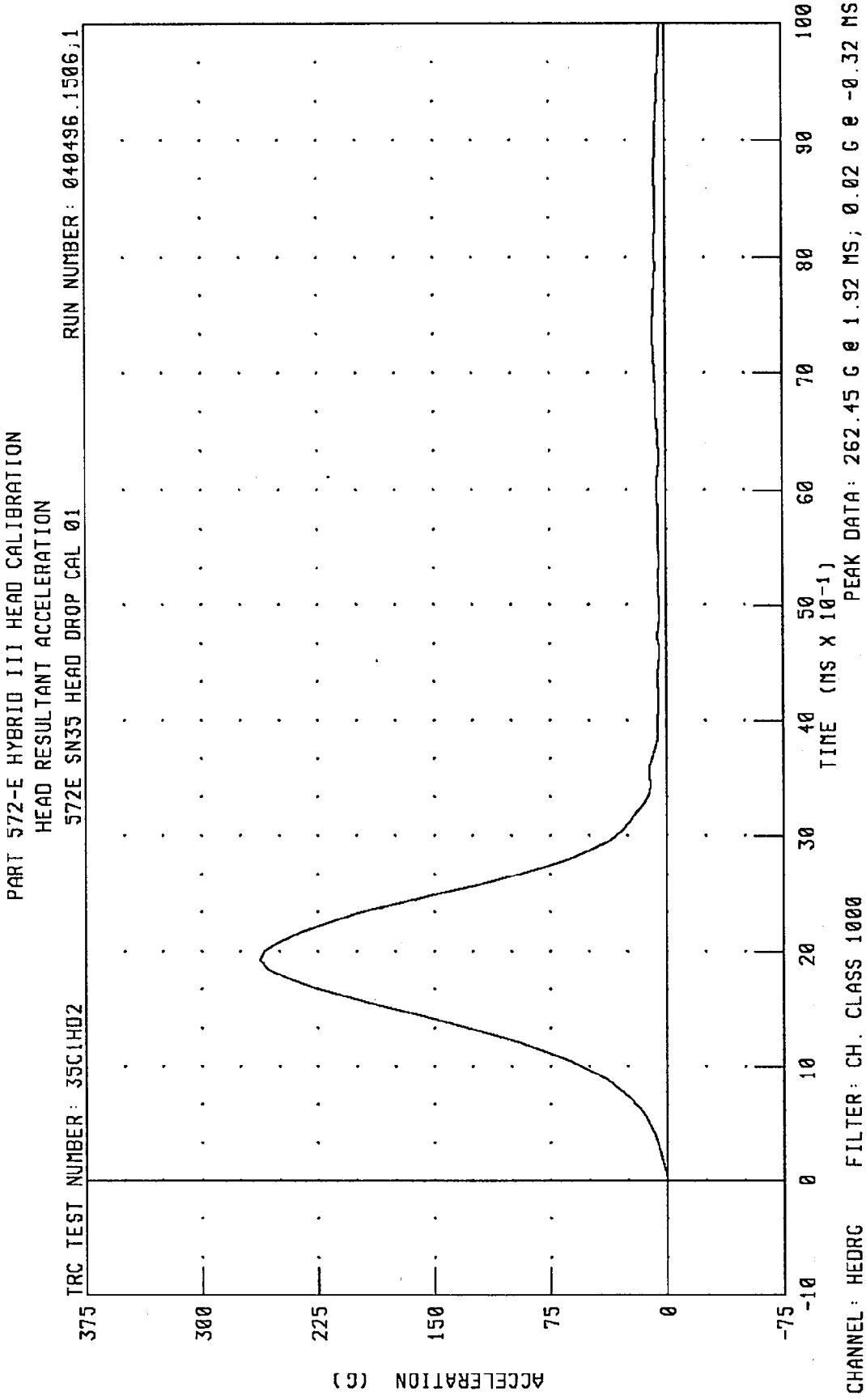
960314


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 35C1H02
572E SN35 HEAD DROP CAL 01
RUN NUMBER: 040496.1506;1
ACCELERATION (G)
225
150
75
0
-75
-150
-225
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 2.20 G @ 4.72 MS; -9.04 G @ 1.92 MS

960314


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
TRC TEST NUMBER: 35C1H02
572E SN35 HEAD DROP CAL 01
RUN NUMBER: 040496.1506;1
75
0
-75
-150
-225
-300
-375
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDZC
FILTER: CH. CLASS 1000
PEAK DATA: -0.01 G @ -0.24 MS; -125.90 G @ 1.92 MS

960314



960314

AS664159

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

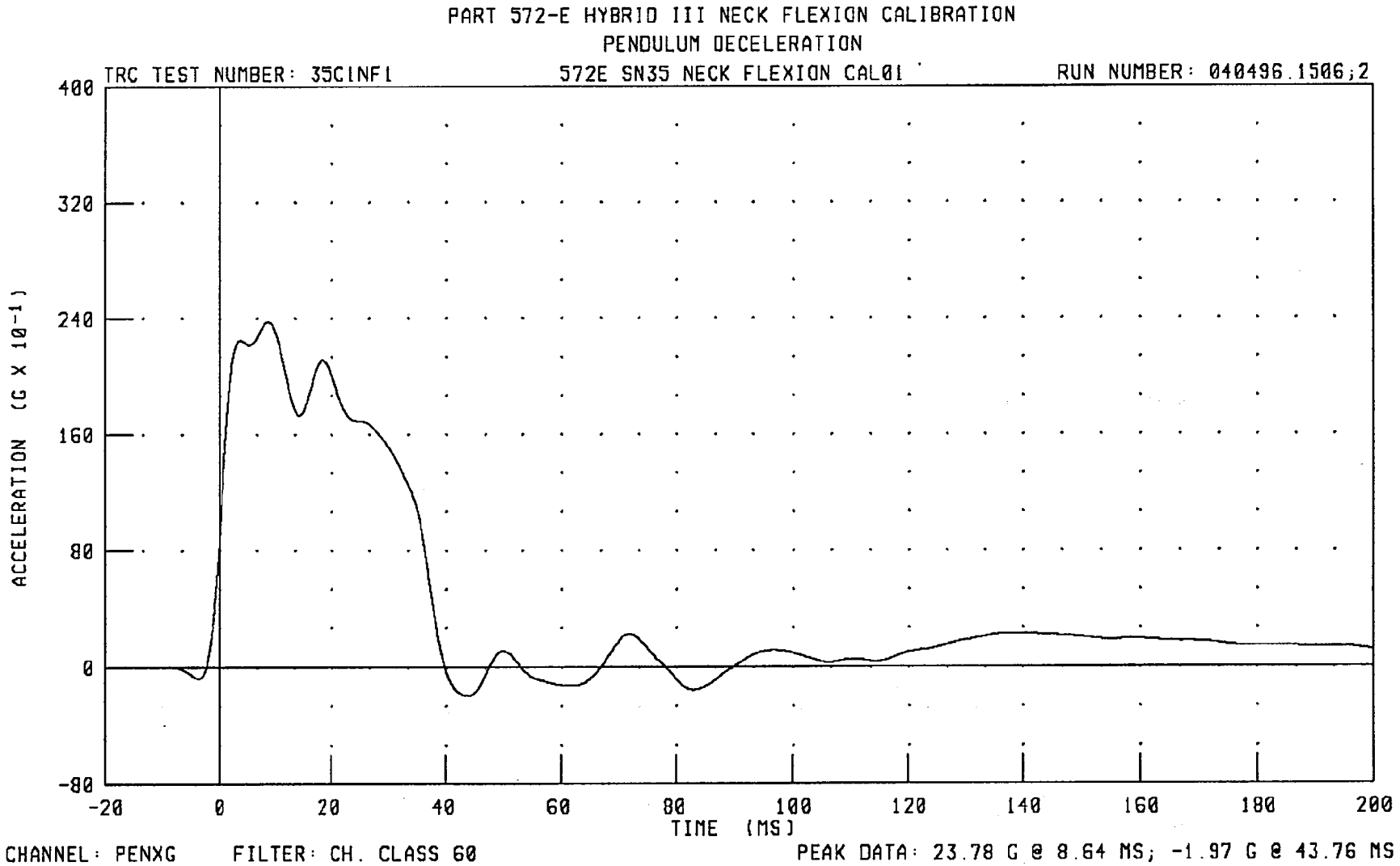
HYBRID III 11-JUL-95

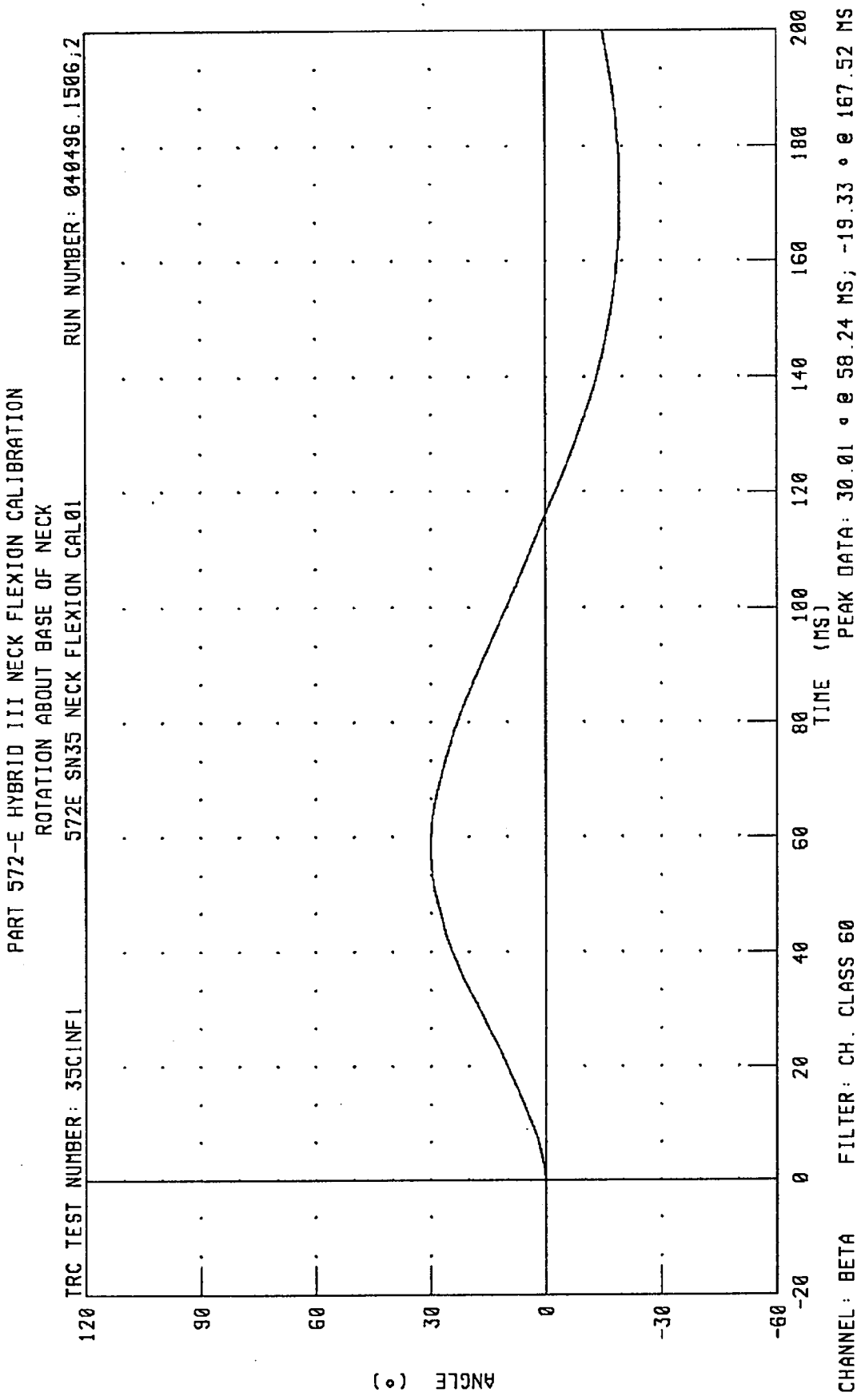
TRC INC. TEST NO: 35C1NF1 572E SN35 NECK FLEXION CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.98 G
	20 MS	17.60 - 22.60 G	20.12 G
	30 MS	12.50 - 18.50 G	15.08 G
MAX PENDULUM G		29 G MAX	23.77 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.03 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	37.36 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	70.37 DEG.
	TIME	57 - 64 MS	58.00 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	96.89 NM
	TIME	47 - 58 MS	50.00 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	114.48 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	99.60 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVon RUN NUMBER: 071195.0843;2


PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 35CINF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 040496.1506;2
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 23.78 G @ 8.64 MS; -1.97 G @ 43.76 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 35CINF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 040496.1506;2
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
PEAK DATA: 30.01 ° @ 58.24 MS; -19.33 ° @ 167.52 MS
CHANNEL: BETA
FILTER: CH. CLASS 60

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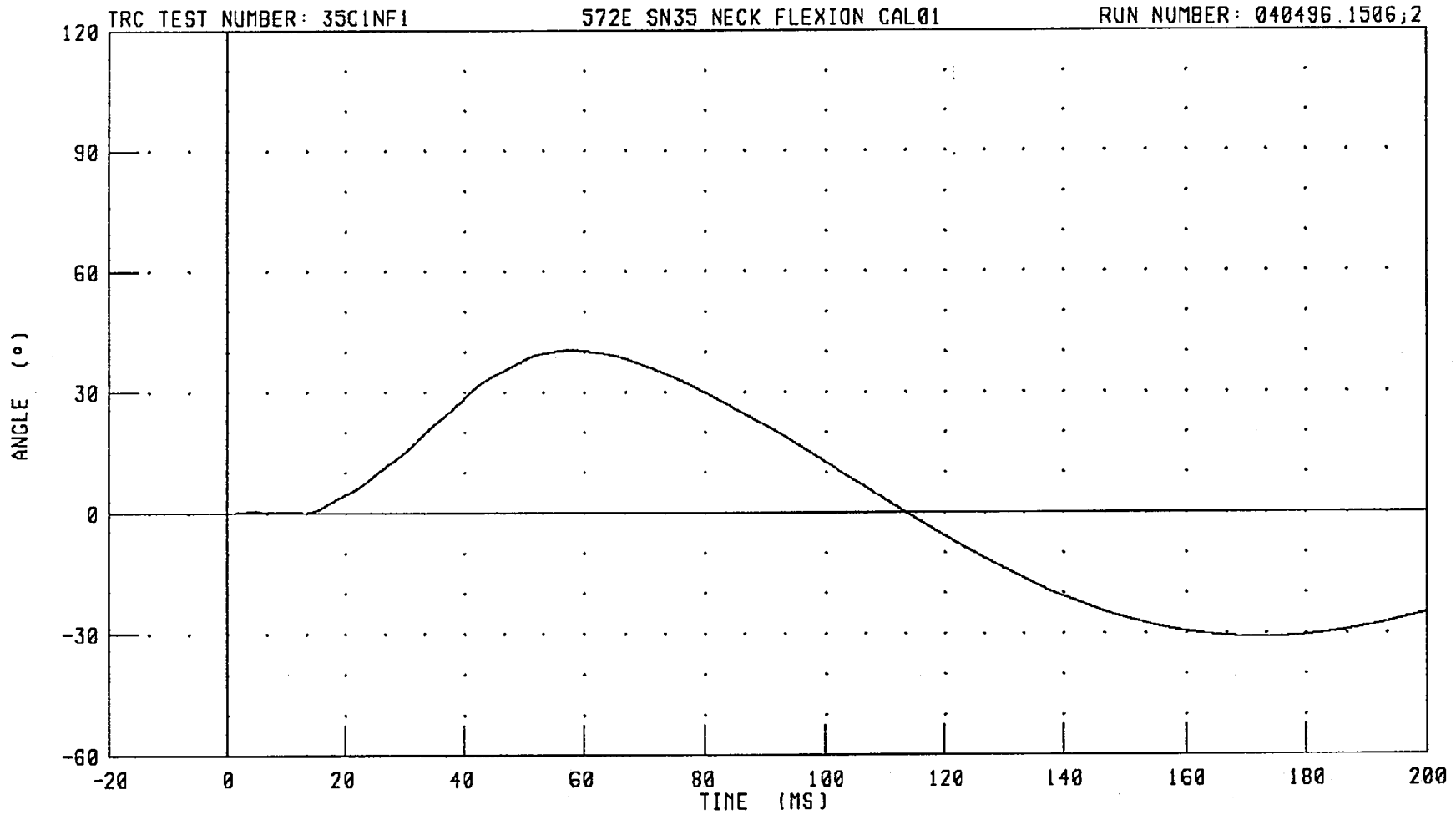
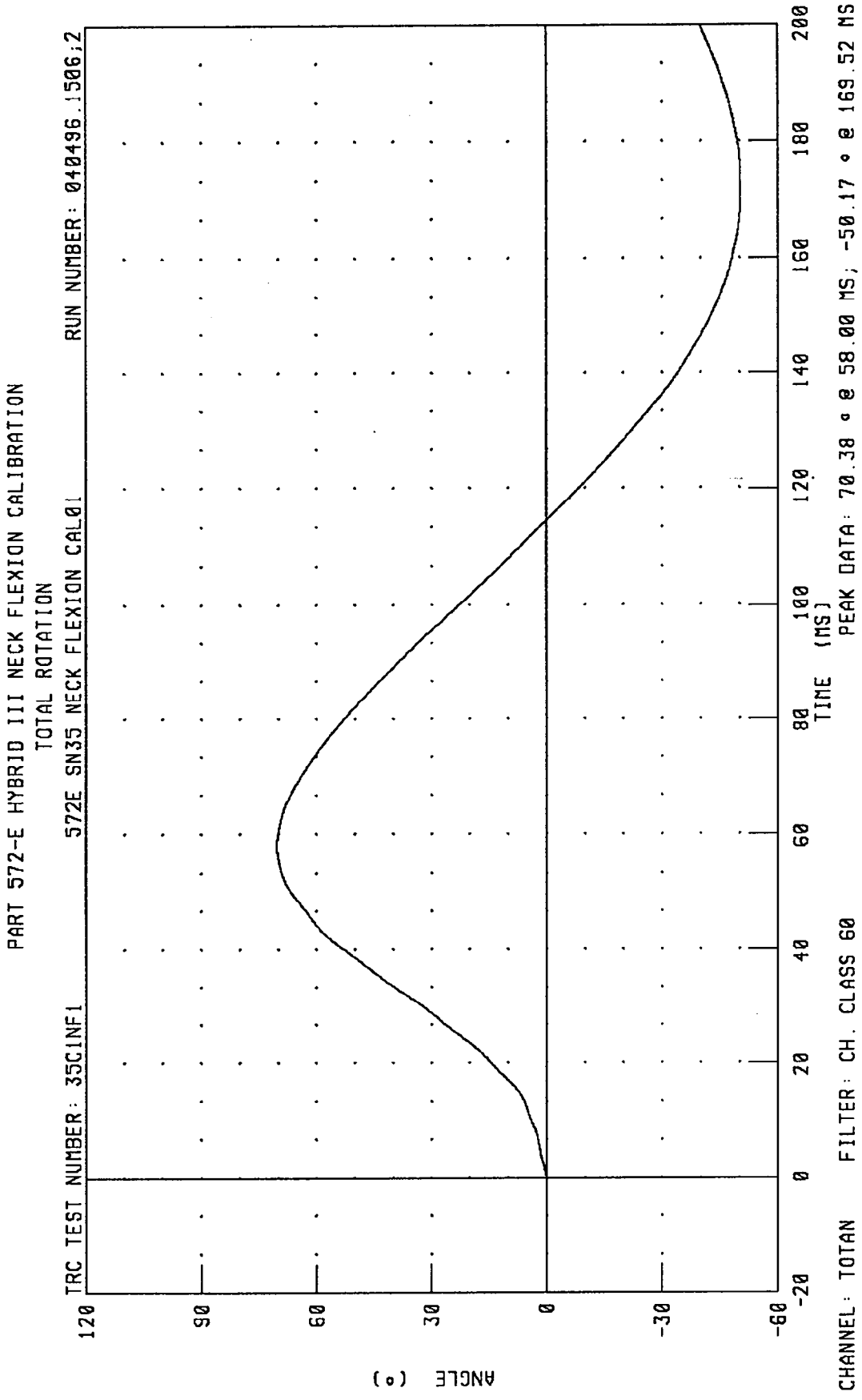
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE





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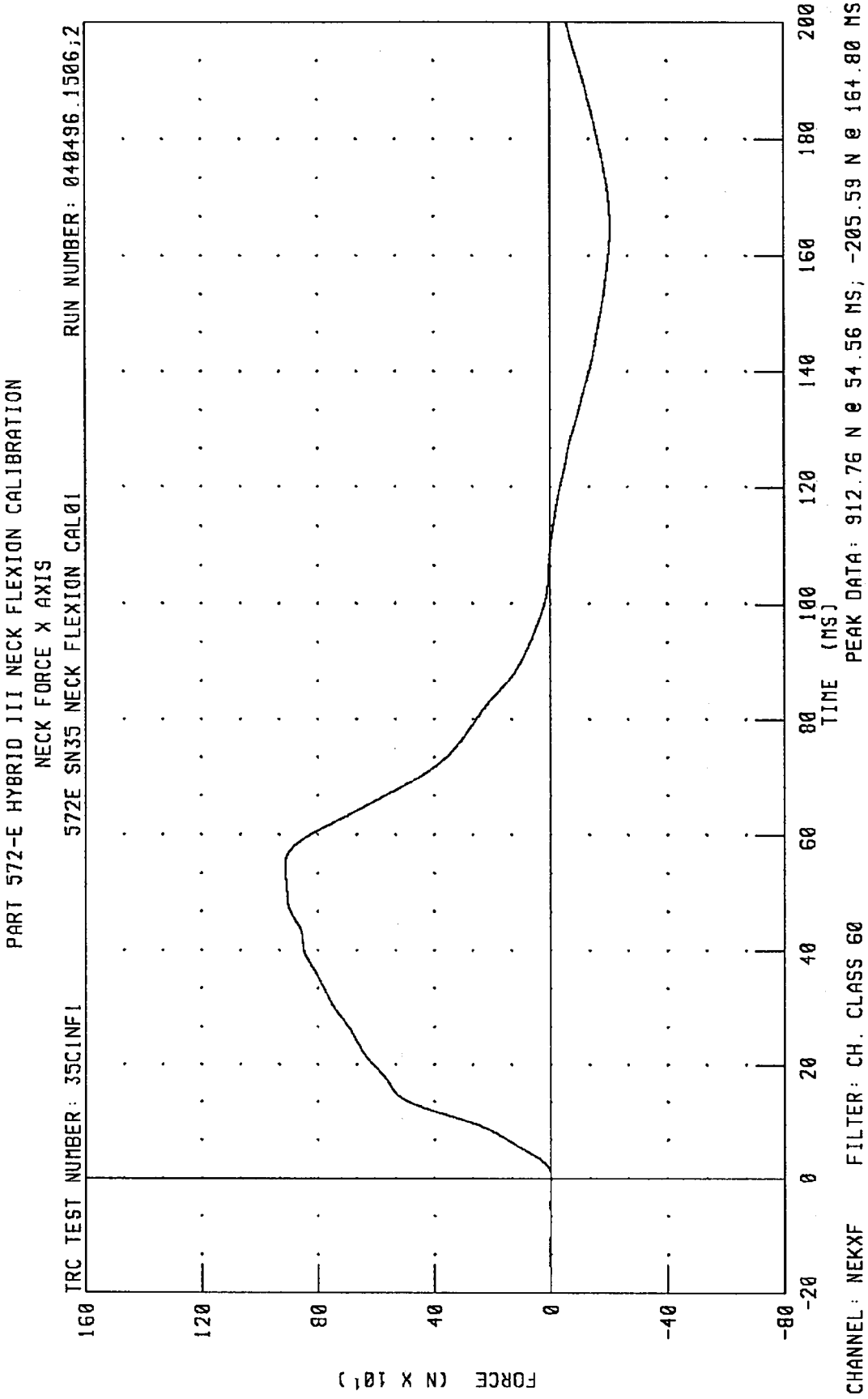
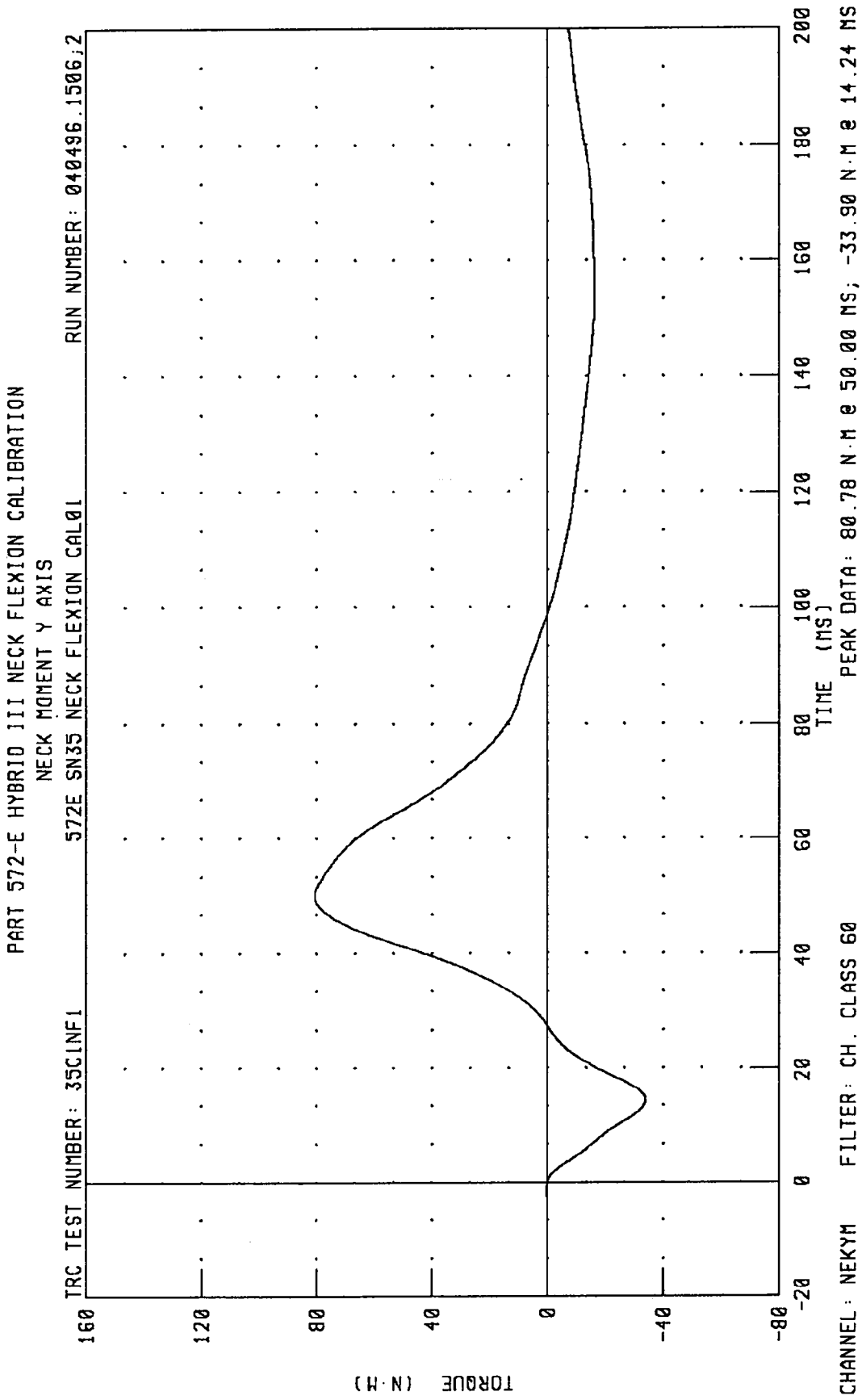
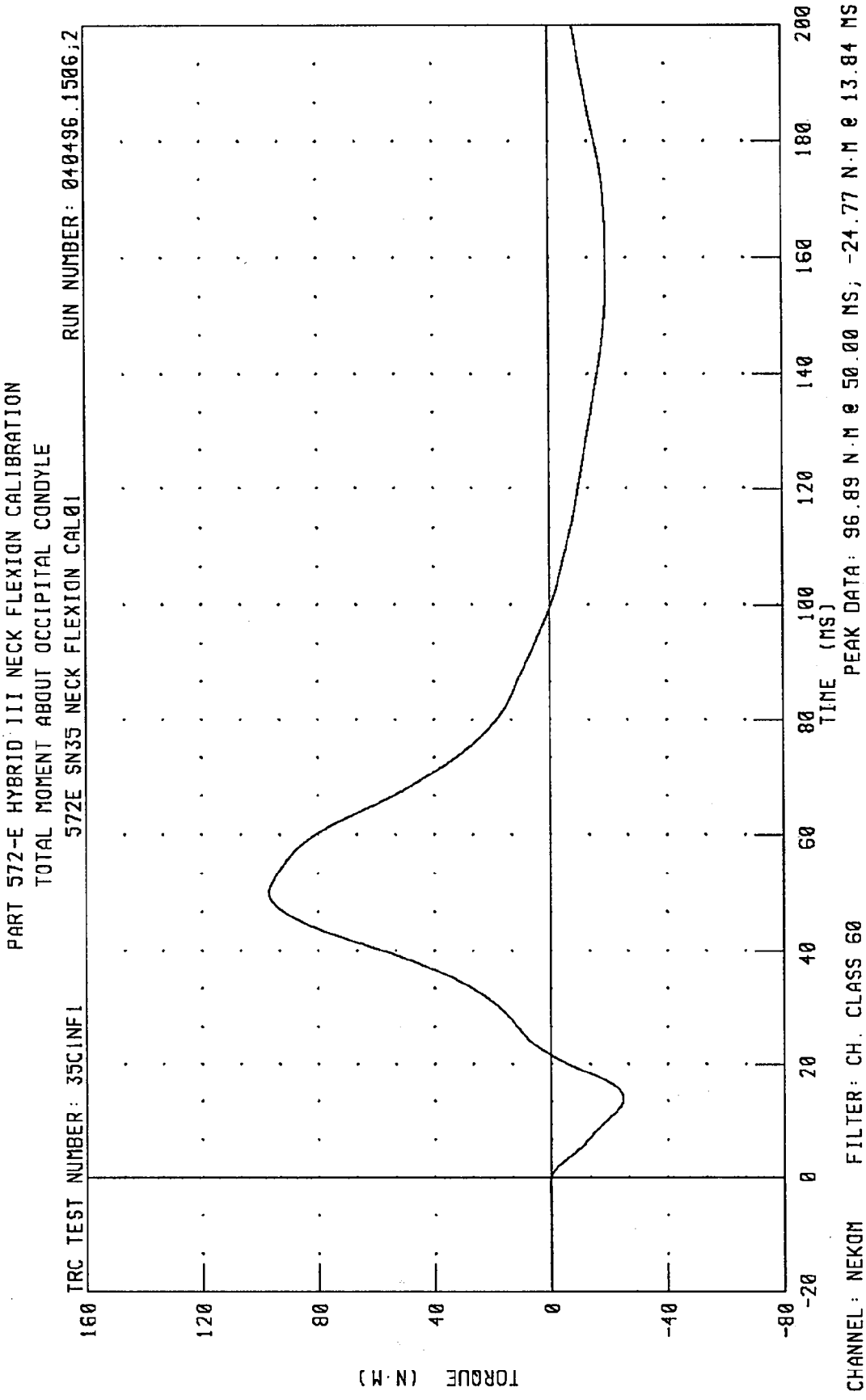
AS664164


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 35CINF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 040496.1506;2
160
120
80
40
0
-40
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
FORCE (N X 10¹)
PEAK DATA: 912.76 N @ 54.56 MS; -205.59 N @ 164.80 MS
CHANNEL: NEKXF
FILTER: CH. CLASS 60

960314


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 35CINF1
572E SN35 NECK FLEXION CAL01
RUN NUMBER: 040496.1506;2
TORQUE (N·M)
160
120
80
40
0
-40
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 80.78 N·M @ 50.00 MS; -33.90 N·M @ 14.24 MS

960314



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AS664167

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

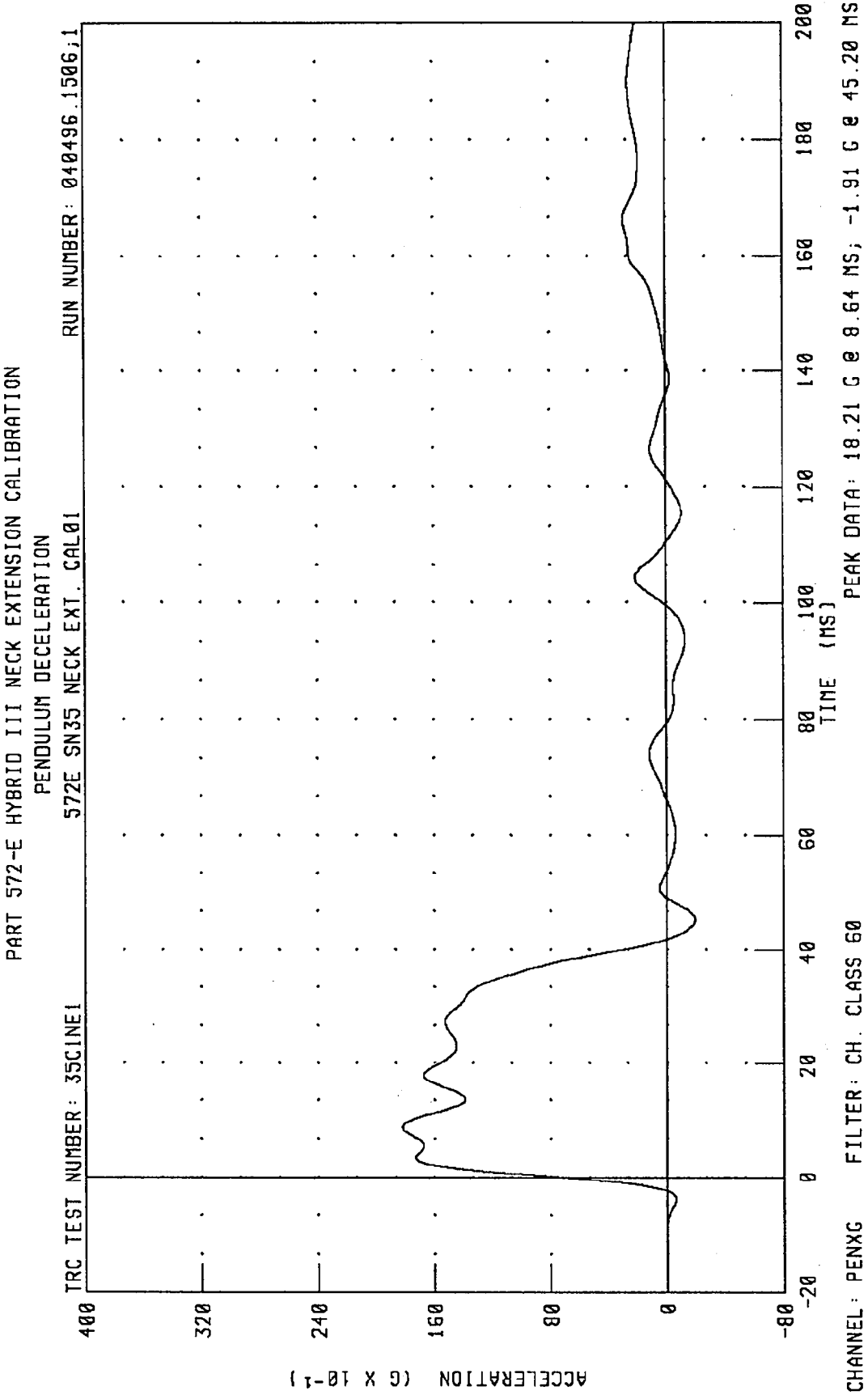
HYBRID III 11-JUL-95

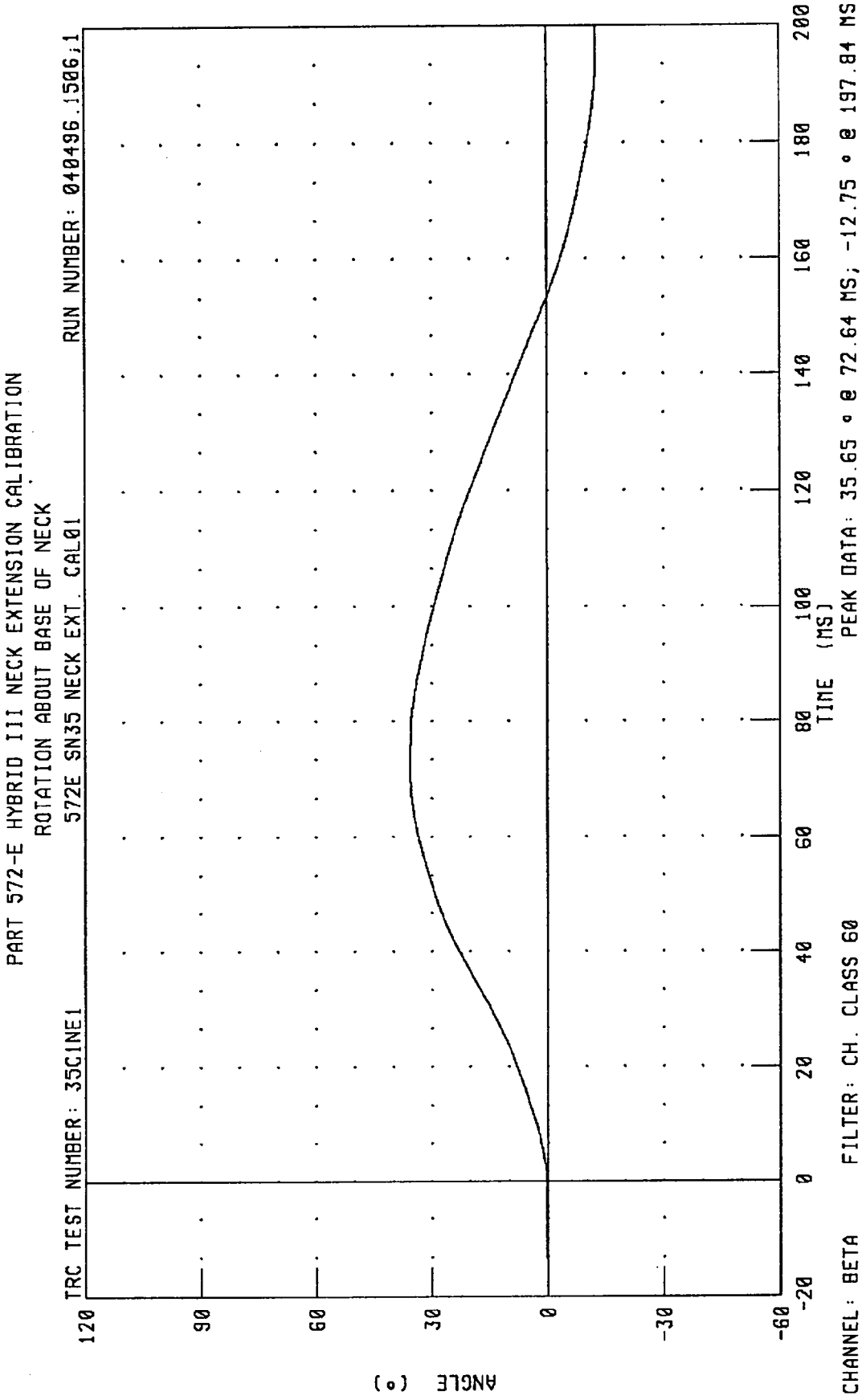
TRC INC. TEST NO: 35C1NE1 572E SN35 NECK EXT. CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.00 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	17.48 G
	20 MS	14.00 - 19.00 G	15.59 G
	30 MS	11.00 - 16.00 G	14.31 G
MAX PENDULUM G		22 G MAX	18.20 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.27 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.04 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	96.12 DEG.
	TIME	72 - 82 MS	74.08 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-65.59 NM
	TIME	65 - 79 MS	69.76 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	134.80 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 071195.0855;1


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 35CINE1
572E SN35 NECK EXT. CAL01
RUN NUMBER: 040496.1506;1
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
PEAK DATA: 18.21 G @ 8.64 MS; -1.91 G @ 45.20 MS
CHANNEL: PENXC FILTER: CH. CLASS 60



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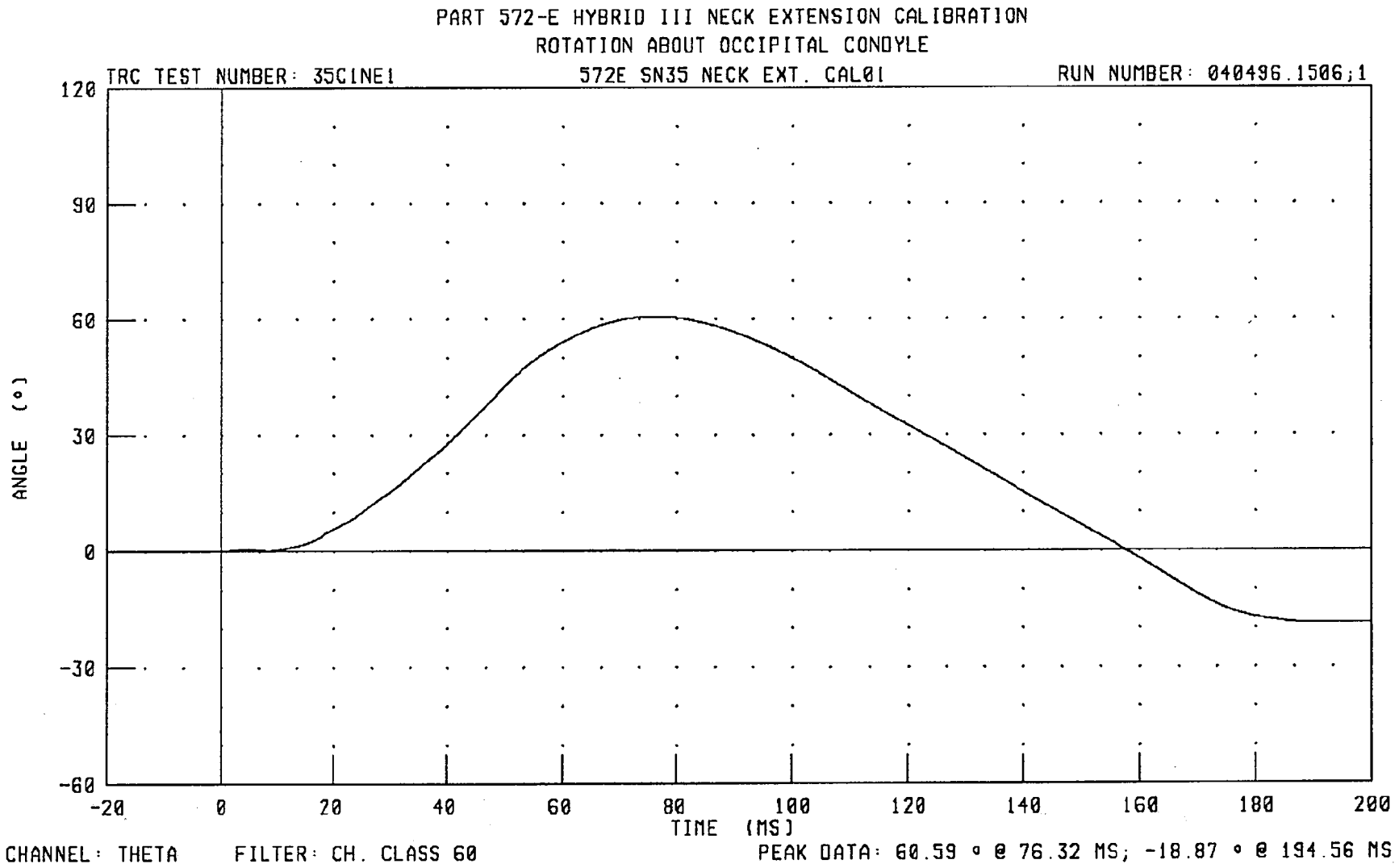
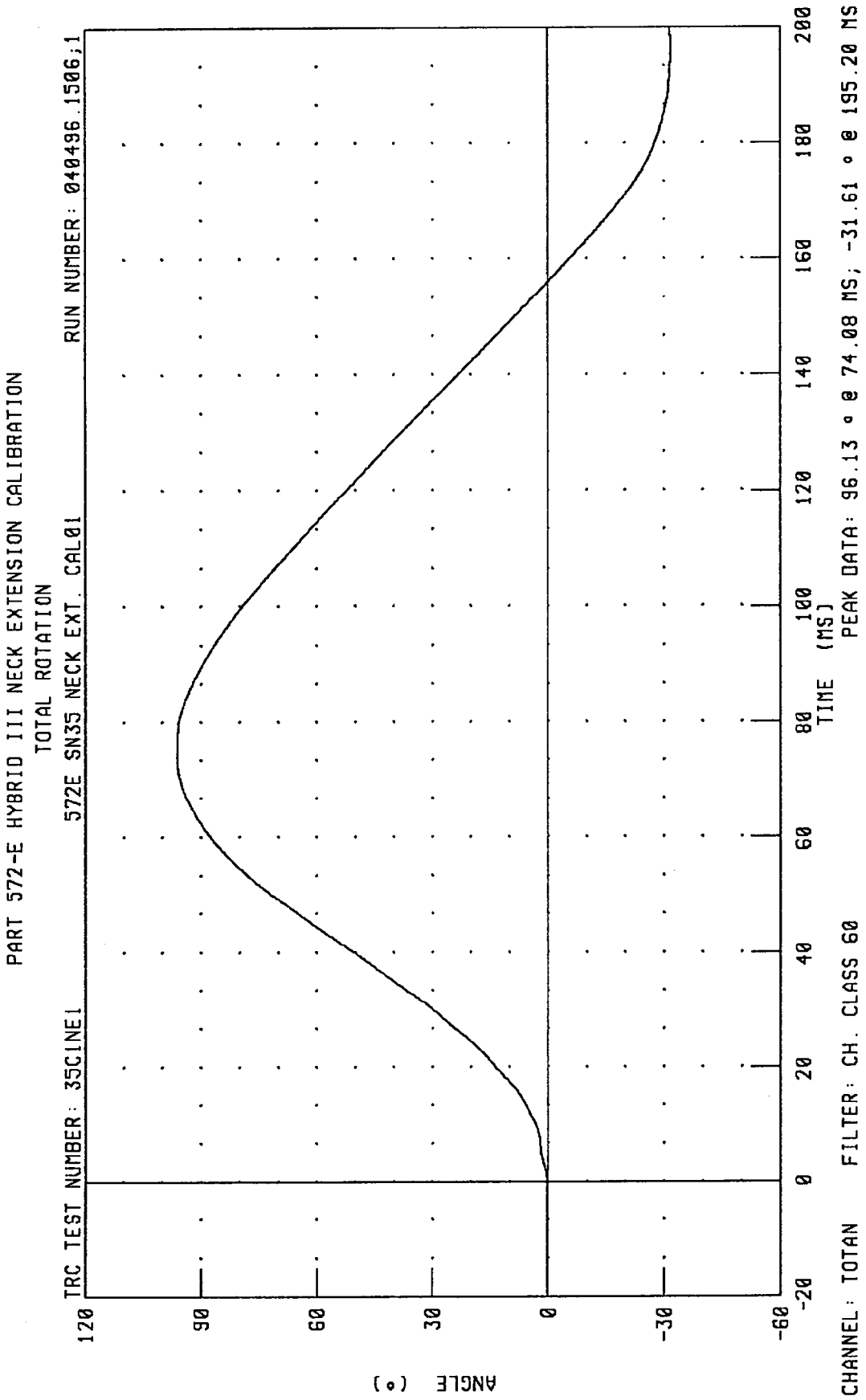
AS664170



960314

AS664171



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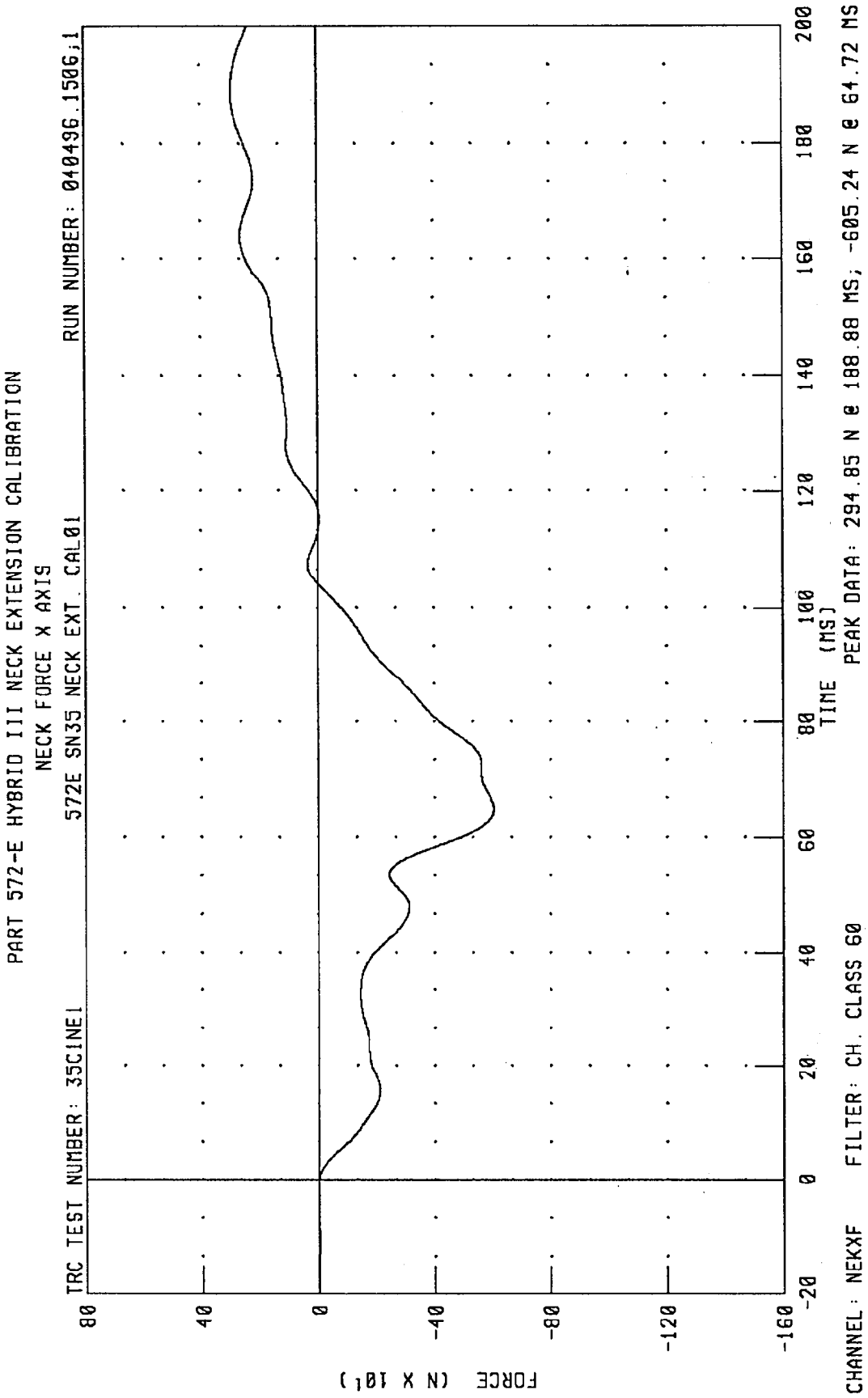
AS664172



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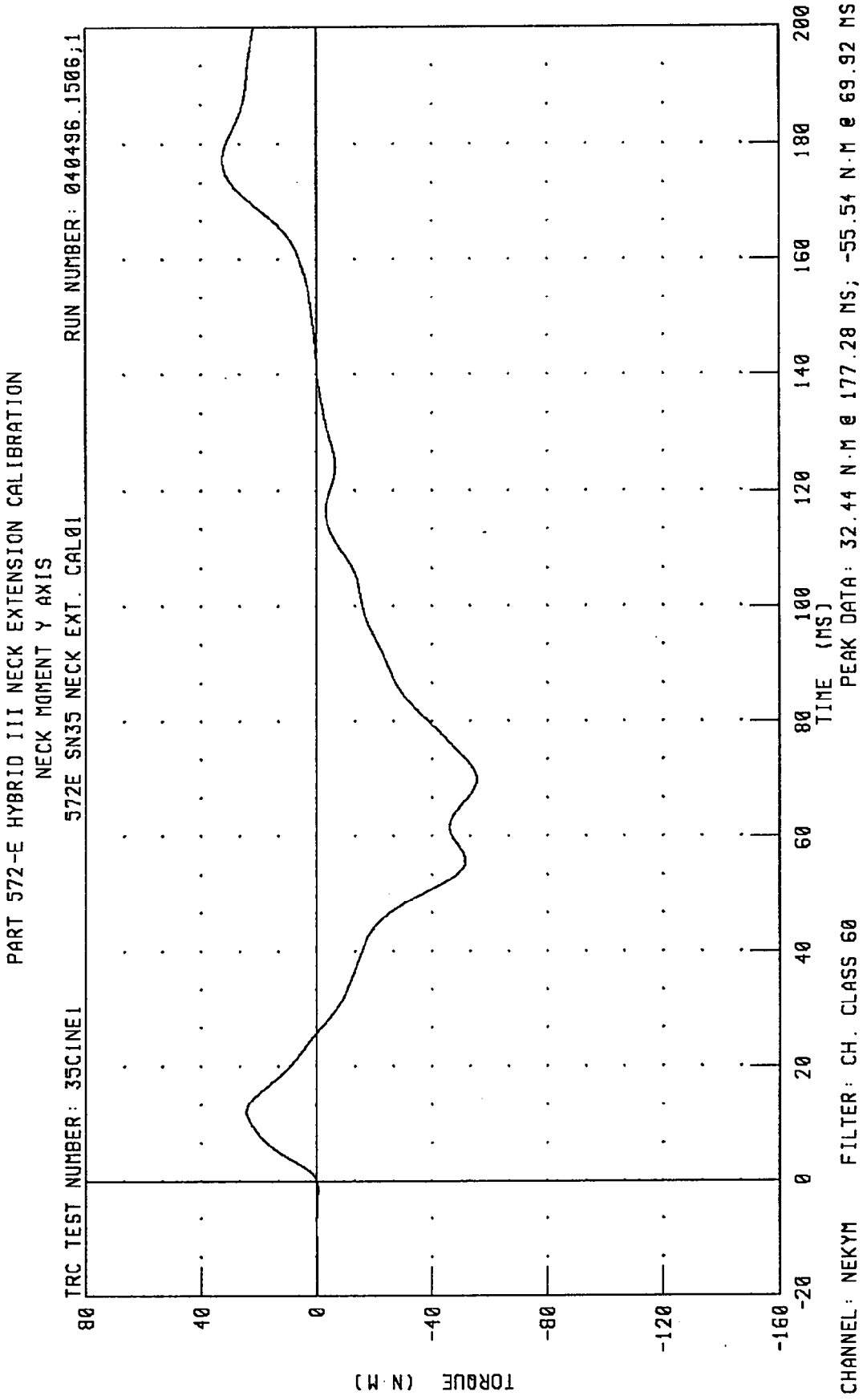
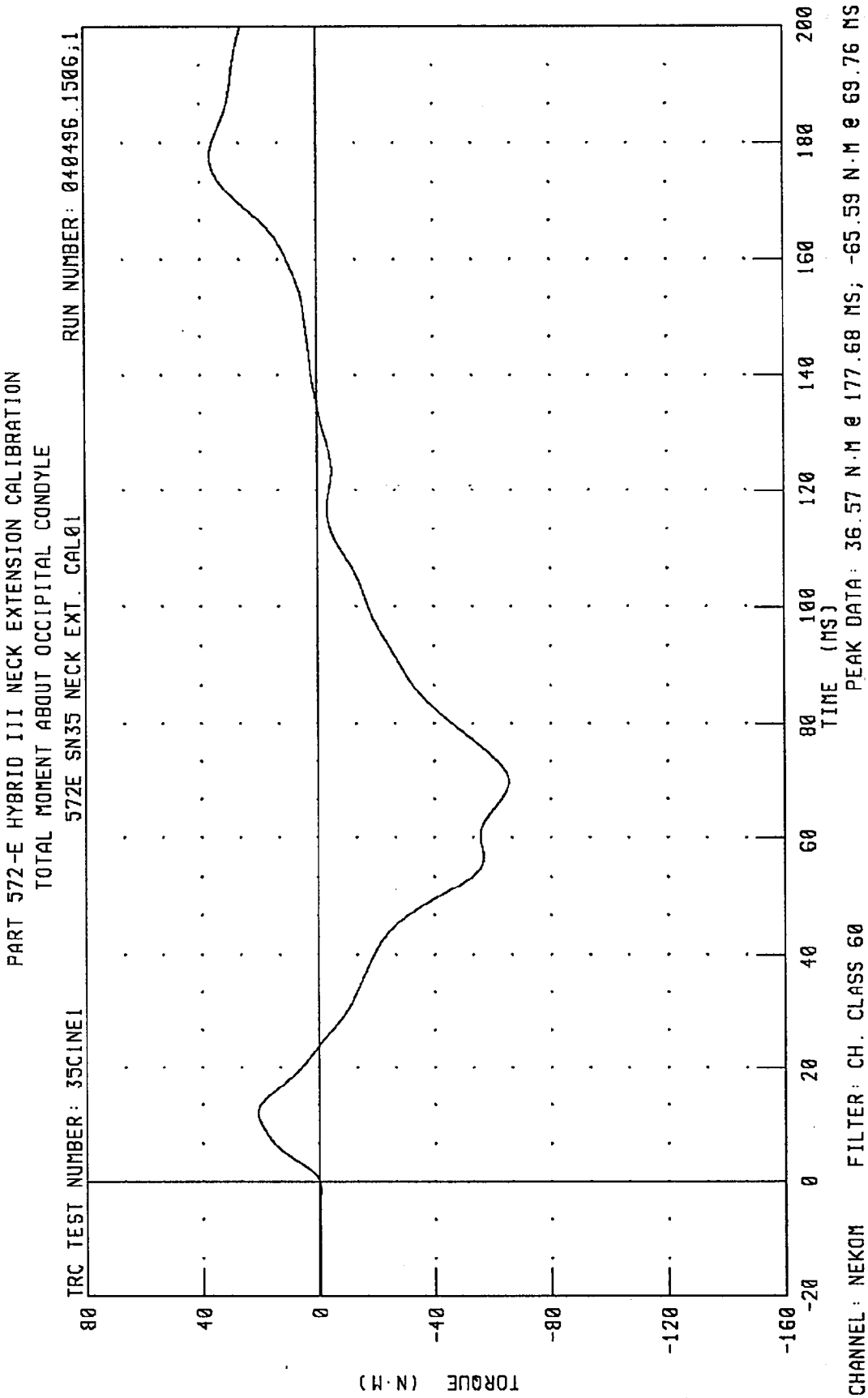
AS664173


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 35CINE1
572E SN35 NECK EXT. CAL01
RUN NUMBER: 040496.1506;1
80
40
0
-40
-80
-120
-160
TORQUE (N.M)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKYM
FILTER: CH. CLASS 60
PEAK DATA: 32.44 N.M @ 177.28 MS; -55.54 N.M @ 69.92 MS



960314

AS664175

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

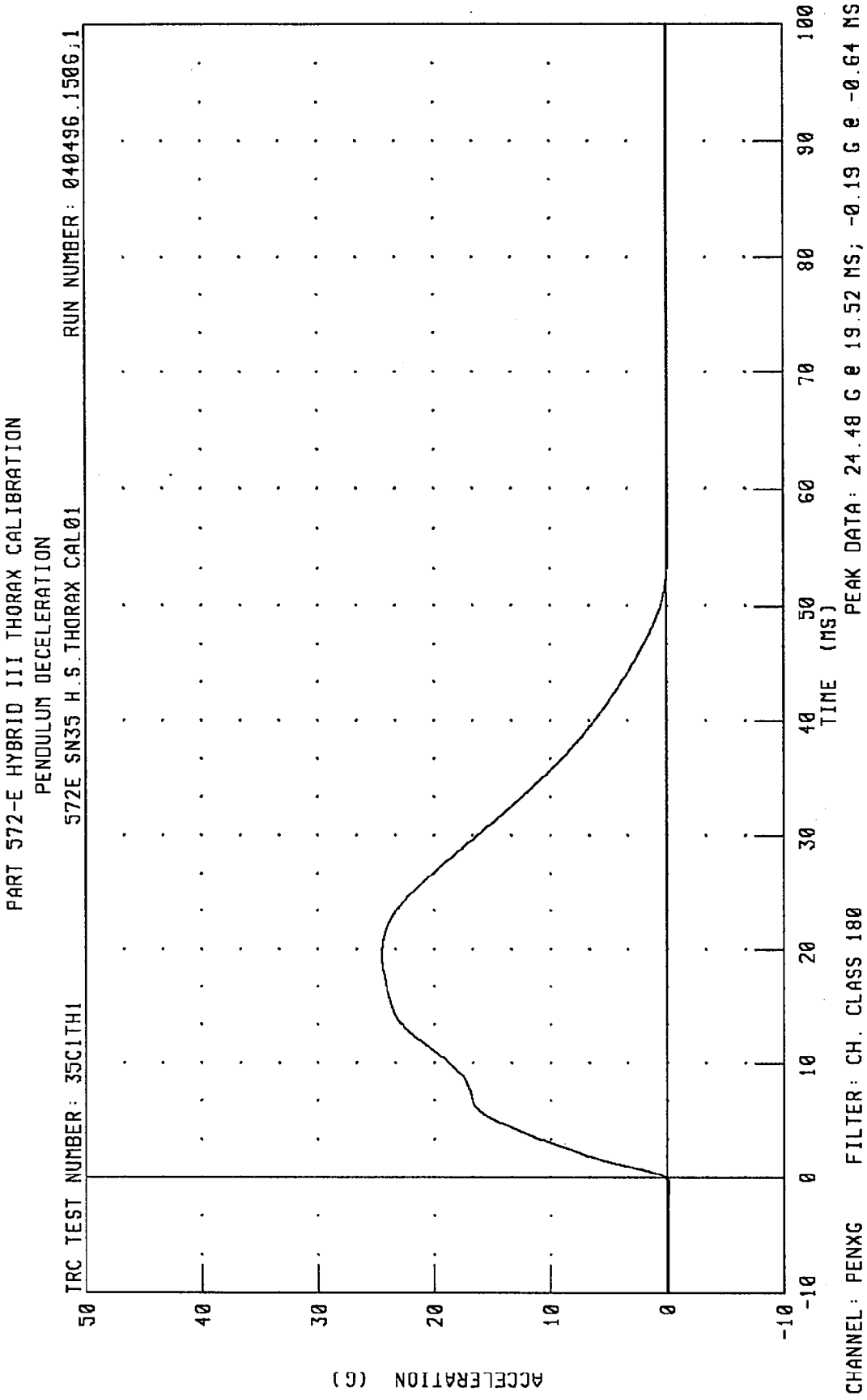
HYBRID III 11-JUL-95

TRC INC. TEST NO: 35C1TH1 572E SN35 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.4 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.62 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	66.7 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5608. N
INTERNAL HYSTERESIS	69% - 85%	73.6%

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 071195.1433;1



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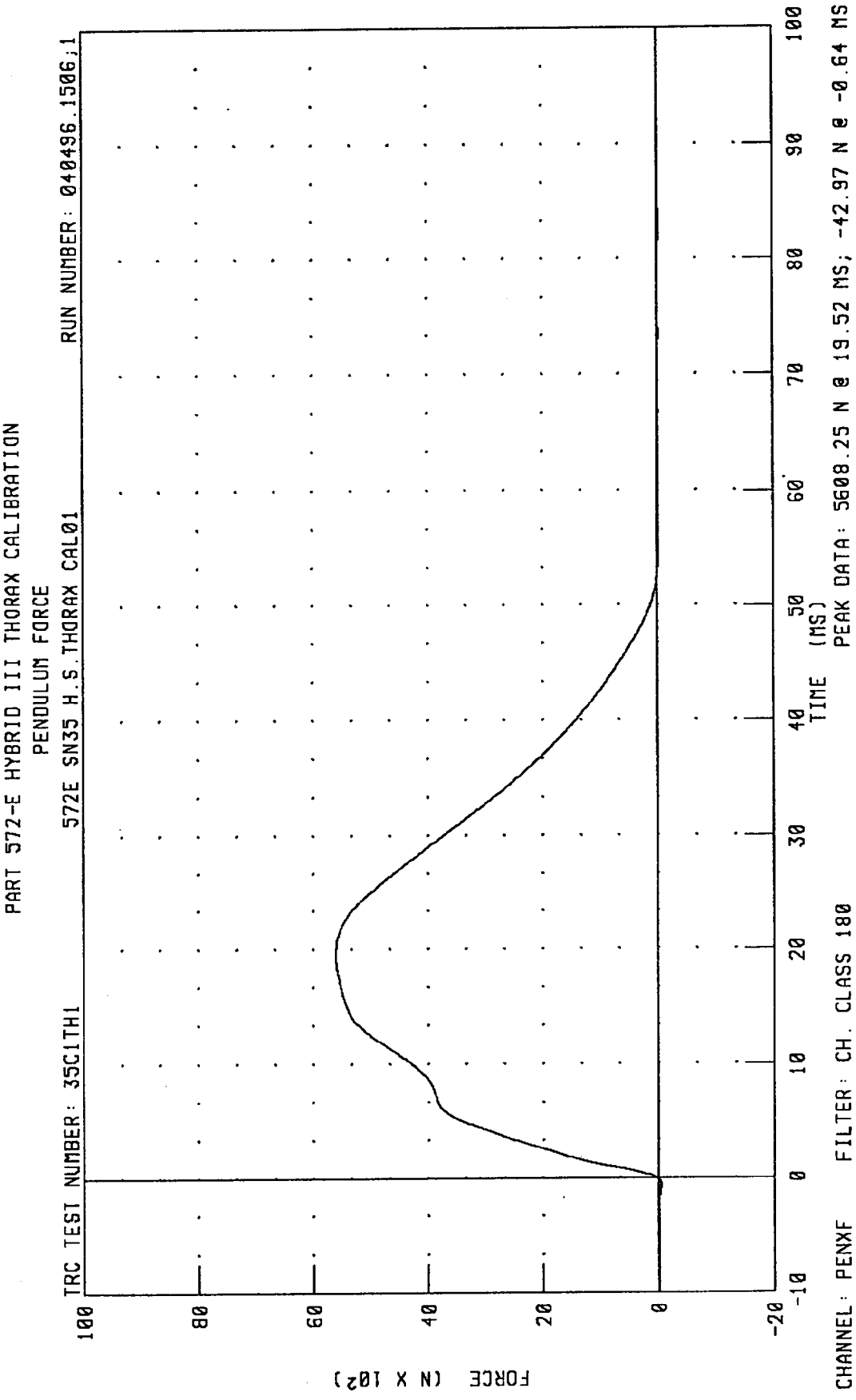
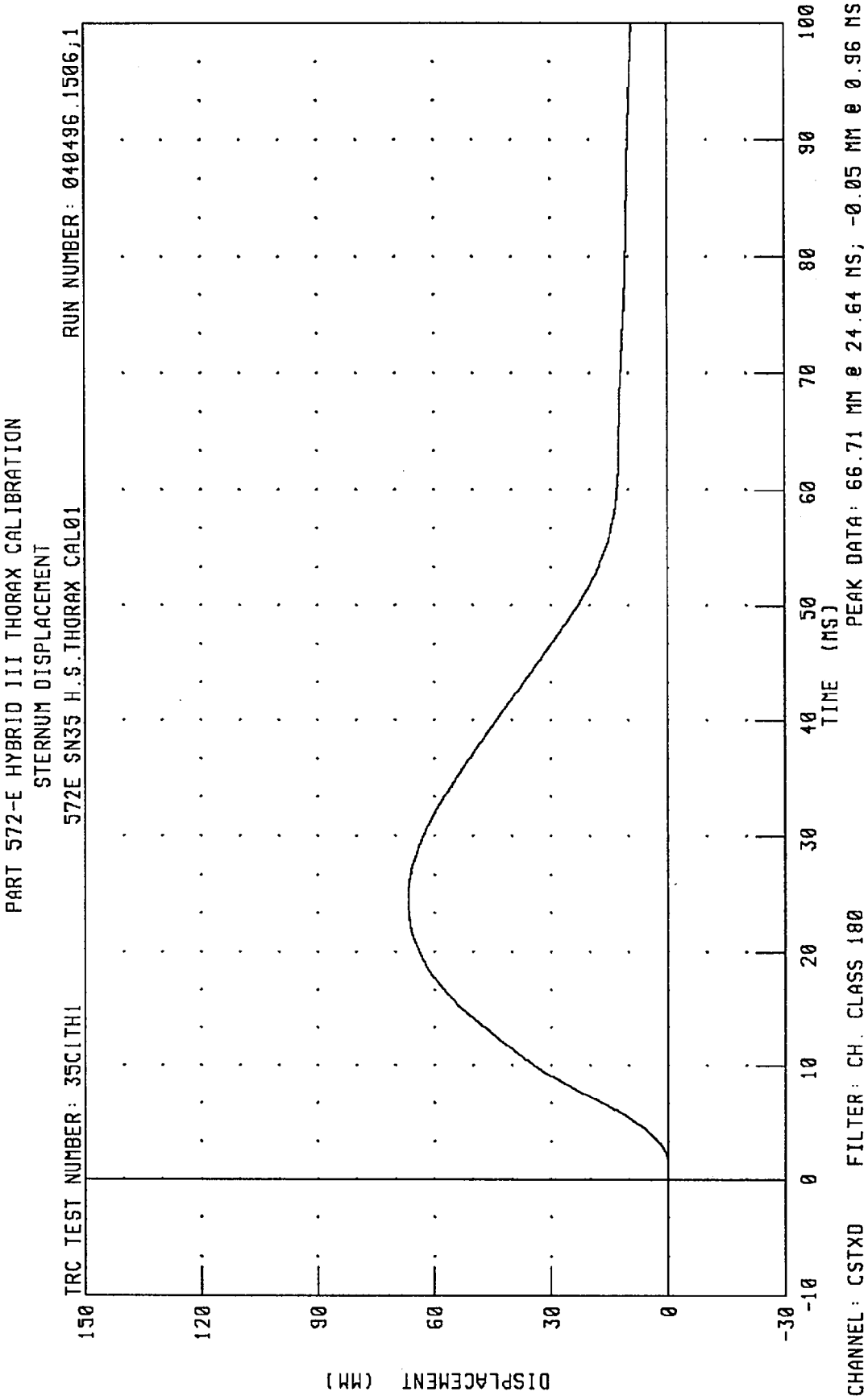
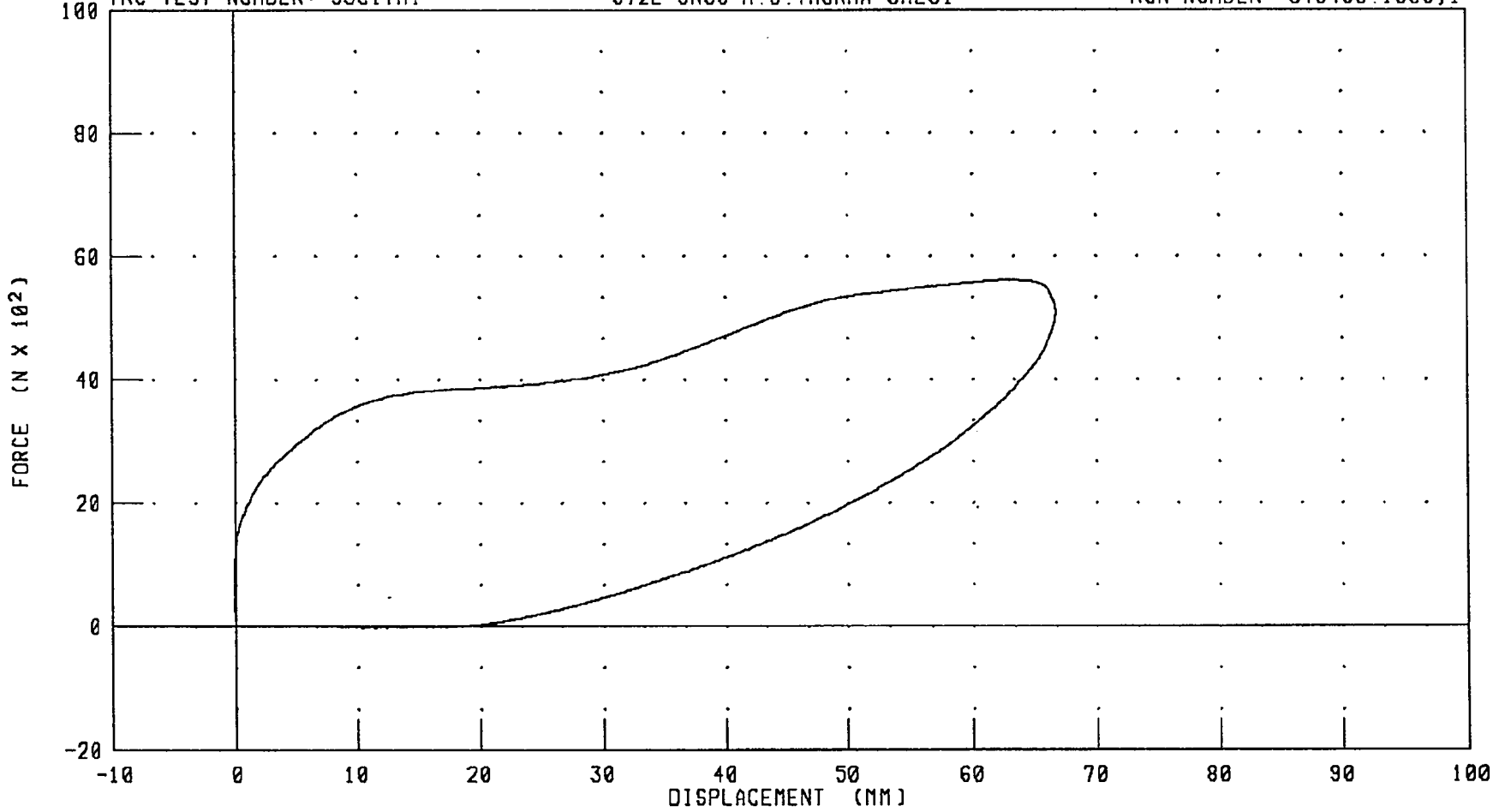
AS664177


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 35C1TH1
572E SN35 H.S.THORAX CAL01
RUN NUMBER: 040496.1506;1
FORCE (N X 10²)
100
80
60
40
20
0
-20
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5608.25 N @ 19.52 MS; -42.97 N @ -0.64 MS


PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT
TRC TEST NUMBER: 35C1TH1
572E SN35 H.S.THORAX CAL01
RUN NUMBER: 040496.1506;1
DISPLACEMENT (MM)
150
120
90
60
30
0
-30
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: CSTXD
FILTER: CH. CLASS 180
PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS

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

TRC TEST NUMBER: 35C1TH1 572E SN35 H.S.THORAX CAL01 RUN NUMBER: 040496.1506;1



CHANNEL: CSTXD FILTER: CH. CLASS 180 PEAK DATA: 66.71 MM @ 24.64 MS; -0.05 MM @ 0.96 MS
PENXF CH. CLASS 180 5608.25 N @ 19.52 MS; -42.97 N @ -0.64 MS

960314

TRANSPORTATION RESEARCH CENTER INC.

RIGHT KNEE IMPACT TEST

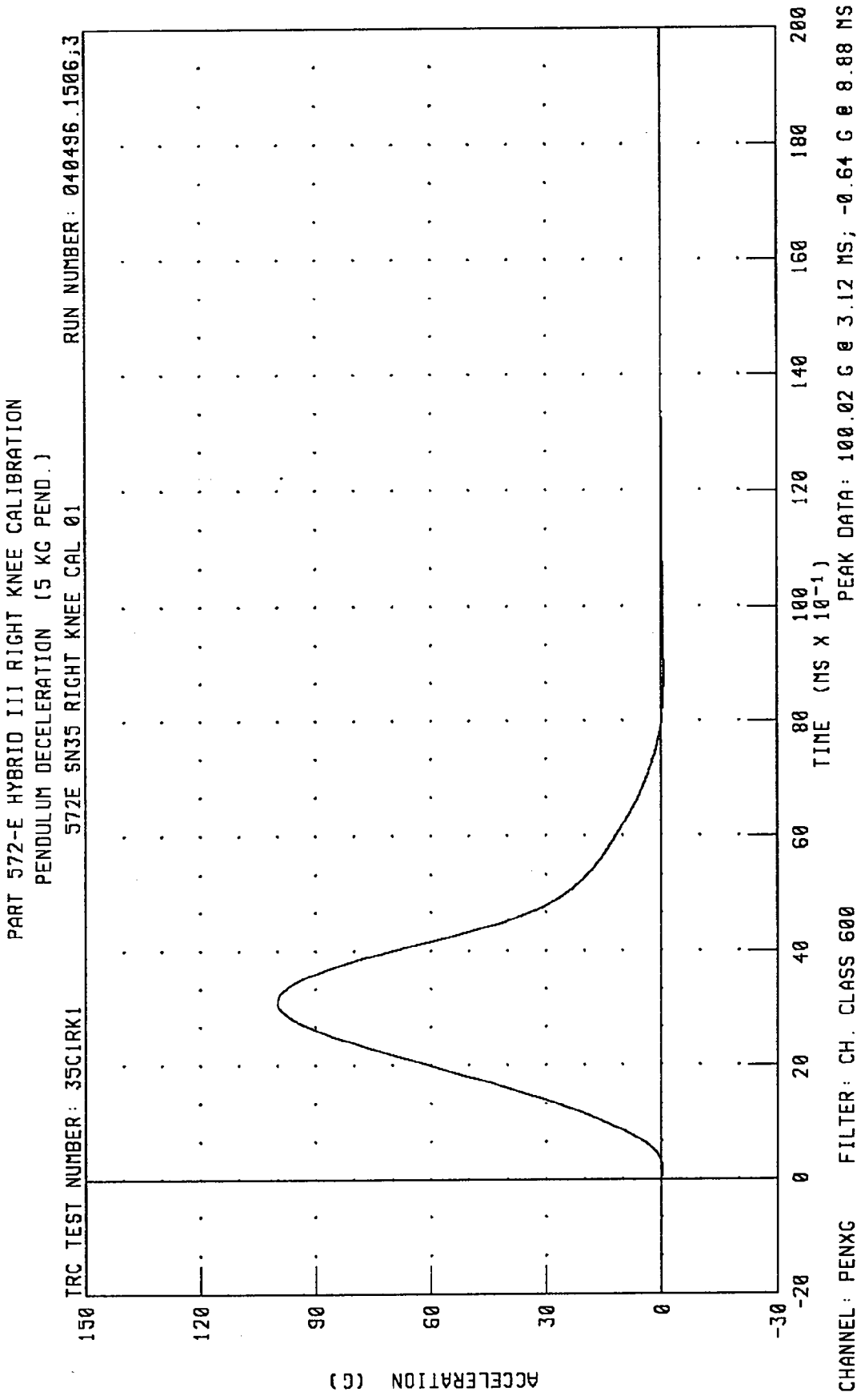
HYBRID III 11-JUL-95

TRC INC. TEST NO: 35C1RK1 572E SN35 RIGHT KNEE CAL 01

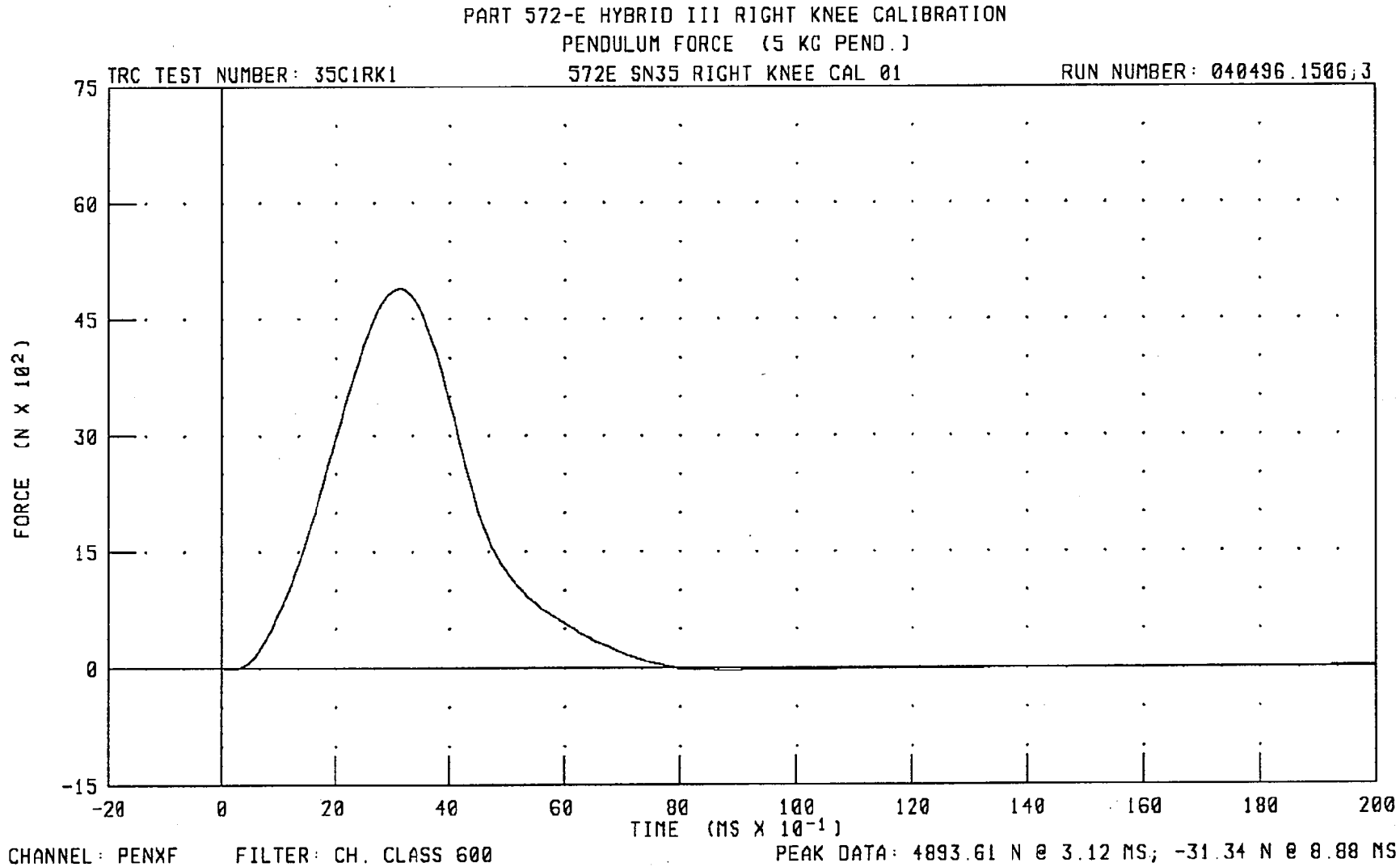
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4893.6 N

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 071195.1336;3


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 35C1RK1
572E SN35 RIGHT KNEE CAL 01
RUN NUMBER: 040496.1506;3
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 100.02 G @ 3.12 MS; -0.64 G @ 8.88 MS

960314



TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

HYBRID III 11-JUL-95

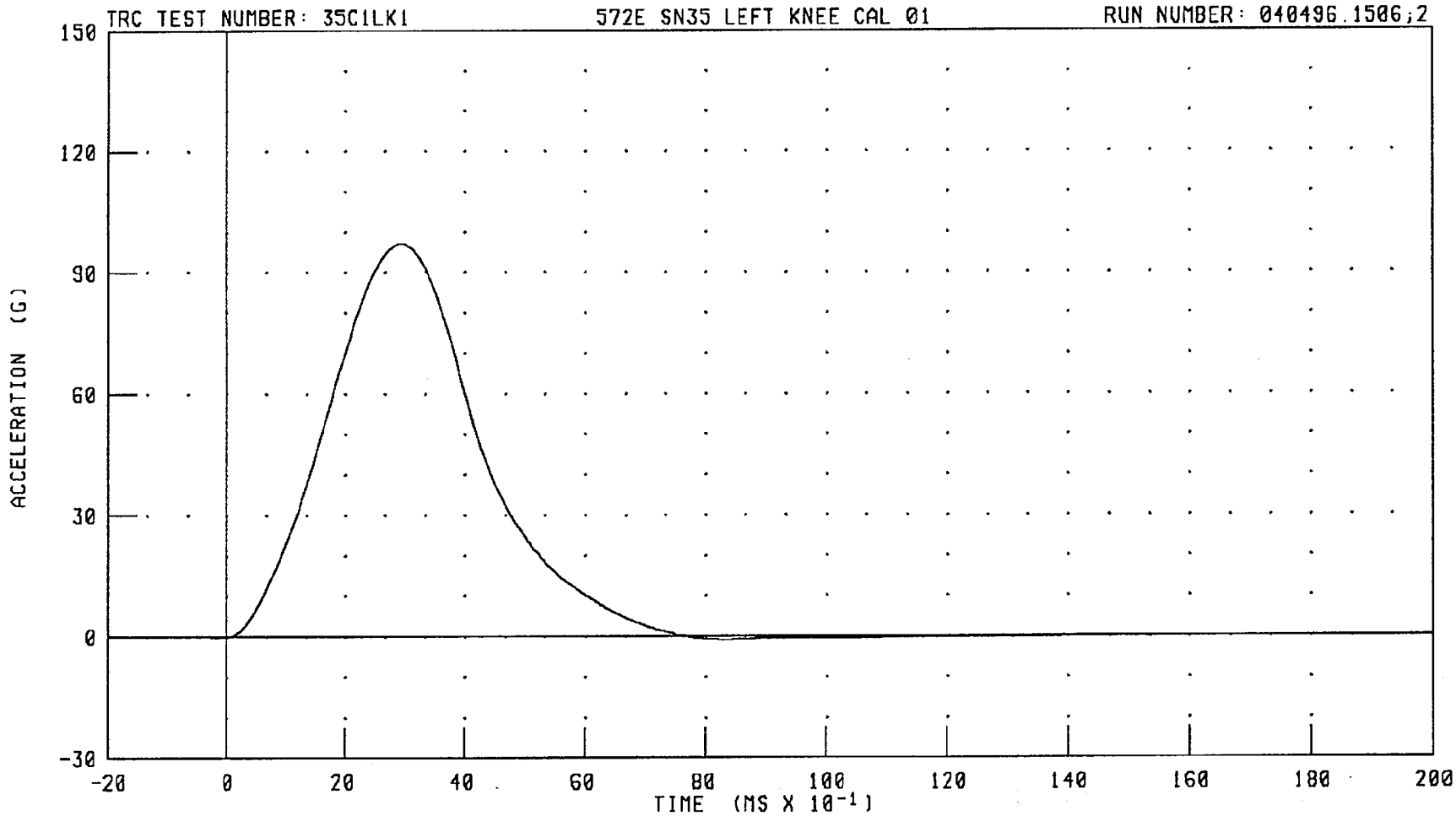
TRC INC. TEST NO: 35C1LK1 572E SN35 LEFT KNEE CAL 01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	4747.9 N

TEST MEETS SPECIFICATIONS

TECHNICIAN _____ RUN NUMBER: 071195.1251;2

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



CHANNEL: PENXG FILTER: CH. CLASS 600 PEAK DATA: 97.04 G @ 2.96 MS; -0.87 G @ 8.32 MS

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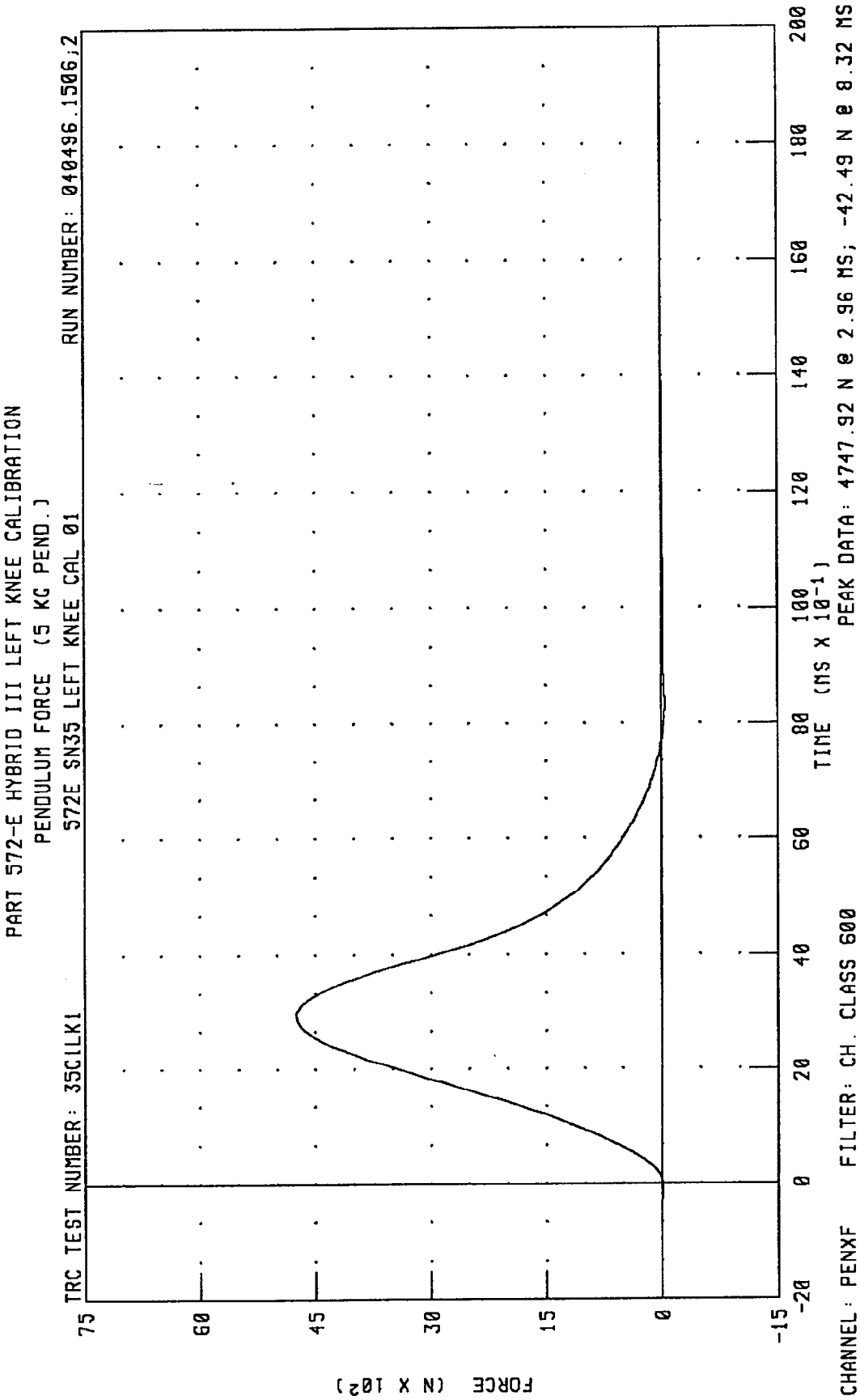

PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)
572E SN35 LEFT KNEE CAL 01
RUN NUMBER: 040496.1506;2
TRC TEST NUMBER: 35C1LK1
FORCE (N X 10²)
75
60
45
30
15
0
-15
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXF FILTER: CH. CLASS 600
PEAK DATA: 4747.92 N @ 2.96 MS; -42.49 N @ 8.32 MS

960314

Pre-Test Calibration

Serial Number 34

TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
34 VECTOR

11-JUL-95

TRC INC. TEST NO: 34C1ED1 572E SN34 EXT.DIMENSION CAL01

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	991. MM
WAIST CIRCUMFERENCE	(Z)	836 - 866 MM	856. MM
CHEST DEPTH	(O)	213 - 229 MM	218. MM
H-POINT HEIGHT	(C)	84 - 89 MM	86. MM
H-POINT FROM SEATBACK	(D)	135 - 140 MM	137. MM
SKULL CAP TO BACKLINE	(H)	41 - 46 MM	43. MM
TOTAL SITTING HEIGHT	(A)	879 - 889 MM	884. MM
THIGH CLEARANCE	(F)	140 - 155 MM	155. MM
BUTTOCK KNEE LENGTH	(K)	579 - 605 MM	602. MM
BUTTOCK POPLITEAL LENGTH	(N)	452 - 478 MM	472. MM
POPLITEAL HEIGHT	(L)	429 - 455 MM	439. MM
KNEE PIVOT HEIGHT	(M)	485 - 500 MM	498. MM
FOOT LENGTH	(P)	252 - 267 MM	254. MM
FOOT BREADTH	(W)	91 - 107 MM	97. 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	208. MM
SHOULDER-ELBOW LENGTH	(I)	330 - 345 MM	335. MM
BACK OF ELBOW TO WRIST PIVOT	(G)	290 - 305 MM	295. MM

DUMMY MEETS SPECIFICATIONS
TECHNICIAN Richard LeLan

RUN NUMBER: 071295.1424

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

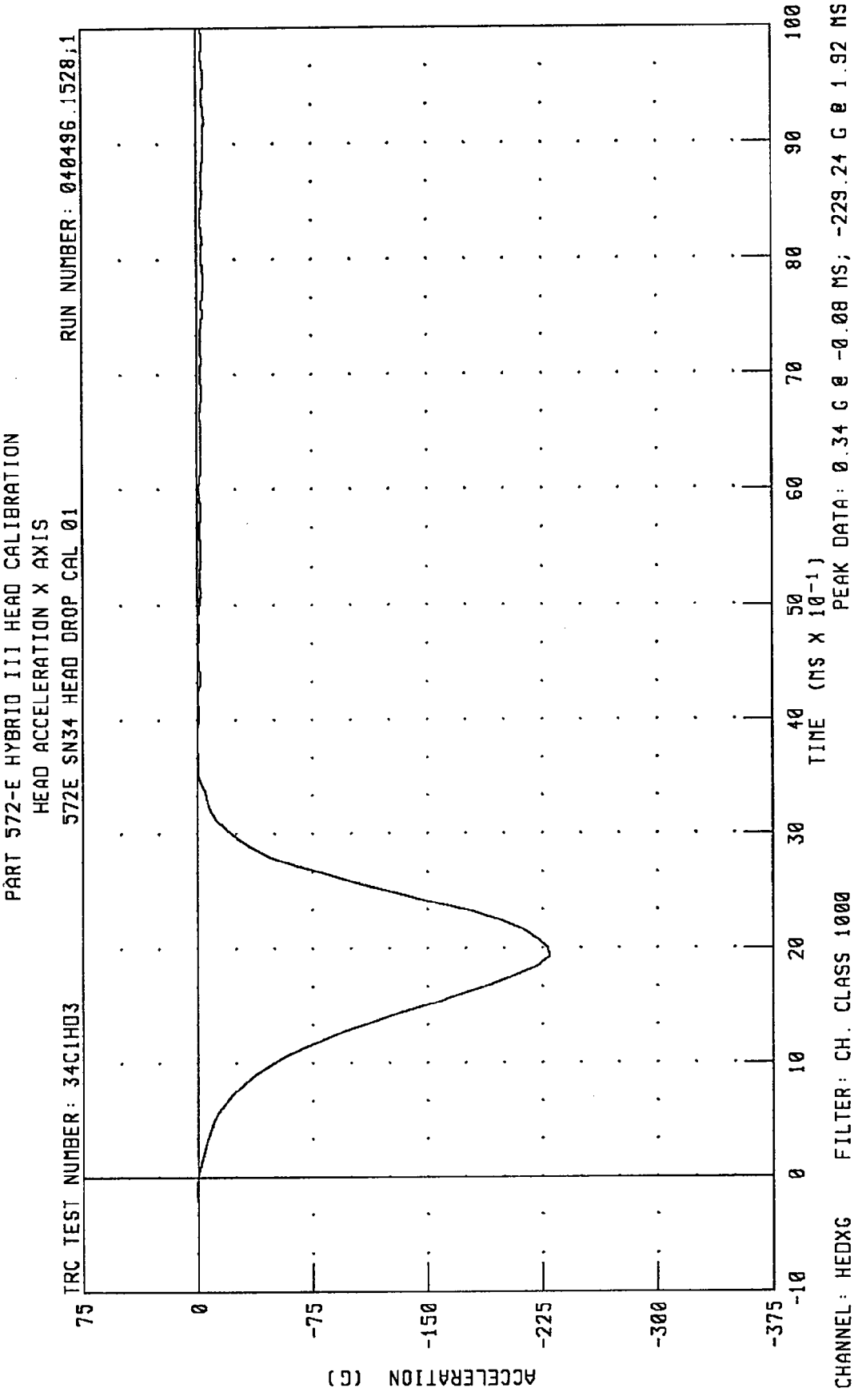
HYBRID III 06-MAR-96

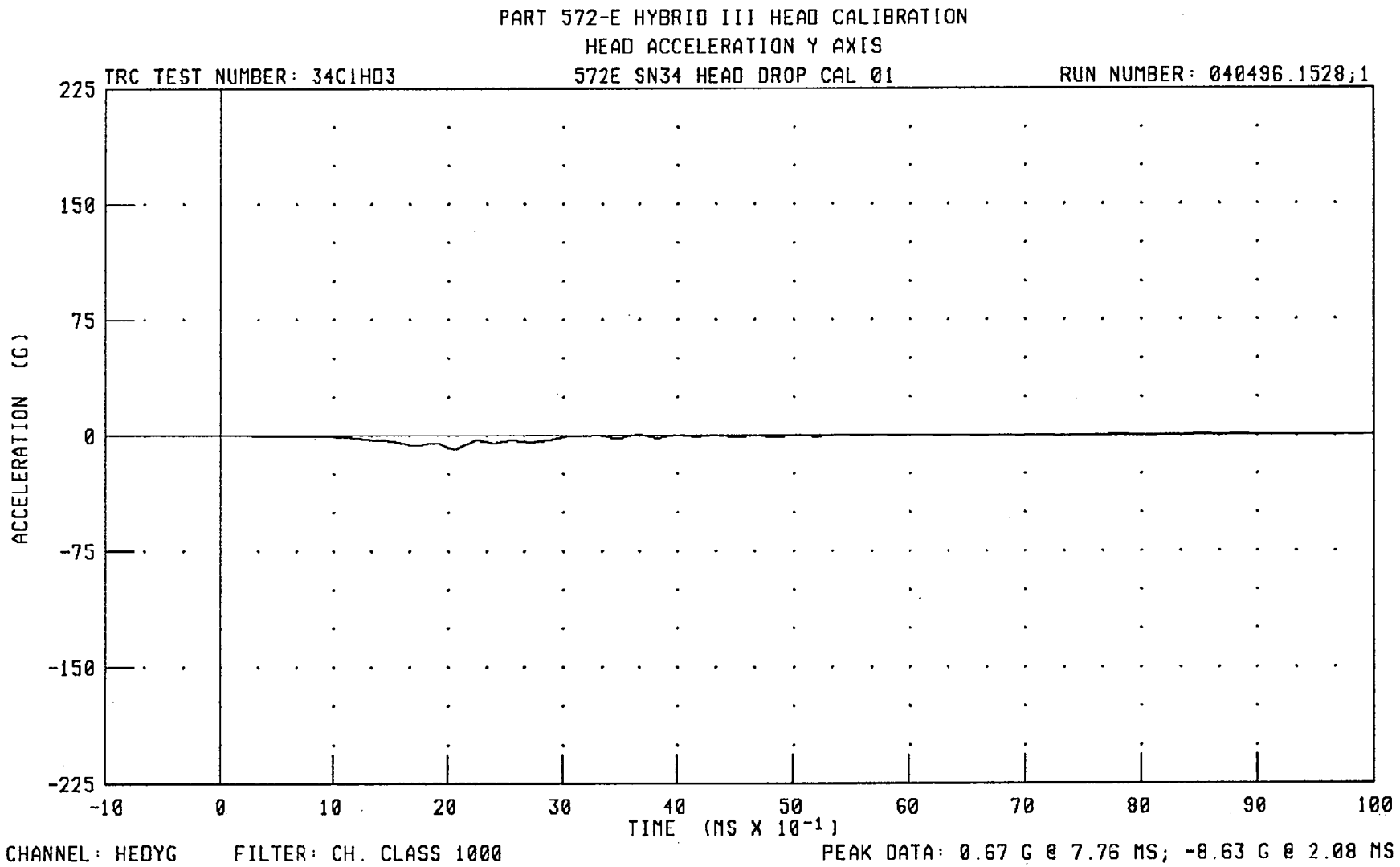
TRC INC. TEST NO: 34C1HD3 572E SN34 HEAD DROP CAL 01

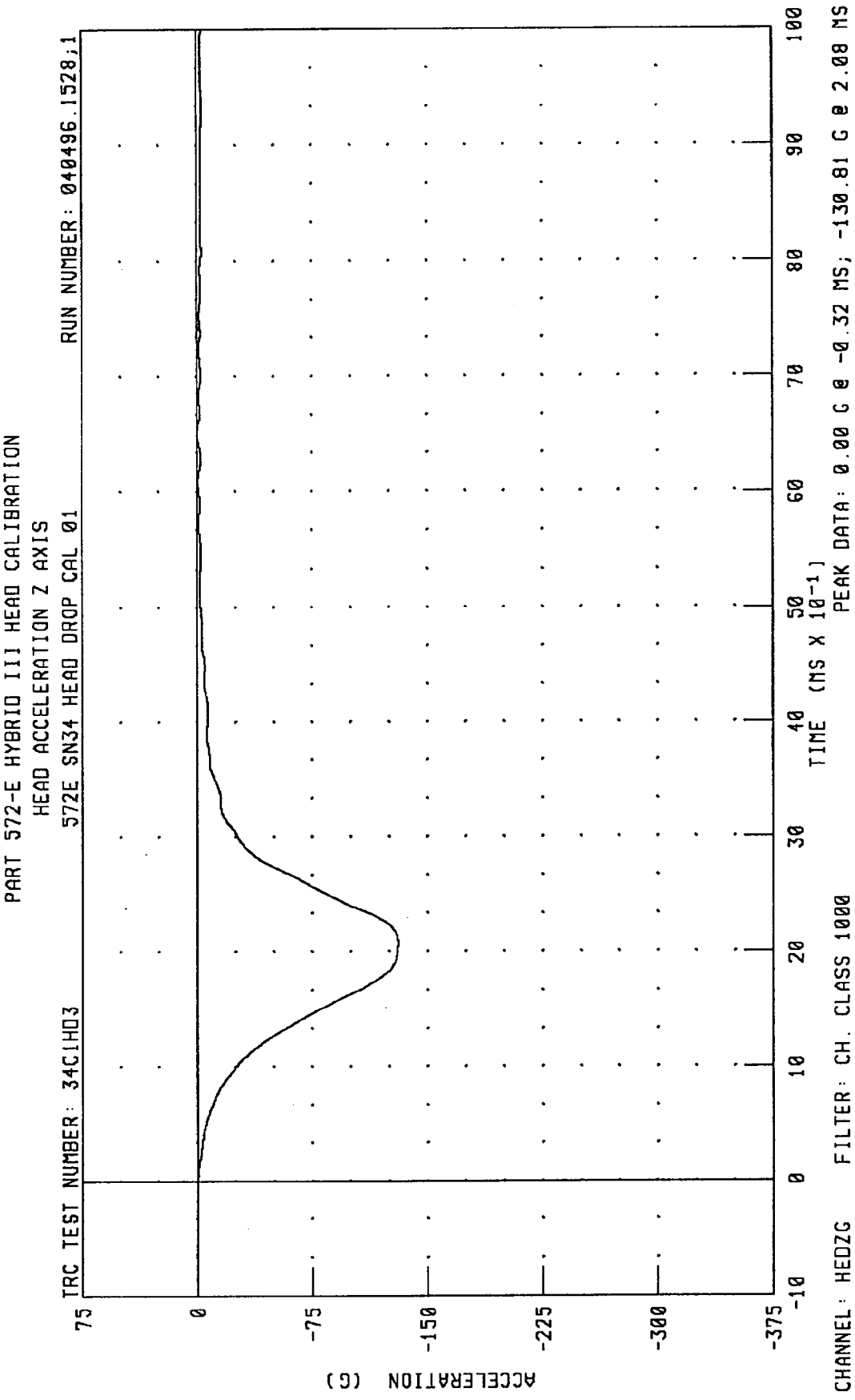
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	39.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	263.60 G
PEAK LATERAL ACCELERATION	15 G MAX	-8.63 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

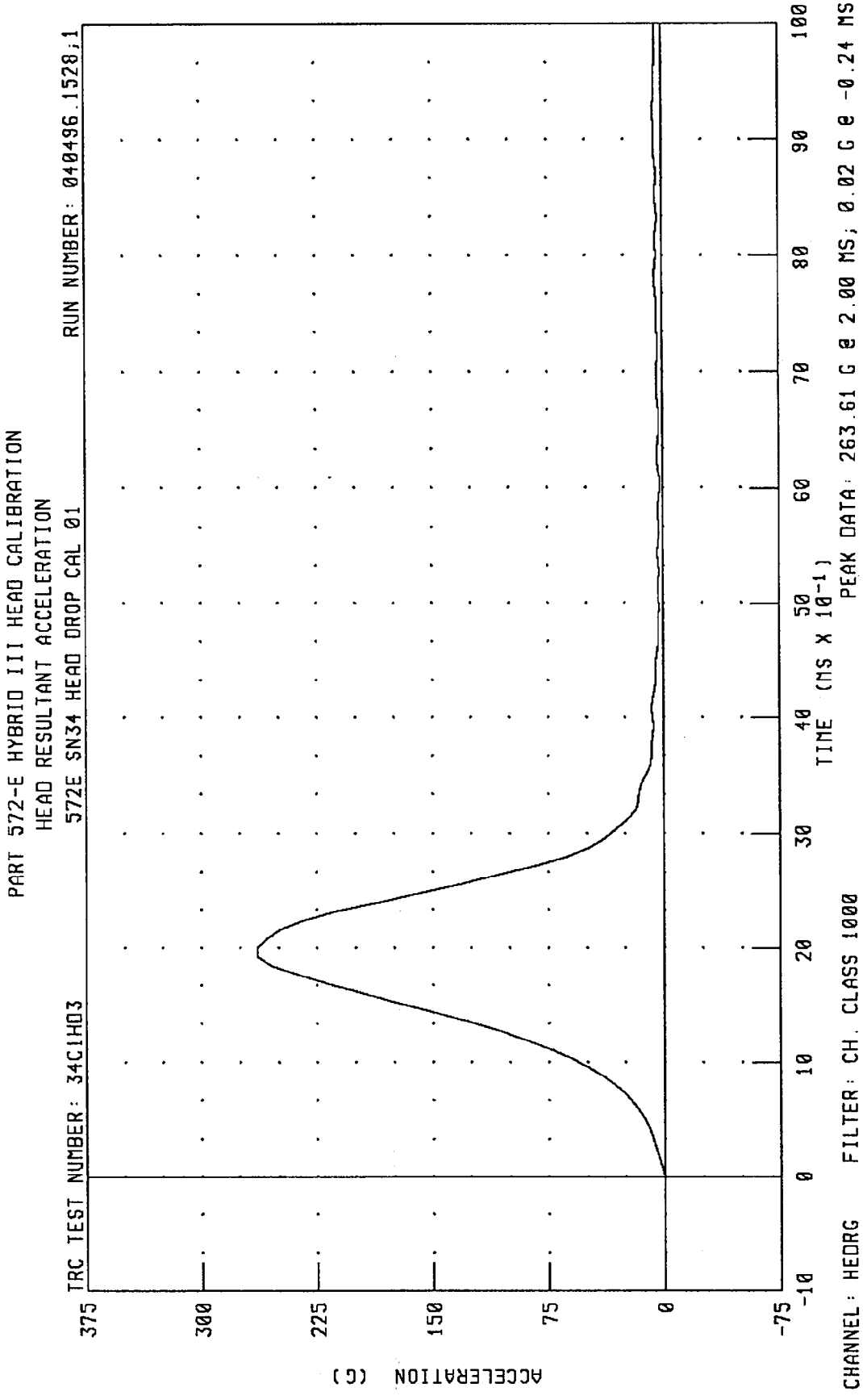
TECHNICIAN Richard LeVan RUN NUMBER: 030696.1057;1


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS
TRC TEST NUMBER: 34C1H03
572E SN34 HEAD DROP CAL 01
RUN NUMBER: 040496.1528;1
ACCELERATION (G)
75
0
-75
-150
-225
-300
-375
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10⁻¹)
CHANNEL: HEDXG
FILTER: CH. CLASS 1000
PEAK DATA: 0.34 G @ -0.08 MS; -229.24 G @ 1.92 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Y AXIS
TRC TEST NUMBER: 34C1H03
572E SN34 HEAD DROP CAL 01
RUN NUMBER: 040496.1528;1
225
150
75
0
-75
-150
-225
ACCELERATION (G)
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10-1)
CHANNEL: HEDYG
FILTER: CH. CLASS 1000
PEAK DATA: 0.67 G @ 7.76 MS; -8.63 G @ 2.08 MS


PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION Z AXIS
TRC TEST NUMBER: 34C1H03
572E SN34 HEAD DROP CAL 01
RUN NUMBER: 040496.1528;1
ACCELERATION (G)
75
0
-75
-150
-225
-300
-375
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS X 10^-1)
CHANNEL: HEDZG
FILTER: CH. CLASS 1000
PEAK DATA: 0.00 G @ -0.32 MS; -130.81 G @ 2.08 MS

960314



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AS664193

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST - 6 CHANNEL TRANSDUCER

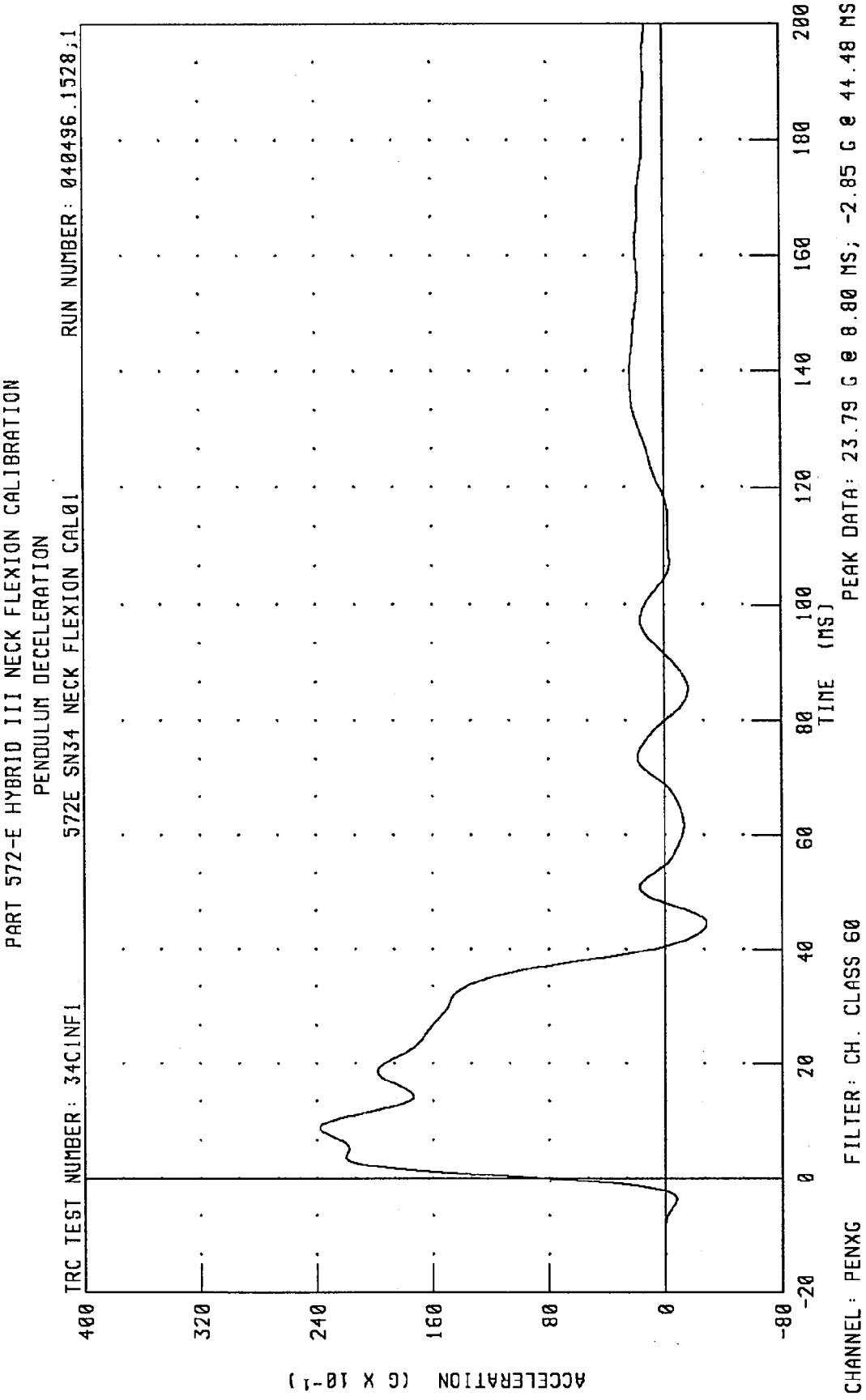
HYBRID III 11-JUL-95

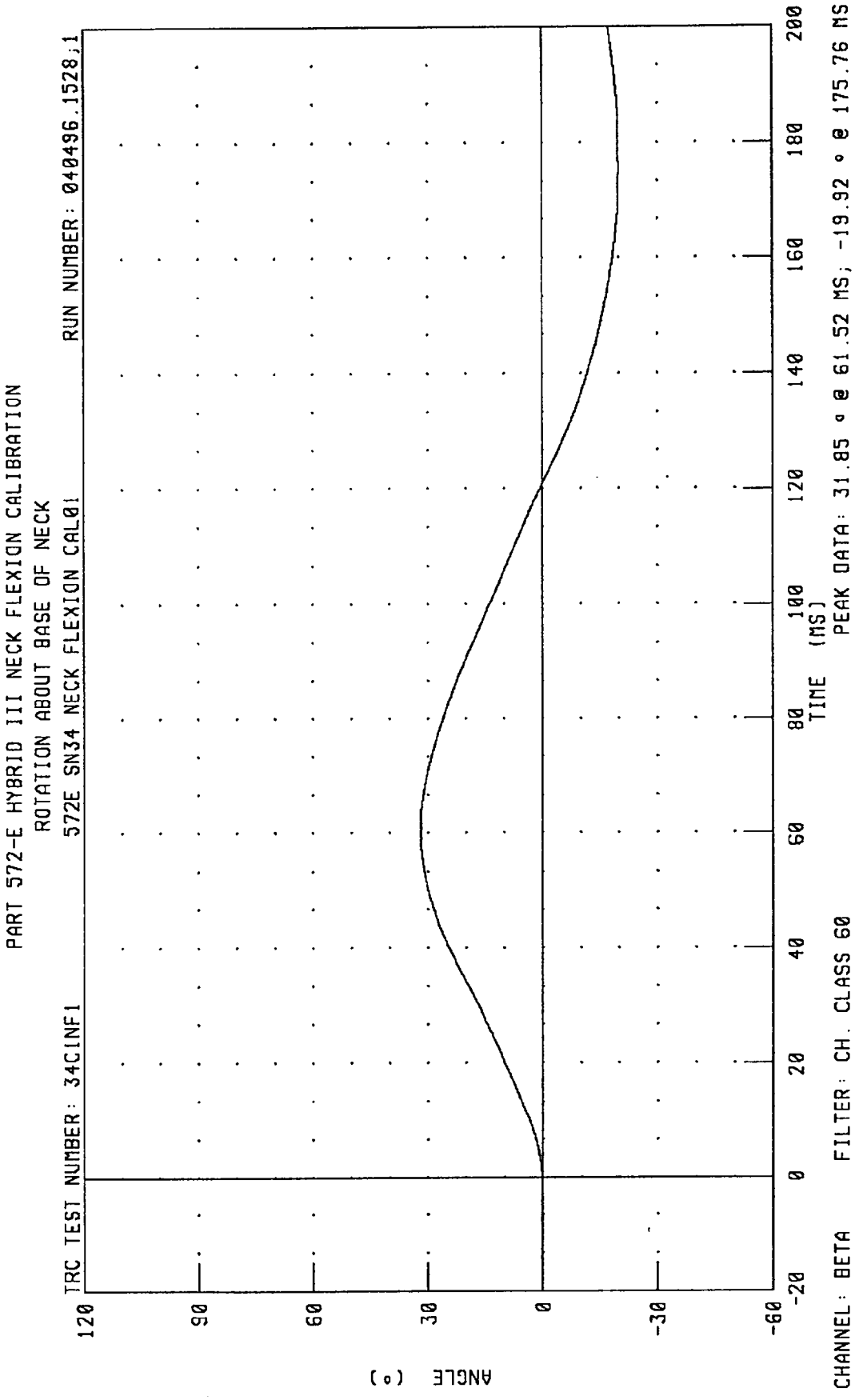
TRC INC. TEST NO: 34C1NF1 572E SN34 NECK FLEXION CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6-22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		6.89 - 7.13 M/S	6.99 M/S
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.98 G
	20 MS	17.60 - 22.60 G	19.34 G
	30 MS	12.50 - 18.50 G	14.91 G
MAX PENDULUM G		29 G MAX	23.79 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	14.89 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.16 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	72.72 DEG.
	TIME	57 - 64 MS	60.24 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	88.2 - 108.5 NM	90.00 NM
	TIME	47 - 58 MS	51.60 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	117.76 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	103.44 MS

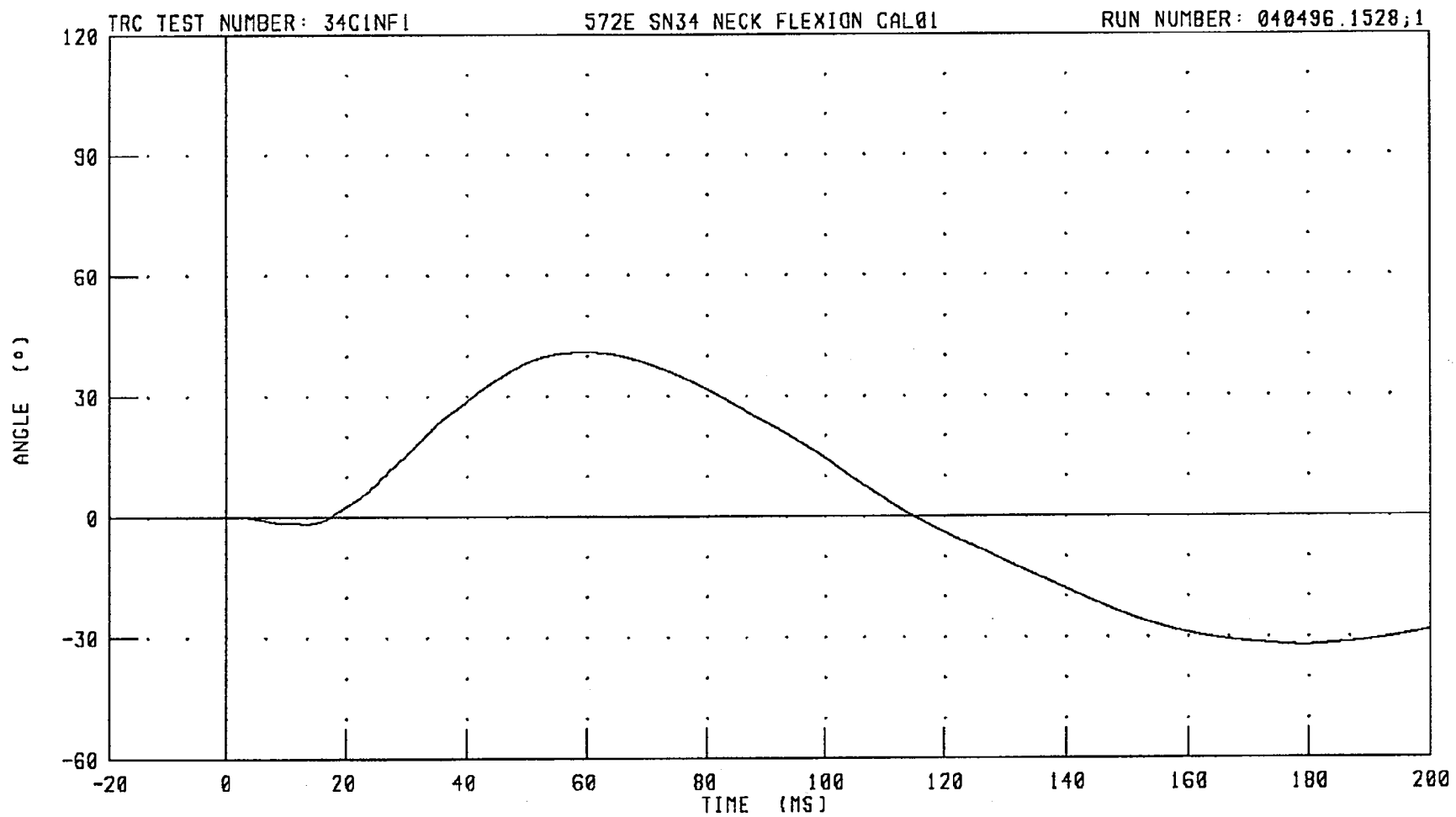
TEST MEETS SPECIFICATIONS

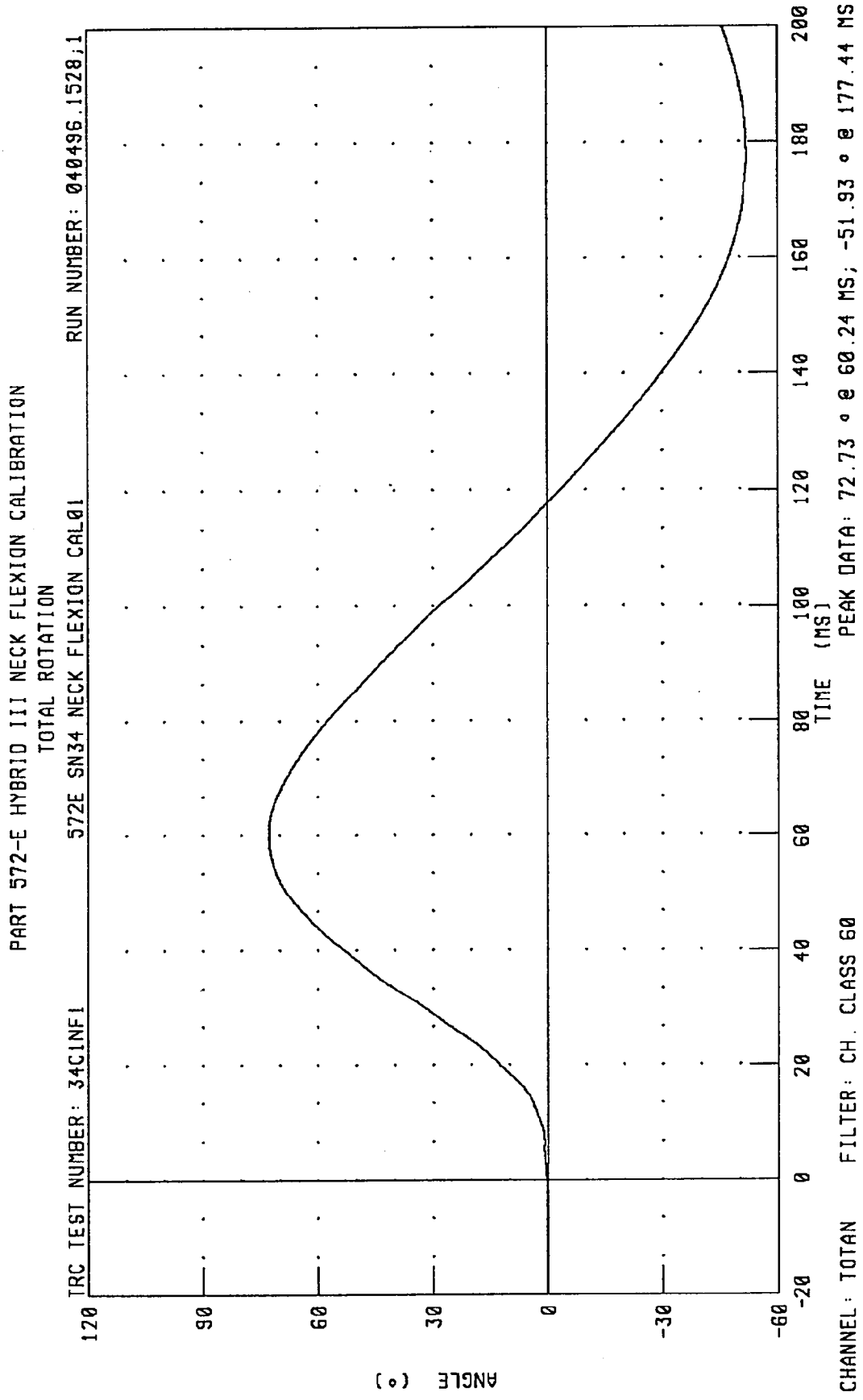
TECHNICIAN Richard LeVan RUN NUMBER: 071195.1004;1


PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 34C1NF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 040496.1528;1
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 23.79 G @ 8.80 MS; -2.85 G @ 44.48 MS

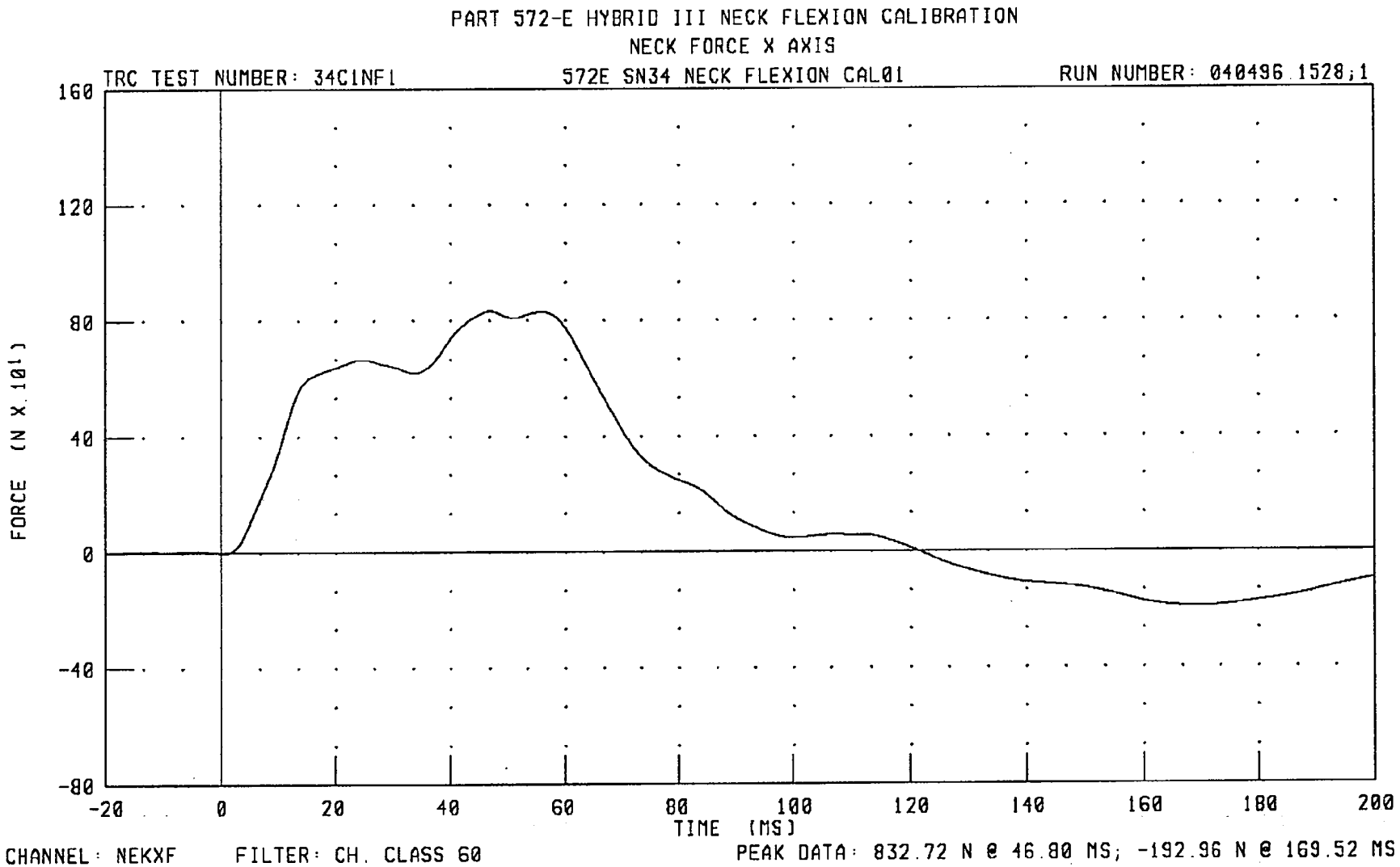

PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 34CINF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 040496.1528;1
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
PEAK DATA: 31.85 ° @ 61.52 MS; -19.92 ° @ 175.76 MS
CHANNEL: BETA
FILTER: CH. CLASS 60

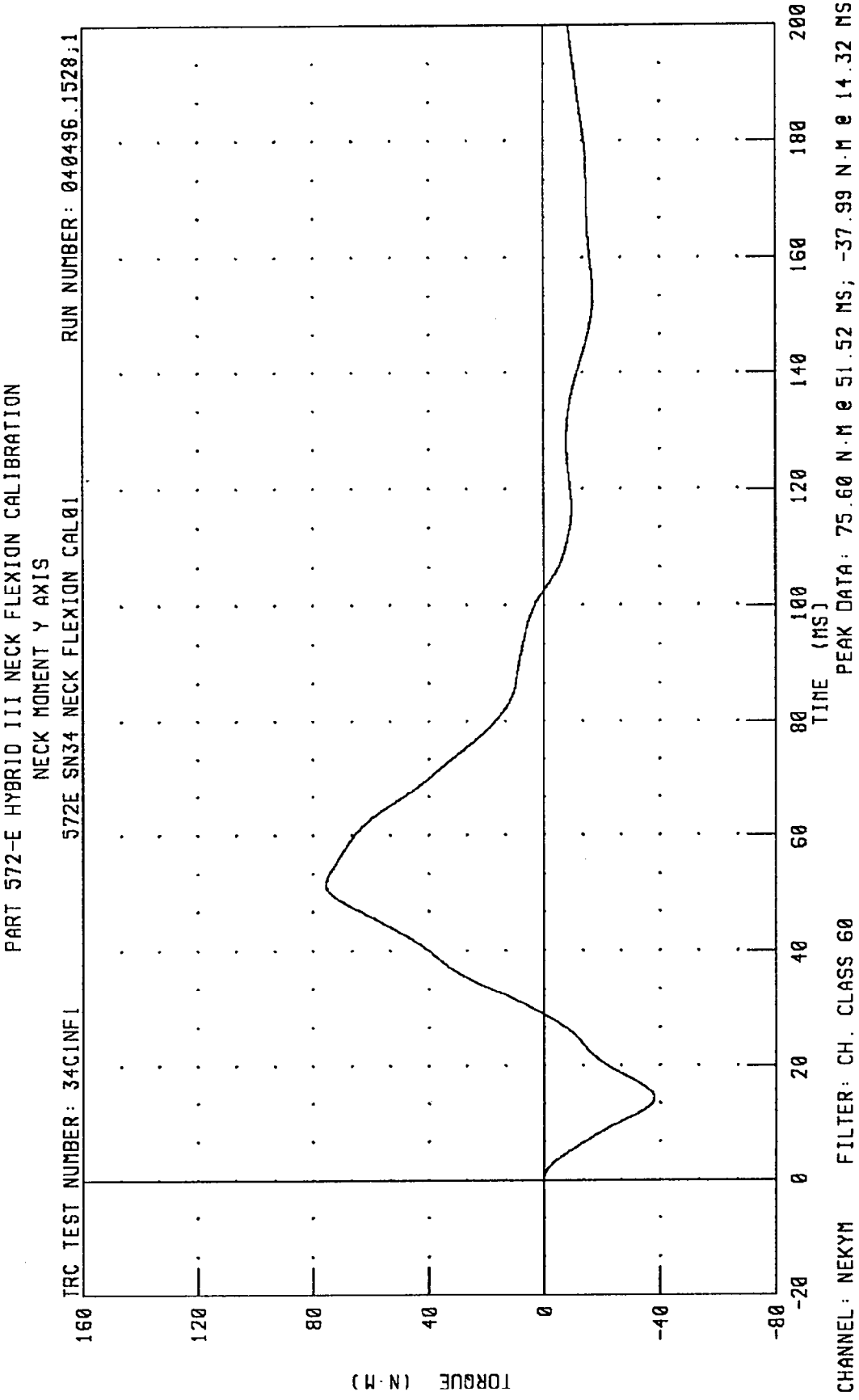
PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE




PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION
TRC TEST NUMBER: 34CINF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 040496.1528;1
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: TOTAN
FILTER: CH. CLASS 60
PEAK DATA: 72.73 ° @ 60.24 MS; -51.93 ° @ 177.44 MS

960314


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS
TRC TEST NUMBER: 34C1NF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 040496.1528;1
160
120
80
40
0
-40
-80
FORCE (N X 10)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKXF
FILTER: CH. CLASS 60
PEAK DATA: 832.72 N @ 46.80 MS; -192.96 N @ 169.52 MS


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS
TRC TEST NUMBER: 34CINF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 040496.1528;1
TORQUE (N-M)
160
120
80
40
0
-40
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
PEAK DATA: 75.60 N-M @ 51.52 MS; -37.99 N-M @ 14.32 MS
CHANNEL: NEKYM
FILTER: CH. CLASS 60

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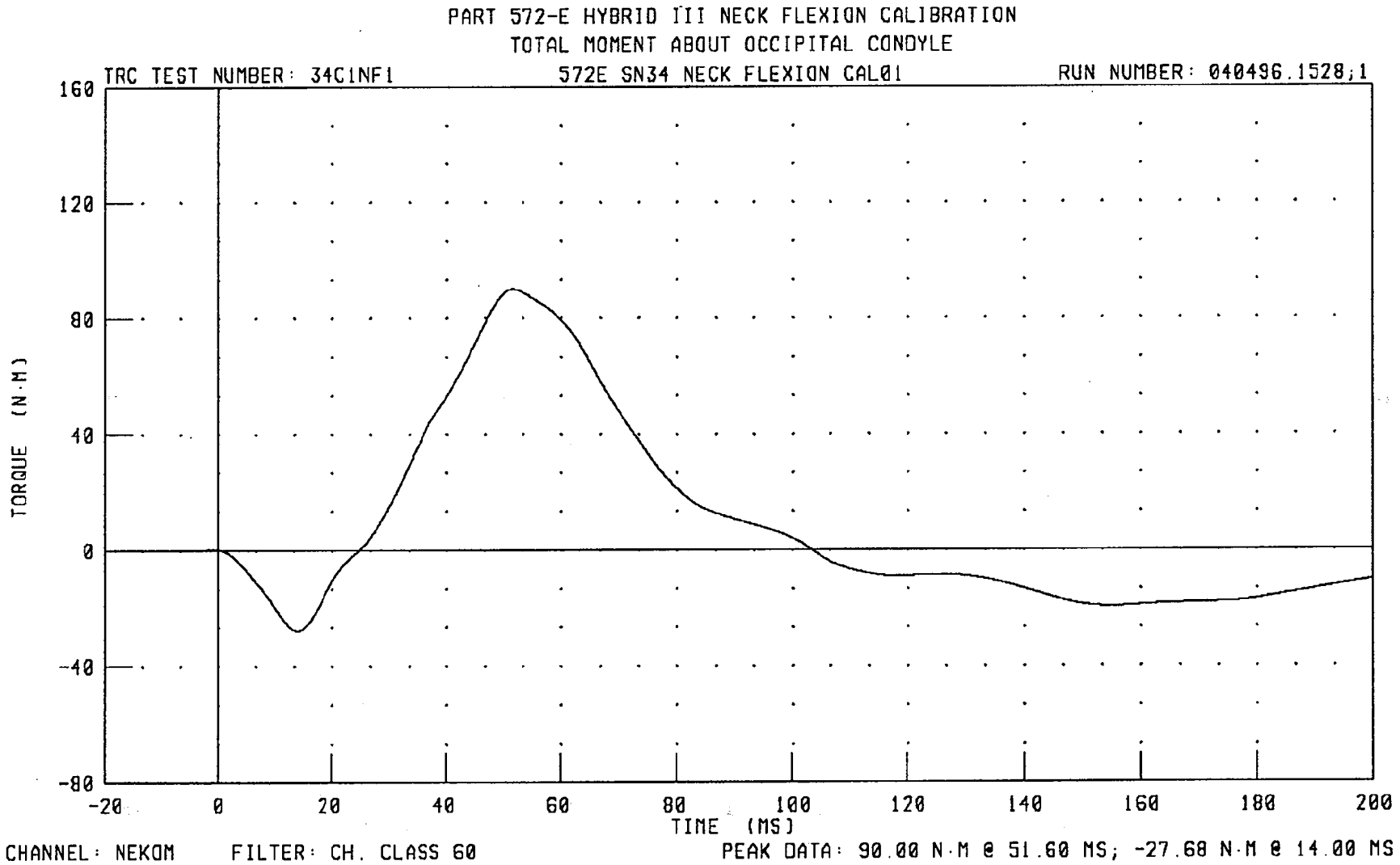

PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 34C1NF1
572E SN34 NECK FLEXION CAL01
RUN NUMBER: 040496.1528;1
TORQUE (N·M)
160
120
80
40
0
-40
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 90.00 N·M @ 51.60 MS; -27.68 N·M @ 14.00 MS

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST - 6 CHANNEL TRANSDUCER

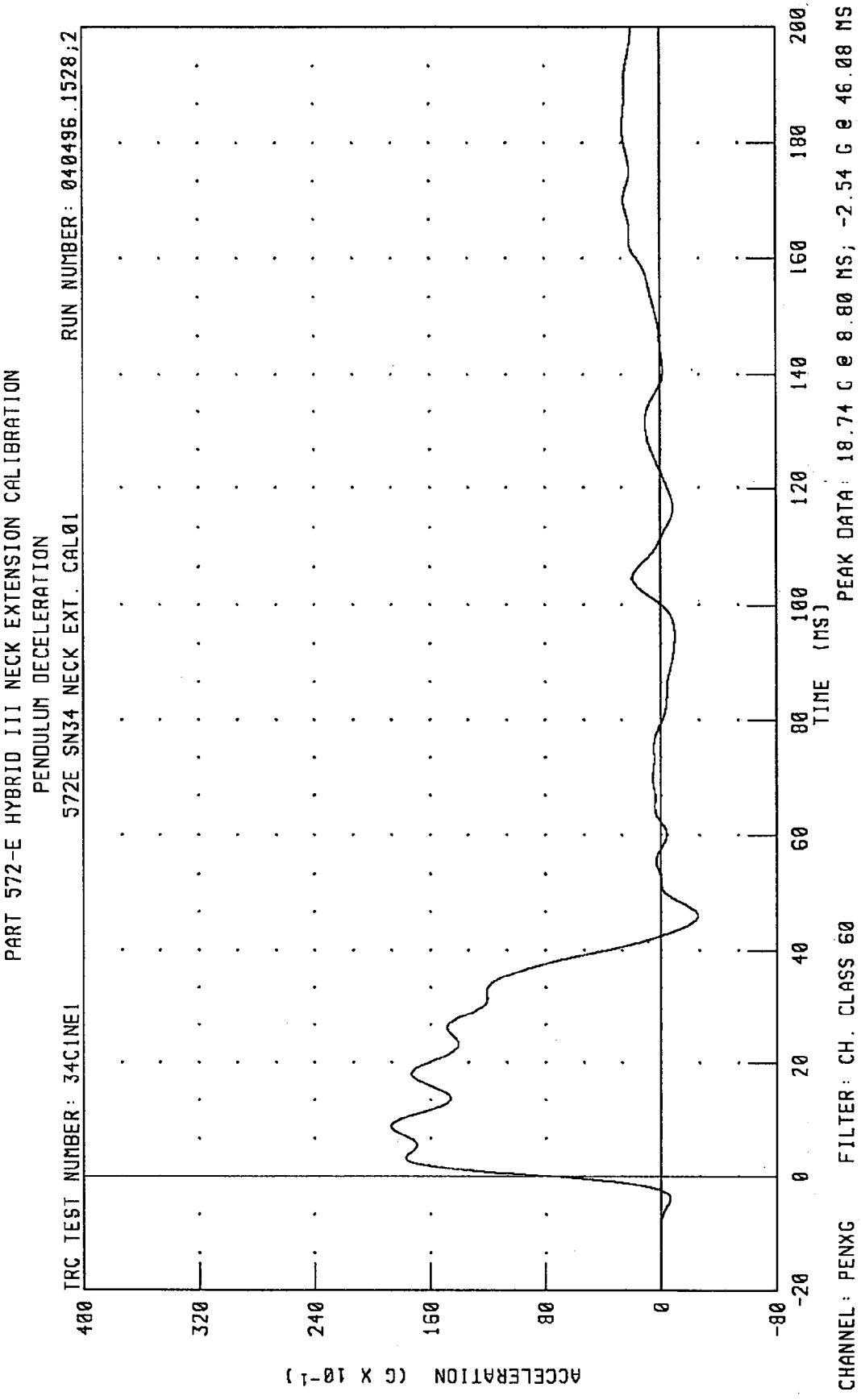
HYBRID III 11-JUL-95

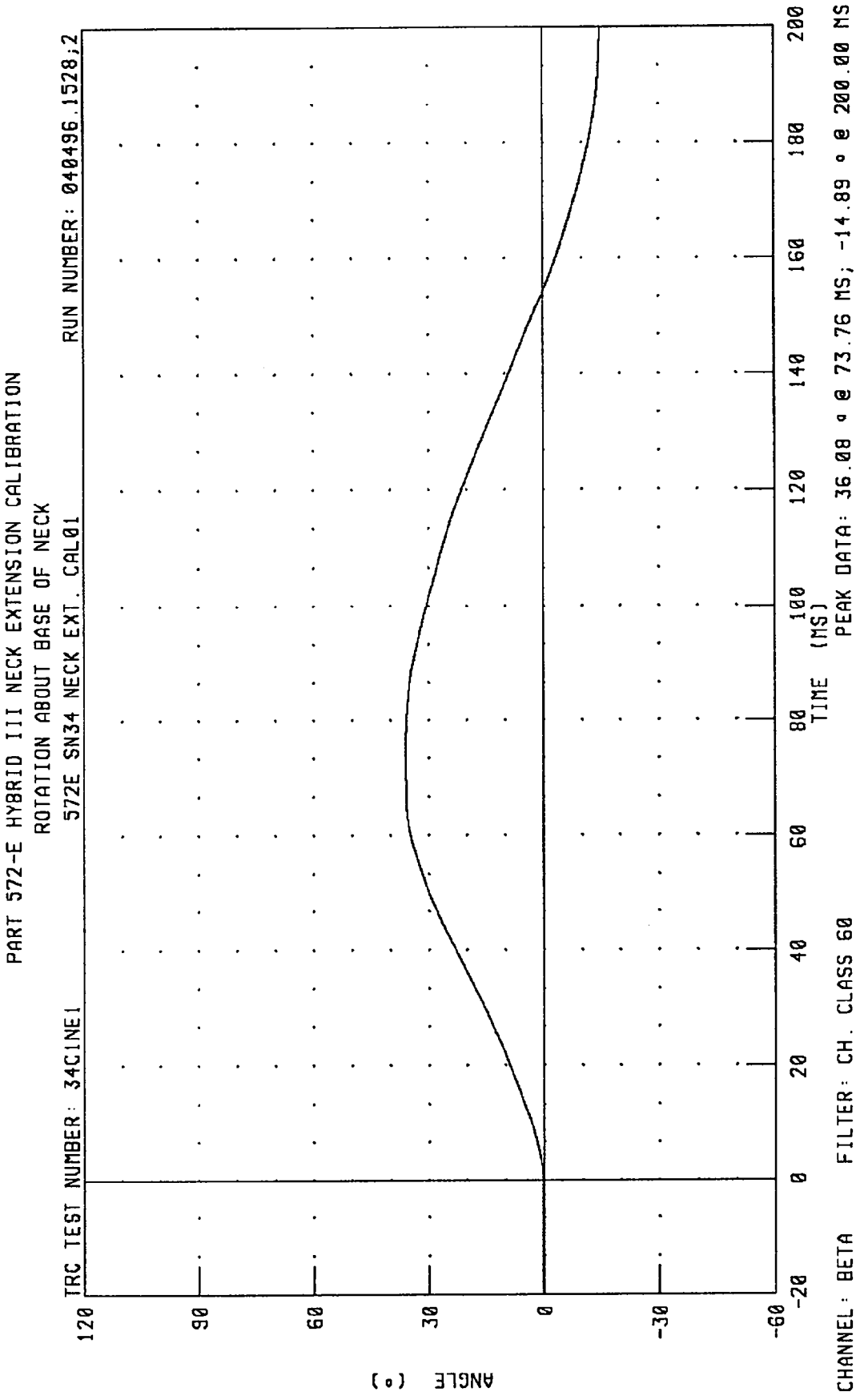
TRC INC. TEST NO: 34C1NE1 572E SN34 NECK EXT. CAL01

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		20.6 - 22.2 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY		10 - 70 %	63.0 %
IMPACT VELOCITY		5.95 - 6.19 M/S	6.05 M/S
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.10 G
	20 MS	14.00 - 19.00 G	16.16 G
	30 MS	11.00 - 16.00 G	12.32 G
MAX PENDULUM G		22 G MAX	18.73 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	12.28 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	39.36 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	97.53 DEG.
	TIME	72 - 82 MS	74.80 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-80.0/-52.9 NM	-71.59 NM
	TIME	65 - 79 MS	69.76 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	154.56 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	142.80 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 071195.1058;2


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 34CINE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 040496.1528;2
ACCELERATION (G X 10-1)
400
320
240
160
80
0
-80
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 60
PEAK DATA: 18.74 G @ 8.80 MS; -2.54 G @ 46.08 MS


PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT BASE OF NECK
TRC TEST NUMBER: 34CINE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 040496.1528;2
ANGLE (°)
120
90
60
30
0
-30
-60
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
PEAK DATA: 36.08 ° @ 73.76 MS; -14.89 ° @ 200.00 MS
CHANNEL: BETA
FILTER: CH. CLASS 60

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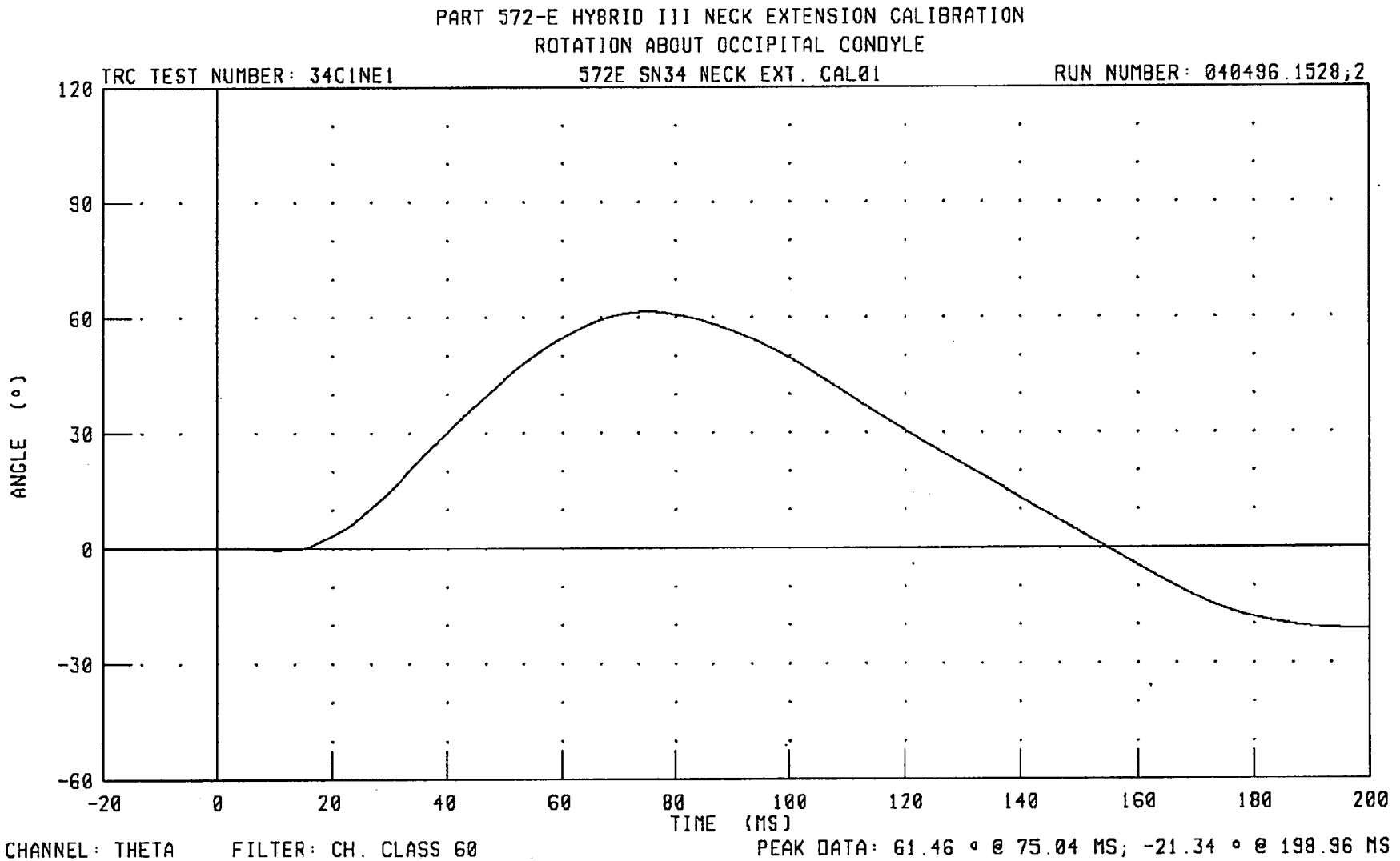
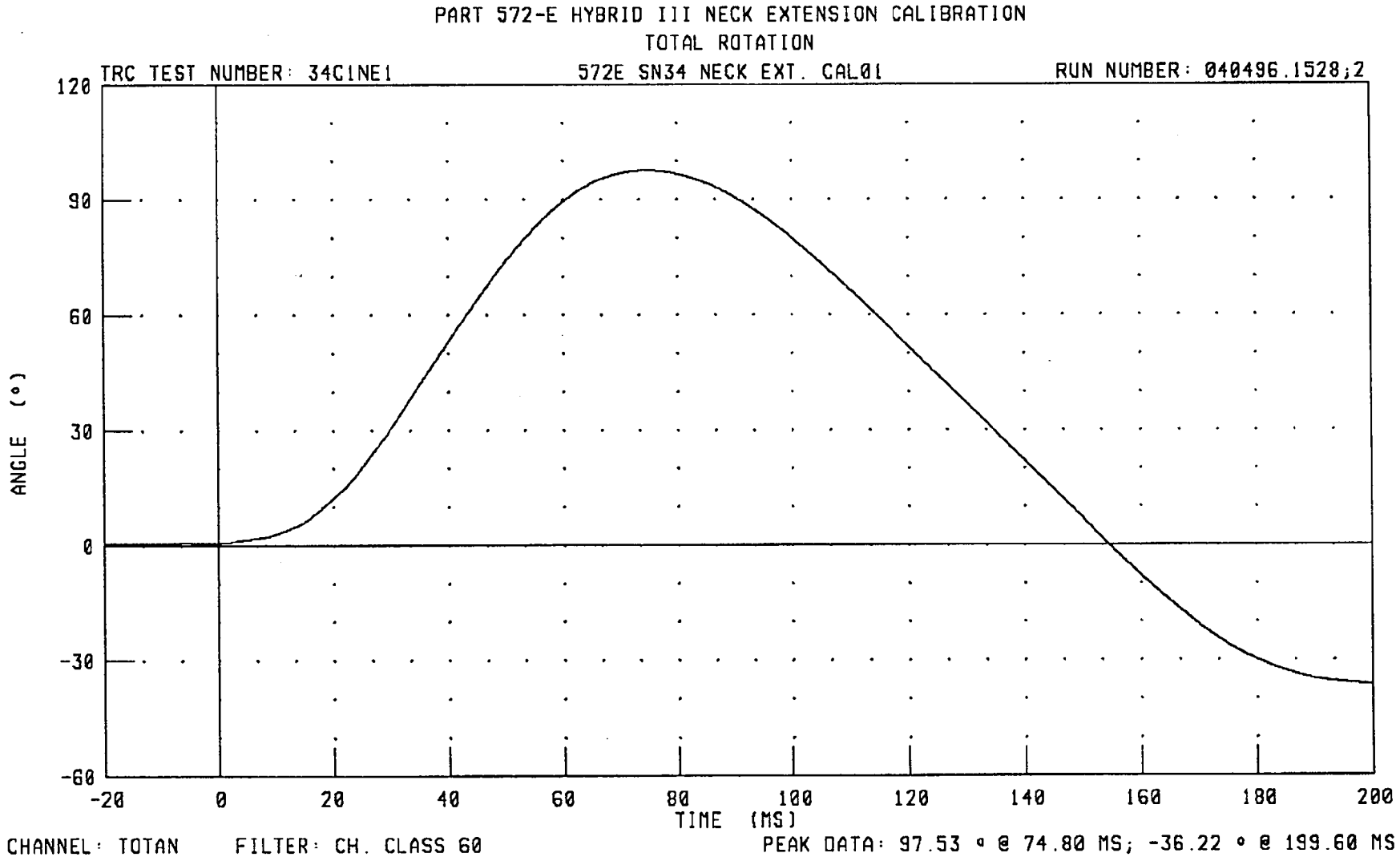
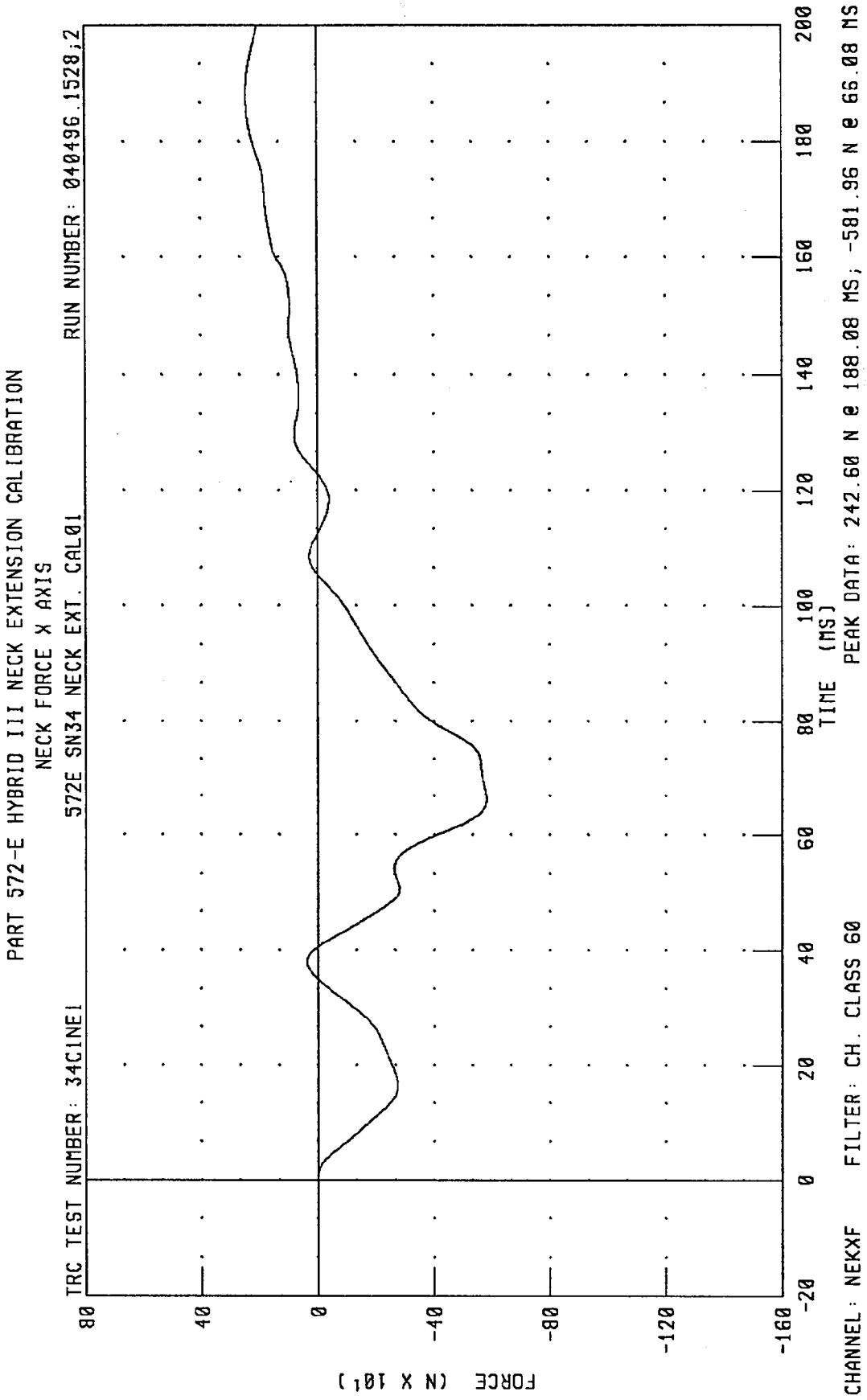

PART 572-E HYBRID III NECK EXTENSION CALIBRATION
ROTATION ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 34C1NE1
572E SN34 NECK EXT. CAL01
RUN NUMBER: 040496.1528;2
120
90
60
30
0
-30
-60
ANGLE (°)
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: THETA
FILTER: CH. CLASS 60
PEAK DATA: 61.46 ° @ 75.04 MS; -21.34 ° @ 198.96 MS





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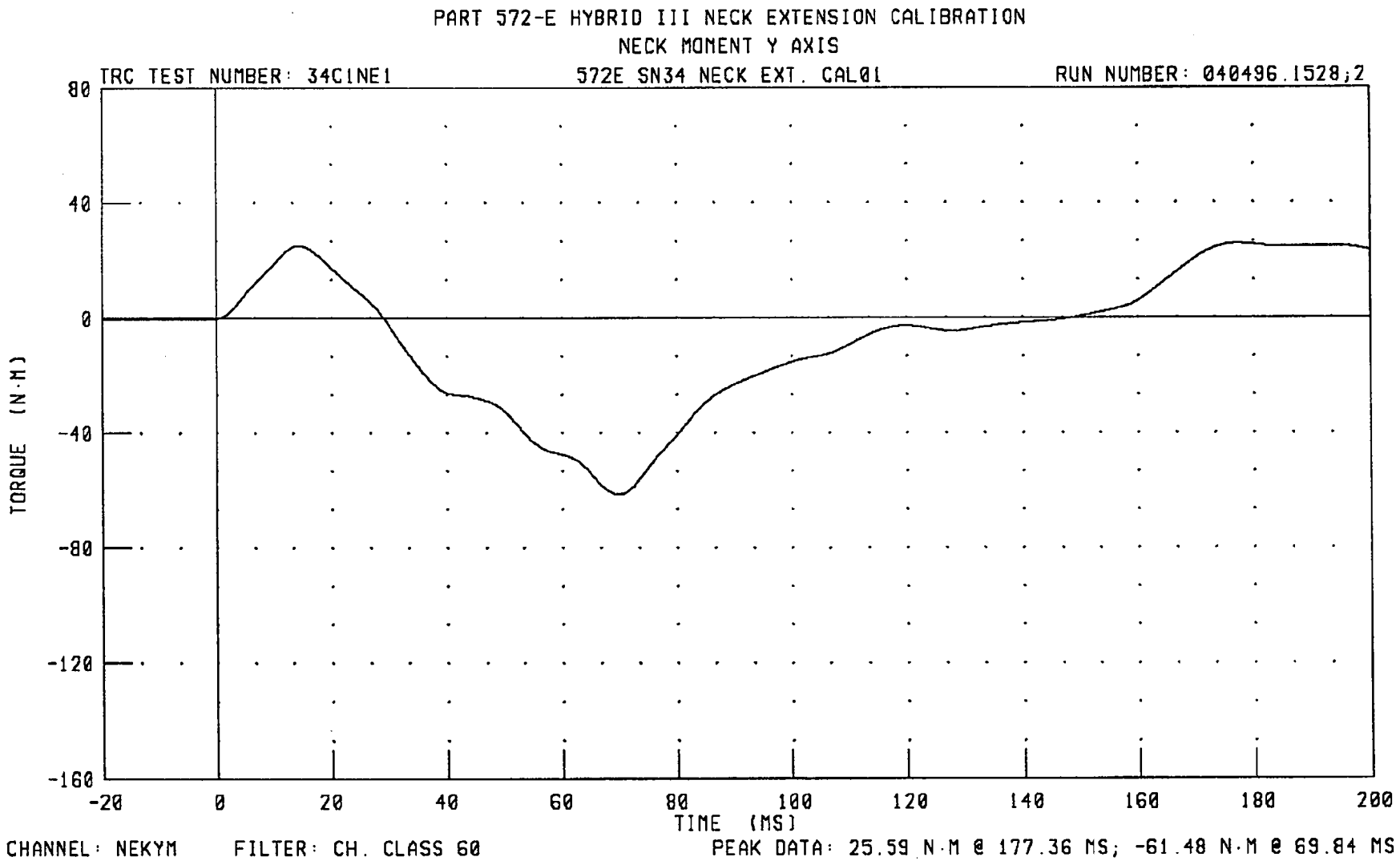
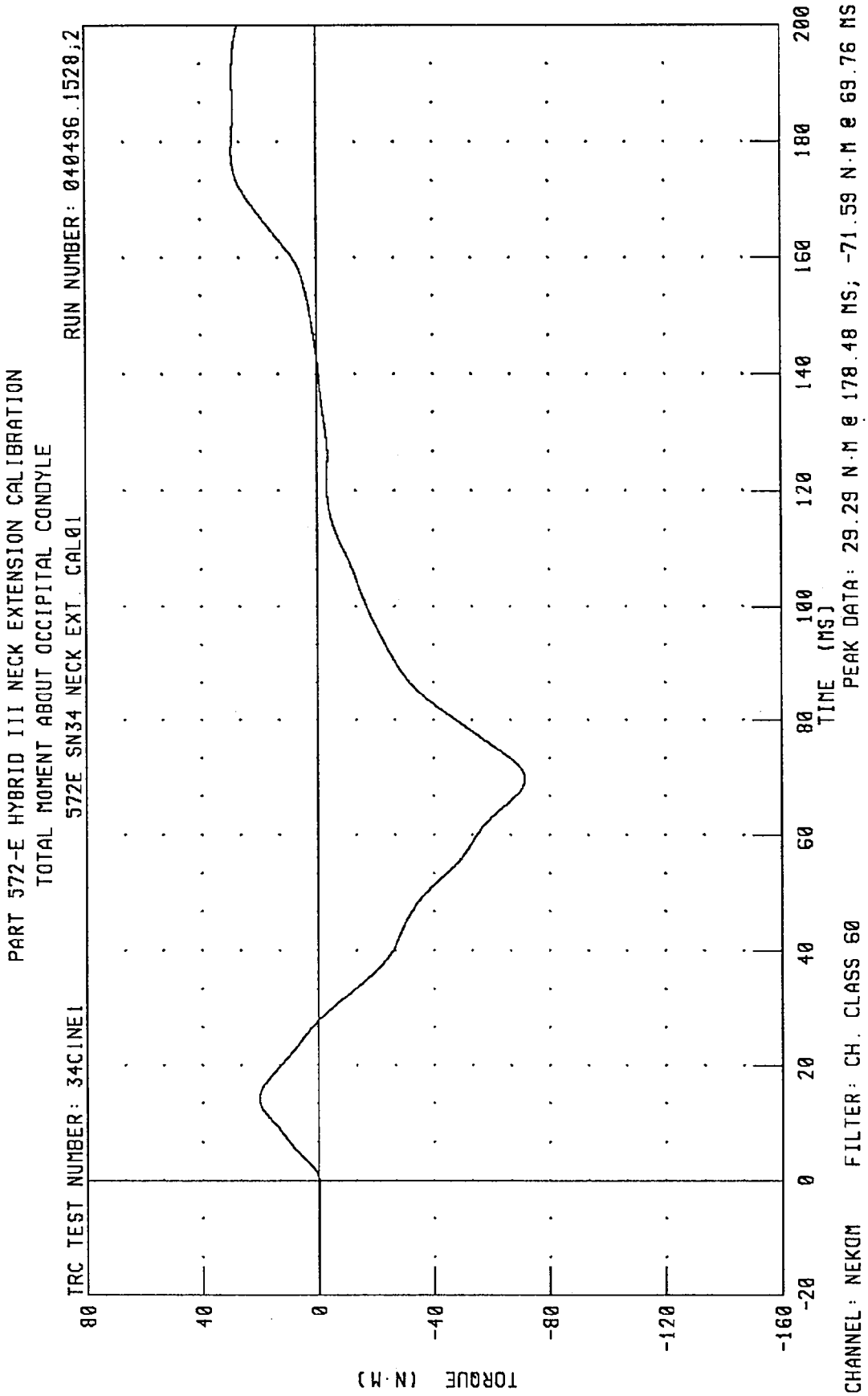
AS664207




PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE
TRC TEST NUMBER: 34CINE1
572E SN34 NECK EXT CAL01
RUN NUMBER: 040496.1528;2
TORQUE (N·M)
80
40
0
-40
-80
-120
-160
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS)
CHANNEL: NEKOM
FILTER: CH. CLASS 60
PEAK DATA: 29.29 N·M @ 178.48 MS; -71.59 N·M @ 69.76 MS

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

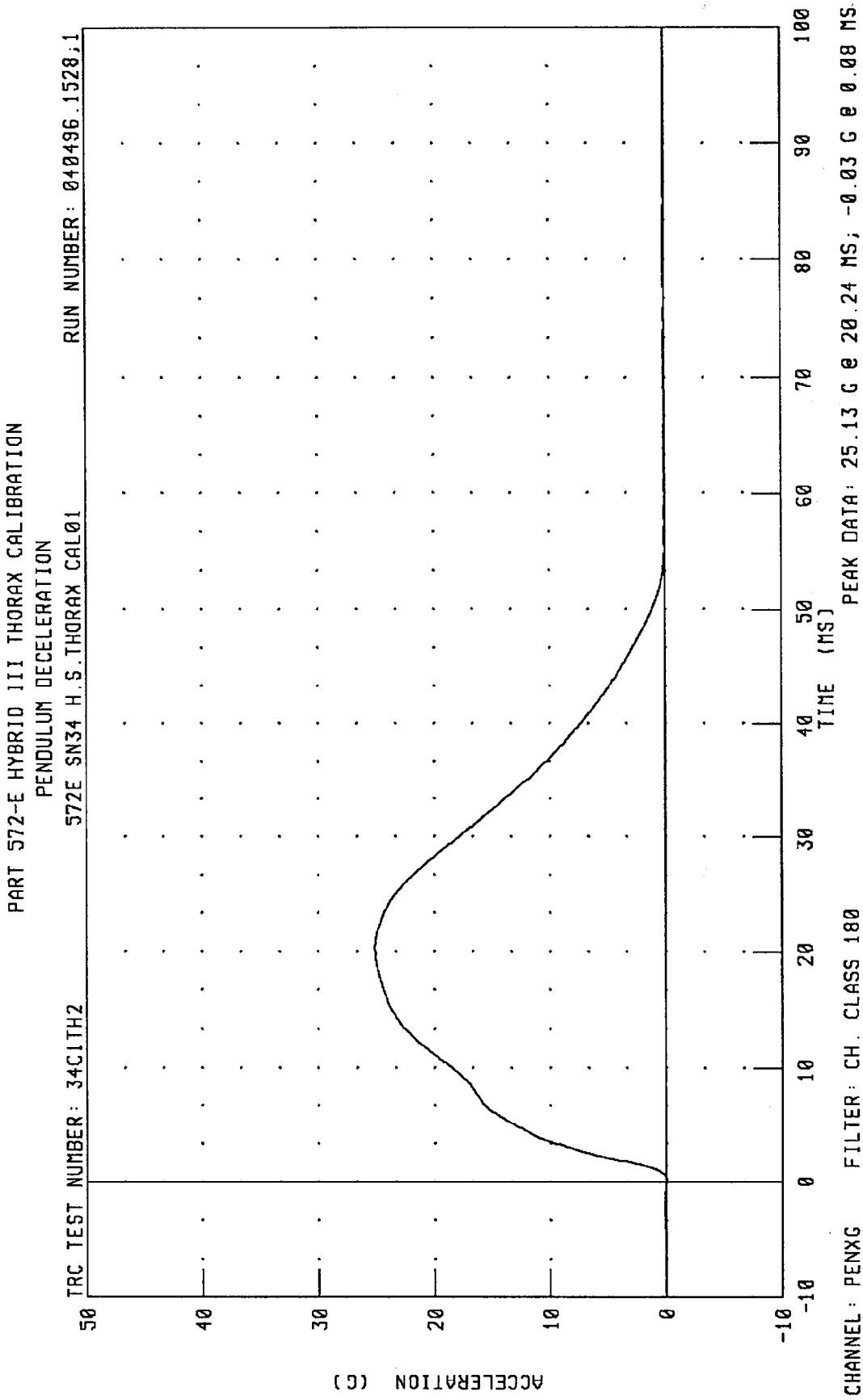
HYBRID III 16-FEB-96

TRC INC. TEST NO: 34C1TH2 572E SN34 H.S.THORAX CAL01

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	20.8 DEG. C
RELATIVE HUMIDITY	10 - 70 %	26.0 %
PENDULUM VELOCITY	6.59 - 6.83 M/S	6.65 M/S
MAXIMUM DEFLECTION	63.5 - 72.6 MM	68.3 MM
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5757. N
INTERNAL HYSTERESIS	69% - 85%	71.1%

TEST MEETS SPECIFICATIONS

TECHNICIAN Richard LeVan RUN NUMBER: 021696.1507;1


PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION
TRC TEST NUMBER: 34C1TH2
572E SN34 H.S.THORAX CAL01
RUN NUMBER: 040496.1528;1
ACCELERATION (G)
50
40
30
20
10
0
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXG
FILTER: CH. CLASS 180
PEAK DATA: 25.13 G @ 20.24 MS; -0.03 G @ 0.08 MS

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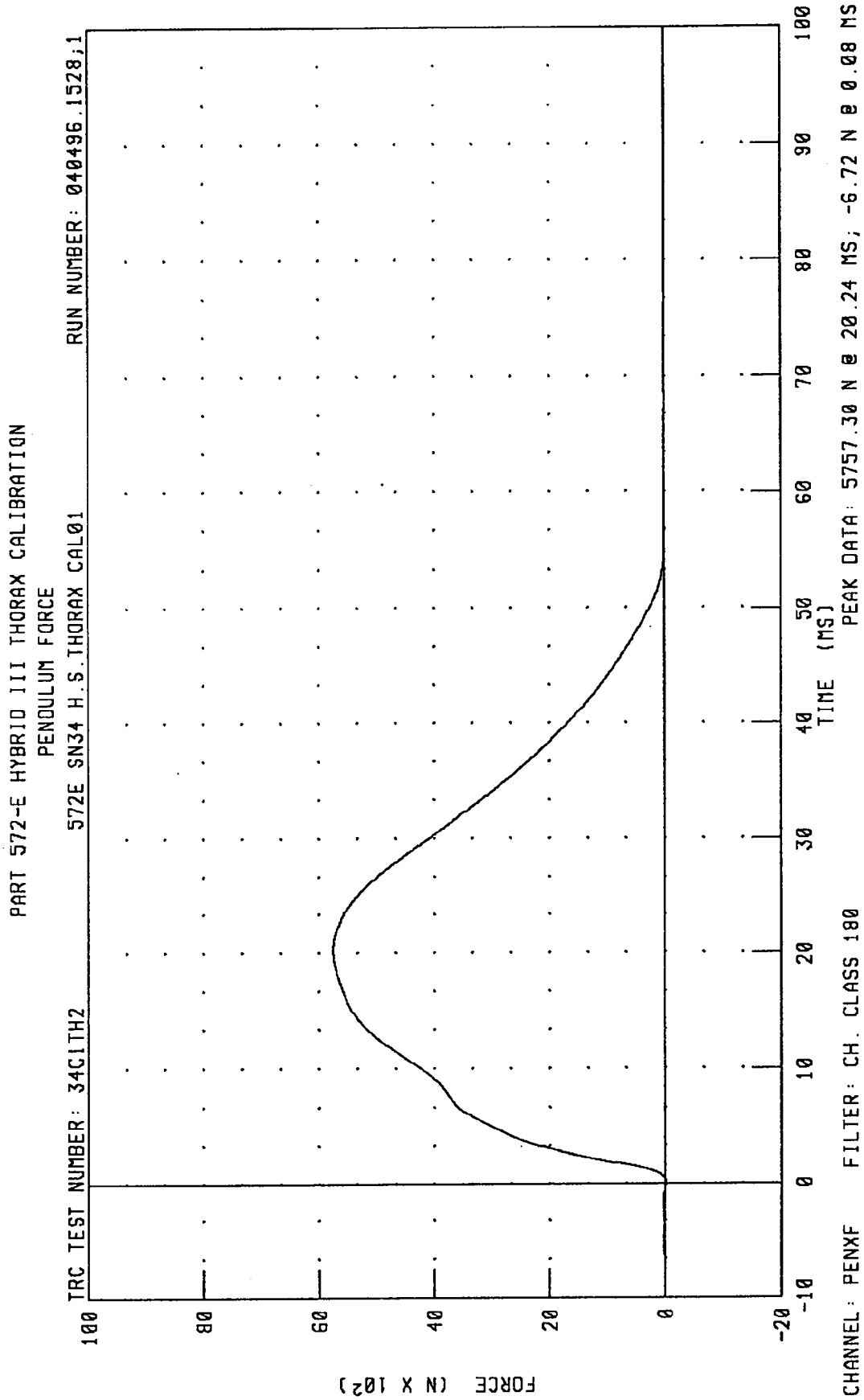
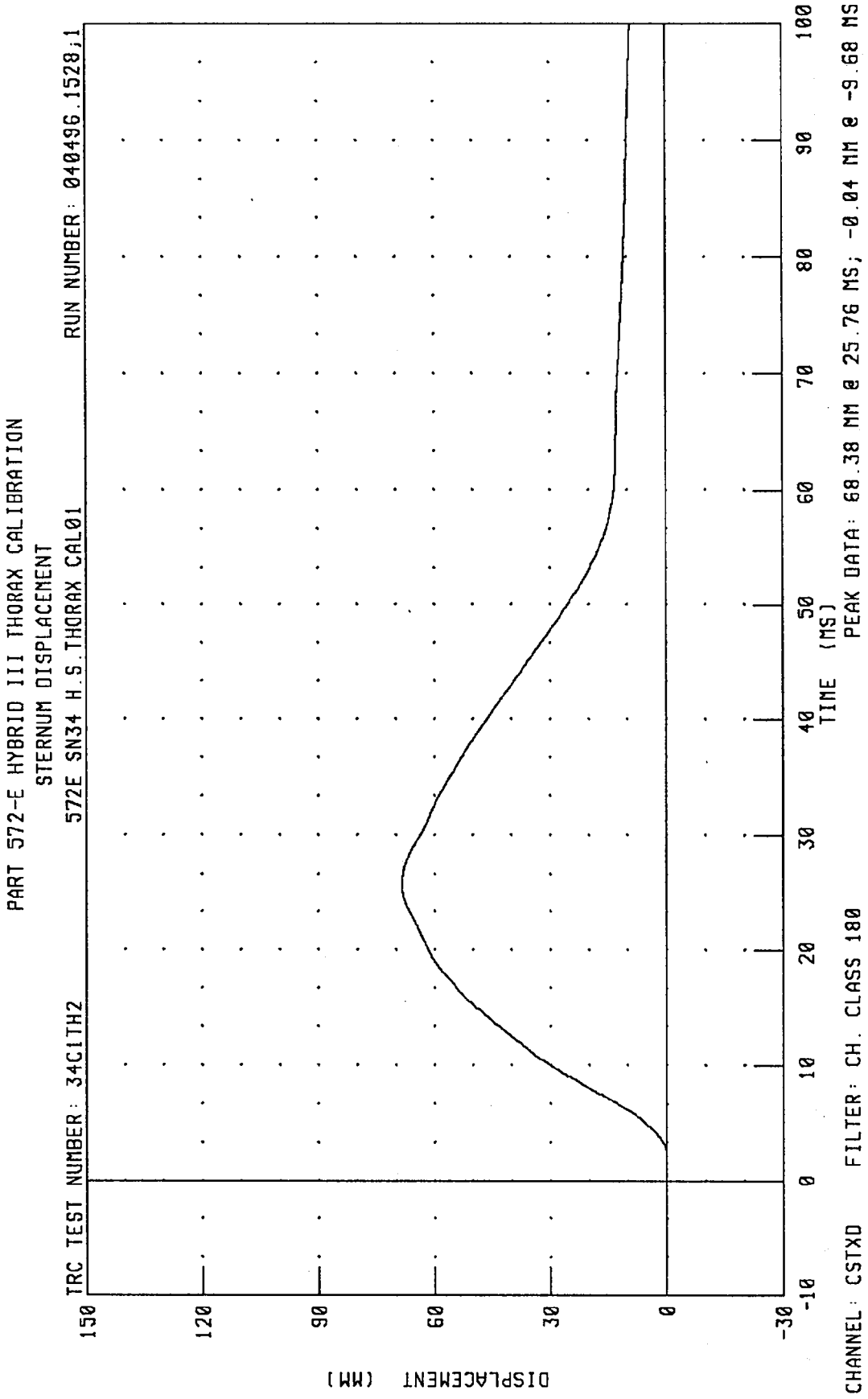
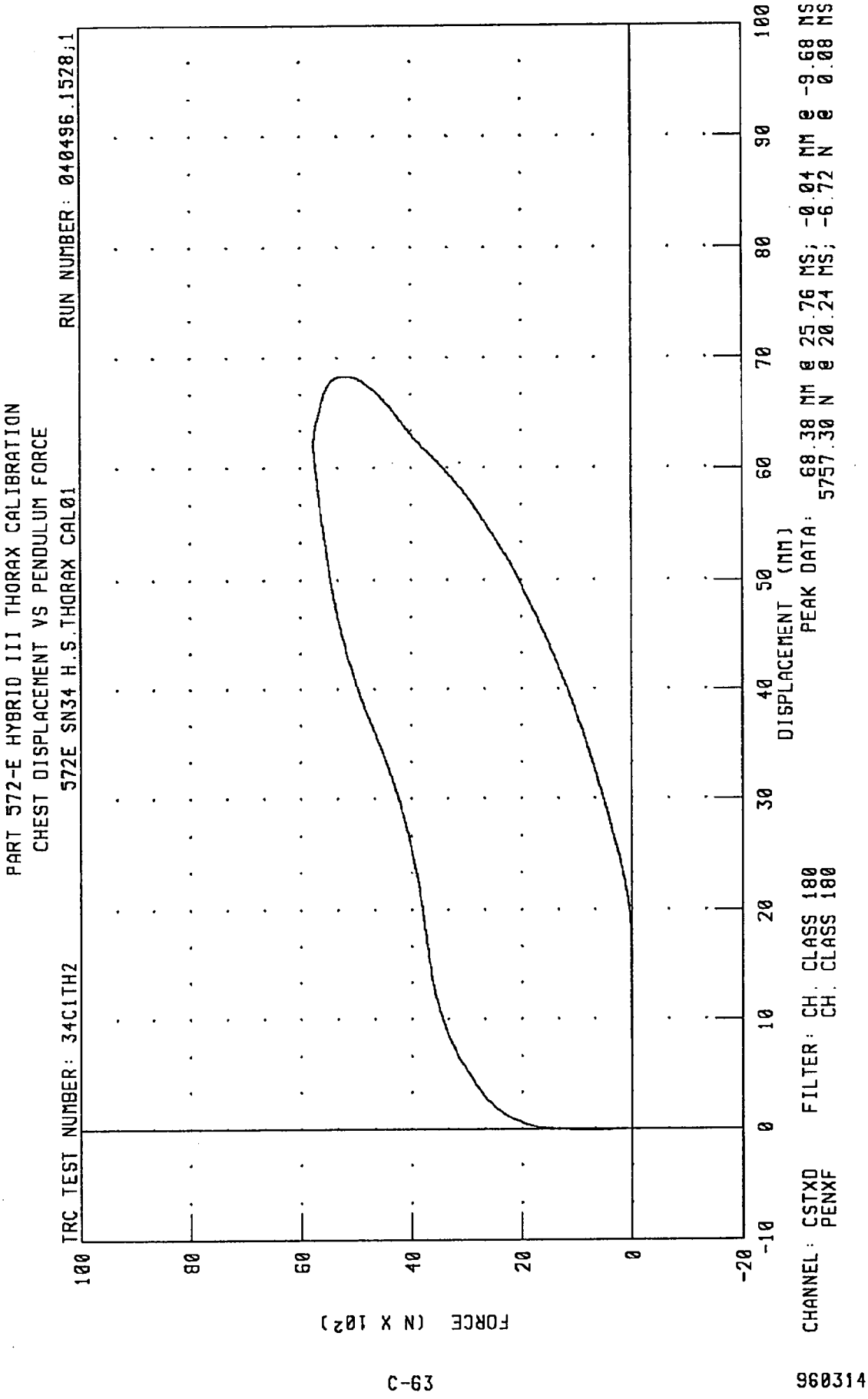

PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM FORCE
TRC TEST NUMBER: 34C1TH2
572E SN34 H.S.THORAX CAL01
RUN NUMBER: 040496.1528;1
FORCE (N X 10²)
100
80
60
40
20
0
-20
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
CHANNEL: PENXF
FILTER: CH. CLASS 180
PEAK DATA: 5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS

960314


PART 572-E HYBRID III THORAX CALIBRATION
STERNUM DISPLACEMENT
TRC TEST NUMBER: 34C1TH2
572E SN34 H.S.THORAX CAL01
RUN NUMBER: 040496.1528;1
DISPLACEMENT (MM)
150
120
90
60
30
0
-30
-10
0
10
20
30
40
50
60
70
80
90
100
TIME (MS)
PEAK DATA: 68.38 MM @ 25.76 MS; -0.04 MM @ -9.68 MS
CHANNEL: CSTXD FILTER: CH. CLASS 180


PART 572-E HYBRID III THORAX CALIBRATION
CHEST DISPLACEMENT VS PENDULUM FORCE
TRC TEST NUMBER: 34C1TH2
572E SN34 H.S.THORAX CAL01
RUN NUMBER: 040496.1528;1
FORCE (N X 10²)
DISPLACEMENT (MM)
PEAK DATA: 68.38 MM @ 25.76 MS; -0.04 MM @ -9.68 MS
5757.30 N @ 20.24 MS; -6.72 N @ 0.08 MS
CHANNEL: CSTXD FILTER: CH. CLASS 180
PENXF CH. CLASS 180

C-63

960314

TRANSPORTATION RESEARCH CENTER INC.

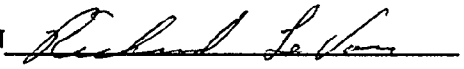
RIGHT KNEE IMPACT TEST

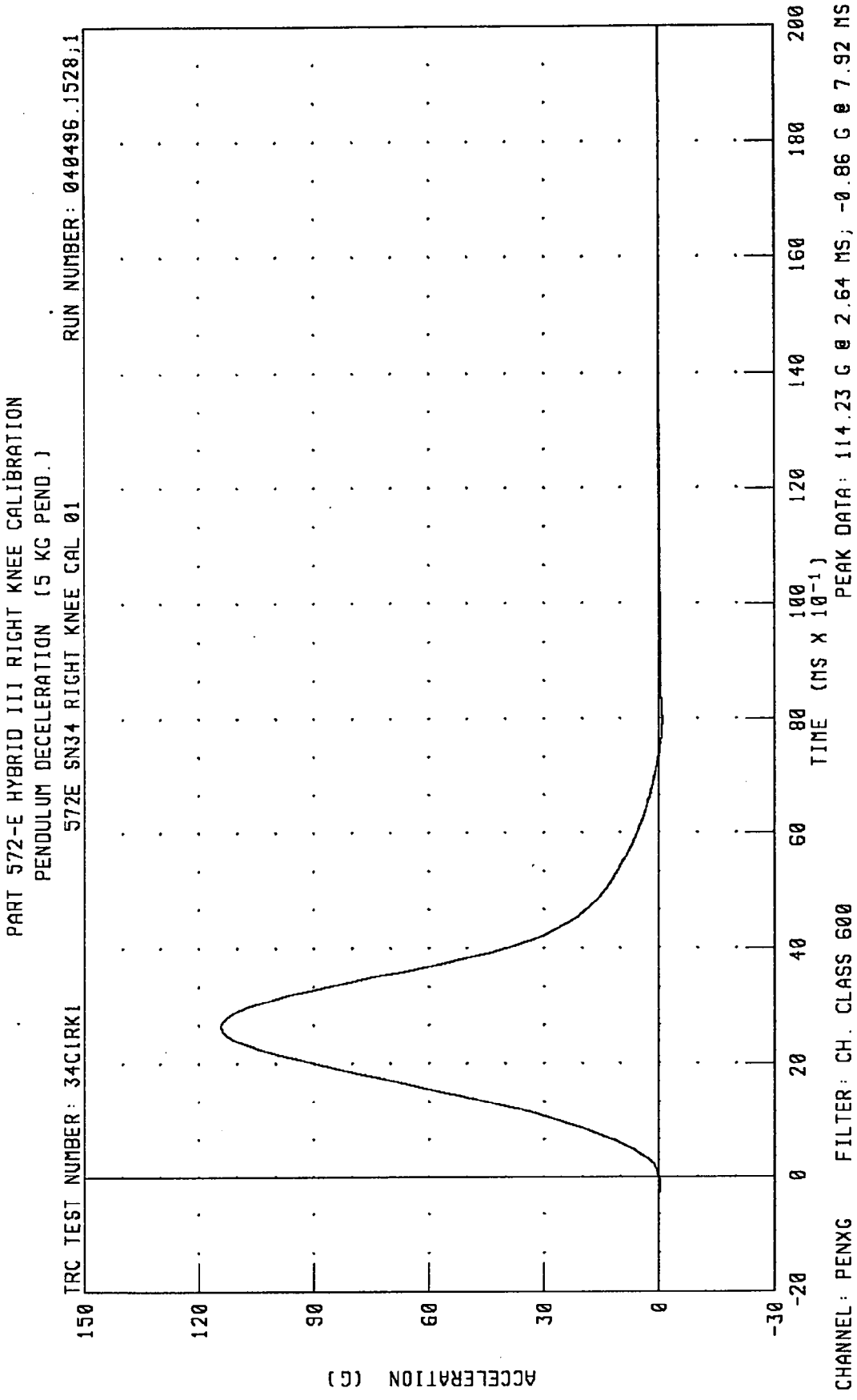
HYBRID III 11-JUL-95

TRC INC. TEST NO: 34C1RK1 572E SN34 RIGHT KNEE CAL 01

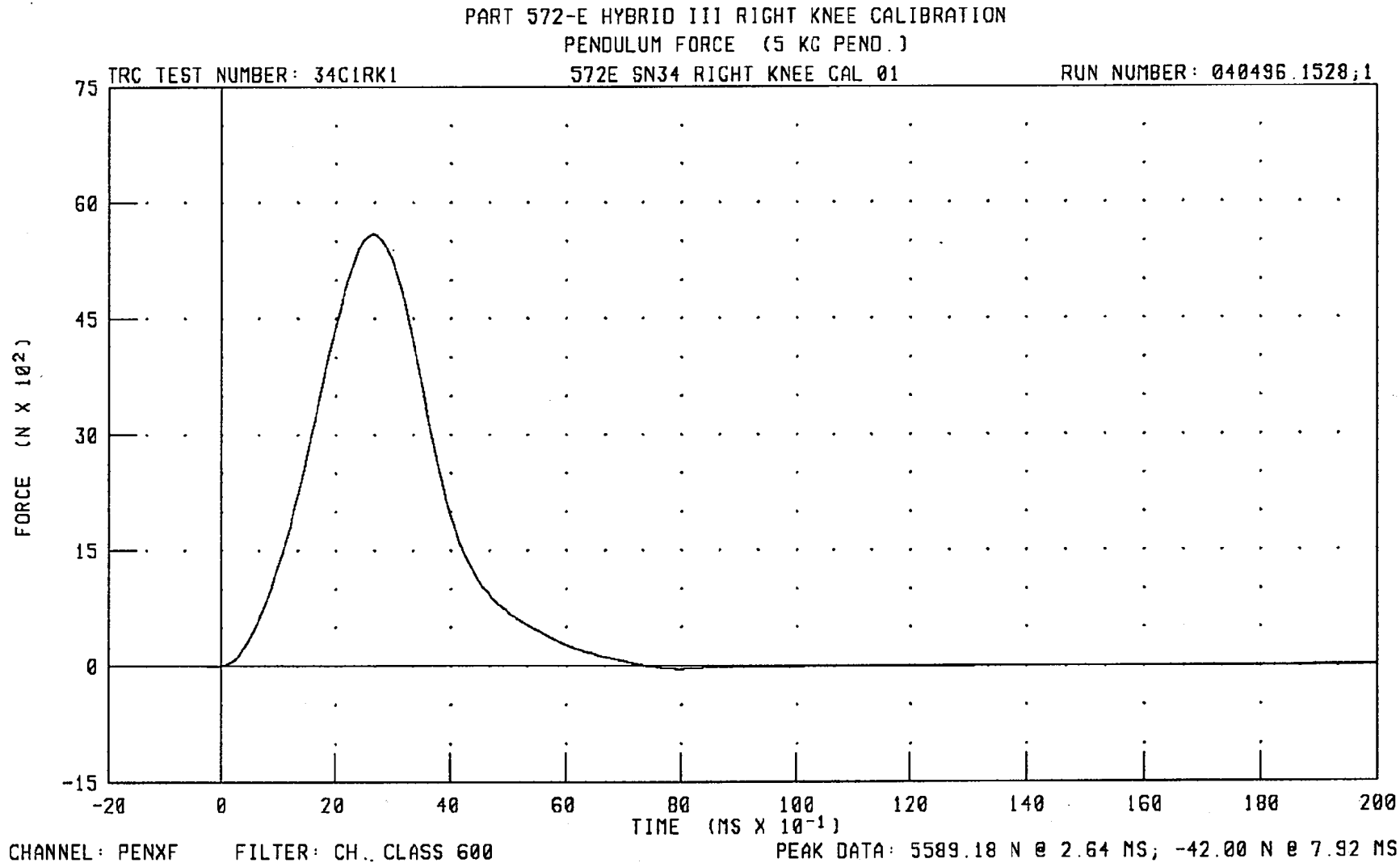
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.11 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5589.1 N

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 071195.1244;1


PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 34C1RK1
572E SN34 RIGHT KNEE CAL 01
RUN NUMBER: 040496.1528;1
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 114.23 G @ 2.64 MS; -0.86 G @ 7.92 MS

960314



TRANSPORTATION RESEARCH CENTER INC.

LEFT KNEE IMPACT TEST

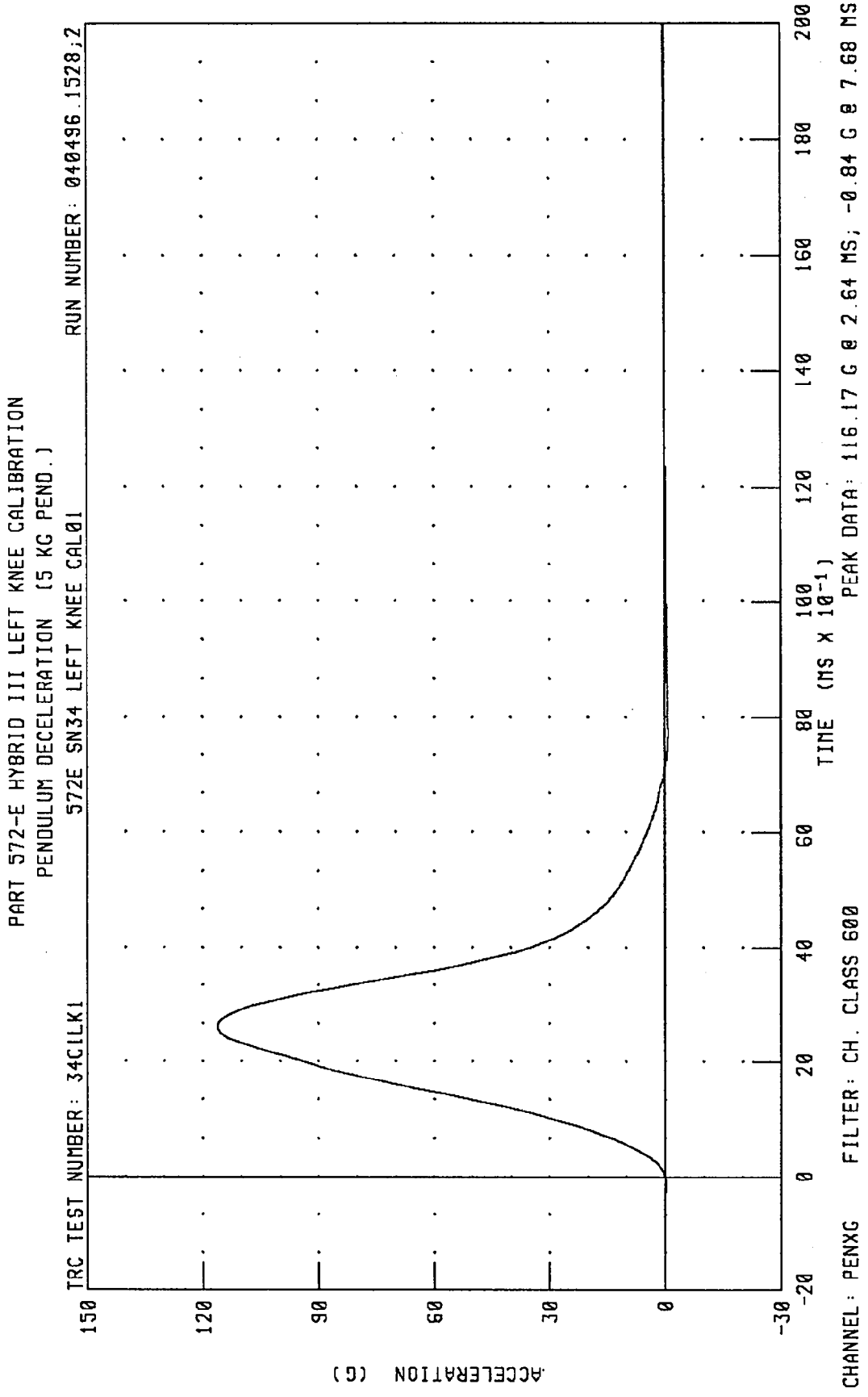
HYBRID III 11-JUL-95

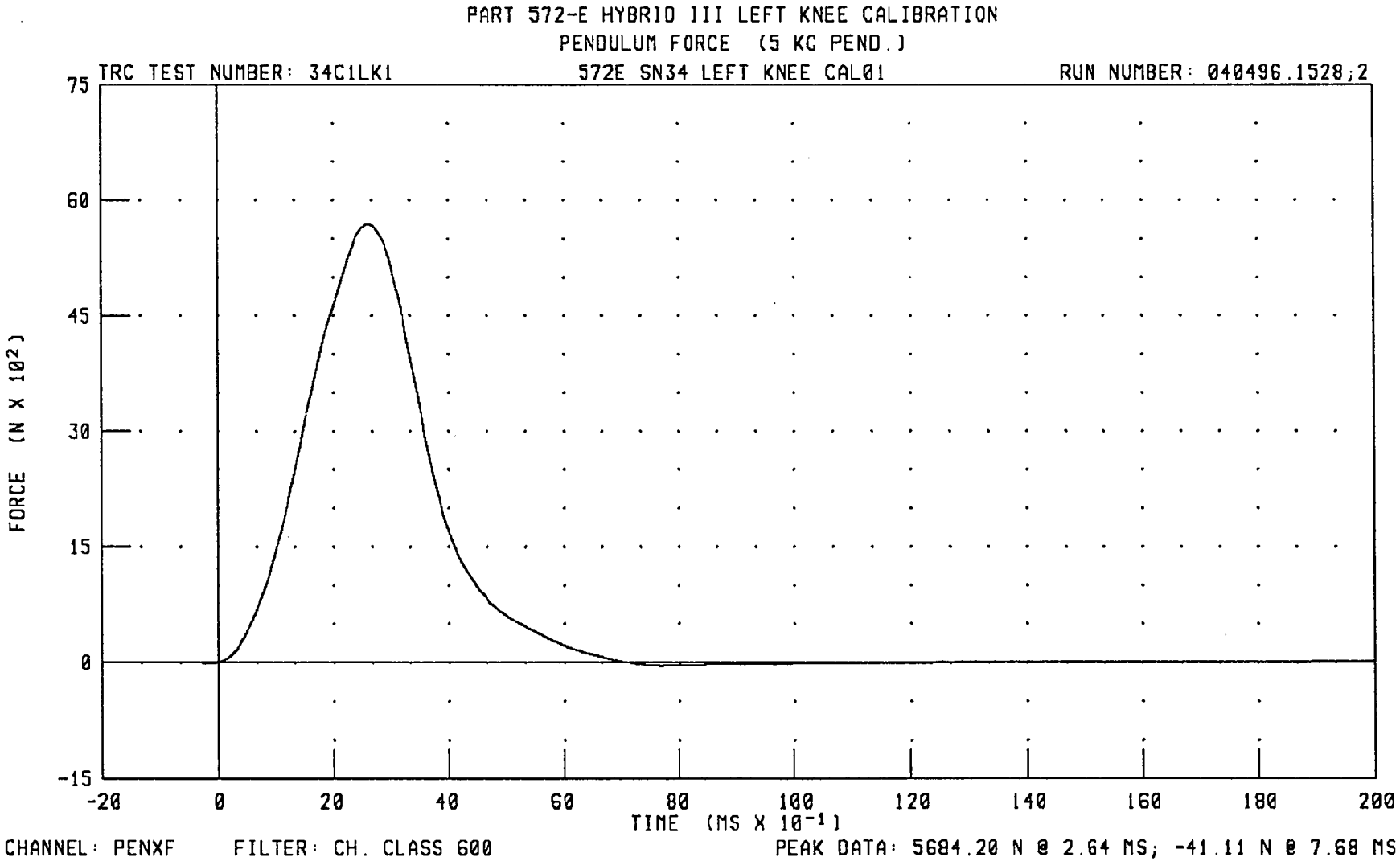
TRC INC. TEST NO: 34C1LK1 572E SN34 LEFT KNEE CAL01

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	20.6 DEG. C
RELATIVE HUMIDITY	10 - 70 %	63.0 %
PROBE VELOCITY	2.07 - 2.13 M/S	2.10 M/S
PEAK KNEE IMPACT FORCE 5.0 KG PENDULUM	4715 - 5782 N	5684.2 N

TEST MEETS SPECIFICATIONS

TECHNICIAN  RUN NUMBER: 071195.1240;2


PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)
TRC TEST NUMBER: 34C1LK1
572E SN34 LEFT KNEE CAL01
RUN NUMBER: 040496.1528;2
ACCELERATION (G)
150
120
90
60
30
0
-30
-20
0
20
40
60
80
100
120
140
160
180
200
TIME (MS X 10⁻¹)
CHANNEL: PENXG
FILTER: CH. CLASS 600
PEAK DATA: 116.17 G @ 2.64 MS; -0.84 G @ 7.68 MS



Appendix D

Miscellaneous Test Information

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
Head form Accelerations	1000

U.S. Department
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**National Highway
Traffic Safety
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

NOV 18 1997

IR 1711

Erika Z. Jones, Esq.
Mayer, Brown & Platt
2000 Pennsylvania Ave., N.W.
Washington, D.C. 20006-1882

Re: CAMI, Inc.

Dear Ms Jones:

By Notice Letter dated March 20, 1997, this office informed CAMI Automotive Inc. of Canada ("CAMI") that the National Highway Traffic Safety Administration's ("NHTSA") Office of Vehicle Safety Compliance ("OVSC")had completed its investigation of the manufacture by CAMI, and importation and sale by General Motors Corporation ("GM") and American Suzuki Motor Corporation ("Suzuki"), of model year ("MY") 1996 Geo Tracker and Suzuki Sidekick motor vehicles that failed to comply with Federal Motor Vehicle Safety Standard No. 301, Fuel System Integrity, 49 CFR 571.301. The results of this investigation initially indicated to us that there was reason to believe that CAMI violated 49 U.S.C. §§ 30112(a) and 30115 in its manufacture and sale of these vehicles. Accordingly, we advised CAMI that NHTSA was considering commencing proceedings that could result in the imposition of a civil penalty against CAMI for violation of sections 30112(a) and 30115, and afforded CAMI an opportunity to submit any mitigating information, data, or arguments relevant to the exercise of reasonable care in this matter and to the imposition of a civil penalty. The letter further advised that, upon receipt and evaluation of CAMI's response, a decision would be made either to suggest that CAMI pay a specified sum in settlement of claims pending against it by NHTSA, or to close the case without such payment.

CAMI responded to our Notice Letter on May 12, 1997, and we asked for further information by letter of May 30, 1997. CAMI provided a response to this letter at a meeting held at the agency on June 13, 1997, which was also attended by representatives of Suzuki and CAMI's Japanese parent, Suzuki Motor Corporation. CAMI provided supplemental information on June 26, 1997, in response to questions asked at the meeting.

AS 279875

The facts of this case indicate that three factors may have contributed to the noncompliance: the orientation of the right rear flange gusset to the fuel tank flange, the spacing of the two spot welds which attach each gusset to the flange on the rear of the fuel tank, and the strengthened fuel tank rear support bracket. The first two factors relate to the fuel tank, and the third relates to the rear support bracket.

The fuel tank was manufactured by CAMI's supplier, Prince Metal Products (PMP). During the investigation, after its initial inspection of OVSC's test vehicle, GM wrote OVSC that "the right rear flange gusset did not appear to be oriented square relative to the tank flange, and the spacing of the gusset spot welds appeared to be too close to the flange attachment hole." Further, GM stated that subsequent inspection of fuel tank samples on hand "revealed variation in both the orientation of the gusset on the flange and the spacing of the two spot welds." (GM letter to NHTSA of August 12, 1996).

In cases where the noncompliance of a motor vehicle with a safety standard results from a problem in a component obtained from an outside, independent supplier, NHTSA pays close attention to the relationship between the manufacturer and the supplier in considering the amount, if any, of civil penalty liability. Among the numerous factors that may be relevant to our assessment are the size and sophistication of the companies, the previous history of the relationship, the complexity of the part in question, the quality control procedures in place at the two companies, the data that the supplier provides the manufacturer, and the basis of the manufacturer's certification.

In this instance, the fuel tank and its gussets are items of motor vehicle equipment that are not complex to manufacture, hence not equipment whose quality would normally be dependent upon continuous monitoring. PMP had been supplying fuel tanks and other equipment to CAMI since 1989, manufacturing them to CAMI's specifications, without apparent deviation. CAMI had never returned a fuel tank to PMP for a departure from specifications. CAMI had provided PMP with quality control guidelines, specifying that there be a visual inspection of 100 percent of the gussets after installation, and that spot weld integrity be verified by conducting a pry test on 100 percent of the gussets after spot welding. CAMI does not contend that PMP failed to inspect the fuel tanks according to CAMI's quality control procedures. The target spot weld locations and parallel gusset orientation were illustrated on the engineering drawings that CAMI provided to PMP, without specifying their tolerances. CAMI contends that this is customary within the industry for drawings of fuel tanks and their attachment components. Finally, it is CAMI's position, as stated at the meeting of June 13, that neither CAMI nor PMP ascribed any particular importance to gusset orientation and spacing prior to this investigation. The agency

possesses insufficient data on industry practice with respect to specifying tolerances for fuel tank attachment components to evaluate CAMI's views on this issue.

The rear support bracket was manufactured by CAMI, which redesigned the bracket for MY 1996 in order to accommodate increased vehicle curb weight. Upon its inspection of NHTSA's test vehicle, GM noted that the post test deformation pattern exhibited by the original bracket in rear impacts was noticeably different than the deformation pattern exhibited in rear impacts with the more robust bracket, leading it to conclude that the strengthening of the bracket coupled with the gusset orientation and spot weld spacing was the root cause of NHTSA's test failure.

Offsetting NHTSA's test failure is the fact that CAMI successfully tested two pre-production MY 1996 vehicles with fuel tanks manufactured by PMP for compliance with Standard No. 301 after it redesigned the fuel tank support bracket. Although CAMI did not test production vehicles for compliance with Standard No. 301, the noncompliance occurred only ten days after the redesigned bracket was introduced into production. While we cannot conclude that testing of production vehicles is never required to establish reasonable care, under the specific circumstances of this case, we are not prepared to conclude that CAMI's failure to conduct such tests amounts to a lack of reasonable care.

Finally, although it is not directly related to the issue of reasonable care, we have viewed favorably the fact that CAMI's two principals, General Motors Corporation and Suzuki Motor Corporation, formally determined the existence of a noncompliance and notified the agency of their determinations only four and five weeks after they became aware of the NHTSA test failure.

On the basis of the foregoing, we have decided to close the file without a penalty.

Sincerely,

Enid Rubenstein
Acting Assistant Chief Counsel
for Litigation

AS 279877

U.S. Department
of Transportation
National Highway
Traffic Safety
Administration

400 Seventh St., S.W.
Washington, D.C. 20590

JUL 24 1997

Sadayuki Hirano
Director, Quality Assurance
CAMI Automotive, Inc.
P.O. Box 1005
300 Ingersoll street
Ingersoll, Ontario,
Canada N5C 4A6

Re: Confidentiality determination; FMVSS 301

Dear Mr. Hirano:

This responds to your letter, dated July 9, 1997, in which you request confidential treatment for certain information relating to a Federal Motor Vehicle Safety Standard (FMVSS) civil penalty notice. Specifically, CAMI requests confidential treatment for:

- all test reports included in Appendix 2 to its letter of June 13, 1997;
- all materials included in response to question 7 in its letter of June 13, 1997;
- all engineering drawings provided during the meeting between CAMI representatives, Suzuki representatives and NHTSA on June 13, 1997;
- the videotape of certain rear barrier and car-to-car crash tests conducted by Suzuki on the Sidekick Tracker; and
- portions of CAMI's follow-up letter of June 26, 1997.

I have decided to grant confidential treatment for this material under Exemption 4 of the Freedom of Information Act, 5 U.S.C. §552(b)(4).

This grant of confidential treatment is subject to certain conditions since the information was submitted pursuant to a compliance investigation by the agency. The information may be disclosed under the authority of 49 U.S.C. §30167(b) and 49 C.F.R. §512.9(a)(2), if the agency decides the disclosure will assist in carrying out the purposes of the National Traffic and Motor Vehicle Safety Act of 1966, as amended.

NHTSA

AS 279878

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

The information may also be disclosed under 49 C.F.R. §512.8, based upon newly discovered or changed facts, and you must inform the agency of any changed circumstances which may affect the protection of the information (49 C.F.R. §512.4(I)). Prior to the release of information under 49 C.F.R. §512.8 or §512.9, you would be notified in accordance with the procedure established by our regulations.

Sincerely,

Heidi L. Coleman
Assistant Chief Counsel
for General Law

AS 279879

U.S.Department
of Transportation

**National Highway
Traffic Safety
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

IR 1711
Follow up to
Civil Penalty Notice Letter

MAY 30 1997

Mr. Sadayuki Hirano
Director, Quality Assurance
CAMI Automotive, Inc.
P.O. Box 1005
300 Ingersoll Street
Ingersoll, Ontario
Canada N5C 4A6

By TELEFAX (519) 425-3100

Dear Mr. Hirano:

Thank you for your letter of May 12, 1997, responding to the agency's civil penalty notice letter of March 20, 1997. After reviewing the information you provided, we would like to ask for certain clarifications.

1. We understand that CAMI Automotive, Inc. ("CAMI") is a joint venture between General Motors Corporation ("GM") and Suzuki Motor Corporation ("Suzuki"). Please quantify the respective interests in CAMI of GM and Suzuki. Please provide a general description of the extent to which GM and Suzuki participate, through the loan of employees or otherwise, in the day to day operations of CAMI. With respect to any such personnel who may have participated in the design, manufacture, or quality control procedures relating to the fuel tanks of 1996-model Suzuki Sidekicks and Geo Trackers ("the vehicles") , please provide the title and a brief job description of each such person.

2. Your letter refers to Certification Tests 75-292 and 76-161. Please provide a complete copy of the documentation of each of these tests, including all data analyses and all still photographs, videotapes, and/or films that may have been taken of such tests.

3. Please provide the name and mailing address of each manufacturer that has supplied CAMI with fuel tanks for the vehicles. Identify the manufacturer that supplied the tank that failed NHTSA's compliance test. Also provide the dates on which each such manufacturer began and ended supplying CAMI with such fuel tanks. If the manufacturer also supplied such fuel tanks for model years of the vehicles other than the 1996 model year, please identify each such model year.

4. We are interested in knowing whether CAMI established a manufacturing tolerance for the placement of the fuel tank gussets, or a manufacturing tolerance for the two spot welds that attached the gusset to the tank (collectively referred to as "tolerances."). If the response is

AS 279880

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

affirmative, please state the tolerances. If CAMI did not specify tolerances for either the placement of the fuel tank gussets or the spot welds, please inform us as to your understanding of the industry expectation for such tolerances in this type of manufacturing.

5. Please state also whether CAMI provided the manufacturer of the fuel tank for the vehicles with written or oral instructions regarding the manufacturing tolerances discussed in item 4. If written instructions were given, please provide us with a copy of each such instruction together with the date of such instruction. If oral instructions were given, please provide us with a summary of each such instruction and an estimated date for each time that such instruction was given. Identify the recipient of each written or oral instruction. State whether these instructions, written or oral, differed from those to CAMI's suppliers given the manufacturer(s) identified in response to question 3 above for model years other than 1996. Identify any changes in these instructions and explain the reason for the changes.

6. Please provide a copy of the engineering drawings that CAMI furnished to each supplier of the fuel tank used on the vehicles. If CAMI specified tolerances for the gussets and/or spot welds, please highlight the tolerances on the engineering drawings.

7. Your letter refers to CAMI's "internal standards" and their modification following NHTSA's test. Please provide a copy of CAMI's internal standards and quality control procedures regarding manufacture and inspection of the fuel tank for the vehicles as in effect for the 1995 model year, and at the time NHTSA's 1996 model year test vehicle was manufactured on August 31, 1995. Please also provide a copy of these standards and procedures as modified after CAMI was informed of NHTSA's test result.

8. Please describe any procedure that CAMI followed to ensure that the supplier of the fuel tank for the vehicles was adhering to the specifications of the engineering drawings, or the instructions, written or oral, that CAMI may have given regarding the manufacture of the fuel tank. If these procedures involved written assurances or reports from the supplier, or visits by CAMI personnel to the supplier to inspect fuel tanks, indicate the frequency with which such written assurances, reports, or visits occurred in the year preceding August 31, 1995. State the date of the last such assurance, report, or visit before August 31, 1995.

This letter also confirms that a meeting has been scheduled with representatives of Suzuki at agency headquarters on Monday, June 9, 1997, at 9:30 a.m. The meeting will be held in room 7236, 400 Seventh Street, SW, in Washington, D.C. You or other CAMI representatives may wish to attend. If CAMI wishes to attend, but cannot provide the information we seek by the time of the meeting on June 9, we are willing to reschedule the meeeting to provide CAMI sufficient time to respond to this letter.

We are sending this letter by FAX to afford you the maximum time possible for response before June 9. Our FAX number is (202) 366-3820. If you have any questions about the information we are seeking or if CAMI would like to be present at any meeting with Suzuki but cannot respond to this letter by the time of the meeting on June 9, please call Taylor Vinson of this Office (202-366-5263). We are furnishing counsel for Suzuki and GM with copies of this letter.

AS 279881

Sincerely,

/s/

Enid Rubenstein
Acting Assistant Chief Counsel
for Litigation

cc: Erika Jones, Esq.
Stephen Selander, Esq.

AS 279882

U.S. Department
of Transportation

National Highway
Traffic Safety
Administration

400 Seventh Street, S.W.
Washington, D.C. 20590

Robert B. Weiss, Esq.
Honigman Miller Schwartz and Cohn
2290 First National Building
Detroit, MI 48228-3583

APR 3 1997

Re: IR 1711 Civil Penalty Notice Letter

Dear Mr. Weiss:

We have received your request, on behalf of CAMI Automotive, Inc. ("CAMI") for an extension until May 11, 1997, of time in which to respond to the agency's Civil Penalty Notice Letter of March 20, 1997.

The reason for your request is that the extension will allow CAMI sufficient time for analysis and review in preparing its response to the Notice Letter.

Because General Motors Corporation rather than CAMI was principally involved during the investigation in this matter, we appreciate the need for CAMI to familiarize itself with the agency file that was enclosed with the Notice Letter, and your request is granted.

Sincerely,

Allan J. Kam
Acting Assistant Chief Counsel
for Litigation

AS 279883

U.S. Department
of Transportation

**National Highway
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Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

MAR 20 1997

NCC-10 ZTV
IR 1711
Civil Penalty Notice Letter

CERTIFIED MAIL -- RETURN RECEIPT REQUESTED

Robert B. Weiss, Esq.
Honigman, Miller, Schwartz and Cohn
2290 First National Building
Detroit, MI 48226

Dear Mr. Weiss:

We understand that CAMI Automotive Inc. of Canada ("CAMI") has designated you its agent under 49 CFR 551.45 to receive correspondence from the National Highway Traffic Safety Administration (NHTSA).

The Office of Vehicle Safety Compliance of NHTSA has completed its investigation of the manufacture by CAMI, and imporation and sale by General Motors Corporation ("GM") and American Suzuki Motor Corporation ("Suzuki"), of Geo Tracker and Suzuki Sidekick motor vehicles that failed to comply with Federal Motor Vehicle Safety Standard No. 301, Fuel System Integrity, 49 CFR 571.301. I enclose the agency's public file of this investigation, and, in addition, certain materials that GM submitted subject to a claim of confidentiality, which has been granted. GM has partially waived confidentiality, for the limited purpose of permitting NHTSA to provide the documents to CAMI. These materials are Attachments 5, 6, and 7 to GM's letter to the agency of August 12, 1996.

With the conclusion of this investigation, and GM and Suzuki having commenced their notification and remedy campaigns as required by 49 U.S.C. § 30118 et seq., the file has been forwarded to the Office of Chief Counsel for appropriate civil penalty action.

The results of this investigation indicate to the Office of Chief Counsel that there is reason to believe that CAMI violated 49 U.S.C. §§ 30112(a) and 30115. These sections provide in pertinent part:

> Section 30112(a) . . . [a] person may not manufacture for sale . . . any motor vehicle . . . manufactured on or after the date an applicable Federal motor vehicle safety standard prescribed under this chapter takes

> effect unless the vehicle . . . complies with the standard and is covered by a certification issued under section 30115 of this title.
>
> Section 30115 . . . A person may not issue the certificate if, in exercising reasonable care, the person has reason to know the certificate is false and misleading in a material respect. . . . .

Section 30165(a) of Title 49 provides that:

> A person that violates any of sections 30112, 30115 . . . or a regulation prescribed under those sections is liable to the United States Government for a civil penalty of not more than $1,000 for each violation. A separate violation occurs for each motor vehicle . . . and for each failure . . . to perform an act required by those sections. The maximum penalty under this subsection for a related series of violations is $800,000.

Section 30112(b)(2)(A) provides that section 30112(a) does not apply to:

> a person establishing that the person had no reason to know, despite exercising reasonable care, that a motor vehicle . . . does not comply with applicable motor vehicle safety standards prescribed under this chapter . . . .

This is to advise you that NHTSA is considering commencing proceedings that could result in the imposition of a civil penalty against CAMI for its violation of sections 30112(a) and 30115. CAMI is hereby afforded an opportunity within 20 calendar days of receipt of this letter to submit to the undersigned any mitigating information, data, or arguments relevant to the exercise of reasonable care in this matter and the imposition of a civil penalty. Upon receipt and evaluation of CAMI's response, a decision will be made either to suggest that CAMI pay a specified sum in settlement of claims pending against it by NHTSA, or to close the case without such payment.

In determining the settlement sum, section 30165(c) requires that "the appropriateness of the penalty or compromise to the size of the business of the person charged and the gravity of the violation" shall be considered. Therefore, CAMI's response should also address these issues.

If you have any questions concerning this matter, you may call Taylor Vinson of this office at (202) 366-5263.

Sincerely,

Enid Rubenstein
Acting Assistant Chief Counsel
for Litigation

Enclosure

AS 279886

Item # 8

MEMO TO FILE

Subject: Action: Technical Investigation Complete/Case Transfer to OCC, 1996 Geo Tracker/Suzuki Sidekick, FMVSS No. 301

Date: JAN 9 1997

From: James A. Jones
Safety Compliance Engineer

Concurrence:

To: File IR 1711

SYNOPSIS

On May 17,1996, a 1996 model year Geo Tracker 4-door (VIN 2CNBJ1362T6905729) sport utility vehicle was tested to the rear impact requirements of Federal Motor Vehicle Safety Standard (FMVSS) No. 301, "Fuel System Integrity," at Calspan in Buffalo, New York. The vehicle spilled 19.7 oz of stoddard solvent in the 5 minute period immediately following the 29.5 mph rear impact by the moving barrier. It continued to leak at a rate of 1.5 oz/minute for the next 25 minutes. On May 31, 1996, General Motors Corporation (GM) and Suzuki representatives inspected the tested vehicle at Calspan. Subsequently, a information request letter (IR 1711) was sent to GM on June 19, 1996. A response was received on August 12, 1996.

MANUFACTURER'S RESPONSE

The following is a brief summarization of GM's response to the IR request;

A. Certification Tests

GM stated that the Tracker is produced by CAMI Automotive Inc., a joint operation between GM and Suzuki Motor Corporation (Suzuki). Suzuki is responsible for performing the necessary certification tests to verify compliance. GM provided data which indicate a number of frontal, oblique, lateral and rear impact tests (including moving deformable barrier tests and vehicle to vehicle rear impact) were performed. Five rear impact tests were conducted at speeds greater than 30 mph (see Attachment 1).

B. **Total Production of affected vehicles**

GM/Suzuki identified 18,121, 1996 Geo Tracker 4-door vehicles and 4,325, 1996 Suzuki Sidekick 4-door vehicles produced from August 23, 1995 through June 21, 1996 that have the same fuel system components and design as the vehicle in the NHTSA compliance test.

C. **Production changes made to subject vehicle which may affect conformance to the standard:**

GM stated that there were two changes made to the Tracker fuel system design. The first change, effective 8/21/95, involved strengthening of the fuel tank mounting bracket to accommodate an increase in curb weight for 1996 model year vehicles. The second change, effective 6/21/96, involved the corrective action; the installation of new gussets placed between the fuel tank mounting brackets and fuel tank flange. The vehicle tested by NHTSA was produced August 31, 1995 and was subject to the first change.

AS 279887

D. **Manufacturer's Review of the Compliance Test Conduct**
GM/Suzuki reviewed the compliance test, test report and film and concluded that the test was conducted properly. GM/Suzuki representatives confirmed that the fuel system fluid spillage came from a puncture of the fuel tank rear surface by a tank flange reinforcement gusset at the right rear attachment of the tank to the vehicle.

E. **Corrective Action**
On June 21, 1996, CAMI introduced into production, a modified gusset with a rolled, broad angled surface on the side nearest the tank wall to prevent puncture of the tank (see Attachment 2). These new gussets act as reinforcements for the tank's rear flange and will replace the original gussets on both right and left rear tank mounts. In addition, GM stated that CAMI has modified its gusset attachment tooling to assure gusset orientation and spacing of the spot welds during manufacture. GM, also stated that inspection of every gusset has been implemented.

On June 28, 1996, GM initiated a recall and remedy campaign to address all the affected Geo vehicles (Suzuki initiated a recall of Sidekick models on July 2, 1996). The service procedure instructs dealers to add (2) new gussets at the tank rear attachments without removing the original welded gussets (see Attachment 3).

F. **Root Cause - Analysis**

I. **GM's Preliminary Analysis**
GM stated that its inspection at Calspan, on May 31, 1996, helped to focus the investigation which led to the following conclusions;

a. The forward corner of the tank flange reinforcement (gusset) at the right rear attachment of the tank to the vehicle, punctured the fuel tank rear surface

b. Impact forces transmitted by the undeformed tank mounting bracket caused localized buckling deformation of the tank flange in the area that should have been covered by the outer portion of the right rear gusset

c. Localized deformation contributed to partial separation between flange and outer portion of the gussets, thus exposing the outboard forward corner of the gusset which penetrated the tank wall

d. To a lesser extent, separation was apparent on the left side, as well, but no penetration was evident

II. **Root Cause Determination:**

a. Gusset Orientation - GM inspected a number of 1996 Geo Tracker 4-door fuel tanks and found manufacturing variability in the attachment of the gusset to the fuel tank rear flange. Gussets were not aligned square relative to the flange as intended by design (see Attachment 4). Improper orientation or alignment resulted in one end of the gusset being too close to the fuel tank wall.

b. Gusset Spot Weld Spacing - The gusset is attached to the flange by two spot welds, one on each side of the attachment bolt hole. GM's observations indicate that a shorter spacing between gusset spot welds resulted in more relative separation of the outer portion of the gusset from the flange and allowed more relative movement of the gusset outer portion toward/into the fuel tank wall (see Attachment 5).

c. Strengthening of the fuel tank rear support bracket - The first change made to the 1996 Geo Tracker fuel system involved strengthening of the support bracket (see Attachment 6). GM noted that the post test deformation pattern exhibited by the original bracket in rear impacts is noticeably different than the deformation pattern exhibited in rear impacts with the more robust bracket (see Attachments 7 & 8). Therefore, GM concluded that strengthening of the bracket, coupled with the gusset problems mentioned above was the root cause of the failure in the NHTSA compliance test.

REVIEW OF MANUFACTURER'S TEST DATA

A. Investigative Analysis Tests

GM/Suzuki submitted data from tests performed during its investigative analysis. These tests consist of quasi-static loading tests performed on a number of fuel tanks and full scale rear moving barrier impact tests performed on full production models.

In the static tests, Suzuki varied the following parameters: gusset orientation, gusset spot weld spacing (or pitch) and fuel tank bracket design (see Table 1). Static test C-1 which combined the modified bracket design with the worst case gusset attachment characteristics, yielded results similar to those of the NHTSA compliance test, i.e. partial separation of the gusset outer edge from the tank flange, which in turn, penetrated the fuel tank wall. In test C-2, the nominal gusset orientation configuration yielded no penetration of the gusset into the tank wall. Static tests C-7 and C-8 which combined worst case gusset attachment characteristics with the original bracket design, yielded no penetration as well.

Table 1 - Quasi-Static Tests

Test No.	Fuel Tank Bracket Design	Gusset Orientation	Spot Weld Spacing(Pitch)	Fuel Tank Penetration
C-1	modified	worst case	narrow-40mm	yes
C-2	modified	nominal	nominal-70mm	no
C-7	original	worst case	narrow-40mm	no
C-8	original	worst case	narrow-40mm	no

Comparison of post-test photographs show the different deformation patterns exhibited in tests which utilized the modified bracket versus tests which utilized the original bracket. In tests with the original bracket there is buckling and bending (upward) of the fuel tank flange and bending of the bracket itself. Only buckling of the flange (particularly in the area of the outer corners of the gusset) occurs in tests with the modified bracket.

Also, GM/Suzuki submitted data from two full scale FMVSS No. 301 rear impact tests performed on Suzuki vehicles representative of the 1996 Geo Tracker 4-door (see Table 2). The first test utilized the modified bracket design and nominal flange gusset orientation and spot weld spacing based upon the information gathered during fuel tank inspections (see attachments 4 and 5). The second test utilized the original bracket design and worst case gusset orientation and spot weld spacing. The results from these dynamic tests are similar to the results from similarly configured static tests (refer to Table 1 Test Nos. C-2 & C-8).

Table 2- Dynamic Rear Impact 301 Tests

Test No.	Fuel Tank Bracket Design	Gusset Orientation	Spot Weld Spacing(Pitch)	Fuel Tank Penetration
86-101	modified	nominal	nominal-70mm	no
86-102	original	worst case	narrow-40mm	no

Post-test photographs show expected deformation patterns. In test 86-101, there is very little deformation in the modified (strengthened) bracket. Buckling of the flange at the outer edge of the gusset is evident. In test 86-102, the original bracket is deformed and the tank flange and attached (welded) gusset are bent upward.

These tests substantiate the manufacturer's claim that the combination of off-nominal gusset attachment conditions and modified tank mounting bracket design was the root cause of the fuel spillage.

AS 279890

B. Corrective Action Verification Tests

For the production fix, CAMI will introduce the new gusset design illustrated in attachment 4. The new gussets have a rolled, broad angled surface on the side nearest the tank wall to prevent puncture of the tank. The new gussets will replace the original gussets (on the bottom side of the flange) at both the left and right side rear fuel tank attachment bolt holes . In addition, CAMI has implemented inspection of each new gusset weld to assure proper orientation and weld spacing (pitch). However, for the recall/remedy, the new gussets will be placed on the **opposite** side (top side of the flange) of the original gussets. The original gussets welded to the bottom side of the flange remain undisturbed.

I. Production Change (effective 6-21-96)

Suzuki performed 2 static tests, 2 dynamic rear impact tests and 1 car to car rear impact test to verify the production change made on 6-21-96 (see Table 4).

Table 4 - Corrective Action Verification (Production Vehicles)

Test No.	Test Type	Fuel Tank Bracket Design	Gusset Orientation	Spot Weld Spacing(Pitch)	Fuel Spillage
C-5	Static	modified	nominal	nominal-70mm	none
C-6	Static	modified	nominal	nominal-70mm	none
86-122	RMB -33.6 mph	modified	nominal	nominal-70mm	none
86-181	RMB -30 mph	modified	nominal	nominal-70mm	none
86-253	C-C -48.8 mph	modified	nominal	nominal-70mm	none

II. Recall/Remedy

Suzuki performed 2 static tests, 2 dynamic rear impact tests and 1 car to car rear impact test to verify compliance of the new gusset configuration in the recall/remedy (see Table 5).

Table 5 - Corrective Action Verification (Recall/Remedy)

Test No.	Test Type	Fuel Tank Bracket Design	Gusset* Orientation	Spot Weld** Spacing(Pitch)	Fuel Spillage
C-3	Static	modified	new (nominal)	narrow-40mm	none
C-4	Static	modified		narrow-40mm	none
86-121	RMB -33.6 mph	modified	original (worst case)	narrow-40mm	none
86-251	RMB -30 mph	modified		narrow-40mm	none
86-202	C-C - 48 mph	modified		narrow-40mm	none

* - there are 2 gussets, the new gusset was placed on the top side of the flange with a nominal orientation , the original gusset was welded on the bottom side of the flange using worst case orientation

** - spot weld spacing refers to the original gussets only

CONCLUSION

GM has provided the necessary information requested by NHTSA. GM and Suzuki have submitted Part 573 reports of noncompliance (96V-121) and initiated recall and remedy actions.

AS 279891

RECOMMENDATION

The technical investigation is complete. Last sentence withheld pursuant to 5 USC 552(b)(5)

#

AS 279892

ATTACHMENT LIST

1 - FMVSS No. 301 Certification Tests
2 - Production Fix - Original and Modified Gusset
3 - Service Campaign
4 - Gusset Orientation
5 - Gusset Spot Weld Spacing
6 - Original and Modified Fuel Tank Bracket
7 - Fuel Tank Deformation with Modified Fuel Tank Bracket
8 - Fuel Tank Deformation with Original Fuel Tank Bracket

AS 279893

Attachment #1

FMVSS No. 301 Certification Tests
1996 Tracker 4-door

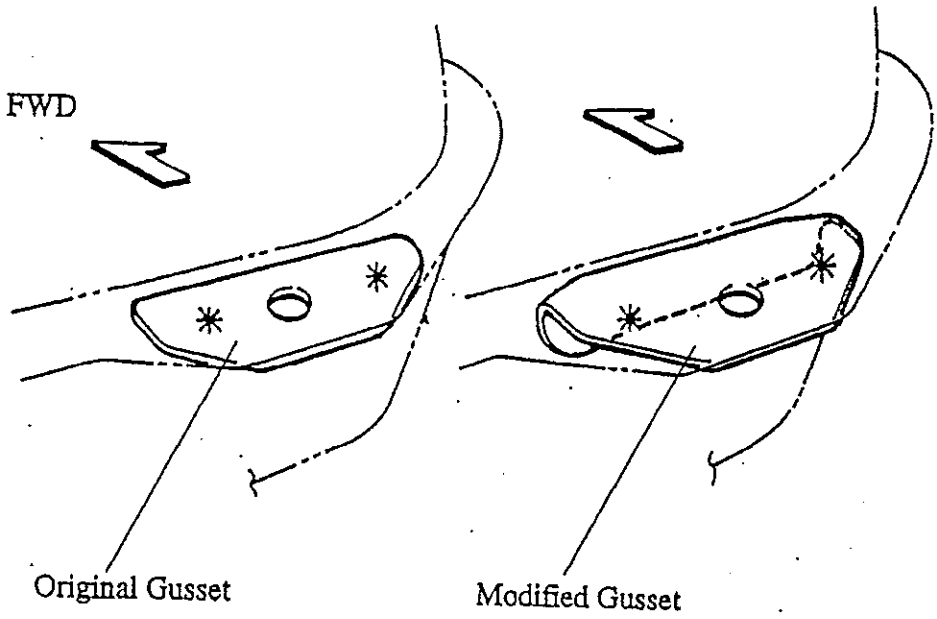
Test Config.	Test No.	Drive	Test Speed(mph)	Test Weight(Kg)*	Test Date	Fuel Spillage			Remarks
						During	After	Rollover	
Frontal	62-072	4WD	30.6	1489.8	02/07/94	none	none	none	
	76-091	2WD	30.2	1466.0	06/09/95	none	none	none	
Oblique Left	61-291	4WD	30.3	1489.4	01/29/94	none	none	none	
	74-112	4WD	30.2	1497.7	04/11/95	none	none	none	
Oblique Right	61-261	4WD	30.3	1493.7	01/26/94	none	none	none	
	75-121	2WD	30.1	1445.0	05/12/95	none	none	none	
Side Left	62-082	4WD	20.3	1479.8	02/08/94	none	none	none	
Side Right	62-081	4WD	20.4	1478.7	02/08/94	none	none	none	
Rear	63-171	4WD	34.5	1477.5	03/17/94	none	none	none	original tank bracket
	75-292	4WD	33.7	1427.8	05/29/95	none	none	none	modified tank bracket
	76-161	2WD	35.0	1478.0	06/16/95	none	none	none	modified tank bracket
	86-102	2WD	33.6	1422.0	06/10/96	none	none	none	original tank bracket
	86-101	4WD	33.6	1472.0	06/10/96	none	none	none	modified tank bracket
Car-to-Car (full)	5A-181	4WD	49.4	1477.0	10/18/93	none	none	none	original tank bracket
	77-071	4WD	49.4	1460.0	07/01/95	none	none	none	modified tank bracket

Note: * - Test weight includes the weight of two dummies
Shaded region indicates tests conducted after NHTSA's compliance test failure

AS 279894

Attachment 2

Original Gusset and Modified Gusset

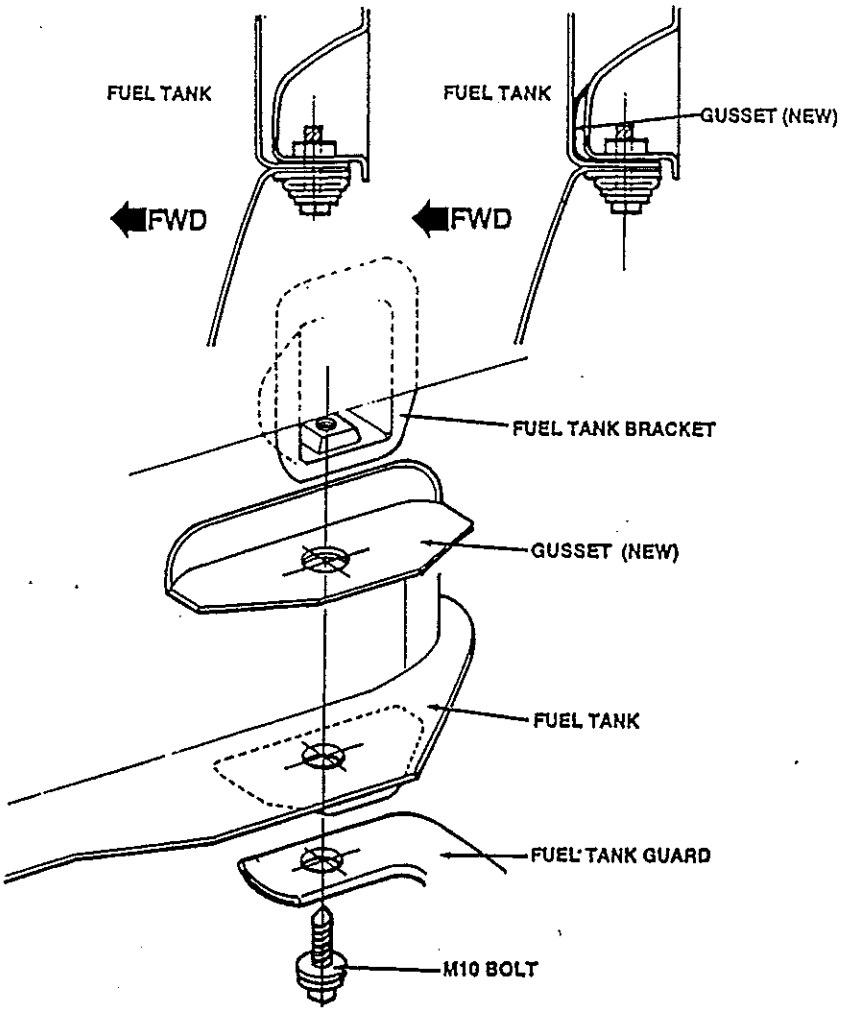


AS 279895

SERVICE PROCEDURE

Attachment 3

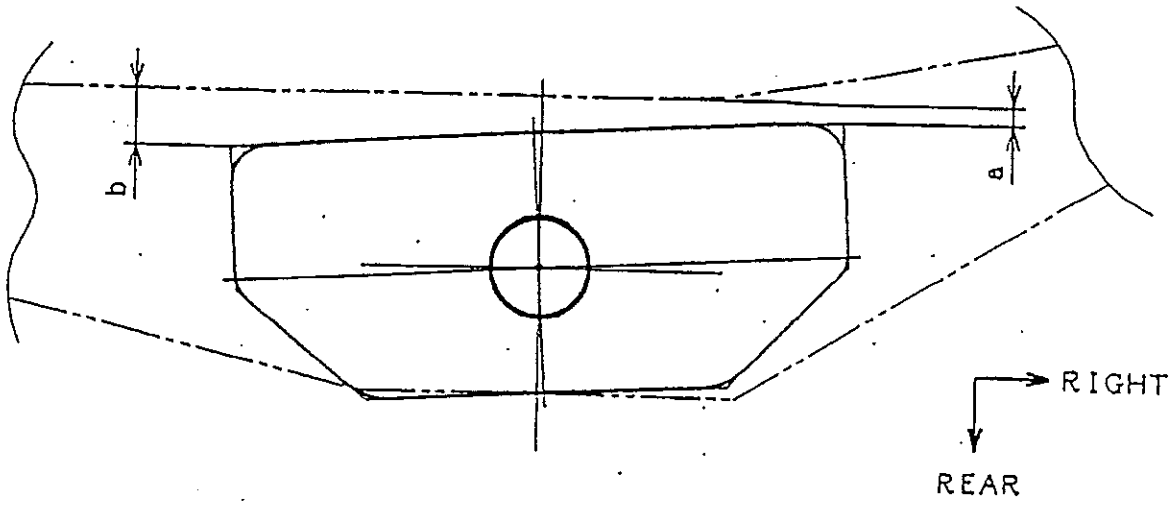
1. Raise and suitably support vehicle.
2. Support fuel tank with a suitable jack.
3. Slowly remove the two (2) rear fuel tank attachment bolts.
4. Install NEW gussets at each rear attachment locations as shown below.
5. Install rear fuel tank attachment bolts and torque to 35 Nm (26 lb. ft.).
6. Remove fuel tank support jack.
7. Lower vehicle.
8. Install the GM Campaign Identification Label.



AS 279896

Location of Fuel Tank Flange Gusset Varies

Attachment 4



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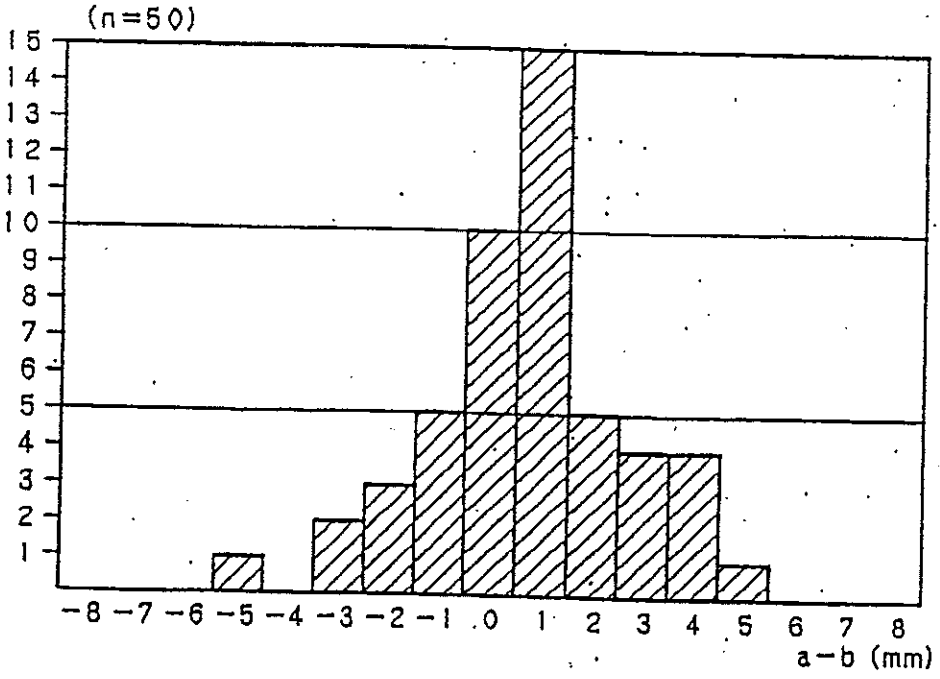
Confidential



AS 279897

Attachment 8

Fuel Tank Deformation With Original Fuel Tank Bracket

AS 279898

Attachments 5, 6, 7 and 9 withheld pursuant to 5 USC 552(b)(4) (See item 7)

AS 279899

MAYER, BROWN & PLATT

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July 15, 1997

Heidi Lewis Coleman, Esq.
Assistant Chief Counsel
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

RE: Request for Confidentiality for Certain Documents Provided by CAMI in Response to Civil Penalty Notice Letter

Dear Ms. Coleman:

Last week CAMI filed a request for confidentiality of certain documents. The certification in support enclosed with that request was faxed from Japan. The original signed certificate has now arrived, and is enclosed. Please add it to CAMI's package.

We appreciate your courtesy in attending to this matter.

Sincerely,

Erika Z. Jones

Erika Z. Jones

Enclosure

CAMI Automotive Inc.

July 9, 1997

Heidi Lewis Coleman, Esq.
Assistant Chief Counsel
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

RE: Request for Confidentiality for Certain Documents Provided in Response to Civil Penalty Notice Letter

Dear Ms. Coleman:

CAMI recently responded to a letter from the Office of Chief Counsel concerning its consideration of whether to impose a civil penalty related to an FMVSS No. 301 noncompliance in certain MY 1996 Sidekicks/Trackers. The purpose of this letter is to request confidential treatment for certain of the documents and materials provided to the Office in connection with that response. CAMI respectfully requests confidential treatment for the following materials[1/]:

- All Test Reports included in Appendix 2 to its letter of June 13, 1997.
- All materials included in response to question 7 in its letter of June 13, 1997.
- All engineering drawings provided during the meeting between CAMI representatives, Suzuki representatives and NHTSA on June 13, 1997.
- The videotape of certain rear barrier and car-to-car crash tests conducted by Suzuki on the Sidekick/Tracker.
- Portions of CAMI's follow-up letter of June 26, 1997.

A justification for each claim of confidentiality is discussed in turn below.

First, the test reports of certification tests 75-292 and 76-161, as well as test 77-011 (high speed car to car) should be protected from public release. Although CAMI recognizes that NHTSA does not routinely protect manufacturers' certification test reports, an exception

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1/ With respect to the first item (test reports), third item (engineering drawings) and fourth item (videotape), these items were provided to NHTSA by CAMI; however, these items are proprietary to Suzuki, one of the CAMI joint venturers. For these items, CAMI respectfully requests confidentiality on behalf of Suzuki.

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should be made in this instance, because Suzuki elected to conduct the certification tests at speeds higher than the standard requires. For this reason, the tests served a dual purpose: supporting the certification of compliance with FMVSS No. 301 and providing valuable information to Suzuki and CAMI about the vehicle's performance at speeds higher than required by the standard. With respect to test 77-011, this high speed car-to-car test is a developmental test that is not required by NHTSA regulations. Release of these three test reports would reveal details of Suzuki's internal engineering test procedures beyond those required for FMVSS certification, including procedures developed for evaluating fuel tank integrity. Furthermore, release of the test report of test 77-011 would allow a competitor to duplicate Suzuki's test procedures for high-speed car-to-car testing and would allow a competitor to learn about the vehicle's high-speed crashworthiness, without having to invest in the development of its own procedures or conducting its own reverse engineering, while Suzuki and CAMI would not benefit by obtaining any similar information from its competitors. The test procedures and test results of the three tests are thus entitled to confidential protection. See, e.g., *Worthington Compressors, Inc.* v. *Costle*, 662 F.2d at 51.

Second, all material provided in response to NHTSA's question 7 in CAMI's letter of June 13, 1997 (Appendices 7-1A, 7-1B, 7-2A, 7-2B, 7-2C, 7-3A, 7-3B, 7-3C, 7-4A, 7-4B, 7-4C, 7-5A and 7-5C) should be protected from public release. These documents identify CAMI's internal standards for parts quality supplied by vendors. These standards are proprietary to CAMI and were developed at CAMI's expense. Release of these standards would permit a competitor to duplicate CAMI's specifications without making the investment ordinarily necessary to develop such standards, while CAMI would obtain no counterpart information from its competitors. The vendor quality specifications should therefore be protected from public release. See *Worthington Compressors, Inc.* v. *Costle*, 662 F.2d 45, 51 (D.C. Cir. 1981).

Third, the blueprints and drawings provided during the June 13 meeting are entitled to protection pursuant to NHTSA's class determination contained in Appendix B to Part 512.

Fourth, the videotape that includes certification tests 75-292 and 76-161 and high speed car-to-car test 77-011 should be protected from public release. The videotape reveals in detail the precise crush characteristics of the rear of the subject vehicle in barrier and car-to-car testing, all of which were conducted at speeds higher than FMVSS No. 301 requires. These tests are entitled to protection for reasons described in the first justification above, and the videotape illustrating them is likewise protectable.

Fifth, the portions of CAMI's letter of June 26, 1997 that discuss CAMI's processes for evaluating the performance of its suppliers should be protected from public release. Although CAMI initially identified the entire June 26, 1997 letter as confidential, CAMI now

believes that certain portions of that letter could safely be released without causing competitive harm to CAMI. CAMI therefore limits this request for confidential treatment to the matter which has been bracketed in the attached copy. A redacted version of the letter is also attached.

The redacted portions of the June 26, 1997 letter are entitled to protection as confidential business information because they contain a candid discussion of CAMI's various quality control processes by which it evaluates its vendors and the process by which it accepts vendor parts and detects potential vendor part problems during the manufacturing process. These processes are proprietary to CAMI. Release of the description of these processes would permit a competitor to duplicate CAMI's processes without making the investment ordinarily necessary to develop such procedures, while CAMI would obtain no counterpart information from its competitors. The vendor quality specifications should therefore be protected from public release. See *Worthington Compressors, Inc.* v. *Costle*, 662 F.2d 45, 51 (D.C. Cir. 1981). Furthermore, while every manufacturer presumably has some level of quality control, the exact level of attention a manufacturer pays to different steps in the quality process will differ from company to company. Release of this much detail about CAMI's processes would permit its competitors to know where CAMI is expending resources for supervision of vendor parts and where it is not, to CAMI's competitive detriment. Disclosure of information that would allow a competitor to base future pricing or product revision decisions in such a way as to take advantage of CAMI's costs of quality control is entitled to protection pursuant to 49 C.F.R. Part 512. See, e.g., *Gulf & Western Industries, Inc.* v. *United States*, 615 F.2d 527, 529-530 and n.6 (D.C. Cir. 1979). Also see *Braintree Elec. Light Dep't.* v. *Department of Energy*, 494 F.Supp. 287, 290 (D.D.C. 1980)(financial information from which a competitor could "determine another's cost of doing business" would cause "substantial" competitive harm).

Finally, a separate basis exists on which to protect all of the confidential CAMI documents. As these documents were all submitted to NHTSA in voluntary compliance with the agency's letter, and because CAMI does not "customarily release to the public" any of the attached confidential documents, NHTSA should protect the documents. *Critical Mass Energy Project v. Nuclear Regulatory Commission*, 975 F.2d 871, 880 (D.C. Cir. 1992), cert. den. 113 S.Ct. 1579 (1993).

* * *

CAMI has appended to this letter the certification required by your regulations.

Sincerely,

Sadayuki Hirano /ej

Sadayuki Hirano
Director, Quality Assurance

Attachments

cc: Enid Rubenstein, Esq.
Acting Assistant Chief Counsel for Litigation

AS 279904

CAMI Automotive Inc.

June 26, 1997

PUBLIC VERSION

Enid Rubenstein, Esq.
Acting Assistant Chief Counsel
for Litigation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Ms. Rubenstein:

Thank you for meeting with us on June 13. In this regard, our letter responds to questions raised at the meeting regarding the reasons why CAMI reasonably had confidence in the quality of parts manufactured by Prince Metal Products (PMP), the fuel tank supplier for the subject vehicles.

PMP is one of several subsidiaries of National Automobile Radiator Manufacturing Company (NARMCO), a major, multiplant supplier of automotive parts to many vehicle manufacturers. NARMCO has been in the automotive parts manufacturing business for more than 50 years, making large stamped panels and welded parts. NARMCO has a particular specialty of manufacturing deep drawn parts, such as oil pans and fuel tanks. Specifically with respect to automotive fuel tanks, NARMCO has been making vehicle fuel tanks for several manufacturers since 1972, either directly or through one of its subsidiaries. In 1988, NARMCO established a new subsidiary, Prince Metal Products (PMP), which manufactures fuel tanks and other stamped and/or welded parts. CAMI has purchased fuel tanks manufactured by PMP since 1989.[

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] Thus, CAMI was reasonable in relying on the extensive experience of PMP and its parent company, NARMCO, in manufacturing fuel tanks and other automotive parts for several vehicle manufacturers and, specifically, for CAMI.

NARMCO and PMP have quality experience with CAMI that is in line with their competitors in the complex metal parts segment of the automotive parts business. PMP last year obtained QS 9000 certification at the 9001 and 9002 levels and ISO 9002 certification. ISO 9002 is the International Standards Organization's standard for quality systems in manufacturing. Earning QS 9000 and ISO 9002 qualification requires that the manufacturing facility demonstrate to the satisfaction of an outside auditor that it has achieved certain rigorous standards for quality control in the manufacturing process.

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]

AS 279906

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PAGE
CONFIDENTIAL

AS 279907

* * *

For all of the above reasons, CAMI believes that it was reasonable to rely on the quality of PMP manufactured parts. We trust this letter has sufficiently answered the questions raised at our June 13 meeting.

Sincerely,

Sadayuki Hirano /kk

Sadayuki Hirano
Director, Quality Assurance

CAMI
Automotive Inc.

CONFIDENTIAL VERSION

June 26, 1997

Enid Rubenstein, Esq.
Acting Assistant Chief Counsel
for Litigation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

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NARMCO and PMP have quality experience with CAMI that is in line with their competitors in the complex metal parts segment of the automotive parts business. PMP last year obtained QS 9000 certification at the 9001 and 9002 levels and ISO 9002 certification. ISO 9002 is the International Standards Organization's standard for quality systems in manufacturing. Earning QS 9000 and ISO 9002 qualification requires that the manufacturing facility demonstrate to the satisfaction of an outside auditor that it has achieved certain rigorous standards for quality control in the manufacturing process.

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AS 279909

ENTIRE PAGE CONFIDENTIAL

In CAMI's own experience, PMP over the years has been a reliable supplier of fuel tanks and other automotive parts, and has demonstrated that it has good systems for manufacturing quality components. When CAMI routinely audited PMP (as it does all major suppliers from time to time), CAMI confirmed that PMP has supplier quality systems that rated within the acceptable category of suppliers. Over the years since CAMI has used PMP as a supplier for fuel tanks and other parts, CAMI has considered PMP's performance to be in line with the expected performance from suppliers of major metal parts. That is, the instances of parts needing to be returned to PMP for any reason has been consistent with CAMI's experience with other vendors of complex metal parts.

You specifically asked us to review the circumstances in which fuel tanks were returned to PMP by CAMI as a result of possible flaws in PMP-manufactured fuel tanks discovered by CAMI during the vehicle assembly process. You asked us to report on fuel tanks returned for this reason during the two-year time period immediately preceding, and including, the date of the manufacture of the vehicle tested by NHTSA (September 1, 1993 through August 31, 1995). We have confirmed that there were no instances of fuel tanks returned to PMP by CAMI for reasons attributed to significant problems noted during the vehicle assembly process in that time period. A "significant" problem would have been a departure from specifications; a manufacturing discrepancy introducing problems on the vehicle assembly line (such as misaligned mounting holes); or any issue raising a question of the safe performance of the product in the field. According to CAMI's records, 36 fuel tanks were returned to PMP in the two-year window for minor reasons, out of approximately 141,800 fuel tanks purchased from PMP. Minor reasons for rejecting these tanks included shipping damage, paint damage and malfunctioning electrical connectors. In CAMI's experience with vendors of complex metal parts, this is an acceptable record of return parts.

CAMI has a quality control process known as "Defective Material Corrective Action Reports" (DMCAR's). The DMCAR process documents defective materials identified by CAMI during the vehicle manufacturing process, and requests a plan for a corrective action from the parts vendor. CAMI issues a DMCAR for a single instance of a flaw in a safety-related characteristic; and for non-safety related defects (such as cuts in seat fabrics), a DMCAR is issued if three instances of the defect are observed in an eight-hour shift.

CAMI reviewed the DMCAR's issued for parts manufactured by PMP in the two years preceding the date of the manufacture of the NHTSA-tested vehicle, and confirmed that, during that time period, no DMCAR's were issued for any PMP-manufactured fuel tank, no DMCAR's were issued to PMP for any mislocated welding on any part (including PMP-manufactured parts other than fuel tanks) and no DMCAR's were issued to PMP for misalignment of any welded part (including PMP- manufactured parts other than fuel tank components). 13 DMCAR's were issued to PMP for parts other than fuel tanks, such as rust found in a front body side panel,

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misformed shape in the stamped metal of an inner back panel, and similar defects. None of the 13 DMCAR's issued to PMP in that time period reflected a repeat problem, suggesting that PMP responded promptly to correct even the minor issues that arose. In CAMI's experience, the volume and type of DMCAR's issued to PMP were in line with those issued to other vendors of complex parts.

You also asked that we briefly summarize CAMI's procedure for acceptance of vendor parts and for detecting potential vendor part problems during the vehicle manufacturing process. The first opportunity to observe potential problems with vendor parts is at the receiving department, where vendor parts are accepted by CAMI personnel. Fuel tanks from PMP are delivered by truck on racks, between two and four times per day, depending upon expected vehicle production volumes that day. The receiving department employee will confirm the delivered volume and conduct a cursory visual check for shipping damage.

Assuming no shipping damage is observed, the rack is accepted and held in receiving until needed on the assembly line. At that point, the rack is moved to the assembly line. The assembly worker removes a fuel tank from the rack for each chassis, and bolts the tank to the chassis. At this time, an obvious manufacturing problem in the fuel tank (such as misaligned mounting holes or unpainted shell) would be noted by the assembly worker, and the tank would be rejected.

Once the chassis manufacturing is completed, each chassis receives a visual inspection for such items as security of bolts, presence of all attachment items (such as hoses), security of all attachments, and similar items. This inspection does not include the underbody of the vehicle, but enables verification of appropriate installation of parts visible from the top of the chassis.

After the passenger compartment is added to the completed chassis, the vehicle passes over an inspection pit in which a worker inspects the underbody of each vehicle for visually observable attachment problems. Then, a small amount of fuel is added (approximately 6 liters for the Sidekick/Tracker) and the car is started. It is driven over a second inspection pit, from which the front wheels are aligned. Although this second inspection is not designed to inspect for fuel tank integrity, it provides another opportunity by which fuel leaks can be observed, because the inspection worker in the pit will immediately notice any odor or liquid evidence of fuel leakage.

Each CAMI-built vehicle receives a final inspection. Part of this inspection includes a chassis dynamometer test (up to 70 mph), followed by underbody inspection to confirm vehicle functions. This inspection provides another opportunity to discern any fuel leakage or serious fuel tank attachment problems before the vehicle is shipped.]

* * *

For all of the above reasons, CAMI believes that it was reasonable to rely on the quality of PMP manufactured parts. We trust this letter has sufficiently answered the questions raised at our June 13 meeting.

Sincerely,

Sadayuki Hirano /kk

Sadayuki Hirano
Director, Quality Assurance

AS 279912

Certificate in Support of Request for Confidentiality

I, Sadayuki Hirano, pursuant to the provisions of 49 C.F.R. Part 512, state as follows:

(1) I am the Director, Quality Assurance and I am authorized by CAMI Automotive Inc, to execute documents on its behalf.

(2) The information contained in the documents identified in the attached letter are confidential and proprietary date and were submitted with the claim that it is entitled to confidential treatment under 5 U.S.C. § 552(b)(4).

(3) I have personally inquired of the responsible CAMI personnel who have authority in the normal course of business to release the information for which a claim of confidentiality has been made to ascertain whether such information has ever been released outside CAMI.

(4) Based upon such inquiries, to the best of my knowledge, information and belief the information for which CAMI has claimed confidential treatment has never been released or become available outside CAMI, expect in the normal course of business in dealing with its suppliers, all of whom are asked to protect the confidentiality of the quality control procedures, and expect for ordinary business dealing with CAMI's joint venture partners, Suzuki and General Motors.

(5) I make no representations beyond those contained in this certificate and in particular, I make no representations as to whether this information may become available outside CAMI because of unauthorized or inadvertent disclosure except as stated in Paragraph 4.

(6) I certify under penalty of perjury that the forogoing is true and correct.

Executed on this the 8th day of July 1997.

Sadayuki Hirano
Director, Quality Assurance

AS 279913

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

CAMI
Automotive Inc.

June 26, 1997

ENTIRE LETTER IS CONFIDENTIAL

Enid Rubenstein, Esq.
Acting Assistant Chief Counsel
for Litigation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Ms. Rubenstein:

Thank you for meeting with us on June 13. In this regard, our letter responds to questions raised at the meeting regarding the reasons why CAMI reasonably had confidence in the quality of parts manufactured by Prince Metal Products (PMP), the fuel tank supplier for the subject vehicles.

PMP is one of several subsidiaries of National Automobile Radiator Manufacturing Company (NARMCO), a major, multiplant supplier of automotive parts to many vehicle manufacturers. NARMCO has been in the automotive parts manufacturing business for more than 50 years, making large stamped panels and welded parts. NARMCO has a particular specialty of manufacturing deep drawn parts, such as oil pans and fuel tanks. Specifically with respect to automotive fuel tanks, NARMCO has been making vehicle fuel tanks for several manufacturers since 1972, either directly or through one of its subsidiaries. In 1988, NARMCO established a new subsidiary, Prince Metal Products (PMP), which manufactures fuel tanks and other stamped and/or welded parts. CAMI has purchased fuel tanks manufactured by PMP since 1989. At this time, CAMI purchases 24 different parts from PMP, including large stamped panels, fender aprons, fuel inlet boxes, back door hinge reinforcements, bracket suspensions, and other stamped and/or welded parts. Thus, CAMI was reasonable in relying on the extensive experience of PMP and its parent company, NARMCO, in manufacturing fuel tanks and other automotive parts for several vehicle manufacturers and, specifically, for CAMI.

NARMCO and PMP have quality experience with CAMI that is in line with their competitors in the complex metal parts segment of the automotive parts business. PMP last year obtained QS 9000 certification at the 9001 and 9002 levels and ISO 9002 certification. ISO 9002 is the International Standards Organization's standard for quality systems in manufacturing. Earning QS 9000 and ISO 9002 qualification requires that the manufacturing facility demonstrate to the satisfaction of an outside auditor that it has achieved certain rigorous standards for quality control in the manufacturing process.

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In CAMI's own experience, PMP over the years has been a reliable supplier of fuel tanks and other automotive parts, and has demonstrated that it has good systems for manufacturing quality components. When CAMI routinely audited PMP (as it does all major suppliers from time to time), CAMI confirmed that PMP has supplier quality systems that rated within the acceptable category of suppliers. Over the years since CAMI has used PMP as a supplier for fuel tanks and other parts, CAMI has considered PMP's performance to be in line with the expected performance from suppliers of major metal parts. That is, the instances of parts needing to be returned to PMP for any reason has been consistent with CAMI's experience with other vendors of complex metal parts.

You specifically asked us to review the circumstances in which fuel tanks were returned to PMP by CAMI as a result of possible flaws in PMP-manufactured fuel tanks discovered by CAMI during the vehicle assembly process. You asked us to report on fuel tanks returned for this reason during the two-year time period immediately preceding, and including, the date of the manufacture of the vehicle tested by NHTSA (September 1, 1993 through August 31, 1995). We have confirmed that there were no instances of fuel tanks returned to PMP by CAMI for reasons attributed to significant problems noted during the vehicle assembly process in that time period. A "significant" problem would have been a departure from specifications; a manufacturing discrepancy introducing problems on the vehicle assembly line (such as misaligned mounting holes); or any issue raising a question of the safe performance of the product in the field. According to CAMI's records, 36 fuel tanks were returned to PMP in the two-year window for minor reasons, out of approximately 141,800 fuel tanks purchased from PMP. Minor reasons for rejecting these tanks included shipping damage, paint damage and malfunctioning electrical connectors. In CAMI's experience with vendors of complex metal parts, this is an acceptable record of return parts.

CAMI has a quality control process known as "Defective Material Corrective Action Reports" (DMCAR's). The DMCAR process documents defective materials identified by CAMI during the vehicle manufacturing process, and requests a plan for a corrective action from the parts vendor. CAMI issues a DMCAR for a single instance of a flaw in a safety-related characteristic; and for non-safety related defects (such as cuts in seat fabrics), a DMCAR is issued if three instances of the defect are observed in an eight-hour shift.

CAMI reviewed the DMCAR's issued for parts manufactured by PMP in the two years preceding the date of the manufacture of the NHTSA-tested vehicle, and confirmed that, during that time period, no DMCAR's were issued for any PMP-manufactured fuel tank, no DMCAR's were issued to PMP for any mislocated welding on any part (including PMP-manufactured parts other than fuel tanks) and no DMCAR's were issued to PMP for misalignment of any welded part (including PMP- manufactured parts other than fuel tank components). 13 DMCAR's were issued to PMP for parts other than fuel tanks, such as rust found in a front body side panel,

misformed shape in the stamped metal of an inner back panel, and similar defects. None of the 13 DMCAR's issued to PMP in that time period reflected a repeat problem, suggesting that PMP responded promptly to correct even the minor issues that arose. In CAMI's experience, the volume and type of DMCAR's issued to PMP were in line with those issued to other vendors of complex parts.

You also asked that we briefly summarize CAMI's procedure for acceptance of vendor parts and for detecting potential vendor part problems during the vehicle manufacturing process. The first opportunity to observe potential problems with vendor parts is at the receiving department, where vendor parts are accepted by CAMI personnel. Fuel tanks from PMP are delivered by truck on racks, between two and four times per day, depending upon expected vehicle production volumes that day. The receiving department employee will confirm the delivered volume and conduct a cursory visual check for shipping damage.

Assuming no shipping damage is observed, the rack is accepted and held in receiving until needed on the assembly line. At that point, the rack is moved to the assembly line. The assembly worker removes a fuel tank from the rack for each chassis, and bolts the tank to the chassis. At this time, an obvious manufacturing problem in the fuel tank (such as misaligned mounting holes or unpainted shell) would be noted by the assembly worker, and the tank would be rejected.

Once the chassis manufacturing is completed, each chassis receives a visual inspection for such items as security of bolts, presence of all attachment items (such as hoses), security of all attachments, and similar items. This inspection does not include the underbody of the vehicle, but enables verification of appropriate installation of parts visible from the top of the chassis.

After the passenger compartment is added to the completed chassis, the vehicle passes over an inspection pit in which a worker inspects the underbody of each vehicle for visually observable attachment problems. Then, a small amount of fuel is added (approximately 6 liters for the Sidekick/Tracker) and the car is started. It is driven over a second inspection pit, from which the front wheels are aligned. Although this second inspection is not designed to inspect for fuel tank integrity, it provides another opportunity by which fuel leaks can be observed, because the inspection worker in the pit will immediately notice any odor or liquid evidence of fuel leakage.

Each CAMI-built vehicle receives a final inspection. Part of this inspection includes a chassis dynamometer test (up to 70 mph), followed by underbody inspection to confirm vehicle functions. This inspection provides another opportunity to discern any fuel leakage or serious fuel tank attachment problems before the vehicle is shipped.

* * *

For all of the above reasons, CAMI believes that it was reasonable to rely on the quality of PMP manufactured parts. We trust this letter has sufficiently answered the questions raised at our June 13 meeting.

Sincerely,

Sadayuki Hirano

Sadayuki Hirano
Director, Quality Assurance

AS 279917

CAMI
Automotive Inc.

June 13, 1997

Enid Rubenstein
Acting Assistant Chief Counsel for Litigation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Re: NCC-10 ZTV
IR 1711
Response to Civil Penalty Notice Letter

Dear Ms. Rubenstein:

CAMI has received your letter of May 30, 1997, regarding follow-up to the civil penalty notice letter of March 20, 1997. The following information is provided in response to your request for clarification. All documents to which this letter refers are attached to this letter, with appendix numbers assigned to correspond to the number of NHTSA's question calling for the document or the number of the response in which the item is discussed. The videotape and drawings to which this letter refers will be provided at the meeting on June 13. Certain items have been marked as Confidential, and supporting justification pursuant to 49 CFR Part 512 will be submitted under separate cover shortly.

1. CAMI Automotive Inc. was established in 1986 at Ingersoll, Ontario, Canada, as a joint venture automotive manufacturing company between General Motors of Canada Limited, Oshawa, Ontario, Canada and Suzuki Motor Corporation, Hamamatsu, Japan. With regard to the respective interest in CAMI, the responsibility is shared equally between General Motors and Suzuki.

   The extent of participation in day to day activities is as follows:
   GM and Suzuki have provided their employees at the management level to support production, product and process engineering, quality and other administrative activities at CAMI. Suzuki has also provided technical advisors to assist in quality, production and production engineering.

   Suzuki also has design engineering staff at CAMI to support engineering matters.

P.O. Box 1005, 300 Ingersoll Street, Ingersoll, Ontario, Canada N5C 4A6
Phone: (519) 485-6400 Fax: (519) 425-3100

Design and development of the vehicles manufactured at CAMI is done by Suzuki in Hamamatsu, Japan. CAMI is responsible for manufacturing and production quality of the vehicle.

The following CAMI production and quality positions were filled with GM or Suzuki personnel in 1995-1996:

Design	Suzuki	• Assistant Manager of Suzuki Engineering Supporting design issues
Production	GM	• Vice President of Production Responsibility for overall production
	GM	• Director of Production Responsibility for production
Quality	Suzuki	• Director of Quality Assurance Responsibility for Final Vehicle Quality
	GM	• Assistant Director of Quality Assurance
	Suzuki	• Manager of Quality Control Parts Inspection Responsibility for QC - Supplier Parts

These positions held by Suzuki/GM employees are temporary assignments. Suzuki and GM will determine at a future date when these positions will no longer be held by Suzuki and GM assignees, based on the development of CAMI personnel to fulfill these roles.

2. A copy of the test reports regarding the certification tests 75-292 and 76-161 is attached at Appendix 2. The test report of test 77-011 (high speed car to car) is also attached at Appendix 2. A videotape of all three tests will be provided at the meeting.

3. The name and address of the supplier of the fuel tanks is as follows:

Prince Metal Products Ltd. (PMP)
2575 Airport Road
Windsor, Ontario
Canada, N8W 1Z4

Production of 4-door Suzuki Sidekicks began in the 1994 model year, November 1993, and continues to the present time. Initially, these vehicles had fuel tanks supplied by Suzuki, Japan, which were assembled by Okamoto Press Industry Co. Ltd., Hamamatsu, Japan. Prince Metal Products (PMP), one of the manufacturing companies of the National Auto Radiator group, began supplying fuel tanks for the 1995 model year 4-door Suzuki Sidekick, which began production in July 1994. There are no other suppliers of fuel tanks for the 4-door Suzuki Sidekick.

The 4-door GM Tracker was introduced in the 1996 model year, which began production in July 1995 and continues to the present time. PMP supplied fuel tanks for these vehicles and continues to supply fuel tanks to CAMI. There is no other supplier of fuel tanks for the 4-door Tracker produced at CAMI.

4. At the time the vehicle tested by NHTSA was manufactured, CAMI's quality assurance requirements for installation of the fuel tank gussets specified that the gusset installer must "ensure hole alignment and edges line up to mating part." This specification was required to be confirmed by a visual inspection of 100% of the gussets after installation. See CIS (CAMI Inspection Standard), Appendix 7-4A at page 3, line 7B. The CAMI Inspection Standard in effect at that time also specified that spot weld integrity must be verified by conducting a pry test on 100% of the gussets after spot welding. See CIS, Appendix 7-4A at page 3, line 8A. The target spot weld locations and parallel gusset orientation are illustrated on Suzuki's engineering drawing.

CAMI's expectation, based on its experience in the industry, was that spot welds would normally lie within a tolerance of ± 5 mm from the target location. Based on this experience, Suzuki's successful certification and other testing of fuel tank integrity on the subject vehicles at speeds well above the FMVSS 301 requirements, and the lack of any field incidences suggesting a need for more detailed specifications, CAMI had no reason to believe it was necessary to specify spot weld location or gusset orientation tolerances in detail.

After the NHTSA test results, Suzuki prepared an Engineering Change Notice (ECN), identifying a new gusset design and proposed installation specifications with tolerances, and sent that ECN to CAMI. CAMI then worked with PMP to implement the new gusset design and to specify in more detail the quality assurance requirements for gusset installation. Now, the CAMI inspection standard specifies the following with respect to gusset installation: the spot weld pitch must be 70 mm ± 5 mm, the spot weld location to hole offset must be 5.5

mm ± 4 mm, and the gusset orientation must be parallel to the fuel tank wall within 1.9 mm. (See CAMI's response of May 12 for further explanation of how the parallelism is measured.) The spot weld pitch and offset is verified by comparison with a newly designed template that is also used to guide the welding gun during the spot weld installation process. The gusset orientation is verified by use of a taper rule. The pry test for weld integrity also remains in place. In each case, the inspection standard requires 100% inspection of each gusset after spot welding for compliance with the standard. See Appendix 7-4C at page 7, line 17.

5. At the time the vehicle tested by NHTSA was manufactured, the written materials available to PMP included the Suzuki engineering drawings and the CAMI Inspection Standard. See further discussion in response to Question 4. CAMI does not believe that oral communications took place with PMP on the subject of gusset installation, but is continuing to make inquiries in this regard.

   After the NHTSA test results, CAMI worked with PMP to establish more detailed quality assurance requirements for gusset orientation. Initially, in June 1996, Suzuki prepared an Engineering Change Notice (ECN), identifying a new gusset design and proposed installation specifications with tolerances, and sent that ECN to CAMI on June 12, 1996. A copy of this notice, which is provided at Appendix 5-1, was given to PMP on the same day. CAMI and PMP then began to work to implement the new design and evaluate the production capability of the proposed tolerances. To achieve the installation of spot welds within the specified tolerances, PMP developed an installation template to guide the spot welding gun during the installation process. With respect to the proposed tolerance for parallel orientation, CAMI and PMP determined that a tolerance of 1.9 mm was feasible within expected manufacturing variability. Documents reflecting oral communications between CAMI and PMP on this issue are provided at Appendix 5-2 and 5-3.

   As identified in response to Question 3, there were no other fuel tank suppliers for the subject vehicles at the time these instructions were developed.

6. The MY 96 original and two subsequent drawings will be provided at the meeting of June 13, 1997.

7. The internal standards referenced in CAMI's May 12 letter are the CAMI Inspection Standards discussed in more detail in response to Question 4.

The CAMI quality control procedures for suppliers in effect for the 1995 model year are attached at Appendix 7-1A. This document is not specific to fuel tanks, but rather governs all supplier parts. This guidance document was revised in minor ways in May 1996. A copy of the document is attached at Appendix 7-1B. Other documents reflecting CAMI's internal standards and quality control procedures include the following:

	Appendix
Production Process Operation Sheet	7-2 A, B, C
Process Flow Diagram	7-3 A, B, C
CIS (CAMI Inspection Standard)	7-4 A, B, C
Final Parts Approval	7-5 A & C

Within each appendix, documents in place during the 1994 and 1995 model years are marked 'A'. Documents in use for the 1996 model year at the time of the NHTSA testing are marked 'B'. Documents in use after corrective action was taken for gusset location and welding and also in use for 1997 model year are marked 'C'. Please note that CAMI has not been able to locate the document that would have been attached as Appendix 7-5B but is continuing to search for a copy. Please also note that Appendix 7-1A and B are both confidential documents for which an appropriate Part 512 justification will be submitted under separate cover.

8. The CAMI procedures for assuring supplier conformance with engineering drawings and other instructions prior to August 31, 1995 were based on an annual evaluation, which included on-site audit if necessary, as described in the Supplier Guidelines found at Appendix 7-1A at 13. Also see the other materials provided in response to Question 7, which describe other procedures pertaining specifically to PMP's inspection of fuel tanks. CAMI also communicated with and visited PMP to discuss design change issues for new part installation of P-sensor for 96 MY and other production issues during the year prior to August 31, 1995. CAMI does not believe that there were any problems identified or discussed related to gusset welding during this period, but is continuing to make inquiries in this regard.

To date, we believe that the last date of contact prior to the above date is August 8, 1995. The following records from the year are attached:

	Appendix
Fax communication from supplier on May 25, 1995	8-1
Meeting report on June 1, 1995	8-2
Confirmation of trial part submission on June 9, 1995	8-3
Fax communication on June 13, 1995	8-4
Fax communication on August 8, 1995	8-5
Miscellaneous documents related to product manufacturing dated July to Novermber 1994	8-6

CAMI is continuing to review its files for additional data pertaining to other contacts with PMP that may have occurred during that year.

I also wish to confirm my presence at a meeting scheduled for June 13, 9:30 a.m. at the NHTSA office. If you have any questions, I will be pleased to discuss these further at that time.

Sincerely,

Sadayuki Hirano

Sadayuki Hirano
Director, Quality Assurance

AS 279923

5-1

1/1

設変通知票 (No.1-A)
ENGINEERING CHANGE NOTICE

A　燃料 434250

発行日 '96 6 12

設変内容 CONTENTS OF CHANGE

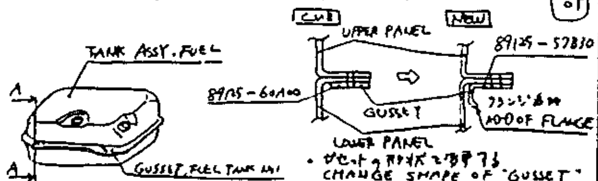
フューエルタンク　上下記の通り変更する。 ADV. START

CHANGE "TANK ASSY, FUEL" AS FOLLOWS

上記に伴い タンク ASSY の品番を変更する

CHANGE PART No. OF "TANK ASSY, FUEL"

(説明) DESCRIPTION



- ガセットの取付け位置及び スポット位置を図面に追加する
  ADD INSTRUCTION OF SPOT WELDING POSITION & GUSSET FIXED POSITION.
- 夾雑物規制を追加
  ADD NOTE OF CONTAMINANT REGULATION
- ガセットの形状を変更する
  CHANGE SHAPE OF "GUSSET"
- 品番変 (タンク ASSY)
  CHANGE PART No (TANK ASSY, FUEL)
  89101-56B01 → -56B02
  89101-57B01 → -57B02
  89101-57B11 → -57B12
  89101-57B30 → -57B31
  89101-57B40 → -57B41

補給は別途に指示

No.		APPLICABLE		PART No.	PART NAME	COMMON USE DWG.
1	新規 (1回)	YF9	NEW	89101-57B31		
			CURRENT	89101-57B30	TANK ASSY, FUEL	89101-57B2

CS830-56

実施指示 INSTRUCTIONS

YA-- 109-3463 SET品番を設定する

CAMI以外の現地部品:96/10月〜

CAMI 89125-57B30 は KD送付とする

SET P/N ~~YEA-2463~~ CREATED BY YEG-3463

OTHER LOCAL PART THAN CAMI → Aug/96

TO BE KD SUPPLIED TO CAMI

SUZUKI MOTOR CORPORATION

56B-2445 (1/2)

1/4

[redacted]

96 7 8

設変通知票 (No.1-B)
ENGINEERING CHANGE NOTICE

No.				NEW / CURRENT	PART No.	QTY	PART NAME	COMMON USE DWG.
1	新規 (1回)		NEW		89101-56B02			
			CURRENT		89101-56B01	0	TANK ASSY, FUEL	
2	新規 (1回)		NEW		89101-57B02			
			CURRENT		89101-57B01			
3	1回		NEW		89101-57B12			89101-57B0
			CURRENT		89101-57B11			
4	1回		NEW		89101-57B41			
			CURRENT		89101-57B40			
5	新規	YF9	NEW	89101-57B31	89125-57B30	4		
			CURRENT	89101-57B30	89125-60A00	2	GUSSET, FUEL TANK No.1	89101-60A0
6			NEW	89101-56B02				
			CURRENT	89101-56B01				
7			NEW	89101-57B02				
			CURRENT	89101-57B01				

[redacted]

96 7 8

URGENT JUN 14 TECHNICAL DEPT.

SUZUKI MOTOR CORPORATION

56B-2445 (2/2)

AS 279924

2/4

06-19-96

5-2 1/9

Temporary Temporary (Initial fixture).

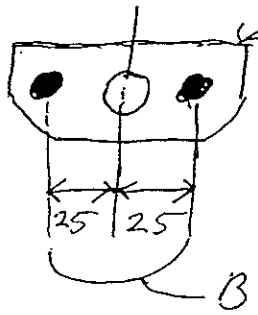
A) Spot Weld (temporary tolerance relief).

① 70 ± 5.0 mm.

② 5.5 ± 4.0 mm.

TOLERANCES FOR A1, 2 & B TO BE FINALIZED AFTER CAPABILITY STUDY (30 PC) IS COMPLETED. DD.

B) Parallelism



CAMI 6/19 6/19.

PMP 96/6-19 "

c) Lot identification.

i) Must identify start & finish of (temporary temporary) fixture : Lot date (FAX)

ii) All these parts painted on filler neck (Blue in color).

iii) Initial parts tag

D) Must have clean break point:

- All old style parts shipped Thursday June 20/96
- All new style parts shipped after Thurs June 20/96

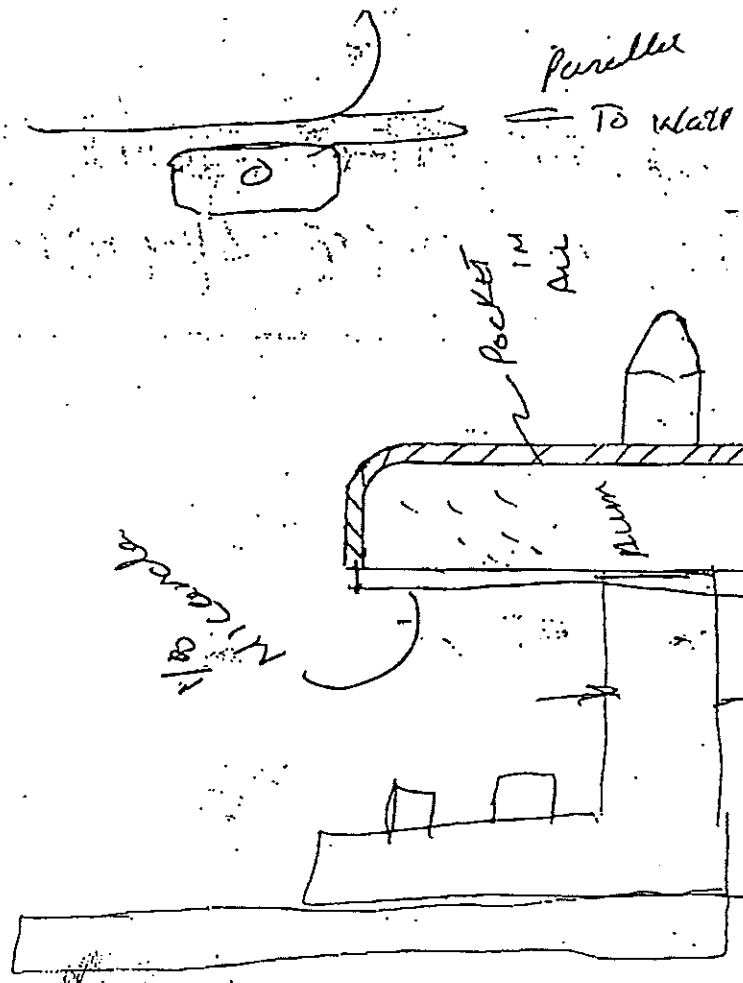
* upon approval from CAMI materials.

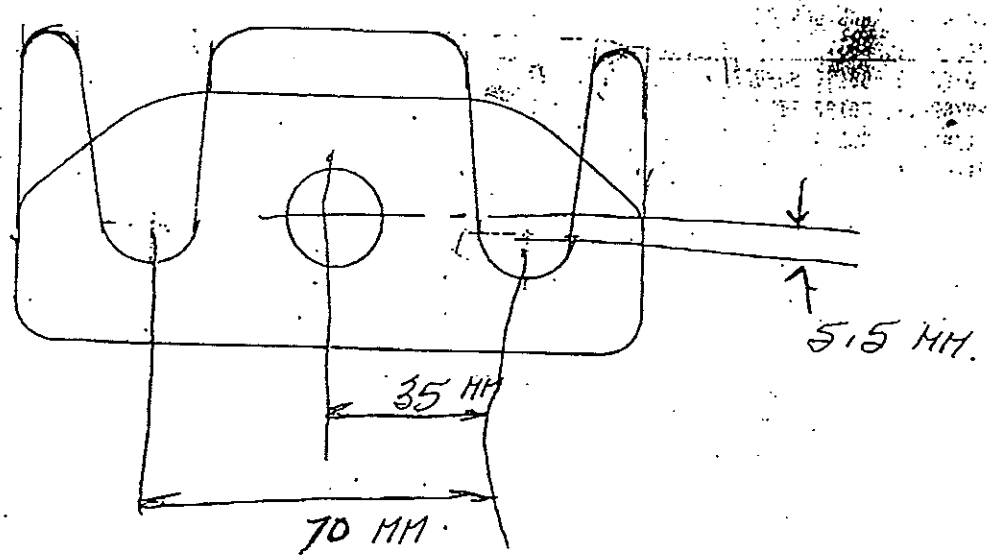
utilize pink tag.

AS 279925

TO GORD TAGG

5-2 2/9





AS 279926

Company : NARMCO
Plant : PRINCE METAL PRODUCTS
Part Desc : GUSSET
: LOC. BETWEEN A & B
Department: PURCHASED PART
Part # : 30019611
Process ID: LOC.BETWEEN SPOTWELDS
Frequency : 30 PC STUDY

5-2 3/9

Engineering Specifications

Lower: 65.0000 Nominal: 70.0000 Upper: 75.0000 Units: MM

Descriptive Statistics - 1 to 6

Total Samples:	30	Total Subgroups:	6
Xdbar:	69.8333	Ave Sam/Sub:	5.0000
Rbar:	1.4383		
Sbar:	0.5773	Std Dev (n - 1):	0.5630
Vbar:	69.9383	Variance (n - 1):	0.3170
Skewness:	-0.0373	Coeff. of Skewness:	-0.2197
Kurtosis:	0.2456	Coeff. of Kurtosis:	2.6156

Control Limit Range 1 - 6: Auto
= 5 : LCLXbar = 69.0034; Xdbar = 69.8333; UCLXbar = 70.6633
LCLR = 0.0000; Rbar = 1.4383; UCLR = 3.0406

Subgroup:		1	2	3	4	5
Sample	1	69.5000	69.8000	69.2000	69.4000	70.6000
	2	69.2000	70.3000	70.4500	69.1200	69.6000
	3	70.0000	69.4000	69.8300	70.4000	69.9000
	4	69.5000	71.0000	70.0000	70.1000	70.0000
	5	70.1000	70.4000	69.2000	70.2000	69.5000
Sum	:	348.3000	350.9000	348.6800	349.2200	348.6000
Xbar	:	69.6600	70.1800	69.7360	69.8440	69.7200
Range	:	0.9000	1.6000	1.2500	1.2800	2.1000
Date	:					
Time	:					
Code	:					

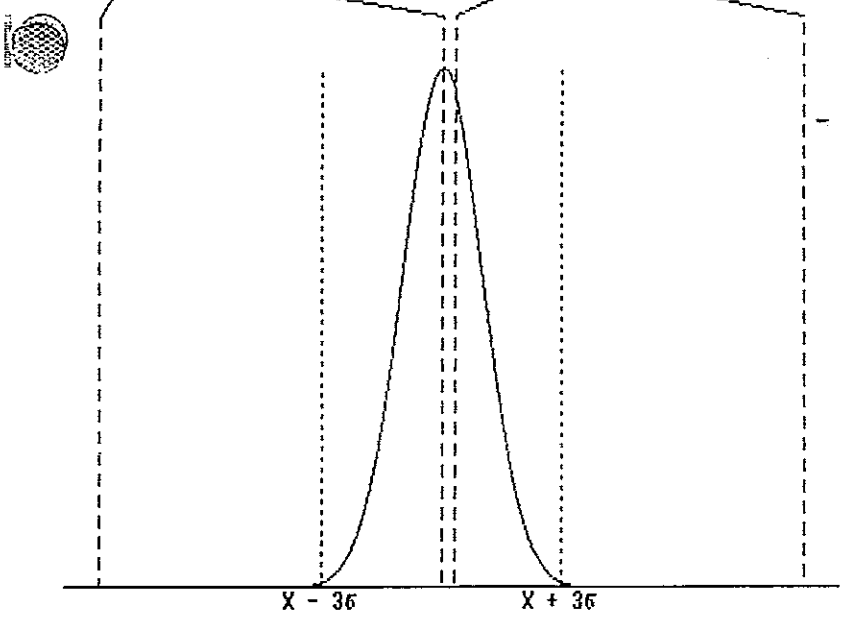
Subgroup:		6
Sample	1	69.0000
	2	70.3000
	3	70.0000
	4	70.5000
	5	69.5000
Sum	:	349.3000
Xbar	:	69.8600
Range	:	1.5000
Date	:	
	:	
	:	

AS 279927

Thu 20 Jun 1996 6:35:40 am FILE: SPOTAB SIZE: 6

NARMCO	PURCHASED PART	PRINCE METAL PRODUCTS
30019611	GUSSET	LOC.BETWEEN SPOTWELDS

LSL: 65.0000 AVG: 69.8333 NOM: 70.0000 USL: 75.0000



σ = 0.5630	Cp = 2.9603	Pzu is negligible
X-3σ = 68.1443	Cr = 0.3378	Pzl is negligible
X+3σ = 71.5224	Cpk = 2.8616	True Normal

5-2

4/9

AS 279928

5-2

pany : NARMCO Department: PURCHASED PART
ant : PRINCE METAL PRODUCTS Part # : 30019611
Desc : GUSSET Process ID: LOC.BETWEEN SPOTWELDS
ar : LOC. BETWEEN C & D Frequency : 30 PC STUDY

5/9

Engineering Specifications

Lower: 65.0000 Nominal: 70.0000 Upper: 75.0000 Units: MM

Descriptive Statistics - 1 to 6

Total Samples:	30	Total Subgroups:	6
dbar:	70.5433	Ave Sam/Sub:	5.0000
bar:	1.2083		
bar:	0.5083	Std Dev (n - 1):	0.5557
bar:	70.6417	Variance (n - 1):	0.3088
kewness:	-0.0294	Coeff. of Skewness:	-0.1805
urtosis:	0.2204	Coeff. of Kurtosis:	2.4741

ontrol Limit Range 1 - 6: Auto
= 5 : LCLXbar = 69.8461; Xdbar = 70.5433; UCLXbar = 71.2405
LCLR = 0.0000; Rbar = 1.2083; UCLR = 2.5544

ubgroup:		1	2	3	4	5
ample :	1	70.8000	69.8000	71.0000	69.3000	70.8000
	2	70.1000	71.0000	70.8000	69.8000	70.9000
	3	69.8000	70.9000	70.2000	70.5500	70.2000
	4	70.5000	71.0000	70.8000	70.8000	71.7000
	5	69.8000	70.4000	70.1000	70.2500	71.4000
um :		351.0000	353.1000	352.9000	350.7000	355.0000
bar :		70.2000	70.6200	70.5800	70.1400	71.0000
nge :		1.0000	1.2000	0.9000	1.5000	1.5000
ate :						
ime :						
de :						

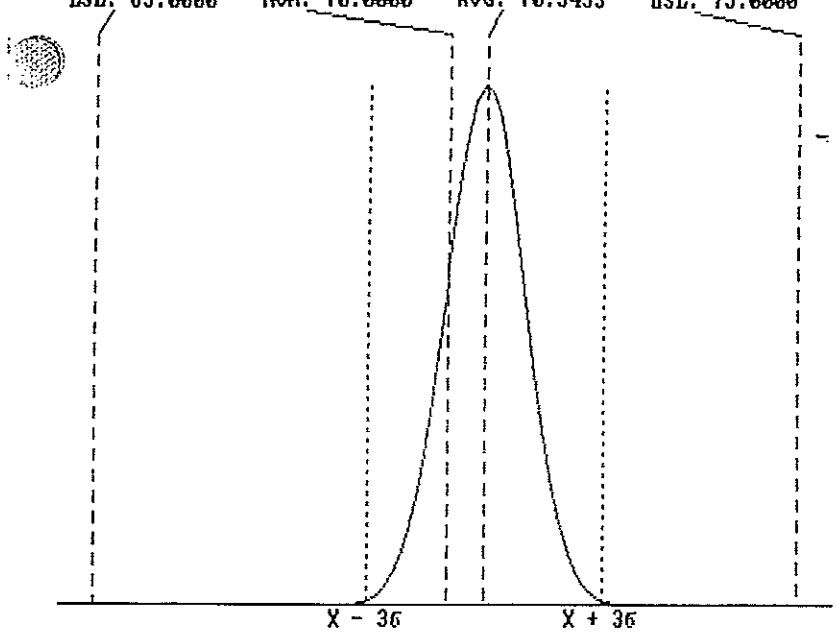
ubgroup:		6
ample :	1	70.4000
	2	70.0000
	3	71.1500
	4	71.1500
	5	70.9000
um :		353.6000
bar :		70.7200
ge :		1.1500
ate :		

AS 279929

Thu 29 Jun 1995 6:38:43 am FILE: SPOTCD SIZE: 6

NAMCO	PURCHASED PART	PRINCE METAL PRODUCTS
38819611	GUSSET	LOC.BETWEEN SPOTWELDS

LSL: 65.0000 NOM: 70.0000 AVG: 70.5433 USL: 75.0000



σ = 0.5557	Cp = 2.9995	Pzu is negligible
X-3σ = 68.8764	Cr = 0.3334	Pzl is negligible
X+3σ = 72.2103	Cpk = 2.6736	True Normal

5-2

6/9

AS 279930

File: DIF-AB.VAR
Date: Thu 20 Jun 1996

Time: 6:23:07 am

5-2
7/9

Company : NARMCO
Plant : PRINCE METAL PRODUCTS
Part Desc : GUSSET
Char : PARALLELISM BET A & B

Department: PURCHASED PART
Part # : 30019611
Process ID: PARALLELISM
Frequency : 30 PC STUDY

Engineering Specifications

Lower: 0.0000 Nominal: 0.7500 Upper: 1.5000 Units: MM

Descriptive Statistics - 1 to 6

Total Samples:	30	Total Subgroups:	6
Xdbar:	0.3893	Ave Sam/Sub:	5.0000
Rbar:	0.5183		
sbar:	0.2040	Std Dev (n - 1):	0.2339
Mdbar:	0.3650	Variance (n - 1):	0.0547
Skewness:	0.0113	Coeff. of Skewness:	0.9289
Kurtosis:	0.0121	Coeff. of Kurtosis:	4.3068

Control Limit Range 1 - 6: Auto
n = 5 : LCLXbar = 0.0903; Xdbar = 0.3893; UCLXbar = 0.6884
LCLR = 0.0000; Rbar = 0.5183; UCLR = 1.0958

Subgroup:		1	2	3	4	5
Sample	1	1.0500	0.6000	0.3400	0.5800	0.5800
	2	0.3900	0.0000	0.5200	0.3300	0.4500
	3	0.5500	0.3000	0.3400	0.4000	0.9600
	4	0.2400	0.0600	0.5000	0.1400	0.3700
	5	0.2000	0.3000	0.3000	0.3000	0.6000
Sum		2.4300	1.2600	2.0000	1.7500	2.9600
Xbar		0.4860	0.2520	0.4000	0.3500	0.5920
Range		0.8500	0.6000	0.2200	0.4400	0.5900
Date						
Time						
Code						

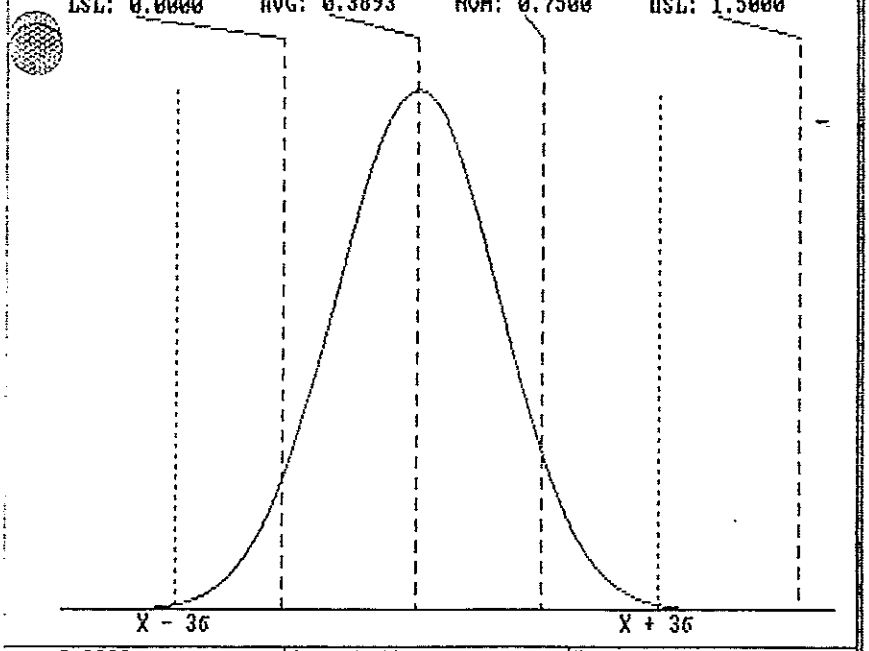
Subgroup:		6
Sample	1	0.4500
	2	0.2500
	3	0.2000
	4	0.0400
	5	0.3400
Sum		1.2800
Xbar		0.2560
Range		0.4100
Date		
True		

AS 279931

Thu 28 Jun 1996 6:23:43 am FILE: DIF-AB SIZE: 6

NARMCO	PURCHASED PART	PRINCE METAL PRODUCTS
30019611	GUSSET	PARALLELISM

LSL: 0.0000 AVG: 0.3893 NOM: 0.7500 USL: 1.5000



σ = 0.2339	Cp = 1.0687	Pzu is negligible
X-3σ = -0.3125	Cr = 0.9357	Pzl = 0.0485
X+3σ = 1.0911	Cpk = 0.5548	Assumed Normal (*)

5-2

8/9

AS 279932

Company : NARMCO
Plant : PRINCE METAL PRODUCTS
Desc : GUSSET
Char : PARALLELISM BET C & D

Department: PURCHASED PART
Part # : 30019611
Process ID: PARALLELISM
Frequency : 30 PC STUDY

5-2 9/9

Engineering Specifications

Lower: 0.0000 Nominal: 0.7500 Upper: 1.5000 Units: MM

Descriptive Statistics - 1 to 6

Total Samples:	30	Total Subgroups:	6
Xdbar:	0.6073	Ave Sam/Sub:	5.0000
Rbar:	0.8117		
Sbar:	0.3320	Std Dev (n - 1):	0.4182
Vbar:	0.6100	Variance (n - 1):	0.1749
Skewness:	0.0514	Coeff. of Skewness:	0.7387
Kurtosis:	0.1165	Coeff. of Kurtosis:	4.0744

Control Limit Range 1 - 6: Auto
n = 5 : LCLXbar = 0.1390; Xdbar = 0.6073; UCLXbar = 1.0757
LCLR = 0.0000; Rbar = 0.8117; UCLR = 1.7159

Subgroup:		1	2	3	4	5
Sample	1	0.4500	1.2000	0.1100	0.3600	0.0000
	2	1.0000	0.7000	0.7000	0.8900	0.2100
	3	0.6300	1.0000	0.6000	0.8500	0.1300
	4	1.0000	0.9600	0.0000	0.5000	0.1900
	5	0.8500	0.8000	0.6000	0.1100	0.5900
Sum	:	3.9300	4.6600	2.0100	2.7100	1.1200
Xbar	:	0.7860	0.9320	0.4020	0.5420	0.2240
Range	:	0.5500	0.5000	0.7000	0.7800	0.5900
Date	:					
Time	:					
Code	:					

Subgroup:		6
Sample	1	0.3500
	2	0.1400
	3	1.8900
	4	0.8500
	5	0.5600
Sum	:	3.7900
Xbar	:	0.7580
Range	:	1.7500
Date	:	
Time	:	
Code	:	

AS 279933

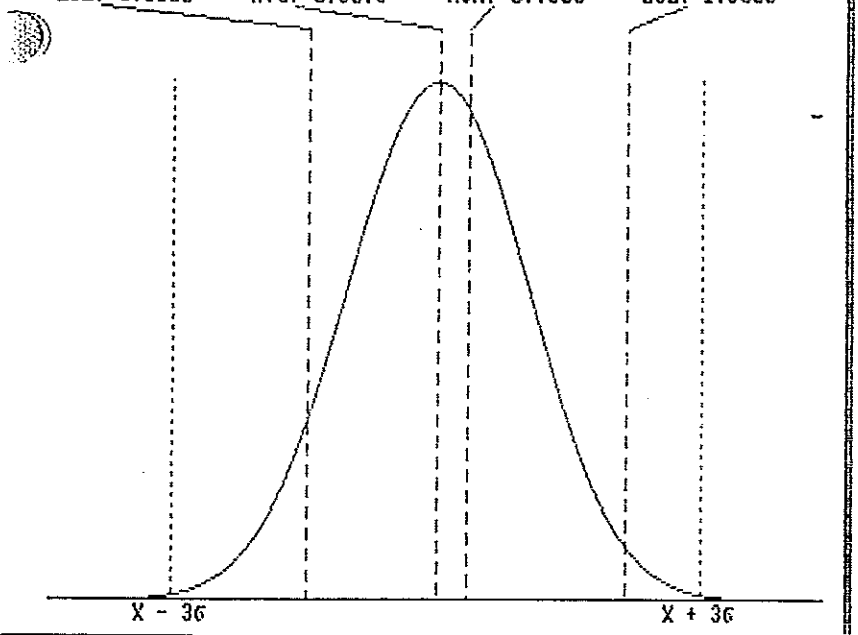
5-3

1/14

ru 20 Jun 1996 6:31:45 am FILE: DIF-CD SIZE: 6

NARMCO	PURCHASED PART	PRINCE METAL PRODUCTS
30019611	GUSSET	PARALLELISM

LSL: 0.0000 AVG: 0.6073 NOM: 0.7500 USL: 1.5000



σ = 0.4182	Cp = 0.5978	Pzu = 0.0166
X-3σ = -0.6473	Cr = 1.6728	Pzl = 0.0735
X+3σ = 1.8619	Cpk = 0.4841	Assumed Normal (*)

N=148

AS 279934

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

5-3

2/14

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED [illegible]

PART NO. 3001961/1

DATE 6-21-96

OPER. "A" DmR   ~~OPER. "B"~~ [illegible]

Gus #1 = gussed by [illegible] without stamp

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

Tank # 173-6-001 Test for weld [illegible] OK to Run

PART	~~OPER. "A"~~ SERIAL #	~~OPER. "B"~~ Gus #1 (No Stamp)	~~OPER. "A"~~ Gus #2 (With Stamp)	OPER. "B"
1	173-6-002	.06	1.00	
2	173-6-003	1.26	.69	
3	173-6-004	.90	.61	
4	173-6-005	.49	.59	
5	173-6-006	.80	.07	
6	173-6-007	.26	.70	
7	173-6-008	.50	1.20	
8	173-6-009	1.30	1.09	
9	173-6-010	1.00	0.30	
10	173-6-011	0.46	0.90	
11	173-6-012	0.70	1.10	
12	173-6-013	0.70	0.60	
13	173-6-014	0.15	1.00	
14	173-6-015	0.05	0.60	
15	173-6-016	0.30	0.15	
16	173-6-017	0.56	0.80	
17	173-6-018	0.70	0.90	
18	173-6-019	0.60	0.90	
19	173-6-020	0.30	0.86	
20	173-6-021	0.90	0.80	

1.29 .99 .73

AS 279935

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

$\bar{x}$ = 0.55   [illegible]   [illegible]

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

5-3

3/14

ATTRIBUTE GAGE USED Parallelism Study

PART NO. 30019611

DATE June 21/96

OPER. "A" Don R. OPER. ~~"B"~~ Clar < 1.5 mil

Gug #1 closest to Failing check Gug without stop

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	~~OPER. "A"~~ Serial #	No Stamp ~~OPER. "B"~~ Gug #1	With Stamp ~~OPER. "A"~~ Gug #2	OPER. "B"
1	173-6-022	0.07	0.80	
2	173-6-023	0.07	1.20	
3	173-6-024	0.70	1.30	
4	173-6-025	0.80	1.00	
5	173-6-026	0.30	0.50	
6	173-6-027	0.16	0.70	
7	173-6-028	0.85	0.25	
8	173-6-029	0.55	0.60	
9	173-6-030	1.00	0.50	
10	173-6-031	0.70	0.50	
11	173-6-032	0.45	0.50	
12	173-6-033	0.40	0.75	
13	173-6-034	0.15	0.65	
14	173-6-035	0.06	0.86	
15	173-6-036	0.55	0.65	
16	173-6-037	0.25	0.30	
17	173-6-038	0.07	1.25	
18	173-6-039	0.90	0.20	
19	173-6-040	0.30	1.00	
20	173-6-041	1.00	0.60	

AS 279936

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

APP. 35C FORM 394 ED

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED _____

5-3

PART NO. _____

4/14

DATE _____

OPER. "A" _____ OPER. "B" _____

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

NO STAMP STAMP

PART	OPER. "A"	OPER. "B"	OPER. "A"	OPER. "B"
1	173-6-042	0.25	1.00	
2	173-6-043	0.30	0.10	
3	173-6-044	0.75	0.28	
4	173-6-045	.80	.95	
5	173-6-046	0.75	0.50	
6	173-6-047	.80	0.22	
7	173-6-048	0.78	0.45	
8	173-6-044	0.23	0.33	
9	173-6-049	0.25	0.45	
10	173-6-051	0.55	0.29	
11	173-6-052	0.58	0.42	
12	173-6-053	0.55	0.37	
13	173-6-054	0.61	0.38	
14	173-6-055	0.24	0.29	
15	173-6-056	0.20	0.24	
16	173-6-057	0.30	0.44	
17	173-6-058	0.30	0.20	
18	173-6-059	0.50	0.35	
19	173-6-060	0.73	0.18	
20	173-6-061	0.45	0.15	

AS 279937

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED HAND HELD CHECKING FIXTURE

5-3

PART NO. 3001J-740

5/14

DATE JUNE 19/96

[redacted]

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.
EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	SERIAL NO.	GUSSET WITH STAMP	~~GUSSET WITHOUT STAMP~~	
141	[illegible]	[illegible]	0.25	
142	[illegible]	[illegible]	0.67	
143	[illegible]	0.82	0.20	
144	[illegible]	0.43	0.44	
145	[illegible]	0.82	0.65	
146	[illegible]	0.12	0.21	
147	[illegible]	0.35	0.55	
148	[illegible]	0.60	0.13	
149	[illegible]	0.13	0.98	
150	[illegible]	0.81	0.82	
151	[illegible]	0.56	0.73	
152	[illegible]	0.50	1.02	
153	[illegible]	0.43	0.61	
154	[illegible]	0.16	0.31	
155	[illegible]	0.21	1.12	
156	[illegible]	0.24	0.61	
157	[illegible]	0.24	0.38	
158	[illegible]	0.24	1.03	
159	[illegible]	0.10	0.30	
160	[illegible]	0.51	0.11	

AS 279938

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED HAND HELD CHECKING FIXTURE

5-3

PART NO. 30018740

6/14

DATE JUNE 19/96

[redacted] [redacted]

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	SERIAL.NO.	GUSSET WITH STAMP GO / NOGO	GUSSET W/OUT STAMP GO / NOGO	
181	[illegible]	~~[illegible]~~	~~0.[illegible]~~	
182	[illegible]	~~[illegible]~~	~~1.10~~	
183	[illegible]	~~.24~~	~~0.77~~	
184	[illegible]	0.20	1.00	
185	[illegible]	0.36	0.48	
186	[illegible]	~~0.13~~	~~0.~~	
187	[illegible]	.68	1.07	
188	[illegible]	0.37	0.85	
189	[illegible]	0.30	0.06	
190	[illegible]	0.04	0.54	
191	[illegible]	0.33	0.82	
192	[illegible]	1.07	1.04	
193	[illegible]	1.03	1.10	
194	[illegible]	1.03	1.33	
195	6-097	0.62	1.06	
196	6-098	0.26	0.36	
197	000	0.46	0.80	
198	[illegible]	0.70	1.21	
199	02	0.66	0.67	
200	03	0.20	0.63	

AS 279939

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

APP. 35C FORM 384 ED $\bar{x}$=0.52 $\bar{x}$=0.75 n=16

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED: HAND HELD CHECKING FIXTURE

53

7/14

PART NO. 3001 8740

DATE: JUNE 19/96

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	SERIAL NO.	GUSSET WITH STAMP GO / NOGO	GUSSET W/OUT STAMP GO / NOGO	
201				
202				
203				
204		.08	0.07	
205				
206		0.75	1.39	
207		0.54	1.17	
208				
209				
210				
211				
212		1.04	1.58	
213		0.95	1.36	
214		0.28	1.01	
215		0.37	1.34	
216		0.22	1.20	
217				
218		0.35	1.22	
219		0.27	0.11	
220		0.2	1.15	

AS 279940

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED HAND HELD CHECKING FIXTURE

PART NO. 30018740 — 5-3 — 8/14

DATE June 19/96

[redacted]

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	SERIAL NO.	GUSSET WITH STAMP GO / NOGO	GUSSET W/OUT STAMP GO / NOGO	
281	[illegible]	0.4	1.41	
282	[illegible]	0.29	1.40	
283	[illegible]	0.23	1.40	
284	[illegible]	0.04	0.56	
285	[illegible]	0.44	1.28	
286	[illegible]	0.34	0.55	
287	[illegible]	0.39	1.21	
288	[illegible]	0.25	1.03	
289	[illegible]	0.05	1.08	
290	[illegible]	0.20	1.00	
291	[illegible]	0.83	1.04	
292	[illegible]	0.37	1.23	
293	[illegible]	0.34	1.59	
294	[illegible]	0.06	0.77	
295	[illegible]	0.58	0.11	
296	[illegible]	0.21	0.34	
297	[illegible]	0.92	0.39	
298	[illegible]	0.05	1.18	
219	[illegible]	1.30	0.85	AS 279941
300	[illegible]	0.75	0.11	

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

APP. 35C FORM 334 EPI $\bar{X}$ = 0.40 $\bar{X}$ = 0.92 N = [illegible]

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED _____

PART NO. 3001 19611 — 5-3 / 9/14

DATE 6-23-96

OPER. "A" _____ OPER. "B" < 1.5 mm

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	OPER. "A"	~~OPER. "B"~~	~~OPER. "A"~~	OPER. "B"
1	173-6-145	0.43	0.80	
2	173-6-146	0.27	1.38	
3	173-6-147	0.35	1.68	
4	173-6-148	0.51	1.61	
5	173-6-149	0.14	0.64	
6	173-6-150	0.20	0.48	
7	173-6-147	0.70	0.45	
8	174-6-002	1.20	0.85	
9	174-6-003	0.75	1.00	
10	174-6-004	0.95	0.90	
11	174-6-005	0.60	0.65	
12	174-6-006	0.75	0.70	
13	174-6-007	0.20	1.00	
14	174-6-008	0.50	0.40	
15	174-6-009	0.95	0.80	
16	174-6-010	0.35	0.85	
17	174-6-011	0.90	0.80	
18	174-6-012	0.50	1.10	
19	174-6-013	0.06	0.60	
20	174-6-014	0.35	0.40	

AS 279942

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

$\bar{X} = 0.53$ $\bar{X} = 0.84$

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED _____ 5-3

PART NO. _____ 12/14

DATE _____

OPER. "A" _____ OPER. "B" _____

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

No Stamp Stamp

PART	OPER. "A" Serial #	OPER. "B" Bus #1	OPER. "A" Bus #2	OPER. "B"
1	174-6-017	0.80	0.95	
2	174-6-018	0.35	1.00	
3	174-6-019	0.08	1.00	
4	174-6-020	0.10	0.15	
5	174-6-021	0.16	0.35	
6	174-6-022	0.30	0.85	
7	174-6-023	0.06	1.00	
8	174-6-024	0.08	1.30	
9	174-6-025	0.30	0.70	
10	174-6-026	0.25	0.15	
11	174-6-027	0.30	1.00	
12	174-6-028	0.50	0.70	
13	174-6-030	0.40	0.65	
14	174-6-029	0.10	0.80	
15	174-6-031	0.25	0.90	
16	174-6-032	0.05	0.65	
17	174-6-033	0.70	0.40	
18	174-6-034	0.75	0.65	
19	174-6-035	0.65	0.60	
20	174-6-036	0.65	0.60	

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

>=0.30 >=0.85

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

AS 279943

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

5-3

11114

ATTRIBUTE GAGE USED ________

PART NO. ________

DATE JUNE 22 /96

OPER. "A" ________ OPER. "B" < 1.5 mm

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	OPER. "A" Sus'd *	OPER. "B" (No Stamp) Gus *1	OPER. "A" (Stamp) Gus *2	OPER. "B"
1	174-6-038	0.25	0.10	
2	174-6-040	0.03	0.75	
3	174-6-039	0.11	0.85	
4	174-6-042	0.79	0.28	
5	174-6-043	0.85	0.10	
6	174-6-044	0.52	0.12	
7	174-6-045	0.42	0.27	
8	174-6-046	1.03	0.15	
9	174-6-047	1.48	0.21	
10	174-6-048	1.47	0.15	
11	174-6-04[illegible]	0.78	0.19	
12	174-6-050	0.30	0.13	
13	174-6-051	0.49	0.19	
14	174-6-052	0.67	0.49	
15	174-6-053	0.44	0.14	
16	174-6-054	0.43	0.09	
17	174-6-055	0.61	0.09	
18	174-6-056	0.50	0.14	
19	174-6-057	0.69	0.22	
20	174-6-058	0.10	0.21	

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

$\bar{X}$ = 0.60 $\bar{X}$ = 0.24

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY (R&R)

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED _____

PART NO. _____ S-3 1-2/14

DATE _____

OPER. "A" _____ OPER. "B" _____

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

Serial # No Stamp Shank

PART	~~OPER. "A"~~	OPER. "B"	OPER. "A"	OPER. "B"
1	175-6-009	0.15	0.80	
2	175-6-007	1.00	0.16	
3	175-6-010	0.02	0.60	
4	175-6-011	0.25	0.45	
5	175-6-012	0.40	0.75	
6	175-6-013	0.12	0.62	
7	175-6-014	0.45	0.40	
8	175-6-015	0.45	0.10	
9	175-6-016	0.70	0.31	
10	175-6-018	0.40	0.65	
11	175-6-019	1.20	0.86	
12	175-6-021	0.55	0.60	
13	175-6-020	0.78	0.90	
14	175-6-023	0.30	0.23	
15	175-6-025	0.80	0.60	
16	175-6-022	0.70	0.50	
17	175-6-024	0.65	0.40	
18	175-6-026	0.85	0.60	
19	175-6-027	0.80	0.60	
20	175-6-028	0.40	0.90	

AS 279945

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

$\bar{x} = 0.52$ $\bar{x} = 0.51$ $n = 20$

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED ________________________

PART NO. 30018740 < 15mm

DATE JUNE 22/96 5-3 13114

OPER. "A" NO STAMP OPER. "B" STAMP

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	OPER. "A" SERIAL #	NO STAMP OPER. "B"	STAMP OPER. "A"	OPER. "B"
1	174-6-059	0.11	0.63	
2	174-6-060	1.22	0.22	
3	174-6-061	1.00	0.02	
4	174-6-062	0.26	0.18	
5	174-6-063	0.23	0.37	
6	174-6-064	0.36	0.23	
7	174-6-066	1.01	0.12	
8	174-6-067	0.63	0.40	
9	174-6-068	0.80	0.10	
10	174-6-069	0.39	0.24	
11	174-6-070	0.37	0.28	
12	174-6-071	0.24	0.32	
13	174-6-072	0.61	0.36	
14	174-6-073	0.08	0.58	
15	174-6-074	0.98	0.08	
16	174-6-075	0.47	0.14	
17	174-6-076	0.85	0.30	
18	174-6-077	1.01	0.69	
19	174-6-078	0.12	0.16	
20	174-6-079	0.89	0.70	

AS 279946

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

174-6-080 0.06 [illegible] 0.54 [illegible]

FAILURE PREVENTION ANALYSIS PROGRAM

ATTRIBUTE GAGE STUDY

EXHIBIT QPM 4.20 E

ATTRIBUTE GAGE USED _____

PART NO. _____ 5-3 1-7/14

DATE _____

OPER. "A" _____ OPER. "B" _____

THE STUDY IS CONDUCTED BY TWO OPERATORS USING THE SAME 20 PARTS WHICH WERE SELECTED AT RANDOM AND IDENTIFIED 1 THROUGH 20.

EACH OPERATOR GAUGES EACH PART AND ENTERS DATA BELOW.

PART	~~OPER. "A"~~	~~OPER. "B"~~	~~OPER. "A"~~	OPER. "B"
1	175-6-031	0.25	0.60	
2	175-6-030	0.50	0.70	
3	175-6-032	0.40	1.10	
4	175-6-034	0.35	0.80	
5	175-6-036	0.85	0.65	
6	175-6-038	0.70	0.10	
7	175-6-039	0.70	1.30	
8	175-6-040	0.15	0.95	
9	175-6-041	0.10	0.50	
10	175-6-042	0.10	0.20	
11	175-6-037	0.60	1.30	
12	175-6-033	0.40	1.20	
13	175-6-035	0.40	0.90	
14	175-6-043	0.50	1.00	
15	175-6-044	0.25	0.40	
16	175-6-045	1.05	0.60	
17	175-6-047	0.65	0.25	
18	175-6-046	0.25	0.55	
19	175-6-047	0.60	0.15	
20	175-6-048	0.05	0.30	

THE GAGE IS ACCEPTABLE IF ALL MEASUREMENTS DECISIONS (4 PER PART) AGREE.

IF THE MEASUREMENT DECISIONS DO NOT AGREE, AN ACCEPTABLE ALTERNATE MEASUREMENT SYSTEM SHOULD BE USED TO MEASURE THE CHARACTERISTIC.

$\bar{X}$=0.44 $\bar{X}$=0.68

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

AS 279947

T-2-A page 1/2

PART IN PROCESS OPERATION SHEET

DATE : 04/15/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

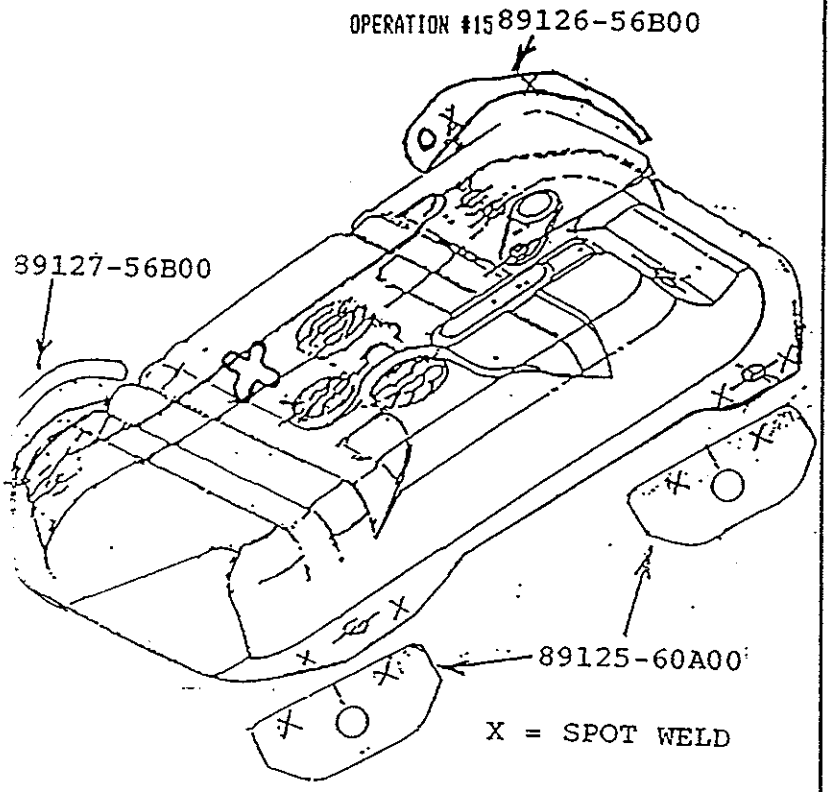
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018740
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI E.C.N.
MACHINE No.:
ECL. : 77E-1647

OPERATION DESCRIPTION: SPOT WELD GUSSETS 2 P/N 89125-60A00, 1 - P/N 89126-56B00, 1 - P/N 89127-56B00 TO TANK
(2 SPOT WELDS FOR EACH GUSSET)

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%. ←
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 4-27-96

AS 279948

ISSUED BY: MINDEE MINOS
PLANT QUALITY MANAGER:

REVISION LEVEL : "1"
REASON: NEW PUMP P/N 30018726

FILE: OPT-15

ENGINEERING APPROVAL
CORPORATE Q.A. MANAGER
PLANT MANAGER

PART IN PROCESS OPERATION SHEET

7-2-A page 2/2

DATE : 04/15/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018740
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI E.C.N.
MACHINE No.:
ECL. : 77E-1647

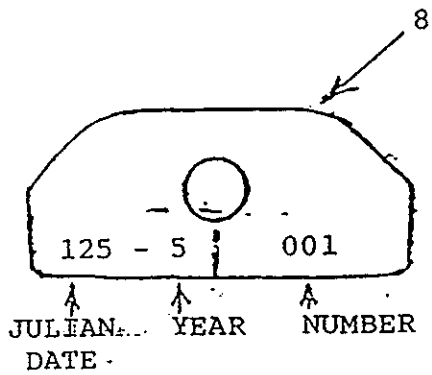
OPERATION DESCRIPTION: OPERATOR STAMPS JULIAN DATE, YEAR AND NUMBER TANK INTO P/N 89125-60A00 (GUSSET)

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION

OPERATION #14



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%. ←
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 4-27-96

AS 279949

REVISION LEVEL : "1"
REASON: NEW PUMP P/N 30018726

ISSUED BY: MINDEE MINOS
PLANT QUALITY MANAGER: H. Taggart

FILE: OPT-14

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

PART IN PROCESS OPERATION SHEET

7-2-B

DATE : 01/12/96

1/17

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268

PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN

MACHINE No.:
ECL. : Y09-1731

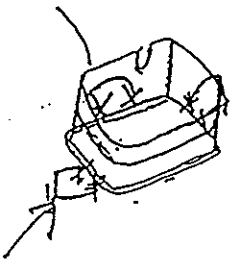
OPERATION DESCRIPTION: SPOT WELD 2 BRACKETS P/N 89177-61A00 (4 WELDS), AND 1 P/N 89176-61A00 (2 WELDS) TO OUTER POT P/N 89171-61A00

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION

89176-61A00



89177-61A00

89177-61A00

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279950

PART

REVISION LEVEL : "0"
REASON: INITIAL

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER

FILE: OPT-1

ENGINEERING APPROVAL CORPORATE Q.A. MANAGER PLANT MANAGER

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

T-2-B 2/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

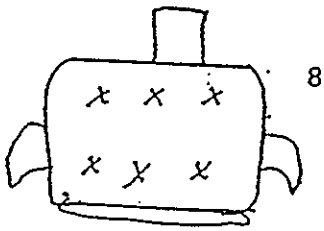
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: INSTALL INNER CAN P/N 89172-56B00 ONTO MACHINE. WELD OUTER POT P/N 89171-61A00 TO INNER POT - 6 SPOT WELDS 89171-61A00

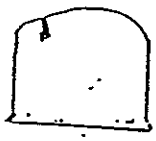
STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



89171-61A00
OUTER POT



89172-56B00
INNER POT

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279951

A PART

REVISION LEVEL : "0"
REASON: INITIAL

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: G. Taggart

FILE: OPT-2

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 3/M

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731

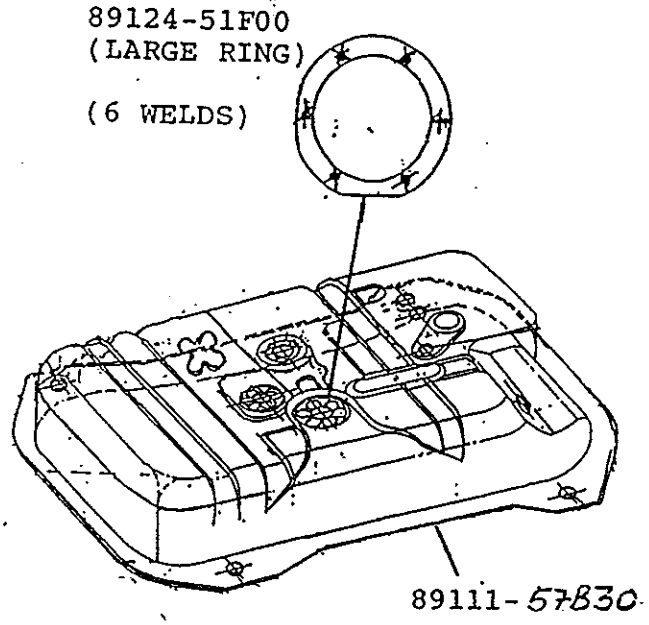
OPERATION DESCRIPTION: SPOT WELD P/N 89124-51F00 (LARGE RING) TO P/N 89111-57B30 UPPER HALF) 6 SPOT WELDS

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION

OPERATION #1



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279952

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

PART

REVISION LEVEL : "0"
REASON: INITIAL

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: J. Taggart

FILE: OPT-3

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 4/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "Ø DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731

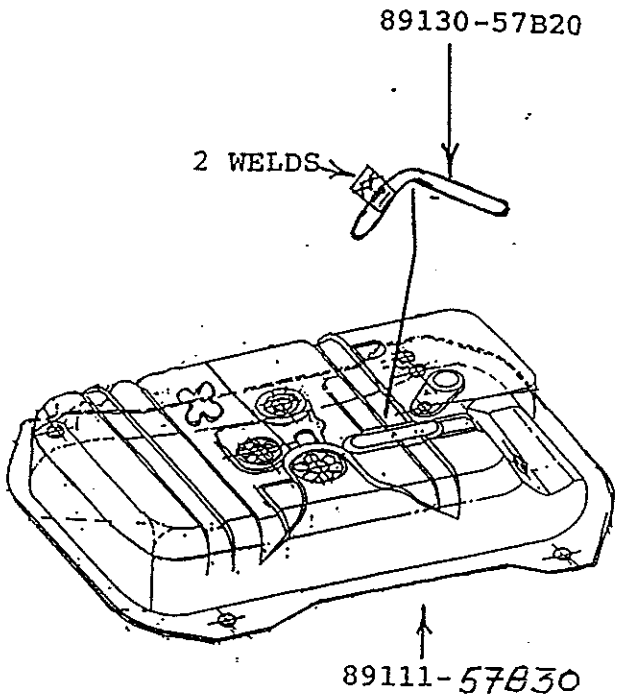
OPERATION DESCRIPTION: SPOT WELD P/N 89130-57B20 (BREATHER PIPE) FROM INSIDE OF P/N 89111-57B30 (UPPER HALF) - 2 SPOT WELDS ON THE BRACKET

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION

OPERATION #2



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279953

PART

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-4

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: G. Taggart

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 5/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268

PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN

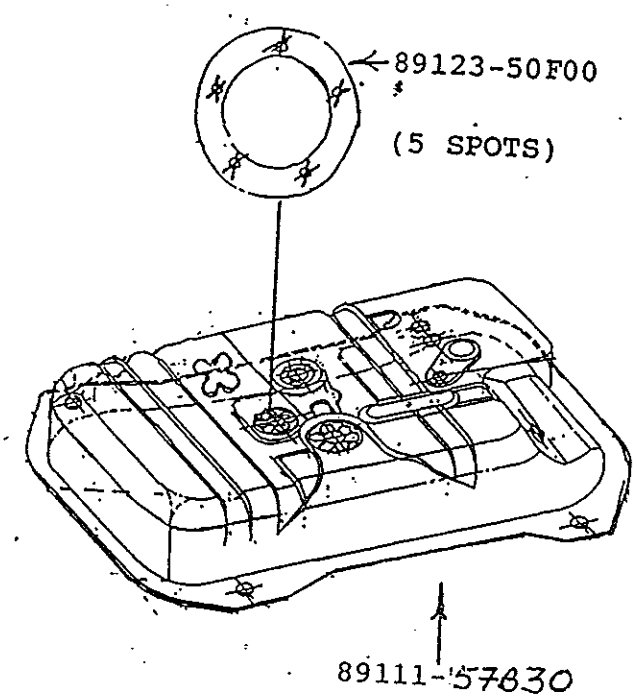
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: SPOT WELD P/N 89123-50F00 (MEDIUM RING) TO P/N 89111-57B30 (UPPER HALF) 5 SPOT WELDS

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279954

1 PART

ISSUED BY: MINDEE MINOS

PLANT QUALITY MANAGER: 1-15-96

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-5

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 6/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

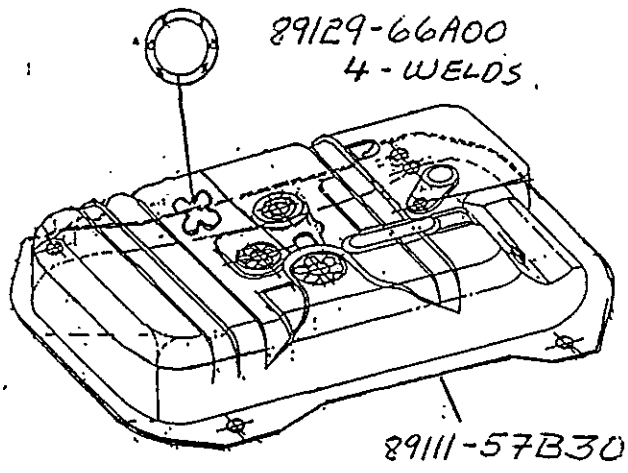
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: PROJECTION WELD P/N 89129-66A00 (P-SENSOR RING) TO P/N 89111-57B30 (UPPER HALF) - 4 SPOT WELDS THE BRACKET

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279955

Ⓐ PART

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-6

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: M. Taggart

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B

7/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268

PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN

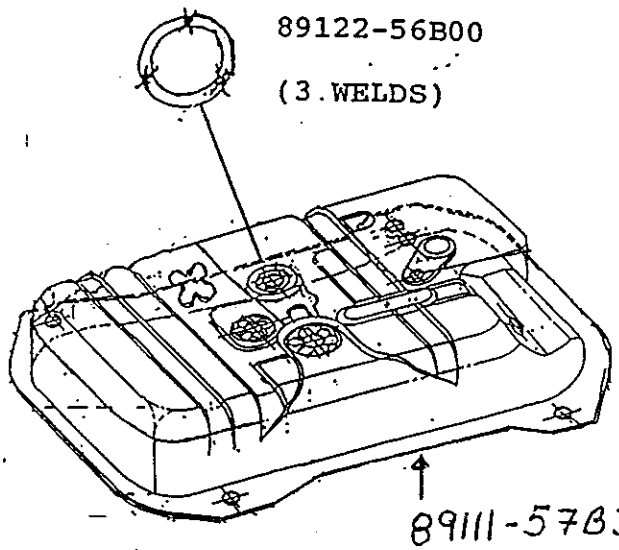
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: SPOT WELD P/N 89122-56B00 (SMALL RING) TO P/N 89111-57B30 (UPPER HALF) 3 SPOT WELDS

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279956

Ⓐ PART

ISSUED BY: MINDEE MINOS

PLANT QUALITY MANAGER: M. Taggart

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-7

ENGINEERING APPROVAL

CORPORATE Q.A. MANAGER

PLANT MANAGER

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B

8/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

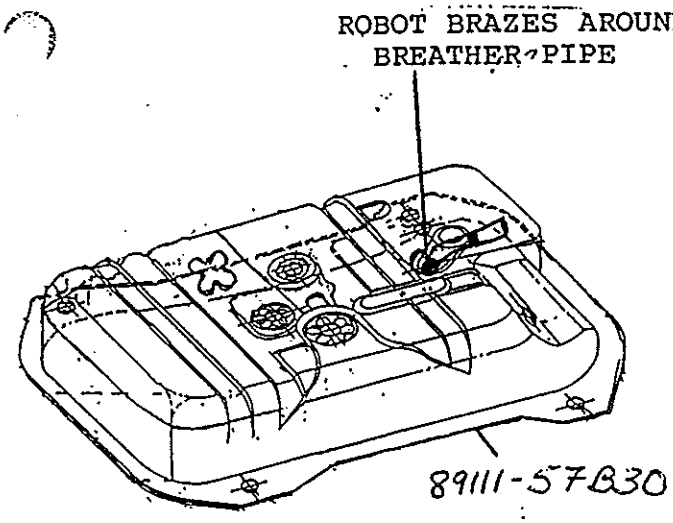
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: OPERATOR INSTALL TANK HALF UPPER P/N 89111-57B30 ON BRAZE TABLE. PROPERLY CLAMPING SIDES DOWN, ROBOT BRAZES AROUND P/N 89130-57B20 (BREATHER PIPE)

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279957

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS

1-15-96

Ⓐ PART

ISSUED BY: MINDEE MINOS
PLANT QUALITY MANAGER: M. Taggart
REVISION LEVEL : "0"
REASON: INITIAL
FILE: OPT-8

ENGINEERING APPROVAL
CORPORATE Q.A. MANAGER
PLANT MANAGER

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

1-2-B 7/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268

PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN

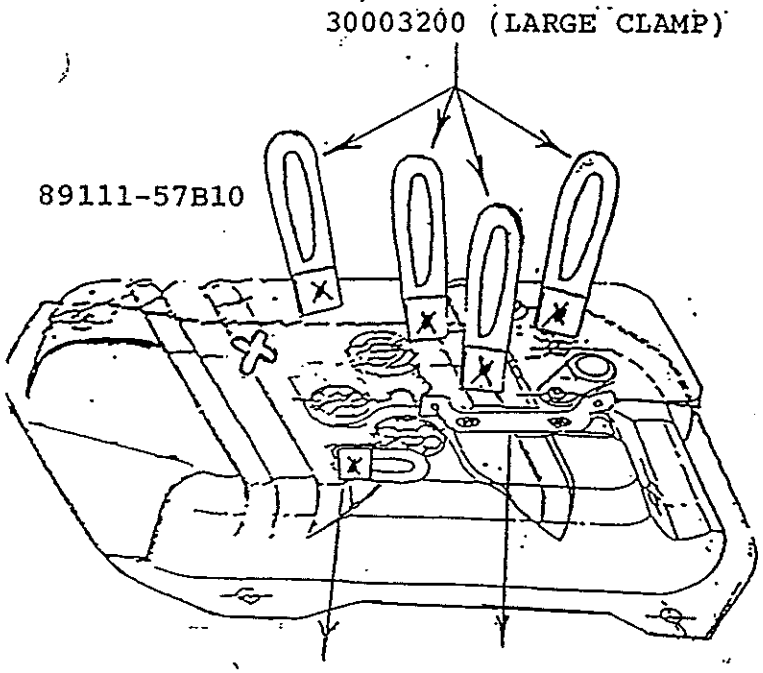
MACHINE No.:
ECL. : Y09-1731.

OPERATION DESCRIPTION: SPOT WELD 4 P/N 30003200 (LARGE CLAMPS) (1 WELD EACH CLAMP), 1 P/N 30001095 (SMALL CLAMP) (1 WELD), AND 1 P/N 89178-60A00 (VAPOUR SEP BRACKET) TO P/N 89111-57B30 (UPPER HALF) (2 WELDS) ** PRY TEST EACH WELD!

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279958

PART

REVISION LEVEL : "0"
REASON: INITIAL

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER:

FILE: OPT-9

ENGINEERING APPROVAL CORPORATE Q.A. MANAGER PLANT MANAGER

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B

DATE : 01/12/96

10/17

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268

PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN

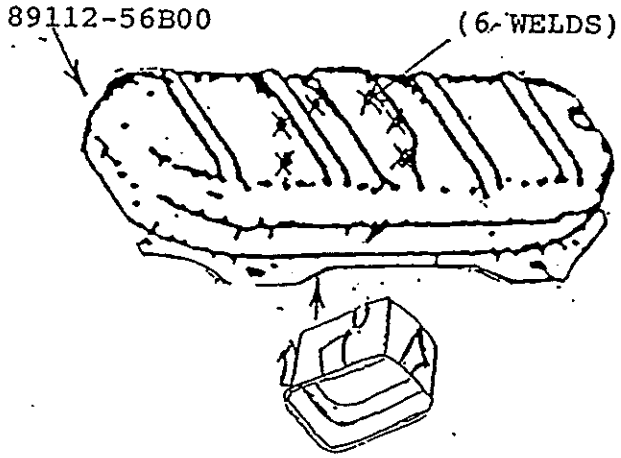
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: OPERATOR WELDS ASSEMBLED VESSELS (89170-56B00) INTO P/N 89112-56B00 (TANK LOWER) ** 6 SPOT WELDS

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



ASSEMBLED CAN

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279959

REVISION LEVEL : "0"
REASON: INITIAL

ISSUED BY: MINDEE MINOS

PLANT QUALITY MANAGER: G. Taggart

FILE: OPT-10

ENGINEERING APPROVAL

CORPORATE Q.A. MANAGER

PLANT MANAGER

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 11/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

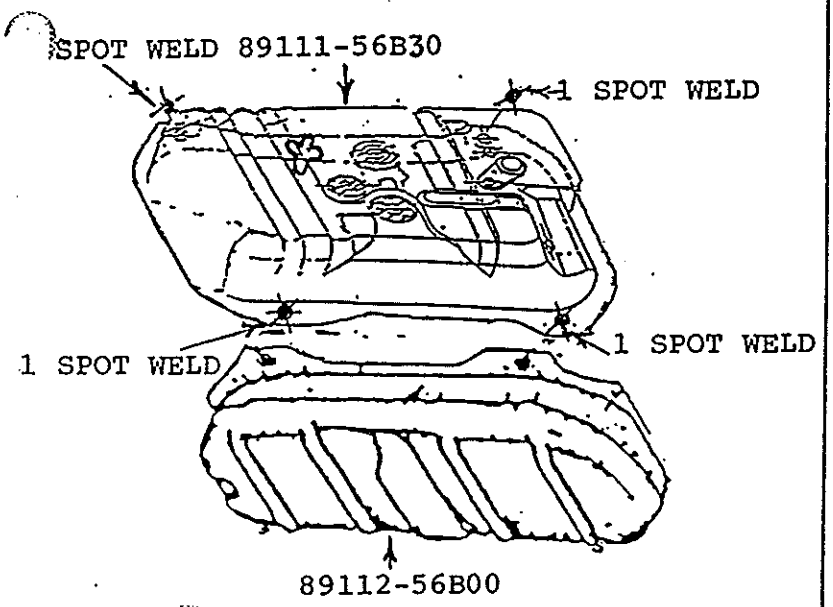
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731.

OPERATION DESCRIPTION: SPOT WELD P/N 89111-56B30 (TANK UPPER) TO P/N 89112-56B00 TANK LOWER) (4 SPOT WELDS)

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: J. Taggart

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279960

A PART

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-11

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 12/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

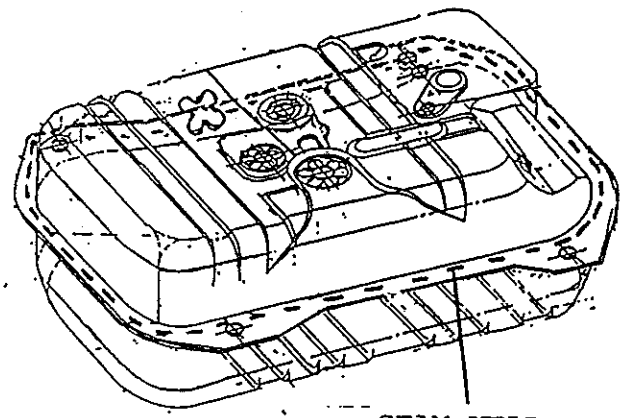
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: TANK IS INSTALLED IN SEAM WELDER AND SEAMED ALONG EDGE OF TANK ALL AROUND. SEAM WELD FUSION OF BOTH HALVES. P/N 89111-57B30 (TANK UPPER) AND P/N 89112- 56B00 (TANK LOWER)

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.
7. FILL OUT CIRCLE A REPORT EACH SHIFT

AS 279961

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

PART

REVISION LEVEL : "0"
REASON: INITIAL

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: M. Taggart

FILE: OPT-12

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B

DATE : 01/12/96

13/17

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "Ø DEFECTS"

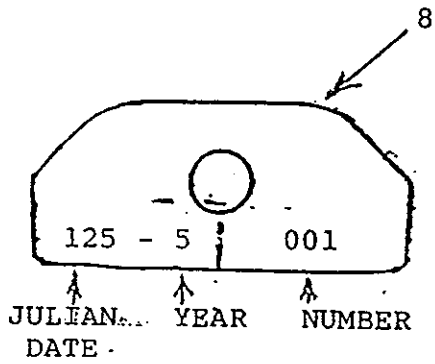
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731.

OPERATION DESCRIPTION: OPERATOR STAMPS JULIAN DATE, YEAR AND NUMBER TANK INTO P/N 89125-60A00 (GUSSET)

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279962

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

Ⓐ PART

REVISION LEVEL : "0"
REASON: INITIAL

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: M. Taggart

FILE: OPT-14

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 14/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

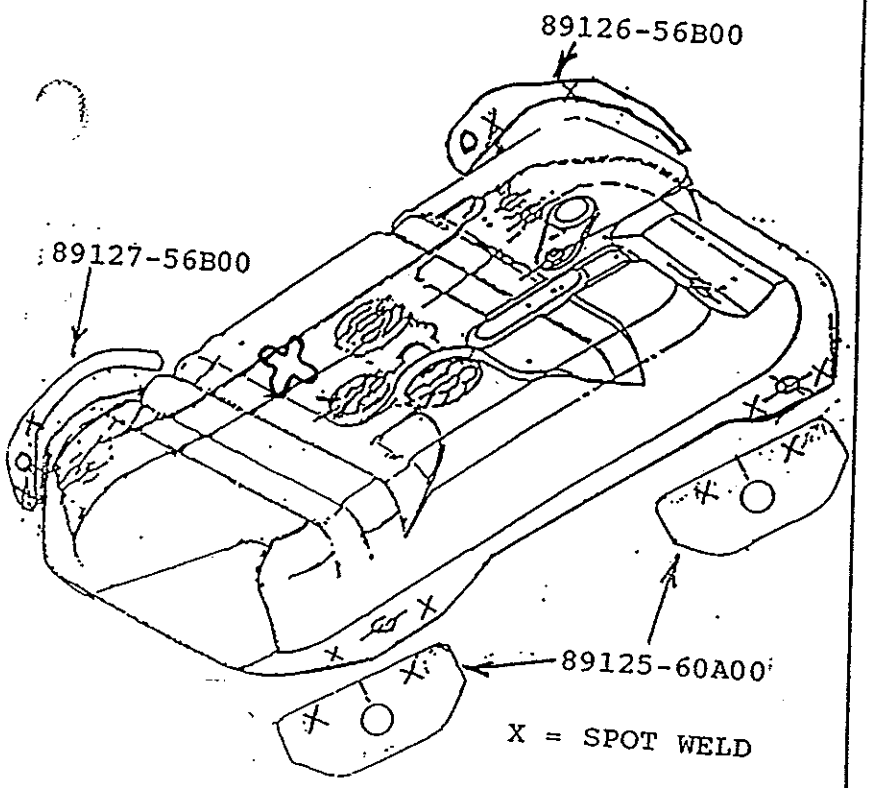
COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268
PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: SPOT WELD GUSSETS 2 - P/N 89125-60A00, 1 - P/N 89126-56B00, 1 - P/N 89127-56B00 TO TANK (2 SPOT WELDS FOR EACH GUSSET)

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279963

Ⓐ PART

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: M. Taggart

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-15

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B

DATE : 01/12/96

15/17

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268

PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN

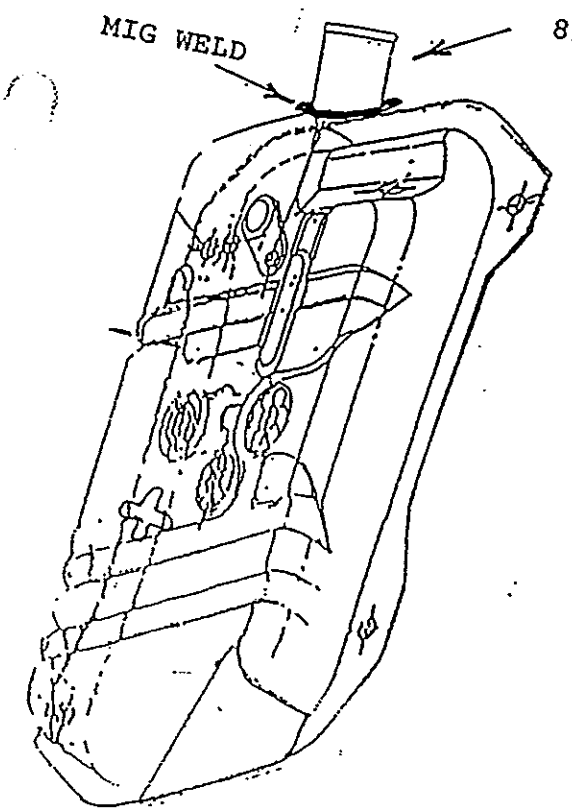
MACHINE No.:
ECL. : Y09-1731 .

OPERATION DESCRIPTION: OPERATOR INSERTS FUEL INLET PIPE P/N 89121-82000 INTO TANK. MIG ROBOT MIG WELDS ALL AROUND PIPE.

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279964

Ⓐ PART

ISSUED BY: KINDEE MINOS

PLANT QUALITY MANAGER: 1-15-96

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-13

ENGINEERING APPROVAL

CORPORATE Q.A. MANAGER

PLANT MANAGER

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B 16/17

DATE : 01/12/96

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30018268

PART NAME : 4 DOOR GAS TANK ASSEMBLY 96
BLUEPRINT DATE : CAMI ECN

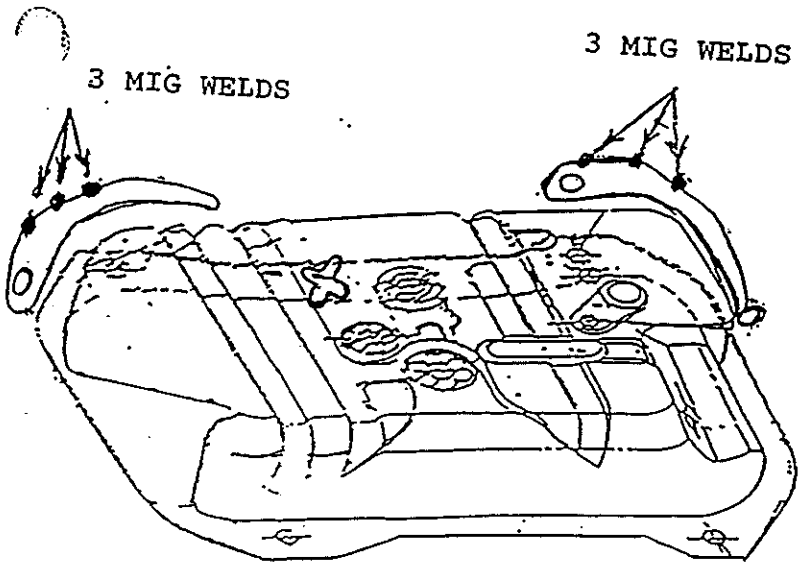
MACHINE No.:
ECL. : Y09-1731

OPERATION DESCRIPTION: OPERATOR PLACES TANK ON MIG ROBOT FIXTURE. ROBOT MIG WELDS 3 SPOTS ON EACH GUSSET P/N 89126-56B00 AND P/N 89127-56B00

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 1-15-96

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279965

Ⓐ PART

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: H. Taggart

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-16

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-B

DATE : 01/12/96

17/17

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "Ø DEFECTS"

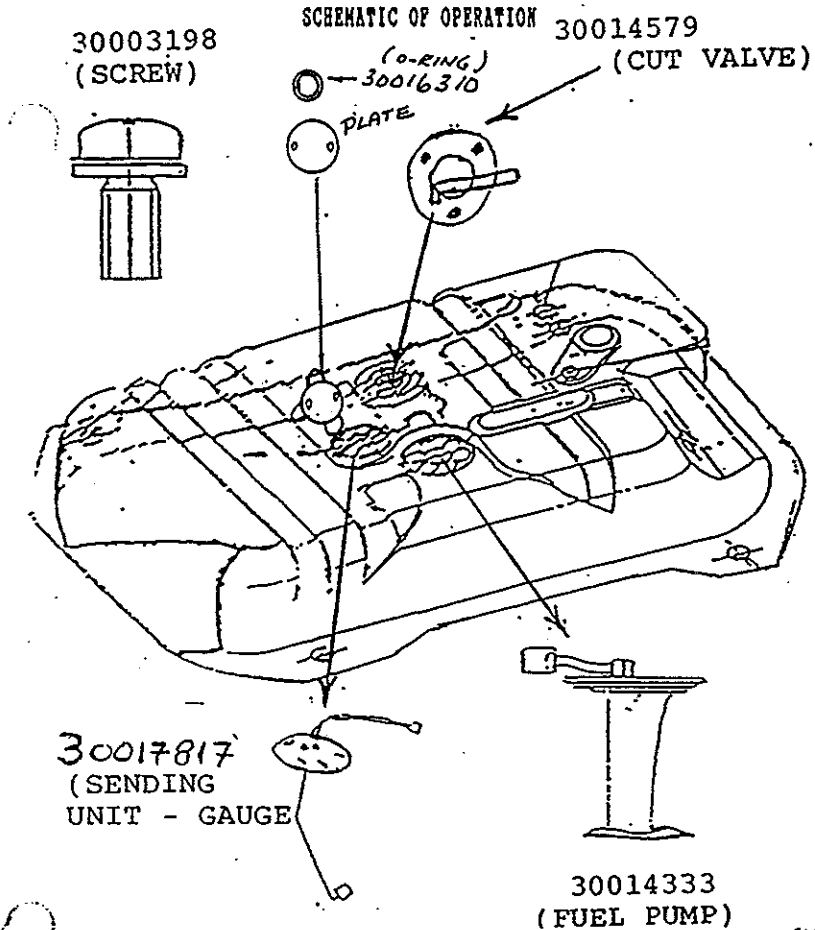
COMPANY : CAMI AUTOMOTIVE	PART NAME : 4 DOOR GAS TANK ASSEMBLY 96	MACHINE No.:
PART NUMBER : 30018268	BLUEPRINT DATE : CAMI ECN	ECL. : Y09-1731

OPERATION DESCRIPTION: INSTALL P/N 30017817 (SENDING UNIT) (5 SCREWS), P/N 30014333 (FUEL PUMP) (6 SCREWS). AND P/N 30014579 (CUT VALVE) (3 SCREWS) TO TOP OF TANK. **SCREWS P/N 30003198, 30016310 (O-RING) FLAT PLATE (2 SCREWS) AND PROPERLY MASK TANK AS PER CONTROL PLAN FOR LEAK TESTER.

STANDARD RULES : 1 - OPERATOR IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - OPERATOR IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

AS 279966

Ⓐ PART

REVISION LEVEL : "0"
REASON: INITIAL

FILE: OPT-17

ISSUED BY: MINDEE MINOS PLANT QUALITY MANAGER: M Taggart 1-15-96

ENGINEERING APPROVAL _____ CORPORATE Q.A. MANAGER _____ PLANT MANAGER _____

CUSTOMER COMPLAINTS TO BE ITEMIZED ON BACK OF SHEET :

PART IN PROCESS OPERATION SHEET

7-2-C page 1/2

DATE : 03/07/97

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30019886

PART NAME : 4 DOOR GAS TANK ASSEMBLY
BLUEPRINT DATE : 06/12/96

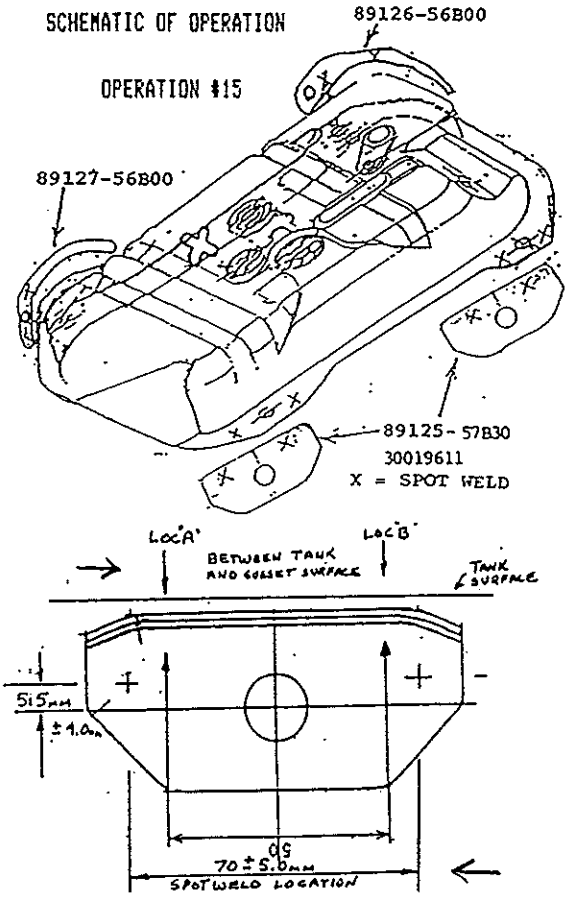
MACHINE No.:
ECL. : 60A-9380

OPERATION DESCRIPTION: SPOT WELD GUSSETS 2 - P/N 30019611 (89125-57B30), 1 - P/N 89126-56B00, 1 - P/N 89127-56B00 TO TANK (2 SPOT WELDS FOR EACH GUSSET)

STANDARD RULES : 1 - PRODUCTION IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - PRODUCTION IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION



VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 3-13-97

OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%. ←
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

A PART

AS 279967

REVISION LEVEL : "3"
REASON: NEW ECL

FILE: OPT-15

ISSUED BY: KATHLEEN SCOTT PLANT QUALITY MANAGER:

ENGINEERING APPROVAL CORPORATE Q.A. MANAGER PLANT MANAGER

7-2-C page 2/2

PART IN PROCESS OPERATION SHEET

DATE : 03/07/97

OPERATOR & SAFETY INSTRUCTION : 1 - MUST WEAR SAFETY SHOES, EAR PLUGS, ARM GUARDS, SAFETY GLASSES AND GLOVES
2 - CHECK : A) WORK AREAS MUST BE FREE OF OIL AND DEBRIS.
B) ALL GUARDS IN THEIR PROPER POSITION.
C) SELECTOR SWITCHES LOCKED IN PROPER POSITION.
D) DIE CLAMPS TIGHT AND FREE OF FOREIGN OBJECTS.
E) PRESS AND PALM BUTTON CHECK.

ACCEPTANCE CRITERIA "0 DEFECTS"

COMPANY : CAMI AUTOMOTIVE
PART NUMBER : 30019888
PART NAME : 4 DOOR GAS TANK ASSEMBLY
BLUEPRINT DATE : 06/12/96
MACHINE No.:
ECL. : 60A-9380

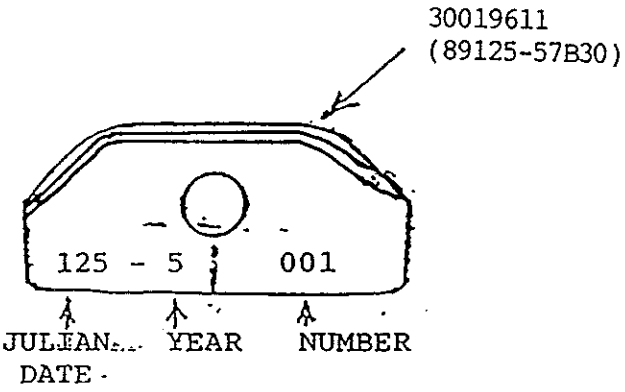
OPERATION DESCRIPTION: OPERATOR STAMPS JULIAN DATE, YEAR AND NUMBER TANK INTO P/N 30019611 (89125-57B30) GUSSET.

STANDARD RULES : 1 - PRODUCTION IS RESPONSIBLE FOR PRODUCING QUALITY PARTS IN STATISTICAL CONTROL.
2 - PRODUCTION IS RESPONSIBLE FOR COMPLETING CONTROL CHARTS ACCORDING TO THE CONTROL PLAN.
3 - IF PROCESS IS OUT OF STATISTICAL CONTROL, CONDUCT THE FOLLOWING
A) SHUT PROCESS DOWN.
B) CONTACT YOUR SUPERVISOR.
C) WRITE THE PROBLEM AND / OR CAUSE ON THE CONTROL CHARTS.
D) WRITE CORRECTIVE ACTION ON CONTROL CHART.
E) SORT PRODUCTION 100 % FROM LAST GOOD CHECK WITHIN BLUEPRINT SPECIFICATION.

* ALL REPAIRS & REWORK SHALL BE RE-INSPECTED AS PER PART QUALITY PLAN

SCHEMATIC OF OPERATION

OPERATION #14



OPERATOR TO CHECK

1. FILL OUT THE MACHINE LOG AT THE START OF SHIFT.
2. FILL OUT LOT TRACEABILITY.
3. FILL OUT INPROCESS CHECKS AS PER CONTROL PLAN.
4. COMPARE TO MASTER SAMPLE.
5. PRY TEST 100%.
6. VISUAL CHECK FOR RUST, MISFORMED, SPLITS, AND BURRS - NONE ALLOWED.

(A) PART

VERIFY CONTAINERS FOR DEBRIS/DAMAGE/LABELS 3-13-97

AS 279968

ISSUED BY: KATHLEEN SCOTT PLANT QUALITY MANAGER: G. Taggart

REVISION LEVEL : "3"
REASON: NEW ECL

FILE: OPT-14

ENGINEERING APPROVAL [signature] CORPORATE Q.A. MANAGER [signature] PLANT MANAGER [signature]

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30018740 (89019-57B62)

B/P Date : CAMI E.C.N.

Level : 77E-1647

Customer : CAMI AUTOMOTIVE

Date Submitted : APRIL 22, 1996

REVISION LEVEL: "1" NEW PUMP P/N 30018726

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
1		PROJECTION WELD (2) P/N 08315-01059 WELD NUTS 5 MM TO P/N 89178-60A00 BRACKET	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
2		SPOT WELD P/N 89176-61A00 & P/N 89177-61A00 BRACKETS TO P/N 89171-61A00 OUTER VESSEL 6 SPOTS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
3		SPOT WELD P/N 89172-56B00 INNER VESSEL TO P/N 89171--61A00 OUTER VESSEL 6 SPOTS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
4		SPOT WELD P/N 89124-51F00 (LARGE RING) TO P/N 89111-57B30 (UPPER HALF) (6 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
5		SPOT WELD P/N 89130-57B20 (BREATHER PIPE) TO P/N 89111-57B30 (UPPER HALF) (2 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
6		SPOT WELD P/N 89123-50F00 (MEDIUM RING) TO P/N 89111-57B30 (UPPER HALF) (5 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
7		SPOT WELD P/N 89129-66A00 (SMALL RING) TO P/N 89111-57B30 (TANK UPPER) (4 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
8		SPOT WELD P/N 89122-56B00 (CUT VALVE RING) TO P/N 89111-57B30 (3 SPOTS)	CORRECT TANK NUMBER, YEAR, AND JULIAN DATE	OPERATOR KNOWLEDGE
9		BRAZE WELD AROUND P/N 89130-57B20 (BREATHER PIPE)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED.

AS 279969

CORPORATE QUALITY MANAGER: [signature] 96-5-7
CORPORATE ENGINEERING: [signature] 5/1/96
PLANT MANAGER: [signature]
QUALITY MANAGER: [signature]

7-3-A page 1/4

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30018740 (89019-57B62)

B/P Date : CAMI E.C.N.

Level : 77E-1647

Customer : CAMI AUTOMOTIVE

Date Submitted : APRIL 22, 1996

REVISION LEVEL: "1" NEW PUMP P/N 30018726

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
10		SPOT WELD P/N 89170-56B00 (CAN ASSEMBLY) TO P/N 89112-56B00 TANK LWR- 6 SPOT WELDS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
11		SPOT WELD (4) P/N 30003200 (LARGE CLAMP) TO P/N 89111-57B30 (UPPER HALF) (1 SPOT WELD EACH CLAMP)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
12		SPOT WELD (1) P/N 30001095 (SMALL CLAMP) TO P/N 89111-57B30 (TANK UPPER) (1 SPOT)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
13		SPOT WELD P/N 89178-60A00 (LARGE BRKT) TO P/N 89111-57B30 (UPPER HALF) (2 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
14		SPOT WELD P/N 89111-57B30 (UPPER HALF) TO P/N 89112-56B00 (LOWER HALF) (4 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
15		SEAM WELD P/N 89111-57B30 (UPPER HALF) TO P/N 89112-56B00 (LOWER HALF) TOGETHER	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
16		MIG WELD P/N 89121-82000 (FUEL INLET PIPE) TO UPPER TANK ASSEMBLY	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
17		STAMP LOT TRACEABILITY ONTO P/N 89125-60A00 (GUSSET)	CORRECT TANK NUMBER, YEAR, AND JULIAN DATE	OPERATOR KNOWLEDGE
18		SPOT WELD 2 P/N 89125-60A00, 1 P/N 89126-56B00 AND 1 P/N 89127-56B00 GUSSETS TO TANK (2 SPOTS EACH GUSSET)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED

AS 279970

CORPORATE QUALITY MANAGER 98-5-1

CORPORATE ENGINEERING 4/10/

PLANT MANAGER

QUALITY MANAGER 4-27-96

7-3-A page 2/4

003

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30018740 (89019-57862)

B/P Date : CAMI E.C.N.

Level : 77E-1647

Customer : CAMI AUTOMOTIVE

Date Submitted : APRIL 22, 1996

REVISION LEVEL: "1" NEW PUMP P/N 30018725

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
19		SECURITY MIG P/N 89126-56800 AND P/N 89127-56800 GUSSETS (6) TO TANK ASSEMBLY	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
20		ATTACH P/N 30018726 (FUEL PUMP) TO TANK UPPER - 6 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
21		ATTACH P/N 30017817 (SENDING UNIT) TO TANK UPPER - 5 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
22		ATTACH P/N 30014579 (CUT VALVE) TO TANK UPPER - 3 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
23		INSERT "O" RING AND ATTACH P-SENSOR COVER PLATE	MISSING COMPONENT	OPERATOR KNOWLEDGE
24		INSTALL PROPER MASKING DEVICES AND LEAK TEST	MISSING COMPONENTS	OPERATOR KNOWLEDGE
25		PLACE TANK ON CONVEYOR TO PAINT LINE	DENTS	OPERATOR HANDLING
26		HANG TANK ON PAINT LINE	NONE	NONE
27		PAINT	PAINT THICKNESS	PAINT LINE MAINTENANCE

7-3-A page 3/4

CORPORATE QUALITY MANAGER: 98-5-1

CORPORATE ENGINEERING: 5/1/96

PLANT MANAGER:

QUALITY MANAGER: J. Taggart 4-27-96

File Name : 740FLOW3

Prepared By : M. MINOS

004

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30018740 (89019-57B62)

B/P Date : CAMI E.C.N.

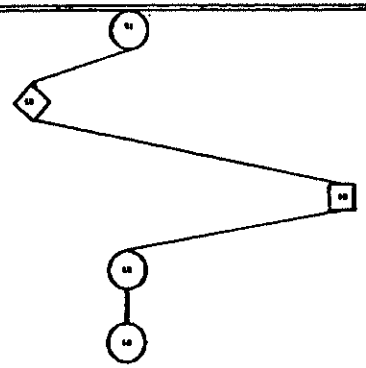
Level : 77E-1647

Customer : CAMI AUTOMOTIVE

Date Submitted : APRIL 22, 1996

REVISION LEVEL: "1" NEW PUMP P/N 30018726

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
28		REMOVE FROM PAINT LINE		
29		TOP DRESS ASSEMBLY AND RE-LEAK TEST	INCOREECT ASSEMBLY, MISSING COMPONENTS	OPERATOR KNOWLEDGE
30		INSPECT AND PACK		
31		MOVE TO SHIPPING DOCK		
32		SHIP TO CAMI		

7-3-A pg 4/4

CORPORATE QUALITY MANAGER: 96-5-1

CORPORATE ENGINEERING: 5/1/96

PLANT MANAGER:

QUALITY MANAGER: 4-27-96

File Name : 740FLDW4

Prepared By : M. MINOS

The Narmco Group - Process Flow Diagram

ACCEPTAN CRITERIA ZERO DEFECTS

ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30018268 (89019-57B61)

B/P Date : CAMI E.C.N.

Level : Y09-1731

Customer : CAMI AUTOMOTIVE

Date Submitted : JANUARY 12, 1996

REVISION LEVEL: "0" INITIAL

(A) PART

Circle – Move (all steps in the system where the object under study moves from one location to another).

Triangle – Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).

Diamond – Fabrication (all steps in the system where the object undergoes a change in form, condition or content).

Square – Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
1	◇	PROJECTION WELD (2) P/N 08315-01059 WELD NUTS 5 MM TO P/N 89178-60A00 BRACKET	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
2	◇	SPOT WELD P/N 89176-61A00 & P/N 89177-61A00 BRACKETS TO P/N 89171-61A00 OUTER VESSEL 6 SPOTS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
3	◇	SPOT WELD P/N 89172-56B00 INNER VESSEL TO P/N 89171--61A00 OUTER VESSEL 6 SPOTS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
4	◇	SPOT WELD P/N 89124-51F00 (LARGE RING) TO P/N 89111-57B30 (UPPER HALF) (6 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
5	◇	SPOT WELD P/N 89130-57B20 (BREATHER PIPE) TO P/N 89111-57B30 (UPPER HALF) (2 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
6	◇	SPOT WELD P/N 89123-50F00 (MEDIUM RING) TO P/N 89111-57B30 (UPPER HALF) (5 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
7	◇	SPOT WELD P/N 89129-66A00 (SMALL RING) TO P/N 89111-57B30 (TANK UPPER) (4 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
8	◇	SPOT WELD P/N 89122-56B00 (CUT VALVE RING) TO P/N 89111-57B30 (3 SPOTS)	CORRECT TANK NUMBER, YEAR, AND JULIAN DATE	OPERATOR KNOWLEDGE
9	◇	BRAZE WELD AROUND P/N 89130-57B20 (BREATHER PIPE)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED.

1-3-B

1/4

CORPORATE QUALITY MANAGER: D.D. Hart

CORPORATE ENGINEERING:

PLANT MANAGER: S.J. Tansey

QUALITY MANAGER: M. Taggart 1-15-96

File Name : 268-FLOW

Prepared by : M. MINOS

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30018268 (89019-57B61)

B/P Date : CAMI E.C.N.

Level : Y09-1731

Customer : CAMI AUTOMOTIVE

Date Submitted : JANUARY 12, 1996

REVISION LEVEL: "0" INITIAL

(A) PART

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
10	◇	SPOT WELD P/N 89170-56B00 (CAN ASSEMBLY) TO P/N 89112-56B00 TANK LWR- 6 SPOT WELDS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
11	◇	SPOT WELD (4) P/N 30003200 (LARGE CLAMP) TO P/N 89111-57B30 (UPPER HALF) (1 SPOT WELD EACH CLAMP)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
12	◇	SPOT WELD (1) P/N 30001095 (SMALL CLAMP) TO P/N 89111-57B30 (TANK UPPER) (1 SPOT)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
13	◇	SPOT WELD P/N 89178-60A00 (LARGE BRKT) TO P/N 89111-57B30 (UPPER HALF) (2 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
14	◇	SPOT WELD P/N 89111-57B30 (UPPER HALF) TO P/N 89112-56B00 (LOWER HALF) (4 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
15	◇	SEAM WELD P/N 89111-57B30 (UPPER HALF) TO P/N 89112-56B00 (LOWER HALF) TOGETHER	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
16	◇	MIG WELD P/N 89121-82000 (FUEL INLET PIPE) TO UPPER TANK ASSEMBLY	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
17	◇	STAMP LOT TRACEABILITY ONTO P/N 89125-60A00 (GUSSET)	CORRECT TANK NUMBER, YEAR, AND JULIAN DATE	OPERATOR KNOWLEDGE
18	◇	SPOT WELD 2 P/N 89125-60A00, 1 P/N 89126-56B00 AND 1 P/N 89127-56B00 GUSSETS TO TANK (2 SPOTS EACH GUSSET)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED

17-3-B

CORPORATE QUALITY MANAGER: D.D. Hart

CORPORATE ENGINEERING:

PLANT MANAGER: S.J. Fawley

QUALITY MANAGER: J. Taggart 1-15-96

File Name : 268FLOW2

Prepared by : M. MINOS

The Narmco Group - Process Flow Diagram

ACCEPTAN CRITERI. ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.
Part Name : TRUCK FUEL TANK ASSEMBLY
Part Number : 30018268 (89019-57B61)
B/P Date : CAMI E.C.N.
Level : Y09-1731
Customer : CAMI AUTOMOTIVE
Date Submitted : JANUARY 12, 1996
REVISION LEVEL: "O" INITIAL

PART

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr.	Move	Store	Insp.	Operation Description	Affected Control Char.	Variation Factor
19	◇				SECURITY MIG P/N 89126-56B00 AND P/N 89127-56B00 GUSSETS (6) TO TANK ASSEMBLY	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
20	◇				ATTACH P/N 30014333 (FUEL PUMP) TO TANK UPPER - 6 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
21	◇				ATTACH P/N 30017817 (SENDING UNIT) TO TANK UPPER - 5 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
22	◇				ATTACH P/N 30014579 (CUT VALVE) TO TANK UPPER - 3 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
23	◇				INSERT "O" RING AND ATTACH P-SENSOR COVER PLATE	MISSING COMPONENT	OPERATOR KNOWLEDGE
24	◇				INSTALL PROPER MASKING DEVICES AND LEAK TEST	MISSING COMPONENTS	OPERATOR KNOWLEDGE
25		○			PLACE TANK ON CONVEYOR TO PAINT LINE	DENTS	OPERATOR HANDLING
26		○			HANG TANK ON PAINT LINE	NONE	NONE
27	◇				PAINT	PAINT THICKNESS	PAINT LINE MAINTENANCE

CORPORATE QUALITY MANAGER: [signature]
CORPORATE ENGINEERING: [signature]
PLANT MANAGER: [signature]
QUALITY MANAGER: [signature] 1-15-96

File Name : 268FLOW3
Prepared : M. MINOS

7-3-B

3/4

AS 279975

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30018268 (89019-57B61)

B/P Date : CAMI E.C.N.

Level : Y09-1731

Customer : CAMI AUTOMOTIVE

Date Submitted : JANUARY 12, 1996

REVISION LEVEL: "0" INITIAL

(A) PART

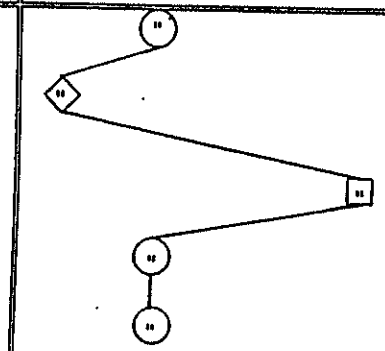
ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Circle – Move (all steps in the system where the object under study moves from one location to another).

Triangle – Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).

Diamond – Fabrication (all steps in the system where the object undergoes a change in form, condition or content).

Square – Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
28		REMOVE FROM PAINT LINE		
29		TOP DRESS ASSEMBLY AND RE-LEAK TEST	INCORRECT ASSEMBLY, MISSING COMPONENTS	OPERATOR KNOWLEDGE
30		INSPECT AND PACK		
31		MOVE TO SHIPPING DOCK		
32		SHIP TO CAMI		

2-C-B

CORPORATE QUALITY MANAGER: [signature]

CORPORATE ENGINEERING: [signature]

PLANT MANAGER: [signature]

QUALITY MANAGER: [signature] 1-15-96

File Name : 268FLOW4

Prepared by : M. MINOS

4/4

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30019612 (89019-57B63)

B/P Date : CAMI E.C.N.

Level : 56B-2445

Customer : CAMI AUTOMOTIVE

Date Submitted : JUNE 20, 1996

REVISION LEVEL: "2" NEW GUSSET P/N 30019611

Ⓐ PART

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr.	Move	Store	Insp.	Operation Description	Affected Control Char.	Variation Factor
1	◇				PROJECTION WELD (2) P/N 08315-01059 WELD NUTS 5 MM TD P/N 89178-60A00 BRACKET	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
2	◇				SPOT WELD P/N 89176-61A00 & P/N 89177-61A00 BRACKETS TO P/N 89171-61A00 OUTER VESSEL 6 SPOTS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
3	◇				SPOT WELD P/N 89172-56B00 INNER VESSEL TO P/N 89171--61A00 OUTER VESSEL 6 SPOTS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
4	◇				SPOT WELD P/N 89124-51F00 (LARGE RING) TO P/N 89111-57B30 (UPPER HALF) (6 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
5	◇				SPOT WELD P/N 89130-57B20 (BREATHER PIPE) TO P/N 89111-57B30 (UPPER HALF) (2 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
6	◇				SPOT WELD P/N 89123-50F00 (MEDIUM RING) TO P/N 89111-57B30 (UPPER HALF) (5 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
7	◇				SPOT WELD P/N 89129-66A00 (SMALL RING) TO P/N 89111-57B30 (TANK UPPER) (4 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
8	◇				SPOT WELD P/N 89122-56B00 (CUT VALVE RING) TO P/N 89111-57B30 (3 SPOTS)	CORRECT TANK NUMBER, YEAR, AND JULIAN DATE	OPERATOR KNOWLEDGE
9	◇				BRAZE WELD AROUND P/N 89130-57B20 (BREATHER PIPE)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED.

AS 279977

CORPORATE QUALITY MANAGER: 96-7-4
CORPORATE ENGINEERING: 7/4/96
PLANT MANAGER:
QUALITY MANAGER: 6-29-96

File Name : 612-FLOW
Prepared By : M. MINOS
Page 1 of 4

7-3-C page 1/4

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30019612 (89019-57B63)

B/P Date : CAMI E.C.N.

Level : 56B-2445

Customer : CAMI AUTOMOTIVE

Date Submitted : JUNE 20, 1996

REVISION LEVEL: "2" NEW GUSSET P/N 30019611

(A) PART

Circle - Move (all steps in the system where the object under study moves from one location to another).
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Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr.	Move	Store	Insp.	Operation Description	Affected Control Char.	Variation Factor
10	◇				SPOT WELD P/N 89170-56B00 (CAN ASSEMBLY) TO P/N 89112-56B00 TANK LWR- 6 SPOT WELDS	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
11	◇				SPOT WELD (4) P/N 30003200 (LARGE CLAMP) TO P/N 89111-57B30 (UPPER HALF) (1 SPOT WELD EACH CLAMP)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
12	◇				SPOT WELD (1) P/N 30001095 (SMALL CLAMP) TO P/N 89111-57B30 (TANK UPPER) (1 SPOT)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
13	◇				SPOT WELD P/N 89178-60A00 (LARGE BRKT) TO P/N 89111-57B30 (UPPER HALF) (2 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
14	◇				SPOT WELD P/N 89111-57B30 (UPPER HALF) TO P/N 89112-56B00 (LOWER HALF) (4 SPOTS)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
15	◇				SEAM WELD P/N 89111-57B30 (UPPER HALF) TO P/N 89112-56B00 (LOWER HALF) TOGETHER	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
16	◇				MIG WELD P/N 89121-82000 (FUEL INLET PIPE) TO UPPER TANK ASSEMBLY	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
17	◇				STAMP LOT TRACEABILITY ONTO P/N 30019611 (GUSSET)	CORRECT TANK NUMBER, YEAR, AND JULIAN DATE	OPERATOR KNOWLEDGE
18	◇				SPOT WELD 2 P/N 30019611 (89125-57B30), 1 P/N 89126-56B00 AND 1 P/N 89127-56B00 GUSSETS TO TANK (2 SPOTS EACH GUSSET)	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED

AS 279978

CORPORATE QUALITY MANAGER: 96-7-4

CORPORATE ENGINEERING: 7/4/96

PLANT MANAGER:

QUALITY MANAGER: 6-29-96

17-3-C page 3/4

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30019612 (89019-57B63)

B/P Date : CAMI E.C.N.

Level : 568-2445

Customer : CAMI AUTOMOTIVE

Date Submitted : JUNE 20, 1996

(A) PART

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Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

REVISION LEVEL: "2" NEW GUSSET P/N 30019611

Step	Fabr.	Move	Store	Insp.	Operation Description	Affected Control Char.	Variation Factor
19					SECURITY MIG P/N 89126-56B00 AND P/N 89127-56B00 GUSSETS (6) TO TANK ASSEMBLY	WELD INTEGRITY, WELD SPLASH, OFF LOCATION	WELDER SCHEDULE PROPERLY MAINTAINED
20					ATTACH P/N 30018726 (FUEL PUMP) TO TANK UPPER - 6 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
21					ATTACH P/N 30017817 (SENDING UNIT) TO TANK UPPER - 5 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
22					ATTACH P/N 30014579 (CUT VALVE) TO TANK UPPER - 3 30003198 SCREWS	TORQUE	TORQUE MAINTENANCE GUN
23					INSERT "O" RING AND ATTACH P-SENSOR COVER PLATE	MISSING COMPONENT	OPERATOR KNOWLEDGE
24					INSTALL PROPER MASKING DEVICES AND LEAK TEST	MISSING COMPONENTS	OPERATOR KNOWLEDGE
25					PLACE TANK ON CONVEYOR TO PAINT LINE	DENTS	OPERATOR HANDLING
26					HANG TANK ON PAINT LINE	NONE	NONE
27					PAINT	PAINT THICKNESS	PAINT LINE MAINTENANCE

AS 279979

CORPORATE QUALITY MANAGER: 96-7-4

CORPORATE ENGINEERING: 7/4/96

PLANT MANAGER:

QUALITY MANAGER: 6-28-96

File Name : 612FLOW3

Prepared By : M. MINOS

7-3-c Page 3/4

The Narmco Group - Process Flow Diagram

ACCEPTANCE CRITERIA
ZERO DEFECTS

Plant : PRINCE METAL PRODUCTS LTD.

Part Name : TRUCK FUEL TANK ASSEMBLY

Part Number : 30019612 (89019-57B63)

B/P Date : CAMI E.C.N.

Level : 56B-2445

Customer : CAMI AUTOMOTIVE

Date Submitted : JUNE 20, 1996

A PART

REVISION LEVEL: "2" NEW GUSSET P/N 30019611

* ALL REPAIRS & REWORK SHALL BE REINSPECTED AS PER QUALITY PLAN

Circle - Move (all steps in the system where the object under study moves from one location to another).
Triangle - Store (all steps in the system where the object under study remains at rest, either temporarily or permanently).
Diamond - Fabrication (all steps in the system where the object undergoes a change in form, condition or content).
Square - Inspection (all steps in the system where the object under study is checked for completeness, quality or quantity).

Step	Fabr. Move Store Insp.	Operation Description	Affected Control Char.	Variation Factor
28		REMOVE FROM PAINT LINE		
29		TOP DRESS ASSEMBLY AND RE-LEAK TEST	INCOREECT ASSEMBLY, MISSING COMPONENTS	OPERATOR KNOWLEDGE
30		INSPECT AND PACK		
31		MOVE TO SHIPPING DOCK		
32		SHIP TO CAMI		

AS 279980

CORPORATE QUALITY MANAGER: 96-7-4
CORPORATE ENGINEERING: 7/4/96
PLANT MANAGER:
QUALITY MANAGER: 6-28-96

File Name : 612FLOW4

Prepared By : M.-MINOS

7-3-C page 4/4

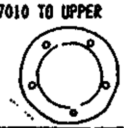
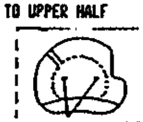
A PART

CIS PART INSPECTION STANDARD (A)

A PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
03/08/94	GORD TAGGART	G. Taggart 3/15/94	[signature]

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30014813 (89019-57B30)	TANK SET, FUEL	4 DOOR TRUCK	Y19-1315	PRINCE METAL PRODUCTS	247650542

NO.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
1A	PROJECTION WELD P/N 89124-85550 TO UPPER HALF OF TANK (6 PLACES) 	1. EACH PROJECTION MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PLATE MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
1B	PROJECTION WELD P/N 85121-67010 TO UPPER HALF OF TANK (5 PLACES) 	1. EACH PROJECTION MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PLATE MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
1C	SPOT WELD P/N 89187-60A00 TO UPPER HALF OF TANK (3 PLACES) 	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
1D	SPOT WELD P/N 89130-56B01 TO UPPER HALF OF TANK (2 PLACES) 	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
2	BRAZE P/N 89130-56B01 AND P/N 89143-60A00 TO UPPER HALF OF TANK 	1. MUST NOT LEAK	1. LEAK TESTER	AREA MANAGER/OPERATOR	100%
		2. MUST EXHIBIT CAPILLERY ATTRACTION	2. CUT, MOUNT, POLISH, ETCH	PMP QUALITY	1/WEEK
3A	SPOT WELD (3) P/N 09405-65302 (30003200) TO UPPER HALF OF TANK (1 SPOT WELD PER CLAMP) 	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
3B	SPOT WELD (1) P/N 09405-35302 (30001095) TO UPPER HALF OF TANK (1 SPOT) 	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%

CAMI Q.C.

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
				[signature] 03.22.94	A. Okamoto 3/17/94

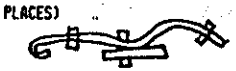
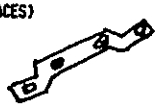
7-4-A page 1/6

AS 279981

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
03/08/94	GORD TAGGART	G. Taggart 3/15/94	

PART NUMBER	PART NAME		MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30014B13 (89019-57B30)	TANK SET, FUEL	Ⓐ PART	4 DOOR TRUCK	Y19-1315	PRINCE METAL PRODUCTS	247650542

NO.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
3C	SPOT WELD P/N 89190-56B00 TO UPPER HALF OF TANK (6 PLACES) 	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
3D	SPOT WELD P/N 89171-82000 TO UPPER HALF OF TANK (1 PLACE)  *LOCATION IMPORTANT	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
		3. DOT SAME SIDE AS FILLER HOLE	3. VISUAL	AREA MANAGER/OPERATOR	100%
3E	SPOT WELD P/N 89178-60A00 TO UPPER HALF OF TANK (2 PLACES)  *LOCATION IMPORTANT	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
		3. BEND IN PART FITS GROOVE IN WELD FIXTURE AND STRAIGHT FLANGE TOWARDS FUEL INLET HOLE	3. VISUAL	AREA MANAGER/OPERATOR	100%
4	SPOT WELD P/N 89170-56B00 TO LOWER HALF OF TANK (6 PLACES) 	1. MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER/OPERATOR	100%
5A	MIG WELD P/N 89121-82000 360 DEGREES TO UPPER HALF OF TANK 	1. MUST NOT LEAK	1. LEAK TESTER	AREA MANAGER/OPERATOR	100%
		2. 10% PENETRATION	2. CUT, MOUNT, POLISH, ETC	P.K.P. QUALITY	1/WEEK
5B	SPOT WELD UPPER AND LOWER HALVES TOGETHER (4 PLACES)(HOLD IN PLACE FOR SEAM WELD)	MUST PULL PARENT MATERIAL .	HAMMER AND CHISEL DESTRUCTION	AREA MANAGER/OPERATOR	2/SHIFT

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:

FILE NAME CI2A

7-4-A Page 2/6

IS PART INSPECTION STANDARD (A)

A PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
03/08/94	GORD TAGGART	G. Taggart 3/15/94	

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30014B13 (89019-57B30)	TANK SET, FUEL	4 DOOR TRUCK	Y19-1315	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
6		SEAM WELD UPPER HALF ASSY TO LOWER HALF ASSY	1. MUST NOT LEAK 2. MUST NOT SEPARATE 3. MUST NOT BREAK AT WELD	1. LEAK TESTER 2. HAMMER AND CHISEL DESTRUCTION 3. TENSILE WELD TESTER	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR P.M.P. QUALITY	100% EVERY 75 PCS 1/WEEK
7A		STAMP LOT TRACEABILITY ON P/N 89125-60A00 AS SHOWN BELOW: EXAMPLE 068 4 155 └ TANK NUMBER YEAR JULIEN DATE	MUST BE PRESENT AND READABLE	VISUAL	AREA MANAGER/OPERATOR	100%
7B		HOLE ALIGNMENT AND EDGES FOR P/N 89125-60A00	ENSURE HOLE ALIGNMENT AND EDGES LINE UP TO MATING PART	VISUAL	AREA MANAGER/OPERATOR	100%
8A		SPOT WELD (2) P/N 89125-60A00 PARTS TO TANK ASSY (4 PLACES)	MUST NOT COME LOOSE	PRY	AREA MANAGER/OPERATOR	100%
8B		SPOT WELD P/N 89126-56B00 PART TO TANK ASSY (2 PLACES)	MUST NOT COME LOOSE	PRY	AREA MANAGER/OPERATOR	100%
8C		SPOT WELD P/N 89127-56B00 PART TO TANK ASSY (2 PLACES)	MUST NOT COME LOOSE	PRY	AREA MANAGER/OPERATOR	100%
8D		RIG FOR SECURITY P/N 89126-56B00 AND P/N 89127-56B00 TO TANK ASSY (3 PLACES EACH COMPONENT)	MUST BE THERE	VISUAL	AREA MANAGER/OPERATOR	100%

CAMI Q.C.

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:

7-4-A page 3/6

FILE NAME: B13-CI3A

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
03/08/94	GORD TAGGART	J. Taggart 5/15/94	

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30014813 (89019-57B30)	TANK SET, FUEL (A) PART	4 DOOR TRUCK	Y19-1315	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
9A		ATTACH P/N 30014770 FUEL PUMP ASS'Y TO TANK ASS'Y USING (6) P/N 09136-05045 (30003198)	1. TORQUE 10-15 KG.CM 2. MUST NOT LEAK	1. TORQUE WRENCH 2. LEAK TESTER	PMP QUALITY AREA MANAGER/OPERATOR	TORQUE VERIFICATION ONCE/WEEK LEAK TEST 100%
9B		ATTACH SENDING UNIT P/N 30000151 TO TANK ASS'Y USING (5) P/N 09136-05045 (30003198)	1. TORQUE 10-15 KG.CM 2. MUST NOT LEAK	1. TORQUE WRENCH 2. LEAK TESTER	PMP QUALITY AREA MANAGER/OPERATOR	ONCE/WEEK LEAK TEST 100%
9C		INSTALL PROPER MASKING DEVICES (HOSES AND CAPS)	MUST BE PRESENT	VISUAL	AREA MANAGER/OPERATOR	100%
10A		LEAK TEST	0.65 KG/CM FOR 30 SECONDS NO BUBBLES ALLOWED	VISUAL	AREA MANAGER/OPERATOR	100%
10B		MARK WHITE LINE INSIDE FILLER TUBE TO SIGNIFY TANK PASSED LEAK TEST	WHITE LINE MUST BE PRESENT	VISUAL	AREA MANAGER/OPERATOR	100%
10C		MUST PUNCTURE BLACK PUMP CAP	MUST BE THROUGH	VISUAL	AREA MANAGER/OPERATOR	100%
11		HANG TANK ON PAINT LINE AND PREPARE WIRES PROPERLY FOR PAINTING	WIRES MUST BE INSTALLED IN MASKING DEVICES PROPERLY	VISUAL	AREA MANAGER/OPERATOR	100%
12		6 STAGE WASHER CONCENTRATION/TEMPERATURE	STAGE 1 CONC - .1-.3 ML/60°F 2 CONC - 17-22 ML/120-140°F 3 CONC - .1-.3 ML/60°F 4 CONC - .1-.3 ML/AMBIENT 5 CONC - .1 MAX ML/AMBIENT 6 CONC - .1 MAX ML/AMBIENT	SEE PROCEDURE SHEET	LAB	1/SHIFT

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:

FILE NAME: 813-CI4A

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CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
03/08/94	GORD TAGGART	J. Taggart 3/15/94	

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30014813 (89019-57B30)	TANK SET, FUEL (A) PART	4 DOOR TRUCK	Y19-1315	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
13		FINISH INSTALLING MASKING DEVICES	COVER NUTS AND HOLES	VISUAL	AREA MANAGER/OPERATOR	100%
14		FLOW RATE OF FLOW COAT ENAMEL	26-30 SECONDS	VISCOSITY CUP	AREA MANAGER/OPERATOR	2/SHIFT
15		WET PRIMER THICKNESS	10-12 MIL	WET THICKNESS GAGE	AREA MANAGER/OPERATOR	1/SHIFT
16		REMOVE MASKING DEVICES FROM ITEM 013 BEFORE FLOW COAT	MUST BE REMOVED	VISUAL	AREA MANAGER/OPERATOR	100%
17		BAKED PAINT AND PRIMER THICKNESS	200 MIL MINIMUM	PAINT THICKNESS GAGE	AREA MANAGER/OPERATOR	1/SHIFT
18		FINISH REMOVING MASKING DEVICES	MUST BE REMOVED	VISUAL	AREA MANAGER/OPERATOR	100%
19		WRAP WIRE HARNESS PROPERLY	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER/OPERATOR	100%
20		100% VISUAL INSPECTION	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER/OPERATOR	100%
21		PACKAGE OF PRODUCT AND USAGE OF PROPER BAR CODES	COMPARE TO PROCESS SHEET	VISUAL	AREA MANAGER/OPERATOR	100%
		PART WEIGHT 9.4 kg				CAMI Q.C.

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:

FILE NAME: 813-C14A

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CIS PART INSPECTION STANDARD (B)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
MARCH 12, 1994	GORD TAGGART	G. Taggart 3/15/94	

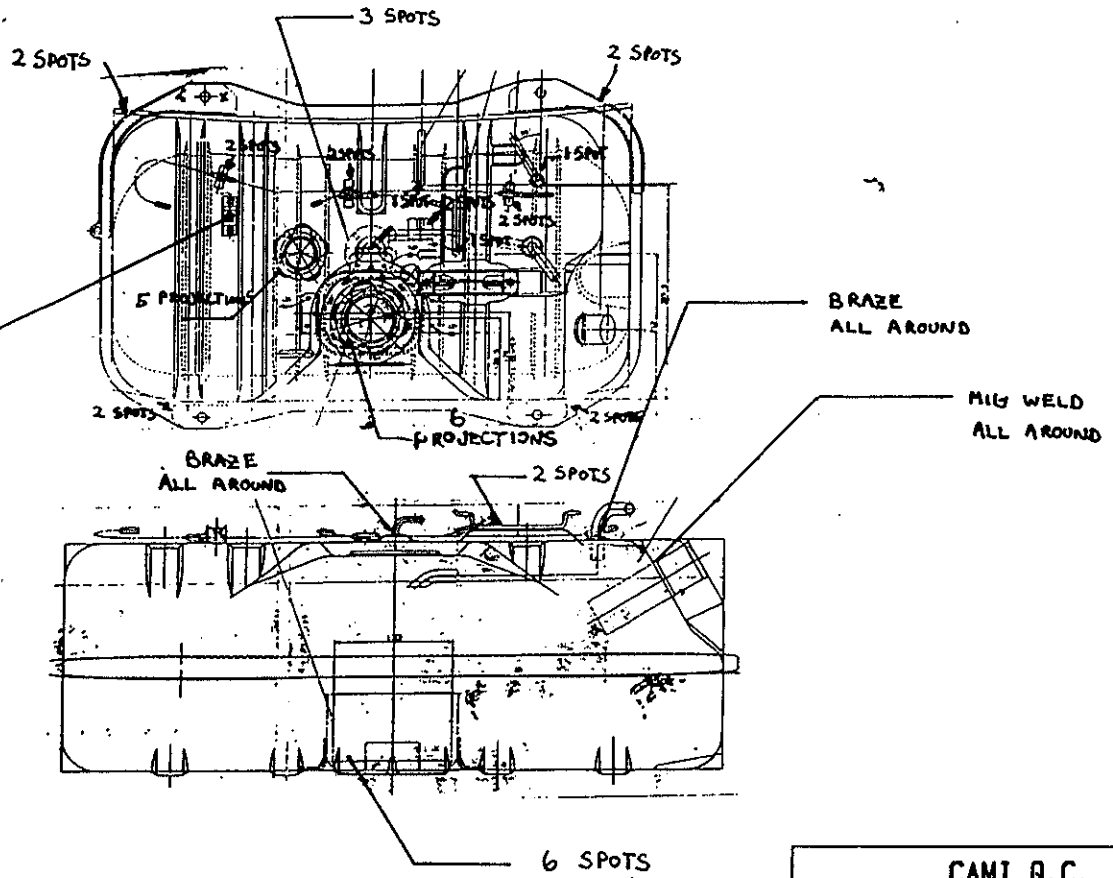
PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30014813 (89019-57830)	TRUCK FUEL TANK ASSEMBLY	4 DOOR TRUCK	Y19-1315	PRINCE METAL PRODUCTS	247650542

SKETCH

SUPPLIER DATA should be supplied to CAMI on the items marked. Data is due at CAMI by the 10th day of the following month. Data frequency of checks as follows:

A PART — Items - each lot
Items - each lot
Items - 1 per month
Items - 1 per month

Inspection data should be tabulated chronologically so the movement in the process can be predicted.



MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:

FILE NAME: B13-CISB

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CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 11, 1996	GORD TAGGART	1-15-96 G. TAGGART	

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57B61)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
1		RECEIVING INSPECTION				
	1	89111-57B30 - GAS TANK UPPER BLANKS (SEE 89111-57B30 CIS)	STCD-92	CERTIFICATION	RECEIVING INSPECTION	EACH BUNDLE OF BLANKS
	2	89112-56B00 - GAS TANK LOWER BLANKS (SEE 89112-56B00 CIS)	STCD-92	CERTIFICATION	RECEIVING INSPECTION	EACH BUNDLE OF BLANKS
	3	89121-82000 - INLET PIPE (PURCHASED FROM SHELBY) A) OUTER DIAMETER OF TUBE B) OVERALL LENGTH C) COATING D) CHEMICAL COMPOSITION OF STEEL	42.7 MM +/- 0.2 MM 129.0 MM +/- 1.0 MM MFZn8-C STKM11A	VERNIER/CALIPER SCALE CERTIFICATION CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	4	89122-56B00 - PLATE CUT VALVE (PURCHASED FROM AXOTEC) A) PROJECTION HEIGHTS B) THREAD VERIFICATION C) COATING D) CHEMICAL COMPOSITION	1.1 MM +0.2/-0 MM 3 PLACES - M5 MFZn8-C BASE STEEL - SPHC	MICROMETER M5 X 0.8 6H THREAD GAGE CERTIFICATION CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	5	89123-S0F00 - PLATE FUEL PUMP ATTACHMENT (PURCHASED FROM NISSHO-IWAI) A) PROJECTION HEIGHTS B) THREAD VERIFICATION C) COATING D) CHEMICAL COMPOSITION	1.1 MM +0.2/-0 MM 5 PLACES M5 MFZn8-C BASE STEEL SPHC	MICROMETER M5 X 0.8 6H THREAD GAGE CERTIFICATION CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	6	89124-51F00 - PLATE FUEL PUMP ATTACHMENT (PURCHASED FROM AXOTEC) A) PROJECTION HEIGHTS B) THREAD VERIFICATION C) COATING D) CHEMICAL COMPOSITION	1.1 MM +0.2/-0 MM 6 PLACES M5 MFZn8-C BASE STEEL SPHC	MICROMETER M5 X 0.8 6H THREAD GAGE CERTIFICATION CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)

MARKS	REASONS FOR REVISION	AUTHORITY	DATE
	Ⓐ PART		

CAMI Q.C.

CHECKED BY:	APPROVED BY:
01-23-96 1/23/96	1/23 96

7-4-B

1/12

FILE NAME: 268-CISI

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART	G. TAGGART	1-15-96

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57B61)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
1		RECEIVING INSPECTION CONTINUED				
	7	89125-60A00 - GUSSET FUEL TANK NO.1 (SEE 89125-60A00 CIS)	SPHC	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
	8	89126-56B00 - GUSSET FUEL TANK NO.2 (SEE 89126-56B00 CIS)	S6AHC-45/45	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
	9	89127-56B00 - GUSSET FUEL TANK NO.3 (SEE 89127-56B00 CIS)	S6AHC-45/45	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
	10	89129-66A00 - PLATE, P-SENSOR ATTACHMENT (PURCHASED FROM AIOTEC) A) MATERIAL THICKNESS B) PROJECTION HEIGHTS C) THREAD VERIFICATION D) COATING E) CHEMICAL COMPOSITION	 3.1 MM +/- 0.1 MM 1.1 MM +0.2/-0 MM 2 PLACES - M5 MFZn8-C BASE STEEL - SPHC	 MICROMETER MICROMETER M5 X 0.8 6H THREAD GAGE CERTIFICATION CERTIFICATION	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	11	89130-57B20 - PIPE COMP FUEL TANK BREATHER A) OUTER DIAMETER OF TUBE B) OUTER DIAMETER OF END OF TUBE C) COATING D) CHEMICAL COMPOSITION	 14.0 MM +/- 0.05 MM 15.4 MM +/- 0.3 MM MFZn8-C BASE STEEL - STKM11A	 VERNIER VERNIER CERTIFICATION CERTIFICATION	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	12	89135-60A00 - BRACKET FUEL TANK BREATHER (SEE 89135-60A00 CIS)	S6ACC-45/45	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
	13	89171-61A00 - OUTER POT (SEE 89171-61A00 CIS)	ZLE-20/20C	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
	14	89172-56B00 - INNER POT (SEE 89172-56B00 CIS)	ZLE-20/20	CERTIFICATION	RECEIVING INSPECTION	EACH COIL

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	(A) PART				

AS 279988

7-4-B

2/12

FILE NAME: 26B-CIS2

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART	G. Taggart	S. Kawai 1-15-96

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
1		RECEIVING INSPECTION CONTINUED				
	15	89176-61A00 - BRACKET (SEE 89176-61A00 CIS)	ZLC-20/20	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
	16	89177-61A00 - BRACKET (SEE 89177-61A00 CIS)	ZLC-20/20	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
	17	89178-60A00 - VAPOUR SEP BRKT ASSY PLATED (SEE 89178-60A00 CIS) COATING PERFORMED BY KLINEC	SPCC-NS MFZn8-C	CERTIFICATION CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION	EACH COIL EACH LOT
	18	09405-45303 (30001095) PURCHASED FROM HARWOOD * PART NOT AS SHOWN ON PART PRINT A) MATERIAL THICKNESS B) BLACK COATING C) CHEMICAL COMPOSITION	0.7 MM +/- 0.04 MM MUST BE PRESENT AND 15.0 TO 18.0 MM FROM EDGE OF PART SPCC	MICROMETER VISUAL CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	19	09405-65303 (30003200) - CLAMP FUEL TANK (PURCHASED FROM HARWOOD) * PART NOT AS SHOWN ON PART PRINT A) MATERIAL THICKNESS B) BLACK COATING C) CHEMICAL COMPOSITION	0.7 MM +/- 0.04 MM MUST BE PRESENT AND 15.0 TO 18.0 MM FROM EDGE OF PART SPCC	MICROMETER VISUAL CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) PER SAMPLING PLAN Q.A.M. 24 (EACH SHIP.) PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	20	89485-56B00 (30014579) - CUT VALVE (PURCHASED FROM NISSHO IWAI) * CAMI APPROVED SOURCE	PART CERTIFICATION FOR ALL TESTS, DIMENSIONS AND MATERIALS	CERTIFICATION	RECEIVING INSPECTION	AS REQUESTED
	21	34810-70E10 (30017817) GAUGE ASSY FUEL LEVEL (PURCHASED FROM NISSHO IWAI) * CAMI APPROVED SOURCE	PART CERTIFICATION FOR ALL TESTS, DIMENSIONS AND MATERIALS	CERTIFICATION	RECEIVING INSPECTION	AS REQUESTED
	22	15100-58B00 (30014333) - PUMP ASSY FUEL (PURCHASED FROM AUTRANS - CONSIGNMENT) * CAMI APPROVED SOURCE	PART CERTIFICATION FOR ALL TESTS, DIMENSIONS AND MATERIALS	CERTIFICATION	RECEIVING INSPECTION	AS REQUESTED

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	(A) PART				

7-4-B 3/2

AS 279989

FILE: 268-CIS3

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART	G. TAGGART	1-15-96

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57B61)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
II		RECEIVING INSPECTION CONTINUED				
	23	09136-05045 (30003198)-SCREW FUEL LEVEL GAUGE				
		A) THREAD VERIFICATION	M5 X 0.8	THREADED RING GAGE	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		B) COATING	MFCrZD	CERTIFICATION	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		C) CHEMICAL COMPOSITION	CH12C	CERTIFICATION	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		D) HEAD HEIGHT	3.3 MM +/- 0.15 MM	VERNIER	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		E) THREAD AND RECESSED LENGTH	10.0 MM +0/-0.8 MM	VERNIER	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
	24	RECEIVING INSPECTION TOP DRESS CUSTOMER SUPPLIED MATERIAL				
		A. 30014576 (89411-56B00)	1. NO VISUAL DEFECTS OR DIRT	VISUAL	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		B. 30014635 (09356-55117-410)	2. VERIFY QUANTITY	VISUAL	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		C. 30015397 (09356-55113-21010)	3. PNP LOT NUMBER	ASSIGNED	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		D. 30016308 (89280-50F00)	4. OUTSTANDING ORDER & BY BUYER'S DUE DATE	VISUAL	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		E. 30016809 (89421-79E60)				
		F. 30016310 (89425-79E00)	5. AFFIX CSM STICKER TO EACH PALLET OF MATERIAL RECEIVED	VISUAL	RECEIVING INSPECTION	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.)
		G. 96057808 (09401-11412)				
		H. 96061880 (09401-11413)				
		I. 30015674 (09402-15511				
	25	30000023 - (02142-05083) THREAD VERIFICATION VERIFY QTY	M5 X 0.8 MM AS INDICATED	RING GAGE VISUAL	RECEIVING INSPECTION " "	PER SAMPLING PLAN Q.A.M. 24 (AS REQUEST.) " " " " "
		INPROCESS INSPECTION				
	1	PROJECTION WELD (2) P/N 08315-01059 WELD NUTS 5 MM TO P/N 89178-60A00 BRACKET	MUST PULL PARENT MATERIAL NO WELD SPLASH ALLOWED	PUSH OUT TEST	AREA MANAGER /OPERATOR	2/SHIFT DESTRUCT TEST AND 100% PRY TOOL CHECK
	2	SPOT WELD P/N 89176-61A00 & 89177-61A00 BRKTS TO P/N 89171-61A00 OTR VESSEL (6 SPOTS)	MUST PULL PARENT MATERIAL	HAMMER AND CHISEL	AREA MANAGER /OPERATOR	2/SHIFT DESTRUCT TEST AND 100% PRY TOOL CHECK
	3	SPOT WELD P/N 89172-56B00 INNER VESSEL TO P/N 89171-61A00 OUTER VESSEL 6 SPOTS	MUST PULL PARENT MATERIAL	HAMMER AND CHISEL	AREA MANAGER /OPERATOR	2/SHIFT DESTRUCT TEST AND 100% PRY TOOL CHECK

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	(A) PART				

AS 279990

7-4-B 4/12

FILE: 268-CIS4

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	QBA GORD TAGGART	G. Taggart	1-15-96

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57B61)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR '96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
11		INPROCESS INSPECTION CONTINUED				
	4	PROJECTION WELD P/N 89124-51F00 TO P/N 89111-57B30 (6 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL 2. PLATE MUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 100%
	5	PROJECTION WELD P/N 89123-50F00 TO P/N 89111-57B30 (5 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL 2. PLATE MUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 100%
	6	PROJECTION WELD P/N 89122-56B00 TO P/N 89111-57B30 (3 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL 2. PLATE MUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 100%
	7	PROJECTION WELD P/N 89129-66A00 TO P/N 89111-57B30 (4 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL 2. .012 FEELER MUST NOT PASS UNDER PROJECTION 3. PLATE MUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. FEELER GAUGE 3. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 2/SHIFT 100%
	8	SPOT WELD P/N 89130-57B20 TO P/N 89111-57B10 (2 PLACES)	1. EACH SPOT WELD MUST PULL PARENT MATERIAL 2. PART MUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 100%
	9	BRAZE P/N 89130-57B20 TO P/N 89111-57B30 (360 DEGREES)	1. MUST NOT LEAK 2. MUST EXHIBIT CAPILLERY ATTRACTION	1. LEAK TESTER 2. CUT, MOUNT, POLISH, ETCH	AREA MANAGER/OPERATOR QUALITY ASSURANCE	100% ONCE PER WEEK
	10	SPOT WELD "1" P/N 09405-65303 (30003200) CLIPS TO P/N 89111-57B30	1. SPOT WELD MUST PULL PARENT MATERIAL	1. HAMMER/CHISEL	AREA MANAGER/OPERATOR RECEIVING INSPECTION	2/SHIFT

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	(A) PART				

7-4-B

5/12

FILE: 268-CISS

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART	G. TAGGART	S. Suzuki 5-96

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57B61)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
11	INPROCESS INSPECTION CONTINUED				
11	SPOT WELD "1" P/N 09405-45303 (3000109S) CLIP TO P/N 89111-57B30	1. SPOT WELD MUST PULL PARENT MATERIAL 2. NUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 100%
12	SPOT WELD P/N 89178-60A00 TO P/N 89111-57B30 (2 PLACES) ** LOCATION IMPORTANT **	1. EACH SPOT WELD MUST PULL PARENT MATERIAL 2. PART MUST NOT COME LOOSE 3. STRAIGHT FLANGE ON BRKT TOWARDS FUEL INLET HOLE 4. 2-5 MM NUTS MUST BE PRESENT	1. HAMMER AND CHISEL 2. PRY 3. VISUAL 4. VISUAL	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 100% 100% 100%
13	SPOT WELD P/N 89170-56B00 TO P/N 89112-56B00 (6 PLACES)	1. EACH SOPT WELD MUST PULL PARENT MATERIAL 2. PART MUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPREATOR	2/SHIFT 100%
14	SPOT WELD P/N 89111-57B30 TO P/N 89112-56B00 (4 PLACES)	1. EACH SPOT WELD MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER/OPERATOR	2/SHIFT
15	SEAM WELD P/N 89111-57B30 TO P/N 89112-56B00	1. NUST NOT LEAK 2. NUST NOT SEPARATE 3. NUST NOT BREAK AT WELD 4. SEAM WELD MUST PASS AS CLOSE AS POSSIBLE TO TANK BUT MUST NOT PASS CORNER RADII	1. LEAK TESTER 2. HAMMER AND CHISEL 3. TENSILE TESTER 4. VISUAL	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	100% EVERY 75 PARTS 1/WEEK 100%
16	STAMP LOT TRACEABILITY ON P/N 89125-60A00 AS SHOWN BELOW 227 5 108 108 — TANK NUMBER 5 — YEAR 227 — JULIAN DATE	1. NUST BE PRESENT AND LEGIBLE	1. VISUAL	AREA MANAGER/OPERATOR	100%

MARKS	REASONS FOR REVISION	AUTHORITY	DATE
	(A) PART		

CAMI Q.C.

CHECKED BY:	APPROVED BY:

7-4-B

6/12

AS 279992

FILE: 268-CIS6

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART	G. TAGGART	

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
11		INPROCESS INSPECTION CONTINUED				
	17	SPOT WELD "2" P/N 89125-60A00 (2 PLACES EACH) TO TANK ASSEMBLY. SPOT WELD P/N 89126-56B00 (2 PLACES) TO TANK ASSEMBLY SPOT WELD P/N 89127-56B00 (2 PLACES) TO TANK ASSEMBLY	1. MUST NOT COME LOOSE	1. PRY	AREA MANAGER/OPERATOR	100%
	18	MIG WELD P/N 89121-82000 TO TANK UPPER ASSEMBLY	1. MUST NOT LEAK 2. 10% PENETRATION	1. LEAK TESTER 2. CUT, MOUNT, POLISH, ETCH	AREA MANAGER/OPERATOR Q.C. LAB LAYOUT	100% 1/WEEK
	19	MIG FOR SECURITY P/N 89126-56B00 AND P/N 89127-56B00 TO TANK ASSEMBLY (3 PLACES EACH COMPONENT)	1. MUST BE PRESENT AND VISUALLY ACCEPTABLE	1. VISUAL	AREA MANAGER/OPERATOR	100%
	20	ATTACH P/N 15100-58B00 (30014333) TO TANK ASSEMBLY USING (6) SCREWS P/N 09136-05045 (30003198)	1. TORQUE - 10-15 Kg.cm 2. MUST NOT LEAK	1. TORQUE WRENCH 2. LEAK TESTER	Q.C. LAB/LAYOUT AREA MANAGER/OPERATOR	1/WEEK 100%
	21	ATTACH P/N 34810-70E10 (20017817)TO TANK ASSEMBLY USING 5 SCREWS P/N 09136-05045 (30003198)	1. TORQUE 10-15 Kg.cm 2. MUST NOT LEAK	1. TORQUE WRENCH 2. LEAK TESTER	Q.C. LAB/ LAYOUT AREA MANAGER/OPERATOR	1/WEEK 100%
	22	ATTACH P/N 89485-56B00 (30014579) TO TANK ASS'Y USING (3) P/N 09136-05045 (30003198)	1. TORQUE 10-15 Kg.cm 2. MUST NOT LEAK	1. TORQUE WRENCH 2. LEAK TESTER	Q.C.LAB / LAYOUT AREA MANAGER/OPERATOR	1/WEEK 100%
	23	INSTALL PROPER MASKING DEVICES 1. YELLOW CAP ON P/N 89130-57B20 2. REMOVE SMALL BLACK CAP FROM P/N 30014333 AND PUT ON P/N 30014579 3. PLACE "O" RING P/N 30016310 IN SLOTTED GROOVE OF P-SENSOR RING P/N 89129-66A00 AND SEAL WITH P-SENSOR PLATE MADE FOR MASKING (2) SCREWS 30003198	MUST BE PRESENT MUST BE PRESENT MUST BE PRESENT & WATER MUST NOT ENTER TANK ASSY	VISUAL VISUAL VISUAL	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	100% 100% 100%

MARKS	REASONS FOR REVISION	AUTHORITY	DATE
	Ⓐ PART		

CAMI Q.C.	
CHECKED BY:	APPROVED BY:

AS 279993

FILE: 268-CIS7

CIS PART INSPECTION STANDARD

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	PRINCE METAL PRODUCTS
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	

NO.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
11	INPROCESS INSPECTION CONTINUED				
11	SPOT WELD "1" P/N 09405-45303 (30001095) CLIP TO P/N 89111-57B30	1. SPOT WELD MUST PULL PARENT MATERIAL 2. NUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	2/SHIFT 100%
12	SPOT WELD P/N 89178-60A00 TO P/N 89111-57B30 (2 PLACES) ** LOCATION IMPORTANT **	1. EACH SPOT WELD MUST PULL PARENT MATERIAL 2. PART MUST NOT COME LOOSE 3. STRAIGHT FLANGE ON BRKT TOWARDS FUEL INLET HOLE 4. 2-5 MM NUTS MUST BE PRESENT	1. HAMMER AND CHISEL 2. PRY 3. VISUAL 4. VISUAL	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	100% 100% 100% 2/SHIFT
13	SPOT WELD P/N 89170-56B00 TO P/N 89112-56B00 (6 PLACES)	1. EACH SOPT WELD MUST PULL PARENT MATERIAL 2. PART MUST NOT COME LOOSE	1. HAMMER AND CHISEL 2. PRY	AREA MANAGER/OPERATOR AREA MANAGER/OPREATOR	100% 2/SHIFT
14	SPOT WELD P/N 89111-57B30 TO P/N 89112-56B00 (4 PLACES)	1. EACH SPOT WELD MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER/OPERATOR	2/SHIFT
15	SEAM WELD P/N 89111-57B30 TO P/N 89112-56B00	1. NUST NOT LEAK 2. NUST NOT SEPARATE 3. NUST NOT BREAK AT WELD 4. SEAM WELD MUST PASS AS CLOSE AS POSSIBLE TO TANK BUT MUST NOT PASS CORNER RADII	1. LEAK TESTER 2. HAMMER AND CHISEL 3. TENSILE TESTER 4. VISUAL	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	100% EVERY 75 PARTS 1/WEEK 100%
16	STAMP LOT TRACEABILITY ON P/N 89125-60A00 AS SHOWN BELOW 227 5 108 108 — TANK NUMBER 5 — YEAR 227 — JULIAN DATE	1. NUST BE PRESENT AND LEGIBLE	1. VISUAL	AREA MANAGER/OPERATOR	100%

AS 279992

MARKS	REASONS FOR REVISION	AUTHORITY	DATE
	(A) PART		

CAMI Q.C.

CHECKED BY:	APPROVED BY:

7-4-8 6/12

APPROVED BY:

7-4-8 2/12

FILE: 268-CIS6

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART	G. Taggart	

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
11	24	INPROCESS INSPECTION CONTINUED LEAK TEST	1. 0.65 Kg.cm FOR 30 SECONDS NO BUBBLES ALLOWED. 2. MUST PASS ALL REQUIREMENTS OF LEAK TEST CARD.	1.VISUAL 1. VISUAL	AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	100% 100%
	25	MARK WHITE LINE INSIDE FILLER TUBE TO SIGNIFY TANK PASSED LEAK TEST	1. WHITE LINE MUST BE PRESENT	1. VISUAL	AREA MANAGER/OPERATOR	100%
	26	MUST PUNCTURE BLACK PUMP CAP	1. MUST BE PRESENT	1. VISUAL	AREA MANAGER/OPERATOR	100%
	27	ATTACH MASKING DEVICE OVER FILLER NECK TUBE	1. MUST BE PRESENT	1. VISUAL	AREA MANAGER/OPERATOR	100%
	28	TOTAL VISUAL INSPECTION FOR COMPONENTS (SEE PUNCH CARD)	1. CARD MUST BE PUNCHED TO VERIFY CHECK	1. VISUAL	AREA MANAGER/OPERATOR	100%
	29	HANG TANK ON PAINT LINE ATTACHING TUBE TO PUMP AND POSITION WIRES TO HOOK	1. MUST BE DONE PROPERLY	1. VISUAL	AREA MANAGER/OPERATOR	100%
	30	6 STAGE WASH (CONCENTRATION/TEMPERATURE)	STAGE 1. CONC 0.0-0.3 mL HOT WATER 2. CONC.17-22 mL COLD WATER 3. CONC.0.0-0.3 ml COLD WATER 4. CONC 0.0-0.3 ml COLD WATER 5. CONC. 0.1 MAX mL AMBIENT 6. FRESH WATER RINSE	 SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET	 AREA MANAGER AREA MANAGER AREA MANAGER AREA MANAGER AREA MANAGER AREA MANAGER	 1/SHIFT 1/SHIFT 1/SHIFT 1/SHIFT 1/SHIFT 1/SHIFT
	31	FLOW RATE OF FLOW COAT - ENAMEL VISCOSITY	26-30 SEC	VISCOSITY CUP	AREA MANAGER/OPERATOR	1/SHIFT
	32	BAKED PAINT AND PRIME THICKNESS	PRIMER - 8 ml MIN, 12 ml MAX PAINT - 0.5 ml MIN	PAINT THICKNESS GAGE PAINT THICKNESS GAGE	AREA MANAGER AREA MANAGER	1/SHIFT 1/SHIFT

AS 279994

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	(A) PART				

7-4-B 8/12

FILE: 268-CIS8

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART	G. TAGGART	

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
11	33	INPROCESS INSPECTION CONTINUED 100% VISUAL INSPECTION	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER/OPERATOR	100%
	34	TOP DRESS INSERT CLAMP P/N 30015674 AND HOSE P/N 30014635 ONTO FUEL PUMP	20-50 Kgf.cm	TORQUE WRENCH	QA LAB	1/WEEK
	35	ENSURE CLAMP (30015674) IS IN PROPER POSITION (REFER TO SAMPLE)	SCREW HEAD FACING UP WITH SCREW SIDE TOWARDS FUEL INLET 3 - 8 MM FROM END OF HOSE	VISUAL/SCALE	AREA MANAGER/OPERATOR	100%
	36	WRAP CLAMPS (30003200) AROUND HOSE (30014635) 2 PLACES (REFER TO SAMPLE)	3-6 MM GAP BETWEEN HOSE RETURN AND HOSE TO SEPARATOR TANK	VISUAL/SCALE	AREA MANAGER/OPERATOR	100%
	37	REMOVE PAINT MASKING PLATE FOR P-SENSOR. ENSURE "O" RING PRESENT AND MARKER CHECK TOP AND BOTTOM OF RING (P/N 30016310) ** ENSURE RING IS CENTERED **	PAINT FREE	VISUAL	AREA MANAGER/OPERATOR	100%
	38	INSTALL P-SENSOR P/N 3018809 WITH 2 SCREWS P/N 30003198	2 - 4 Nm	TORQUE WRENCH	QA LAB	1/WEEK
	39	CRITICAL: ENSURE THE LONG SIDE OF P-SENSOR IS FACING IN OPPOSITE DIRECTION OF FUEL FILLER NECK	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER/OPERATOR	100%
	40	DROPPING OF P-SENSOR	NOT ALLOWED (NOTIFY Q.C.)	VISUAL	AREA MANAGER/OPERATOR	100%
	41	INSTALL PRE-ASSEMBLIED SUB-ASSEMBLY P/N 268-1 CONSISTS OF: P/N'S 30014576,96057808, 96061880, 30015397	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER/OPERATOR	100%

AS 279995

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	Ⓐ PART				

7-4-8

9/12

FILE: 268-CIS9

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART		1-15-96

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.		INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
11		INPROCESS INSPECTION TOP DRESS CONTINUED				
	42	ENSURE CLIPS (96061880 & 96057808) ARE IN PROPER POSITION	3-8 MM FROM END OF HOSE AND FACING UP	VISUAL/SCALE	AREA MANAGER/OPERATOR	100%
	43	ENSURE 1 CLIP P/N 96061880 ON HOSE P/N 30015397 ON SEPARATOR BOTTLE P/N 30014576 IS IN PROPER POSITION (END CLIP ON TOP HOSE CLOSEST TO FILLER NECK)	40-50 MM FROM END OF HOSE	VISUAL/SCALE	AREA MANAGER/OPERATOR	100%
	44	AFFIX SUB-ASSEMBLY P/N 268-1 WITH 2 SCREWS P/N 30000023	35-70 Kgf.cm	TORQUE WRENCH	AREA MANAGER/OPERATOR	100%
	45	RED MARKER CHECK TO FOLLOWING (CAMI REQUIRE.) P/N 30003198 P/N 30015674 P/N 96061880 P/N 96057808 P/N 30000023	 2 REQUIRED 1 REQUIRED 2 REQUIRED 2 REQUIRED 2 REQUIRED	 VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM	 AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR AREA MANAGER/OPERATOR	 100% 100% 100% 100% 100%
	46	OPERATOR TO PUT BADGE # ON P/N 30014576, SEPARATOR FUEL & VAPOUR BOTTLE.	MUST USE RED MARKER	VISUAL	AREA MANAGER/OPERATOR	100%
	47	LEAK TEST 9.2 P.S.I. 0.65 Kg/cm2 FOR 12-15 SEC.	PRESSURIZE IN TANK, NO LEAKS	VISUAL	AREA MANAGER/OPERATOR	100%
	48	INSERT VALUE COMP FUEL TANK P/N 30016308	MUST BE PRESENT	VISUAL	AREA MANAGER/OPERATOR	100%
	49	ACCEPTED/DATE STAMP	TO SIGNIFY PASS 2ND LEAK TEST	STAMP/VISUAL	AREA MANAGER/OPERATOR	100%
	50	LOAD TANK P/N 30018268 ONTO SKID PLATE P/N 30014575	MUST BE PROPERLY SECURED	VISUAL	AREA MANAGER/OPERATOR	100%

AS 279996

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	(A) PART				

2-4-B

10/12

FILE: 268CIS10

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART		

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
111	FINAL INSPECTION				
	A) BAR CODE TAGS	MUST MATCH PART IN SHIPPING RACK	VISUAL	FINAL AUDITOR	EACH RACK
	B) ALL WELD ARE SECURE	MUST NOT COME LOOSE	PRY	FINAL AUDITOR	EACH RACK
	C) PAINT ON FILLER NECK AND CONNECTORS	NOT ALLOWED	VISUAL	FINAL AUDITOR	EACH RACK
	D) SCREW PRESENCE	MUST HAVE 18	VISUAL	FINAL AUDITOR	EACH RACK
	E) ALL CLAMPS IN PROPER POSITION AND MARKER CHECKED.	MUST HAVE 5	VISUAL	FINAL AUDITOR	EACH RACK
	F) ENSURE PROPER GAP BETWEEN HOSE SEPARATOR AND FUEL RETURN HOSE	MUST HAVE 3 - 6 MM GAP	VISUAL/SCALE	FINAL AUDITOR	EACH RACK
	G) VISUAL CHARACTERISTICS	NO DINGS, DENTS, BARE METAL AND MISSING COMPONENTS ALLOWED.	VISUAL	FINAL AUDITOR	EACH RACK

NOTES: AS PER Q.A.M. #11, REFER TO Q.C.I.'S FOR SPECIAL PROCESSES.
1. ALL NON-CONFORMING MATERIAL TO BE HANDLED PER Q.A.M.#15.
2. ALL RY TEST CONDUCTED PER Q.C.I. #127.
3. SEAM WELD PULL TEST CONDOCTED PER Q.C.I. #130
4. MIG WELD TESTS CONDUCTED PER Q.C.I.#137
5. COLD SPOT WELDS HANDLED PER Q.C.I. #125
6. DESTRUCTIVE TEST OF SPOT WELDS CONDUCTED PER Q.C.I. #008
7. PINHOLE WELD REPAIR PER Q.C.I. #061
8. WELD SPLASH IN THREADS PER Q.C.I. # 062
9. PUSH OUT TEST PER Q.C.I. #009
10. PAINT SPEC VERIFIED QUARTERLY

AS 279997

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	(A) PART				

7-4-B 11/12

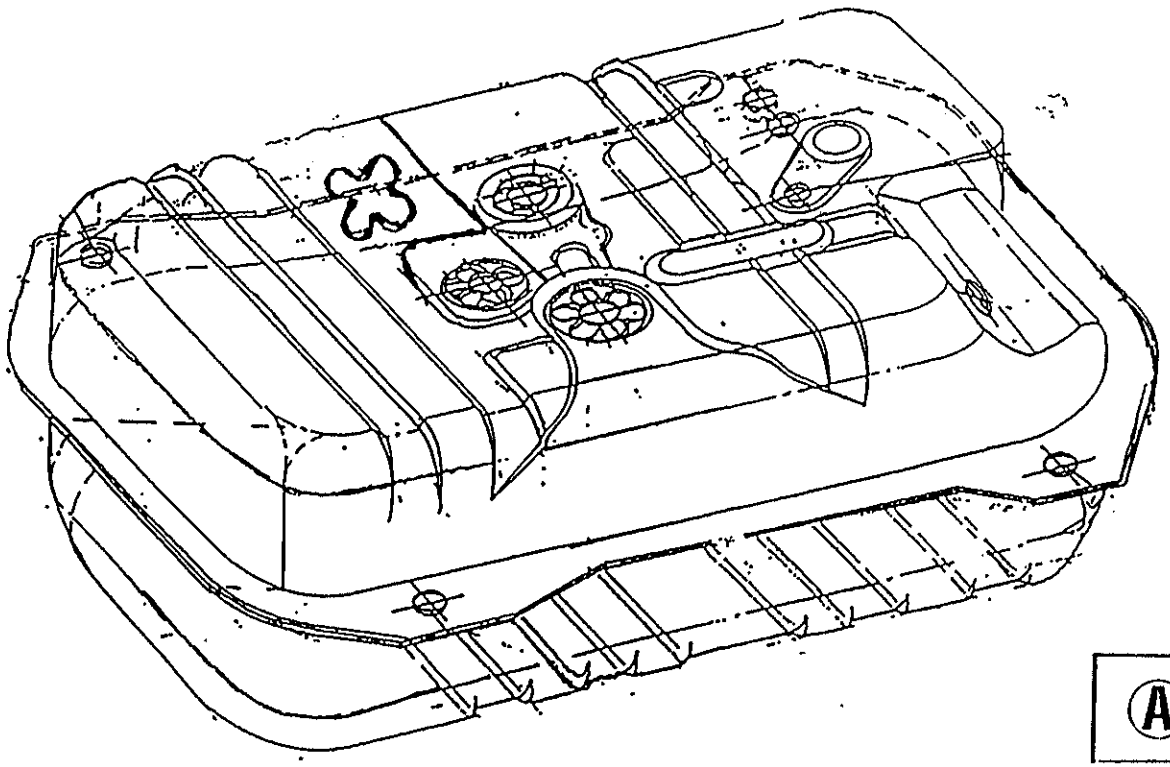
FILE: 260CIS11

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JANUARY 12, 1996	GORD TAGGART		1-15-96

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
30018268 (89019-57861)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 96 MODEL YEAR	Y09-1731	PRINCE METAL PRODUCTS	247650542

NO.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY



A P

MARKS	REASONS FOR REVISION	AUTHORITY	DATE

CAMI Q.C.	
CHECKED BY:	APPROVED BY:

7-4-B

12/12

AS 279998

FILE: 268CIS11

CIS PART INSPECTION STANDARD (A)

(A) PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN ROATH	A. Taggart 3-13-97	3/14/97 9-5-13

T NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
13808 (89019-57B64)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	60A-9380 (CAMI ECN) 6/12/96	PRINCE METAL PRODUCTS	247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
1	RECEIVING INSPECTION 89111-57B30 - GAS TANK UPPER BLANKS (SEE 89111-57B30 CIS)	STCD-92	CERTIFICATION	RECEIVING INSPECTION	EACH BUNDLE OF BLANKS
2	89112-56B00 - GAS TANK LOWER BLANKS (SEE 89112-56B00 CIS)	STCD-92	CERTIFICATION	RECEIVING INSPECTION	EACH BUNDLE OF BLANKS
3	89121-82000 - INLET PIPE (PURCHASED FROM SHELBY) A) OUTER DIAMETER OF TUBE B) OVERALL LENGTH C) COATING D) CHEMICAL COMPOSITION OF STEEL E) INSIDE TUBE DIA.	 42.7 MM +/- 0.5 MM 129.0 MM +/- 1.2 MM MFZn8-C STKM11A	 VERNIER/CALIPER SCALE VISUAL/CERTIFICATION VISUAL/CERTIFICATION CHECK VALVE	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	(AS REQUESTED PER P.O.) PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST)
4	89122-56B00 - PLATE CUT VALVE (PURCHASED FROM LANEX) A) PROJECTION HEIGHTS B) THREAD VERIFICATION C) COATING D) CHEMICAL COMPOSITION E) MAT'L THICKNESS	 1.1 MM +0.2/-0 MM 3 PLACES - M5 MFZn8-C BASE STEEL - SPHC 3.2 ± 0.21	 MICROMETER M5 X 0.8 6H THREAD GAGE VISUAL/ CERTIFICATION CERTIFICATION VISUAL/ CERTIFICATION	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST)
5	89123-50F00 - PLATE, FUEL PUMP ATTACHMENT (PURCHASED FROM NISSHO-IWAI) A) PROJECTION HEIGHTS B) THREAD VERIFICATION C) COATING D) CHEMICAL COMPOSITION E) MAT'L THICKNESS	 1.1 MM +0.2/-0 MM 5 PLACES M5 MFZn8-C BASE STEEL SPHC 3.2 ± 0.21	 MICROMETER M5 X 0.8 6H THREAD GAGE VISUAL/ CERTIFICATION VISUAL/ CERTIFICATION VISUAL/ CERTIFICATION	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST)
6	89124-51F00 - PLATE FUEL PUMP ATTACHMENT(LANEX) A) PROJECTION HEIGHTS B) THREAD VERIFICATION C) COATING D) CHEMICAL COMPOSITION E) MAT'L THICKNESS	1.1 MM +0.2/-0 MM 6 PLACES M5 MFZn8-C BASE STEEL SPHC 3.2 ± 0.21	MICROMETER M5 X 0.8 6H THREAD GAGE VISUAL/ CERTIFICATION VISUAL/ CERTIFICATION VISUAL/ CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST) PER SAMPLING PLAN QPM 4.10.2.2(AS REQUEST)

CAMI Q.C.

ARKS	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
"1"	PUMP CHANGE FROM 30014233 TO 30018725	GORD TAGGART	04/22/96	04-25-97	
"2"	NEW GUSSET P/N 30019617	GORD TAGGART	06/20/96		
3"	SEL CHANGE & "F" SENSOR CHANGE	GORD TAGGART	03/07/97	S-DUNN	

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AS 279999

CIS PART INSPECTION STANDARD (A)

(A) PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN POATH	J. Taggart 3-13-97	3/14/97

NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
68S [illegible]	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	6AA-9380 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
7	RECEIVING INSPECTION CONTINUED 38015611 (89125-57B30) GUSSET FUEL TANK NO.1	S6ACE - 45/45	REFER CIS '89125-57B30'		
8	89126-56B00 - GUSSET FUEL TANK NO.2 (SEE 89126-56B00 CIS)	S6AHC-45/45	CERTIFICATION REFER CIS '89126-56B00'	RECEIVING INSPECTION	EACH COIL
9	89127-56B00 - GUSSET FUEL TANK NO.3 (SEE 89127-56B00 CIS)	S6AHC-45/45	CERTIFICATION REFER CIS '89127-56B00'	RECEIVING INSPECTION	EACH COIL
10	89129-56A00 - PLATE, P-SENSOR ATTACHMENT (PURCHASED FROM LANEX) A) MATERIAL THICKNESS B) PROJECTION HEIGHTS C) THREAD VERIFICATION D) COATING E) CHEMICAL COMPOSITION	 3.2 MM +/- 0.21 MM 1.1 MM +0.2/-0 MM 2 PLACES - M5 MFZnB-C BASE STEEL - SPHC	 MICROMETER MICROMETER M5 X 0.8 6H THREAD GAGE VISUAL / CERTIFICATION VISUAL / CERTIFICATION	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.)
11	89130-57B20 - PIPE COMP FUEL TANK BREATHER A) OUTER DIAMETER OF TUBE B) OUTER DIAMETER OF END OF TUBE C) COATING D) CHEMICAL COMPOSITION E) WELD INTEGRITY	 14.0 MM +/- 0.05 MM 15.4 MM +/- 0.3 MM MFZnB-C BASE STEEL - STKM11A P.P.M.	 VERNIER VERNIER CERTIFICATION CERTIFICATION PRY TOOL	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.) PER SAMPLING PLAN QPM 4.10.2.2 (EACH SHIP.)
12	89135-60A00 - BRACKET FUEL TANK BREATHER (SEE 89135-60A00 CIS)	S6ACC-45/45	CERTIFICATION REFER CIS '89135-60A00'	RECEIVING INSPECTION	EACH COIL
13	89171-61A00 - OUTER POT (SEE 89171-61A00 CIS)	ZLE-20/20C	CERTIFICATION REFER CIS '89171-61A00'	RECEIVING INSPECTION	EACH COIL
14	89172-56B00 - INNER POT (SEE 89172-56B00 CIS)	ZLE-20/20	CERTIFICATION REFER CIS '89172-56B00'	RECEIVING INSPECTION	EACH COIL

CAMI Q.C.

REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
PUMP CHANGE FROM 30014333 TO 30019726	JOSEPH TAGGART	04/22/96		
NEW GUSSET P/N 300*	JOSEPH TAGGART	06/20/96		
[illegible]	[illegible]	10/07/97		

AS 280000

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CIS PART INSPECTION STANDARD (A)

Ⓐ PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN FOATH	J. Taggart 3-13-97	3/14/97

PT NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
19888	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	60A-9380 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
	RECEIVING INSPECTION CONTINUED				
15	89176-61A00 - BRACKET (SEE 89176-61A00 CIS)	ZLC-20/20 REFER CIS 89176-61A00	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
16	89177-61A00 - BRACKET (SEE 89177-61A00 CIS)	ZLC-20/20 REFER CIS 89177-61A00	CERTIFICATION	RECEIVING INSPECTION	EACH COIL
17	89178-60A00 - VAPOUR SEP BRKT ASSY PLATED (SEE 89178-60A00 CIS) COATING PERFORMED BY KLINEC	SPCC-NS REFER CIS 89178-60A00 MZn8-C	CERTIFICATION CERTIFICATION	RECEIVING INSPECTION RECEIVING INSPECTION	EACH COIL PER SAMPLING PLAN QPM 4.10.2.2 (AS REQUEST)
18	09405-35302 (30001095) - CLAMP FUEL TANK (PURCHARED FROM MARWOOD) * PART NOT AS SHOWN ON PART PRINT A) MATERIAL THICKNESS B) BLACK COATING	0.7 MM +/- 0.04 MM (MUST BE PRESENT) 15.0 TO 18.0 MM FROM EDGE OF PART MUST HAVE NO COATING	MICROMETER VISUAL AND SCALE	RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (EACH SHIP)
19	09405-65303 (30003200) - CLAMP FUEL TANK (PURCHARED FROM MARWOOD) * PART NOT AS SHOWN ON PART PRINT A) MATERIAL THICKNESS B) BLACK COATING	0.7 MM +/- 0.04 MM MUST BE PRESENT AND 15.0 TO 18.0 MM FROM EDGE OF PART	MICROMETER VISUAL	RECEIVING INSPECTION RECEIVING INSPECTION	PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (EACH SHIP)
20	99495-5E800 (30014579) - CUT VALVE (PURCHASED BY NISSHO IWAI) * CAMI APPROVED SOURCE	PART CERTIFICATION FOR ALL TESTS, DIMENSIONS AND MATERIALS	CERTIFICATION	RECEIVING INSPECTION	AS REQUESTED
21	24810-70E30 (30013887) GAUGE ASSY FUEL LEVEL (PURCHASED FROM NISSHO IWAI) * CAMI APPROVED SOURCE	PART CERTIFICATION FOR ALL TESTS, DIMENSIONS AND MATERIALS	CERTIFICATION	RECEIVING INSPECTION	AS REQUESTED
22	16100-55B01 (30015726) - PUMP ASSY FUEL (PURCHASED FROM SUTPANS - CONSIGNMENT) * CAMI APPROVED SOURCE	PART CERTIFICATION FOR ALL TESTS, DIMENSIONS AND MATERIALS	CERTIFICATION	RECEIVING INSPECTION	AS REQUESTED

REVISION	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
"1"	PUMP CHANGE FROM 30014533 TO 30016726	BOFD TASSART	04/22/96		
"2"	NEW GUSSET P/N 30019611	BOFD TASSART	05/20/96		
"3"	NEW ECL & "R" SENSOR CHANGE	BOFD TASSART	03/07/97		

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AS 280001

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

CIS PART INSPECTION STANDARD (A)

Ⓐ PART

		DATE: JUNE 20, 1996	PROPOSED BY: KEVIN ROATH	CHECKED BY: S. Taggart 3-13-97	APPROVED BY: [signatures] 3/14/97 97-3-13
NUMBER: 5686 (89019-57B64)	PART NAME: 4 DOOR TRUCK TANK FUEL ASSEMBLY	MODEL: 4 DOOR GAS TANK	ENG CHANGE NUMBER: 60A-9380 (CAMI ECN) 06/12/96	SUPPLIER NAME: PRINCE METAL PRODUCTS	DUNS NUMBER: 247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
	RECEIVING INSPECTION CONTINUED				
23	09139-05045 (30003199)-SCREW FUEL LEVEL GAUGE A) THREAD VERIFICATION B) COATING C) CHEMICAL COMPOSITION D) HEAD HEIGHT E) THREAD AND RECESSED LENGTH	 M5 X 0.8 MFC/ZD CH12C 3.3 MM +/- 0.15 MM 13.0 MM +0/-0.8 MM	 THREADED RING GAGE CERTIFICATION CERTIFICATION VERNIER VERNIER	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST)
24	RECEIVING INSPECTION TOP DRESS - CUSTOMER SUPPLIED MATERIAL A. 30014576 (89411-56B00) B. 30014635 (09356-55117-410) C. 30015397 (09356-55113-21010) D. 30016308 (83280-50FG0) E. 30019909 (69421-79E10) F. 30016310 (89425-79E00) G. 96057808 (09401-11412) H. 96061880 (09401-11413) I. 30015674 (09402-15511) J. 268-1 K. 30014575 (PROTECT) L. MIS WIRE (0.9MM) TYPE NS101 - (PRAXAIR)	 1. NO VISUAL DEFECTS OF DIRT 2. VERIFY QUANTITY 3. PMF LOT NUMBER 4. OUTSTANDING ORDER & 5) BUYER'S DUE DATE 5. AFFIX CSM STICKER TO EACH PALLET OF MATERIAL RECEIVED	 VISUAL VISUAL ASSIGNED VISUAL VISUAL	 RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST)
25	30000023 - (02142-05083) THREAD VERIFICATION VERIFY QUANTITY	 M5 X 0.8 MM VERIFY QUANTITY	 RING GAGE VISUAL	 RECEIVING INSPECTION RECEIVING INSPECTION	 PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST) PER SAMPLING PLAN QPM# 4.10.2.2 (AS REQUEST)
1	INPROCESS INSPECTION 89111-57B30 89112-57B30 PROJECTION WELD (2) P/N 08315-01059 WELD NUTS 5 MM TO P/N 85178-60A00 BRACKET	SEE CIS FOR IN-PROCESS CONTROLS MUST PULL PARENT MATERIAL NO WELD SPLASH ALLOWED	PUSH OUT TEST	AREA MANAGER AND OPERATOR	2 PCS PER SHIFT DESTRUCT TEST AND 100% PRY TOOL CHECK
2	SPOT WELD P/N 85178-61A00 & 89177-61A00 BRKTS TO 89171-61A00 OUTER VESSEL (6 SPOTS)	MUST PULL PARENT MATERIAL	HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2 PCS PER SHIFT DESTRUCT TEST AND 100% PRY TOOL CHECK
3	SPOT WELD P/N 89172-56B00 INNER VESSEL TO P/N 89171-61A00 OUTER VESSEL (6 SPOTS)	MUST PULL PARENT MATERIAL	HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2 PCS PER SHIFT DESTRUCT TEST AND 100% PRY TOOL CHECK

CAMI Q.C.

REV	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
	PUMP CHANGE FROM 30014333 TO 30019728	BERT TAGGART	04/22/96		
	NEW SUBSET P/N 30019511	BERT TAGGART	06/20/96		
	NEW EOL & (P) SENSOR CHANGE	BERT TAGGART	03/07/97		

NAME: 989-1194

AS 280002

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EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

CIS PART INSPECTION STANDARD (A)

Ⓐ PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN FOATH	G. Taggart 3-13-97	3/14/97 97-3-13

PART NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
919888 (83019-57B64)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	EOA-9360 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

NO.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
	INPROCESS INSPECTION CONTINUED				
4	PROJECTION WELD P/N 89124-51F00 TO P/N 89111-57B30 (6 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. PLATE MUST NOT COME LOOSE	2. PRY	AREA MANAGER AND OPERATOR	100%
5	PROJECTION WELD P/N 89123-50F00 TO P/N 89111-57B30 (5 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. PLATE MUST NOT COME LOOSE	2. PRY	AREA MANAGER AND OPERATOR	100%
6	PROJECTION WELD P/N 89122-56B00 TO P/N 89111-57B30 (3 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. PLATE MUST NOT COME LOOSE	2. PRY	AREA MANAGER AND OPERATOR	100%
7	PROJECTION WELD P/N 89129-66A00 TO P/N 89111-57B30 (4 PLACES)	1. EACH PROJECTION MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. .012 FEELER MUST NOT PASS UNDER PROJECTION	2. FEELER GAUGE	AREA MANAGER AND OPERATOR	2/SHIFT
		3. PLATE MUST NOT COME LOOSE	3. PRY	AREA MANAGER AND OPERATOR	100%
8	SPOT WELD P/N 89130-57B20 TO P/N 89111-57B30 (2 PLACES)	1. EACH SPOT WELD MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER AND OPERATOR	100%
9	BRAZE P/N 89130-57B20 TO P/N 89111-57B30 (360 DEGREES)	1. MUST NOT LEAK	1. LEAK TESTER	AREA MANAGER AND OPERATOR	100%
		2. MUST EXHIBIT CAPILLARY ATTRACTION	2. CUT, MOUNT, POLISH, ETCH	QUALITY ASSURANCE	ONCE PER WEEK
10	SPOT WELD "4" P/N 09405-65303 (30003200) CLIPS TO P/N 89111-57B30	1. SPOT WELD MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT

CAMI Q.C.

MARKS	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
"1"	PUMP CHANGE FROM 30014332 TO 30018725	GORD TAGGART	04/22/96		
"2"	NEW GUSSET P/N 30019611	GORD TAGGART	05/20/96		
"3"	ECL CHANGE & FPT SENSOR CHANGE	GORD TAGGART	03/07/97		

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AS 280003

CIS PART INSPECTION STANDARD (A)

Ⓐ PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN POATH	J. Taggart 3-13-97	3/14/97

NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
888 (89017-57B54)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR 6AS TANK	60A-9389 (CAMI ECN) 05/12/95	PRINCE METAL PRODUCTS	247650543

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
	INPROCESS INSPECTION CONTINUED				
11	SPOT WELD "1" 09405-35303 (30001095) CLIP TO P/N 89111-57B30	1. EACH PROJECTION MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. PLATE MUST NOT COME LOOSE	2. PRY	AREA MANAGER AND OPERATOR	100%
12	SPOT WELD P/N 89178-60A00 TO P/N 89111-57B30 (2 PLACES) ** LOCATION IMPORTANT **	1. EACH SPOT WELD MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER AND OPERATOR	100%
		3. STRAIGHT FLANGE ON BRKT TOWARDS FUEL INLET HOLE	3. VISUAL	AREA MANAGER AND OPERATOR	100%
		4. 2-5 MM NUTS MUST BE PRESENT PARENT MATERIAL	4. VISUAL	AREA MANAGER AND OPERATOR	100%
13	SPOT WELD P/N 89170-56B00 TO P/N 89112-56B00 (6 PLACES)	1. EACH SPOT WELD MUST PULL MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
		2. PART MUST NOT COME LOOSE	2. PRY	AREA MANAGER AND OPERATOR	100%
14	SPOT WELD P/N 89111-57B30 TO P/N 89112-56B00 (4 PLACES)	1. EACH SPOT WELD MUST PULL PARENT MATERIAL	1. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	2/SHIFT
15	SEAM WELD P/N 89111-57B30 TO P/N 89112-56B00 Ⓐ	1. MUST NOT LEAK	1. LEAK TESTER	AREA MANAGER AND OPERATOR	100%
		2. MUST NOT SEPARATE	2. HAMMER AND CHISEL	AREA MANAGER AND OPERATOR	EVERY 75 PARTS
		3. MUST NOT BREAK AT WELD	3. TENSILE TESTER	AREA MANAGER AND OPERATOR	1/WEEK
		4. SEAM WELD MUST PASS AS CLOSE AS POSSIBLE TO TANK BUT MUST NOT PASS CORNER RADII	4. VISUAL	AREA MANAGER AND OPERATOR	100%
16	STAMP LOT TRACEABILITY ON P/N 89125-60A00 AS SHOWN BELOW 102 E 108 = TANK NUMBER └ YEAR └ JULIAN DATE	1. MUST BE PRESENT AND LEGIBLE	1. VISUAL	AREA MANAGER AND OPERATOR	100%

CAMI Q.C.

S	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
	PUMP CHANGE FROM 30014333 TO 30018726	GORI TAGGART	04/22/96		
	NEW GUSSET P/N 30019611	GORD TAGGART	06/20/96		
	NEW SIZE & "P" SE HANGE	GORD TAGGART	03/07/97		

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AS 280004

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

7-4-C page 7/12

CIS PART INSPECTION STANDARD (A)

Ⓐ PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN ROATH	J. Taggart 3-13-97	D. DeMol 3/14/97 77-3-13

[PA]RT NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
19888 (89019-57B64)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	60A-5380 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
17	INPROCESS INSPECTION CONTINUED SPOT WELD "2" P/N 30019611 (89125-57B30) (2 PLACES EACH) TO TANK ASSEMBLY.	1. MUST NOT COME LOOSE 2. PITCH BETWEEN SPOT WELDS 70.0 MM +/- 5.0 MM 3. SPOT WELDS LOCATION TO HOLE OFFSET 5.5 MM + 4.0 MM 4. PARALLALISM WITHIN 1.9 MM LOC. A & B	1. FFY (100%) 2. & 3. SPOT WELD MUST BE WITHIN TEMPLATE REQUIREMENTS 4. TAPER RULE	AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR	2/SHIFT • •
	SPOT WELD P/N 89126-56B00 (2 PLACES) TO TANK ASSEMBLY SPOT WELD P/N 89127-56B00 (2 PLACES) TO TANK ASSEMBLY	1. MUST NOT COME LOOSE	1. FFY (100%)	AREA MANAGER AND OPERATOR	2/SHIFT
18	MIG WELD P/N 89121-82000 TO TANK UPPER ASSEMBLY	1. MUST NOT LEAK 2. 10% PENETRATION	1. LEAK TESTER 2. CUT, MOUNT, POLISH, ETCH	AREA MANAGER AND OPERATOR Q.C. LAB/LAYOUT	100% 1/WEEK
19	MIG FOR SECURITY P/N 89126-56B00 AND P/N 89127-56B00 TO TANK ASSEMBLY (3 PLACES EACH COMPONENT)	1. MUST BE PRESENT AND VISUALLY ACCEPTABLE	1. VISUAL	AREA MANAGER AND OPERATOR	100%
20	ATTACH P/N 15100-58B01 (30018726) TO TANK ASSEMBLY USING (6) SCREWS P/N 09136-05045 (30003198)	1. TORQUE - 20-40 Kgf.cm. 2. MUST NOT LEAK	1. TORQUE WRENCH-SET AT 30Kgf.cm (17.36-34.72INLBS) 2. LEAK TESTER SET AT 26.04INLBS)	Q.C. LAB/LAYOUT AREA MANAGER AND OPERATOR	1/WEEK 100%
21	ATTACH P/N 34810-70E10 (30017817) TO TANK ASSEMBLY USING 5 SCREWS P/N 09136-05045 (30003198)	1. TORQUE 20-40 Kgf.cm. 2. MUST NOT LEAK	1. TORQUE WRENCH-SET AT 30Kgf.cm (17.36-34.72INLBS) 2. LEAK TESTER SET AT 26.04INLBS)	Q.C. LAB/LAYOUT AREA MANAGER AND OPERATOR	1/WEEK 100%
22	ATTACH P/N 89485-5EB00 (30014579) TO TANK ASSY USING (3) P/N 09136-05045 (30003198)	1. TORQUE 20-40 Kgf.cm. 2. MUST NOT LEAK	1. TORQUE WRENCH-SET AT 30Kgf.cm (17.36-34.72INLBS) 2. LEAK TESTER SET AT 26.04INLBS)	Q.C. LAB/LAYOUT AREA MANAGER AND OPERATOR	1/WEEK 100%
23	INSTALL PROPER MASKING DEVICES 1. YELLOW CAP ON P/N 89130-57B20 2. REMOVE SMALL BLACK CAP FROM P/N 30018726 AND PUT ON P/N 30014579 3. PLACE "O" RING P/N 30016310 IN SLOTTED GROOVE OF P-SENSOR RING P/N 89129-56A00 AND SEAL WITH P-SENSOR PLATE MADE FOR MASKING (2) SCREWS 30003198	1. MUST BE PRESENT 2. MUST BE PRESENT 3. MUST BE PRESENT & WATER MUST NOT ENTER TANK ASSY	1. VISUAL 2. VISUAL 3. VISUAL	AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR	100% 100% 100%

CAMI Q.C.

E	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
	PUMP CHANGE FROM 30014332 TO 30018726	SORD TAGGART	04/22/96		
	NEW GUSSET P/N 30019611	SORD TAGGART	06/20/96		
	[illegible]	[illegible] TAGGART	[illegible]		

AS 280005

CIS PART INSPECTION STANDARD (A)

(A) PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN ROATH	J. Taggart 3-13-97	3/14/97

NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
3888 (35913-57B04)	4 DOOR TRUCK TANK FUEL ASSEMELY	4 DOOR GAS TANK	60A-9380 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
	INPROCESS INSPECTION CONTINUED				
24	LEAK TEST	1. 0.65 Kg/cm^2 (9.2psi) FOR 30 SECONDS. NO BUBBLES ALLOWED. 2. MUST PASS ALL REQUIREMENTS OF LEAK TEST CARD.	1. VISUAL 2. VISUAL	AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR	100% 100%
25	MARK WHITE LINE INSIDE FILLER TUBE TO SIGNIFY TANK PASSED LEAK TEST	1. WHITE LINE MUST BE PRESENT	1. VISUAL	AREA MANAGER AND OPERATOR	100%
26	MUST PUNCTURE BLACK PUMP CAP	1. MUST BE PRESENT	1. VISUAL	AREA MANAGER AND OPERATOR	100%
27	ATTACH MASKING DEVICE OVER FILLER NECK TUBE	1. MUST BE PRESENT	1. VISUAL	AREA MANAGER AND OPERATOR	100%
28	TOTAL VISUAL INSPECTION FOR COMPONENTS (SEE PUNCH CARD)	1. CARD MUST BE PUNCHED TO VERIFY CHECK	1. VISUAL	AREA MANAGER AND OPERATOR	100%
29	HANG TANK ON PAINT LINE ATTACHING TUBE TO PUMP AND POSITION WIRES TO HOOK	1. MUST BE DONE PROPERLY	1. VISUAL	AREA MANAGER AND OPERATOR	100%
30	6 STAGE WASH (CONCENTRATION/TEMPERATURE)	STAGE 1. CONC 0.0-0.3 oL HOT WATER 2. CONC. 17-22 oL COLD WATER 3. CONC 0.0-0.3 oL COLD WATER 4. CONC 0.0-0.3 oL COLD WATER 5. CONC. 0.1 MAX oL AMBIENT 6. FRESH WATER RINSE	SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET SEE PROCEDURE SHEET	AREA MANAGER AREA MANAGER AREA MANAGER AREA MANAGER AREA MANAGER AREA MANAGER	1/SHIFT 1/SHIFT 1/SHIFT 1/SHIFT 1/SHIFT 1/SHIFT
31	FLOW RATE OF FLOW COAT - ENAMEL VISCOSITY	26-30 SEC	VISCOSITY CUP	AREA MANAGER AND OPERATOR	1/SHIFT
32	SAVER PAINT AND PRIME THICKNESS	PRIMER - 8 oL MIN, 12 oL MAX PAINT - 0.5 oL MIN	PAINT THICKNESS GAGE PAINT THICKNESS GAGE	AREA MANAGER AREA MANAGER	1/SHIFT 1/SHIFT

CAMI Q.C.

S	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
	PUMP CHANGE FROM 30014333 TO 30018728	GORD TAGGART	04/22/96		
	NEW GASKET P/N 30019611	GORD TAGGART	05/20/96		
	NEW SEAL P/N [illegible] HANGE	GORD TAGGART	03/07/97		

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AS 280006

CIS PART INSPECTION STANDARD (A)

Ⓐ PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN ROATH	3-13-97	3/14/97 97-3-13

PT NUMBER	PART NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
19888 (55019-57B64)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	60A-9380 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
	INPROCESS INSPECTION CONTINUED				
33	100% VISUAL INSPECTION	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER AND OPERATOR	100%
34	TOP DRESS INSERT CLAMP P/N 30015674 AND HOSE P/N 30014635 ONTO FUEL PUMP	TIGHTENING TORQUE 15 - 20 Kgf.cm. (13.02 - 17.36 IN.LBS.)	TORQUE WRENCH	QUALITY LAB/LAYOUT	1/WEEK
35	ENSURE CLAMP (30015674) IS IN PROPER POSITION (REFER TO SAMPLE)	SCREW HEAD FACING UP WITH SCREW SIDE TOWARDS FUEL INLET 3 - 6 MM FROM END OF HOSE	VISUAL/SCALE	AREA MANAGER AND OPERATOR	100%
36	WRAP CLAMPS (30003200) AROUND HOSE (30014635) 2 PLACES (REFER TO SAMPLE)	3-6 MM GAP BETWEEN HOSE RETURN AND HOSE TO SEPARATOR TANK	VISUAL/SCALE	AREA MANAGER AND OPERATOR	100%
37	REMOVE PAINT MASKING PLATE FOR P-SENSOR. ENSURE "O" RING PRESENT AND MARKER CHECK TOP AND BOTTOM OF RING (P/N 30016310) ** ENSURE RING IS CENTERED **	PAINT FREE	VISUAL	AREA MANAGER AND OPERATOR	100%
38	INSTALL P-SENSOR P/N 30018909 WITH 2 SCREWS P/N 30013198 (RE-USE PRESENT SCREWS ON SENSOR PLATE)	TIGHTENING TORQUE 20 - 40 Kgf.cm. (17.36 - 34.72 IN.LBS.)	TORQUE WRENCH	QUALITY LAB/LAYOUT	1/WEEK
39	CRITICAL: ENSURE THE LONG SIDE OF P-SENSOR IS FACING IN OPPOSITE DIRECTION OF FUEL FILLER NECK	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER AND OPERATOR	100%
40	DROPPING OF P-SENSOR	NOT ALLOWED (NOTIFY Q.C.)	VISUAL	AREA MANAGER AND OPERATOR	100%
41	INSTALL PRE-ASSEMBLED SUB-ASSEMBLY P/N 2EB-1 CONSISTS OF: P/N 30014576, 96057808, 96061830, 30015397	COMPARE TO MASTER SAMPLE	VISUAL	AREA MANAGER AND OPERATOR	100%

CAMI Q.C.

REVISION	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
[illegible]	PUMP CHANGE FROM 30014232 TO 30018726	GORD TAGGART	04/22/96		
[illegible]	NEW GUSSET P/N 30019511	GORD TAGGART	06/20/96		
[illegible]	NEW P/N & "O" SENSOR CHANGE	GORD TAGGART	07/02/96		

AS 280007

2-4-C page 9/12

CIS PART INSPECTION STANDARD (A)

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN ROATH	3-13-97	3/14/97

Ⓐ PART

NUMBER	NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
3898 (89019-57B647)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR CAR TANK	60A-9380 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
	INPROCESS INSPECTION CONTINUED				
42	ENSURE CLIPS (96061B60 & 96057B08) ARE IN PROPER POSITION	3 - 8 MM FROM END OF HOSE AND FACING UP	VISUAL/SCALE	AREA MANAGER AND OPERATOR	100%
43	ENSURE 1 CLIP P/N 96061B80 ON HOSE P/N 30015397 ON SEPARATOR BOTTLE P/N 30014576 IS IN PROPER POSITION (END CLIP ON TOP HOSE CLOSEST TO FILLER NECK)	40-50 MM FROM END OF HOSE	VISUAL/SCALE	AREA MANAGER AND OPERATOR	100%
44	AFFIX SUB-ASSEMBLY P/N 268-1 WITH 2 SCREWS P/N 30000023.	TIGHTENING TORQUE 35 - 70 Kgf.cm. (30.38 - 60.76 IN.LBS.)	TORQUE WRENCH	AREA MANAGER AND OPERATOR	100%
45	RED MARKER CHECK TO FOLLOWING (CAMI REQUIRE.) P/N 30013198 P/N 30015674 P/N 96061B80 P/N 96057B06 P/N 30000023	 2 REQUIRED 1 REQUIRED 1 REQUIRED 2 REQUIRED 2 REQUIRED	 VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM VISUAL/PUNCHCARD SYSTEM	 AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR AREA MANAGER AND OPERATOR	 100% 100% 100% 100% 100%
46	OPERATOR TO PUT BADGE # ON P/N 30014576, SEPARATOR FUEL & VAPOUR BOTTLE.	MUST USE RED MARKER	VISUAL	AREA MANAGER AND OPERATOR	100%
47	LEAK TEST 9.2 P.S.I.(0.65 Kg/cm2) FOR 12-15 SEC.	PRESSURIZE IN TANK, NO LEAKS	VISUAL	AREA MANAGER AND OPERATOR	100%
48	INSERT VALVE COMP FUEL TANK P/N 30016308	MUST BE PRESENT	VISUAL	AREA MANAGER AND OPERATOR	100%
49	ACCEPTED/DATE STAMP	TO SIGNIFY PASS 2ND LEAK TEST	STAMP/VISUAL	AREA MANAGER AND OPERATOR	100%
50	LOAD TANK P/N 30018740 ONTO SKID PLATE P/N 30014575	MUST BE PROPERLY SECURED	VISUAL	AREA MANAGER AND OPERATOR	100%

CAMI Q.C.

S	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
	PUMP CHANGE FROM 30014333 TO 30018726	BOPD TAGGART	04/22/96		
	NEW GUSSET P/N 30019611	BOPD TAGGART	06/20/96		
	NEW SIL [illegible] SENSOR CHANGE	BOPD TAGGART	03/07/97		

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NAME: 9961[illegible]

AS 280008

CIS PART INSPECTION STANDARD (A)

(A) PART

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN ROATH	Y. Taggart 3-13-97	3/14/97 97-8-13

ART NUMBER	AR NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
3019888 (33019-57B64)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	60A-5389 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	247650542

O.	INSPECTION CHARACTERISTICS	CRITERIA	INSPECTION METHOD	INSPECTION DIVISION	QUANTITY AND FREQUENCY
1	FINAL INSPECTION				
	A) BAR CODE TAGS	MUST MATCH PART IN SHIPPING RACK	VISUAL	FINAL AUDITOR	EACH RACK
	B) ALL WELDS ARE SECURE	MUST NOT COME LOOSE	PRY	FINAL AUDITOR	EACH RACK
	C) PAINT ON FILLER NECK AND CONNECTORS	NOT ALLOWED	VISUAL	FINAL AUDITOR	EACH RACK
	D) SCREW PRESENCE	MUST HAVE 18	VISUAL	FINAL AUDITOR	EACH RACK
	E) ALL CLAMPS IN PROPER POSITION AND MARKER CHECKED	MUST HAVE 5	VISUAL	FINAL AUDITOR	EACH RACK
	F) ENSURE PROPER GAP BETWEEN HOSE SEPARATOR AND FUEL RETURN HOSE	MUST HAVE 3 - 6 MM GAP	VISUAL/SCALE	FINAL AUDITOR	EACH RACK
	G) VISUAL CHARACTERISTICS	NO DINGS, DENTS, BARE METAL AND MISSING COMPONENTS ALLOWED	VISUAL	FINAL AUDITOR	EACH RACK

NOTES: AS PER Q.A.M.#11, REFER TO Q.C.I.'S FOR SPECIAL PROCESSES.
1. ALL NON-CONFORMING MATERIAL TO BE HANDLED PER Q.P.M. 4.13
2. ALL PRY TEST CONDUCTED PER Q.C.I. #127
3. SEAM WELD PULL TEST CONDUCTED PER Q.C.I.#130
4. MIG WELD TESTS CONDUCTED PER Q.C.I. #137
5. COLD SPOT WELDS HANDLED PER Q.C.I. #125
6. DESTRUCTIVE TEST OF SPOT WELDS CONDUCTED PER Q.C.I. #008
7. PINHOLE WELD REPAIRE PER Q.C.I. #061
8. WELD SPLASH IN THREAD PER Q.C.I. #062
9. PUSH OUT TEST PER Q.C.I. #109
10. PAINT SPEC VERIFIED QUARTERLY.

CAMI Q.C.

...ES	REASONS FOR REVISION	AUTHORITY	DATE	CHECKED BY:	APPROVED BY:
1*	PUMP CHANGE FROM 30014238 TO 30018726	GORD TAGGART	04/22/96		
2*	NEW SHEET P.N 30019811	GORD TAGGART	05/20/96		
3*	NEW ECL & 'P' SENSOR CHANGE	GORD TAGGART	03/07/97		

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E NAME: BB801811

AS 280009

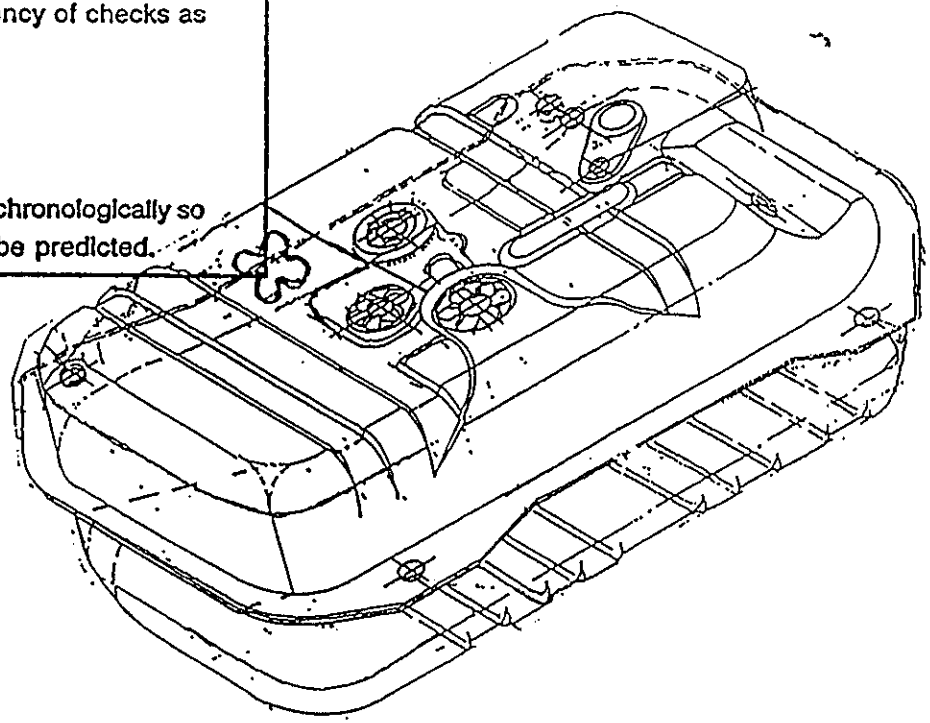
CIS PART INSPECTION STANDARD (A)

Ⓐ PART

T NUMBER	RT NAME	MODEL	ENG CHANGE NUMBER	SUPPLIER NAME	DUNS NUMBER
13856 (65019-57864)	4 DOOR TRUCK TANK FUEL ASSEMBLY	4 DOOR GAS TANK	60A-9380 (CAMI ECN) 06/12/96	PRINCE METAL PRODUCTS	147650542

DATE:	PROPOSED BY:	CHECKED BY:	APPROVED BY:
JUNE 20, 1996	KEVIN PORTH	T. Taggart 3-13-97	3/14/97 7-3-15

SUPPLIER DATA should be supplied to CAMI on the items marked. Data is due at CAMI by the 10th day of the following month. Data frequency of checks as follows: 1/ Ⓐ Items - each lot
2/ Ⓞ Items - each lot
3/ Ⓕ Items - 1 per month
4/ X Items - 1 per month
Inspection data should be formated chronologically so the movement in the process can be predicted.



S	REASONS FOR REVISION	AUTHORITY	DATE	CAMI Q.C. CHECKED BY:	CAMI Q.C. APPROVED BY:
	PUMP CHANGE FROM 20014233 TO 20018726	GOPD TA66APT	04/22/96		
	NEW GUSSET P/N 20019611	GOPD TA66APT	06/20/96		
	NEW ECL & EF SENSOR CHANGE	GOPD TA65APT	03/07/97		

NAME: PORTER

AS 280010

7-4-C

1. Objec... is document outlines CAMI'S procedure for requesting ...inal Part Approval". It's purpose is to clarify the Part Approval procedure and the Quality Standards.

2. Scope Supplier should determine which Part number requires this confirmation procedure. Prior to submission of this document, each product must meet the following conditions:

1. Product must meet all dimensional and functional quality requirements as specified on prints, DSF's, CIS etc.
2. All corrective actions requested by CAMI for quality improvement must be complete.
3. Inspection Standards and Process Control Standards are to be complete and submitted to CAMI.
4. Dies, jigs, process and facility are fully prepared for mass production.

This document shall not be submitted unless all the conditions noted above are satisfied!

3. When to Report Time to be determined by the supplier. It must be submitted prior to mass production.

4. How to Report Complete the attached form and submit the original to Cami.

5. Send to Quality Control Department, CAMI Automitve, Inc.

6. Approval After this document has been submitted to CAMI, it will be reviewed in conjunction with results from Joint Inspection and the review of the supplier's production process. A copy will then be returned to the supplier.

Note Corrective measures shall be taken in consultation between CAMI and the supplier to address all quality problems which may occur at CAMI and in the market following the Final Part Approval.

---- --VAL813

SUPPLIER NAME: P.N.P.

Engineering Change Level: Y19-1315

DUNS #: 247650542

Part Number:	Part Name:	(A) PART
30014813 (89019-57B30)	TRUCK FUEL TANK ASSEMBLY (4 DOOR)	

Part Classification:

_A (A) Part ___ E Part ___ Functional _X_ General

Manager, Quality Control (Submitted By)

Signature L. Taggart 3-15-94

Manager, Sales (Submitted By)

Signature Peter Lee

Complete the following by referring to Section 2:

	YES	NO	DATE
1. CIS/CONTROL PLAN	X	___	03/16/94
2. CAMI CORRECTIVE ACTION	N/A	___	NOT REQ'D
3. INSPECTION/PROCESS STANDARDS	X	___	03/16/94
4. Dies/Moulds	X	___	
5. Jigs/Fixtures	X	___	
6. Process	X	___	
7. Facility	X	___	

CAMI Decision _X_ Accept ___ Reject

Date: 03/22/94

Comments: Tank cross + Lower KD supplied

Comments	Quality Control	Purchasing
	03/23	

Supplier ▸▸ CAMI Q.C. ▸▸ Purchasing (Original) ▸▸ Supplier (copy)
CAMI Q.C. (copy)

4/6/94 JC

7-5-A Page 1/1

AS 280011

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

1. Objective This document outlines CAMI'S procedure for requesting "Final Part Approval". It's purpose is to clarify the Part Approval procedure and the Quality Standards.

2. Scope Supplier should determine which Part number requires this confirmation procedure. Prior to submission of this document, each product must meet the following conditions:

1. Product must meet all dimensional and Functional quality requirements as specified on prints, QSF's, CIS etc.
2. All corrective actions requested by CAMI for quality improvement must be complete.
3. Inspection Standards and Process Control Standards are to be complete and submitted to CAMI.
4. Dies, jigs, process and facility are fully prepared for mass production.

This document shall not be submitted unless all the conditions noted above are satisfied!

3. When to Report Time to be determined by the supplier. It must be submitted prior to mass production.

4. How to Report Complete the attached form and submit the original to Cami.

5. Send to Quality Control Department, CAMI Automitve, Inc.

6. Approval After this document has been submitted to CAMI, it will be reviewed in conjunction with results from Joint Inspection and the review of the supplier's production process. A copy will then be returned to the supplier.

Note Corrective measures shall be taken in consultation between CAMI and the supplier to address all quality problems which may occur at CAMI and in the market following the Final Part Approval.

F	SUPPLIER NAME: P.M.P.
Engineering Change Level: CAMI ECN 568-2445	DUNS #: 247650542
Part Number: 30019612 (89019-57B63)	Part Name: 4 DR TRUCK GAS TANK
Part Classification: _x_ A Part ____ E Part ____ Functional _X_ General	
Manager, Quality Control (Submitted By) Signature J. Taggart 8-15-96	Manager, Sales (Submitted By) Signature

Complete the following by referring to Section 2:

	YES	NO	DATE
1. CIS/CONTROL PLAN	X		
2. CAMI CORRECTIVE ACTION			
3. INSPECTION/PROCESS STANDARDS		X	
4. Dies/Moulds	X		
5. Jigs/Fixtures			
6. Process	X		
7. Facility	X		

CAMI Decision _X_ Accept ____ Reject

Date: 8/19/96

Comments:

Comments	Quality Control	Purchasing
	08-16-96	

Supplier ▸▸ CAMI Q.C. ▸▸ Purchasing (Original) ▸▸ Supplier (copy)
CAMI Q.C. (copy)

8/15/96
8/21/96

7-5-C page 1/1

TLE: APPROVAL

AS 280012

8-1 page 1/1

THE NARMCO GROUP

CORPORATE OFFICE: 2575 AIRPORT ROAD, WINDSOR, ONTARIO N8W 1Z4 CAN. (519) 969-3350 U.S. (313) 962-3433 TELEFAX (519) 969-0083

TRANSMITTAL COVER SHEET

DATE: 05/25/95

TO: ATTENTION: Mr. Marcus Johnston DEPT./LOC. QC

FAX NO.: 3130 NO. OF PAGES (INCL. COVER SHEET) 1

FROM: NAME/DEPT: Peter Angermann DIRECT PHONE: (519) 969-3350

MESSAGE: Dear Marcus...

As per our previous discussion we are ready for your visit to PMP to discuss any and all open issues pertaining to the 2 and 4 door fuel tank "Top Dress" and, more specifically, those issues relevent to the "P" sensor.

Sample topics for discussion as follows:

a) What are component requirements for receiving, inspection, certification; etc.

b) What are required specifications for the "Top Dress" ie. torques, alignments etc. (We still do not have assy. drawings).

c) 'P' sensor - Test and Paint issues. ie. If it is not feasible to assemble prior to paint then what are the requirements for assy. and testing after paint. - Can we arrange studies? ie. full assy & test before paint. — Also... "EVAP II" standa

d) Anything which concerns you.

This will be a casual meeting. Attending will be myself, Mr. Go Taggart, Mr. Steve Fonscy, Ms. Maria Dupuis. It would be greatly appreciated if you could bring us the relevent assembly drawings So far we are looking at the date of Thursday June 1 1956 @ 10.00 AM @ PMP. If you have a problem with this date please advise and we will adjust accordingly. Thank you Marcus.

DIRECT RESPONSE TO: Any questions please call. Regards Peter A.

MEETING REPORT

8-2

TOPIC: NARMCO PMP 1996 TANK ASSY

Issued By : M. JOHNSTON
Checked By : 1/2/95
Approved By: 1/3/95

Issue Date: 06.02
Meeting Date: 06.01
Time: 11 :00 to 1 :00
Place: PMP

Attendants DAVE ASHMAN, PETER ANGERMAN, STEVE FANECY, FRED KRUSE, GORD TAGGART, M. JOHNSTON

Contents

1. INSTALLATION OF P SENSOR IN YF9 TANK PER Y09-1282.

NARMCO RESPONSIBILITY/LIABILITY FOR P SENSOR

P SENSOR IS CONSIGNED THROUGH NISSHO. RESPONSIBILITY FOR DESIGN AND MANUFACTURING OF P SENSOR RESTS WITH CAMI (AS FAR AS THE RELATIONSHIP BETWEEN NARMCO & CAMI IS CONCERNED). NARMCO IS RESPONSIBLE FOR: ① EXAMINING CONTAINERS/CARTONS FOR DAMAGE PRIOR TO TAKING RECEIPT OF SHIPMENT

② HANDLING PARTS WITH PROPER CARE TO PREVENT DAMAGE DURING THE ASSEMBLY PROCESS. IN PARTICULAR, MEASURES NECESSARY TO PREVENT DROPPING OF PARTS AND QUARANTINE OF DROPPED PARTS.

③ MANUFACTURING PROCESS CONTROL NECESSARY TO PREVENT DAMAGE/CONTAMINATION OF THE P SENSOR DURING ASSEMBLY AND LEAK TESTING

④ PROVIDING A LEAK FREE, CONTAMINANT FREE, FUEL TANK ASSEMBLY TO CAMI.

NARMCO IS NOT RESPONSIBLE FOR: ① RECEIVING INSPECTION EXCEPT AS NOTED IN ① ABOVE.

② FUNCTIONAL TESTING OF ANY KIND EXCEPT LEAK FREE CONDITION AFTER SUB ASSEMBLY. NARMCO IS PROHIBITED FROM PERFORMING ELECTRICAL TESTING OF P SENSOR FUNCTION EXCEPT AS MAY BE SPECIFICALLY DIRECTED BY CAMI.

2. P SENSOR IS TO BE INSTALLED AFTER PAINTING FOR SOP 96. IN FUTURE STUDIES MAY BE CONDUCTED TO DETERMINE WHETHER THE P SENSOR COVER WILL ALLOW SENSOR INSTALLATION PRIOR TO PAINTING.

A LEAK TEST MUST BE PERFORMED AFTER SENSOR INSTALLATION. TEST MAY VERIFY THE ENTIRE ASSEMBLY (FULL IMMERSION) OR ONLY THE P SENSOR AREA. WHICH METHOD IS EMPLOYED MAY BE DECIDED BY NARMCO, SUBJECT TO CAMI

Opinions MUCH OF THIS MEETING WAS DEVOTED TO LIABILITY ARISING FROM NARMCO INSTALLATION OF CONSIGNED PARTS.

Circulation:

Copy To: PURCHASING

AS 280014

Form QC

CAMI QC

MEETING REPORT

8-2

TOPIC:

Issued By :
Checked By :
Approved By:

Issue Date:
Meeting Date:
Time: : to :
Place:

Attendants

Contents

APPROVAL.

3 DRAWINGS FOR -65A AND -57810 FUEL TANK SUB ASSEMBLIES PROVIDED. WORK ON THIS PROJECT IS NOT SUFFICIENTLY ADVANCED FOR SOP 96 START. SSR FOR -65A IS NOT YET APPROVED.

4. CEL HOUSING ASSEMBLY ROAD ANGLE BUILD OUT IS 06.09. LAST SHIPMENT SHOULD BE 06.10. LINE WILL REMAIN INTACT FOR 15 TO 30 DAYS

Opinions

AS 280015

Circulation:

Copy To:

8-2

Japanese (3/2)

96My Jフェーエルタンクについて.（Pセンサ組付け）

1 96MyからJチドラのフェーエルタンクにPセンサが付く.
その仕入先（PMP）と責任分担，検査方法等について打ち合せさしん

PMPの責任範囲項目
① コンテナ，箱にキズ，ダメージがないかチェックする
② 箱からPセンサを取り出し，タンクに組み付けるまでの工程で
Pセンサを落としたり，ダメージを与えないこと
③ タンクへの組付け時及びリークテスト時にPセンサにダメージ
を与えないこと
④ 組付け後，リークの無いこと

PMPの責任範囲以外の項目
① 受け入れ検査（①上記以外）
② 機能検査（Pセンサの作動チェックのこと）

2．Pセンサはタンクの塗装後に組み付けること
リークテストは，Pセンサ組み付け後，必ず実施すること
方法は，ブラケット回りのソープチェックでもOK

以上

AS 280016

8-3

THE NARMCO GROUP

CORPORATE OFFICE: 2575 AIRPORT ROAD, WINDSOR, ONTARIO N8W 1Z4 CAN. (519) 969-3350 U.S. (313) 943-9418 TELEFAX (519) 969-0063

TRANSMITTAL COVER SHEET

DATE: 6-9-95

TO: ATTENTION: CLARENCE BOOTH. MARCUS JOHNSON. DEPT./LOC. Q.C. ASSEMBLY

FAX NO.: 1-519 425 3139 NO. OF PAGES (INCL. COVER SHEET) 1

FROM: NAME/DEPT: G. TAGGART DIRECT PHONE:

MESSAGE:

MARCUS.

WE ARE SENDING 2 RACKS OF 12 TANKS EACH OF 2 DOOR AND 4 DOOR FUEL TANKS WITH TOP DRESS. THE 4 DOOR TANKS ARE IN NEW RACK WHICH CLARENCE NEEDS TO REVIEW. MATERIAL WILL ARRIVE AT DOCK 'JJ' AT 7:00 P.M. THIS DATE.

G. Taggart

DIRECT RESPONSE TO:

CAMI Automotive Inc.

1/2

8-4 page 1/2

Quality Assurance Department

From: M. Johnston Q.C. Fax #: (519) 425-3130

Telephone: (519) 425 - 3127 Ext.: 4838

Date: 06.13.95 To: Gord Taggart

Company: PMP

# of pages (Including cover) 2 Fax #:

TRIAL SHIPMENT OF SUB ASSEMBLED FUEL TANKS.

GENERALLY THE PARTS SHIPPED WERE PRETTY GOOD, HOWEVER THERE WAS CONSIDERABLE VARIATION FROM TANK TO TANK.

1. ALL CLIPS AND HOSE CLAMPS SHOULD BE MARKED RED

2. ALL CLIPS FACE UPWARD. ON SOME TANKS, THE SUB ASSEMBLED VALVE 2WAY CHECK AND HOSES WERE INSTALLED ON THE TANK WITH THE CLIPS FACING DOWN

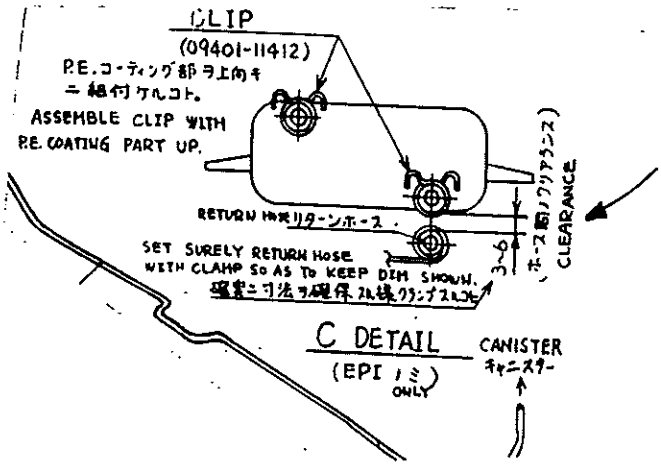
AS 280018

3. PE COAT ON CLIP 09401-11412 WAS DAMAGED DURING ASSEMBLY. SOME OF THESE CLIPS WERE BADLY DISTORTED

3. CON'T BY ASSEMBLY TOOLS BEING SQUEEZED TOO TIGHT.

4. TIGHTENING TORQUE FOR RETURN HOSE GEAR CLAMP ('SHORT BODY TANK) IS 15 ~ 25 Kgf.cm. CLAMPS SUPPLIED WERE A LITTLE TIGHT.

5. CLAMPING OF RETURN HOSE UNDER SEPARATOR
- MAINTAIN 3~6mm GAP AS SHOWN



6. UNUSED CLIPS SHOULD BE SET ON THE HOSE 25 ~ 35 mm. SOME ASSEMBLIES HAS CLAMPS ON 60mm OR MORE.

AS 280019

CAMI Automotive Inc.

1/2

8-4 page 1/2

Quality Assurance Department

From: M. Johnston Q.C. Fax # : (519) 425-3130

Telephone: (519) 425-3127 Ext.: 4838

Date: 06.13.95 To: Gord Taggart

Company: PMP

# of pages (including cover) 2 Fax # :

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AS 280020

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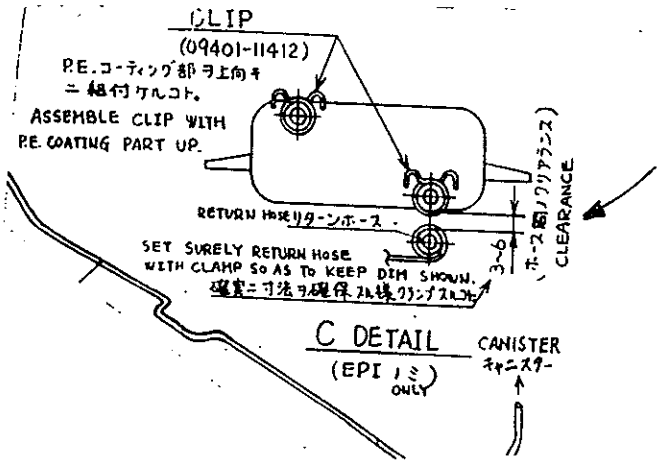
3/ CON'T BY ASSEMBLY TOOLS BEING SQUEEZED TOO TIGHT.

4/ TIGHTENING TORQUE FOR RETURN HOSE GEAR CLAMP ('SHORT BODY TANK) IS 15 ~ 25 kg/f.cm. CLAMPS SUPPLIED WERE A LITTLE TIGHT.

5/ CLAMPING OF RETURN HOSE UNDER SEPARATOR

- MAINTAIN 3±6mm GAP AS SHOWN



6/ UNUSED CLIPS SHOULD BE SET ON THE HOSE 25 ~ 35 mm. SOME ASSEMBLIES HAD CLAMPS ON 60mm OR MORE.

AS 280021

CAMI Automotive Inc.

8-5 page 1/1

Quality Assurance Department

From: M. Johnston Q.C. Fax # : (519) 425-3130

Telephone: (519) _____ Ext.: 4838

Date: 08.08 (95) MB 06.09.97 To: Gord Taggart

Company: PMP

# of pages (including cover) 1 Fax # : _____

Fuel Tank Set J Short Body..

Lot 5-2-212

July 31

Shift 2 Clock # 422, 421

M8x1.25 Bolt used To Secure Protecton

To Tank is Loose (Torque Spec 180~280K/

Tanks with 421 and 422 are NG.

Please Check Your Stock. This is Not

(A) and Does not Require 100% Limit

Wrench Check in Process, However, Air

Tools must Be Checked Regularly

AS 280022

1/10

8-6

CAMI Automotive Inc.

Quality Assurance Department

From: M. JOHNSTON Q.C. Fax # : (519) 425-3130

Telephone: (519) ________ Ext.: 4838

Date: 07-27 To: GORD TAGGART

Company: PMP

# of pages (including cover) 1 Fax # : ________

IN AN EARLIER FAX TO PETER ANGERMAN I DESCRIBED THE ORIENTATION OF THE VALUE COMP FUEL TANK INLET (89280-50F0) MY DESCRIPTION WAS INCORRECT - HINGE LINE SHOULD BE HORIZONTAL, NOT VERTICAL AS I INDICATED PREVIOUSLY

— HORIZONTAL

PLEASE MODIFY ASSEMBLY INSTRUCTIONS

[signature]

AS 280023

CAMI Automotive Inc.

8-6 (2)/10

Quality Assurance Department

From: M Johnston Q.C. Fax #: (519) 425-3130

Telephone: (519) _____ Ext.: _____

Date: 07-28 To: Peter Angerman

Company: Nammco

# of pages (including cover) _____ Fax #: _____

Answers to your Questions Re J-4 Fuel Tank Sub

(1) Clip is Correct - Gear Clamp is only used on 2 DR.

(2) Orientation up  Set Visually

3 P Sensor Orientation ± 2 Degrees is OK Provided Mounting Plate is Correctly Oriented To Fuel Tank.

Please Keep Cami Advised of P Sensor Leak Condition.

AS 280024

8-6 ③/10

THE NARMCO GROUP

CORPORATE OFFICE: 2575 AIRPORT ROAD, WINDSOR, ONTARIO N8W 1Z4 CAN. (519) 969-3350 U.S. (313) 962-3432 TELEFAX (519) 969-0063

T R A N S M I T T A L   C O V E R   S H E E T

DATE: 07/19/9[illegible]

TO: ATTENTION: MR MARCUS JOHNSTON DEPT./LOC. QUALITY ASSURANCE!

FAX NO.: (519) 425-3130. NO. OF PAGES (INCL. COVER SHEET) 2

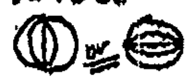
FROM: NAME/DEPT: PETE ANGERMANN DIRECT PHONE: (519) 977-5333

MESSAGE: Re: 4 DR FUEL TANK "TOP DRESS" (START UP ISSUES – TWEAKING)

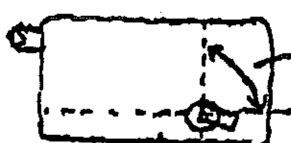
MARCUS...

We are just now getting into the actual "top dress" and testing of the 4 DR. tank. We have several questions which need your input. They are as follows:

① FUEL PUMP HOSE CONNECTION – our Canu built sample tank shows the use of a spring clip. On the 2 dr version we are using the TRIDON GEAR CLAMP. Is the spring clamp correct? Yes

② VALVE COMP FUEL TANK – P/N 89280-50F00 (30016308) is orientation of internal "flap" valves critical. If so what is the correct position? 

③ P-SENSOR – The orientation of our connector ring and P-sensor is not quite perpendicular to end of tank or parallel to side of tank. (By about 1 or 2 degrees) Is this acceptable or should it be dead nuts 90°?



DIRECT RESPONSE TO:

CONT'D

PAINTING • ASSEMBLY NARMCO Associate WELDING • FUEL TANKS

CEL
PHONE: 519-977-7523
FAX: 519-977-6686

PMP
PHONE: 519-977-5361
FAX: 519-977-0096

AS 280025

8-6

4/10

(4) Because we mask off the P-SENSOR ring for paint and later mount the P-sensor the ring is not fully coated (and ugly) Should we worry about this and re-touch or is it acceptable as is?

These are the only questions which we have Marcus. We are looking forward to your prompt input,

THANK'S.

Pete

AS 280026

8-6 (5)/10

THE NARMCO GROUP

PORATE OFFICE: 2678 AIRPORT ROAD, WINDSOR, ONTARIO N8W 1Z4 CAN. (519) 969-3350 U.S. (313) 982-9132 TELEFAX (519) 969-0063

TRANSMITTAL COVER SHEET

DATE: 7/17/95

TO: ATTENTION: Marcus Johnston DEPT./LOC. Quality Control

FAX NO.: 1-519-425-3330 NO. OF PAGES (INCL. COVER SHEET) 3

FROM: NAME/DEPT: Gord Taggart DIRECT PHONE: (519) 977-5333

MESSAGE: Please see attached documents!

DIRECT RESPONSE TO:

PAINTING • ASSEMBLY NARMCO Associate WELDING • FUEL TANKS

CEL
PHONE: 519-977-7523
FAX: 519-977-6686

PMP
PHONE: 519-977-5381
FAX: 519-977-0996

7

AS 280027

8-6 6/10

July 17, 1995

RE: 2 DOOR 95 MODEL YEAR GAS TANK

DEAR MARCUS,

Enclosed please find our 2 door top dress component listing for your approval. Without an updated print, we have enclosed the updated GM and Suzuki number provided by Cami. I would be most grateful for your written approval should you agree with our component listing and diagram.

Thank you for your time and effort.

Gord Taggart

AS 280028

TOP DRESSING COMPONENTS 30018475

P/N 30018475 (89019-65A31) - 2 DOOR FUEL TANK B.P. REFER TO NARMCO PCR DATED 06/05/95 E.C.N. Y09-1831

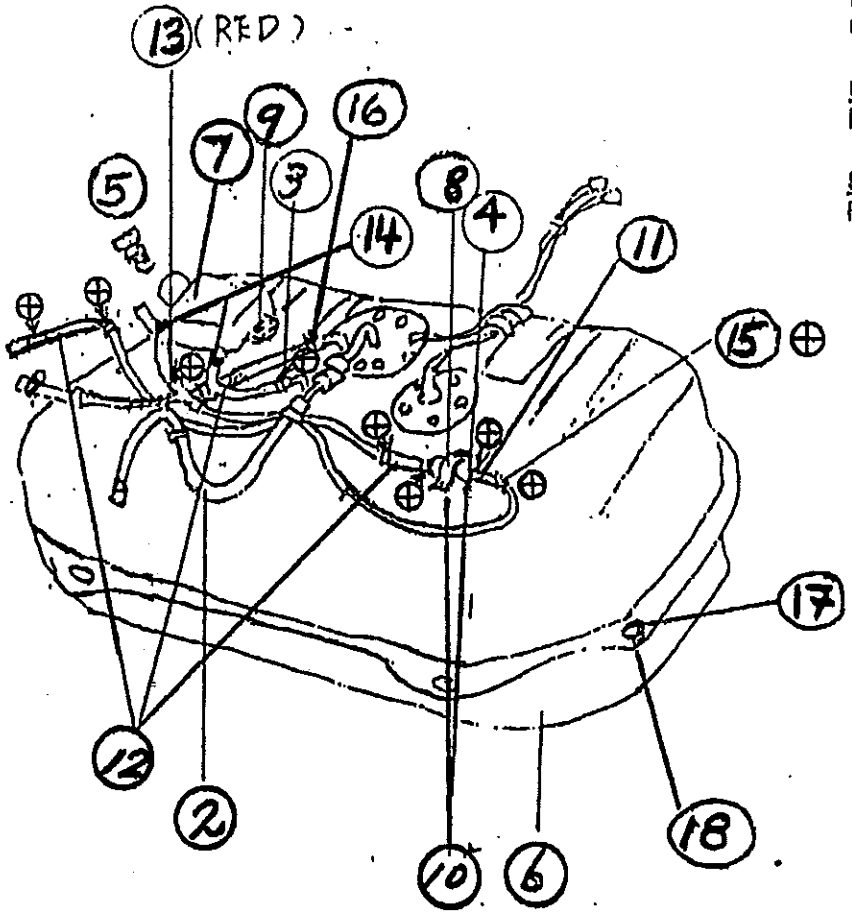
NO.	PART #	QTY	PARTNAME
1	30018475 (89109-65A33)	1	TANK SET FUEL
2	15810-57B00	1	HOSE COMP FUEL (FILTER INLET -CAMI)
3	96059598 (15864-61A00)	1	HOSE COMP RETURN PIPE TO PUMP
4	96052867 (85451-75100)	1	VALVE 2 WAY CHECK
5	96059438 (89280-60A00)	1	VALVE COMP FUEL TANK INLET
6	30004113 (89320-60AA0)	1	PROTECTOR COMP, FUEL TANK
7	30000732 (89411-60A01)	1	SEPARATOR FUEL AND EVAPO
8	96061879 (89485-60A00)	1	CLAMP, CHECK VALVE
9	30000023 (02142-05083)	2	SCREW, FUEL & EVAPO SEPARATOR
10	96053512 (02112-05083)	2	SCREW, CHECK VALVE
11	30000061 (09354-54115-100)	1	HOSE, CHECK VALVE TO TANK EVAPO
12	30014822 (09354-54115-140)	3	HOSE
13	30000064 (09354-54116-125)	1	HOSE, SEPARTATOR TO TANK EVAPO
14	96057808 (09401-11412)	2	CLIP
15	96061880 (09401-11413)	8	CLIP
16	30015674 (09402-15511)	1	CLAMP FUEL RETURN PIPE
17	96054836 (09118-08128)	1	BOLT WITH 1 LOCK WASHER & 1 WASHER
18	30011183 (08316-20083)	1	NUT

APPROVED BY: 07.26.95

Marcus Johnson
Cami Specialist

Gord Taggart
PMP Quality Manager

Steve Fancsy
PMP Plant Manager



FILE: LISTING

AS 280029

8-6

8

THE NARMCO GROUP

RPORATE OFFICE: 2575 AIRPORT ROAD, WINDSOR, ONTARIO N8W 1Z4 CAN. (519) 969-3350 U.S. (313) 962-3492 TELEFAX (519) 969-0063

TRANSMITTAL COVER SHEET

DATE: 11-25-94

TO: ATTENTION: MARCUS JOHNSON DEPT./LOC. R.C. ASSY

FAX NO.: 1-425 3130 NO. OF PAGES (INCL. COVER SHEET) 3

FROM: NAME/DEPT: G. TAGGART DIRECT PHONE:

MESSAGE:

MARCUS.

CURRENT 2 DR. FUEL TANK ASSEMBLY UTILIZES A VESSEL ASSY PT. NO. 89170-61A00. A PART LISTING CHANGE COPY ATTACHED HAS BEEN CHANGED TO ALLOW COMMONIZATION WITH 4 DR FUEL TANK VESSEL PT. NO 89170-56B00. WE HAVE INITIATED BUILD OF FUEL TANK ASSEMBLY 30010248 WITH THIS VESSEL. PARTS WILL BE IDENTIFIED WITH A PINK TAG.

DIRECT RESPONSE TO:

J 94 + 95 MY 2 DR 3001024-8

FUEL TANK Copy Supplier FUEL TANK ASSY.

```
TC=      TCS=N07-H9-VN071XX      TERM= LFVC2     - 00095 94/07/27  22:46:34
(ADMF>---------------------------------------------------PAGE= 0001 -INQ.-
*****  [illegible]  *****
[illegible]  ( CX850-01        ) [illegible] (        )
01 89109-65A32                 001 TANK SET,FUEL              60A-6739    L
02  15100-61AA0                001 PUMP ASSY,FUEL             Y09-9064    L CB200-
03   15100-61AX0               000 PUMP ASSY,FUEL             60A-6739    D
02  34810-60A11                001 GAUGE ASSY,FUEL LEVEL                  K CE050-
02  89101-65A10                001 TANK ASSY,FUEL             Y19-1047    S CS830-
03   85121-67010               001 PLATE,FUEL GAUGE ATTAC                 S
03   89111-65A00               001 PANEL,FUEL TANK UPPER 60A-4709         S
03   89112-60A00               001 PANEL,FUEL TANK LOWER                  S
03   89121-82000               001 PIPE,FUEL TANK INLET                   S
03   89124-85550               001 PLATE,FUEL PUMP ATTACH                 S
03   89125-60A00               002 GUSSET,FUEL TANK,NO.1 60A-4709         S
03   89126-65A00               001 GUSSET,FUEL TANK,NO.2 60A-4709         S
03   89127-65A00               001 GUSSET,FUEL TANK,NO.3 60A-4709         S
03   89131-60A00               001 PIPE,FUEL TANK BREATHE                 S
03   89135-60A00               001 BRACKET,FUEL TANK BREA                 S
03   89143-60A00               001 PIPE,FUEL TANK EVAPO                   S
03   89170-56B00               001 VESSEL COMP,FUEL TANK 60A-5447         S
04    89171-61A00     01       001 VESSEL,FUEL TANK OUTLE                 S
04    89172-56B00              001 VESSEL,FUEL TANK OUTLE60A-5447         S
** NEXT PAGE *** F-PFK B-PFK2 E-PFK3

TC=      TCS=N07-H9-VN071XX      TERM= LFVC2     - 00095 94/07/27  22:47:08
(ADMF>---------------------------------------------------PAGE= 0002 -INQ.-
*****  [illegible]  *****
[illegible]  ( CX850-01        ) [illegible] (        )
04    89176-61A00              001 BRACKET,OUTER VESSEL,F                 S
04    89177-61A00              002 BRACKET,OUTER VESSEL,R                 S
03   89171-82000               001 BRACKET,CHECK VALVE                    S
03   89178-60A00               001 BRACKET,FUEL VAPOR SEP                 S
03   89187-60A00               001 BOX,FUEL TANK EVAPO BA                 S
03   89190-60A00               001 PIPE COMP,FUEL TANK EV                 S
04    89191-60A00              001 PIPE,FUEL TANK EVAPO,N60A-1960         S
04    89192-60A00              001 PIPE,FUEL TANK EVAPO,N60A-1960         S
04    89196-60A00              001 BRACKET,EVAPO PIPE,NO.60A-1960         S
04    89197-60A00              002 BRACKET,EVAPO PIPE,NO.60A-2055         S
03   09405-45303               001 CLAMP,GAUGE LEAD WIRE 51 -6008         S
03   09405-65303               003 CLAMP,FUEL HOSE       51 -6008         S
02  09136-05045                005 SCREW,FUEL LEVEL GAUGEY19-0915         S CE050-
02  09136-05045       10       006 SCREW,FUEL PUMP        Y19-0915        S CB200-
    *****  END  *****

** END  PAGE   AGAIN OR NXT   PFK11 PFK12
```

AS 280031

VA ENGINEERING CHANGE REQUEST

CAMI Automotive Inc. Program Management - ECR - 003 09/24/92 Please PRINT clearly in BLOCK LETTERS.

ECR NO. (PROGRAM MANAGEMENT)
ECR -

J/MII/MIII	PART NUMBER 3 0 0 1 0 2 4 8 L/KD 8 9 1 0 9 - 6 5 A 3 2 -	PART NAME FUEL TANK ASSEMBLY - 2 DOOR

BRIEF DESCRIPTION OF CHANGE: TO ELIMINATE CURRENT 3 PC ASSEMBLY WITH 2 PC 1995 VESSEL OF 4 DR.

SUPPLIER: P.M.P.
ISSUER: G. TAGGART
DATE: 09/20/94

BUYER:
DATE:
MANAGER:
DATE:

REASON FOR CHANGE
1. IMPROVE PERFORMANCE / QUALITY
2. CONVENIENCE / STANDARDIZATION
3. COST REDUCTION
4. MACHINING / ASSEMBLING
5. SPEC CHANGE
6. OTHERS

COST: US$ / CDN$ / YEN +/- PER PIECE / PER VEHICLE

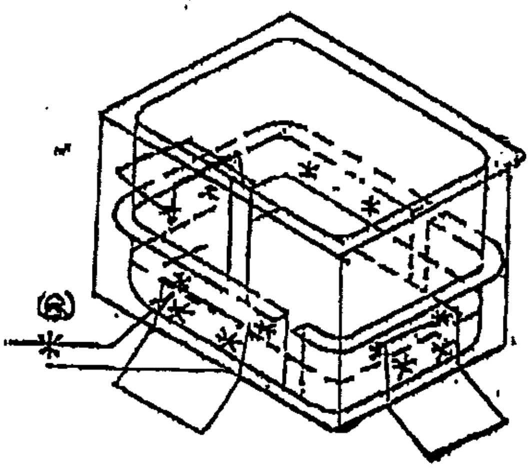
TOOLING / INVESTMENT US$ / CDN$ / YEN +/-

REQUESTORS REF. NO.

DETAILS OF CHANGE AND DETAILED SKETCH INCLUDING AFFECTED MODELS.
(PLEASE INCLUDE ADDITIONAL DOCUMENTS SUCH AS DRAWINGS AS REQUIRED)
PLEASE WRITE BOTH IN ENGLISH AND JAPANESE.

PRESENT CONDITION

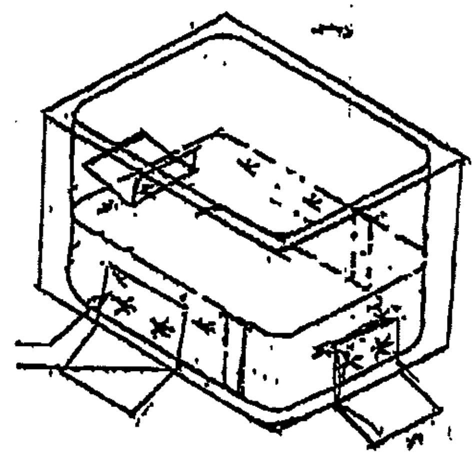
6 INDIVIDUAL COMPONENTS.



2 DR.

PROPOSED CONDITION

5 INDIVIDUAL COMPONENTS



4 DR

PROGRAM MANAGEMENT (YES/NO)

Tooling Cost Responsibility ☐CAMI ☐Suzuki ☐CPC | MCR (YES/NO)

DATE:

Adoption YES / NO / EVALUATING

ENG. CHANGE NO.

Comment

AS 280032

Examiner

Manager Date

Comment

Staff Date

SUZUKI REPLY — DESIGN DEPT. — 'G' OFFICE

PLEASE RETURN ECR TO PMC AFTER EVALUATION BY YOUR DEPARTMENT

2DR - 89172-61A00

4DR · 89172 - 56800.

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

5194253130

CAMI
Automotive Inc.

May 12, 1997

Enid Rubenstein
Acting Assistant Chief Counsel for Litigation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Re: **NCC-10 ZTV**
IR 1711

Dear Ms. Rubenstein:

This letter responds to your Civil Penalty Notice Letter dated March 20, 1997, pertaining to a voluntary recall undertaken in 1996 by Suzuki and General Motors Corporation of certain Sidekick/Tracker models manufactured by CAMI Automotive Inc. (CAMI) (Recall Identification Nos. 96V121 and 96V121.002). The voluntary recall was undertaken in response to an apparent noncompliance with FMVSS 301 observed by NHTSA in a Geo Tracker tested at Calspan for NHTSA on May 17, 1996.

CAMI appreciates this opportunity to explain why it did not, in the exercise of reasonable care, have reason to know that the Sidekick/Tracker model might not comply with FMVSS 301. CAMI therefore submits that, under the circumstances described in this letter, there has been no violation by CAMI of Chapter 301 of Title 49 of the United States Code, and therefore that a civil penalty in this case is not warranted.

As explained in more detail in the August 12, 1996 response of General Motors to NHTSA's information request (IR 1711 JJo), CAMI is a joint operation between Suzuki Motor Corporation (Suzuki) and General Motors Corporation (GM). Suzuki had the responsibility for assuring the compliance of the Sidekick/Tracker with the requirements of all applicable Federal Motor Vehicle Safety standards, including FMVSS 301.

A. SUZUKI'S CERTIFICATION TESTING WAS EXTENSIVE, AND CAMI REASONABLY RELIED ON IT.

Suzuki conducted extensive certification testing of the Sidekick/Tracker to evaluate and confirm its compliance with FMVSS 301, including several crash tests at speeds significantly higher than 30 mph. A list of the certification tests and related testing was provided as

AS 280033

EA12-005
PRODUCED BY SUZUKI MOTOR CORPORATION

Attachment 1 to the General Motors letter to NHTSA dated August 12, 1996; for your convenience, another copy is attached to this letter as Attachment 1. Suzuki specifically undertook to confirm the continued compliance of the Sidekick/Tracker with FMVSS 301 after upgrading the fuel tank attachment bracket in 1995 to account for the increased curb weight of the vehicle caused by the added weight of newly provided airbag and antilock brake systems. Suzuki confirmed the compliance of the Sidekick/Tracker in two separate certification tests — Test 75-292, conducted at 33.7 mph, and test 76-161, conducted at 35 mph. Suzuki's confidence in the compliance of the Sidekick/Tracker was further assured in Test 77-011[1/], a high-speed car-to-car test conducted at 49.4 mph, in which the rear of a Sidekick/Tracker equipped with the modified fuel tank attachment bracket was impacted by a heavier vehicle -- a Toyota Crown, which is approximately the size of a General Motors A-Car. There was no fuel tank leakage in the Sidekick in that test, either.

Suzuki provided this information to CAMI, and CAMI relied on this certification testing to form the basis for its certification of compliance with FMVSS 301. We believe that CAMI's reliance on Suzuki's test data was reasonable, both due to the extensiveness of the successful testing and due to Suzuki's excellent record of compliance with FMVSS 301 in the past.

B. SUZUKI HAD NO REASON TO ANTICIPATE THE NHTSA TEST RESULT.

To CAMI's knowledge, there has never been an FMVSS 301 test obtaining a noncompliant result on a Sidekick or a Tracker, other than NHTSA's single test. CAMI has confirmed that, throughout Suzuki's fuel tank integrity tests on vehicles intended for production, including tests at speeds incorporating far more energy than required by FMVSS 301, Suzuki never observed fuel tank leakage in a Sidekick/Tracker.

Nor could Suzuki reasonably have predicted the NHTSA result on the basis of the function or location of the gussset that apparently punctured the fuel tank wall in the NHTSA test. The function of the gusset is solely to reinforce the flange at the mounting bolt location. It is permanently welded to the underside of the flange. On a new (off the shelf) fuel tank assembly the gusset does not touch the fuel tank wall at any place. Thus, Suzuki had no reason to consider the potential separate contribution of the gusset to the risk of FMVSS 301 noncompliance. Furthermore, neither Suzuki nor General Motors have received warranty

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[1/] CAMI wishes to take this opportunity to correct a typographical error in GM's August 12, 1996 submission, which identified this test as "Test 77-071." As a result of this typographical error, NHTSA's public file also refers to this car-to-car test as "Test 77-071," however, it is correctly identified as Test 77-011.

claims, consumer complaints or lawsuits alleging post-collision fuel tank leakage in the subject vehicles.

C. IT IS HIGHLY UNLIKELY THAT SUZUKI WOULD HAVE REPLICATED THE NHTSA TEST RESULTS IN ANY REASONABLE AMOUNT OF ADDITIONAL TESTING.

In the NHTSA test, an unusual confluence of circumstances combined to induce the apparent noncompliance -- first, post-test examination of the vehicle tested by NHTSA confirmed that the right side of the right-hand reinforcement gusset separated from the flange to which it had been attached and the welding pitch was relatively shorter than expected. Second, although the initial orientation of the reinforcement gusset could not be confirmed after the NHTSA test, Suzuki's static testing confirmed that the gusset would have to have been substantially misaligned to have induced the fuel tank wall puncture observed in the NHTSA test.

As noted in subsection B. above, to CAMI's knowledge, neither NHTSA nor Suzuki has replicated the results of the May 17, 1996 NHTSA test. None of Suzuki's extensive certification tests resulted in fuel tank leakage, nor has any collision in the field corroborated the NHTSA results, to our knowledge.

After the NHTSA test, Suzuki and GM promptly began an investigation to determine the probable cause of the fuel tank wall puncture. Based on static bench tests, Suzuki confirmed that the only circumstance in which the post-collision deformation observed in the NHTSA test would result in a gusset-induced puncture of the fuel tank wall was the *combination* of two assembly conditions: significant gusset misalignment and narrow spot weld spacing. Suzuki's static tests showed that fuel tank wall puncture would not have occurred if the gusset had had only *one* of these "off nominal" attributes; the gusset would have to have had *both* a significant off-parallel orientation *and* narrow spacing of spot welds before fuel tank wall puncture would have been induced in the Suzuki static tests.

It may be useful to summarize briefly here the Suzuki static testing conducted as part of the 1996 investigation into the probable cause of the fuel tank wall puncture. At that time, Suzuki conducted static testing in which it simulated the fuel tank wall deformation observed in the NHTSA test vehicle with the gussets oriented in different positions and with different spot weld spacing. As NHTSA's investigative report correctly notes, the only condition in which the static test demonstrated the potential for fuel tank puncture was when the modified fuel tank attachment bracket was installed and when the reinforcement gusset was ***both*** substantially misaligned ***and*** when the gusset's spot welds were narrowly spaced. (Suzuki static test C-1). Although the NHTSA investigative report correctly defined the narrow spot weld spacing of the

spot welds as 40 mm apart, it did not define the misalignment of the gusset in test C-1, which was in fact measured at -9 mm. As illustrated on Attachment 4 to the GM letter of August 12, 1996, which is also appended to NHTSA's investigative report, the measurement of misalignment was made in the following manner: first, an imaginary straight line was drawn along the edge of the fuel tank wall from the left side corner of the gusset to the right side corner of the gusset. (As shown on the sketch at the top of Attachment 4, the fuel tank wall curves away from the rear of the vehicle slightly before the right side corner; therefore, the right end of the imaginary straight line does not touch the fuel tank wall at that corner.) Second, the distance from the right side corner of the right-hand reinforcement gusset was measured to the nearest point of the imaginary straight line (point "a"). Third, the distance from the left side corner of the right-hand reinforcement gusset was measured to the nearest point of the imaginary straight line (point "b"). Finally, the distance at "b" was subtracted from the distance at "a". The resulting value is the measurement of misalignment. If the resulting value was zero, the gusset was perfectly parallel to the fuel tank wall. If the resulting value was a positive number, the right side gusset was misaligned, but with the right side corner oriented away from the fuel tank wall -- in other words, a benign misalignment. Even though the left side corner is closer to the fuel tank wall in such a misalignment, this condition does not present a risk of puncture, because of the lack of fuel tank deformation on the in-board side of the gusset resembling the deformation seen on the outboard side in the NHTSA test. If, on the other hand, the resulting value was a negative number, the gusset was misaligned with its right corner toward the fuel tank wall -- which presented the possibility of contact with the fuel tank wall if the misalignment was substantial.

As part of the Suzuki-GM-CAMI investigation following NHTSA's May 17, 1996 test, CAMI conducted a survey of 50 fuel tank assemblies in the condition in which they were received from CAMI's fuel tank assembly vendor. The results of this survey confirmed that the orientation of most reinforcement gussets was perfectly parallel or within less than one millimeter of parallel. (As described above, if the misalignment value is measured to be one mm, this reflects the difference between the right corner and the left corner; however, each corner of the gusset is misaligned by only one-half mm from the parallel position.) Furthermore, the worst gusset orientation observed in these 50 fuel tanks was only -5 mm, substantially less than the -9 mm evaluated in Suzuki in static test C-1.

Suzuki recently conducted additional static testing to evaluate the potential contribution of different gusset misalignment measurements to the risk of fuel tank puncture. These tests were conducted in a manner identical to static test C-1, except that the gusset misalignment measurements were -8 mm, -5 mm, -3 mm and 0 mm. In these recent tests, Suzuki confirmed the results of static test C-1 with the gusset misaligned at -8 mm; that is, there was contact with the fuel tank wall that would likely have induced fuel tank puncture in a collision; however, with the gusset misaligned at -5 mm, there was only slight contact with the fuel tank wall, which

might or might not have induced a puncture in a real-world collision. And, at both -3 mm misalignment and at 0 misalignment (parallel), there was no contact with the fuel tank wall in the static test. Based on these results, Suzuki concludes that the risk of gusset-induced fuel tank puncture is slight with a misalignment at -5 mm, and nonexistent at -3 mm and below.

In the 50-tank survey, ***none*** of the surveyed tanks exhibited right-side gusset orientation measurements worse than -5 mm, and ***only one*** of the surveyed fuel tanks exhibited ***both*** an observed right-side gusset orientation measurement of -5 mm (as noted above, the minus sign indicates a misalignment with the right corner toward the fuel tank wall) ***and*** a right-side spot weld spacing of 20 mm from the center bolt. It is not clear that even this one "worst-case" tank in the 50-tank survey would have been punctured in a collision. In other words, had Suzuki tested 50 more vehicles containing these 50 fuel tanks, Suzuki would not likely have obtained a noncompliant result.

Thus, Suzuki could not reasonably have anticipated the NHTSA test outcome, without an unreasonable and impracticable number of additional compliance tests, if at all.

D. CAMI'S MANUFACTURING AND QUALITY STANDARDS ARE HIGH.

CAMI's internal quality standards in effect at the time that the subject Sidekick/Tracker models were manufactured provided that the gusset installation was to be performed by the vendor in such a manner that the edges were "line[d] up to the mating part", and that compliance with that instruction was to be confirmed by a visual inspection of 100% of the fuel tanks. The 50-tank survey confirmed that most gussets were, indeed, aligned parallel to the flange or within 1 mm of parallel. Furthermore, CAMI standards provided that the strength of the spot welds of the gusset was to be confirmed by subjecting 100% of the gussets to a test to confirm attachment.

Nonetheless, the NHTSA test result demonstrated the potential benefits of more specific quality control instructions for gusset installation. CAMI's internal standards now specify that the gusset shall be installed parallel to the flange within a specified maximum tolerance of 1.9 mm, with compliance to be verified by means of a measuring instrument. In addition, CAMI has now added a standard for spot weld location, specifying that the spot welds must be 70 mm apart, within a tolerance of no more than ±5.0 mm, with compliance to be verified by means of a measuring instrument. These quality control improvements, coupled with the redesigned gusset described in GM's August 12, 1996 letter to the agency, should substantially reduce or eliminate the already remote chance of a gusset-induced fuel tank wall puncture.

E. GM AND SUZUKI COOPERATED FULLY WITH NHTSA'S INVESTIGATION AND RESPONDED PROMPTLY WITH CORRECTIVE ACTION.

Notwithstanding the companies' surprise at the outcome of the NHTSA test, GM and Suzuki promptly conducted and concluded an inquiry into the probable cause of the NHTSA test result, leading to a decision to conduct a recall to reinforce the flange area within a few weeks of first being notified of the NHTSA test. The companies undertook this prompt recall to assure the safety of its customers, even though the field risk of gusset-induced fuel tank wall puncture is remote. CAMI urges NHTSA to take this prompt cooperation by GM and Suzuki into account in evaluating CAMI's compliance with Chapter 301.

* * *

For reasons explained above, CAMI did not know, nor could it have known in the exercise of reasonable care, that the Sidekick/Tracker tested by NHTSA would fail to comply with FMVSS 301. The combination of circumstances shown to be necessary before the gusset will induce fuel tank wall puncture is extremely rare. Neither Suzuki nor GM had any indication from field collisions of the previously unanticipated contribution of the gusset's welding quality to the risk of fuel tank wall puncture. Under these circumstances, and in light of GM and Suzuki's prompt recall of the subject vehicles, CAMI respectfully submits that no violation of Chapter 301 of Title 49 of the United States Code has taken place and, therefore, that the imposition of any civil penalty in this matter would be unwarranted.

Sincerely,

Sadayuki Hirano /ej

Sadayuki Hirano
Director, Quality Assurance

AS 280038

Dec #4

RECALL CAMPAIGNS

NAME OF MANUFACTURER : SUZUKI MOTOR CORP.

SUBJECT OF RECALL : FMVSS 301, "FUEL TANK INTEGRITY"

RECALL CAMPAIGN NUMBER : 96V-121.002

ACTION THAT INFLUENCED RECALL

MANUFACTURED INFLUENCED

ODI INFLUENCED:

ACTION NO. :

DED INVESTIGATOR :

RAD INVESTIGATOR :

OVSC INFLUENCED:

ACTION NO. : IR-1711

OVSC INVESTIGATOR : L. IONES

AS 280039

SUZUKI

AMERICAN SUZUKI MOTOR CORPORATION

July 2, 1996

Mr. Michael B. Brownlee
Associate Administrator for Safety Assurance
National Highway Traffic Safety Administration
400 7th Street, S.W.
Washington, D.C. 20590

96V-121,002 (01)

Dear Mr. Brownlee:

The following information is submitted in accordance with the noncompliance reporting regulations in Title 49 of the Code of Federal Regulations, Part 573.

1. Name of Manufacturer and Importers

Manufacturer: CAMI Automotive, Inc.

Importer: American Suzuki Motor Corporation

2. Identification of Vehicles Potentially Involved

1996 model year 4-door Suzuki Sidekick vehicles produced by CAMI Automotive, Inc. from August 1995 through June 1996.

3. Total Number of Vehicles Potentially Involved

4,325

4. Percentage of Vehicles Estimated to Contain the Noncompliance

Unknown

5. Description of Noncompliance

American Suzuki Motor Corporation has decided that certain 1996 model year 4-door Suzuki Sidekick vehicles fail to conform to Federal Motor Vehicle Safety Standard No. 301, "Fuel System Integrity". The fuel tank on these vehicles may become punctured by a fuel tank flange attachment reinforcement (gusset) during certain types of rear end collisions.

3251 E. Imperial Highway, P.O. Box 1100, Brea, CA 92822-1100 · Tel. (714) 996-7040 · FAX (714) 970-6005

AS 280040

96V-121.002 (02)

6. Chronology of Principal Events

General Motors was contacted by NHTSA in May of 1996 when a Geo Tracker tested by NHTSA did not pass FMVSS 301. An investigation was initiated to determine the cause and extent of the condition.

7. Description of Corrective Action

This information is provided in the attached dealer bulletins.

8. Schedule

Dealer Bulletins have already been mailed. Owner notification letters will be mailed in July 1996.

9. Copy of Notices

Enclosed are copies of the Technical Service Bulletin, Campaign Bulletin, and draft owner notification letter for this campaign.

10. Suzuki Campaign Number

S1

Sincerely,

AMERICAN SUZUKI MOTOR CORPORATION

Kenneth M. Bush
Regulations Manager
Government Relations Department

AS 280041

DRAFT 96V-121.
002 (03)

IMPORTANT SAFETY RECALL NOTICE

Dear Suzuki Owner:

This notice is sent to you in accordance with provisions of the National Traffic and Motor Vehicle Safety Act.

American Suzuki Motor Corporation has decided that certain 1996 Suzuki 4-Door Sidekick vehicles fail to conform to Federal Motor Vehicle Safety Standard (FMVSS) 301, "Fuel System Integrity". According to our records, you own one of the affected vehicles.

The fuel tank on these affected vehicles may become punctured by a fuel tank flange attachment reinforcement gusset during certain types of rear end collisions. If this were to occur, a punctured fuel tank could allow fuel spillage in excess of the amount prescribed by FMVSS 301. If an ignition source were present, fuel leakage resulting from this puncture could result in a post-crash fire.

To preclude the possibility of this occurring, your Suzuki dealer, at no charge to you, will install two new gussets between the fuel tank and attachment brackets to prevent the reinforcement from puncturing the fuel tank wall.

Please contact you Suzuki dealer to schedule an appointment for this Safety Recall. Instructions have been sent to your dealer and parts are available. The service can be completed in about 30 minutes. Please ask you dealer if additional time will be needed to process your vehicle. When you arrive for your pre-scheduled service, please present this letter to your Suzuki dealer. If you no longer own this vehicle, please complete the enclosed postage-paid reply card and return it to us.

If your dealer does not make the correction within a reasonable period of time, we recommend you contact the American Suzuki Customer Relations Department at (800) 934-0934. If you are still not satisfied that American Suzuki and your dealer have done our best to make the correction within a reasonable period of time, you may wish to write the Administrator, National Highway Traffic Safety Administration, 400 Seventh Street, S.W., Washington DC 20590 or call the toll-free Auto Safety Hotline at (800) 424-9393.

We are sorry for any inconvenience this Safety Recall may cause, but we are certain you understand our interest in your safety and your continued satisfaction with Suzuki products.

AS 280042

DRAFT

NOTICE TO LESSORS

96V-121-
002 (04)

Under Federal law, the lessor of a vehicle who receives this letter must provide a copy of it to the vehicle lessee(s). The lessor must also keep record of the lessee(s) to whom this letter is sent, and the applicable Vehicle Identification Number.
(For the purposes of this notice, a lessor means a person or entity that in the last twelve months prior to the date of this notification has been the owner, as referenced on the vehicle's title, of any five or more leased vehicles. A leased vehicle is a vehicle leased to another person for a term of at least four months.)

Sincerely,

AMERICAN SUZUKI MOTOR CORPORATION

AS 280043