#1908

SAFETY COMPLIANCE TEST FOR
FMVSS 301-75R
FUEL SYSTEM INTEGRITY

1993 NISSAN QUEST MPV

NHTSA No. CP5205

MOBILITY SYSTEMS AND EQUIPMENT COMPANY
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MAY 20, 1993

FINAL REPORT

Prepared Under Contract No. DTNH22-93-C-01007

For:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
Office of Vehicle Safety Compliance
400 Seventh Street, S.W.
Washington, DC 20590

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MOBILITY SYSTEMS AND EQUIPMENT COMPANY

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Date: 17 May 1993

FINAL REPORT ACCEPTED BY:

_____ C.T.R. w/ comments 5/28/93
Contracting Officer's Technical Representative,
Office of Vehicle Safety Compliance

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16. Abstract

Tests were conducted on the subject 1993 Nissan Quest MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure TP-301-00, dated April 26, 1989, for the determination of FMVSS 301-75 Rear compliance.

Test failures identified were: None.

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TABLE OF CONTENTS

SECTION 1

INTRODUCTION

This report presents information on tests conducted on a 1993 Nissan Quest MPV, NHTSA No. CP5205, to determine compliance with the requirements of FMVSS 301-75 Rear impact testing. All tests were conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure TP-301-00 dated April 26, 1989 and the corresponding Mobility Systems and Equipment Company (MSE) Test Procedure MSE-TP-301-75/R-01 dated March 19, 1993, which is approved by NHTSA officials. The tests were conducted under contract No. DTNH22-93-C-01007.

Section 2 of this report describes the test procedure and presents the summary data. Section 3 of this report presents all the test results. Section 5 presents all the pertinent photographs. Section 6 presents all the time history data plots.

No test failures related to FMVSS 301-75 Rear were identified for the tested 1993 Nissan Quest MPV.

SECTION 2

TEST PROCEDURE AND SUMMARY DATA

The 1993 Nissan Quest MPV, NHTSA No. CP5205, was subjected to FMVSS 301-75 Rear testing on April 30, 1993. The vehicle is shown in pretest condition in Figures 5-1 to 5-4. The manufacturer's certification label and tire placard are shown in Figure 5-5.

The vehicle was inspected, measured, weighed, marked, photographed and tested in accordance with the procedure requirements. A partially instrumented part 572E Anthropomorphic Test Device (ATD) was positioned in the vehicle, in the driver position. ATD instrumentation consists of triaxial accelerometers in the head, chest and pelvis and a six-axis neck transducer. Seven additional sensors were installed in the vehicle. The driver lap and shoulder belts were instrumented with load cells. A displacement transducer was installed to measure driver shoulder belt pullout. Primary and redundant X-axis accelerometers were placed at the approximate vehicle c.g. An angular rate sensor and an accelerometer were placed on the top frame rail of the driver seat. A non-instrumented part 572B ATD was positioned in the front passenger position for ballast.

High speed cameras were set up as required in the test procedure. The camera positions for the FMVSS 301-75 Rear test are as shown in Figure 2-1. Actual locations are presented in Table 2-1. All high speed cameras were set to run at a minimum of 500 frames per second. The onboard camera was set to run at a minimum of 1000 frames per second. Actual camera speeds are also presented in Table 2-2.

The test was conducted with a moving barrier impacting the rear of the stationary test vehicle. The center of the moving barrier was set to impact the longitudinal centerline of the vehicle. The test vehicle was checked for fuel system leaks for a thirty minute period after the initial impact and for successive 7 minute periods afterwards at 90, 180, 270 and 360 degree rollover attitudes.

The velocity of the impact sled was 29.40 mph. The 1993 Nissan Quest MPV, NHTSA No. CP5205 had no fuel system leaks. No test failures related to FMVSS 301-75 Rear were identified on the tested 1993 Nissan Quest MPV.

TABLE 2-1

SUMMARY OF RESULTS

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Nissan/Quest/MPV

VEHICLE NHTSA No.: CP5205 TEST MODE: Rear Moving Barrier

TEST DATE: 04/30/93 TIME: 4:30 pm TEMPERATURE: 85° F

VEHICLE TEST WEIGHT: 4479 lb IMPACT VELOCITY: 29.40 mph

STATIC CRUSH: Left Side = 6.1 in

Right Side = 6.0 in

Centerline = 6.7 in

AVERAGE CRUSH: 6.3 in

VEHICLE REBOUND: N/A in (Frontal impacts only)

TYPE OF FRONT OCCUPANT RESTRAINT INSTALLED IN TEST VEHICLE:

Driver DSP: Automatic Shoulder Belt, Manual Lap Belt

Outboard Front Passenger DSP: Automatic Shoulder Belt, Manual Lap Belt

VISIBLE ATD CONTACT POINTS:

Driver ATD: Left knee hit the lower steering wheel rim.

Passenger ATD: N/A

VEHICLE DOOR OPENING INFORMATION:

Door	Opened	Jammed
Right Front	Yes	No
Left Front	Yes	No
Right Rear	Yes	Yes
Left Rear	N/A	N/A

LOSS OF WINDSHIELD RETENTION: N/A

PENETRATION OF WINDSHIELD ZONE TEMPLATE: N/A

STODDARD SOLVENT SPILLAGE FROM VEHICLE'S FUEL SYSTEM: No spillage

Recorded By: Brian O'Keefe Date: 05/13/93

Approved By: [signature] Date: 05/17/93

TABLE 2-2

CAMERA DATA

Camera Location*	Coordinates (inches)			Angle (degrees)	Lens Size (mm)	Film Speed (fps)
	X	Y	Z			
1. Onboard	125	46	46	-1	16	1000
2. Overhead	-24	0	236	-90	16	520
3. Left Side View	30	-660	55	-2	28	600
4. Right Side View #1	-55	475	58	-2	13	590
5. Right Side View #2	0	1200	125	-12	15-70 Zoom	24
6. Underbody View #1	71	2	-64	74	16	550
7. Underbody View #2	115	0	-68	78	16	600
8. Underbody View #3	183	-2	-65	57	16	610

COORDINATE REFERENCE: X - Film plane to barrier face impact plane

Y - Film plane to monorail centerline

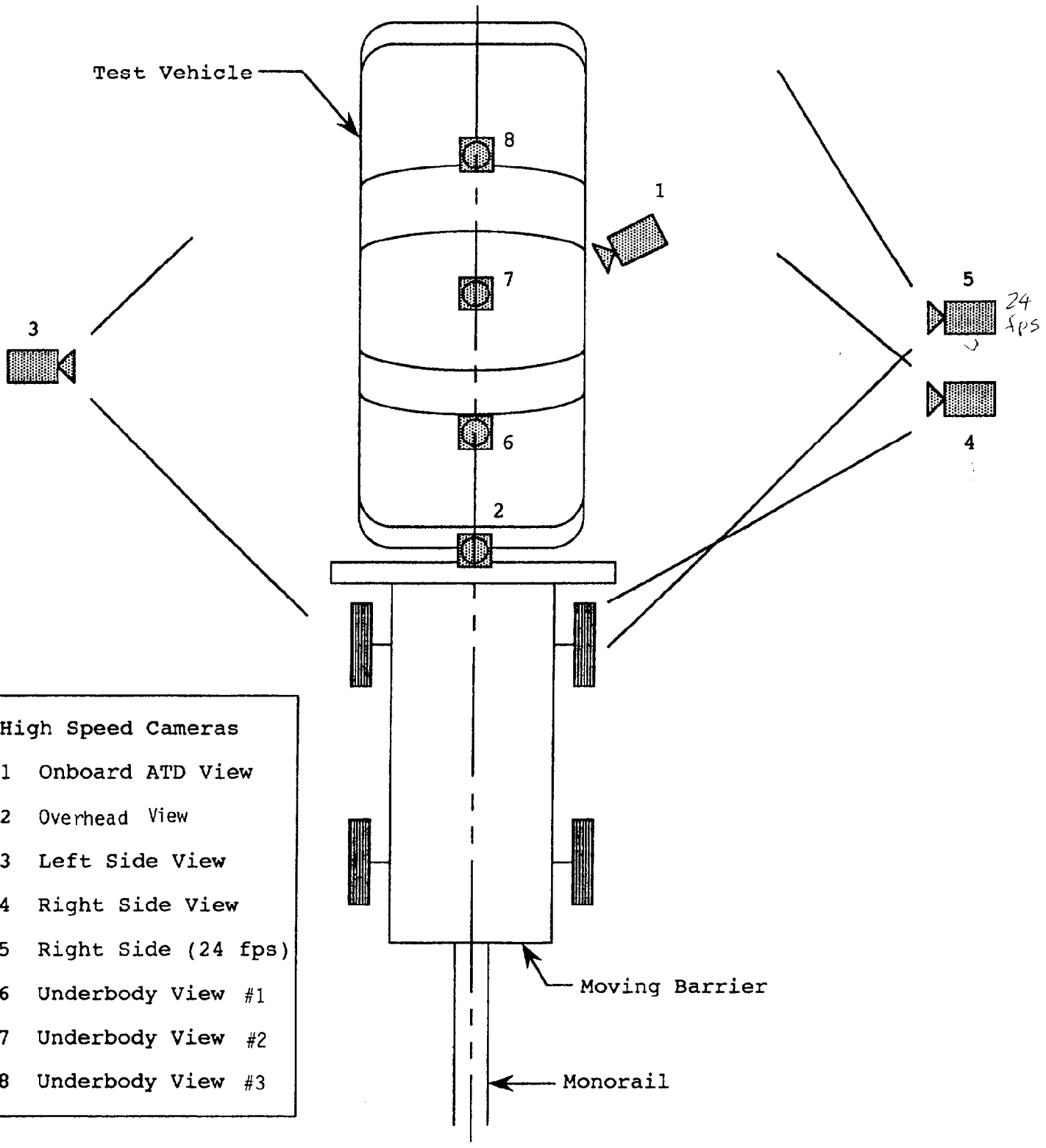
Z - Film plane to ground

Angle with reference to horizontal plane;
+ upwards, - downwards

* SEE FIGURE 2-1 FOR CAMERA POSITIONS

FIGURE 2-1

CAMERA POSITIONS



High Speed Cameras	
1	Onboard ATD View
2	Overhead View
3	Left Side View
4	Right Side View
5	Right Side (24 fps)
6	Underbody View #1
7	Underbody View #2
8	Underbody View #3

SECTION 3

COMPLIANCE TEST RESULTS

The results of the FMVSS 301-75 Rear compliance tests on the tested 1993 Nissan Quest MPV, NHTSA No. CP5205, are presented in this section.

The test vehicle was inspected upon receipt. Vehicle pretest information, delivered weights and attitudes, test weights and attitudes, tire information and fuel system capacity were recorded and are presented in Table 3-1.

The velocity of the rear impact sled was 29.40 mph. Test velocity information and posttest crush details are given in Table 3-2. Posttest left side, front, right side and rear views of the test vehicle are given in Figures 5-6 to 5-9.

No solvent leaked from any part of the vehicle's fuel system during impact or for 30 minutes after the impact event. The vehicle was then placed on the static rollover machine and rotated to the 90, 180, 270 and 360 degree positions successively at the required time intervals. No fuel system leaks were detected at any of the rollover positions. The details of the rollover test sequence are presented in Table 3-3. Pretest and posttest views of the vehicle underbody are shown in Figures 5-10 to 5-12.

Upon impact the driver ATD moved rearward and rotated with his feet swinging inboard. The only contact point was his left knee hitting the lower steering wheel rim. The Head Injury Criteria (HIC) for the driver ATD was 38.2. The chest resultant (3 msec clip) was 10.7 g's. All driver ATD instrumentation results are presented in Table 3-4. The displacement transducer for the seat belt pullout malfunctioned and no data was acquired. Pretest measurements are shown in Tables 3-5 and 3-6. Pretest and posttest views of the Driver ATD position are shown in Figures 5-13 and 5-14. A posttest view of the vehicle interior is shown in Figure 5-15.

No test failures related to FMVSS 301-75 Rear were identified for the tested 1993 Nissan Quest MPV.

* SEE TABLE 3-7

TABLE 3-1

TEST VEHICLE DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Nissan/Quest/MPV

VEHICLE NHTSA No.: C P 5 2 0 5 ; VIN: 4 N 2 D N 1 1 W 8 P D 8 1 8 6 8 4

VEHICLE BODY COLOR: Beige ; MONTH AND YEAR OF MANUFACTURE: 01/93

ENGINE: 6 Cylinders; 180.62 cu in; 3.0 Liters; 2960 cc
X Gas; ___ Diesel; ___ Turbocharged
PLACEMENT: ___ Longitudinal; X Transverse (Lateral)

TRANSMISSION: 3 Speed; ___ Manual; X Automatic; X Overdrive

FINAL DRIVE: X Front Wheel Drive; ___ Rear Wheel Drive; ___ Four Wheel Drive

DATE VEHICLE AVAILABLE FOR TESTING: 03/02/93

ODOMETER READING: 246 mi; OPTIONS: X A/C; X P/S; ___ P/Window;
X Tilt Whl.; ___ Cruise Control

GVWR: 5445 lb GAWR Front: 2716 lb GAWR Rear: 2800 lb

DATA RECORD FROM VEHICLE'S TIRE PLACARD:

Location of Placard on Vehicle: Driver Side B-Pillar
Recommended Cold Tire Pressure: 35 psi Front; 35 psi Rear
Tire Pressure (at maximum capacity): 35 psi Front; 35 psi Rear
Recommended Tire Size: P205/75RX15S Recommended Load Range: N/A
Tires on Vehicle: P205/75R15 97S Load Range: 3 Plies
Tire Manufacturer: General Type of Spare Tire: T125/90D16
Number of Occupants: 2 Front; 2 Rear; 3 Third Seat; 7 TOTAL
Type of Front Seats: X Bucket; ___ Bench; ___ Split Bench
Type of Front Seat Back: ___ Fixed; X Adj. Lever; ___ Adj. Rotating Knob

Vehicle Maximum Capacity Loading: N/A lb
No. of Occupants x 150 lb: N/A lb
Cargo Capacity (Max - Occupants): 300 lb *

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Right Front:	1097 lb			
Left Front:	1157 lb	Total Front:	2254 lb	(58% of Total)
Right Rear:	831 lb			
Left Rear:	770 lb	Total Rear:	1601 lb	(42% of Total)
		Total Weight:	3855 lb	

CALCULATION OF TEST VEHICLE TARGET WEIGHT:

Total Test Vehicle Delivered Weight With Maximum Fluids:	3855 lb
Maximum Cargo Carrying Capacity of Test Vehicle:	300 lb *
Weight of Two Part 572 ATD's (2 * 164 lb):	328 lb
TEST VEHICLE TARGET WEIGHT:	4483 lb

* 300 lb for light trucks and MPV's

TABLE 3-1 (Cont.)

TEST VEHICLE DATA

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 ATD's AND CARGO:

Right Front: 1217 lb
Left Front: 1236 lb Total Front: 2453 lb (55% of Total)
Right Rear: 1050 lb
Left Rear: 976 lb Total Rear: 2026 lb (45% of Total)

Total Weight: 4479 lb (includes 180 lb of sandbag ballast secured in the cargo / luggage area)

VEHICLE COMPONENTS REMOVED TO MEET TARGET WEIGHT:

1. N/A 2. N/A

TEST VEHICLE ATTITUDE:

As Delivered -	Right Front:	31.2 in	Ready for Test -	Right Front:	30.2 in
	Left Front:	31.0 in		**Left Front:**	30.4 in
	Right Rear:	31.7 in		Right Rear:	29.9 in
	Left Rear:	31.7 in		Left Rear:	30.5 in

TEST VEHICLE DIMENSIONS:

Total Vehicle Length: 190.2 in

Wheelbase: 112.2 in

C. G. is 50.8 in rearward of front axle centerline.

FUEL SYSTEM DATA:

Fuel System Capacity Listed in Owner's Manual: 20.0 gallons
Usable Capacity Figure Furnished by COTR: 20.0 gallons
Test Volume Range (92% to 94% of Usable Capacity)
18.4 gallons to 18.8 gallons
ACTUAL TEST VOLUME: 18.5 gallons (with entire fuel system filled)

Test Fluid Type: Stoddard Solvent
Test Fluid Specific Gravity: 0.764
Test Fluid Kinematic Viscocity: as per ASTM Standard D484-71
Test Fluid Color: Red (Red is preferred)

Type of Vehicle Fuel Pump: Electric
Electric Fuel Pump Operation with Ignition ON and Engine OFF:
Electric fuel pump does not operate with ignition on and engine off

Details of Fuel System: Fuel tank is located forward of the rear axle, slightly offset to the left side of the vehicle. The filler neck is slightly forward of the left rear wheel. The filler neck runs straight down and across to the side of the fuel tank.

Recorded By: Brian O'Keefe Date: 05/13/93

Approved By: [signature] Date: 05/17/93

TABLE 3-2

POST IMPACT DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Nissan/Quest/MPV

VEHICLE NHTSA No.: CP5205 TEST MODE: Rear Moving Barrier

TEST DATE: 04/30/93 TIME: 4:30 pm TEMPERATURE: 85° F

REQUIRED IMPACT VELOCITY RANGE: 28.9 to 29.9 mph

ACTUAL IMPACT VELOCITY: (speed traps located within 5 feet of impact plane)

Trap No. 1 = 29.40 mph Trap No. 2 = 29.16 mph

Average Impact Speed = 29.28 mph

VEHICLE STATIC CRUSH:

Location	Pretest (in)	Posttest (in)	Crush(in)
Left Side	186.7	180.6	6.1
Right Side	186.8	180.8	6.0
Centerline	190.2	183.5	6.7
27.5" Left of C.L.	186.7	180.6	6.1
16.5" Left of C.L.	188.9	181.9	7.0
5.5" Left of C.L.	190.0	182.6	7.4
5.5" Right of C.L.	190.0	182.5	7.5
16.5" Right of C.L.	188.9	182.0	6.9
27.5" Right of C.L.	186.8	180.8	6.0

Collision Deformation Classification (CDC) Code: B

Midpoint of Damage: Vehicle Longitudinal Centerline

Length of Damaged Area: 55.0 in

Vehicle Wheelbase: 112.2 in

Recorded By: Brian O'Keefe Date: 05/13/93

Approved By: [signature] Date: 05/17/93

TABLE No. 3-3

FMVSS No. 301-75 STATIC ROLLOVER DATA

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Nissan/Quest/MPV

VEH. NHTSA NO.: CP5205 TEST DATE: 04/30/93

USABLE CAPACITY OF VEHICLE'S FUEL TANK: 20.0 Gallons (furnished by Mfr.)

AMOUNT OF STODDARD SOLVENT ADDED TO THE VEHICLE'S FUEL TANK:

18.5 Gallons, which is 92.5% of the stated usable capacity

SOLVENT SPILLAGE MEASUREMENT AFTER 20 MPH MOVING BARRIER IMPACT TEST:

	Actual	Max. Allowed
From impact until vehicle motion ceases	0 oz.	1 oz.
For 5 min. period after vehicle motion ceases	0 oz.	5 oz.
For next 25 min. at barrier face	0 oz.	1 oz./min.

SOLVENT SPILLAGE DETAILS: None

STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. range = 1 to 3 min)

Time reqd. for machine to rotate 90°	1 minutes,	20 seconds
FMVSS 301-75 position hold time	5 minutes,	00 seconds
Total	6 minutes,	20 seconds
Next whole minute interval	7 minutes	

VEHICLE STATIC ROLLOVER DATA:

	1st 5 Min.	6th min.	7th min.	8th min.
Max allowable solvent spillage	5 oz.	1 oz.	1 oz.	1 oz.
0° to 90° (filler cap down)	0 oz.	0 oz.	0 oz.	N/A
90° to 180°	0 oz.	0 oz.	0 oz.	N/A
180° to 270°	0 oz.	0 oz.	0 oz.	N/A
270° to 360°	0 oz.	0 oz.	0 oz.	N/A

SOLVENT SPILLAGE LOCATIONS: None

STATIC ROLLOVER TEST DATA:

A. Test Phase = 0 to 90 degrees

Determination of Stoddard Solvent Collection Time Period:

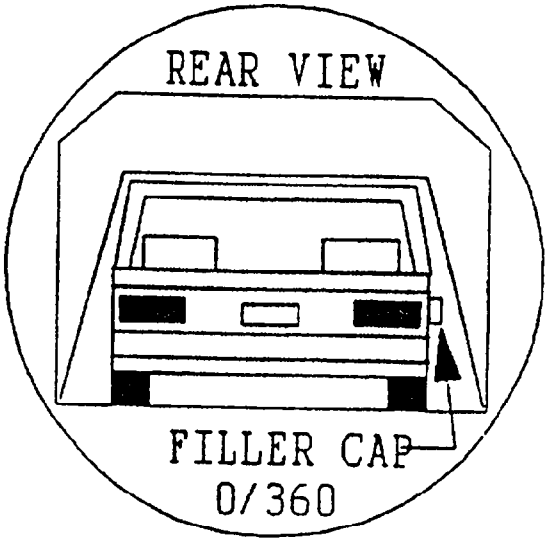
1. Rollover Fixture 90 degree Rotation Time = 1 minutes, 20 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 20 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



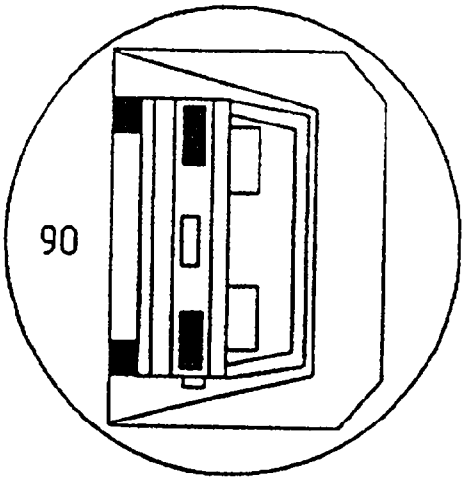
Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

3. 7th minute = 0 oz. (1 oz. allowed)

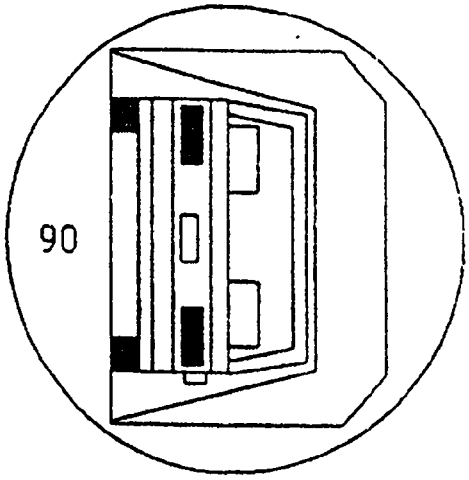
4. 8th minute (if required) = 0 oz. (1 oz. allowed)



Provide Details of Stoddard Solvent Spillage Locations--

N/A

B. Test Phase = 90 to 180 degrees



Determination of Stoddard Solvent Collection Time Period:

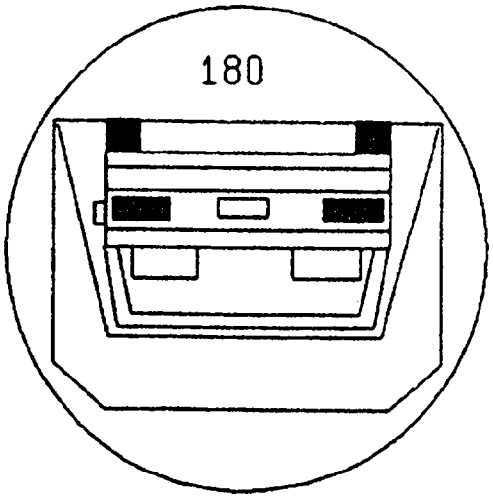
1. Rollover Fixture 90 degree Rotation Time = 1 minutes, 20 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 20 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

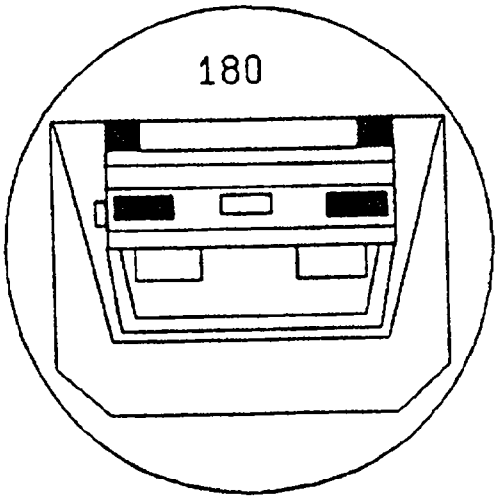
3. 7th minute = 0 oz. (1 oz. allowed)

4. 8th minute (if required) = 0 oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations--

N/A

C. Test Phase = 180 to 270 degrees



Determination of Stoddard Solvent Collection Time Period:

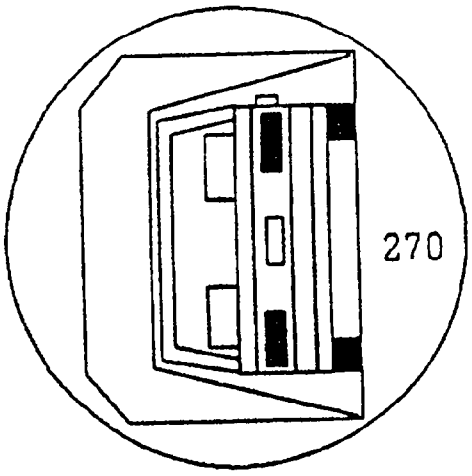
1. Rollover Fixture 90 degree Rotation Time = 1 minutes, 20 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 20 seconds

4. NEXT WHOLE MINUTE INTERVAL = 0 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

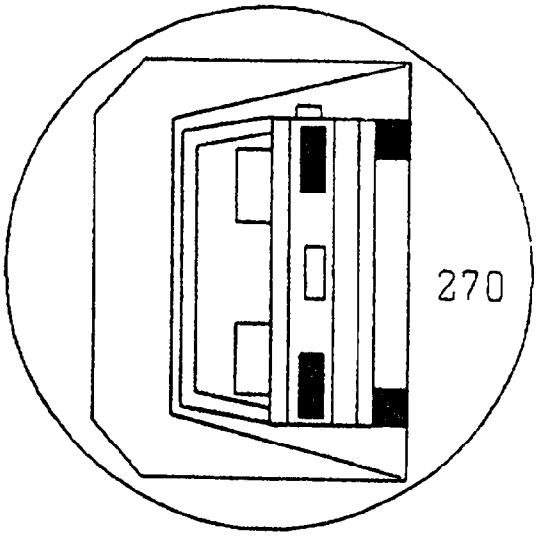
3. 7th minute = 0 oz. (1 oz. allowed)

4. 8th minute (if required) = 0 oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations--

N/A

D. Test Phase = 270 to 360 degrees



Determination of Stoddard Solvent Collection Time Period:

1. Rollover Fixture 90 degree Rotation Time = 1 minutes, 20 seconds

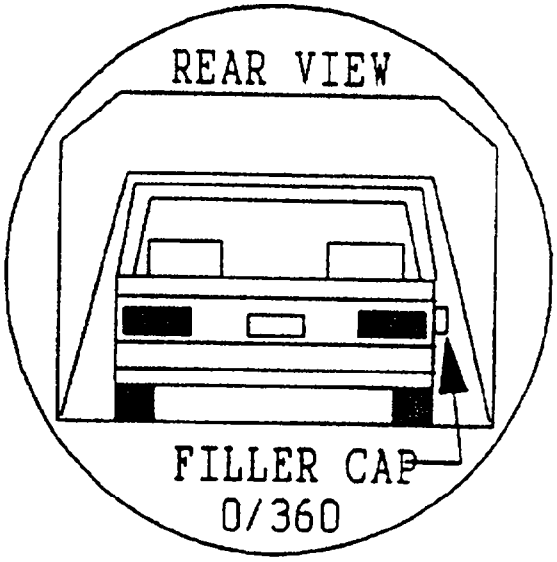
(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 20 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes

Actual Test Vehicle Stoddard Solvent Spillage:



1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

3. 7th minute = 0 oz. (1 oz. allowed)

4. 8th minute (if required) = 0 oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations-- N/A

Recorded By: Brian O'Keefe Date: 04/30/93

Approved By: [signature] Date: 05/17/93

TABLE No. 3-4
FMVSS No. 208 OCCUPANT CRASH PROTECTION DATA SHEET

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1993/Nissan/Quest/MPV

VEH. NHTSA NO.: CP5205 TEST DATE: 04/30/93

MAXIMUM ACCELERATION VALUES:	DRIVER ATD No. 339	PASSENGER ATD No. N/A
Head X	-15.8	N/A
Head Y	-9.3	N/A
Head Z	10.6	N/A
HEAD RESULTANT	19.7	N/A
Chest X	10.4	N/A
Chest Y	-5.2	N/A
Chest Z	5.3	N/A
CHEST RESULTANT (3msec clip)	10.7	N/A
TIME INTERVAL (msec)	60.8 to 63.8	N/A
Pelvis X	20.7	N/A
Pelvis Y	-6.3	N/A
Pelvis Z	9.7	N/A
PELVIS RESULTANT	21.3	N/A

6 AXIS NECK TRANSDUCER VALUES:

Neck X - Load (lbs)	-26.8	N/A
Neck Y - Load (lbs)	50.0	N/A
Neck Z - Load (lbs)	162.3	N/A
NECK LOAD RESULTANT	168.9	N/A
Neck X - Moment (in-lbs)	106.9	N/A
Neck Y - Moment (in-lbs)	-105.3	N/A
Neck Z - Moment (in-lbs)	-124.4	N/A
NECK MOMENT RESULTANT	173.4	N/A

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	38.2	N/A
t^1 (msec)	148.9	N/A
t^2 (msec)	184.9	N/A
Avg. Acceleration t^1 to t^2	16.2	N/A

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	67.8	N/A
Shoulder Belt (N)	31.3	N/A

MAXIMUM SEAT BELT WEBBING SPOOLOUT:

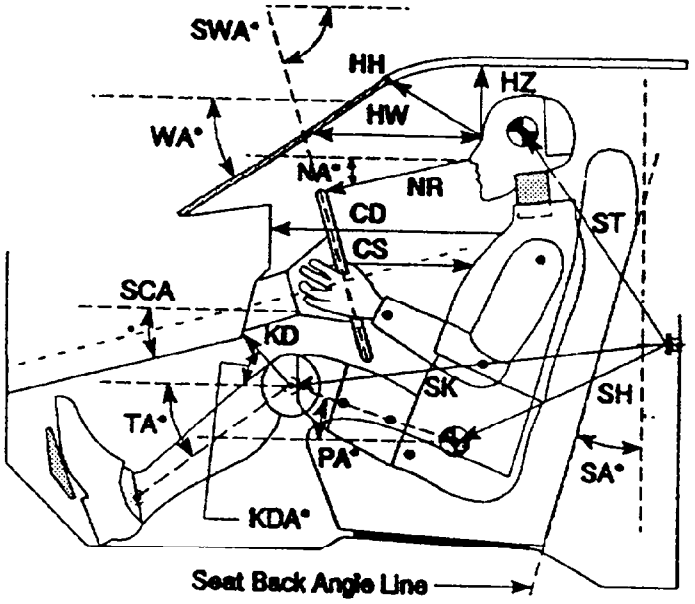
Lap/Shoulder Belt Combination	N/D	N/A

TABLE No. 3-5
TEST ATD POSITIONING DATA

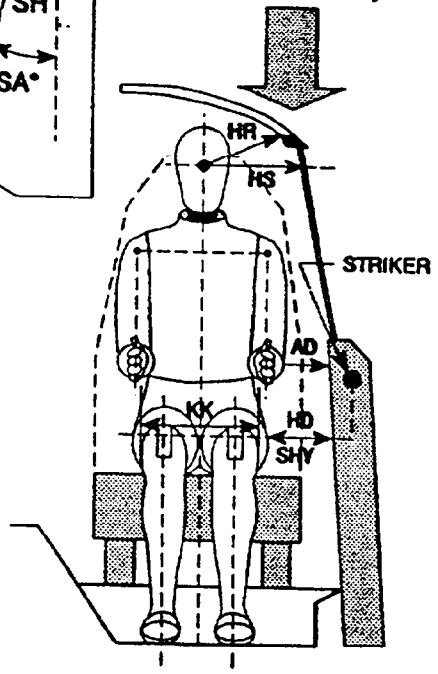
Measurement*	Driver (Serial No. 339)		Passenger (Serial No. N/A)	
	Length (in)	Angle (Degrees)	Length (in)	Angle (Degrees)
WA	---	31	---	---
SWA	---	62	---	---
SCA	---	29	---	---
SA	---	23	---	N/A
HZ	8.5	90	N/A	90
HH	17.3	---	N/A	---
HW	25.0	0	N/A	0
HR	7.5	---	N/A	---
NR	16.6	-11	---	---
CD	22.6	---	N/A	---
CS	13.0	0	---	---
RA	7.8	0	---	---
KDL	8.0	26	N/A	---
KDR	7.8	---	N/A	N/A
PA	---	21	---	N/A
TA	---	-51	---	N/A
KK	10.6	---	N/A	---
ST	24.5	75	N/A	N/A
SK	28.8	2	N/A	N/A
SH	11.2	-7	N/A	N/A
SHY	9.3	0	N/A	0
HS	11.5	0	N/A	0
HD	6.6	0	N/A	0
AD	5.0	0	N/A	0

* SEE PAGE 12A

DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
SHY- Striker to H-Point (Y Direction)



CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW - Head to Windshield
HZ - Head to Roof
KDA- Knee to Dash Angle
KDL- Left Knee to Dash
KDR- Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA- Steering Column Angle
SH - Striker to H-Point
SK - Striker to Knee
ST - Striker to Head
SWA- Steering Wheel Angle
TA - Tibial Angle
WA - Windshield Angle

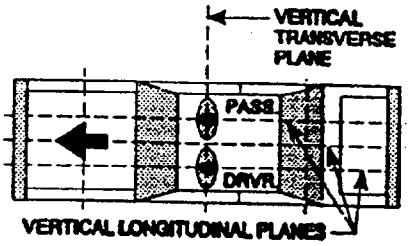
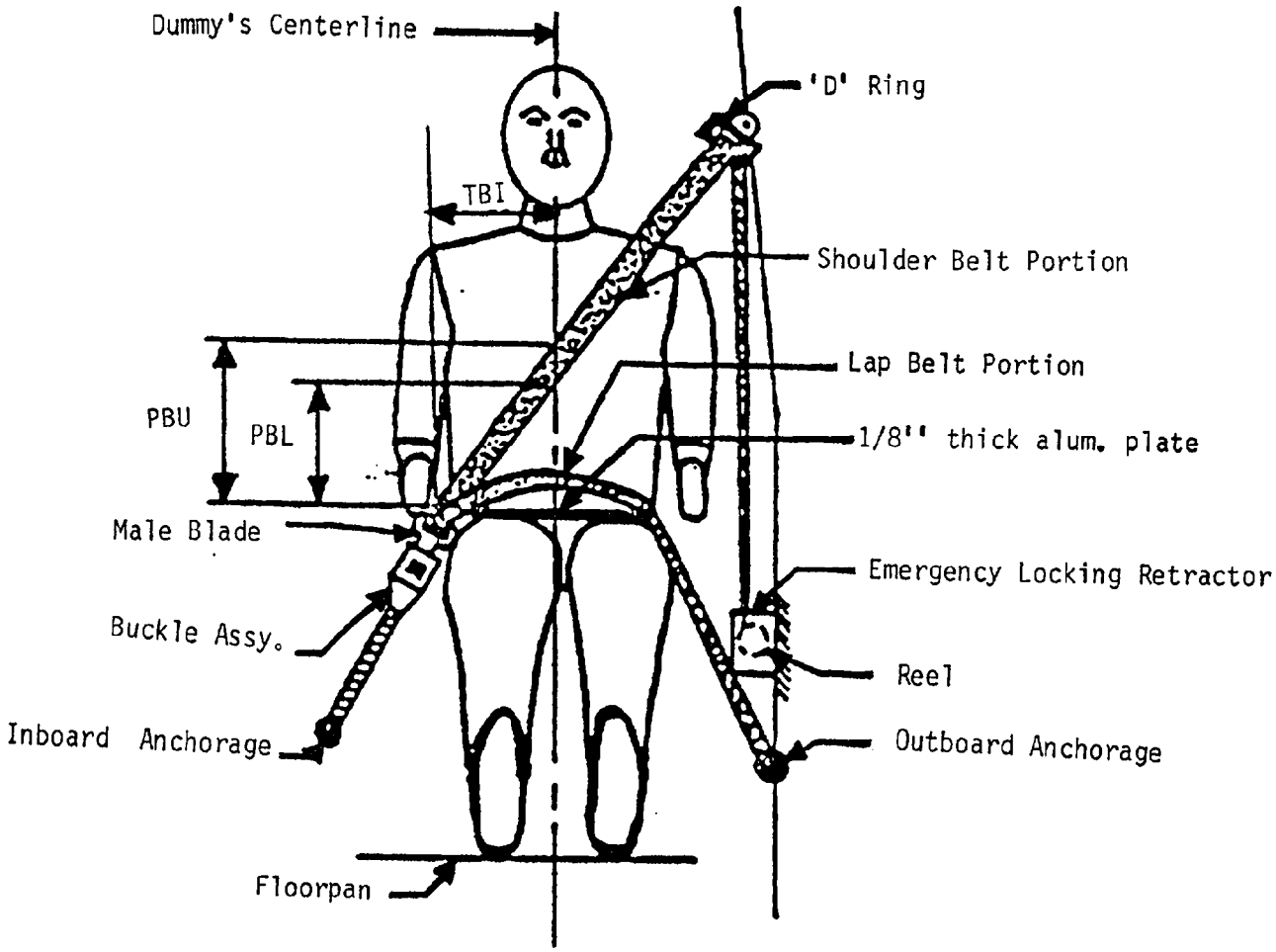


TABLE No. 3-6
SEAT BELT POSITIONING DATA



FRONT VIEW OF DRIVER DUMMY

Measurement	Driver ATD	Passenger ATD
PBU - Top Surface of alum. plate to belt upper edge (in)	11.7	N/A
PBL - Top Surface of alum. plate to belt lower edge (in)	9.0	N/A
TBI - Vertical Centerline of ATD to belt intersection (in)	N/A	N/A
Lap Belt Tension (lbs)	N/D	N/A
Shoulder Belt Tension (lbs)	N/D	N/A

TABLE No. 3-7
VEHICLE TRANSDUCER LOCATION AND DATA SUMMARY

No.	Description	Location			Maximum Value *			
		X	Y	Z	-X	msec	+X	msec
1	Vehicle c.g. Primary	111	-2	16	1.8	112.1	22.3	31.7
2	Vehicle c.g. Secondary	111	-2	16	1.2	112.3	21.9	31.8
3	Top of driver seat Accelerometer	87	-10	43	67.7	63.0	52.4	73.5
4	Top of driver seat Rate Sensor	87	-10	43	3.1	177.9	14.3	70.0

REFERENCE: X - Rear bumper trailing edge
Y - Vehicle centerline (Right Pos., Left Neg.)
Z - Ground level

All dimensions in inches

* g's for accelerometers, radians per second for rate sensor

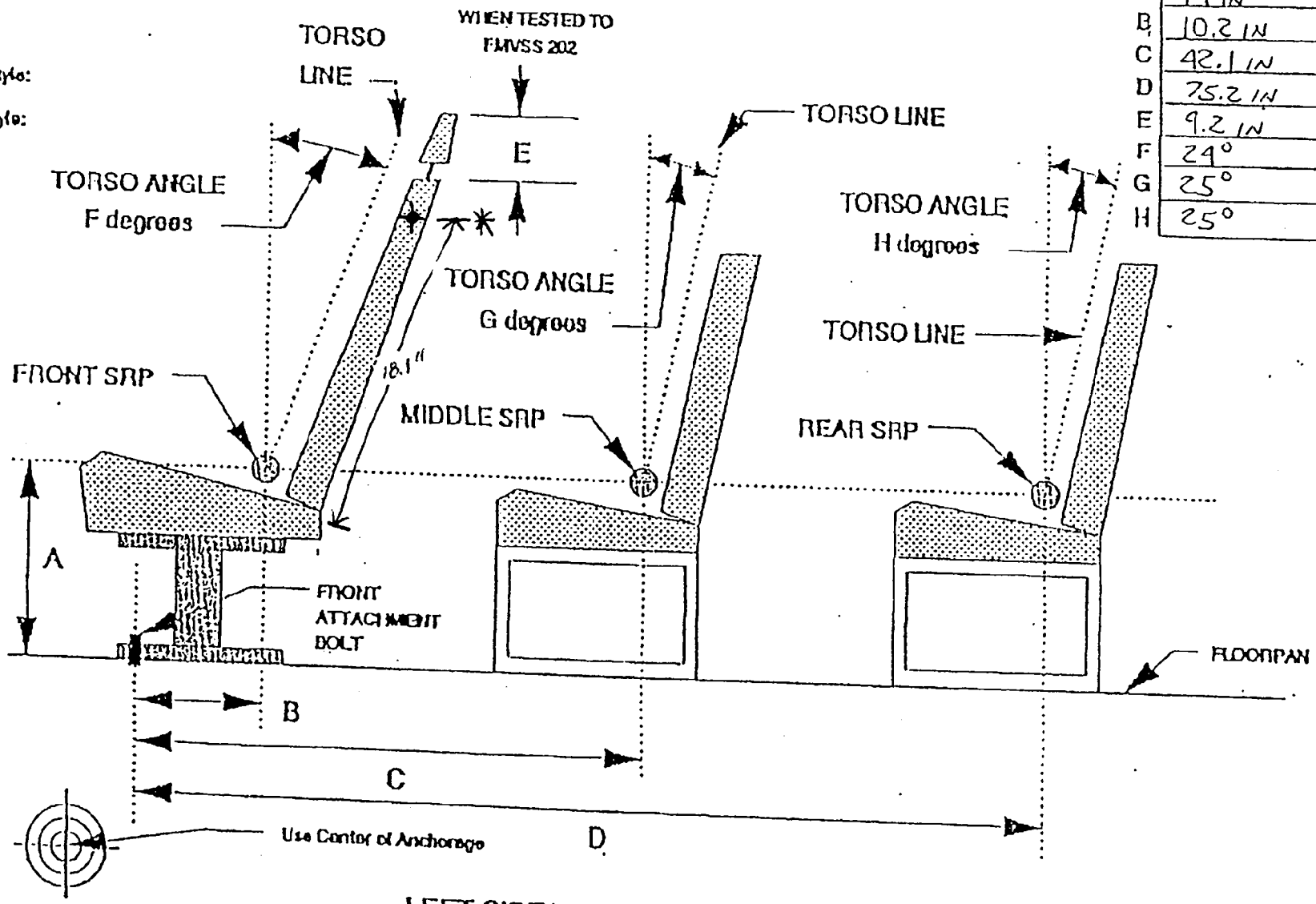
SEATING REFERENCE POINT (SRP) AND TORSO ANGLE DATA FOR FMVSS 201, 202, 203, 207 & 210

(All Dimensions In Inches)

FORM 48
PAGE 1 OF 3

Model Year:
Make:
Model:
Body Style:
Seat Style:

A	14 IN	
B	10.2 IN	
C	42.1 IN	
D	75.2 IN	
E	9.2 IN	
F	24°	°
G	25°	°
H	25°	°



LEFT SIDE VIEW OF TEST VEHICLE

* ARS AND ACCEL ARE MOUNTED 18.1 INCHES ABOVE SEATBACK PIVOT POINT, ON INBOARD SIDE OF DRIVER SEAT

SECTION 4

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: 301(R) TEST DATE:_____

LABORATORY: MOBILITY SYSTEMS AND EQUIPMENT CO.

CONTRACT NO.: DTNH22-93-C-01007 DELV. ORDER NO.:_____

LABORATORY PROJECT ENGINEER'S NAME:_____

TEST SPECIMEN DESCRIPTION:_____

VEHICLE NHTSA NO.:_____ VIN:_____

MFR.:_____

TEST FAILURE DESCRIPTION:_____

N/A

FMVSS REQUIREMENT, PARAGRAPH S :_____

NOTIFICATION TO NHTSA (COTR):_____

DATE:_____; BY:_____

REMARKS:_____

SECTION 5

PHOTOGRAPHS

FIGURE 5-1 PRETEST LEFT SIDE VIEW

FIGURE 5-2 PRETEST FRONT VIEW

FIGURE 5-3 PRETEST RIGHT SIDE VIEW

FIGURE 5-4 PRETEST REAR VIEW

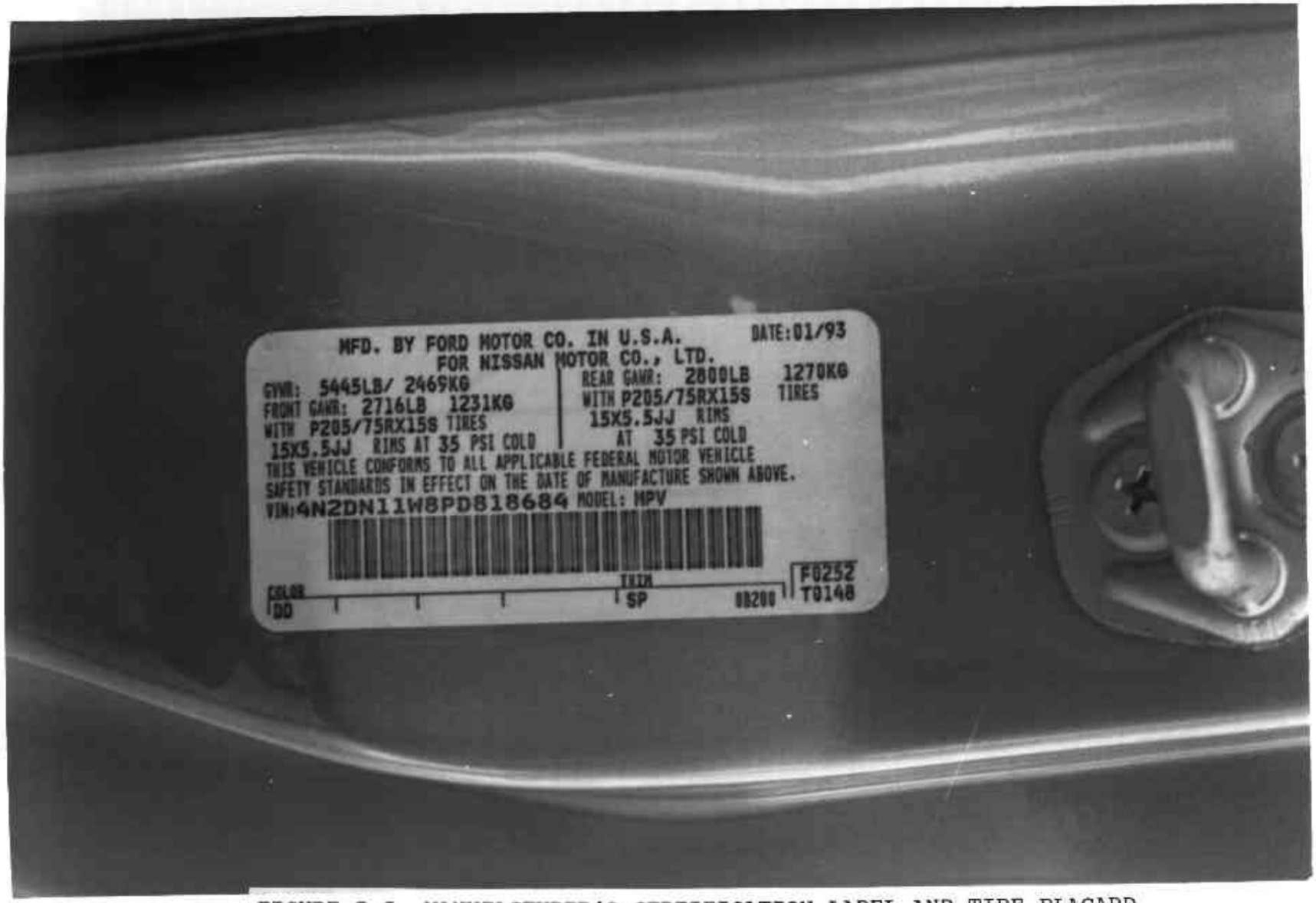


FIGURE 5-5 MANUFACTURER'S CERTIFICATION LABEL AND TIRE PLACARD

FIGURE 5-6 POSTTEST LEFT SID2 VIEW

FIGURE 5-7 POSTTEST FRONT VIEW

FIGURE 5-8 POSTTEST RIGHT SIDE VIEW

FIGURE 5-9 POSTTEST REAR VIEW

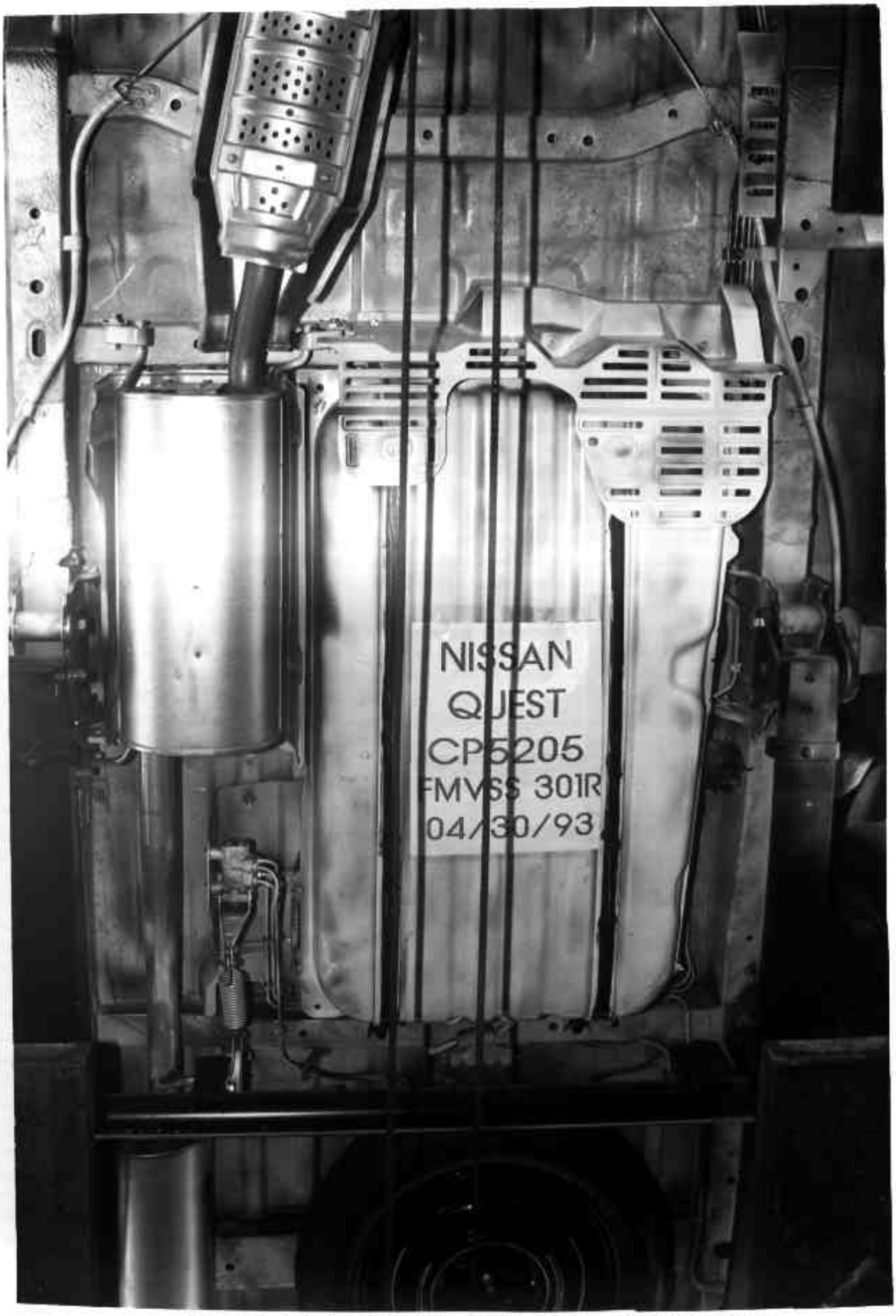


FIGURE 5-10 PRETEST FUEL TANK CLOSEUP VIEW

FIGURE 5-11 POSTTEST FUEL TANK CLOSEUP VIEW

FIGURE 5-12 POSTTEST UNDERBODY VIEW

FIGURE 5-13 PRETEST DRIVER ATD POSITION

FIGURE 5-14 POSTTEST DRIVER ATD POSITION

FIGURE 5-15 POSTTEST VEHICLE INTERIOR VIEW

SECTION 6

TIME HISTORY DATA PLOTS

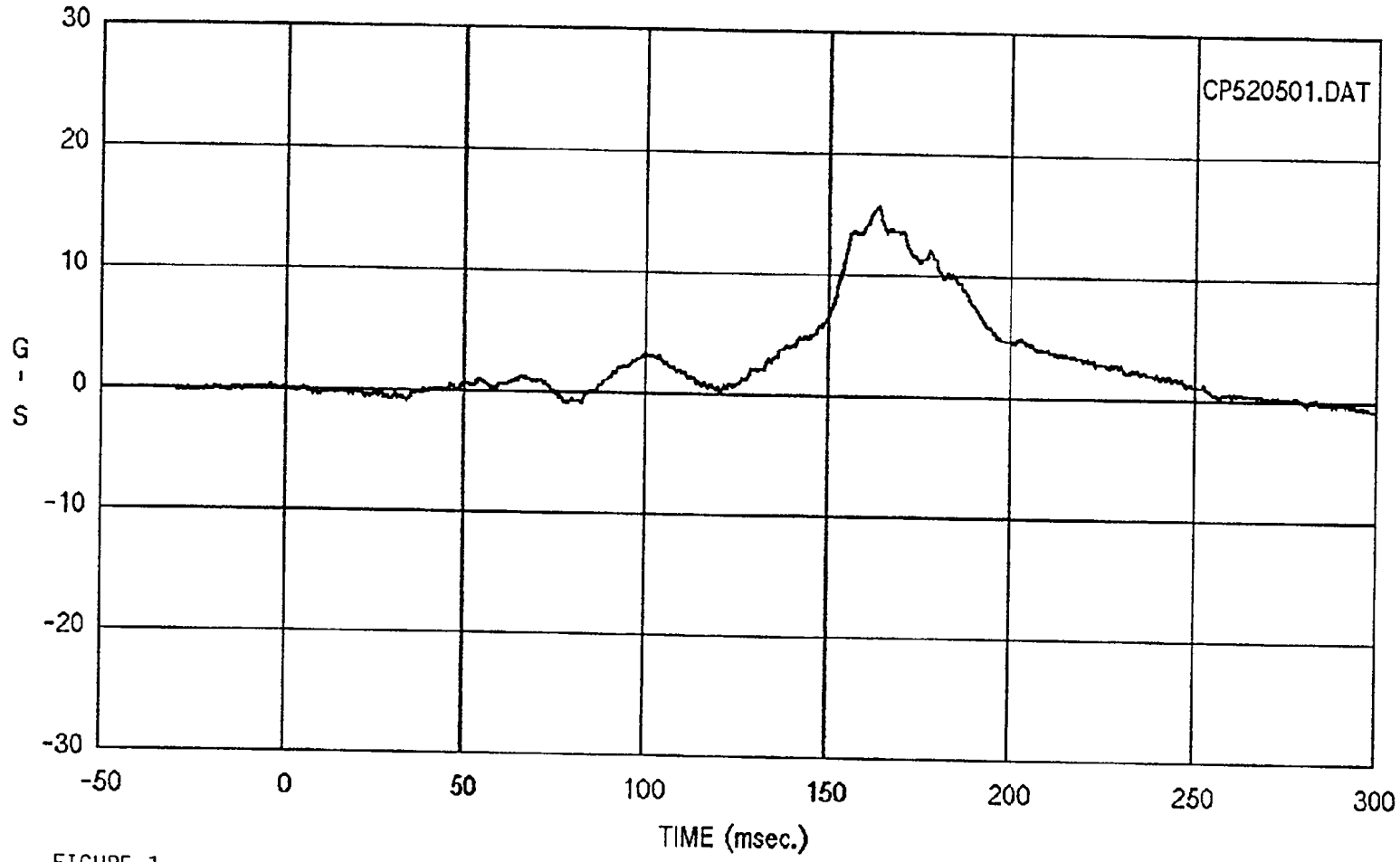


FIGURE 1

Curve: Driver head acceleration -- X axis Filter: SAE CLASS 1000 Max = 15.778 Min = -.95306

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

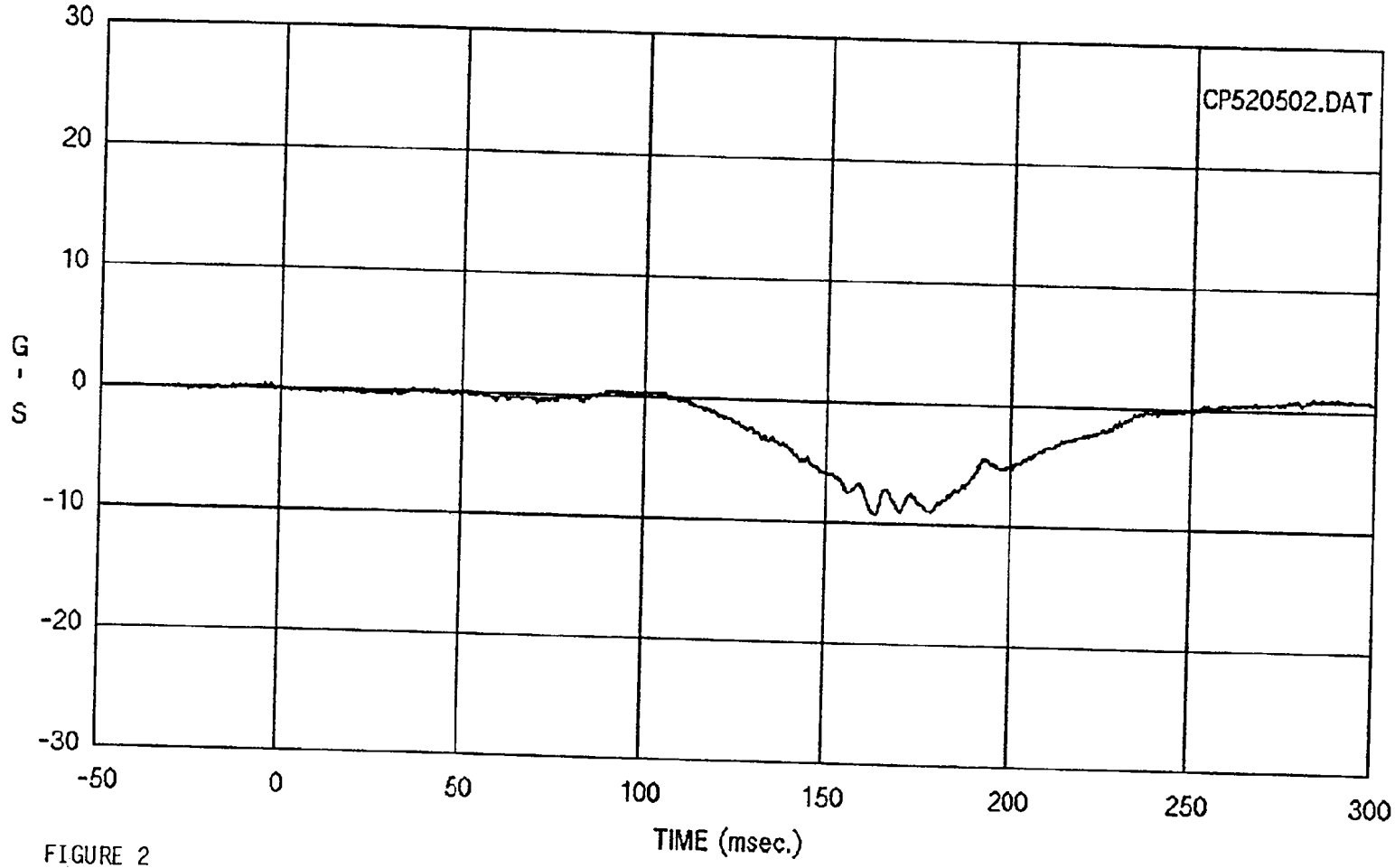


FIGURE 2

Curve: Driver head acceleration -- Y axis Filter: SAE CLASS 1000 Max = 1.1925 Min = -9.3228

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

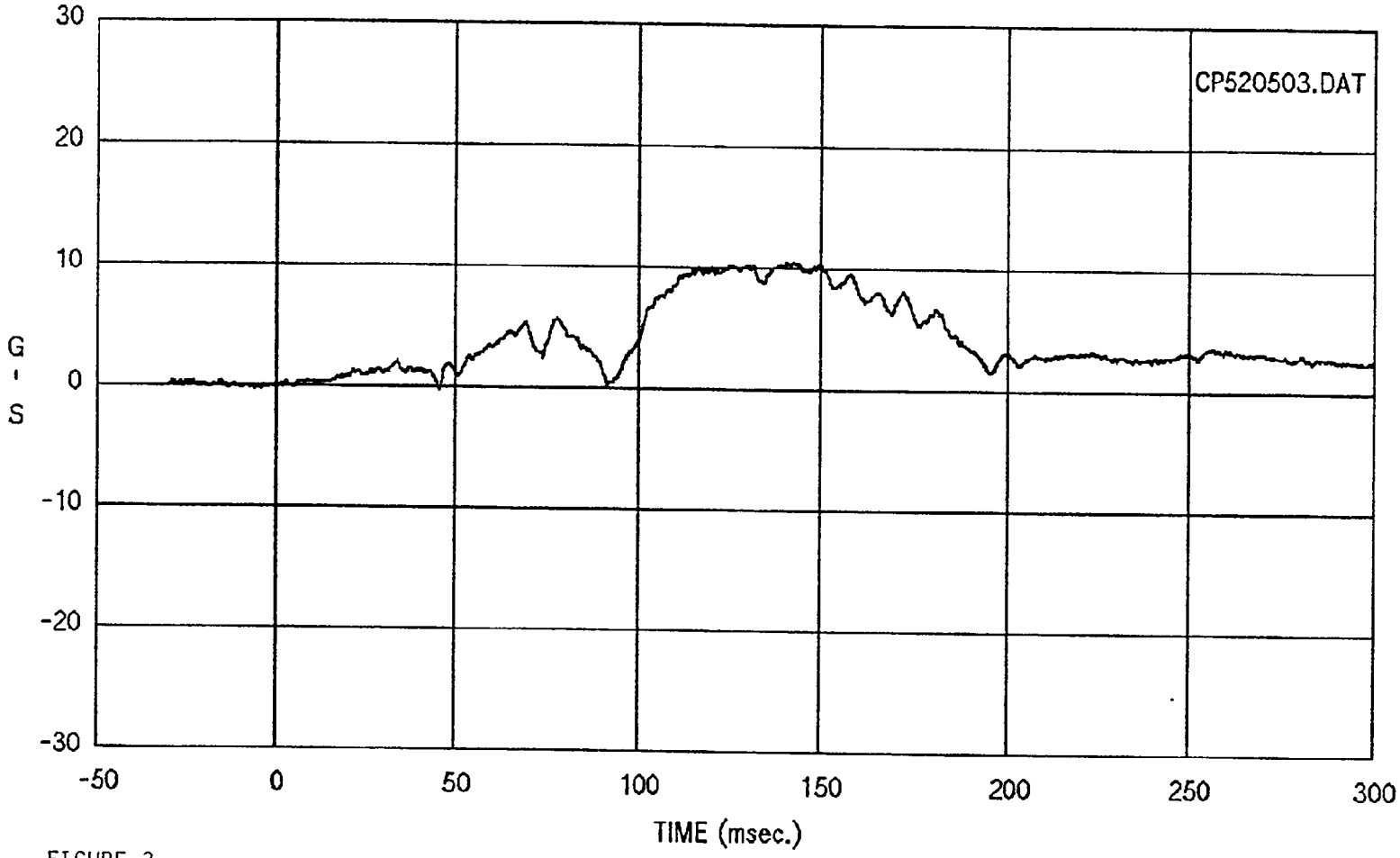


FIGURE 3

Curve: Driver head acceleration -- Z axis Filter: SAE CLASS 1000 Max = 10.649 Min = -.32224

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

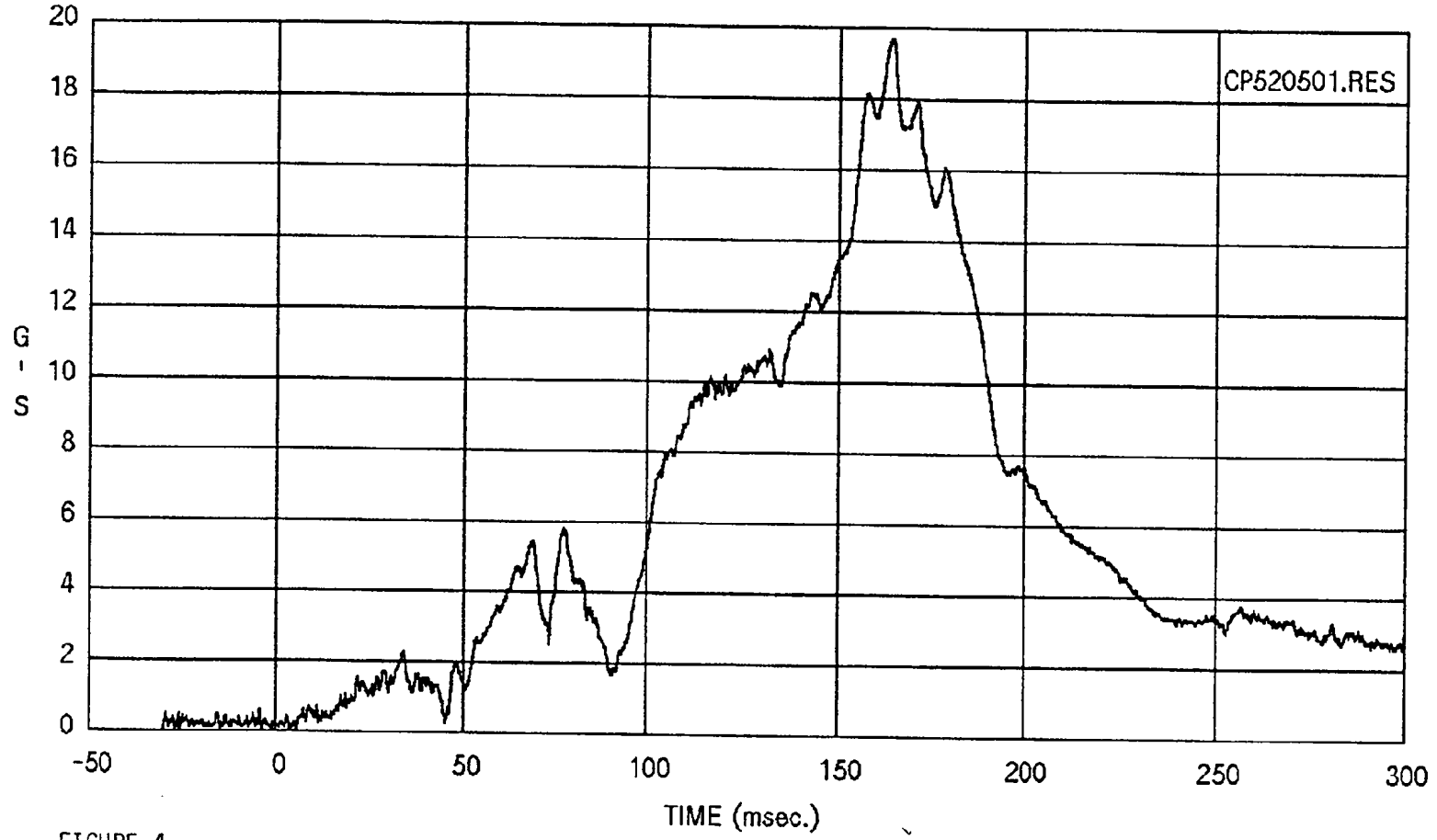


FIGURE 4

Curve: Driver head acceleration -- Resultant Filter: SAE CLASS 1000 03 Max = 19.720 Min = .43945E

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

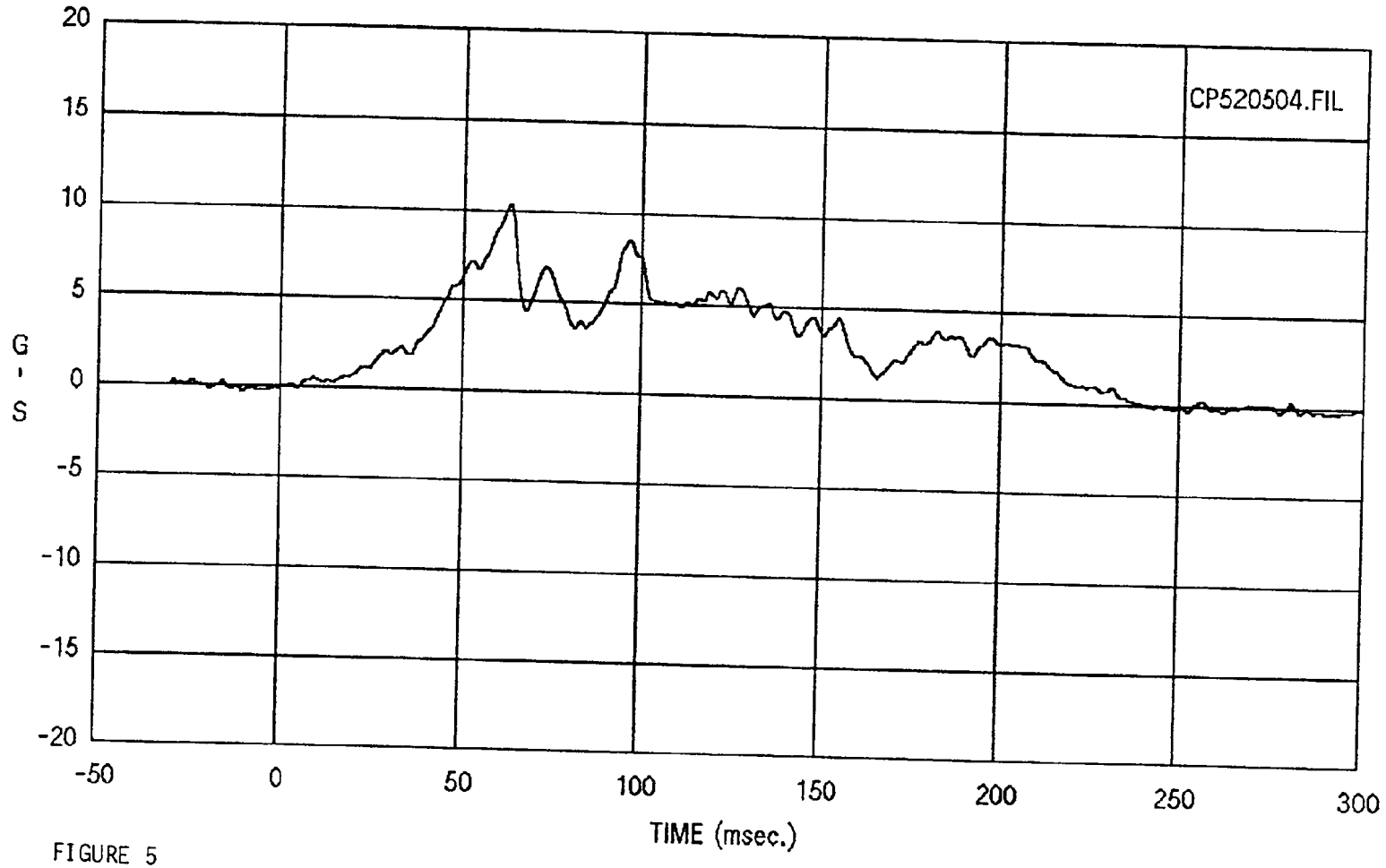


FIGURE 5

Curve: Driver chest acceleration -- X axis Filter: SAE CLASS 180 Max = 10.365 Min = -.30285

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

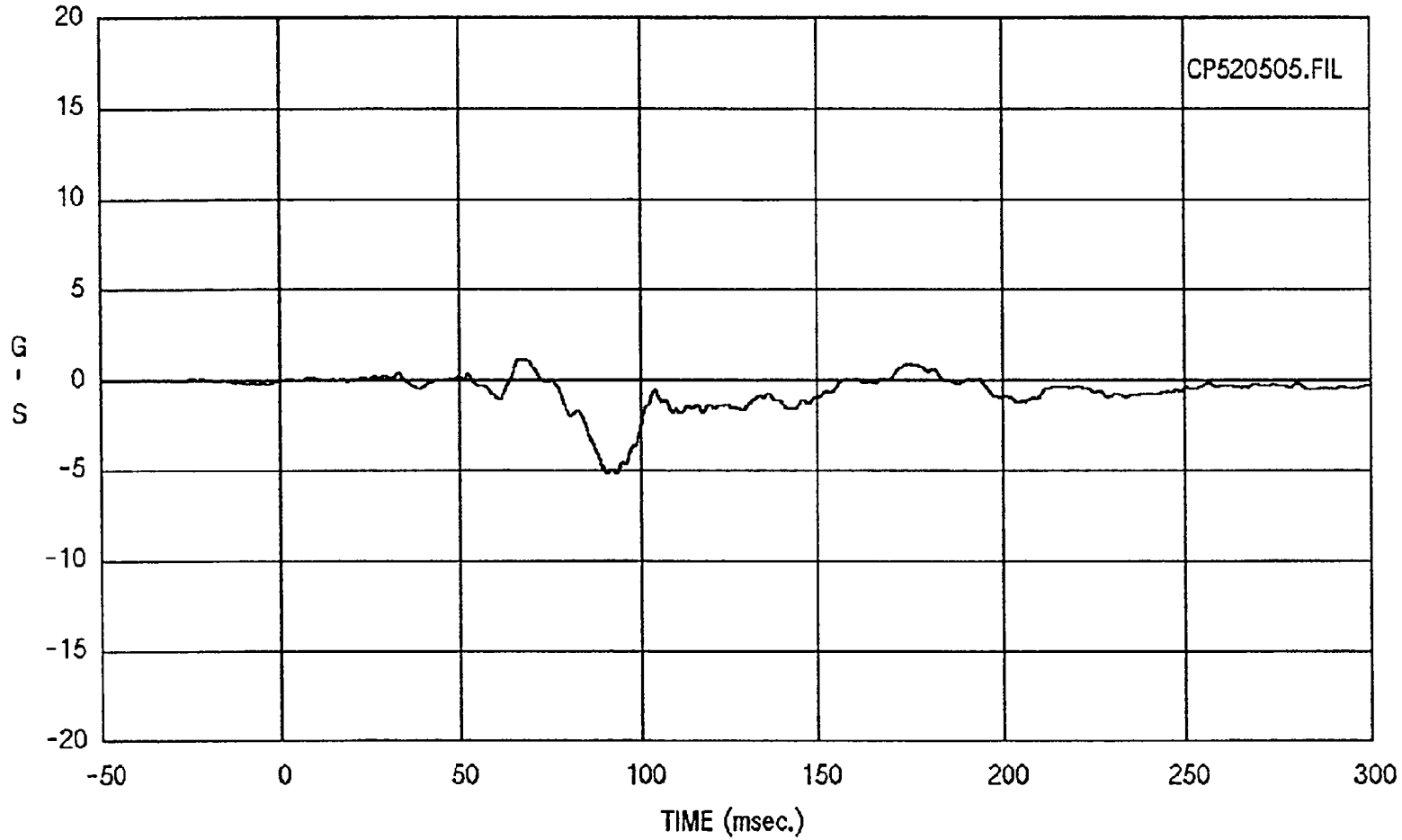


FIGURE 6

Curve: Driver chest acceleration -- Y axis Filter: SAE CLASS 180 Max = 1.1839 Min = -5.1686

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

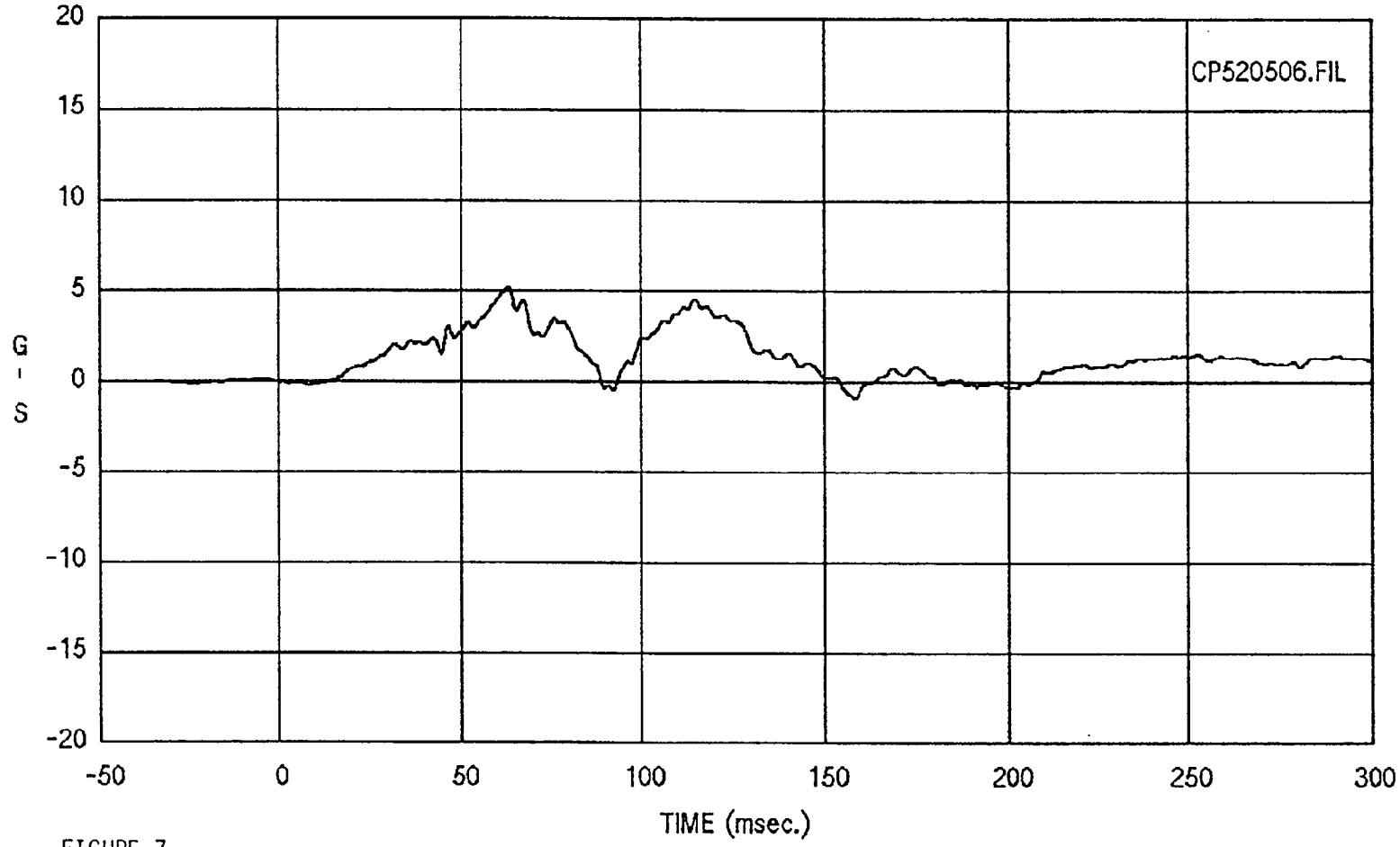


FIGURE 7

Curve: Driver chest acceleration -- Z axis Filter: SAE CLASS 180 Max = 5.3003 Min = -.85361

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

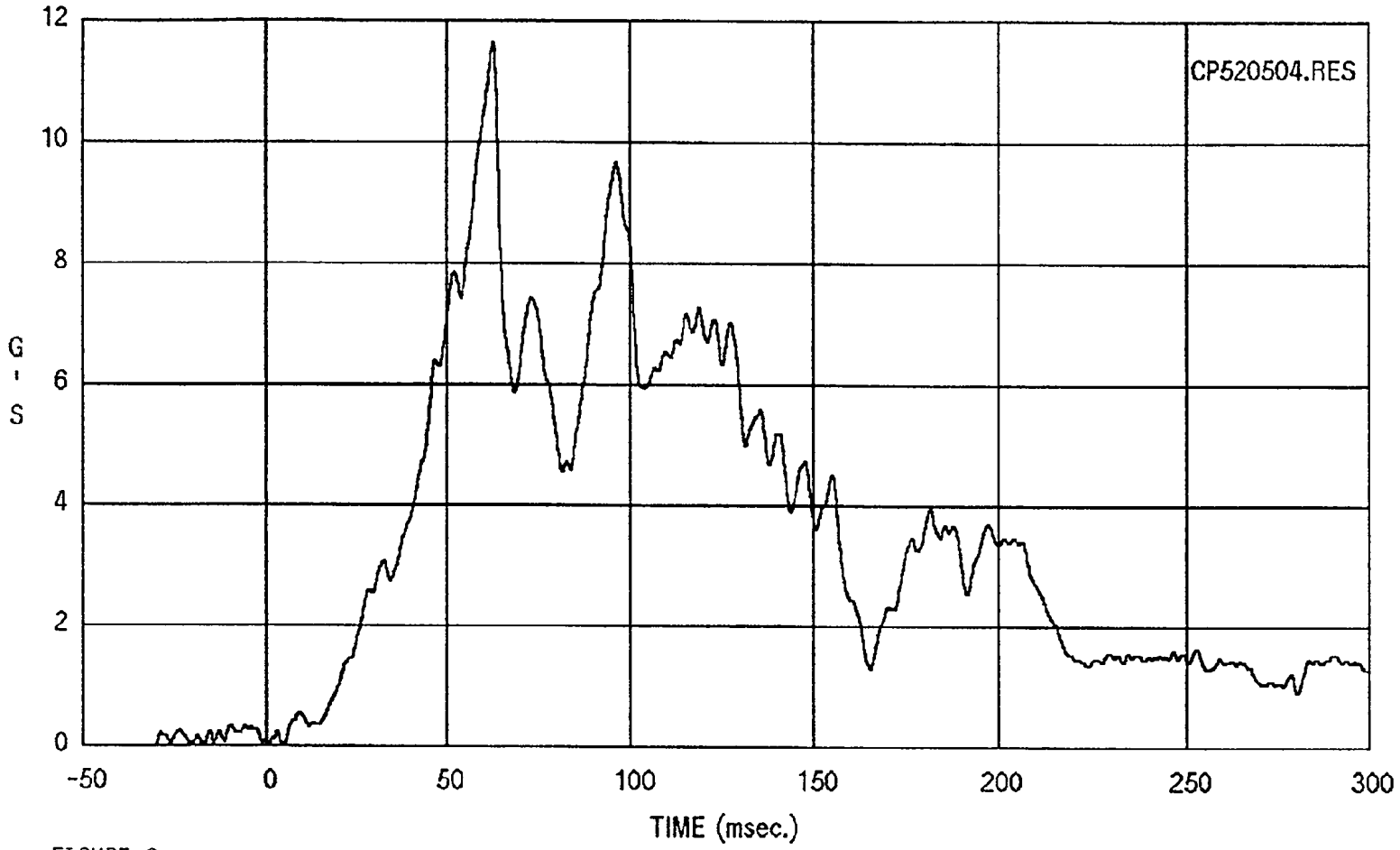


FIGURE 8

Curve: Driver chest acceleration -- Resultant Filter: SAE CLASS 180 01 Max = 11.643 Min = .23506E

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

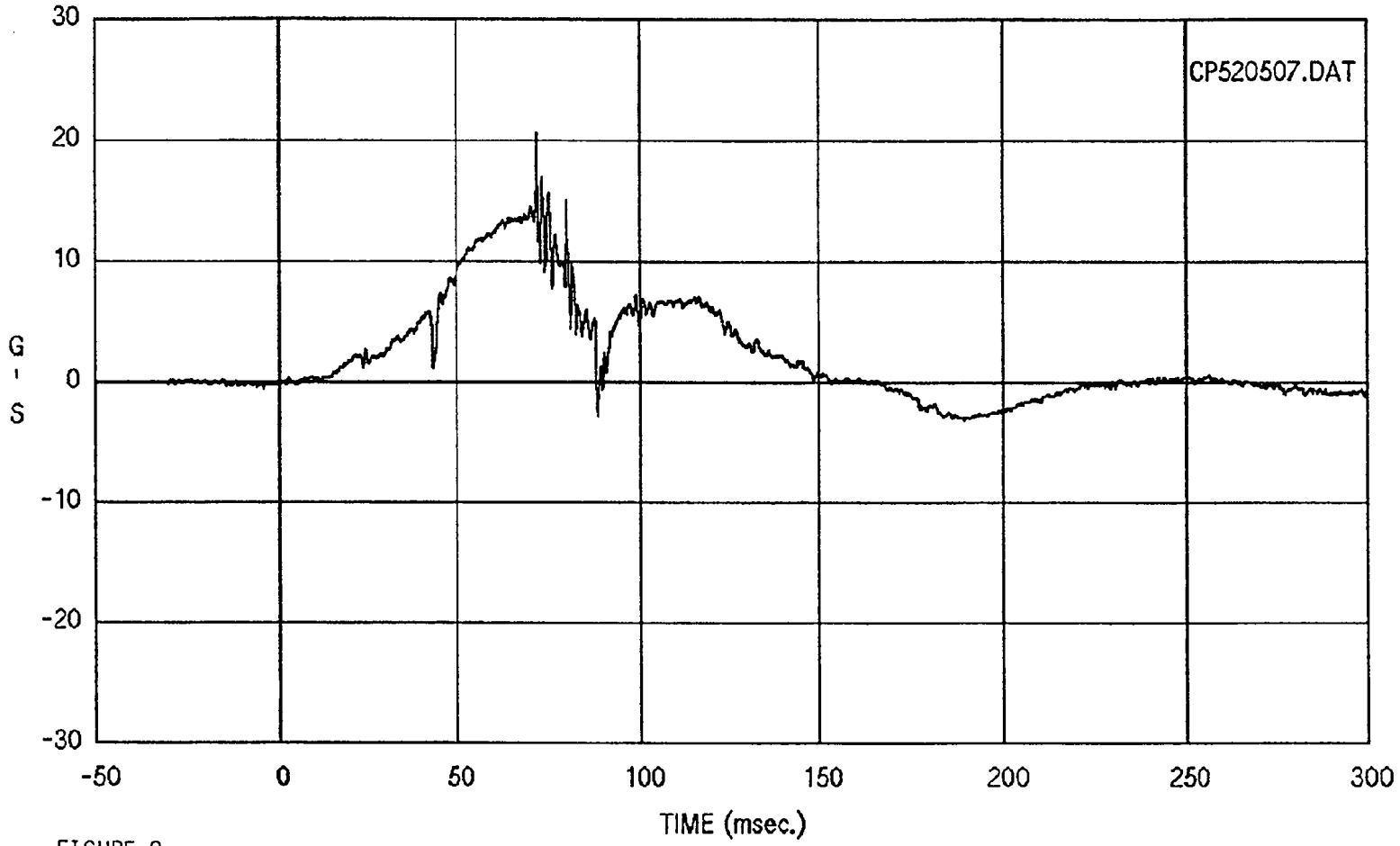


FIGURE 9

Curve: Driver pelvis acceleration -- X axis Filter: SAE CLASS 1000 Max = 20.692 Min = -3.5964

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

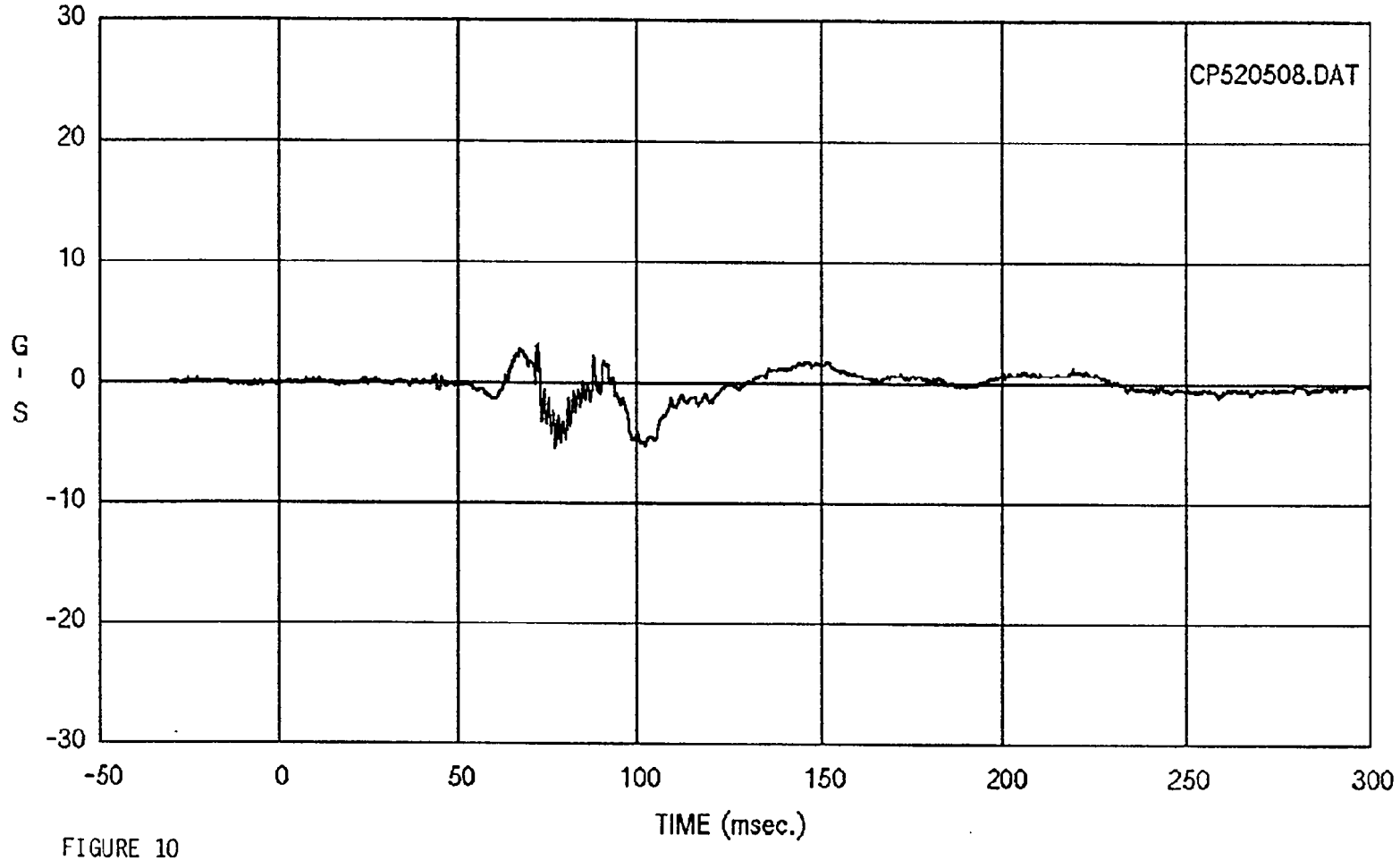


FIGURE 10

Curve: Driver pelvis acceleration -- Y axis Filter: SAE CLASS 1000 Max = 4.1746 Min = -6.2939

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

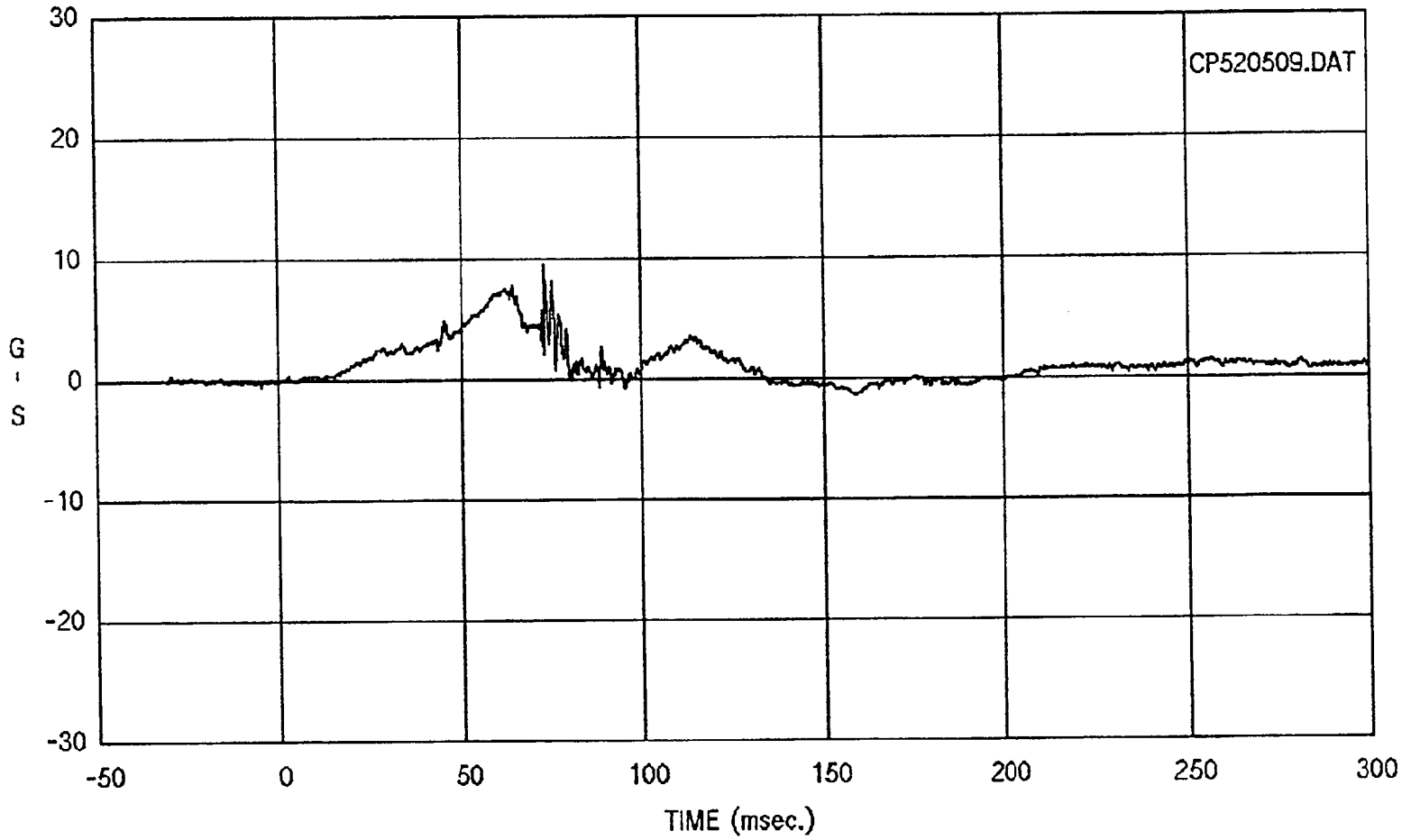


FIGURE 11

Curve: Driver pelvis acceleration -- Z axis Filter: SAE CLASS 1000 Max = 9.7213 Min = -1.3576

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

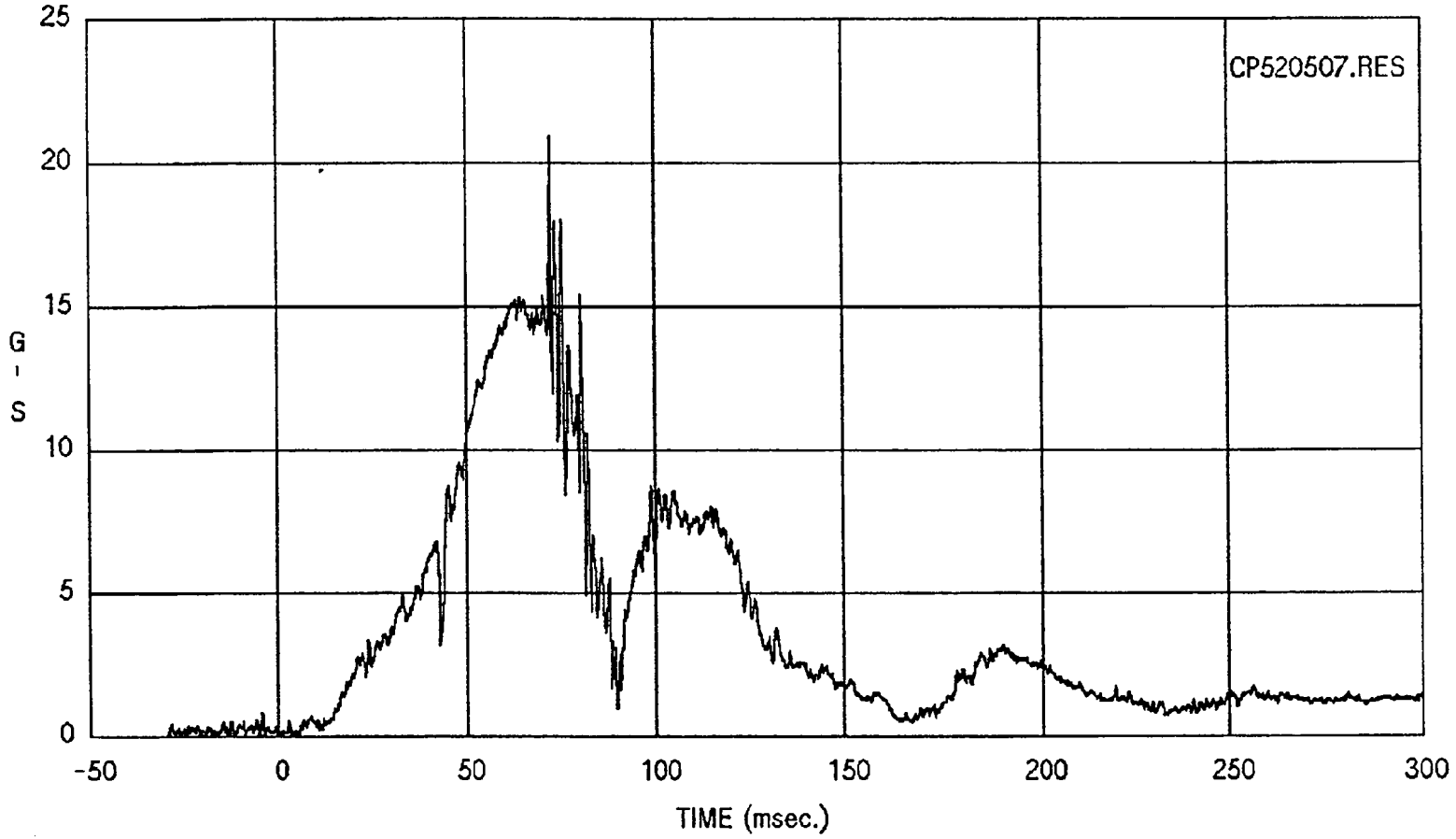


FIGURE 12

Curve: Driver pelvis acceleration -- Resultant Filter: SAE CLASS 1000 01 Max = 21.255 Min = .11743E

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

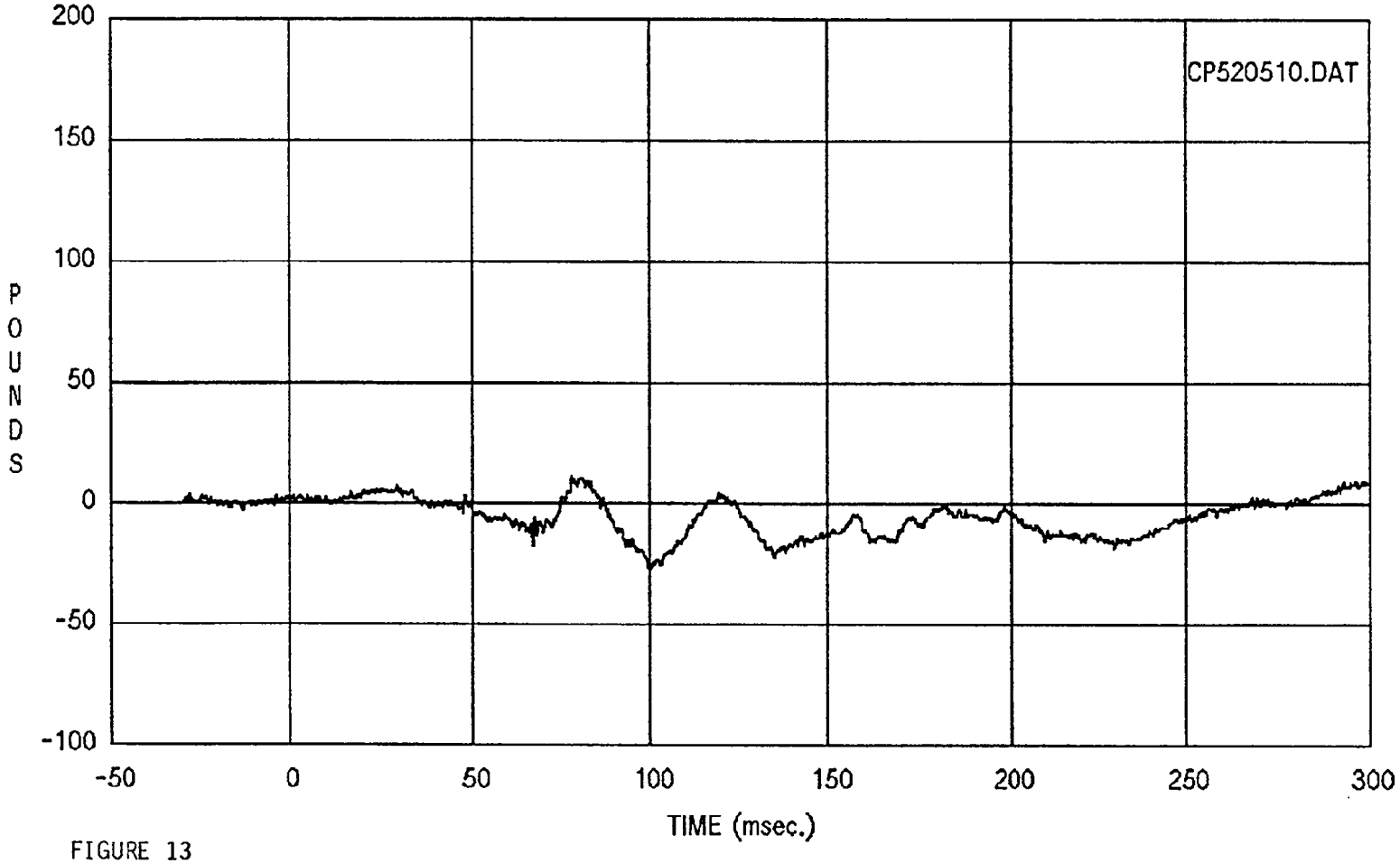


FIGURE 13

Curve: Driver neck force -- X axis Filter: SAE CLASS 1000 Max = 11.599 Min = -26.833

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

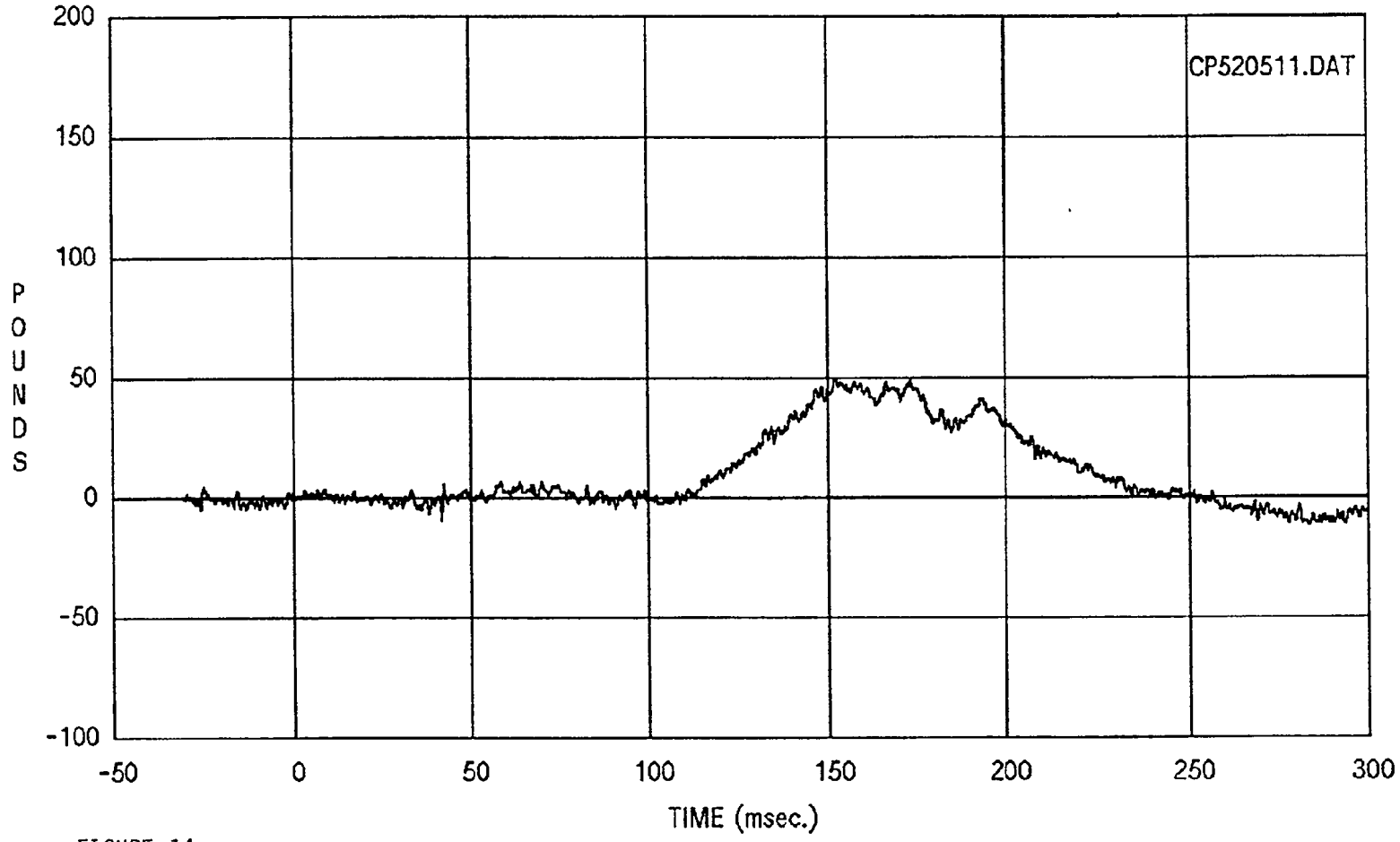


FIGURE 14

Curve: Driver neck force -- Y axis Filter: SAE CLASS 1000 Max = 49.967 Min = -11.594

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

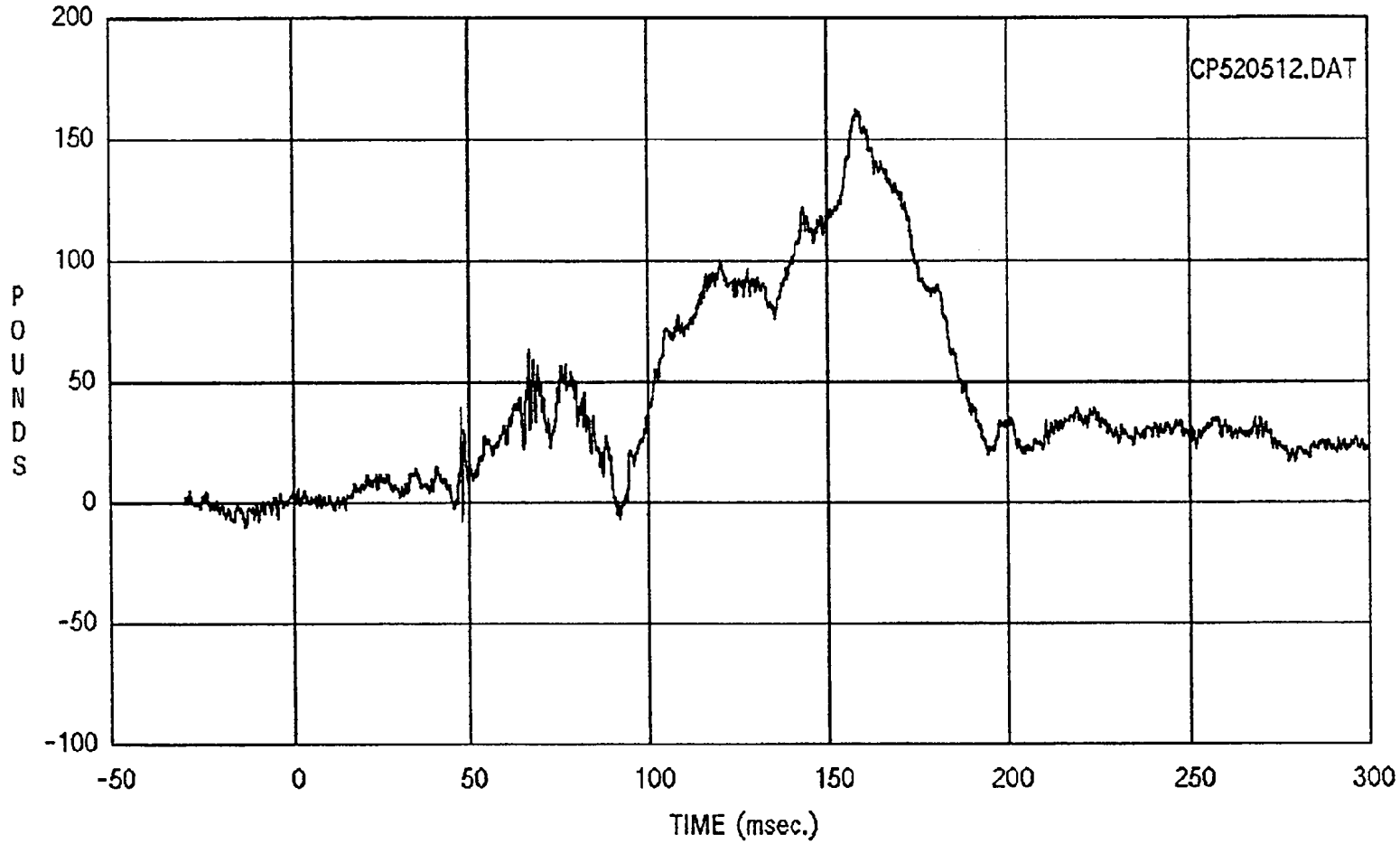


FIGURE 15

Curve: Driver neck force -- Z axis Filter: SAE CLASS 1000 Max = 162.33 Min = -8.0202

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

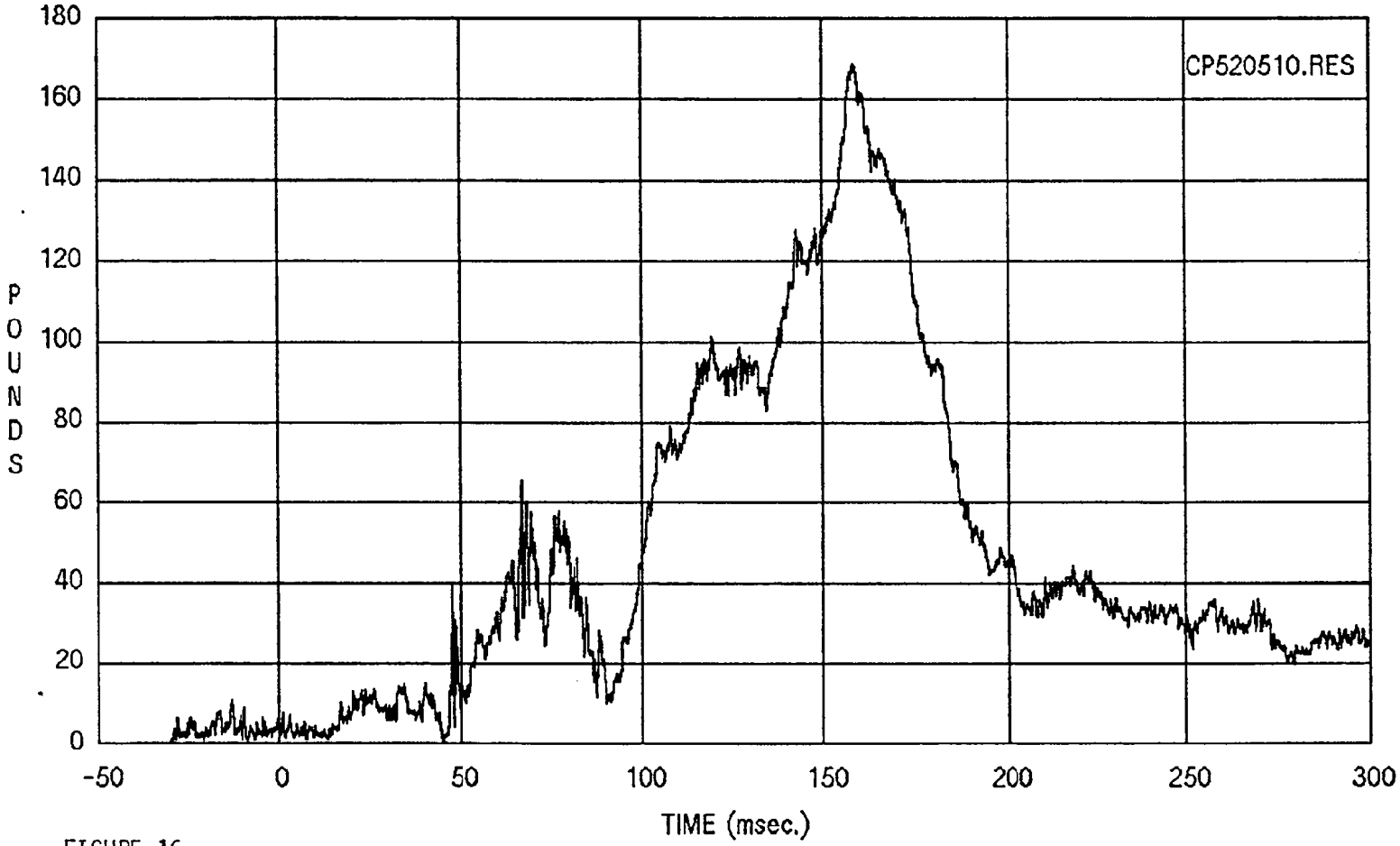


FIGURE 16

Curve: Driver neck force -- Resultant Filter: SAE CLASS 1000 Max = 168.90 Min = .64339

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

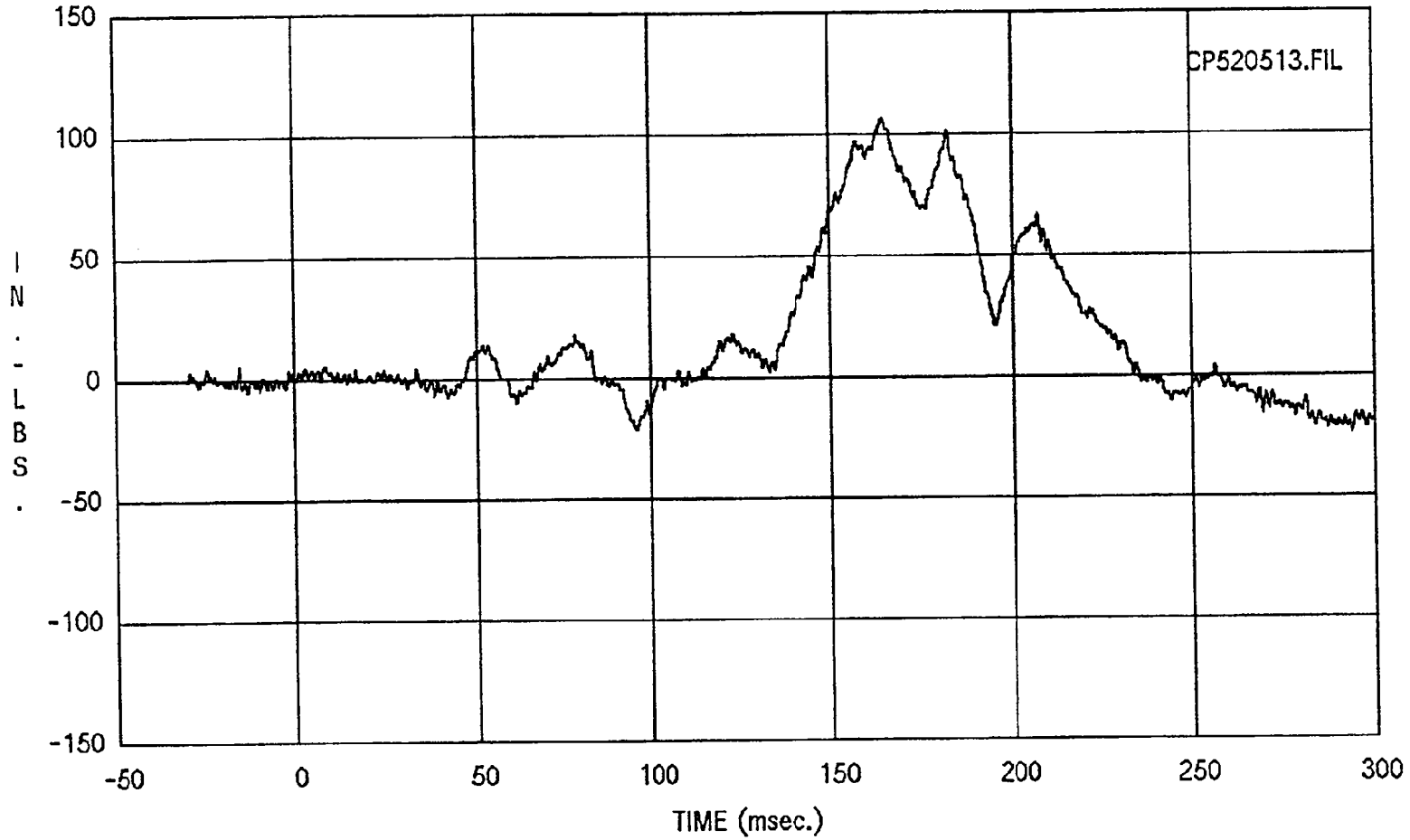


FIGURE 17

Curve: Driver neck moment -- X axis Filter: SAE CLASS 600 Max = 106.86 Min = -23.739

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

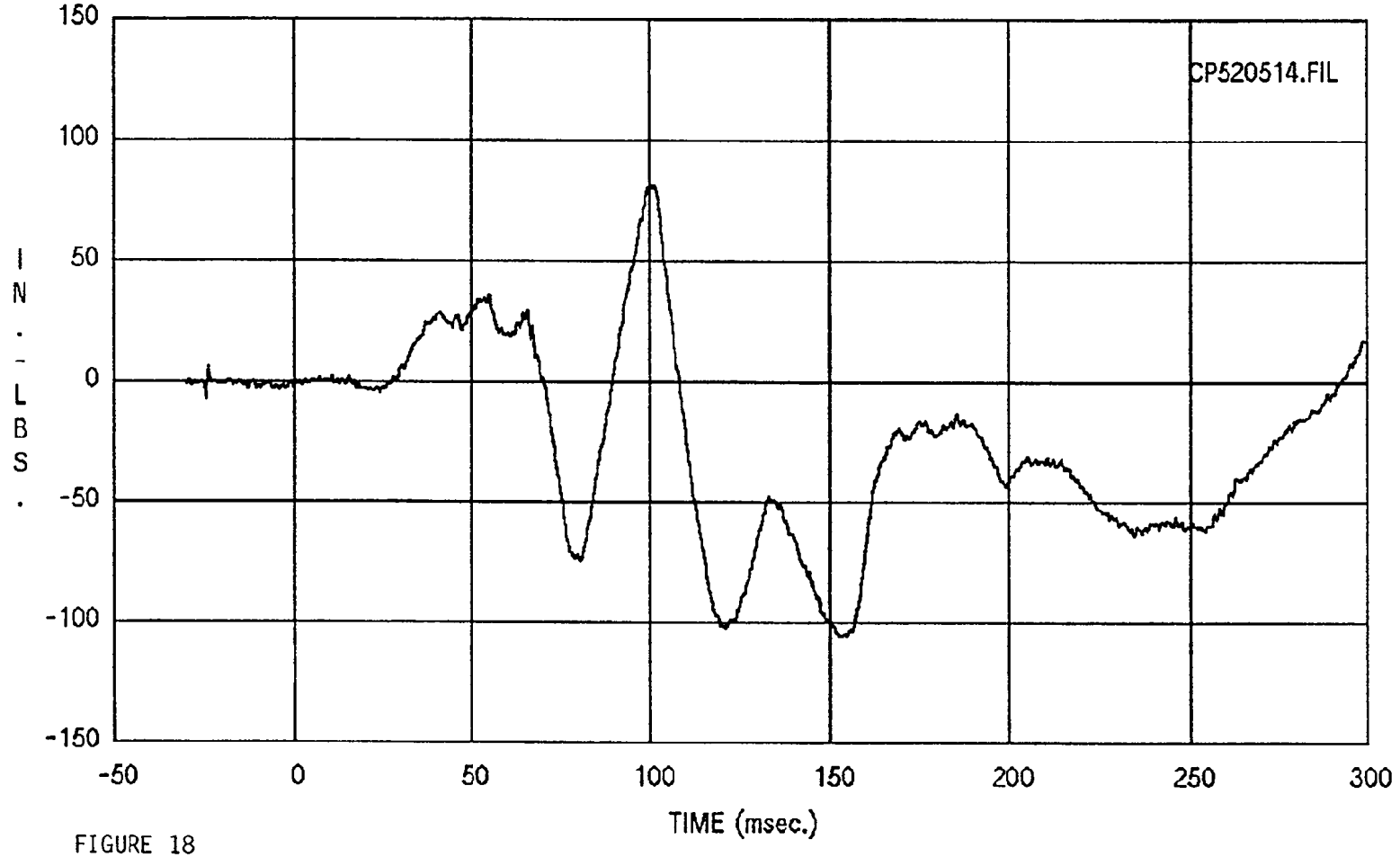


FIGURE 18

Curve: Driver neck moment -- Y axis Filter: SAE CLASS 600 Max = 81.787 Min = -105.28

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

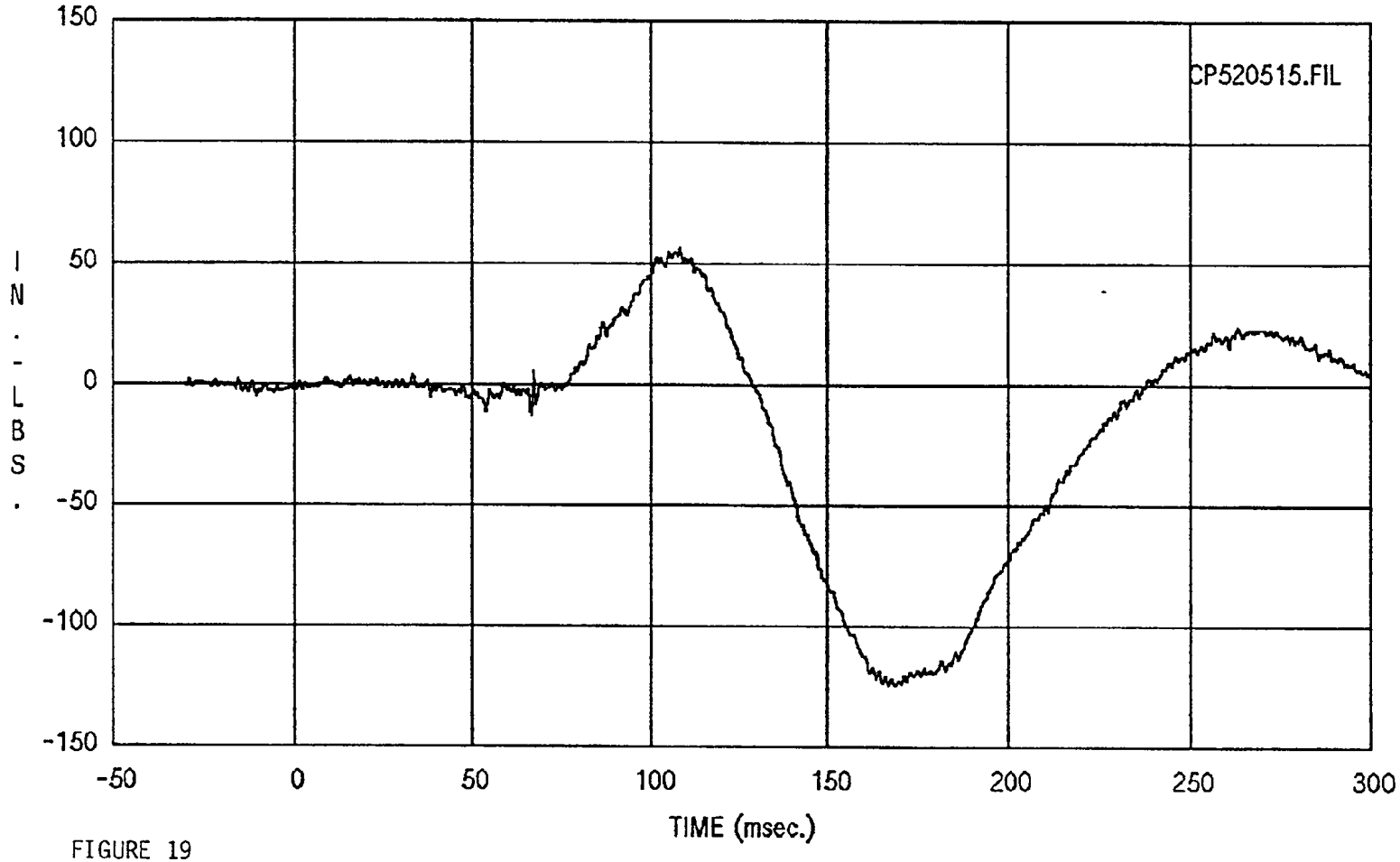


FIGURE 19

Curve: Driver neck moment -- Z axis Filter: SAE CLASS 600 Max = 56.725 Min = -124.39

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

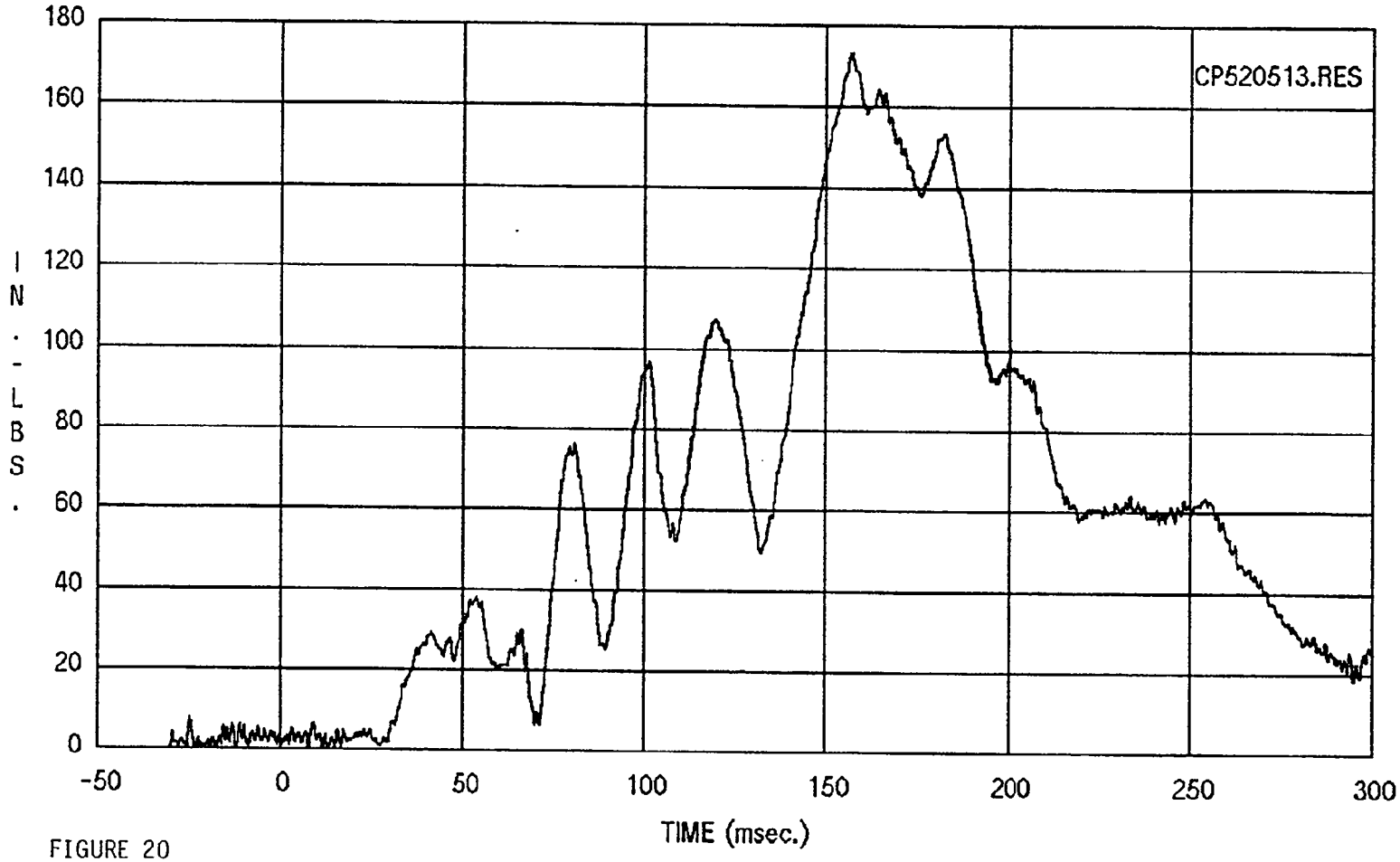


FIGURE 20

Curve: Driver neck moment -- Resultant Filter: SAE CLASS 600 Max = 173.41 Min = .33935

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

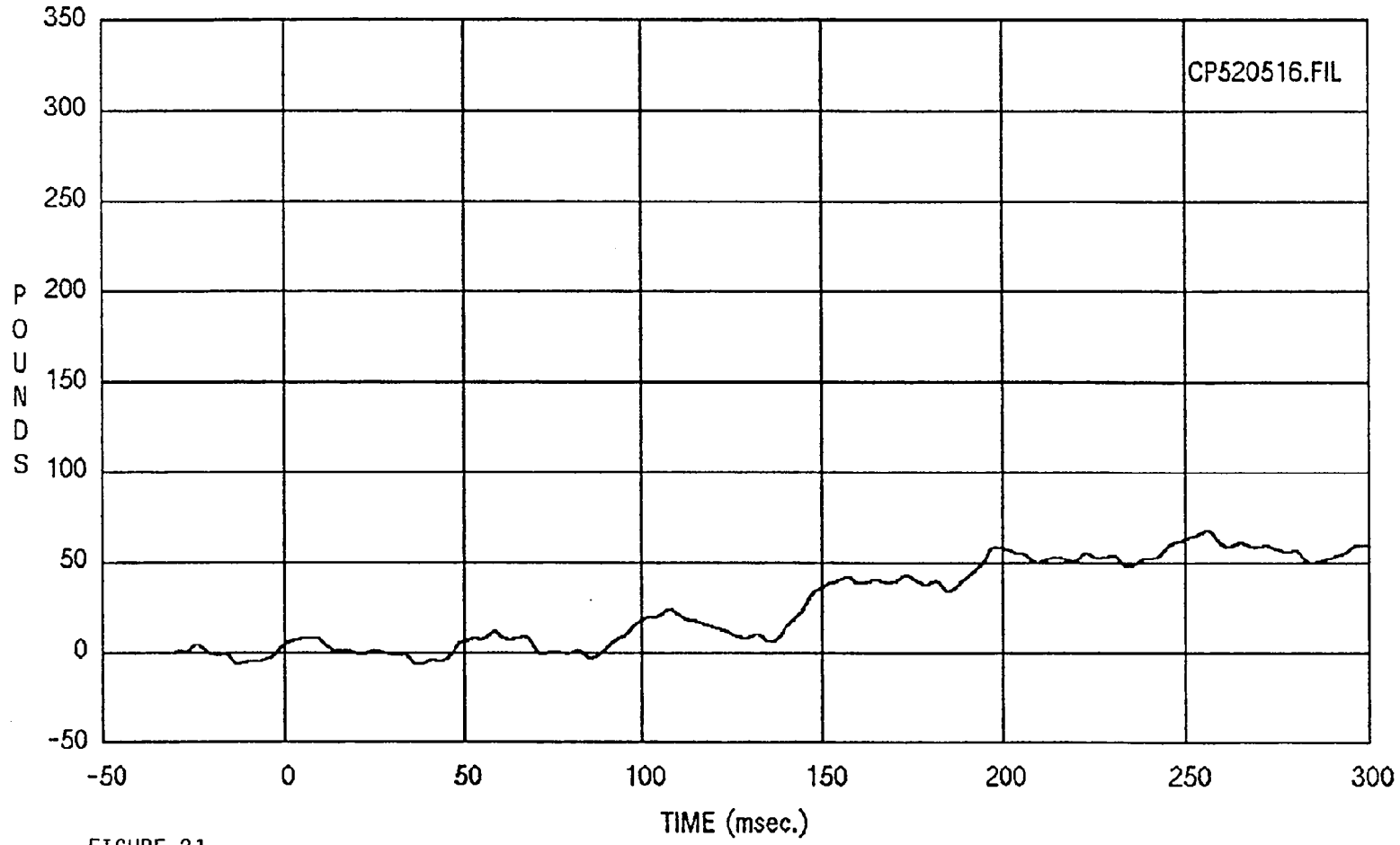


FIGURE 21

Curve: Driver lap belt load Filter: SAE CLASS 60 Max = 67.803 Min = -6.3705

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

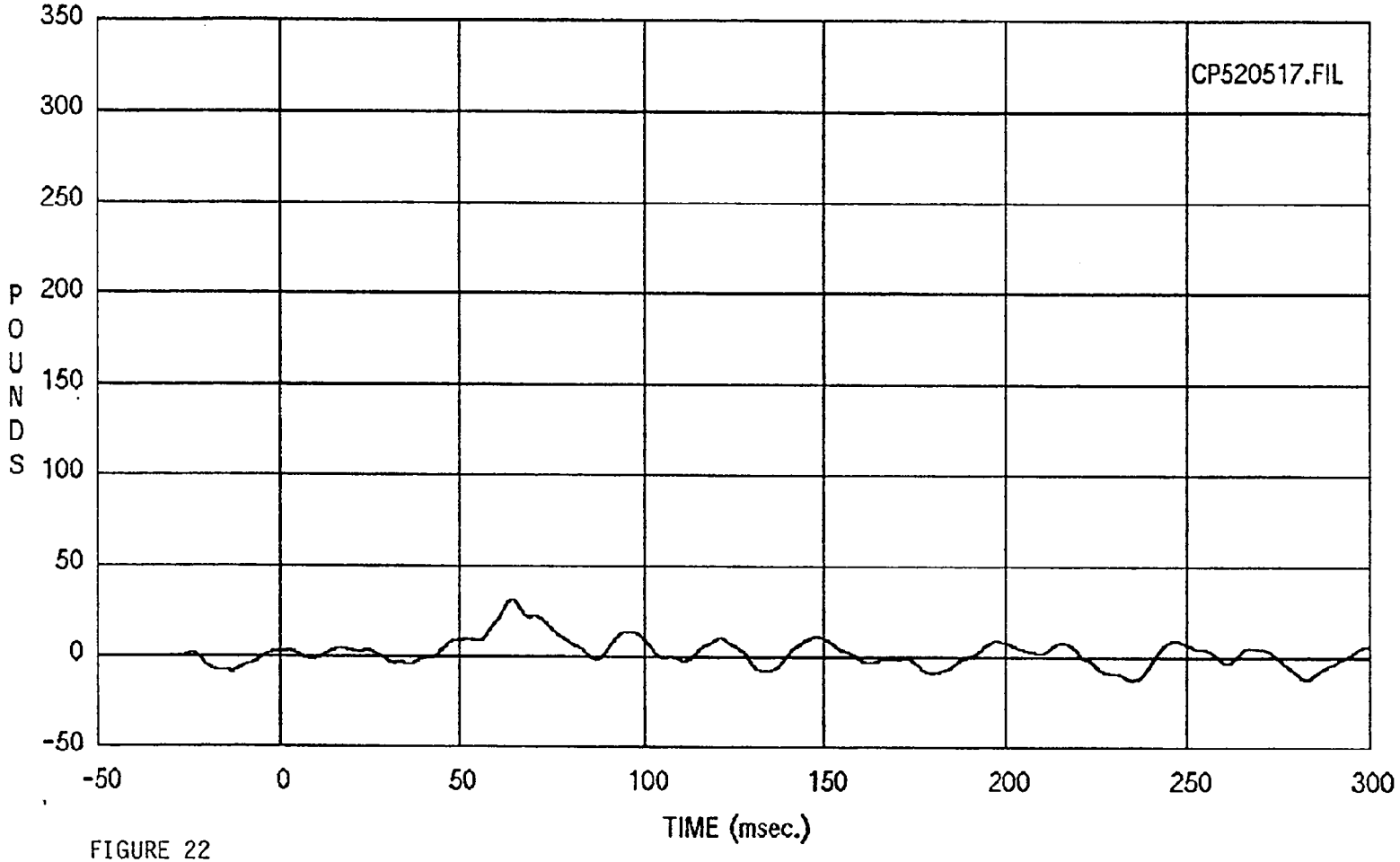


FIGURE 22

Curve: Driver shoulder belt load Filter: SAE CLASS 60 Max = 31.269 Min = -12.614

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

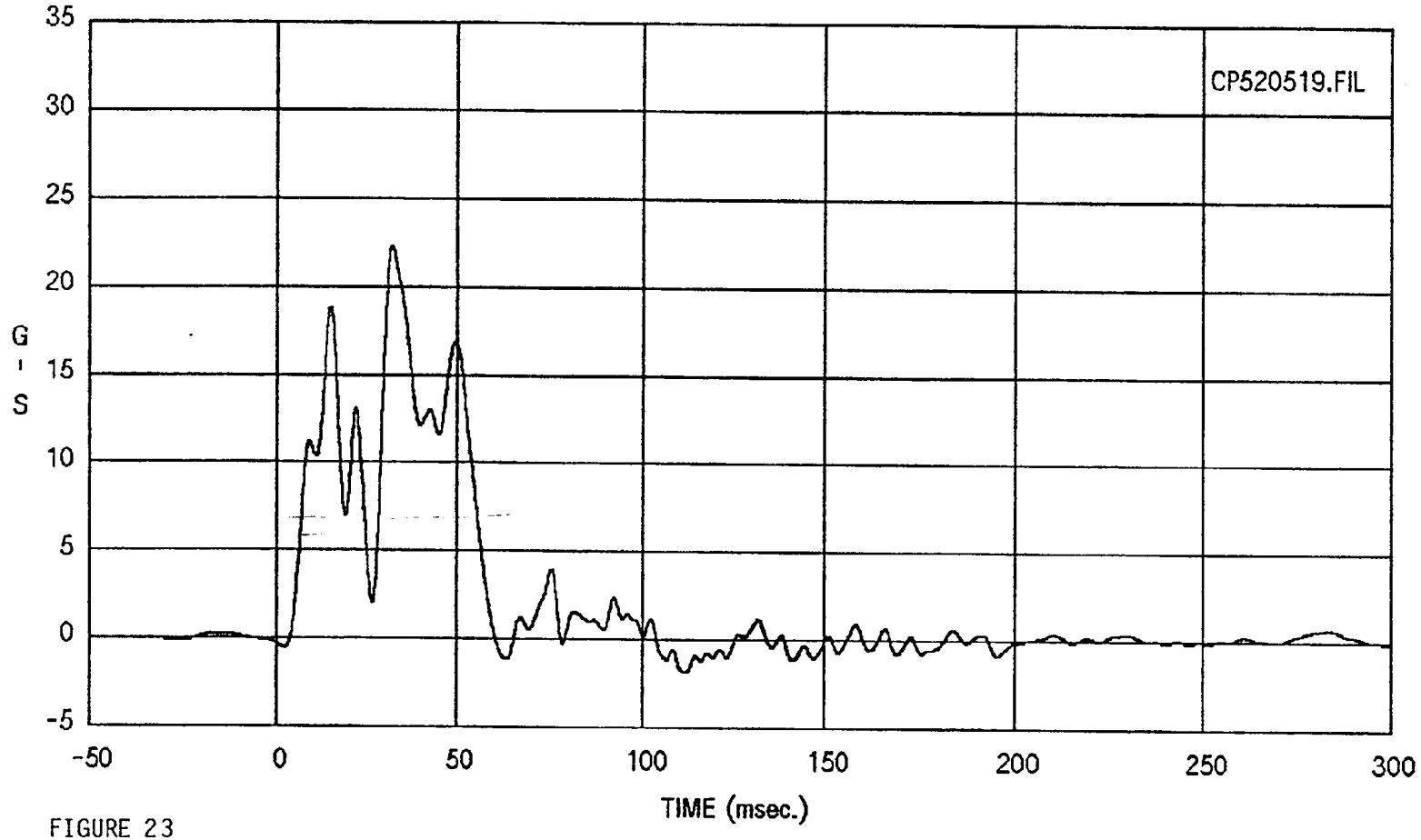


FIGURE 23

Curve: Vehicle C.G. acceleration -- X axis (Primary) Filter: SAE CLASS 60 Max = 22.343 Min = -1.8027

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

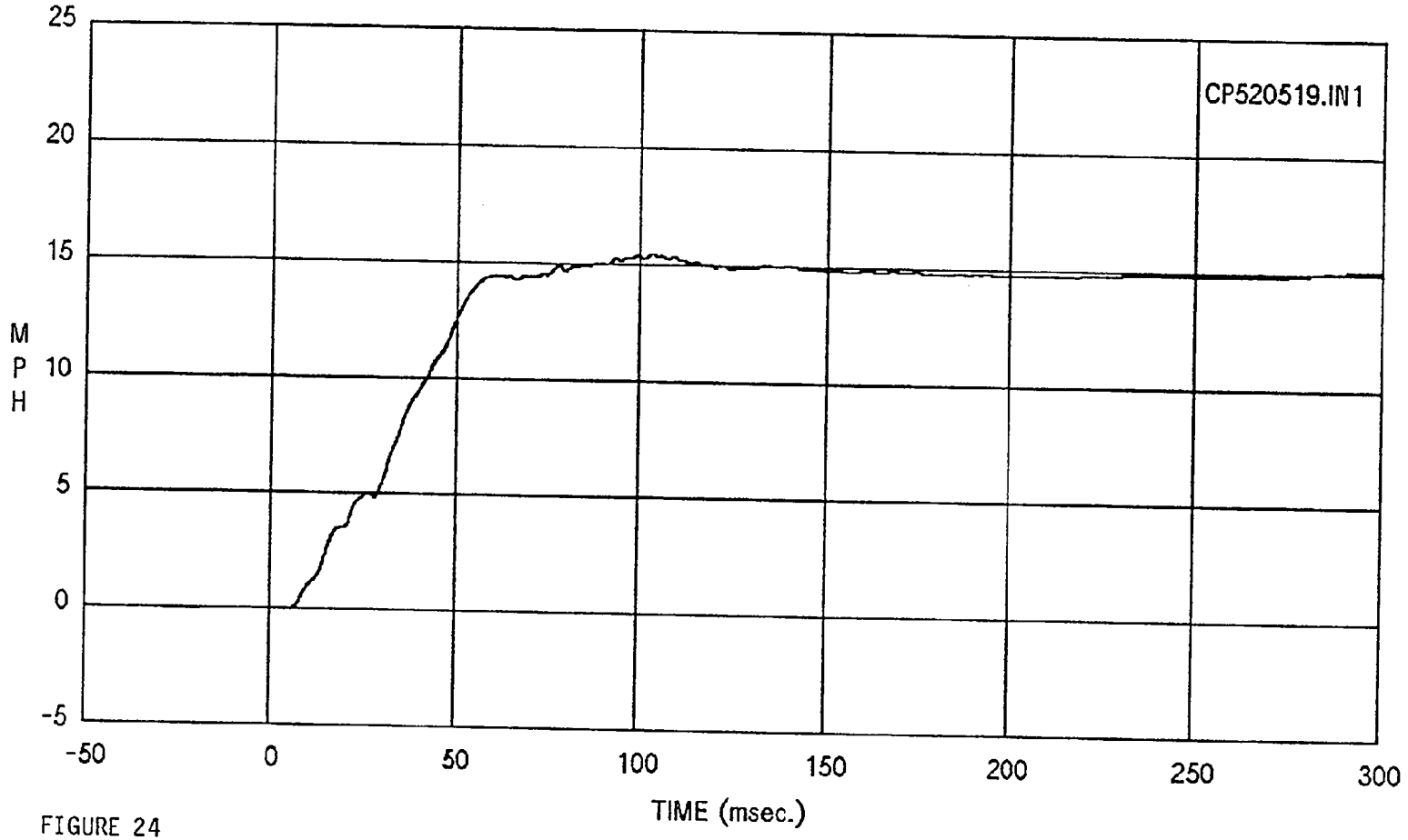


FIGURE 24

Curve: Vehicle C.G. delta V -- X axis (Primary) Filter: SAE CLASS 180 01 Max = 15.476 Min = -.16239E

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

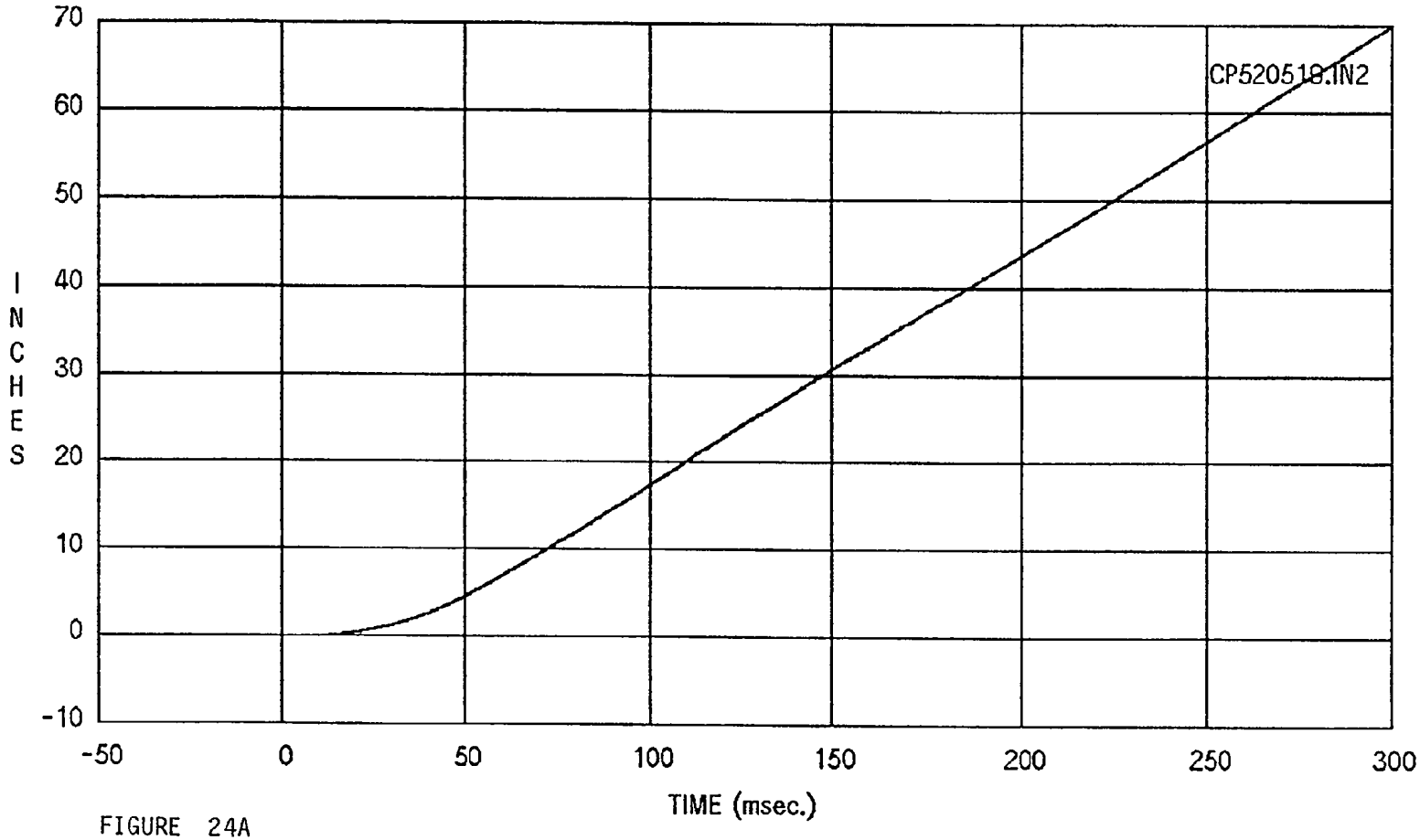


FIGURE 24A

Curve: Vehicle C.G. displacement -- X axis (Primary) Filter: SAE CLASS 180 Max = 69.886 Min = -.87019E-03

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

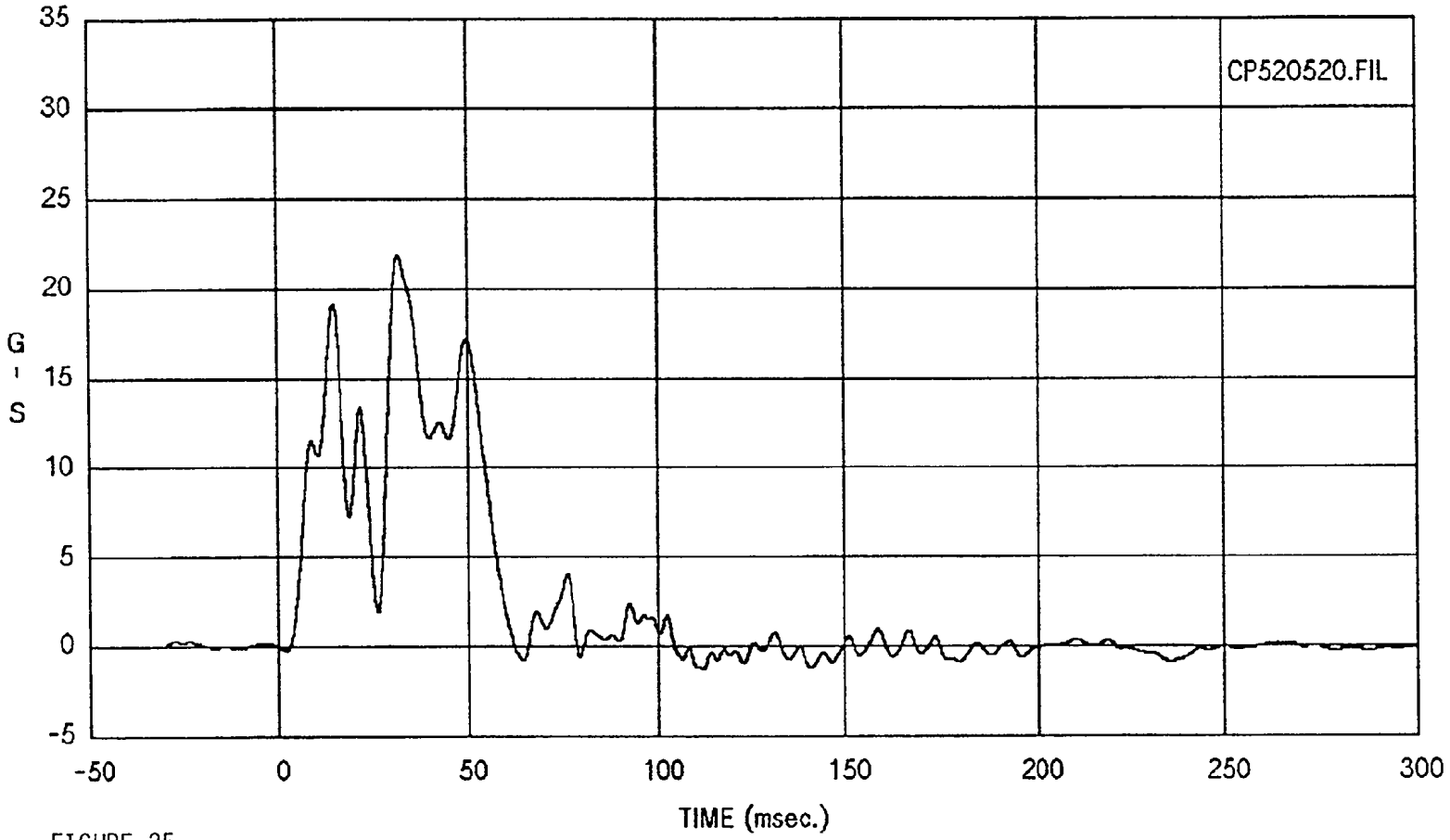


FIGURE 25

Curve: Vehicle C.G. acceleration -- X axis (Secondary) Filter: SAE CLASS 60 Max = 21.896 Min = -1.245

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

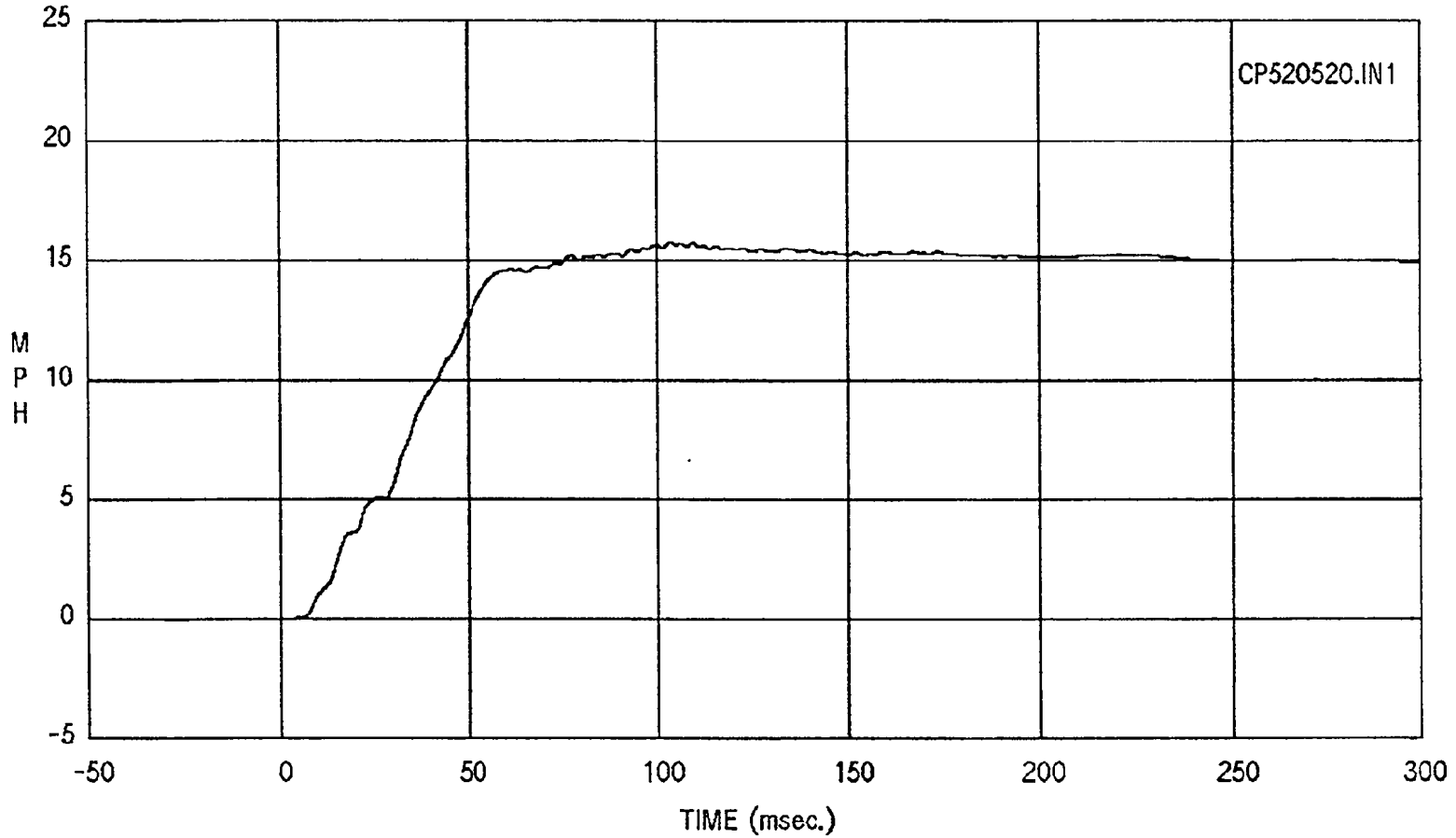


FIGURE 26

Curve: Vehicle C.G. delta V -- X axis (Secondary) Filter: SAE CLASS 180 02 Max = 15.781 Min = .98742

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

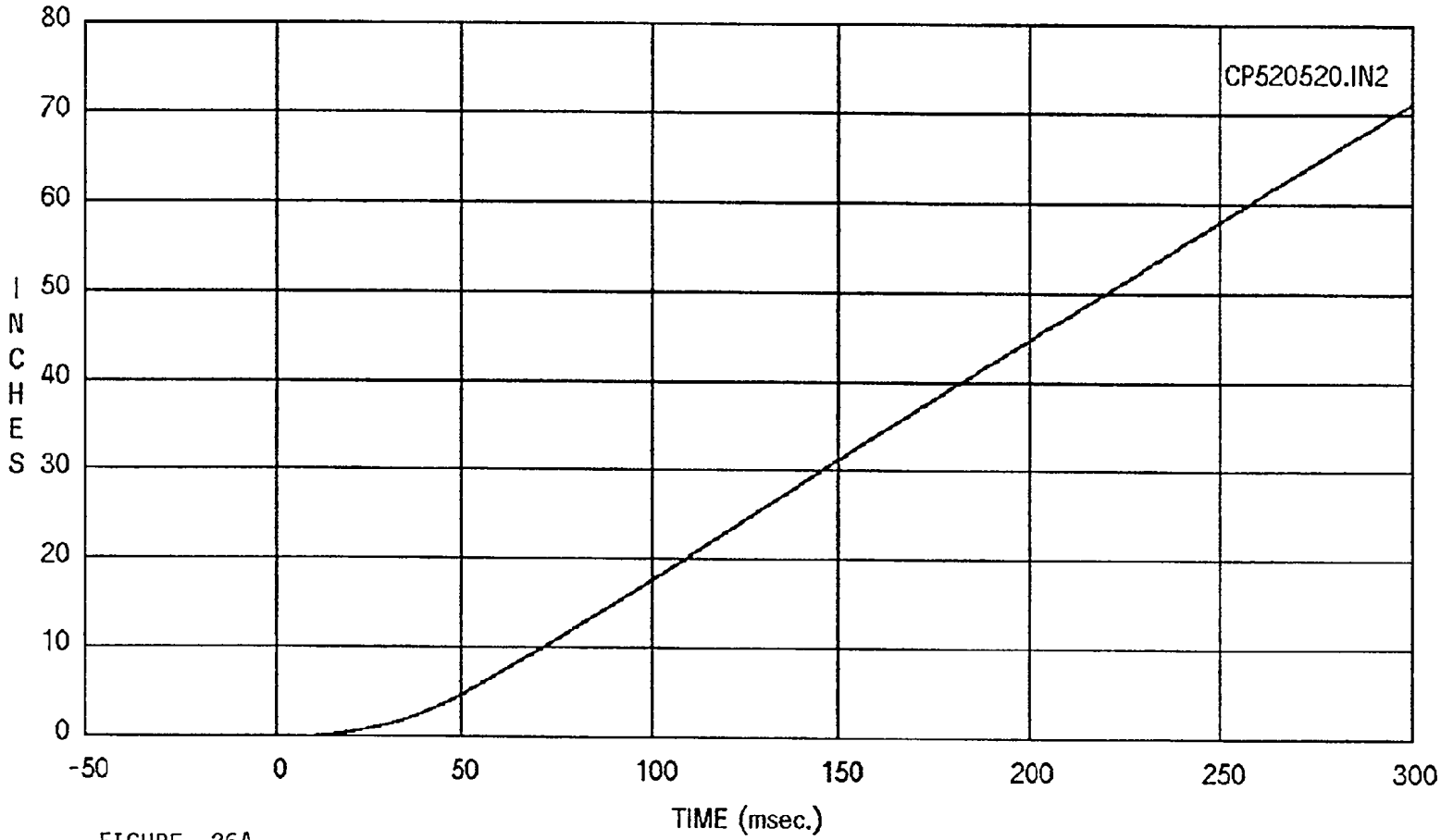


FIGURE 26A

Curve: Vehicle C.G. displacement -- X axis (Secondary) Filter: SAE CLASS 180 Max = 71.259 Min = .10000E+11

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

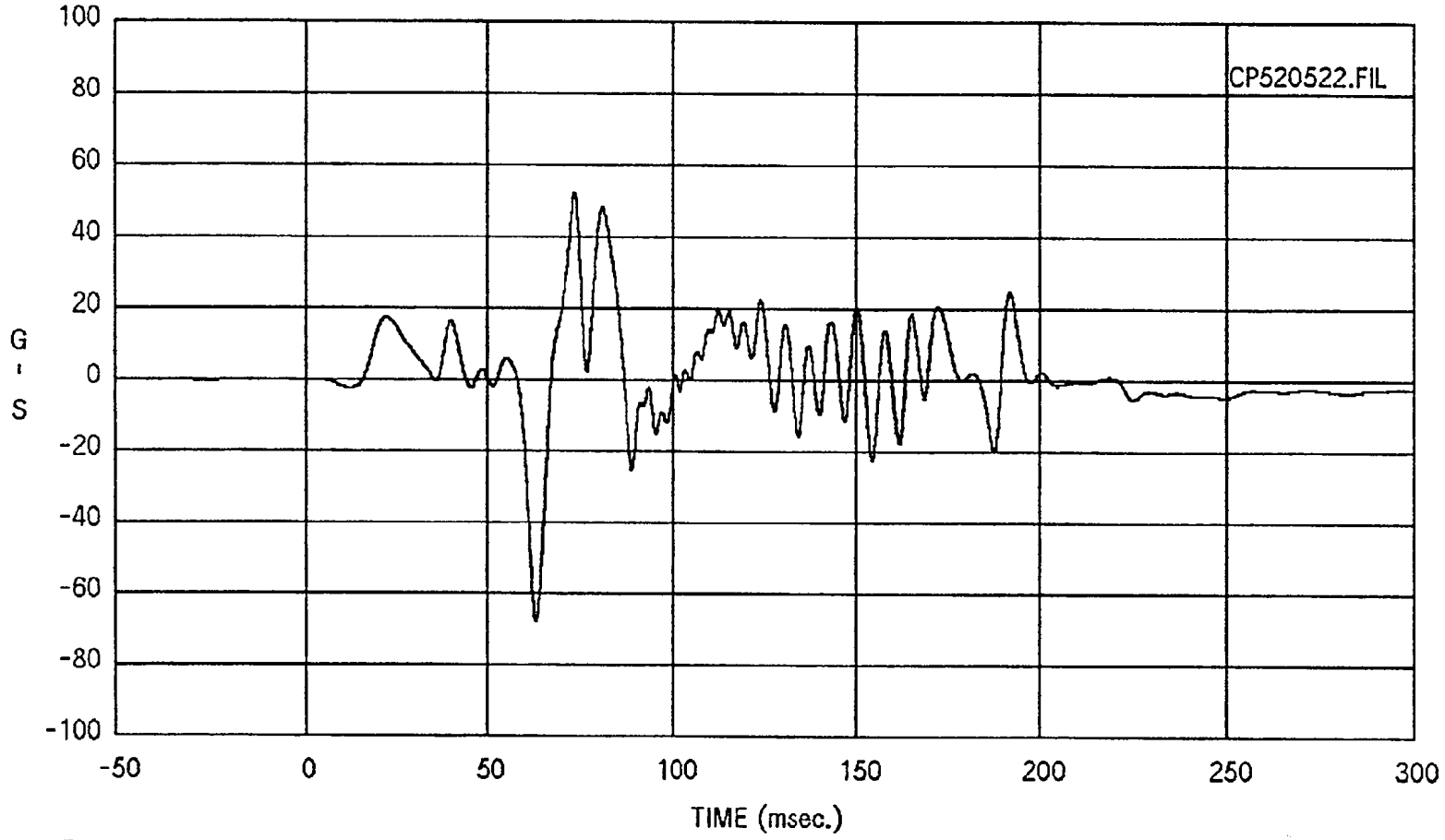


FIGURE 27

Curve: Driver seatback acceleration -- X axis Filter: SAE CLASS 60 Max = 52.433 Min = -67.722

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

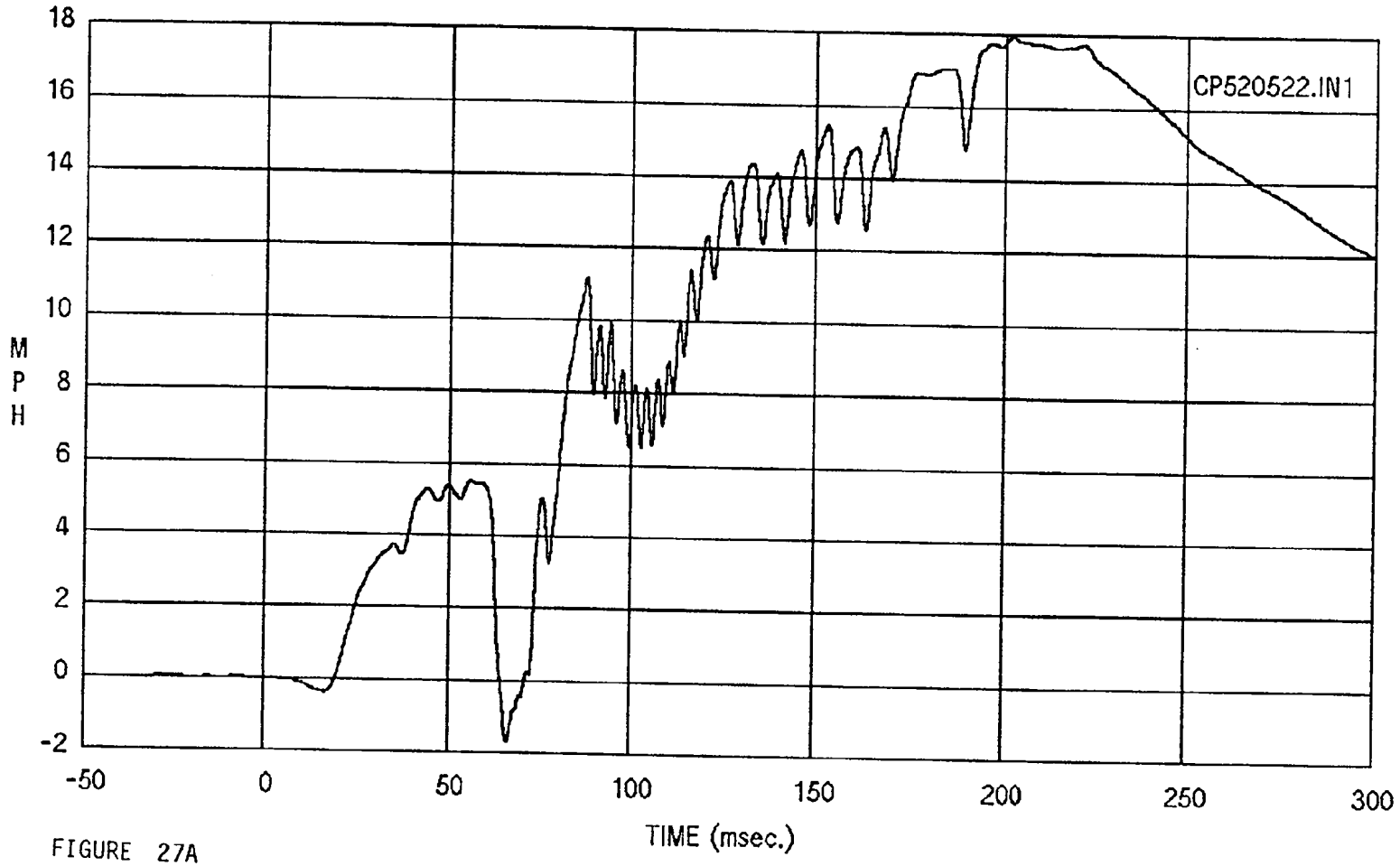


FIGURE 27A

Curve: Driver seatback delta V -- X axis Filter: SAE CLASS 180 Max = 17.954 Min = -1.6924

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

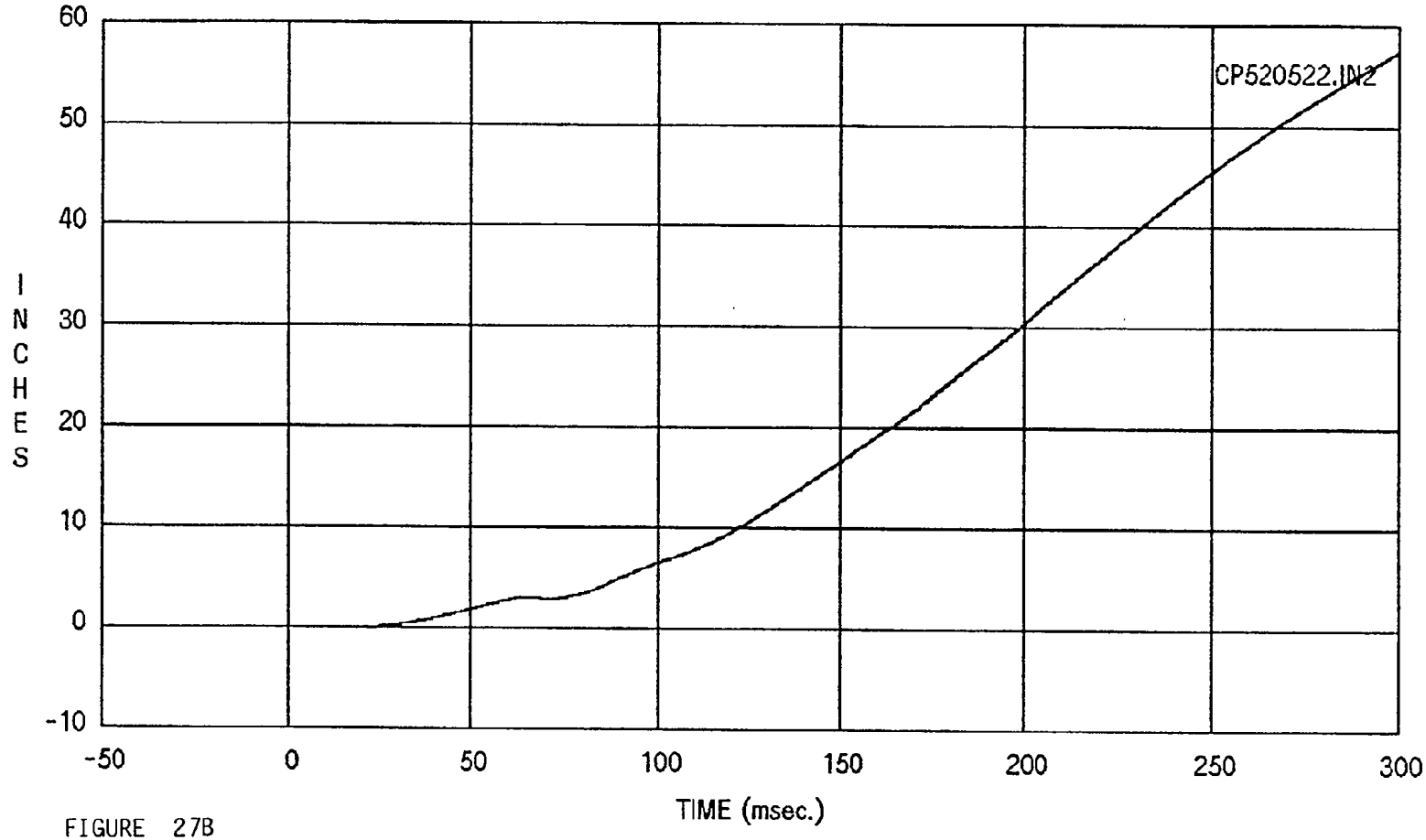


FIGURE 27B

Curve: Driver seatback displacement -- X axis Filter: SAE CLASS 180 01 Max = 57.396 Min = -.45595

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

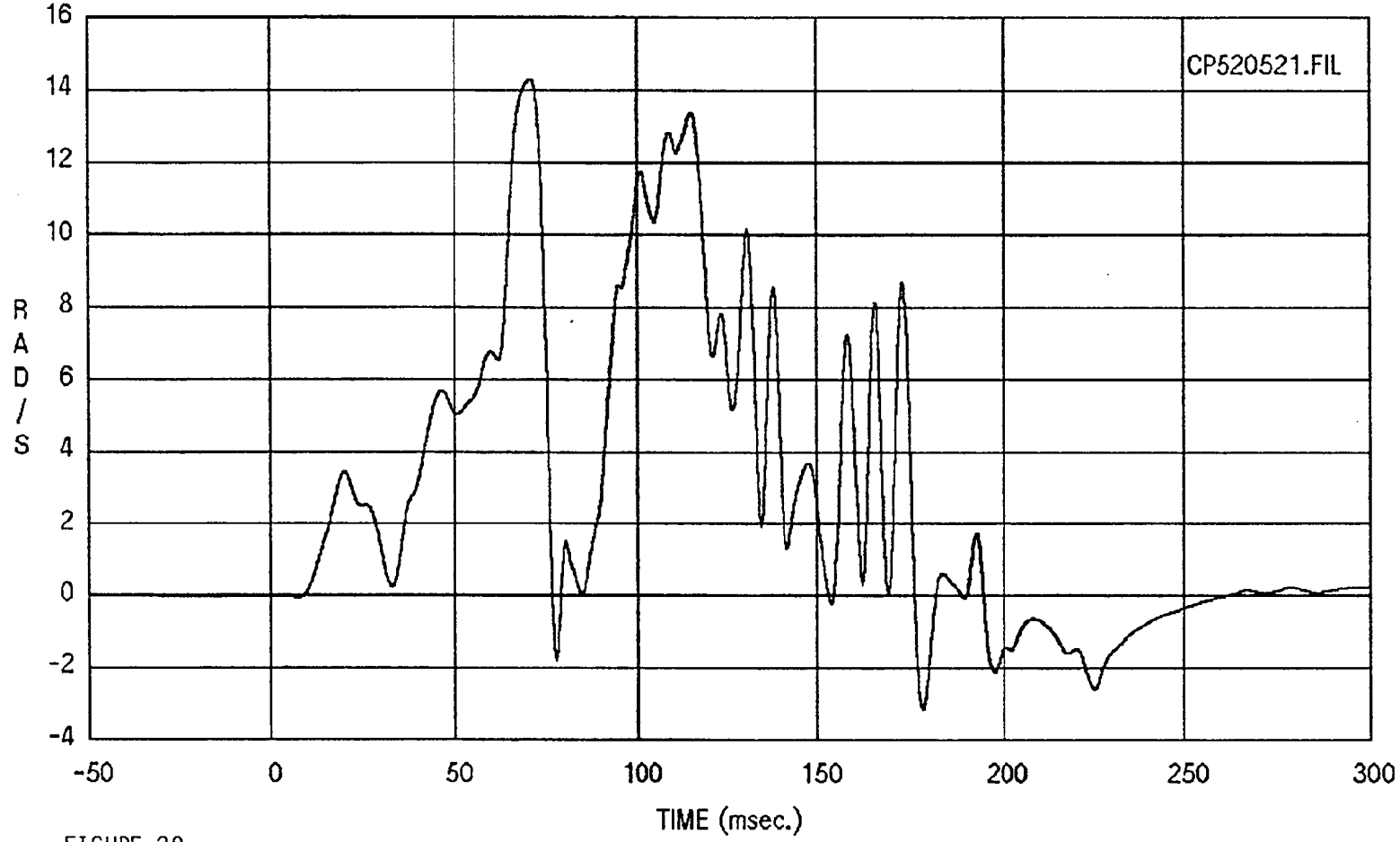


FIGURE 28

Curve: Driver seatback angular rate -- X axis Filter: SAE CLASS 60 Max = 14.290 Min = -3.1050

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

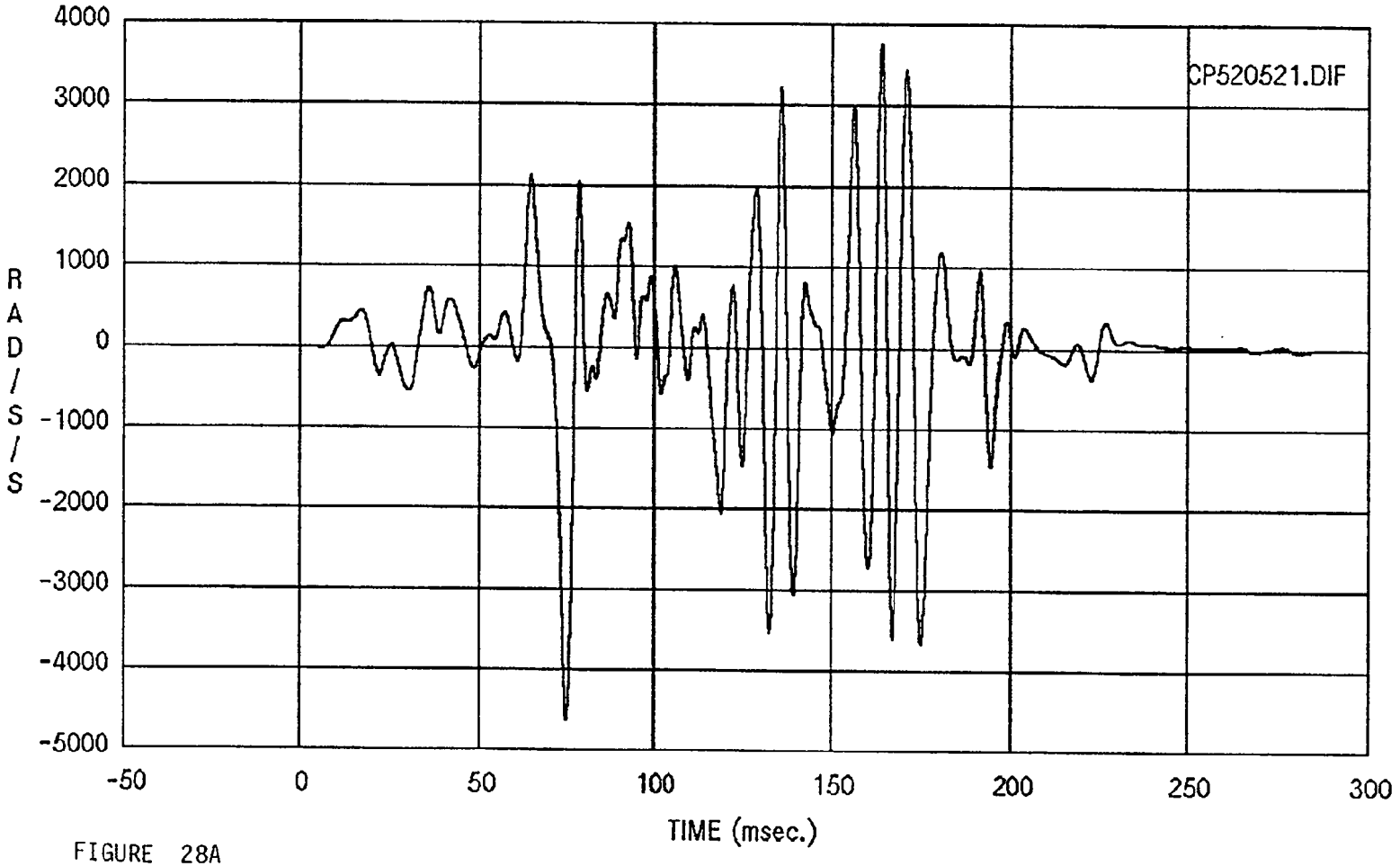


FIGURE 28A

Curve: Driver seatback angular acceleration Filter: SAE CLASS 100 Max = 3768.5 Min = -4628.2

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest

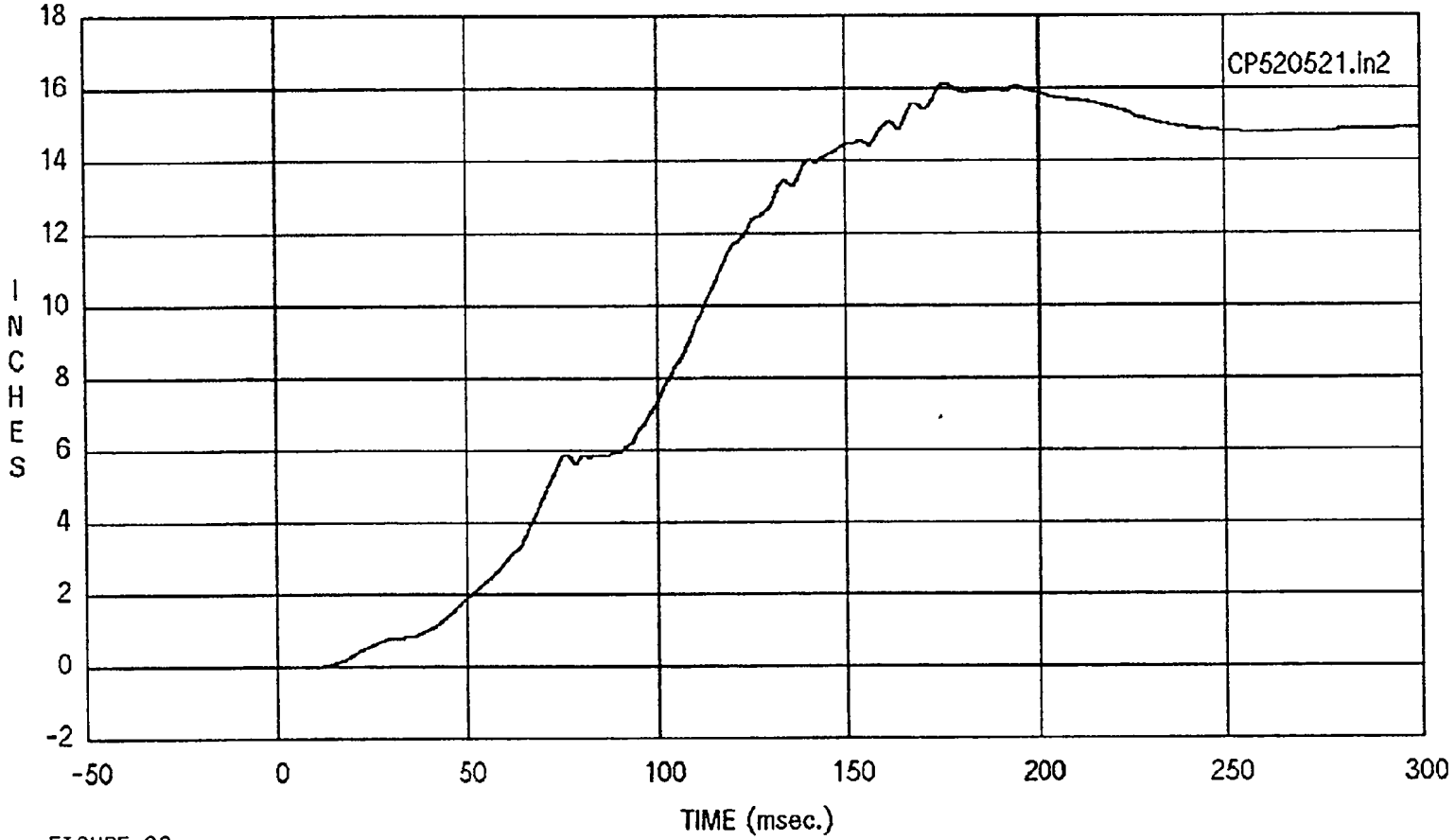


FIGURE 29

Curve: Driver seatback angular displacement Filter: SAE CLASS 180 02 Max = 16.134 Min = -.11520E

MSE Date: 04/30/93 Program: 1993 FMVSS 301 Rear Vehicle: 1993 Nissan Quest