

REPORT NUMBER: 201U-VER-04-01

**SAFETY COMPLIANCE TESTING FOR FMVSS 201
OCCUPANT PROTECTION IN INTERIOR IMPACT
UPPER INTERIOR HEAD IMPACT PROTECTION**

**GENERAL MOTORS OF CANADA LTD.
2004 PONTIAC GRAND PRIX 4-DOOR SEDAN**

NHTSA NUMBER: C40101

GD TEST NUMBER: 8730-01

**ADVANCED INFORMATION ENGINEERING SERVICES
A GENERAL DYNAMICS COMPANY
TRANSPORTATION SCIENCES CENTER
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Test Date: December 3, 2003

FINAL REPORT

PREPARED FOR:

**U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
Mail Code: NVS-220, Room 6111
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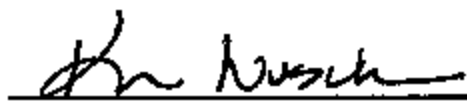
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16. Abstract Compliance tests were conducted on the subject vehicle, a 2004 Pontiac Grand Prix 4-door Sedan, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure TP-201U-01 for determination of FMVSS 201 compliance. Test failures identified were as follows in the table below:					
Target Point	Horizontal	Vertical	Velocity	HIC	HICd
None	-	-	-	-	-
None	-	-	-	-	-
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SECTION 1

PURPOSE AND TEST PROCEDURE

This head impact compliance test is part of the FMVSS 201 Upper Interior Head Impact Protection Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-99-C-01005. The purpose of this head impact compliance test was to determine whether the subject vehicle, 2004 Pontiac Grand Prix 4-door Sedan, NHTSA No. C40101, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact. The compliance test was conducted in accordance with the OVSC Laboratory Test Procedure No. TP-201U-01 dated April 03, 1998.

SECTION 2

SUMMARY OF UPPER INTERIOR HEAD IMPACTS

A 2004 Pontiac Grand Prix 4-door Sedan, NHTSA No. C40101, was impacted at various locations throughout its upper interior by a 4.54 kg 50th percentile headform. A total of ten (10) impacts were performed in this test series. The target area impacts were chosen by the NHTSA Contracting Officer's Technical Representative (COTR). A summary of test results can be found on data sheet 2-1. The ten (10) area chosen for testing were:

BP4	RP1	AP3	AP1	URBP
SR2A	BP2	RP2	BP1	AP2

The selected impact areas on the test vehicle appeared to comply with the performance requirements of FMVSS 201.

Five Free Motion Headforms (FMH), were used in this test series. All five FMH's were calibrated prior to and after the test series. Calibration information are included in Appendix B. Each FMH weighed 4.54±0.5 kg and has an orthogonal tri-axis accelerometer pack mounted at the center of gravity (c.g.).

A total of three (3) channels of data for each target impact test are recorded on a Keyser-Threde data acquisition system. Data plots along with still photographs can be found in Section 3 of this report.

To document each target area impact test, one Weinberger high-speed video camera was placed at various locations to view the headform contact with the selected target area.

DATA SHEET 2-1

SUMMARY OF UPPER INTERIOR HEAD IMPACT TESTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS542X41171754
DATE OF MANUFACTURE:	06/03/08 (CERTIFICATION LABEL)
COLOR:	White

TARGET CODE	Driver Side			Passenger Side			Approach Angles (degrees)		Velocity (mph)	FMH HIC	HIC(d)
	X(mm)	Y(mm)	Z(mm)	X(mm)	Y(mm)	Z(mm)	Horizontal	Vertical			
AP1	2983.9	-546.5	1442.7	2980.2	547.8	1439.5	111	31	23.57	797.1	767.8
AP2	2831.5	-610.4	1355.6	2828.6	604.7	1354.6	211	46	23.69	1012.8	930.5
AP3	2729.2	-630.1	1305.9	2722.7	627.4	1304.3	135	43	23.36	905.6	849.7
BP1	3465.0	-473.3	1502.0	3464.9	473.4	1496.0	270	16	18.83	419.4	482.8
BP2	3451.1	-588.2	1300.0	3444.6	591.7	1293.7	270	8	23.54	707.2	700.0
BP3	3415.9	-617.7	1315.1	3409.3	623.9	1307.8	-	-	-	-	-
BP4	3484.7	-669.8	1216.3	3481.8	676.5	1212.1	140	-9	23.55	739.9	724.7
FH1	2990.0	-436.6	1481.7	2921.1	427.1	1478.4	Relocated 1 circle	-	-	-	-
Rel. FH1	2927.9	-414.5	1483.0	2920.6	408.4	1478.8	-	-	-	-	-
FH2	2920.3	-286.8	1490.8	2911.1	288.2	1483.9	-	-	-	-	-
RP1	4051.7	-511.1	1450.5	4049.9	516.0	1450.2	76	25	18.41	349.7	460.4
RP2	4312.4	-618.4	1302.9	4305.6	628.9	1297.6	Relocated 2 circles	-	-	-	-
Rel. RP2	4281.6	-571.0	1349.7	4260.6	589.3	1343.4	300	10	18.63	533.7	570.6
RH	4056.7	-351.7	1496.7	4053.0	348.5	1490.7	-	-	-	-	-
SR1	3136.2	-508.7	1482.6	3127.0	510.6	1471.7	-	-	-	-	-
SR2A	3286.1	-487.8	1499.8	3281.6	488.9	1492.8	50	32	18.65	583.8	606.9
SR2B	3168.1	-505.0	1483.8	3164.1	506.7	1476.8	-	-	-	-	-
SR3	3703.8	-438.0	1501.6	3702.8	442.9	1493.8	-	-	-	-	-
URAP	3046.7	-416.1	1509.2	3041.9	423.5	1506.0	-	-	-	-	-
URBP	3283.3	-372.1	1566.0	3462.5	379.7	1566.1	90	32	23.54	976.3	903.0
URRP	3905.0	-357.3	1553.7	3910.9	357.4	1543.9	-	-	-	-	-

G.M.'s reference point for x,y,z coordinate correlation (Door striker upper bolt hole x=3321.6 mm, y=-796.9 mm, and z=823.6 mm) to General Dynamic's coordinate system.
 *HIC(d)=0.75446(Free Motion Headform HIC)+166.4

DATA SHEET 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:											
Year/Make/Model/Body Style:				2004 Pontiac Grand Prix 4-door Sedan							
VIN:				2G2WS542X41171754							
Month & Year of Manufacture:				08/03 (SEE CERTIFICATION LABEL)							
Vehicle Body Color:				White							
Engine Data:	6	Cylinders:	-	CID:	3.8	Liters:	-	cc			
Engine Placement:	x		Longitudinal;	or		-		Lateral			
Transmission:	4	Speed;	-	Manual;	x	Automatic;	-	Overdrive			
Final Drive:	-	Rear Wheel Drive;	x	Front Wheel Drive;	-	Four Wheel Drive					
Odometer Reading:	76		km								
Options:	x	A/C;	x	Power Steering;	x	Pwr.Brakes;	x	Pwr. Windows			
Interior Trim Information:											
1. B-Pillars have adjustable seat belt anchorages.											
2. Lighted grab handles located on rear side rails.											
3. Sunglass holder roof attachment located on front of vehicle roof.											

DATA FROM TIRE PLACARD:													
Tire Pressure (at capacity);				210		kPa FRONT							
				210		kPa REAR							
Recommended Tire Size:													
Tires on Test Vehicle:				P225/60R16		Manufacturer:				Goodyear			
Vehicle Capacity Data:													
Number of Occupants:		2	Front;	3	Rear;	-	3rd Seat;	5	Total				
Type of Front Seats:		x	Bucket;	-	Bench;	-	Split Bench						
Type of Front Seat Back:		-	Fixed;	x	Adjustable with	x	Lever or	-	Knob				
Vehicle Capacity Weight (VCW)=				416		kg (A)							
No. of Occupants x 68 kg. =				340		kg (B)							
Rated Cargo/Luggage Weight (RCLW)=				76		kg (A-B) Max. RCLW = 136 kg.							

DATA SHEET 2-2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:					
Left Front	=	495	kg	Left Rear	= 285 kg
Right Front	=	496	kg	Right Rear	= 300 kg
TOTAL FRONT	=	991	kg	TOTAL REAR	= 585 kg
% of Total Weight	=	62.9	%	% of Total Weight	= 37.1 %
TOTAL WEIGHT	=	1576	kg		

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:			
Total Test Vehicle Delivered Weight	=	1576	kg (A)
+ Rated Cargo/Luggage Weight	=	76	kg (B)
TEST VEHICLE TARGET WEIGHT	=	1652	kg (A+B)

WEIGHT OF TEST VEHICLE (FULLY LOADED):					
Left Front	=	488	kg	Left Rear	= 327 kg
Right Front	=	492	kg	Right Rear	= 340 kg
TOTAL FRONT	=	980	kg	TOTAL REAR	= 667 kg
% of Total Weight	=	59.5	%	% of Total Weight	= 40.5 %
TOTAL TEST WEIGHT	=	1647	kg		
Weight of vehicle secured in test vehicle's cargo area	=	76	kg		

TEST VEHICLE ATTITUDE (all dimensions in millimeters):					
AS DELIVERED:	Left Front	755	Left Rear	767	
	Right Front	756	Right Rear	765	
FULLY LOADED:	Left Front	753	Left Rear	751	
	Right Front	755	Right Rear	750	
Test Vehicle Wheelbase		2810	millimeters		

TEST VEHICLE PITCH AND ROLL ANGLES:					
AS DELIVERED:	PITCH ANGLES		ROLL ANGLES		
	Left Door Sill	0.11	Front Bumper	0.11	
	Right Door Sill	0.11	Rear Bumper	0.31	
FULLY LOADED:	PITCH ANGLES		ROLL ANGLES		
	Left Door Sill	0.41	Front Bumper	0.0	
	Right Door Sill	0.41	Rear Bumper	0.21	
AS TESTED:	PITCH ANGLES		ROLL ANGLES		
	Left Door Sill	0.21	Front Bumper	0.11	
	Right Door Sill	0.31	Rear Bumper	0.21	

**DATA SHEET 2-3
TARGET MEASUREMENT REFERENCE SHEET**

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS542X41171754
DATE OF MANUFACTURE:	08/03 (SEE CERTIFICATION LABEL)
COLOR:	White

Measurements	Description	Left Side	Right Side
M	Seat fore / Aft travel (Front seats)	240	288
T°	Horizontal angle (CG-F1 (Left seat) to (Right A-pillar))	110	-
A1°	360° - T°	250	-
W°	Horizontal angle (CG-F2 (Left seat) to (Left A-pillar))	205	-
A2°	A2° = W°	205	-
U°	Horizontal angle (CG-F2 (Left seat) to (Left B-pillar))	291	-
B1°	B1° = U°	291	-
V°	Horizontal angle (CG-FR (Left seat) to (Right B-pillar))	280	-
B2°	B2° = V°	280	-
W°	Horizontal angle (CG-F2 (Right seat) to (Right A-pillar))	-	155
A1°	A1° (Right) = W° (Right)	-	155
T°	Horizontal angle (CG-F1 (Right seat) to (Left A-pillar))	-	250
A2°	360° - T° (Right)	-	110
V°	Horizontal angle (CG-FR (Right seat) to (Right B-pillar))	-	160
B1°	B1° (Right) = V° (Right)	-	160
U°	Horizontal angle (CG-F2 (Right seat) to (Right B-pillar))	-	69
B2°	B2° (Right) = U° (Right)	-	69
J	A-pillar ((Plane 3) - (Plane 5))	277	276
J/2	J + 2	138.5	138
D1	Upper Roof ((Plane A) - (Plane B))		1310
D1/2	D1 + 2		655
D2	Upper Roof ((Plane C) - (Plane D))		1224
D2/2	D2 + 2		612
.35D1	.35 x D1		459
.35D2	.35 x D2		428
N	B-pillar ((BPR) - (lowest point on the daylight opening forward of B-pillar))	376	378
N/2	B-pillar ((BP3) - (lowest point on the daylight opening forward of B-pillar))	188	189
N/4	B-pillar ((BP3) - (lowest point on the daylight opening forward of B-pillar))	94	94.5
Q	Other-pillar ((OPR) - (lowest point on the daylight opening forward of O-pillar))	-	-
Q/2	Other-pillar ((OP2) - (lowest point on the daylight opening forward of O-pillar))	-	-
D	((Corner of roof area, point 7) - (roof area center, point M))	643	643
3D/7	(3 x D) + 7	276	276
MM	Widest door opening of slider door	-	-
M	MM + 2	-	-

DATA SHEET 2-4

APPROACH ANGLE LIMITS

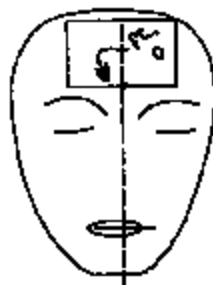
Target Code	Left Side			Right Side		
	Horizontal Angles (deg.)		Vertical Angles (deg.)	Horizontal Angles (deg.)		Vertical Angles (deg.)
	Minimum	Maximum		Minimum	Maximum	
AP1	205	230	-5	110	155	-5
AP2	205	230	-5	110	155	-5
AP3	205	230	-5	110	155	-5
BP1	200	251	-20	69	160	-10
BP2	ANY	ANY	0	ANY	ANY	0
BP3	200	291	-20	69	160	-10
BP4	200	291	-20	69	160	-10
CP1	270	270	-10	90	90	-10
CP2	270	270	-10	90	90	-10
RP1	270	345	-10	15	90	-10
RP2	270	345	-10	15	90	-10
FH1	180	180	0	180	180	0
FH2	180	180	0	180	180	0
RH	360	360	0	0	0	0
SR1	270	270	0	90	90	0
SR2A	270	270	0	90	90	0
SR2B	270	270	0	90	90	0
SR3	270	270	0	90	90	0
URAP	ANY	ANY	0	ANY	ANY	0
URBP	ANY	ANY	0	ANY	ANY	0
URRP	ANY	ANY	0	ANY	ANY	0

Note : BP2 target location - Seat belt anchorage

DATA SHEET 2-5

SUMMARY TARGET IMPACT LOCATION ON FMH

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS542X41171754
DATE OF MANUFACTURE:	08/03(SBB CERTIFICATION LABEL)
COLOR:	White



R RIGHT SIDE OF FACE

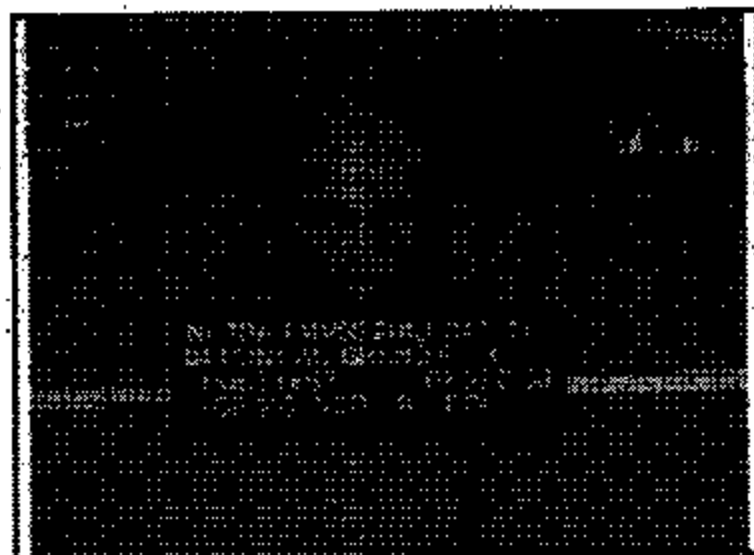
TARGET	Distance Above Point O (mm)	Distance Over From Pt. O (mm)
BP4	13	8 to the left
RP1	25	1 to the right
AP3	14	6 to the left
AP1	26	11 to the right
URBP	46	0
SR2A	0	0
BP2	0	6 to the left
RP2	39	0
BP1	6	2 to the left
AP2	31	4 to the right

SECTION 3
SUMMARY OF TEST RESULTS AND DATA PLOTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2W3342X41171734
DATE OF MANUFACTURE:	06/04/03 (SEE CERTIFICATION LABEL)
COLOR:	White

Test Number:	01
Test Date:	12/02/2003
Target Location:	Passenger Side B-Pillar
Target Code:	BP4
Horizontal Impact Angle:	140°
Vertical Impact Angle:	-9°
Ambient Temperature:	21 °C
Relative Humidity:	23
Time of Impact:	9:35
Headform Number:	805

Impact Point Description (from lower midpoint on midsagittal line)				
On Centerline	8	mm right	x	mm left
On Centerline	13	mm up		



POST-IMPACT BP4 HEADFORM

Free Motion HIC	739.9
HIC(d)	724.7
Impact Velocity (kph)	23.55
HIC T1 (msec)	5.0
HIC T2 (msec)	9.7

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - BP4

FMH Headform 805

Location: BP4

Test Date: December 02, 2003

Work File: BP4

TEST RESULTS

Lab Temperature: 21 C

HICd: 724.7

Lab Humidity: 22 %

HIC (36ms): 739.9

Velocity at Impact: 23.55 KPH

t1: 5.0 msec

t2: 9.7 msec

Free Flight Distance: 212.33 mm

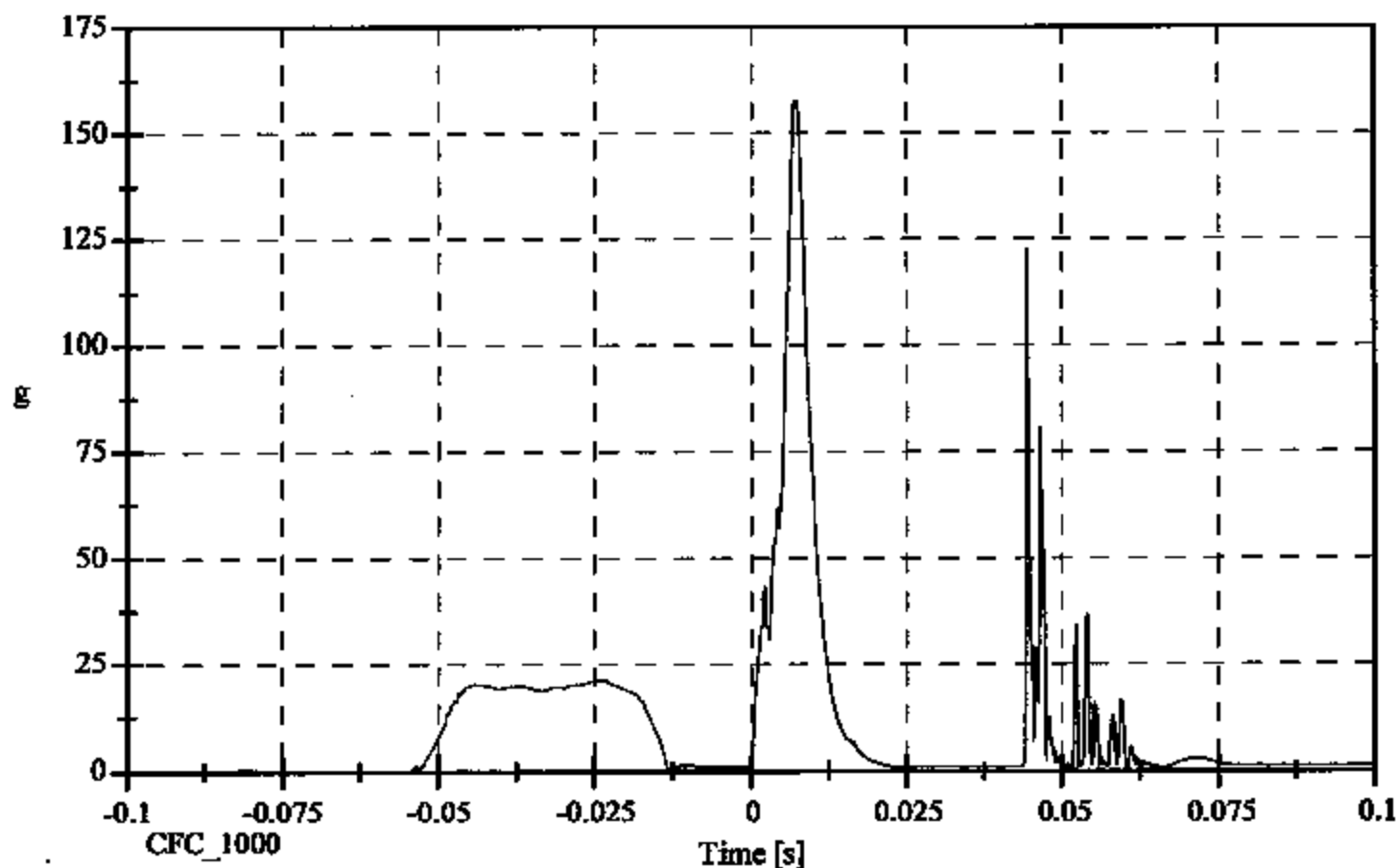
Duration: 4.6 msec

Average Acceleration: 9.6 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 157.7 [g] at 0.007 [s]

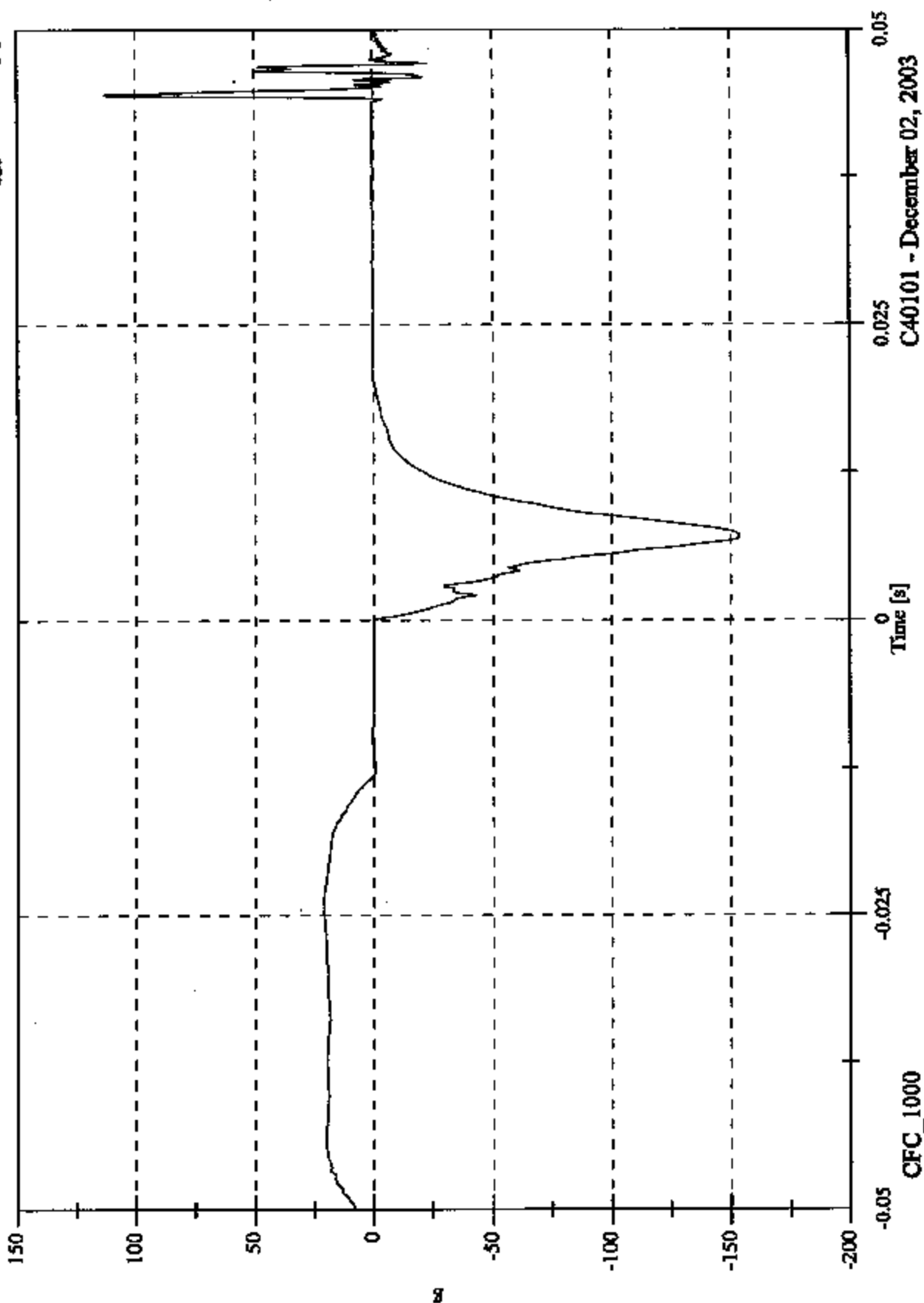
Min: 0.0 [g] at -0.082 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

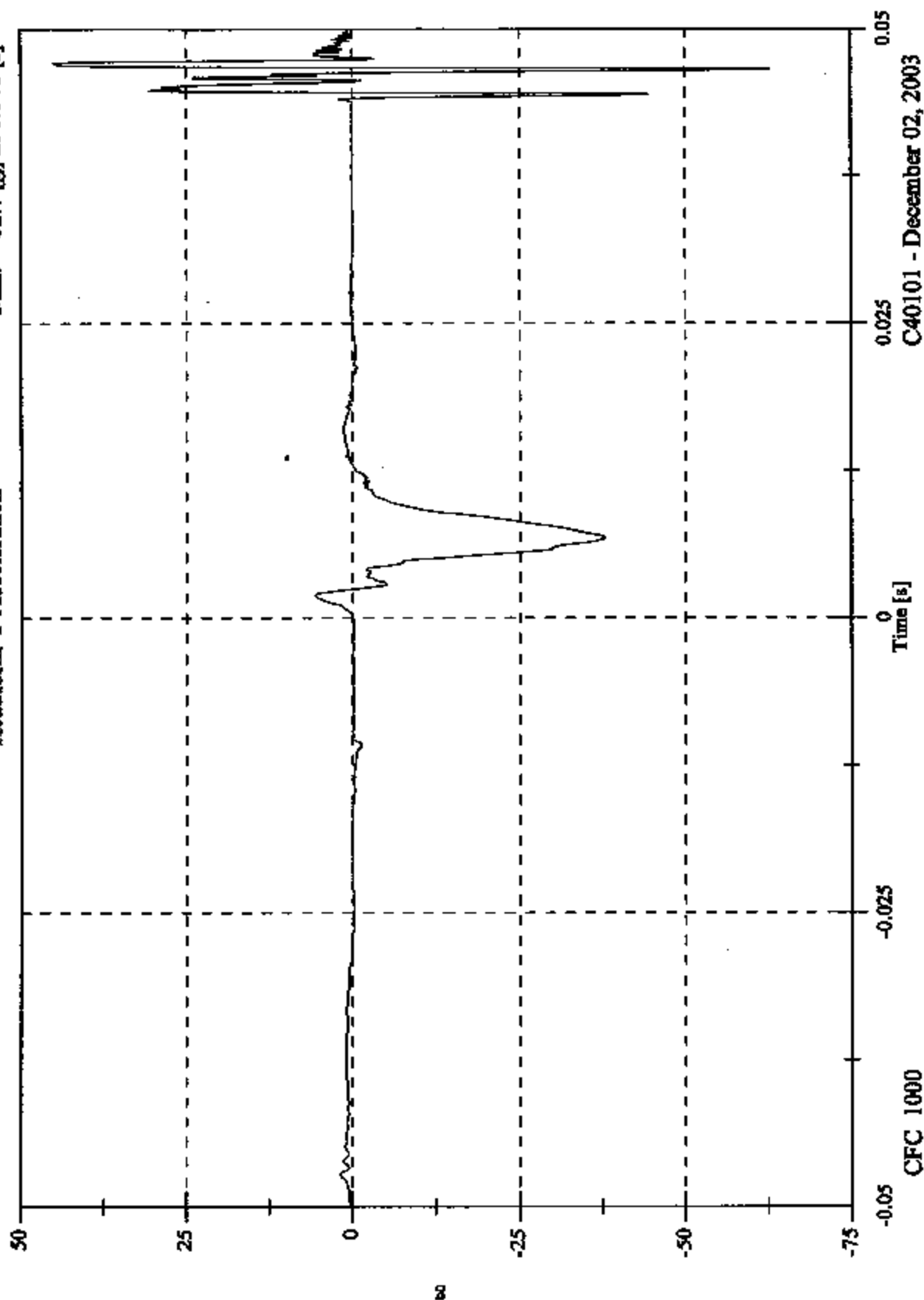
Max: 112.8 [g] at 0.044 [s]
Min: -153.6 [g] at 0.007 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

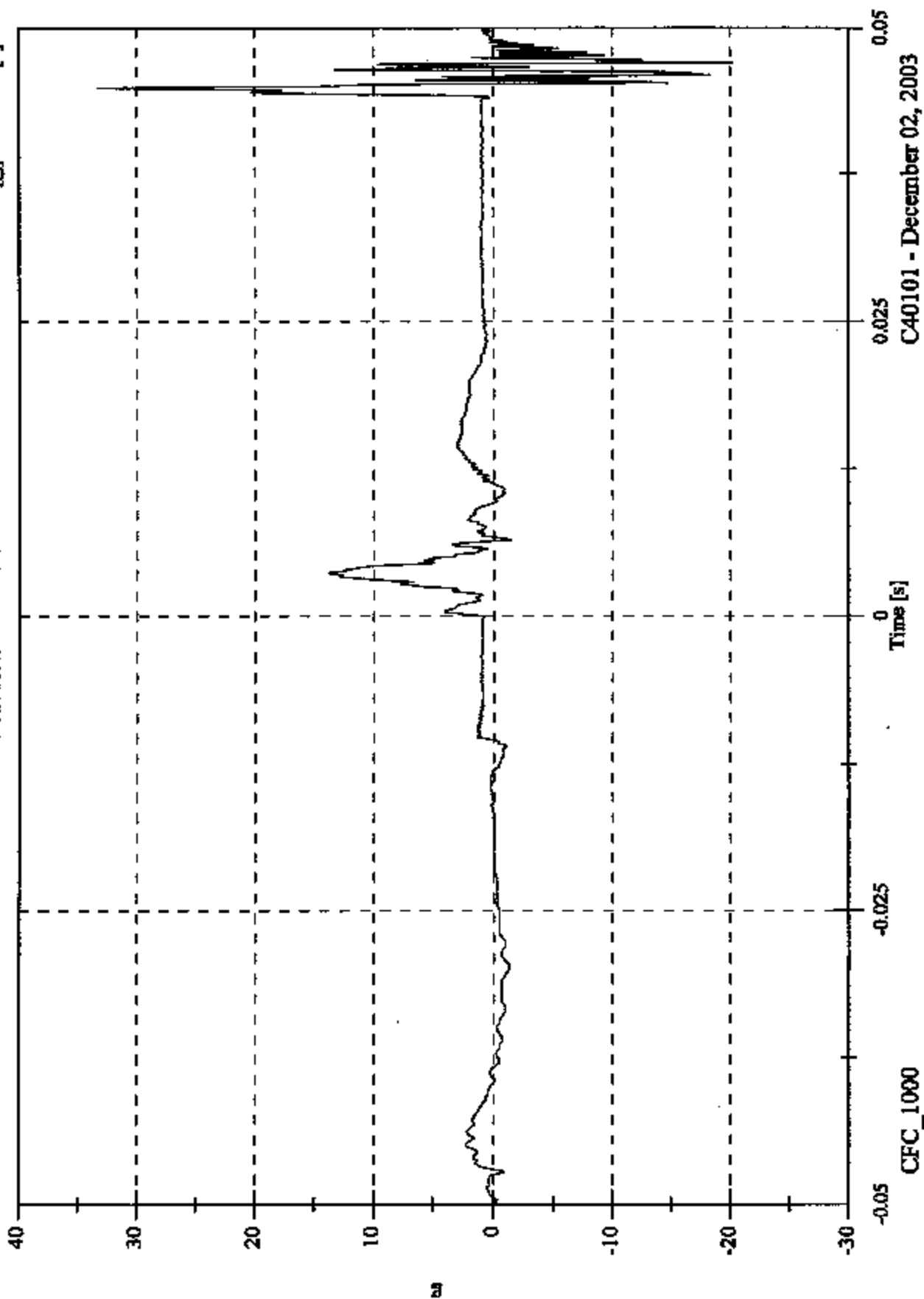
Max: 45.0 [g] at 0.047 [s]
Min: -62.7 [g] at 0.046 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

Max: 33.3 [g] at 0.045 [s]
Min: -20.2 [g] at 0.047 [s]

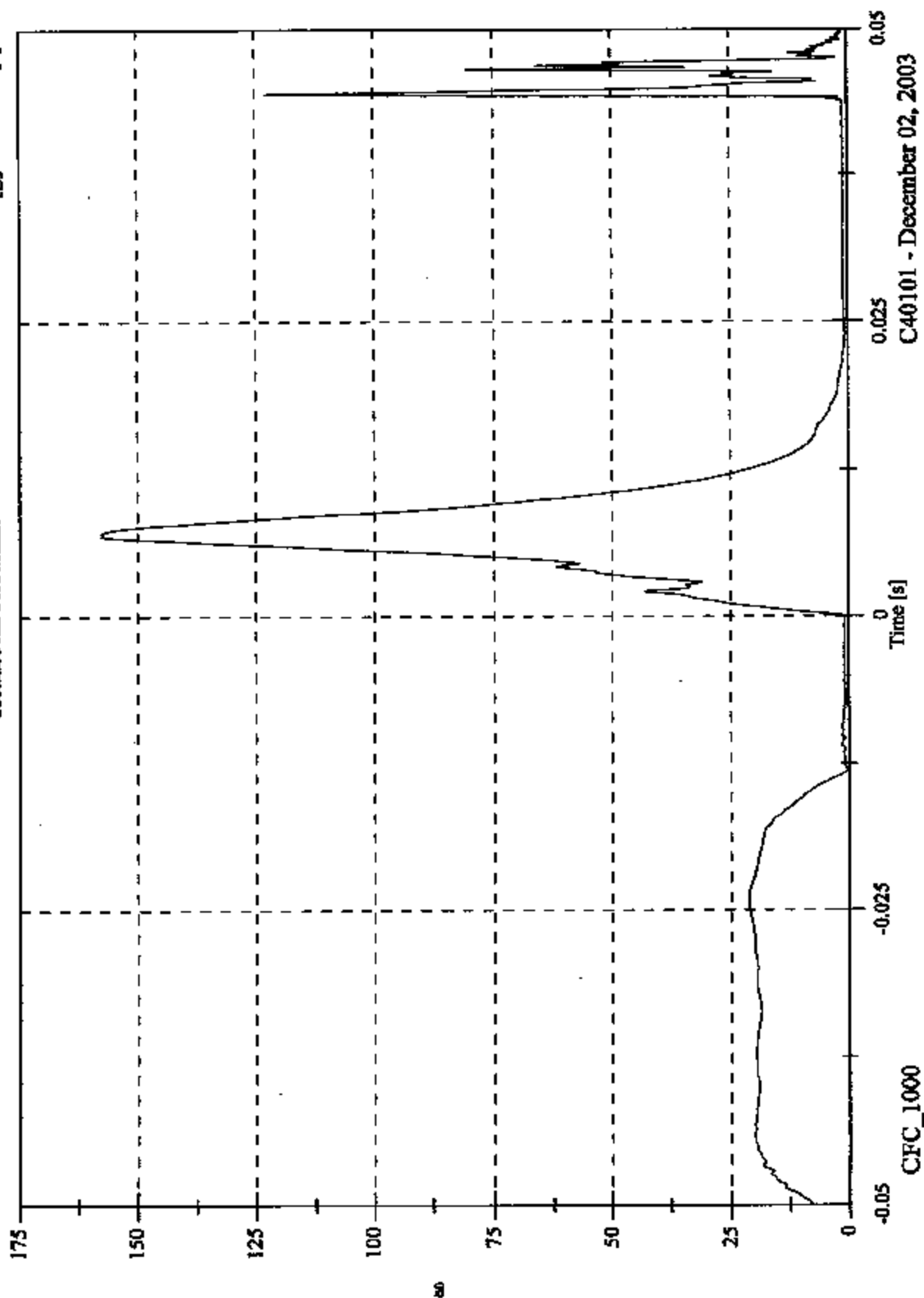


FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

Max: 157.7 [g] at 0.007 [s]

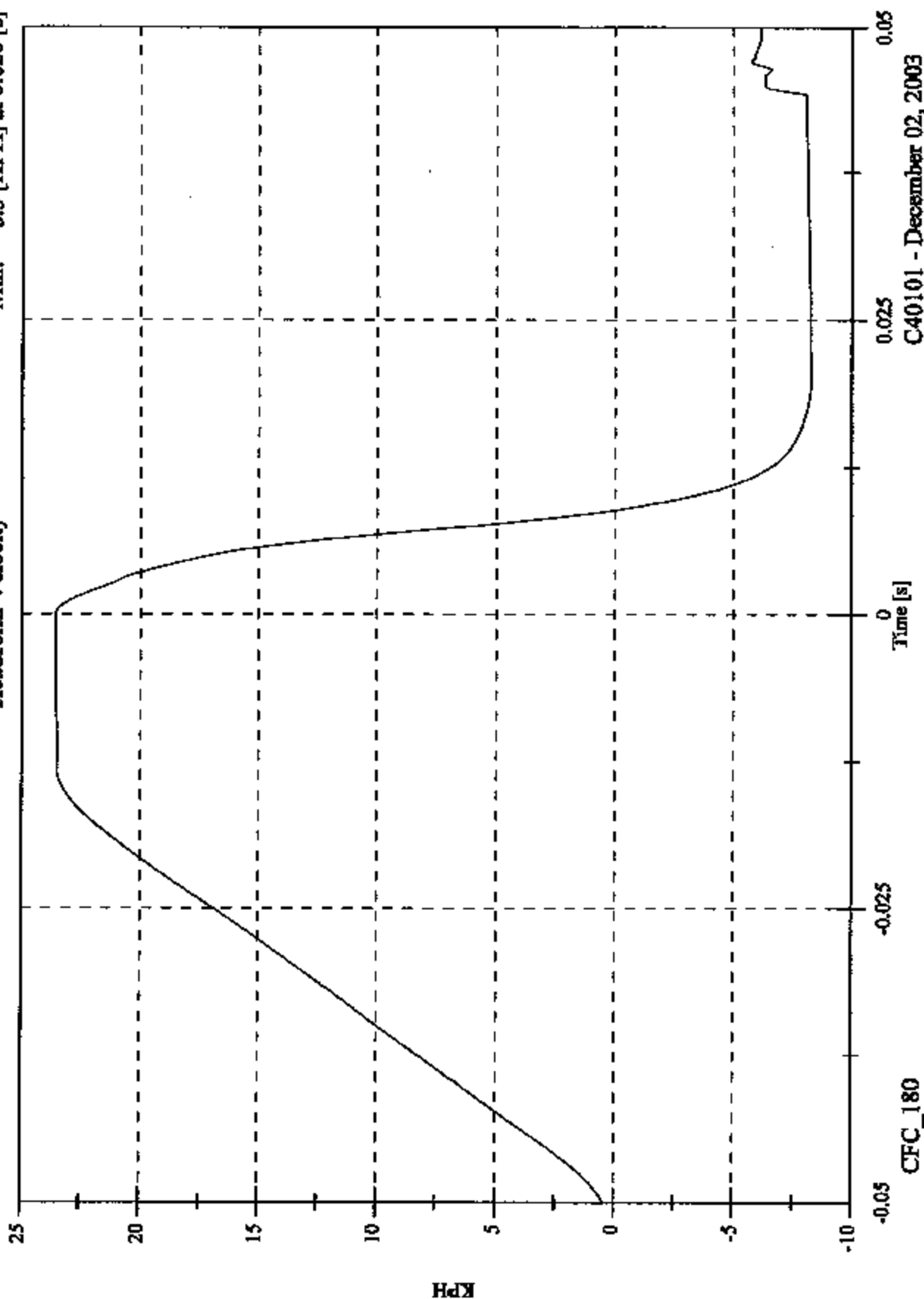
Min: 0.2 [g] at -0.013 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Velocity

Max: 23.6 [KPH] at -0.000 [s]
Min: -8.3 [KPH] at 0.020 [s]





PRE-IMPACT REM

8730-01



POST-IMPACT RPS

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS542X41171754
DATE OF MANUFACTURE:	04/03(SM CERTIFICATION LABEL)
COLOR:	White

Test Number:	02
Test Date:	12/02/2003
Target Location:	Passenger Side Rear Pillar
Target Code:	RP1
Horizontal Impact Angle:	76°
Vertical Impact Angle:	25°
Ambient Temperature:	21°C
Relative Humidity:	22
Time of Impact:	11:00
Headform Number:	0355

Impact Point Description (from lower midpoint on midline)			
On Centerline	1	mm right	mm left
On Centerline	25	mm up	



POST-IMPACT RP1 HEADFORM

Free Motion HIC	389.7
HIC(Δ)	450.4
Impact Velocity (kph)	18.41
HIC T1 (msec)	2.8
HIC T2 (msec)	8.4

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - RP1

FMH Headform 0355

Location: RP1

Test Date: December 02, 2003

Work File: RP1

TEST RESULTS

Lab Temperature: 21 C

HICd: 460.4

Lab Humidity: 22 %

HIC (36ms): 389.7

Velocity at Impact: 18.41 KPH

t1: 2.8 msec

t2: 8.4 msec

Free Flight Distance: 225.50 mm

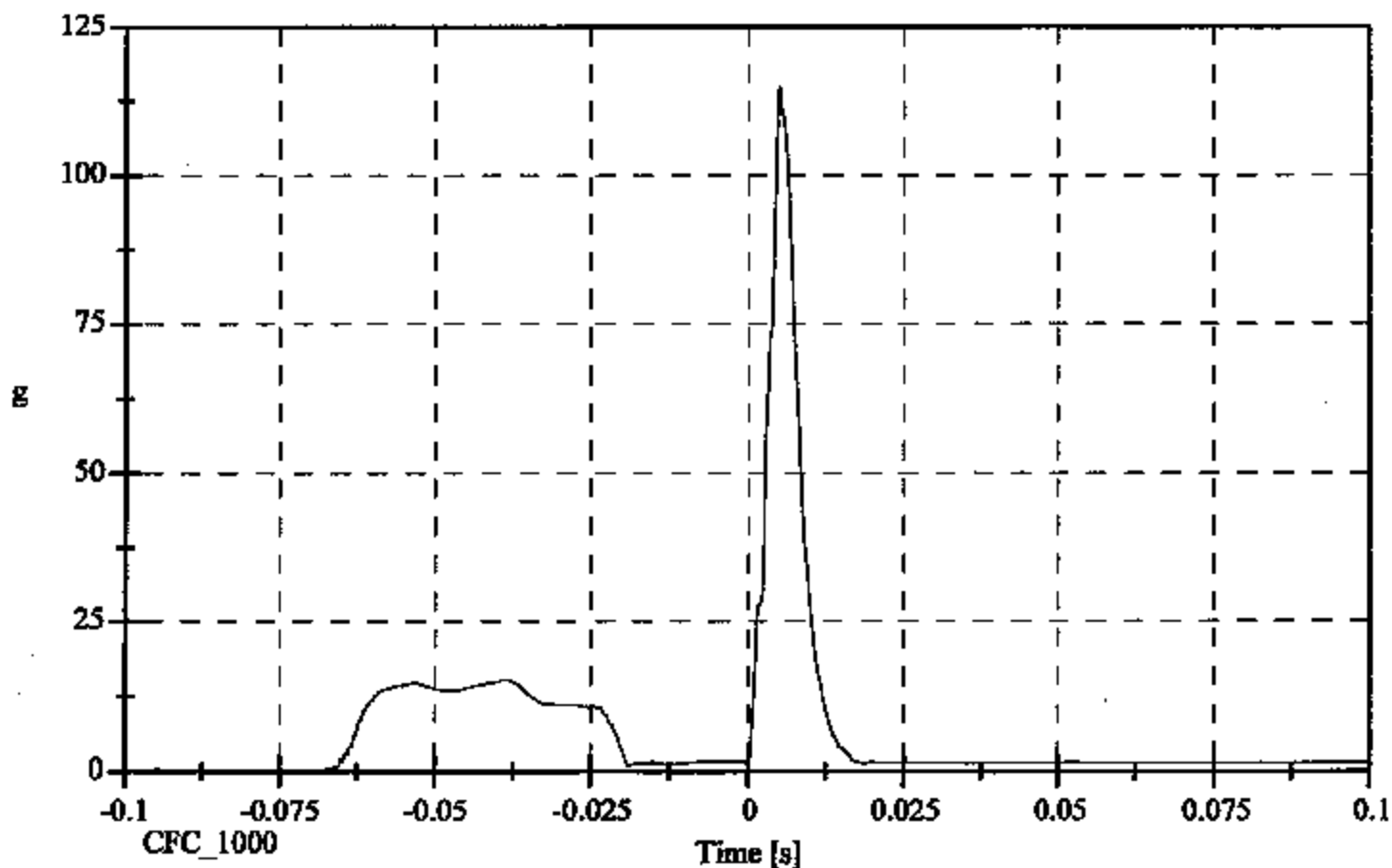
Duration: 5.6 msec

Average Acceleration: 6.9 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 115.0 [g] at 0.005 [s]

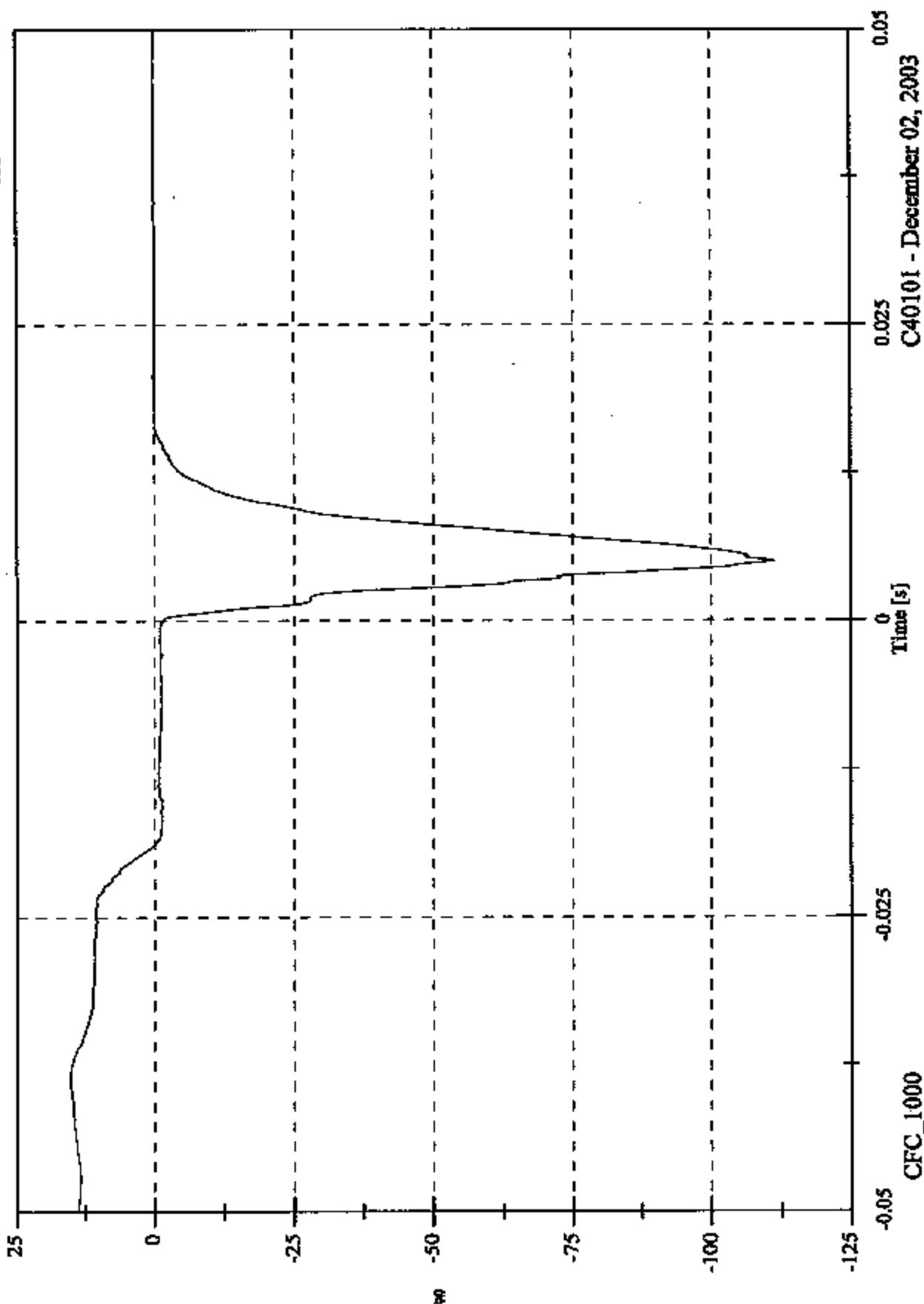
Min: 0.0 [g] at -0.085 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

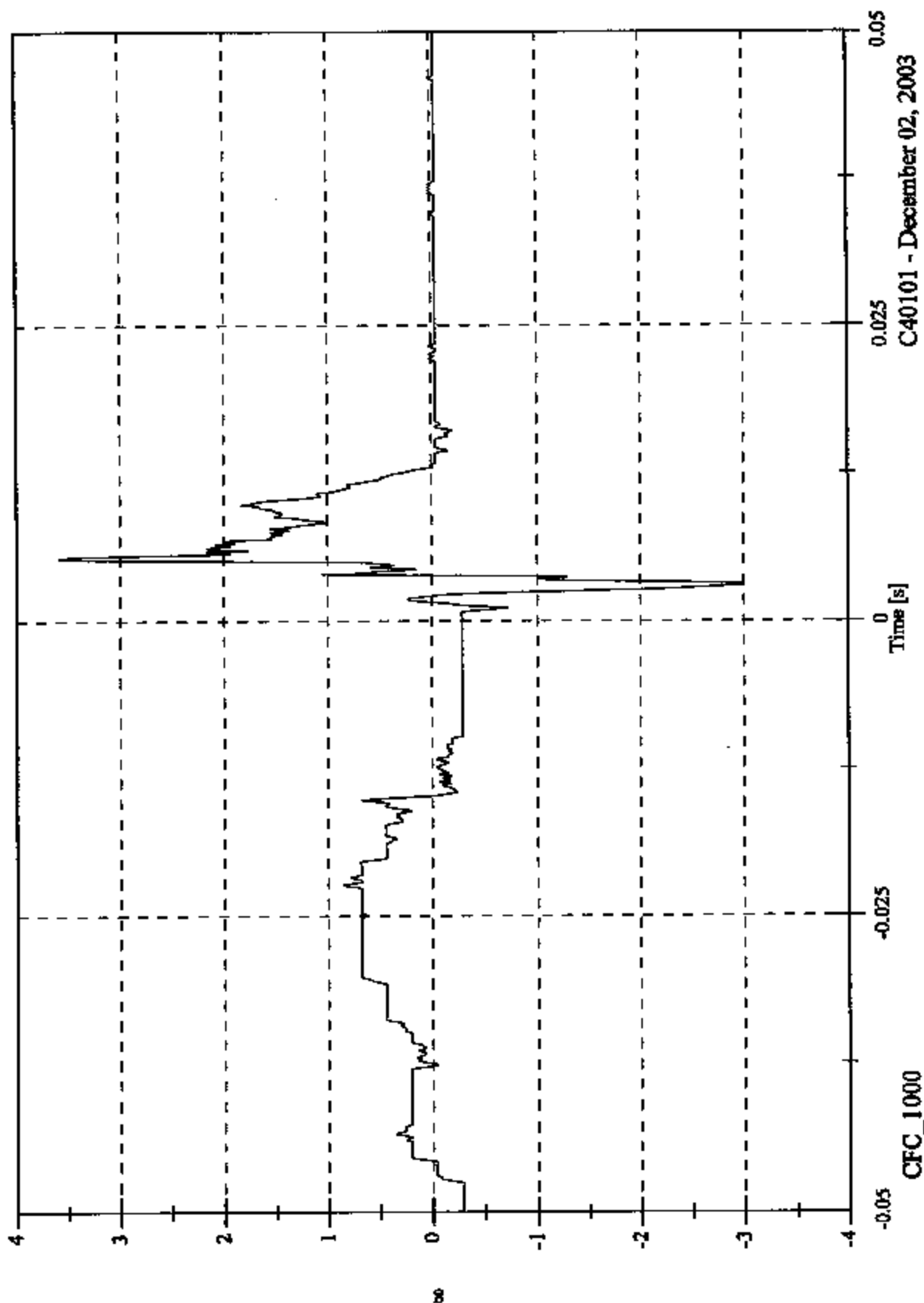
Max: 15.2 [g] at -0.039 [s]
Min: -111.3 [g] at 0.005 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

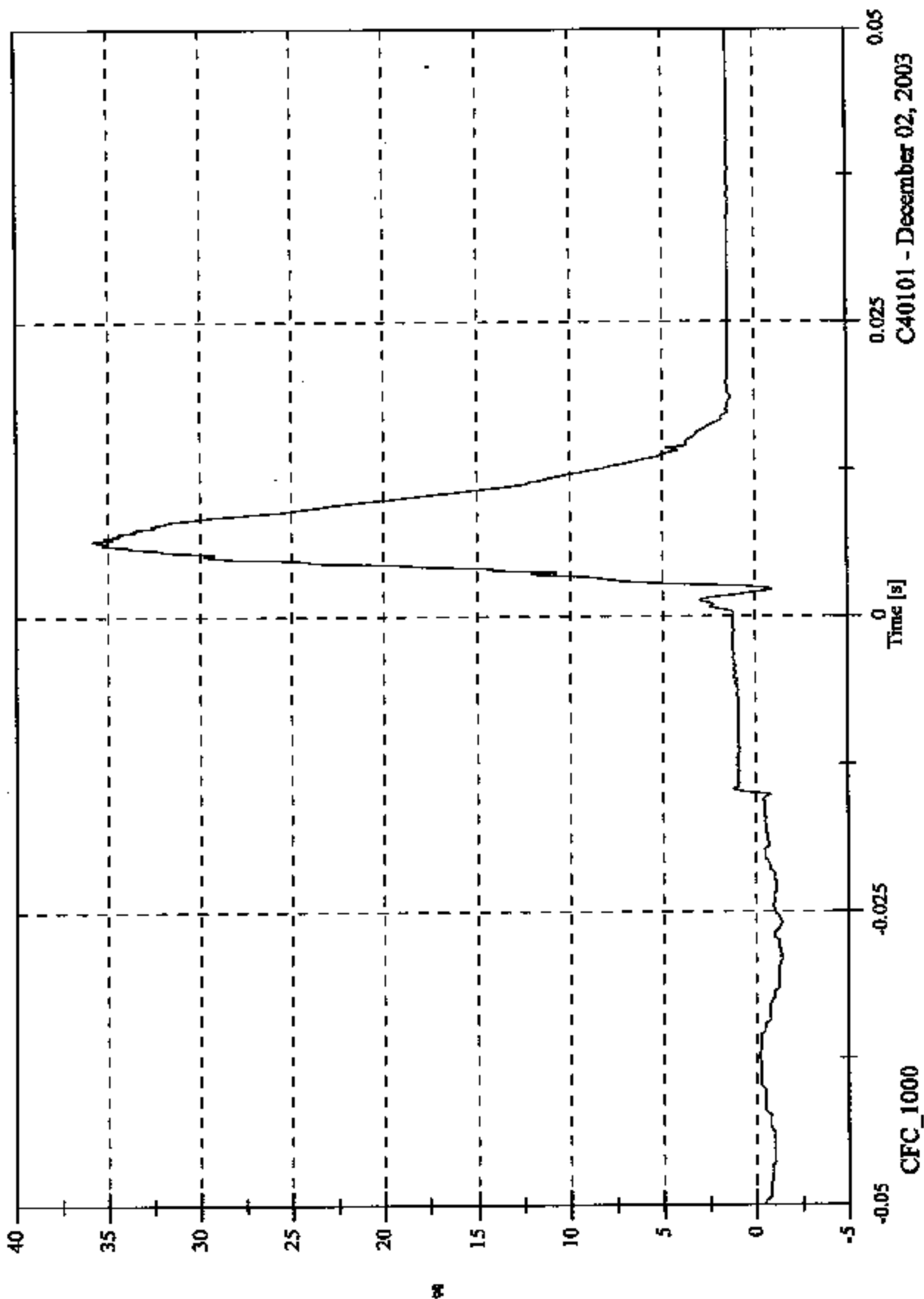
Max: 3.6 [g] at 0.005 [s]
Min: -3.0 [g] at 0.003 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

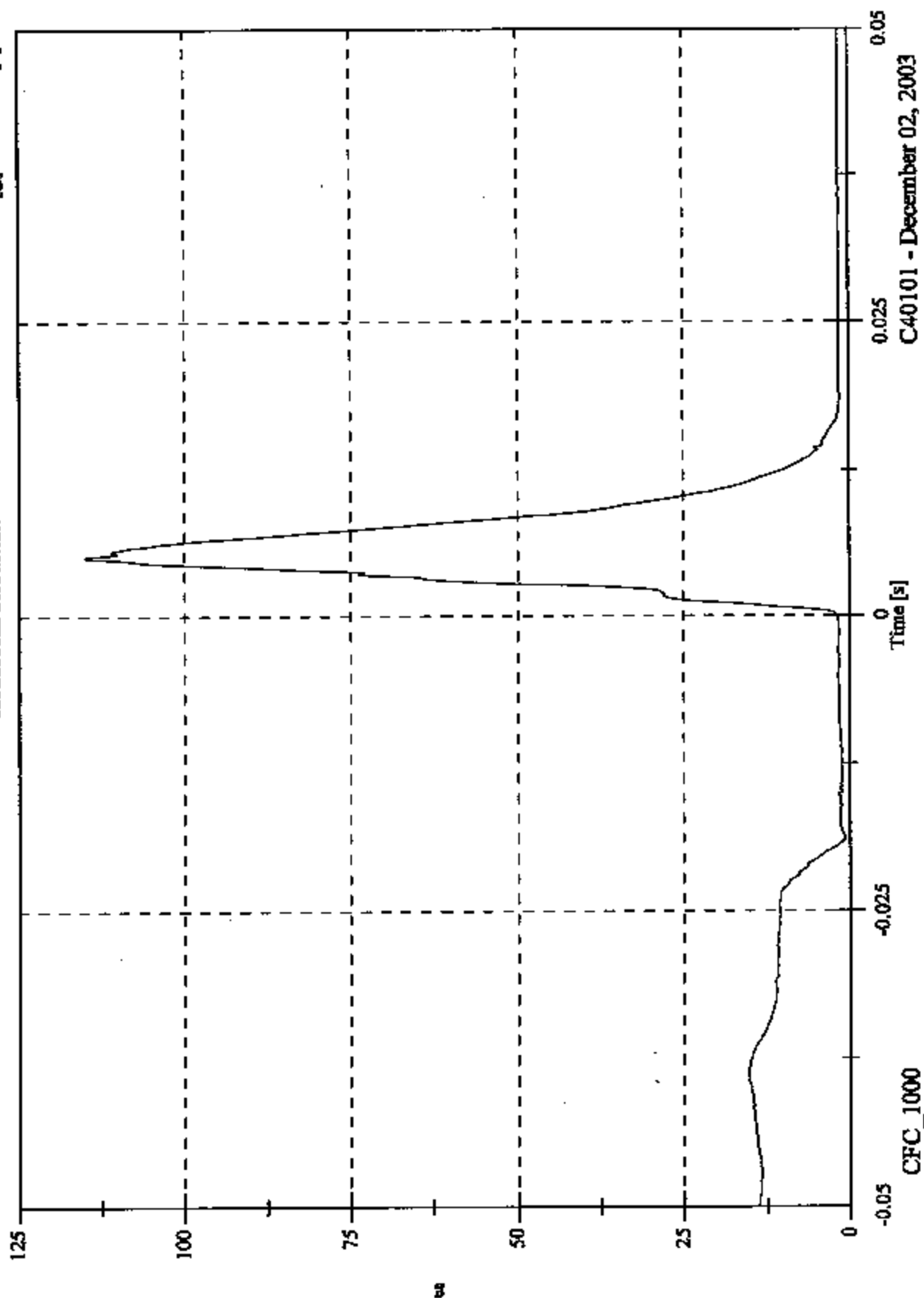
Max: 35.8 [g] at 0.007 [s]
Min: -1.4 [g] at -0.029 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

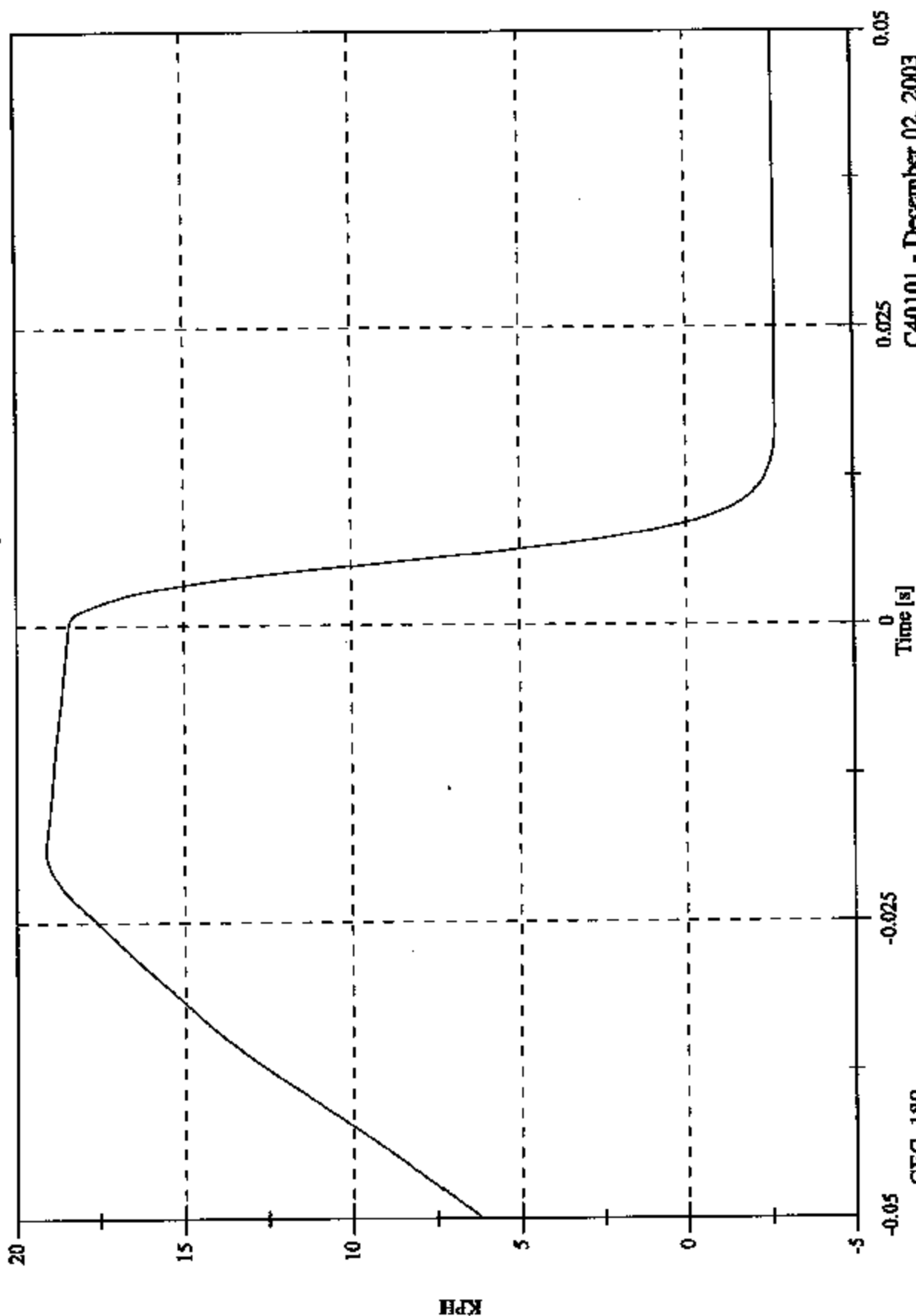
Max: 115.0 [g] at 0.005 [s]
Min: 0.8 [g] at -0.019 [s]



Max: 19.1 [KPH] at -0.019 [s]
Min: -2.7 [KPH] at 0.019 [s]

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

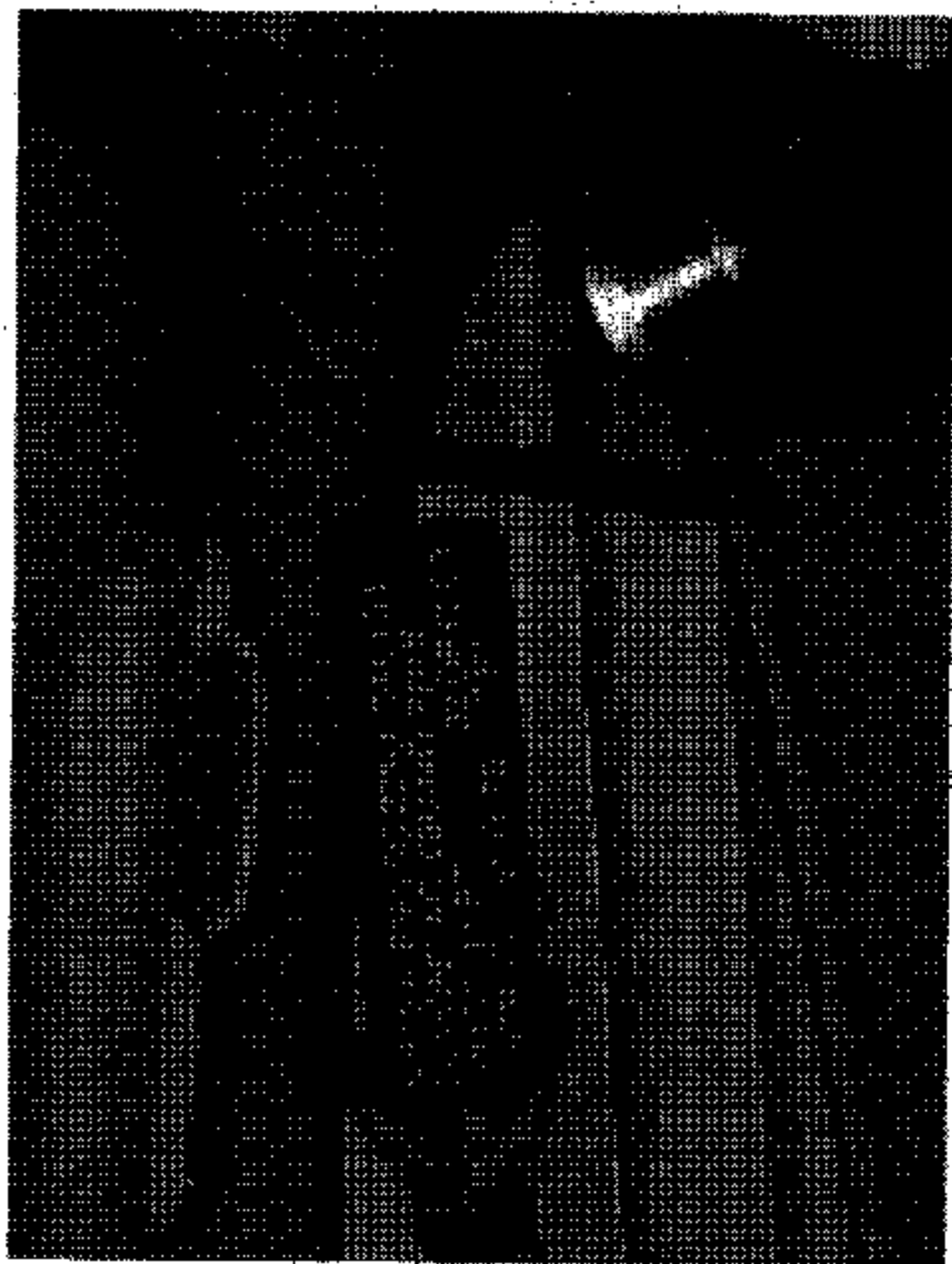
Headform Velocity





PBB-IMPACT 201

6730-01



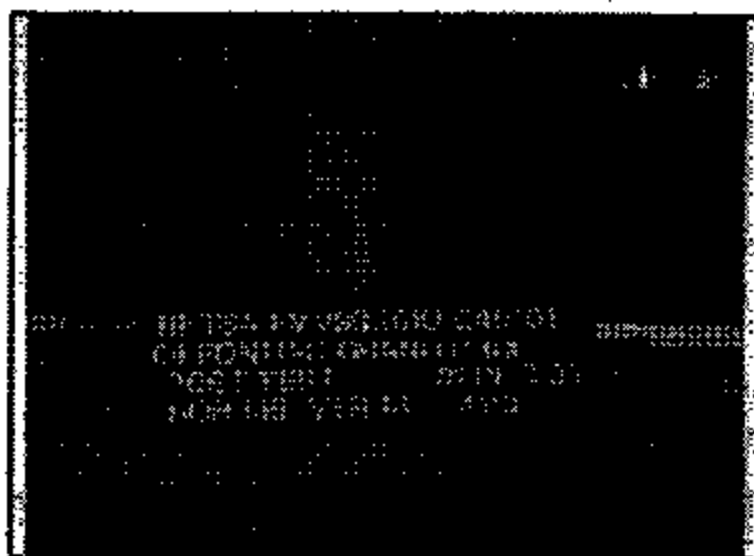
POST-IMPACT RTI

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2W5342X41171734
DATE OF MANUFACTURE:	03/03 (SEE CERTIFICATION LABEL)
COLOR:	White

Test Number:	05
Test Date:	12/02/2003
Target Location:	Passenger Side A-Pillar
Target Code:	AP3
Horizontal Impact Angle:	135°
Vertical Impact Angle:	43°
Ambient Temperature:	21°C
Relative Humidity:	22
Time of Impact:	11:15
Headform Number:	0642

Impact Point Description (From lower midpoint on midsagittal line)			
On Centerline	6	mm right	mm left
On Centerline	14	mm up	



POST-IMPACT AP3 HEADFORM

Free Motion HIC	905.6
HIC(d)	849.7
Impact Velocity (kph)	21.36
HIC T1 (msec)	8.4
HIC T2 (msec)	11.3

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - AP3

FMH Headform 0642

Location: AP3

Test Date: December 02, 2003

Work File: AP3

TEST RESULTS

Lab Temperature: 21 C

HICd: 849.7

Lab Humidity: 22 %

HIC (36ms): 905.6

Velocity at Impact: 23.36 KPH

t1: 8.4 msec

t2: 11.3 msec

Free Flight Distance: 210.42 mm

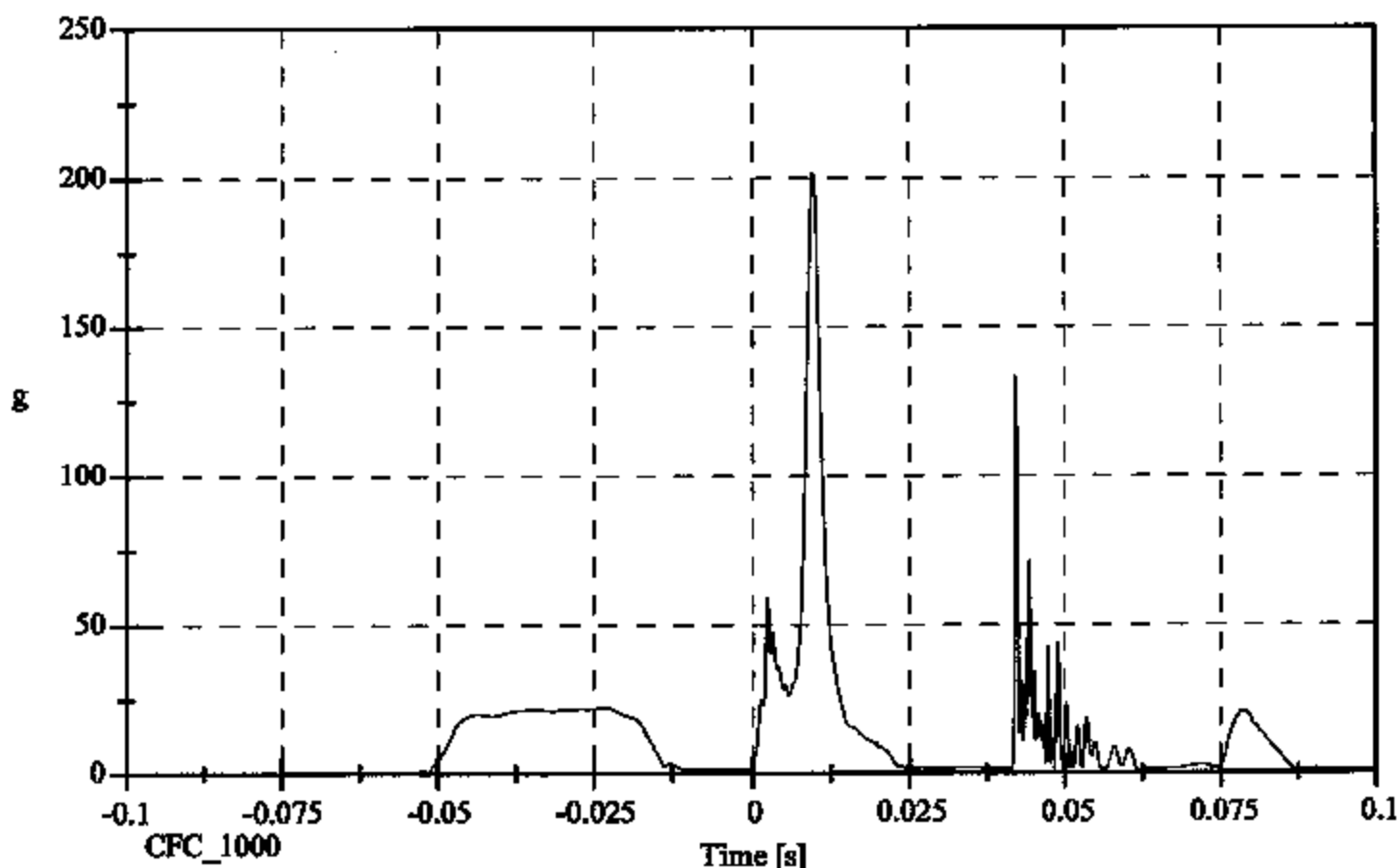
Duration: 2.9 msec

Average Acceleration: 10.9 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 201.8 [g] at 0.010 [s]

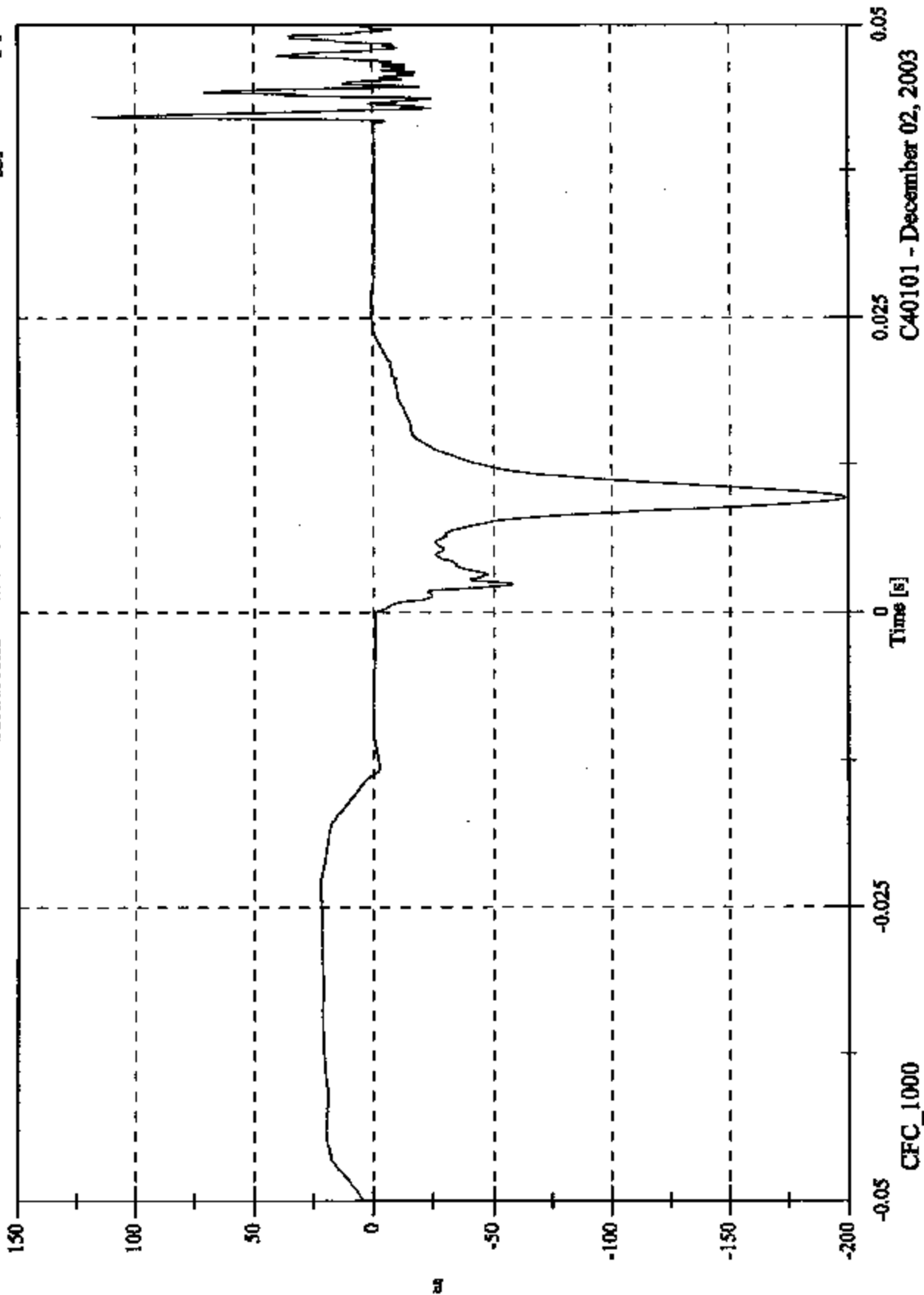
Min: 0.0 [g] at -0.095 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

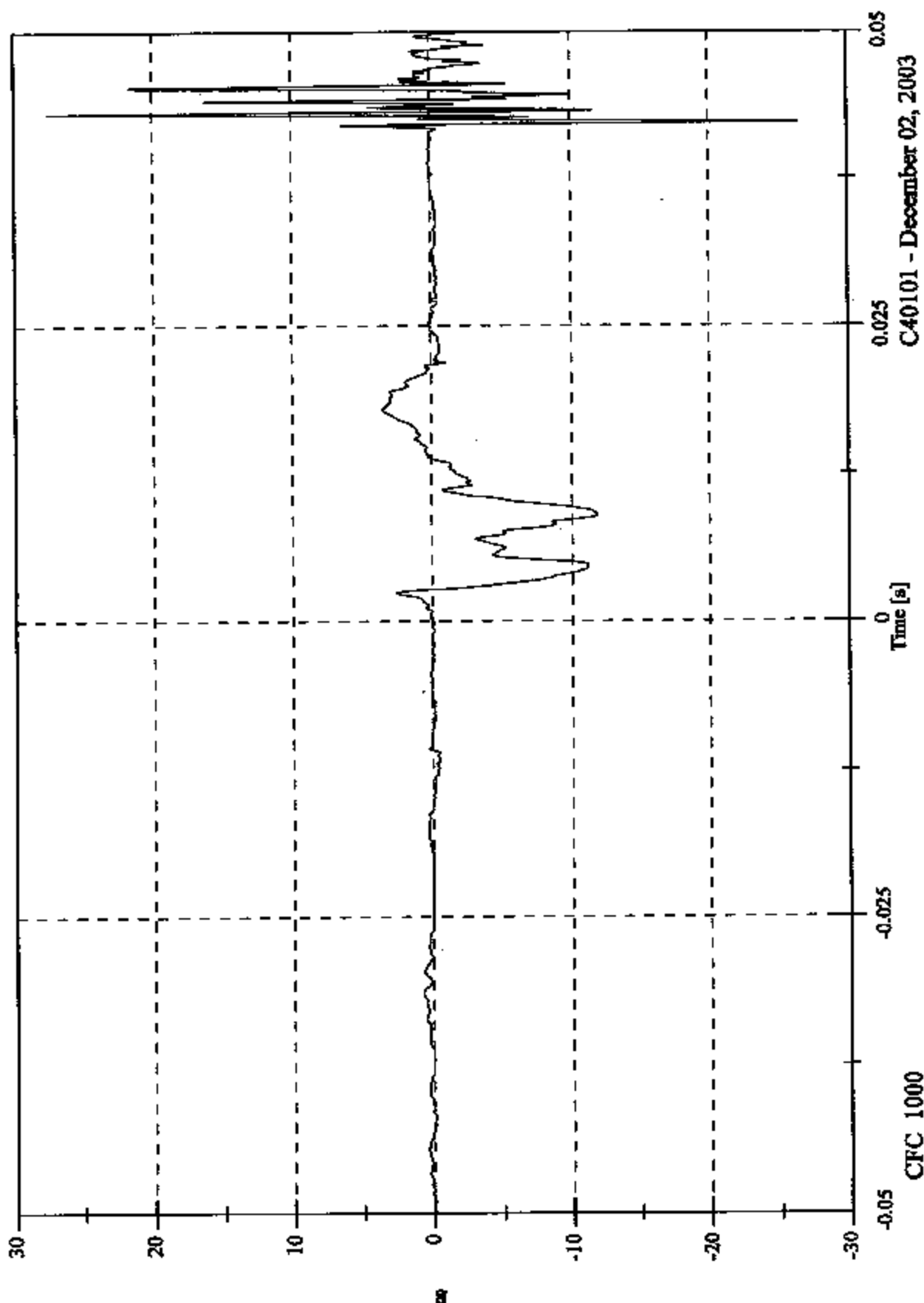
Max: 118.0 [g] at 0.042 [s]
Min: -198.8 [g] at 0.010 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

Max: 27.5 [g] at 0.043 [s]
Min: -26.4 [g] at 0.042 [s]

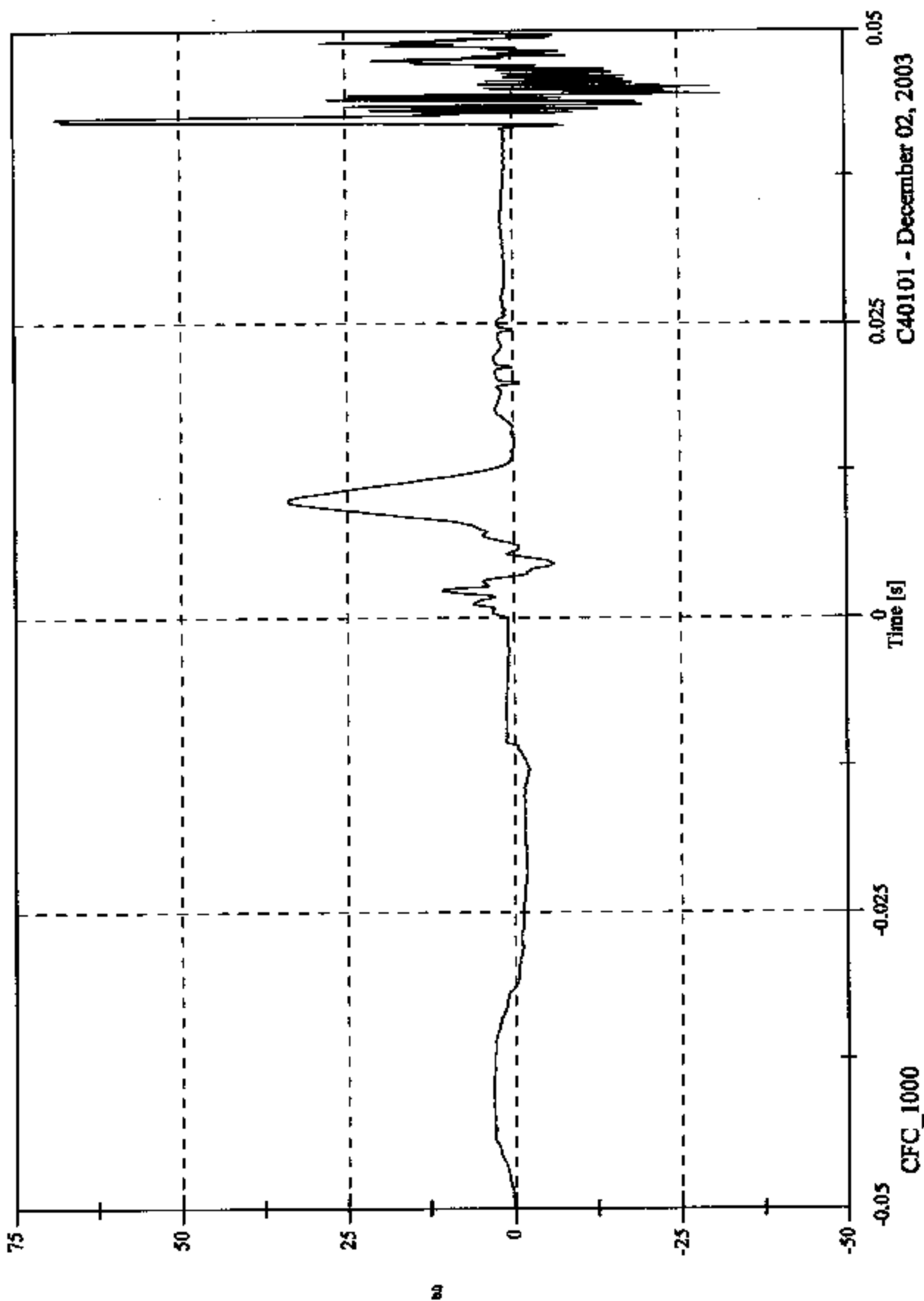


FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

Max: 68.7 [g] at 0.042 [s]

Min: -31.3 [g] at 0.044 [s]

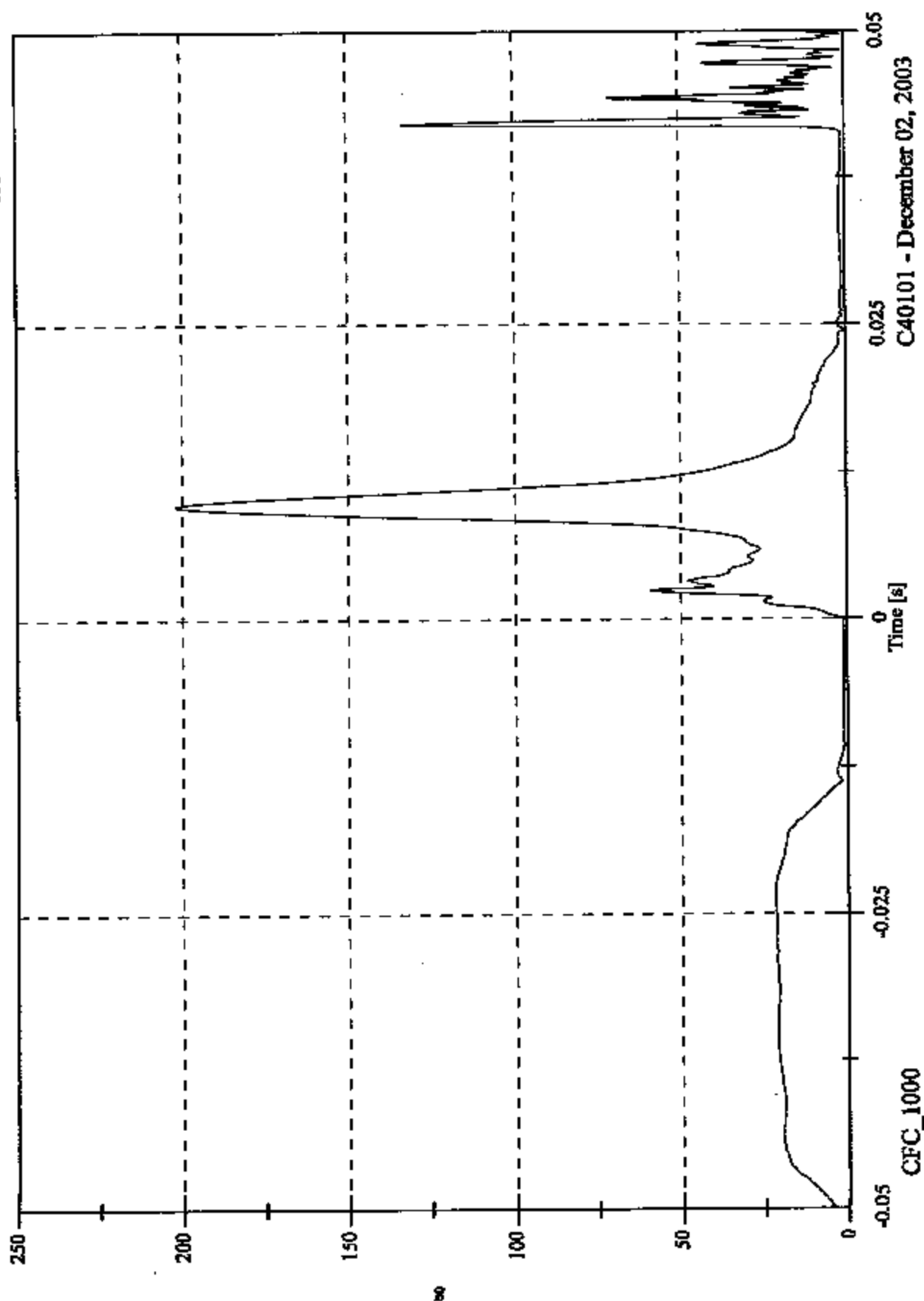


FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

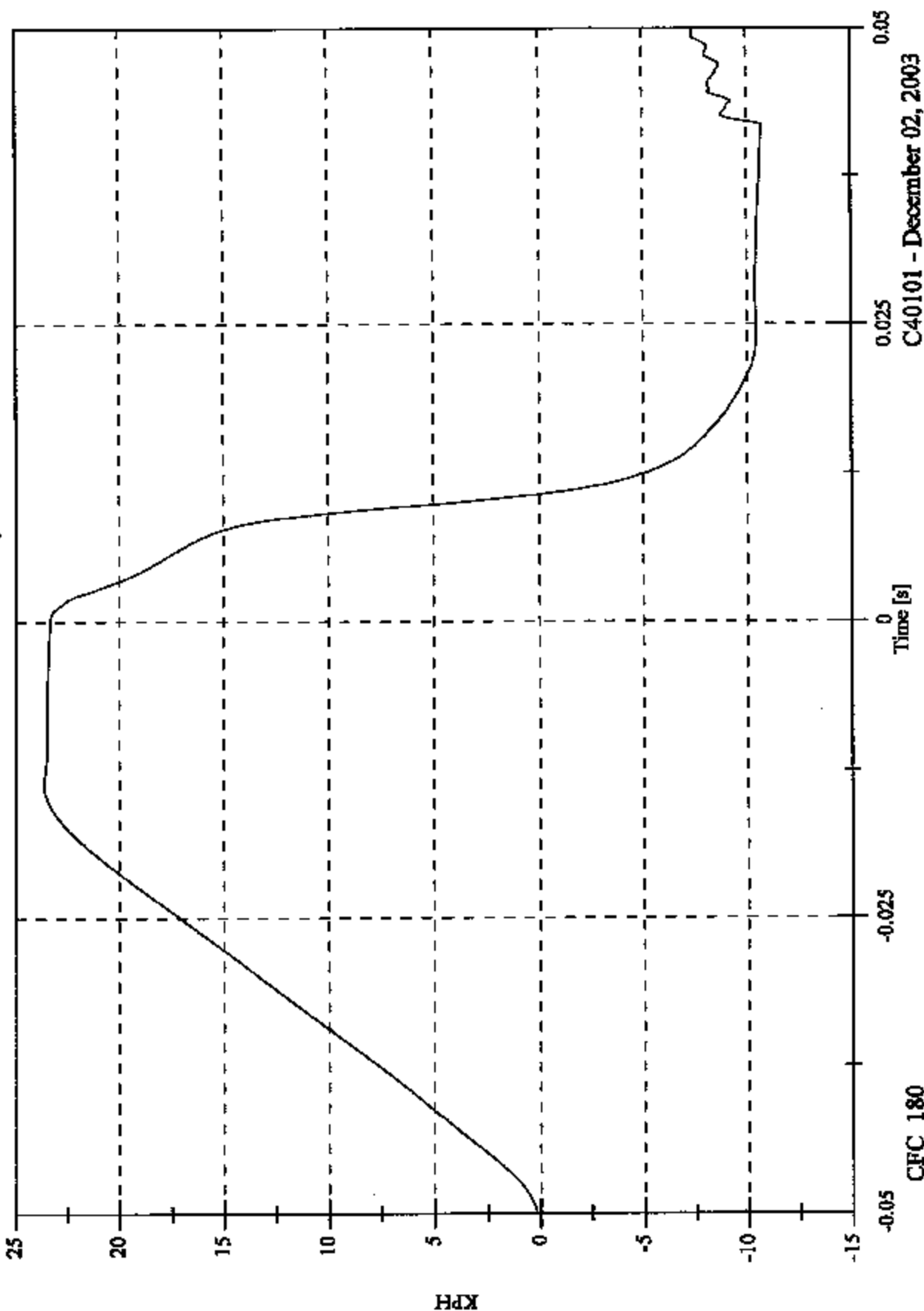
Max: 201.8 [g] at 0.010 [s]

Min: 0.5 [g] at 0.024 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Velocity

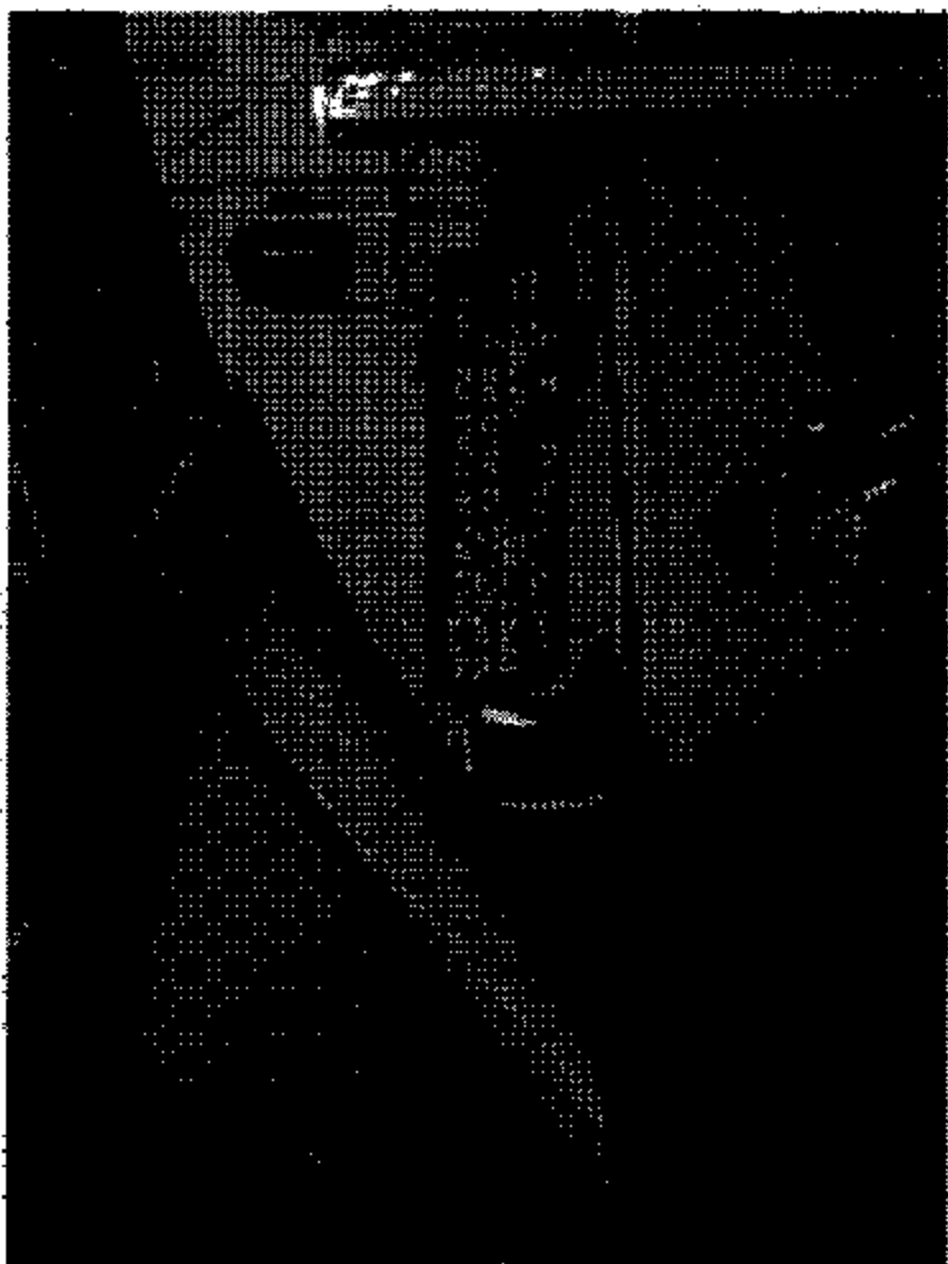
Max: 23.7 [KPH] at -0.014 [s]
Min: -10.7 [KPH] at 0.042 [s]





PHOTOGRAPH ACT 103

10-000001



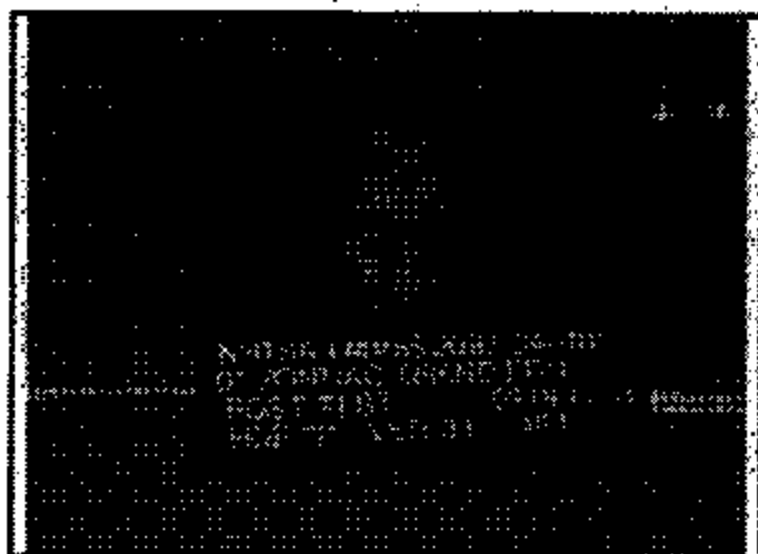
POST-IMPACT AP9

8750-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2W5541X41171754
DATE OF MANUFACTURE:	08/03 (SEE CERTIFICATION LABEL)
COLOR:	White

Test Number:	04
Test Date:	12/02/2003
Target Location:	Passenger Side A-Pillar
Target Code:	AP1
Horizontal Impact Angle:	111°
Vertical Impact Angle:	31°
Ambient Temperature:	21°C
Relative Humidity:	22
Time of Impact:	13:20
Headform Number:	1255

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	11	☒ mm right	☐ mm left
On Centerline	26	☐ mm up	



POST-IMPACT AP1 HEADFORM

Free Motion HIC	797.1
HIC(d)	767.8
Impact Velocity (kph)	23.37
HIC T1 (msec)	4.7
HIC T2 (msec)	8.4

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - AP1

FMH Headform 12355

Location: AP1

Test Date: December 02, 2003

Work File: AP1

TEST RESULTS

Lab Temperature: 21 C

HICd: 767.8

Lab Humidity: 22 %

HIC (36ms): 797.1

Velocity at Impact: 23.57 KPH

t1: 4.7 msec

t2: 8.4 msec

Duration: 3.7 msec

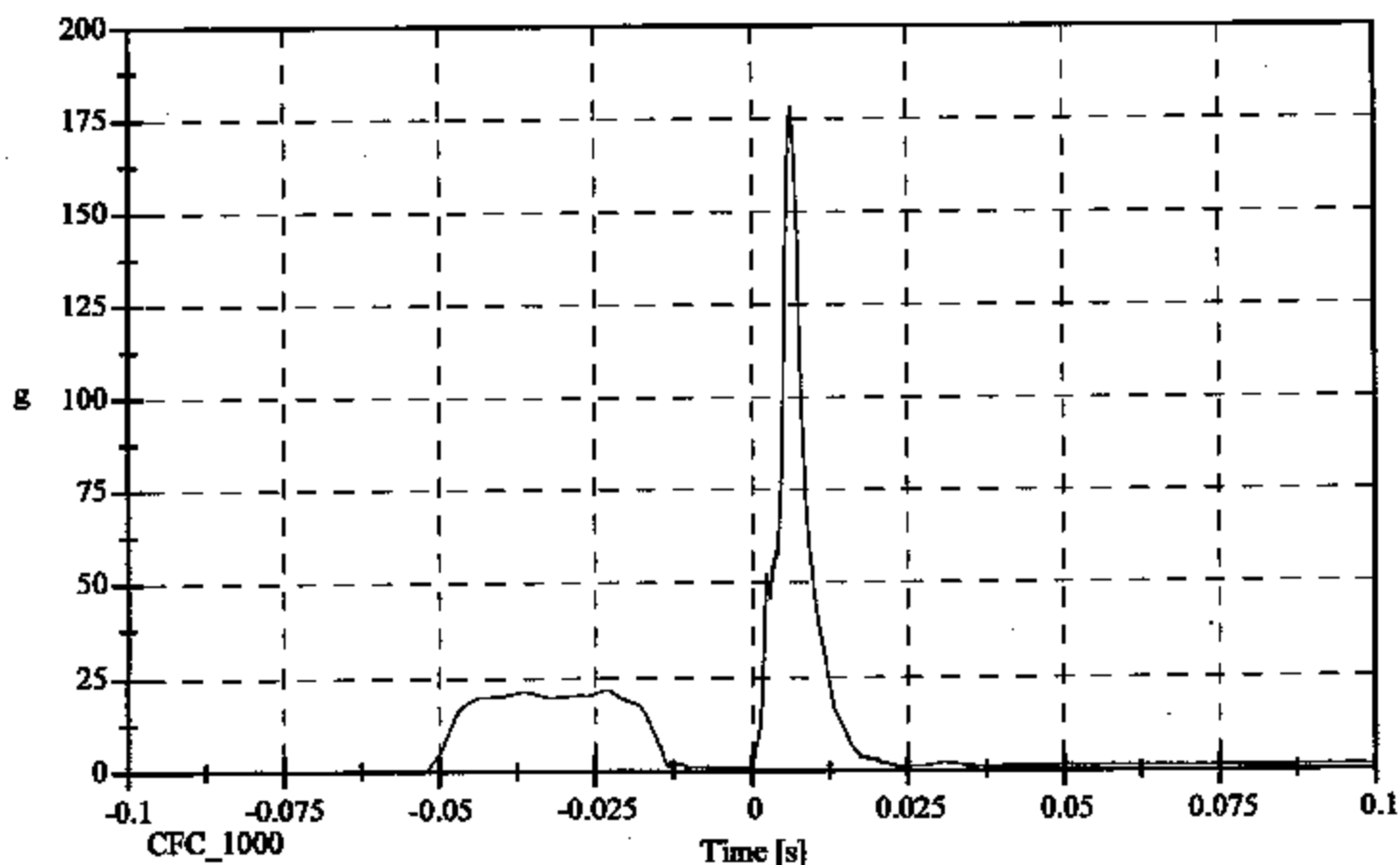
Free Flight Distance: 211.93 mm

Average Acceleration: 8.7 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 178.3 [g] at 0.006 [s]

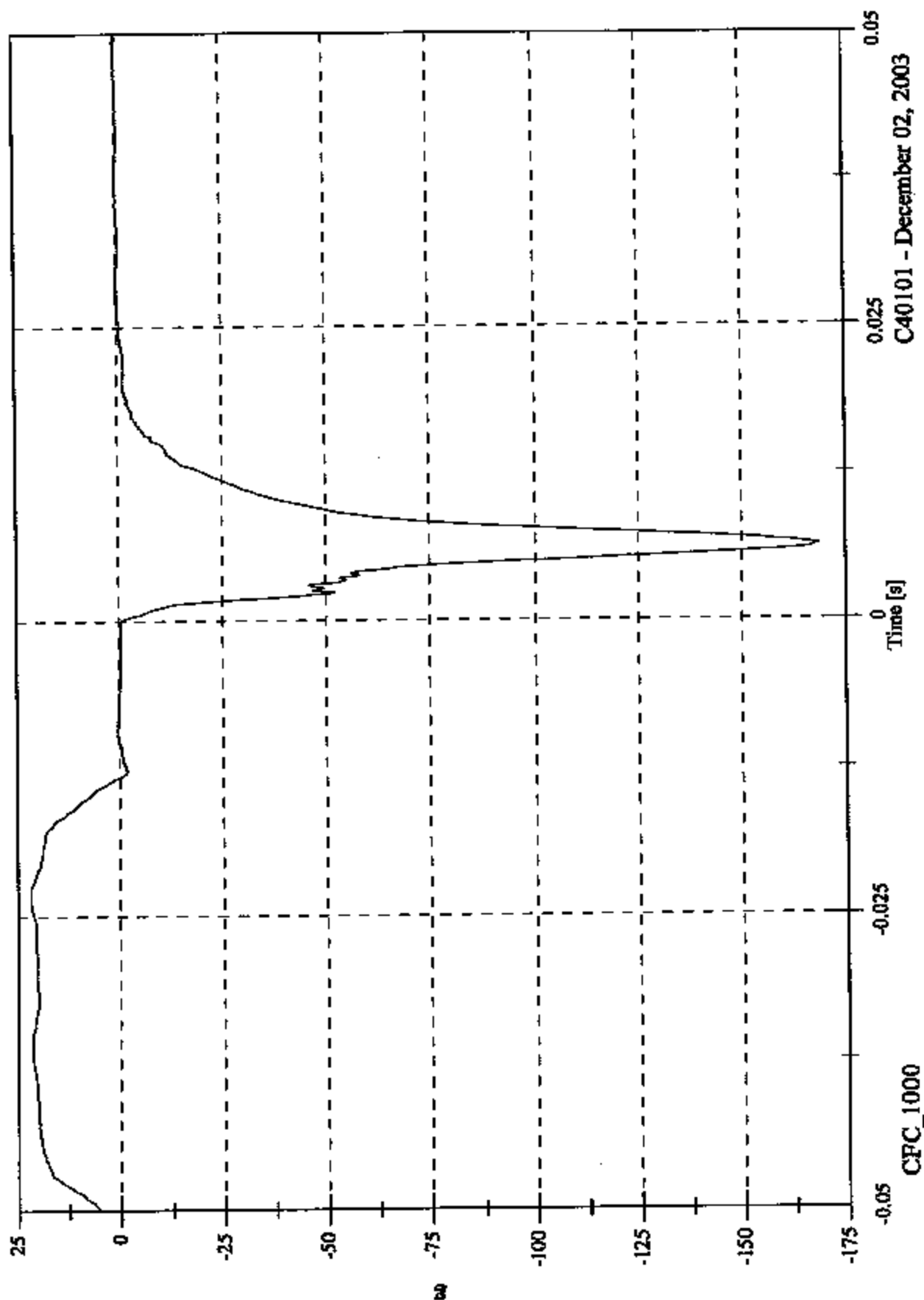
Min: 0.0 [g] at -0.099 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

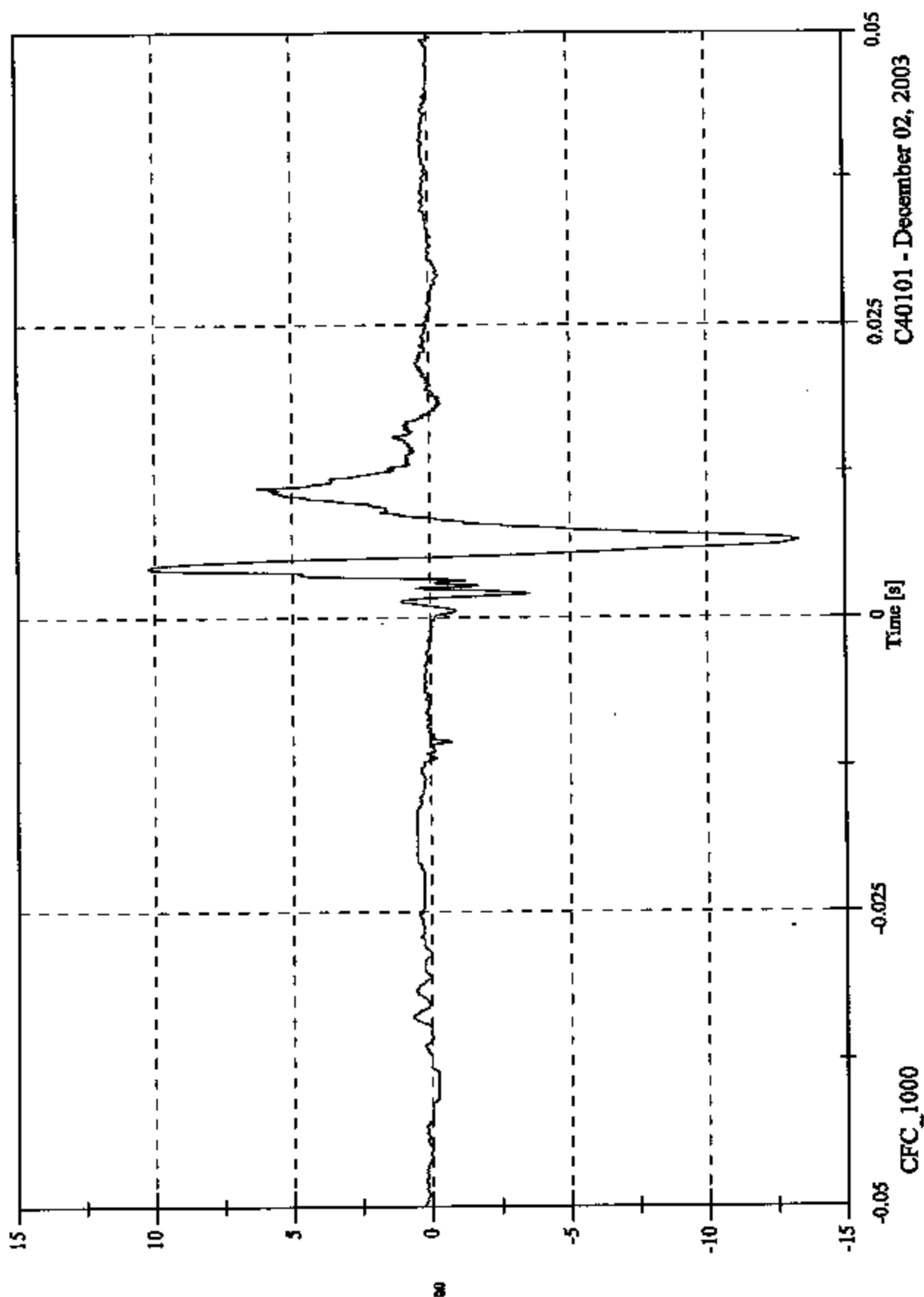
Max: 21.8 [g] at -0.024 [s]
Min: -168.8 [g] at 0.006 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

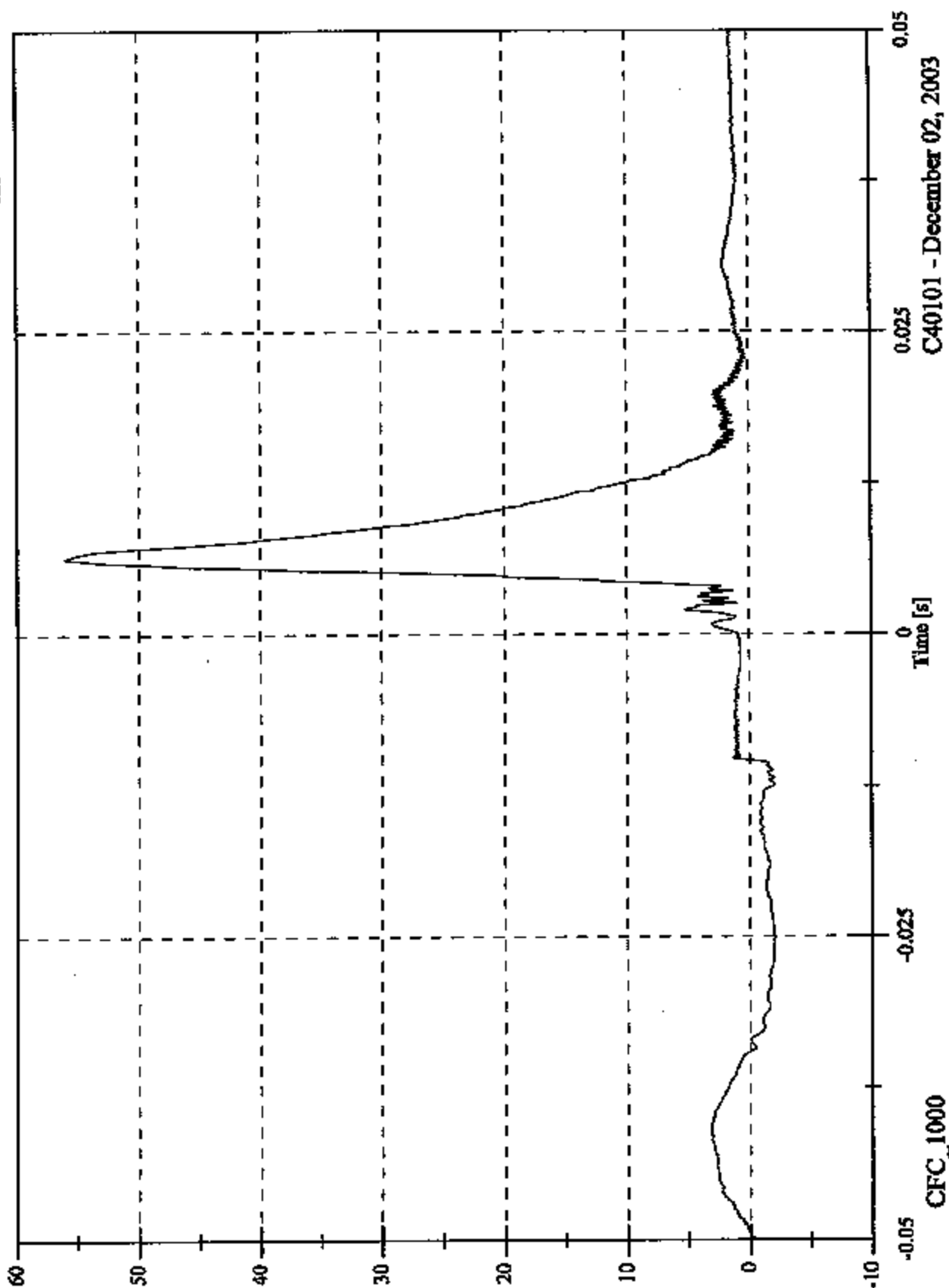
Max: 10.2 [g] at 0.004 [s]
Min: -13.3 [g] at 0.007 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

Max: 56.1 [g] at 0.006 [s]
Min: -2.1 [g] at -0.025 [s]

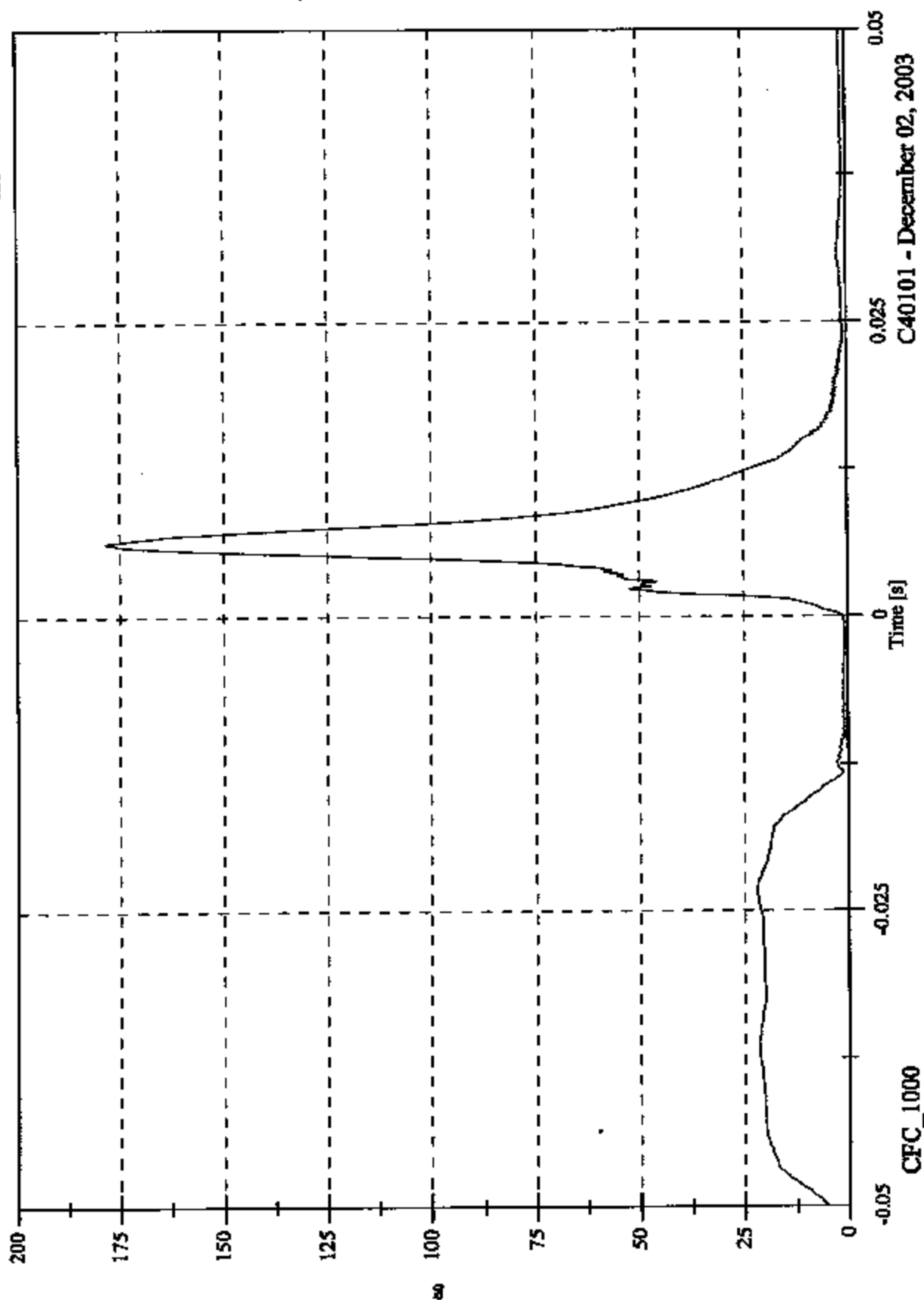


C40101 - December 02, 2003

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Max: 178.3 [g] at 0.006 [s]
Min: 0.5 [g] at -0.010 [s]

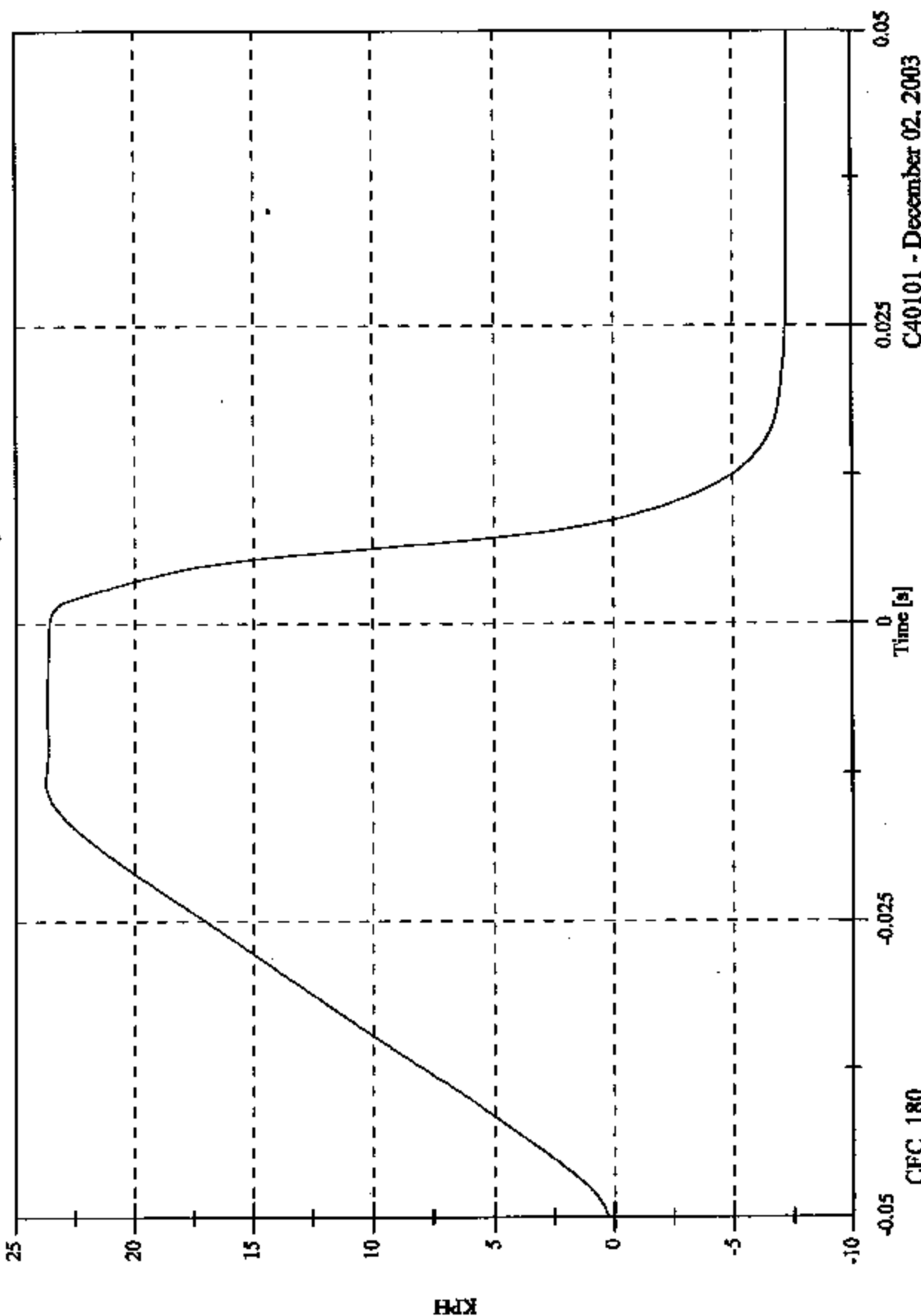
Headform Resultant



Max: 23.7 [KPH] at -0.013 [s]
Min: -7.3 [KPH] at 0.050 [s]

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Velocity





PRE-IMPACT A/P

8730-01



POST-IMPACT API

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS542X41171754
DATE OF MANUFACTURE:	MANUFACTURE CERTIFICATION LABEL
COLOR:	White

Test Number:	05
Test Date:	12/02/2003
Target Location:	Passenger Side Upper Roof by B-Pillar
Target Code:	URBP
Horizontal Impact Angle:	90°
Vertical Impact Angle:	32°
Ambient Temperature:	21°C
Relative Humidity:	22
Time of Impact:	14:30
Headform Number:	0062

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	0	mm right	mm left
On Centerline	46	mm up	



POST-IMPACT URBP HEADFORM

Free Motion HIC	976.3
HIC(d)	903.0
Impact Velocity (kph)	23.54
HIC T1 (msec)	4.3
HIC T2 (msec)	10.4

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - URBP

FMH Headform 0062

Location: URBP

Test Date: December 02, 2003

Work File: URBP

TEST RESULTS

Lab Temperature: 21 C

HICd: 903.0

Lab Humidity: 22 %

HIC (36ms): 976.3

Velocity at Impact: 23.54 KPH

t1: 4.5 msec

t2: 10.4 msec

Free Flight Distance: 209.92 mm

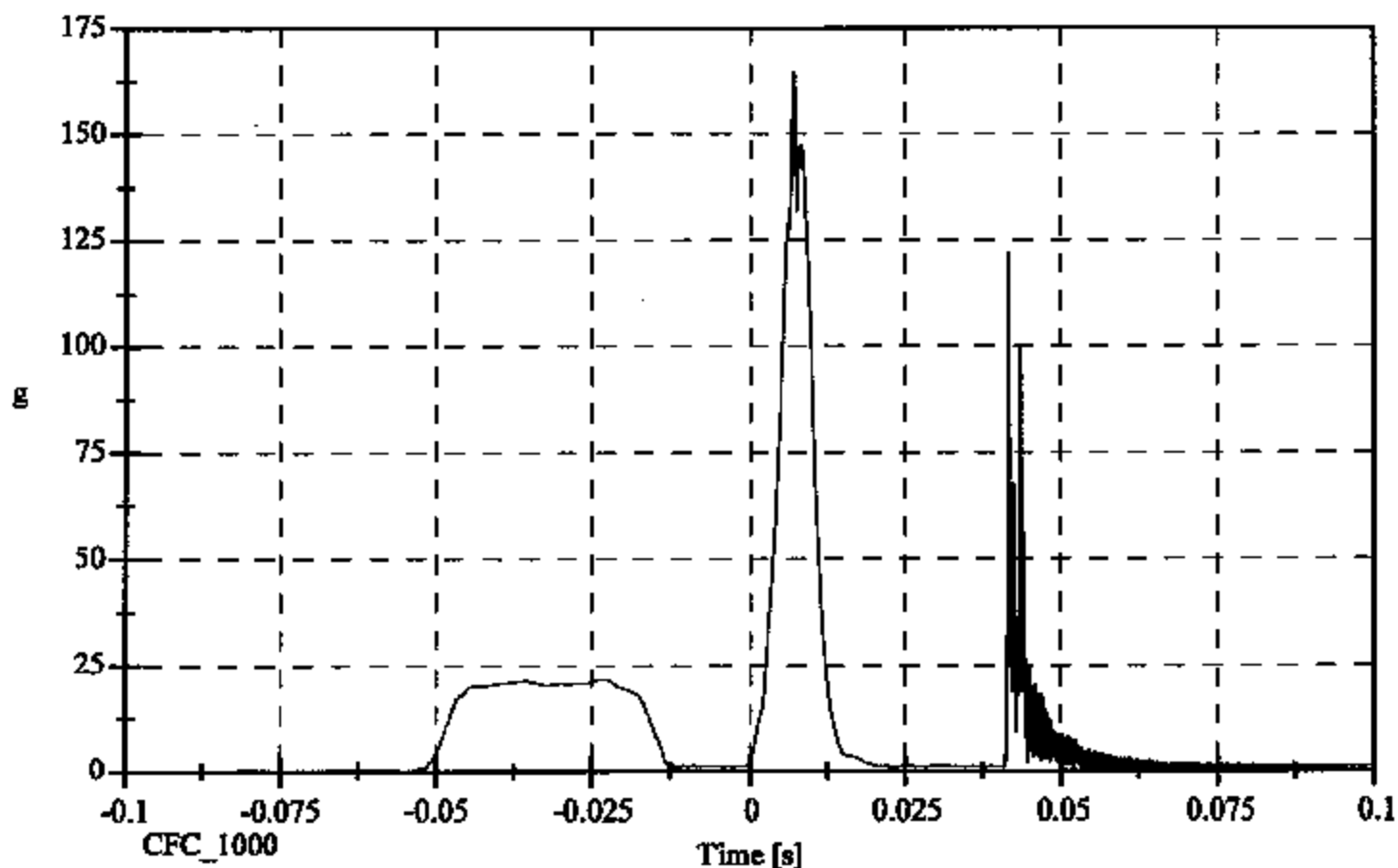
Duration: 5.9 msec

Average Acceleration: 9.9 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 164.5 [g] at 0.007 [s]

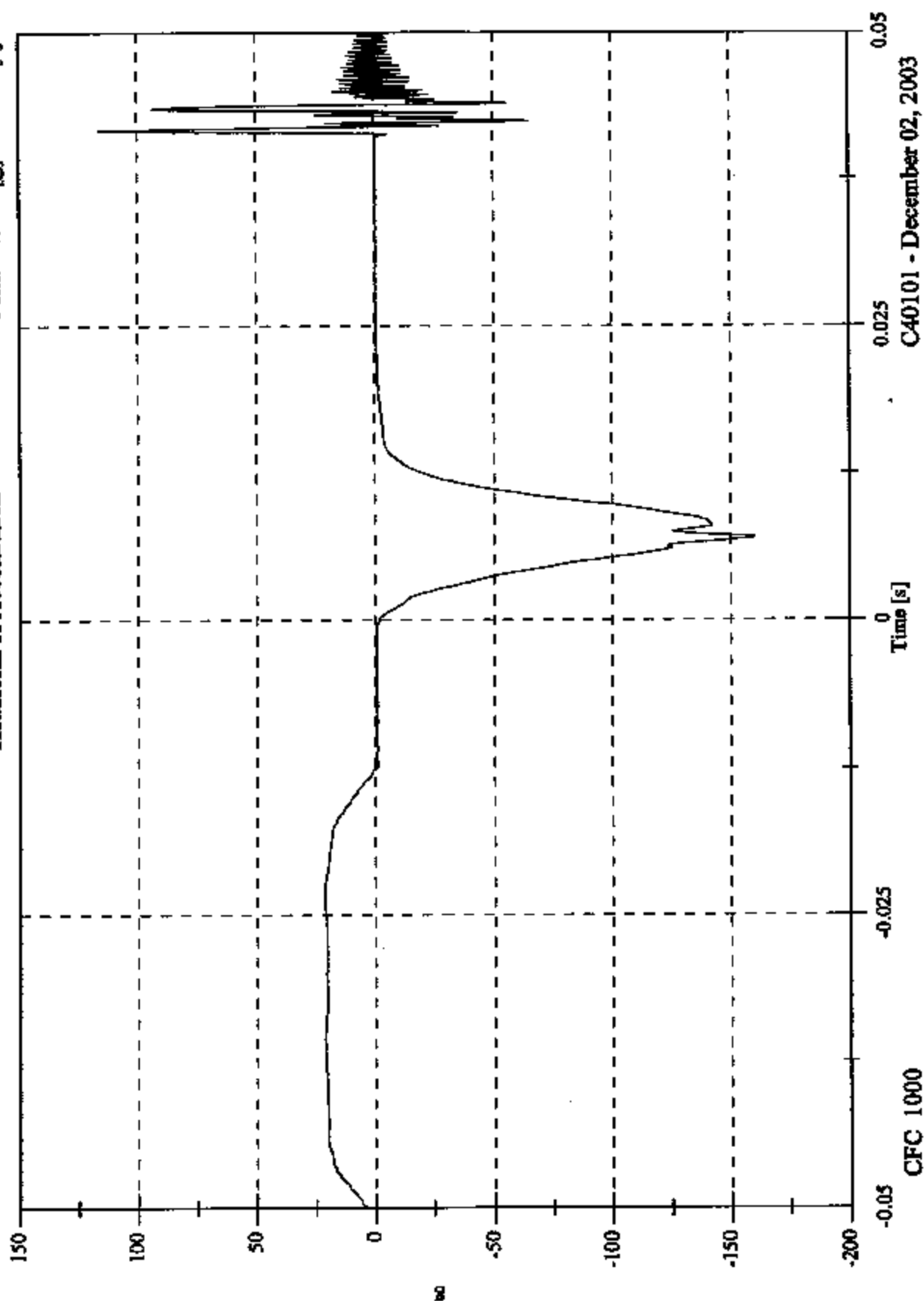
Min: 0.0 [g] at -0.058 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

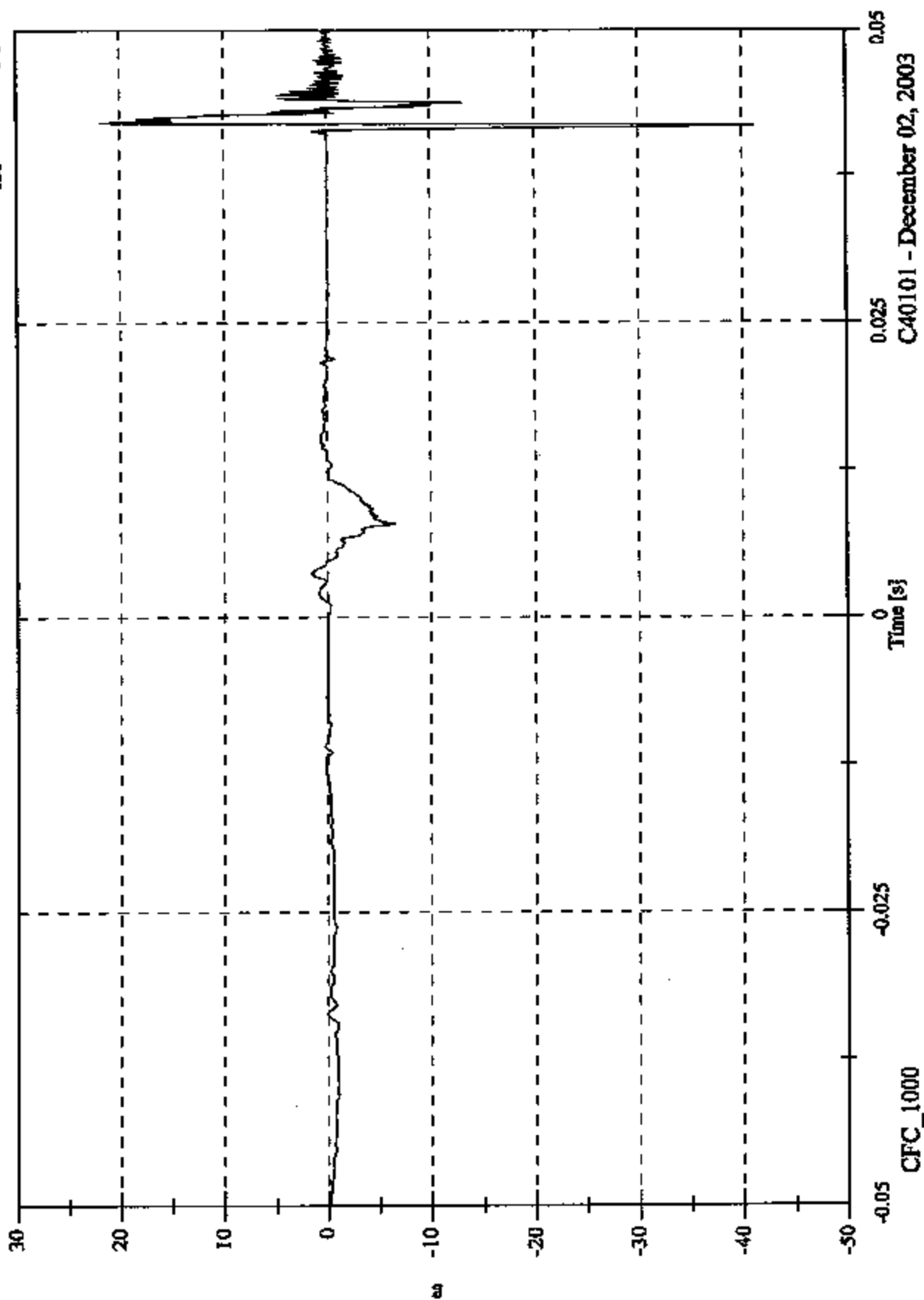
Max: 116.1 [g] at 0.042 [s]
Min: -159.9 [g] at 0.007 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

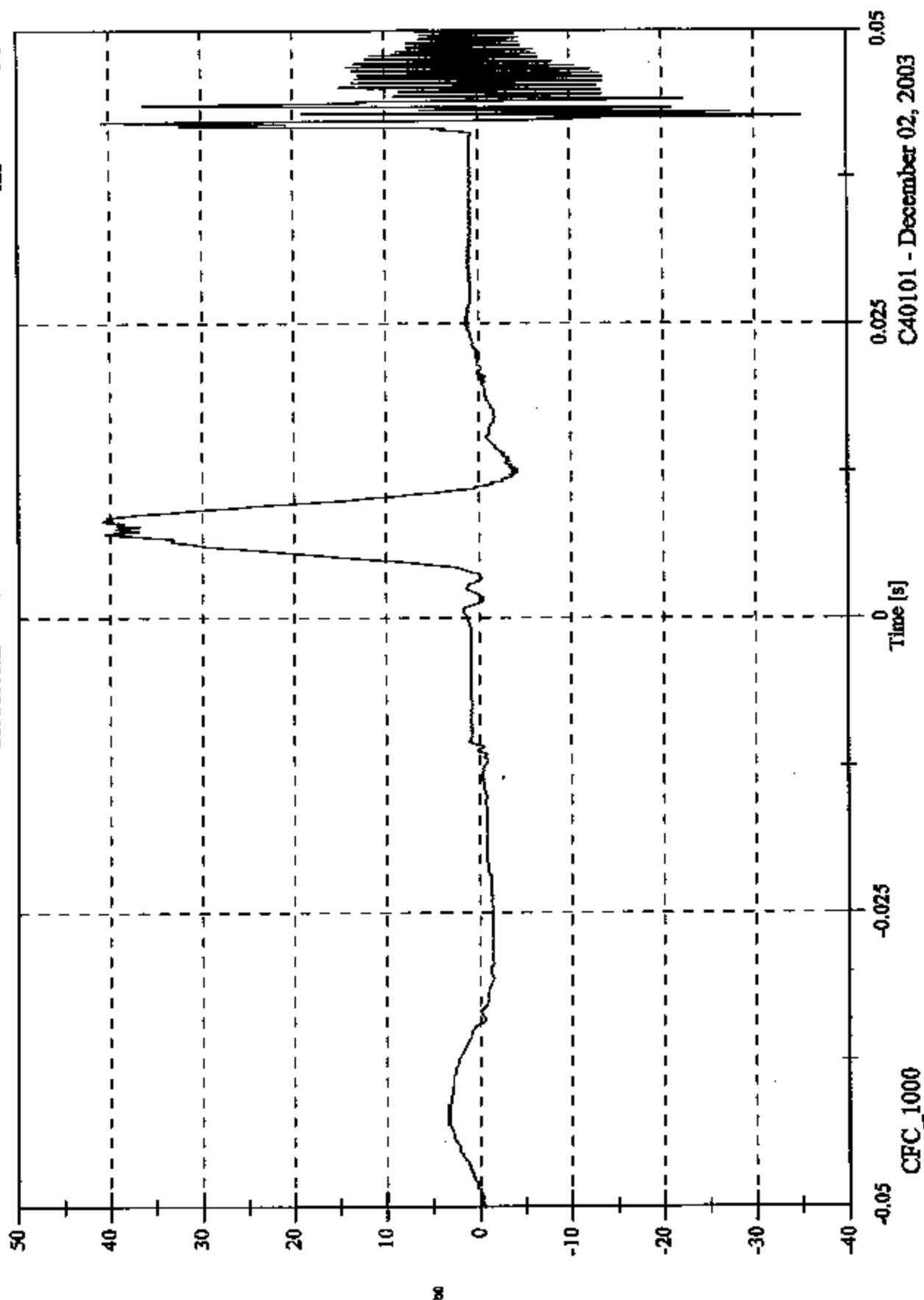
Max: 22.0 [g] at 0.042 [s]
Min: -41.2 [g] at 0.042 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

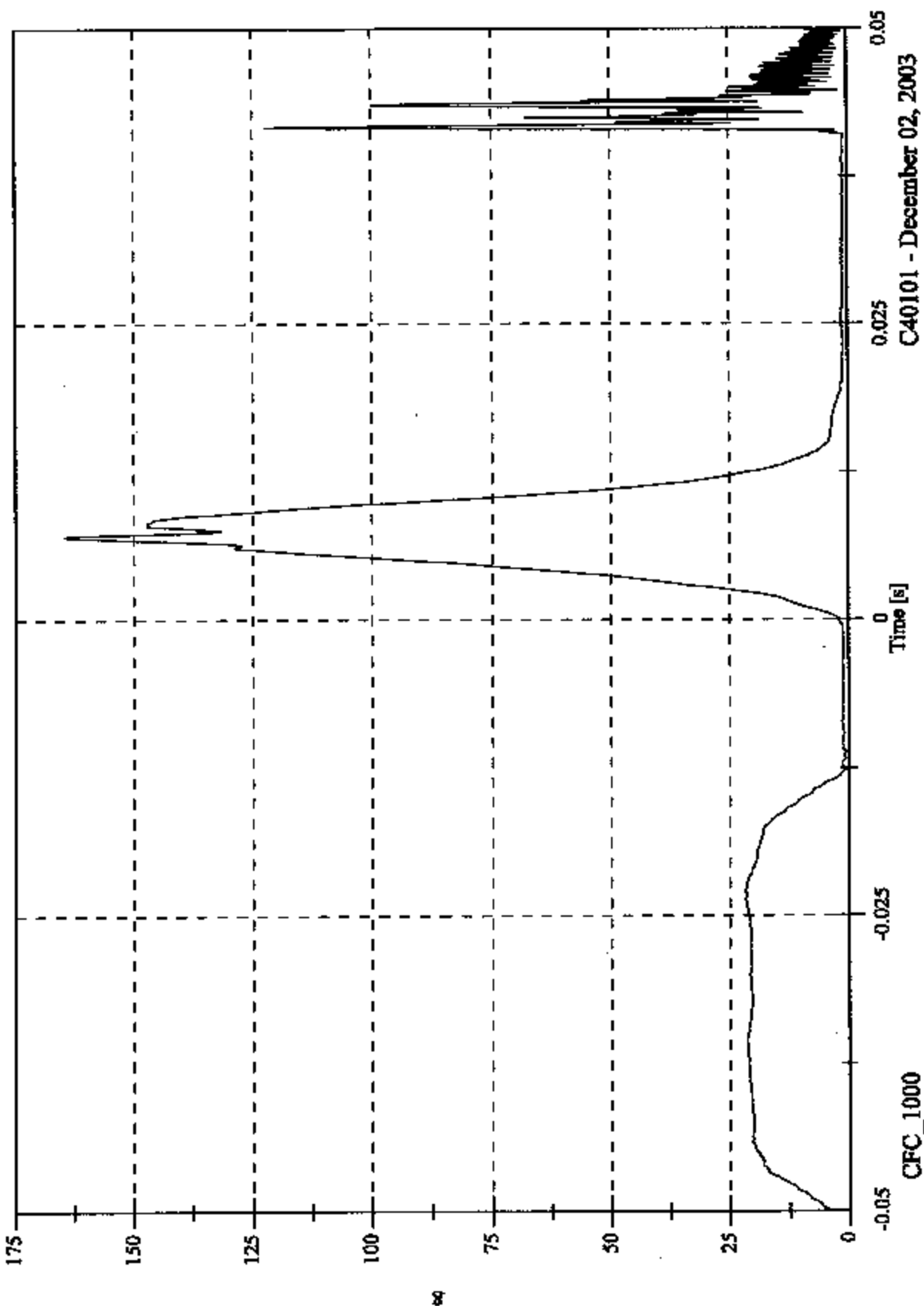
Max: 40.9 [g] at 0.008 [s]
Min: -35.2 [g] at 0.043 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

Max: 164.5 [g] at 0.007 [s]
Min: 0.5 [g] at -0.013 [s]

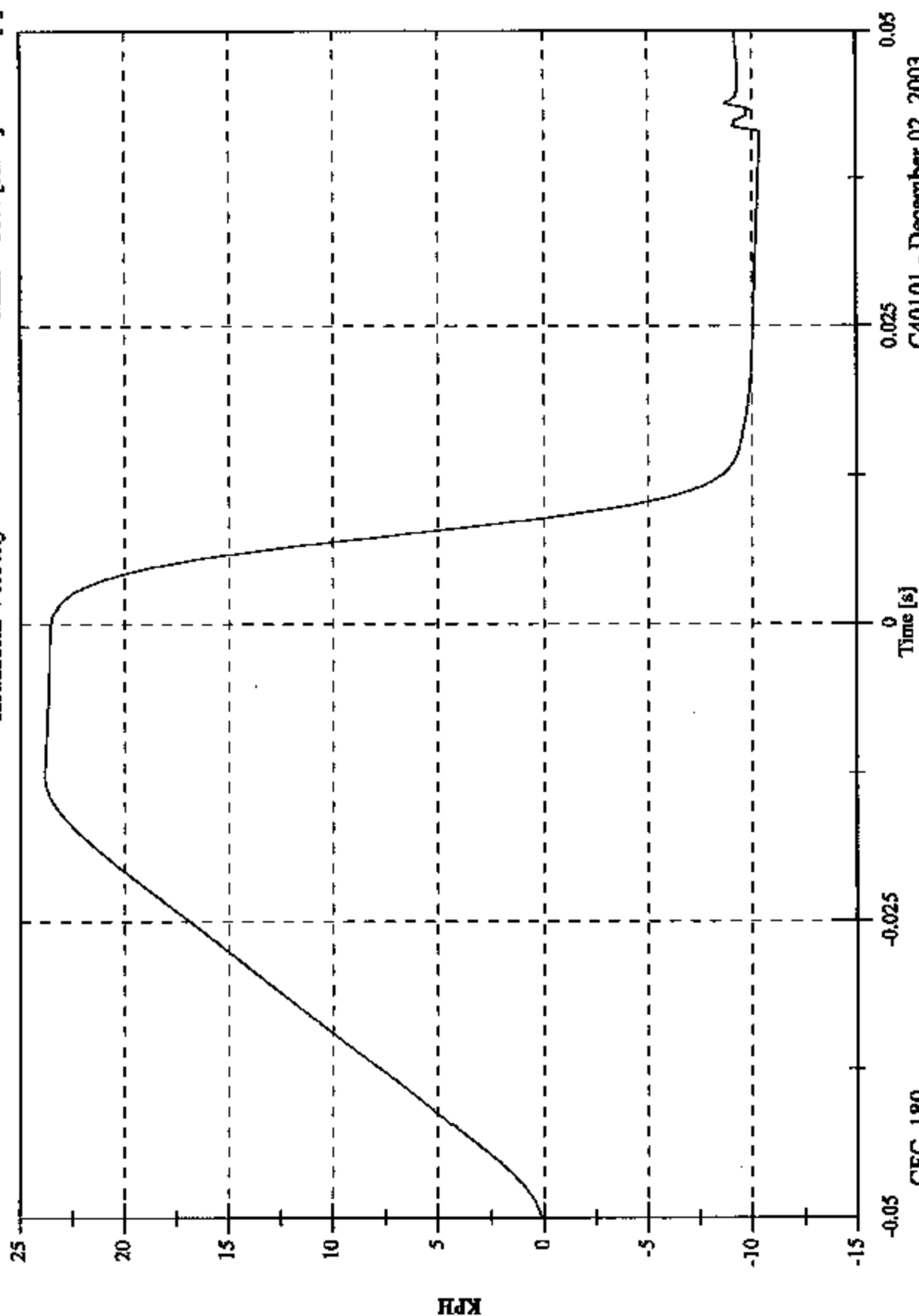


FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Max: 23.8 [KPH] at -0.013 [s]

Min: -10.4 [KPH] at 0.041 [s]

Headform Velocity



CFC_180



PRE-IMPACT VIEW

8730-01



POST-IMPACT USER

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS542X41171754
DATE OF MANUFACTURE:	(SEE CERTIFICATION LABEL)
COLOR:	White

Test Number:	06
Test Date:	12/02/2003
Target Location:	Passenger Side Side Rail from A-Pillar
Target Code:	SR2A
Horizontal Impact Angle:	90°
Vertical Impact Angle:	32°
Ambient Temperature:	21°C
Relative Humidity:	72
Time of Impact:	15:35
Headform Number:	0805

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	0	mm right	mm left
On Centerline	0	mm up	



POST-IMPACT SR2A HEADFORM

Free Motion HIC	983.8
HIC(d)	606.9
Impact Velocity (kph)	18.65
HIC T1 (msec)	3.6
HIC T2 (msec)	9.3

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - SR2A

FMH Headform 805

Location: SR2A

Test Date: December 02, 2003

Work File: SR2A

TEST RESULTS

Lab Temperature: 21 C

HICd: 606.9

Lab Humidity: 22 %

HIC (36ms): 583.8

Velocity at Impact: 18.65 KPH

t1: 3.6 msec

t2: 9.3 msec

Free Flight Distance: 213.21 mm

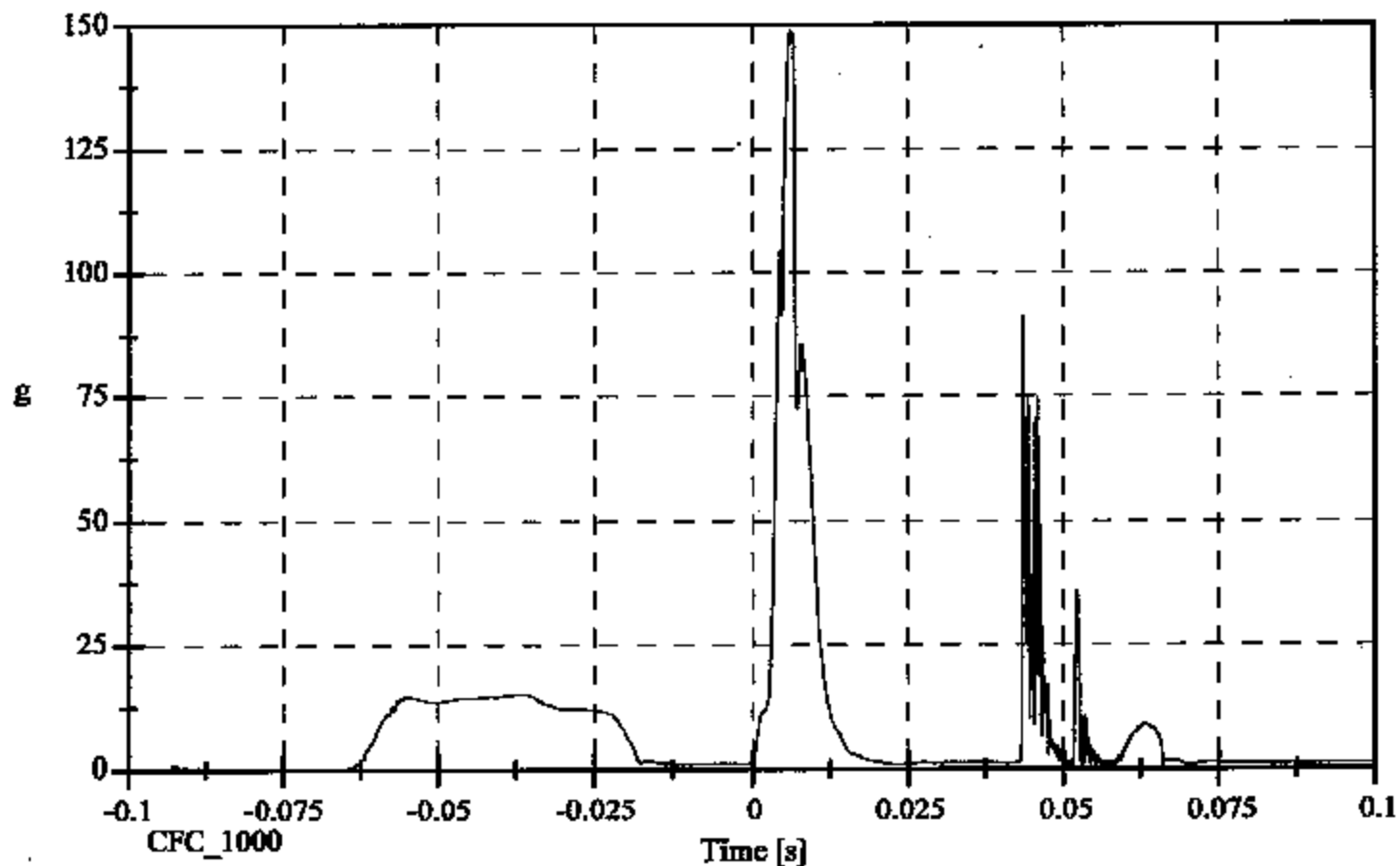
Duration: 5.7 msec

Average Acceleration: 8.1 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 148.8 [g] at 0.006 [s]

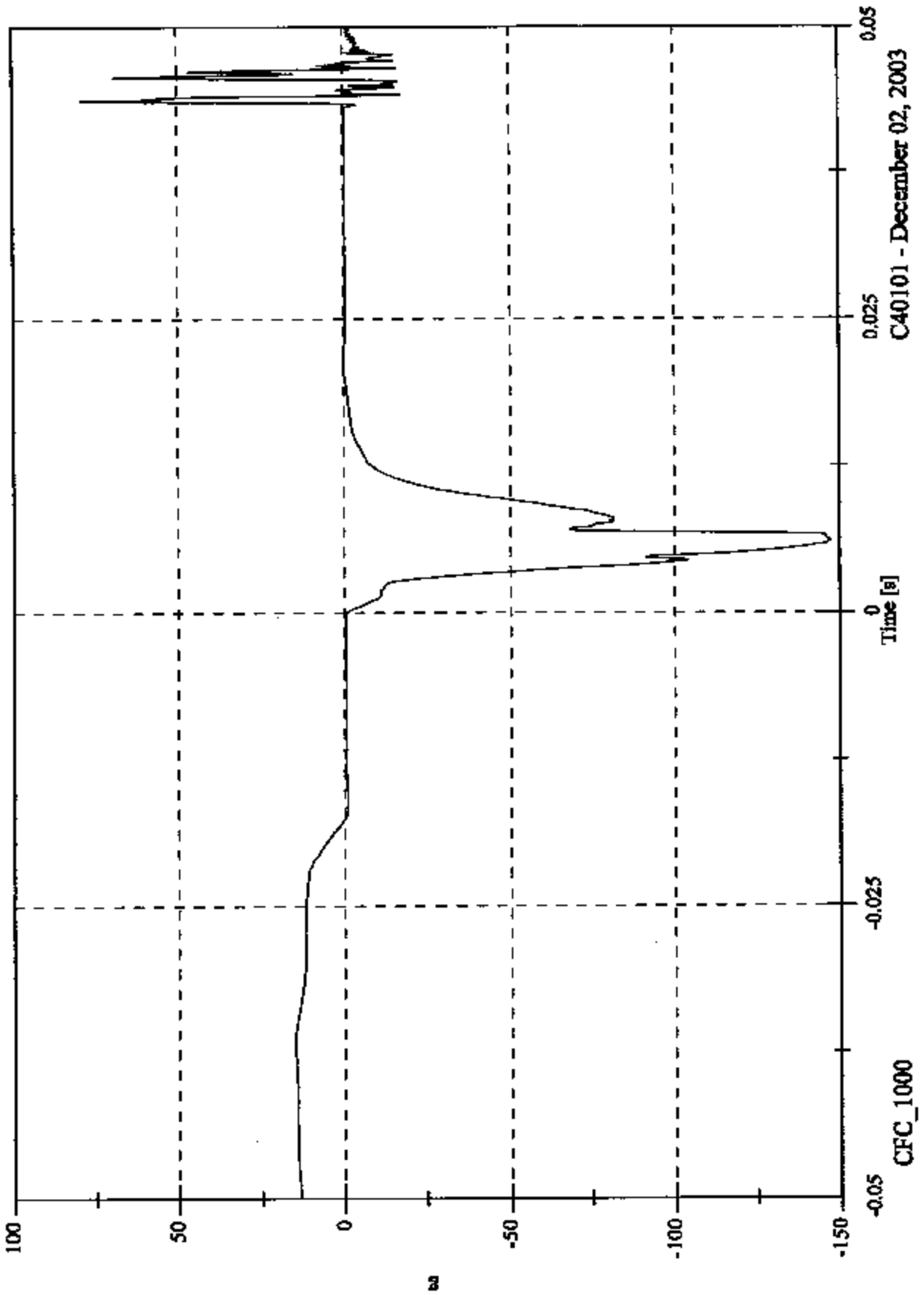
Min: 0.0 [g] at -0.066 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

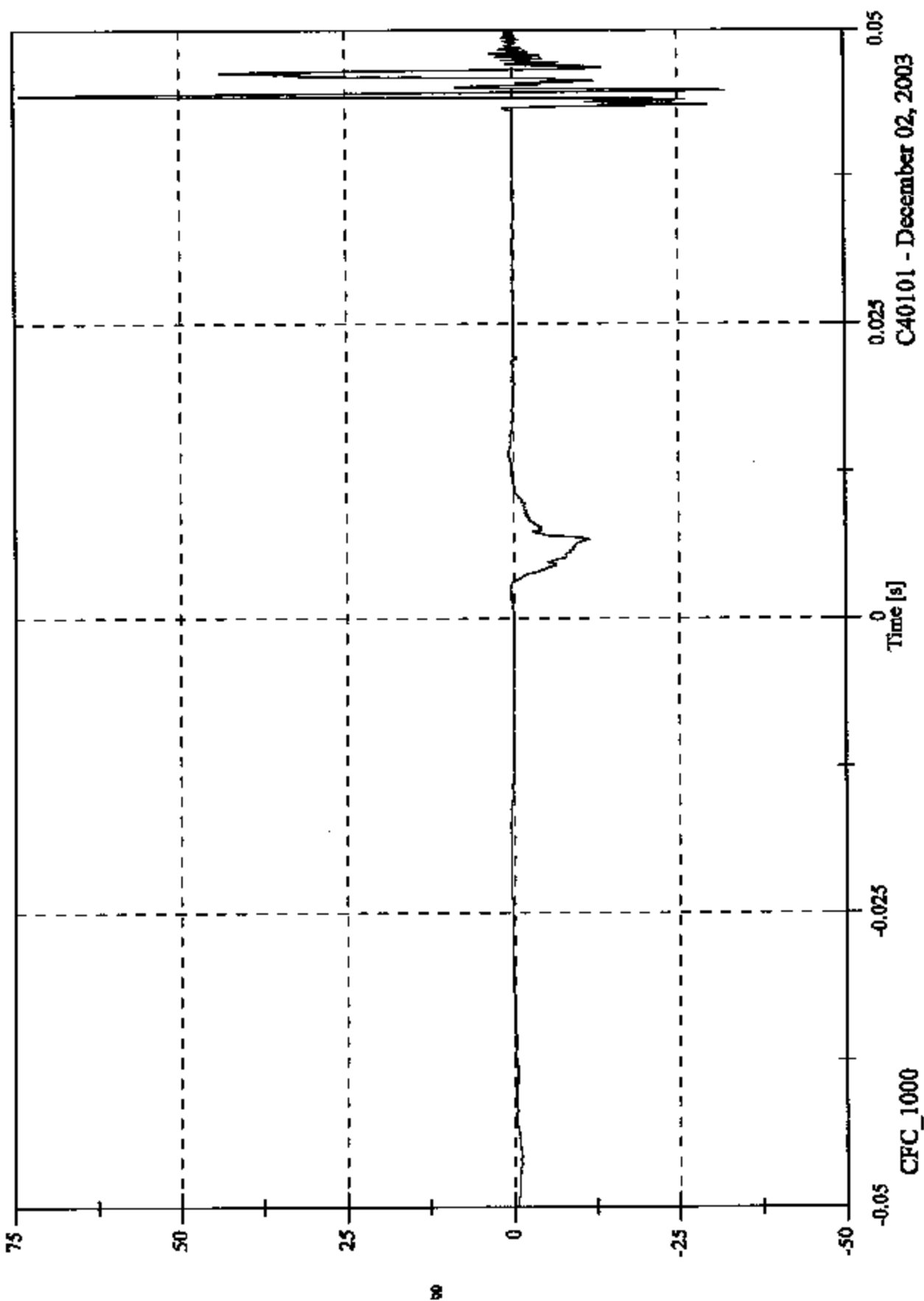
Max: 79.2 [g] at 0.044 [s]
Min: -147.3 [g] at 0.006 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

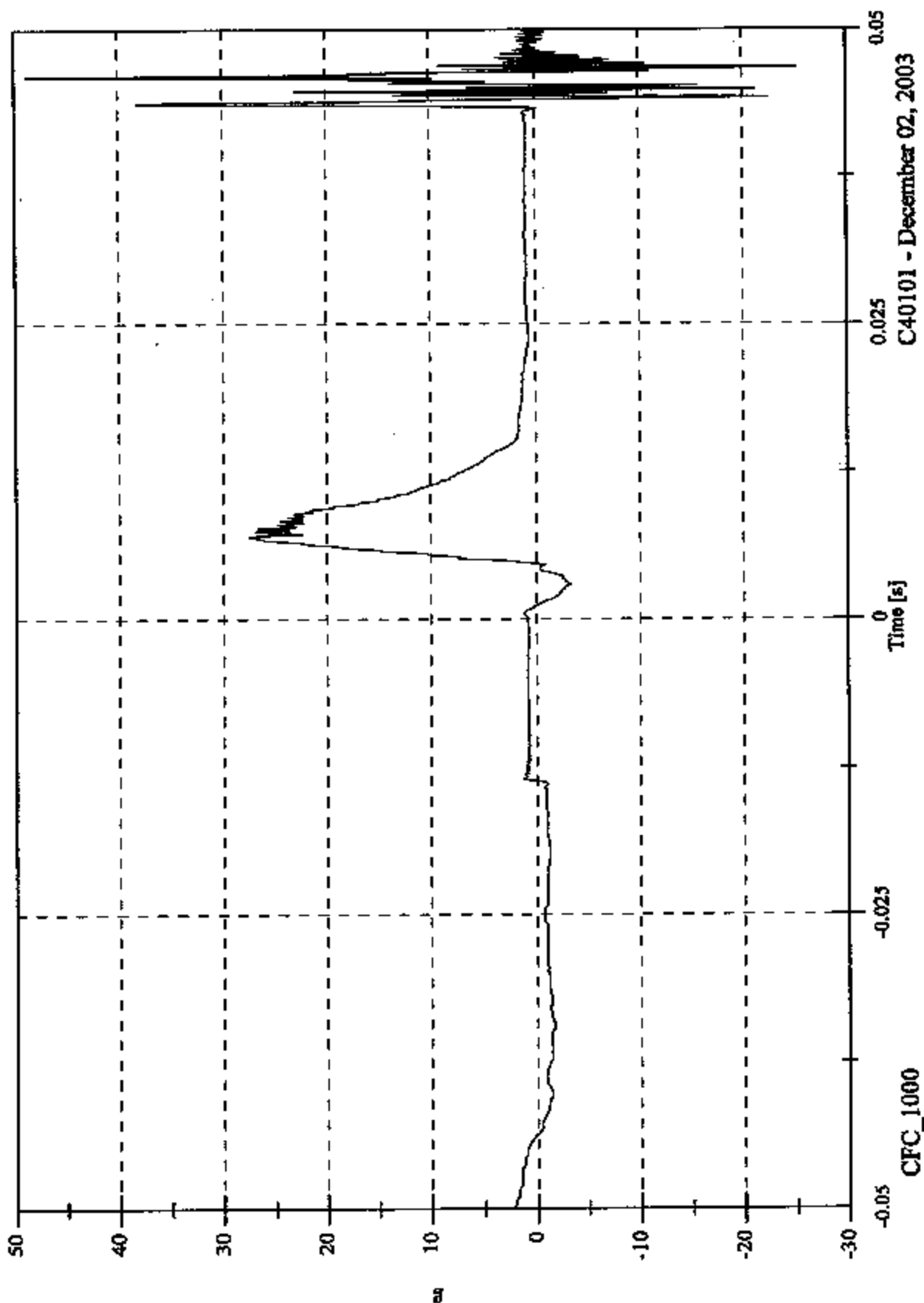
Max: 73.9 [g] at 0.044 [s]
Min: -32.3 [g] at 0.045 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

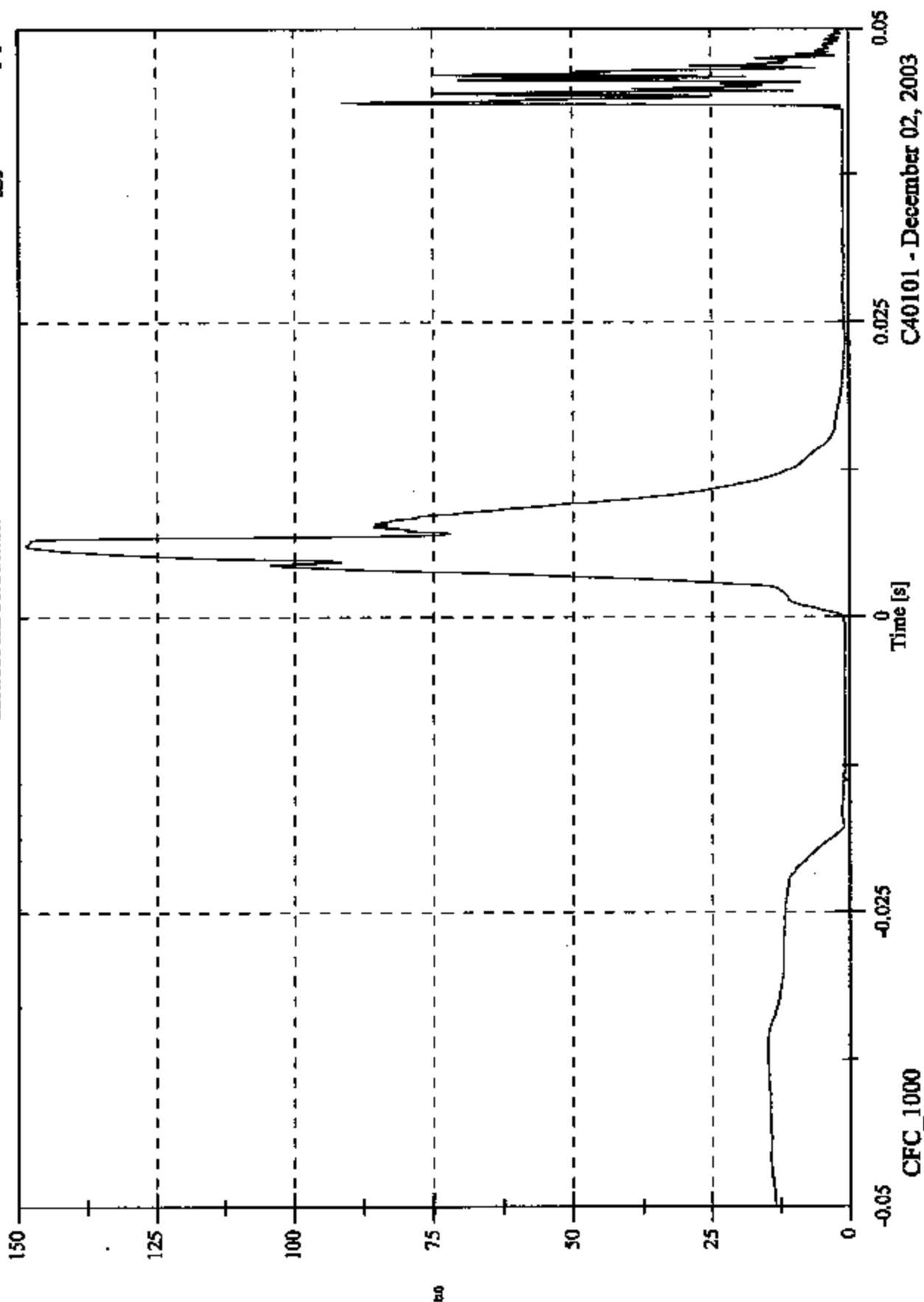
Max: 48.8 [g] at 0.046 [s]
Min: -25.3 [g] at 0.047 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

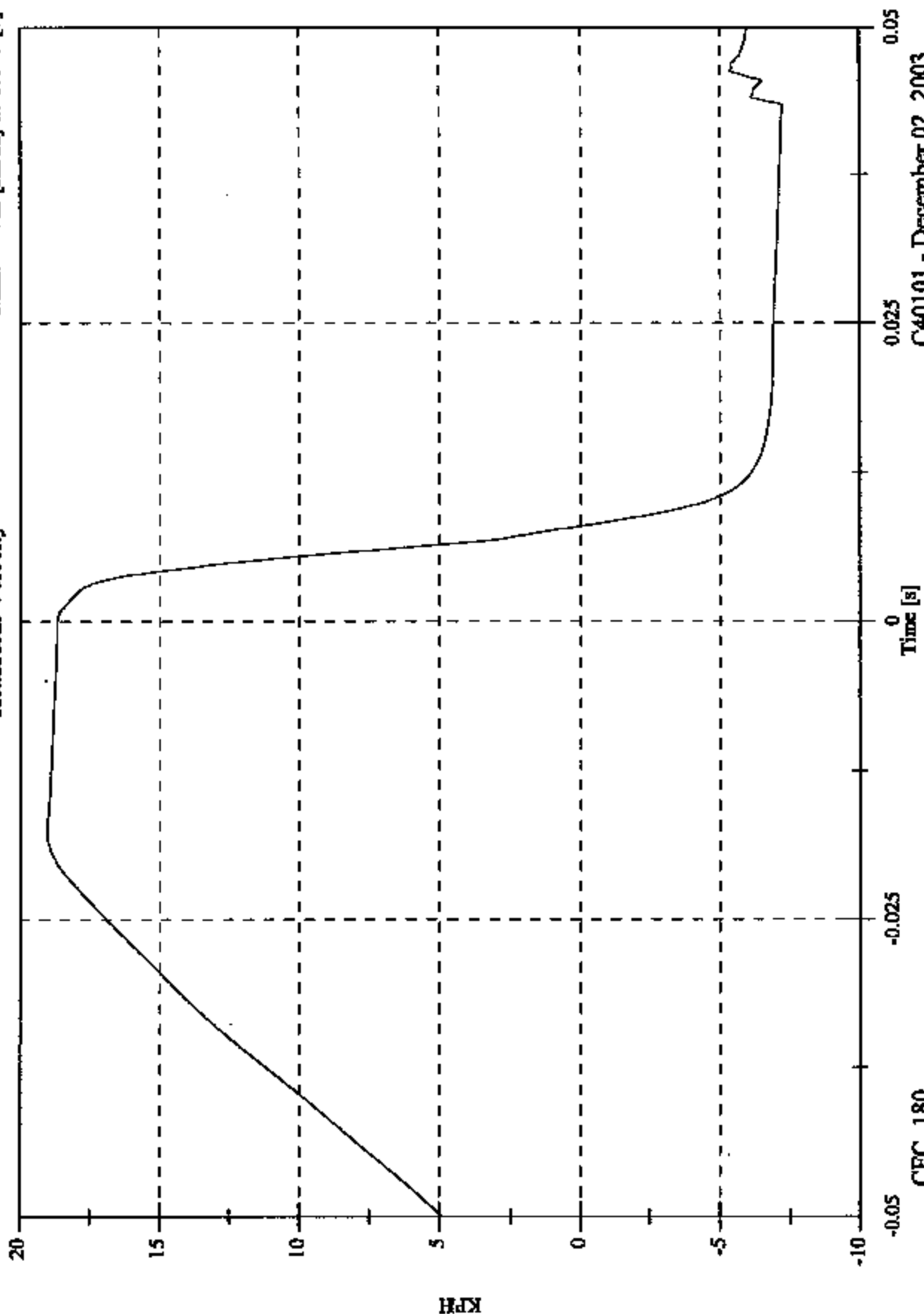
Max: 148.8 [g] at 0.006 [s]
Min: 0.5 [g] at -0.014 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Velocity

Max: 19.0 [KPH] at -0.018 [s]

Min: -7.2 [KPH] at 0.043 [s]





FOR IMPACT SIDA

8730-01



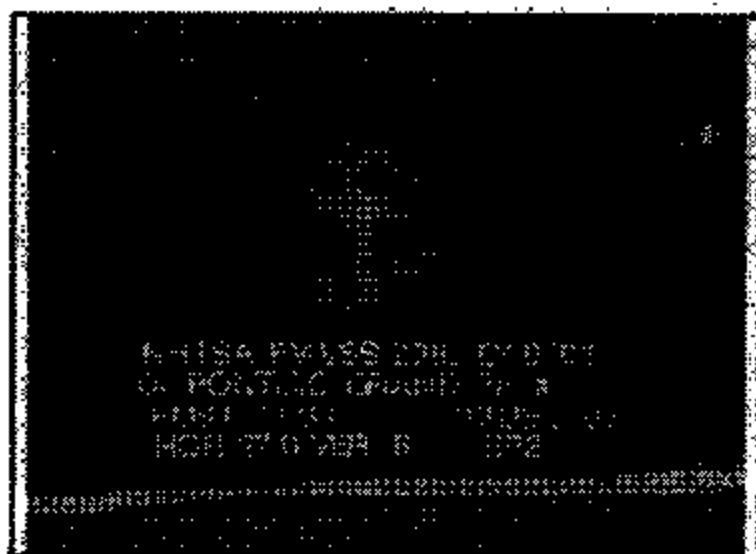
POST-IMPACT SEIZ

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS342X41171734
DATE OF MANUFACTURE:	(NADH/SEE CERTIFICATION LABEL)
COLOR:	White

Test Number:	07
Test Date:	12/03/2003
Target Location:	Driver Side B-Pillar Seat Belt Anchorage
Target Code:	BP2
Horizontal Impact Angle:	270°
Vertical Impact Angle:	8°
Ambient Temperature:	20°C
Relative Humidity:	18
Time of Impact:	9:00
Headform Number:	803

Impact Point Description (from lower midpoint on mid sagittal line)			
On Centerline	6	mm right	x mm left
On Centerline	0	mm up	



POST-IMPACT BP2 HEADFORM

Free Motion HIC	707.2
HIC(d)	700.0
Impact Velocity (kph)	23.54
HIC T1 (msec)	1.6
HIC T2 (msec)	8.6

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - BP2

FMH Headform 805

Location: BP2

Test Date: December 03, 2003

Work File: BP2

TEST RESULTS

Lab Temperature: 20 C

HICd: 700.0

Lab Humidity: 18 %

HIC (36ms): 707.2

Velocity at Impact: 23.54 KPH

t1: 1.6 msec

t2: 8.6 msec

Free Flight Distance: 214.58 mm

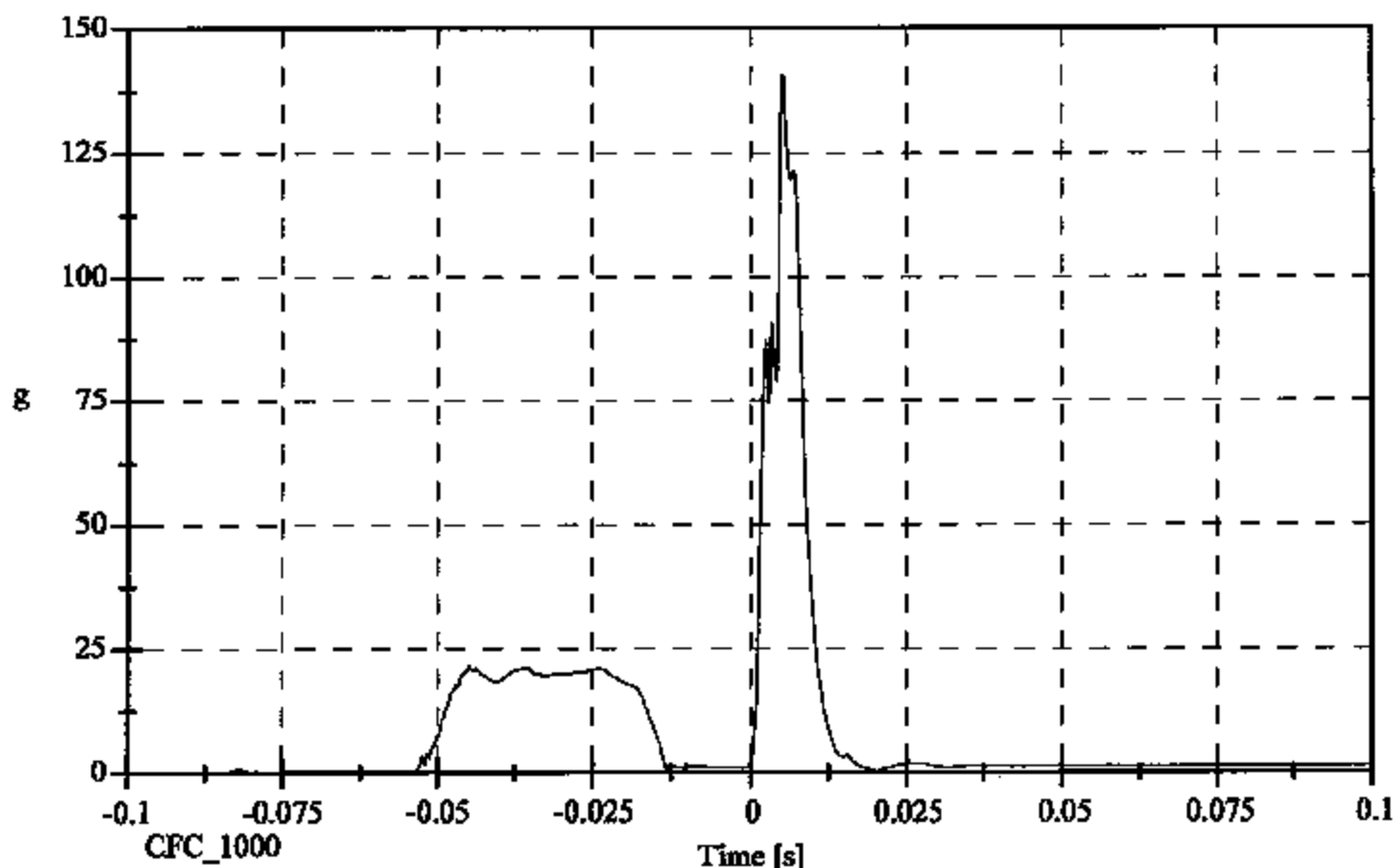
Duration: 7.0 msec

Average Acceleration: 8.3 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 140.9 [g] at 0.005 [s]

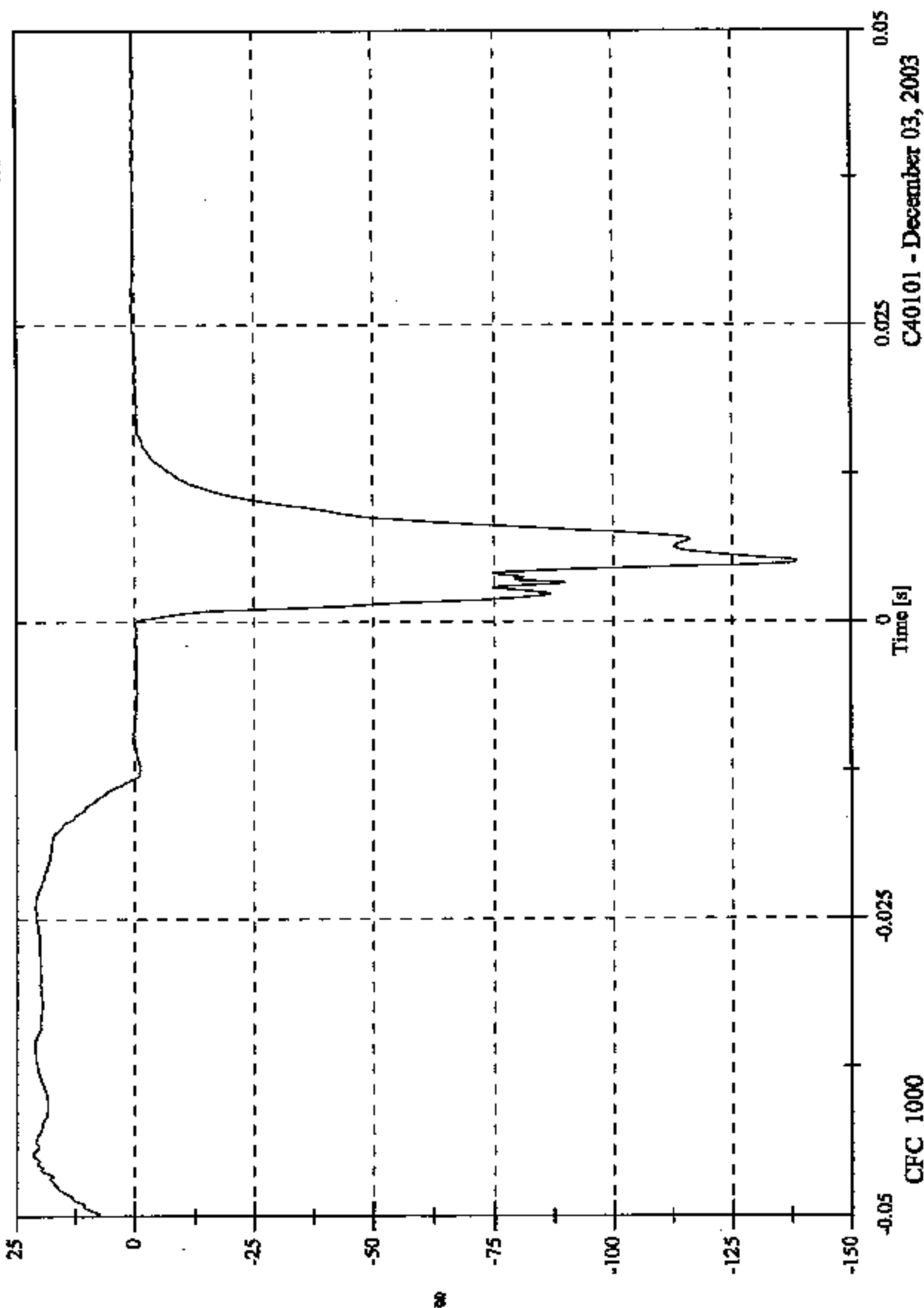
Min: 0.0 [g] at -0.092 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

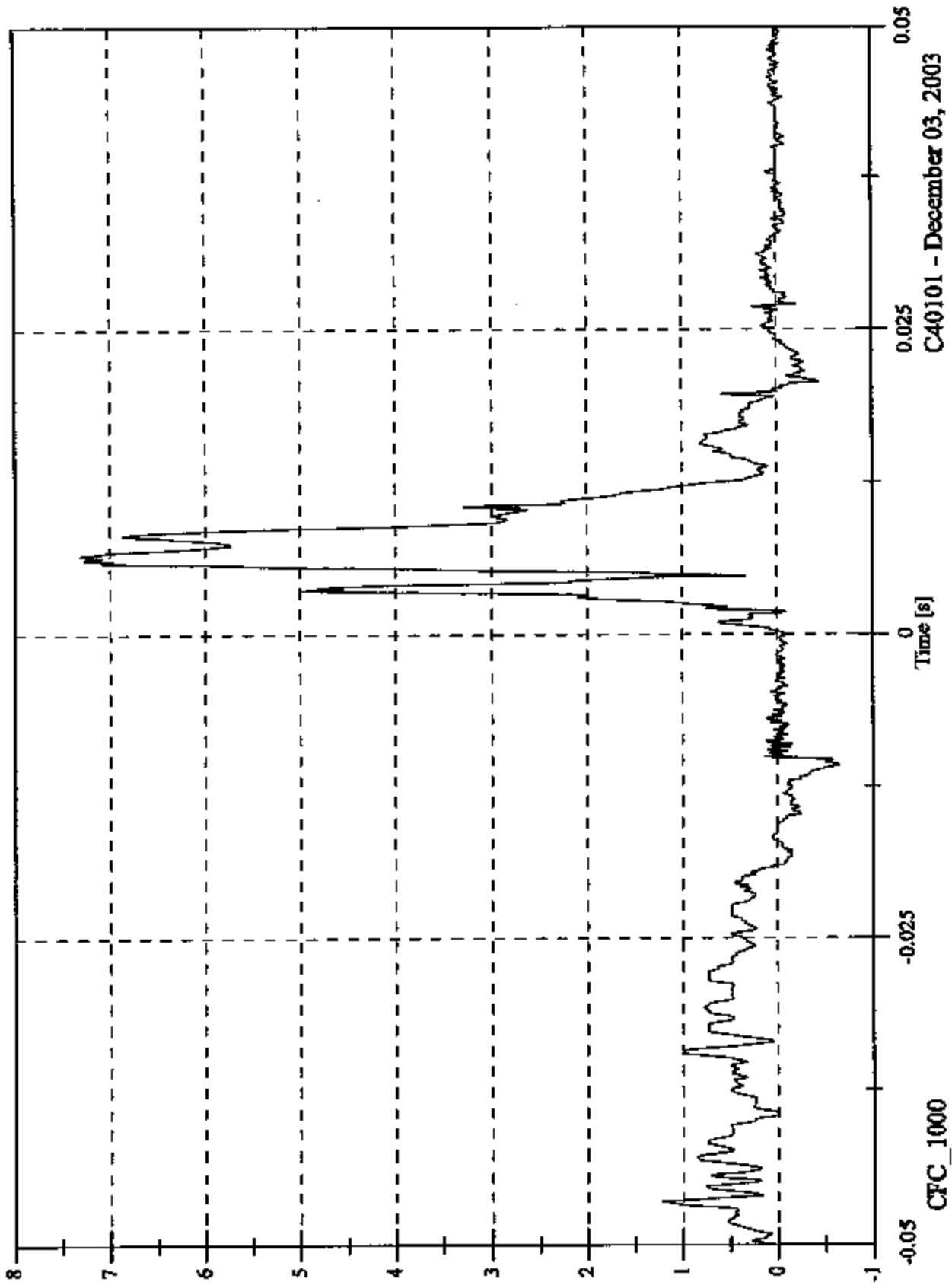
Max: 21.5 [g] at -0.045 [s]
Min: -138.5 [g] at 0.005 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

Max: 7.3 [g] at 0.006 [s]
Min: -0.6 [g] at -0.011 [s]

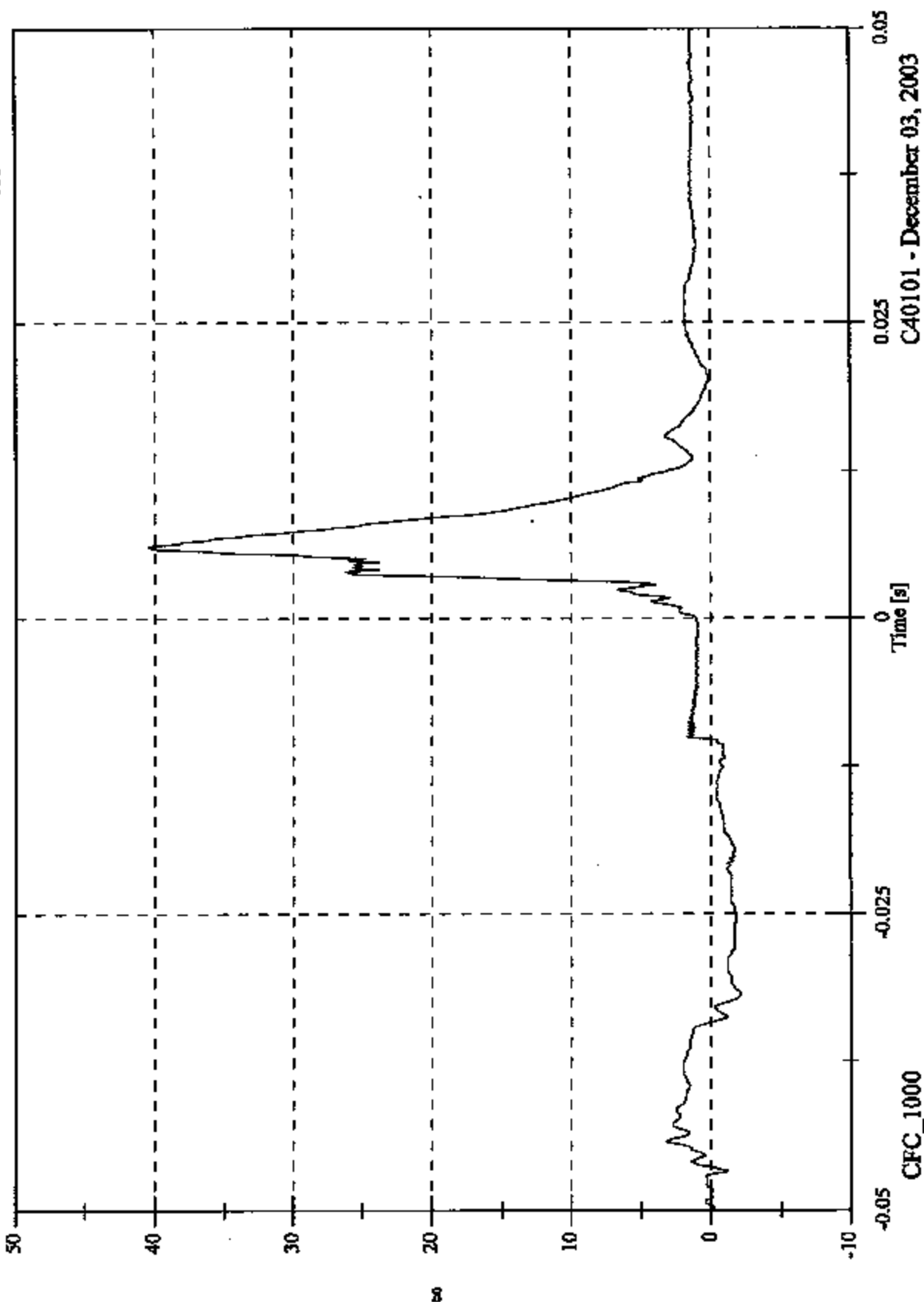


0.025 0.05
C40101 - December 03, 2003

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

Max: 40.5 [g] at 0.006 [s]
Min: -2.1 [g] at -0.032 [s]

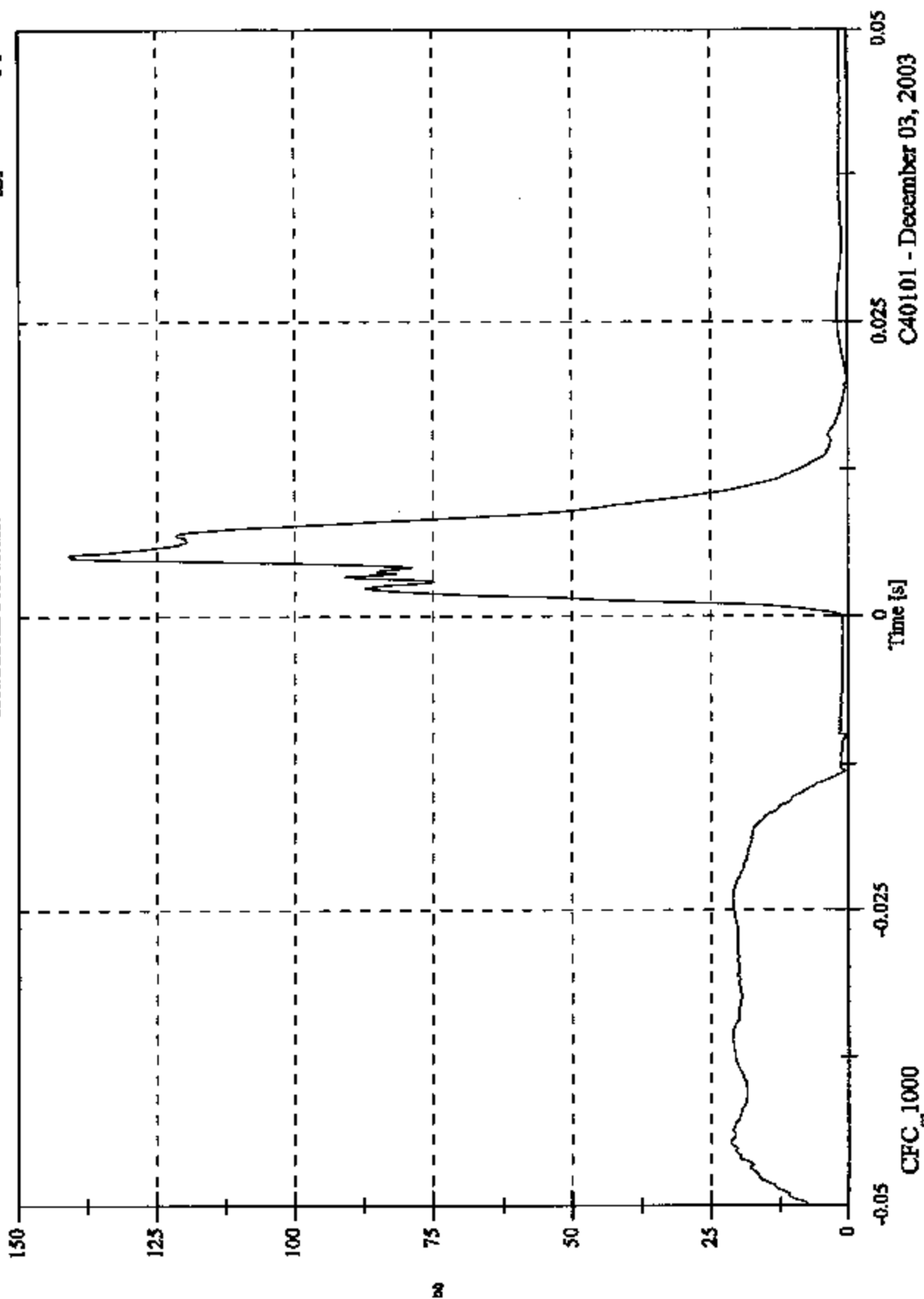


C40101 - December 03, 2003

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

Max: 140.9 [g] at 0.005 [s]
Min: 0.1 [g] at 0.020 [s]

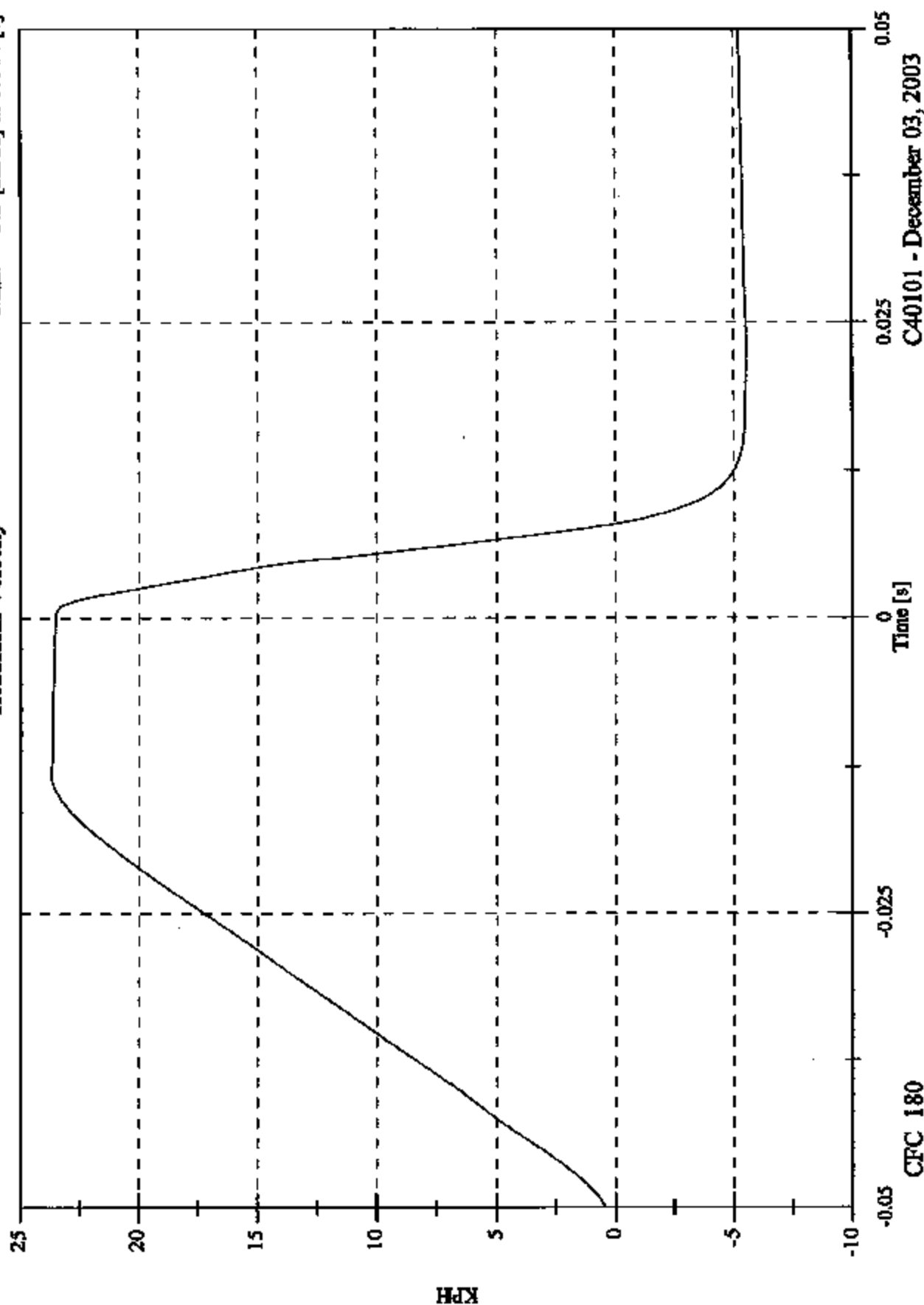


FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Max: 23.7 [KPH] at -0.013 [s]

Min: -5.5 [KPH] at 0.024 [s]

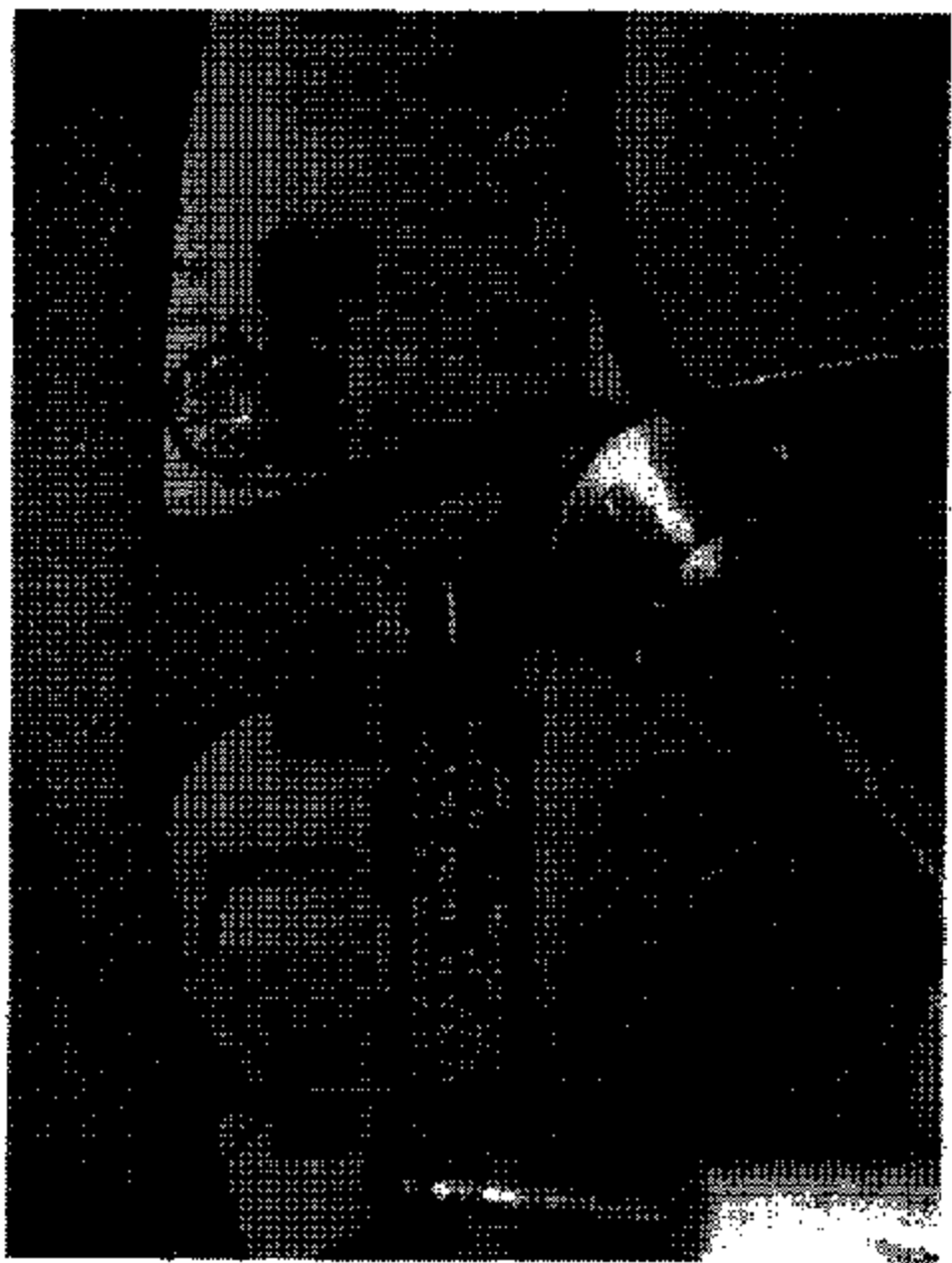
Headform Velocity





THE IMPACT OF

8730-01



POST-IMPACT 5/2

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	3G2WS542X41171754
DATE OF MANUFACTURE:	(SEE CERTIFICATION LABEL)
COLOR:	White

Test Number:	08
Test Date:	12/02/2003
Target Location:	Driver Side Rear Pillar
Target Code:	RP2
Horizontal Impact Angle:	300°
Vertical Impact Angle:	10°
Ambient Temperature:	20°C
Relative Humidity:	18
Time of Impact:	10:15
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	0	mm right	mm left
On Centerline	39	mm up	



POST-IMPACT RP2 HEADFORM (Photo is mislabeled Item 300 Ver 10)

Free Motion HIC	535.7
HIC(d)	570.6
Impact Velocity (lph)	18.63
HIC T1 (msec)	7.3
HIC T2 (msec)	12.8

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - RP2

FMH Headform 0355

Location: RP2

Test Date: December 03, 2003

Work File: RP2

TEST RESULTS

Lab Temperature: 20 C

HICd: 570.6

Lab Humidity: 18 %

HIC (36ms): 535.7

Velocity at Impact: 18.63 KPH

t1: 7.3 msec

t2: 12.8 msec

Free Flight Distance: 216.23 mm

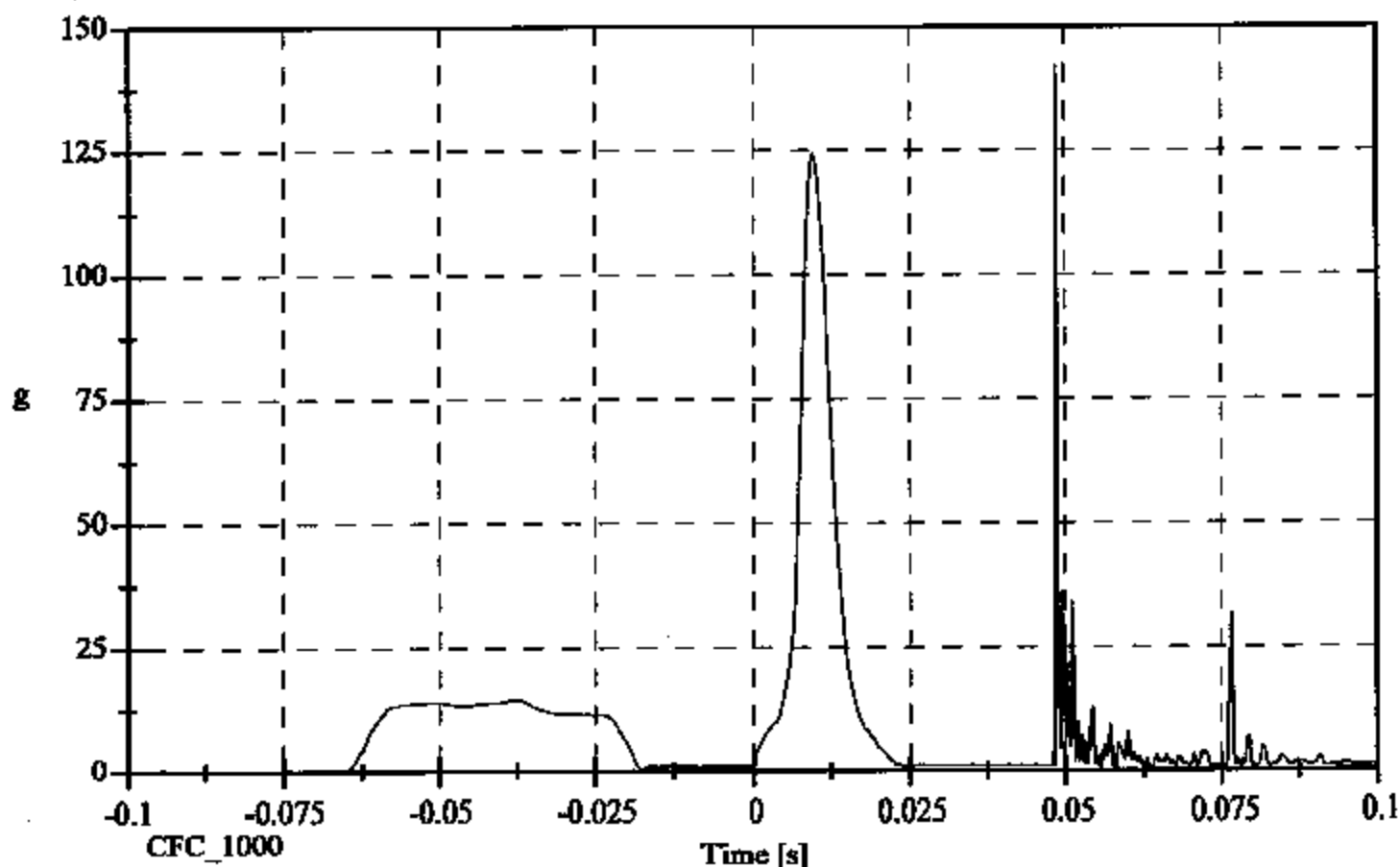
Duration: 5.4 msec

Average Acceleration: 8.1 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 142.2 [g] at 0.049 [s]

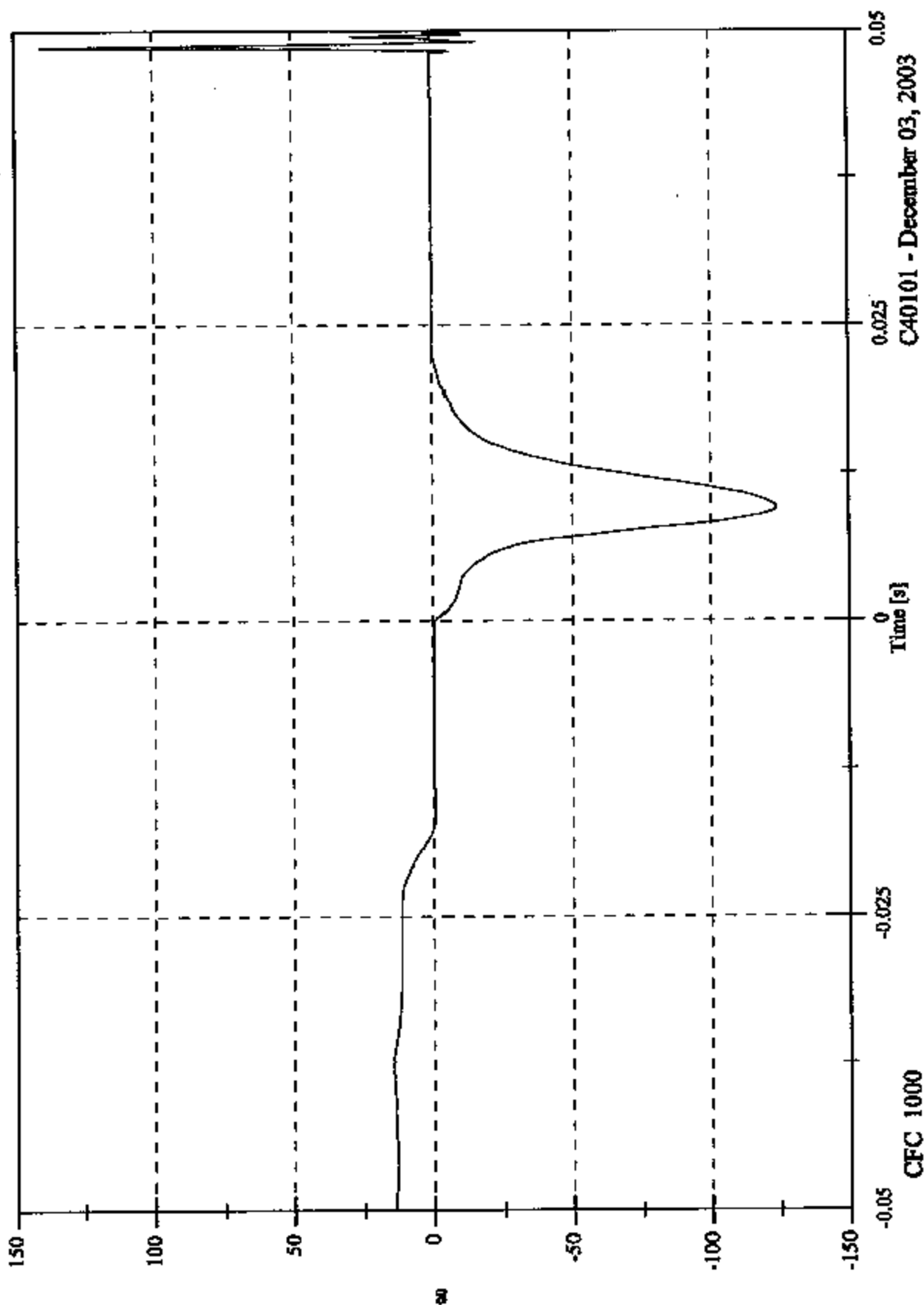
Min: 0.0 [g] at -0.085 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

Max: 140.2 [g] at 0.049 [s]
Min: -123.8 [g] at 0.010 [s]

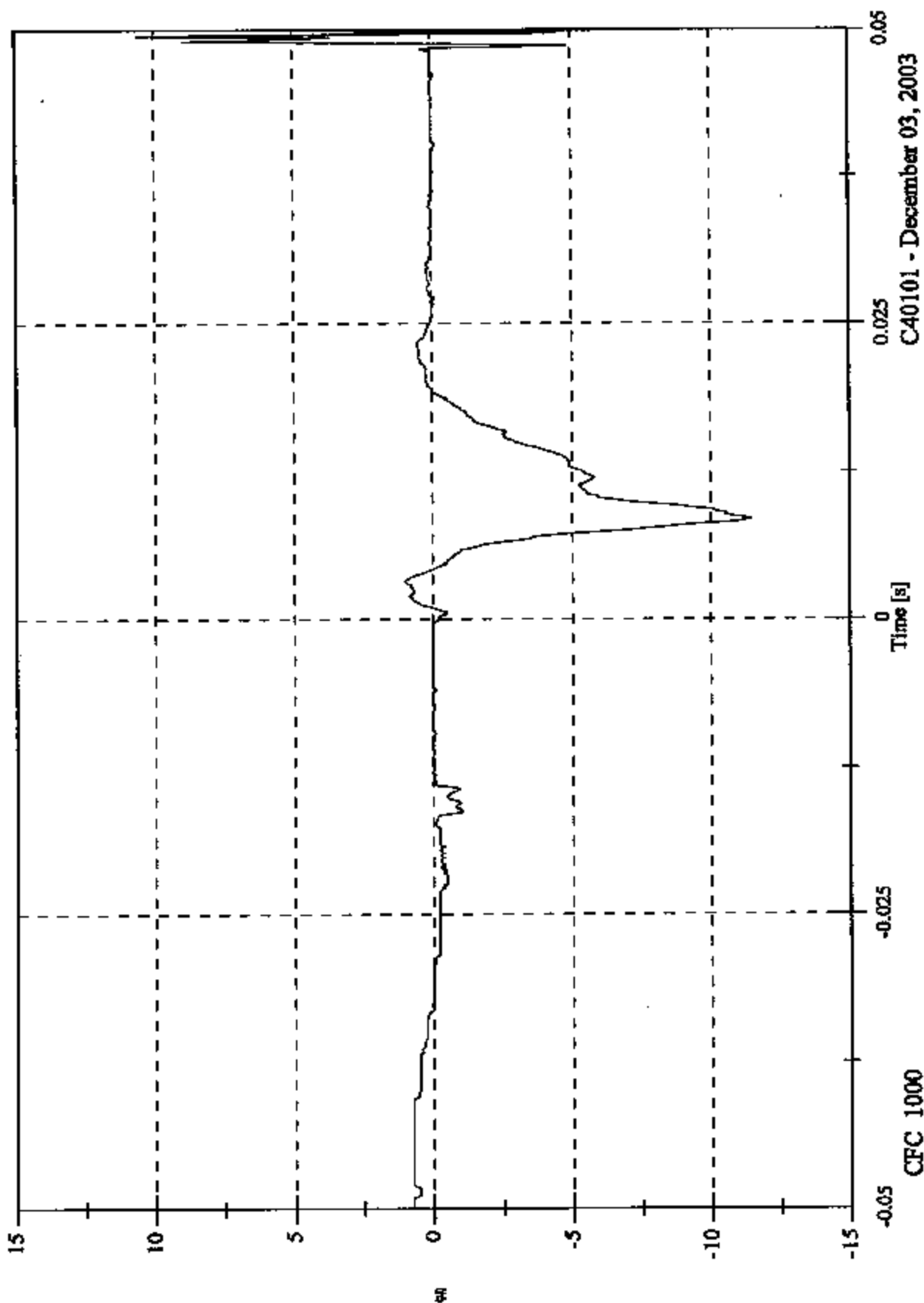


C40101 - December 03, 2003

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

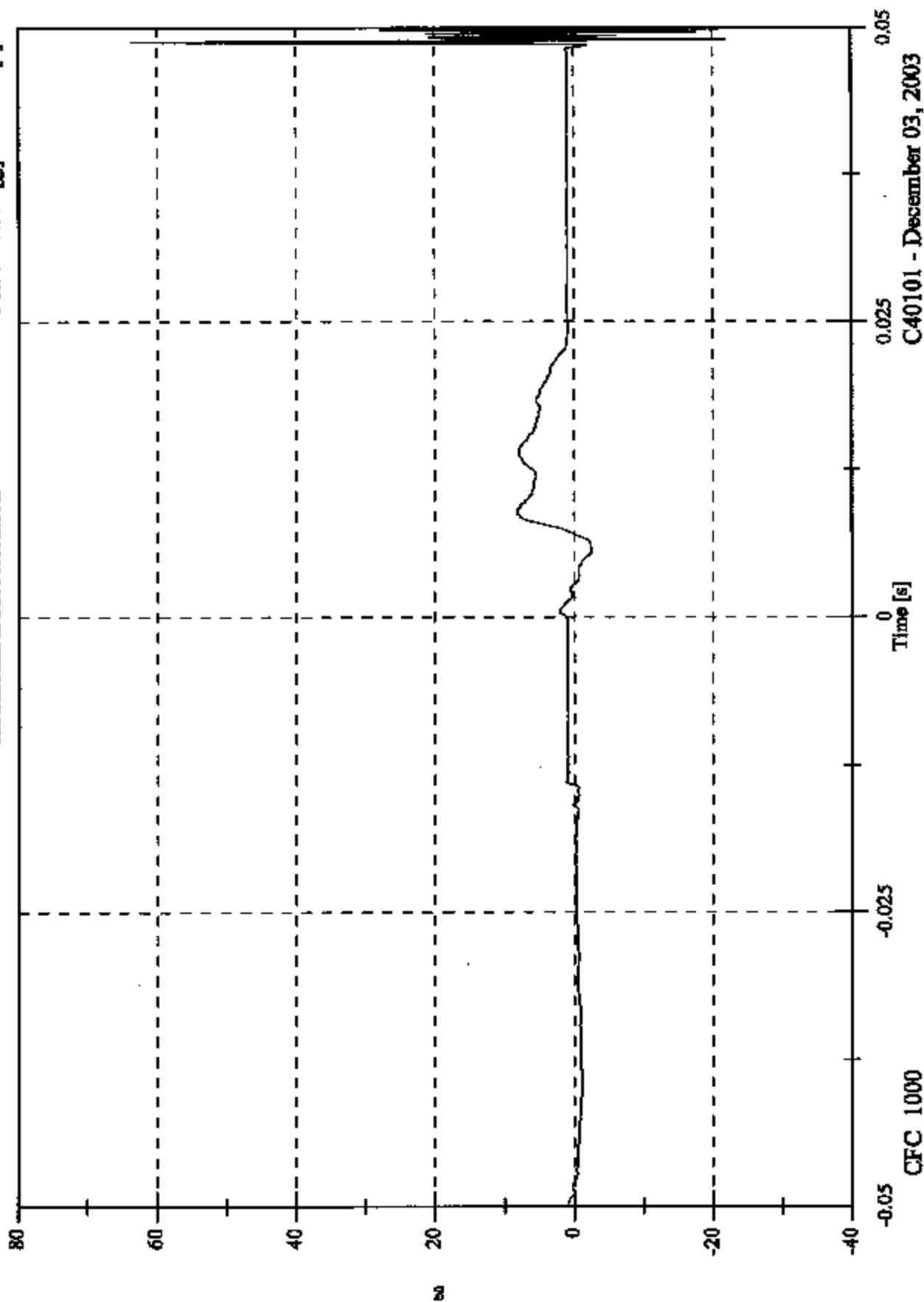
Max: 10.6 [g] at 0.049 [s]
Min: -11.4 [g] at 0.008 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

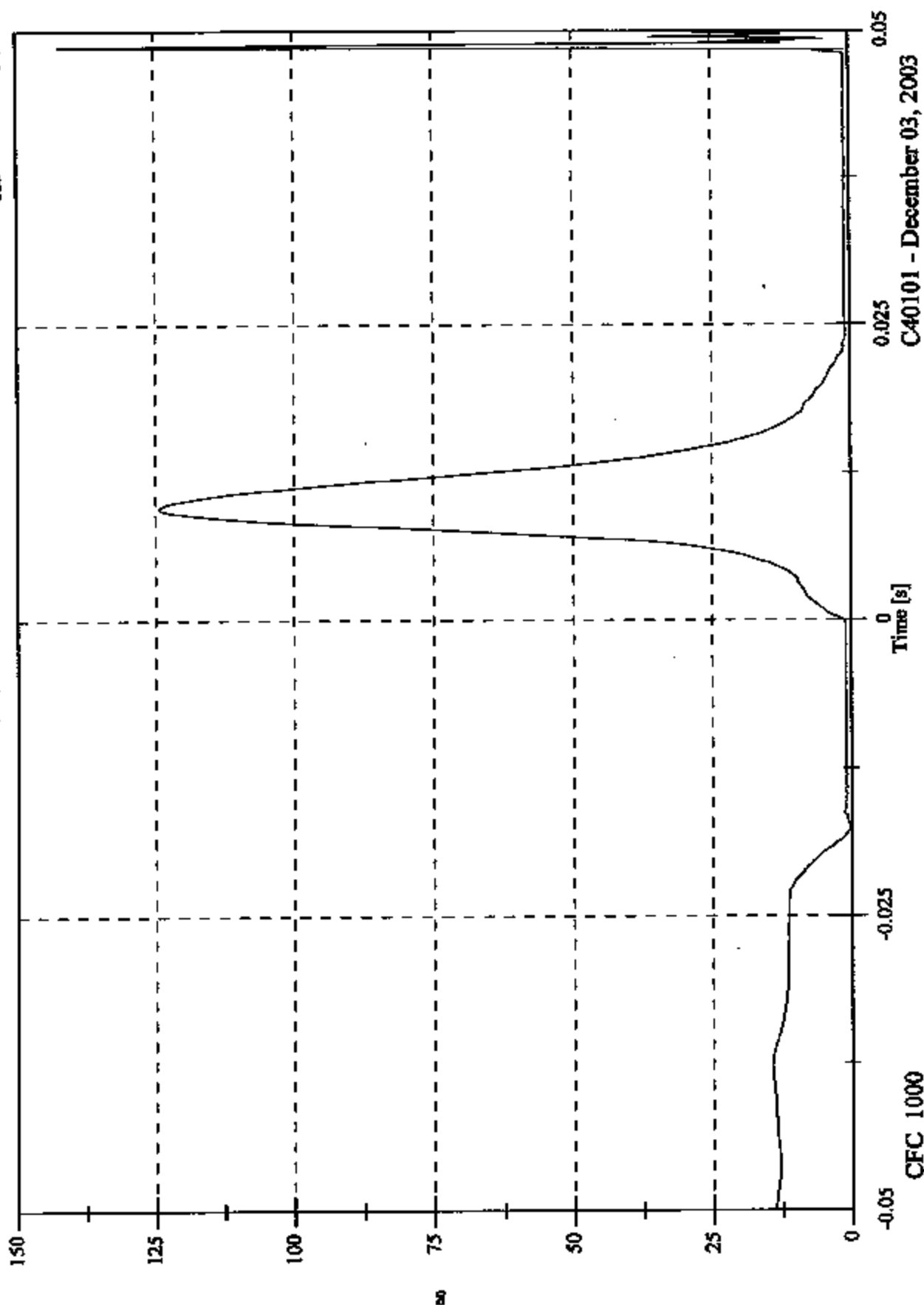
Max: 63.5 [g] at 0.049 [s]
Min: -25.9 [g] at 0.050 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

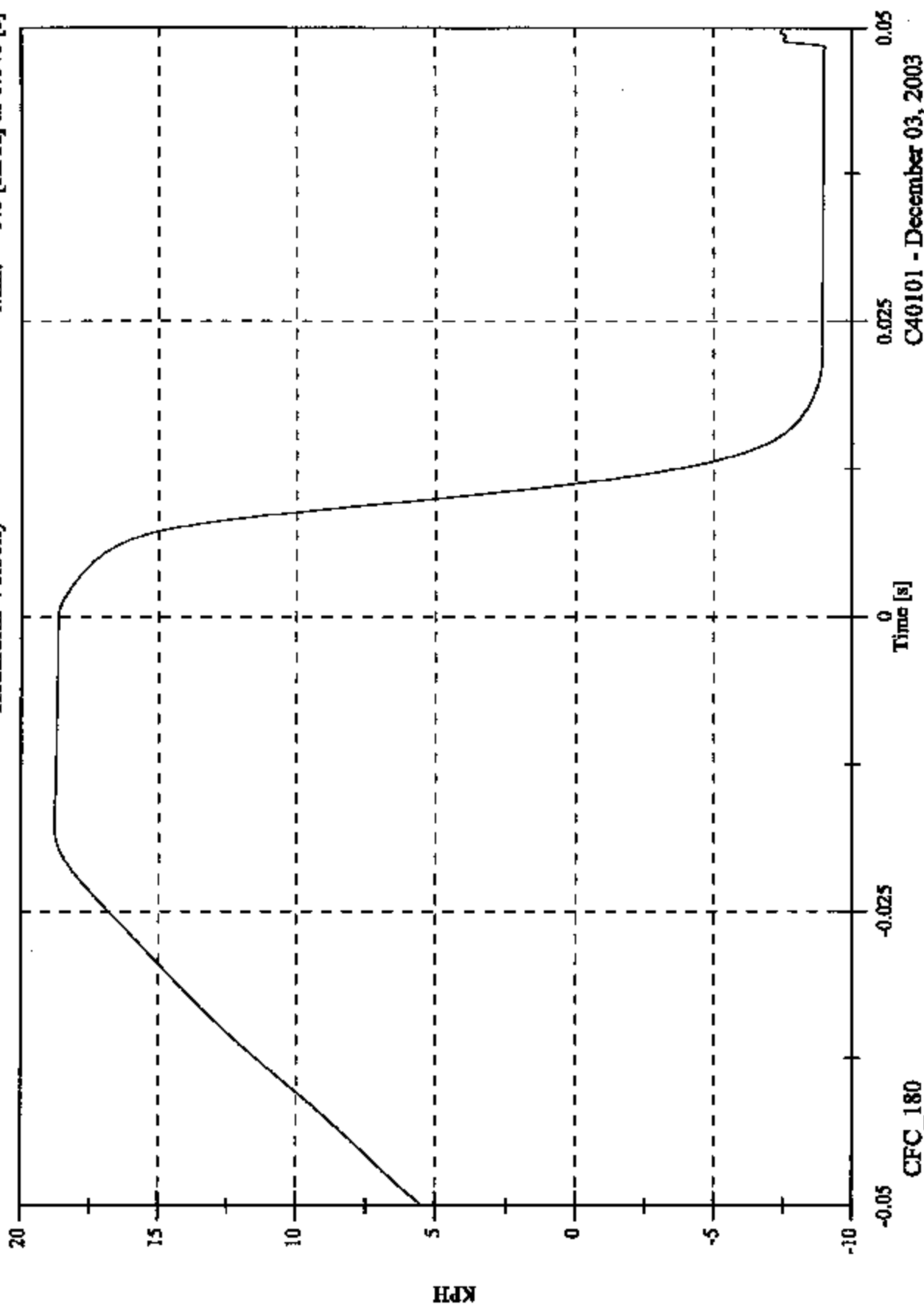
Max: 142.2 [g] at 0.049 [s]
Min: 0.3 [g] at -0.017 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Max: 18.8 [KPH] at -0.018 [s]
 Min: -9.0 [KPH] at 0.048 [s]

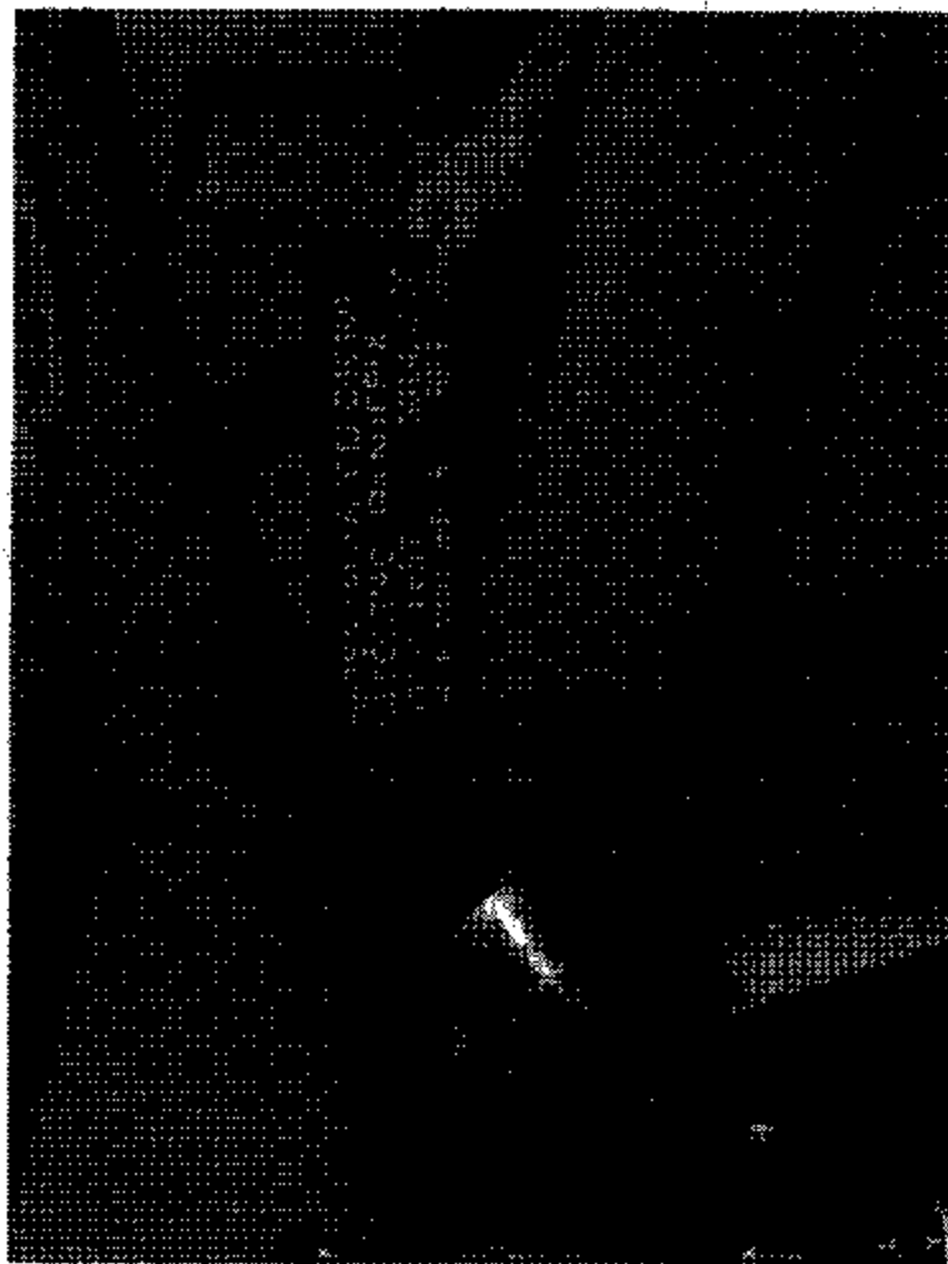
Headform Velocity





FILE-1000-ALCY 2073 (Photo is undated) Mar 200 Ver 10)

8730-411



POST-IMPACT RPS (Photo is unclassified) (Ror 200 Yec 10)

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS542X41171734
DATE OF MANUFACTURE:	AWED(SEE CERTIFICATION LABEL)
COLOR:	White

Test Number:	09
Test Date:	12/03/2003
Target Location:	Driver Side B-Pillar
Target Code:	BP1
Horizontal Impact Angle:	270°
Vertical Impact Angle:	16°
Ambient Temperature:	20°C
Relative Humidity:	18
Time of Impact:	10:55
Headform Number:	0642

Impact Point Description (from lower midpoint on midsagittal line)				
On Centerline	2		mm right	mm left
On Centerline	6		mm up	



POST-IMPACT BP1 HEADFORM

Free Motion HIC	419.4
HIC(d)	482.8
Impact Velocity (kph)	18.83
HIC T1 (msec)	4.9
HIC T2 (msec)	9.9

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - BP1

FMH Headform 0642

Location: BP1

Test Date: December 03, 2003

Work File: BP1

TEST RESULTS

Lab Temperature: 20 C

HICd: 482.8

Lab Humidity: 18 %

HIC (36ms): 419.4

Velocity at Impact: 18.83 KPH

t1: 4.9 msec

t2: 9.9 msec

Free Flight Distance: 217.44 mm

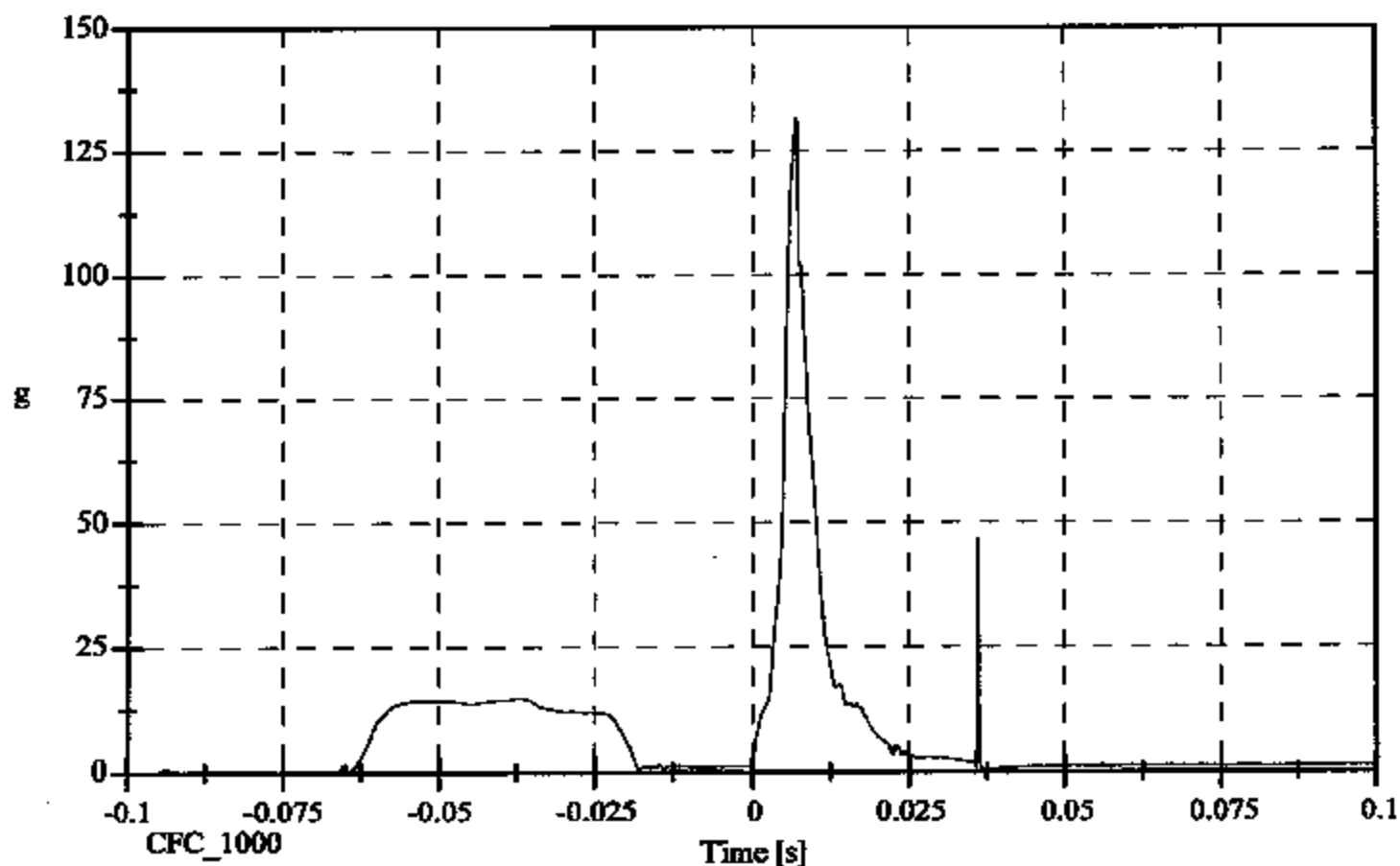
Duration: 5.0 msec

Average Acceleration: 7.3 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 131.7 [g] at 0.007 [s]

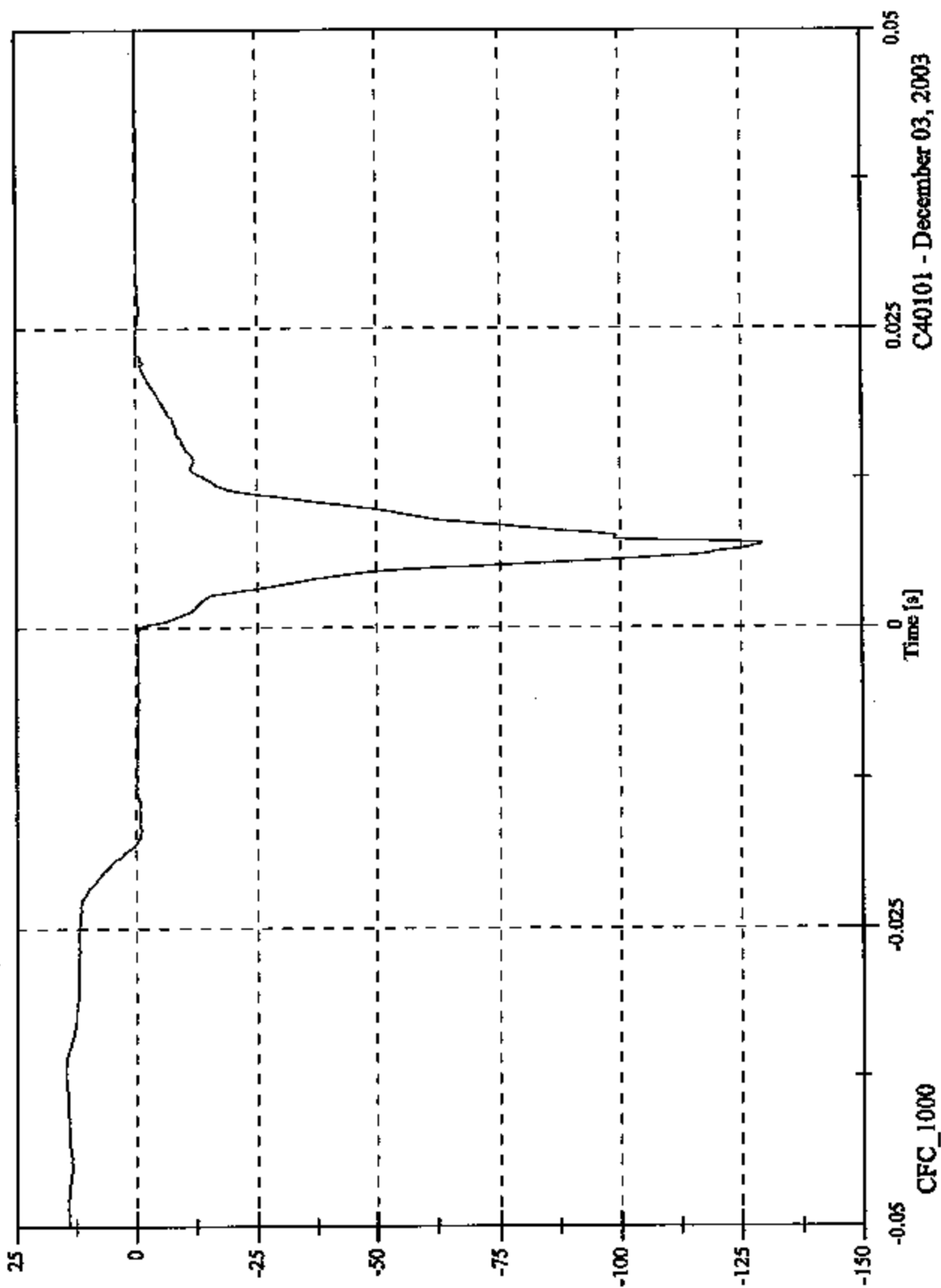
Min: 0.0 [g] at -0.088 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

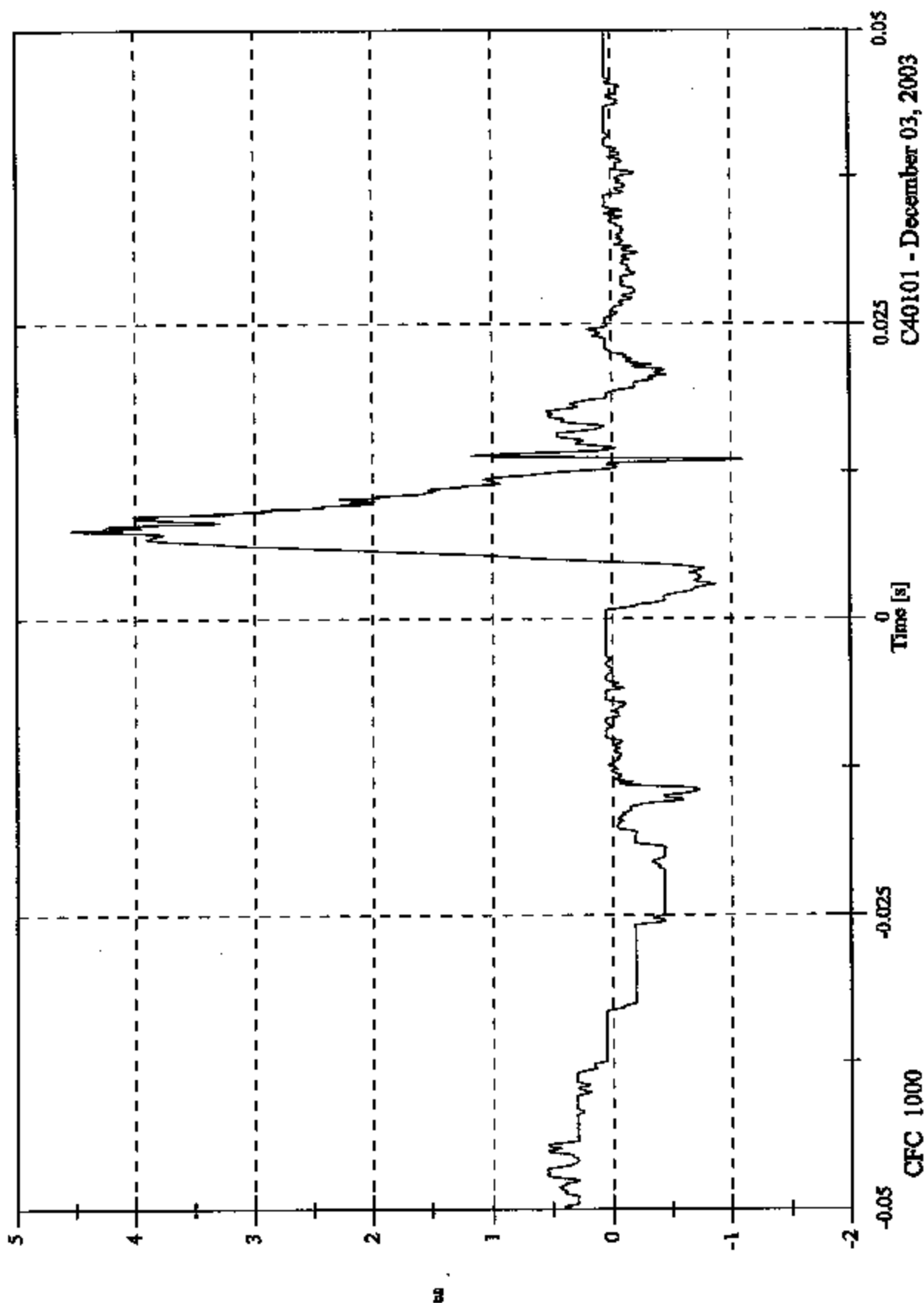
Max: 14.7 [g] at -0.037 [s]
Min: -129.4 [g] at 0.007 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

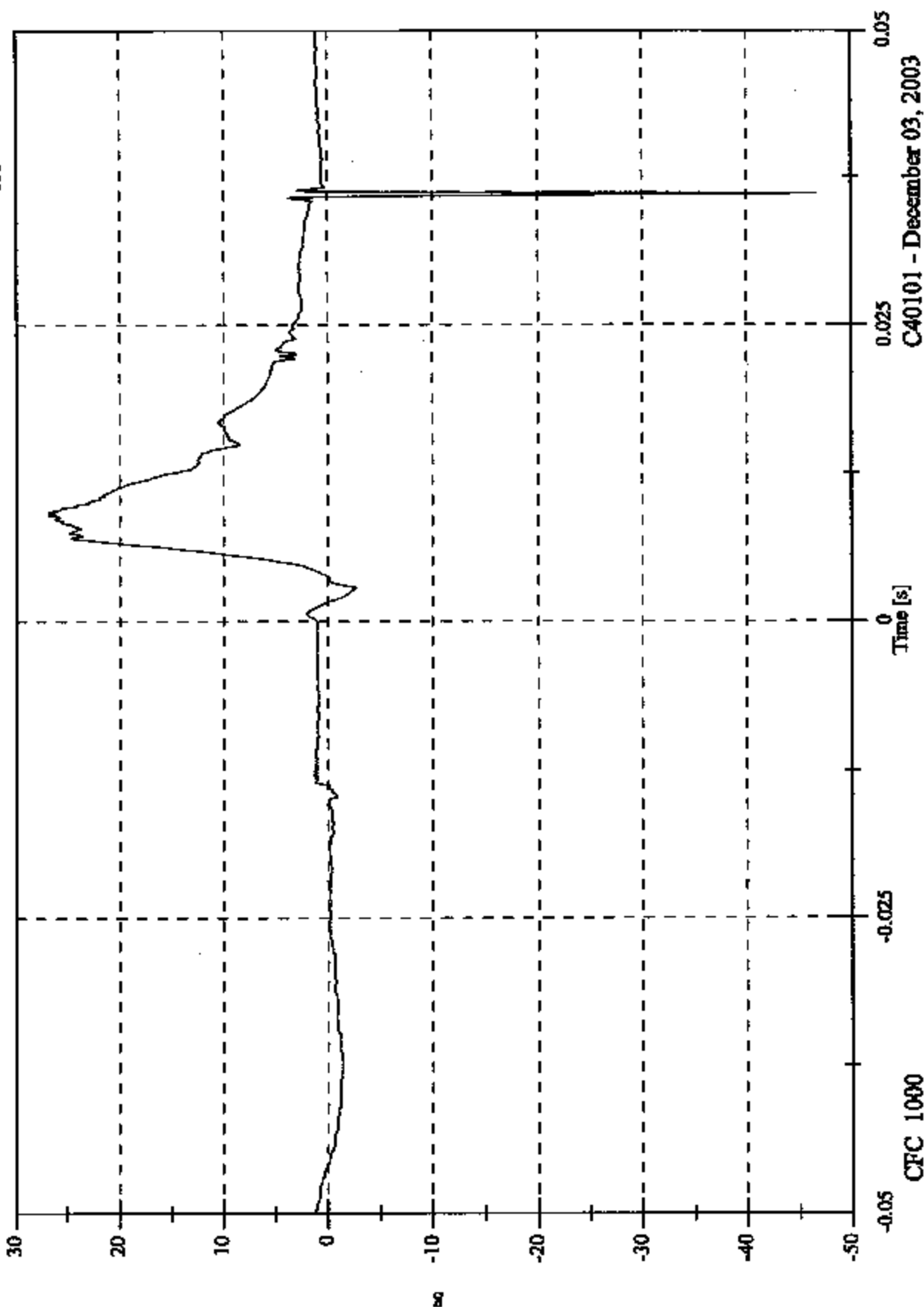
Max: 4.5 [g] at 0.008 [s]
Min: -1.1 [g] at 0.013 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

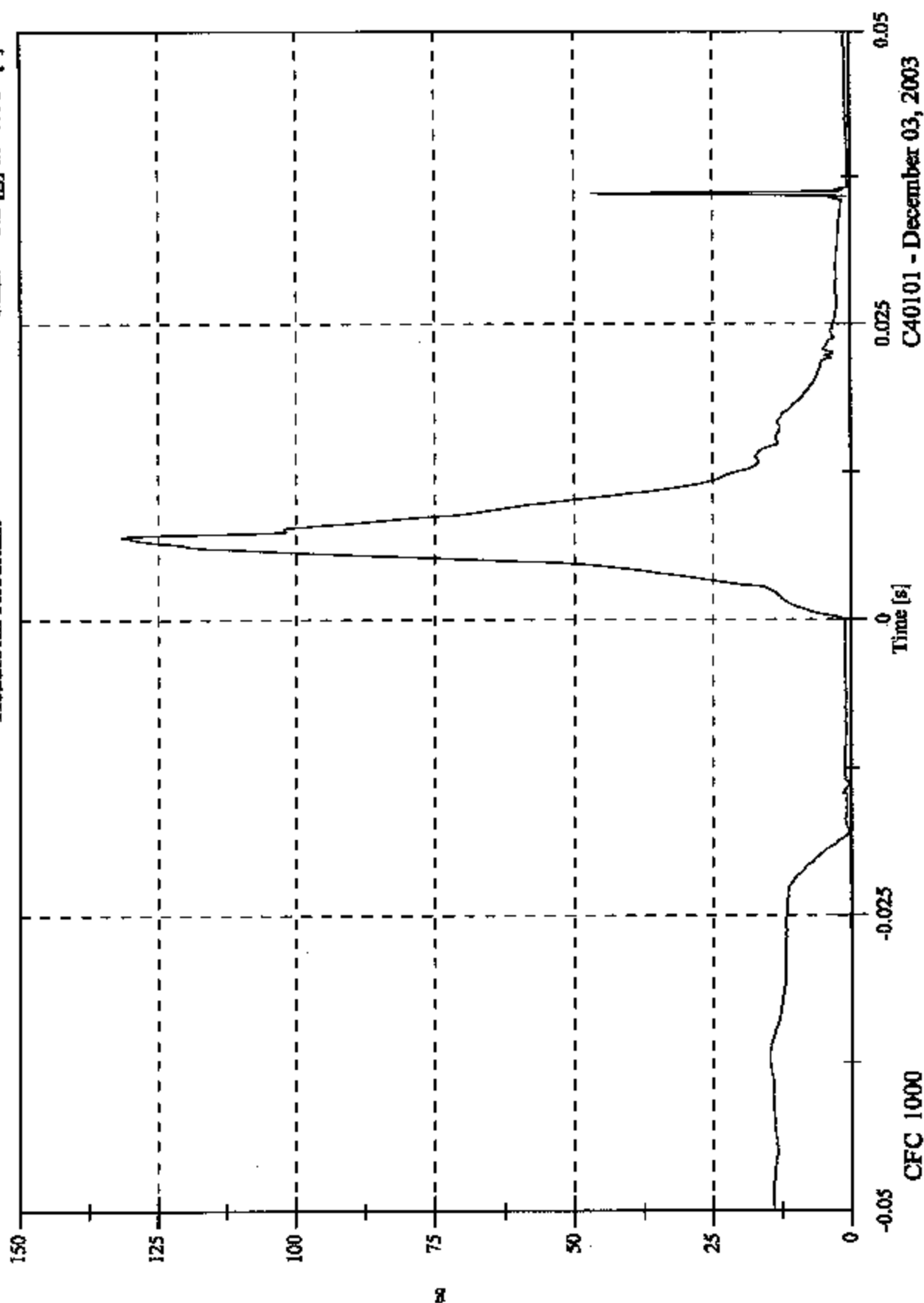
Max: 26.9 [g] at 0.009 [s]
Min: -46.7 [g] at 0.036 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

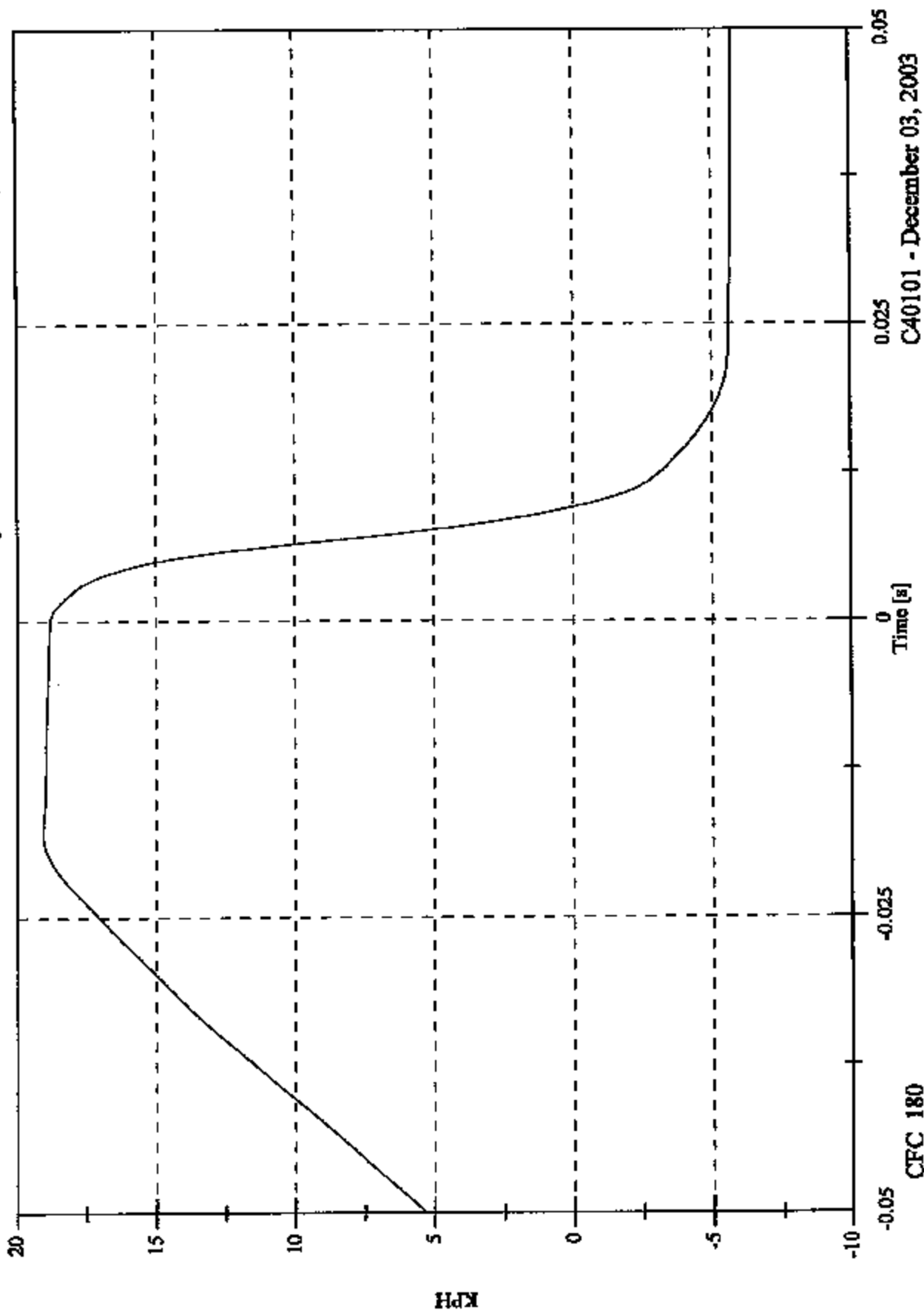
Max: 131.7 [g] at 0.007 [s]
Min: 0.2 [g] at -0.014 [s]

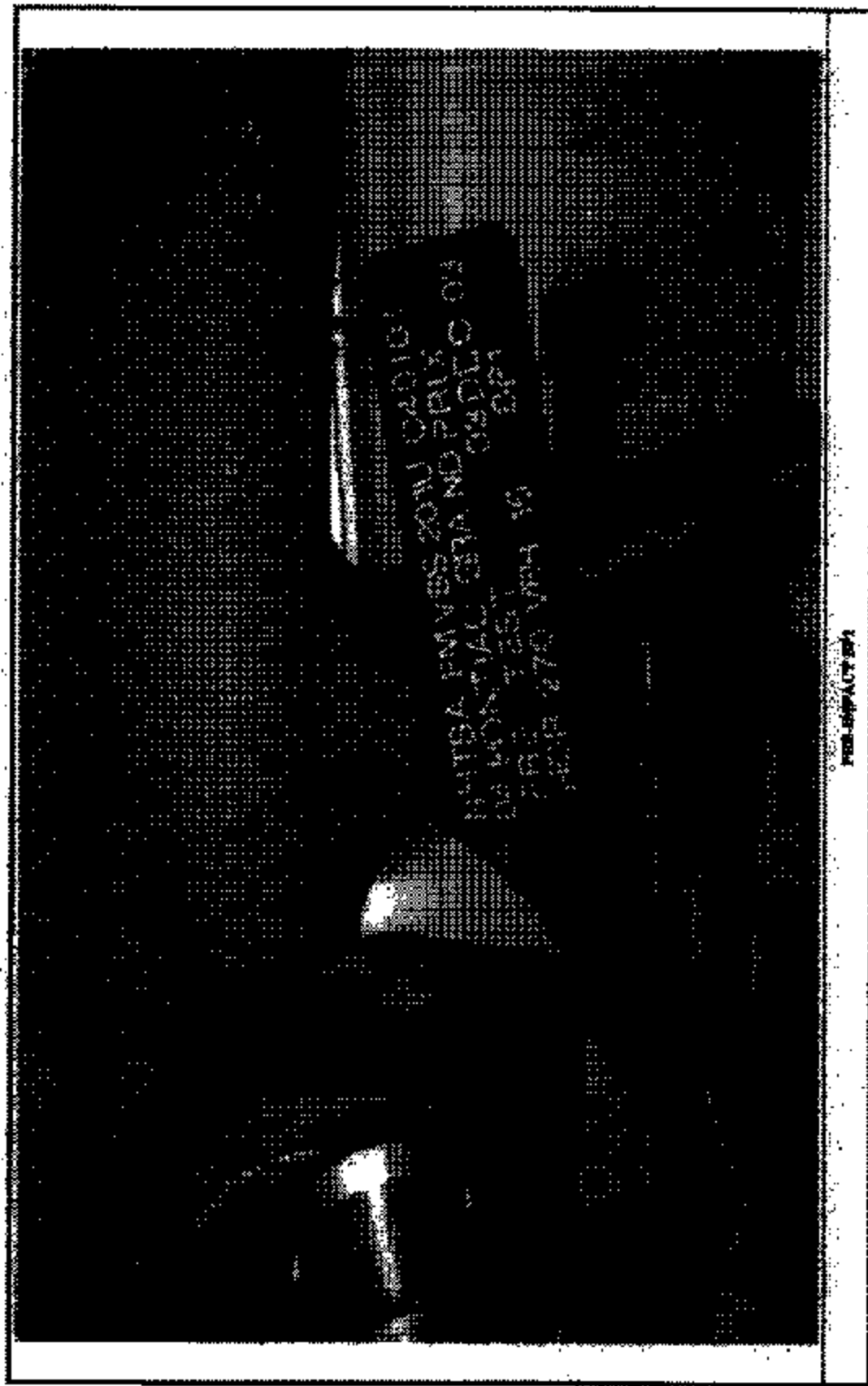


Max: 19.1 [KPH] at -0.018 [s]
Min: -5.7 [KPH] at 0.050 [s]

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

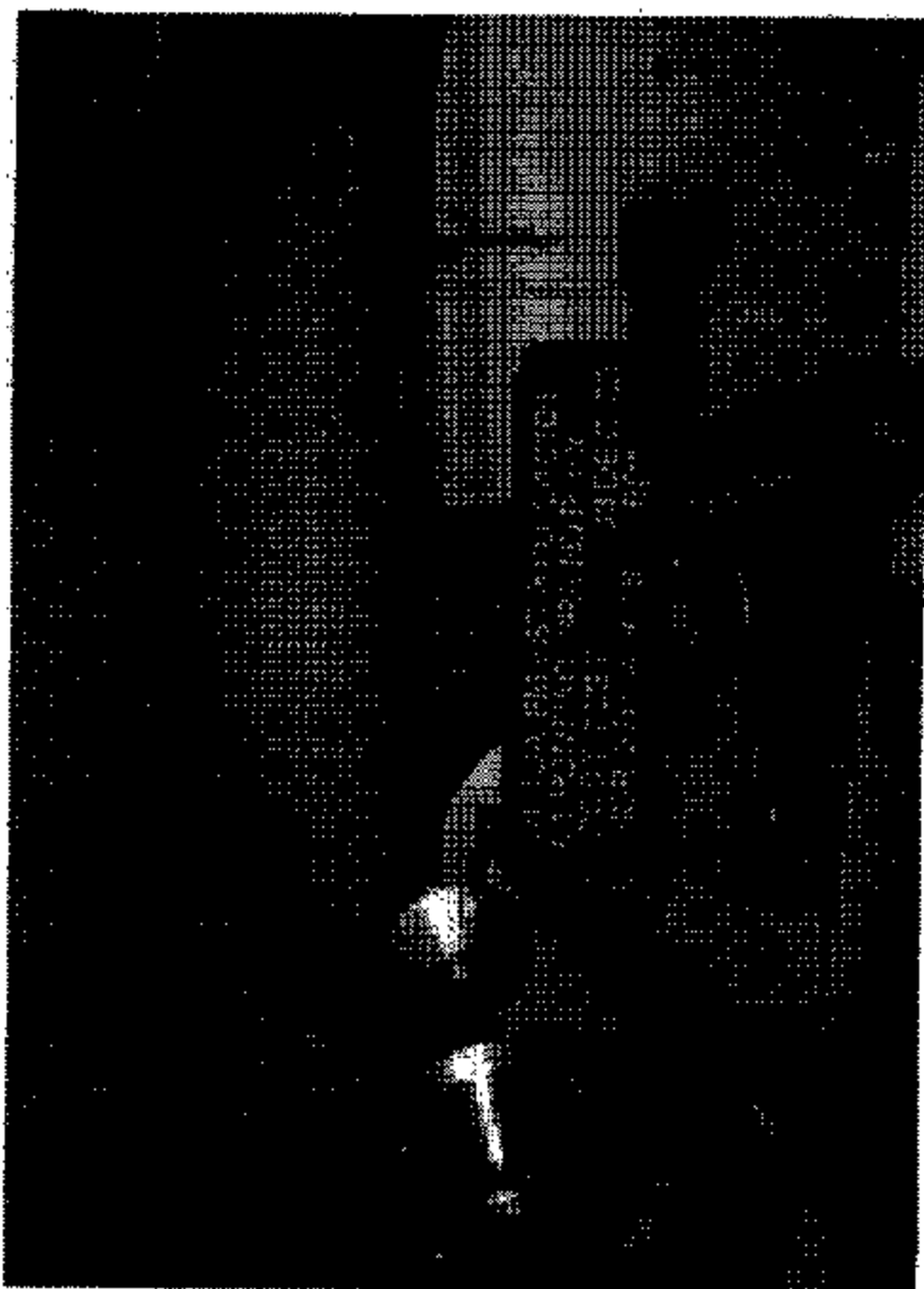
Headform Velocity





PROD. 10/10/10

8710-01



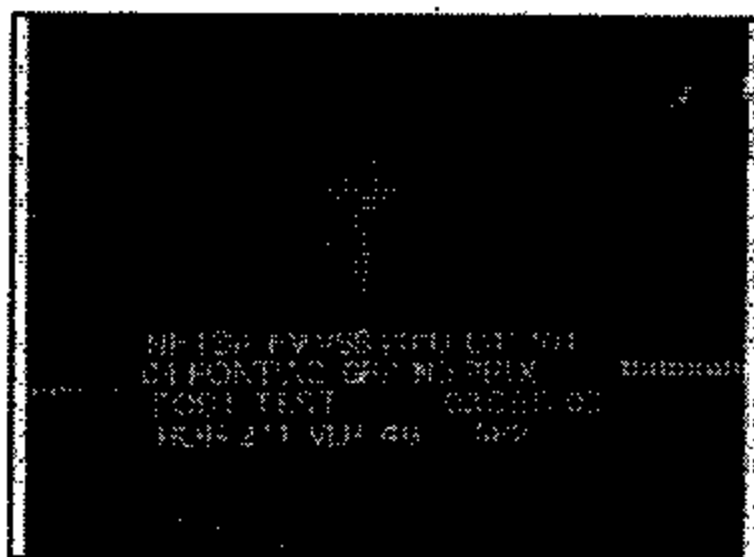
POST-EMERGENCY

8730-01

VEHICLE YEAR/MAKE/MODEL/STYLE:	2004 Pontiac Grand Prix 4-door Sedan
VIN:	2G2WS342X41171754
DATE OF MANUFACTURE:	ONLY SEE CERTIFICATION LABEL
COLOR:	White

Test Number:	10
Test Date:	12/03/2003
Target Location:	Driver Side A-Pillar
Target Code:	AP2
Horizontal Impact Angle:	211°
Vertical Impact Angle:	46°
Ambient Temperature:	26°C
Relative Humidity:	18
Time of Impact:	11:45
Headform Number:	1253

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	4	mm right	mm left
On Centerline	31	mm up	



POST-IMPACT AP2 HEADFORM

Free Motion HIC	1012.9
HIC(d)	930.5
Impact Velocity (kph)	23.69
HIC T1 (msec)	6.9
HIC T2 (msec)	9.5

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix C40101 - AP2

FMH Headform 1255

Location: AP2

Test Date: December 03, 2003

Work File: AP2

TEST RESULTS

Lab Temperature: 20 C

HICd: 930.5

Lab Humidity: 18 %

HIC (36ms): 1012.8

Velocity at Impact: 23.69 KPH

t1: 6.9 msec

t2: 9.5 msec

Free Flight Distance: 218.41 mm

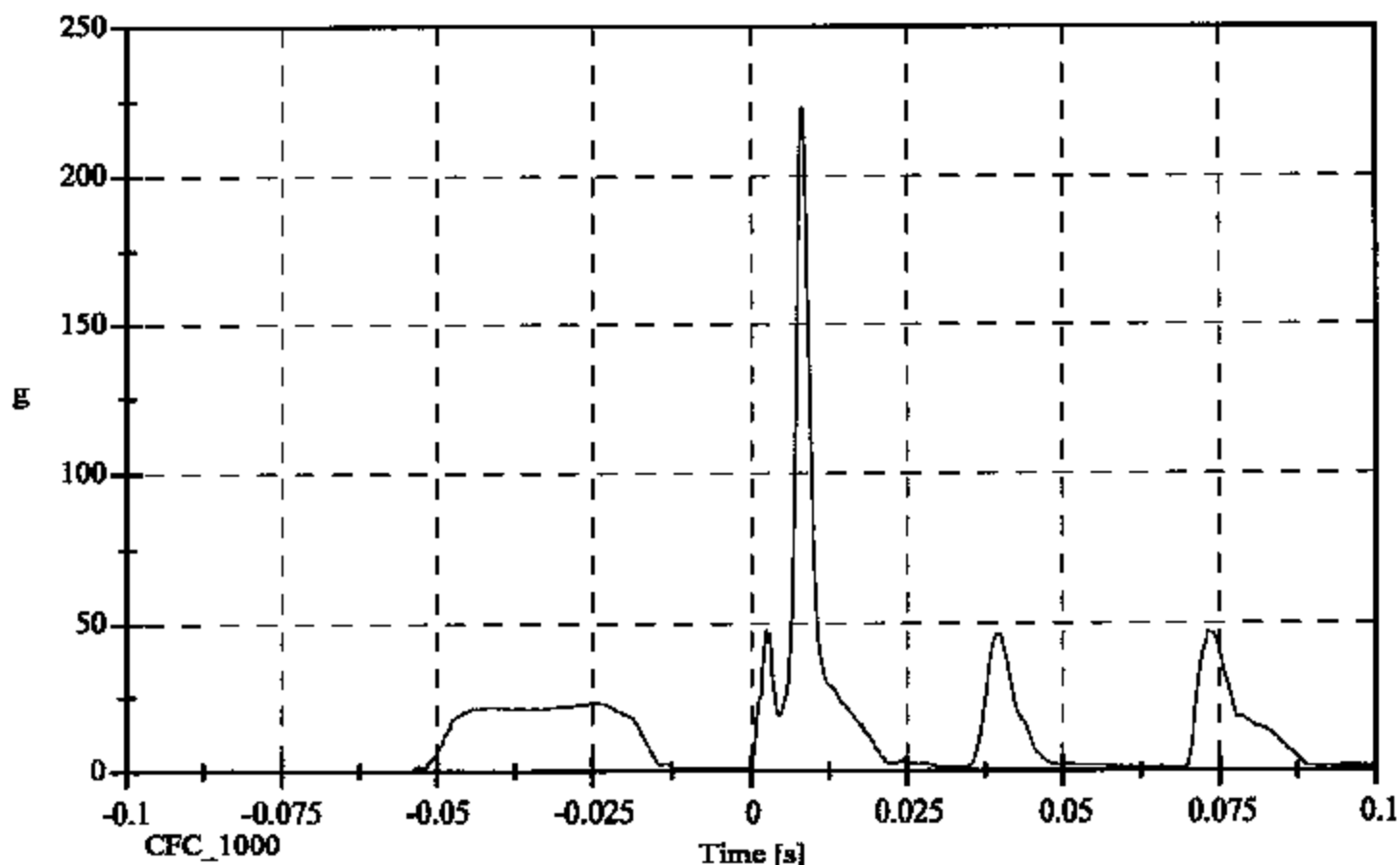
Duration: 2.6 msec

Average Acceleration: 11.9 g

FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix
Headform Resultant

Max: 222.7 [g] at 0.008 [s]

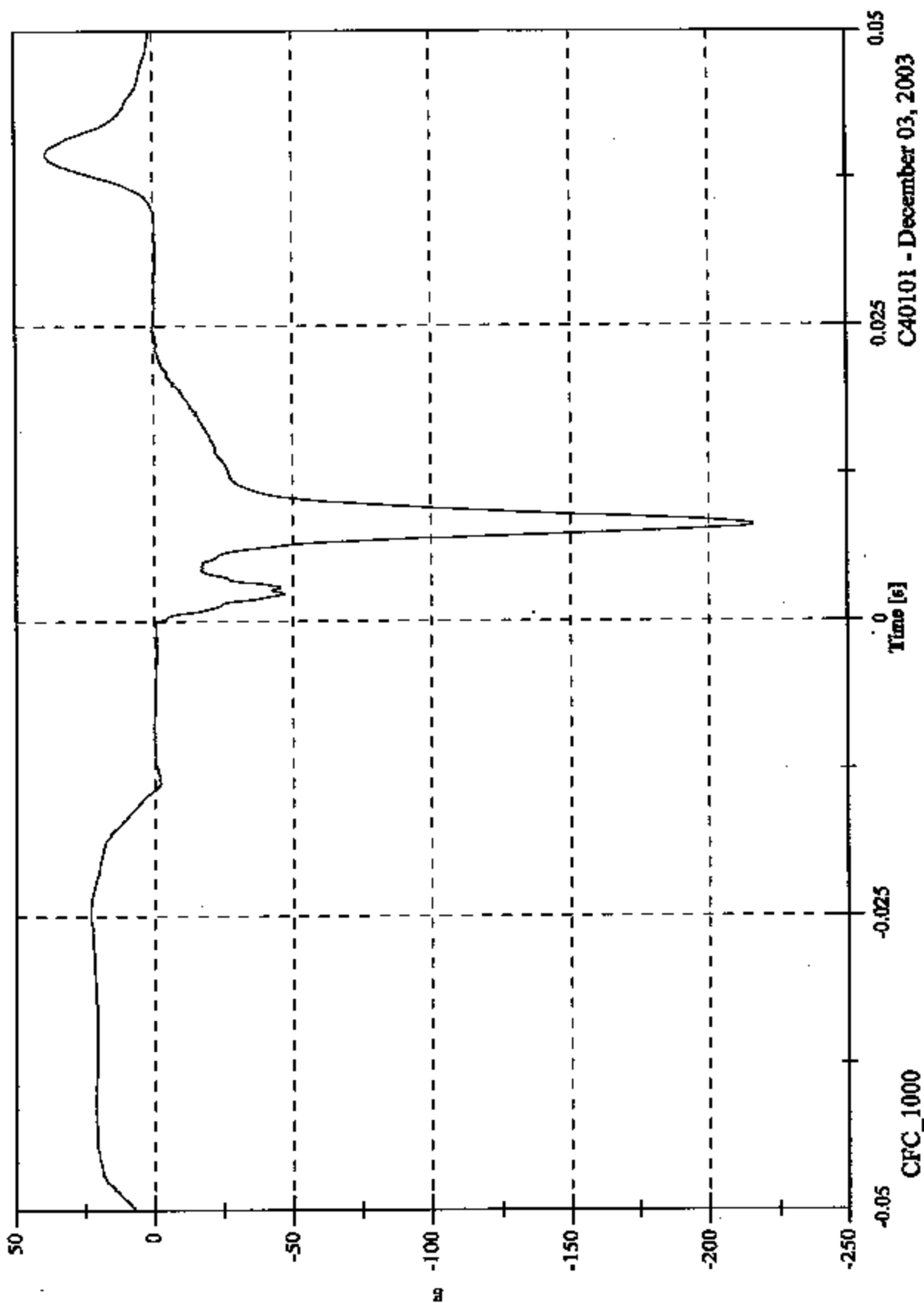
Min: 0.0 [g] at -0.064 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform X Acceleration

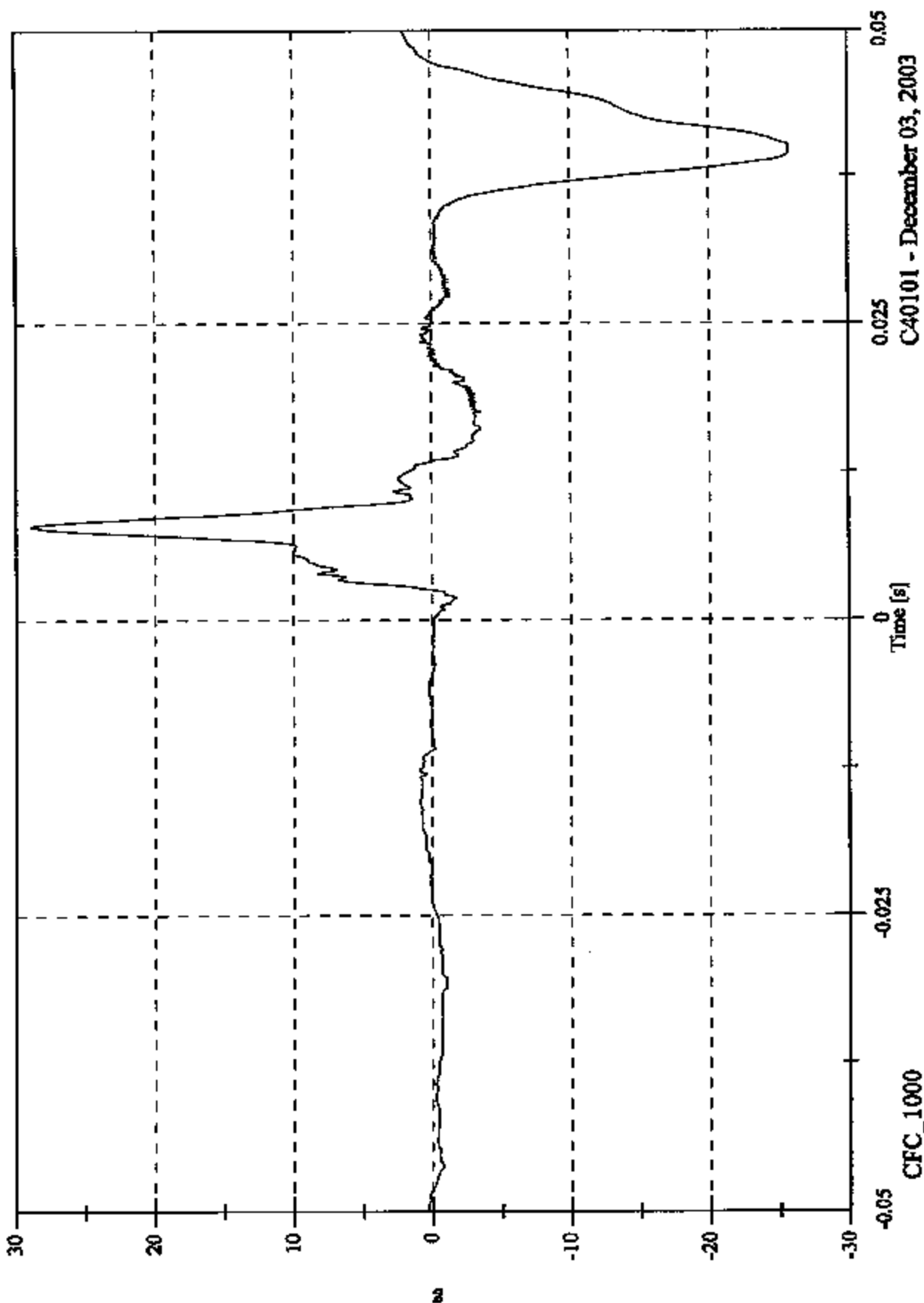
Max: 38.8 [g] at 0.040 [s]
Min: -215.8 [g] at 0.008 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Y Acceleration

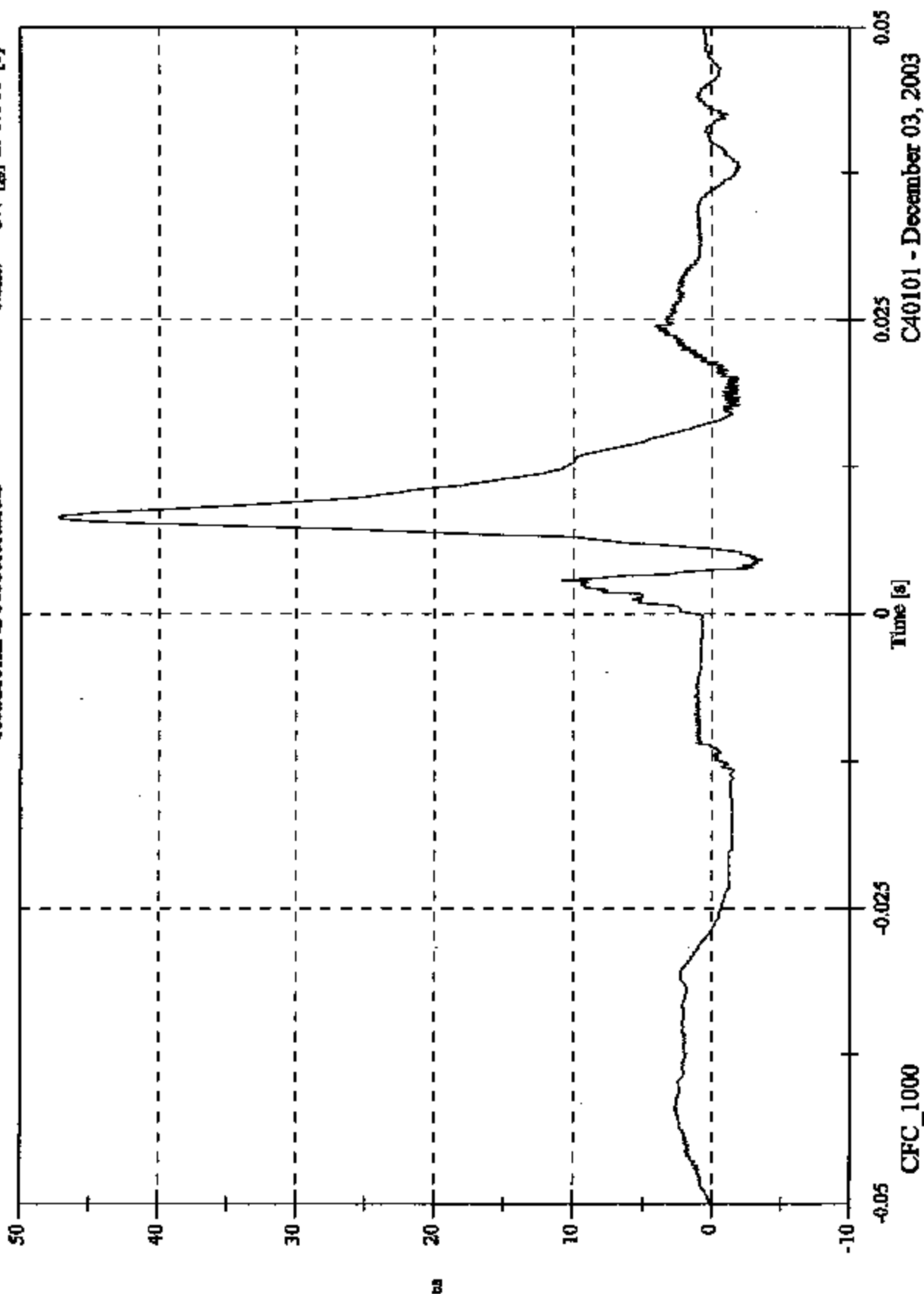
Max: 28.9 [g] at 0.008 [s]
Min: -25.8 [g] at 0.040 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Z Acceleration

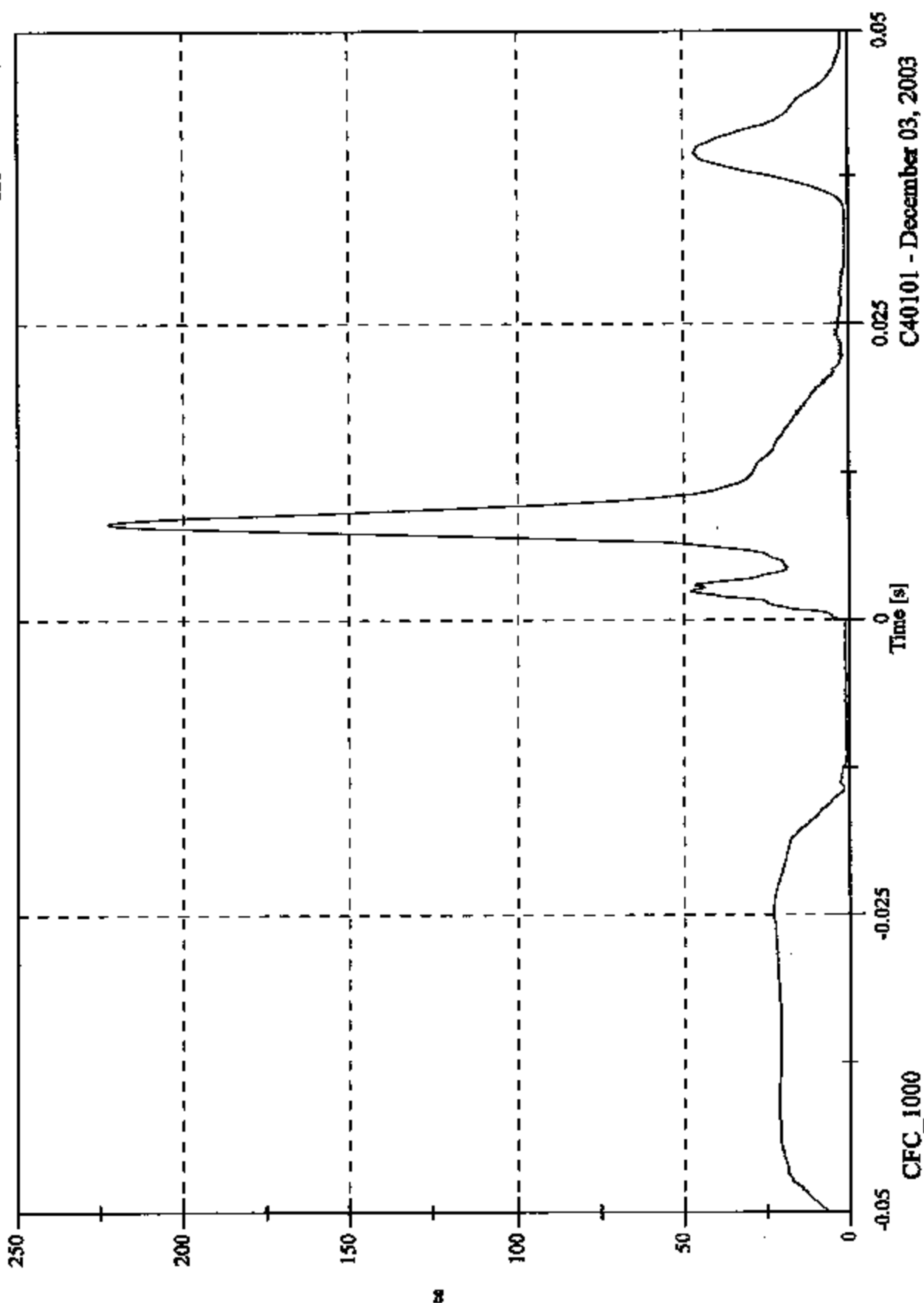
Max: 47.3 [g] at 0.008 [s]
Min: -3.7 [g] at 0.005 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Resultant

Max: 222.7 [g] at 0.008 [s]
Min: 0.4 [g] at -0.011 [s]



FMVSS 201U IMPACT TEST - 2004 Pontiac Grand Prix

Headform Velocity

Max: 24.0 [KPH] at -0.014 [s]
Min: -8.7 [KPH] at 0.035 [s]

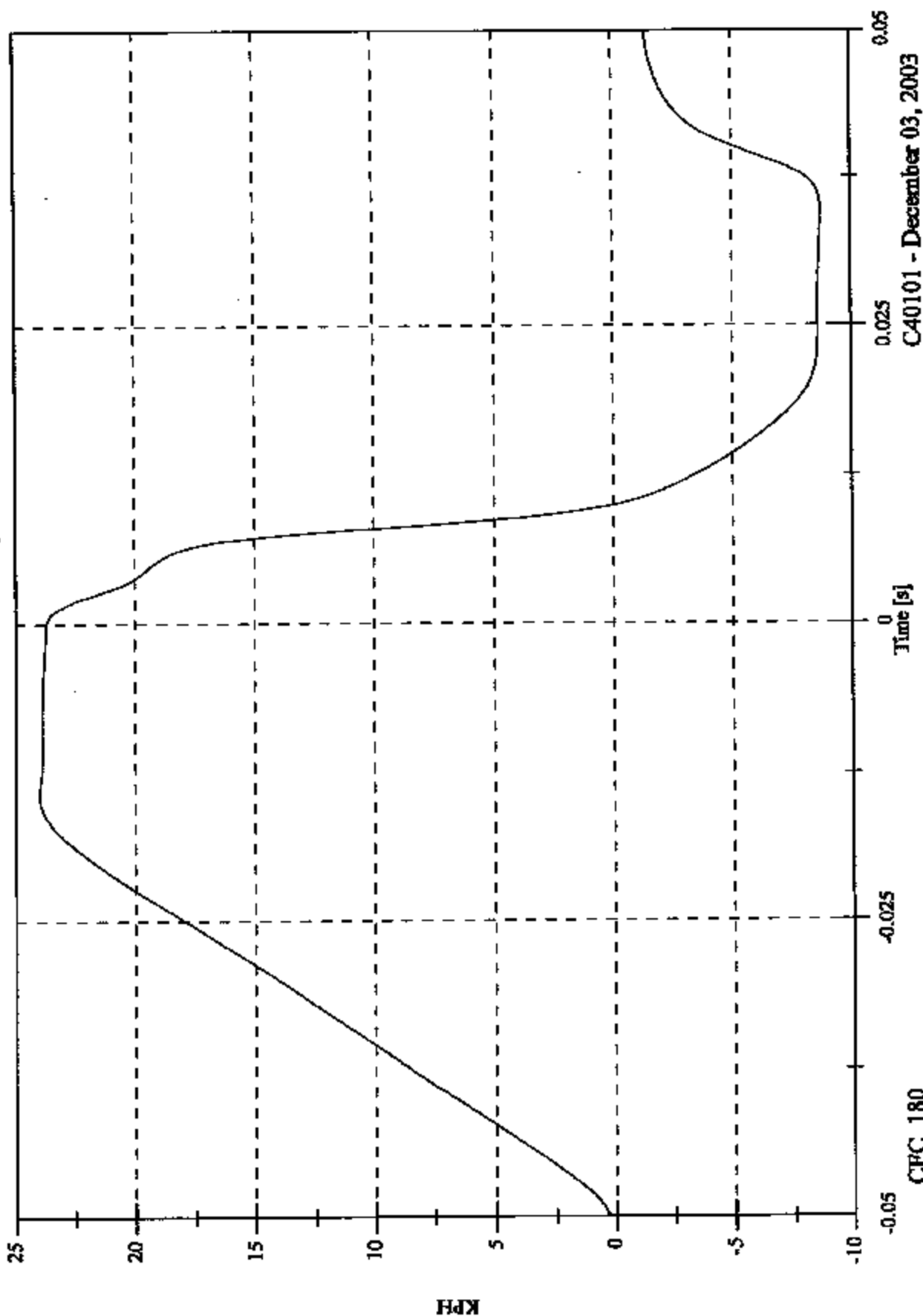




FIGURE 1

8730-01



POST-IMPACT API

8730-01

APPENDIX A
PHOTOGRAPHS

PHOTOGRAPHS

FIGURE	VIEW
A-1	LEFT SIDE VIEW OF VEHICLE
A-2	RIGHT SIDE VIEW OF VEHICLE
A-3	3/4 FRONTAL VIEW FROM LEFT SIDE OF VEHICLE
A-4	3/4 REAR VIEW FROM RIGHT SIDE OF VEHICLE
A-5	VEHICLE'S CERTIFICATION LABEL
A-6	VEHICLE'S TIRE INFORMATION LABEL
A-7	PRE-TEST DRIVER SIDE A-PILLAR
A-8	PRE-TEST DRIVER SIDE FRONT HEADER
A-9	PRE-TEST DRIVER SIDE SIDE RAIL
A-10	PRE-TEST DRIVER SIDE B-PILLAR
A-11	PRE-TEST DRIVER SIDE REAR PILLAR
A-12	PRE-TEST PASSENGER SIDE A-PILLAR
A-13	PRE-TEST PASSENGER SIDE FRONT HEADER
A-14	PRE-TEST PASSENGER SIDE SIDE RAIL
A-15	PRE-TEST PASSENGER SIDE B-PILLAR
A-16	PRE-TEST PASSENGER SIDE REAR PILLAR
A-17	POST-TEST DRIVER SIDE A-PILLAR
A-18	POST-TEST DRIVER FRONT HEADER
A-19	POST-TEST DRIVER SIDE SIDE RAIL
A-20	POST-TEST DRIVER SIDE B-PILLAR
A-21	POST-TEST DRIVER SIDE REAR PILLAR
A-22	POST-TEST PASSENGER SIDE A-PILLAR
A-23	POST-TEST PASSENGER FRONT HEADER
A-24	POST-TEST PASSENGER SIDE SIDE RAIL
A-25	POST-TEST PASSENGER SIDE B-PILLAR
A-26	POST-TEST PASSENGER SIDE REAR PILLAR

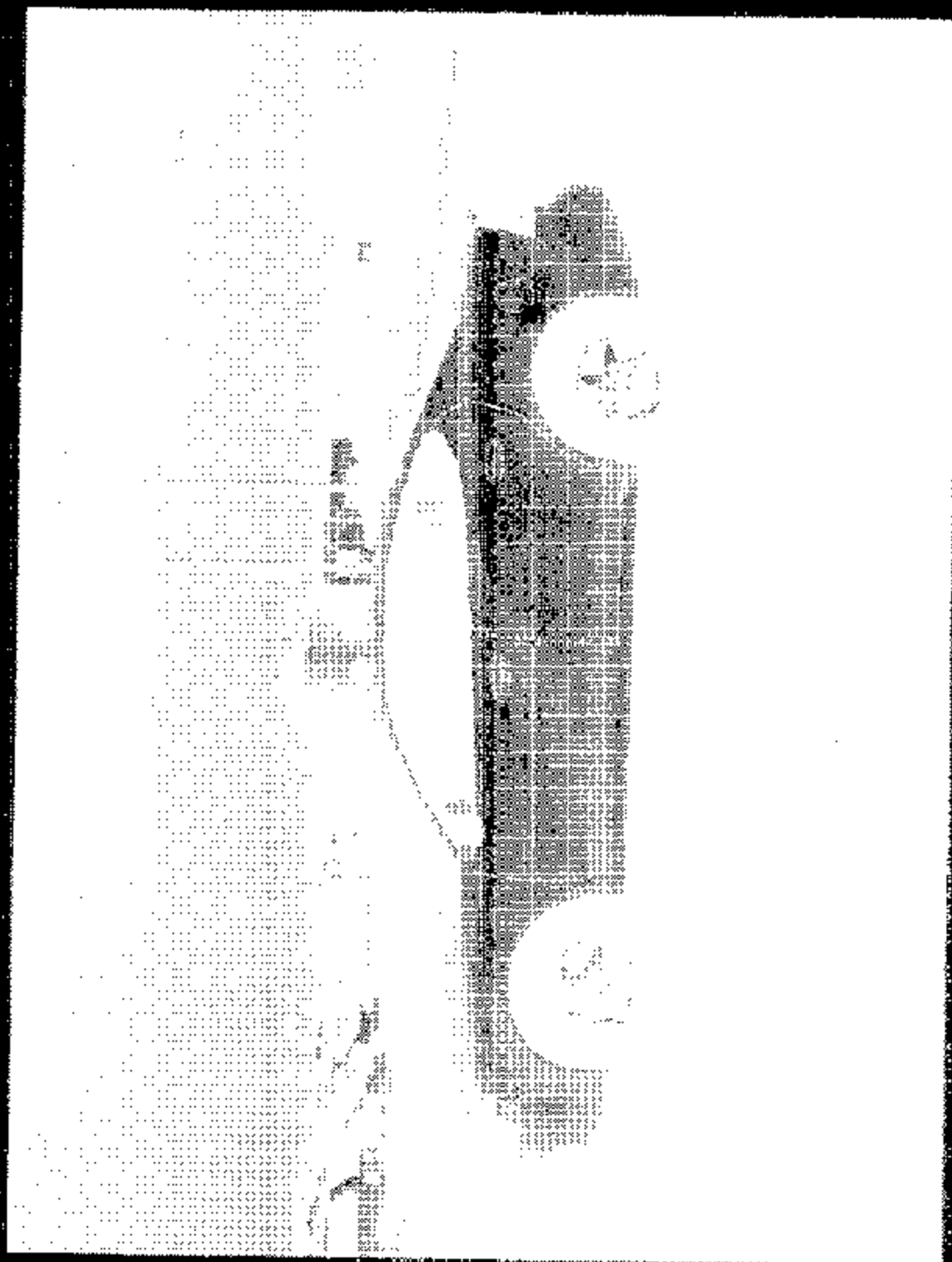


Figure A-1 : LEFT SIDE VIEW OF VEHICLE

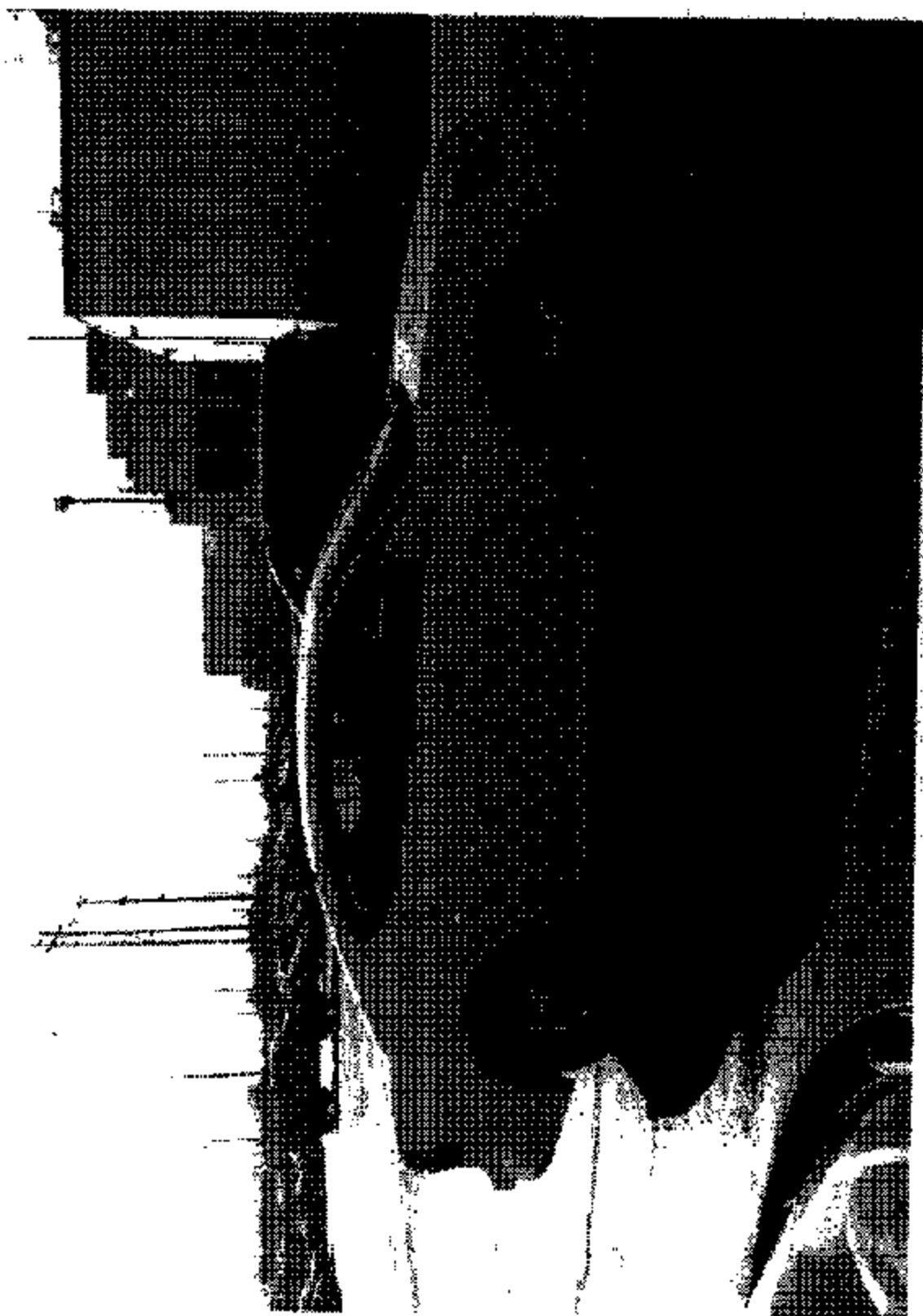


Figure A-2: RIGHT SIDE VIEW OF VEHICLE

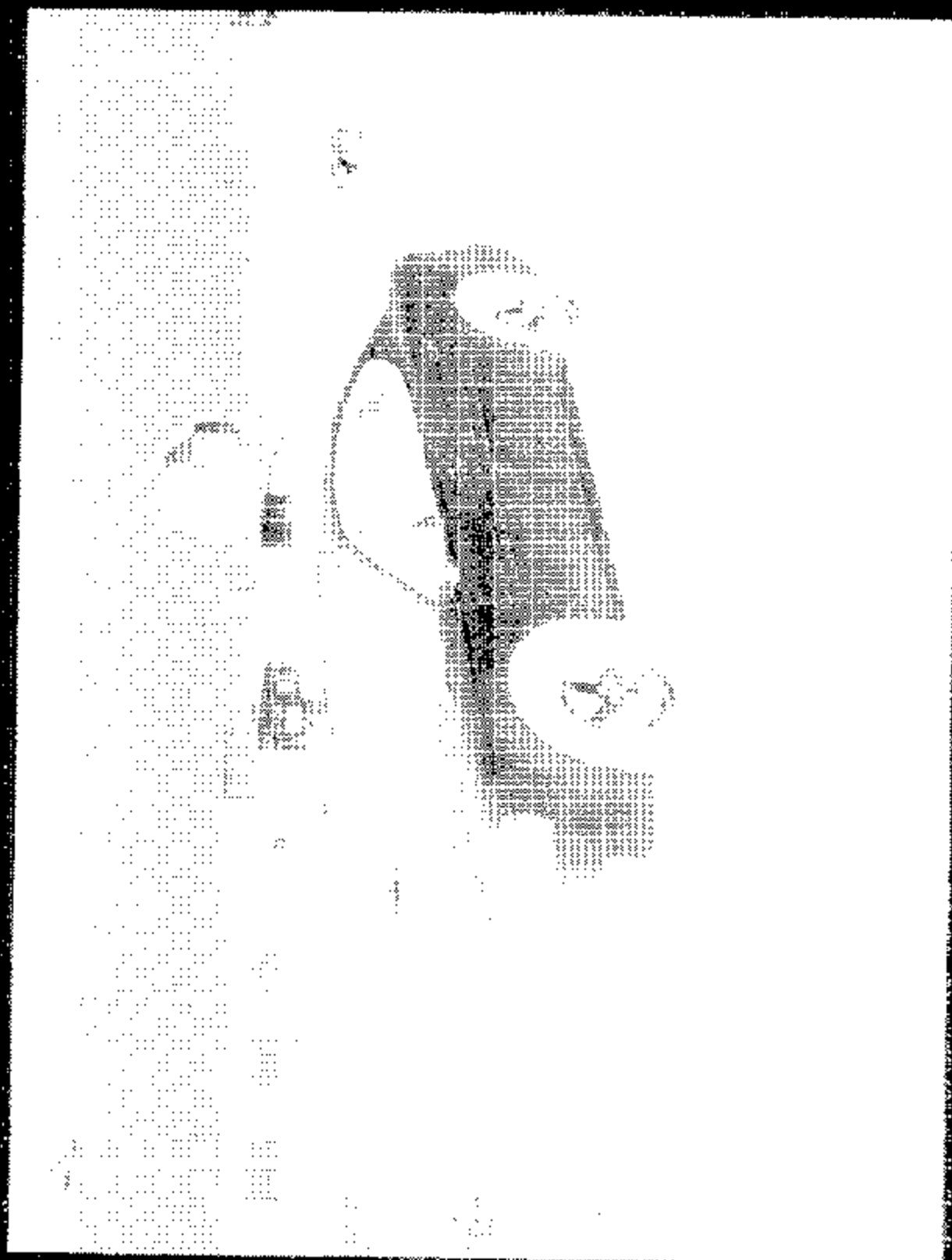


Figure A-3 : 3/4 FRONTAL VIEW FROM LEFT SIDE OF VEHICLE

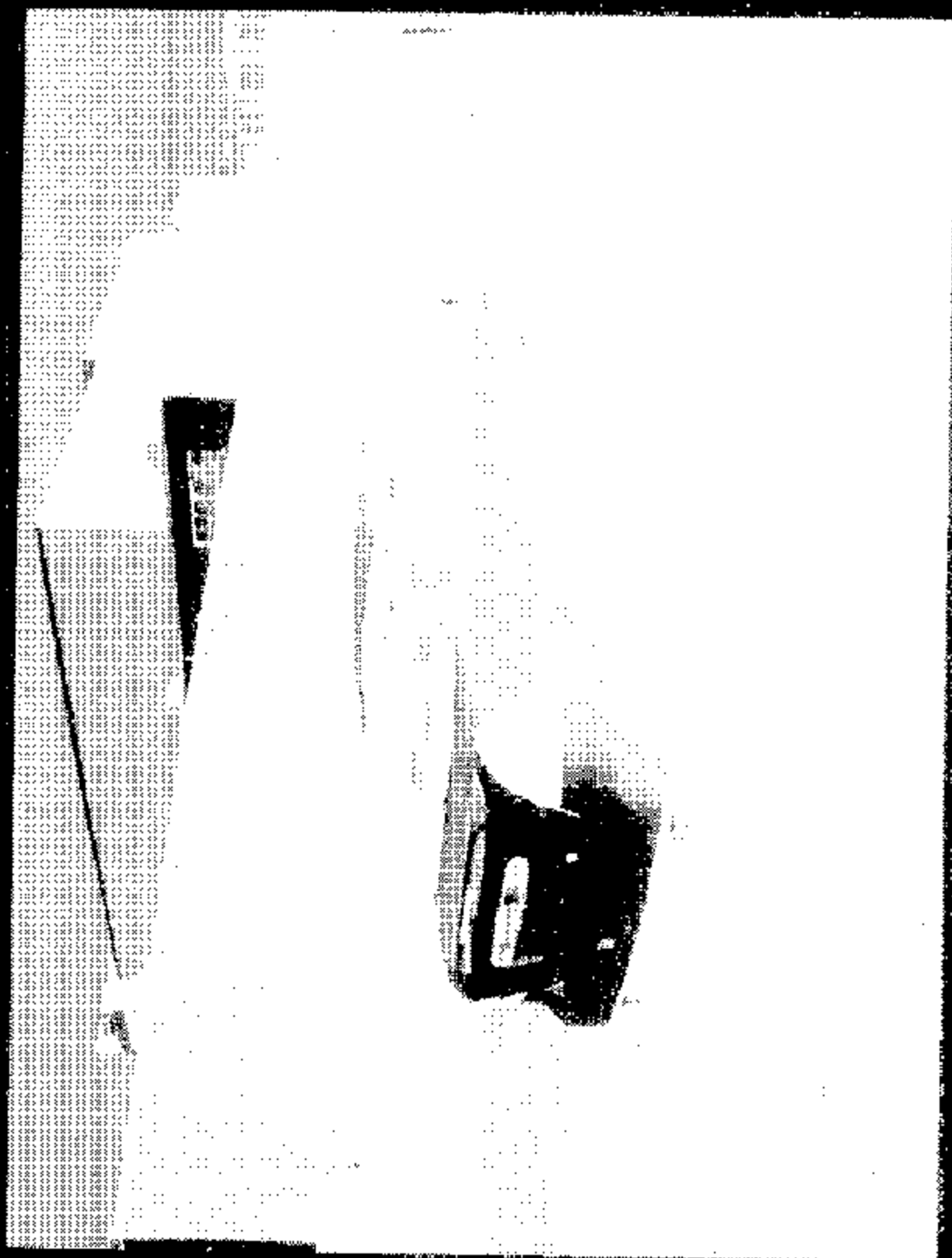


Figure A-4: 3/4 REAR VIEW FROM RIGHT SIDE OF VEHICLE

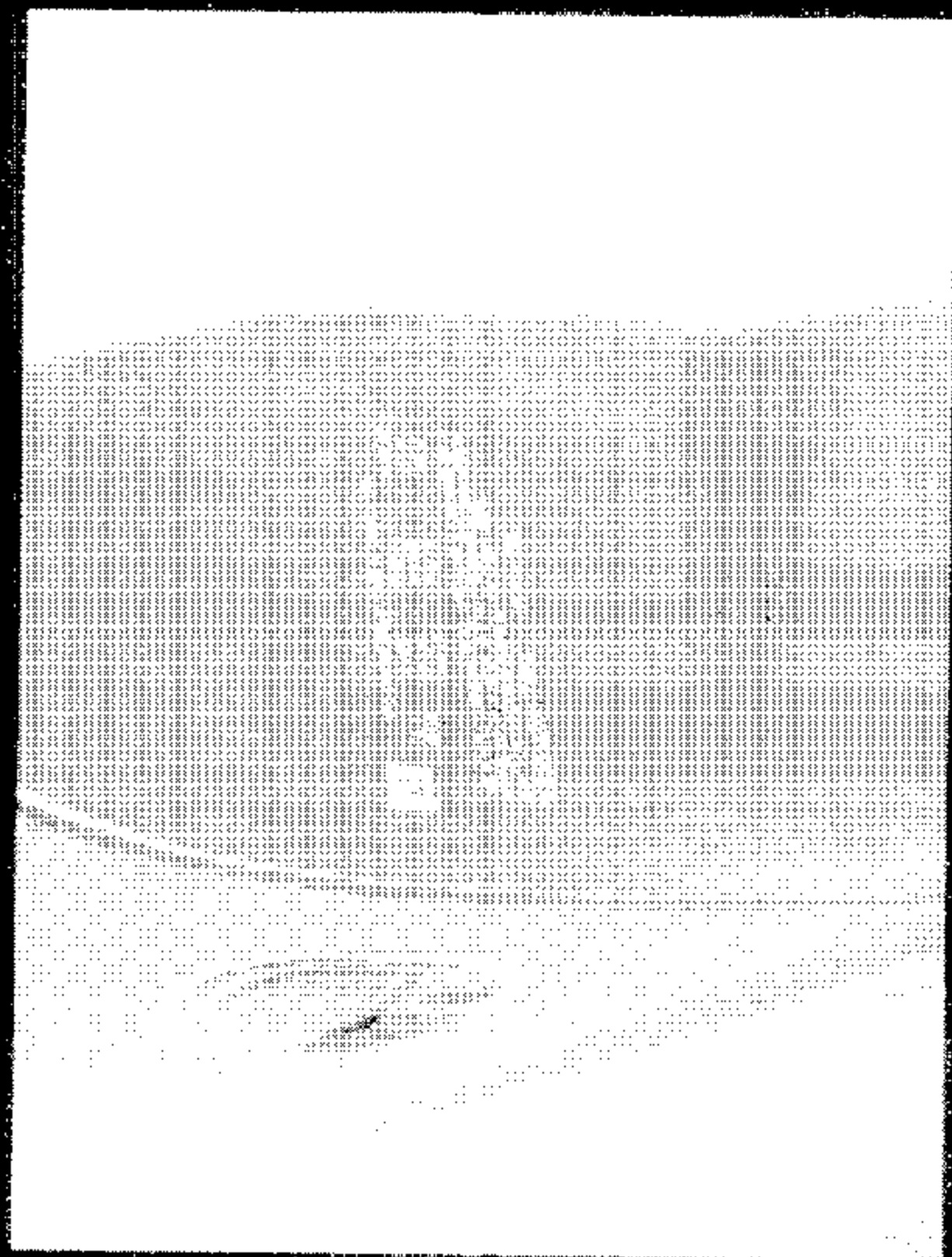


Figure A-5 VEHICLE CERTIFICATION LABEL

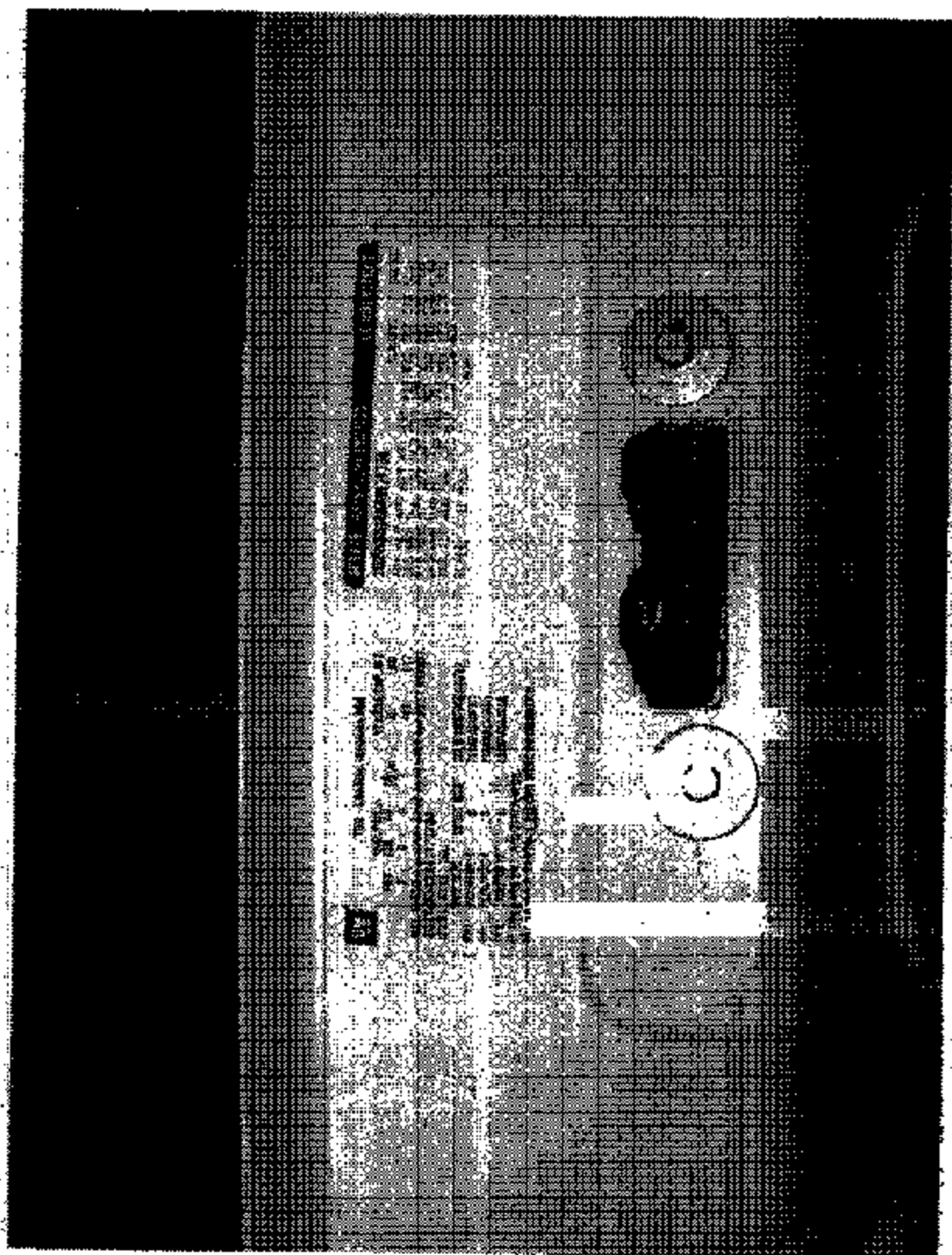


Figure A-6: VEHICLE'S TIRE INFORMATION LABEL.



Figure A-7: PRE-TEST DRIVER SIDE A-PILLAR

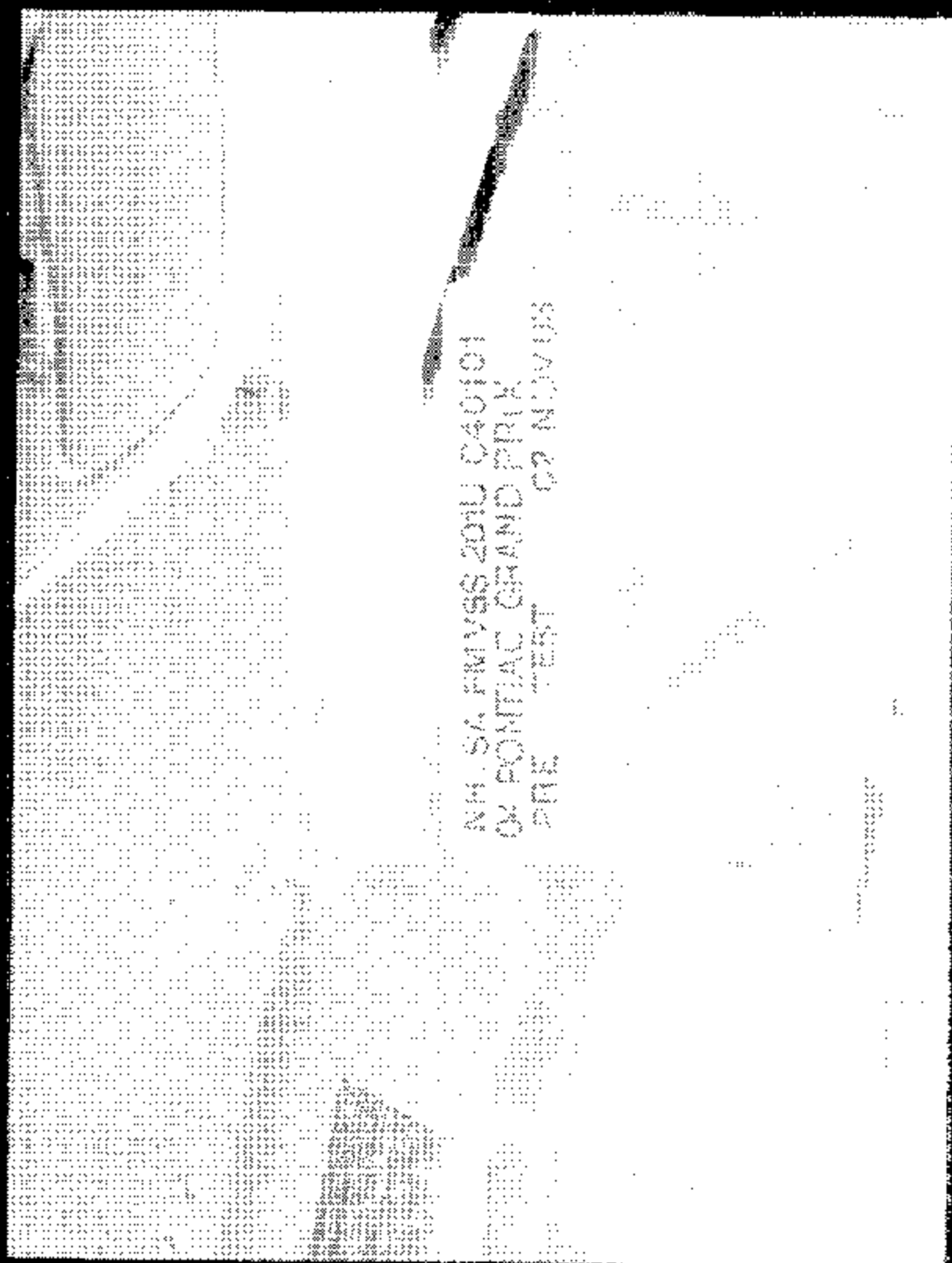


Figure A-3 PRE-TEST DRIVER SIDE FRONT HEADER

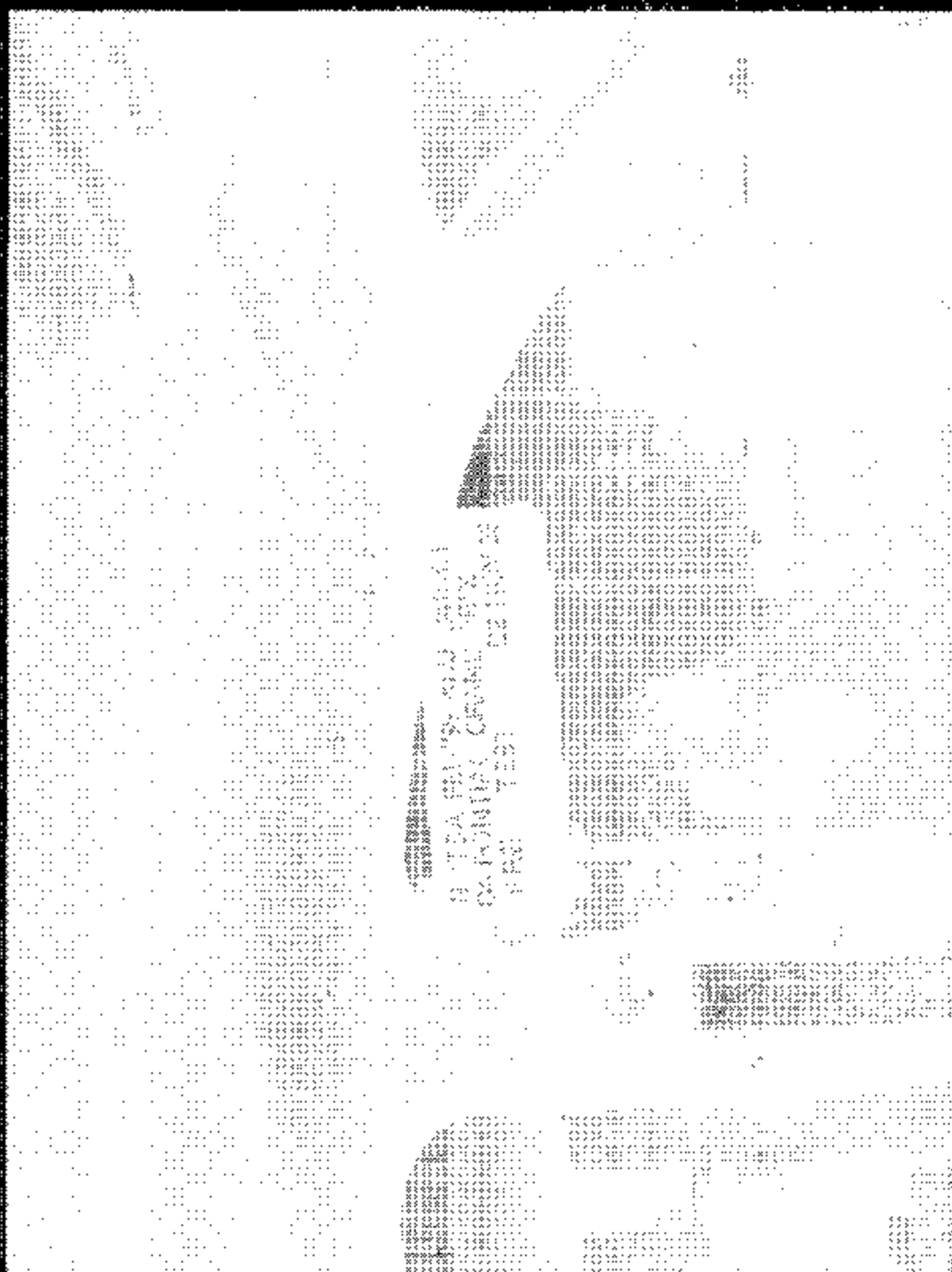


Figure A-9 PRE-TEST DRIVER SIDE SIDE RAIL

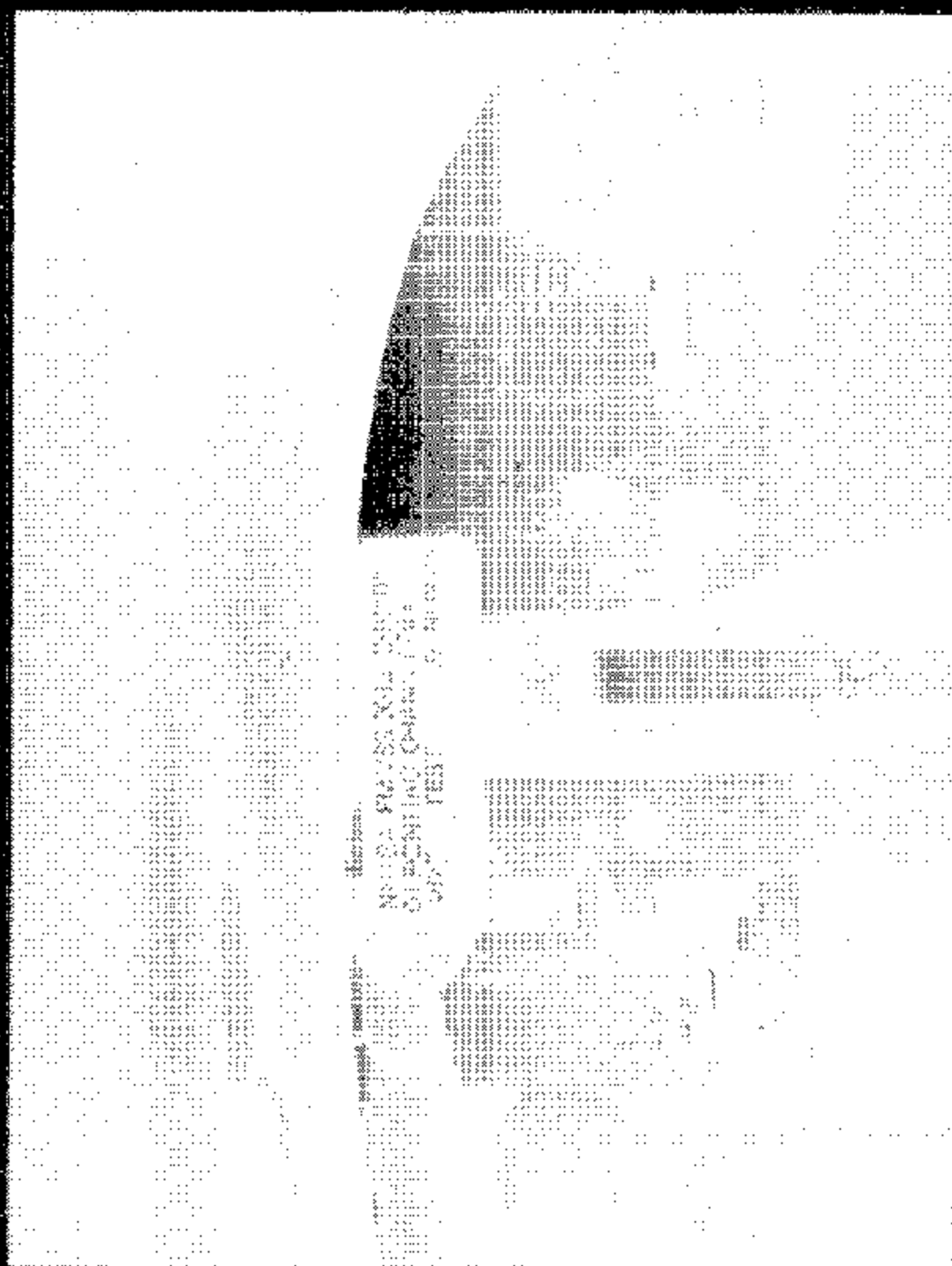


Figure A-10: PIE-TEST DRIVER SIDE B-PILLAR



Figure A-11 : PRE-TEST DRIVER SIDE REAR PILLAR



Figure A-12: PRE-TEST PASSENGER SIDE A-PILLAR



Figure A-13 PRE-TEST PASSENGER SIDE FRONT HEADER



Figure A-14: PRE-TEST PASSENGER SIDE SIDE RAIL



Figure A-15: PRE-TEST PASSENGER SIDE B-PILLAR

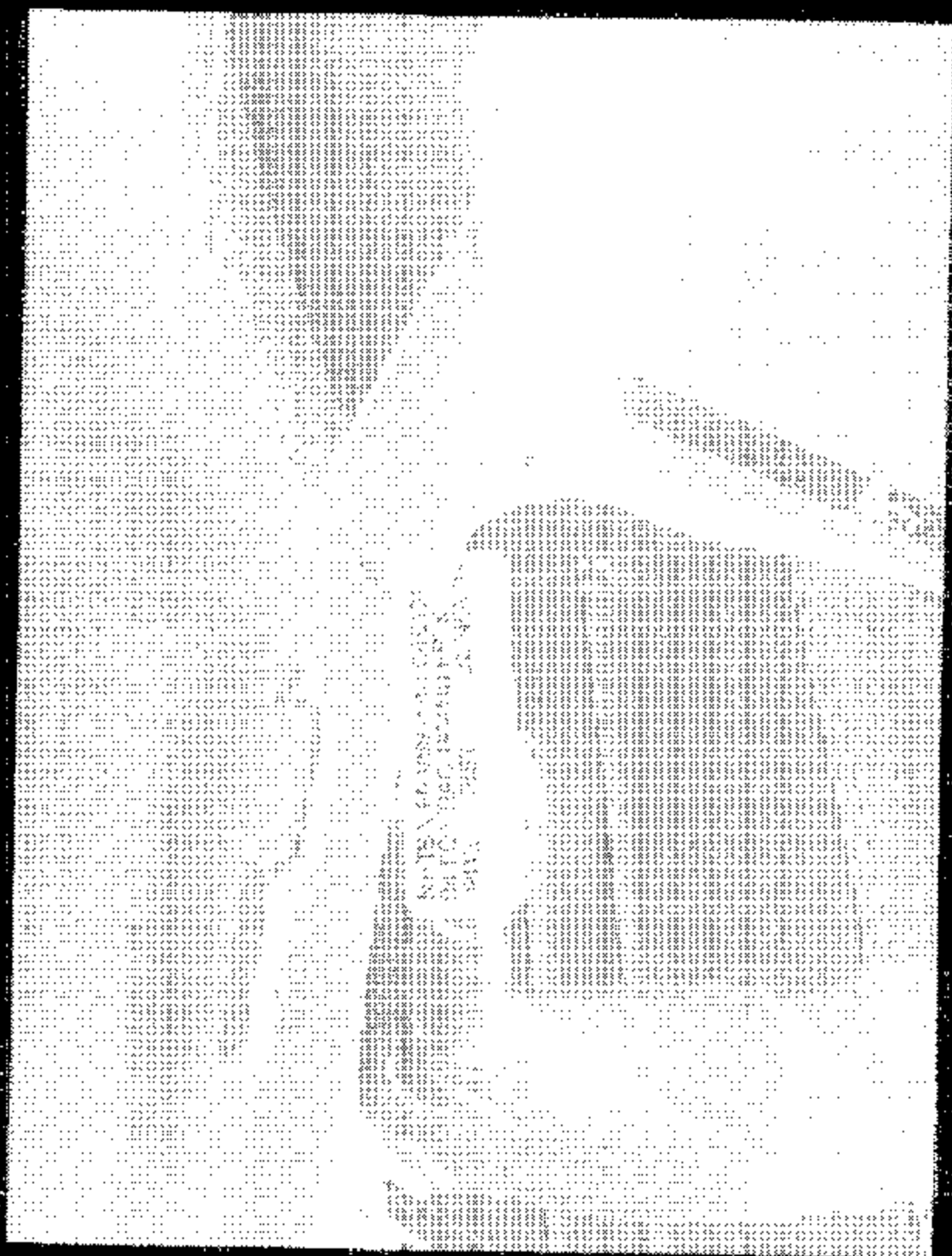


Figure A-16: PRE-TEST PASSENGER SIDE REAR PILLAR



Figure A-17 POST-TEST DRIVER SIDE A-PILLAR



Figure A-14 : POST-TEST DRIVER SIDE FRONT BEAMER



Figure A-19: POST-TEST DRIVER SHIR NICE RAIL

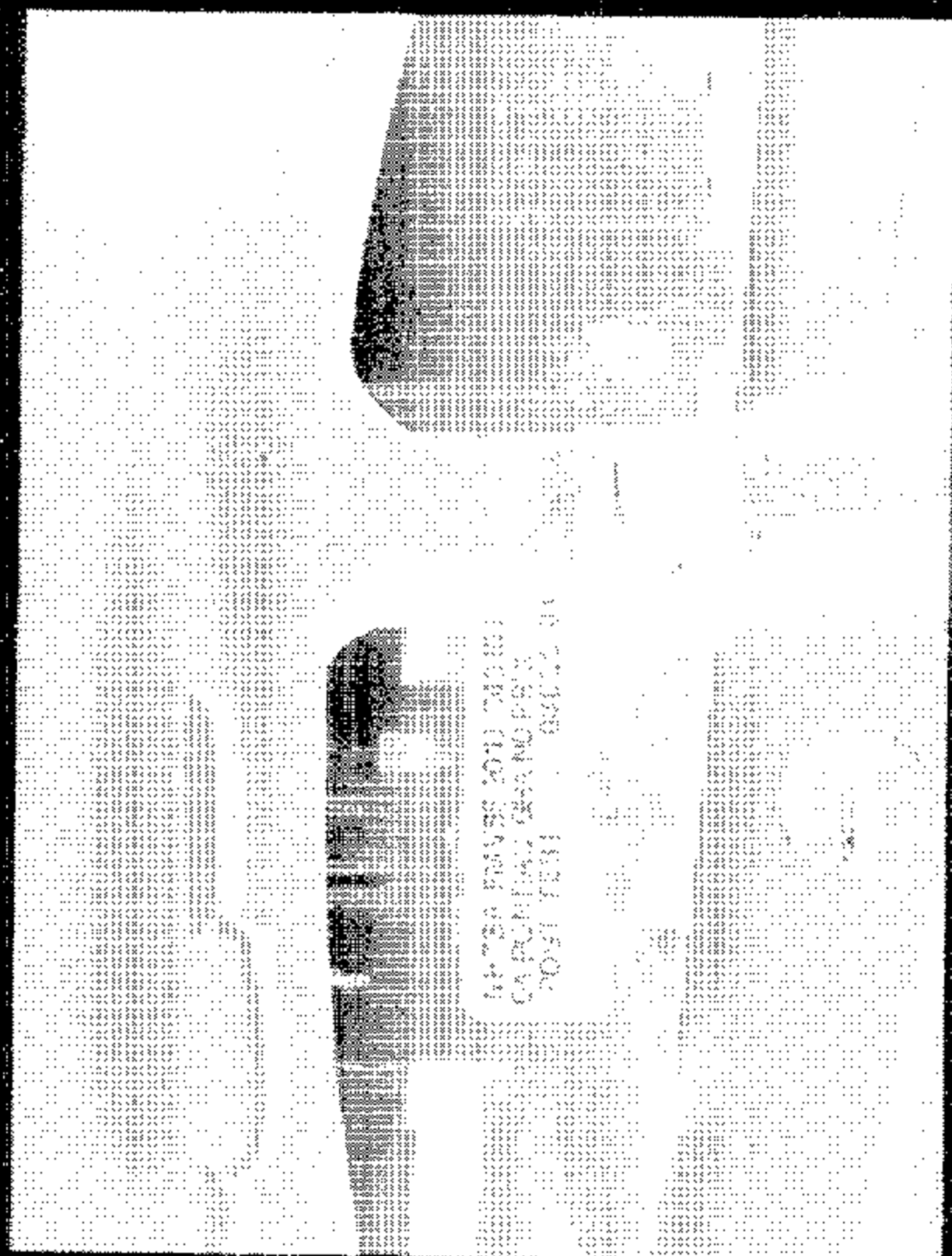


Figure A-20: POST-TEST DRIVER SIDE B-PILLAR



Figure A-21 POST-TEST DRIVER SIDE REAR PILLAR



Figure A-21: POST-TEST-PASSENGER SIDE A-PILLAR

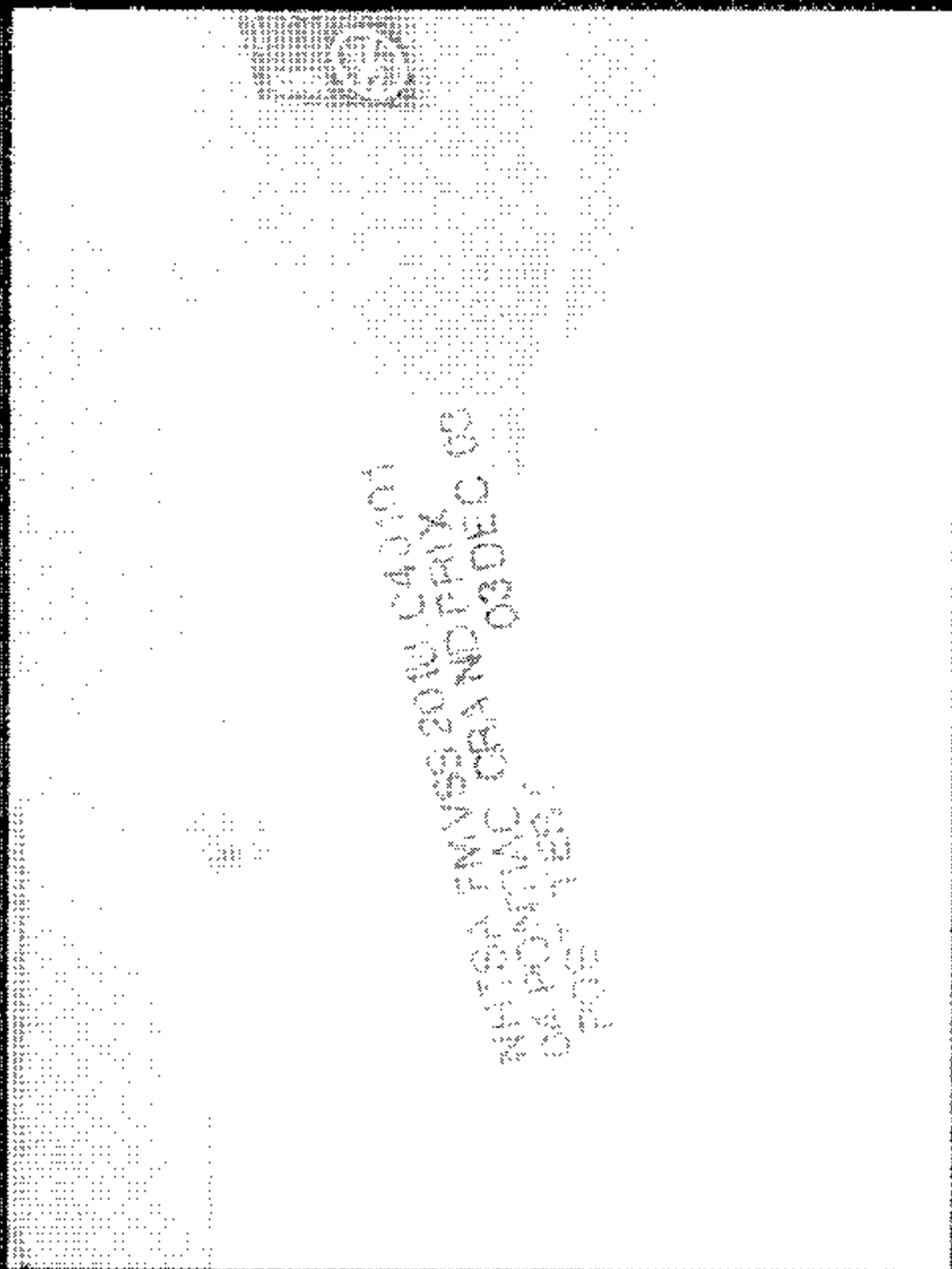


Figure A-23: POST-TEST PASSENGER SIDE FRONT HEADER



Figure A-24. POST-TEST PASSENGER RIDE SIDE RAIL

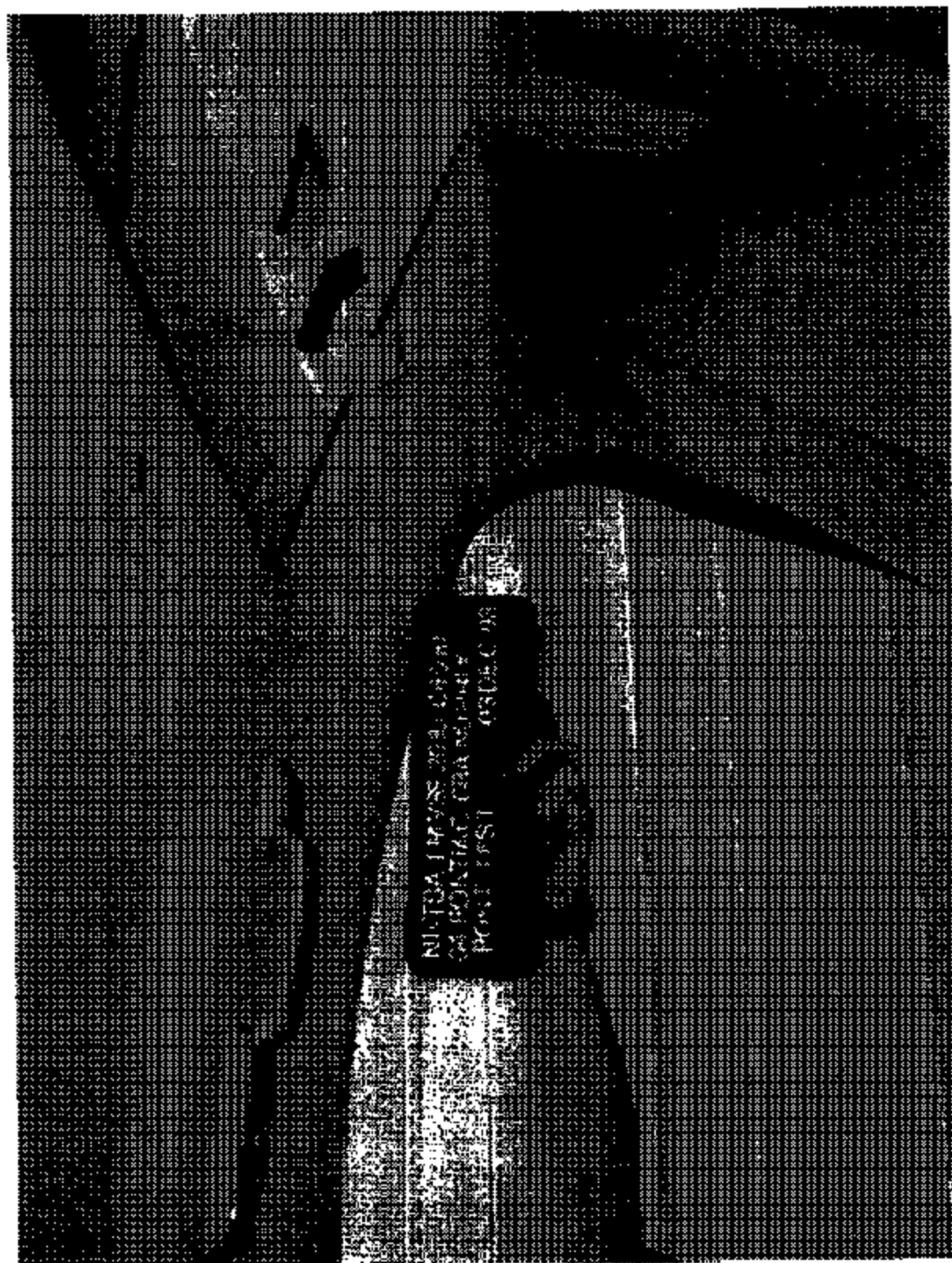


Figure A-26 POST-TEST PASSENGER SIDE REAR PILLAR

APPENDIX B

PART 572L PERFORMANCE CALIBRATION IN SUPPORT OF VEHICLE SAFETY COMPLIANCE TESTING FOR OCCUPANT PROTECTION IN INTERIOR IMPACT

Appendix B contains the results from certification tests performed on the Free Motion Headforms utilized in this test program. The results indicate that the headforms meet all of the performance specifications given in 49 CFR Part 572 Subpart L.

The tests were conducted at the Dummy Certification Test Facility of Veridian Engineering. A summary of the test results are included in this Appendix.

**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS
SERIAL NUMBER:		0642
CALIBRATION DATE:		August 29, 2003
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19°C to 26°C	22
RELATIVE HUMIDITY	10% to 70%	37
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	234.1
PEAK LATERAL ACCELERATION	15 Gs Maximum	13
IS ACCELERATION CURVE UNIMODAL?	YES	YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J24876	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J33030	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	08/22/03	02/23/04

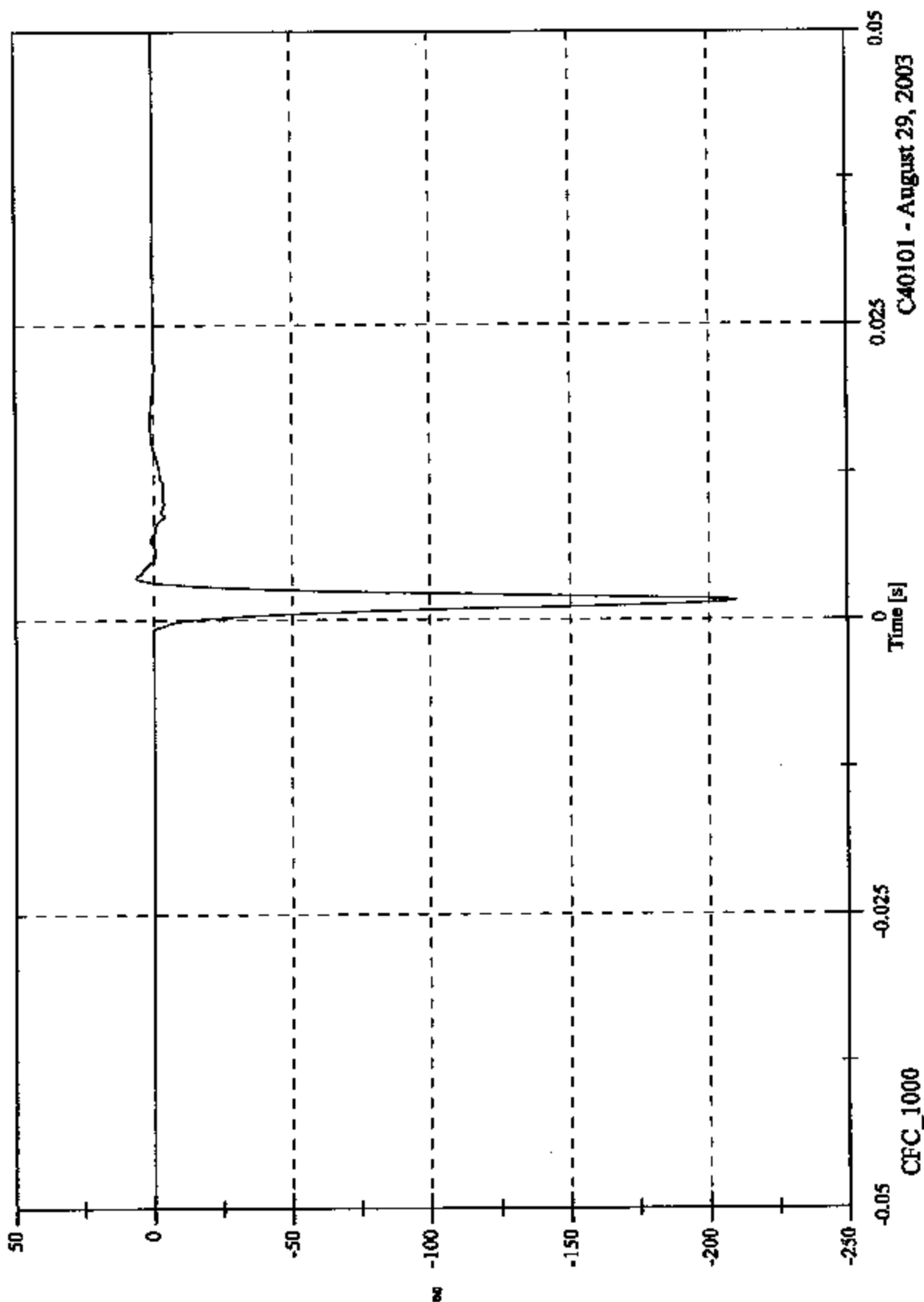
REMARKS:

FMVSS 201U - Headform Calibration Drops

Max: 6.1 [g] at 0.004 [s]

Min: -209.6 [g] at 0.002 [s]

Headform X Acceleration

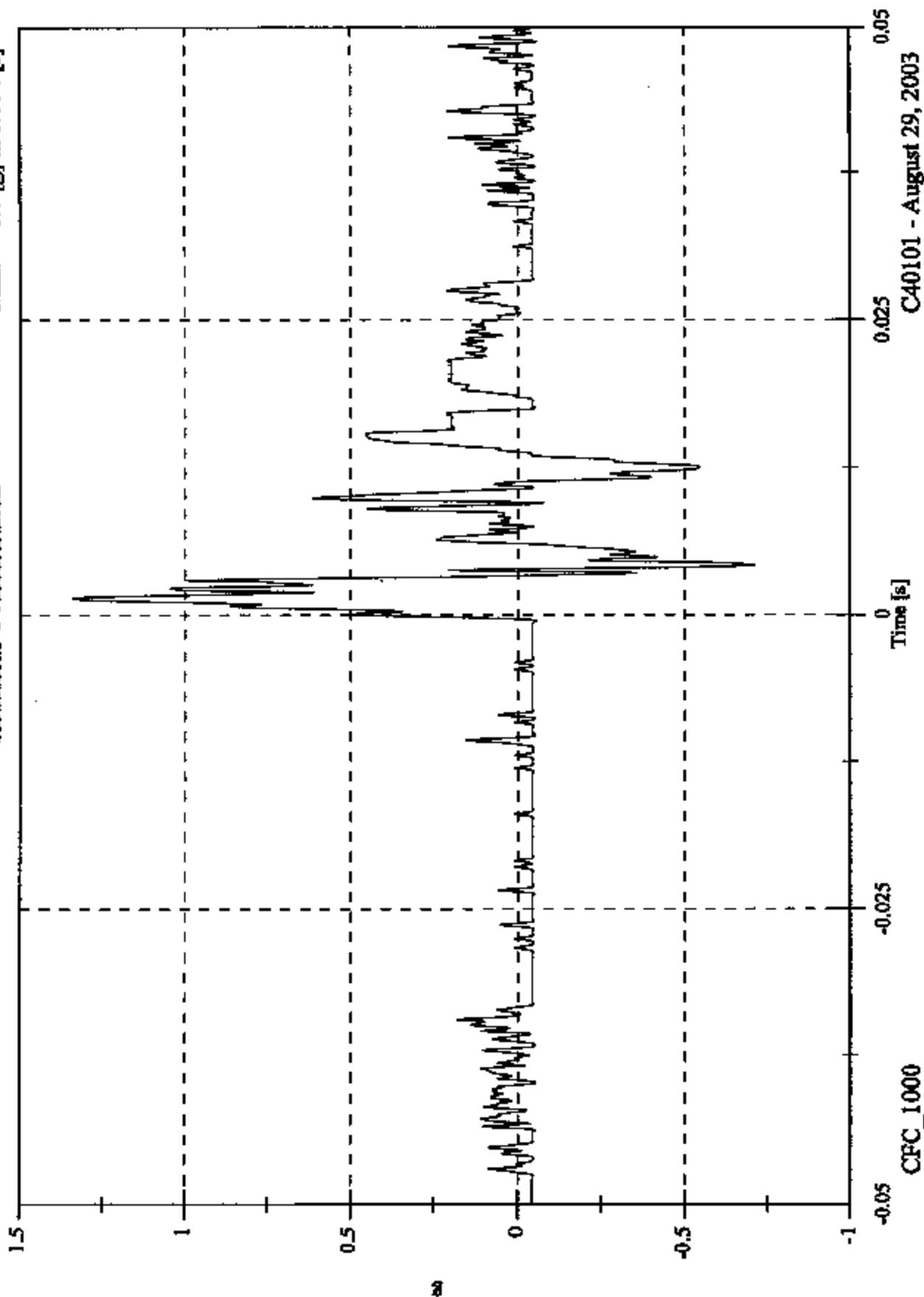


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 1.3 [g] at 0.001 [s]
Min: -0.7 [g] at 0.004 [s]

Headform Y Acceleration

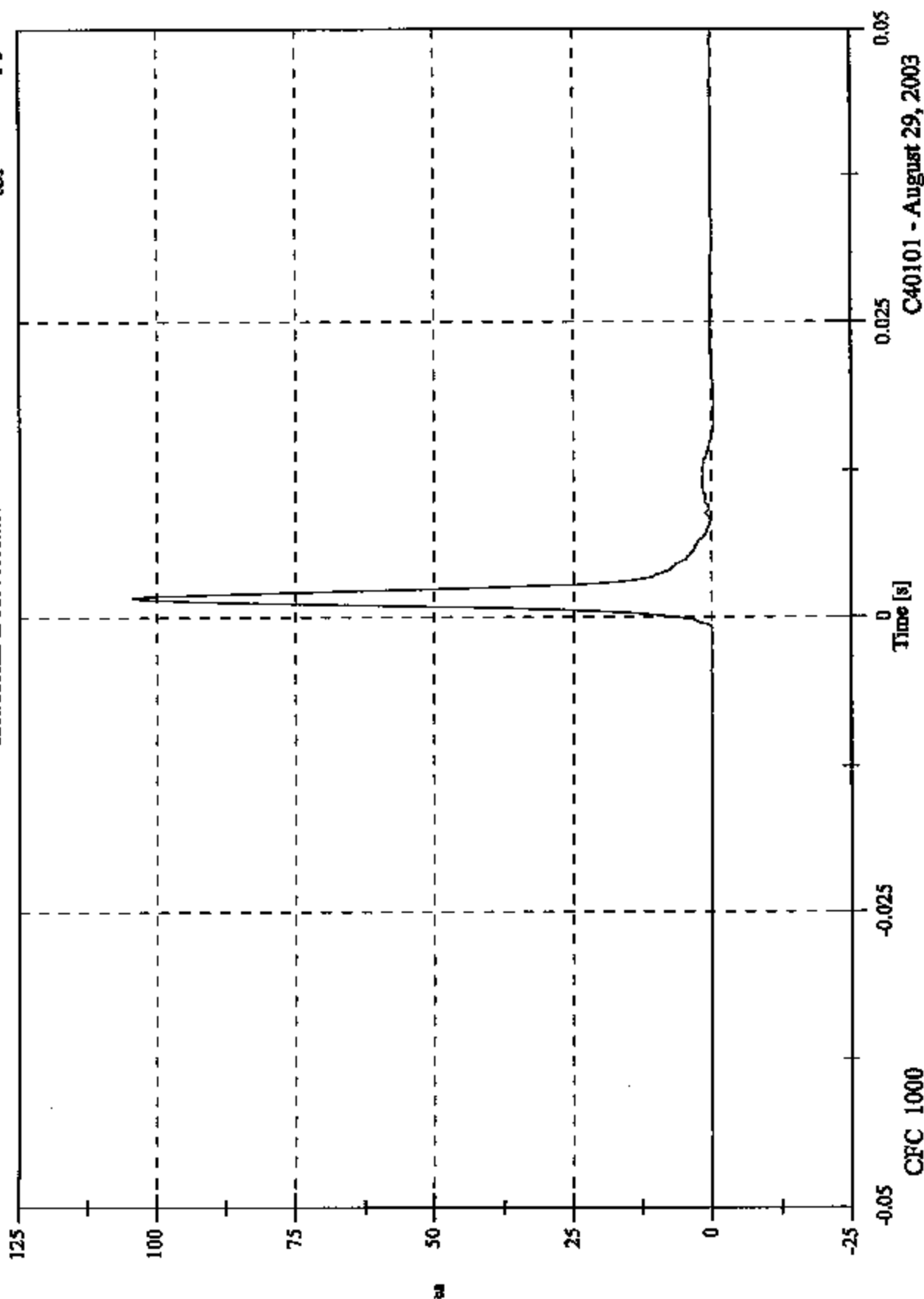


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 104.3 [g] at 0.002 [s]
Min: -0.4 [g] at 0.017 [s]

Headform Z Acceleration

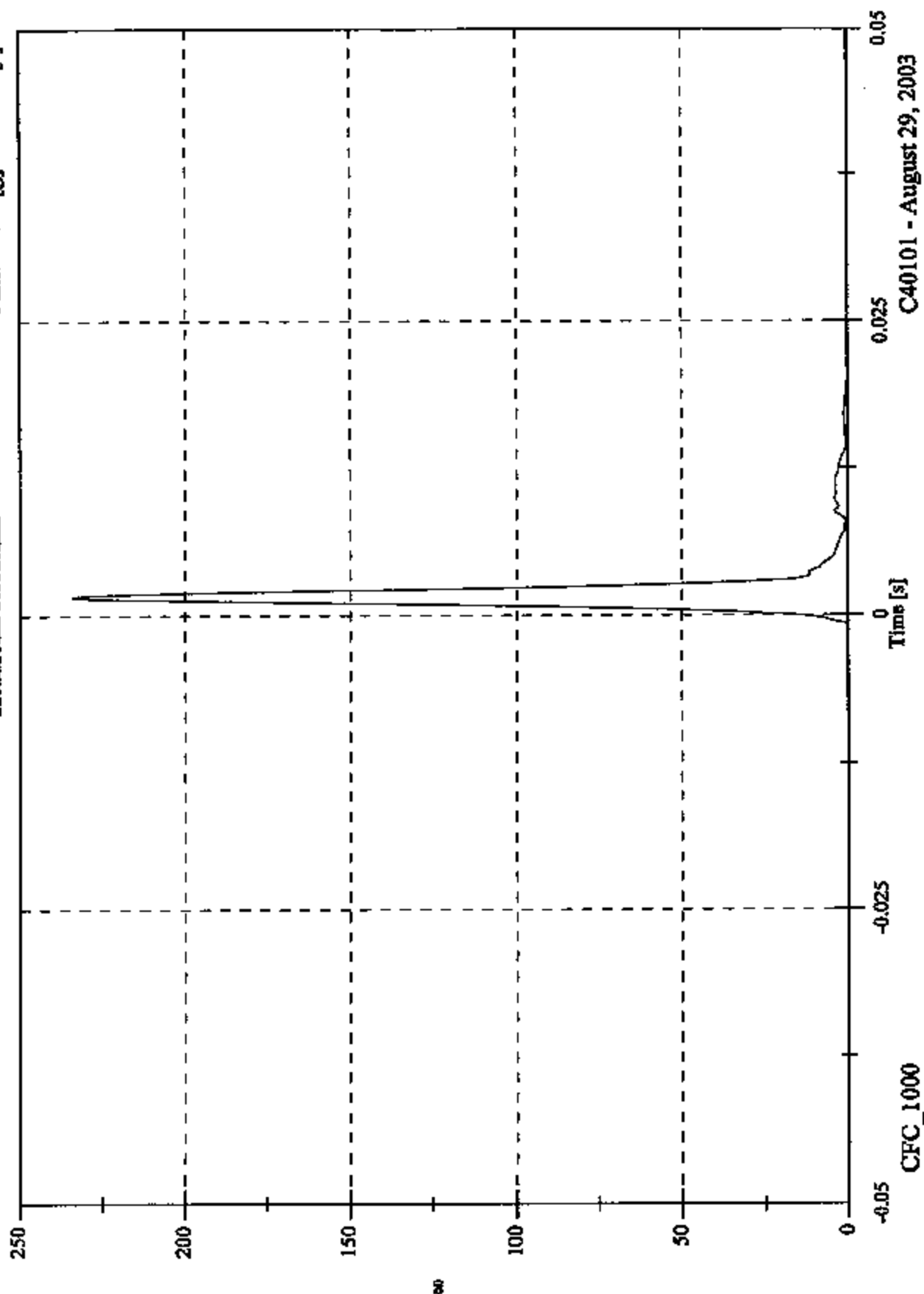


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 234.1 [g] at 0.002 [s]
Min: 0.0 [g] at -0.046 [s]

Headform Resultant



C40101 - August 29, 2003

**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS
SERIAL NUMBER:		8062
CALIBRATION DATE:		August 27, 2003
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19°C to 26°C	22
RELATIVE HUMIDITY	10% to 70%	22
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	248.0
PEAK LATERAL ACCELERATION	15 Gs Maximum	5.6
IS ACCELERATION CURVE UNIMODAL?	YES	YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

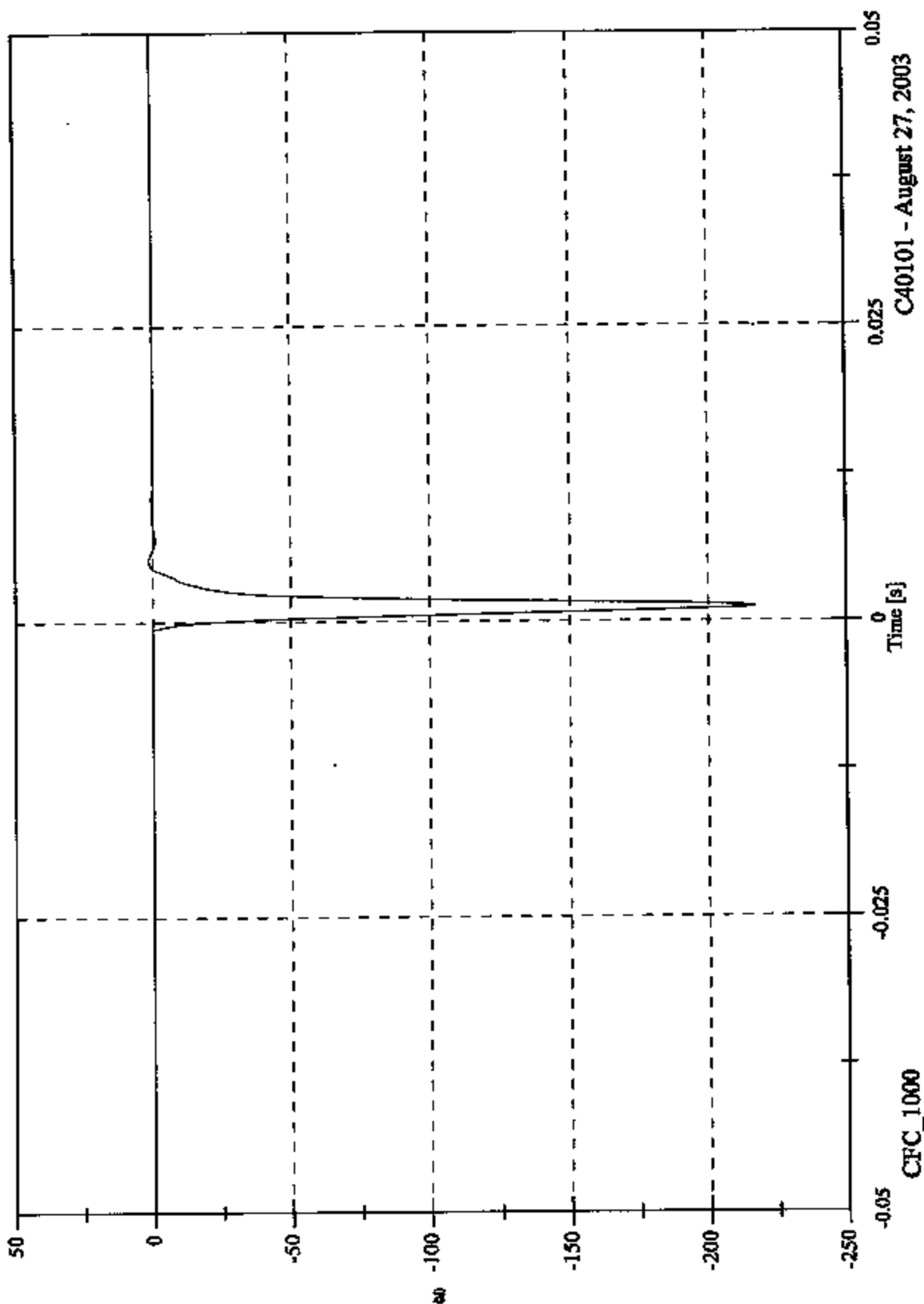
ID. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J33127	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J33019	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J32782	08/22/03	02/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Headform X Acceleration

Max: 1.6 [g] at 0.005 [s]
Min: -216.9 [g] at 0.001 [s]

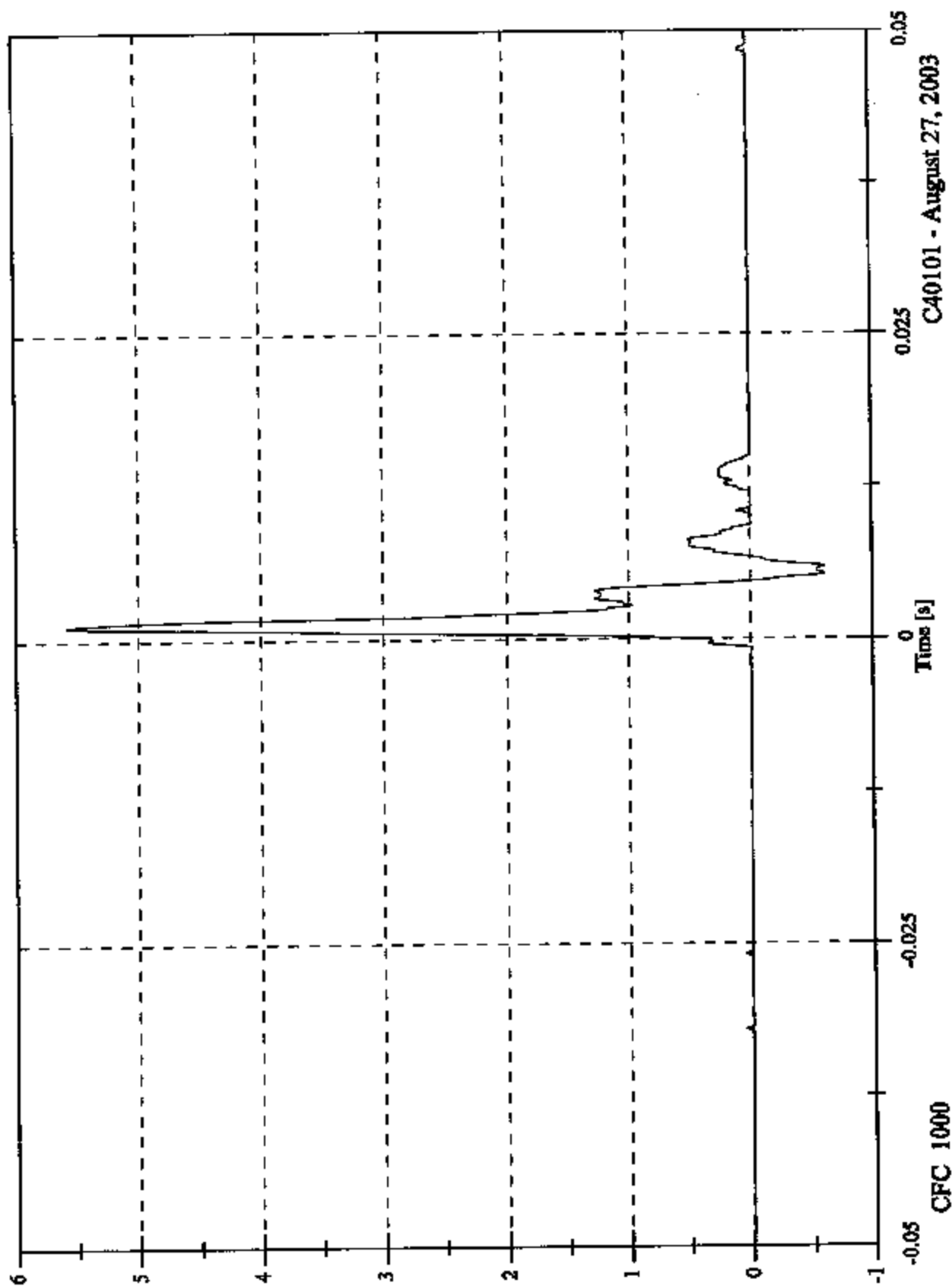


C40101 - August 27, 2003

FMVSS 201U - Headform Calibration Drops

Max: 5.6 [g] at 0.001 [s]
 Min: -0.6 [g] at 0.005 [s]

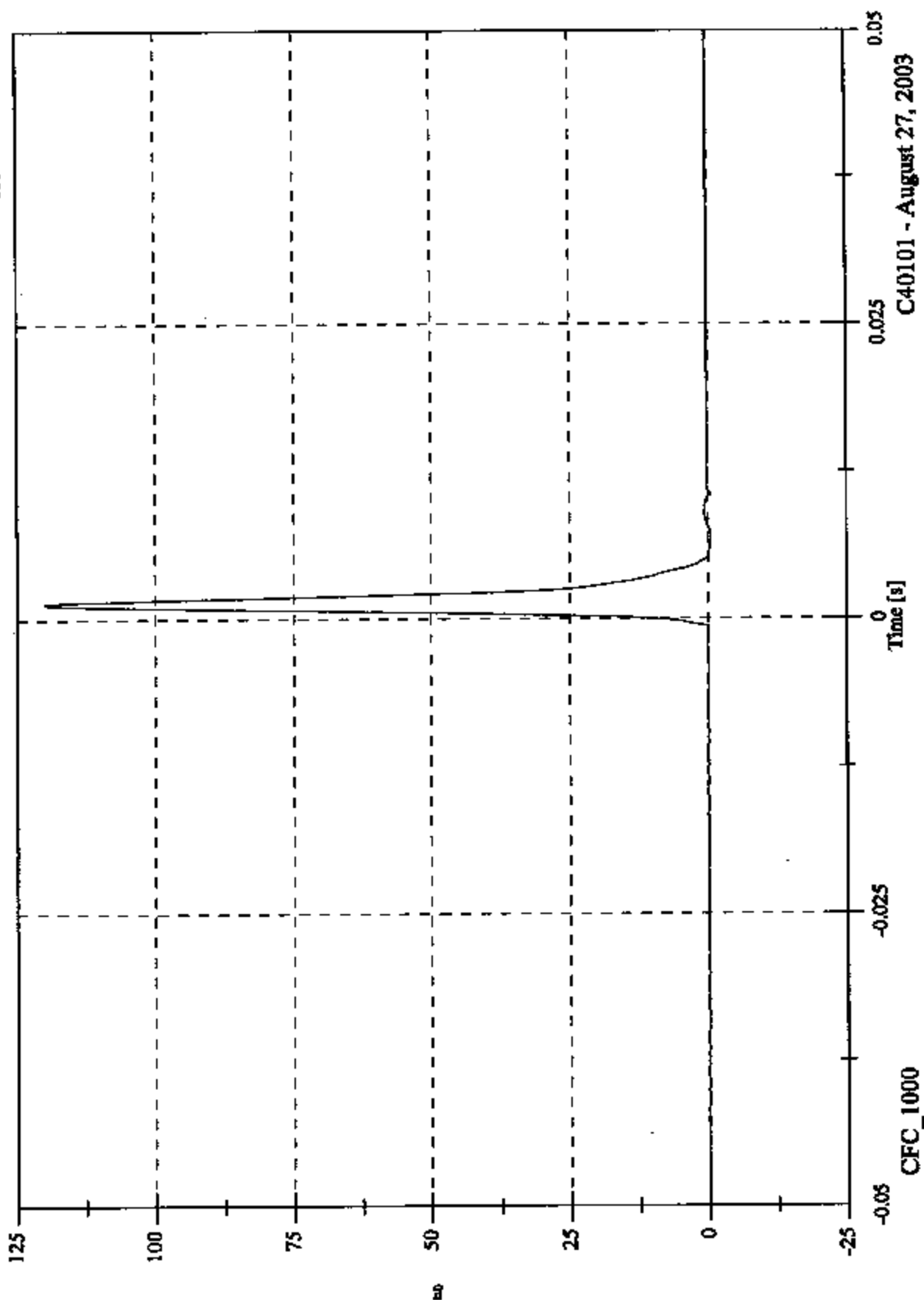
Headform Y Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 120.1 [g] at 0.001 [s]
Min: -0.5 [g] at 0.007 [s]

Headform Z Acceleration

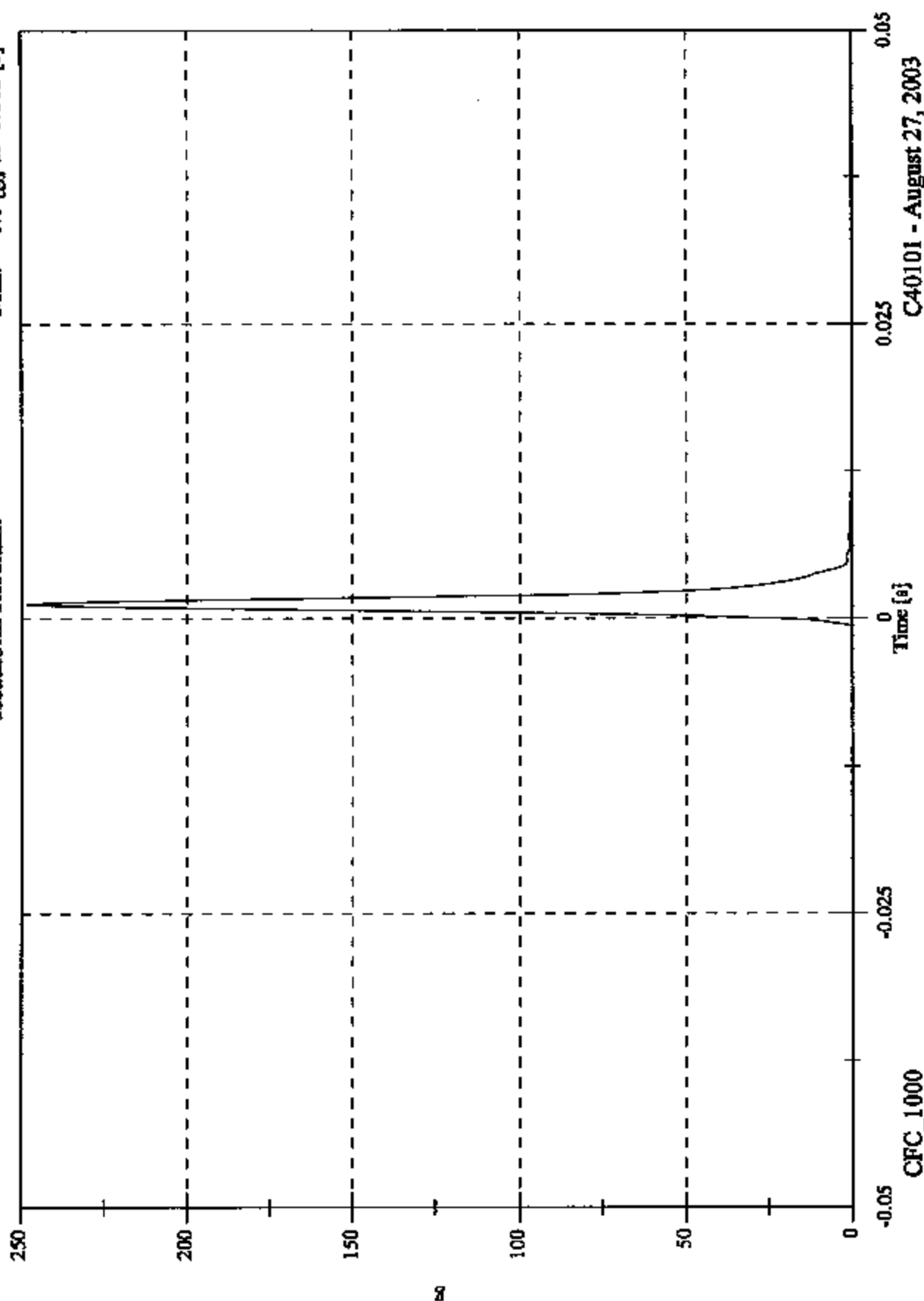


C40101 - August 27, 2003

FMVSS 201U - Headform Calibration Drops

Max: 248.0 [g] at 0.001 [s]
Min: 0.0 [g] at -0.003 [s]

Headform Resultant



C40101 - August 27, 2003

**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		805	
CALIBRATION DATE:		August 29, 2003	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	19°C to 26°C		22
RELATIVE HUMIDITY	10% to 70%		37
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		264.4
PEAK LATERAL ACCELERATION	15 Gs Maximum		13.7
IS ACCELERATION CURVE UNIMODAL?	YES		YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

ID. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J38127	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J37980	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J37854	08/22/03	02/23/04

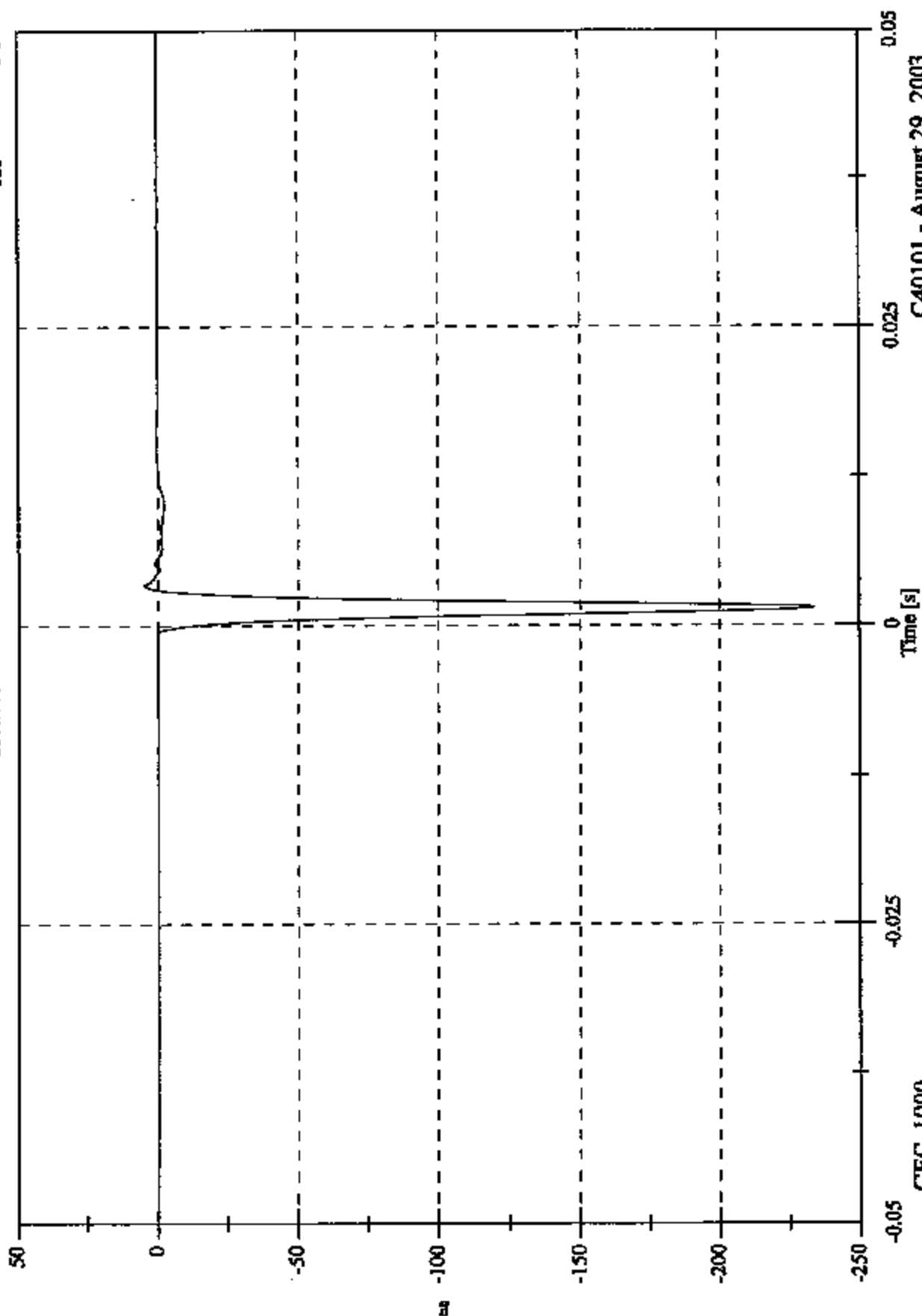
REMARKS:

FMVSS 201U - Headform Calibration Drops

Max: 4.8 [g] at 0.003 [s]

Min: -234.0 [g] at 0.001 [s]

Headform X Acceleration

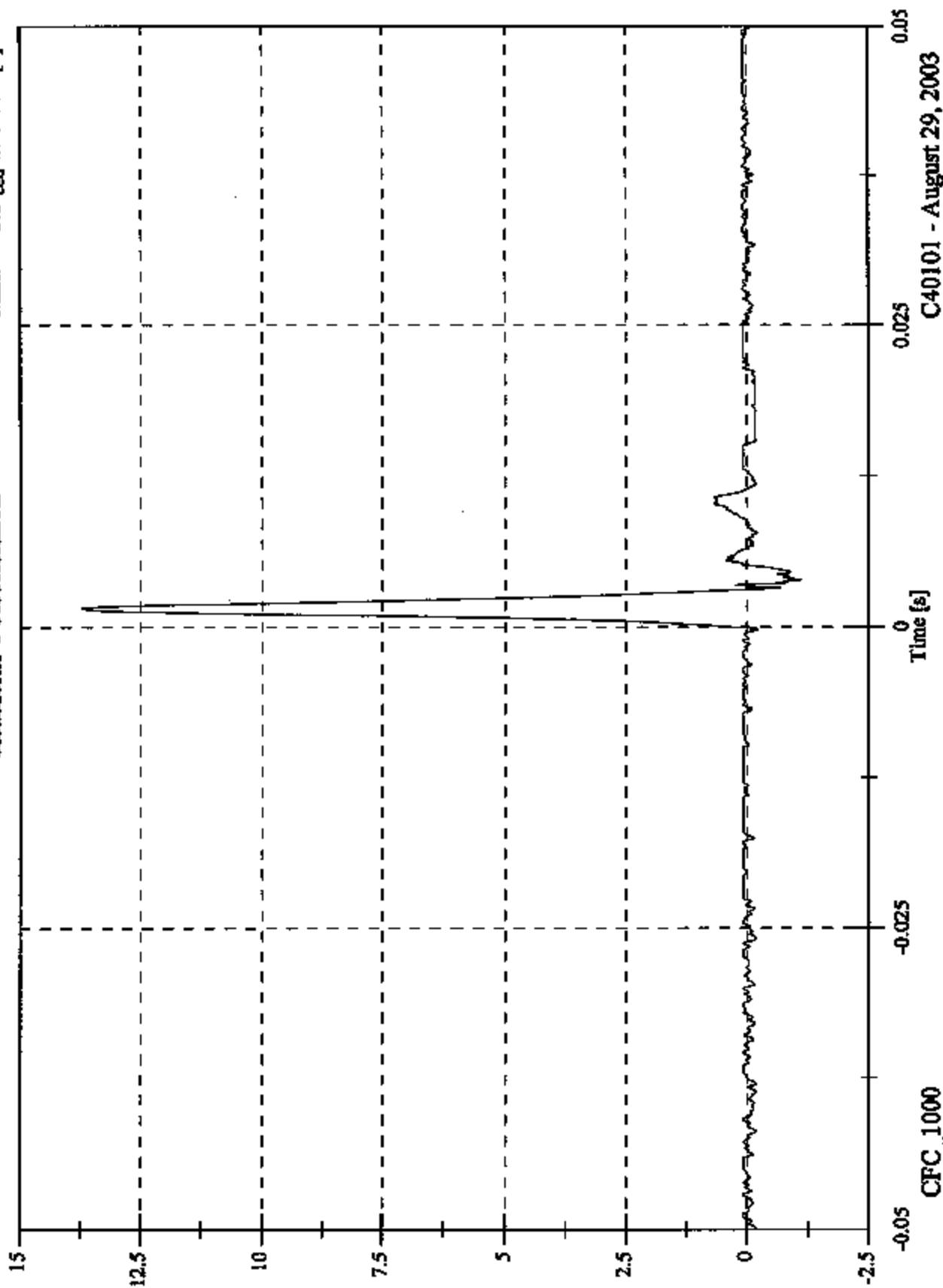


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 13.7 [g] at 0.002 [s]
Min: -1.1 [g] at 0.004 [s]

Headform Y Acceleration

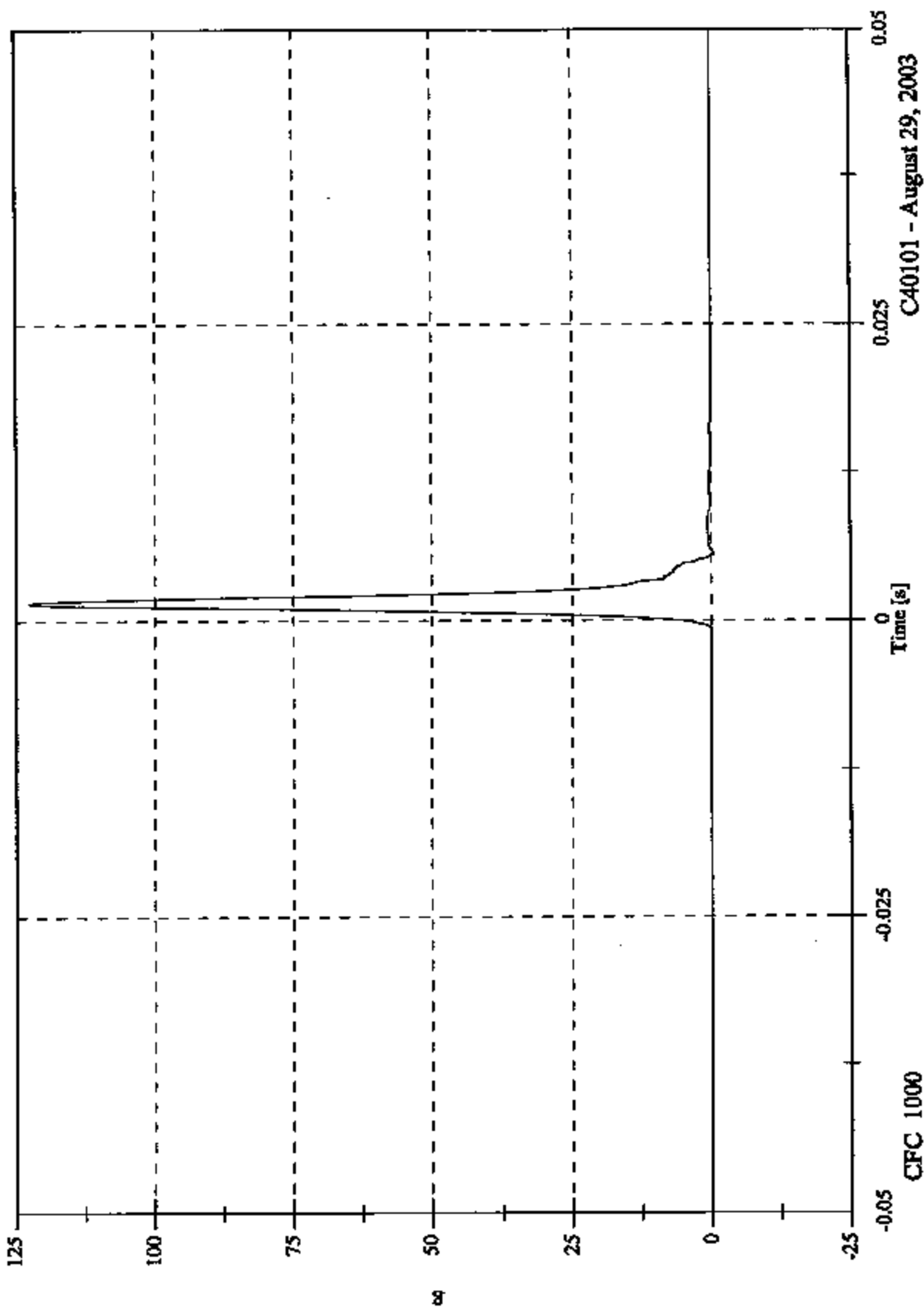


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 122.6 [g] at 0.001 [s]
Min: -0.5 [g] at 0.006 [s]

Headform Z Acceleration

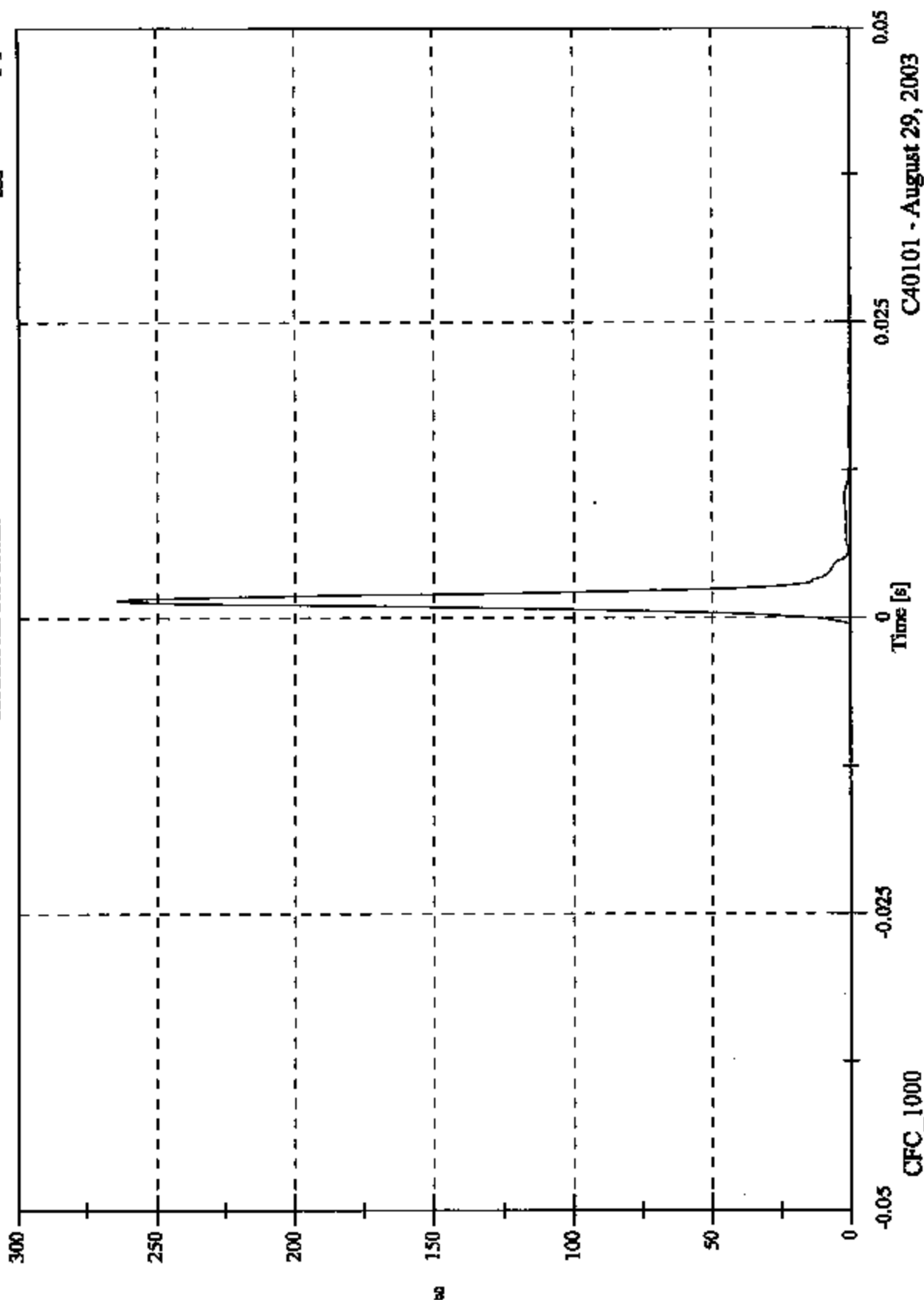


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 264.4 [g] at 0.001 [s]
Min: 0.0 [g] at 0.027 [s]

Headform Resultant



C40101 - August 29, 2003

**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		0355	
CALIBRATION DATE:		August 29, 2003	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22	
RELATIVE HUMIDITY	10% to 70%	37	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	246.2	
PEAK LATERAL ACCELERATION	15 Gs Maximum	10.4	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

HEAD ACCELEROMETER CALIBRATION INFORMATION

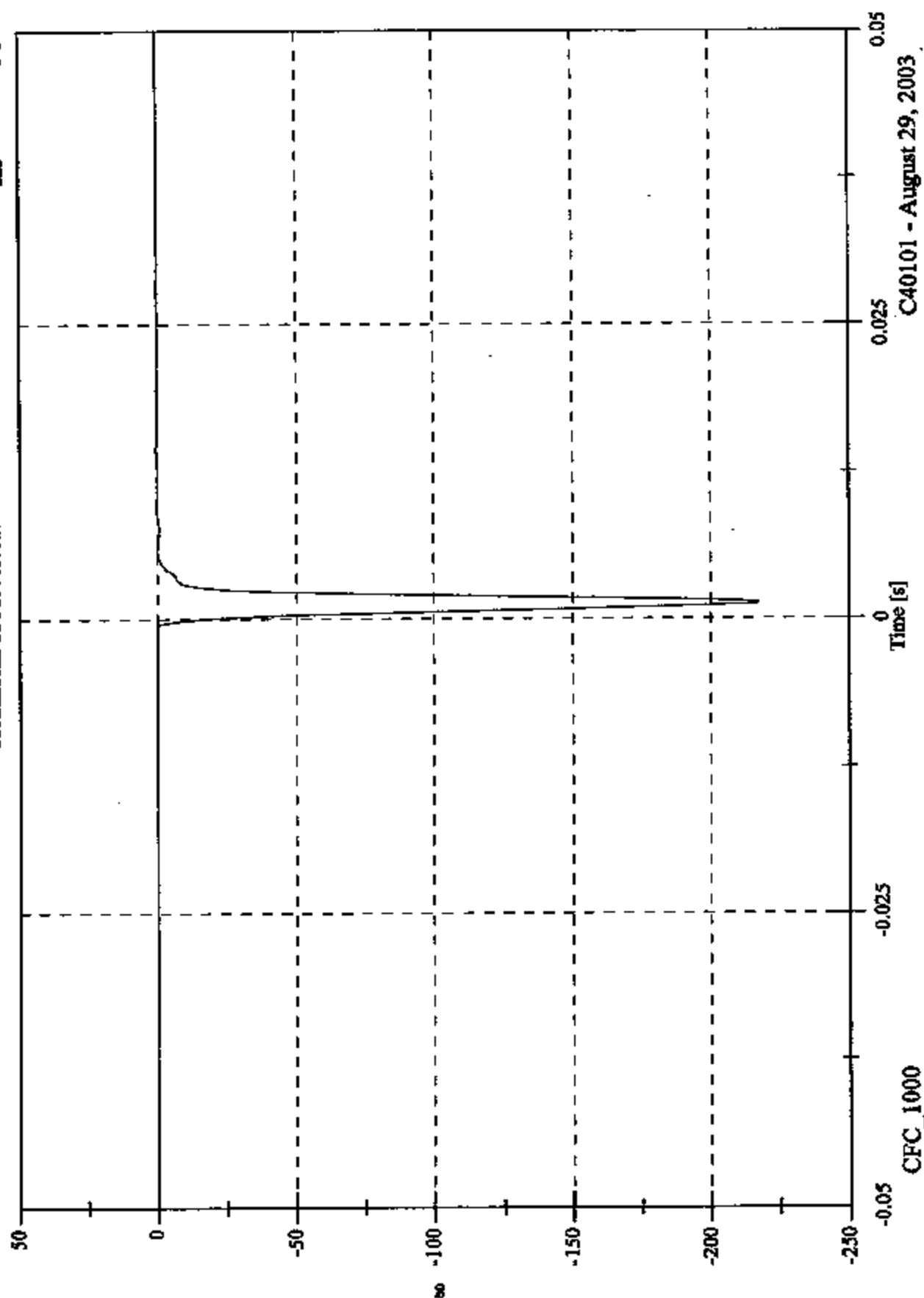
LD. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J28671	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J32779	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J25854	08/22/03	02/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Max: 0.8 [g] at 0.014 [s]
Min: -217.5 [g] at 0.001 [s]

Headform X Acceleration

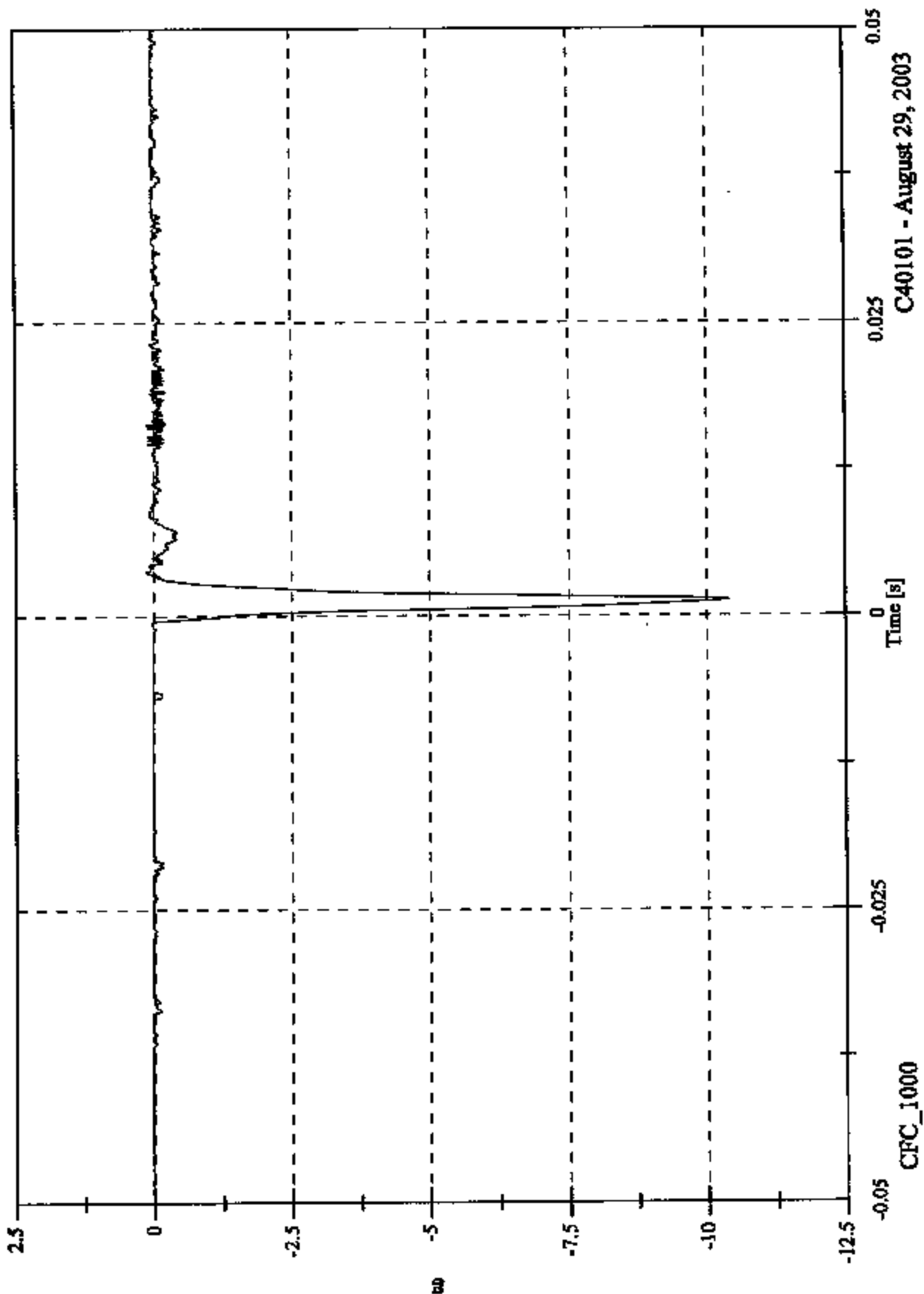


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 0.1 [g] at 0.004 [s]
Min: -10.4 [g] at 0.001 [s]

Headform Y Acceleration

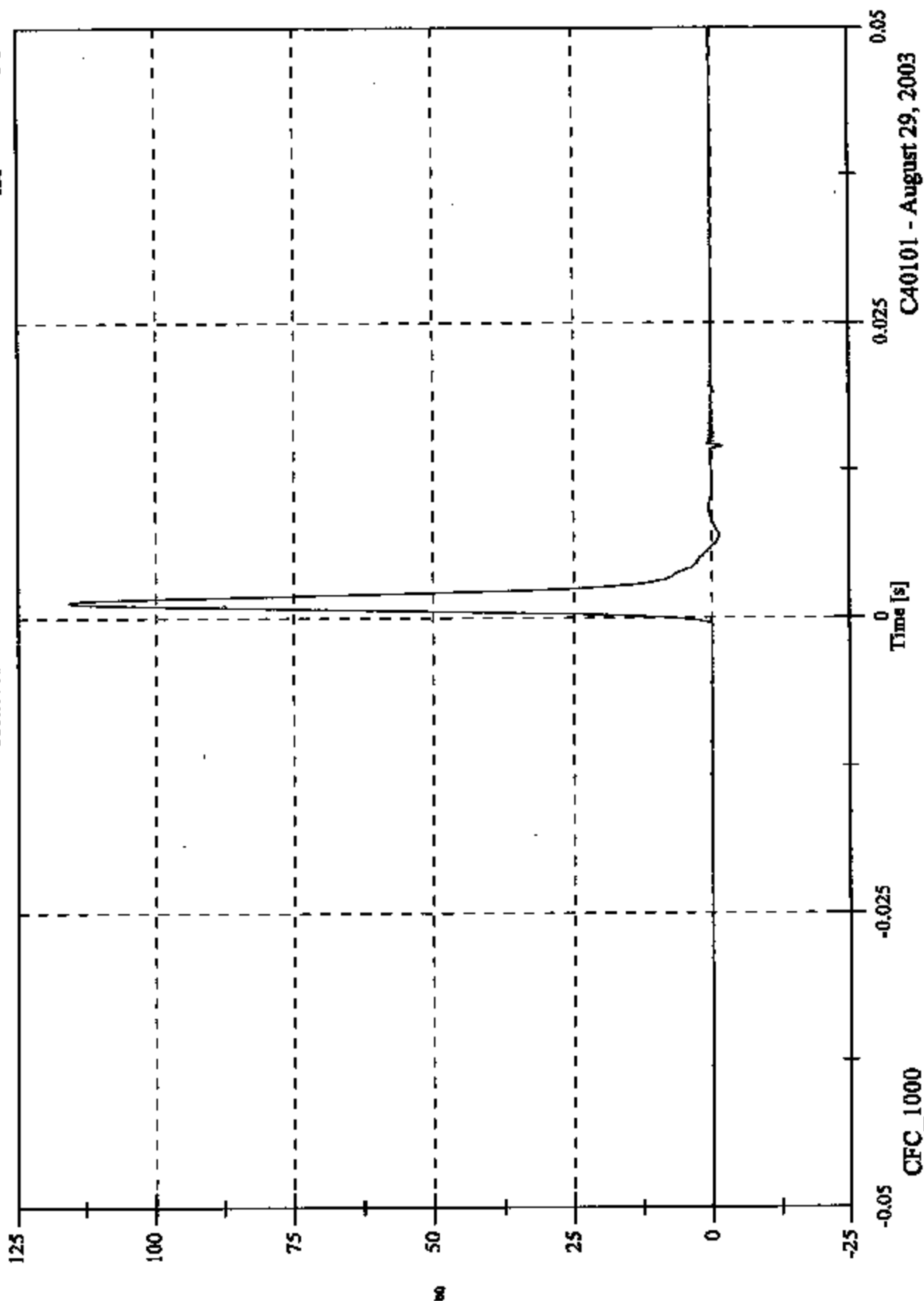


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Headform Z Acceleration

Max: 115.5 [g] at 0.001 [s]
Min: -1.9 [g] at 0.014 [s]

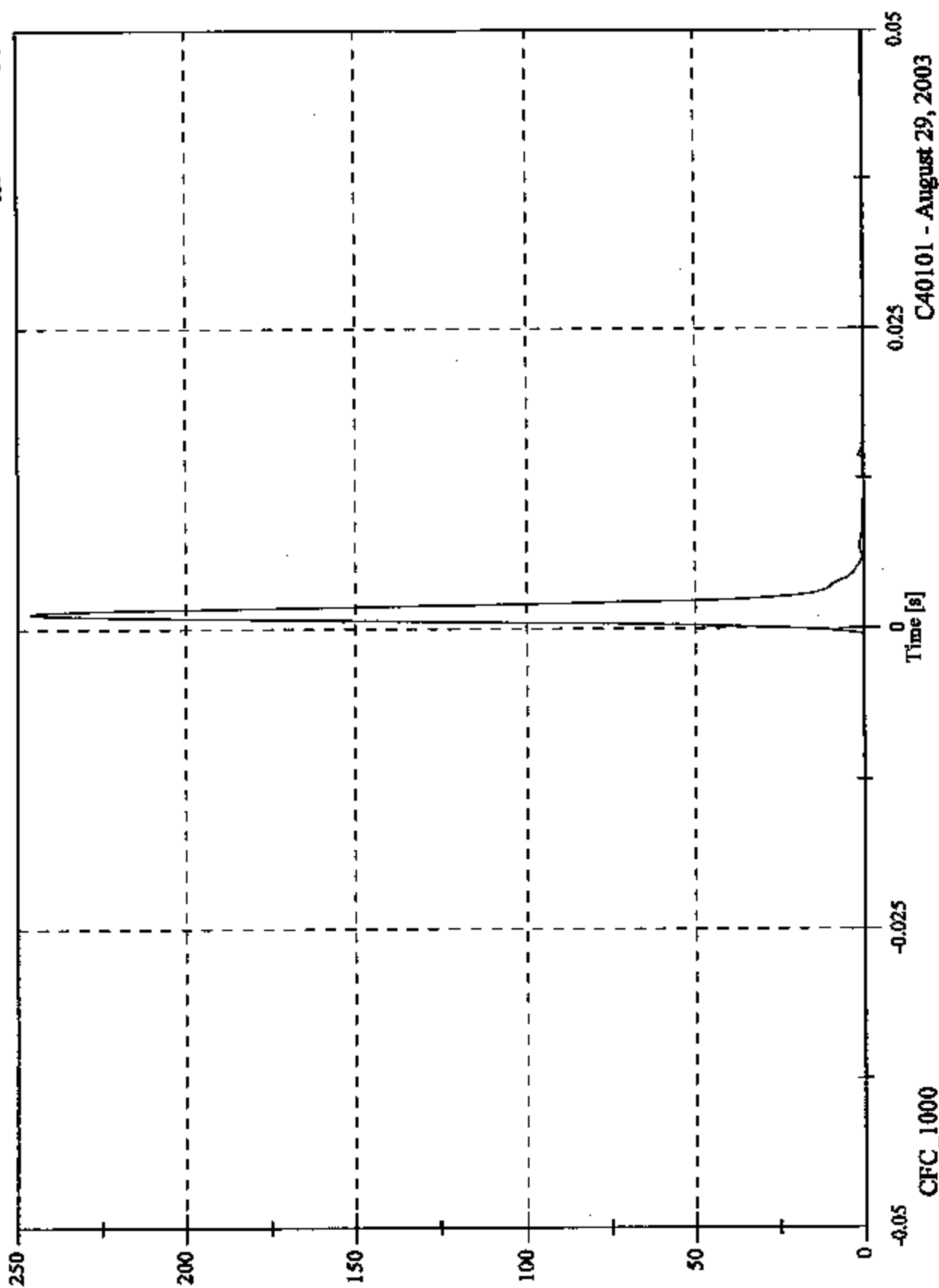


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 246.2 [g] at 0.001 [s]
Min: 0.0 [g] at -0.001 [s]

Headform Resultant



**PART 572L
HEAD DROP PRE-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS
SERIAL NUMBER:		1255
CALIBRATION DATE:		August 29, 2003
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19°C to 26°C	22
RELATIVE HUMIDITY	10% to 70%	37
PEAK RESULTANT ACCELERATION	215 Gs to 275 Gs	226.1
PEAK LATERAL ACCELERATION	15 Gs Maximum	2.6
IS ACCELERATION CURVE UNIMODAL?	YES	YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

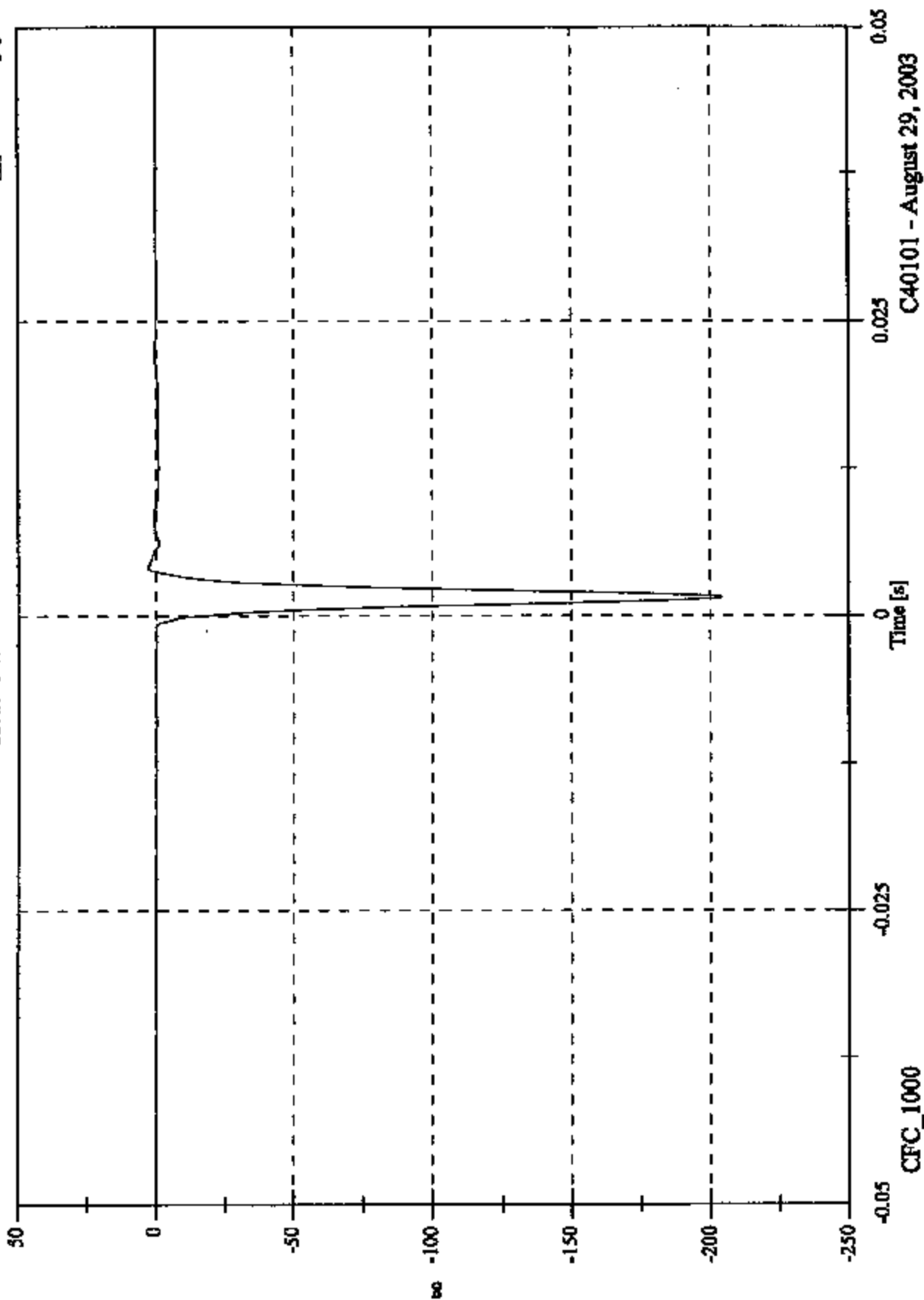
ID NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J41006	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J40994	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	08/22/03	02/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Max: 2.5 [g] at 0.004 [s]
Min: -204.5 [g] at 0.002 [s]

Headform X Acceleration

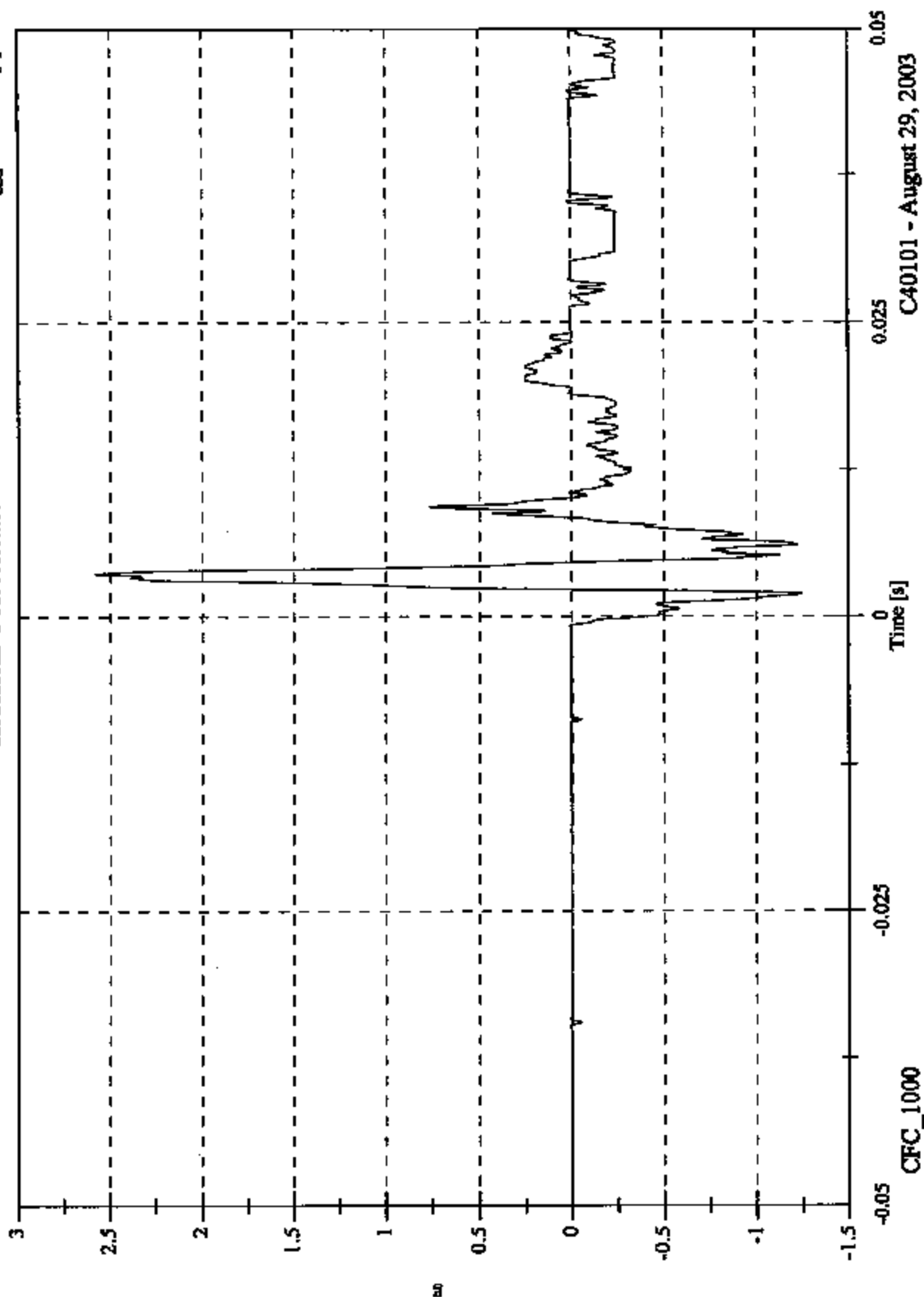


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 2.6 [g] at 0.004 [s]
Min: -1.2 [g] at 0.002 [s]

Headform Y Acceleration

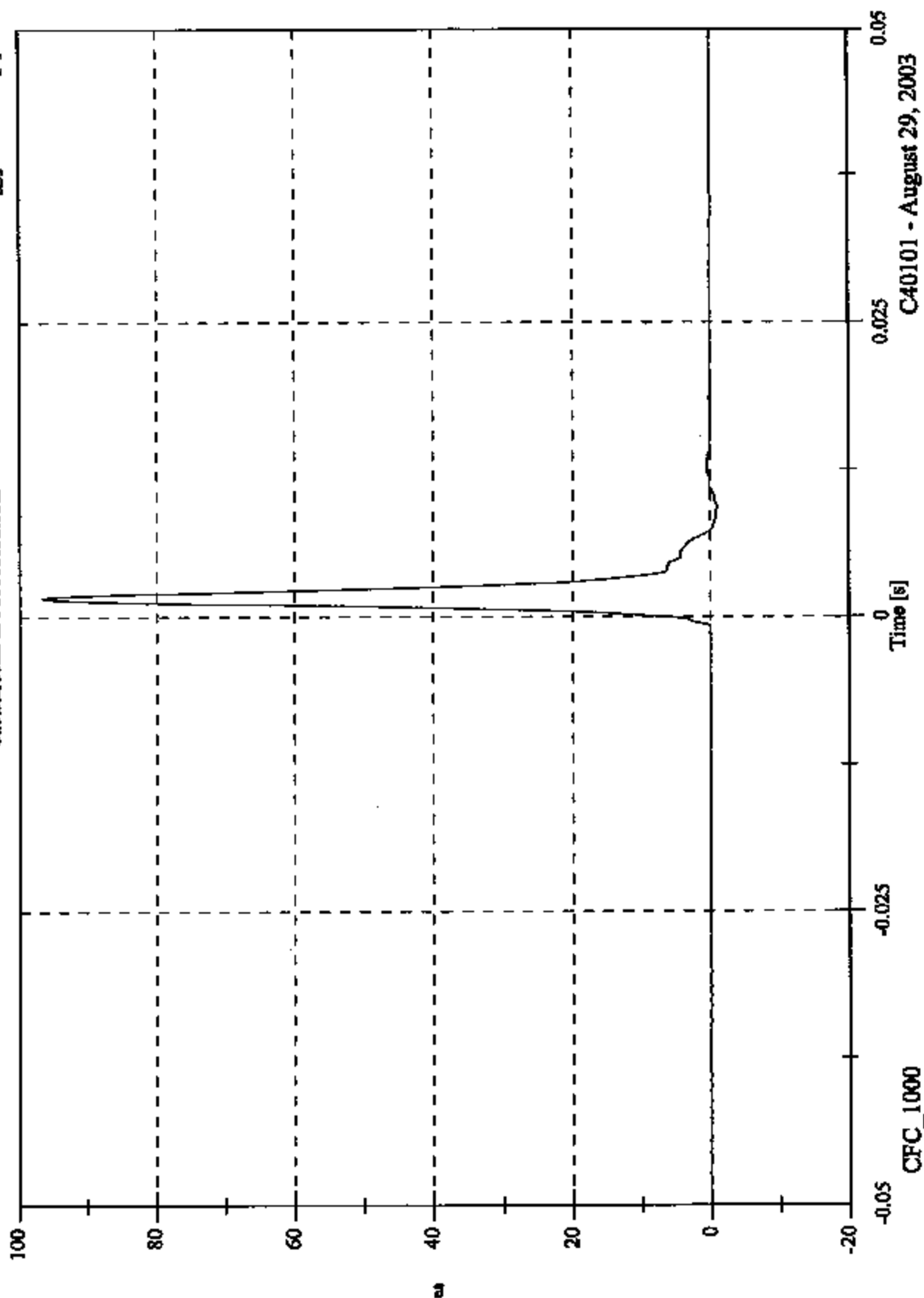


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 96.7 [g] at 0.002 [s]
Min: -1.0 [g] at 0.009 [s]

Headform Z Acceleration

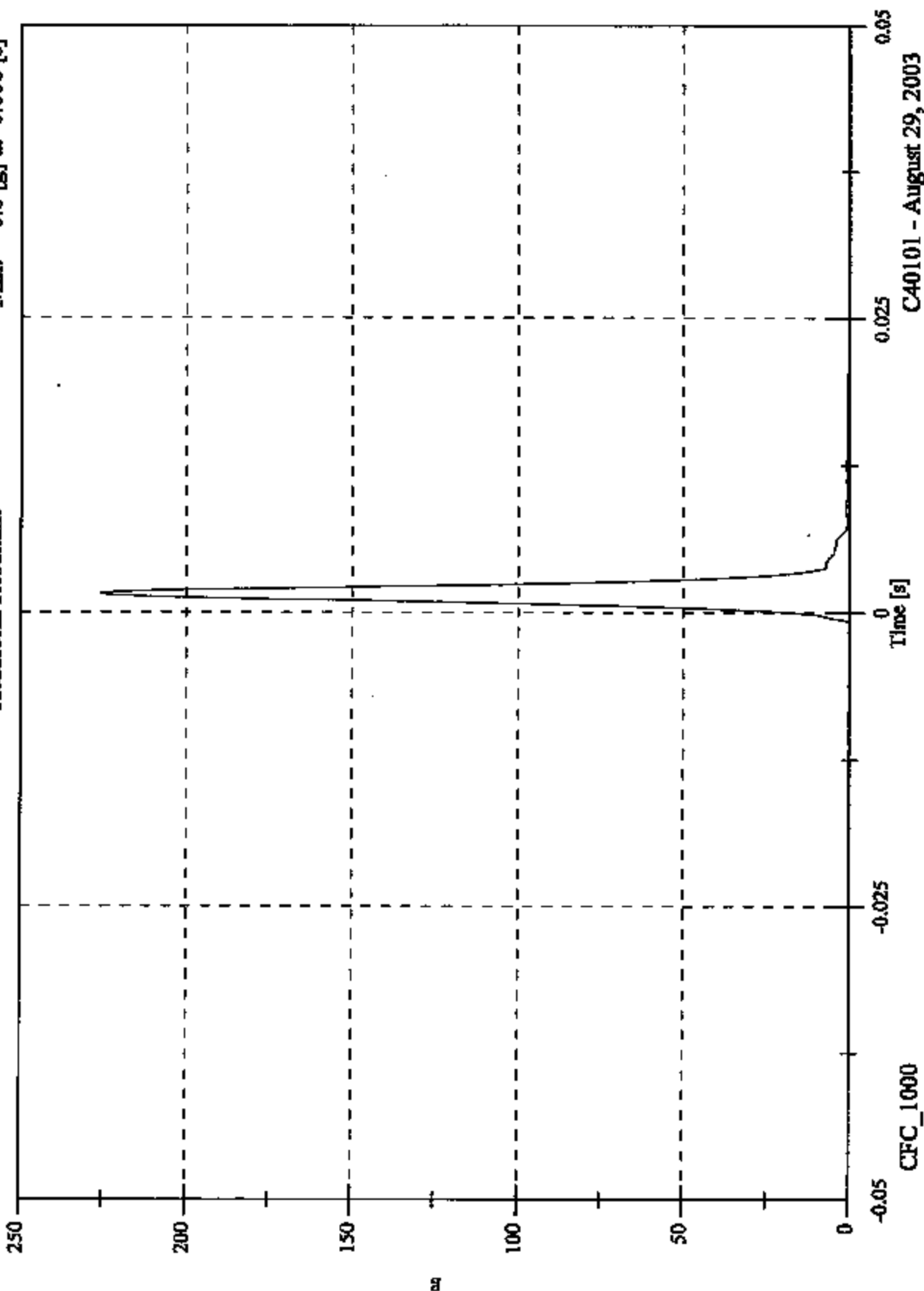


C40101 - August 29, 2003

FMVSS 201U - Headform Calibration Drops

Max: 226.1 [g] at 0.002 [s]
Min: 0.0 [g] at -0.008 [s]

Headform Resultant



C40101 - August 29, 2003

**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		0642	
CALIBRATION DATE:		December 03, 2003	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	15°C to 26°C	21	
RELATIVE HUMIDITY	10% to 70%	18	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	268.1	
PEAK LATERAL ACCELERATION	15 Gs Maximum	12.8	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

HEAD ACCELEROMETER CALIBRATION INFORMATION

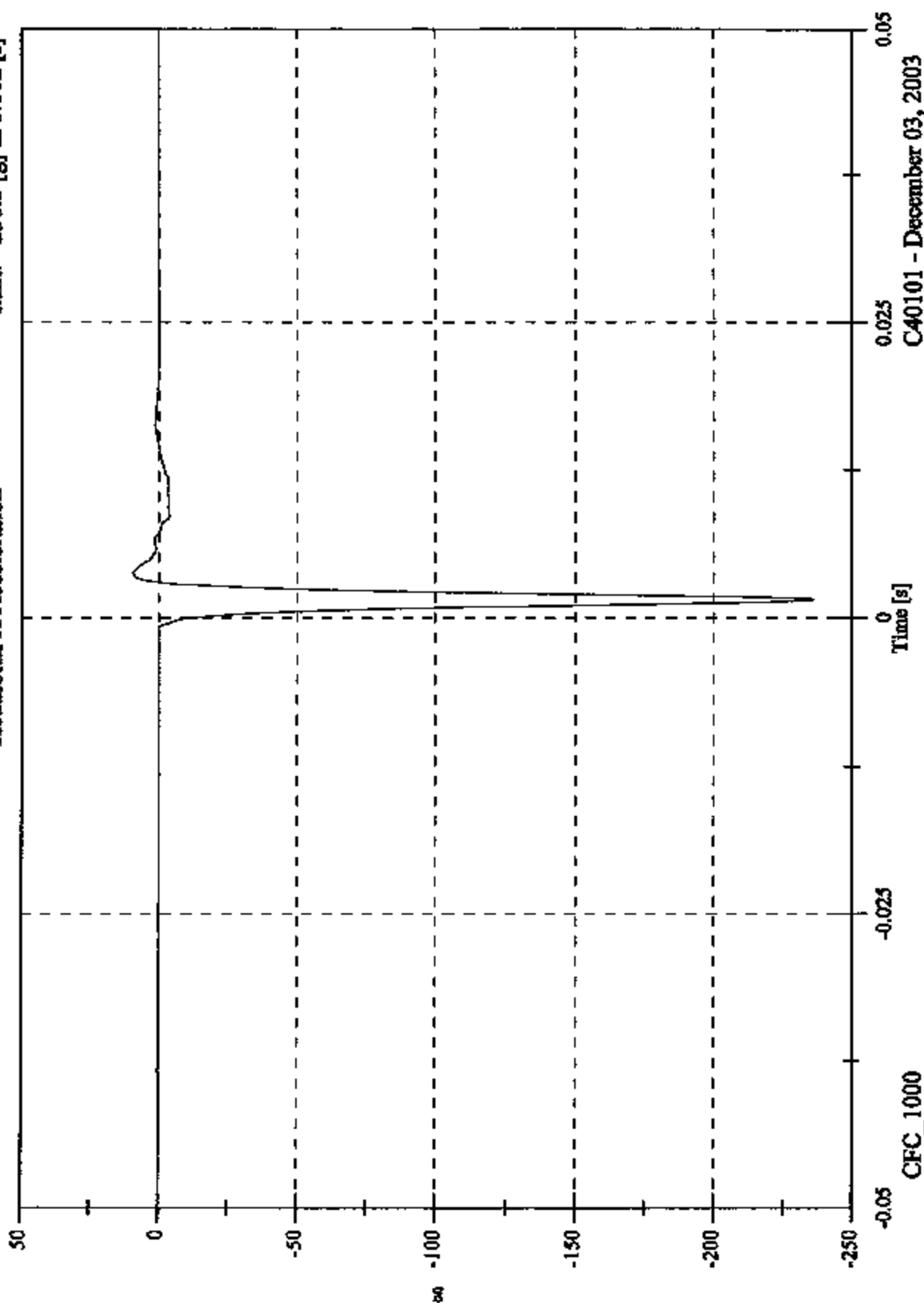
ID. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J14976	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J33838	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J31809	08/22/03	02/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Max: 9.4 [g] at 0.004 [s]
Min: -236.5 [g] at 0.002 [s]

Headform X Acceleration

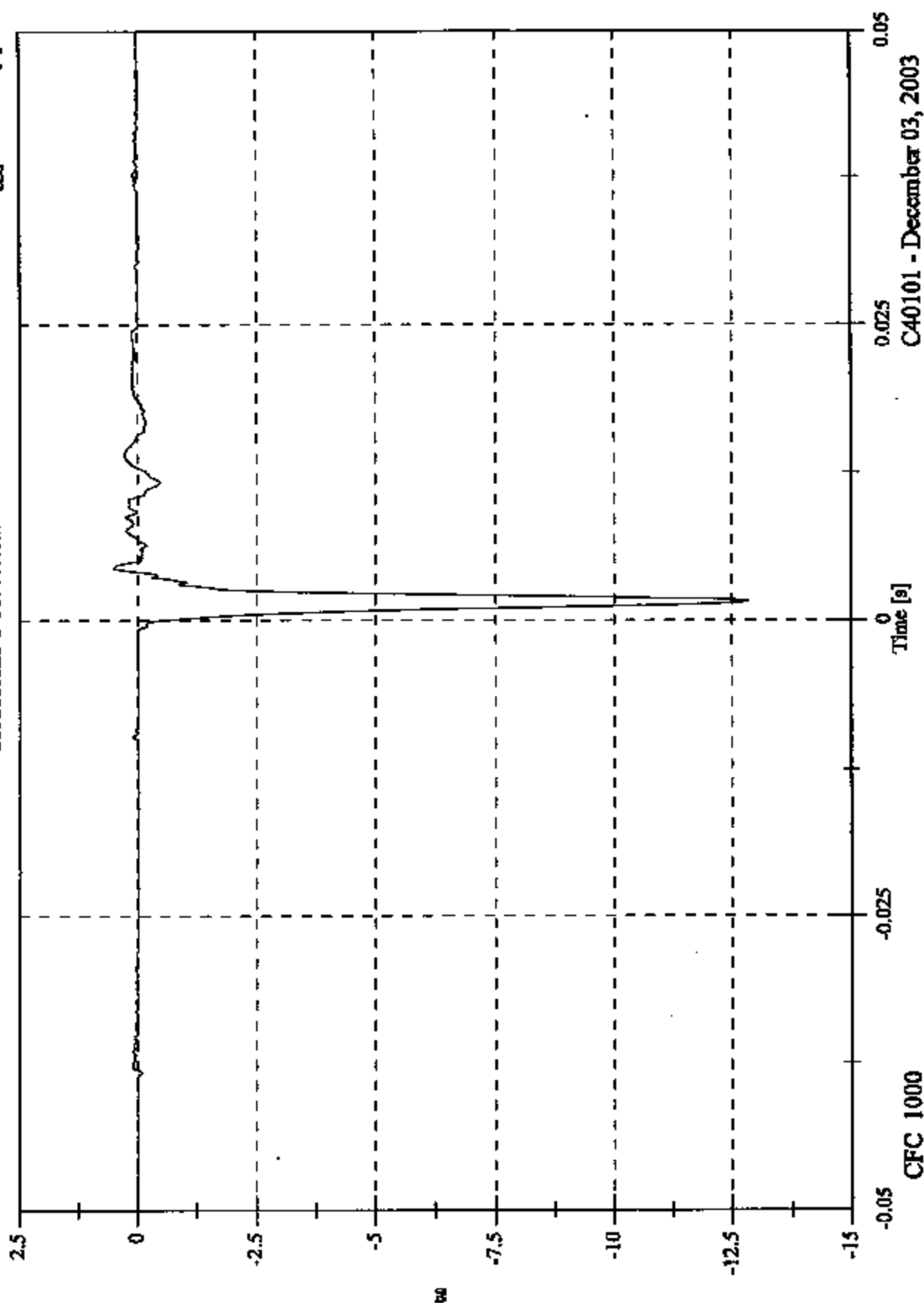


0.025
0.05
C40101 - December 03, 2003

FMVSS 201U - Headform Calibration Drops

Max: 0.5 [g] at 0.004 [s]
Min: -12.8 [g] at 0.002 [s]

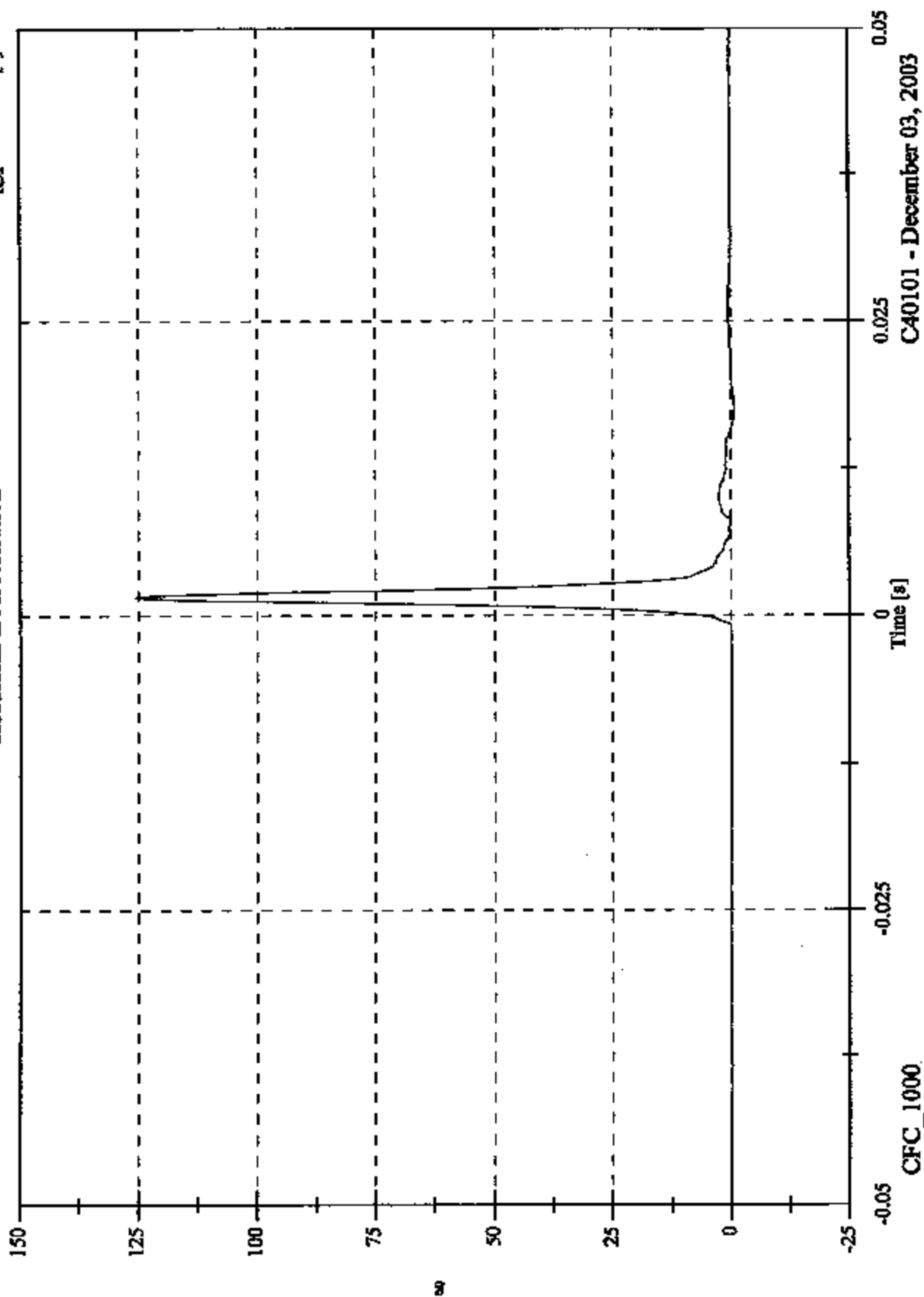
Headform Y Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 125.6 [g] at 0.002 [s]
 Min: -0.7 [g] at 0.017 [s]

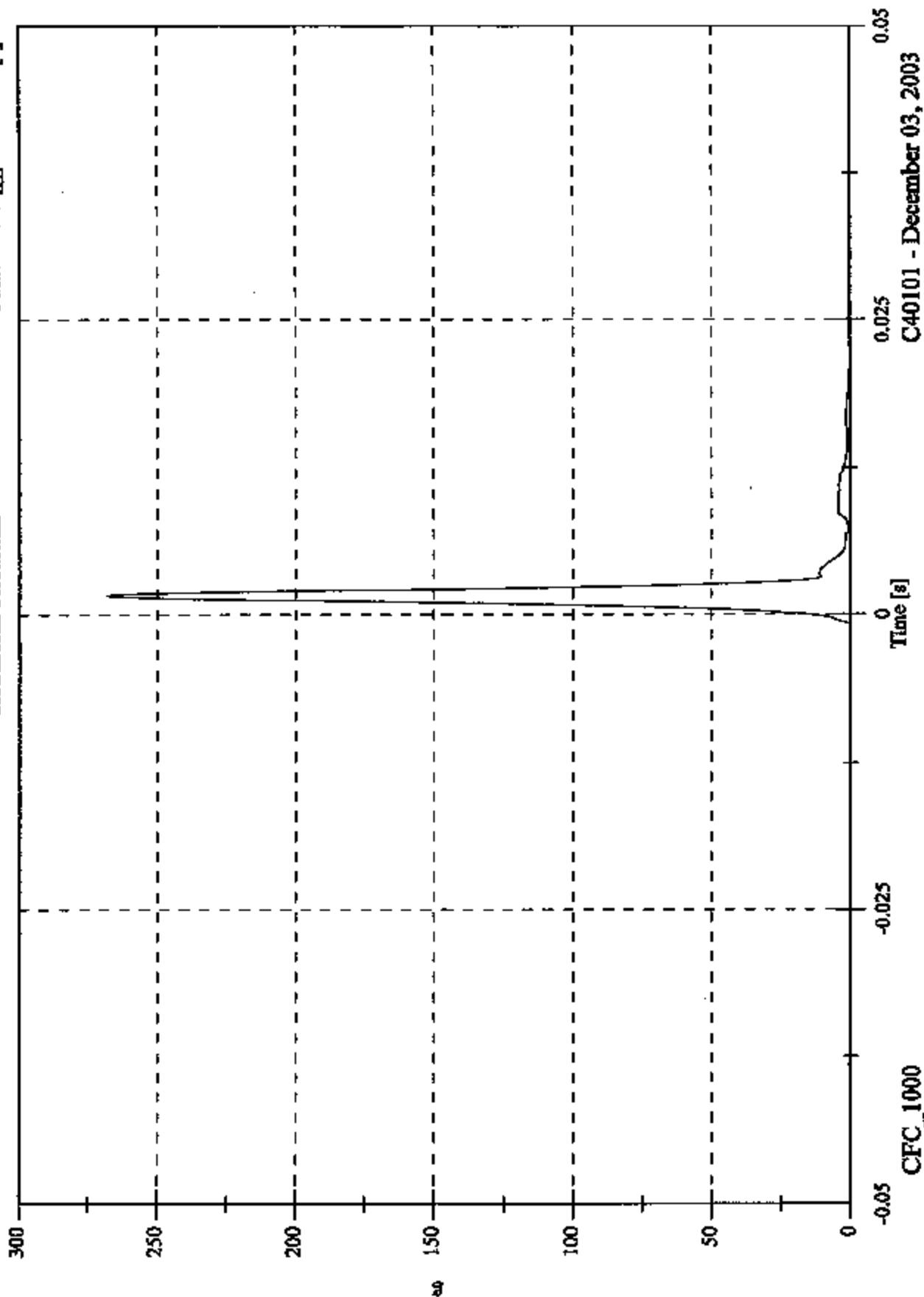
Headform Z Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 268.1 [g] at 0.002 [s]
Min: 0.0 [g] at -0.033 [s]

Headform Resultant



**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS
SERIAL NUMBER:		0062
CALIBRATION DATE:		December 03, 2003
TEST PARAMETER	SPE CIFICATION	TEST RESULTS
TEMPERATURE	15°C to 26°C	21
RELATIVE HUMIDITY	10% to 78%	18
PEAK RESULTANT ACCELERATION	125 Gs to 275 Gs	138.0
PEAK LATERAL ACCELERATION	15 Gs Maximum	10.1
IS ACCELERATION CURVE UNIMODAL?	YES	YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

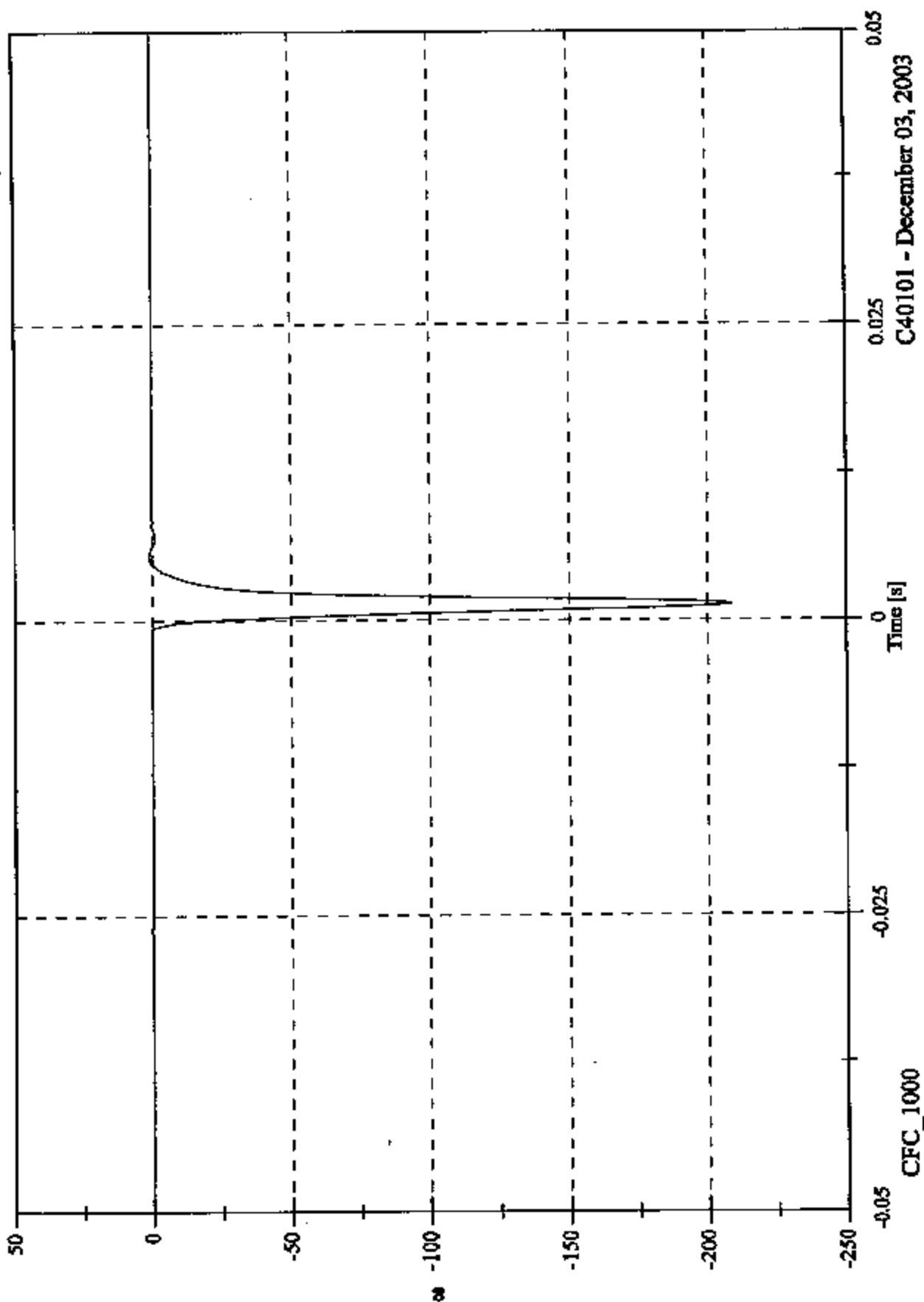
ID. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J33127	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J33019	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J33781	08/22/03	02/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Headform X Acceleration

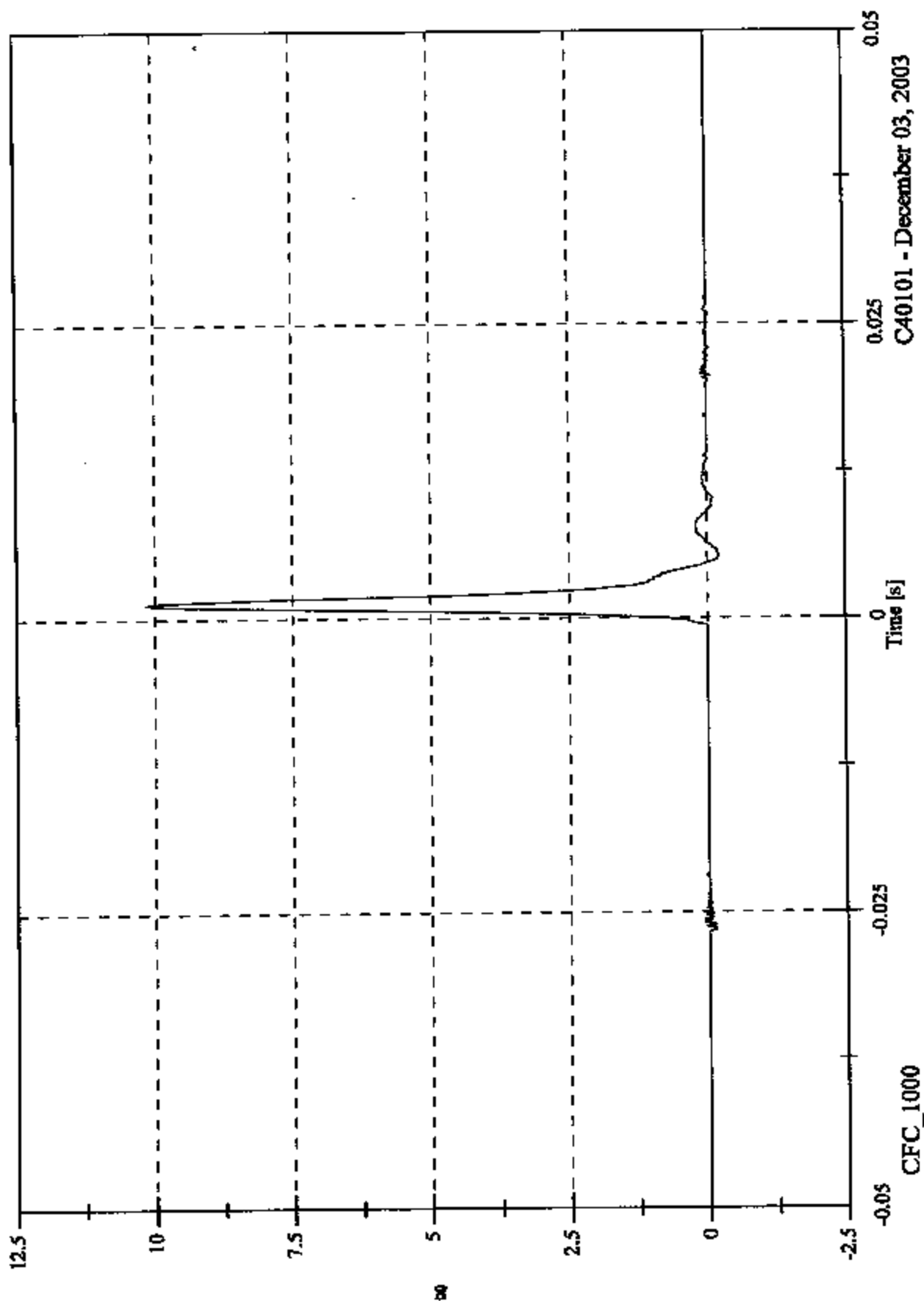
Max: 1.3 [g] at 0.005 [s]
Min: -208.4 [g] at 0.001 [s]



FMVSS 201U - Headform Calibration Drops

Max: 10.1 [g] at 0.001 [s]
Min: -0.2 [g] at 0.005 [s]

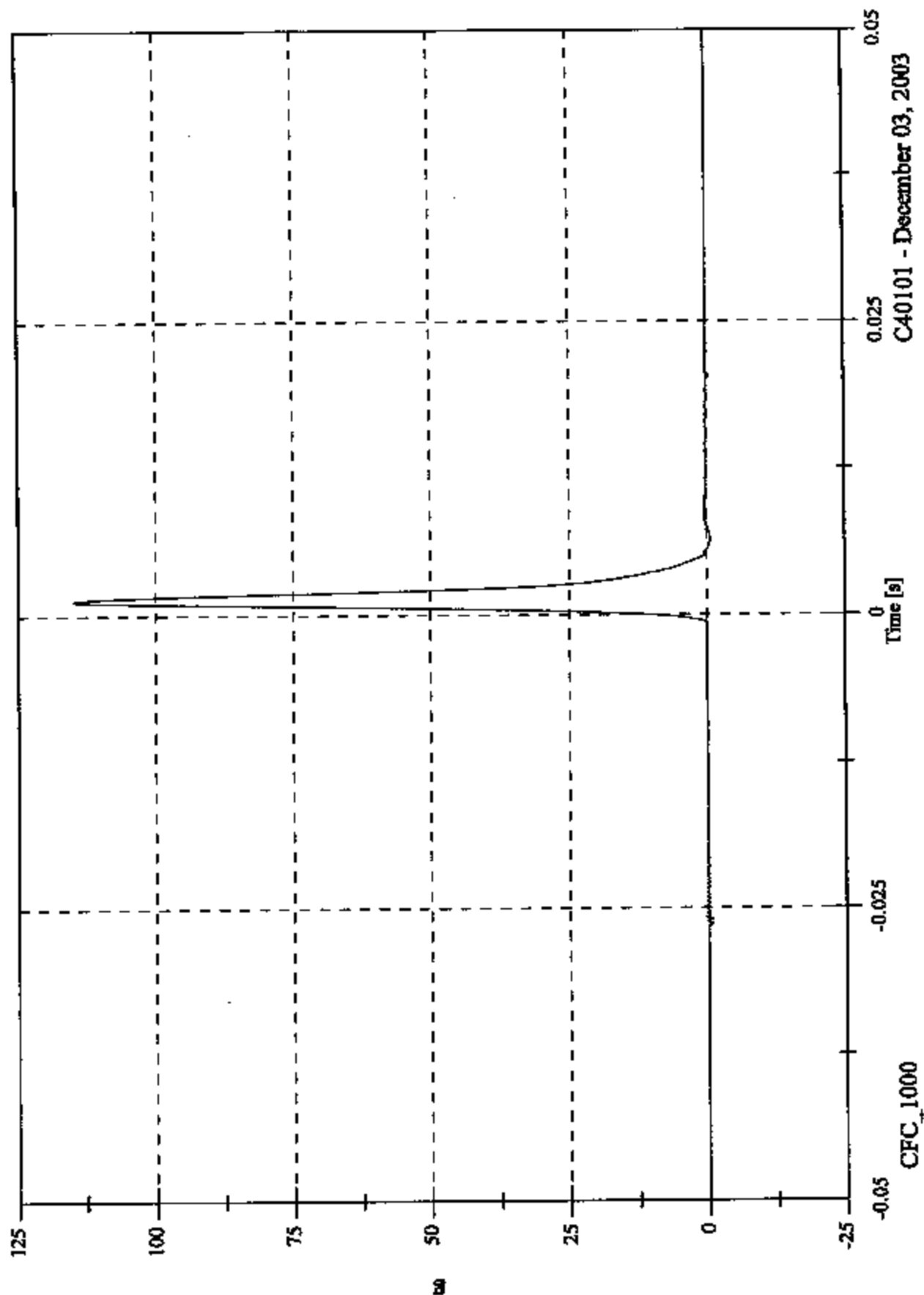
Headform Y Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 115.0 [g] at 0.001 [s]
Min: -0.8 [g] at -0.026 [s]

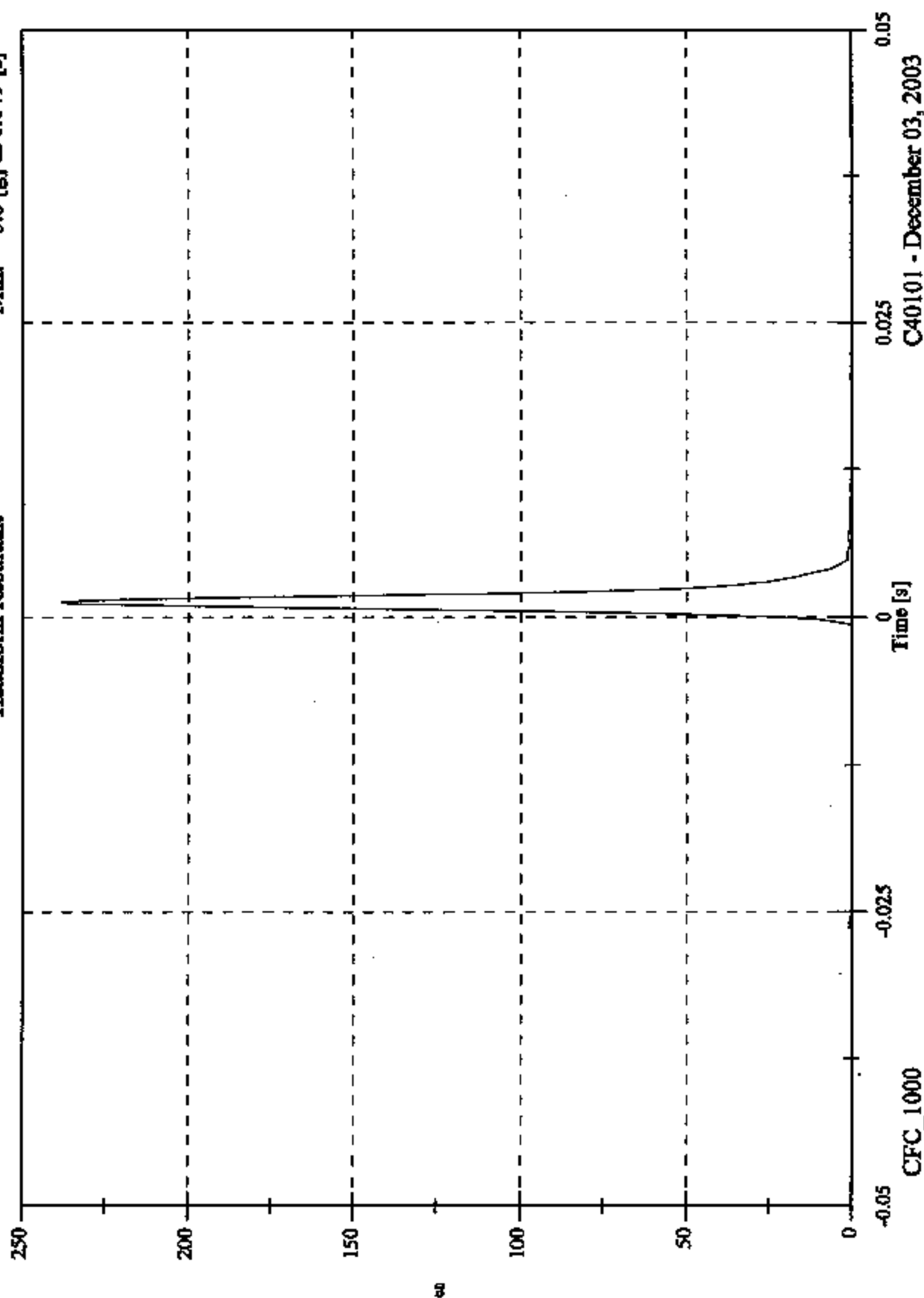
Headform Z Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 238.0 [g] at 0.001 [s]
Min: 0.0 [g] at 0.049 [s]

Headform Resultant



**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		885	
CALIBRATION DATE:		December 03, 2003	
TEST PARAMETER	SPECIFICATION		TEST RESULTS
TEMPERATURE	15°C to 26°C		21
RELATIVE HUMIDITY	10% to 70%		19
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs		254.0
PEAK LATERAL ACCELERATION	15 Gs Maximum		6.1
IS ACCELERATION CURVE UNIMODAL?	YES		YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

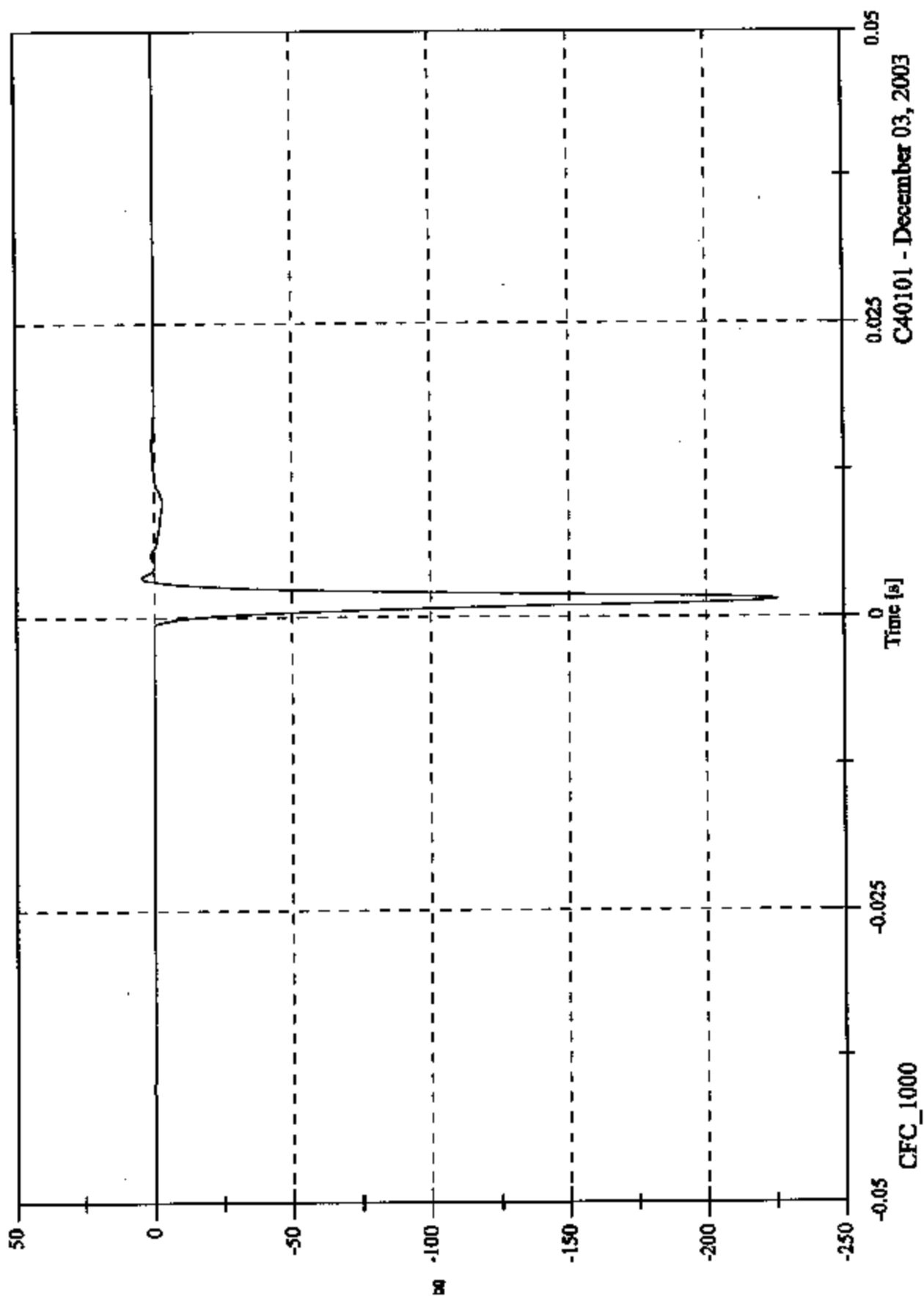
ID. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J38127	08/22/03	01/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J37980	08/22/03	01/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J37854	08/22/03	01/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Headform X Acceleration

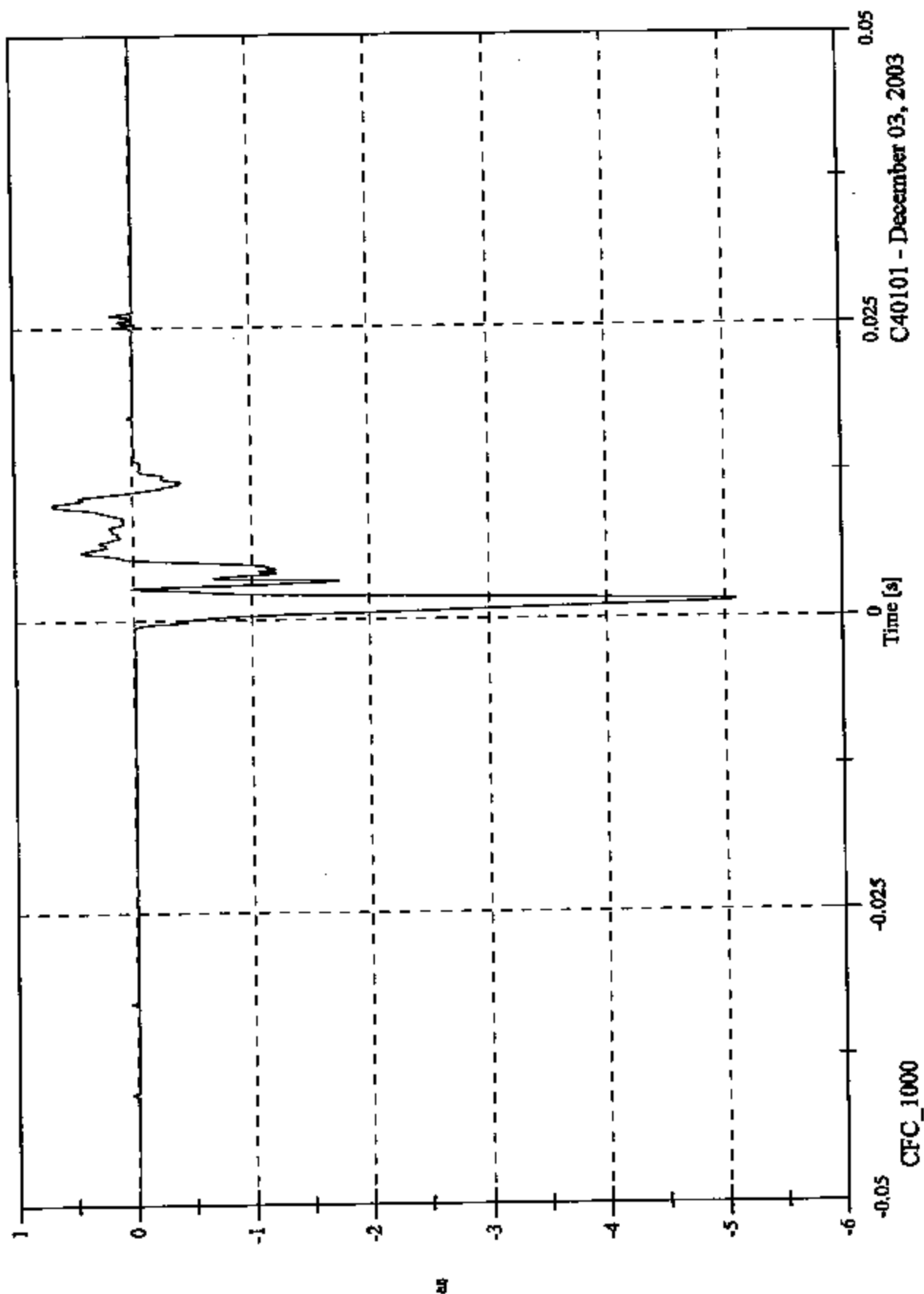
Max: 4.6 [g] at 0.003 [s]
Min: -225.8 [g] at 0.001 [s]



FMVSS 201U - Headform Calibration Drops

Max: 0.7 [g] at 0.010 [s]
Min: -5.1 [g] at 0.001 [s]

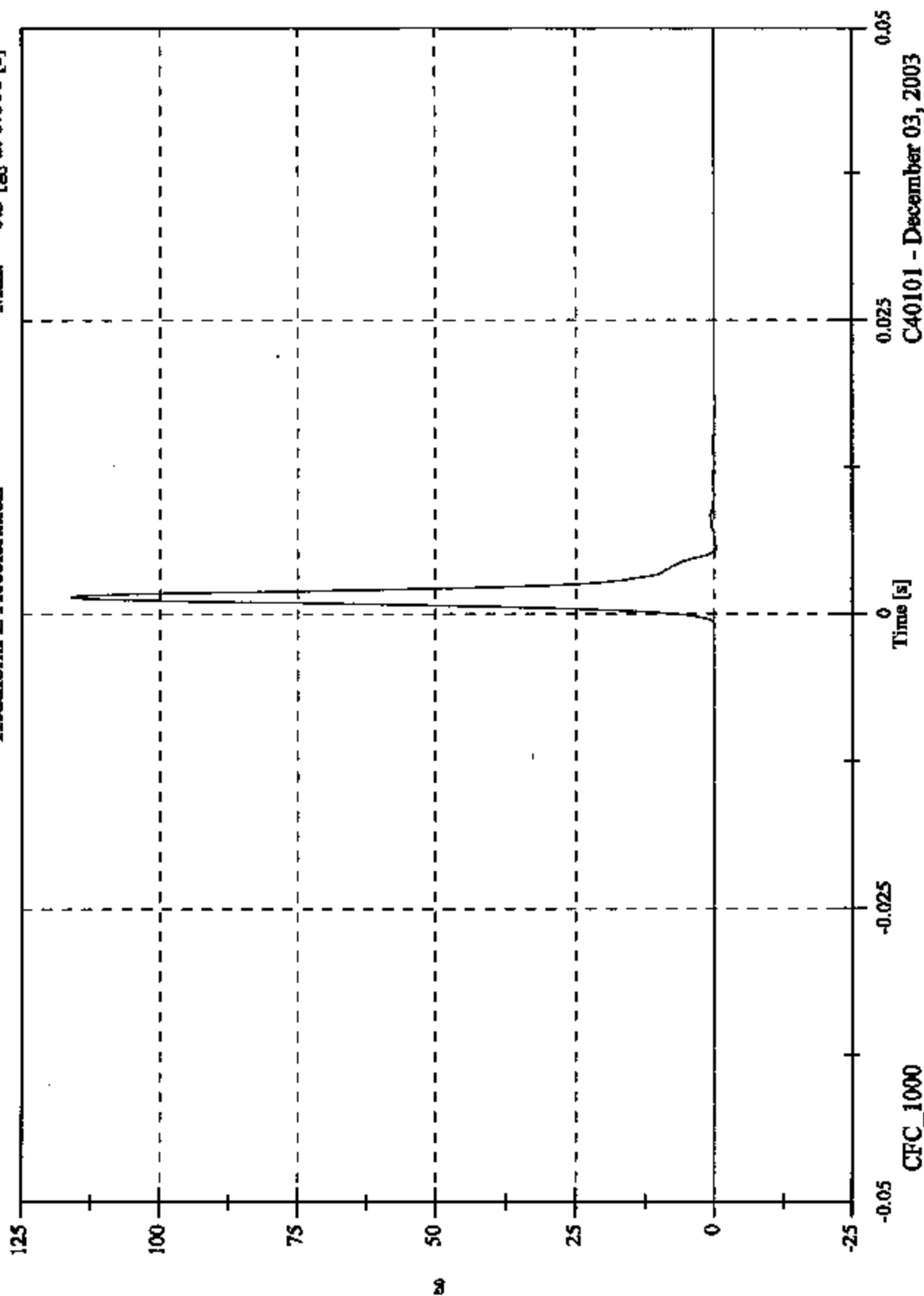
Headform Y Acceleration



FMVSS 201U - Headform Calibration Drops

Headform Z Acceleration

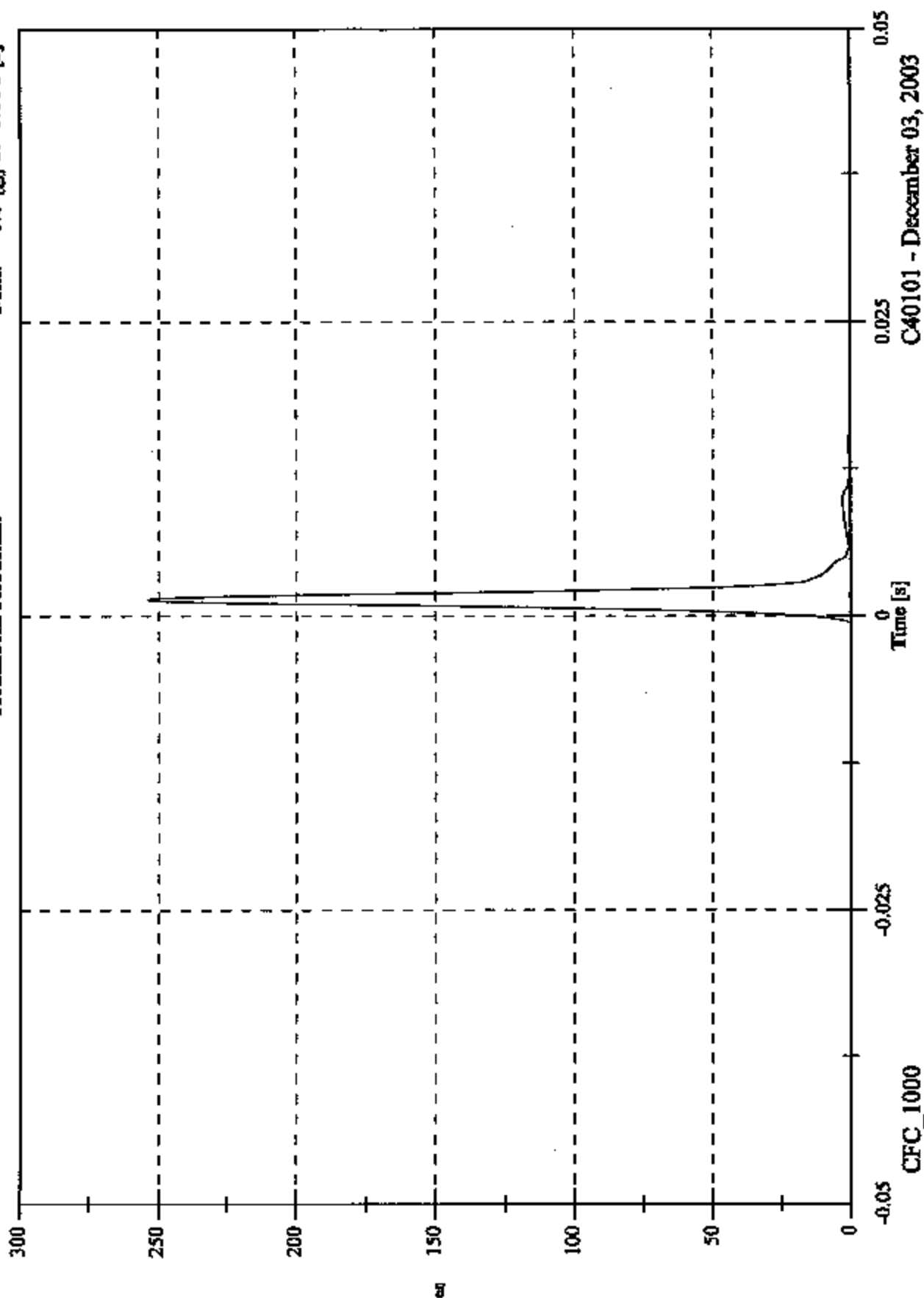
Max: 116.2 [g] at 0.001 [s]
Min: -0.3 [g] at 0.006 [s]



FMVSS 201U - Headform Calibration Drops

Max: 254.0 [g] at 0.001 [s]
Min: 0.0 [g] at -0.001 [s]

Headform Resultant



**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		0355	
CALIBRATION DATE:		December 03, 2003	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	15°C to 26°C	21	
RELATIVE HUMIDITY	10% to 70%	18	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	256.8	
PEAK LATERAL ACCELERATION	15 Gs Maximum	8.1	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

HEAD ACCELEROMETER CALIBRATION INFORMATION

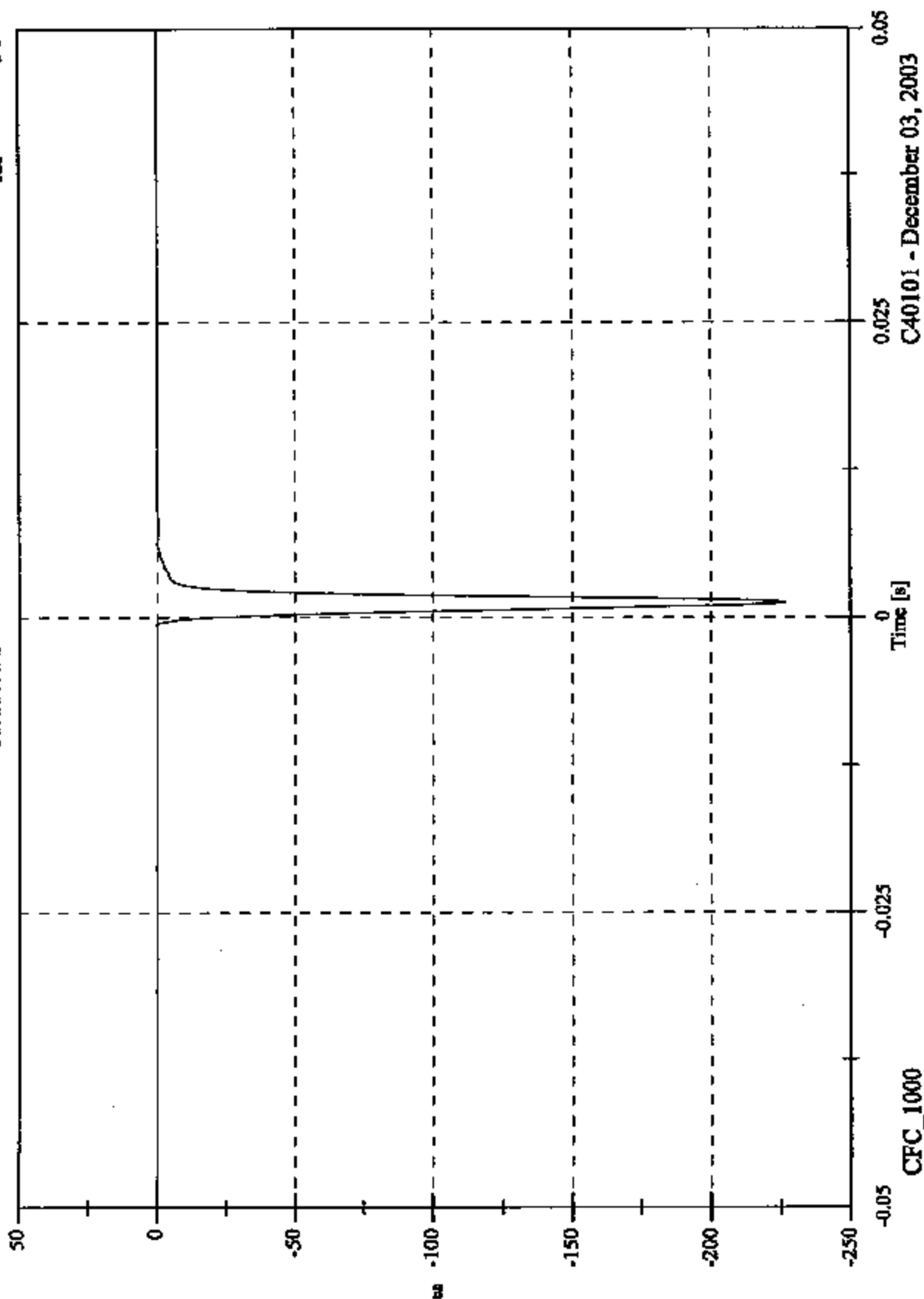
ID NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J28671	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J32779	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J25854	08/22/03	02/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Max: 0.3 [g] at 0.009 [s]
Min: -226.6 [g] at 0.001 [s]

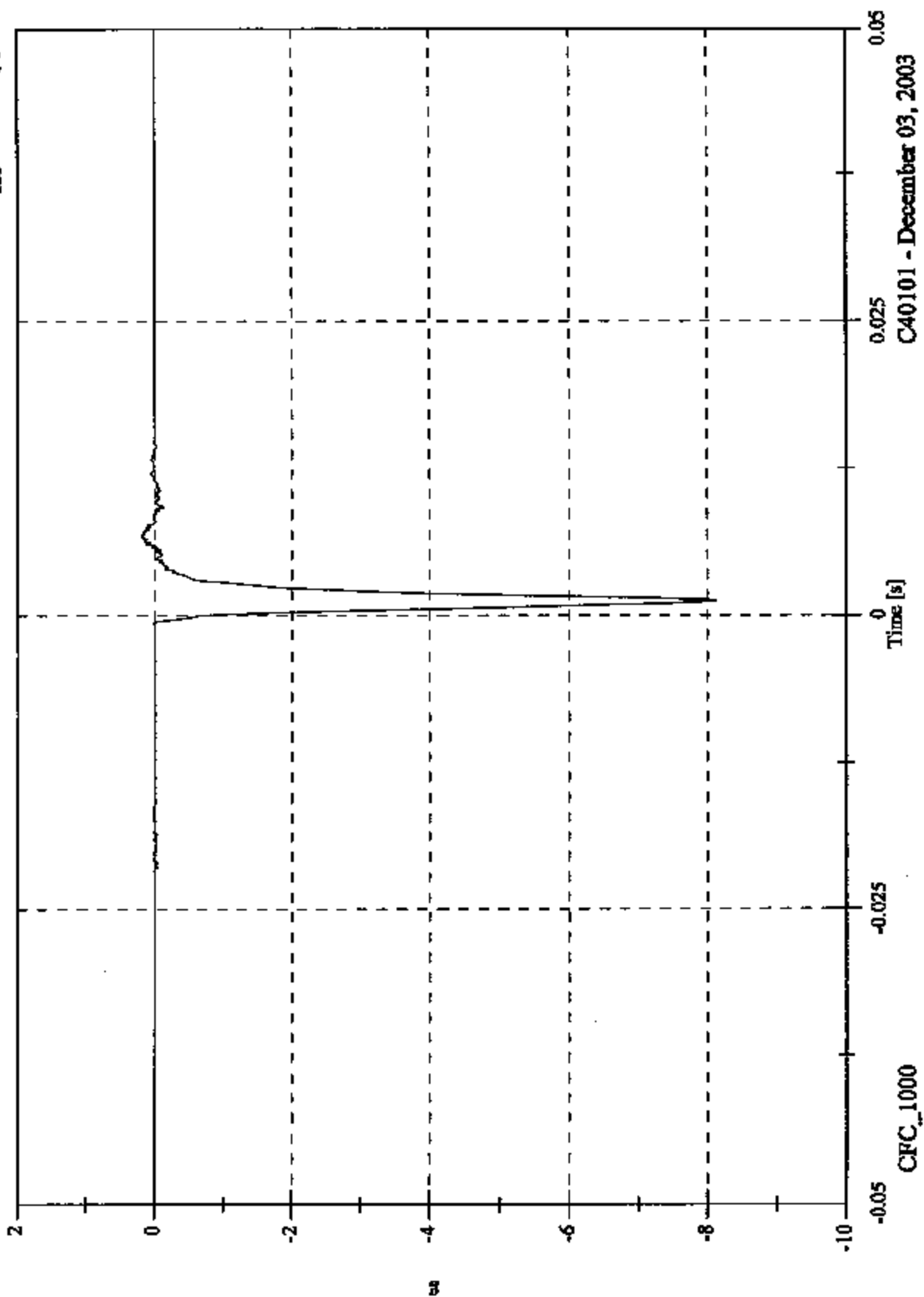
Headform X Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 0.2 [g] at 0.007 [s]
Min: -8.1 [g] at 0.001 [s]

Headform Y Acceleration

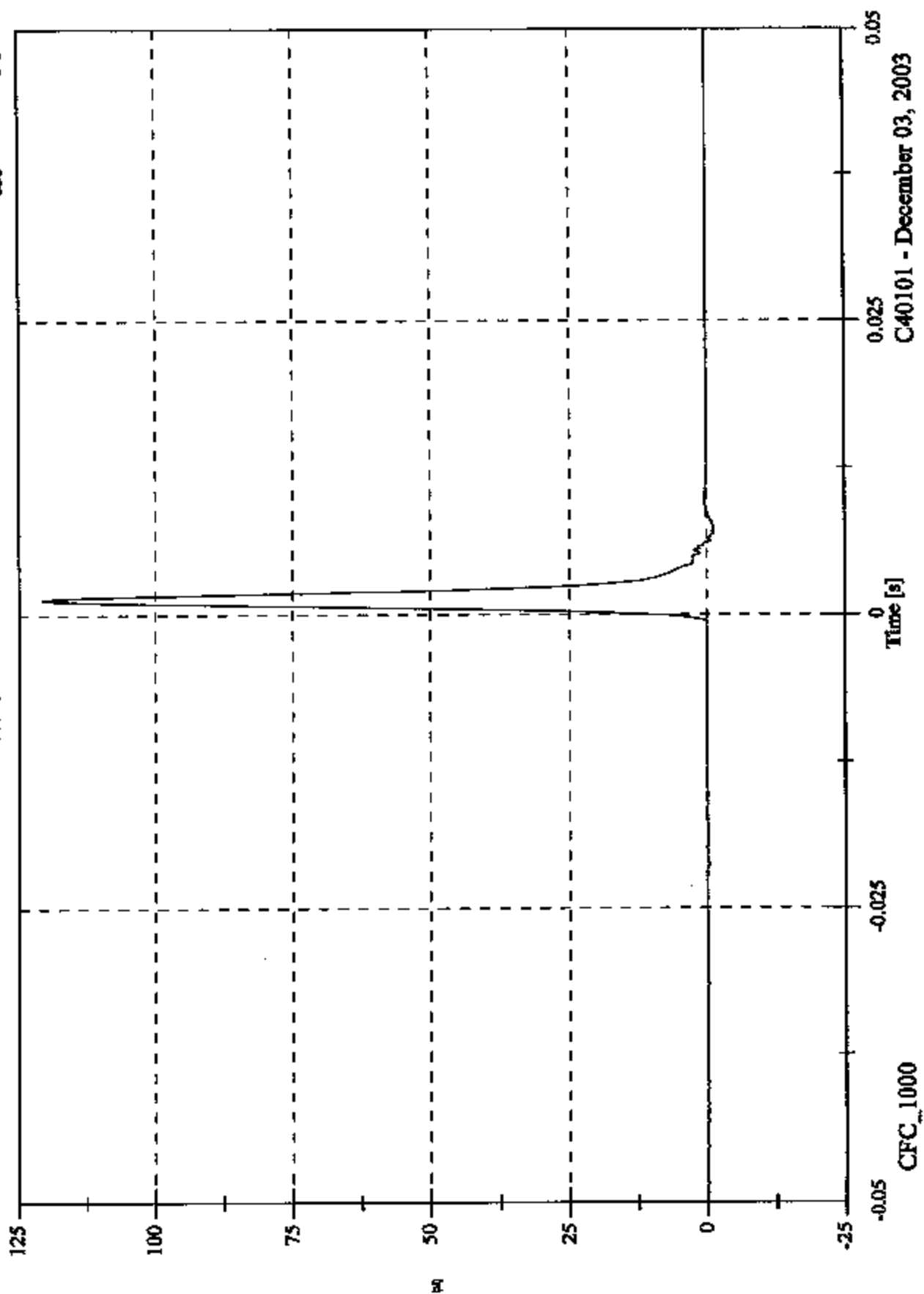


CFC_1000

FMVSS 201U - Headform Calibration Drops

Max: 120.8 [g] at 0.001 [s]
Min: -1.3 [g] at 0.007 [s]

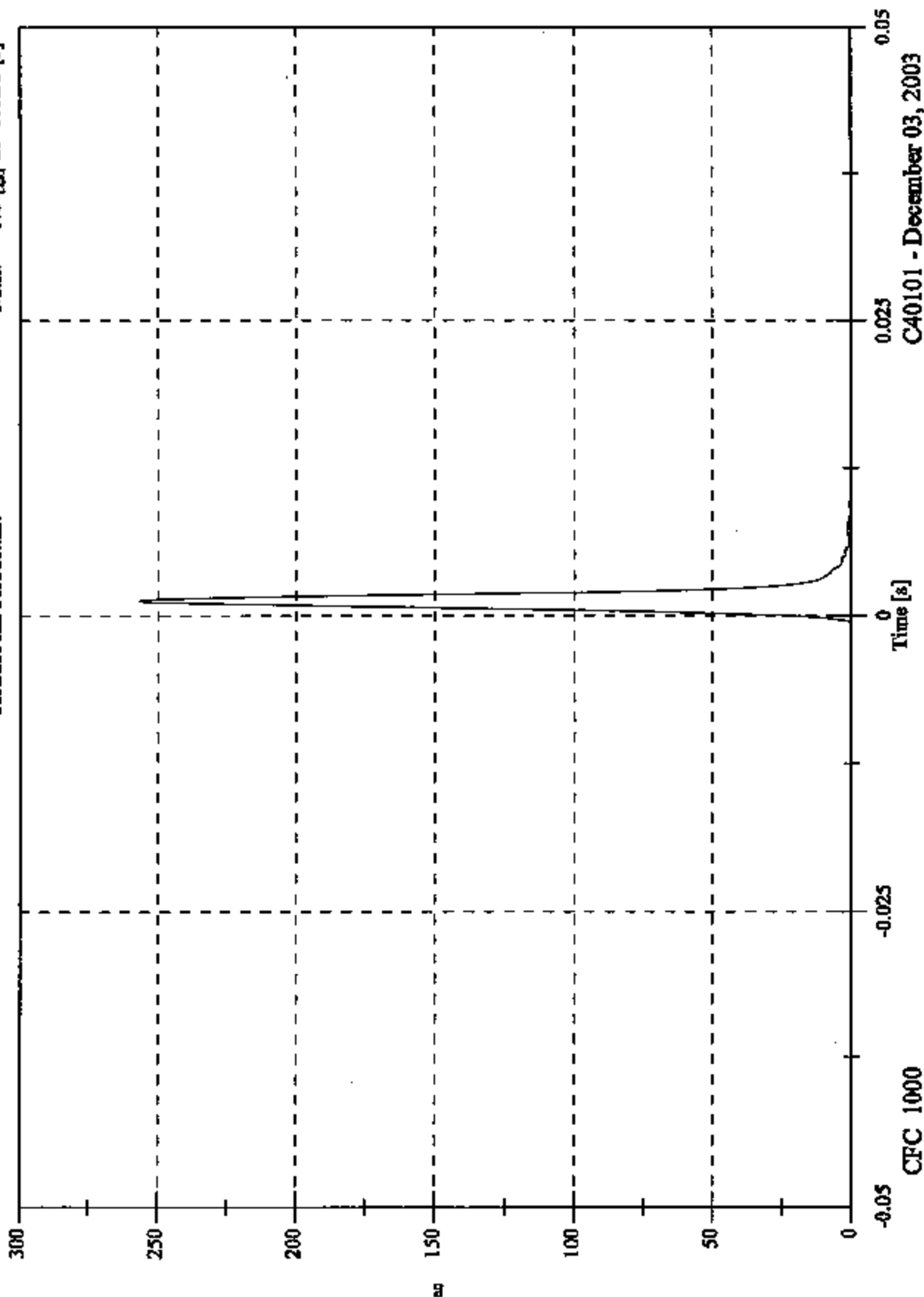
Headform Z Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 256.8 [g] at 0.001 [s]
Min: 0.0 [g] at -0.026 [s]

Headform Resultant



C40101 - December 03, 2003

**PART 572L
HEAD DROP POST-TEST**

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS
SERIAL NUMBER:		1255
CALIBRATION DATE:		December 03, 2003
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	19°C to 26°C	21
RELATIVE HUMIDITY	10% to 70%	18
PEAK RESULTANT ACCELERATION	225 G_r to 275 G_r	231.6
PEAK LATERAL ACCELERATION	15 G_r Maximum	2.9
IS ACCELERATION CURVE UNIMODAL?	YES	YES

HEAD ACCELEROMETER CALIBRATION INFORMATION

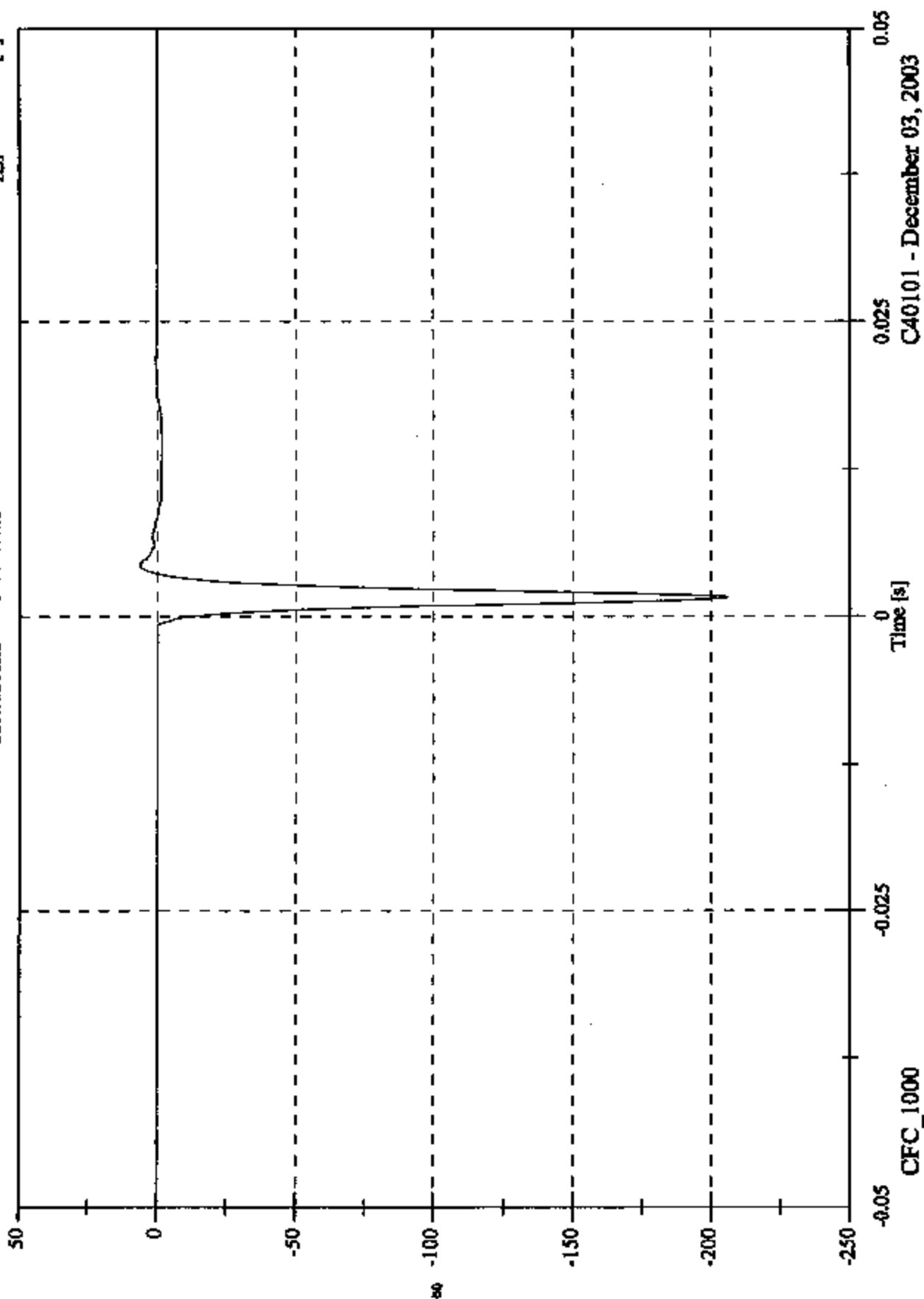
ID NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J41006	08/22/03	02/23/04
2 - LATERAL	ENDEVCO	7264-2000T	J40994	08/22/03	02/23/04
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	08/22/03	02/23/04

REMARKS:

FMVSS 201U - Headform Calibration Drops

Max: 6.4 [g] at 0.004 [s]
Min: -205.9 [g] at 0.002 [s]

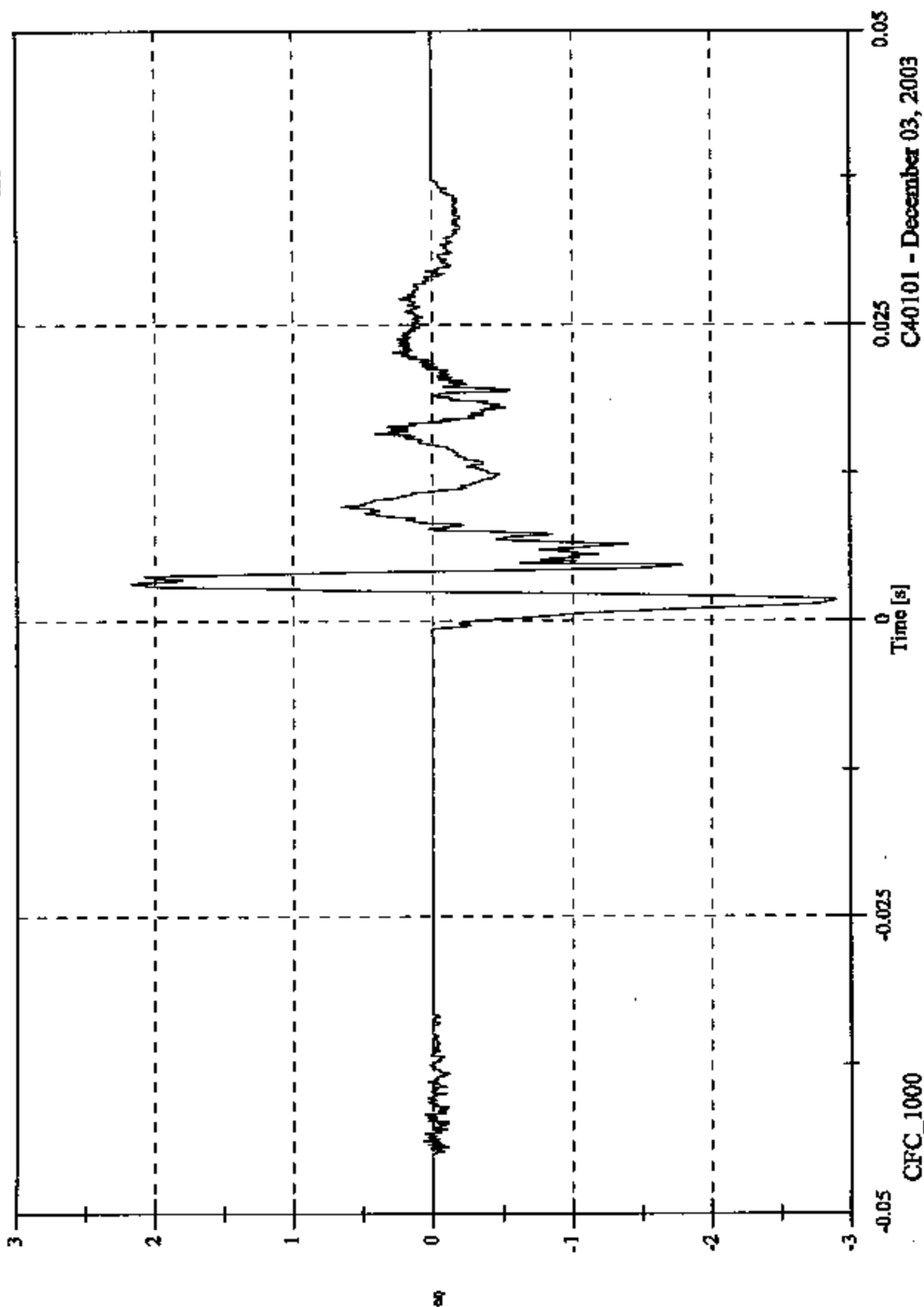
Headform X Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 2.2 [g] at 0.003 [s]
Min: -2.9 [g] at 0.002 [s]

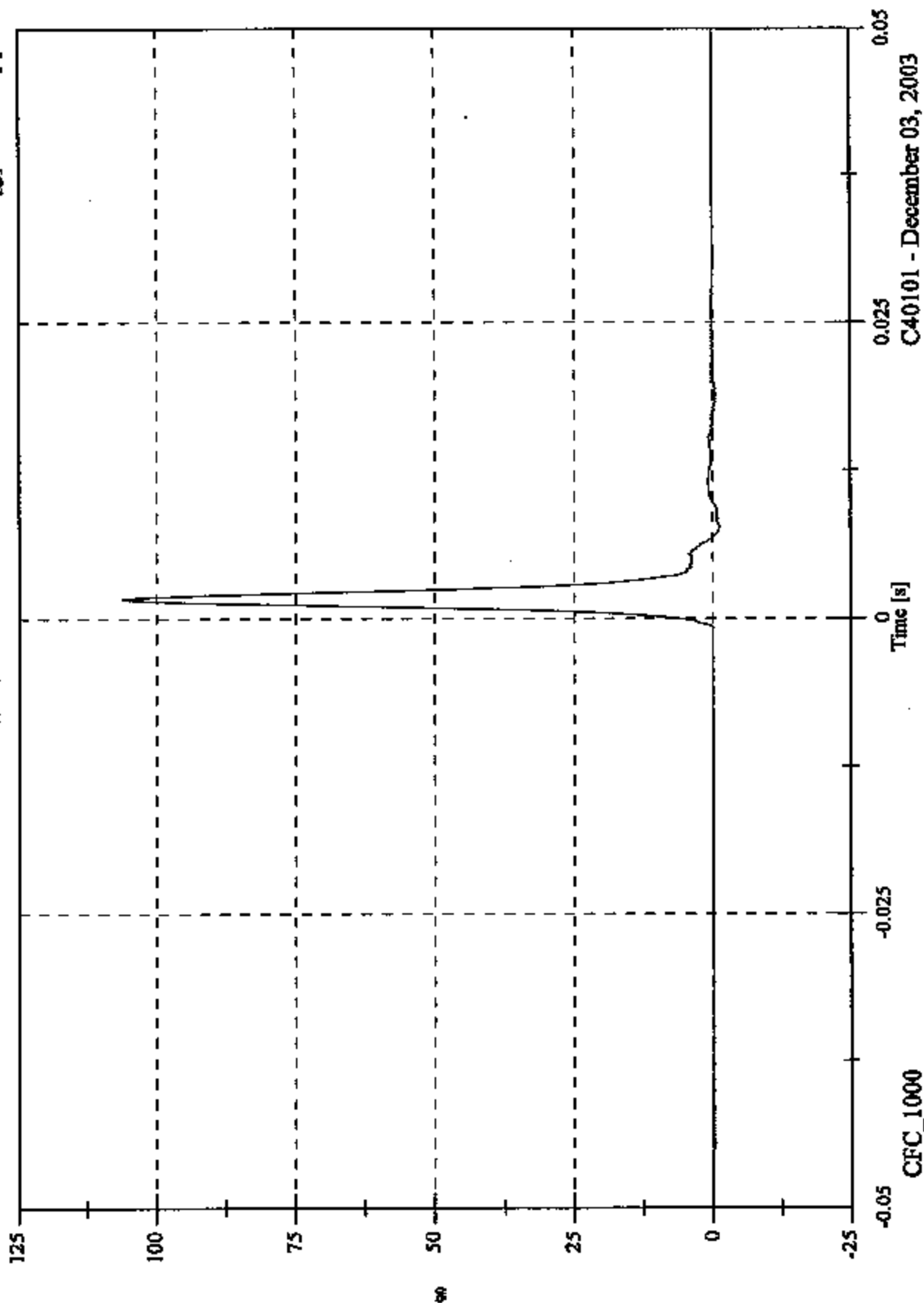
Headform Y Acceleration



FMVSS 201U - Headform Calibration Drops

Max: 106.1 [g] at 0.002 [s]
Min: -1.2 [g] at 0.008 [s]

Headform Z Acceleration



CFC_1000

FMVSS 201U - Headform Calibration Drops

Max: 231.6 [g] at 0.002 [s]
Min: 0.0 [g] at -0.032 [s]

Headform Resultant

