

REPORT NUMBER: 201UI-CAL-08-04

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

**BAYERISCHE MOTORENWERKE
2008 BMW 328i 4-DOOR SEDAN**

NHTSA NUMBER: C80509

CALSPAN TEST NUMBER: 8851-04

CALSPAN
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



Test Date: March 3, 2008

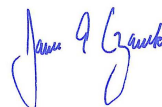
FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
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Enforcement
Office of Vehicle Safety Compliance
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15. <i>Supplementary Notes</i>																							
16. <i>Abstract</i> Compliance tests were conducted on the subject vehicle, a 2008 BMW 328i, 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:																							
<table border="1"> <thead> <tr> <th>Target Point</th> <th>Horizontal</th> <th>Vertical</th> <th>Velocity</th> <th>HIC</th> <th>HICd</th> </tr> </thead> <tbody> <tr> <td>None</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>None</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>						Target Point	Horizontal	Vertical	Velocity	HIC	HICd	None	-	-	-	-	-	None	-	-	-	-	-
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. DTNH22-04-C-01027. The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2008 BMW 328i, 4-door Sedan, NHTSA No. C80509, 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 2008 BMW 328i, 4-door Sedan, NHTSA No. C80509, was tested at various upper interior locations by a 4.54 kg 50th percentile headform. A total of twelve (12) 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, Summary of Upper Interior Head Impact Tests. The twelve (12) area chosen for testing were:

RP1	BP4	BP3	BP1	SR2A
AP3	AP1	RP2	URRP	BP2
URBP	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 had an orthogonal tri-axis accelerometer pack mounted at the headform's center of gravity (c.g.).

A total of three (3) channels of data for each test were recorded on a Keyser-Threde data acquisition system. Data plots, along with still images, can be found in Section 3, Summary of Test Results and Data Plots.

To document each target area impact test, a Weinberger high-speed video camera was placed at an appropriate location to record the headform contact with the selected target area.

DATA SHEET 2-1

SUMMARY OF UPPER INTERIOR HEAD IMPACT TESTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07 (SEE CERTIFICATION LABEL)
COLOR:	Gray

TARGET CODE	Target Coordinates						Approach Angles (degrees)		Velocity (kph)	FMH HIC	HIC(d)
	Driver Side			Passenger Side			Horizontal	Vertical			
	X(mm)	Y(mm)	Z(mm)	X(mm)	Y(mm)	Z(mm)					
AP1	1328.069	-525.164	952.6857	1334.426	522.8961	955.5681	Relocated 2 circles		-	-	-
AP1_R2	1322.646	-545.033	913.8816	1329.558	544.5016	916.0035	125°	44°	18.84	622.1	635.7
AP2	1218.583	-577.086	864.5963	1223.192	576.1009	865.402	210°	43°	18.56	828.6	791.5
AP3	1088.162	-608.063	792.3905	1099.083	607.4683	797.1359	143°	41°	18.54	849.5	807.3
BP1	1818.065	-474.849	998.1101	1815.705	475.2434	997.1303	90°	10°	18.60	245.8	351.8
BP2	1781.926	-596.521	788.8918	1782.645	598.9663	787.7566	270°	4°	23.59	648.7	655.8
BP3	1729.435	-601.440	799.2564	1727.667	604.3449	797.2602	90°	-1°	23.78	610.5	627.0
BP4	1828.133	-649.893	698.0966	1825.359	651.0761	697.740	139°	-6°	23.77	590.6	612.0
FH1	1254.270	-407.381	958.9413	1254.989	405.8216	961.7613	-	-	-	-	-
FH2	1237.221	-257.476	962.6602	1239.304	253.1379	966.6847	-	-	-	-	-
RH	2571.269	-326.525	993.0664	2573.81	328.2852	987.2928	-	-	-	-	-
RP1	2562.241	-487.484	955.4293	2561.273	488.9502	948.3363	40°	25°	18.34	371.6	446.8
RP2	2703.528	-595.406	804.6656	2702.316	600.0526	802.1259	Relocated 7 circles		-	-	-
RP2_R7	2572.933	-554.296	885.259	2570.087	563.7147	873.5151	286°	25°	18.80	594.0	614.5
SR1	1477.901	-486.489	968.8347	1486.031	490.8042	967.558	-	-	-	-	-
SR2A	1631.548	-485.596	1000.405	1632.011	491.3918	999.9032	Relocated 1 circle		-	-	-
SR2A_R1	1620.086	-480.148	983.6454	1626.09	486.9082	981.595	90°	49°	18.66	345.5	427.1
SR2B	1518.625	-492.695	990.9792	1515.744	493.3957	992.4893	Relocated 2 circles		-	-	-
SR2B_R2	1520.546	-518.430	962.3328	1520.283	524.1576	958.9259	-	-	-	-	-
SR3F	2148.778	-475.268	979.7416	2150.744	479.3032	975.0527	-	-	-	-	-
SR3R	2317.746	-481.981	972.5335	2319.175	487.5623	965.6843	-	-	-	-	-
URAP	1424.832	-373.869	987.9551	1436.118	378.2875	987.9433	-	-	-	-	-
URBP	1924.877	-326.674	1012.229	1923.891	329.4689	1008.02	270°	50°	23.53	326.9	413.0
URRP	2419.238	-366.751	1007.928	2433.248	375.3577	999.7422	283°	50°	23.81	681.6	680.6
URSR	1677.482	-384.740	1010.507	1660.222	383.141	1013.537	-	-	-	-	-

*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:				2008 BMW 328i 4-door Sedan					
VIN:				WBAVC53588A246718					
Month & Year of Manufacture:				11/07 (SEE CERTIFICATION LABEL)					
Vehicle Body Color:				Gray					
Engine Data:	6	Cylinders;	-	CID;	3.0	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:		21	km						
Options:	x	A/C;	x	Power Steering;	x	Pwr.Brakes;	x	Pwr. Windows	
Interior Trim Information :									
1. Sunroof									
2. Adjustable seat belt anchorages									
3. Grab handles on all outboard seating positions									

DATA FROM TIRE PLACARD:									
Tire Pressure (at capacity);				220		kPa FRONT			
				250		kPa REAR			
Recommended Tire Size:				P205/55R16					
Tires on Test Vehicle:		P205/55R16		Manufacturer:		-			
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)=				480		kg (A)			
No. of Occupants x 68 kg. =				340		kg (B)			
Rated Cargo/Luggage Weight (RCLW) =				140		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 =	365.5	kg	Left Rear =	377.5	kg
Right Front =	398.5	kg	Right Rear =	381.5	kg
TOTAL FRONT =	764.0	kg	TOTAL REAR =	759.0	kg
% of Total Weight =	50.2%	%	% of Total Weight =	49.8%	%
TOTAL WEIGHT =	1523.0		kg		

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:		
Total Test Vehicle Delivered Weight=	1523.0	kg (A)
+ Rated Cargo/Luggage Weight =	136	kg (B)
TEST VEHICLE TARGET WEIGHT =	1659.0	kg (A+B)

WEIGHT OF TEST VEHICLE (FULLY LOADED):					
Left Front =	362.5	kg	Left Rear =	446.5	kg
Right Front =	396.5	kg	Right Rear =	450.5	kg
TOTAL FRONT =	759.0	kg	TOTAL REAR =	897.0	kg
% of Total Weight =	45.8%	%	% of Total Weight =	54.2%	%
TOTAL TEST WEIGHT =	1656.0		kg		
Weight of vehicle secured in test vehicles cargo area =	133.0		kg		

TEST VEHICLE ATTITUDE (all dimensions in millimeters):				
AS DELIVERED:	Left Front	699	Left Rear	684
	Right Front	690	Right Rear	685
FULLY LOADED:	Left Front	699	Left Rear	661
	Right Front	690	Right Rear	660
Test Vehicle Wheelbase:	-			millimeters

TEST VEHICLE PITCH AND ROLL ANGLES:				
AS DELIVERED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑0.9↓	Front Bumper	↓1.6↑
	Right Door Sill	↓0.8↑	Rear Bumper	↓0.3↑
FULLY LOADED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑0.4↓	Front Bumper	↓1.7↑
	Right Door Sill	↓0.2↑	Rear Bumper	↓0.2↑
AS TESTED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑0.7↓	Front Bumper	↓1.6↑
	Right Door Sill	↓0.4↑	Rear Bumper	↓0.2↑

DATA SHEET 2-3

APPROACH ANGLE LIMITS

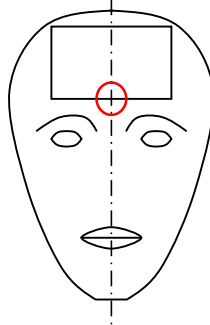
Target Code	Left Side				Target Code	Right Side			
	Horizontal Angles (deg.)		Vertical Angles (deg.)			Horizontal Angles (deg.)		Vertical Angles (deg.)	
	Minimum	Maximum	Minimum	Maximum		Minimum	Maximum	Minimum	Maximum
AP1	208	254	-5	44	AP1	106	152	-5	44
AP2	208	254	-5	43	AP2	106	152	-5	43
AP3	208	254	-5	41	AP3	106	152	-5	41
BP1	206	279	-10	10	BP1	81	154	-10	10
BP2	ANY		0	4	BP2	ANY		0	4
BP3	206	279	-10	-1	BP3	81	154	-10	-1
BP4	206	279	-10	-6	BP4	81	154	-10	-6
OP1	270		-10	-	OP1	90		-10	-
OP2	270		-10	-	OP2	90		-10	-
RP1	270	345	-10	25	RP1	15	90	-10	25
RP2	270	345	-10	25	RP2	15	90	-10	25
FH1	180		0	50	FH1	180		0	50
FH2	180		0	50	FH2	180		0	50
RH	360		0	50	RH	0		0	50
SR1	270		0	48	SR1	90		0	48
SR2A	270		0	49	SR2A	90		0	49
SR2B	270		0	49	SR2B	90		0	49
SR3	270		0	49	SR3	90		0	49
URAP	ANY		0	50	URAP	ANY		0	50
URBP	ANY		0	50	URBP	ANY		0	50
URRP	ANY		0	50	URRP	ANY		0	50

Note : BP2 target location – Seat belt anchorage

DATA SHEET 2-4

SUMMARY TARGET IMPACT LOCATION ON FMH

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray



ã RIGHT SIDE OF FACE

TARGET	Distance Above Point 0 (mm)	Distance Over From Pt. O (mm)
RP1	35	0
BP4	20	8L
BP3	15	0
BP1	64	5L
SR2A	15	3L
AP3	8	8L
AP1	6	14R
RP2	2	4R
URRP	48	4L
BP2	10	4L
URBP	45	4L
AP2	9	3R

SECTION 3

SUMMARY OF TEST RESULTS AND DATA PLOTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	01
Test Date:	02/29/08
Target Location:	REAR PILLAR
Target Code:	RP1
Horizontal Impact Angle:	40°
Vertical Impact Angle:	25°
Ambient Temperature:	20.4 C°
Relative Humidity:	12.3 %
Time of Impact:	10:30
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	0	<input type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	35				mm up



POST-IMPACT RP1 HEADFORM

Free Motion HIC	371.6
HIC(d)	446.8
Impact Velocity (kph)	18.34
HIC T1 (msec)	3.5
HIC T2 (msec)	12.7

FMVSS 201U 2008 BMW 328i C80509 - RP1

FMH Headform 0355

Location: RP1

Test Date: February 29, 2008

Work File: RP1

-----TEST RESULTS-----

Lab Temperature: 20.4 C

HICd: 446.8

Lab Humidity: 12.3 %

HIC (36ms): 371.6

Velocity at Impact: 18.34 KPH

t1: 3.5 msec

t2: 12.7 msec

Free Flight Distance: 219.69 mm

Duration: 9.2 msec

Average Acceleration: 7.7 g

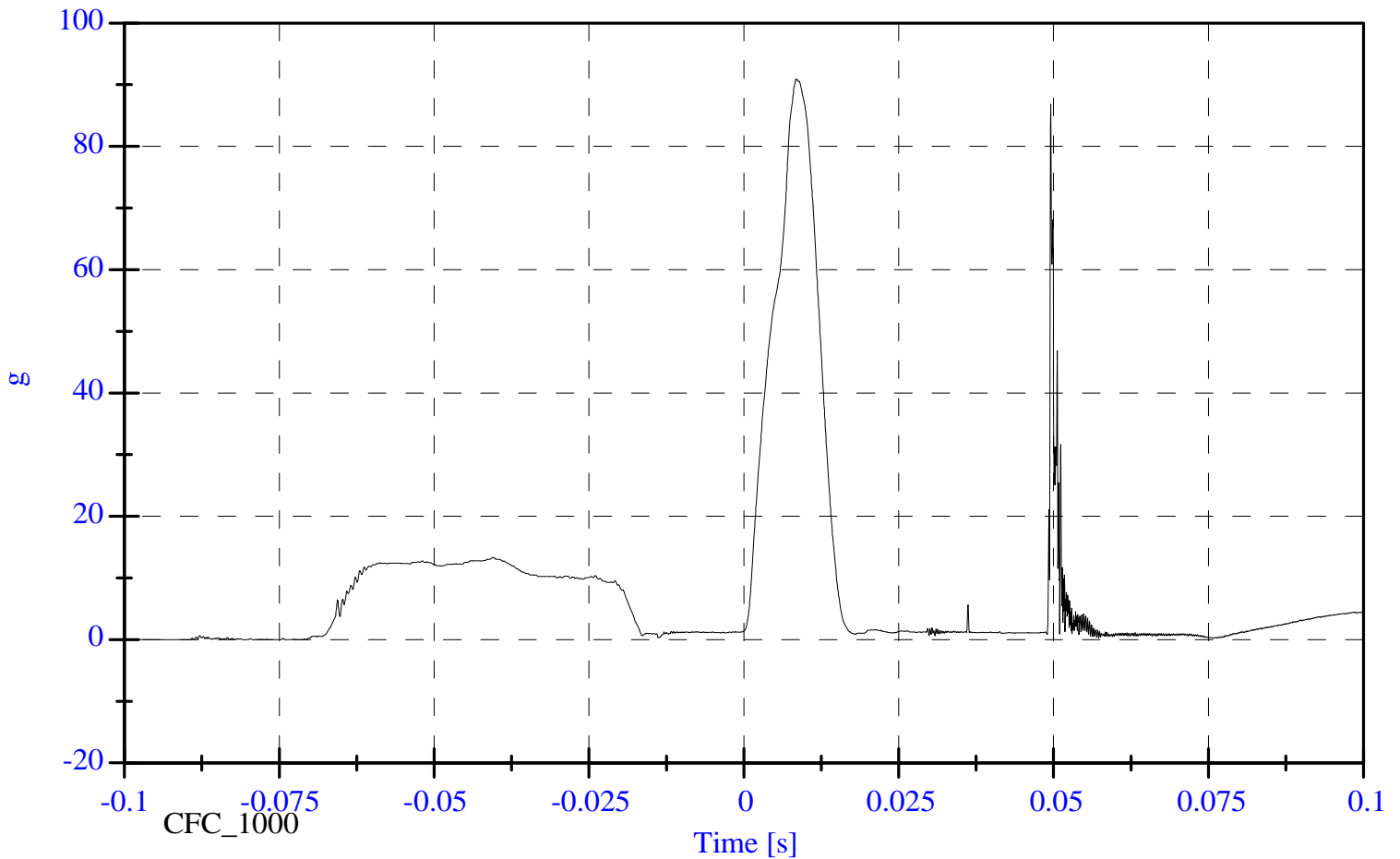
Maximum: 90.9 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 90.9 [g] at 0.008 [s]

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

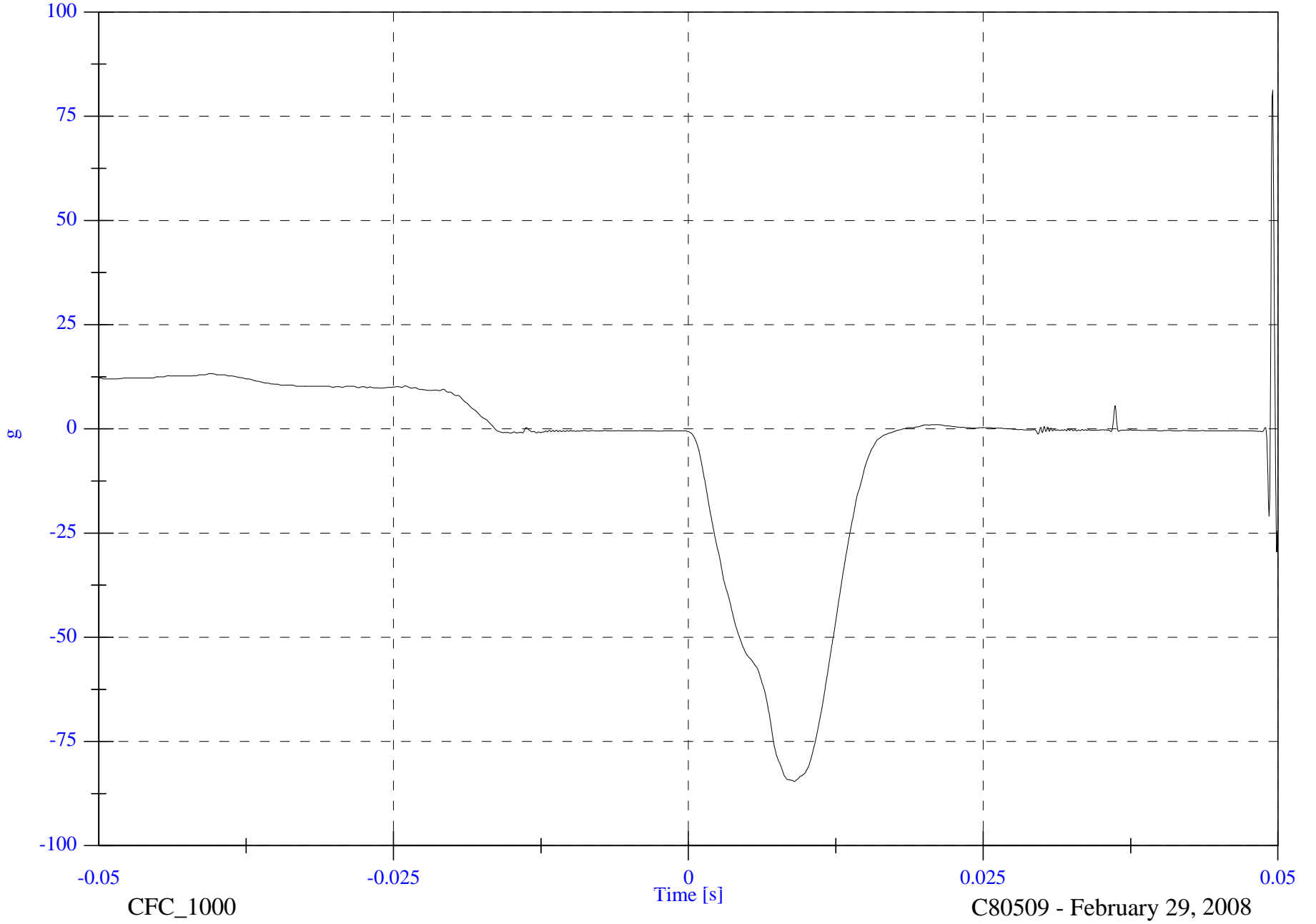


FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 81.3 [g] at 0.050 [s]

Min: -84.6 [g] at 0.009 [s]



C80509 PASSENGER SIDE RPI IMPACT PLOT #2

8851-04

CFC_1000

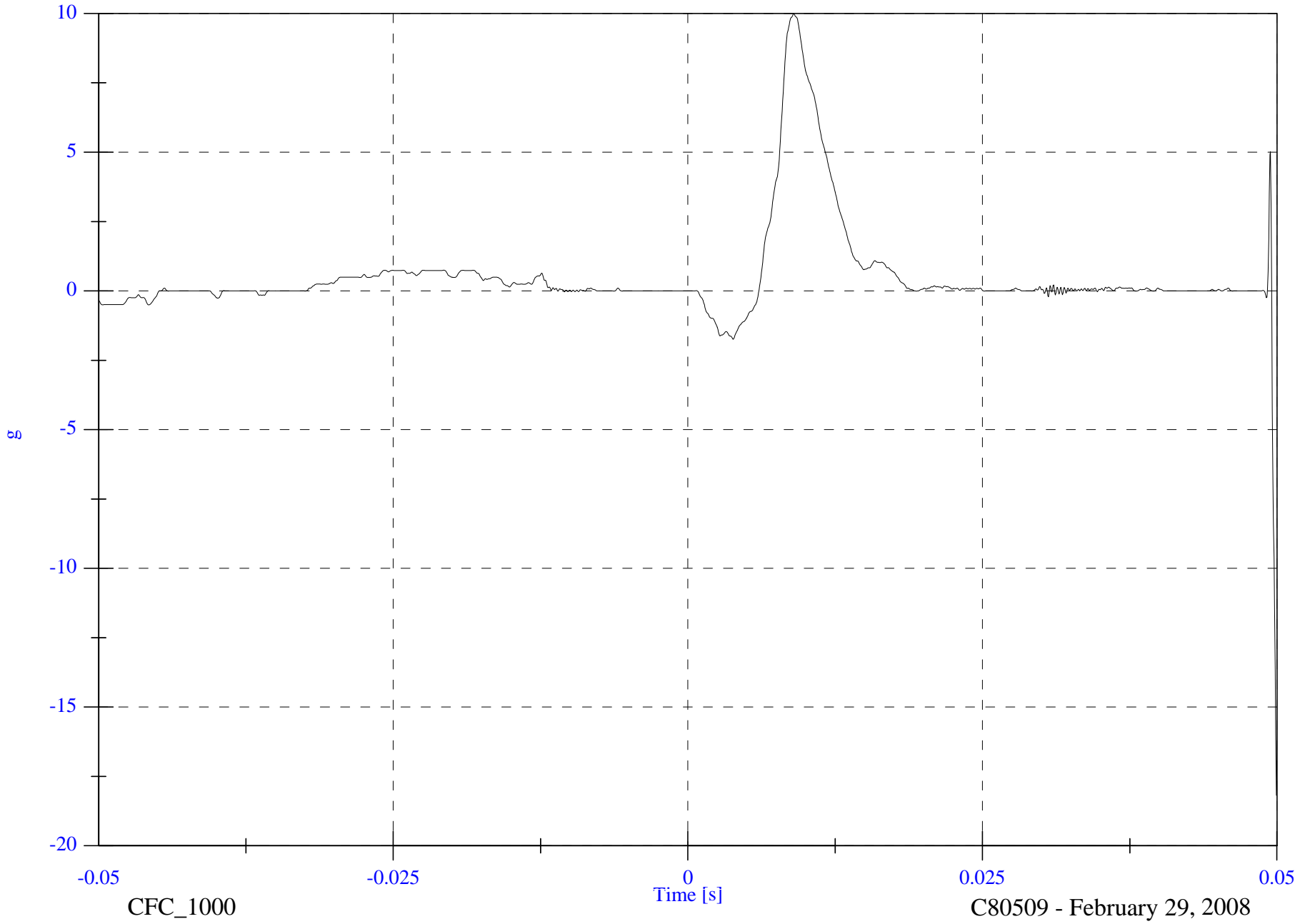
C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

Max: 10.0 [g] at 0.009 [s]

Min: -18.2 [g] at 0.050 [s]

Headform Y Acceleration



C80509 PASSENGER SIDE RPI IMPACT PLOT #3

8851-04

CFC_1000

C80509 - February 29, 2008

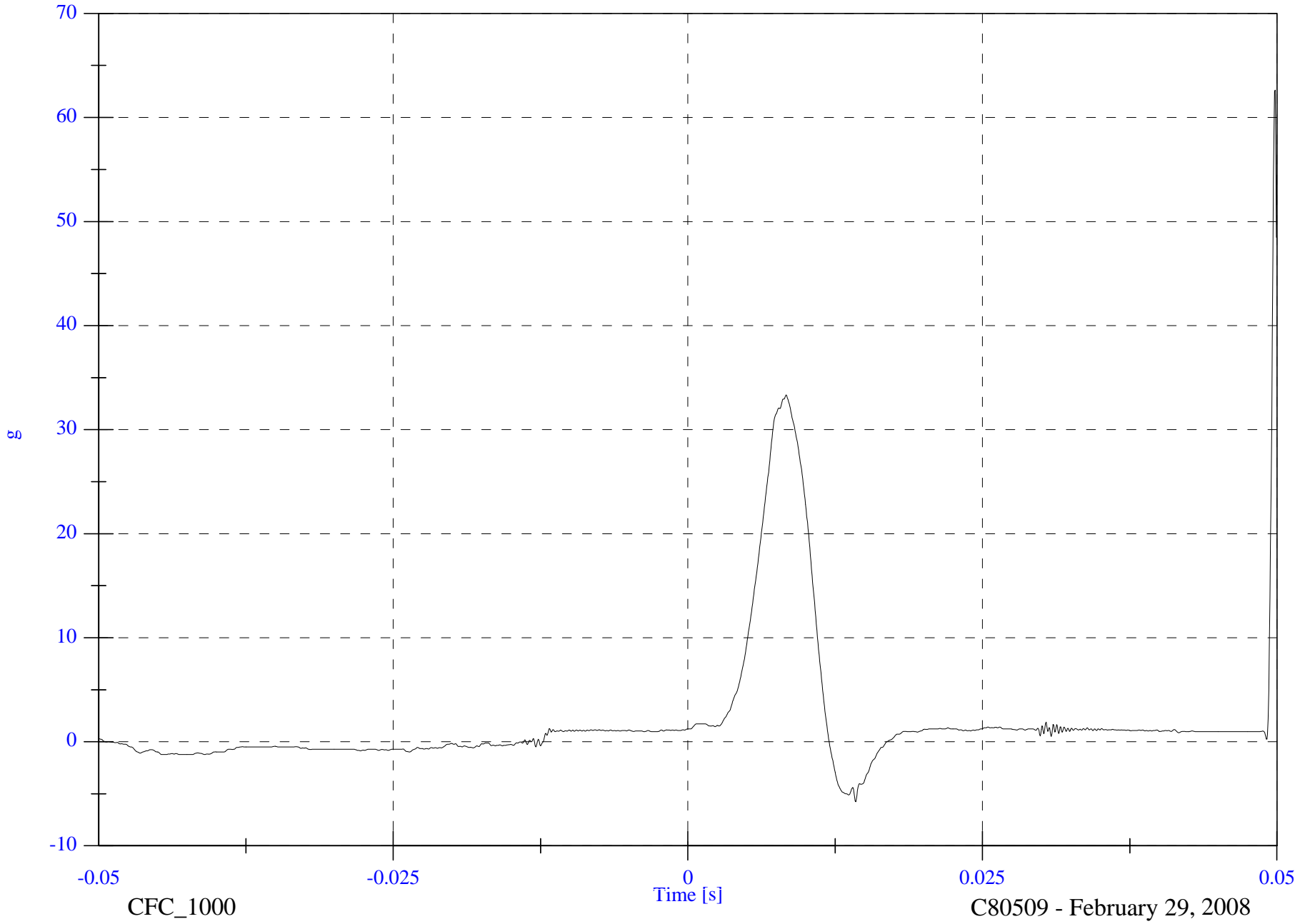
FMVSS 201U 2008 BMW 328i

Headform Z Acceleration

Max: 62.7 [g] at 0.050 [s]
Min: -5.8 [g] at 0.014 [s]

C80509 PASSENGER SIDE RPI IMPACT PLOT #4

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

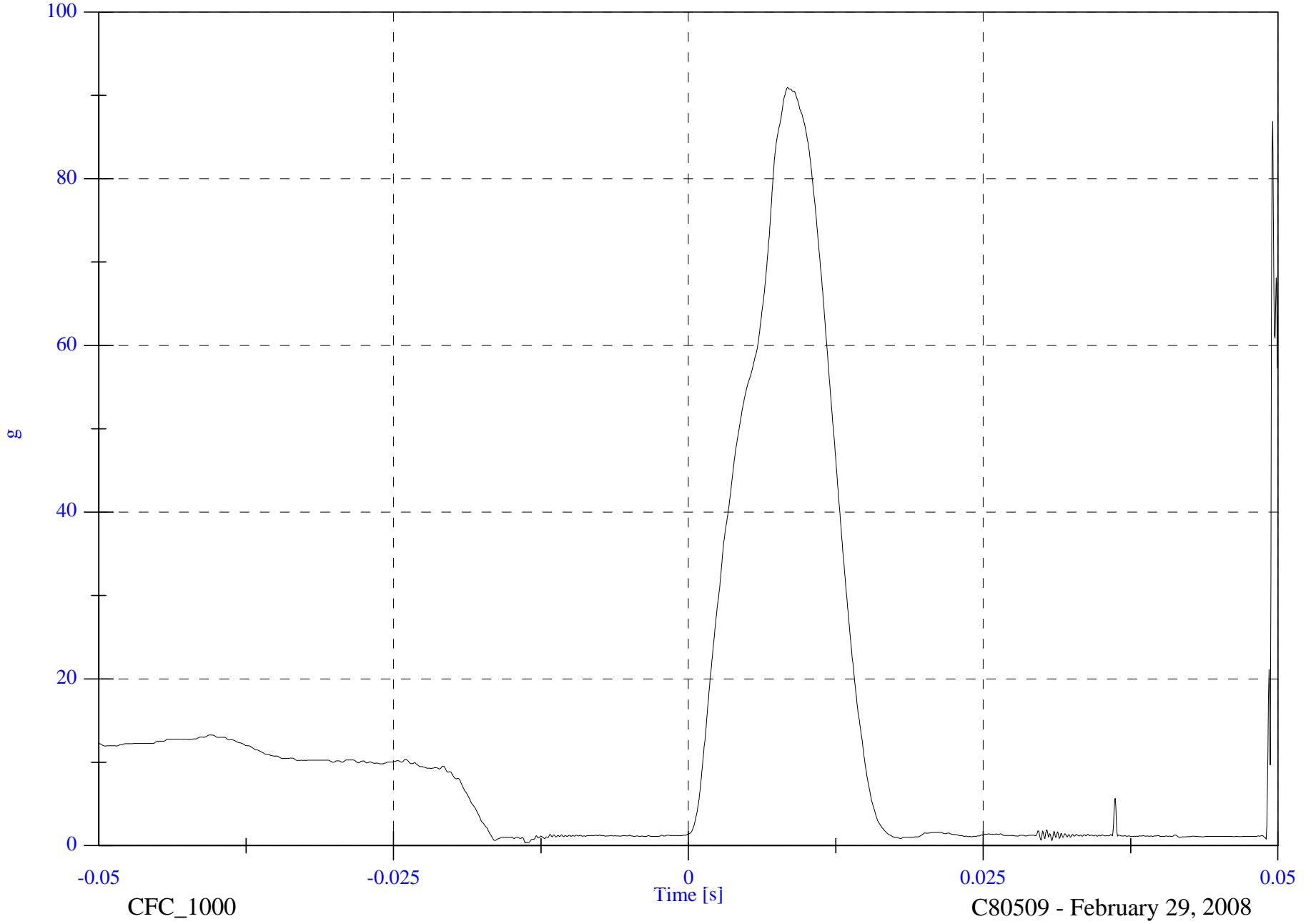
Headform Resultant

Max: 90.9 [g] at 0.008 [s]

Min: 0.3 [g] at -0.014 [s]

C80509 PASSENGER SIDE RPI IMPACT PLOT #5

8851-04

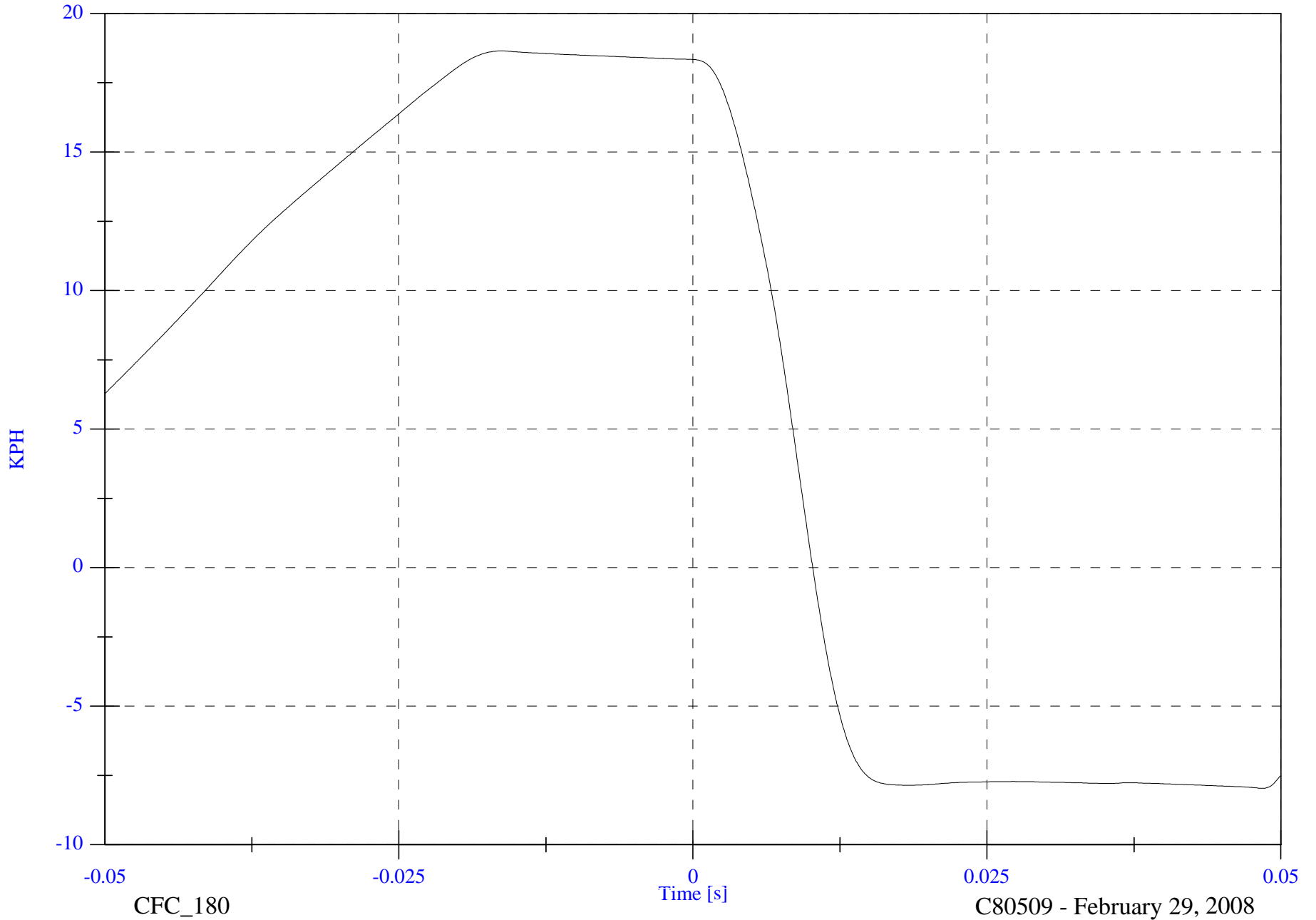


FMVSS 201U 2008 BMW 328i

Max: 18.6 [KPH] at -0.016 [s]

Min: -8.0 [KPH] at 0.048 [s]

Headform Velocity



C80509 PASSENGER SIDE RPI IMPACT PLOT #6

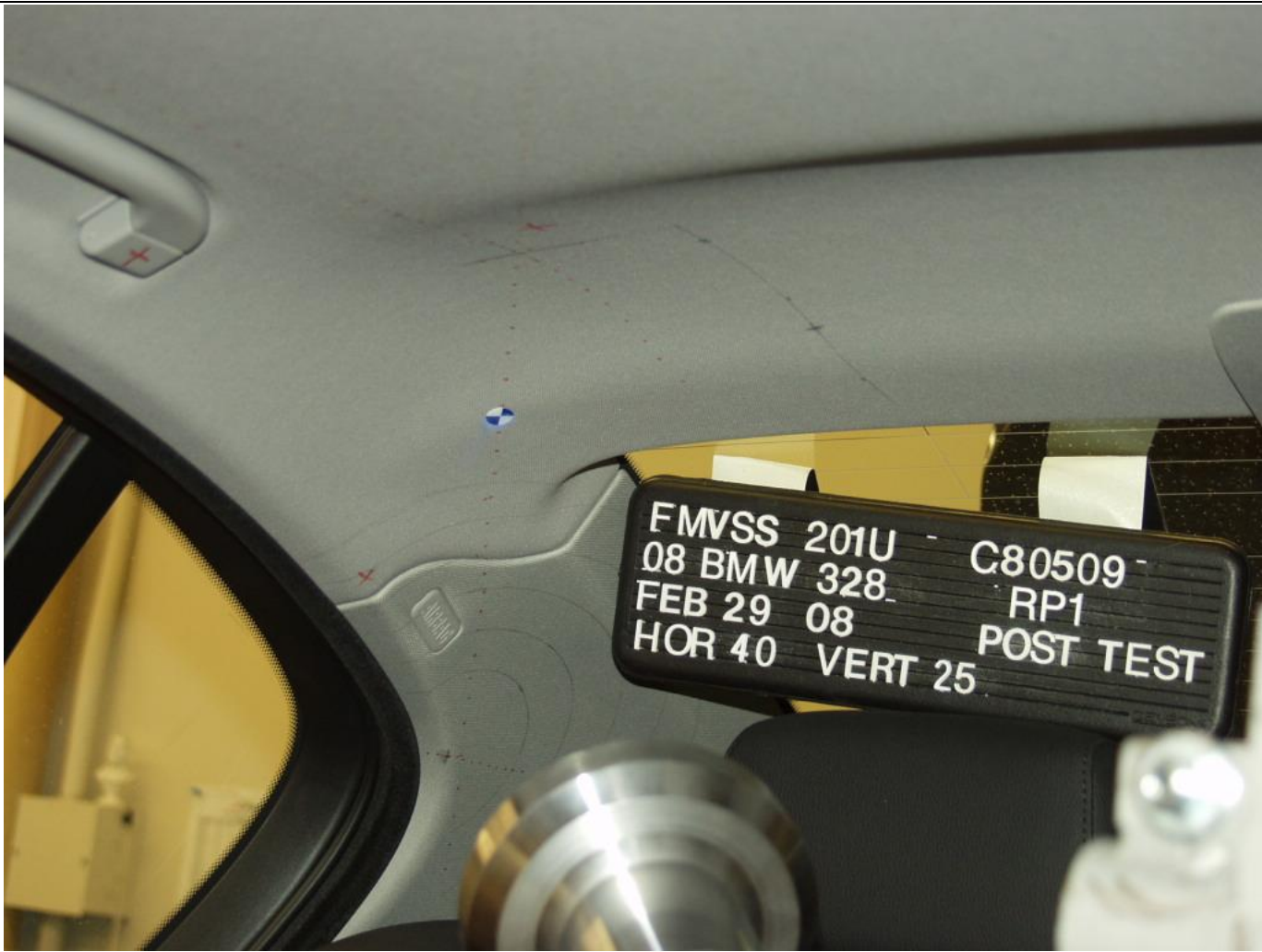
8851-04

CFC_180

C80509 - February 29, 2008



PRE-IMPACT RP1



POST-IMPACT RP1

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	02
Test Date:	02/29/08
Target Location:	B-PILLAR
Target Code:	BP4
Horizontal Impact Angle:	139°
Vertical Impact Angle:	-6°
Ambient Temperature:	20.5 C°
Relative Humidity:	12.6 %
Time of Impact:	11:10
Headform Number:	1142

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	8	<input type="checkbox"/>	mm right	<input checked="" type="checkbox"/>	mm left
On Centerline	20				mm up



POST-IMPACT BP4 HEADFORM

Free Motion HIC	590.6
HIC(d)	612
Impact Velocity (kph)	23.77
HIC T1 (msec)	5.8
HIC T2 (msec)	10.2

FMVSS 201U 2008 BMW 328I C80509 - BP4

FMH Headform 1142

Location: BP4

Test Date: February 29, 2008

Work File: BP4

-----TEST RESULTS-----

Lab Temperature: 20.5 C

HICd: 612.0

Lab Humidity: 12.6 %

HIC (36ms): 590.6

Velocity at Impact: 23.77 KPH

t1: 5.8 msec

t2: 10.2 msec

Free Flight Distance: 217.67 mm

Duration: 4.4 msec

Average Acceleration: 8.8 g

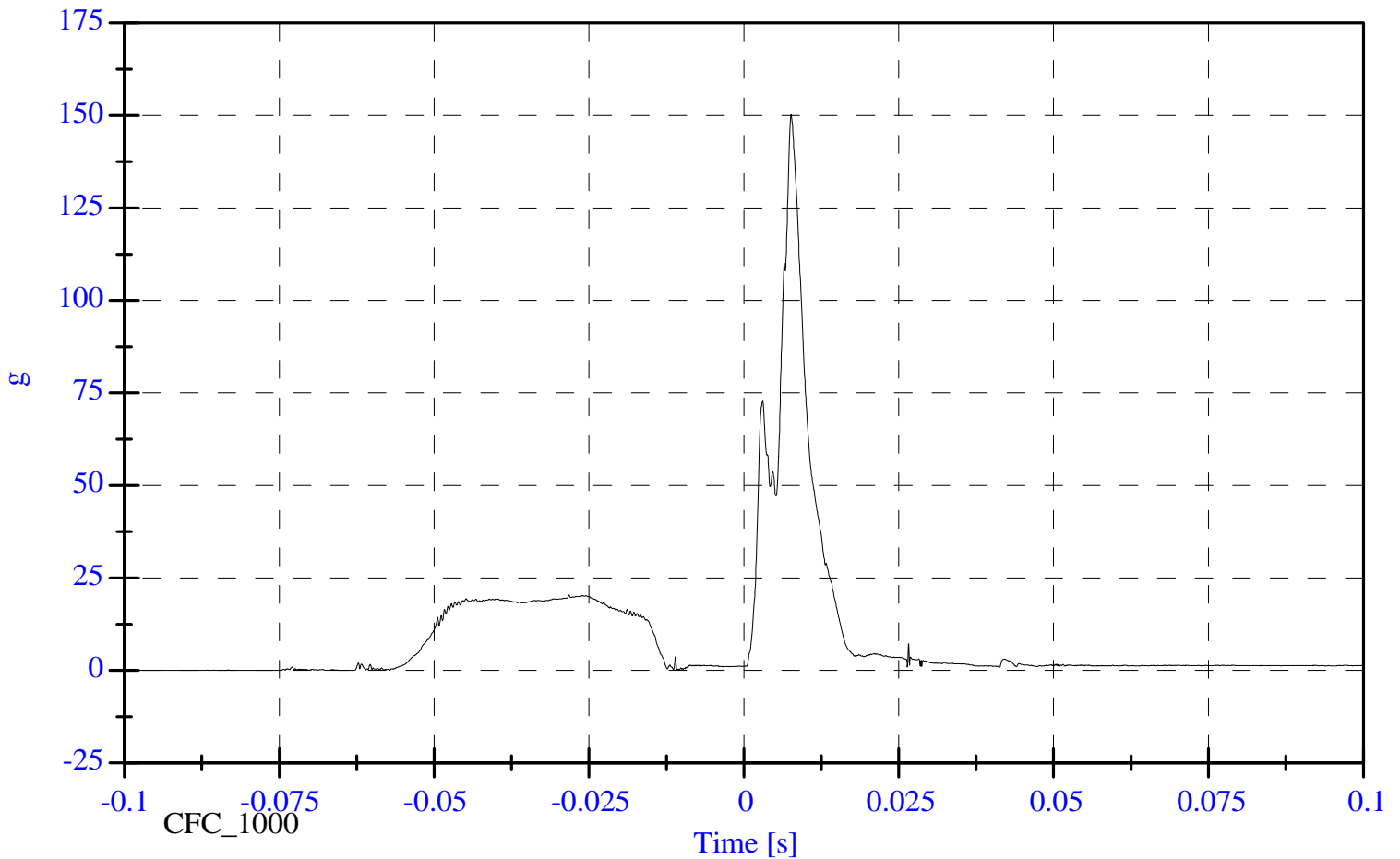
Maximum: 150.2 g

FMVSS 201U 2008 BMW 328I

Headform Resultant

Max: 150.2 [g] at 0.008 [s]

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

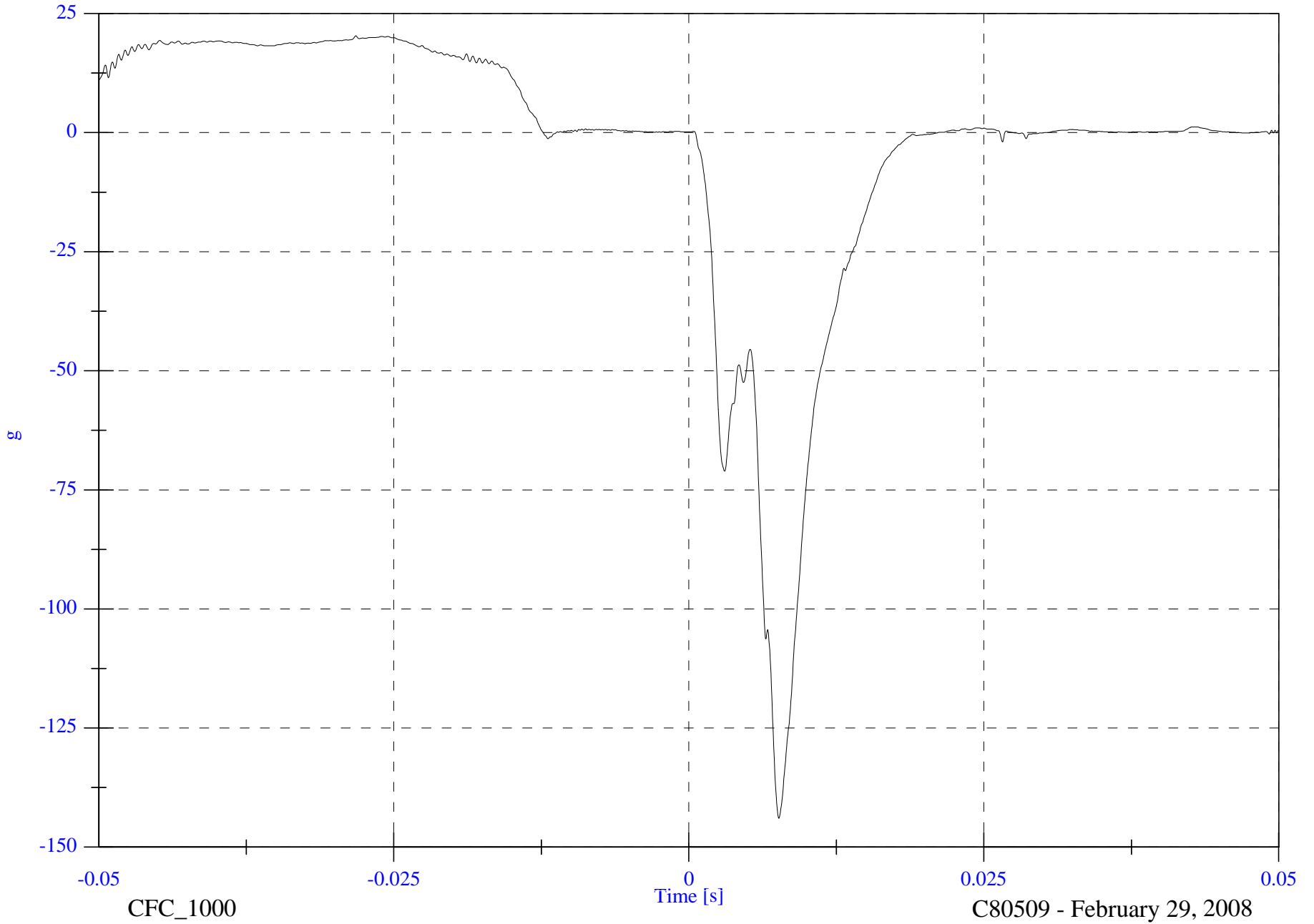


FMVSS 201U 2008 BMW 328I

Headform X Acceleration

Max: 20.3 [g] at -0.028 [s]

Min: -144.0 [g] at 0.008 [s]



C80509 PASSENGER SIDE BP4 IMPACT PLOT #2

8851-04

CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328I

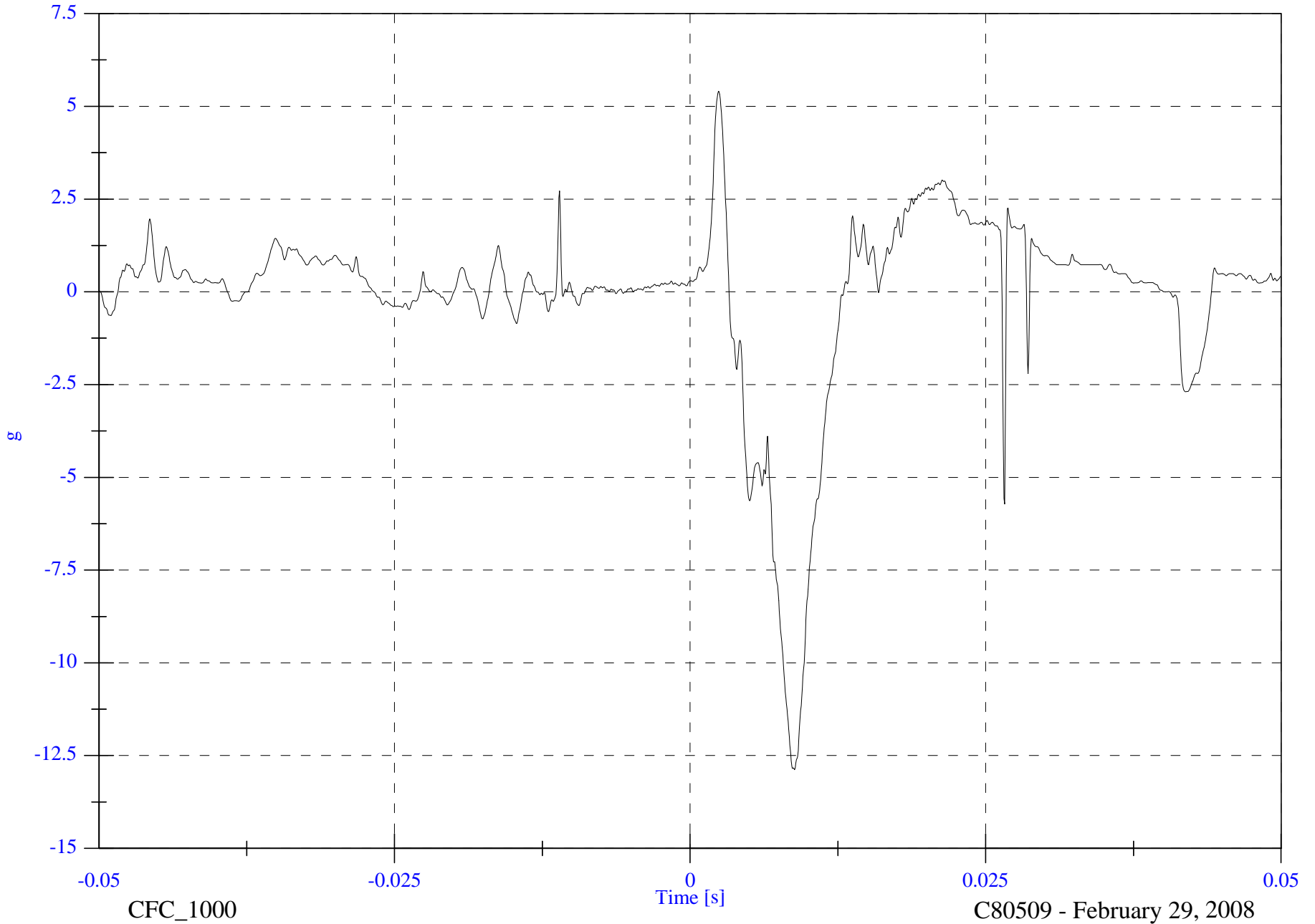
Max: 5.4 [g] at 0.002 [s]

Min: -12.9 [g] at 0.009 [s]

Headform Y Acceleration

C80509 PASSENGER SIDE BP4 IMPACT PLOT #3

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328I

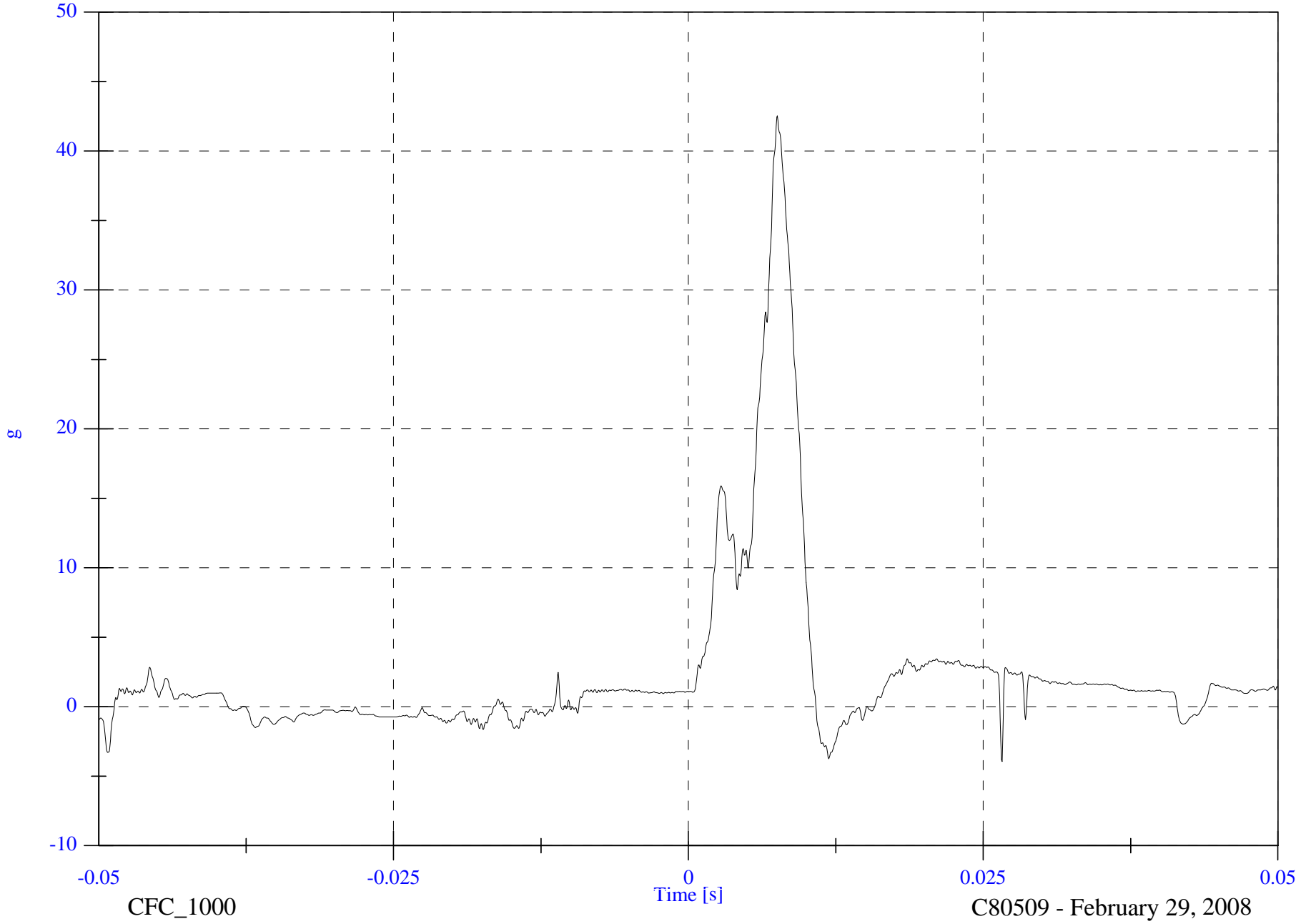
Headform Z Acceleration

Max: 42.5 [g] at 0.008 [s]

Min: -4.0 [g] at 0.027 [s]

C80509 PASSENGER SIDE BP4 IMPACT PLOT #4

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328I

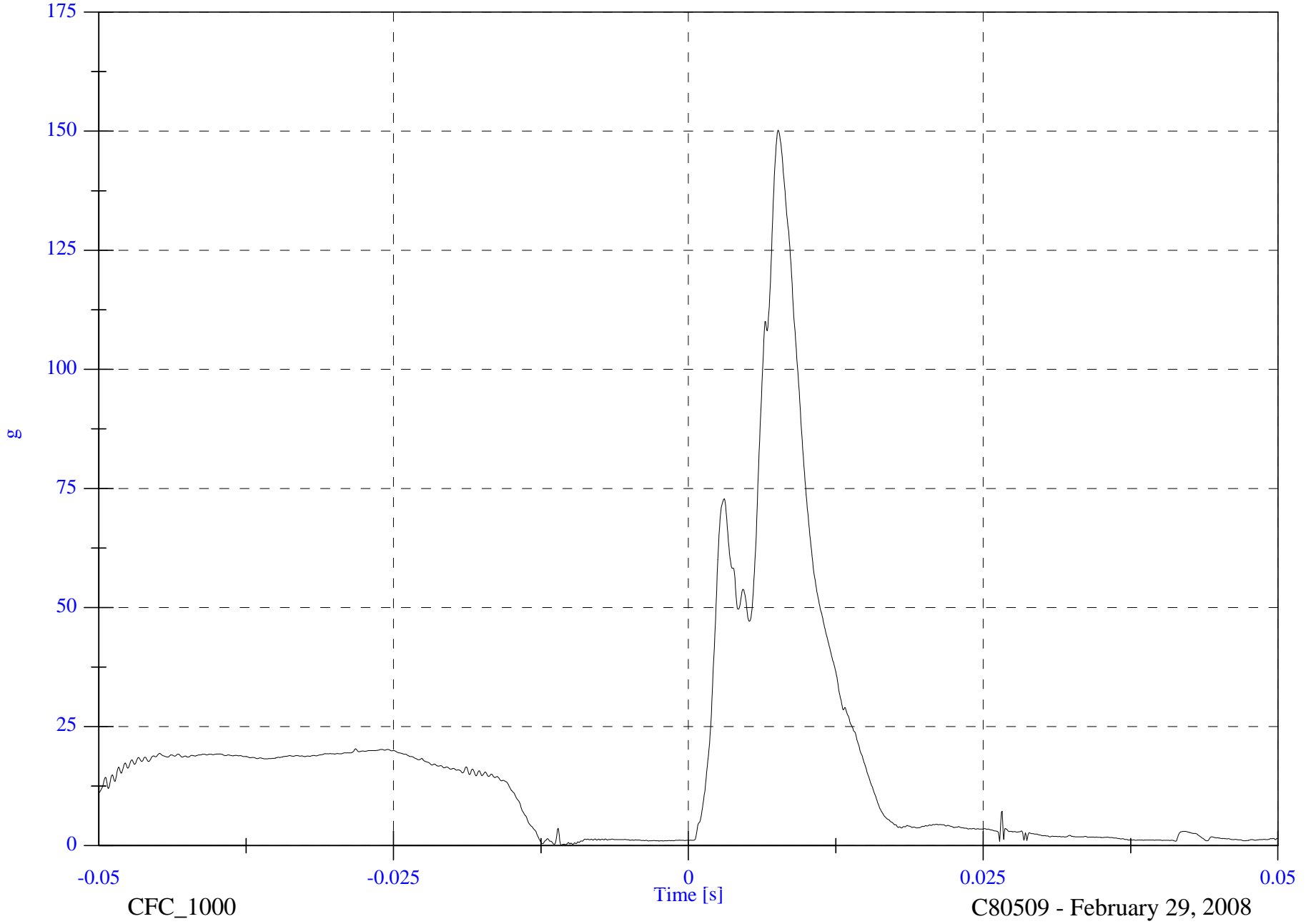
Headform Resultant

Max: 150.2 [g] at 0.008 [s]

Min: 0.1 [g] at -0.011 [s]

C80509 PASSENGER SIDE BP4 IMPACT PLOT #5

8851-04



CFC_1000

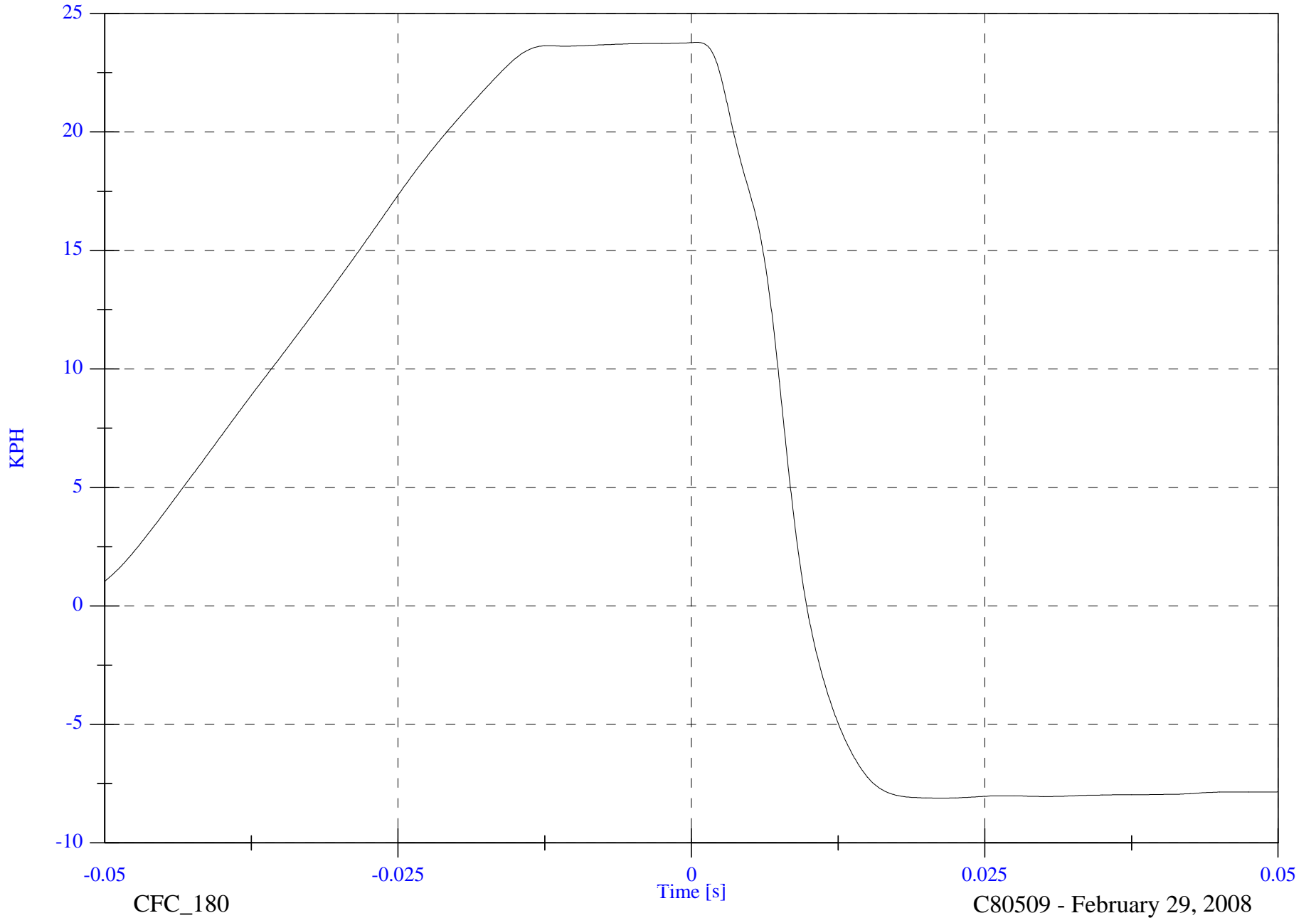
C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328I

Max: 23.8 [KPH] at 0.000 [s]

Min: -8.1 [KPH] at 0.021 [s]

Headform Velocity



C80509 PASSENGER SIDE BP4 IMPACT PLOT #6

8851-04

CFC_180

C80509 - February 29, 2008



PRE-IMPACT BP4



POST-IMPACT BP4

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	03
Test Date:	02/29/08
Target Location:	B-PILLAR
Target Code:	BP3
Horizontal Impact Angle:	90°
Vertical Impact Angle:	-1°
Ambient Temperature:	20.7 C°
Relative Humidity:	13.0 %
Time of Impact:	11:45
Headform Number:	0805

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	0	<input type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	15				mm up



POST-IMPACT BP3 HEADFORM

Free Motion HIC	610.5
HIC(d)	627.0
Impact Velocity (kph)	23.78
HIC T1 (msec)	3.6
HIC T2 (msec)	10.6

FMVSS 201U 2008 BMW 328i C80509 - BP3

FMH Headform 0805

Location: BP3

Test Date: February 29, 2008

Work File: BP3

-----TEST RESULTS-----

Lab Temperature: 20.7 C

HICd: 627.0

Lab Humidity: 13.0 %

HIC (36ms): 610.5

Velocity at Impact: 23.78 KPH

t1: 3.6 msec

t2: 10.6 msec

Free Flight Distance: 220.65 mm

Duration: 7.0 msec

Average Acceleration: 9.5 g

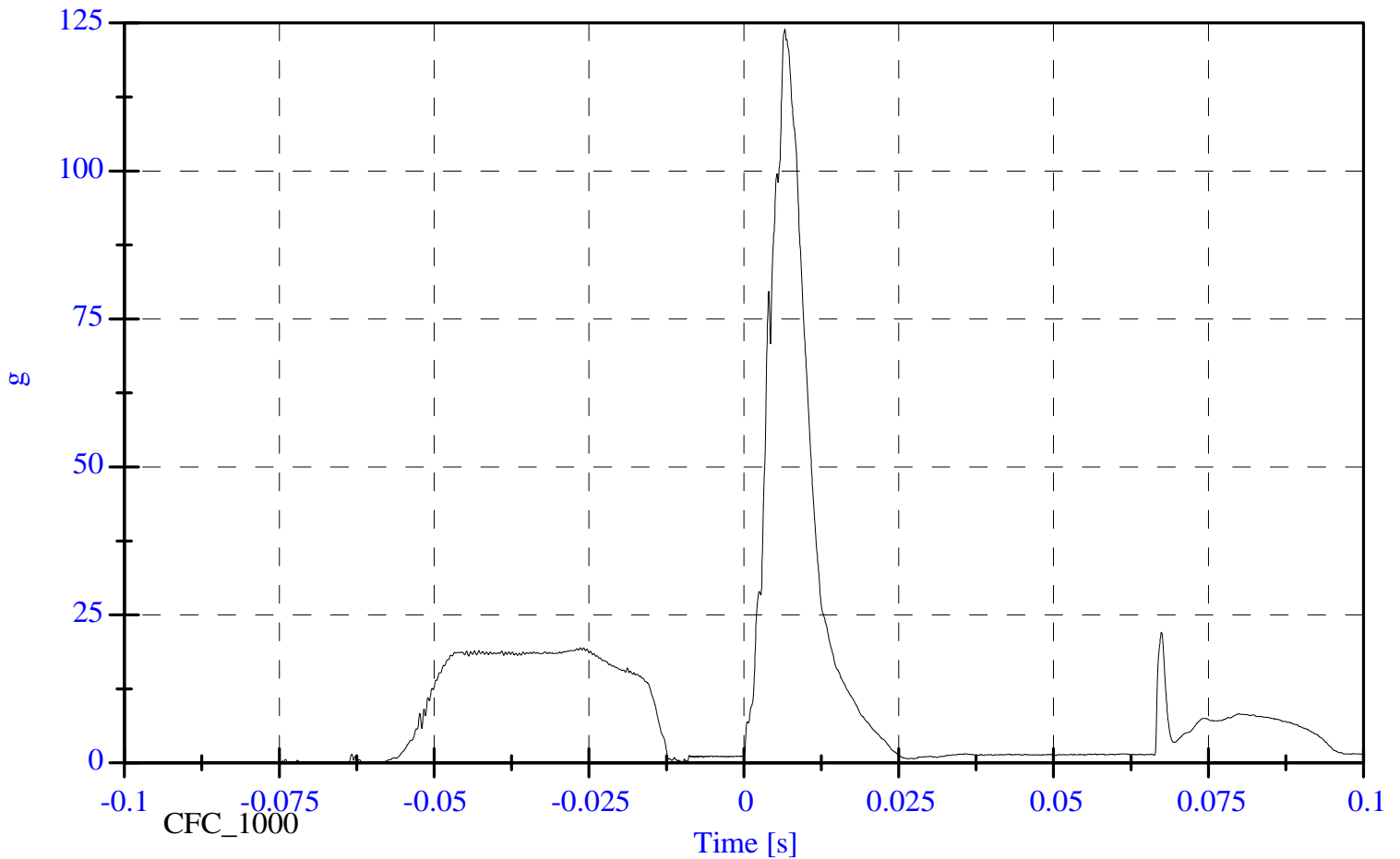
Maximum: 124.0 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 124.0 [g] at 0.007 [s]

Min: 0.0 [g] at -0.096 [s]

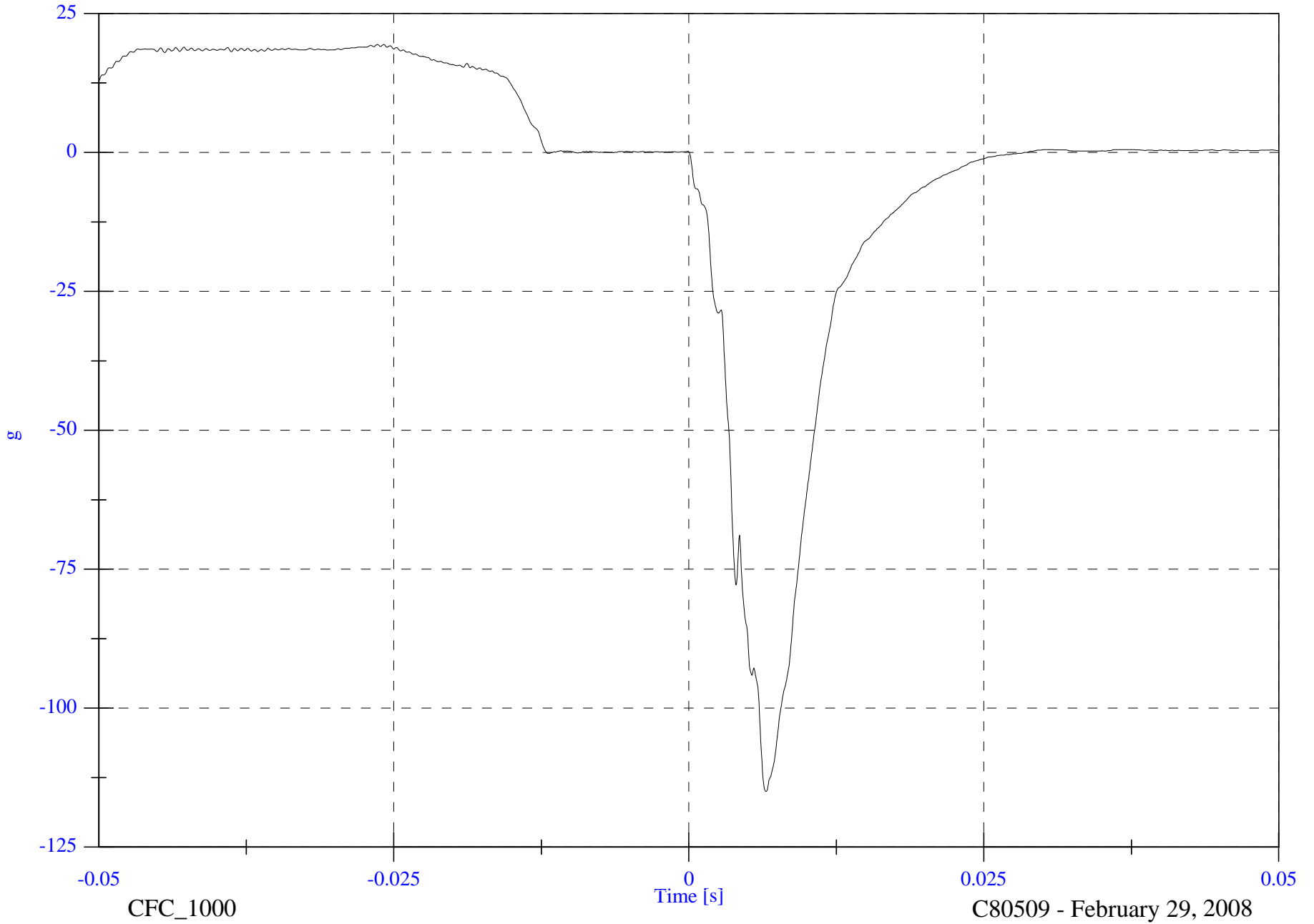


FMVSS 201U 2008 BMW 328i

Max: 19.4 [g] at -0.026 [s]

Min: -115.0 [g] at 0.007 [s]

Headform X Acceleration



C80509 PASSENGER SIDE BP3 IMPACT PLOT #2

8851-04

CFC_1000

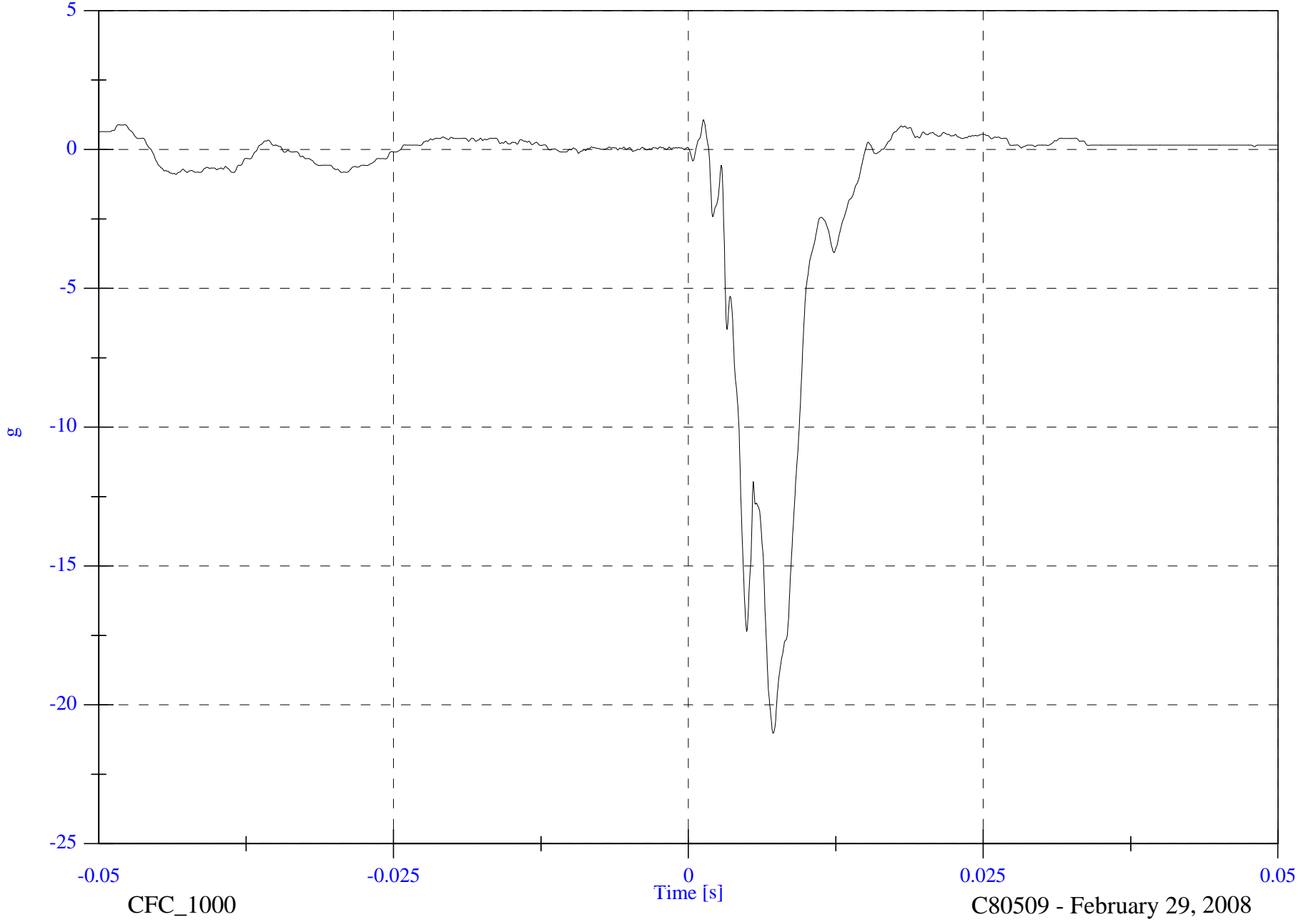
C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

Headform Y Acceleration

Max: 1.1 [g] at 0.001 [s]

Min: -21.0 [g] at 0.007 [s]



C80509 PASSENGER SIDE BP3 IMPACT PLOT #3

8851-04

CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

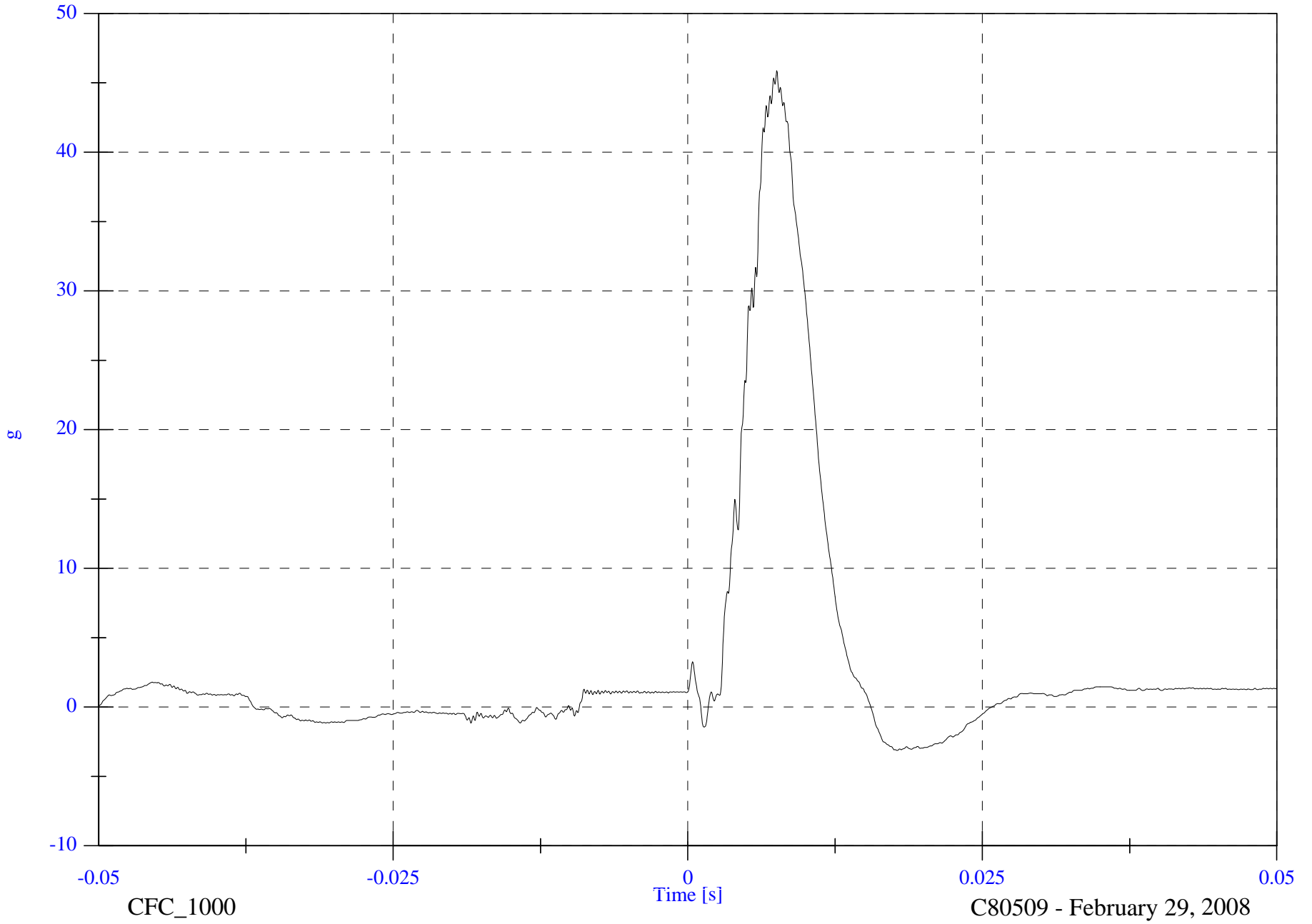
Headform Z Acceleration

Max: 45.9 [g] at 0.008 [s]

Min: -3.1 [g] at 0.018 [s]

C80509 PASSENGER SIDE BP3 IMPACT PLOT #4

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

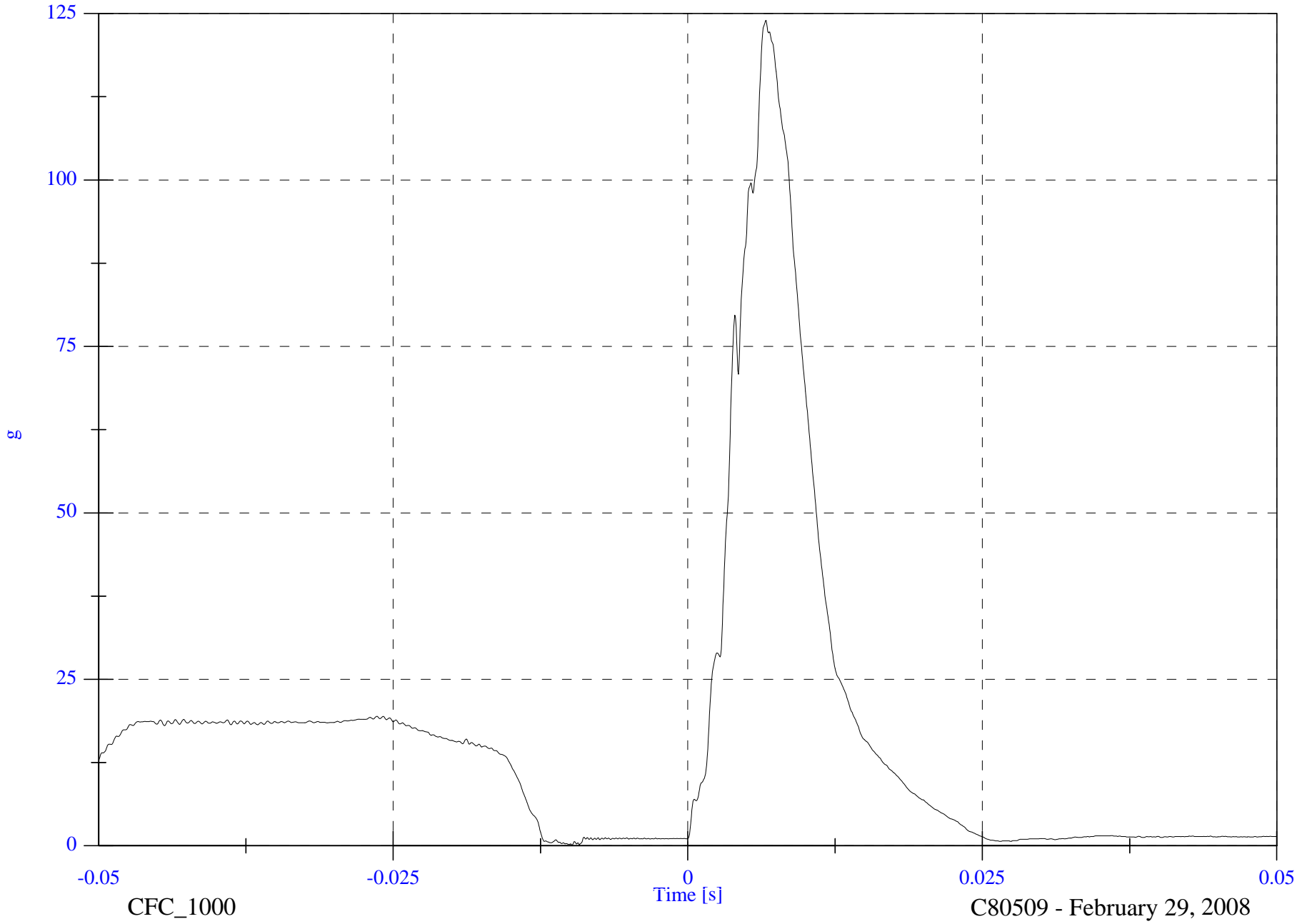
Headform Resultant

Max: 124.0 [g] at 0.007 [s]

Min: 0.1 [g] at -0.009 [s]

C80509 PASSENGER SIDE BP3 IMPACT PLOT #5

8851-04



CFC_1000

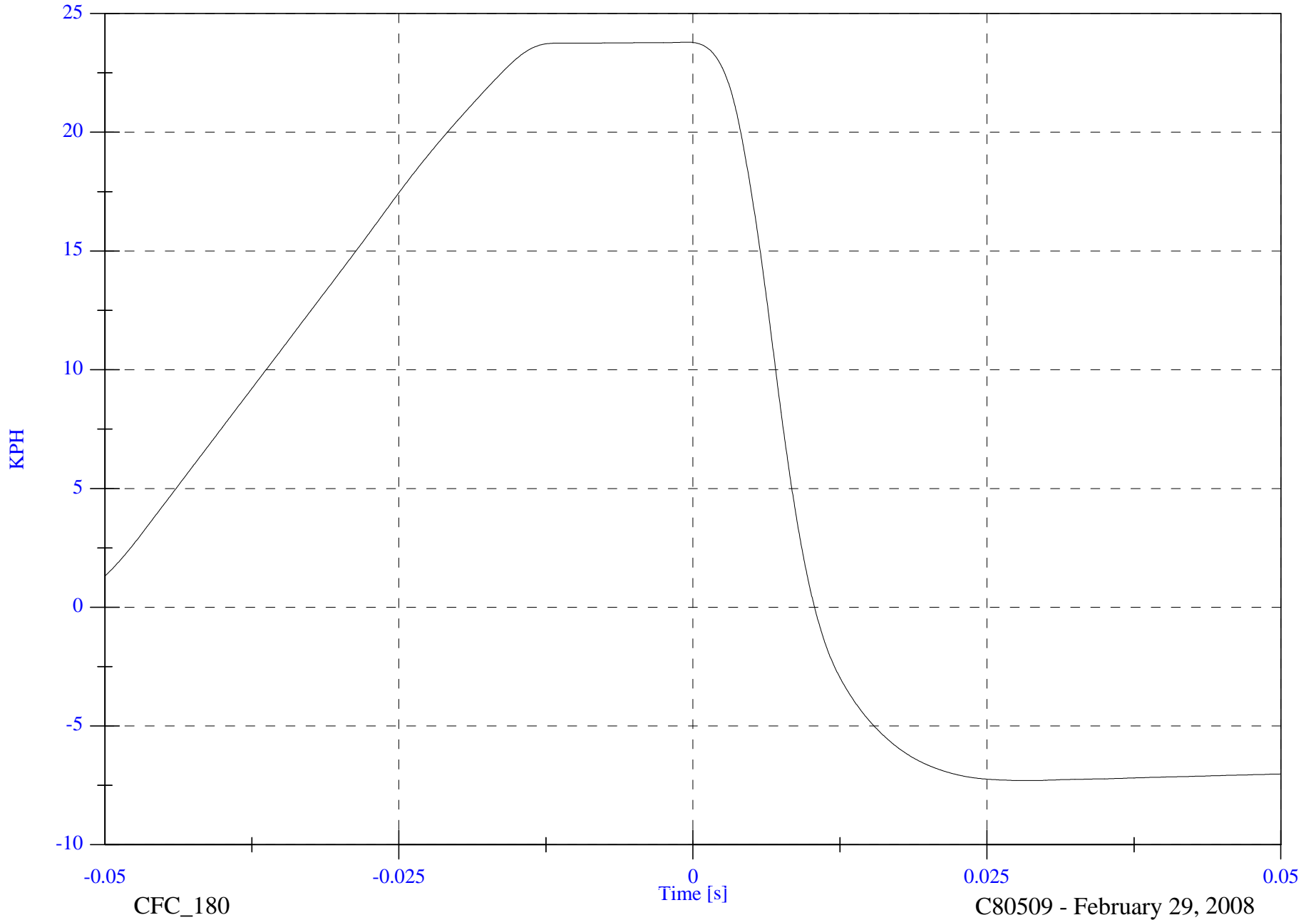
C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

Max: 23.8 [KPH] at -0.000 [s]

Min: -7.3 [KPH] at 0.029 [s]

Headform Velocity



C80509 PASSENGER SIDE BP3 IMPACT PLOT #6

8851-04

CFC_180

C80509 - February 29, 2008



PRE-IMPACT BP3



POST-IMPACT BP3

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	04
Test Date:	02/29/08
Target Location:	B-PILLAR
Target Code:	BP1
Horizontal Impact Angle:	90°
Vertical Impact Angle:	10°
Ambient Temperature:	21.1 C°
Relative Humidity:	13.7 %
Time of Impact:	13:50
Headform Number:	62

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	5	<input type="checkbox"/>	mm right	<input checked="" type="checkbox"/>	mm left
On Centerline	64				mm up



POST-IMPACT BP1 HEADFORM

Free Motion HIC	245.8
HIC(d)	351.8
Impact Velocity (kph)	18.6
HIC T1 (msec)	7.8
HIC T2 (msec)	14.8

FMVSS 201U 2008 BMW 328i C80509 - BP1

FMH Headform 0062

Location: BP1

Test Date: February 29, 2008

Work File: BP1

-----TEST RESULTS-----

Lab Temperature: 21.1 C

HICd: 351.8

Lab Humidity: 13.7 %

HIC (36ms): 245.8

Velocity at Impact: 18.60 KPH

t1: 7.8 msec

t2: 14.8 msec

Free Flight Distance: 197.87 mm

Duration: 7.0 msec

Average Acceleration: 7.1 g

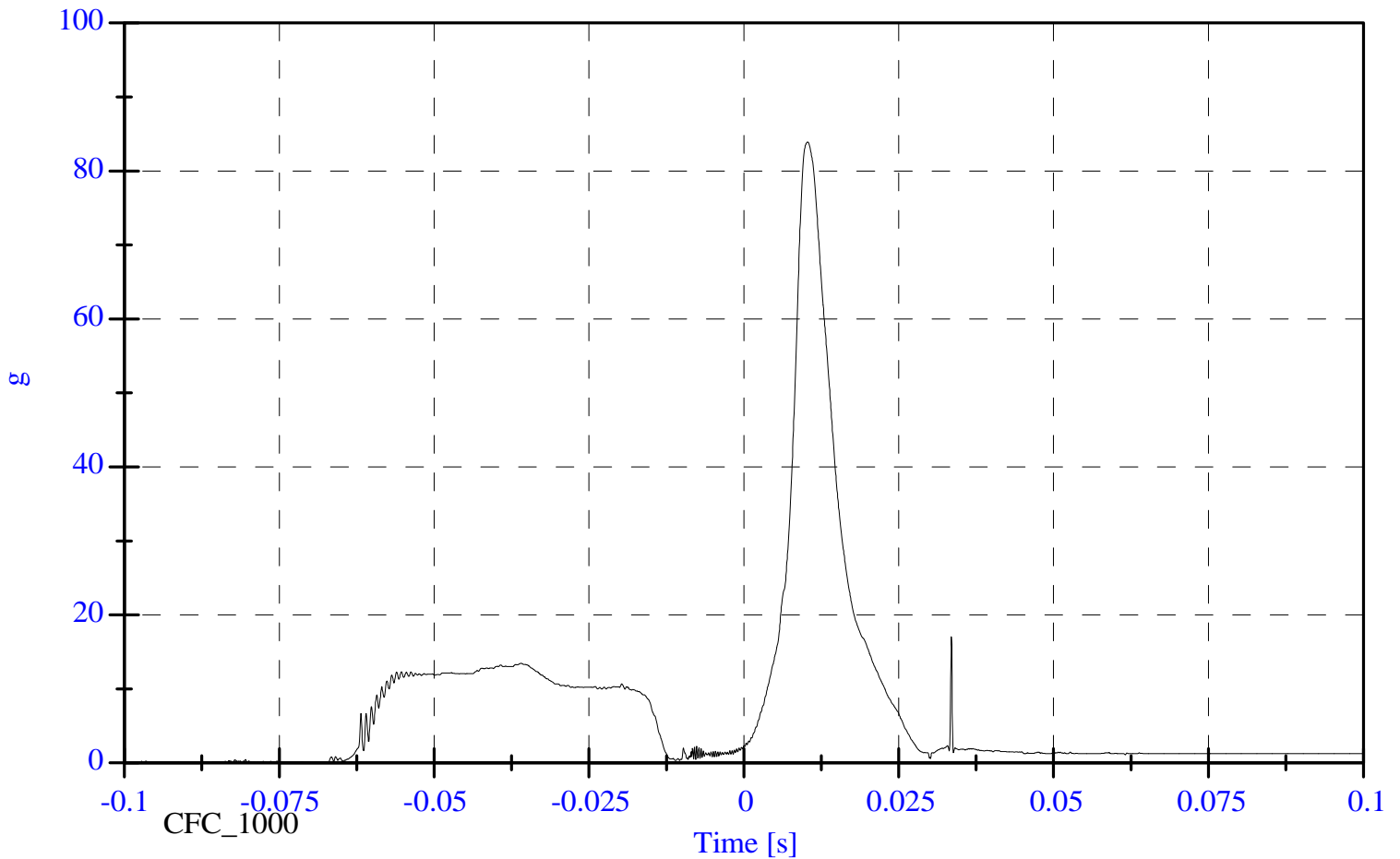
Maximum: 83.9 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 83.9 [g] at 0.010 [s]

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



FMVSS 201U 2008 BMW 328i

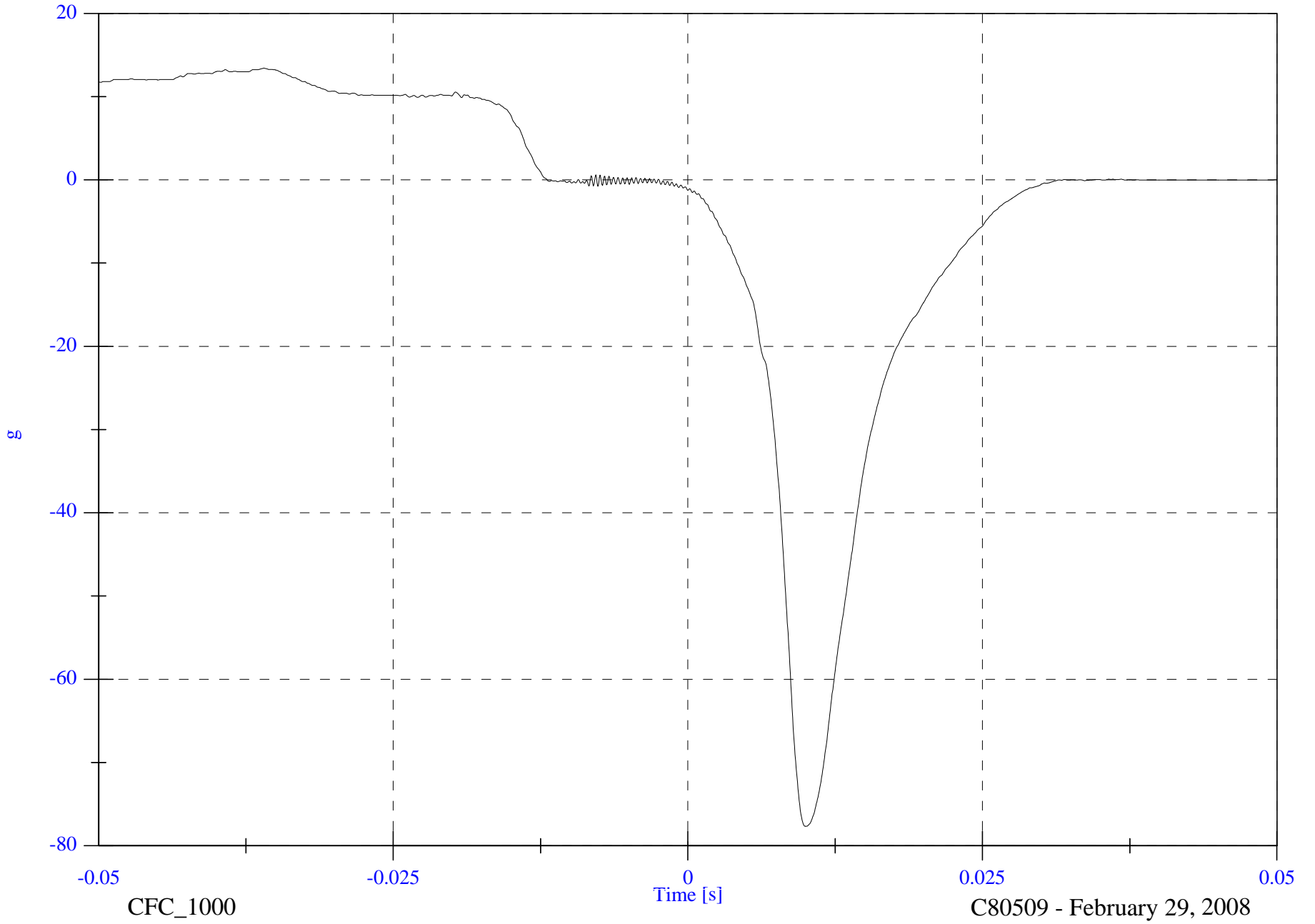
Headform X Acceleration

Max: 13.4 [g] at -0.036 [s]

Min: -77.7 [g] at 0.010 [s]

C80509 PASSENGER SIDE BPI IMPACT PLOT #2

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

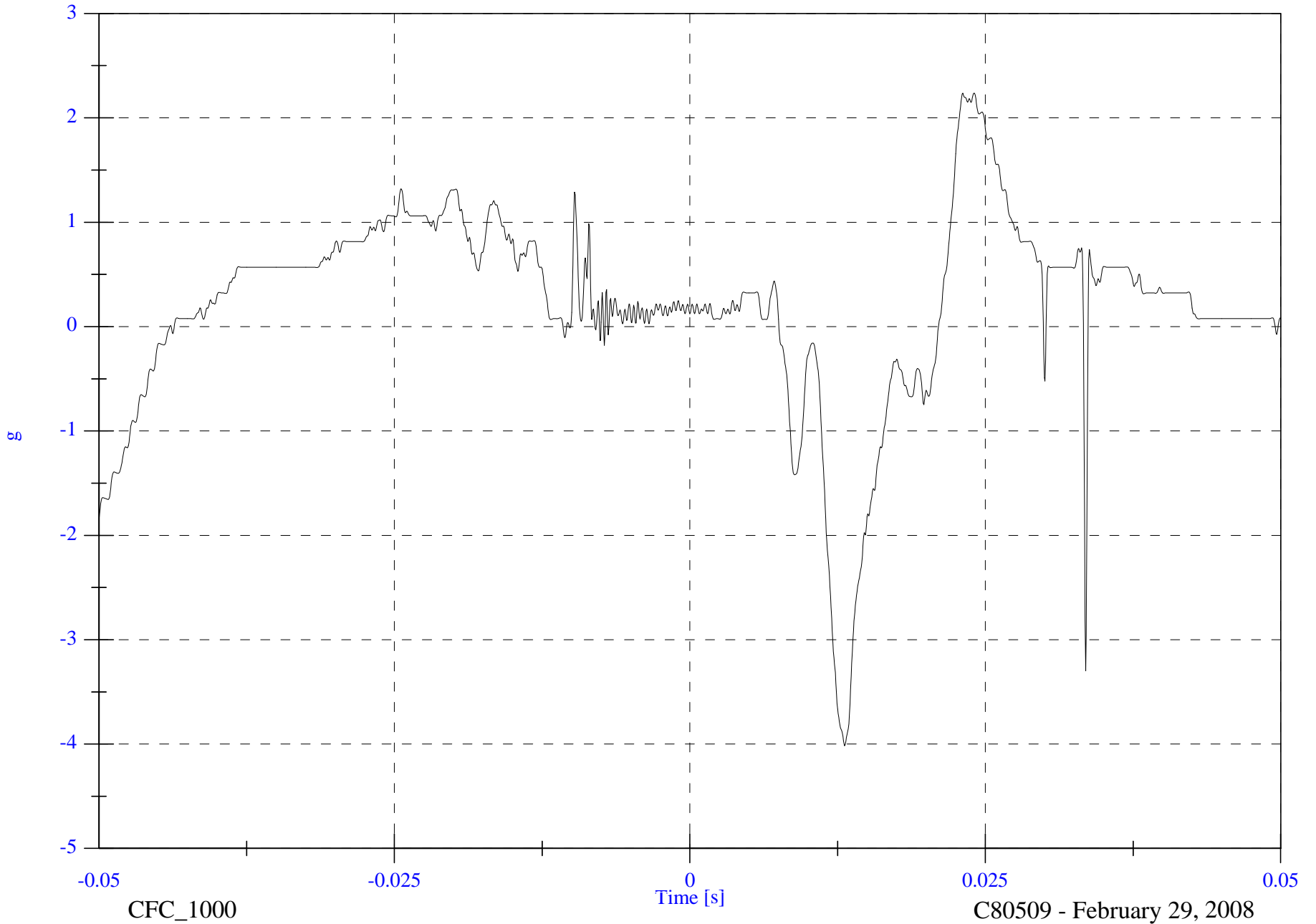
Headform Y Acceleration

Max: 2.2 [g] at 0.024 [s]

Min: -4.0 [g] at 0.013 [s]

C80509 PASSENGER SIDE BP1 IMPACT PLOT #3

8851-04



FMVSS 201U 2008 BMW 328i

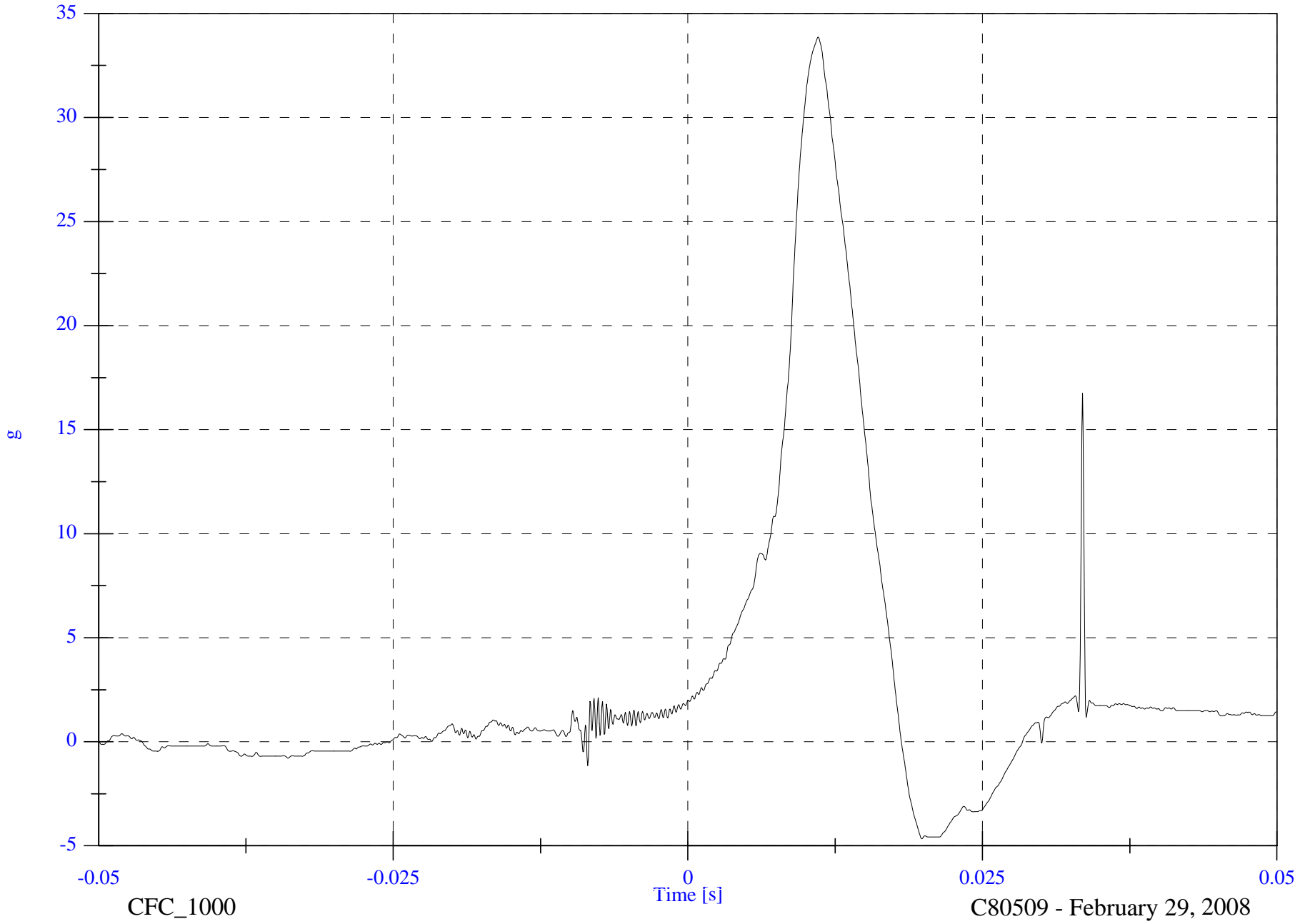
Headform Z Acceleration

Max: 33.9 [g] at 0.011 [s]

Min: -4.7 [g] at 0.020 [s]

C80509 PASSENGER SIDE BPI IMPACT PLOT #4

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

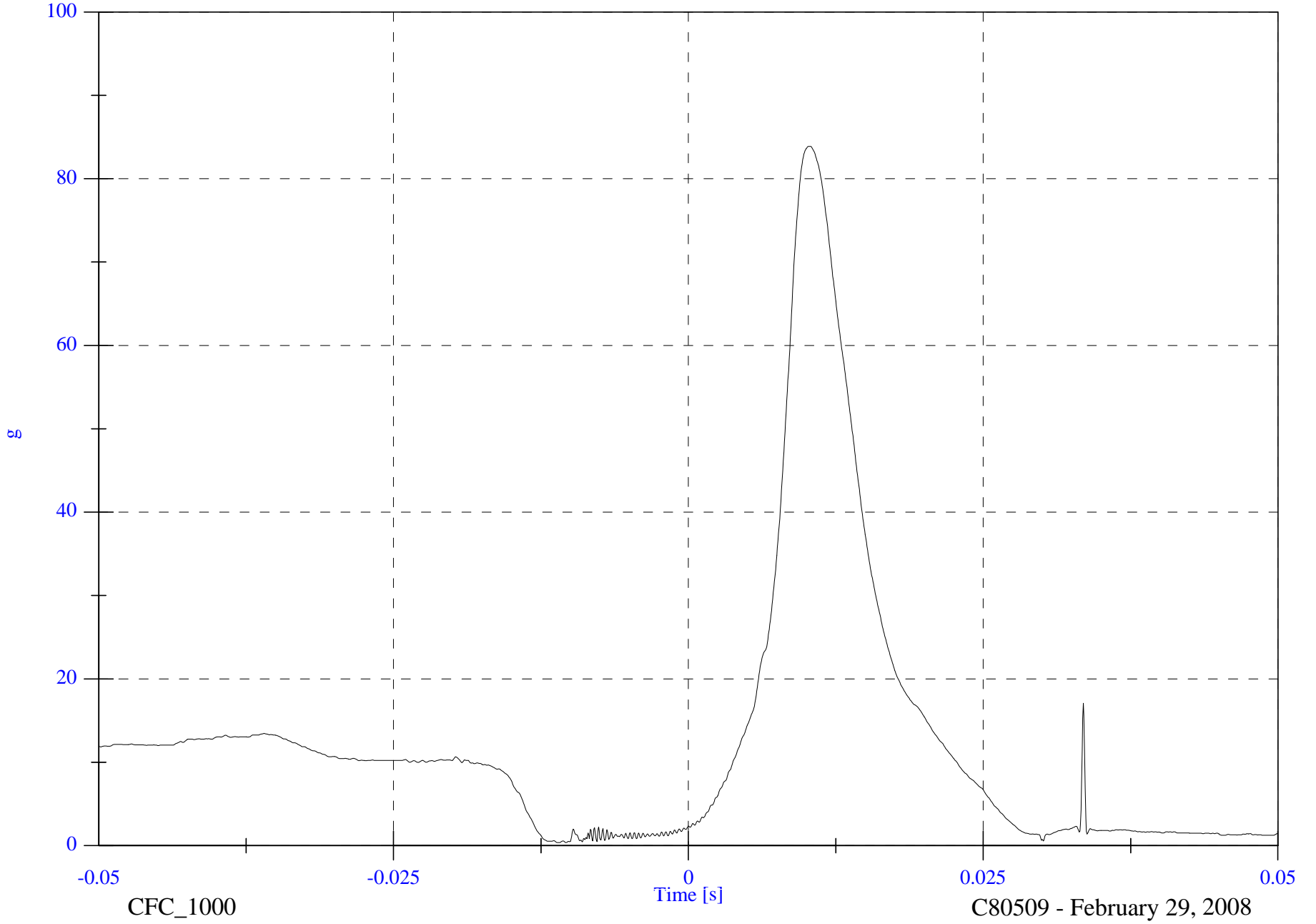
Headform Resultant

Max: 83.9 [g] at 0.010 [s]

Min: 0.3 [g] at -0.010 [s]

C80509 PASSENGER SIDE BPI IMPACT PLOT #5

8851-04



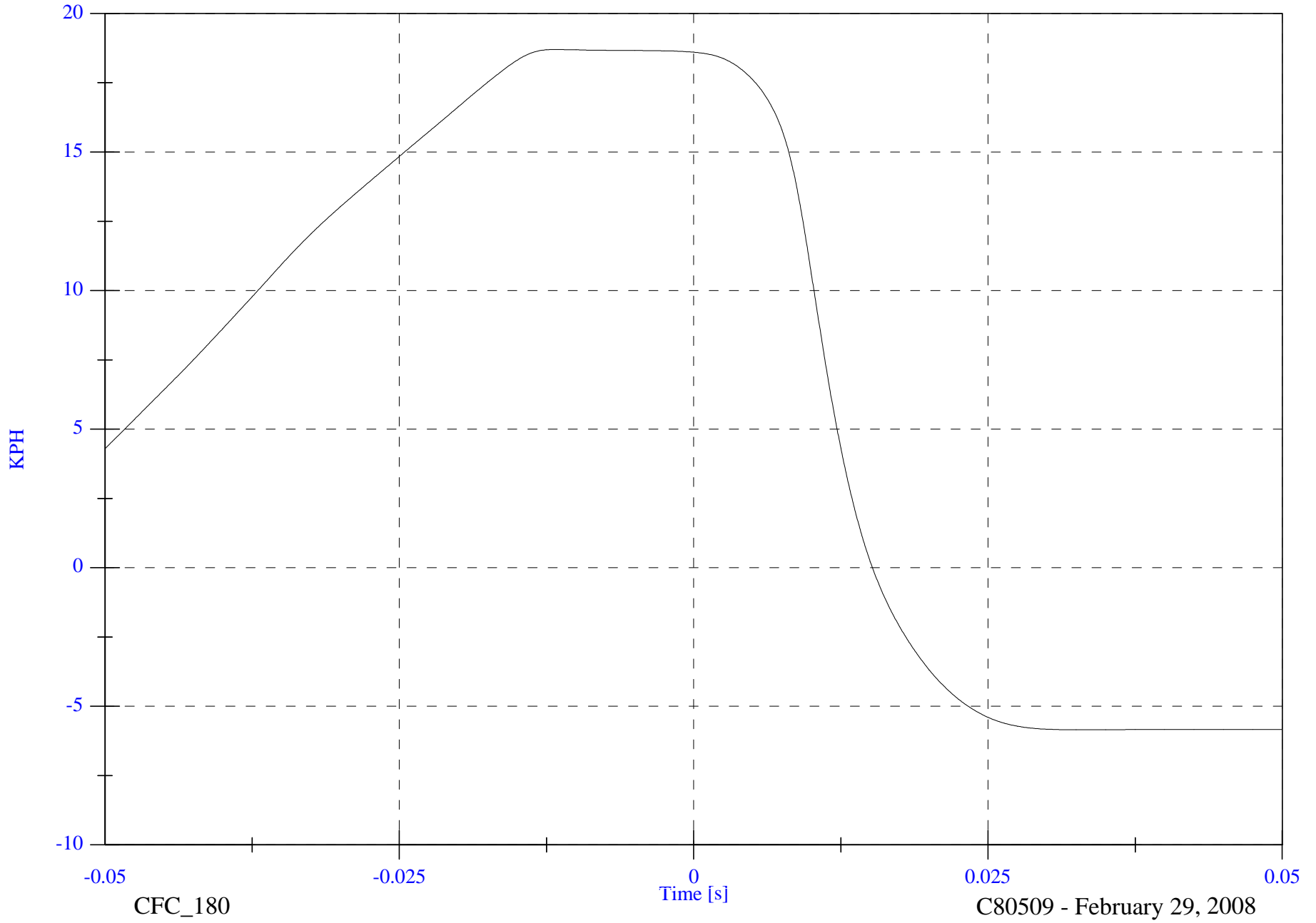
CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

Max: 18.7 [KPH] at -0.012 [s]
Min: -5.8 [KPH] at 0.034 [s]

Headform Velocity

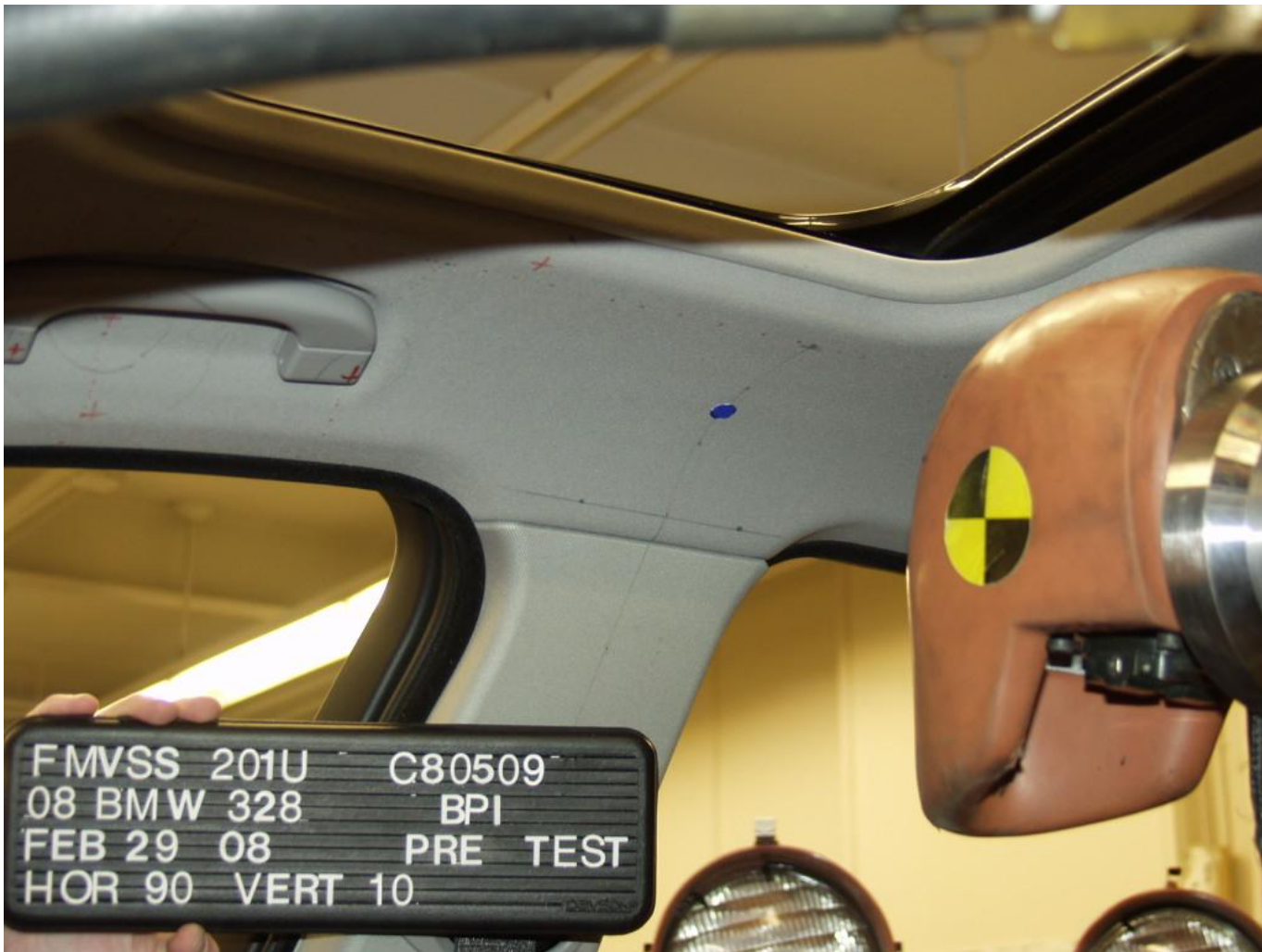


C80509 PASSENGER SIDE BPI IMPACT PLOT #6

8851-04

CFC_180

C80509 - February 29, 2008



PRE-IMPACT BPI



POST-IMPACT BPI

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	05
Test Date:	02/29/08
Target Location:	SIDE RAIL
Target Code:	SR2A
Horizontal Impact Angle:	90°
Vertical Impact Angle:	49°
Ambient Temperature:	21.2 C°
Relative Humidity:	14.6 %
Time of Impact:	14:50
Headform Number:	1140

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	3	<input type="checkbox"/>	mm right	<input checked="" type="checkbox"/>	mm left
On Centerline	15				mm up



POST-IMPACT SR2A HEADFORM

Free Motion HIC	345.5
HIC(d)	427.1
Impact Velocity (kph)	18.66
HIC T1 (msec)	1.6
HIC T2 (msec)	11.1

FMVSS 201U 2008 BMW328i C80509 - SR2A

FMH Headform 1140

Location: SR2A

Test Date: February 29, 2008

Work File: SR2A

-----TEST RESULTS-----

Lab Temperature: 21.2 C

HICd: 427.1

Lab Humidity: 14.6 %

HIC (36ms): 345.5

Velocity at Impact: 18.66 KPH

t1: 1.6 msec

t2: 11.1 msec

Free Flight Distance: 220.71 mm

Duration: 9.4 msec

Average Acceleration: 7.1 g

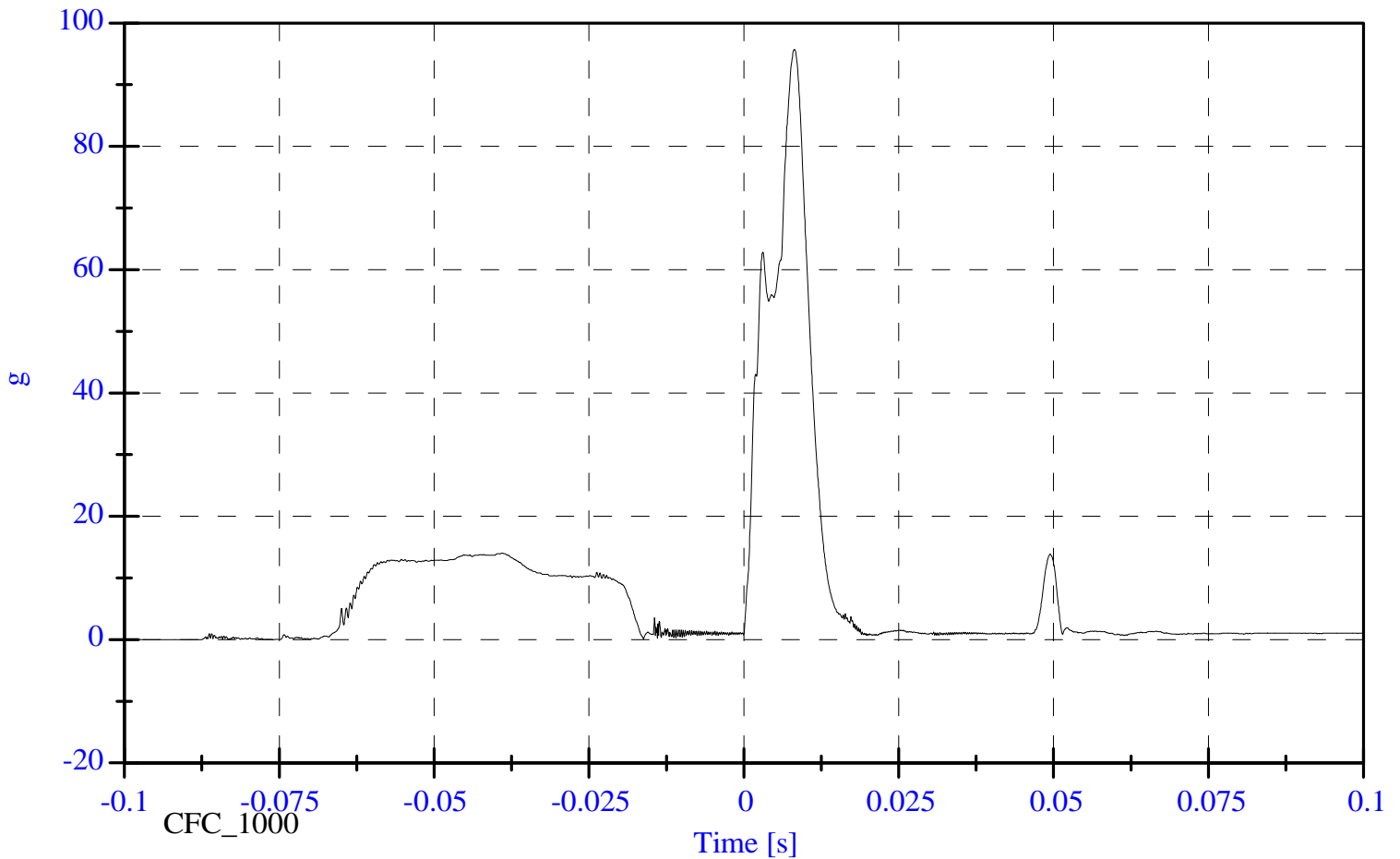
Maximum: 95.7 g

FMVSS 201U 2008 BMW328i

Headform Resultant

Max: 95.7 [g] at 0.008 [s]

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



FMVSS 201U 2008 BMW328i

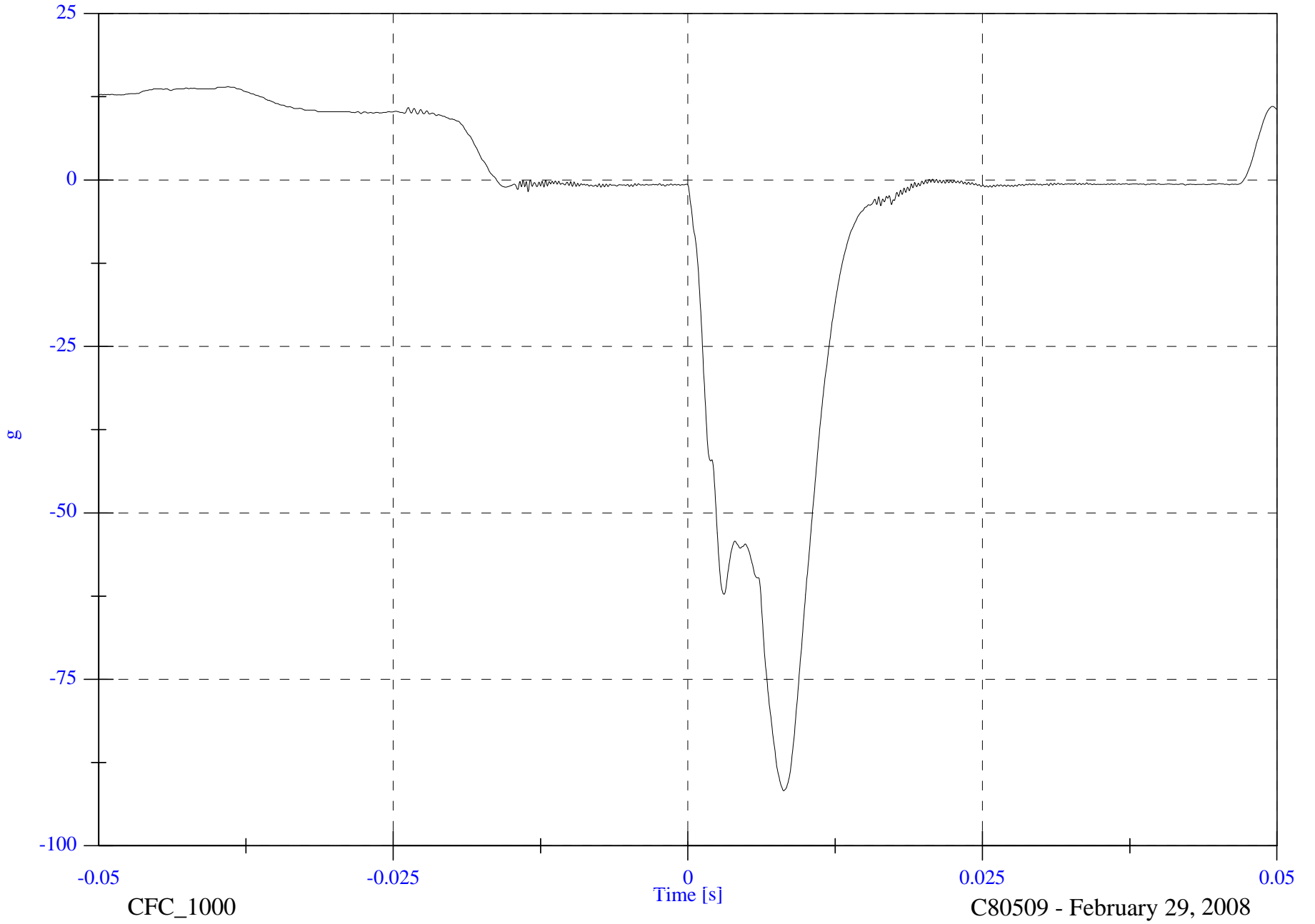
Headform X Acceleration

Max: 14.0 [g] at -0.039 [s]

Min: -91.7 [g] at 0.008 [s]

C80509 PASSENGER SIDE SR2A IMPACT PLOT #2

8851-04



CFC_1000

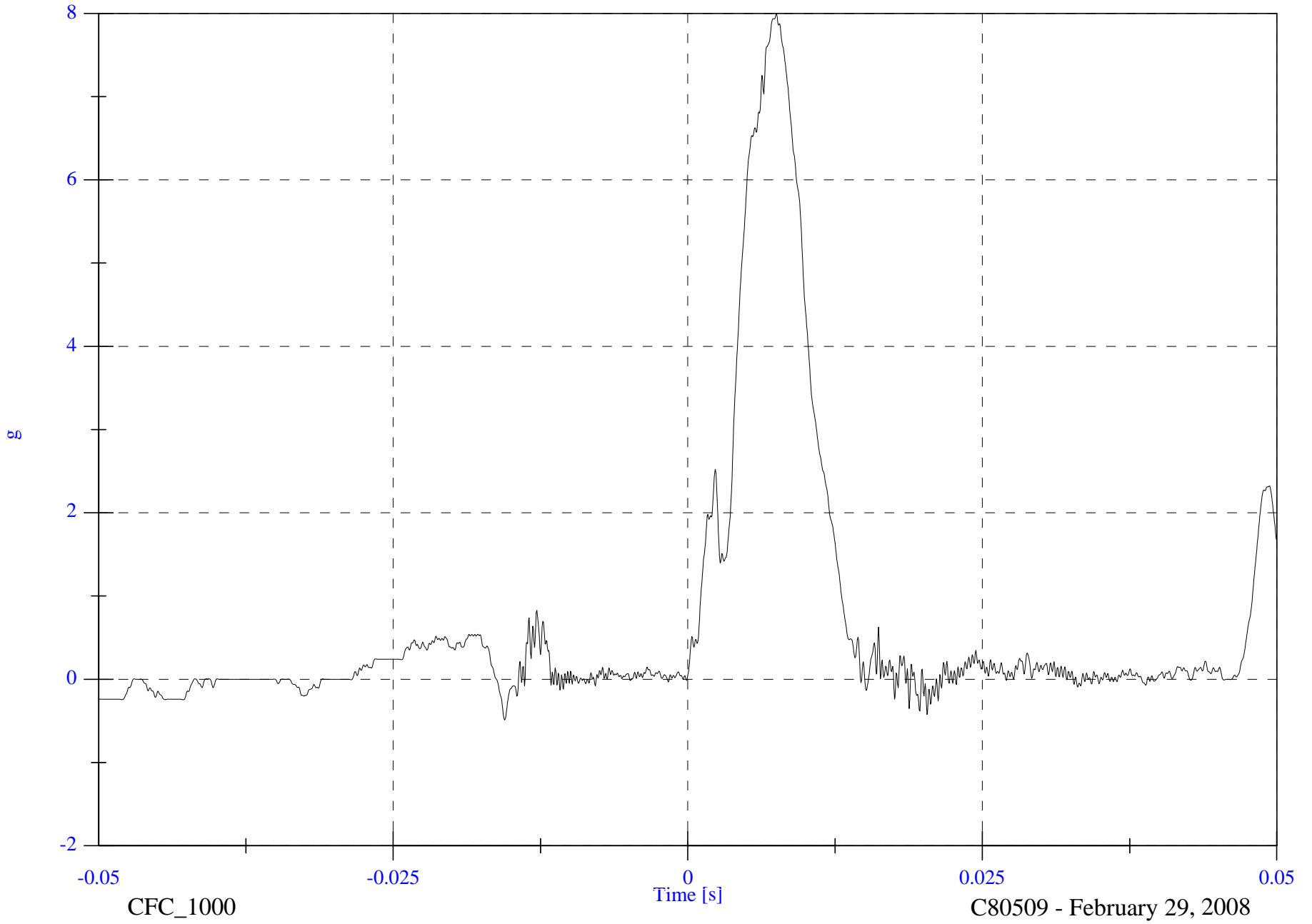
C80509 - February 29, 2008

FMVSS 201U 2008 BMW328i

Max: 8.0 [g] at 0.008 [s]

Min: -0.5 [g] at -0.016 [s]

Headform Y Acceleration



C80509 PASSENGER SIDE SR2A IMPACT PLOT #3

8851-04

CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW328i

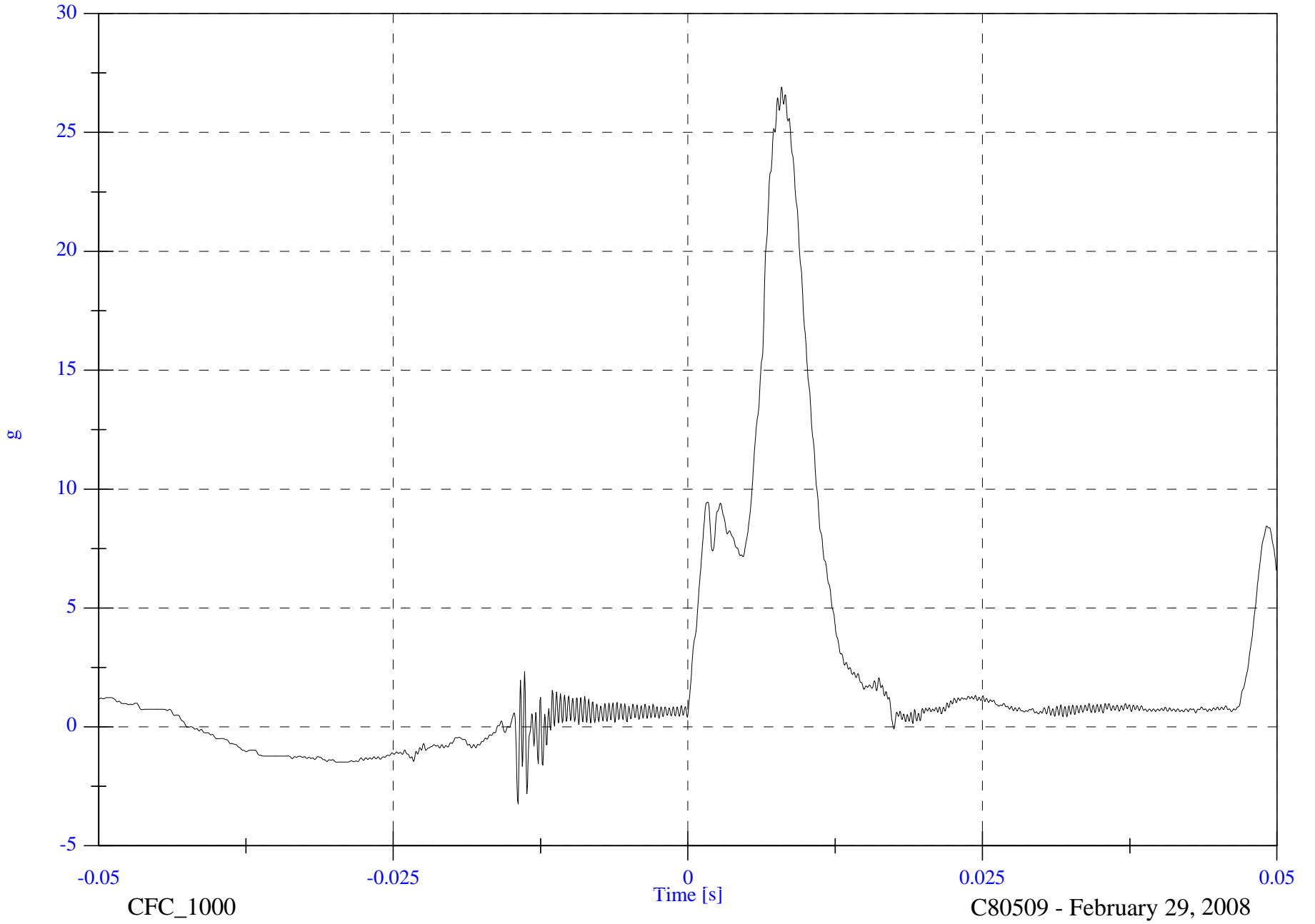
Headform Z Acceleration

Max: 26.9 [g] at 0.008 [s]

Min: -3.2 [g] at -0.014 [s]

C80509 PASSENGER SIDE SR2A IMPACT PLOT #4

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW328i

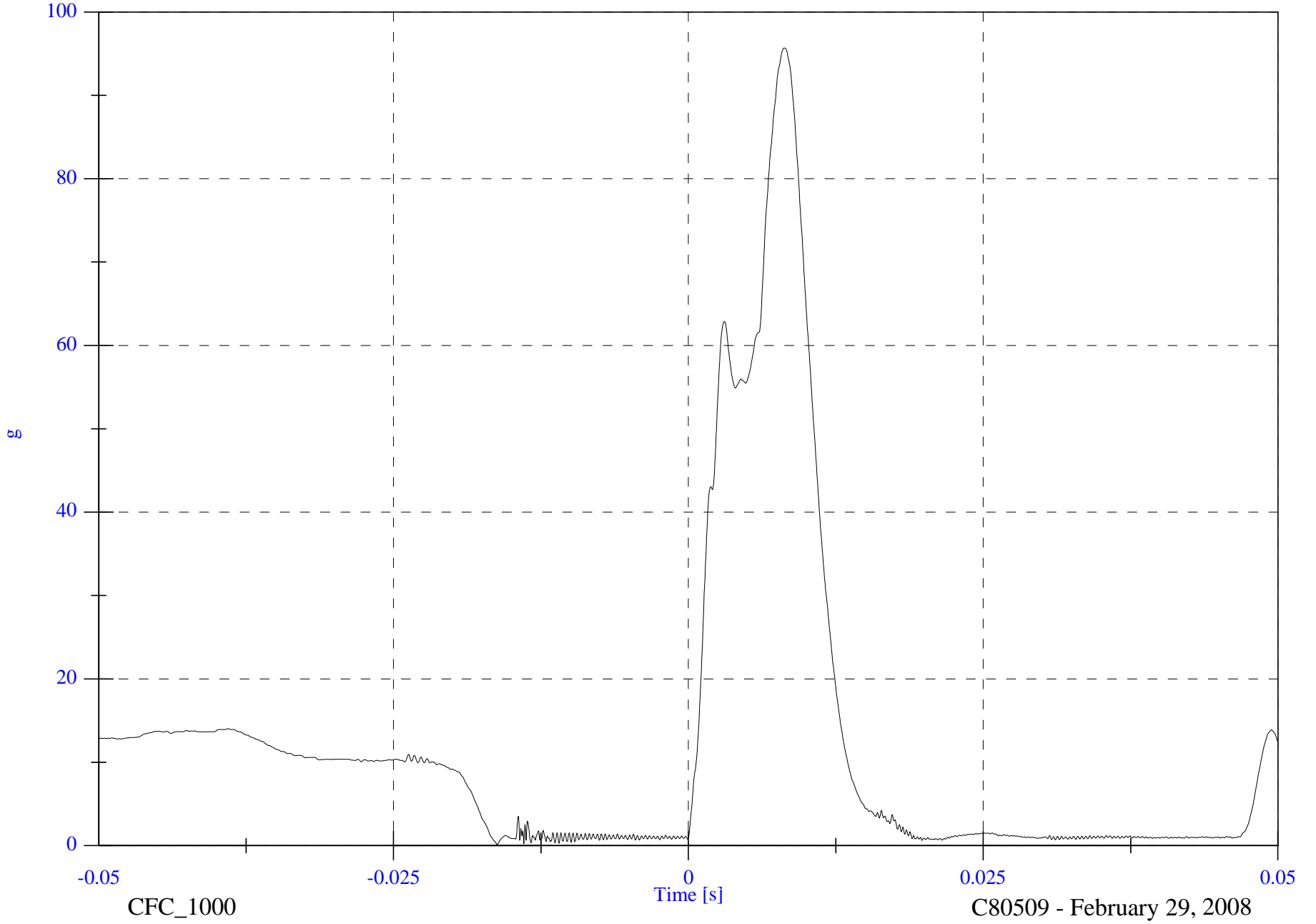
Headform Resultant

Max: 95.7 [g] at 0.008 [s]

Min: 0.1 [g] at -0.016 [s]

C80509 PASSENGER SIDE SR2A IMPACT PLOT #5

8851-04



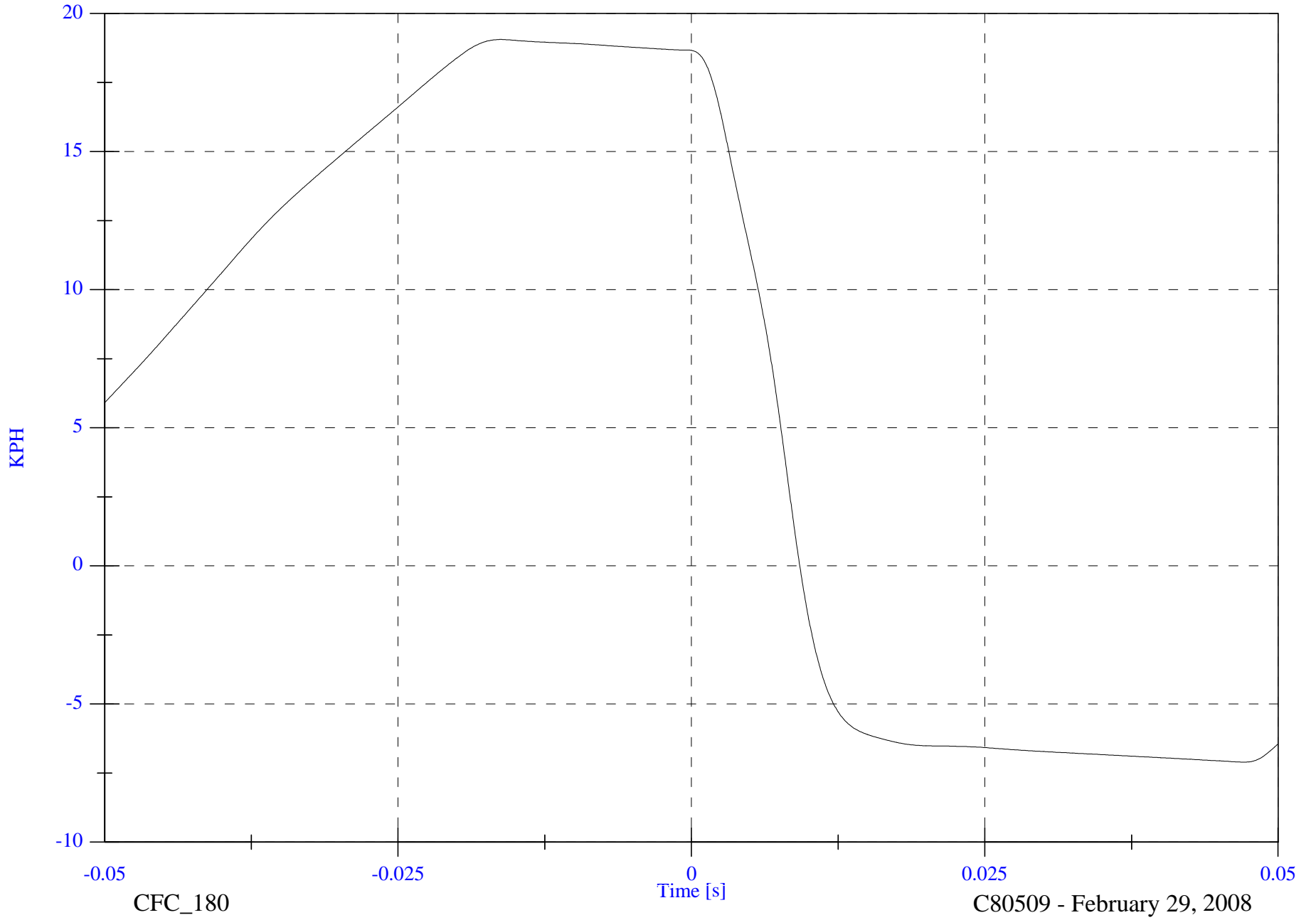
FMVSS 201U 2008 BMW328i

Headform Velocity

Max: 19.1 [KPH] at -0.016 [s]
Min: -7.1 [KPH] at 0.047 [s]

C80509 PASSENGER SIDE SR2A IMPACT PLOT #6

8851-04



CFC_180

C80509 - February 29, 2008



PRE-IMPACT SR2A



POST-IMPACT SR2A

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	06
Test Date:	02/29/08
Target Location:	A-PILLAR
Target Code:	AP3
Horizontal Impact Angle:	143°
Vertical Impact Angle:	41°
Ambient Temperature:	21.5 C°
Relative Humidity:	15.5 %
Time of Impact:	15:30
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	8	<input type="checkbox"/>	mm right	<input checked="" type="checkbox"/>	mm left
On Centerline	8				mm up



POST-IMPACT AP3 HEADFORM

Free Motion HIC	849.5
HIC(d)	807.3
Impact Velocity (kph)	18.54
HIC T1 (msec)	1.8
HIC T2 (msec)	6.1

FMVSS 201U 2008 BMW 328i C80509 - AP3

FMH Headform 0355

Location: AP3

Test Date: February 29, 2008

Work File: AP3

-----TEST RESULTS-----

Lab Temperature: 21.5 C

HICd: 807.3

Lab Humidity: 15.5 %

HIC (36ms): 849.5

Velocity at Impact: 18.54 KPH

t1: 1.8 msec

t2: 6.1 msec

Free Flight Distance: 224.95 mm

Duration: 4.3 msec

Average Acceleration: 8.6 g

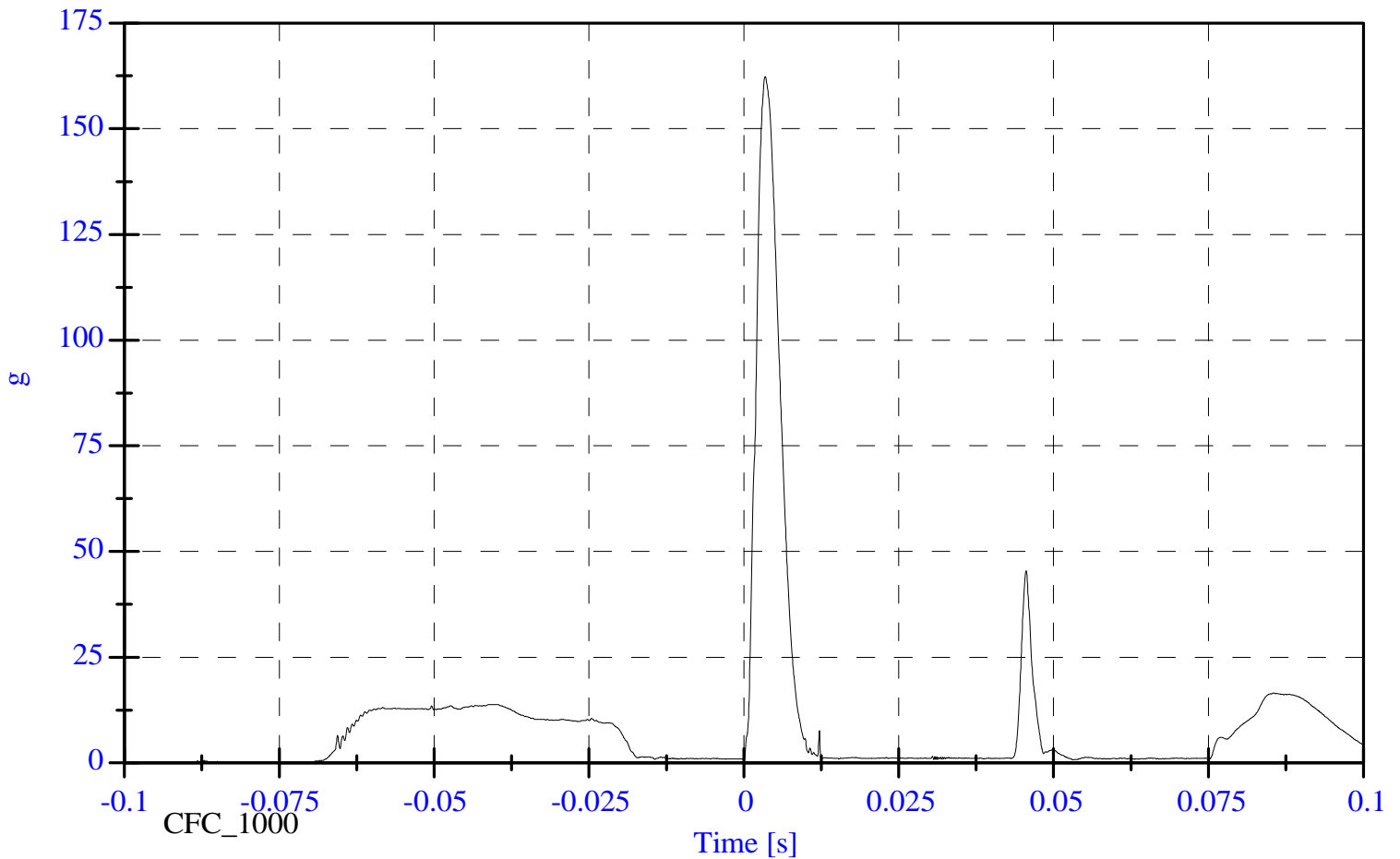
Maximum: 162.4 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 162.4 [g] at 0.003 [s]

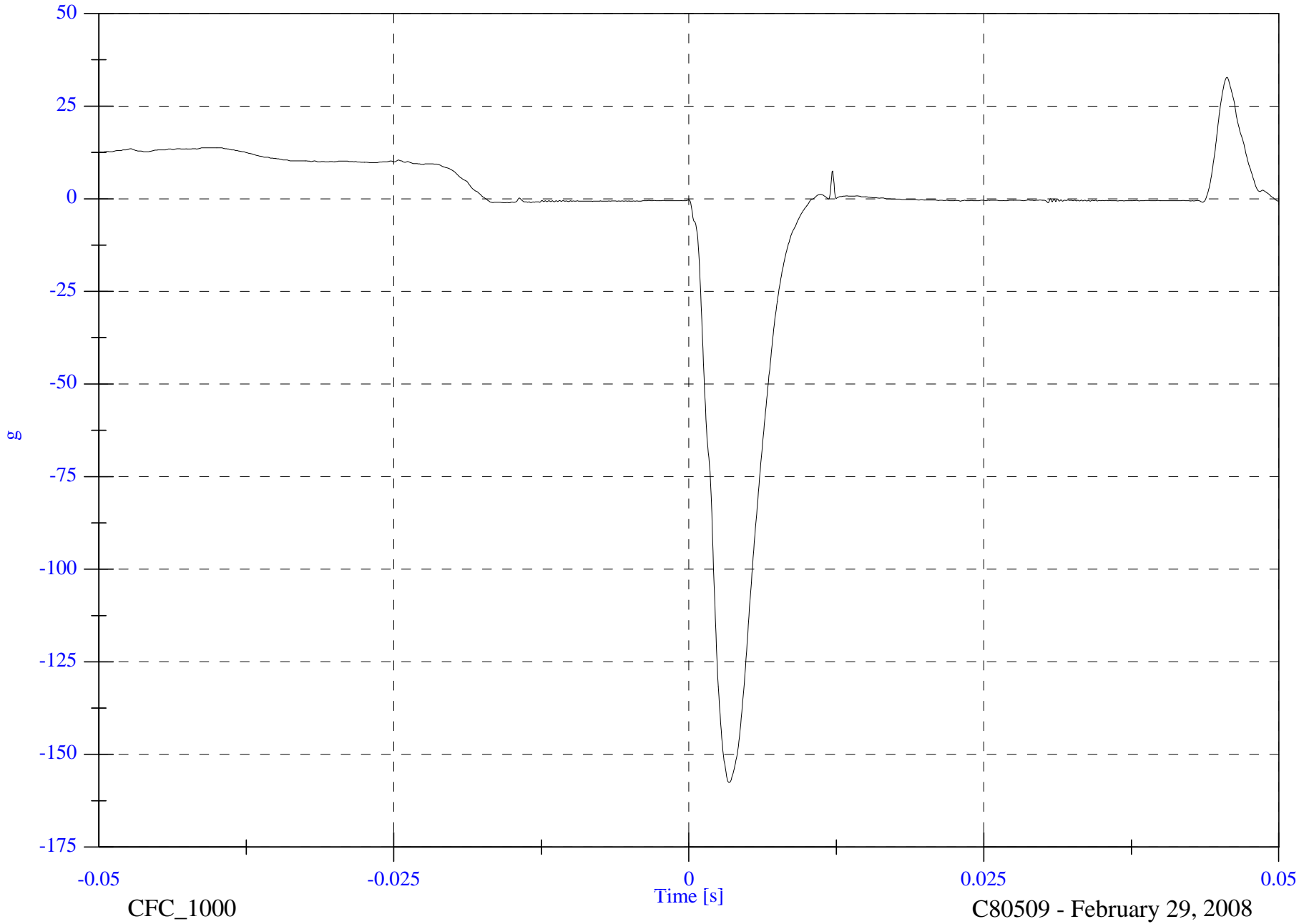
Min: 0.0 [g] at -0.093 [s]



FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 32.8 [g] at 0.046 [s]
Min: -157.6 [g] at 0.003 [s]



C80509 PASSENGER SIDE AP3 IMPACT PLOT #2

8851-04

CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

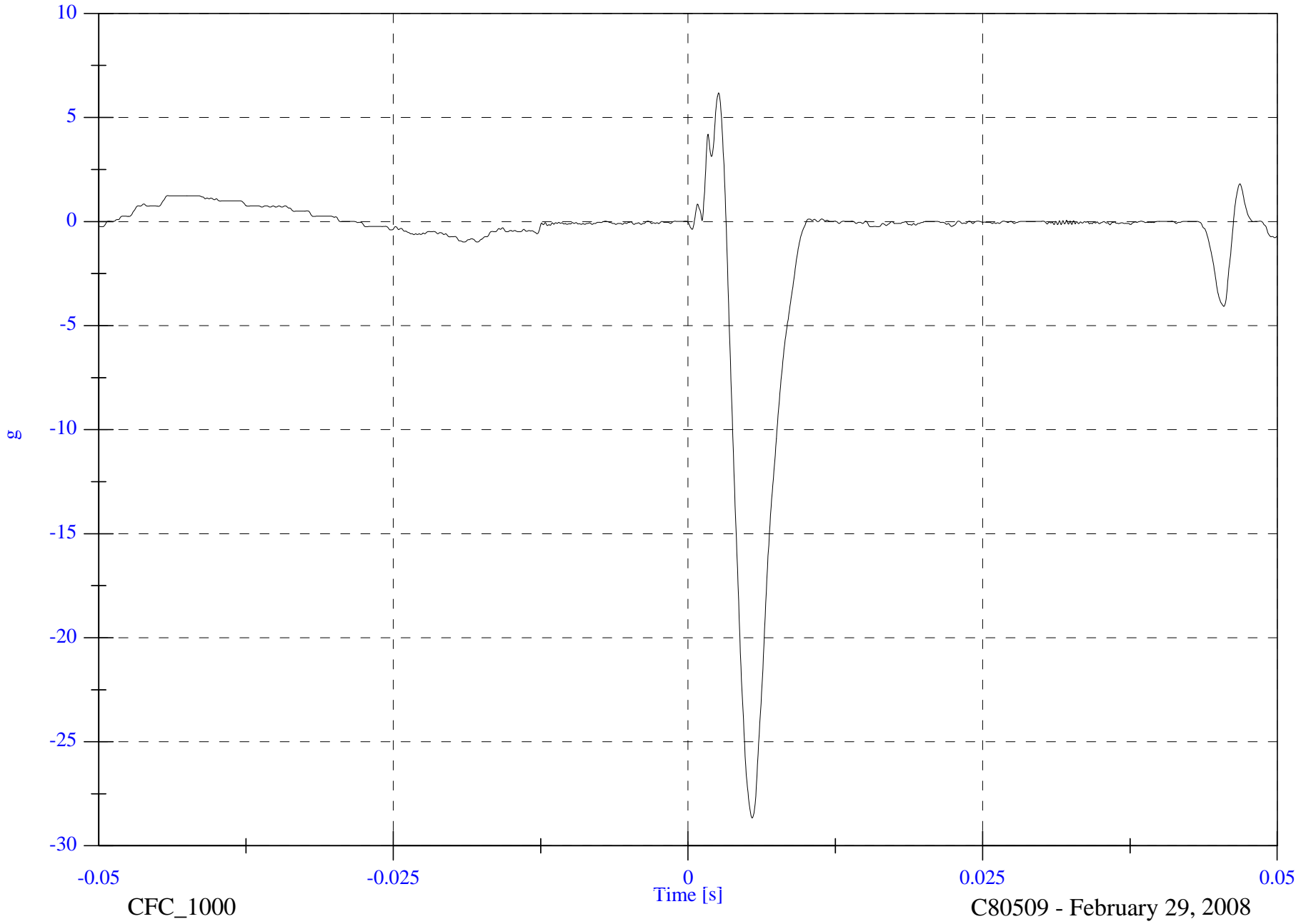
Headform Y Acceleration

Max: 6.2 [g] at 0.003 [s]

Min: -28.7 [g] at 0.005 [s]

C80509 PASSENGER SIDE AP3 IMPACT PLOT #3

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

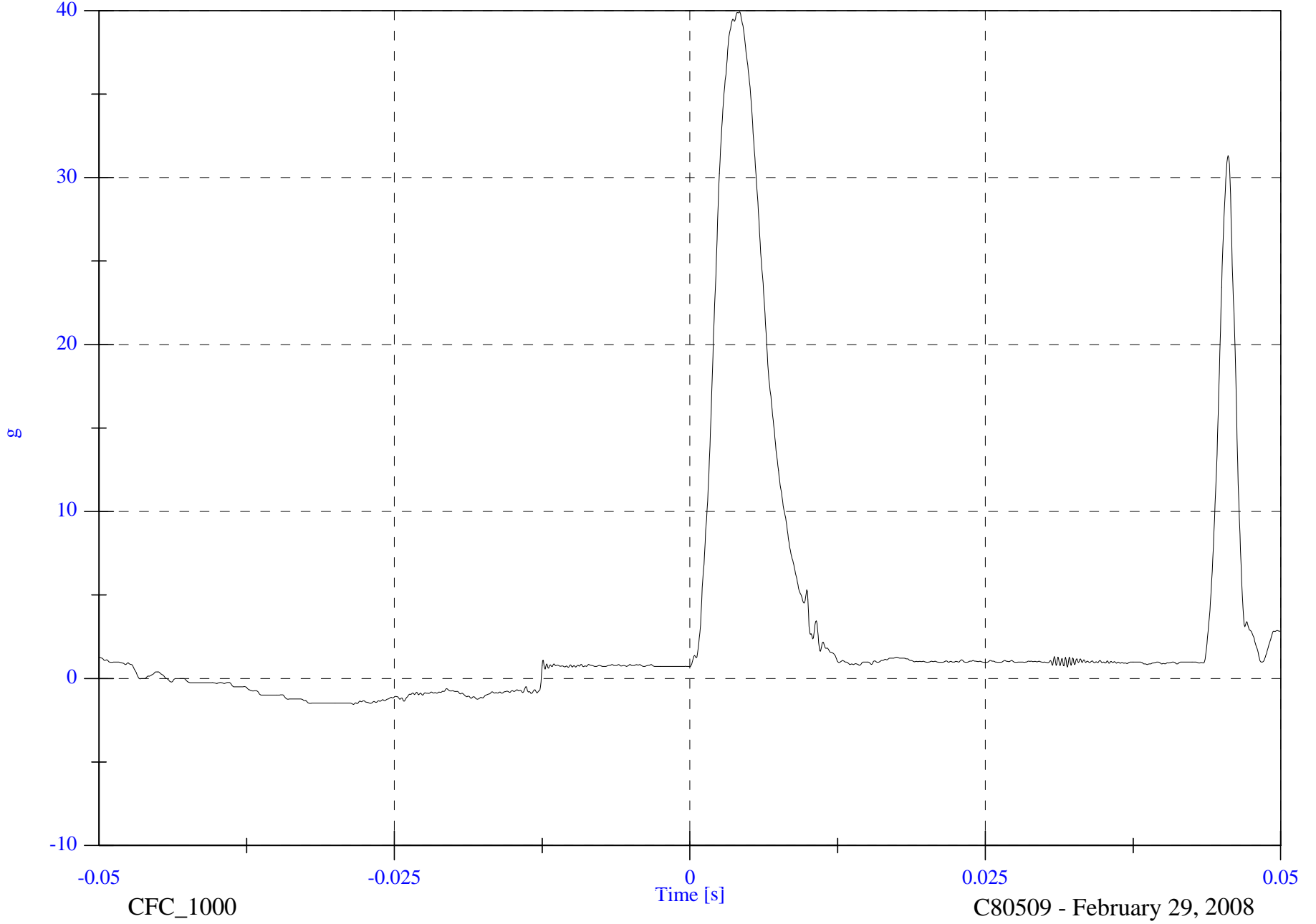
Headform Z Acceleration

Max: 39.9 [g] at 0.004 [s]

Min: -1.5 [g] at -0.028 [s]

C80509 PASSENGER SIDE AP3 IMPACT PLOT #4

8851-04



FMVSS 201U 2008 BMW 328i

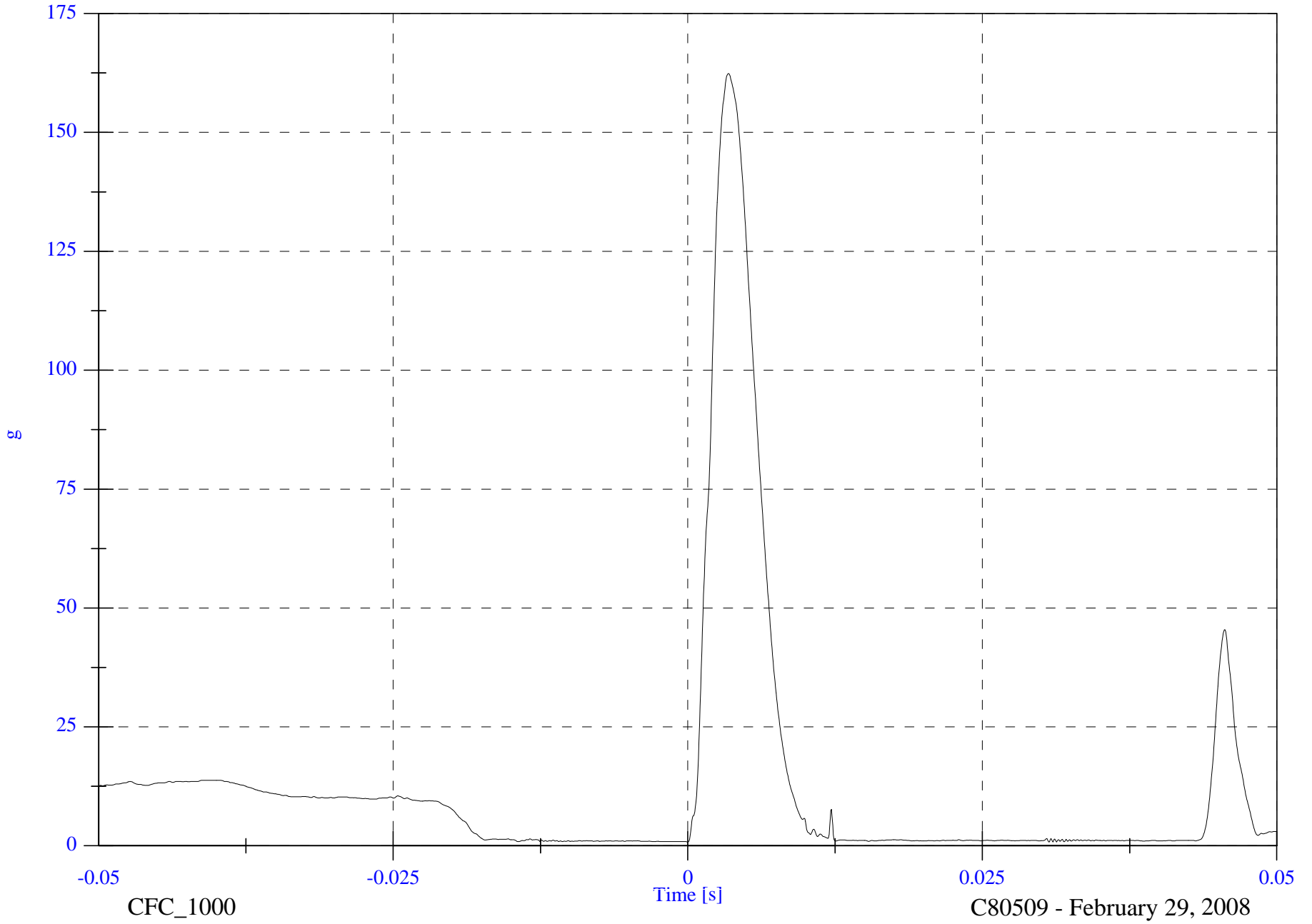
Headform Resultant

Max: 162.4 [g] at 0.003 [s]

Min: 0.8 [g] at 0.000 [s]

C80509 PASSENGER SIDE AP3 IMPACT PLOT #5

8851-04



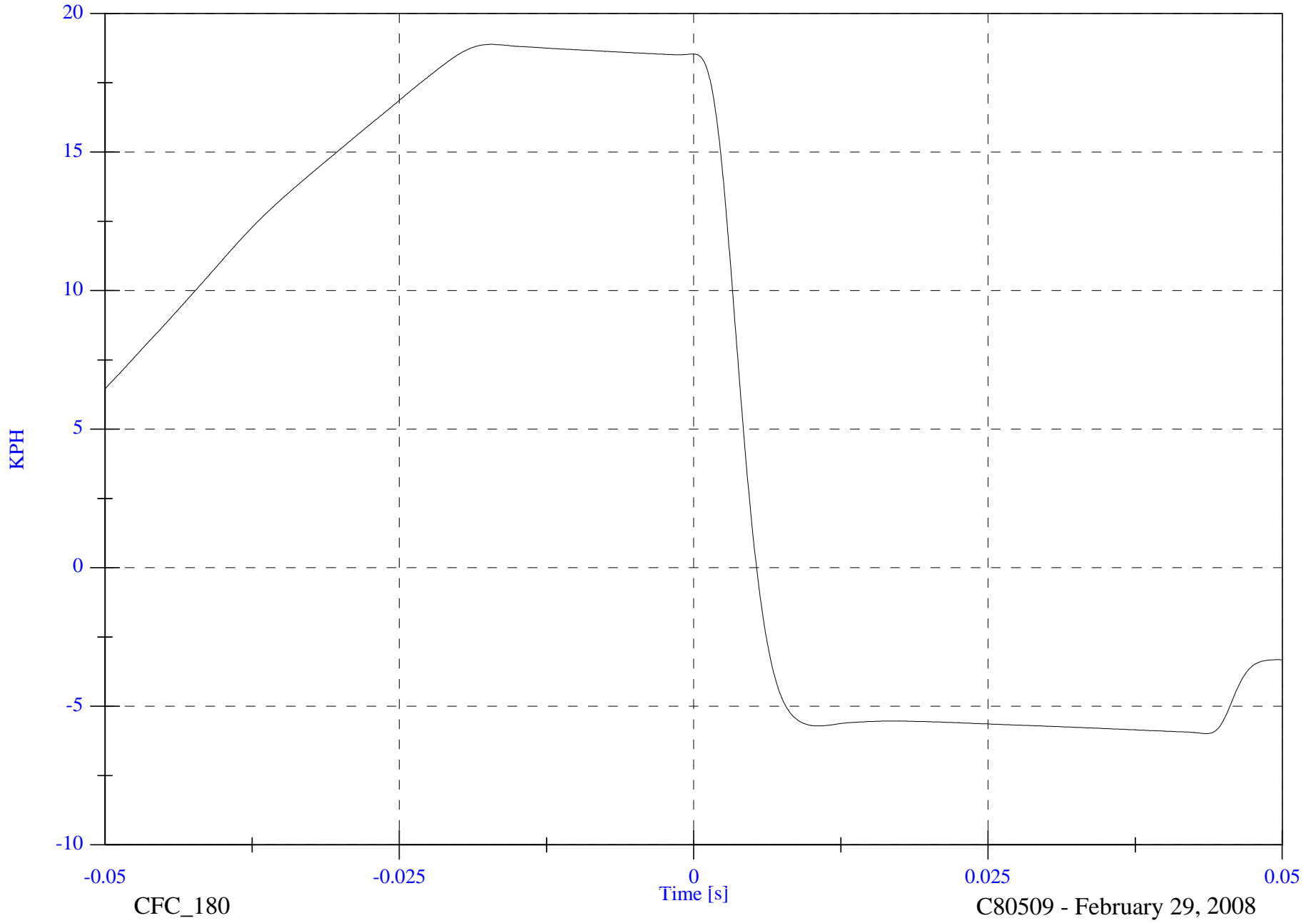
CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

Headform Velocity

Max: 18.9 [KPH] at -0.017 [s]
Min: -6.0 [KPH] at 0.044 [s]



C80509 PASSENGER SIDE AP3 IMPACT PLOT #6

8851-04

CFC_180

C80509 - February 29, 2008



PRE-IMPACT AP3



POST-IMPACT AP3

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	07
Test Date:	02/29/08
Target Location:	A-PILLAR
Target Code:	AP1
Horizontal Impact Angle:	125°
Vertical Impact Angle:	44°
Ambient Temperature:	21.7 C°
Relative Humidity:	16.2 %
Time of Impact:	16:20
Headform Number:	1142

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	14	<input checked="" type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	6				mm up



POST-IMPACT AP1 HEADFORM

Free Motion HIC	622.1
HIC(d)	635.7
Impact Velocity (kph)	18.84
HIC T1 (msec)	3.4
HIC T2 (msec)	8.2

FMVSS 201U 2008 BMW 328i C80509 - AP1

FMH Headform 1142

Location: AP1

Test Date: February 29, 2008

Work File: AP1

-----TEST RESULTS-----

Lab Temperature: 21.7 C

HICd: 635.7

Lab Humidity: 16.2 %

HIC (36ms): 622.1

Velocity at Impact: 18.84 KPH

t1: 3.4 msec

t2: 8.2 msec

Free Flight Distance: 223.25 mm

Duration: 4.9 msec

Average Acceleration: 8.5 g

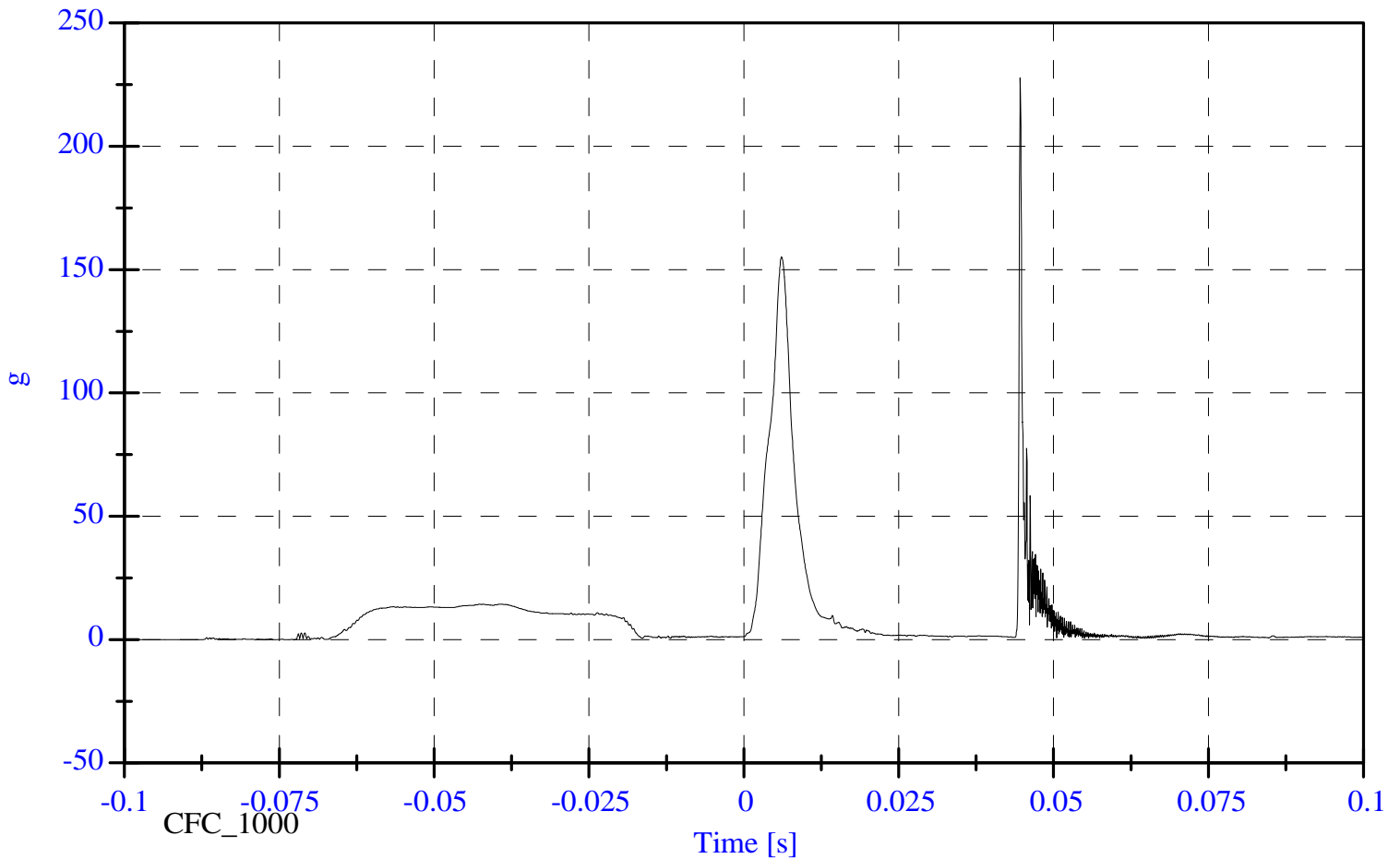
Maximum: 155.1 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 155.1 [g] at 0.006 [s]

Min: -0.0 [g] at -0.098 [s]

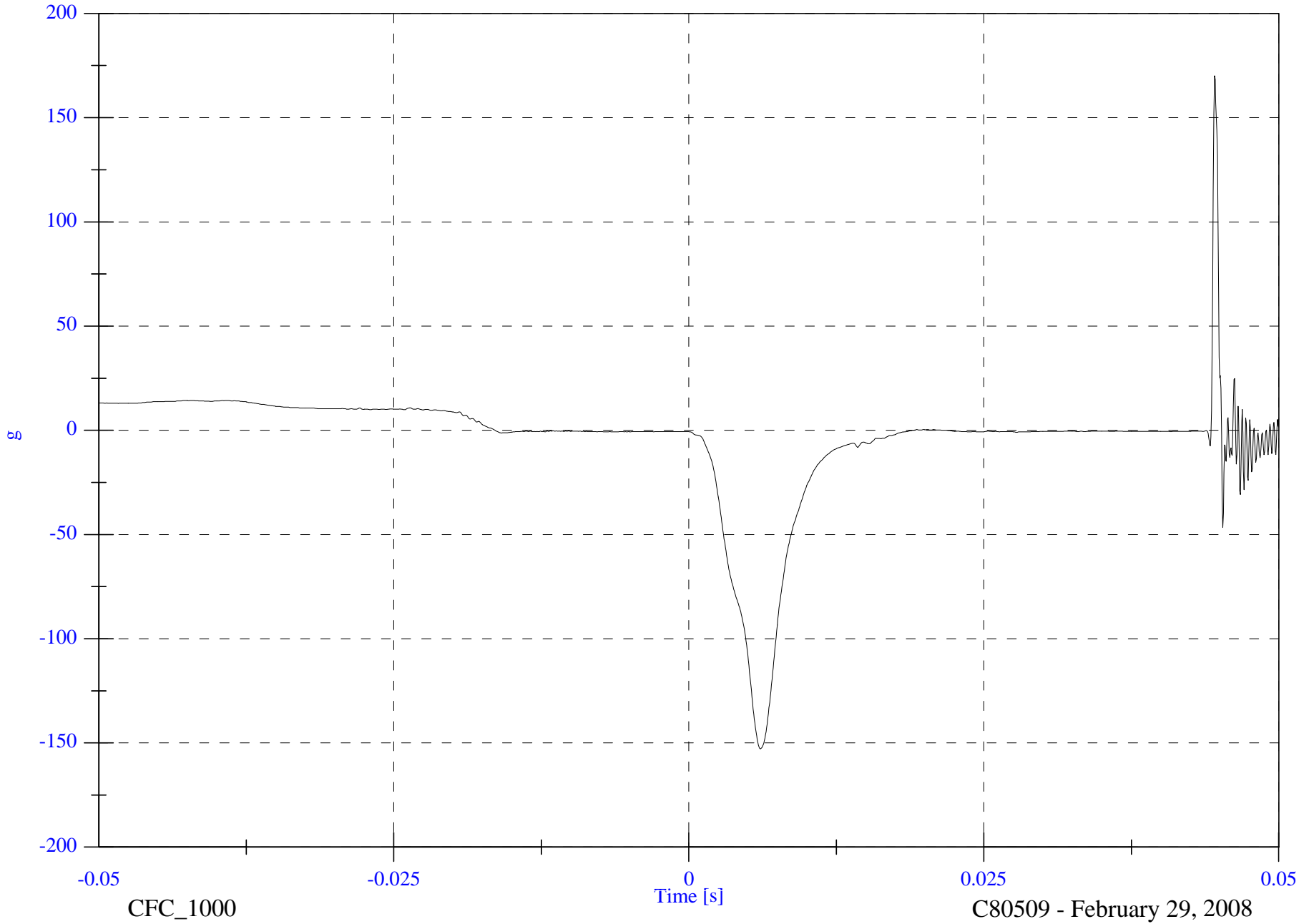


FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 170.1 [g] at 0.045 [s]

Min: -152.8 [g] at 0.006 [s]



C80509 PASSENGER SIDE AP1 IMPACT PLOT #2

8851-04

CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

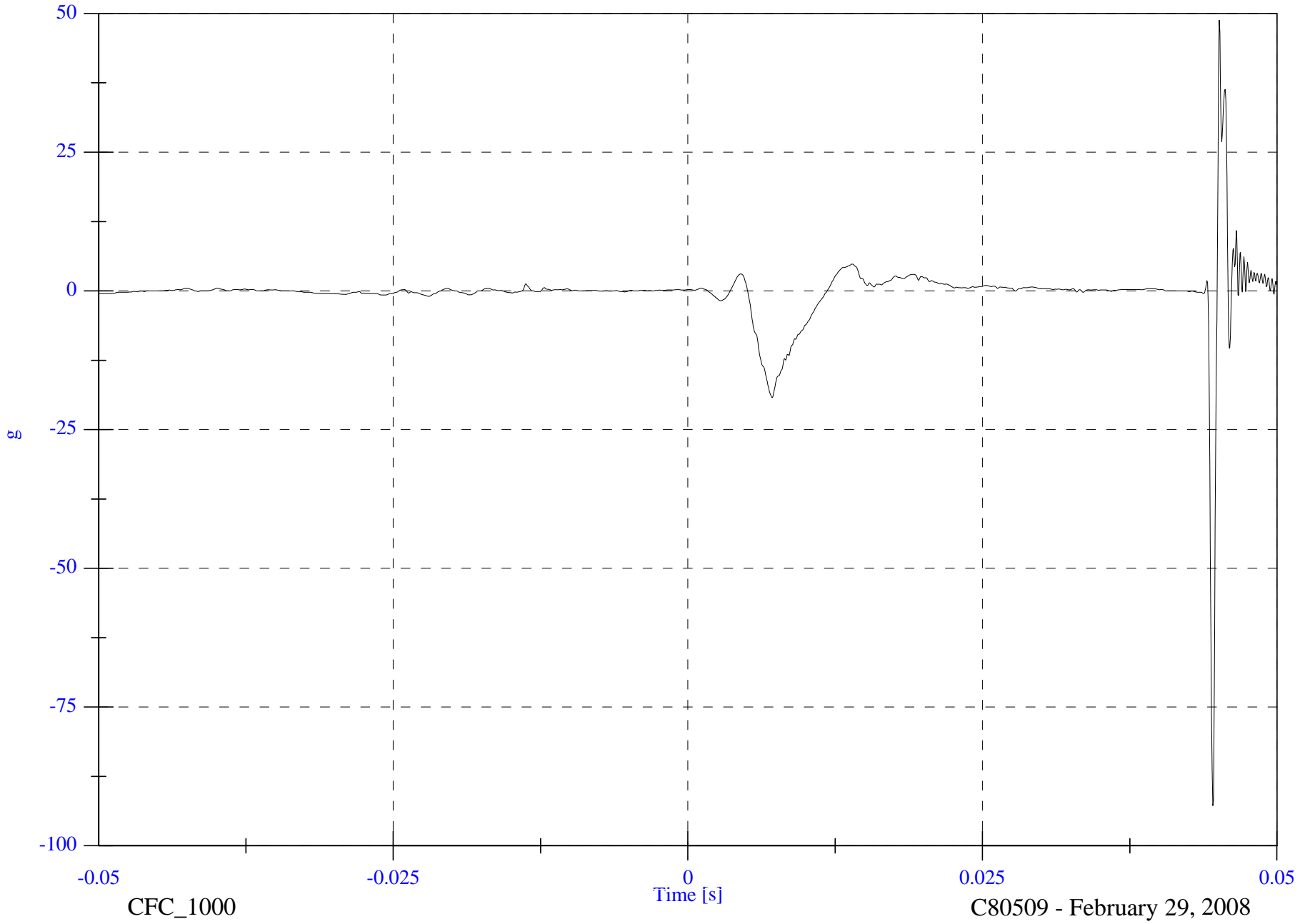
Headform Y Acceleration

Max: 48.8 [g] at 0.045 [s]

Min: -92.8 [g] at 0.045 [s]

C80509 PASSENGER SIDE AP1 IMPACT PLOT #3

8851-04



C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

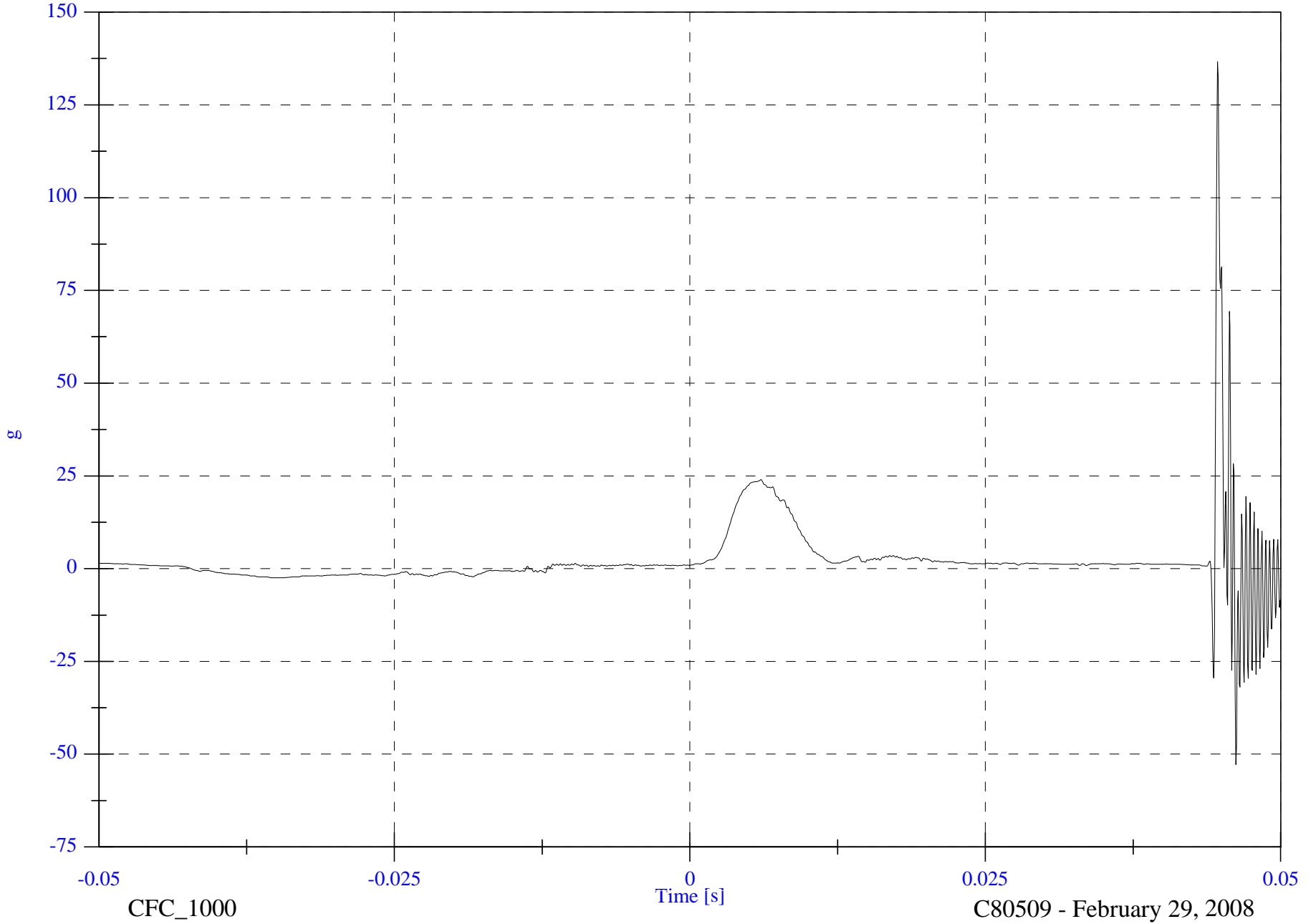
Headform Z Acceleration

Max: 136.6 [g] at 0.045 [s]

Min: -52.8 [g] at 0.046 [s]

C80509 PASSENGER SIDE AP1 IMPACT PLOT #4

8851-04



CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

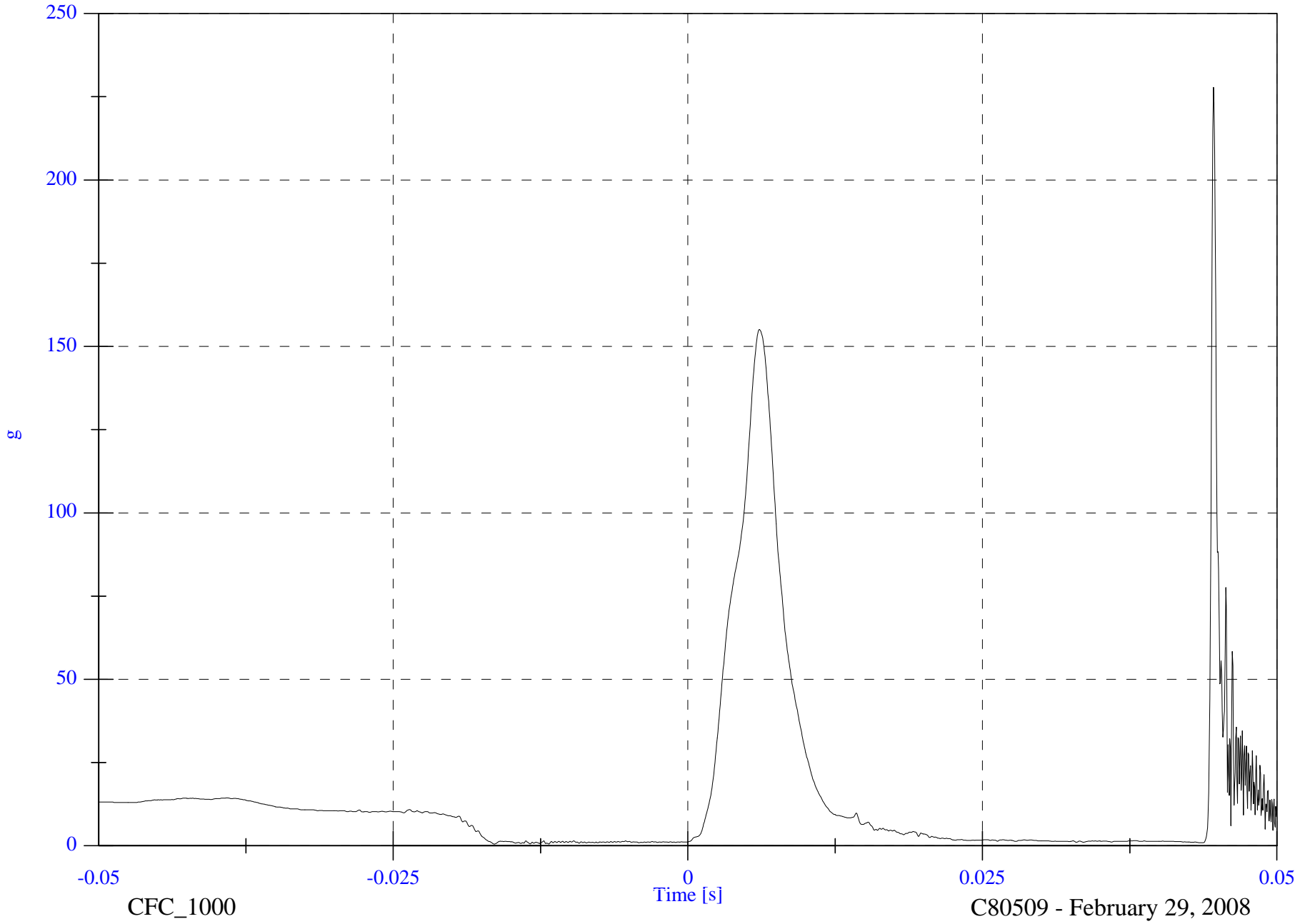
Headform Resultant

Max: 227.8 [g] at 0.045 [s]

Min: 0.5 [g] at -0.012 [s]

C80509 PASSENGER SIDE AP1 IMPACT PLOT #5

8851-04



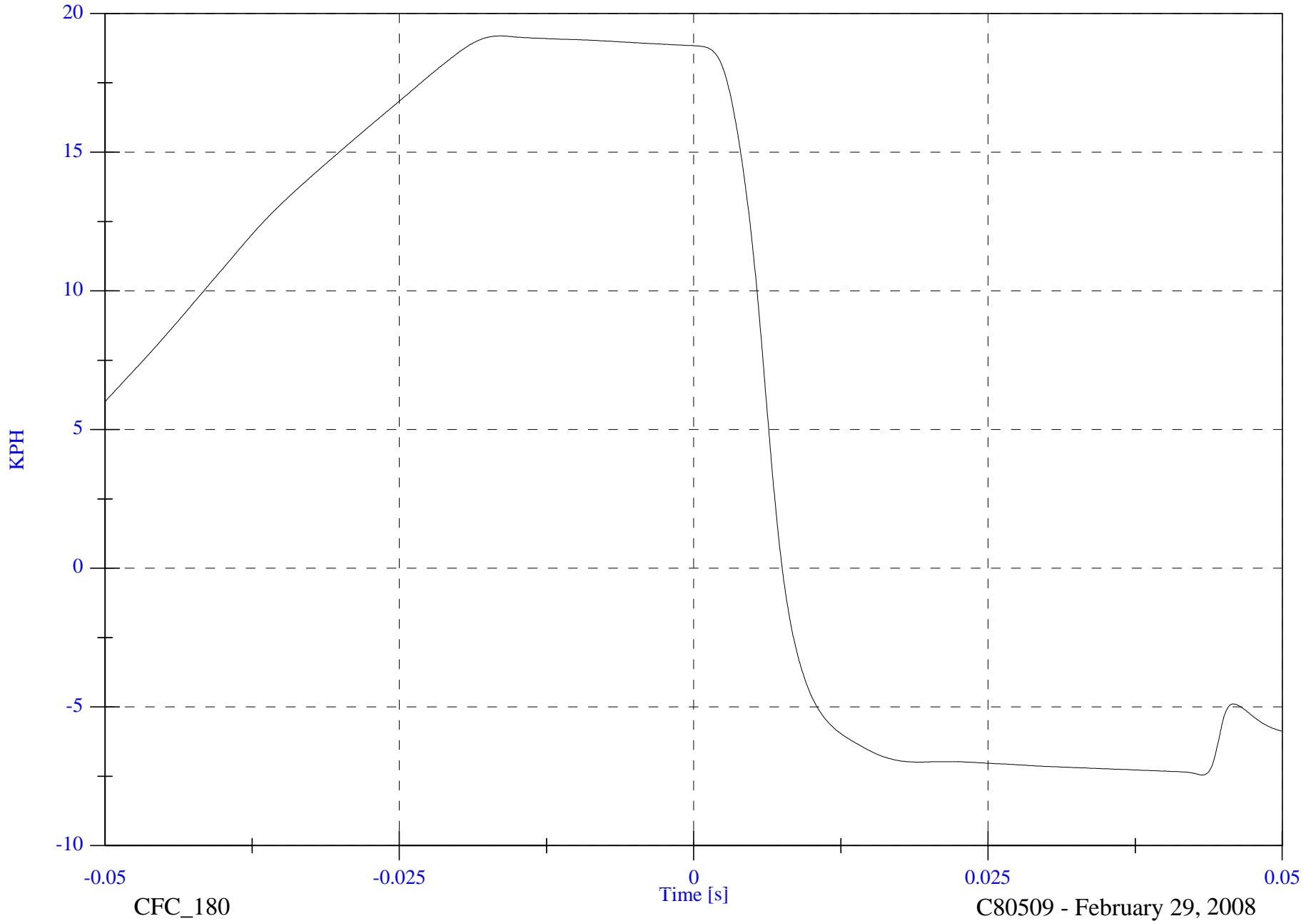
CFC_1000

C80509 - February 29, 2008

FMVSS 201U 2008 BMW 328i

Max: 19.2 [KPH] at -0.016 [s]
Min: -7.5 [KPH] at 0.043 [s]

Headform Velocity



C80509 PASSENGER SIDE AP1 IMPACT PLOT #6

8851-04

CFC_180

C80509 - February 29, 2008



PRE-IMPACT API



POST-IMPACT API

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	08
Test Date:	03/03/08
Target Location:	REAR PILLAR
Target Code:	RP2
Horizontal Impact Angle:	286°
Vertical Impact Angle:	25°
Ambient Temperature:	23.3 C°
Relative Humidity:	25.0 %
Time of Impact:	9:40
Headform Number:	1142

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	4	<input checked="" type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	2				mm up



POST-IMPACT RP2 HEADFORM

Free Motion HIC	594.0
HIC(d)	614.5
Impact Velocity (kph)	18.8
HIC T1 (msec)	5.8
HIC T2 (msec)	11.5

FMVSS 201U 2008 BMW 328i C80509 - RP2

FMH Headform 1142

Location: RP2

Test Date: March 03, 2008

Work File: RP2

-----TEST RESULTS-----

Lab Temperature: 23.3 C

HICd: 614.5

Lab Humidity: 25.0 %

HIC (36ms): 594.0

Velocity at Impact: 18.80 KPH

t1: 5.8 msec

t2: 11.5 msec

Free Flight Distance: 213.85 mm

Duration: 5.8 msec

Average Acceleration: 8.8 g

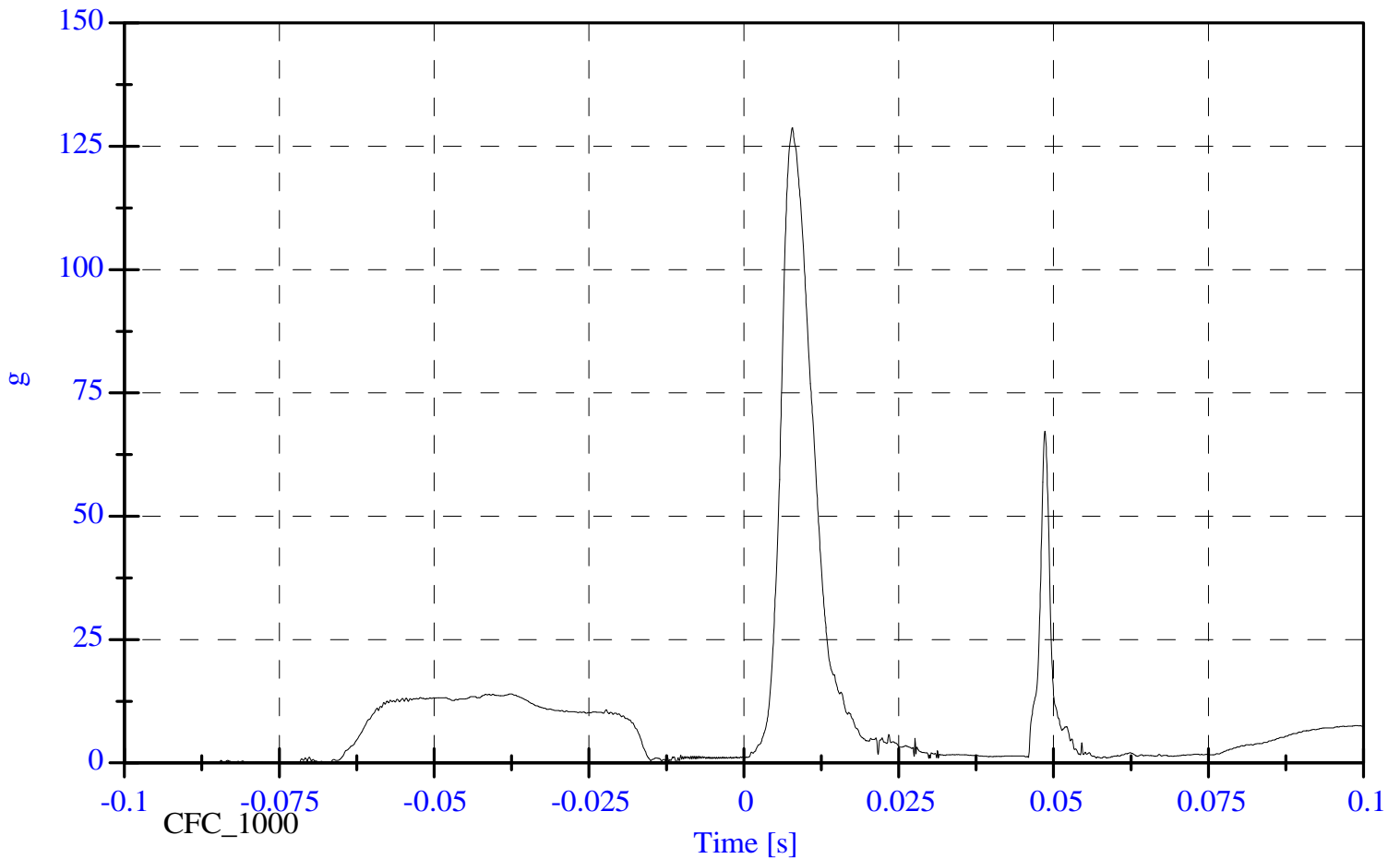
Maximum: 128.8 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 128.8 [g] at 0.008 [s]

Min: 0.0 [g] at -0.086 [s]



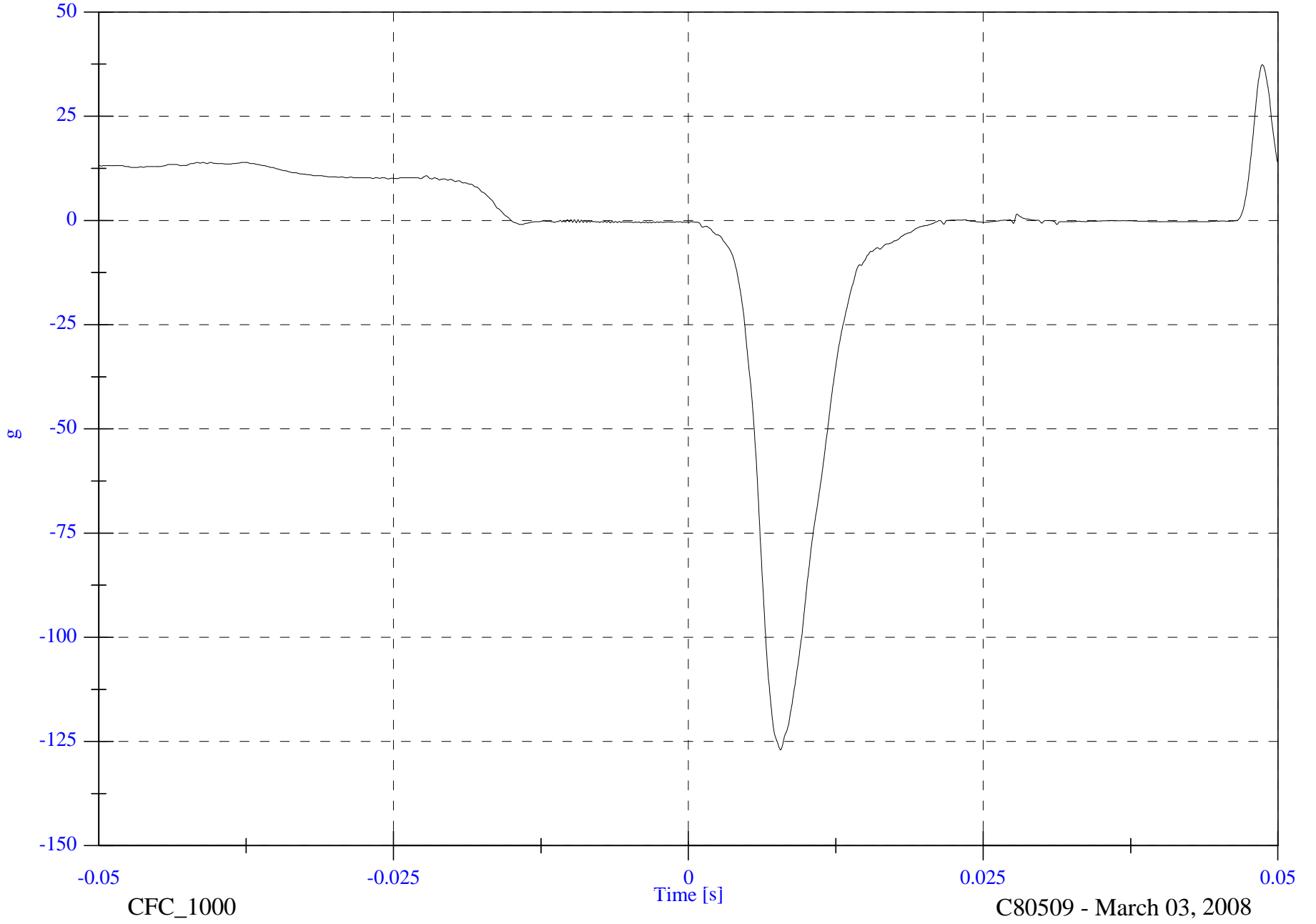
FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 37.4 [g] at 0.049 [s]
Min: -127.0 [g] at 0.008 [s]

C80509 DRIVER SIDE RP2 IMPACT PLOT #2

8851-04



CFC_1000

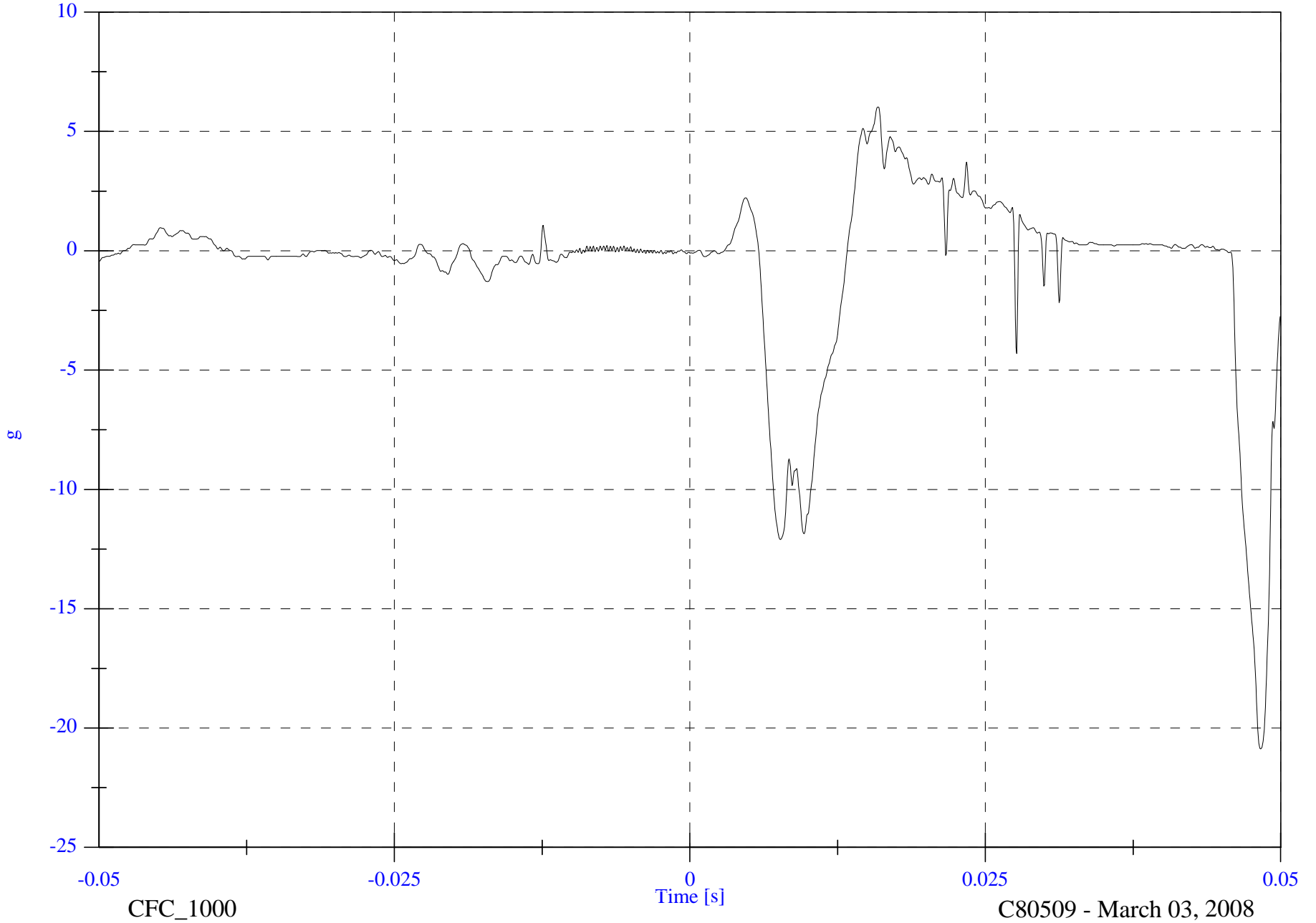
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Headform Y Acceleration

Max: 6.0 [g] at 0.016 [s]

Min: -20.9 [g] at 0.048 [s]



C80509 DRIVER SIDE RP2 IMPACT PLOT #3

8851-04

CFC_1000

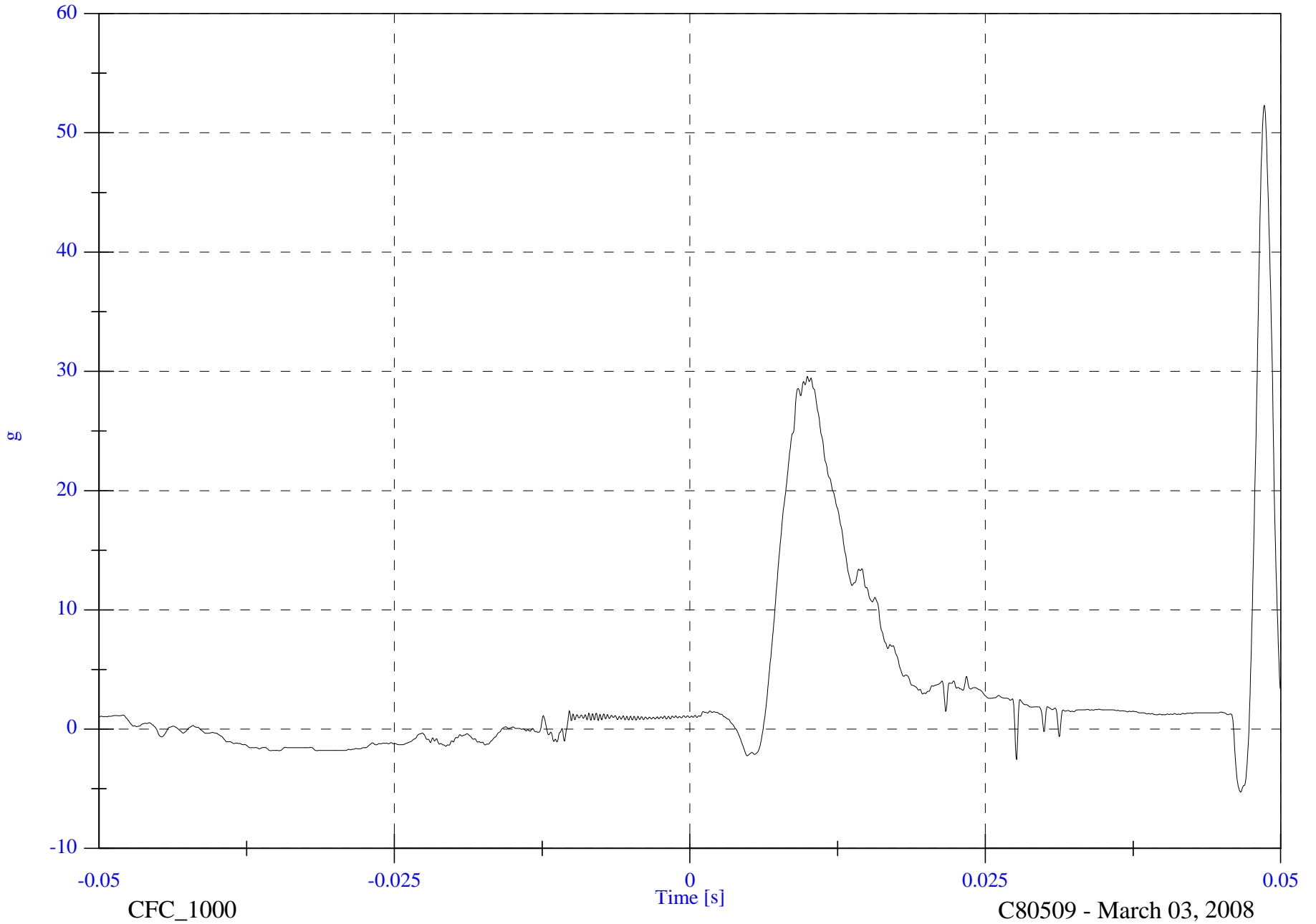
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Headform Z Acceleration

Max: 52.3 [g] at 0.049 [s]

Min: -5.3 [g] at 0.047 [s]



C80509 DRIVER SIDE RP2 IMPACT PLOT #4

8851-04

CFC_1000

C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

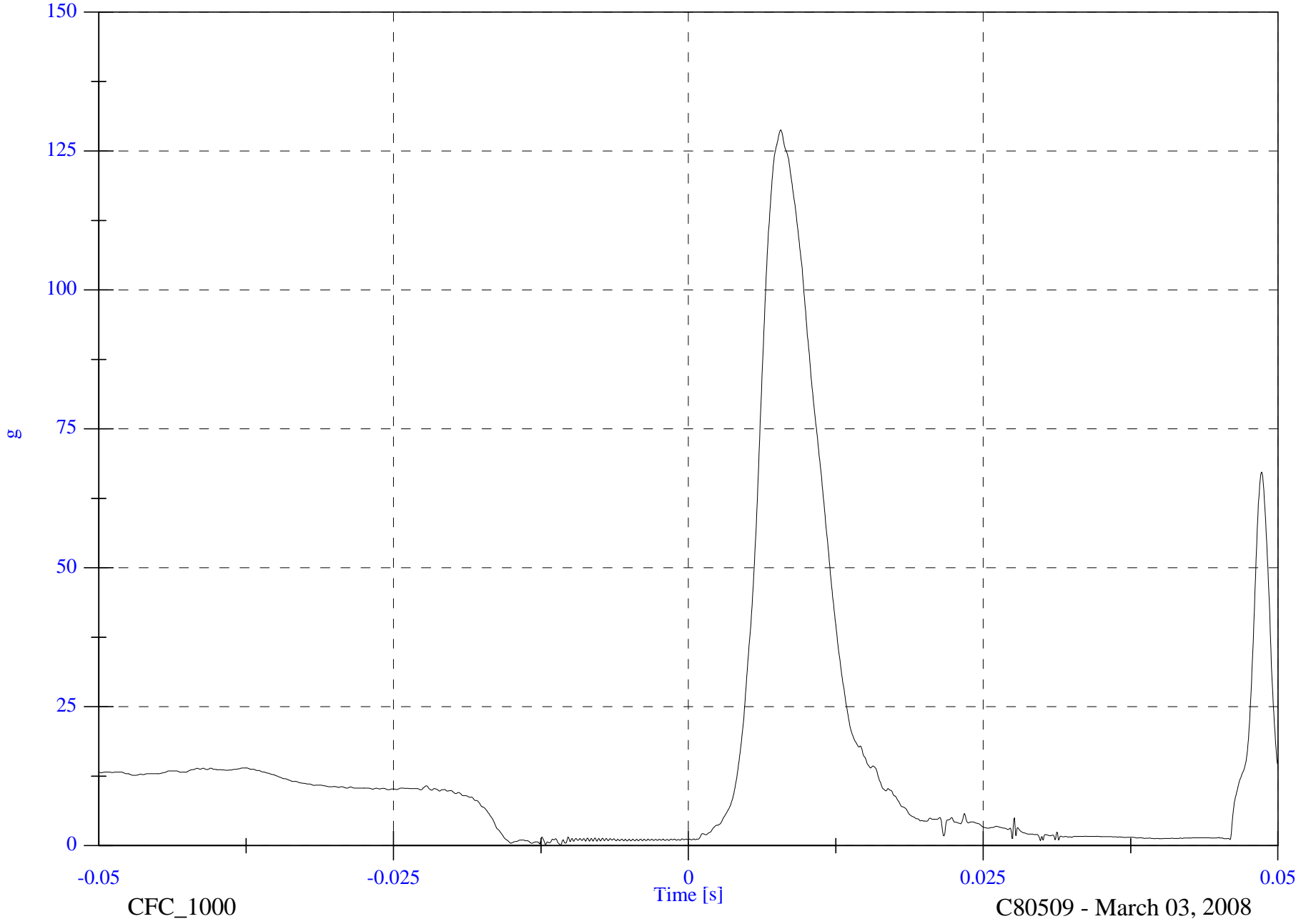
Headform Resultant

Max: 128.8 [g] at 0.008 [s]

Min: 0.2 [g] at -0.011 [s]

C80509 DRIVER SIDE RP2 IMPACT PLOT #5

8851-04



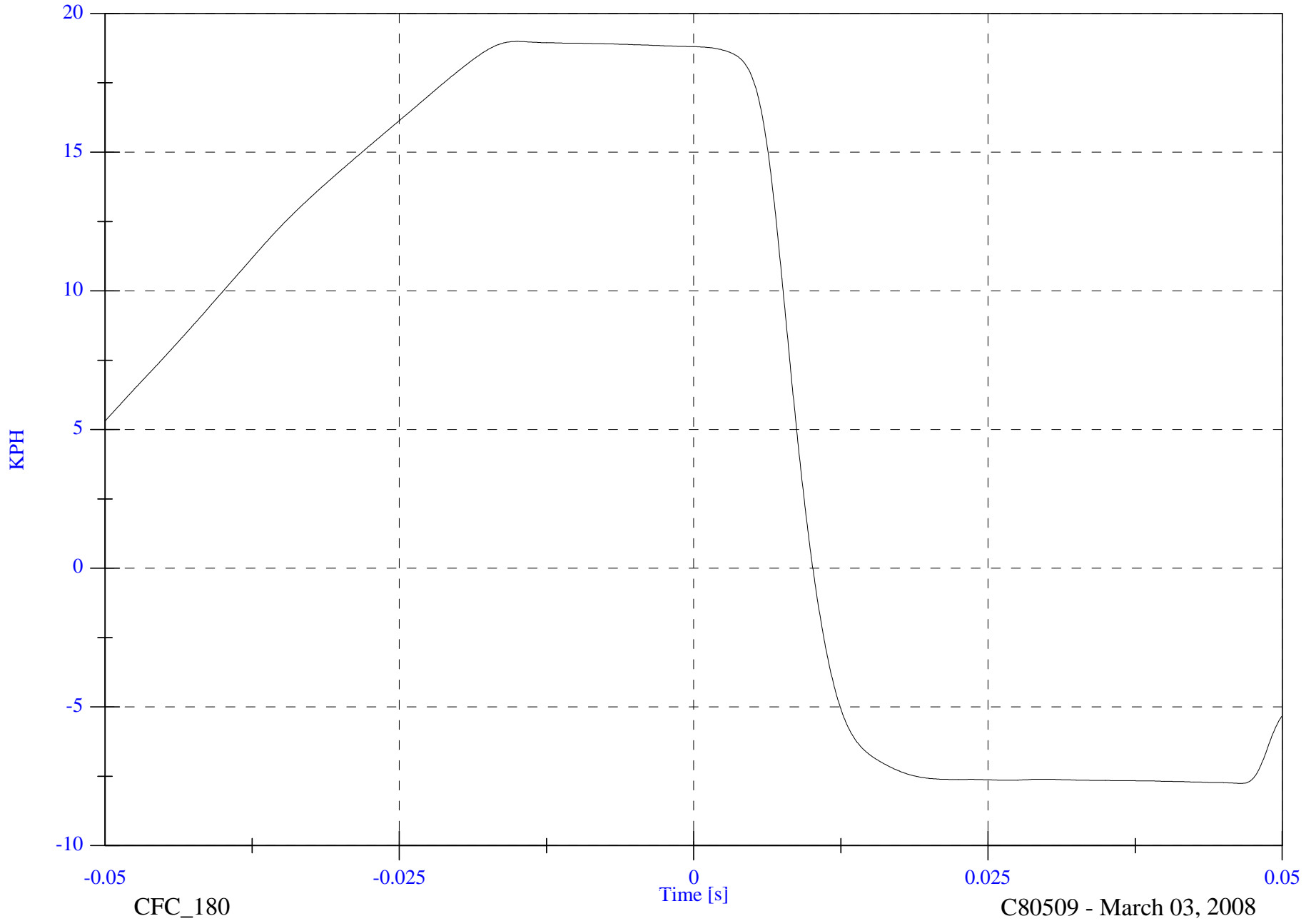
CFC_1000

C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Max: 19.0 [KPH] at -0.015 [s]
Min: -7.8 [KPH] at 0.046 [s]

Headform Velocity



C80509 DRIVER SIDE RP2 IMPACT PLOT #6

8851-04

CFC_180

C80509 - March 03, 2008



PRE-IMPACT RP2



POST-IMPACT RP2

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	09
Test Date:	03/03/08
Target Location:	UPPER ROOF
Target Code:	URRP
Horizontal Impact Angle:	283°
Vertical Impact Angle:	50°
Ambient Temperature:	23.5 C°
Relative Humidity:	24.1 %
Time of Impact:	10:00
Headform Number:	0805

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	4	<input type="checkbox"/>	mm right	<input checked="" type="checkbox"/>	mm left
On Centerline	48				mm up



POST-IMPACT URRP HEADFORM

Free Motion HIC	681.6
HIC(d)	680.6
Impact Velocity (kph)	23.81
HIC T1 (msec)	2.8
HIC T2 (msec)	8.1

FMVSS 201U 2008 BMW 328i C80509 - URRP

FMH Headform 0805

Location: URRP

Test Date: March 03, 2008

Work File: URRP

-----TEST RESULTS-----

Lab Temperature: 23.5 C

HICd: 680.6

Lab Humidity: 24.1 %

HIC (36ms): 681.6

Velocity at Impact: 23.81 KPH

t1: 2.8 msec

t2: 8.1 msec

Free Flight Distance: 220.72 mm

Duration: 5.3 msec

Average Acceleration: 8.8 g

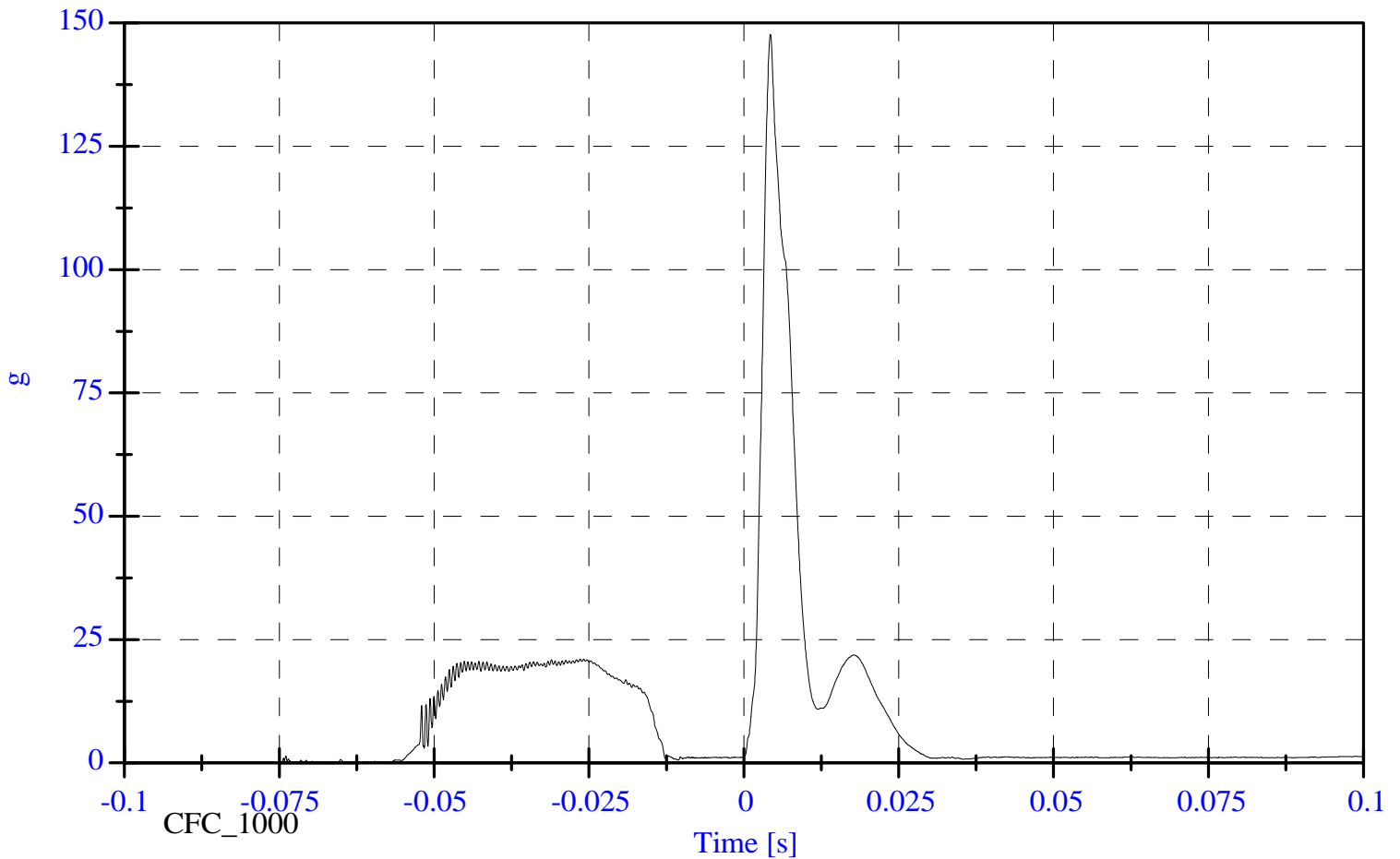
Maximum: 147.7 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 147.7 [g] at 0.004 [s]

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

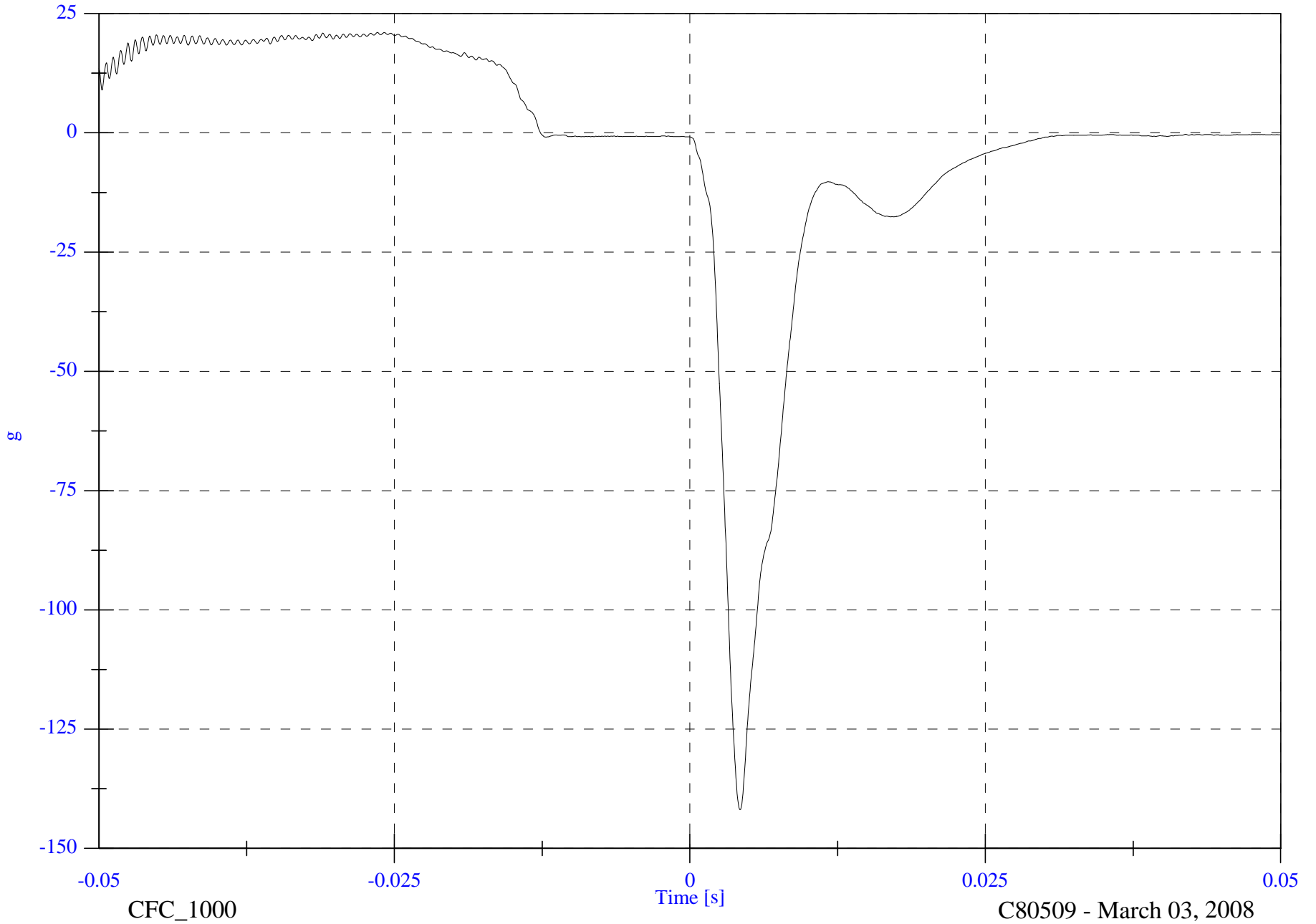


FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 21.0 [g] at -0.026 [s]

Min: -141.9 [g] at 0.004 [s]



C80509 DRIVER SIDE URRP IMPACT PLOT #2

8851-04

CFC_1000

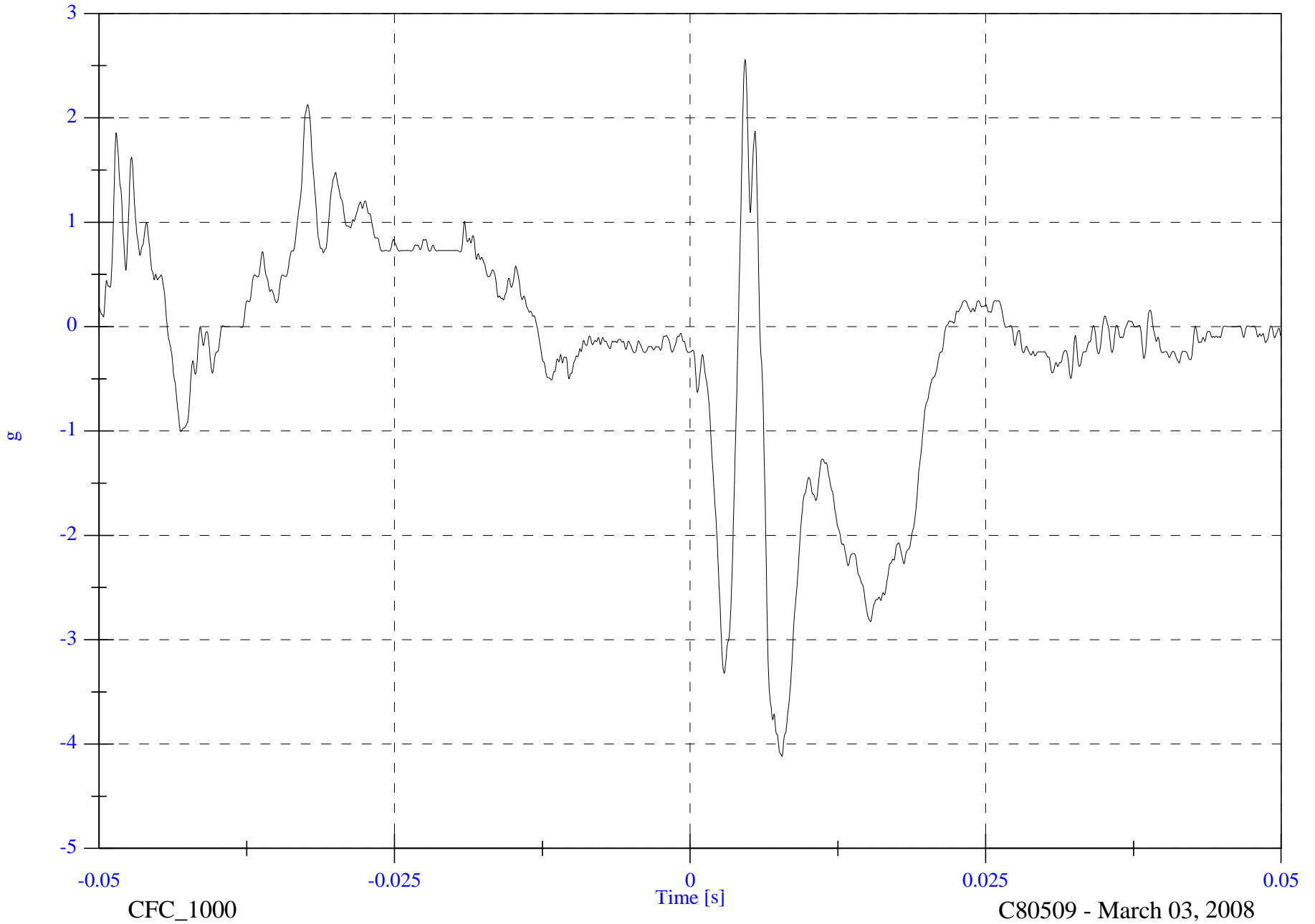
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Headform Y Acceleration

Max: 2.6 [g] at 0.005 [s]

Min: -4.1 [g] at 0.008 [s]



C80509 DRIVER SIDE URRP IMPACT PLOT #3

8851-04

CFC_1000

C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

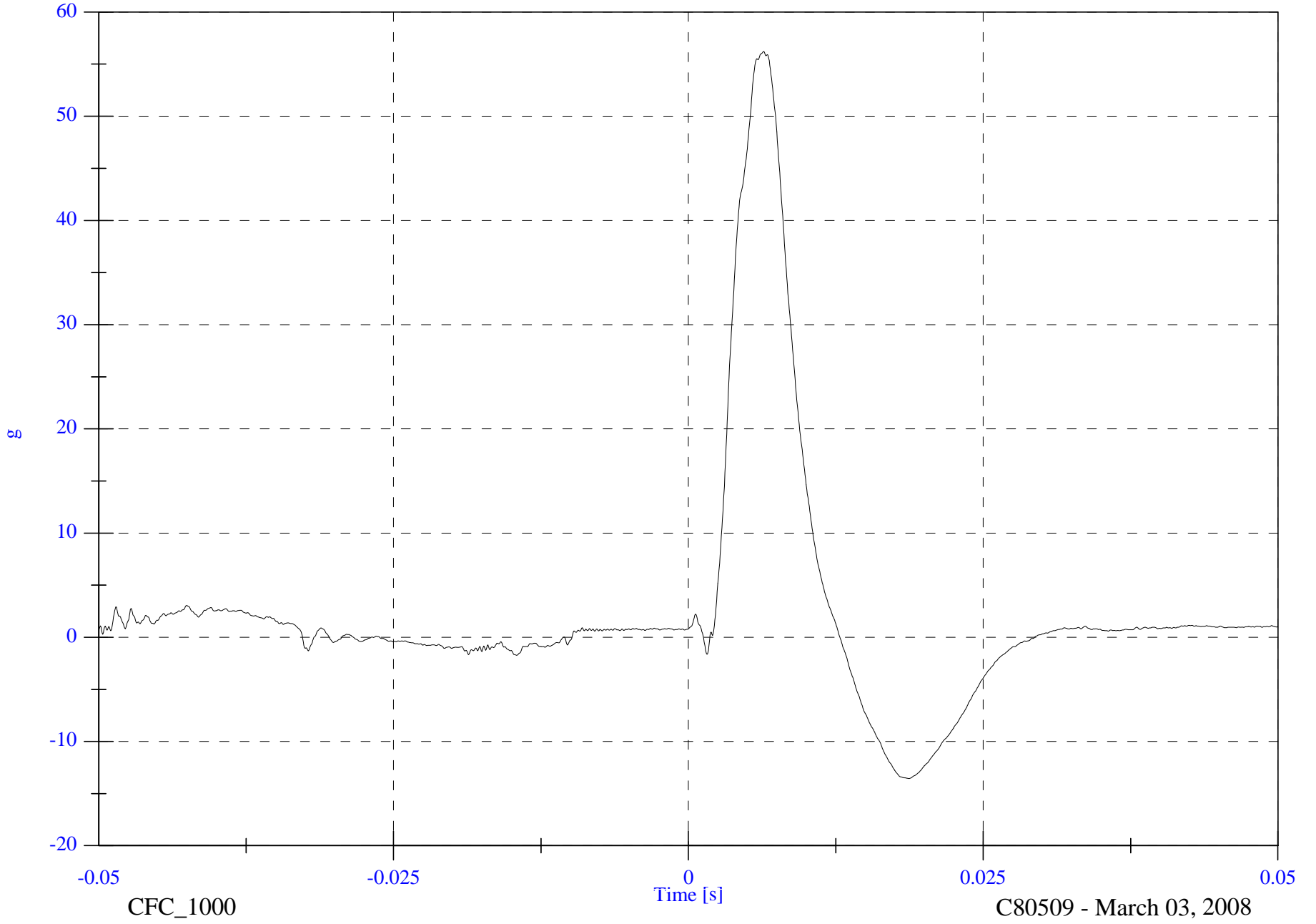
Headform Z Acceleration

Max: 56.2 [g] at 0.006 [s]

Min: -13.5 [g] at 0.019 [s]

C80509 DRIVER SIDE URRP IMPACT PLOT #4

8851-04



CFC_1000

C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

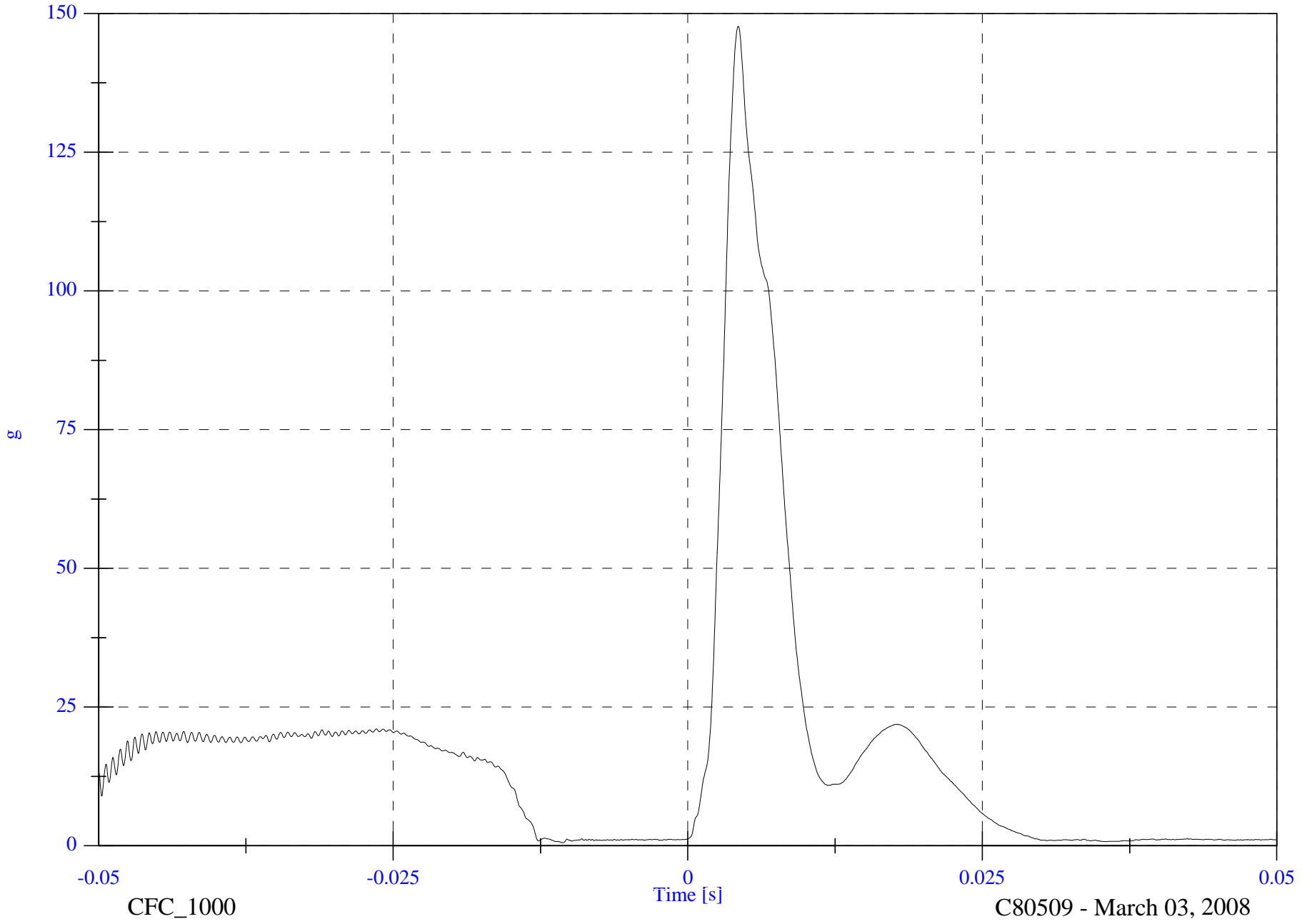
Headform Resultant

Max: 147.7 [g] at 0.004 [s]

Min: 0.6 [g] at -0.011 [s]

C80509 DRIVER SIDE URRP IMPACT PLOT #5

8851-04



CFC_1000

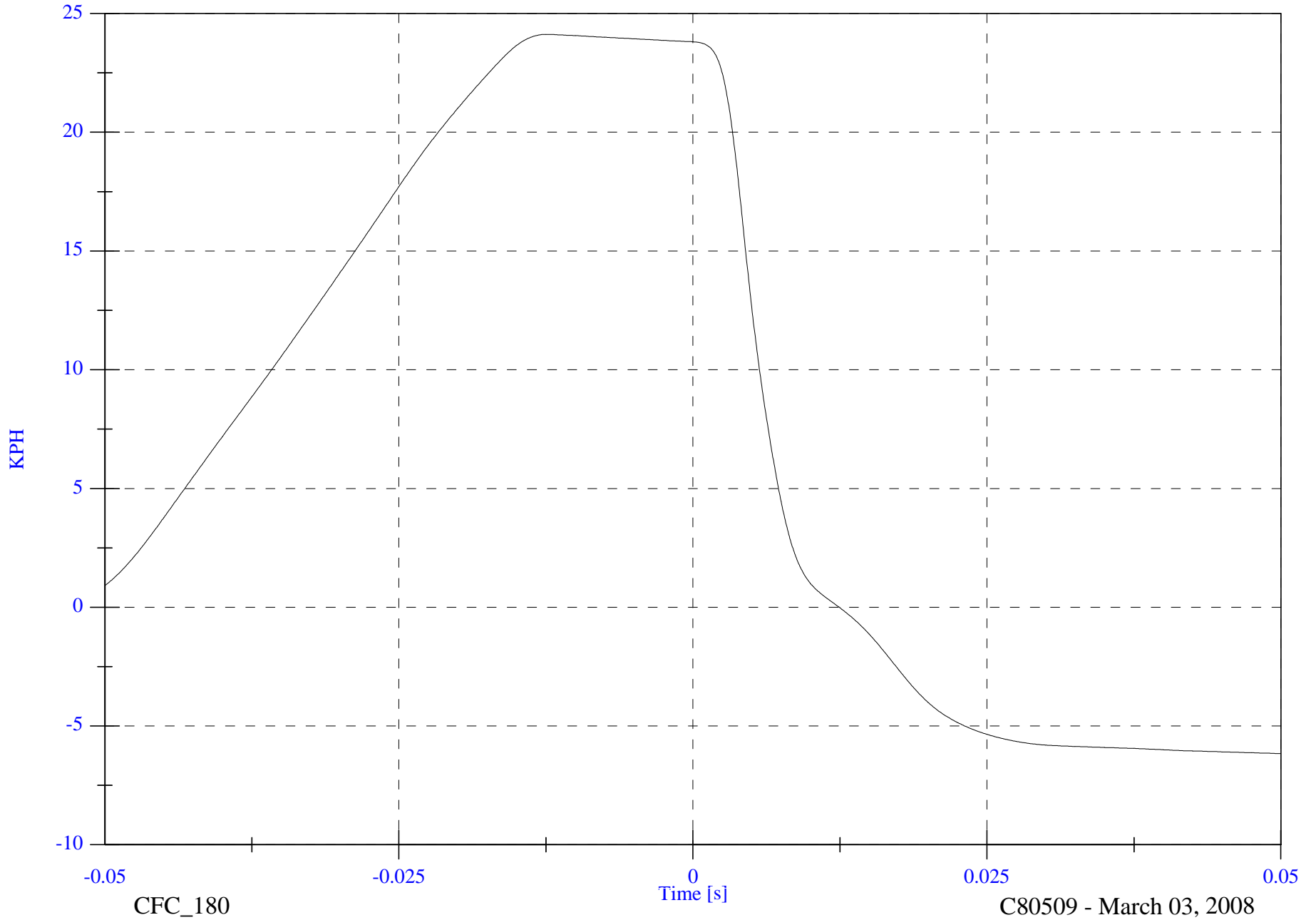
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Max: 24.1 [KPH] at -0.012 [s]

Min: -6.2 [KPH] at 0.050 [s]

Headform Velocity



C80509 DRIVER SIDE URRP IMPACT PLOT #6

8851-04

CFC_180

C80509 - March 03, 2008



PRE-IMPACT URRP



POST-IMPACT URRP

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	10
Test Date:	03/03/08
Target Location:	B-PILLAR
Target Code:	BP2
Horizontal Impact Angle:	270°
Vertical Impact Angle:	4°
Ambient Temperature:	23.2 C°
Relative Humidity:	24.2 %
Time of Impact:	10:45
Headform Number:	1140

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	4	<input type="checkbox"/>	mm right	<input checked="" type="checkbox"/>	mm left
On Centerline	10				mm up



POST-IMPACT BP2 HEADFORM

Free Motion HIC	648.7
HIC(d)	655.8
Impact Velocity (kph)	23.59
HIC T1 (msec)	1.6
HIC T2 (msec)	9.4

FMVSS 201U 2008 BMW 328i C80509 - BP2

FMH Headform 1140

Location: BP2

Test Date: March 03, 2008

Work File: BP2

-----TEST RESULTS-----

Lab Temperature: 23.2 C

HICd: 655.8

Lab Humidity: 24.2 %

HIC (36ms): 648.7

Velocity at Impact: 23.59 KPH

t1: 1.6 msec

t2: 9.4 msec

Free Flight Distance: 219.45 mm

Duration: 7.8 msec

Average Acceleration: 8.7 g

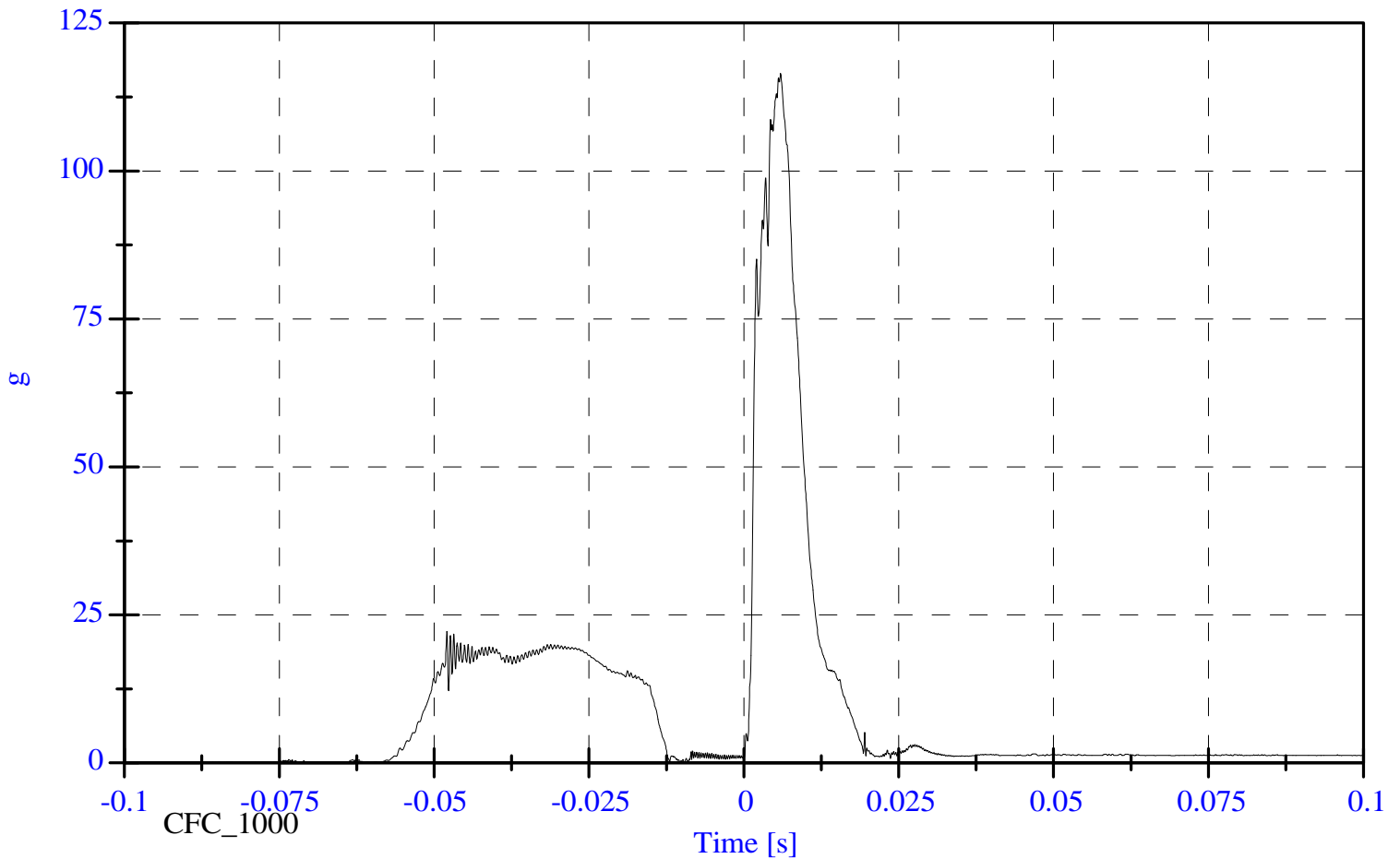
Maximum: 116.5 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 116.5 [g] at 0.006 [s]

Min: 0.0 [g] at -0.090 [s]

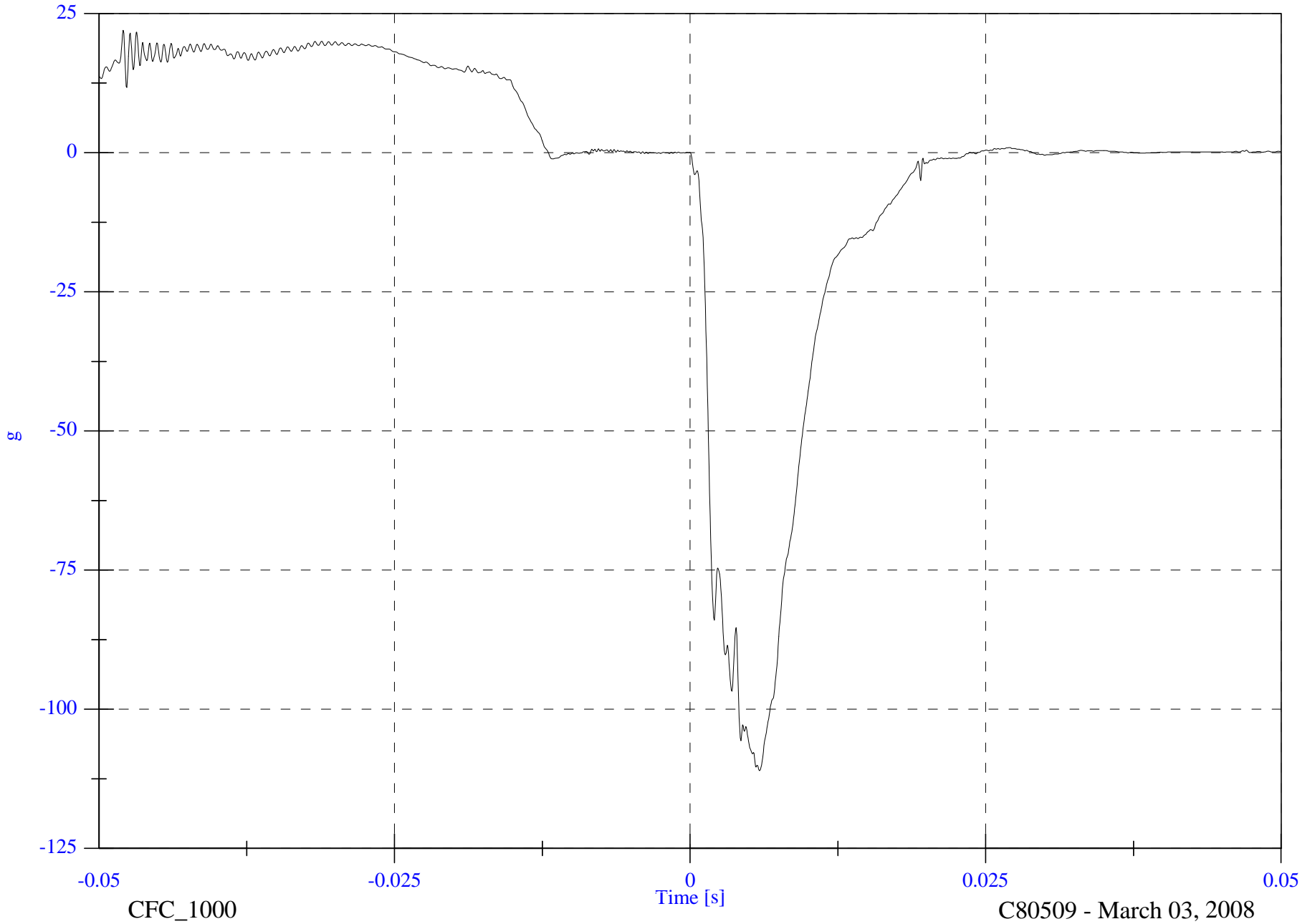


FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 22.0 [g] at -0.048 [s]

Min: -111.0 [g] at 0.006 [s]



BP2 DRIVER SIDE BP2 IMPACT PLOT #2

8851-04

CFC_1000

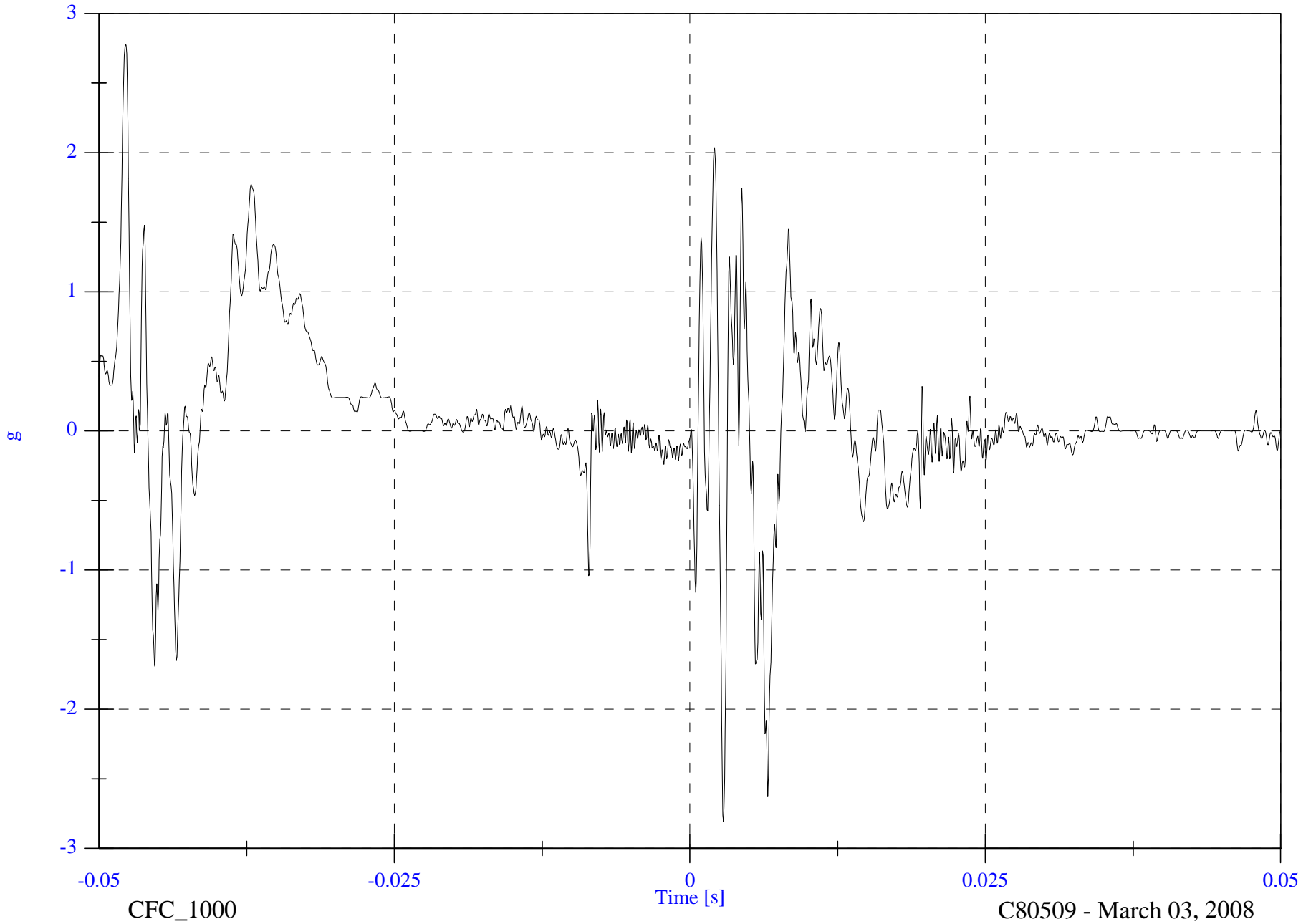
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Headform Y Acceleration

Max: 2.8 [g] at -0.048 [s]

Min: -2.8 [g] at 0.003 [s]



BP2 DRIVER SIDE BP2 IMPACT PLOT #3

8851-04

CFC_1000

C80509 - March 03, 2008

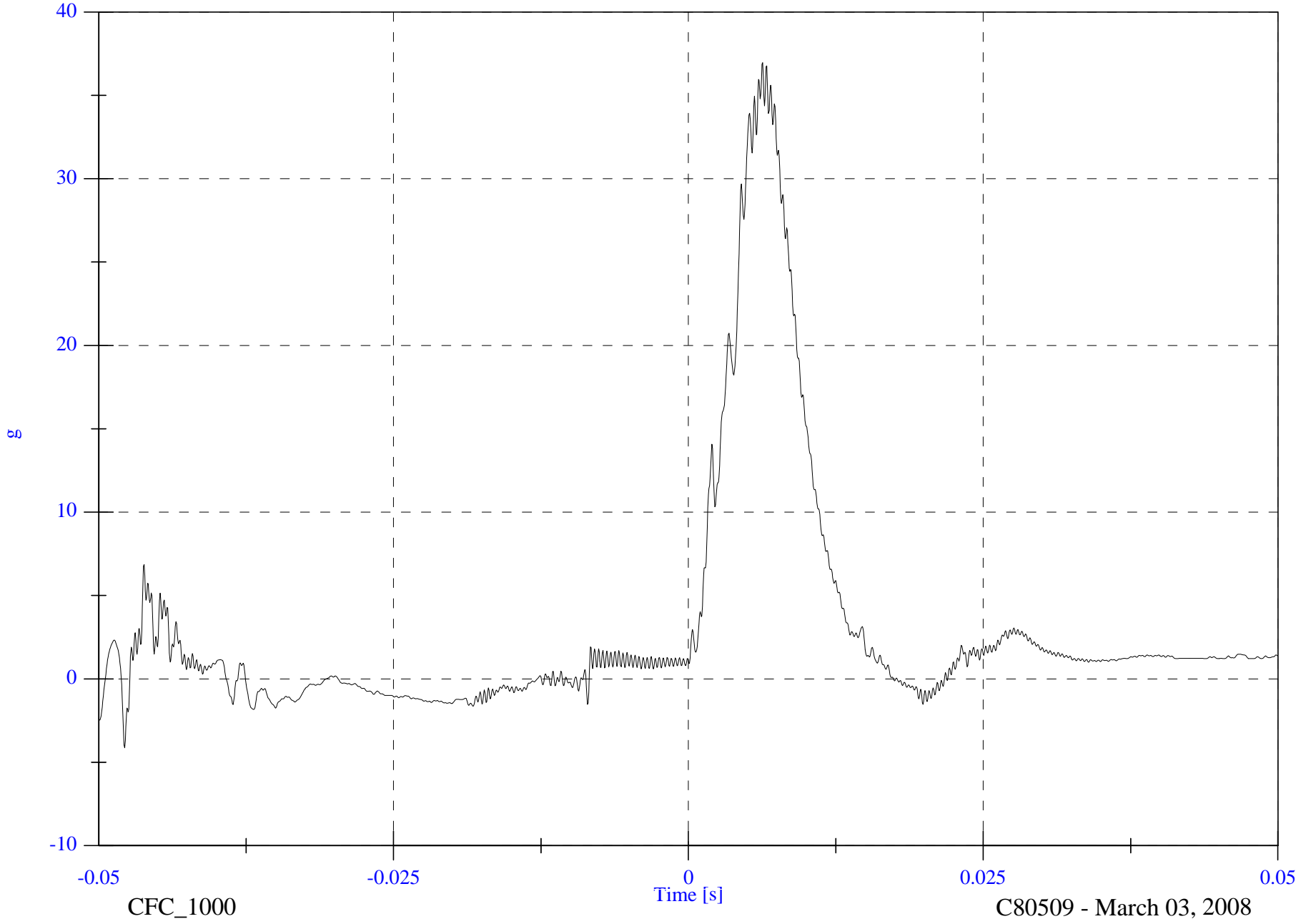
FMVSS 201U 2008 BMW 328i

Headform Z Acceleration

Max: 37.0 [g] at 0.006 [s]
Min: -4.1 [g] at -0.048 [s]

BP2 DRIVER SIDE BP2 IMPACT PLOT #4

8851-04



FMVSS 201U 2008 BMW 328i

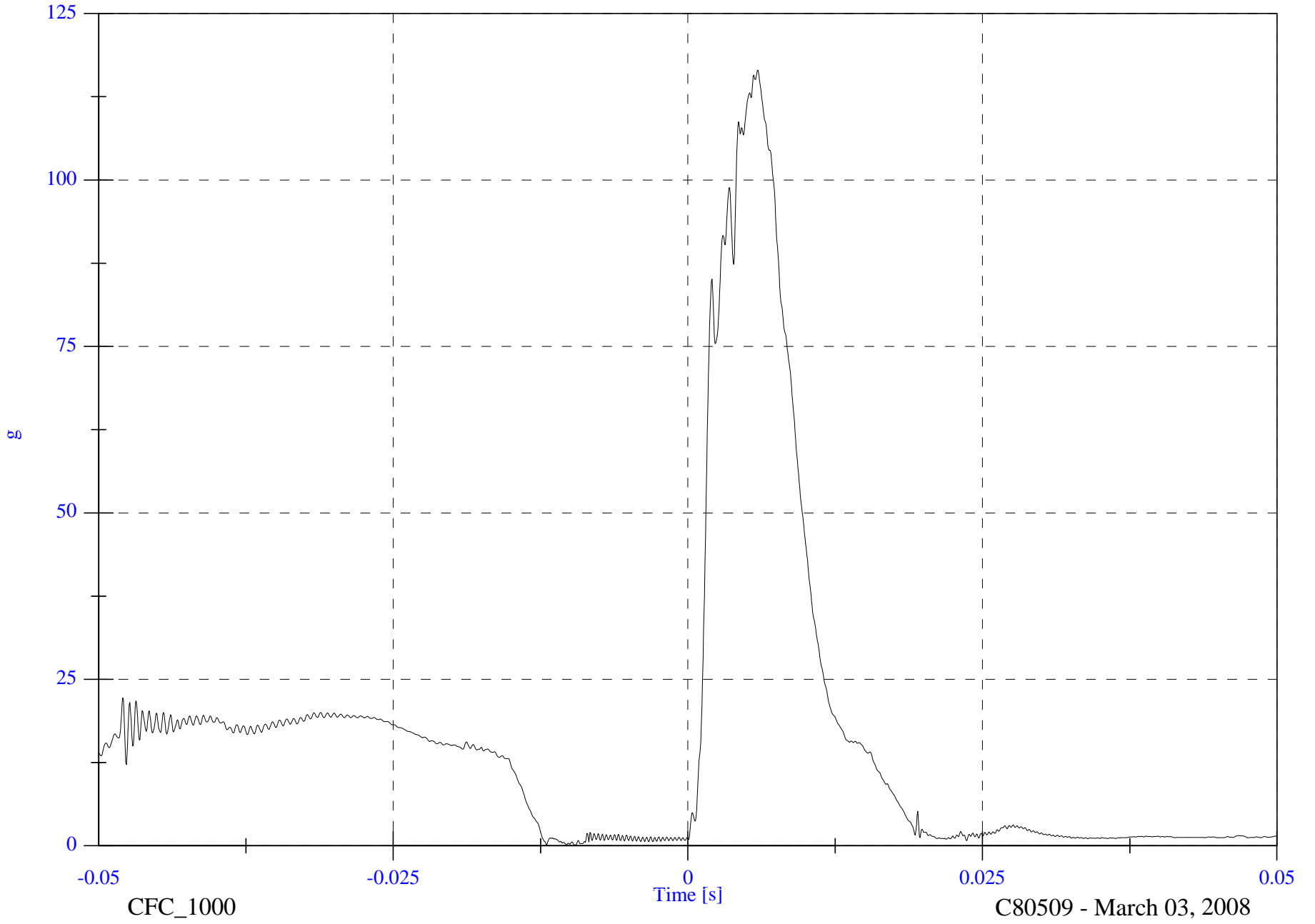
Headform Resultant

Max: 116.5 [g] at 0.006 [s]

Min: 0.1 [g] at -0.010 [s]

BP2 DRIVER SIDE BP2 IMPACT PLOT #5

8851-04



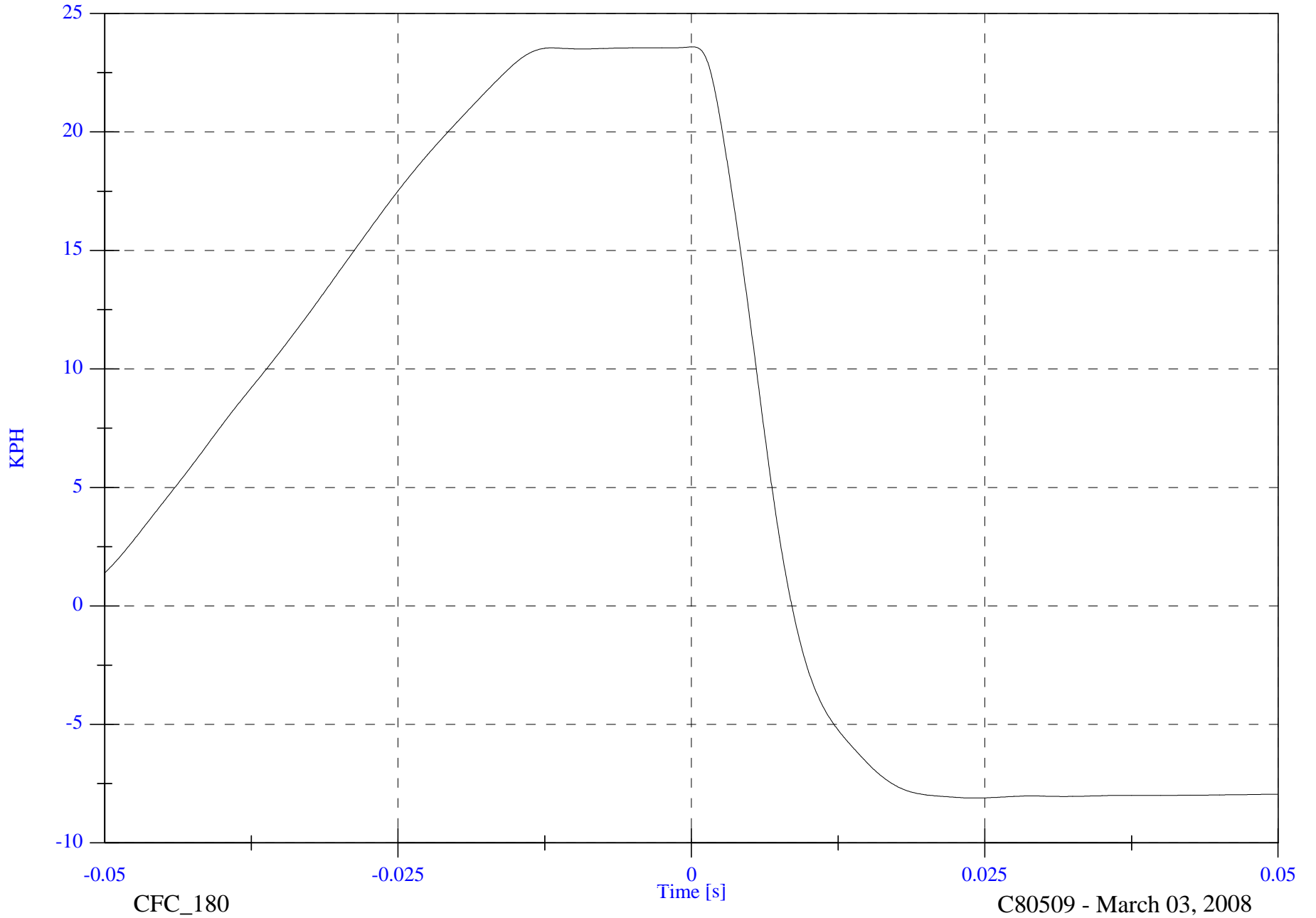
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Max: 23.6 [KPH] at 0.000 [s]

Min: -8.1 [KPH] at 0.024 [s]

Headform Velocity



BP2 DRIVER SIDE BP2 IMPACT PLOT #6

8851-04

CFC_180

C80509 - March 03, 2008



PRE-IMPACT BP2



POST-IMPACT BP2

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	11
Test Date:	03/03/08
Target Location:	UPPER ROOF
Target Code:	URBP
Horizontal Impact Angle:	270°
Vertical Impact Angle:	50°
Ambient Temperature:	22.7 C°
Relative Humidity:	26.1 %
Time of Impact:	11:15
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	4	<input type="checkbox"/>	mm right <input checked="" type="checkbox"/> mm left
On Centerline	45		mm up



POST-IMPACT URBP HEADFORM

Free Motion HIC	326.9
HIC(d)	413.0
Impact Velocity (kph)	23.53
HIC T1 (msec)	3.7
HIC T2 (msec)	17.0

FMVSS 201U 2008 BMW 328i C80509 - URBP

FMH Headform 0355

Location: URBP

Test Date: March 03, 2008

Work File: URBP

-----TEST RESULTS-----

Lab Temperature: 22.7 C

HICd: 413.0

Lab Humidity: 26.1 %

HIC (36ms): 326.9

Velocity at Impact: 23.53 KPH

t1: 3.7 msec

t2: 17.0 msec

Free Flight Distance: 219.65 mm

Duration: 13.3 msec

Average Acceleration: 8.6 g

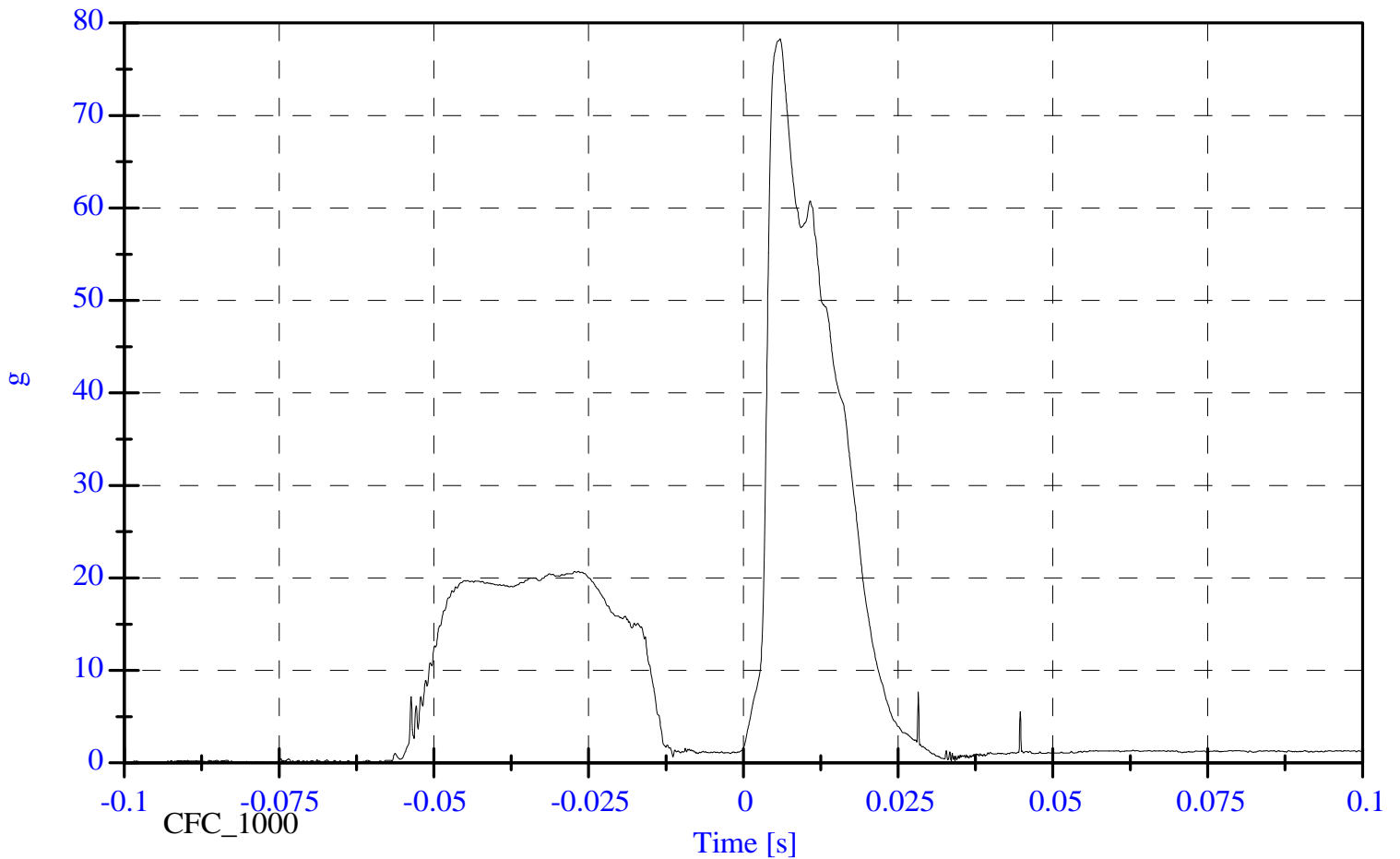
Maximum: 78.3 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 78.3 [g] at 0.006 [s]

Min: 0.0 [g] at -0.098 [s]

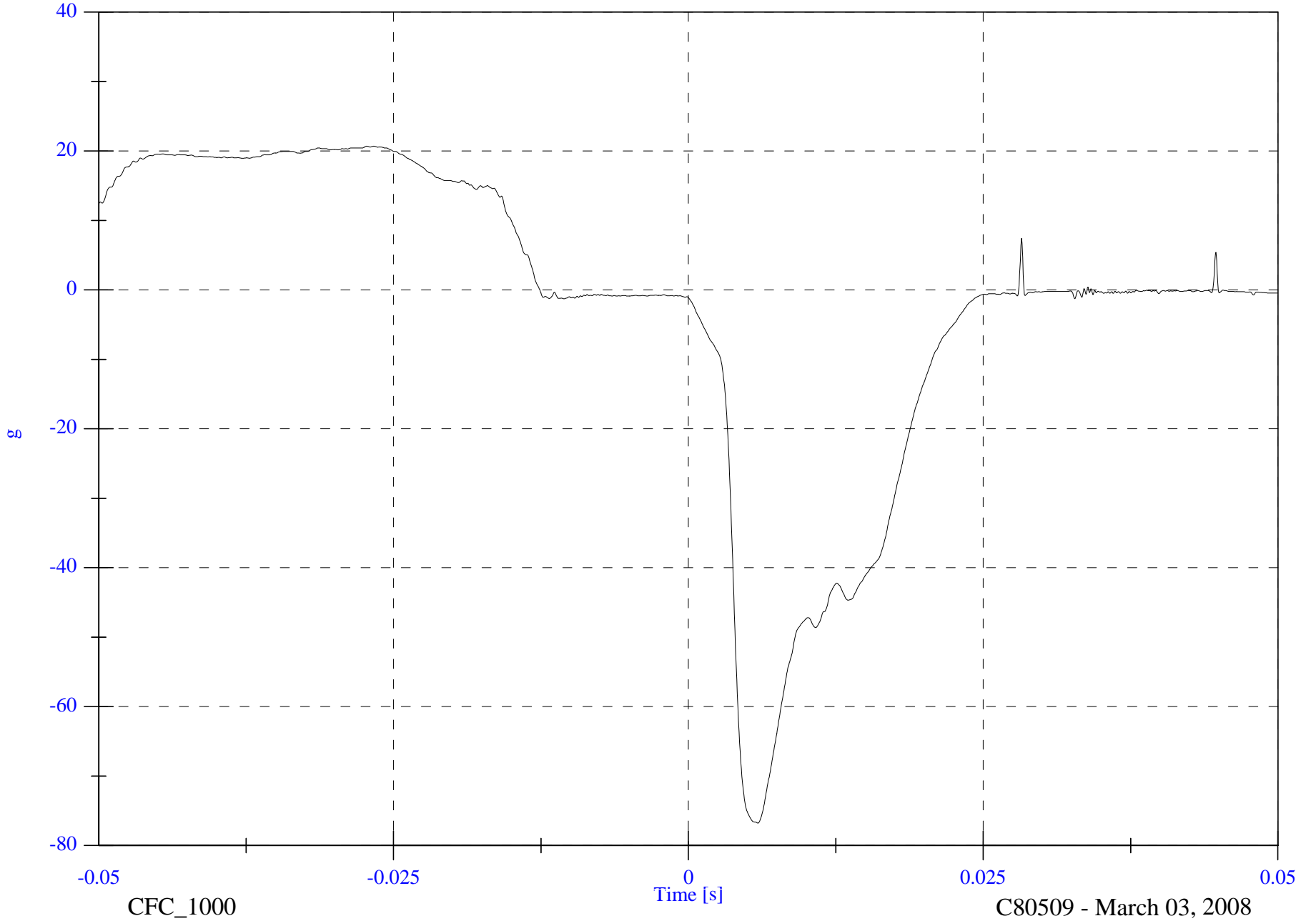


FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 20.7 [g] at -0.027 [s]

Min: -76.8 [g] at 0.006 [s]



C80509 DRIVER SIDE URBP IMPACT PLOT #2

8851-04

CFC_1000

C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

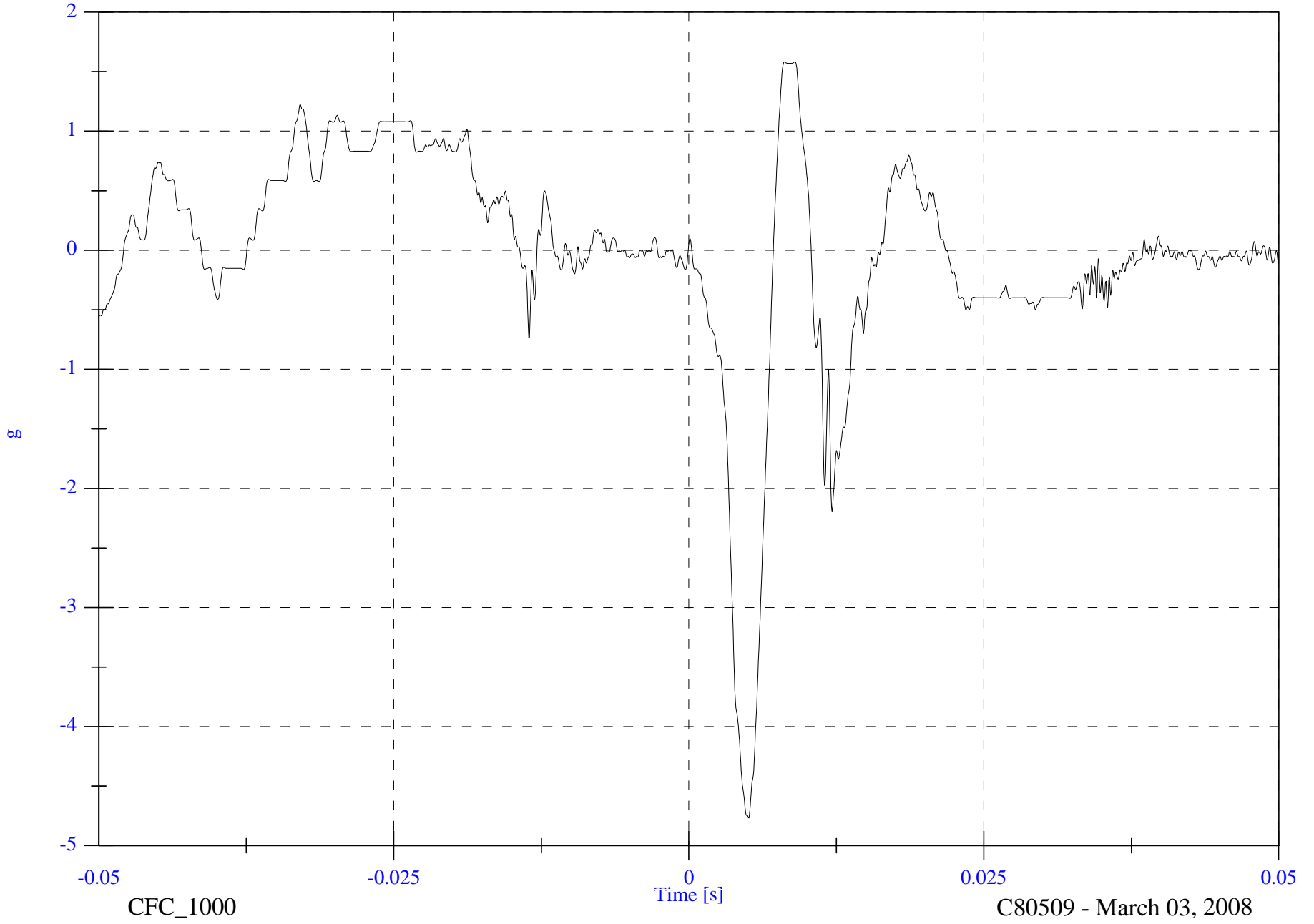
Headform Y Acceleration

Max: 1.6 [g] at 0.009 [s]

Min: -4.8 [g] at 0.005 [s]

C80509 DRIVER SIDE URBP IMPACT PLOT #3

8851-04



FMVSS 201U 2008 BMW 328i

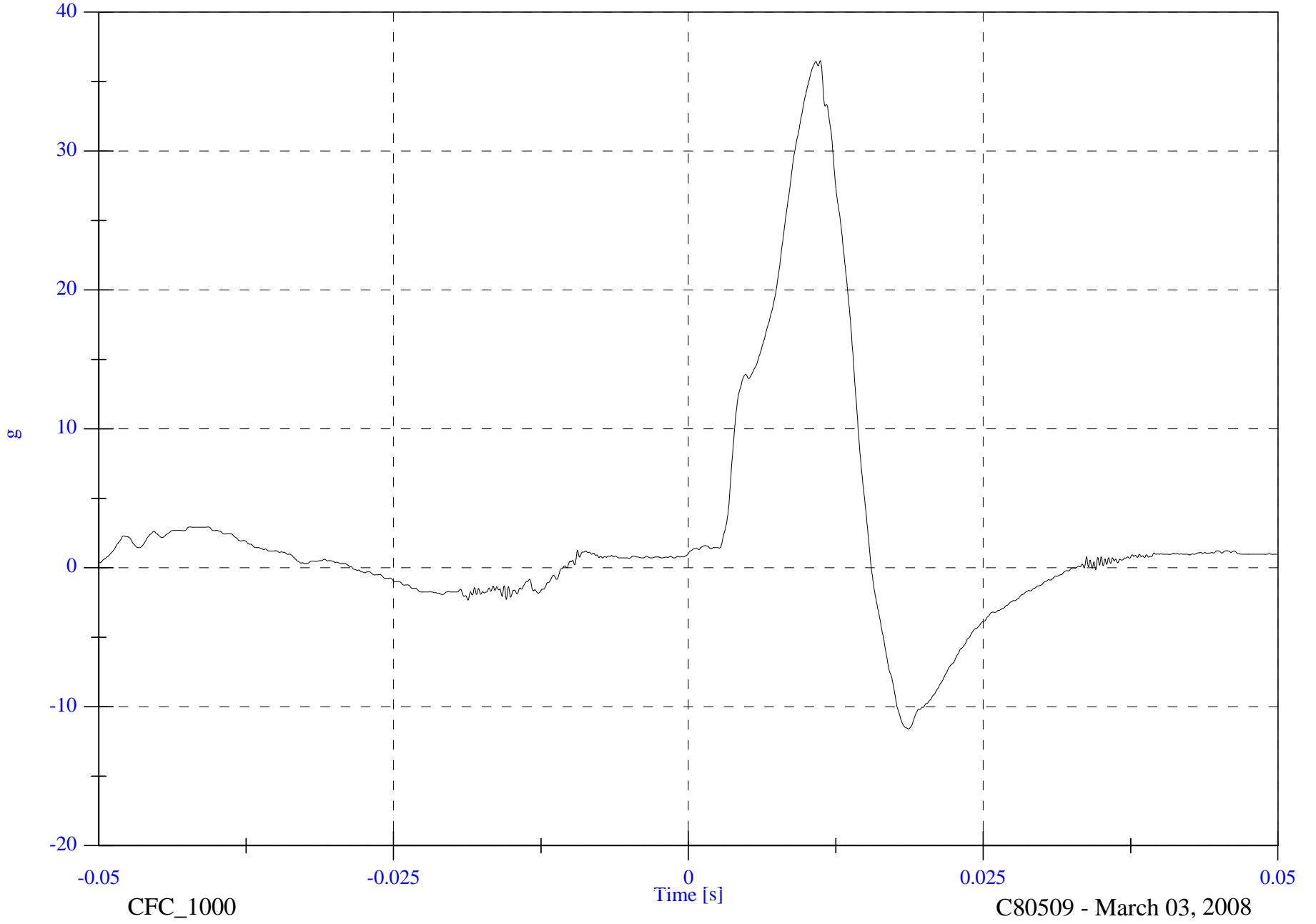
Headform Z Acceleration

Max: 36.5 [g] at 0.011 [s]

Min: -11.6 [g] at 0.019 [s]

C80509 DRIVER SIDE URBP IMPACT PLOT #4

8851-04



FMVSS 201U 2008 BMW 328i

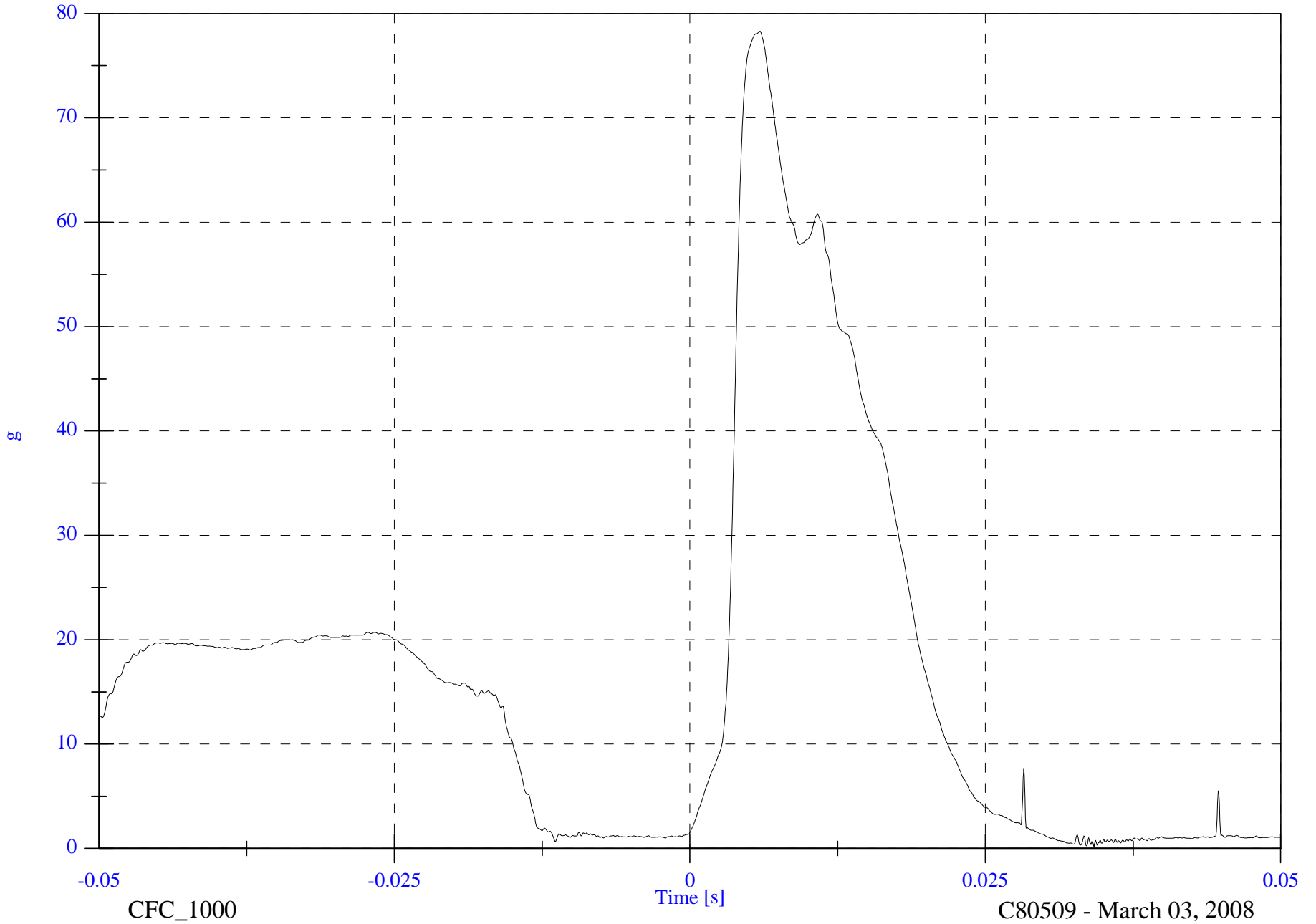
Headform Resultant

Max: 78.3 [g] at 0.006 [s]

Min: 0.2 [g] at 0.034 [s]

C80509 DRIVER SIDE URBP IMPACT PLOT #5

8851-04



CFC_1000

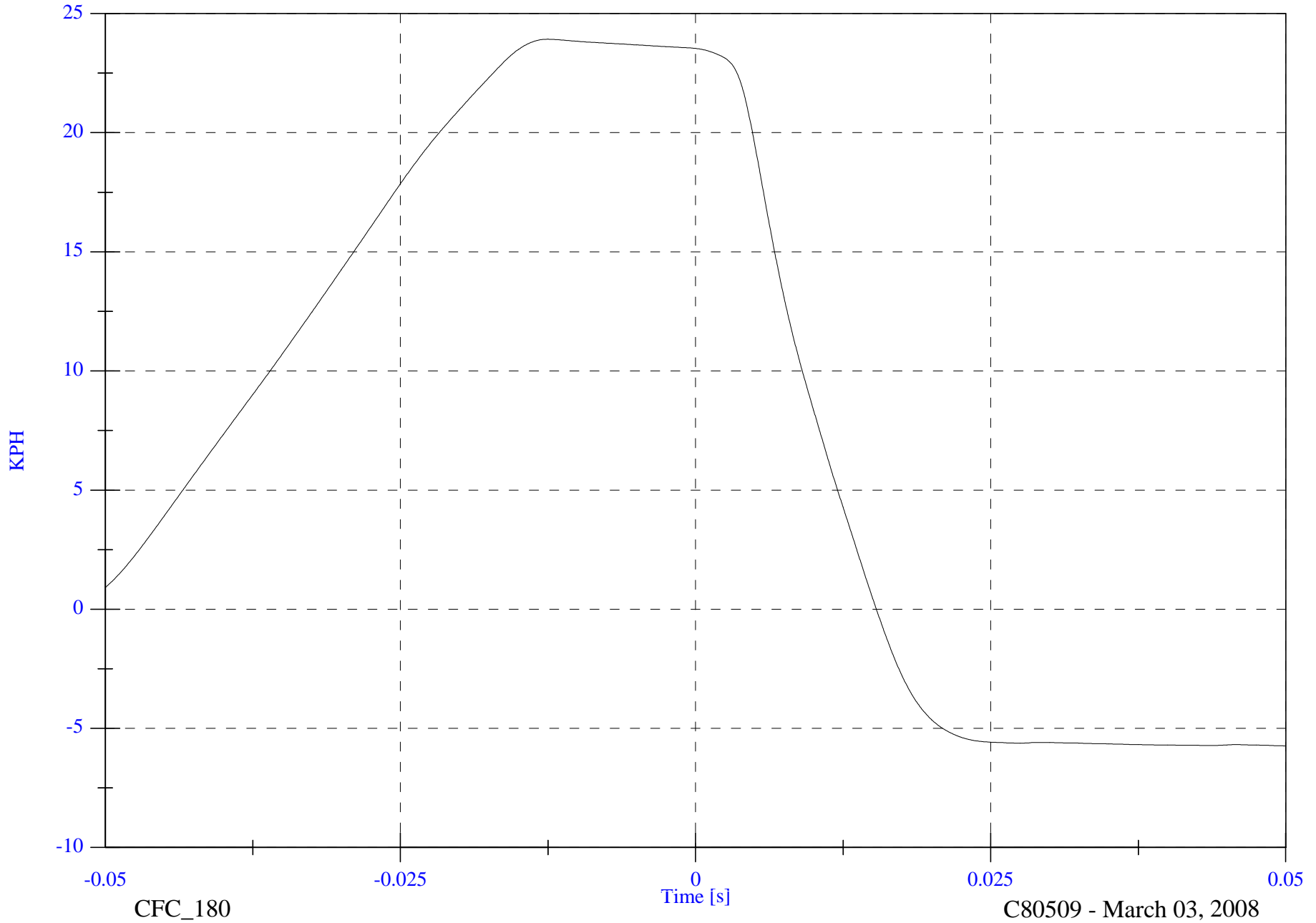
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Max: 23.9 [KPH] at -0.012 [s]

Min: -5.7 [KPH] at 0.050 [s]

Headform Velocity



C80509 DRIVER SIDE URBP IMPACT PLOT #6

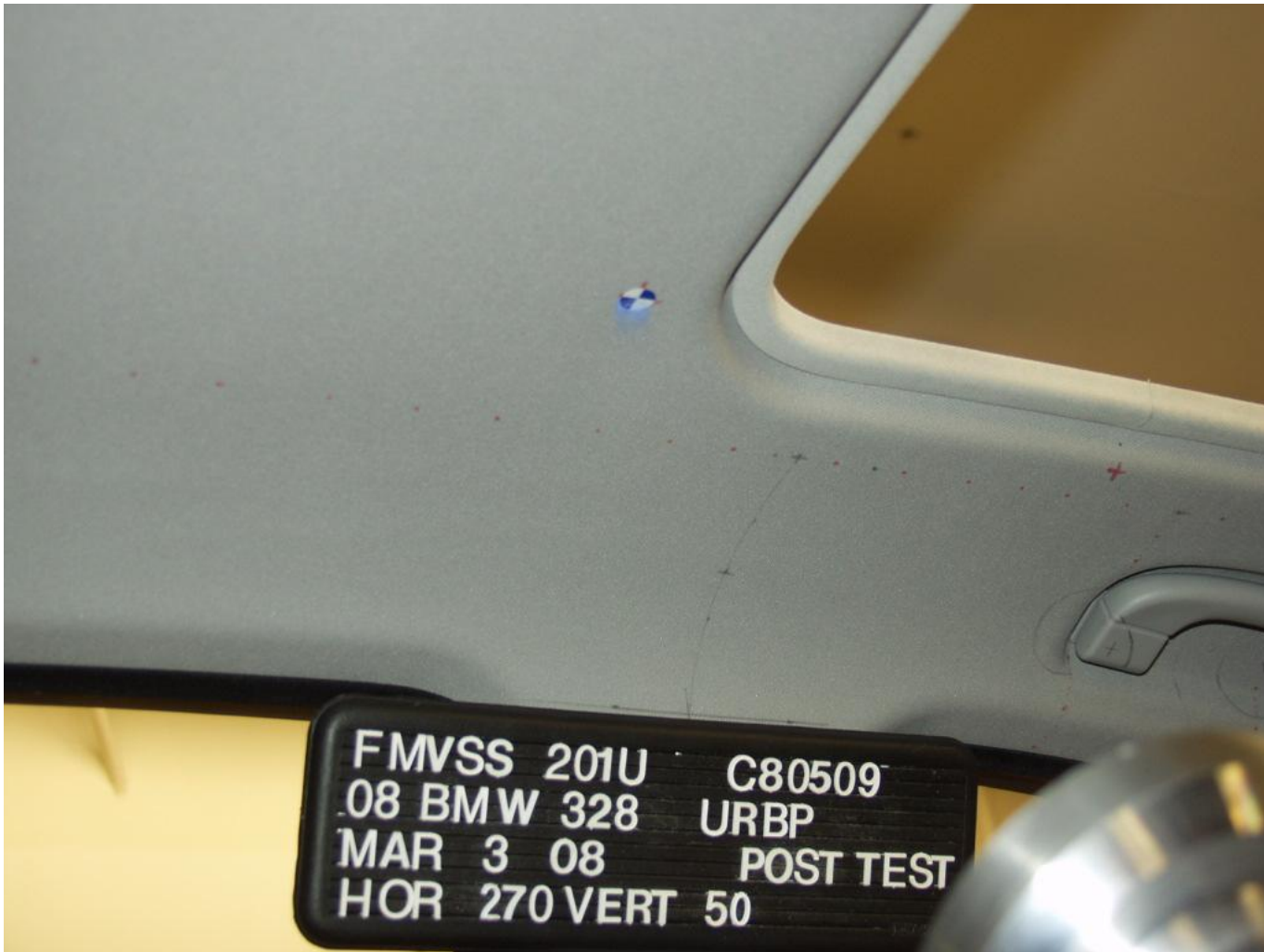
8851-04

CFC_180

C80509 - March 03, 2008



PRE-IMPACT URBP



POST-IMPACT URBP

VEHICLE YEAR/MAKE/MODEL/STYLE:	2008 BMW 328i 4-door Sedan
VIN:	WBAVC53588A246718
DATE OF MANUFACTURE:	11/07(SEE CERTIFICATION LABEL)
COLOR:	Gray

Test Number:	12
Test Date:	03/03/08
Target Location:	A-PILLAR
Target Code:	AP2
Horizontal Impact Angle:	210°
Vertical Impact Angle:	43°
Ambient Temperature:	23.0 C°
Relative Humidity:	25.9 %
Time of Impact:	12:05
Headform Number:	0062

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	3	<input checked="" type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	9				mm up



POST-IMPACT AP2 HEADFORM

Free Motion HIC	828.6
HIC(d)	791.5
Impact Velocity (kph)	18.56
HIC T1 (msec)	2.3
HIC T2 (msec)	6.6

FMVSS 201U 2008 BMW 328i C80509 - AP2

FMH Headform 0062

Location: AP2

Test Date: March 03, 2008

Work File: AP2

-----TEST RESULTS-----

Lab Temperature: 23.0 C

HICd: 791.5

Lab Humidity: 25.9 %

HIC (36ms): 828.6

Velocity at Impact: 18.56 KPH

t1: 2.3 msec

t2: 6.6 msec

Free Flight Distance: 215.09 mm

Duration: 4.3 msec

Average Acceleration: 8.5 g

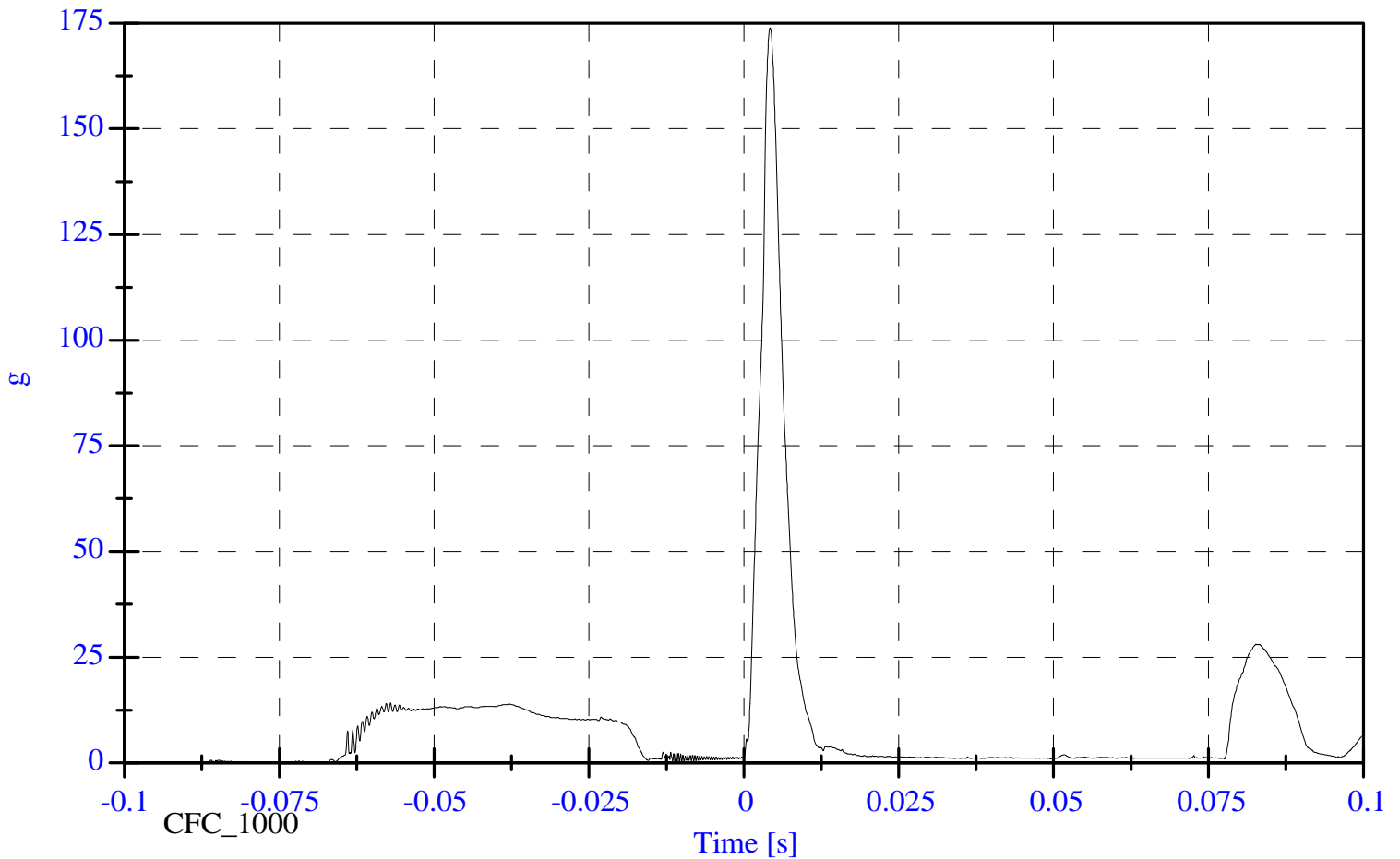
Maximum: 173.9 g

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 173.9 [g] at 0.004 [s]

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

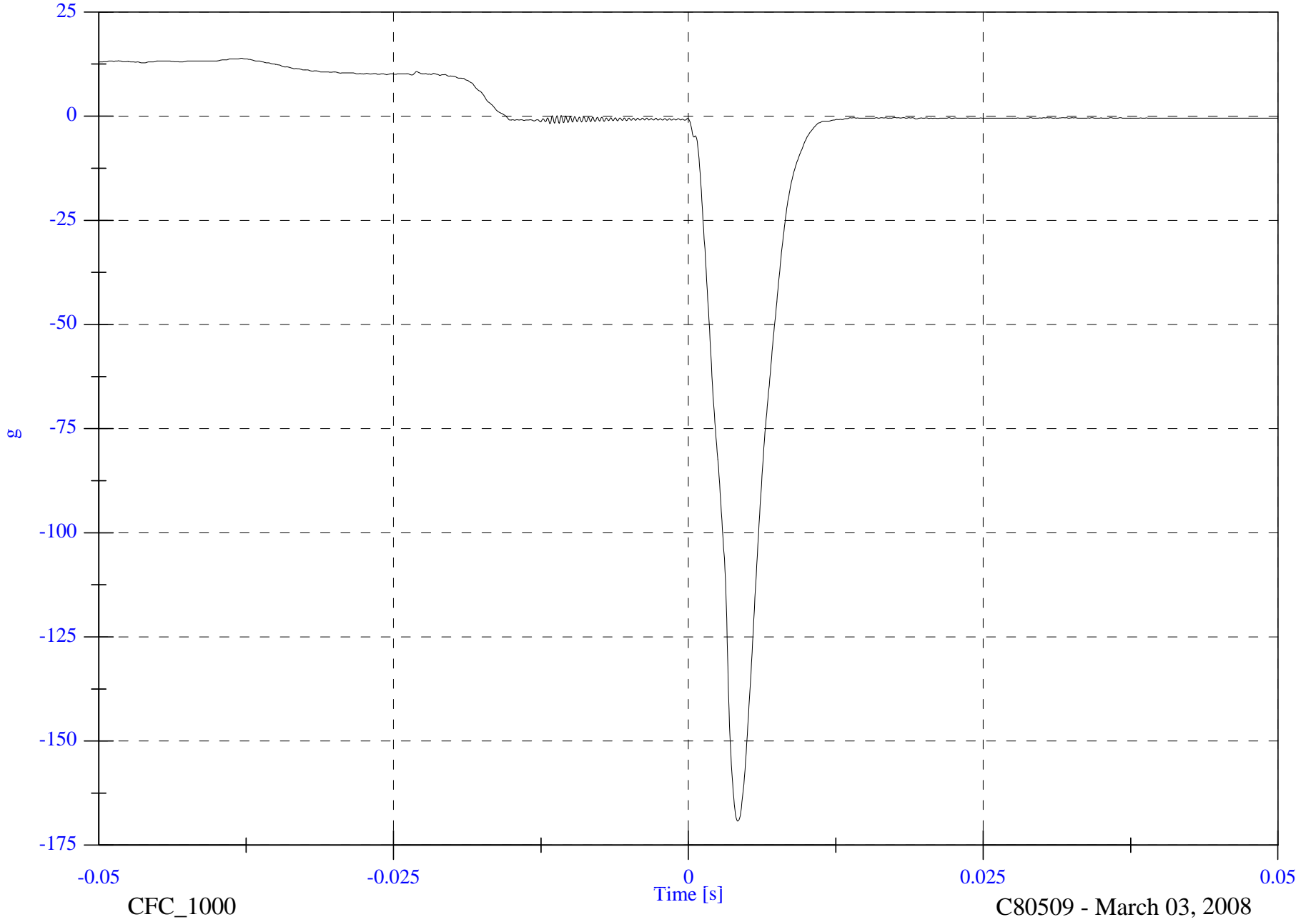


FMVSS 201U 2008 BMW 328i

Headform X Acceleration

Max: 13.9 [g] at -0.038 [s]

Min: -169.2 [g] at 0.004 [s]



C80509 DRIVER SIDE AP2 IMPACT PLOT #2

8851-04

CFC_1000

C80509 - March 03, 2008

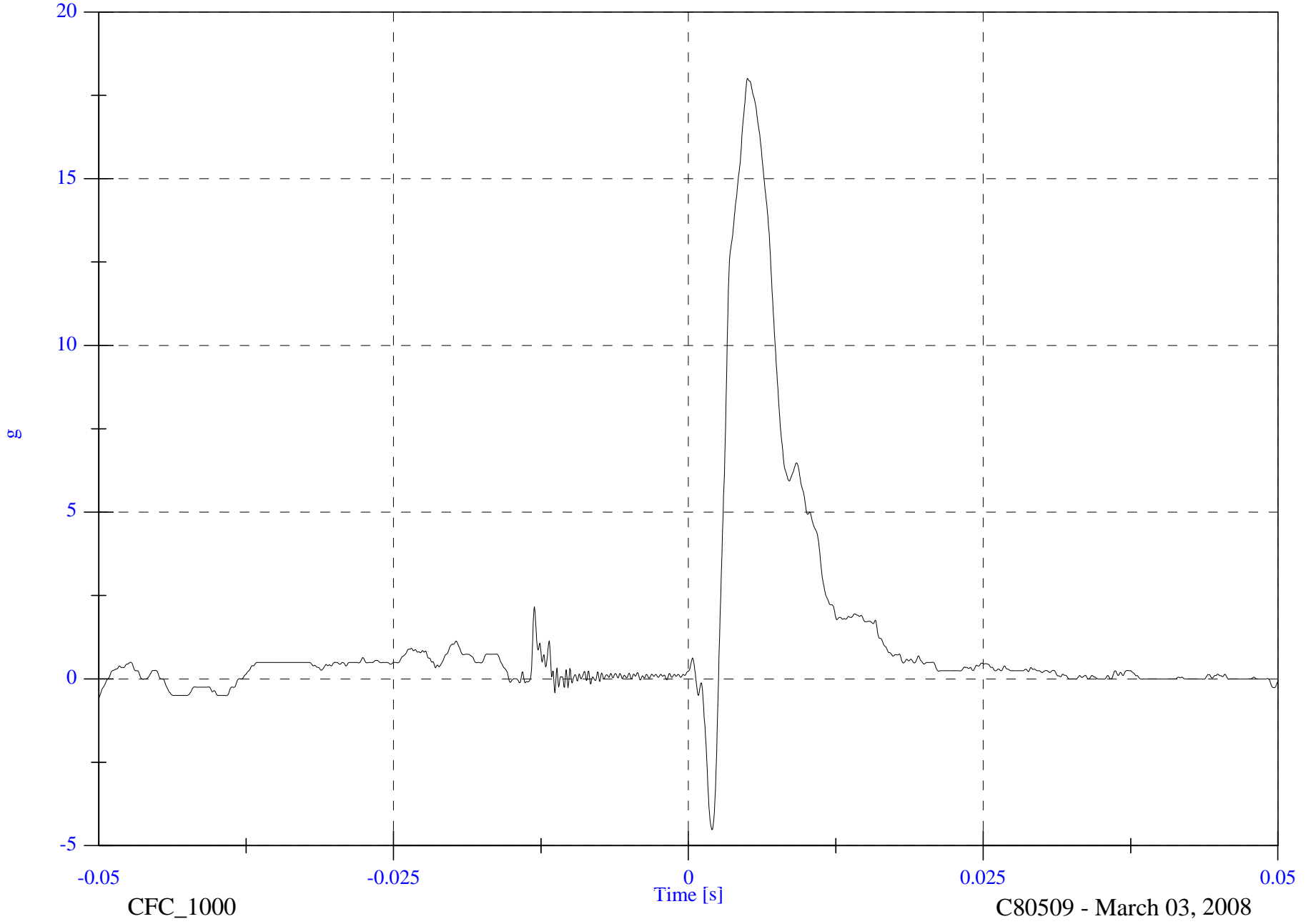
FMVSS 201U 2008 BMW 328i

Headform Y Acceleration

Max: 18.0 [g] at 0.005 [s]
Min: -4.5 [g] at 0.002 [s]

C80509 DRIVER SIDE AP2 IMPACT PLOT #3

8851-04



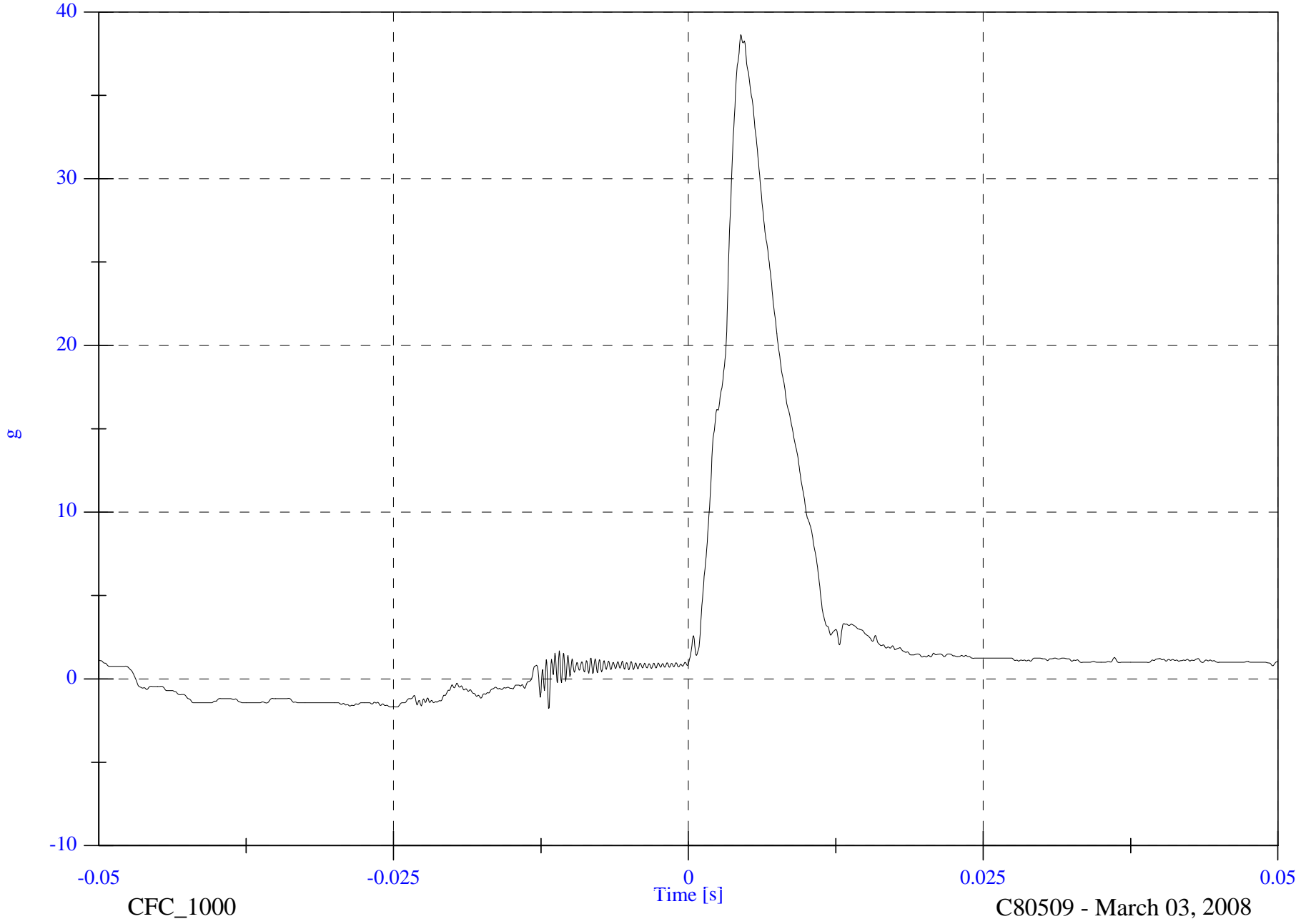
CFC_1000

C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Headform Z Acceleration

Max: 38.6 [g] at 0.004 [s]
Min: -1.8 [g] at -0.012 [s]



C80509 DRIVER SIDE AP2 IMPACT PLOT #4

8851-04

CFC_1000

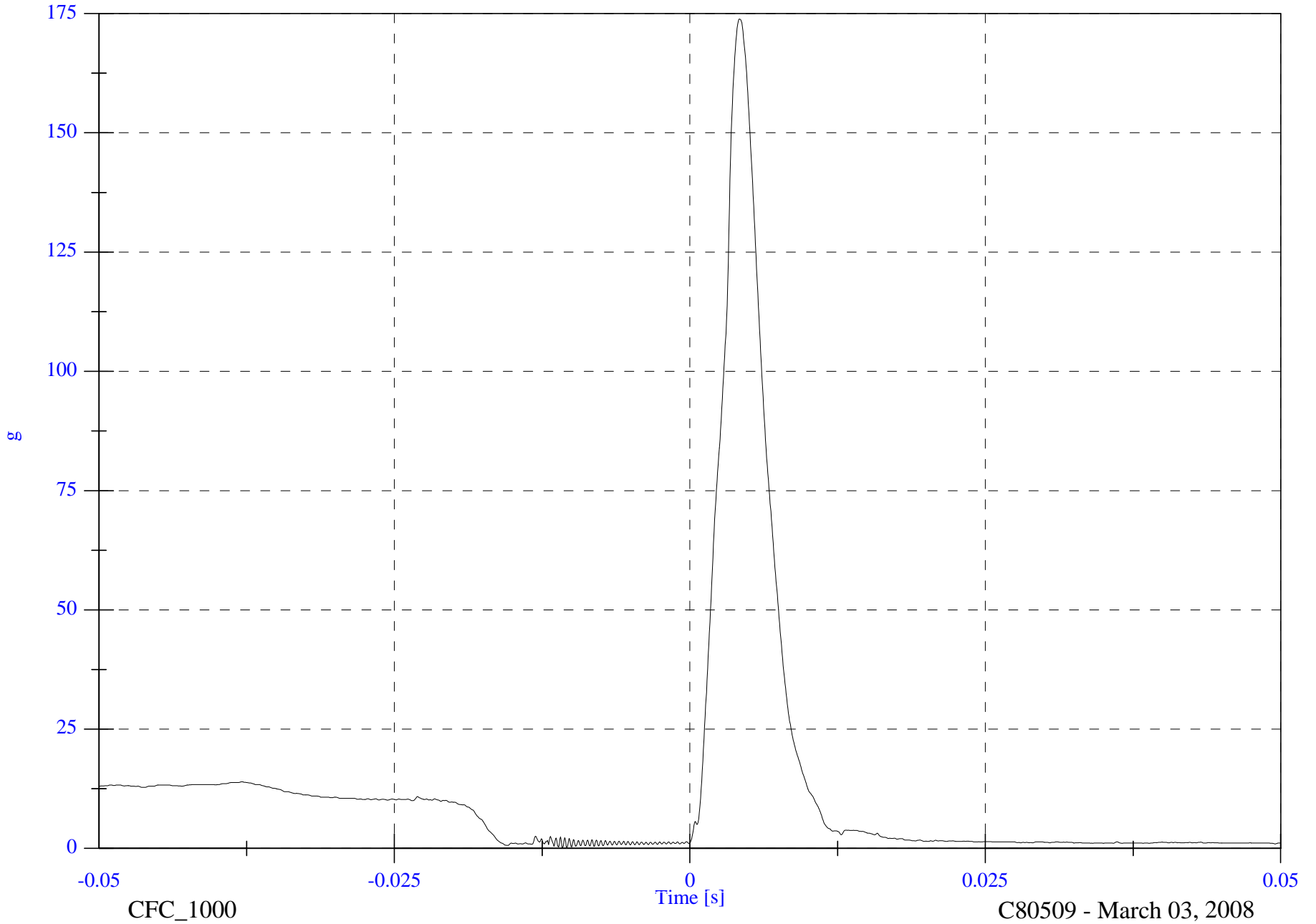
C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Headform Resultant

Max: 173.9 [g] at 0.004 [s]

Min: 0.1 [g] at -0.011 [s]



C80509 DRIVER SIDE AP2 IMPACT PLOT #5

8851-04

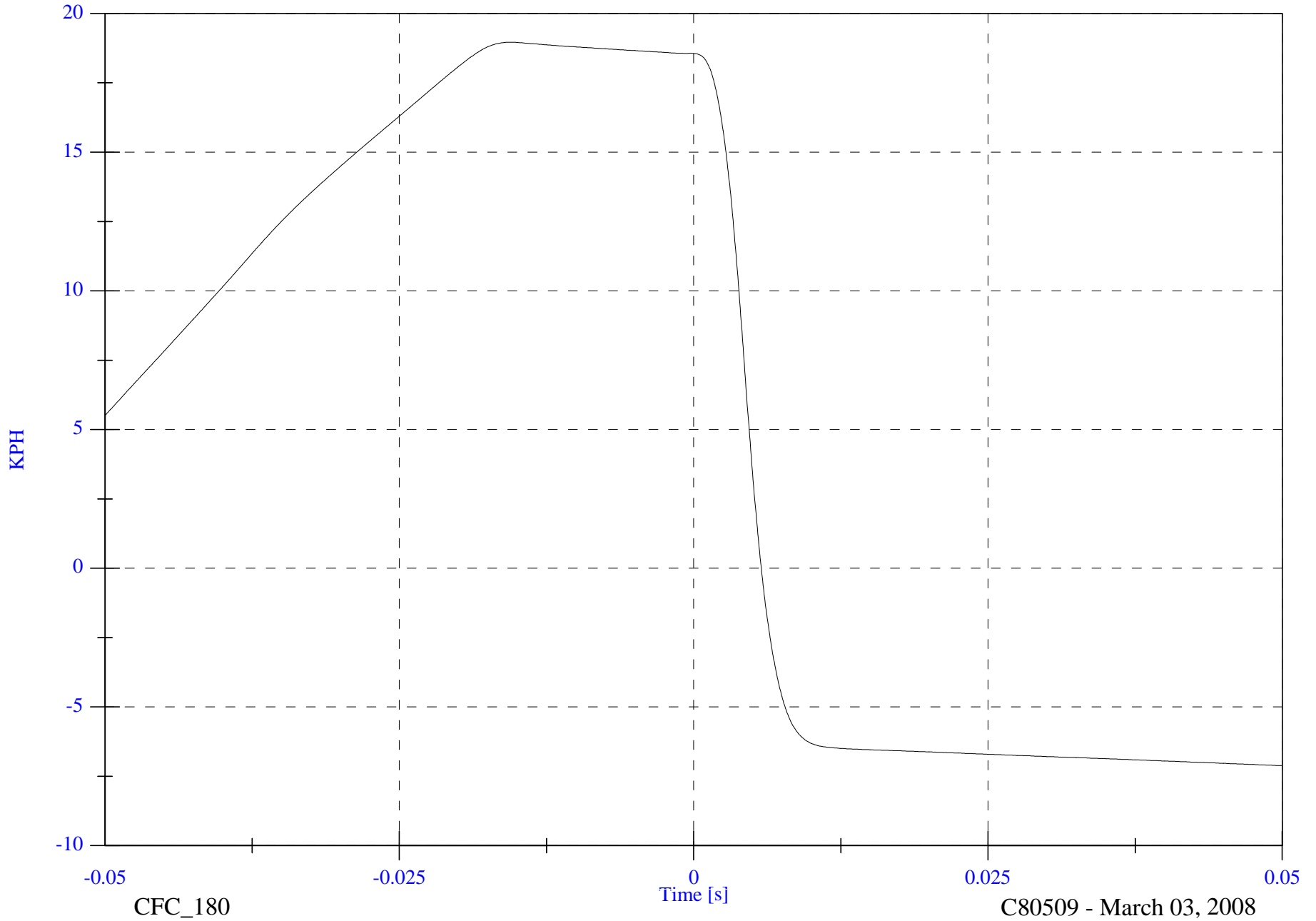
CFC_1000

C80509 - March 03, 2008

FMVSS 201U 2008 BMW 328i

Max: 19.0 [KPH] at -0.016 [s]
Min: -7.1 [KPH] at 0.050 [s]

Headform Velocity



C80509 DRIVER SIDE AP2 IMPACT PLOT #6

8851-04

CFC_180

C80509 - March 03, 2008



PRE-IMPACT AP2



POST-IMPACT AP2

APPENDIX A

PHOTOGRAPHS

PHOTOGRAPHS

FIGURE	VIEW	PAGE
A-1	LEFT SIDE VIEW OF VEHICLE	A-3
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A-15	PRE-TEST PASSENGER SIDE B-PILLAR	A-17
A-16	PRE-TEST PASSENGER SIDE REAR PILLAR	A-18
A-17	POST-TEST DRIVER SIDE A-PILLAR	A-19
A-18	POST-TEST DRIVER SIDE FRONT HEADER	A-20
A-19	POST-TEST DRIVER SIDE SIDE RAIL	A-21
A-20	POST-TEST DRIVER SIDE B-PILLAR	A-22
A-21	POST-TEST DRIVER SIDE REAR PILLAR	A-23
A-22	POST-TEST PASSENGER SIDE A-PILLAR	A-24
A-23	POST-TEST PASSENGER SIDE FRONT HEADER	A-25
A-24	POST-TEST PASSENGER SIDE SIDE RAIL	A-26
A-25	POST-TEST PASSENGER SIDE B-PILLAR	A-27
A-26	POST-TEST PASSENGER SIDE REAR PILLAR	A-28



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'S CERTIFICATION LABEL



Figure A-6 : VEHICLE'S TIRE INFORMATION LABEL



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



Figure A-8 : PRE-TEST DRIVER SIDE FRONT HEADER



Figure A-9 : PRE-TEST DRIVER SIDE SIDE RAIL



Figure A-10 : PRE-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-18 : POST-TEST DRIVER SIDE FRONT HEADER



Figure A-19 : POST-TEST DRIVER SIDE SIDE RAIL



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



Figure A-21 : POST-TEST DRIVER SIDE REAR PILLAR



Figure A-22 : POST-TEST PASSENGER SIDE A-PILLAR



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



Figure A-24 : POST-TEST PASSENGER SIDE SIDE RAIL



Figure A-25 : POST-TEST PASSENGER SIDE B-PILLAR



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 Calspan Corporation. A summary of the test results are included in this Appendix.

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

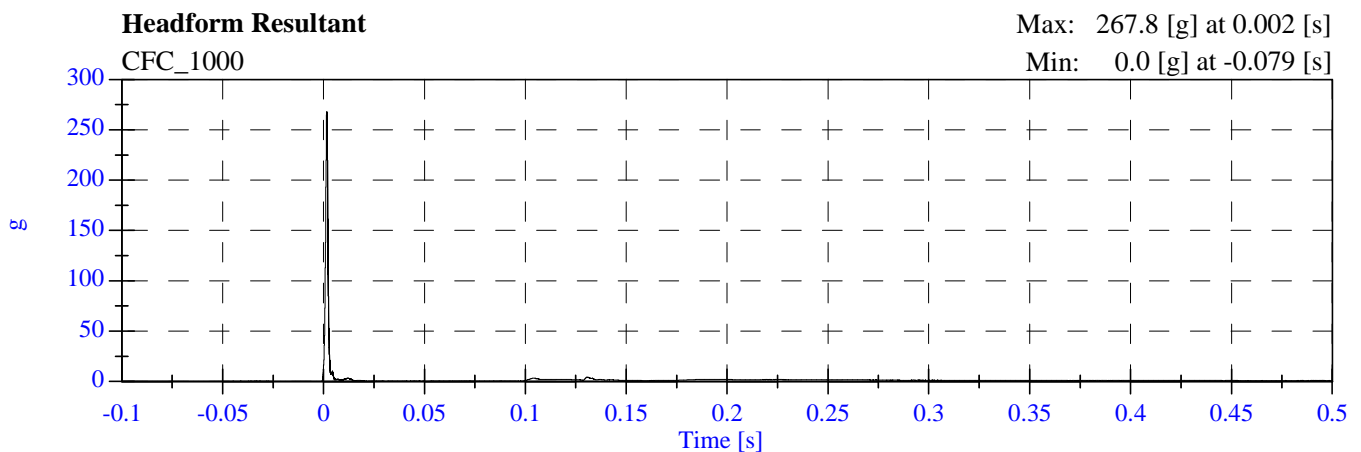
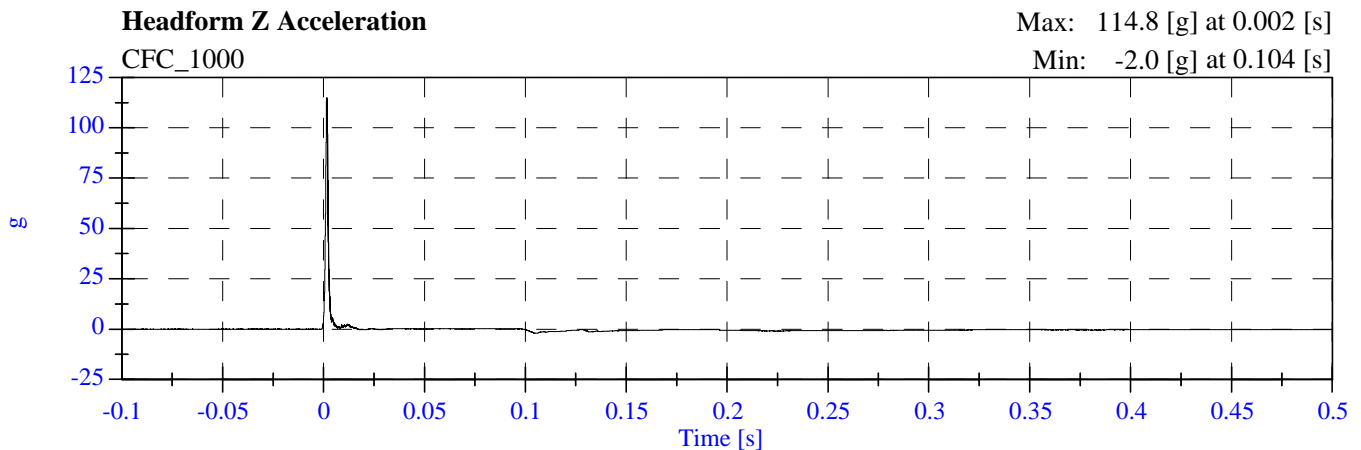
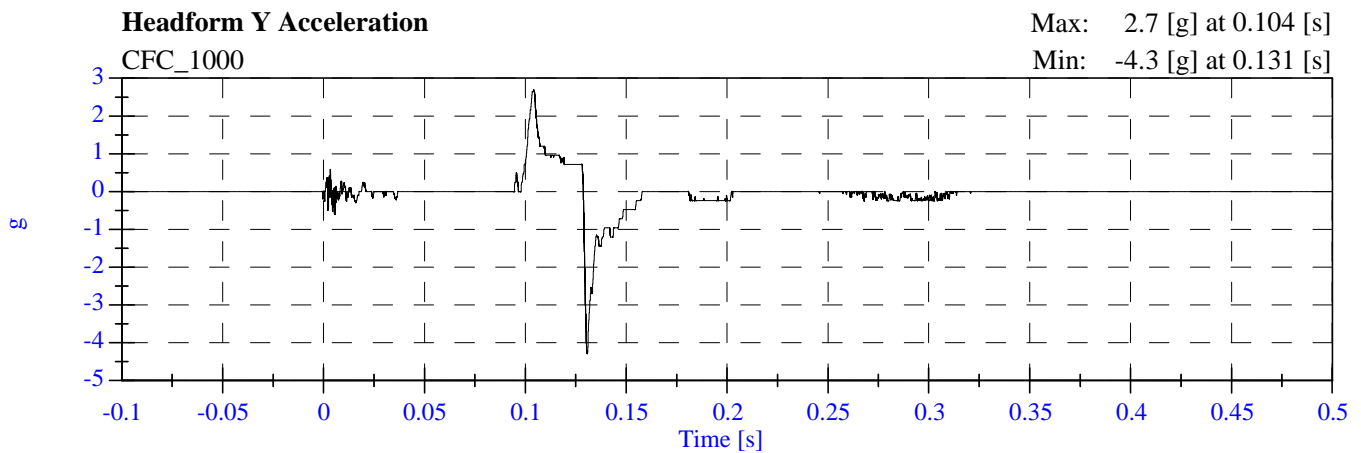
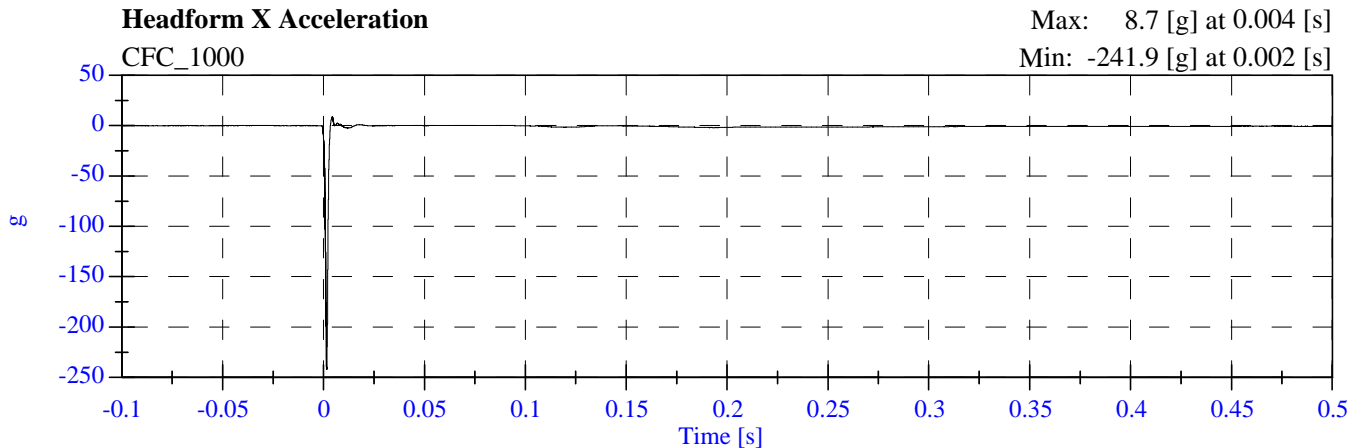
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SERIAL NUMBER:		1140	
CALIBRATION DATE:		February 21, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.2	
RELATIVE HUMIDITY	10% to 70%	12	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	267.8	
PEAK LATERAL ACCELERATION	15 Gs Maximum	0.5	
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	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J33030	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops C80509 - February 21, 2008



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

MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0062	
CALIBRATION DATE:		February 21, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.2	
RELATIVE HUMIDITY	10% to 70%	12	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	254.4	
PEAK LATERAL ACCELERATION	15 Gs Maximum	11.0	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

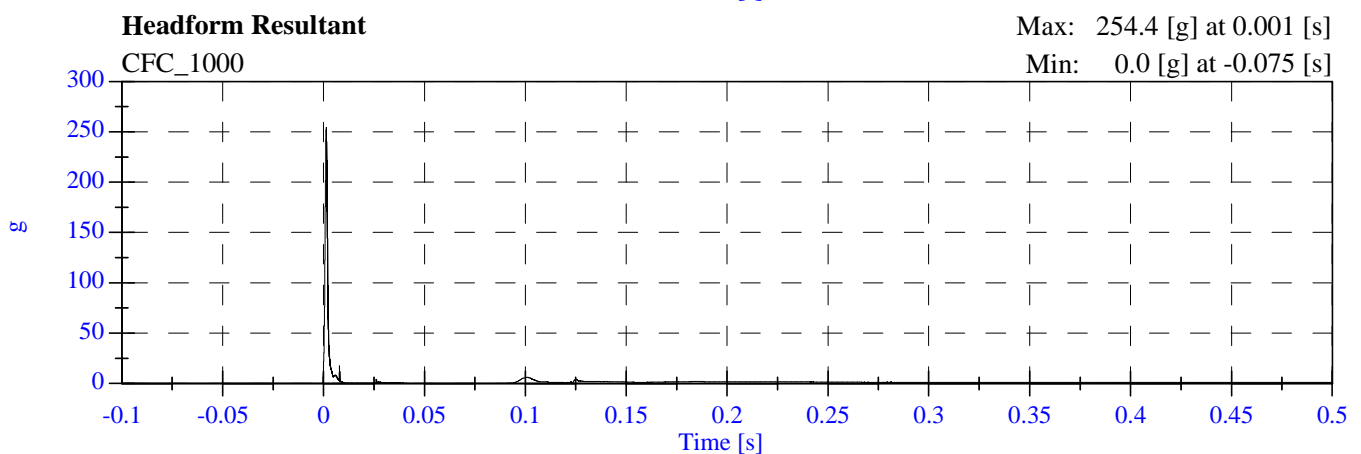
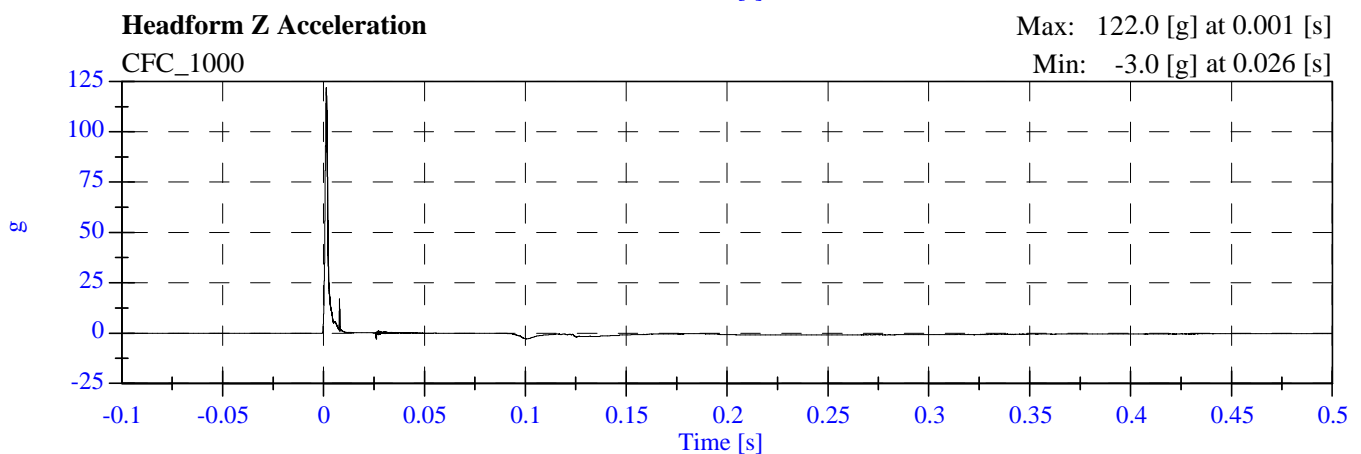
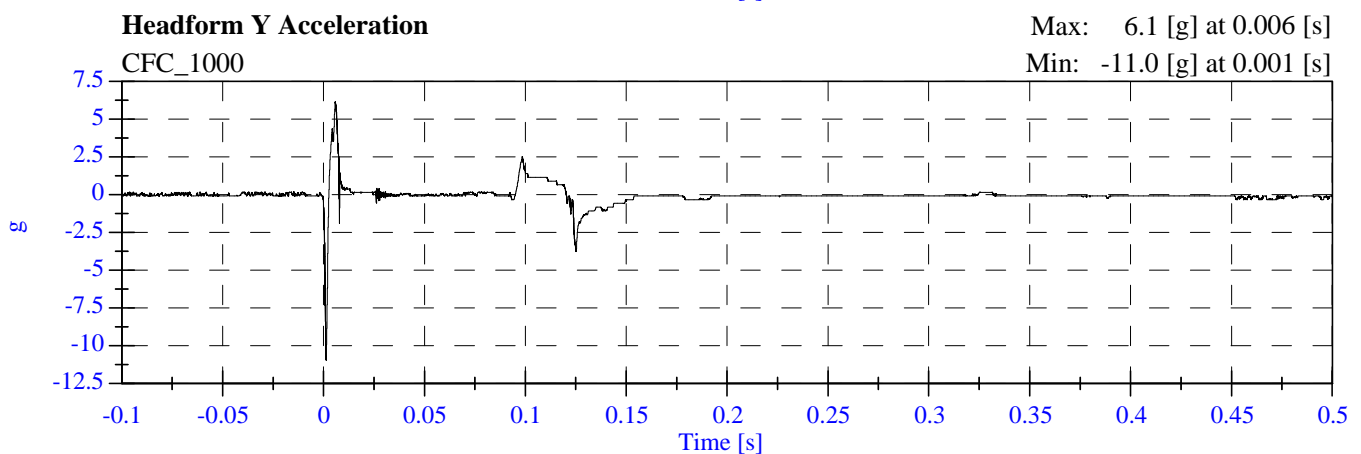
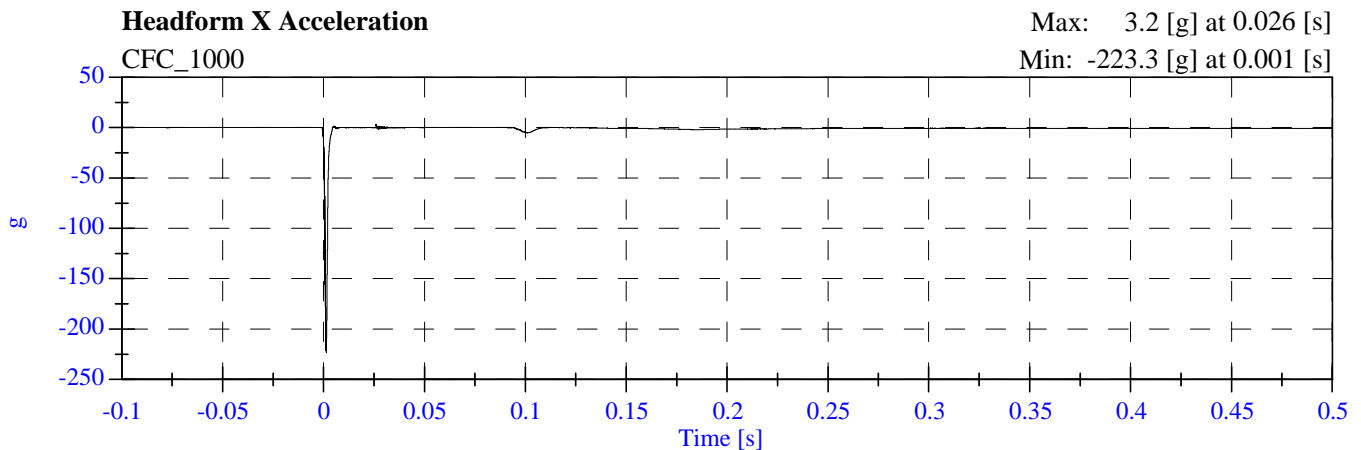
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J33127	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J33019	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J32782	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops

C80509 - February 21, 2008



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

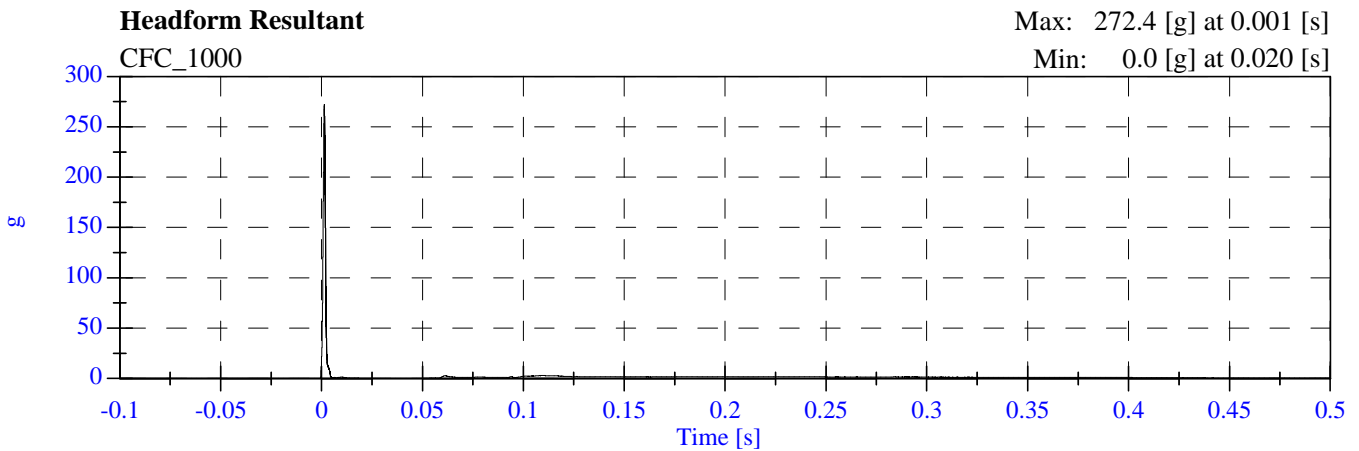
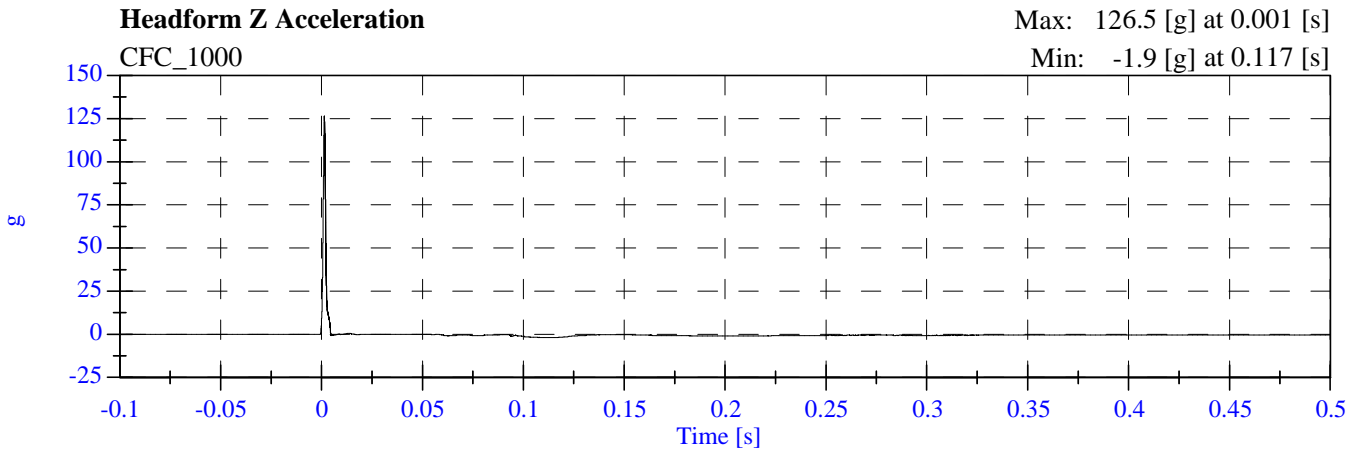
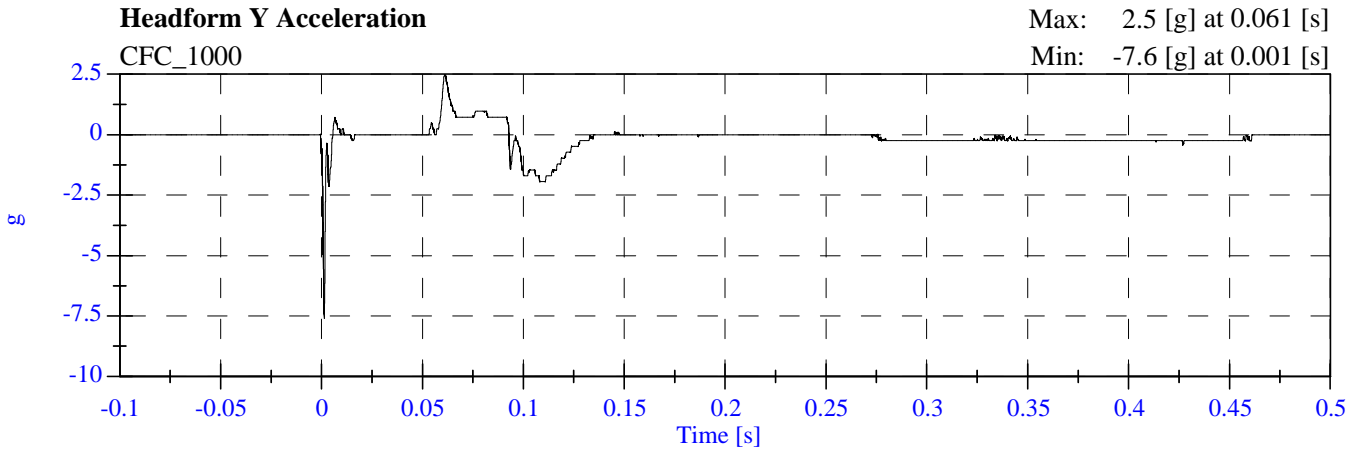
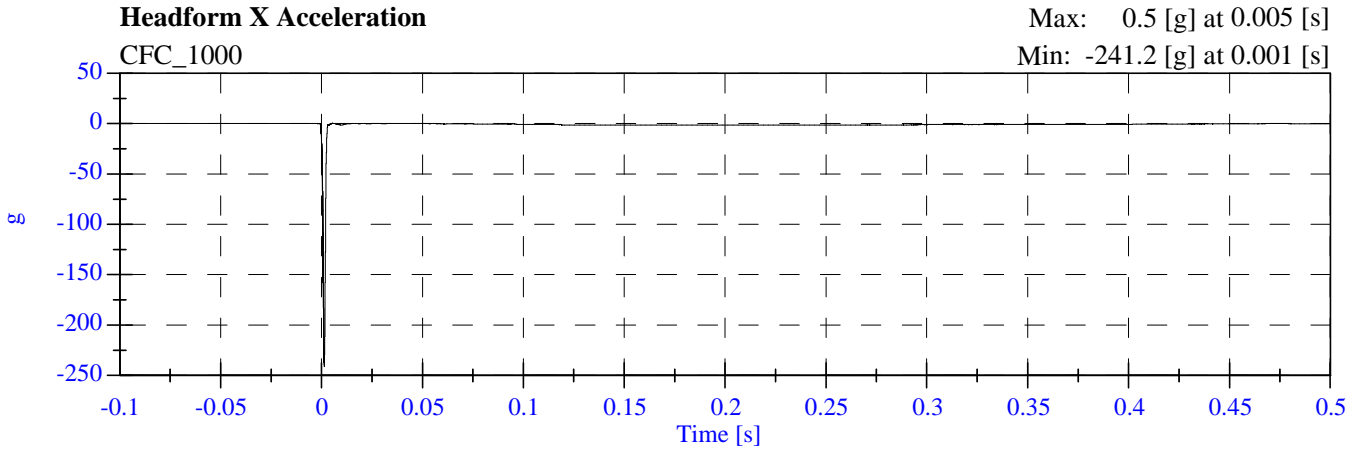
MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		805	
CALIBRATION DATE:		February 21, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.2	
RELATIVE HUMIDITY	10% to 70%	12	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	272.4	
PEAK LATERAL ACCELERATION	15 Gs Maximum	7.6	
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	J41004	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J37496	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J41016	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops C80509 - February 21, 2008



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

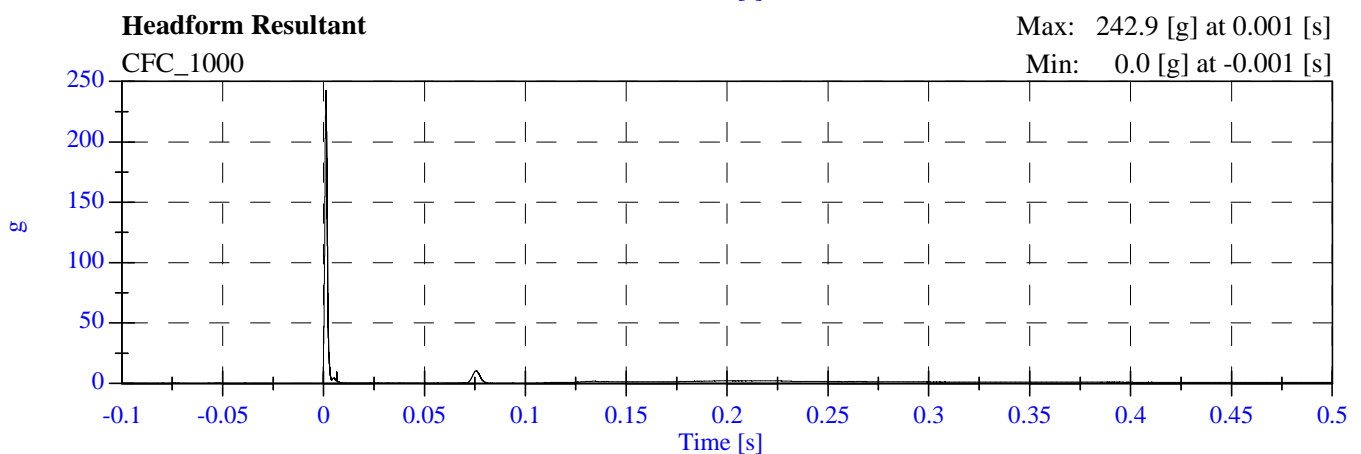
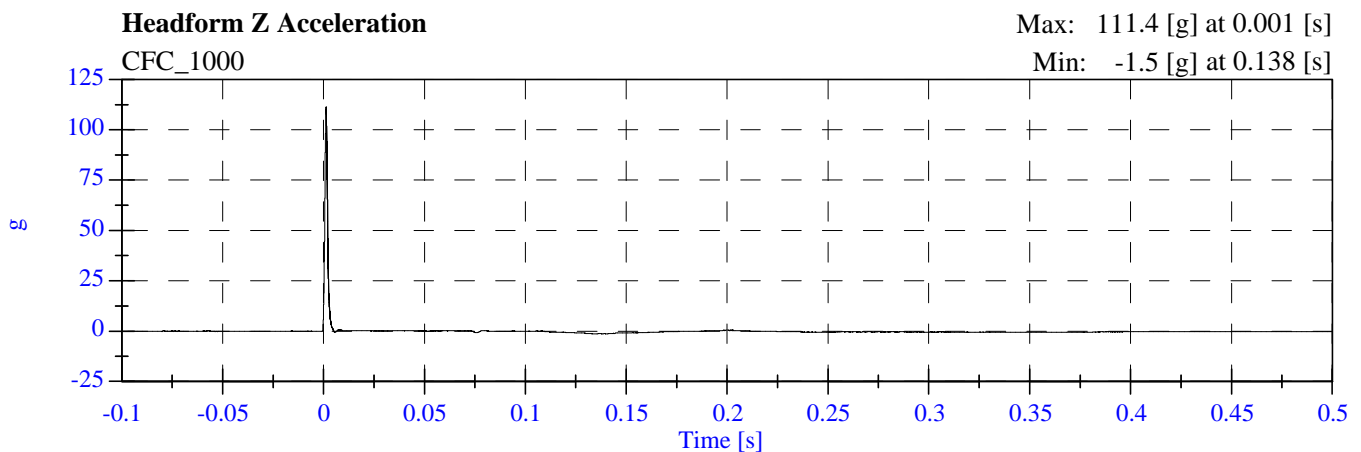
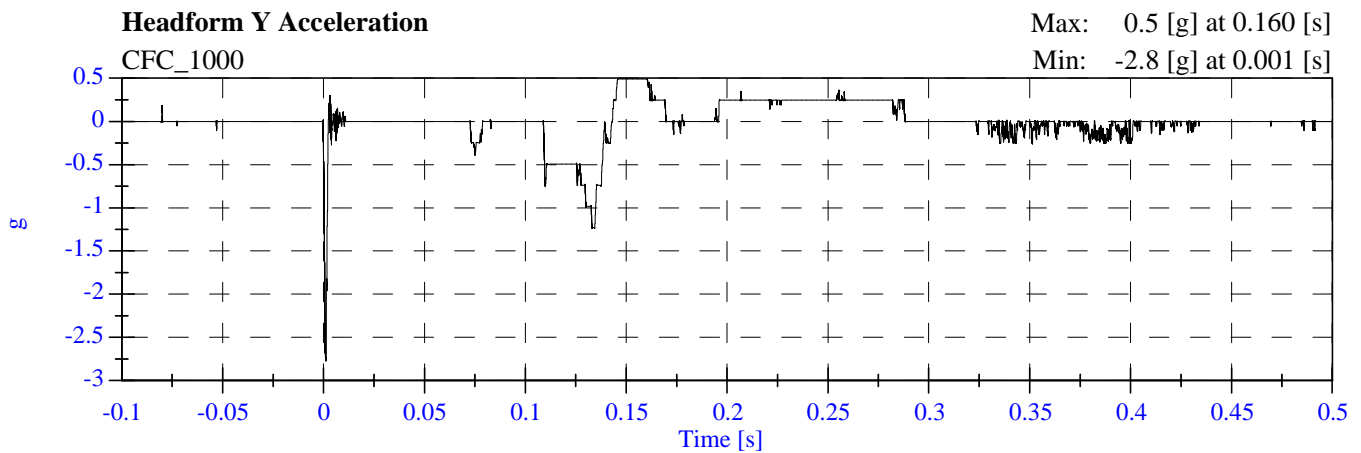
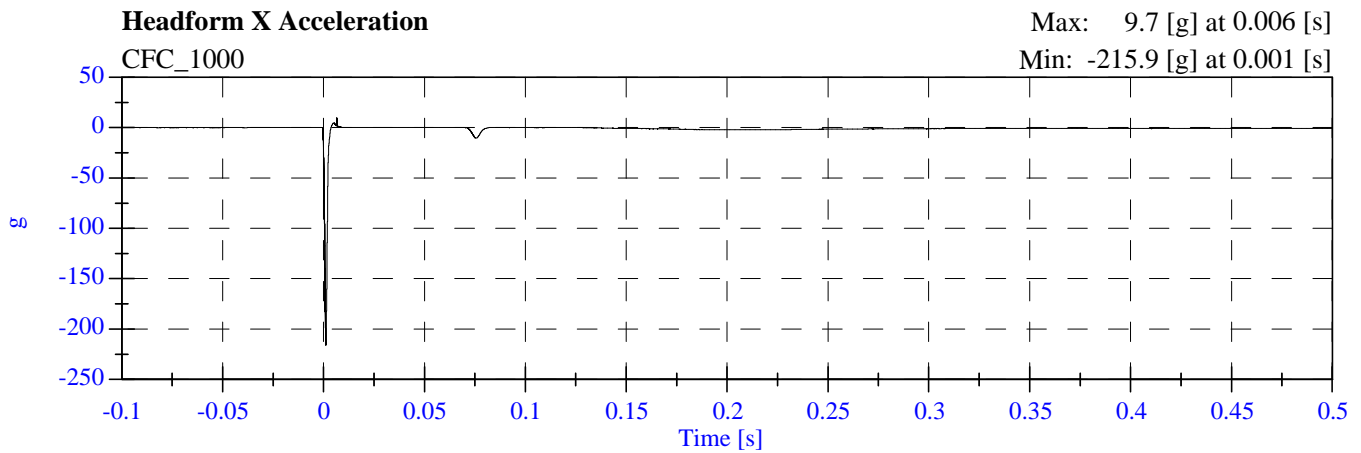
MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0355	
CALIBRATION DATE:		February 21, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.2	
RELATIVE HUMIDITY	10% to 70%	12	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	242.9	
PEAK LATERAL ACCELERATION	15 Gs Maximum	2.8	
IS ACCELERATION 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	J28671	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J32779	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J25854	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops C80509 - February 21, 2008



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

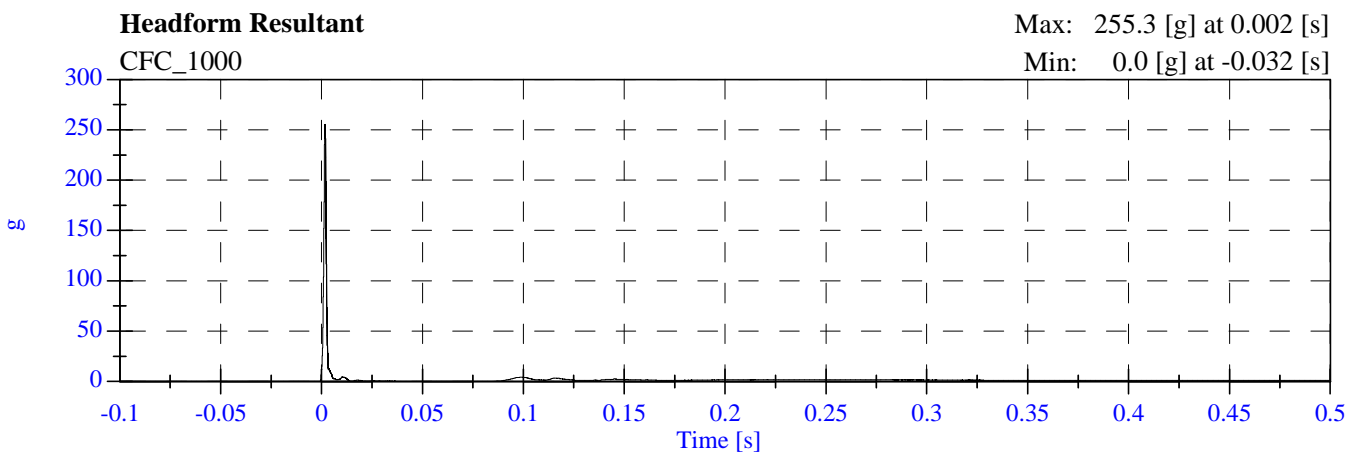
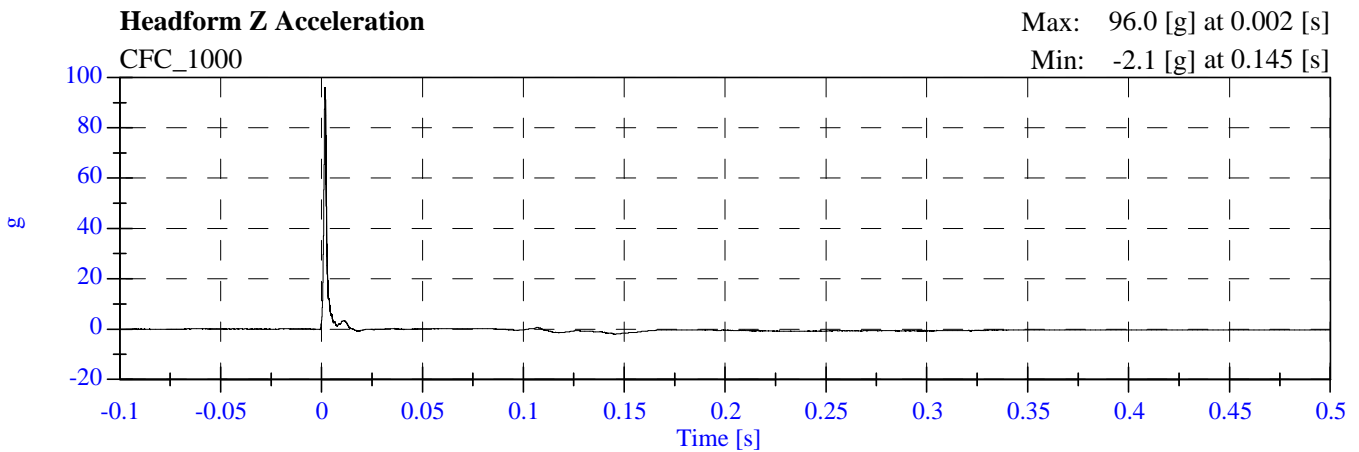
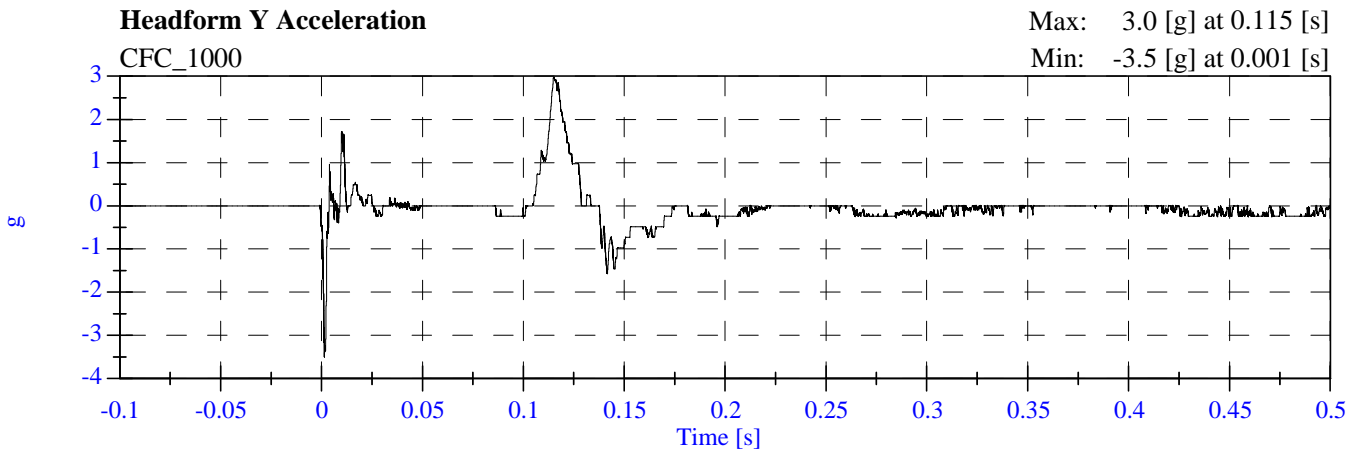
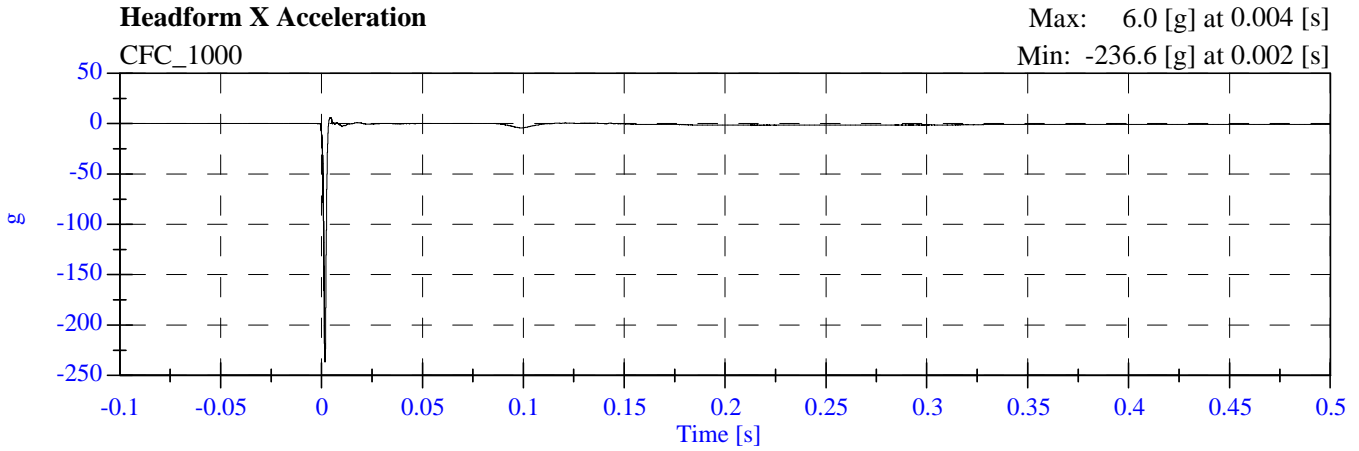
MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		1142	
CALIBRATION DATE:		February 21, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.2	
RELATIVE HUMIDITY	10% to 70%	12	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	255.3	
PEAK LATERAL ACCELERATION	15 Gs Maximum	3.5	
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	J41006	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J40994	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops C80509 - February 21, 2008



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

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		1140	
CALIBRATION DATE:		MARCH 4, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.8	
RELATIVE HUMIDITY	10% to 70%	18	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	271.5	
PEAK LATERAL ACCELERATION	15 Gs Maximum	2.3	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

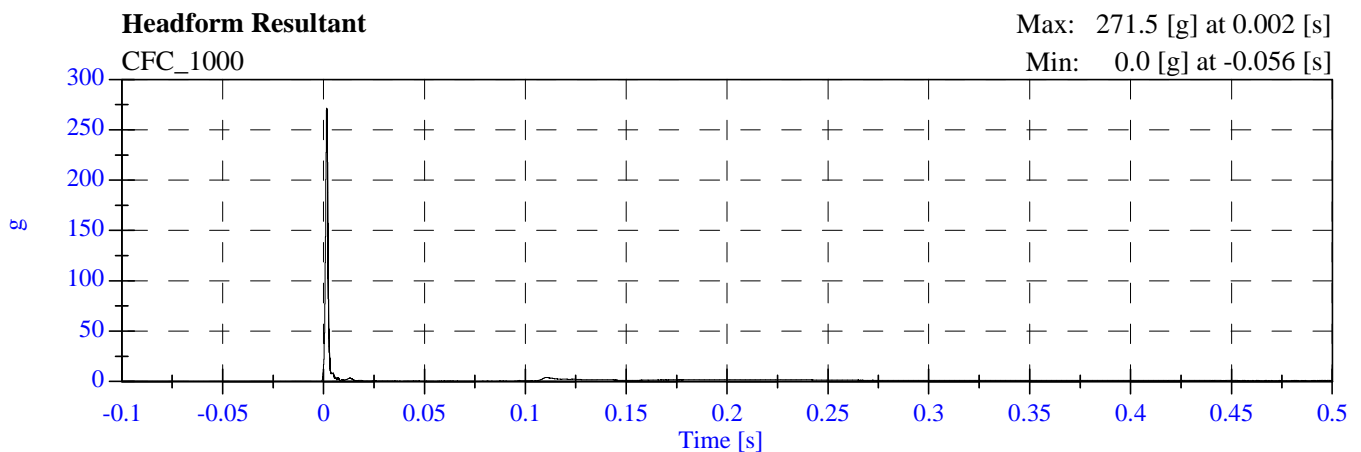
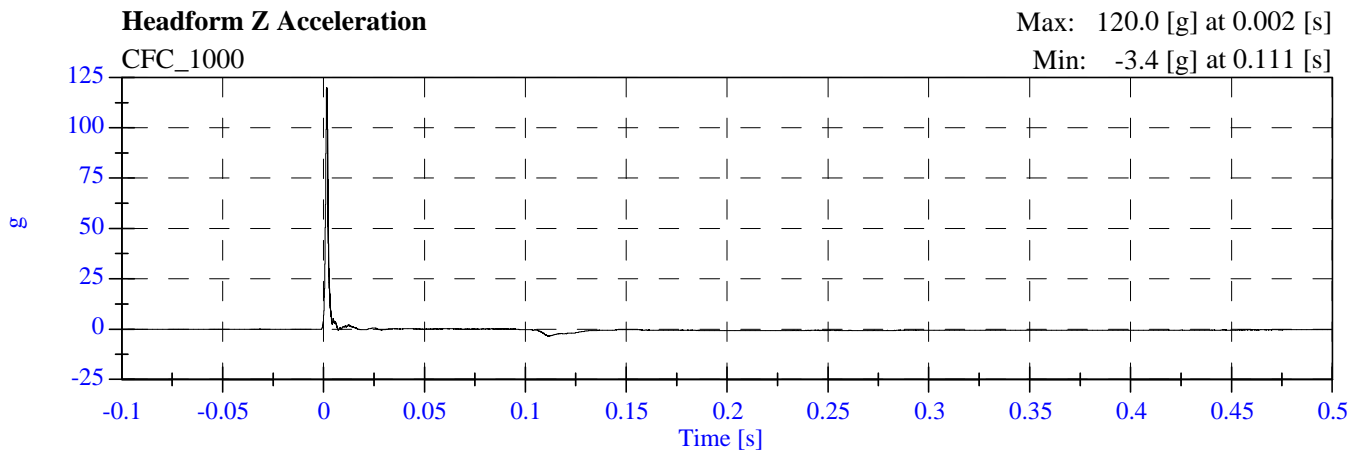
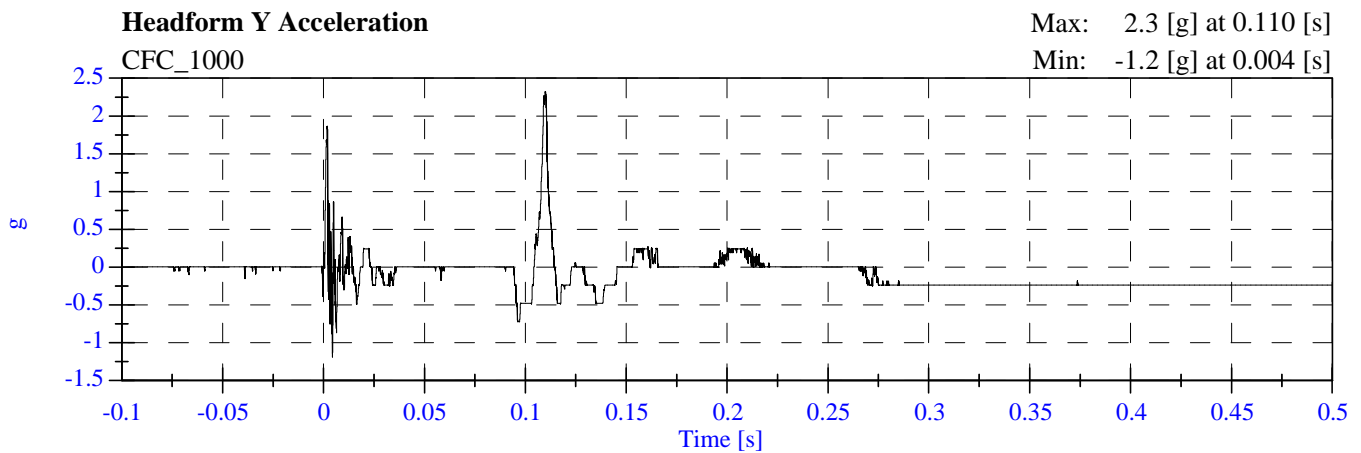
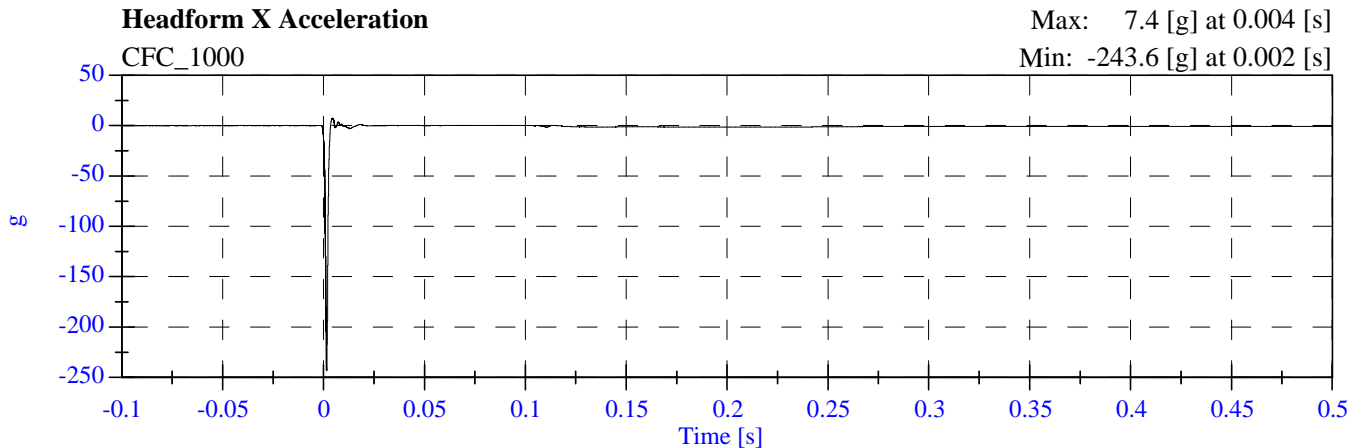
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J24876	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J33030	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops

C80509 - March 04, 2008



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

MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0062	
CALIBRATION DATE:		MARCH 4, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.8	
RELATIVE HUMIDITY	10% to 70%	18	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	272.2	
PEAK LATERAL ACCELERATION	15 Gs Maximum	7.4	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

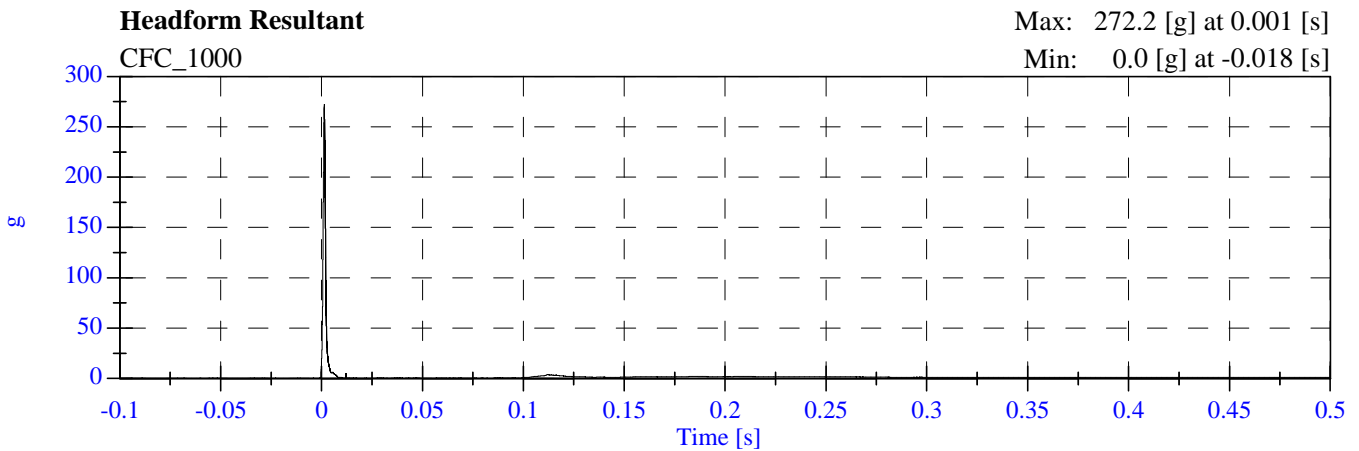
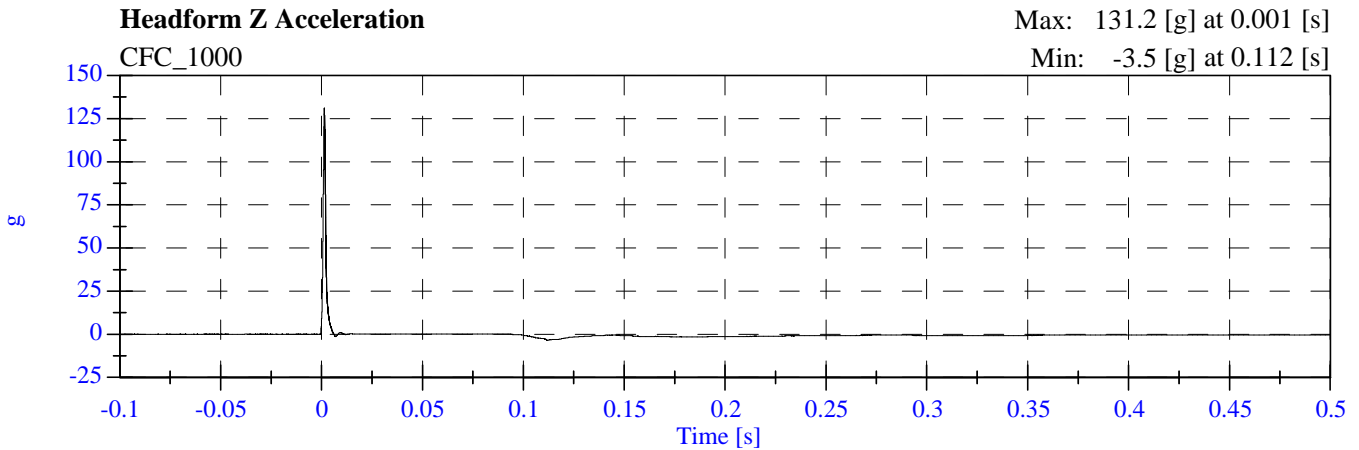
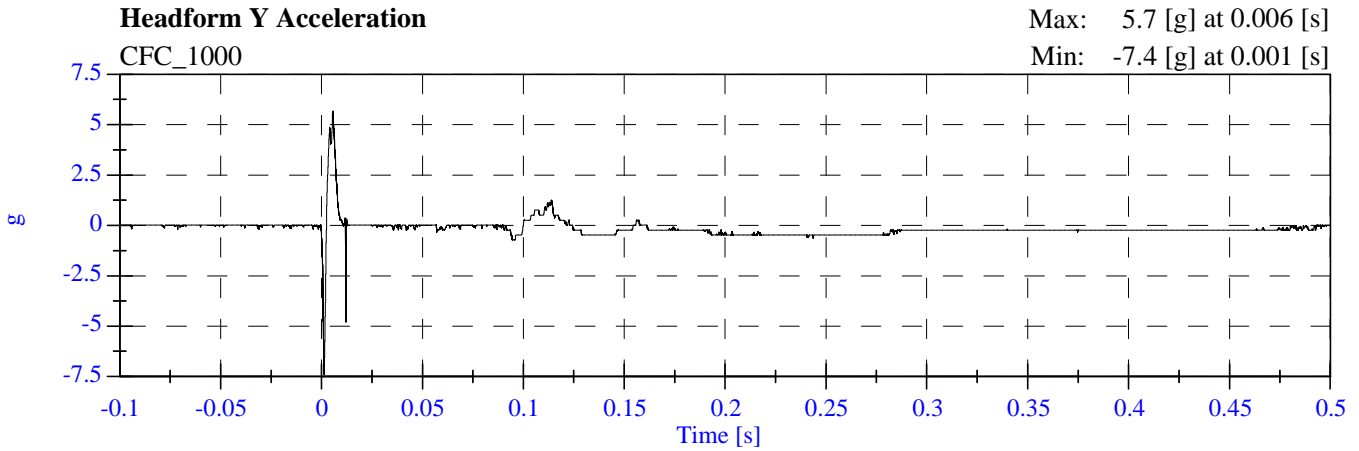
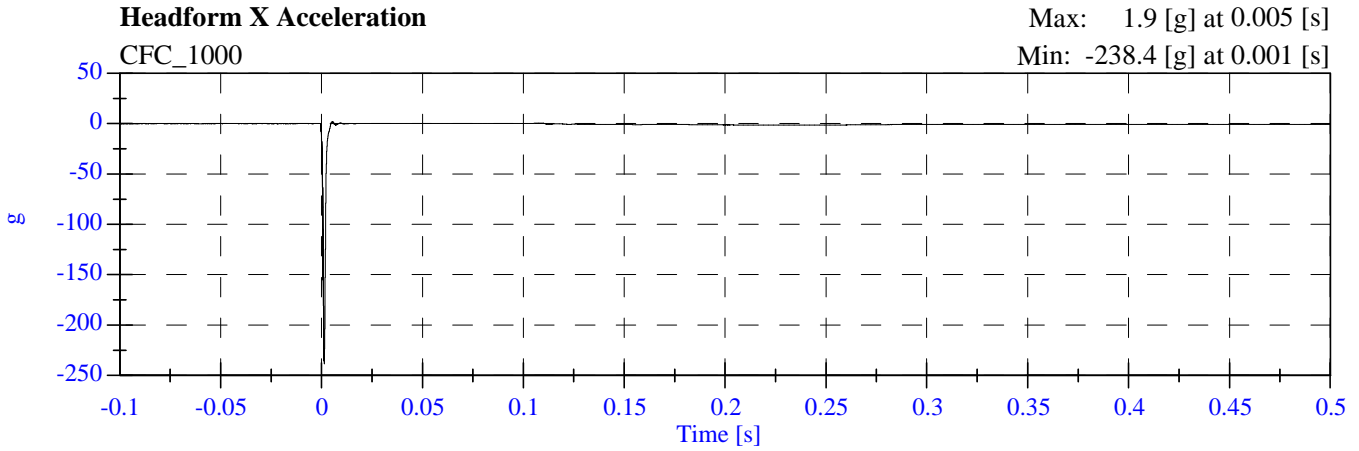
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J33127	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J33019	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J32782	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops

C80509 - March 04, 2008



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

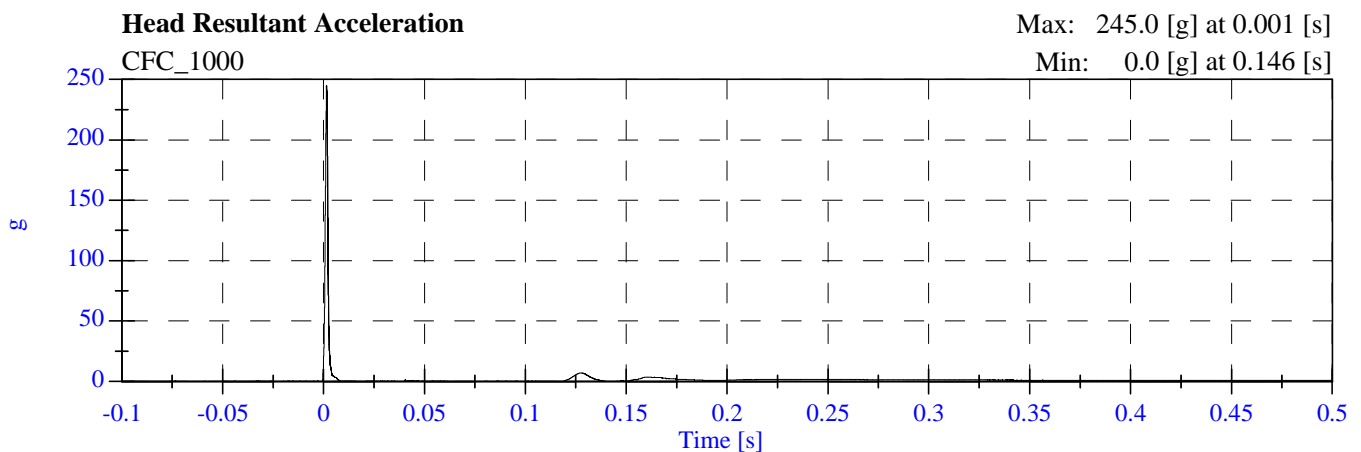
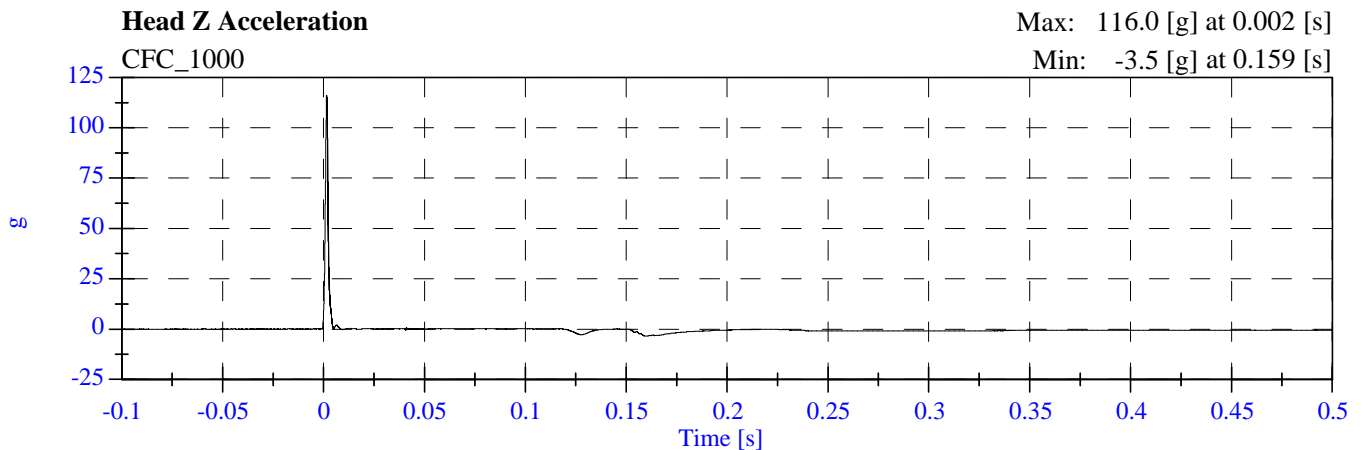
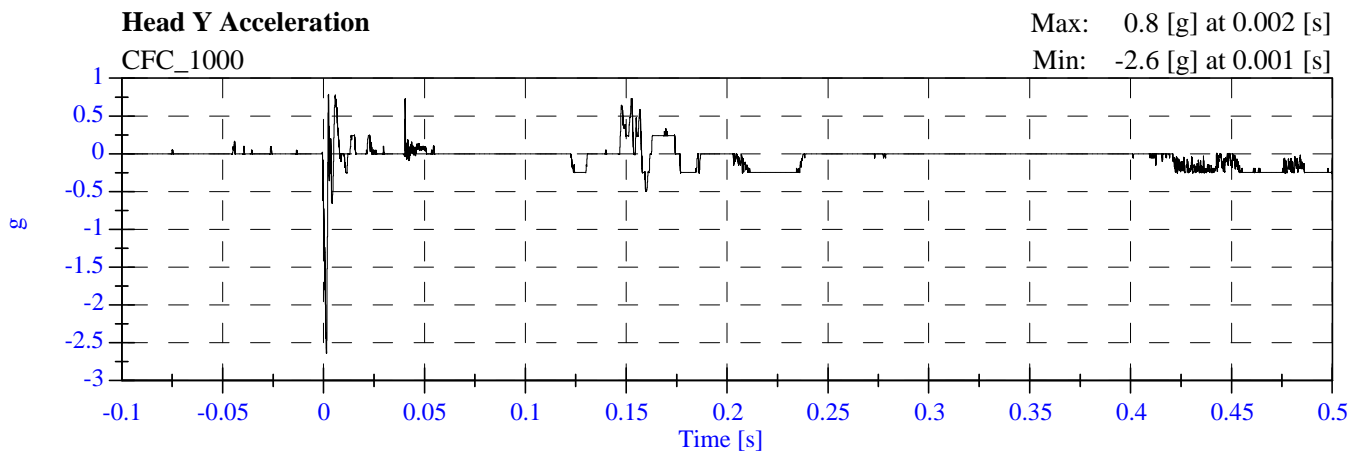
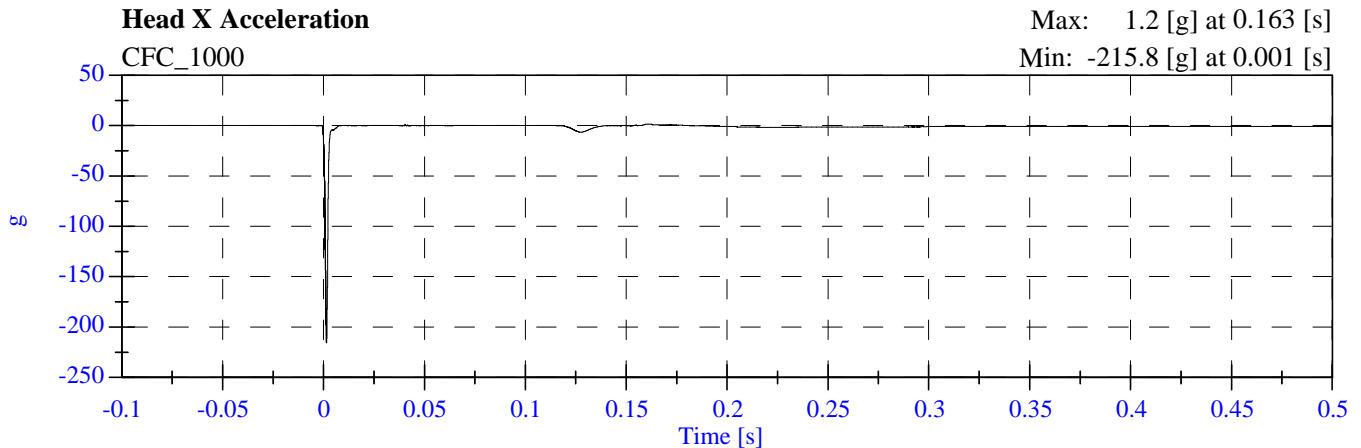
MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		805	
CALIBRATION DATE:		MARCH 4, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.2	
RELATIVE HUMIDITY	10% to 70%	23	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	245.0	
PEAK LATERAL ACCELERATION	15 Gs Maximum	2.6	
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	J41004	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J37496	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J41016	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops C80509 - March 04, 2008



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

MANUFACTURER:		DENTON ATD INC.	
SERIAL NUMBER:		0355	
CALIBRATION DATE:		MARCH 4, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.8	
RELATIVE HUMIDITY	10% to 70%	18	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	260.4	
PEAK LATERAL ACCELERATION	15 Gs Maximum	3.3	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

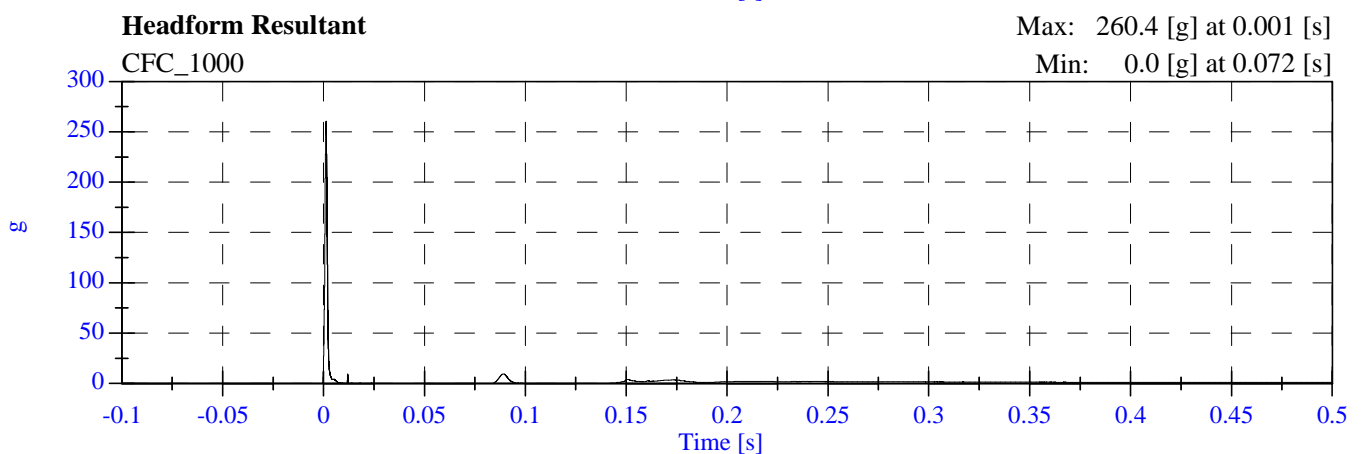
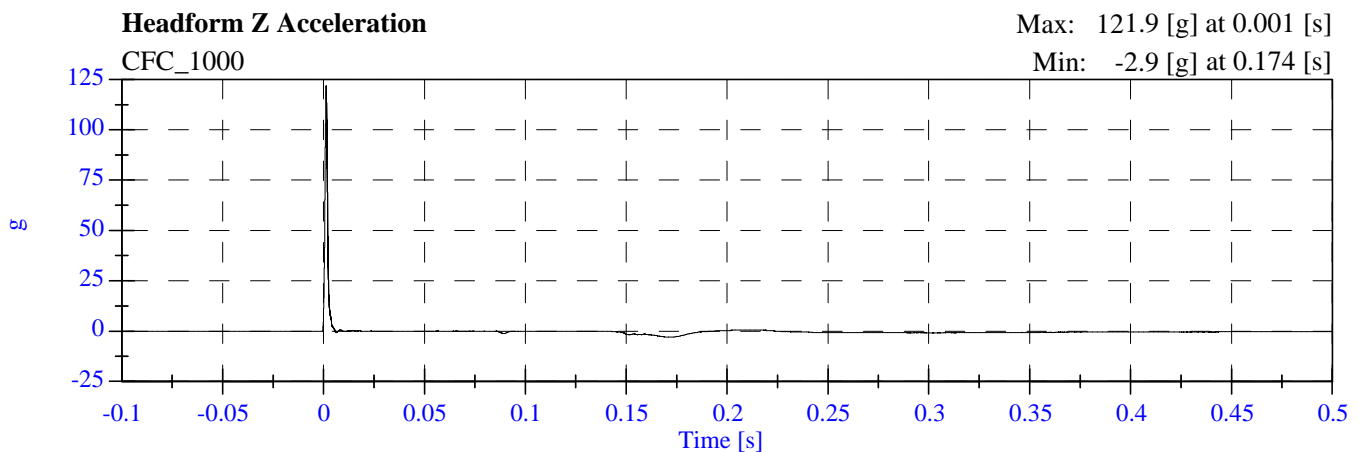
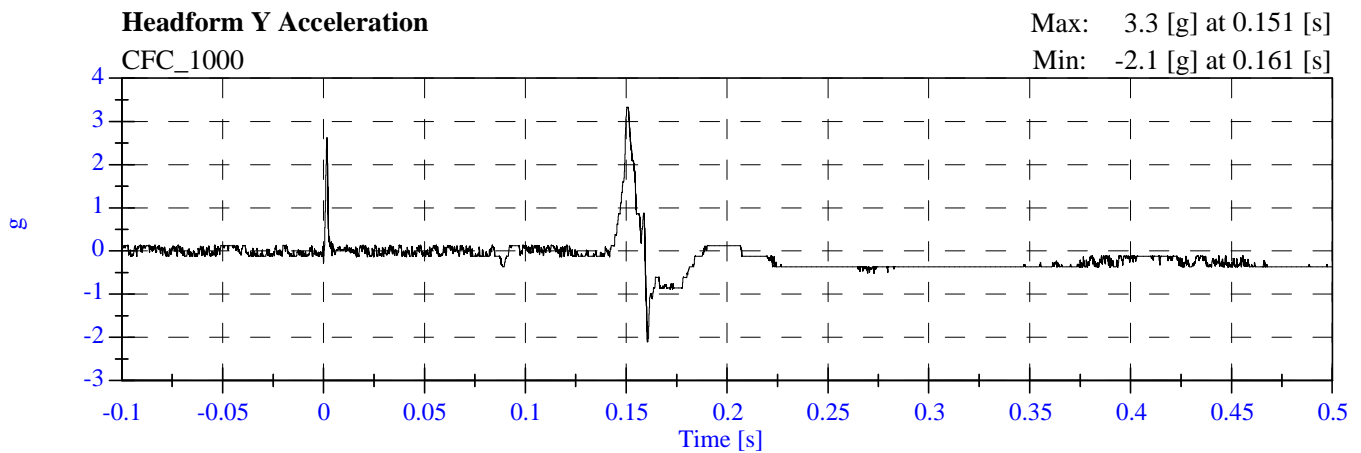
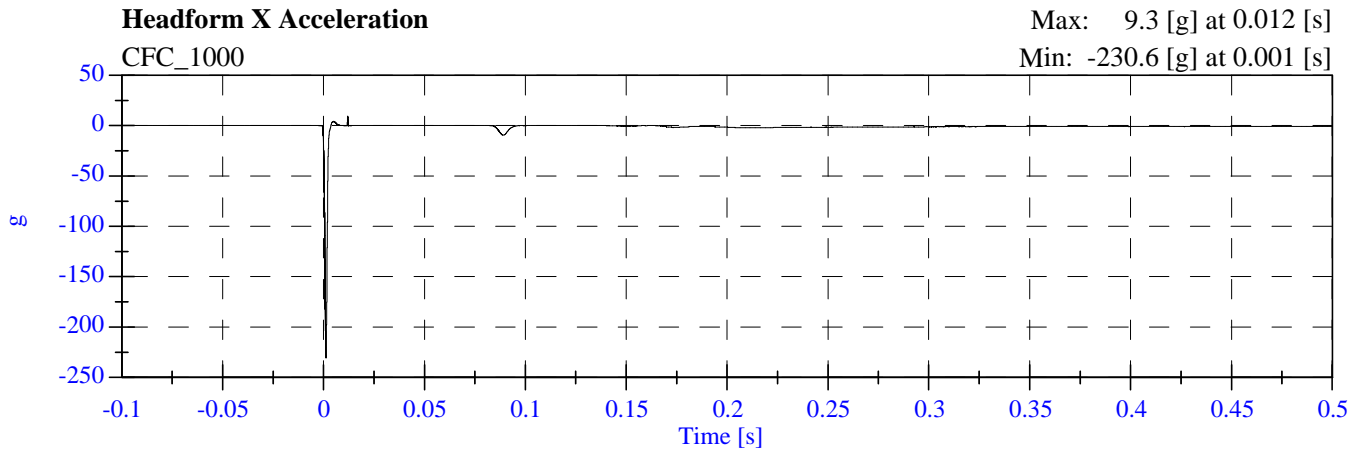
HEAD ACCELEROMETER CALIBRATION INFORMATION

I.D. NUMBER	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J28671	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J32779	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J25854	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops

C80509 - March 04, 2008



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

MANUFACTURER:		FIRST TECHNOLOGY SAFETY SYSTEMS	
SERIAL NUMBER:		1142	
CALIBRATION DATE:		MARCH 4, 2008	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	19°C to 26°C	22.8	
RELATIVE HUMIDITY	10% to 70%	18	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	257.7	
PEAK LATERAL ACCELERATION	15 Gs Maximum	2.7	
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	J41006	Jan. 18, 2008	June 18, 2008
2 - LATERAL	ENDEVCO	7264-2000T	J40994	Jan. 18, 2008	June 18, 2008
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	Jan. 18, 2008	June 18, 2008

REMARKS:

FMVSS 201U - Headform Calibration Drops

C80509 - March 04, 2008

