

REPORT NUMBER: 201UI-CAL-09-07

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

**HYUNDAI MOTOR COMPANY  
2009 HYUNDAI ELANTRA**

NHTSA NUMBER: C90506

CALSPAN TEST NUMBER: 8877-07

CALSPAN  
TRANSPORTATION SCIENCES CENTER  
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BUFFALO, NEW YORK 14225



Test Date: March 27, 2009

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Enforcement  
Office of Vehicle Safety Compliance  
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9/11/09

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15. <i>Supplementary Notes</i>					
16. <i>Abstract</i>  Compliance tests were conducted on the subject vehicle, a 2009 Hyundai Elantra, 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	-	-	-	-	-
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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 2009 Hyundai Elantra, NHTSA No. C90506, 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 2009 Hyundai Elantra, NHTSA No. C90506, was tested at various upper interior locations by a 4.54 kg 50<sup>th</sup> 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	URRP	SR3F	BP4	BP1
SR2A	AP3 PASS	AP1	OP2	BP2
URBP	AP3 DRIV			

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  $4.54 \pm 0.5$  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:	2009 Hyundai Elantra
VIN:	KMHU46DX9U626955
DATE OF MANUFACTURE:	11/08 (SEE CERTIFICATION LABEL)
COLOR:	Black

TARGET CODE	Target Coordinates						Approach Angles (degrees)		Velocity (kph)	FMH HIC	HIC(d) <sup>1</sup>
	Driver Side			Passenger Side			Horizontal	Vertical			
	X(mm)	Y(mm)	Z(mm)	X(mm)	Y(mm)	Z(mm)					
AP1	1128.622	-522.567	1086.624	1120.321	532.7739	1073.928	Relocated 2 circles		-	-	-
AP1 R2	1134.614	-535.551	1059.605	1129.257	548.6809	1053.997	120°	35°	18.41	599.5	618.7
AP2	1010.186	-575.023	998.4616	972.2473	587.4661	986.1355	-	-	-	-	-
AP3	837.1996	-609.843	919.1617	818.3272	619.573	911.415	134°	41°	23.65 <sup>2</sup>	1265	1121
							226°	41°	18.69	417.9	481.9
BP1	1617.756	-475.737	1150.738	1615.4839	478.3341	1152.242	90°	11°	18.51	377.3	451.1
BP2	1577.594	-600.454	886.0808	1581.3587	594.6337	907.9885	270°	6°	23.49	721.7	710.9
BP3 ANCHOR	1556.599	-589.707	926.7576	1558.4498	590.0232	927.7394	-	-	-	-	-
BP4	1638.15	-644.703	816.7549	1635.0336	644.3093	814.922	139°	-10°	23.47	437.9	496.7
FH1	1048.158	-409.338	1095.94	1054.9617	430.7782	1098.428	-	-	-	-	-
FH2	1031.601	-257.454	1103.124	1032.5624	281.3558	1105.784	-	-	-	-	-
OP1	2289.517	-452.188	1118.532	2290.498	450.111	1119.198	-	-	-	-	-
OP2	2386.885	-592.643	938.813	2386.655	591.349	938.621	270°	4°	23.55	316	404.8
RH	2324.867	-341.469	1120.918	2328.1567	340.8655	1119.356	-	-	-	-	-
RP1	2344.262	-506.721	1082.46	2351.0028	498.9418	1084.45	64°	20°	18.42	402.7	470.2
RP2	2351.914	-597.041	931.7459	2343.6198	594.5094	934.0485	-	-	-	-	-
SR1	1278.686	-486.197	1123.697	1274.737	487.2634	1111.493	-	-	-	-	-
SR2A	1429.016	-482.822	1145.716	1424.7582	475.726	1127.266	90°	41°	18.54	186.5	307.1
SR2B	1314.329	-485.573	1129.953	1311.5651	499.4016	1138.161	Relocated 2 circles		-	-	-
SR2B R2	-	-	-	1285.8584	483.0098	1114.486	-	-	-	-	-
SR3F	1943.344	-457.099	1133.452	1940.6133	460.8698	1131.92	90°	44°	18.32	238.6	346.4
SR3R	2098.174	-462.735	1121.135	2096.7796	470.4651	1117.315	-	-	-	-	-
URAP	1263.165	-363.456	1145.257	1268.5333	364.9305	1150.082	-	-	-	-	-
URBP	1615.102	-361.367	1179.836	1620.6215	358.3886	1181.808	270°	50°	23.39	726.8	714.8
URFSR	1431.591	-358.096	1186.073	1424.9197	369.4294	1183.357	-	-	-	-	-
URRP	2183.871	-376.799	1158.634	2202.1419	370.6945	1155.847	90°	50°	23.57	499.8	543.5
URRSR	1994.13	-372.87	1174.736	1980.5636	373.7705	1175.833	-	-	-	-	-

<sup>1</sup> HIC(d)=0.75446(Free Motion Headform HIC)+166.4    <sup>2</sup> Invalid test – Per S6.2(b)(2) to be impacted at any speed up to and including 19 km/hr



**DATA SHEET 2-2**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

<b>TEST VEHICLE INFORMATION:</b>									
Year/Make/Model/Body Style:				2009 Hyundai Elantra					
VIN:				KMHDU46DX9U626955					
Month & Year of Manufacture:				11/08 (SEE CERTIFICATION LABEL)					
Vehicle Body Color:				Black					
Engine Data:	4	Cylinders;	-	CID;	2.0	Liters;	-	cc	
Engine Placement:		x	Longitudinal;	or		-	Lateral		
Transmission:	5	Speed;	x	Manual;	-	Automatic;	-	Overdrive	
Final Drive:	-	Rear Wheel Drive;	x	Front Wheel Drive;	-	Four Wheel Drive			
Odometer Reading:		121	km						
Options:	x	A/C;	x	Power Steering;	x	Pwr.Brakes;	x	Pwr. Windows	
Interior Trim Information :									
1. Grab handles on front passenger side and on outside rear seating positions.									
2. Adjustable seat belt anchorages on both B-Pillars.									
3. Normal roof vehicle									

<b>DATA FROM TIRE PLACARD:</b>									
Tire Pressure (at capacity);				220		kPa FRONT			
				220		kPa REAR			
Recommended Tire Size:				P195/65R15					
Tires on Test Vehicle:		P195/65R15		Manufacturer:			Kumho		
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)=				385.0		kg (A)			
No. of Occupants x 68 kg. =				340.0		kg (B)			
Rated Cargo/Luggage Weight (RCLW) =				45.0		kg (A-B) Max. RCLW = 136 kg.			

**DATA SHEET 2-2**

**GENERAL TEST AND VEHICLE PARAMETER DATA (cont.)**

<b>TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:</b>							
Left Front	=	<b>409.0</b>	<b>kg</b>	Left Rear	=	<b>245.0</b>	<b>kg</b>
Right Front	=	<b>393.5</b>	<b>kg</b>	Right Rear	=	<b>244.5</b>	<b>kg</b>
TOTAL FRONT	=	<b>802.5</b>	<b>kg</b>	TOTAL REAR	=	<b>489.5</b>	<b>kg</b>
% of Total Weight	=	<b>62.1%</b>	<b>%</b>	% of Total Weight	=	<b>37.9%</b>	<b>%</b>
TOTAL WEIGHT	=	<b>1292.0</b>				<b>kg</b>	

<b>CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:</b>		
Total Test Vehicle Delivered Weight=	<b>1292.0</b>	kg (A)
+ Rated Cargo/Luggage Weight =	<b>45</b>	kg (B)
TEST VEHICLE TARGET WEIGHT =	<b>1337.0</b>	kg (A+B)

<b>WEIGHT OF TEST VEHICLE (FULLY LOADED):</b>							
Left Front	=	<b>410.0</b>	<b>kg</b>	Left Rear	=	<b>263.0</b>	<b>kg</b>
Right Front	=	<b>392.0</b>	<b>kg</b>	Right Rear	=	<b>267.0</b>	<b>kg</b>
TOTAL FRONT	=	<b>802.0</b>	<b>kg</b>	TOTAL REAR	=	<b>530.0</b>	<b>kg</b>
% of Total Weight	=	<b>60.2%</b>	<b>%</b>	% of Total Weight	=	<b>39.8%</b>	<b>%</b>
TOTAL TEST WEIGHT	=	<b>1332.0</b>					
Weight of vehicle secured in test vehicles cargo area	=	<b>40.0</b>				<b>kg</b>	

<b>TEST VEHICLE ATTITUDE (all dimensions in millimeters):</b>				
AS DELIVERED:	Left Front	<b>693</b>	Left Rear	<b>720</b>
	Right Front	<b>697</b>	Right Rear	<b>719</b>
FULLY LOADED:	Left Front	<b>692</b>	Left Rear	<b>708</b>
	Right Front	<b>695</b>	Right Rear	<b>708</b>
Test Vehicle Wheelbase:	<b>2650</b>		Millimeters	

<b>TEST VEHICLE PITCH AND ROLL ANGLES:</b>				
AS DELIVERED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	<b>↑1.1↓</b>	Front Bumper	<b>0.0</b>
	Right Door Sill	<b>↓1.0↑</b>	Rear Bumper	<b>0.0</b>
FULLY LOADED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	<b>↑0.8↓</b>	Front Bumper	<b>0.0</b>
	Right Door Sill	<b>↓0.8↑</b>	Rear Bumper	<b>0.0</b>
AS TESTED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	<b>↑1.0↓</b>	Front Bumper	<b>0.0</b>
	Right Door Sill	<b>↓0.9↑</b>	Rear Bumper	<b>0.0</b>

DATA SHEET 2-3

APPROACH ANGLE LIMITS

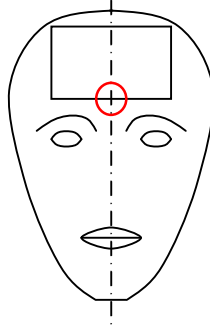
Target Code	Left Side				Target Code	Right Side			
	Horizontal Angles (deg.)		Vertical Angles (deg.)			Horizontal Angles (deg.)		Vertical Angles (deg.)	
	Minimum	Maximum	Minimum	Maximum		Minimum	Maximum	Minimum	Maximum
AP1	203	250	-5	35	AP1	110	157	-5	35
AP2	203	250	-5	38	AP2	110	157	-5	38
AP3	203	250	-5	41	AP3	110	157	-5	41
BP1	201	286	-10	11	BP1	74	159	-10	11
BP2	ANY		0	6	BP2	ANY		0	6
BP3	201	286	-10	0	BP3	74	159	-10	0
BP4	201	286	-10	-10	BP4	74	159	-10	-10
OP1	270		-10	32	OP1	90		-10	32
OP2	270		-10	4	OP2	90		-10	4
RP1	270	345	-10	20	RP1	15	90	-10	20
RP2	270	345	-10	17	RP2	15	90	-10	17
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	42	SR1	90		0	42
SR2A	270		0	41	SR2A	90		0	41
SR2B	270		0	41	SR2B	90		0	41
SR3F	270		0	44	SR3F	90		0	44
SR3R	270		0	44	SR3R	90		0	44
URAP	ANY		0	50	URAP	ANY		0	50
URBP	ANY		0	50	URBP	ANY		0	50
URFSR	ANY		0	50	URFSR	ANY		0	50
URRSR	ANY		0	50	URRSR	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:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black



ã RIGHT SIDE OF FACE

TARGET	Distance Above Point 0 (mm)	Distance Over From Pt. O (mm)
RP1	35	1L
URRP	31	14R
SR3F	29	2R
BP4	21	14L
BP1	40	0
SR2A	36	5R
AP3 PASS	16	5L
AP1	13	8R
OP2	26	0
BP2	5	0
URBP	54	5L
AP3 DRIV	26	5L

**SECTION 3**

**SUMMARY OF TEST RESULTS AND DATA PLOTS**

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	01
Test Date:	03/26/09
Target Location:	REAR PILLAR
Target Code:	RP1
Horizontal Impact Angle:	64°
Vertical Impact Angle:	20°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	9:30
Headform Number:	1142

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	1	<input type="checkbox"/>	mm right	<input checked="" type="checkbox"/>	mm left
On Centerline	35				mm up



POST-IMPACT RP1 HEADFORM

Free Motion HIC	402.7
HIC(d)	470.2
Impact Velocity (kph)	18.42
HIC T1 (msec)	4.0
HIC T2 (msec)	11.3

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - RP1

FMH Headform 1142

Location: RP1

Test Date: March 26, 2009

Work File: RP1

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 470.2

Lab Humidity: 24 %

HIC (36ms): 402.7

Velocity at Impact: 18.42 KPH

t1: 4.0 msec

t2: 11.3 msec

Free Flight Distance: 215.03 mm

Duration: 7.2 msec

Average Acceleration: 7.7 g

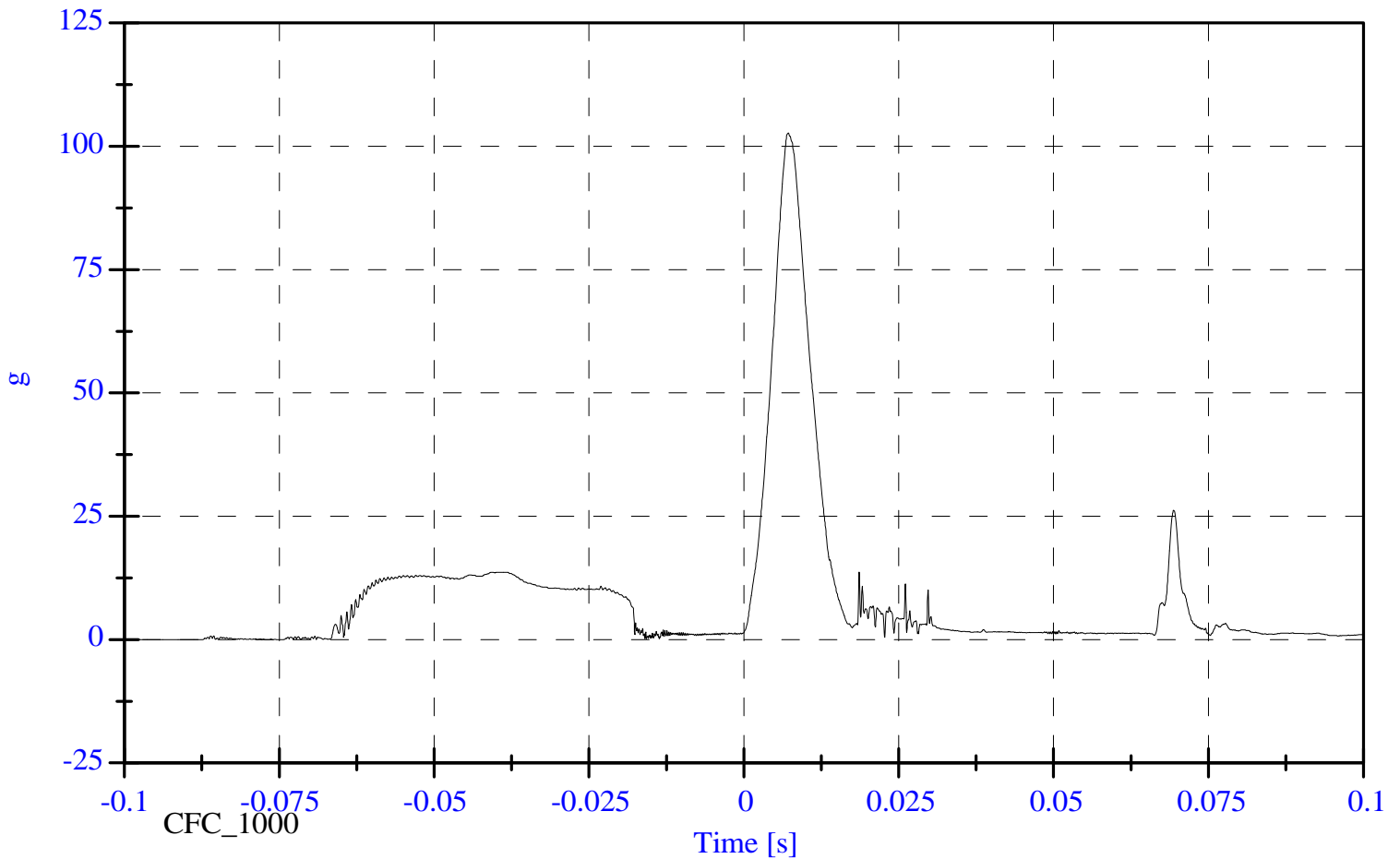
Maximum: 102.7 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 102.7 [g] at 0.007 [s]

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



FMVSS 201U 09 HYUNDAI ELANTRA

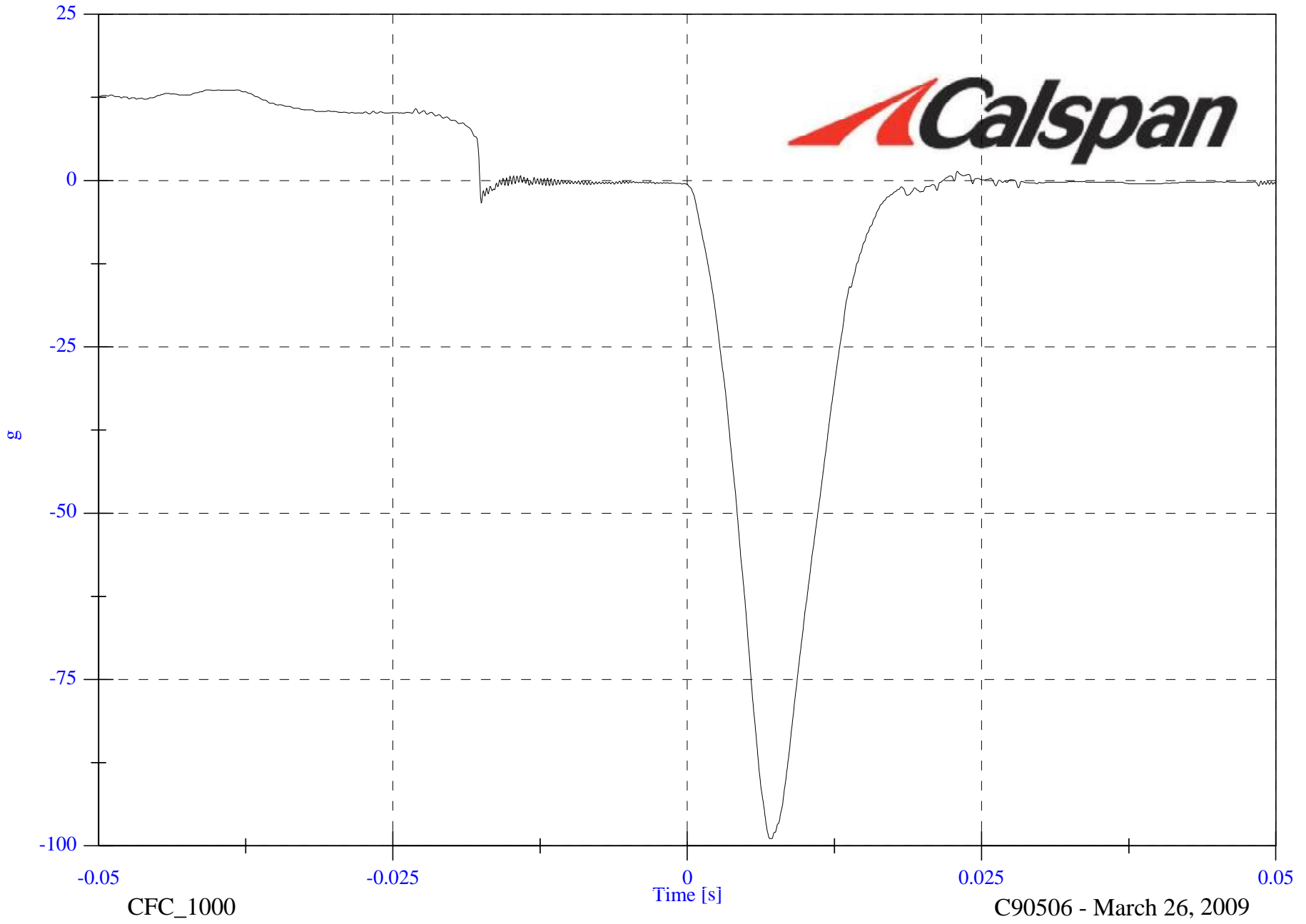
Headform X Acceleration

Max: 13.6 [g] at -0.038 [s]

Min: -98.9 [g] at 0.007 [s]



C90506 PASSENGER SIDE RPI IMPACT PLOT #1





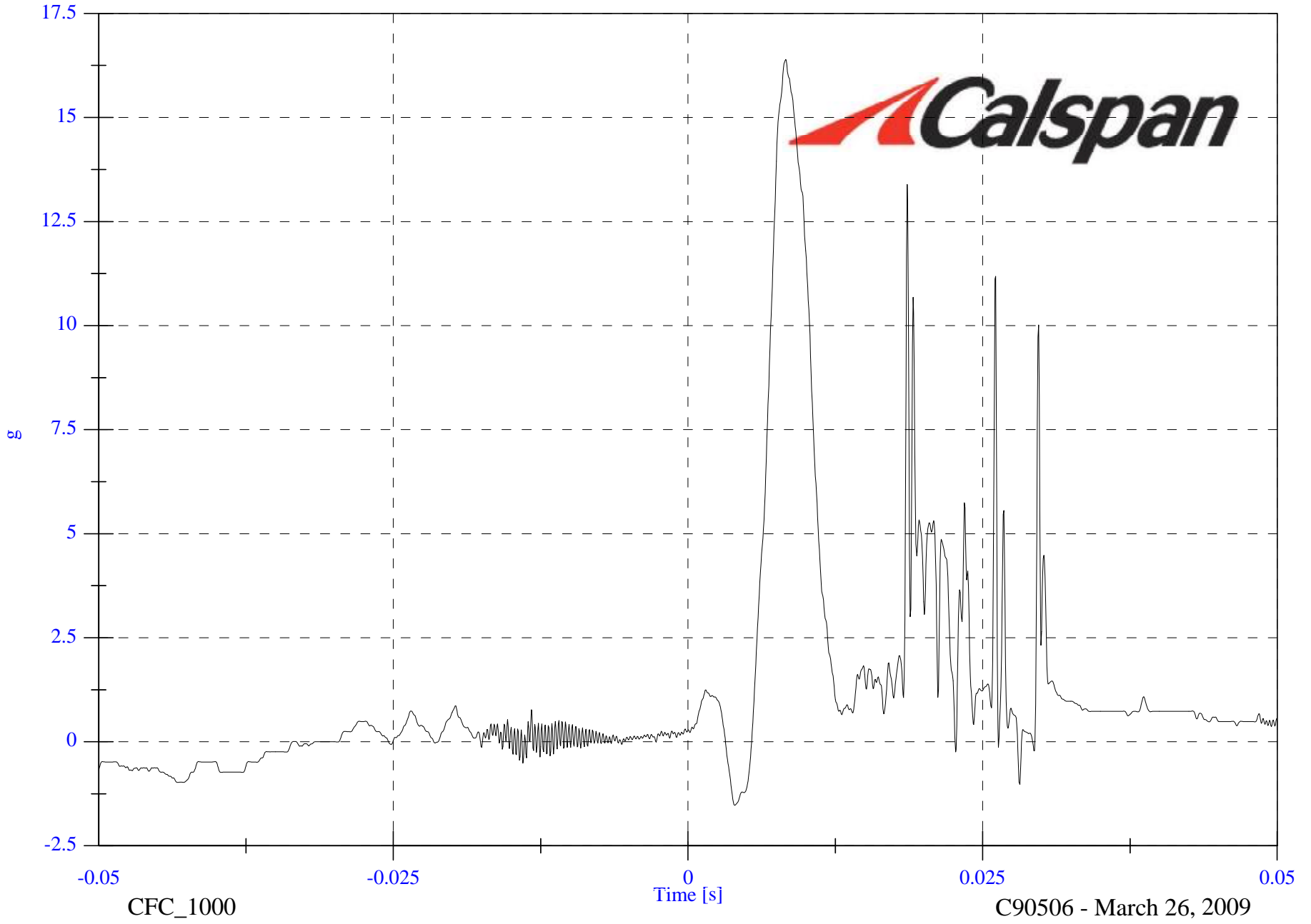
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 16.4 [g] at 0.008 [s]

Min: -1.5 [g] at 0.004 [s]

C90506 PASSENGER SIDE RPI IMPACT PLOT #2



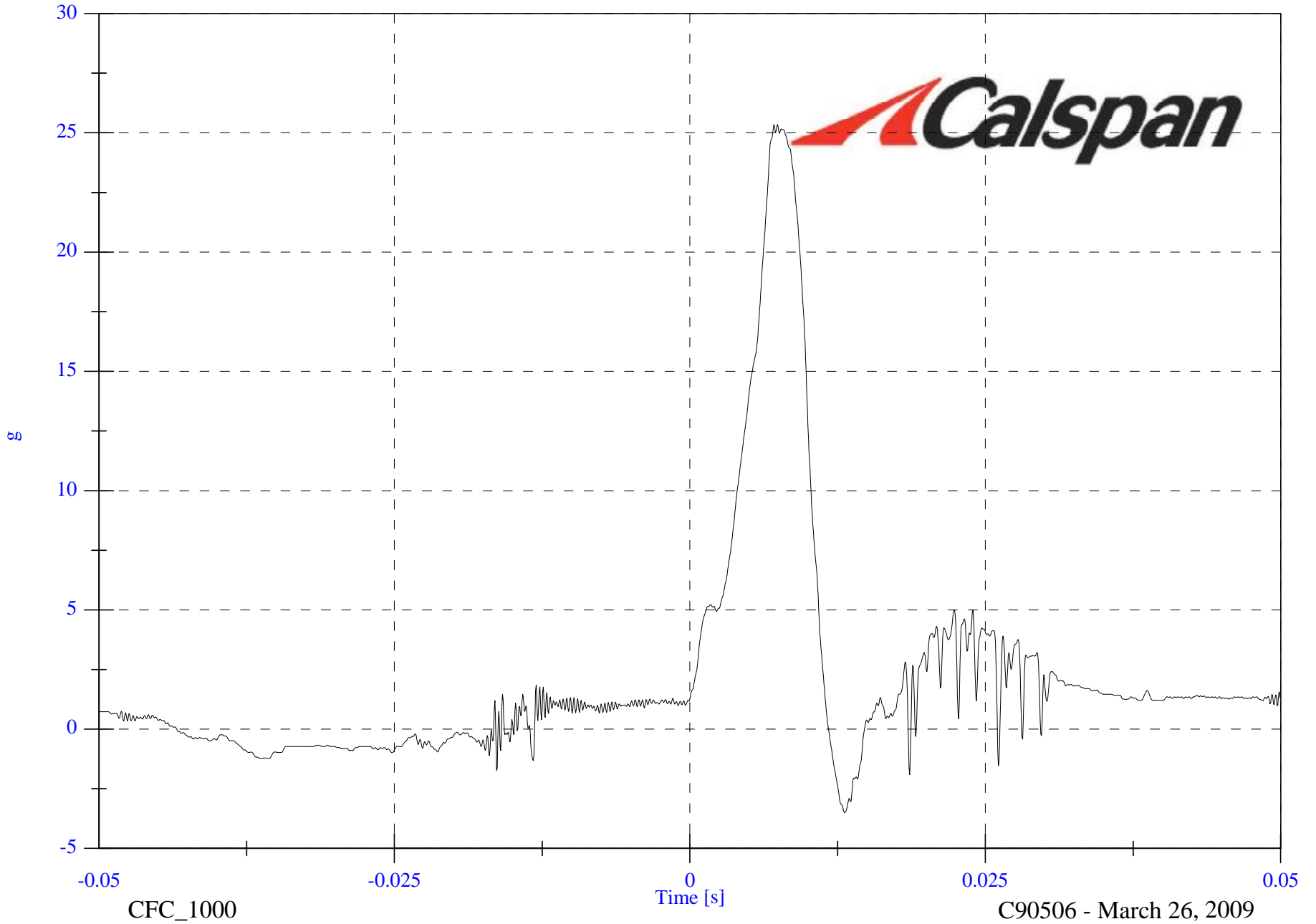
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 25.3 [g] at 0.007 [s]

Min: -3.5 [g] at 0.013 [s]

C90506 PASSENGER SIDE RPI IMPACT PLOT #3



CFC\_1000

C90506 - March 26, 2009

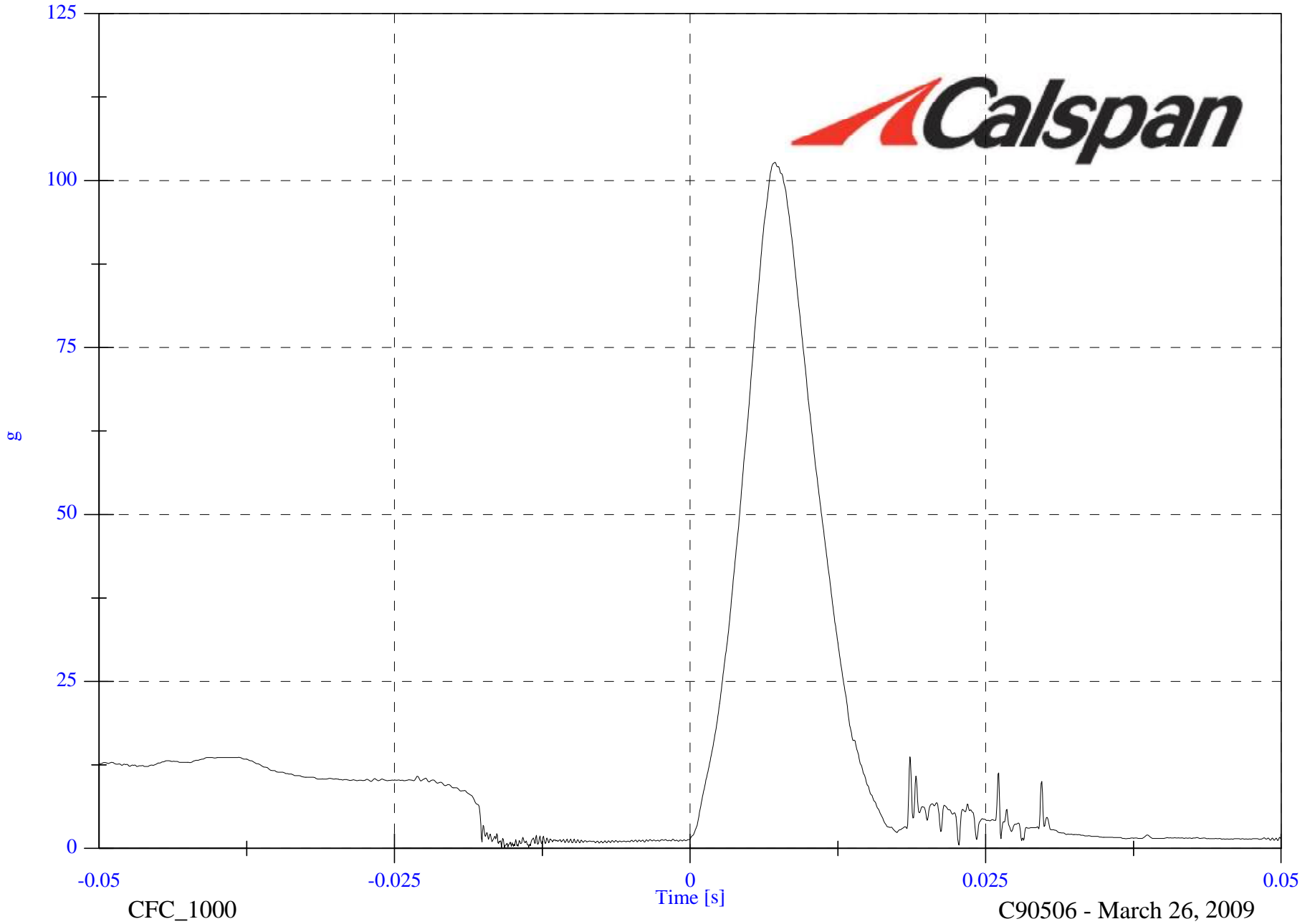
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 102.7 [g] at 0.007 [s]

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

C90506 PASSENGER SIDE RPI IMPACT PLOT #4



C90506 - March 26, 2009

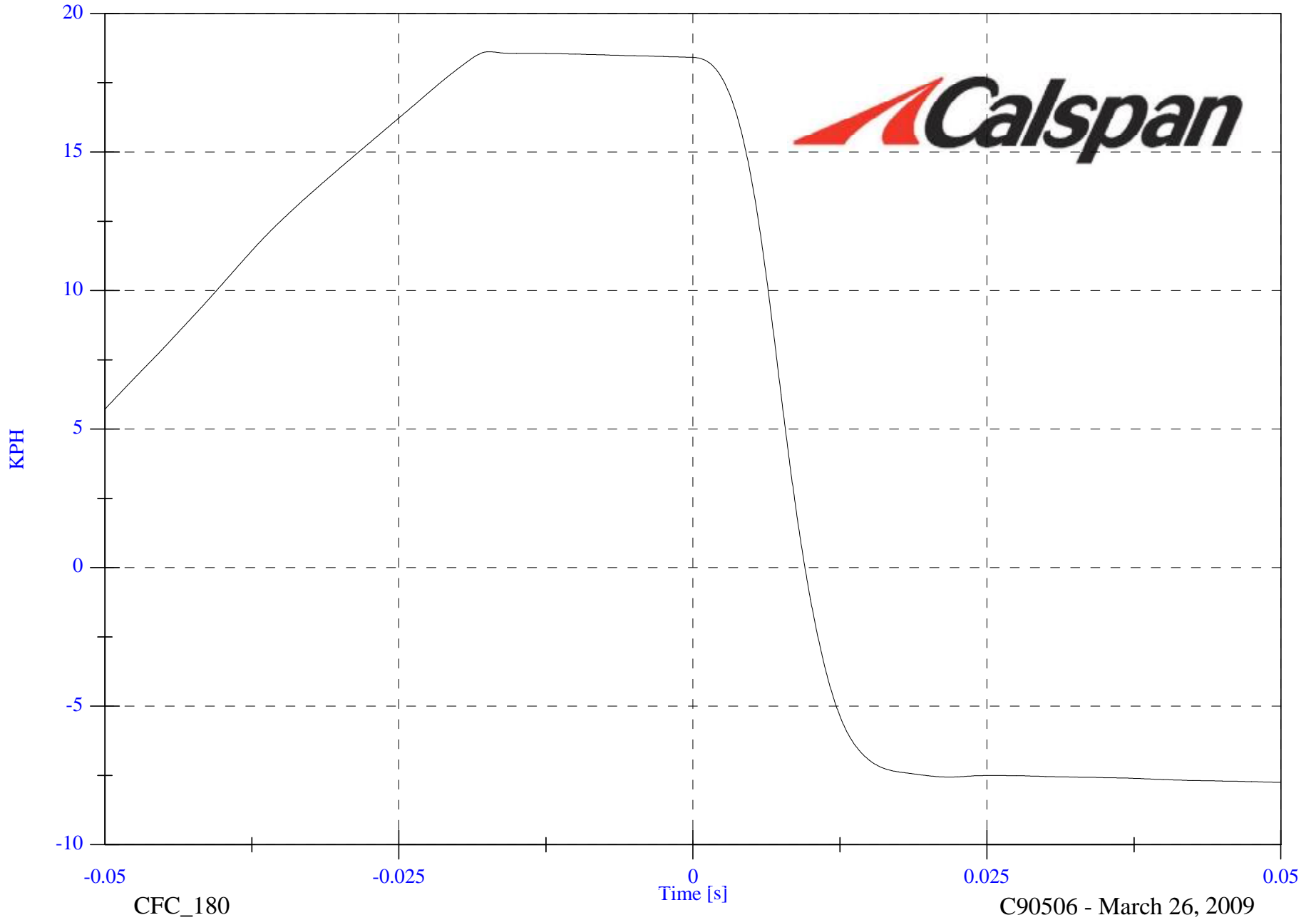
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 18.6 [KPH] at -0.017 [s]

Min: -7.8 [KPH] at 0.050 [s]

Headform Velocity

C90506 PASSENGER SIDE RPI IMPACT PLOT #5



CFC\_180

C90506 - March 26, 2009



PRE-IMPACT RPI



POST-IMPACT RPI

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	02
Test Date:	03/26/09
Target Location:	UPPER ROOF
Target Code:	URRP
Horizontal Impact Angle:	90°
Vertical Impact Angle:	50°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	9:58
Headform Number:	1140

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	31				mm up



POST-IMPACT URRP HEADFORM

Free Motion HIC	499.8
HIC(d)	543.5
Impact Velocity (kph)	23.57
HIC T1 (msec)	6.7
HIC T2 (msec)	14.3

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - URRP

FMH Headform 1140

Location: URRP

Test Date: March 26, 2009

Work File: URRP

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 543.5

Lab Humidity: 24 %

HIC (36ms): 499.8

Velocity at Impact: 23.57 KPH

t1: 6.7 msec

t2: 14.3 msec

Free Flight Distance: 219.72 mm

Duration: 7.6 msec

Average Acceleration: 9.6 g

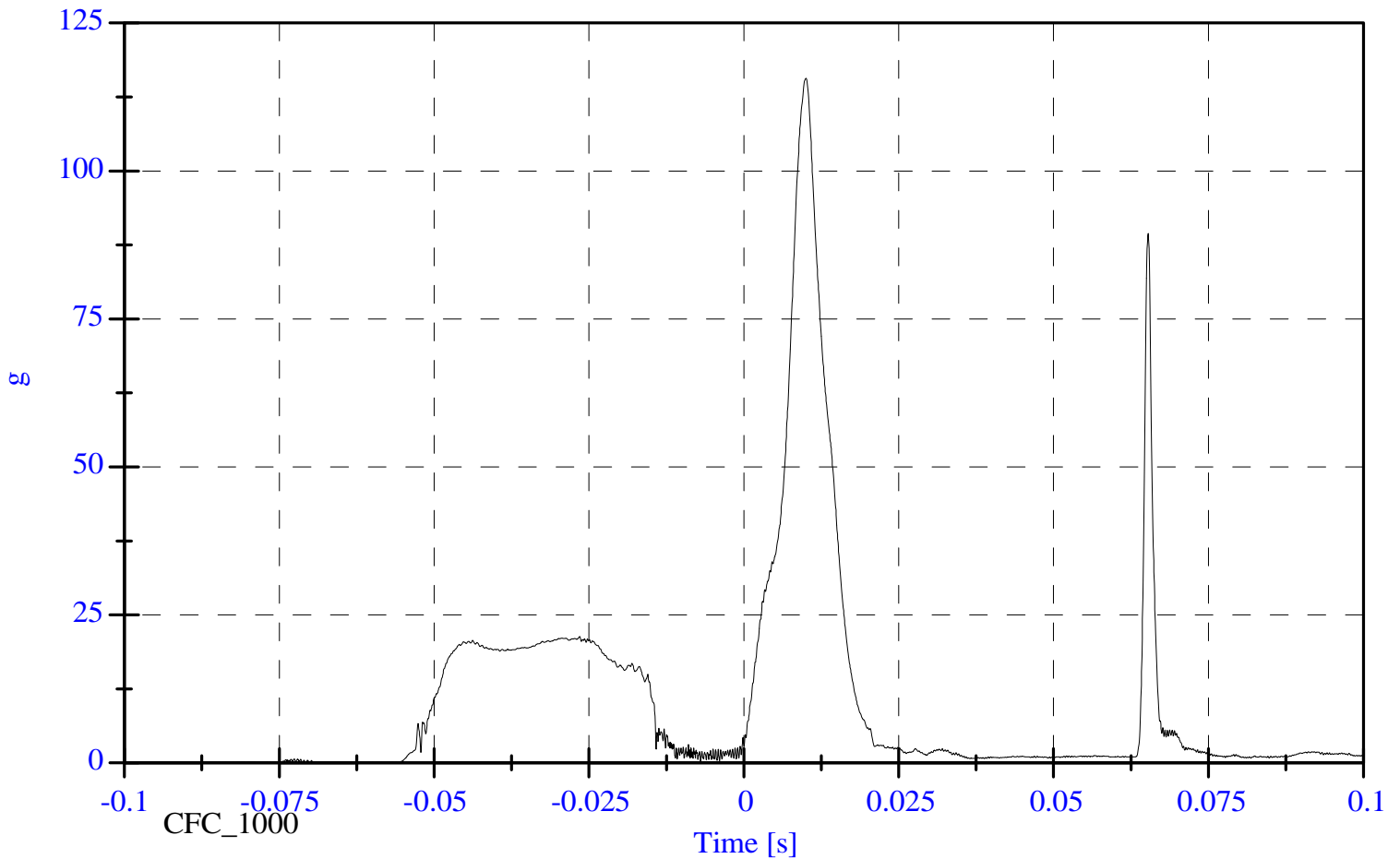
Maximum: 115.7 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 115.7 [g] at 0.010 [s]

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





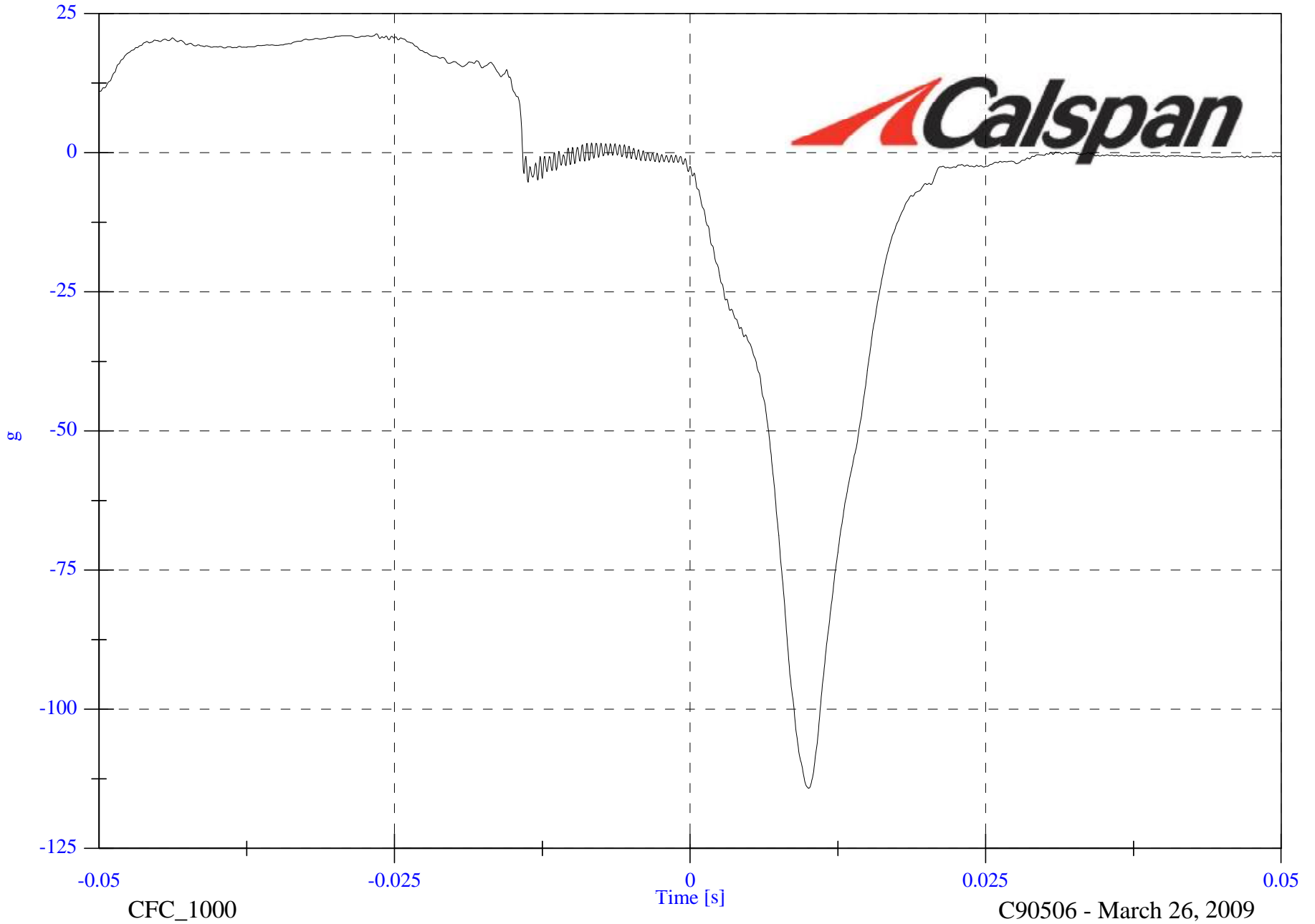
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 21.3 [g] at -0.027 [s]

Headform X Acceleration

Min: -114.2 [g] at 0.010 [s]

C90506 PASSENGER SIDE URRP IMPACT PLOT #1



CFC\_1000

C90506 - March 26, 2009

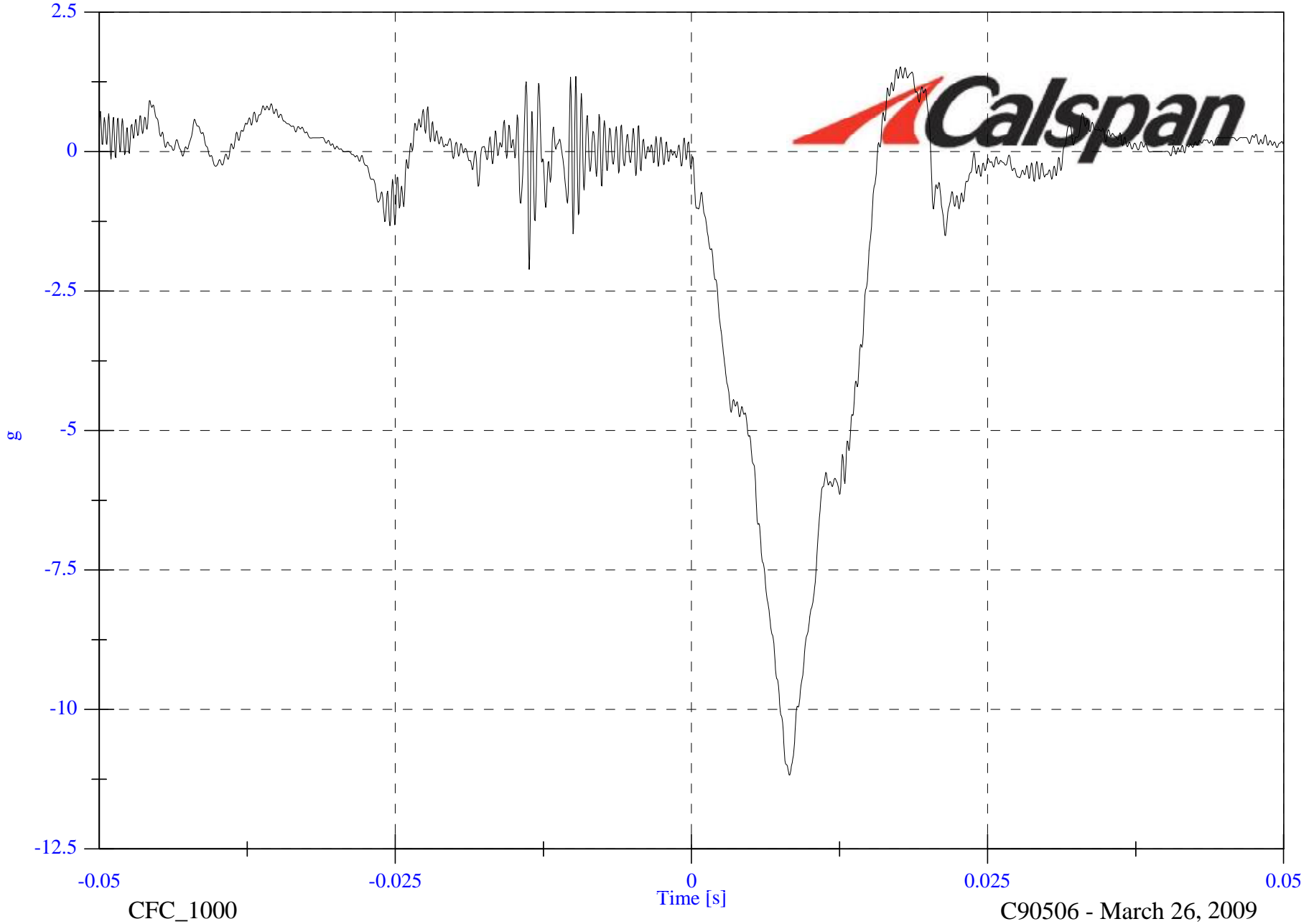
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 1.5 [g] at 0.018 [s]

Min: -11.2 [g] at 0.008 [s]

C90506 PASSENGER SIDE URRP IMPACT PLOT #2



C90506 - March 26, 2009

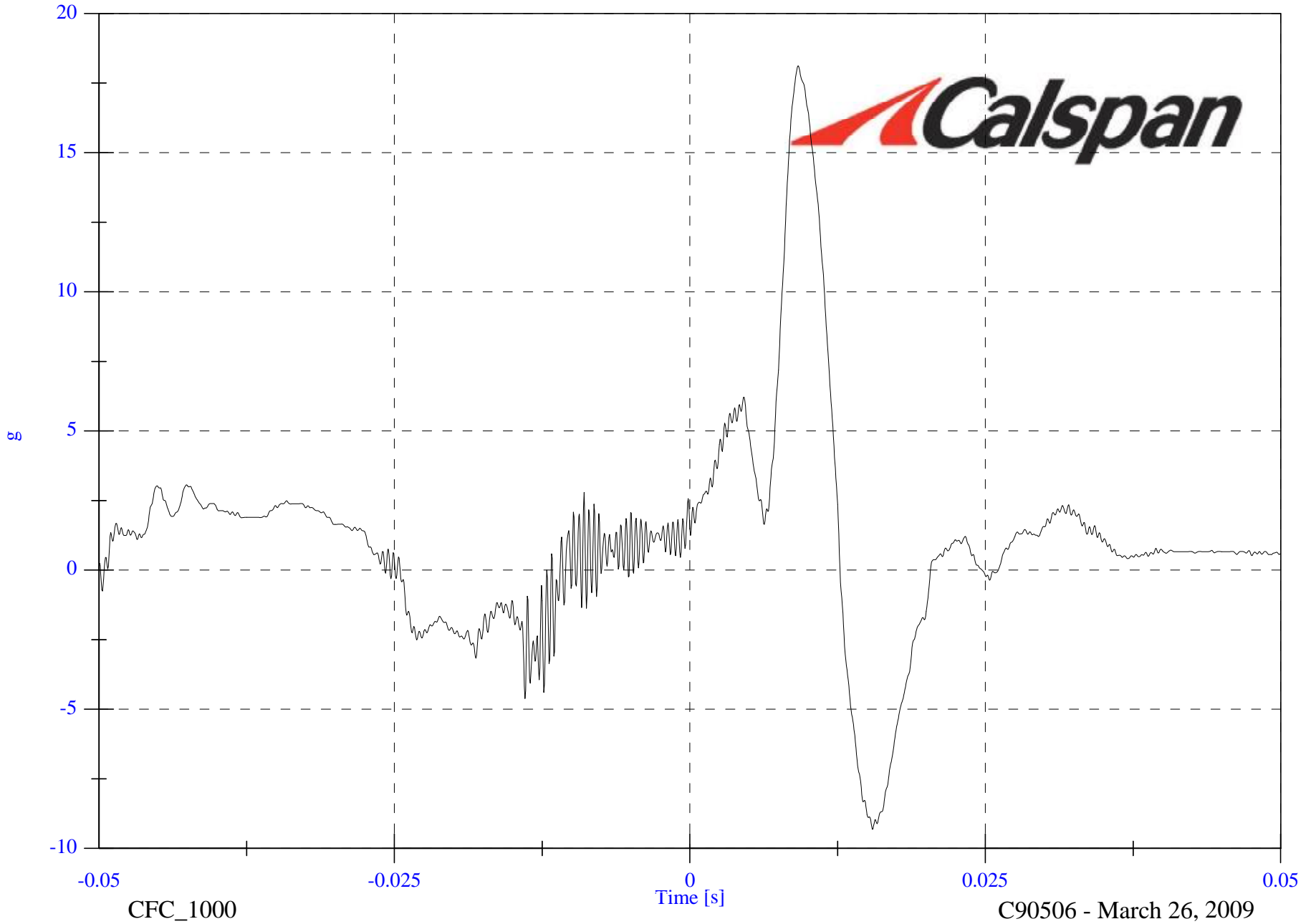
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 18.1 [g] at 0.009 [s]

Min: -9.3 [g] at 0.015 [s]

C90506 PASSENGER SIDE URRP IMPACT PLOT #3



CFC\_1000

C90506 - March 26, 2009

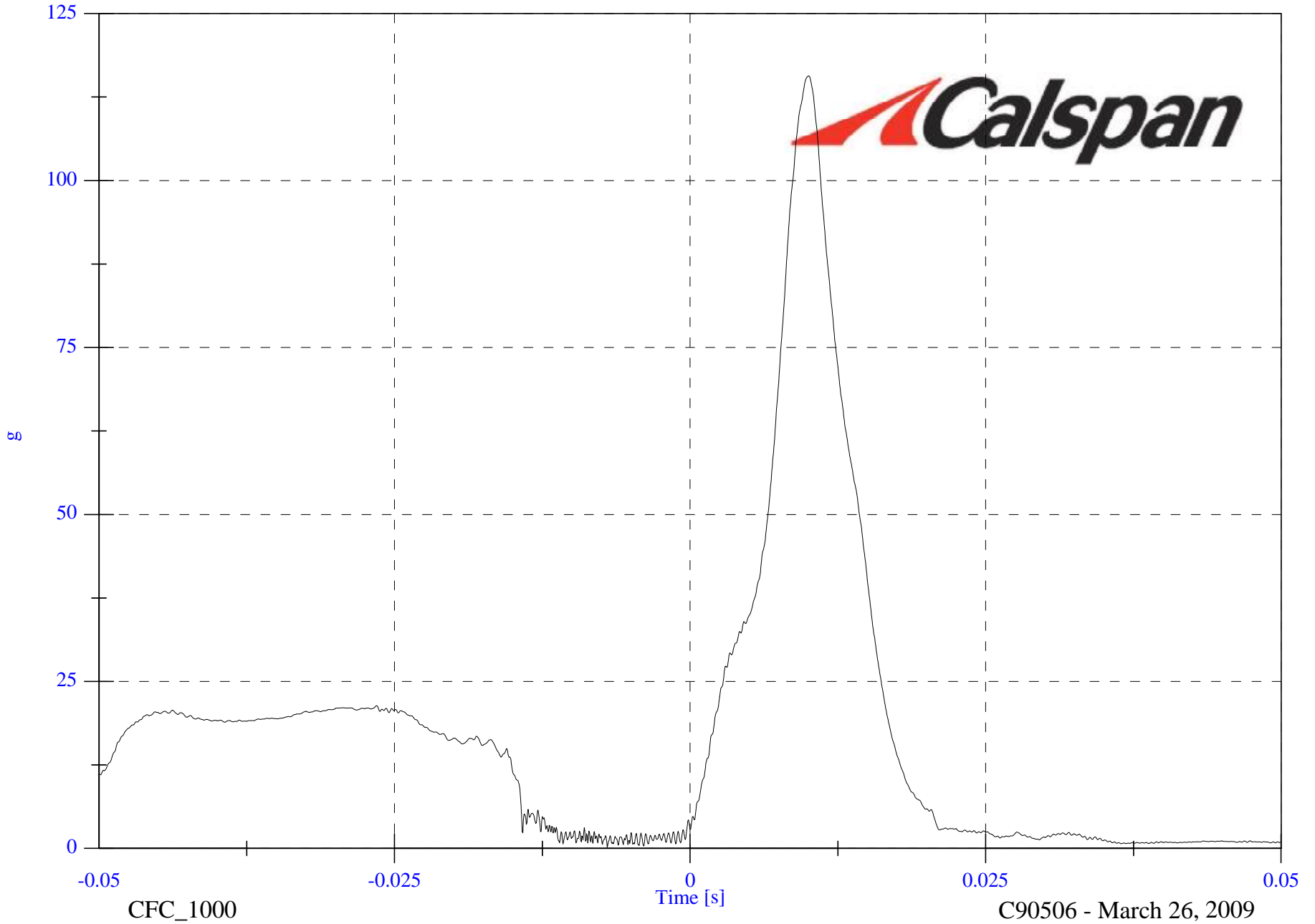
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 115.7 [g] at 0.010 [s]

Min: 0.2 [g] at -0.007 [s]

C90506 PASSENGER SIDE URRP IMPACT PLOT #4



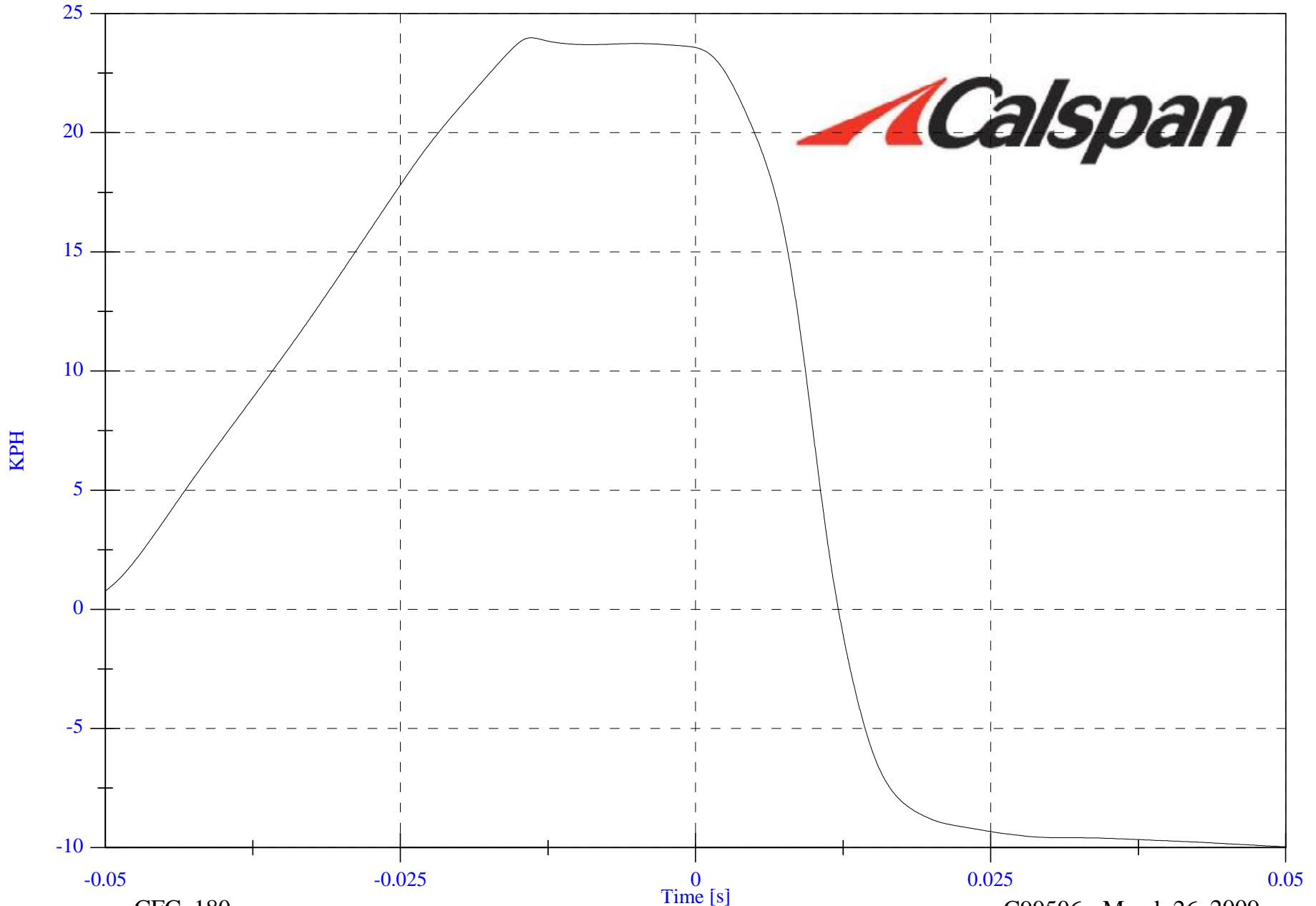
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 24.0 [KPH] at -0.014 [s]

Min: -10.0 [KPH] at 0.050 [s]

Headform Velocity

C90506 PASSENGER SIDE URRP IMPACT PLOT #5



CFC\_180

C90506 - March 26, 2009



PRE-IMPACT URRP



POST-IMPACT URRP

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMHDU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	03
Test Date:	03/26/09
Target Location:	SIDE RAIL
Target Code:	SR3F
Horizontal Impact Angle:	90°
Vertical Impact Angle:	44°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	10:20
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	2	<input checked="" type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	29				mm up



POST-IMPACT SR3F HEADFORM

Free Motion HIC	238.6
HIC(d)	346.4
Impact Velocity (kph)	18.32
HIC T1 (msec)	2.2
HIC T2 (msec)	14.1



# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - SR3F

FMH Headform 0355

Location: SR3F

Test Date: March 26, 2009

Work File: SR3F

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 346.4

Lab Humidity: 24 %

HIC (36ms): 238.6

Velocity at Impact: 18.32 KPH

t1: 2.2 msec

t2: 14.1 msec

Free Flight Distance: 222.07 mm

Duration: 11.9 msec

Average Acceleration: 6.8 g

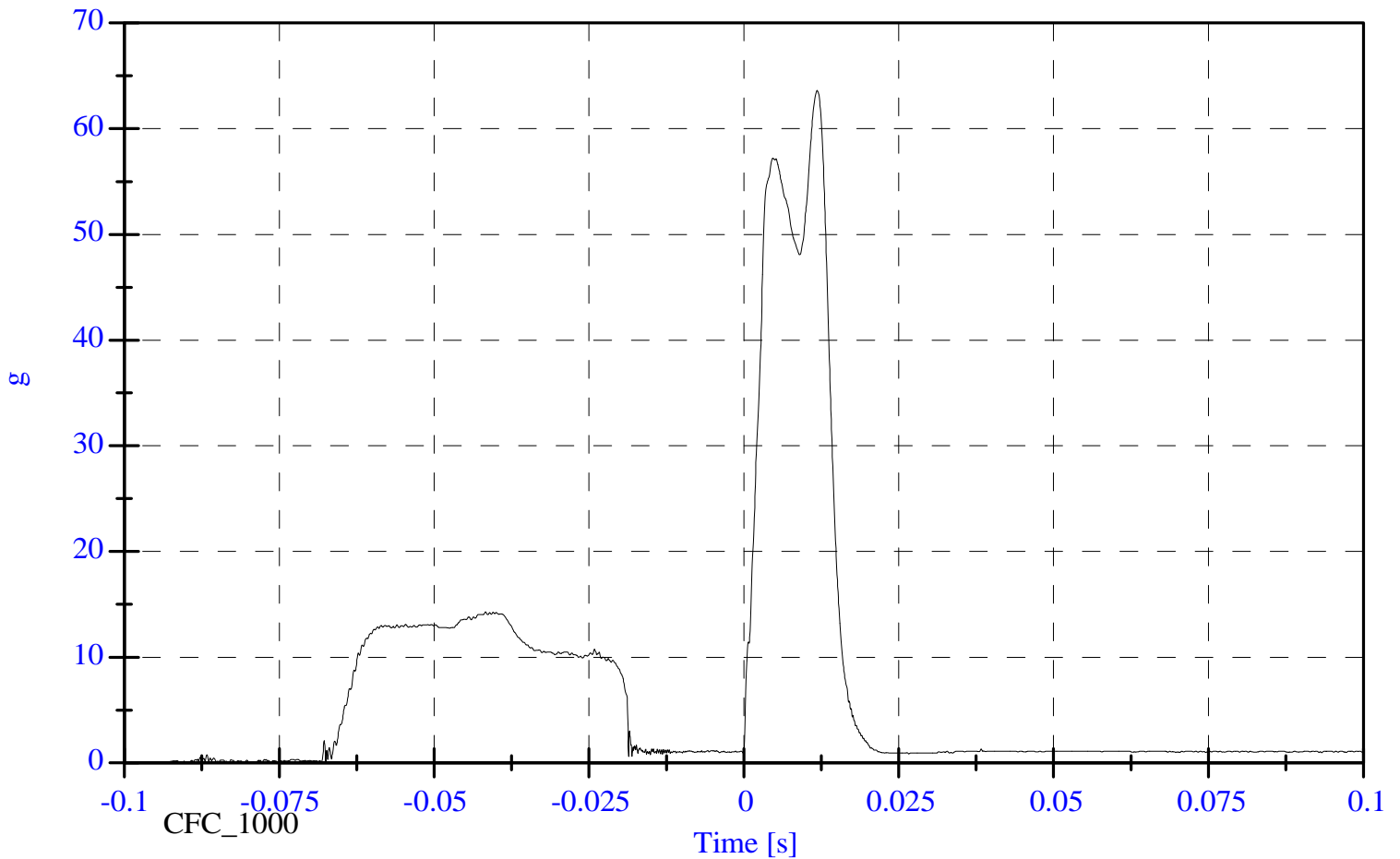
Maximum: 63.6 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 63.6 [g] at 0.012 [s]

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



FMVSS 201U 09 HYUNDAI ELANTRA

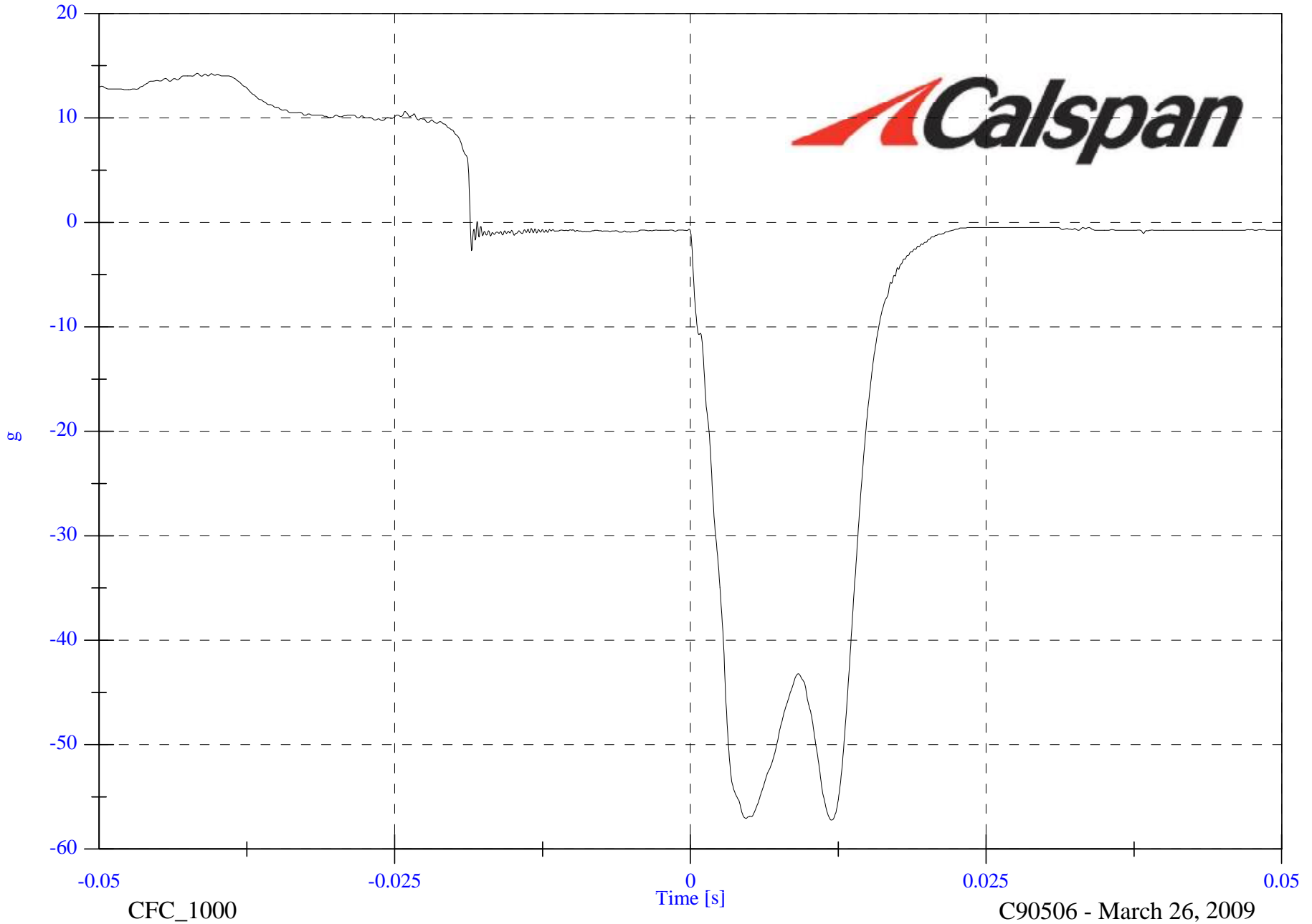
Max: 14.3 [g] at -0.042 [s]

Headform X Acceleration

Min: -57.2 [g] at 0.012 [s]



C90506 PASSENGER SIDE SR3F IMPACT PLOT #1



CFC\_1000

C90506 - March 26, 2009

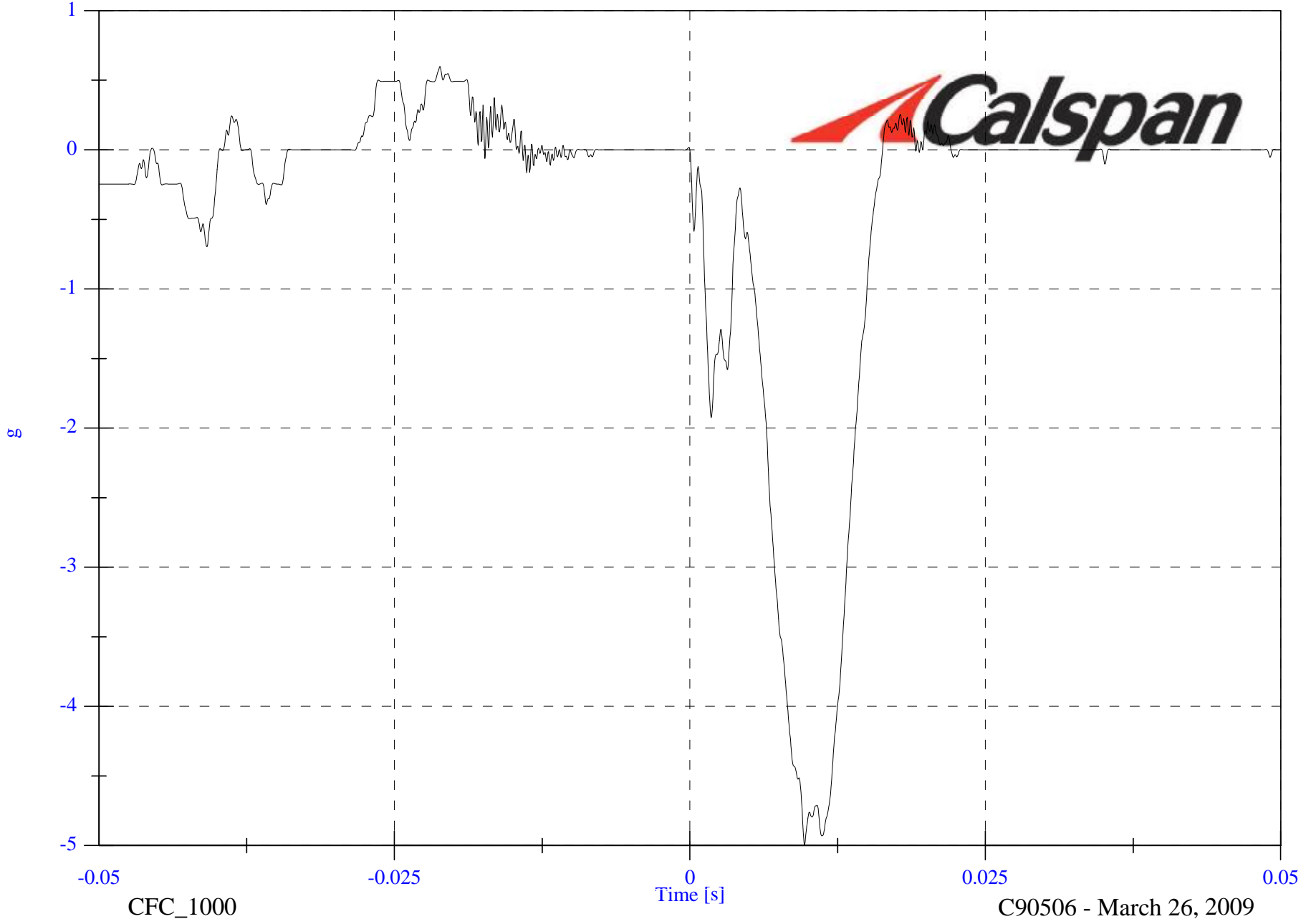
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 0.6 [g] at -0.021 [s]

Min: -5.0 [g] at 0.010 [s]

C90506 PASSENGER SIDE SR3F IMPACT PLOT #2



CFC\_1000

C90506 - March 26, 2009

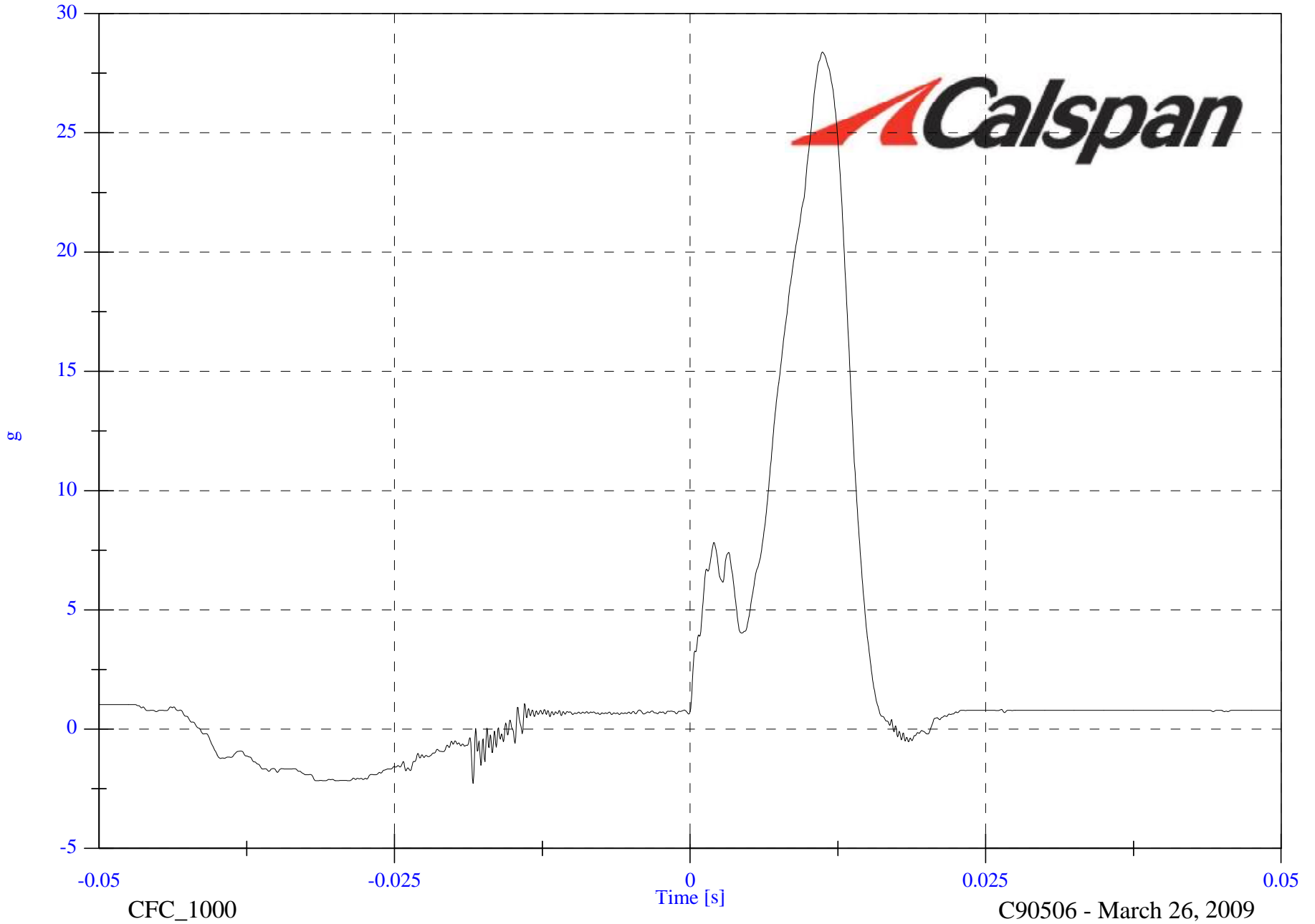
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 28.4 [g] at 0.011 [s]

Min: -2.3 [g] at -0.018 [s]

C90506 PASSENGER SIDE SR3F IMPACT PLOT #3



C90506 - March 26, 2009

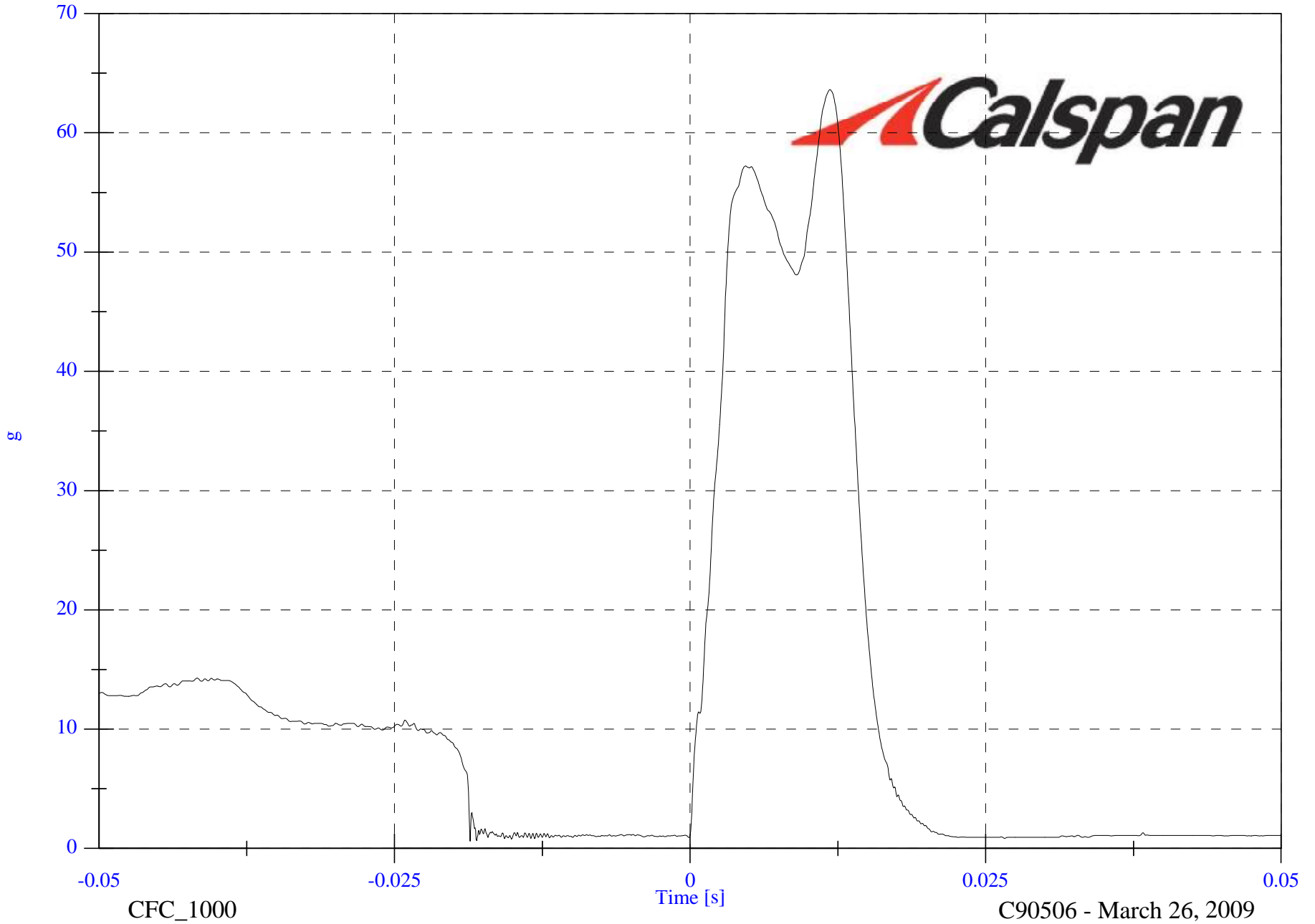
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 63.6 [g] at 0.012 [s]

Min: 0.6 [g] at -0.019 [s]

C90506 PASSENGER SIDE SR3F IMPACT PLOT #4



CFC\_1000

C90506 - March 26, 2009

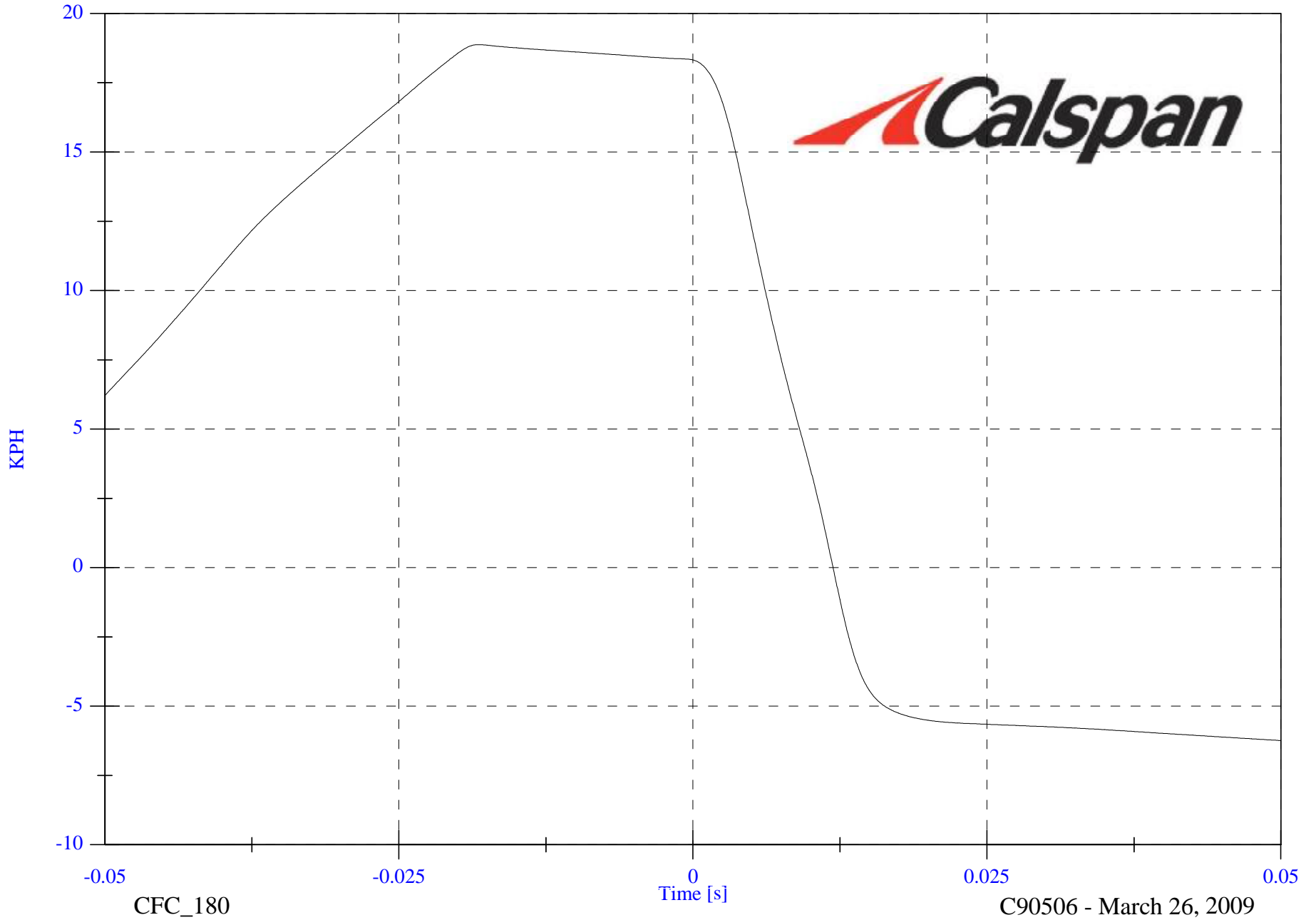
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 18.9 [KPH] at -0.018 [s]

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

Headform Velocity

C90506 PASSENGER SIDE SR3F IMPACT PLOT #5



CFC\_180

C90506 - March 26, 2009



PRE-IMPACT SR3F



POST-IMPACT SR3F



VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMHDU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	04
Test Date:	03/26/09
Target Location:	B-PILLAR
Target Code:	BP4
Horizontal Impact Angle:	139°
Vertical Impact Angle:	-10°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	10:50
Headform Number:	0805

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	14	<input type="checkbox"/>	mm right <input checked="" type="checkbox"/> mm left
On Centerline	21		mm up



POST-IMPACT BP4 HEADFORM

Free Motion HIC	437.9
HIC(d)	496.7
Impact Velocity (kph)	23.47
HIC T1 (msec)	0.9
HIC T2 (msec)	13.3

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - BP4

FMH Headform 0805

Location: BP4

Test Date: March 26, 2009

Work File: BP4

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 496.7

Lab Humidity: 24 %

HIC (36ms): 437.9

Velocity at Impact: 23.47 KPH

t1: 0.9 msec

t2: 13.2 msec

Free Flight Distance: 221.51 mm

Duration: 12.3 msec

Average Acceleration: 10.0 g

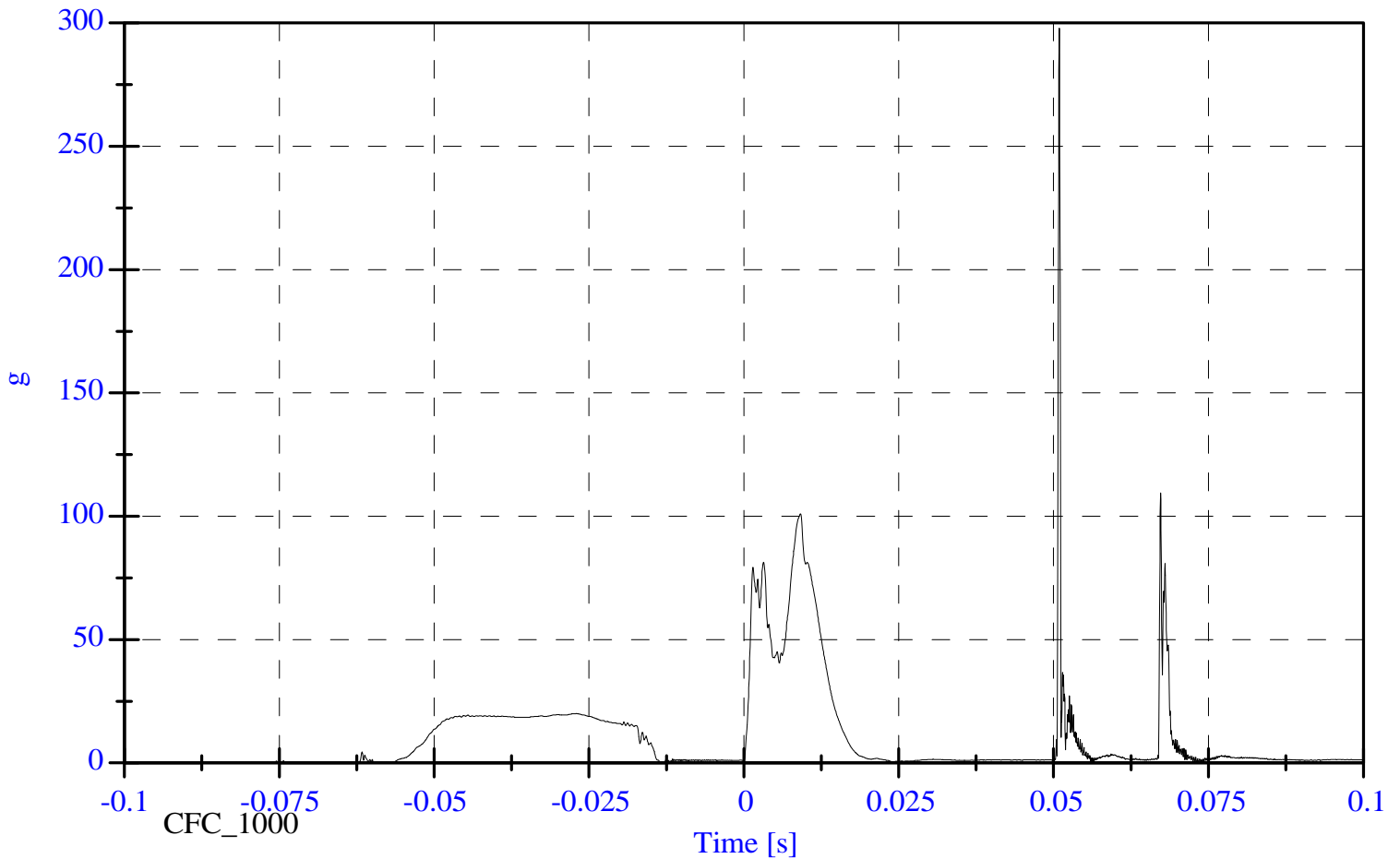
Maximum: 101.0 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 101.0 [g] at 0.009 [s]

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



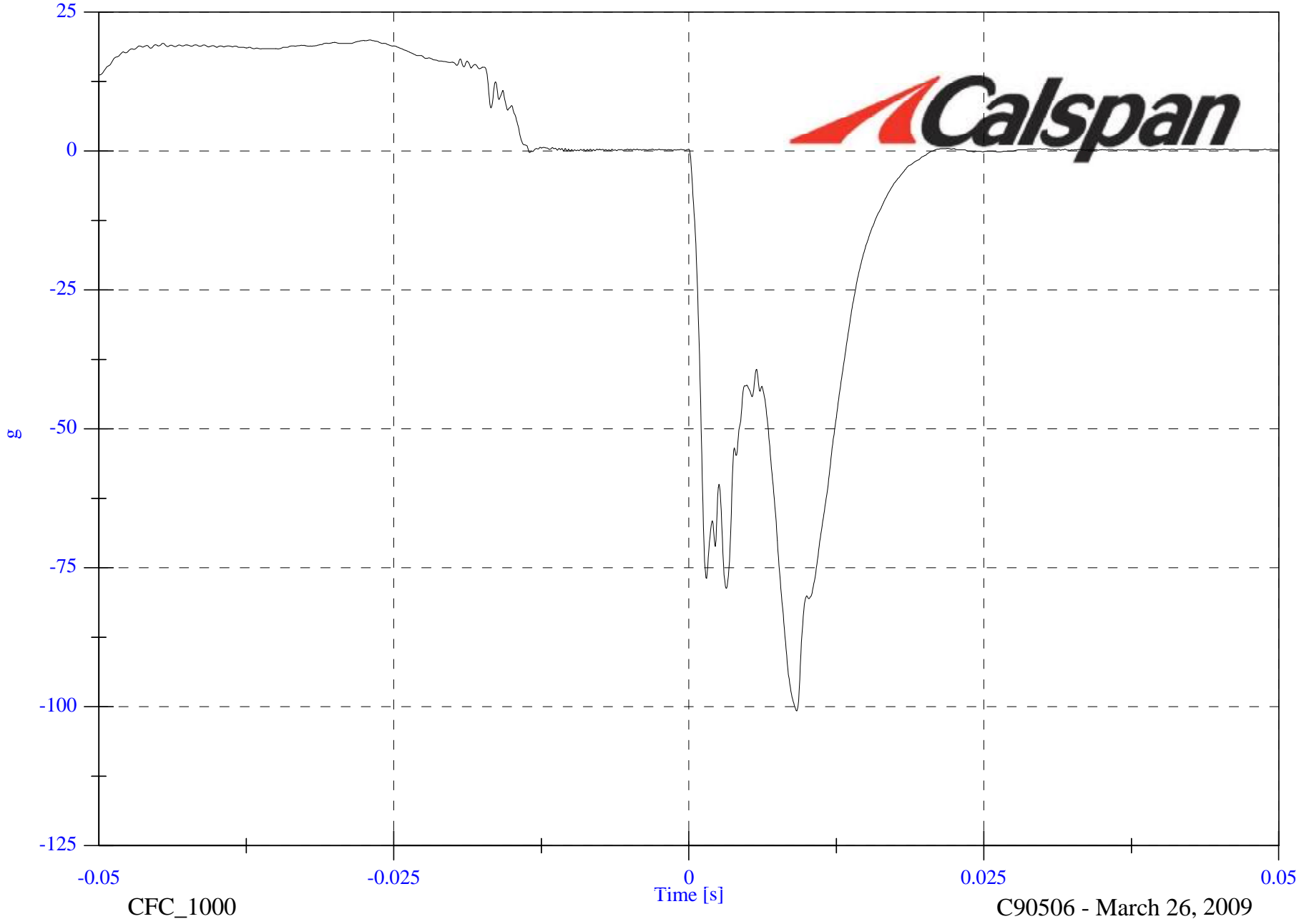
FMVSS 201U 09 HYUNDAI ELANTRA

Headform X Acceleration

Max: 20.0 [g] at -0.027 [s]

Min: -100.7 [g] at 0.009 [s]

C90506 PASSENGER SIDE BP4 IMPACT PLOT #1



CFC\_1000

C90506 - March 26, 2009

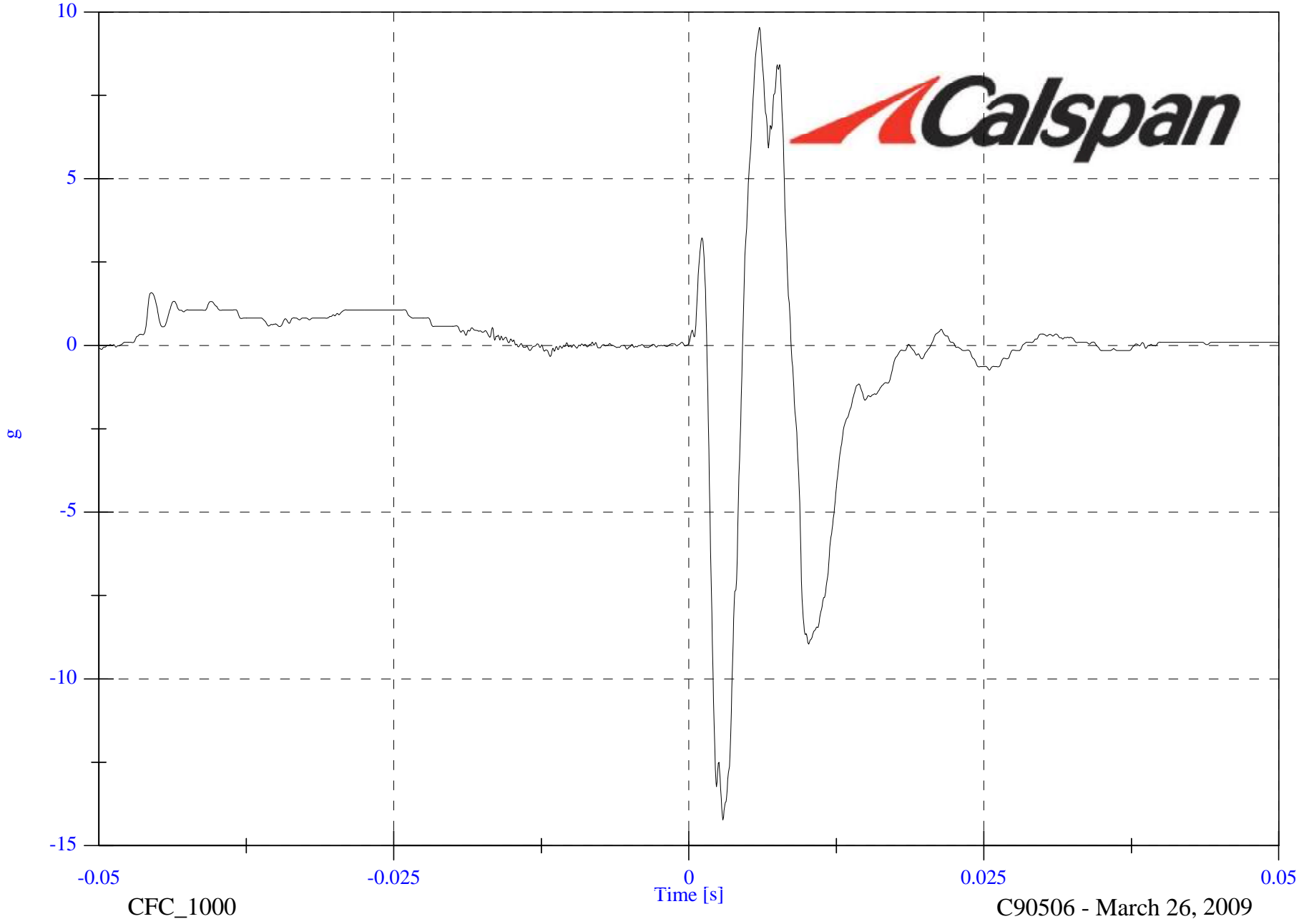
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 9.5 [g] at 0.006 [s]

Min: -14.2 [g] at 0.003 [s]

C90506 PASSENGER SIDE BP4 IMPACT PLOT #2



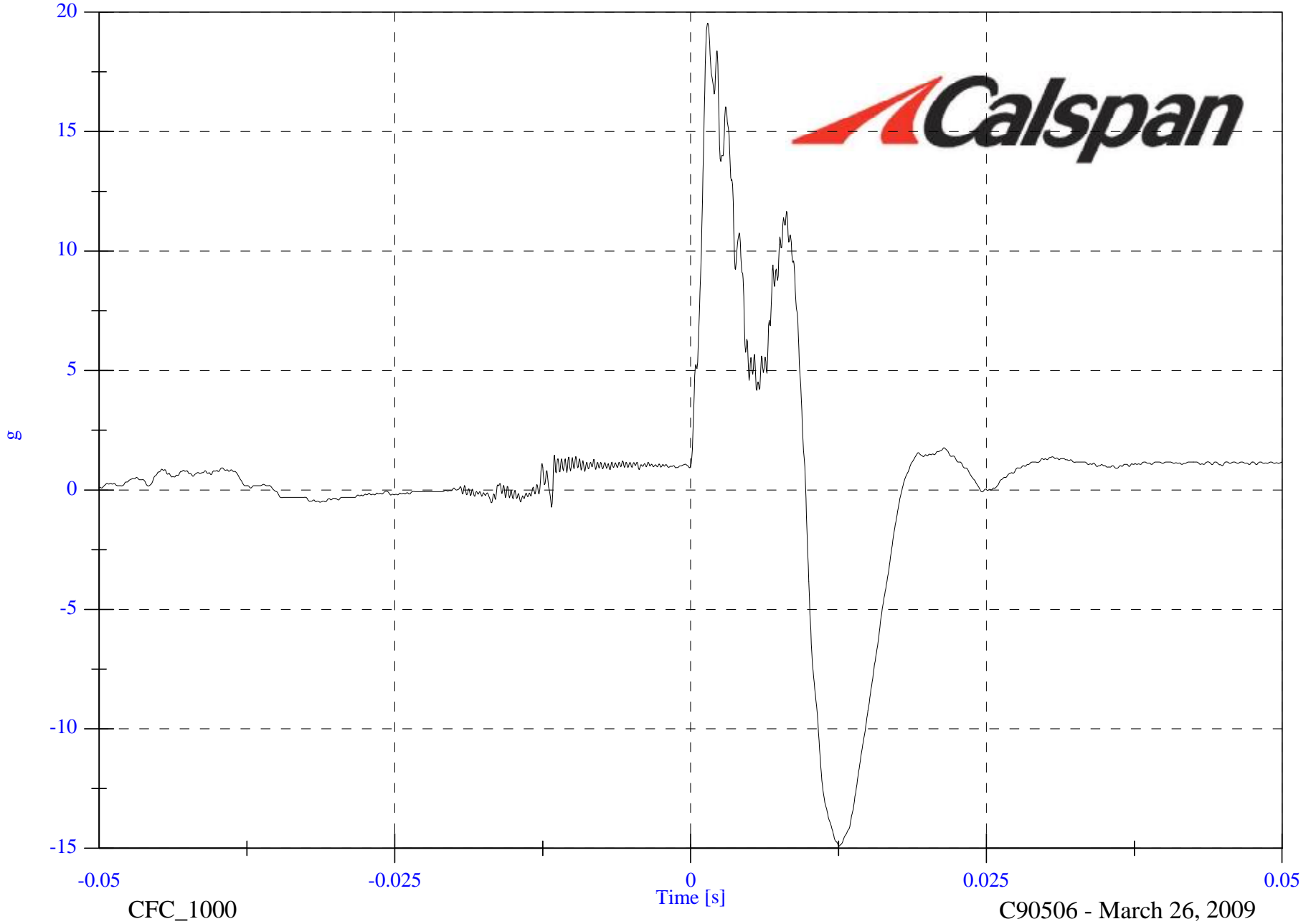
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 19.5 [g] at 0.001 [s]

Min: -14.9 [g] at 0.013 [s]

C90506 PASSENGER SIDE BP4 IMPACT PLOT #3

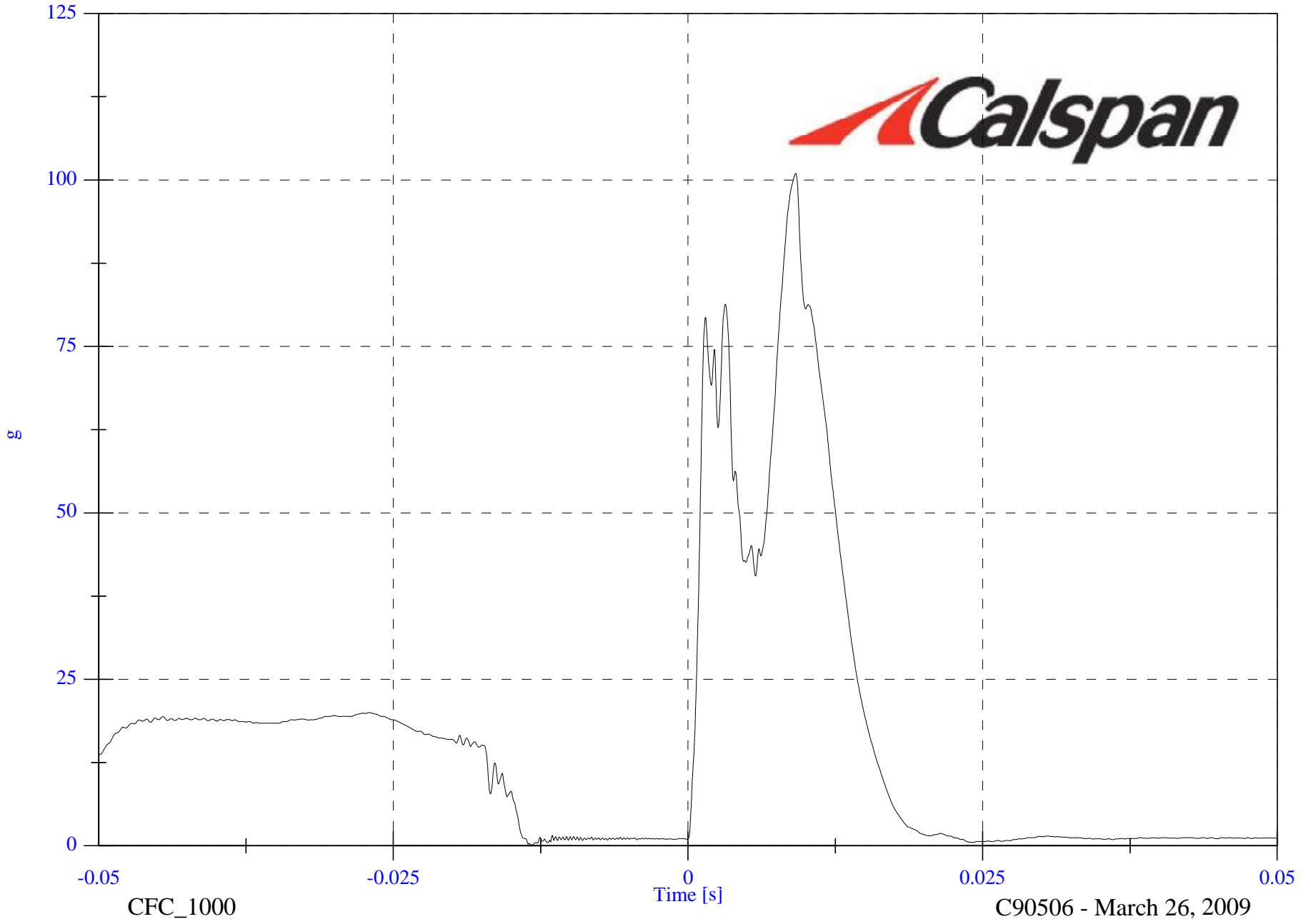


CFC\_1000

C90506 - March 26, 2009



C90506 PASSENGER SIDE BP4 IMPACT PLOT #4



FMVSS 201U 09 HYUNDAI ELANTRA

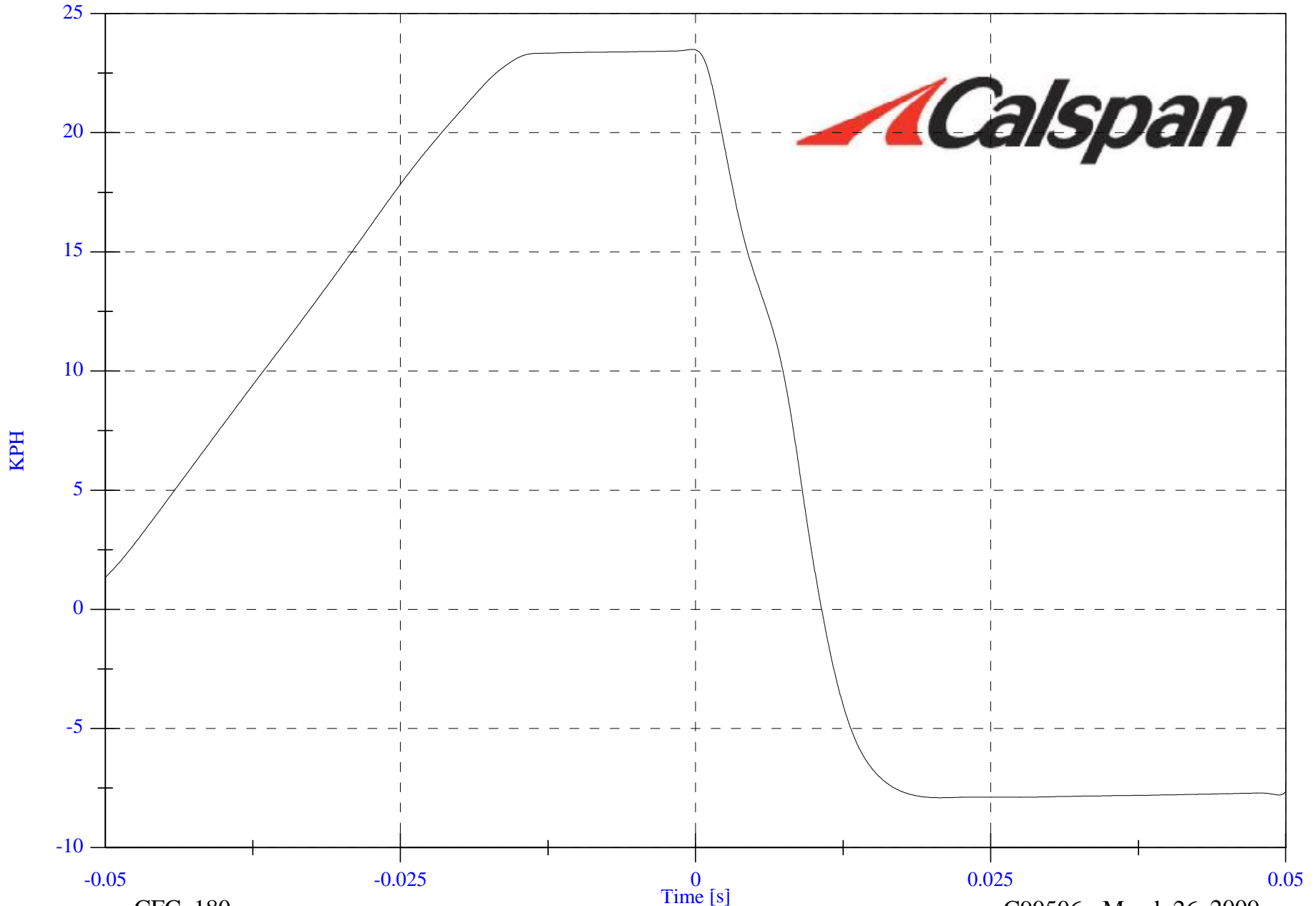
Max: 23.5 [KPH] at -0.000 [s]

Min: -7.9 [KPH] at 0.021 [s]

Headform Velocity



C90506 PASSENGER SIDE BP4 IMPACT PLOT #5



CFC\_180

C90506 - March 26, 2009



PRE-IMPACT BP4



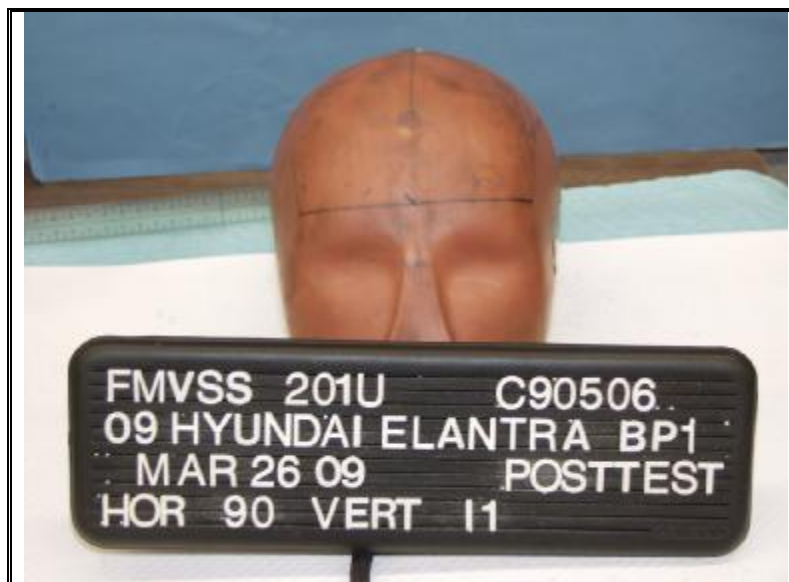


POST-IMPACT BP4

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	05
Test Date:	03/26/09
Target Location:	B-PILLAR
Target Code:	BP1
Horizontal Impact Angle:	90°
Vertical Impact Angle:	11°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	11:25
Headform Number:	0062

Impact Point Description (from lower midpoint on midsagittal line)			
On Centerline	0	<input type="checkbox"/>	mm right <input type="checkbox"/> mm left
On Centerline	40		mm up



POST-IMPACT BP1 HEADFORM

Free Motion HIC	377.3
HIC(d)	451.1
Impact Velocity (kph)	18.51
HIC T1 (msec)	4.7
HIC T2 (msec)	12.4

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - BP1

FMH Headform 0062

Location: BP1

Test Date: March 26, 2009

Work File: BP1

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 451.1

Lab Humidity: 24 %

HIC (36ms): 377.3

Velocity at Impact: 18.51 KPH

t1: 4.7 msec

t2: 12.4 msec

Free Flight Distance: 214.86 mm

Duration: 7.7 msec

Average Acceleration: 7.3 g

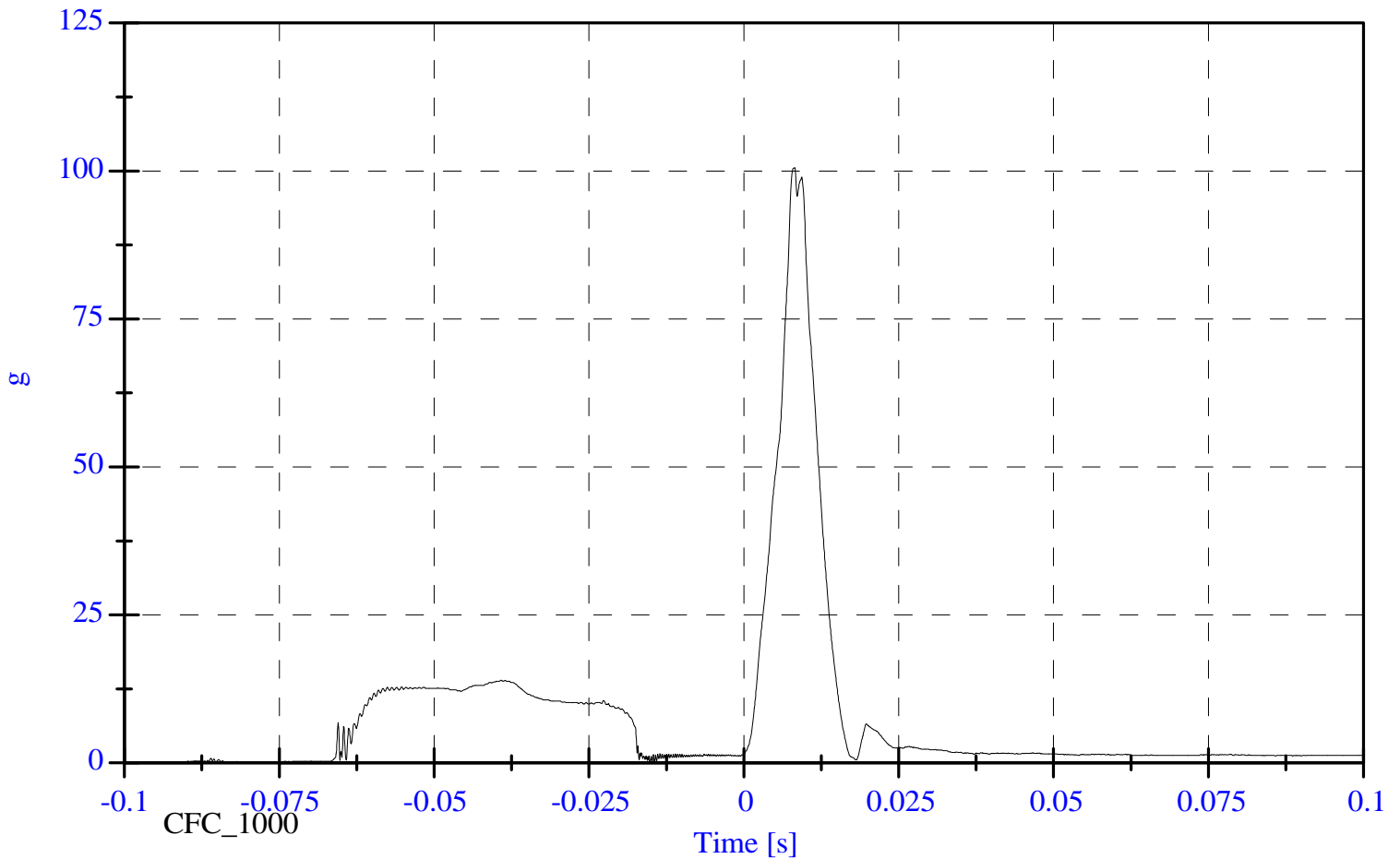
Maximum: 100.6 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 100.6 [g] at 0.008 [s]

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



FMVSS 201U 09 HYUNDAI ELANTRA

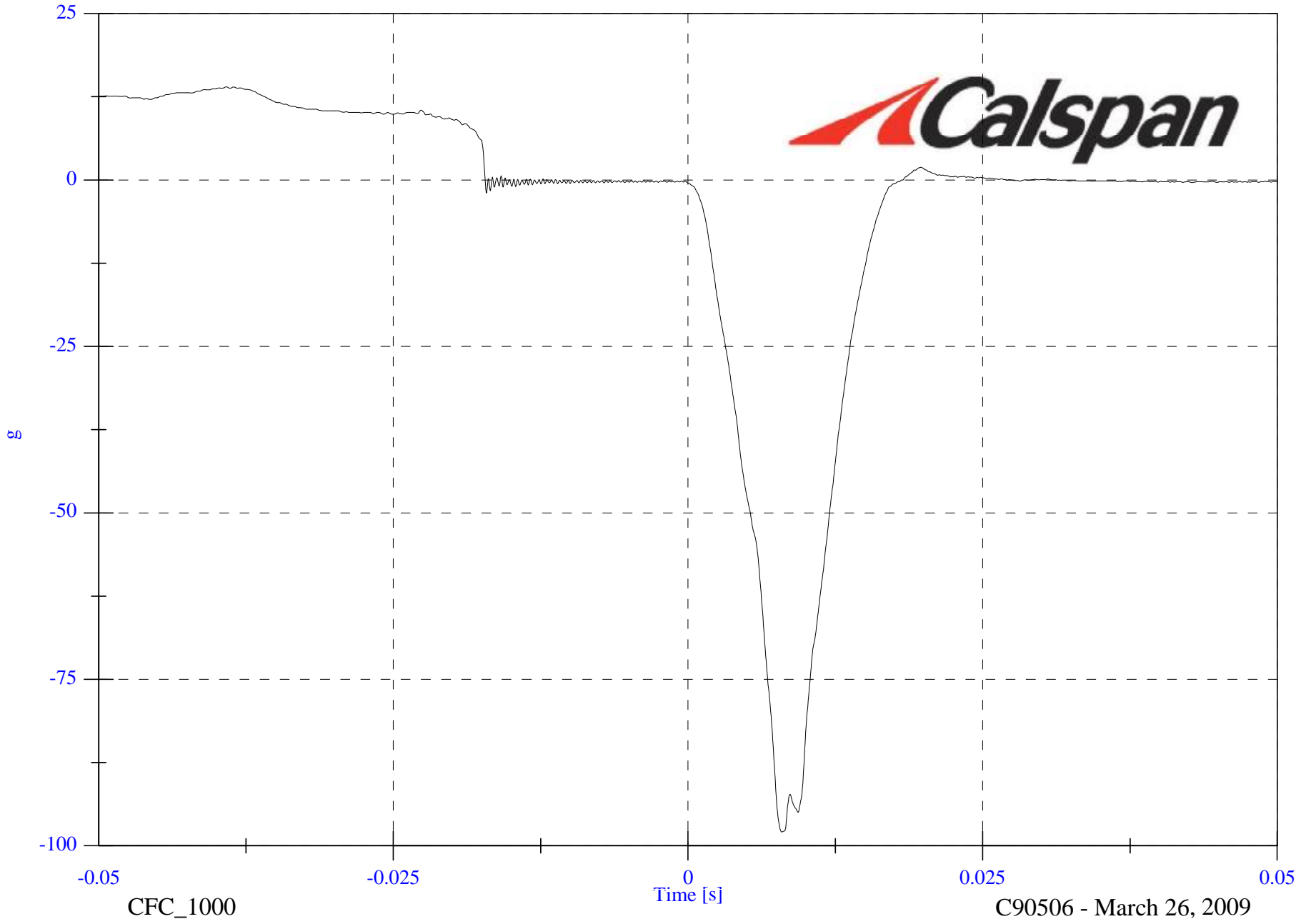
Headform X Acceleration

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

Min: -97.9 [g] at 0.008 [s]



C90506 PASSENGER SIDE BPI IMPACT PLOT #1



CFC\_1000

C90506 - March 26, 2009

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 3.1 [g] at 0.020 [s]

Min: -4.0 [g] at 0.007 [s]



C90506 PASSENGER SIDE BP1 IMPACT PLOT #2



CFC\_1000

C90506 - March 26, 2009

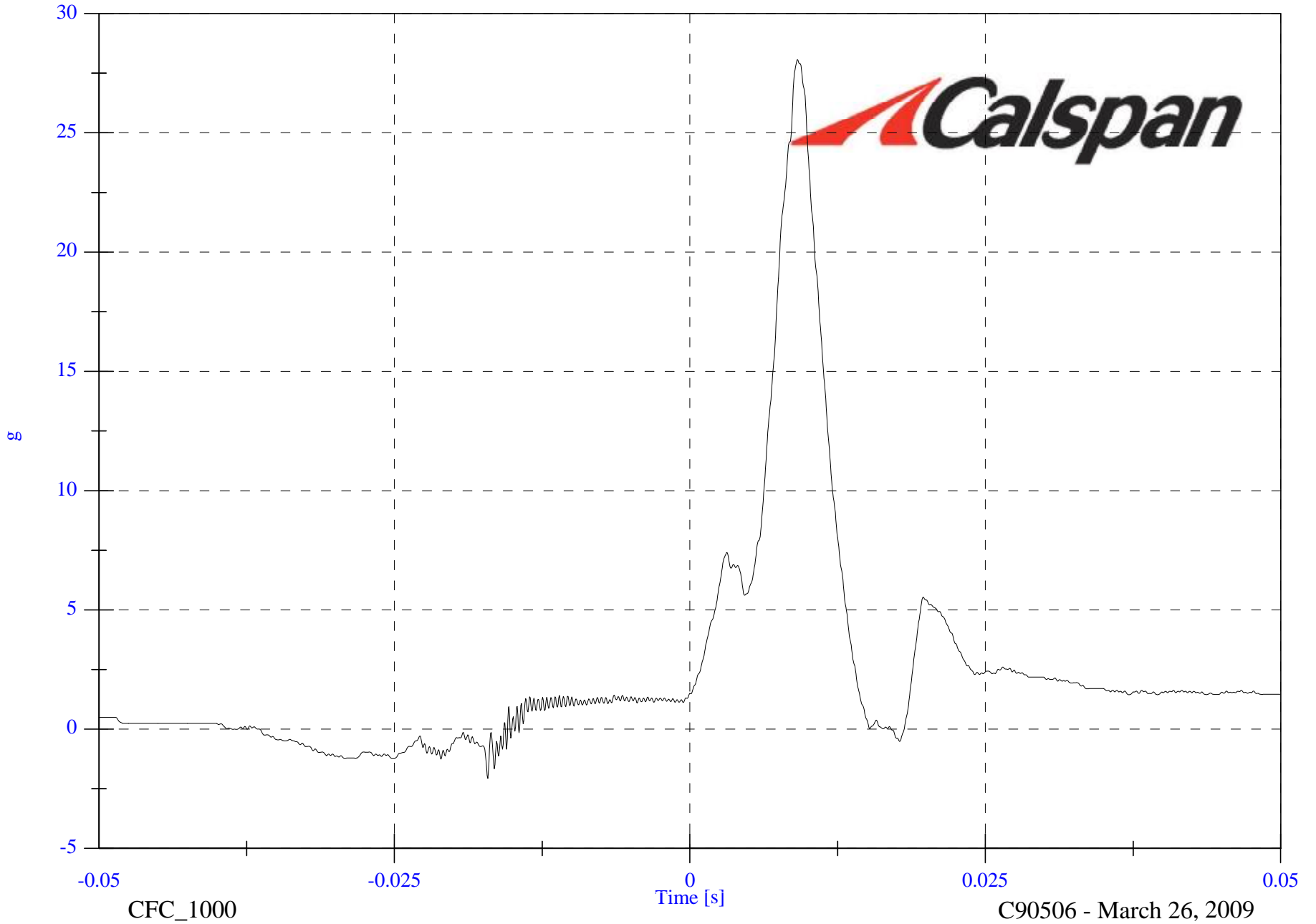
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 28.1 [g] at 0.009 [s]

Min: -2.1 [g] at -0.017 [s]

C90506 PASSENGER SIDE BPI IMPACT PLOT #3



CFC\_1000

C90506 - March 26, 2009

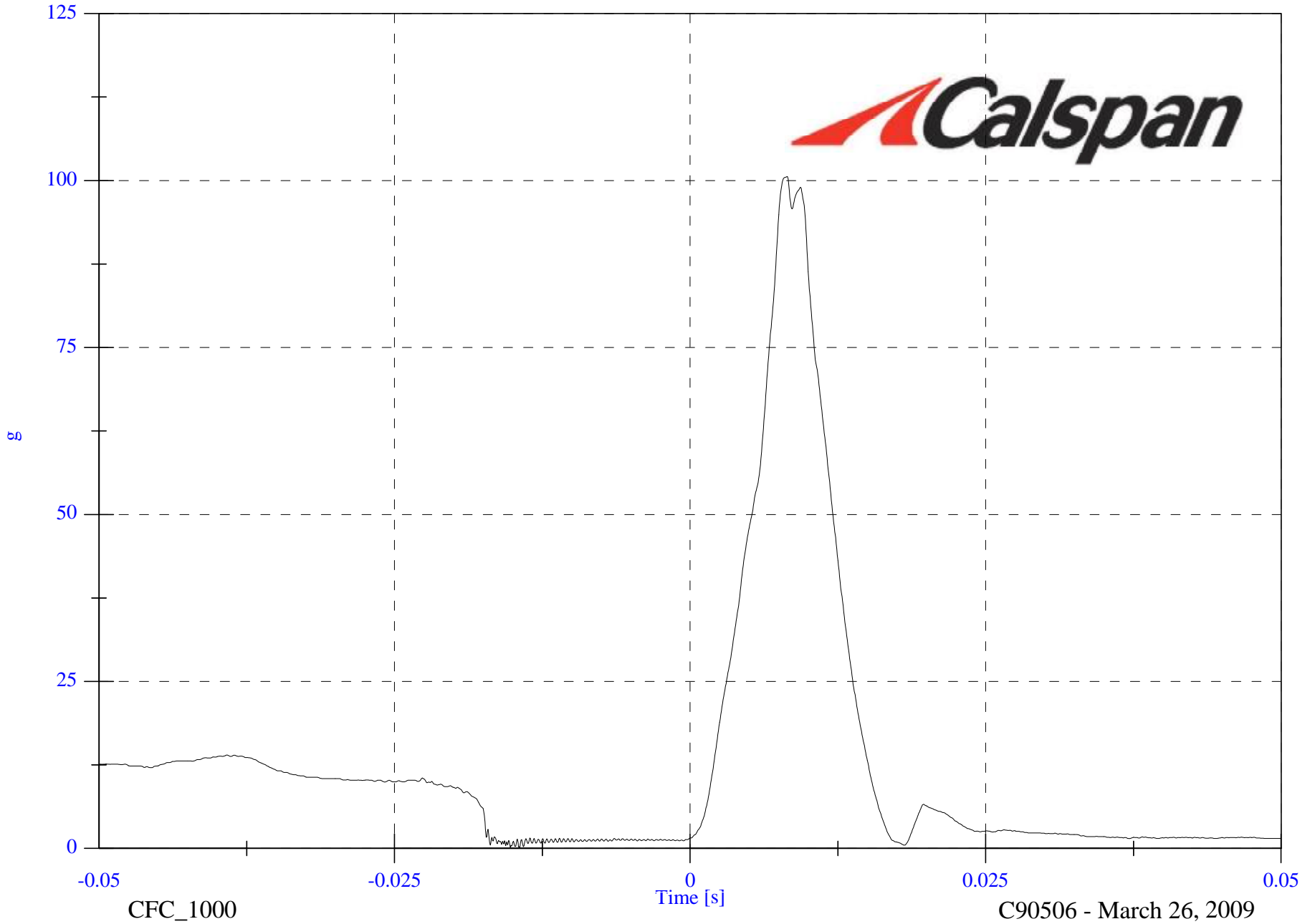
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 100.6 [g] at 0.008 [s]

Min: 0.2 [g] at -0.014 [s]

C90506 PASSENGER SIDE BPI IMPACT PLOT #4



CFC\_1000

C90506 - March 26, 2009

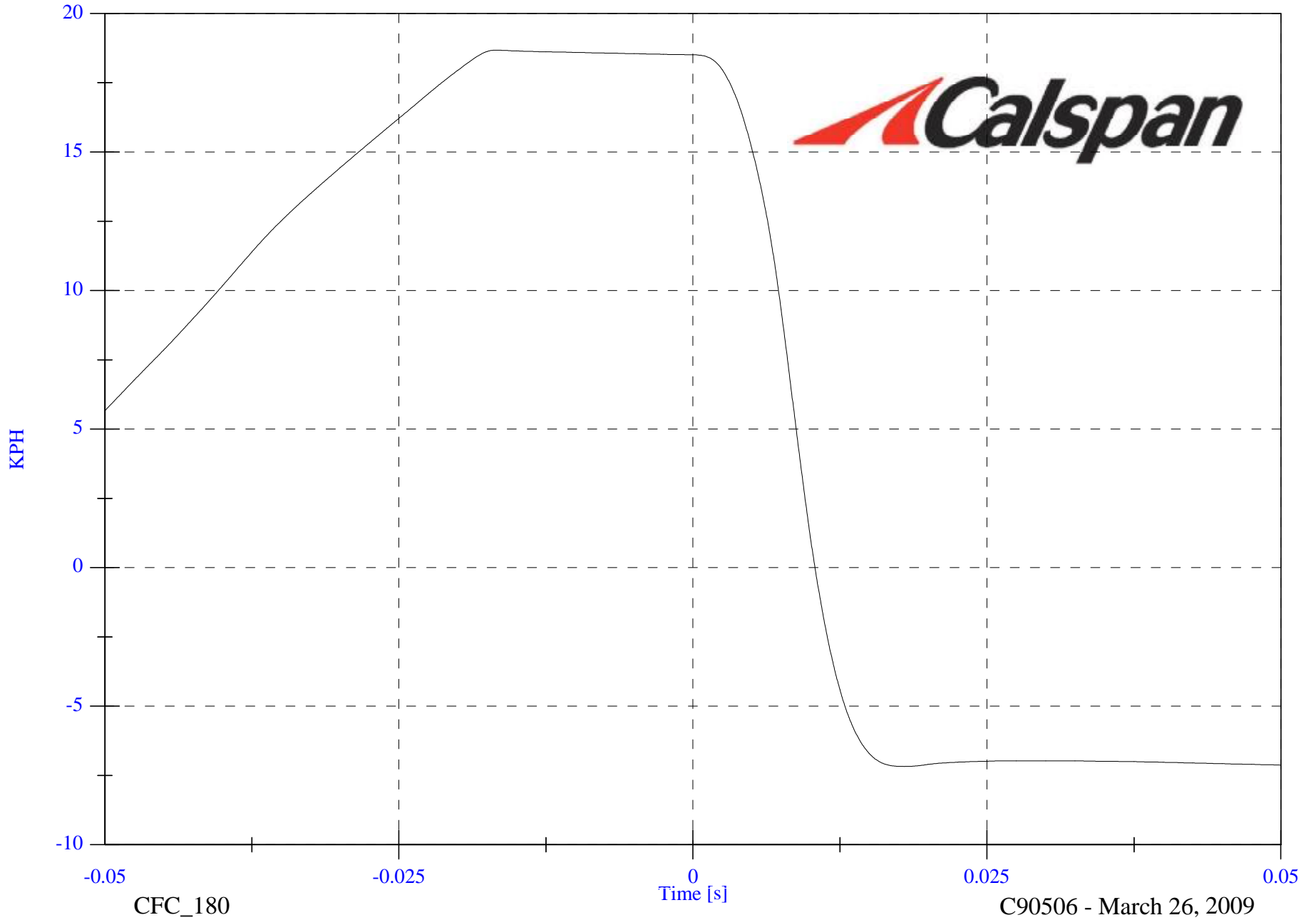
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 18.7 [KPH] at -0.017 [s]

Min: -7.2 [KPH] at 0.018 [s]

Headform Velocity

C90506 PASSENGER SIDE BPI IMPACT PLOT #5



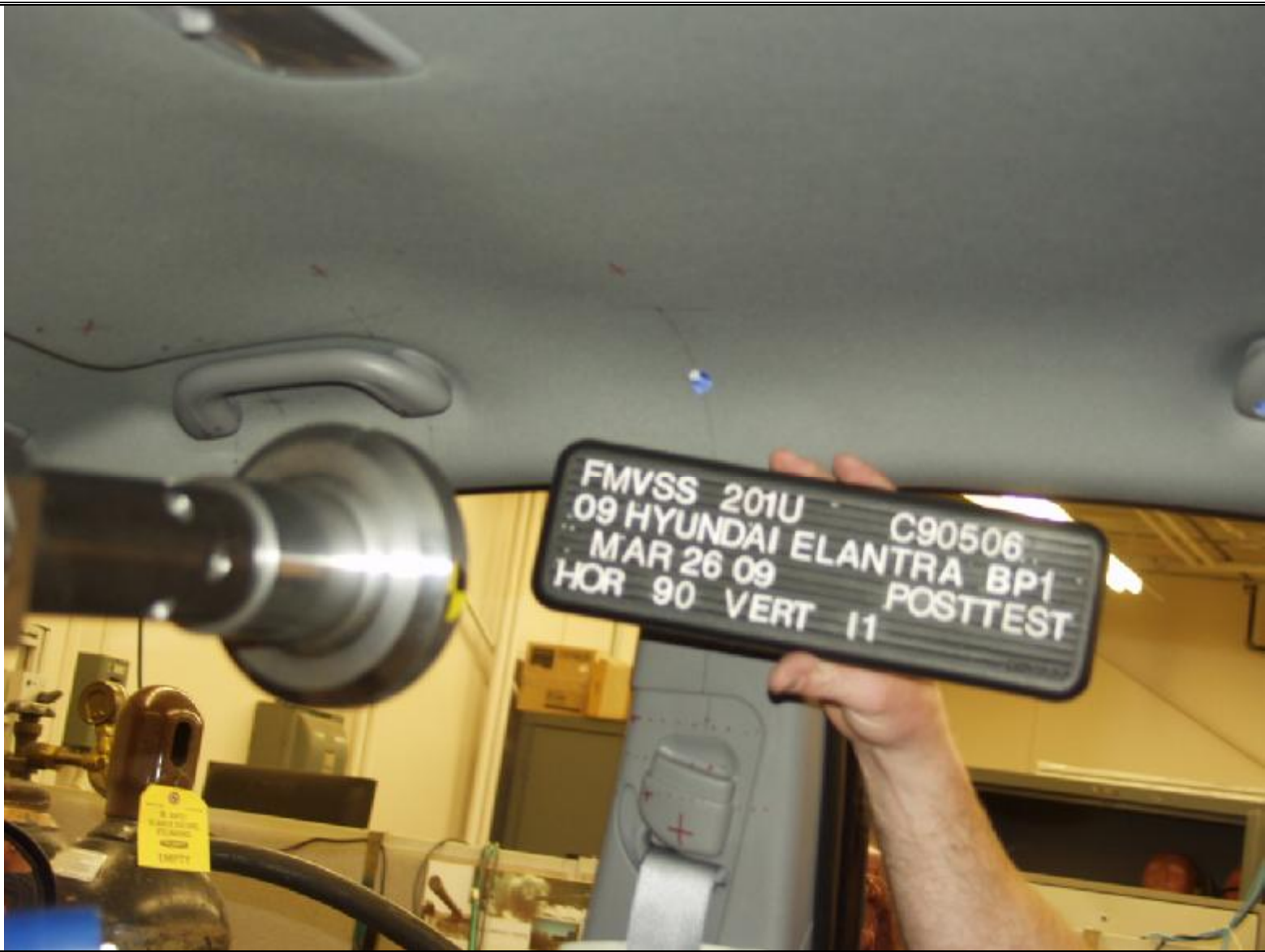
CFC\_180

C90506 - March 26, 2009





PRE-IMPACT BP1



POST-IMPACT BP1

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMHDU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	06
Test Date:	03/26/09
Target Location:	SIDE RAIL
Target Code:	SR2A
Horizontal Impact Angle:	90°
Vertical Impact Angle:	41°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	12:45
Headform Number:	1142

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	5	<input checked="" type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	36				mm up



POST-IMPACT SR2A HEADFORM

Free Motion HIC	186.5
HIC(d)	307.1
Impact Velocity (kph)	18.54
HIC T1 (msec)	2.8
HIC T2 (msec)	16.1

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - SR2A

FMH Headform 1142

Location: SR2A

Test Date: March 26, 2009

Work File: SR2A

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 307.1

Lab Humidity: 24 %

HIC (36ms): 186.5

Velocity at Impact: 18.54 KPH

t1: 2.8 msec

t2: 16.1 msec

Free Flight Distance: 212.84 mm

Duration: 13.3 msec

Average Acceleration: 7.2 g

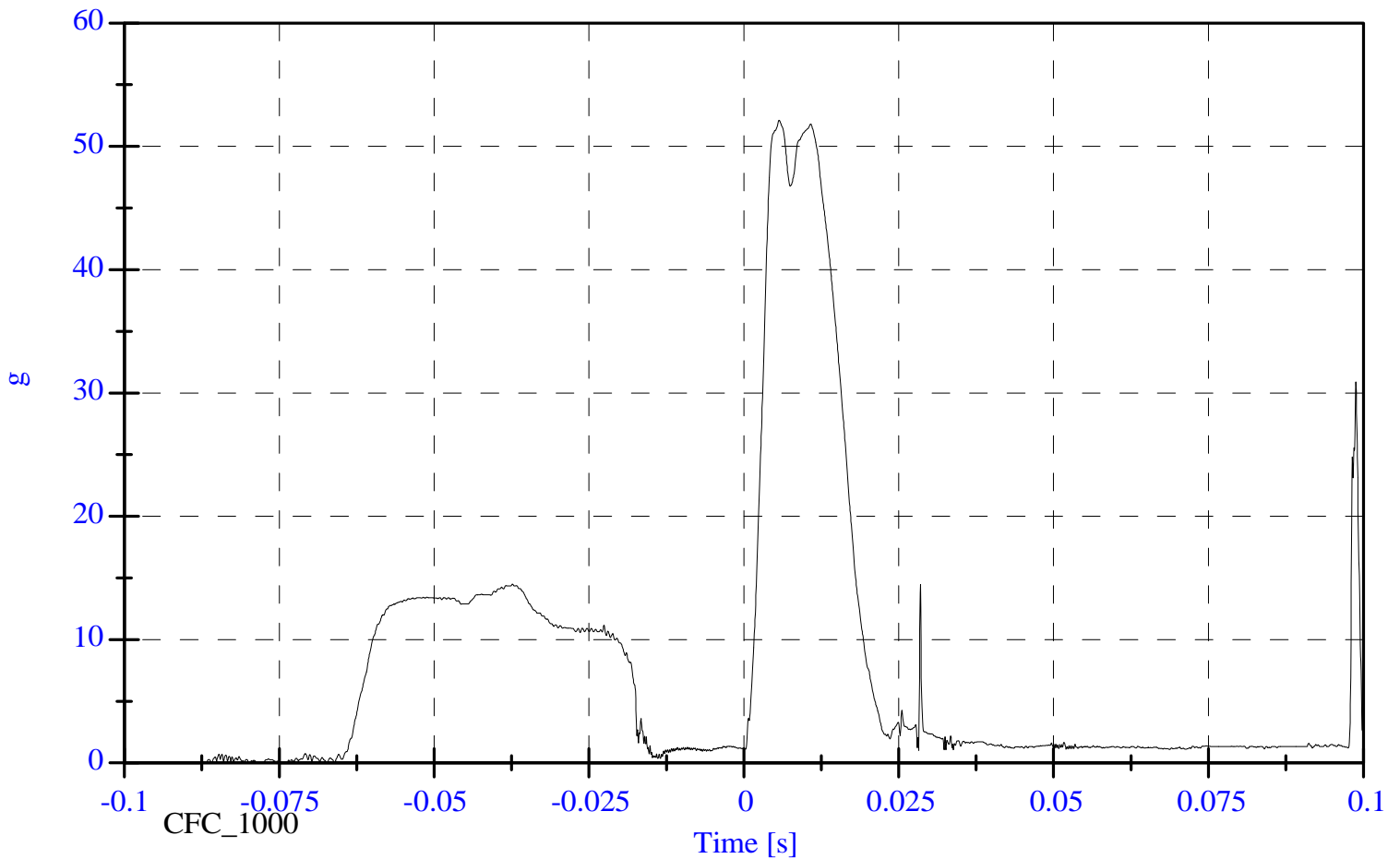
Maximum: 52.1 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 52.1 [g] at 0.006 [s]

Min: 0.0 [g] at -0.097 [s]



FMVSS 201U 09 HYUNDAI ELANTRA

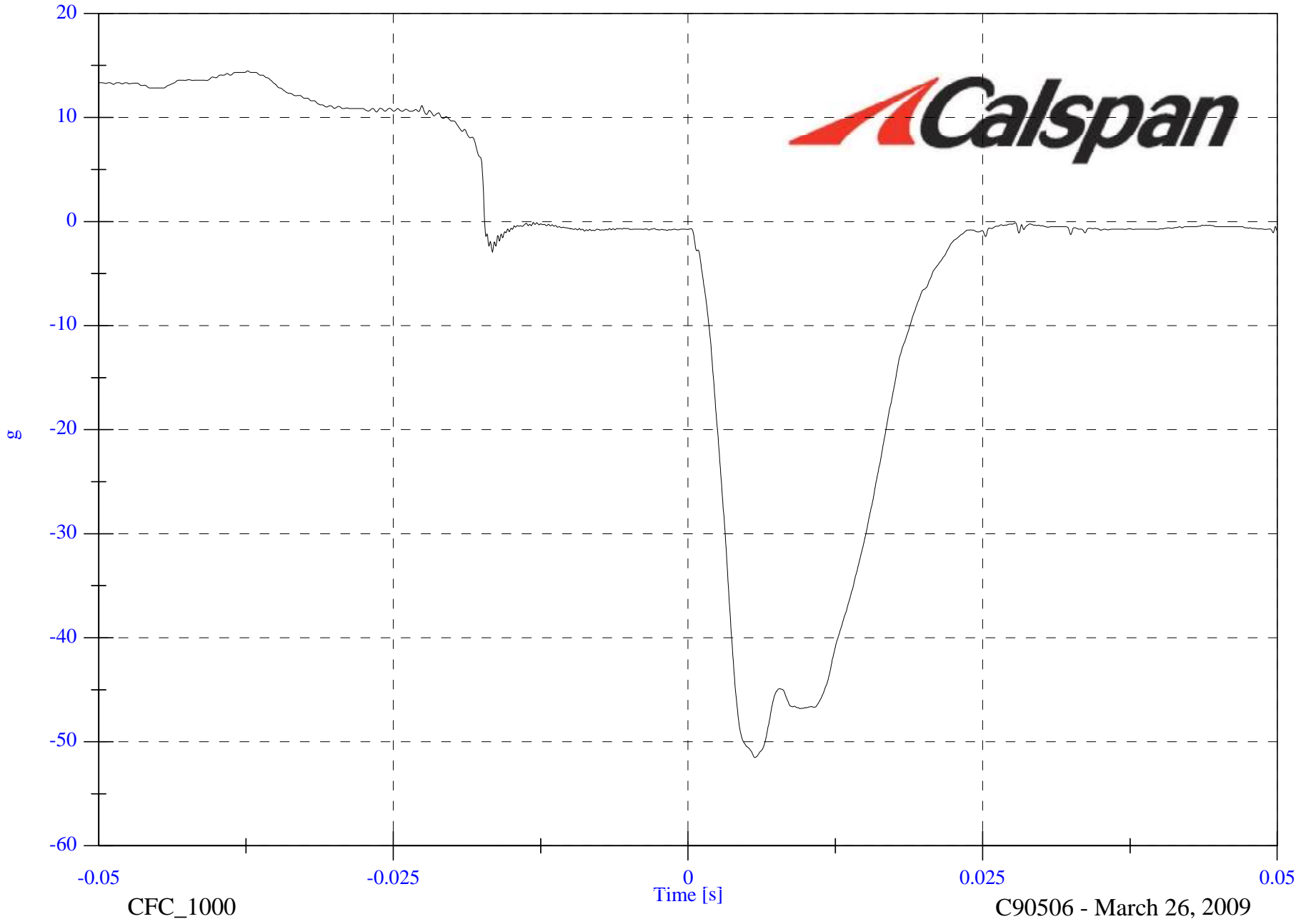
Headform X Acceleration

Max: 14.5 [g] at -0.037 [s]

Min: -51.5 [g] at 0.006 [s]



C90506 PASSENGER SIDE SR2A IMPACT PLOT #1



CFC\_1000

C90506 - March 26, 2009

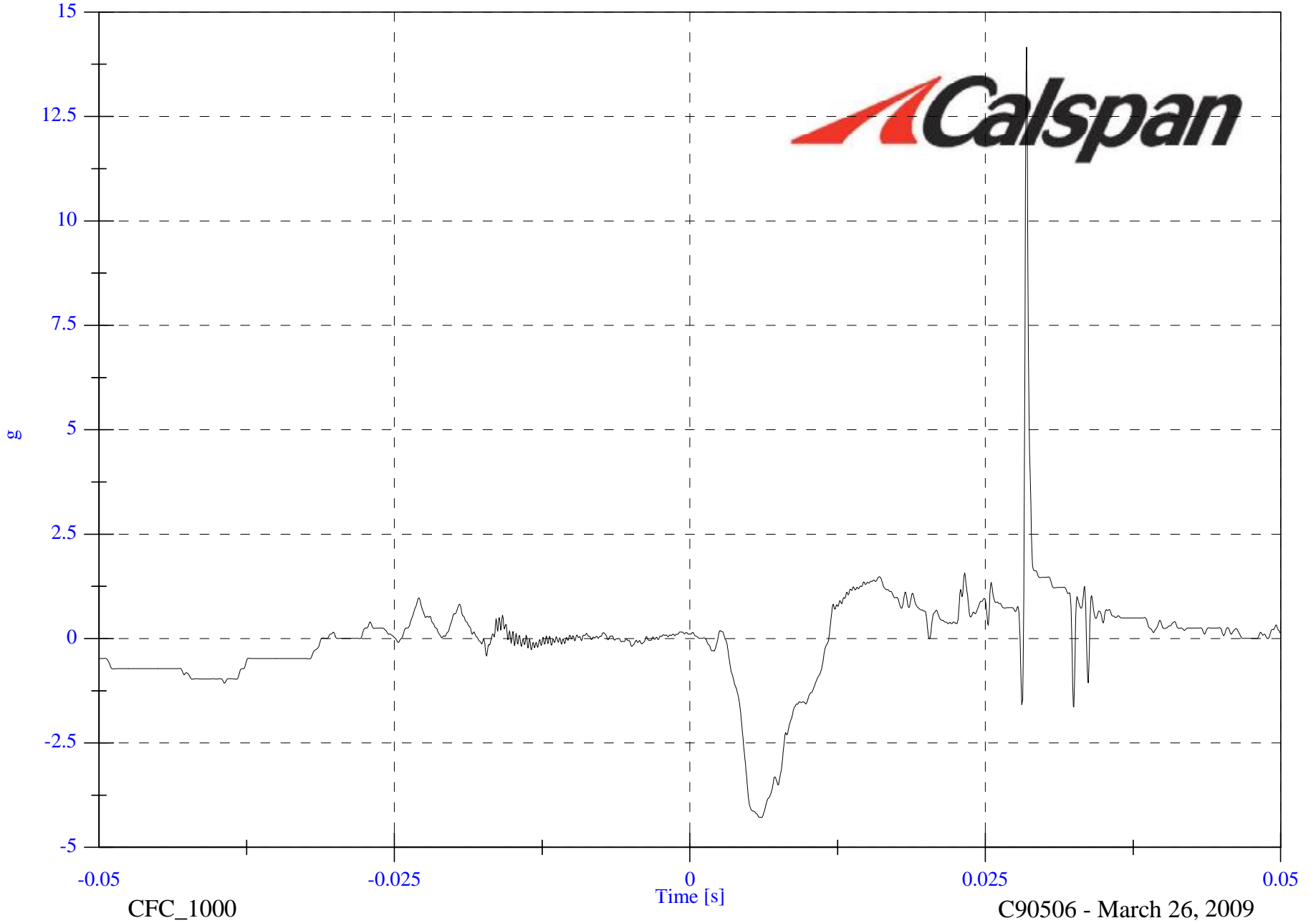
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 14.2 [g] at 0.029 [s]

Min: -4.3 [g] at 0.006 [s]

C90506 PASSENGER SIDE SR2A IMPACT PLOT #2



CFC\_1000

C90506 - March 26, 2009

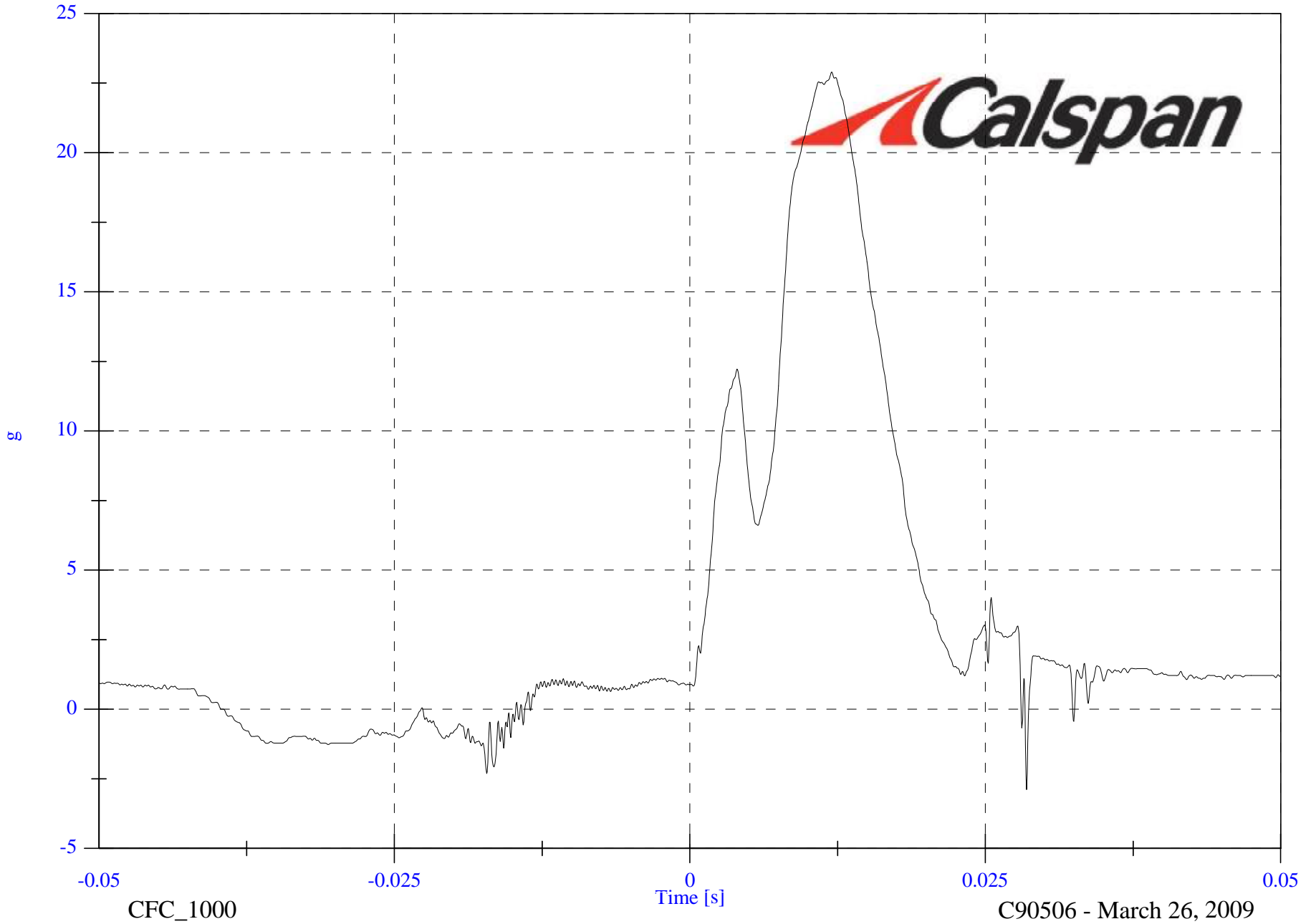
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 22.9 [g] at 0.012 [s]

Min: -2.9 [g] at 0.029 [s]

C90506 PASSENGER SIDE SR2A IMPACT PLOT #3



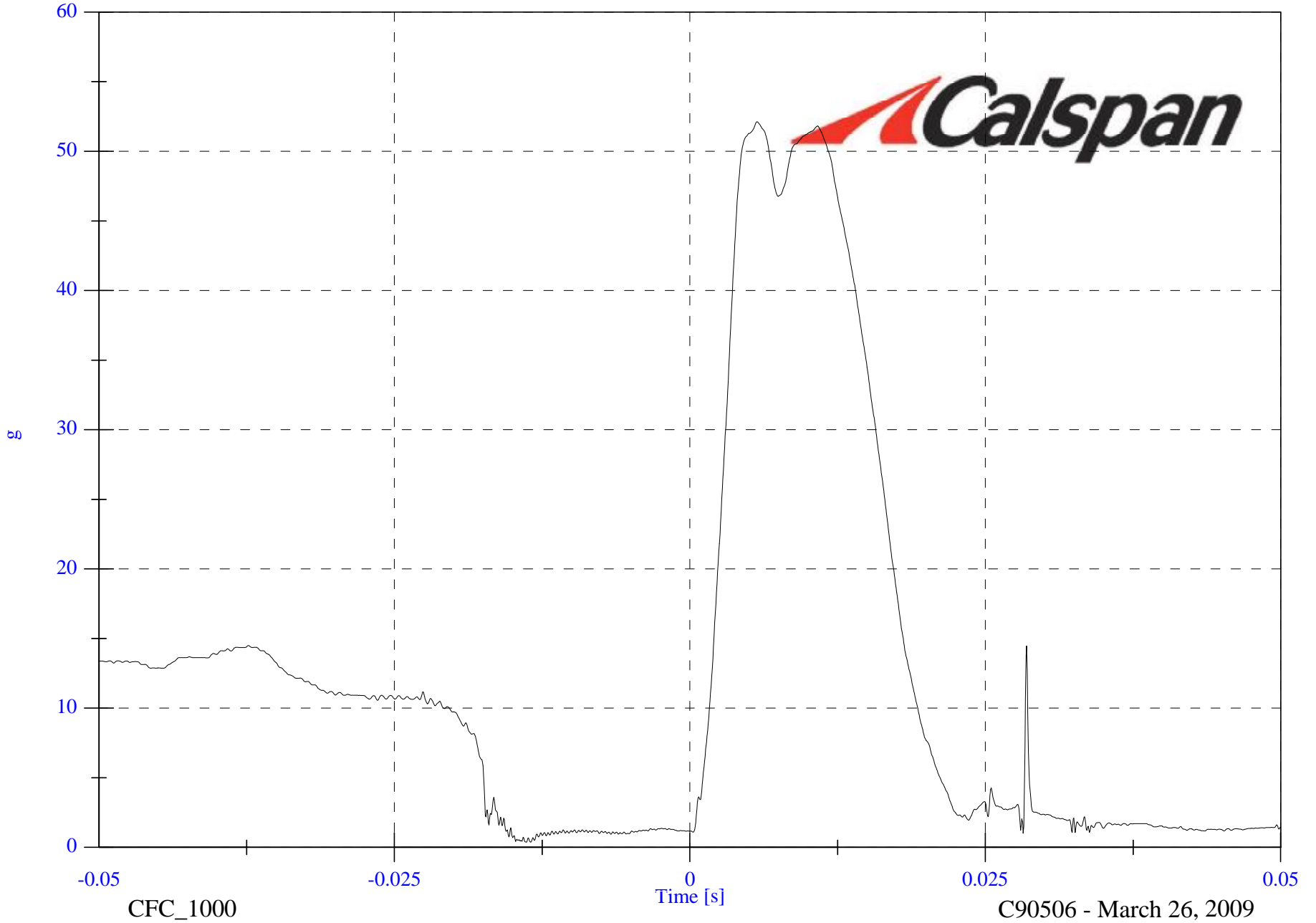
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 52.1 [g] at 0.006 [s]

Min: 0.4 [g] at -0.013 [s]

C90506 PASSENGER SIDE SR2A IMPACT PLOT #4



CFC\_1000

C90506 - March 26, 2009



FMVSS 201U 09 HYUNDAI ELANTRA

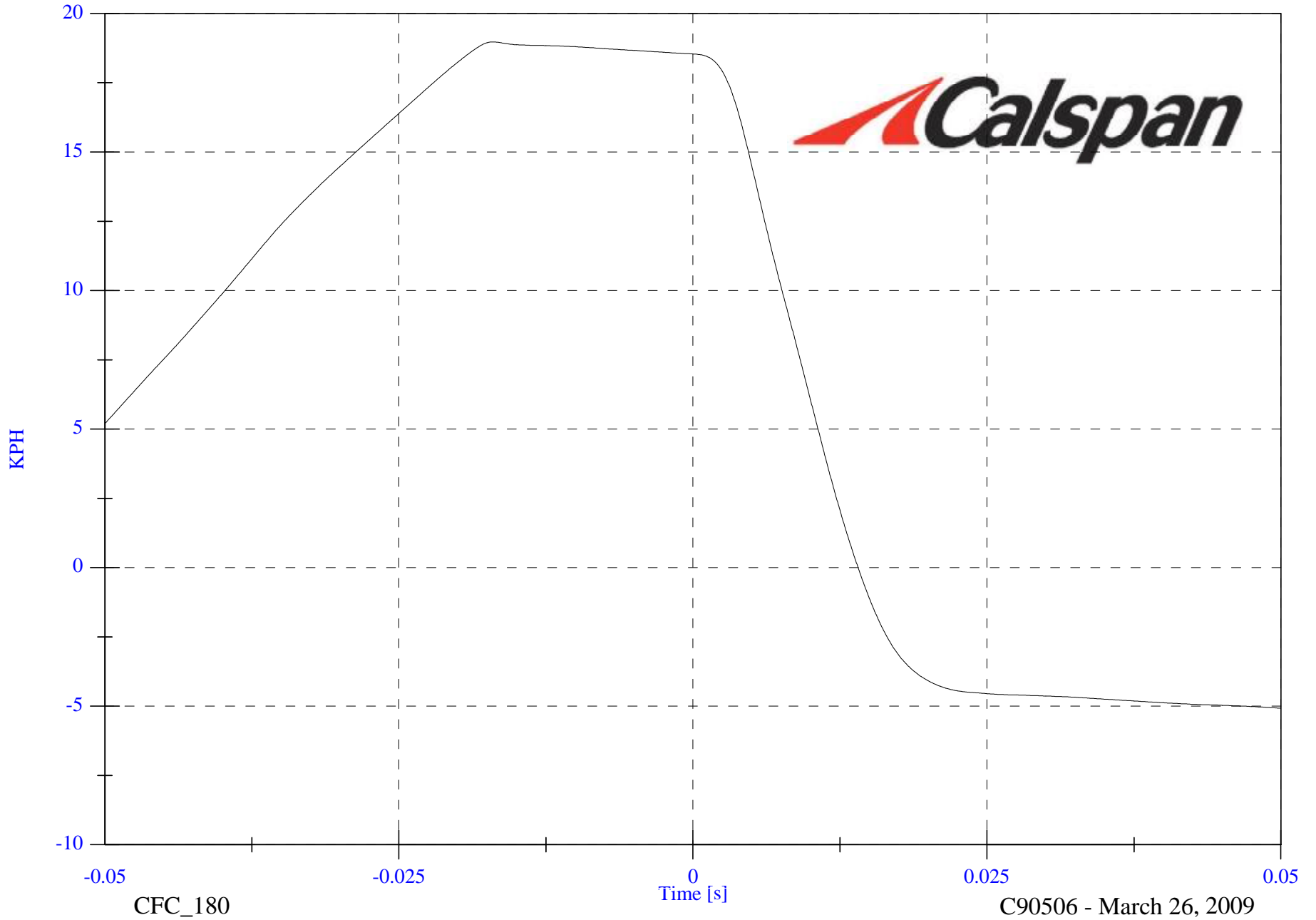
Max: 19.0 [KPH] at -0.017 [s]

Min: -5.1 [KPH] at 0.050 [s]

Headform Velocity



C90506 PASSENGER SIDE SR2A IMPACT PLOT #5



C90506 - March 26, 2009



PRE-IMPACT SR2A



POST-IMPACT SR2A

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	07
Test Date:	03/26/09
Target Location:	A-PILLAR
Target Code:	AP3
Horizontal Impact Angle:	134°
Vertical Impact Angle:	41°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	13:20
Headform Number:	1140

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	16		mm up



POST-IMPACT AP3 PASS HEADFORM

Free Motion HIC	1265.0
HIC(d)	1121.0
Impact Velocity (kph)	23.65
HIC T1 (msec)	5.3
HIC T2 (msec)	8.7

TRIM CRACKED UPON IMPACT

NOTE : Invalid test - per S6.2(b)(2) to be impacted at any speed up to and including 19 km/kr

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - AP3

FMH Headform 1140

Location: AP3

Test Date: March 26, 2009

Work File: fmh

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 1121.0

Lab Humidity: 24 %

HIC (36ms): 1265.3

Velocity at Impact: 23.65 KPH

t1: 5.3 msec

t2: 8.7 msec

Free Flight Distance: 219.60 mm

Duration: 3.4 msec

Average Acceleration: 4.7 g

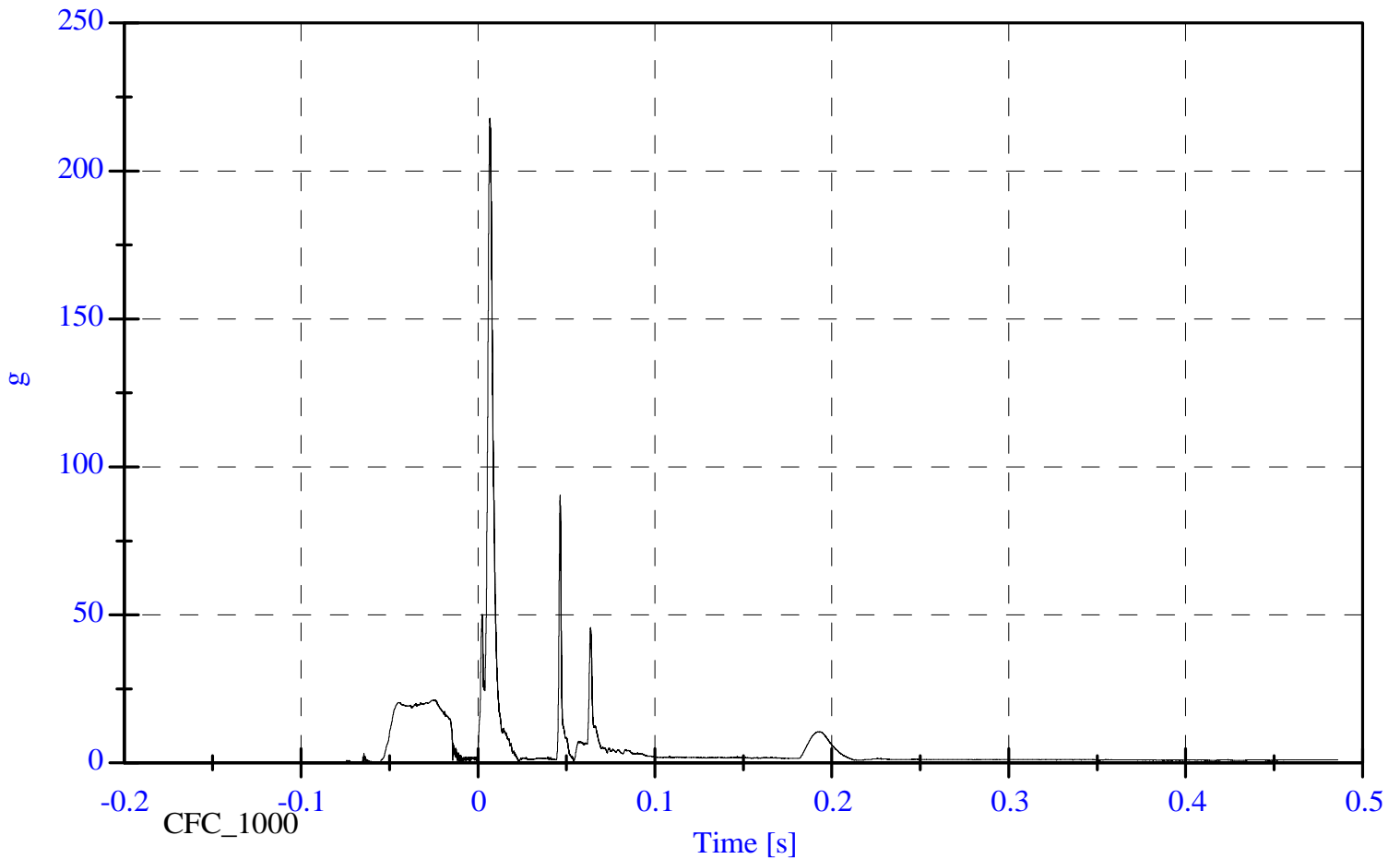
Maximum: 217.9 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 217.9 [g] at 0.007 [s]

Min: 0.0 [g] at -0.103 [s]

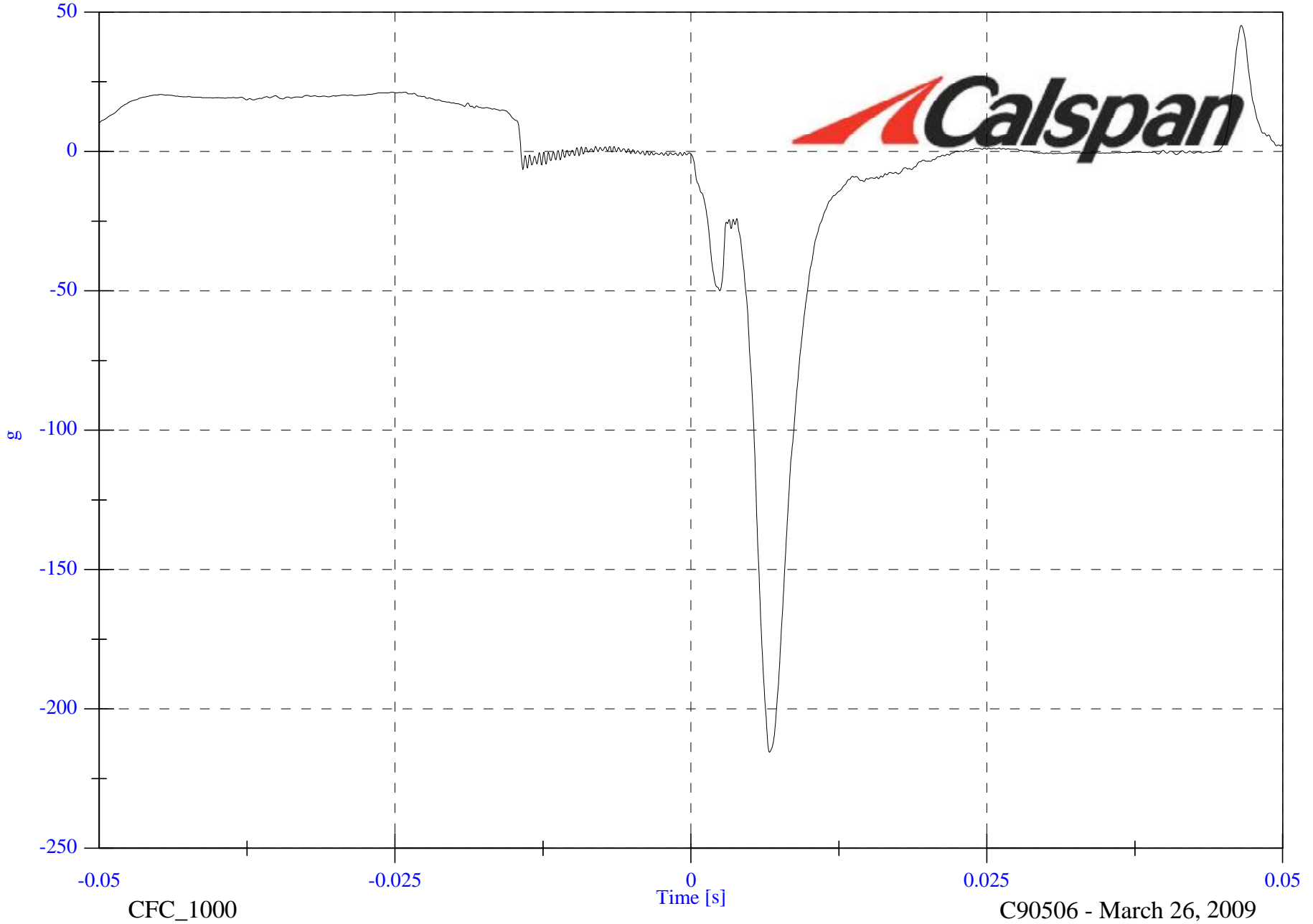


FMVSS 201U 09 HYUNDAI ELANTRA

Headform X Acceleration

Max: 45.3 [g] at 0.046 [s]  
Min: -215.5 [g] at 0.007 [s]

C90506 PASSENGER SIDE AP3 IMPACT PLOT #1



C90506 - March 26, 2009

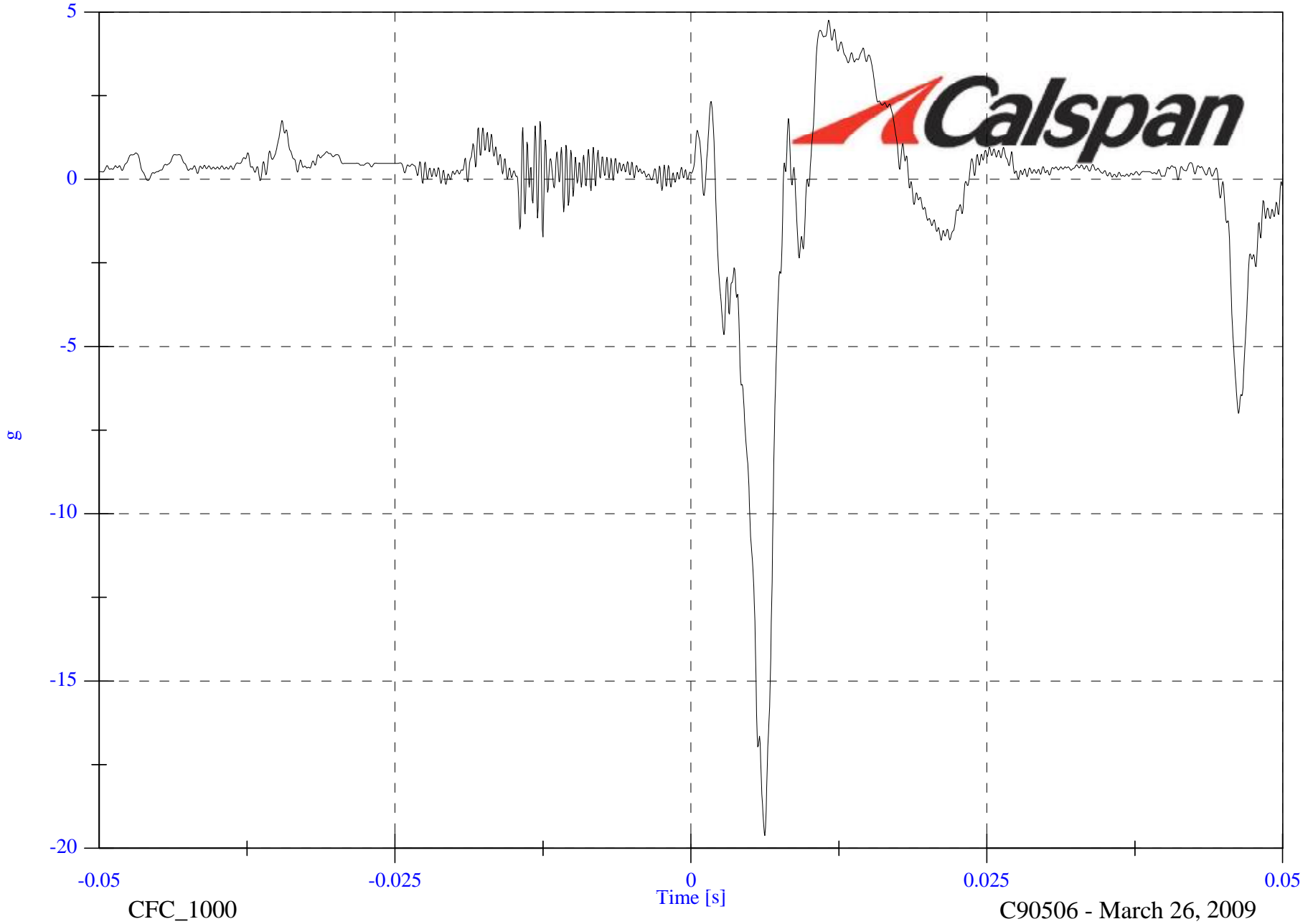
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 4.8 [g] at 0.012 [s]

Min: -19.6 [g] at 0.006 [s]

C90506 PASSENGER SIDE AP3 IMPACT PLOT #2



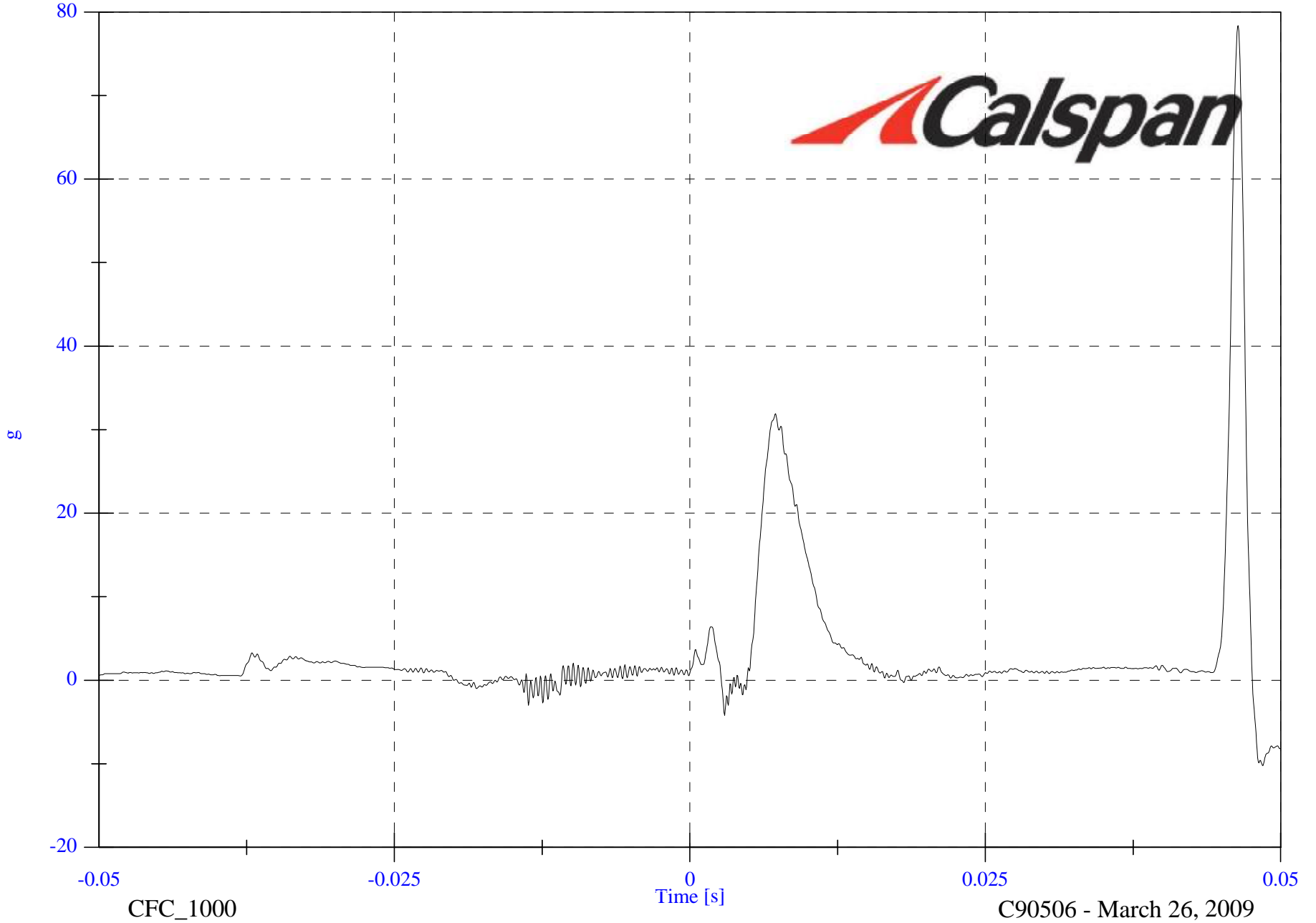
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 78.4 [g] at 0.046 [s]

Min: -10.2 [g] at 0.048 [s]

C90506 PASSENGER SIDE AP3 IMPACT PLOT #3





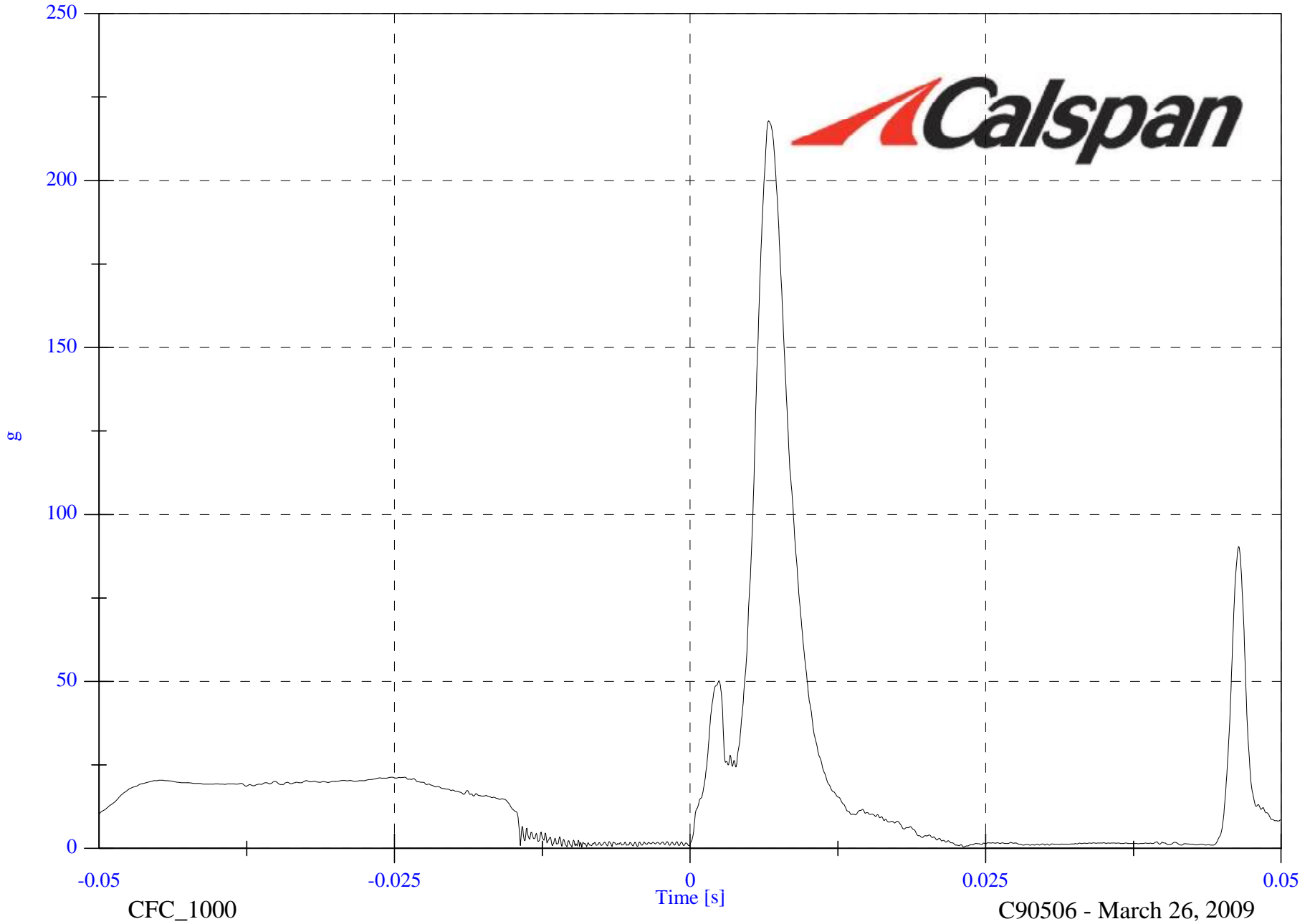
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 217.9 [g] at 0.007 [s]

Min: 0.4 [g] at -0.009 [s]

C90506 PASSENGER SIDE AP3 IMPACT PLOT #4



CFC\_1000

C90506 - March 26, 2009

FMVSS 201U 09 HYUNDAI ELANTRA

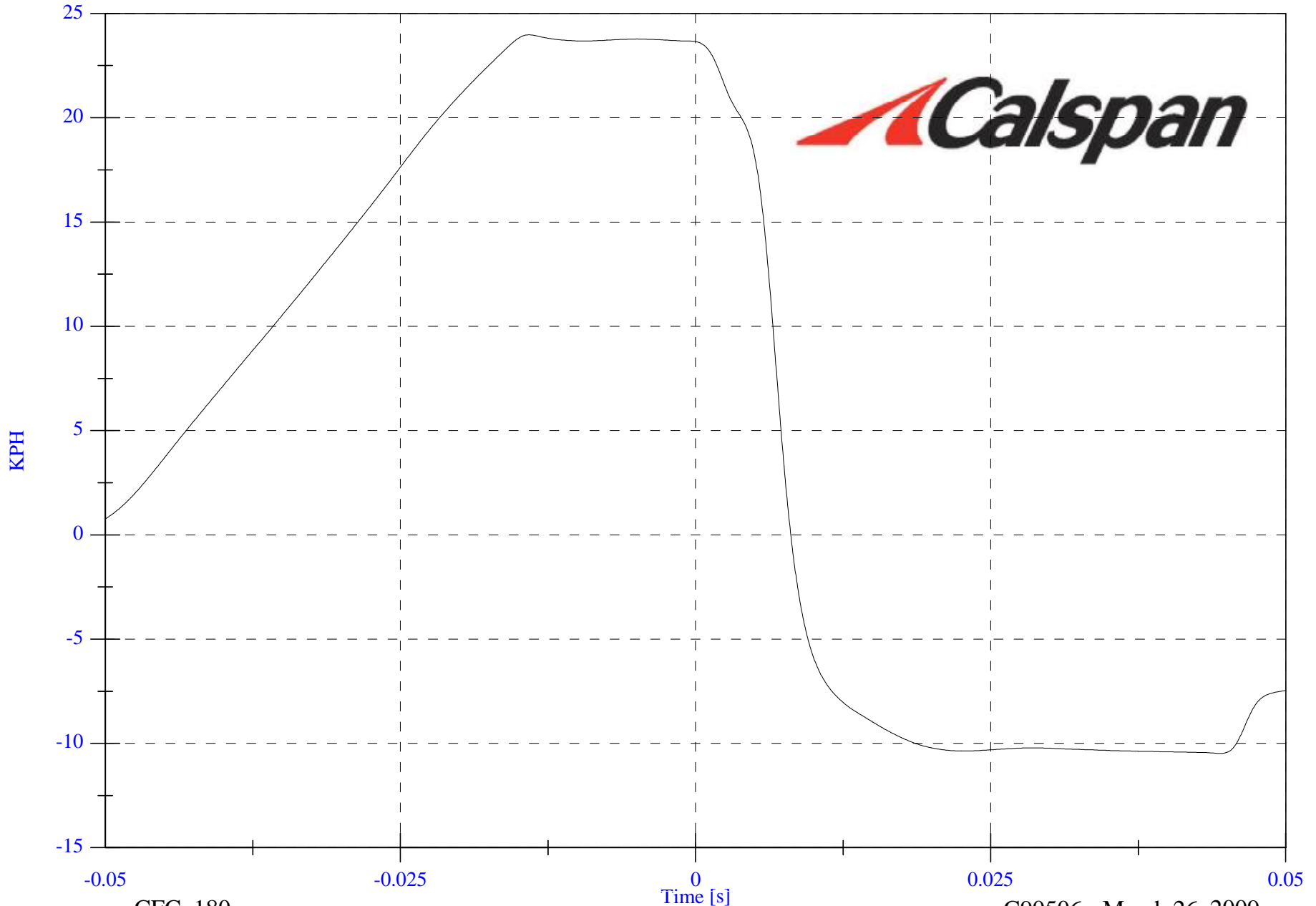
Max: 24.0 [KPH] at -0.014 [s]

Min: -10.5 [KPH] at 0.044 [s]

Headform Velocity

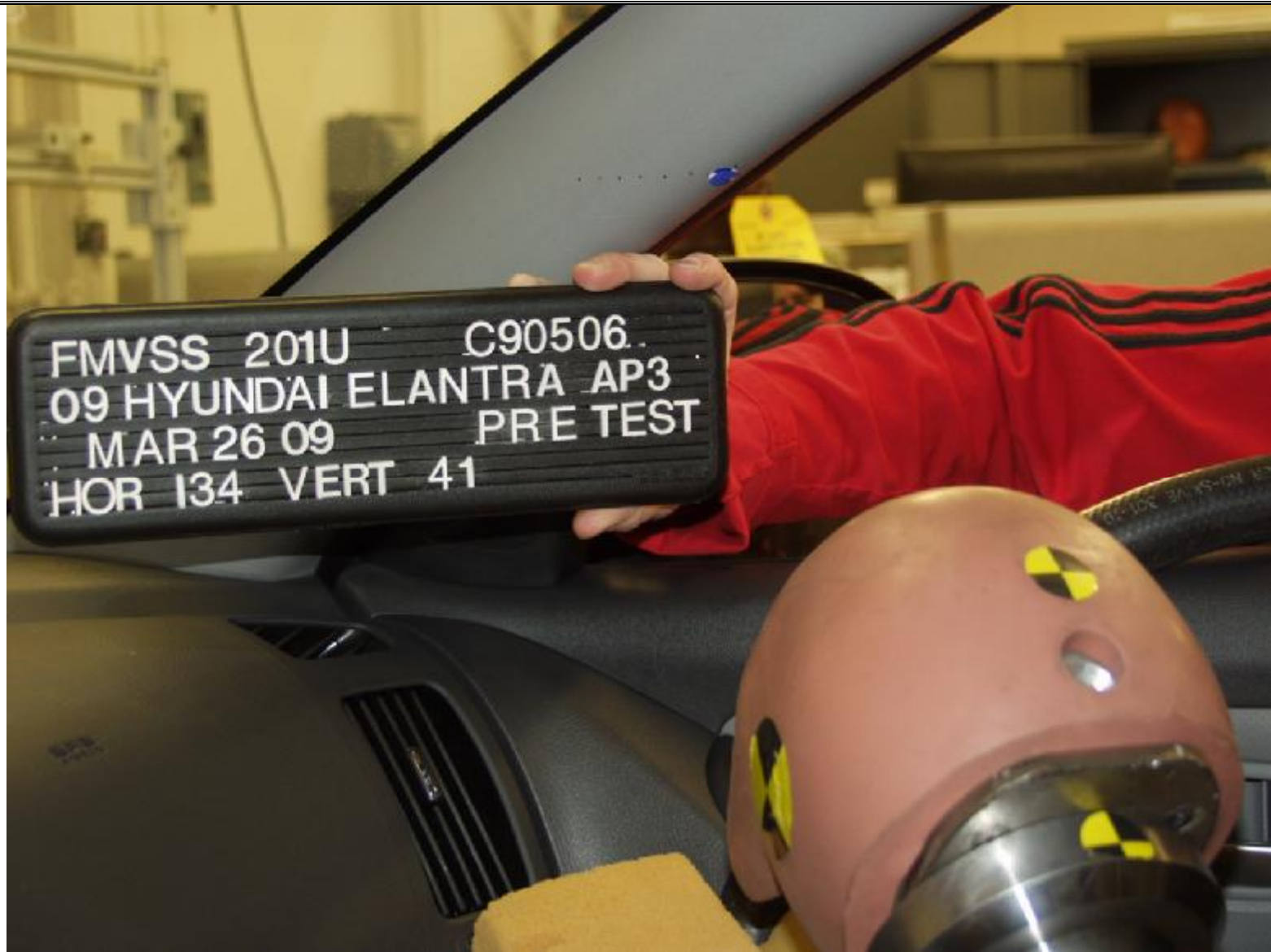


C90506 PASSENGER SIDE AP3 IMPACT PLOT #5



CFC\_180

C90506 - March 26, 2009



PRE-IMPACT AP3 PASS



POST-IMPACT AP3 PASS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	08
Test Date:	03/26/09
Target Location:	A-PILLAR
Target Code:	AP1
Horizontal Impact Angle:	120°
Vertical Impact Angle:	35°
Ambient Temperature:	23°C
Relative Humidity:	24
Time of Impact:	15:05
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	8	<input checked="" type="checkbox"/>	mm right	<input type="checkbox"/>	mm left
On Centerline	13				mm up



POST-IMPACT AP1 HEADFORM

Free Motion HIC	599.5
HIC(d)	618.7
Impact Velocity (kph)	18.41
HIC T1 (msec)	7.0
HIC T2 (msec)	11.1

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - AP1

FMH Headform 0355

Location: AP1

Test Date: March 26, 2009

Work File: AP1

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 618.7

Lab Humidity: 24 %

HIC (36ms): 599.5

Velocity at Impact: 18.41 KPH

t1: 7.0 msec

t2: 11.1 msec

Free Flight Distance: 224.46 mm

Duration: 4.1 msec

Average Acceleration: 7.1 g

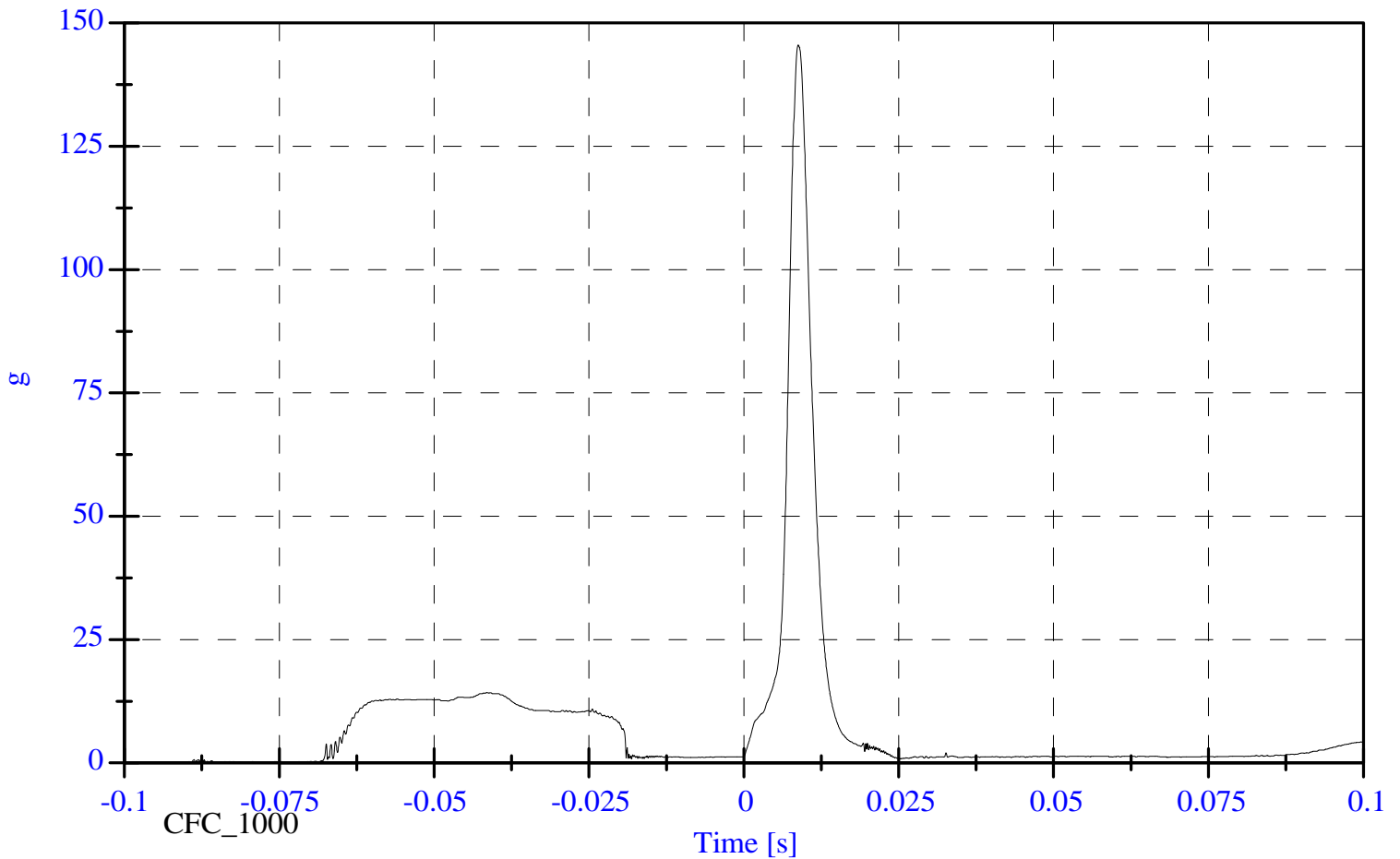
Maximum: 145.6 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 145.6 [g] at 0.009 [s]

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



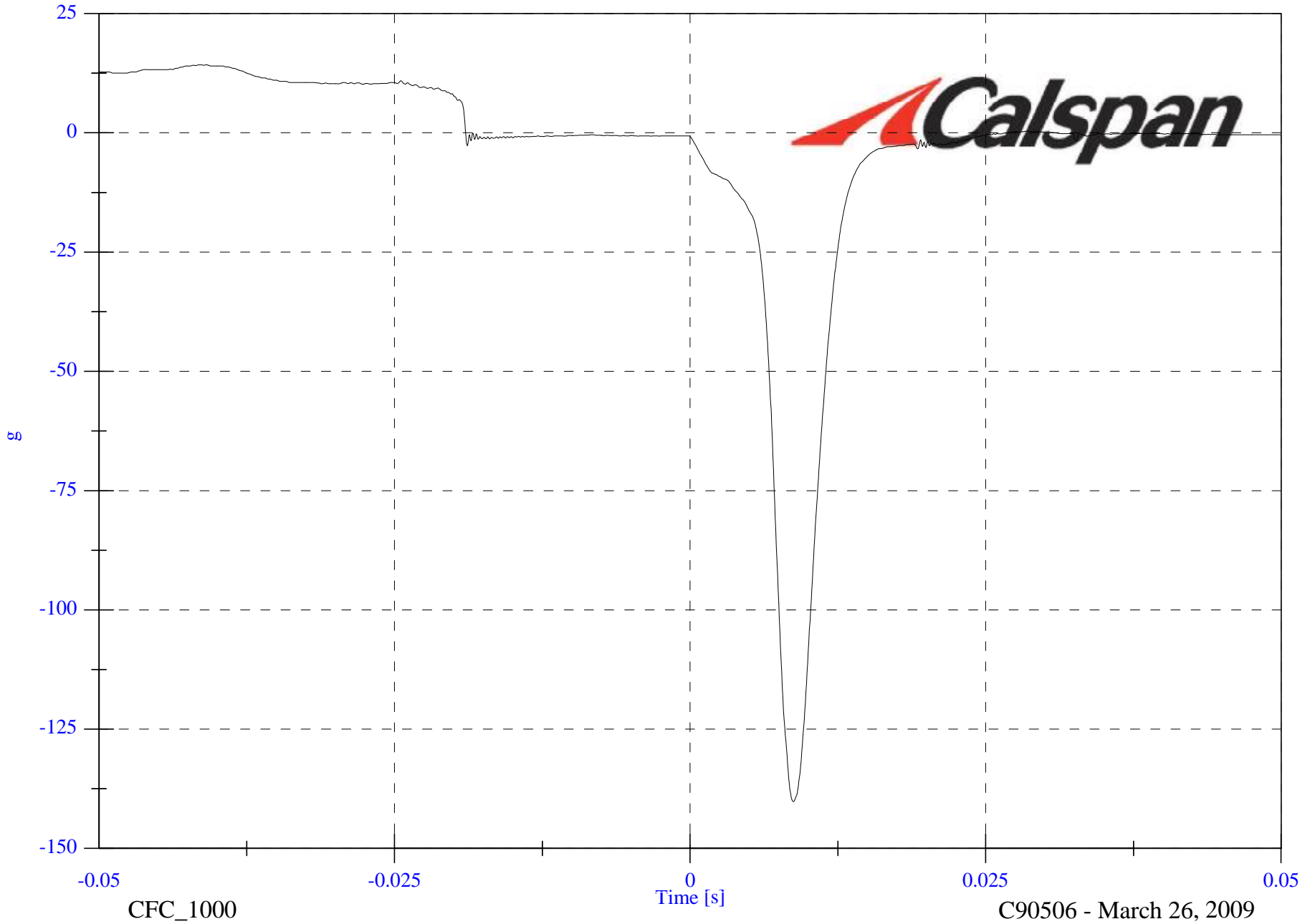
FMVSS 201U 09 HYUNDAI ELANTRA

Headform X Acceleration

Max: 14.3 [g] at -0.041 [s]

Min: -140.2 [g] at 0.009 [s]

C90506 PASSENGER SIDE AP1 IMPACT PLOT #1



CFC\_1000

C90506 - March 26, 2009

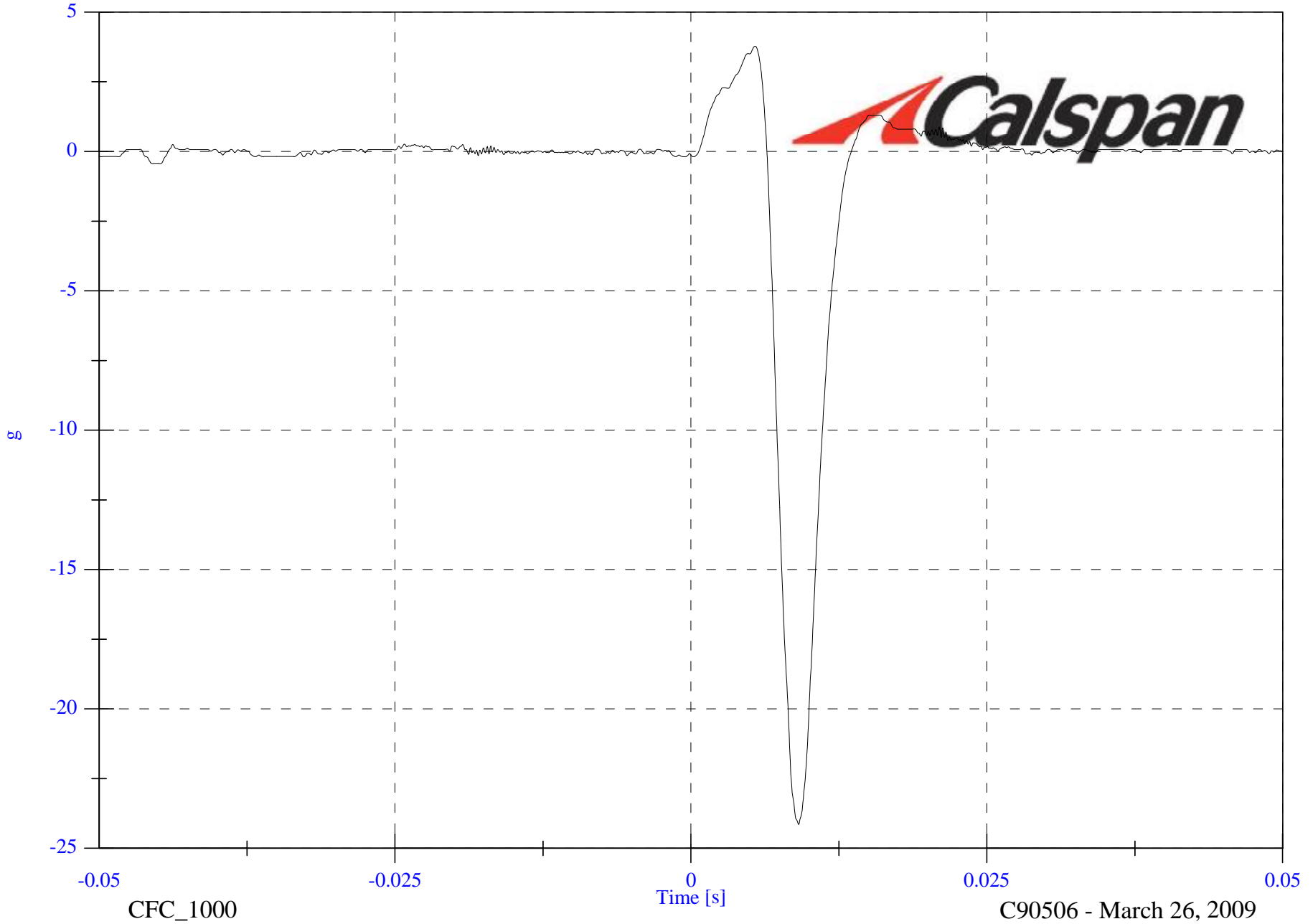
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 3.8 [g] at 0.005 [s]

Min: -24.1 [g] at 0.009 [s]

C90506 PASSENGER SIDE AP1 IMPACT PLOT #2





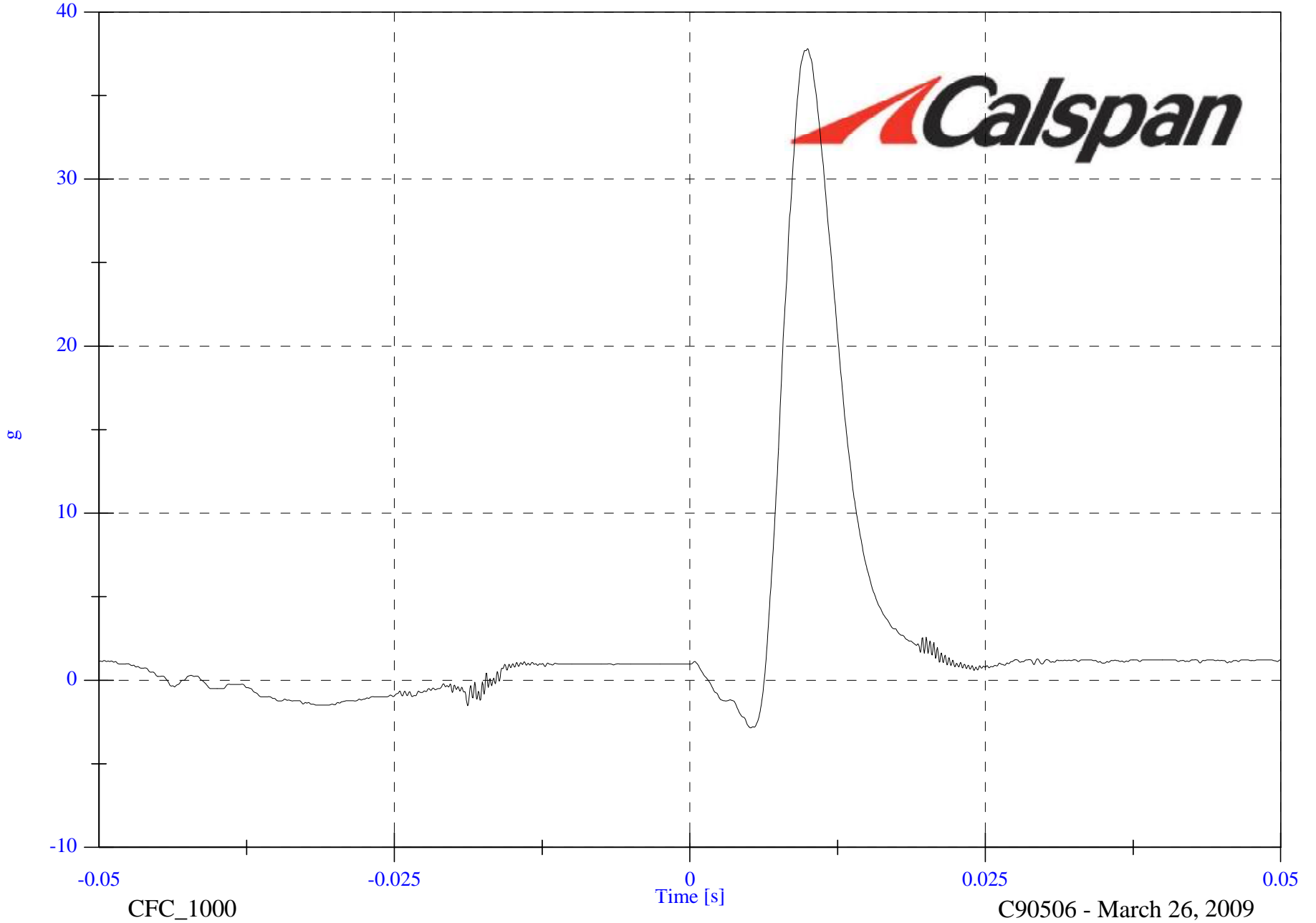
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 37.8 [g] at 0.010 [s]

Min: -2.8 [g] at 0.005 [s]

C90506 PASSENGER SIDE AP1 IMPACT PLOT #3



CFC\_1000

C90506 - March 26, 2009

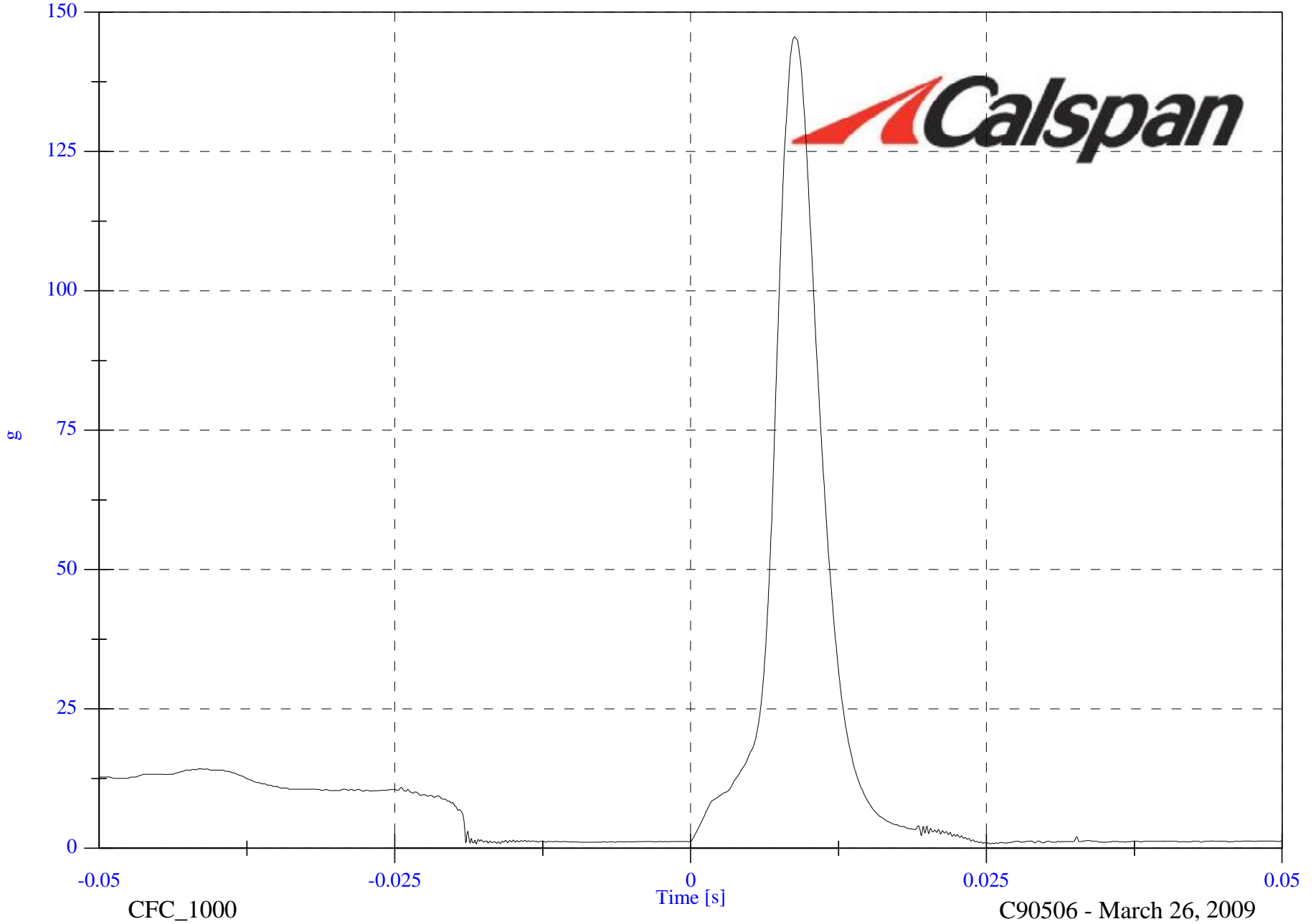
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 145.6 [g] at 0.009 [s]

Min: 0.8 [g] at -0.018 [s]

C90506 PASSENGER SIDE AP1 IMPACT PLOT #4



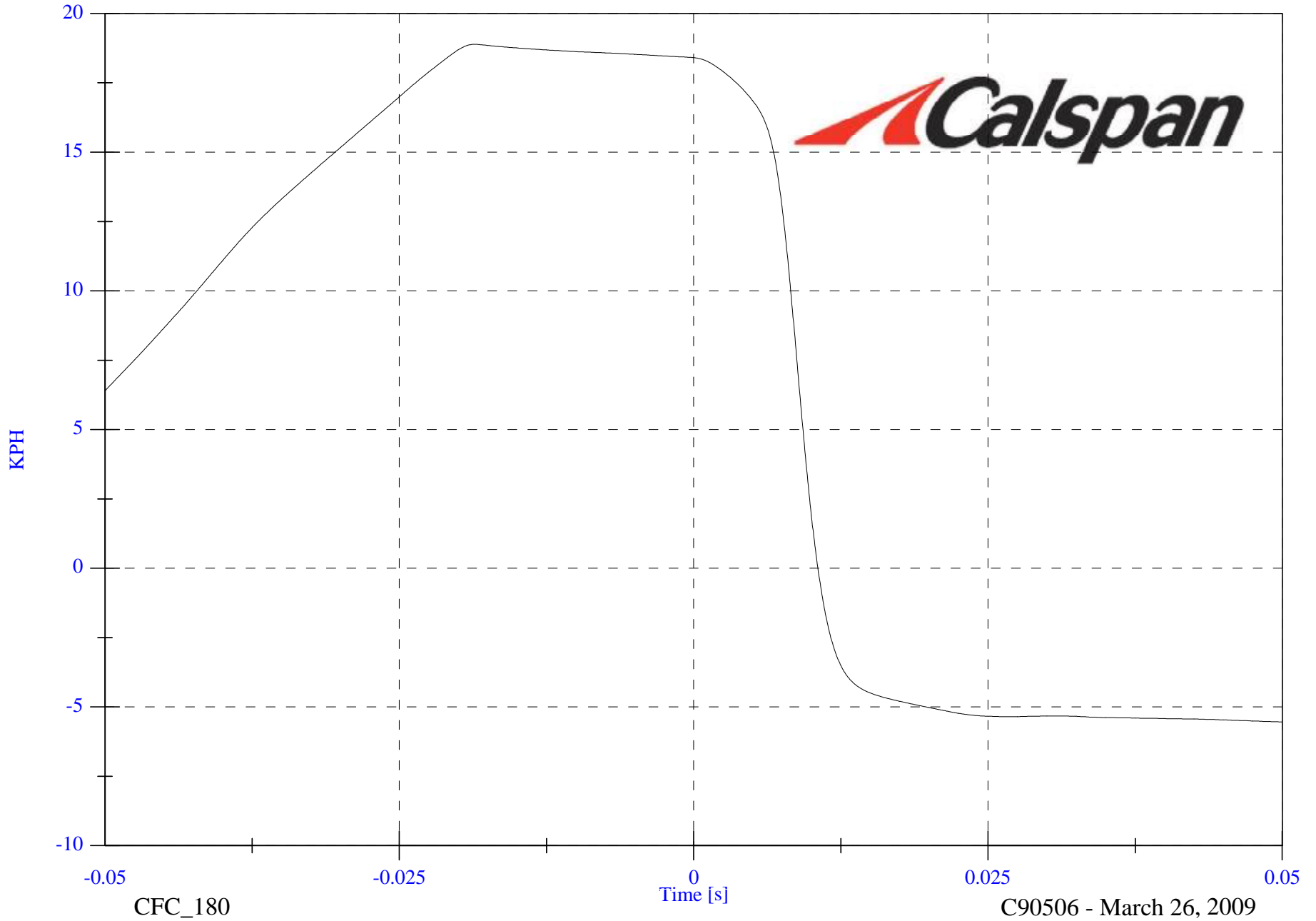
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 18.9 [KPH] at -0.019 [s]

Min: -5.5 [KPH] at 0.050 [s]

Headform Velocity

C90506 PASSENGER SIDE AP1 IMPACT PLOT #5



CFC\_180

C90506 - March 26, 2009



PRE-IMPACT API



POST-IMPACT AP1

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMHDU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	09
Test Date:	03/27/09
Target Location:	OTHER PILLAR
Target Code:	OP2
Horizontal Impact Angle:	270°
Vertical Impact Angle:	4°
Ambient Temperature:	23°C
Relative Humidity:	23
Time of Impact:	9:15
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	26		mm up



POST-IMPACT OP2 HEADFORM

Free Motion HIC	316.0
HIC(d)	404.8
Impact Velocity (kph)	23.55
HIC T1 (msec)	2.4
HIC T2 (msec)	13.9

TRIM CRACKED UPON IMPACT

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - OP2

FMH Headform 0355

Location: OP2

Test Date: March 27, 2009

Work File: OP2

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 404.8

Lab Humidity: 23 %

HIC (36ms): 316.0

Velocity at Impact: 23.55 KPH

t1: 2.4 msec

t2: 13.9 msec

Free Flight Distance: 220.79 mm

Duration: 11.5 msec

Average Acceleration: 8.2 g

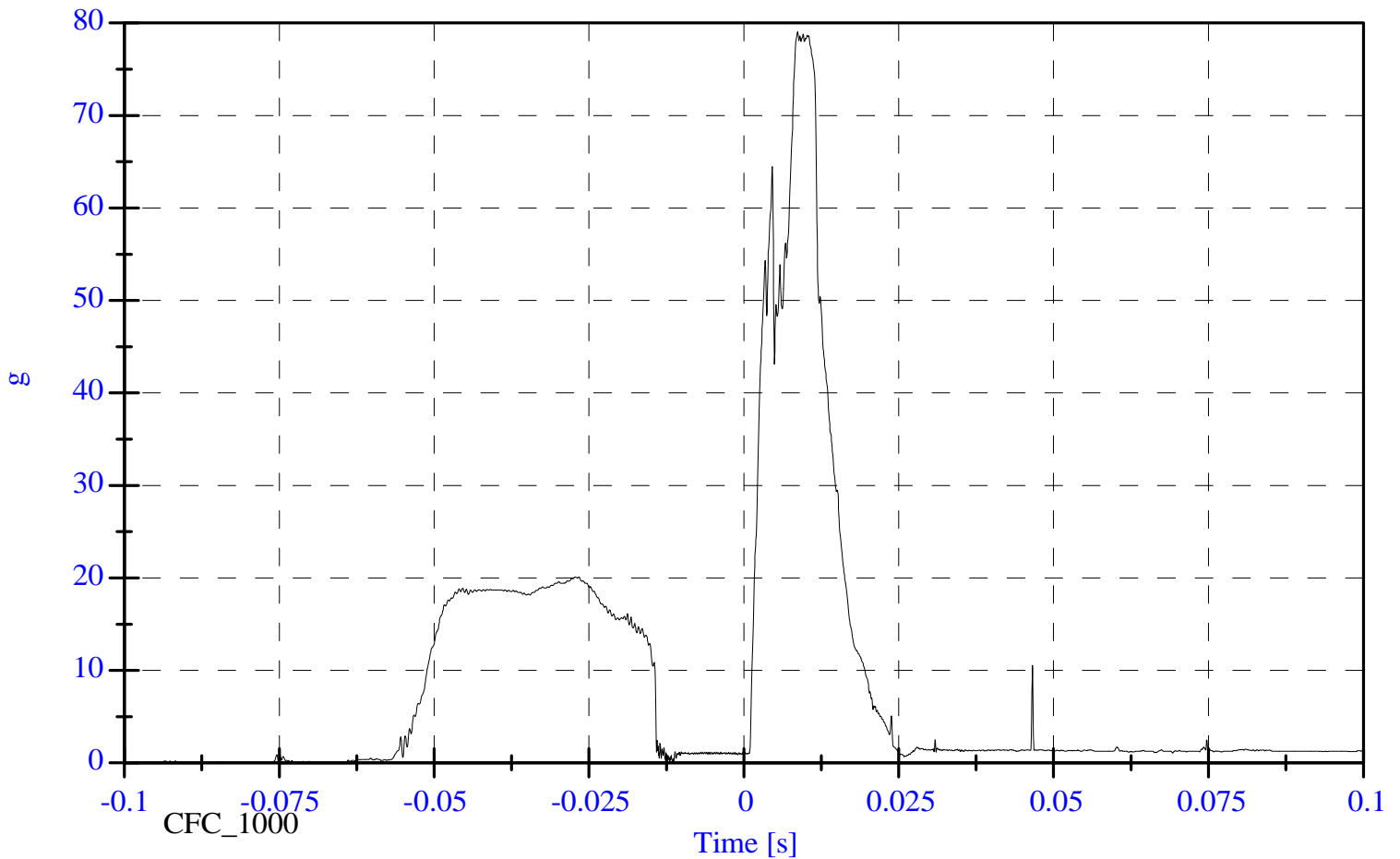
Maximum: 79.1 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 79.1 [g] at 0.009 [s]

Min: 0.0 [g] at -0.072 [s]



FMVSS 201U 09 HYUNDAI ELANTRA

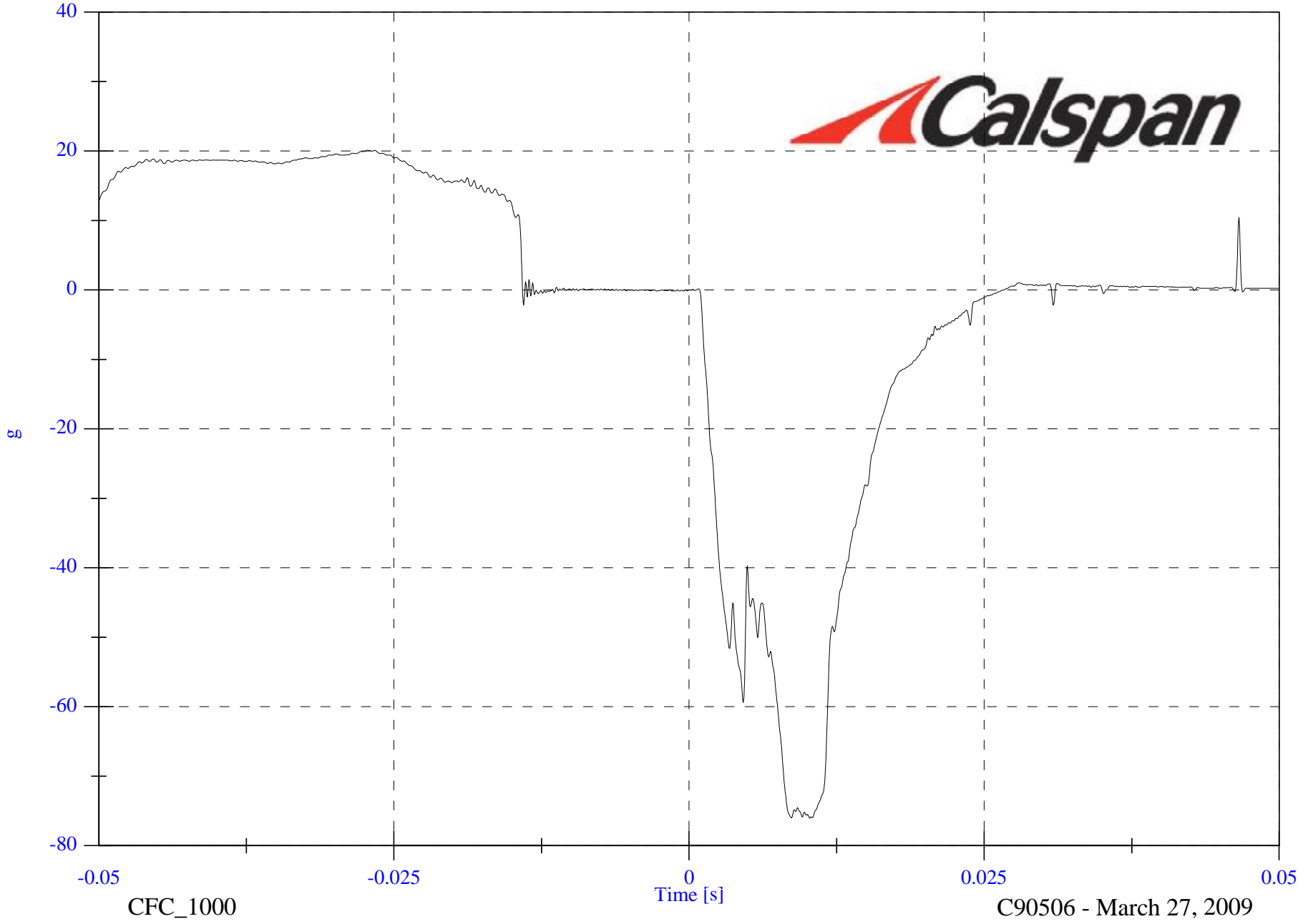
Headform X Acceleration

Max: 20.1 [g] at -0.027 [s]

Min: -76.0 [g] at 0.010 [s]



C90506 DRIVER SIDE OP2 IMPACT PLOT #1



CFC\_1000

C90506 - March 27, 2009



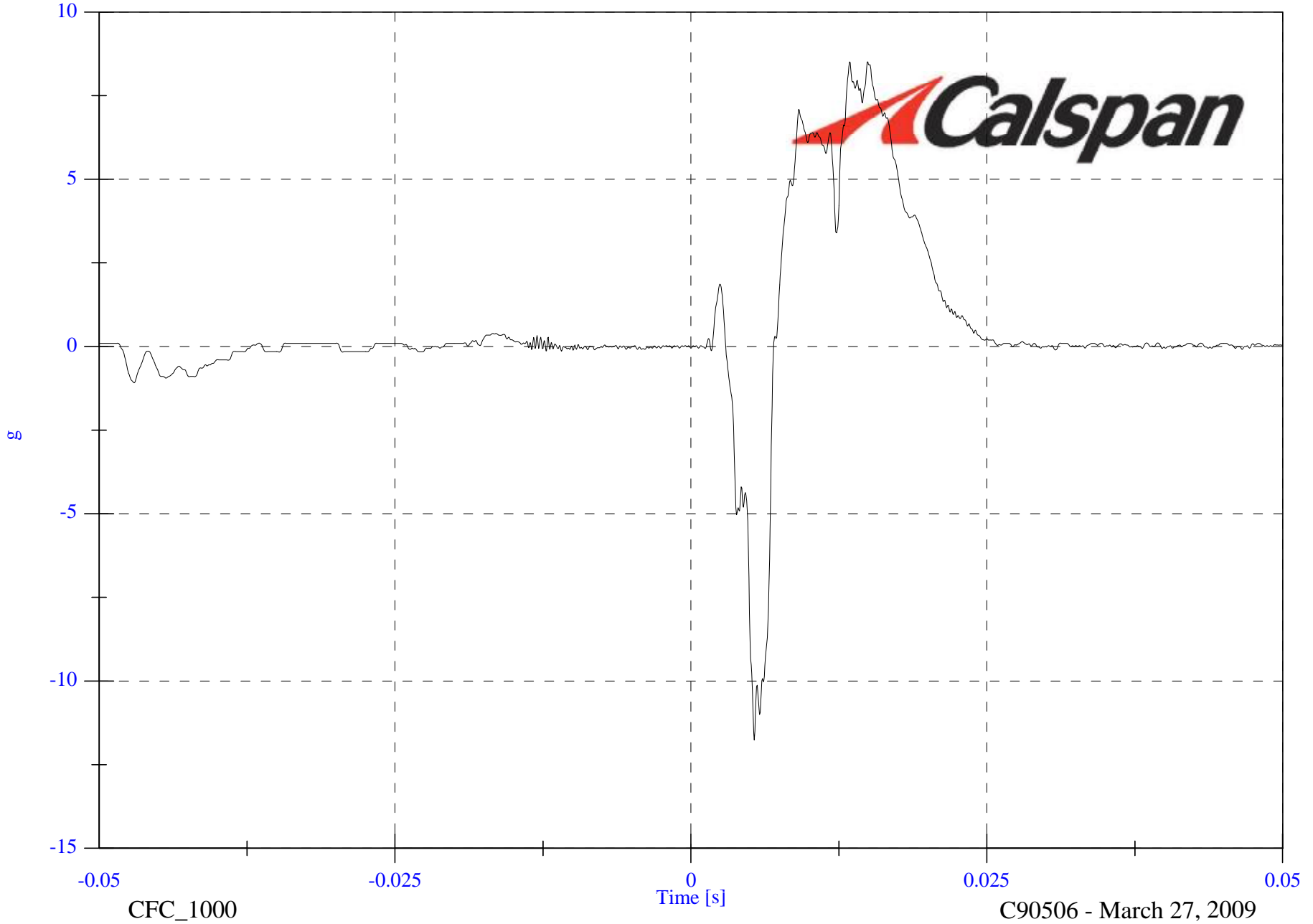
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 8.5 [g] at 0.015 [s]

Min: -11.8 [g] at 0.005 [s]

C90506 DRIVER SIDE OP2 IMPACT PLOT #2



CFC\_1000

C90506 - March 27, 2009

FMVSS 201U 09 HYUNDAI ELANTRA

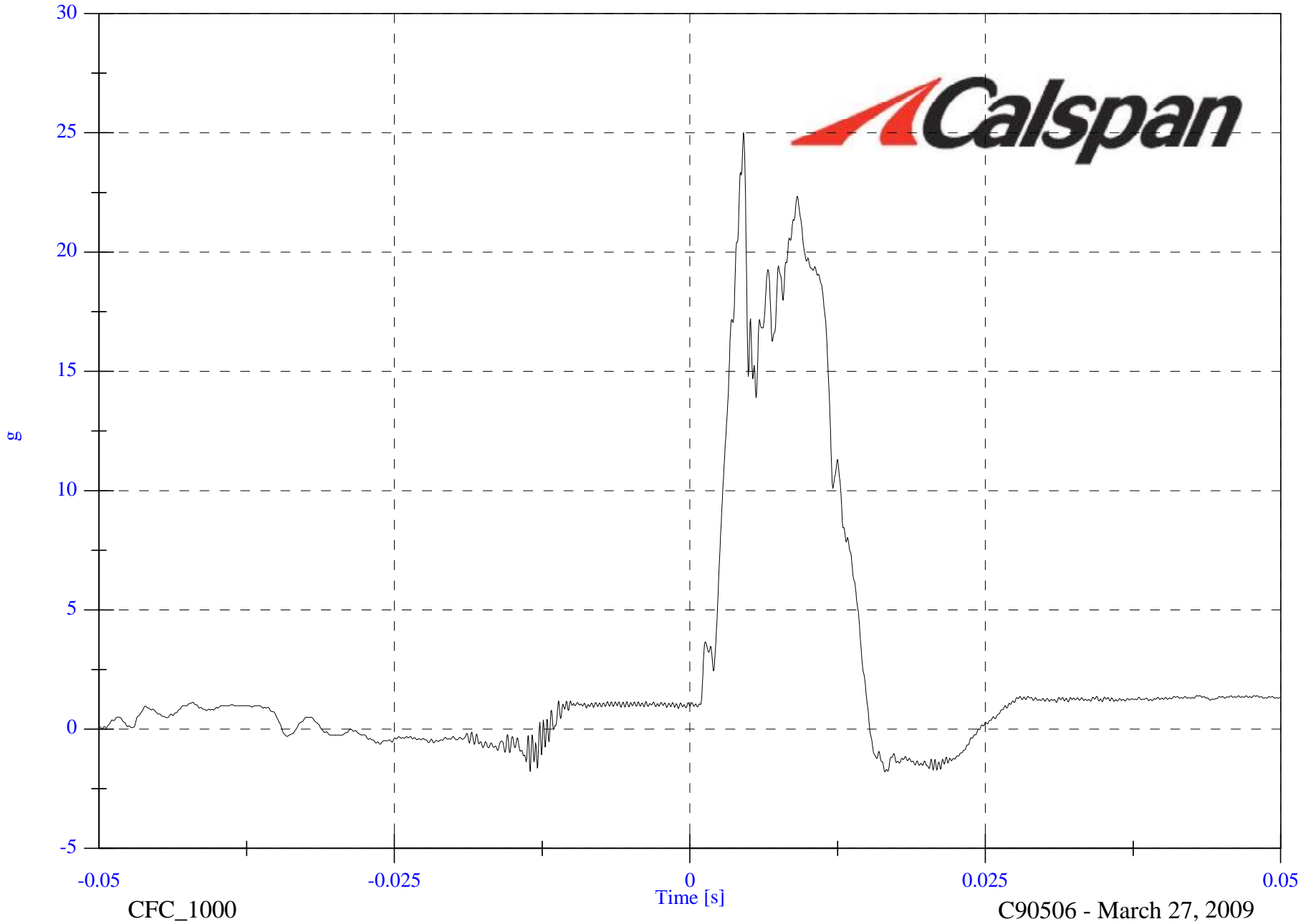
Headform Z Acceleration

Max: 25.0 [g] at 0.005 [s]

Min: -1.8 [g] at 0.016 [s]



C90506 DRIVER SIDE OP2 IMPACT PLOT #3



CFC\_1000

C90506 - March 27, 2009

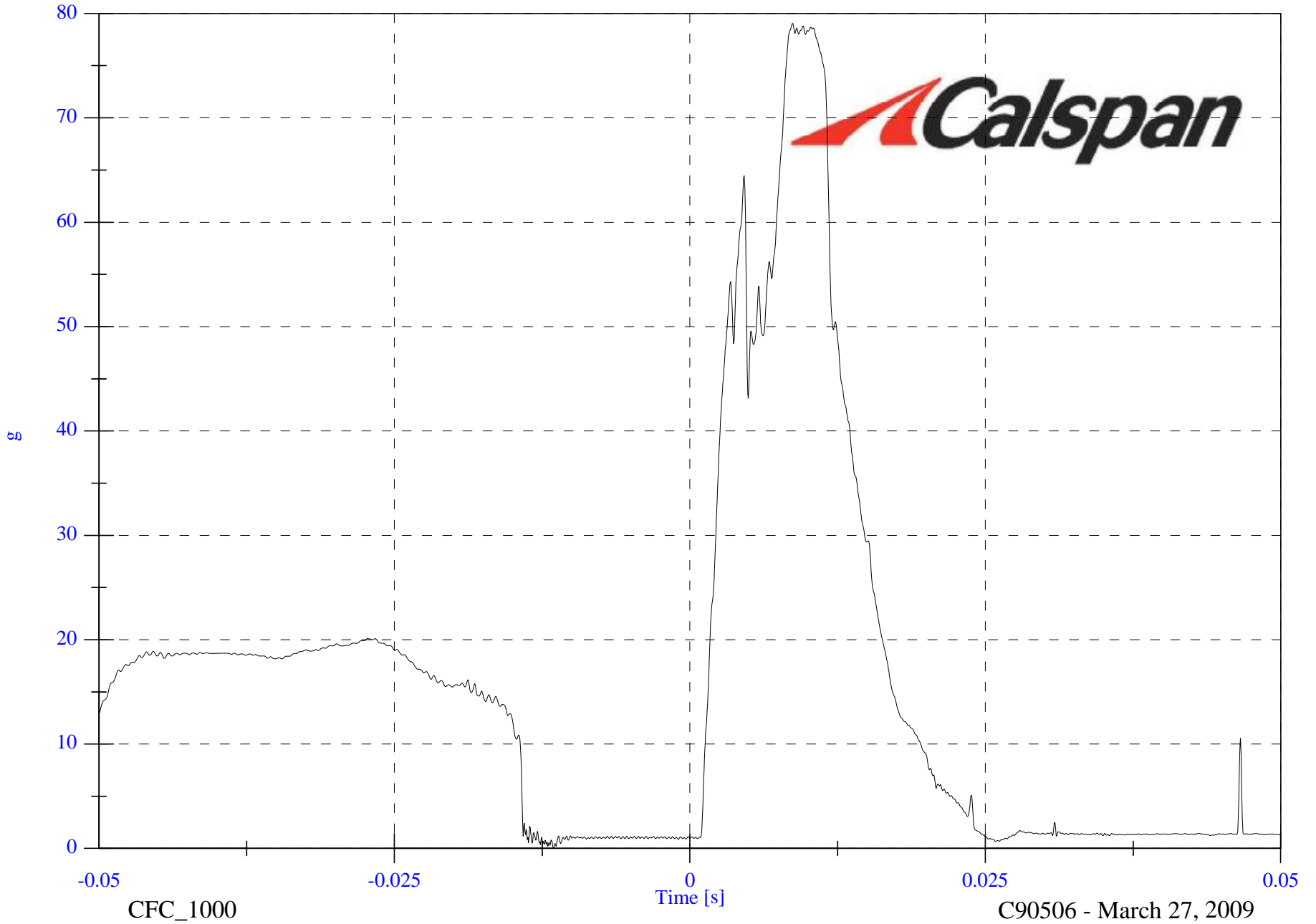
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 79.1 [g] at 0.009 [s]

Min: 0.1 [g] at -0.012 [s]

C90506 DRIVER SIDE OP2 IMPACT PLOT #4



C90506 - March 27, 2009

FMVSS 201U 09 HYUNDAI ELANTRA

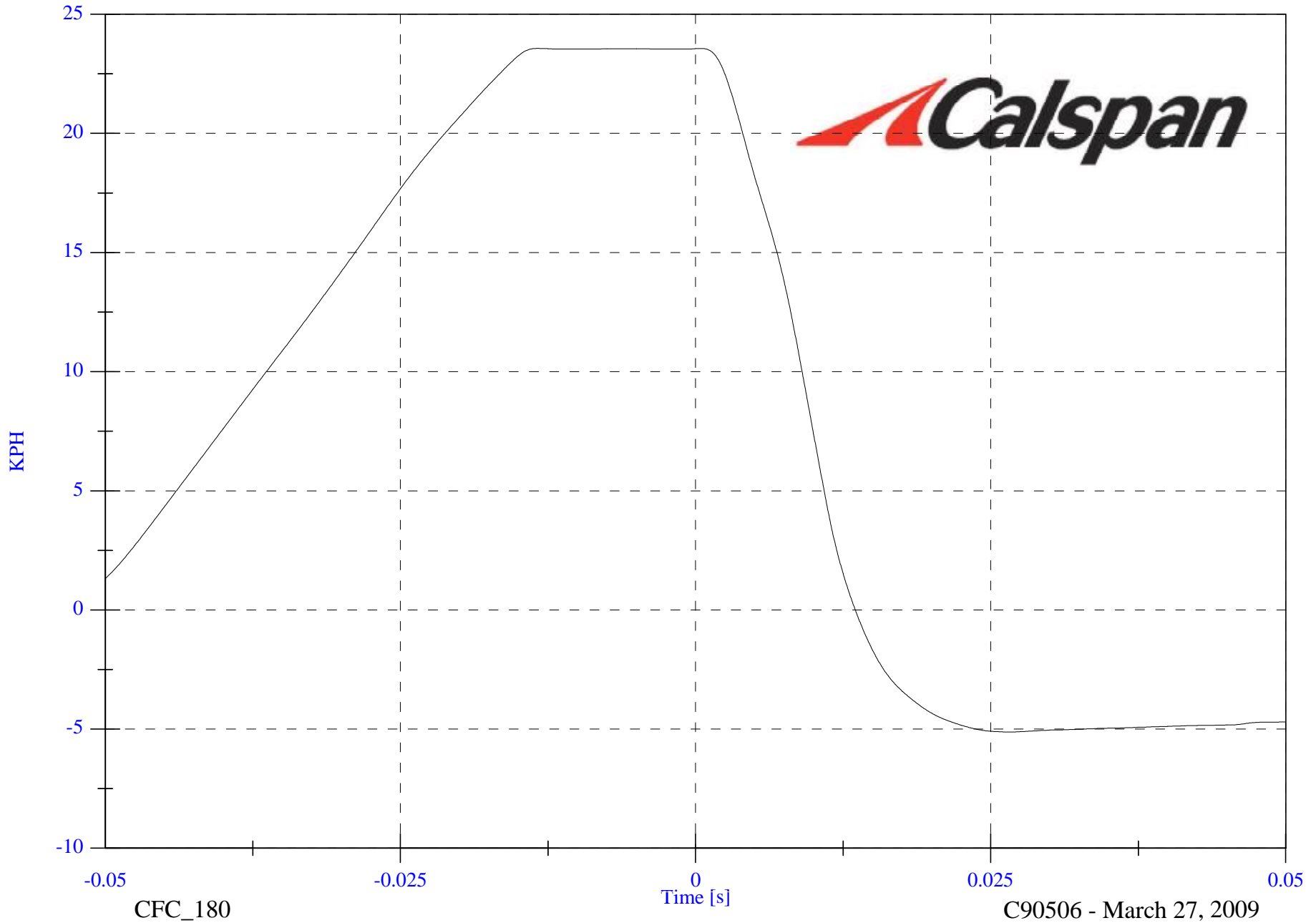
Max: 23.6 [KPH] at -0.013 [s]

Min: -5.1 [KPH] at 0.027 [s]

Headform Velocity



C90506 DRIVER SIDE OP2 IMPACT PLOT #5



CFC\_180

C90506 - March 27, 2009



PRE-IMPACT OP2



POST-IMPACT OP2

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	10
Test Date:	03/27/09
Target Location:	B-PILLAR
Target Code:	BP2
Horizontal Impact Angle:	270°
Vertical Impact Angle:	6°
Ambient Temperature:	23°C
Relative Humidity:	23
Time of Impact:	10:00
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	5		mm up



POST-IMPACT BP2 HEADFORM

Free Motion HIC	721.7
HIC(d)	710.9
Impact Velocity (kph)	23.49
HIC T1 (msec)	3.3
HIC T2 (msec)	8.6

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - BP2

FMH Headform 0805

Location: BP2

Test Date: March 27, 2009

Work File: BP2

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 710.9

Lab Humidity: 23 %

HIC (36ms): 721.7

Velocity at Impact: 23.49 KPH

t1: 3.2 msec

t2: 8.6 msec

Free Flight Distance: 217.06 mm

Duration: 5.4 msec

Average Acceleration: 9.1 g

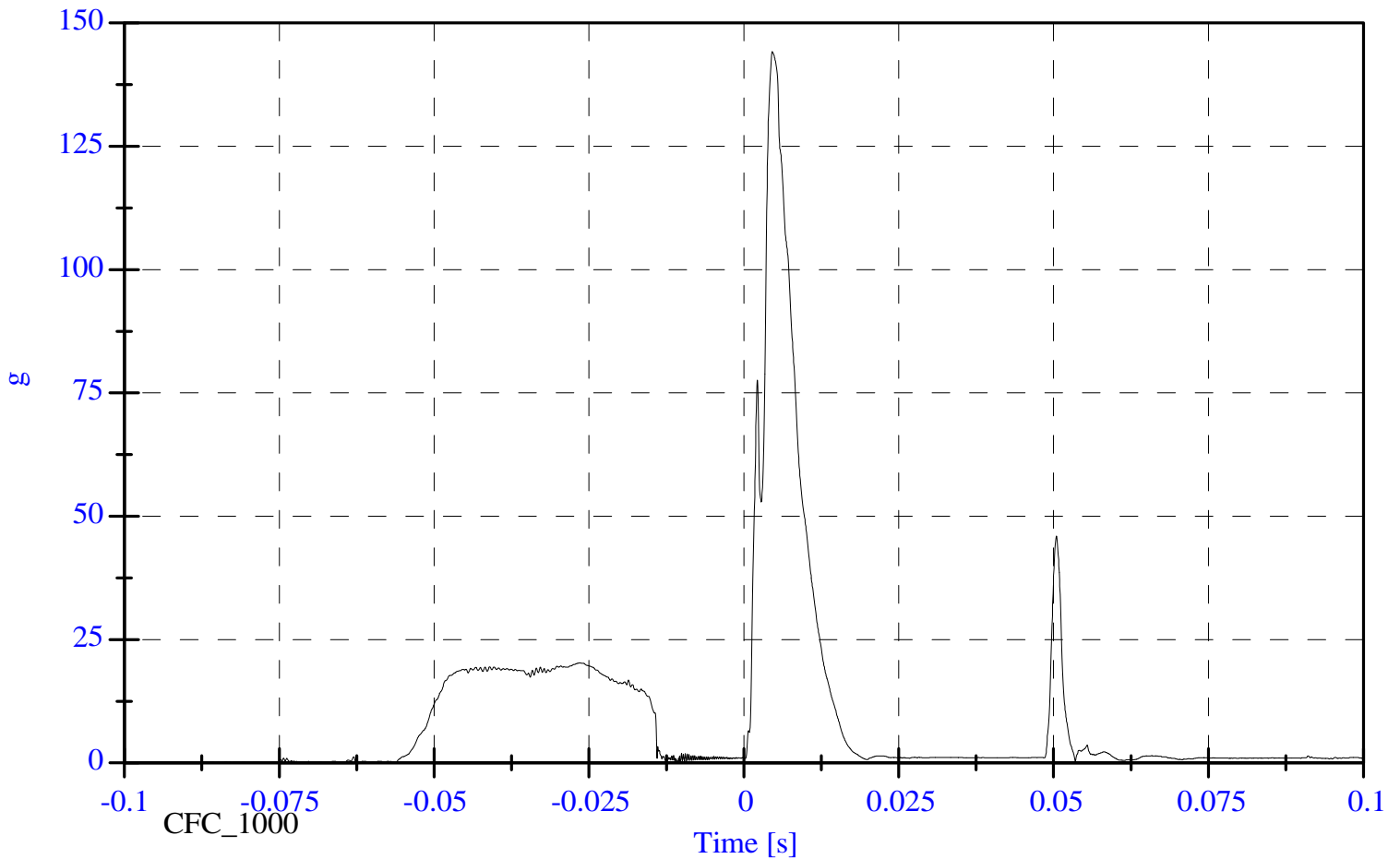
Maximum: 144.2 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 144.2 [g] at 0.005 [s]

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



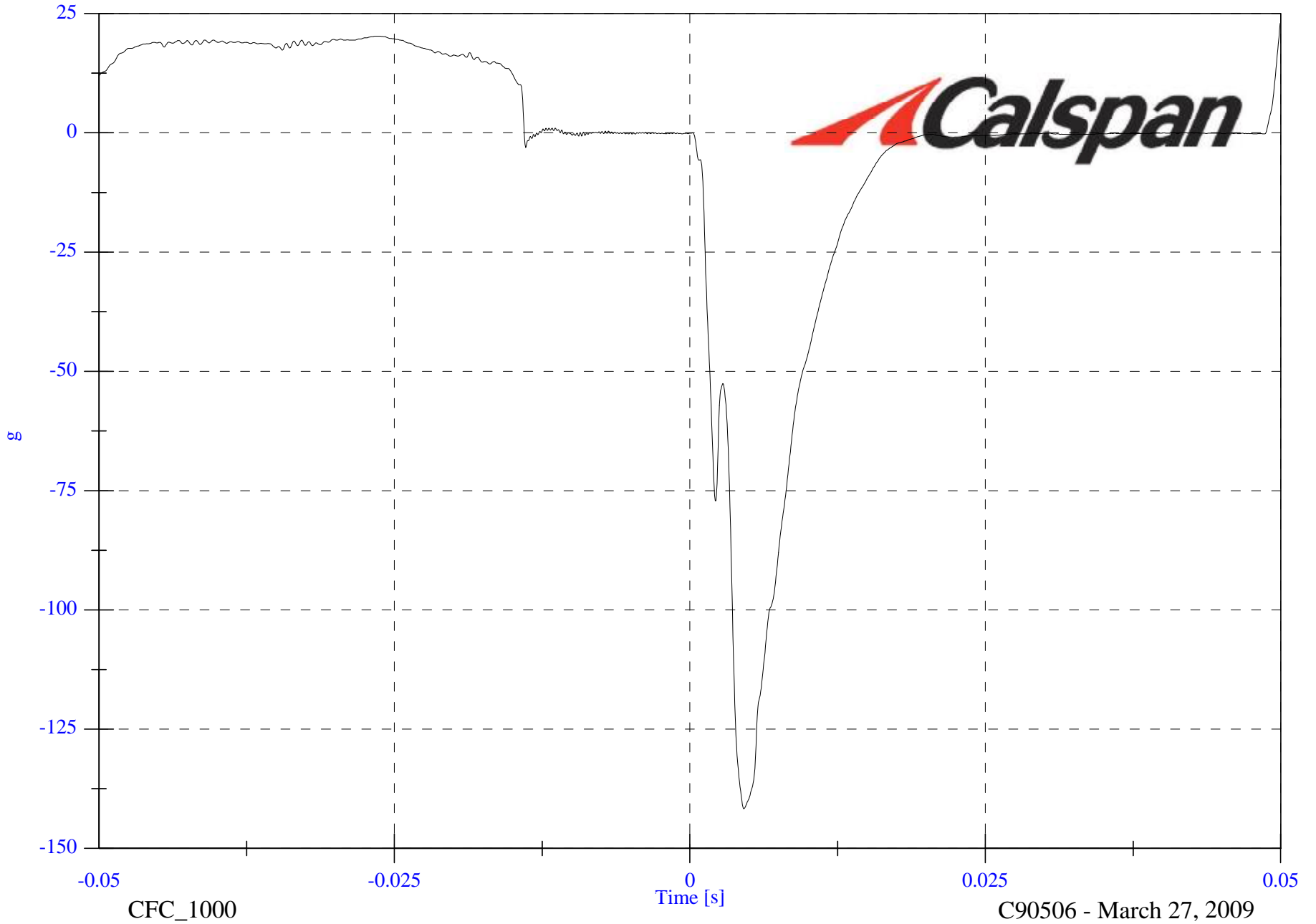


FMVSS 201U 09 HYUNDAI ELANTRA

Headform X Acceleration

Max: 23.0 [g] at 0.050 [s]  
Min: -141.7 [g] at 0.005 [s]

C90506 DRIVER SIDE BP2 IMPACT PLOT #1



C90506 - March 27, 2009

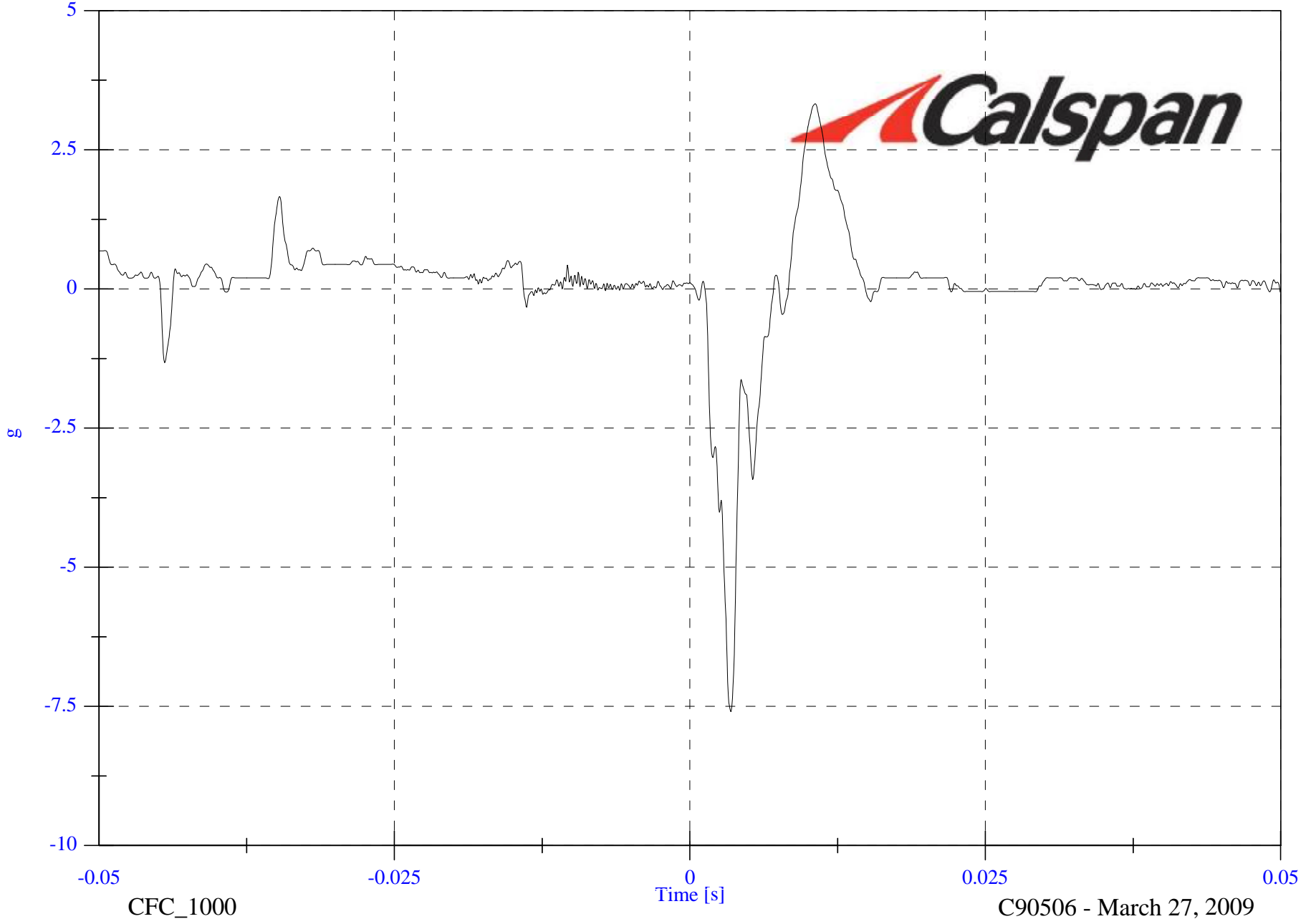
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 3.3 [g] at 0.011 [s]

Min: -7.6 [g] at 0.003 [s]

C90506 DRIVER SIDE BP2 IMPACT PLOT #2



C90506 - March 27, 2009

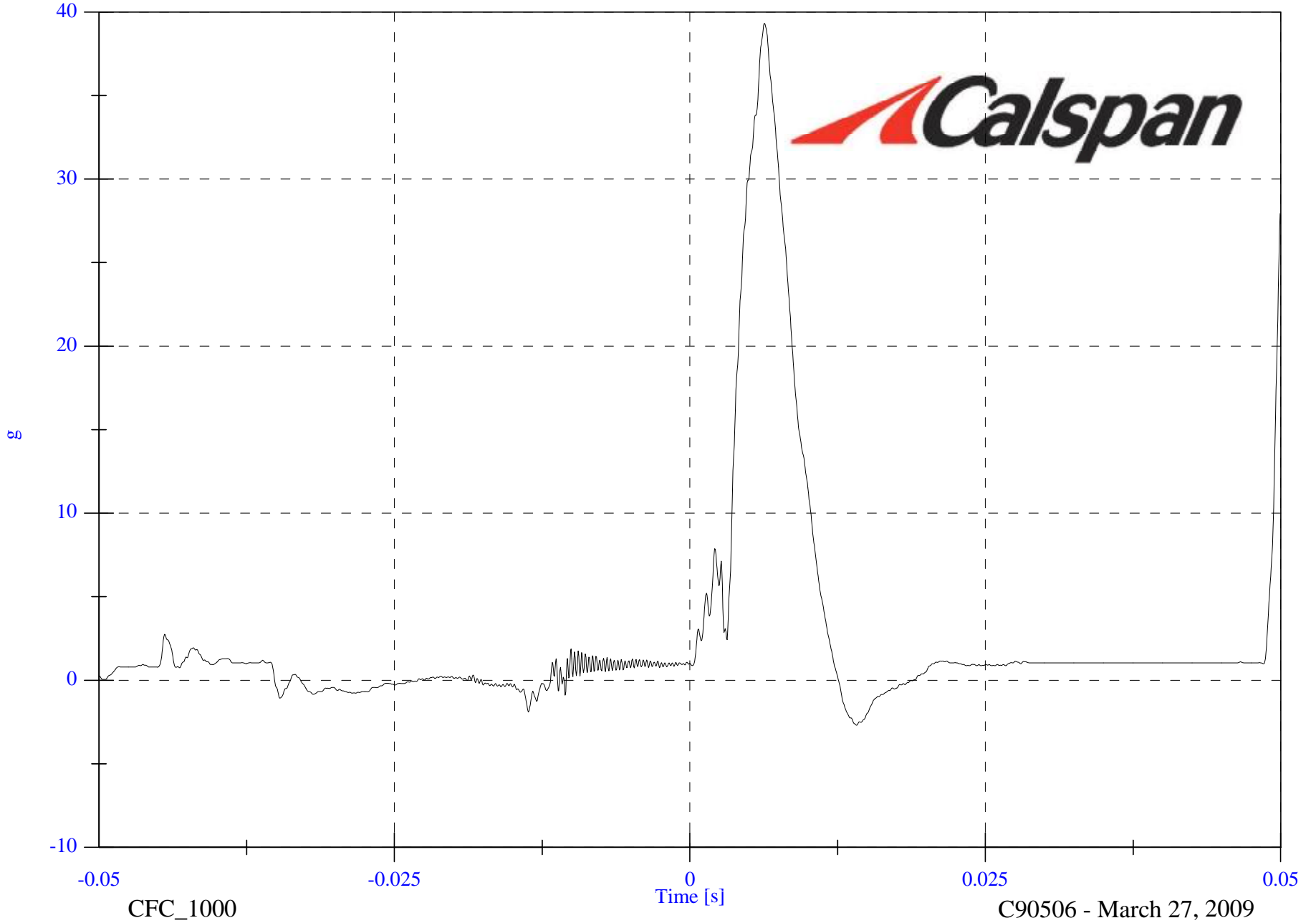
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 39.3 [g] at 0.006 [s]

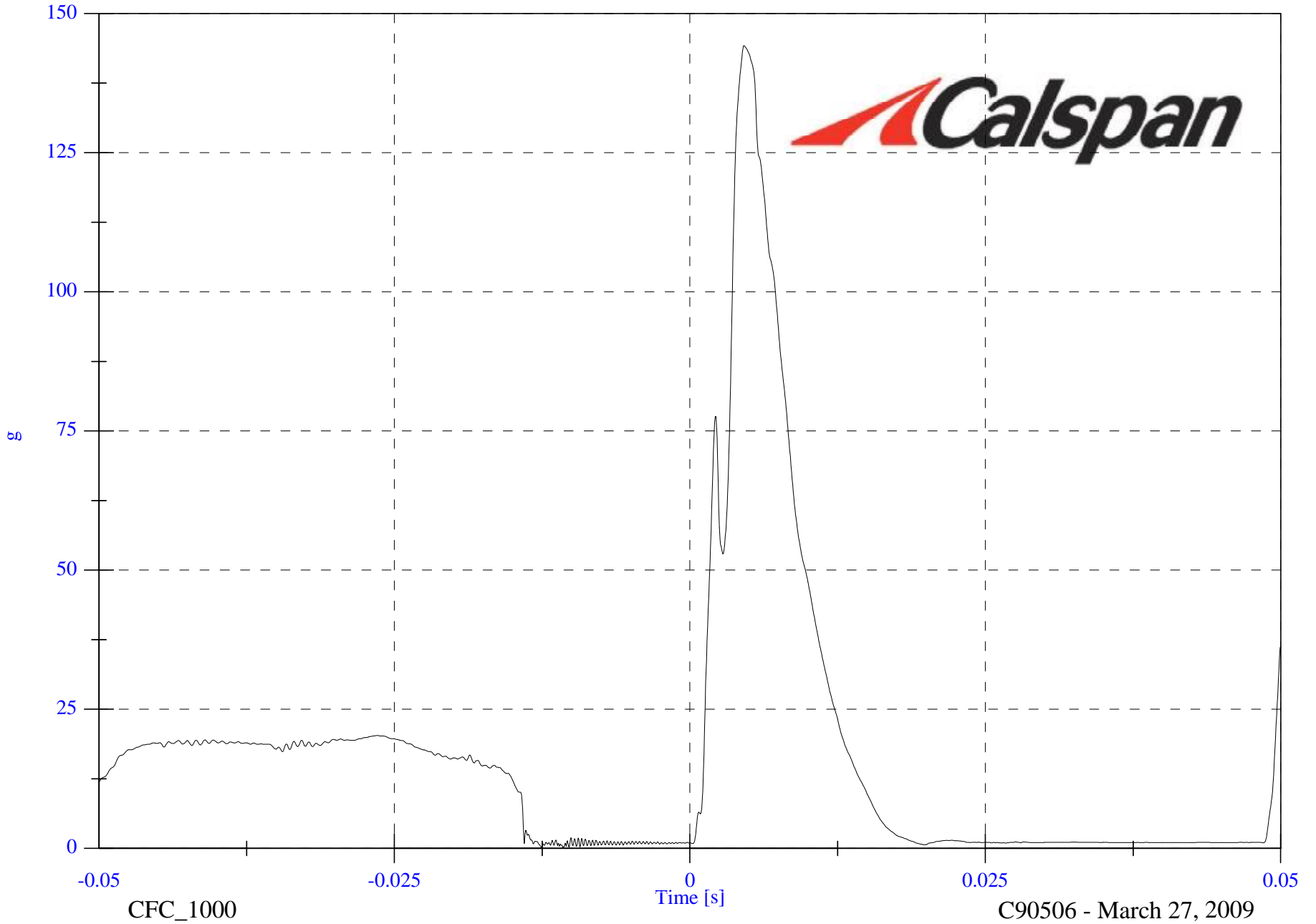
Min: -2.7 [g] at 0.014 [s]

C90506 DRIVER SIDE BP2 IMPACT PLOT #3



C90506 - March 27, 2009

C90506 DRIVER SIDE BP2 IMPACT PLOT #4



FMVSS 201U 09 HYUNDAI ELANTRA

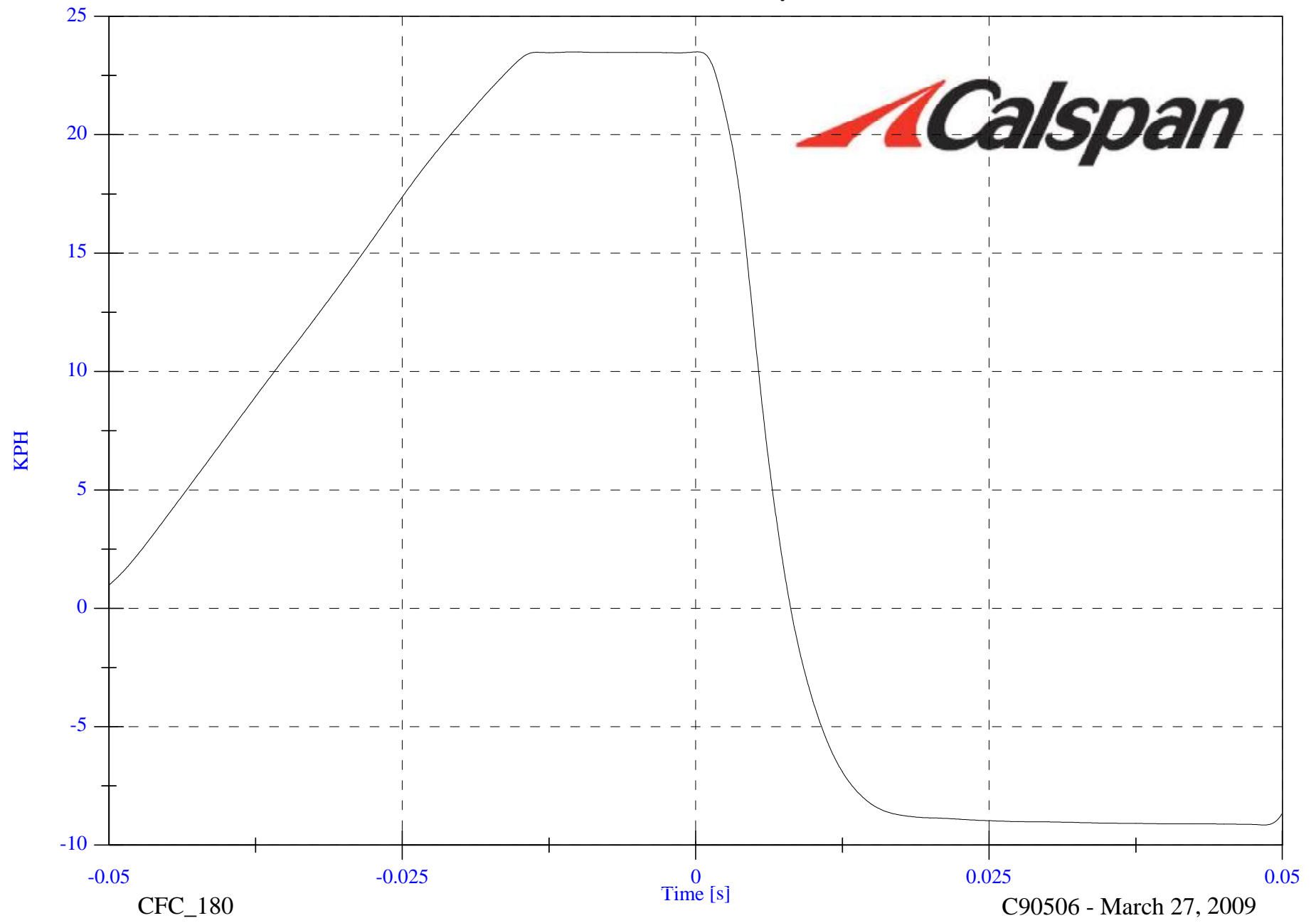
Max: 23.5 [KPH] at 0.000 [s]

Min: -9.2 [KPH] at 0.048 [s]

Headform Velocity



C90506 DRIVER SIDE BP2 IMPACT PLOT #5



CFC\_180

C90506 - March 27, 2009



PRE-IMPACT BP2

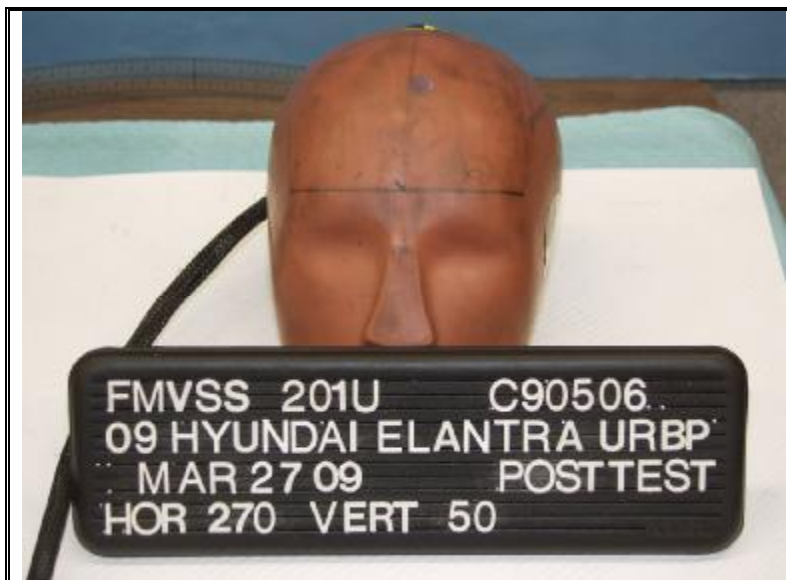


POST-IMPACT BP2

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMHDU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	11
Test Date:	03/27/09
Target Location:	UPPER ROOF
Target Code:	URBP
Horizontal Impact Angle:	270°
Vertical Impact Angle:	50°
Ambient Temperature:	23°C
Relative Humidity:	23
Time of Impact:	10:35
Headform Number:	0062

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	54				mm up



POST-IMPACT URBPHEADFORM

Free Motion HIC	726.8
HIC(d)	714.8
Impact Velocity (kph)	23.39
HIC T1 (msec)	4.5
HIC T2 (msec)	12.2



# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - URBP

FMH Headform 0062

Location: URBP

Test Date: March 27, 2009

Work File: URBP

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 714.8

Lab Humidity: 23 %

HIC (36ms): 726.8

Velocity at Impact: 23.39 KPH

t1: 4.5 msec

t2: 12.2 msec

Free Flight Distance: 223.08 mm

Duration: 7.6 msec

Average Acceleration: 10.7 g

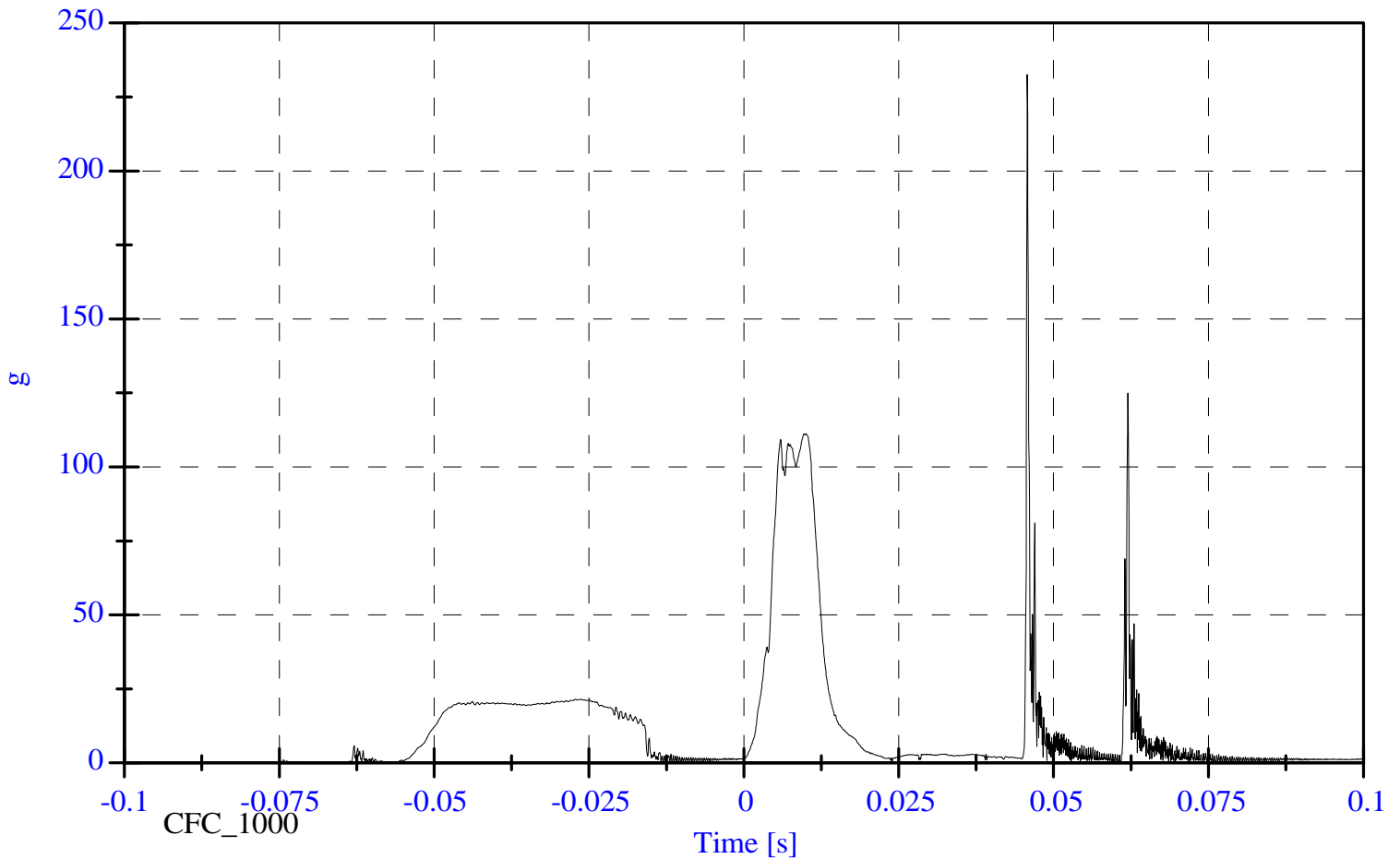
Maximum: 111.3 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 111.3 [g] at 0.010 [s]

Min: 0.0 [g] at -0.080 [s]



FMVSS 201U 09 HYUNDAI ELANTRA

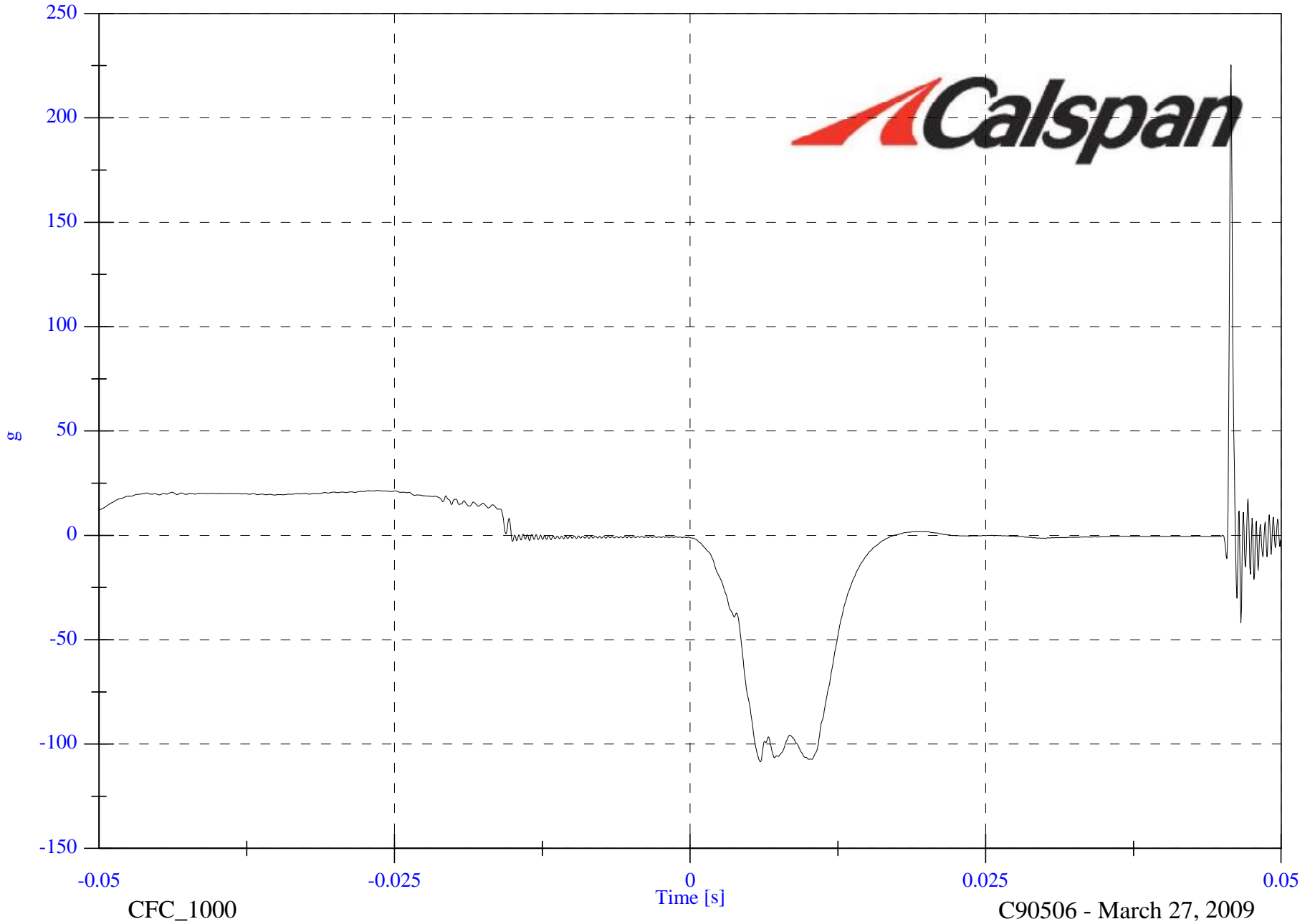
Headform X Acceleration

Max: 225.4 [g] at 0.046 [s]

Min: -108.6 [g] at 0.006 [s]



C90506 DRIVER SIDE URBP IMPACT PLOT #1



CFC\_1000

C90506 - March 27, 2009

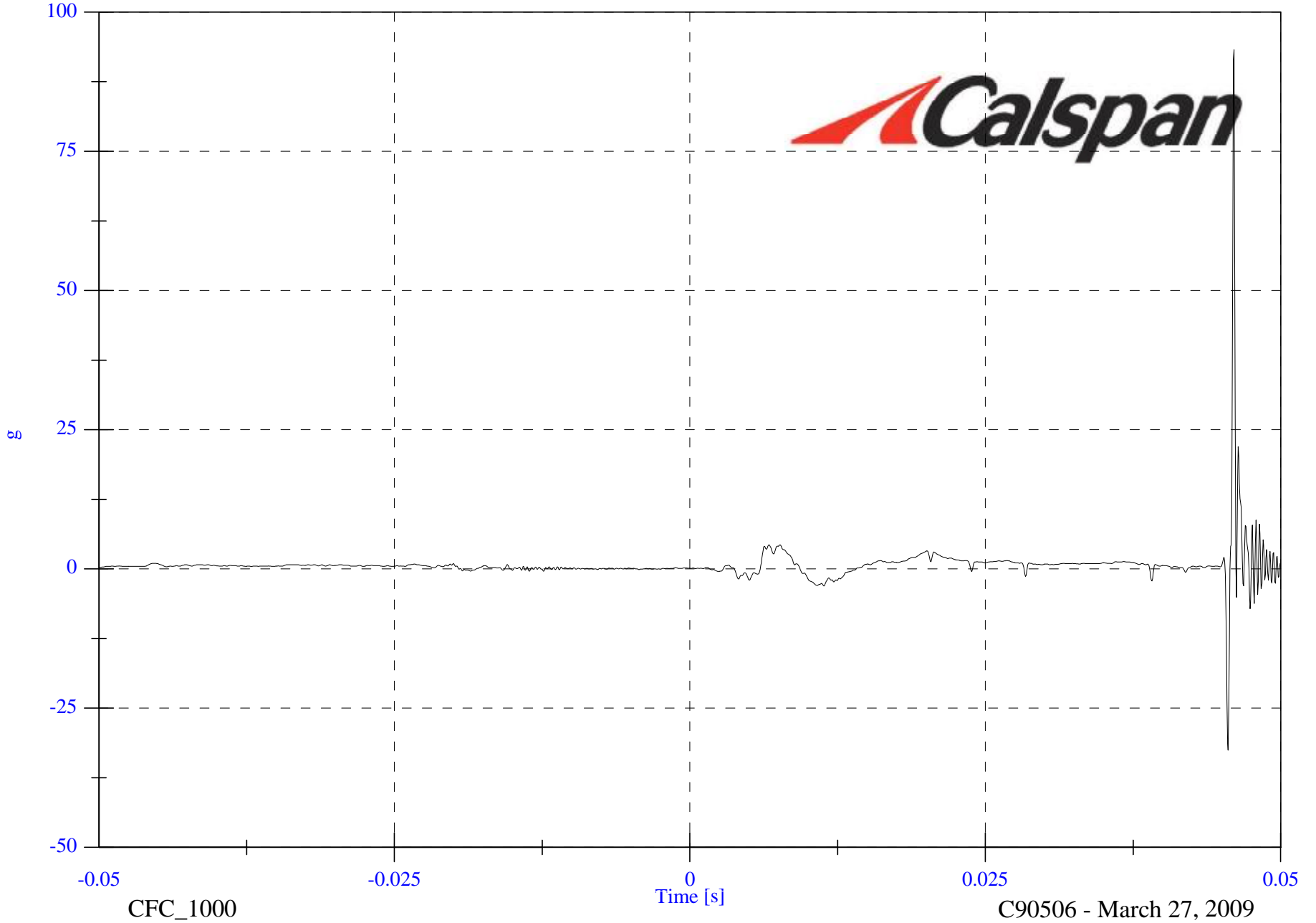
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 93.2 [g] at 0.046 [s]

Min: -32.6 [g] at 0.046 [s]

C90506 DRIVER SIDE URBP IMPACT PLOT #2



C90506 - March 27, 2009

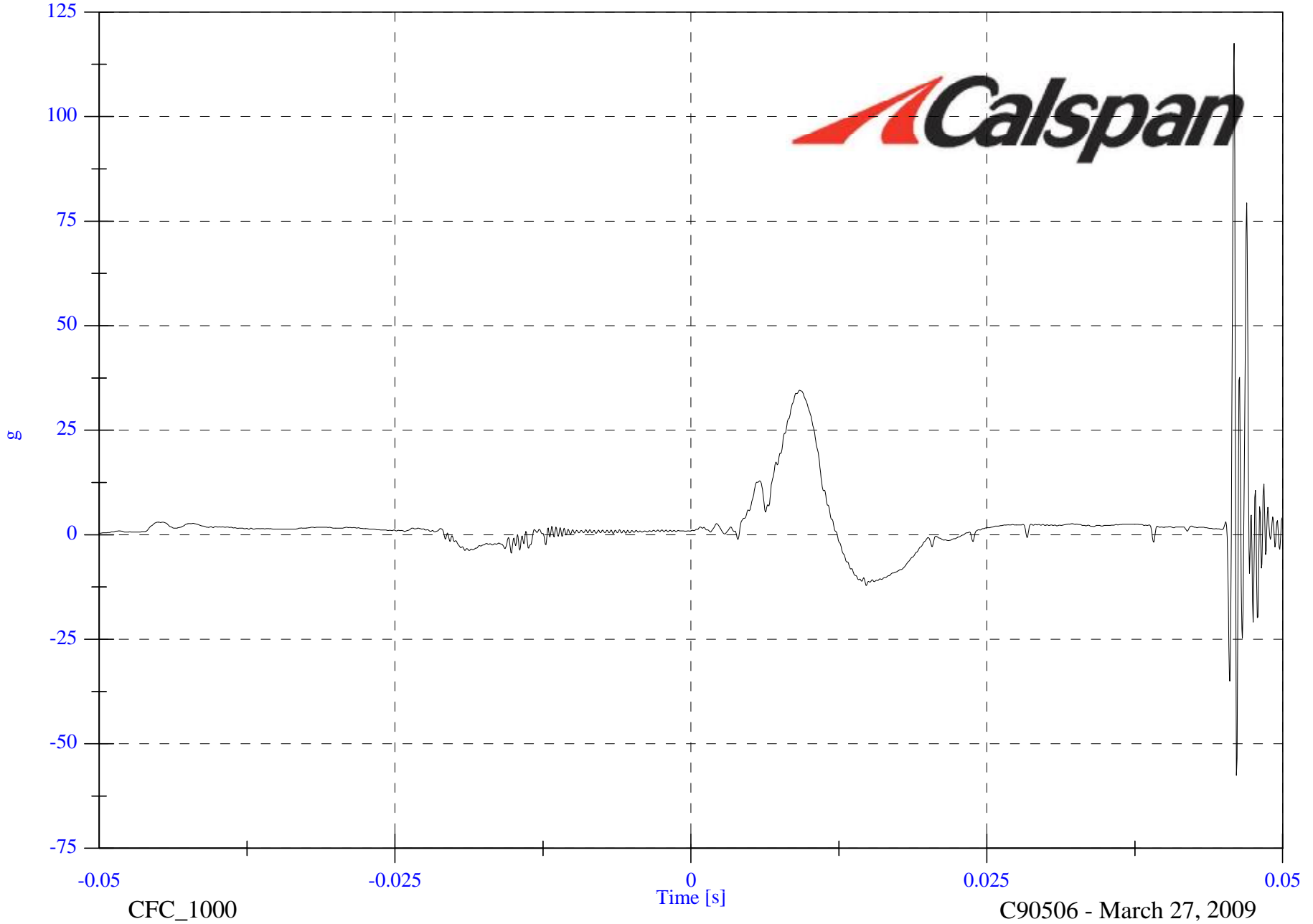
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 117.5 [g] at 0.046 [s]

Min: -57.5 [g] at 0.046 [s]

C90506 DRIVER SIDE URBP IMPACT PLOT #3



CFC\_1000

C90506 - March 27, 2009

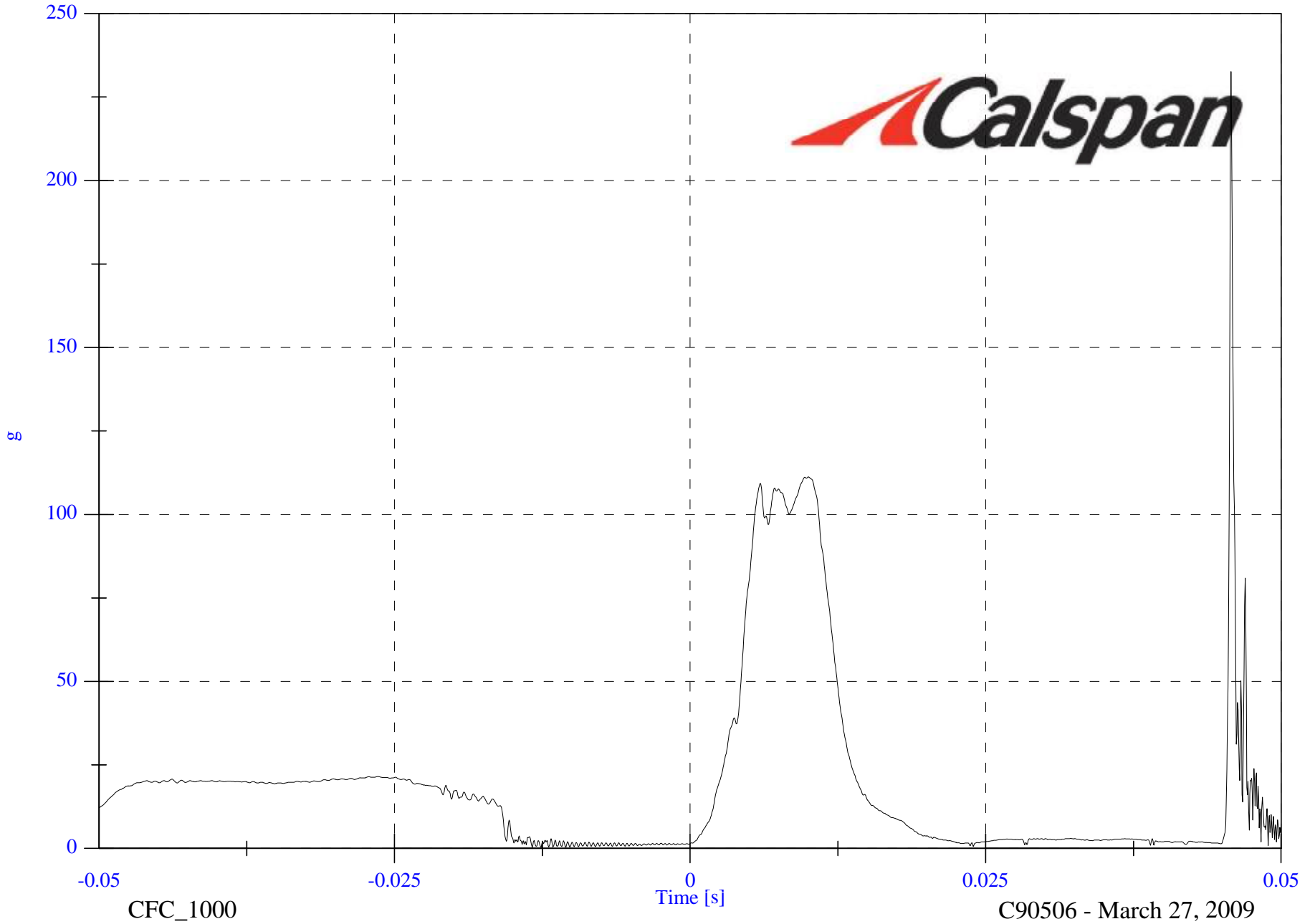
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 232.6 [g] at 0.046 [s]

Min: 0.3 [g] at -0.013 [s]

C90506 DRIVER SIDE URBP IMPACT PLOT #4



C90506 - March 27, 2009

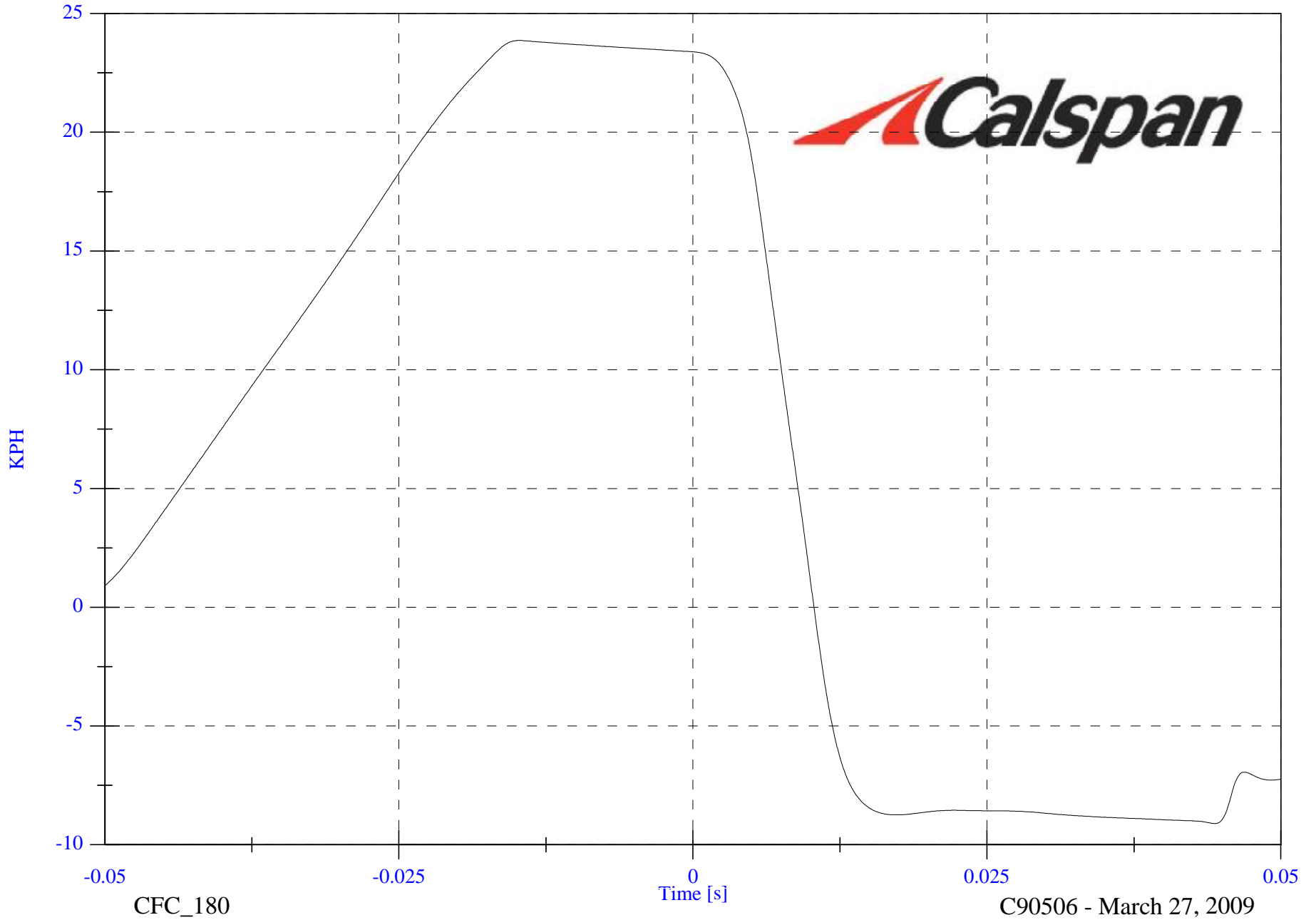
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 23.9 [KPH] at -0.015 [s]

Min: -9.1 [KPH] at 0.044 [s]

Headform Velocity

C90506 DRIVER SIDE URBP IMPACT PLOT #5



CFC\_180

C90506 - March 27, 2009



PRE-IMPACT URBP



POST-IMPACT URBP



VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Hyundai Elantra
VIN:	KMH DU46DX9U626955
DATE OF MANUFACTURE:	11/08(SEE CERTIFICATION LABEL)
COLOR:	Black

Test Number:	12
Test Date:	03/27/09
Target Location:	A-PILLAR
Target Code:	AP3
Horizontal Impact Angle:	226°
Vertical Impact Angle:	41°
Ambient Temperature:	23°C
Relative Humidity:	23
Time of Impact:	12:05
Headform Number:	1142

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	26		mm up



POST-IMPACT AP3 DRIV HEADFORM

Free Motion HIC	417.9
HIC(d)	481.9
Impact Velocity (kph)	18.69
HIC T1 (msec)	6.7
HIC T2 (msec)	10.9

# FMVSS 201U 09 HYUNDAI ELANTRA C90506 - AP3

FMH Headform 1142

Location: AP3

Test Date: March 27, 2009

Work File: AP3 DRIV

## -----TEST RESULTS-----

Lab Temperature: 23 C

HICd: 481.7

Lab Humidity: 23 %

HIC (36ms): 417.9

Velocity at Impact: 18.69 KPH

t1: 6.7 msec

t2: 10.9 msec

Free Flight Distance: 219.38 mm

Duration: 4.2 msec

Average Acceleration: 9.3 g

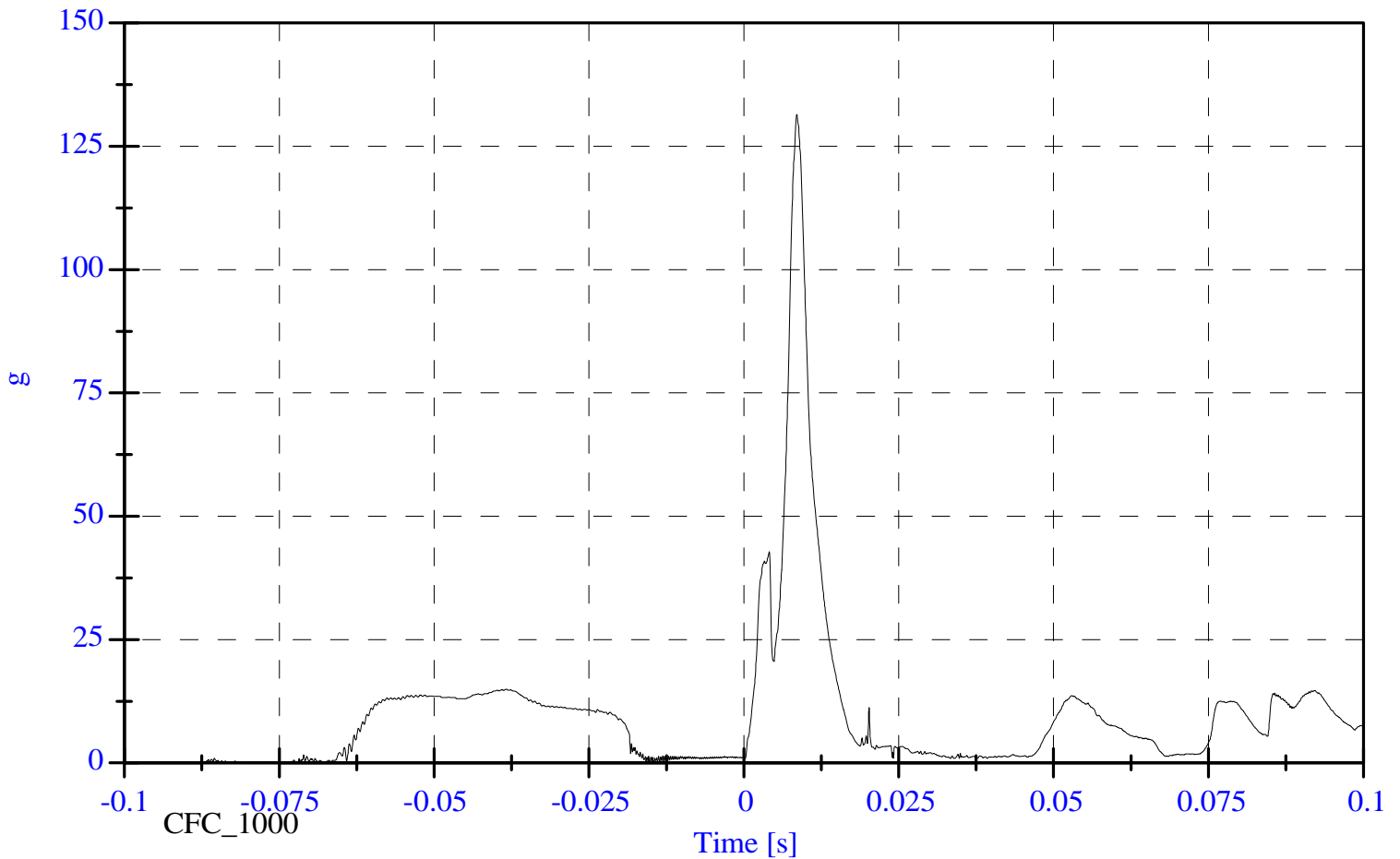
Maximum: 131.5 g

FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 131.5 [g] at 0.009 [s]

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



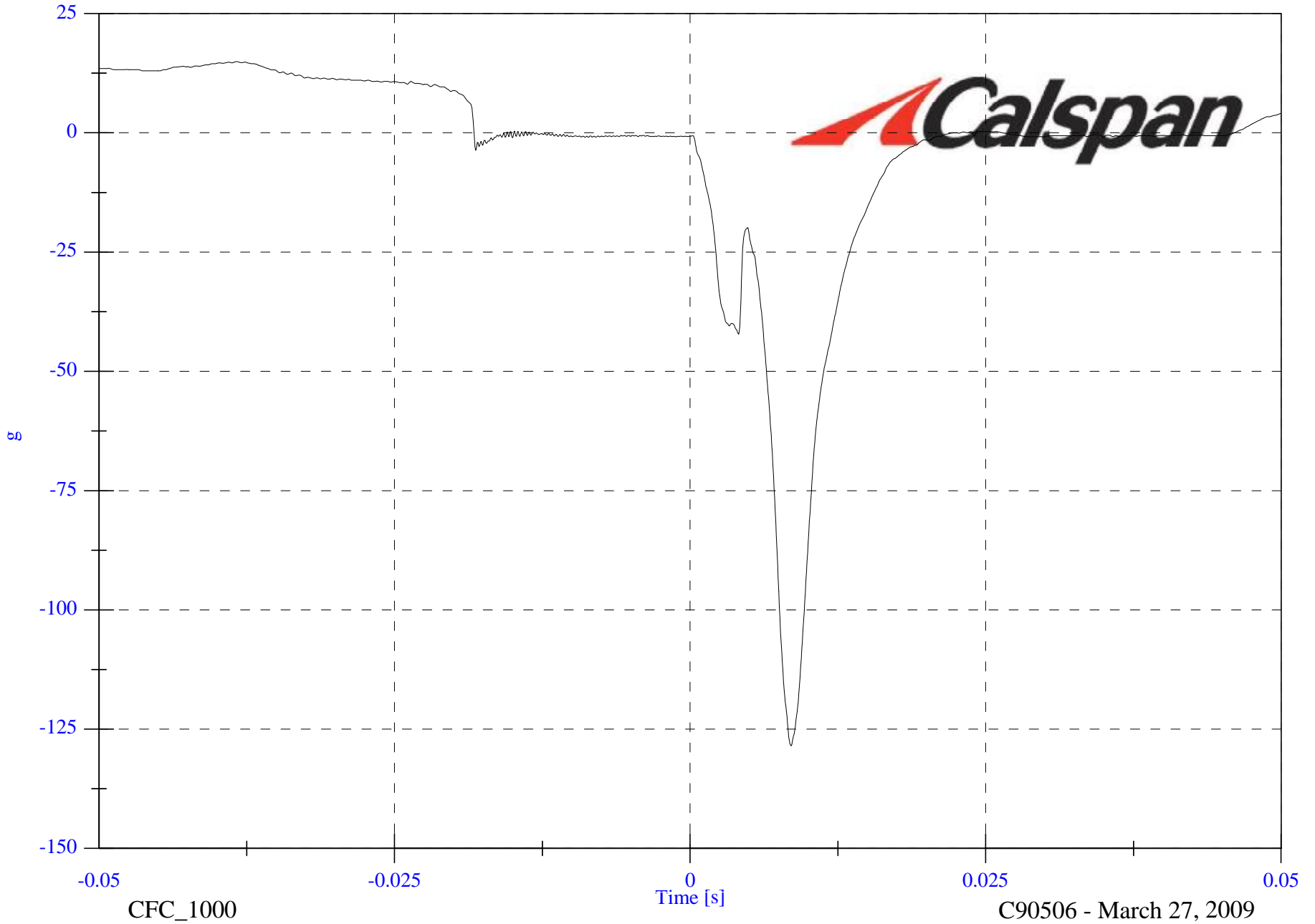
FMVSS 201U 09 HYUNDAI ELANTRA

Headform X Acceleration

Max: 14.9 [g] at -0.038 [s]

Min: -128.5 [g] at 0.009 [s]

C90506 DRIVER SIDE AP3 IMPACT PLOT #1



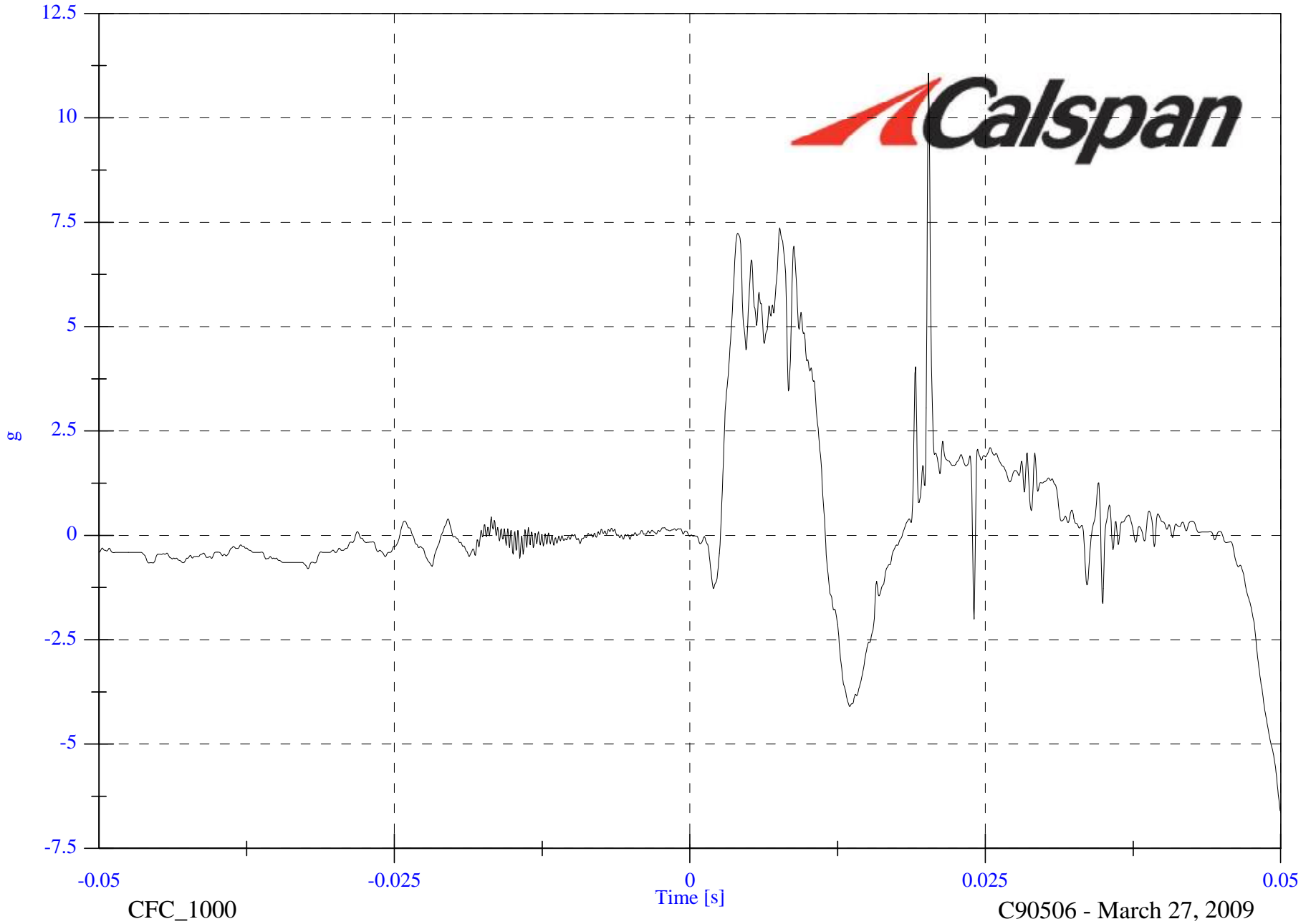
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Y Acceleration

Max: 11.1 [g] at 0.020 [s]

Min: -6.6 [g] at 0.050 [s]

C90506 DRIVER SIDE AP3 IMPACT PLOT #2



C90506 - March 27, 2009

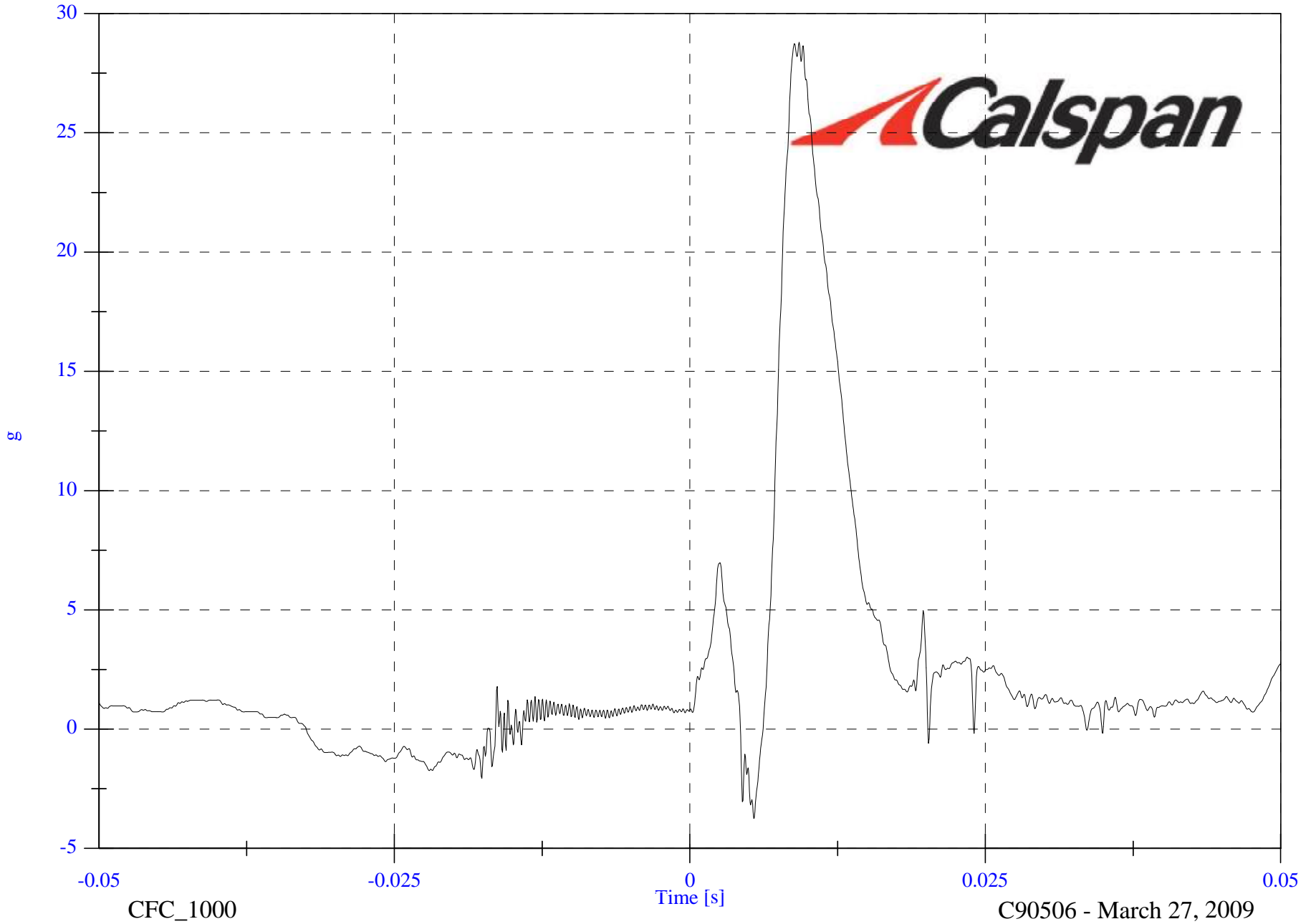
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Z Acceleration

Max: 28.8 [g] at 0.009 [s]

Min: -3.7 [g] at 0.005 [s]

C90506 DRIVER SIDE AP3 IMPACT PLOT #3



CFC\_1000

C90506 - March 27, 2009

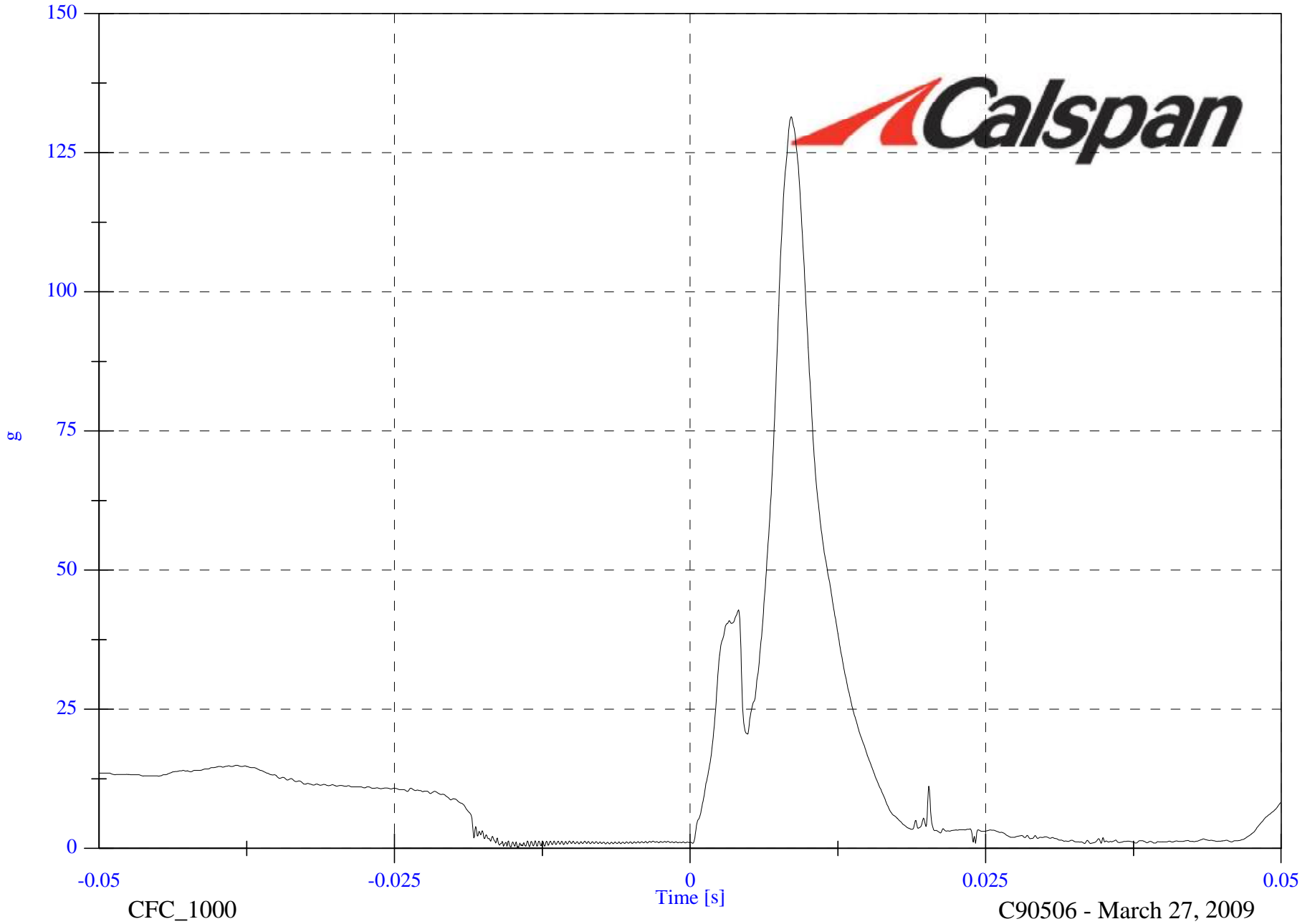
FMVSS 201U 09 HYUNDAI ELANTRA

Headform Resultant

Max: 131.5 [g] at 0.009 [s]

Min: 0.1 [g] at -0.014 [s]

C90506 DRIVER SIDE AP3 IMPACT PLOT #4



CFC\_1000

C90506 - March 27, 2009

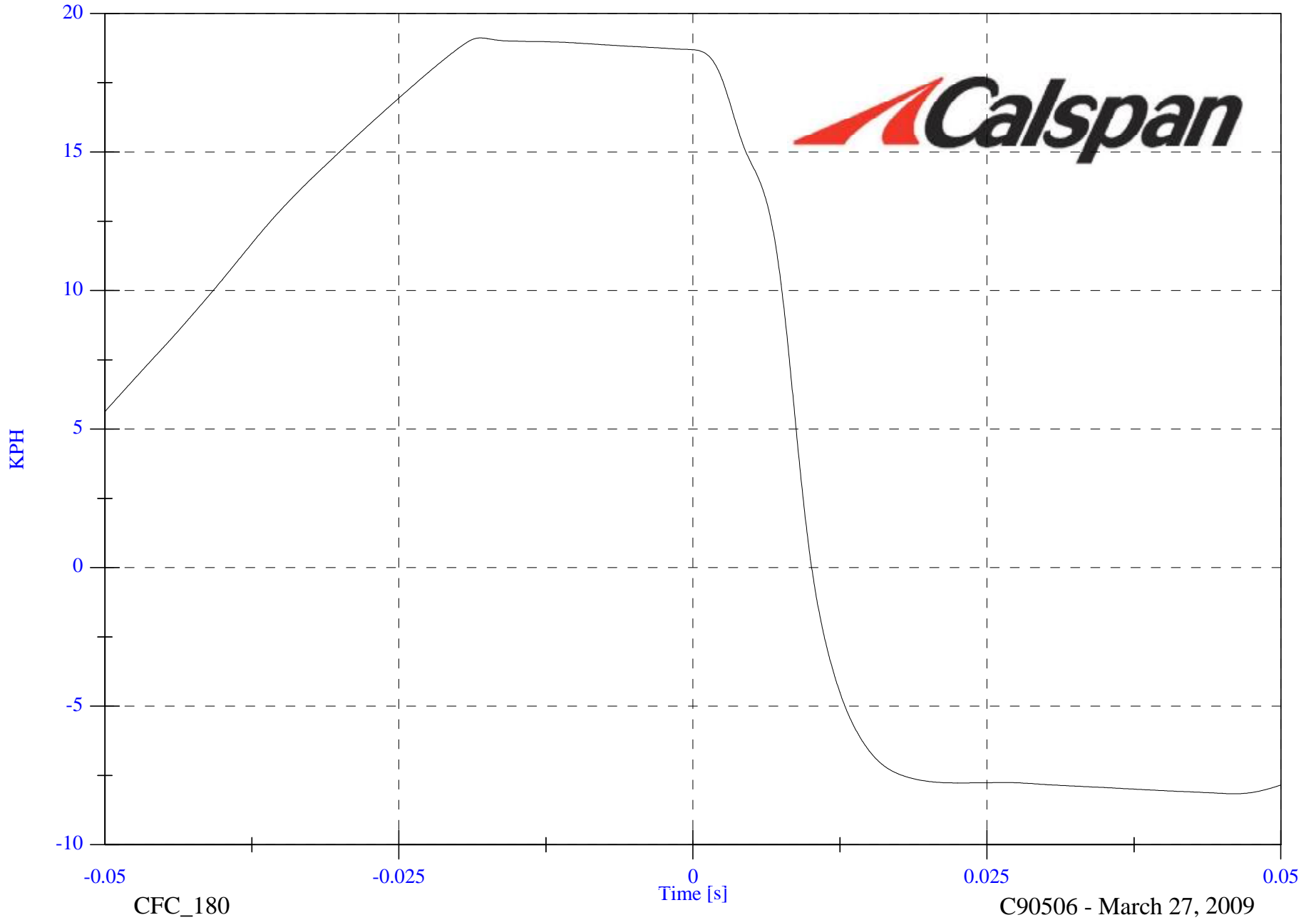
FMVSS 201U 09 HYUNDAI ELANTRA

Max: 19.1 [KPH] at -0.018 [s]

Min: -8.2 [KPH] at 0.046 [s]

Headform Velocity

C90506 DRIVER SIDE AP3 IMPACT PLOT #5



CFC\_180

C90506 - March 27, 2009



PRE-IMPACT AP3 DRIV



A hand is holding a black identification tag with white text. The tag is positioned in the upper left quadrant of the image, partially overlapping the car's interior components. The text on the tag is arranged in four lines. The background shows the interior of a car, including a grey door panel, a speaker, and a window. A person's arm in a pink checkered shirt is visible in the background.

FMVSS 201U C90506  
09 HYUNDAI ELANTRA AP3  
MAR 27 09 POSTTEST  
HOR 226 VERT 41

POST-IMPACT AP3 DRIV

**APPENDIX A**

**PHOTOGRAPHS**

## PHOTOGRAPHS

<b>FIGURE</b>	<b>VIEW</b>	<b>PAGE</b>
A-1	LEFT SIDE VIEW OF VEHICLE	A-3
A-2	RIGHT SIDE VIEW OF VEHICLE	A-4
A-3	3/4 FRONTAL VIEW FROM LEFT SIDE OF VEHICLE	A-5
A-4	3/4 REAR VIEW FROM RIGHT SIDE OF VEHICLE	A-6
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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**

<b>MANUFACTURER:</b>		<b>FIRST TECHNOLOGY SAFETY SYSTEMS</b>	
<b>SERIAL NUMBER:</b>		1142	
<b>CALIBRATION DATE:</b>		MARCH 16, 2009	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
TEMPERATURE	19°C to 26°C	21	
RELATIVE HUMIDITY	10% to 70%	24	
PEAK RESULTANT ACCELERATION	225 Gs to 275 Gs	263.7	
PEAK LATERAL ACCELERATION	15 Gs Maximum	3.1	
IS ACCELERATION CURVE UNIMODAL?	YES	YES	

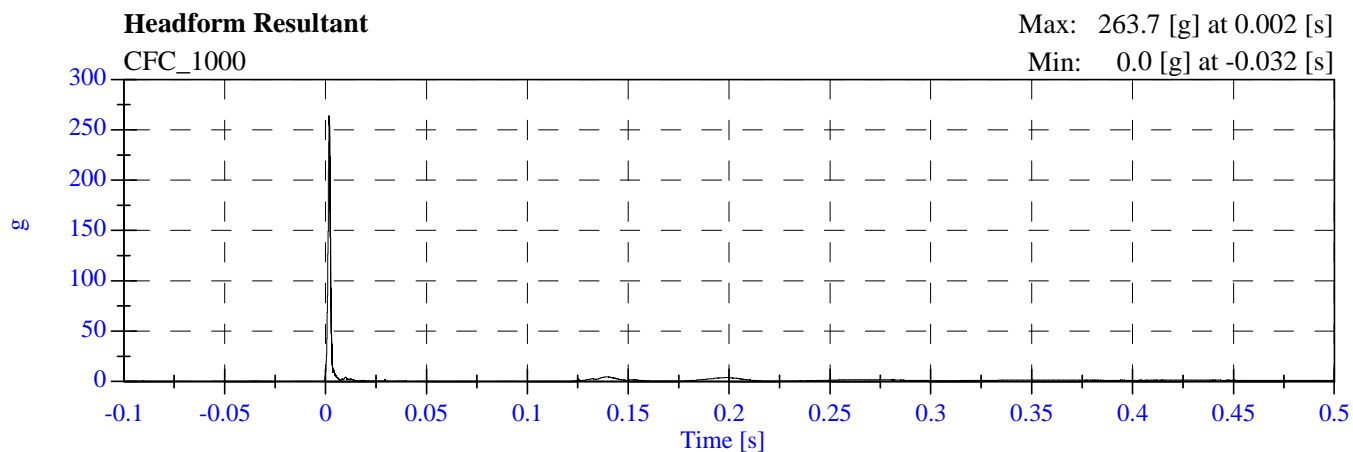
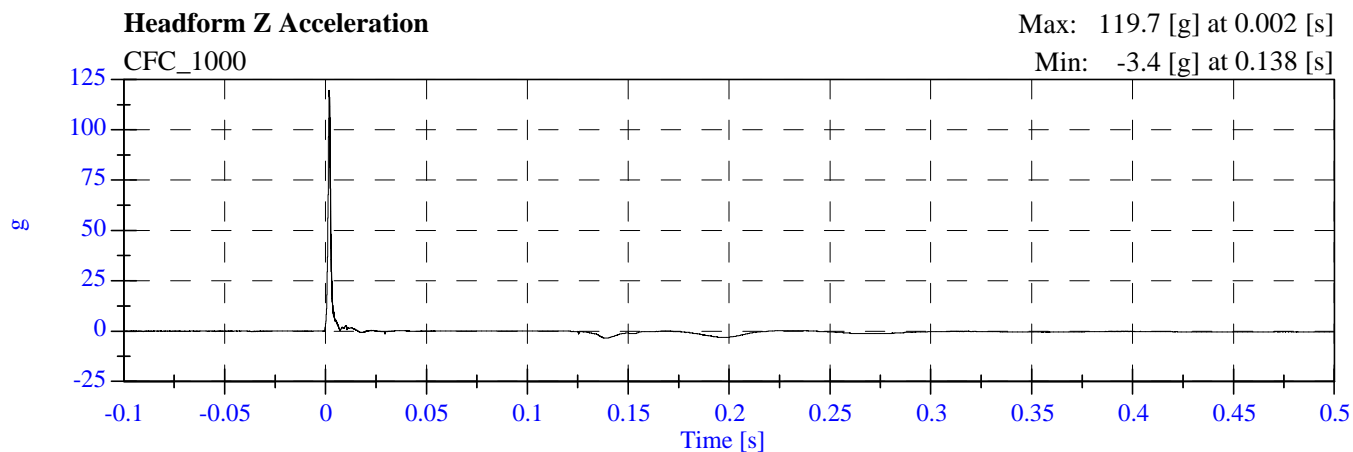
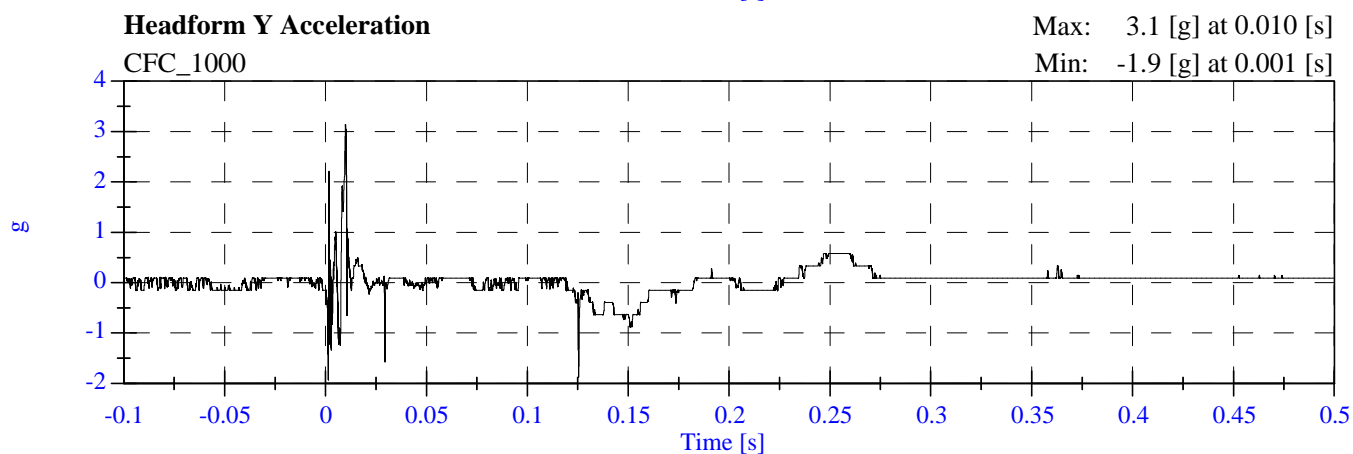
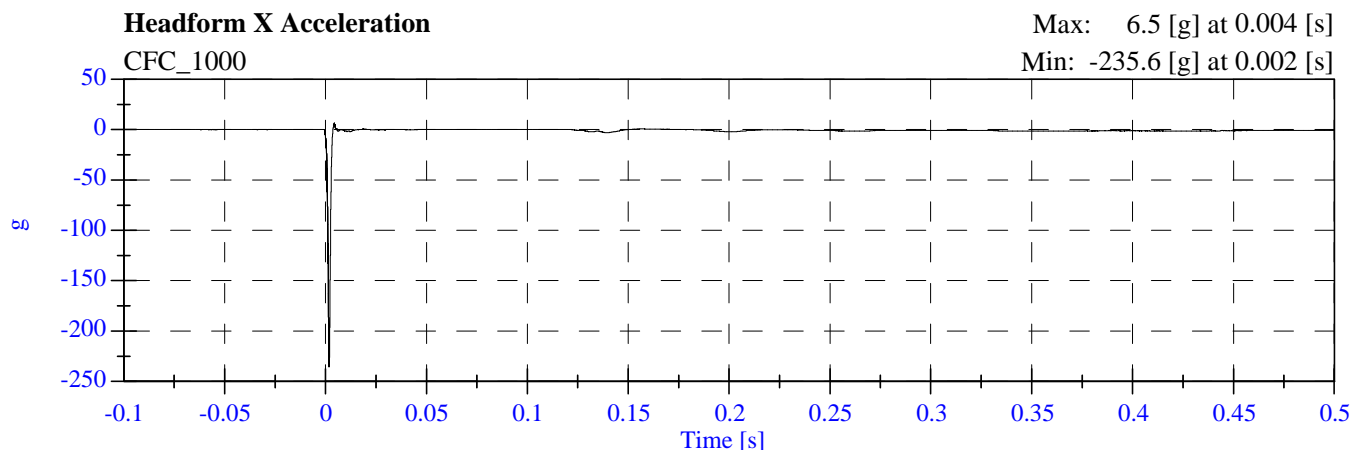
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
1 - LONGITUDINAL	ENDEVCO	7264-2000T	J24876	3/2/2009	9/2/2009
2 - LATERAL	ENDEVCO	7264-2000T	J33030	3/2/2009	9/2/2009
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	3/2/2009	9/2/2009

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 16, 2009





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

<b>MANUFACTURER:</b>		<b>DENTON ATD INC.</b>	
<b>SERIAL NUMBER:</b>		<b>0062</b>	
<b>CALIBRATION DATE:</b>		<b>MARCH 16, 2009</b>	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>21</b>	
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>	
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>259.7</b>	
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>8.0</b>	
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>	

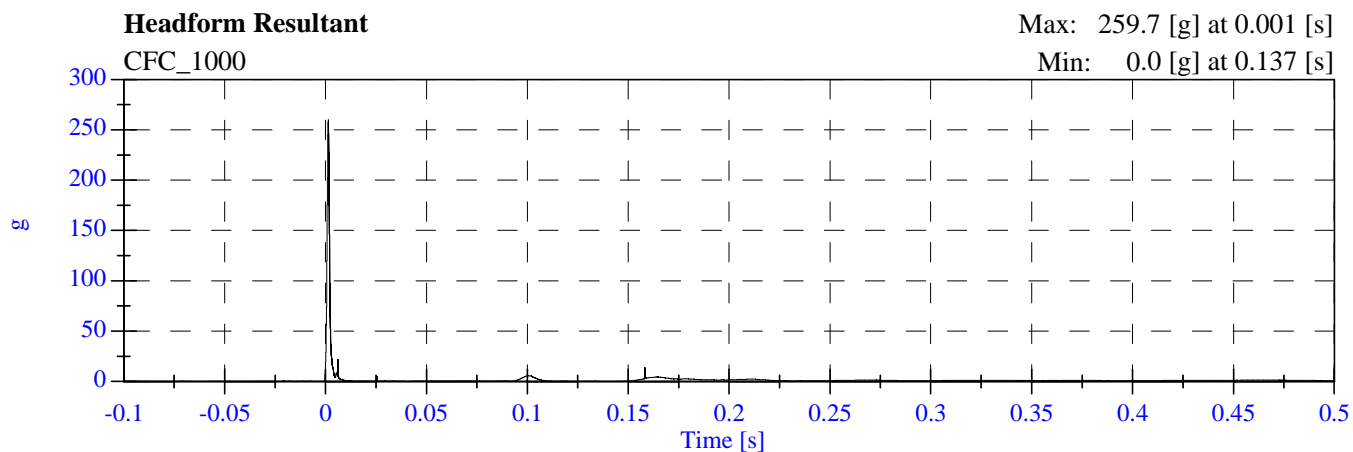
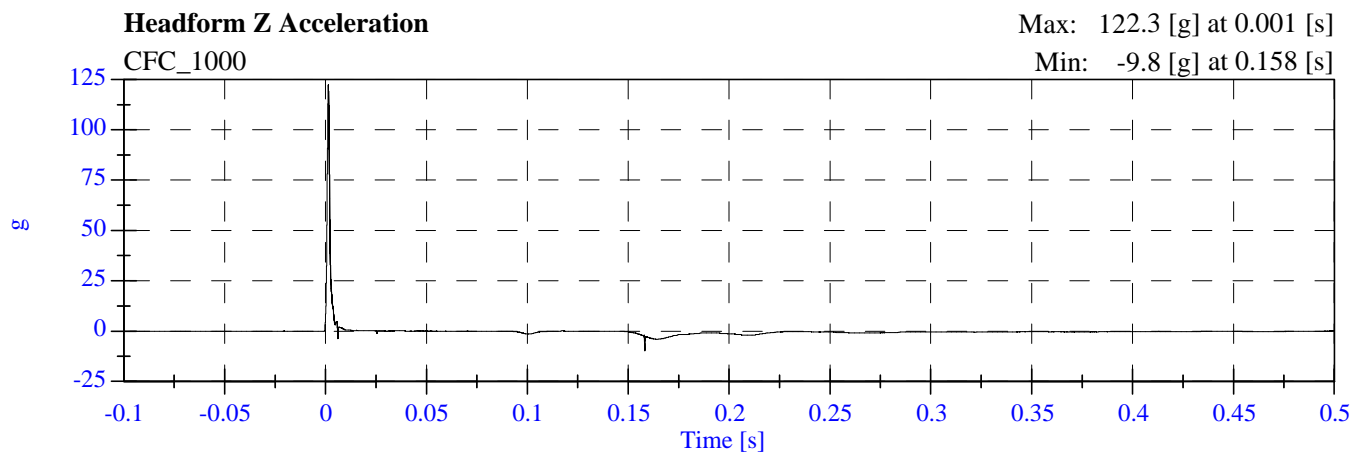
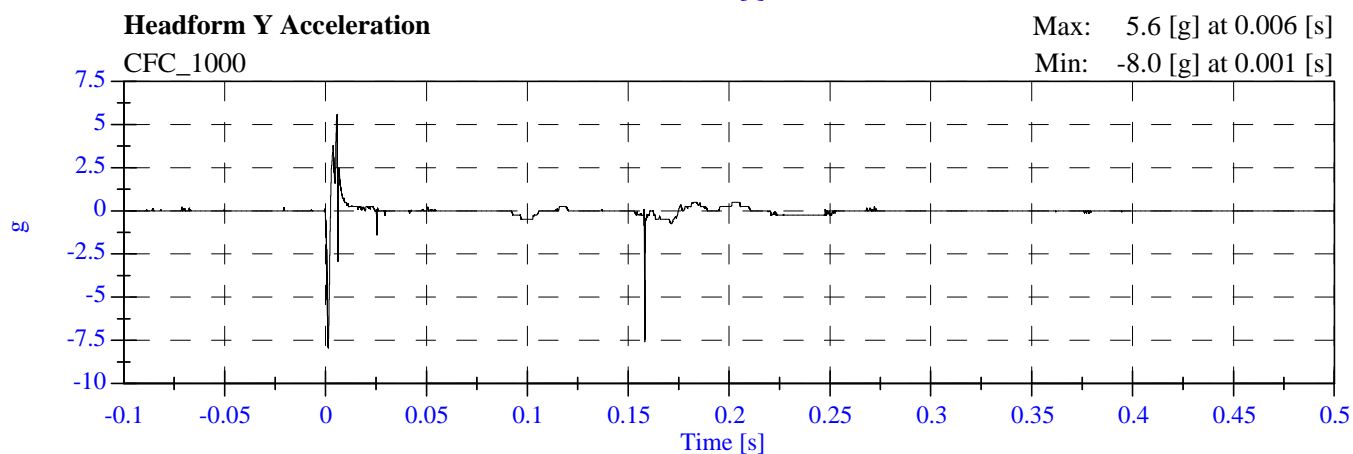
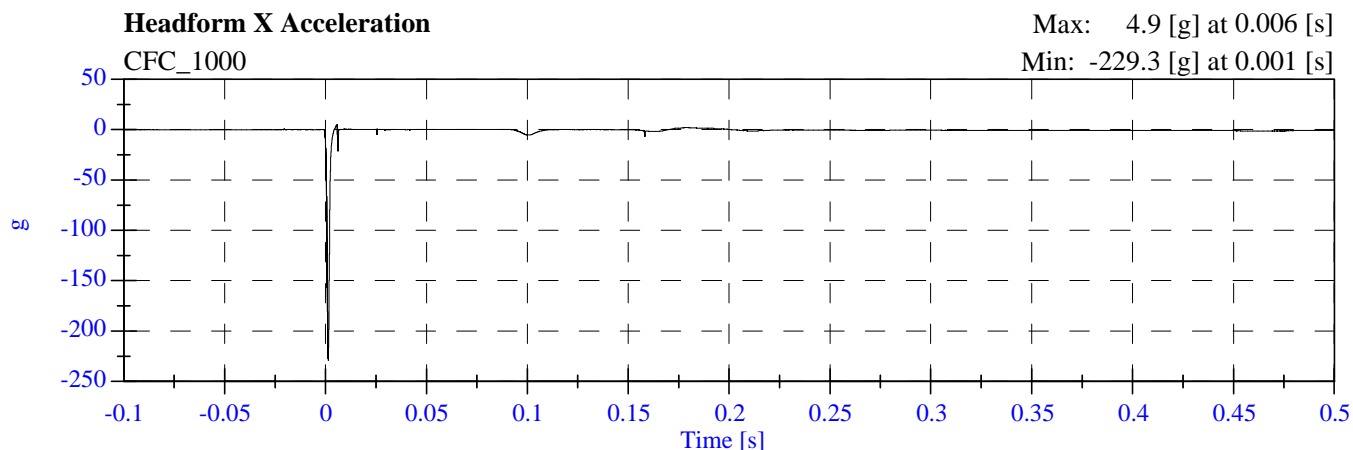
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J33127</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J33019</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J32782</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90606 - March 16, 2009



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

<b>MANUFACTURER:</b>		<b>FIRST TECHNOLOGY SAFETY SYSTEMS</b>	
<b>SERIAL NUMBER:</b>		<b>805</b>	
<b>CALIBRATION DATE:</b>		<b>MARCH 16, 2009</b>	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>21</b>	
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>	
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>265.3</b>	
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>4.0</b>	
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>	

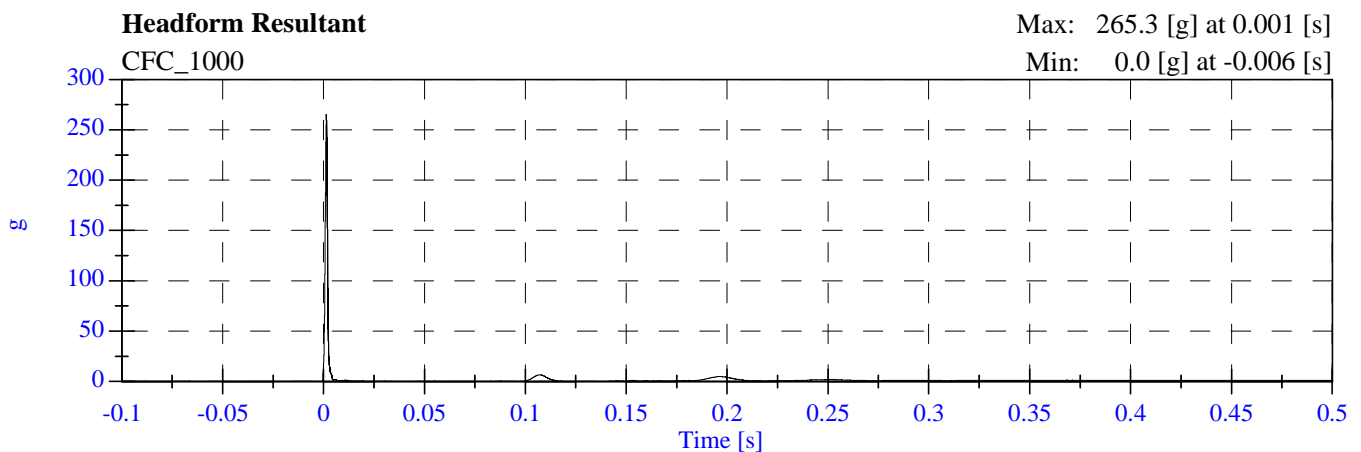
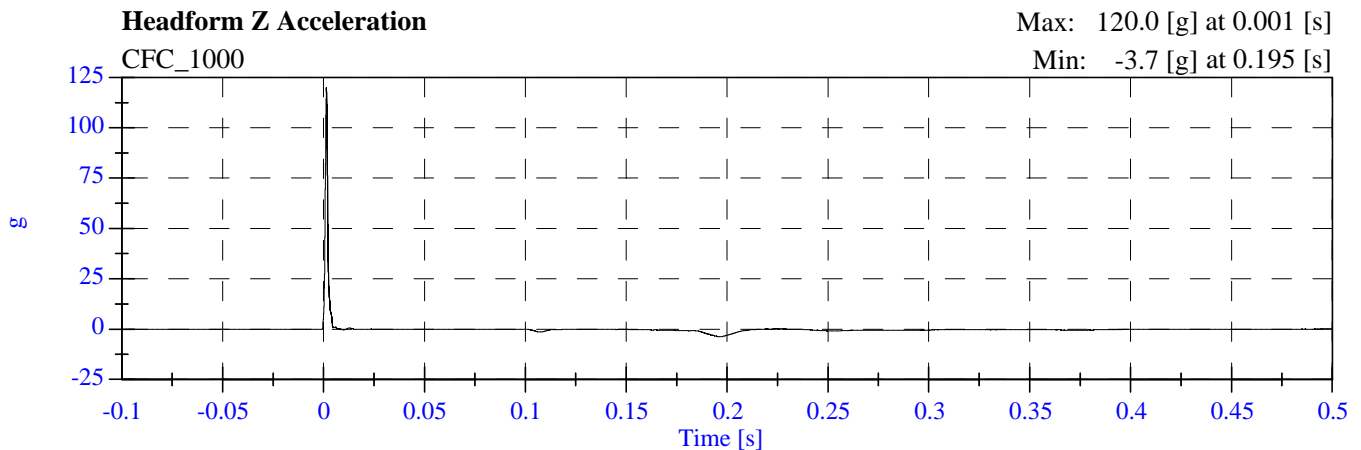
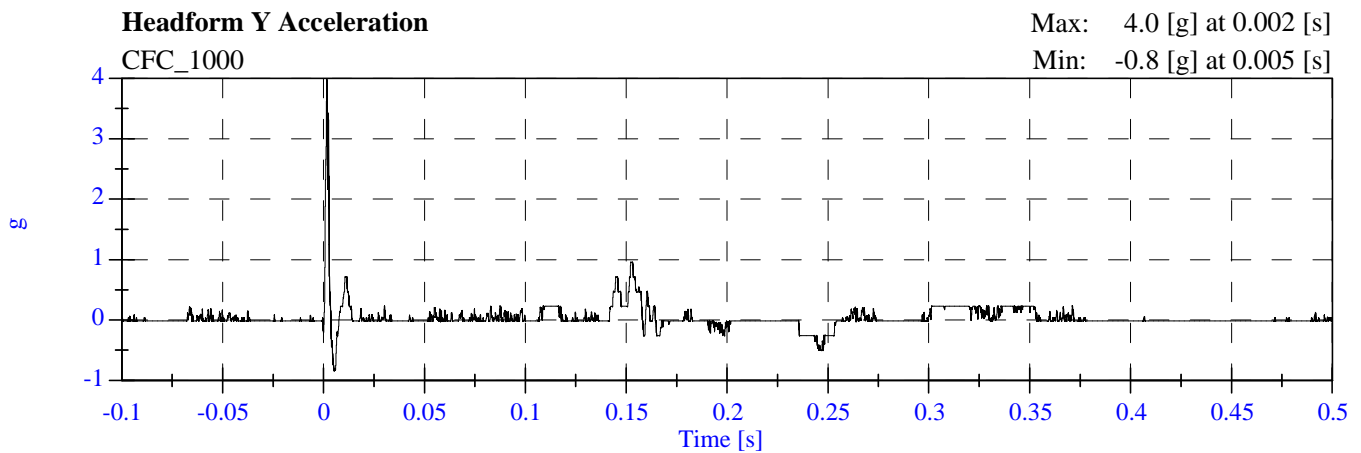
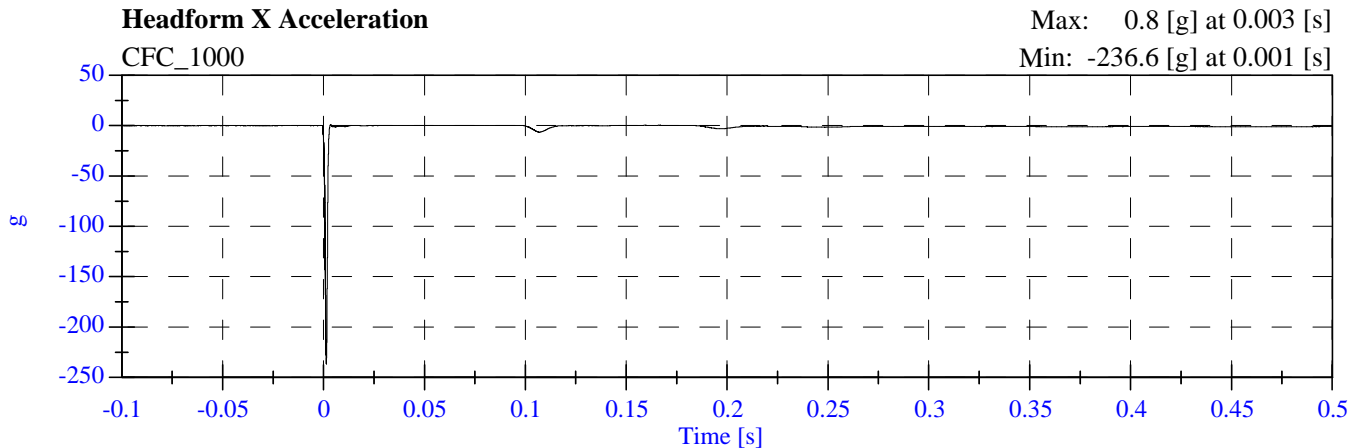
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41004</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J37496</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41016</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 16, 2009



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

<b>MANUFACTURER:</b>		<b>DENTON ATD INC.</b>	
<b>SERIAL NUMBER:</b>		<b>0355</b>	
<b>CALIBRATION DATE:</b>		<b>MARCH 16, 2009</b>	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>21</b>	
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>	
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>256.0</b>	
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>11.5</b>	
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>	

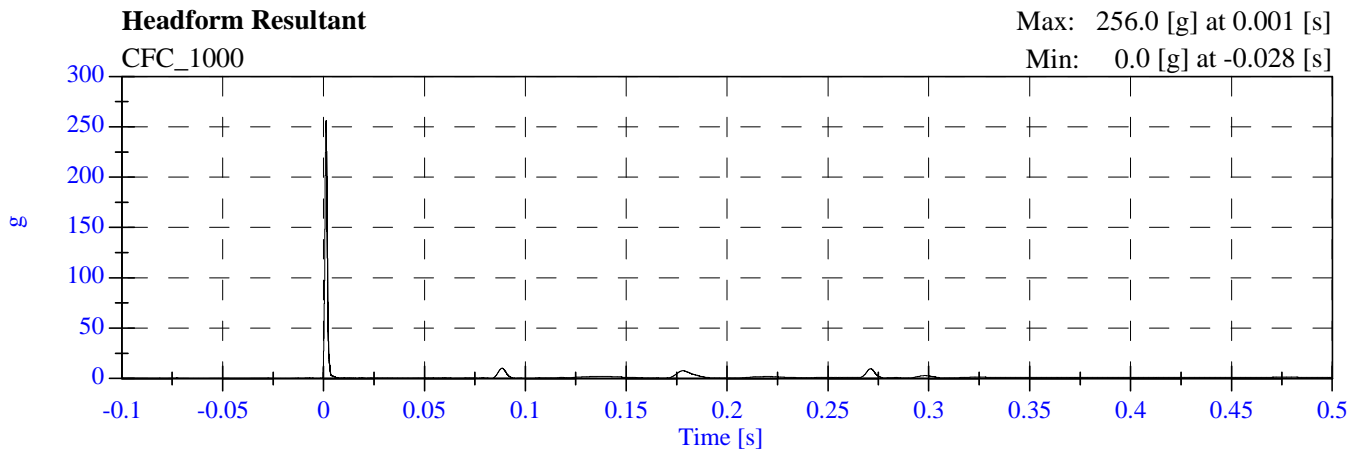
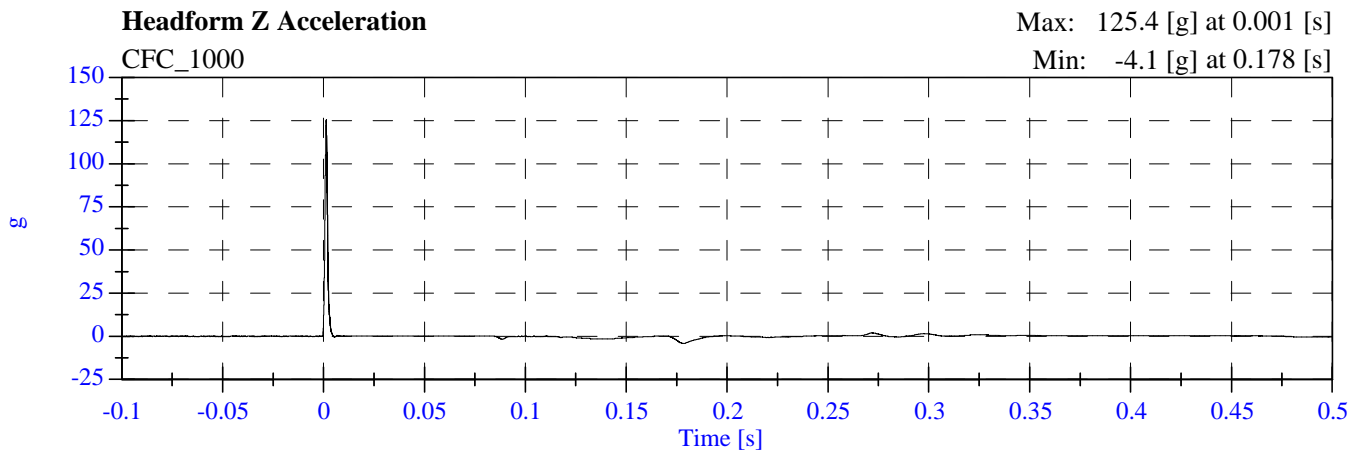
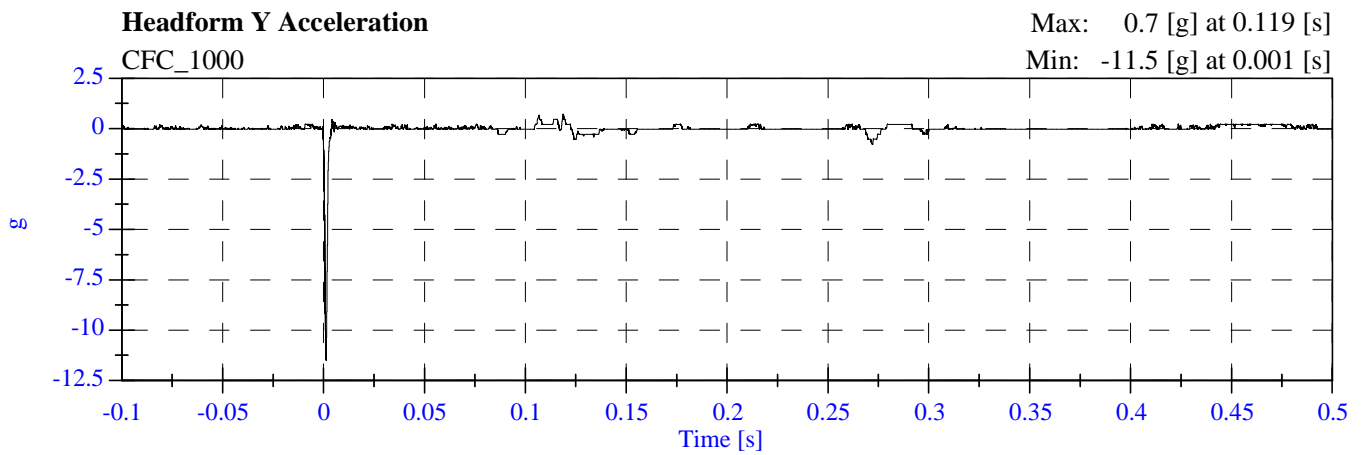
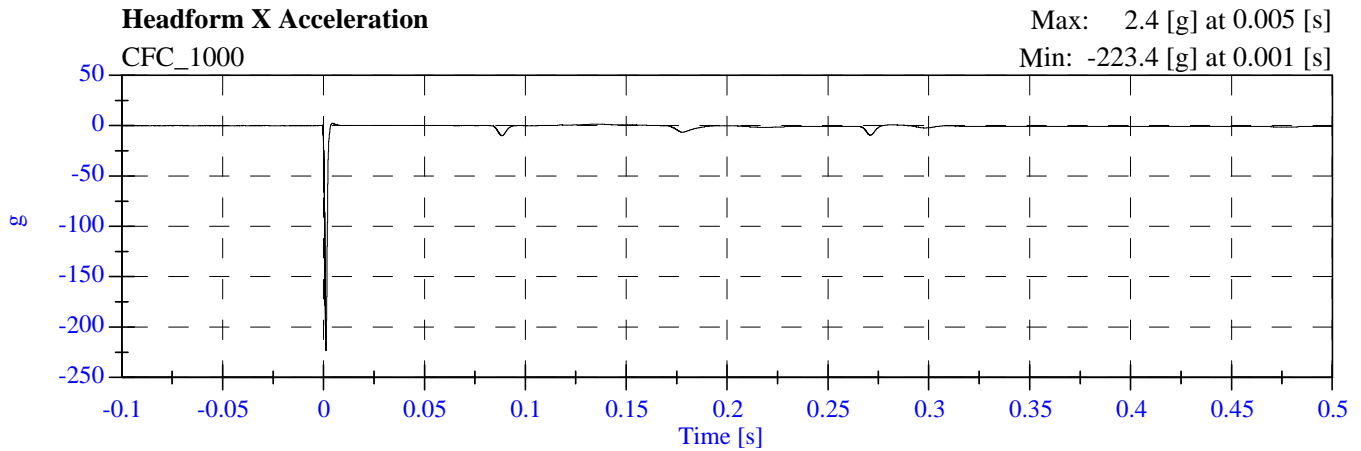
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J28671</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J32779</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J25854</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 16, 2009



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

<b>MANUFACTURER:</b>		<b>FIRST TECHNOLOGY SAFETY SYSTEMS</b>	
<b>SERIAL NUMBER:</b>		<b>1140</b>	
<b>CALIBRATION DATE:</b>		<b>MARCH 16, 2009</b>	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>21</b>	
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>	
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>233.0</b>	
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>7.5</b>	
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>	

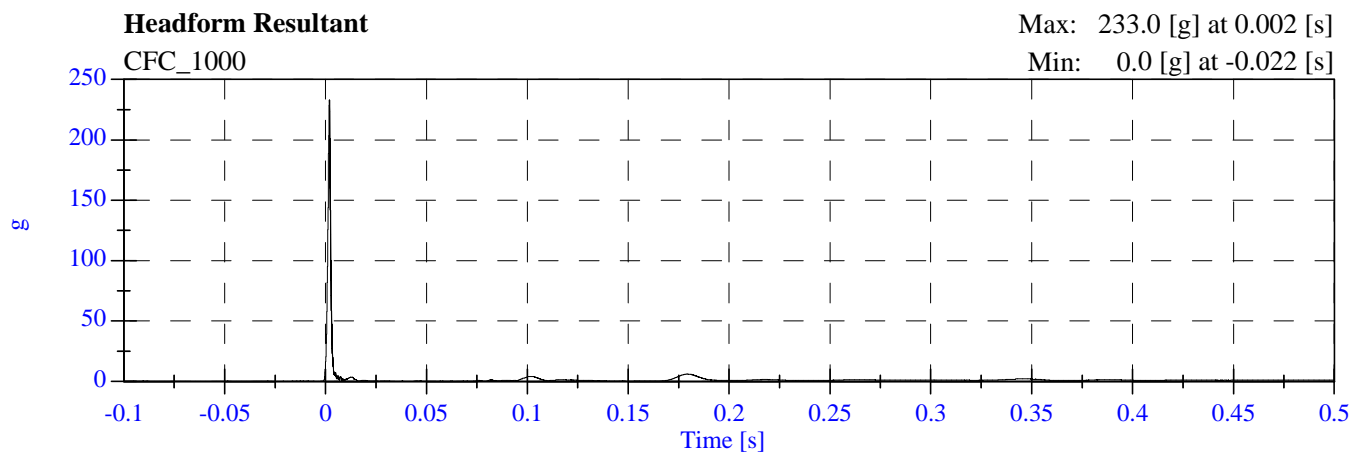
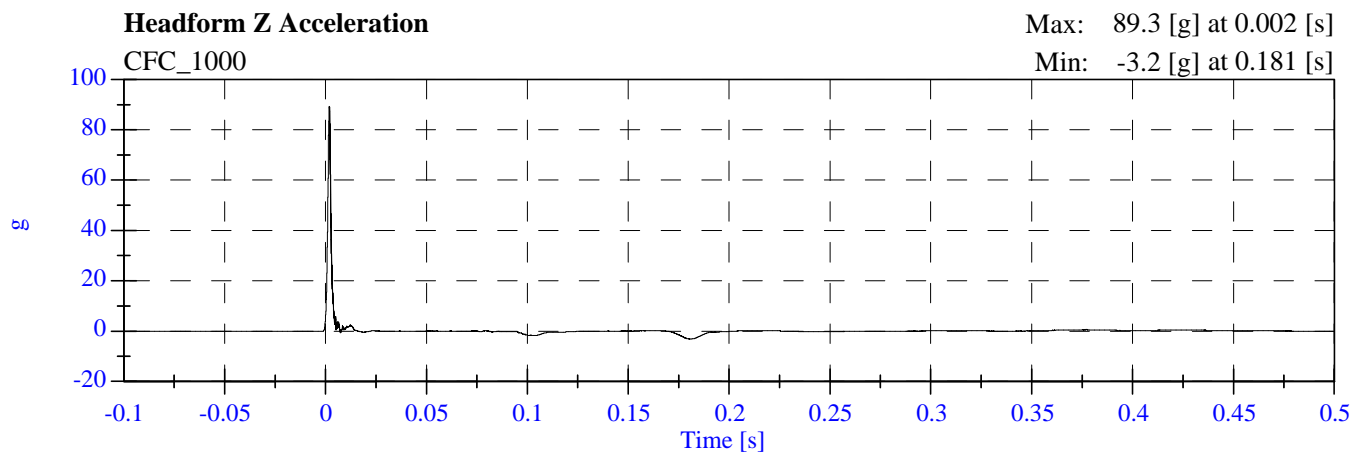
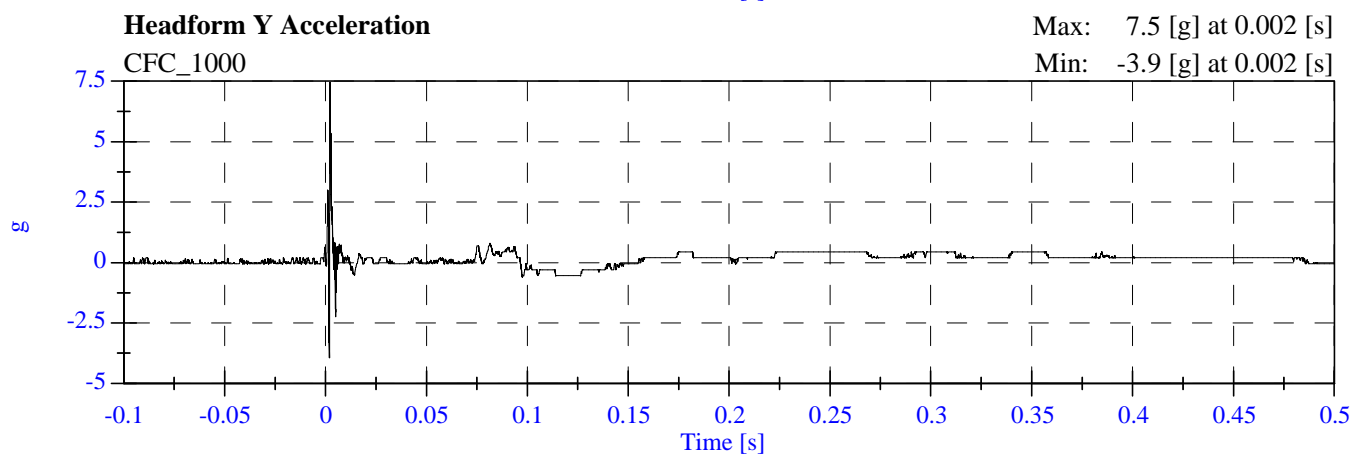
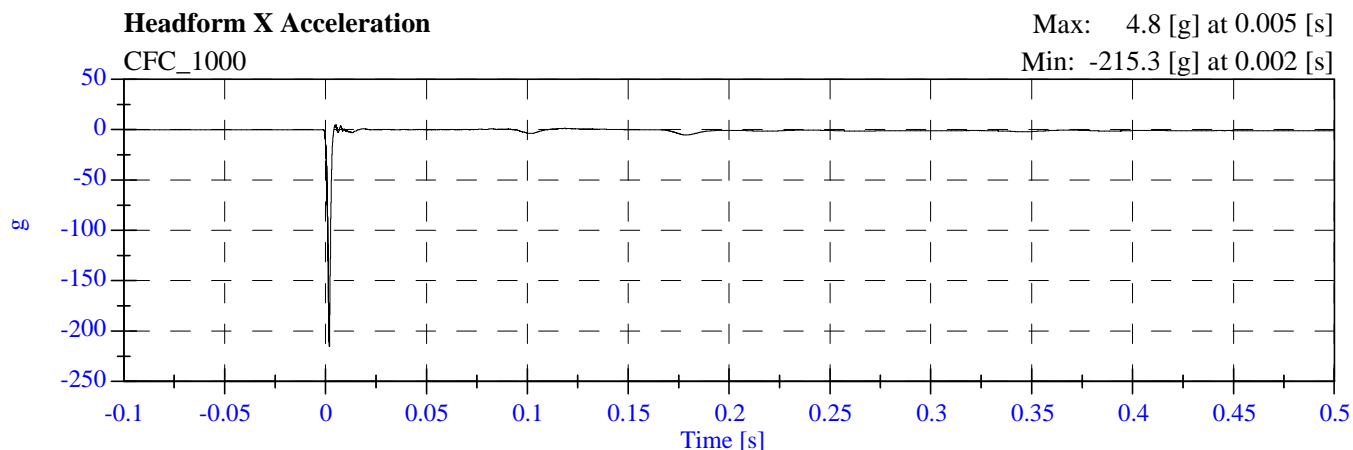
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41006</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J40994</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41007</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 16, 2009





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

<b>MANUFACTURER:</b>		<b>FIRST TECHNOLOGY SAFETY SYSTEMS</b>
<b>SERIAL NUMBER:</b>		<b>1142</b>
<b>CALIBRATION DATE:</b>		<b>March 31,2009</b>
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>22</b>
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>251.2</b>
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>12.1</b>
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>

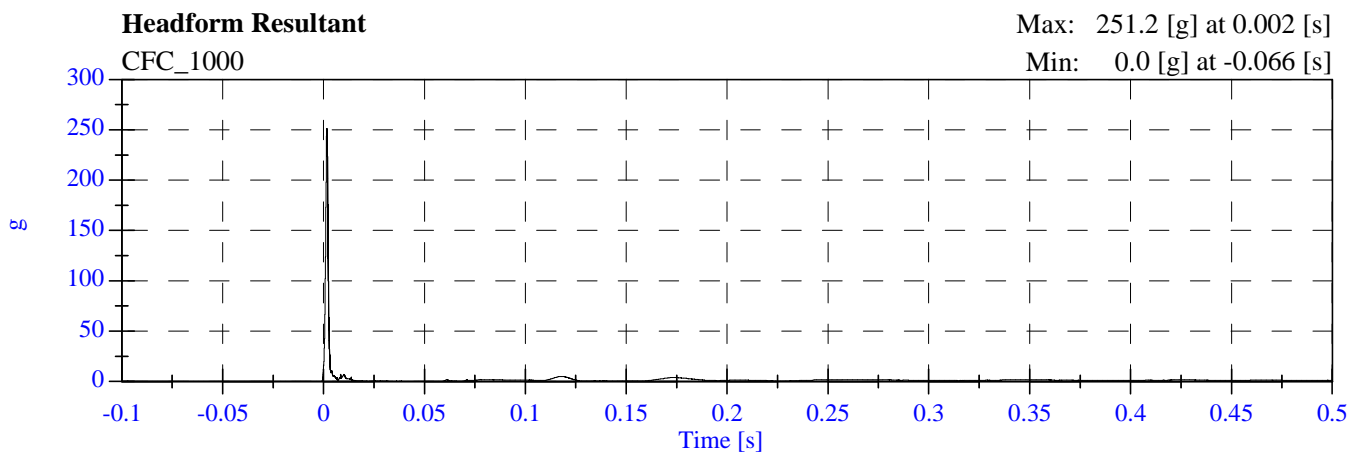
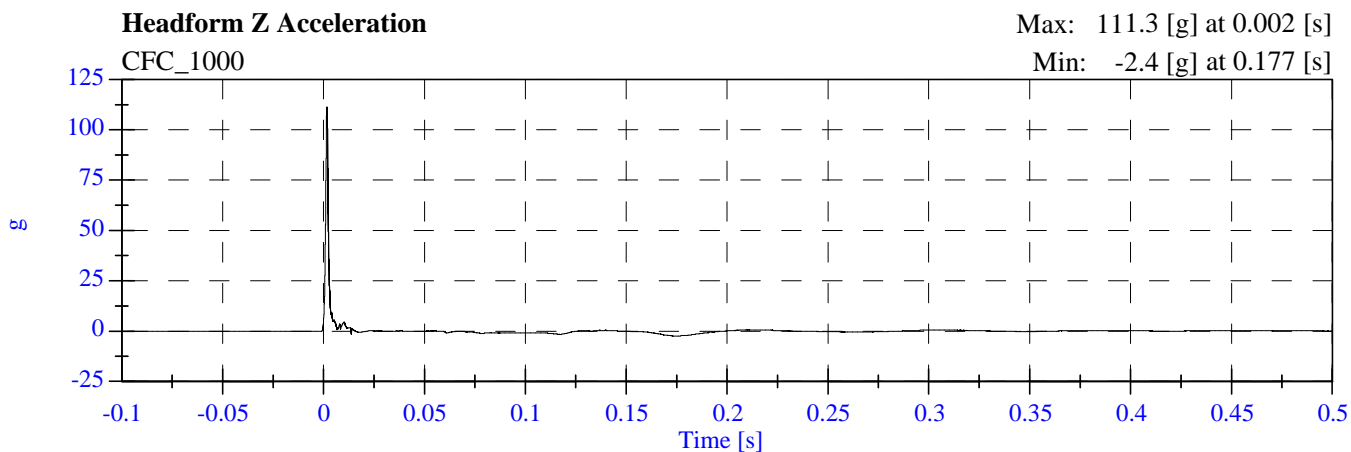
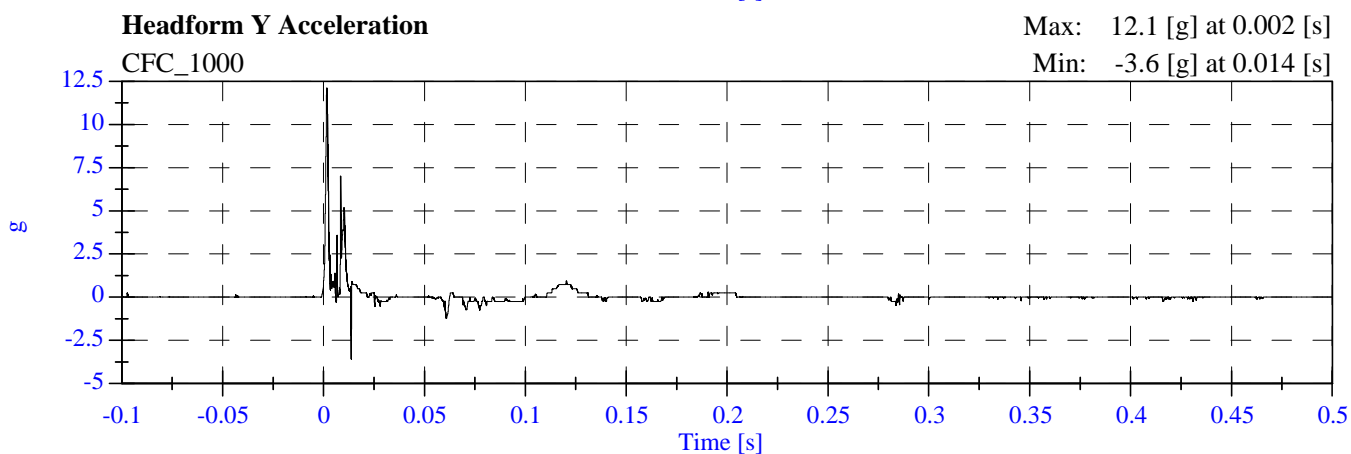
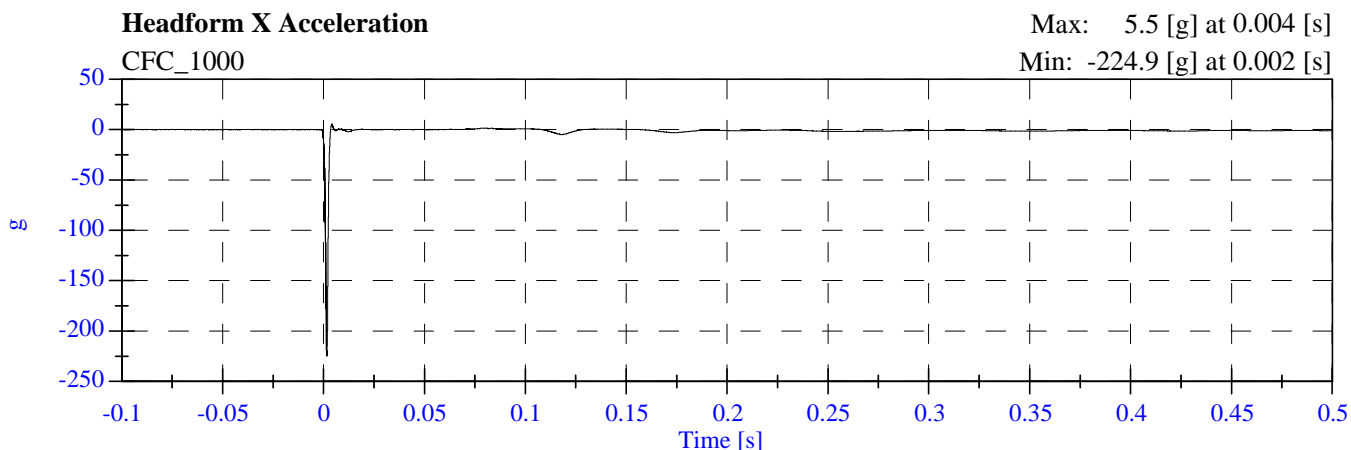
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J24876</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J33030</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J31009</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 31, 2009



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

<b>MANUFACTURER:</b>		<b>DENTON ATD INC.</b>	
<b>SERIAL NUMBER:</b>		<b>0062</b>	
<b>CALIBRATION DATE:</b>		<b>March 31,2009</b>	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>22</b>	
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>	
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>265.4</b>	
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>8.5</b>	
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>	

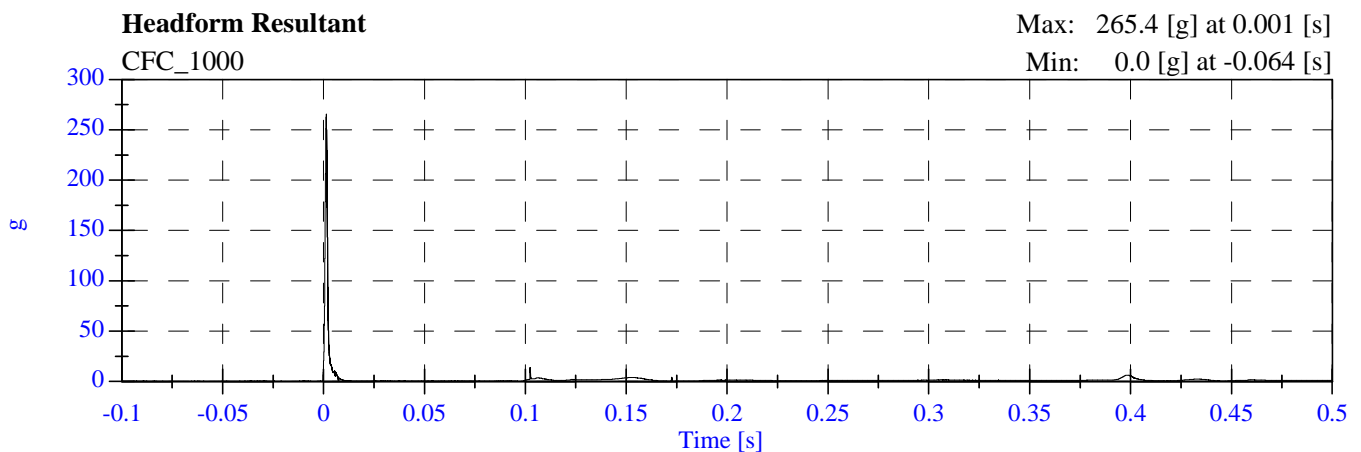
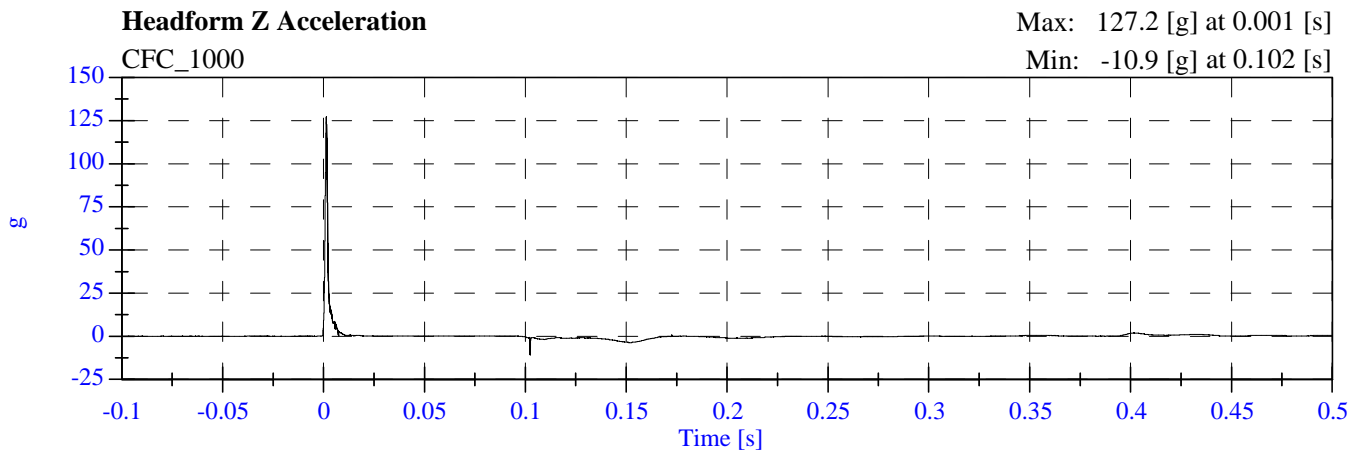
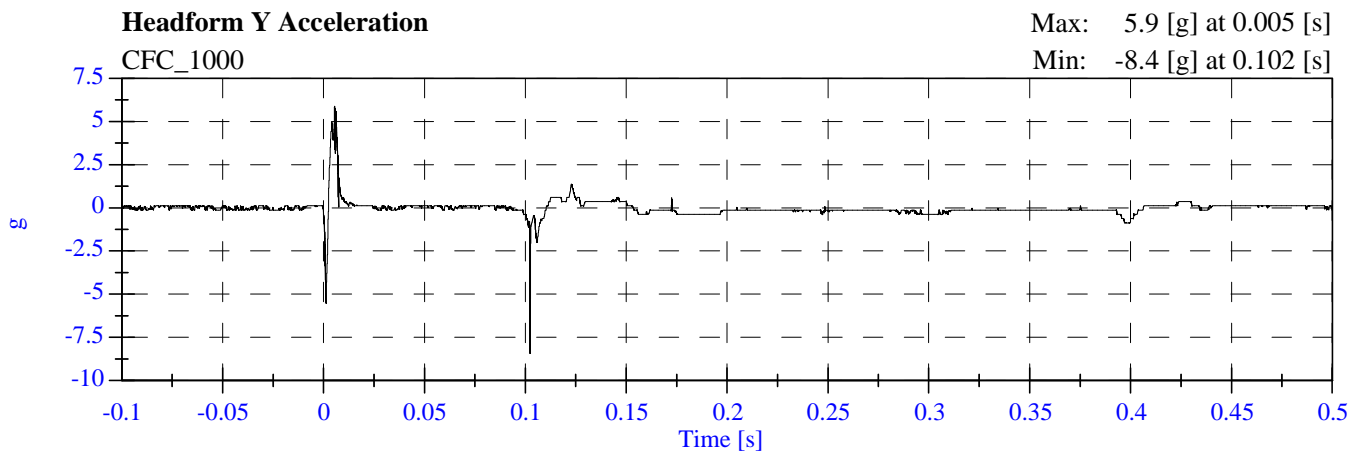
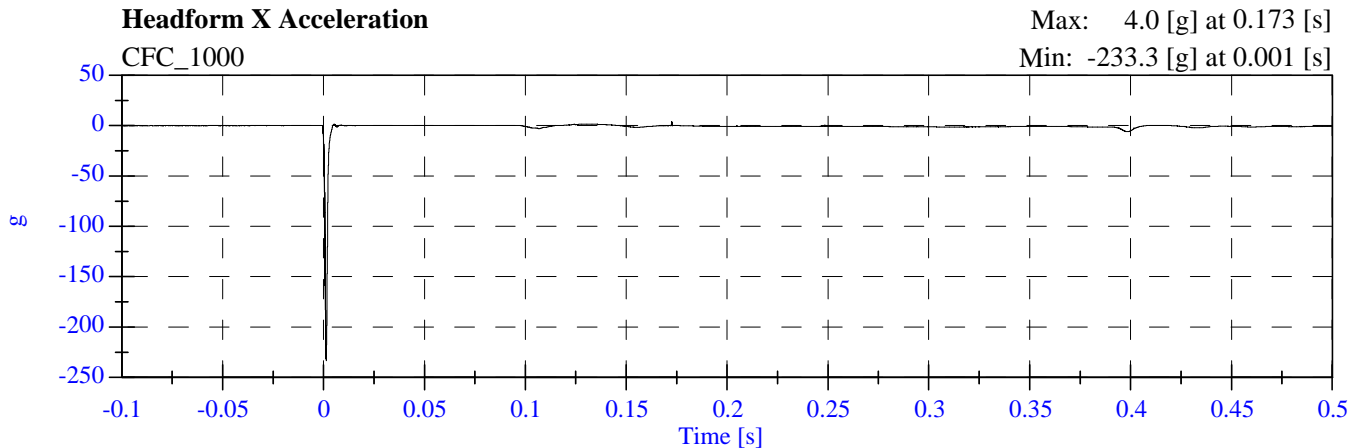
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 -LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J33127</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J33019</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J32782</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 31, 2009



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

<b>MANUFACTURER:</b>		<b>FIRST TECHNOLOGY SAFETY SYSTEMS</b>	
<b>SERIAL NUMBER:</b>		<b>805</b>	
<b>CALIBRATION DATE:</b>		<b>March 31,2009</b>	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>22</b>	
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>	
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>270.3</b>	
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>1.7</b>	
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>	

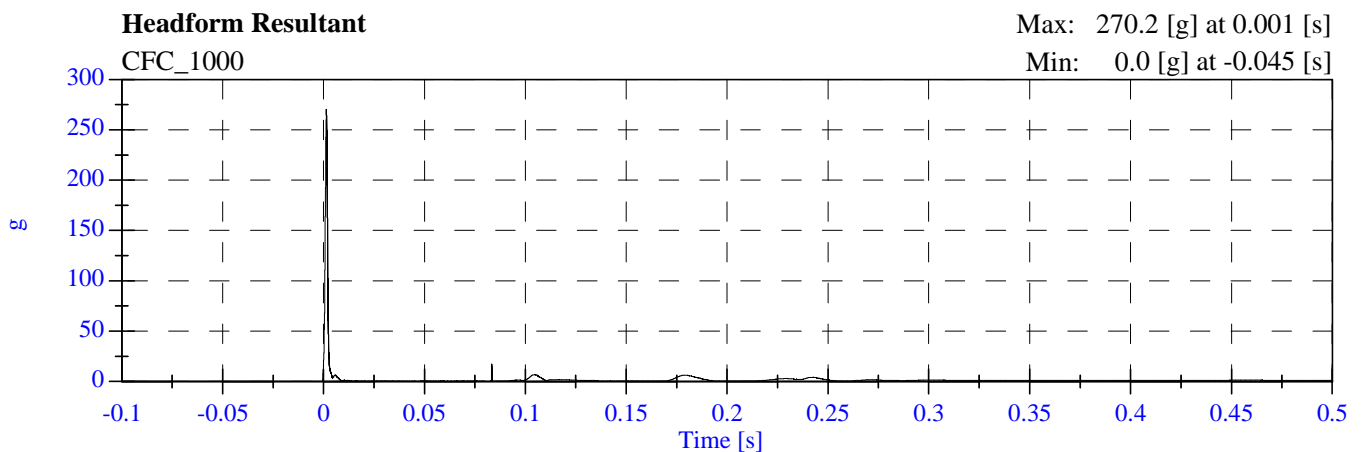
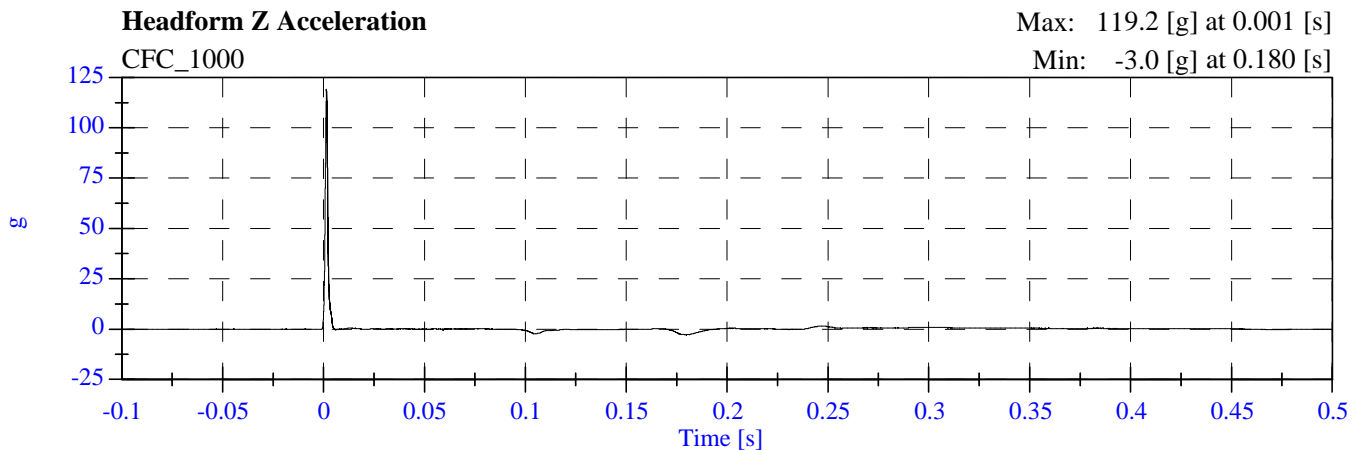
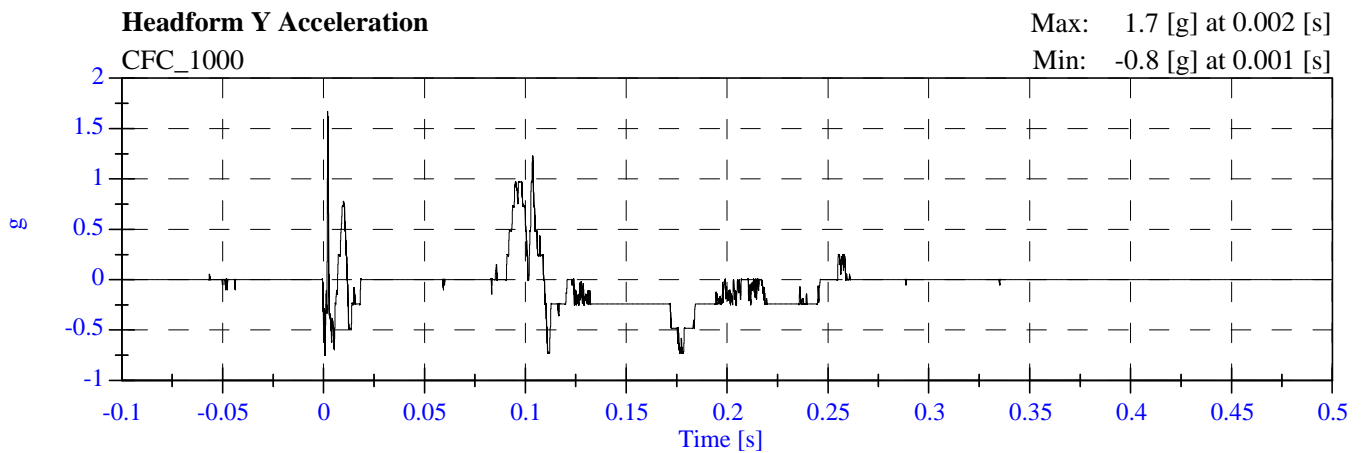
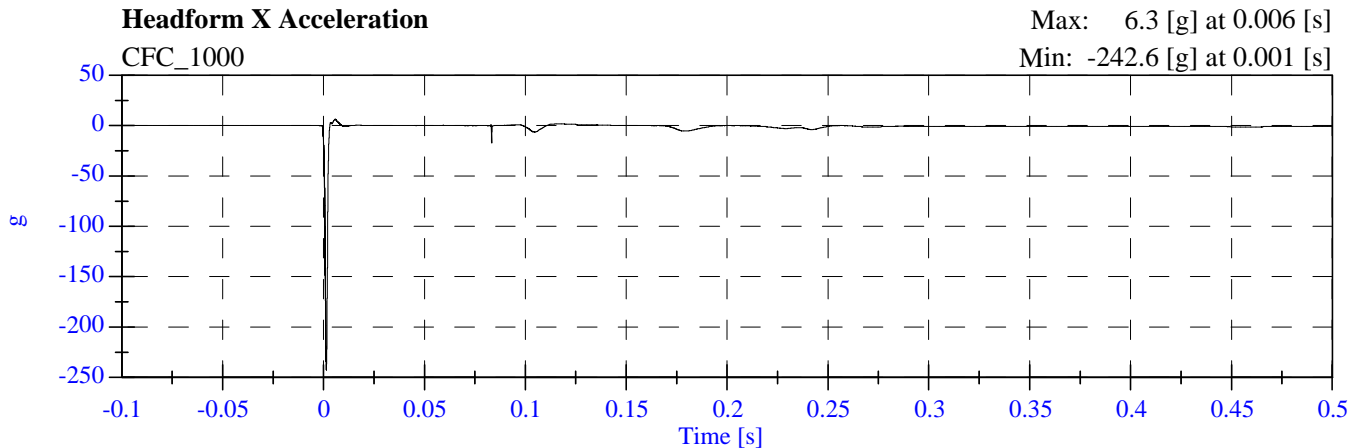
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41004</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J37496</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41016</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 31, 2009



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

<b>MANUFACTURER:</b>		<b>DENTON ATD INC.</b>	
<b>SERIAL NUMBER:</b>		<b>0355</b>	
<b>CALIBRATION DATE:</b>		<b>March 31,2009</b>	
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>	
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>22</b>	
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>	
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>248.8</b>	
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>6.4</b>	
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>	

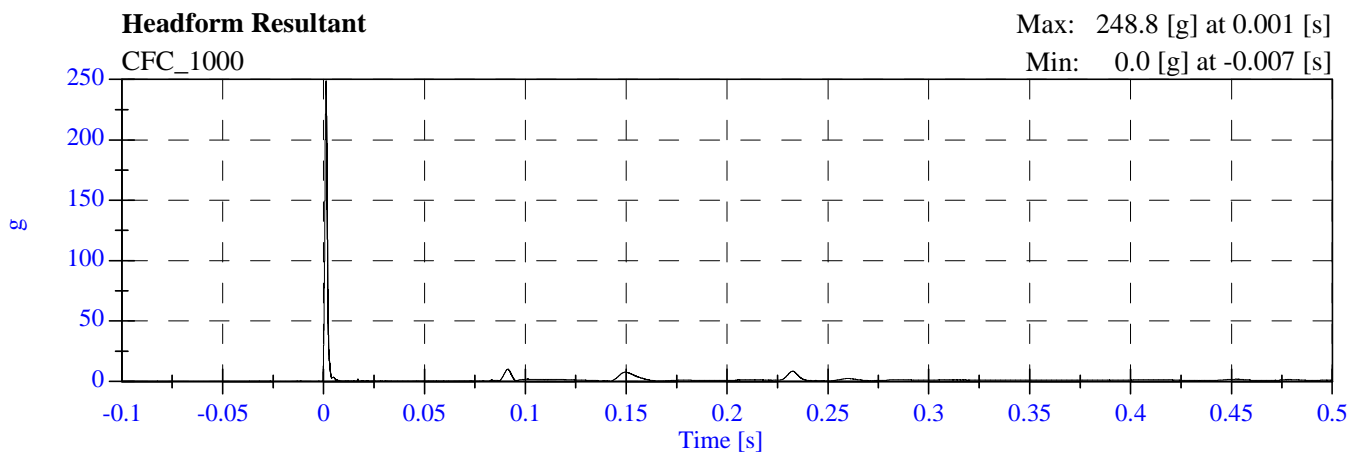
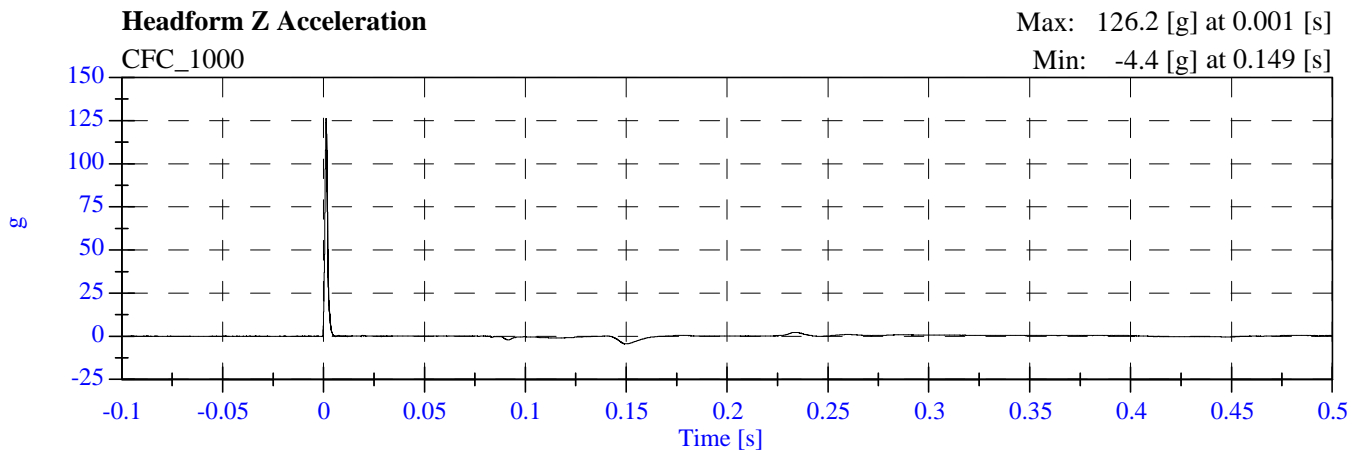
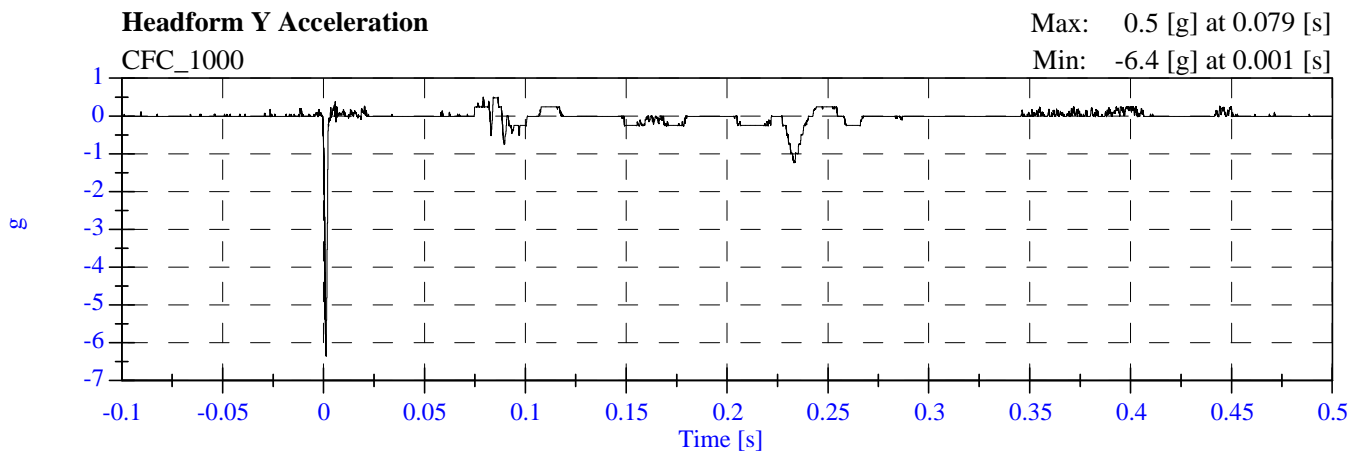
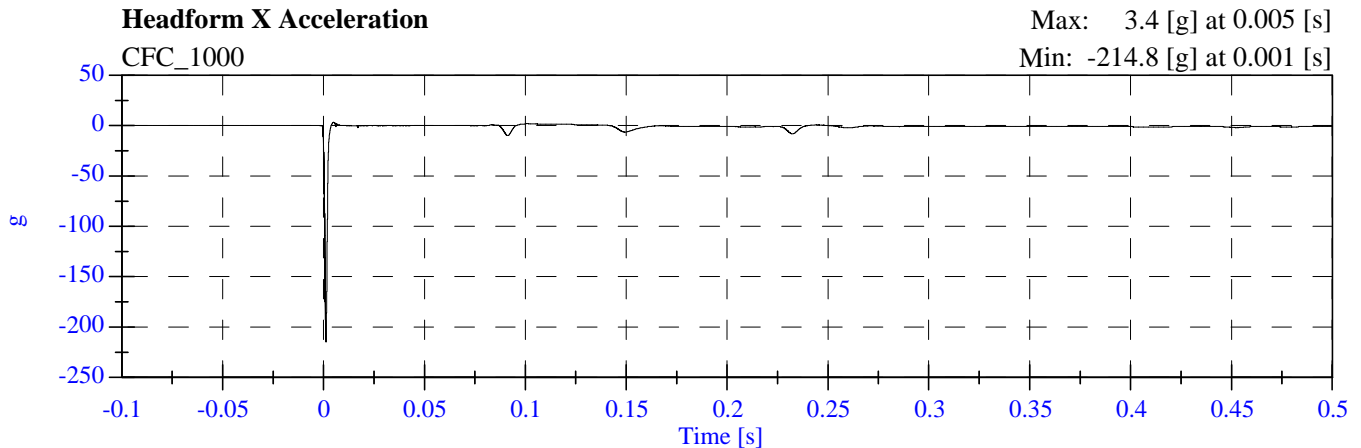
**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J28671</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J32779</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J25854</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 31, 2009





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

<b>MANUFACTURER:</b>		<b>FIRST TECHNOLOGY SAFETY SYSTEMS</b>
<b>SERIAL NUMBER:</b>		<b>1140</b>
<b>CALIBRATION DATE:</b>		<b>March 31,2009</b>
<b>TEST PARAMETER</b>	<b>SPECIFICATION</b>	<b>TEST RESULTS</b>
<b>TEMPERATURE</b>	<b>19°C to 26°C</b>	<b>22</b>
<b>RELATIVE HUMIDITY</b>	<b>10% to 70%</b>	<b>24</b>
<b>PEAK RESULTANT ACCELERATION</b>	<b>225 Gs to 275 Gs</b>	<b>256.8</b>
<b>PEAK LATERAL ACCELERATION</b>	<b>15 Gs Maximum</b>	<b>6.3</b>
<b>IS ACCELERATION CURVE UNIMODAL?</b>	<b>YES</b>	<b>YES</b>

**HEAD ACCELEROMETER CALIBRATION INFORMATION**

<b>I.D. NUMBER</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>	<b>DATE OF NEXT CALIBRATION</b>
<b>1 - LONGITUDINAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41006</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>2 - LATERAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J40994</b>	<b>3/2/2009</b>	<b>9/2/2009</b>
<b>3 - VERTICAL</b>	<b>ENDEVCO</b>	<b>7264-2000T</b>	<b>J41007</b>	<b>3/2/2009</b>	<b>9/2/2009</b>

**REMARKS:**

# FMVSS 201U - Headform Calibration Drops

## C90506 - March 31, 2009

