REPORT NUMBER: 201U-CAL-10-08

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

FORD MOTOR COMPANY
2010 Ford Transit Connect

NHTSA NUMBER: CA0216

CALSPAN TEST NUMBER: CC2010-08

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

Test Date: April 20, 2010

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
Mail Code: NVS-220, West Building 4th Floor
1200 New Jersey Avenue, SE
Washington, DC 20590

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NHTSA, Office of Vehicle Safety Compliance

Date of Report Acceptance

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16. Abstract

Compliance tests were conducted on the subject vehicle a, 2010 Ford Transit Connect, 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
URBP	270	41	23.71	1270.8	1125.2
-	-	-	-	-	-

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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. DTNH22-09-D-00130. The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2010 Ford Transit Connect, NHTSA No. CA0216, 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 2010 Ford Transit Connect, NHTSA No. CA0216, was tested at various upper interior locations by a 4.54 kg 50th percentile headform. A total of four (4) 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 four (4) areas chosen for testing were:

SR2B RH	SR2B LH	BP4 LH	URBP LH

The URBP impact area on the test vehicle had a high HICd result with respect to the compliance performance requirements of FMVSS 201.

Four Free Motion Headforms (FMH) were used in this test series. All four FMH's were calibrated prior to and after the test series. Calibration information is 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:	2010 Ford Transit Connect
VIN:	NM0KS9BN7AT016628
DATE OF MANUFACTURE:	8/09 (SEE CERTIFICATION LABEL)
COLOR:	Panther Black Metallic

TARGET CODE	Target Coordinates						Approach Angles (degrees)		Velocity (kph)	FMH HIC	HIC(d)
	Driver Side			Passenger Side							
	X(mm)	Y(mm)	Z(mm)	X(mm)	Y(mm)	Z(mm)	Horizontal	Vertical			
AP1	2769.79	-617.53	1687.79	2763.04	609.56	1692.64	-	-	-	-	-
AP2	2617.85	-649.42	1601.55	2611.19	641.04	1603.42	-	-	-	-	-
AP3	2428.02	-677.93	1450.82	2426.15	670.88	1455.73	-	-	-	-	-
FH1	2671.97	-497.05	1699.59	2671.37	490.42	1701.83	-	-	-	-	-
FH R2	2715.89	-488.97	1688.01	2709.39	483.03	1690.76	-	-	-	-	-
FH2	2645.68	-351.78	1699.80	2643.44	341.28	1702.88	-	-	-	-	-
FH2 R2	2690.05	-342.34	1686.18	2679.95	335.97	1688.48	-	-	-	-	-
SR1	2920.08	-596.93	1679.85	2911.87	589.64	1680.77	-	-	-	-	-
SR2	3069.65	-572.63	1814.80	3061.36	565.57	1816.99	-	-	-	-	-
SR2B	3036.96	-572.46	1808.36	3040.46	566.60	1811.36	270 LH / 90 RH	11 LH / 15 RH	23.35/23.87	914.5/1103.0	991.5/998.5
URBP	3339.44	-464.11	1957.68	3337.15	458.47	1959.41	270	41	23.71	1270.8	1125.2
BP1	3337.79	-551.82	1825.03	3339.24	548.52	1825.17	-	-	-	-	-
BP2	3321.41	-649.81	1438.98	3319.87	643.84	1443.61	-	-	-	-	-
BP3	3278.44	-677.85	1493.19	3276.00	674.07	1492.63	-	-	-	-	-
BP4	3362.64	-696.35	1327.91	3361.17	692.01	1329.26	-	-	-	-	-
BP4 R1	3361.82	-692.80	1351.80	3361.46	689.40	1351.45	242	5	23.43	396.5	465.5
SR3	3489.64	-554.12	1884.12	3488.74	548.49	1886.20	-	-	-	-	-
SD	3811.98	-576.58	1927.87	3814.21	569.16	1928.25	-	-	-	-	-
CGF1	2947.31	-349.06	1904.71	2939.31	351.36	1900.04	-	-	-	-	-
CGF2	3233.03	-349.41	1984.02	3229.45	353.02	1986.45	-	-	-	-	-
OP1	4312.87	-574.12	1928.43	4308.36	566.50	1929.60	-	-	-	-	-
OP2	4308.94	-703.43	1515.26	4307.02	693.04	1524.59	-	-	-	-	-
OP2 R12	4299.77	-624.66	1803.24	4283.30	614.56	1814.51	-	-	-	-	-
UROP	4314.45	-461.28	1991.44	4306.14	454.92	1995.52	-	-	-	-	-
CGF3	4079.00	-357.57	2015.62	4071.69	355.88	2018.00	-	-	-	-	-

*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:	2010 Ford Transit Connect							
VIN:	NM0KS9BN7AT016628							
Month & Year of Manufacture:	8/09 (SEE CERTIFICATION LABEL)							
Vehicle Body Color:	Panther Black Metallic							
Engine Data:	4	Cylinders;	-	CID;	2.0	Liters;	-	cc
Engine Placement:		X	Longitudinal;	or			Lateral	
Transmission:	4	Speed;	-	Manual;	X	Automatic;	X	Overdrive
Final Drive:	-	Rear Wheel Drive;	X	Front Wheel Drive;		-	Four Wheel Drive	
Odometer Reading:	450	Km						
Options:	X	A/C;	X	Power Steering;	X	Pwr.Brakes;	-	Pwr. Windows
Interior Trim Information :								
1.Adjustable seat belt anchorages on both B-pillars								
2.No-adjustable seat belt anchorages on both Other pillars								
3.Roof shelf located near front header / A-pillar area								

DATA FROM TIRE PLACARD:								
Tire Pressure (at capacity);	250	kPa FRONT						
	340	kPa REAR						
Recommended Tire Size:								
Tires on Test Vehicle:	P205/65R15	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)=	647.0	kg (A)						
No. of Occupants x 68 kg. =	340	kg (B)						
Rated Cargo/Luggage Weight (RCLW) =	307	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 =	461.0	kg	Left Rear =	337.5	kg
Right Front =	418.5	kg	Right Rear =	362.5	kg
TOTAL FRONT =	879.5	kg	TOTAL REAR =	700.0	kg
% of Total Weight =	55.7	%	% of Total Weight =	44.3	%
TOTAL WEIGHT =	1579.5	kg			

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:		
Total Test Vehicle Delivered Weight=	1579.5	kg (A)
+ Rated Cargo/Luggage Weight =	136.0	kg (B)
TEST VEHICLE TARGET WEIGHT =	1715.5	kg (A+B)

WEIGHT OF TEST VEHICLE (FULLY LOADED):					
Left Front =	456.5	kg	Left Rear =	404.0	kg
Right Front =	420.5	kg	Right Rear =	427.0	kg
TOTAL FRONT =	877.0	kg	TOTAL REAR =	831.0	kg
% of Total Weight =	51.3	%	% of Total Weight =	48.7	%
TOTAL TEST WEIGHT =	1708.0				
Weight of vehicle secured in test vehicles cargo area =	134.4	kg			

TEST VEHICLE ATTITUDE (all dimensions in millimeters):				
AS DELIVERED:	Left Front	730.0	Left Rear	791.0
	Right Front	736.0	Right Rear	796.0
FULLY LOADED:	Left Front	728.0	Left Rear	774.0
	Right Front	734.0	Right Rear	779.0
Test Vehicle Wheelbase:	2919.0	millimeters		

TEST VEHICLE PITCH AND ROLL ANGLES:				
AS DELIVERED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑1.4↓	Front Bumper	↓0.1↑
	Right Door Sill	↓1.3↑	Rear Bumper	↑0.1↓
FULLY LOADED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑1.1↓	Front Bumper	↓0.1↑
	Right Door Sill	↓0.1↑	Rear Bumper	↑0.1↓
AS TESTED:	PITCH ANGLES		ROLL ANGLES	
	Left Door Sill	↑1.2↓	Front Bumper	↓0.1↑
	Right Door Sill	↓1.0↑	Rear Bumper	↑0.1↓

DATA SHEET 2-3

APPROACH ANGLE LIMITS

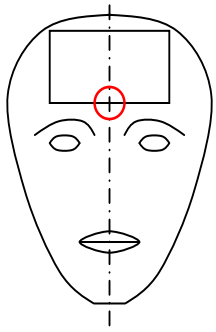
Left Side					Right Side				
Target Code	**Horizontal Angles (deg.)**		**Vertical Angles (deg.)**		**Target Code**	**Horizontal Angles (deg.)**		**Vertical Angles (deg.)**	
	Minimum	**Maximum**	**Minimum**	**Maximum**		**Minimum**	**Maximum**	**Minimum**	**Maximum**
AP1	205	248	-5	41	AP1	112	155	-5	41
AP2	205	248	-5	4	AP2	112	155	-5	4
AP3	205	248	-5	18	AP3	112	155	-5	18
BP1	201	282	-10	11	BP1	78	159	-10	11
BP2	Any		0	5	BP2	Any		0	5
BP3	201	282	-10	-10	BP3	78	159	-10	-10
BP4	201	282	-10	5	BP4	78	159	-10	5
OP1	270		-10	9	OP1	90		-10	9
OP2	270		-10	9	OP2	90		-10	9
RP1	270	345	-10	N/A	RP1	15	90	-10	N/A
RP2	270	345	-10	N/A	RP2	15	90	-10	N/A
FH1	180		0	50	FH1	180		0	50
FH2	180		0	50	FH2	180		0	50
RH	360		0	N/A	RH	0		0	N/A
SR1	270		0	45	SR1	90		0	45
SR2A	270		0	6	SR2A	90		0	6
SR2B	270		0	14	SR2B	90		0	11
SR3	270		0	6	SR3	90		0	6
SR3GH	270		0	14	SR3GH	90		0	14
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
N/A – Not Available

DATA SHEET 2-4

SUMMARY TARGET IMPACT LOCATION ON FMH

VEHICLE YEAR/MAKE/MODEL/STYLE:	2010 Ford Transit Connect
VIN:	NM0KS9BN7AT016628
DATE OF MANUFACTURE:	8/09(SEE CERTIFICATION LABEL)
COLOR:	Panther Black Metallic



↖ RIGHT SIDE OF FACE

TARGET	Distance Above Point 0 (mm)	Distance Over From Pt. O (mm)
SR2B RH	25	-3 L
SR2B LH	19	-4 L
URBP	56	-15 L
BP4 R1	18	5 R

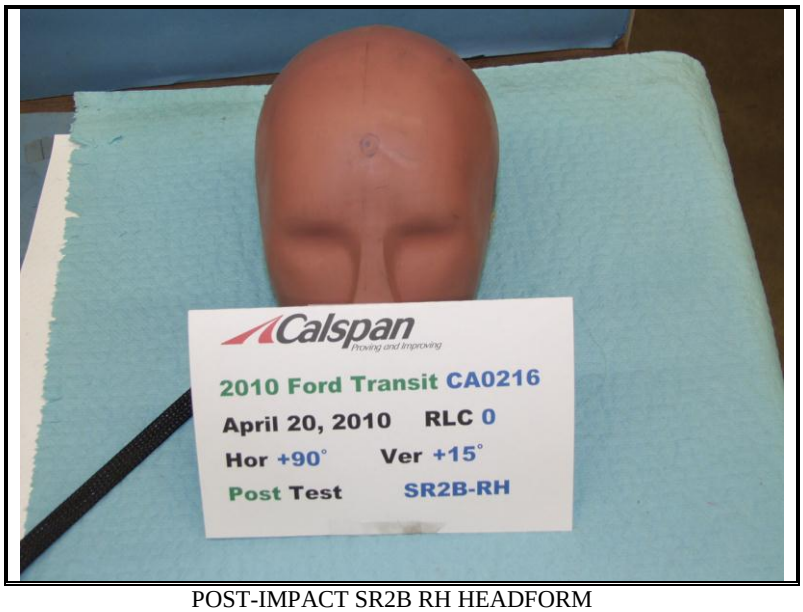
SECTION 3

SUMMARY OF TEST RESULTS AND DATA PLOTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2010 Ford Transit Connect
VIN:	NM0KS9BN7AT016628
DATE OF MANUFACTURE:	8/09(SEE CERTIFICATION LABEL)
COLOR:	Panther Black Metallic

Test Number:	01
Test Date:	April 20, 2010
Target Location:	SR2B RH
Target Code:	SR2B RH
Horizontal Impact Angle:	90
Vertical Impact Angle:	15
Ambient Temperature:	22 C
Relative Humidity:	27.2 %
Time of Impact:	10:17 am
Headform Number:	1142

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	-3		mm right	X	mm left
On Centerline	25	mm up			



POST-IMPACT SR2B RH HEADFORM

Free Motion HIC	1103.0
HIC(d)	998.5
Impact Velocity (kph)	23.9
HIC T1 (msec)	3.2
HIC T2 (msec)	9.4

SR2B RH Side CA0216 - SR2B RH

FMH Headform 1142

Test Date: April 20, 2010

Location: SR2B RH

Work File: fmh

----------**TEST RESULTS**----------

Lab Temperature: 22 C

Lab Humidity: 29 %

Velocity at Impact: 23.87 KPH

Free Flight Distance: 225.76 mm

Maximum: 161.5 g

HICd: 998.5

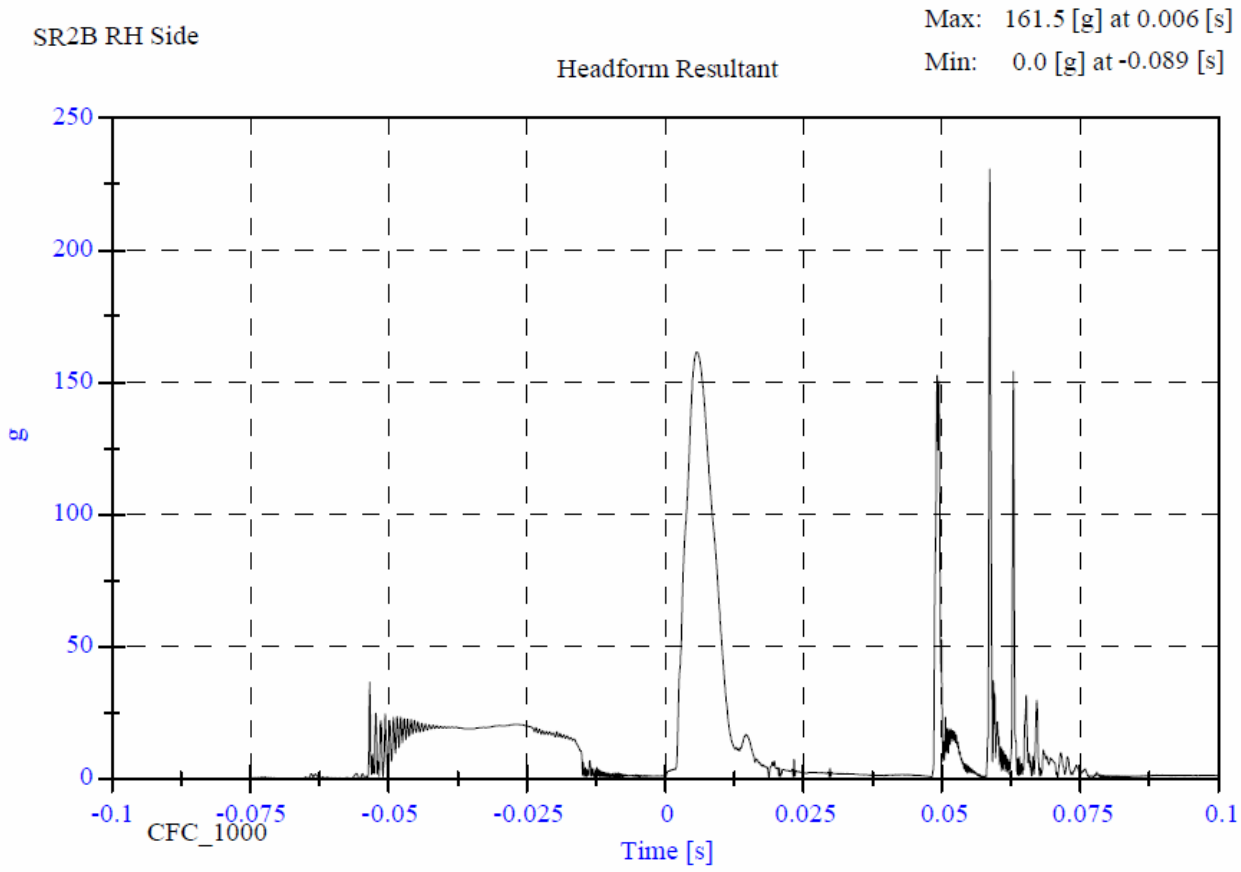
HIC (36ms): 1103.0

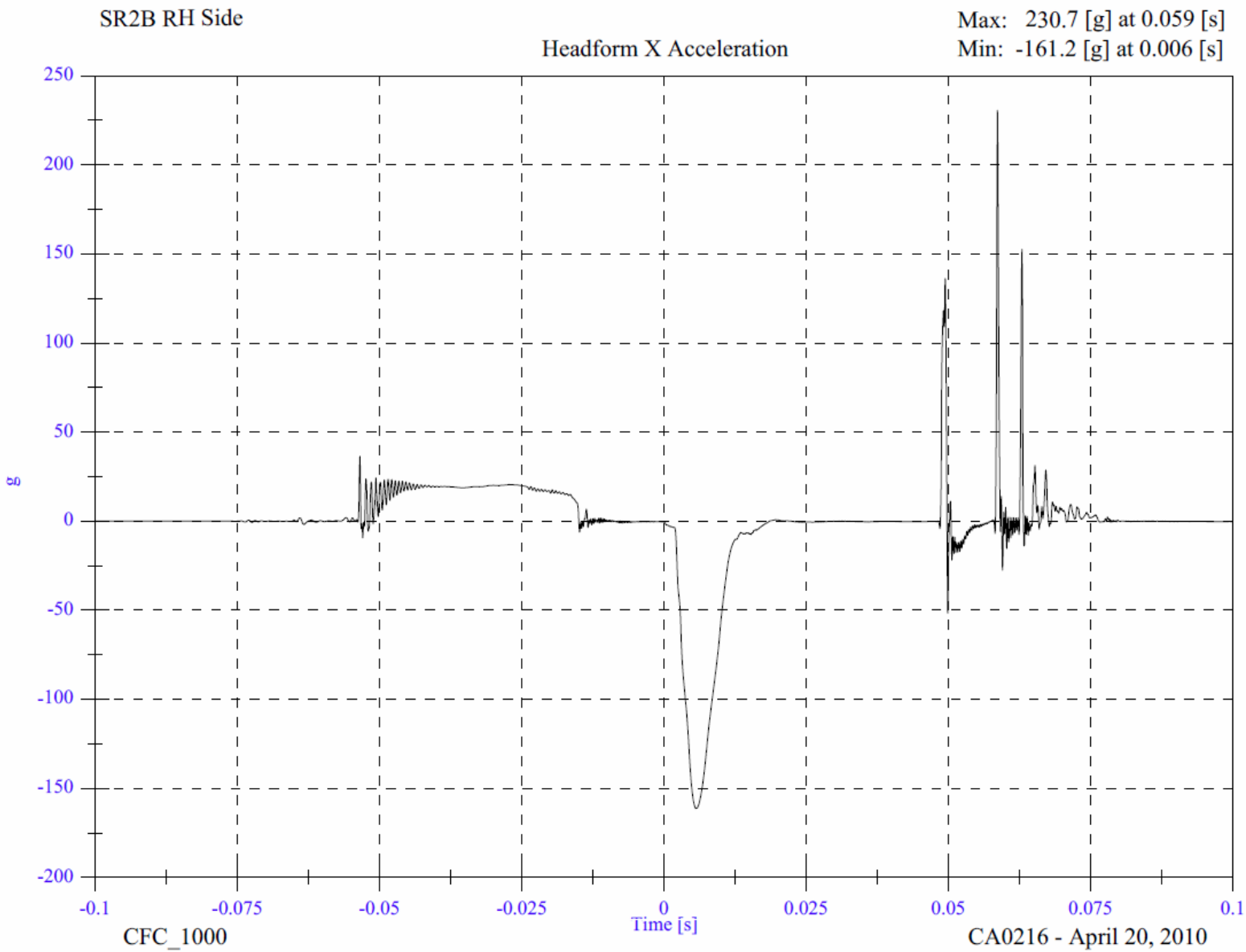
t1: 3.2 msec

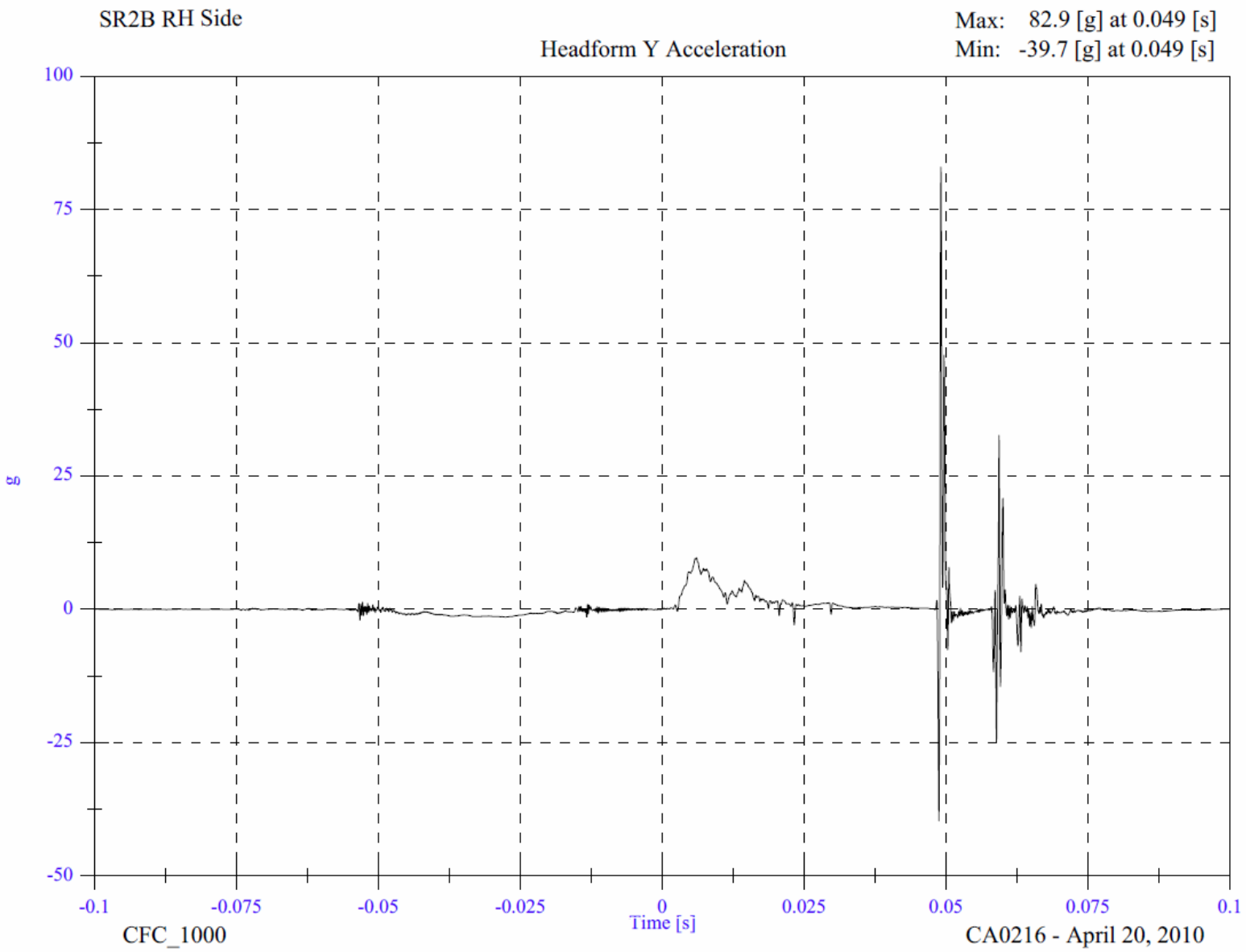
t2: 9.4 msec

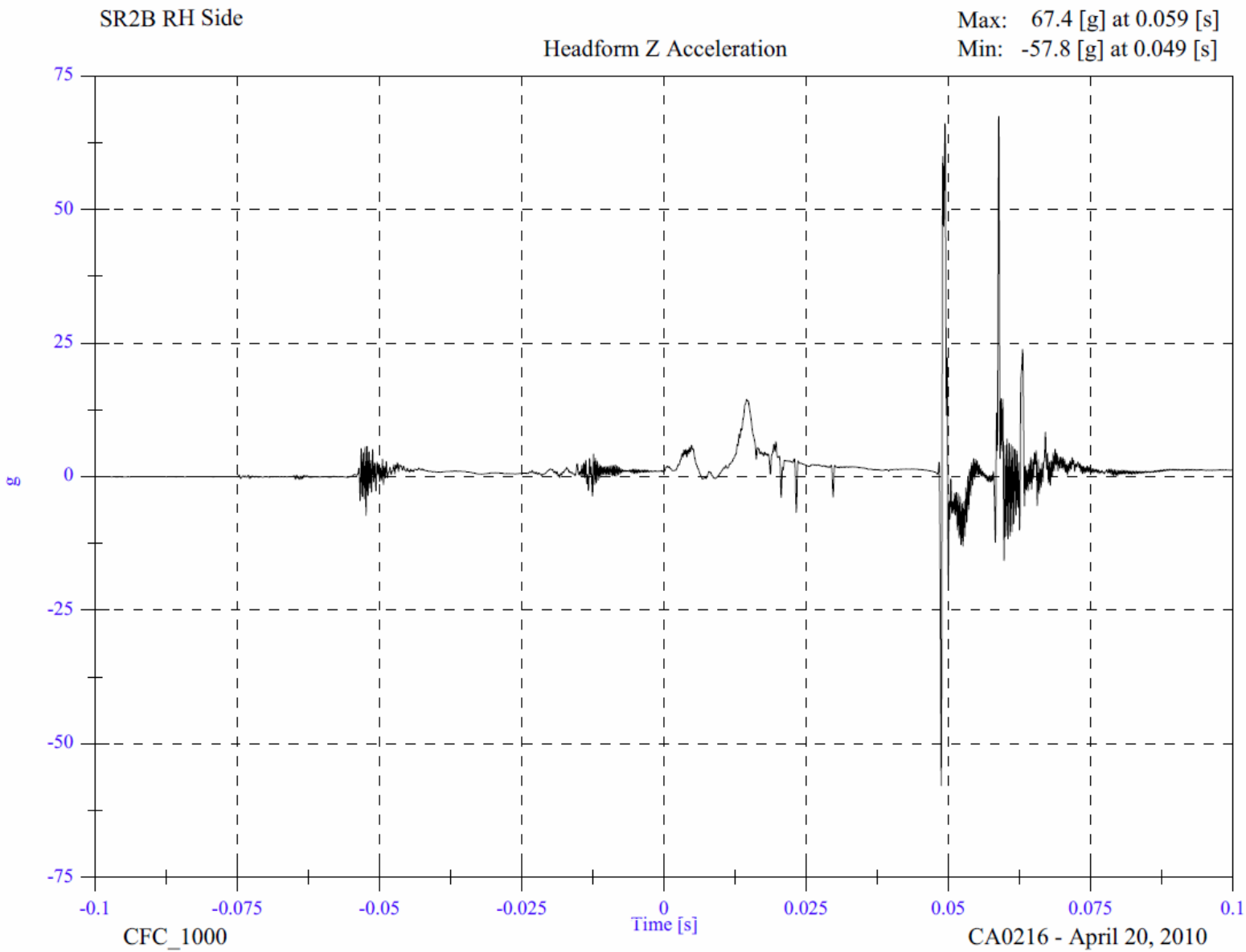
Duration: 6.2 msec

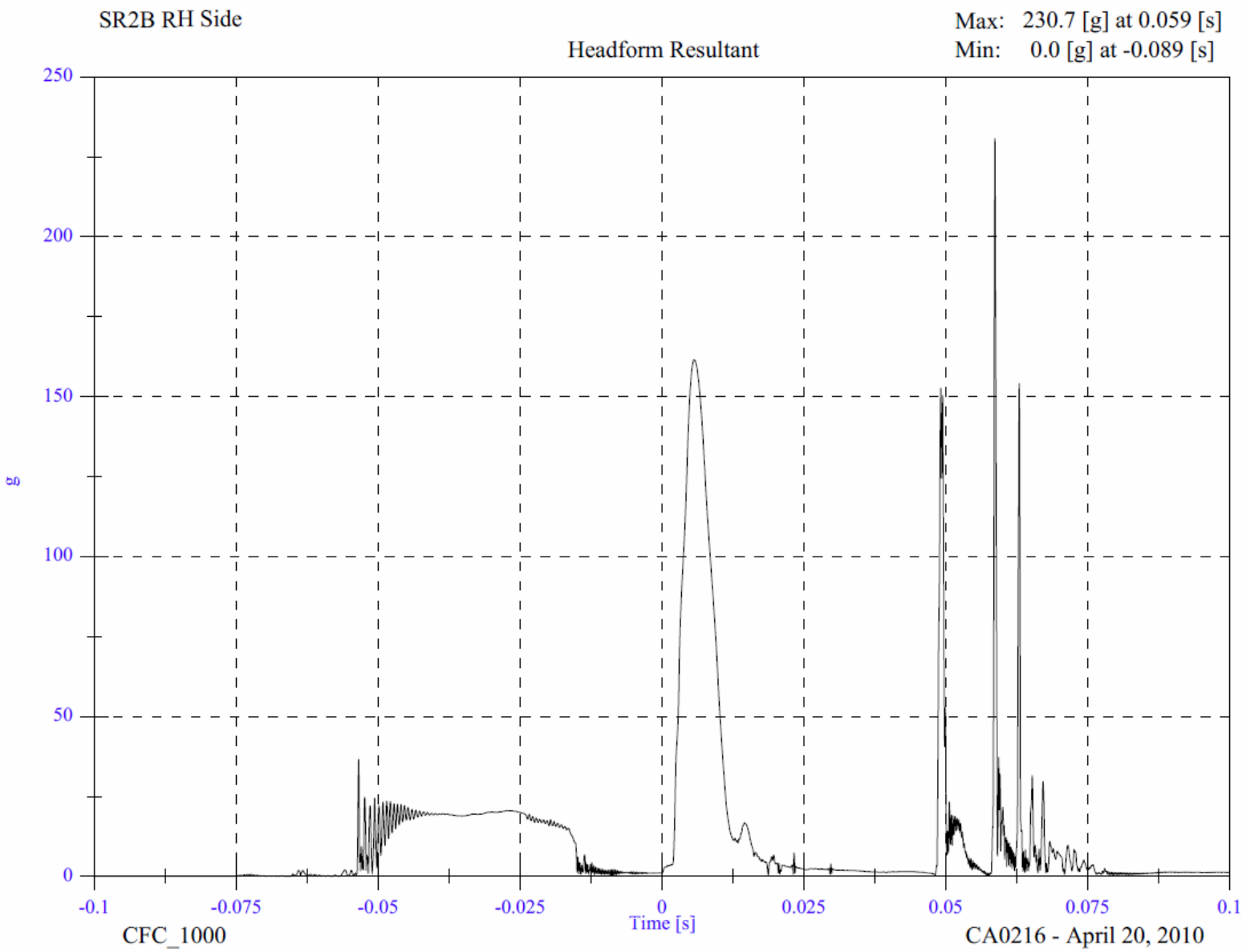
Average Acceleration: 11.4 g

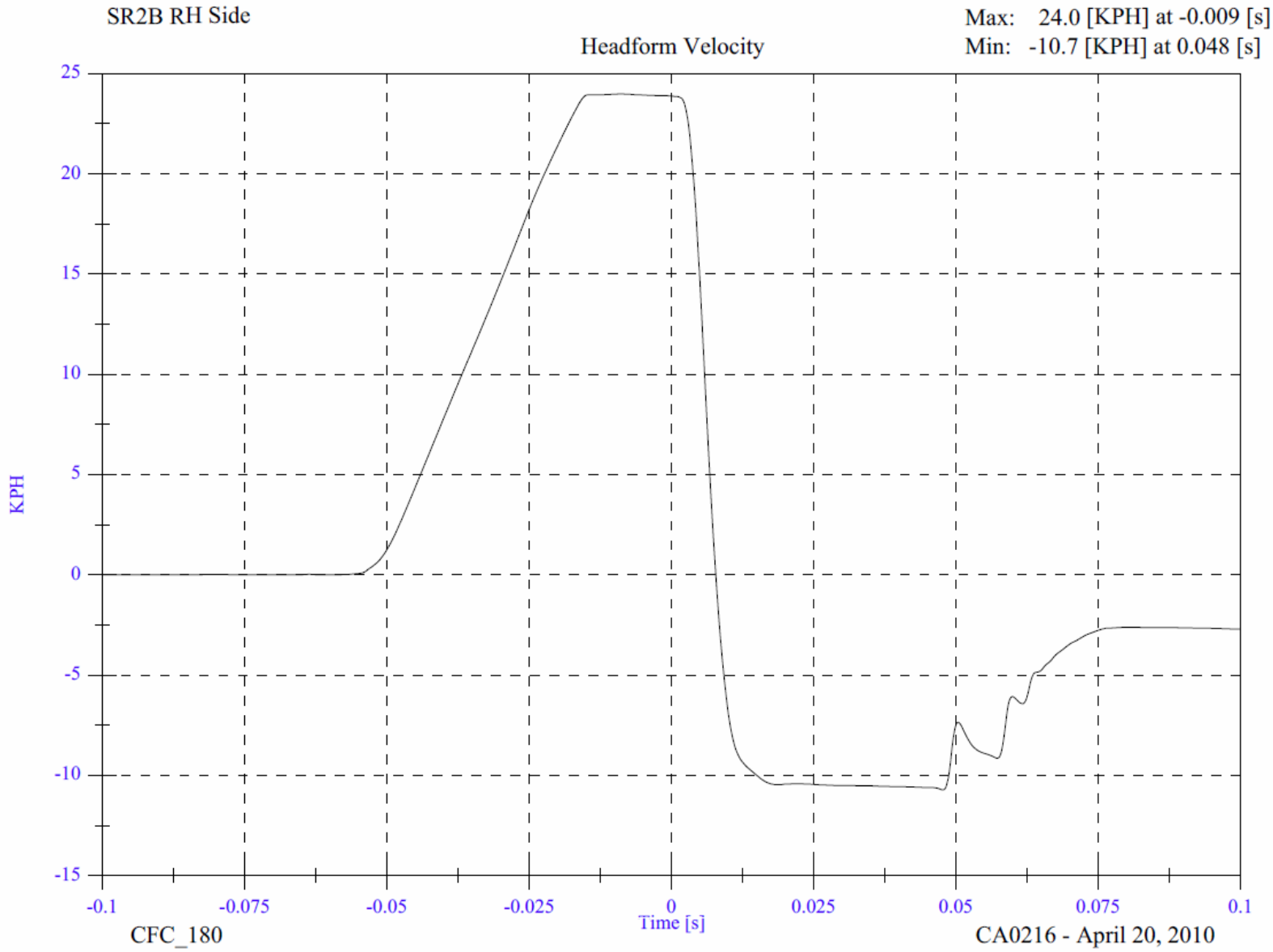


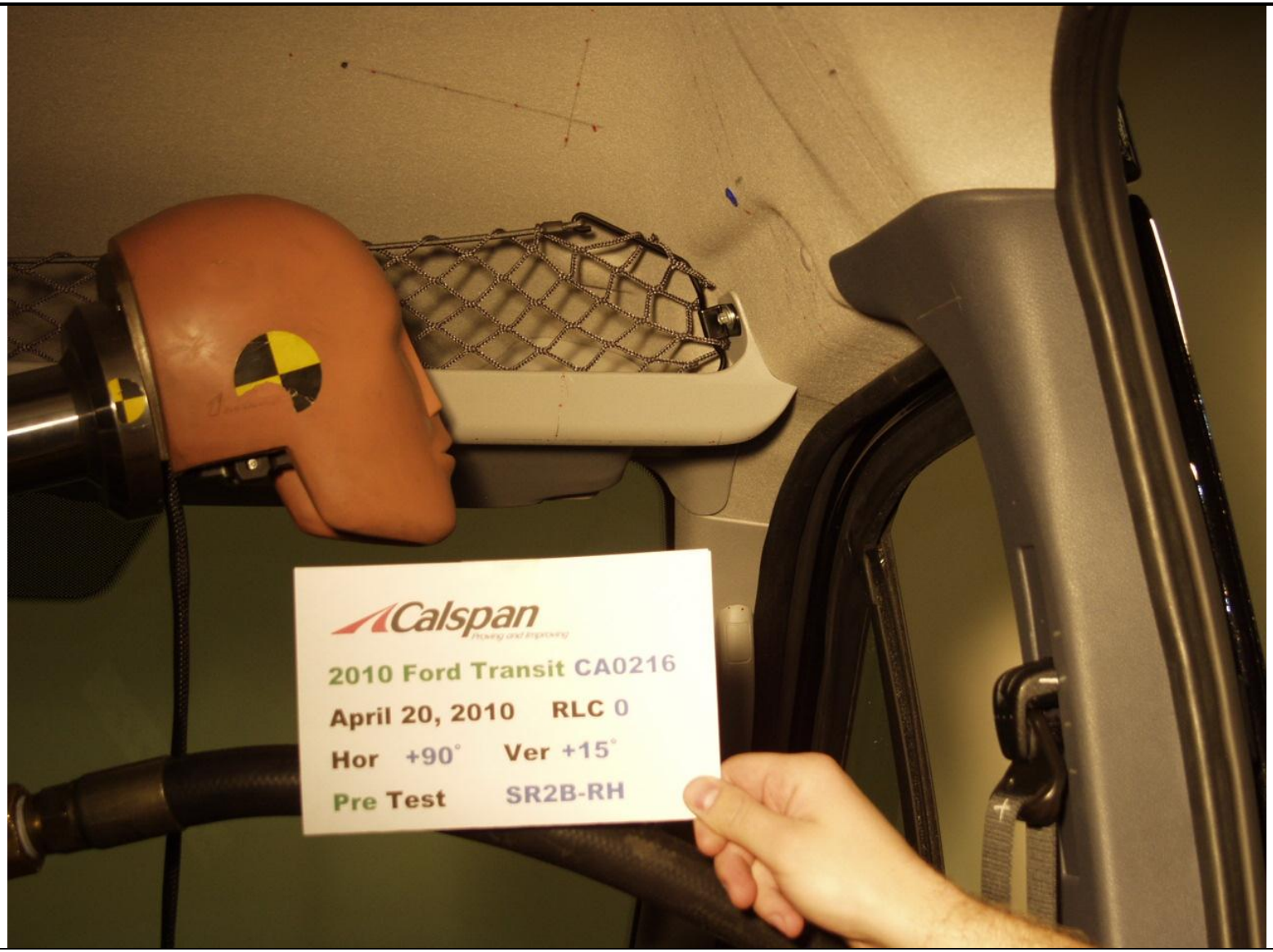

SR2B RH Side
Headform X Acceleration
Max: 230.7 [g] at 0.059 [s]
Min: -161.2 [g] at 0.006 [s]
250
200
150
100
50
0
-50
-100
-150
-200
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


SR2B RH Side
Headform Y Acceleration
Max: 82.9 [g] at 0.049 [s]
Min: -39.7 [g] at 0.049 [s]
100
75
50
25
0
-25
-50
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


SR2B RH Side
Headform Z Acceleration
Max: 67.4 [g] at 0.059 [s]
Min: -57.8 [g] at 0.049 [s]
75
50
25
0
-25
-50
-75
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


SR2B RH Side
Headform Resultant
Max: 230.7 [g] at 0.059 [s]
Min: 0.0 [g] at -0.089 [s]
250
200
150
100
50
0
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


SR2B RH Side
Headform Velocity
Max: 24.0 [KPH] at -0.009 [s]
Min: -10.7 [KPH] at 0.048 [s]
25
20
15
10
5
0
-5
-10
-15
KPH
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_180
CA0216 - April 20, 2010



PRE-IMPACT **SR2B RH**

POST-IMPACT SR2B RH

VEHICLE YEAR/MAKE/MODEL/STYLE:	2010 Ford Transit Connect
VIN:	NM0KS9BN7AT016628
DATE OF MANUFACTURE:	8/09(SEE CERTIFICATION LABEL)
COLOR:	Panther Black Metallic

Test Number:	02
Test Date:	April 20, 2010
Target Location:	SR2B LH
Target Code:	SR2B LH
Horizontal Impact Angle:	270
Vertical Impact Angle:	11
Ambient Temperature:	22.5 C
Relative Humidity:	29.8 %
Time of Impact:	11:54 am
Headform Number:	1140

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	-4	[ ]	mm right	[X]	mm left
On Centerline	19	mm up			

POST-IMPACT SR2B LH HEADFORM

Free Motion HIC	914.5
HIC(d)	991.5
Impact Velocity (kph)	23.4
HIC T1 (msec)	3.9
HIC T2 (msec)	10.0

SR2B LH Side CA0216 - SR2B LH

FMH Headform 1140

Test Date: April 20, 2010

Location: SR2B LH

Work File: fmh

----------**TEST RESULTS**----------

Lab Temperature: 22.4 C

Lab Humidity: 29.8 %

Velocity at Impact: 23.35 KPH

Free Flight Distance: 225.49 mm

Maximum: 158.2 g

HICd: 914.5

HIC (36ms): 991.5

t1: 3.9 msec

t2: 10.0 msec

Duration: 6.1 msec

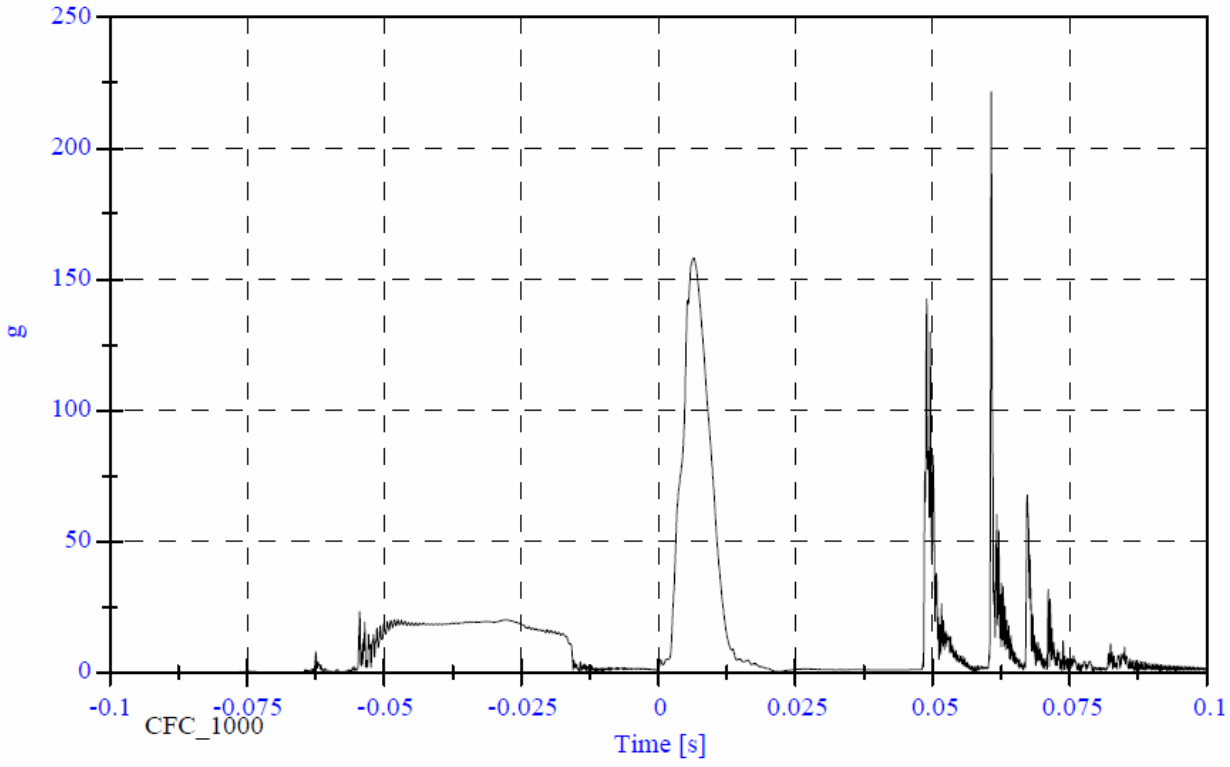
Average Acceleration: 11.2 g

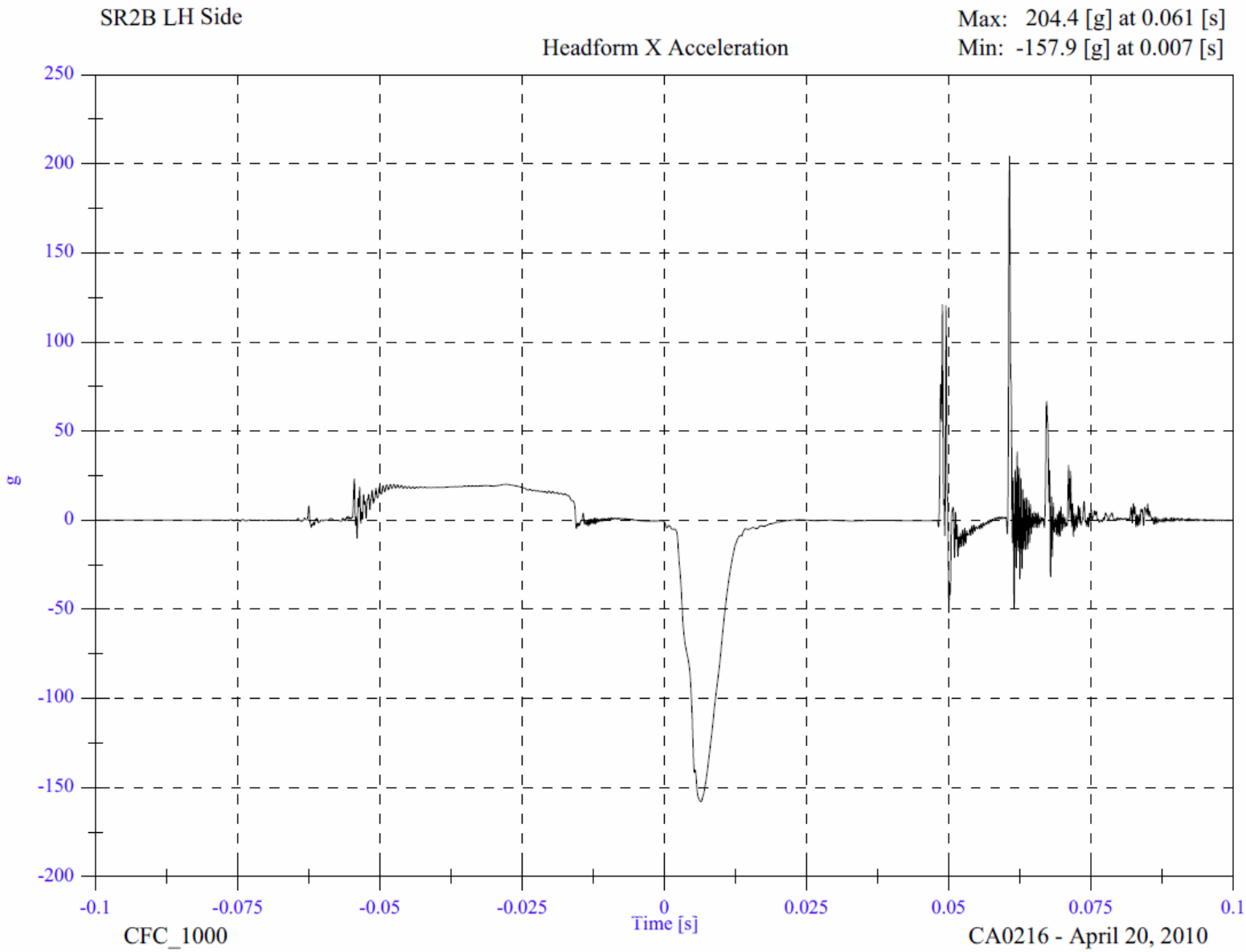
SR2B LH Side

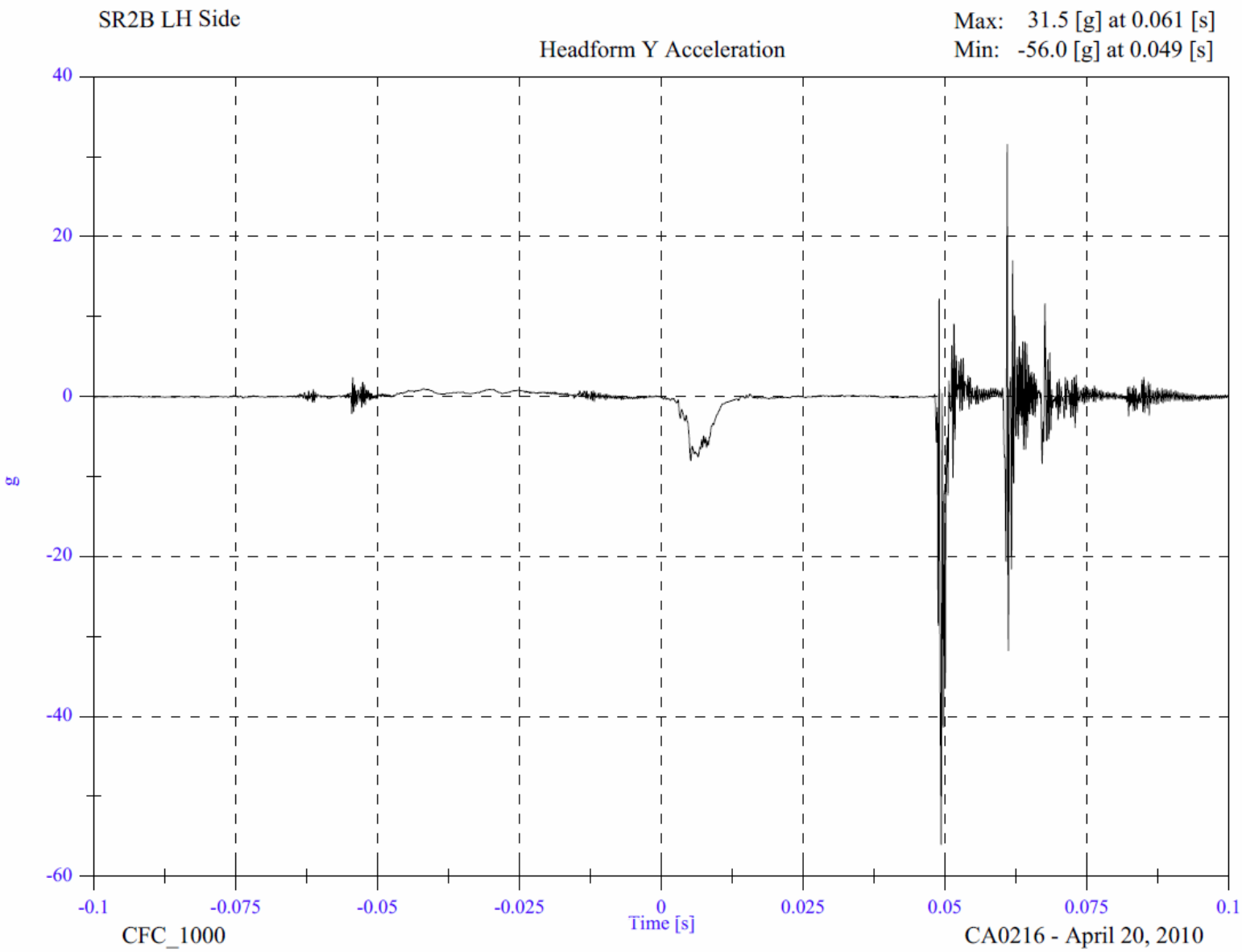
Headform Resultant

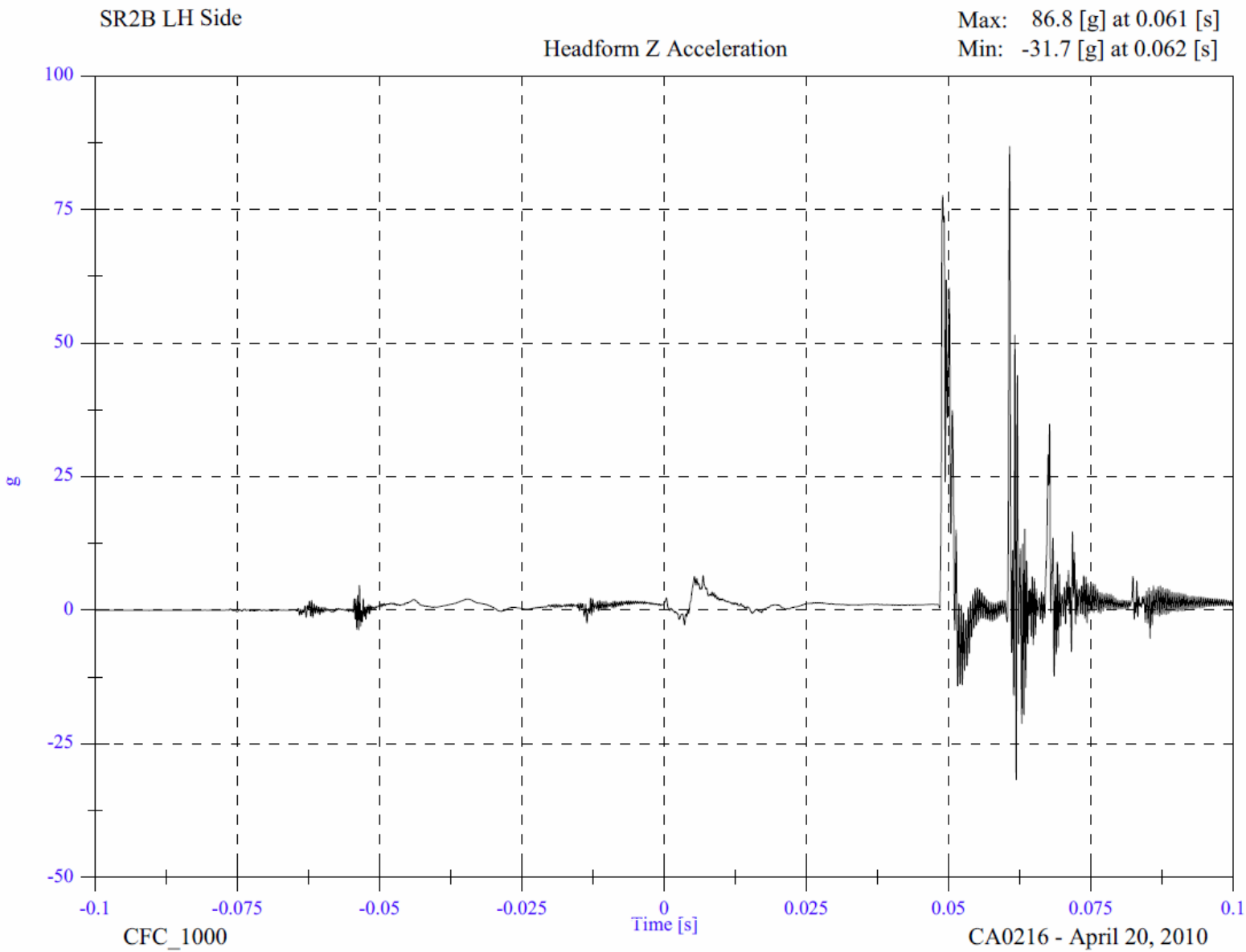
Max: 158.2 [g] at 0.007 [s]

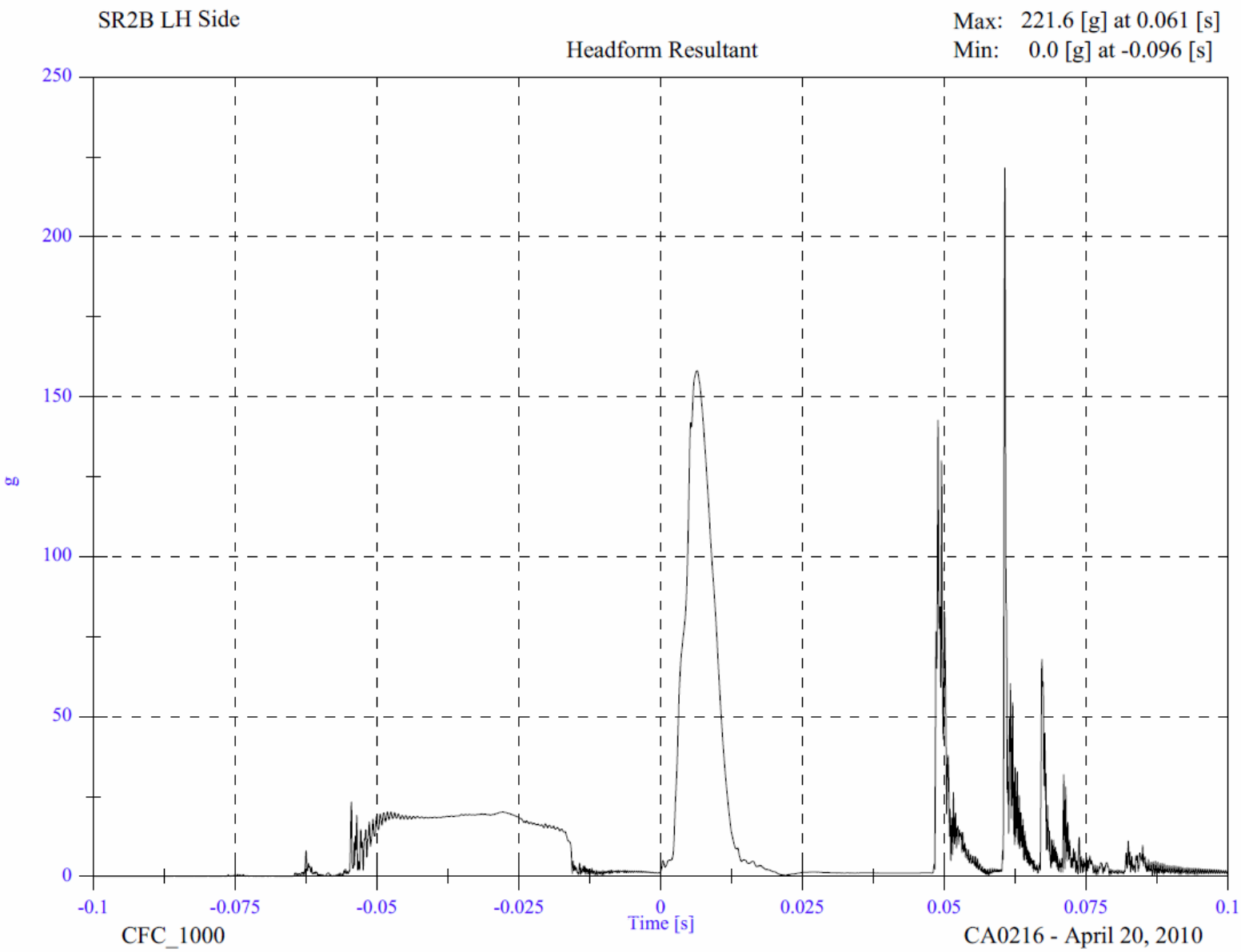
Min: 0.0 [g] at -0.096 [s]

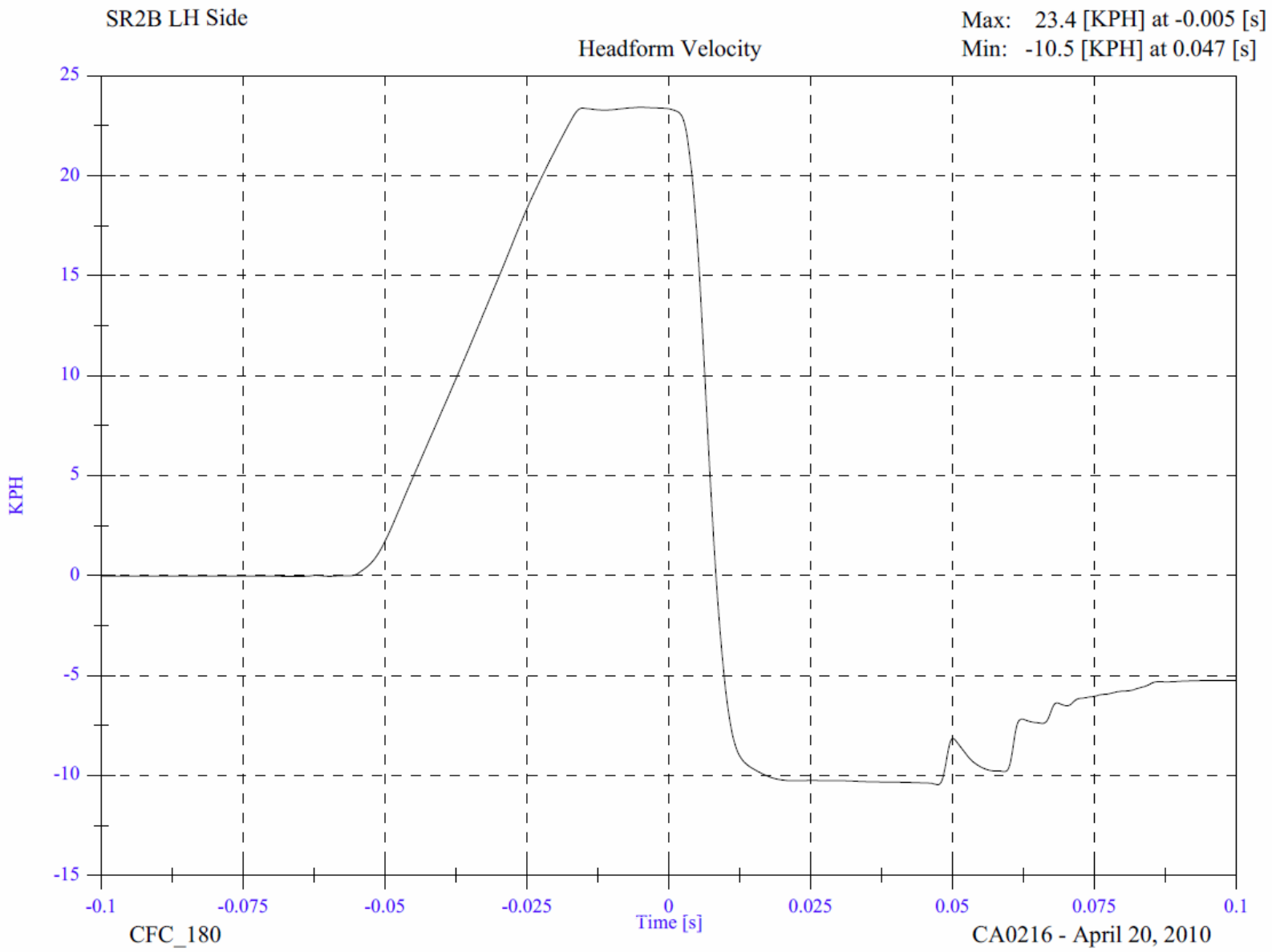



SR2B LH Side
Headform X Acceleration
Max: 204.4 [g] at 0.061 [s]
Min: -157.9 [g] at 0.007 [s]
250
200
150
100
50
0
-50
-100
-150
-200
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010

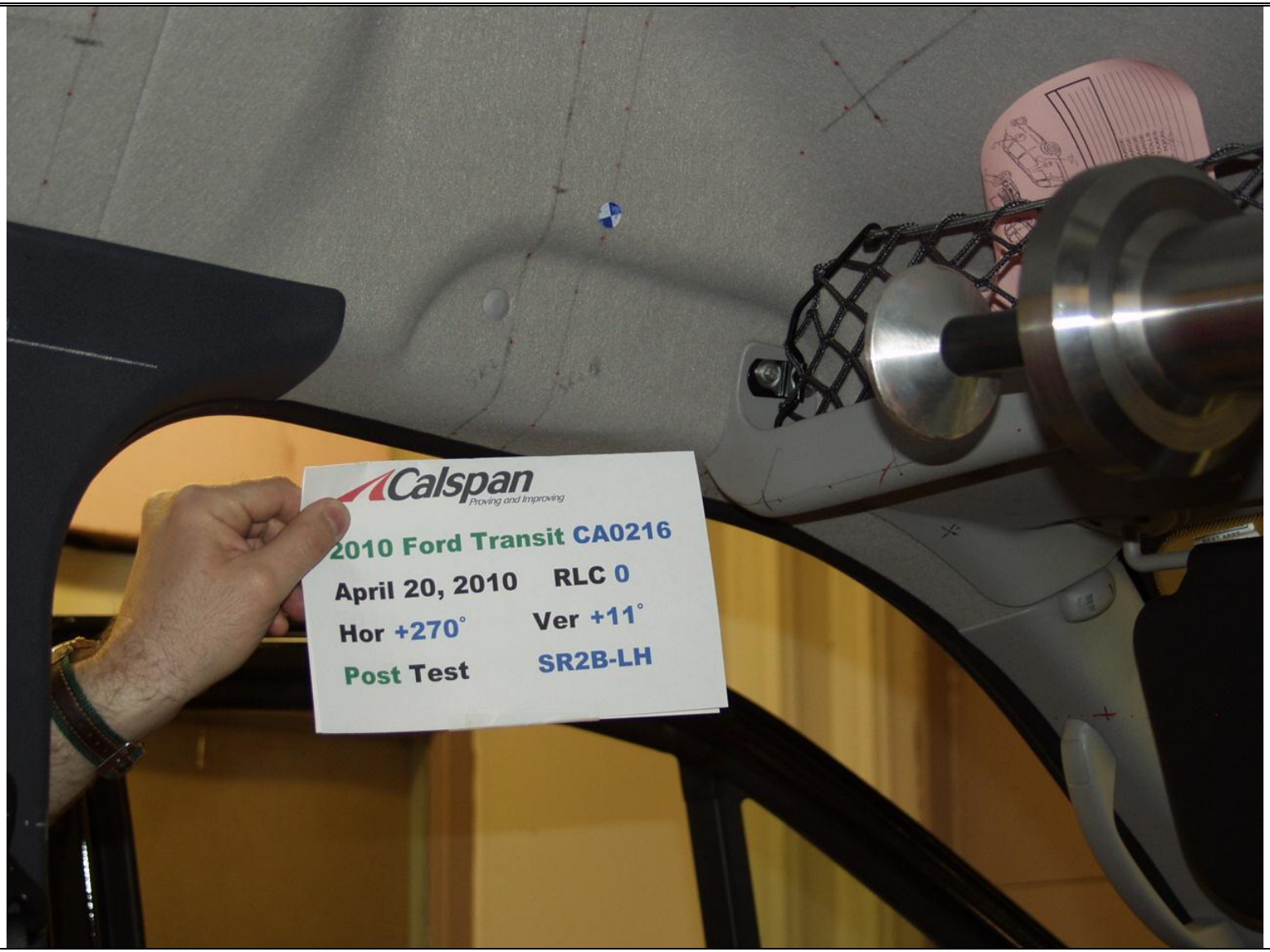

SR2B LH Side
Headform Y Acceleration
Max: 31.5 [g] at 0.061 [s]
Min: -56.0 [g] at 0.049 [s]
40
20
0
-20
-40
-60
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


SR2B LH Side
Headform Z Acceleration
Max: 86.8 [g] at 0.061 [s]
Min: -31.7 [g] at 0.062 [s]
100
75
50
25
0
-25
-50
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


SR2B LH Side
Headform Resultant
Max: 221.6 [g] at 0.061 [s]
Min: 0.0 [g] at -0.096 [s]
250
200
150
100
50
0
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


SR2B LH Side
Headform Velocity
Max: 23.4 [KPH] at -0.005 [s]
Min: -10.5 [KPH] at 0.047 [s]
25
20
15
10
5
0
-5
-10
-15
KPH
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_180
CA0216 - April 20, 2010

PRE-IMPACT SR2B LH



POST-IMPACT SR2B LH

VEHICLE YEAR/MAKE/MODEL/STYLE:	2010 Ford Transit Connect
VIN:	NM0KS9BN7AT016628
DATE OF MANUFACTURE:	8/09(SEE CERTIFICATION LABEL)
COLOR:	Panther Black Metallic

Test Number:	03
Test Date:	April 20, 2010
Target Location:	BP4 LH
Target Code:	BP4 LH
Horizontal Impact Angle:	242
Vertical Impact Angle:	5
Ambient Temperature:	22.5 C
Relative Humidity:	28.5 %
Time of Impact:	2:28 pm
Headform Number:	0355

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	5	X	mm right		mm left
On Centerline	18	mm up			

POST-IMPACT HEADFORM

Free Motion HIC	396.5
HIC(d)	465.5
Impact Velocity (kph)	23.4
HIC T1 (msec)	1.9
HIC T2 (msec)	10.7

BP4 LH Side CA0216 - BP4 LH

FMH Headform 0355 — Location: BP4 LH

Test Date: April 20, 2010 — Work File: fmh

----------**TEST RESULTS**----------

Lab Temperature: 22.5 C

Lab Humidity: 28.5 %

Velocity at Impact: 23.43 KPH

Free Flight Distance: 224.36 mm

Maximum: 96.1 g

HICd: 465.5

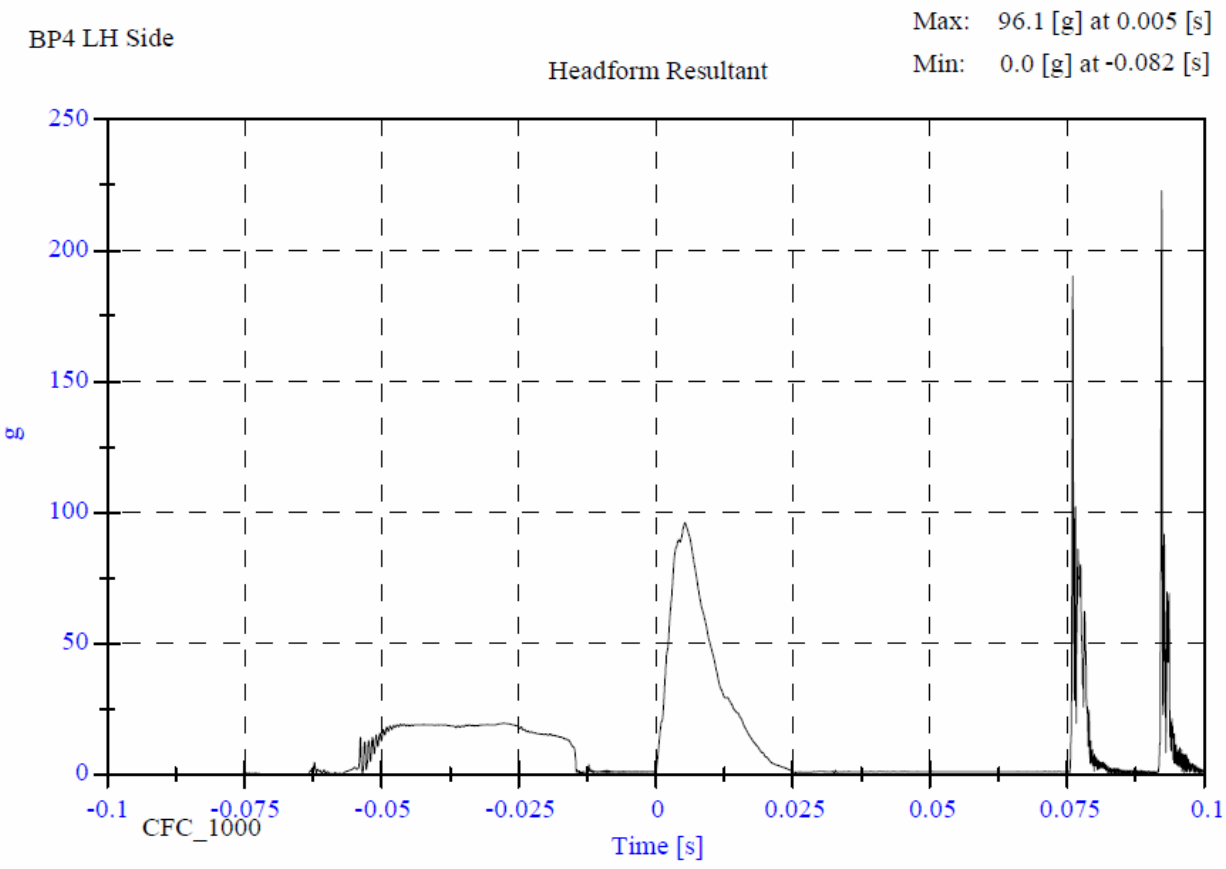
HIC (36ms): 396.5

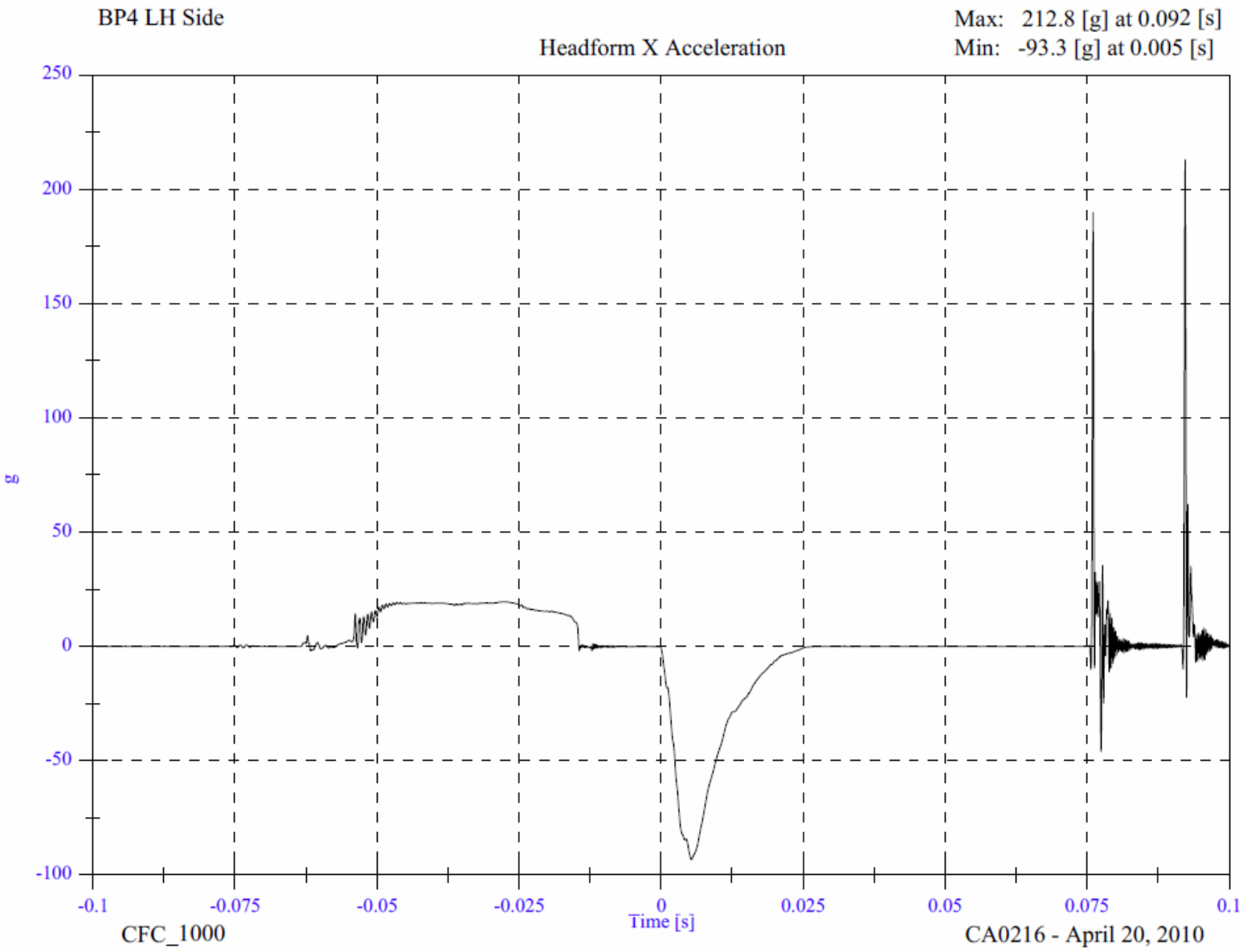
t1: 1.9 msec

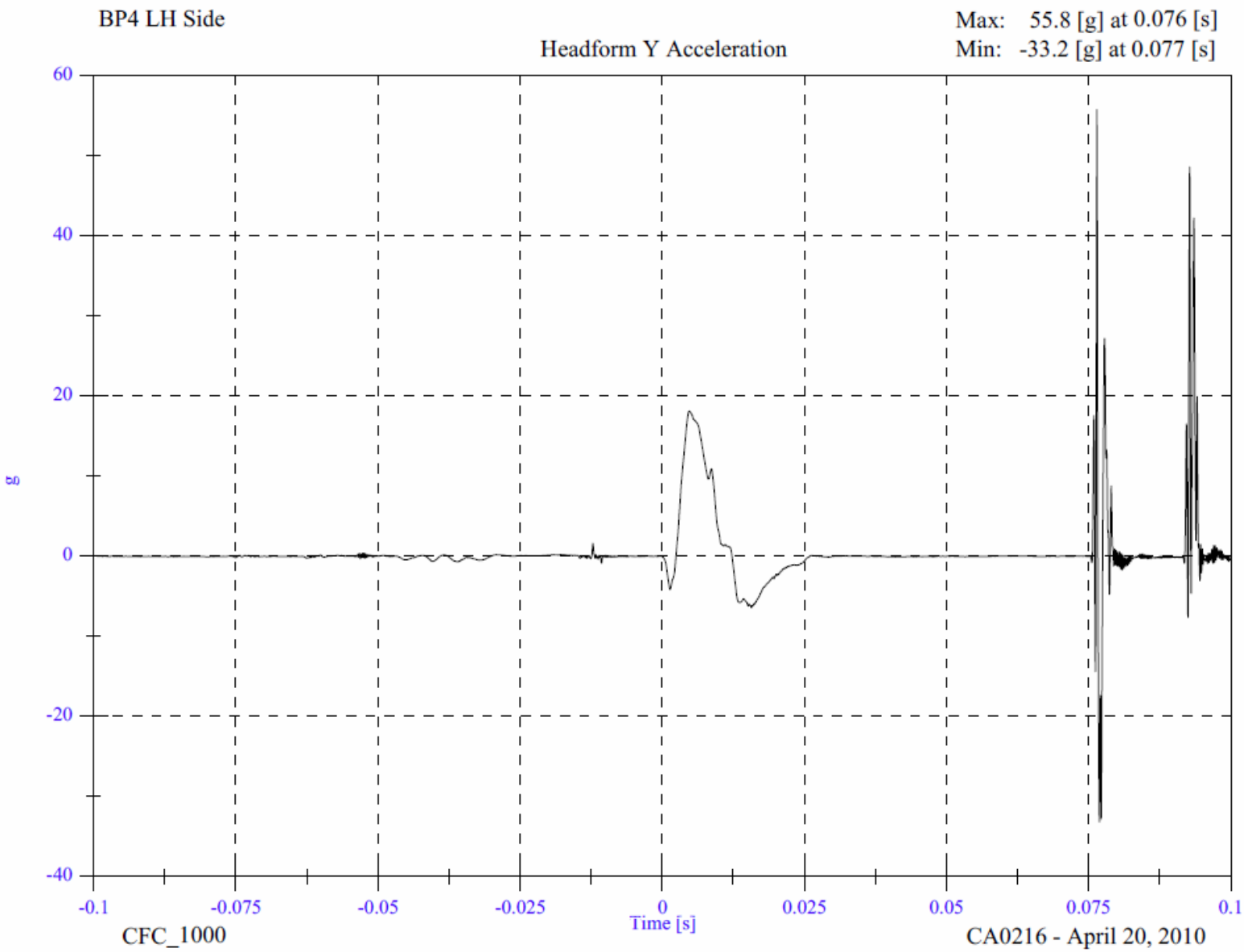
t2: 10.7 msec

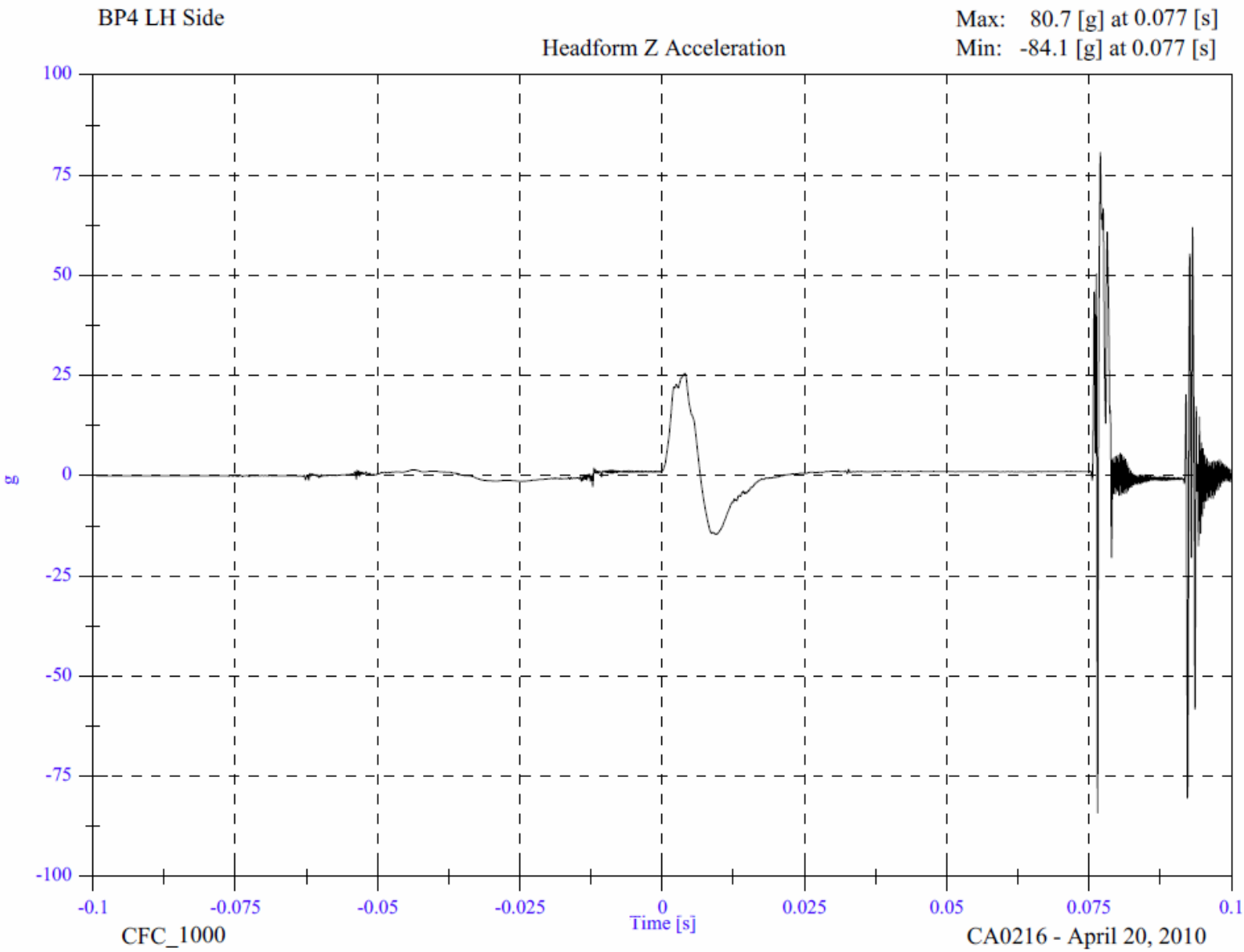
Duration: 8.8 msec

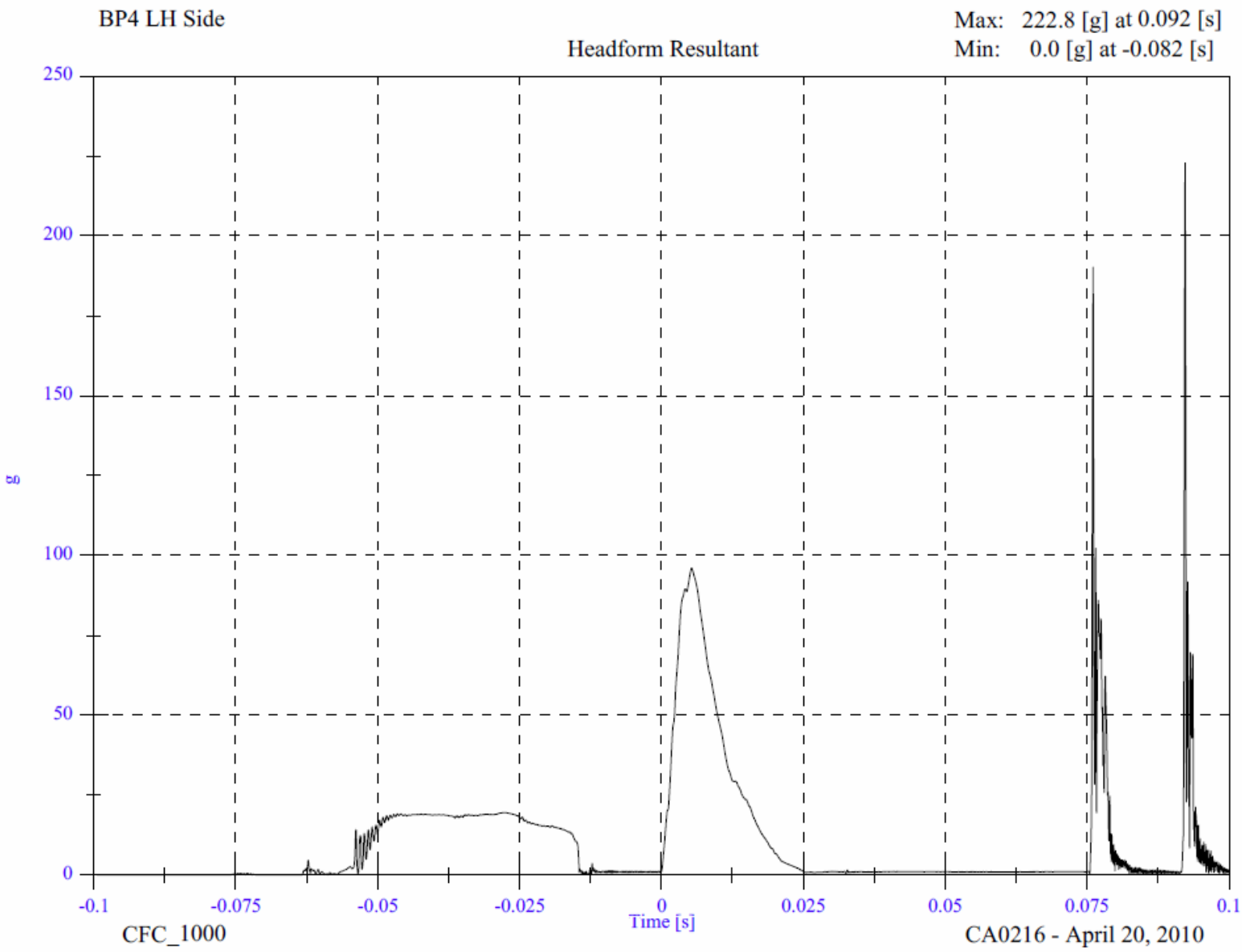
Average Acceleration: 10.1 g

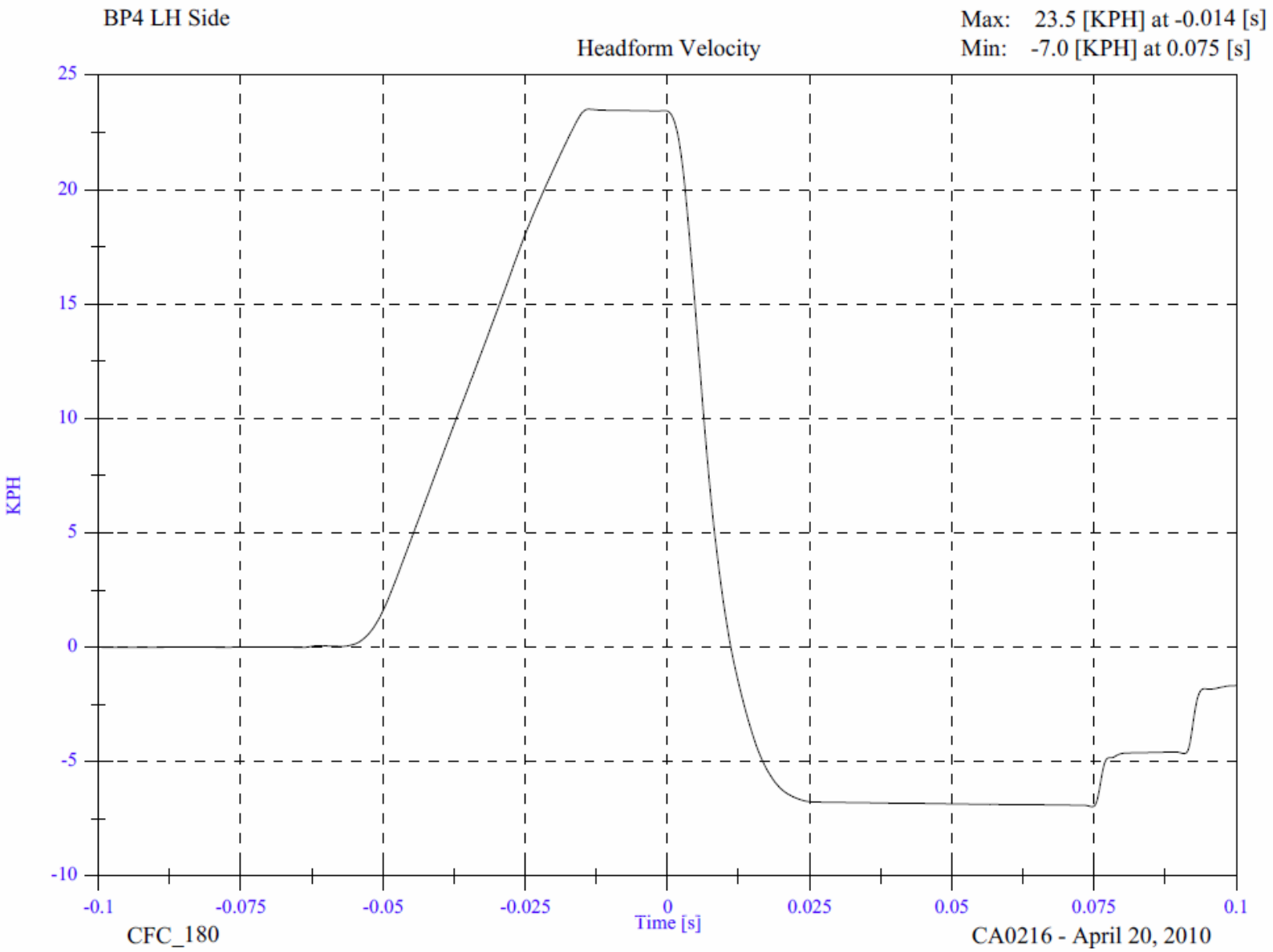



BP4 LH Side
Headform X Acceleration
Max: 212.8 [g] at 0.092 [s]
Min: -93.3 [g] at 0.005 [s]
250
200
150
100
50
0
-50
-100
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


BP4 LH Side
Headform Y Acceleration
Max: 55.8 [g] at 0.076 [s]
Min: -33.2 [g] at 0.077 [s]
60
40
20
0
-20
-40
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


BP4 LH Side
Headform Z Acceleration
Max: 80.7 [g] at 0.077 [s]
Min: -84.1 [g] at 0.077 [s]
100
75
50
25
0
-25
-50
-75
-100
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


BP4 LH Side
Headform Resultant
Max: 222.8 [g] at 0.092 [s]
Min: 0.0 [g] at -0.082 [s]
250
200
150
100
50
0
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


BP4 LH Side
Headform Velocity
Max: 23.5 [KPH] at -0.014 [s]
Min: -7.0 [KPH] at 0.075 [s]
KPH
25
20
15
10
5
0
-5
-10
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_180
CA0216 - April 20, 2010


Calspan
Proving and Improving
2010 Ford Transit CA0216
April 20, 2010 RLC - 5
Hor 242° Ver +5°
Pre Test BP4-LH

PRE-IMPACT

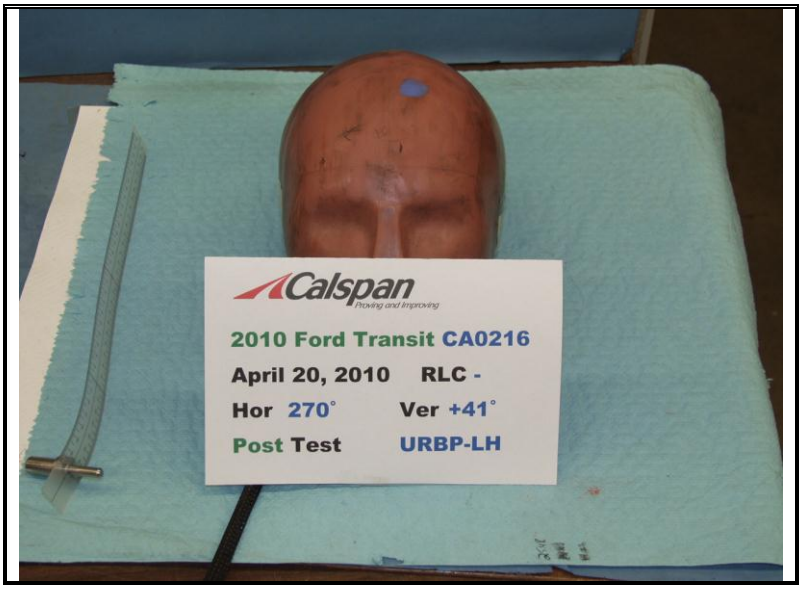

Calspan
Proving and Improving
2010 Ford Transit CA0216
April 20, 2010 RLC - 5
Hor 242° Ver +5°
Post Test BP4-LH

POST-IMPACT

VEHICLE YEAR/MAKE/MODEL/STYLE:	2010 Ford Transit Connect
VIN:	NM0KS9BN7AT016628
DATE OF MANUFACTURE:	8/09(SEE CERTIFICATION LABEL)
COLOR:	Panther Black Metallic

Test Number:	04
Test Date:	April 20, 2010
Target Location:	URBP LH
Target Code:	URBP LH
Horizontal Impact Angle:	270
Vertical Impact Angle:	41
Ambient Temperature:	22.5
Relative Humidity:	28.6 %
Time of Impact:	2:55 pm
Headform Number:	805

Impact Point Description (from lower midpoint on midsagittal line)					
On Centerline	-15	[ ]	mm right	[X]	mm left
On Centerline	56	mm up			



POST-IMPACT HEADFORM

Free Motion HIC	1270.8
HIC(d)	1125.2
Impact Velocity (kph)	23.7
HIC T1 (msec)	2.0
HIC T2 (msec)	5.2

URBP LH Side CA0216 - URBP LH

FMH Headform 805 | Location: URBP LH

Test Date: April 20, 2010 | Work File: fmh

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

Lab Temperature: 22.5 C

Lab Humidity: 28,6 %

Velocity at Impact: 23.71 KPH

Free Flight Distance: 228.10 mm

Maximum: 221.4 g

HICd: 1125.2

HIC (36ms): 1270.8

t1: 2.0 msec

t2: 5.2 msec

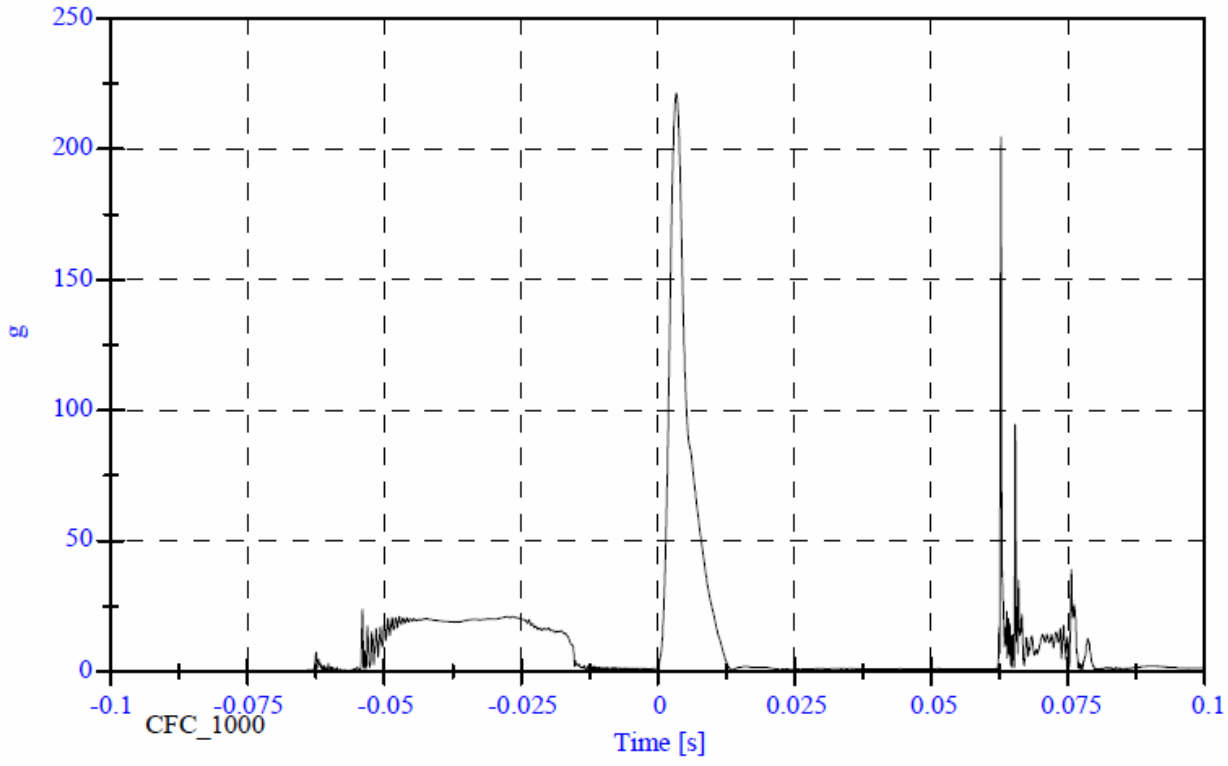
Duration: 3.2 msec

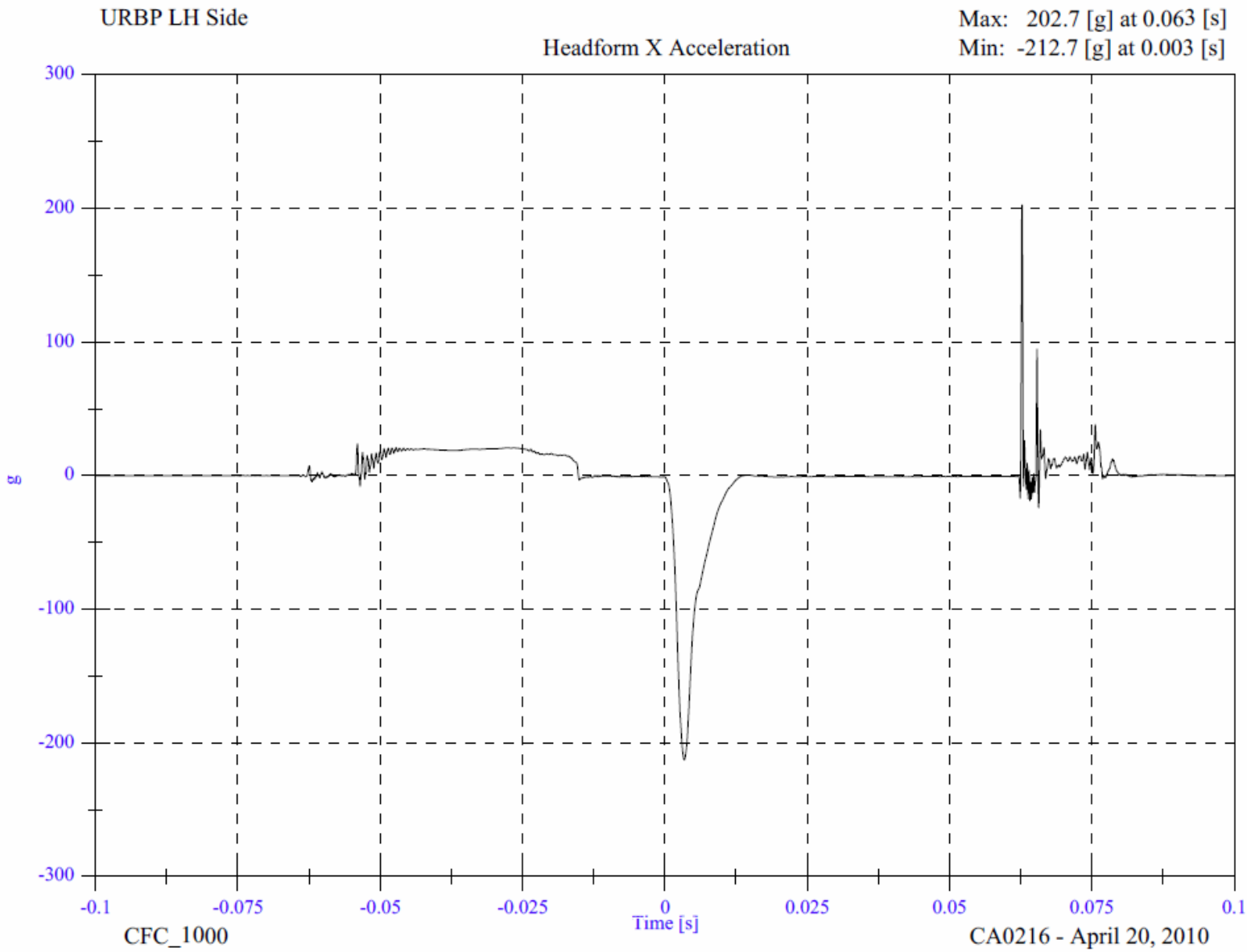
Average Acceleration: 10.0 g

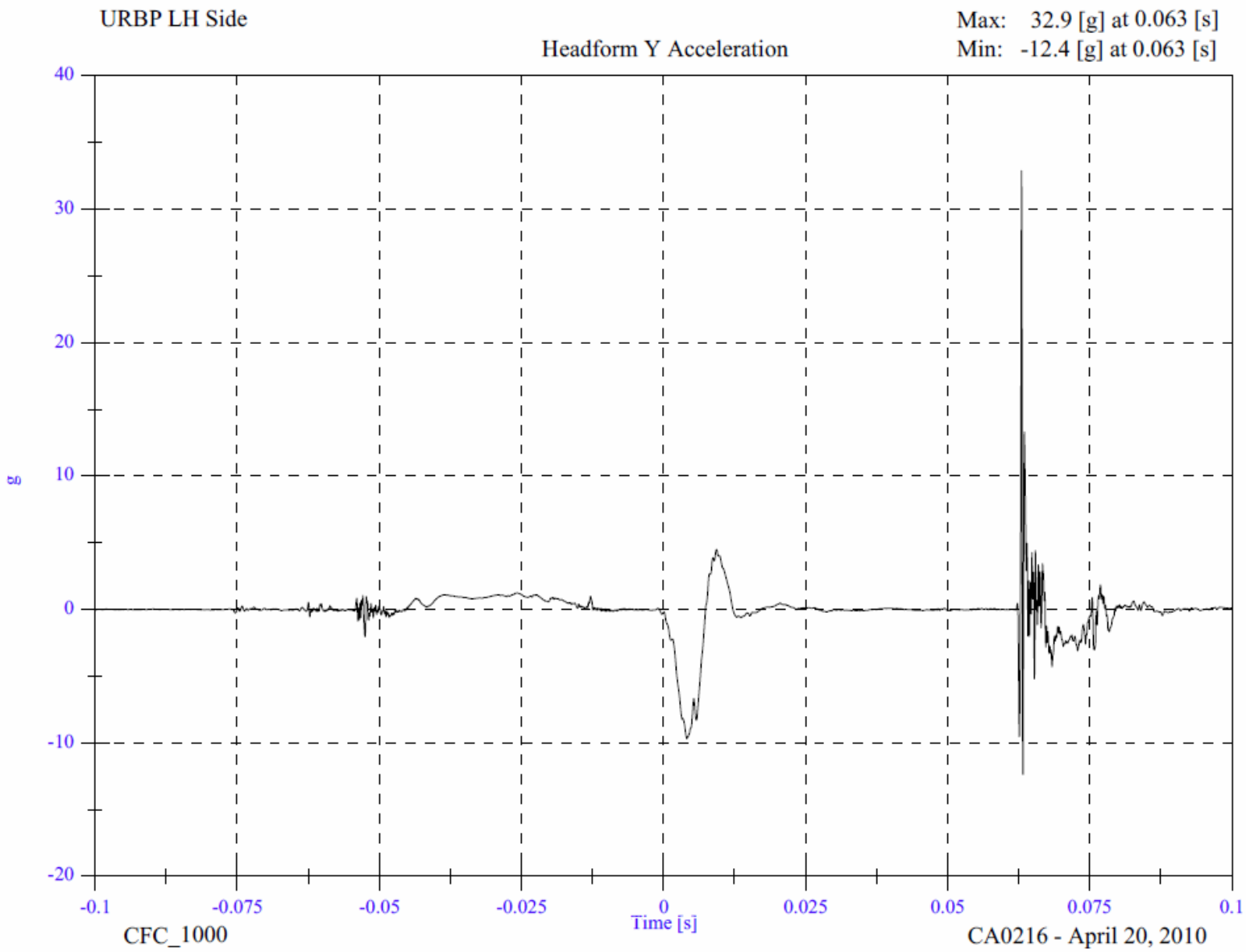
URBP LH Side

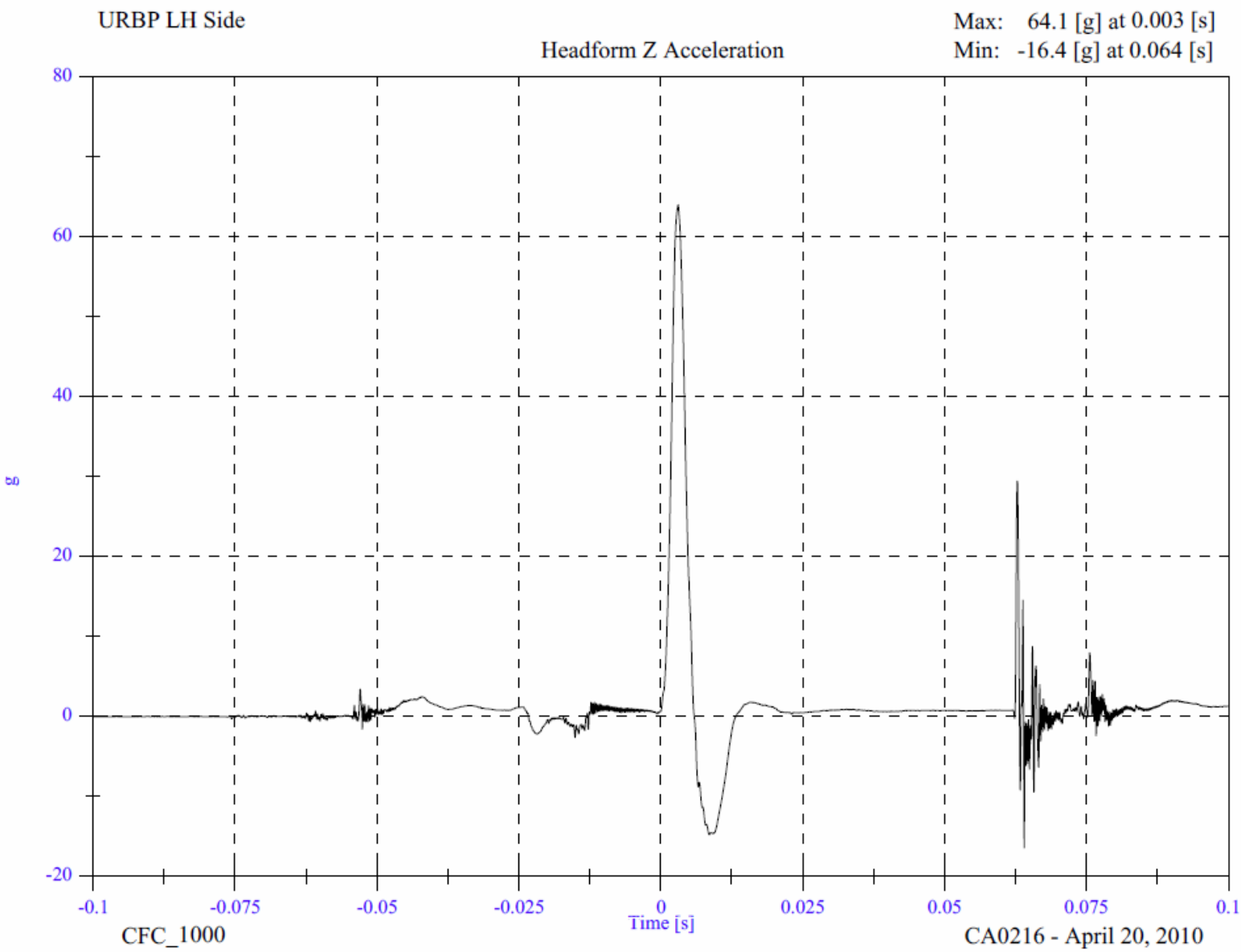
Max: 221.4 [g] at 0.003 [s]

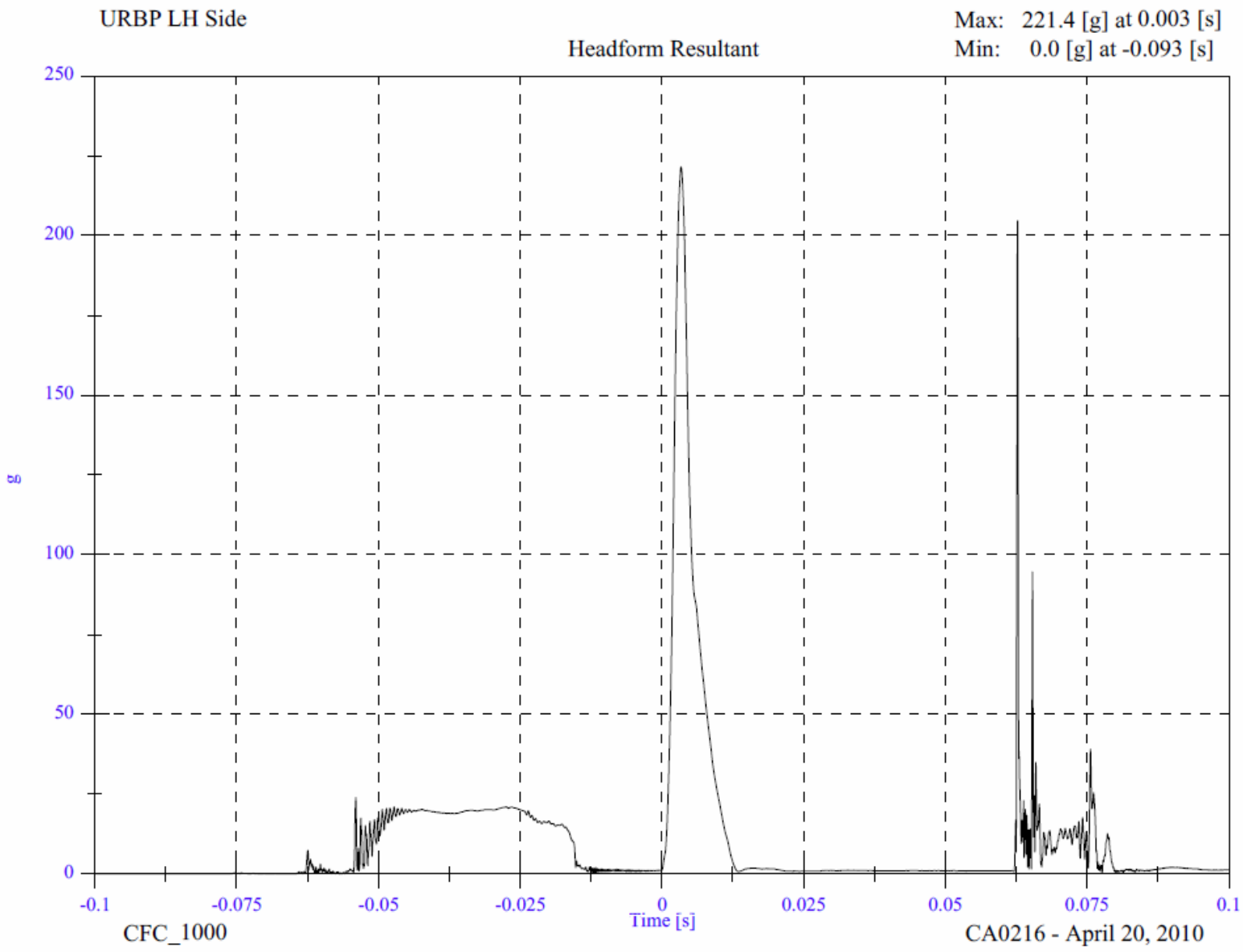
Min: 0.0 [g] at -0.093 [s]

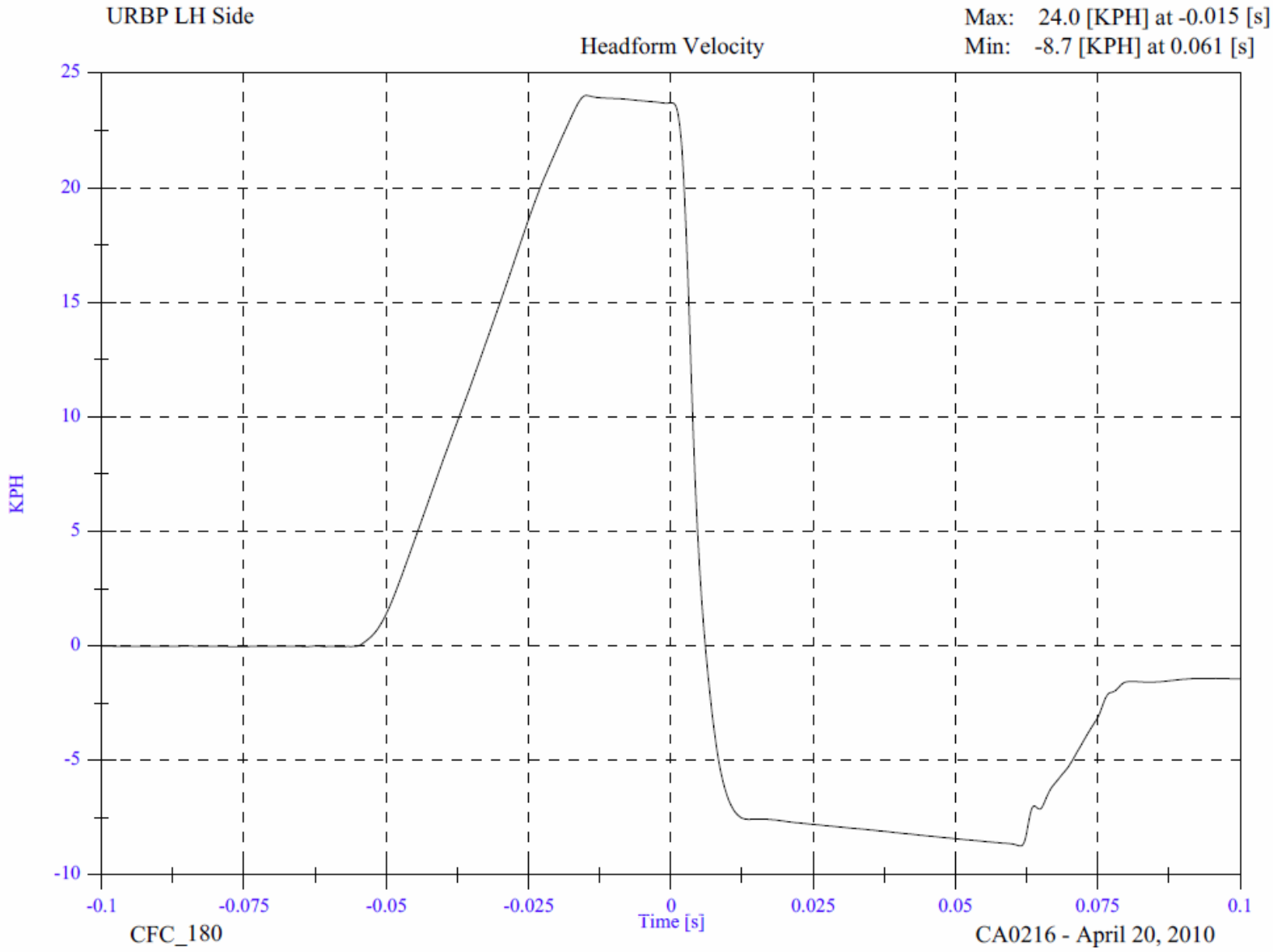


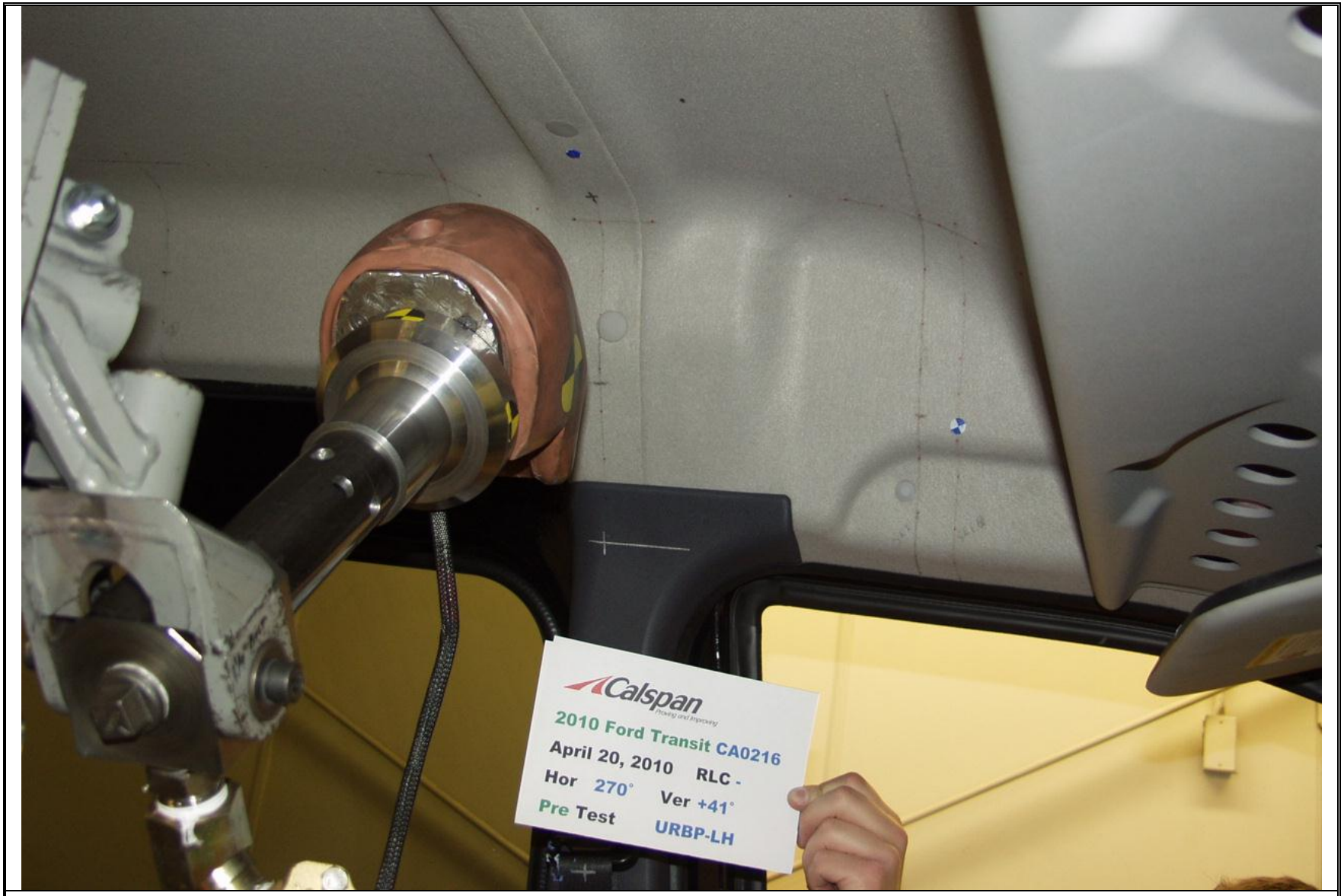

URBP LH Side
Headform X Acceleration
Max: 202.7 [g] at 0.063 [s]
Min: -212.7 [g] at 0.003 [s]
300
200
100
0
-100
-200
-300
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


URBP LH Side
Headform Y Acceleration
Max: 32.9 [g] at 0.063 [s]
Min: -12.4 [g] at 0.063 [s]
40
30
20
10
0
-10
-20
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


URBP LH Side
Headform Z Acceleration
Max: 64.1 [g] at 0.003 [s]
Min: -16.4 [g] at 0.064 [s]
80
60
40
20
0
-20
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


URBP LH Side
Headform Resultant
Max: 221.4 [g] at 0.003 [s]
Min: 0.0 [g] at -0.093 [s]
250
200
150
100
50
0
g
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_1000
CA0216 - April 20, 2010


URBP LH Side
Headform Velocity
Max: 24.0 [KPH] at -0.015 [s]
Min: -8.7 [KPH] at 0.061 [s]
25
20
15
10
5
0
-5
-10
KPH
-0.1
-0.075
-0.05
-0.025
0
0.025
0.05
0.075
0.1
Time [s]
CFC_180
CA0216 - April 20, 2010


Calspan
2010 Ford Transit CA0216
April 20, 2010 RLC -
Hor 270° Ver +41°
Pre Test URBP-LH

PRE-IMPACT


Calspan
2010 Ford Transit CA0216
April 20, 2010 RLC -
Hor 270° Ver +41°
Post Test URBP-LH

POST-IMPACT

APPENDIX A

PHOTOGRAPHS

PHOTOGRAPHS

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 FRONT HEADER

Figure A-10 : PRE-TEST DRIVER SIDE RAIL and B-PILLAR
(Pre-impact picture is shown because pre-test pictures were unavailable)

Figure A-11 : PRE-TEST PASSENGER SIDE A-PILLAR

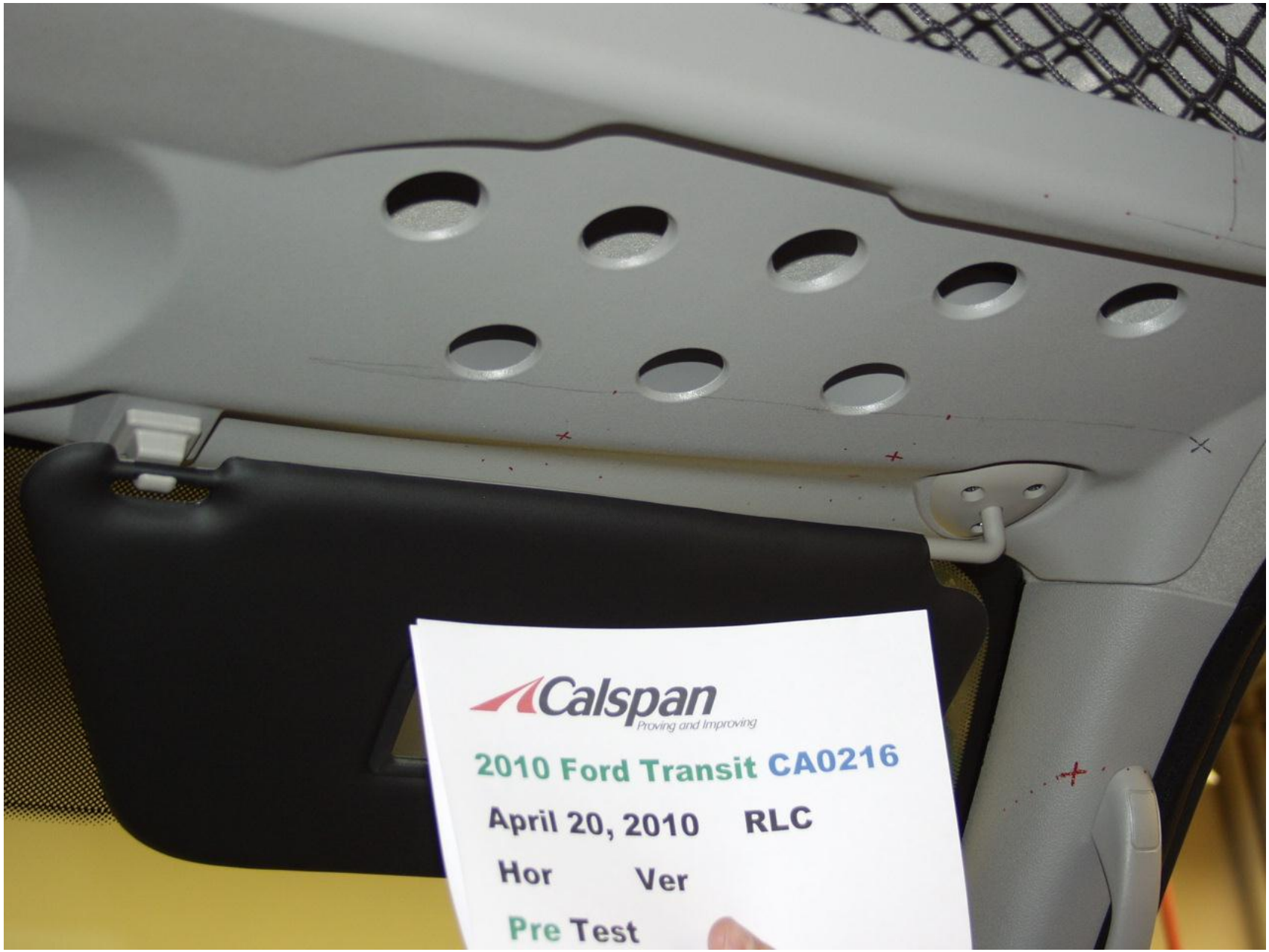


Figure A-12 : PRE-TEST PASSENGER SIDE FRONT HEADER

Figure A-13 : PRE-TEST PASSENGER SIDE SIDE RAIL

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

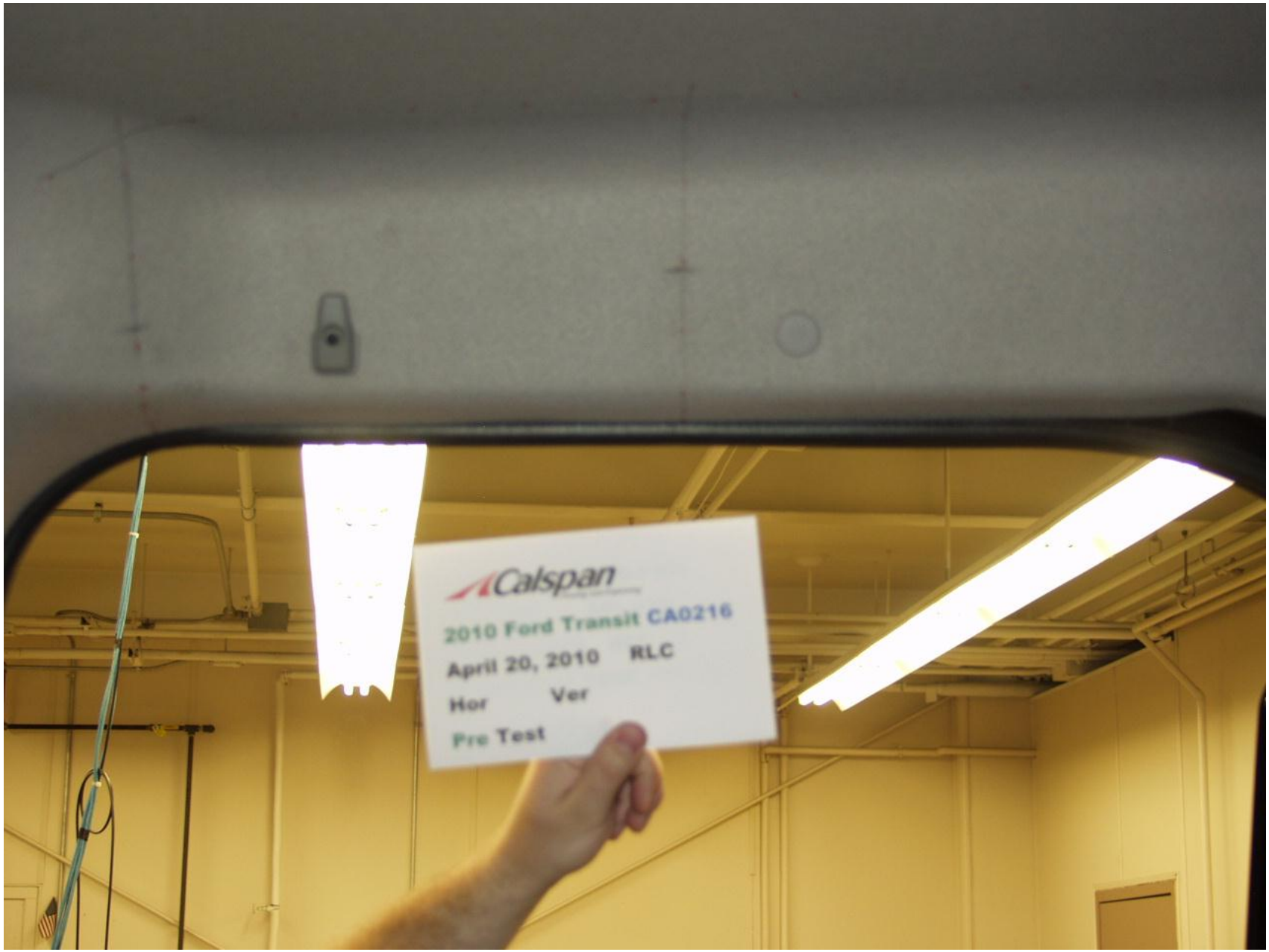


Figure A-15 : PRE-TEST PASSENGER SIDE SLIDING DOOR

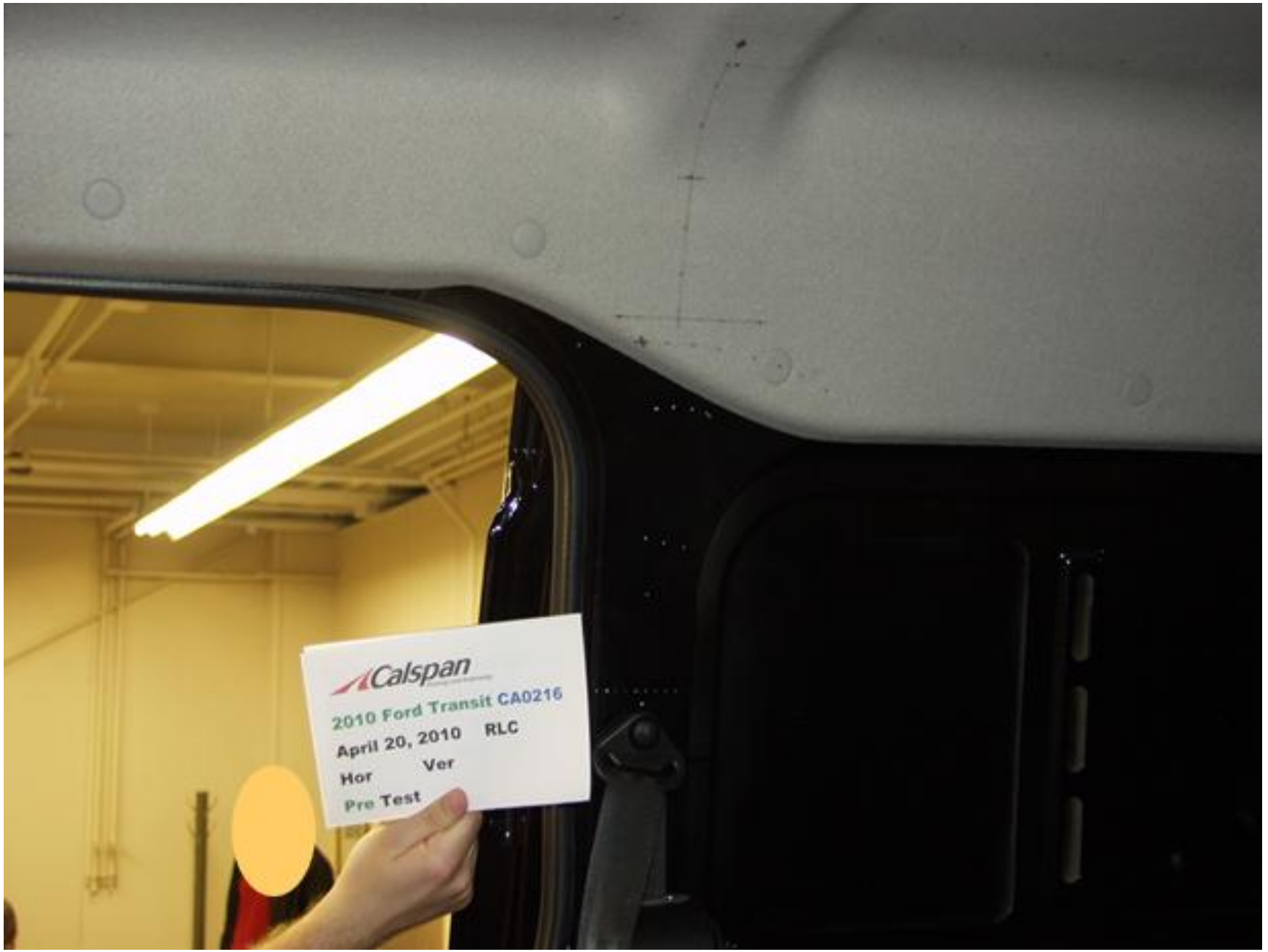


Figure A-16 : PRE-TEST PASSENGER SIDE OTHER PILLAR

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

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

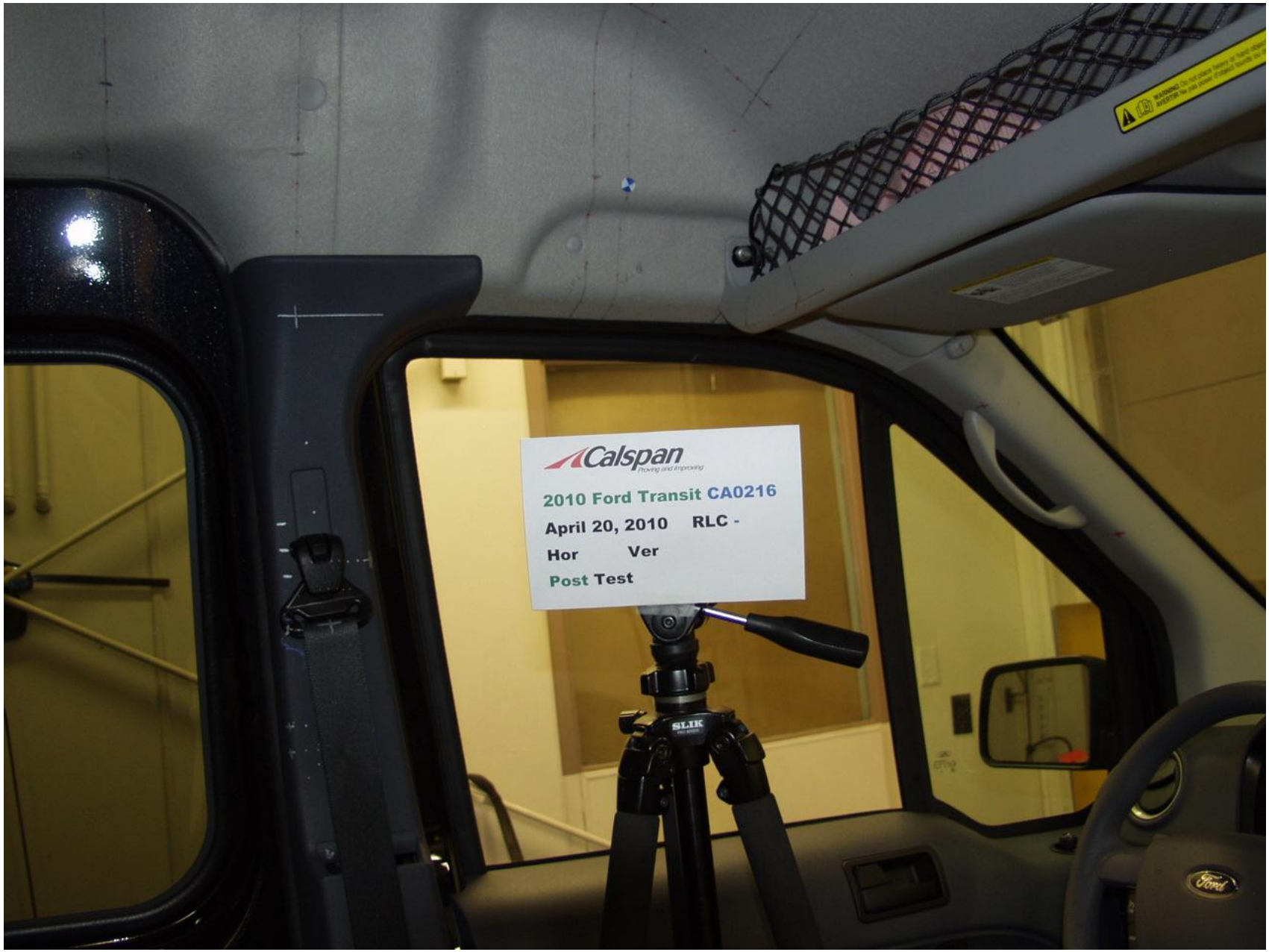


Figure A-19 : POST-TEST DRIVER SIDE SIDE RAIL

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

Figure A-21 : POST-TEST DRIVER SIDE SLIDING DOOR

Figure A-22 : POST-TEST DRIVER SIDE OTHER PILLAR

Figure A-23 : POST-TEST PASSENGER SIDE A-PILLAR

Figure A-24 : POST-TEST PASSENGER SIDE FRONT HEADER

Figure A-25 : POST-TEST PASSENGER SIDE SIDE RAIL

Figure A-26 : POST-TEST PASSENGER SIDE B-PILLAR

Figure A-27 : POST-TEST PASSENGER SIDE SLIDING DOOR

Figure A-28 : POST-TEST PASSENGER SIDE OTHER 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

MANUFACTURER:	**DENTON ATD INC.**	
SERIAL NUMBER:	**0355**	
CALIBRATION DATE:	**April 14, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**23**
RELATIVE HUMIDITY	**10% to 70%**	**21**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**237.0**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**6.1**
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	3/2/2010	9/2/2010
2 - LATERAL	ENDEVCO	7264-2000T	J32779	3/2/2010	9/2/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J31020	3/2/2010	9/2/2010

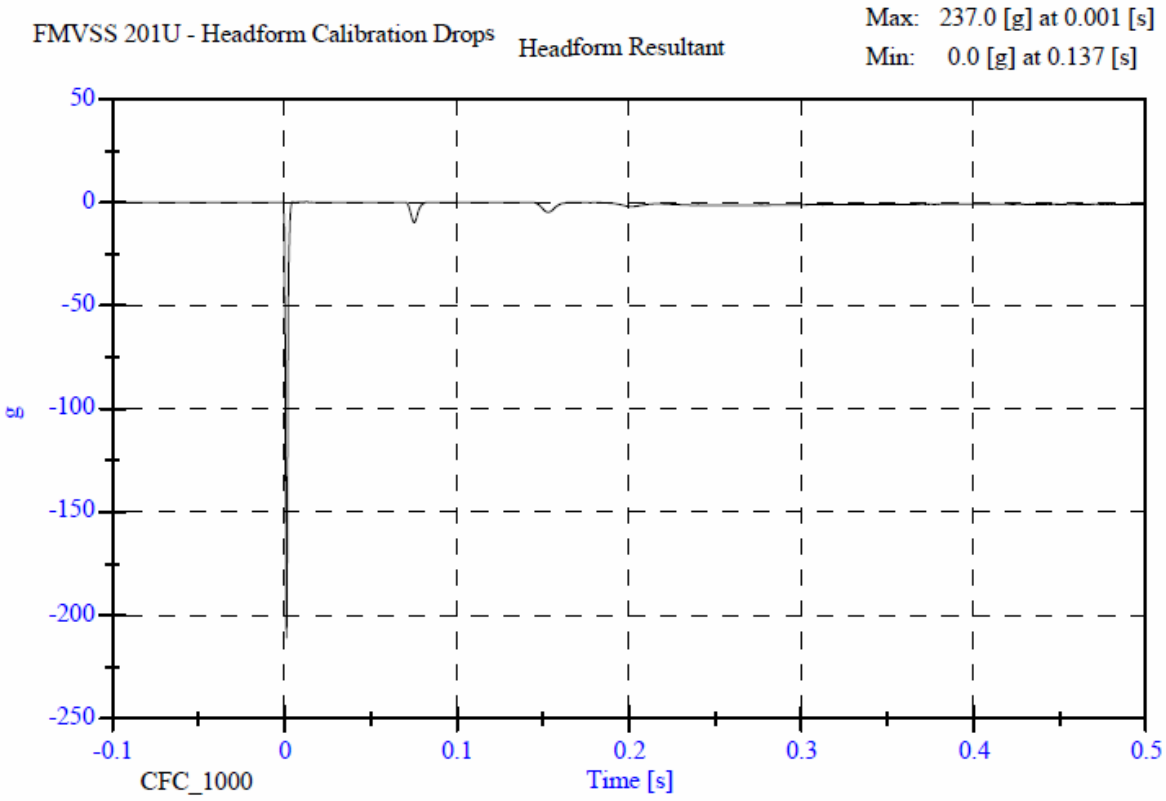
REMARKS:

FMVSS 201U - Headform Calibration Drops

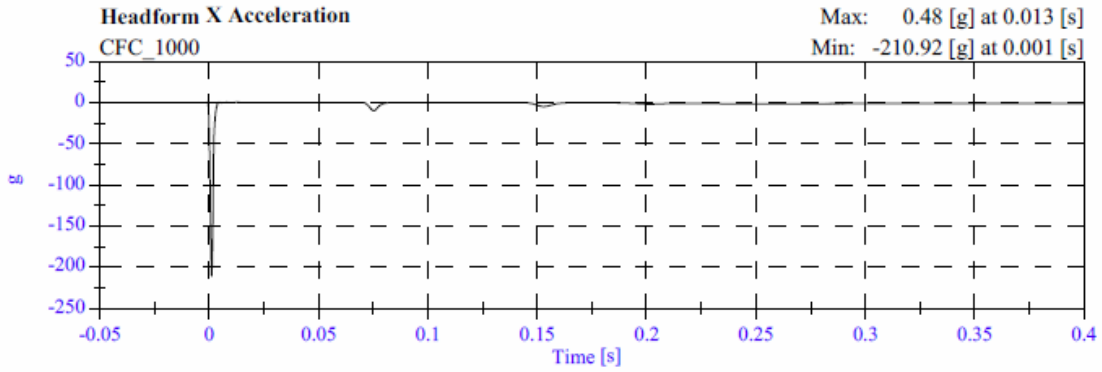
Part 572E Head Drop		Calibration Date:	April 14, 2010
Serial No:	WinCarat II	Work File:	fmh

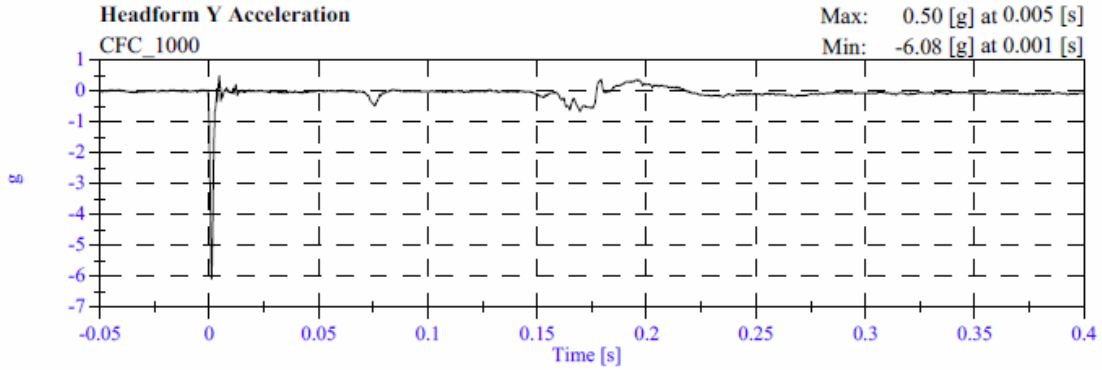
----------TEST RESULTS----------

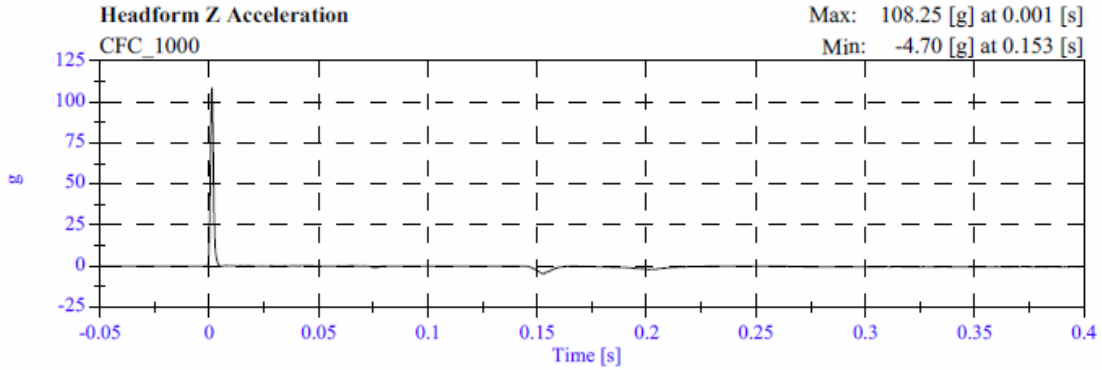
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	23.3 C	Passed
Lab Humidity:	10-70 %	21.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	236.96 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	6.08 Gs	Passed
Curve PerCent NonModal:	< 10%	4.11 %	Passed

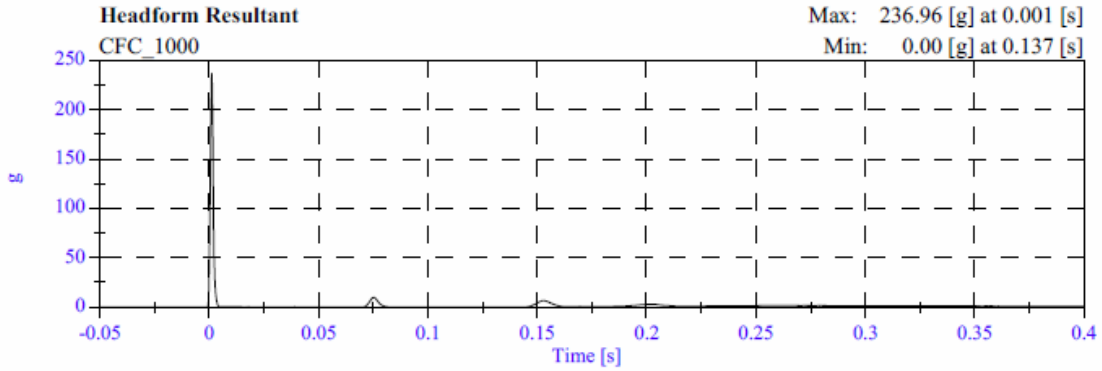


FMVSS 201U - Headform Calibration Drops
CA0216 - April 14, 2010









PART 572L
HEAD DROP PRE-TEST

MANUFACTURER:	**FIRST TECHNOLOGY SAFETY SYSTEMS**	
SERIAL NUMBER:	**0805**	
CALIBRATION DATE:	**April 14, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**23**
RELATIVE HUMIDITY	**10% to 70%**	**21**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**233.0**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**4.7**
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	J25854	3/2/2010	9/2/2010
2 - LATERAL	ENDEVCO	7264-2000T	J37496	3/2/2010	9/2/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J41016	3/2/2010	9/2/2010

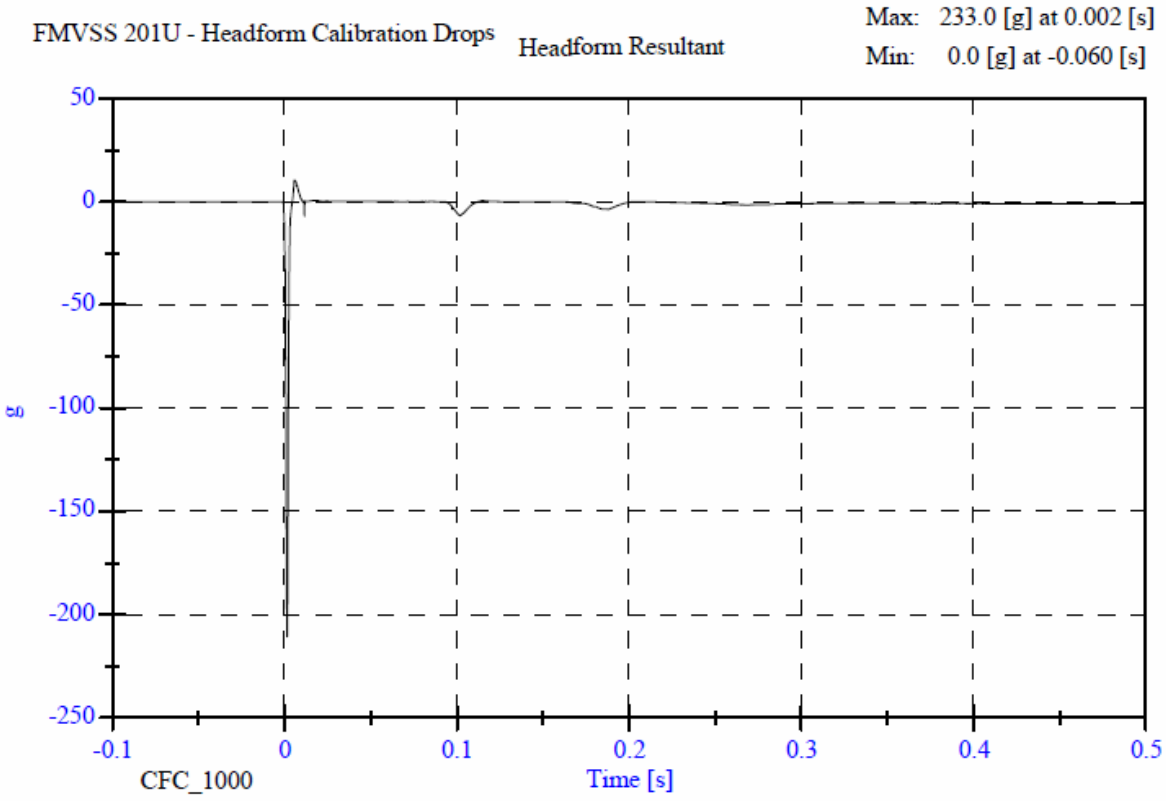
REMARKS:

FMVSS 201U - Headform Calibration Drops

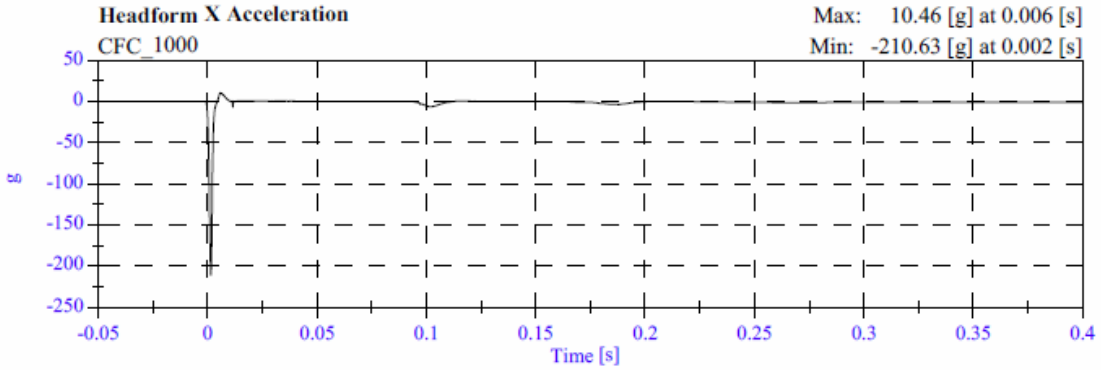
Part 572E Head Drop		Calibration Date:	April 14, 2010
Serial No:	WinCarat II	Work File:	fmh

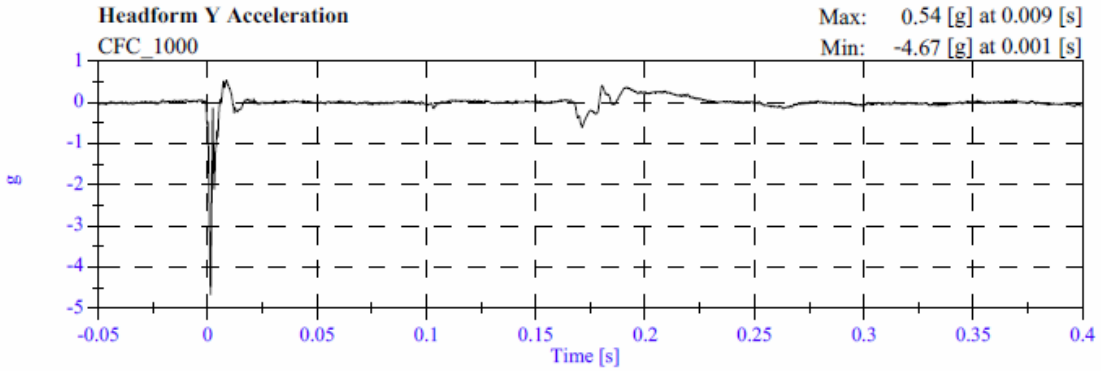
----------TEST RESULTS----------

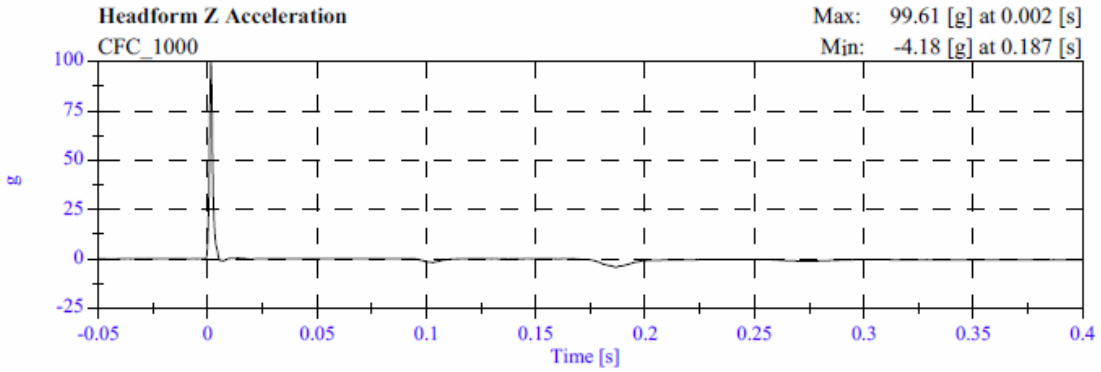
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	23.3 C	Passed
Lab Humidity:	10-70 %	21.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	233.04 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	4.67 Gs	Passed
Curve PerCent NonModal:	< 10%	4.50 %	Passed

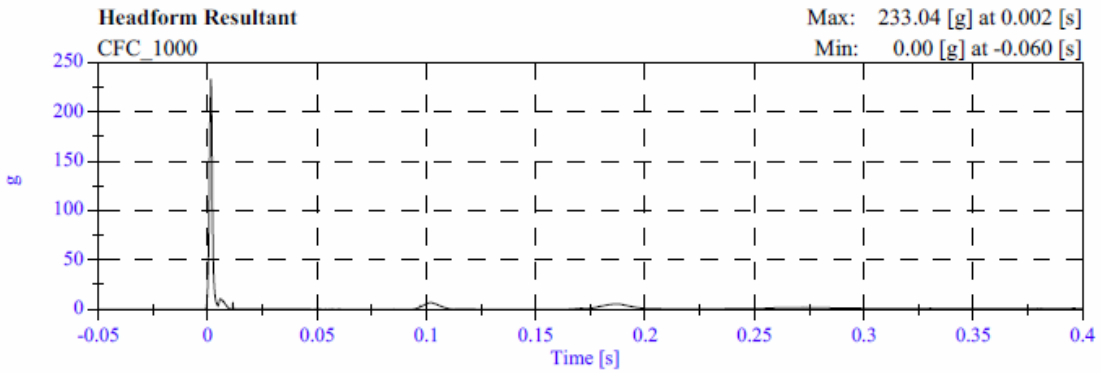


FMVSS 201U - Headform Calibration Drops
CA0216 - April 14, 2010









PART 572L
HEAD DROP PRE-TEST

MANUFACTURER:	**FIRST TECHNOLOGY SAFETY SYSTEMS**	
SERIAL NUMBER:	**1140**	
CALIBRATION DATE:	**April 14, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**23**
RELATIVE HUMIDITY	**10% to 70%**	**21**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**226.5**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**10.8**
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	J40994	3/3/2010	9/3/2010
2 - LATERAL	ENDEVCO	7264-2000T	J45450	3/3/2010	9/3/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	3/3/2010	9/3/2010

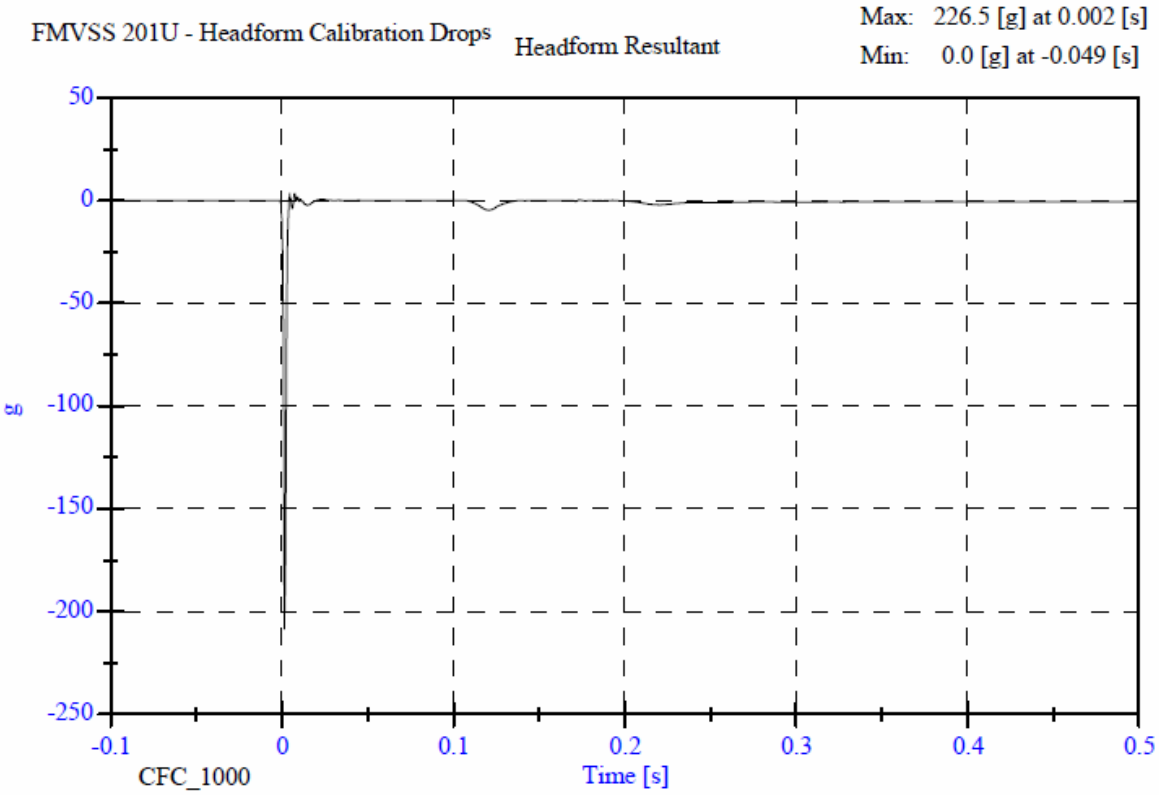
REMARKS:

FMVSS 201U - Headform Calibration Drops

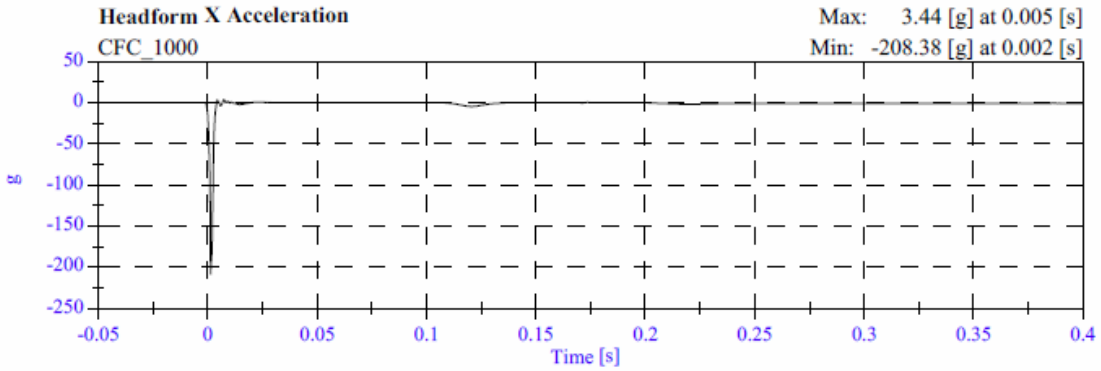
Part 572E Head Drop		Calibration Date:	April 14, 2010
Serial No:	WinCarat II	Work File:	fmh

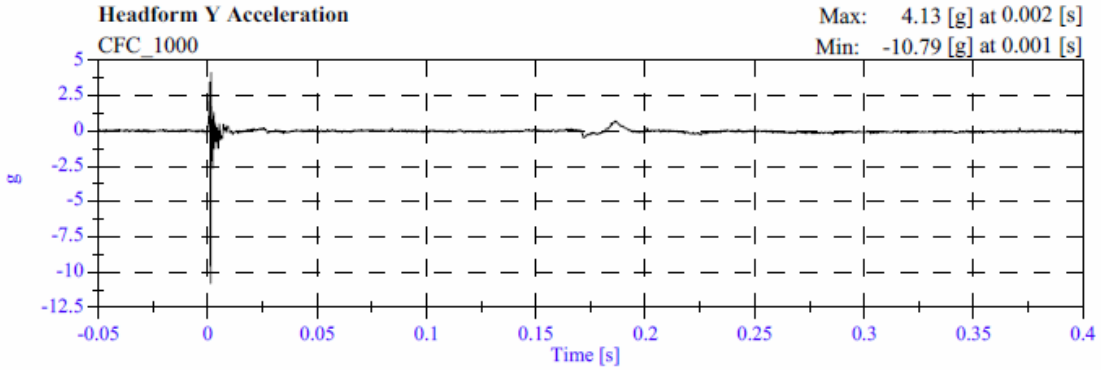
----------TEST RESULTS----------

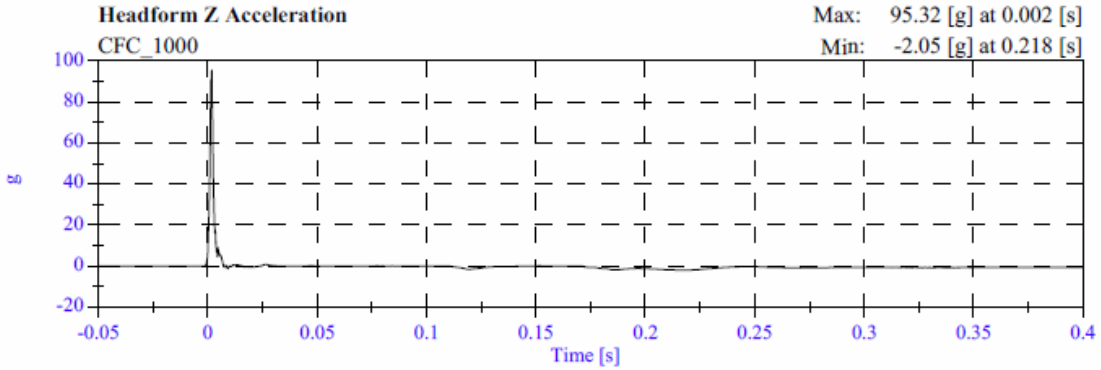
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	23.3 C	Passed
Lab Humidity:	10-70 %	21.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	226.53 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	10.79 Gs	Passed
Curve PerCent NonModal:	< 10%	5.84 %	Passed

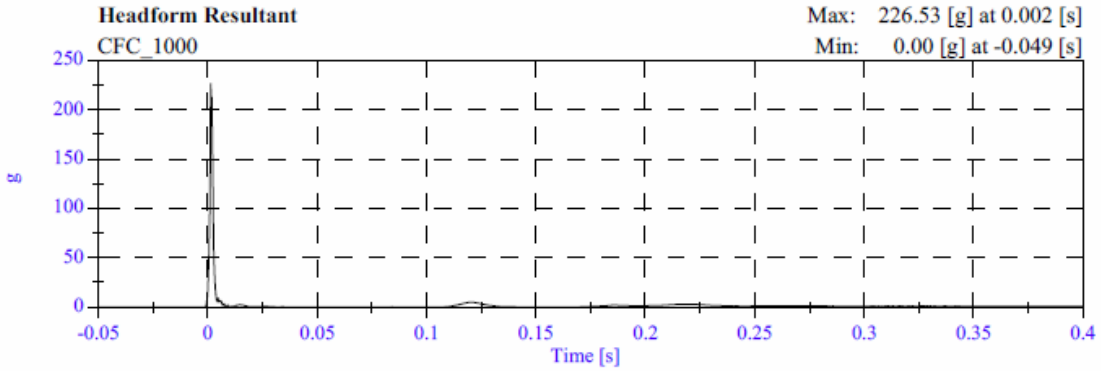


FMVSS 201U - Headform Calibration Drops
CA0216 - April 14, 2010









PART 572L
HEAD DROP PRE-TEST

MANUFACTURER:	**FIRST TECHNOLOGY SAFETY SYSTEMS**	
SERIAL NUMBER:	**1142**	
CALIBRATION DATE:	**April 14, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**23**
RELATIVE HUMIDITY	**10% to 70%**	**19**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**259.6**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**10.7**
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	4/8/2010	10/8/2010
2 - LATERAL	ENDEVCO	7264-2000T	J33030	4/8/2010	10/8/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	4/8/2010	10/8/2010

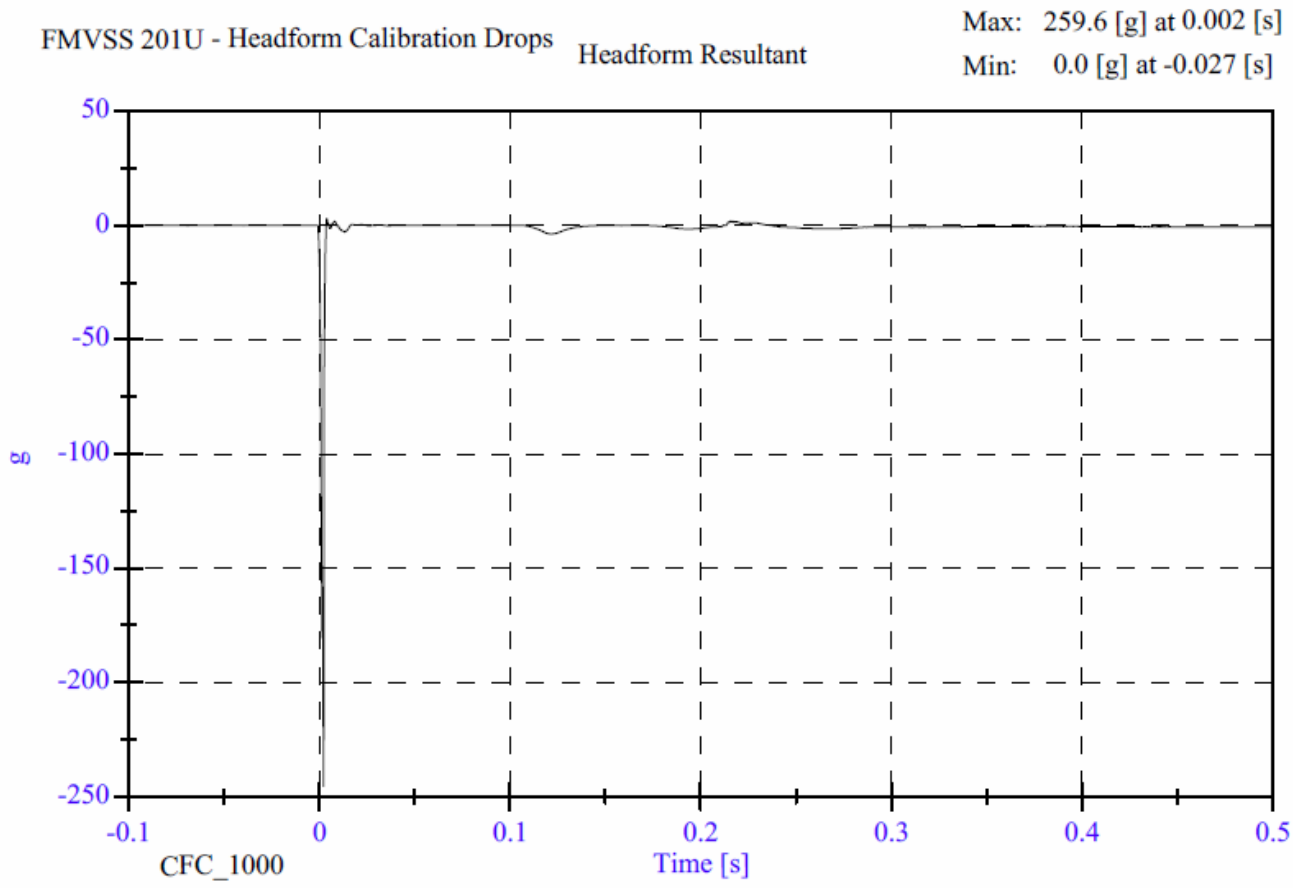
REMARKS:

FMVSS 201U - Headform Calibration Drops

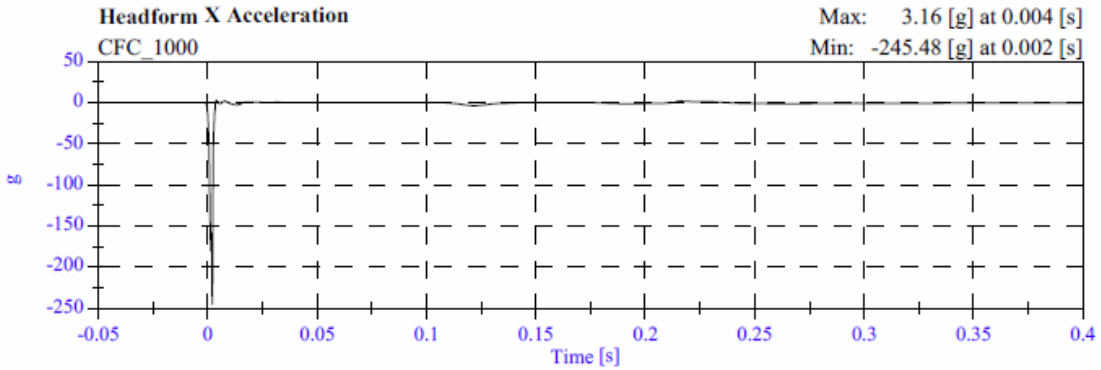
Part 572E Head Drop		Calibration Date:	April 14, 2010
Serial No:	WinCarat II	Work File:	fmh

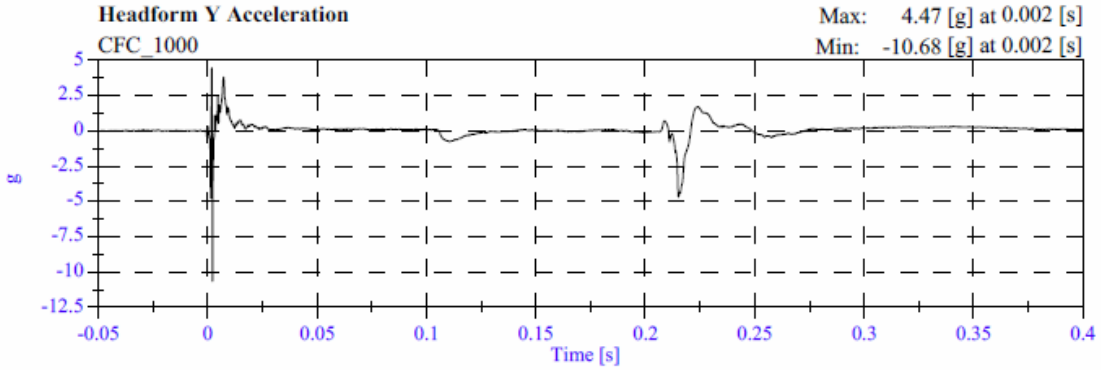
----------TEST RESULTS----------

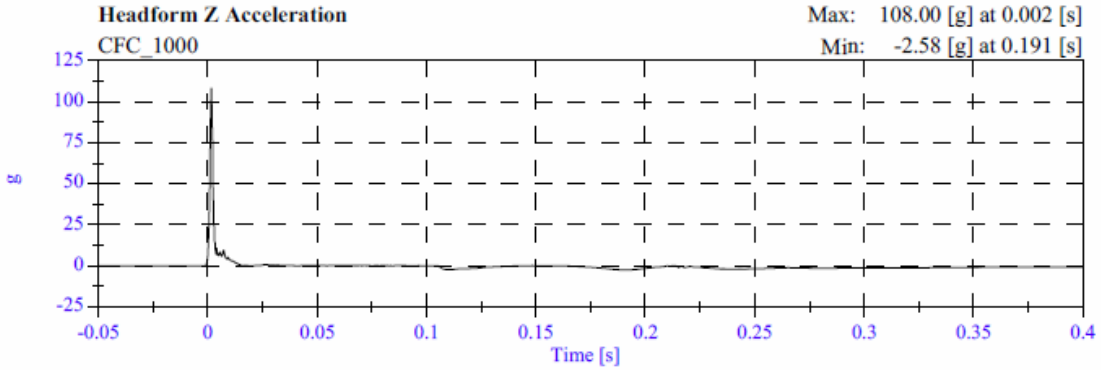
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	23.3 C	Passed
Lab Humidity:	10-70 %	19.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	259.59 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	10.68 Gs	Passed
Curve PerCent NonModal:	< 10%	6.52 %	Passed

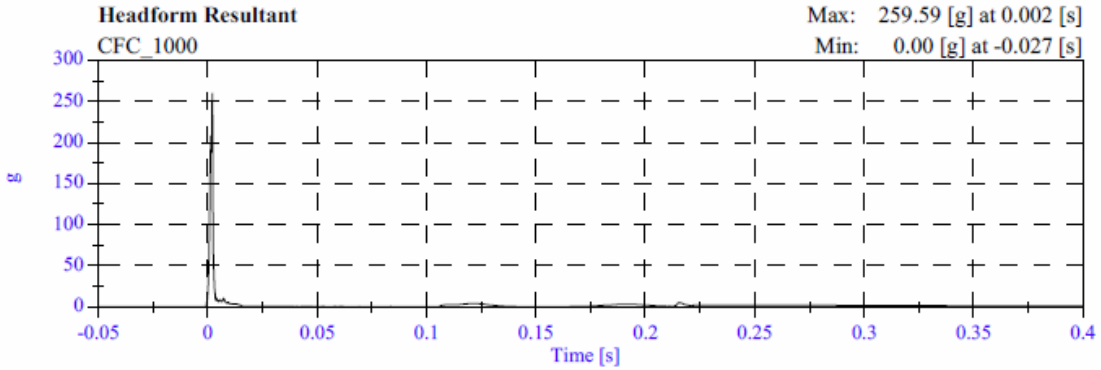


FMVSS 201U - Headform Calibration Drops
CA0216 - April 14, 2010









PART 572L
HEAD DROP POST-TEST

MANUFACTURER:	**DENTON ATD INC.**	
SERIAL NUMBER:	**0355**	
CALIBRATION DATE:	**April 21, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**22**
RELATIVE HUMIDITY	**10% to 70%**	**30**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**244.5**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**13.3**
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	3/2/2010	9/2/2010
2 - LATERAL	ENDEVCO	7264-2000T	J32779	3/2/2010	9/2/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J31020	3/2/2010	9/2/2010

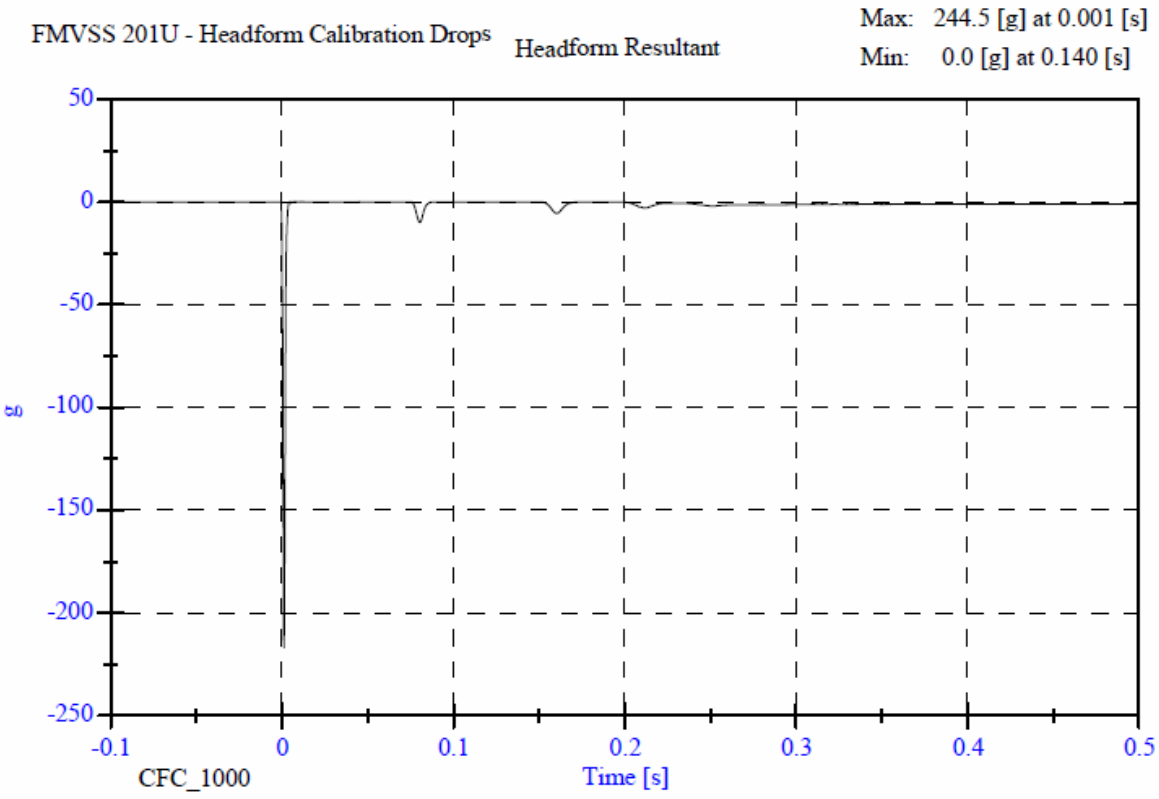
REMARKS:

FMVSS 201U - Headform Calibration Drops

Part 572E Head Drop		Calibration Date:	April 21, 2010
Serial No:	WinCarat II	Work File:	fmh

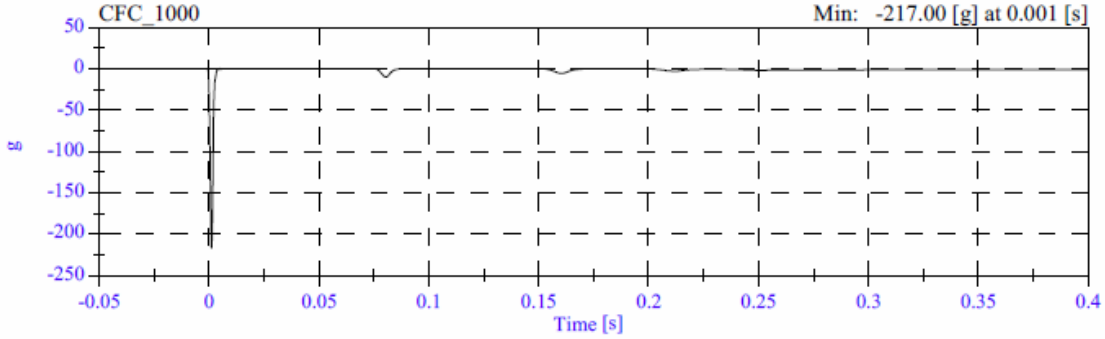
----------TEST RESULTS----------

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	21.7 C	Passed
Lab Humidity:	10-70 %	30.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	244.50 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	13.28 Gs	Passed
Curve PerCent NonModal:	< 10%	5.43 %	Passed

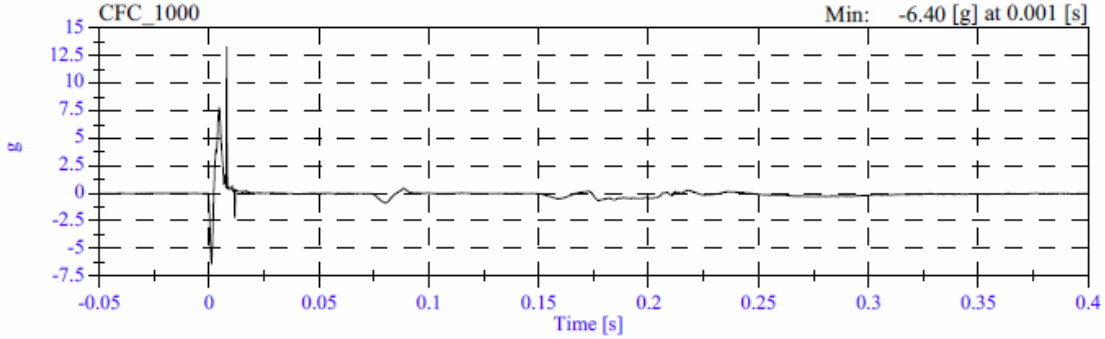


FMVSS 201U - Headform Calibration Drops
CA0216 - April 21, 2010

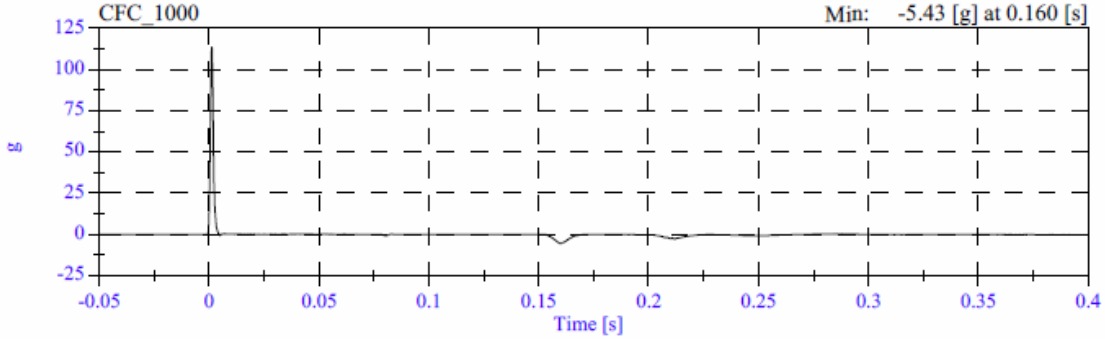
Headform X Acceleration
CFC_1000
Max: 0.28 [g] at -0.001 [s]
Min: -217.00 [g] at 0.001 [s]



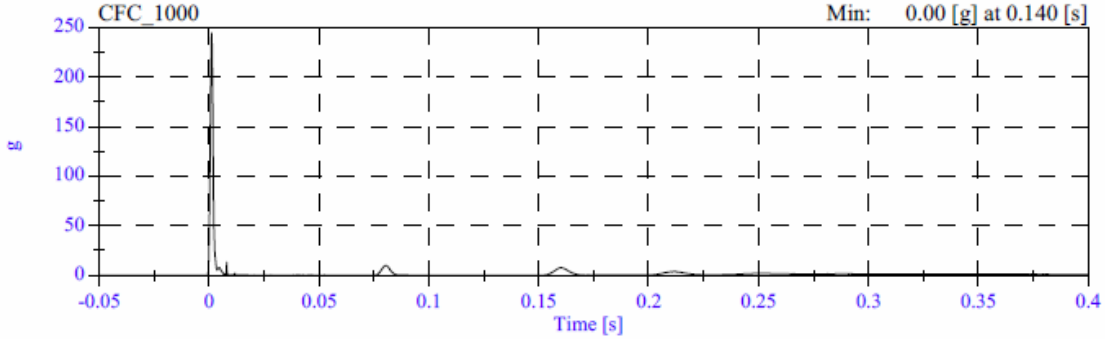
Headform Y Acceleration
CFC_1000
Max: 13.28 [g] at 0.008 [s]
Min: -6.40 [g] at 0.001 [s]



Headform Z Acceleration
CFC_1000
Max: 113.40 [g] at 0.001 [s]
Min: -5.43 [g] at 0.160 [s]



Headform Resultant
CFC_1000
Max: 244.50 [g] at 0.001 [s]
Min: 0.00 [g] at 0.140 [s]



PART 572L
HEAD DROP POST-TEST

MANUFACTURER:	**FIRST TECHNOLOGY SAFETY SYSTEMS**	
SERIAL NUMBER:	**0805**	
CALIBRATION DATE:	**April 21, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**23**
RELATIVE HUMIDITY	**10% to 70%**	**25**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**242.6**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**2.1**
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	J25854	3/2/2010	9/2/2010
2 - LATERAL	ENDEVCO	7264-2000T	J37496	3/2/2010	9/2/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J41016	3/2/2010	9/2/2010

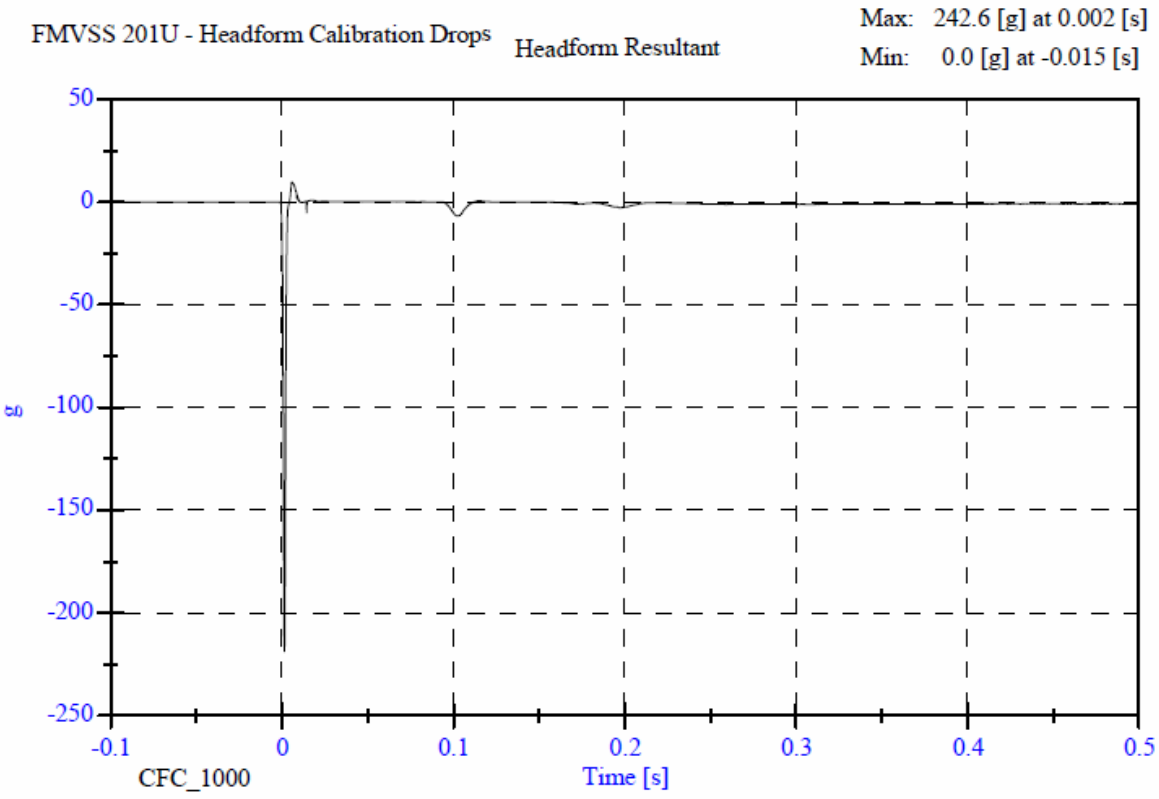
REMARKS:

FMVSS 201U - Headform Calibration Drops

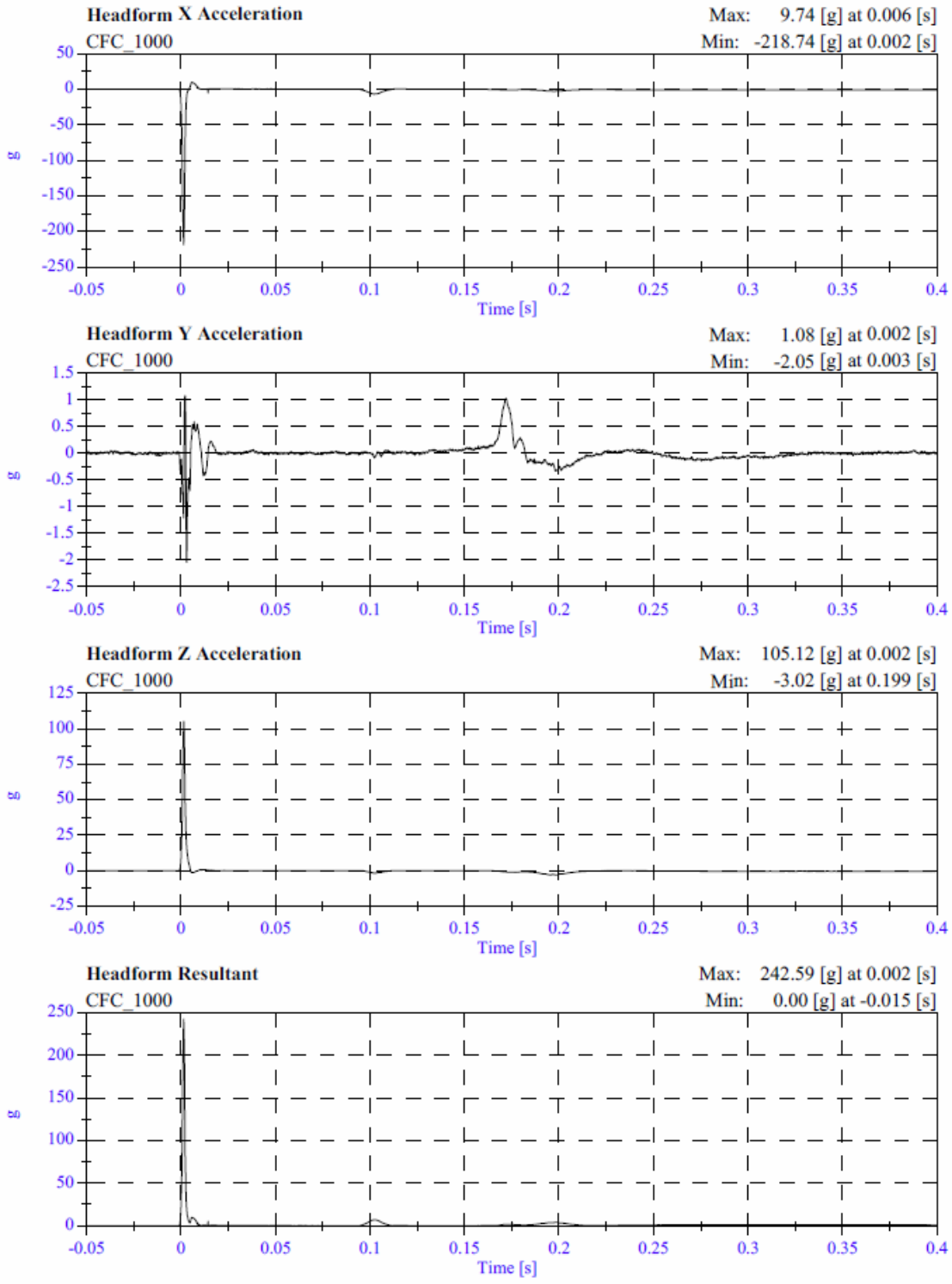
Part 572E Head Drop		Calibration Date:	April 21, 2010
Serial No:	WinCarat II	Work File:	fmh

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

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	22.8 C	Passed
Lab Humidity:	10-70 %	25.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	242.59 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	2.05 Gs	Passed
Curve PerCent NonModal:	< 10%	4.06 %	Passed



FMVSS 201U - Headform Calibration Drops
Passed - April 21, 2010



PART 572L
HEAD DROP POST-TEST

MANUFACTURER:	**FIRST TECHNOLOGY SAFETY SYSTEMS**	
SERIAL NUMBER:	**1140**	
CALIBRATION DATE:	**May 10, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**22**
RELATIVE HUMIDITY	**10% to 70%**	**24**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**225.1**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**12.6**
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	J40994	3/3/2010	9/3/2010
2 - LATERAL	ENDEVCO	7264-2000T	J45450	3/3/2010	9/3/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J41007	3/3/2010	9/3/2010

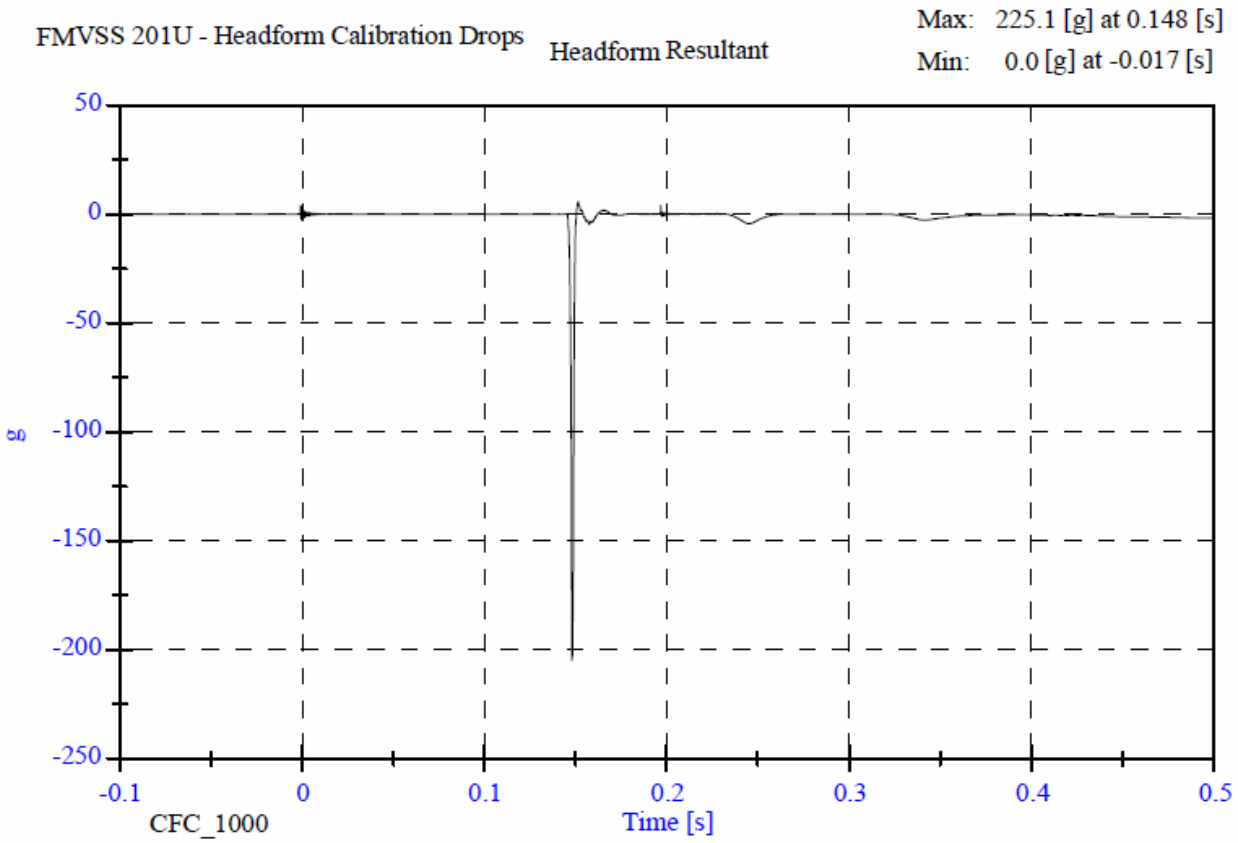
REMARKS:

FMVSS 201U - Headform Calibration Drops

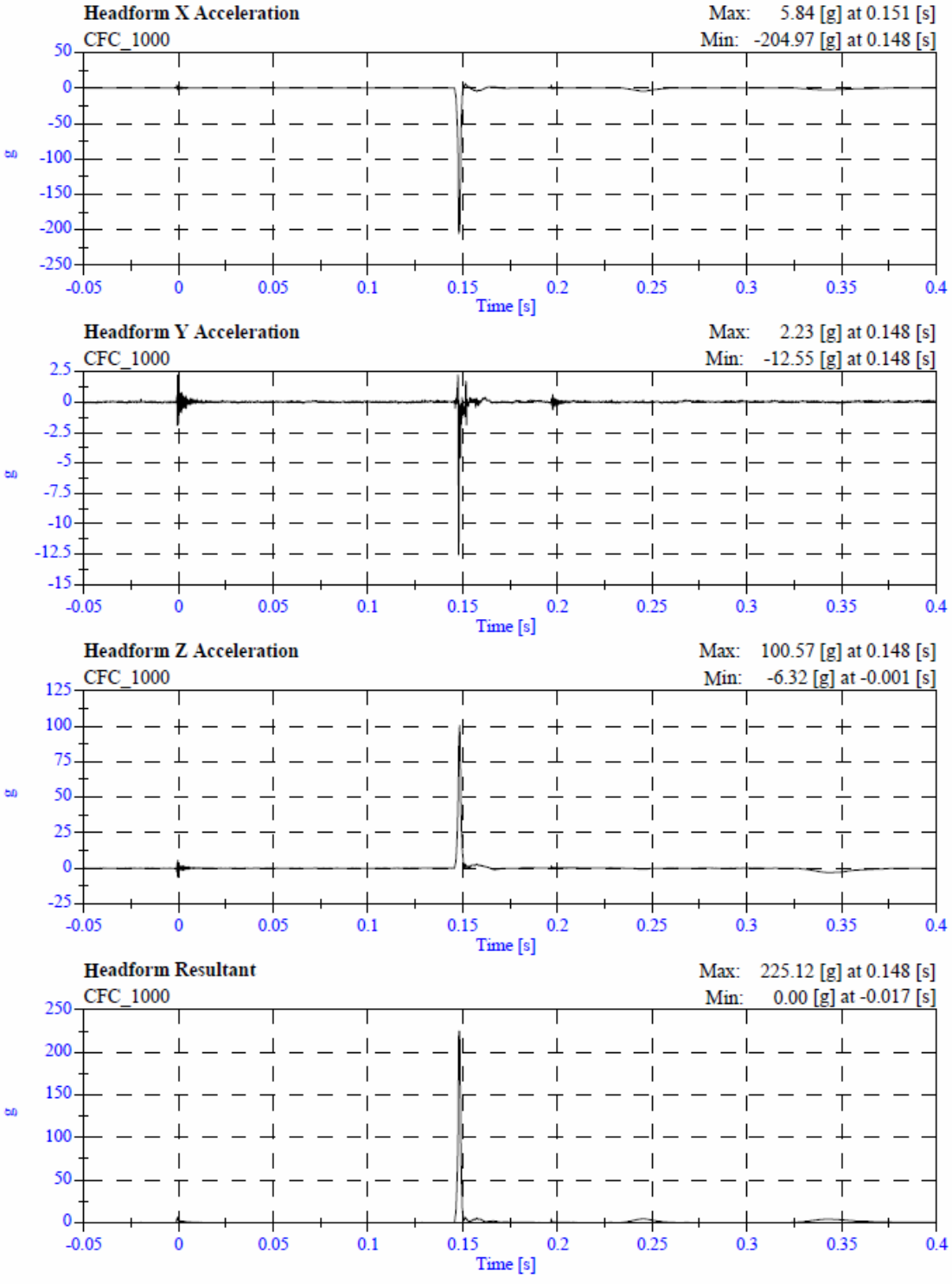
Part 572E Head Drop		Calibration Date:	May 10, 2010
Serial No:	1140	Work File:	fmh

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

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	21.7 C	Passed
Lab Humidity:	10-70 %	24.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	225.12 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	12.55 Gs	Passed
Curve PerCent NonModal:	< 10%	2.61 %	Passed



FMVSS 201U - Headform Calibration Drops
CA5303 - May 10, 2010



PART 572L
HEAD DROP POST-TEST

MANUFACTURER:	**FIRST TECHNOLOGY SAFETY SYSTEMS**	
SERIAL NUMBER:	**1142**	
CALIBRATION DATE:	**April 21, 2010**	
TEST PARAMETER	**SPECIFICATION**	**TEST RESULTS**
TEMPERATURE	**19°C to 26°C**	**23**
RELATIVE HUMIDITY	**10% to 70%**	**25**
PEAK RESULTANT ACCELERATION	**225 Gs to 275 Gs**	**254.1**
PEAK LATERAL ACCELERATION	**15 Gs Maximum**	**7.0**
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	J41006	4/8/2010	10/8/2010
2 - LATERAL	ENDEVCO	7264-2000T	J33030	4/8/2010	10/8/2010
3 - VERTICAL	ENDEVCO	7264-2000T	J31009	4/8/2010	10/8/2010

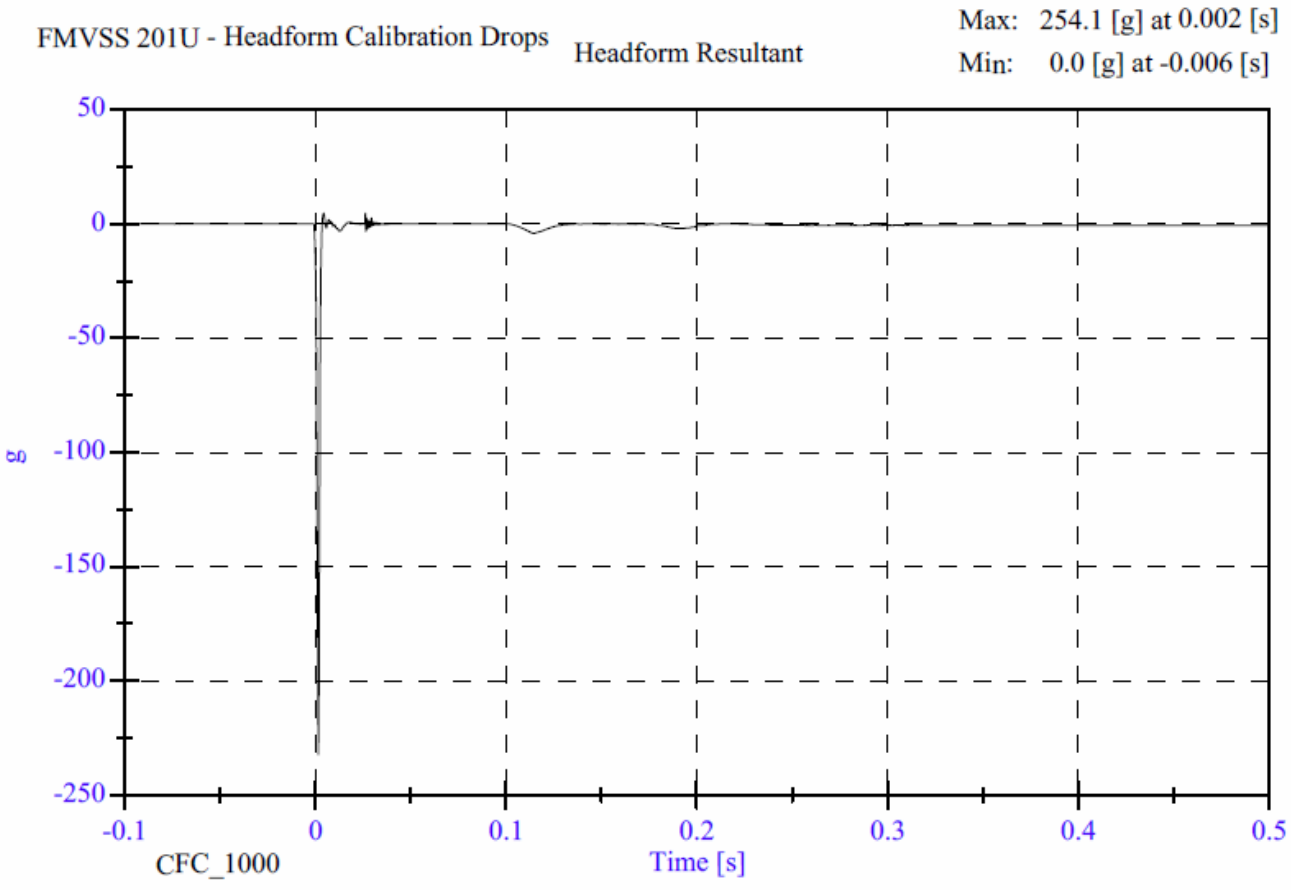
REMARKS:

FMVSS 201U - Headform Calibration Drops

Part 572E Head Drop		Calibration Date:	April 21, 2010
Serial No:	WinCarat II	Work File:	fmh

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

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	23.3 C	Passed
Lab Humidity:	10-70 %	25.00 %	Passed
Peak Resultant Accel.:	225-275 Gs	254.09 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	7.01 Gs	Passed
Curve PerCent NonModal:	< 10%	4.44 %	Passed



FMVSS 201U - Headform Calibration Drops
CA0215 - April 21, 2010