

REPORT NUMBER: 201-CAL-09-03

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

**GENERAL MOTORS CORPORATION  
2009 CHEVROLET MALIBU**

NHTSA NUMBER: C90102

CALSPAN TEST NUMBER: 8885-03

CALSPAN  
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Test Date: February 19, 2009

FINAL REPORT

PREPARED FOR:

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National Highway Traffic Safety Administration  
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**TECHNICAL REPORT STANDARD TITLE PAGE**

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16. <i>Abstract</i>  Compliance tests were conducted on the subject vehicle, a 2009 Chevrolet Malibu, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure TP-201-02 for determination of FMVSS 201 compliance.  Test failures identified were as follows: None					
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## LIST OF DATA SHEETS

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## **SECTION 1**

### **PURPOSE AND TEST PROCEDURE**

This head impact compliance test is part of the FMVSS 201 Occupant Protection in Interior Impact Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-C-00031. The purpose of this impact compliance test was to determine whether the subject vehicle, a 2009 Chevrolet Malibu, NHTSA No. C90102, meets the performance requirements of FMVSS 201, Occupant Protection in Interior Impact. The compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-201-02 dated March 3, 1989.

## SECTION 2

### SUMMARY OF OCCUPANT PROTECTION IN INTERIOR IMPACTS

A 2009 Chevrolet Malibu, NHTSA No. C90102, was impacted at various locations throughout its instrument cluster/dash panel and seat back area by a 6.8 kg (15 lb.), 165 mm (6.5 inch) diameter steel 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). The four (4) chosen impact points were:

Seat Back / Head Rest Area

Instrument Panel Cluster Area

Airbag Cover / Dash Panel Area (2 impacts)

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

The 165 mm (6.5 inch) diameter steel headform weighed 6.8 kg (15 lb.) and had an accelerometer mounted along the centerline of the head.

One (1) channel of data for each target impact test was recorded on a Keyser-Threde data acquisition system. Data plots can be found in Appendix C along with still photographs can be found in Appendix A of this report.

To document each target area impact test, one 35mm camera picture was taken pre- and post-test at various locations to view the headform contact with the selected target areas.

## TEST VEHICLE RECEIVING INSPECTION DATA SHEET

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Chevrolet Malibu
NHTSA NO.:	C90102
VIN:	1G1ZG57B89F127475
DATE OF MANUFACTURE:	08/08 (SEE CERTIFICATION LABEL)
COLOR:	White
ODOMETER READING:	35
LABORATORY:	Calspan
TEST DATE:	February 19, 2009

NUMBER OF SEATING POSITIONS:

FRONT: 2            REAR: 3

INSTRUMENT PANEL:

NOTE UNUSUAL FEATURES:        None

TYPE OF FRONT SEATS:

BENCH: -            BUCKET: X            SPLIT BACKS: -

TYPE OF HEAD RESTRAINTS:

FIXED: -            ADJUSTABLE: X

VEHICLE EQUIPPED WITH ARMRESTS?

NO: -            YES: X            NUMBER: 3

LOCATION:            Front and Rear Door Panels and Center Console Arm Rest

VEHICLE EQUIPPED WITH SUN VISORS?

NO: -            YES: X

VEHICLE EQUIPPED WITH INTERIOR DOOR LATCHES?

NO: -            YES: X            NUMBER: 3

LOCATION:            Glove Box, Floor Console and Storage Bin

**HEAD FORM IMPACT TEST RESULTS  
INSTRUMENT PANEL**

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Chevrolet Malibu
NHTSA NO.:	C90102
VIN:	1G1ZG57B89F127475
DATE OF MANUFACTURE:	08/08 (SEE CERTIFICATION LABEL)
COLOR:	White
ODOMETER READING:	35
LABORATORY:	Calspan
TEST DATE:	February 19, 2009

IMPACT LOCATION AND NUMBER				VELOCITY (kph)	PEAK ACCELERATION (3 ms Clip) Gs
TARGET	X (mm)	Y (mm)	ANGLE (degrees)		
Center Cluster below Storage Bin	2488	14	36	18.75	48.19
Left Side of Airbag Cover	2432	263	49	18.60	57.48
Right Side of Airbag Cover	2442	514	49	18.62	56.89

REFERENCE POINT: The front centerline of the vehicle is the starting coordinate (0,0,0) at ground level.

REMARKS:

**HEAD FORM IMPACT TEST RESULTS  
SEAT BACKS**

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Chevrolet Malibu
NHTSA NO.:	C90102
VIN:	1G1ZG57B89F127475
DATE OF MANUFACTURE:	08/08 (SEE CERTIFICATION LABEL)
COLOR:	White
ODOMETER READING:	35
LABORATORY:	Calspan
TEST DATE:	February 19, 2009

IMPACT LOCATION AND NUMBER				VELOCITY (kph)	PEAK ACCELERATION (3 ms Clip) Gs
TARGET	X (mm)	Y (mm)	ANGLE (degrees)		
Seat Back Head Restraint	3547	354	31	23.61	41.34

REFERENCE POINT: The front centerline of the vehicle is the starting coordinate (0,0,0) at ground level.

## SUNVISOR AND ARMREST EVALUATION

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Chevrolet Malibu
NHTSA NO.:	C90102
VIN:	1G1ZG57B89F127475
DATE OF MANUFACTURE:	08/08 (SEE CERTIFICATION LABEL)
COLOR:	White
ODOMETER READING:	35
LABORATORY:	Calspan
TEST DATE:	February 19, 2009

### SUN VISOR INFORMATION:

1. Are sun visors constructed of or covered with energy absorbing material?

YES (PASS): X

NO (FAIL): -

2. Are any edges statically contactable by a spherical 165 mm (6.5 inch) diameter head form of radius less than 31.75 mm (1.25 inch)?

YES (FAIL): -

NO (PASS): X

### ARMREST INFORMATION:

#### A. FIXED ARMREST

1. Is it constructed of energy absorbing material with the capability of laterally deflecting 50.8 mm (2 inches) without contacting any underlying rigid material?

YES: N/A

NO: N/A

2. Is it constructed of energy absorbing material that deflects or collapses within 31.75 mm (1.25 inches) of the rigid test panel surface without contacting underlying rigid material between 12.7 mm (0.50) inches and 31.75 mm (1.25 inches) from the panel which has a vertical height of less than 25.4 mm (1 inch)?

YES: N/A

NO: N/A

3. Does it provide adequate pelvic area impact protection?

YES: X

NO: -

4. Does it meet at least one of the criteria No. 1 to 3?

YES (PASS): X

NO (FAIL): -

#### B. FOLDING ARMREST

Is it made of or covered with energy absorbing material? Or does it meet at least one of the criteria No. 1 to 3?

YES (PASS): X

NO (FAIL): -

**DOOR LATCH EVALUATION**

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Chevrolet Malibu
NHTSA NO.:	C90102
VIN:	1G1ZG57B89F127475
DATE OF MANUFACTURE:	08/08 (SEE CERTIFICATION LABEL)
COLOR:	White
ODOMETER READING:	35
LABORATORY:	Calspan
TEST DATE:	February 19, 2009

**LATCH ENGAGEMENT INTERFERENCE**

<b>DESCRIPTION OF LATCH LOCATION</b>	<b>NO LOAD</b>	<b>10G HORIZONTAL TRANSVERSE</b>	<b>10G VERTICAL</b>	<b>30G HORIZONTAL LONGITUDINAL</b>
Storage Bin	N/A	N/A	N/A	N/A
Floor Center Console	N/A	N/A	N/A	N/A
Glove Box	N/A	N/A	N/A	N/A

(APPENDIX B CONTAINS CALCULATION SHEETS WHICH ARE BASED ON MANUFACTURER'S DATA)

## SUMMARY OF RESULTS

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Chevrolet Malibu
NHTSA NO.:	C90102
VIN:	1G1ZG57B89F127475
DATE OF MANUFACTURE:	08/08 (SEE CERTIFICATION LABEL)
COLOR:	White
ODOMETER READING:	35
LABORATORY:	Calspan
TEST DATE:	February 19, 2009

	NUMBER OF IMPACTS	PASS/FAIL
INSTRUMENT PANEL	3	PASSED
SEAT BACK	1	PASSED
SUN VISORS	N/A	PASSED
ARMRESTS	N/A	PASSED
INTERIOR COMPARTMENT DOORS	N/A	N/A

REMARKS:

**APPENDIX A**

**PHOTOGRAPHS**

## PHOTOGRAPHS

<b><u>FIGURE</u></b>	<b><u>VIEW</u></b>
A-1	LEFT SIDE VIEW OF VEHICLE
A-2	RIGHT SIDE VIEW OF VEHICLE
A-3	3/4 FRONTAL VIEW FROM LEFT SIDE OF VEHICLE
A-4	3/4 REAR VIEW FROM RIGHT SIDE OF VEHICLE
A-5	VEHICLE'S CERTIFICATION LABEL
A-6	VEHICLE'S TIRE INFORMATION LABEL
A-7	SUN VISOR CONSTRUCTION
A-8	ARMREST LEFT FRONT DOOR
A-9	ARMREST FLOOR CONSOLE
A-10	ARMREST LEFT REAR DOOR
A-11	INSTRUMENT PANEL
A-12	DELINEATED INSTRUMENT PANEL IMPACT ZONE PRE-TEST
A-13	DELINEATED INSTRUMENT PANEL IMPACT ZONE POST-TEST
A-14	INSTRUMENT PANEL IMPACT #1 PRE-TEST
A-15	INSTRUMENT PANEL IMPACT #1 POST-TEST
A-16	INSTRUMENT PANEL IMPACT #2 PRE-TEST
A-17	INSTRUMENT PANEL IMPACT #2 POST-TEST
A-18	INSTRUMENT PANEL IMPACT #3 PRE-TEST
A-19	INSTRUMENT PANEL IMPACT #3 POST-TEST
A-20	HEAD RESTRAINT
A-21	HEAD RESTRAINT IMPACT AREA PRE-TEST
A-22	HEAD RESTRAINT IMPACT AREA POST-TEST



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 : SUN VISOR CONSTRUCTION



Figure A-8 : ARMREST LEFT FRONT DOOR



Figure A-9 : ARMREST FLOOR CONSOLE



Figure A-10 : ARMREST LEFT REAR DOOR



Figure A-11 : INSTRUMENT PANEL



Figure A-12 : DELINEATED INSTRUMENT PANEL IMPACT ZONE PRE-TEST



Figure A-13 : DELINEATED INSTRUMENT PANEL IMPACT ZONE POST-TEST

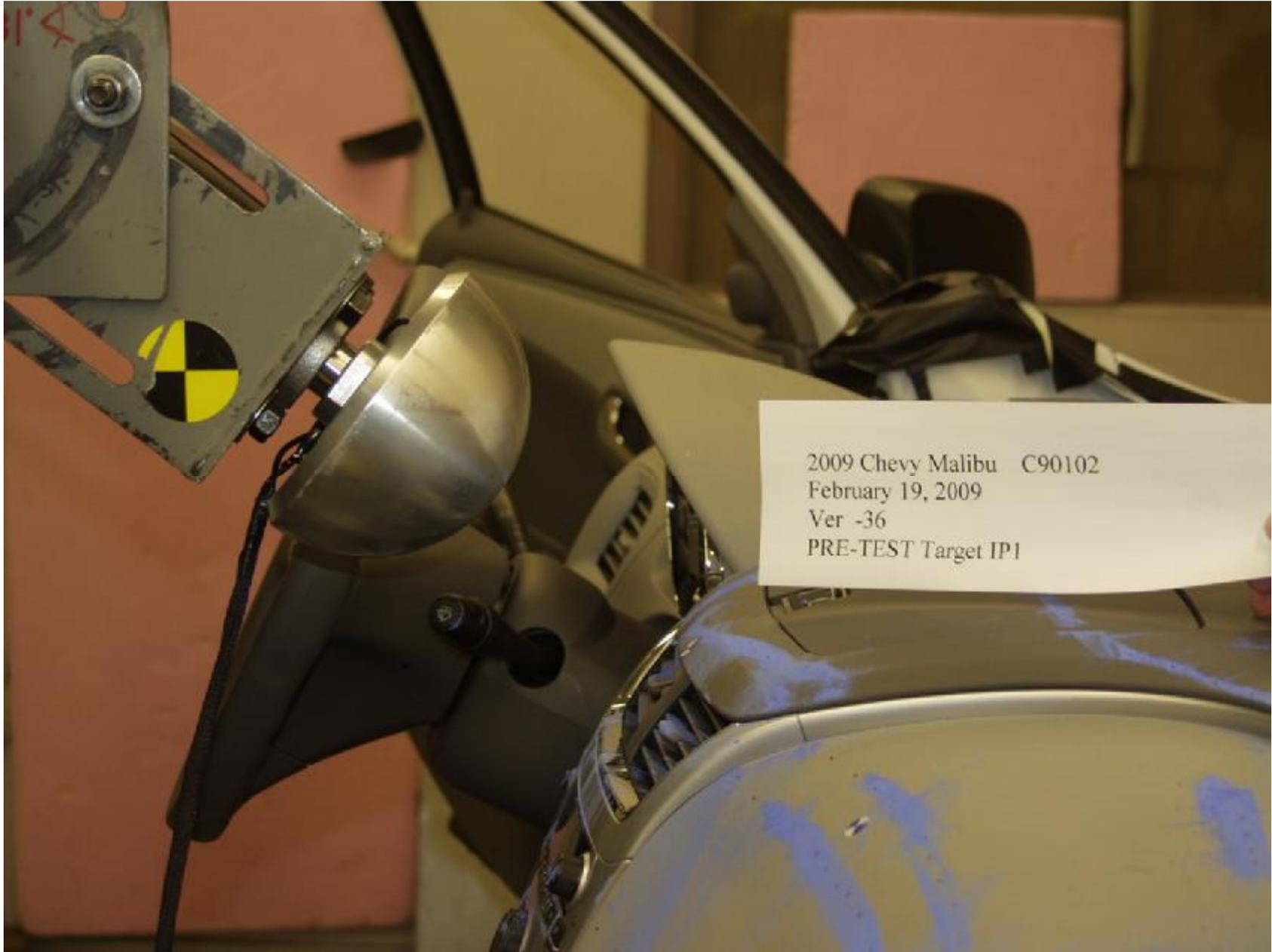


Figure A-14 : INSTRUMENT PANEL IMPACT #1 PRE-TEST

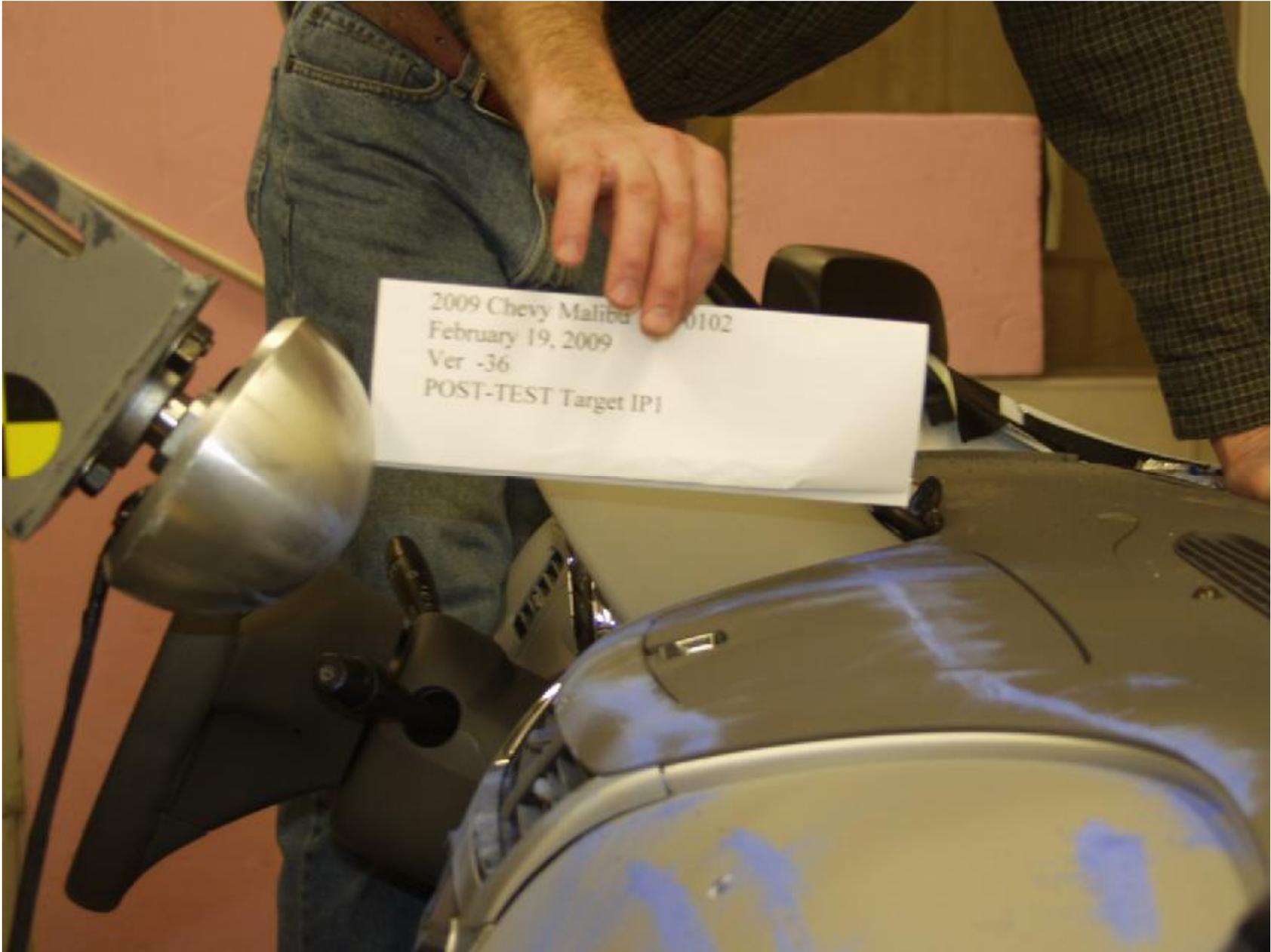


Figure A-15 : INSTRUMENT PANEL IMPACT #1 POST-TEST

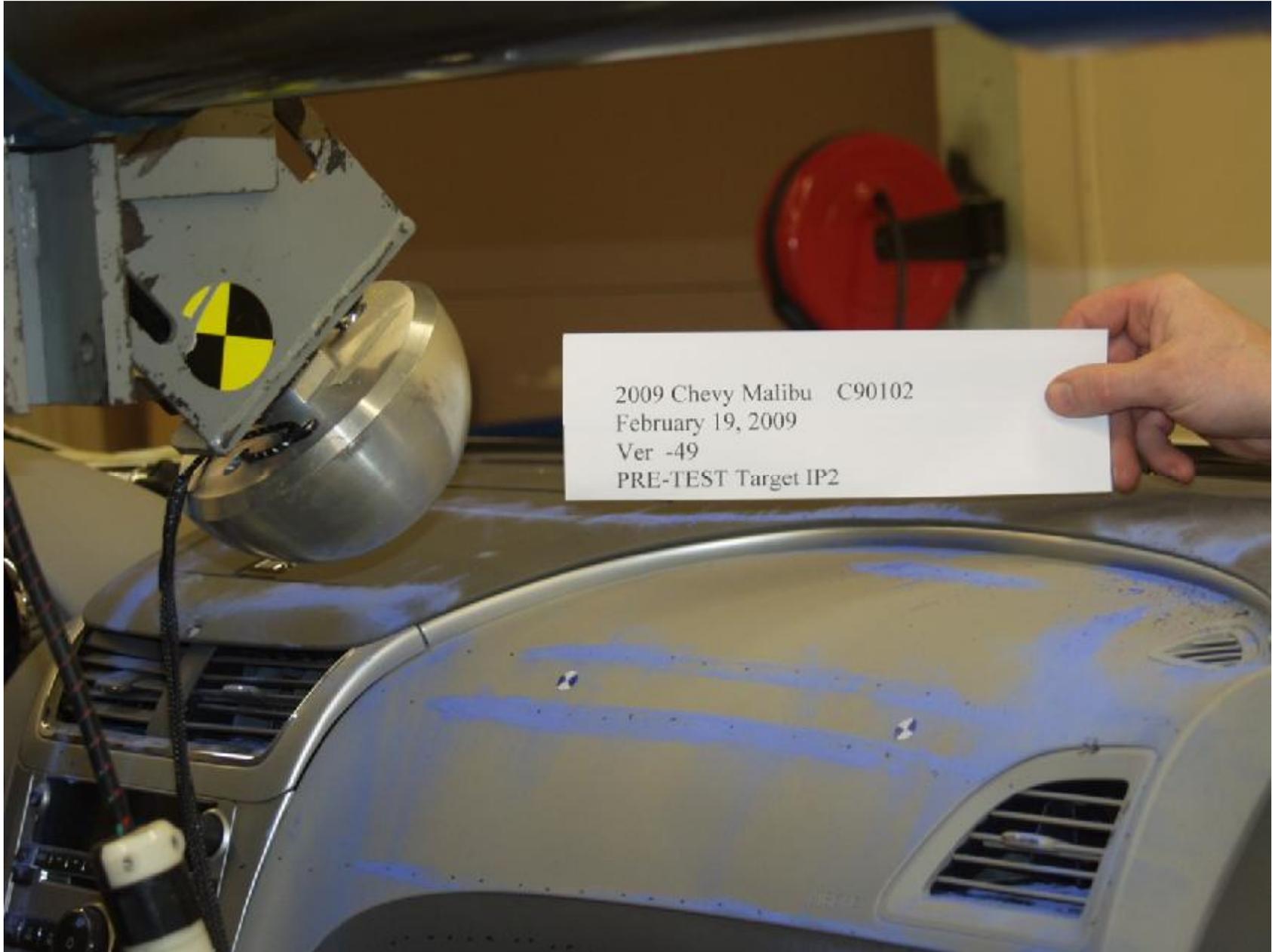


Figure A-16 : INSTRUMENT PANEL IMPACT #2 PRE-TEST

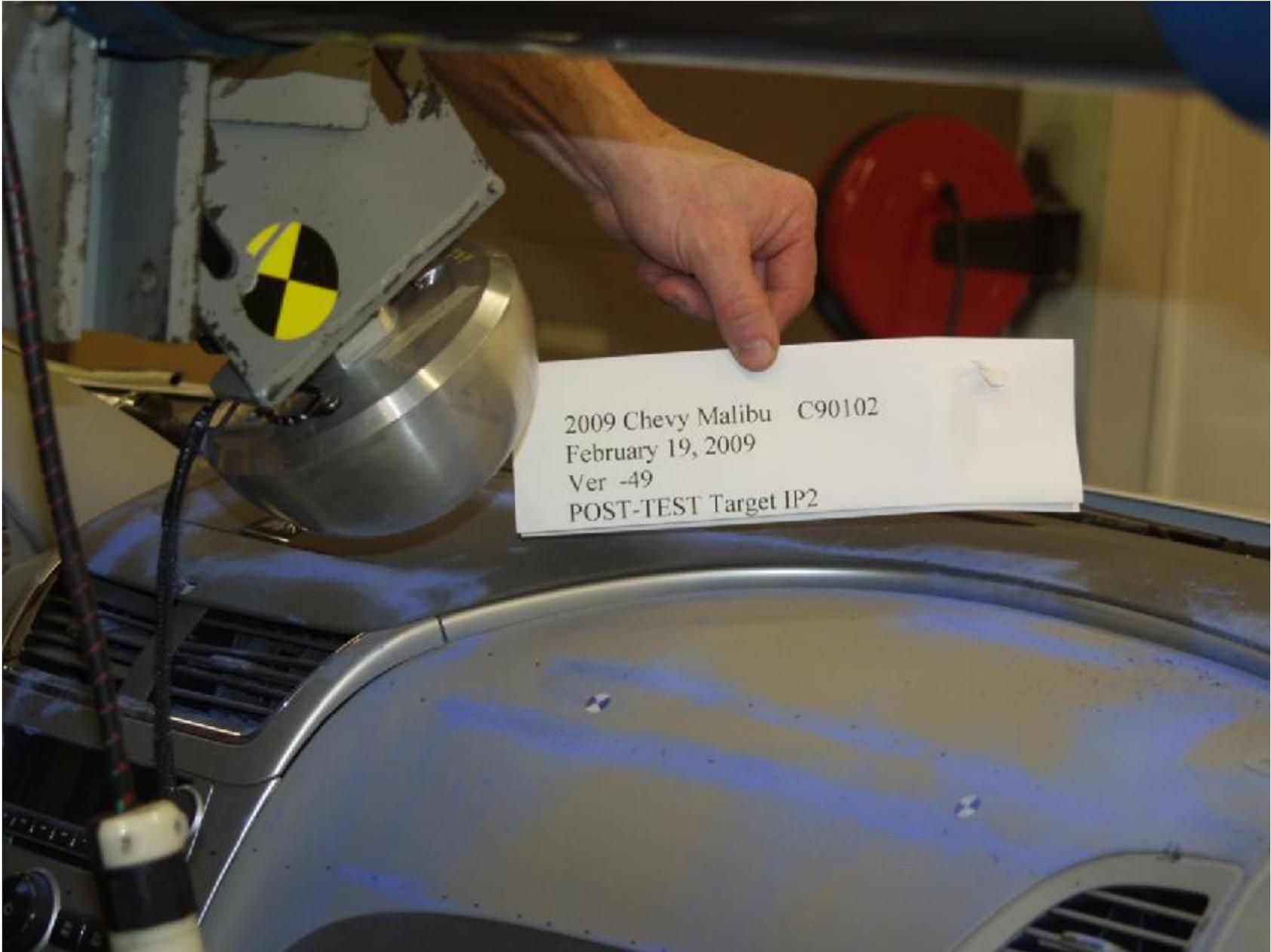


Figure A-17 : INSTRUMENT PANEL IMPACT #2 POST-TEST

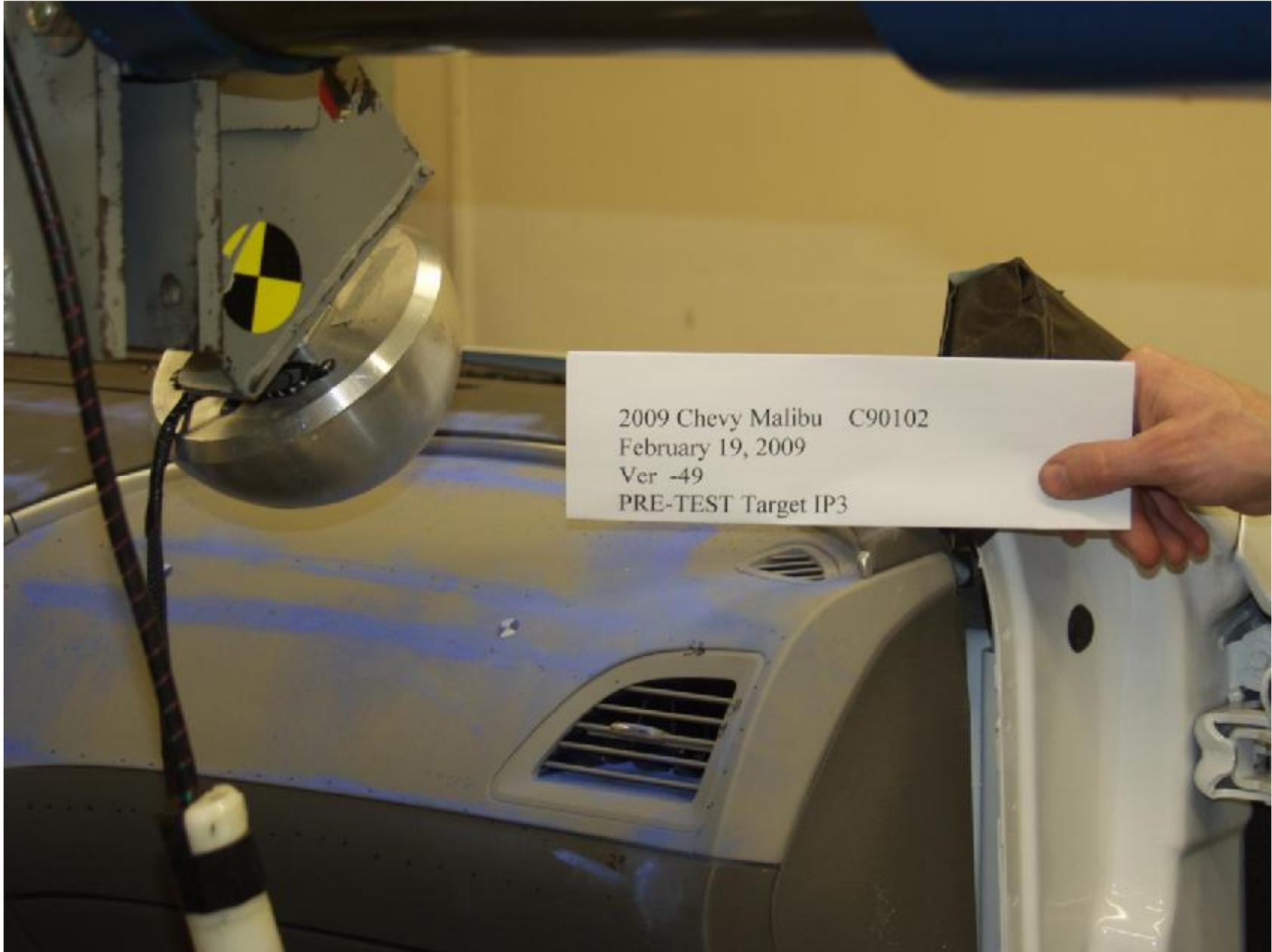


Figure A-18 : INSTRUMENT PANEL IMPACT #3 PRE-TEST



Figure A-19 : INSTRUMENT PANEL IMPACT #3 POST-TEST



A-22

8885-03

Figure A-20 : HEAD RESTRAINT

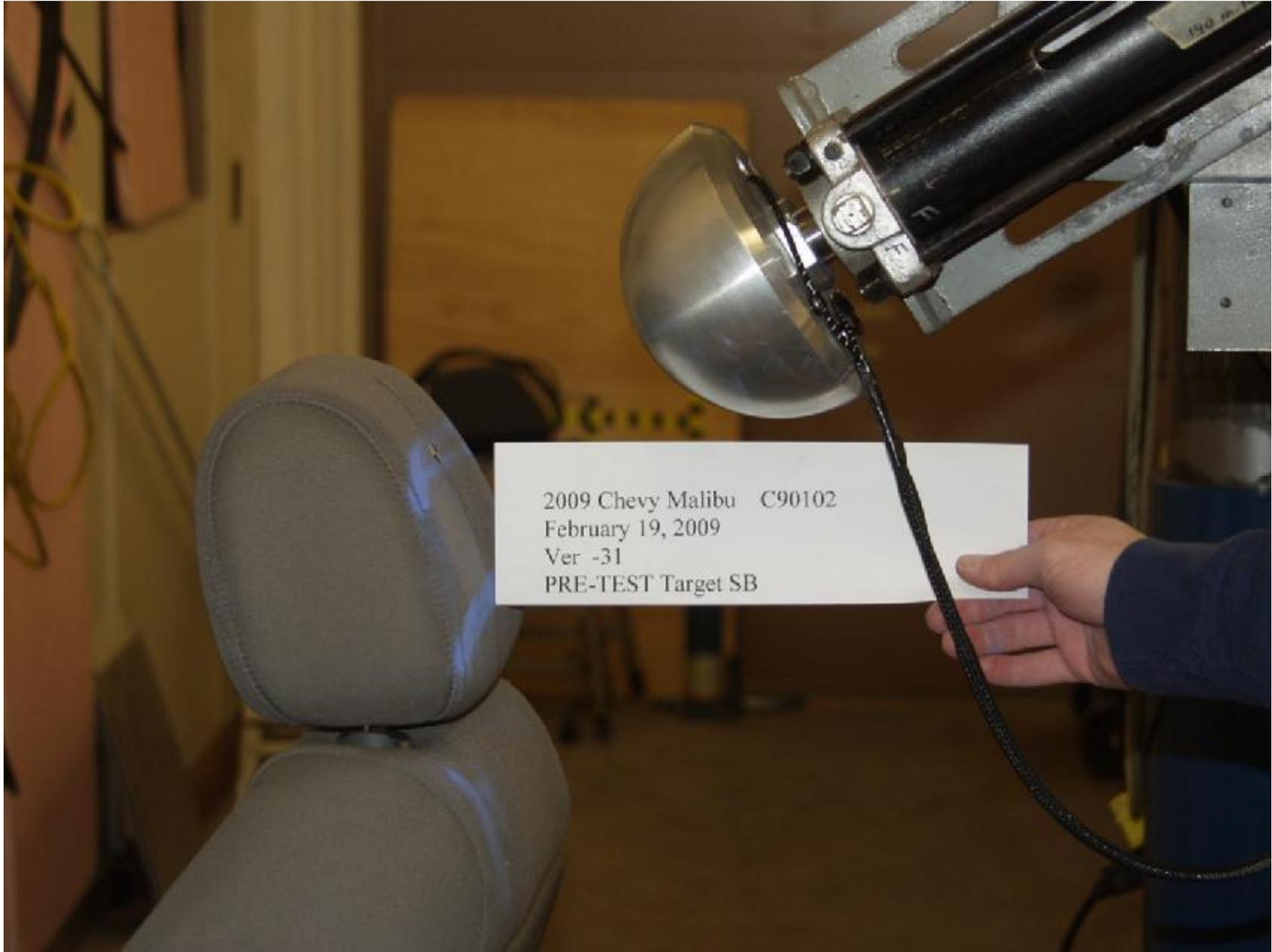


Figure A-21 : HEAD RESTRAINT IMPACT AREA PRE-TEST

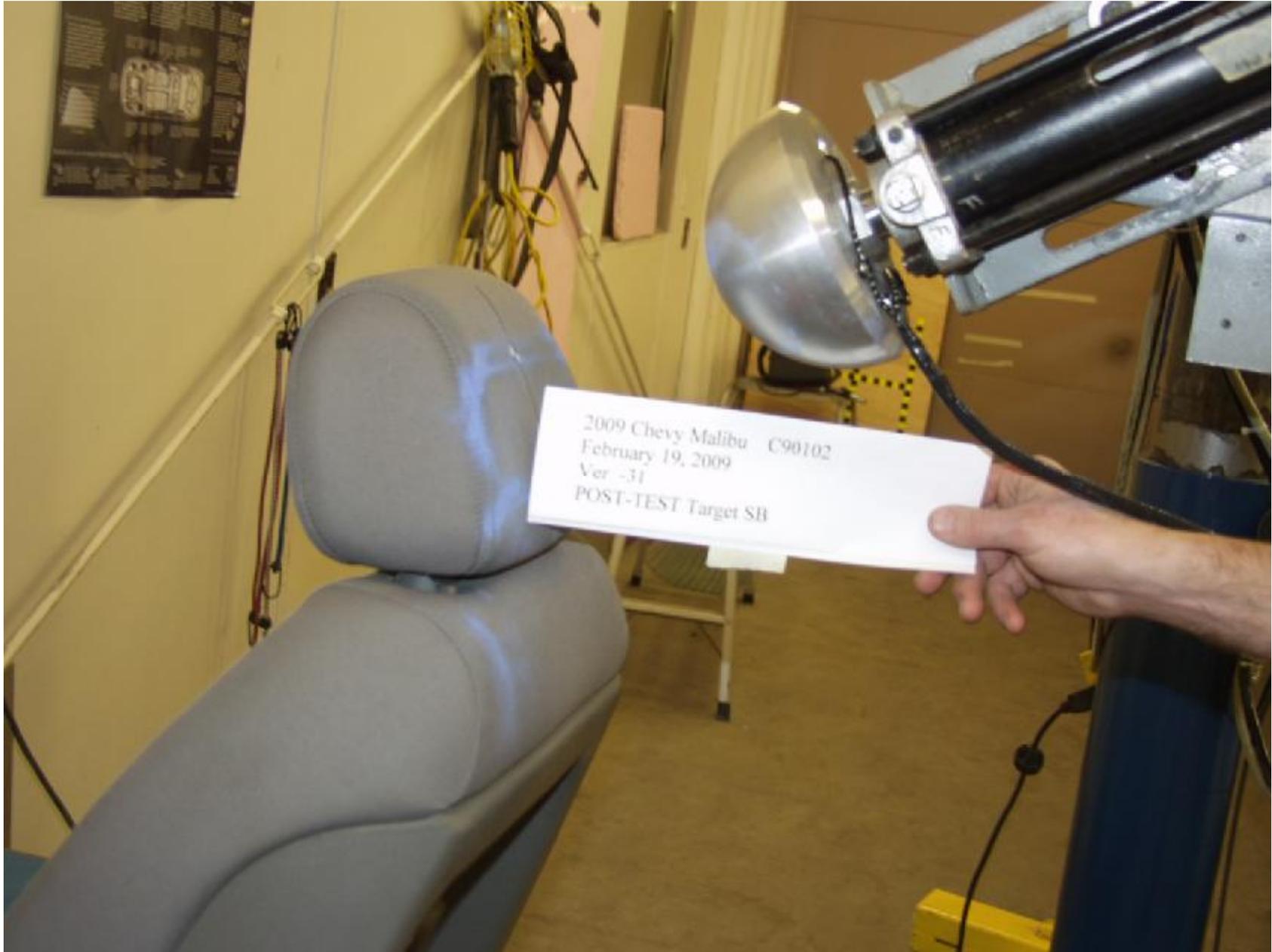


Figure A-22 : HEAD RESTRAINT IMPACT AREA POST-TEST

APPENDIX B

INTERIOR COMPARTMENT DOOR CALCULATIONS

Calculations not supplied

APPENDIX C

DATA PLOTS

FMVSS 201 Linear Impact - 2009 Chevy Malibu - IP1

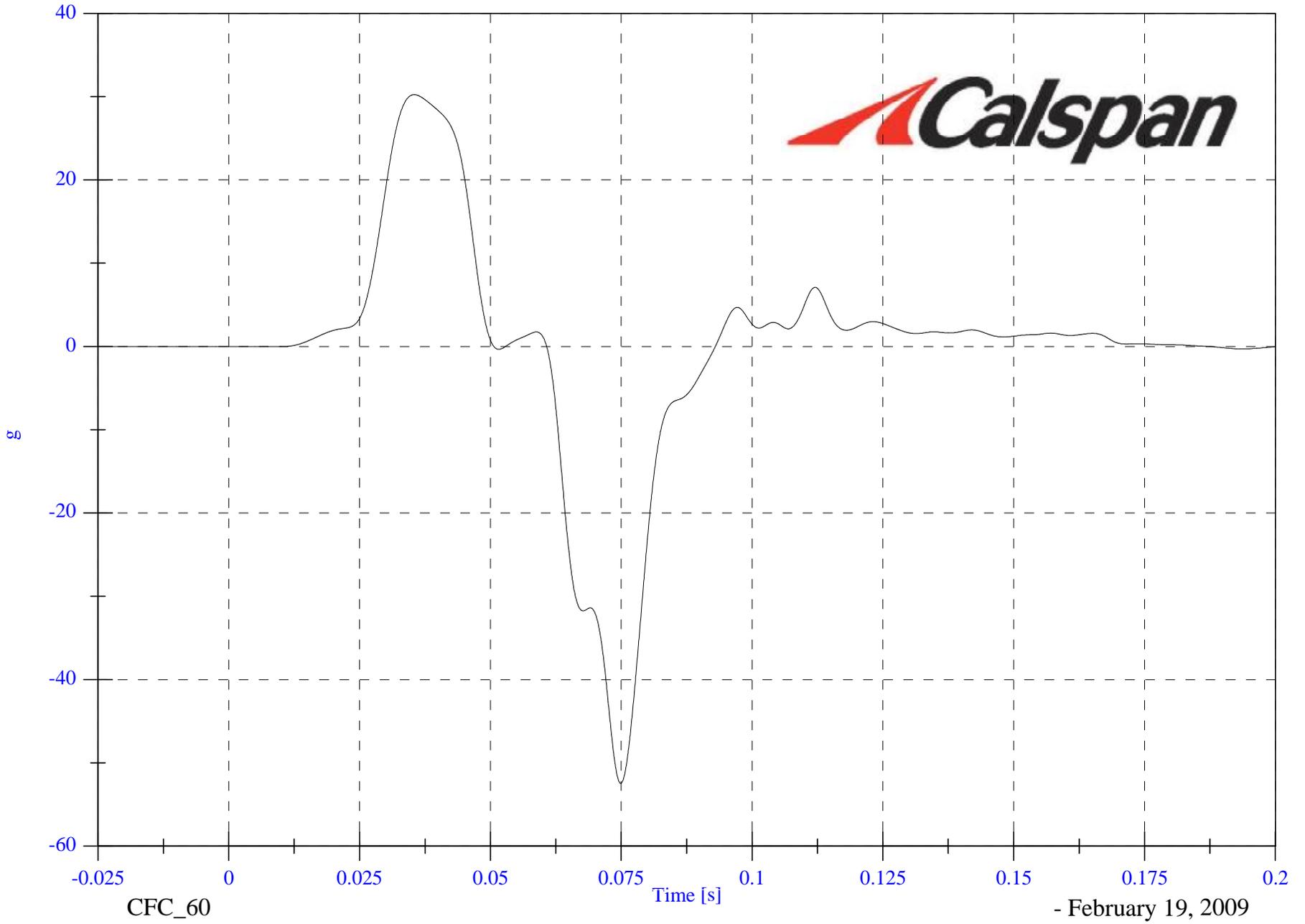
Impactor Headform Ax

Max: 30.2 [g] at 0.035 [s]

Min: -52.5 [g] at 0.075 [s]



C90102 INSTRUMENT PANEL VENT CLUSTER IMPACT PLOT #1



CFC\_60

- February 19, 2009

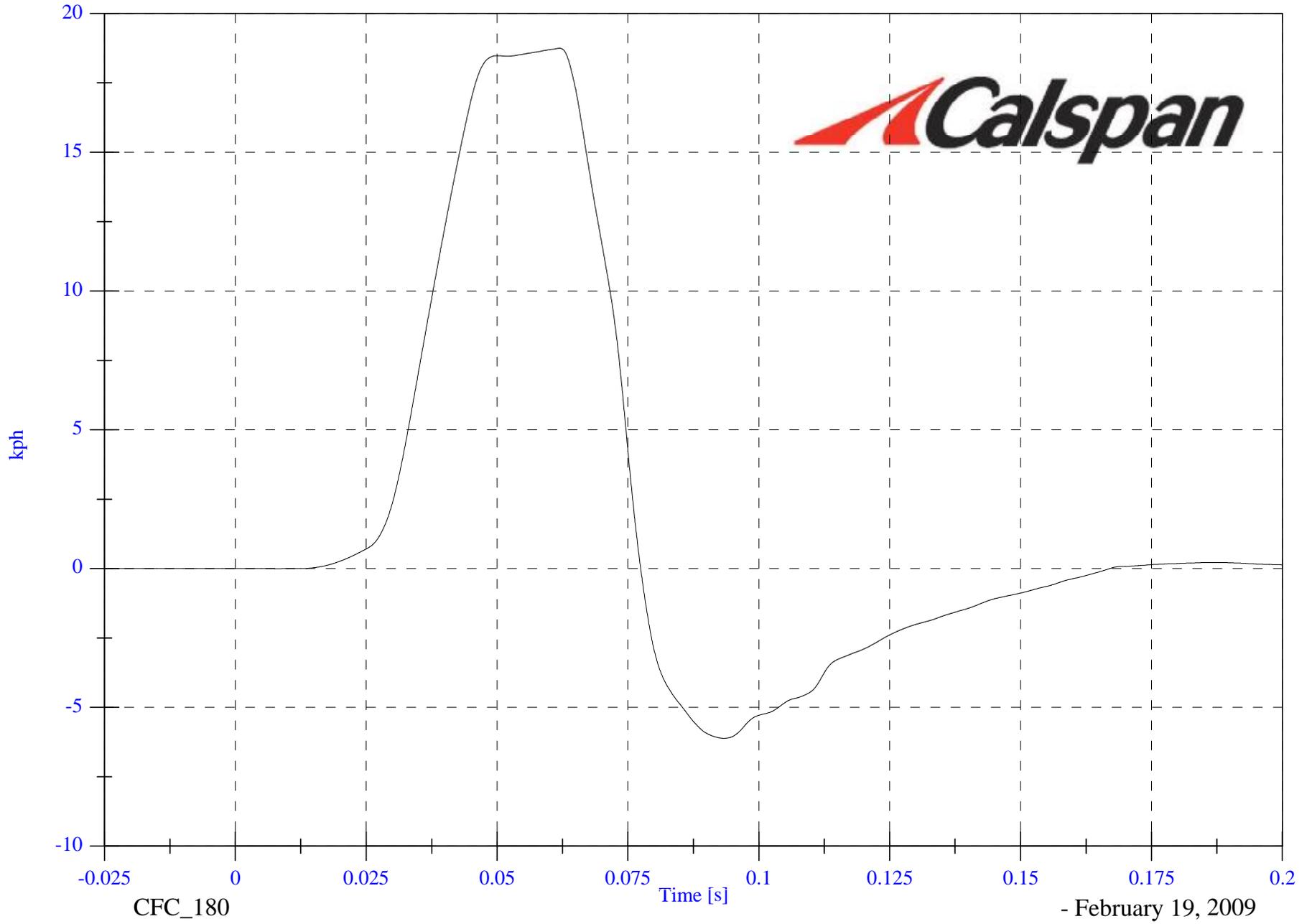
FMVSS 201 Linear Impact - 2009 Chevy Malibu - IP1

Impactor Headform Ax Velocity

Max: 18.7 [kph] at 0.062 [s]

Min: -6.1 [kph] at 0.093 [s]

C90102 INSTRUMENT PANEL VENT CLUSTER IMPACT PLOT #2



CFC\_180

- February 19, 2009

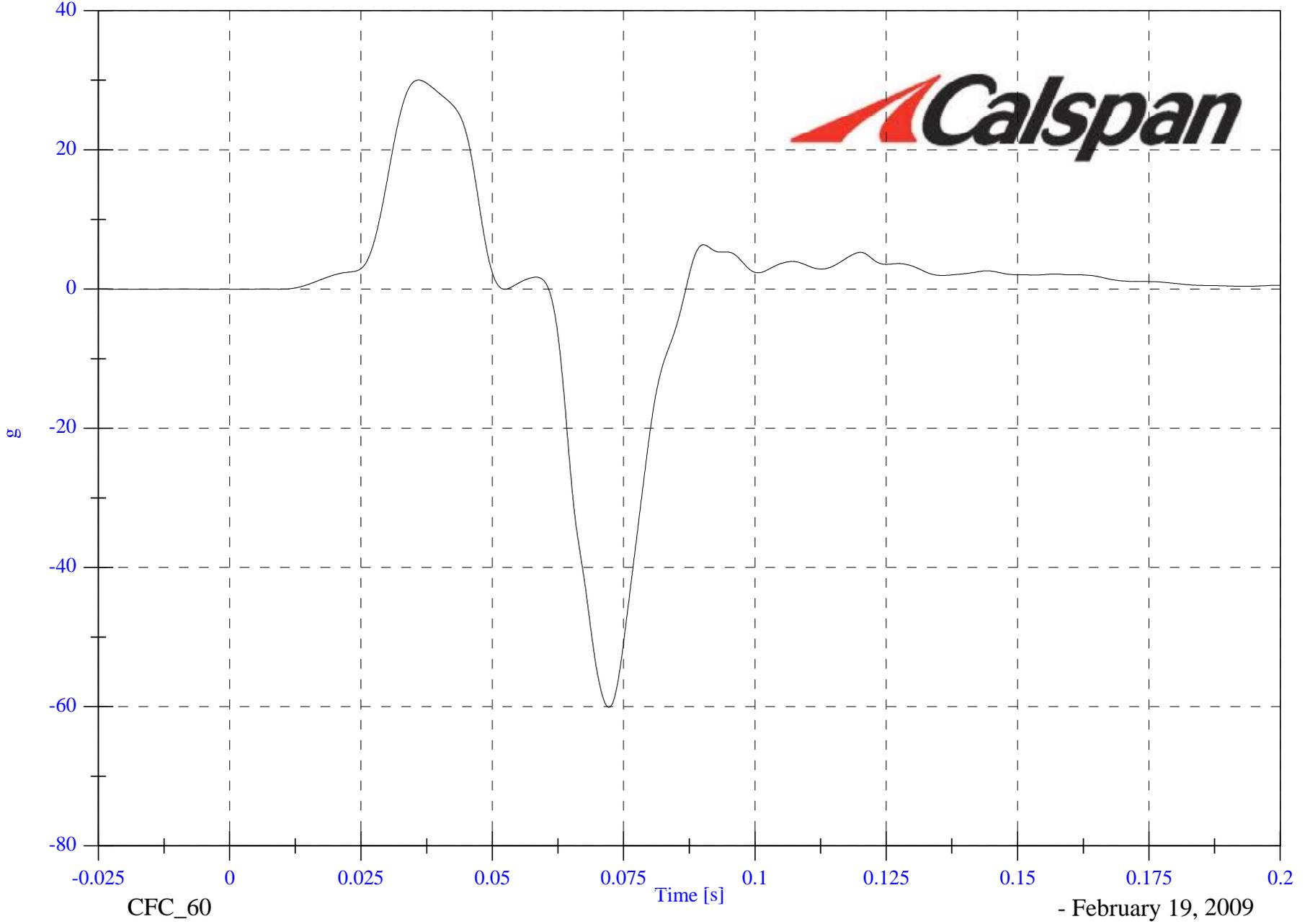
FMVSS 201 Linear Impact - 2009 Chevy Malibu - IP2

Impactor Headform Ax

Max: 30.0 [g] at 0.036 [s]

Min: -60.1 [g] at 0.072 [s]

C90102 INSTRUMENT PANEL LEFT SIDE AIRBAG COVER IMPACT PLOT #1



- February 19, 2009

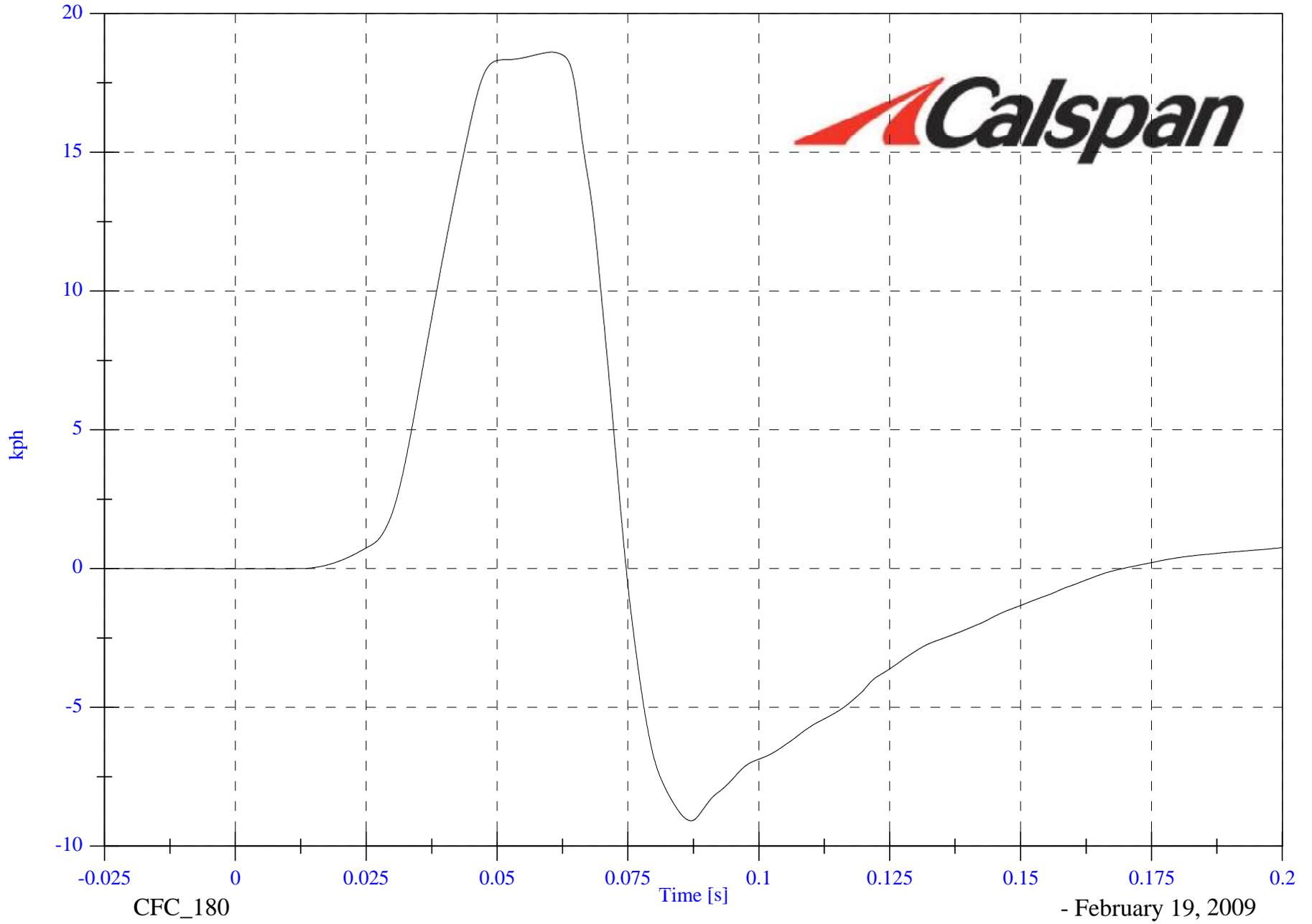
FMVSS 201 Linear Impact - 2009 Chevy Malibu - IP2

Impactor Headform Ax Velocity

Max: 18.6 [kph] at 0.060 [s]

Min: -9.1 [kph] at 0.087 [s]

C90102 INSTRUMENT PANEL LEFT SIDE AIRBAG COVER IMPACT PLOT #2



CFC\_180

- February 19, 2009

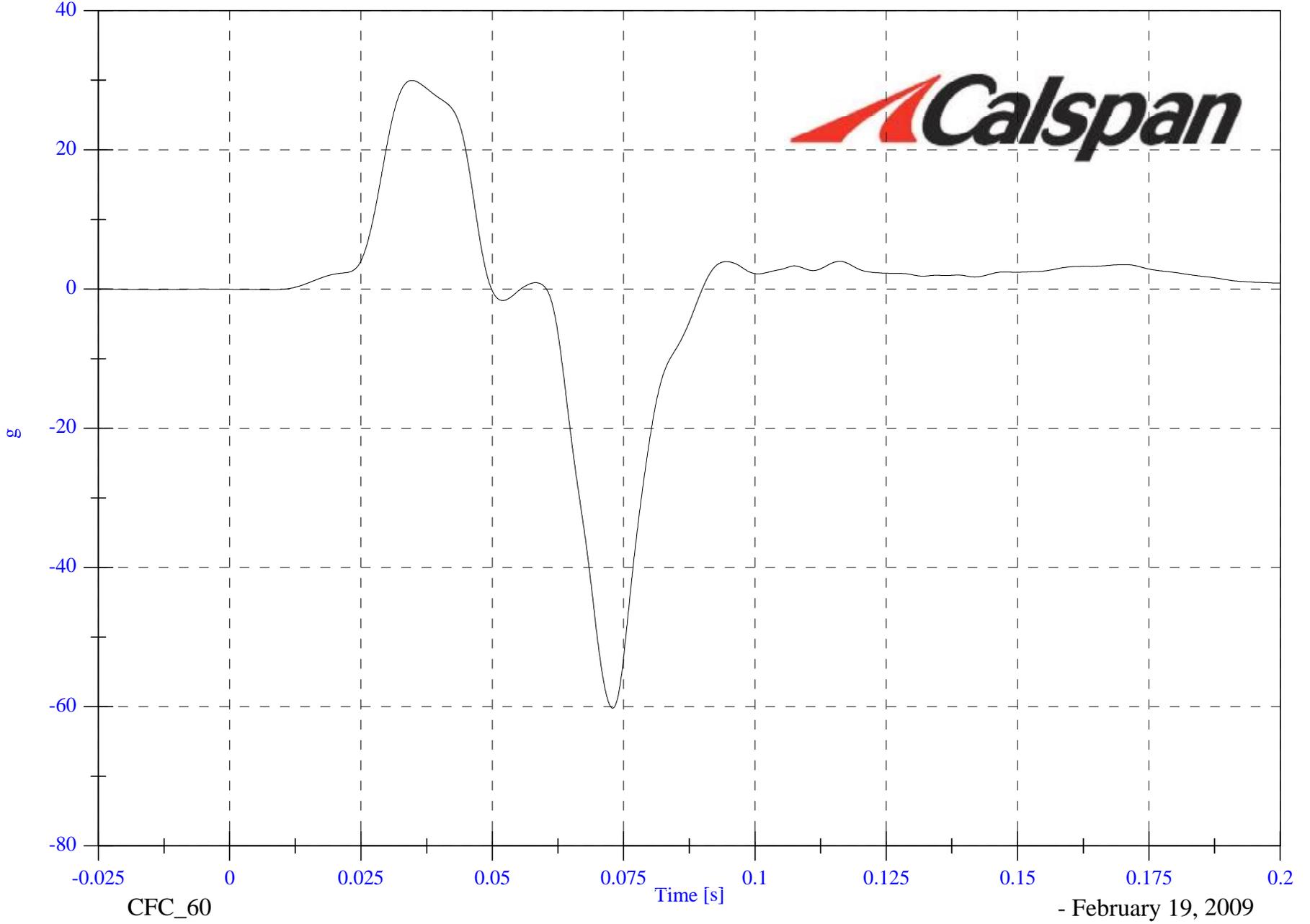
FMVSS 201 Linear Impact - 2009 Chevy Malibu - IP3

Impactor Headform Ax

Max: 30.0 [g] at 0.035 [s]

Min: -60.2 [g] at 0.073 [s]

C90102 INSTRUMENT PANEL RIGHT SIDE AIRBAG COVER IMPACT PLOT #1



- February 19, 2009

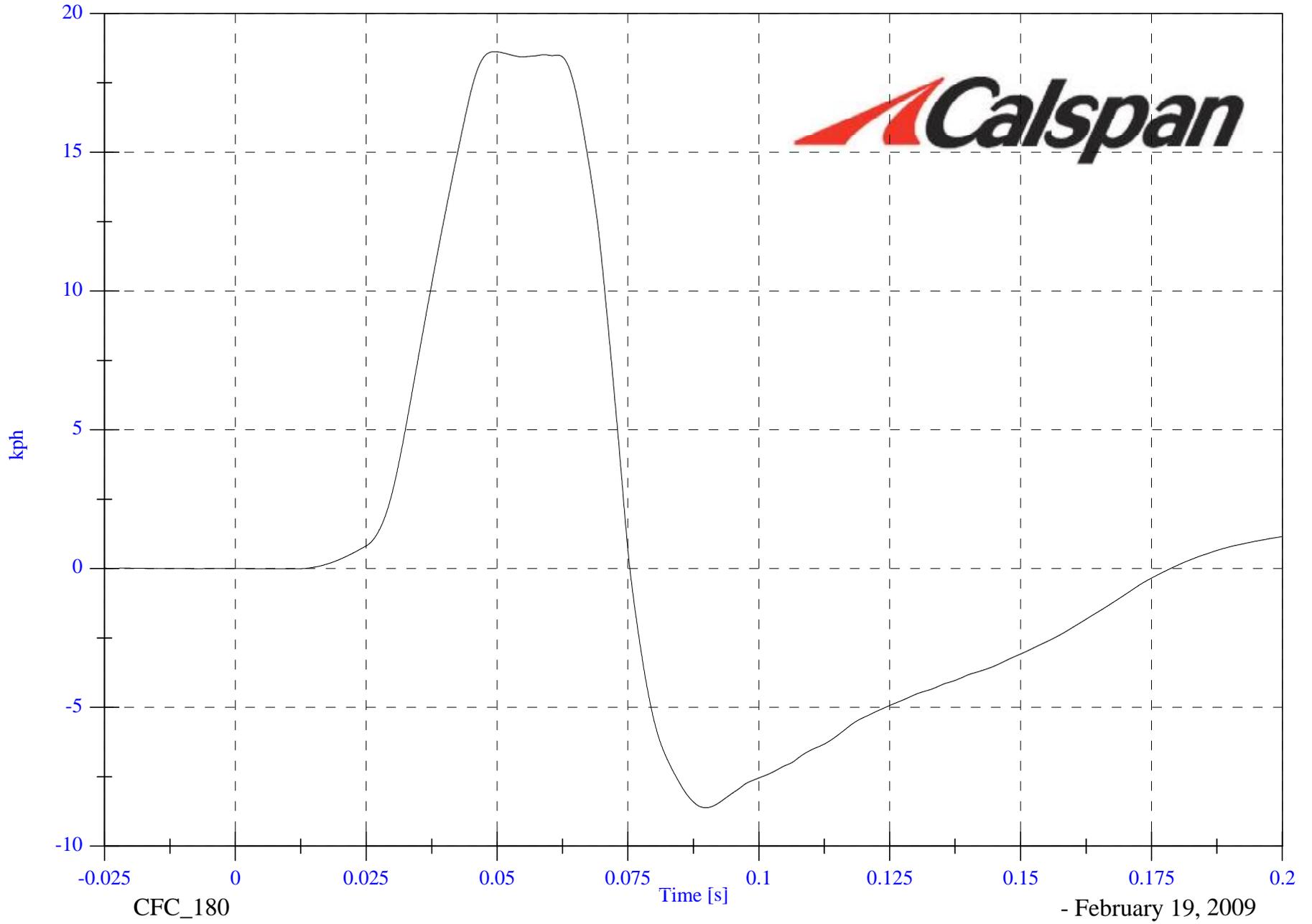
FMVSS 201 Linear Impact - 2009 Chevy Malibu - IP3

Impactor Headform Ax Velocity

Max: 18.6 [kph] at 0.049 [s]

Min: -8.6 [kph] at 0.090 [s]

C90102 INSTRUMENT PANEL RIGHT SIDE AIRBAG COVER IMPACT PLOT #2



CFC\_180

- February 19, 2009

FMVSS 201 Linear Impact - 2009 Chevy Malibu - SB

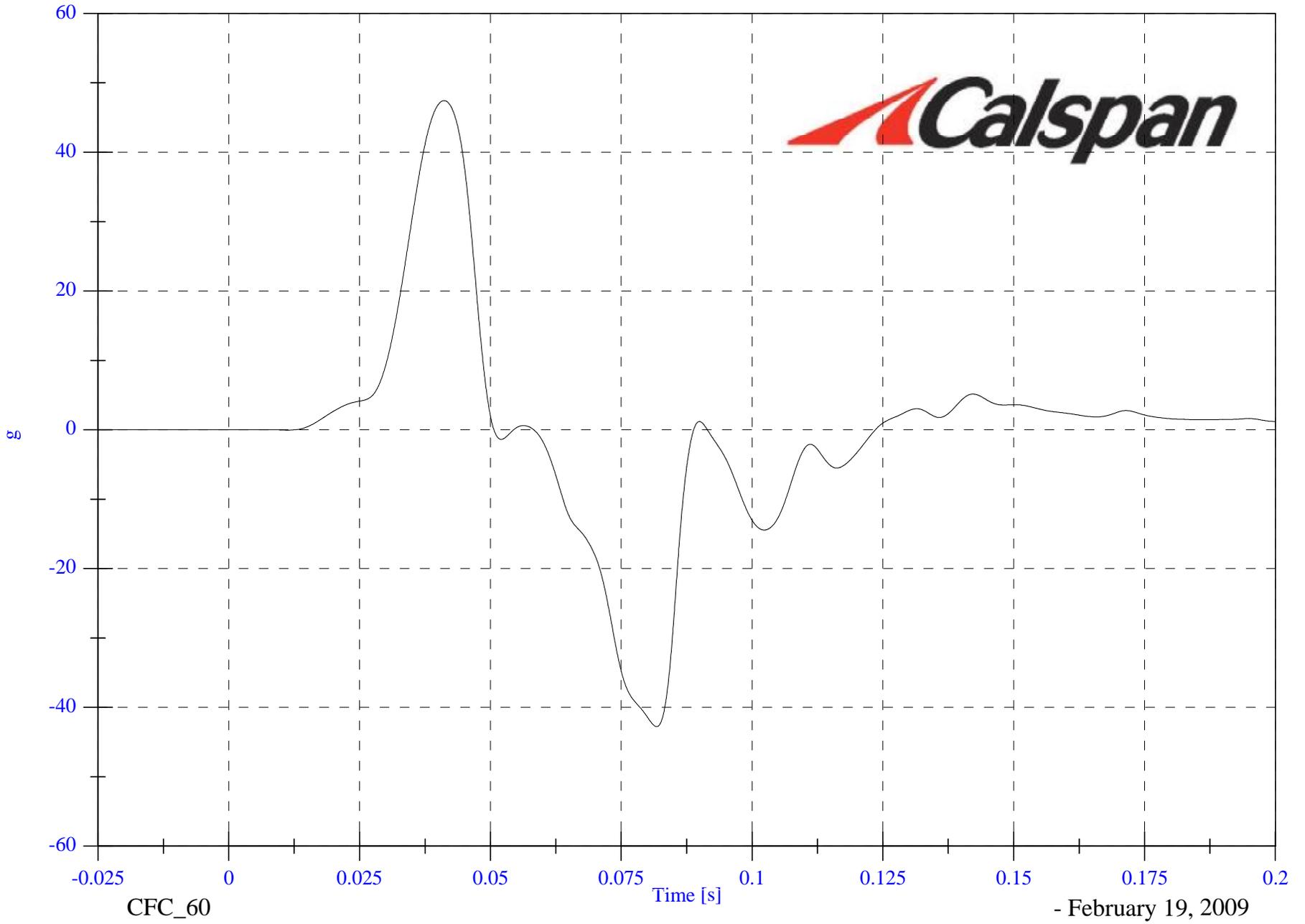
Impactor Headform Ax

Max: 47.4 [g] at 0.041 [s]

Min: -42.8 [g] at 0.082 [s]



C90102 SEAT BACK HEAD RESTRAINT IMPACT PLOT #1



FMVSS 201 Linear Impact - 2009 Chevy Malibu - SB

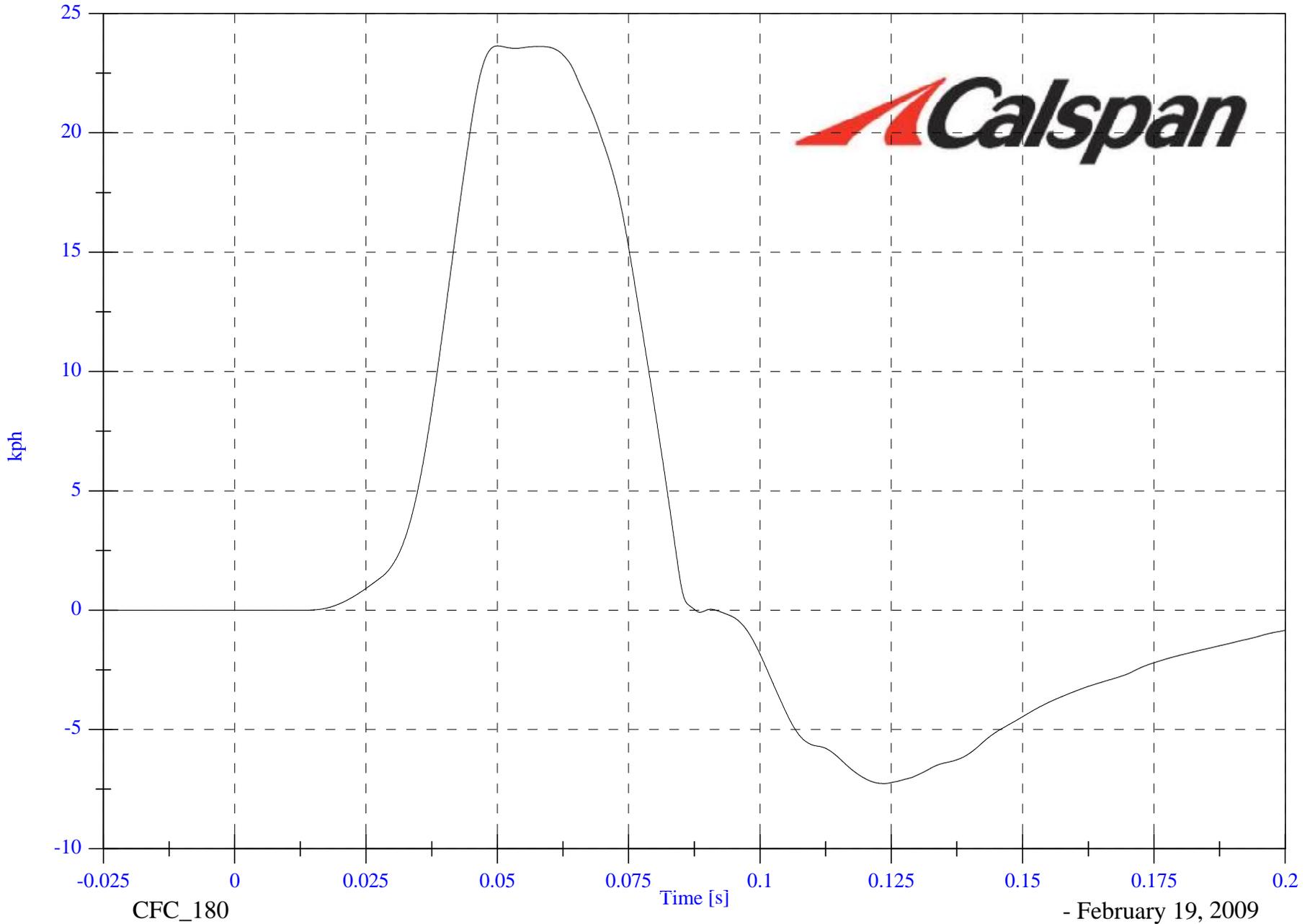
Impactor Headform Ax Velocity

Max: 23.6 [kph] at 0.050 [s]

Min: -7.3 [kph] at 0.124 [s]



C90102 SEAT BACK HEAD RESTRAINT IMPACT PLOT #2



CFC\_180

- February 19, 2009