

REPORT NUMBER: 201-CAL-09-05

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

**KIA MOTORS CORPORATION
2009 KIA SEDONA**

NHTSA NUMBER: C90502

CALSPAN TEST NUMBER: 8885-05

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



Test Date: June 30, 2009

FINAL REPORT

PREPARED FOR:

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National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
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Prepared by:



James Czarniecki, Project Engineer

Approved by:



David J. Travale, Program Manager
Transportation Science Center

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16. <i>Abstract</i> Compliance tests were conducted on the subject vehicle, a 2009 Kia Sedona, 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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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 Kia Sedona, NHTSA No. C90502, 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 Kia Sedona, NHTSA No. C90502, 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 Kia Sedona
NHTSA NO.:	C90502
VIN:	KNDMB133096286580
DATE OF MANUFACTURE:	07/08 (SEE CERTIFICATION LABEL)
COLOR:	Blue
ODOMETER READING:	40
LABORATORY:	Calspan
TEST DATE:	June 30, 2009

NUMBER OF SEATING POSITIONS:

FRONT: 2 REAR: 5

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: 4

LOCATION: Front and rear door panels - Front and rear seat arm rests

VEHICLE EQUIPPED WITH SUN VISORS?

NO: - YES: X

VEHICLE EQUIPPED WITH INTERIOR DOOR LATCHES?

NO: - YES: X NUMBER: 1

LOCATION: Glove Box

**HEAD FORM IMPACT TEST RESULTS
INSTRUMENT PANEL**

VEHICLE YEAR/MAKE/MODEL/STYLE:	2009 Kia Sedona
NHTSA NO.:	C90502
VIN:	KNDMB133096286580
DATE OF MANUFACTURE:	07/08 (SEE CERTIFICATION LABEL)
COLOR:	Blue
ODOMETER READING:	40
LABORATORY:	Calspan
TEST DATE:	June 30, 2009

IMPACT LOCATION AND NUMBER				VELOCITY (kph)	PEAK ACCELERATION (3 ms Clip) Gs
TARGET	X (mm)	Y (mm)	ANGLE (degrees)		
Radio Cluster	1680	23	24	18.85	50.07
Left Side of Airbag Cover	1634	290	48	18.67	60.57
Right Side of Airbag Cover	1637	539	55	18.85	50.47

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 Kia Sedona
NHTSA NO.:	C90502
VIN:	KNDMB133096286580
DATE OF MANUFACTURE:	07/08 (SEE CERTIFICATION LABEL)
COLOR:	Blue
ODOMETER READING:	40
LABORATORY:	Calspan
TEST DATE:	June 30, 2009

IMPACT LOCATION AND NUMBER				VELOCITY (kph)	PEAK ACCELERATION (3 ms Clip) Gs
TARGET	X (mm)	Y (mm)	ANGLE (degrees)		
Seat Back Head Restraint	2715	423	12	23.55	41.98

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 Kia Sedona
NHTSA NO.:	C90502
VIN:	KNDMB133096286580
DATE OF MANUFACTURE:	07/08 (SEE CERTIFICATION LABEL)
COLOR:	Blue
ODOMETER READING:	40
LABORATORY:	Calspan
TEST DATE:	June 30, 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) 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 Kia Sedona
NHTSA NO.:	C90502
VIN:	KNDMB133096286580
DATE OF MANUFACTURE:	07/08 (SEE CERTIFICATION LABEL)
COLOR:	Blue
ODOMETER READING:	40
LABORATORY:	Calspan
TEST DATE:	June 30, 2009

LATCH ENGAGEMENT INTERFERENCE

DESCRIPTION OF LATCH LOCATION	NO LOAD	10G HORIZONTAL TRANSVERSE	10G VERTICAL	30G HORIZONTAL LONGITUDINAL
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	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 Kia Sedona
NHTSA NO.:	C90502
VIN:	KNDMB133096286580
DATE OF MANUFACTURE:	07/08 (SEE CERTIFICATION LABEL)
COLOR:	Blue
ODOMETER READING:	40
LABORATORY:	Calspan
TEST DATE:	June 30, 2009

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

REMARKS:

APPENDIX A

PHOTOGRAPHS

PHOTOGRAPHS

<u>FIGURE</u>	<u>VIEW</u>
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
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A-9	ARMREST LEFT FRONT SEAT
A-10	ARMREST LEFT REAR DOOR
A-11	ARMREST LEFT REAR SEAT
A-12	INSTRUMENT PANEL
A-13	DELINEATED INSTRUMENT PANEL IMPACT ZONE PRE-TEST
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A-15	INSTRUMENT PANEL IMPACT #1 PRE-TEST
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A-19	INSTRUMENT PANEL IMPACT #3 PRE-TEST
A-20	INSTRUMENT PANEL IMPACT #3 POST-TEST
A-21	HEAD RESTRAINT
A-22	HEAD RESTRAINT IMPACT AREA PRE-TEST
A-23	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 LEFT FRONT SEAT



Figure A-10 : ARMREST LEFT REAR DOOR



Figure A-11 : ARMREST LEFT REAR SEAT



Figure A-12 : INSTRUMENT PANEL



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



Figure A-14 : DELINEATED INSTRUMENT PANEL IMPACT ZONE POST-TEST

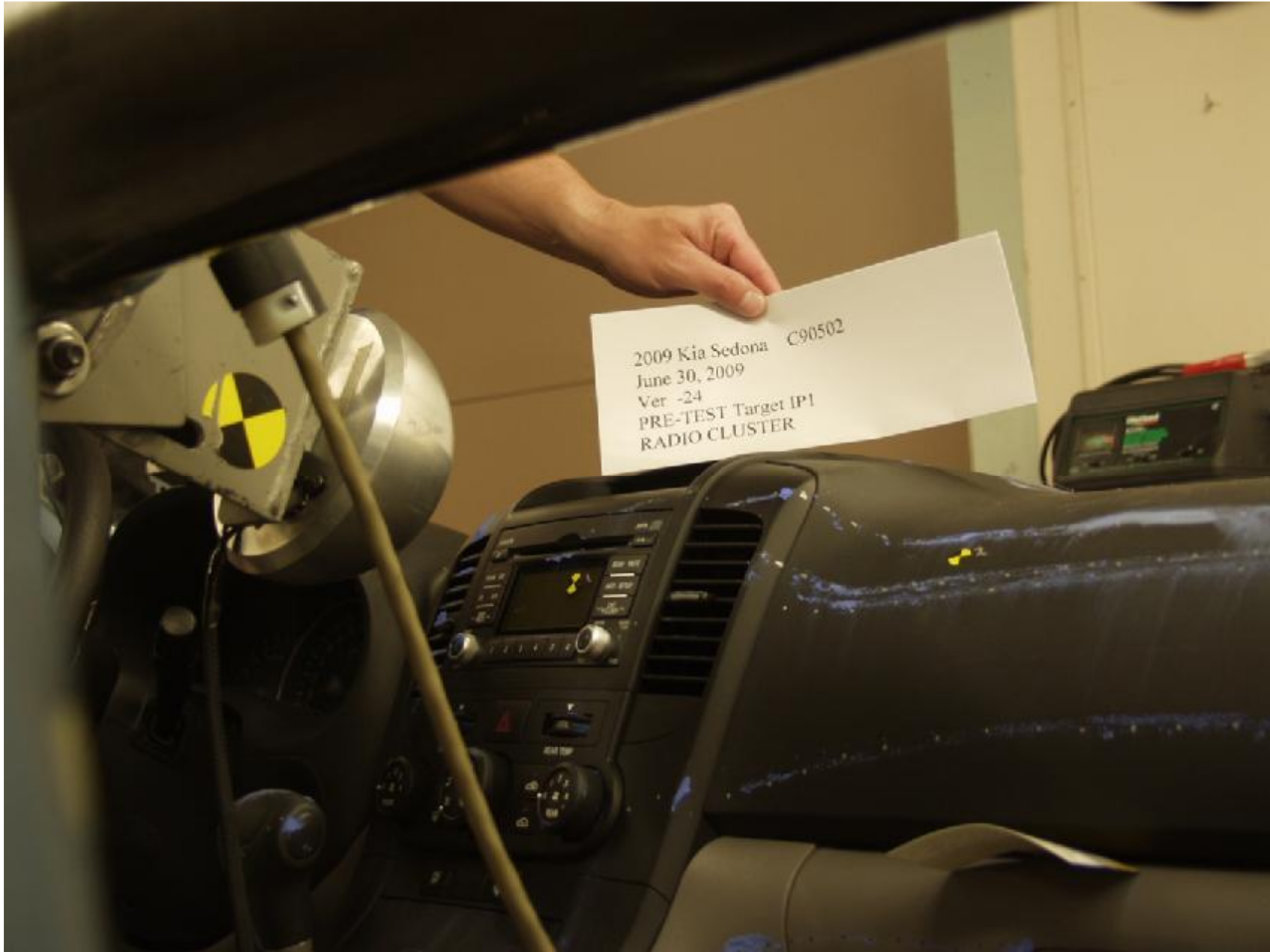


Figure A-15 : INSTRUMENT PANEL IMPACT #1 PRE-TEST



Figure A-16 : INSTRUMENT PANEL IMPACT #1 POST-TEST

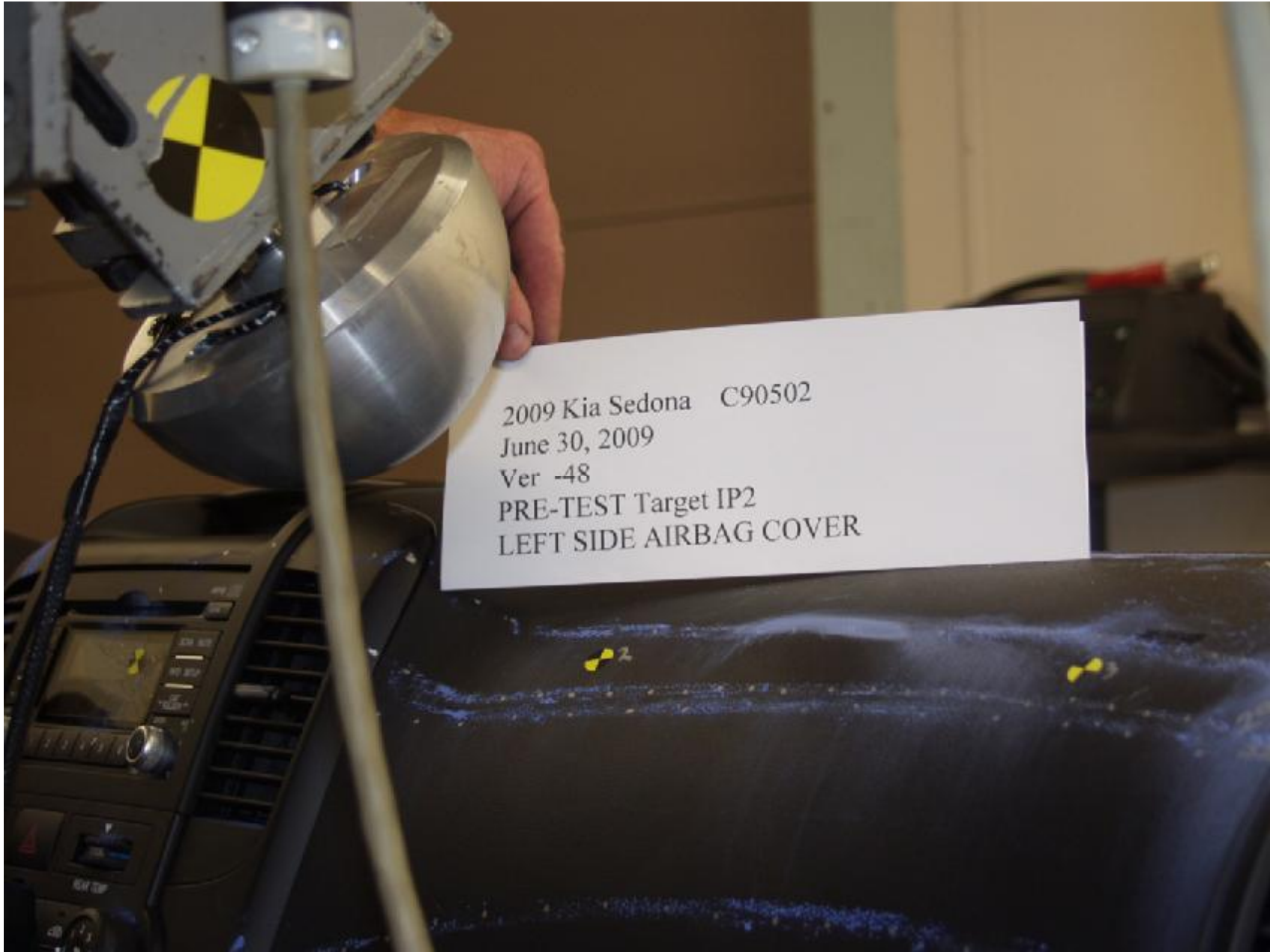


Figure A-17 : INSTRUMENT PANEL IMPACT #2 PRE-TEST

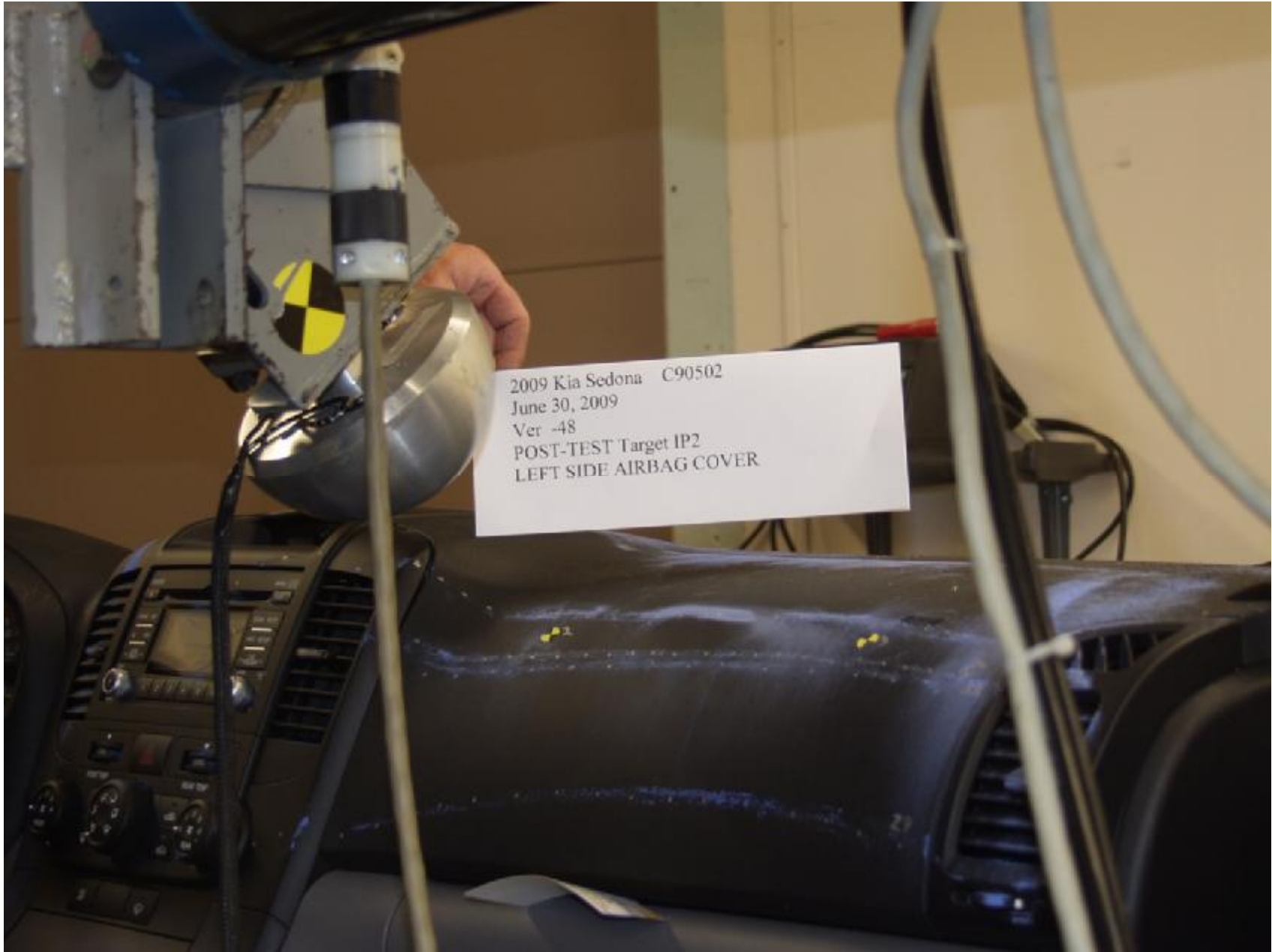


Figure A-18 : INSTRUMENT PANEL IMPACT #2 POST-TEST



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



Figure A-20 : INSTRUMENT PANEL IMPACT #3 POST-TEST



Figure A-21 : HEAD RESTRAINT



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



Figure A-23 : HEAD RESTRAINT IMPACT AREA POST-TEST

APPENDIX B

INTERIOR COMPARTMENT DOOR CALCULATIONS

Data not provided

APPENDIX C

DATA PLOTS

FMVSS 201 Linear Impact - 2009 Kia Sedona - IP1

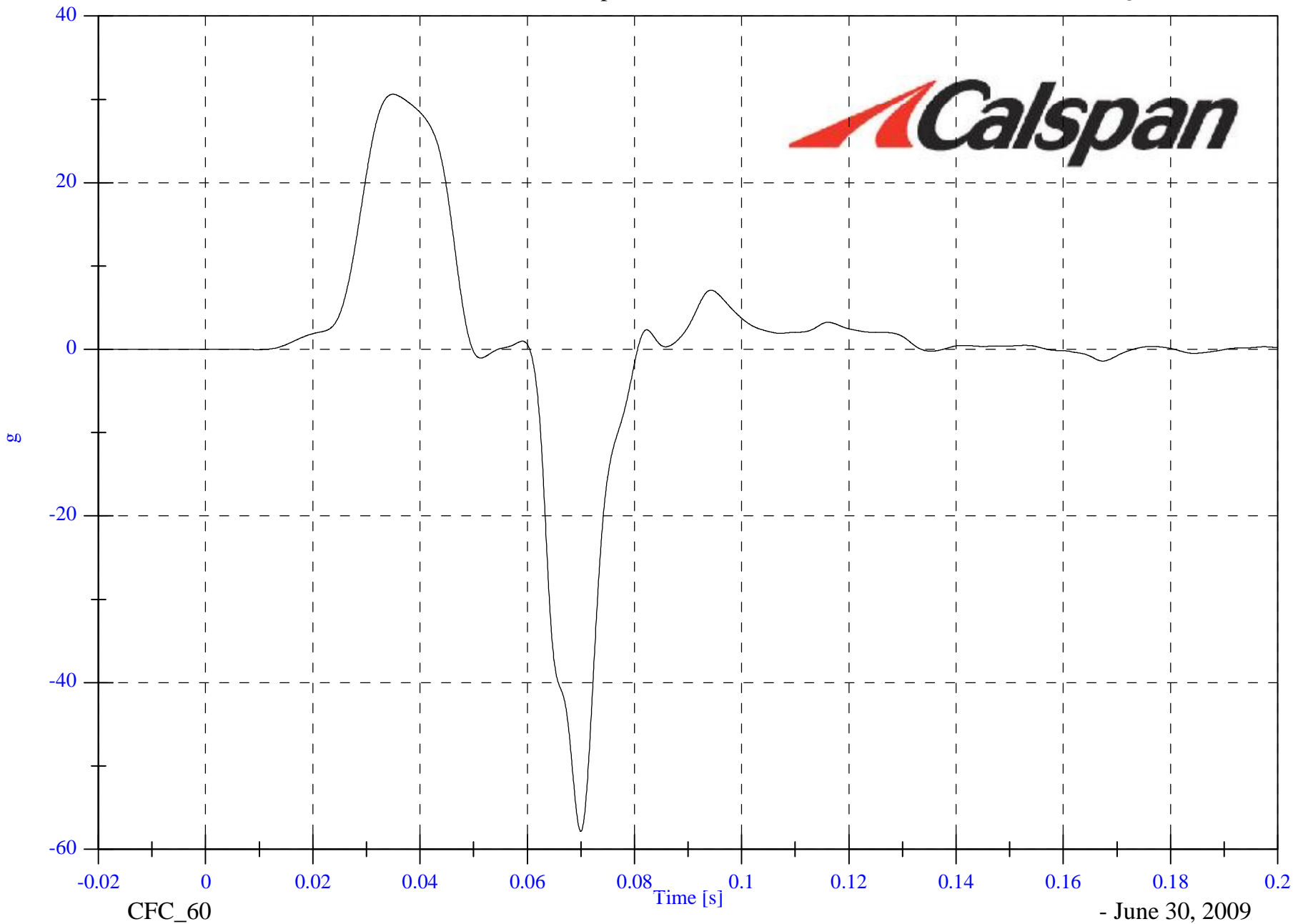
Impactor Headform Ax

Max: 30.6 [g] at 0.035 [s]

Min: -57.8 [g] at 0.070 [s]



C90502 IP1 IMPACT PLOT #1



- June 30, 2009

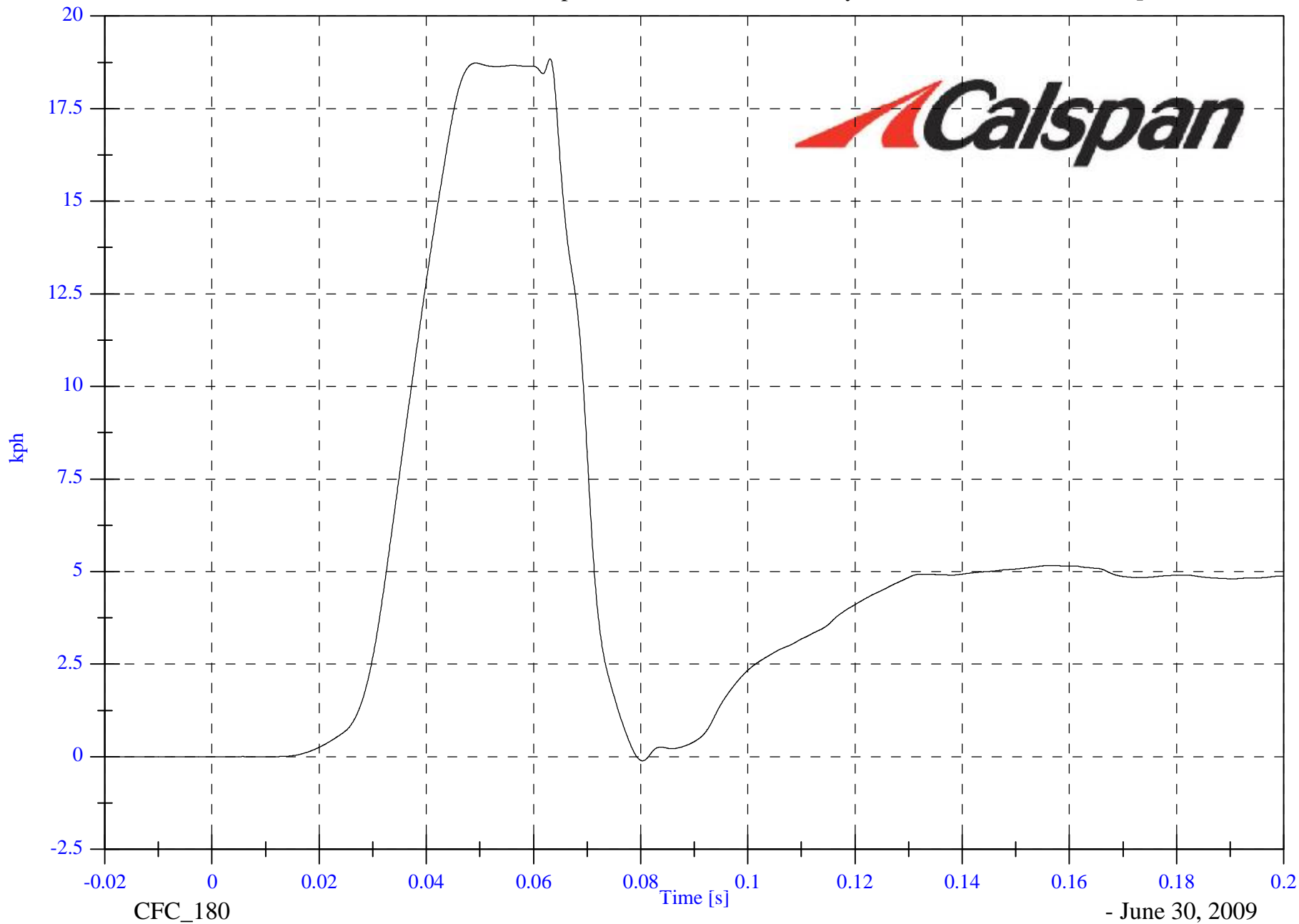
FMVSS 201 Linear Impact - 2009 Kia Sedona - IP1

Impactor Headform Ax Velocity

Max: 18.8 [kph] at 0.063 [s]

Min: -0.1 [kph] at 0.080 [s]

C90502 IP1 IMPACT PLOT #2



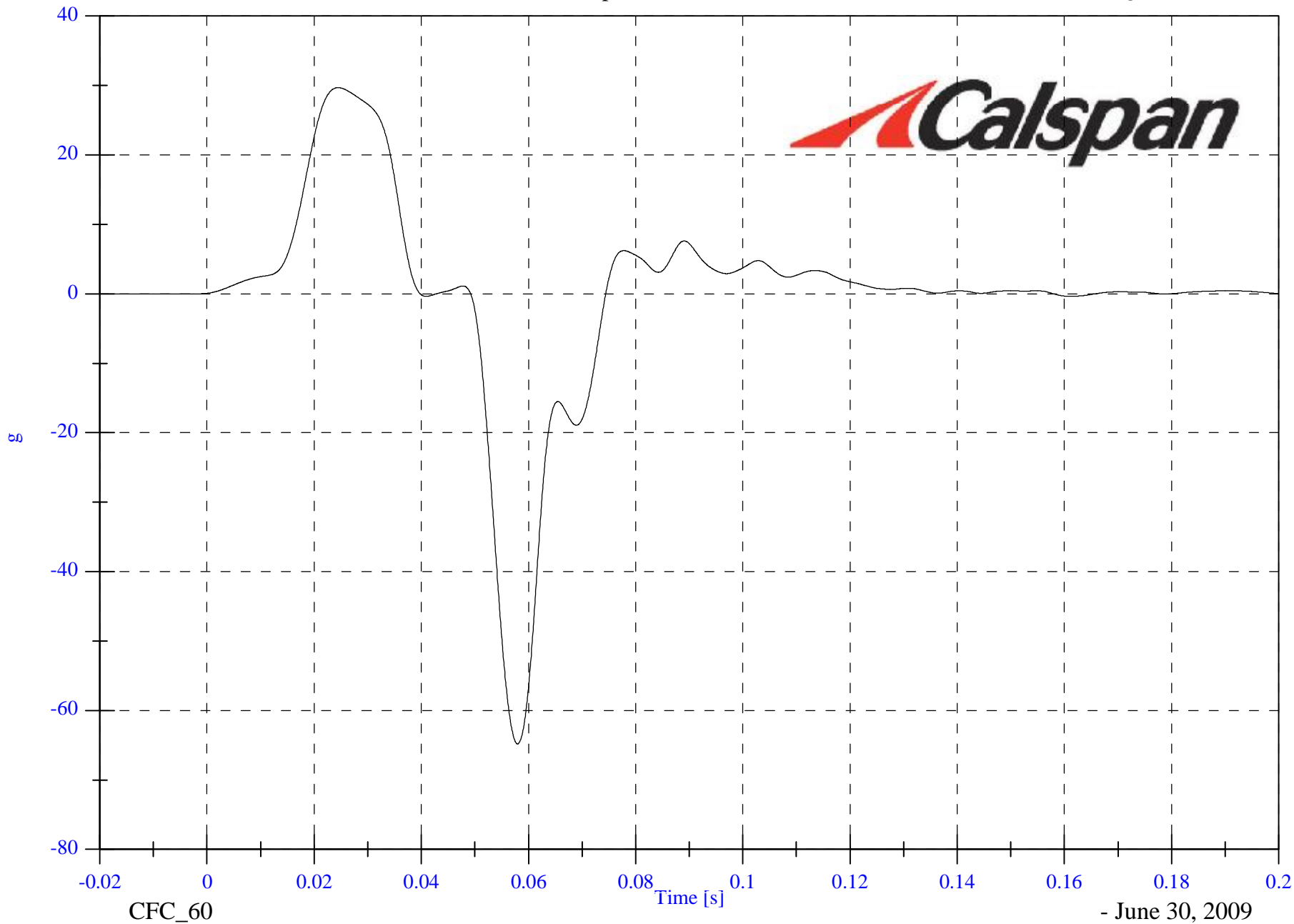
FMVSS 201 Linear Impact - 2009 Kia Sedona - IP2

Impactor Headform Ax

Max: 29.7 [g] at 0.024 [s]

Min: -64.8 [g] at 0.058 [s]

C90502 IP2 IMPACT PLOT #1



- June 30, 2009

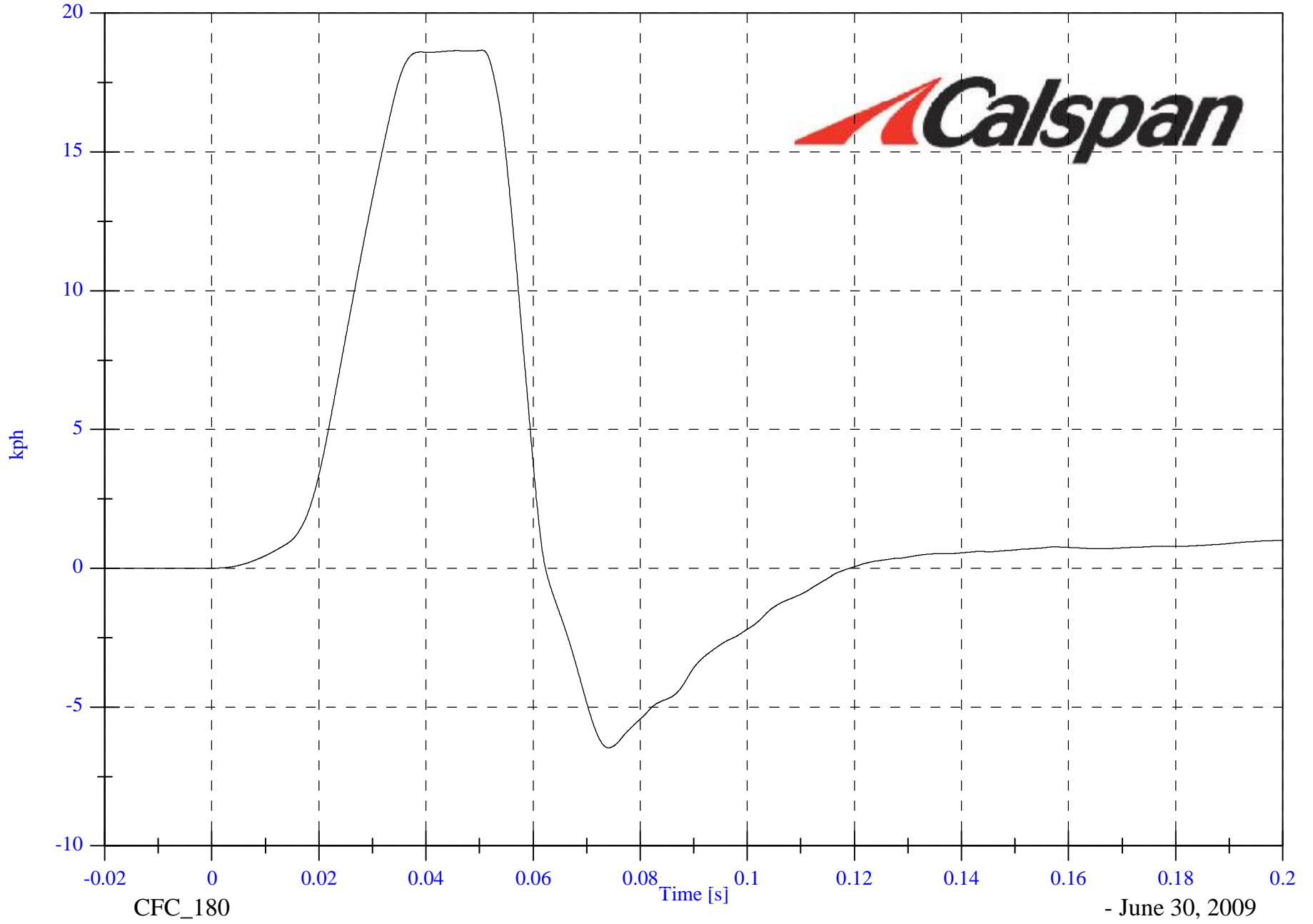
FMVSS 201 Linear Impact - 2009 Kia Sedona - IP2

Impactor Headform Ax Velocity

Max: 18.7 [kph] at 0.050 [s]

Min: -6.5 [kph] at 0.074 [s]

C90502 IP2 IMPACT PLOT #2



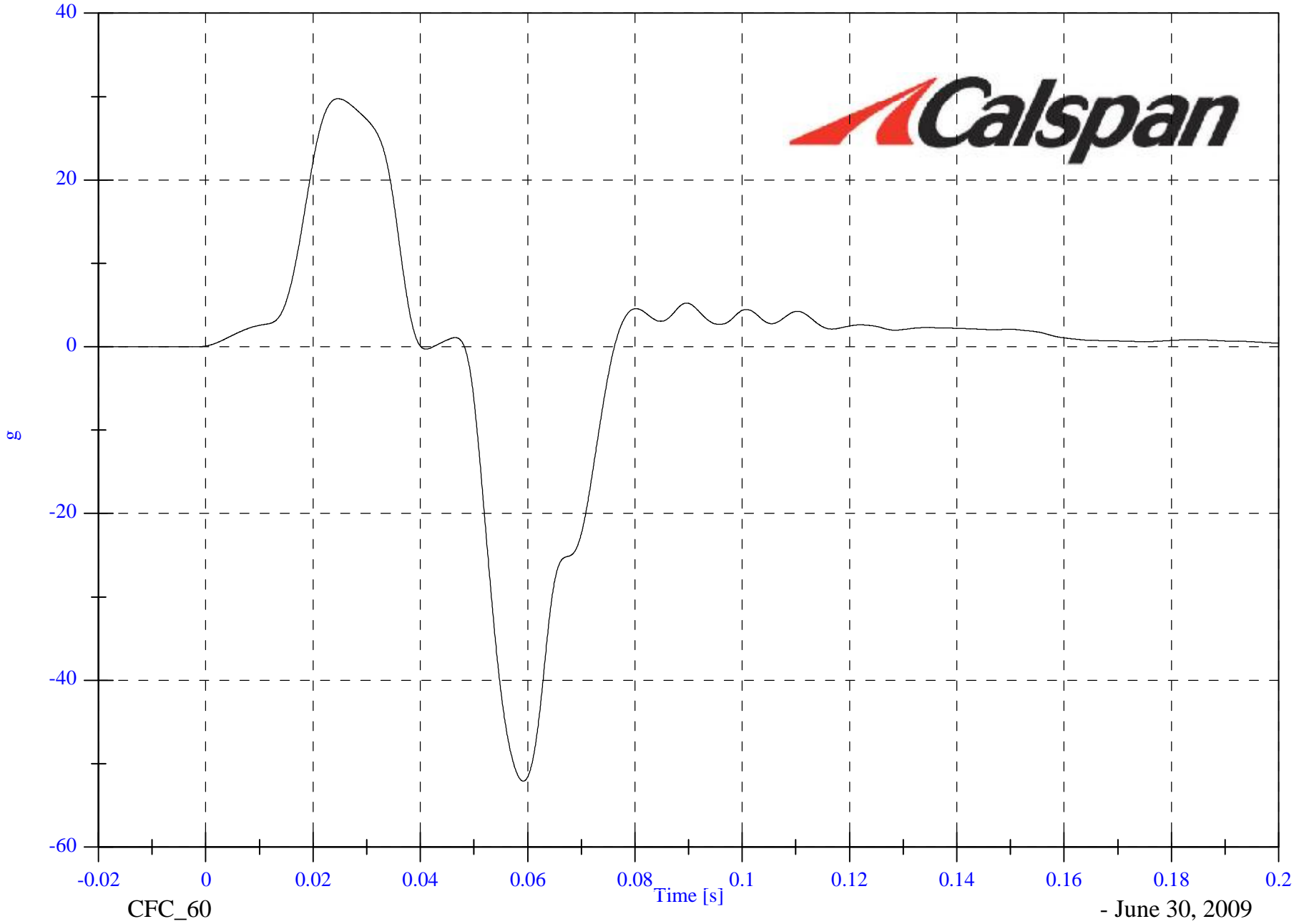
FMVSS 201 Linear Impact - 2009 Kia Sedona - IP3

Impactor Headform Ax

Max: 29.8 [g] at 0.025 [s]

Min: -52.1 [g] at 0.059 [s]

C90502 IP3 IMPACT PLOT #1



- June 30, 2009

FMVSS 201 Linear Impact - 2009 Kia Sedona - IP3

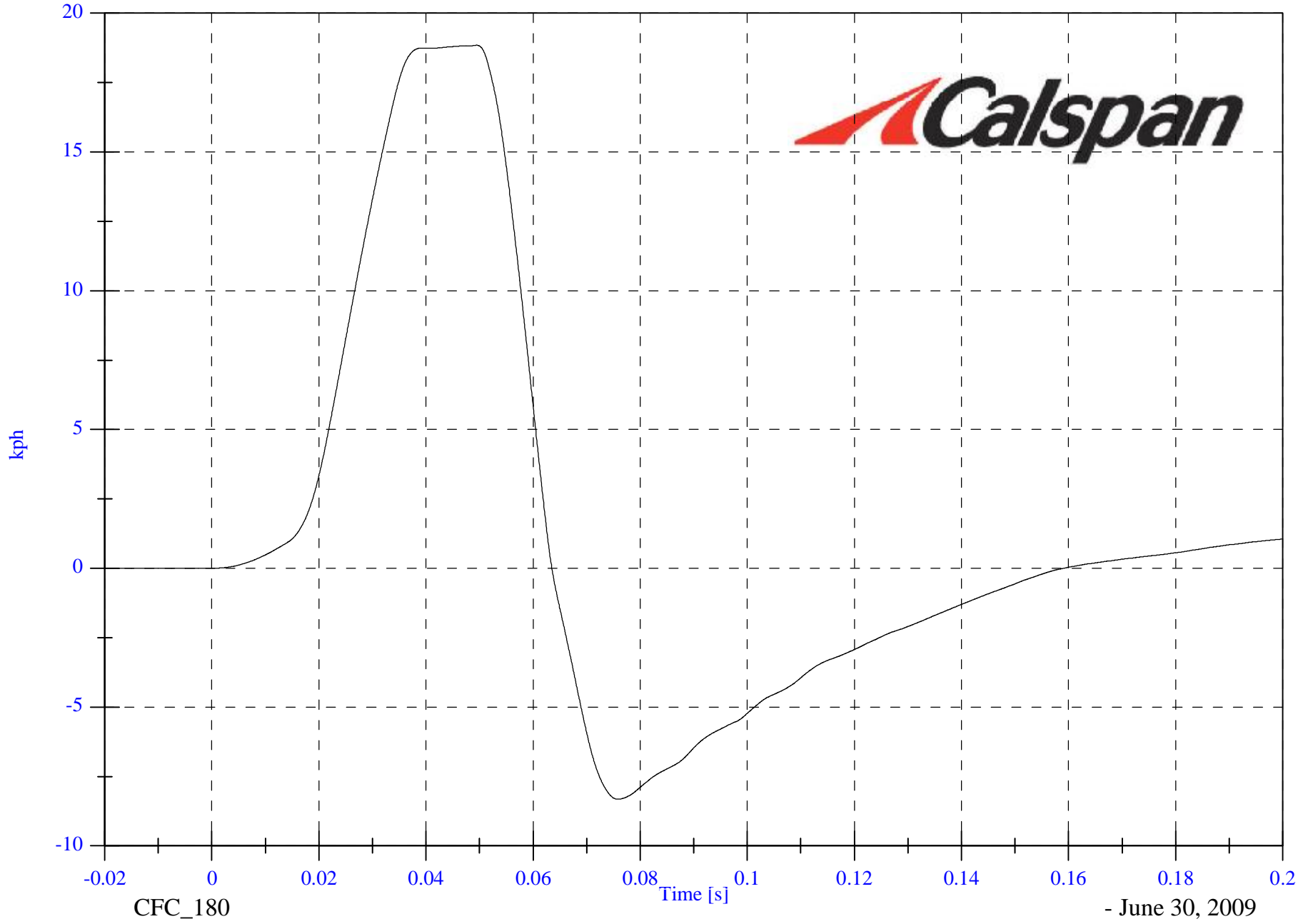
Impactor Headform Ax Velocity

Max: 18.8 [kph] at 0.049 [s]

Min: -8.3 [kph] at 0.076 [s]



C90502 IP3 IMPACT PLOT #2



CFC_180

- June 30, 2009

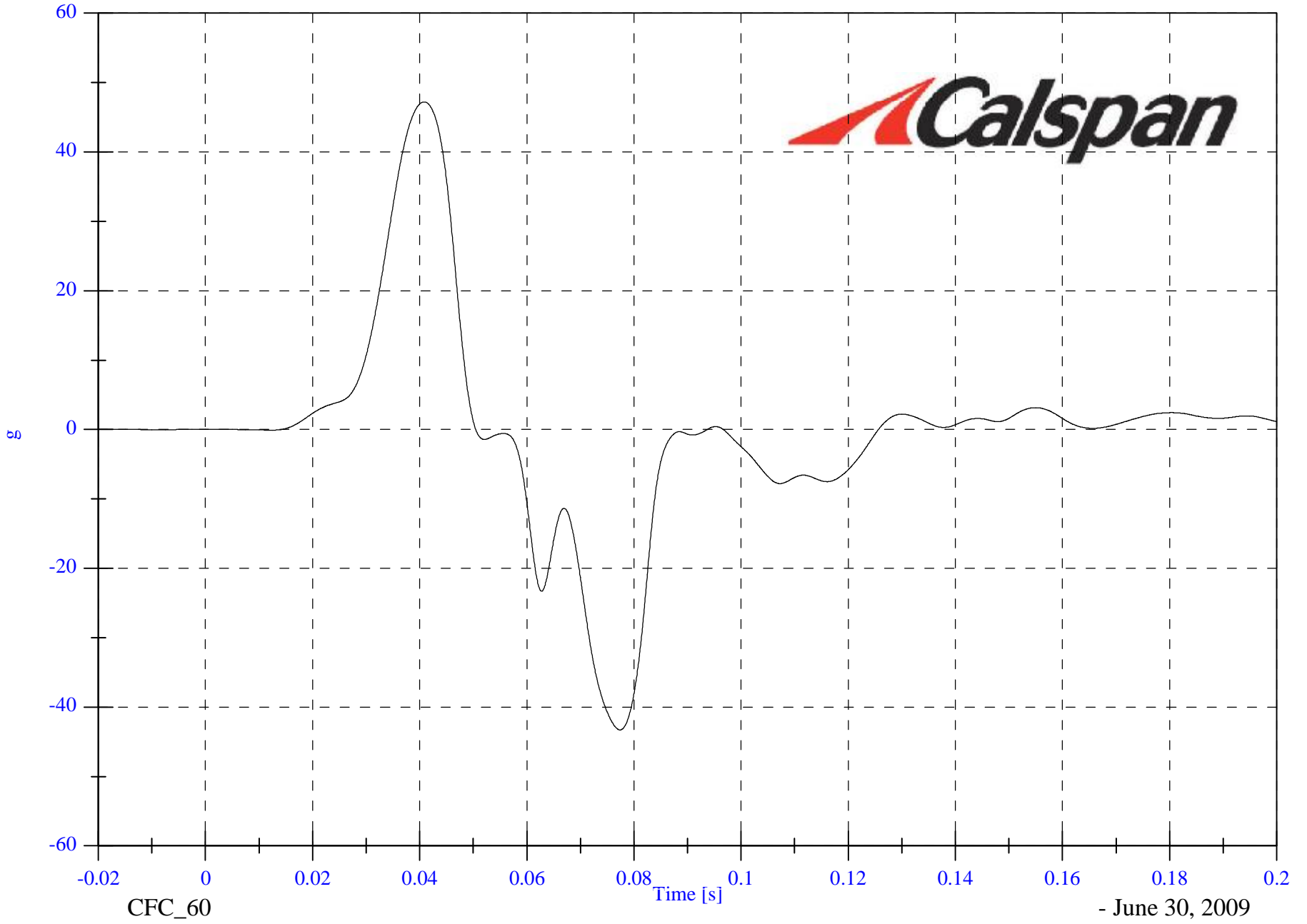
FMVSS 201 Linear Impact - 2009 Kia Sedona - SB

Impactor Headform Ax

Max: 47.2 [g] at 0.041 [s]

Min: -43.3 [g] at 0.077 [s]

C90502 SB IMPACT PLOT #1



- June 30, 2009

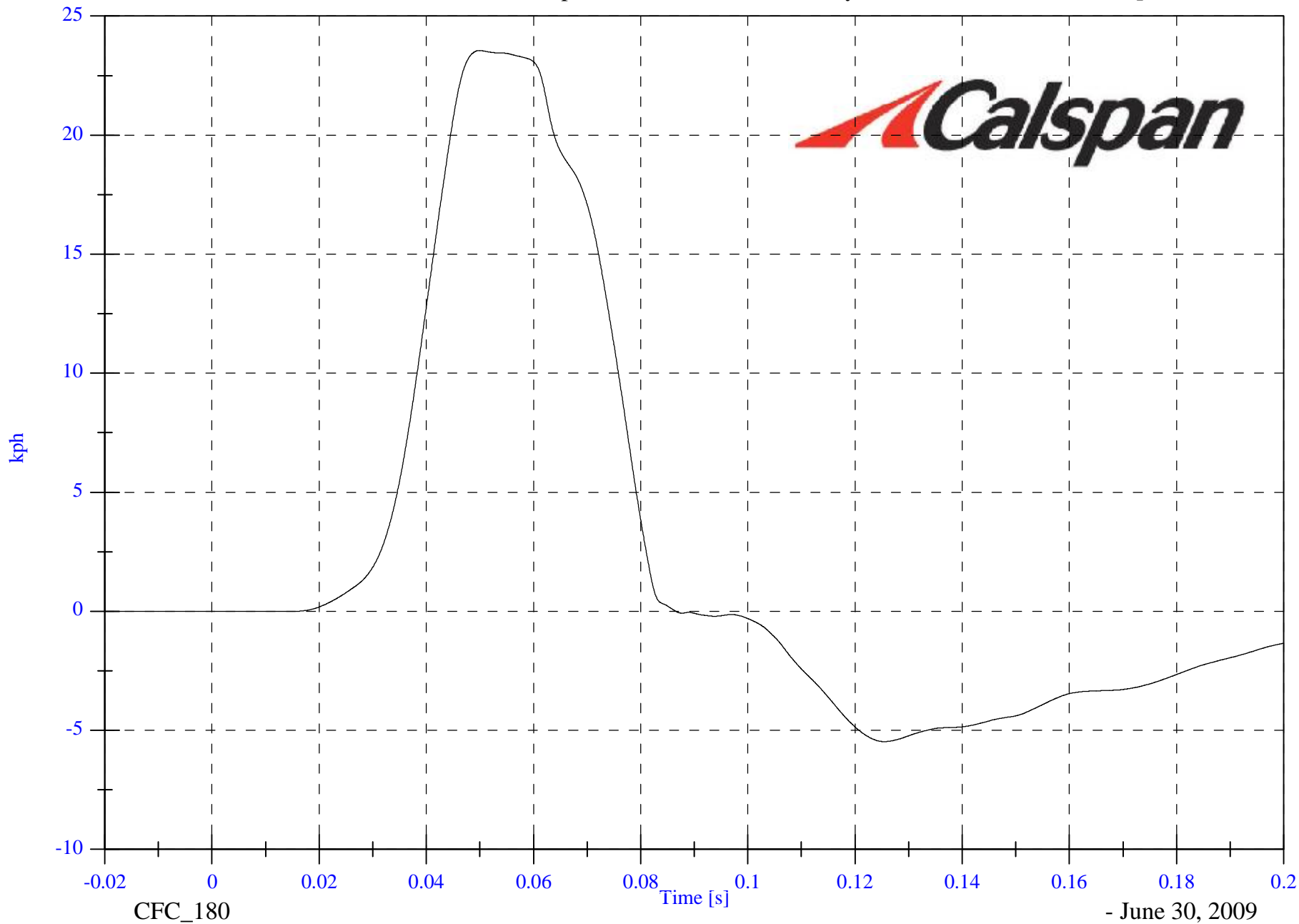
FMVSS 201 Linear Impact - 2009 Kia Sedona - SB

Max: 23.6 [kph] at 0.050 [s]

Impactor Headform Ax Velocity

Min: -5.5 [kph] at 0.125 [s]

C90502 SB IMPACT PLOT #2



- June 30, 2009