

REPORT NUMBER: CAL-03-06

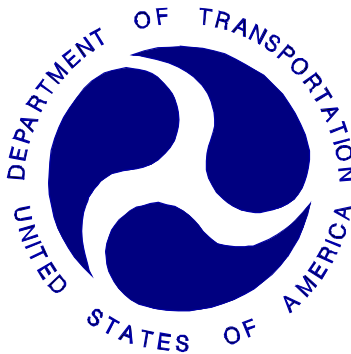
**NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST**

FUJI HEAVY IND. LTD.  
2003 SUBARU FORESTER  
WAGON

NHTSA NUMBER: M30507

VERIDIAN TEST NUMBER: 8642-NCAP-28

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



February 5, 2003

FINAL REPORT

PREPARED FOR:

U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Rulemaking  
Office of Crashworthiness Standards  
Mail Code: NVS-111  
400 Seventh Street, SW, Room No. 5313  
Washington, DC 20590

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FINAL REPORT ACCEPTANCE BY OCS:

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Manager, New Car Assessment Program (NCAP)  
NHTSA, Office of Crashworthiness Standards

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Date of Report Acceptance

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COTR, New Car Assessment Program (NCAP)  
NHTSA, Office of Crashworthiness Standards

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Date of Report Acceptance

**TECHNICAL REPORT STANDARD TITLE PAGE**

1. <i>Report No.</i> CAL-03-06		2. <i>Government Accession No.</i>		3. <i>Recipient's Catalog No.</i>	
4. <i>Title and Subtitle</i> Final Report of NEW CAR ASSESSMENT PROGRAM (NCAP) Testing of a 2003 Subaru Forester Wagon NHTSA No. M30507				5. <i>Report Date</i> February 5, 2003	
				6. <i>Performing Organization Code</i> CAL	
7. <i>Author(s)</i> David J. Travale, Program Manager Lawrence Q. Valvo, Project Engineer				8. <i>Performing Organization Report No.</i> 8642-NCAP-28	
9. <i>Performing Organization Name and Address</i> Veridian Engineering 4455 Genesee Street Buffalo, New York 14225				10. <i>Work Unit No.</i>	
				11. <i>Contract or Grant No.</i> DTNH22-01-D-32005	
12. <i>Sponsoring Agency Name and Address</i> U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh, SW, Room 5313 Washington, D.C. 20590				13. <i>Type of Report and Period Covered</i> Final Report February 2003	
				14. <i>Sponsoring Agency Code</i> NVS-111	
15. <i>Supplementary Notes</i>					
16. <i>Abstract</i>  A frontal load cell barrier test of a 2003 Subaru Forester Wagon was performed at Veridian Engineering crash test facility in Buffalo, New York, on February 5, 2003. The impact velocity was 56.97 kph and the temperature at the barrier face was 21.1°C. The maximum post-test vehicle crush was 478 mm. The test vehicle was equipped with pretensioning / load limiting 3-point restraint systems, knee bolsters, and airbags at both the driver and right outboard passenger seating positions. With respect to FMVSS 208 "Occupant Crash Protection - Injury Criteria" both the driver and passenger appeared to comply with head, chest, and femur requirements.					
<b>ATD Position</b>	<b>HIC</b>	<b>Clip (g's)</b>	<b>Chest Disp (mm)</b>	<b>Left Femur (N)</b>	<b>Right Femur (N)</b>
<b>Driver (061)</b>	442.6	43.6	32.6	1623.7	1476.3
<b>Passenger (064)</b>	349.9	41.0	26.0	5164.3	2599.0
17. <i>Key Words</i> 56 kph Frontal Barrier Impact test New Car Assessment Program (NCAP)				18. <i>Distribution Statement</i> <u>Copies of this report are available from:</u> NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5108 Washington, DC 20590	
19. <i>Security Classif. (of this report)</i> UNCLASSIFIED		20. <i>Security Classif. (of this page)</i> UNCLASSIFIED		21. <i>No. of Pages</i> 292	22. <i>Price</i>

**Form DOT F1700.7 (8-69)**

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## SECTION 1

### PURPOSE AND SUMMARY OF TEST

#### 1.1 PURPOSE

This 56.97 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-01-D-32005. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.97 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

#### 1.2 TEST PROCEDURE

This 56.97 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated December 1999. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301 "Fuel System Integrity" performance. Procedures for receiving, inspection testing and reporting of test results are described in the test procedures and are not repeated in this report.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with nine accelerometer array head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap belts to measure dummy pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No.064) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The vehicle, occupant, camera and measurement data are presented in Section 2. Appendix A contains the still photograph prints. The 139 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Appendix C contains the dummy calibration data and Appendix D contains the transducer calibration dates.

### 1.3 SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 36 load cells was impacted by a 2003 Subaru Forester Wagon at a velocity of 56.97 kph. The test was performed at Veridian Engineering on February 5, 2003. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The occupant data is summarized below.

	<b>HIC</b>	<b>Clip (g)</b>	<b>Chest Disp. (mm)</b>	<b>Left Femur (N)</b>	<b>Right Femur (N)</b>	<b>Belt Spool (mm)</b>	<b>Belt Stretch (mm/50 mm)</b>
<b>Driver ATD</b>	442.6	43.6	32.6	1623.7	1476.3	-	-
<b>Passenger ATD</b>	349.9	41.0	26.0	5164.3	2599.0	-	-

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum vehicle static crush was 478 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: Face to upper center of airbag, back of head to head restraint, chest to airbag, left knee to knee bolster left of steering column, right knee to knee bolster right of steering column.. The passenger's visible contact points were as follows: Face to center of airbag, back of head to head restraint, chest to airbag, left knee to left third of glove compartment door, right knee to right third of glove compartment door.

The 2003 Subaru Forester Wagon did not exceed the requirements of FMVSS 208, FMVSS 212, FMVSS 219, and FMVSS 301. Data pertaining to these standards are presented in the data sheets.

**SECTION 2**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

**DATA SHEET NO. 1 CRASH TEST SUMMARY**

Vehicle NHTSA No.:           M30507           Test Mode:           56.3 kph Frontal Barrier          

Test Date:           February 5, 2003           Time:           14:19           Temperature:           21.1           °C

Vehicle Make/Model/Body Style:           2003 Subaru Forester Wagon          

Vehicle Test Weight:           1640.0           kg

Vehicle/Barrier Impact Angle:           0           °

Impact Velocity:           56.97           kph

Maximum Static Crush:           478           mm

Vehicle Rebound:           418           mm

<u>DUMMIES:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Type:	<u>          572E          </u>	<u>          572E          </u>
Restraint System:	<u>          Seatbelt (pretensioning / load limiting), Airbag, Knee Bolster          </u>	<u>          Seatbelt (pretensioning / load limiting), Airbag, Knee Bolster          </u>

Number of Data Channels:           139          

Number of Cameras:           1           Real Time

          16           High Speed

DOOR OPENING DATA:           Door remained closed and latched, door opened without tools           - Left Front  
          Door remained closed and latched, door opened without tools           - Right Front

Front Seat(s) Data:	<u>DRIVER</u>	<u>PASSENGER</u>
Seat Track Failure: (mm of shift)	<u>          0          </u>	<u>          0          </u>
Seat Back Failure:	<u>          None          </u>	<u>          None          </u>

<u>VISIBLE DUMMY CONTACT POINTS:</u>	<u>DRIVER</u>	<u>PASSENGER</u>
Head:	<u>          Face to upper center of airbag; Back of head to head restraint          </u>	<u>          Face to center of airbag; Back of head to head restraint          </u>
Abdomen:	<u>          None          </u>	<u>          None          </u>
Chest:	<u>          Airbag          </u>	<u>          Airbag          </u>
Knees:	<u>          Left knee to knee bolster left of steering column. Right knee to knee bolster right of steering column.          </u>	<u>          Left knee to left third of glove compartment door. Right knee to right third of glove compartment door.          </u>

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2003 Subaru Forester Wagon

NHTSA No. : M30507 ; VIN: JF1SG63683G747127 ; Color: Silver

Engine Data: 4 cylinders; - CID; 2.5 Liters; - cc

Placement: X Longitudinal or In-Line; - Transverse or Lateral

Transmission Data: 5 speeds; X Manual; - Automatic; - Overdrive

Final Drive: - Rear Wheel Drive; - Front Wheel Drive; X Four Wheel Drive

Safety Belt Features – Driver X Pretensioner (Shoulder); X Load Limiter; X Adj. Anchorage

Safety Belt Features - Passenger X Pretensioner (Shoulder); X Load Limiter; X Adj. Anchorage

Major Options: X A/C; X Pwr.Strg.; X Pwr. Brakes

X Pwr. Windows; X Pwr. Door Locks; X Tilt Wheel

Date Received: 1/28/2003 ; Odometer Reading 19 km

Selling Dealer: Northtown Hyundai-Subaru

& Address: 3675 Sheridan Drive, Amherst, NY 14226

DATA FROM TIRE VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Fuji Heavy Ind. Ltd.

Date of Manufacture 10/02

GVWR: 1880 kg; GAWR: 930 kg FRONT; 1000 kg REAR

DATA FROM TIRE PLACARD:

Recommended Tire Size: P215/60 R16

\* Recommended Cold Tire Pressure: 200 kpa FRONT; 190 kpa REAR

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P215/60 R16 94H ; Manufacturer: Yokohama

Tire Pressure with Maximum Capacity Vehicle Load: Front: 300 kPa; Rear: 300 kPa

Treadwear: 320 ; Traction: B ; Temperature: A

VEHICLE CAPACITY DATA:

Type of Front Seats: - Bench; X Bucket; - Split Bench

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 410 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 69.8 kg

\*Tire pressure used for test

DATA SHEET NO. 2 GENERAL TEST AND VEHICLE PARAMETER DATA ( cont. )

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front =	<u>386.0</u>	kg	Right Rear =	<u>318.5</u>	kg
Left Front =	<u>404.5</u>	kg	Left Rear =	<u>316.5</u>	kg
TOTAL FRONT =	<u>790.5</u>	kg	TOTAL REAR =	<u>635.0</u>	kg
TOTAL DELIVERED WEIGHT =	<u>1425.5</u>	kg			
% of Total Front of Vehicle Weight =	<u>55.5%</u>		% of Total Rear Weight =	<u>44.5%</u>	%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	<u>1425.5</u>	kg
Rated Cargo/Luggage Weight (RCLW) =	<u>4.8</u>	kg
Weight of 2 p.572 Dummies @ 76 each =	<u>152</u>	kg
TARGET TEST WEIGHT =	<u>1582.3</u>	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND

62.5

KG OF CARGO WEIGHT:

Right Front =	<u>429.0</u>	kg	Right Rear =	<u>388.5</u>	kg
Left Front =	<u>438.5</u>	kg	Left Rear =	<u>384.0</u>	kg
TOTAL FRONT =	<u>867.5</u>	kg	TOTAL REAR =	<u>772.5</u>	kg
TOTAL TEST WEIGHT =	<u>1640.0</u>	kg			
% of Total Front Weight =	<u>52.9%</u>	%	% of Total Rear Weight =	<u>47.1%</u>	%
Weight of Ballast Secured in Vehicle Trunk Area =	<u>0</u>	kg			
Vehicle Components Removed for Weight Reduction:	<u>Cargo compartment trim, tail lights, muffler</u>				

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	<u>766</u>	LF	<u>762</u>	RR	<u>773</u>	LR	<u>765</u>
FULLY LOADED:	RF	<u>758</u>	LF	<u>751</u>	RR	<u>647</u>	LR	<u>740</u>
AS TESTED:	RF	<u>758</u>	LF	<u>752</u>	RR	<u>647</u>	LR	<u>745</u>
Vehicle's Wheel Base:	<u>2525</u> mm							
Location of Vehicle's C.G.:	<u>1189</u> mm rearward of front wheel center.							

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual =	<u>60</u>	liters		
Usable Capacity Figure Furnished by COTR =	<u>60</u>	liters		
Test Volume Range (92 to 94% of Usable Capacity) =	<u>55.2</u>	to	<u>56.4</u>	liters
ACTUAL TEST VOLUME=	<u>27.3H</u>	liters (with entire fuel system filled)		
Test Fluid Type:	<u>Stoddard Solution</u>	; Spec. Grav. =	<u>0.764</u>	
Kinematic Viscosity =	<u>0.96</u>	centistokes;	Color = <u>Orange</u>	
Type of Fuel Pump: Electric-	<u>X</u>	; Mechanical-	<u>-</u>	
Does Electric Pump operate with ignition switch "ON" & engine "OFF"	Yes- <u>X</u>	No- <u>-</u>		
<u>Details of Fuel System: Fuel Tank – Located on the vehicle underbody between the rear wheels; Fuel Lines -</u>				
<u>Routed along the vehicle interior inboard of the left sill; Fuel Filler – Located on the right rear</u>				
<u>quarter panel rear of the rear wheel.</u>				

H Stoddard volume was reduced to achieve target test weight and was approved by the COTR.

DATA SHEET NO. 3 POST IMPACT DATA

TYPE OF TEST:

Type of Test: Frontal Barrier Impact Angle: 0°  
Test Date: February 5, 2003 Time: 14:19 Temperature: 21.1 °C  
Vehicle NHTSA No.: M30507  
Required Impact Velocity Range: 55.5 to 57.1 kph

BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 56.97 kph; Trap No. 2 = 56.97 kph  
Distance from vehicle to barrier: (1) entering trap = 813 mm  
(2) exiting trap = 305 mm

VEHICLE STATIC CRUSH: (mm) (For frontal and rear impacts only.)

Vehicle Length:

Pre-Test	Left = <u>4434</u> ; C/L = <u>4461</u> ; Right = <u>4445</u>
Post-Test	Left = <u>3992</u> ; C/L = <u>3984</u> ; Right = <u>4010</u>
Crush	Left = <u>442</u> ; C/L = <u>477</u> ; Right = <u>435</u>
AVERAGE	= <u>451</u> mm

VEHICLE REBOUND: (From rigid barrier only.)

Distance from front of test vehicle to impact point:

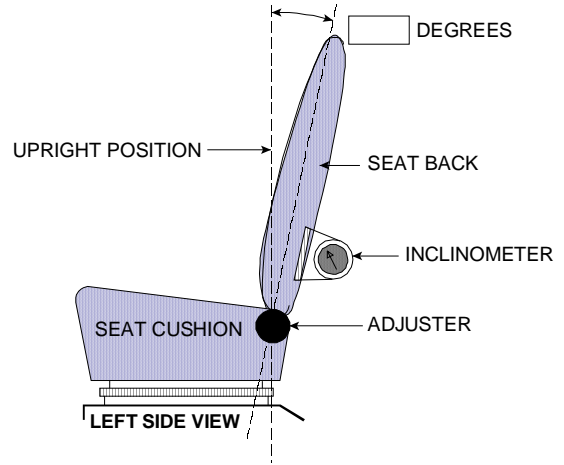
	Left = <u>438</u> ; C/L = <u>429</u> ; Right = <u>387</u>
AVERAGE	= <u>418</u> mm

DATA SHEET NO. 4 TEST VEHICLE INFORMATION

VEHICLE IDENTIFICATION:

Model Year : 2003 Vehicle Model: Subaru Forester Body Style : Wagon

1. Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.



**FRONT SEAT ASSEMBLY**

Seat back angle for driver's seat: 25 degrees

Measurement instructions: Where the most upright locking position is defined as 0, recline the seat back to detent 7 (8<sup>th</sup> locking position as defined by Subaru)

Seat back angle for passenger's seat: 25 degrees

Measurement instructions: Where the most upright locking position is defined as 0, recline the seat back to detent 7 (8<sup>th</sup> locking position as defined by Subaru)

2. Seat Fore and Aft Positioning

Positioning of the driver's seat: Where the forward-most position is defined as detent 0 and the rear-most position is detent 16, position the seat in detent 8 (9<sup>th</sup> latch position as defined by Subaru)

Positioning of the passenger's seat: Where the forward-most position is defined as detent 0 and the rear-most position is detent 16, position the seat in detent 8 (9<sup>th</sup> latch position as defined by Subaru)

3. Fuel Tank Capacity Data

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 60 liters

B. "Usable Capacity" of the optional equipment fuel tank is - liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 60 liters

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 27.3 liters

3.3 Is vehicle equipped with electric fuel pump? Yes- X ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

The fuel pump operates briefly when the ignition it turned on and the engine is not started. The fuel pump operates continuously while the engine is running.

DATA SHEET NO. 4 TEST VEHICLE INFORMATION (cont.)

4. STEERING COLUMN ADJUSTMENTS:

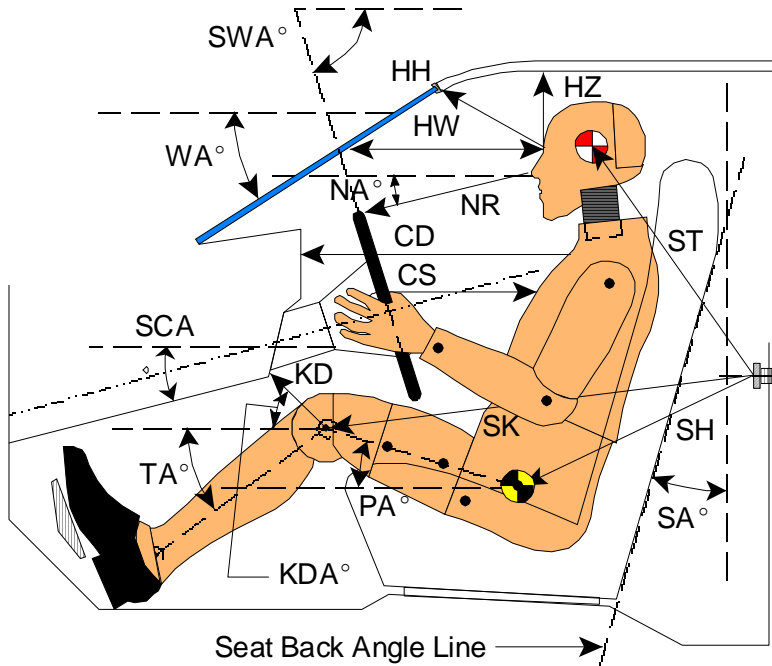
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: Using the dimension between the bottom of the instrument panel and the steering column cover separation line, place the column in mid-position.

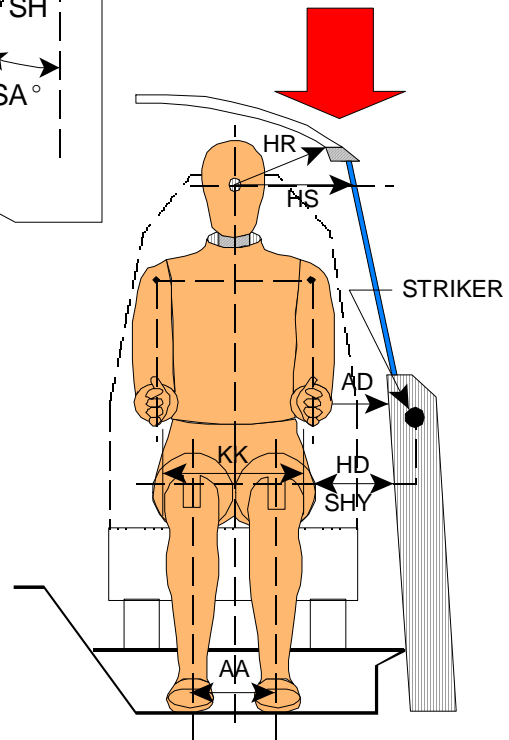
5. SEAT BELT UPPER ANCHORAGE

Nominal design riding position: Where the top position is defined as detent 0, place the anchorage in detent 1 (2<sup>nd</sup> locking position as defined by Subaru)

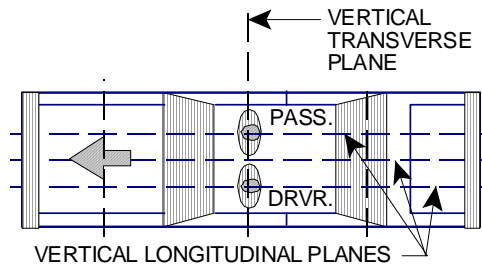
DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE  
**DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS**



- AD - Arm to Door
- HD - H-Point to Door
- HR - Head to Side Header
- HS - Head to Side Window
- KK - Knee to Knee
- AA - Ankle to Ankle
- SHY- Striker to H-Point (Y Direction)



- CD - Chest to Dash
- CS - Steering Wheel to Chest
- HH - Head to Header
- HW - Head to Windshield
- HZ - Head to Roof
- KDA - Knee to Dash Angle
- KDL- Left Knee to Dash
- KDR - Right Knee to Dash
- NA - Nose to Rim Angle
- NR - Nose to Rim
- PA - Pelvic Angle
- RA - Rim to Abdomen
- SA - Seat Back Angle
- SCA - Steering Column Angle
- SH - Striker to H-Point
- SK - Striker to Knee
- ST - Striker to Head
- SWA- Steering Wheel Angle
- TA - Tibial Angle
- WA - Windshield Angle

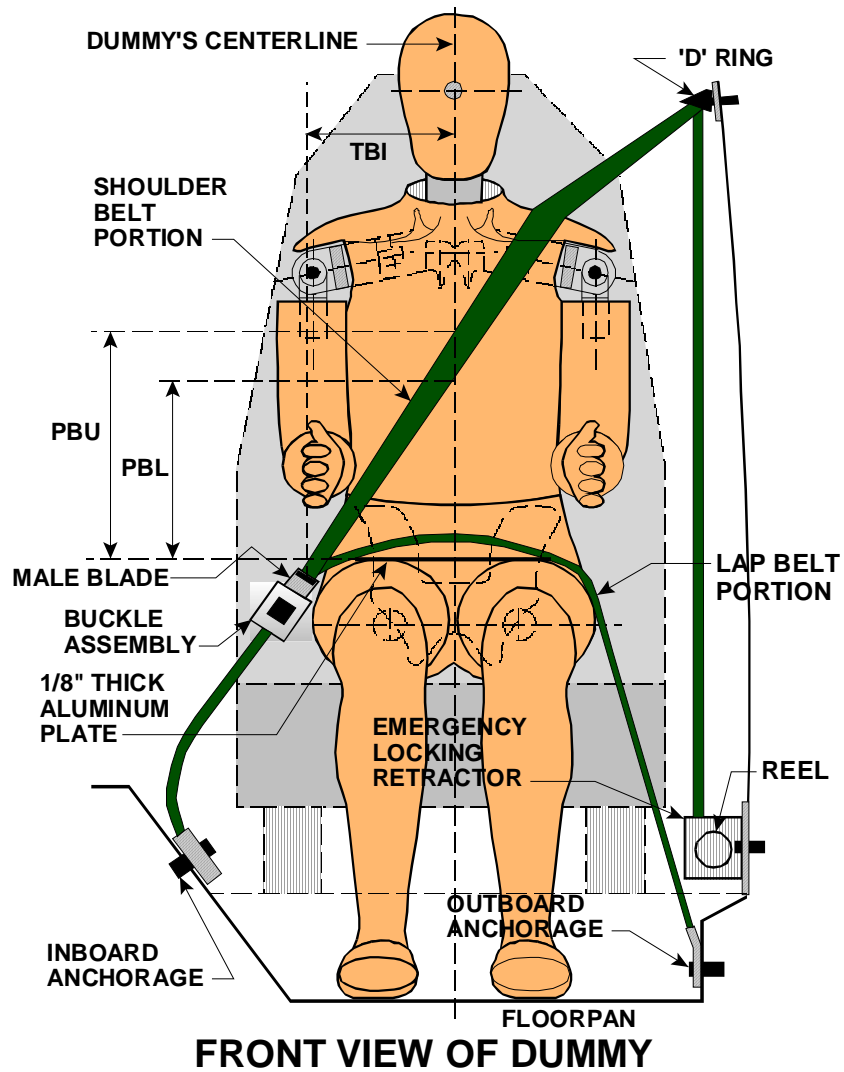


DATA SHEET NO. 5 FRONT SEAT DUMMY POSITIONING MEASUREMENTS IN VEHICLE (cont.)

	DRIVER (Serial #061)			PASS. (Serial #064)		
WA <sup>o</sup>	35 deg.			N/A		
SWA <sup>o</sup>	66 deg.			N/A		
SCA <sup>o</sup>	24 deg.			N/A		
SA <sup>o</sup>	25 deg.			25 deg.		
HZ	221			211		
HH	431			421		
HW	680			618		
HR	219			217		
NR	439	Angle	12 deg.	N/A		
CD	547			544		
CS	335			N/A		
RA	218			N/A		
KDL	175	Angle (KDA)	36 deg.	171		
KDR	177			170	Angle (KDA)	33 deg.
PA <sup>o</sup>	23.2 deg.			24.4 deg.		
TA <sup>o</sup>	35 deg.			44 deg.		
KK	390			335		
AA	300			227		
ST	578	Angle	359 deg.	560	Angle	0 deg.
SK	521	Angle	90 deg.	527	Angle	87 deg.
SH	160	Angle	119 deg.	154	Angle	120 deg.
SHY	212			210		
HS	335			334		
HD	133			128		
AD	79			81		

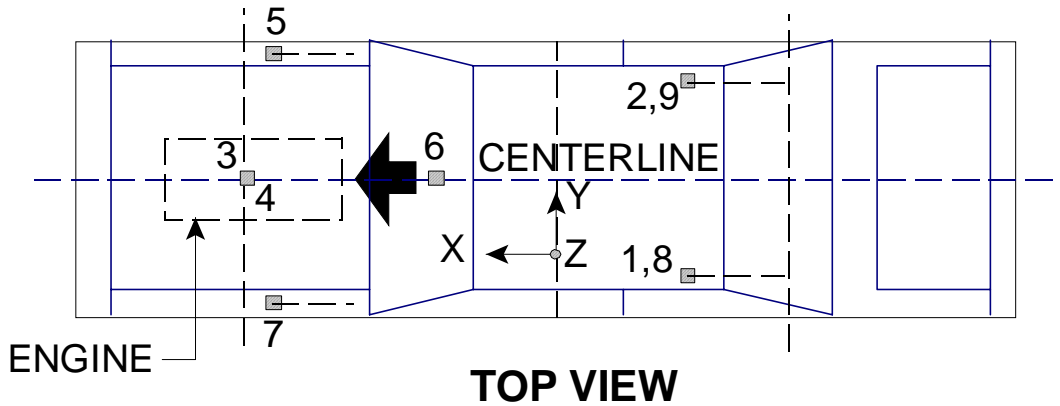
Dimensions in millimeters

**SEAT BELT POSITIONING DATA**

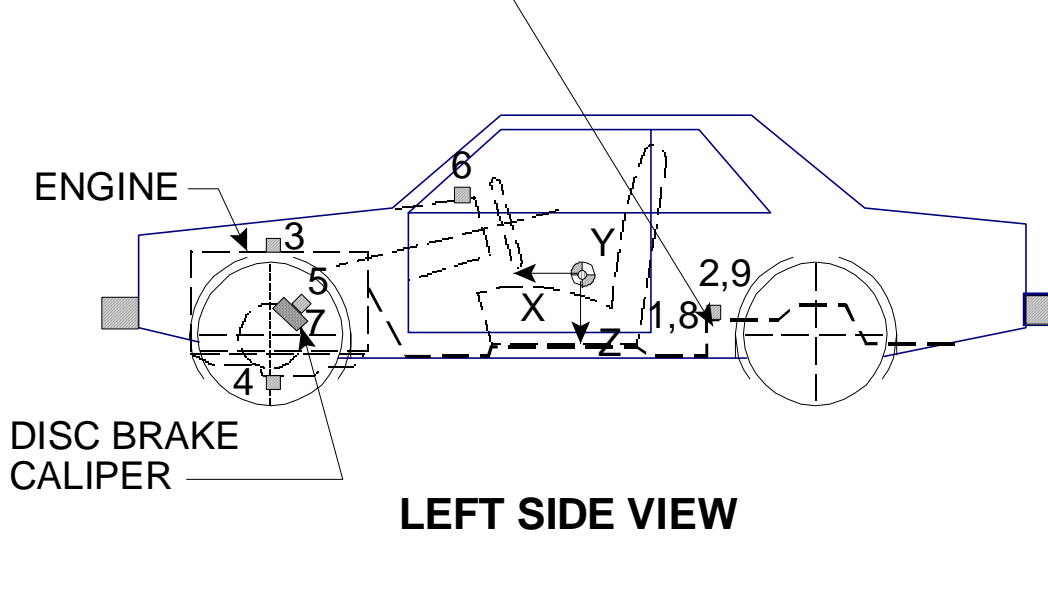


	DRIVER DUMMY (mm)	PASSENGER DUMMY (mm)
PBU -- Top surface of alum. plate to upper edge	334	335
PBL-- Top surface of alum. plate to belt lower edge	251	250
LAP BELT TENSION	10 N	10 N
SHOULDER BELT TENSION	Retractor	Retractor

## VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



REAR SEAT CUSHION  
ASSY. FRONT ATTACHMENT  
BRACKET SUPPORT



Note: Vehicle accelerometer location and data summary shown in DATA SHEET NO. 7

DATA SHEET NO. 7 VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY (cont.)

LOCATION		PRE-TEST LENGTH (mm)		
		X	Y	Z
1	Left Rear Seat Cross Member X	1796	-544	-460
2	Right Rear Seat Cross Member X	1777	490	-473
3	Top of Engine Block	3867	196	-813
4	Bottom of Engine	3383	-60	-212
5	Disc Brake Caliper @ Right Side	3426	800	-385
6	Instrument Panel	2795	94	-856
7	Disc Brake Caliper @Left Side	3413	-804	-389
8	Left Rear Seat Cross Member Z	1796	-544	-460
9	Right Rear Seat Cross Member Z	1777	490	-473

LOCATION NUMBER	DESCRIPTION	MAXIMUM VALUE (g's)			
		Pos.	msec.	Neg.	msec.
1	Left Rear Seat Cross Member X	1.5	97.8	-47.2	36.1
2	Right Rear Seat Cross Member X	1.1	112.1	-49.5	36.0
3	Top of Engine Block	88.7	37.6	-151.8	24.5
4	Bottom of Engine	32.5	35.6	-132.7	24.3
5	Disc Brake Caliper @ Right Side	17.6	74.2	-76.3	42.7
6	Instrument Panel	47.1	72.6	-82.2	54.1
7	Disc Brake Caliper @Left Side	H	-	H	-
8	Left Rear Seat Cross Member Z	12.8	31.8	-12.2	45.5
9	Right Rear Seat Cross Member Z	12.3	35.5	-12.1	46.0

H Wire cut at 48ms

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES

Vehicle Year/Make/Model/Body Style: 2003 Subaru Forester Wagon

NHTSA Test No.: M30507 Test Date: February 5, 2003

DESCRIPTION	Unit	MAXIMUM VALUE							
		Driver				Passenger			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head 9 Array X Arm Y	g	3.6	51.3	-16.0	70.5	6.4	49.7	-10.6	57.3
Head 9 Array X Arm Z	g	23.9	70.1	-6.7	124.9	31.3	57.2	-6.4	129.6
Head 9 Array Y Arm X	g	8.5	242.7	-52.9	71.6	3.9	242.7	-45.9	69.5
Head 9 Array Y Arm Z	g	22.9	47.2	-1.6	134.4	29.0	60.6	-3.4	100.1
Head 9 Array Z Arm X	g	12.9	244.3	-46.7	81.8	8.2	243.7	-49.8	75.6
Head 9 Array Z Arm Y	g	5.5	59.9	-22.4	92.7	6.5	65.5	-12.8	76.8
Head X	g	7.5	243.4	-47.9	71.9	4.9	244.7	-45.3	69.0
Head Y	g	4.3	51.3	-16.7	87.5	4.4	49.9	-11.9	88.0
Head Z	g	20.7	47.2	-1.0	124.8	27.7	64.3	-3.6	97.1
Head Resultant	g	51.8	71.8	-	-	50.4	68.9	-	-
Redundant Head X	g	7.7	243.4	-49.7	71.8	5.3	237.4	-45.3	71.1
Redundant Head Y	g	4.4	51.8	-16.6	87.5	4.6	42.8	-12.0	86.1
Redundant Head Z	g	20.1	46.9	-0.8	124.9	28.2	64.7	-3.0	100.5
Redundant Head Resultant	g	53.8	71.9	-	-	49.7	67.0	-	-
Upper Neck Fx	N	389.5	81.2	-425.5	116.3	286.2	79.9	-356.0	132.0
Upper Neck Fy H	N	122.6	52.2	-143.6	107.8	157.0	60.1	-158.7	108.2
Upper Neck Fz	N	1395.3	72.0	-66.9	102.1	1273.7	61.1	-157.8	100.2
Upper Neck F Resultant H	N	1439.3	69.4	-	-	1287.0	61.1	-	-
Upper Neck Mx	N-m	11.2	59.8	-17.0	102.2	25.7	67.5	-11.6	117.7
Upper Neck My	N-m	38.7	124.4	-19.4	266.5	32.6	132.7	-13.2	226.5
Upper Neck Mz	N-m	23.4	100.1	-9.8	145.3	14.5	86.7	-5.1	59.0
Upper Neck M Resultant	N-m	39.2	124.0	-	-	33.4	132.8	-	-
Chest X	g	1.5	296.7	-46.6	69.0	1.2	299.9	-42.2	63.1
Chest Y	g	5.9	60.0	-6.8	33.8	5.1	44.3	-8.8	63.9
Chest Z	g	14.3	46.1	-7.7	100.9	10.9	39.8	-9.1	99.4
Chest Resultant	g	46.8	69.0	-	-	43.5	63.5	-	-

H P2 Upper Neck Fy data is questionable after 112 ms.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

Vehicle Year/Make/Model/Body Style: 2003 Subaru Forester Wagon

NHTSA Test No.: M30507 Test Date: February 5, 2003

		MAXIMUM VALUE							
		Driver				Passenger			
DESCRIPTION	Unit	Pos	msec	Neg	msec	Pos	msec	Neg	msec
Redundant Chest X	g	1.5	296.7	-46.4	69.1	1.1	299.9	-42.6	63.3
Redundant Chest Y	g	6.6	58.5	-6.7	32.3	5.9	44.4	-8.9	63.8
Redundant Chest Z	g	14.2	46.0	-8.3	100.4	11.1	39.7	-9.1	99.4
Redundant Chest Resultant	g	46.5	69.0	-	-	43.9	63.5	-	-
Chest Displacement	mm	0.0	-6.6	-32.6	77.5	0.0	-2.9	-26.0	65.3
Pelvic X	g	5.4	98.7	-69.5	53.1	3.6	96.2	-83.4	43.9
Pelvic Y	g	10.1	78.5	-14.5	41.3	7.3	46.6	-6.6	80.8
Pelvic Z	g	1.8	282.0	-29.2	64.6	2.3	19.2	-27.6	57.9
Pelvic Resultant	g	72.6	53.0	-	-	84.2	43.9	-	-
Left Femur	N	1752.7	45.8	-1623.7	53.5	625.9	37.2	-5164.3	43.6
Right Femur	N	704.8	32.6	-1476.3	48.0	744.2	38.6	-2599.0	46.5
Left Upper Tibia Mx	N-m	19.7	130.5	-69.0	59.1	9.8	68.9	-17.7	40.7
Left Upper Tibia My	N-m	125.2	57.3	-72.9	25.8	23.2	43.7	-89.6	60.0
Left Lower Tibia Fz	N	122.1	117.3	-2865.8	23.5	110.7	298.8	-1897.8	63.5
Left Lower Tibia Mx	N-m	49.0	71.1	-8.2	42.7	26.8	65.1	-8.2	87.0
Left Lower Tibia My	N-m	42.5	78.2	-33.0	45.5	37.3	87.9	-36.7	58.3
Right Upper Tibia Mx	N-m	19.0	34.7	-19.0	73.7	14.9	46.2	-19.5	136.0
Right Upper Tibia My	N-m	15.2	52.5	-122.8	42.4	92.4	43.4	-63.2	37.1
Right Lower Tibia Fz	N	81.0	233.5	-5924.6	41.8	89.1	122.5	-1740.9	25.3
Right Lower Tibia Mx	N-m	12.2	58.6	-10.7	42.3	8.1	49.3	-27.8	83.2
Right Lower Tibia My	N-m	29.9	65.7	-55.5	45.1	53.5	98.5	-27.9	39.1
Left Foot Aft Ax	g	17.9	89.0	-60.0	60.5	25.6	96.8	-64.5	43.8
Left Foot Aft Az	g	14.5	53.2	-48.3	27.1	3.6	52.8	-44.3	41.1
Left Foot Fore Az	g	35.7	22.4	-95.6	14.6	13.0	53.7	-68.7	41.0
Right Foot Aft Ax	g	25.4	64.0	-159.4	41.6	29.0	85.5	-53.6	56.5
Right Foot Aft Az	g	17.3	34.7	-126.3	40.7	9.6	52.1	-37.6	38.9
Right Foot Fore Az	g	92.0	37.1	-173.3	41.3	38.8	95.5	-61.5	41.5
Lap Belt Load	N	9708.6	53.0	-7.7	-14.9	7711.0	49.5	-8.0	-7.1

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)

Vehicle Year/Make/Model/Body Style: 2003 Subaru Forester Wagon

NHTSA Test No.: M30507 Test Date: February 5, 2003

HEAD INJURY CRITERIA (HIC)				
	HIC**	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub>
Position #1 - Driver	442.6	61.2	97.2	43.2
Position #2 - Passenger	349.9	58.5	94.5	39.4

\*\* HIC is as defined in FMVSS 208. The maximum time interval from t<sub>1</sub> to t<sub>2</sub> is 36 milliseconds.

CLIP SUMMARY*				
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #1 - Driver	43.6	67.7	70.7	408.2
Position #2 - Passenger	41.0	61.9	64.9	326.3

\* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 8 DUMMY INJURY CRITERIA VALUES (cont.)  
REDUNDANT DATA

Vehicle Year/Make/Model/Body Style: 2003 Subaru Forester Wagon

NHTSA Test No.: M30507 Test Date: February 5, 2003

HEAD INJURY CRITERIA (HIC) <b>REDUNDANT</b>				
	HIC**	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub>
Position #1 - Driver	478.4	61.0	97.0	44.6
Position #2 - Passenger	342.0	58.7	94.7	39.0

\*\* HIC is as defined in FMVSS 208. The maximum time interval from t<sub>1</sub> to t<sub>2</sub> is 36 milliseconds.

CLIP SUMMARY* <b>REDUNDANT</b>				
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #1 - Driver	43.6	67.7	70.7	404.4
Position #2 - Passenger	41.1	61.9	64.9	338.5

\* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 9 SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:

Belt length from trim panel exit  
to bolt hole anchor point for  
continuous webbing systems.

Driver

Passenger

1681

1721

Shoulder belt length as measured  
on Part 572 Dummy.

765

784

Lap belt length as measured  
on Part 572 Dummy.

741

762

SHOULDER BELT SPOOL-OFF DATA:

As determined by film analysis.

H

H

As determined mechanically.

HH

HH

As determined electronically.

HH

HH

BELT STRETCH DATA:

Measured electronically between shoulder  
belt load cell and the "D" ring.

HH mm/m

HH mm/m

Measured mechanically.

0 mm/m

0 mm/m

H Onboard camera was used for CRS view. Close-up high speed camera view of shoulder belts is not available.  
HH Vehicle was equipped with pretensioning seatbelts. Device was not installed to prevent potential interference with system.

\_\_\_\_\_   
Dimensions in millimeters

DATA SHEET NO.10 SUMMARY OF FMVSS 212 DATA

FMVSS NO. 212 - "WINDSHIELD MOUNTING" DATA

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Windshield is bonded in place and covered with a 20 mm molding.

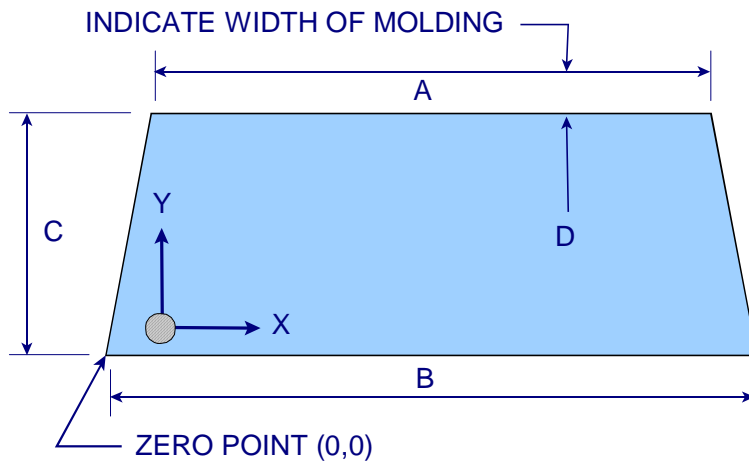
FMVSS 212 REQUIREMENTS:

The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants,

FMVSS 212 TEST DATA

	WINDSHIELD PERIPHERY		% OF RETENTION
	PRE-TEST (mm)	POST-TEST (mm)	
RIGHT SIDE	2049.5	2049.5	100.0%
LEFT SIDE	2049.5	2049.5	100.0%
TOTAL	4099	4099	100.0%

AREA OF RETENTION FAILURE:



DIMENSIONS (mm)	
A	1155
B	1520
C	712
D	20

**FRONT VIEW OF WINDSHIELD**

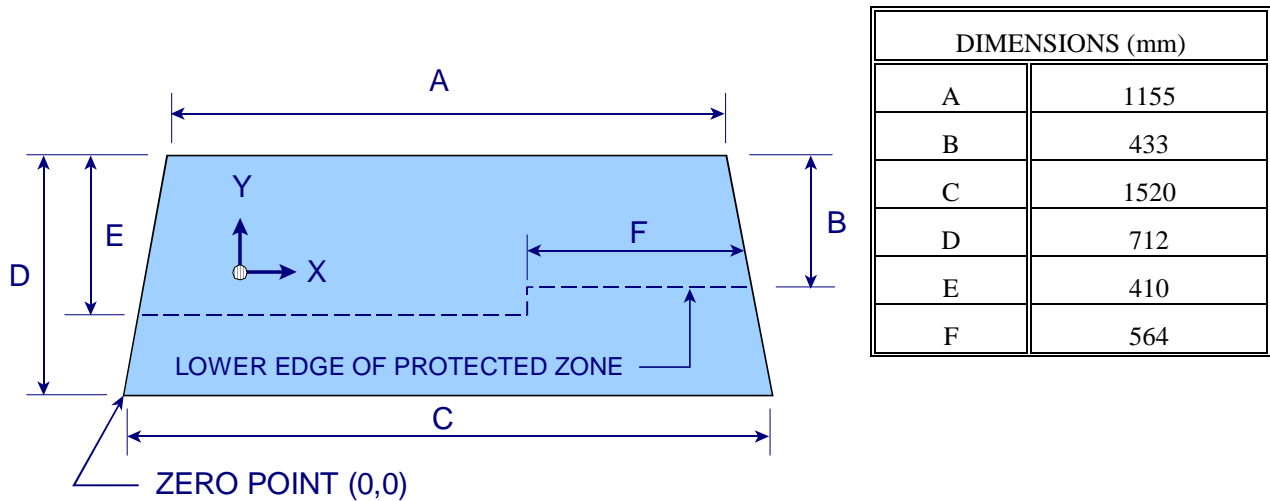
FAILURE DETAILS: None

DATA SHEET NO. 11 FMVSS NO. 219 (PARTIAL) - "WINDSHIELD ZONE INTRUSION" DATA

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield, then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 TEST DATA:



**FRONT VIEW OF WINDSHIELD**

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 6 mm: None

(Show location of penetration on the above sketch)

	COORDINATES	
	X	Y
1.	-	-
2.	-	-
3.	-	-
4.	-	-

DATA SHEET NO. 12 FMVSS NO. 301-75 "FUEL SYSTEM INTEGRITY" POST IMPACT TEST DATA

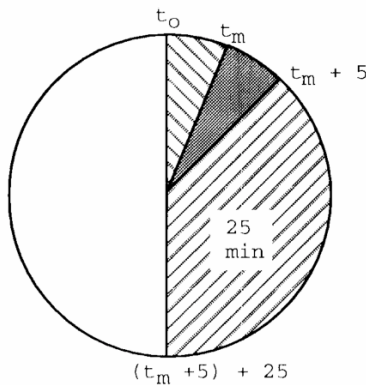
NHTSA TEST No.: M30507 TEST DATE: February 5, 2003  
VEHICLE MAKE/MODEL: 2003 Subaru Forester Wagon

The test vehicle was filled from 92% to 94% of the manufacturer's "usable" capacity. The electric fuel pump was operating if it will operate without engine operation. Two Part 572 anthropomorphic test devices were located at each of the front designated seating positions.

=====

TEST VEHICLE IMPACT TYPE: X Frontal (56 kph)  
- Oblique (48 kph) with \_\_\_\_\_ deg. barrier face first contacting \_\_\_\_\_  
- (driver/passenger) side  
- Rear Moving Barrier (48 kph)  
- Lateral Moving Barrier (32 kph)

FUEL SPILLAGE MEASUREMENT:



1. From impact until vehicle motion ceases
2. For 5 minute period after vehicle motion ceases
3. For next 25 minutes

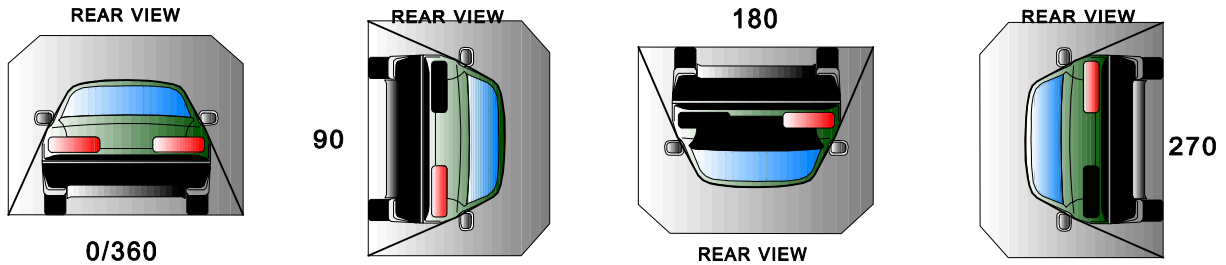
ACTUAL	MAX ALLOWED
0	28 g
0	141 g
0	28 g/min.

SOLVENT SPILLAGE DETAILS: None

**DATA SHEET NO. 13 - ROLLOVER DATA**

Vehicle: 2003 Subaru Forester Wagon

NHTSA No.: M30507



**I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:**

Rollover Stage	Rotation Time (spec. 1 -3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
	1	minutes	16	seconds	5	minutes	6	minutes	16	seconds	7	minutes
0° - 90°	1	minutes	16	seconds	5	minutes	6	minutes	16	seconds	7	minutes
90° - 180°	1	minutes	12	seconds	5	minutes	6	minutes	12	seconds	7	minutes
180°-270°	1	minutes	2	seconds	5	minutes	6	minutes	2	seconds	7	minutes
270°-360°	1	minutes	5	seconds	5	minutes	6	minutes	5	seconds	7	minutes

**II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):**

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)
142 g	28 g	28 g	28 g

**III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:**

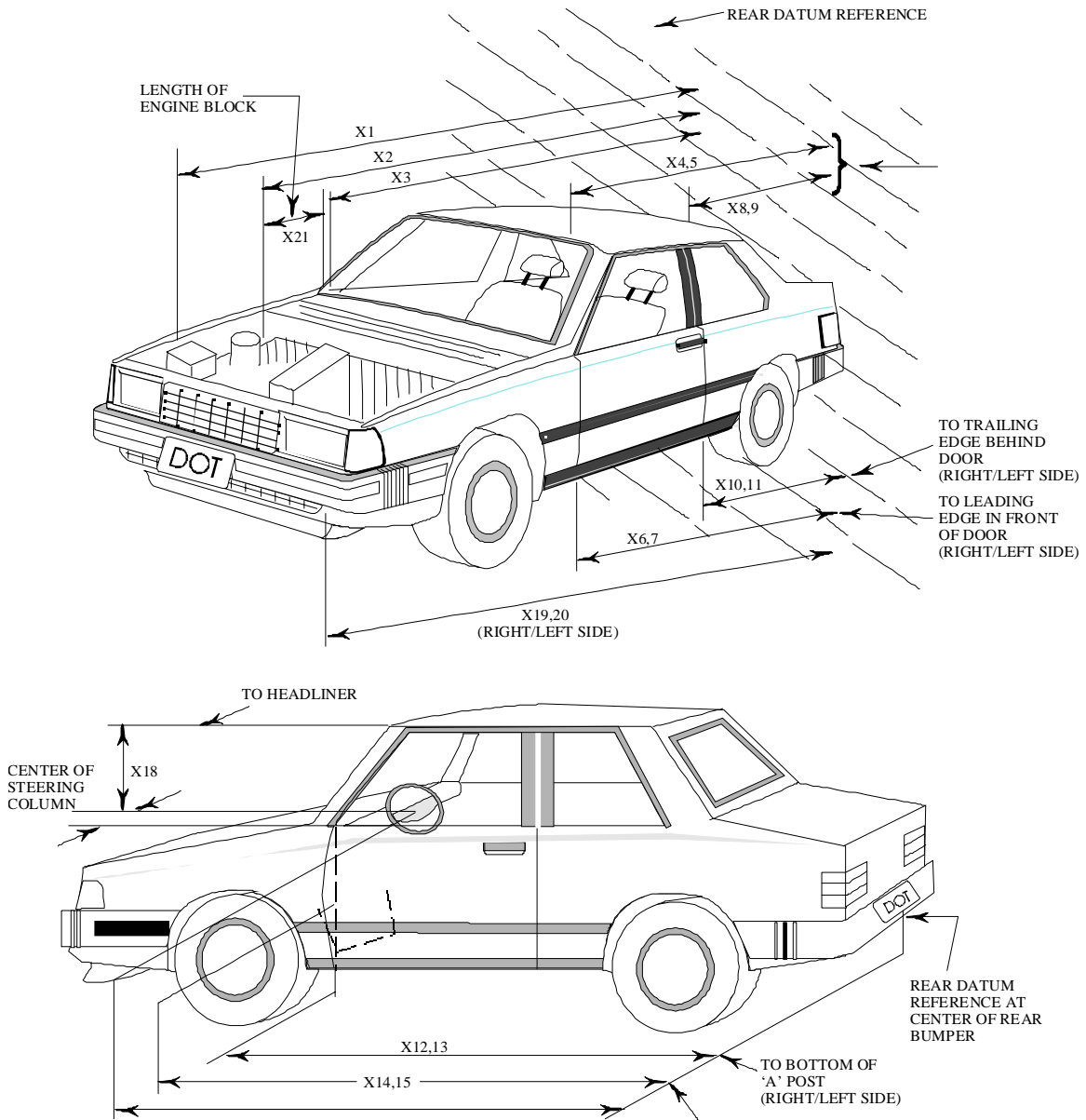
Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0° - 90°	0	0	0	-
90° - 180°	0	0	0	-
180°-270°	0	0	0	-
270°-360°	0	0	0	-

Note: Record spillage for whole minute intervals only as determined above.

**IV. SOLVENT SPILLAGE LOCATION(S):**

Rollover Stage	Spillage Location
0° - 90°	-
90° - 180°	-
180°-270°	-
270°-360°	-

**DATA SHEET NO. 14 TEST VEHICLE MEASUREMENTS**

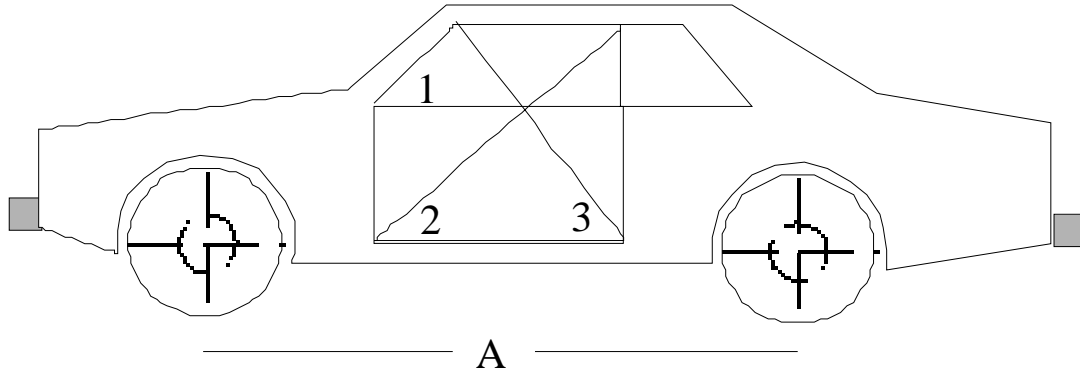


DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)

No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	4461	3984	477
X2	Rear Surface of Vehicle to Front of Engine	3860	3601	259
X3	Rear Surface of Vehicle to Firewall	3374	3338	36
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	3003	3009	-6
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	3009	3017	-8
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	3101	3104	-3
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	3100	3112	-12
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	2019	2019	0
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	2025	2026	-1
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	2063	2066	-3
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	2067	2073	-6
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	3121	3152	-31
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	3127	3156	-29
X14	Rear Surface of Vehicle to Firewall, Right Side	3409	3349	60
X15	Rear Surface of Vehicle to Firewall, Left Side	3406	3353	53
X16	Rear Surface of Vehicle to Steering Column	2616	2628	-12
X17	Center of Steering Column to "A" Post	320	303	17
X18	Center of Steering Column to Headliner	466	473	-7
X19	Rear Surface of Vehicle to Right Side of Front Bumper	4445	4010	435
X20	Rear Surface of Vehicle to Left Side of Front Bumper	4434	3992	442
X21	Length of Engine Block	247	241	6
RD	Rear Surface of Vehicle to Right Side of Dash Panel	2776	2776	0
CD	Rear Surface of Vehicle to Center of Dash Panel	2814	2817	-3
LD	Rear Surface of Vehicle to Left Side of Dash Panel	2779	2767	12

All Dimensions in mm

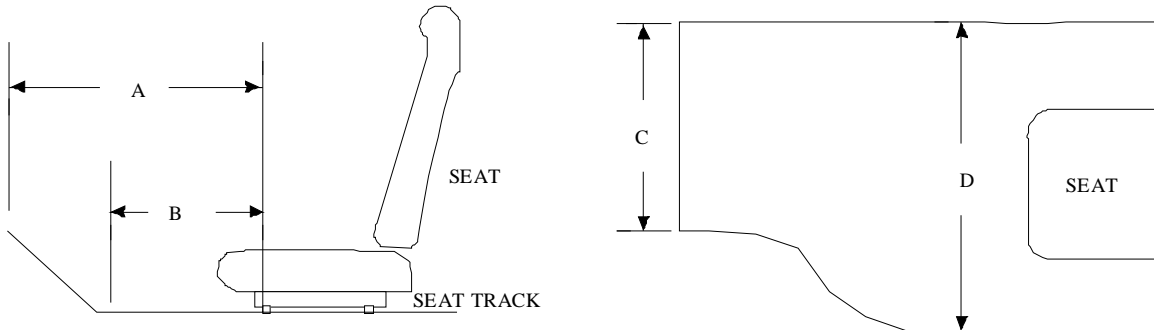
DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
**VEHICLE INTRUSION MEASUREMENTS**  
**DOOR OPENING WIDTH**



UNITS (mm)	LEFT			RIGHT		
MEASUREMENT	1	2	3	1	2	3
BEFORE TEST	938	1392	972	948	1400	945
AFTER TEST	959	1409	981	943	1406	954
DIFFERENCE	-21	-17	-9	5	-6	-9

UNITS (mm)	A = WHEELBASE LEFT	A = WHEELBASE RIGHT
BEFORE TEST	2525	2525
AFTER TEST	2512	2502
DIFFERENCE	13	23

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
 VEHICLE INTRUSION MEASUREMENTS  
 STATIC FOOTWELL DEFORMATION



DRIVER

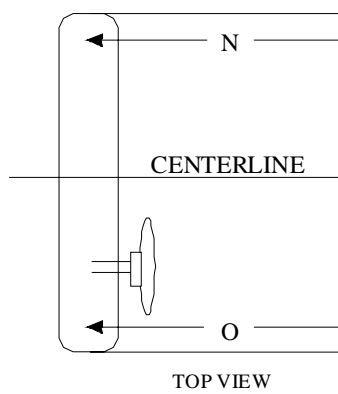
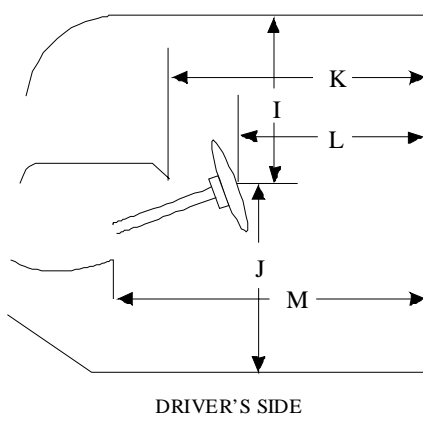
Measurement	Pre-Test	Post-Test	Difference
A	779	700	79
B	501	533	-32
C	410	399	11
D	425	424	1

PASSENGER

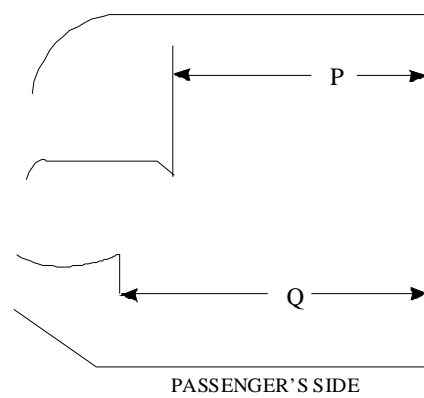
Measurement	Pre-Test	Post-Test	Difference
A	663	611	52
B	409	369	40
C	352	403	-51
D	437	443	-6

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
**VEHICLE INTRUSION MEASUREMENTS**  
**STATIC PASSENGER COMPARTMENT INTRUSION**



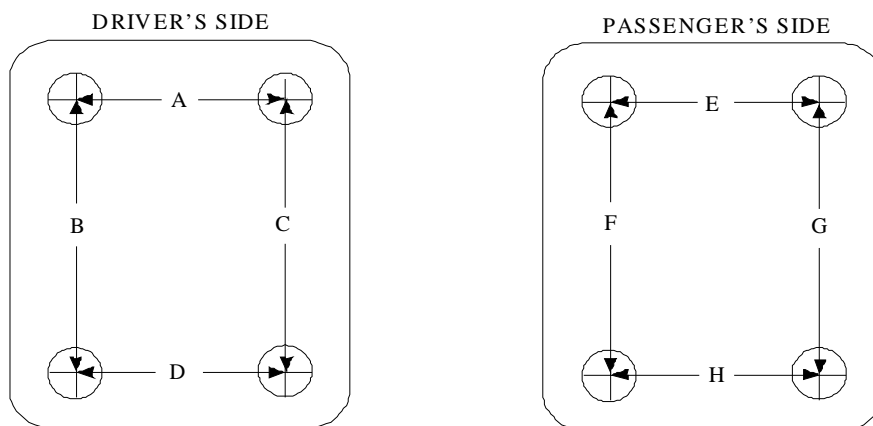
MEASUREMENTS  
FROM C-PILLAR  
BELT ANCHORAGE



Measurement	Pre-Test	Post-Test	Difference
I	466	473	-7
J	630	627	3
K	1611	1597	14
L	1425	1436	-11
M	1676	1672	4
N	1592	1591	1
O	1588	1575	13
P = K (PASS.)	1772	1777	-5
Q = M (PASS.)	1702	1705	-3

Units = mm

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
FLOORBOARD DEFORMATION

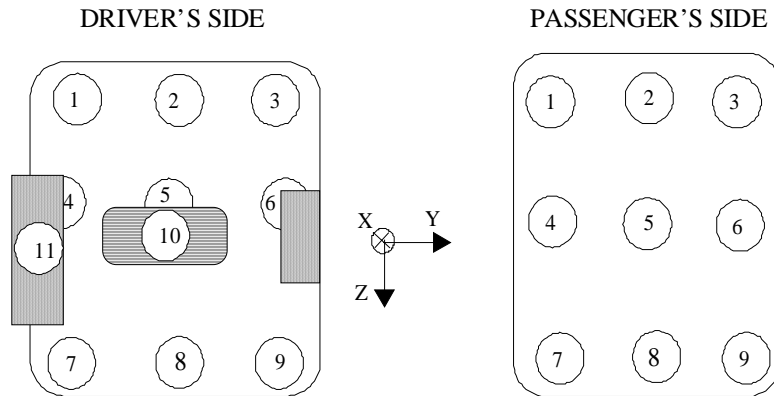


TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	410	399	11
B	327	324	3
C	295	306	-11
D	425	424	1
E	352	403	-51
F	412	401	11
G	392	330	62
H	437	443	-6

Units = mm

**DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)**  
**TOE-PAN INTRUSION**



**Driver Side Toe-pan Measurements**

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3289	3231	58	-630	-670	40
2	3337	3255	82	-608	-652	44
3	3339	3254	85	-606	-633	27
4	3248	3201	47	-496	-523	27
5	3240	3207	33	-472	-501	29
6	3140	3077	63	-446	-462	16
7	3131	3122	9	-379	-394	15
8	3058	3089	-31	-353	-369	16
9	3107	3073	34	-418	-428	10
10	3047	2969	78	-520	-555	35
11	3170	3151	19	-512	-514	2

**Passenger Side Toe-pan Measurements**

Toe-pan Location	X Deformation (mm)			Z Deformation (mm)		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3093	3006	87	-484	-500	16
2	3221	3169	52	-521	-532	11
3	3218	3189	29	-524	-538	14
4	3107	3074	33	-400	-395	-5
5	3105	3099	6	-397	-417	20
6	3104	3104	0	-411	-430	19
7	2947	2892	55	-356	-327	-29
8	2967	2927	40	-333	-312	-21
9	2980	2973	7	-334	-325	-9

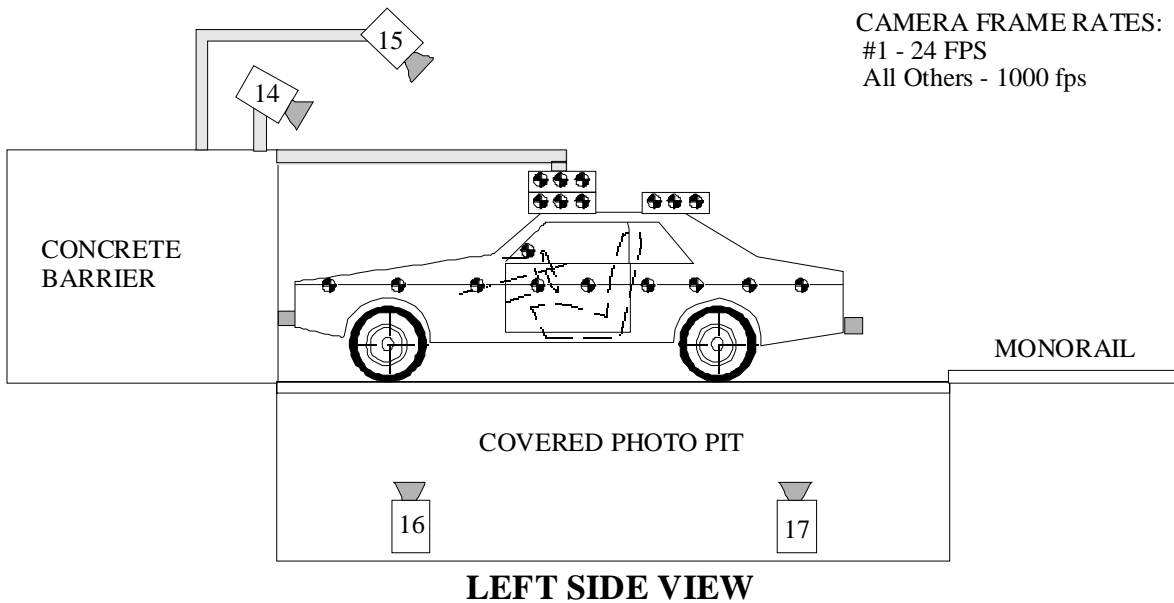
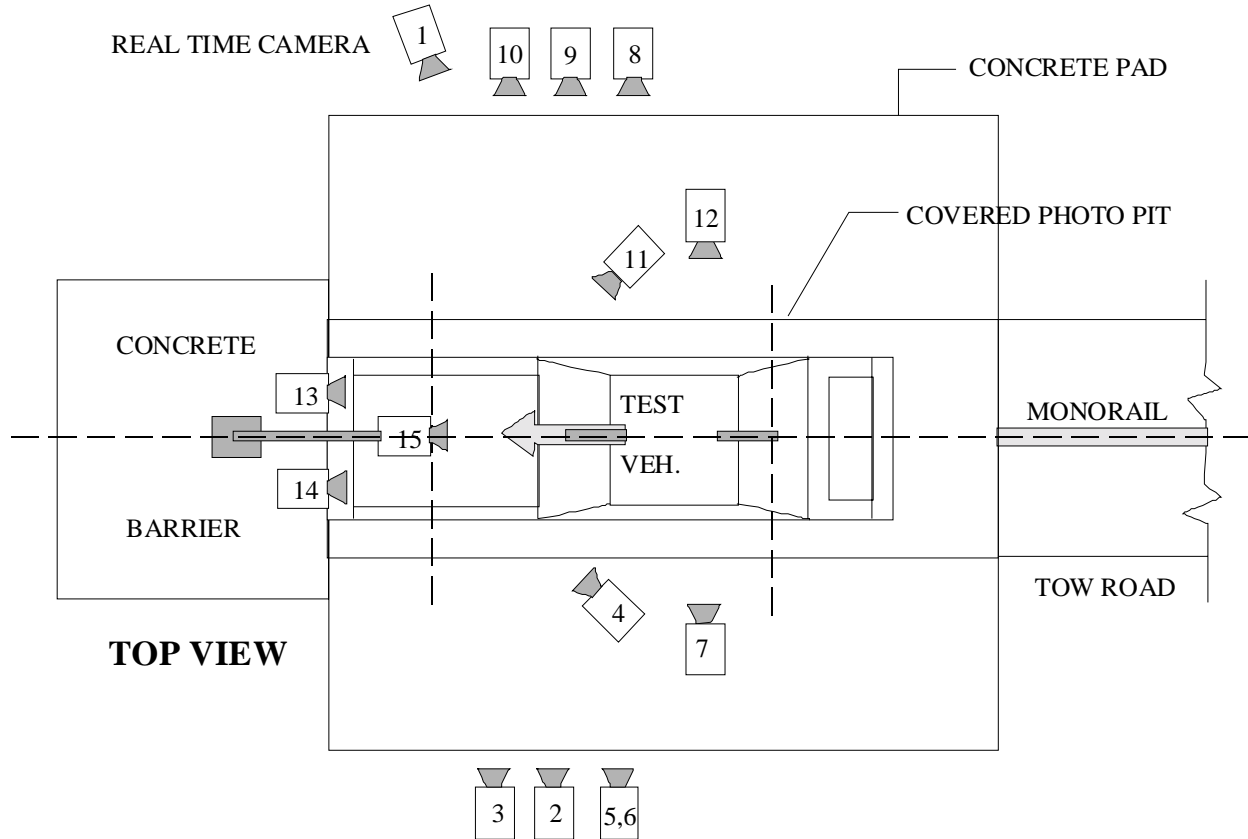
Reference: SAE: X = Rear Bumper (Positive: forward); Z = Ground (Positive: down)

DATA SHEET NO.14 VEHICLE MEASUREMENTS (cont.)  
TARGET VEHICLE STRUCTURAL MEASUREMENTS

	Elements	Pre-Test (mm)
1	Total length	4461
2	Total Width	1735
3	Bumper Top Height	614
4	Bumper Bottom Height	412
5	Longitudinal Member Top Height	595
6	Distance Between Longitudinal Members	1055
7	Longitudinal Member Width	90
8	Engine top height	815
9	Engine bottom height	240
10	Engine and gearbox width	750
11	Front bumper-engine distance	448
12	Front shock absorber fixing height	927
13	Bonnet leading edge height	827
14	Front shock absorber fixing width	1074
15	Front bumper – front axle distance	918
16	Front axle – a pillar distance	430
17	A-pillar – B pillar distance	1070
18	B-pillar – rear axle distance	1040
19	B-pillar – C Pillar distance	635
20	Roof sill bottom height	1404
21	Roof sill top height	1506
22	Floor sill bottom height	235
23	Floor sill top height	423

DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS

NOTE: Camera information shown in DATA SHEET NO. 15.



DATA SHEET NO.15 HIGH-SPEED CAMERA LOCATIONS (cont.)

NHTSA Test No.:           M30507           Vehicle:           2003 Subaru Forester Wagon          

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE (deg)**	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	6396	1570	1095	-1.5	5946	12.5	1015
3	Left Side View	7870	803	1074	-2.8	7420	25	1000
4	Driver and Interior View	7271	2655	1985	-9.1	-	25	1055
5	Steering Column (Bottom)	7061	1770	1175	-3.1	6611	25	1020
6	Steering Column (Top)	7061	1770	1788	-8.6	6611	25	1020
7	CRS View Left	3390	2920	2550	-26.5	-	25	1020
8	Overall Right Side	6576	1895	1086	-3.2	6863	12.5	1010
9	Right Side View	7705	1365	1092	-1.7	7992	25	1005
10	Right Passenger View	7720	1803	1382	-2.6	8007	35	1020
11	Passenger and Interior View	7243	2737	1978	-7.5	-	25	1015
12	CRS View Right	3410	2980	2466	-24.8	-	25	1030
13	Passenger Front View	620	-92	1987	-33.9	-	13	1005
14	Driver Front View	620	-92	1987	-34.2	-	13	1010
15	Windshield View	0	-530	3374	-51.0	-	13	1000
16	Pit View of Engine	0	730	-3048	90.0	-	13	1005
17	Pit View of Fuel Tank	0	2890	-3048	90.0	-	13	1040

\*X = film plane to monorail centerline                      \*\* = referenced to horizontal plane

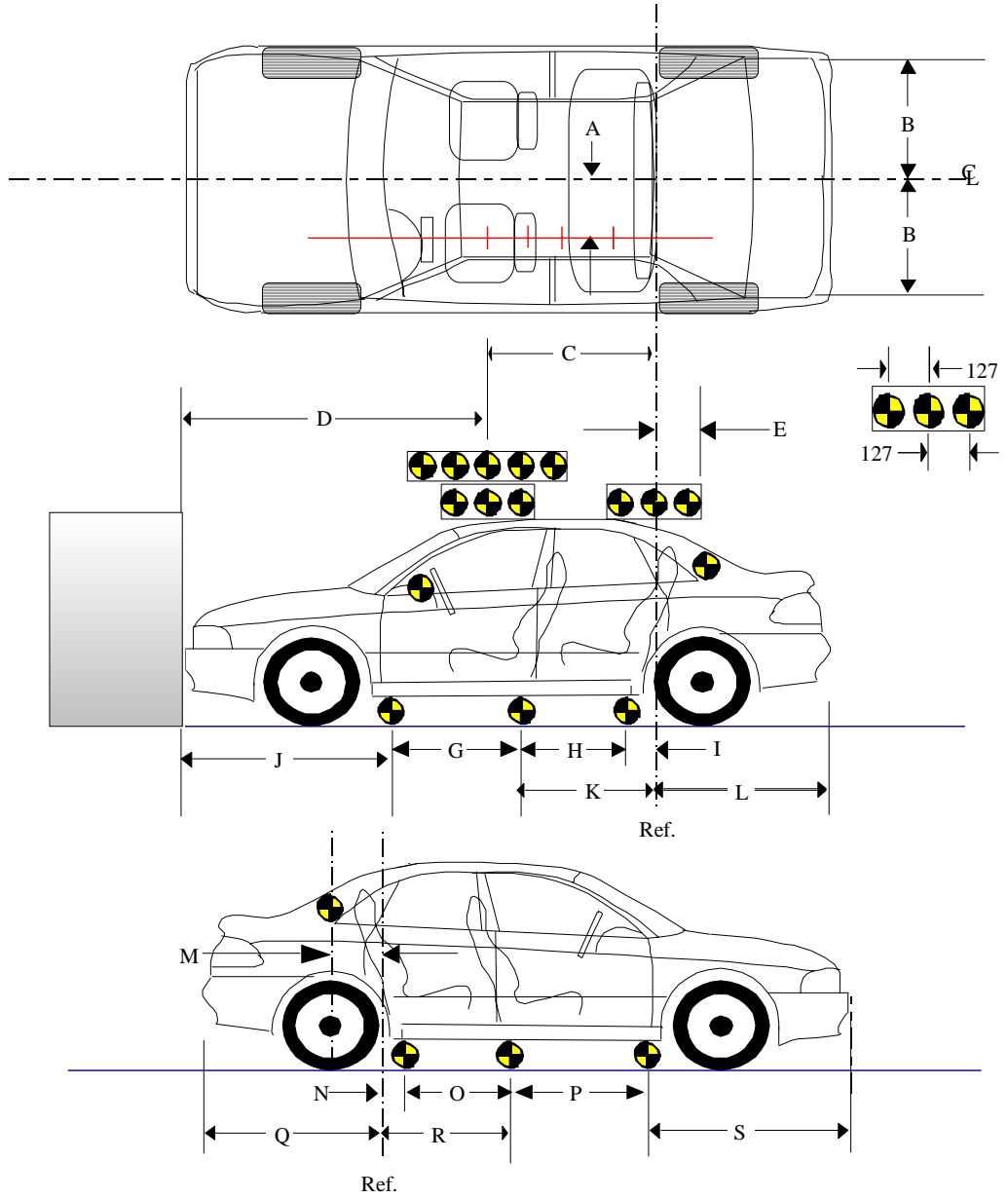
Y = film plane to impact location                      N.T. indicates No Timing

Z = film plane to ground

DATA SHEET NO. 16 VEHICLE REFERENCE PHOTO TARGET LOCATIONS

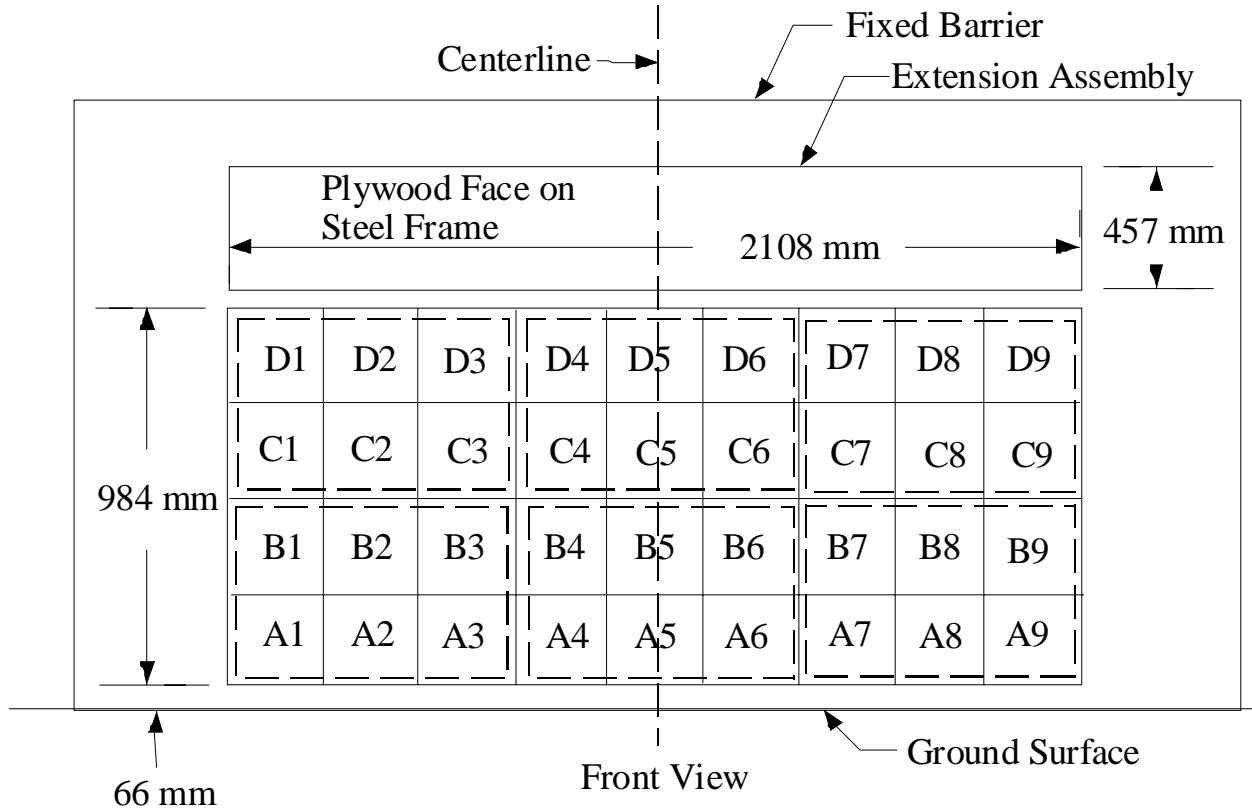
(Dimensions in millimeters)

A	363
B	737
C	1218
D	1885
E	165
F	1428
G	817
H	818
I	106
J	1366
K	924
L	1355
M	172
N	101
O	823
P	822
Q	1349
R	924
S	1366



DATA SHEET NO. 17 LOAD CELL LOCATIONS ON FIXED BARRIER

- 36 Load Cells
- 4 Rows
- 9 Columns
- 6 Groupings (6 cells/group)



6 GROUPS OF 6 LOAD CELLS EACH

Group 4 C1 thru D3	Group 5 C4 thru D6	Group 6 C7 thru D9
Group 1 A1 thru B3	Group 2 A4 thru B6	Group 3 A7 thru B9

The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or Sum of 36 individual load cells
- (3) Data from 6 Groupings shown above (6 cells/group)

DATA SHEET NO. 18 POST TEST AIR BAG DATA

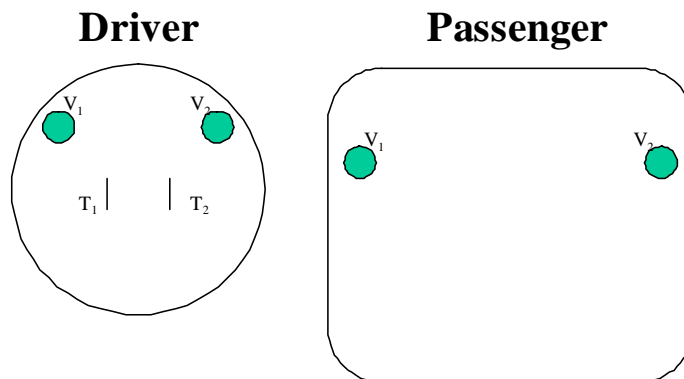
NHTSA No.:  M30507; Test Date:  February 5, 2003; Technician:  Lawrence Q. Valvo

Vehicle Model Year/Make/Model:  2003 Subaru Forester Wagon

- A. No. of vent holes:  2  -Driver  2  -Passenger
- B. Size of vent holes: (mm<sup>2</sup>)  491  -Driver  1590  -Passenger
- C. Total vent area: (mm<sup>2</sup>)  982  -Driver  3180  -Passenger
- D. Deflated air bag length and width dimensions or, if round, diameter. (mm)  
 Driver:  630  -Height;  630  -Width;  230  -Depth  
 Passenger:  600  -Height;  540  -Width;  220  -Depth
- E. Is the air bag tethered?  
 Driver:  X  -Yes;  -  -No; If yes, record length of tether-  240   
 Passenger:  -  -Yes;  X  -No; If yes, record length of tether-  -

Sketch the air bag showing the location of the vent holes, how the bag is tethered, and where the bag is tethered. Also describe how the tethers are attached to the bag and the steering wheel.

(Note: Not to scale;  $V_n$  = Vent hole<sub>n</sub>,  $T_n$  = Tether<sub>n</sub>).



- F. Record part numbers and manufacturer name of the air bag and gas generator.
- Driver:  Air bag: 98215-SA000 1DK0D001957   
 Generator: 905695302Y38
- Passenger:  Air bag: GA220-00350 5D2022268   
 Generator: E04758702P87

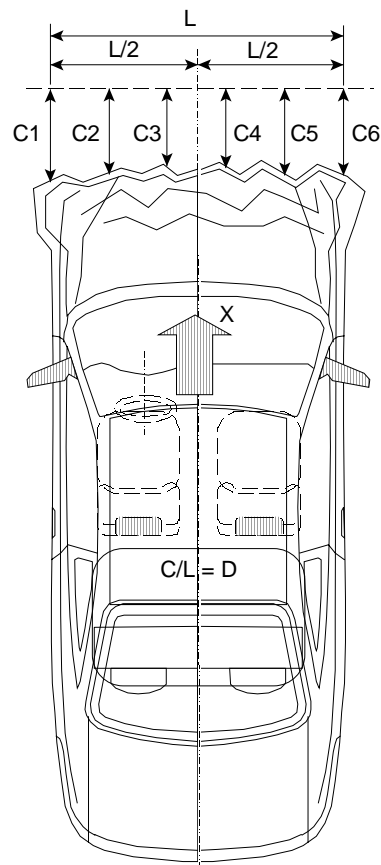
DATA SHEET NO. 19 ACCIDENT INVESTIGATION DIVISION DATA

FOR FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Subaru Forester Wagon  
 NHTSA Test No.: M30507 VIN: JF1SG63683G747127  
 Model Year: 2003 Build Date: 10/02 Test Date: February 5, 2003  
 Vehicle Size Category: passenger car Test Weight: 1640.0 kg  
 Vehicle Wheelbase: 2525 mm; Front Overhang: 918 mm; Overall Width: 1735 mm  
 Collision Deformation Classification (CDC) Code: 12FDEW3

Crush Depth Dimensions

	PRE (mm)	POST (mm)	DIFF (mm)
C1 =	4294	3956	338
C2 =	4439	3990	449
C3 =	4457	3981	476
C4 =	4459	3981	478
C5 =	4449	4009	440
C6 =	4307	3976	331



Midpoint of Damage: D = Vehicle Centerline (Longitudinal)

Length of Damaged Region: L1= 1510 mm  
 L2= 755.0 mm  
 L5= 302 mm

**APPENDIX A**  
**PHOTOGRAPHS**

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Figure A-1 LOAD CELL LOCATIONS



Figure A-2 VEHICLE CERTIFICATION PLACARD



**VEHICLE CAPACITY WEIGHT:**  
900LB(410KG)

**NUMBER OF OCCUPANTS:**  
TOTAL 5 (FRONT 2/REAR 3)

**RECOMMENDED TIRE INFLATION PRESSURE**  
kPa (psi)

TIRE SIZE	FRONT		REAR
	LIGHT LOAD	FULL LOAD	
P215/60R16 94H	200(29)	200(29)	190(28)
		250(36)	250(36)

At trailer towing, rear inflation pressure is 280kPa(41psi).

**SUBARU DW**

**SRS SIDE AIRBAG**

**!WARNING**

Figure A-3 VEHICLE TIRE PLACARD



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Figure A-4 RIGHT FRONT, AS RECEIVED

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Figure A-5 LEFT REAR, AS RECEIVED



Figure A-6 PRE-TEST FRONT VIEW



Figure A-7 POST-TEST FRONT VIEW



Figure A-8 PRE-TEST LEFT SIDE VIEW



Figure A-9 POST-TEST LEFT SIDE VIEW



Figure A-10 PRE-TEST RIGHT SIDE VIEW



Figure A-11 POST-TEST RIGHT SIDE VIEW



Figure A-12 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-13 POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-14 PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-15 POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-16 LEFT REAR THREE-QUARTER VIEW OF DOORS AFTER IMPACT



Figure A-17 RIGHT REAR THREE-QUARTER VIEW OF DOORS AFTER IMPACT



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Figure A-18 PRE-TEST WINDSHIELD VIEW



Figure A-19 POST-TEST WINDSHIELDVIEW



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Figure A-20 PRE-TEST ENGINE COMPARTMENT VIEW



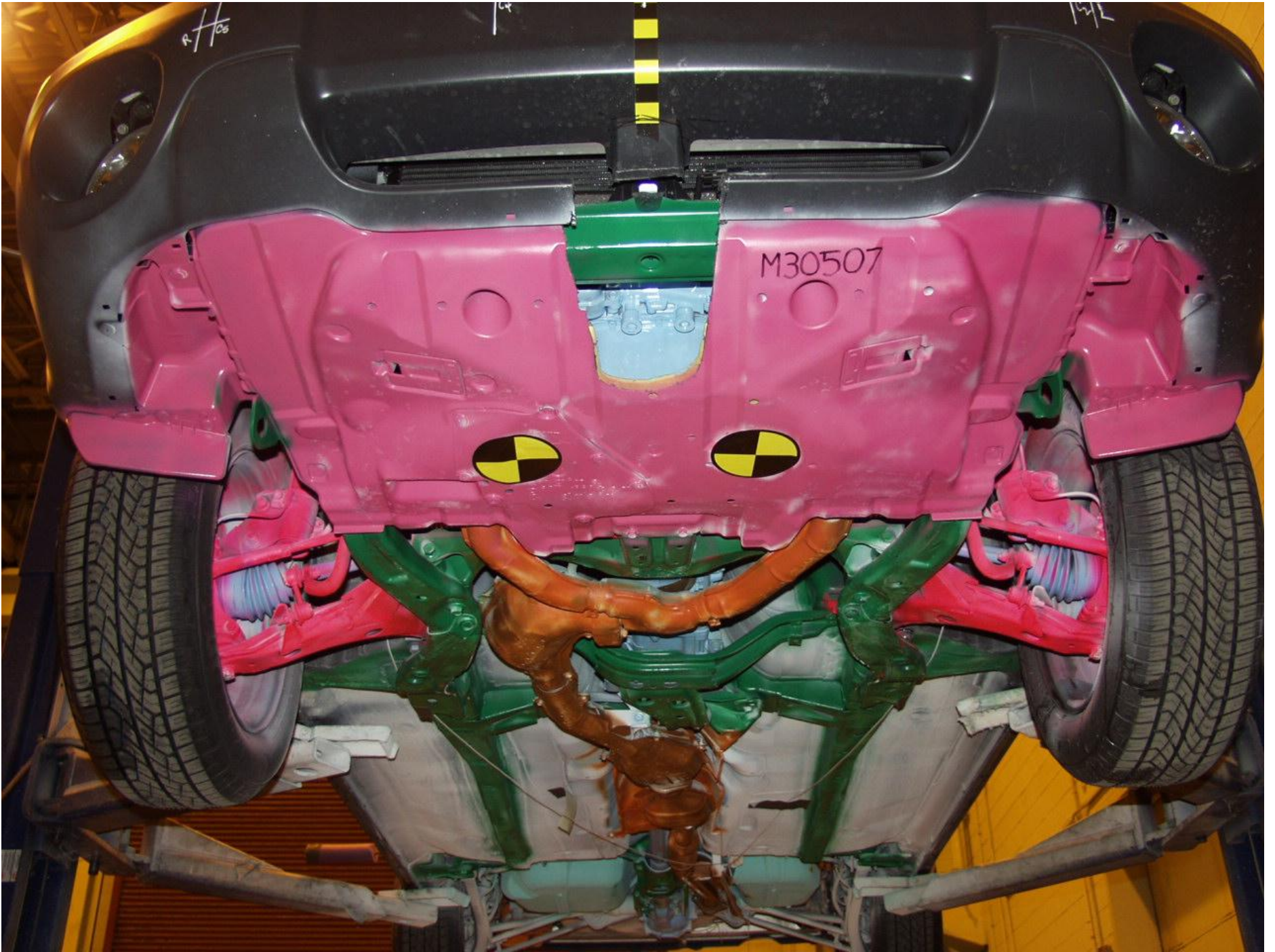
Figure A-21 POST-TEST ENGINE COMPARTMENT VIEW



Figure A-22 PRE-TEST FUEL CAP VIEW



Figure A-23 POST-TEST FUEL CAP VIEW



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Figure A-24 PRE-TEST FRONT UNDERBODY VIEW



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Figure A-25 POST-TEST FRONT UNDERBODY VIEW



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Figure A-26 PRE-TEST MID UNDERBODY VIEW



Figure A-27 POST-TEST MID UNDERBODY VIEW



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Figure A-28 PRE-TEST REAR UNDERBODY VIEW



Figure A-29 POST-TEST REAR UNDERBODY VIEW



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Figure A-30 PRE-TEST DRIVER HEAD LOCATION



Figure A-31 POST-TEST DRIVER HEAD LOCATION



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Figure A-32 PRE-TEST DRIVER POSITION VIEW



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Figure A-33 POST-TEST DRIVER POSITION VIEW



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Figure A-34 PRE-TEST DRIVER AND INTERIOR VIEW



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Figure A-35 POST-TEST DRIVER AND INTERIOR VIEW



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Figure A-36 PRE-TEST DRIVER FEET VIEW



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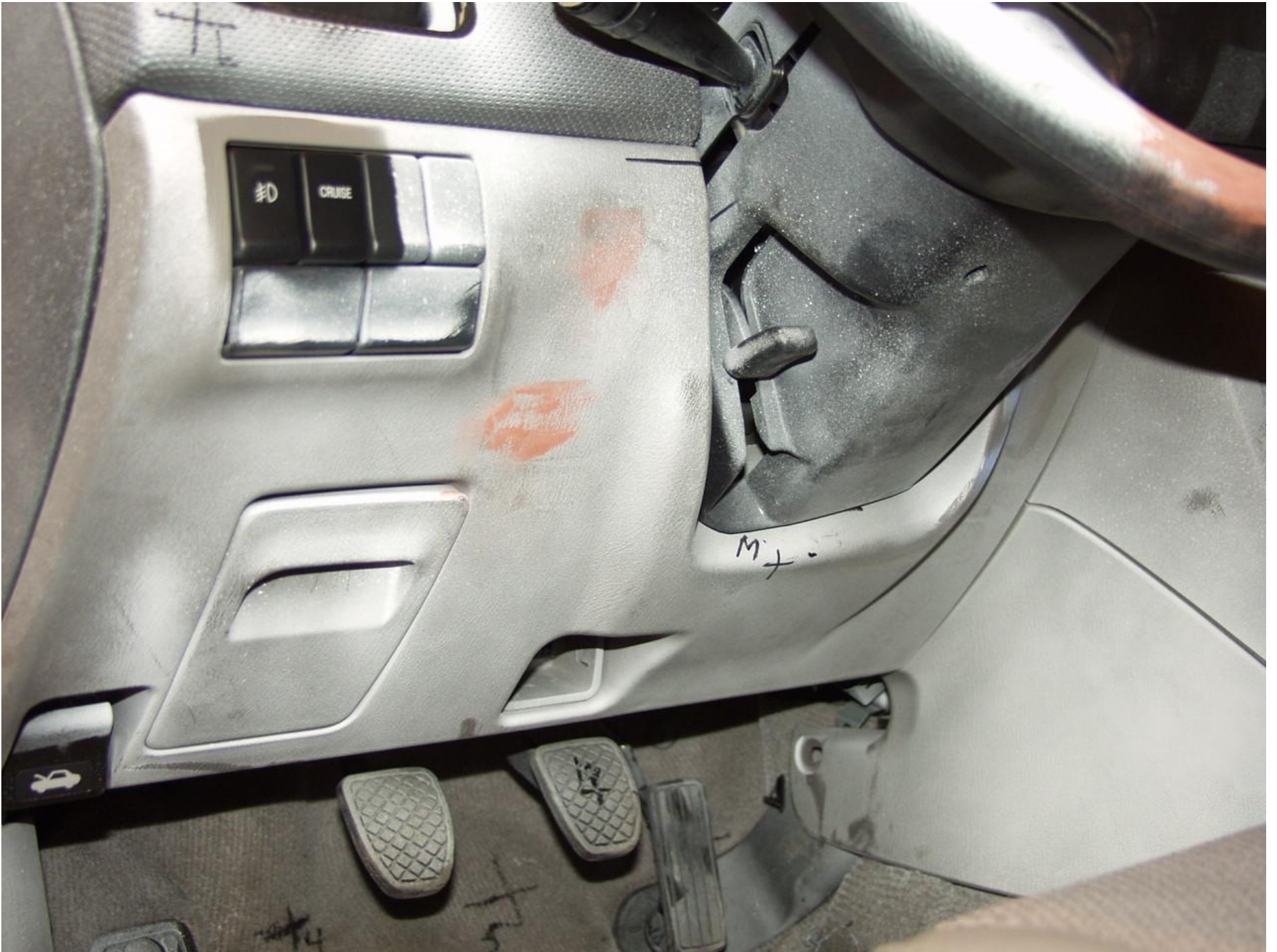
Figure A-37 POST-TEST DRIVER FEET VIEW



A-41

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Figure A-38 PRE-TEST DRIVER KNEE BOLSTER VIEW



A-42

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Figure A-39 POST-TEST DRIVER KNEE BOLSTER VIEW



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Figure A-40 PRE-TEST DRIVER FLOOR PAN VIEW



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Figure A-41 POST-TEST DRIVER FLOOR PAN VIEW



Figure A-42 DRIVER HEAD VIEW



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Figure A-43 POST-TEST DRIVER CONTACT TO AIRBAG



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Figure A-44 PRE-TEST PASSENGER HEAD LOCATION



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Figure A-45 POST-TEST PASSENGER HEAD LOCATION



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Figure A-46 PRE-TEST PASSENGER POSITION VIEW



Figure A-47 POST-TEST PASSENGER POSITION VIEW



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Figure A-48 PRE-TEST PASSENGER AND INTERIOR VIEW



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Figure A-49 POST-TEST PASSENGER AND INTERIOR VIEW



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Figure A-50 PRE- TEST PASSENGER FEET VIEW



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Figure A-51 POST-TEST PASSENGER FEET VIEW



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Figure A-52 PRE-TEST PASSENGER KNEE BOLSTER VIEW



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Figure A-53 POST-TEST PASSENGER KNEE BOLSTER VIEW



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Figure A-54 PRE-TEST PASSENGER FLOOR PAN VIEW



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Figure A-55 POST-TEST PASSENGER FLOOR PAN VIEW



Figure A-56 PASSENGER HEAD VIEW



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Figure A-57 POST-TEST PASSENGER CONTACT TO AIRBAG

A-61

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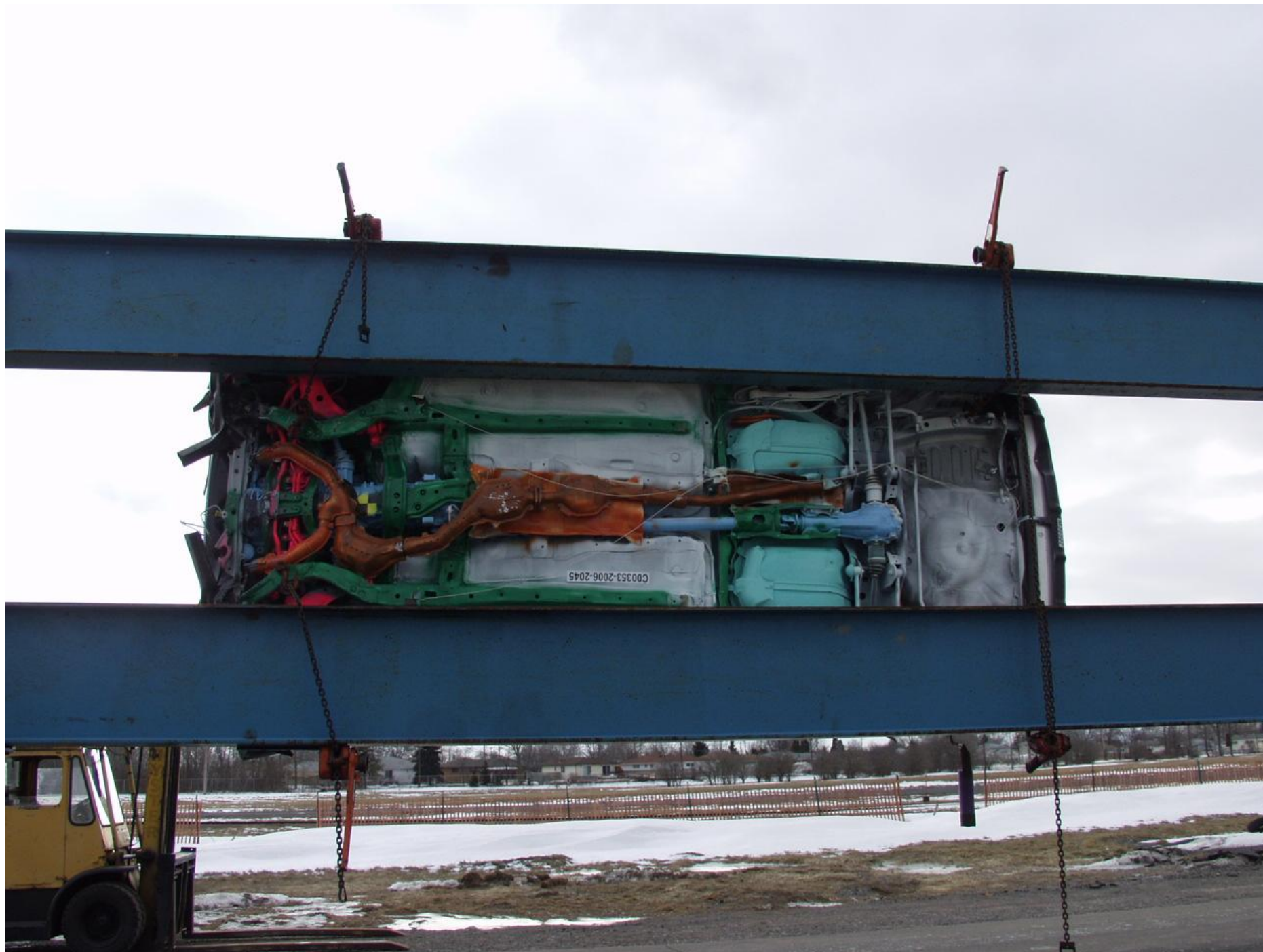


Figure A-58 ROLLOVER VIEW



Figure A-59 IMPACT VIEW

**APPENDIX B**

**DUMMY, VEHICLE AND LOAD CELL BARRIER RESPONSE DATA**

**Hybrid III Dummy Sign Conventions  
Load Cells and Special Transducers**

<b>Transducer</b>	<b>SAE Sign Convention (positive unless noted)</b>
Upper Neck Load Cell	Fx    Head rearward Fy    Head left Fz    Neck in tension Mx    Left ear to left shoulder My    Chin to chest (flexion) Mz    Chin to left shoulder (look left)
Chest Displacement Potentiometer	Compression is negative
Pelvic Load Cell (Lower Lumbar)	Fx    Chest rearward Fy    Chest left Fz    Spine in tension
Femur Load Cell	Compression is negative
Upper Tibia Load Cell (right and left leg)	Mx    Support tibia at ends, load left side center My    Support tibia at ends, load front (shin) center
Lower Tibia Load Cell (right and left leg)	Fz    Tibia in tension Mx    Support tibia at ends, load left side center My    Support tibia at ends, load front (shin) center

DATA CHANNEL FILTER CLASS SUMMARY

NHTSA TEST NO. M30507

<b>DATA TYPE</b>	<b>SAE FILTER CLASS (Hz)</b>
Dummy Head Accelerations	1000
Dummy Chest Accelerations	180
Dummy Chest Displacements	600
Dummy Femur Forces	600
Dummy Belt Loads	60
Dummy Belt Displacements	180
Dummy Neck Forces	1000
Dummy Neck Moments	600
Vehicle Accelerations	60
Vehicle Velocity Integrations	180
Vehicle Displacement Integrations	180
Load Cell Barrier Forces	60

## TABLE OF DATA PLOTS

PLOT	PLOT NAME[UNITS, CHANNEL FILTER CLASS]	PAGE
1	V1P1 Head 9 Array X Arm Ay [g, CFC_1000]	B-8
2	V1P1 Head 9 Array X Arm Az [g, CFC_1000]	B-9
3	V1P1 Head 9 Array Y Arm Ax [g, CFC_1000]	B-10
4	V1P1 Head 9 Array Y Arm Az [g, CFC_1000]	B-11
5	V1P1 Head 9 Array Z Arm Ax [g, CFC_1000]	B-12
6	V1P1 Head 9 Array Z Arm Ay [g, CFC_1000]	B-13
7	V1P1 Head CG x [g, CFC_1000]	B-14
8	V1P1 Head CG y [g, CFC_1000]	B-15
9	V1P1 Head CG z [g, CFC_1000]	B-16
10	V1P1 Head CG Resultant [g, CFC_1000]	B-17
11	V1P1 Head CG Red x [g, CFC_1000]	B-18
12	V1P1 Head CG Red y [g, CFC_1000]	B-19
13	V1P1 Head CG Red z [g, CFC_1000]	B-20
14	V1P1 Head CG Red Resultant [g, CFC_1000]	B-21
15	V1P1 Upper Neck Fx [N, CFC_1000]	B-22
16	V1P1 Upper Neck Fy [N, CFC_1000]	B-23
17	V1P1 Upper Neck Fz [N, CFC_1000]	B-24
18	V1P1 Upper Neck F Resultant [N, CFC_1000]	B-25
19	V1P1 Upper Neck Mx [N-m, CFC_600]	B-26
20	V1P1 Upper Neck My [N-m, CFC_600]	B-27
21	V1P1 Upper Neck Mz [N-m, CFC_600]	B-28
22	V1P1 Upper Neck M Resultant [N-m, CFC_600]	B-29
23	V1P1 Chest x [g, CFC_180]	B-30
24	V1P1 Chest y [g, CFC_180]	B-31
25	V1P1 Chest z [g, CFC_180]	B-32
26	V1P1 Chest Resultant [g, CFC_180]	B-33
27	V1P1 Chest Red x [g, CFC_180]	B-34
28	V1P1 Chest Red y [g, CFC_180]	B-35
29	V1P1 Chest Red z [g, CFC_180]	B-36
30	V1P1 Chest Red Resultant [g, CFC_180]	B-37
31	V1P1 Chest Compression x [mm, CFC_600]	B-38
32	V1P1 Pelvic x [g, CFC_1000]	B-39
33	V1P1 Pelvic y [g, CFC_1000]	B-40
34	V1P1 Pelvic z [g, CFC_1000]	B-41
35	V1P1 Pelvic Resultant [g, CFC_1000]	B-42
36	V1P1 Left Femur z [N, CFC_600]	B-43
37	V1P1 Right Femur z [N, CFC_600]	B-44
38	V1P1 Left Upper Tibia Mx [N-m, CFC_600]	B-45
39	V1P1 Left Upper Tibia My [N-m, CFC_600]	B-46
40	V1P1 Left Lower Tibia Fz [N, CFC_600]	B-47
41	V1P1 Left Lower Tibia Mx [N-m, CFC_600]	B-48
42	V1P1 Left Lower Tibia My [N-m, CFC_600]	B-49

43	V1P1 Right upper Tibia Mx [N-m, CFC_600]	B-50
44	V1P1 Right upper Tibia My [N-m, CFC_600]	B-51
45	V1P1 Right Lower Tibia Fz [N, CFC_600]	B-52
46	V1P1 Right Lower Tibia Mx [N-m, CFC_600]	B-53
47	V1P1 Right Lower Tibia My [N-m, CFC_600]	B-54
48	V1P1 Left Foot Aft x [g, CFC_600]	B-55
49	V1P1 Left Foot Aft z [g, CFC_600]	B-56
50	V1P1 Left Foot Fore z [g, CFC_600]	B-57
51	V1P1 Right Foot Aft x [g, CFC_600]	B-58
52	V1P1 Right foot Aft z [g, CFC_600]	B-59
53	V1P1 Right Foot Fore z [g, CFC_600]	B-60
54	V1P1 Lap Belt [N, CFC_60]	B-61
55	V1P2 Head 9 Array X Arm Ay [g, CFC_1000]	B-62
56	V1P2 Head 9 Array X Arm Az [g, CFC_1000]	B-63
57	V1P2 Head 9 Array Y Arm Ax [g, CFC_1000]	B-64
58	V1P2 Head 9 Array Y Arm Az [g, CFC_1000]	B-65
59	V1P2 Head 9 Array Z Arm Ax [g, CFC_1000]	B-66
60	V1P2 Head 9 Array Z Arm Ay [g, CFC_1000]	B-67
61	V1P2 Head CG x [g, CFC_1000]	B-68
62	V1P2 Head CG y [g, CFC_1000]	B-69
63	V1P2 Head CG z [g, CFC_1000]	B-70
64	V1P2 Head CG Resultant [g, CFC_1000]	B-71
65	V1P2 Head CG Red x [g, CFC_1000]	B-72
66	V1P2 Head CG Red y [g, CFC_1000]	B-73
67	V1P2 Head CG Red z [g, CFC_1000]	B-74
68	V1P2 Head CG Red Resultant [g, CFC_1000]	B-75
69	V1P2 Upper Neck Fx [N, CFC_1000]	B-76
70	V1P2 Upper Neck Fy [N, CFC_1000]	B-77
71	V1P2 Upper Neck Fz [N, CFC_1000]	B-78
72	V1P2 Upper Neck F Resultant [N, CFC_1000]	B-79
73	V1P2 Upper Neck Mx [N-m, CFC_600]	B-80
74	V1P2 Upper Neck My [N-m, CFC_600]	B-81
75	V1P2 Upper Neck Mz [N-m, CFC_600]	B-82
76	V1P2 Upper Neck M Resultant [N-m, CFC_600]	B-83
77	V1P2 Chest x [g, CFC_180]	B-84
78	V1P2 Chest y [g, CFC_180]	B-85
79	V1P2 Chest z [g, CFC_180]	B-86
80	V1P2 Chest Resultant [g, CFC_180]	B-87
81	V1P2 Chest Red x [g, CFC_180]	B-88
82	V1P2 Chest Red y [g, CFC_180]	B-89
83	V1P2 Chest Red z [g, CFC_180]	B-90
84	V1P2 Chest Red Resultant [g, CFC_180]	B-91
85	V1P2 Chest Compression x [mm, CFC_600]	B-92
86	V1P2 Pelvic x [g, CFC_1000]	B-93
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88	V1P2 Pelvic z [g, CFC_1000]	B-95
89	V1P2 Pelvic Resultant [g, CFC_1000]	B-96

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93	V1P2 Left Upper Tibia My [N-m, CFC_600]	B-100
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97	V1P2 Right Upper Tibia Mx [N-m, CFC_600]	B-104
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107	V1P2 Right Foot Fore z [g, CFC_600]	B-114
108	V1P2 Lap Belt [N, CFC_60]	B-115
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111	V1 Left Rear #1x Displacement [mm, CFC_180]	B-118
112	V1 Right Rear #2x [g, CFC_60]	B-119
113	V1 Right Rear #2x Velocity [kph, CFC_180]	B-120
114	V1 Right Rear #2x Displacement [mm, CFC_180]	B-121
115	V1 Engine Top #3x [g, CFC_60]	B-122
116	V1 Engine Top #3x Velocity [kph, CFC_180]	B-123
117	V1 Engine Top #3x Displacement [mm, CFC_180]	B-124
118	V1 Engine Bottom #4x [g, CFC_60]	B-125
119	V1 Engine Bottom #4x Velocity [kph, CFC_180]	B-126
120	V1 Engine Bottom #4x Displacement [mm, CFC_180]	B-127
121	V1 Right Caliper #5x [g, CFC_60]	B-128
122	V1 Right Caliper #5x Velocity [kph, CFC_180]	B-129
123	V1 Right Caliper #5x Displacement [mm, CFC_180]	B-130
124	V1 Instrument Panel #6x [g, CFC_60]	B-131
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126	V1 Instrument Panel #6x Displacement [mm, CFC_180]	B-133
127	V1 Left Caliper #7x [g, CFC_60]	B-134
128	V1 Left Caliper #7x Velocity [kph, CFC_180]	B-135
129	V1 Left Caliper #7x Displacement [mm, CFC_180]	B-136
130	V1 Left Rear #8z [g, CFC_60]	B-137
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132	V1 Left Rear #8z Displacement [mm, CFC_180]	B-139
133	V1 Right Rear #9z [g, CFC_60]	B-140
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135	V1 Right Rear #9z Displacement [mm, CFC_180]	B-142
136	Barrier Load Cell A1 Fx [N, CFC_60]	B-143

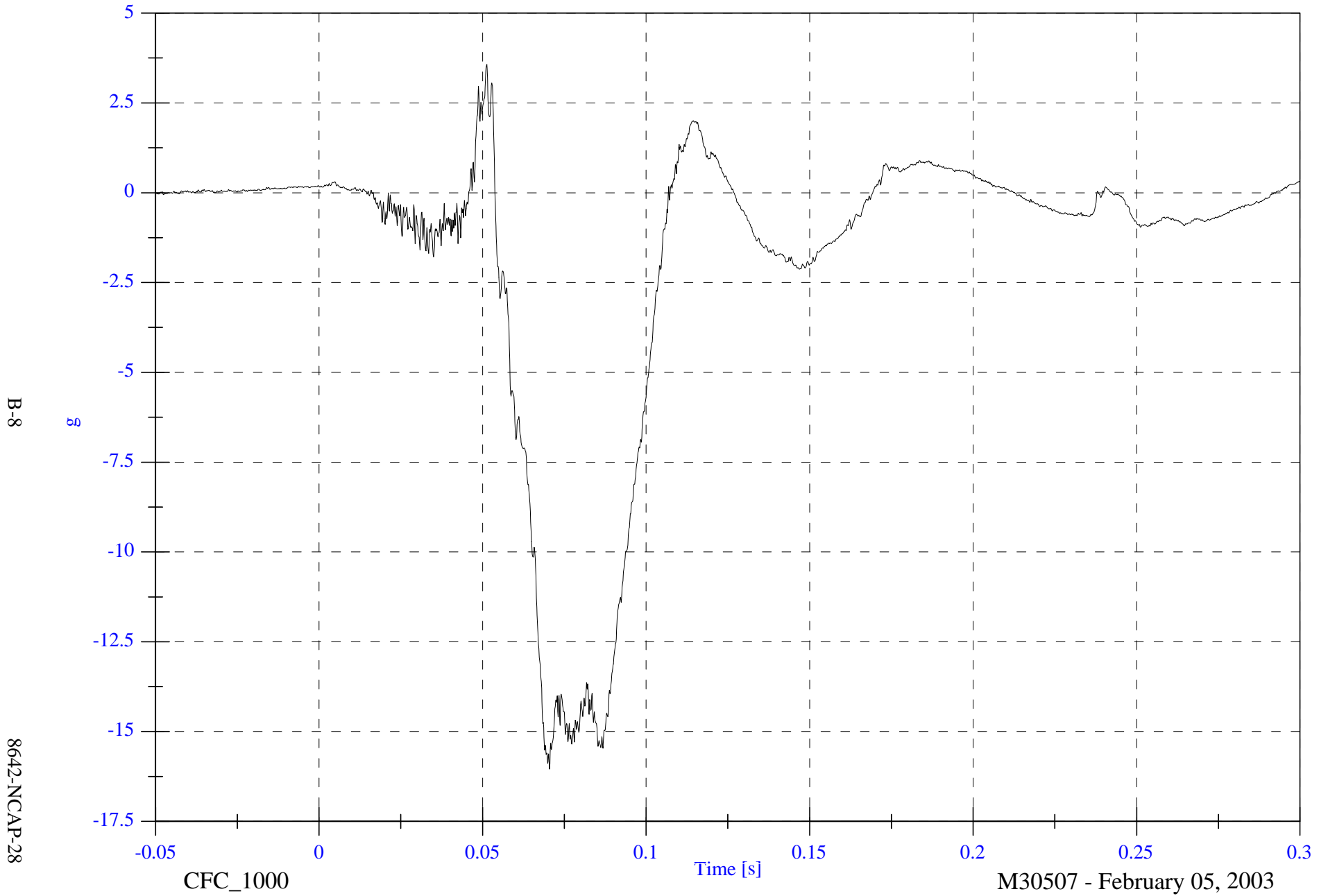
137	Barrier Load Cell A2 Fx [N, CFC_60]	B-144
138	Barrier Load Cell A3 Fx [N, CFC_60]	B-145
139	Barrier Load Cell A4 Fx [N, CFC_60]	B-146
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148	Barrier Load Cell B4 Fx [N, CFC_60]	B-155
149	Barrier Load Cell B5 Fx [N, CFC_60]	B-156
150	Barrier Load Cell B6 Fx [N, CFC_60]	B-157
151	Barrier Load Cell B7 Fx [N, CFC_60]	B-158
152	Barrier Load Cell B8 Fx [N, CFC_60]	B-159
153	Barrier Load Cell B9 Fx [N, CFC_60]	B-160
154	Barrier Load Cell C1 Fx [N, CFC_60]	B-161
155	Barrier Load Cell C2 Fx [N, CFC_60]	B-162
156	Barrier Load Cell C3 Fx [N, CFC_60]	B-163
157	Barrier Load Cell C4 Fx [N, CFC_60]	B-164
158	Barrier Load Cell C5 Fx [N, CFC_60]	B-165
159	Barrier Load Cell C6 Fx [N, CFC_60]	B-166
160	Barrier Load Cell C7 Fx [N, CFC_60]	B-167
161	Barrier Load Cell C8 Fx [N, CFC_60]	B-168
162	Barrier Load Cell C9 Fx [N, CFC_60]	B-169
163	Barrier Load Cell D1 Fx [N, CFC_60]	B-170
164	Barrier Load Cell D2 Fx [N, CFC_60]	B-171
165	Barrier Load Cell D3 Fx [N, CFC_60]	B-172
166	Barrier Load Cell D4 Fx [N, CFC_60]	B-173
167	Barrier Load Cell D5 Fx [N, CFC_60]	B-174
168	Barrier Load Cell D6 Fx [N, CFC_60]	B-175
169	Barrier Load Cell D7 Fx [N, CFC_60]	B-176
170	Barrier Load Cell D8 Fx [N, CFC_60]	B-177
171	Barrier Load Cell D9 Fx [N, CFC_60]	B-178
172	Group 1 Load Cell Sum (A1,A2,A3,B1,B2,B3)	B-179
173	Group 2 Load Cell Sum (A4,A5,A6,B4,B5,B6)	B-180
174	Group 3 Load Cell Sum (A7,A8,A9,B7,B8,B9)	B-181
175	Group 4 Load Cell Sum (C1,C2,C3,D1,D2,D3)	B-182
176	Group 5 Load Cell Sum (C4,C5,C6,D4,D5,D6)	B-183
177	Group 6 Load Cell Sum (C7,C8,C9,D7,D8,D9)	B-184
178	Total Load Cell Sum (All 6 Groups)	B-185

NCAP Test #6 - 2003 Subaru Forester

V1P1 Head 9 Array X Arm Ay

Max: 3.6 [g] at 0.051 [s]

Min: -16.0 [g] at 0.070 [s]



B-8

8642-NCAP-28

CFC\_1000

Time [s]

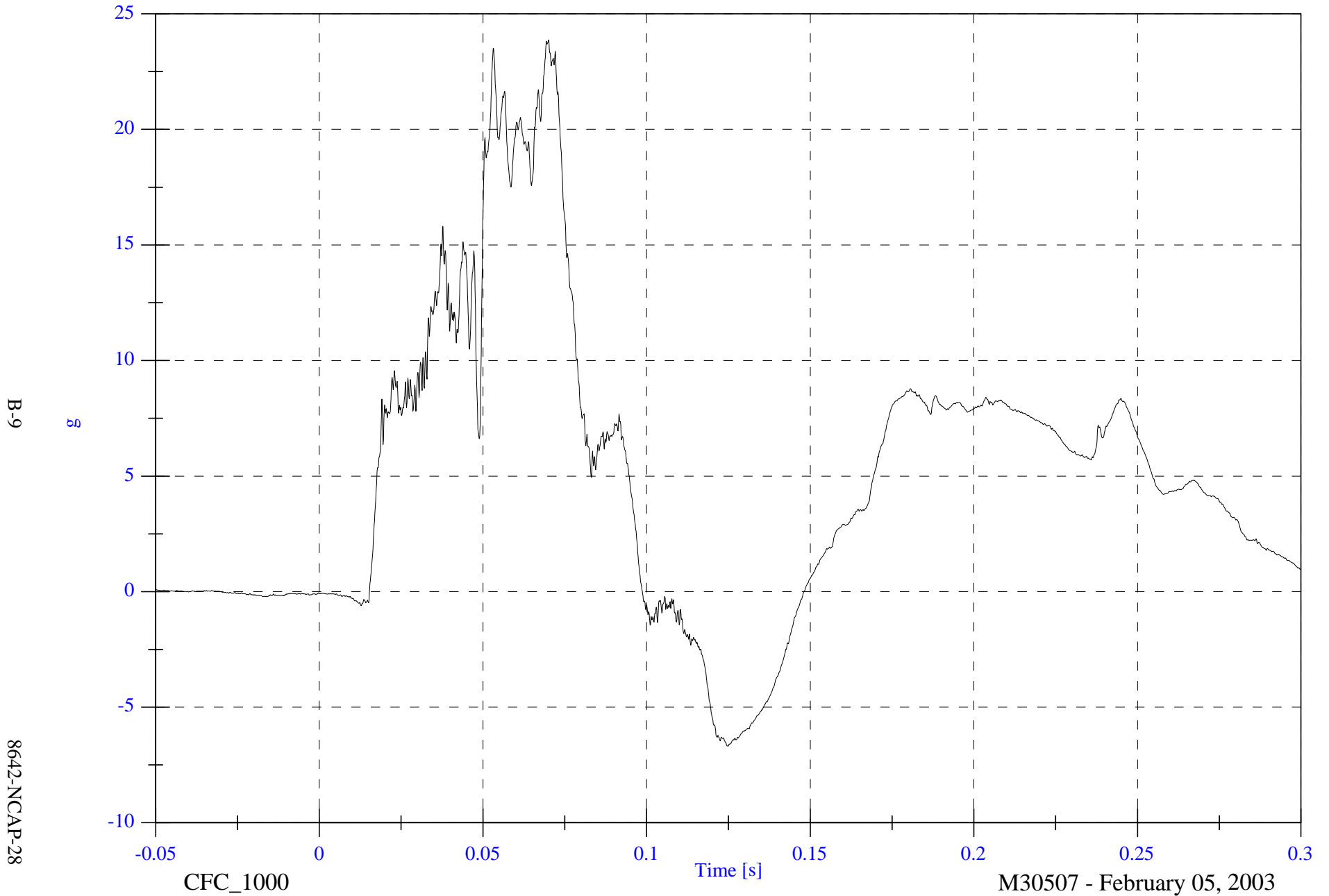
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Head 9 Array X Arm Az

Max: 23.9 [g] at 0.070 [s]

Min: -6.7 [g] at 0.125 [s]



B-9

8642-NCAP-28

CFC\_1000

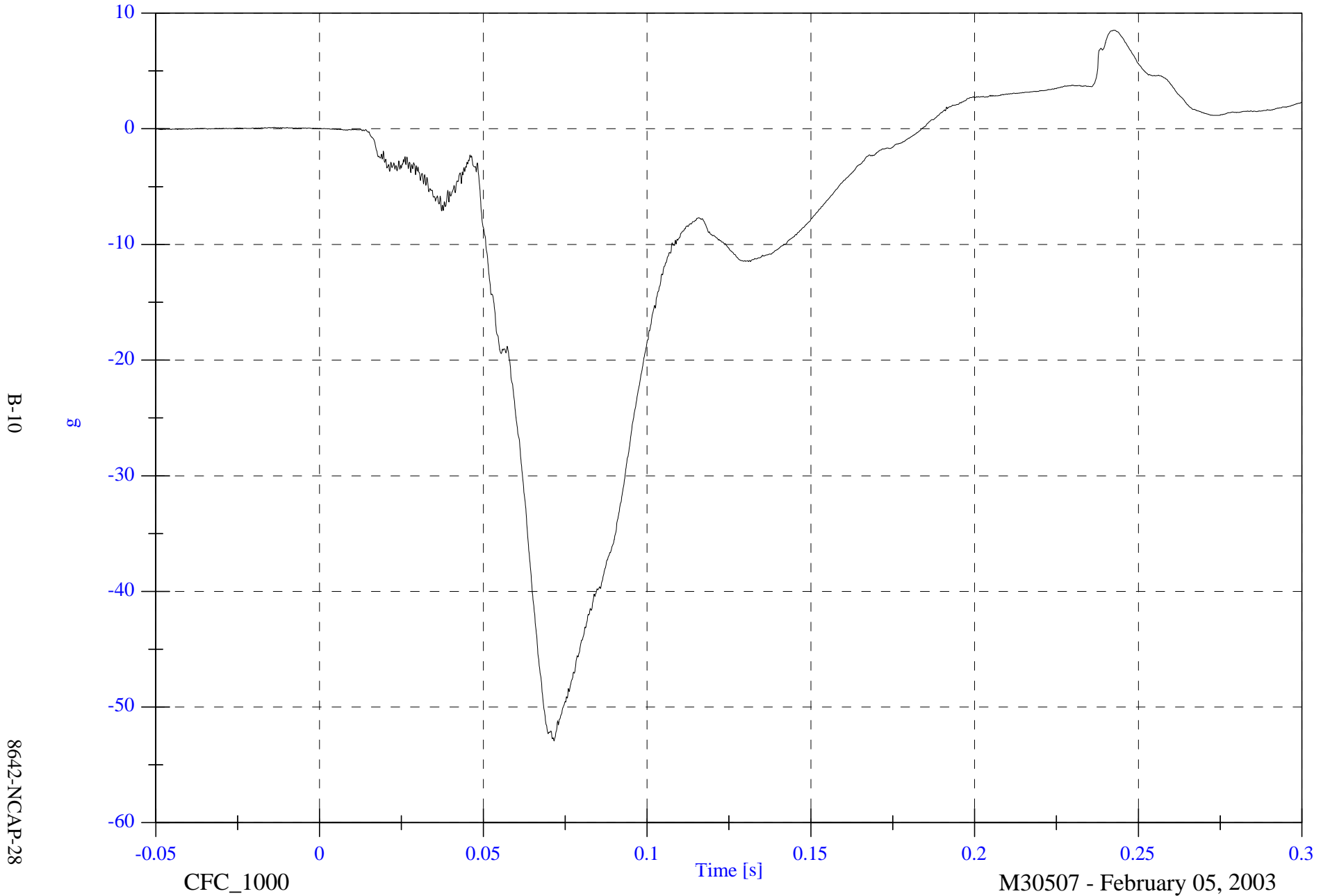
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Head 9 Array Y Arm Ax

Max: 8.5 [g] at 0.243 [s]

Min: -52.9 [g] at 0.072 [s]

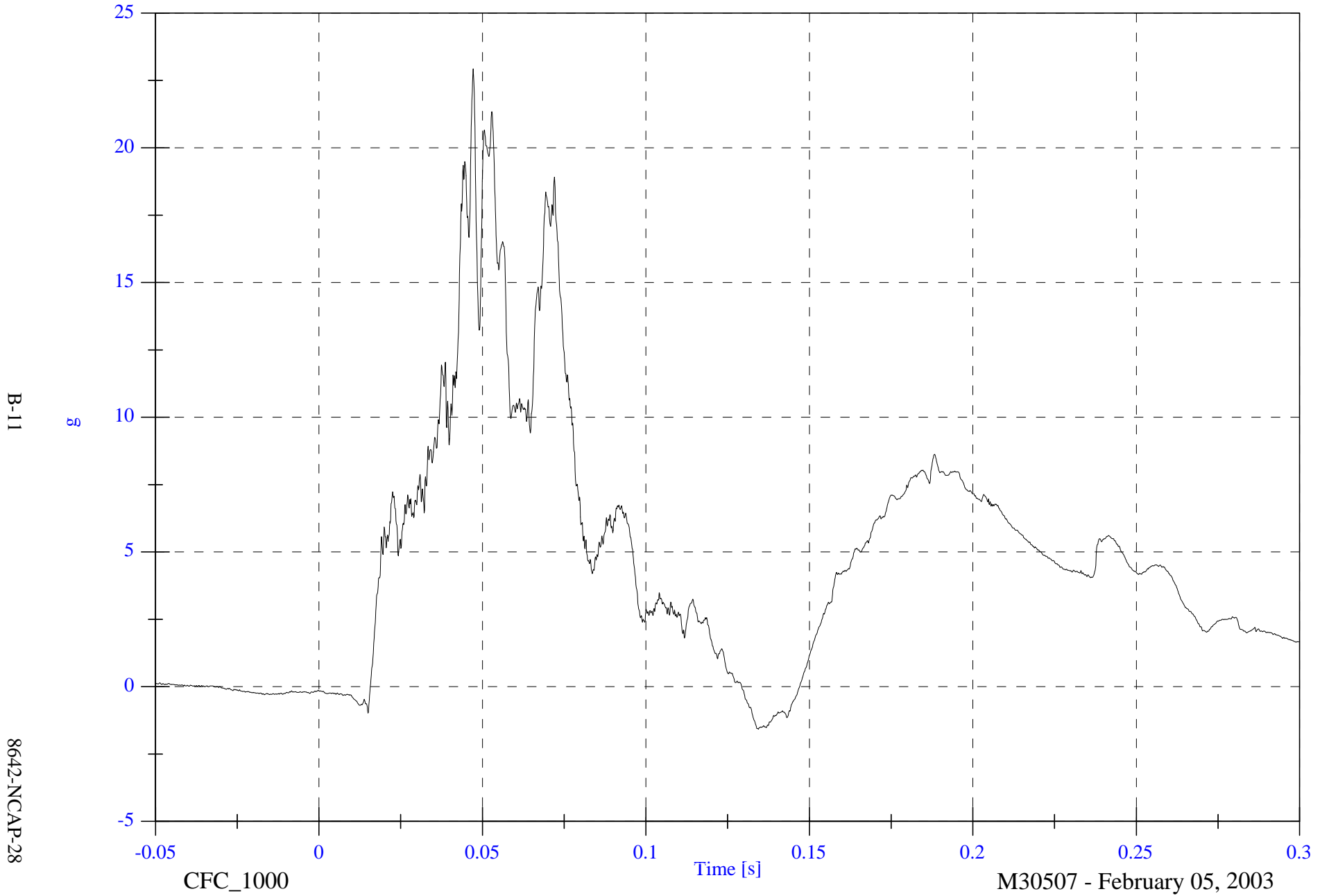


NCAP Test #6 - 2003 Subaru Forester

V1P1 Head 9 Array Y Arm Az

Max: 22.9 [g] at 0.047 [s]

Min: -1.6 [g] at 0.134 [s]

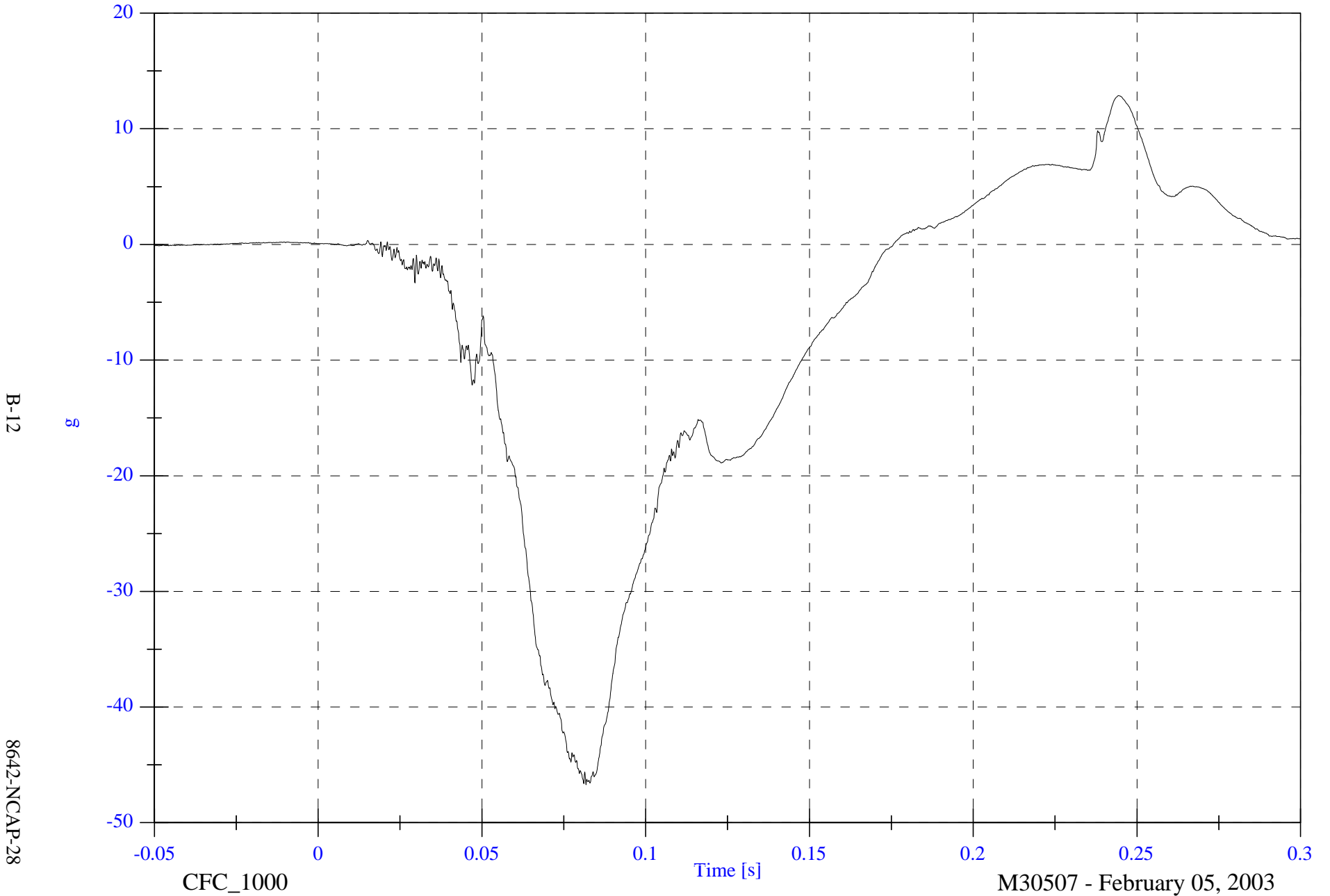


NCAP Test #6 - 2003 Subaru Forester

V1P1 Head 9 Array Z Arm Ax

Max: 12.9 [g] at 0.244 [s]

Min: -46.7 [g] at 0.082 [s]



B-12

8642-NCAP-28

CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

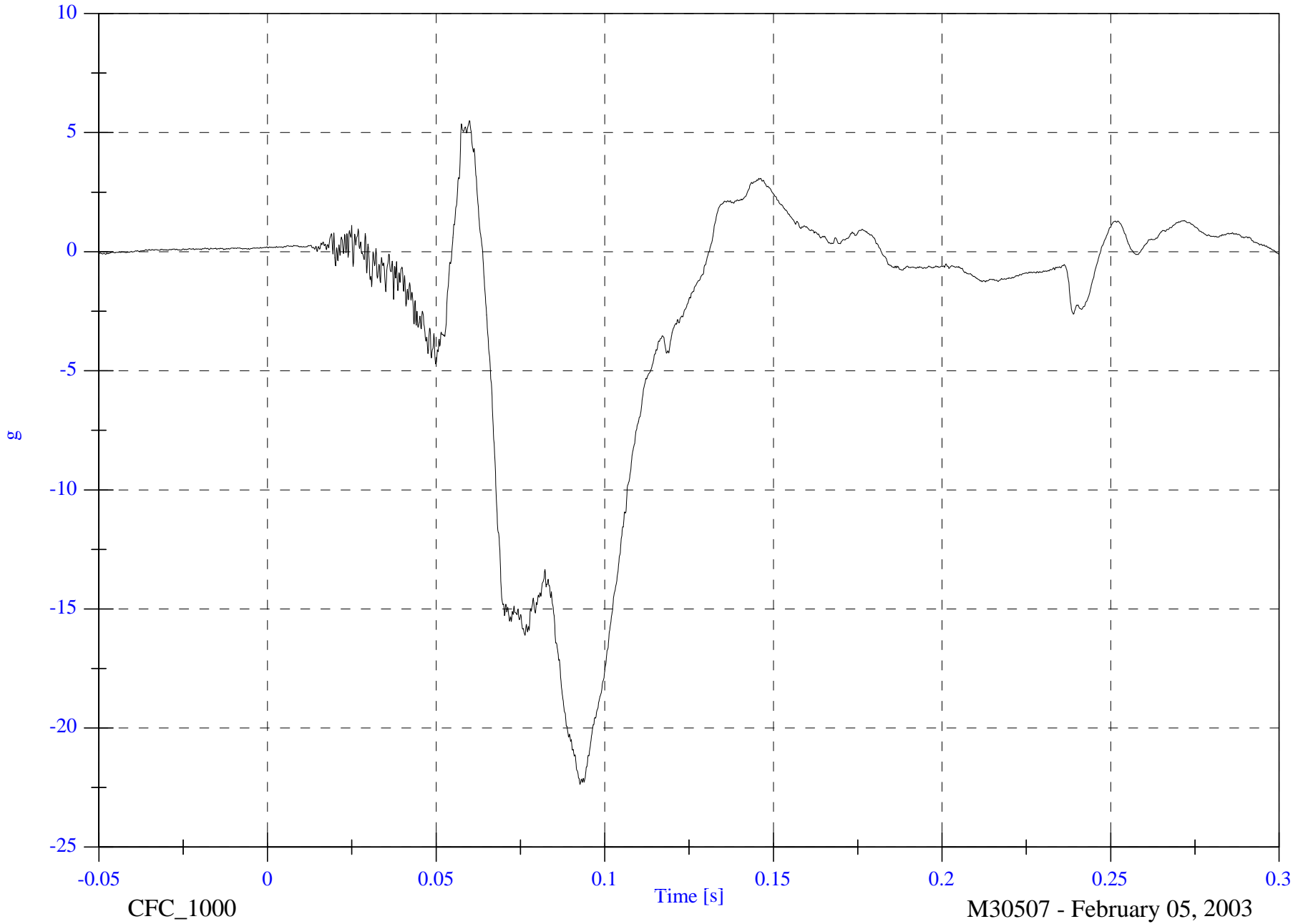
V1P1 Head 9 Array Z Arm Ay

Max: 5.5 [g] at 0.060 [s]

Min: -22.4 [g] at 0.093 [s]

B-13

8642-NCAP-28



CFC\_1000

Time [s]

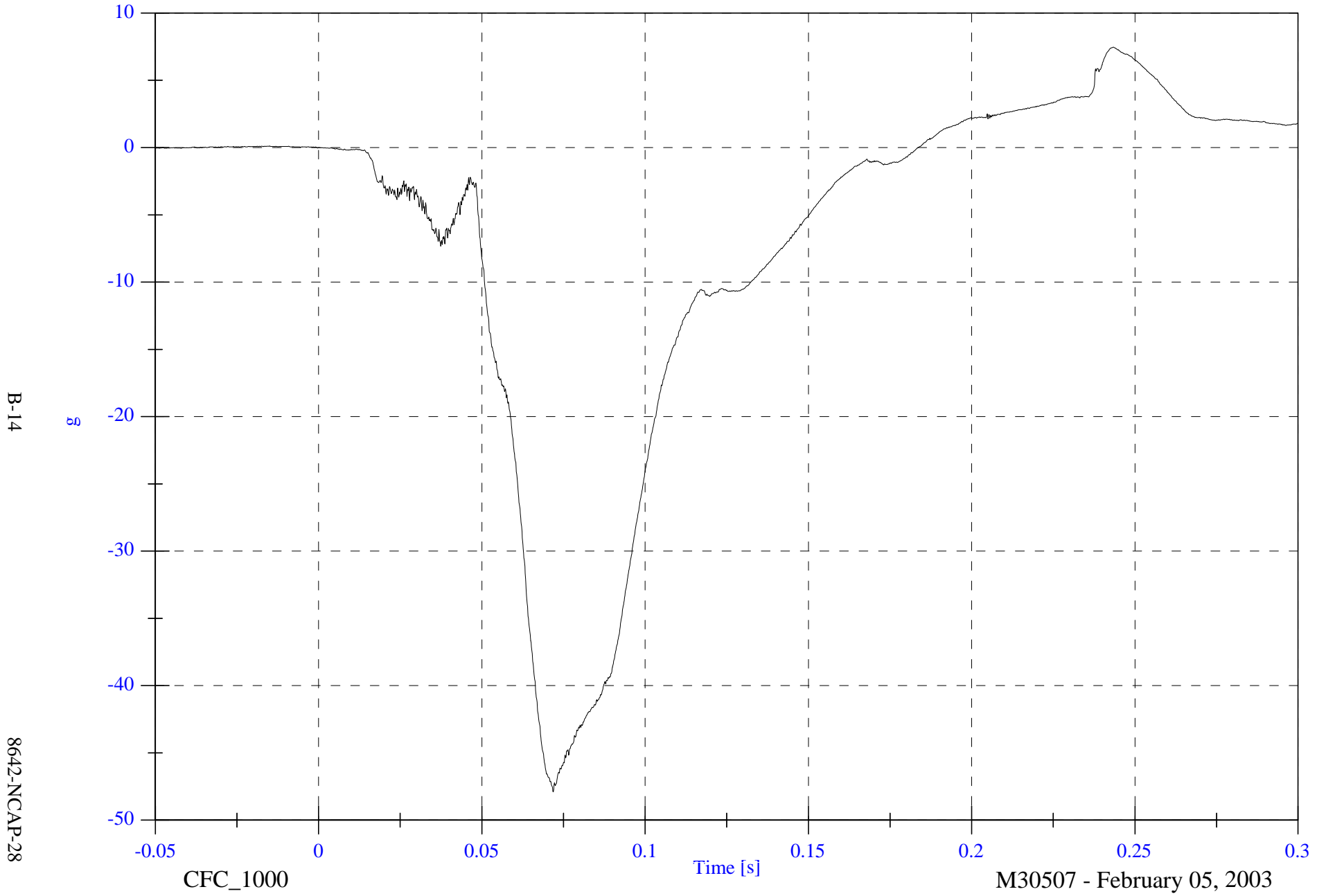
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Head CG x

Max: 7.5 [g] at 0.243 [s]

Min: -47.9 [g] at 0.072 [s]



B-14

8642-NCAP-28

CFC\_1000

Time [s]

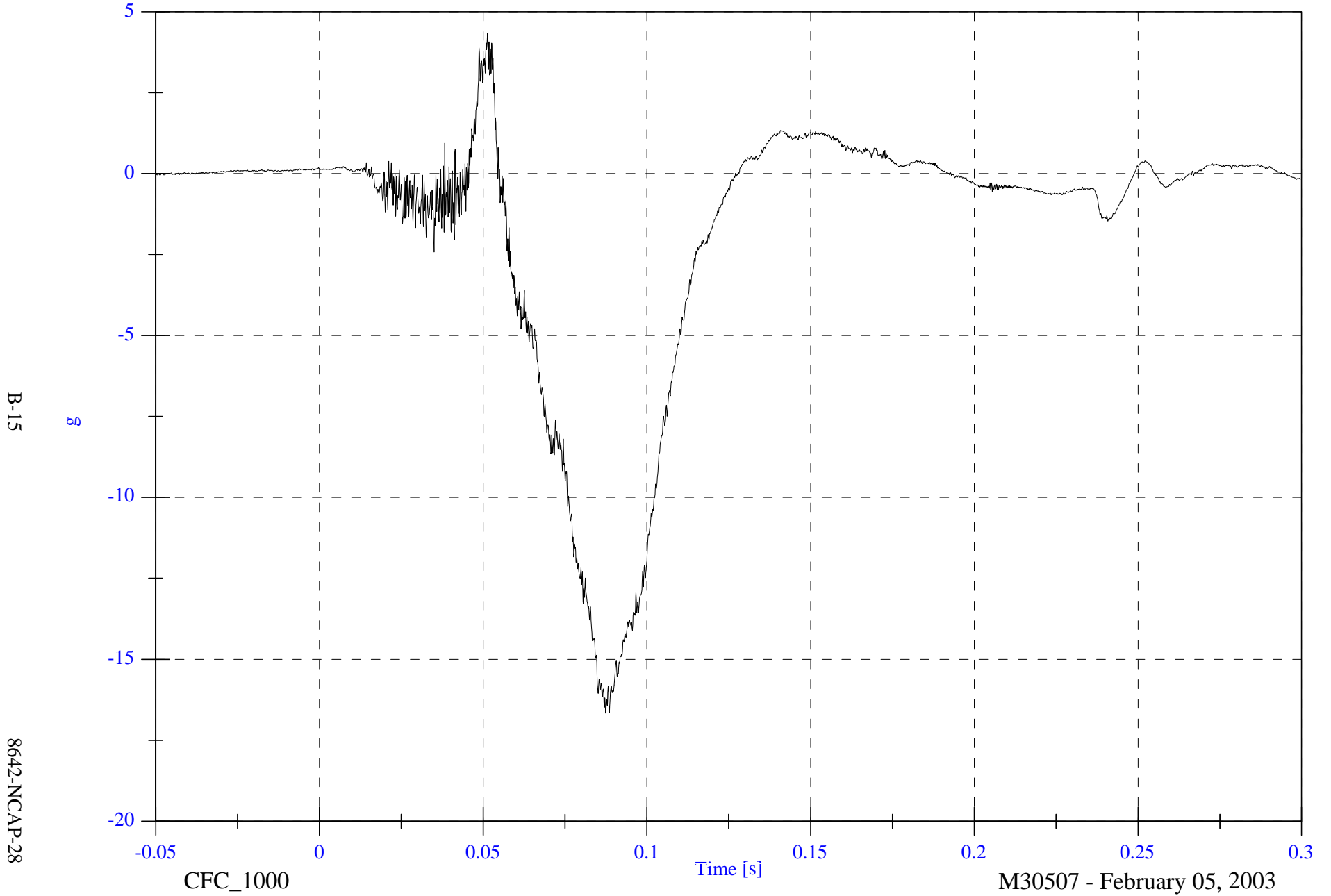
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Head CG y

Max: 4.3 [g] at 0.051 [s]

Min: -16.7 [g] at 0.087 [s]



NCAP Test #6 - 2003 Subaru Forester

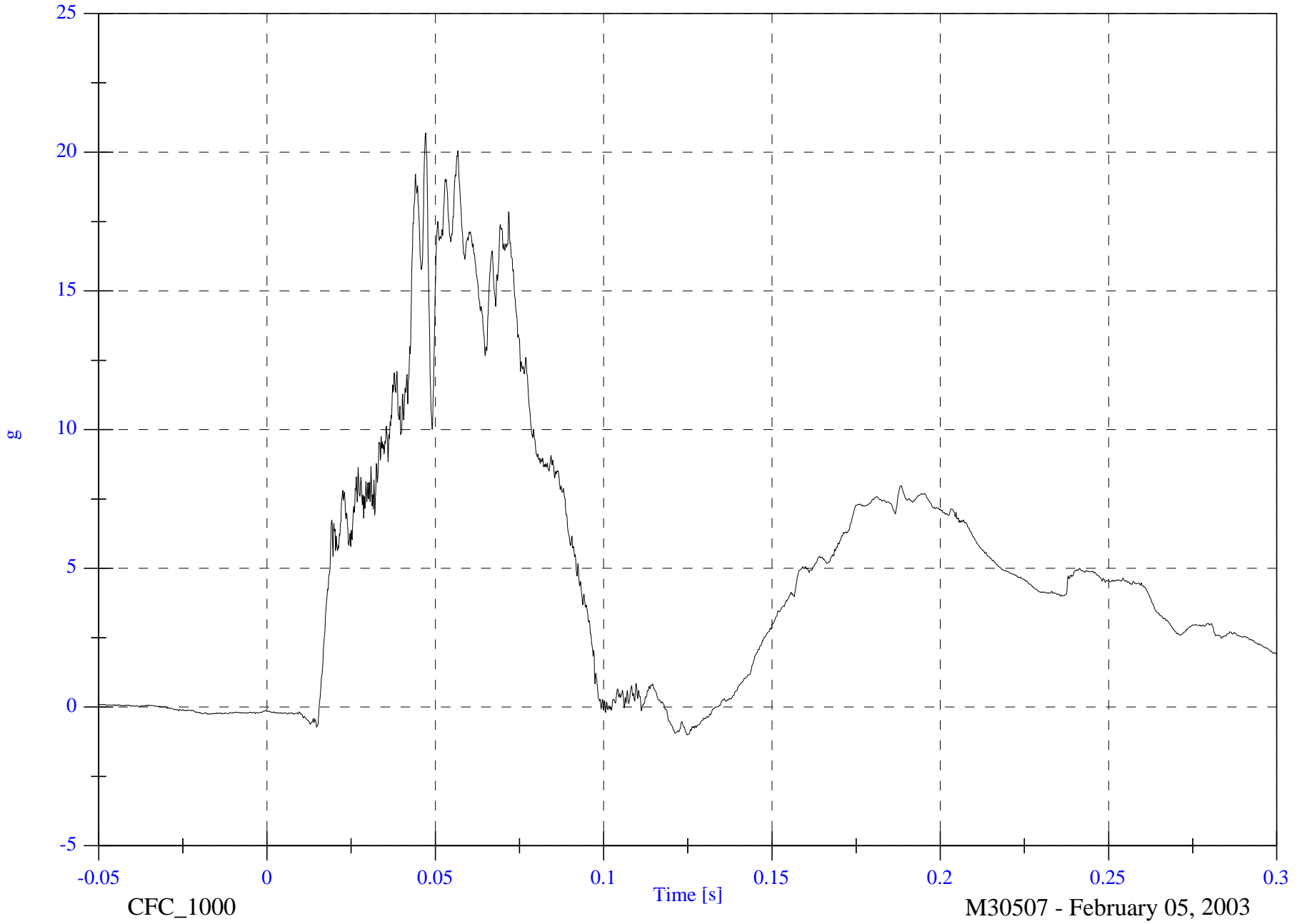
V1P1 Head CG z

Max: 20.7 [g] at 0.047 [s]

Min: -1.0 [g] at 0.125 [s]

B-16

8642-NCAP-28



CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

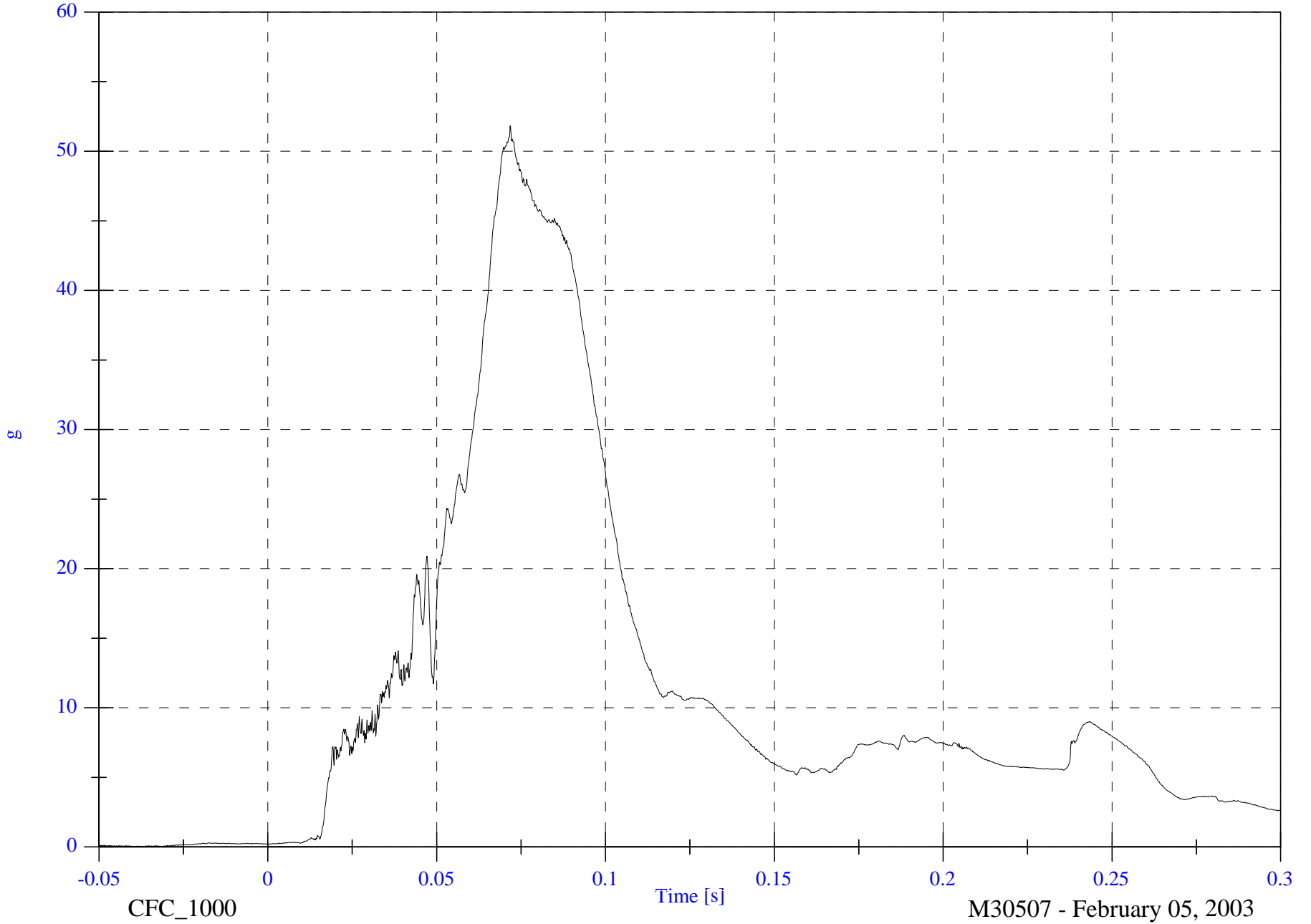
V1P1 Head CG Resultant

Max: 51.8 [g] at 0.072 [s]

Min: 0.0 [g] at -0.038 [s]

B-17

8642-NCAP-28



CFC\_1000

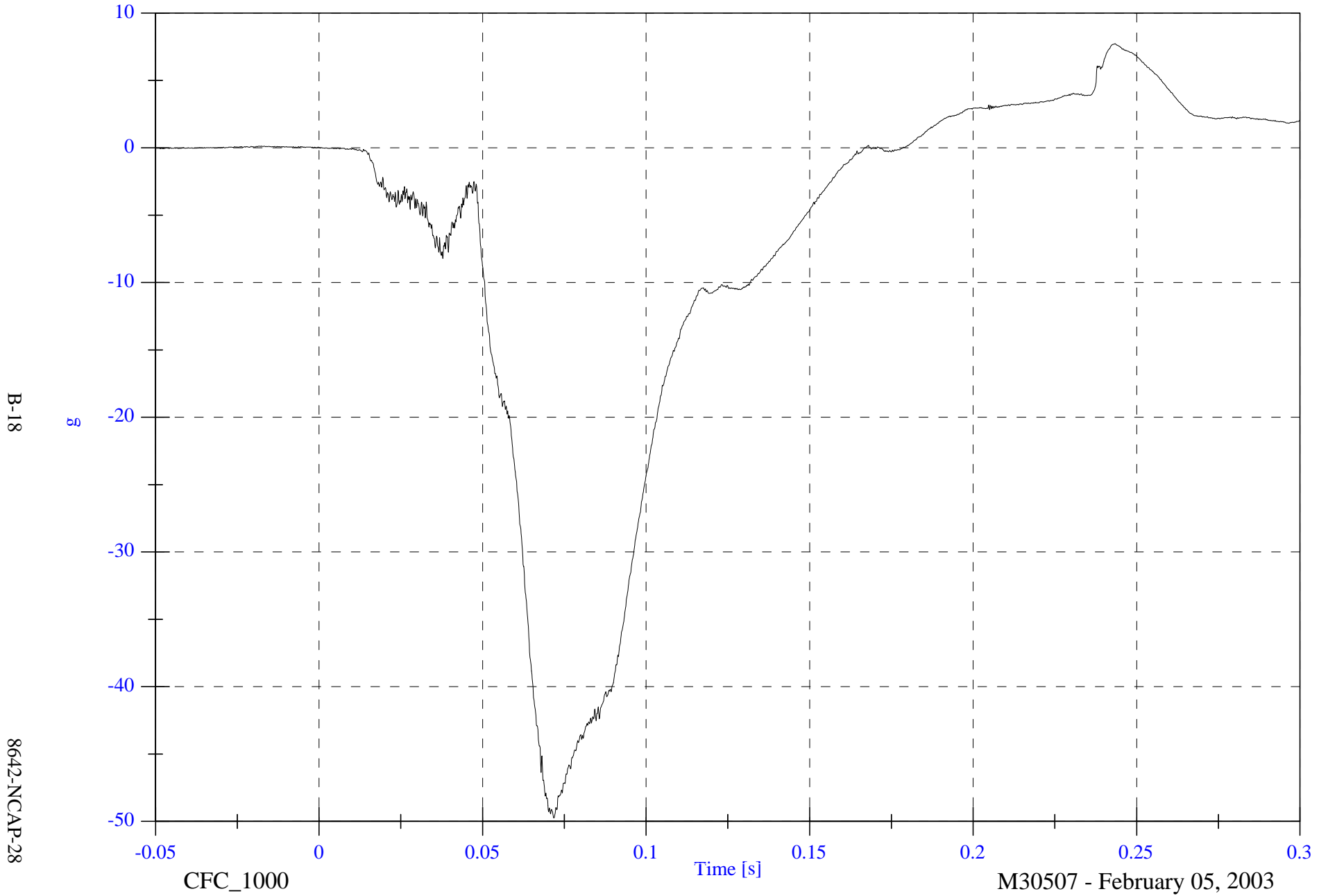
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Head CG Red x

Max: 7.7 [g] at 0.243 [s]

Min: -49.7 [g] at 0.072 [s]

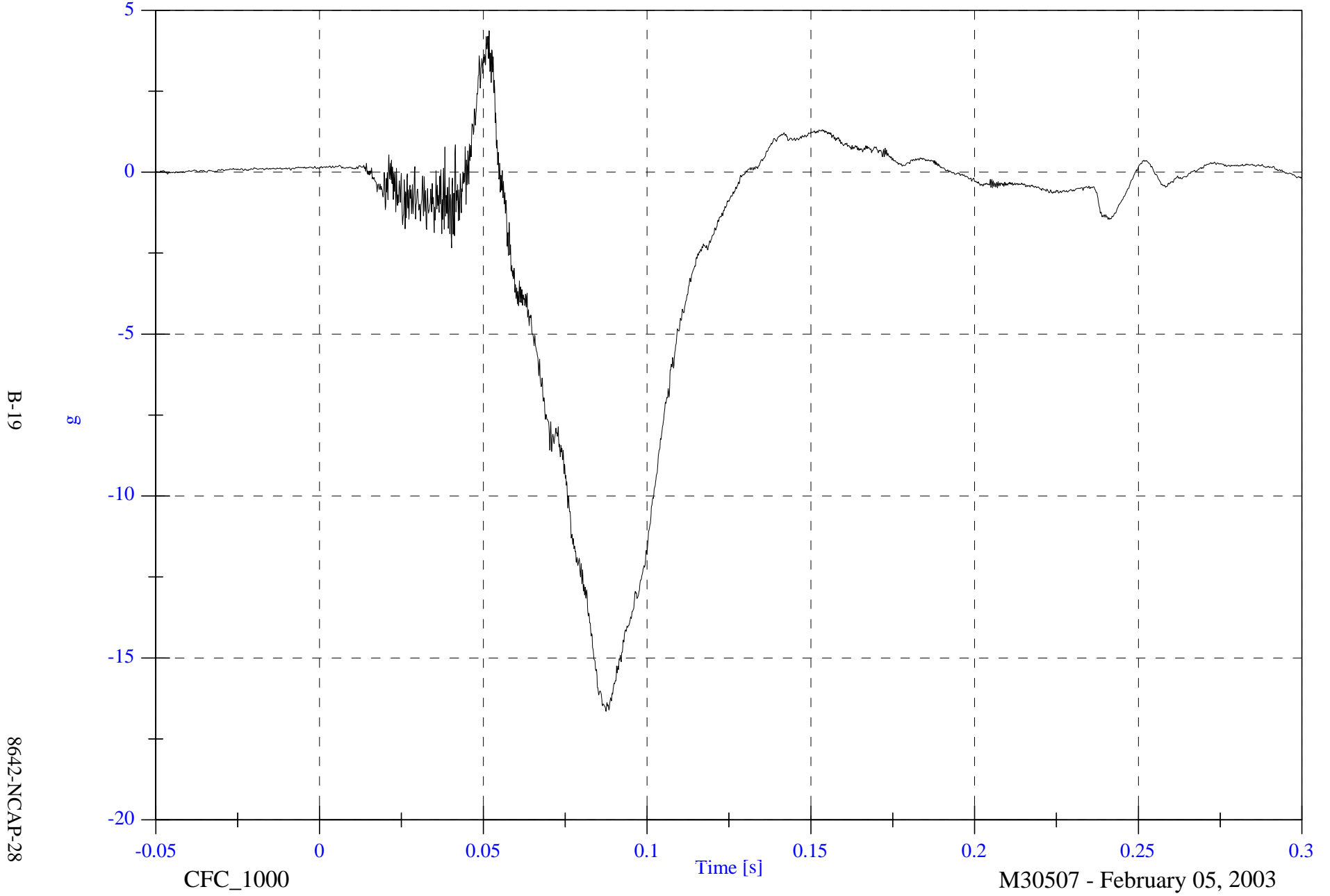


NCAP Test #6 - 2003 Subaru Forester

V1P1 Head CG Red y

Max: 4.4 [g] at 0.052 [s]

Min: -16.6 [g] at 0.087 [s]



NCAP Test #6 - 2003 Subaru Forester

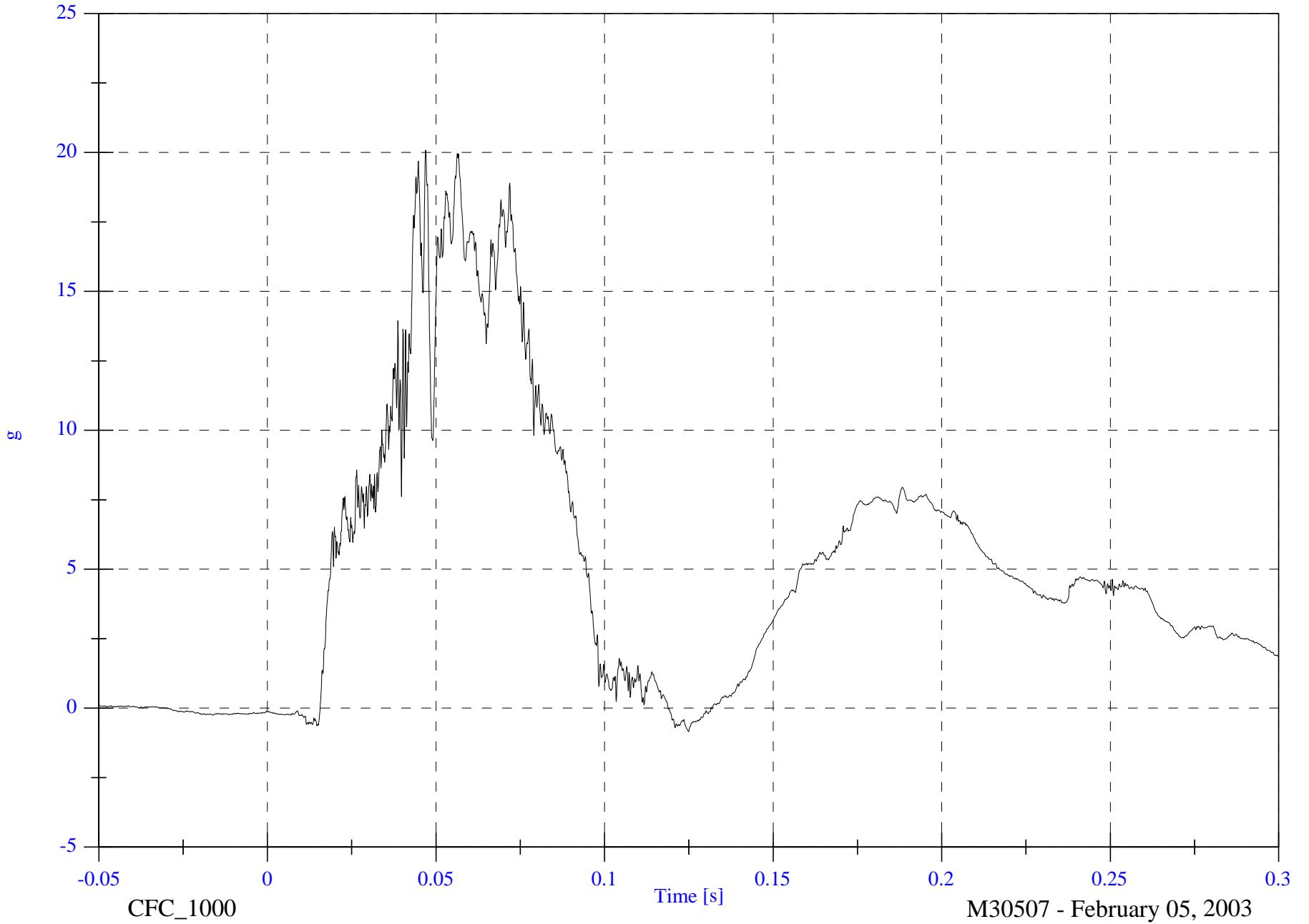
V1P1 Head CG Red z

Max: 20.1 [g] at 0.047 [s]

Min: -0.8 [g] at 0.125 [s]

B-20

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

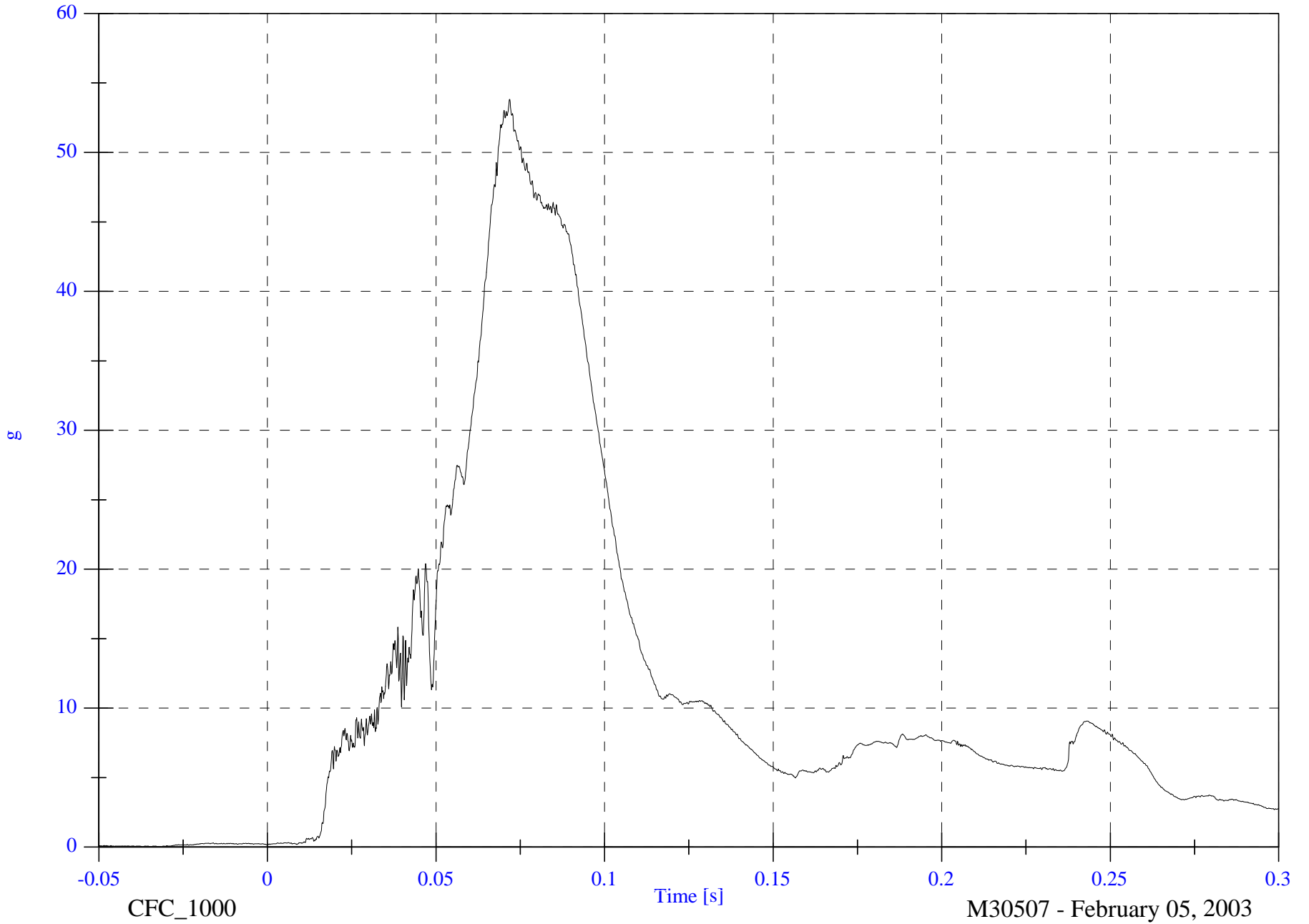
V1P1 Head CG Red Resultant

Max: 53.8 [g] at 0.072 [s]

Min: 0.0 [g] at -0.037 [s]

B-21

8642-NCAP-28



CFC\_1000

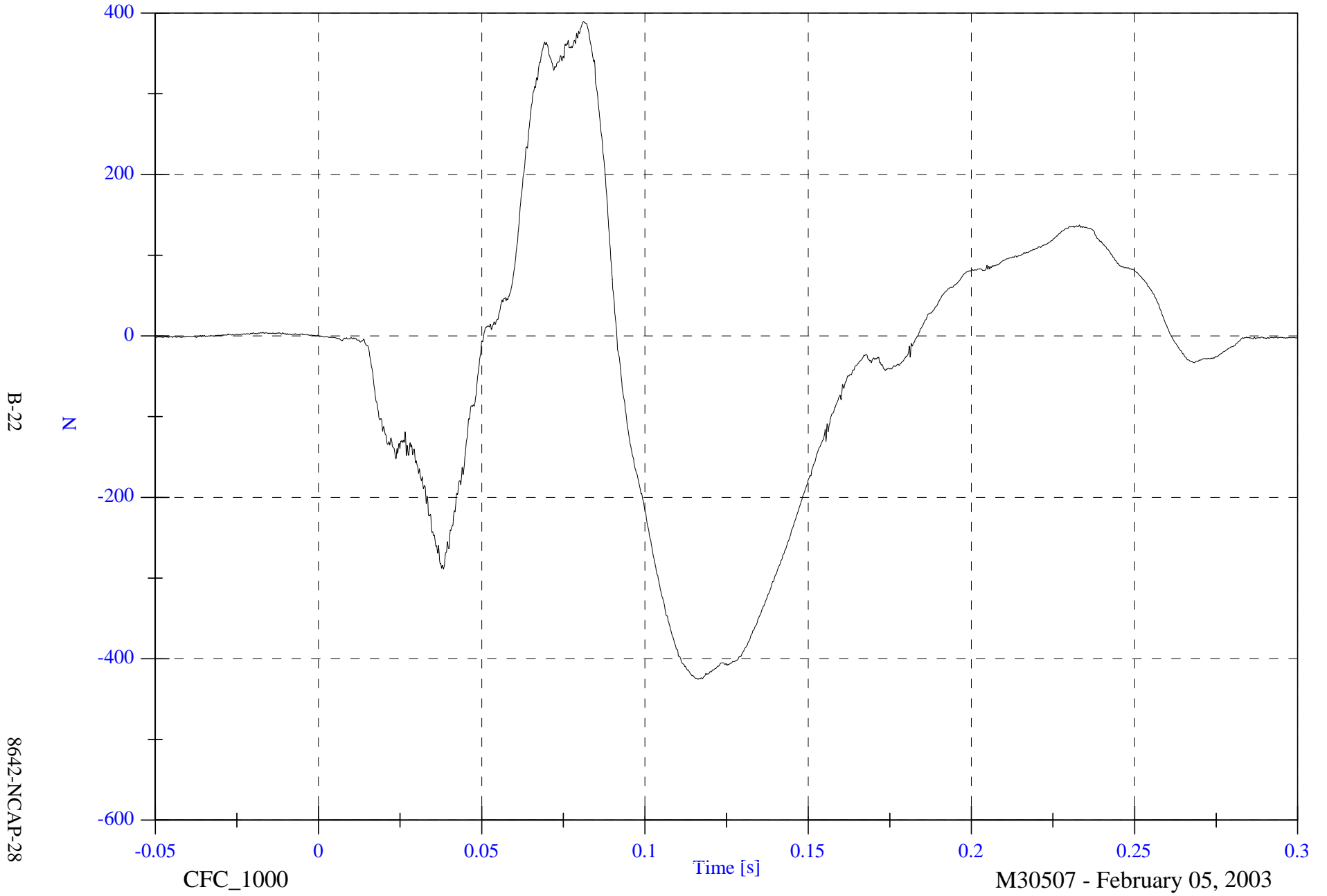
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 389.5 [N] at 0.081 [s]

Min: -425.5 [N] at 0.116 [s]

V1P1 Upper Neck Fx

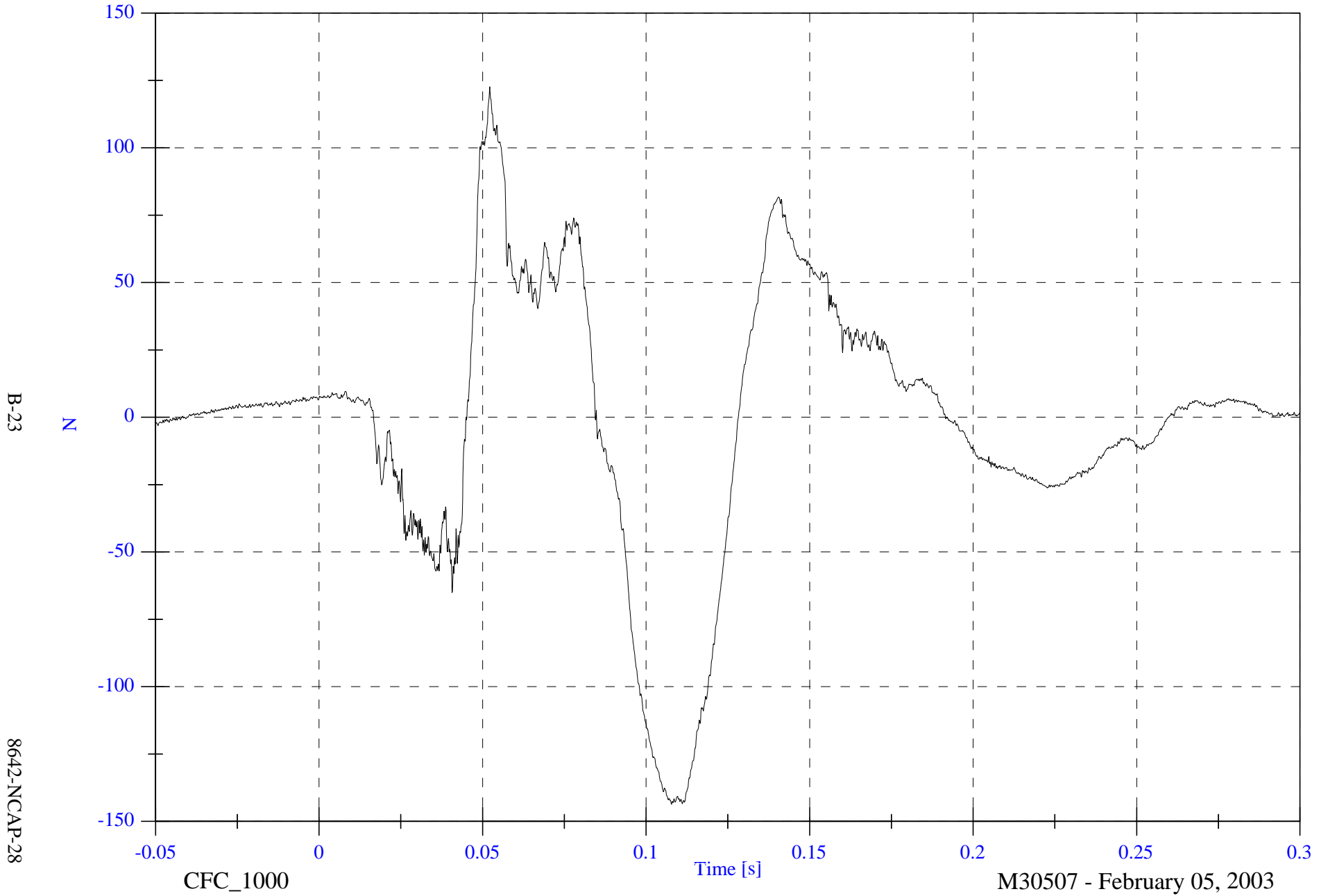


NCAP Test #6 - 2003 Subaru Forester

V1P1 Upper Neck Fy

Max: 122.6 [N] at 0.052 [s]

Min: -143.6 [N] at 0.108 [s]

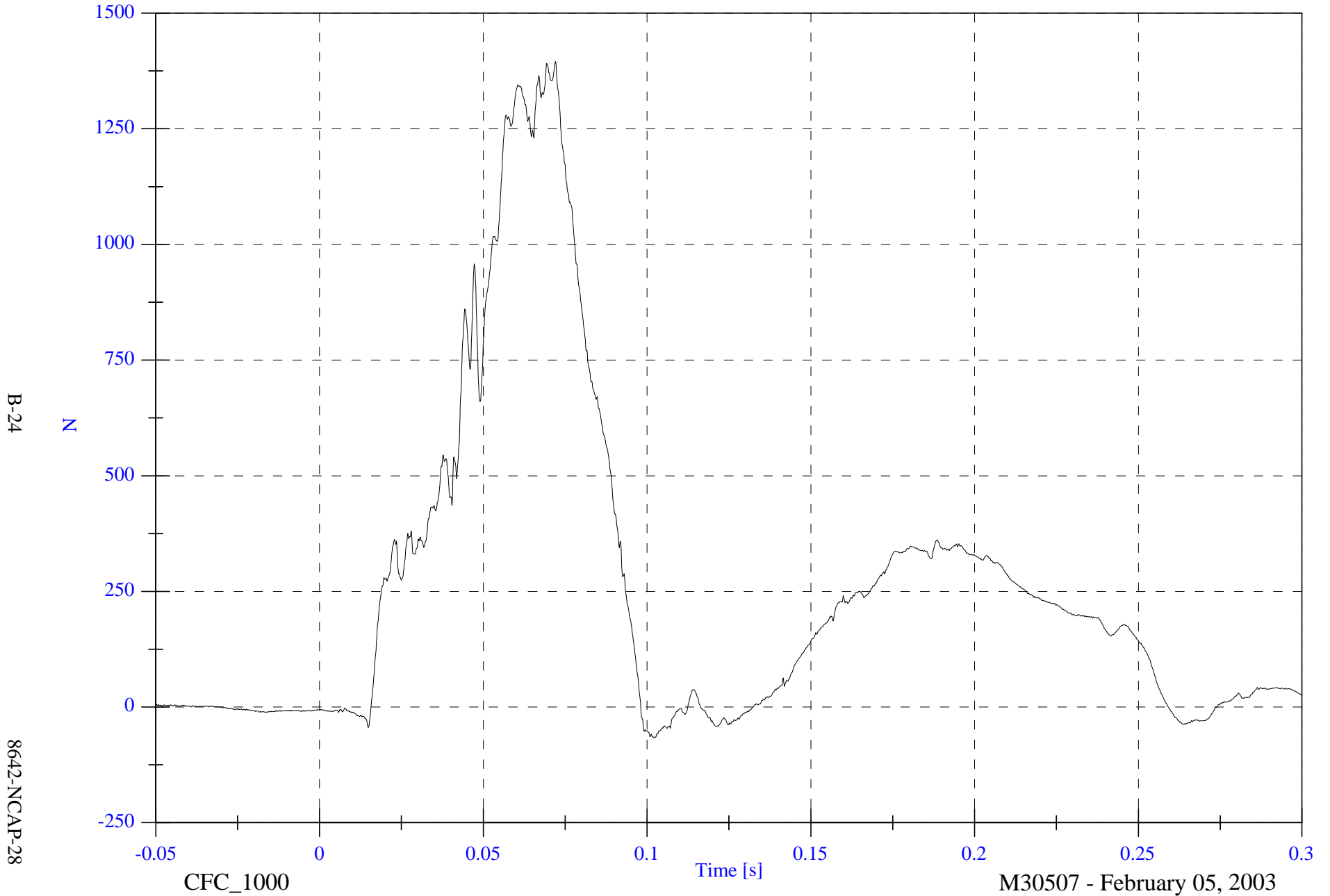


NCAP Test #6 - 2003 Subaru Forester

V1P1 Upper Neck Fz

Max: 1395.3 [N] at 0.072 [s]

Min: -66.9 [N] at 0.102 [s]



B-24

8642-NCAP-28

CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

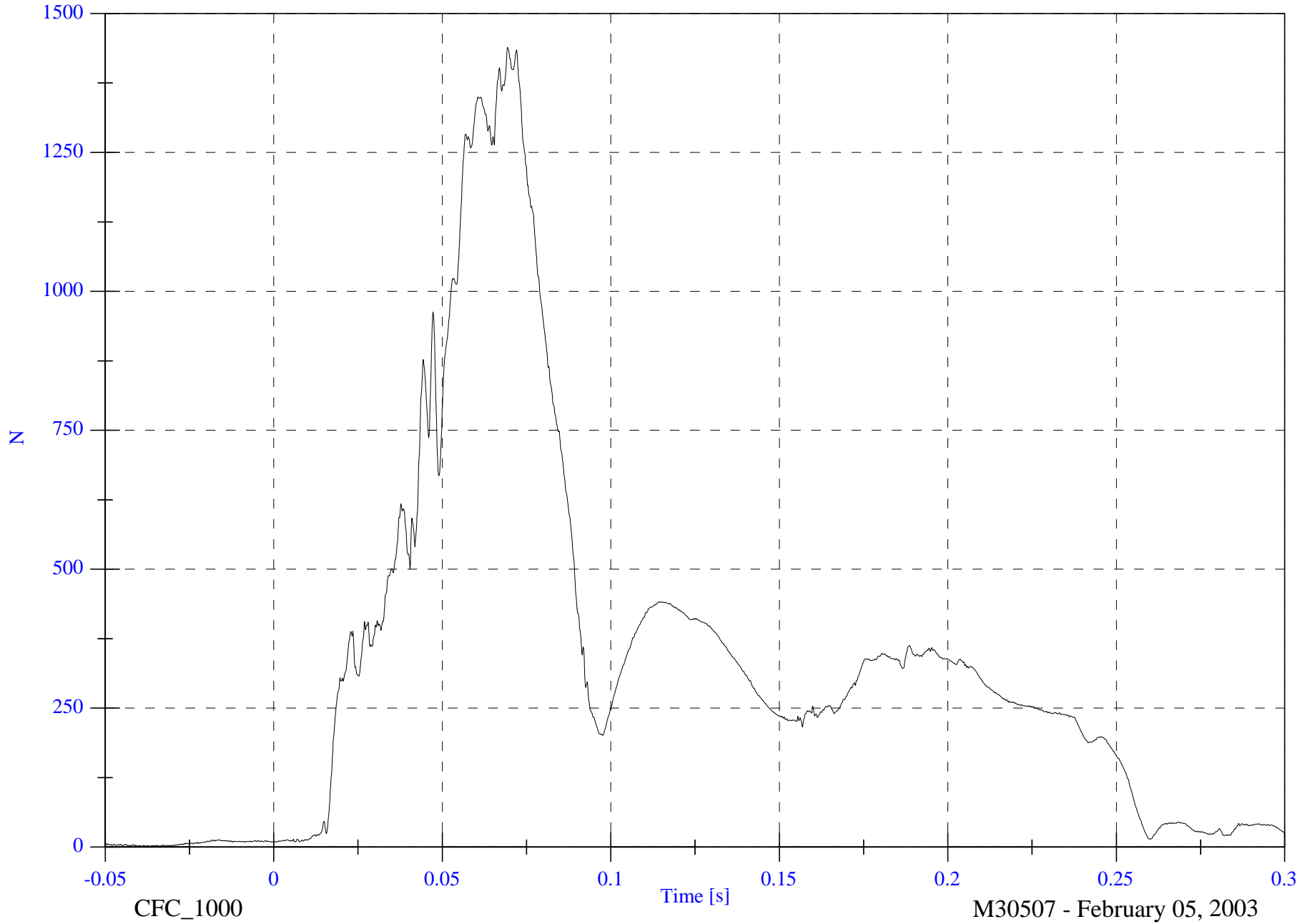
V1P1 Upper Neck F Resultant

Max: 1439.3 [N] at 0.069 [s]

Min: 1.1 [N] at -0.039 [s]

B-25

8642-NCAP-28



CFC\_1000

Time [s]

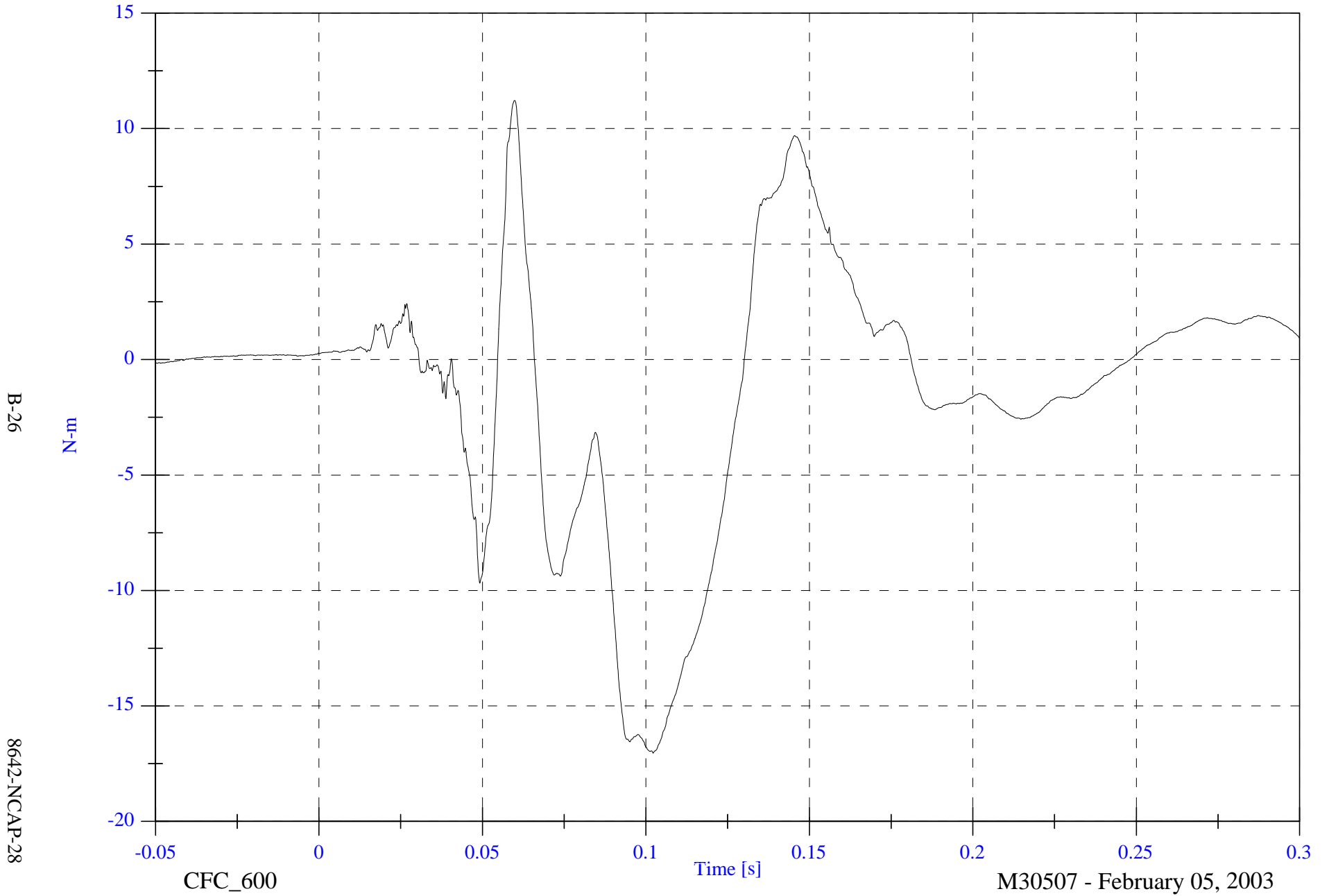
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 11.2 [N-m] at 0.060 [s]

V1P1 Upper Neck Mx

Min: -17.0 [N-m] at 0.102 [s]



B-26

8642-NCAP-28

CFC\_600

Time [s]

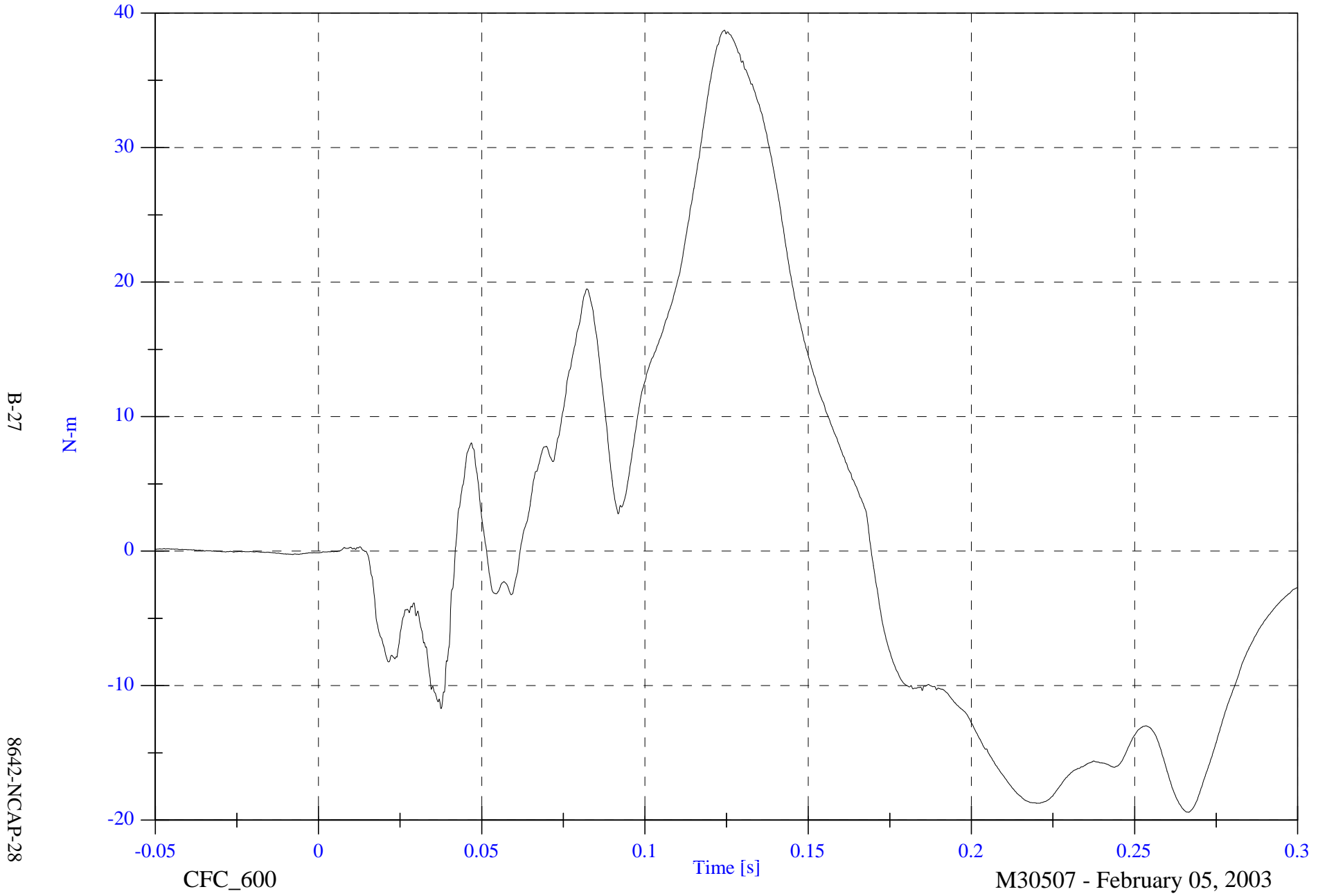
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 38.7 [N-m] at 0.124 [s]

Min: -19.4 [N-m] at 0.266 [s]

V1P1 Upper Neck My

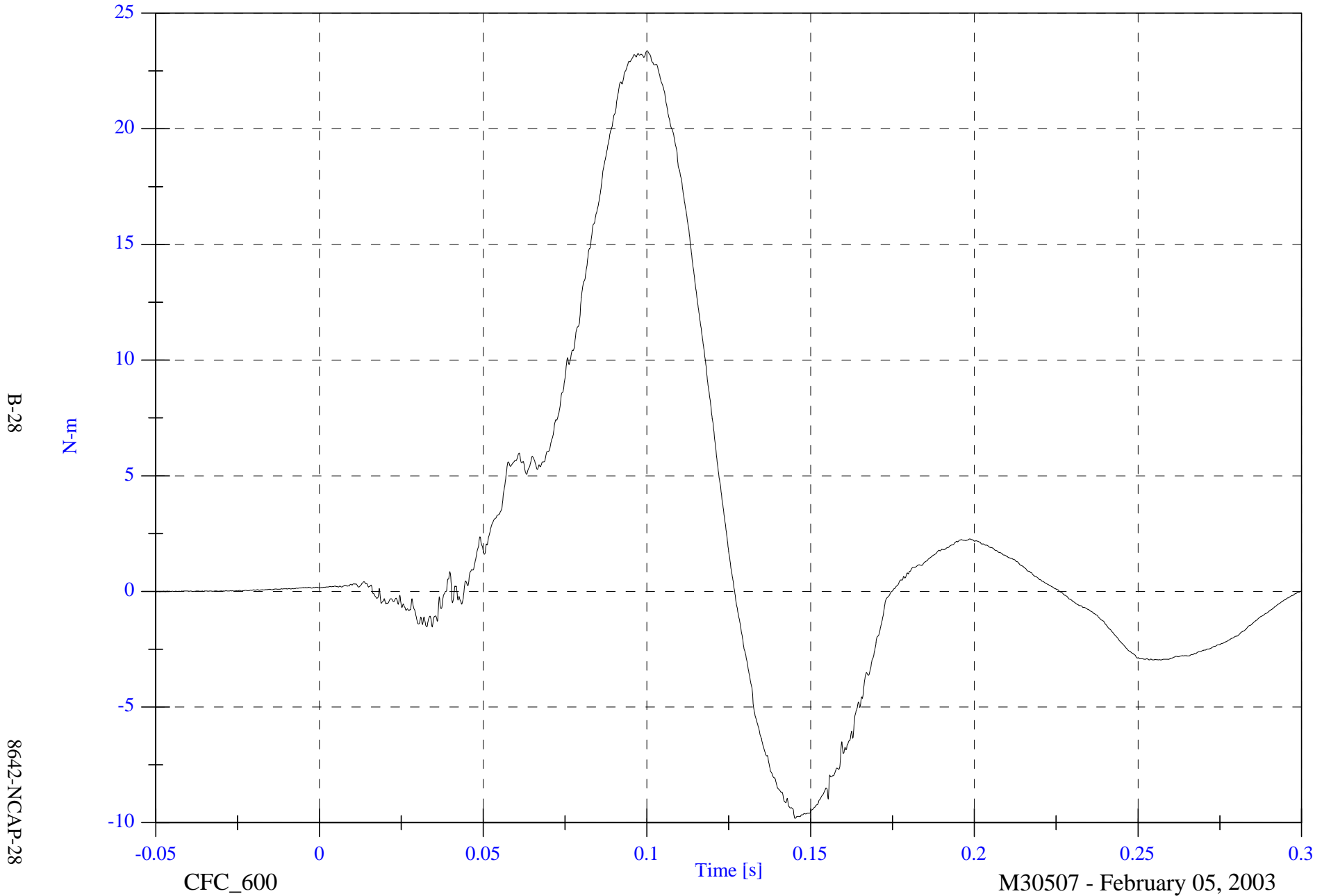


NCAP Test #6 - 2003 Subaru Forester

Max: 23.4 [N-m] at 0.100 [s]

Min: -9.8 [N-m] at 0.145 [s]

V1P1 Upper Neck Mz



B-28

8642-NCAP-28

CFC\_600

Time [s]

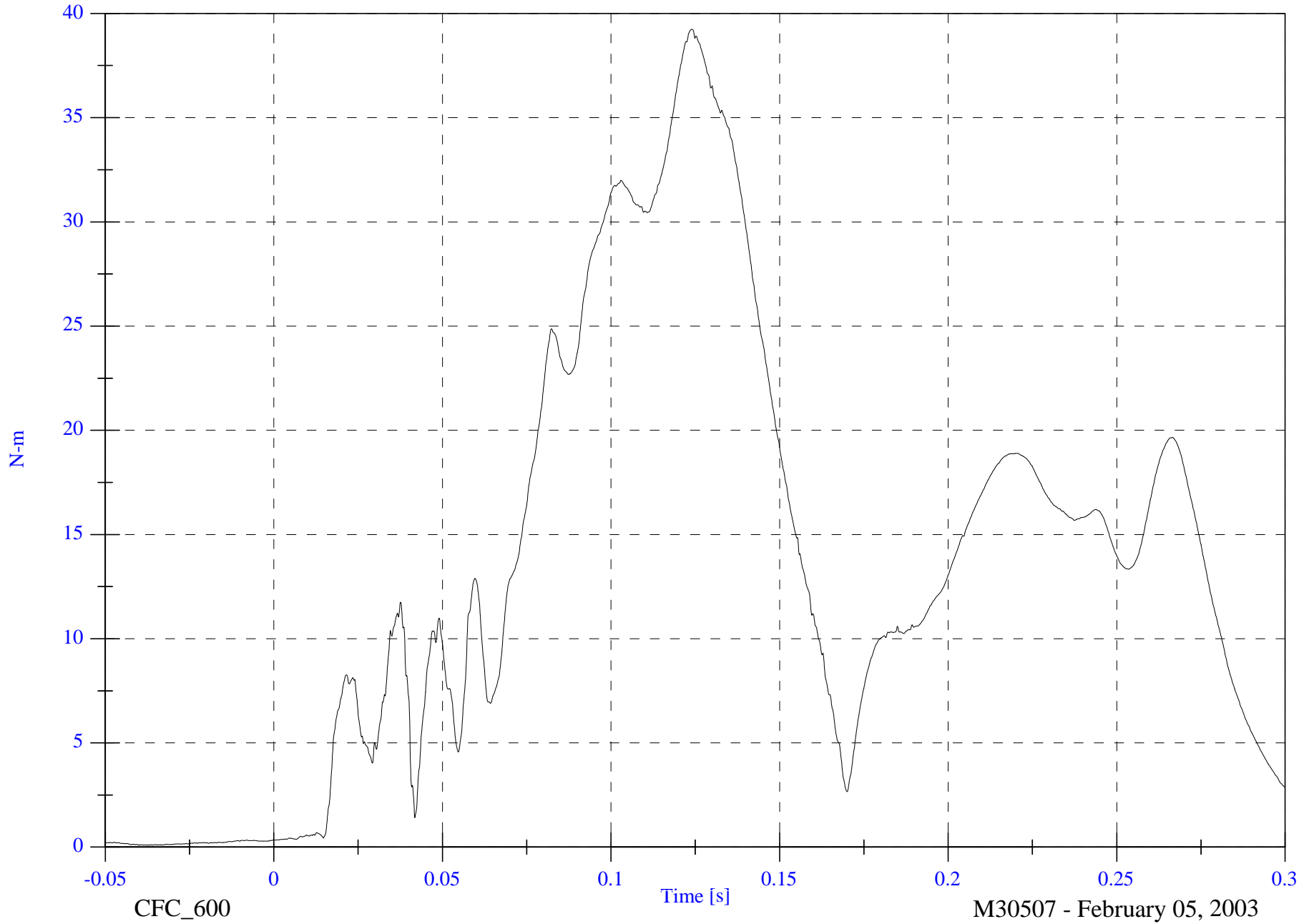
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Upper Neck M Resultant

Max: 39.2 [N-m] at 0.124 [s]

Min: 0.1 [N-m] at -0.038 [s]



B-29

8642-NCAP-28

CFC\_600

Time [s]

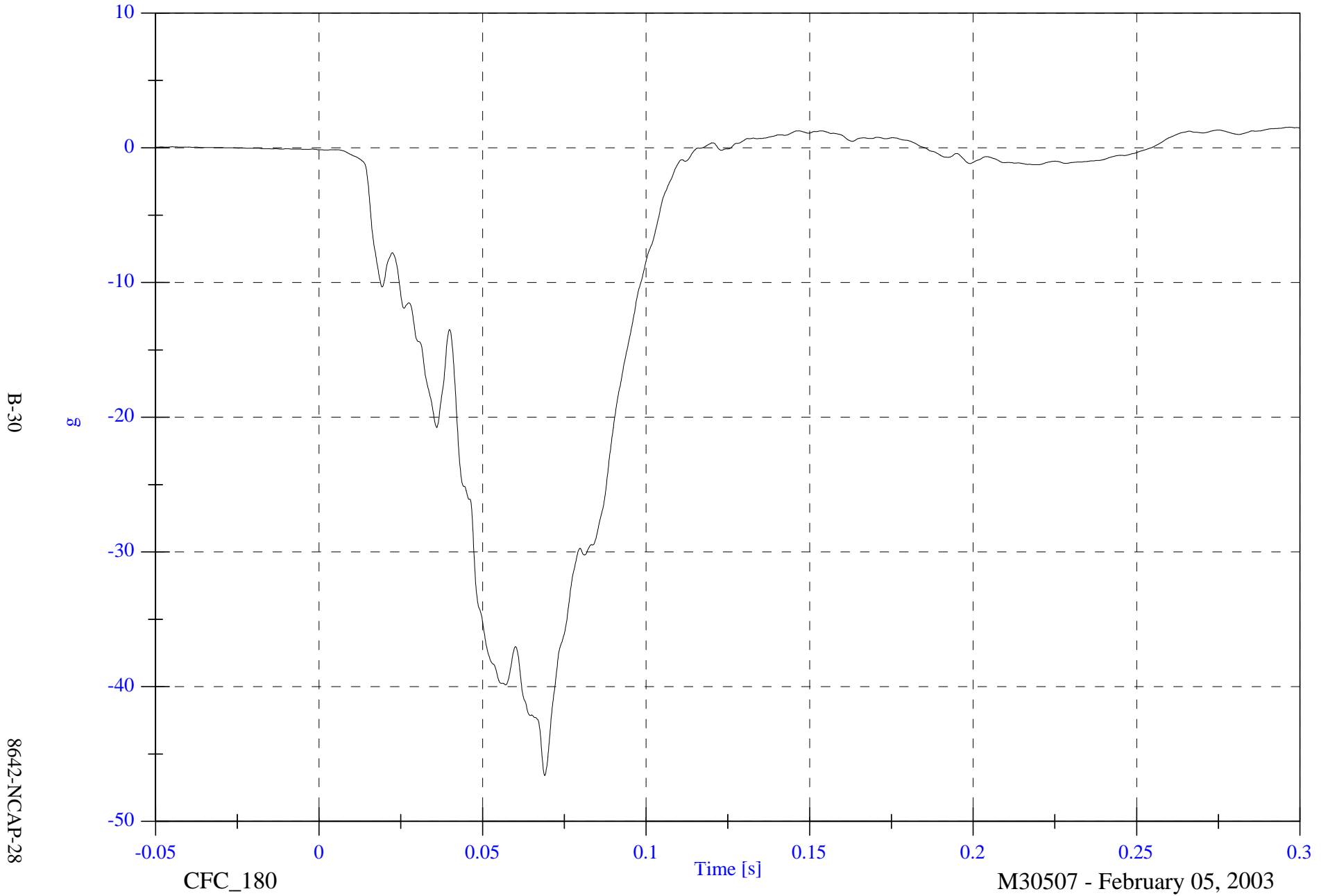
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

VIP1 Chest x

Max: 1.5 [g] at 0.297 [s]

Min: -46.6 [g] at 0.069 [s]

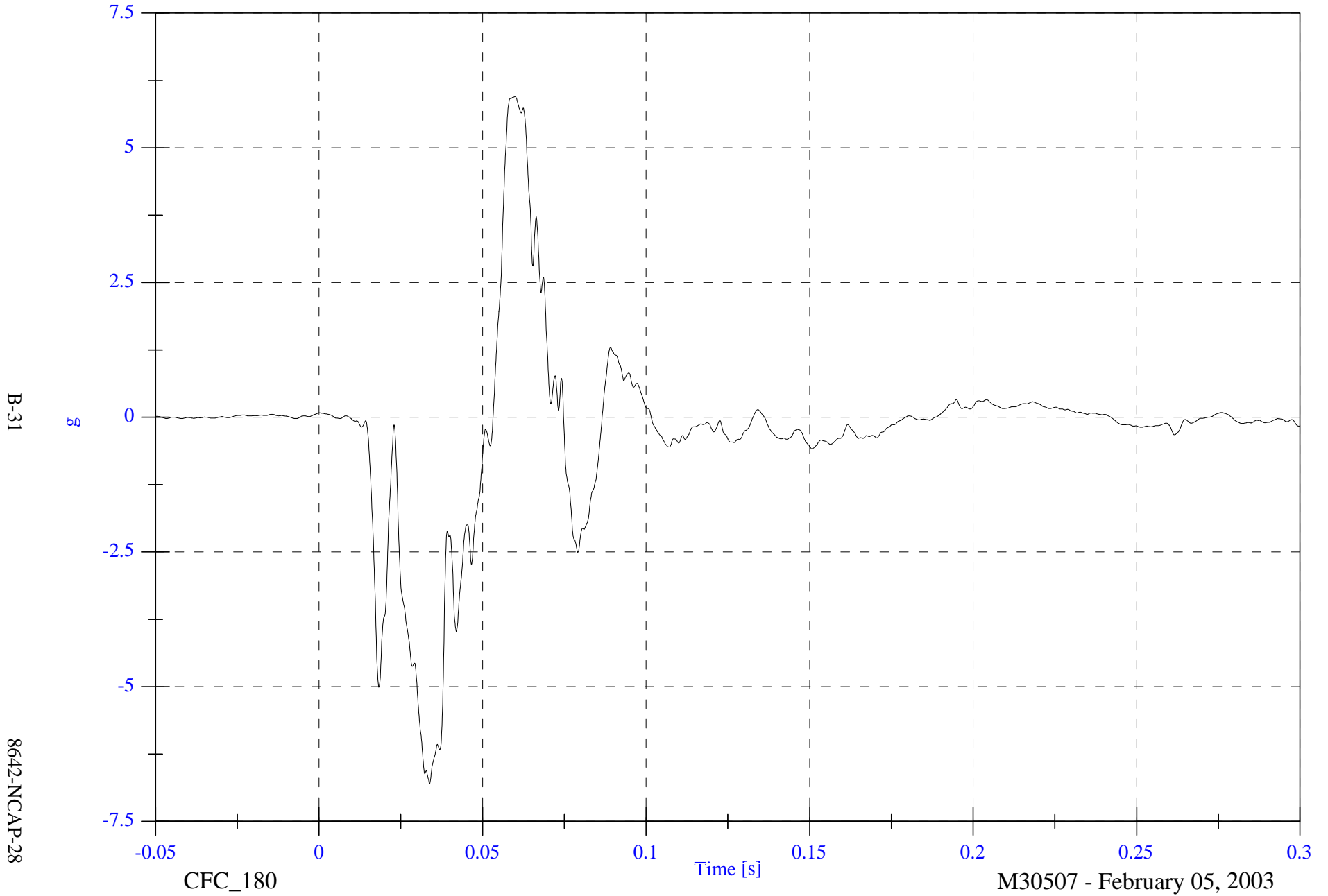


NCAP Test #6 - 2003 Subaru Forester

VIP1 Chest y

Max: 5.9 [g] at 0.060 [s]

Min: -6.8 [g] at 0.034 [s]



B-31

8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

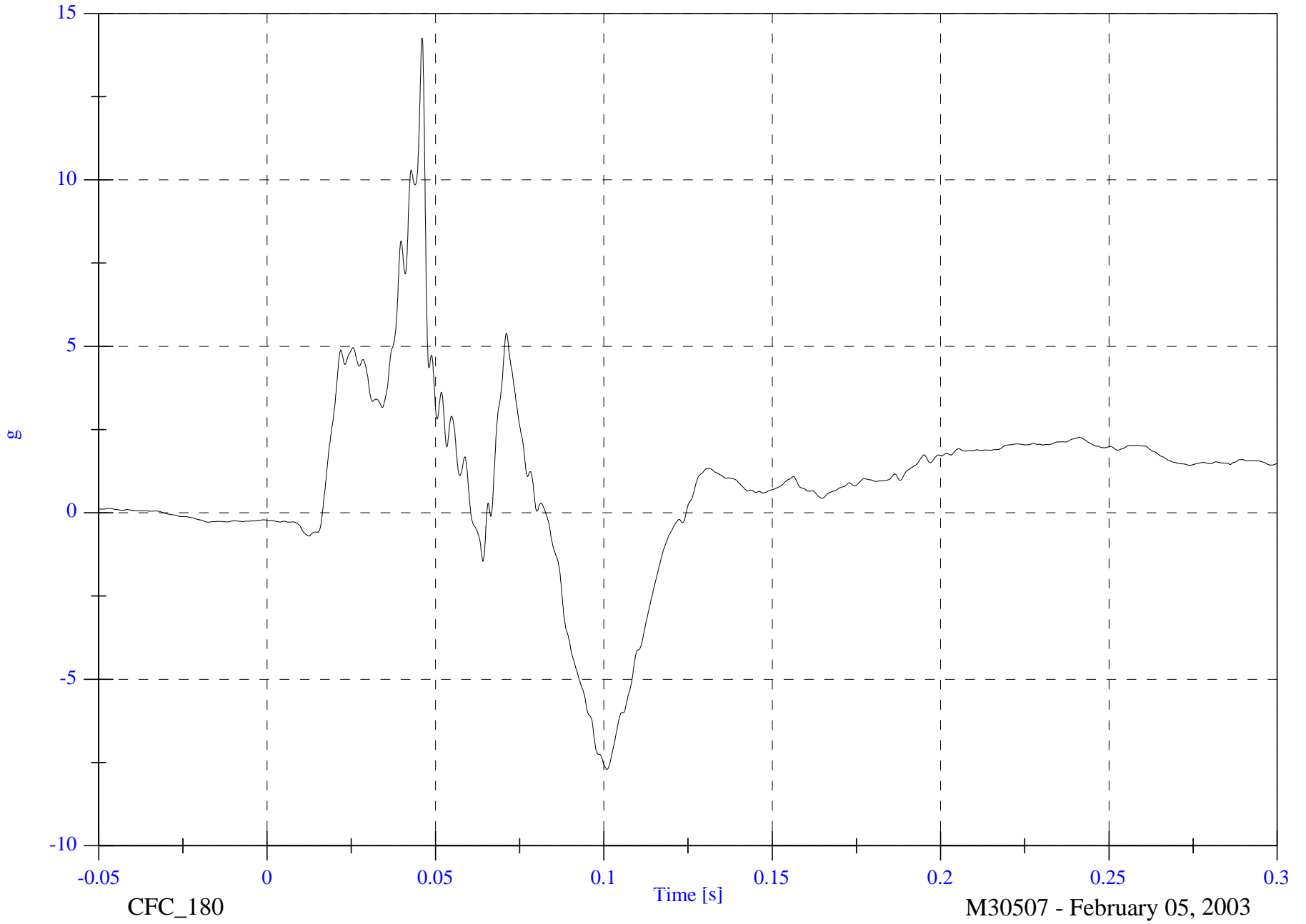
VIP1 Chest z

Max: 14.3 [g] at 0.046 [s]

Min: -7.7 [g] at 0.101 [s]

B-32

8642-NCAP-28



CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

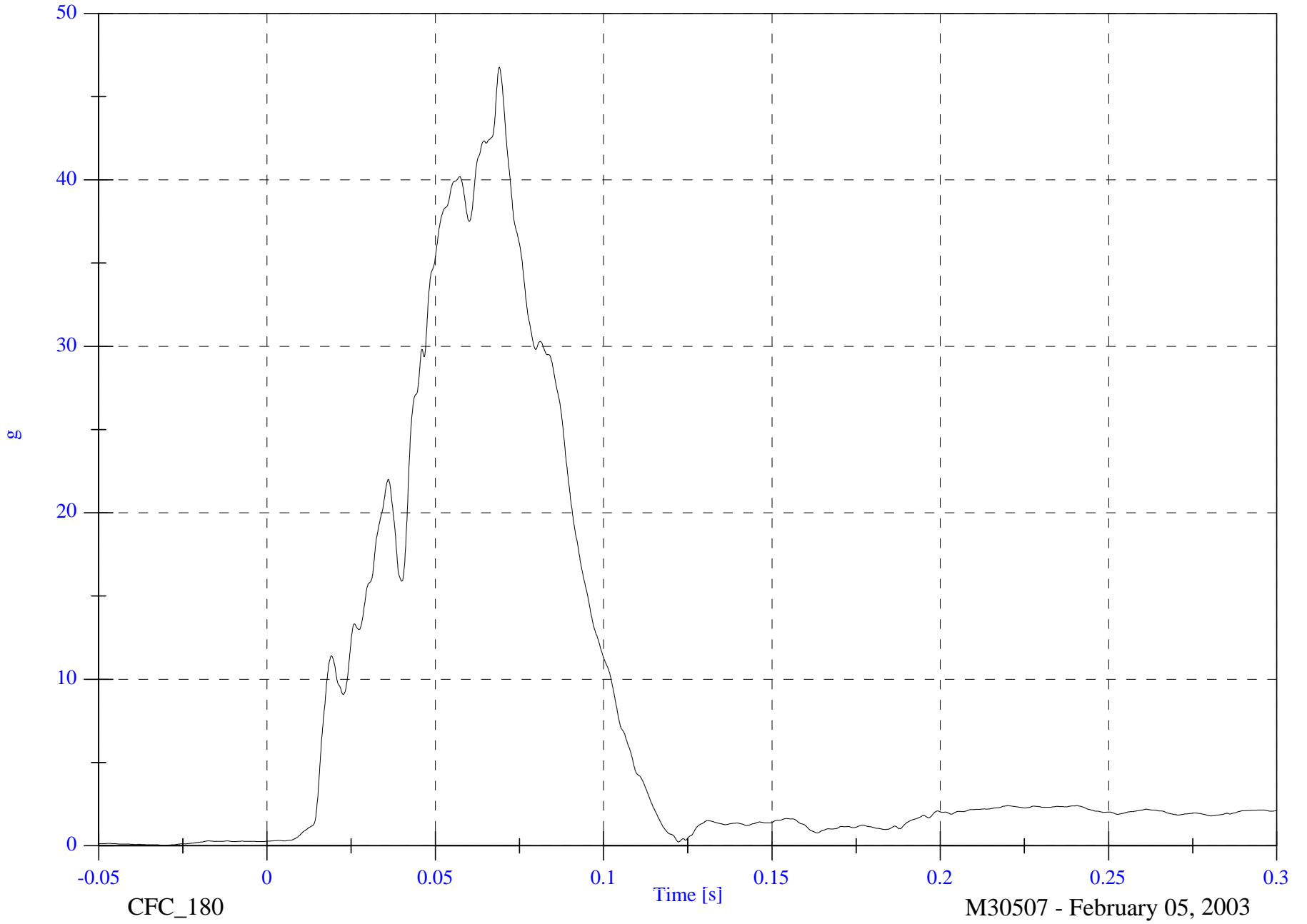
V1P1 Chest Resultant

Max: 46.8 [g] at 0.069 [s]

Min: 0.0 [g] at -0.031 [s]

B-33

8642-NCAP-28

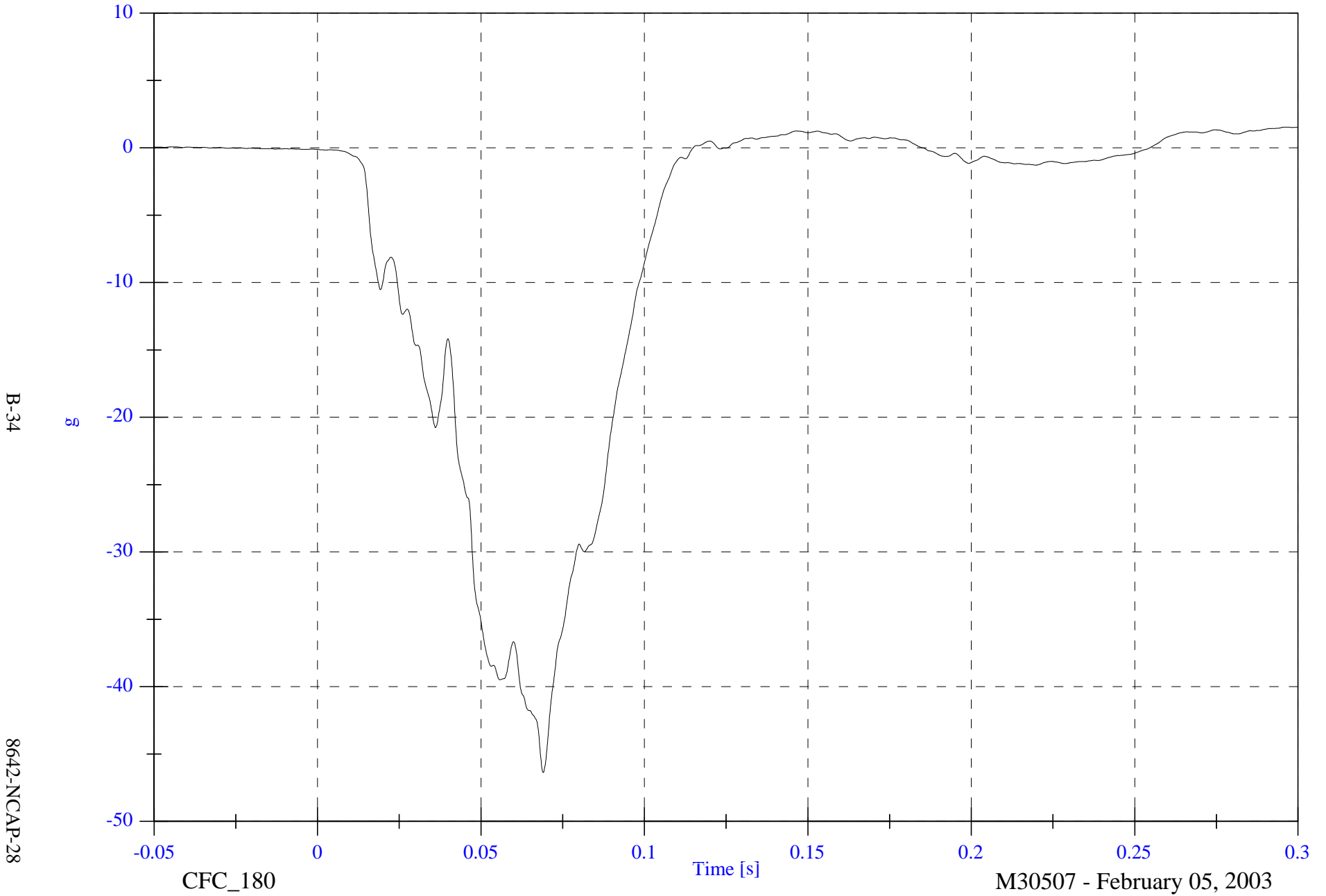


NCAP Test #6 - 2003 Subaru Forester

VIP1 Chest Red x

Max: 1.5 [g] at 0.297 [s]

Min: -46.4 [g] at 0.069 [s]

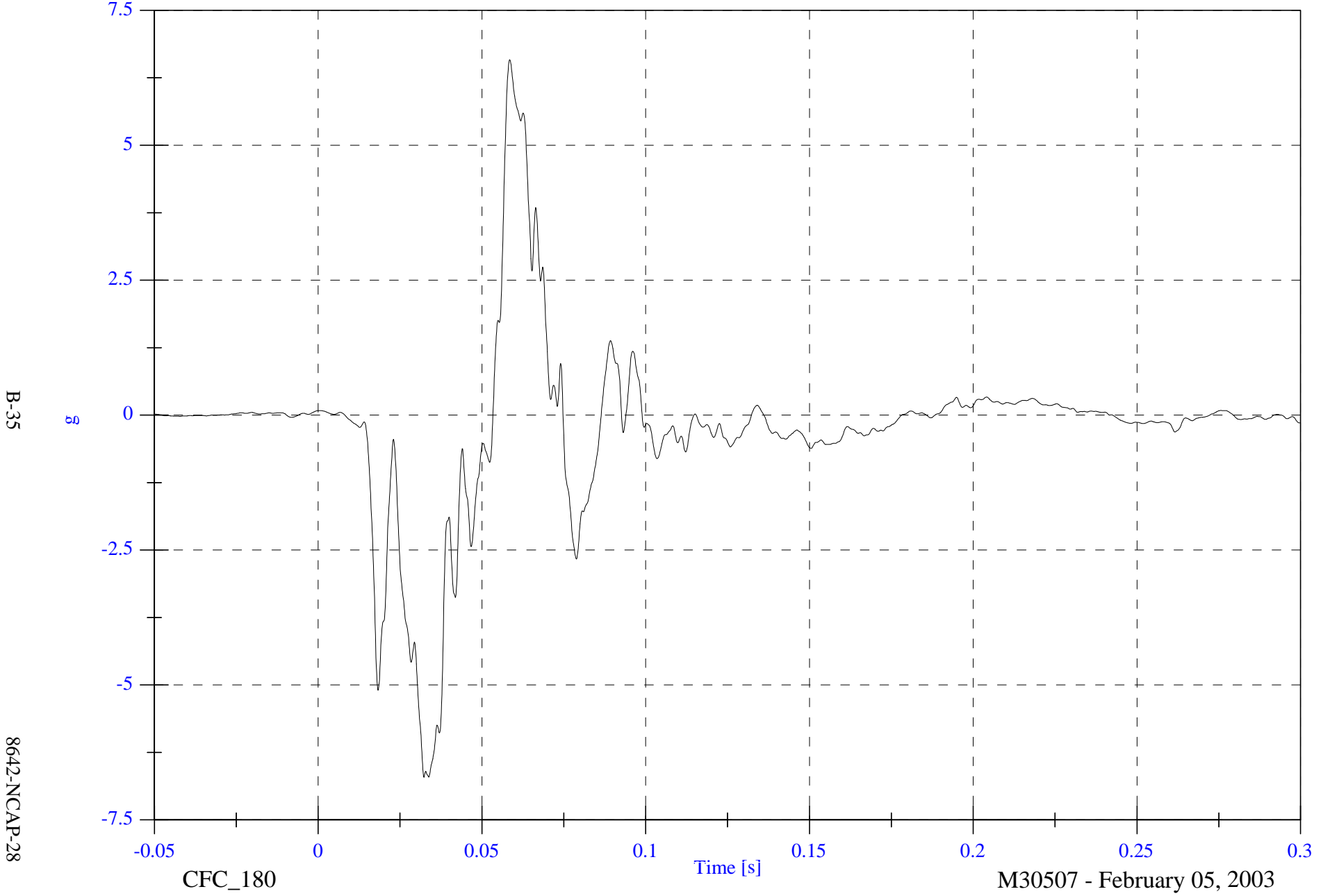


NCAP Test #6 - 2003 Subaru Forester

VIP1 Chest Red y

Max: 6.6 [g] at 0.058 [s]

Min: -6.7 [g] at 0.032 [s]

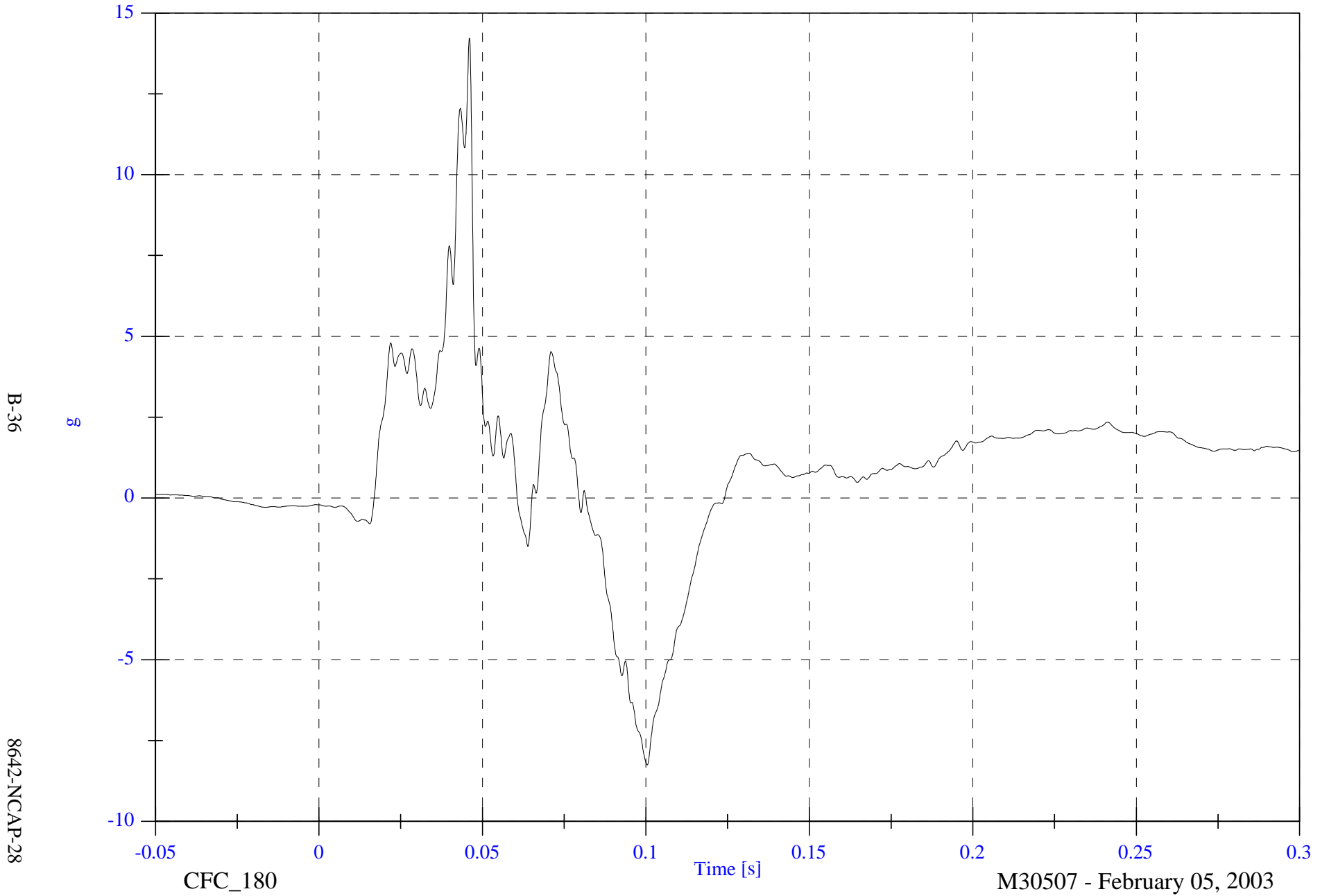


NCAP Test #6 - 2003 Subaru Forester

VIP1 Chest Red z

Max: 14.2 [g] at 0.046 [s]

Min: -8.3 [g] at 0.100 [s]



NCAP Test #6 - 2003 Subaru Forester

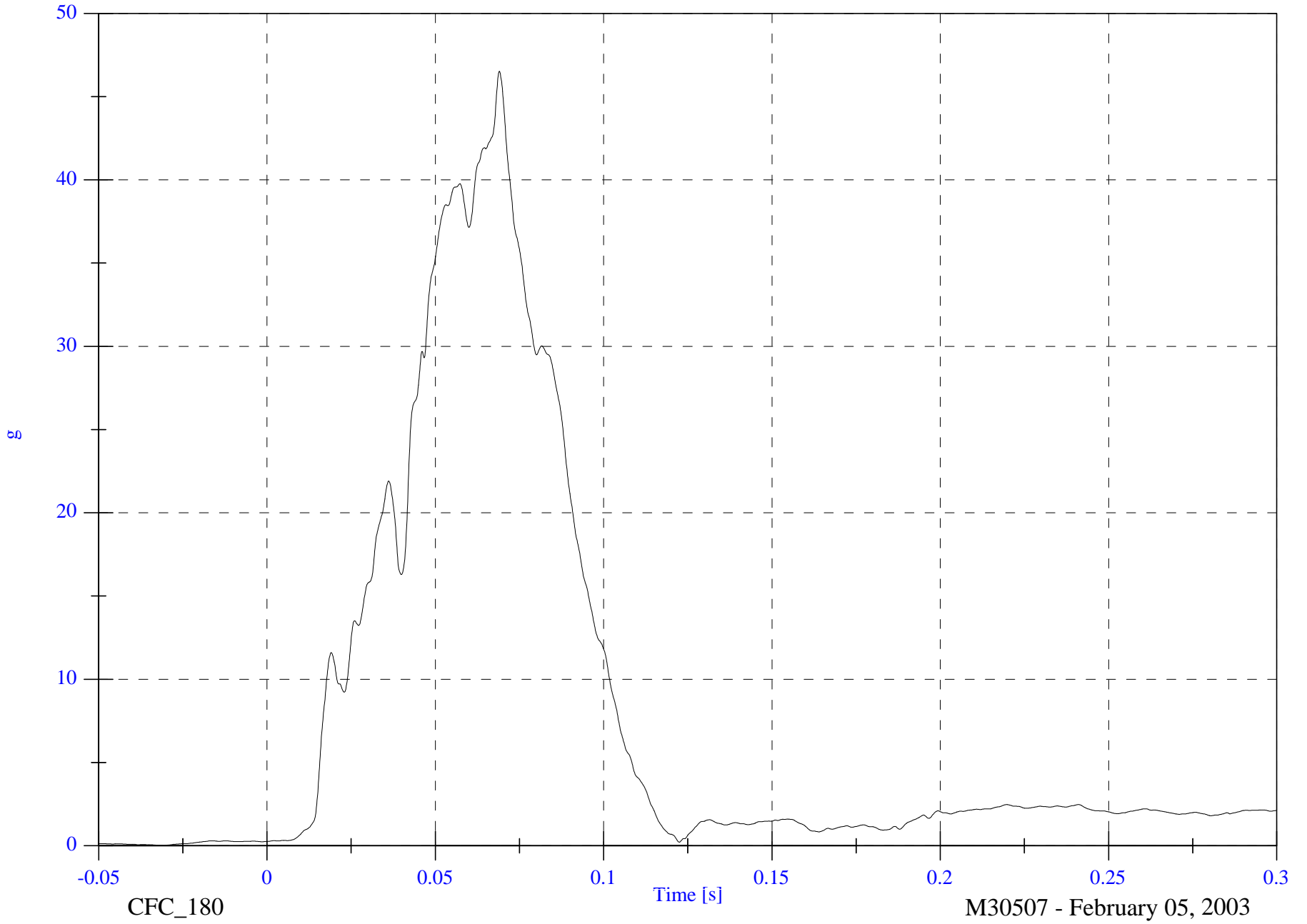
V1P1 Chest Red Resultant

Max: 46.5 [g] at 0.069 [s]

Min: 0.0 [g] at -0.031 [s]

B-37

8642-NCAP-28



CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

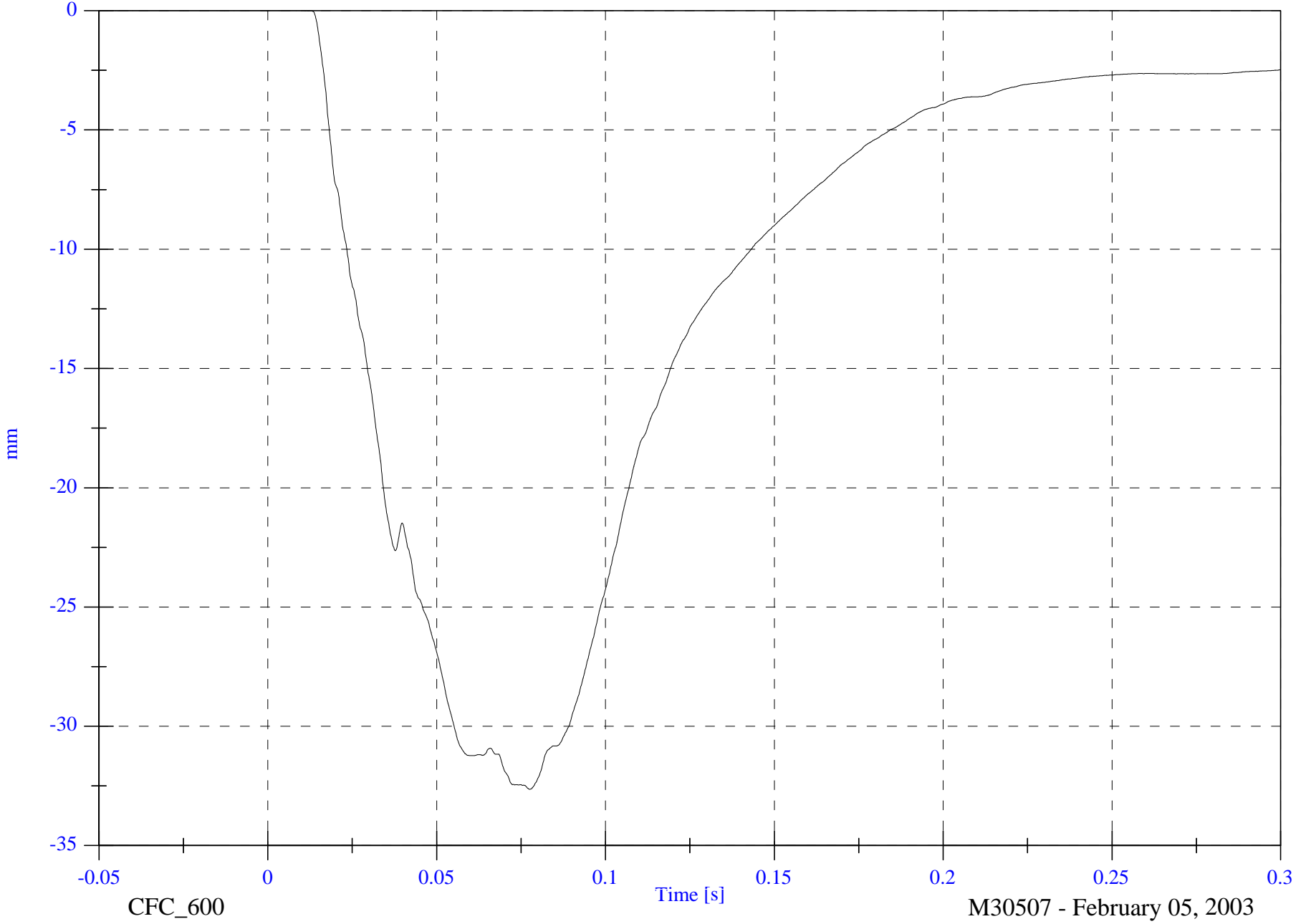
VIP1 Chest Compression x

Max: 0.0 [mm] at -0.007 [s]

Min: -32.6 [mm] at 0.077 [s]

B-38

8642-NCAP-28



CFC\_600

Time [s]

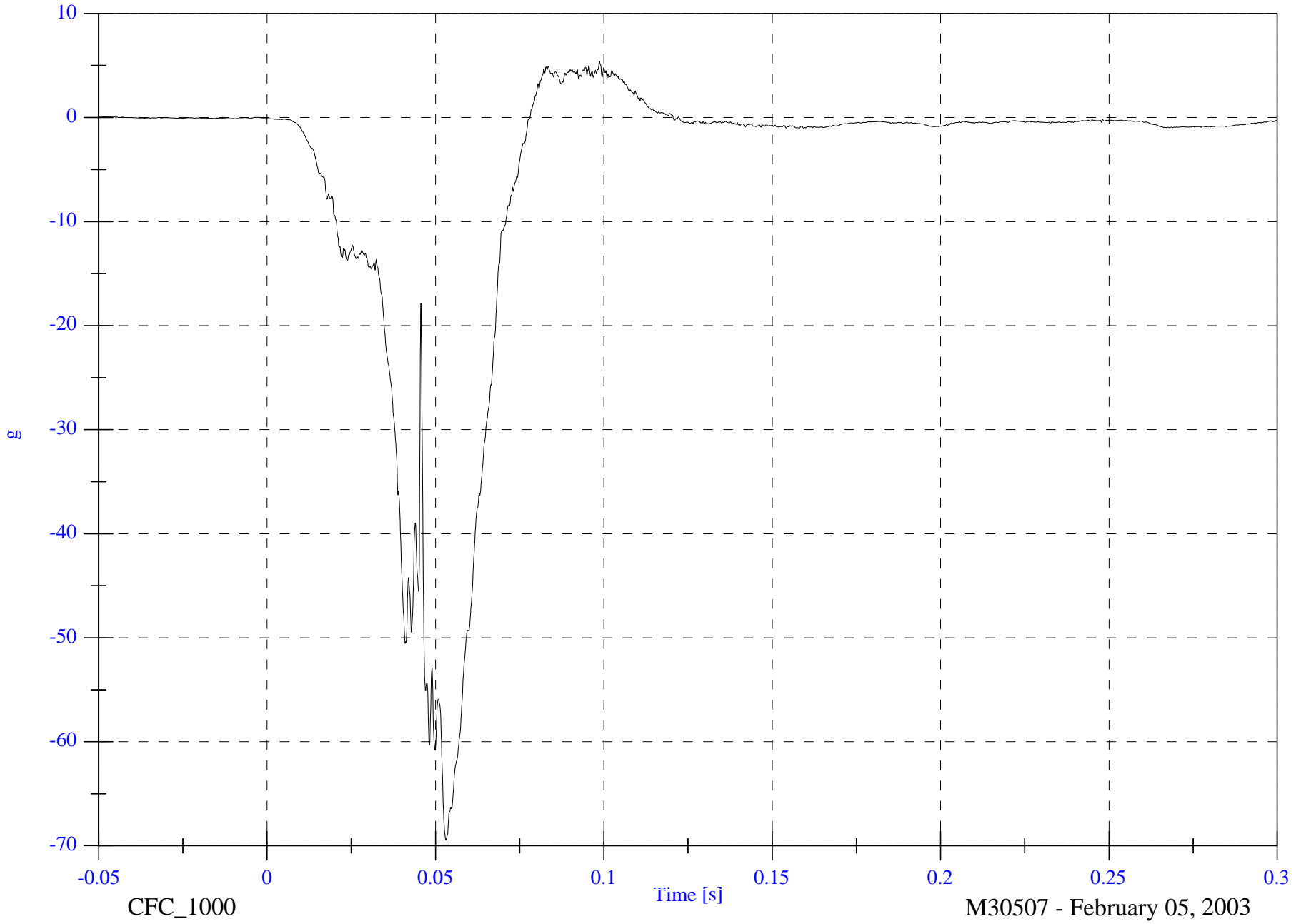
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Pelvic x

Max: 5.4 [g] at 0.099 [s]

Min: -69.5 [g] at 0.053 [s]



B-39

8642-NCAP-28

CFC\_1000

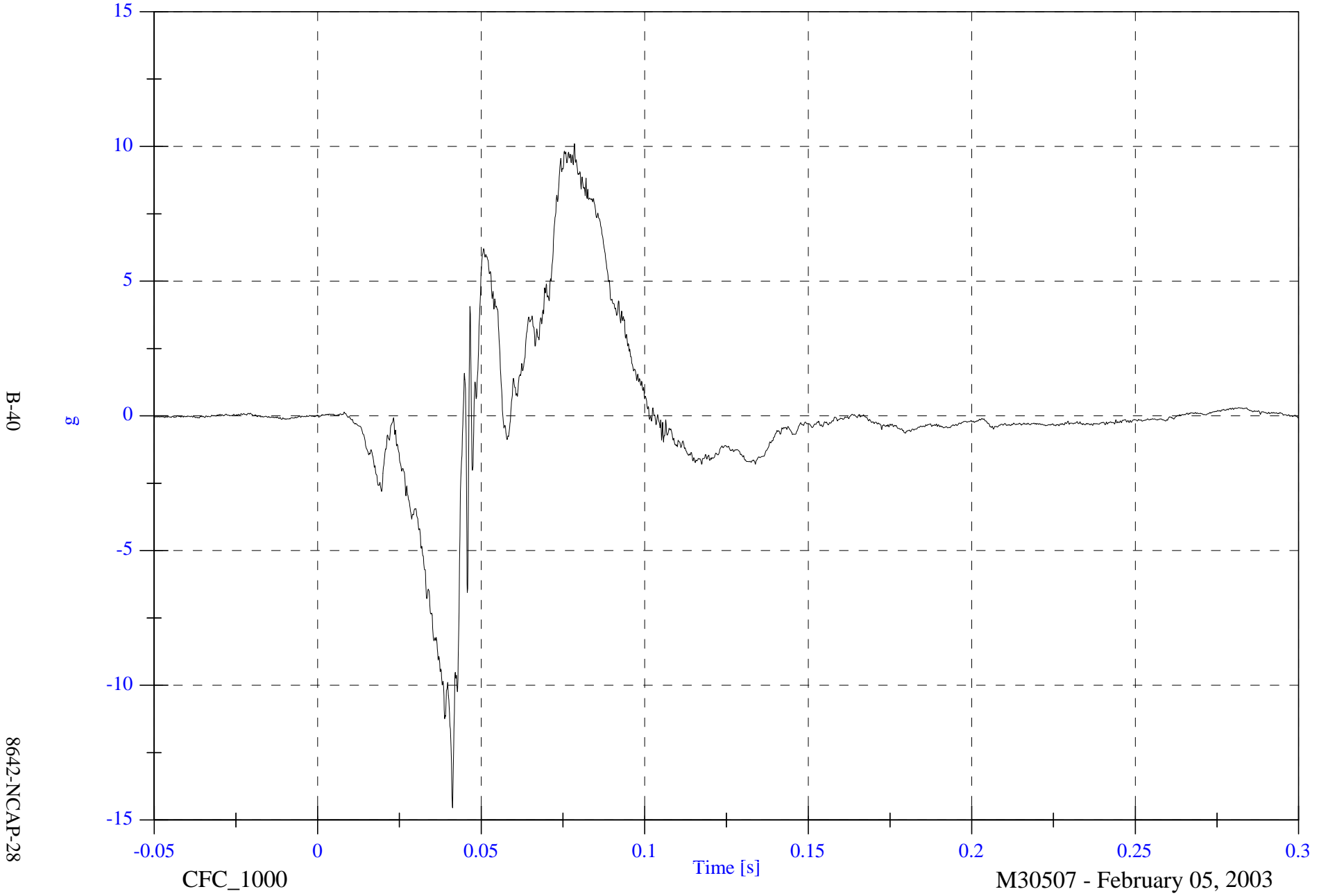
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Pelvic y

Max: 10.1 [g] at 0.078 [s]

Min: -14.5 [g] at 0.041 [s]

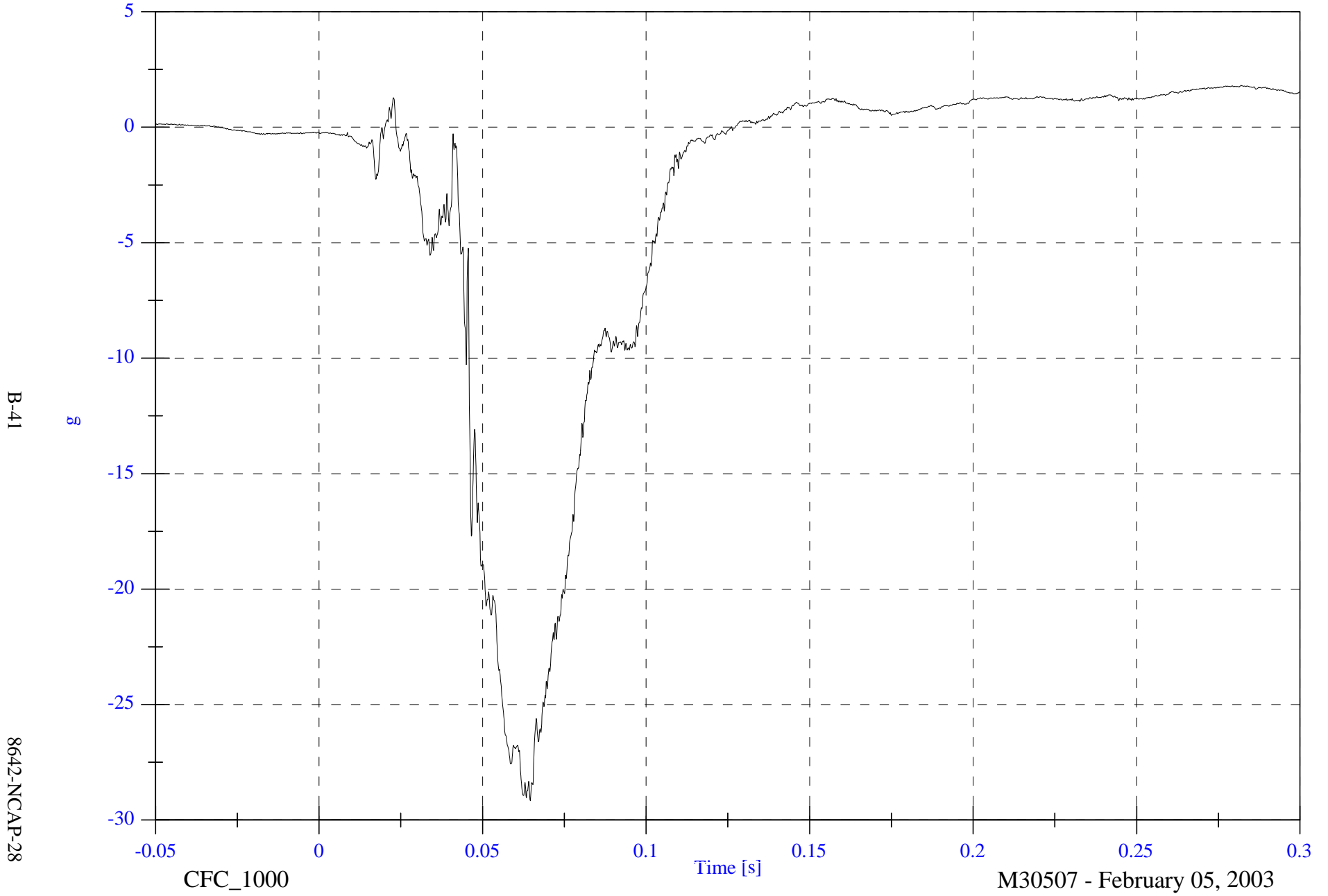


NCAP Test #6 - 2003 Subaru Forester

V1P1 Pelvic z

Max: 1.8 [g] at 0.282 [s]

Min: -29.2 [g] at 0.065 [s]



B-41

8642-NCAP-28

CFC\_1000

Time [s]

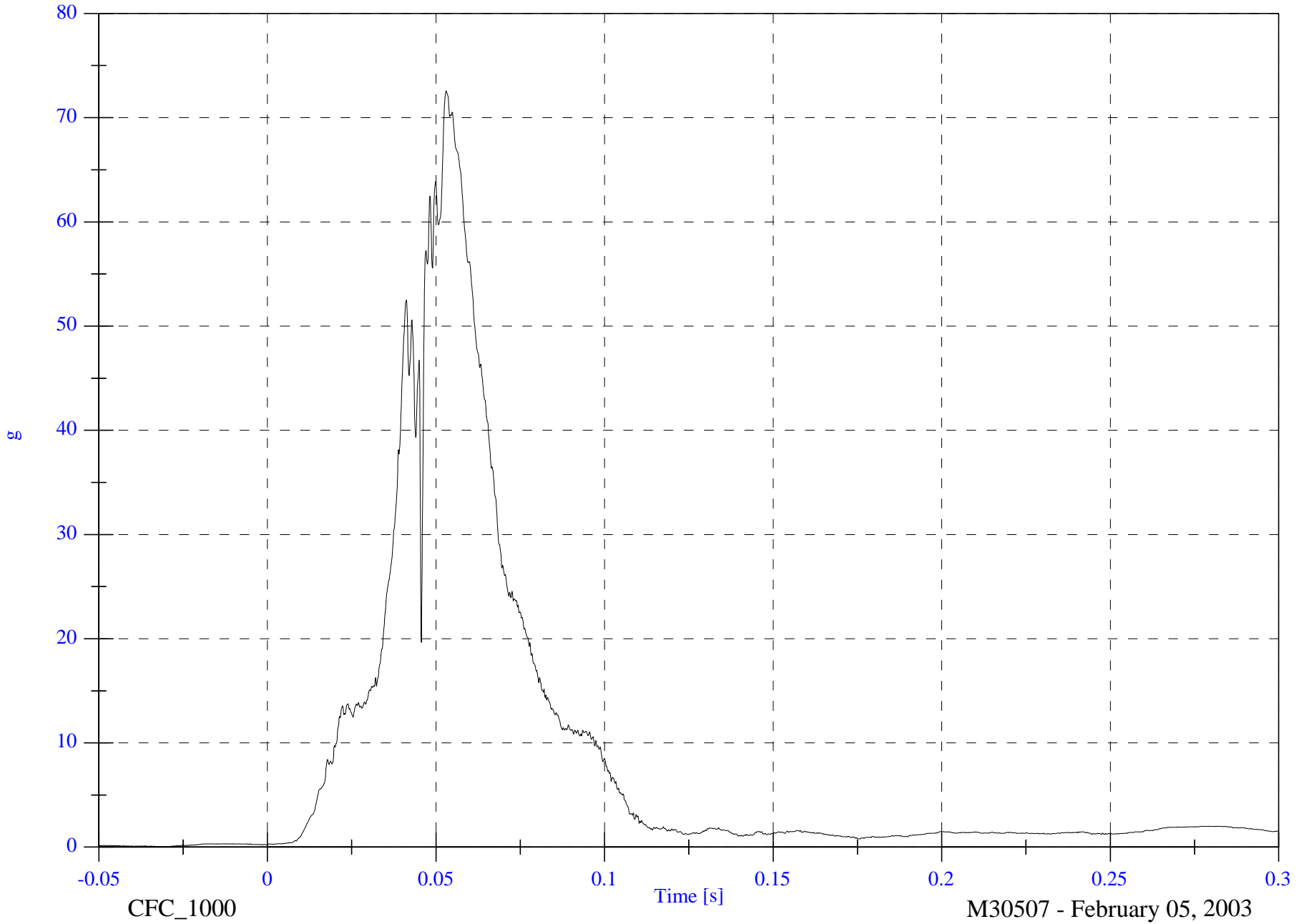
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Pelvic Resultant

Max: 72.6 [g] at 0.053 [s]

Min: 0.0 [g] at -0.031 [s]



B-42

8642-NCAP-28

CFC\_1000

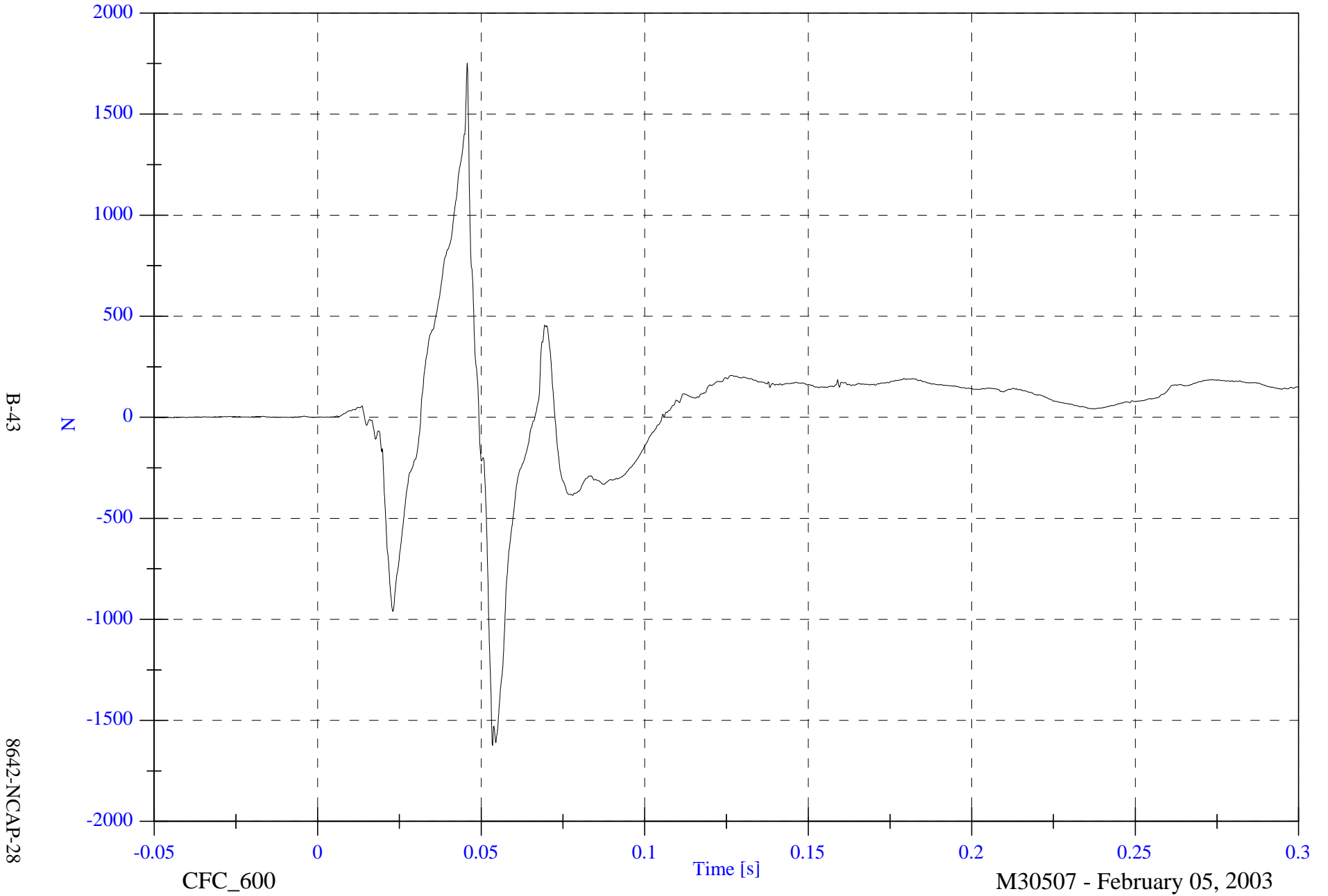
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Left Femur z

Max: 1752.7 [N] at 0.046 [s]

Min: -1623.7 [N] at 0.053 [s]

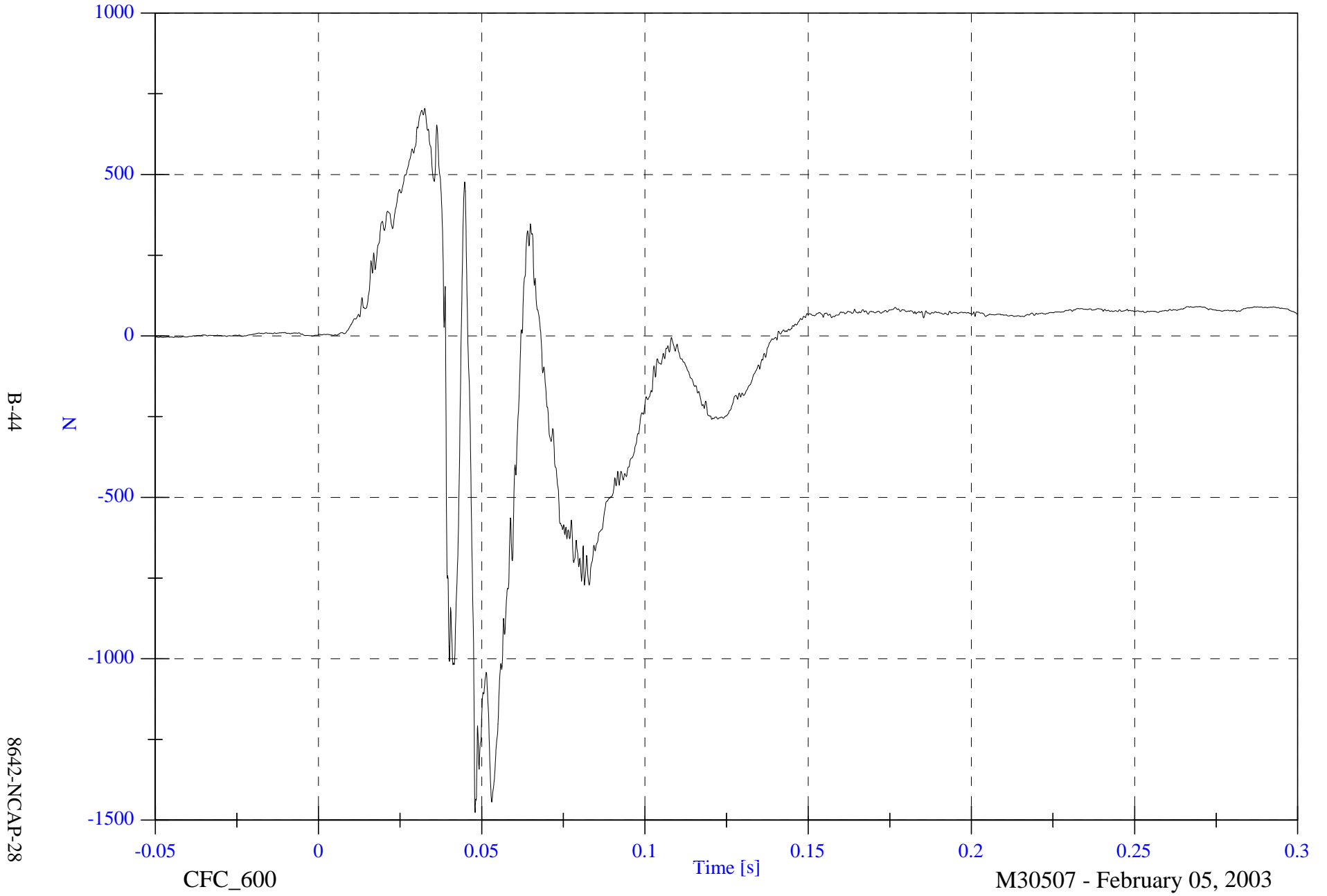


NCAP Test #6 - 2003 Subaru Forester

VIP1 Right Femur z

Max: 704.8 [N] at 0.033 [s]

Min: -1476.3 [N] at 0.048 [s]



NCAP Test #6 - 2003 Subaru Forester

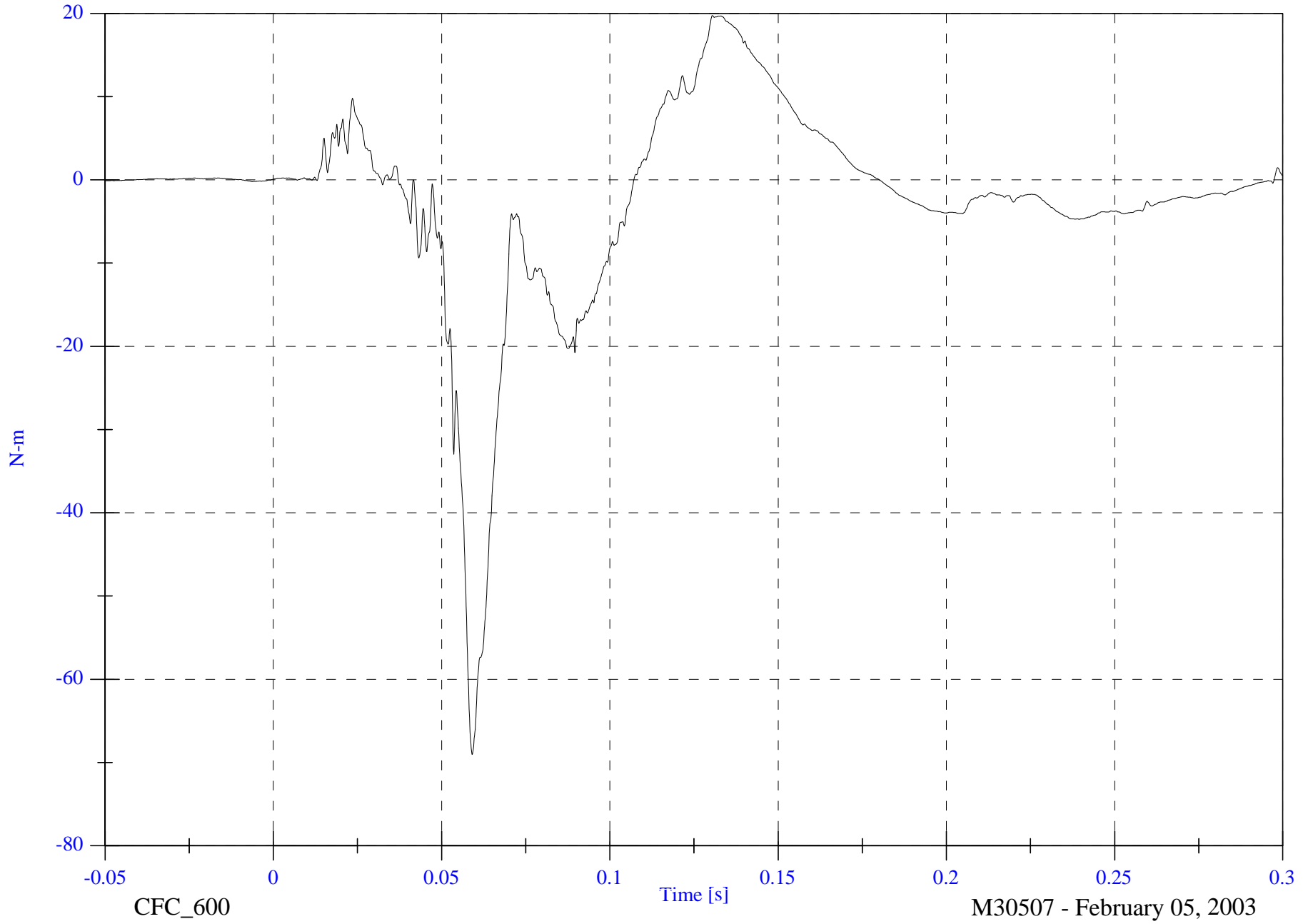
V1P1 Left Upper Tibia Mx

Max: 19.7 [N-m] at 0.130 [s]

Min: -69.0 [N-m] at 0.059 [s]

B-45

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CFC\_600

Time [s]

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NCAP Test #6 - 2003 Subaru Forester

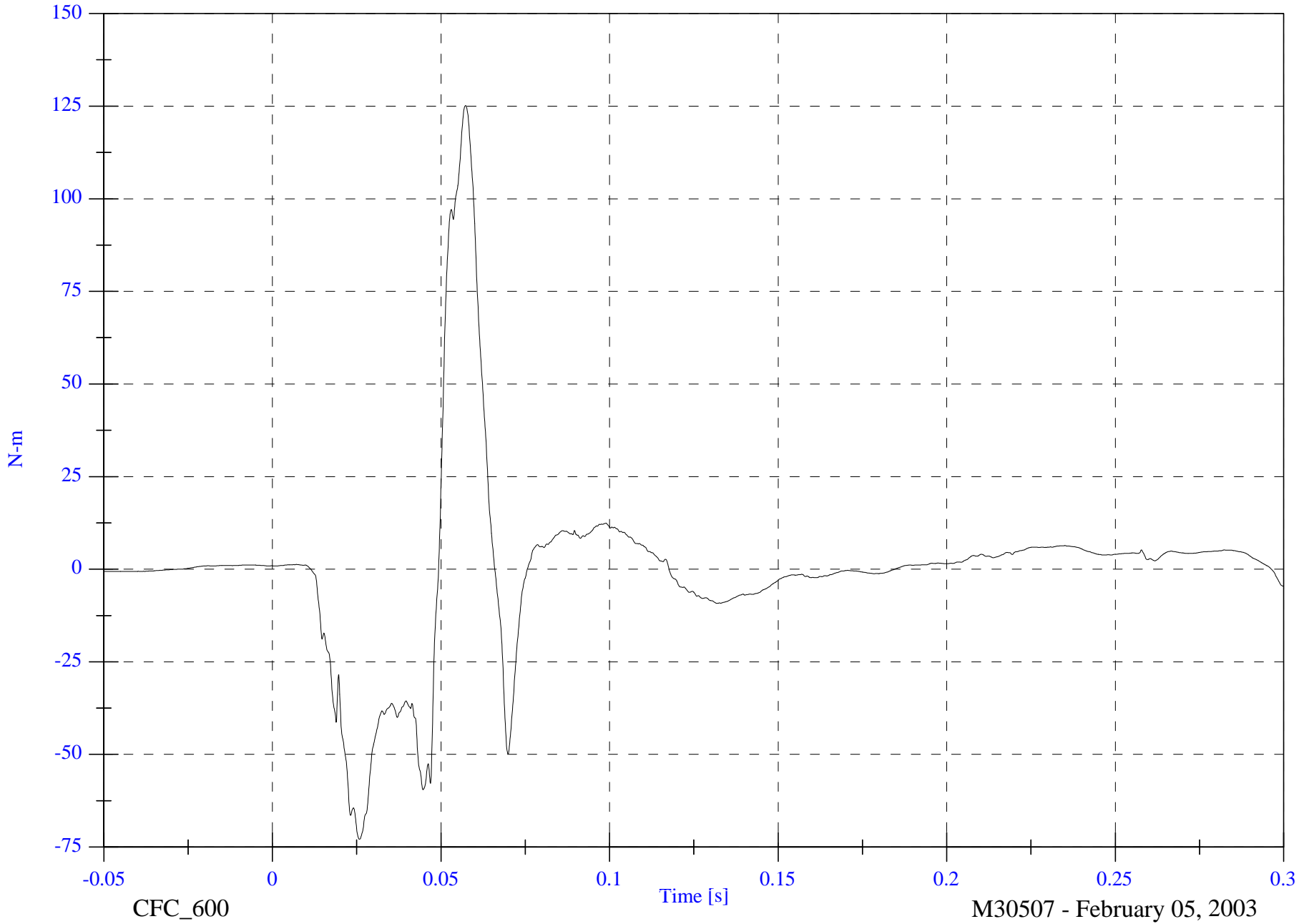
V1P1 Left Upper Tibia My

Max: 125.2 [N-m] at 0.057 [s]

Min: -72.9 [N-m] at 0.026 [s]

B-46

8642-NCAP-28



CFC\_600

Time [s]

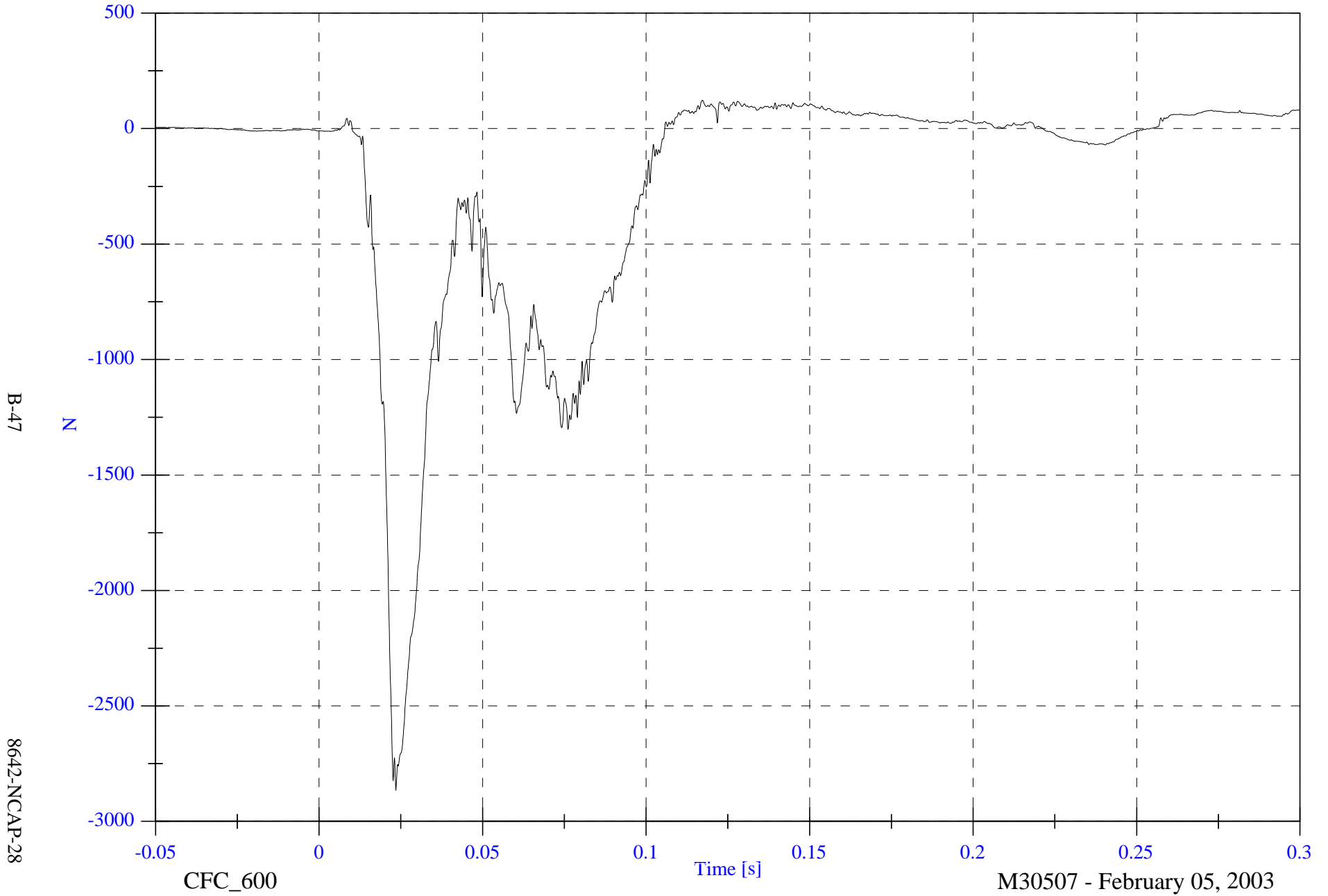
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Left Lower Tibia Fz

Max: 122.1 [N] at 0.117 [s]

Min: -2865.8 [N] at 0.023 [s]



B-47

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CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

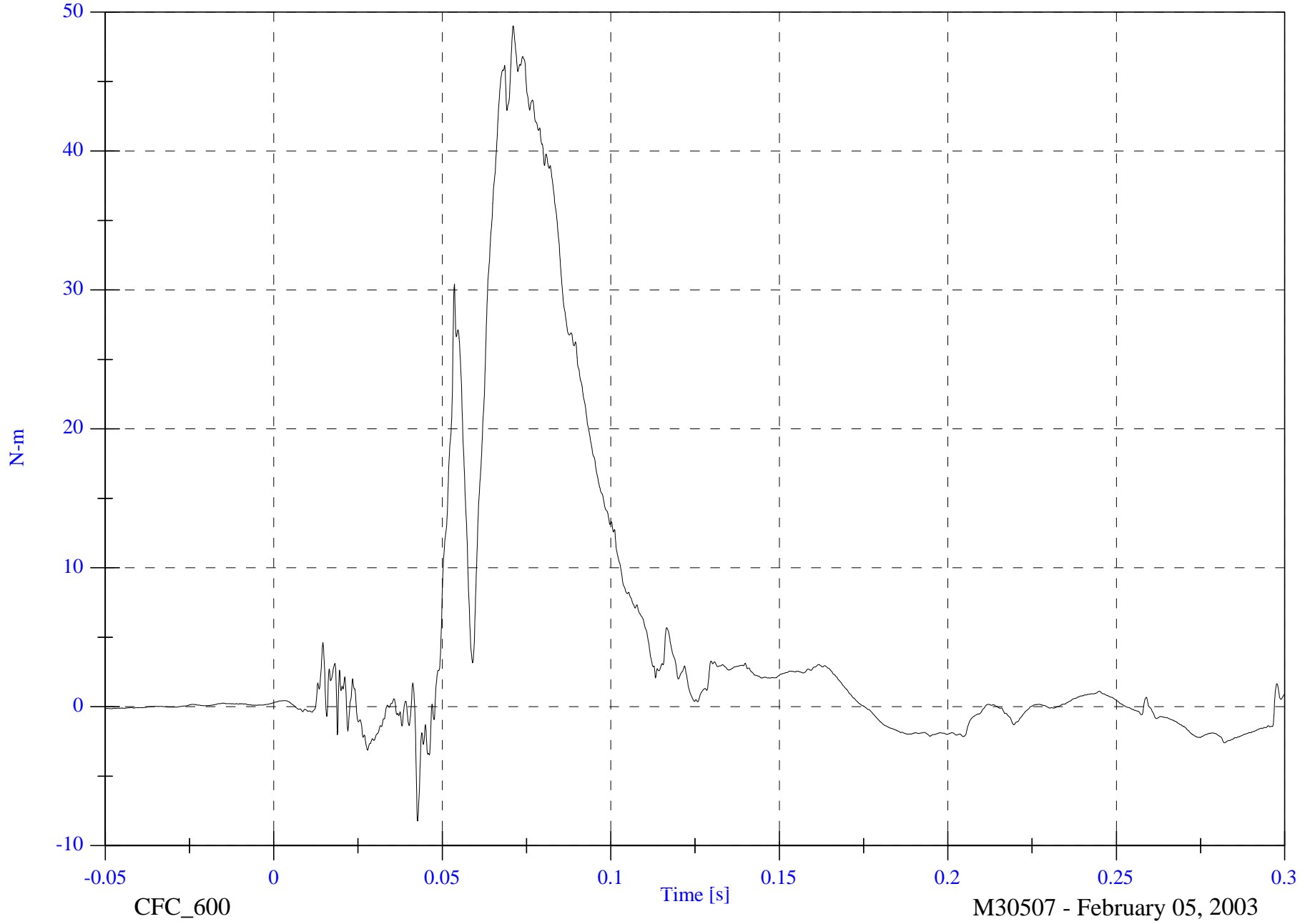
VIP1 Left Lower Tibia Mx

Max: 49.0 [N-m] at 0.071 [s]

Min: -8.2 [N-m] at 0.043 [s]

B-48

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CFC\_600

Time [s]

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NCAP Test #6 - 2003 Subaru Forester

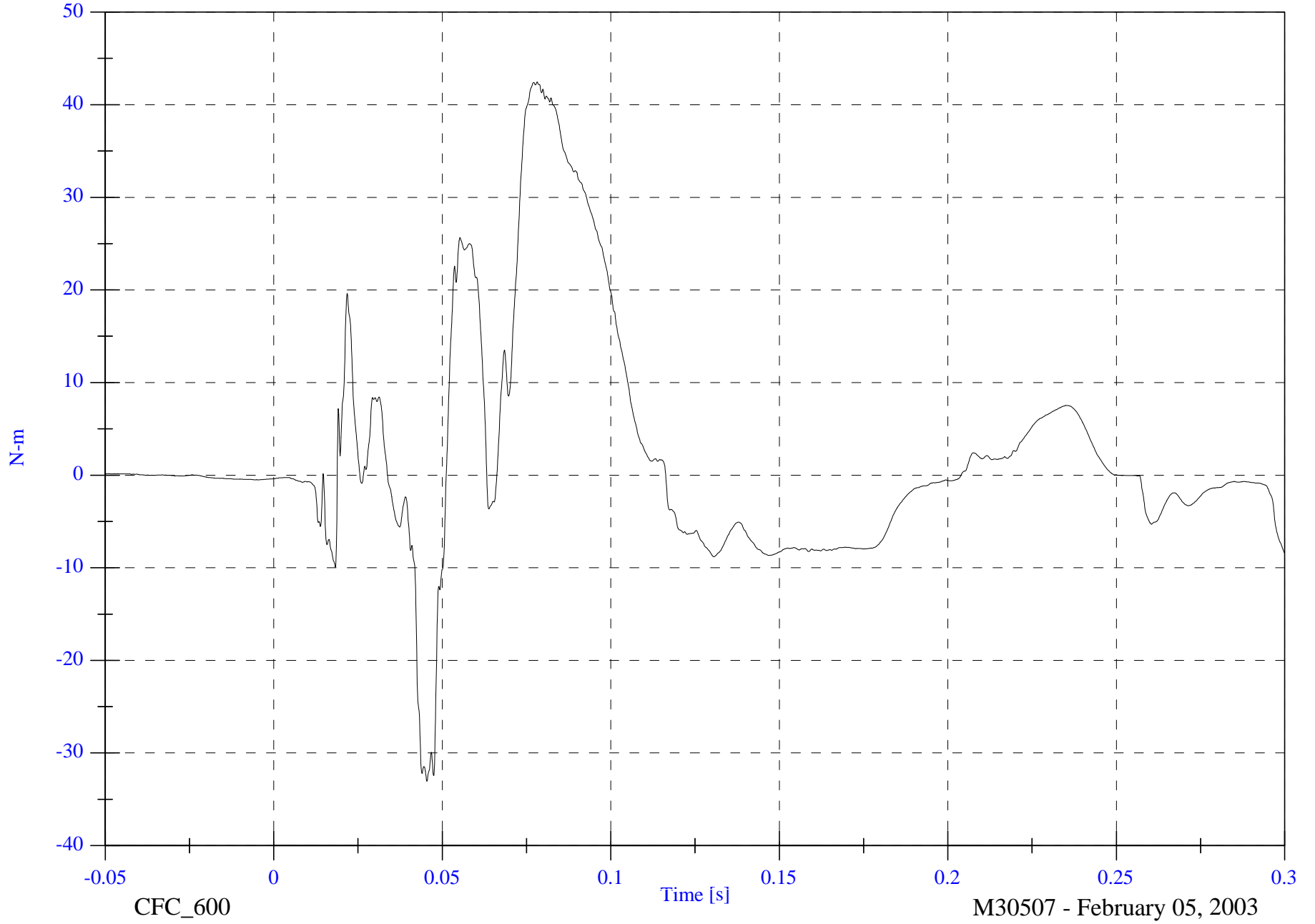
VIP1 Left Lower Tibia My

Max: 42.5 [N-m] at 0.078 [s]

Min: -33.0 [N-m] at 0.045 [s]

B-49

8642-NCAP-28



CFC\_600

Time [s]

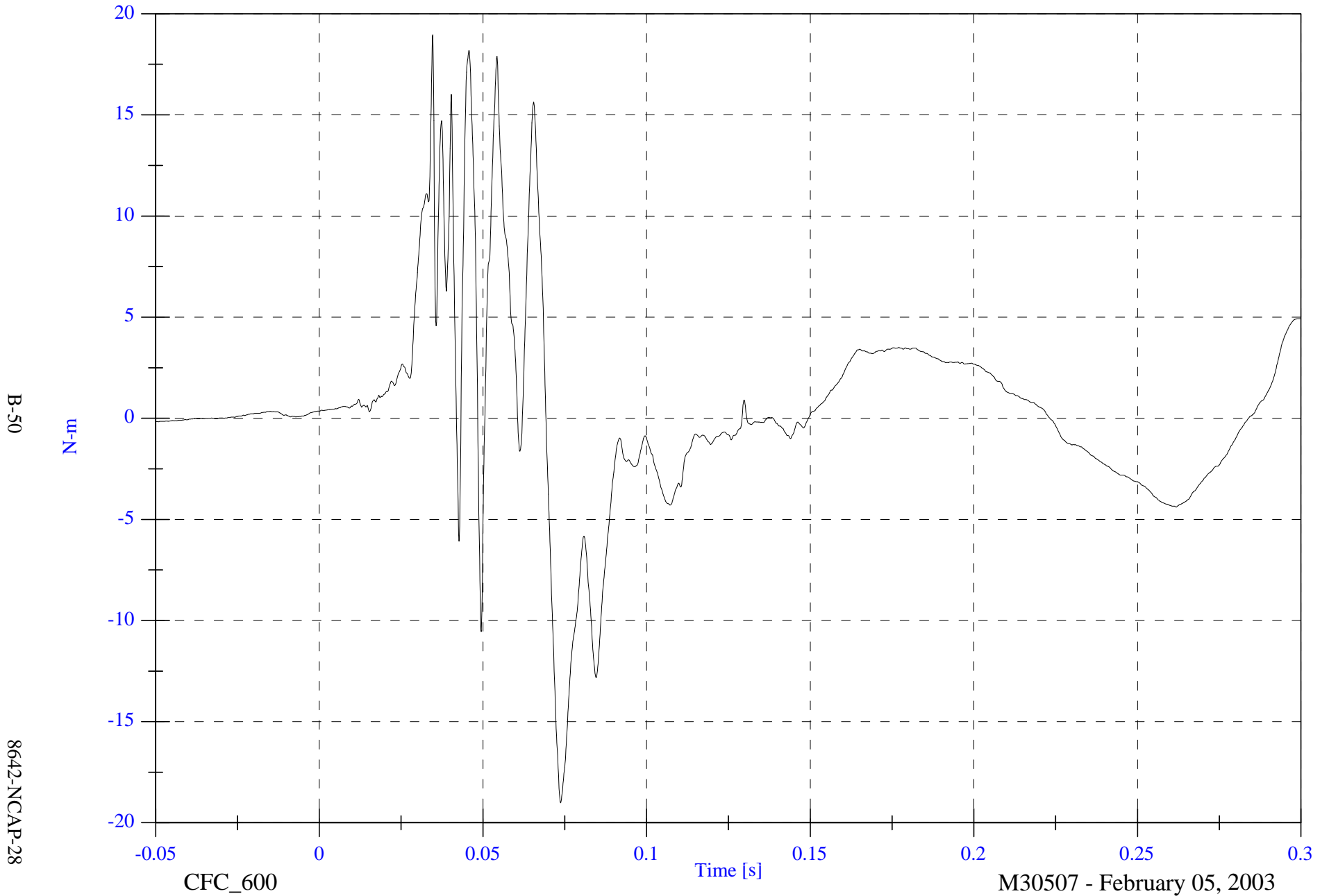
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Right upper Tibia Mx

Max: 19.0 [N-m] at 0.035 [s]

Min: -19.0 [N-m] at 0.074 [s]



B-50

8642-NCAP-28

CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

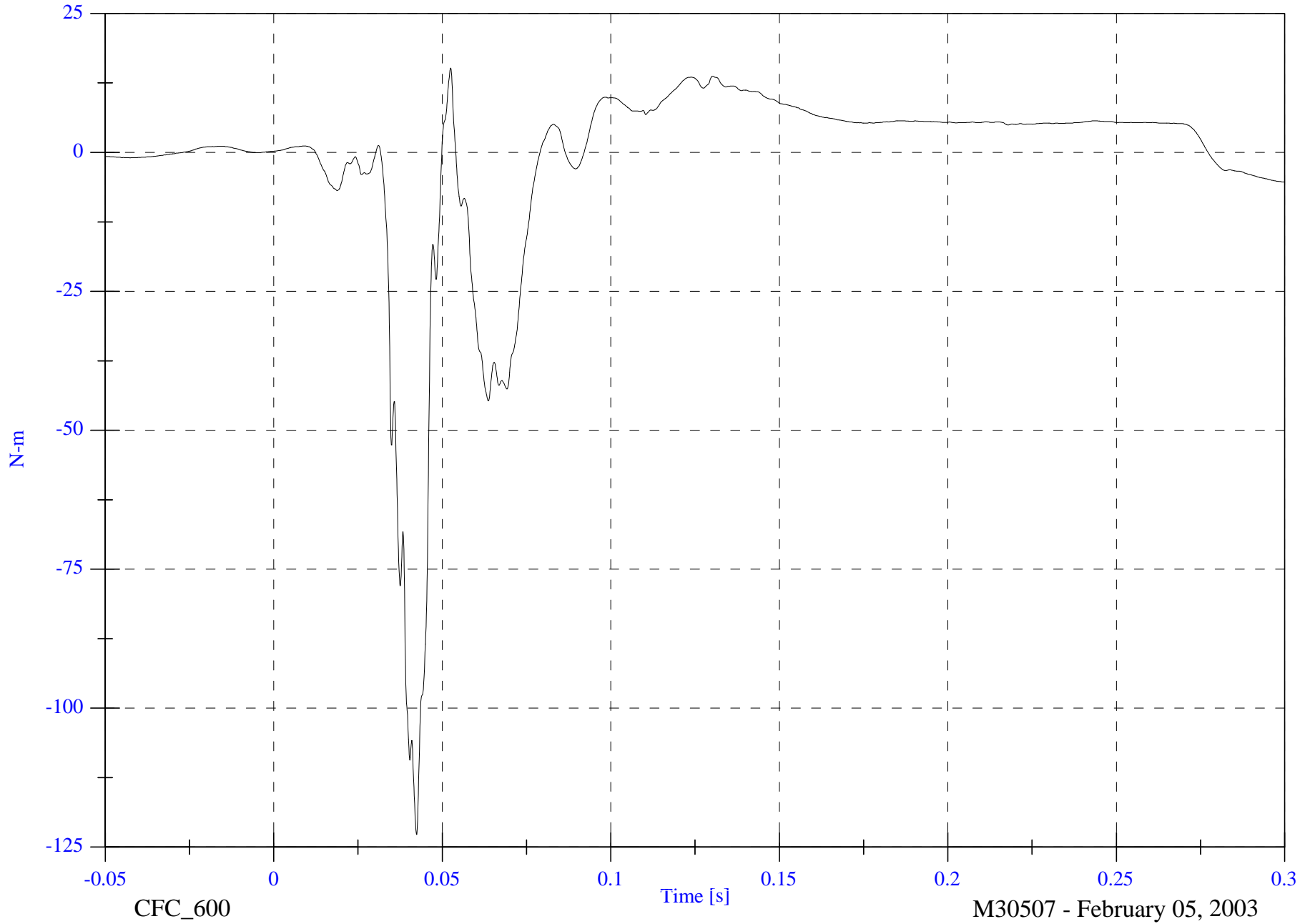
V1P1 Right upper Tibia My

Max: 15.2 [N-m] at 0.053 [s]

Min: -122.8 [N-m] at 0.042 [s]

B-51

8642-NCAP-28



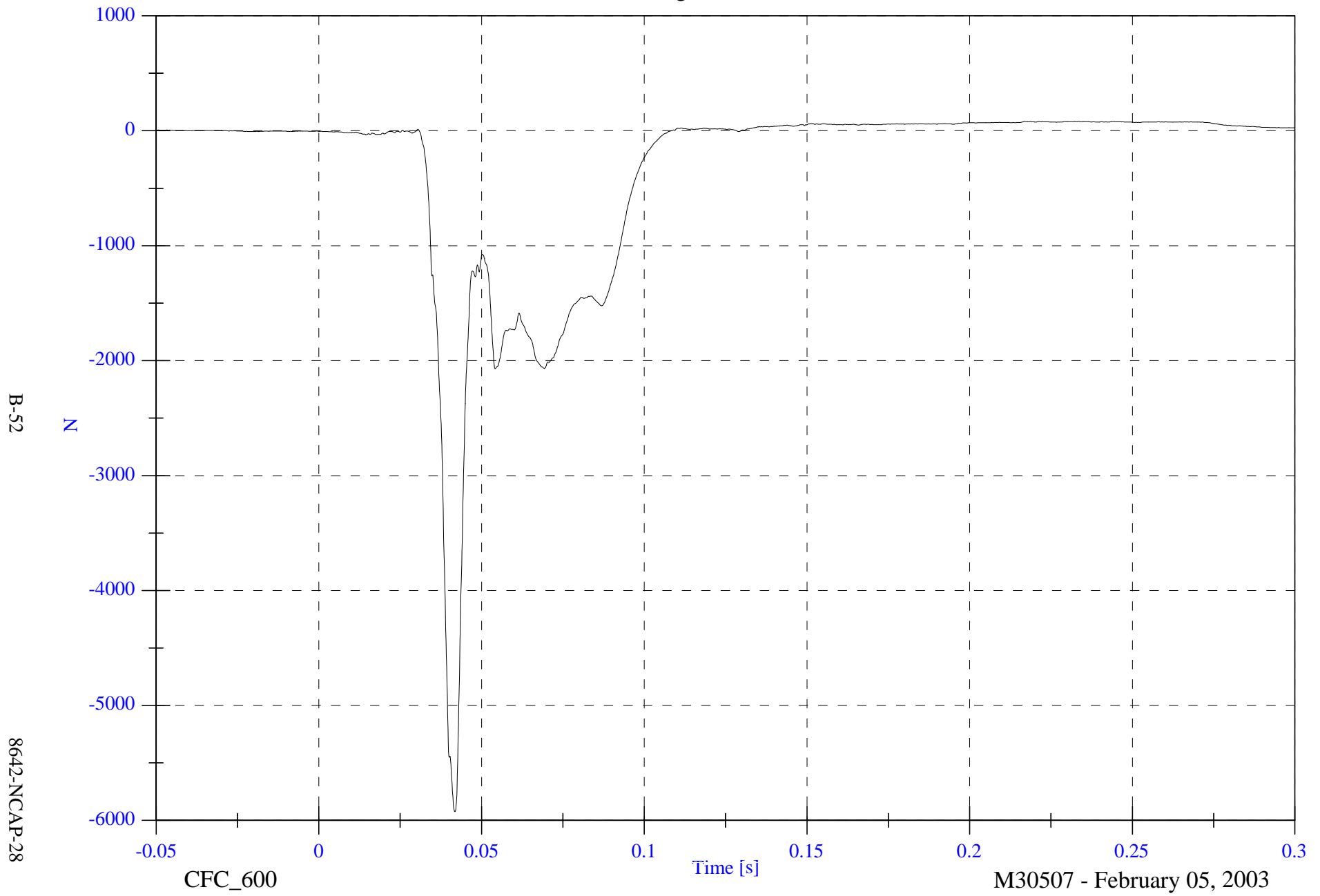
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Right Lower Tibia Fz

Max: 81.0 [N] at 0.233 [s]

Min: -5924.6 [N] at 0.042 [s]



B-52

8642-NCAP-28

CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

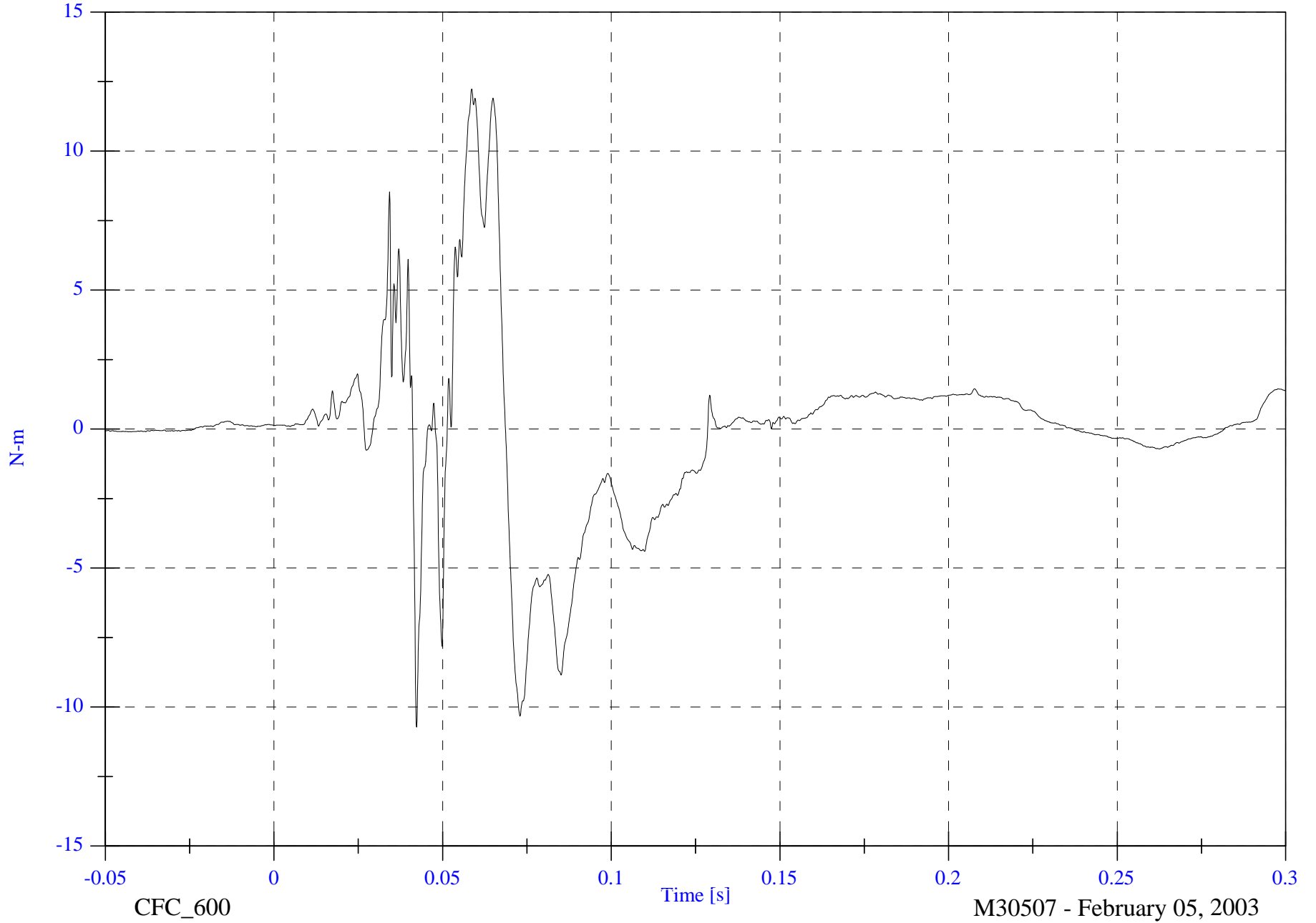
V1P1 Right Lower Tibia Mx

Max: 12.2 [N-m] at 0.059 [s]

Min: -10.7 [N-m] at 0.042 [s]

B-53

8642-NCAP-28



CFC\_600

Time [s]

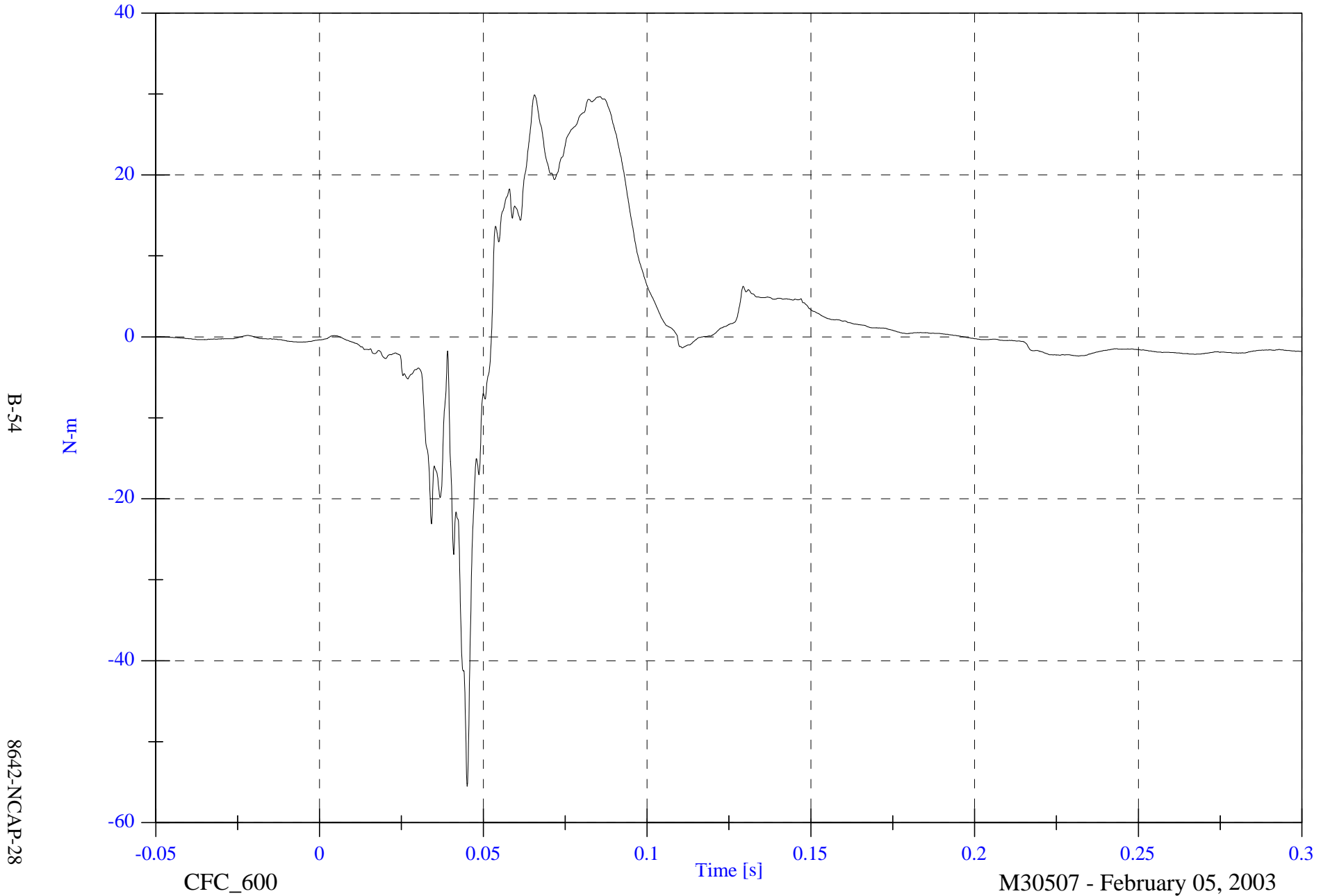
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 29.9 [N-m] at 0.066 [s]

Min: -55.5 [N-m] at 0.045 [s]

V1P1 Right Lower Tibia My

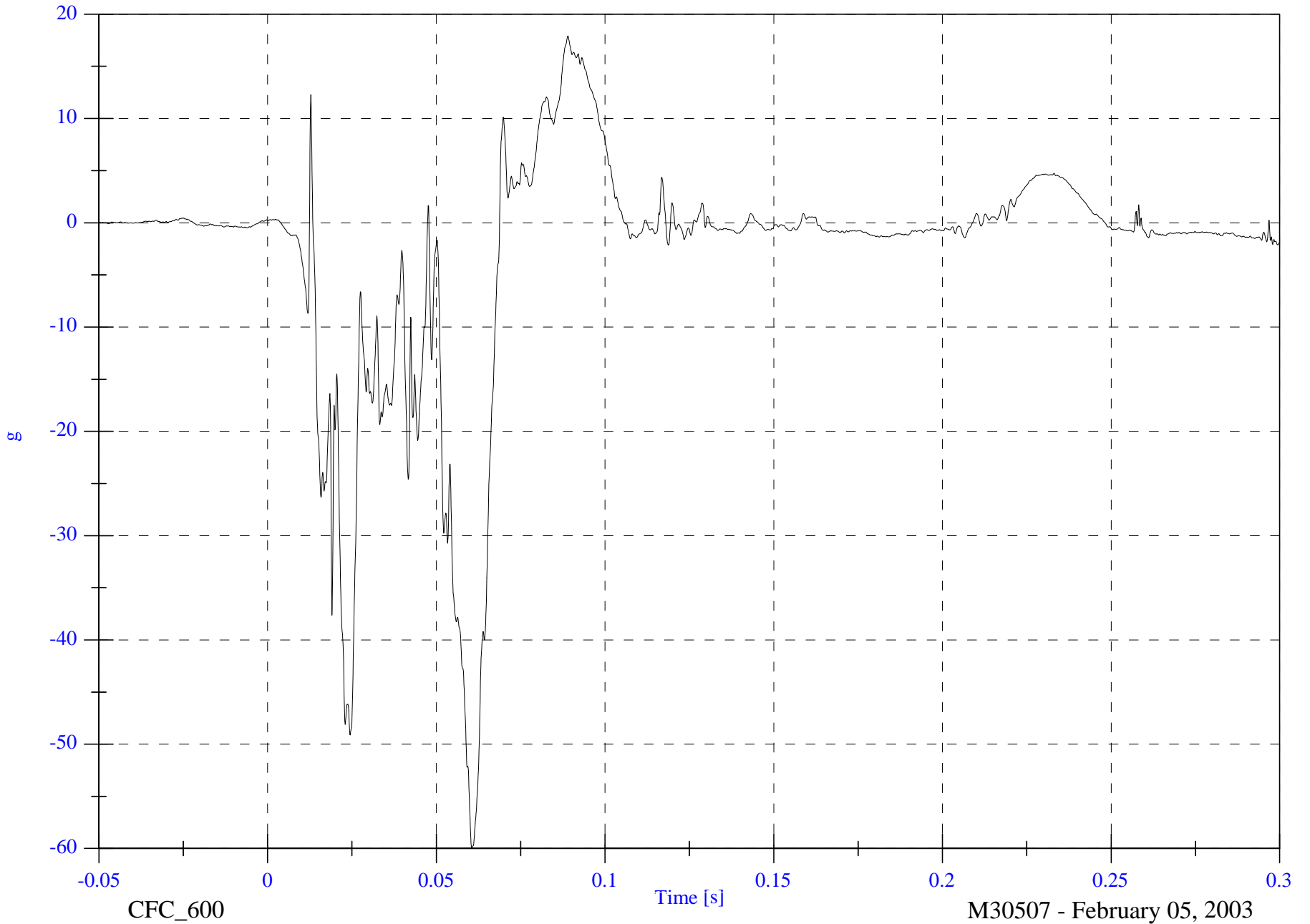


NCAP Test #6 - 2003 Subaru Forester

Max: 17.9 [g] at 0.089 [s]

Min: -60.0 [g] at 0.060 [s]

V1P1 Left Foot Aft x



B-55

8642-NCAP-28

CFC\_600

Time [s]

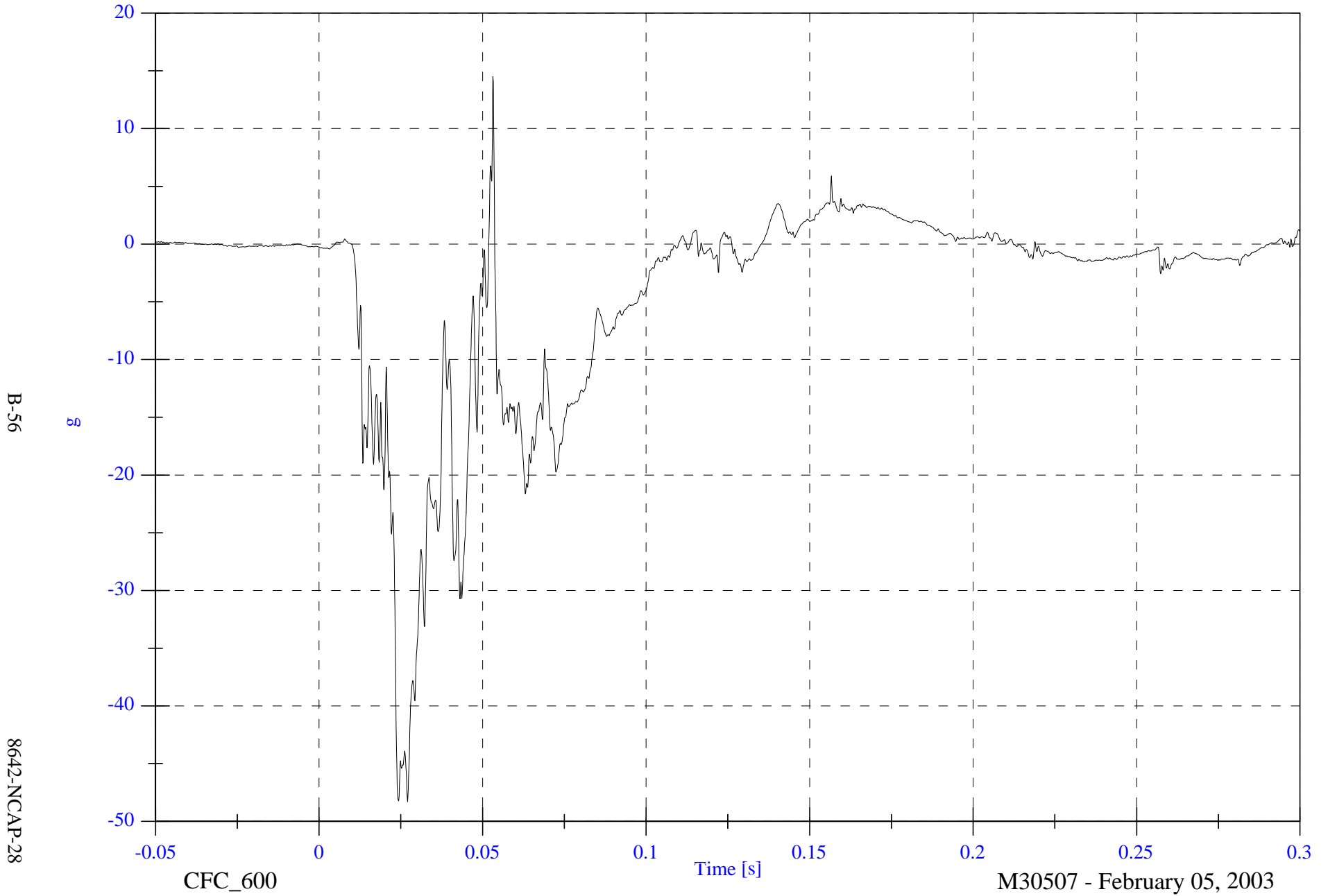
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Left Foot Aft z

Max: 14.5 [g] at 0.053 [s]

Min: -48.3 [g] at 0.027 [s]

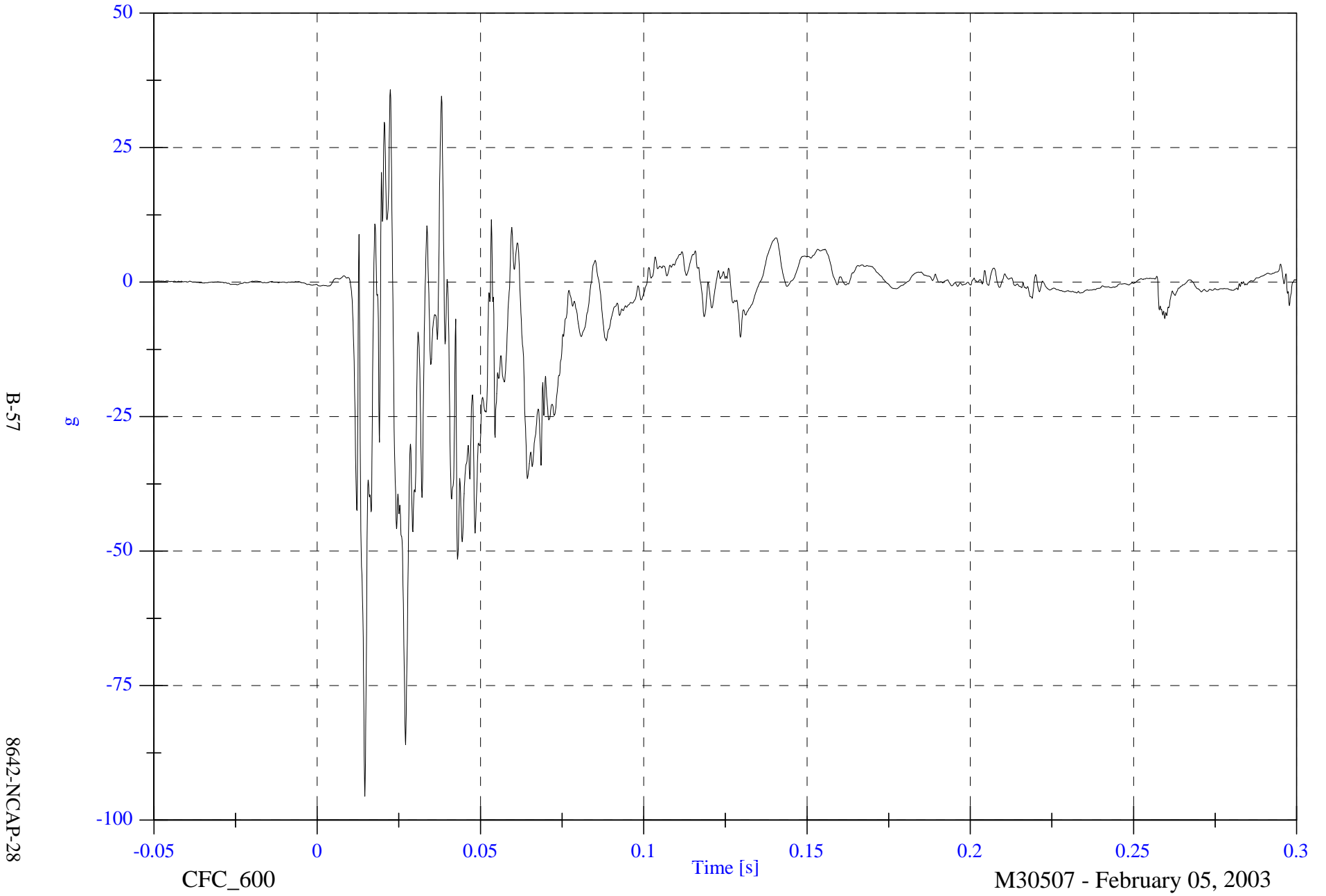


NCAP Test #6 - 2003 Subaru Forester

V1P1 Left Foot Fore z

Max: 35.7 [g] at 0.022 [s]

Min: -95.6 [g] at 0.015 [s]



B-57

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CFC\_600

Time [s]

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NCAP Test #6 - 2003 Subaru Forester

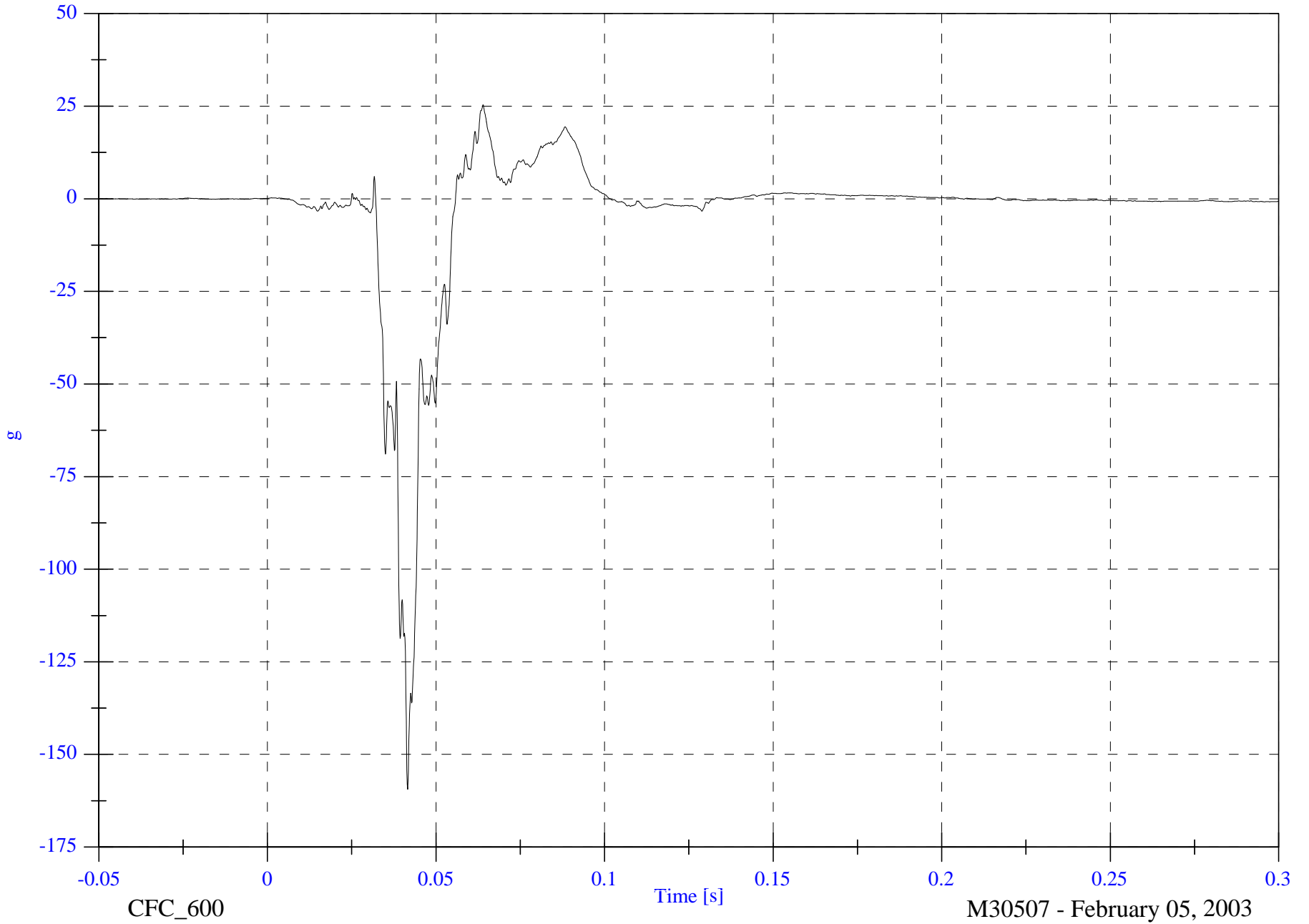
VIP1 Right Foot Aft x

Max: 25.4 [g] at 0.064 [s]

Min: -159.4 [g] at 0.042 [s]

B-58

8642-NCAP-28



CFC\_600

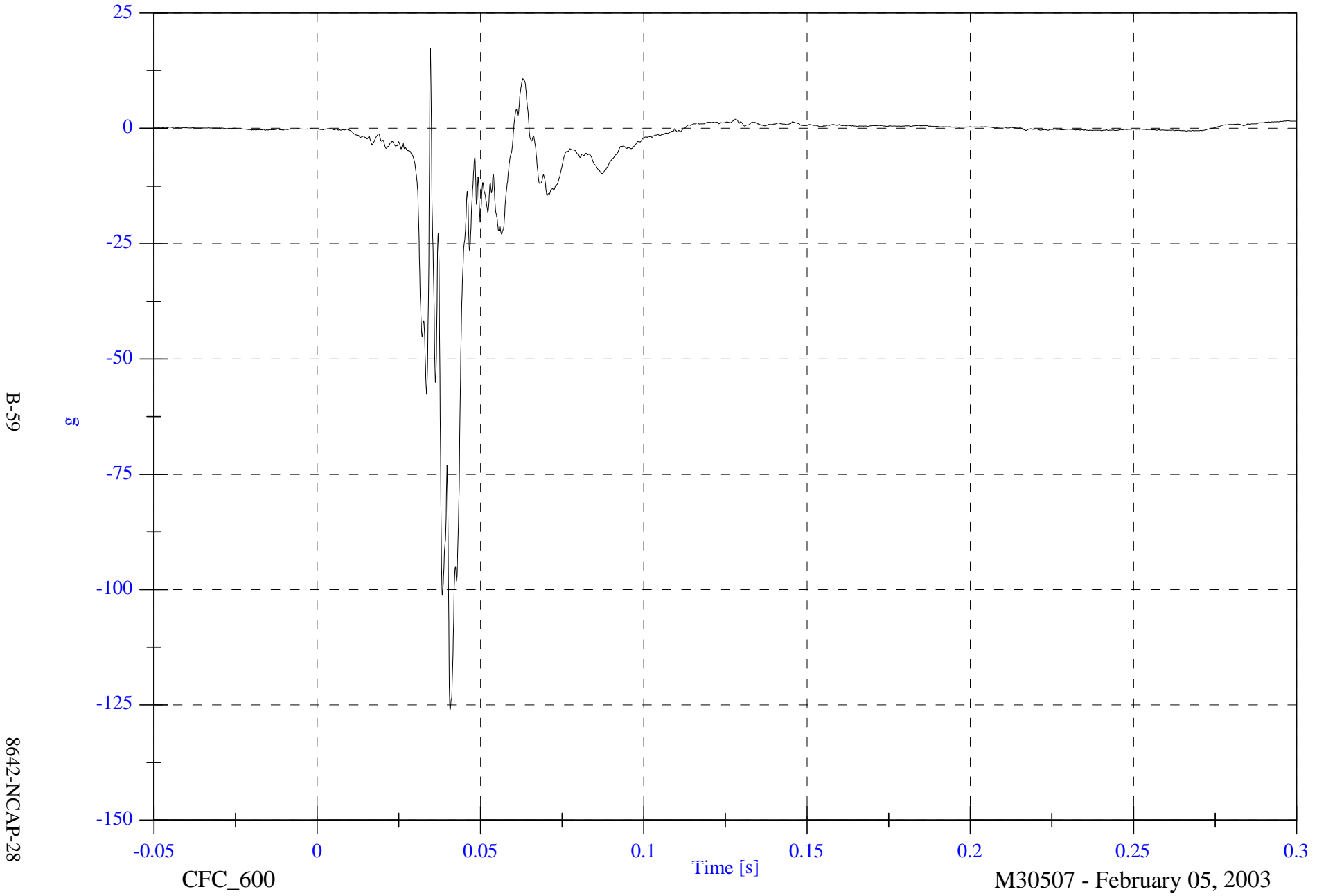
Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P1 Right foot Aft z

Max: 17.3 [g] at 0.035 [s]  
Min: -126.3 [g] at 0.041 [s]

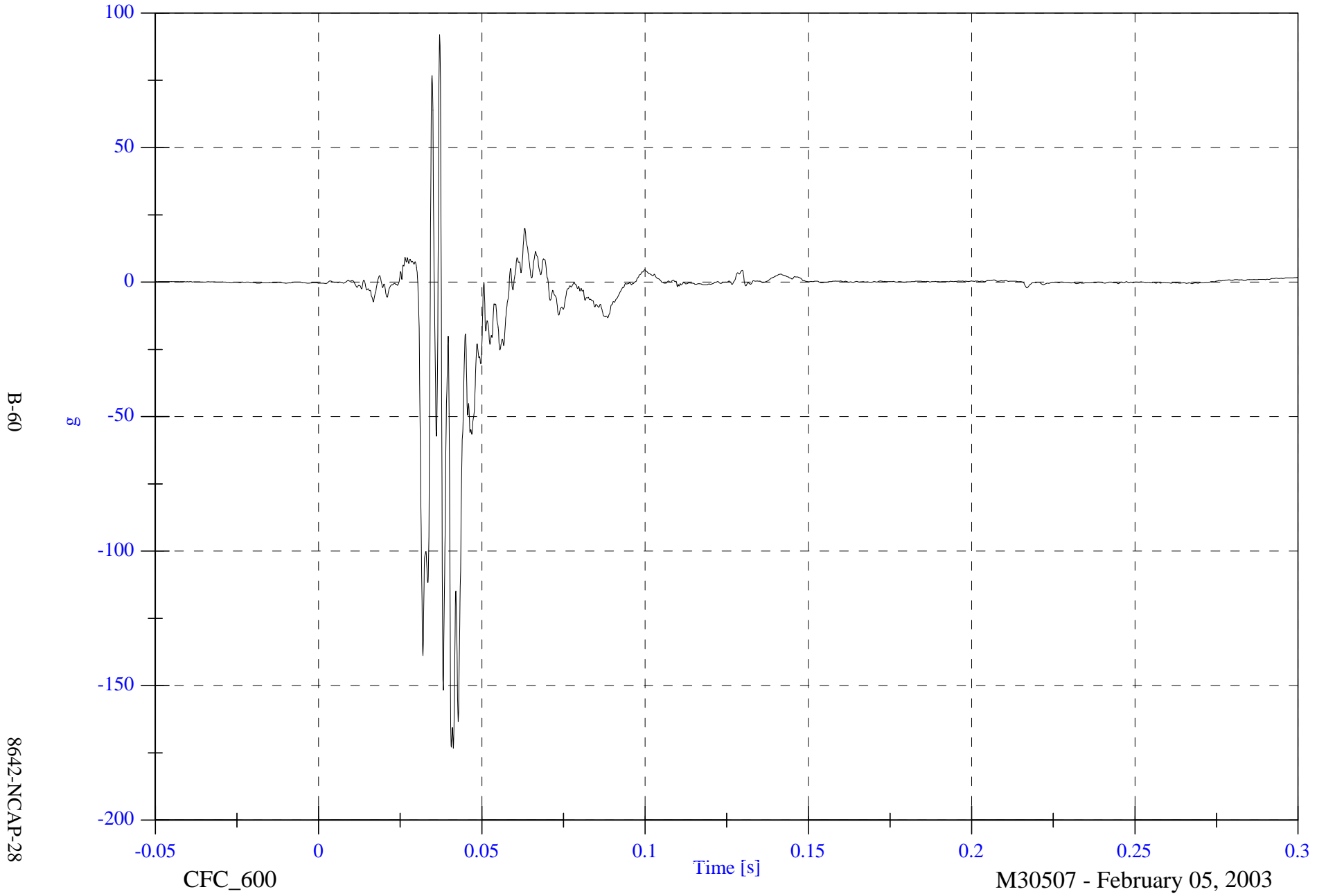


NCAP Test #6 - 2003 Subaru Forester

V1P1 Right Foot Fore z

Max: 92.0 [g] at 0.037 [s]

Min: -173.3 [g] at 0.041 [s]

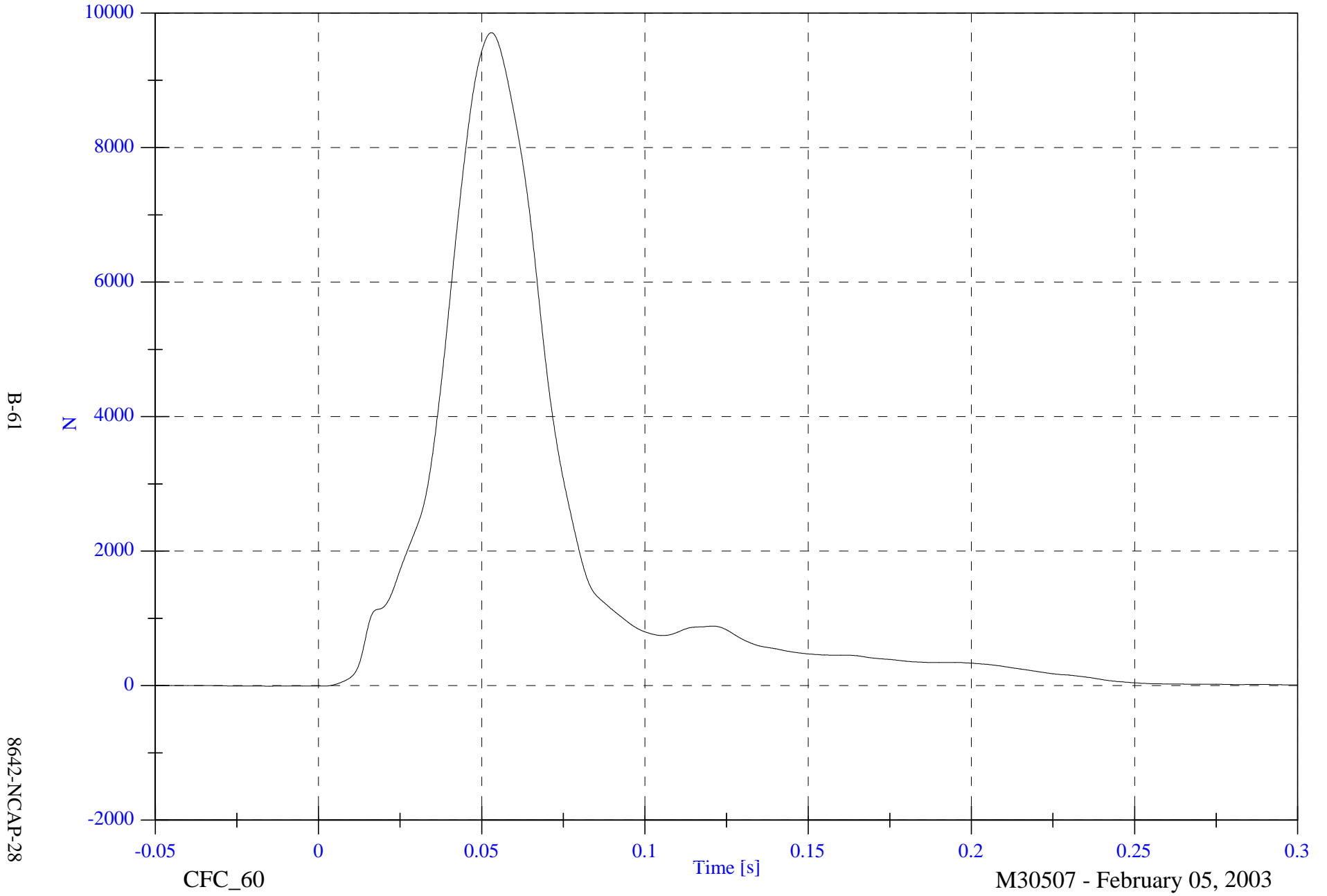


NCAP Test #6 - 2003 Subaru Forester

V1P1 Lap Belt

Max: 9708.6 [N] at 0.053 [s]

Min: -7.7 [N] at -0.015 [s]



B-61

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CFC\_60

Time [s]

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NCAP Test #6 - 2003 Subaru Forester

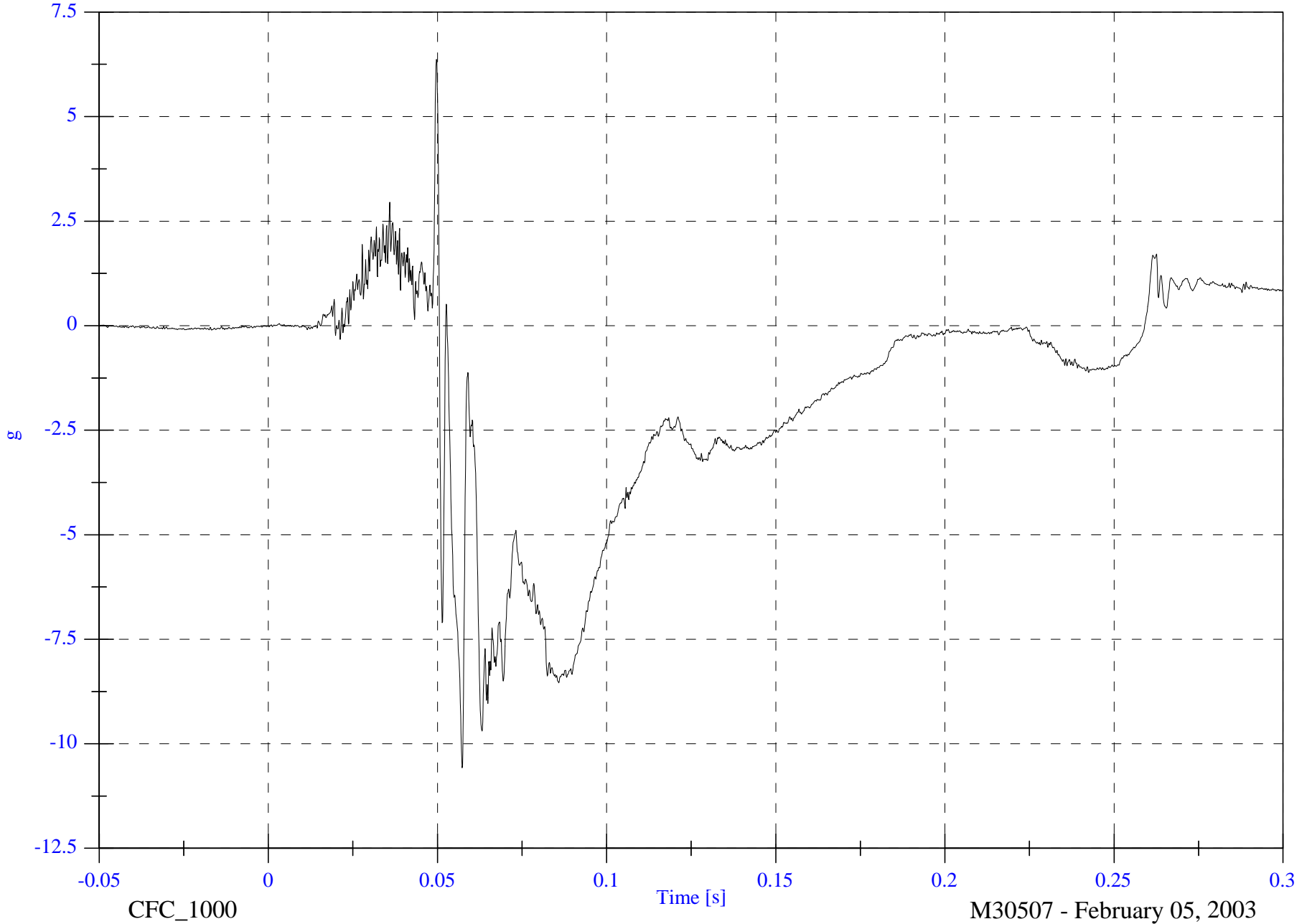
V1P2 Head 9 Array X Arm Ay

Max: 6.4 [g] at 0.050 [s]

Min: -10.6 [g] at 0.057 [s]

B-62

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NCAP Test #6 - 2003 Subaru Forester

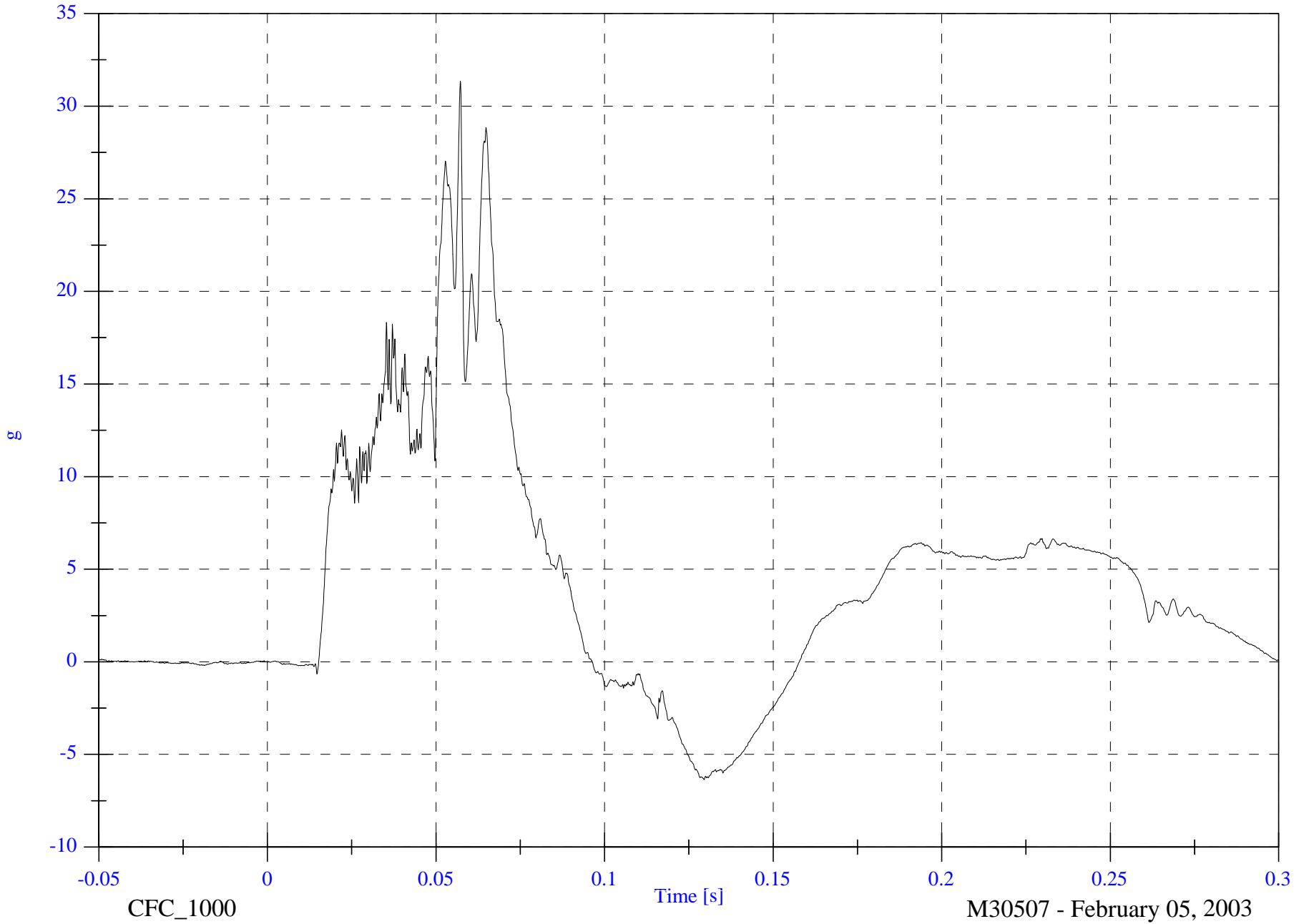
V1P2 Head 9 Array X Arm Az

Max: 31.3 [g] at 0.057 [s]

Min: -6.4 [g] at 0.130 [s]

B-63

8642-NCAP-28



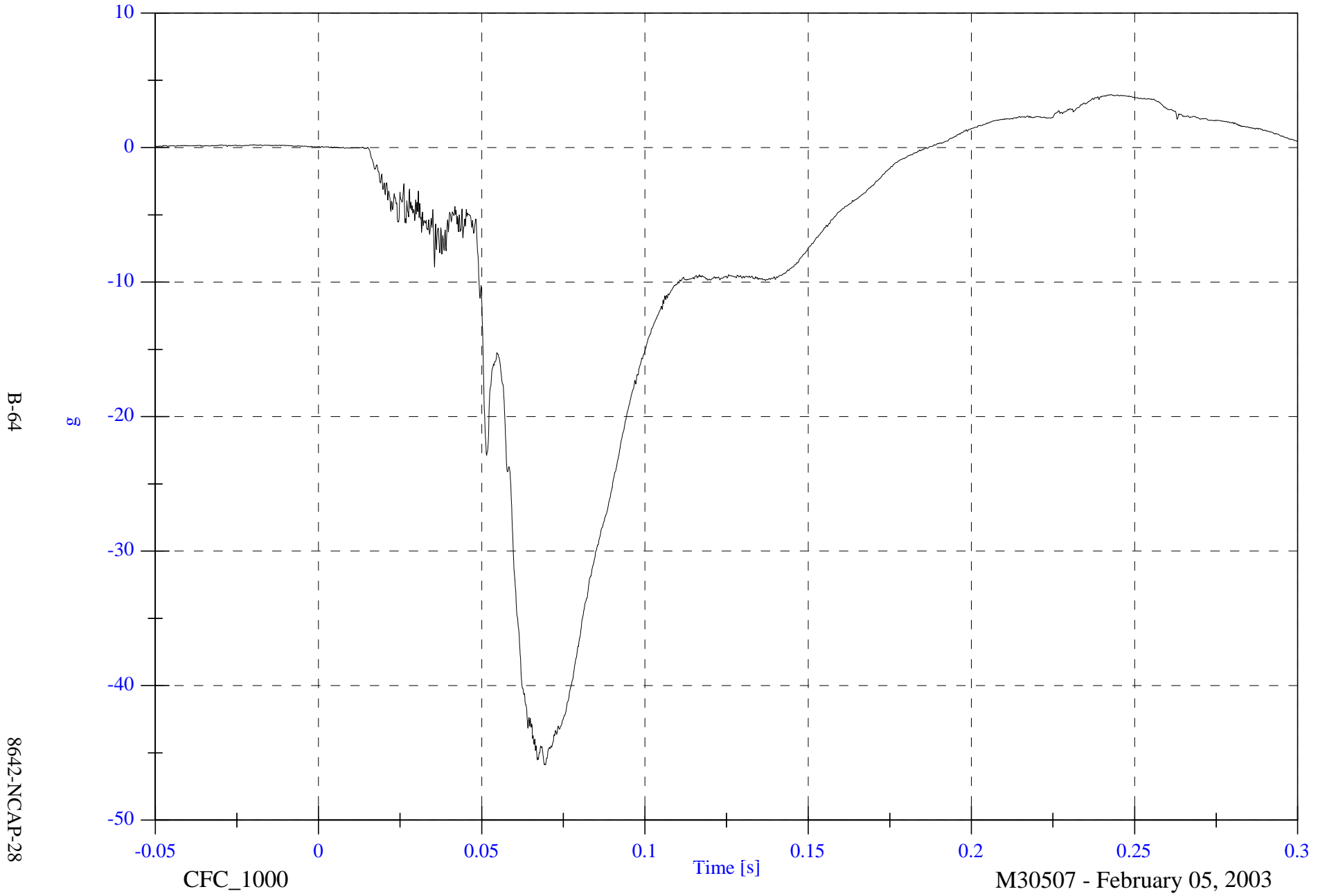
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Head 9 Array Y Arm Ax

Max: 3.9 [g] at 0.243 [s]

Min: -45.9 [g] at 0.069 [s]



B-64

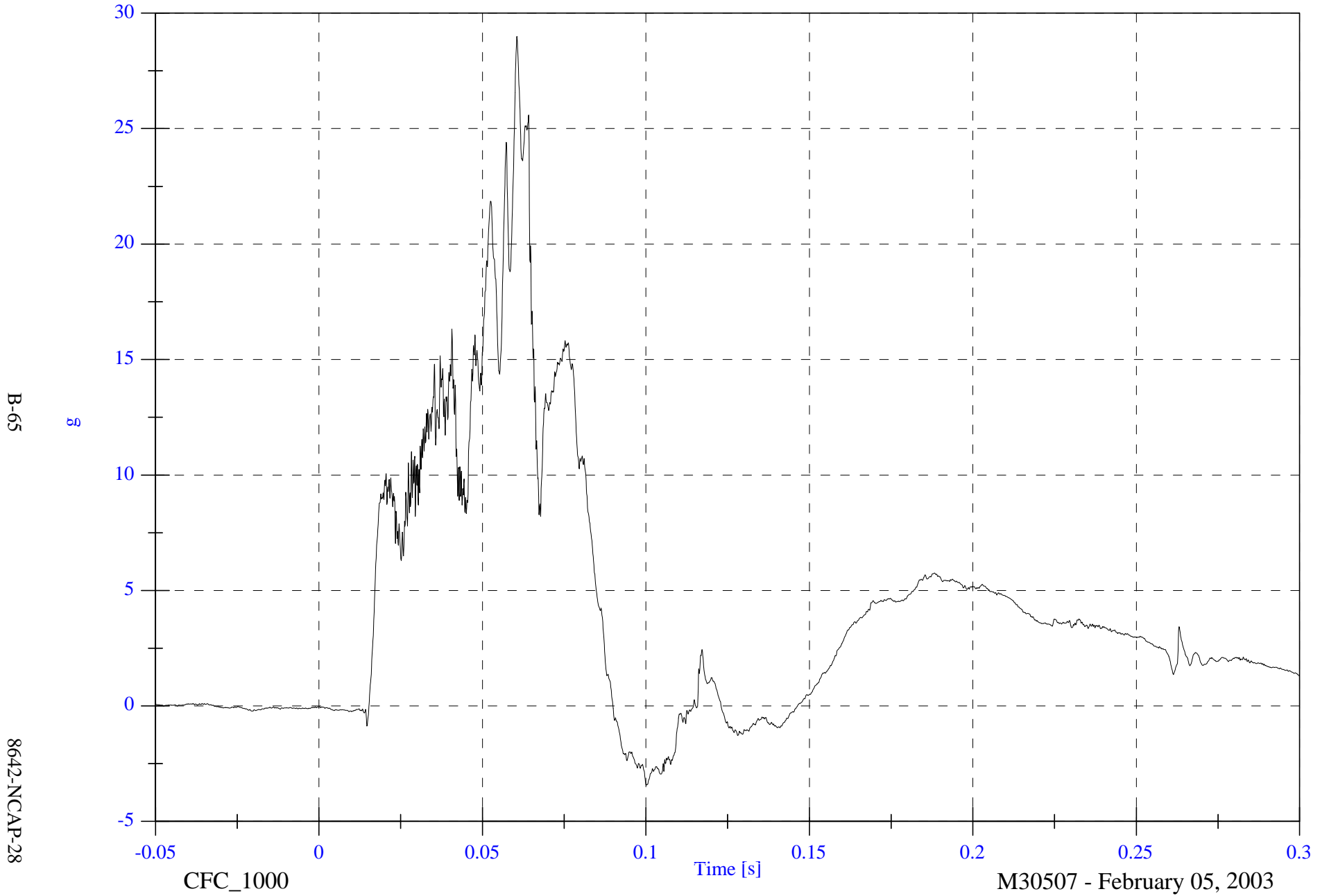
8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

V1P2 Head 9 Array Y Arm Az

Max: 29.0 [g] at 0.061 [s]

Min: -3.4 [g] at 0.100 [s]



NCAP Test #6 - 2003 Subaru Forester

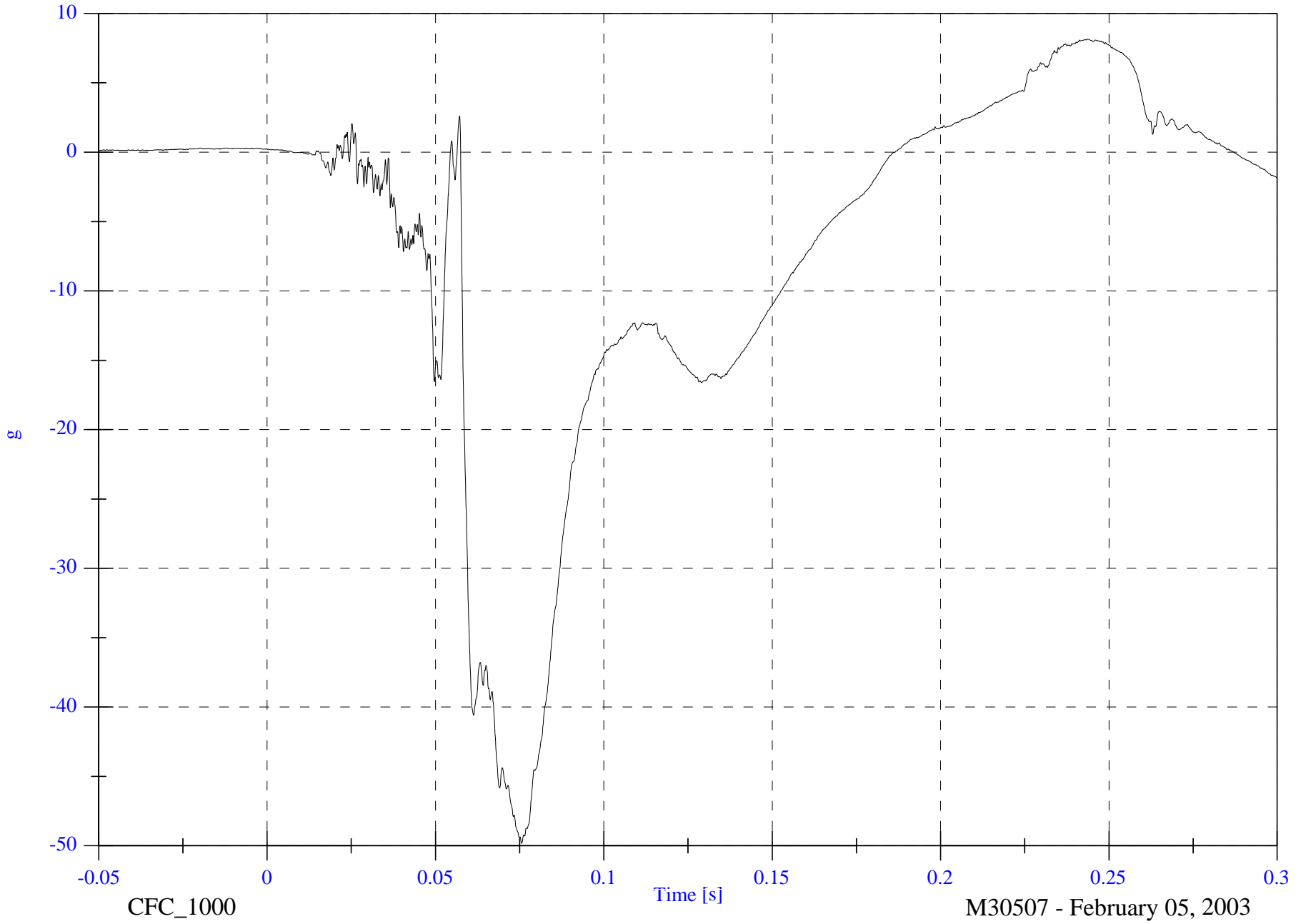
V1P2 Head 9 Array Z Arm Ax

Max: 8.2 [g] at 0.244 [s]

Min: -49.8 [g] at 0.076 [s]

B-66

8642-NCAP-28



CFC\_1000

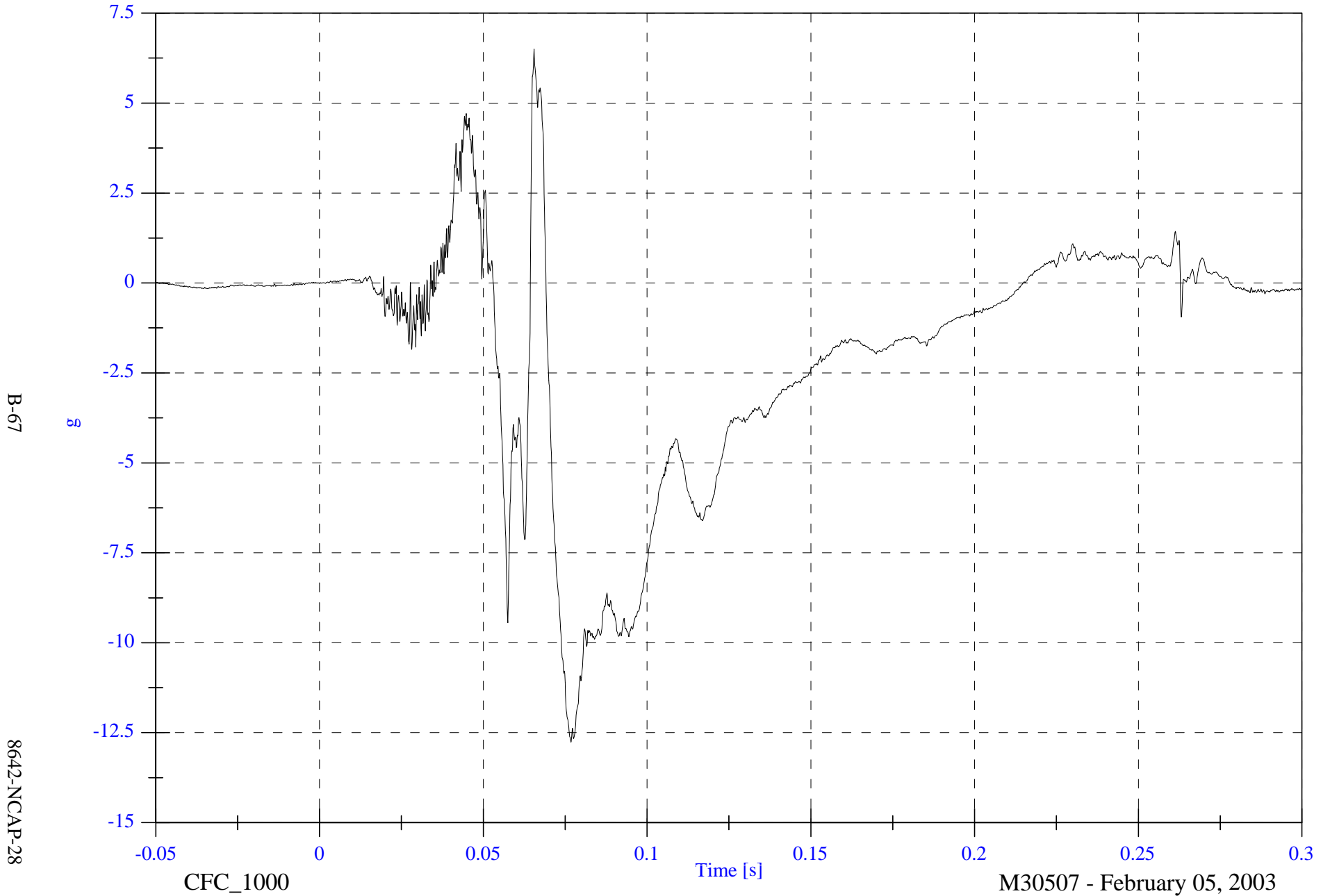
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Head 9 Array Z Arm Ay

Max: 6.5 [g] at 0.065 [s]

Min: -12.8 [g] at 0.077 [s]

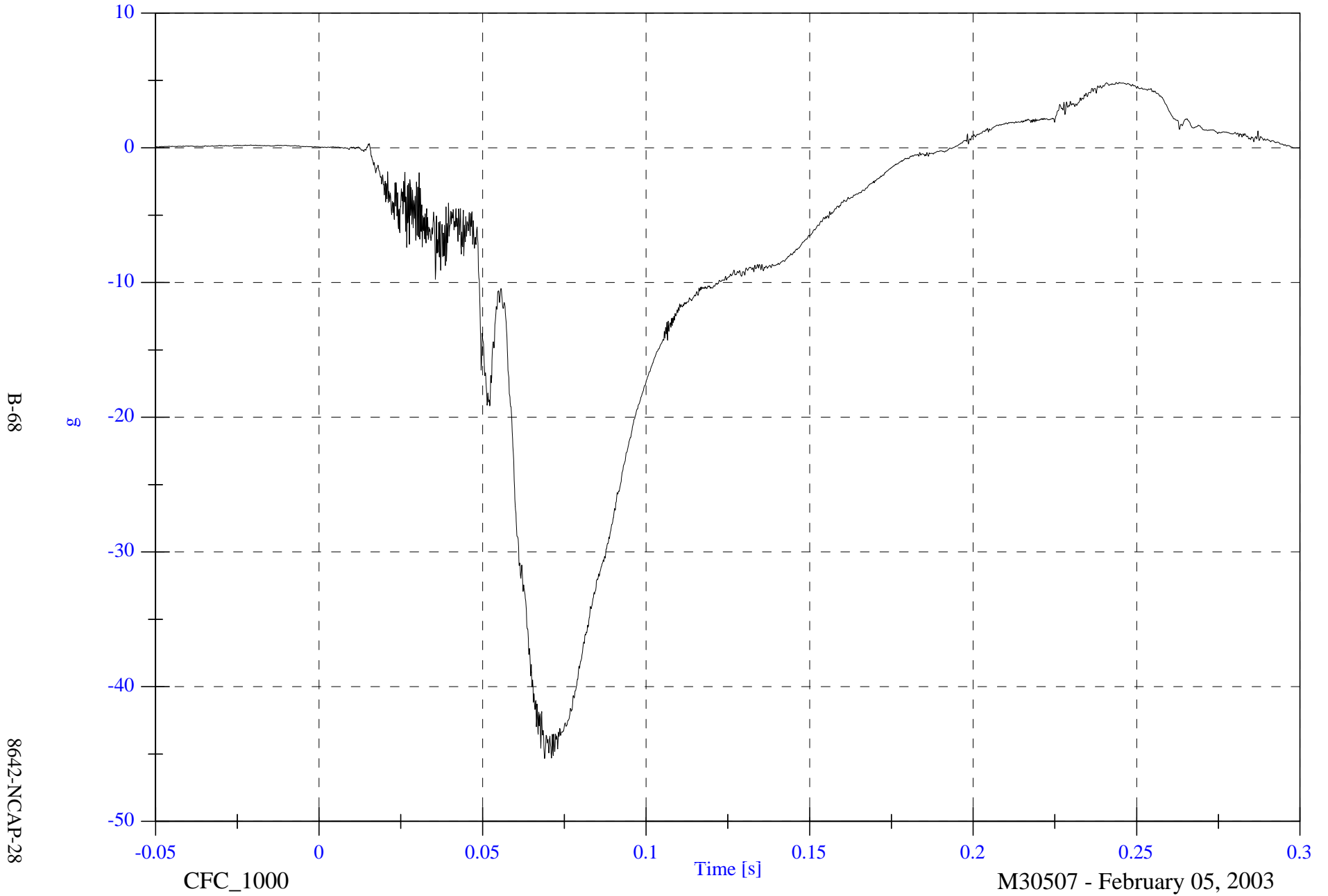


NCAP Test #6 - 2003 Subaru Forester

V1P2 Head CG x

Max: 4.9 [g] at 0.245 [s]

Min: -45.3 [g] at 0.069 [s]

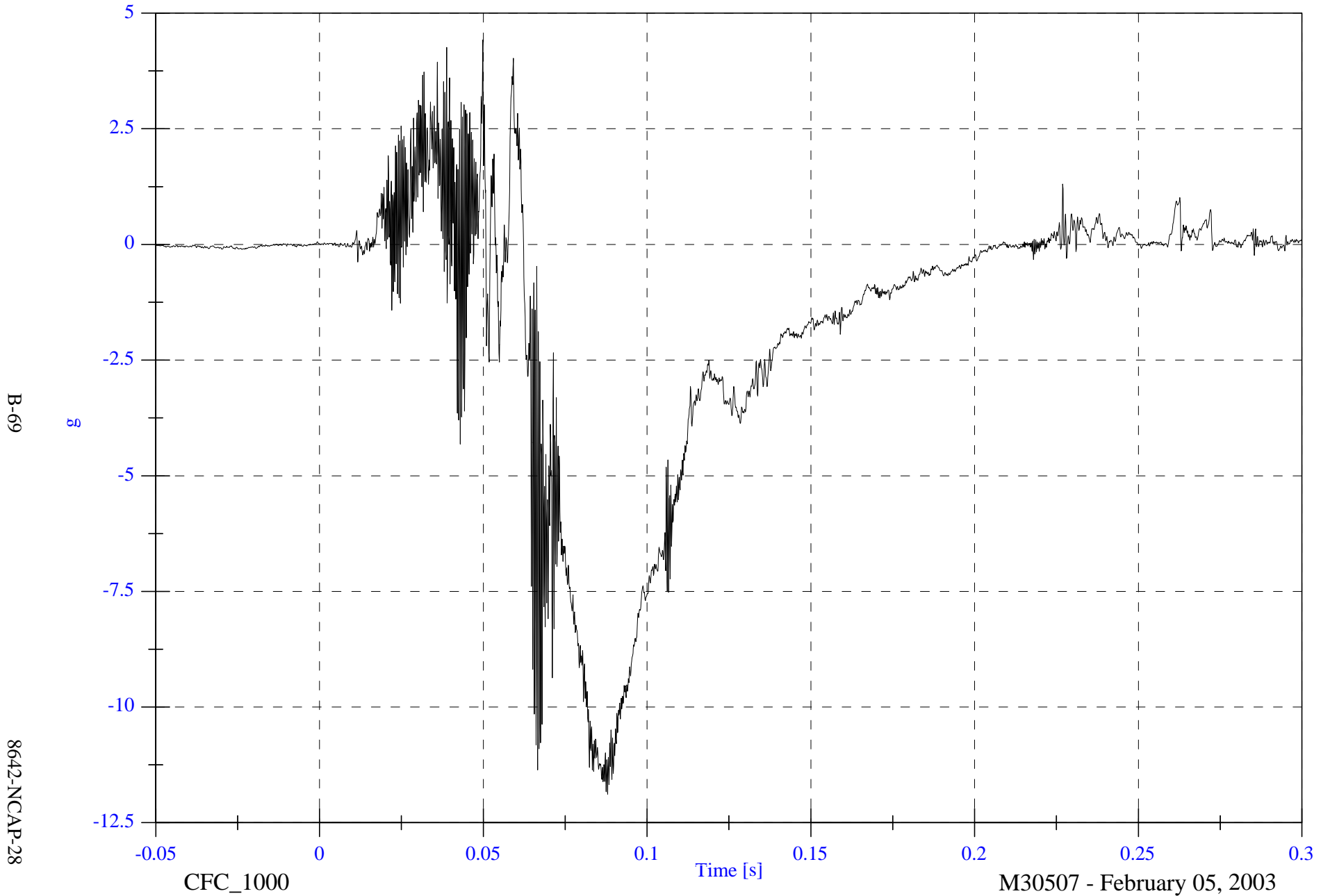


NCAP Test #6 - 2003 Subaru Forester

V1P2 Head CG y

Max: 4.4 [g] at 0.050 [s]

Min: -11.9 [g] at 0.088 [s]

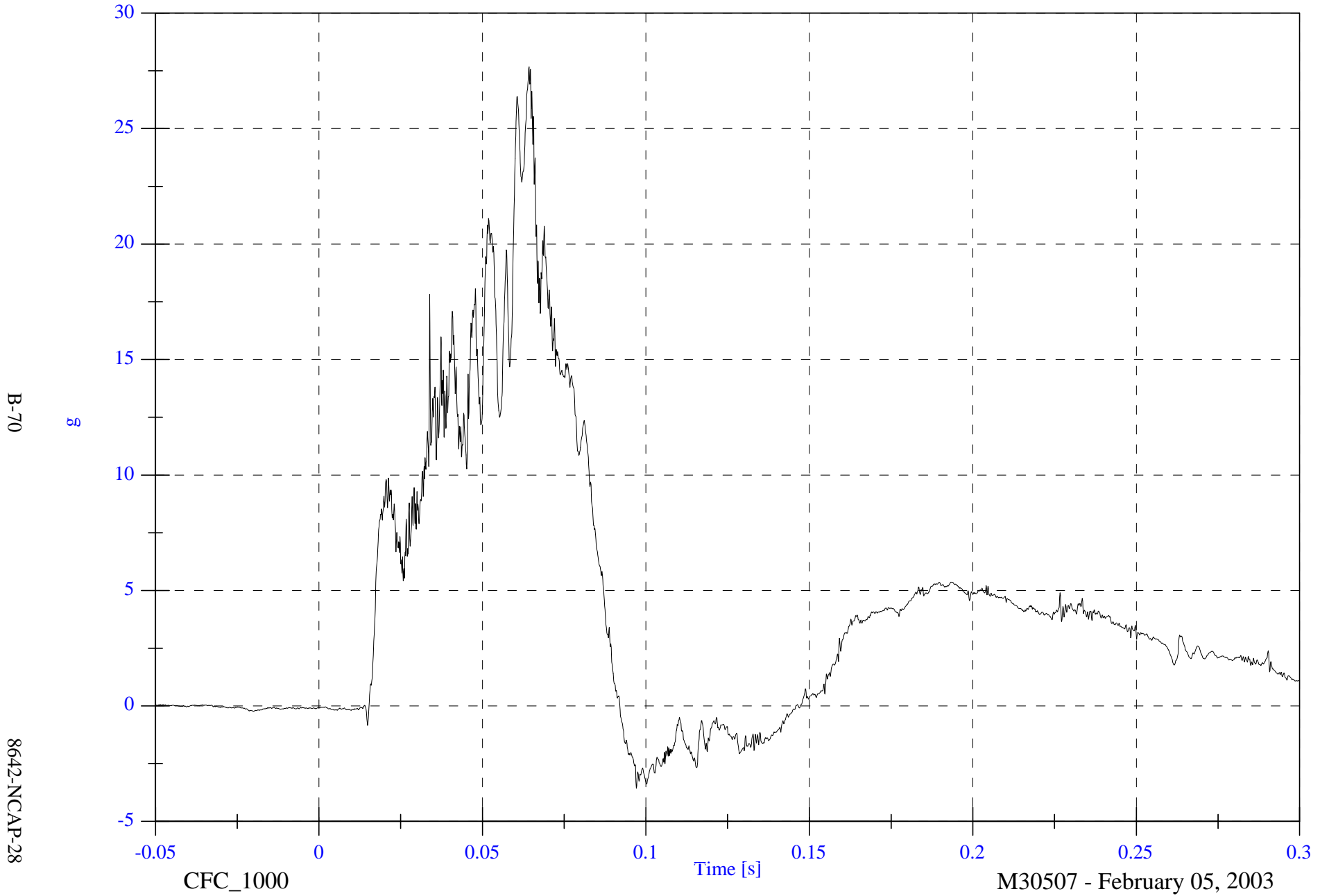


NCAP Test #6 - 2003 Subaru Forester

V1P2 Head CG z

Max: 27.7 [g] at 0.064 [s]

Min: -3.6 [g] at 0.097 [s]



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CFC\_1000

Time [s]

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NCAP Test #6 - 2003 Subaru Forester

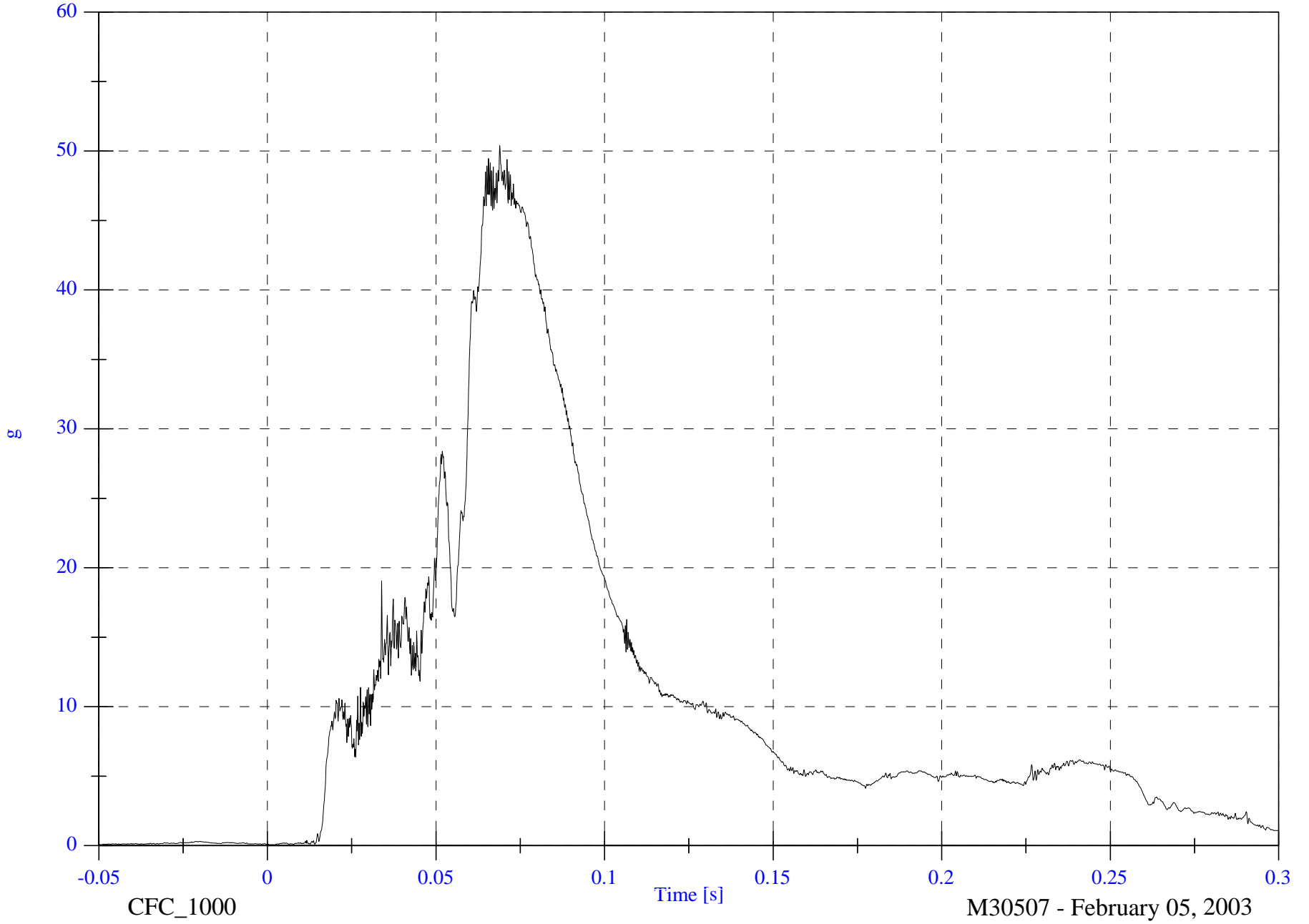
V1P2 Head CG Resultant

Max: 50.4 [g] at 0.069 [s]

Min: 0.1 [g] at 0.002 [s]

B-71

8642-NCAP-28



CFC\_1000

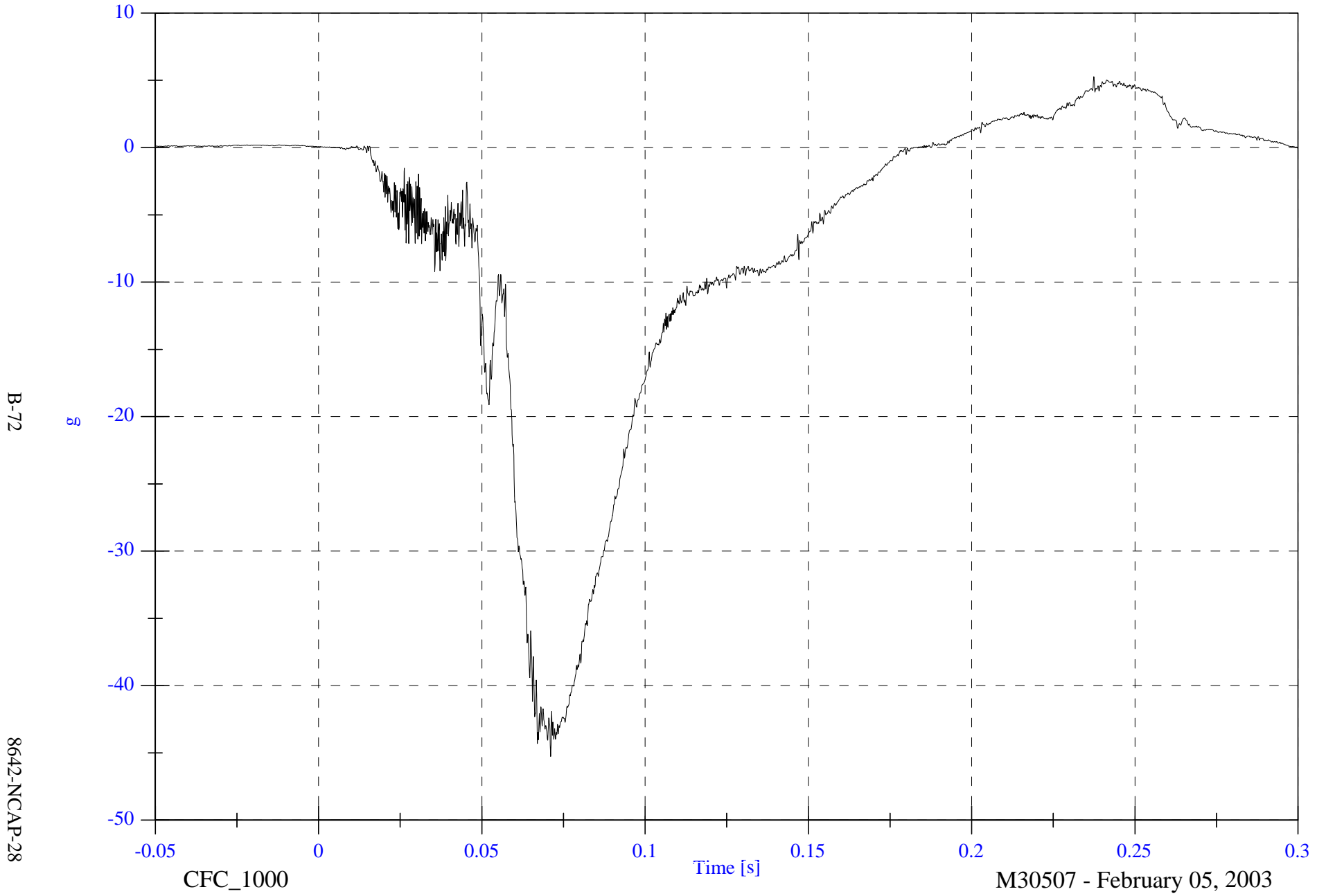
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Head CG Red x

Max: 5.3 [g] at 0.237 [s]

Min: -45.3 [g] at 0.071 [s]



B-72

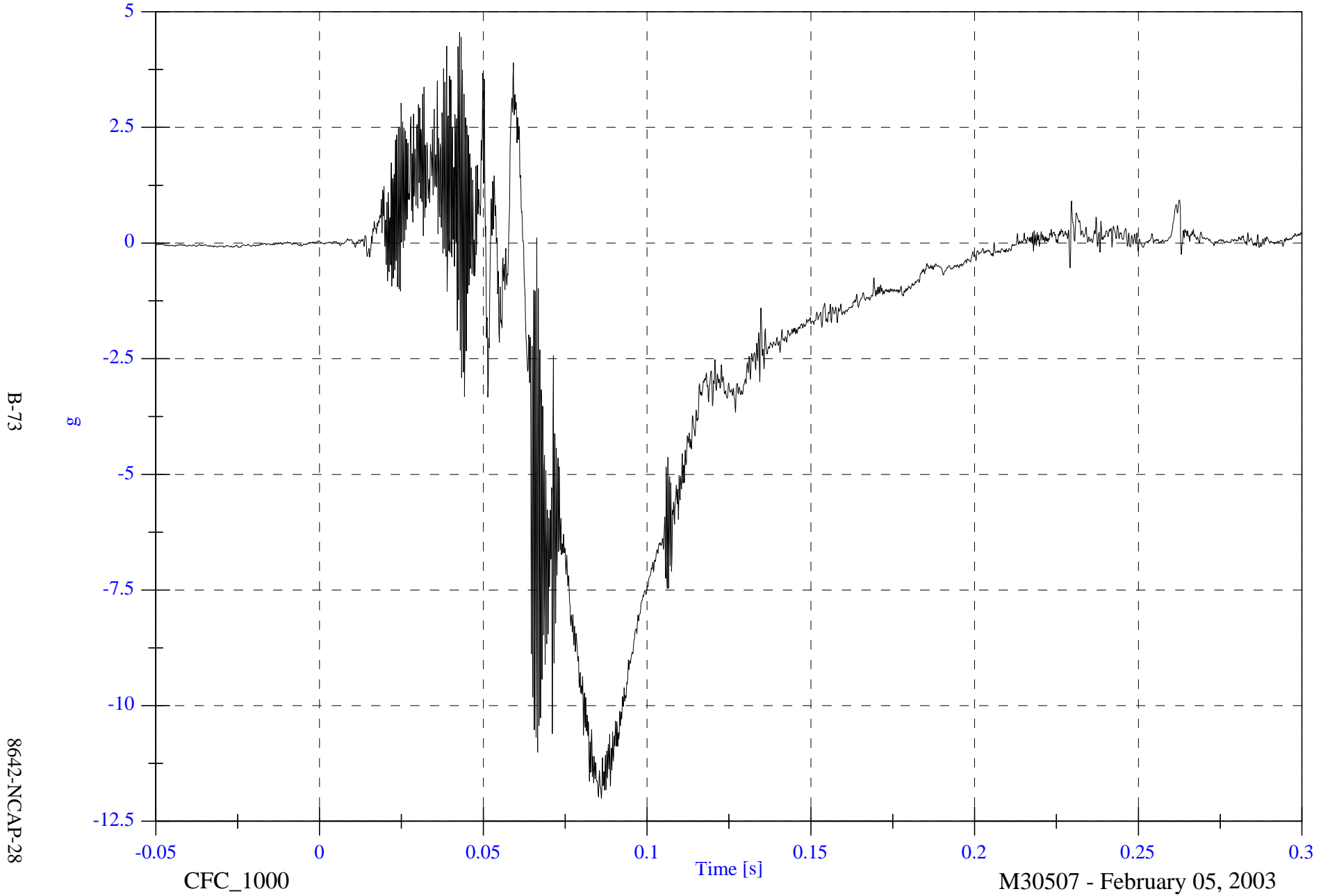
8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

V1P2 Head CG Red y

Max: 4.6 [g] at 0.043 [s]

Min: -12.0 [g] at 0.086 [s]



NCAP Test #6 - 2003 Subaru Forester

V1P2 Head CG Red z

Max: 28.2 [g] at 0.065 [s]

Min: -3.0 [g] at 0.100 [s]



B-74

8642-NCAP-28

CFC\_1000

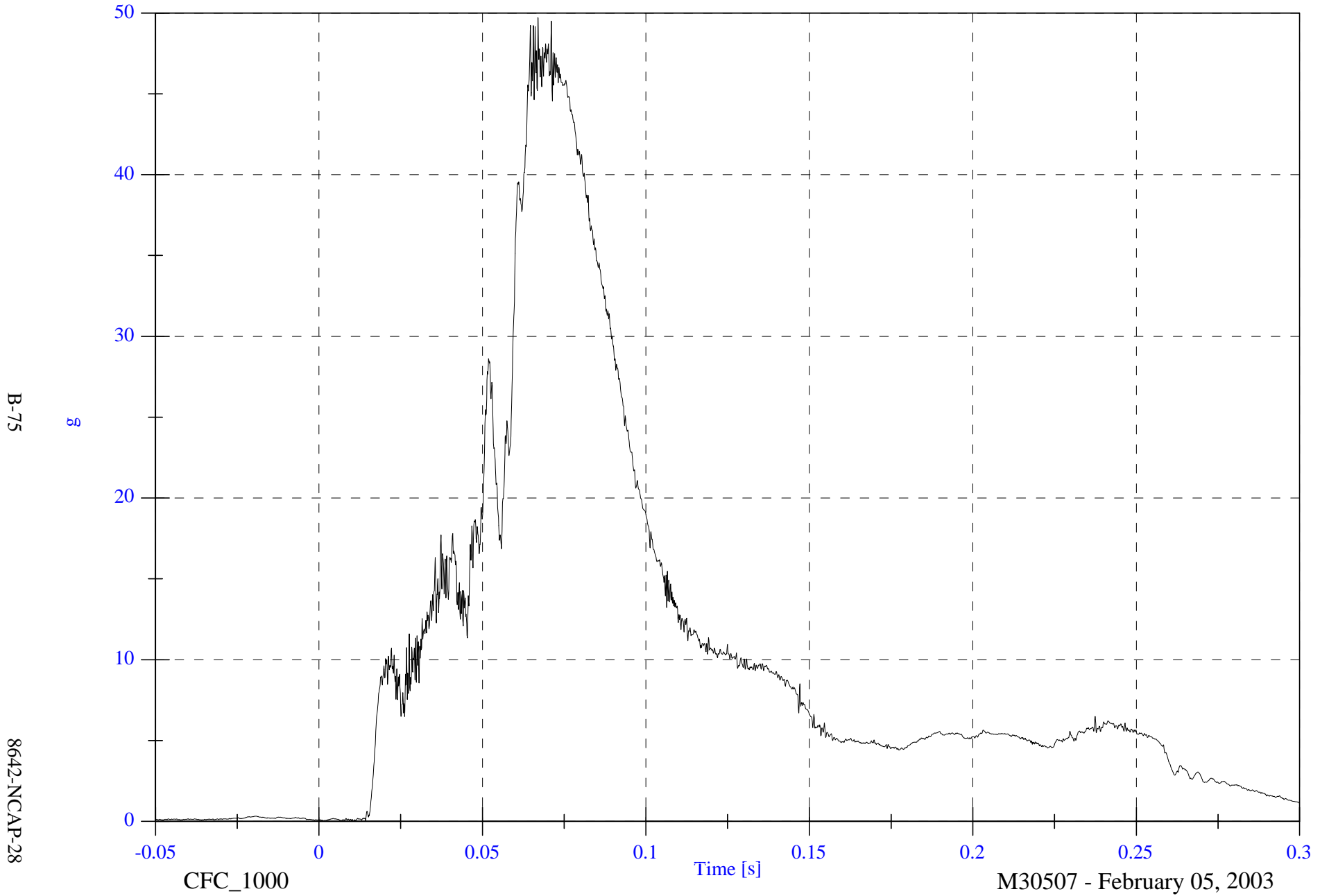
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Head CG Red Resultant

Max: 49.7 [g] at 0.067 [s]

Min: 0.0 [g] at 0.014 [s]

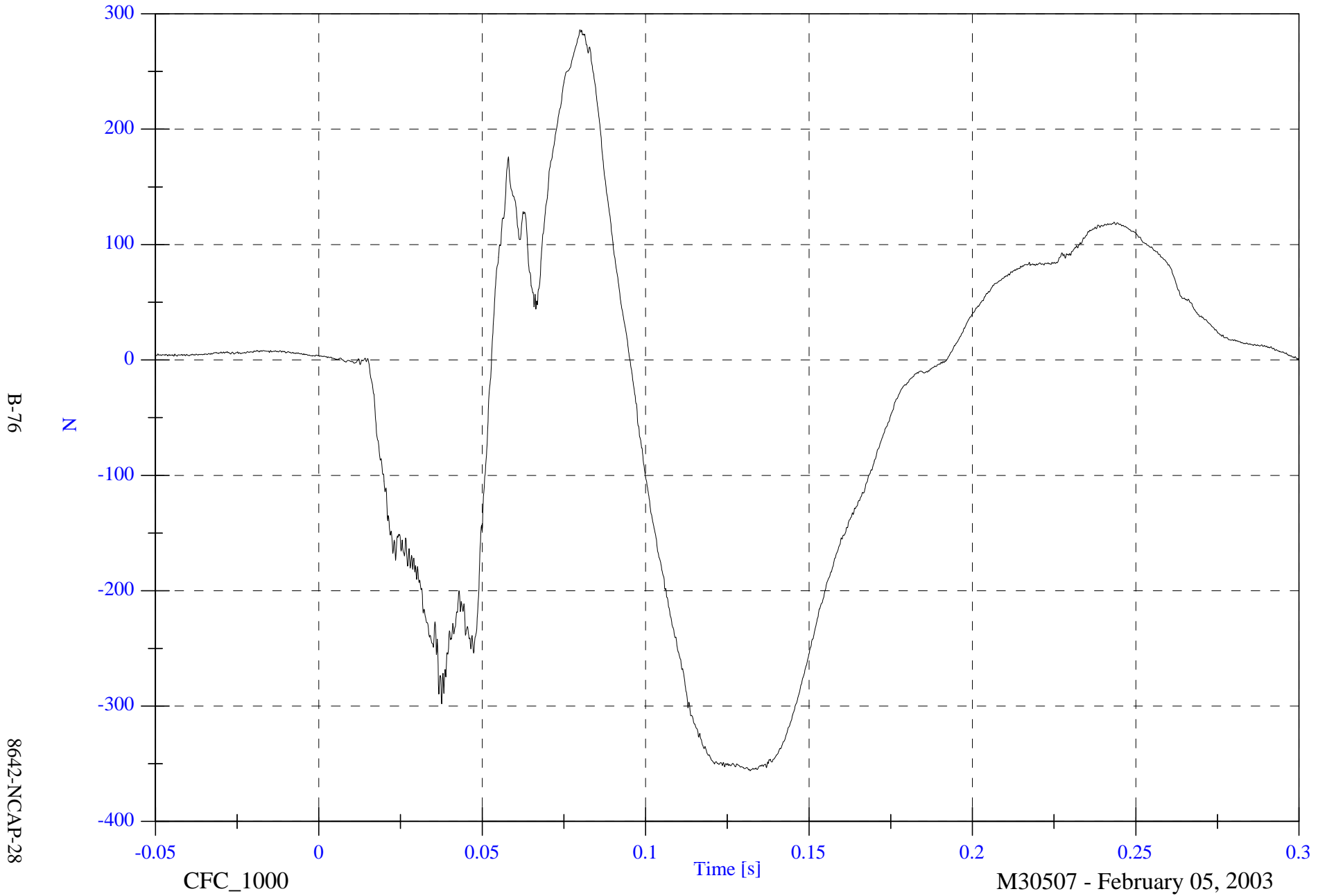


NCAP Test #6 - 2003 Subaru Forester

Max: 286.2 [N] at 0.080 [s]

Min: -356.0 [N] at 0.132 [s]

V1P2 Upper Neck Fx



B-76

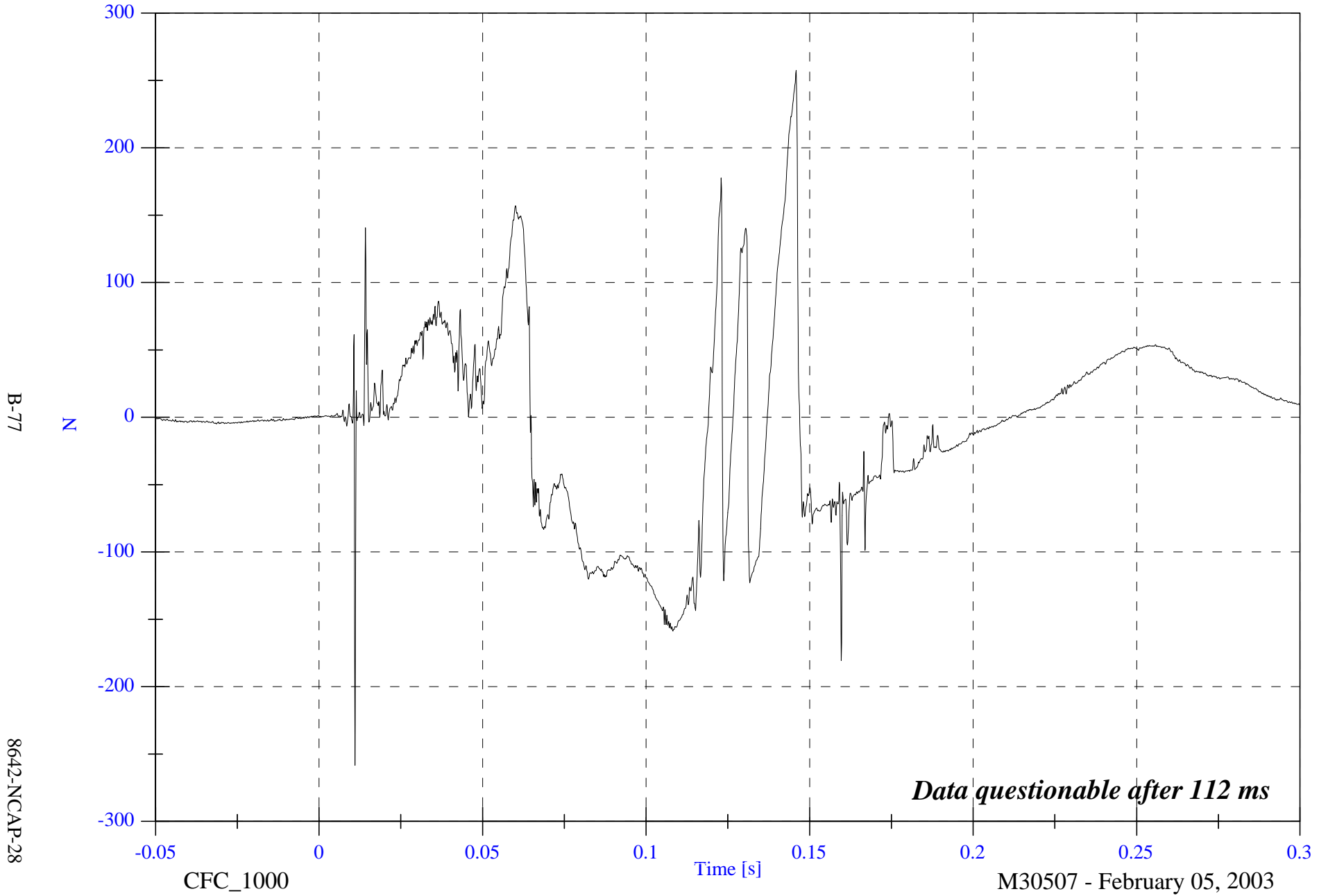
8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

Max: 257.4 [N] at 0.146 [s]

Min: -258.5 [N] at 0.011 [s]

V1P2 Upper Neck Fy

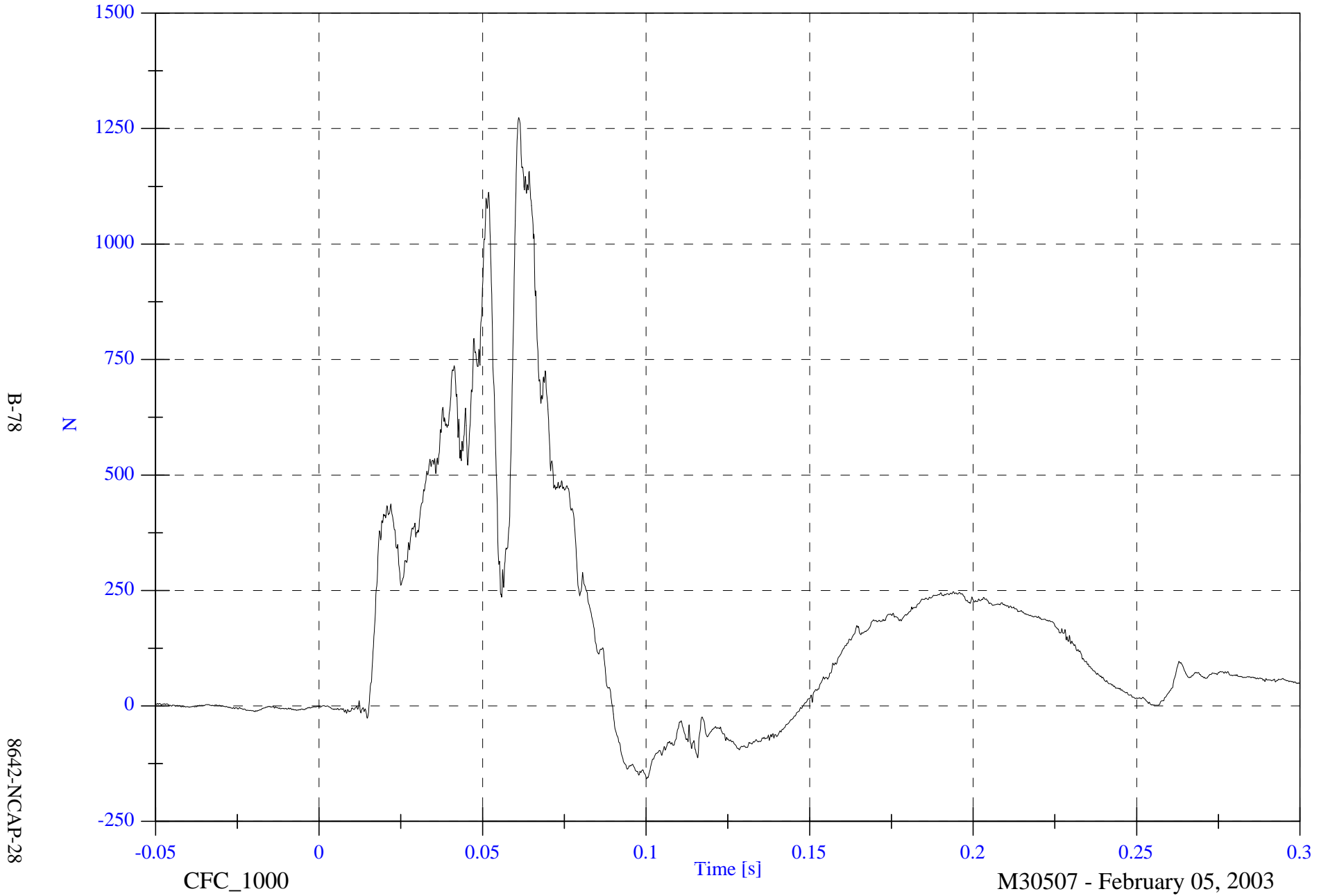


NCAP Test #6 - 2003 Subaru Forester

V1P2 Upper Neck Fz

Max: 1273.7 [N] at 0.061 [s]

Min: -157.8 [N] at 0.100 [s]



NCAP Test #6 - 2003 Subaru Forester

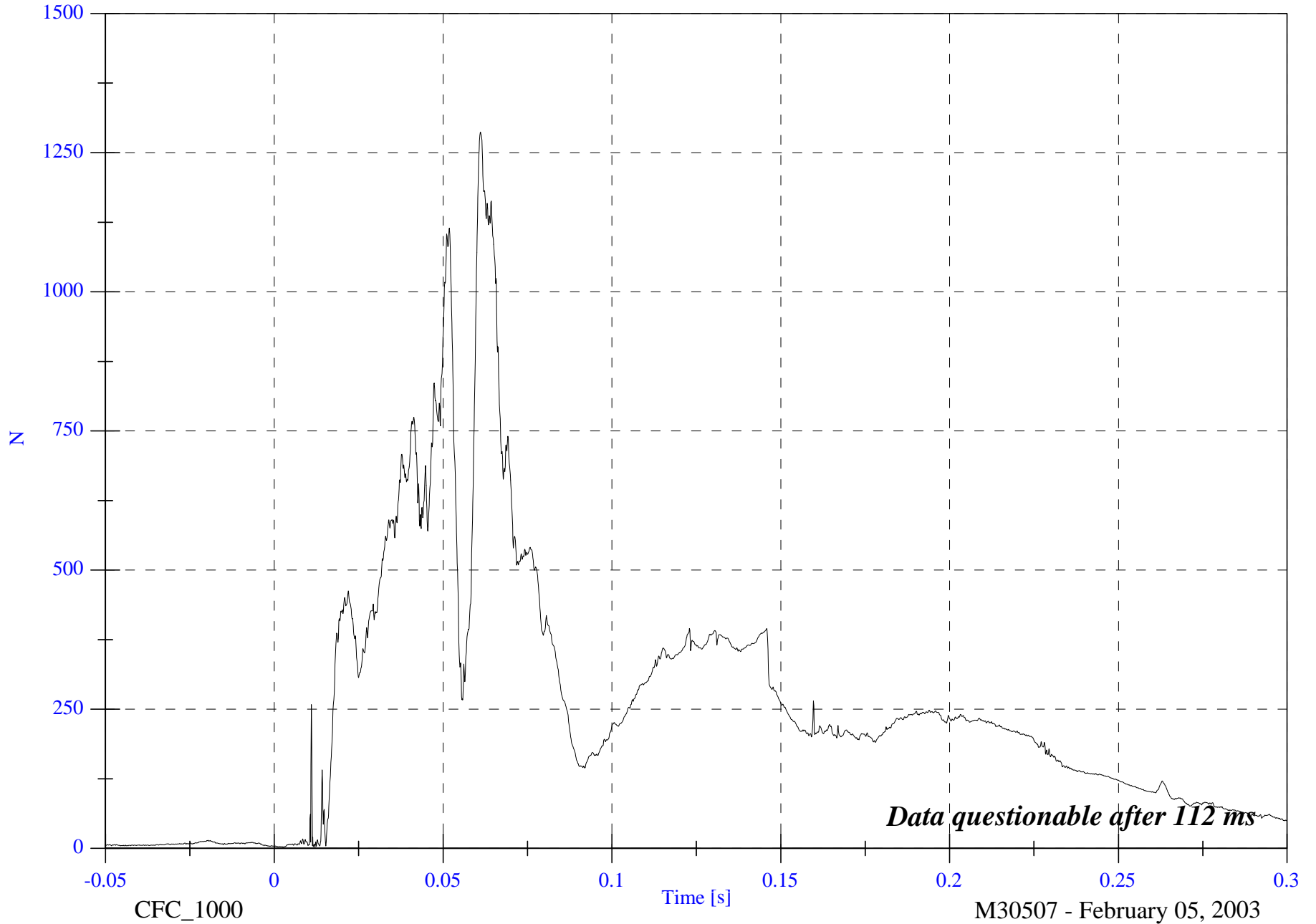
V1P2 Upper Neck F Resultant

Max: 1287.0 [N] at 0.061 [s]

Min: 2.1 [N] at 0.003 [s]

B-79

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*Data questionable after 112 ms*

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NCAP Test #6 - 2003 Subaru Forester

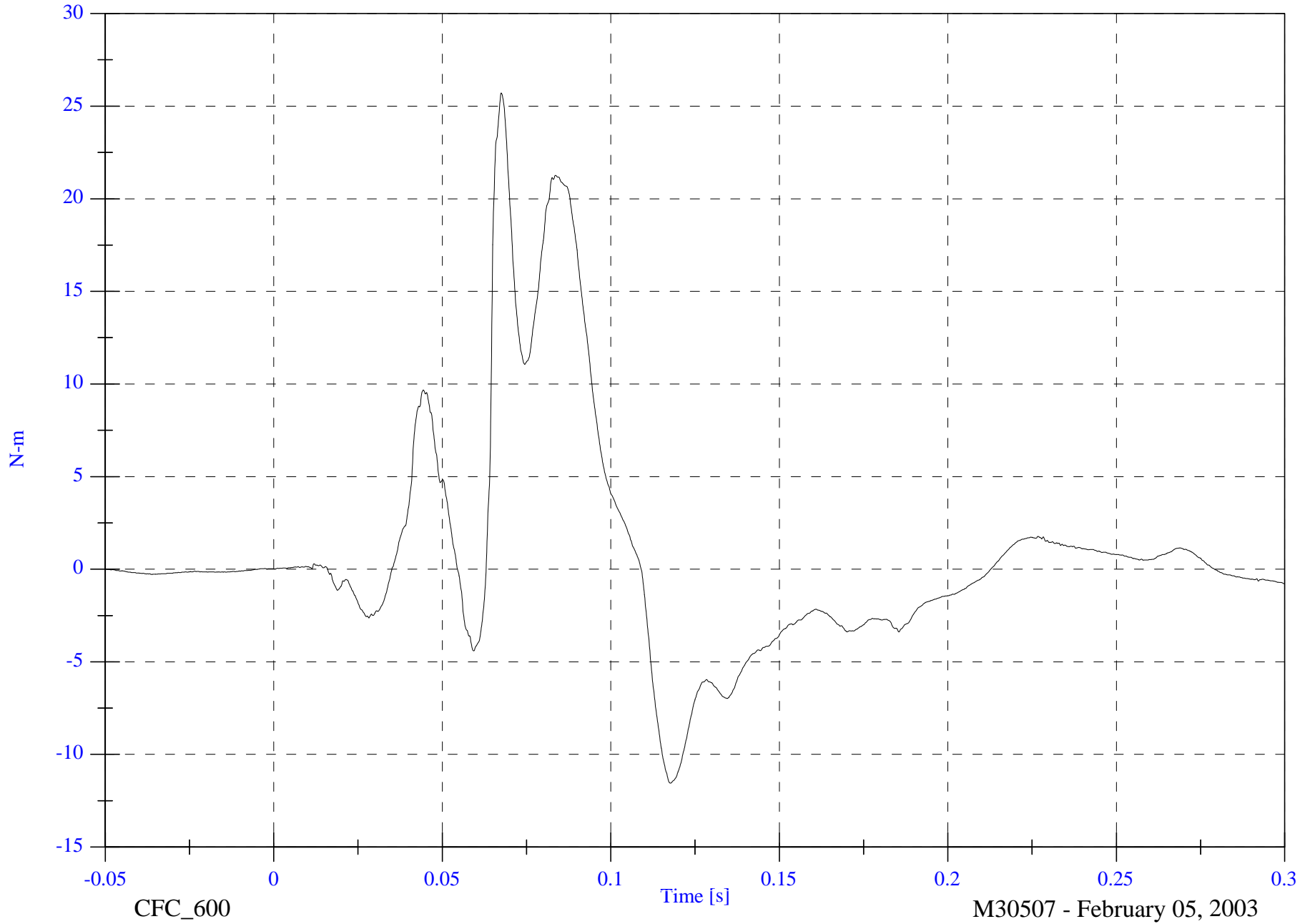
Max: 25.7 [N-m] at 0.067 [s]

V1P2 Upper Neck Mx

Min: -11.6 [N-m] at 0.118 [s]

B-80

8642-NCAP-28



CFC\_600

Time [s]

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NCAP Test #6 - 2003 Subaru Forester

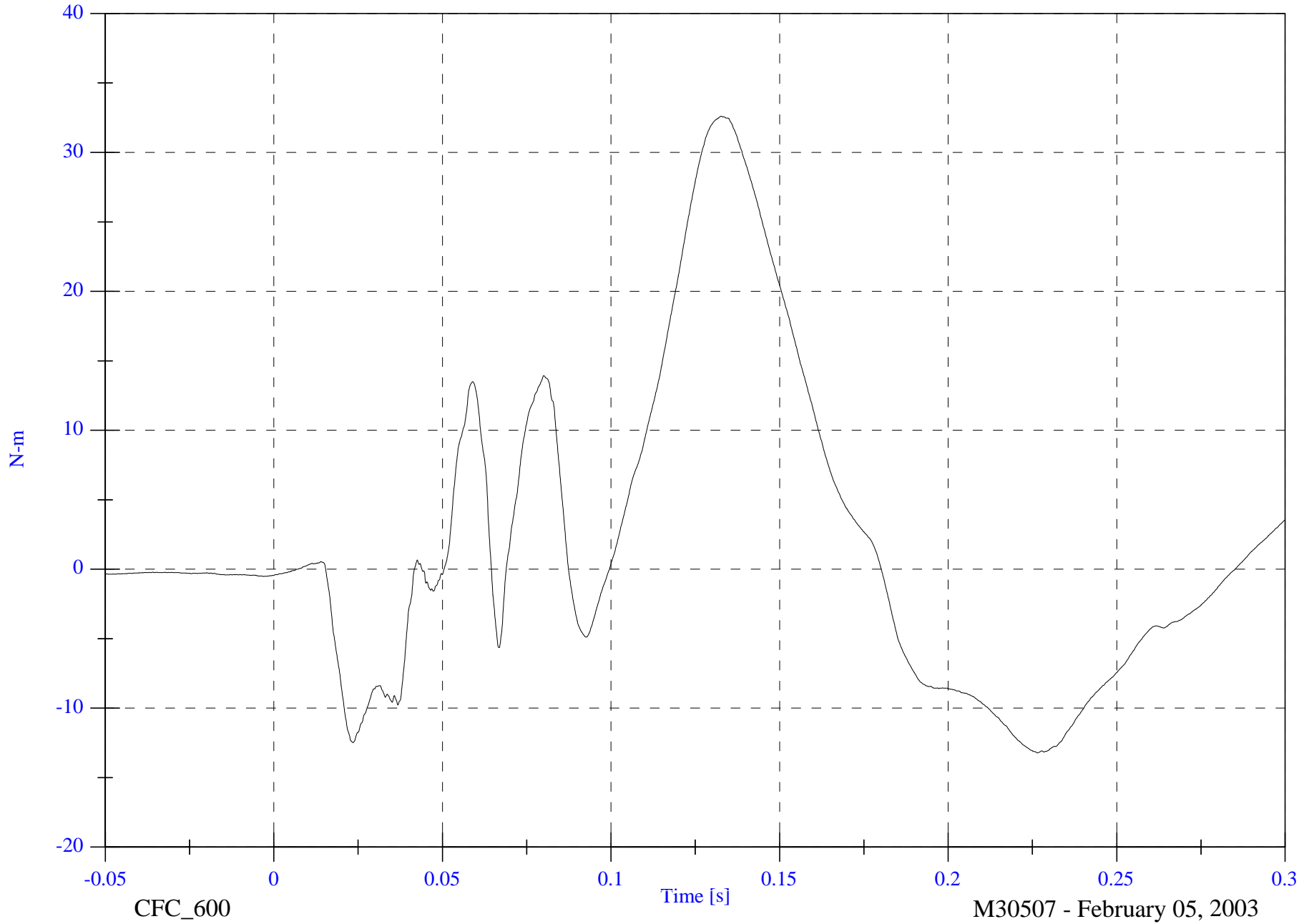
V1P2 Upper Neck My

Max: 32.6 [N-m] at 0.133 [s]

Min: -13.2 [N-m] at 0.227 [s]

B-81

8642-NCAP-28

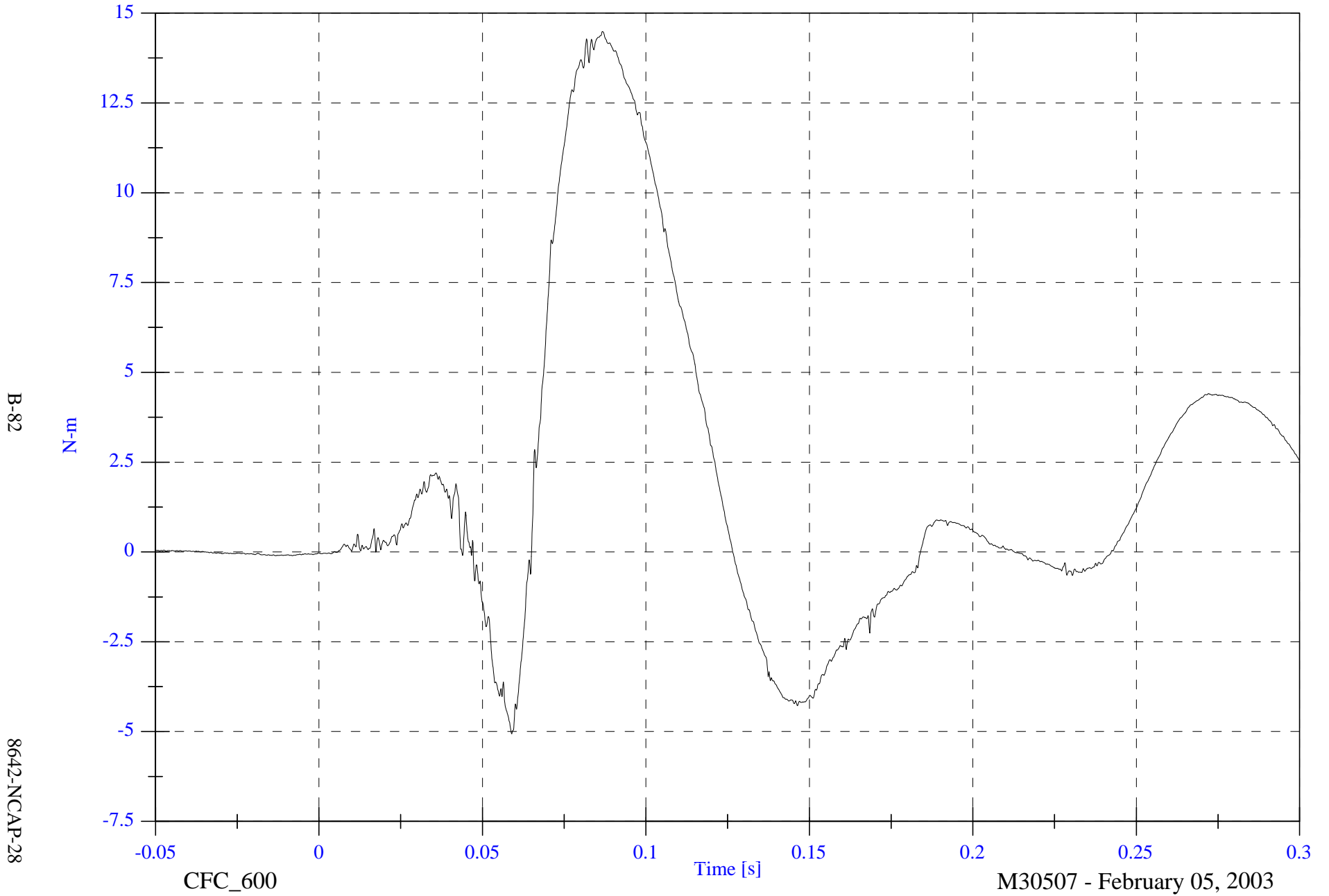


NCAP Test #6 - 2003 Subaru Forester

Max: 14.5 [N-m] at 0.087 [s]

Min: -5.1 [N-m] at 0.059 [s]

V1P2 Upper Neck Mz



B-82

8642-NCAP-28

CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

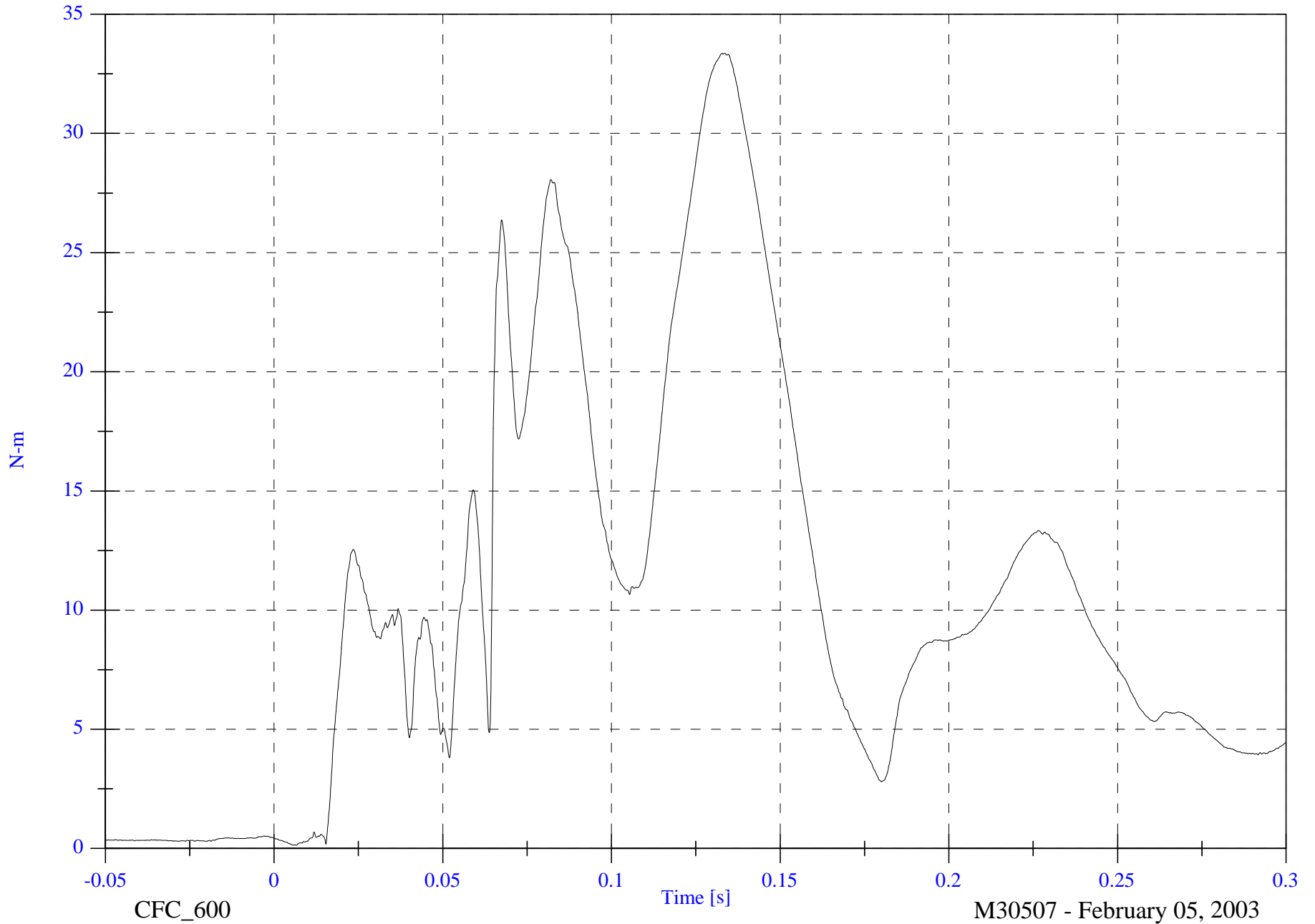
V1P2 Upper Neck M Resultant

Max: 33.4 [N-m] at 0.133 [s]

Min: 0.1 [N-m] at 0.007 [s]

B-83

8642-NCAP-28



CFC\_600

Time [s]

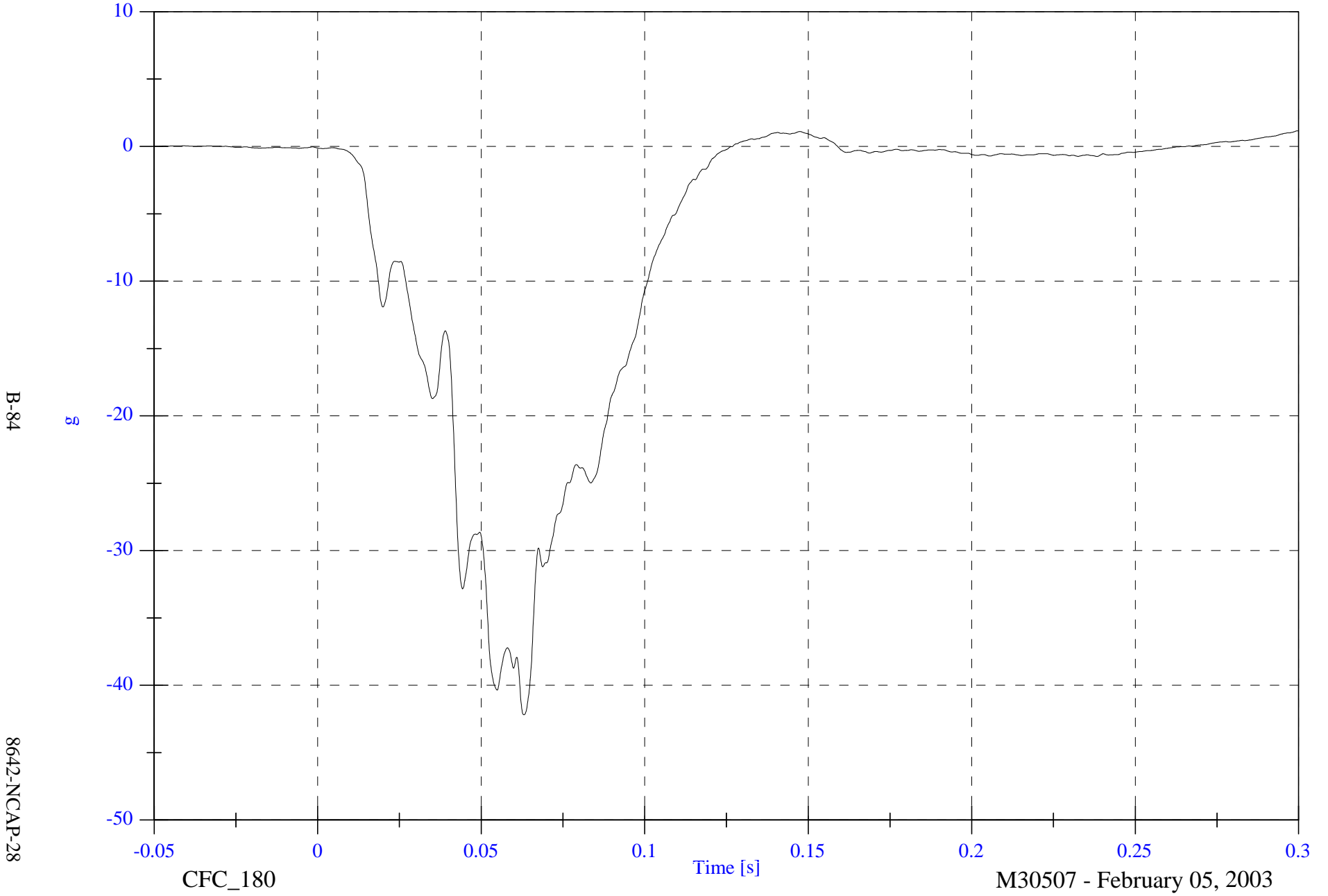
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NCAP Test #6 - 2003 Subaru Forester

V1P2 Chest x

Max: 1.2 [g] at 0.300 [s]

Min: -42.2 [g] at 0.063 [s]

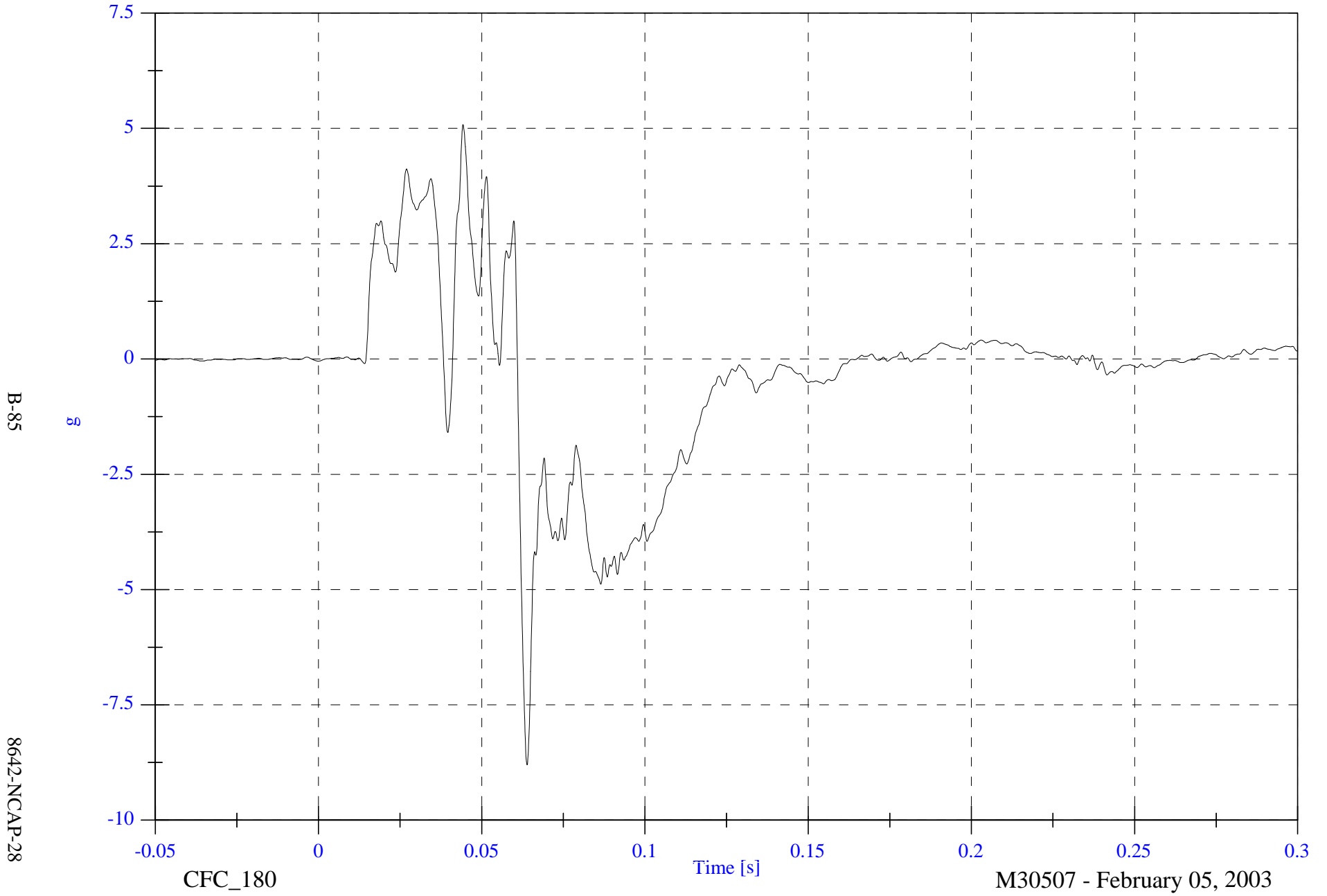


NCAP Test #6 - 2003 Subaru Forester

V1P2 Chest y

Max: 5.1 [g] at 0.044 [s]

Min: -8.8 [g] at 0.064 [s]

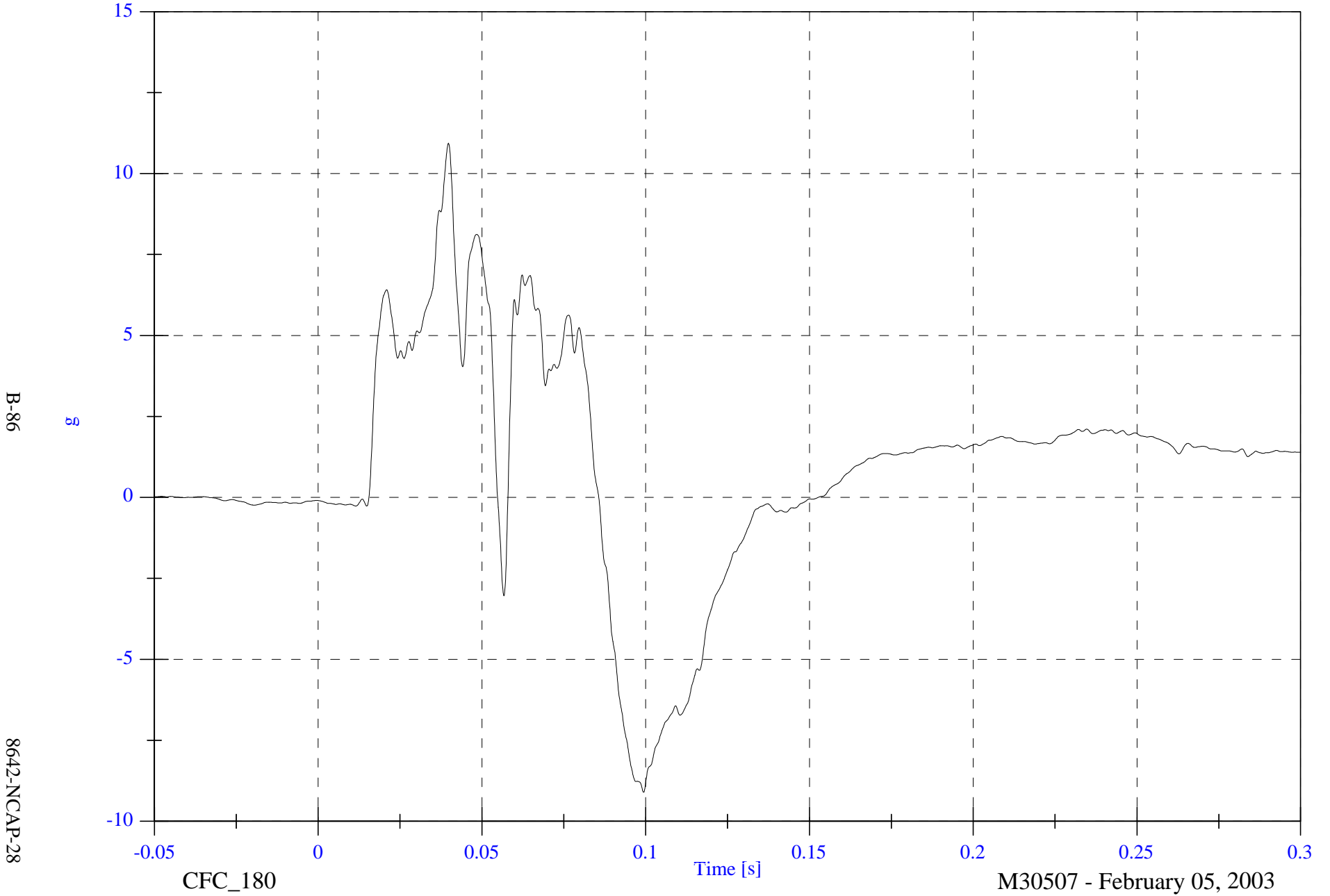


NCAP Test #6 - 2003 Subaru Forester

VIP2 Chest z

Max: 10.9 [g] at 0.040 [s]

Min: -9.1 [g] at 0.099 [s]



NCAP Test #6 - 2003 Subaru Forester

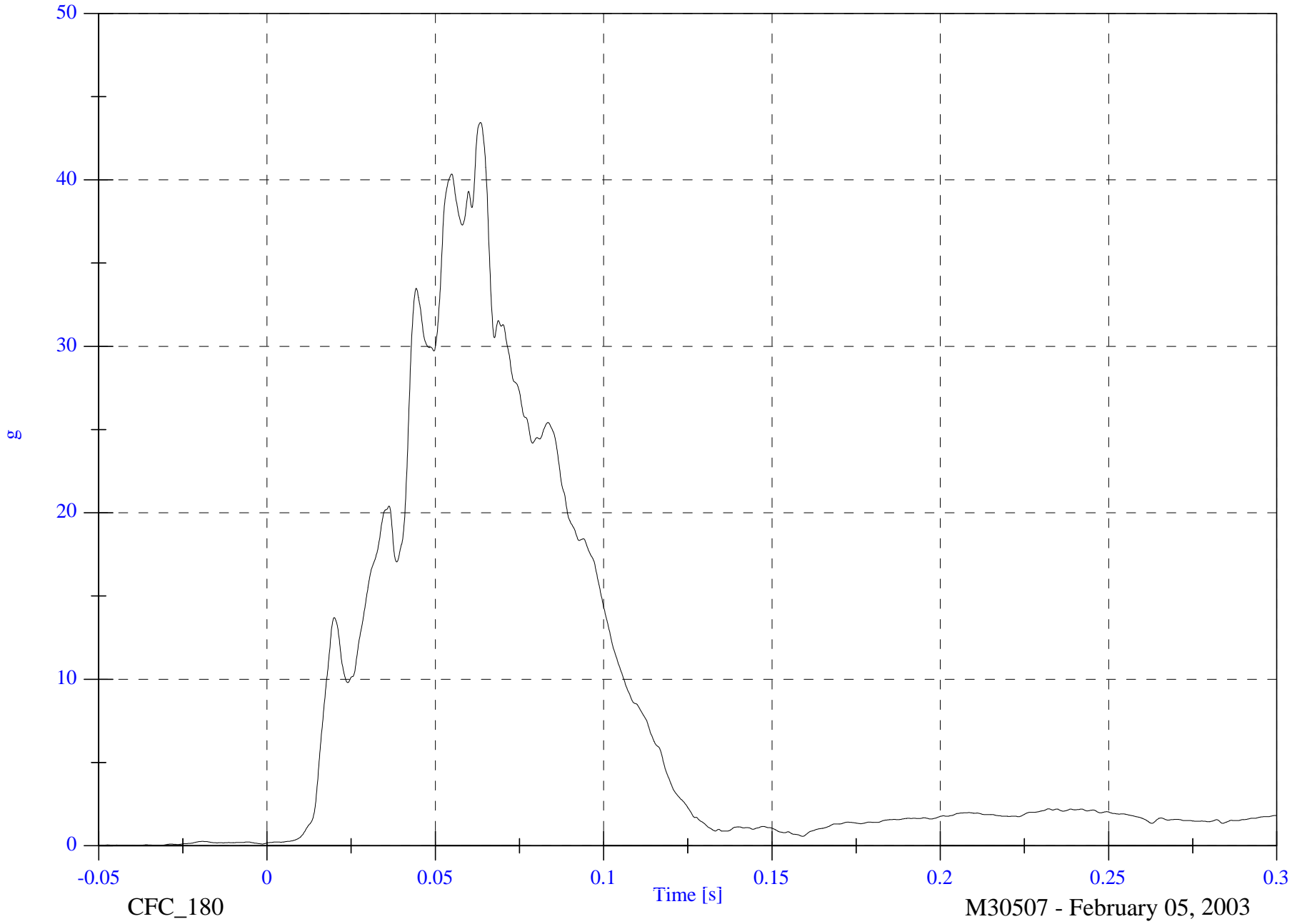
V1P2 Chest Resultant

Max: 43.5 [g] at 0.063 [s]

Min: 0.0 [g] at -0.039 [s]

B-87

8642-NCAP-28

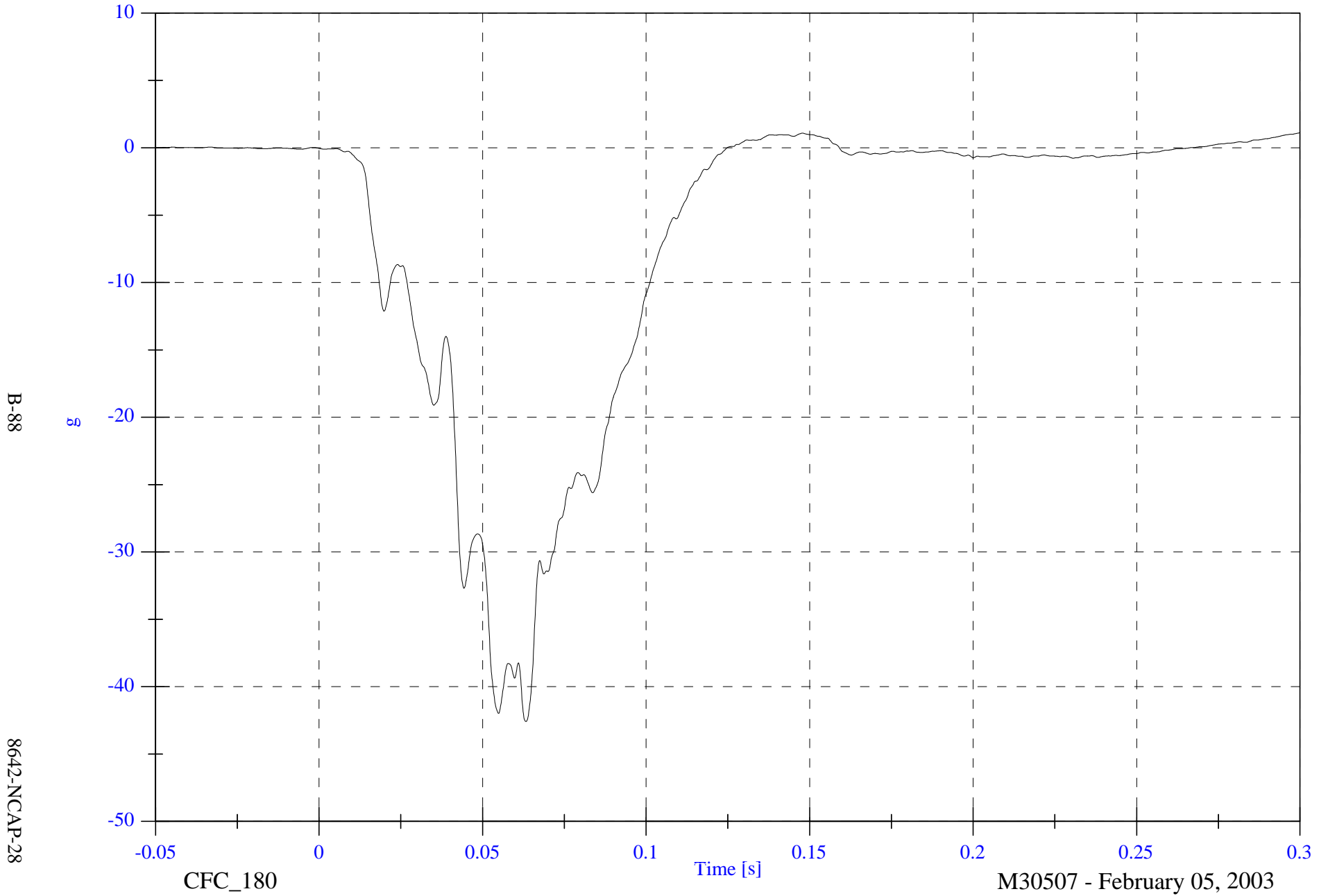


NCAP Test #6 - 2003 Subaru Forester

V1P2 Chest Red x

Max: 1.1 [g] at 0.300 [s]

Min: -42.6 [g] at 0.063 [s]

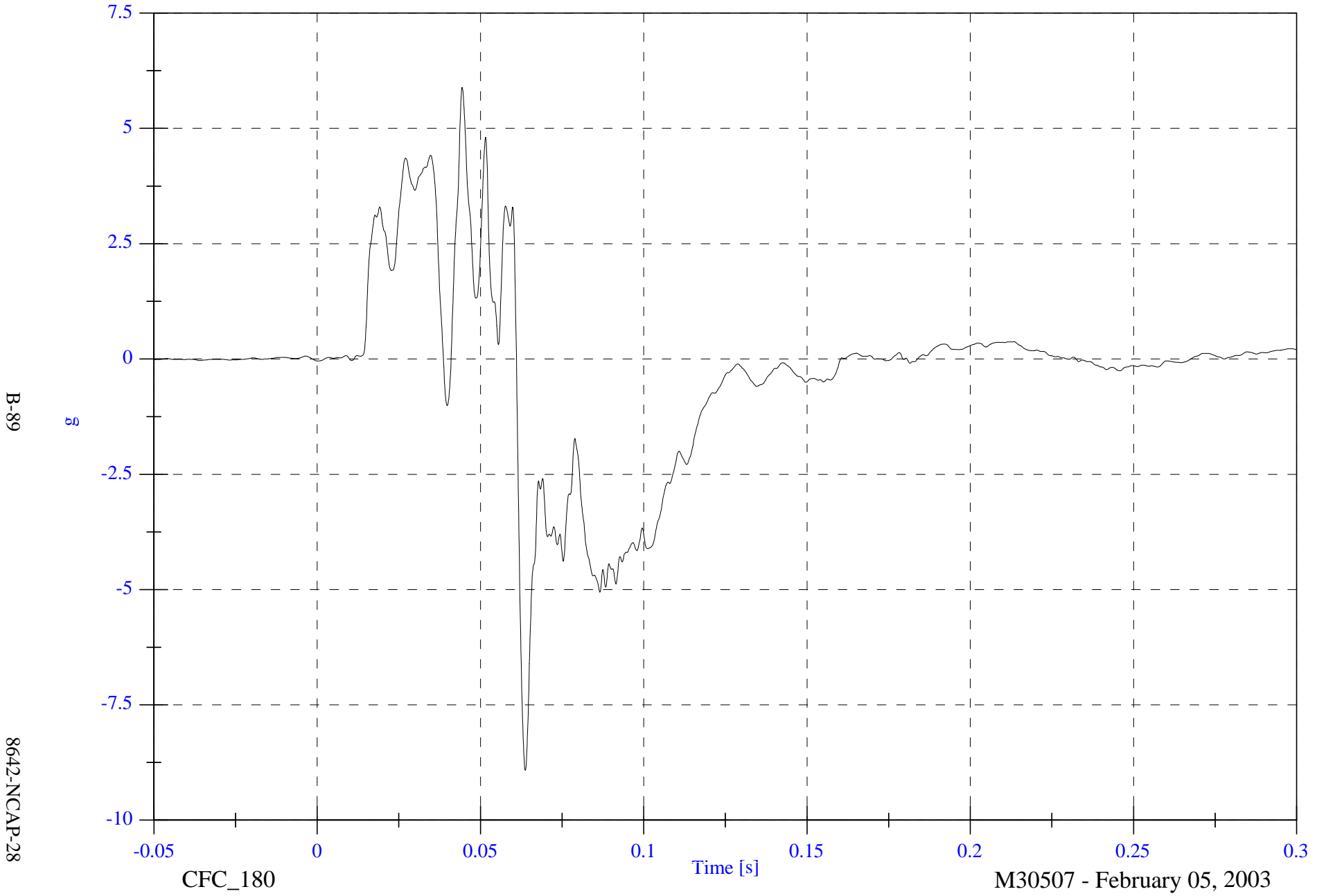


NCAP Test #6 - 2003 Subaru Forester

V1P2 Chest Red y

Max: 5.9 [g] at 0.044 [s]

Min: -8.9 [g] at 0.064 [s]



B-89

8642-NCAP-28

CFC\_180

Time [s]

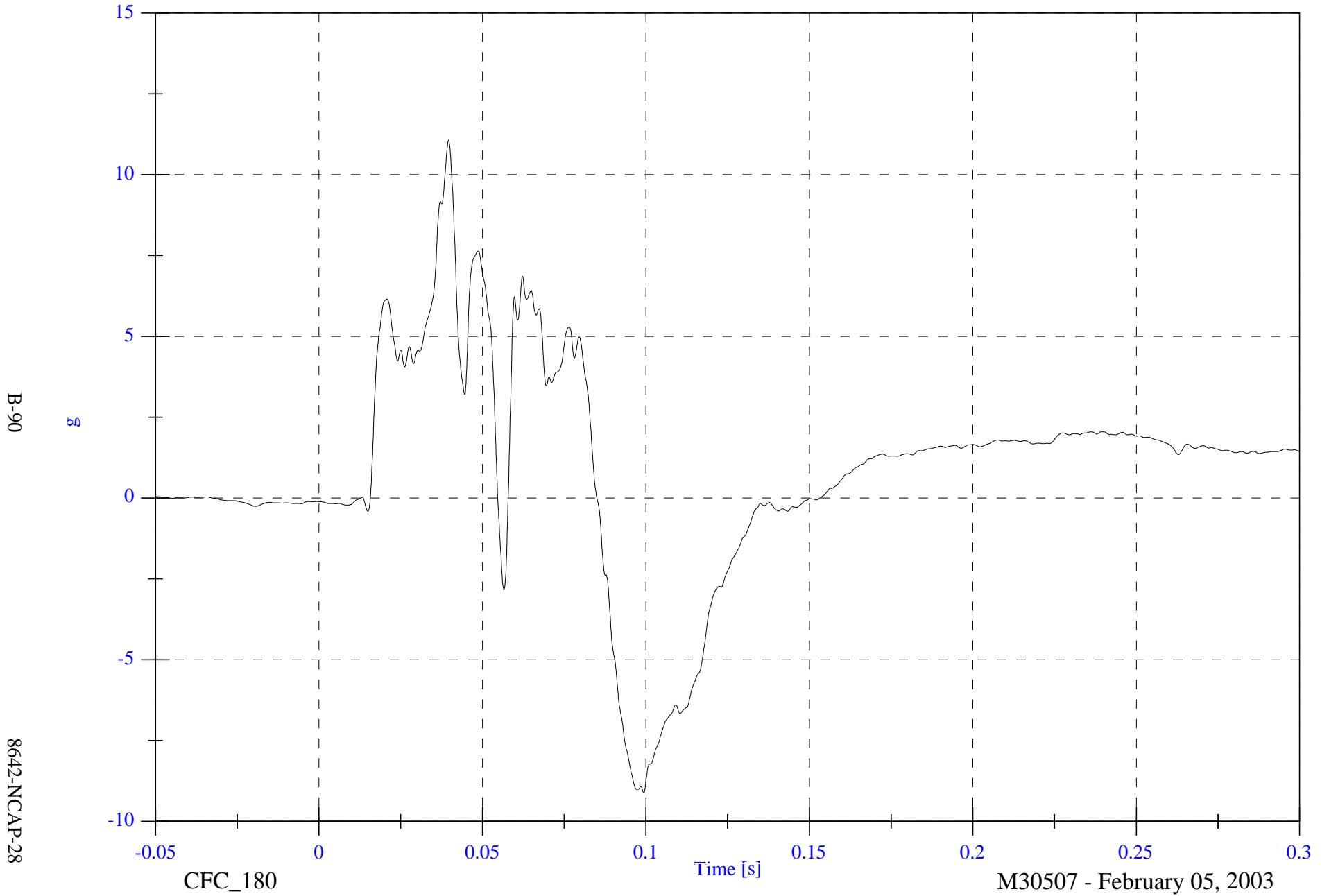
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

VIP2 Chest Red z

Max: 11.1 [g] at 0.040 [s]

Min: -9.1 [g] at 0.099 [s]



NCAP Test #6 - 2003 Subaru Forester

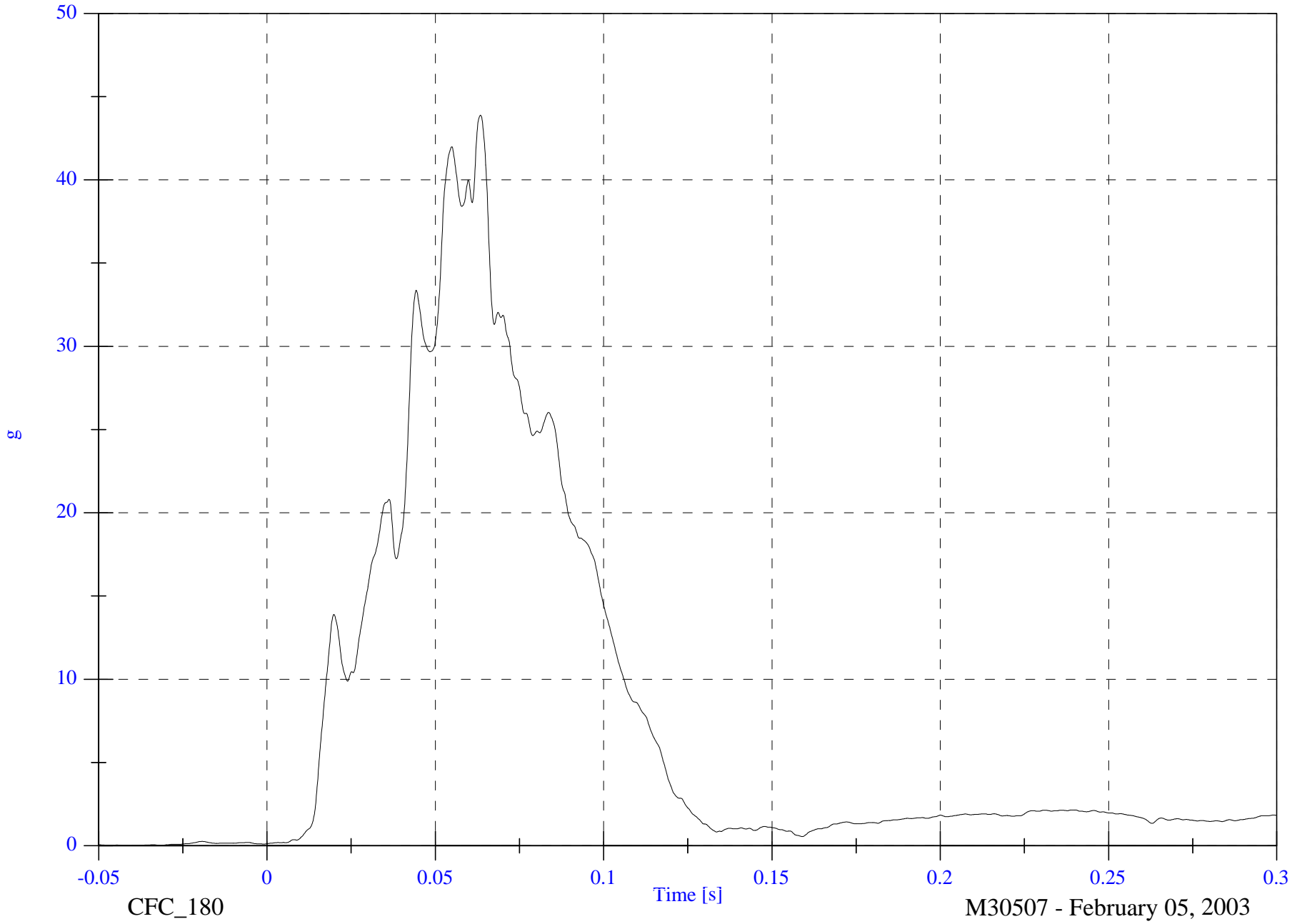
V1P2 Chest Red Resultant

Max: 43.9 [g] at 0.063 [s]

Min: 0.0 [g] at -0.042 [s]

B-91

8642-NCAP-28



CFC\_180

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

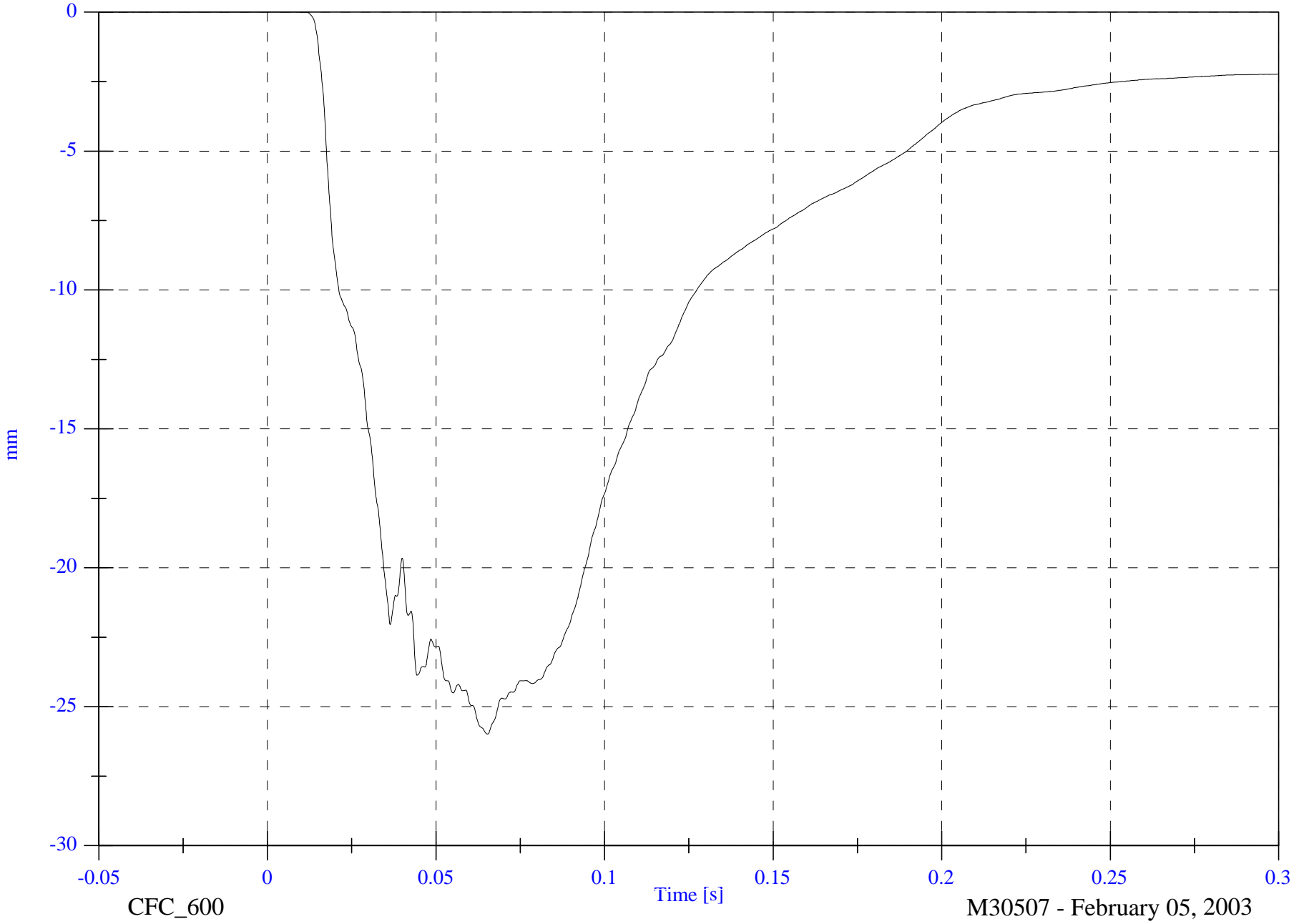
VIP2 Chest Compression x

Max: 0.0 [mm] at -0.003 [s]

Min: -26.0 [mm] at 0.065 [s]

B-92

8642-NCAP-28



CFC\_600

Time [s]

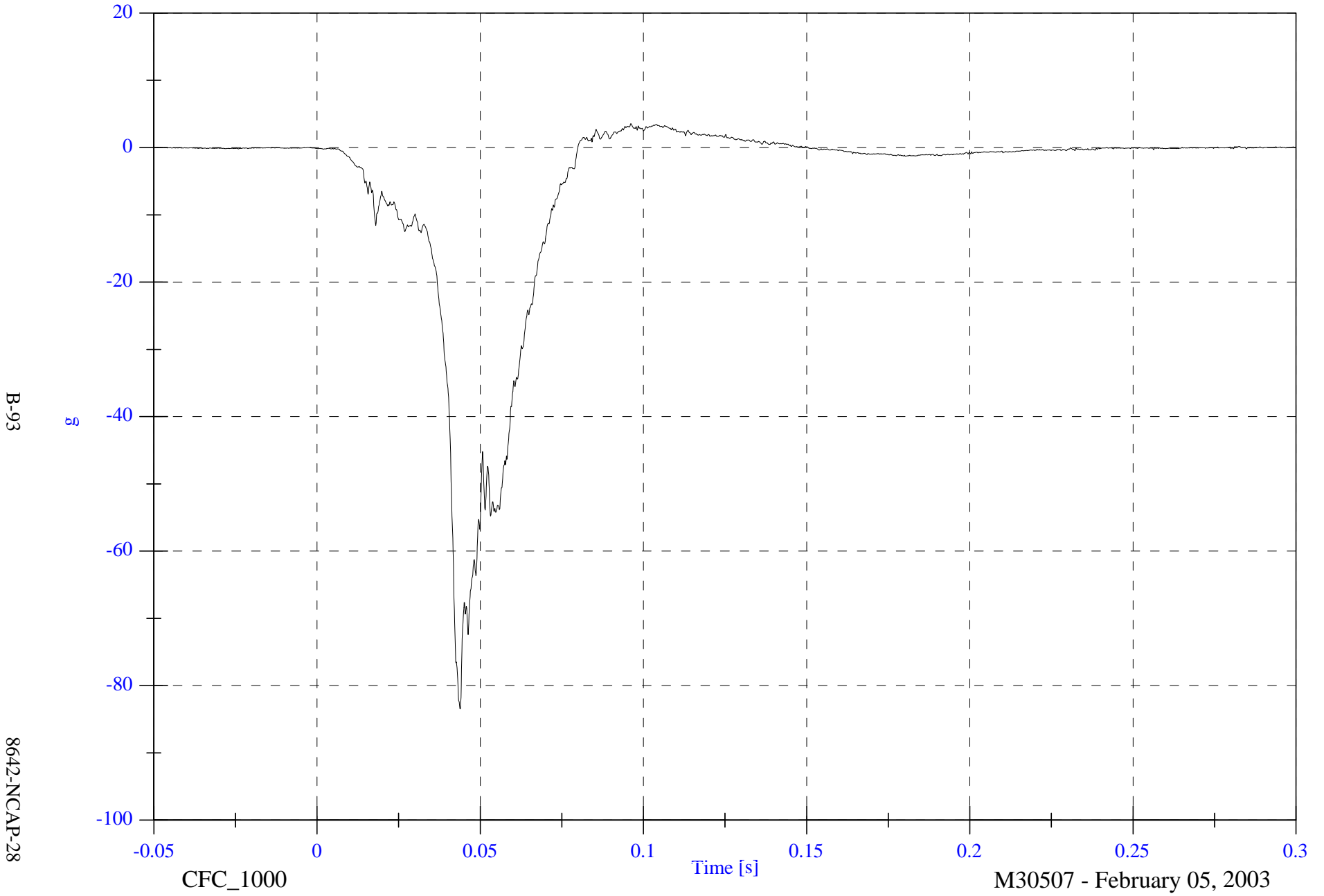
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 3.6 [g] at 0.096 [s]

Min: -83.4 [g] at 0.044 [s]

V1P2 Pelvic x



B-93

8642-NCAP-28

CFC\_1000

Time [s]

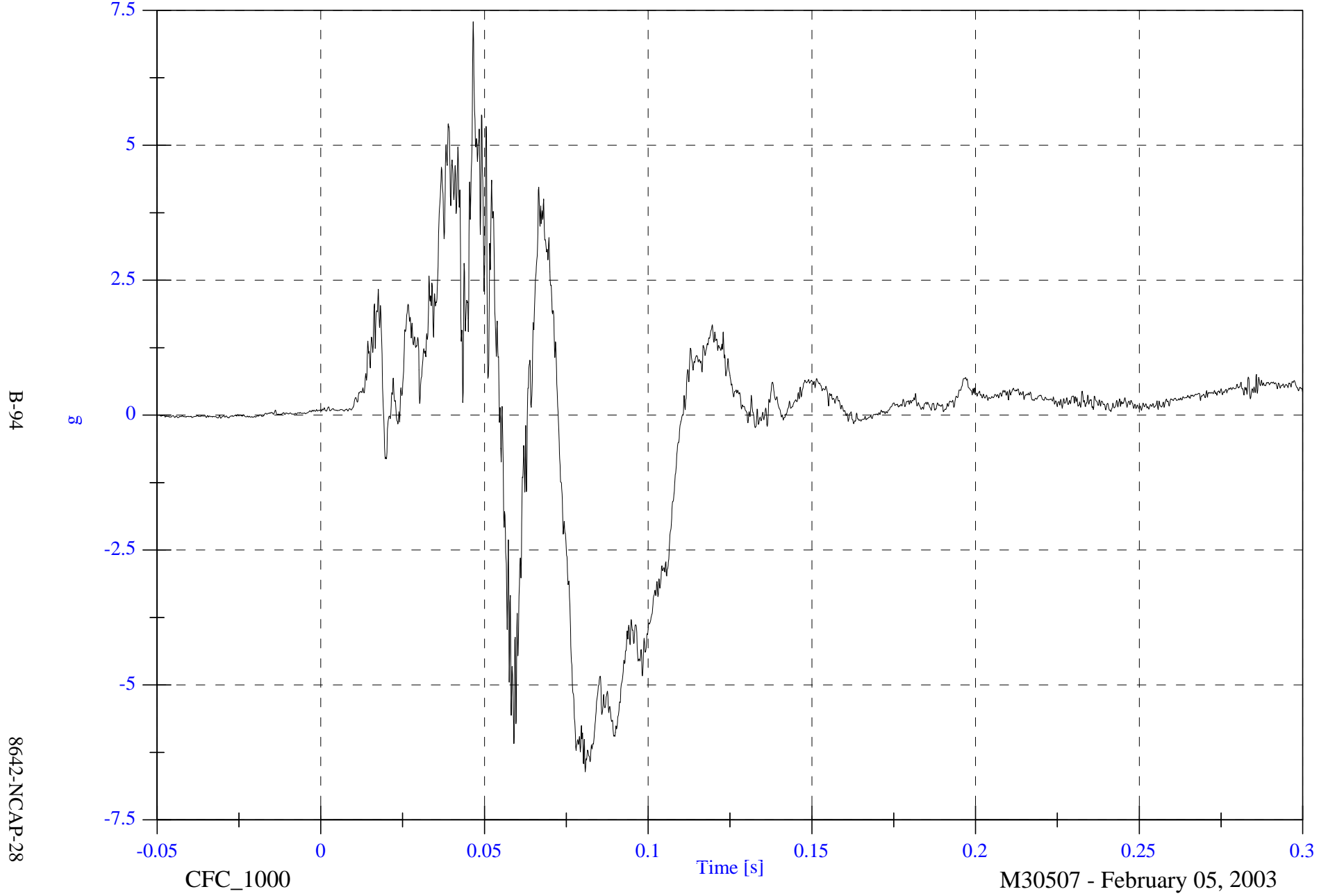
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Pelvic y

Max: 7.3 [g] at 0.047 [s]

Min: -6.6 [g] at 0.081 [s]



B-94

8642-NCAP-28

CFC\_1000

Time [s]

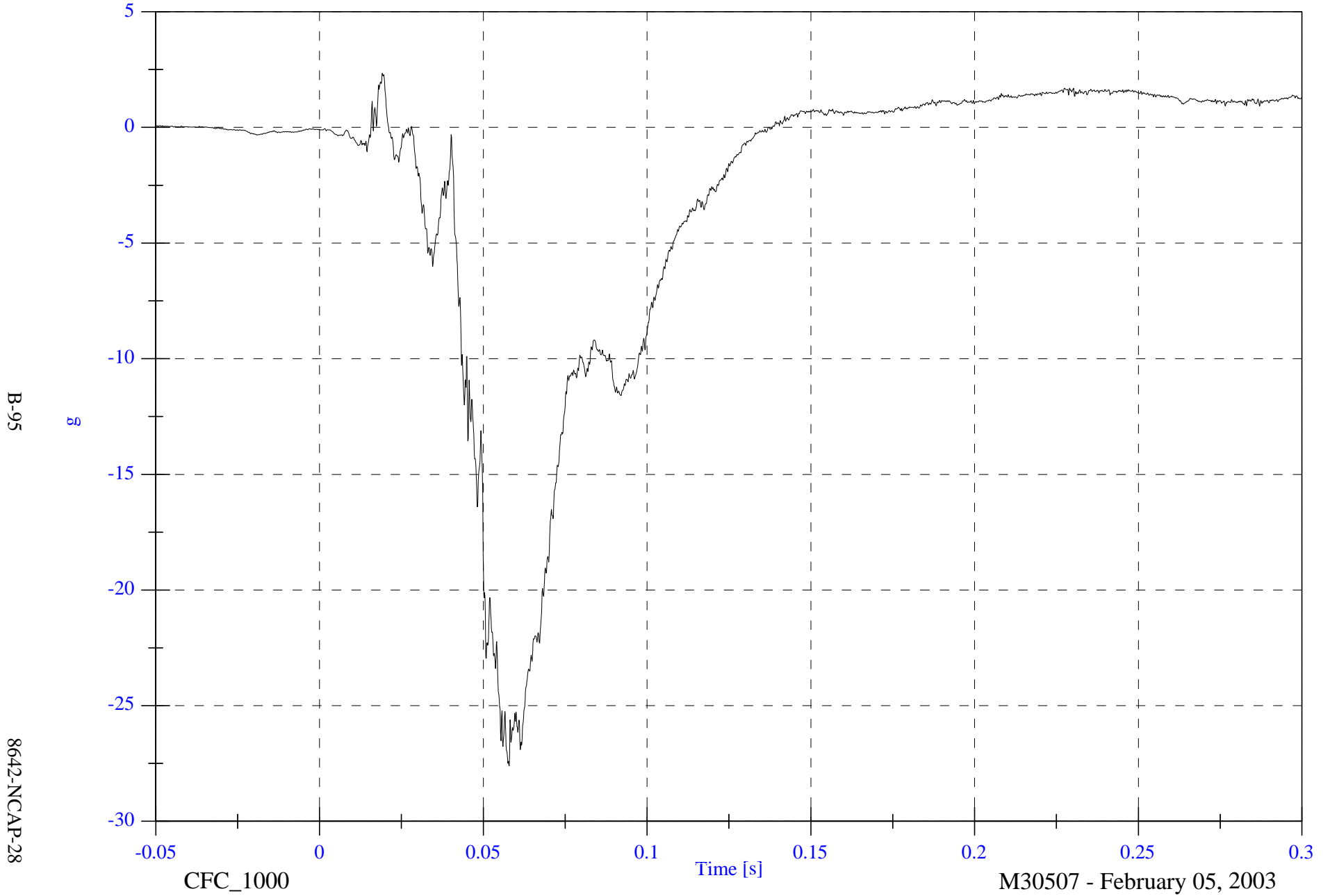
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Pelvic z

Max: 2.3 [g] at 0.019 [s]

Min: -27.6 [g] at 0.058 [s]



NCAP Test #6 - 2003 Subaru Forester

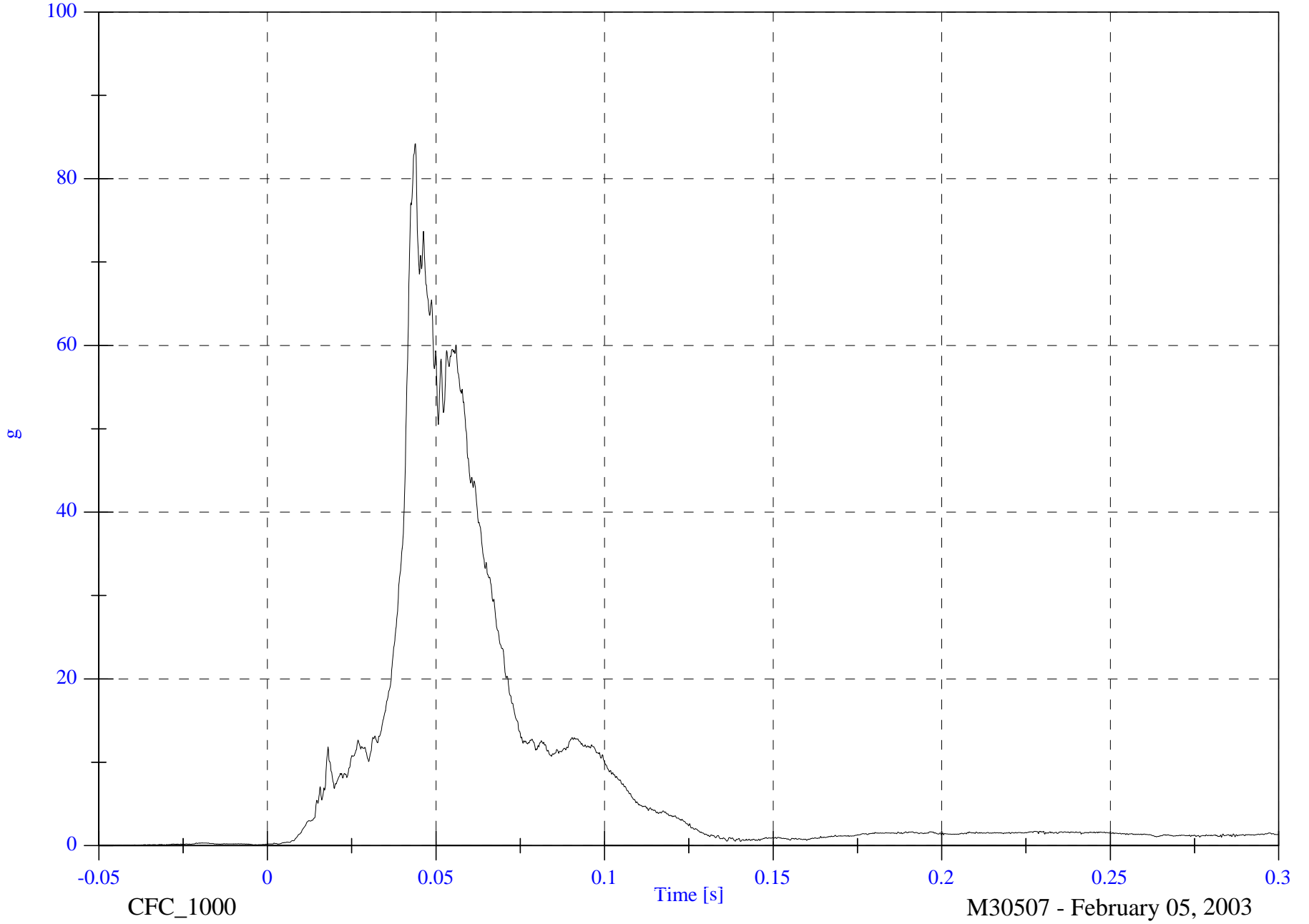
V1P2 Pelvic Resultant

Max: 84.2 [g] at 0.044 [s]

Min: 0.0 [g] at -0.041 [s]

B-96

8642-NCAP-28

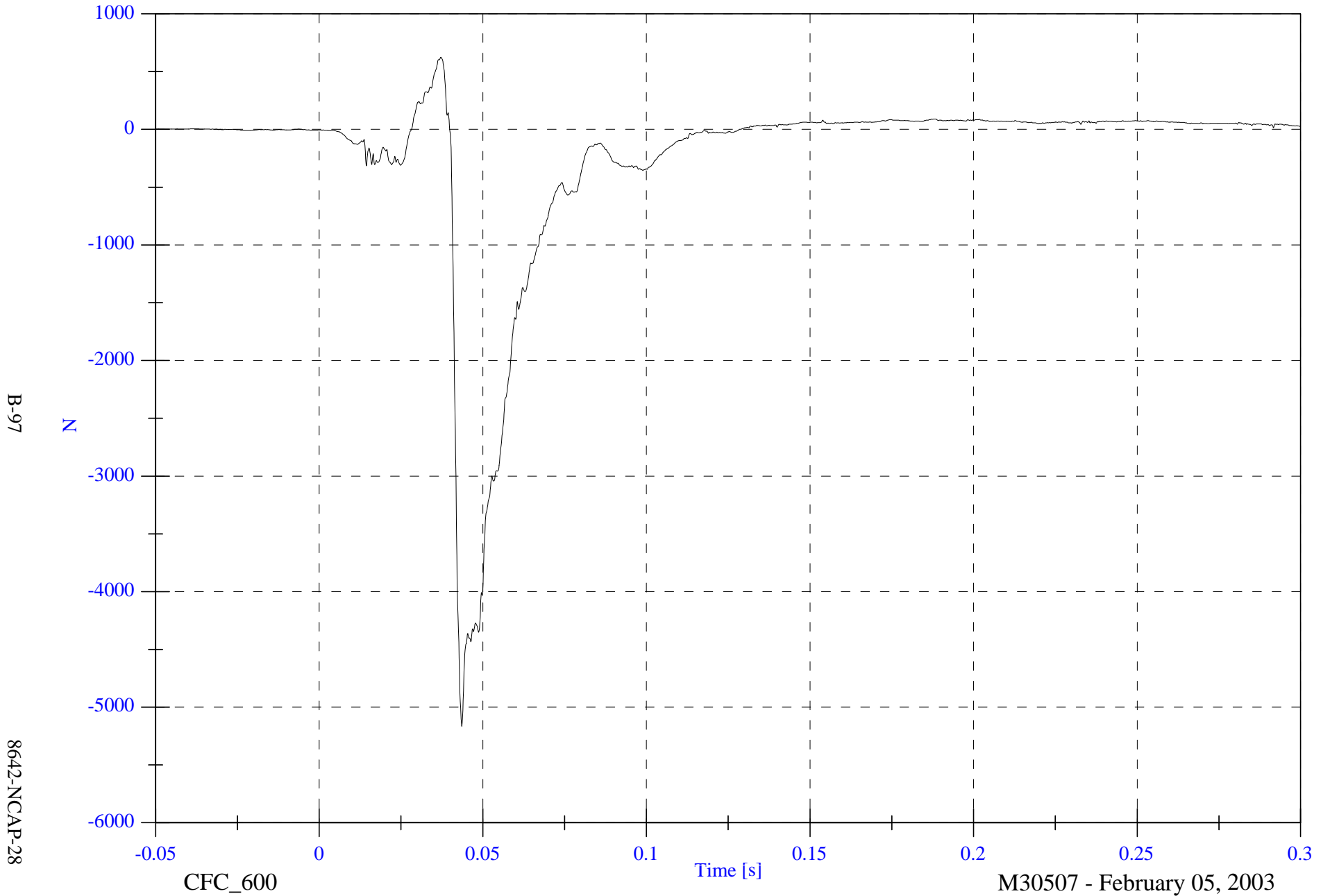


NCAP Test #6 - 2003 Subaru Forester

V1P2 Left Femur z

Max: 625.9 [N] at 0.037 [s]

Min: -5164.3 [N] at 0.044 [s]



B-97

8642-NCAP-28

CFC\_600

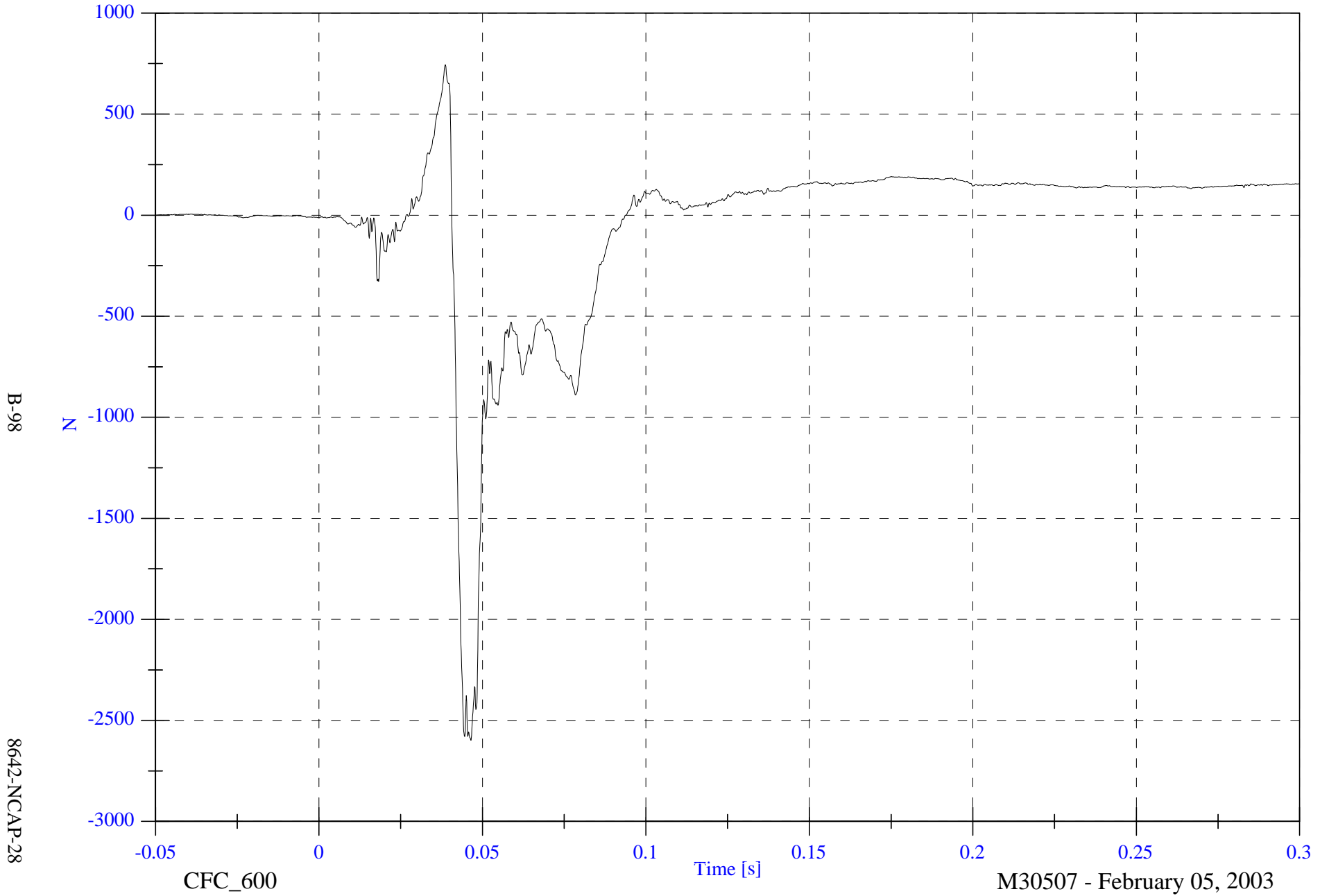
Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Right Femur z

Max: 744.2 [N] at 0.039 [s]  
Min: -2599.0 [N] at 0.046 [s]



B-98

8642-NCAP-28

CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

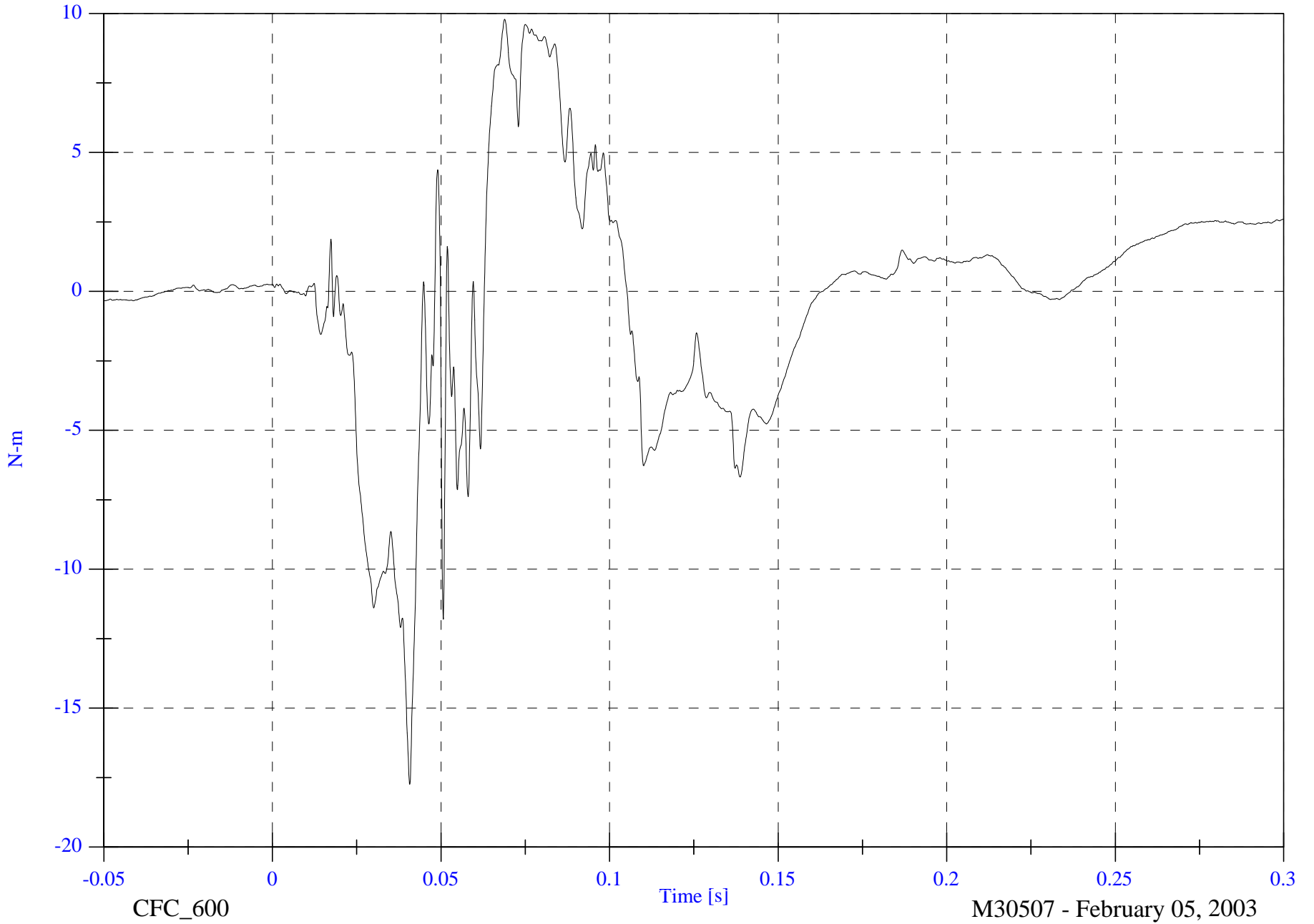
V1P2 Left Upper Tibia Mx

Max: 9.8 [N-m] at 0.069 [s]

Min: -17.7 [N-m] at 0.041 [s]

B-99

8642-NCAP-28



CFC\_600

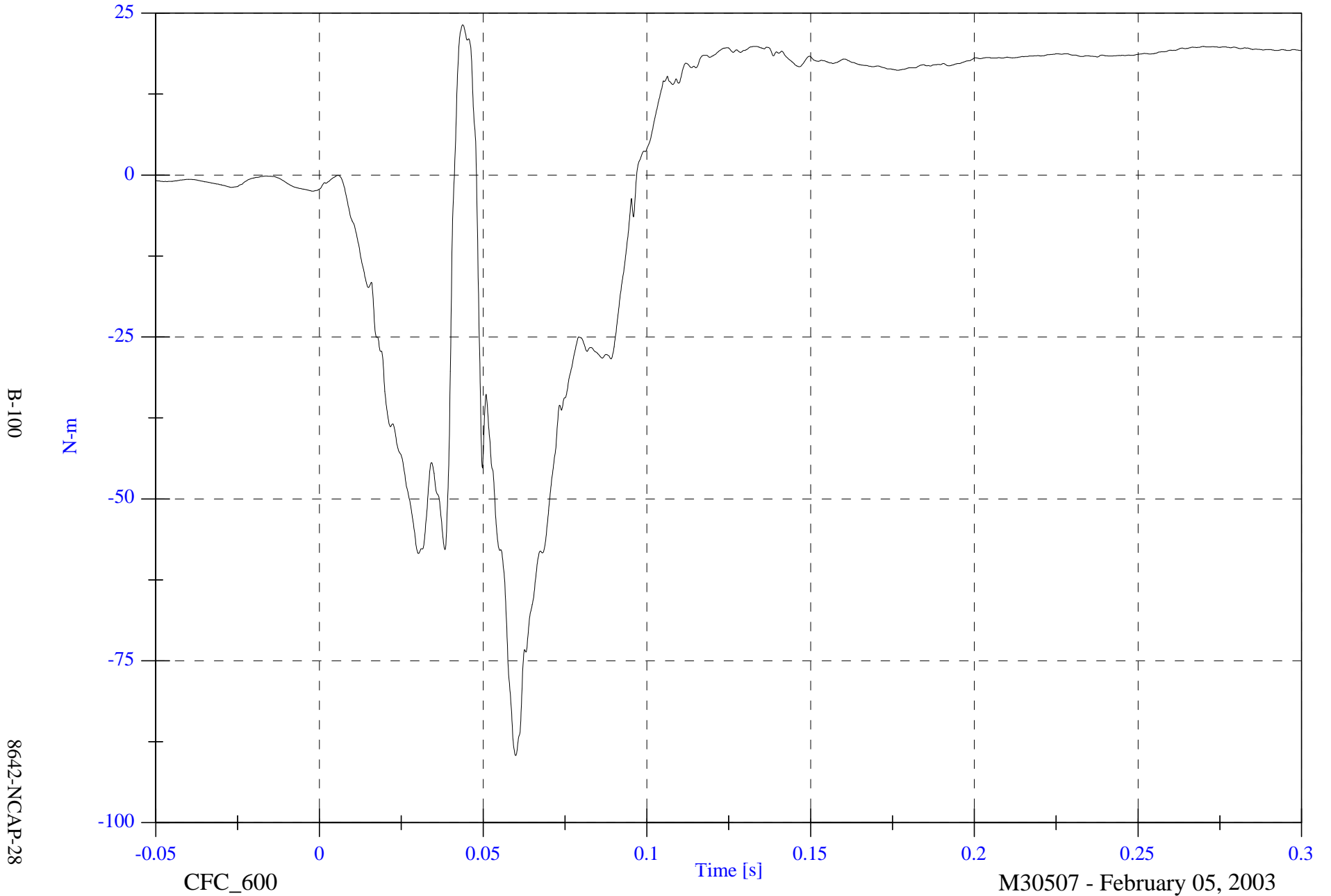
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 23.2 [N-m] at 0.044 [s]

V1P2 Left Upper Tibia My

Min: -89.6 [N-m] at 0.060 [s]

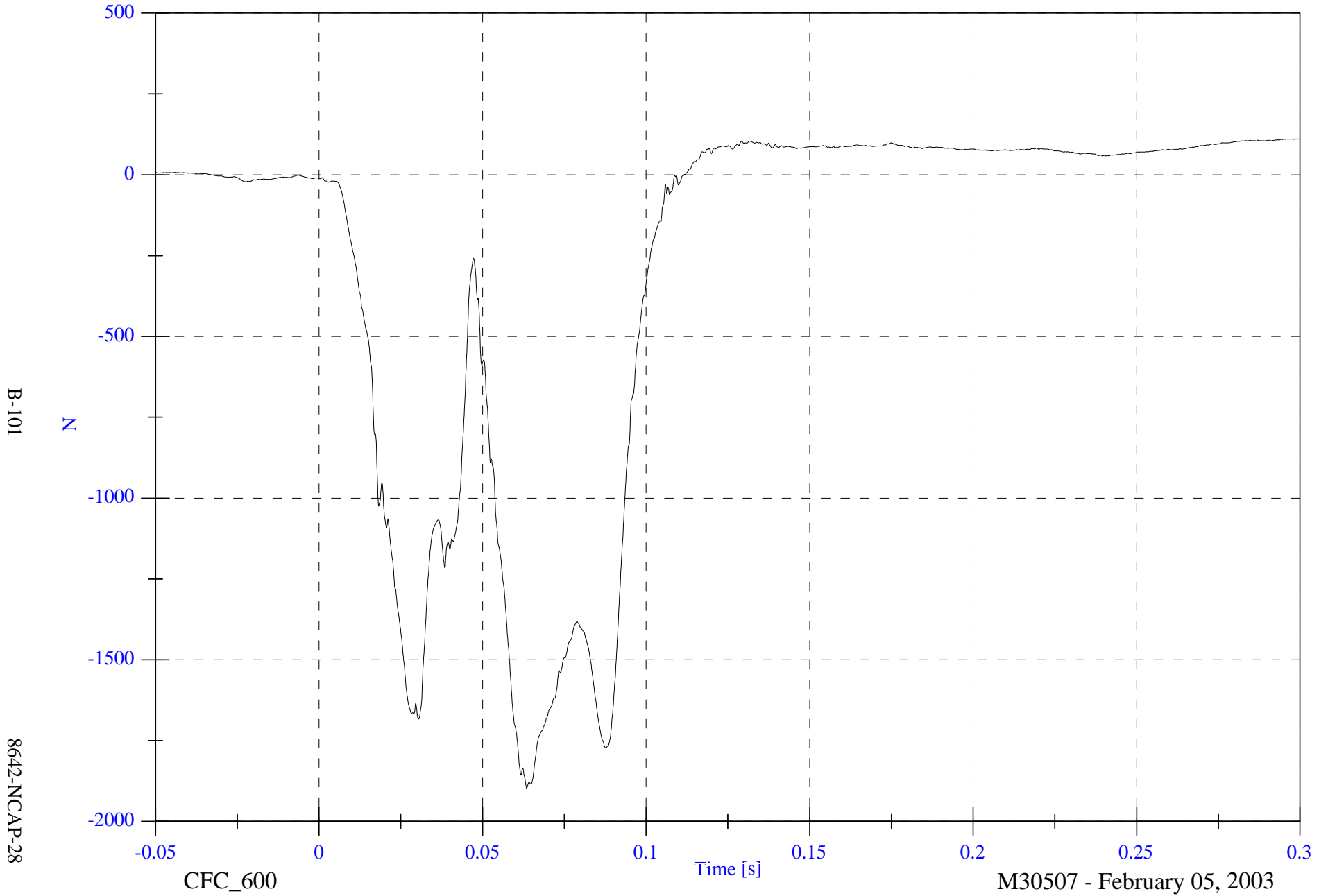


NCAP Test #6 - 2003 Subaru Forester

V1P2 Left Lower Tibia Fz

Max: 110.7 [N] at 0.299 [s]

Min: -1897.8 [N] at 0.063 [s]



NCAP Test #6 - 2003 Subaru Forester

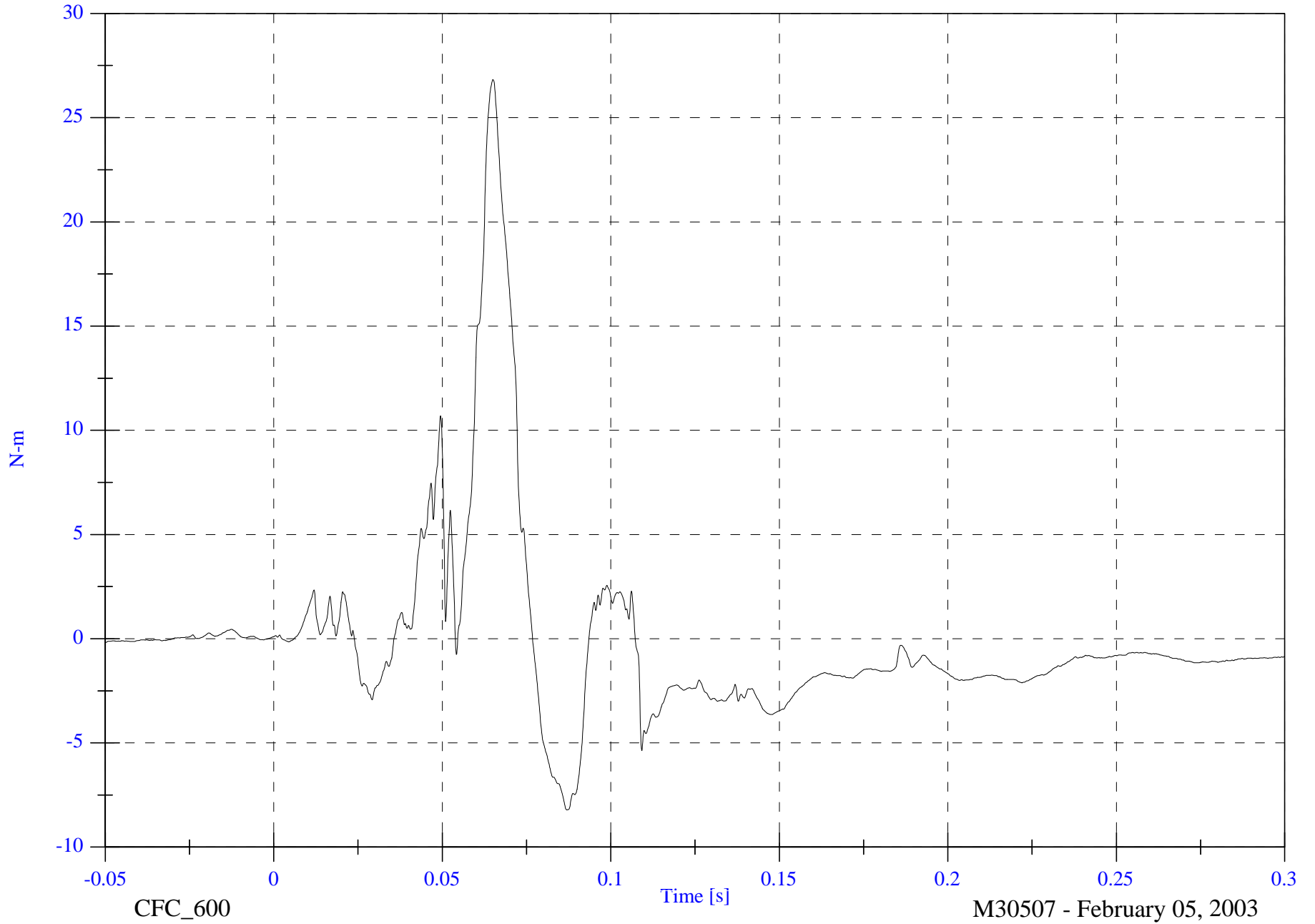
V1P2 Left Lower Tibia Mx

Max: 26.8 [N-m] at 0.065 [s]

Min: -8.2 [N-m] at 0.087 [s]

B-102

8642-NCAP-28



CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

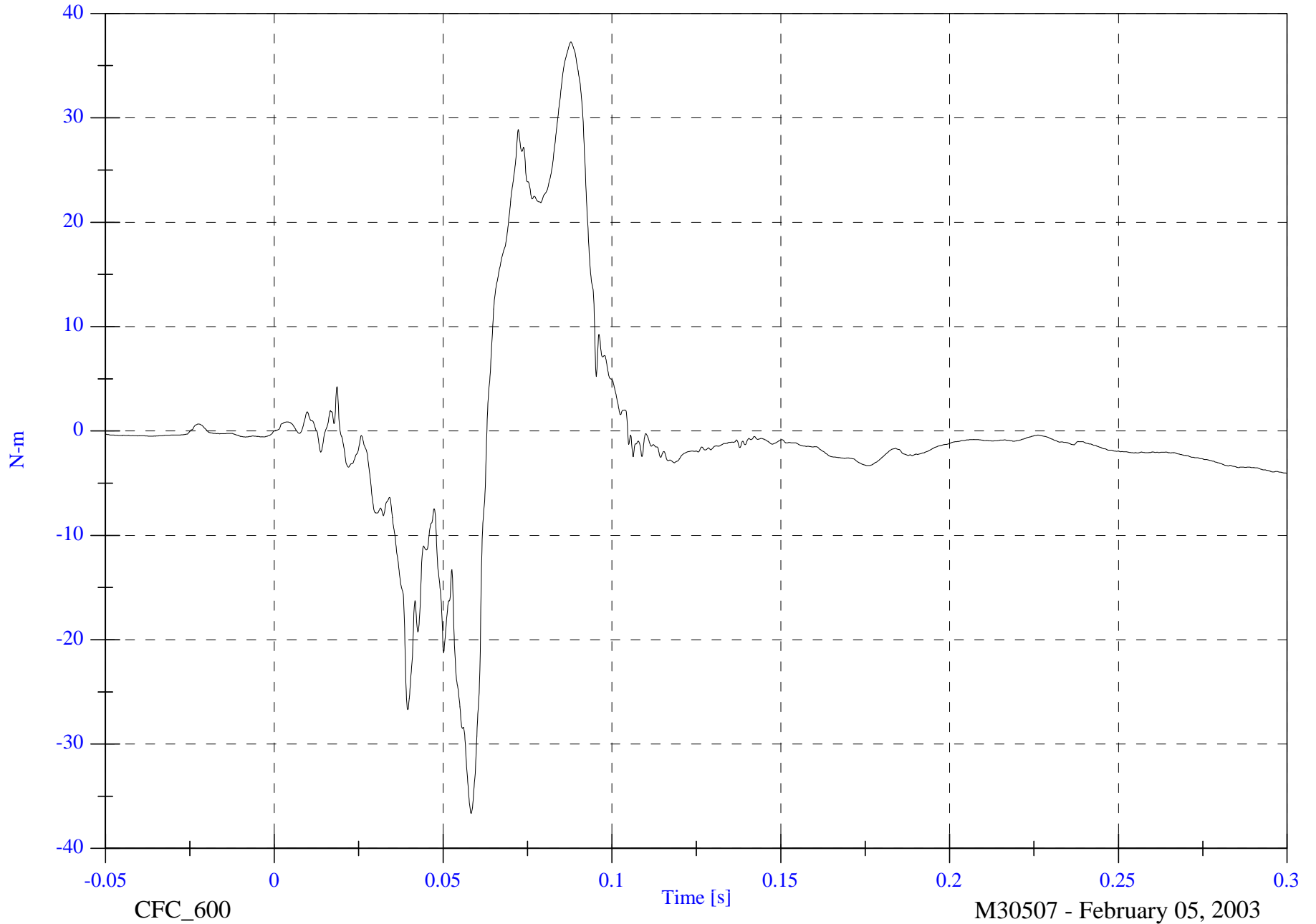
Max: 37.3 [N-m] at 0.088 [s]

Min: -36.7 [N-m] at 0.058 [s]

V1P2 Left Lower Tibia My

B-103

8642-NCAP-28



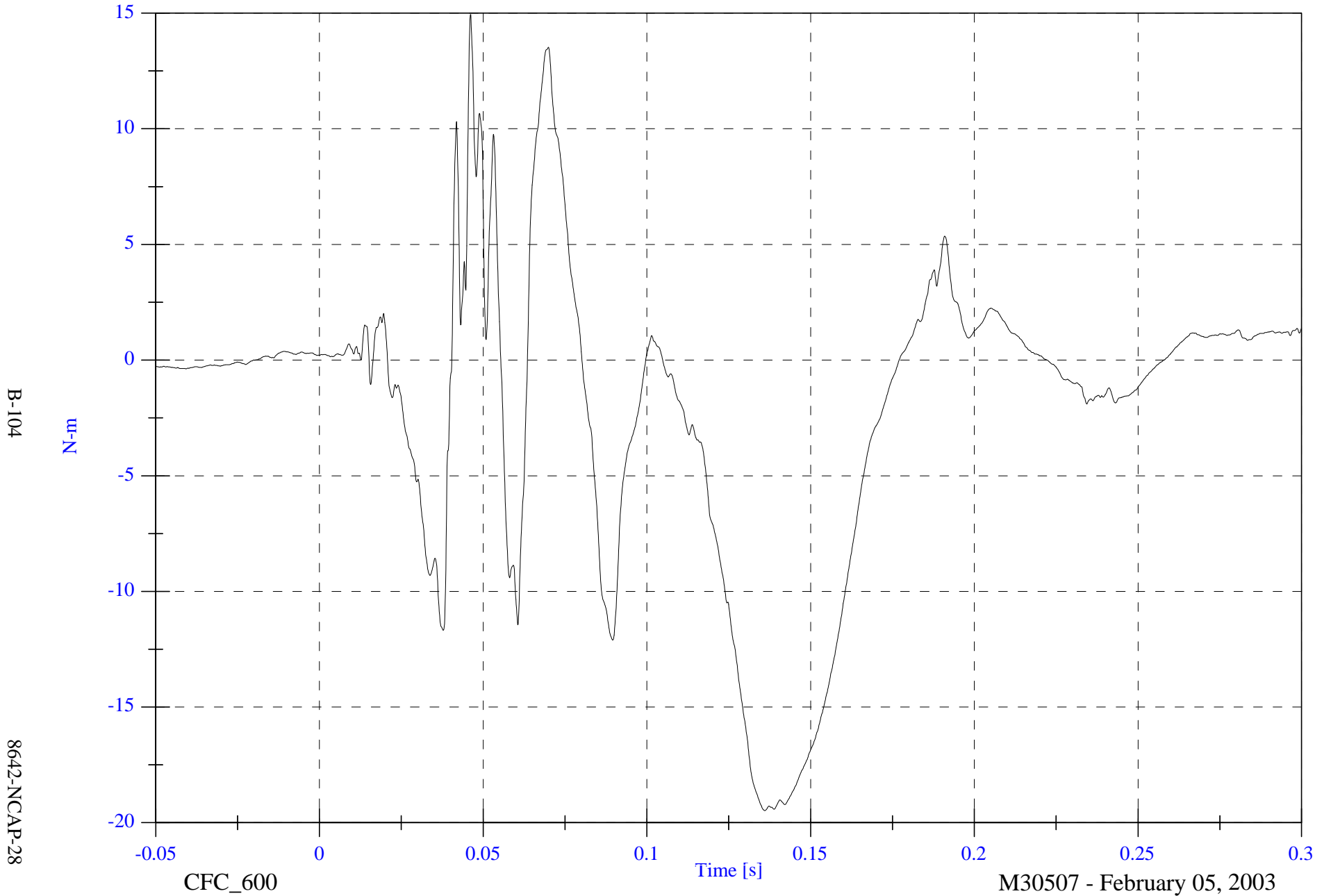
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P2 Right Upper Tibia Mx

Max: 14.9 [N-m] at 0.046 [s]

Min: -19.5 [N-m] at 0.136 [s]

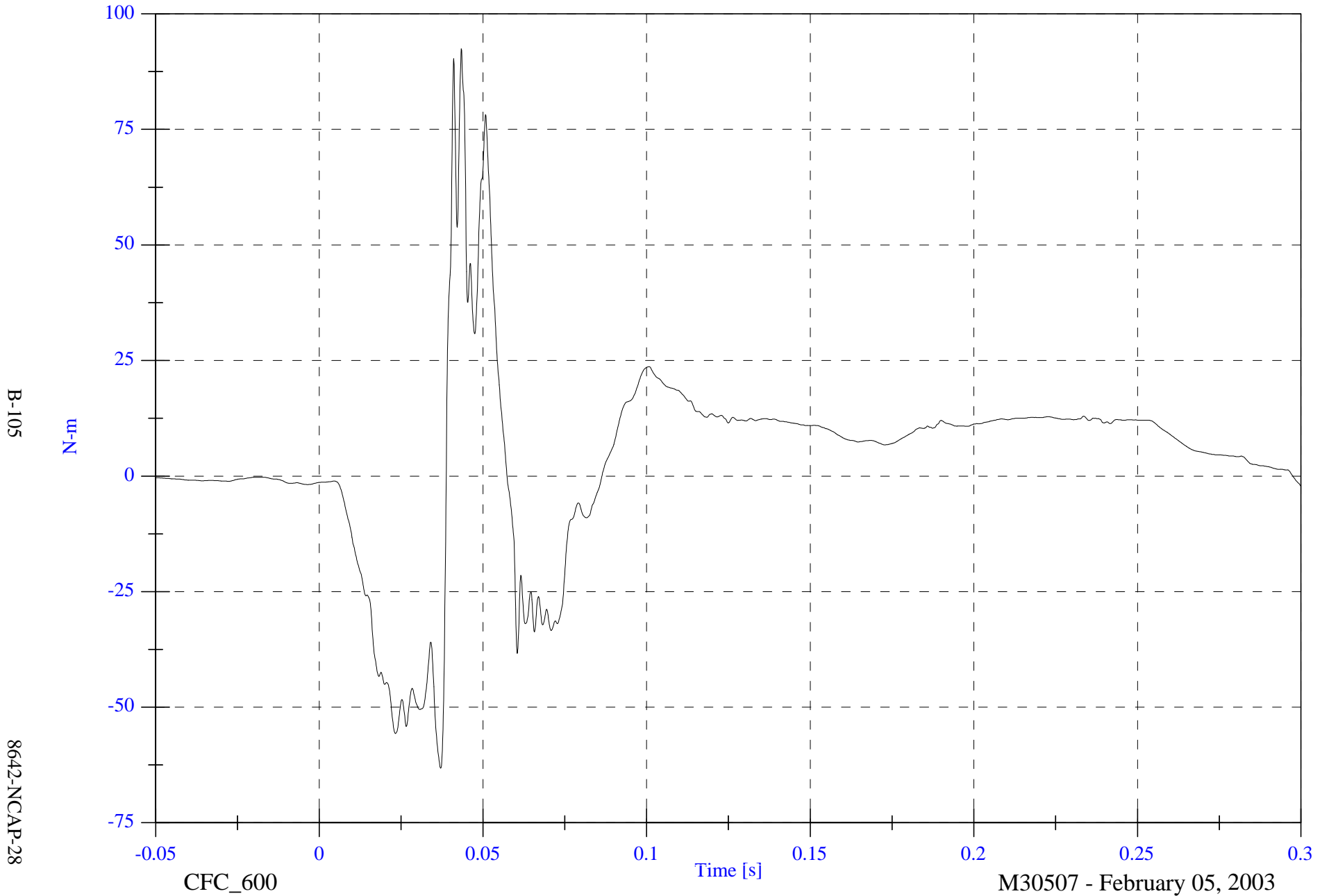


NCAP Test #6 - 2003 Subaru Forester

V1P2 Right Upper Tibia My

Max: 92.4 [N-m] at 0.043 [s]

Min: -63.2 [N-m] at 0.037 [s]

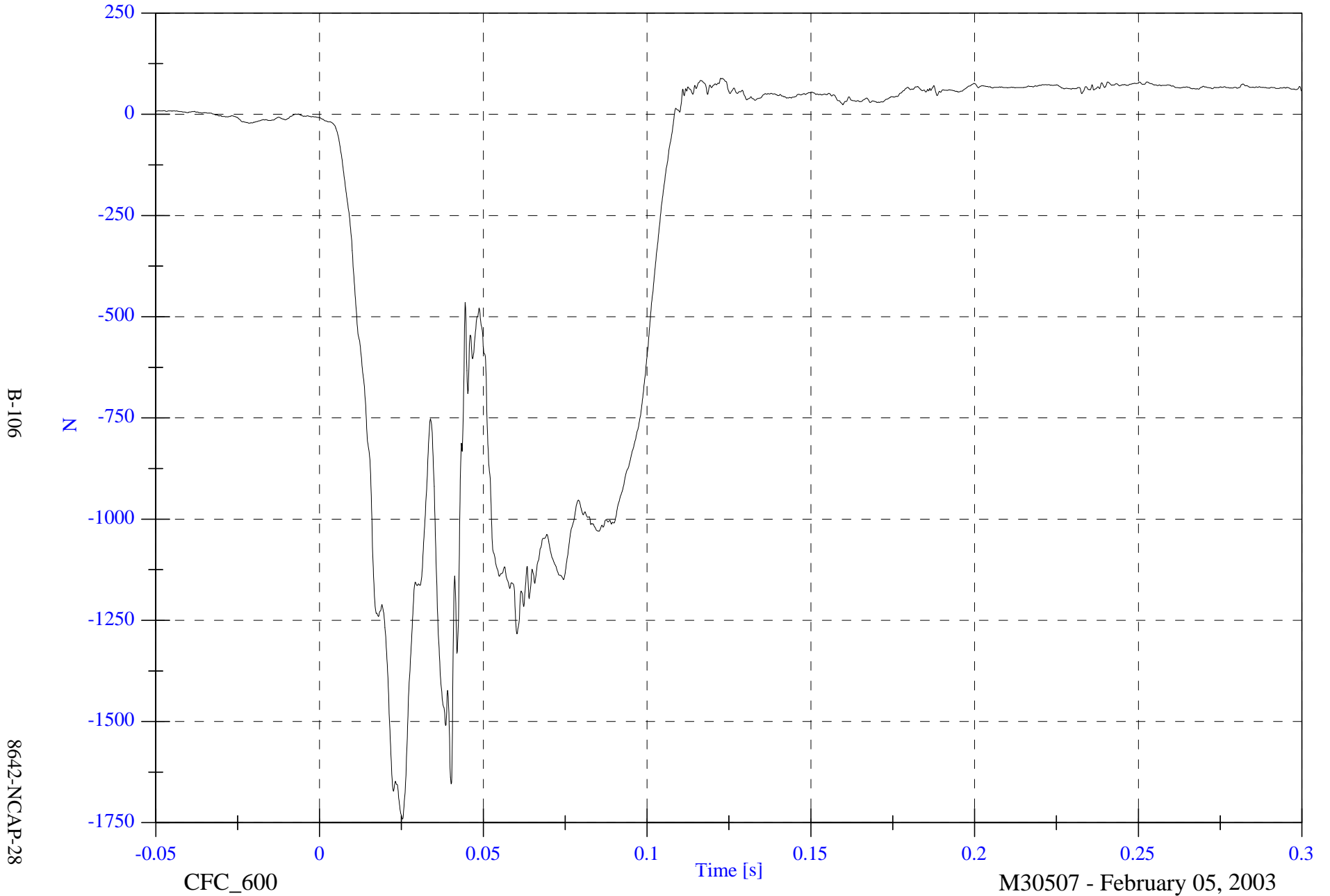


NCAP Test #6 - 2003 Subaru Forester

V1P2 Right Lower Tibia Fz

Max: 89.1 [N] at 0.123 [s]

Min: -1740.9 [N] at 0.025 [s]



NCAP Test #6 - 2003 Subaru Forester

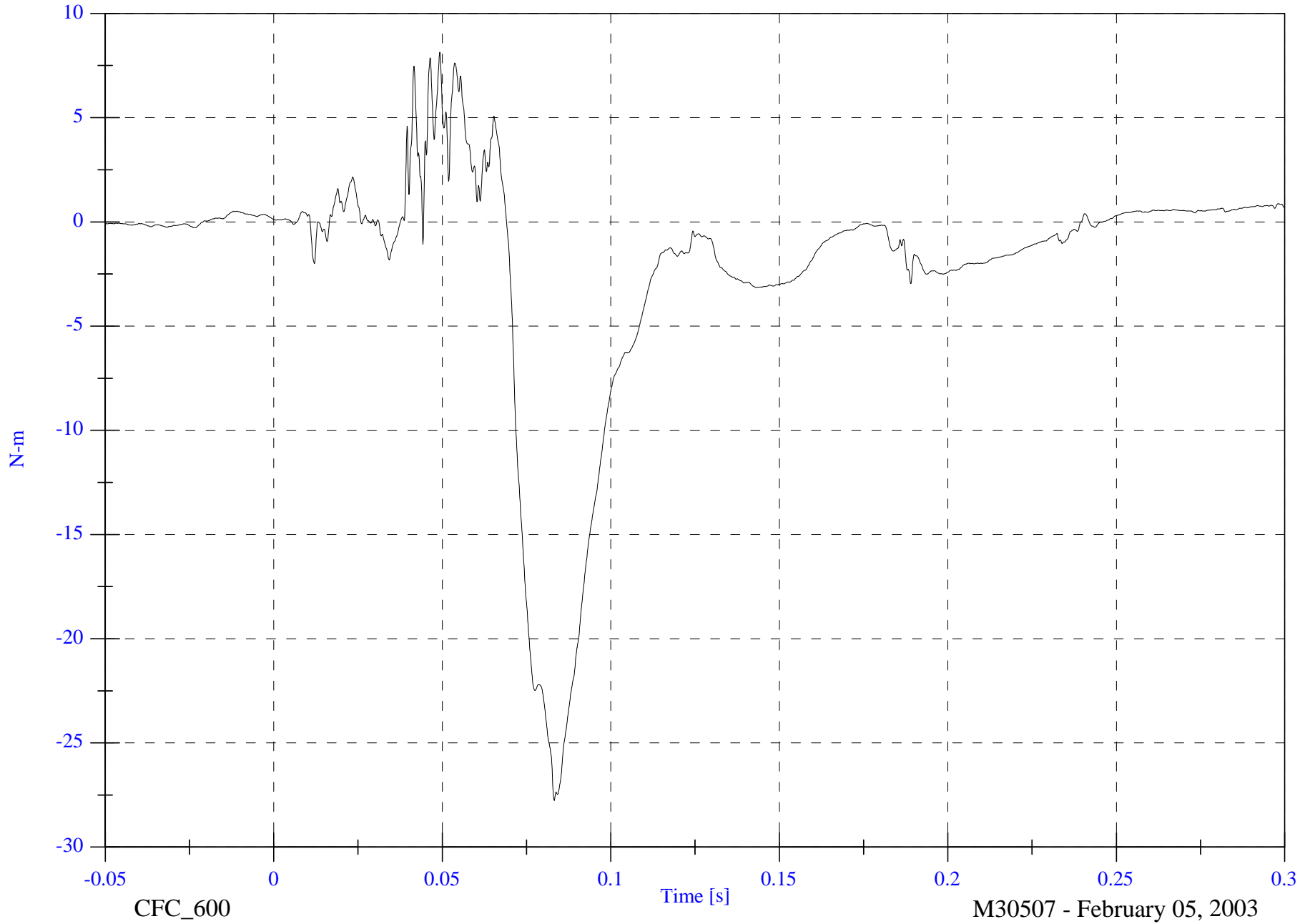
V1P2 Right Lower Tibia Mx

Max: 8.1 [N-m] at 0.049 [s]

Min: -27.8 [N-m] at 0.083 [s]

B-107

8642-NCAP-28



CFC\_600

Time [s]

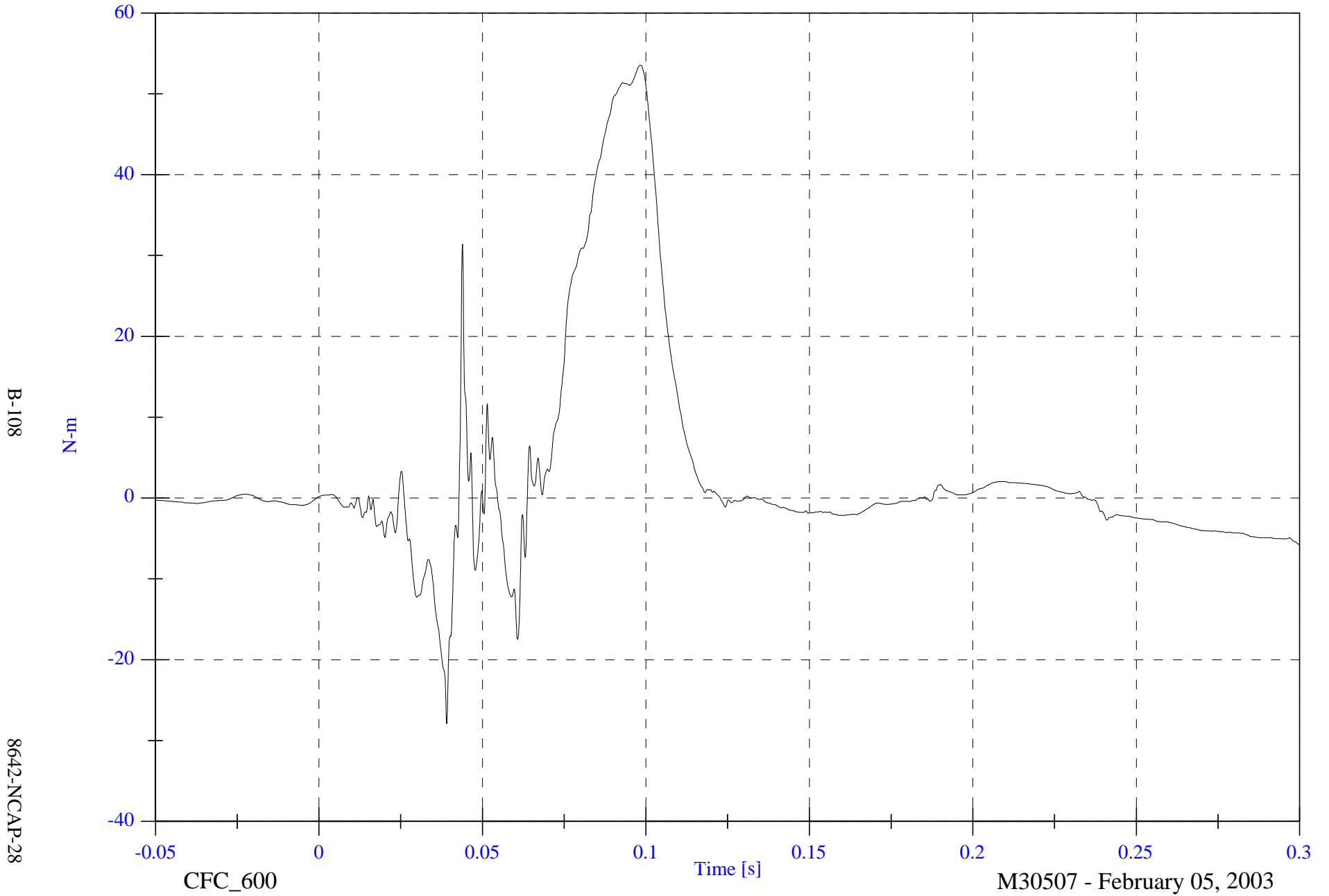
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 53.5 [N-m] at 0.098 [s]

Min: -27.9 [N-m] at 0.039 [s]

V1P2 Right Lower Tibia My



B-108

8642-NCAP-28

CFC\_600

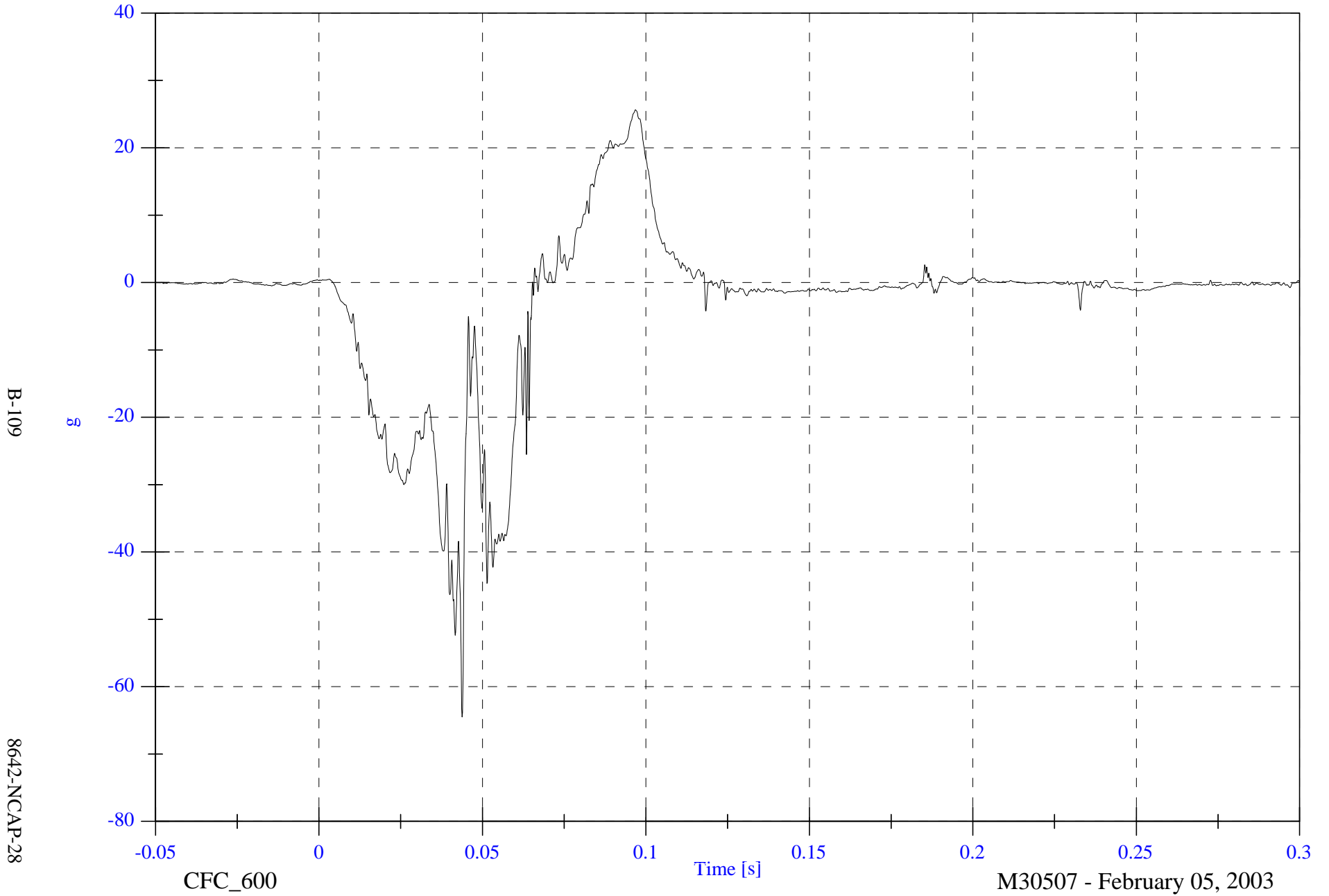
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 25.6 [g] at 0.097 [s]

Min: -64.5 [g] at 0.044 [s]

V1P2 Left Foot Aft x



B-109

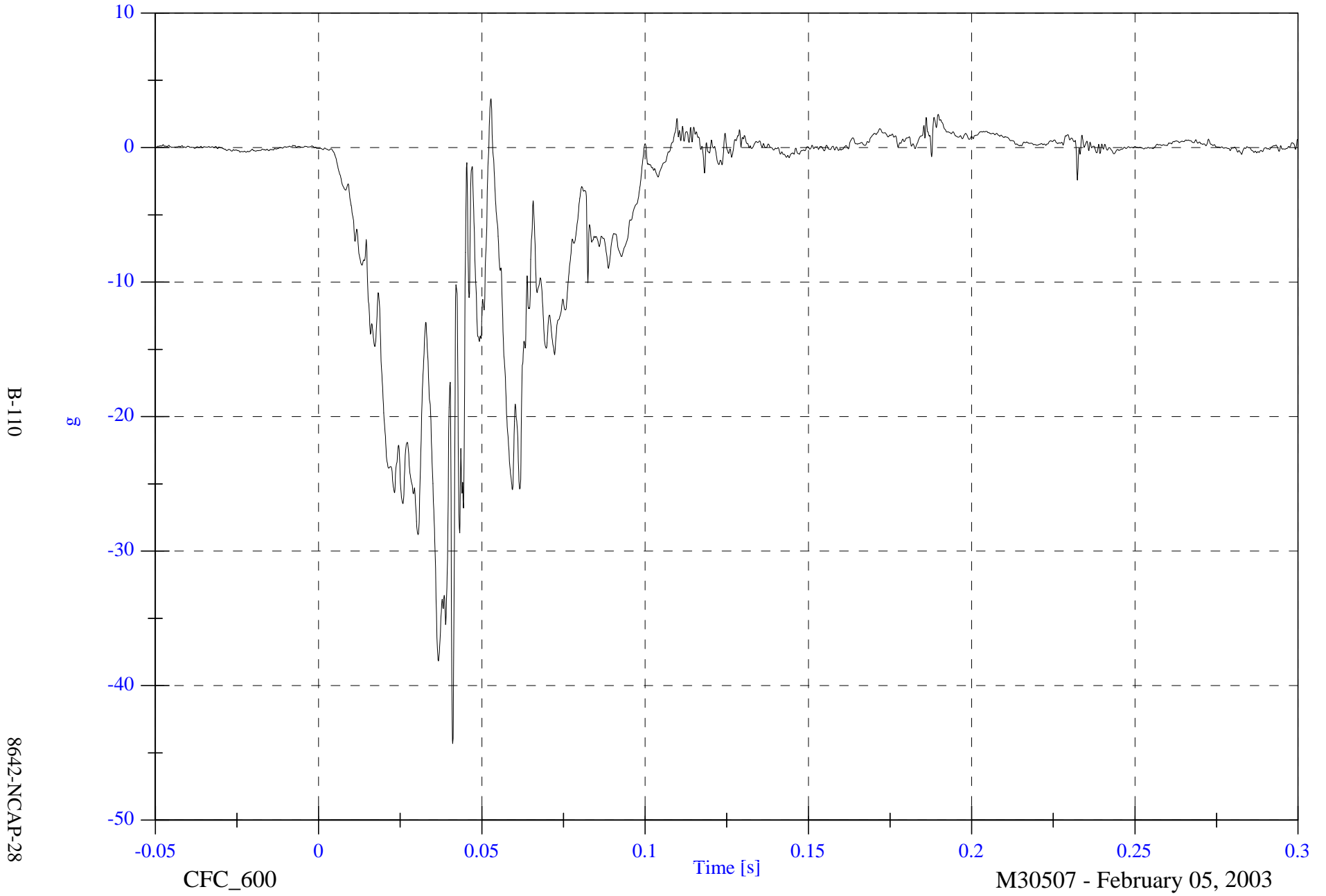
8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

V1P2 Left Foot Aft z

Max: 3.6 [g] at 0.053 [s]

Min: -44.3 [g] at 0.041 [s]

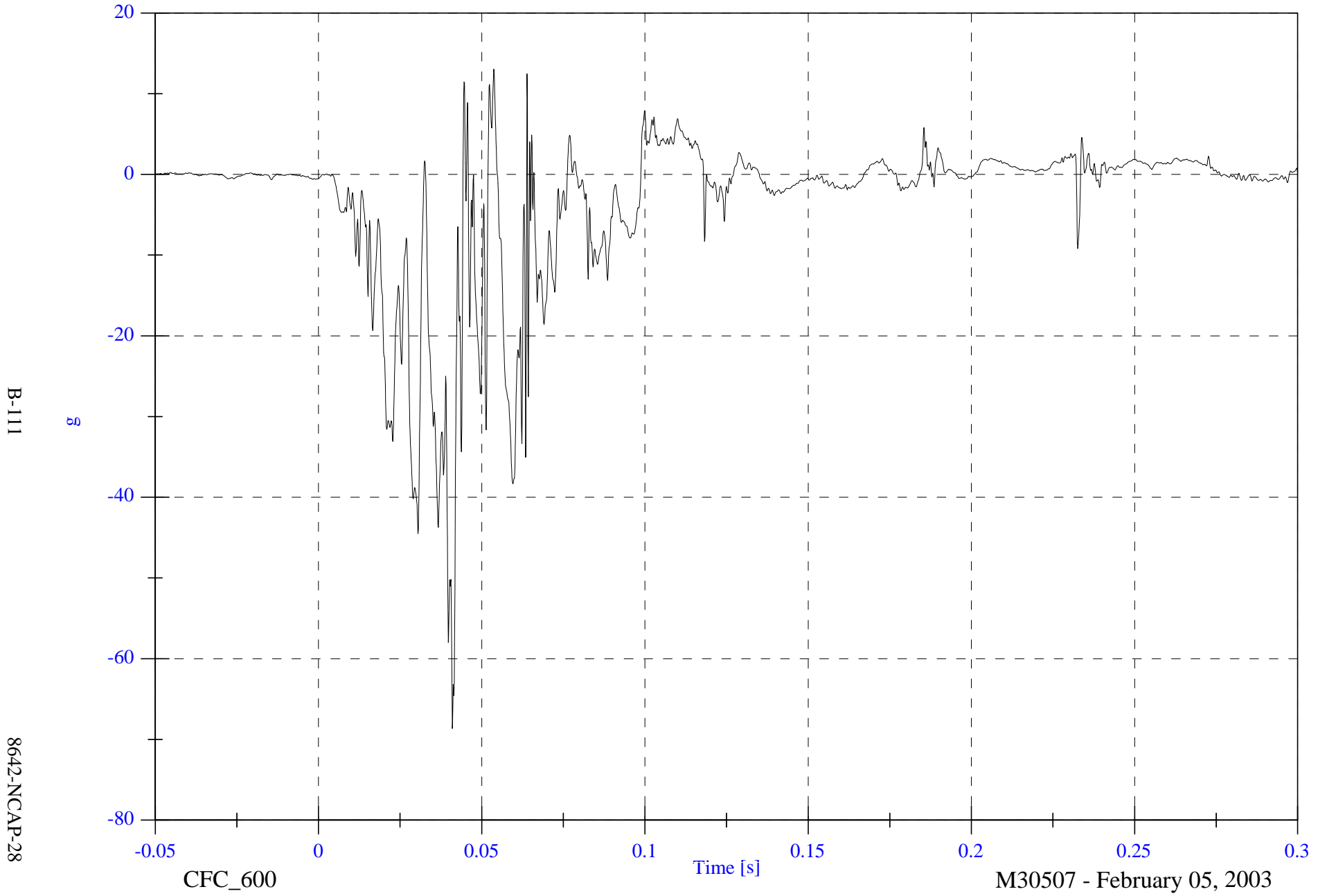


NCAP Test #6 - 2003 Subaru Forester

V1P2 Left Foot Fore z

Max: 13.0 [g] at 0.054 [s]

Min: -68.7 [g] at 0.041 [s]

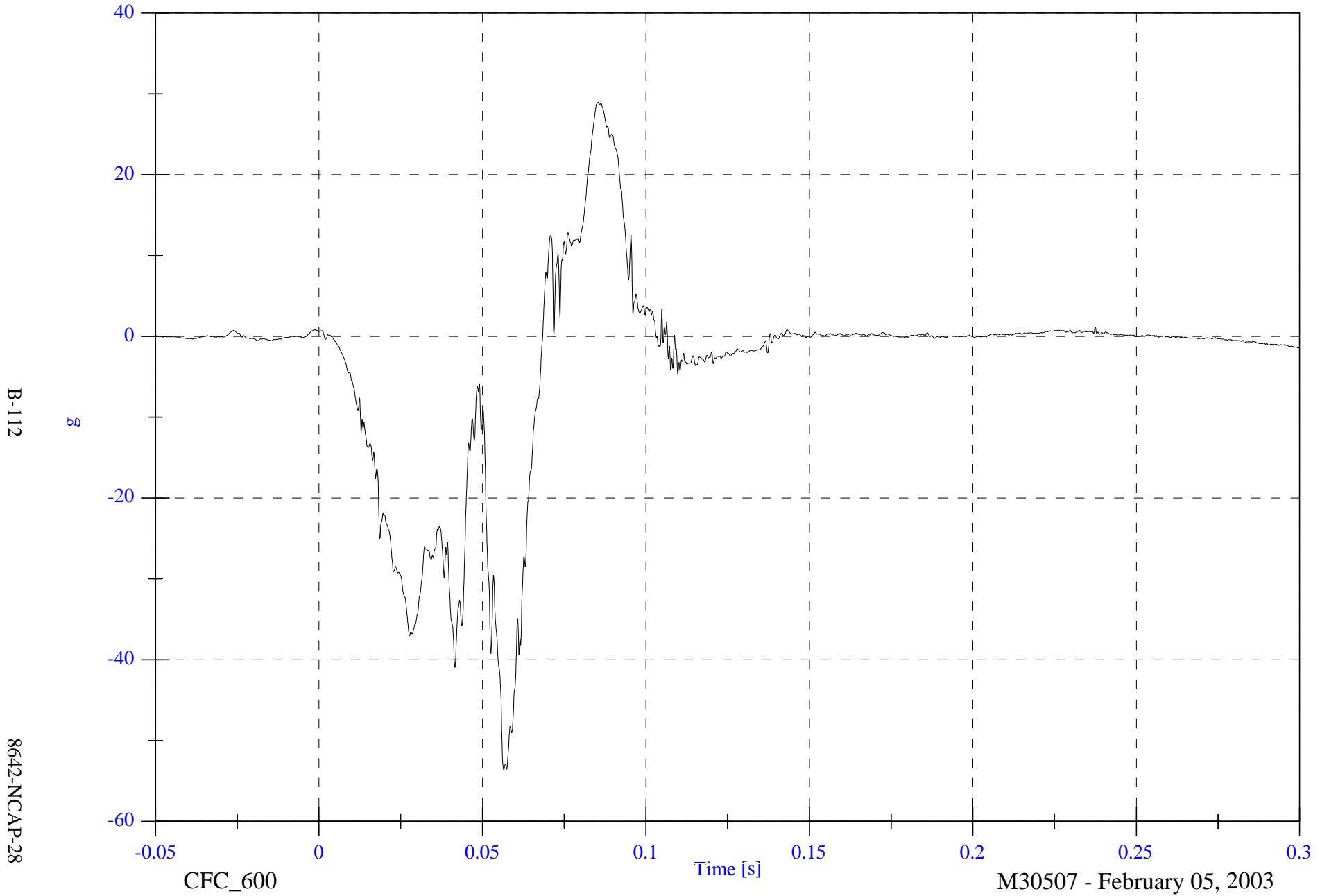


NCAP Test #6 - 2003 Subaru Forester

Max: 29.0 [g] at 0.086 [s]

Min: -53.6 [g] at 0.057 [s]

V1P2 Right Foot Aft x

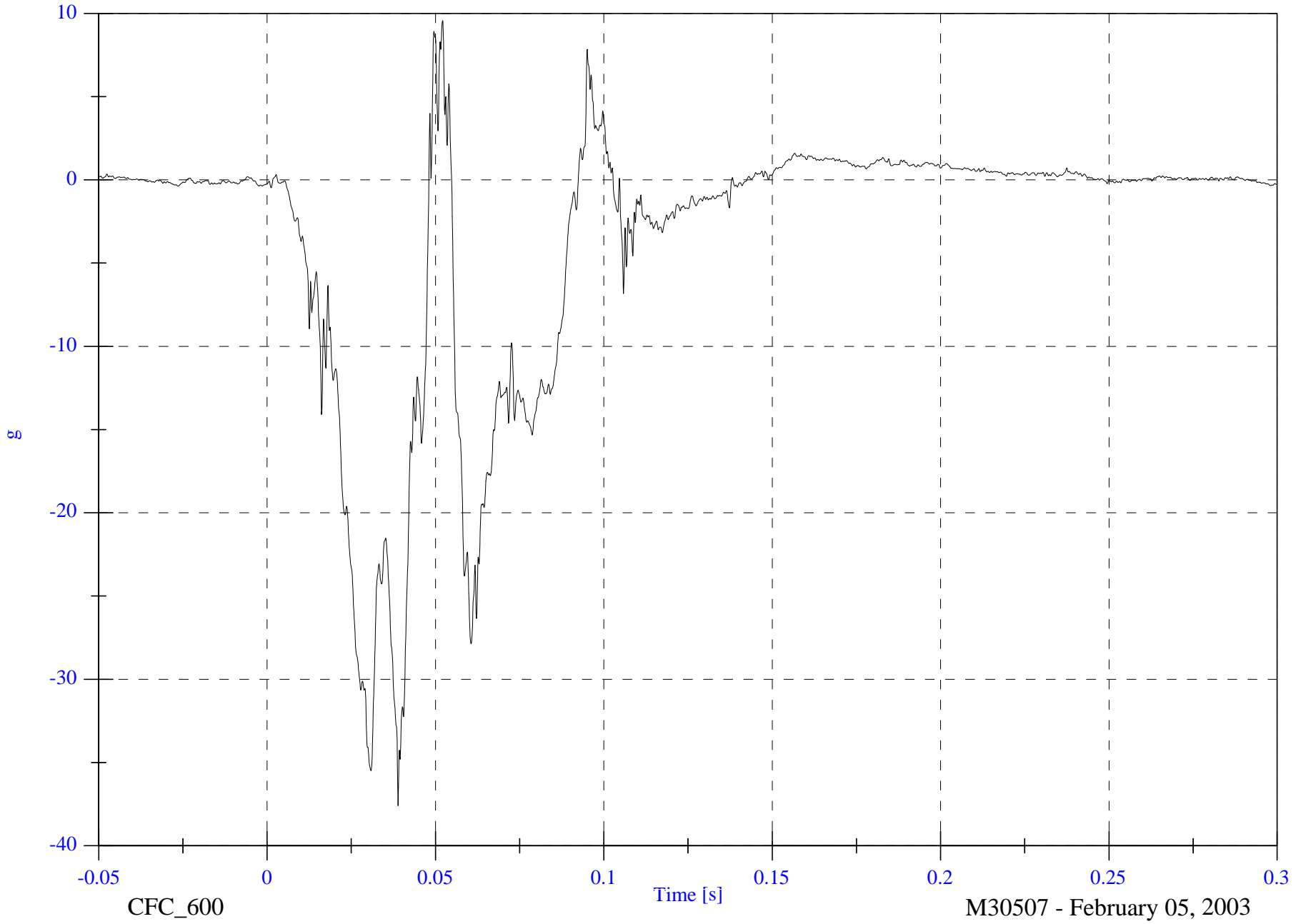


NCAP Test #6 - 2003 Subaru Forester

Max: 9.6 [g] at 0.052 [s]

Min: -37.6 [g] at 0.039 [s]

V1P2 Right Foot Aft z



B-113

8642-NCAP-28

CFC\_600

Time [s]

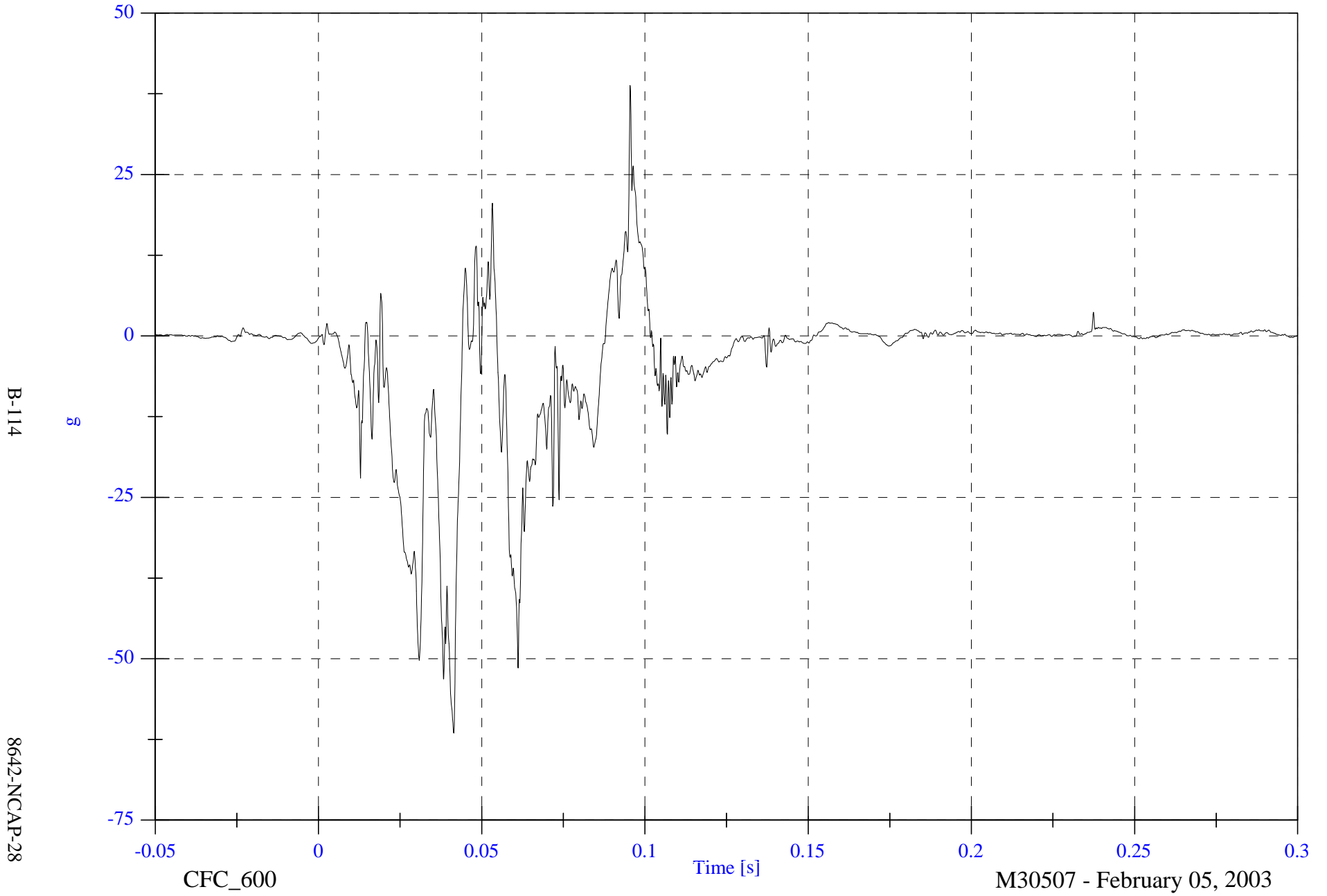
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 38.8 [g] at 0.095 [s]

Min: -61.5 [g] at 0.041 [s]

V1P2 Right Foot Fore z

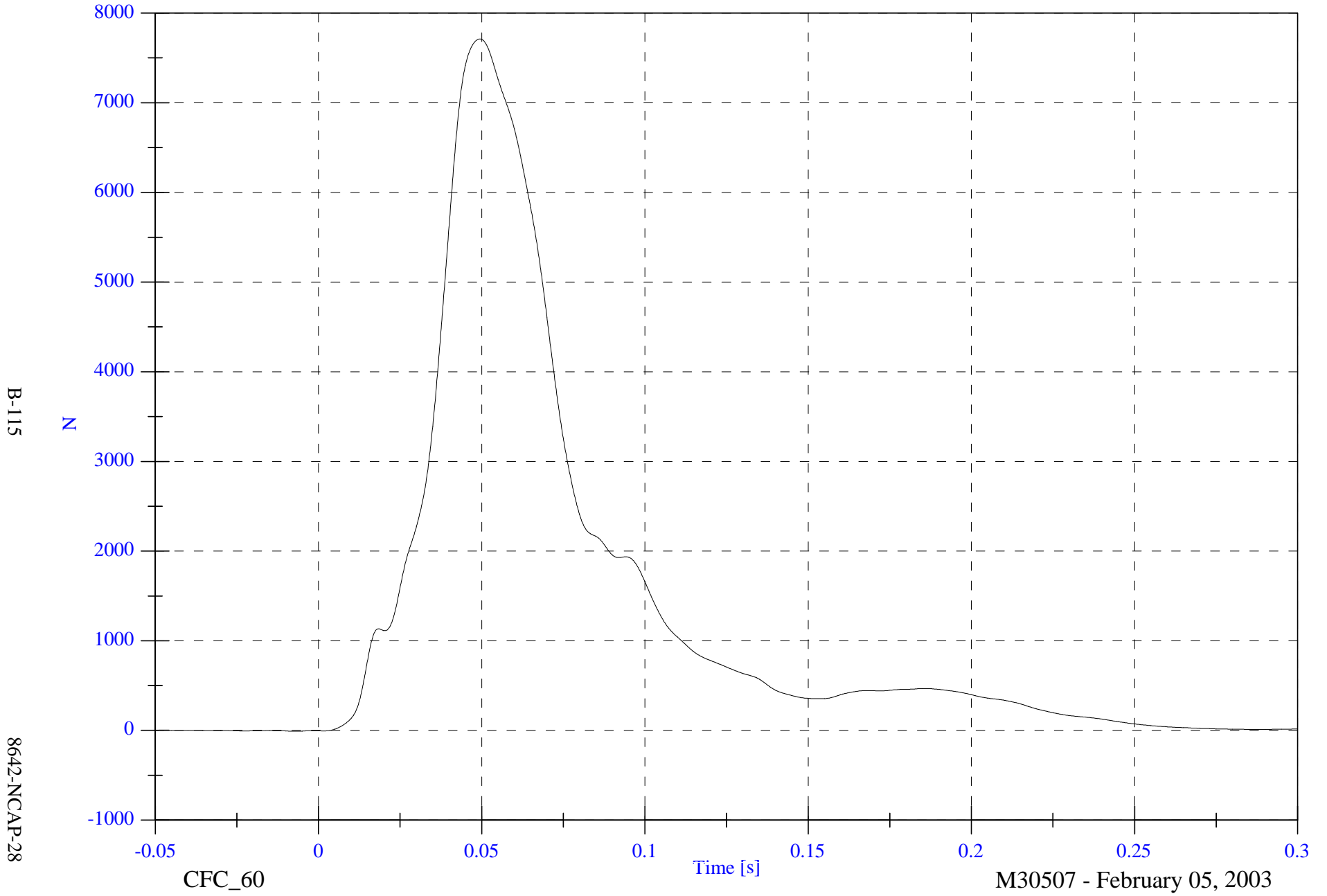


NCAP Test #6 - 2003 Subaru Forester

V1P2 Lap Belt

Max: 7711.0 [N] at 0.049 [s]

Min: -8.0 [N] at -0.007 [s]



B-115

8642-NCAP-28

CFC\_60

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

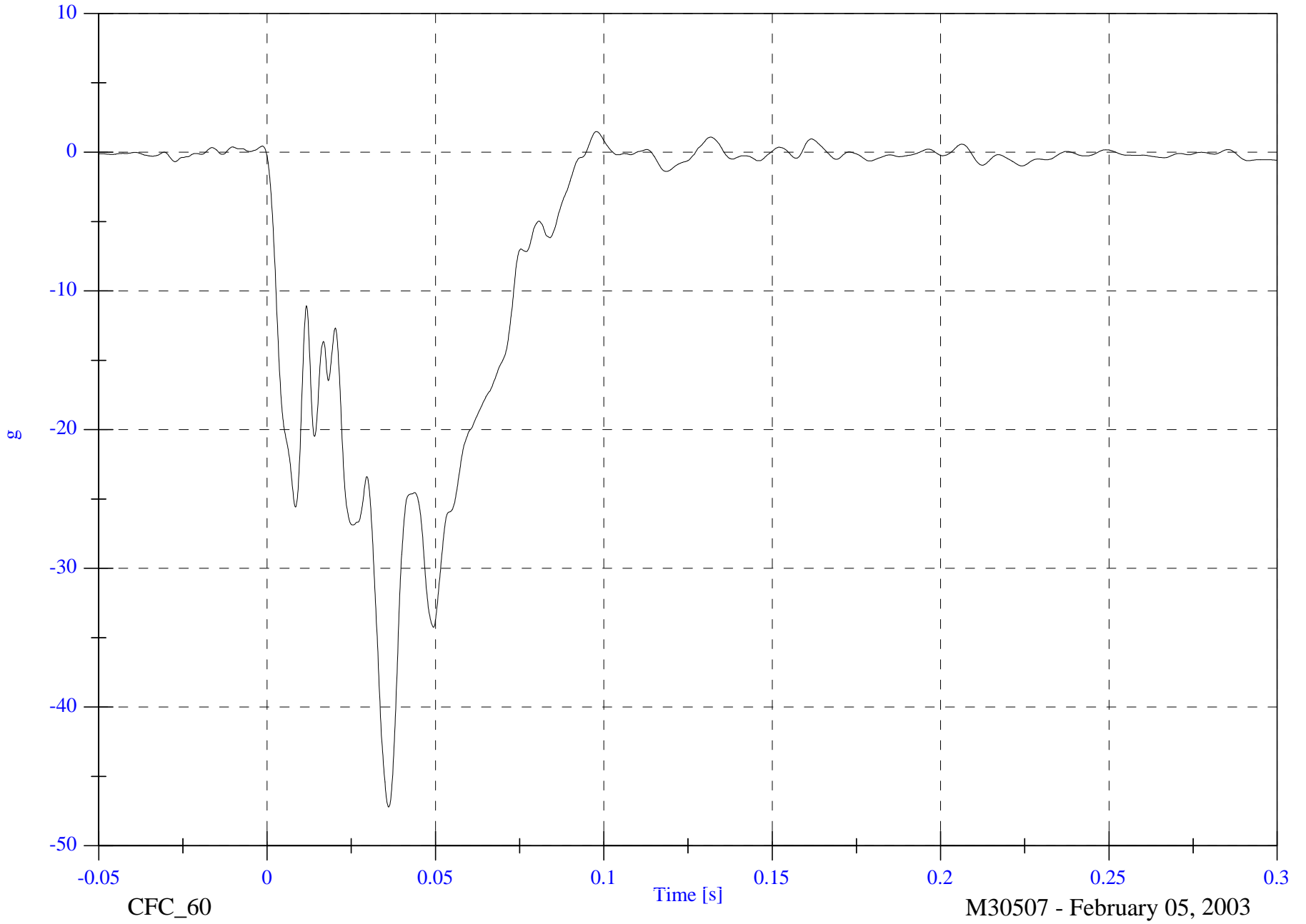
V1 Left Rear #1x

Max: 1.5 [g] at 0.098 [s]

Min: -47.2 [g] at 0.036 [s]

B-116

8642-NCAP-28



CFC\_60

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

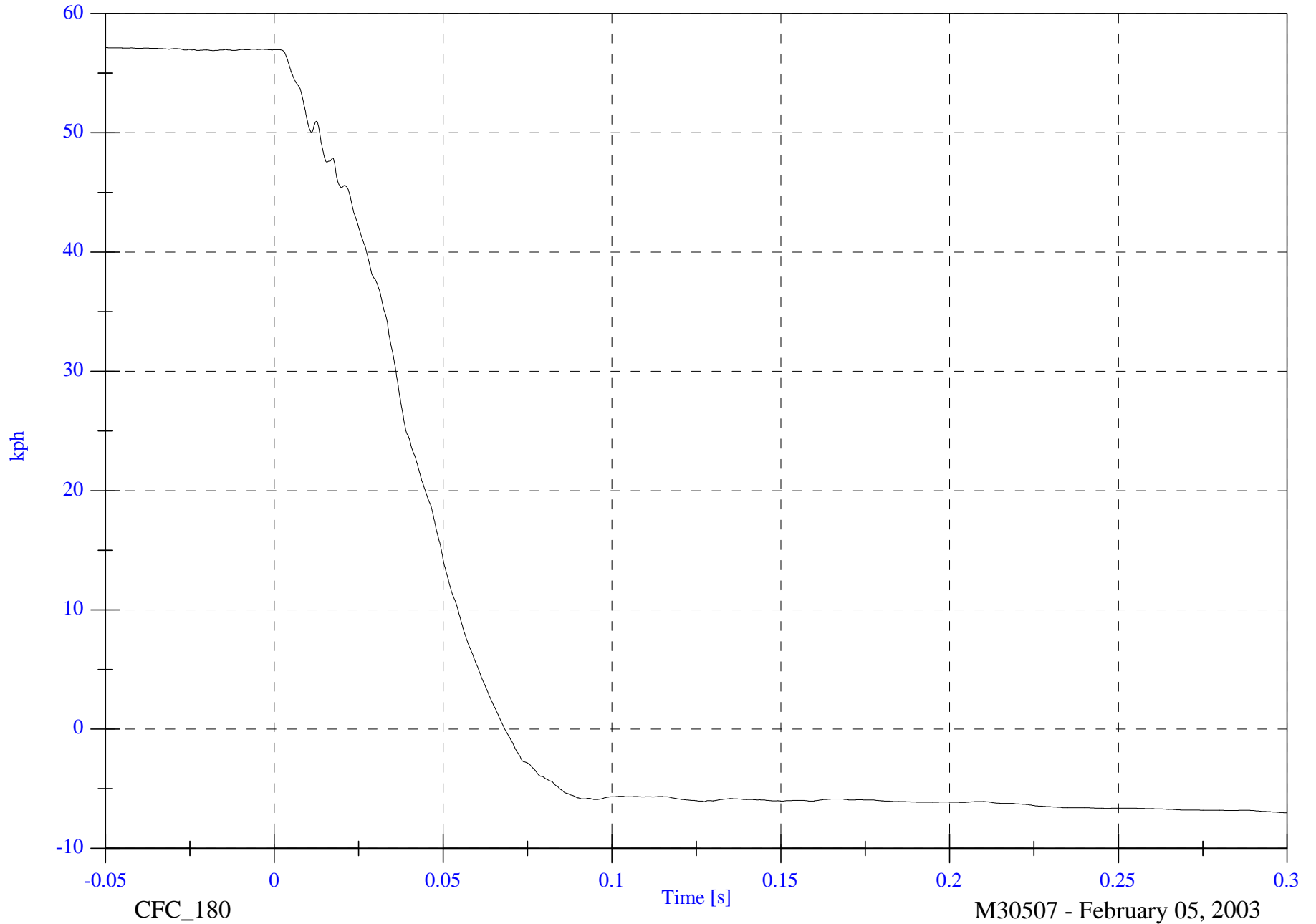
V1 Left Rear #1x Velocity

Max: 57.1 [kph] at -0.050 [s]

Min: -7.0 [kph] at 0.300 [s]

B-117

8642-NCAP-28



CFC\_180

Time [s]

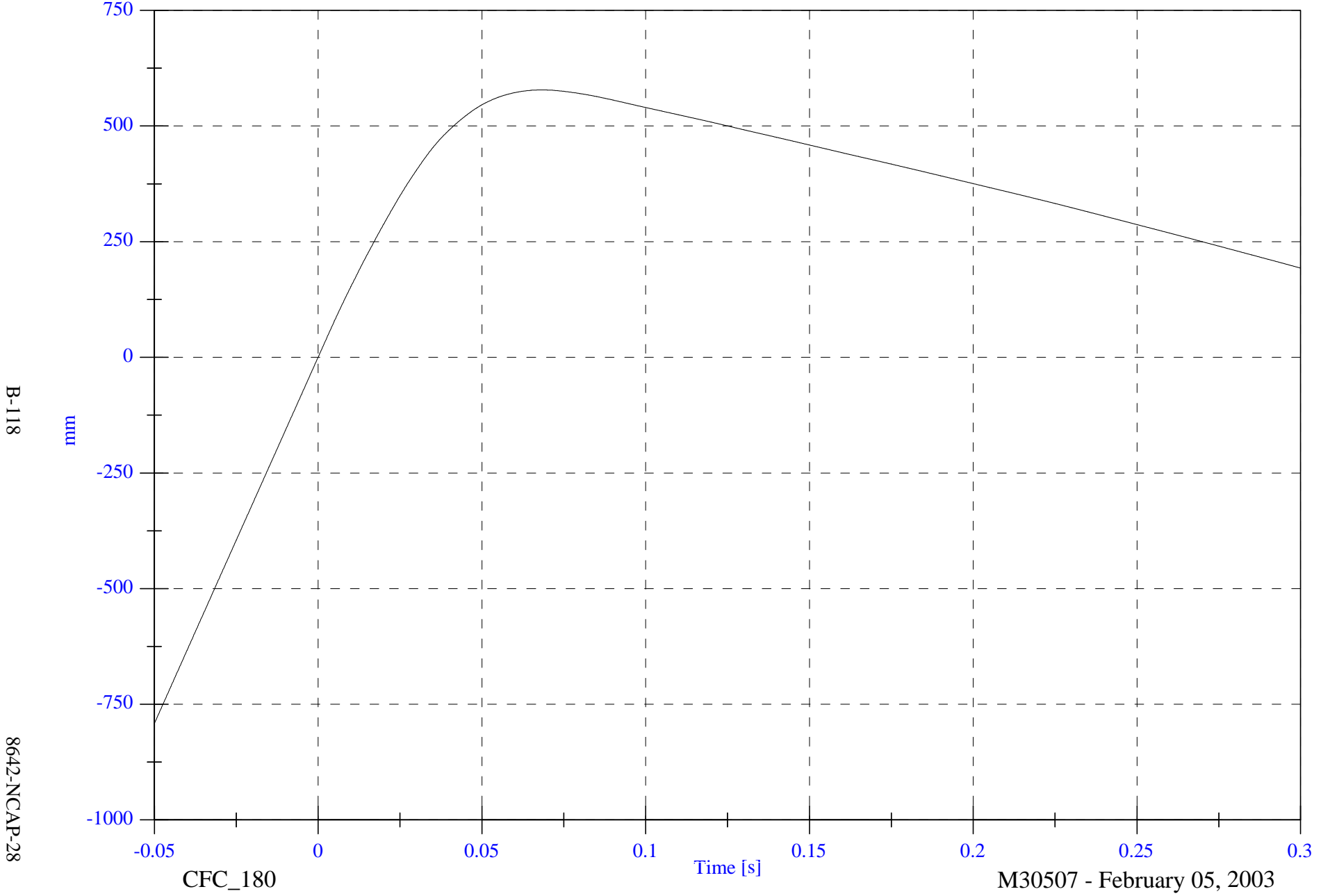
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Left Rear #1x Displacement

Max: 577.9 [mm] at 0.068 [s]

Min: -791.8 [mm] at -0.050 [s]



B-118

8642-NCAP-28

CFC\_180

Time [s]

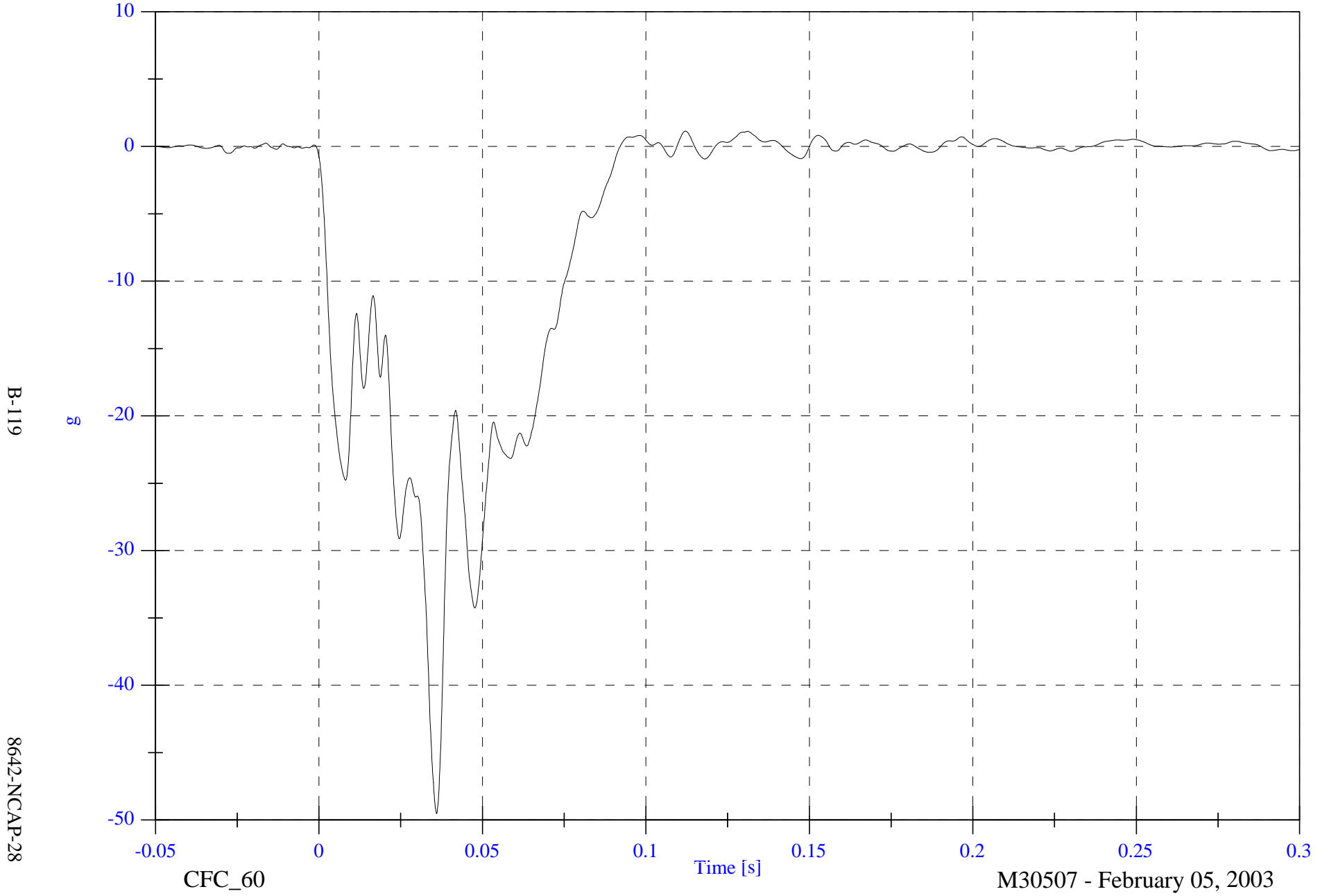
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Right Rear #2x

Max: 1.1 [g] at 0.112 [s]

Min: -49.5 [g] at 0.036 [s]



NCAP Test #6 - 2003 Subaru Forester

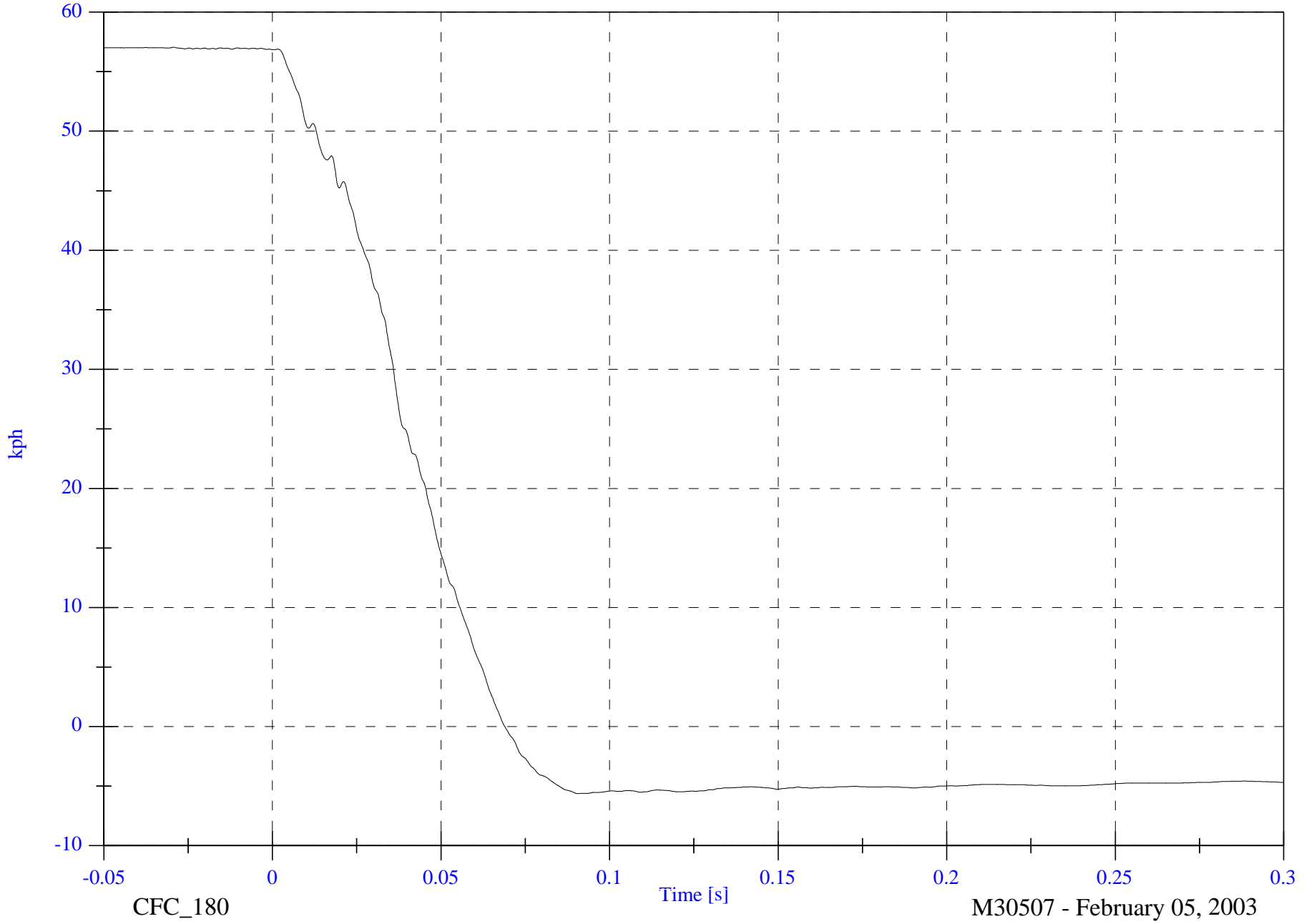
V1 Right Rear #2x Velocity

Max: 57.0 [kph] at -0.029 [s]

Min: -5.6 [kph] at 0.091 [s]

B-120

8642-NCAP-28



CFC\_180

Time [s]

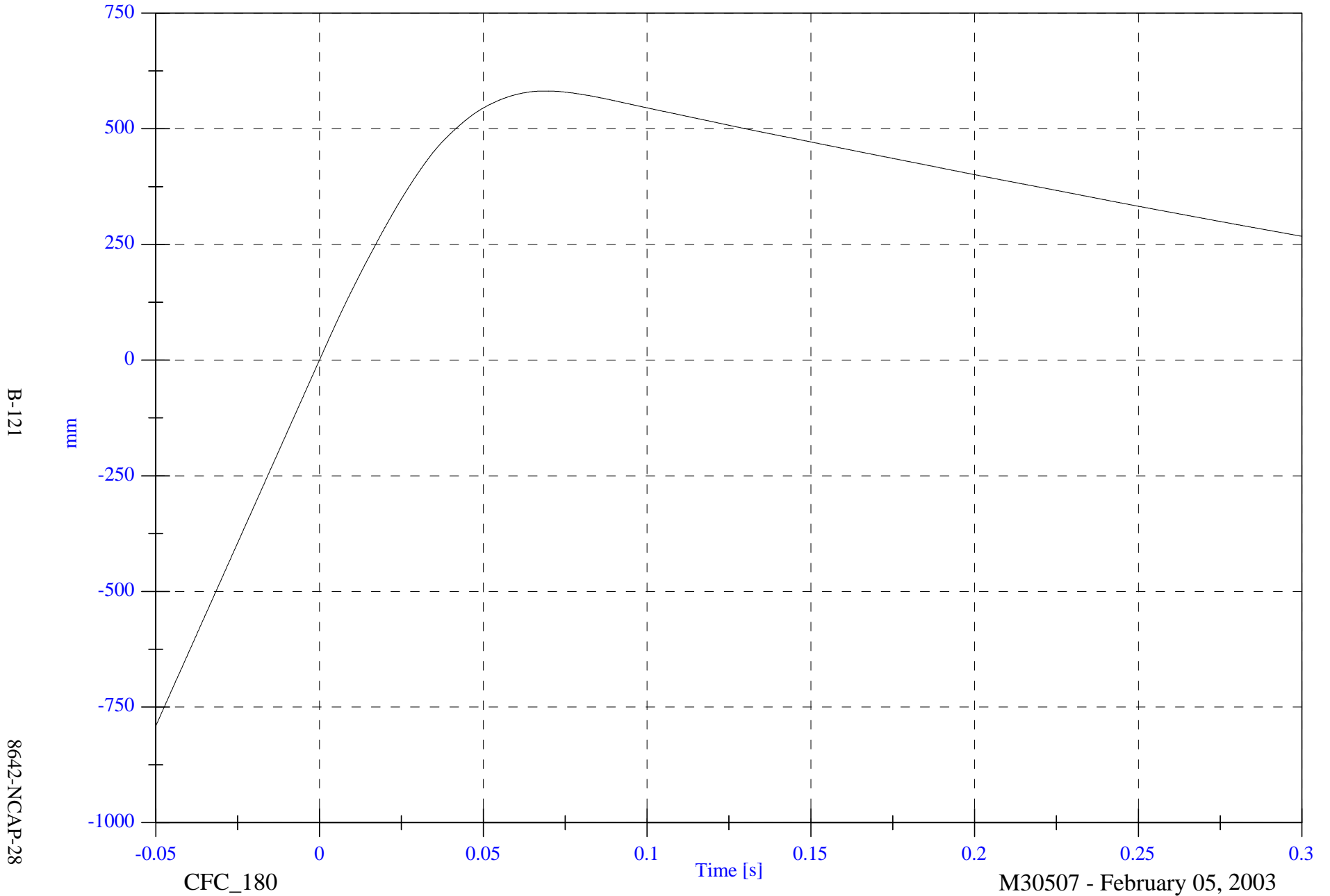
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Right Rear #2x Displacement

Max: 581.6 [mm] at 0.069 [s]

Min: -791.2 [mm] at -0.050 [s]



B-121

8642-NCAP-28

CFC\_180

Time [s]

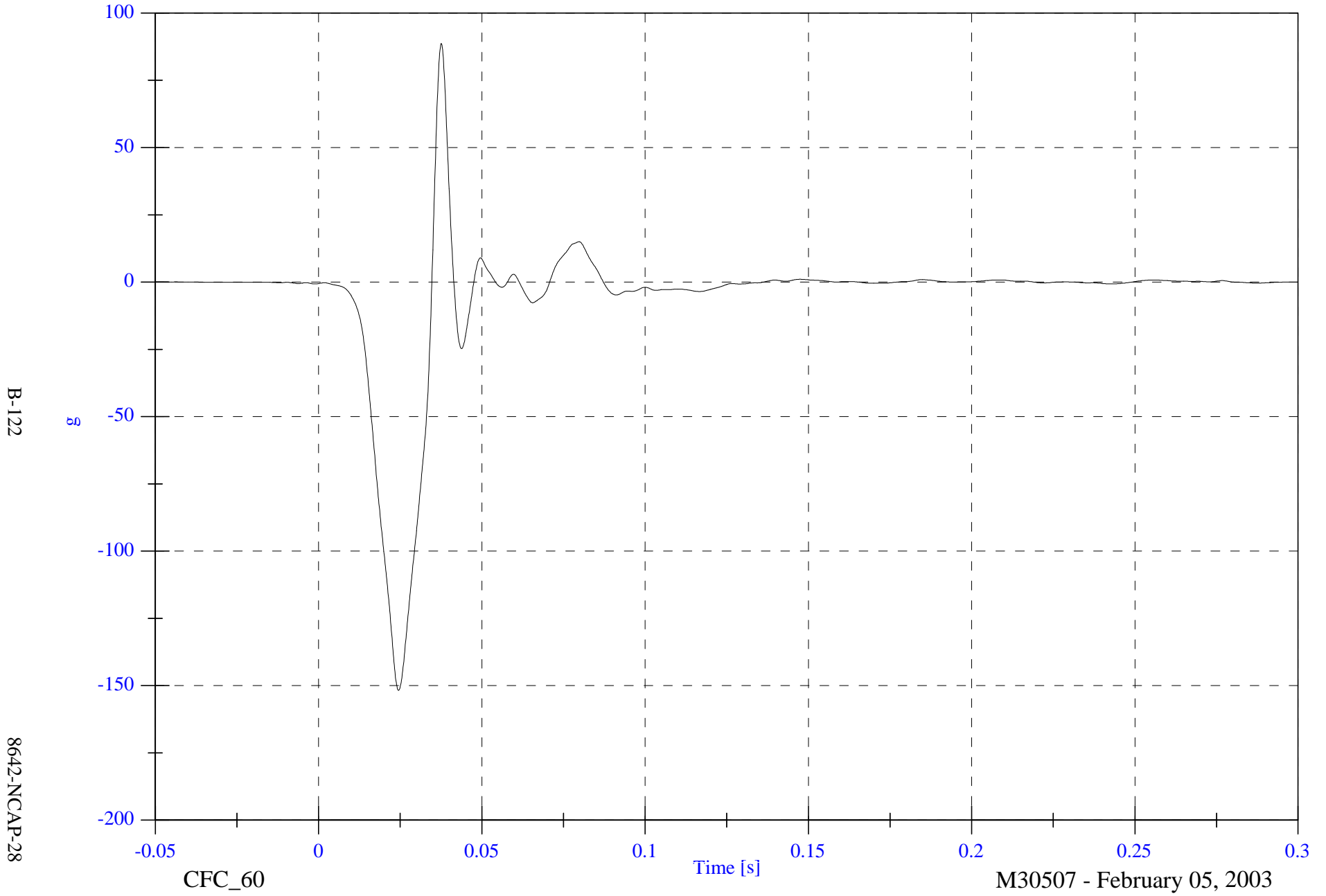
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Engine Top #3x

Max: 88.7 [g] at 0.038 [s]

Min: -151.8 [g] at 0.025 [s]



CFC\_60

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

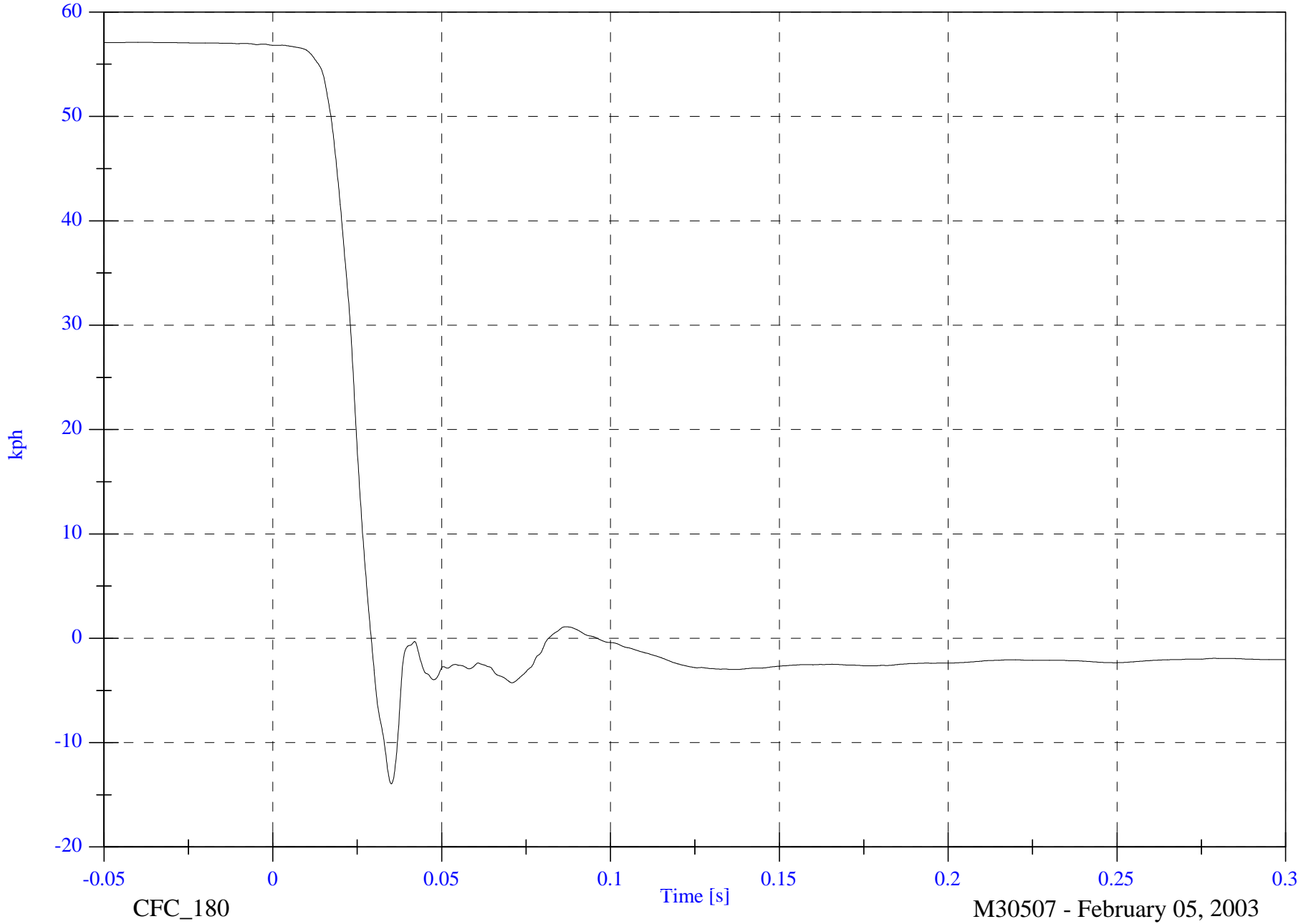
Max: 57.1 [kph] at -0.041 [s]

V1 Engine Top #3x Velocity

Min: -14.0 [kph] at 0.035 [s]

B-123

8642-NCAP-28



CFC\_180

Time [s]

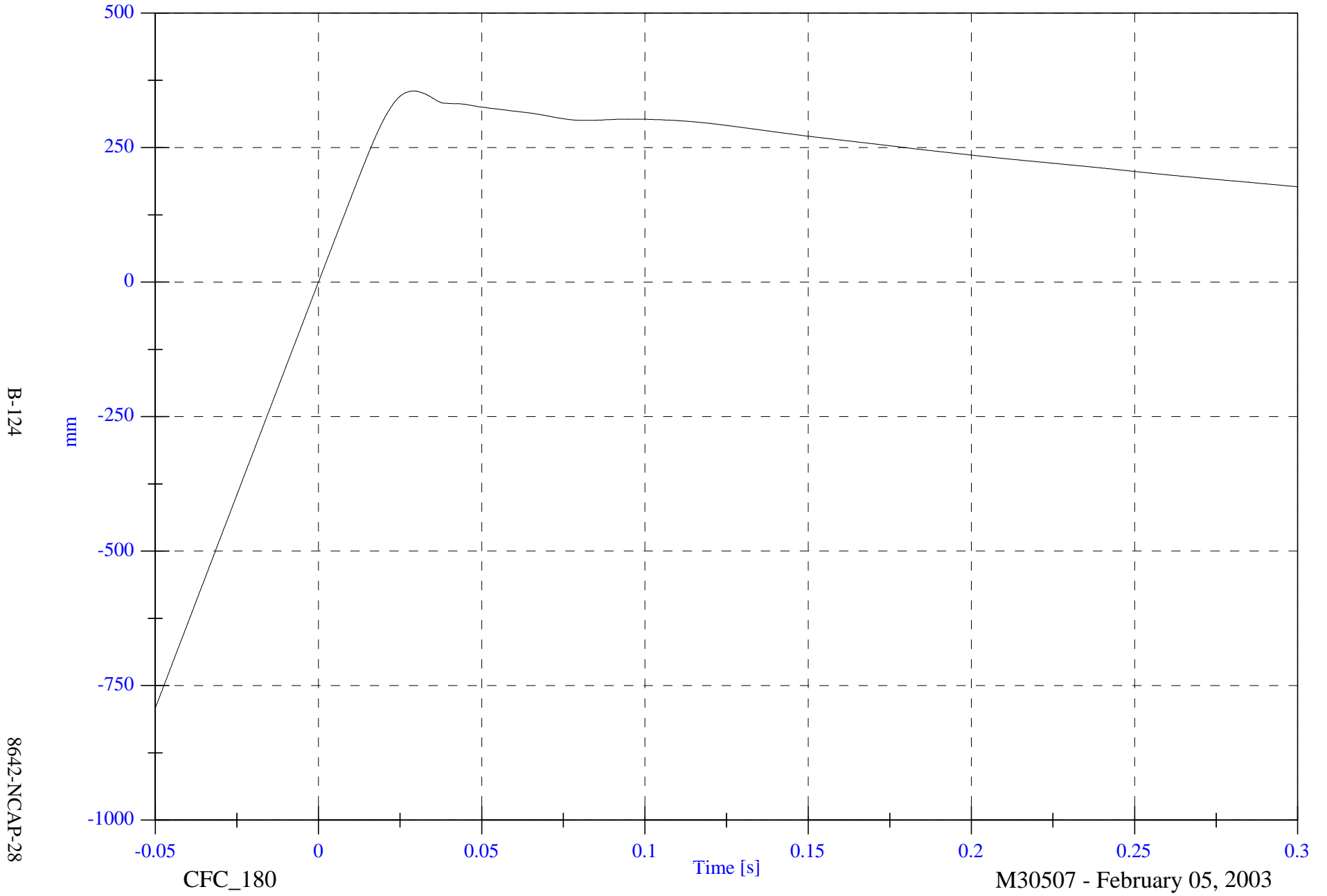
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Engine Top #3x Displacement

Max: 355.0 [mm] at 0.029 [s]

Min: -792.1 [mm] at -0.050 [s]



B-124

8642-NCAP-28

CFC\_180

Time [s]

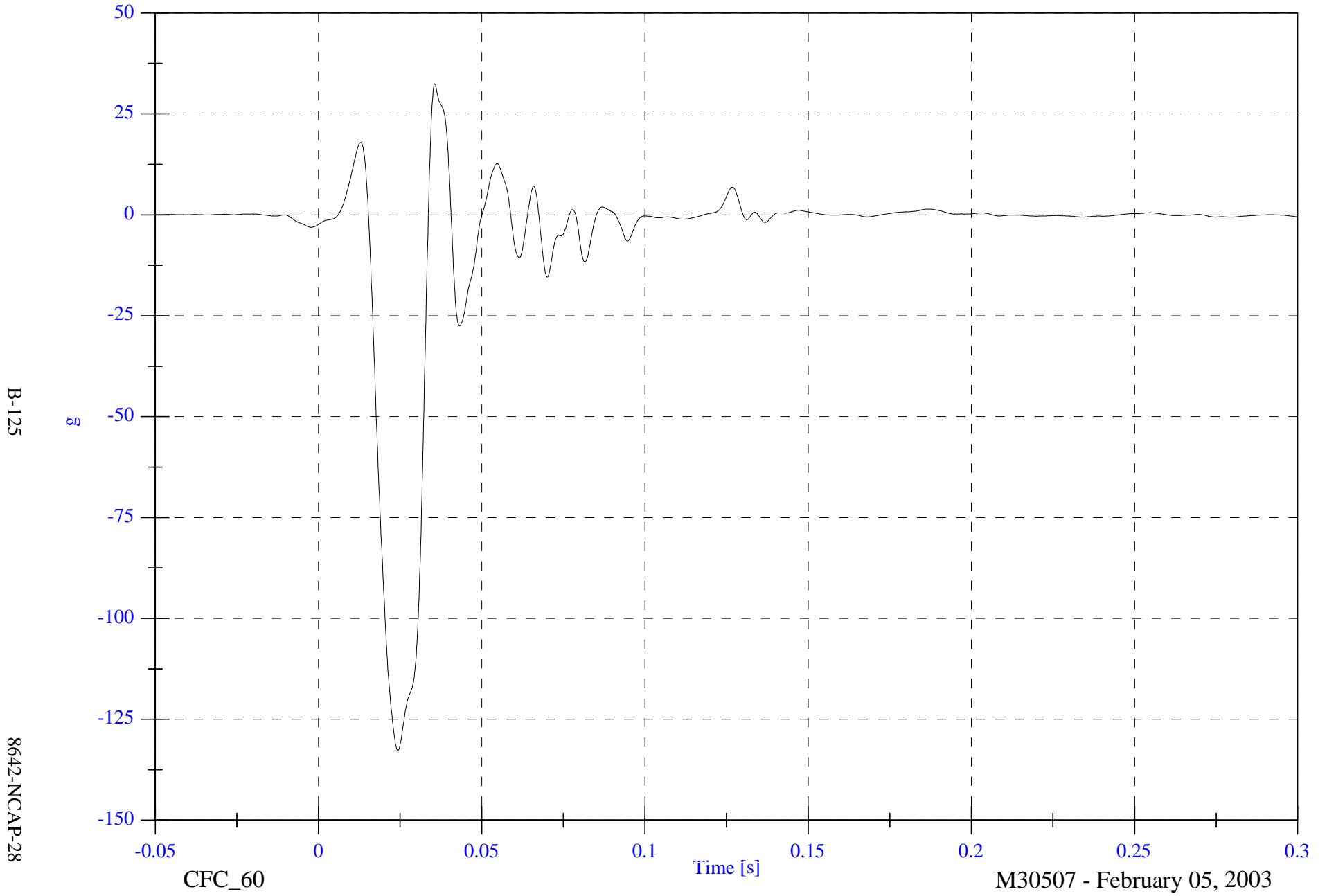
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Engine Bottom #4x

Max: 32.5 [g] at 0.036 [s]

Min: -132.7 [g] at 0.024 [s]



NCAP Test #6 - 2003 Subaru Forester

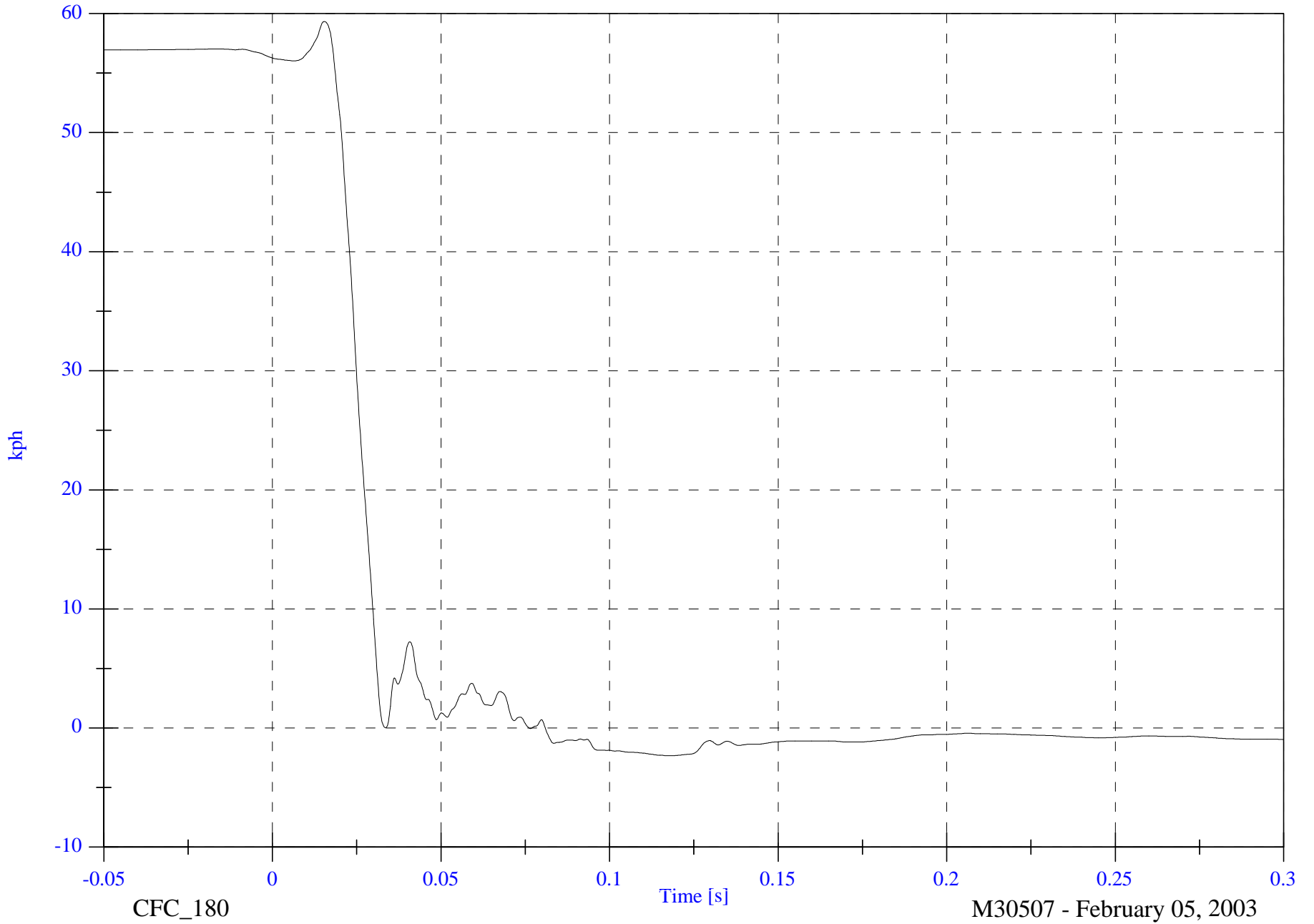
V1 Engine Bottom #4x Velocity

Max: 59.3 [kph] at 0.015 [s]

Min: -2.3 [kph] at 0.118 [s]

B-126

8642-NCAP-28



CFC\_180

Time [s]

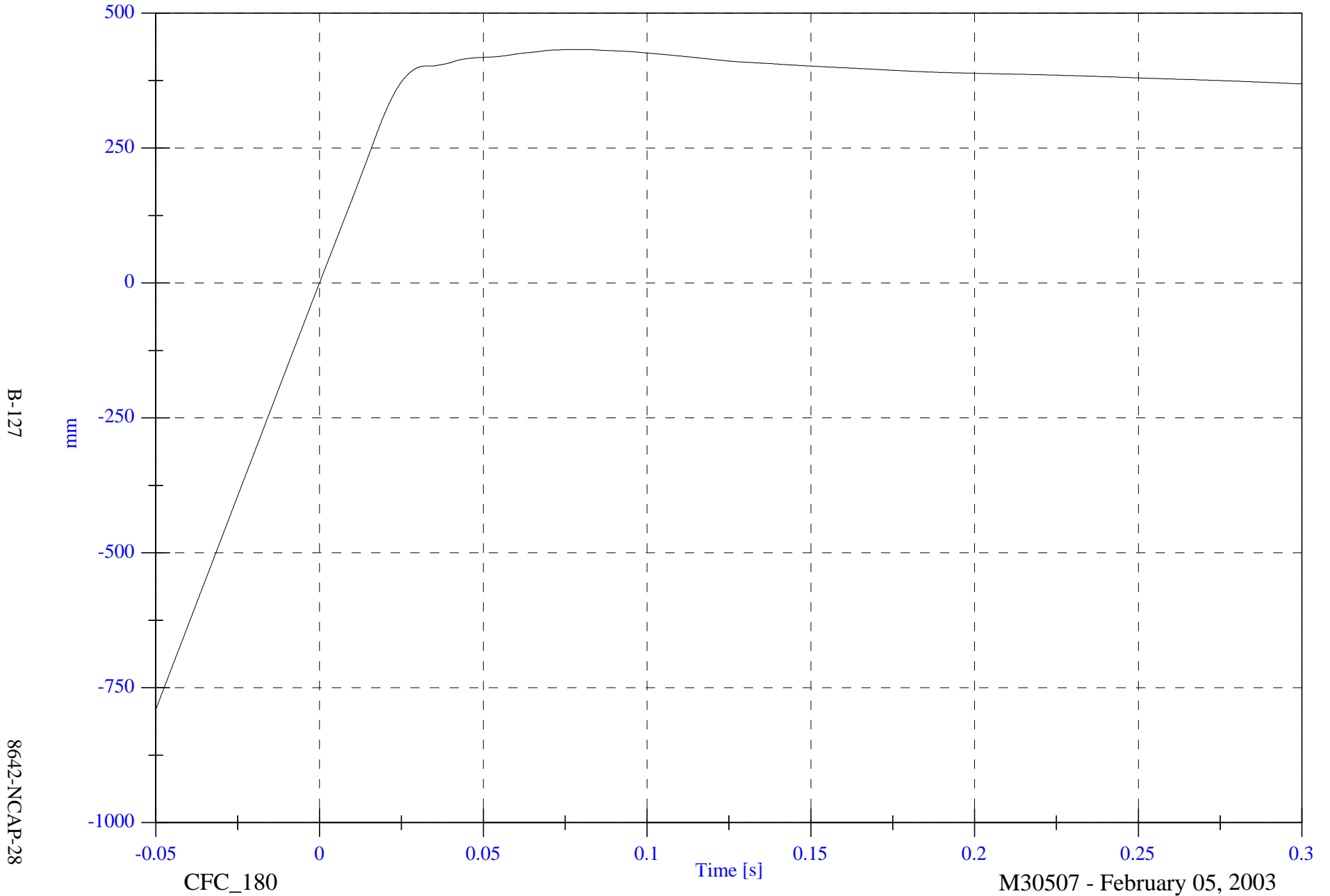
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Engine Bottom #4x Displacement

Max: 432.7 [mm] at 0.081 [s]

Min: -790.6 [mm] at -0.050 [s]



B-127

8642-NCAP-28

CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

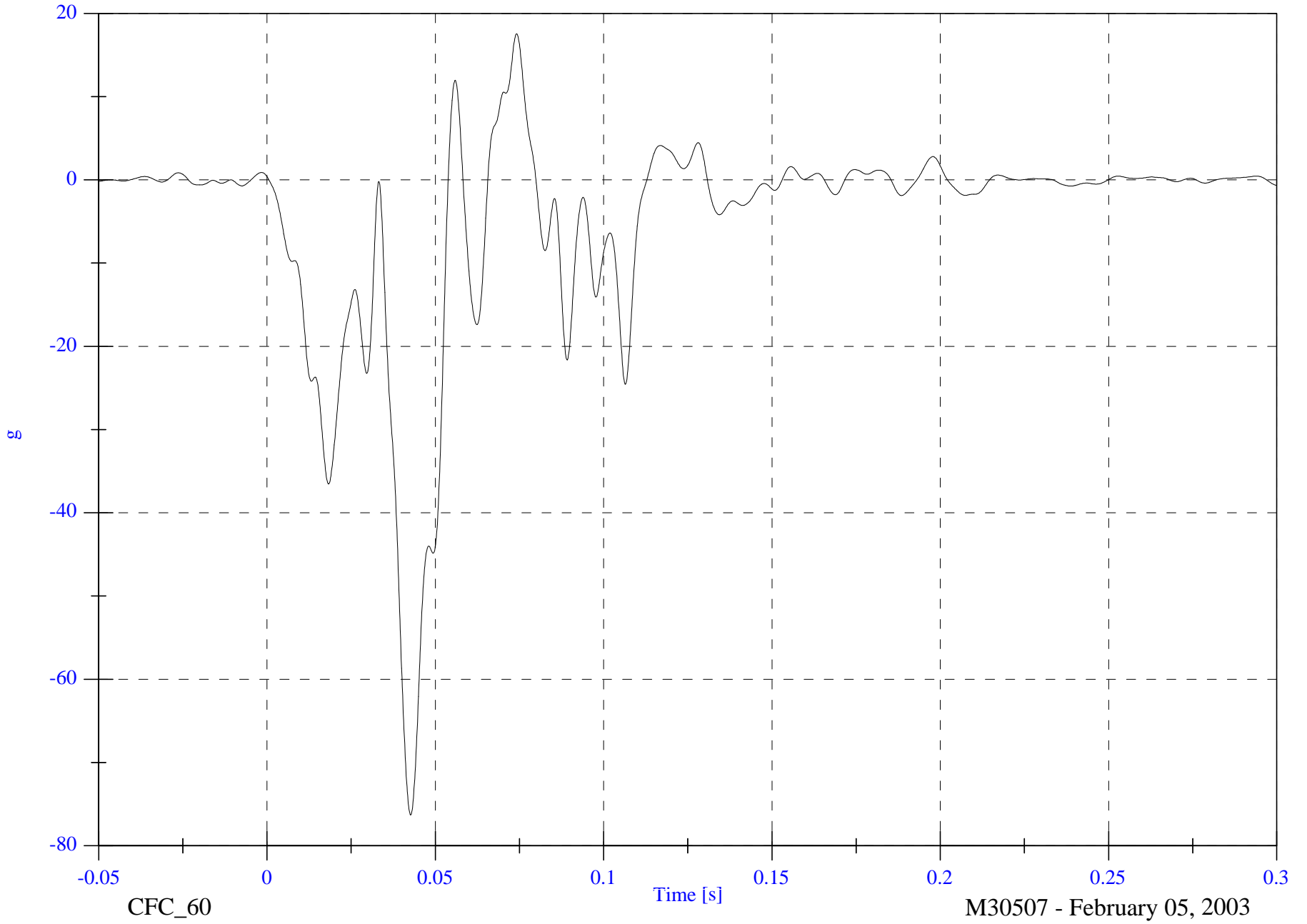
V1 Right Caliper #5x

Max: 17.6 [g] at 0.074 [s]

Min: -76.3 [g] at 0.043 [s]

B-128

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

Max: 57.1 [kph] at -0.023 [s]

V1 Right Caliper #5x Velocity

Min: -1.9 [kph] at 0.114 [s]

B-129

8642-NCAP-28



CFC\_180

Time [s]

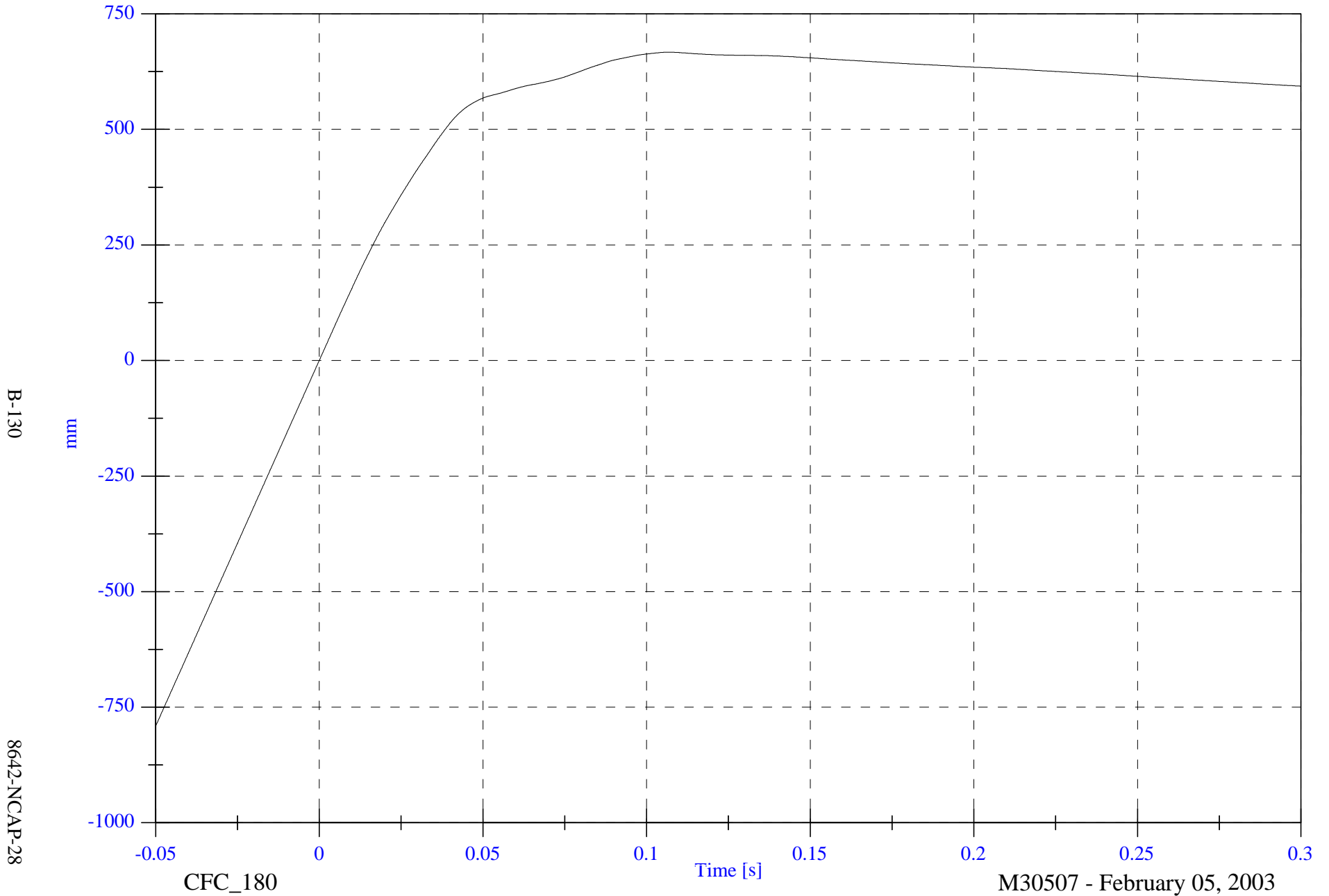
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Right Caliper #5x Displacement

Max: 667.1 [mm] at 0.107 [s]

Min: -791.2 [mm] at -0.050 [s]



B-130

8642-NCAP-28

CFC\_180

Time [s]

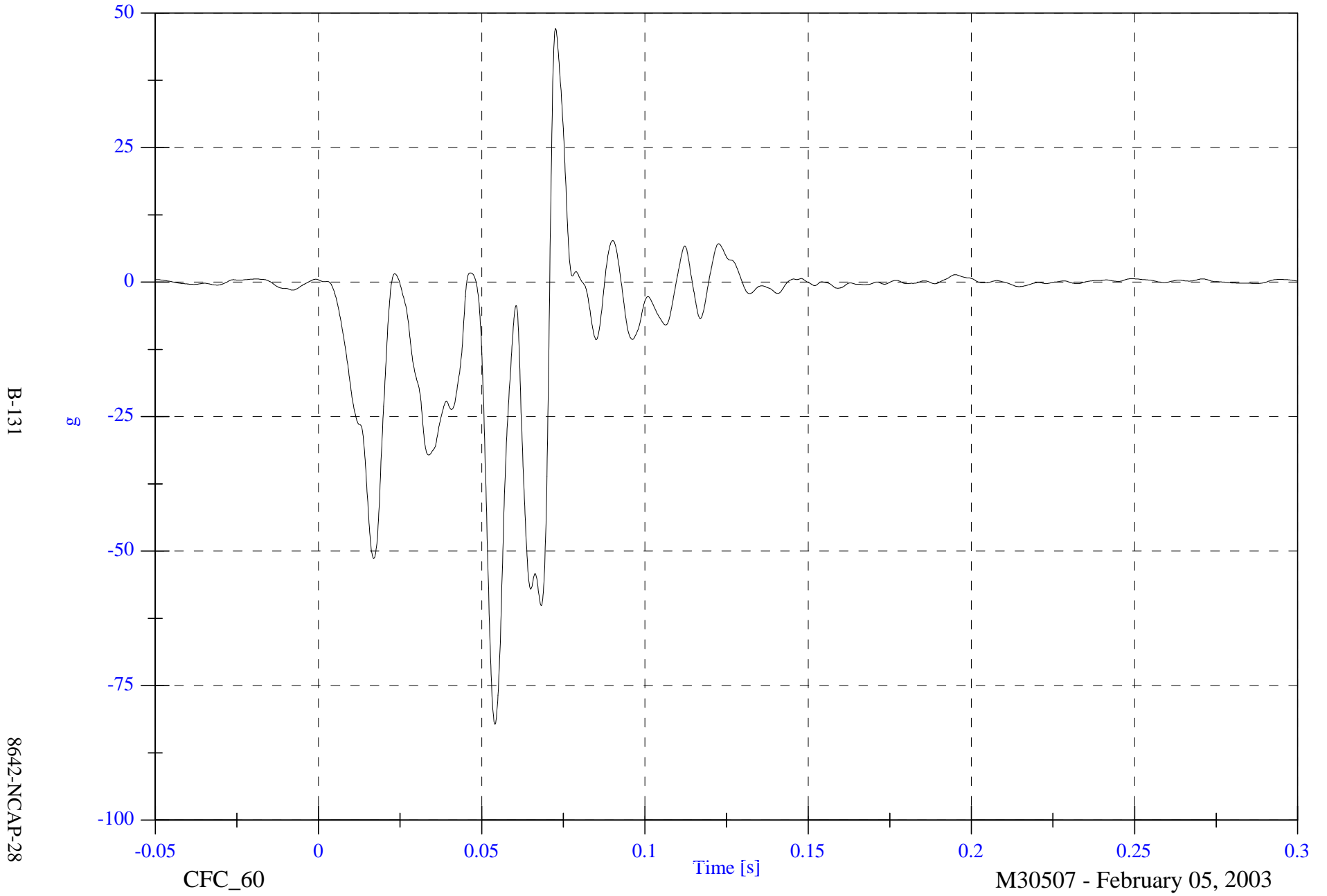
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Instrument Panel #6x

Max: 47.1 [g] at 0.073 [s]

Min: -82.2 [g] at 0.054 [s]



NCAP Test #6 - 2003 Subaru Forester

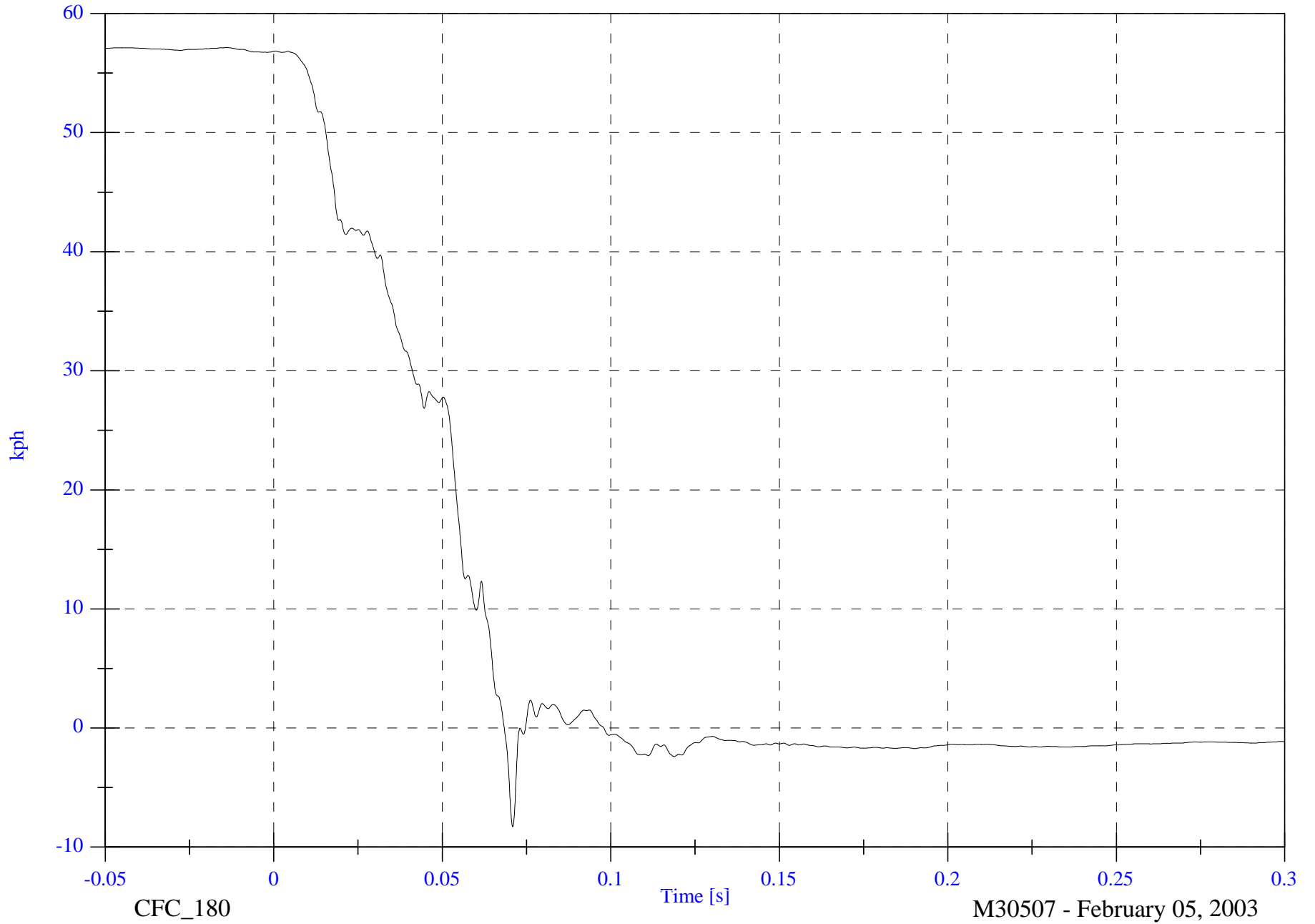
V1 Instrument Panel #6x Velocity

Max: 57.1 [kph] at -0.014 [s]

Min: -8.3 [kph] at 0.071 [s]

B-132

8642-NCAP-28



CFC\_180

Time [s]

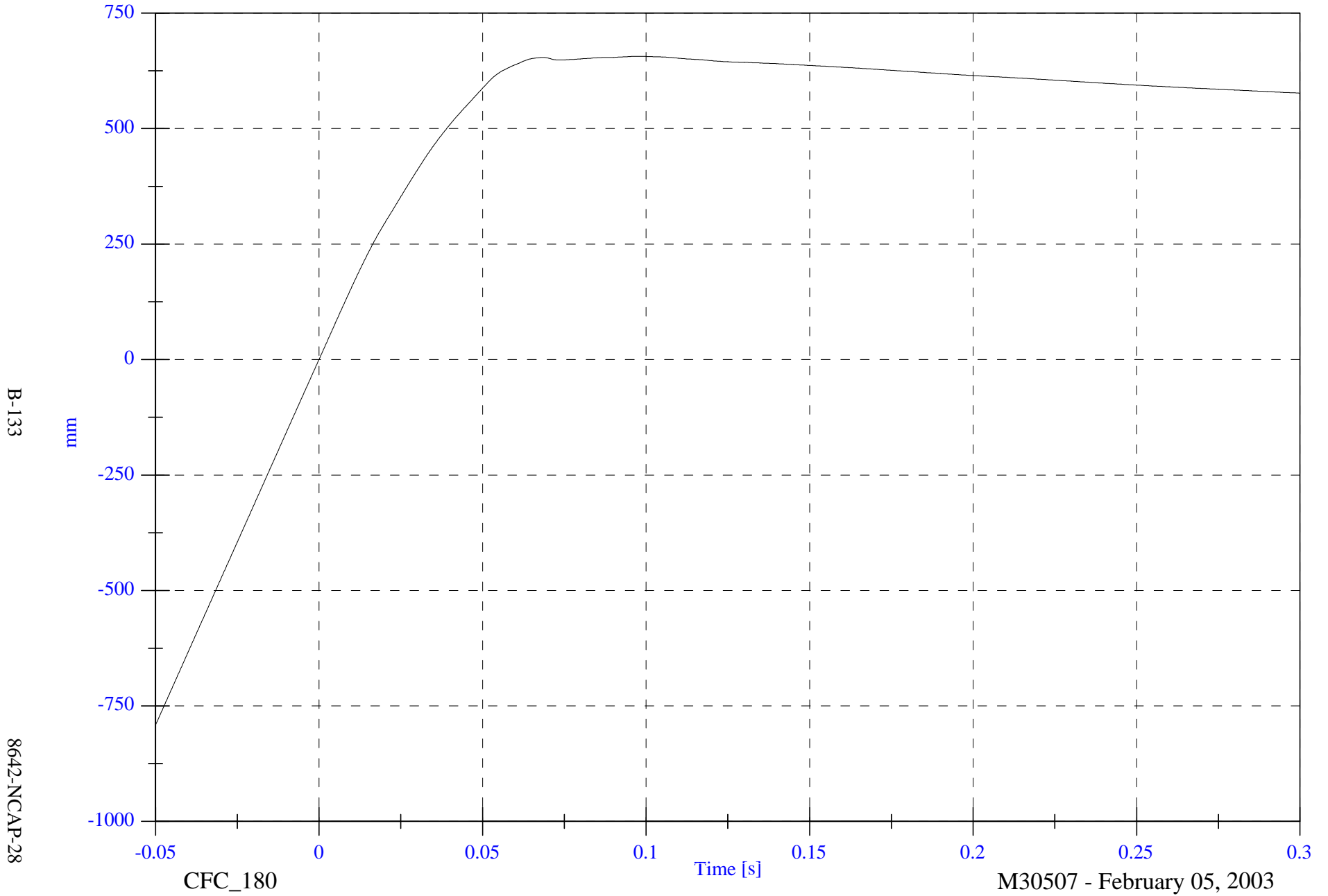
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Instrument Panel #6x Displacement

Max: 656.2 [mm] at 0.098 [s]

Min: -791.6 [mm] at -0.050 [s]



B-133

8642-NCAP-28

CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

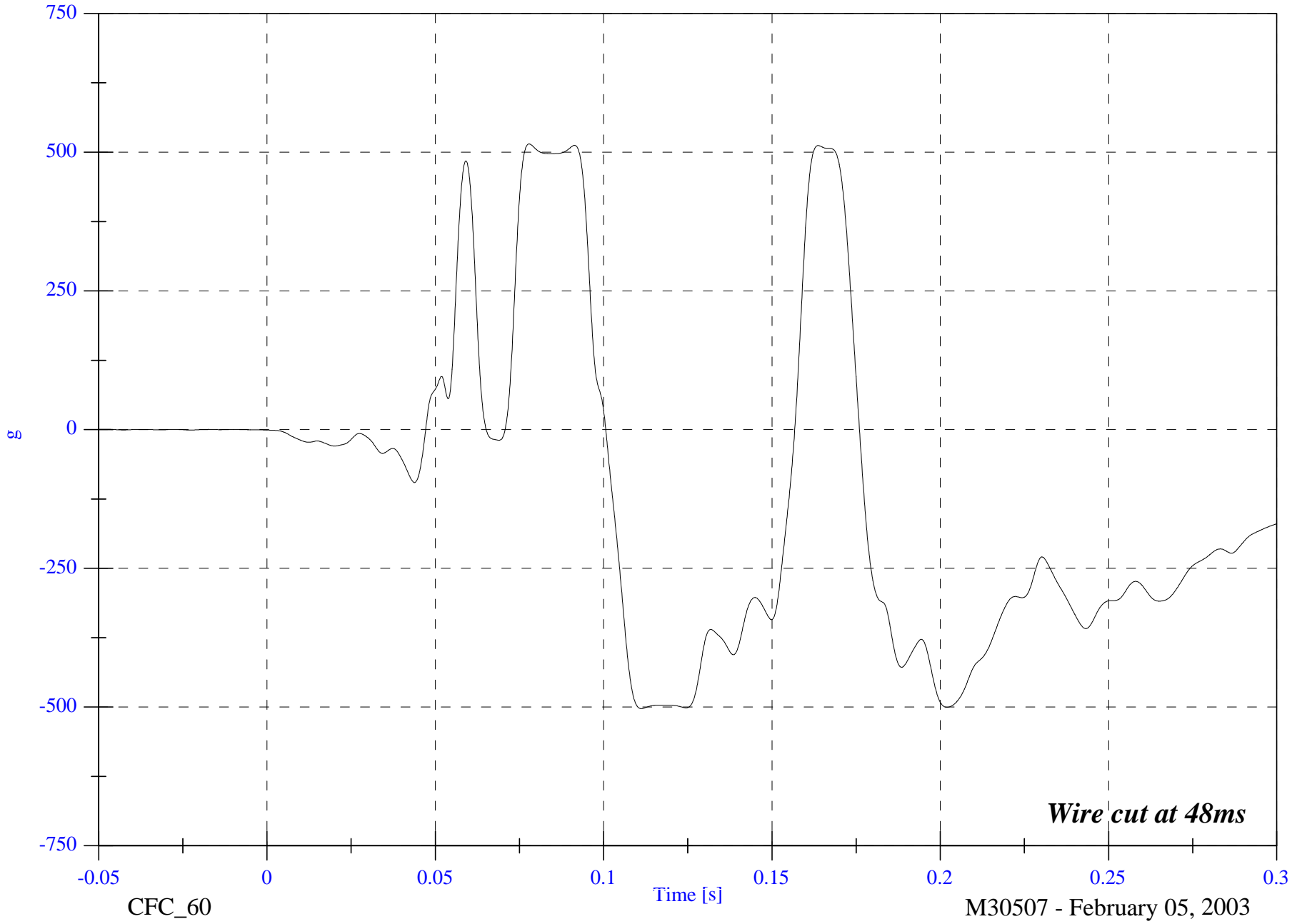
V1 Left Caliper #7x

Max: 514.9 [g] at 0.078 [s]

Min: -502.8 [g] at 0.111 [s]

B-134

8642-NCAP-28

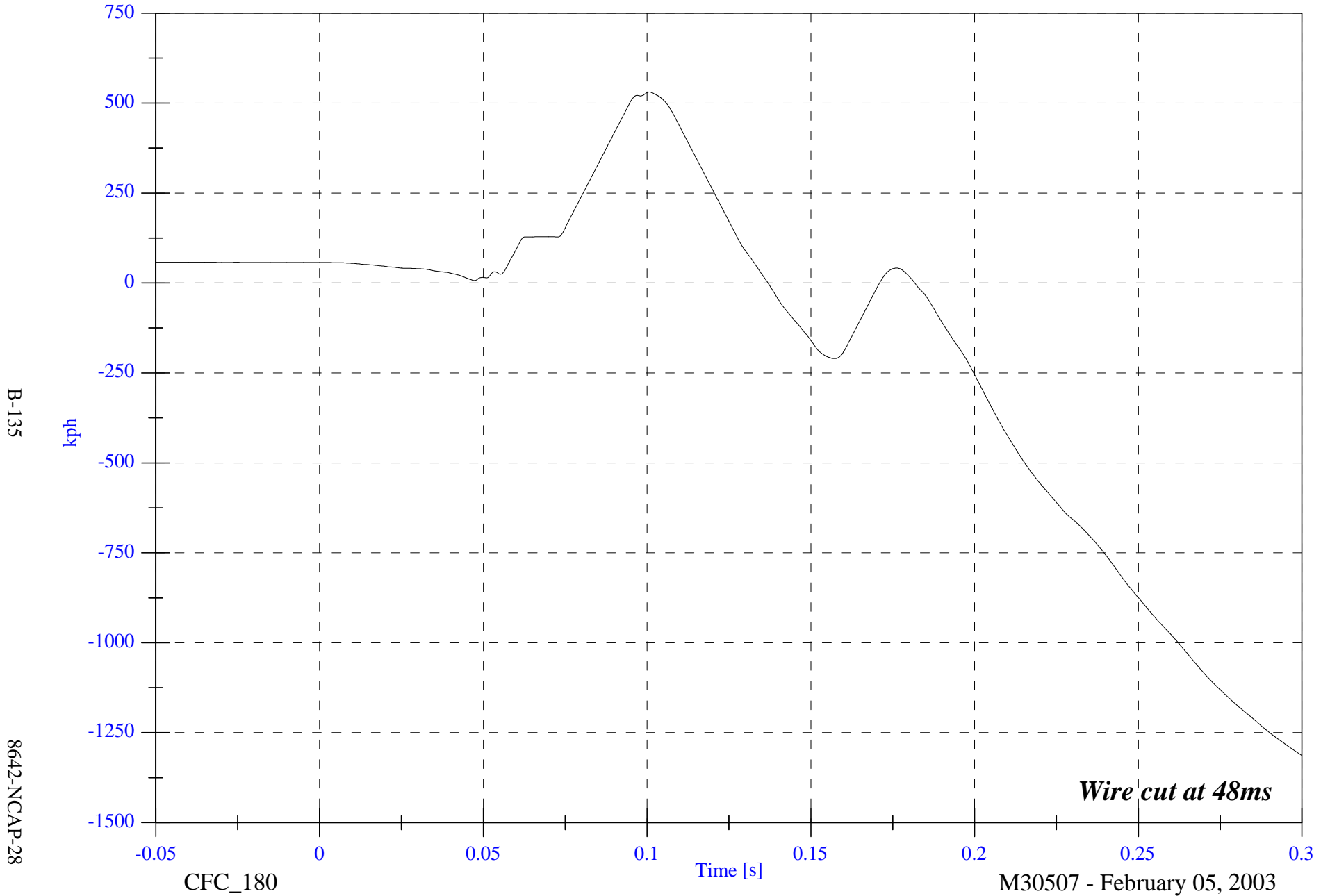


NCAP Test #6 - 2003 Subaru Forester

Max: 530.7 [kph] at 0.101 [s]

Min: -1312.9 [kph] at 0.300 [s]

V1 Left Caliper #7x Velocity



B-135

8642-NCAP-28

CFC\_180

Time [s]

M30507 - February 05, 2003

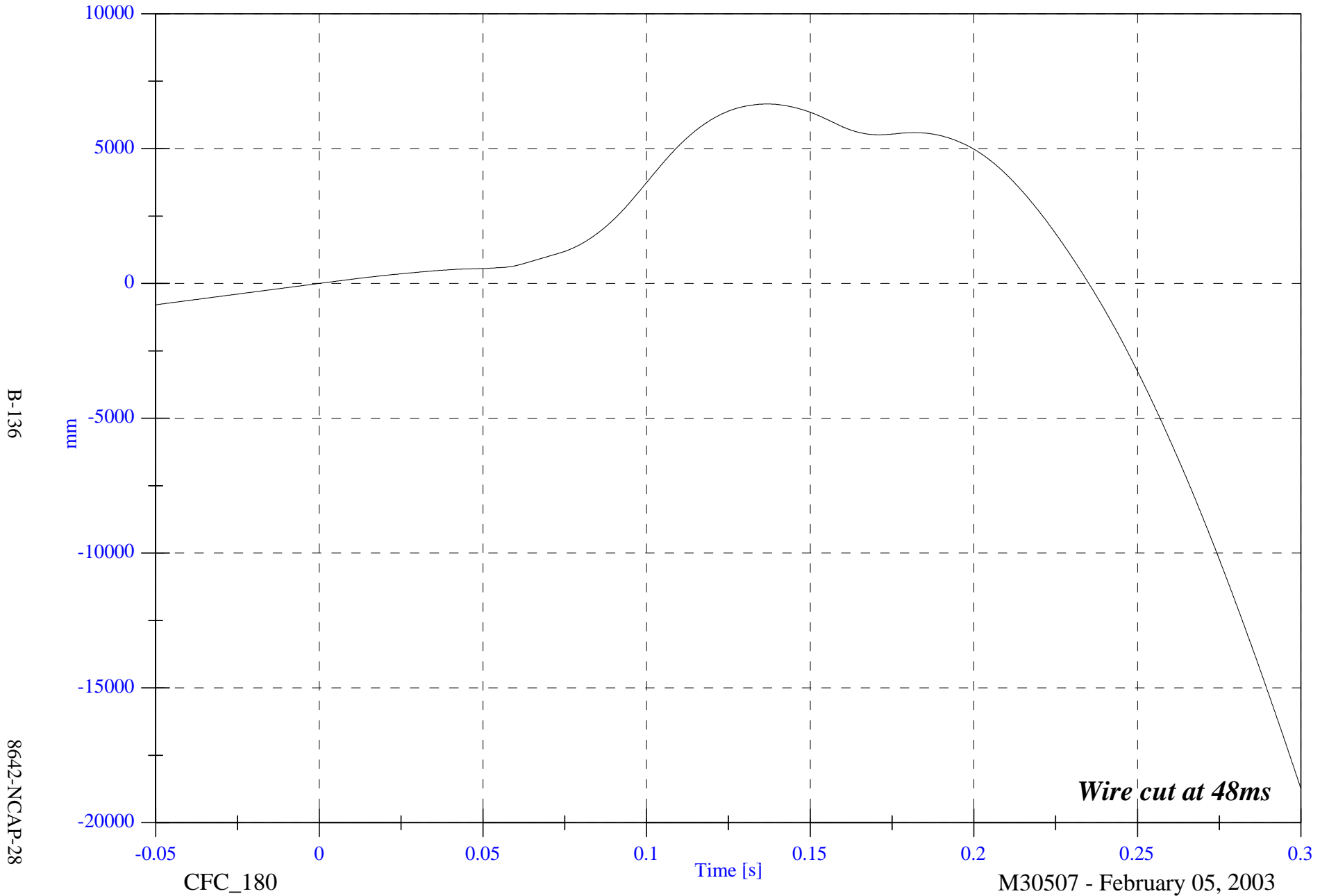
*Wire cut at 48ms*

NCAP Test #6 - 2003 Subaru Forester

V1 Left Caliper #7x Displacement

Max: 6654.5 [mm] at 0.137 [s]

Min: -18718.1 [mm] at 0.300 [s]



B-136

8642-NCAP-28

CFC\_180

Time [s]

M30507 - February 05, 2003

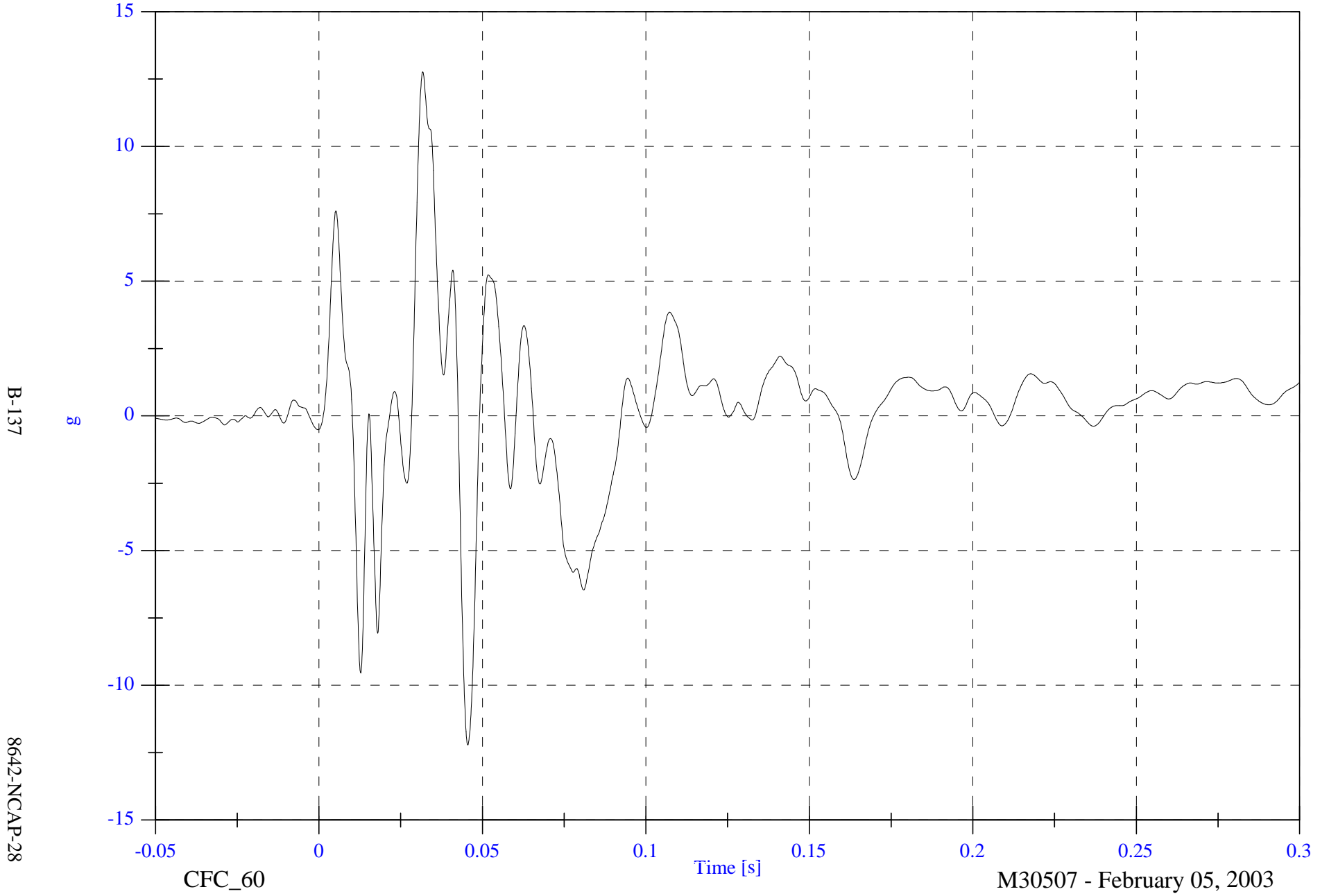
*Wire cut at 48ms*

NCAP Test #6 - 2003 Subaru Forester

V1 Left Rear #8z

Max: 12.8 [g] at 0.032 [s]

Min: -12.2 [g] at 0.045 [s]



NCAP Test #6 - 2003 Subaru Forester

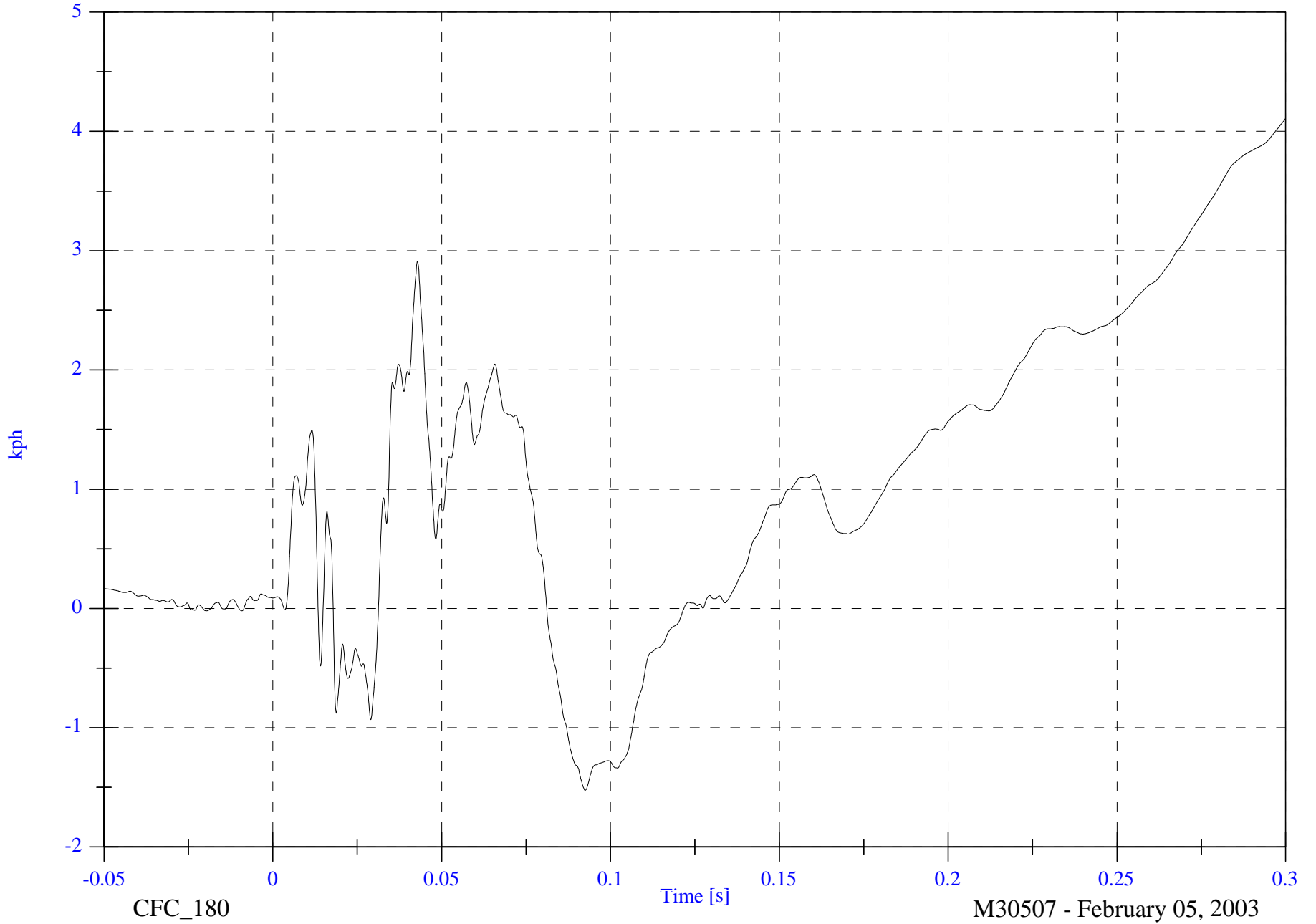
V1 Left Rear #8z Velocity

Max: 4.1 [kph] at 0.300 [s]

Min: -1.5 [kph] at 0.092 [s]

B-138

8642-NCAP-28



CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

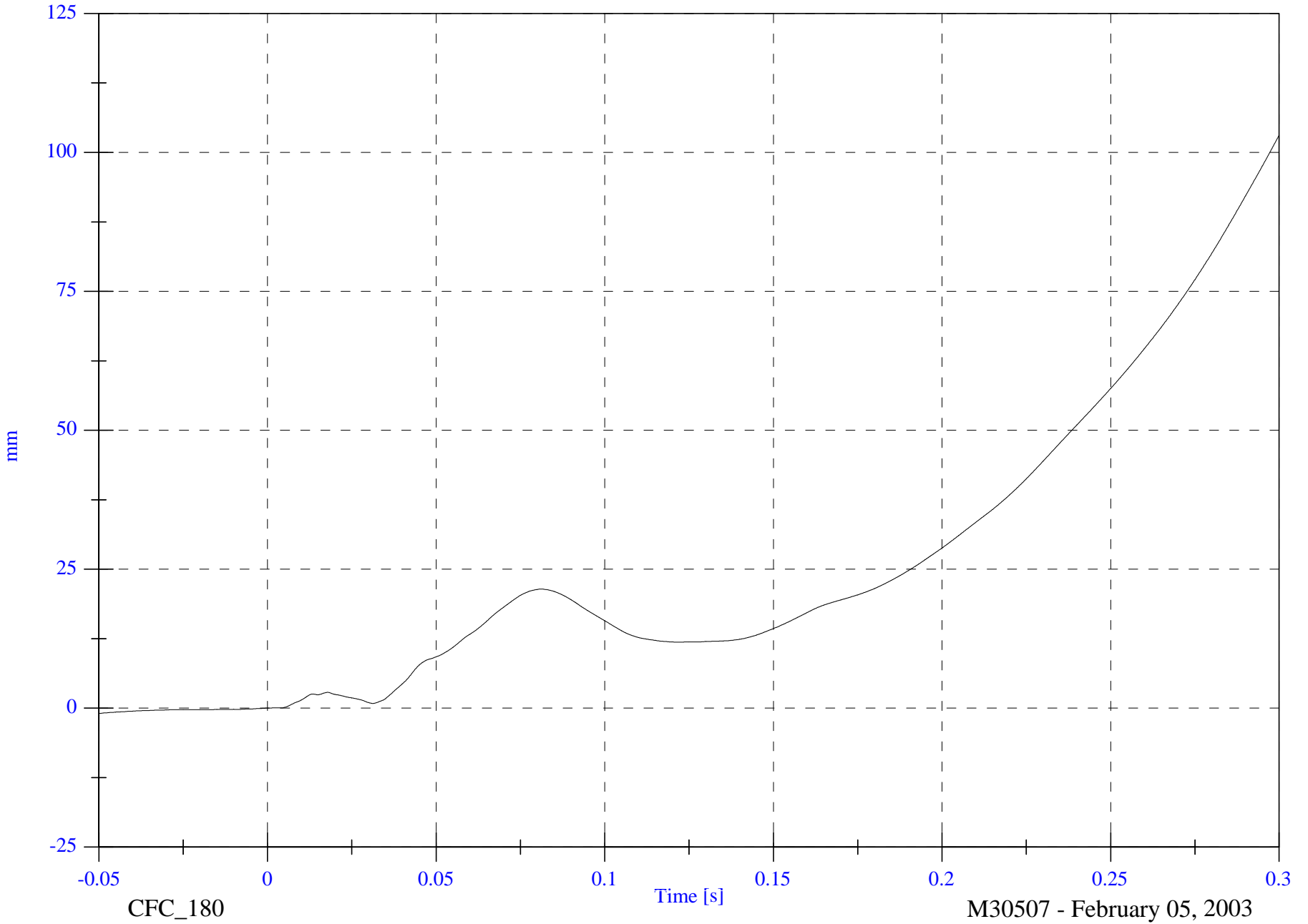
V1 Left Rear #8z Displacement

Max: 103.0 [mm] at 0.300 [s]

Min: -0.9 [mm] at -0.050 [s]

B-139

8642-NCAP-28



CFC\_180

Time [s]

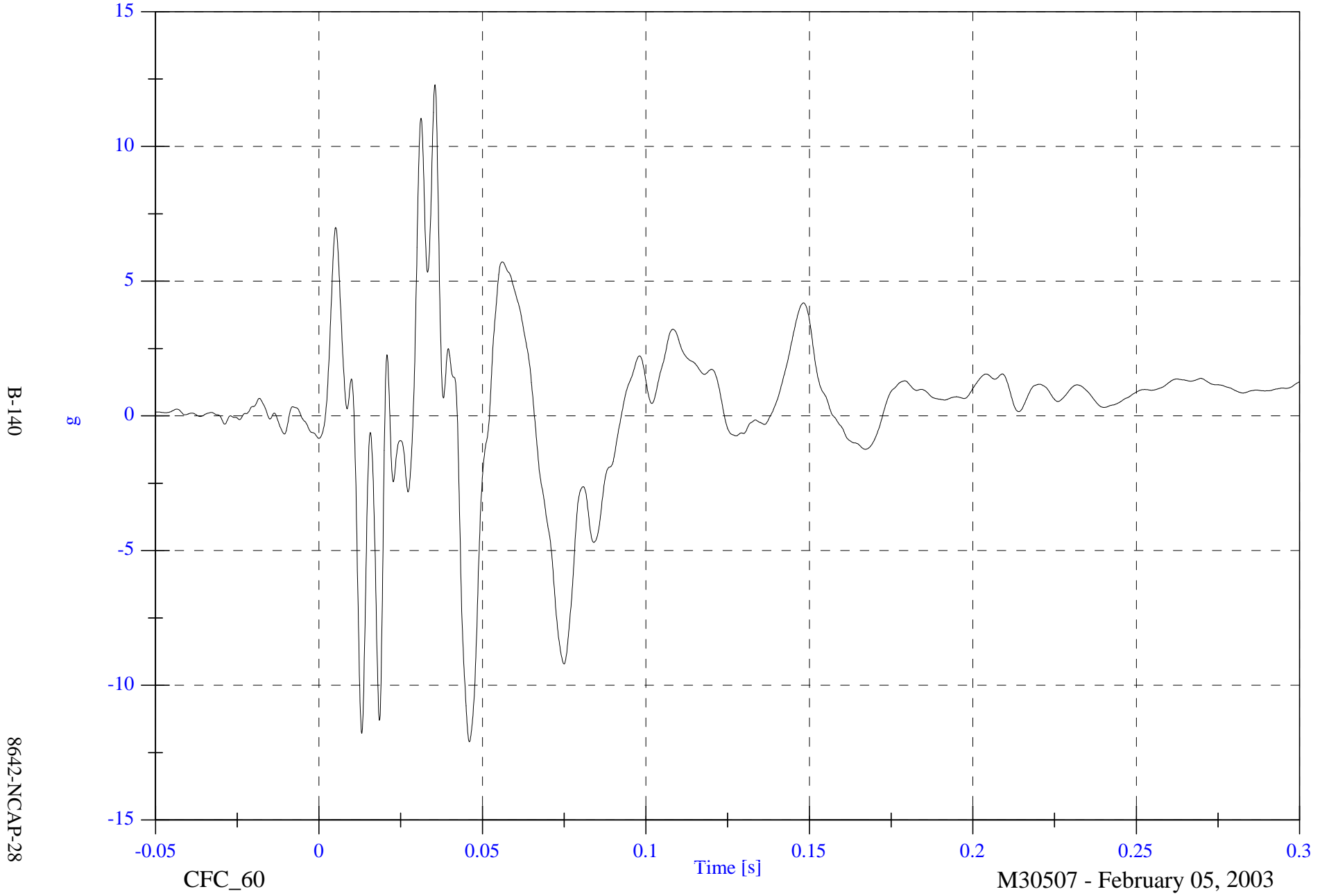
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Right Rear #9z

Max: 12.3 [g] at 0.035 [s]

Min: -12.1 [g] at 0.046 [s]



NCAP Test #6 - 2003 Subaru Forester

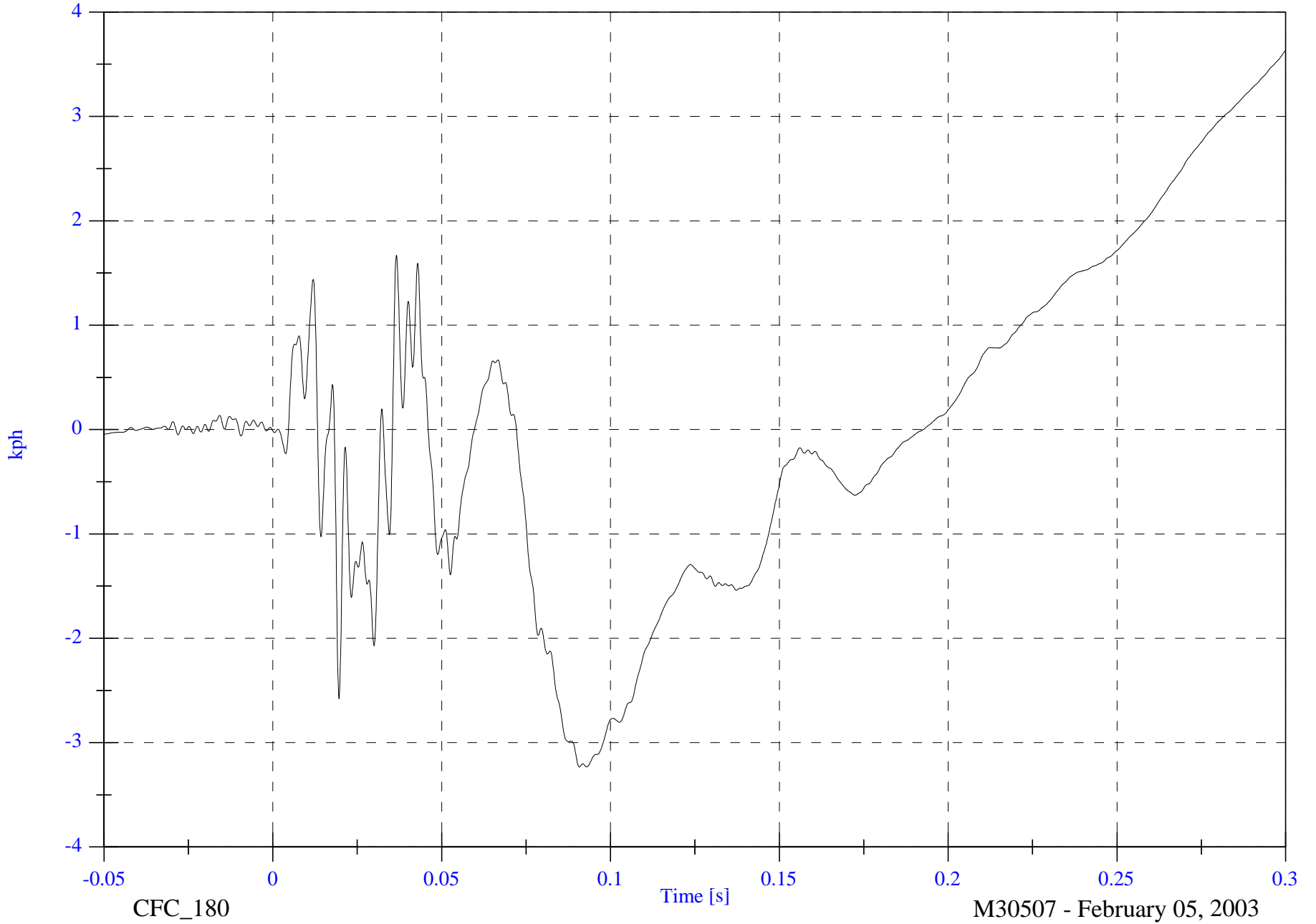
V1 Right Rear #9z Velocity

Max: 3.6 [kph] at 0.300 [s]

Min: -3.2 [kph] at 0.091 [s]

B-141

8642-NCAP-28



CFC\_180

Time [s]

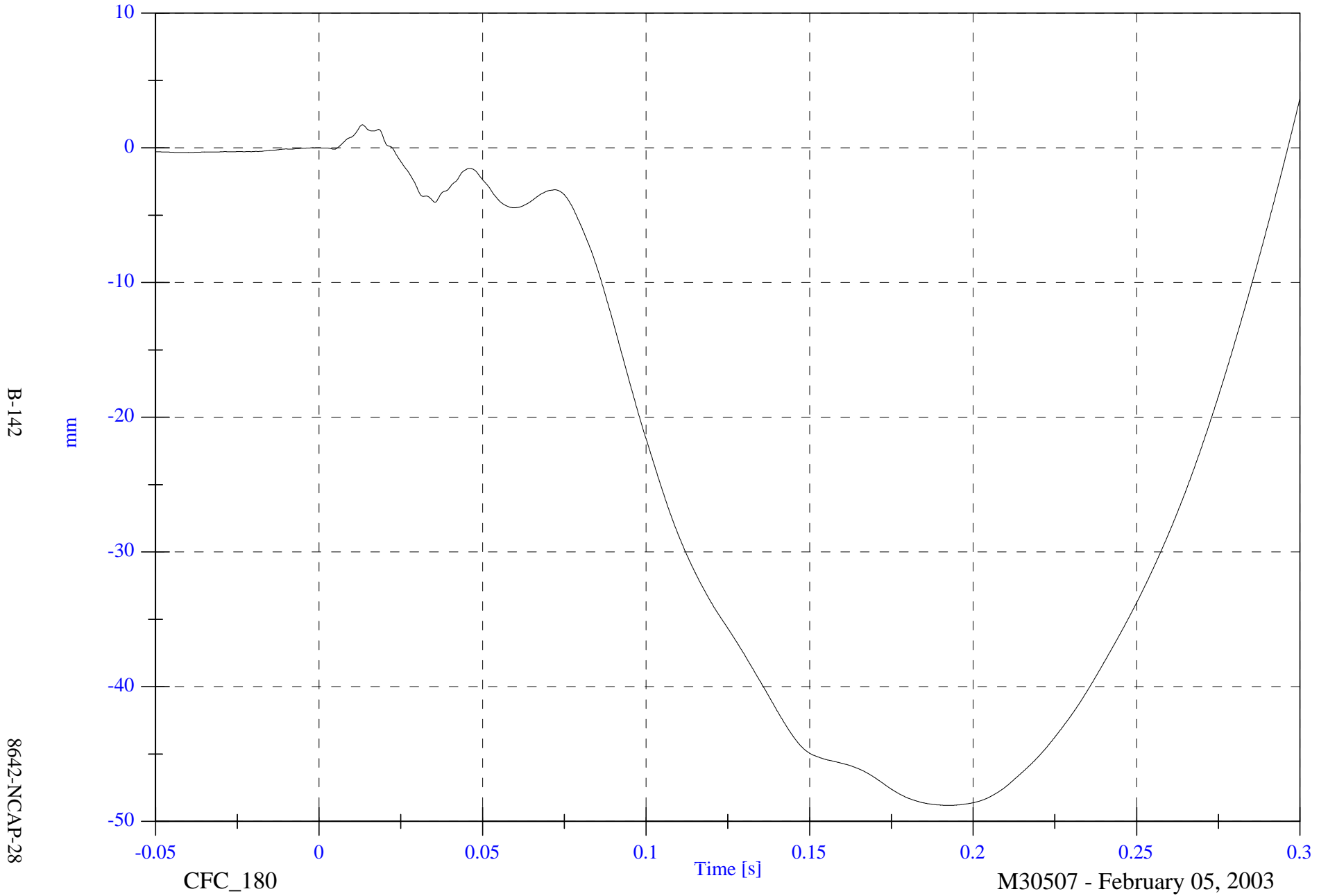
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1 Right Rear #9z Displacement

Max: 3.6 [mm] at 0.300 [s]

Min: -48.8 [mm] at 0.193 [s]



B-142

8642-NCAP-28

CFC\_180

Time [s]

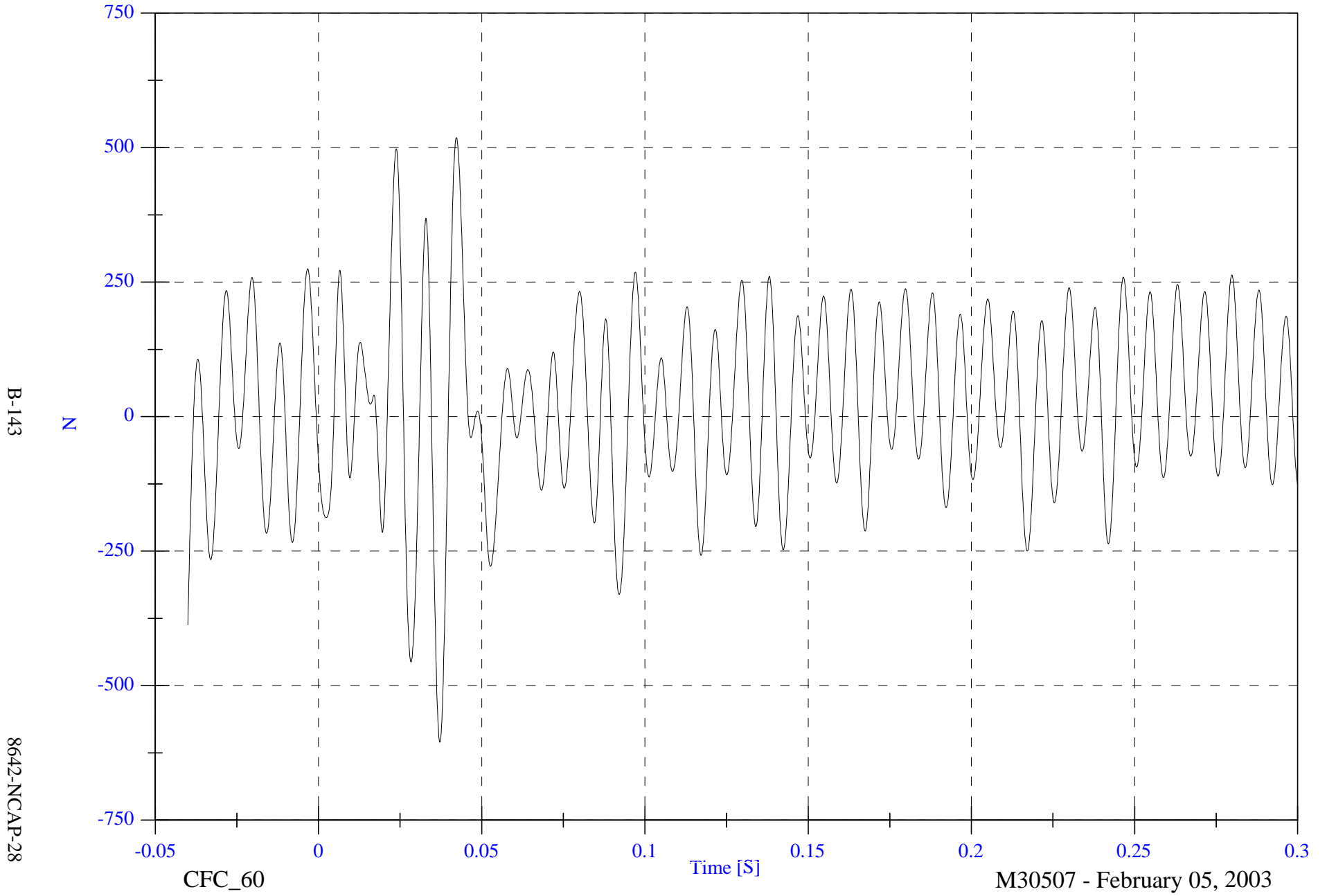
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A1 Fx

Max: 518.5 [N] at 0.042 [S]

Min: -605.3 [N] at 0.037 [S]



B-143

8642-NCAP-28

CFC\_60

Time [S]

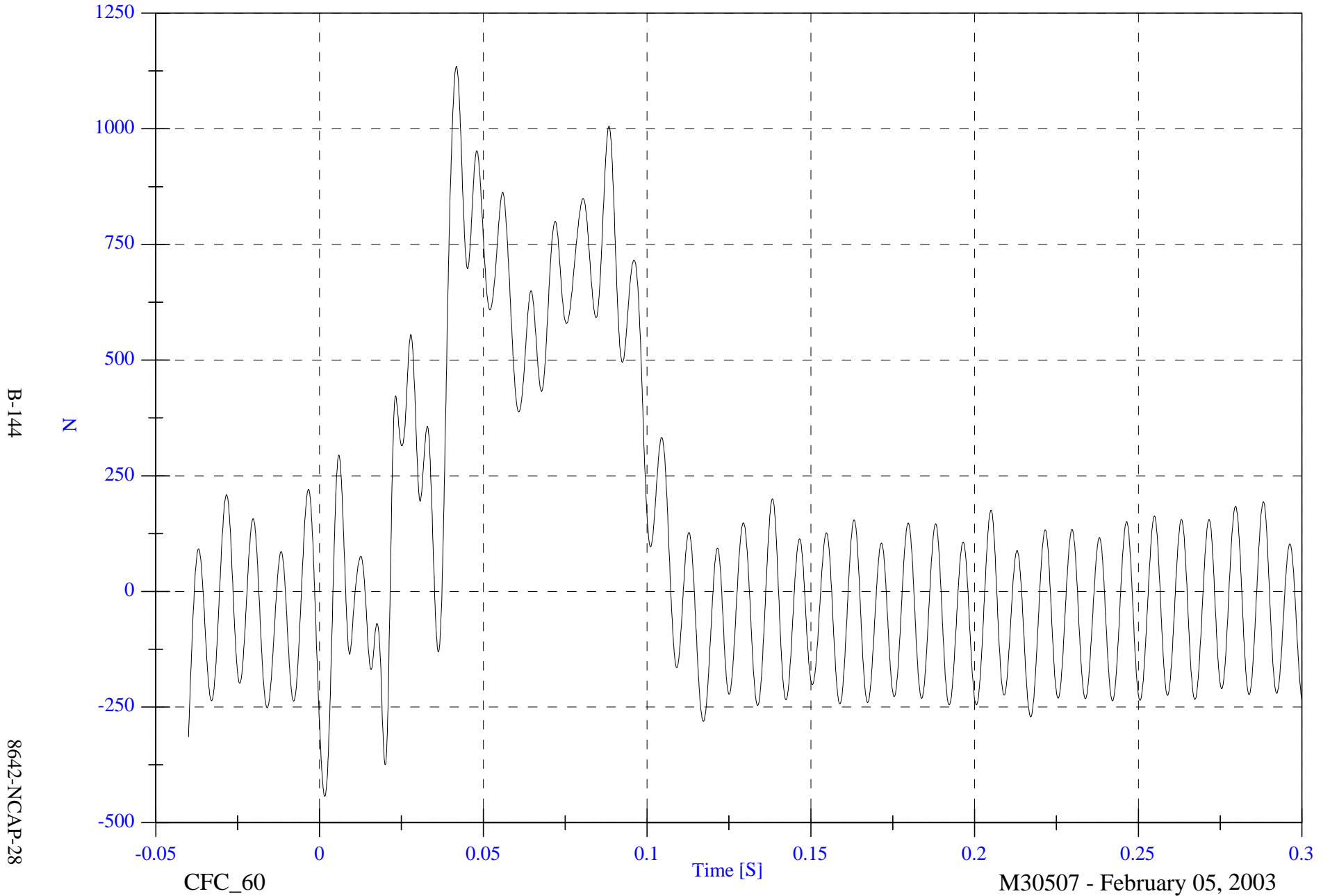
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A2 Fx

Max: 1134.9 [N] at 0.042 [S]

Min: -443.1 [N] at 0.002 [S]

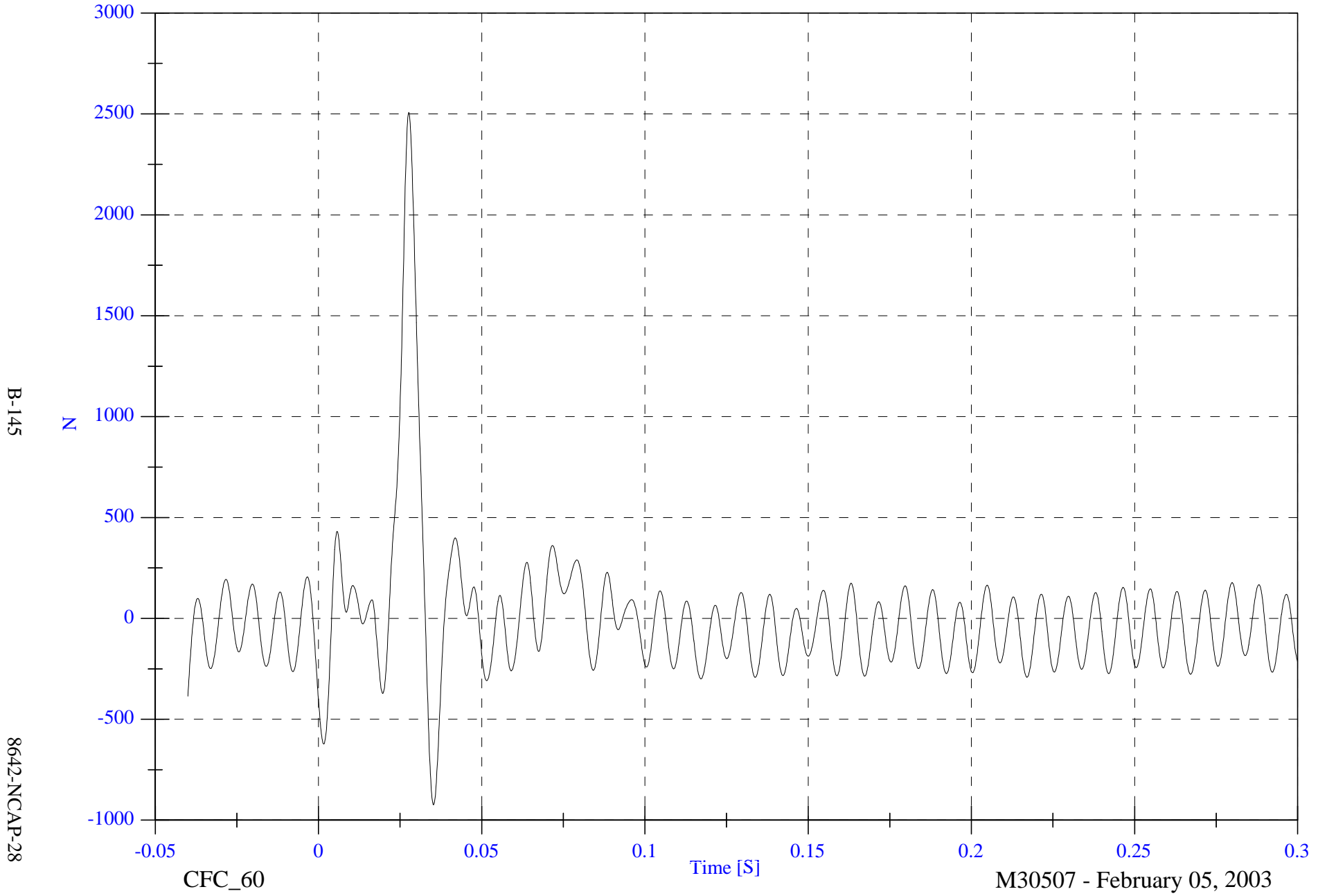


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A3 Fx

Max: 2507.7 [N] at 0.028 [S]

Min: -923.8 [N] at 0.035 [S]

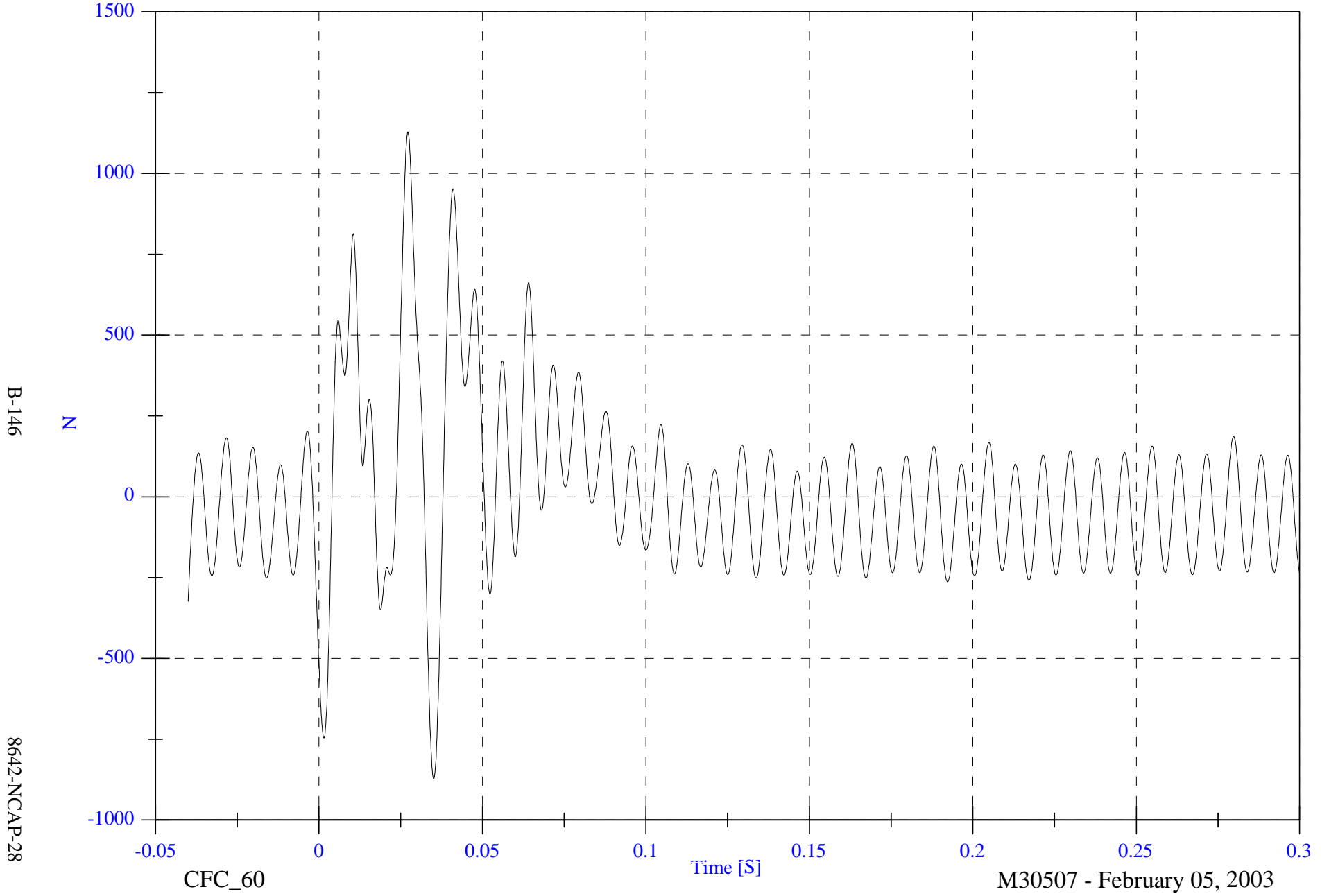


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A4 Fx

Max: 1128.3 [N] at 0.027 [S]

Min: -872.9 [N] at 0.035 [S]

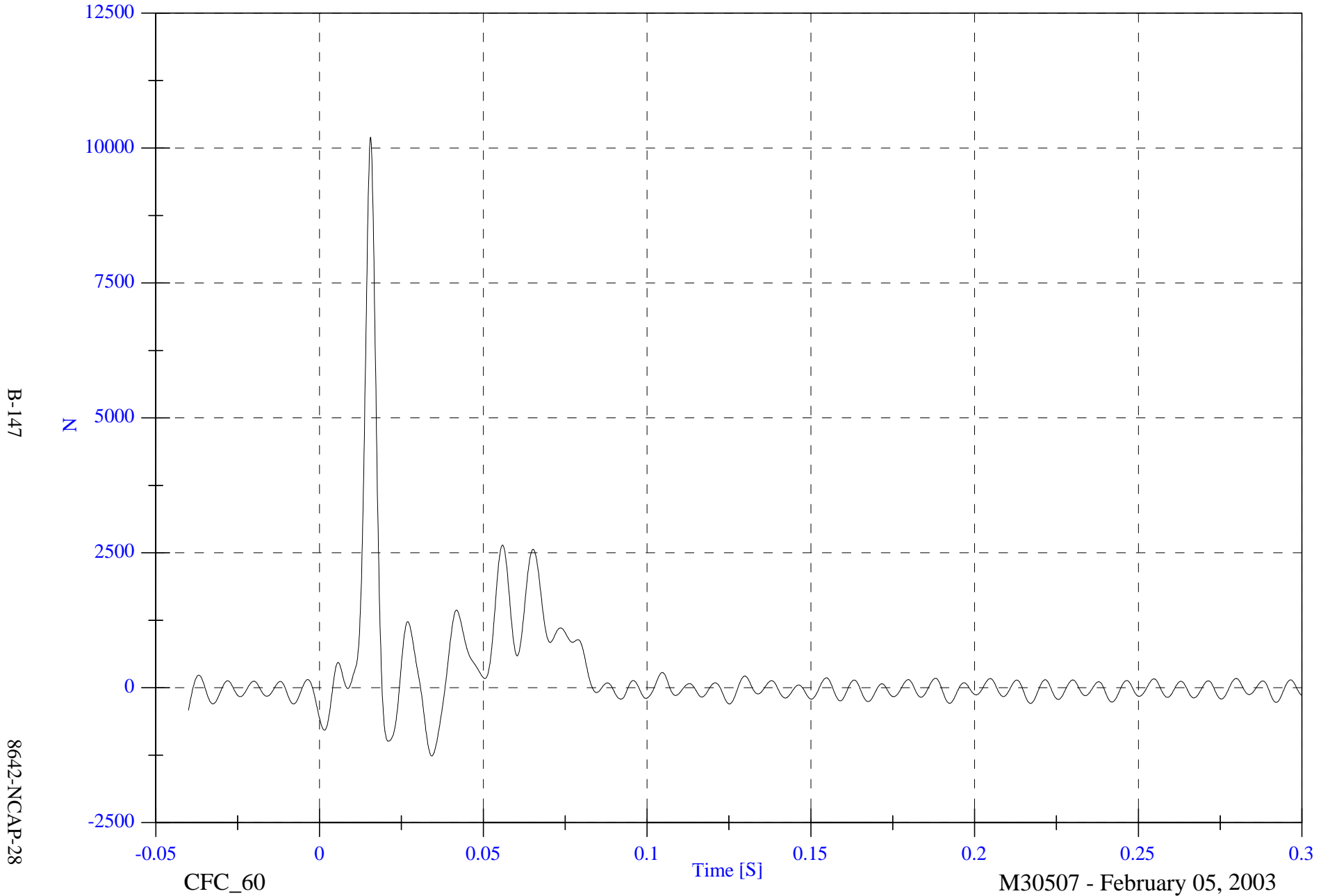


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A5 Fx

Max: 10203.2 [N] at 0.016 [S]

Min: -1263.6 [N] at 0.034 [S]

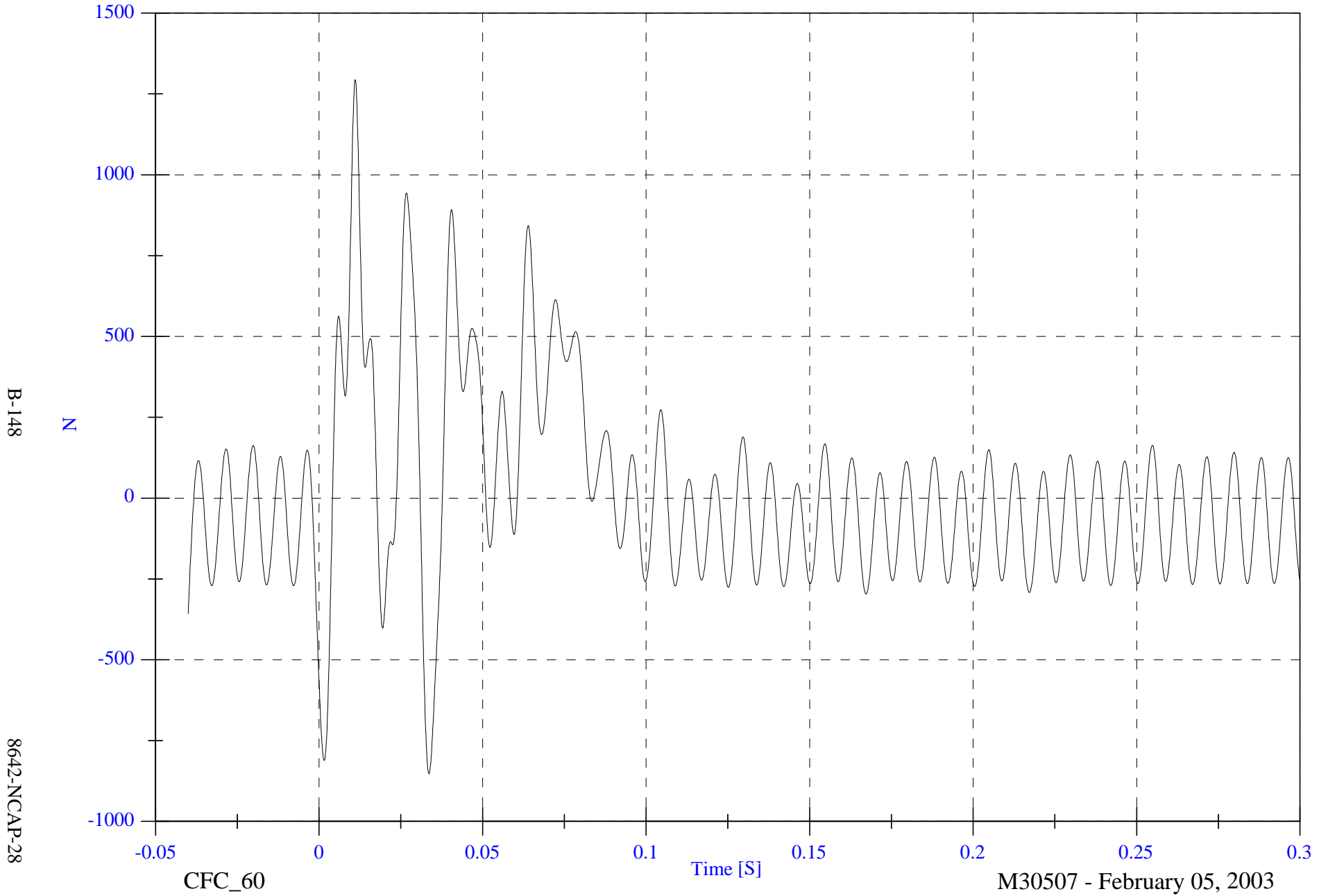


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A6 Fx

Max: 1293.9 [N] at 0.011 [S]

Min: -853.1 [N] at 0.034 [S]

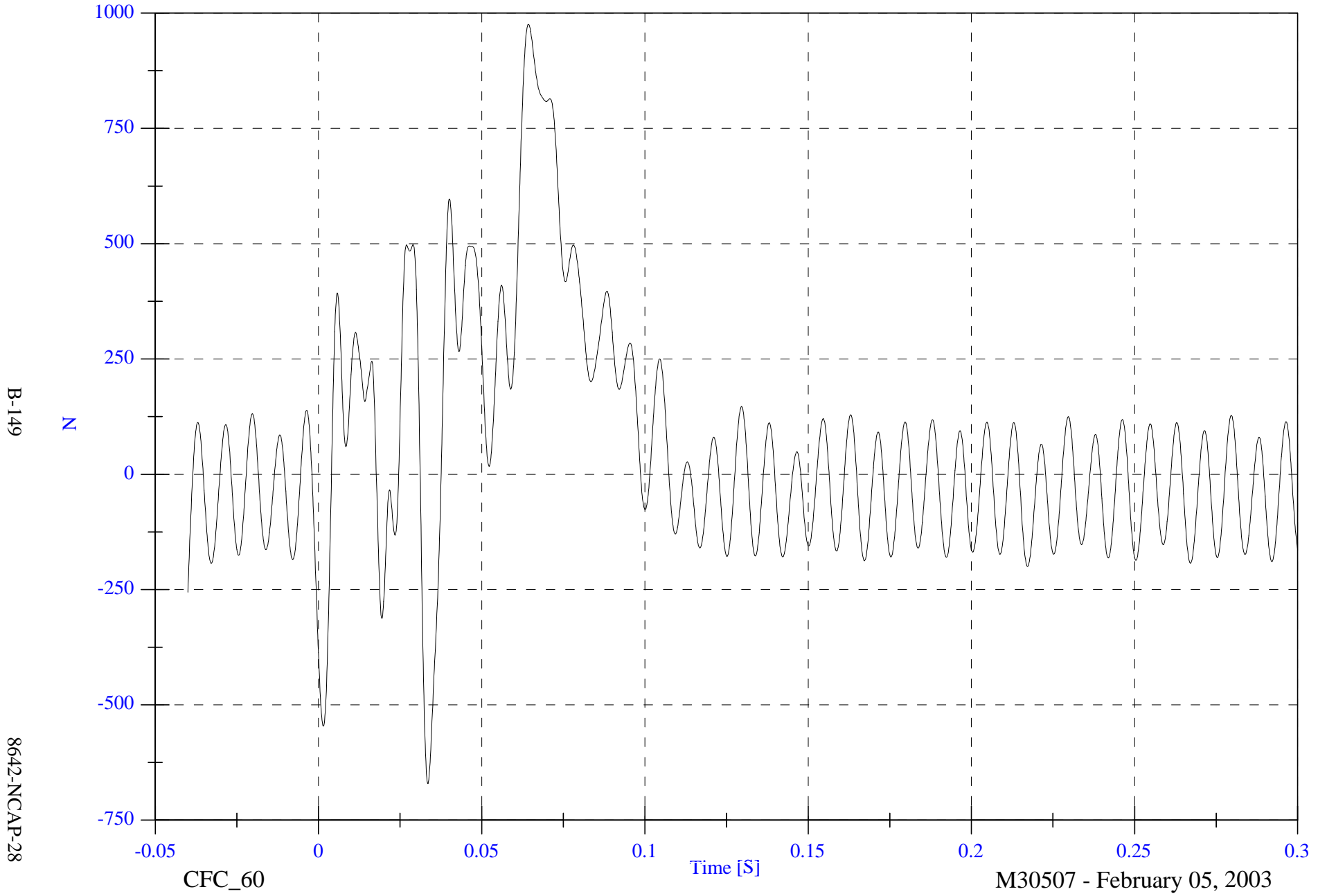


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A7 Fx

Max: 975.6 [N] at 0.064 [S]

Min: -670.9 [N] at 0.033 [S]

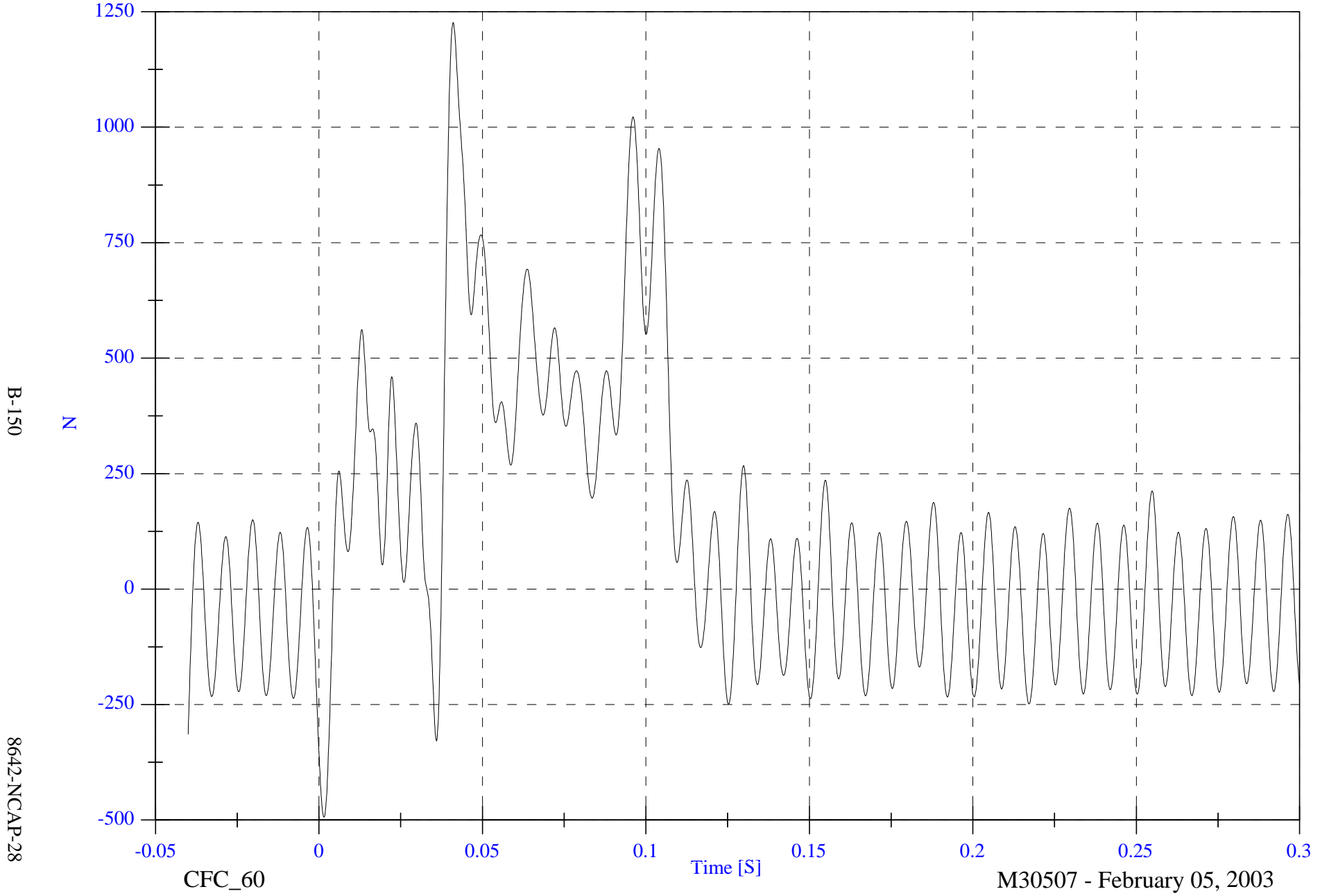


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell A8 Fx

Max: 1226.2 [N] at 0.041 [S]

Min: -493.6 [N] at 0.001 [S]

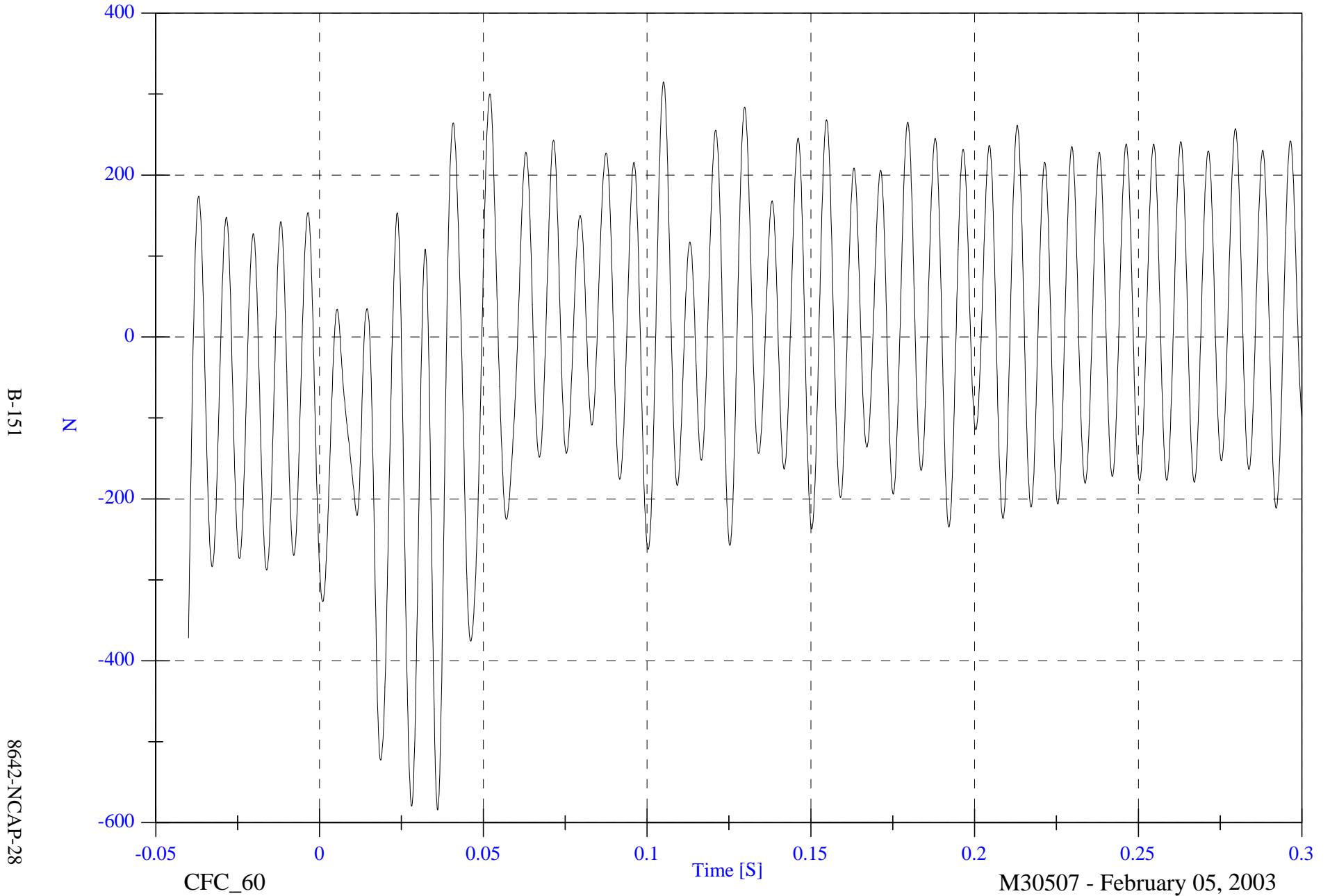


NCAP Test #6 - 2003 Subaru Forester

Max: 315.0 [N] at 0.105 [S]

Barrier Load Cell A9 Fx

Min: -584.4 [N] at 0.036 [S]



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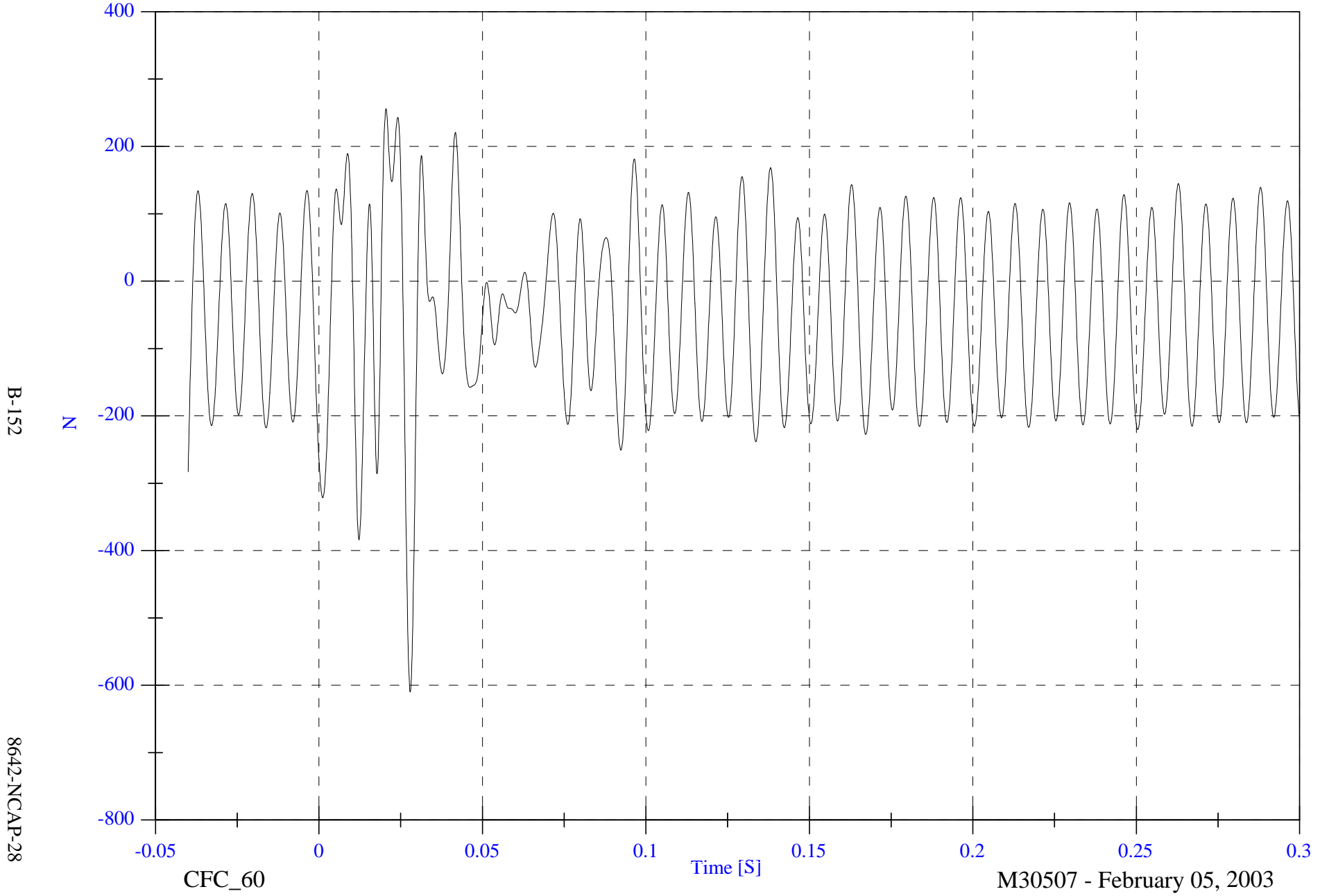
8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

Max: 256.0 [N] at 0.020 [S]

Barrier Load Cell B1 Fx

Min: -610.2 [N] at 0.028 [S]

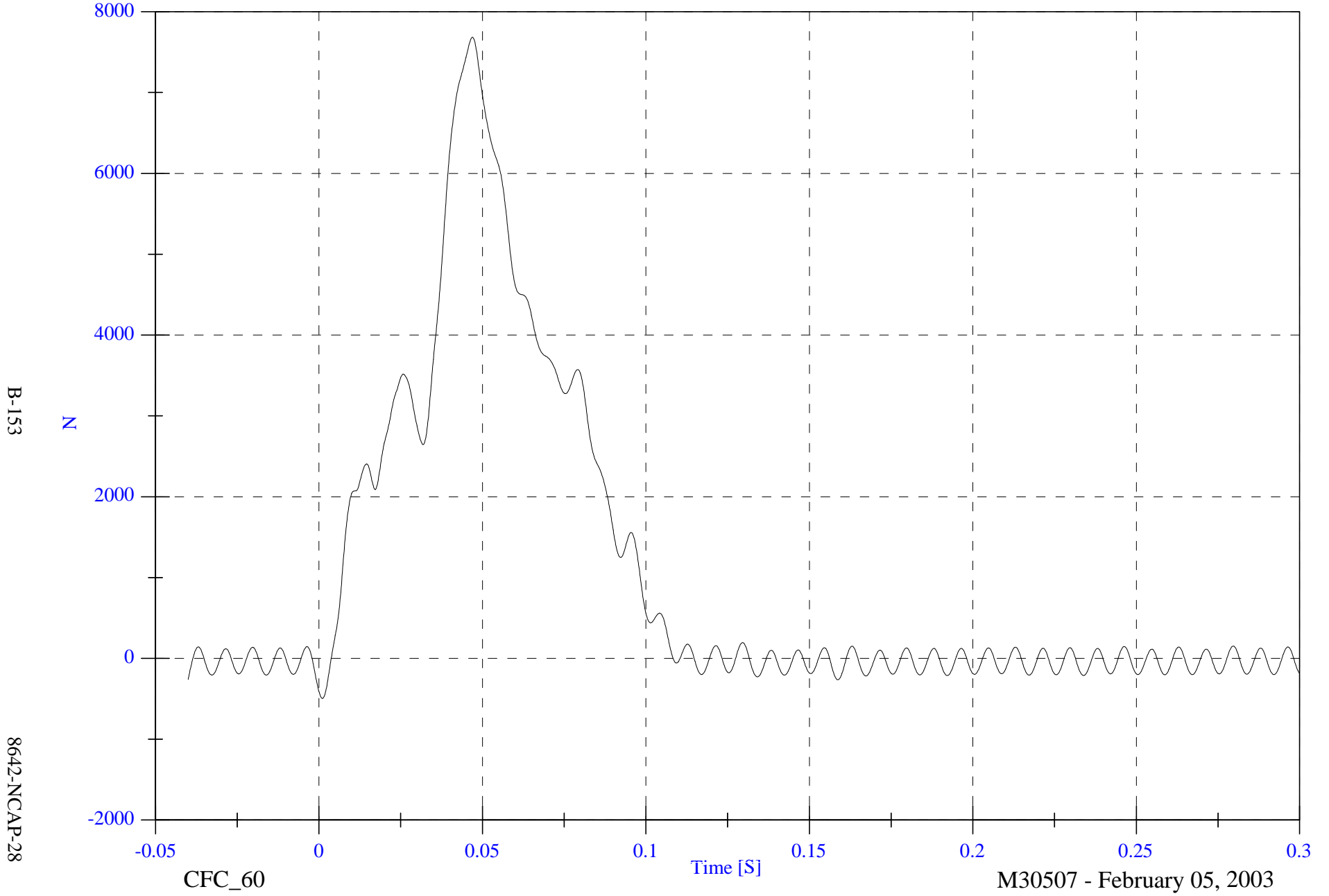


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell B2 Fx

Max: 7683.5 [N] at 0.047 [S]

Min: -495.9 [N] at 0.001 [S]



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8642-NCAP-28

CFC\_60

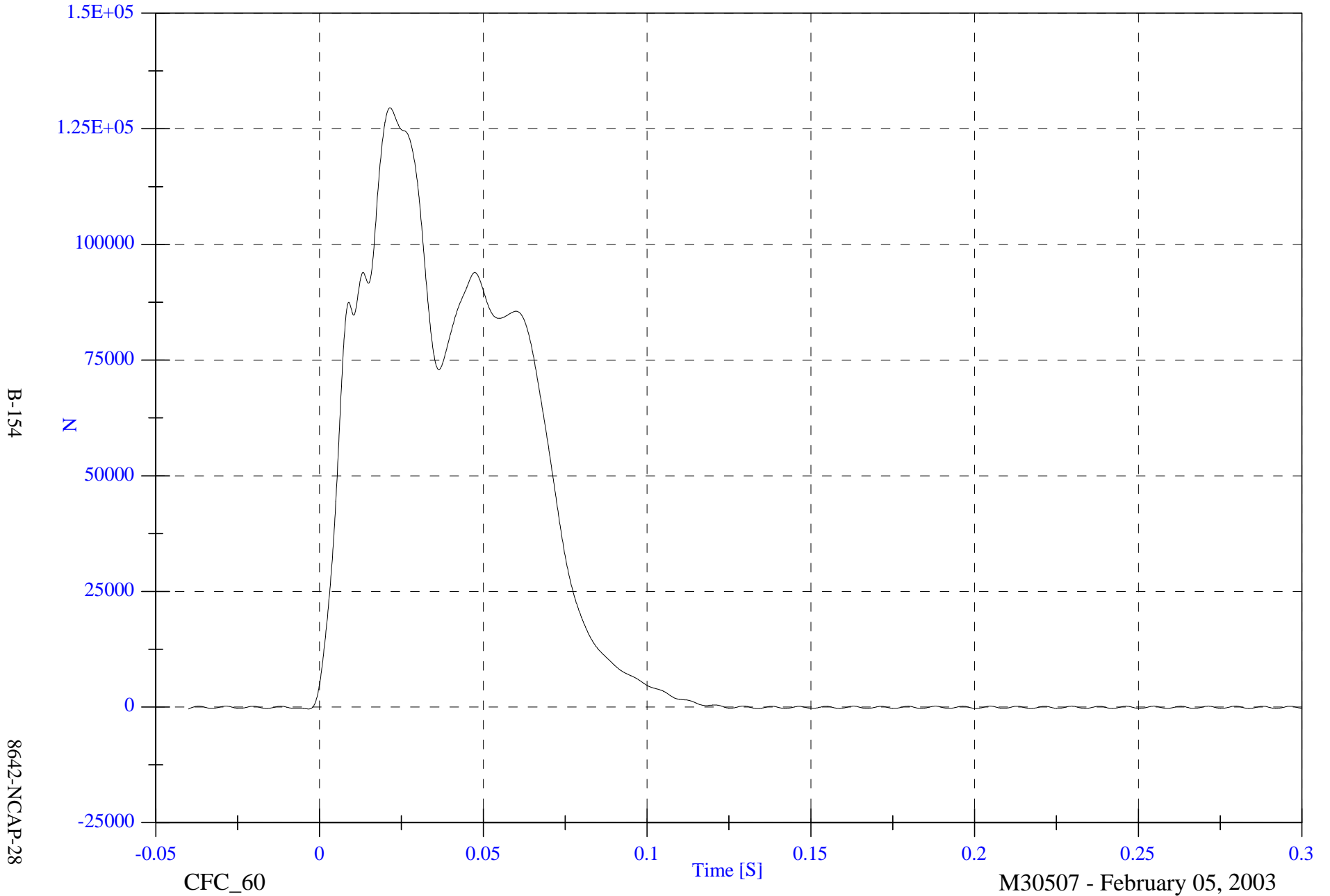
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 129523.4 [N] at 0.021 [S]

Barrier Load Cell B3 Fx

Min: -419.6 [N] at -0.040 [S]



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8642-NCAP-28

CFC\_60

Time [S]

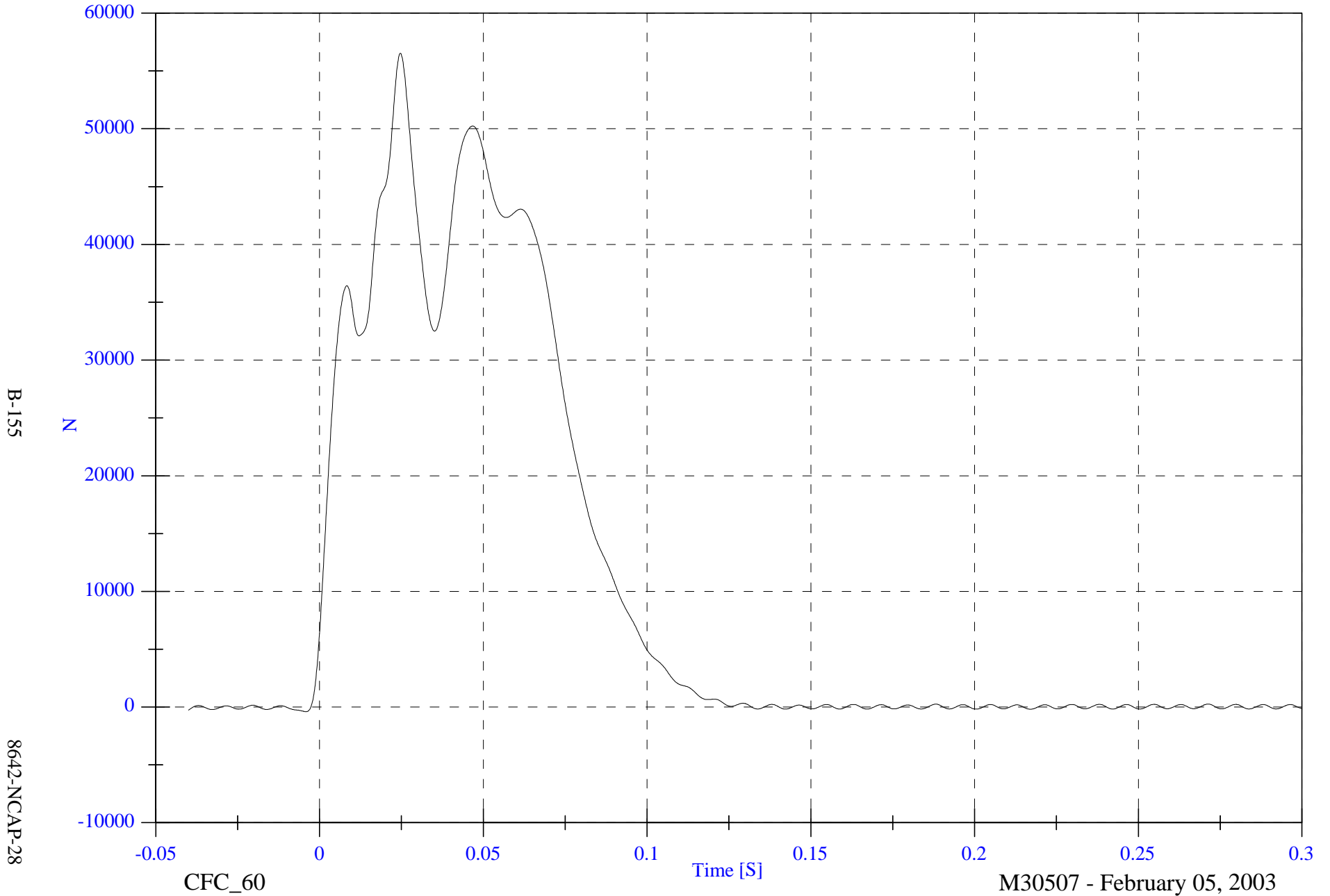
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell B4 Fx

Max: 56525.9 [N] at 0.025 [S]

Min: -397.8 [N] at -0.004 [S]



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8642-NCAP-28

CFC\_60

Time [S]

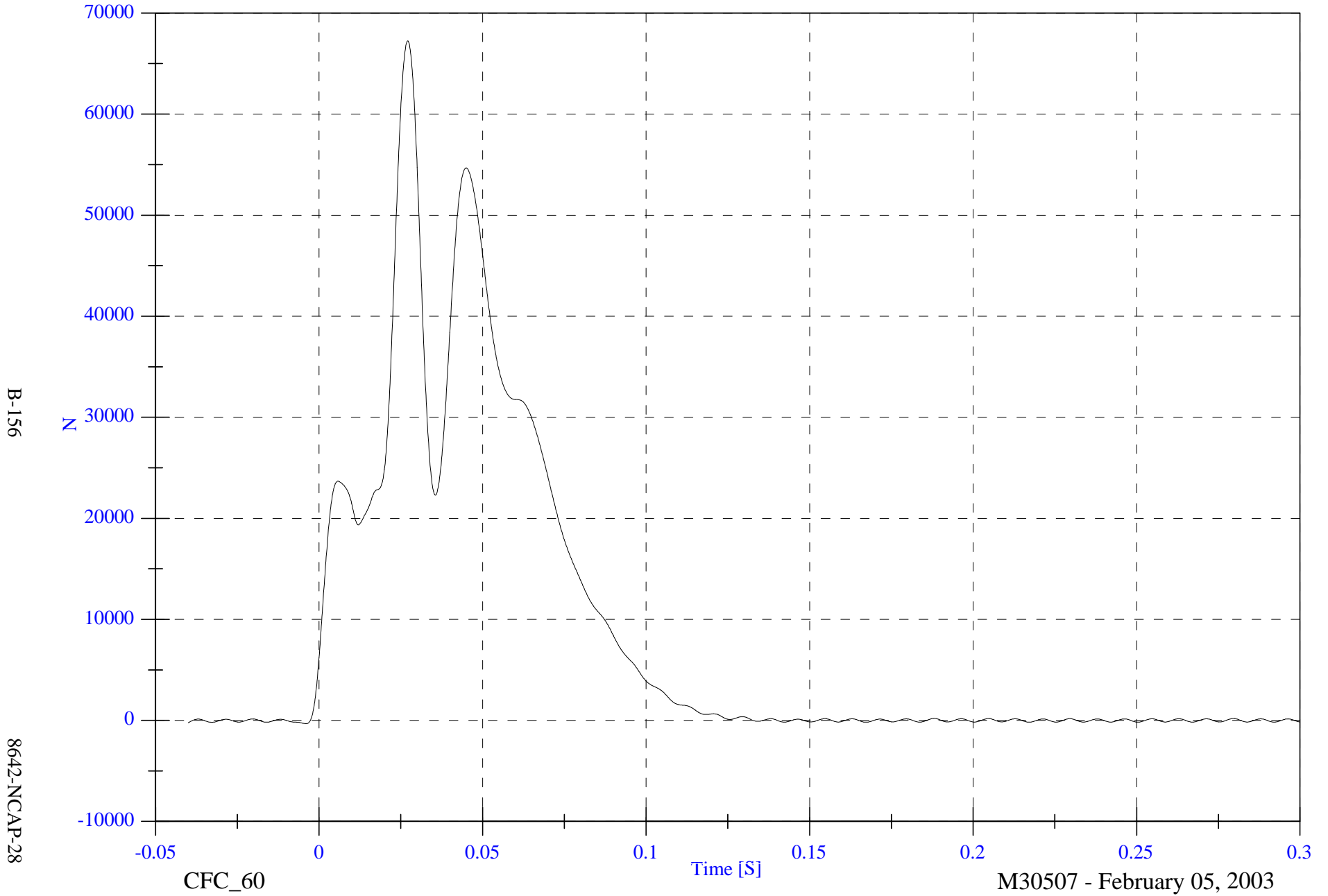
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell B5 Fx

Max: 67251.4 [N] at 0.027 [S]

Min: -333.2 [N] at -0.004 [S]

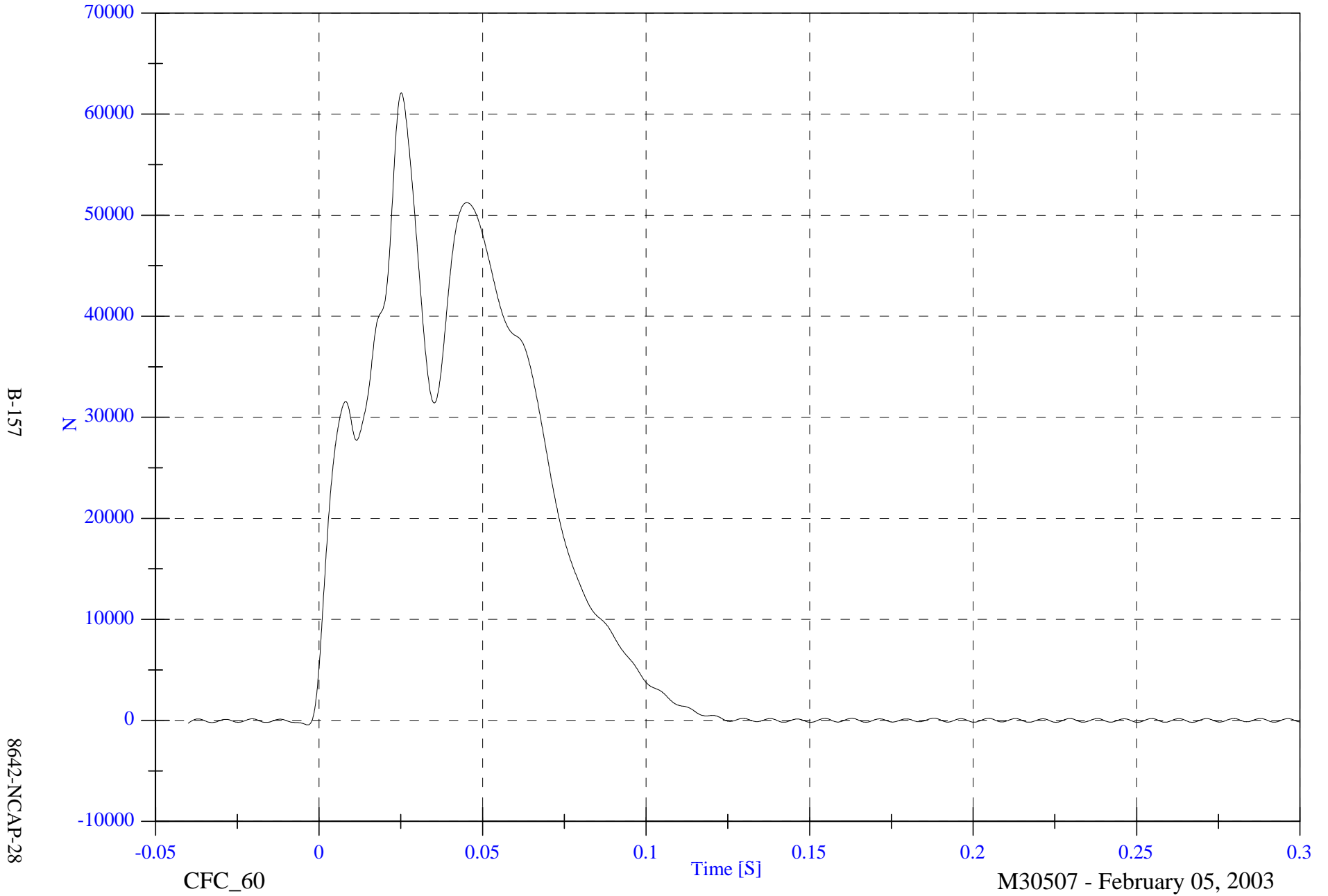


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell B6 Fx

Max: 62101.7 [N] at 0.025 [S]

Min: -444.3 [N] at -0.003 [S]

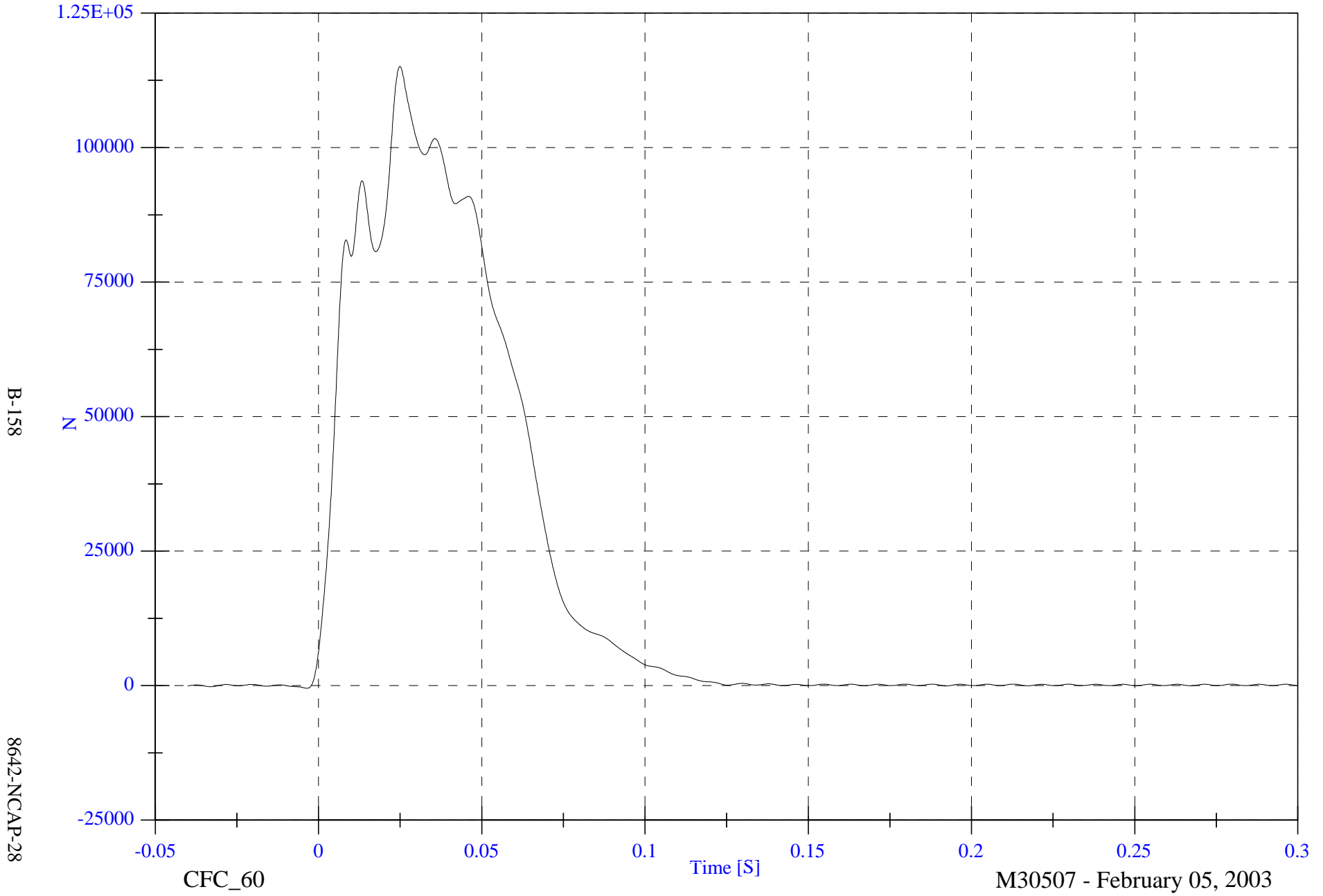


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell B7 Fx

Max: 115072.7 [N] at 0.025 [S]

Min: -494.5 [N] at -0.004 [S]



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8642-NCAP-28

CFC\_60

Time [S]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell B8 Fx

Max: 7062.8 [N] at 0.048 [S]

Min: -771.4 [N] at 0.134 [S]



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8642-NCAP-28

CFC\_60

Time [S]

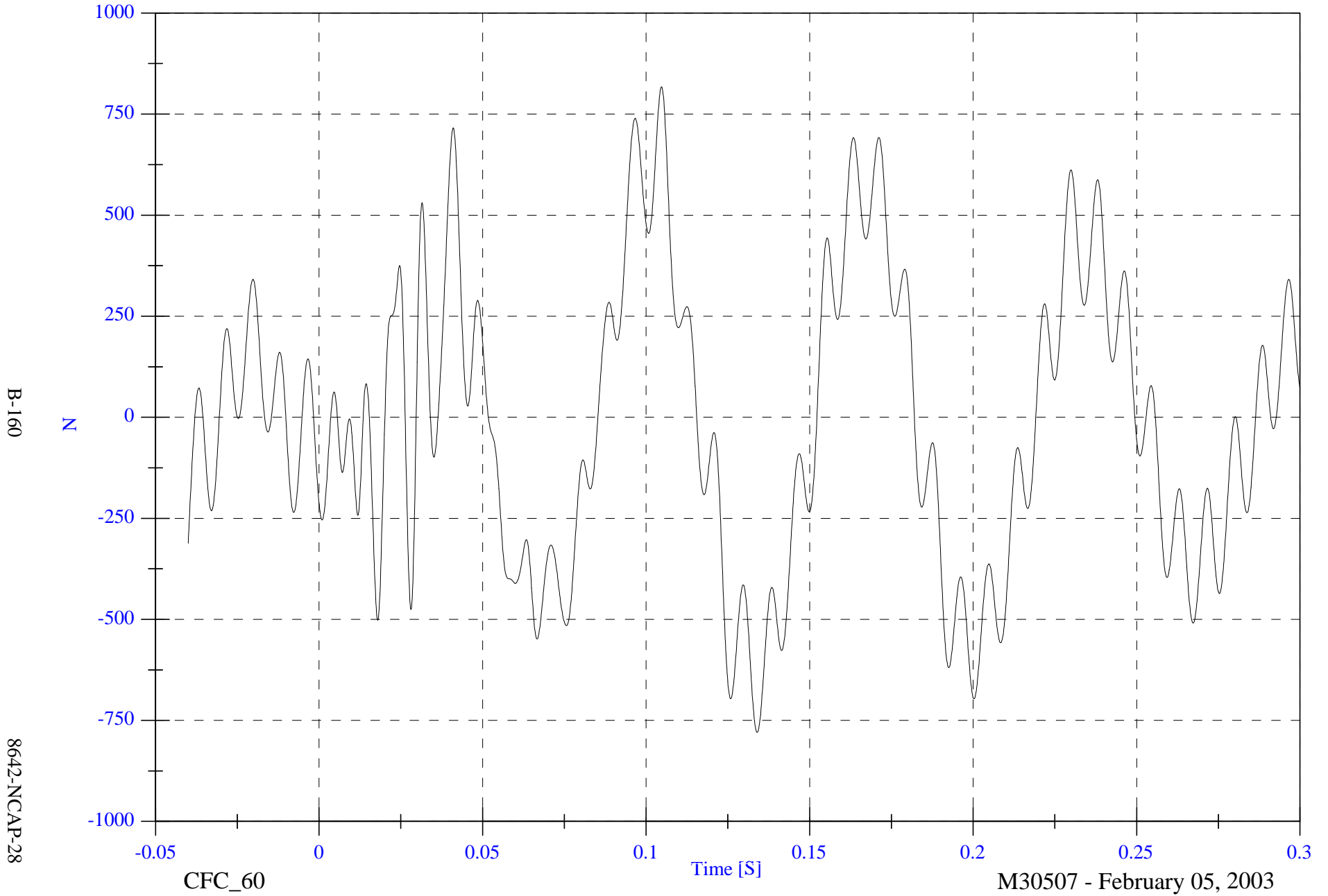
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 817.6 [N] at 0.105 [S]

Min: -779.7 [N] at 0.134 [S]

Barrier Load Cell B9 Fx

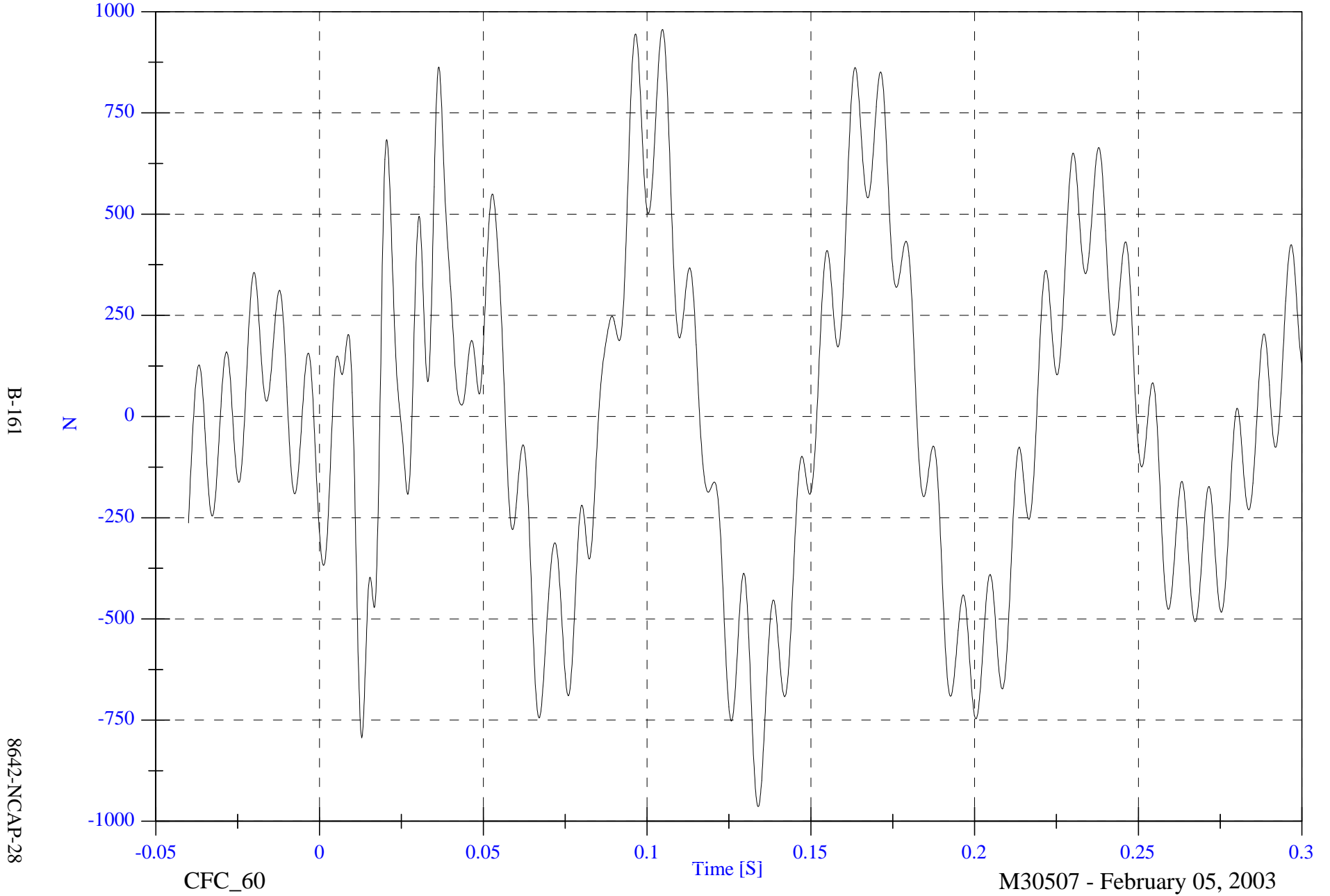


NCAP Test #6 - 2003 Subaru Forester

Max: 956.2 [N] at 0.105 [S]

Min: -963.9 [N] at 0.134 [S]

Barrier Load Cell C1 Fx



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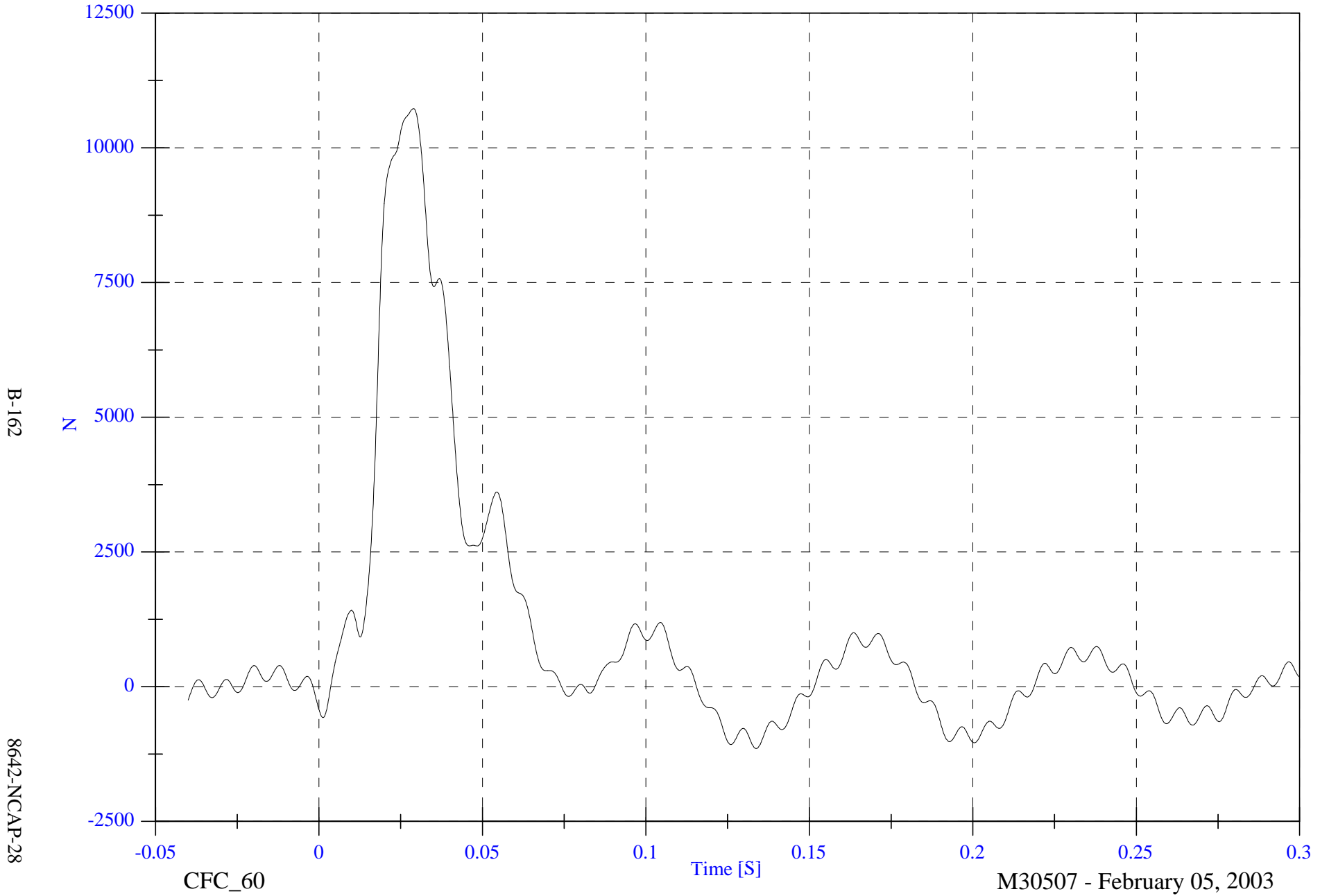
8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell C2 Fx

Max: 10726.5 [N] at 0.029 [S]

Min: -1147.3 [N] at 0.134 [S]

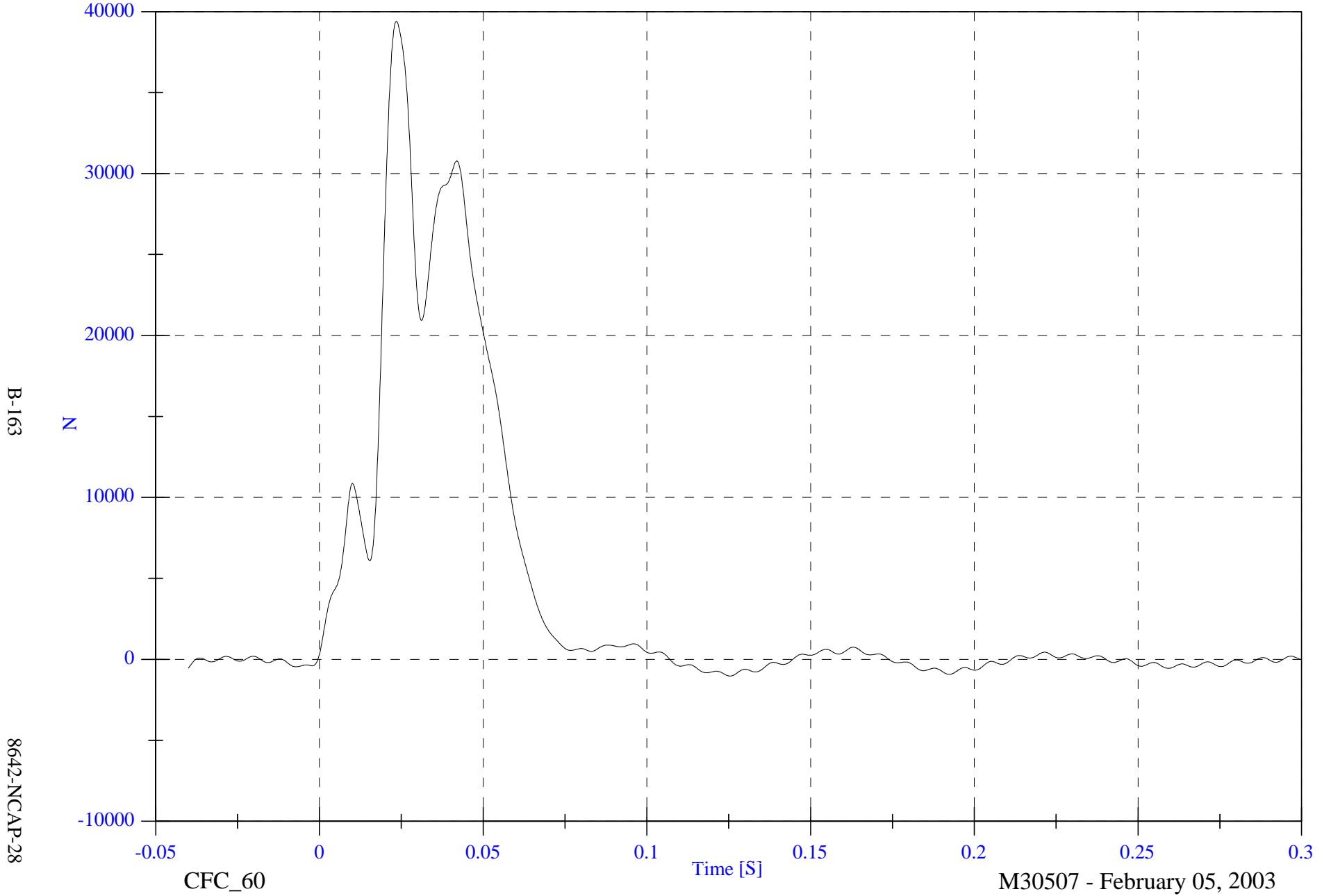


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell C3 Fx

Max: 39405.8 [N] at 0.023 [S]

Min: -1026.3 [N] at 0.125 [S]



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8642-NCAP-28

CFC\_60

Time [S]

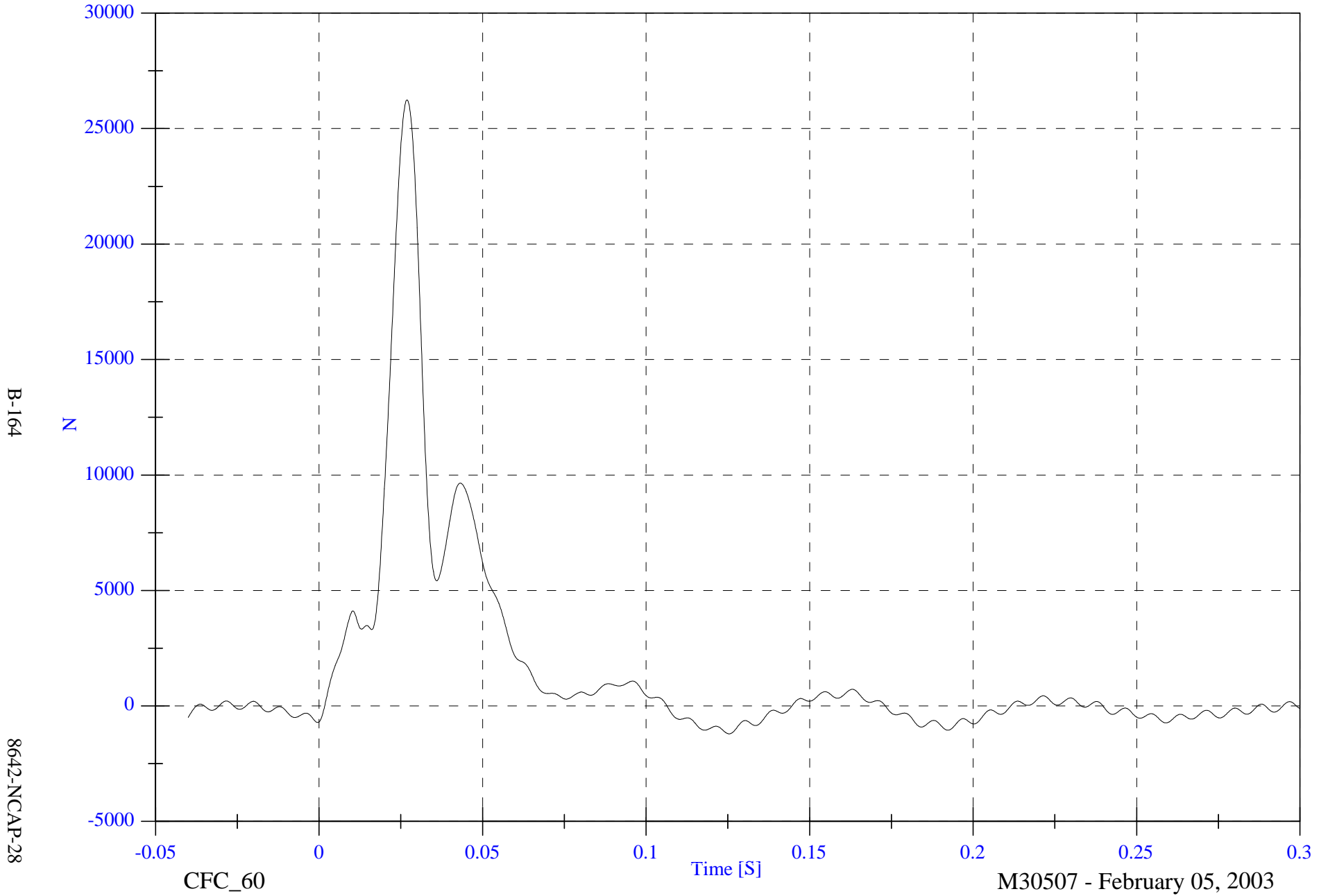
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell C4 Fx

Max: 26241.4 [N] at 0.027 [S]

Min: -1205.3 [N] at 0.125 [S]

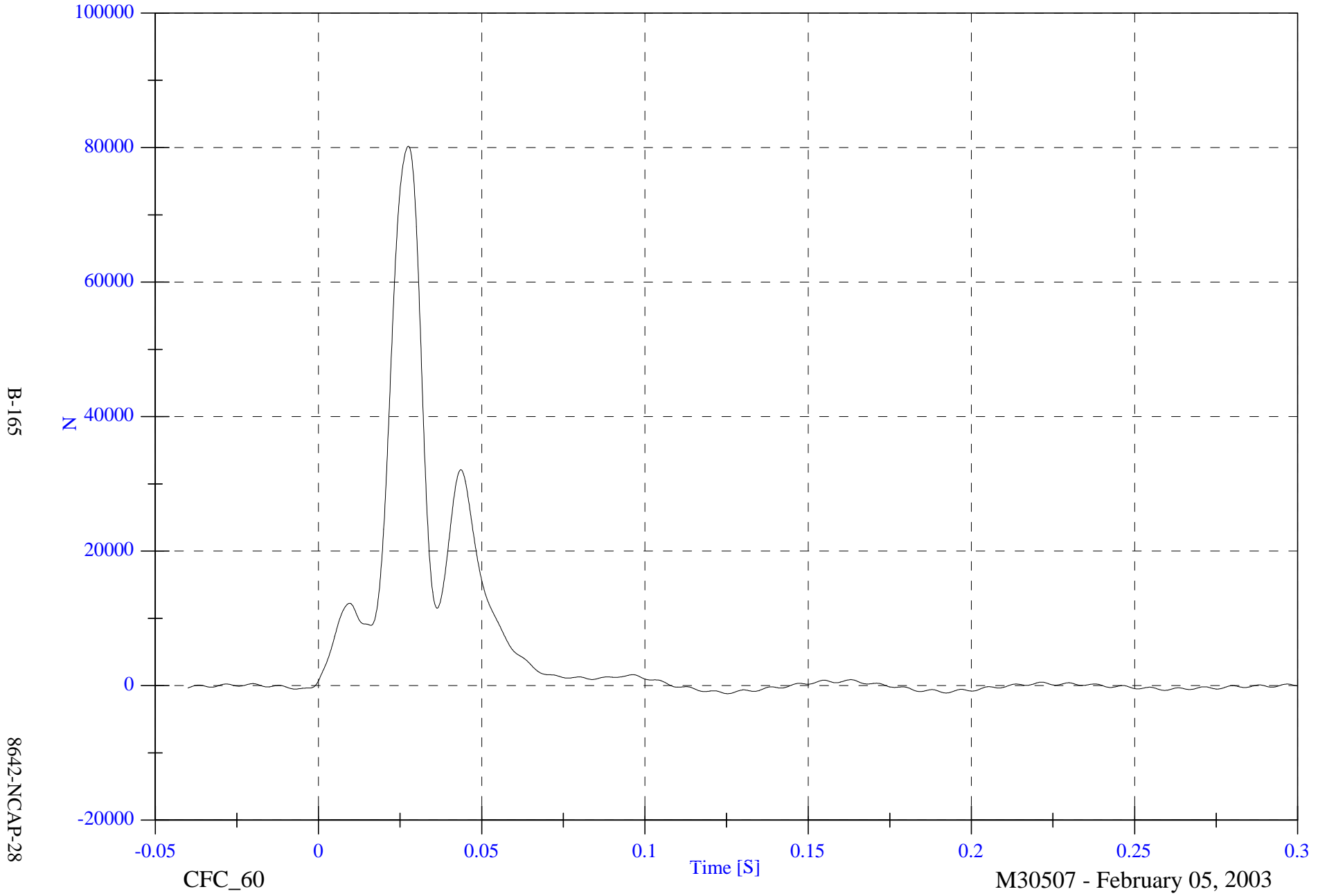


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell C5 Fx

Max: 80204.7 [N] at 0.028 [S]

Min: -1204.1 [N] at 0.125 [S]



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8642-NCAP-28

CFC\_60

Time [S]

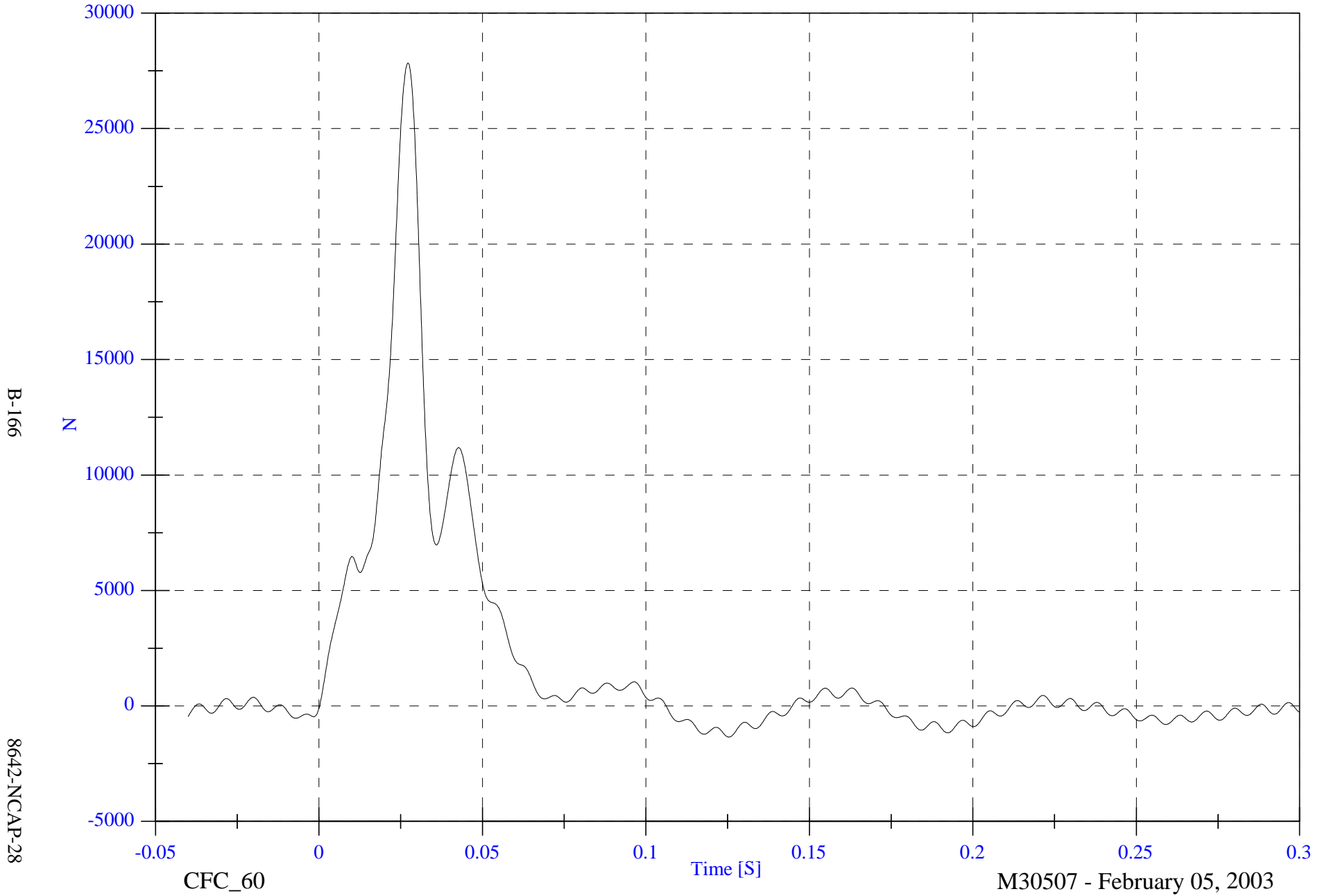
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell C6 Fx

Max: 27836.4 [N] at 0.027 [S]

Min: -1348.6 [N] at 0.125 [S]



B-166

8642-NCAP-28

CFC\_60

Time [S]

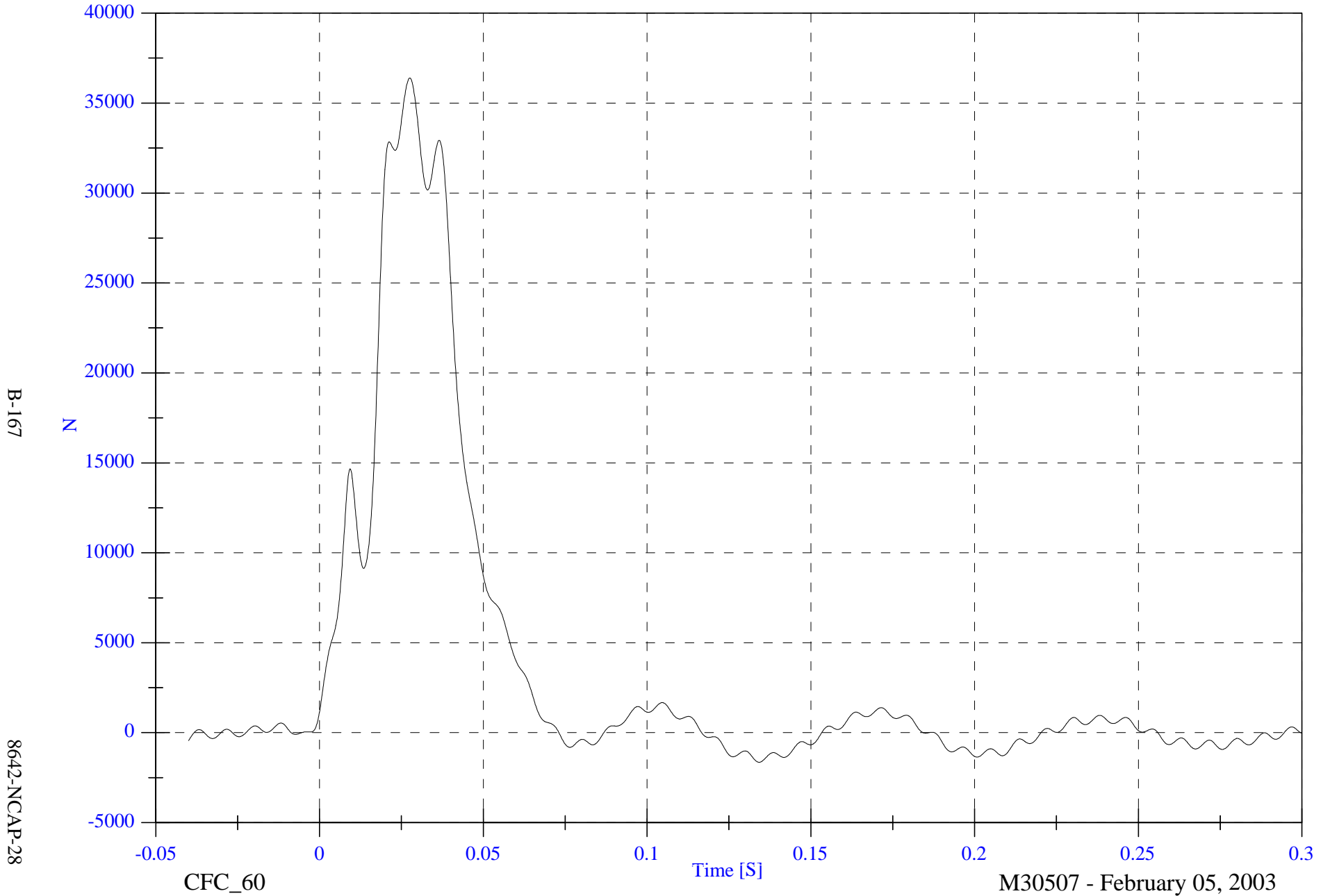
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell C7 Fx

Max: 36395.2 [N] at 0.028 [S]

Min: -1640.5 [N] at 0.134 [S]



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8642-NCAP-28

CFC\_60

Time [S]

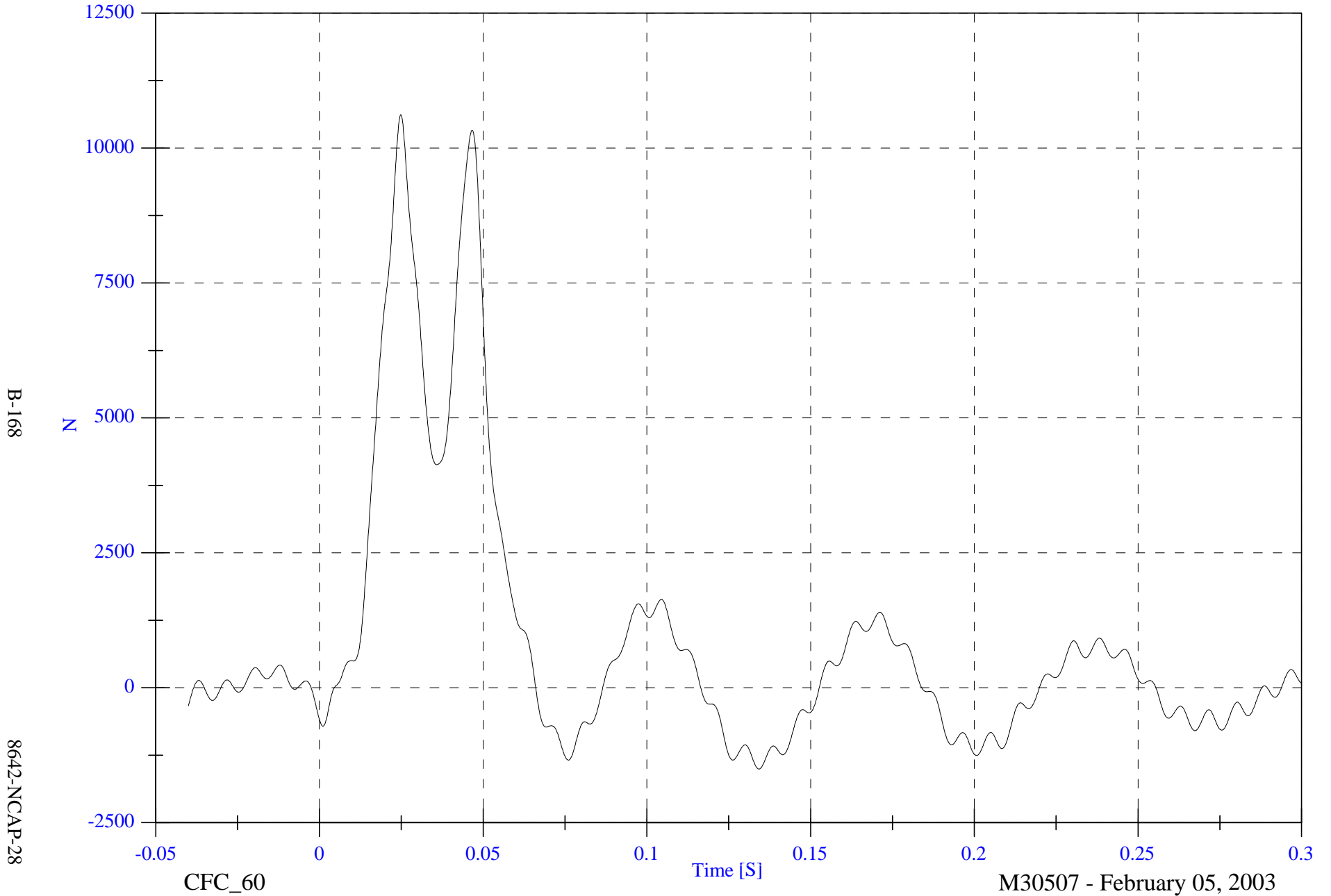
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 10617.9 [N] at 0.025 [S]

Barrier Load Cell C8 Fx

Min: -1505.9 [N] at 0.134 [S]



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8642-NCAP-28

CFC\_60

Time [S]

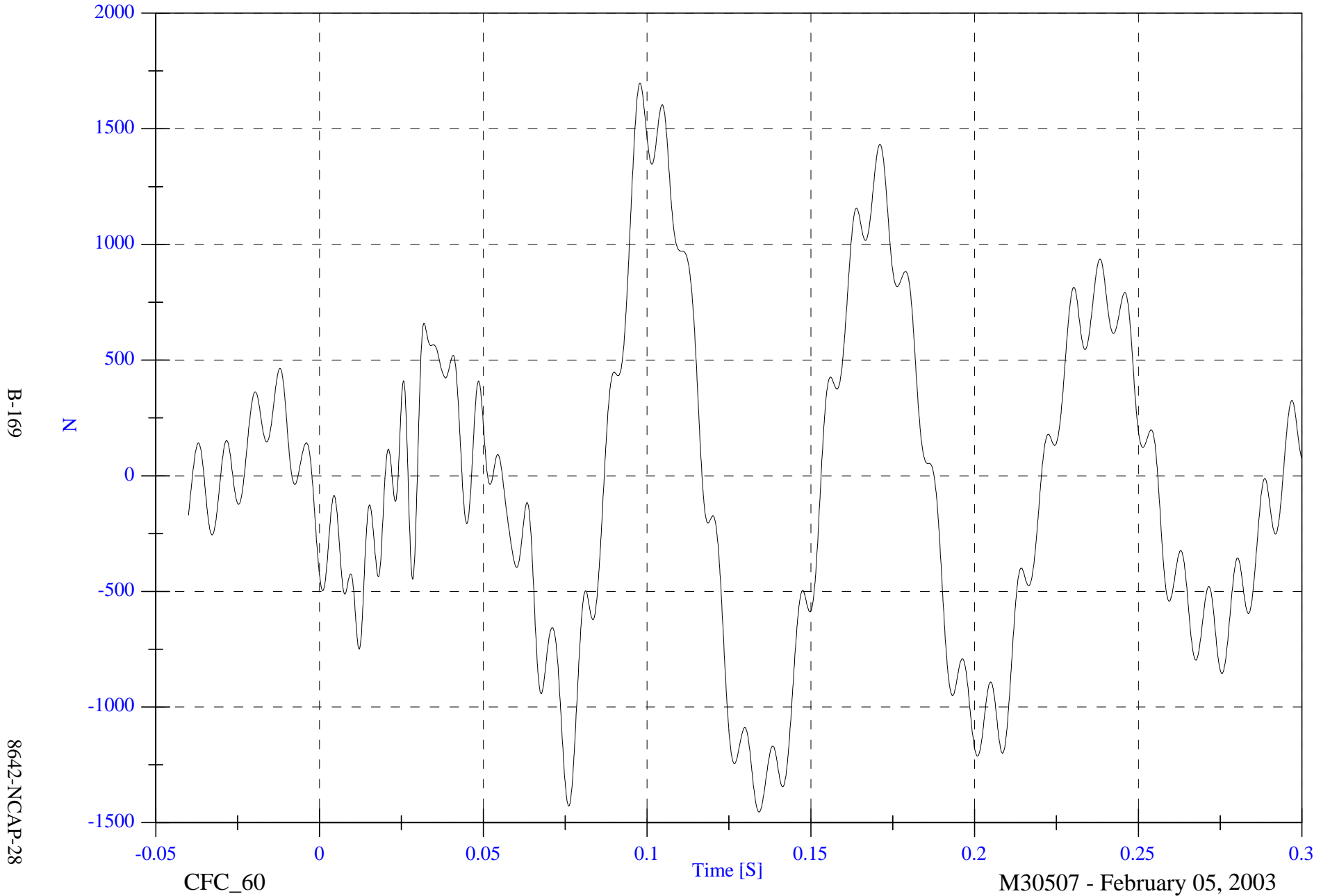
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 1696.6 [N] at 0.098 [S]

Barrier Load Cell C9 Fx

Min: -1454.0 [N] at 0.134 [S]

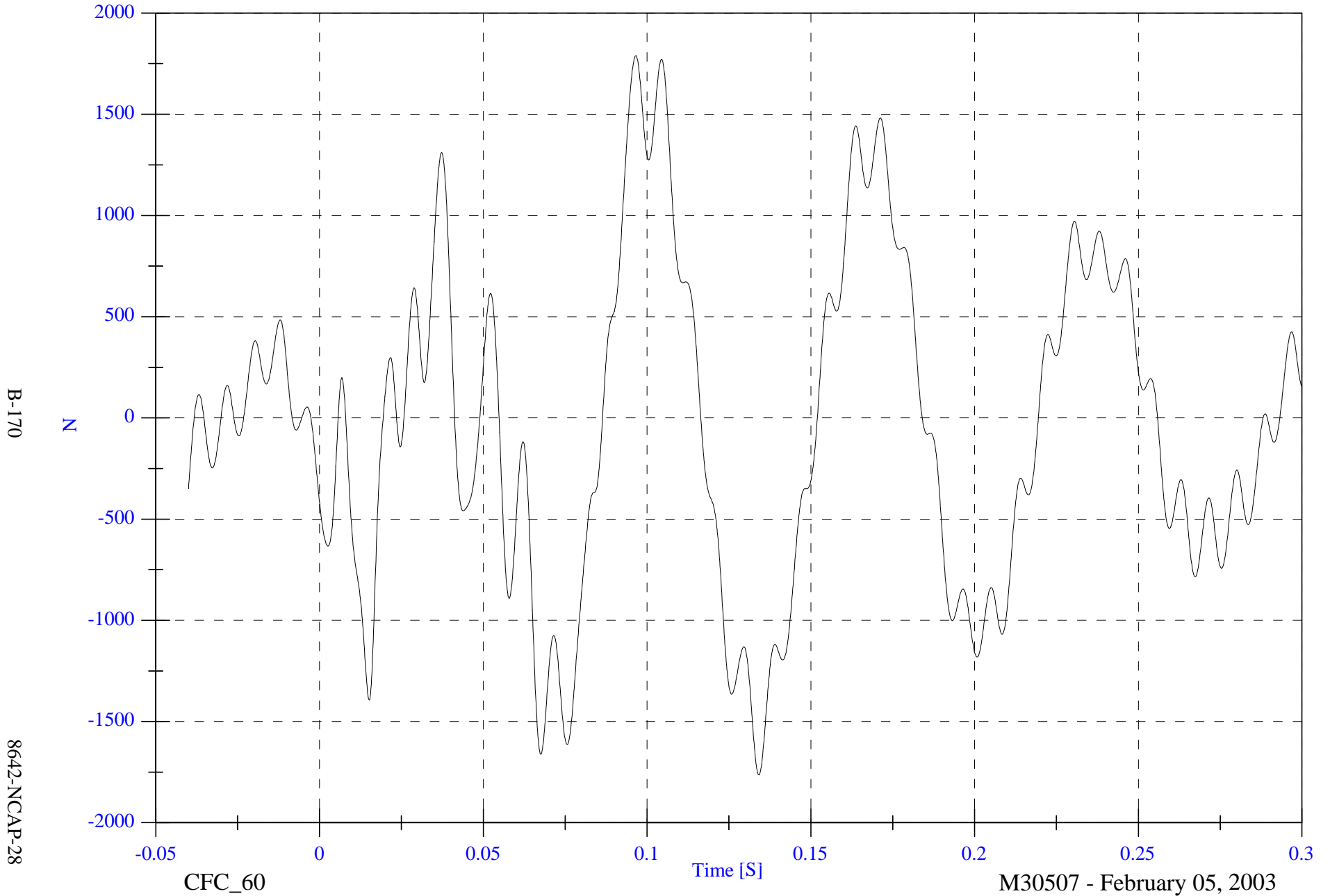


NCAP Test #6 - 2003 Subaru Forester

Max: 1790.0 [N] at 0.097 [S]

Min: -1764.3 [N] at 0.134 [S]

Barrier Load Cell D1 Fx

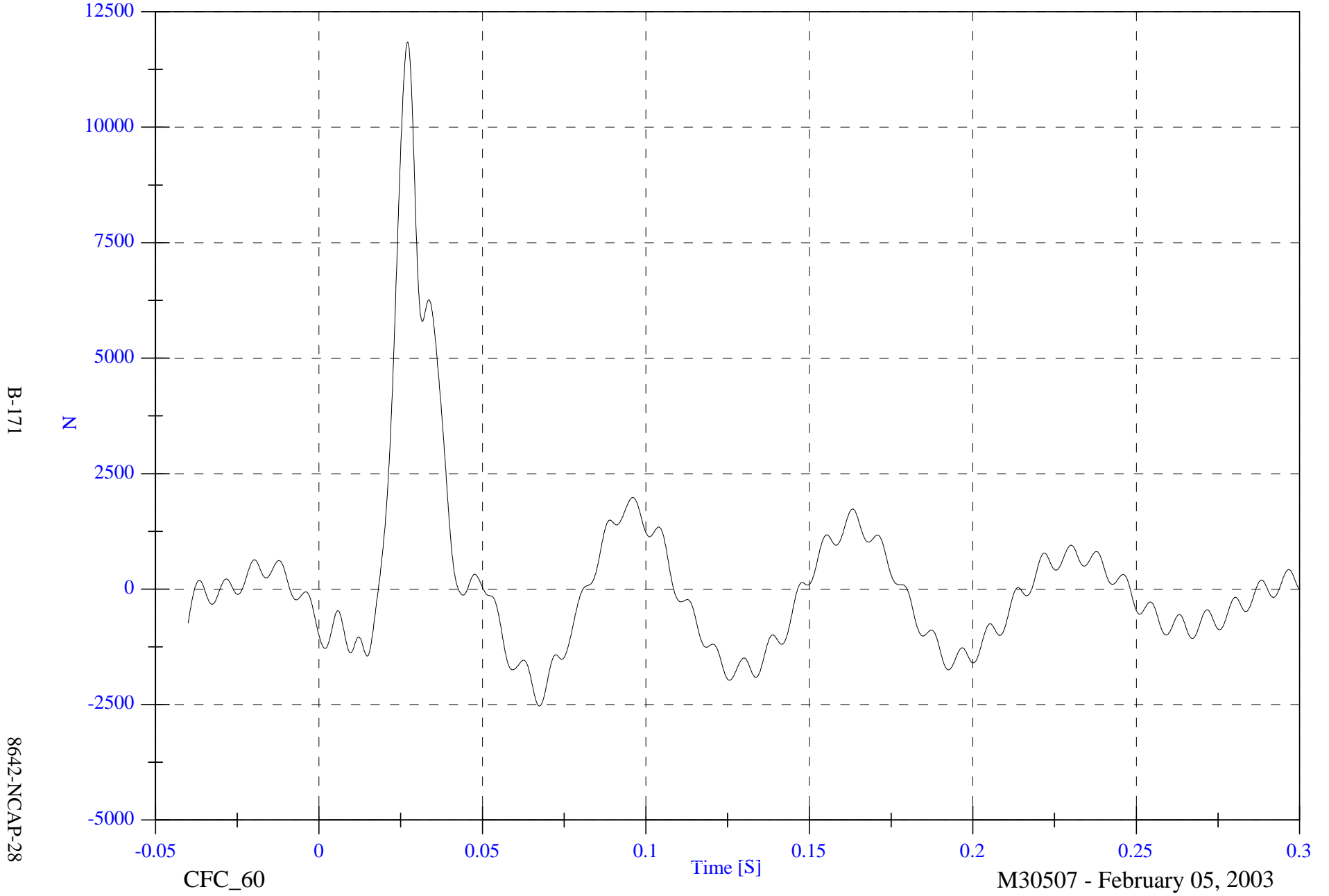


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D2 Fx

Max: 11842.3 [N] at 0.027 [S]

Min: -2532.2 [N] at 0.067 [S]



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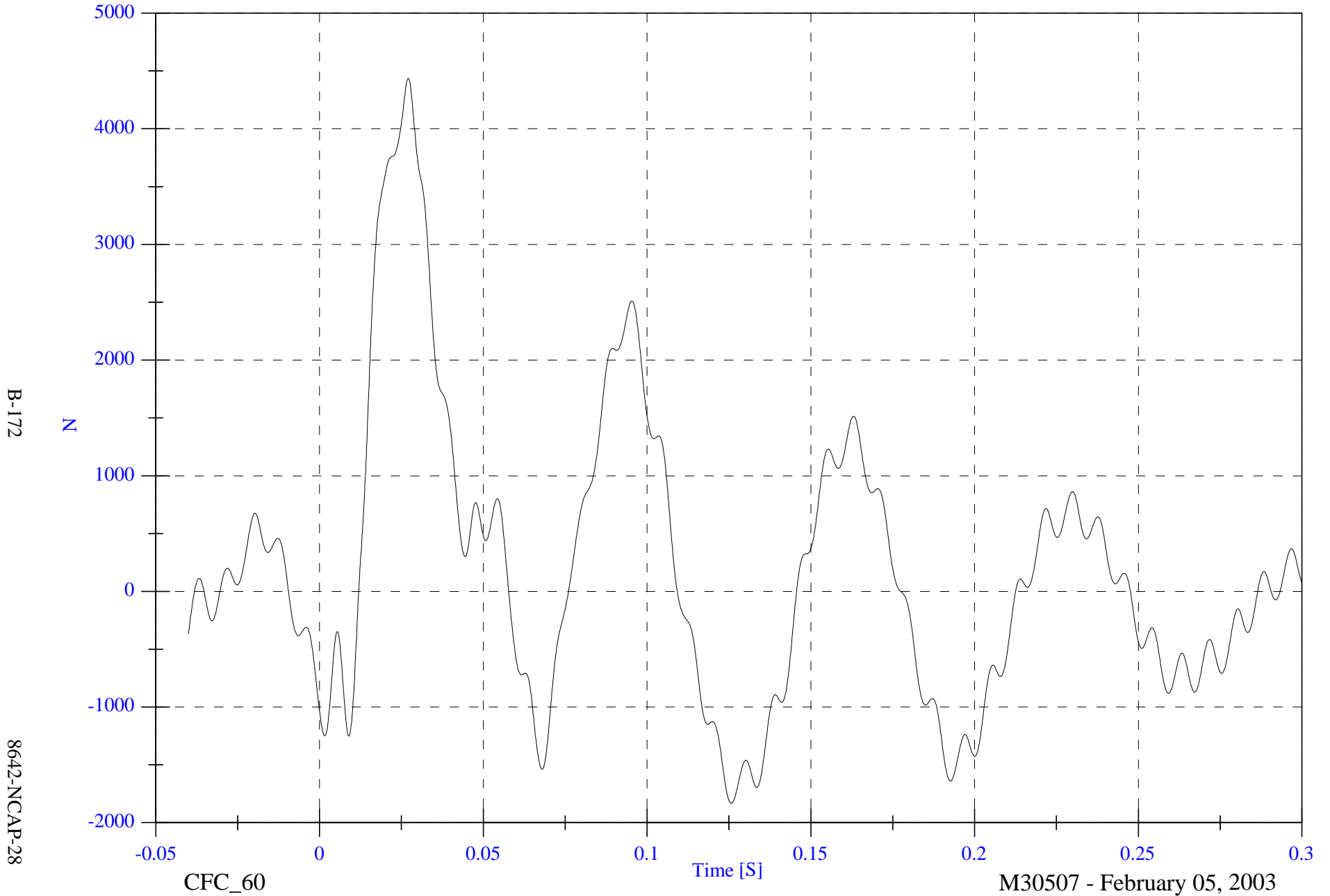
8642-NCAP-28

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D3 Fx

Max: 4435.6 [N] at 0.027 [S]

Min: -1832.1 [N] at 0.126 [S]



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8642-NCAP-28

CFC\_60

Time [S]

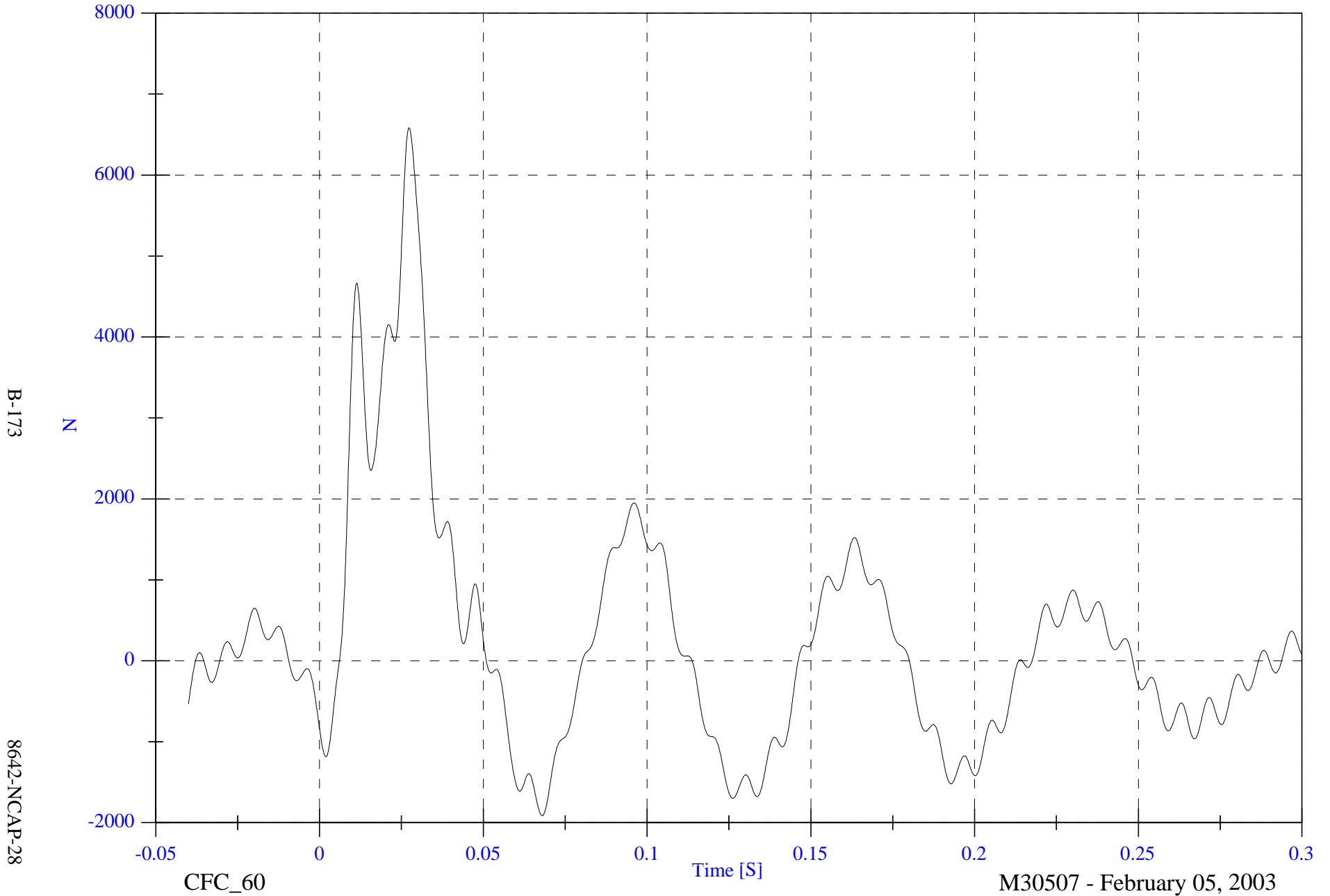
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D4 Fx

Max: 6583.3 [N] at 0.027 [S]

Min: -1912.6 [N] at 0.068 [S]



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8642-NCAP-28

CFC\_60

Time [S]

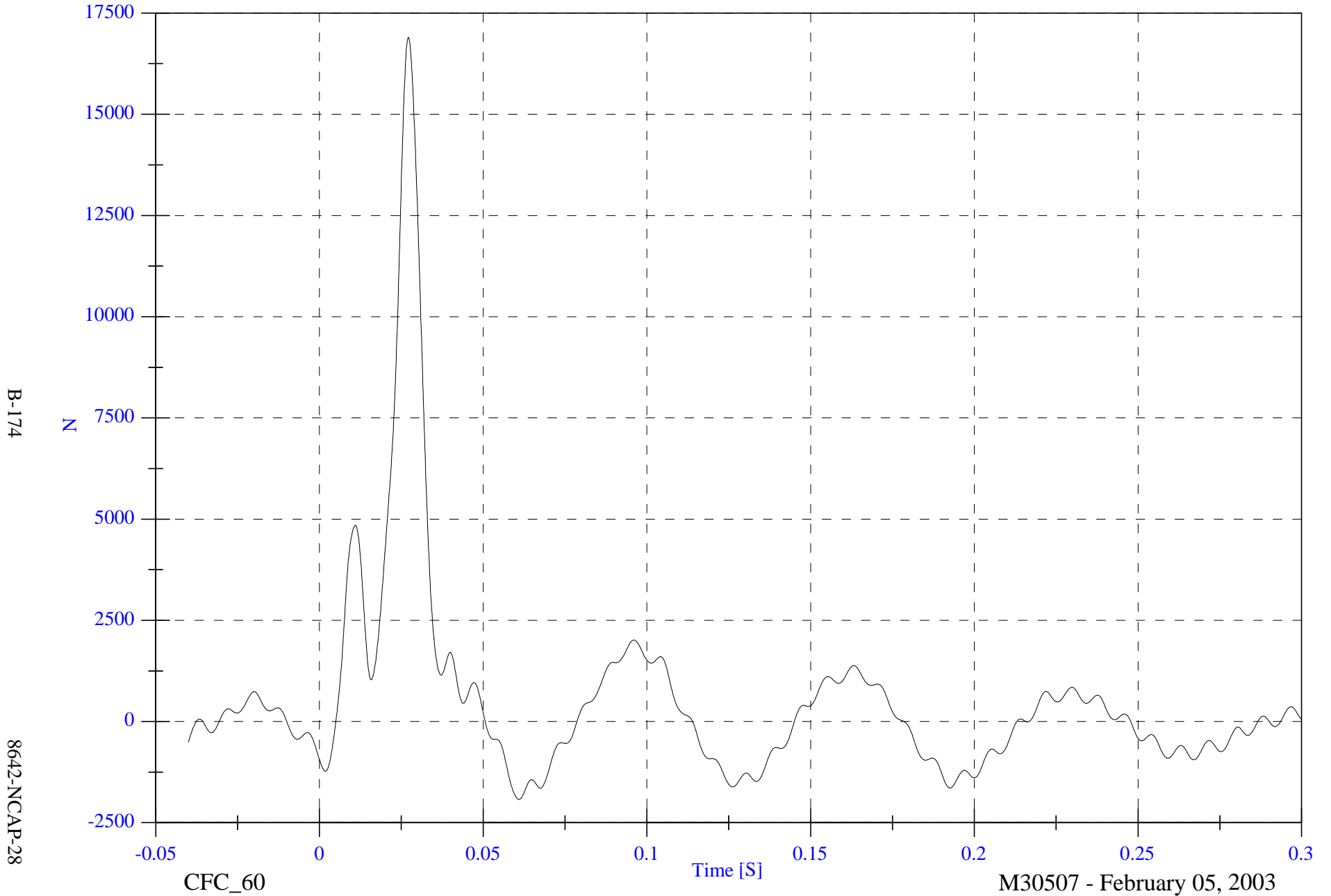
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D5 Fx

Max: 16901.7 [N] at 0.027 [S]

Min: -1925.1 [N] at 0.061 [S]

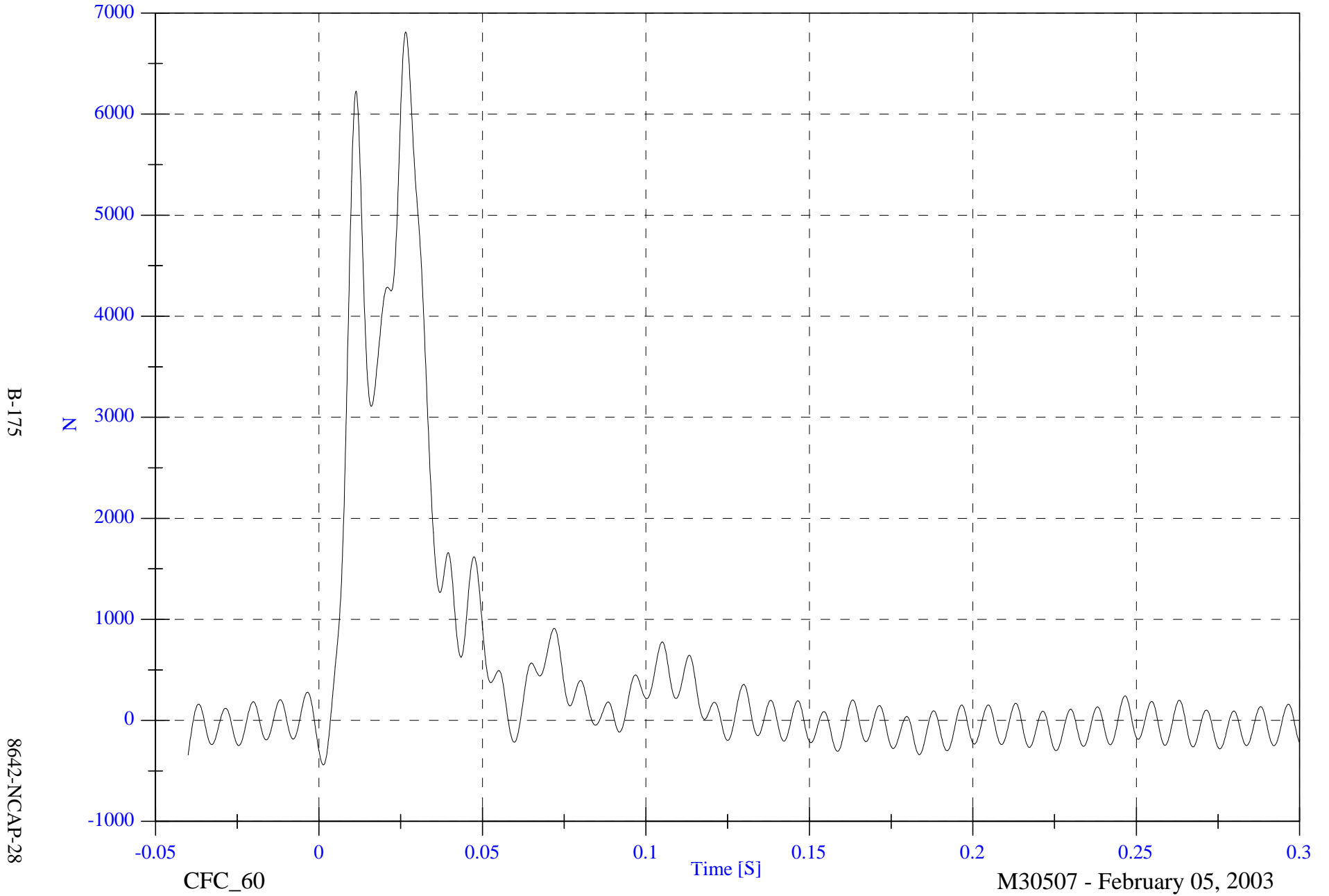


NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D6 Fx

Max: 6812.7 [N] at 0.026 [S]

Min: -440.3 [N] at 0.001 [S]



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8642-NCAP-28

CFC\_60

Time [S]

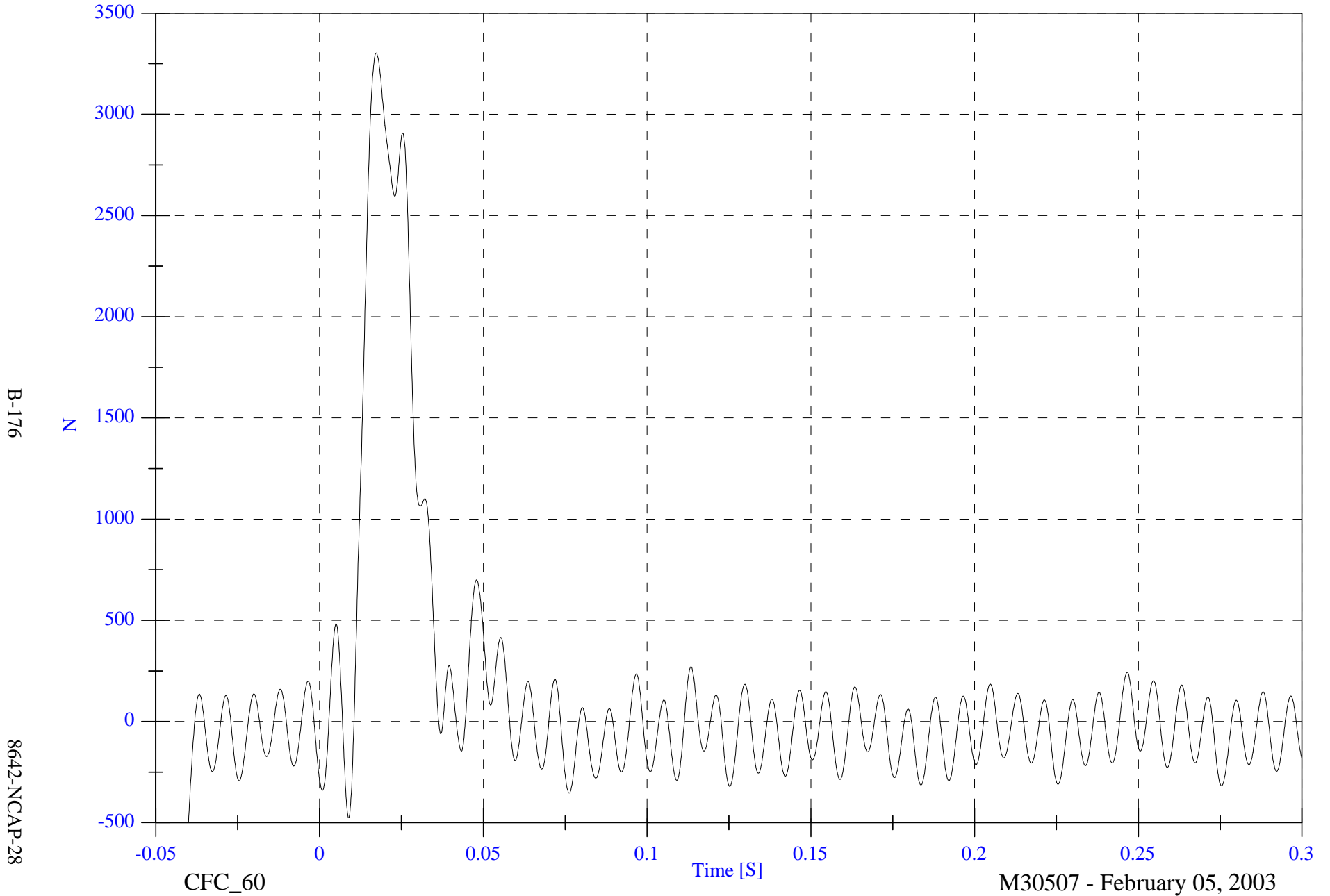
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D7 Fx

Max: 3303.7 [N] at 0.017 [S]

Min: -499.6 [N] at -0.040 [S]



B-176

8642-NCAP-28

CFC\_60

Time [S]

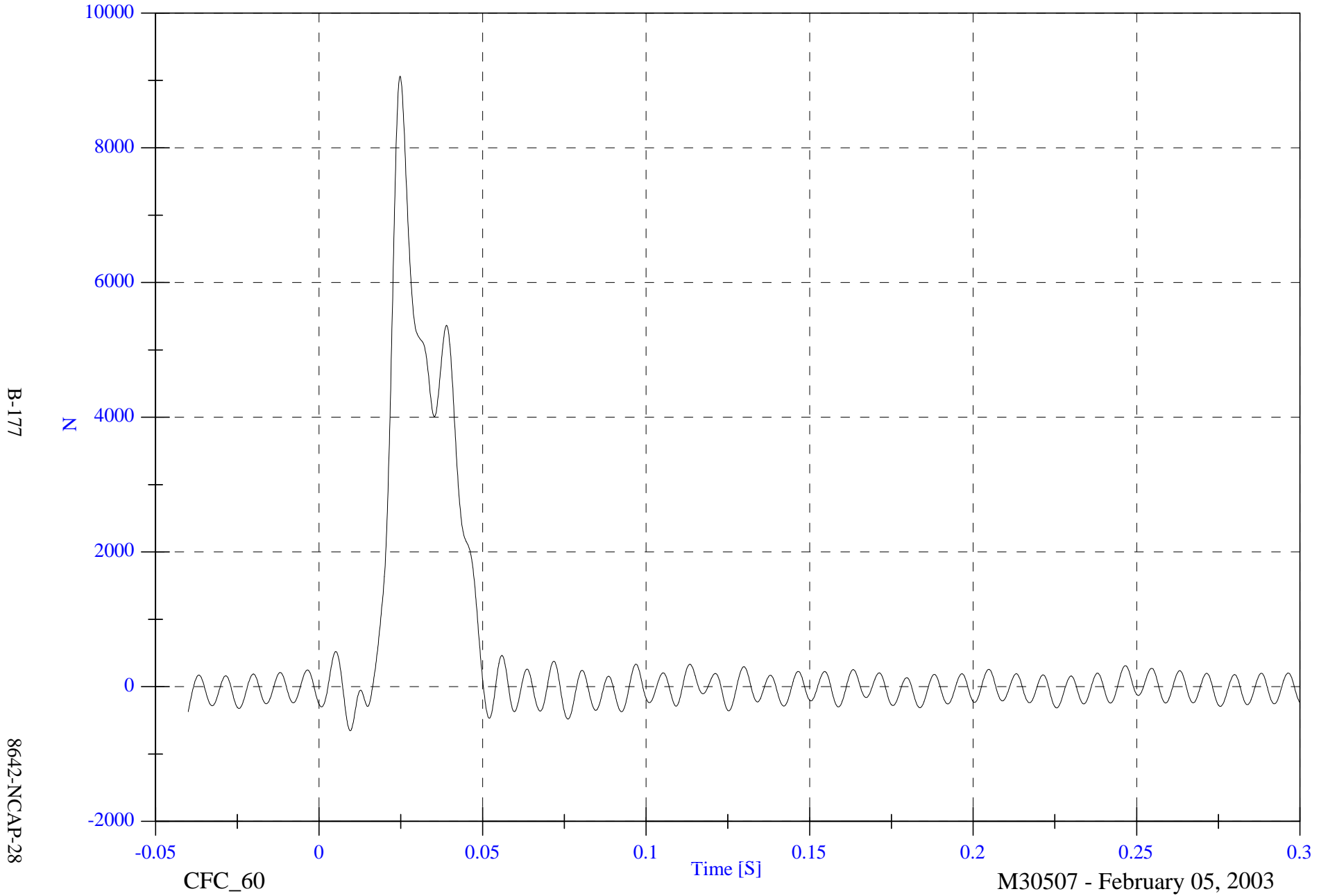
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D8 Fx

Max: 9062.9 [N] at 0.025 [S]

Min: -653.1 [N] at 0.009 [S]



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8642-NCAP-28

CFC\_60

Time [S]

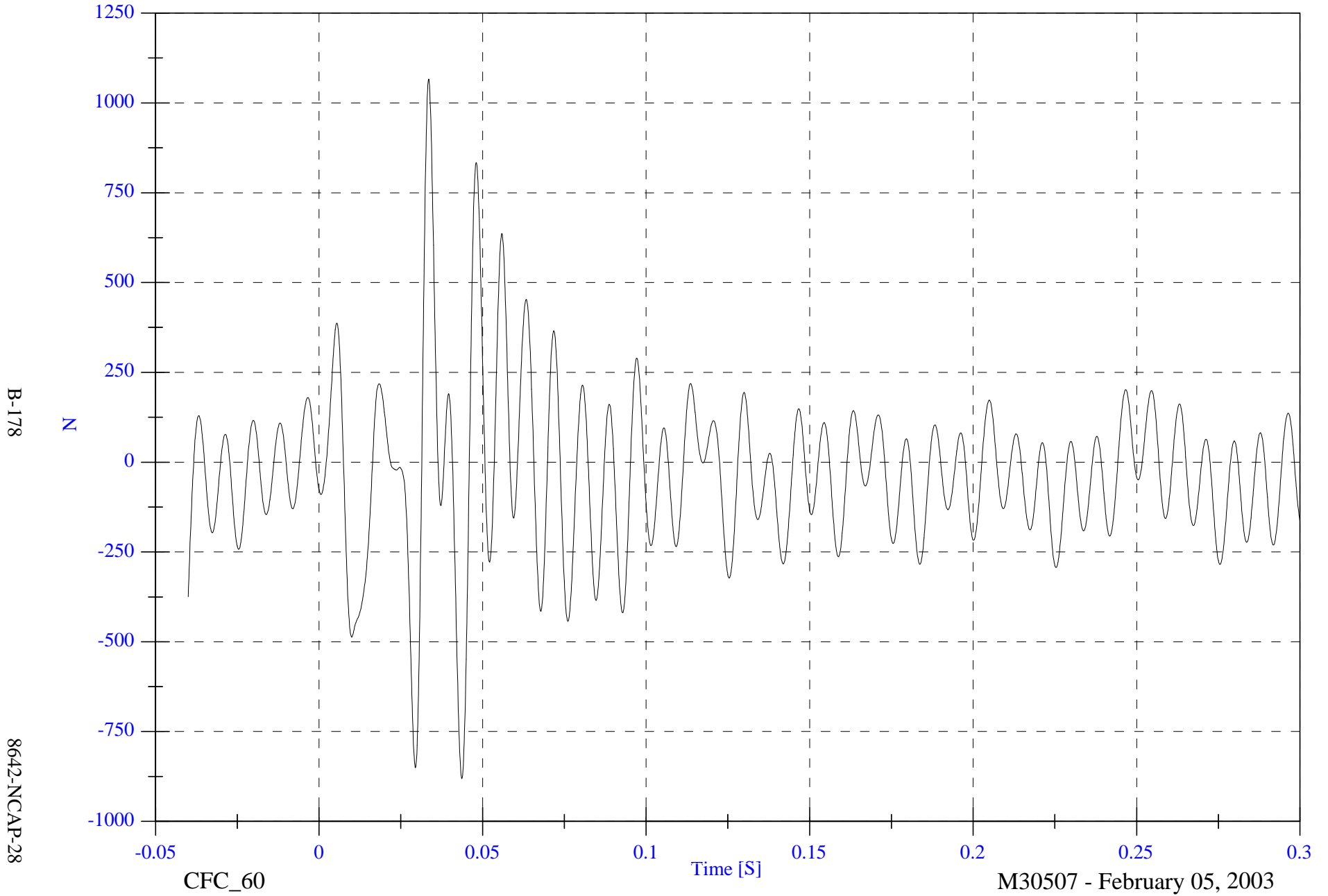
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Barrier Load Cell D9 Fx

Max: 1066.4 [N] at 0.033 [S]

Min: -881.0 [N] at 0.044 [S]

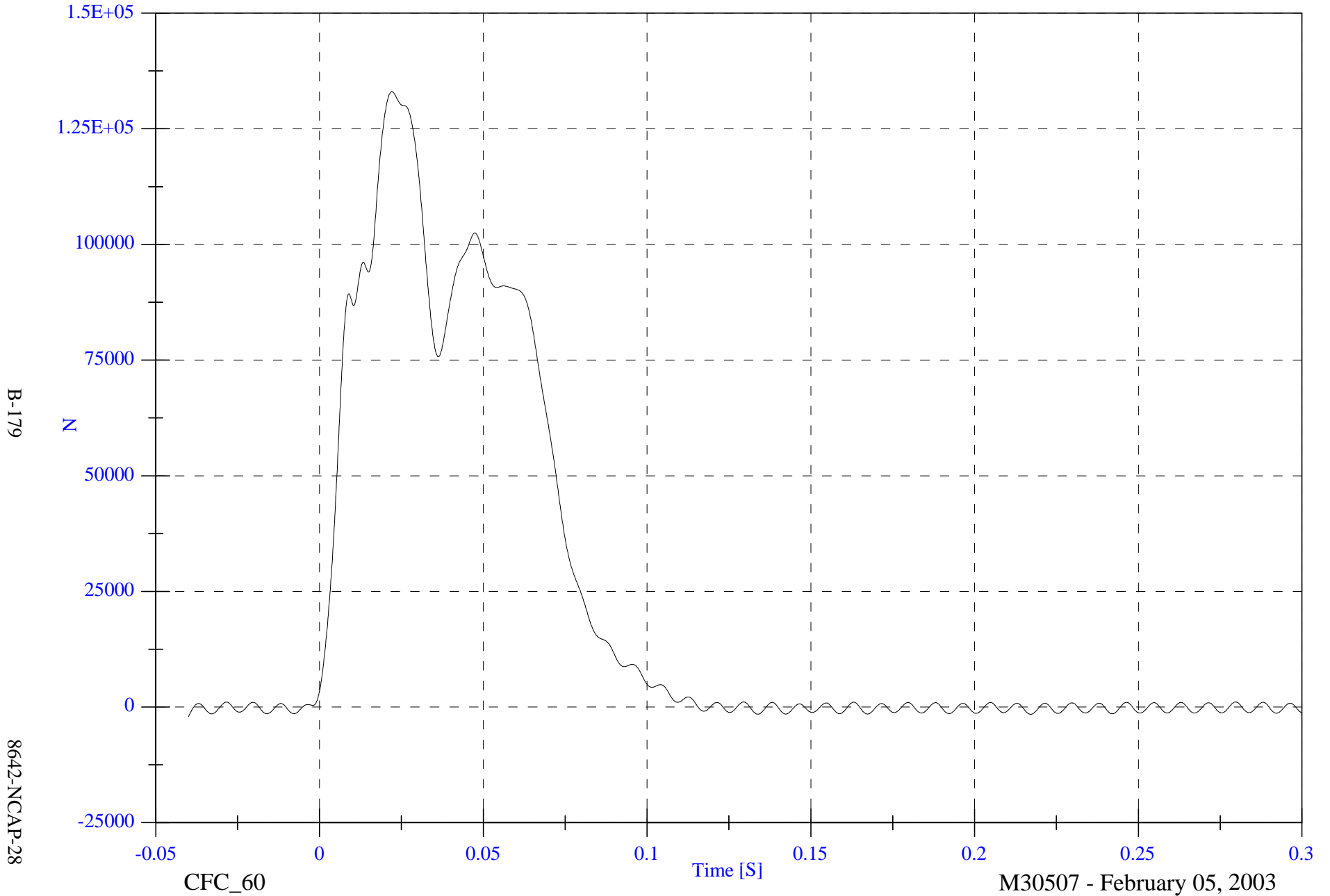


NCAP Test #6 - 2003 Subaru Forester

Max: 133027.1 [N] at 0.022 [S]

Group 1 Load Cell Sum (A1,A2,A3,B1,B2,B3)

Min: -2049.9 [N] at -0.040 [S]



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8642-NCAP-28

CFC\_60

Time [S]

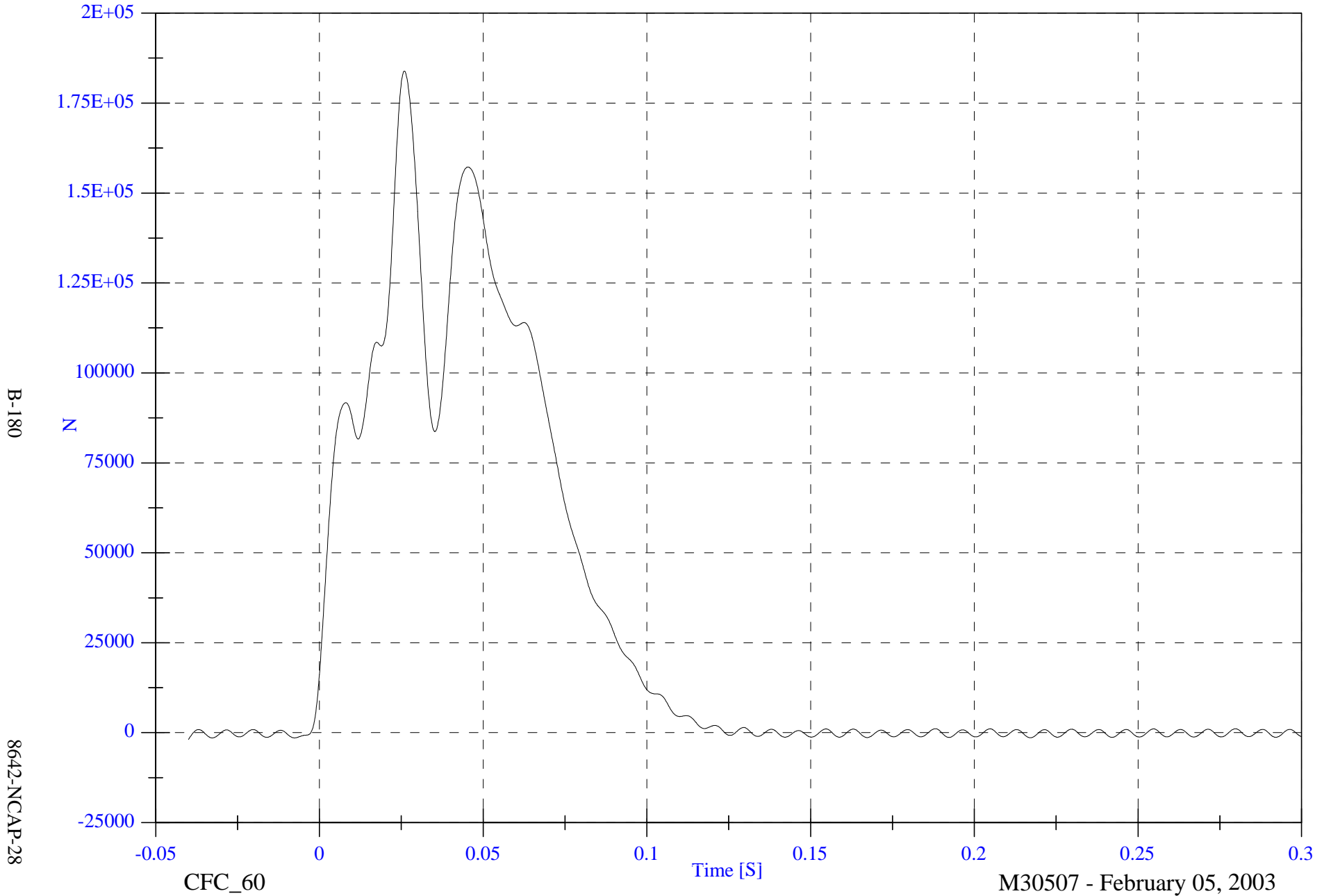
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Group 2 Load Cell Sum (A4,A5,A6,B4,B5,B6)

Max: 183888.1 [N] at 0.026 [S]

Min: -1883.8 [N] at -0.040 [S]

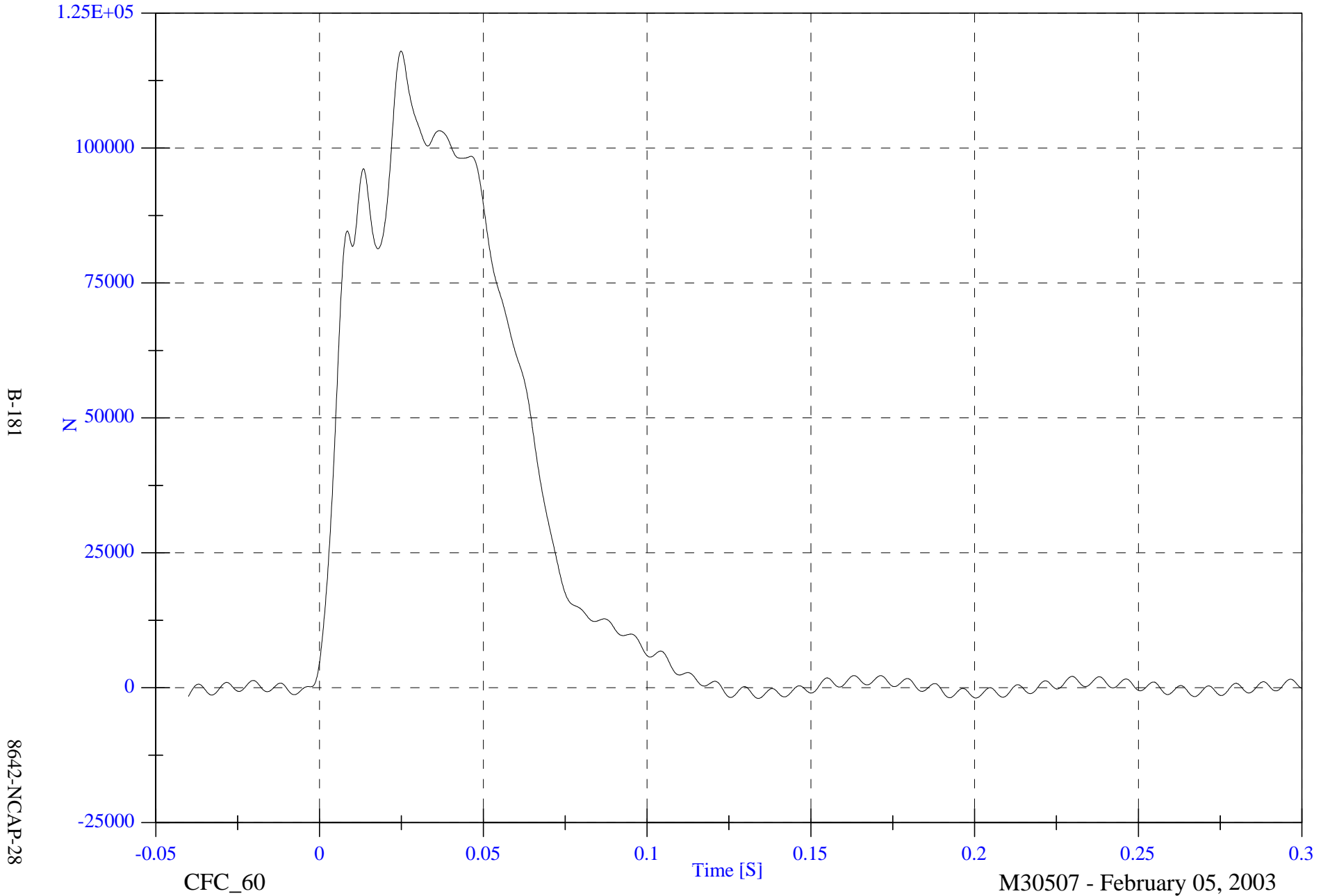


NCAP Test #6 - 2003 Subaru Forester

Group 3 Load Cell Sum (A7,A8,A9,B7,B8,B9)

Max: 117963.6 [N] at 0.025 [S]

Min: -1974.0 [N] at 0.134 [S]



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8642-NCAP-28

CFC\_60

Time [S]

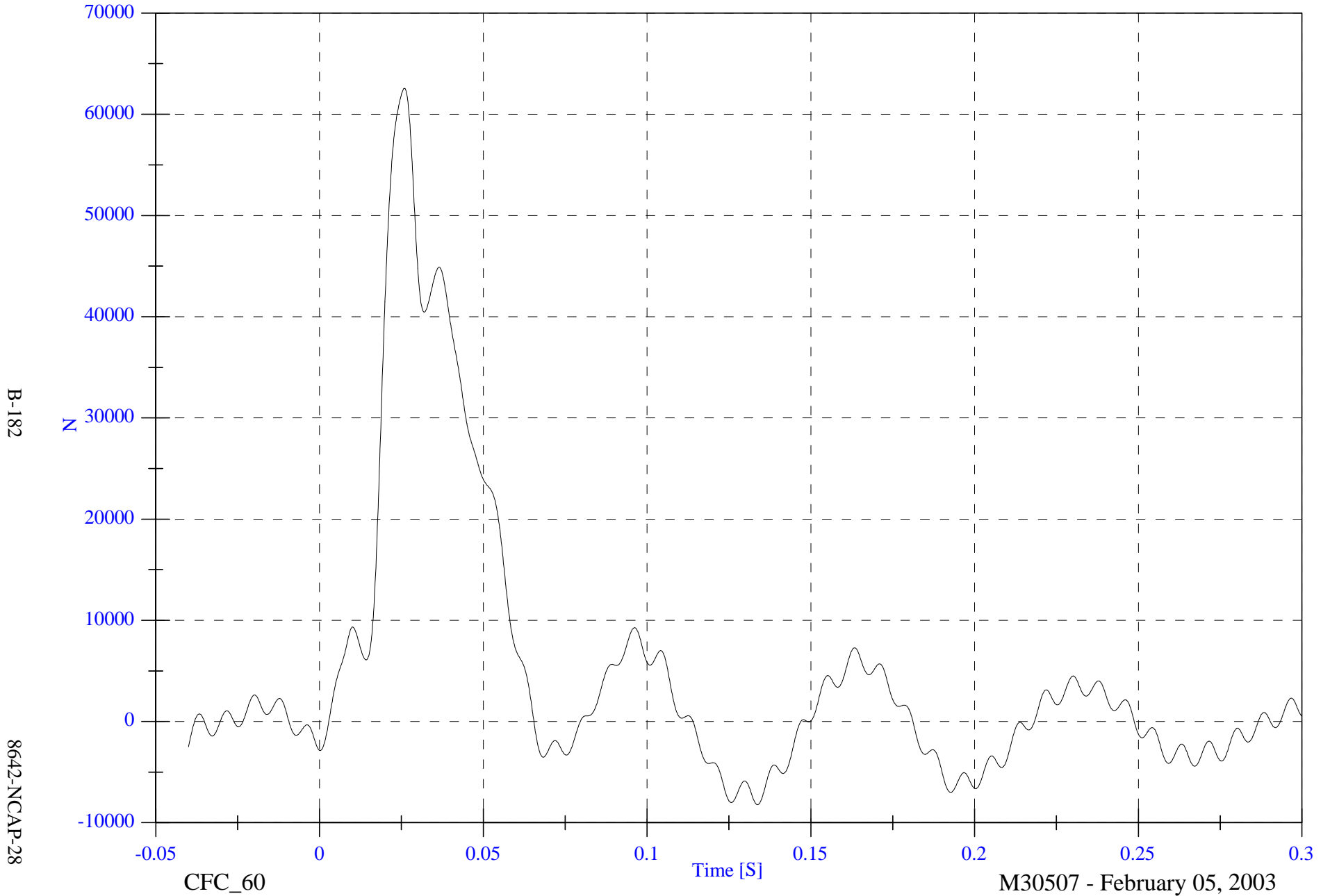
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Group 4 Load Cell Sum (C1,C2,C3,D1,D2,D3)

Max: 62569.2 [N] at 0.026 [S]

Min: -8226.0 [N] at 0.134 [S]



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8642-NCAP-28

CFC\_60

Time [S]

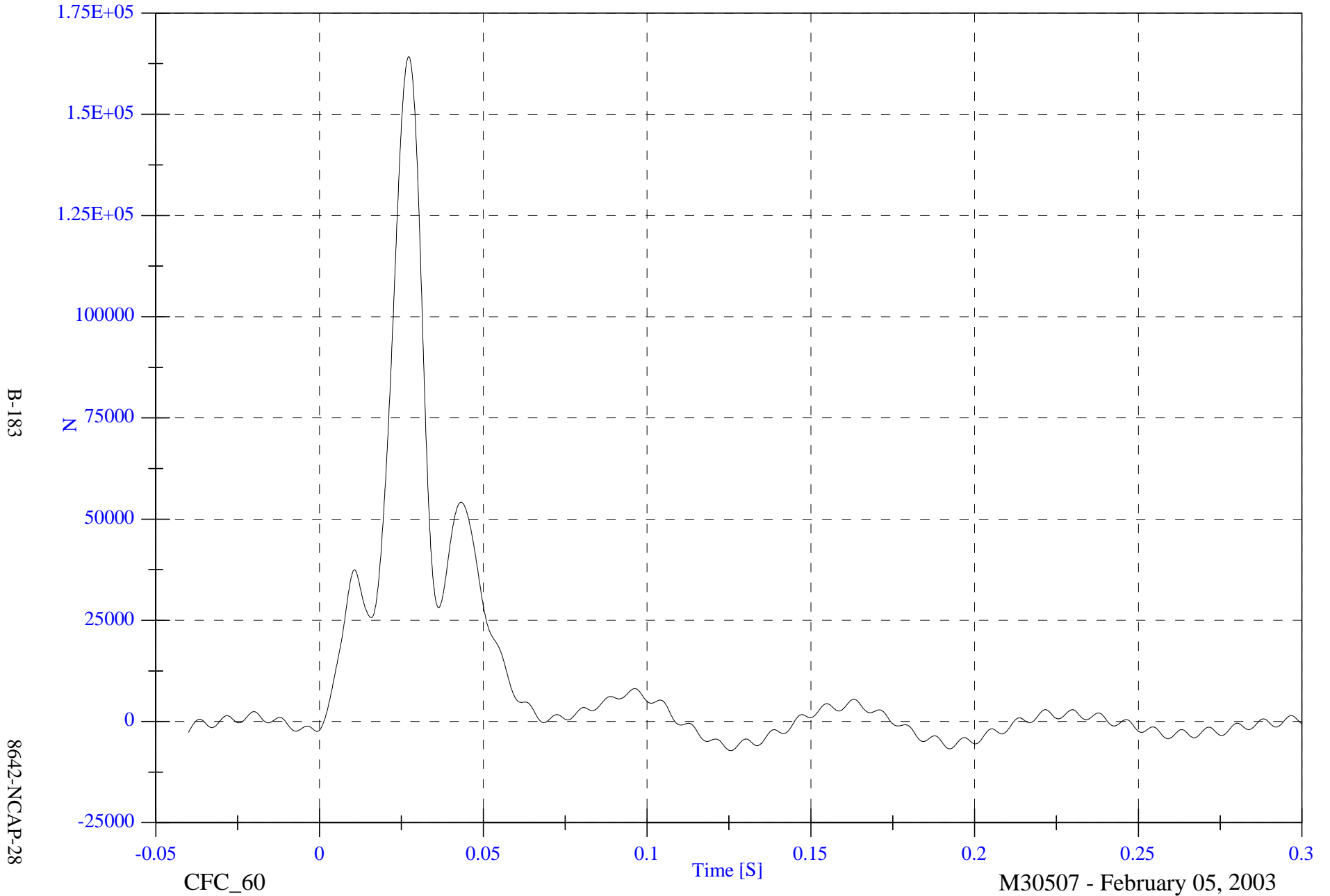
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Group 5 Load Cell Sum (C4,C5,C6,D4,D5,D6)

Max: 164242.0 [N] at 0.027 [S]

Min: -7209.7 [N] at 0.126 [S]



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8642-NCAP-28

CFC\_60

Time [S]

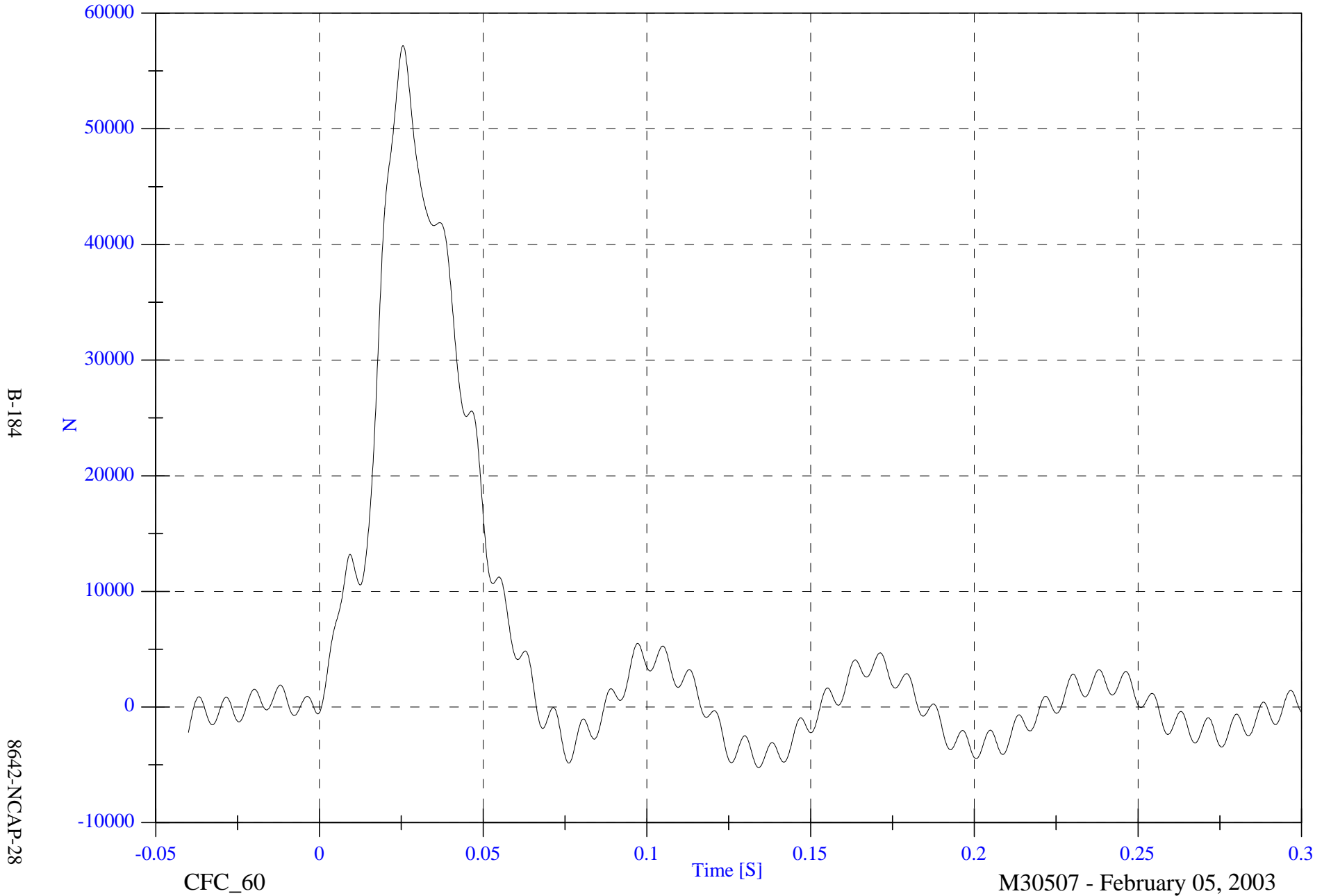
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Group 6 Load Cell Sum (C7,C8,C9,D7,D8,D9)

Max: 57189.4 [N] at 0.025 [S]

Min: -5237.9 [N] at 0.134 [S]



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8642-NCAP-28

CFC\_60

Time [S]

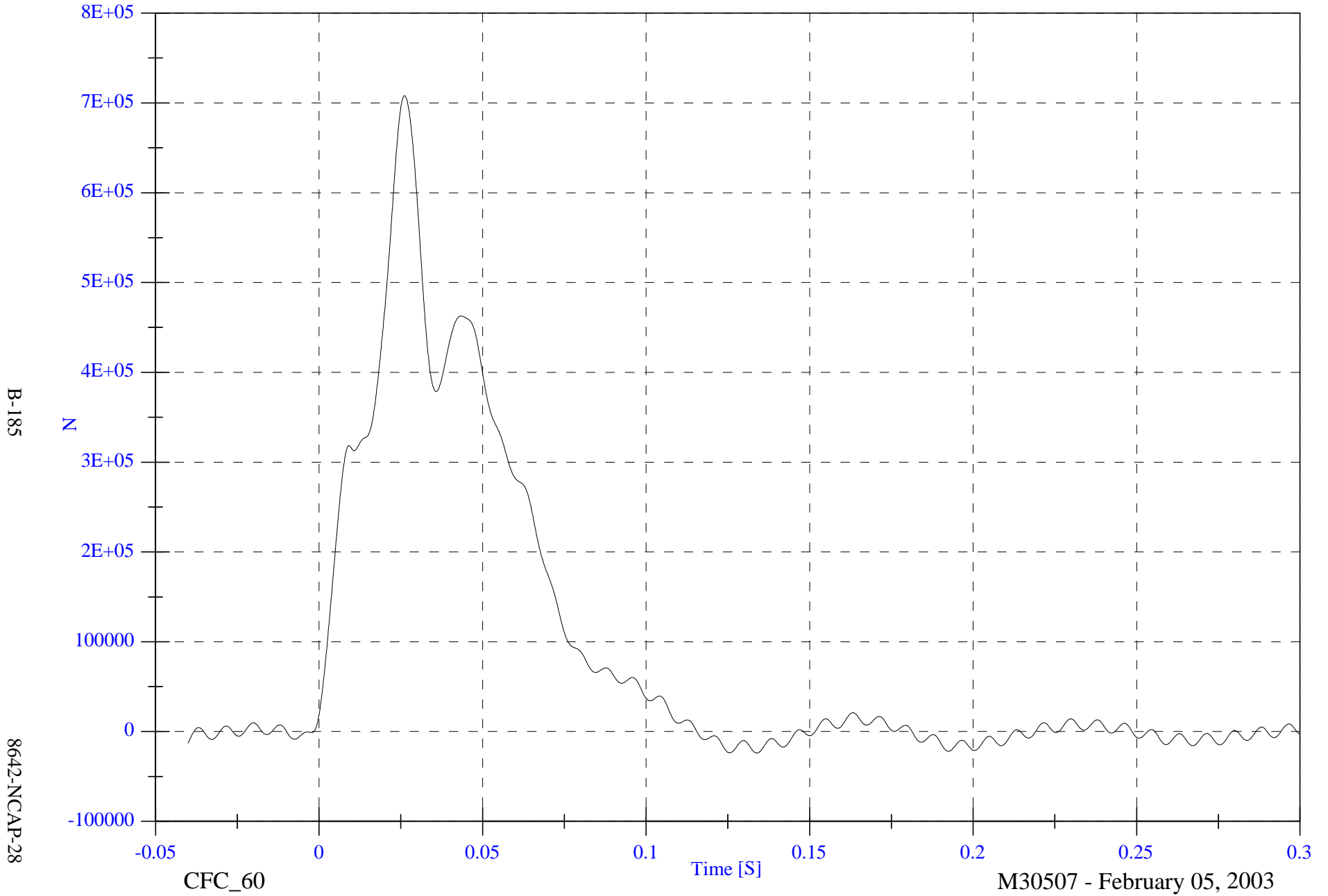
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 708056.5 [N] at 0.026 [S]

Total Load Cell Sum (All 6 Groups)

Min: -23902.4 [N] at 0.134 [S]



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8642-NCAP-28

CFC\_60

Time [S]

M30507 - February 05, 2003

**APPENDIX C**

**PART 572B/E DUMMY CONFIGURATION  
AND PERFORMANCE VERIFICATION DATA SHEETS**

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CFR Part 572, Federal Register, Volume 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Veridian Engineering. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

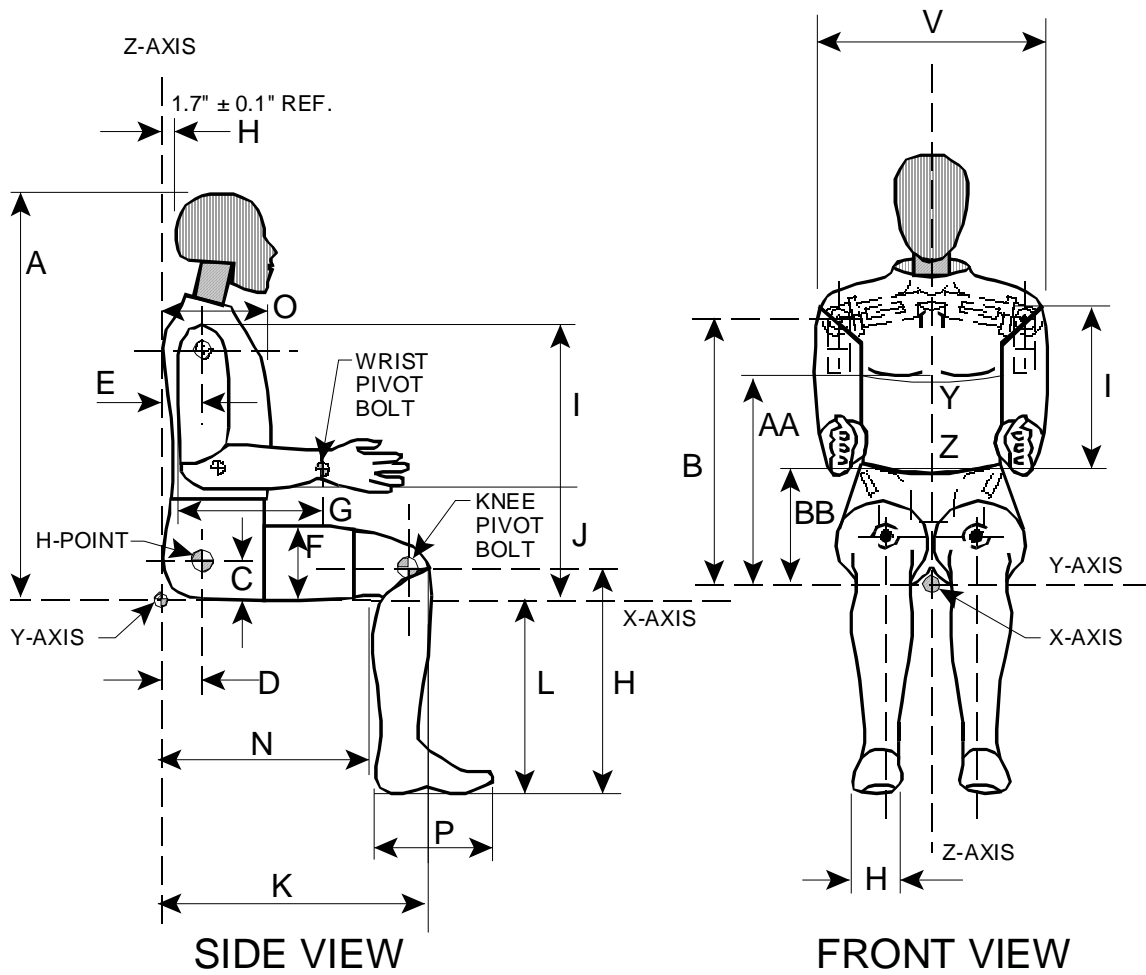
<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	1/23/03
#2/Right Front Passenger	064	1/23/03

#### Electronic Test Equipment

The complement of signal conditioning, recording and display equipment, in conjunction with dummy certification testing, can be found in New Car Assessment and Standards Indicant Testing Final Report No. 6525-V-1.

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude. (REF: S572.31(A)(6))

PART 572E  
HEAD DROP TEST

Dummy Serial Number 061  
Sequential Test Number 1  
Date 12-18-02  
Workfile 061H 12-18-02

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	69
Relative Humidity	10% - 70%	38
Peak Resultant Acceleration	225-275 G's	243.82
Peak Lateral Acceleration	15 G's Max	8.26
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E  
NECK FLEXION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	01-15-03	6 Axis Neck Transducer
Workfile	061Flx2 01-15-03	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	40
Impact Velocity	22.60 - 23.40 Ft/s	22.76
Pendulum Deceleration	10 ms	22.50 - 27.50 G's
	20 ms	17.60 - 22.60 G's
	30 ms	12.50 - 18.50 G's
Max Pendulum G's Above 30 ms	29 G's Max	16.88
Deceleration - Time Curve Decay Time to 5 G's	34 - 42 ms	41.90
D Plane Rotation	Max	64 - 78 Deg
	Time	57 - 64 ms
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs
	Time	47 - 58 ms
Rotation Angle - Time Curve Decay Time to Zero	113 - 128 ms	116.90
Positive Moment - Time Curve Decay Time to Zero	97 - 107 ms	97.30

Remarks:

Laboratory Technician:

B. Swiecicki

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PART 572E  
NECK EXTENSION TEST

Dummy Serial Number	061	
Sequential Test Number	1	
Date	12-19-02	6 Axis Neck Transducer
Workfile	061Ext2 12-19-02	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	29
Impact Velocity	19.50 - 20.30 Ft/s	19.81
Pendulum Deceleration	10 ms	17.20 - 21.20 G's
	20 ms	14.00 - 19.00 G's
	30 ms	11.00 - 16.00 G's
Max Pendulum G's Above 30 ms	22 G's Max	13.81
Deceleration - Time Curve Decay Time to 5 G's	38 - 46 ms	39.20
D Plane Rotation	Max	81 - 106 Deg
	Time	72 - 82 ms
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs
	Time	65 - 79 ms
Rotation Angle - Time Curve Decay Time to Zero	147 - 174 ms	151.70
Positive Moment - Time Curve Decay Time to Zero	120 - 148 ms	132.40

Remarks:

Laboratory Technician:

B. Swiecicki

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PART 572E  
THORAX IMPACT TEST

Dummy Serial Number 061  
Sequential Test Number 1  
Date 01-22-03  
Workfile 061T 01-22-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	39
Pendulum Velocity	21.6 - 22.4 Ft/s	21.91
Maximum Deflection	2.50 - 2.86 in	2.57
Maximum Resistive Force	1160 - 1325 Lbs	1320.59
Internal Hysteresis	69 - 85 %	77.70

Remarks:

Laboratory Technician:

\_\_\_\_\_ B. Swiecicki

PART 572E  
KNEE IMPACT TEST

Dummy Serial Number           061  
 Sequential Test Number        1  
 Date                                01-23-03  
 Workfile                         061LF 01-23-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
<b>LEFT KNEE</b>		
Temperature	66 - 78 Deg F	71
Relative Humidity	10% - 70%	39
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1219.79
<b>RIGHT KNEE</b>		
Temperature	66 - 78 Deg F	71
Relative Humidity	10% - 70%	39
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1225.65

Remarks:

Laboratory Technician:

\_\_\_\_\_  
B. Swiecicki

PART 572E  
EXTERNAL DIMENSIONS

Dummy Serial Number           061  
Sequential Test Number        1  
Date                                1/23/03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			40
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	33.6
Chest Depth	O	8.4 - 9.0 in	8.4
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.6
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.7
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Foot Length	P	9.9 - 10.5 in	10.1
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.5
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.1
Elbow Rest Height	J	7.5 - 8.3 in	7.8
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.4
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician:

B. Swiecicki

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PART 572E  
HEAD DROP TEST

Dummy Serial Number 064  
Sequential Test Number 1  
Date 12-18-02  
Workfile 064H 12-18-02

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66-78 Deg F	69
Relative Humidity	10% - 70%	38
Peak Resultant Acceleration	225-275 G's	273.12
Peak Lateral Acceleration	15 G's Max	6.70
Is Acceleration Curve Unimodal?	YES	YES

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E  
NECK FLEXION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	01-21-03	6 Axis Neck Transducer
Workfile	064Flx14 01-21-03	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	33
Impact Velocity	22.60 - 23.40 Ft/s	22.64
Pendulum Deceleration	10 ms	22.50 - 27.50 G's
	20 ms	17.60 - 22.60 G's
	30 ms	12.50 - 18.50 G's
Max Pendulum G's Above 30 ms	29 G's Max	23.80
Deceleration - Time Curve Decay Time to 5 G's	34 - 42 ms	40.80
D Plane Rotation	Max	64 - 78 Deg
	Time	57 - 64 ms
Moment About Occipital Condyle	Max	65 - 80 Ft-Lbs
	Time	47 - 58 ms
Rotation Angle - Time Curve Decay Time to Zero	113 - 128 ms	120.40
Positive Moment - Time Curve Decay Time to Zero	97 - 107 ms	98.90

Remarks:

Laboratory Technician: \_\_\_\_\_ B. Swiecicki

PART 572E  
NECK EXTENSION TEST

Dummy Serial Number	064	
Sequential Test Number	1	
Date	01-22-03	6 Axis Neck Transducer
Workfile	064Ext 1-22-03	

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature		69-72 Deg F	70
Relative Humidity		10% - 70%	29
Impact Velocity		19.50 - 20.30 Ft/s	19.72
Pendulum Deceleration	10 ms	17.20 - 21.20 G's	18.44
	20 ms	14.00 - 19.00 G's	16.03
	30 ms	11.00 - 16.00 G's	13.91
Max Pendulum G's Above 30 ms		22 G's Max	13.91
Deceleration - Time Curve Decay Time to 5 G's		38 - 46 ms	40.20
D Plane Rotation	Max	81 - 106 Deg	81.27
	Time	72 - 82 ms	76.00
Moment About Occipital Condyle	Max	-59.0 - -39.0 Ft-Lbs	-44.27
	Time	65 - 79 ms	71.80
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 ms	155.40
Positive Moment - Time Curve Decay Time to Zero		120 - 148 ms	134.80

Remarks:

Laboratory Technician:

B. Swiecicki

PART 572E  
THORAX IMPACT TEST

Dummy Serial Number 064  
Sequential Test Number 1  
Date 01-22-03  
Workfile 064T 1-22-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	69-72 Deg F	70
Relative Humidity	10% - 70%	39
Pendulum Velocity	21.6 - 22.4 Ft/s	21.80
Maximum Deflection	2.50 - 2.86 in	2.55
Maximum Resistive Force	1160 - 1325 Lbs	1315.54
Internal Hysteresis	69 - 85 %	74.92

Remarks:

Laboratory Technician:

\_\_\_\_\_ B. Swiecicki

PART 572E  
KNEE IMPACT TEST

Dummy Serial Number           064  
 Sequential Test Number        1  
 Date                               01-23-03  
 Workfile                         064LF 01-23-03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
<b>LEFT KNEE</b>		
Temperature	66 - 78 Deg F	71
Relative Humidity	10% - 70%	39
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1214.02
<b>RIGHT KNEE</b>		
Temperature	66 - 78 Deg F	71
Relative Humidity	10% - 70%	39
Probe Velocity	6.8 - 7.0 Ft/s	7.00
Peak Knee Impact Force	1060 - 1300 Lbs	1200.42

Remarks:

Laboratory Technician:

\_\_\_\_\_  
B. Swiecicki

PART 572E  
EXTERNAL DIMENSIONS

Dummy Serial Number           064  
Sequential Test Number        1  
Date                                1/23/03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature			70
Relative Humidity			40
Location for Chest Circumference	AA	16.9 - 17.1 in	17.0
Location for Waist Circumference	BB	8.9 - 9.1 in	9.0
Chest Circumference (With Jacket)	Y	38.2 - 39.4 in	39.2
Waist Circumference	Z	32.9 - 34.1 in	34.0
Chest Depth	O	8.4 - 9.0 in	8.6
H-Point Height	C	3.3 - 3.5 in	3.4
H-Point from Backline	D	5.3 - 5.5 in	5.4
Skull Cap to Backline	H	1.6 - 1.8 in	1.7
Total Sitting Height	A	34.6 - 35.0 in	34.8
Thigh Clearance	F	5.5 - 6.1 in	6.0
Buttock Knee Length	K	22.8 - 23.8 in	23.6
Buttock Popliteal Length	N	17.8 - 18.8 in	18.4
Popliteal Height	L	16.9 - 17.9 in	17.3
Knee Pivot Height	M	19.1 - 19.7 in	19.4
Foot Length	P	9.9 - 10.5 in	10.2
Foot Breadth	W	3.6 - 4.2 in	3.8
Shoulder Pivot from Backline	E	3.3 - 3.7 in	3.6
Shoulder Breadth	V	16.6 - 17.2 in	16.8
Shoulder Pivot Height	B	19.9 - 20.5 in	20.4
Elbow Rest Height	J	7.5 - 8.3 in	8.0
Shoulder - Elbow Length	I	13.0 - 13.6 in	13.4
Back of Elbow to Wrist Pivot	G	11.4 - 12.0 in	11.6

Remarks:

Laboratory Technician:

B. Swiecicki

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## **APPENDIX D**

### **DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION**

INSTRUMENT CALIBRATION FOR DRIVER DUMMY  
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 061)	Manufacturer	Serial #	Calibration		
			Last	Next	
Head 9 Array	X Arm Y	ENTRAN	AC-01G18-F06	08/20/02	02/18/03
	X Arm Z	ENTRAN	AC-00L13-F39	08/20/02	02/18/03
	Y Arm X	ENTRAN	AC-00L13-F14	08/21/02	02/19/03
	Y Arm Z	ENTRAN	AC-01G18-F16	08/21/02	02/19/03
	Z Arm X	ENTRAN	AC-00L13-F72	08/21/02	02/19/03
	Z Arm Y	ENTRAN	AC-01G18-F12	08/21/02	02/19/03
Head	X	ENTRAN	AC-00L13-F04	08/21/02	02/19/03
	Y	ENTRAN	AC-01G18-F15	08/21/02	02/19/03
	Z	ENTRAN	AC-01G18-F14	08/21/02	02/19/03
Head	X (R)	ENDEVCO	AC-P23873	10/10/02	04/10/03
	Y (R)	ENTRAN	AC-01G18-F05	08/21/02	02/19/03
	Z (R)	ENDEVCO	AC-J14668	08/21/02	02/19/03
Neck Load Cell	X	DENTON	LC-205FX	10/15/02	04/15/03
	Y	DENTON	LC-205FY	10/15/02	04/15/03
	Z	DENTON	LC-205FZ	10/15/02	04/15/03
Neck Moment	X	DENTON	LC-205MX	10/15/02	04/15/03
	Y	DENTON	LC-205MY	10/15/02	04/15/03
	Z	DENTON	LC-205MZ	10/15/02	04/15/03
Chest	X	ENDEVCO	AC-P21373	08/20/02	02/18/03
	Y	ENDEVCO	AC-P22639	08/20/02	02/18/03
	Z	ENDEVCO	AC-P21297	08/20/02	02/18/03
Chest	X (R)	ENDEVCO	AC-P21171	08/20/02	02/18/03
	Y (R)	ENDEVCO	AC-P23136	08/20/02	02/18/03
	Z (R)	ENDEVCO	AC-P23128	08/20/02	02/18/03
Chest Deflection	X	SERVO	DS-061	09/23/02	03/24/03
Pelvic	X	ENDEVCO	AC-P21441	08/20/02	02/18/03
	Y	ENDEVCO	AC-P19246	08/20/02	02/18/03
	Z	ENDEVCO	AC-P21516	08/20/02	02/18/03

INSTRUMENT CALIBRATION FOR DRIVER DUMMY  
(Six Month Calibration Minimum)

DRIVER DUMMY (S/N 061)	Manufacturer	Serial #	Calibration		
			Last	Next	
Left Femur Load Cell Fz	GSE	LC-659	09/25/02	03/26/03	
Right Femur Load Cell Fz	GSE	LC-723	09/25/02	03/26/03	
Left Upper Tibia	Mx	DENTON	LC-016MX	10/25/02	04/25/03
	My	DENTON	LC-016MY	10/25/02	04/25/03
Left Lower Tibia	Fz	DENTON	LC-123FZ	10/25/02	04/25/03
	Mx	DENTON	LC-123MX	10/25/02	04/25/03
	My	DENTON	LC-123MY	10/25/02	04/25/03
Right Upper Tibia	Mx	DENTON	LC-023MX	10/25/02	04/25/03
	My	DENTON	LC-023MY	10/25/02	04/25/03
Right Lower Tibia	Fz	DENTON	LC-111FZ	10/25/02	04/25/03
	Mx	DENTON	LC-111MX	10/25/02	04/25/03
	My	DENTON	LC-111MY	10/25/02	04/25/03
Left Foot Rear	X	ENDEVCO	AC-P19343	08/20/02	02/18/03
	Z	ENDEVCO	AC-P16583	08/20/02	02/18/03
Left Foot Front	Z	ENDEVCO	AC-P18525	08/20/02	02/18/03
Right Foot Rear	X	ENDEVCO	AC-P18628	08/20/02	02/18/03
	Z	ENDEVCO	AC-P18741	08/20/02	02/18/03
Right Foot Front	Z	ENDEVCO	AC-P23276	08/20/02	02/18/03
Lap Belt Load Cell	LEBOW	LC-706	11/12/02	05/13/03	

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY  
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)	Manufacturer	Serial #	Calibration		
			Last	Next	
Head 9 Array	X Arm Y	ENTRAN	AC-01G18-F08	08/23/02	02/21/03
	X Arm Z	ENTRAN	AC-00L20-A13	08/23/02	02/21/03
	Y Arm X	ENTRAN	AC-00L20-A08	08/23/02	02/21/03
	Y Arm Z	ENTRAN	AC-01G18-F13	08/23/02	02/21/03
	Z Arm X	ENTRAN	AC-01J02-F18	08/23/02	02/21/03
	Z Arm Y	ENTRAN	AC-01G25-N11	08/23/02	02/21/03
Head	X	ENDEVCO	AC-J32184	08/27/02	02/25/03
	Y	ENDEVCO	AC-J32185	08/27/02	02/25/03
	Z	ENDEVCO	AC-J31011	08/27/02	02/25/03
Head	X (R)	ENDEVCO	AC-J31020	08/27/02	02/25/03
	Y (R)	ENDEVCO	AC-J31101	08/27/02	02/25/03
	Z (R)	ENDEVCO	AC-J31059	08/27/02	02/25/03
Neck Load Cell	X	DENTON	LC-440FX	10/15/02	04/15/03
	Y	DENTON	LC-440FY	10/15/02	04/15/03
	Z	DENTON	LC-440FZ	10/15/02	04/15/03
Neck Moment	X	DENTON	LC-440MX	10/15/02	04/15/03
	Y	DENTON	LC-440MY	10/15/02	04/15/03
	Z	DENTON	LC-440MZ	10/15/02	04/15/03
Chest	X	ENDEVCO	AC-J34019	08/28/02	02/26/03
	Y	ENDEVCO	AC-J33018	08/27/02	02/25/03
	Z	ENDEVCO	AC-J32783	08/28/02	02/26/03
Chest	X (R)	ENDEVCO	AC-J31066	08/28/02	02/26/03
	Y (R)	ENDEVCO	AC-P16979	08/27/02	02/25/03
	Z (R)	ENDEVCO	AC-J31022	08/28/02	02/26/03
Chest Deflection	X	SERVO	DS-064	09/23/02	03/24/03
Pelvic	X	ENDEVCO	AC-P23174	08/23/02	02/21/03
	Y	ENDEVCO	AC-P23164	08/23/02	02/21/03
	Z	ENDEVCO	AC-P23137	08/23/02	02/21/03

INSTRUMENT CALIBRATION FOR PASSENGER DUMMY  
(Six Month Calibration Minimum)

PASSENGER DUMMY (S/N 064)	Manufacturer	Serial #	Calibration		
			Last	Next	
Left Femur Load Cell Fz	GSE	LC-954	09/25/02	03/26/03	
Right Femur Load Cell Fz	GSE	LC-955	09/25/02	03/26/03	
Left Knee Shear Dx	DENTON	LC-045MX	10/24/02	04/24/03	
Right Knee Shear Dx	DENTON	LC-045MY	10/24/02	04/24/03	
Left Upper Tibia	Mx	DENTON	LC-125FZ	10/24/02	04/24/03
	My	DENTON	LC-125MX	10/24/02	04/24/03
Left Lower Tibia	Fz	DENTON	LC-125MY	10/24/02	04/24/03
	Mx	DENTON	LC-038MX	10/24/02	04/24/03
	My	DENTON	LC-038MY	10/24/02	04/24/03
Right Upper Tibia	Mx	DENTON	LC-124FZ	10/24/02	04/24/03
	My	DENTON	LC-124MX	10/24/02	04/24/03
Right Lower Tibia	Fz	DENTON	LC-124MY	10/24/02	04/24/03
	Mx	ENDEVCO	AC-J30491	08/23/02	02/21/03
	My	ENDEVCO	AC-J31026	08/23/02	02/21/03
Left Foot Rear	X	ENDEVCO	AC-J32831	08/23/02	02/21/03
	Z	ENDEVCO	AC-J33376	08/23/02	02/21/03
Left Foot Front	Z	ENDEVCO	AC-J32832	08/23/02	02/21/03
Right Foot Rear	X	ENDEVCO	AC-J31095	08/23/02	02/21/03
	Z	LEBOW	LC-711	11/12/02	05/13/03
Right Foot Front	Z	GSE	LC-954	09/25/02	03/26/03
Lap Belt Load Cell	GSE	LC-955	09/25/02	03/26/03	

INSTRUMENT CALIBRATION FOR VEHICLE ACCELEROMETERS  
(Six Month Calibration Minimum)

	Manufacturer	Serial #	Calibration	
			Last	Next
Left Seat Rear Crossmember X	ICS	AC-8084-020	11/20/02	05/21/03
Right Rear Seat Crossmember X	ICS	AC-8084-041	11/20/02	05/21/03
Top of Engine	ICS	AC-9026-036	11/11/02	05/12/03
Bottom of Engine	ICS	AC-8084-010	11/08/02	05/09/03
Right Disc Brake Caliper	ICS	AC-8084-016	11/11/02	05/12/03
Instrument Panel	ICS	AC-8086-044	11/21/02	05/22/03
Left Disc Brake Caliper	ICS	AC-6917-020	11/20/02	05/21/03
Left Seat Rear Crossmember Z	ICS	AC-6917-012	11/11/02	05/12/03
Right Seat Rear Crossmember Z	ICS	AC-8084-006	11/20/02	05/21/03

REPORT NUMBER: CAL-03-06

**NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST**

EVENFLO VANGUARD 5 COMFORT TOUCH  
FORWARD FACING CONVERTIBLE  
SECURED WITH THE LATCH SYSTEM AND THE TOP TETHER  
AND  
EVENFLO VANGUARD COMFORT TOUCH  
FORWARD FACING CONVERTIBLE (WITH OVERHEAD SHIELD)  
SECURED WITH THE LATCH SYSTEM AND THE TOP TETHER

NHTSA NUMBER: M30507

VERIDIAN ENGINEERING TEST NUMBER: 8642-NCAP-28

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



February 5, 2003

FINAL REPORT

U. S. DEPARTMENT OF TRANSPORTATION  
National Highway Traffic Safety Administration  
Rulemaking  
Office of Crashworthiness Standards  
Mail Code: NVS-111  
400 Seventh Street, SW, Room No. 5313  
Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-01-D-32005. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

Prepared By:

\_\_\_\_\_  
Lawrence Q. Valvo, Project Engineer

Approved By:

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David J. Travale, Program Manager  
Transportation Sciences Center

Approval Date:

\_\_\_\_\_

FINAL REPORT ACCEPTANCE BY:

Accepted By:

\_\_\_\_\_

Acceptance Date:

\_\_\_\_\_

**TECHNICAL REPORT STANDARD TITLE PAGE**

1. Report No. CAL-03-06		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of Evenflo Vanguard Comfort Touch Forward Facing Convertible NHTSA No.: M30507				5. Report Date February 5, 2003	
				6. Performing Organization Code CAL	
7. Author(s) Lawrence Q. Valvo, Project Engineer David J. Travale, Program Manager				8. Performing Organization Report No. 8642-NCAP-28	
9. Performing Organization Name and Address Veridian Engineering Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-01-D-32005	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh SW, Room 5313 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report, February 2003	
				14. Sponsoring Agency Code NVS-111	
15. Supplementary Notes					
16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) load cell barrier test. An Evenflo Vanguard 5 Comfort Touch forward facing convertible CRS was secured in Position 3 (P3) with the LATCH system and top tether. An Evenflo Vanguard Comfort Touch forward facing convertible CRS (with overhead shield) was secured in Position 4 (P4) with the LATCH system and top tether. This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on February 5, 2003.					
<b>ATD Position</b>		<b>HIC 15</b>		<b>HIC 36</b>	
<b>P3 (Right Rear) (044)</b>		663.4		1078.1	
<b>P4 (Left Rear) (142)</b>		667.8		1041.9	
				<b>Clip (3 ms)</b>	
				49.9	
				47.8	
17. Key Words New Car Assessment Program (NCAP)				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Reference Division Room 5108 (NAD-52) 400 Seventh St., S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 ATTN: Robert Hornicle	
19. Security Classification of Report UNCLASSIFIED		20. Security Classification of Page UNCLASSIFIED		21. No. of Pages 153	
				22. Price	

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## SECTION 1

### PURPOSE AND SUMMARY OF TEST M30507

The purpose of this test was to obtain CRS performance data in a frontal impact NCAP condition. The 56.97 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

#### SUMMARY

Both 3 Year Old Hybrid III (P572 P) child dummies were instrumented with head, chest, and pelvic triaxial accelerometers, chest displacement potentiometers, and upper and lower six axial neck force and moment load cells. An additional head z accelerometer was installed in the Position 4 child dummy.

The right rear (Position 3) child dummy (serial no. 044 ) and left rear (Position 4) child dummy (serial no. 142 ) were calibrated previous to this test. Child dummy certification information is found in section 5.

The right rear child dummy's HIC was 663.4, maximum chest deceleration over 3 ms was 49.9 g's. The left rear child dummy's HIC was 667.8, maximum chest deceleration over 3 ms was 47.8 g's.

**SECTION 2**  
**DATA SHEET NO. 1**  
**CRASH TEST SUMMARY**

TEST DUMMY INFORMATION:

DESCRIPTION	Position #3 CRS	Position #4 CRS
<b>ATD Type/Serial No.</b>	3 Year Old Hybrid III (P572 P) / 044	3 Year Old Hybrid III (P572 P) / 142
<b>Restraint System:</b>	Evenflo Vanguard 5 Comfort Touch forward facing convertible secured with LATCH and top tether.	Evenflo Vanguard Comfort Touch forward facing convertible (with overhead shield) secured with LATCH and top tether.

Number of Data Channels \_\_\_\_\_ 53  
 Number of Cameras: \_\_\_\_\_ 1 \_\_\_\_\_ Real Time  
 \_\_\_\_\_ 2 \_\_\_\_\_ High Speed

POST TEST DOOR OPENING

DESCRIPTION	FRONT	REAR
<b>Left Side Doors</b>	Door remained closed and latched, door opened without tools	Door remained closed and latched, door opened without tools
<b>Right Side Doors</b>	Door remained closed and latched, door opened without tools	Door remained closed and latched, door opened without tools
<b>Hatch/Other Door</b>	-	Hatch remained closed and latched, door opened without tools

POST TEST SEAT DATA

LOCATION	SEAT MOVEMENT (mm)	SEAT BACK FAILURE
<b>P1 (Left Front)</b>	0	None
<b>P2 (Right Front)</b>	0	None
<b>P3 (Right Rear)</b>	0	None
<b>P4 (Left Rear)</b>	0	None

VISIBLE DUMMY CONTACT POINTS

	Position #3 CRS	Position #4 CRS
<b>Head Contact:</b>	Chin to chest, back of head to child restraint seat back	Face to center of shield, back of head to P1 seatback, back of head to child restraint seat back
<b>Upper Torso Contact:</b>	None	Chest to child restraint shield
<b>Lower Torso Contact:</b>	None	None
<b>Left Knee Contact:</b>	Left foot to P2 seat back	Left foot to P1 seat back
<b>Right Knee Contact:</b>	Right foot to P2 seat back	Right foot to P1 seat back

**DATA SHEET NO. 2**

**CRS PARAMETER DATA**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether. NHTSA No. M30507

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1425.5 kg (A)

AS TESTED WEIGHT OF VEHICLE (2 P572E + 2 P572 P w/CRSs+CARGO+EQUIPMENT & INSTRUMENTATION):

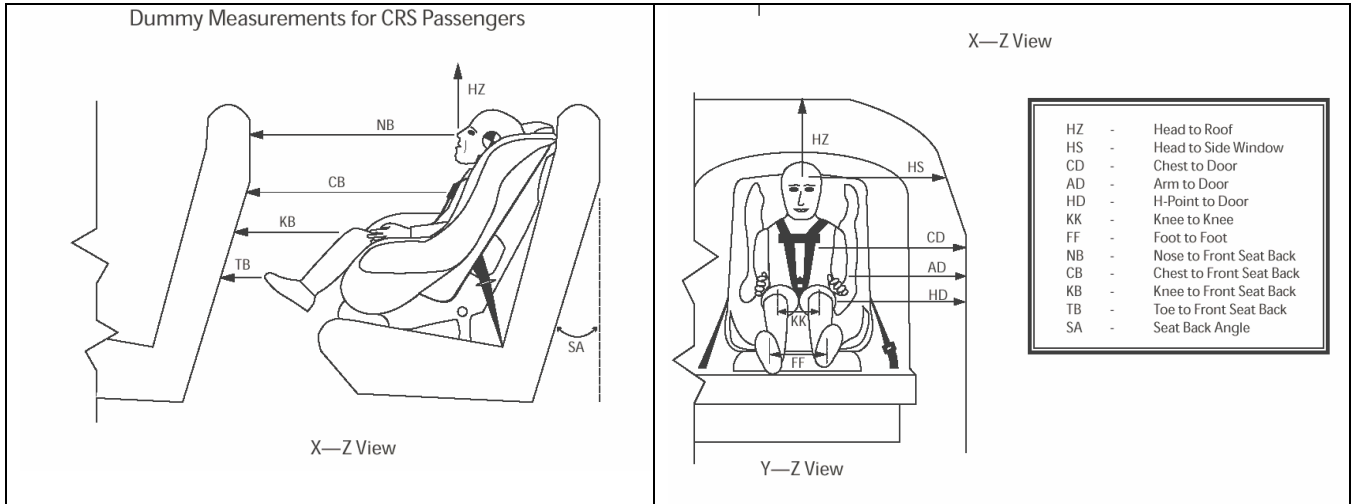
Left Front	=	<u>438.5</u>	kg	Left Rear	=	<u>384.0</u>	kg
Right Front	=	<u>429.0</u>	kg	Right Rear	=	<u>388.5</u>	kg
TOTAL FRONT	=	<u>867.5</u>	kg	TOTAL REAR	=	<u>772.5</u>	kg
TOTAL TEST WEIGHT =		<u>1640.0</u>	kg				

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30507



Measurement	Pre-Test (mm)		Post Test (mm)	
	P3 CRS ( 044)	P4 CRS (142)	P3 CRS ( 044)	P4 CRS (142)
SA	21.5°	21.5°	19.5°	19.5°
HS	412	414	378	384
CD	382	354	356	355
AD	242	228	261	232
HD	323	252	305	255
HZ	395	401	394	392
NB	500	500	522	525
CB	513	466	533	470
KK	150	142	157	150
FF	152	165	170	172
KB – LEFT	356	318	365	310
KB – RIGHT	364	318	368	312
TB – LEFT	60	14	70	18
TB – RIGHT	50	0	42	10

All dimensions in mm (unless noted)  
P3 – Right Rear Passenger (CRS #1)  
P4 – Left Rear Passenger (CRS #2)

**DATA SHEET 4**

**CHILD DUMMY INJURY CRITERIA VALUES**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether. NHTSA No. M30507

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Head X	g	48.5	205.6	-39.1	96.9	44.5	194.2	-52.4	96.1
Head Y	g	3.9	58.4	-6.7	97.7	12.1	95.7	-4.3	88.6
Head Z	g	74.2	75.6	-9.2	34.4	73.8	80.6	-9.1	36.9
Head Resultant	g	77.1	75.6	0.0	-47.3	77.4	80.5	0.0	-48.0
Head RZ	g	-	-	-	-	80.8	83.9	-22.3	192.8
Upper Neck Fx	N	43.4	246.6	-996.0	96.4	39.4	239.1	-696.3	93.9
Upper Neck Fy	N	106.5	60.4	-43.9	126.4	30.2	254.8	-105.9	96.1
Upper Neck Fz	N	2003.7	87.8	-223.3	34.9	1939.8	80.8	-284.0	210.8
Upper Neck F Resultant	N	2169.4	87.8	-	-	2024.9	80.8	-	-
Upper Neck Mx	N-m	7.4	68.9	-5.2	103.8	2.7	284.9	-4.1	64.5
Upper Neck My	N-m	3.6	138.3	-18.5	97.7	5.7	296.1	-19.3	212.2
Upper Neck Mz	N-m	3.6	236.5	-1.1	296.2	3.8	103.1	-2.0	79.7
Upper Neck M Resultant	N-m	18.9	97.8	-	-	19.4	212.2	-	-
Lower Neck Fx	N	136.2	197.5	-905.9	88.1	122.0	193.6	-785.5	83.4
Lower Neck Fy	N	109.5	75.4	-36.6	100.1	77.7	65.8	-156.3	88.0
Lower Neck Fz	N	1744.5	72.4	-291.1	33.9	1806.8	79.2	-319.3	36.0
Lower Neck F Resultant	N	1819.1	72.4	-	-	1945.8	79.9	-	-
Lower Neck Mx	N-m	20.2	67.1	-6.8	126.7	5.1	255.4	-16.8	92.3
Lower Neck My	N-m	113.9	93.2	-10.8	197.2	94.1	94.0	-9.9	193.6
Lower Neck Mz	N-m	5.5	71.1	-6.5	101.8	2.5	230.7	-9.1	78.2
Lower Neck M Resultant	N-m	114.4	93.2	-	-	95.6	94.0	-	-

**DATA SHEET 4**

**CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30507

DESCRIPTION	Unit	MAXIMUM VALUE							
		Position #3				Position #4			
		Pos	msec	Neg	msec	Pos	msec	Neg	msec
Chest X	g	11.5	215.2	-43.6	56.3	6.7	211.2	-36.2	79.0
Chest Y	g	7.4	57.1	-2.0	131.8	1.8	270.7	-5.9	85.7
Chest Z	g	20.7	86.7	-26.2	58.1	20.0	90.0	-33.6	57.1
Chest Resultant	g	50.8	56.7	-	-	49.3	57.1	-	-
Chest Displacement	g	0.1	14.6	-23.2	102.1	0.0	-1.3	-13.7	67.0
Pelvic X	g	9.9	121.3	-58.8	57.2	18.3	112.4	-58.8	56.0
Pelvic Y	g	7.8	63.9	-4.6	126.4	3.8	43.3	-3.7	114.5
Pelvic Z	g	12.4	209.5	-41.8	57.3	28.7	98.3	-45.4	55.6
Pelvic Resultant	g	72.4	57.3	-	-	74.2	56.0	-	-
Tether Belt Load	N	3421.0	69.9	-12.1	268.5	3505.4	69.7	-28.3	237.3

**DATA SHEET 4**

**CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether. NHTSA No. M30507

	HEAD INJURY CRITERIA (HIC)							
	HIC15				HIC36			
	HIC	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub> (g's)	HIC	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	Average Acceleration t <sub>1</sub> to t <sub>2</sub> (g's)
Position #3 - Right	663.4	67.1	82.1	72.2	1078.1	61.7	97.7	61.7
Position #4 - Left	667.8	72.1	87.1	72.3	1041.9	65.7	101.7	60.9

	CLIP SUMMARY*			
	CLIP (g's)	t <sub>1</sub> (msec)	t <sub>2</sub> (msec)	CSI
Position #3 - Right	49.9	55.6	58.6	509.1
Position #4 - Left	47.8	55.8	58.8	462.4

\* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

**Position 3 Neck Injury Summary (3 Year Old Hybrid III (P572 P) – In Position)**

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.13	137.0	182.1	61.0	3.4
Nte	1.35	91.9	1808.8	-962.2	-17.4
Ncf	0.00	0	0	0	0
Nce	0.60	214.9	-18.8	-287.2	-17.6

**Peak Tension (CFC1000) 2003.7 N Peak Compression (CFC1000) 223.3 N**

**Critical Values**

Nij Intercepts				Peak Limits	
Tension (CVt)	2340 N	Extension (mCVe)	30 N-m	Tension	1430 N
Compression (CVc)	2120 N	Flexion (mCVf)	68 N-m	Compression	-1380 N

Condyle Offset -0.0000

**Position 4 Neck Injury Summary (3 Year Old Hybrid III (P572 P) – In Position)**

Nij V10	Nij	Time (ms)	Z Force (N)	X Force (N)	Y Moment (N-m)
Ntf	0.75	85.5	1754.9	-537.9	0.0
Nte	1.10	73.2	1640.5	-575.6	-11.9
Ncf	0.10	299.9	-30.9	-78.6	5.6
Nce	0.77	212.1	-277.7	-257.9	-19.3

**Peak Tension (CFC1000) 1939.8 N Peak Compression (CFC1000) 284.0 N**

**Critical Values**

Nij Intercepts				Peak Limits	
Tension (CVt)	2340 N	Extension (mCVe)	30 N-m	Tension	1430 N
Compression (CVc)	2120 N	Flexion (mCVf)	68 N-m	Compression	-1380 N

Condyle Offset -0.0000

**DATA SHEET NO. 5**

**CRS PERFORMANCE DATA**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30507

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
<b>P3 CRS X</b>	<b>g</b>	11.2	132.3	-67.0	53.0
<b>P3 CRS Y</b>	<b>g</b>	29.5	68.5	-31.0	71.8
<b>P3 CRS Z</b>	<b>g</b>	12.0	37.0	-23.6	71.6
<b>P3 CRS Resultant</b>	<b>g</b>	70.0	53.1	-	-
<b>P4 CRS X</b>	<b>g</b>	17.1	191.9	-61.8	51.3
<b>P4 CRS Y</b>	<b>g</b>	10.6	268.4	-10.4	280.5
<b>P4 CRS Z</b>	<b>g</b>	18.6	39.6	-29.1	49.4
<b>P4 CRS Resultant</b>	<b>g</b>	67.6	50.1	-	-

**DATA SHEET NO. 5**

**CRS PERFORMANCE DATA (CONTINUED)**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether. NHTSA No. M30507

**POSITION #3 CRS POST-TEST INSPECTION (Serial No. 08JAN03 3681261 P1)**

<b>LOCATION</b>	<b>DAMAGE</b>	<b>REMARKS</b>
Upper Tether Strap	No	-
Upper Tether Buckle	No	-
Upper Tether Hook	No	-
Vehicle Upper Tether Anchor	No	-
Lower Anchor Strap	No	-
Lower Anchor Buckle	No	-
Lower Anchor Hooks	No	-
Vehicle Lower CRS Anchors	No	-
Five Point Harness Connections	No	-
Cracks on CRS	No	-
Fabric Tears on CRS	No	-
Vehicle Seat Structure	No	-
Vehicle Seat Fabric Tears	No	-
Child Dummy	No	-

**POSITION #4 CRS POST-TEST INSPECTION (Serial No. 22NOV02 3691261 P1)**

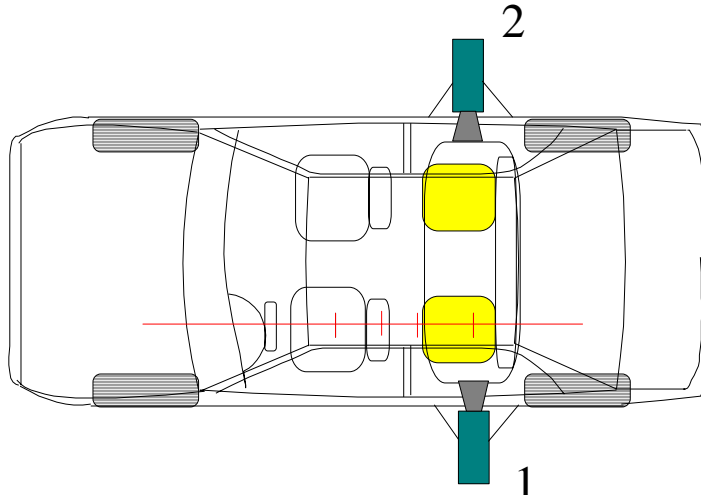
<b>LOCATION</b>	<b>DAMAGE</b>	<b>REMARKS</b>
Upper Tether Strap	No	-
Upper Tether Buckle	No	-
Upper Tether Hook	No	-
Vehicle Upper Tether Anchor	No	-
Lower Anchor Strap	No	-
Lower Anchor Buckle	No	-
Lower Anchor Hooks	No	-
Vehicle Lower CRS Anchors	No	-
Harness Connections	No	-
Overhead Shield	No	The P4 CRS adjustable shield slid to its forward-most adjustment position during the event (a total displacement of 42 mm from its original position). The adjustable shield was verified locked prior to the test.
Cracks on CRS	No	-
Fabric Tears on CRS	No	-
Vehicle Seat Structure	No	-
Vehicle Seat Fabric Tears	No	-
Child Dummy	No	-

**DATA SHEET NO. 6**

**CRS CAMERA DATA**

CRS: Evenflo Vanguard 5 Comfort Touch and Evenflo Vanguard Comfort Touch (with overhead shield) forward facing convertibles secured with LATCH and top tether.

NHTSA No. M30507



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	3280	2920	2535	-26.5	25	1020
2	Right side CRS lateral view	3390	2930	2500	-24.8	25	1030

\* Reference (from point of impact); all measurements accurate to within  $\pm 6$  mm.

- X = + Forward
- Y = + To Right
- Z = + Down

**SECTION 3**

**PHOTOGRAPHS**

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Figure 3-1: CLOSE-UP VIEW OF POSITION 3 CRS LABEL



Figure 3-2: PRE-TEST FRONTAL VIEW OF POSITION 3 CRS



Figure 3-3: POST-TEST FRONTAL VIEW OF POSITION 3 CRS



Figure 3-4: PRE-TEST REAR VIEW OF POSITION 3 CRS



Figure 3-5: POST-TEST REAR VIEW OF POSITION 3 CRS



Figure 3-6: PRE-TEST LEFT SIDE VIEW OF POSITION 3 CRS



Figure 3-7: POST-TEST LEFT SIDE VIEW OF POSITION 3 CRS



Figure 3-8: PRE-TEST RIGHT SIDE VIEW OF POSITION 3 CRS



Figure 3-9: POST-TEST RIGHT SIDE VIEW OF POSITION 3 CRS



Figure 3-10: CLOSE-UP VIEW OF POSITION 4 CRS LABEL



Figure 3-11: PRE-TEST FRONTAL VIEW OF POSITION 4 CRS



Figure 3-12: POST-TEST FRONTAL VIEW OF POSITION 4 CRS



Figure 3-13: PRE-TEST REAR VIEW OF POSITION 4 CRS



Figure 3-14: POST-TEST REAR VIEW OF POSITION 4 CRS



Figure 3-15: PRE-TEST LEFT SIDE VIEW OF POSITION 4 CRS



Figure 3-16: POST-TEST LEFT SIDE VIEW OF POSITION 4 CRS



Figure 3-17: PRE-TEST RIGHT SIDE VIEW OF POSITION 4 CRS



Figure 3-18: POST-TEST RIGHT SIDE VIEW OF POSITION 4 CRS



Figure 3-19: PRE-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-20: POST-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-21: PRE-TEST POSITION 4 LEFT SIDE VIEW



Figure 3-22: POST-TEST POSITION 4 LEFT SIDE VIEW



Figure 3-23: PRE-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-24: POST-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-25: PRE-TEST POSITION 4 RIGHT SIDE VIEW



Figure 3-26: POST-TEST POSITION 4 RIGHT SIDE VIEW



Figure 3-27: PRE-TEST POSITION 3 FRONT VIEW



Figure 3-28: POST-TEST POSITION 3 FRONT VIEW



Figure 3-29: PRE-TEST POSITION 4 FRONT VIEW



Figure 3-30: POST-TEST POSITION 4 FRONT VIEW

## **SECTION 4**

### **CHILD DUMMY RESPONSE AND CRS DATA TRACES**

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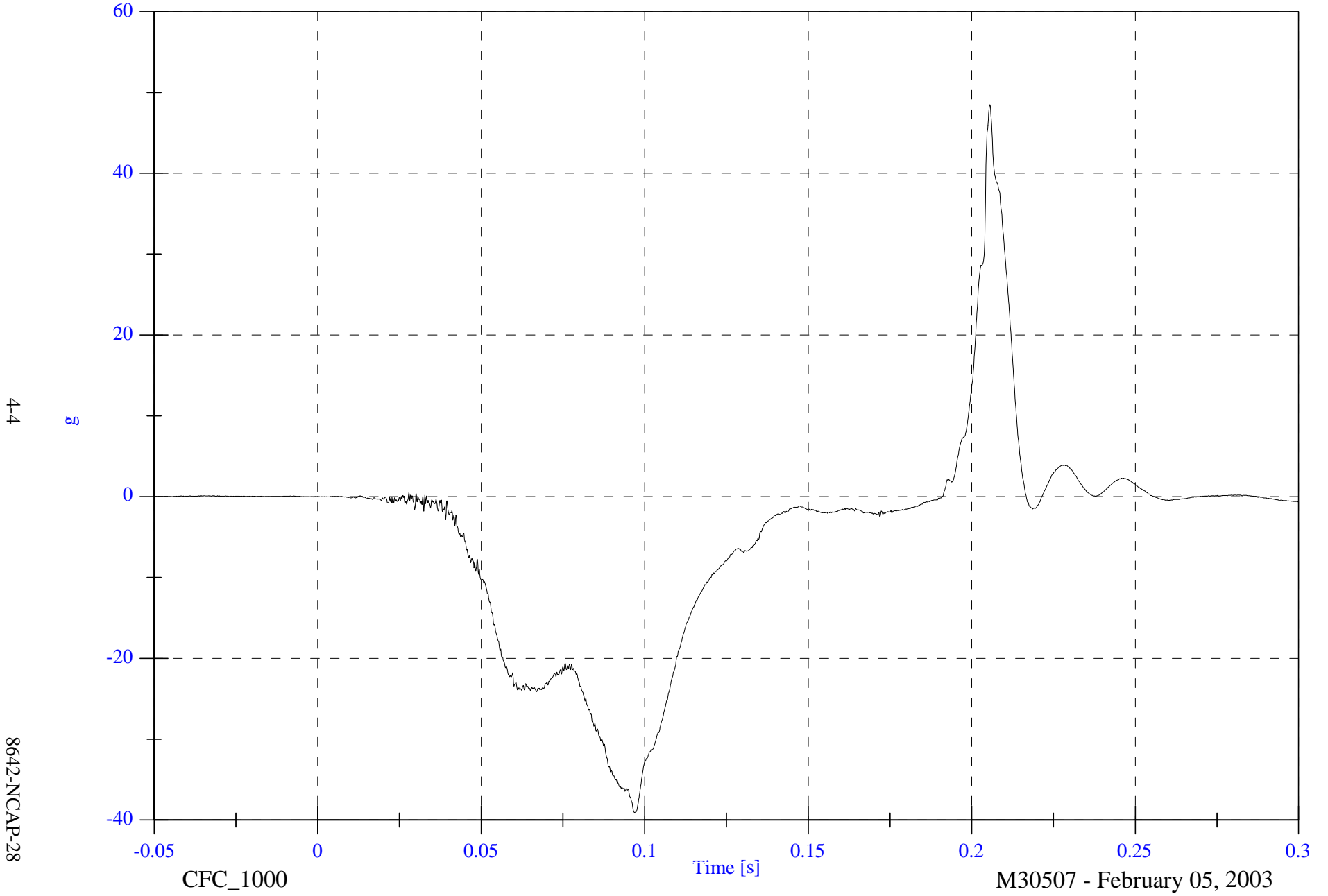
47	V1P4 Upper Neck Fy [N, CFC_1000]	4-50
48	V1P4 Upper Neck Fz [N, CFC_1000]	4-51
49	V1P4 Upper Neck F Resultant [N, CFC_1000]	4-52
50	V1P4 Upper Neck Mx [N-m, CFC_600]	4-53
51	V1P4 Upper Neck My [N-m, CFC_600]	4-54
52	V1P4 Upper Neck Mz [N-m, CFC_600]	4-55
53	V1P4 Upper Neck M Resultant [N-m, CFC_600]	4-56
54	V1P4 Lower Neck Fx [N, CFC_1000]	4-57
55	V1P4 Lower Neck Fy [N, CFC_1000]	4-58
56	V1P4 Lower Neck Fz [N, CFC_1000]	4-59
57	V1P4 Lower Neck F Resultant [N, CFC_1000]	4-60
58	V1P4 Lower Neck Mx [N-m, CFC_600]	4-61
59	V1P4 Lower Neck My [N-m, CFC_600]	4-62
60	V1P4 Lower Neck Mz [N-m, CFC_600]	4-63
61	V1P4 Lower Neck M Resultant [N-m, CFC_600]	4-64
62	V1P4 Chest x [g, CFC_180]	4-65
63	V1P4 Chest y [g, CFC_180]	4-66
64	V1P4 Chest z [g, CFC_180]	4-67
65	V1P4 Chest Resultant [g, CFC_180]	4-68
66	V1P4 Chest Compression [mm, CFC_600]	4-69
67	V1P4 Pelvic x [g, CFC_1000]	4-70
68	V1P4 Pelvic y [g, CFC_1000]	4-71
69	V1P4 Pelvic z [g, CFC_1000]	4-72
70	V1P4 Pelvic Resultant [g, CFC_1000]	4-73
71	V1P4 CRS Tether Belt [N, CFC_60]	4-74
72	V1P4 CRS x [g, CFC_60]	4-75
73	V1P4 CRS x Velocity [kph, CFC_180]	4-76
74	V1P4 CRS x Displacement [mm, CFC_180]	4-77
75	V1P4 CRS y [g, CFC_60]	4-78
76	V1P4 CRS y Velocity [kph, CFC_180]	4-79
77	V1P4 CRS y Displacement [mm, CFC_180]	4-80
78	V1P4 CRS z [g, CFC_60]	4-81
79	V1P4 CRS z Velocity [kph, CFC_180]	4-82
80	V1P4 CRS z Displacement [mm, CFC_180]	4-83
81	V1P4 CRS Resultant [g, CFC_60]	4-84

NCAP Test #6 - 2003 Subaru Forester

V1P3 Head x

Max: 48.5 [g] at 0.206 [s]

Min: -39.1 [g] at 0.097 [s]

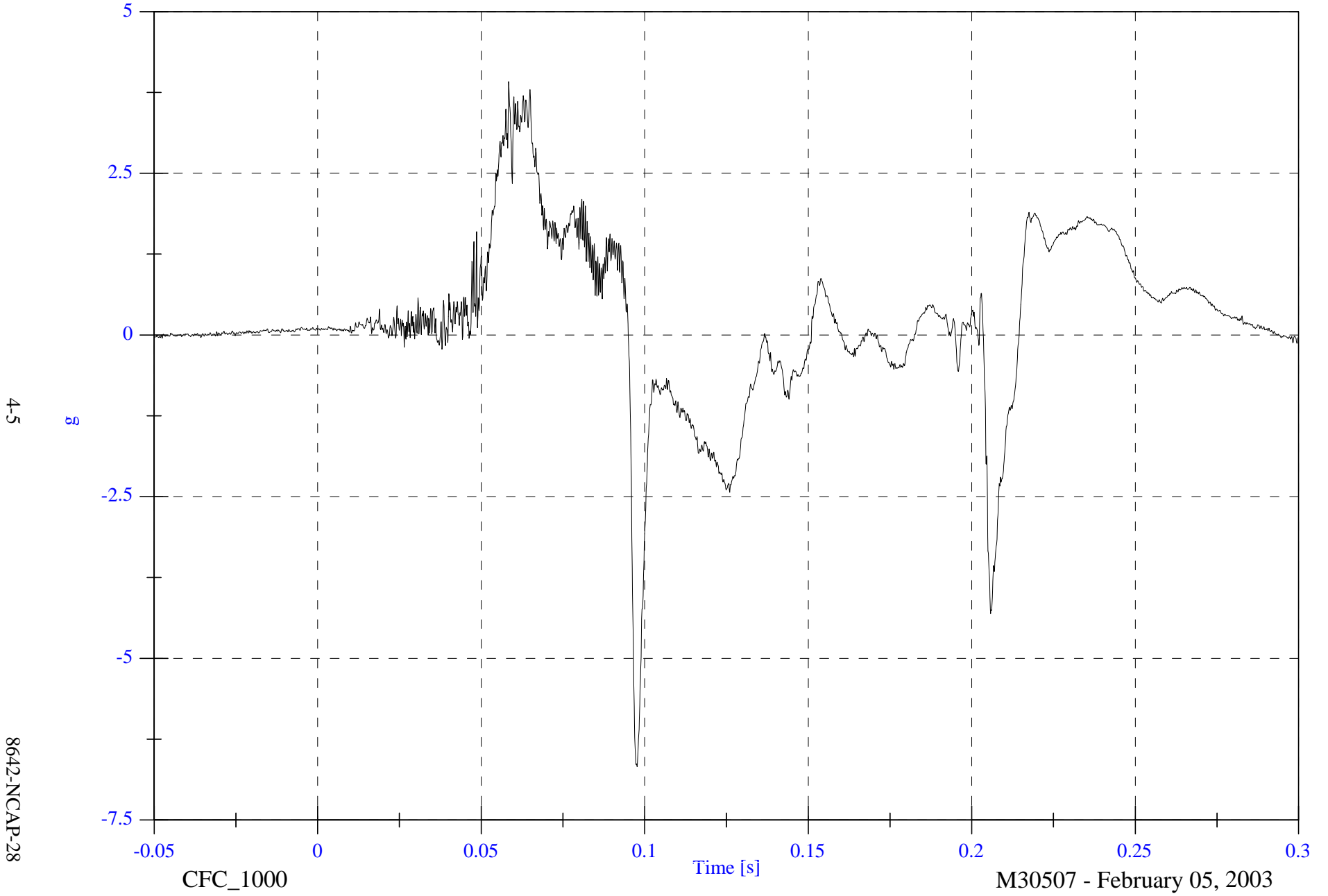


NCAP Test #6 - 2003 Subaru Forester

V1P3 Head y

Max: 3.9 [g] at 0.058 [s]

Min: -6.7 [g] at 0.098 [s]



4-5

g

8642-NCAP-28

CFC\_1000

Time [s]

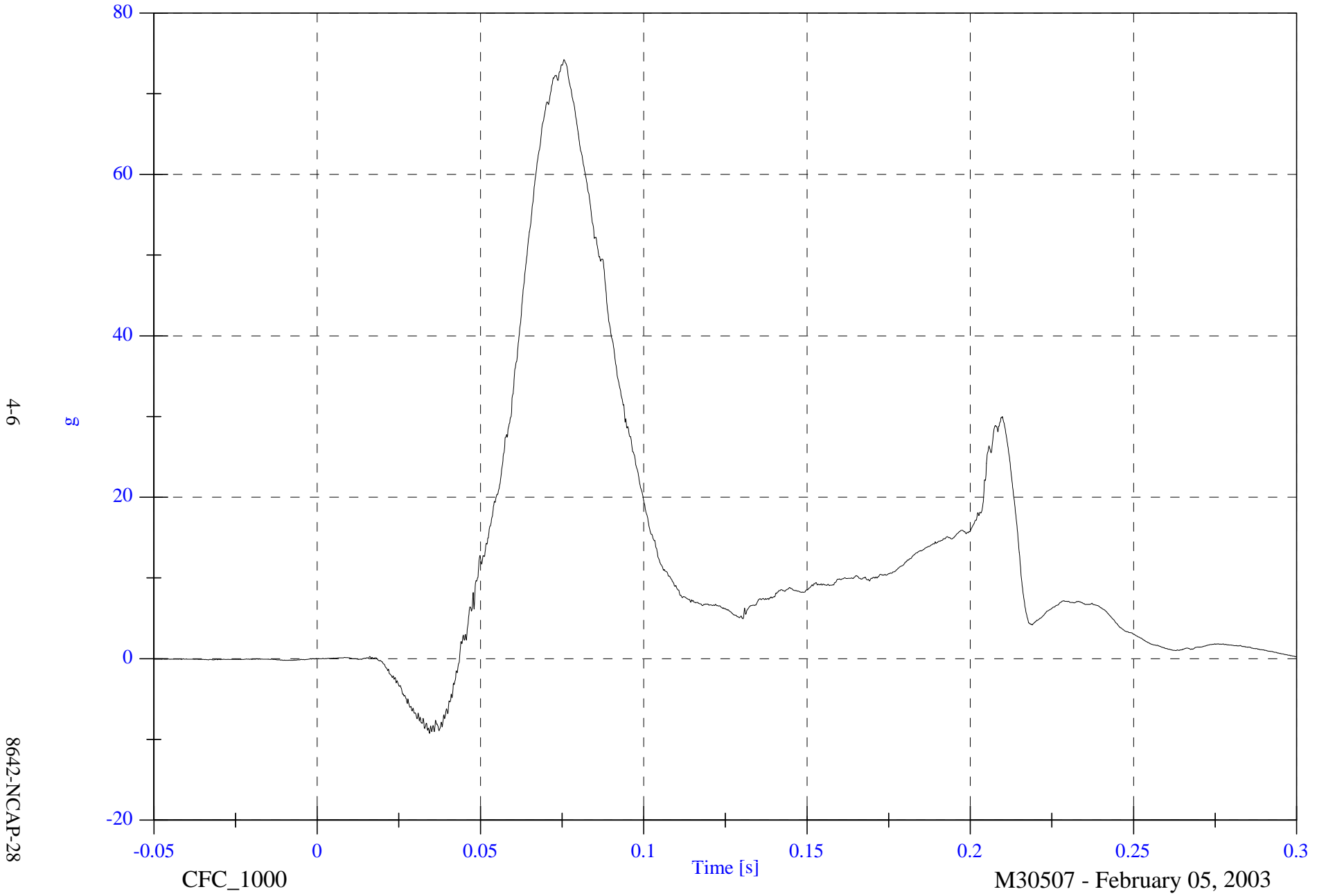
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P3 Head z

Max: 74.2 [g] at 0.076 [s]

Min: -9.2 [g] at 0.034 [s]



4-6

g

8642-NCAP-28

CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

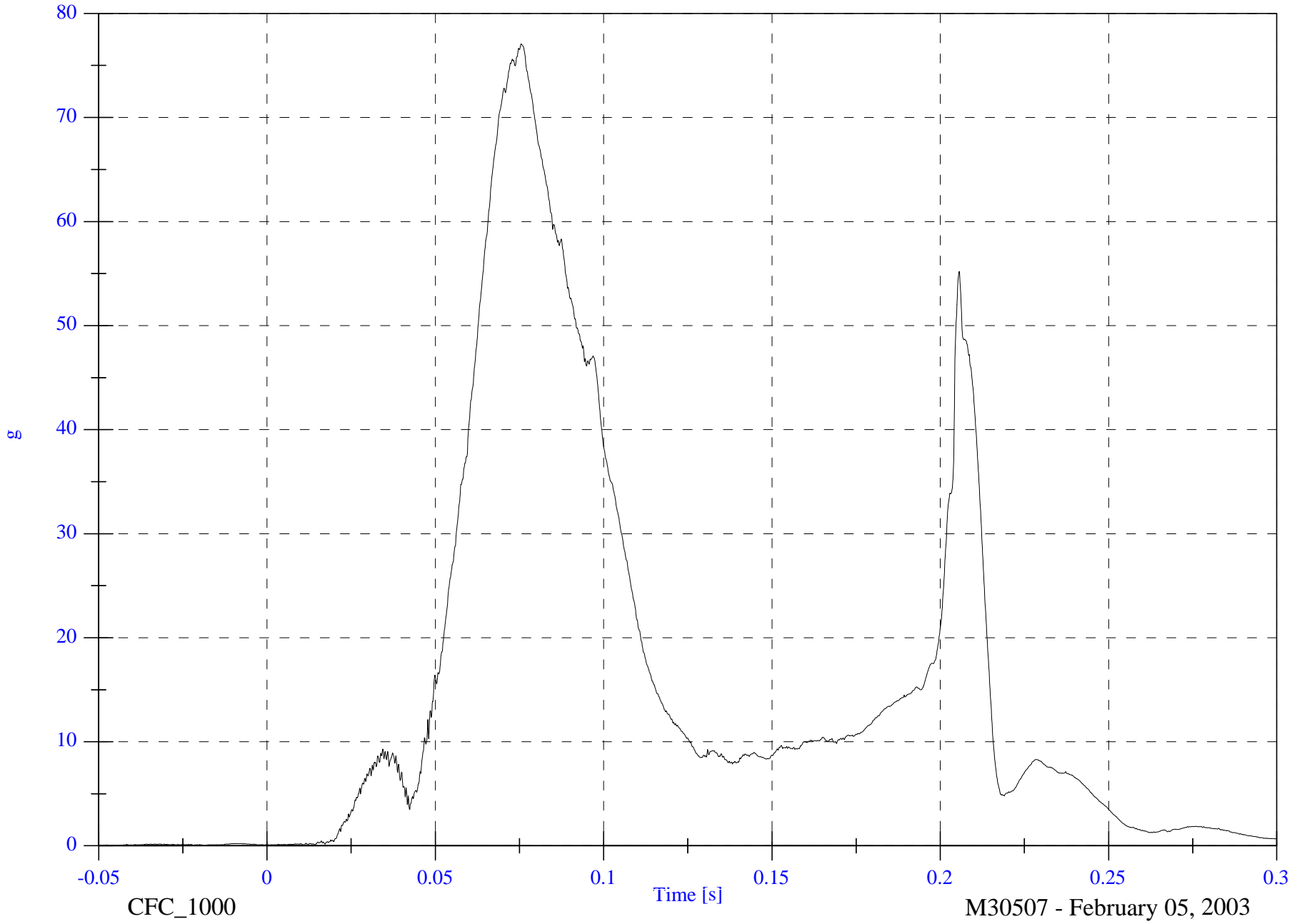
V1P3 Head Resultant

Max: 77.1 [g] at 0.076 [s]

Min: 0.0 [g] at -0.047 [s]

4-7

8642-NCAP-28



CFC\_1000

Time [s]

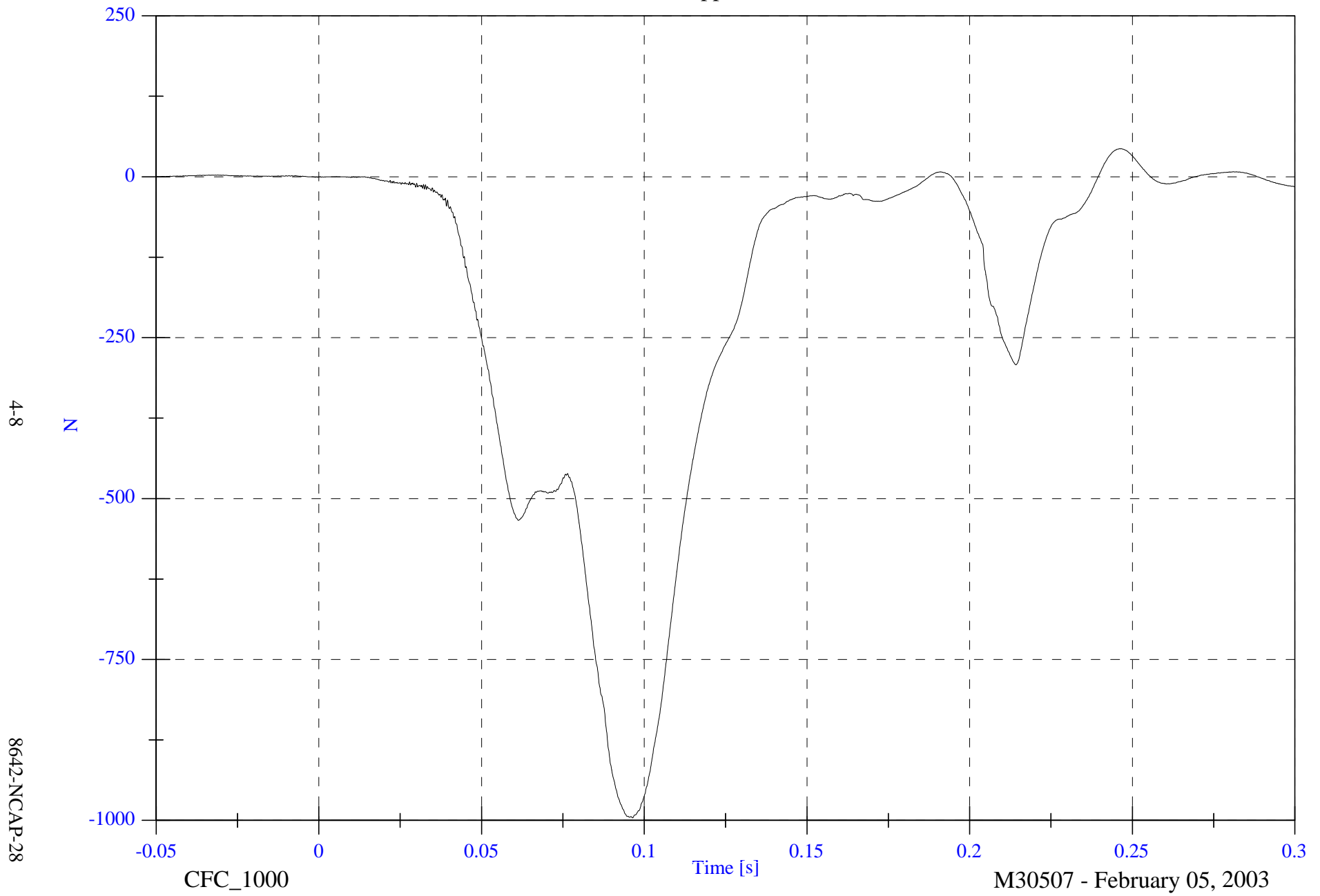
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P3 Upper Neck Fx

Max: 43.4 [N] at 0.247 [s]

Min: -996.0 [N] at 0.096 [s]



4-8

N

8642-NCAP-28

CFC\_1000

Time [s]

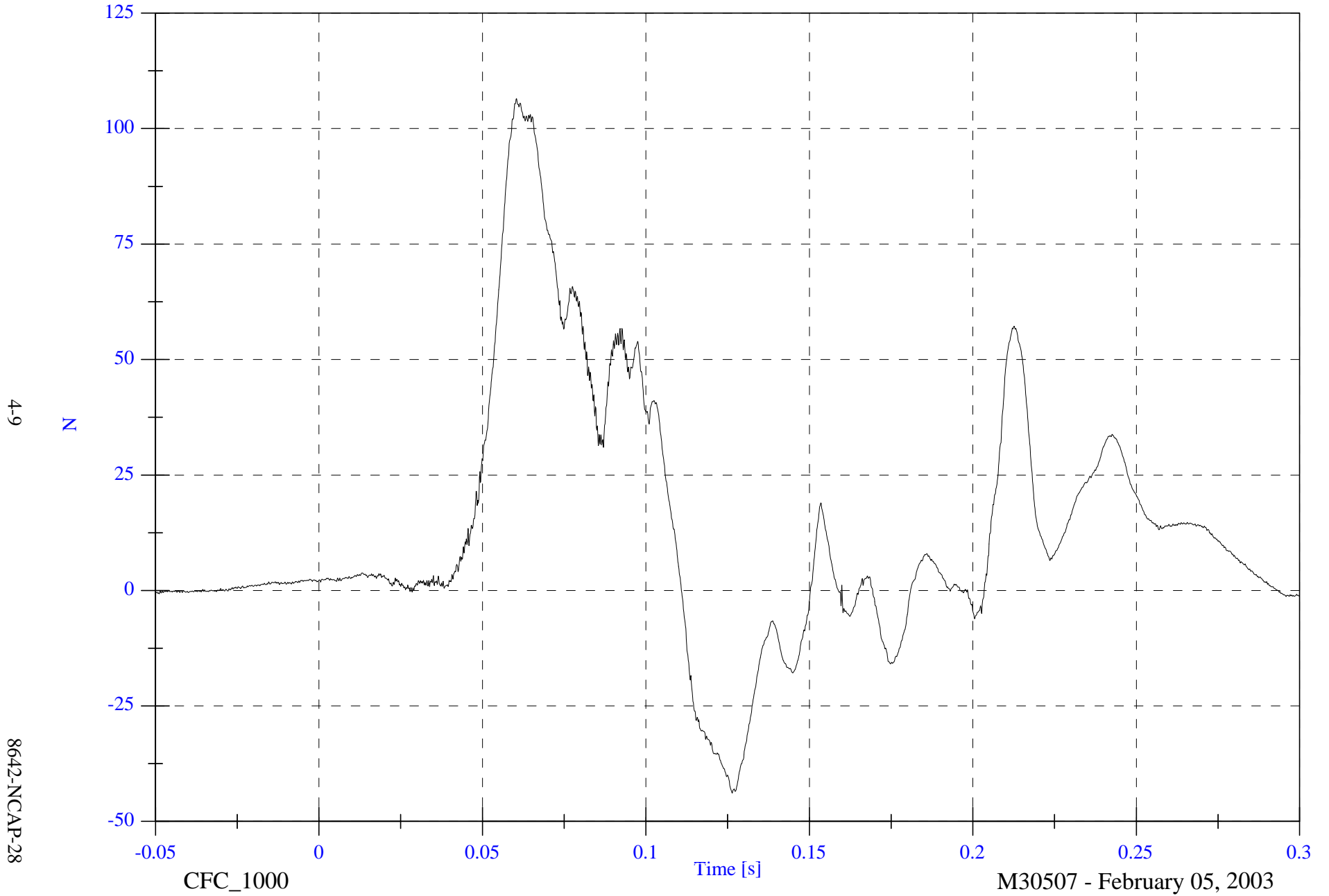
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P3 Upper Neck Fy

Max: 106.5 [N] at 0.060 [s]

Min: -43.9 [N] at 0.126 [s]



4-9

8642-NCAP-28

CFC\_1000

Time [s]

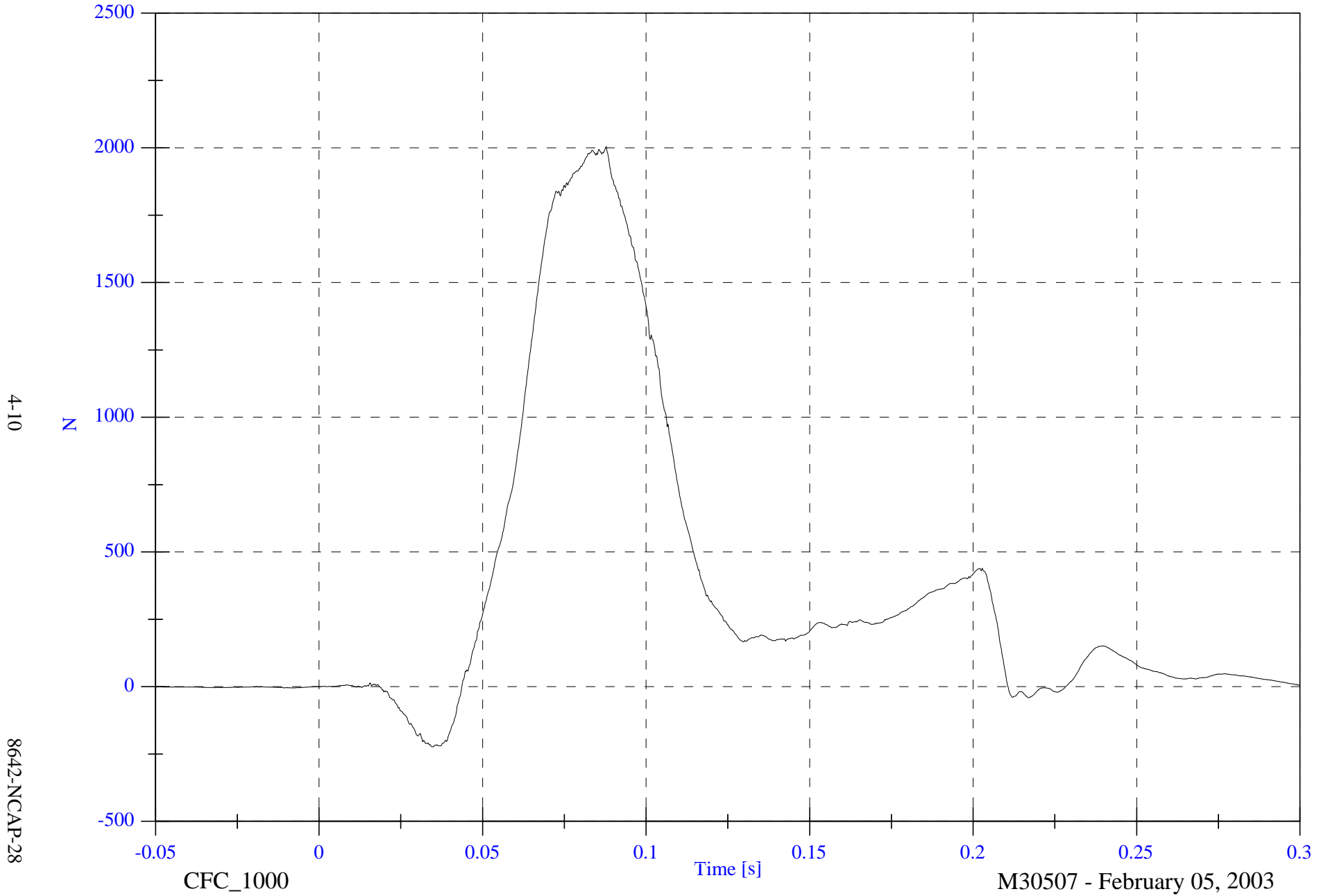
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P3 Upper Neck Fz

Max: 2003.7 [N] at 0.088 [s]

Min: -223.3 [N] at 0.035 [s]



4-10

8642-NCAP-28

CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

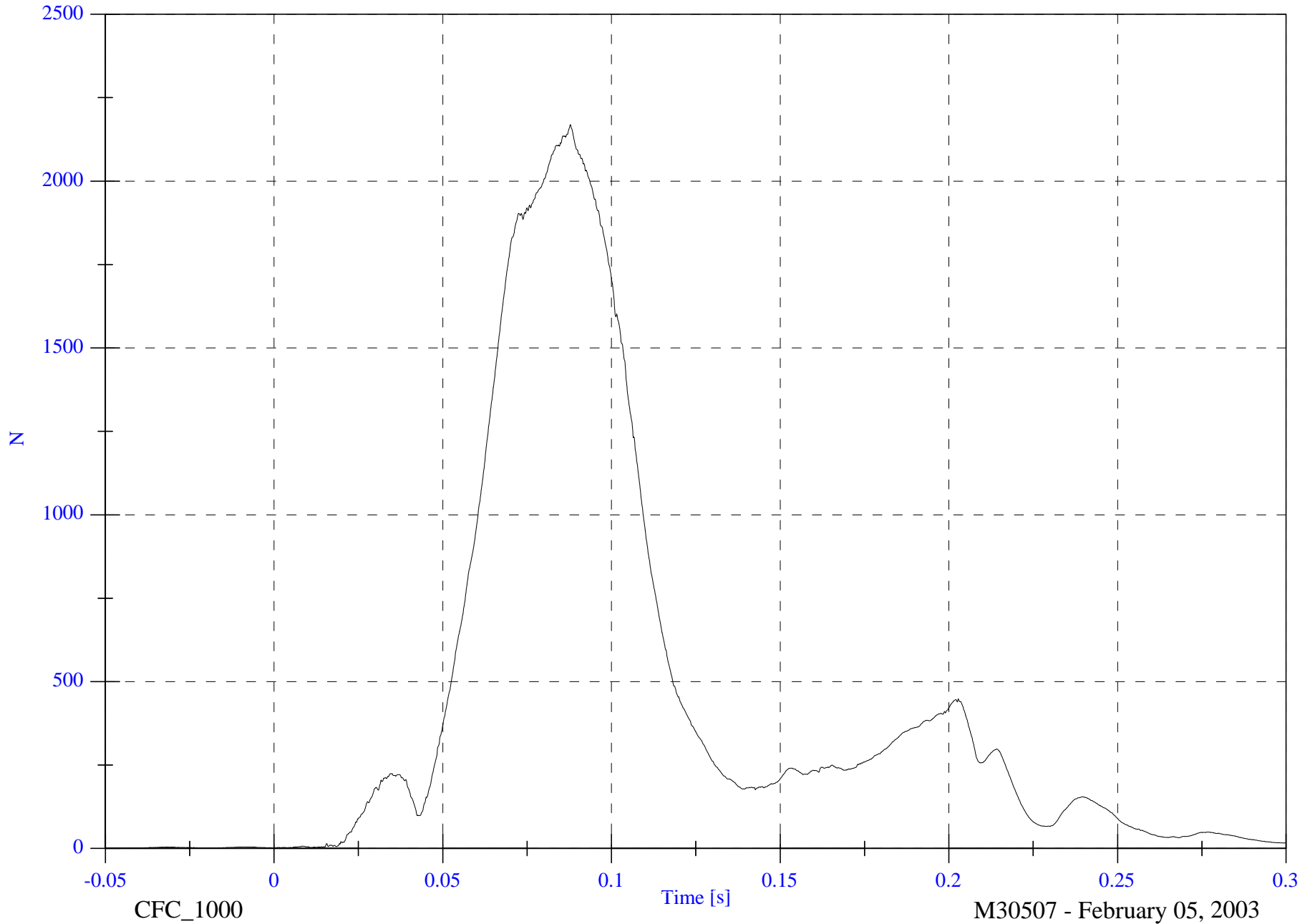
V1P3 Upper Neck F Resultant

Max: 2169.4 [N] at 0.088 [s]

Min: 0.4 [N] at -0.048 [s]

4-11

8642-NCAP-28



CFC\_1000

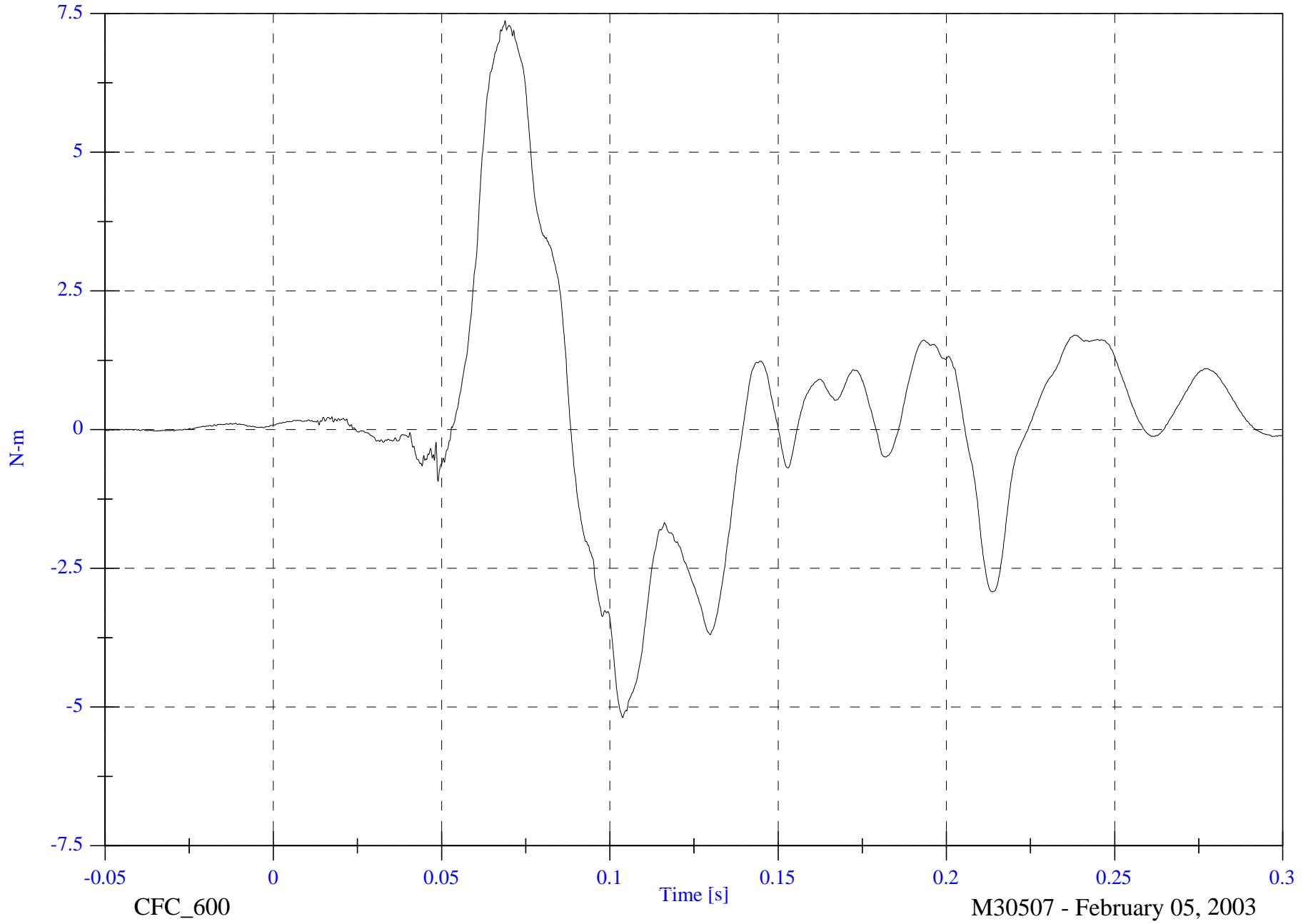
Time [s]

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V1P3 Upper Neck Mx

4-12

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

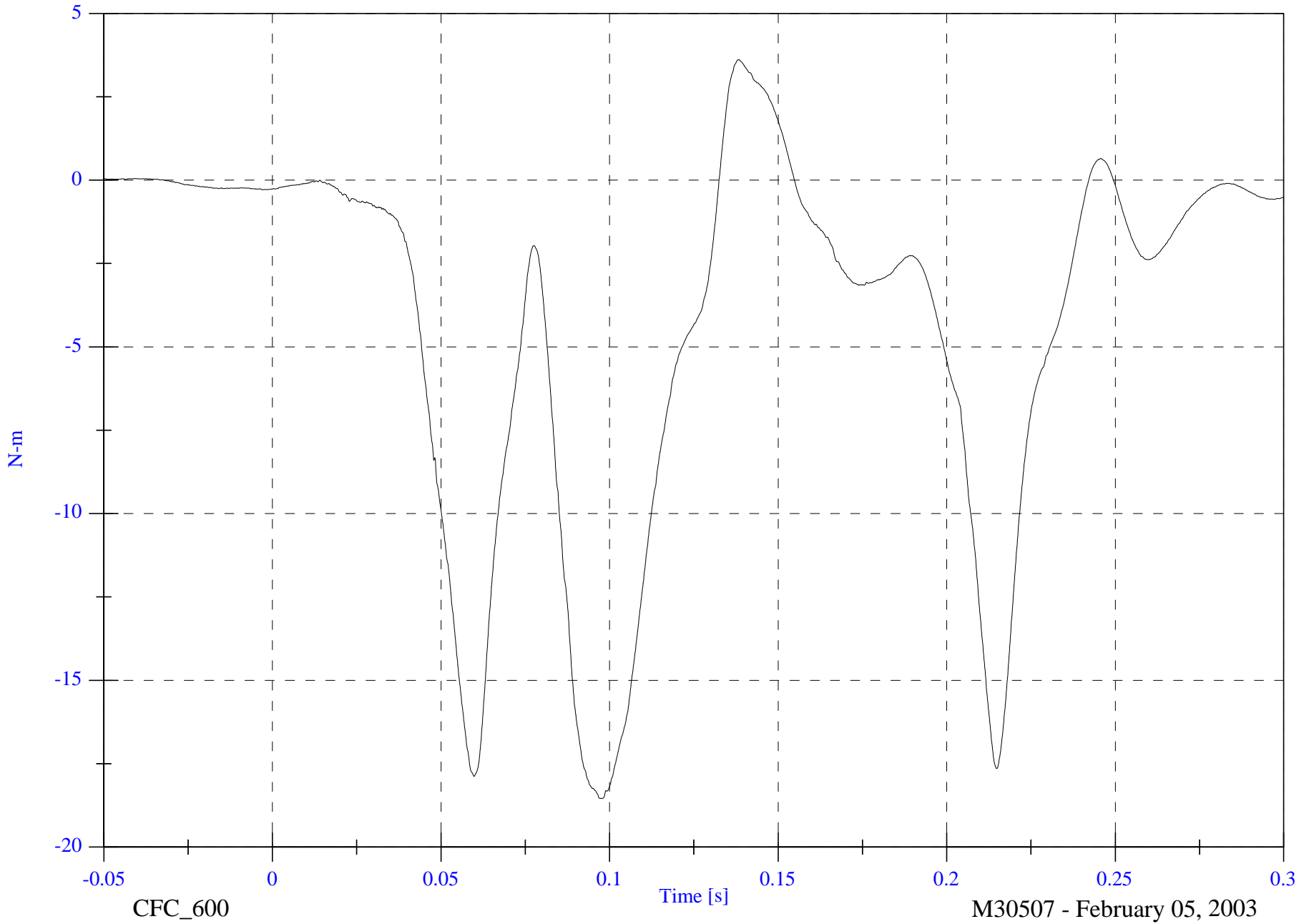
V1P3 Upper Neck My

Max: 3.6 [N-m] at 0.138 [s]

Min: -18.5 [N-m] at 0.098 [s]

4-13

8642-NCAP-28



CFC\_600

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

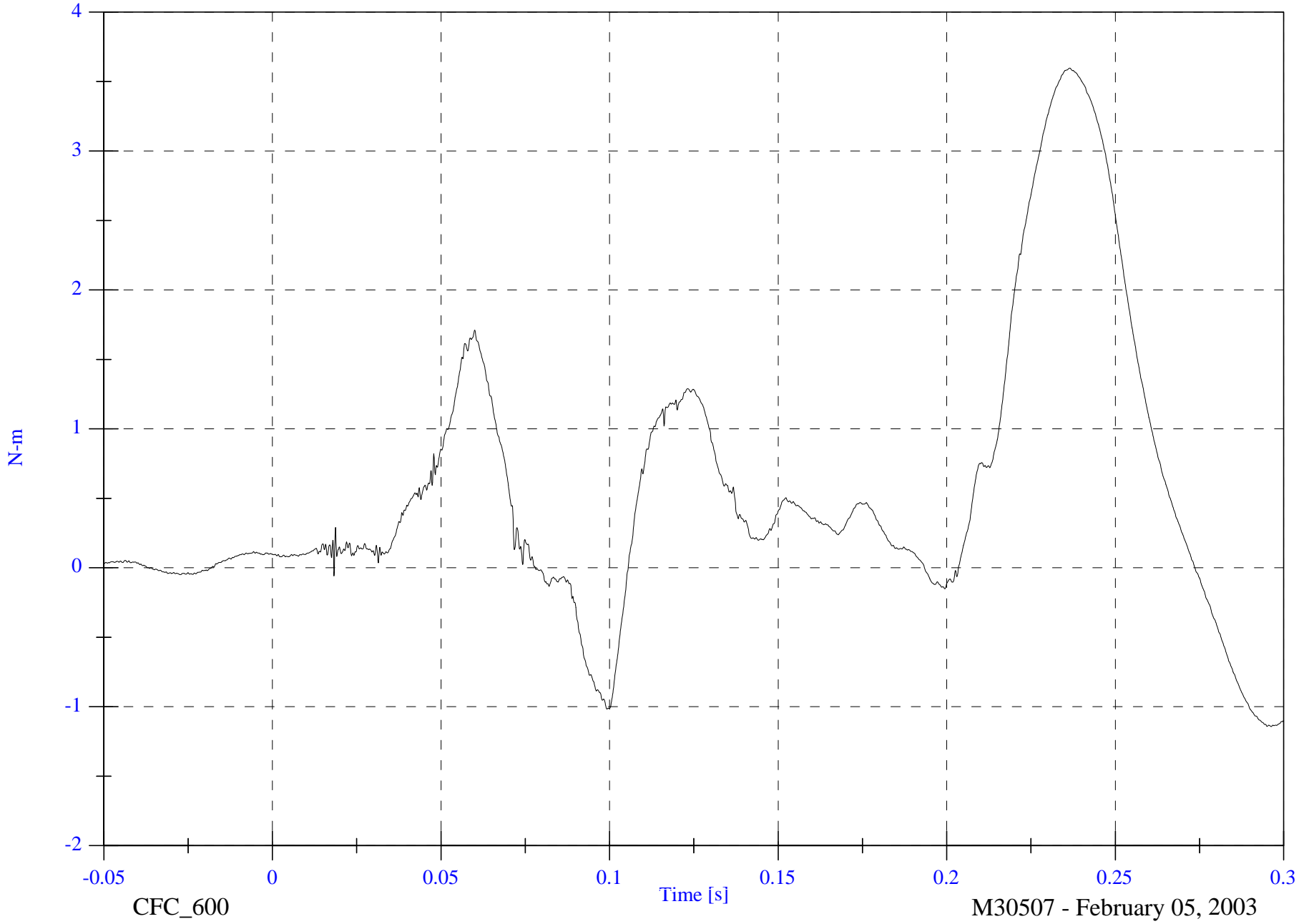
V1P3 Upper Neck Mz

Max: 3.6 [N-m] at 0.236 [s]

Min: -1.1 [N-m] at 0.296 [s]

4-14

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

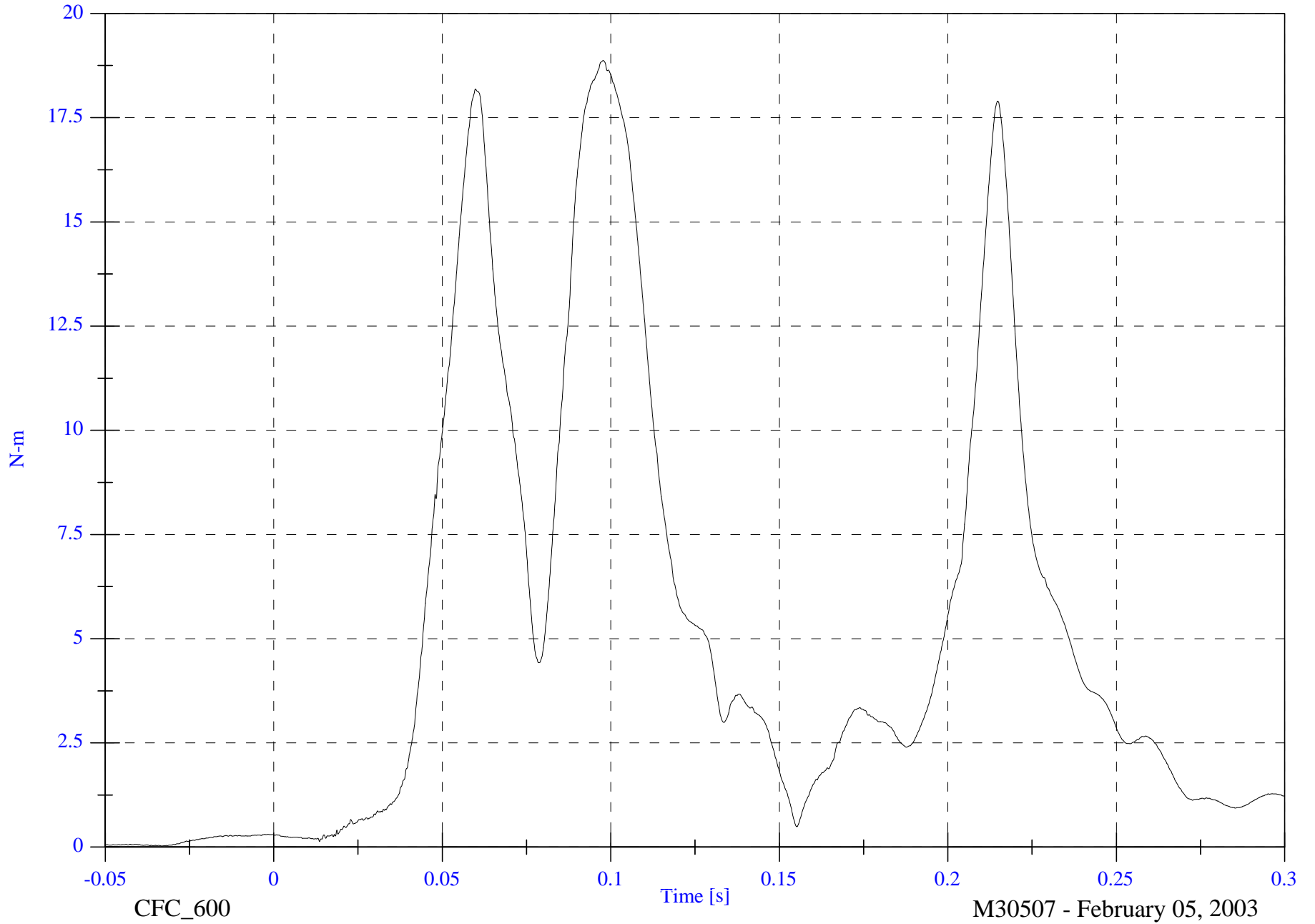
V1P3 Upper Neck M Resultant

Max: 18.9 [N-m] at 0.098 [s]

Min: 0.0 [N-m] at -0.033 [s]

4-15

8642-NCAP-28



CFC\_600

Time [s]

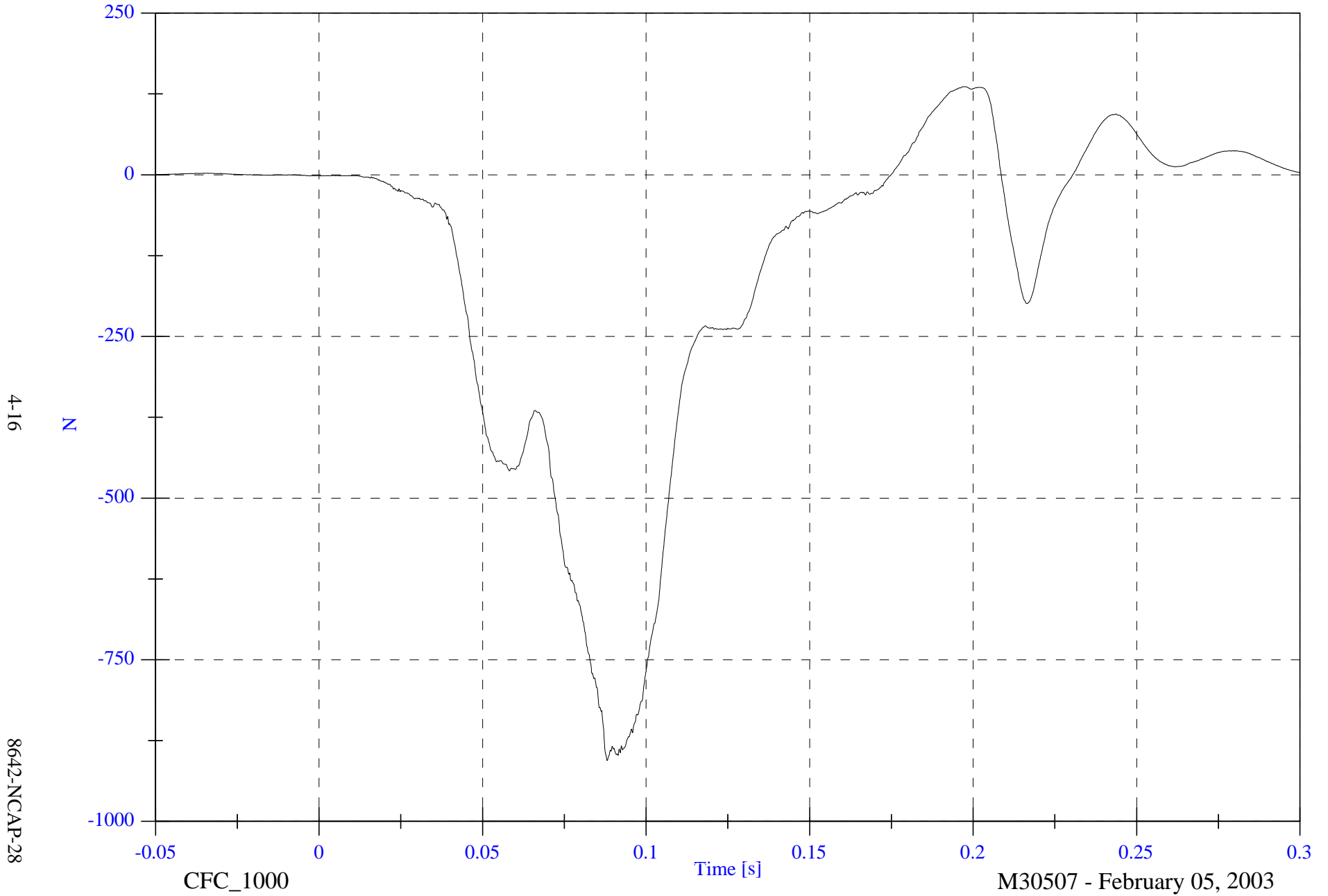
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P3 Lower Neck Fx

Max: 136.2 [N] at 0.198 [s]

Min: -905.9 [N] at 0.088 [s]



4-16

8642-NCAP-28

CFC\_1000

Time [s]

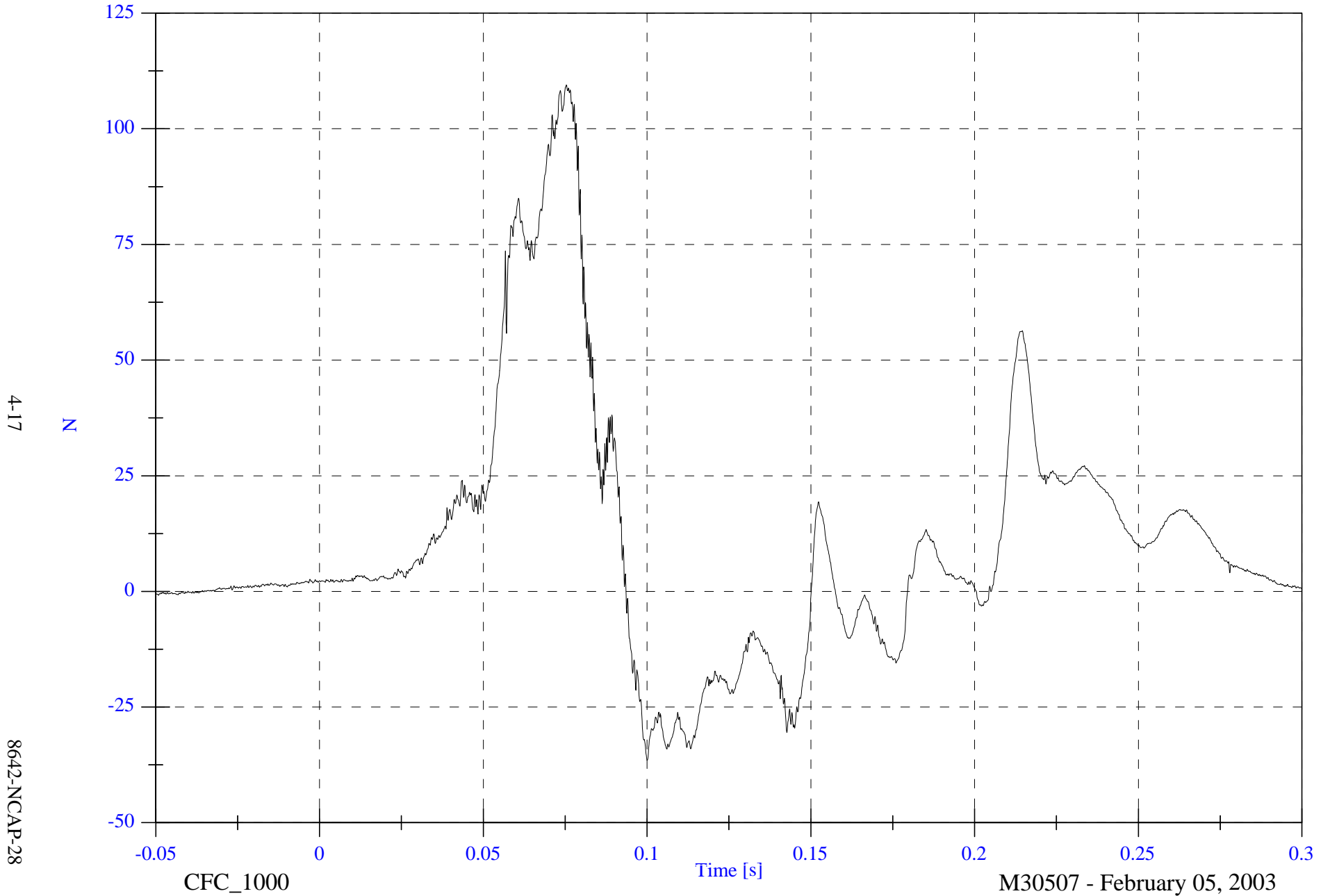
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P3 Lower Neck Fy

Max: 109.5 [N] at 0.075 [s]

Min: -36.6 [N] at 0.100 [s]



4-17

8642-NCAP-28

CFC\_1000

Time [s]

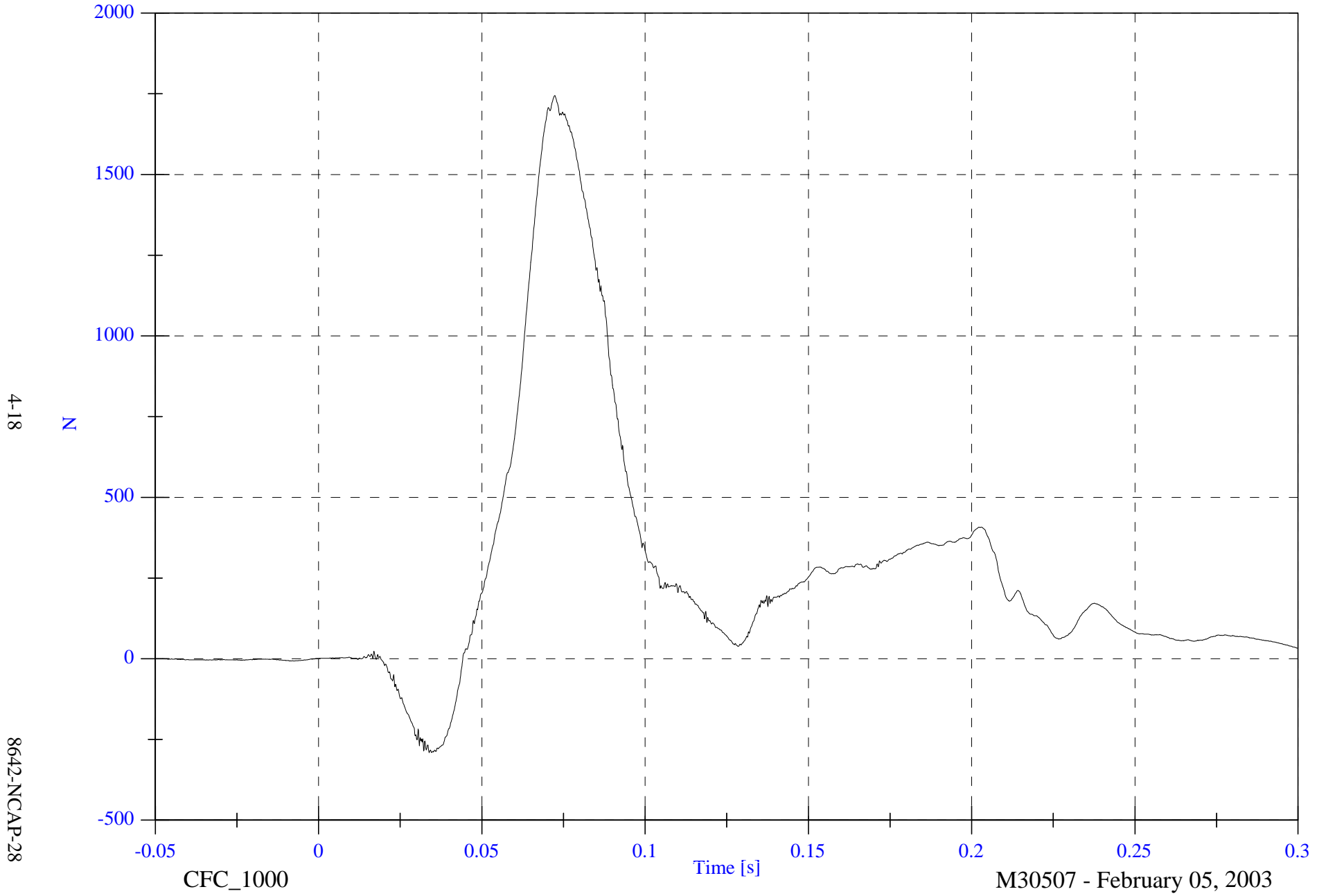
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P3 Lower Neck Fz

Max: 1744.5 [N] at 0.072 [s]

Min: -291.1 [N] at 0.034 [s]



4-18

8642-NCAP-28

CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

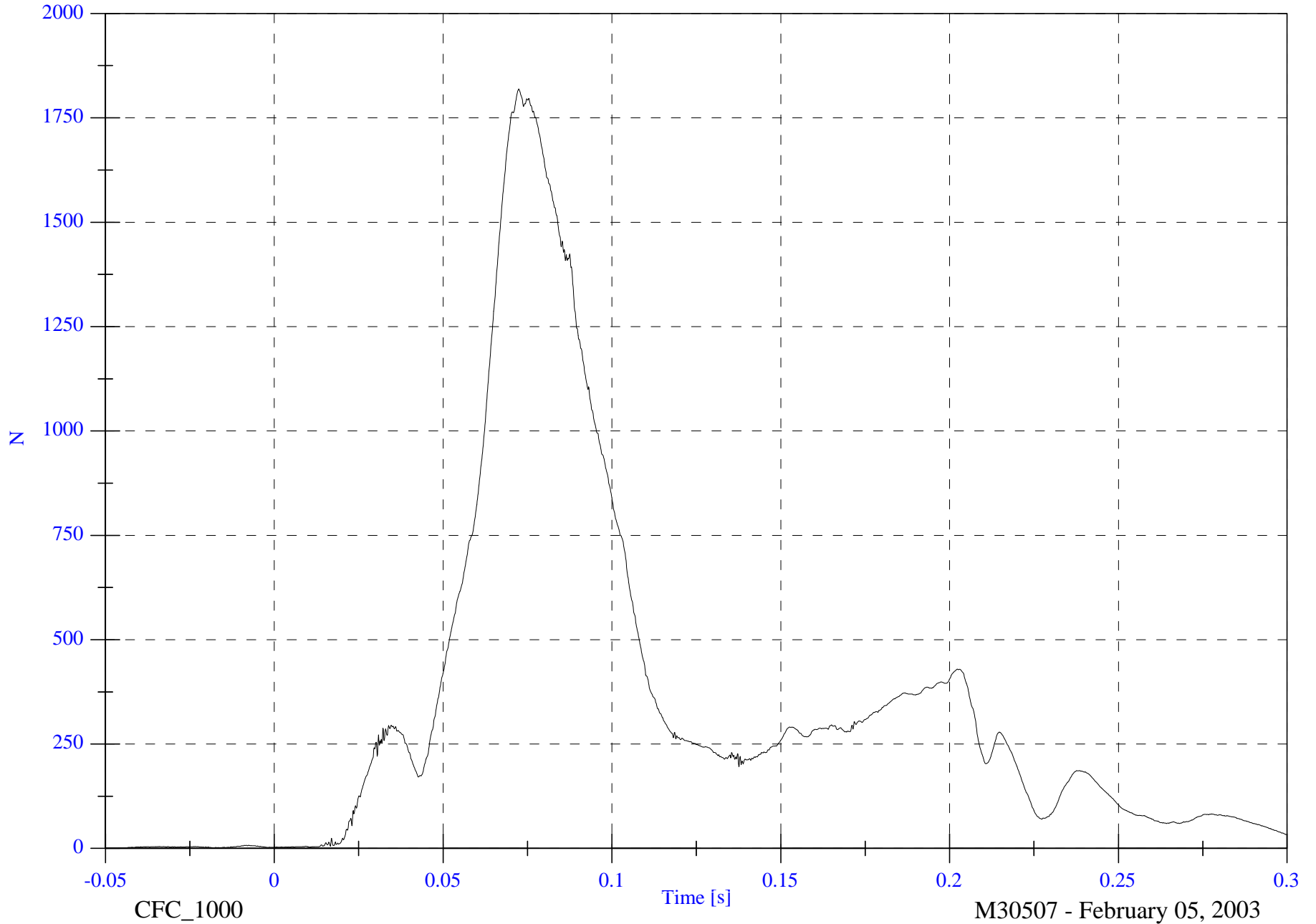
V1P3 Lower Neck F Resultant

Max: 1819.1 [N] at 0.072 [s]

Min: 0.5 [N] at -0.048 [s]

4-19

8642-NCAP-28



CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

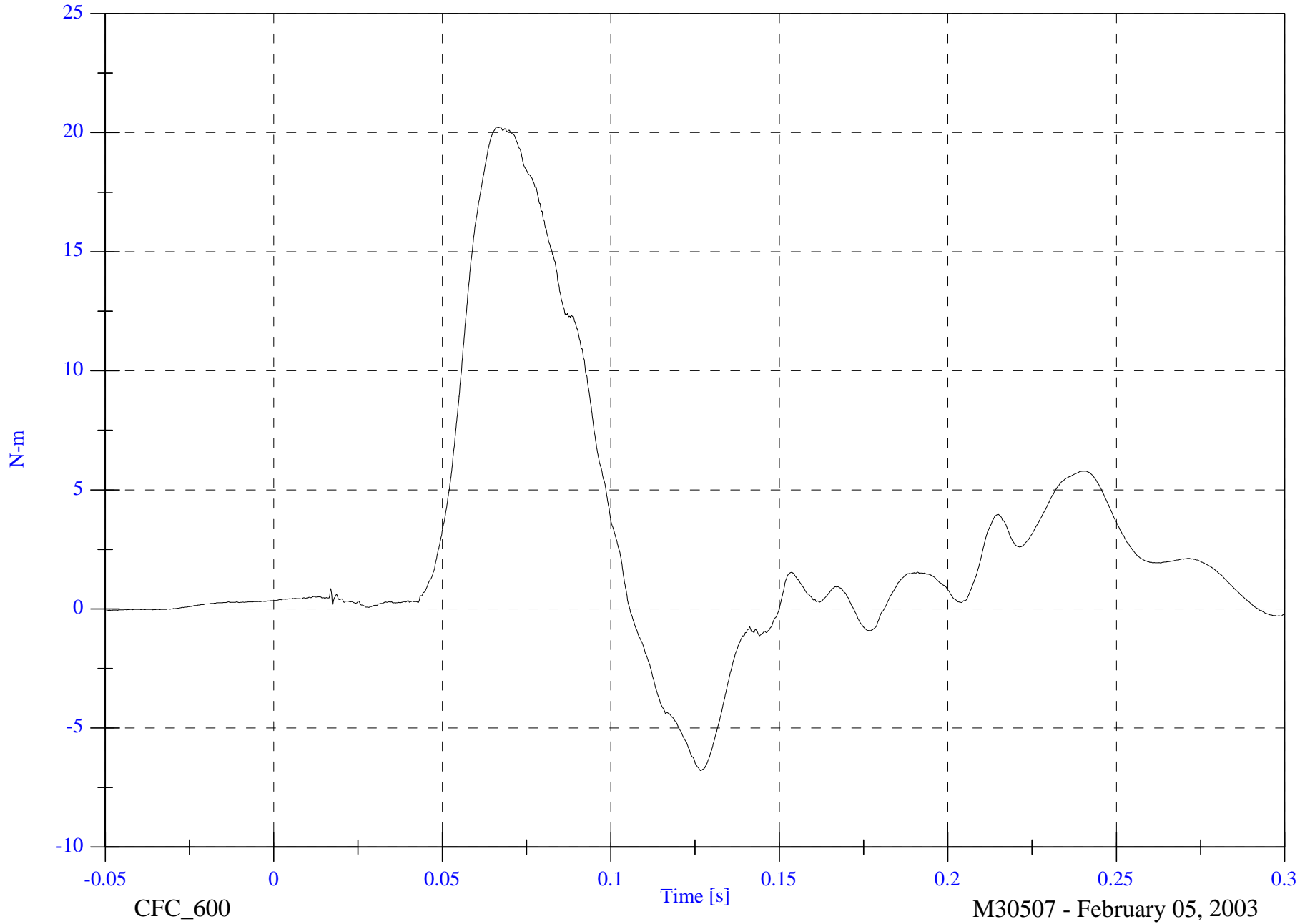
V1P3 Lower Neck Mx

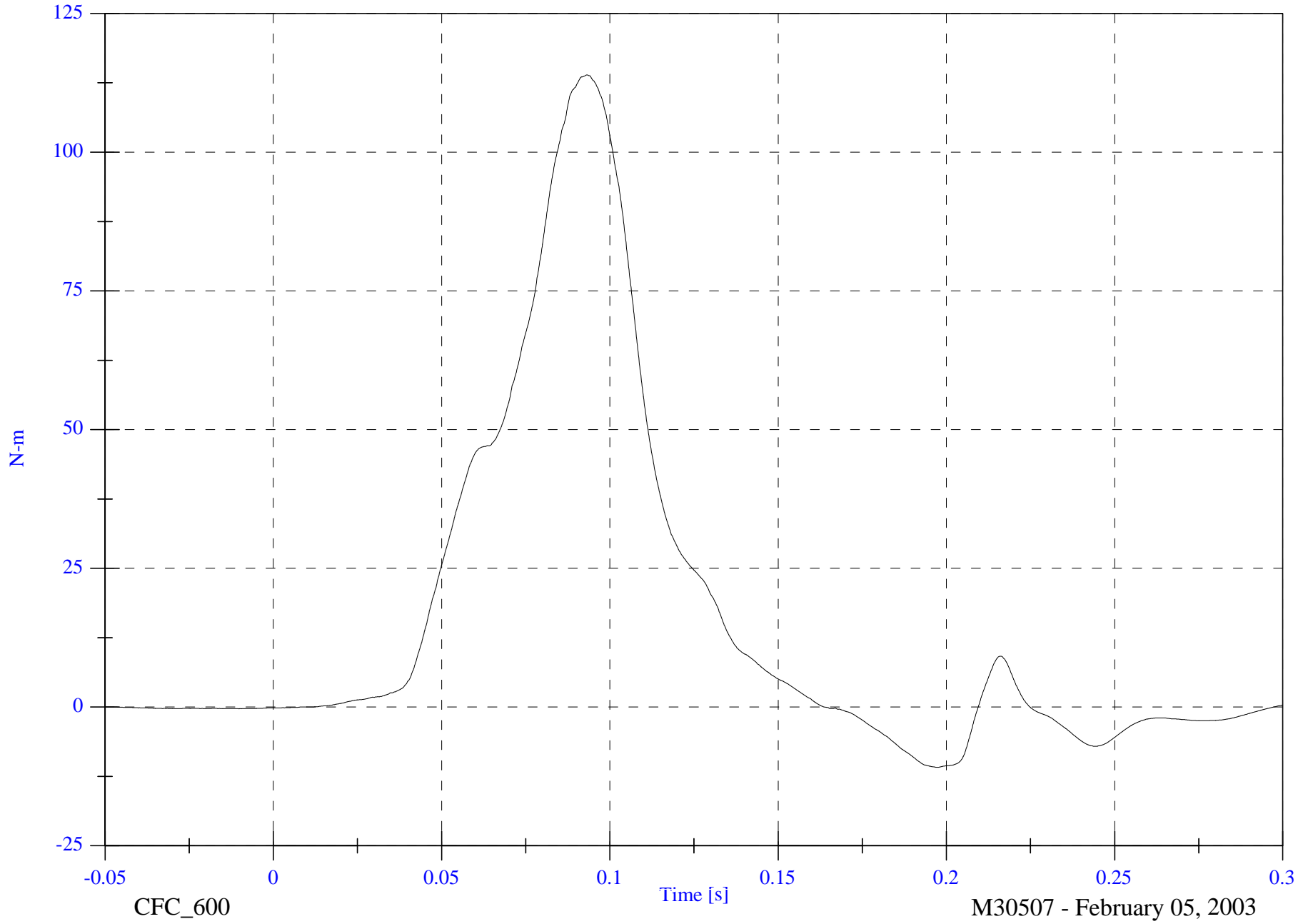
Max: 20.2 [N-m] at 0.067 [s]

Min: -6.8 [N-m] at 0.127 [s]

4-20

8642-NCAP-28





NCAP Test #6 - 2003 Subaru Forester

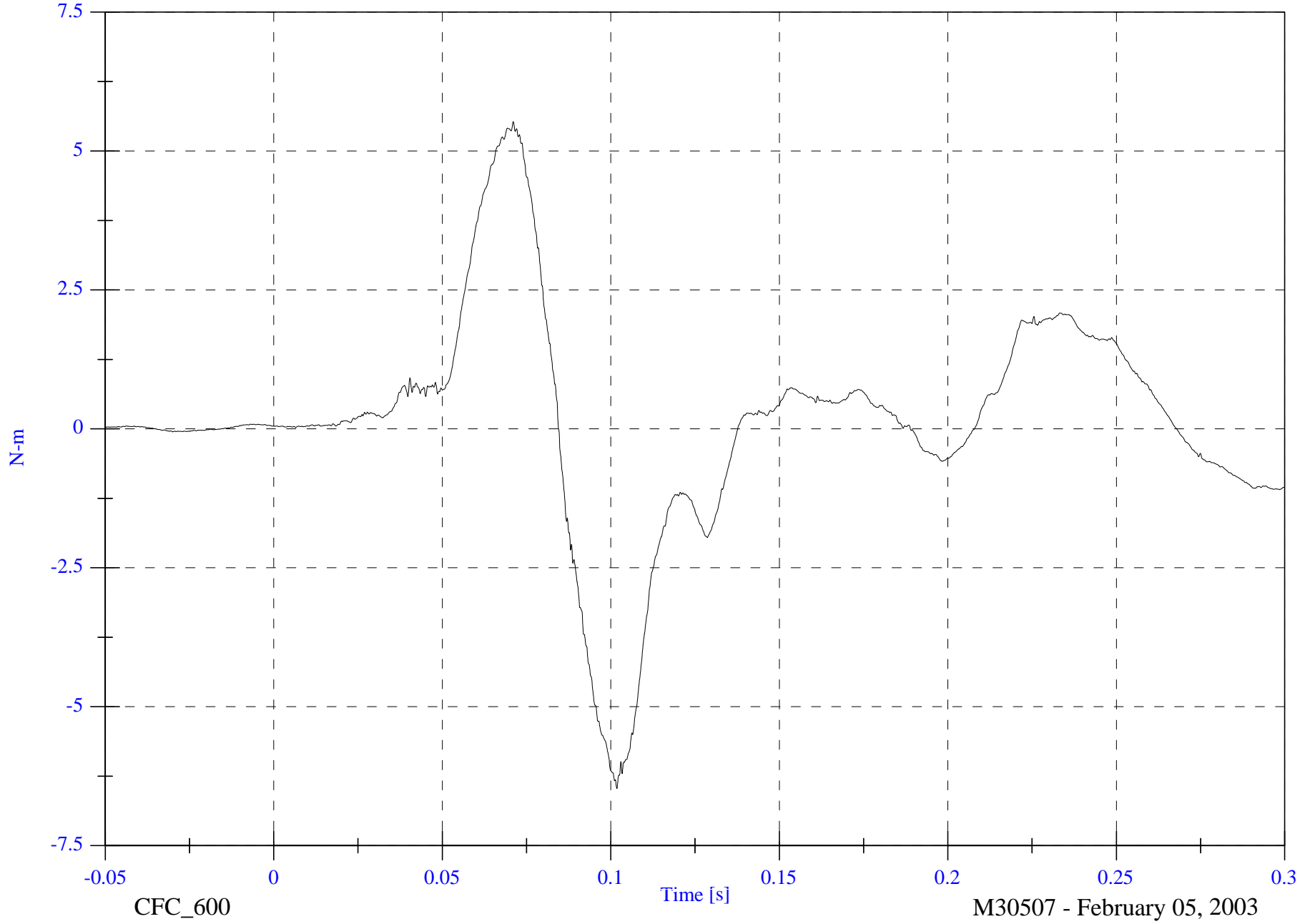
V1P3 Lower Neck Mz

Max: 5.5 [N-m] at 0.071 [s]

Min: -6.5 [N-m] at 0.102 [s]

4-22

8642-NCAP-28



CFC\_600

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

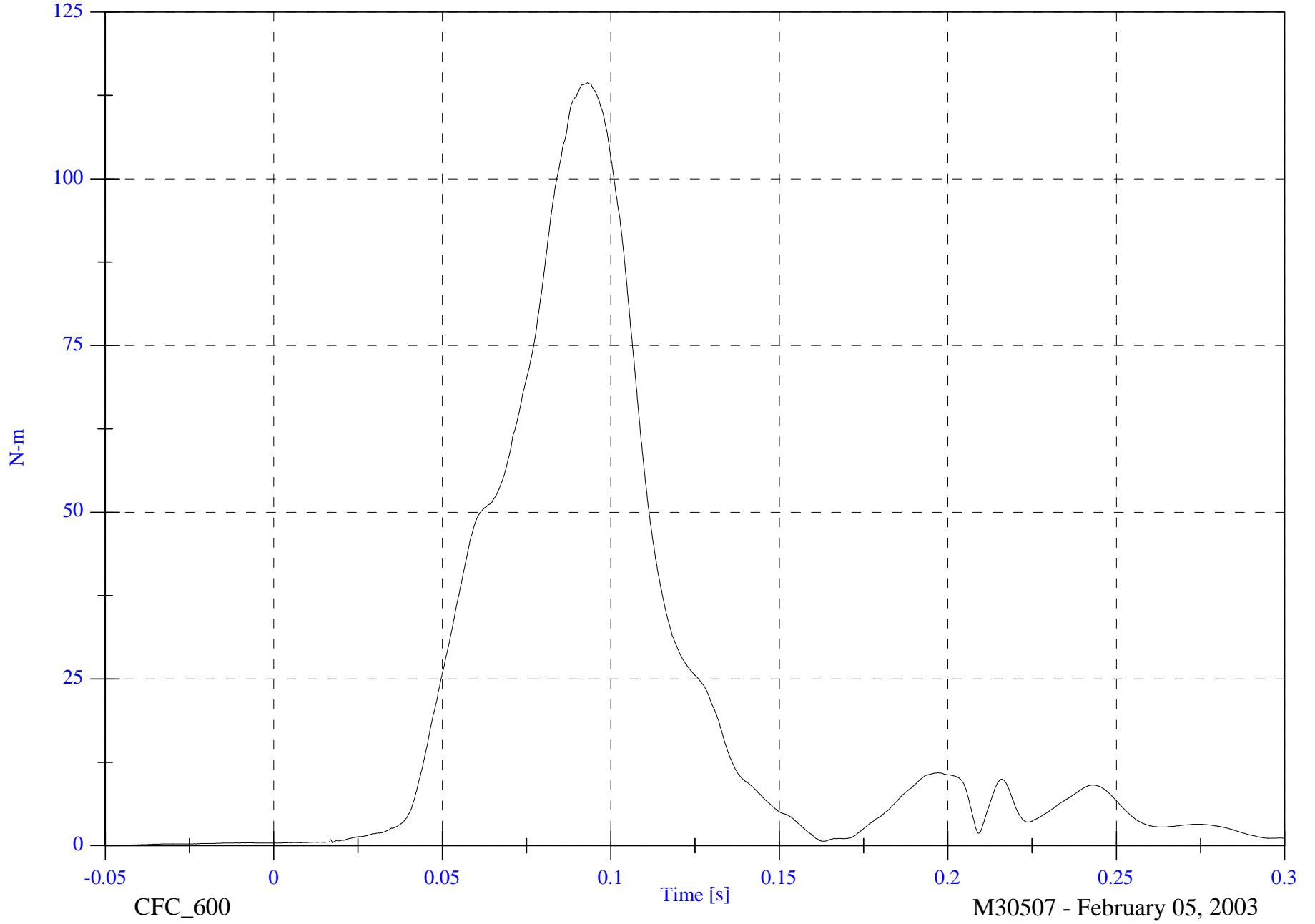
V1P3 Lower Neck M Resultant

Max: 114.4 [N-m] at 0.093 [s]

Min: 0.1 [N-m] at -0.045 [s]

4-23

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

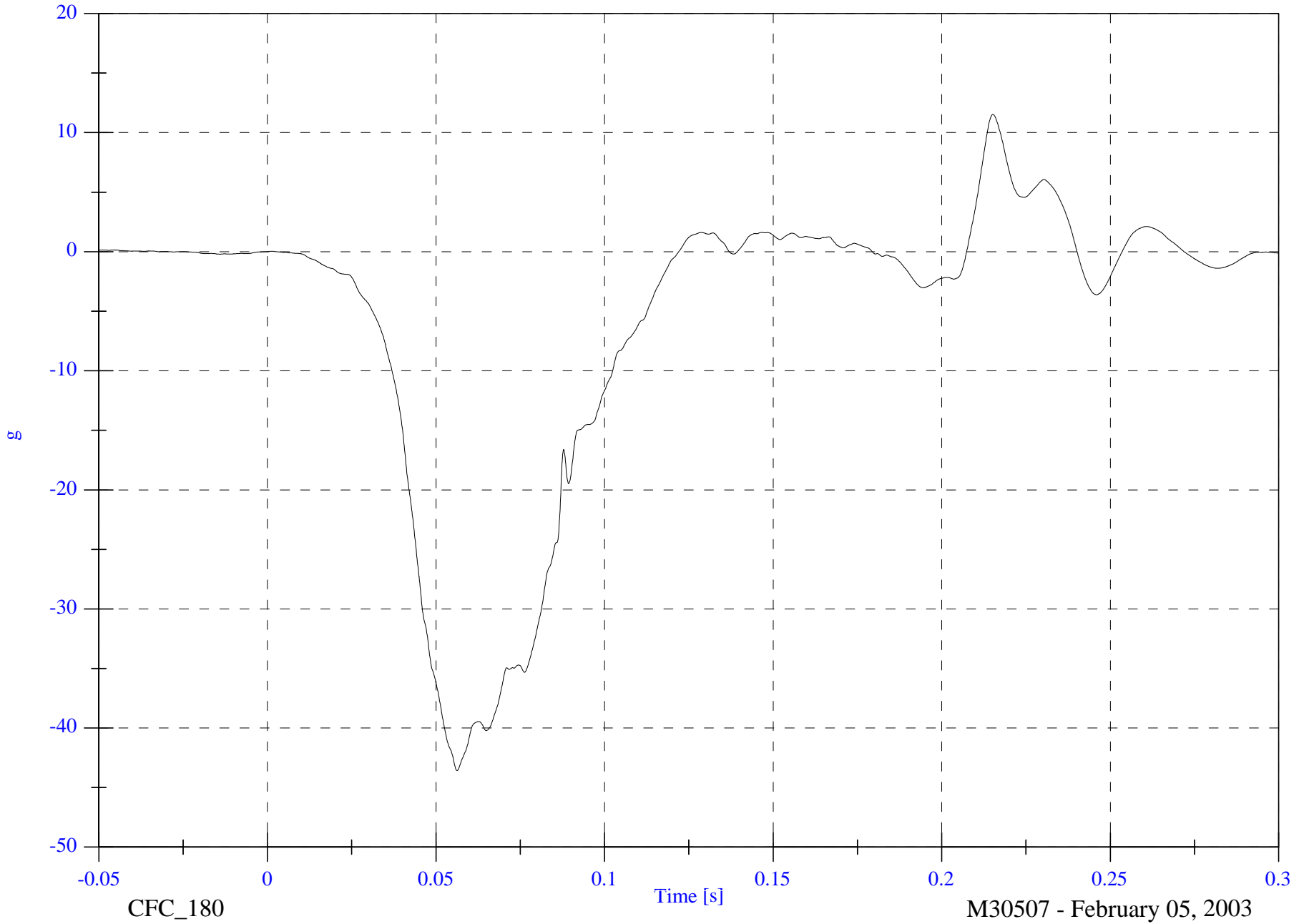
VIP3 Chest x

Max: 11.5 [g] at 0.215 [s]

Min: -43.6 [g] at 0.056 [s]

4-24

8642-NCAP-28



CFC\_180

Time [s]

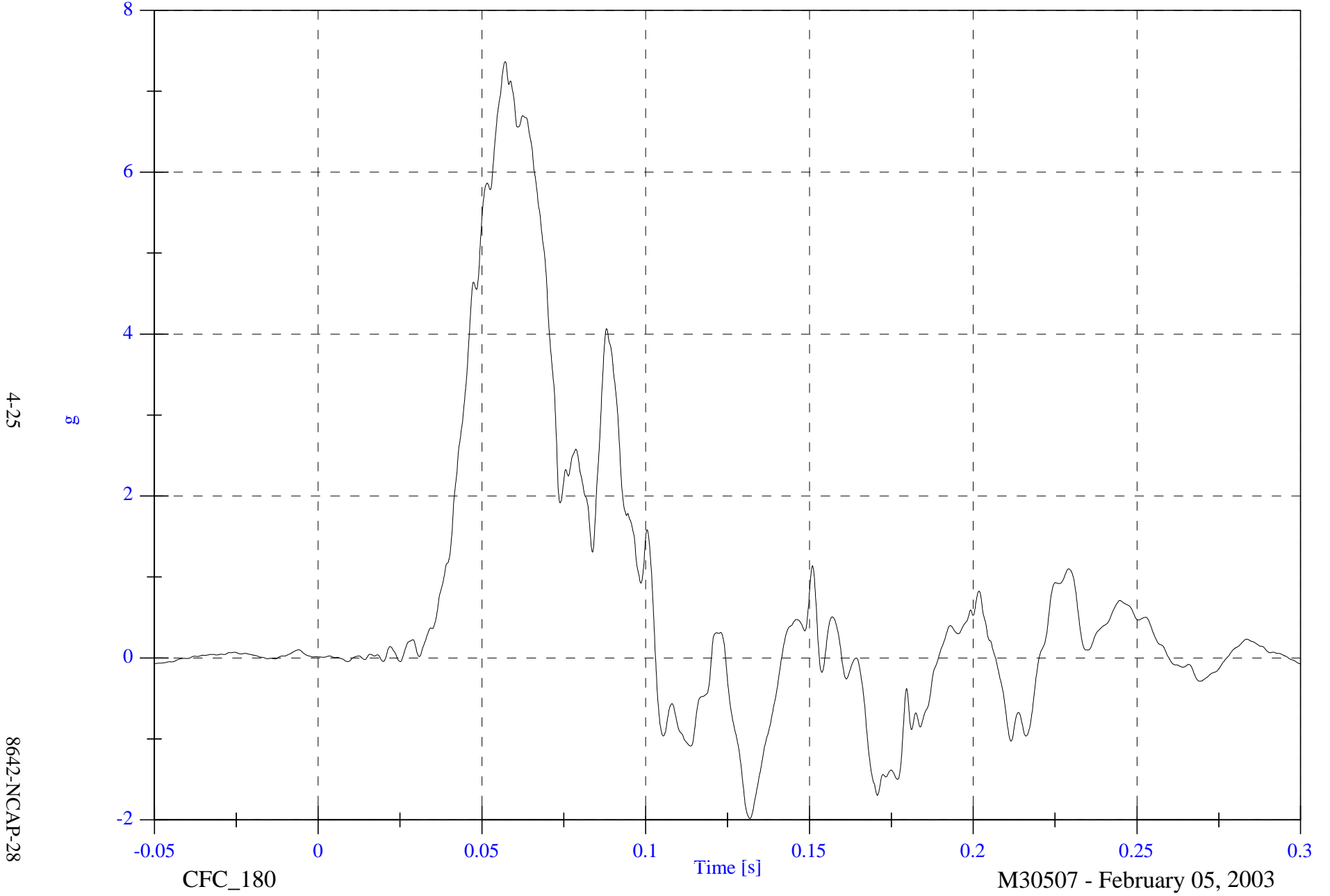
M30507 - February 05, 2003

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VIP3 Chest y

Max: 7.4 [g] at 0.057 [s]

Min: -2.0 [g] at 0.132 [s]



4-25

g

8642-NCAP-28

CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

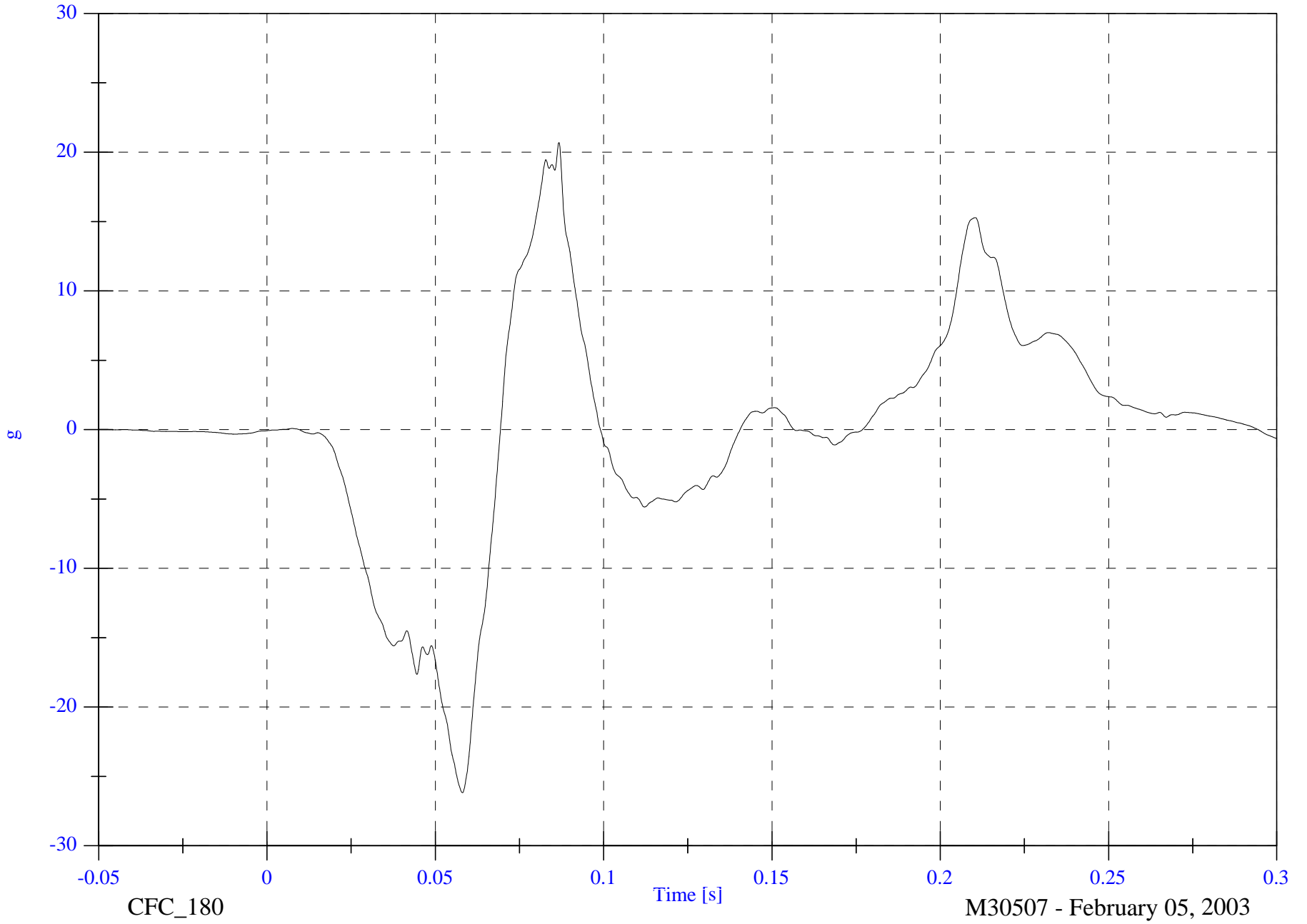
VIP3 Chest z

Max: 20.7 [g] at 0.087 [s]

Min: -26.2 [g] at 0.058 [s]

4-26

8642-NCAP-28

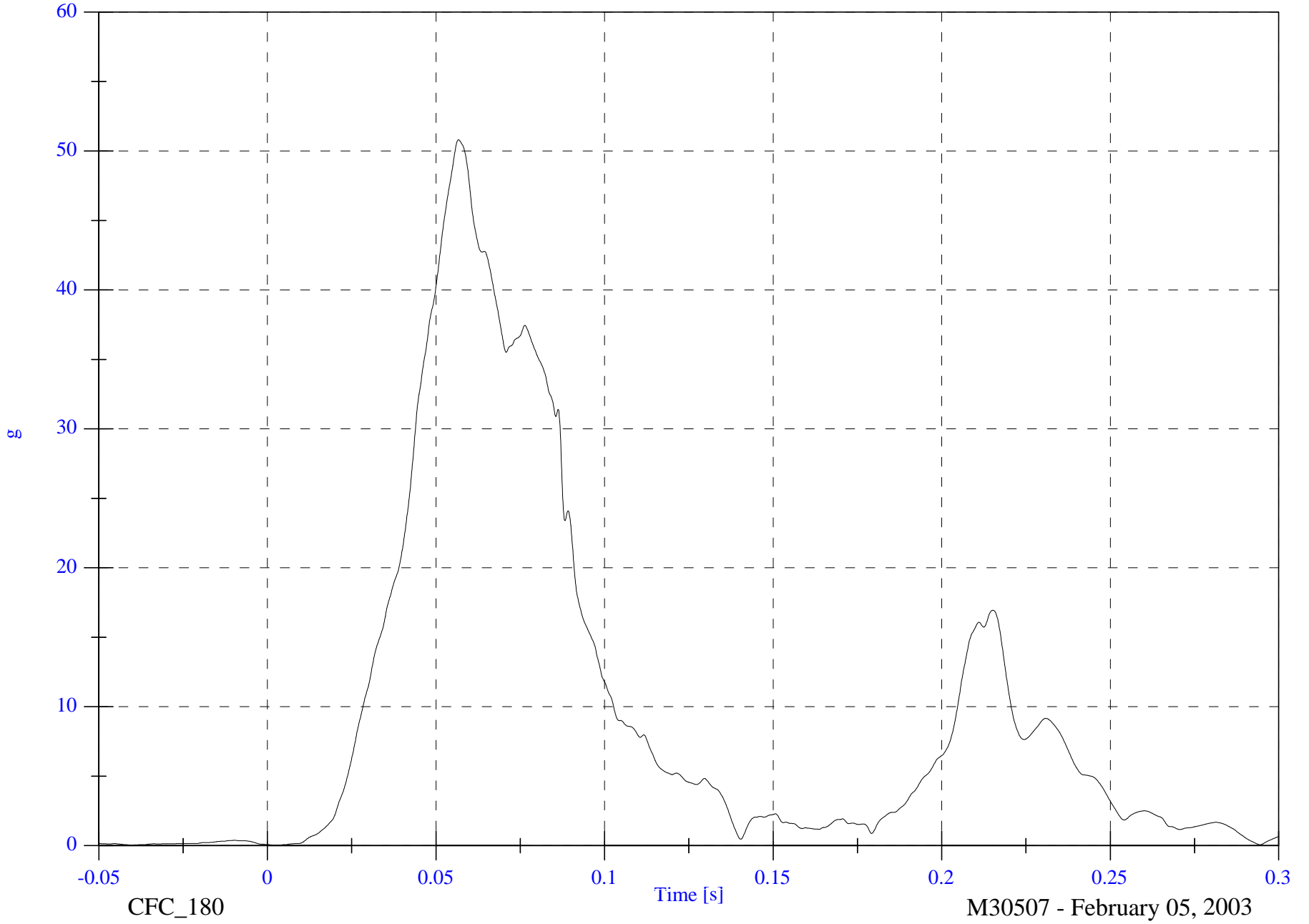


NCAP Test #6 - 2003 Subaru Forester

V1P3 Chest Resultant

Max: 50.8 [g] at 0.057 [s]

Min: 0.0 [g] at 0.002 [s]



4-27

8642-NCAP-28

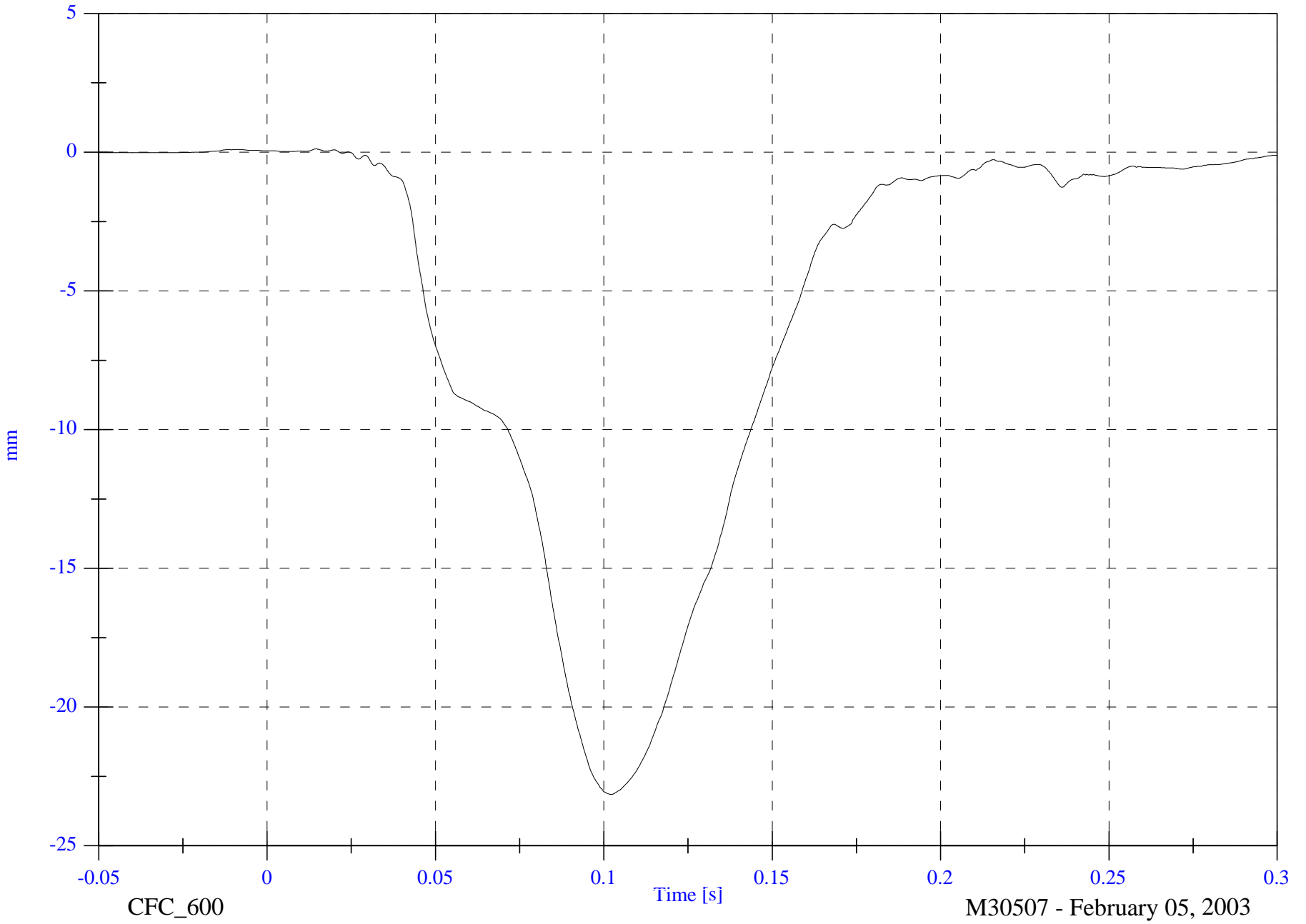
CFC\_180

Time [s]

M30507 - February 05, 2003

4-28

8642-NCAP-28

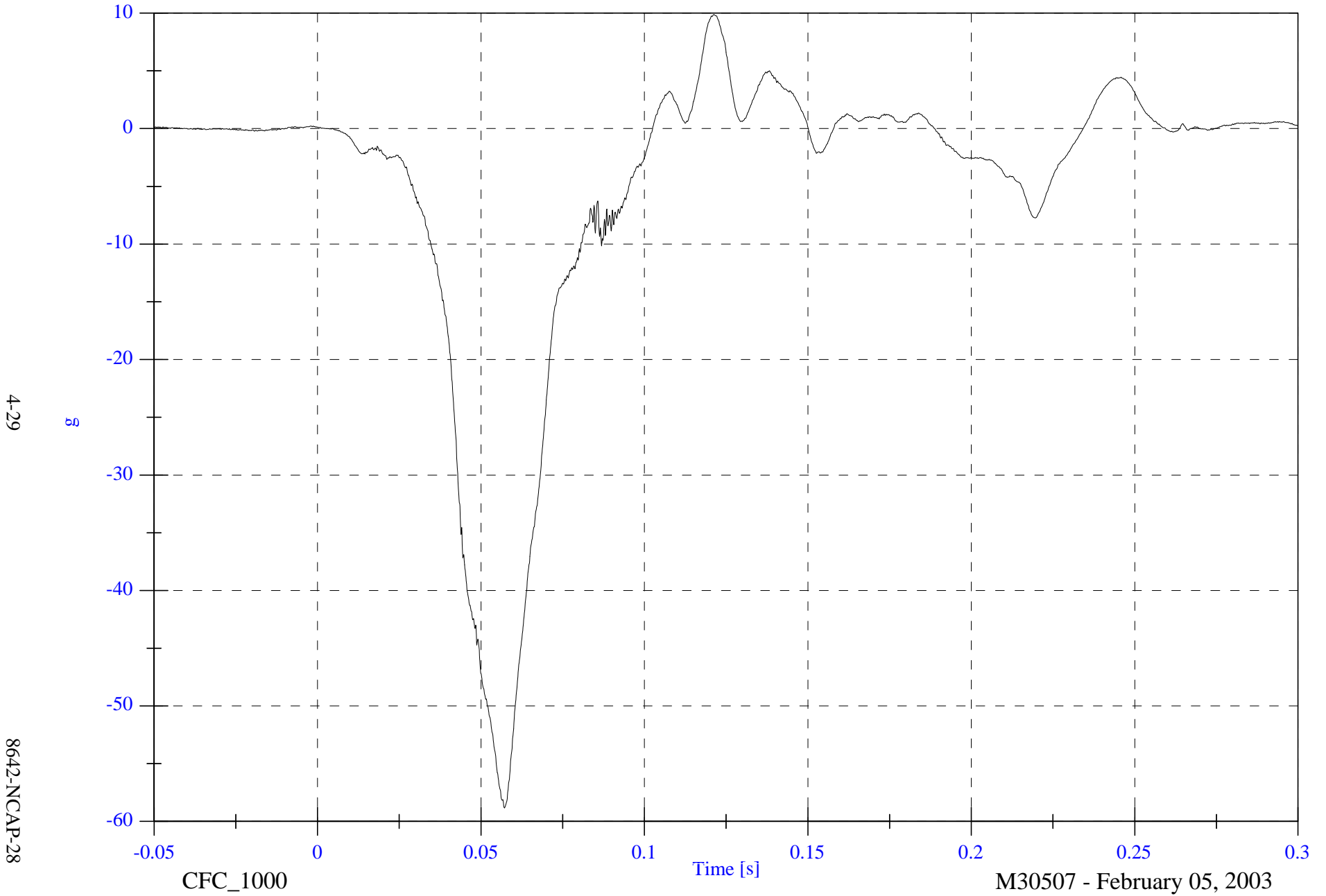


NCAP Test #6 - 2003 Subaru Forester

Max: 9.9 [g] at 0.121 [s]

Min: -58.8 [g] at 0.057 [s]

V1P3 Pelvic x



NCAP Test #6 - 2003 Subaru Forester

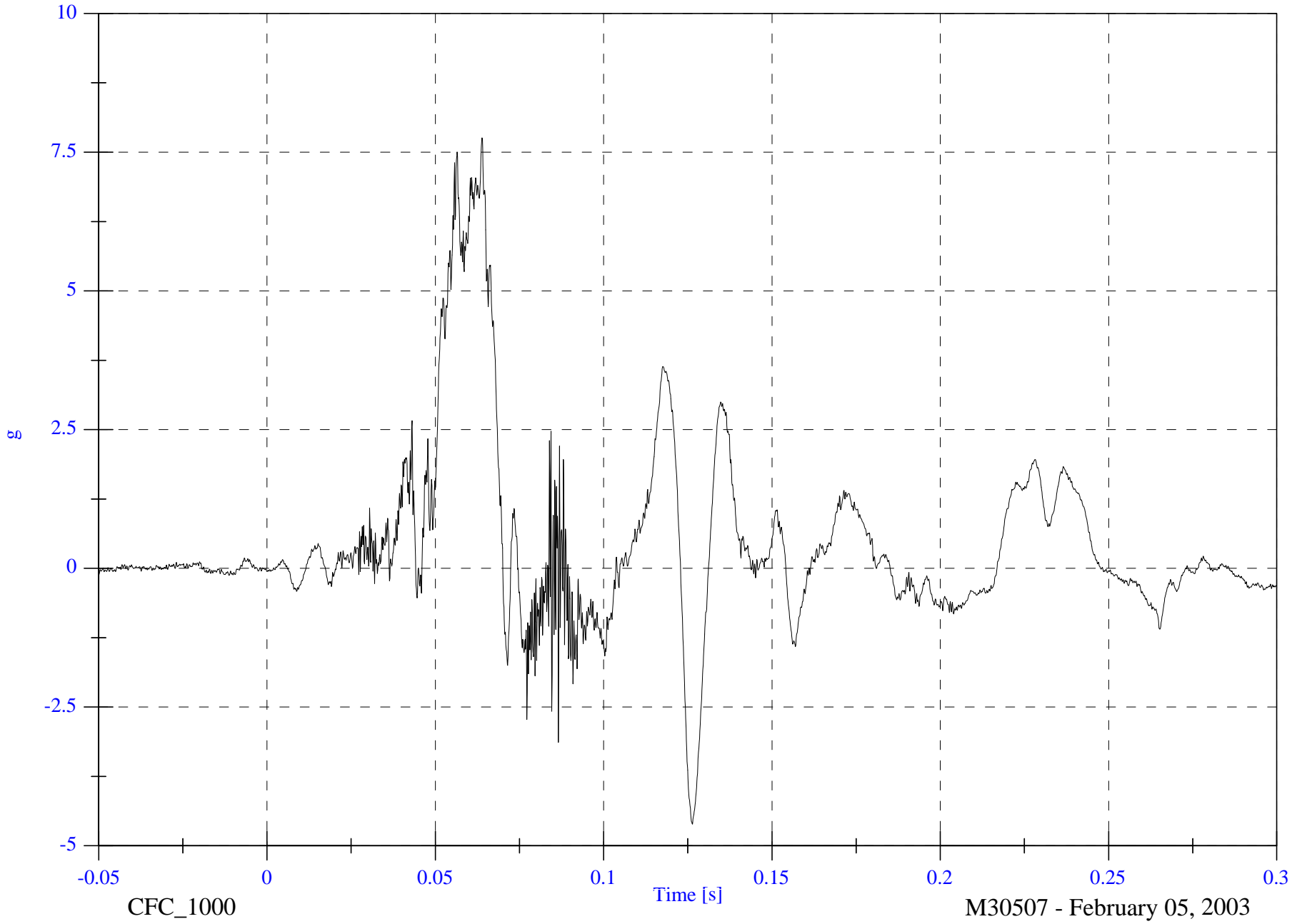
V1P3 Pelvic y

Max: 7.8 [g] at 0.064 [s]

Min: -4.6 [g] at 0.126 [s]

4-30

8642-NCAP-28



CFC\_1000

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

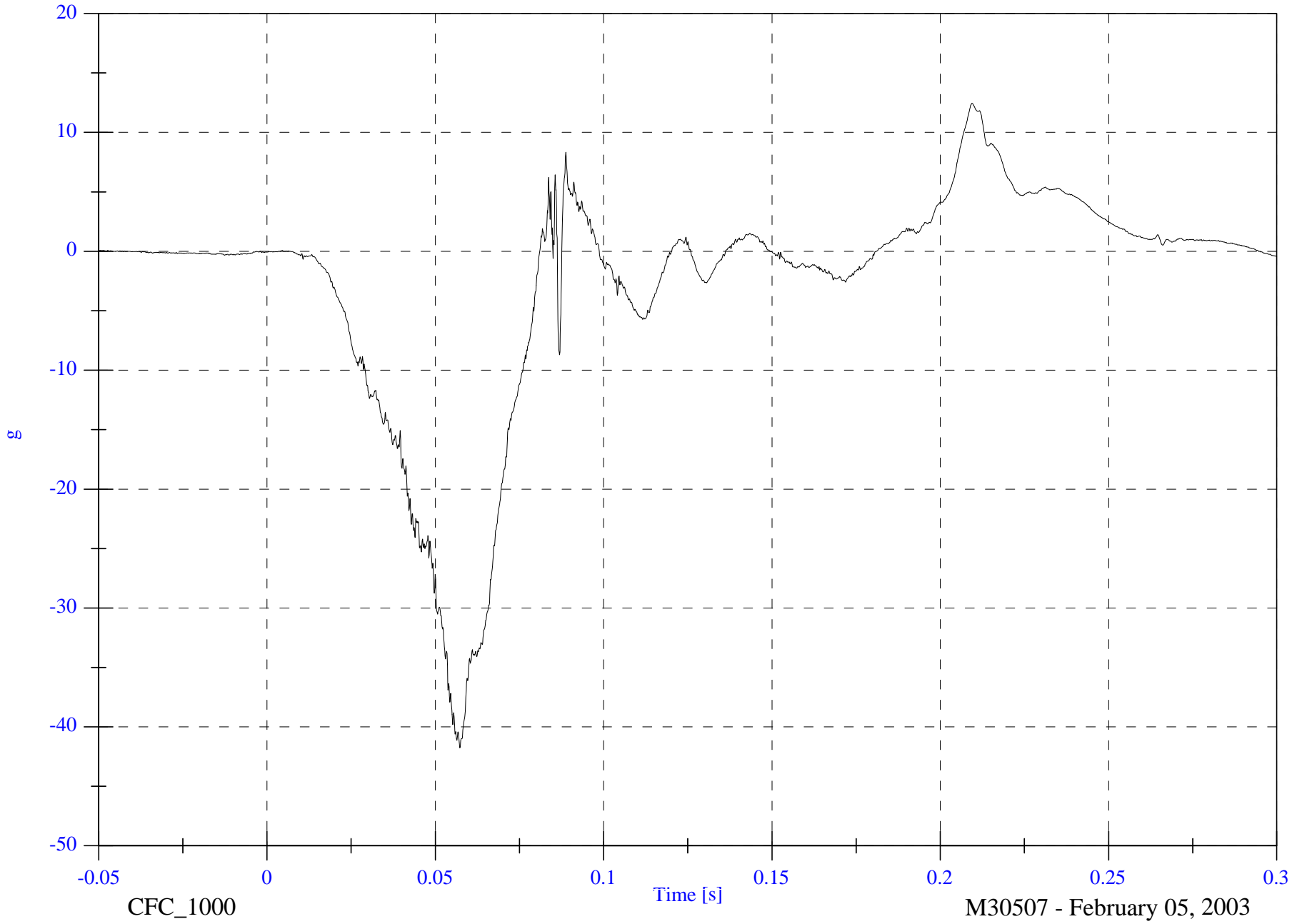
V1P3 Pelvic z

Max: 12.4 [g] at 0.209 [s]

Min: -41.8 [g] at 0.057 [s]

4-31

8642-NCAP-28

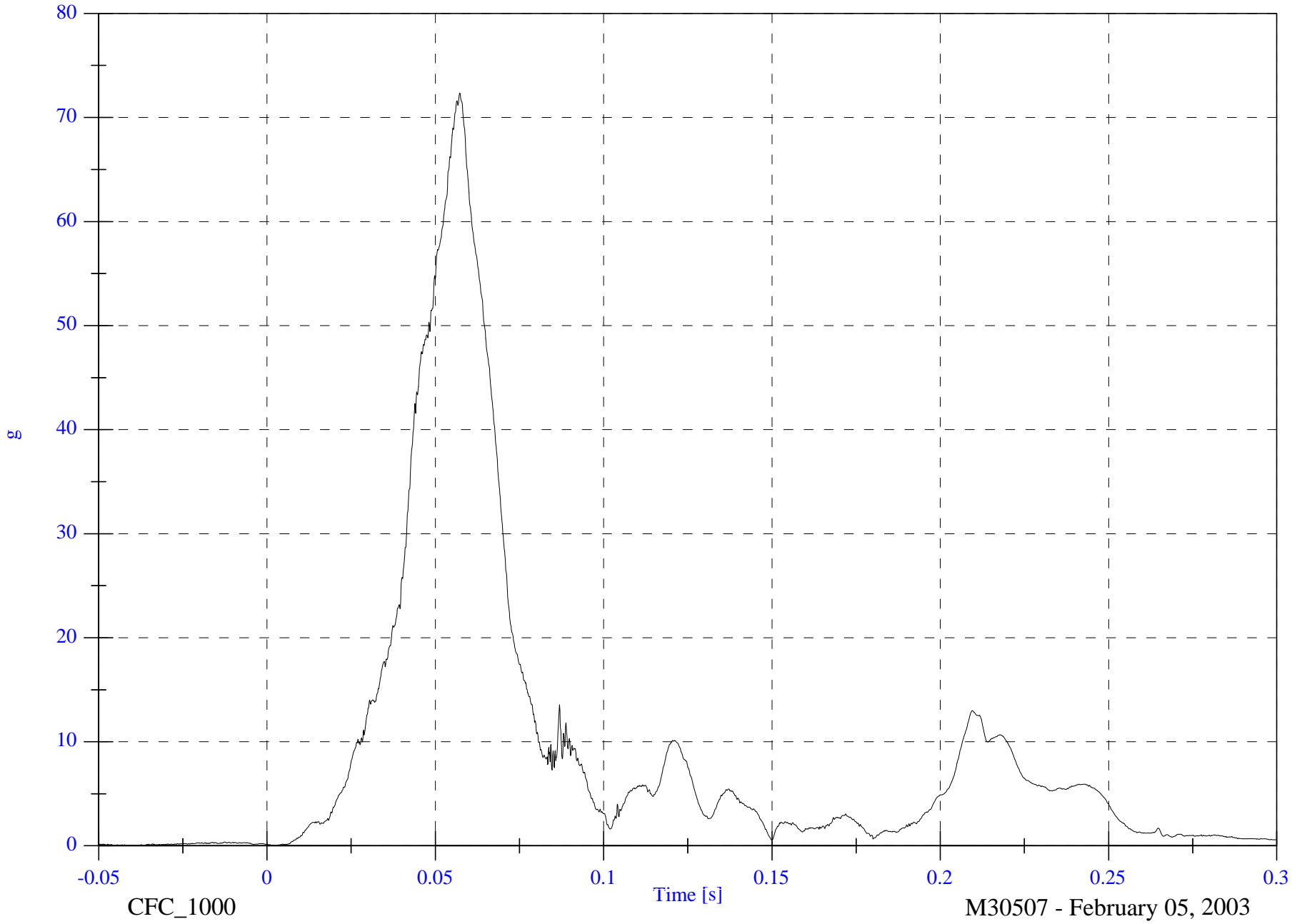


NCAP Test #6 - 2003 Subaru Forester

V1P3 Pelvic Resultant

Max: 72.4 [g] at 0.057 [s]

Min: 0.0 [g] at -0.041 [s]



4-32

8642-NCAP-28

CFC\_1000

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

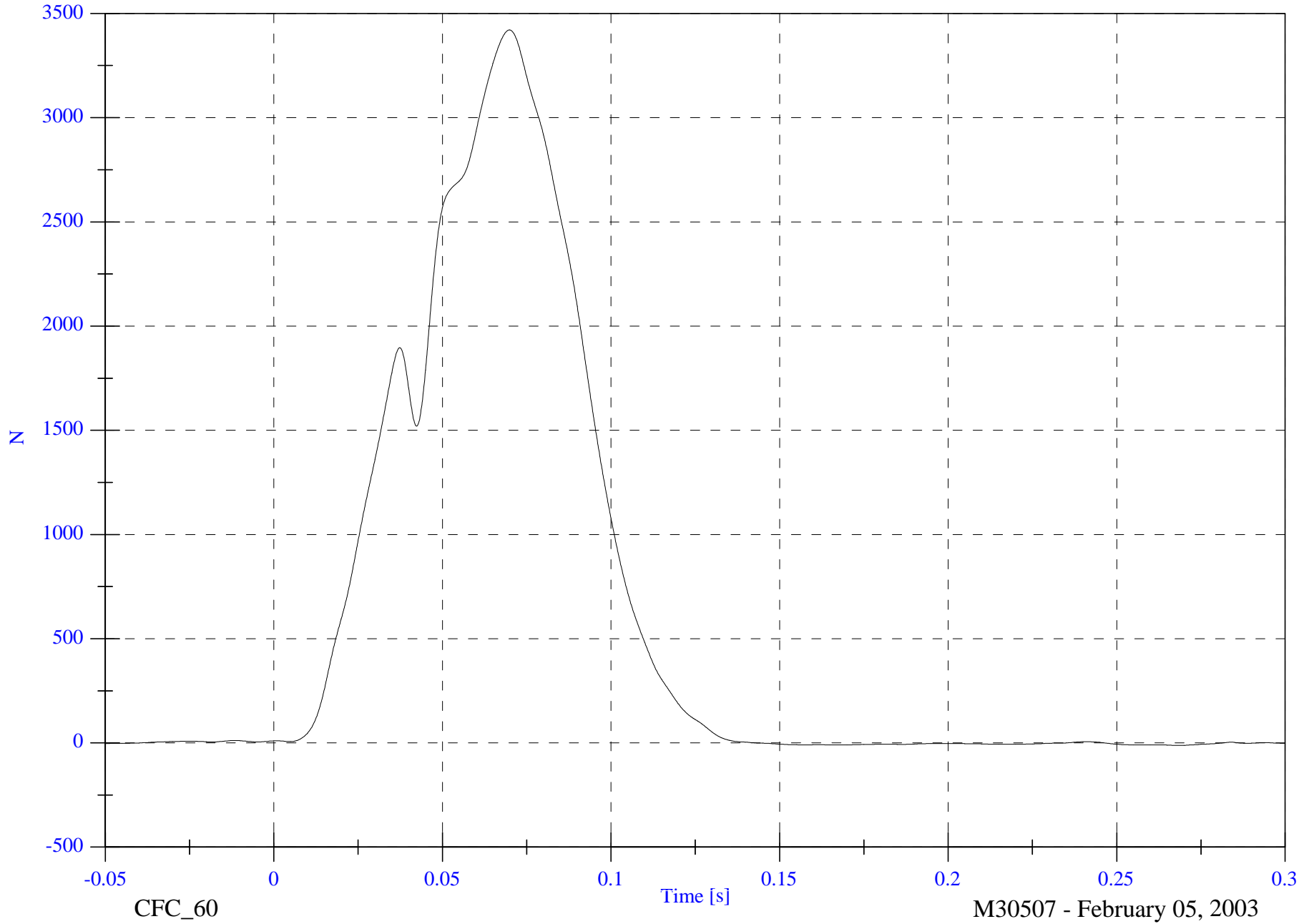
VIP3 CRS Tether Belt

Max: 3421.0 [N] at 0.070 [s]

Min: -12.1 [N] at 0.269 [s]

4-33

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

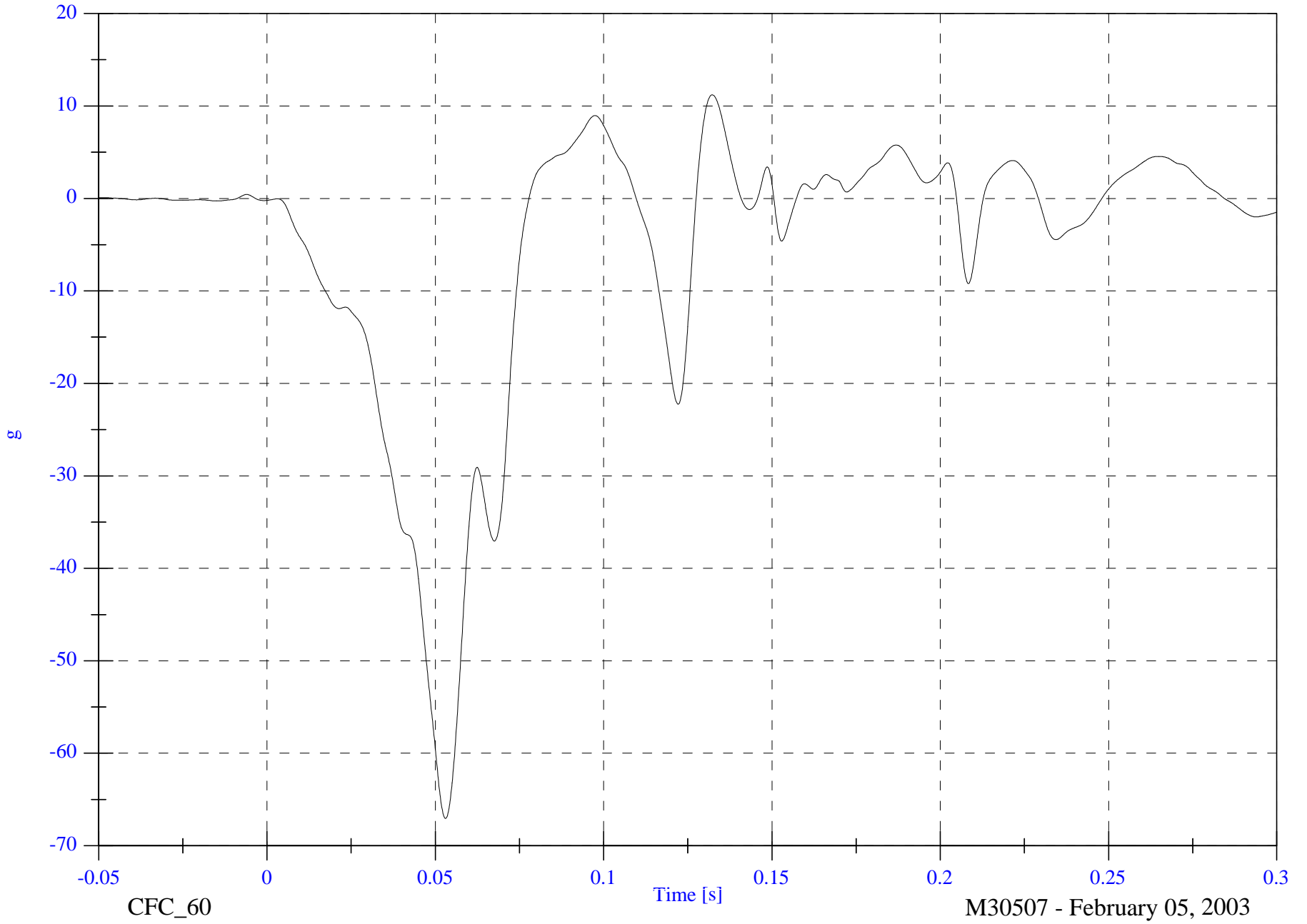
V1P3 CRS x

Max: 11.2 [g] at 0.132 [s]

Min: -67.0 [g] at 0.053 [s]

4-34

8642-NCAP-28



CFC\_60

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

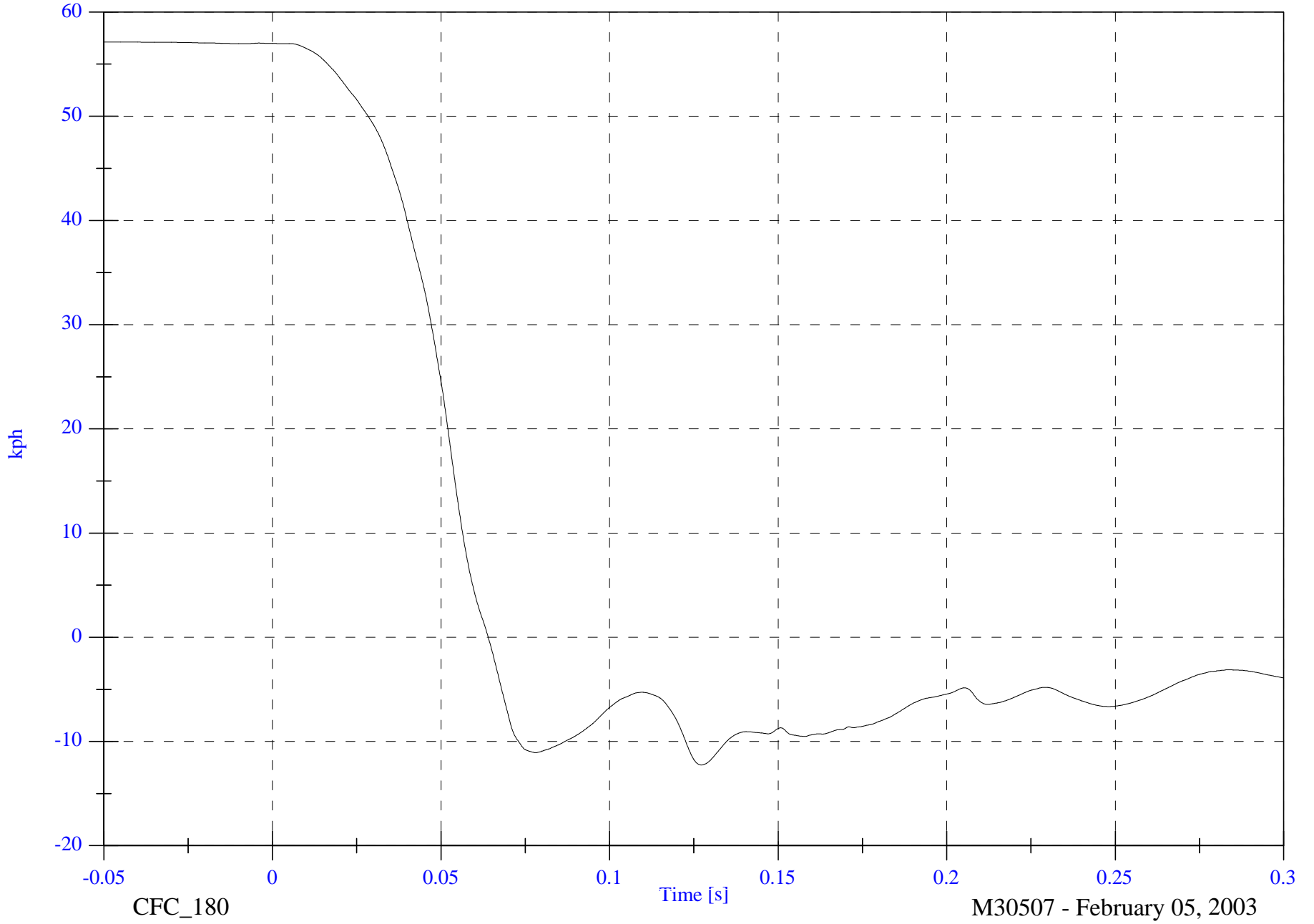
Max: 57.1 [kph] at -0.044 [s]

V1P3 CRS x Velocity

Min: -12.3 [kph] at 0.127 [s]

4-35

8642-NCAP-28



CFC\_180

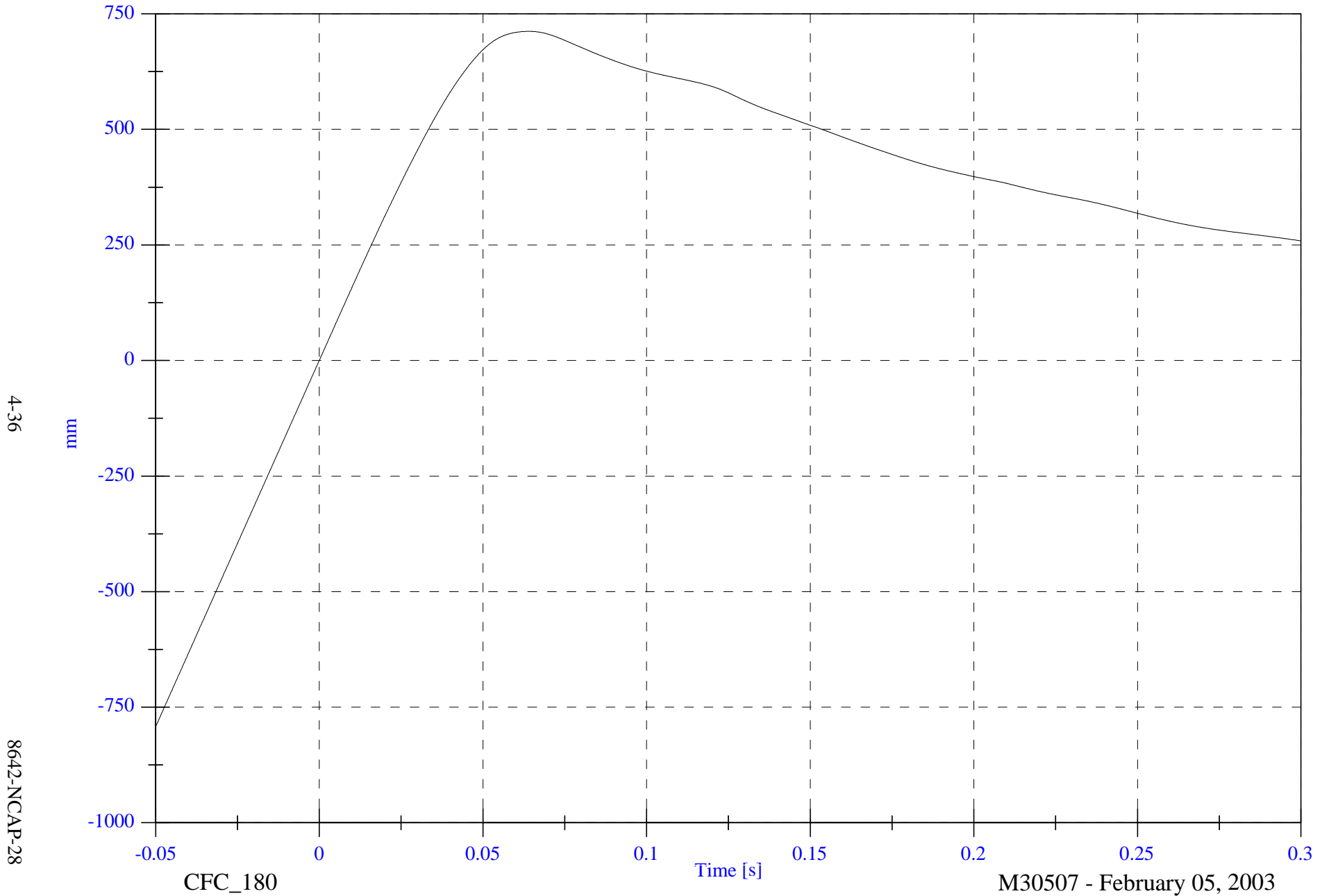
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Max: 712.0 [mm] at 0.064 [s]

Min: -792.5 [mm] at -0.050 [s]

V1P3 CRS x Displacement



4-36

8642-NCAP-28

CFC\_180

Time [s]

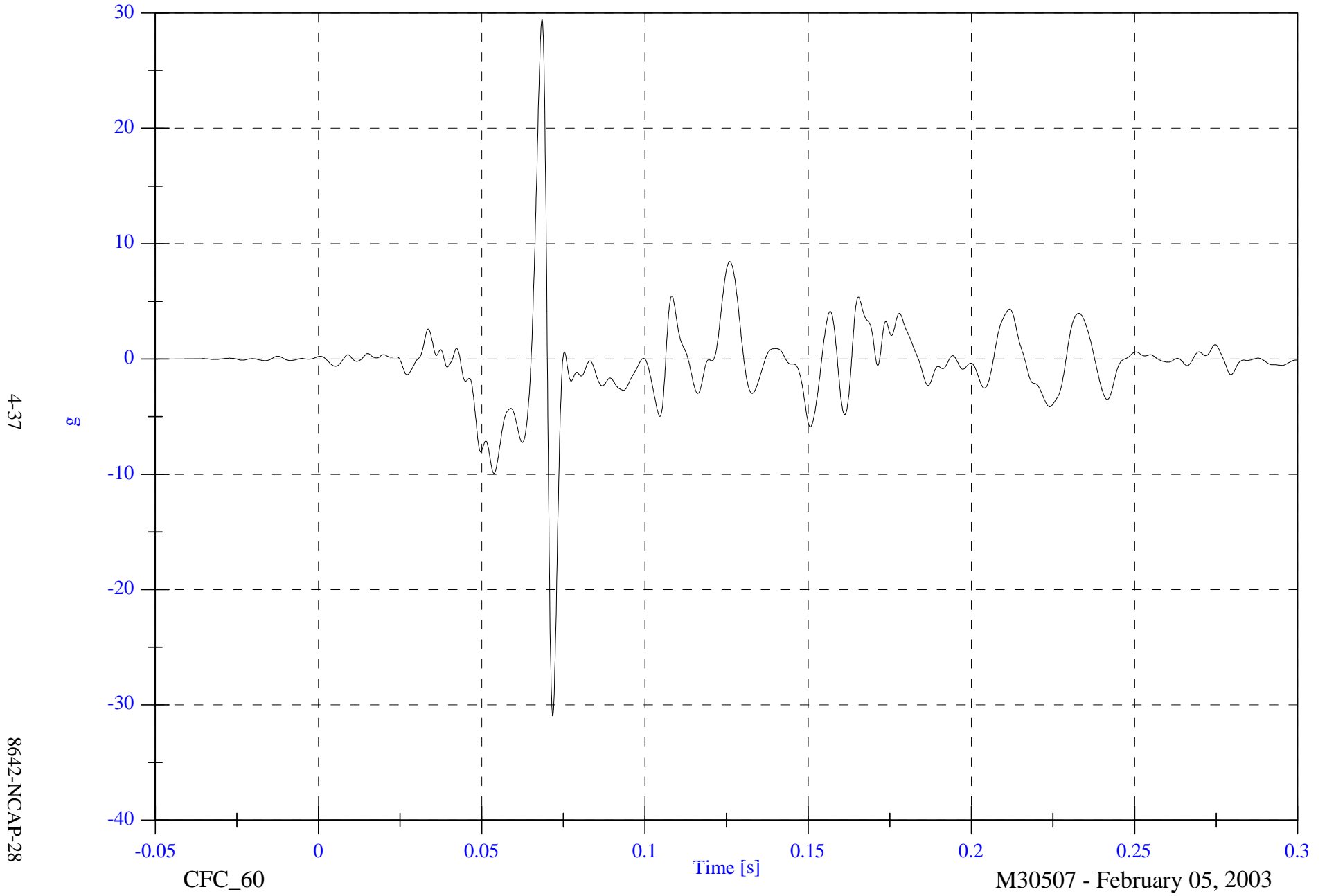
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 29.5 [g] at 0.068 [s]

Min: -31.0 [g] at 0.072 [s]

V1P3 CRS y

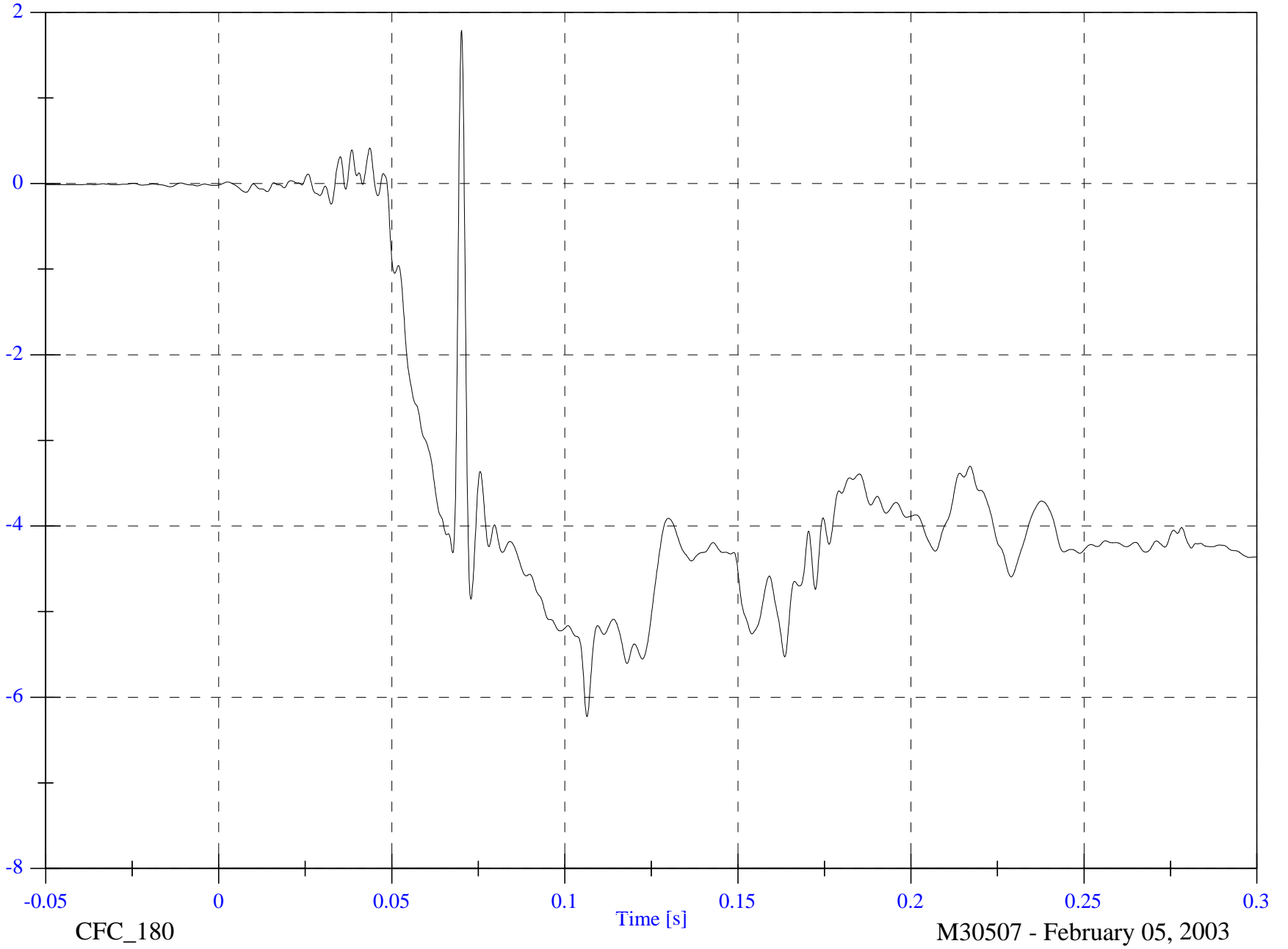


NCAP Test #6 - 2003 Subaru Forester

V1P3 CRS y Velocity

Max: 1.8 [kph] at 0.070 [s]

Min: -6.2 [kph] at 0.106 [s]



4-38

8642-NCAP-28

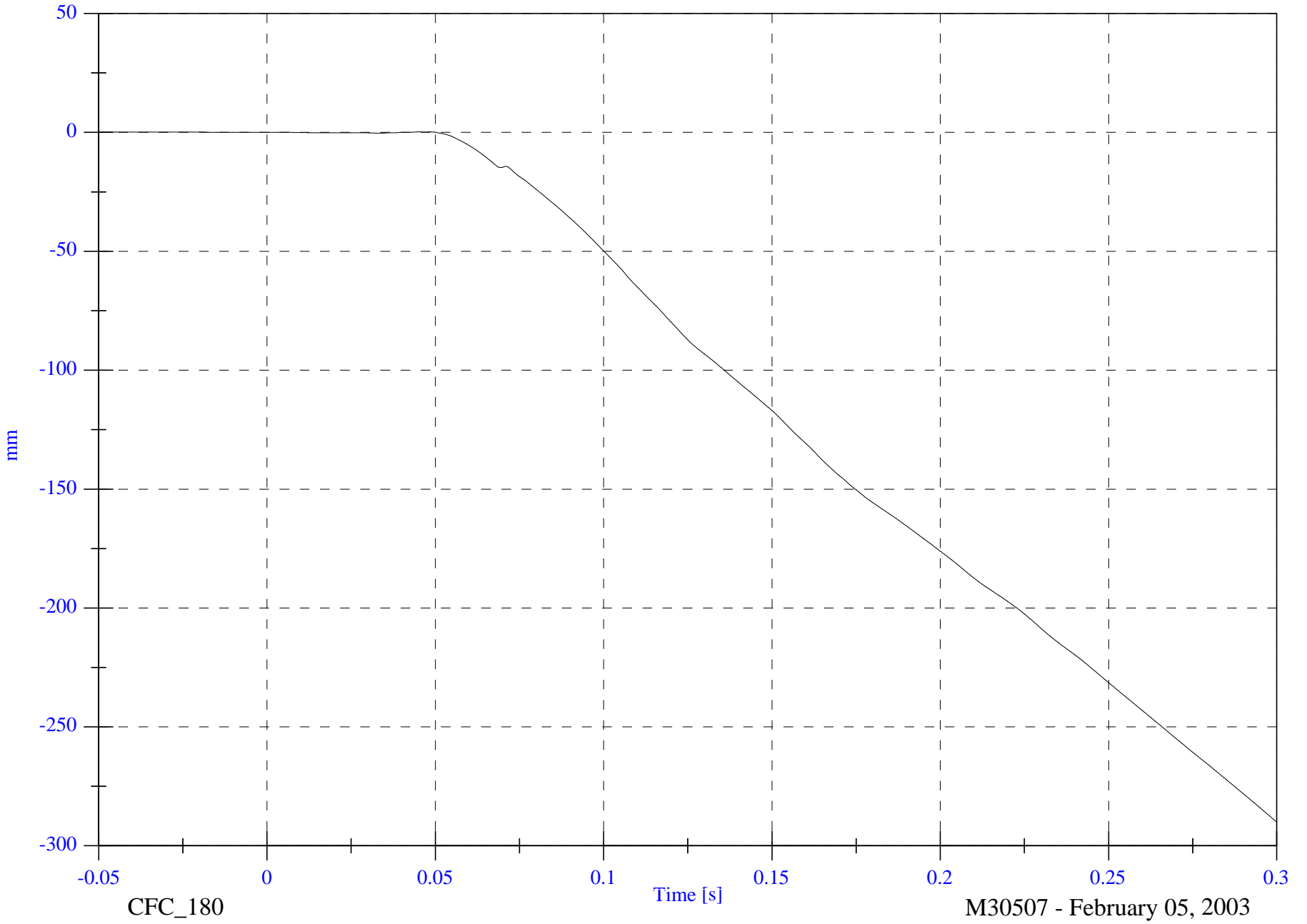
CFC\_180

Time [s]

M30507 - February 05, 2003

4-39

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

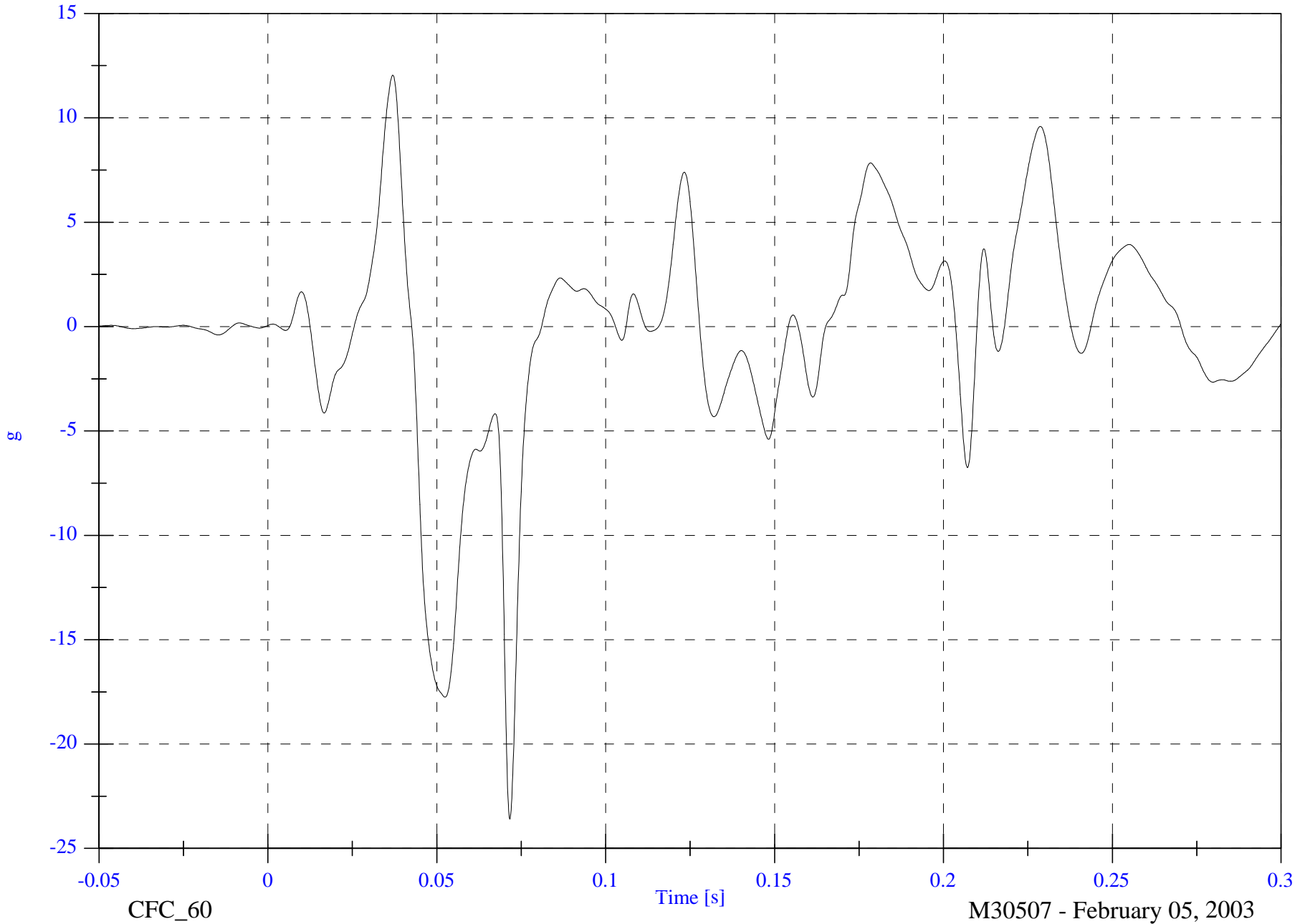
V1P3 CRS z

Max: 12.0 [g] at 0.037 [s]

Min: -23.6 [g] at 0.072 [s]

4-40

8642-NCAP-28

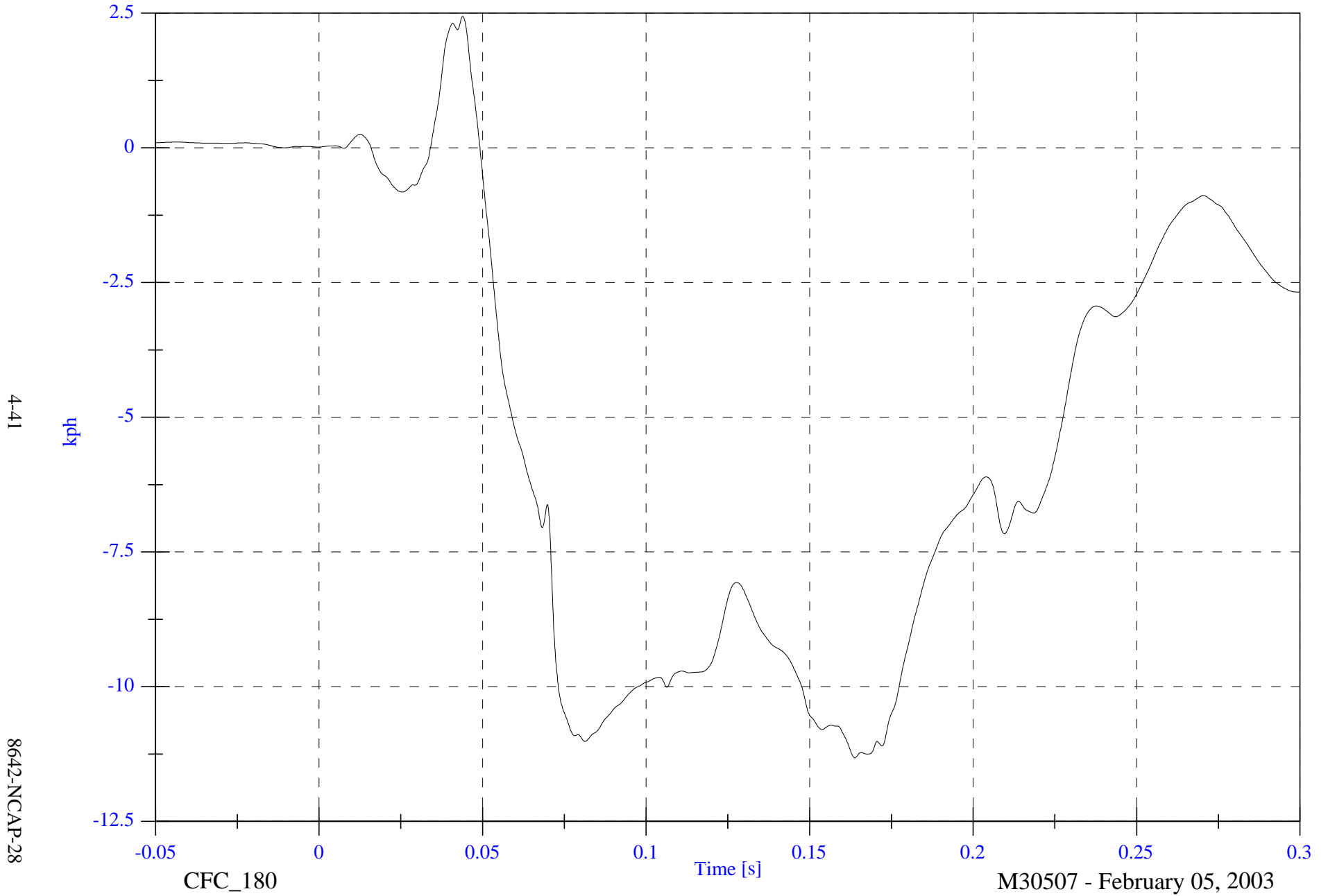


NCAP Test #6 - 2003 Subaru Forester

Max: 2.4 [kph] at 0.044 [s]

V1P3 CRS z Velocity

Min: -11.3 [kph] at 0.164 [s]



4-41

8642-NCAP-28

CFC\_180

Time [s]

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NCAP Test #6 - 2003 Subaru Forester

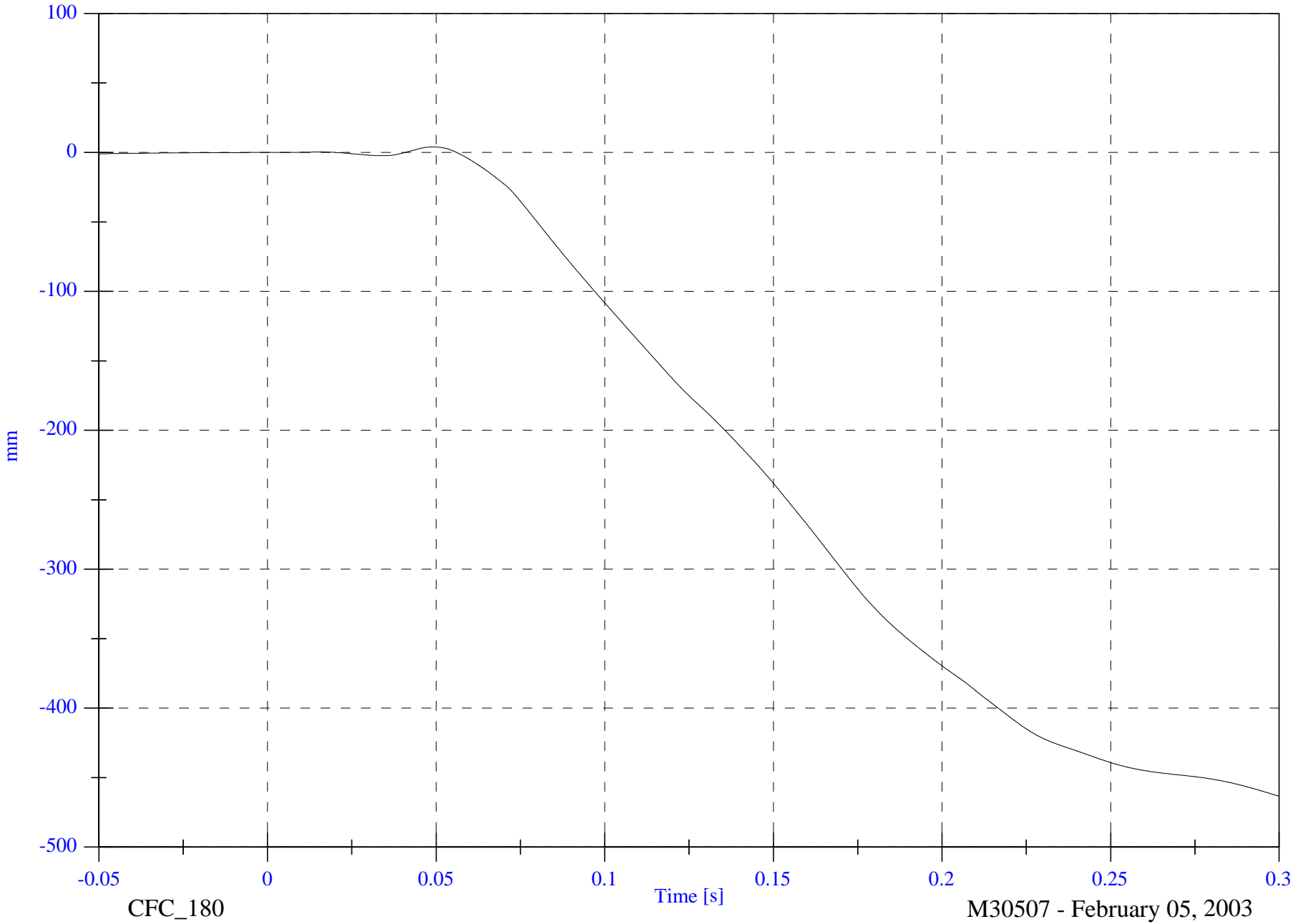
V1P3 CRS z Displacement

Max: 4.0 [mm] at 0.049 [s]

Min: -463.4 [mm] at 0.300 [s]

4-42

8642-NCAP-28



CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

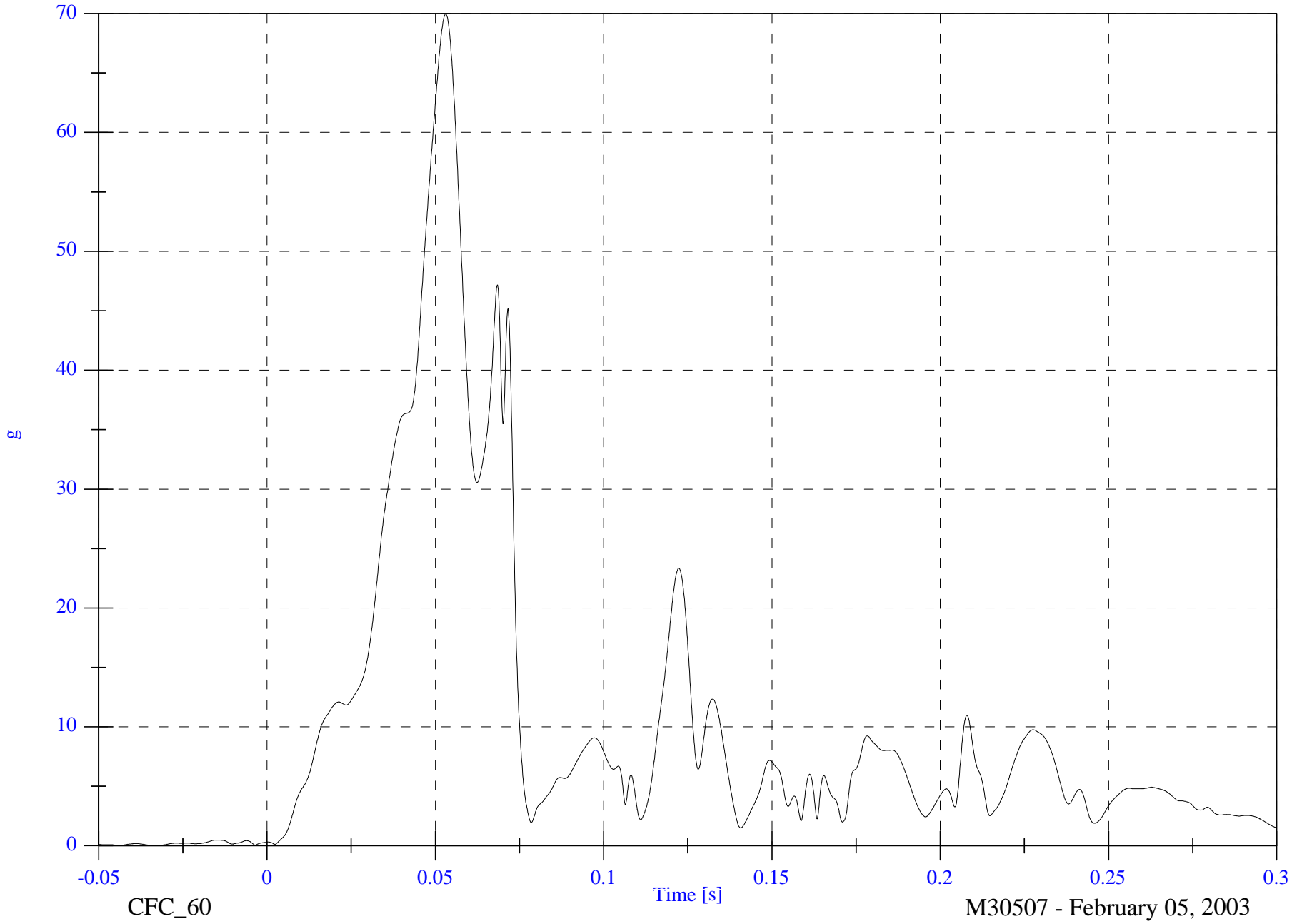
V1P3 CRS Resultant

Max: 70.0 [g] at 0.053 [s]

Min: 0.0 [g] at -0.044 [s]

4-43

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

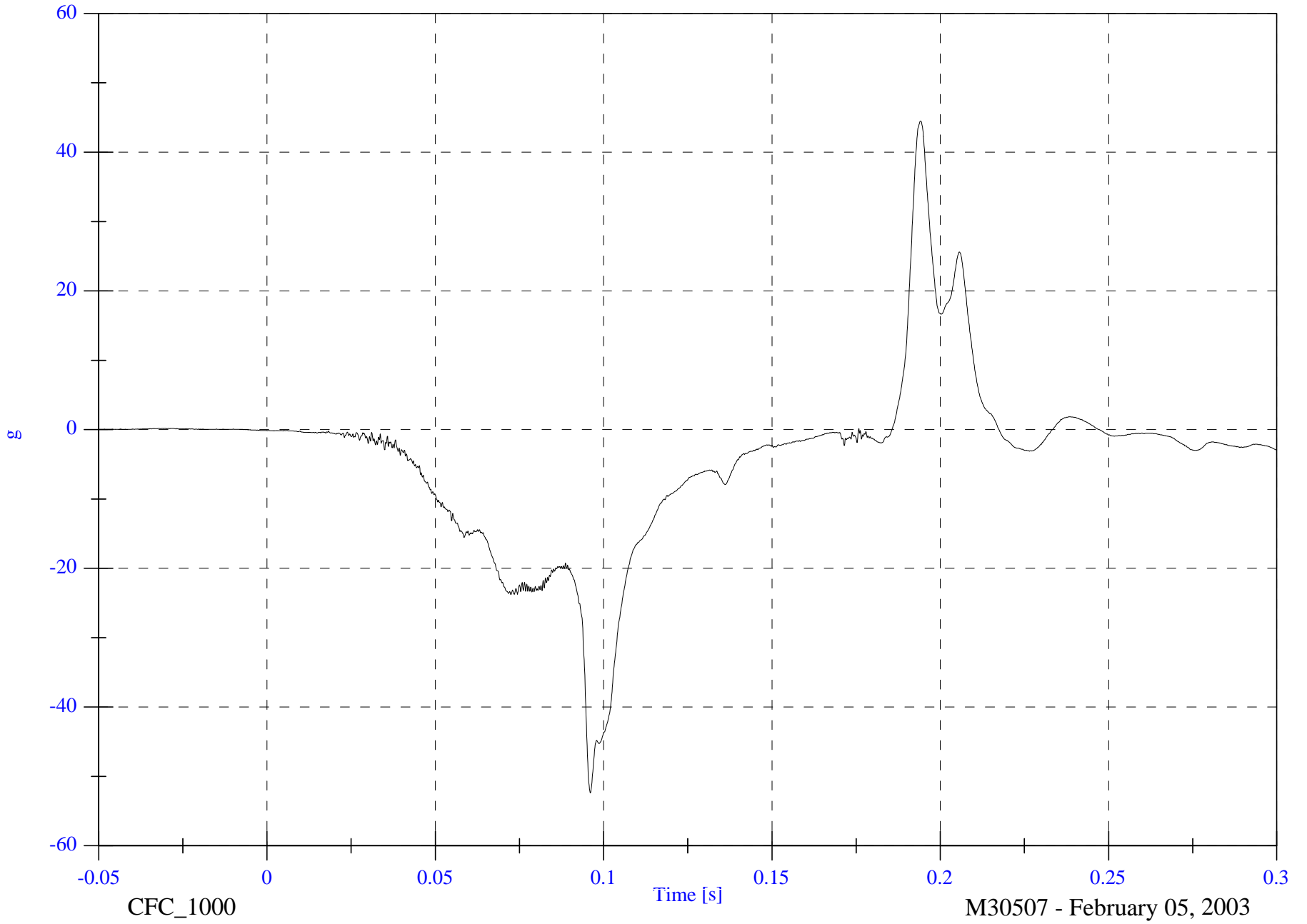
V1P4 Head x

Max: 44.5 [g] at 0.194 [s]

Min: -52.4 [g] at 0.096 [s]

4-44

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

V1P4 Head y

Max: 12.1 [g] at 0.096 [s]  
Min: -4.3 [g] at 0.089 [s]



NCAP Test #6 - 2003 Subaru Forester

V1P4 Head z

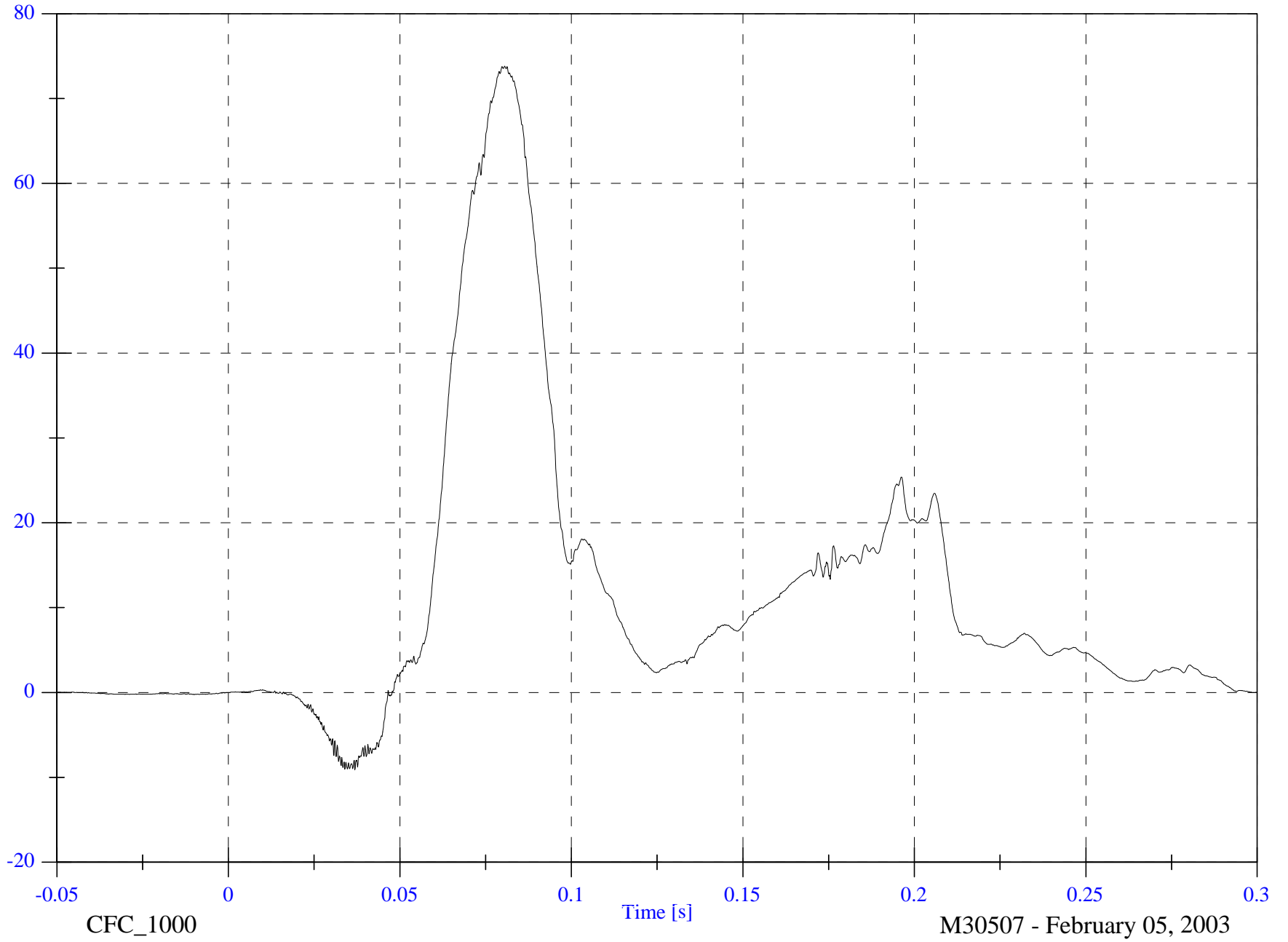
Max: 73.8 [g] at 0.081 [s]

Min: -9.1 [g] at 0.037 [s]

4-46

g

8642-NCAP-28



CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

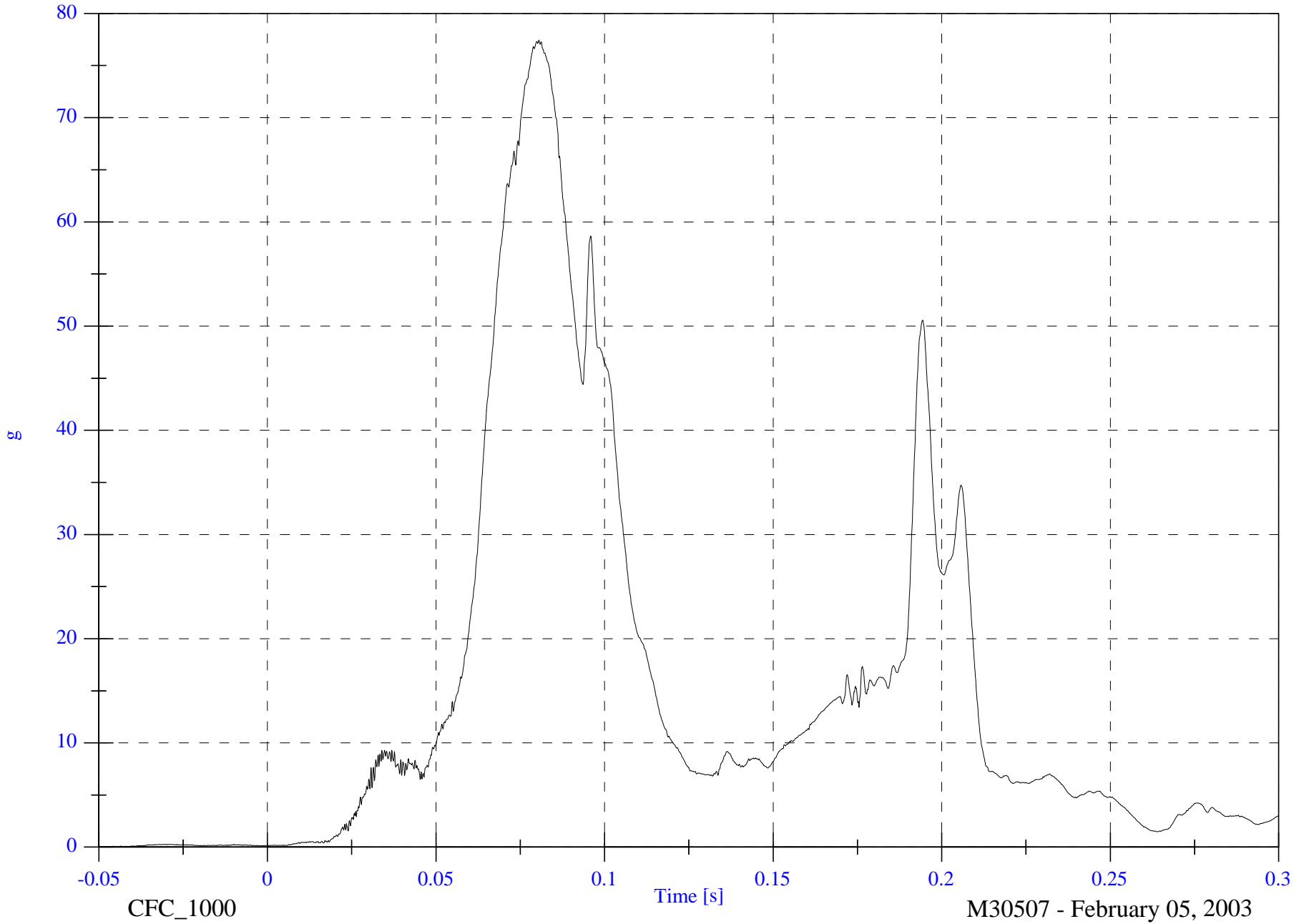
V1P4 Head Resultant

Max: 77.4 [g] at 0.081 [s]

Min: 0.0 [g] at -0.048 [s]

4-47

8642-NCAP-28



CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

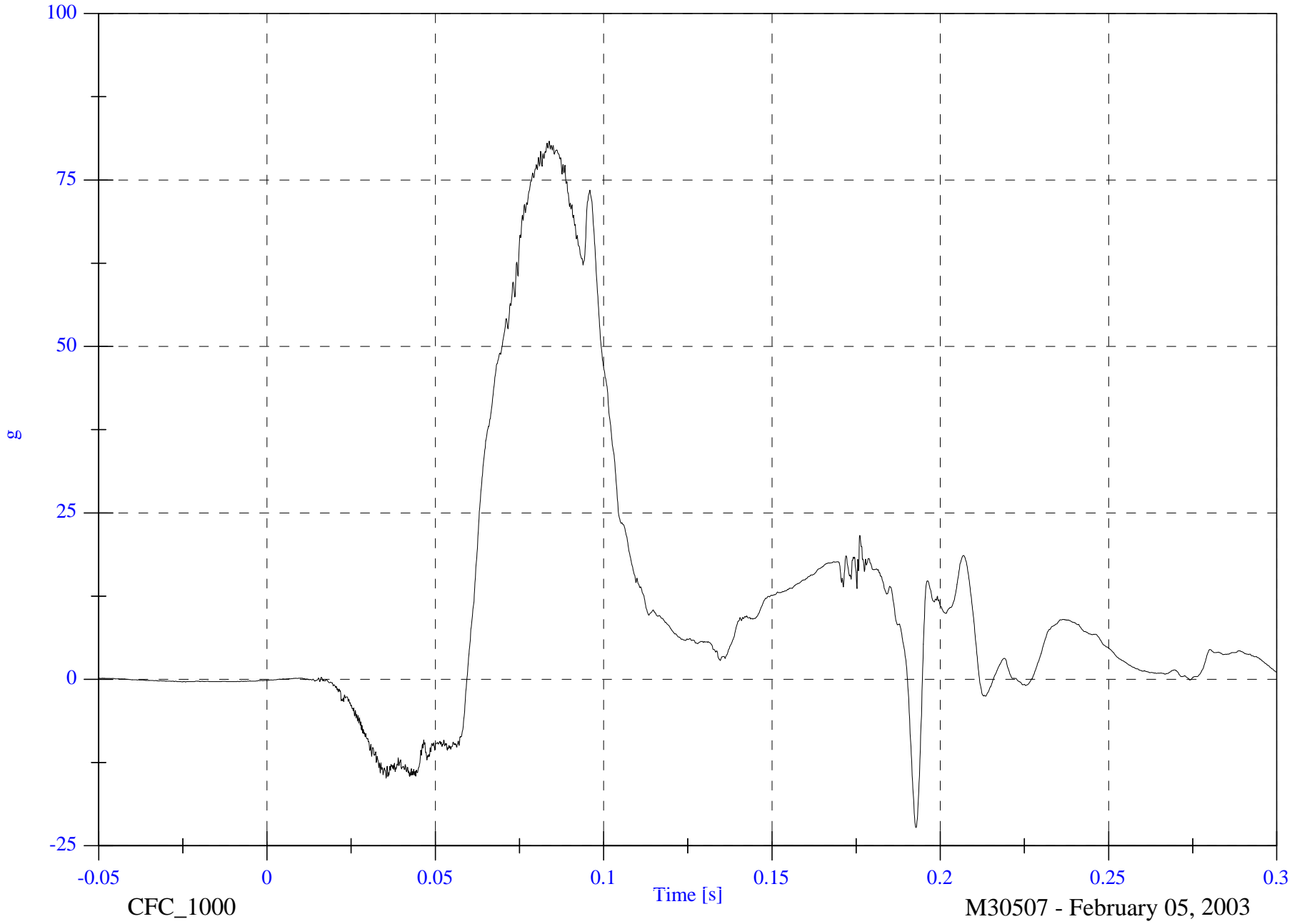
V1P4 Head Red z

Max: 80.8 [g] at 0.084 [s]

Min: -22.3 [g] at 0.193 [s]

4-48

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

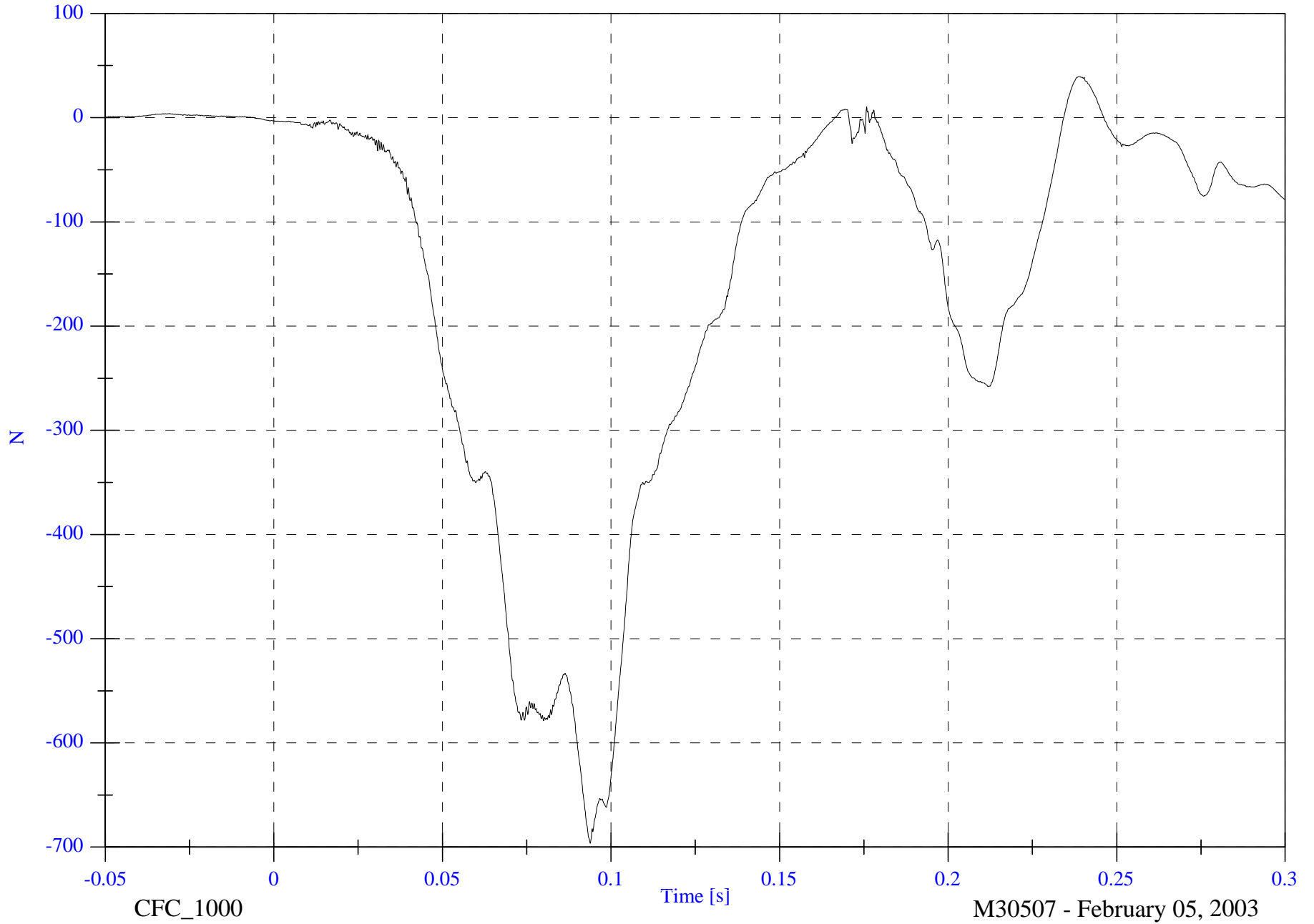
V1P4 Upper Neck Fx

Max: 39.4 [N] at 0.239 [s]

Min: -696.3 [N] at 0.094 [s]

4-49

8642-NCAP-28



CFC\_1000

Time [s]

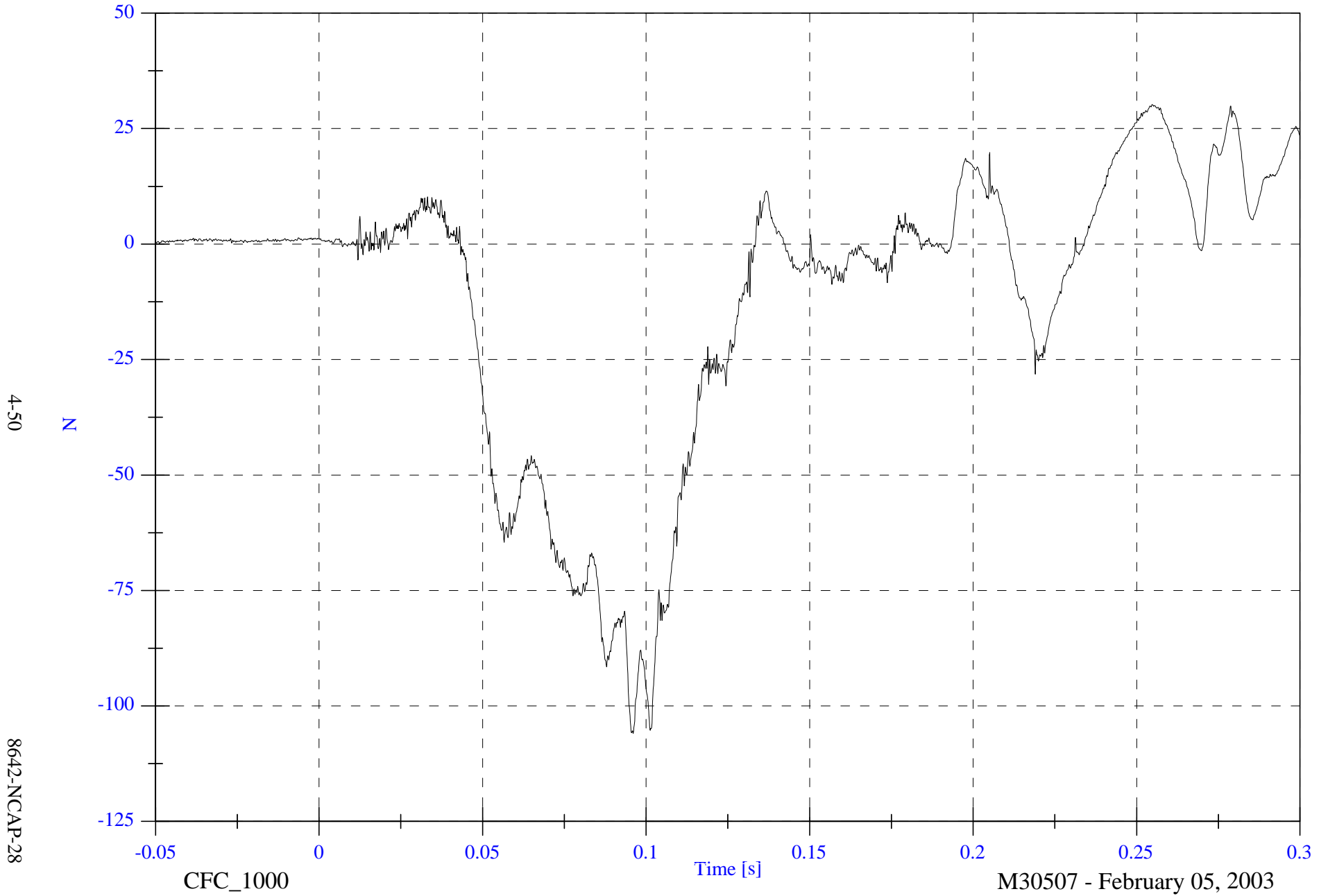
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 Upper Neck Fy

Max: 30.2 [N] at 0.255 [s]

Min: -105.9 [N] at 0.096 [s]



4-50

8642-NCAP-28

CFC\_1000

Time [s]

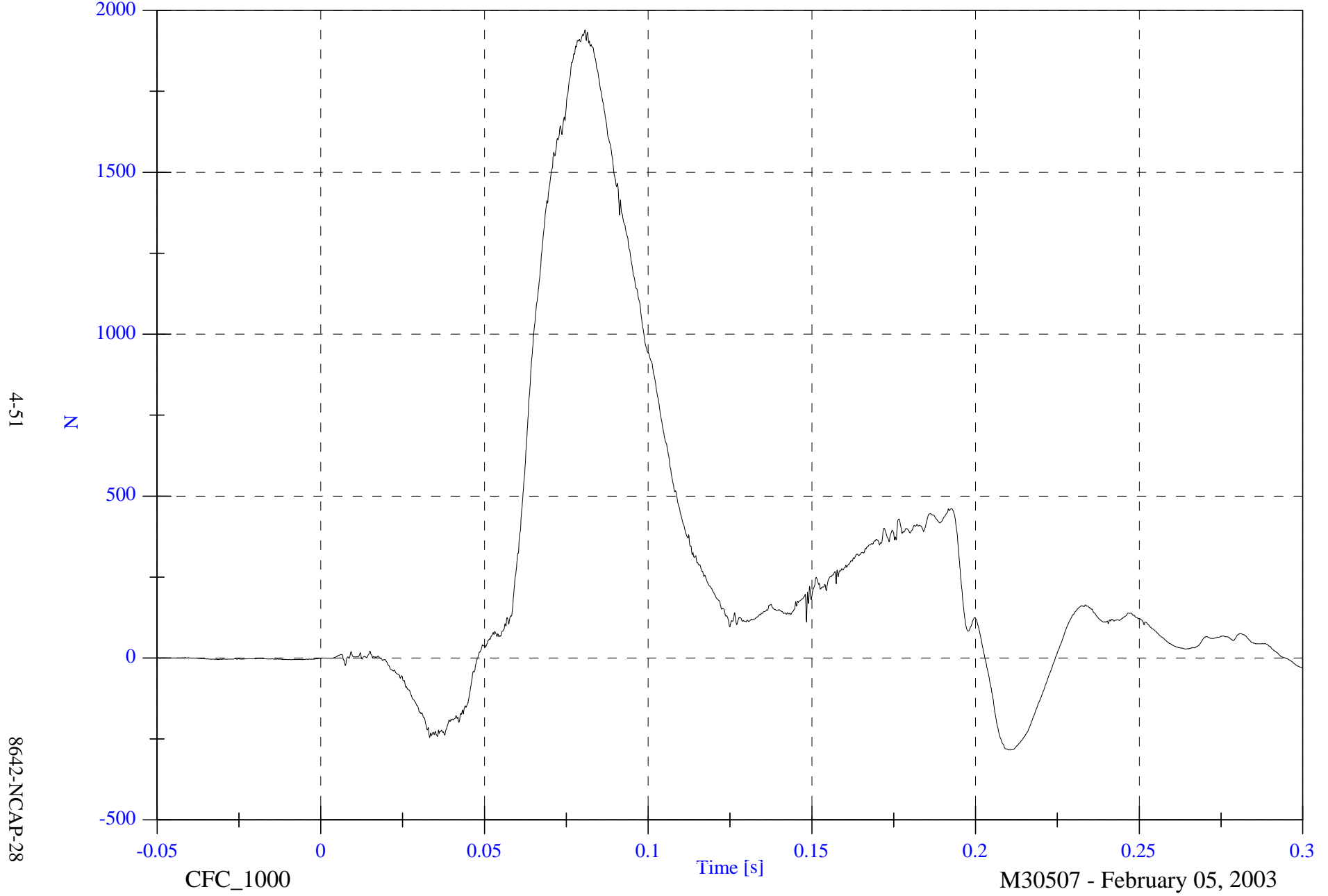
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 1939.8 [N] at 0.081 [s]

Min: -284.0 [N] at 0.211 [s]

V1P4 Upper Neck Fz



4-51

8642-NCAP-28

CFC\_1000

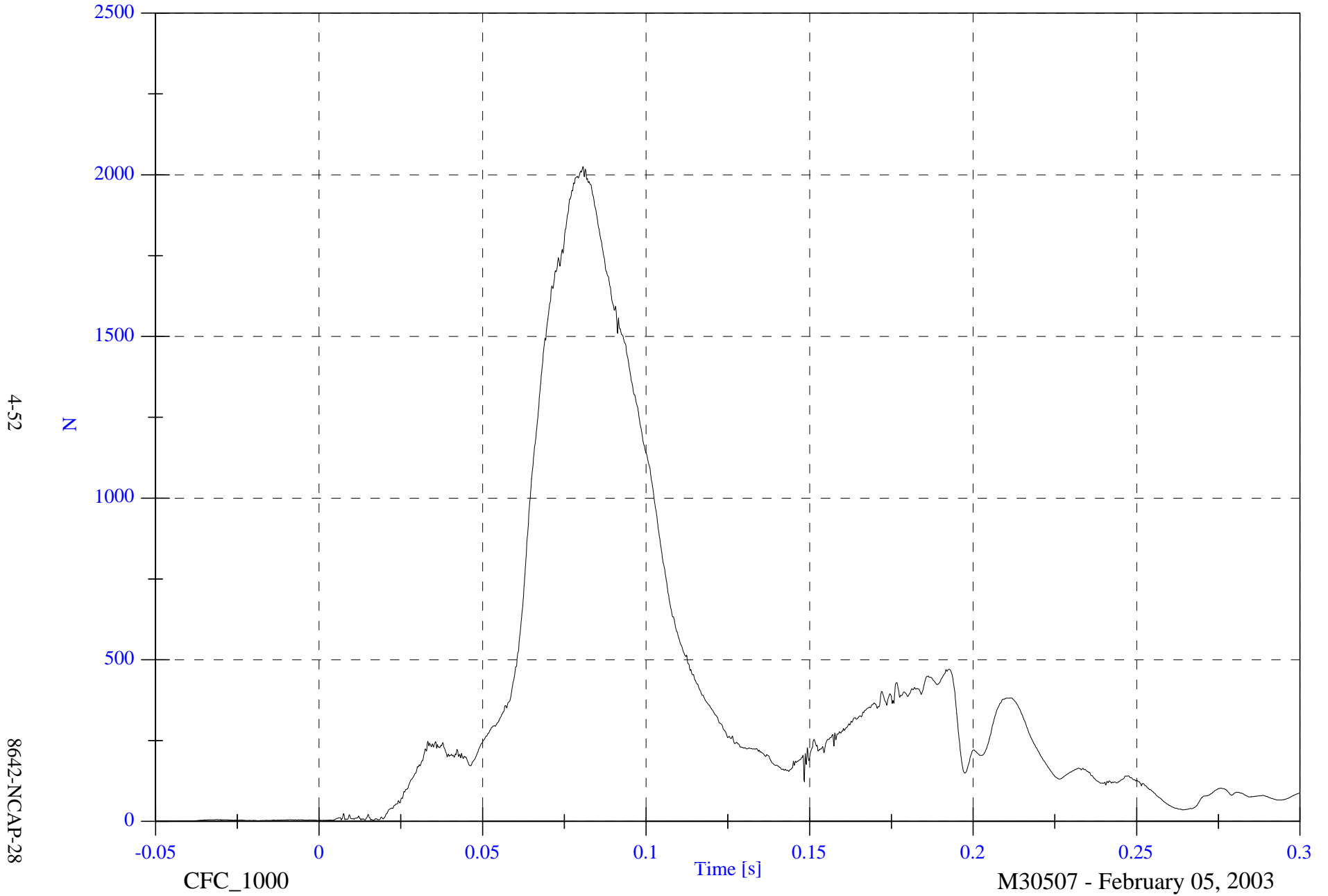
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 Upper Neck F Resultant

Max: 2024.9 [N] at 0.081 [s]

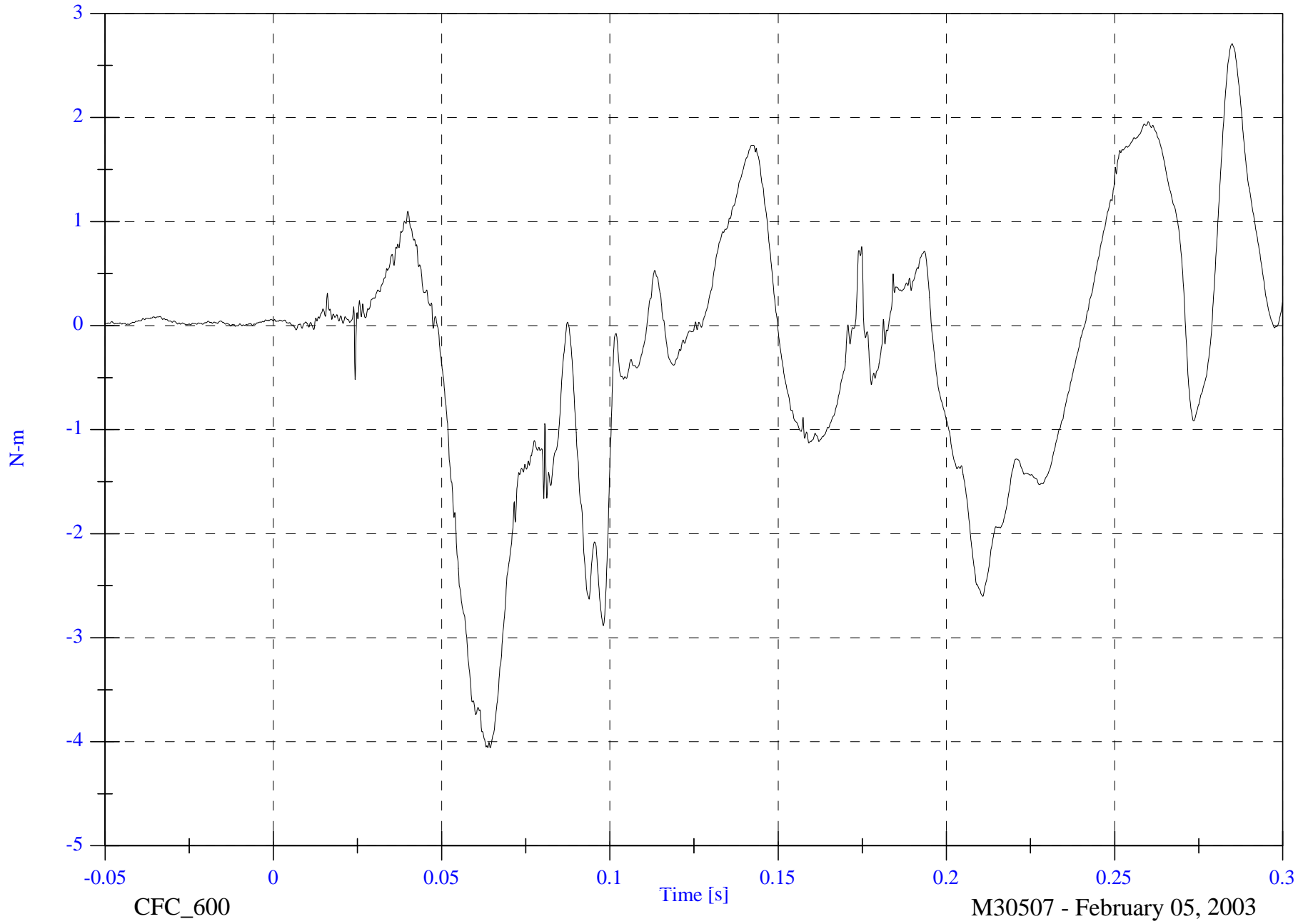
Min: 0.6 [N] at -0.050 [s]



NCAP Test #6 - 2003 Subaru Forester

V1P4 Upper Neck Mx

Max: 2.7 [N-m] at 0.285 [s]  
Min: -4.1 [N-m] at 0.064 [s]



4-53

8642-NCAP-28

CFC\_600

M30507 - February 05, 2003

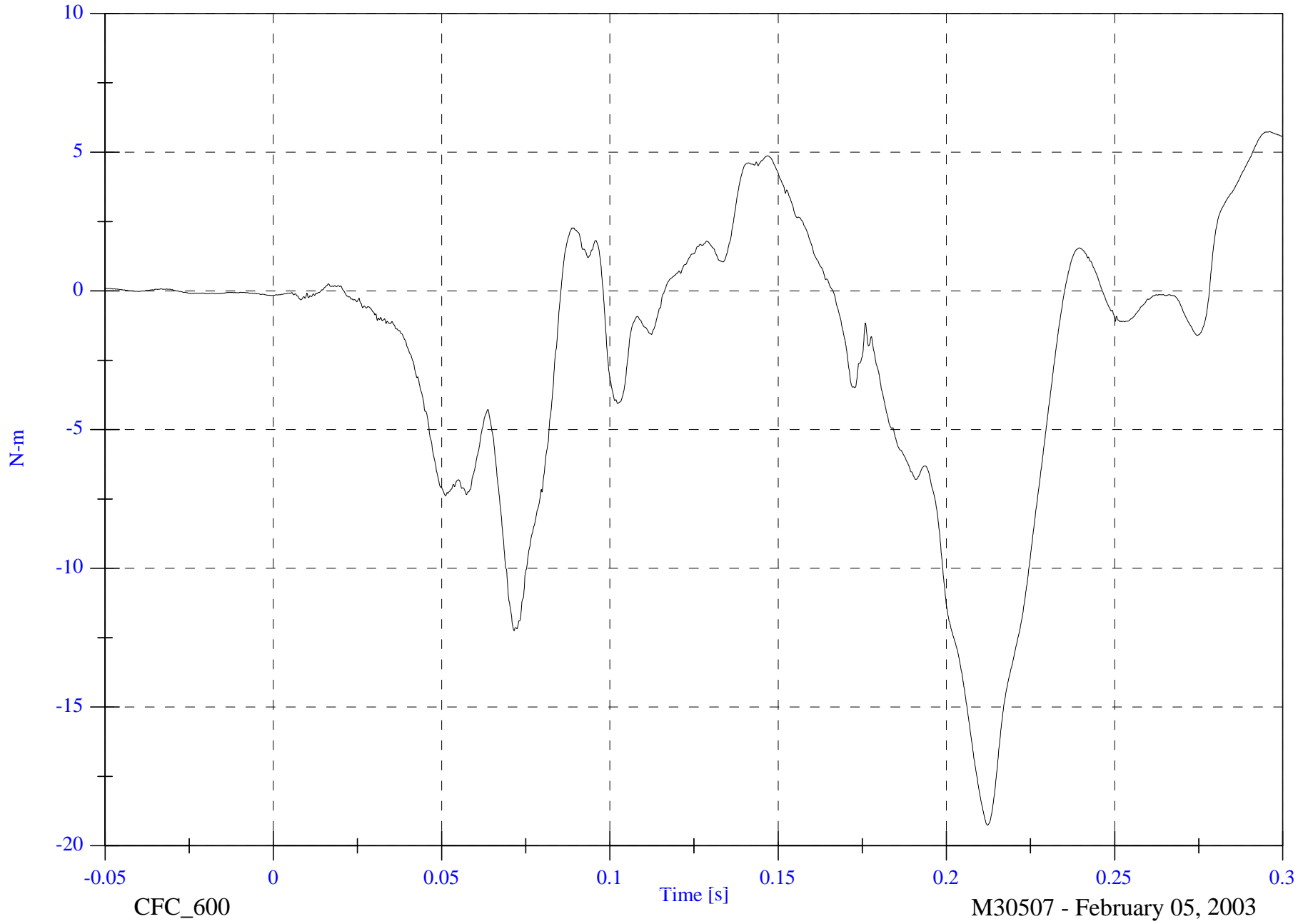
NCAP Test #6 - 2003 Subaru Forester

V1P4 Upper Neck My

Max: 5.7 [N-m] at 0.296 [s]  
Min: -19.3 [N-m] at 0.212 [s]

4-54

8642-NCAP-28



CFC\_600

Time [s]

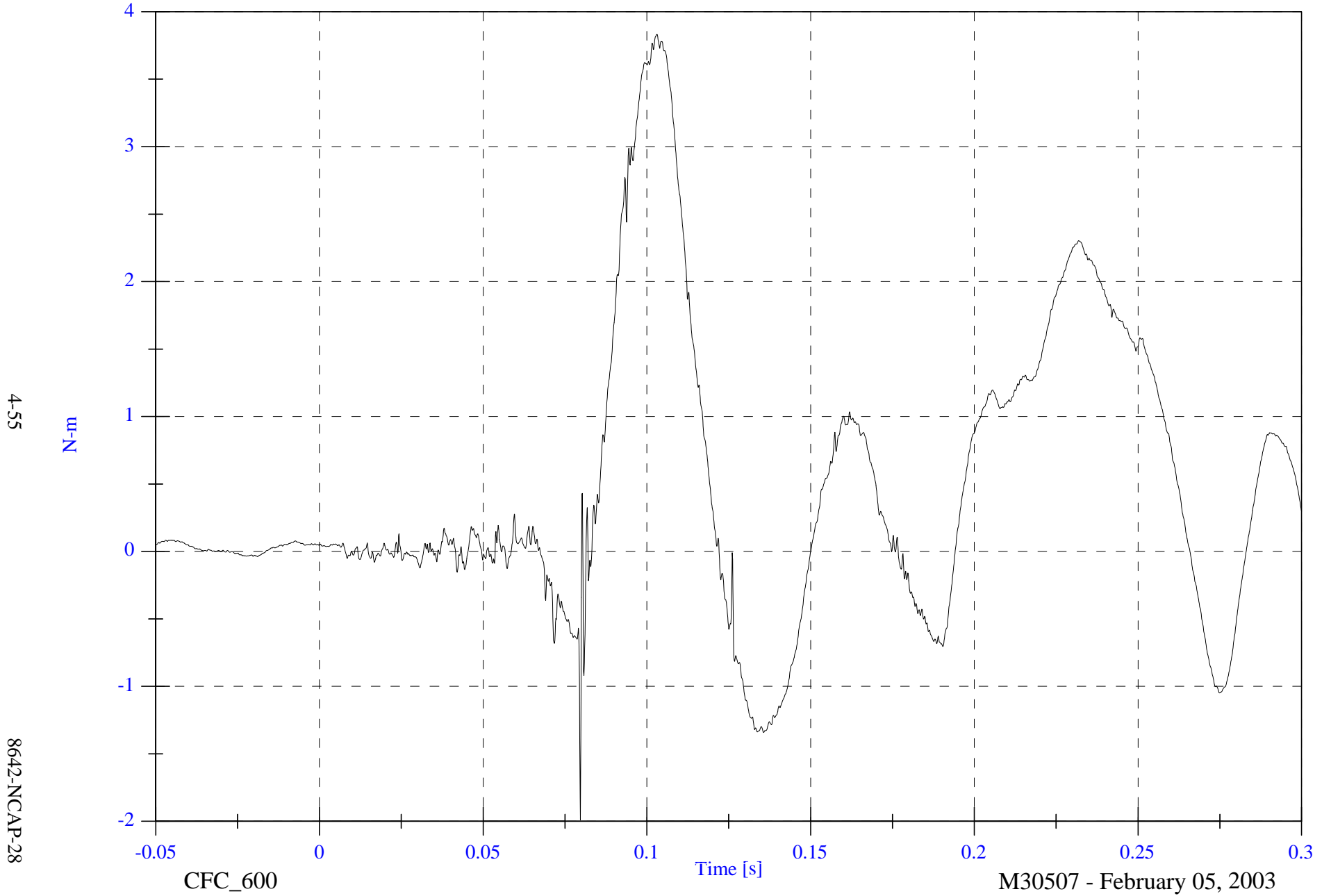
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 3.8 [N-m] at 0.103 [s]

Min: -2.0 [N-m] at 0.080 [s]

V1P4 Upper Neck Mz



4-55

8642-NCAP-28

CFC\_600

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

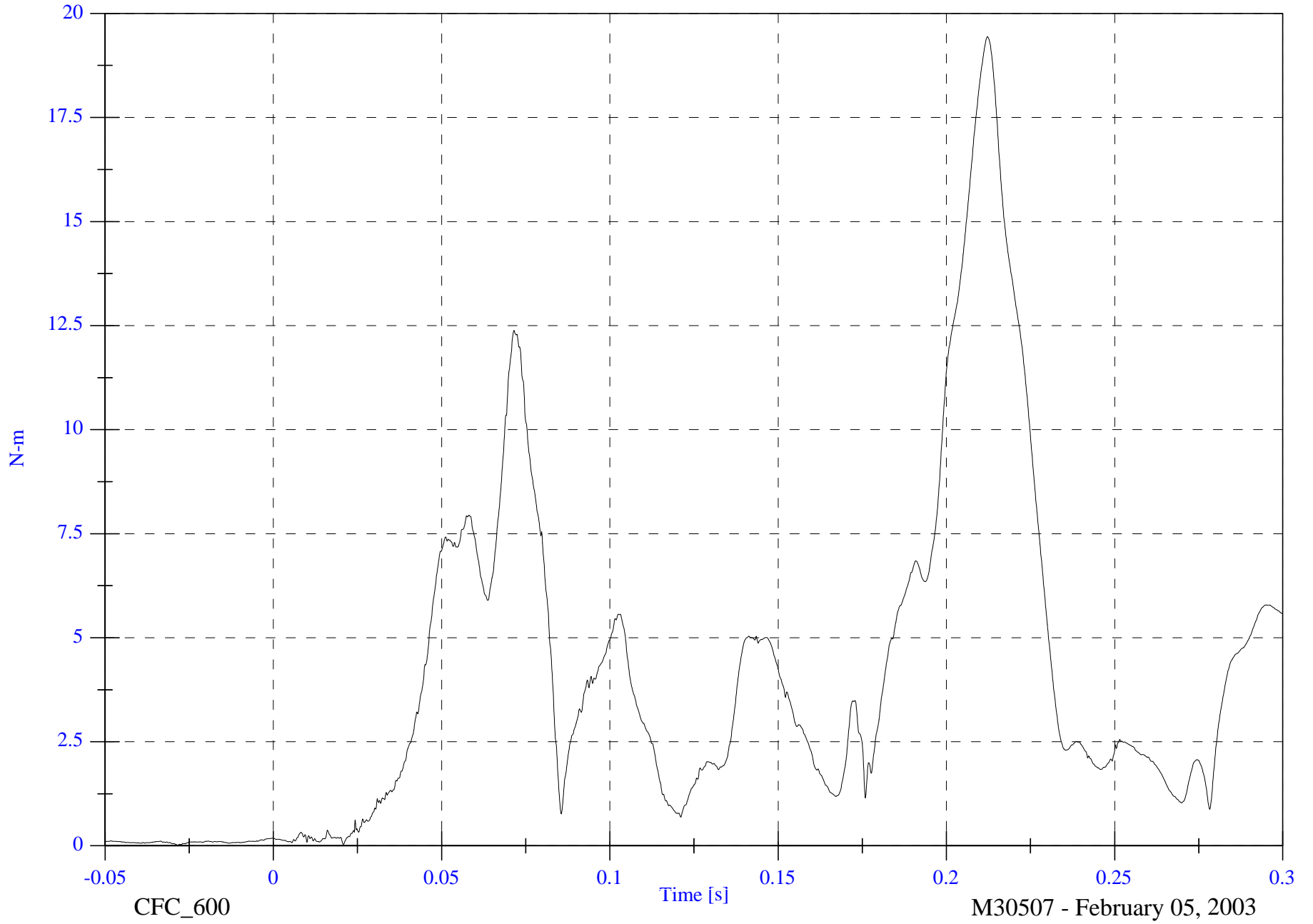
V1P4 Upper Neck M Resultant

Max: 19.4 [N-m] at 0.212 [s]

Min: 0.0 [N-m] at -0.028 [s]

4-56

8642-NCAP-28



CFC\_600

Time [s]

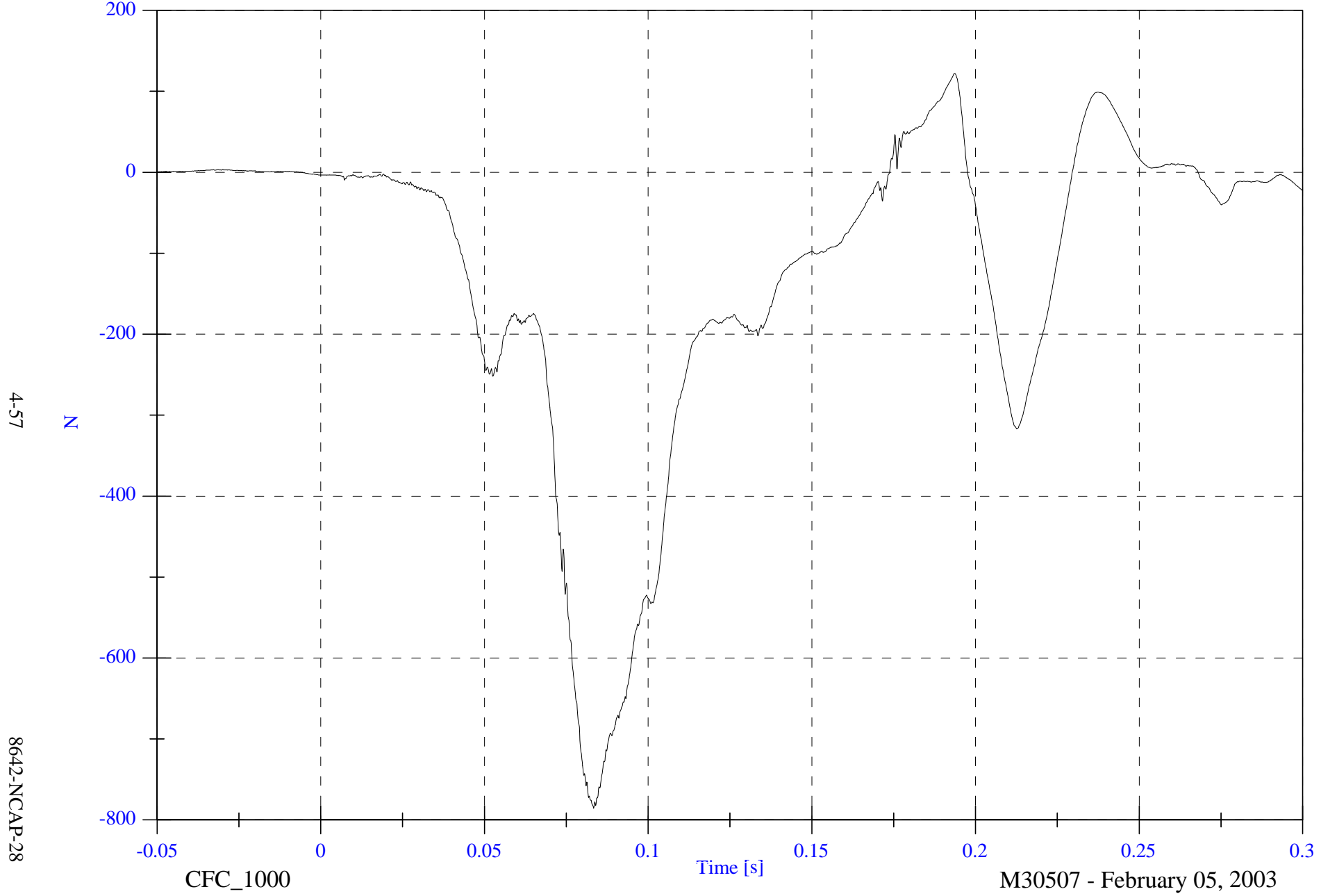
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 Lower Neck Fx

Max: 122.0 [N] at 0.194 [s]

Min: -785.5 [N] at 0.083 [s]



4-57

8642-NCAP-28

CFC\_1000

Time [s]

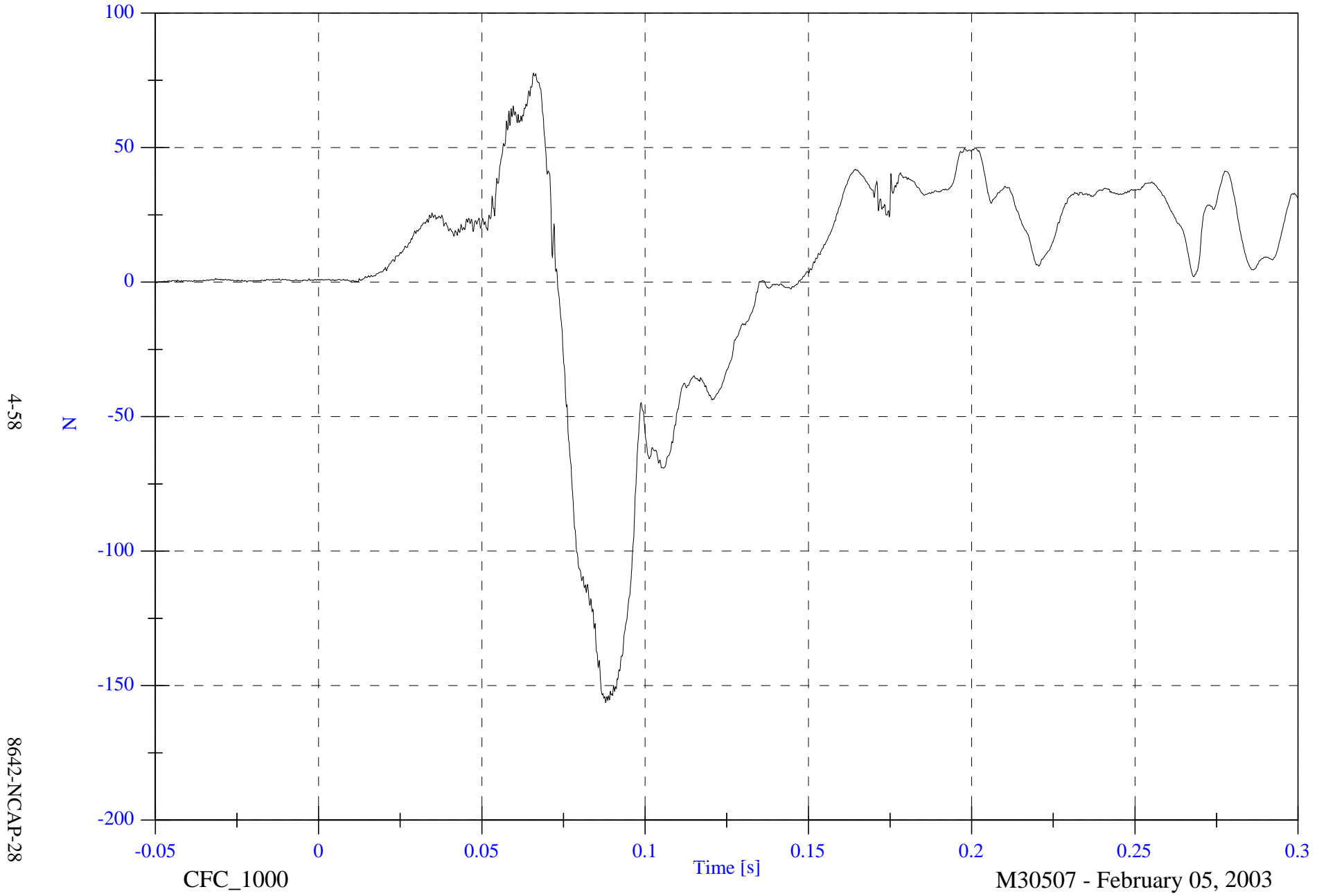
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 Lower Neck Fy

Max: 77.7 [N] at 0.066 [s]

Min: -156.3 [N] at 0.088 [s]



4-58

8642-NCAP-28

CFC\_1000

Time [s]

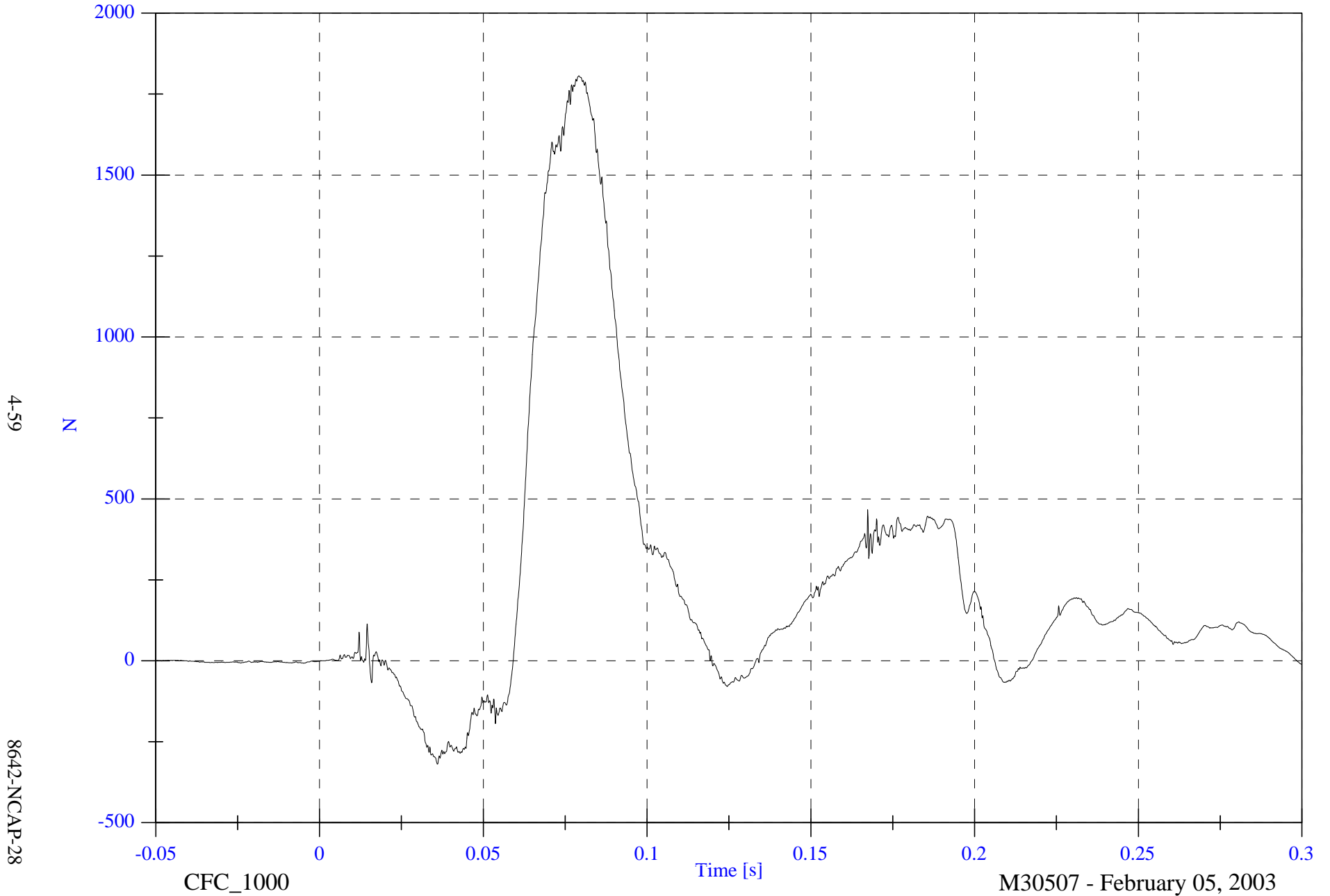
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 1806.8 [N] at 0.079 [s]

Min: -319.3 [N] at 0.036 [s]

V1P4 Lower Neck Fz



NCAP Test #6 - 2003 Subaru Forester

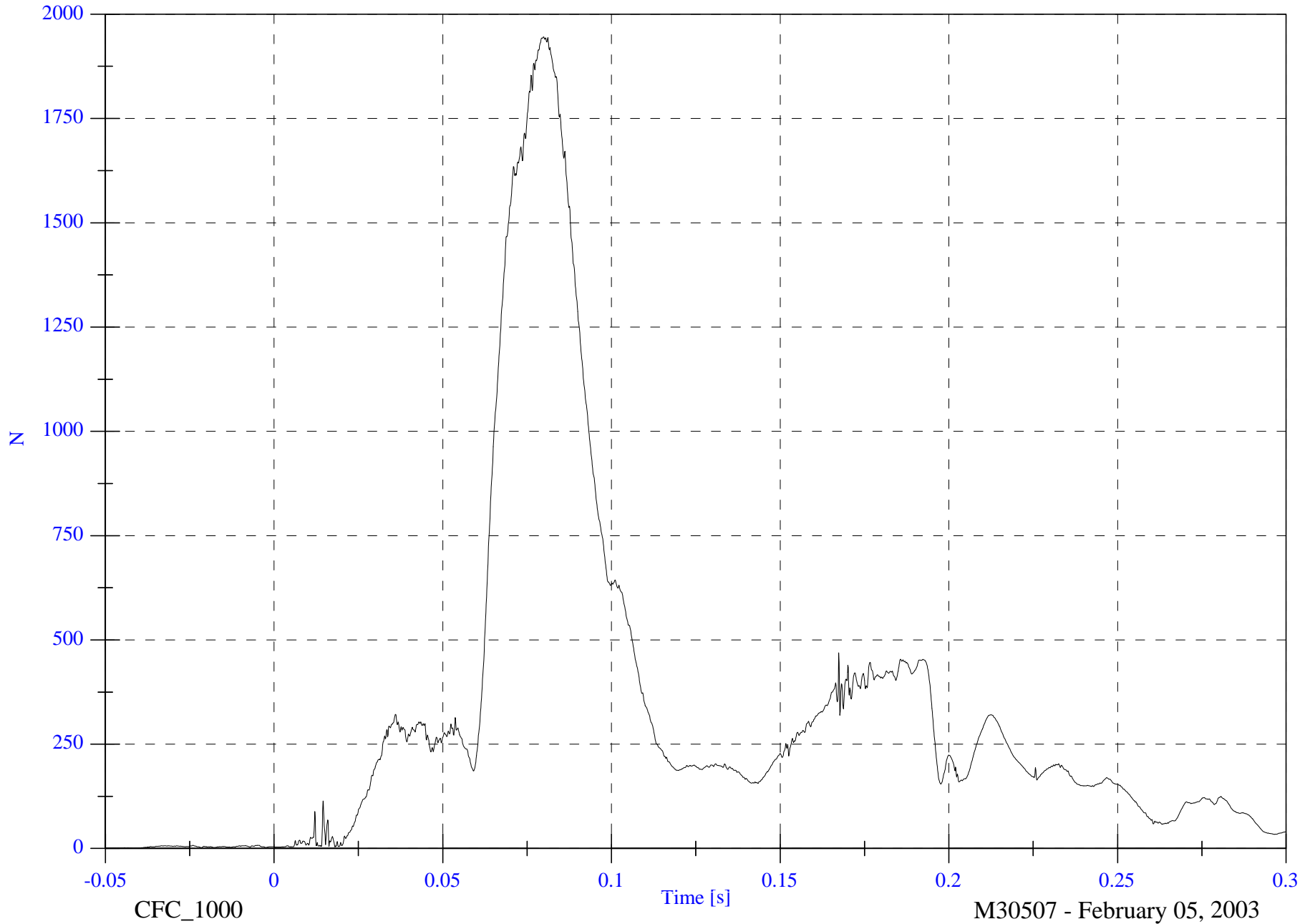
Max: 1945.8 [N] at 0.080 [s]

V1P4 Lower Neck F Resultant

Min: 0.6 [N] at -0.050 [s]

4-60

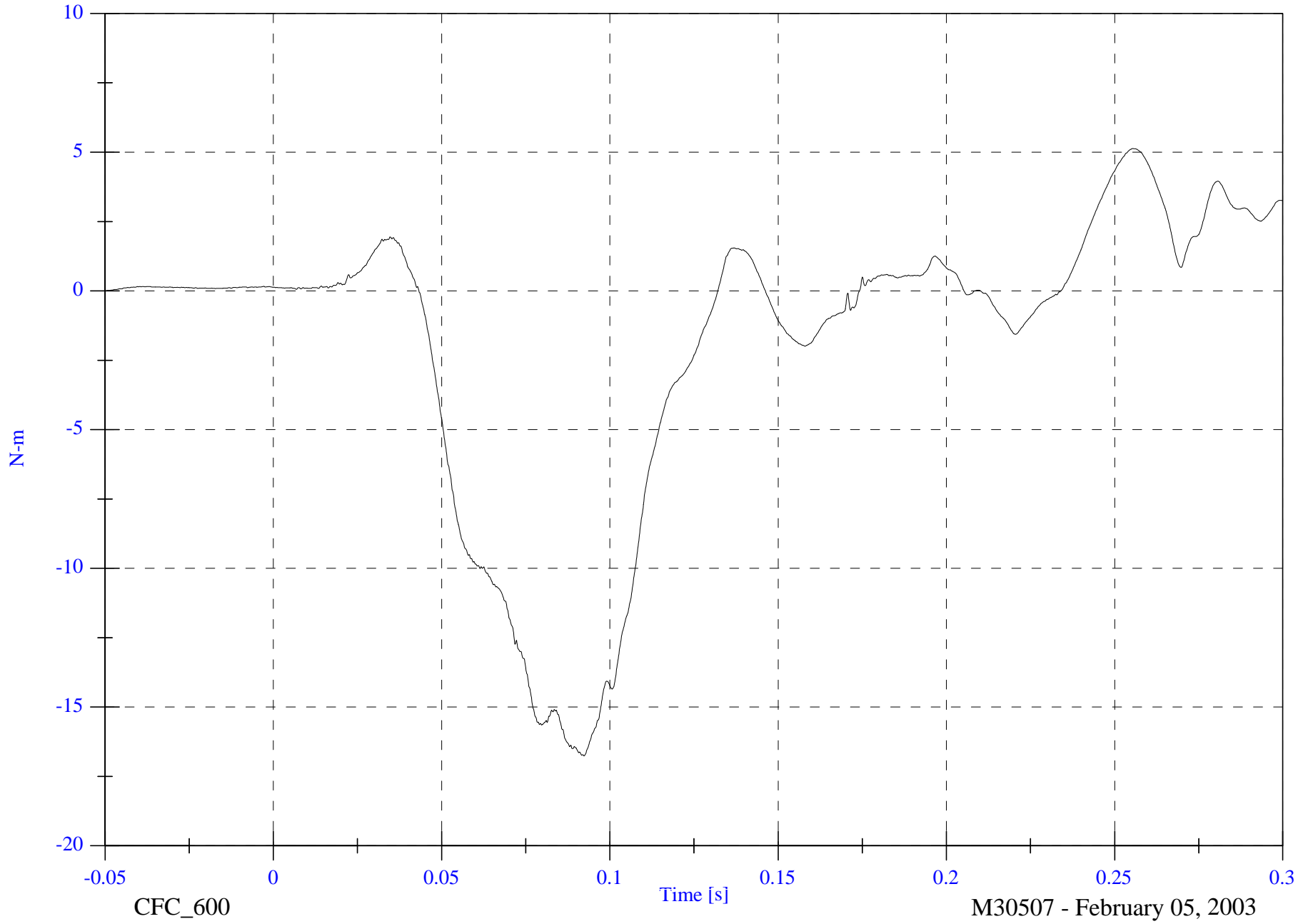
8642-NCAP-28



CFC\_1000

Time [s]

M30507 - February 05, 2003



NCAP Test #6 - 2003 Subaru Forester

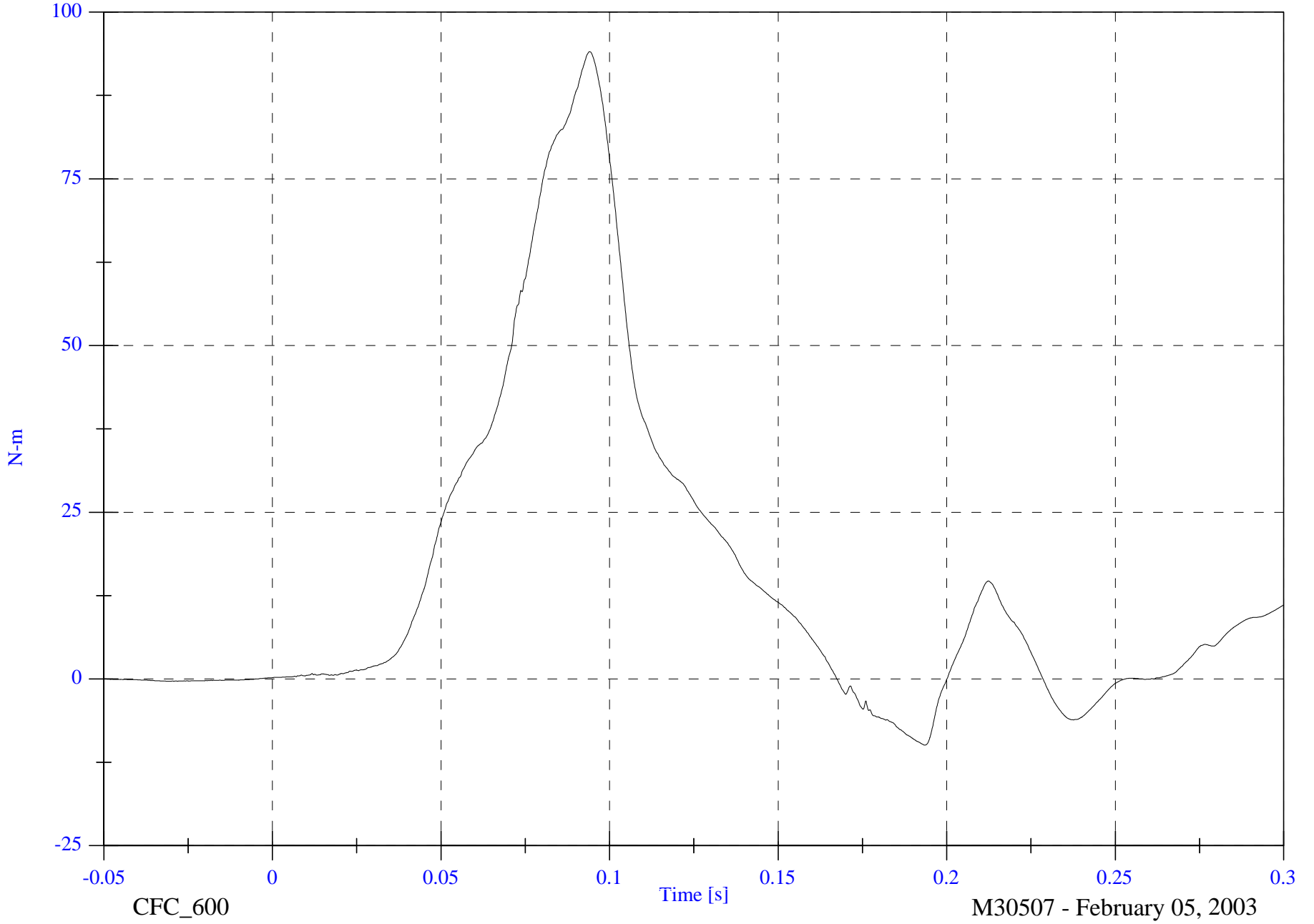
V1P4 Lower Neck My

Max: 94.1 [N-m] at 0.094 [s]

Min: -9.9 [N-m] at 0.194 [s]

4-62

8642-NCAP-28



CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

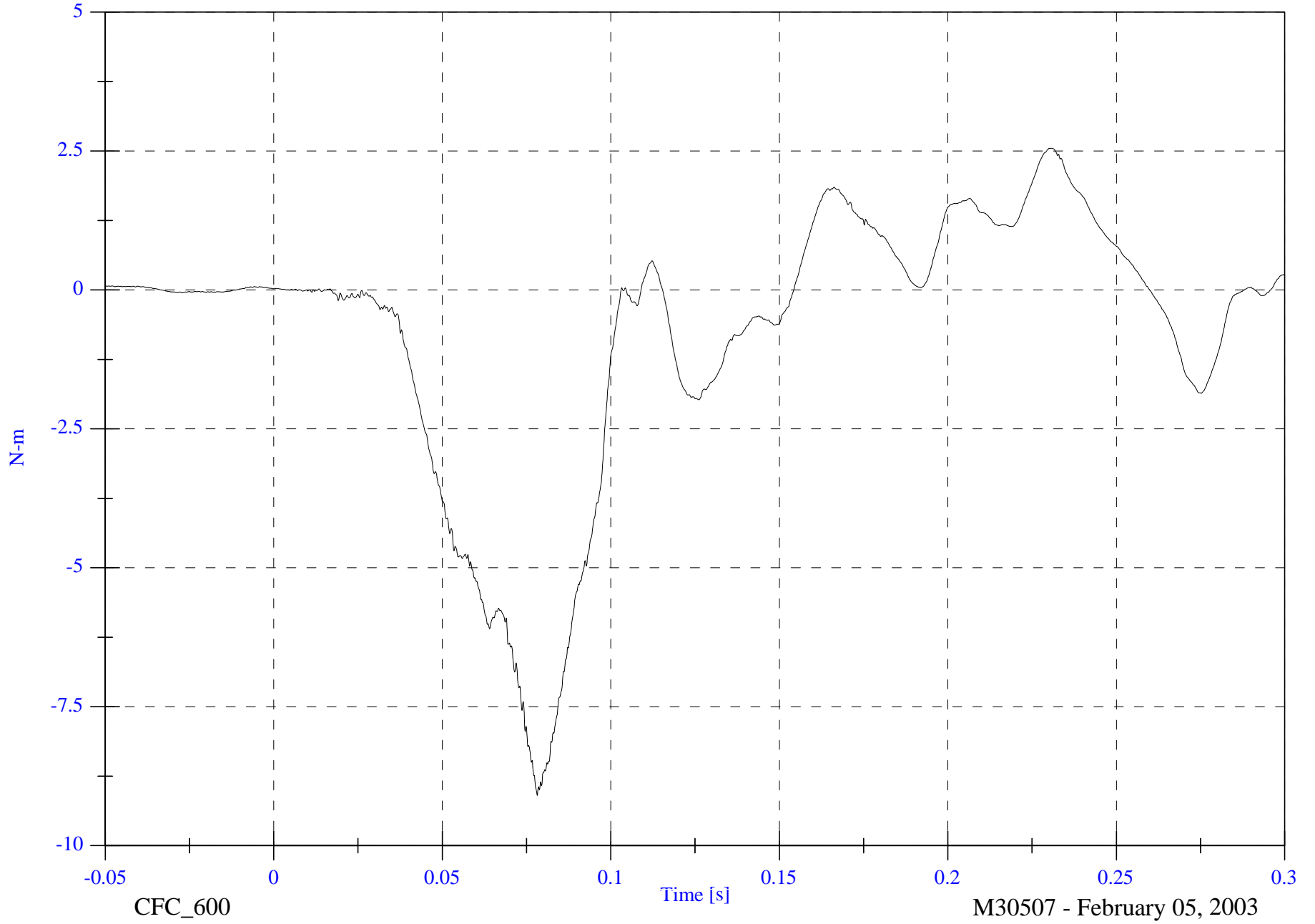
V1P4 Lower Neck Mz

Max: 2.5 [N-m] at 0.231 [s]

Min: -9.1 [N-m] at 0.078 [s]

4-63

8642-NCAP-28



CFC\_600

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

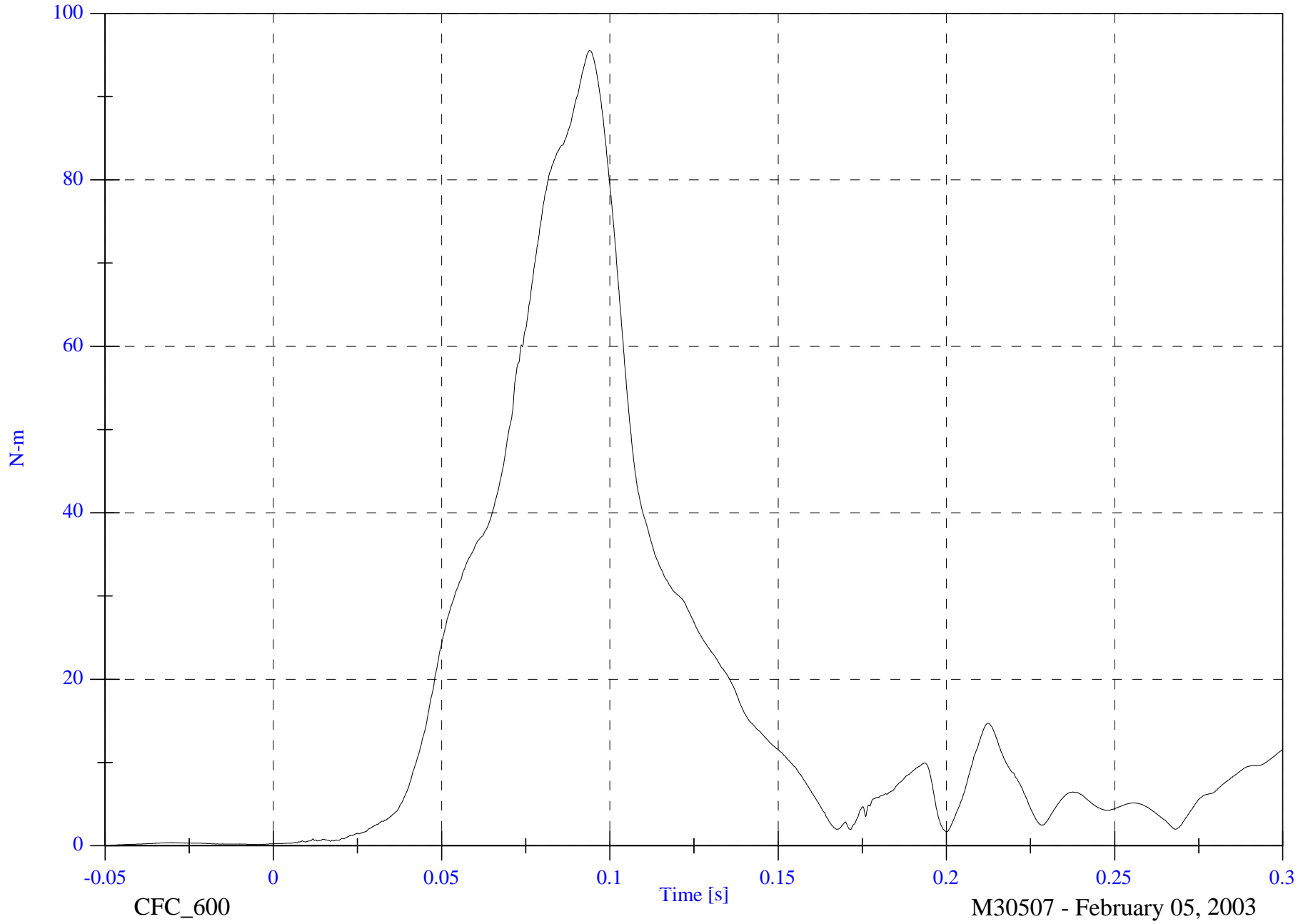
V1P4 Lower Neck M Resultant

Max: 95.6 [N-m] at 0.094 [s]

Min: 0.1 [N-m] at -0.050 [s]

4-64

8642-NCAP-28

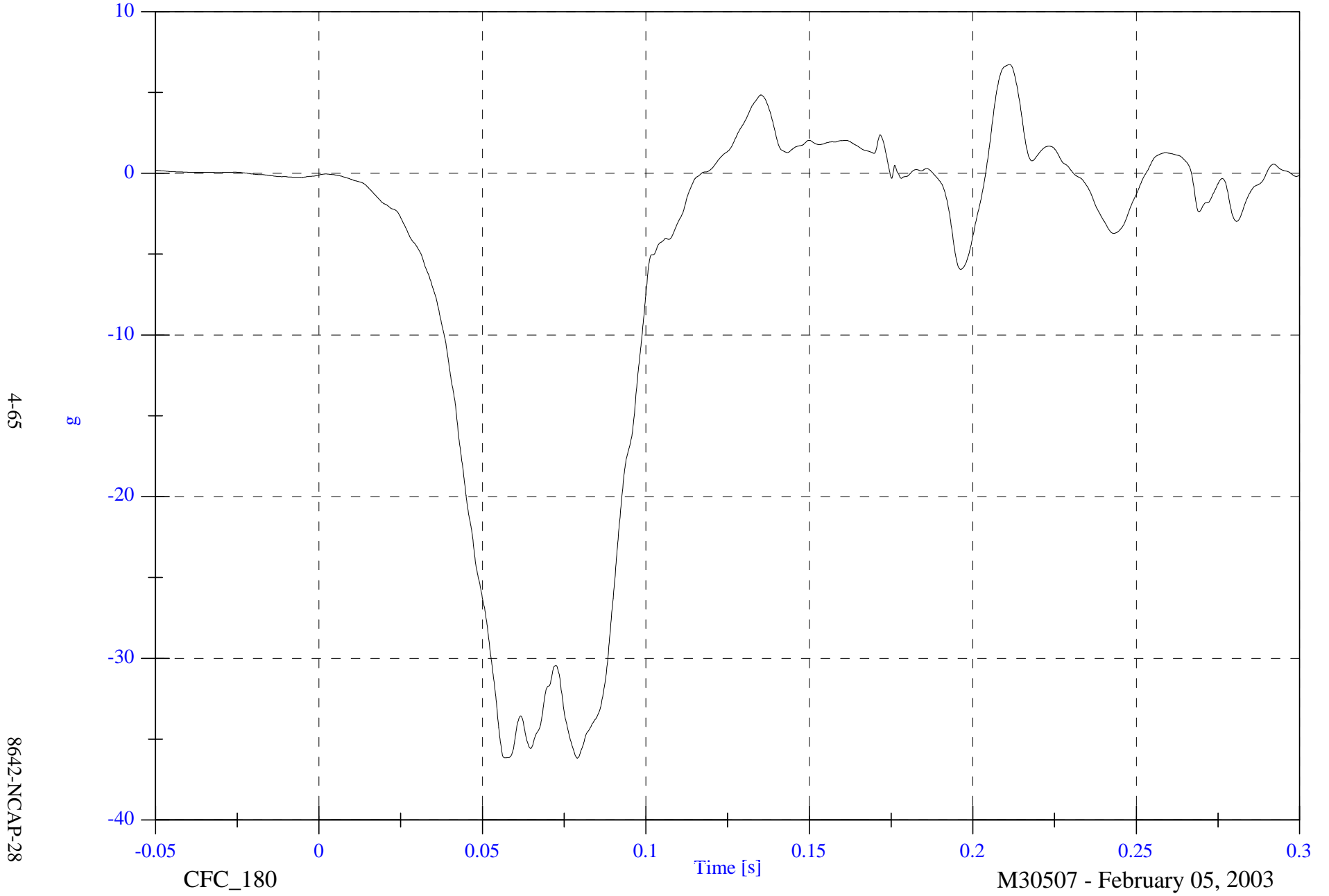


NCAP Test #6 - 2003 Subaru Forester

VIP4 Chest x

Max: 6.7 [g] at 0.211 [s]

Min: -36.2 [g] at 0.079 [s]



NCAP Test #6 - 2003 Subaru Forester

VIP4 Chest y

Max: 1.8 [g] at 0.271 [s]

Min: -5.9 [g] at 0.086 [s]

4-66

8642-NCAP-28

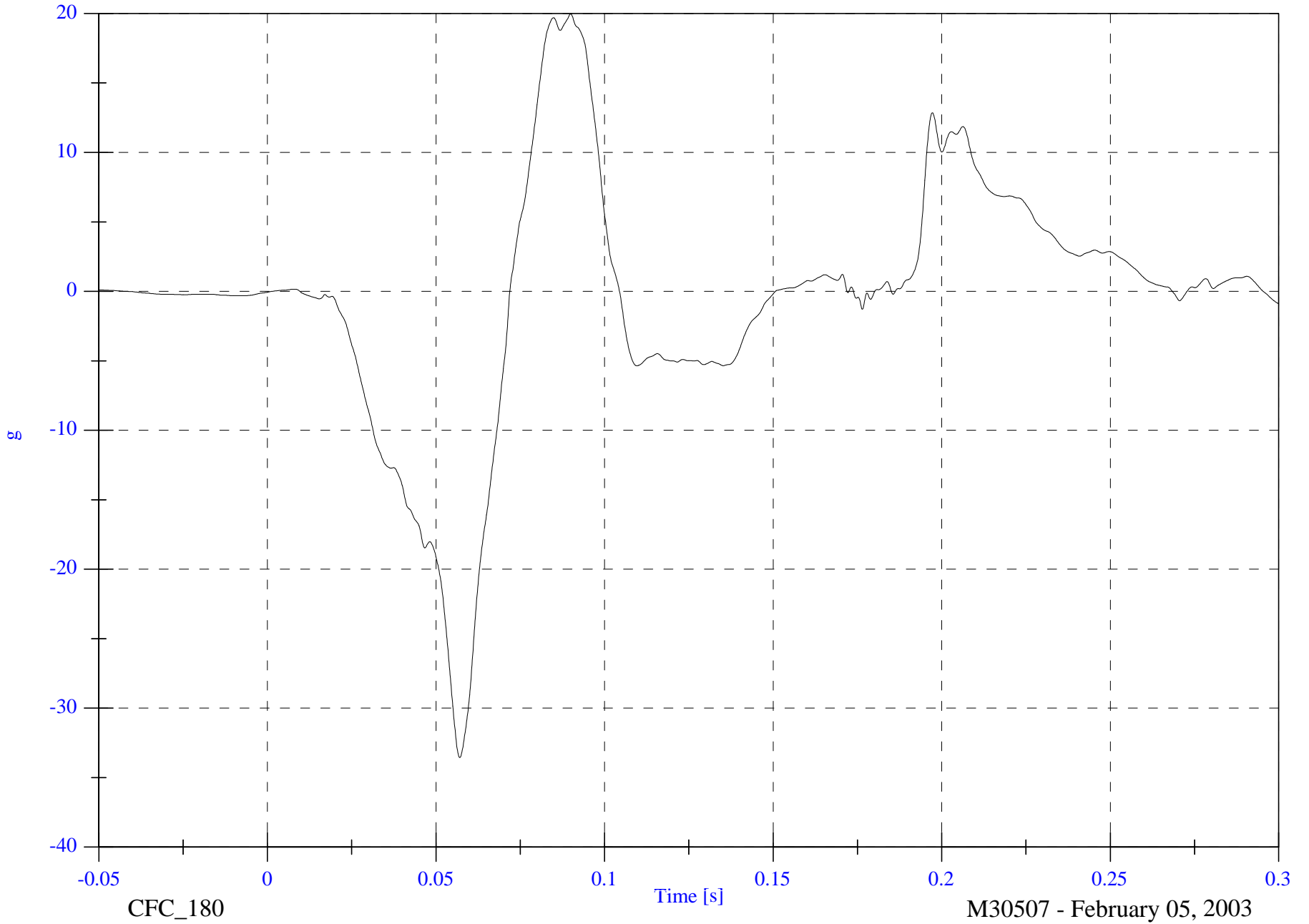


NCAP Test #6 - 2003 Subaru Forester

VIP4 Chest z

Max: 20.0 [g] at 0.090 [s]

Min: -33.6 [g] at 0.057 [s]



4-67

8642-NCAP-28

CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

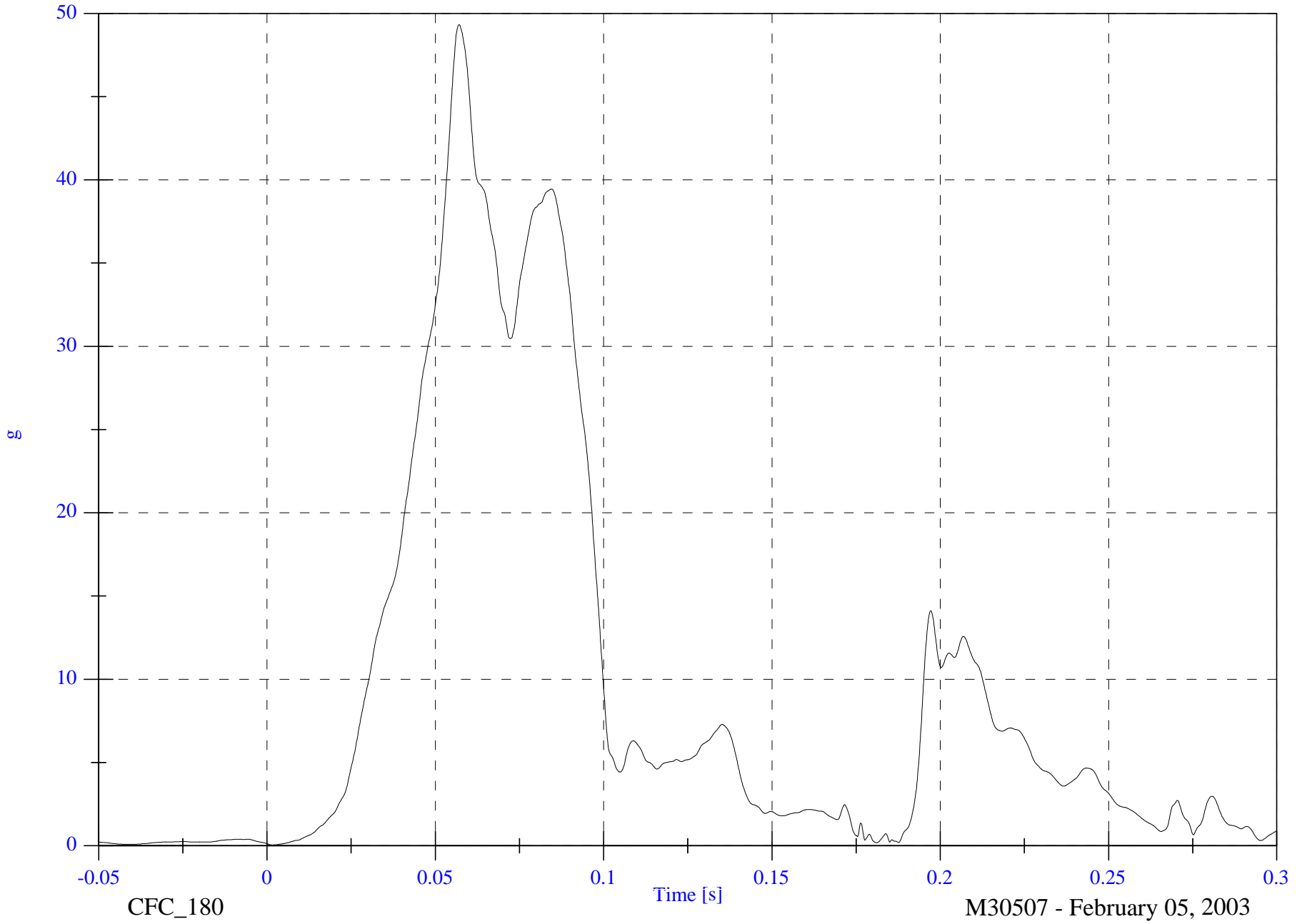
V1P4 Chest Resultant

Max: 49.3 [g] at 0.057 [s]

Min: 0.0 [g] at 0.002 [s]

4-68

8642-NCAP-28



CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

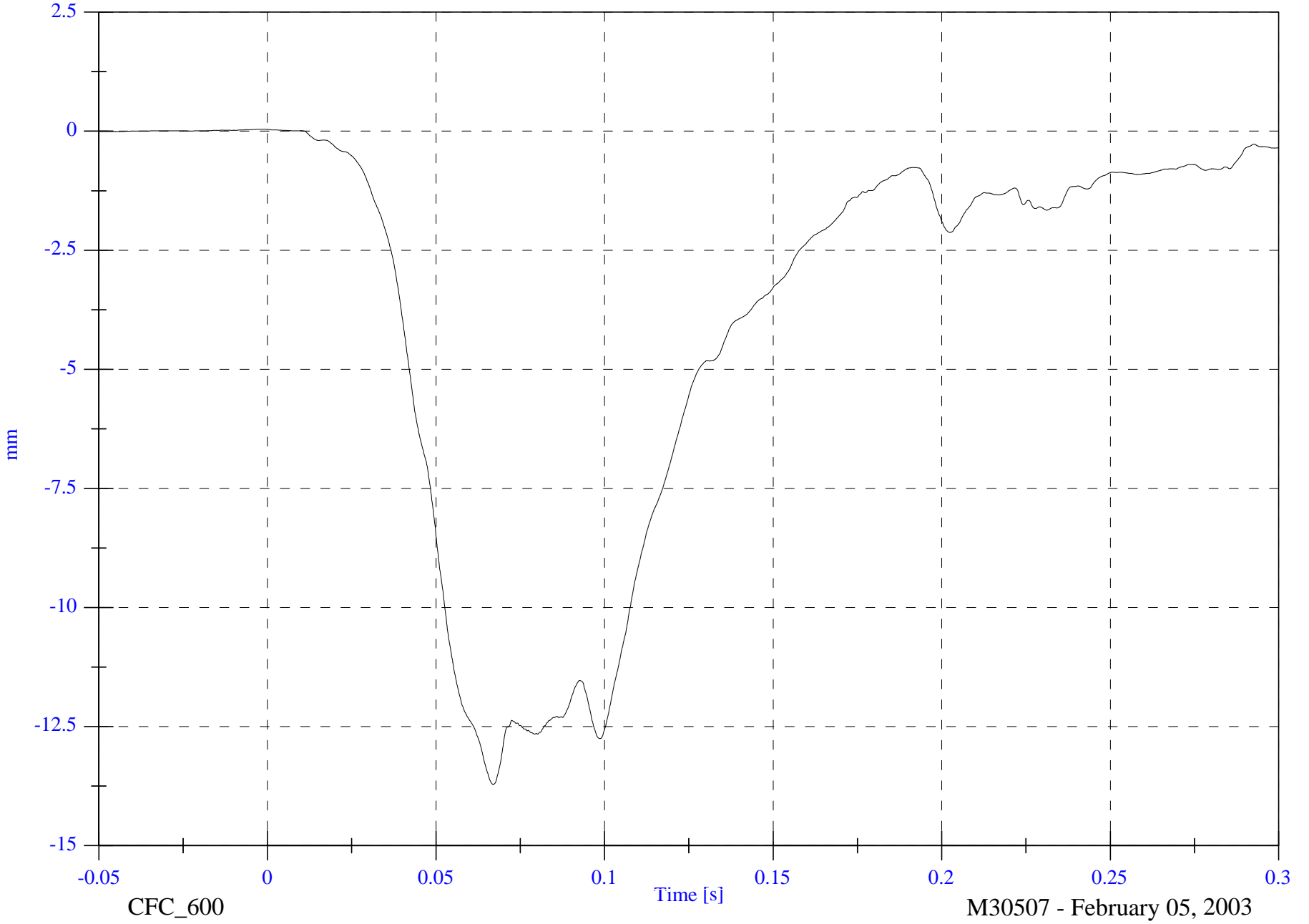
V1P4 Chest Compression

Max: 0.0 [mm] at -0.001 [s]

Min: -13.7 [mm] at 0.067 [s]

4-69

8642-NCAP-28



CFC\_600

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 18.3 [g] at 0.112 [s]

Min: -58.8 [g] at 0.056 [s]

V1P4 Pelvic x



NCAP Test #6 - 2003 Subaru Forester

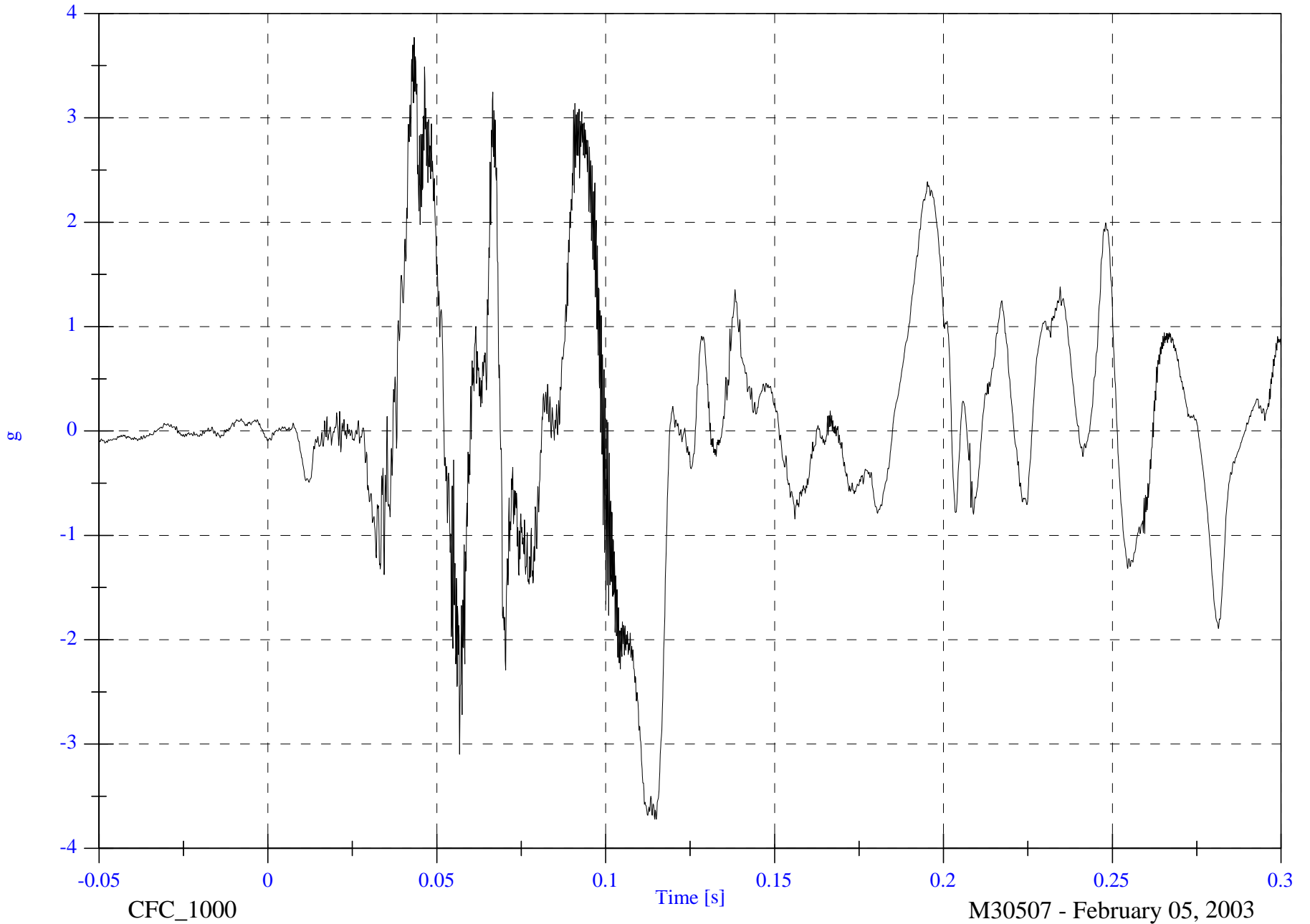
V1P4 Pelvic y

Max: 3.8 [g] at 0.043 [s]

Min: -3.7 [g] at 0.114 [s]

4-71

8642-NCAP-28



CFC\_1000

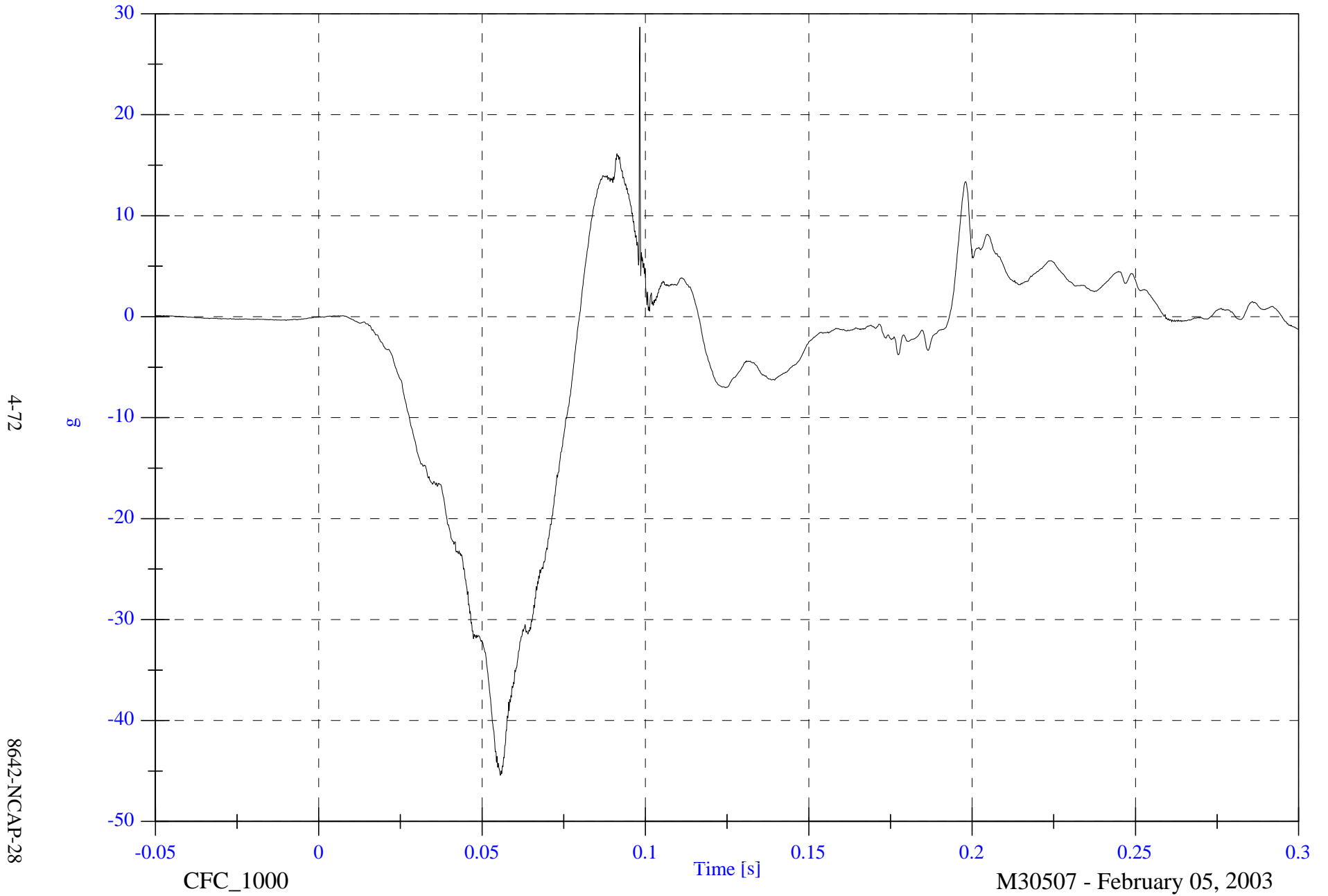
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

Max: 28.7 [g] at 0.098 [s]

Min: -45.4 [g] at 0.056 [s]

V1P4 Pelvic z



4-72

8642-NCAP-28

CFC\_1000

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

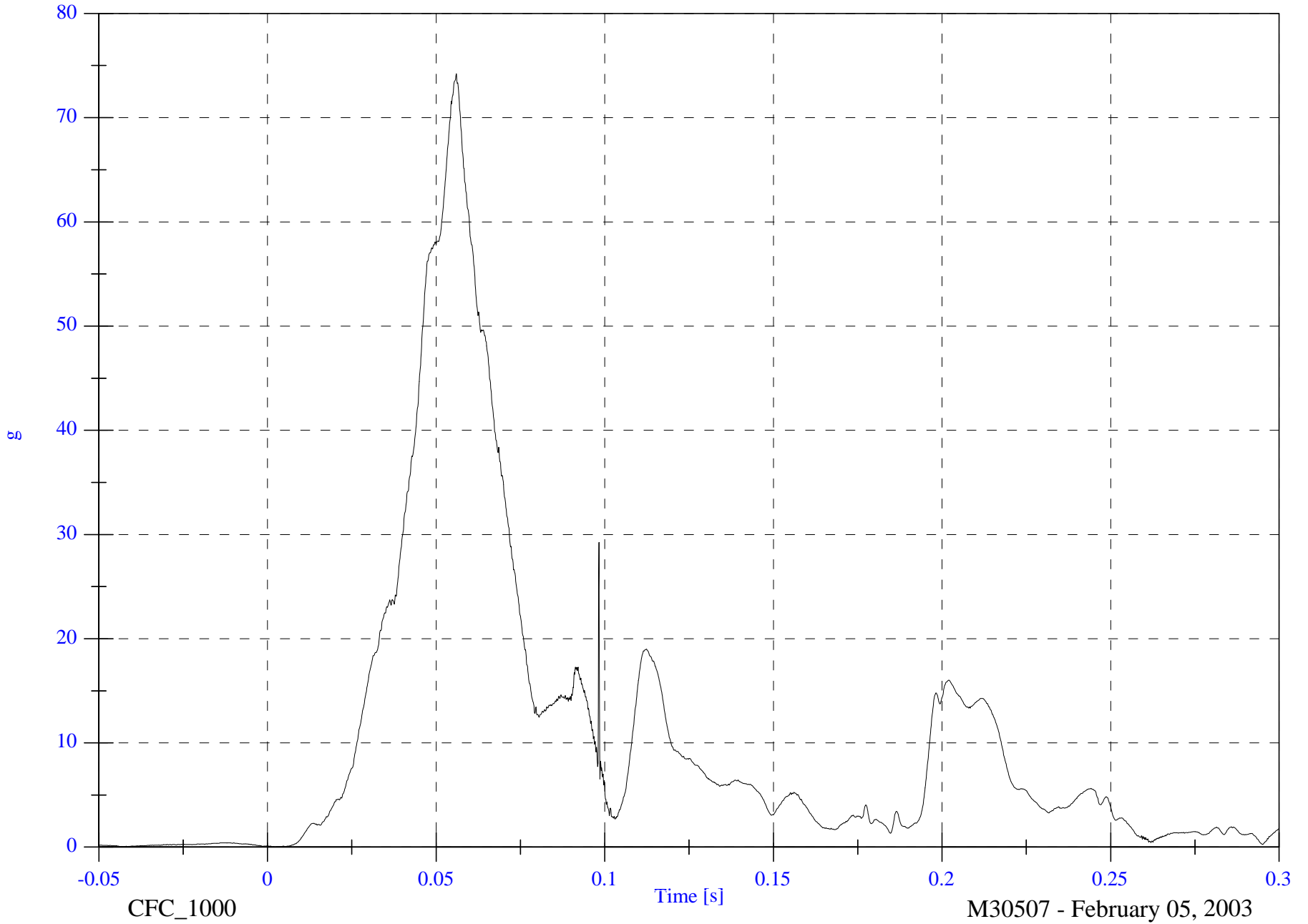
V1P4 Pelvic Resultant

Max: 74.2 [g] at 0.056 [s]

Min: 0.0 [g] at 0.002 [s]

4-73

8642-NCAP-28



CFC\_1000

Time [s]

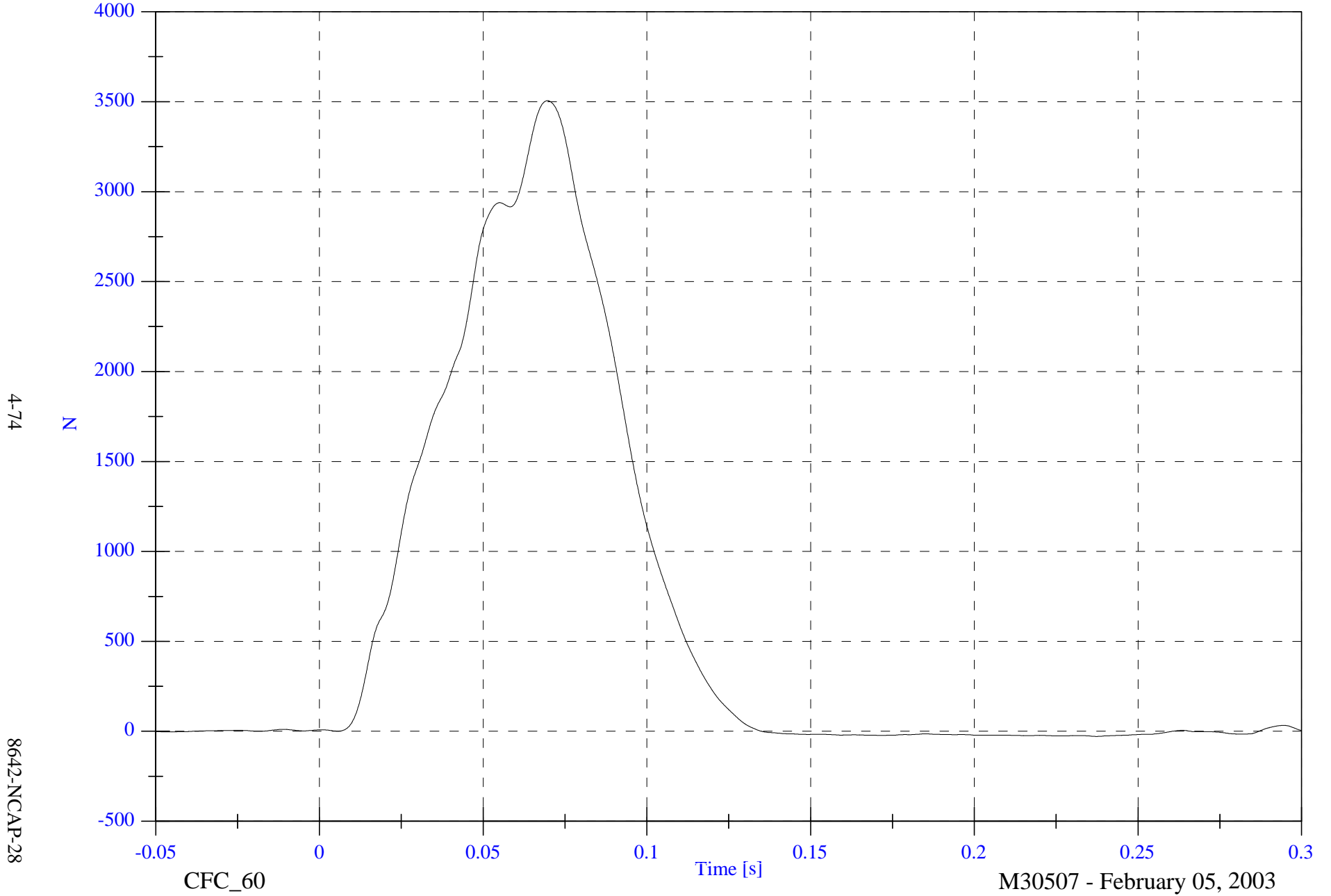
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 CRS Tether Belt

Max: 3505.4 [N] at 0.070 [s]

Min: -28.3 [N] at 0.237 [s]



4-74

8642-NCAP-28

CFC\_60

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 CRS x

Max: 17.1 [g] at 0.192 [s]

Min: -61.8 [g] at 0.051 [s]



NCAP Test #6 - 2003 Subaru Forester

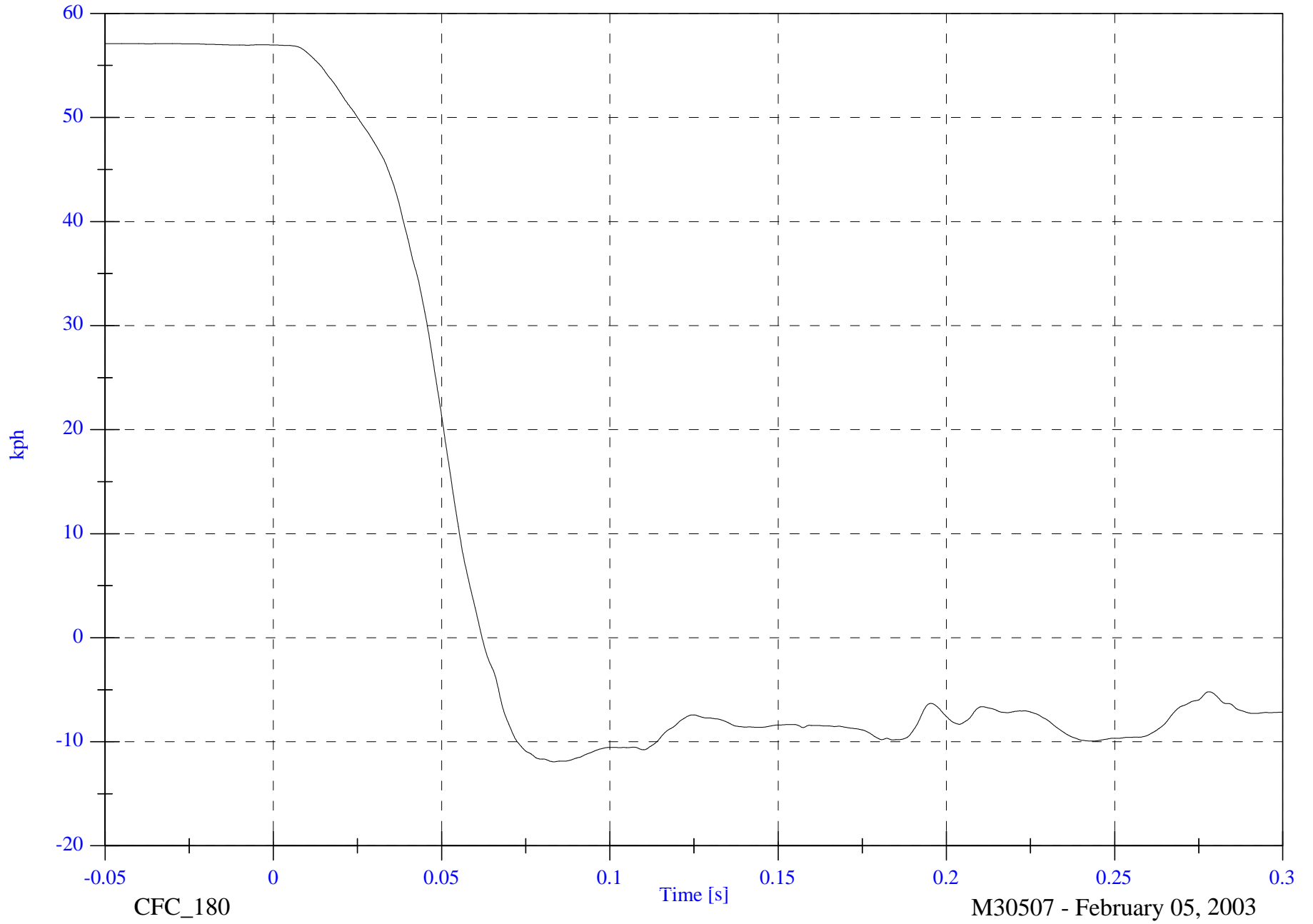
Max: 57.1 [kph] at -0.045 [s]

V1P4 CRS x Velocity

Min: -11.9 [kph] at 0.083 [s]

4-76

8642-NCAP-28



CFC\_180

Time [s]

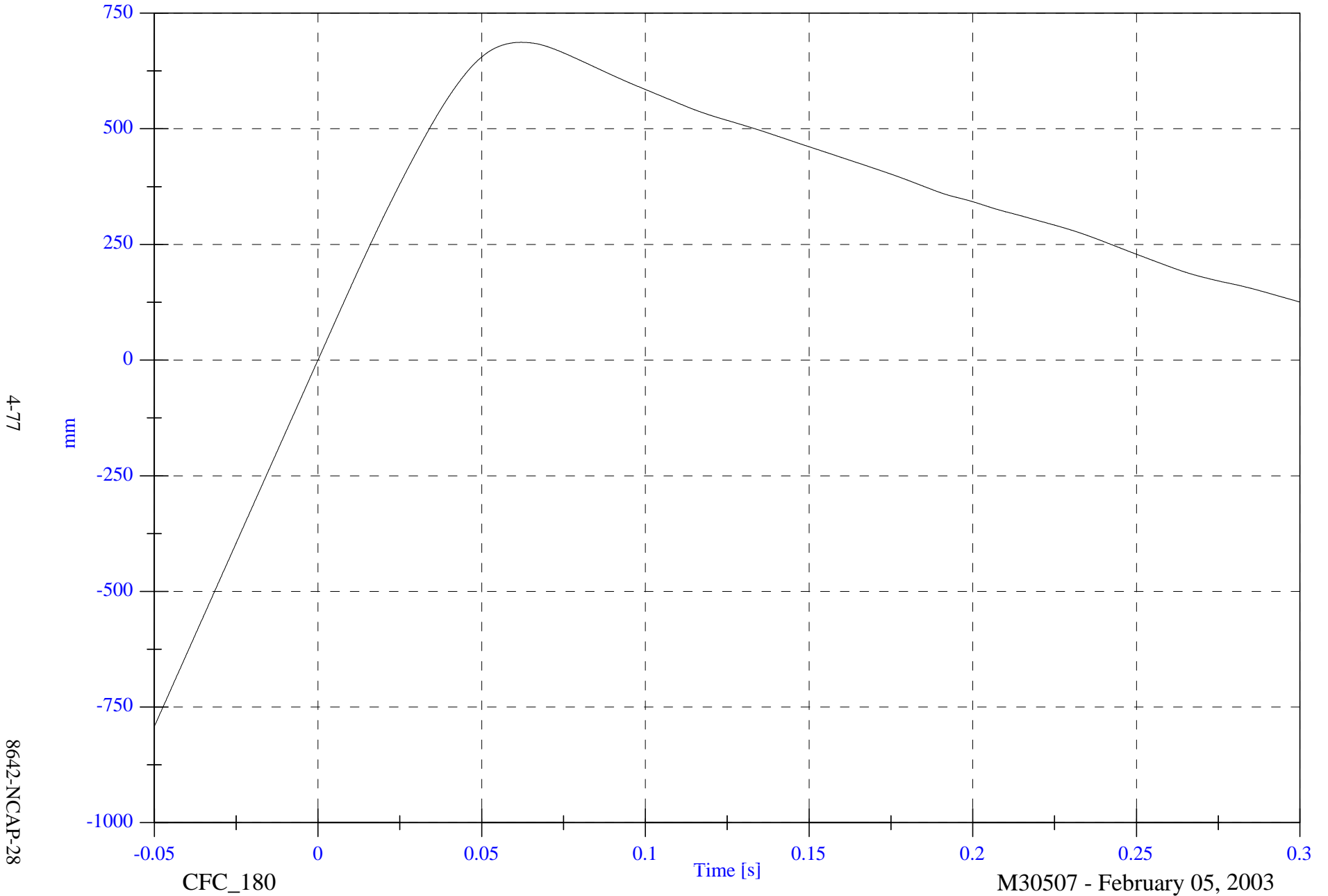
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 CRS x Displacement

Max: 686.9 [mm] at 0.062 [s]

Min: -792.3 [mm] at -0.050 [s]



4-77

8642-NCAP-28

CFC\_180

Time [s]

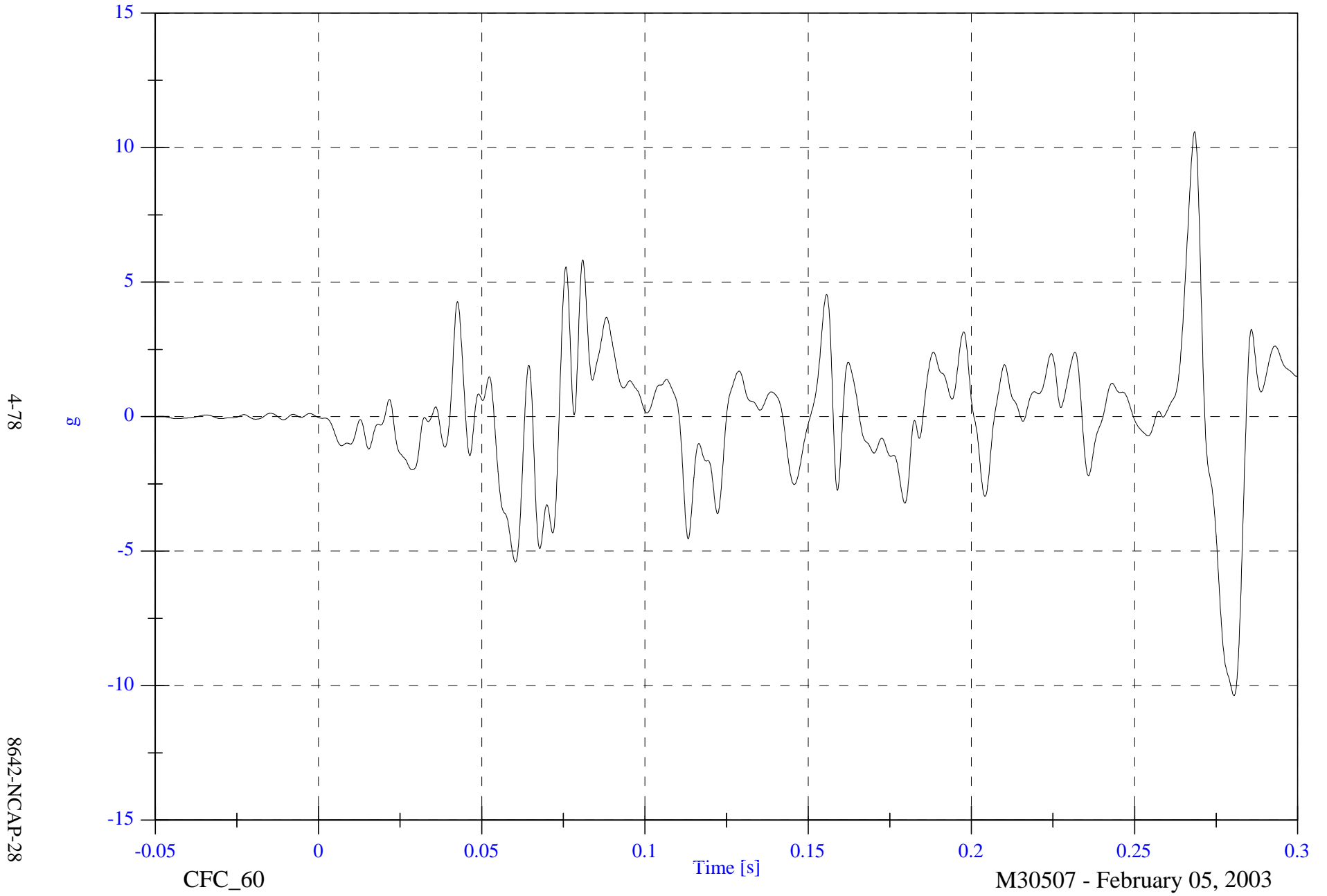
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 CRS y

Max: 10.6 [g] at 0.268 [s]

Min: -10.4 [g] at 0.280 [s]



NCAP Test #6 - 2003 Subaru Forester

V1P4 CRS y Velocity

Max: 2.3 [kph] at 0.271 [s]

Min: -2.6 [kph] at 0.074 [s]

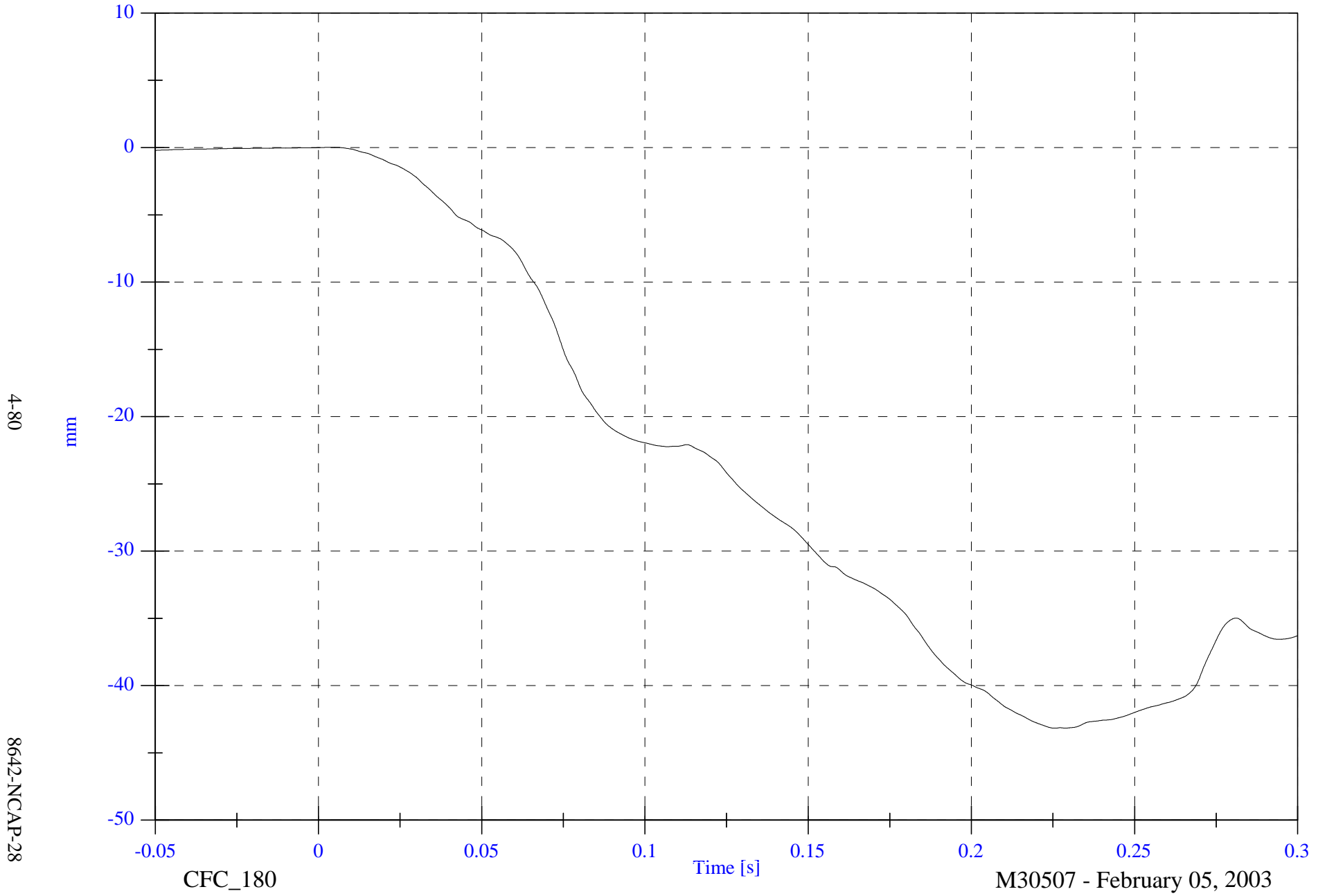


NCAP Test #6 - 2003 Subaru Forester

V1P4 CRS y Displacement

Max: 0.0 [mm] at 0.005 [s]

Min: -43.2 [mm] at 0.225 [s]



4-80

8642-NCAP-28

CFC\_180

Time [s]

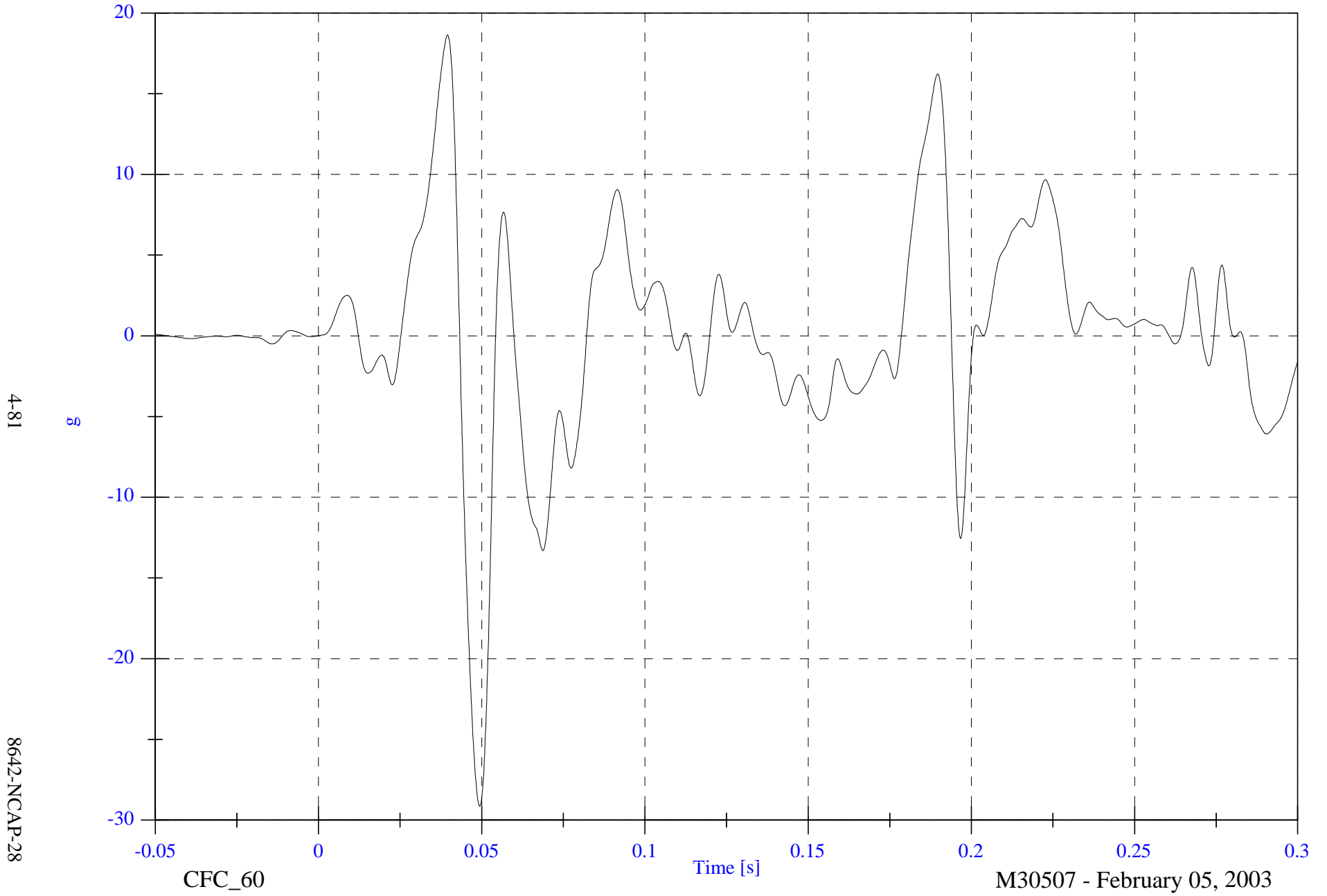
M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

V1P4 CRS z

Max: 18.6 [g] at 0.040 [s]

Min: -29.1 [g] at 0.049 [s]



4-81

8642-NCAP-28

CFC\_60

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

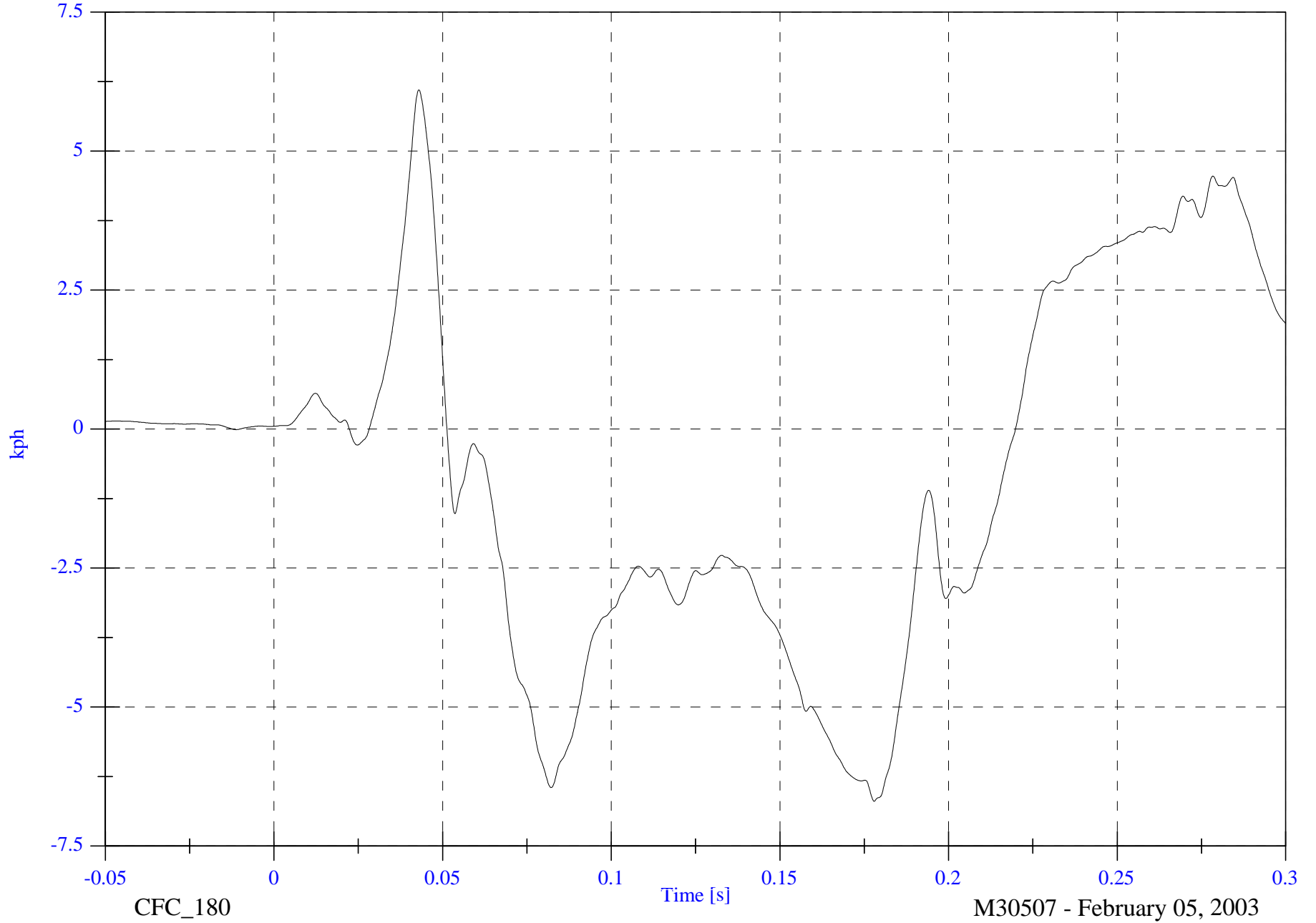
V1P4 CRS z Velocity

Max: 6.1 [kph] at 0.043 [s]

Min: -6.7 [kph] at 0.178 [s]

4-82

8642-NCAP-28



NCAP Test #6 - 2003 Subaru Forester

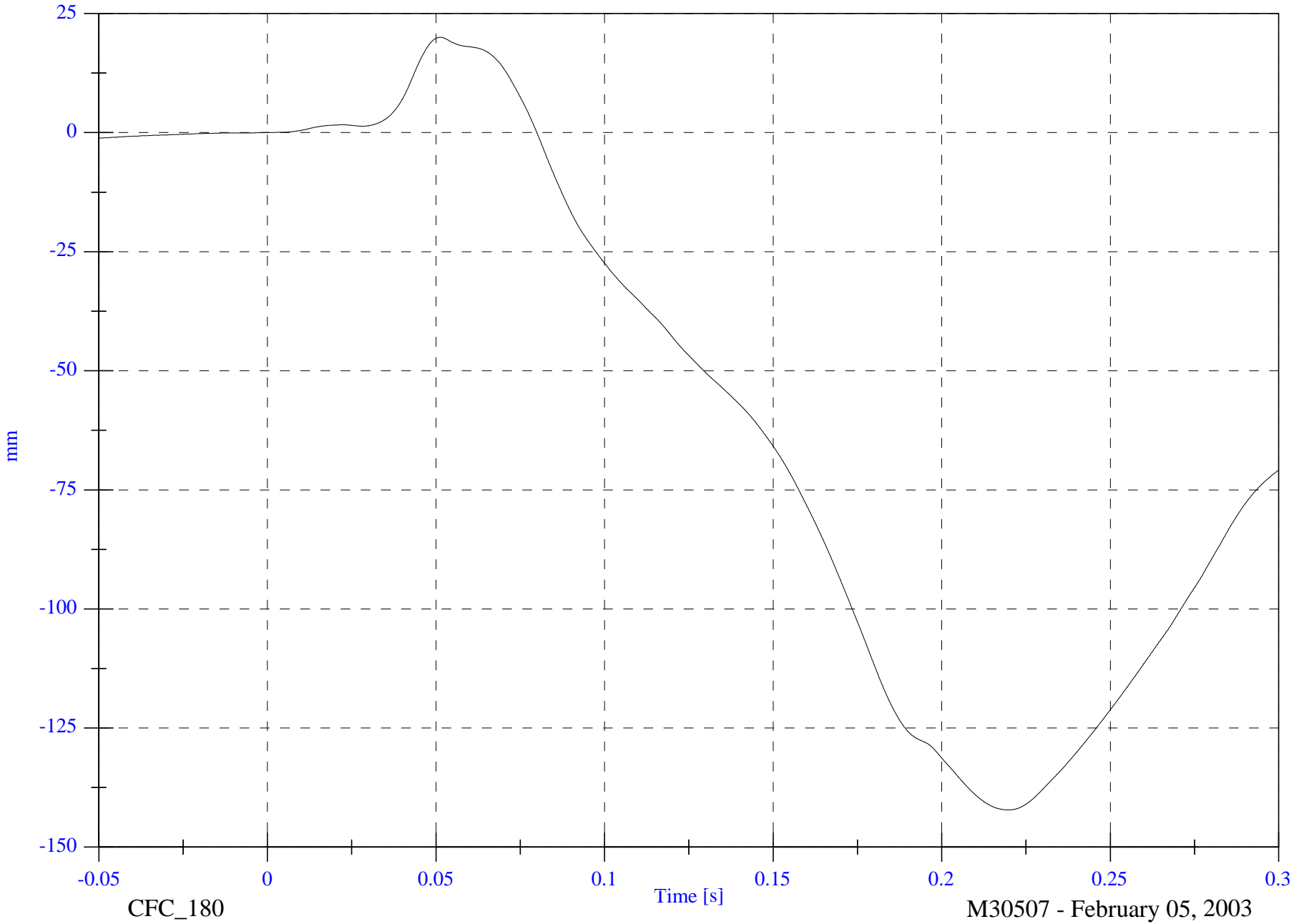
V1P4 CRS z Displacement

Max: 20.0 [mm] at 0.051 [s]

Min: -142.2 [mm] at 0.220 [s]

4-83

8642-NCAP-28



CFC\_180

Time [s]

M30507 - February 05, 2003

NCAP Test #6 - 2003 Subaru Forester

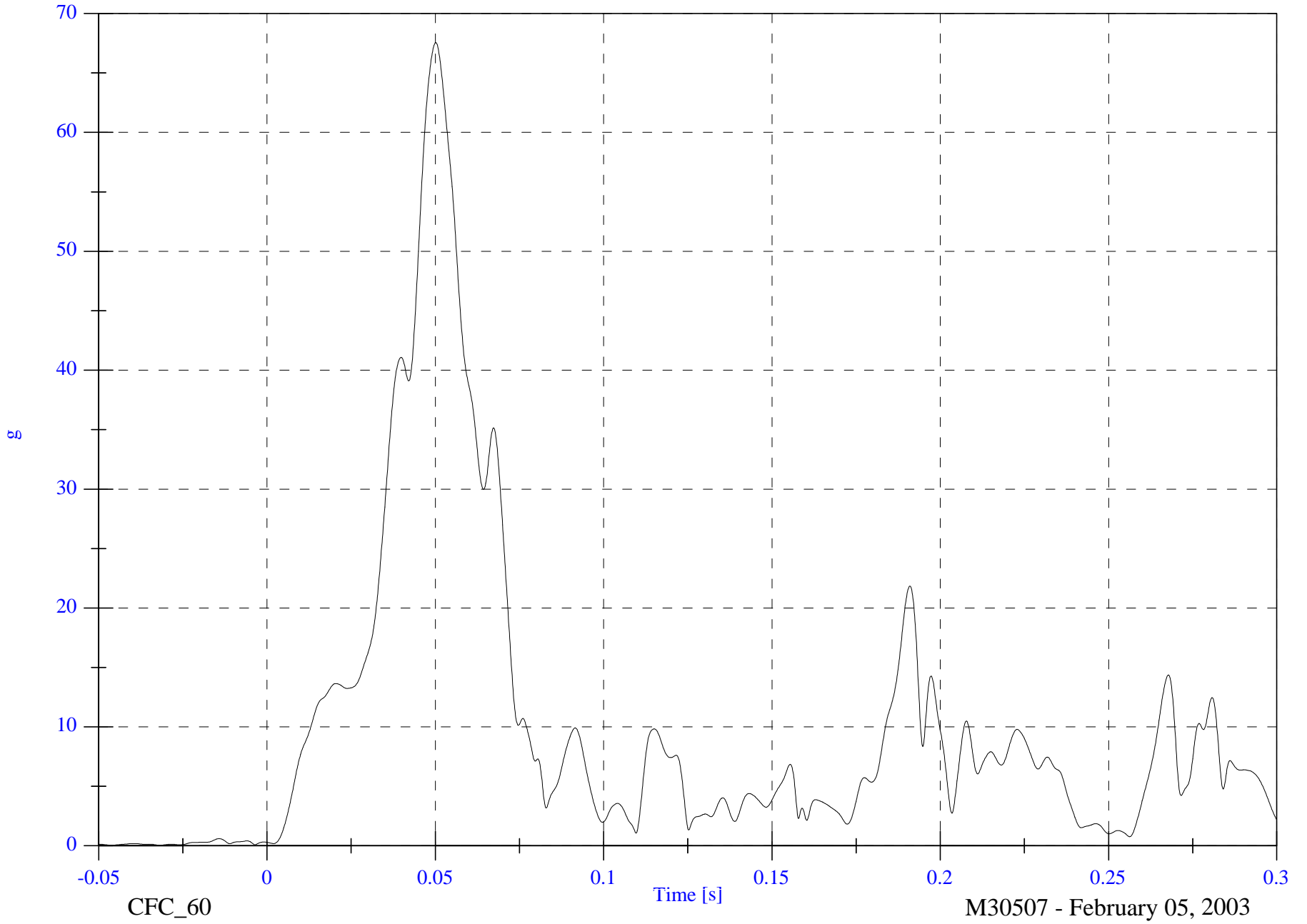
VIP4 CRS Resultant

Max: 67.6 [g] at 0.050 [s]

Min: 0.0 [g] at -0.032 [s]

4-84

8642-NCAP-28



**SECTION 5**

**CHILD DUMMY CALIBRATION INFORMATION**

# 044 Head Drop

Part 572P Head Drop

Calibration Date: 01-27-03

Serial No: 044

Work File: 044H 01-27-03

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

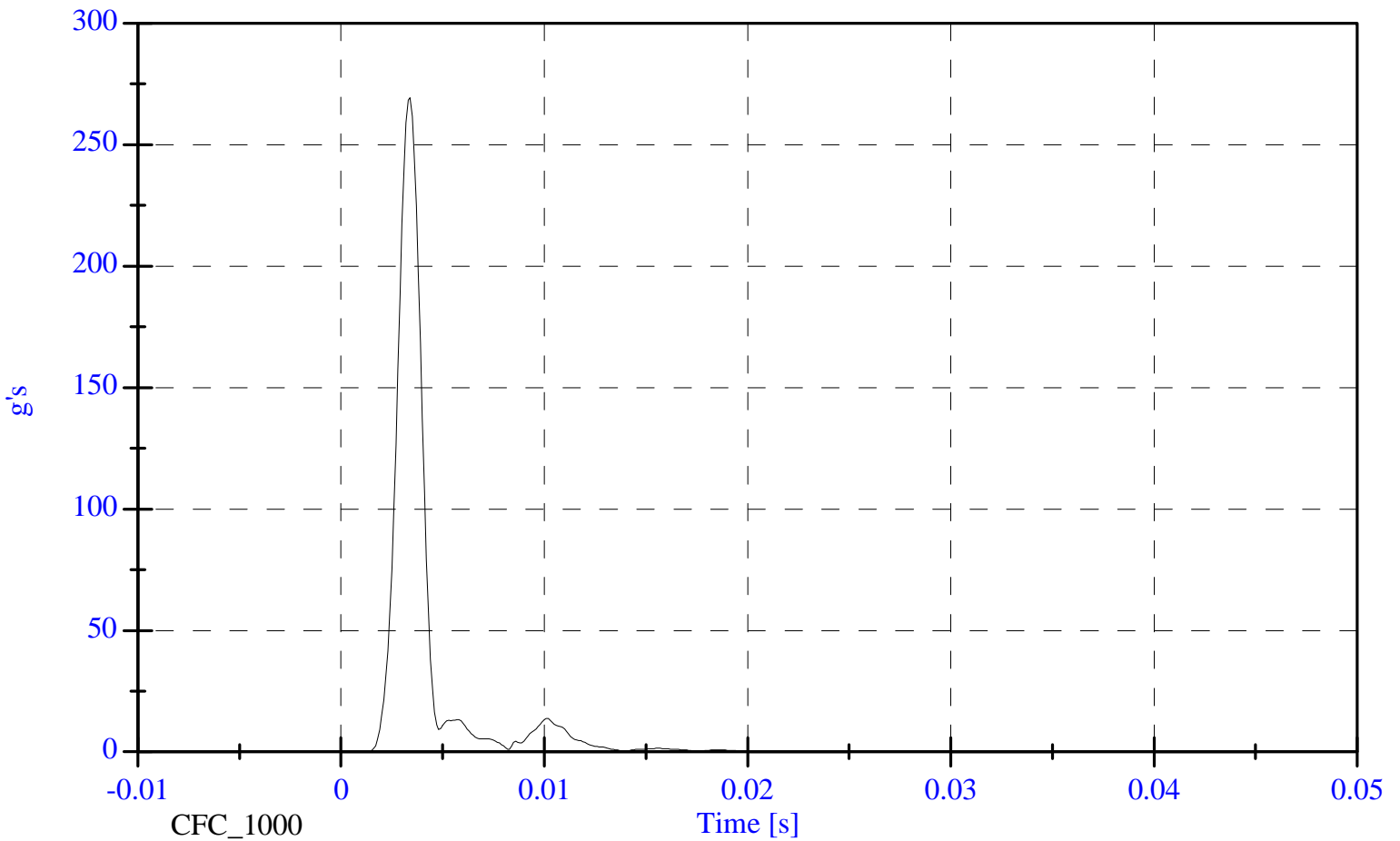
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	37.00 %	Passed
Peak Resultant Accel.:	250-280 Gs	269.30 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	3.21 Gs	Passed
Curve PerCent NonModal:	< 10%	5.12 %	Passed

044 Head Drop

Head Resultant

Max: 269.3 [g's] at 0.003 [s]

Min: 0.0 [g's] at -0.009 [s]



# 044 Chest Impact

Part 572P Thorax Impact

Calibration Date: 01-28-03

Serial No: 044

Work File: 044T1 01-28-03

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

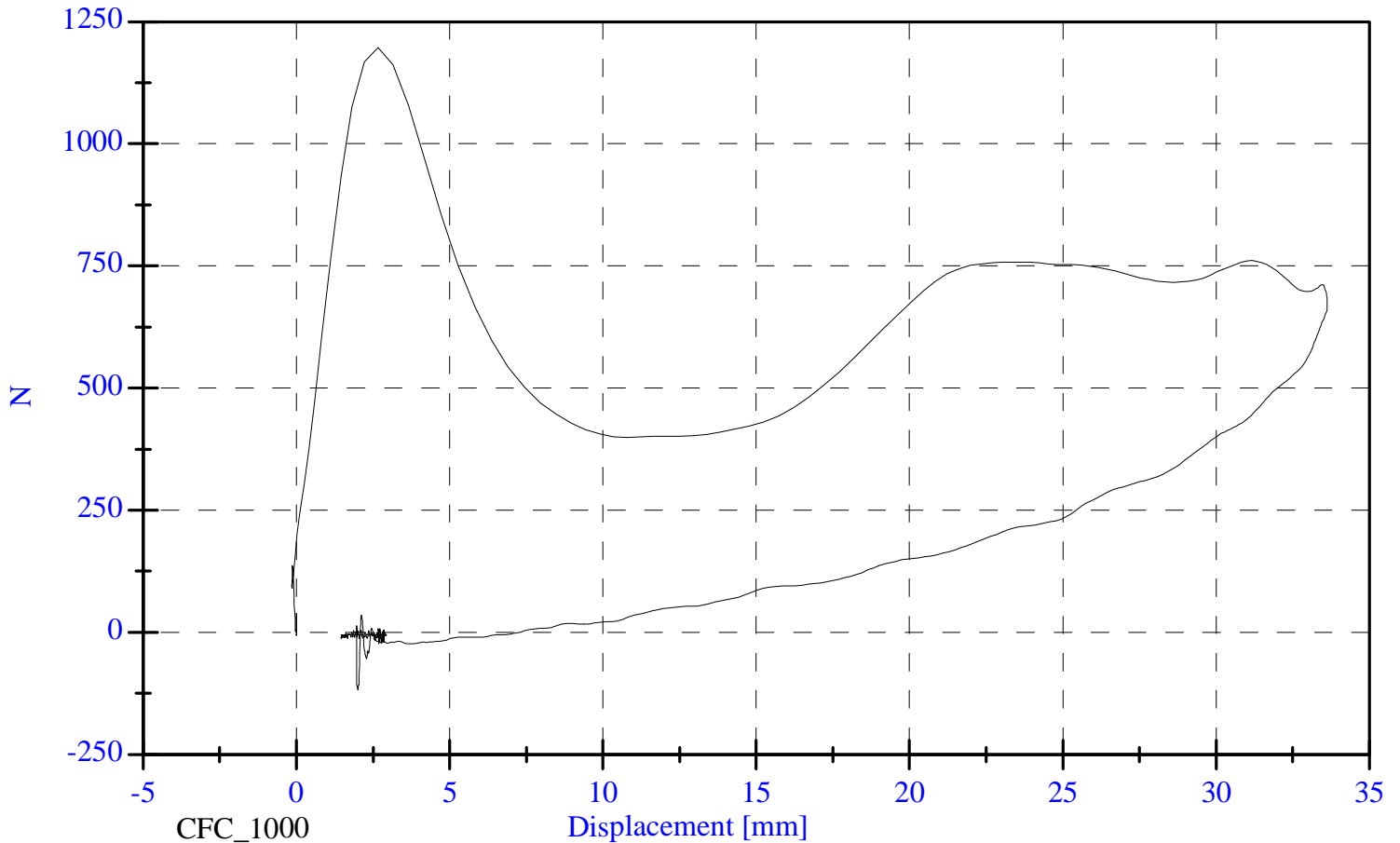
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Pendulum Velocity:	5.90- 6.10 m/s	5.94 m/s	Passed
Maximum Deflection:	32.00-38.00 mm	33.62 mm	Passed
Maximum Res. Force:	680.00- 810.00 N	740.30 N	Passed
Internal Hysteresis:	65-85 %	76.47 %	Passed
Pass Sternum Force Criteria?:	860.00 N	760.89	Passed

044 Chest Impact

Probe Force vs. Displacement

Max: 1196.8 [N] at 2.669 [mm]

Min: -117.8 [N] at 2.005 [mm]



# 044 Neck Flexion

Part 572P Neck Flexion Test Calibration Date: 01-27-03  
Serial No: 044 Work File: 044N 01-27-03

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

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	37.00 %	Passed
Test Pendulum Speed:	5.40- 5.60 m/s	5.43 m/s	Passed

## -----PENDULUM PULSE-----

Pulse at 10 ms:	2.00- 2.70 m/s	2.04 m/s	Passed
Pulse at 15 ms:	3.00- 4.00 m/s	3.05 m/s	Passed
Pulse at 20 ms:	4.00- 5.10 m/s	4.25 m/s	Passed

## -----D PLANE ROTATION-----

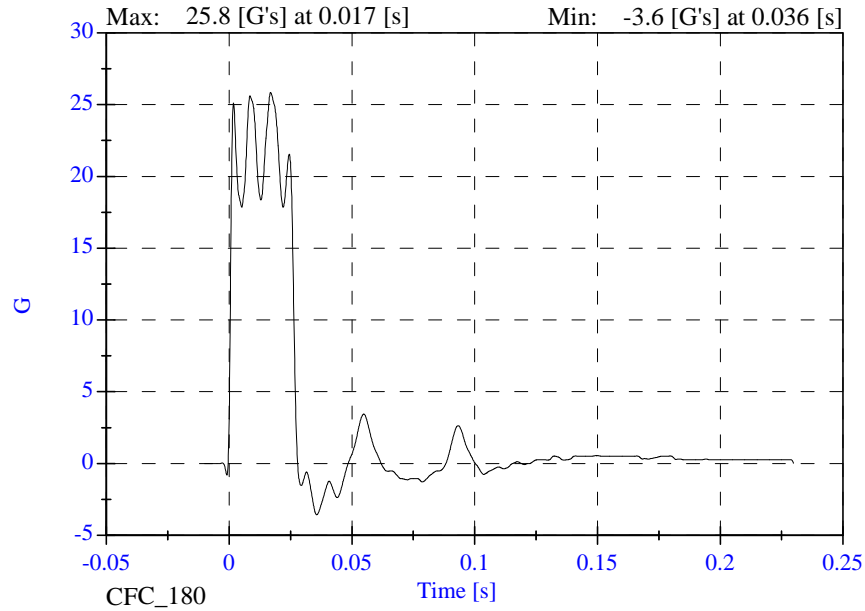
Maximum Rotation:	70.0-82.0 Deg	75.22 Deg	Passed
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## -----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	42.00- 53.00 N-m	45.09 N-m	Passed
Occipital Moment Decay:	60.0-80.0 ms	76.10 ms	Passed

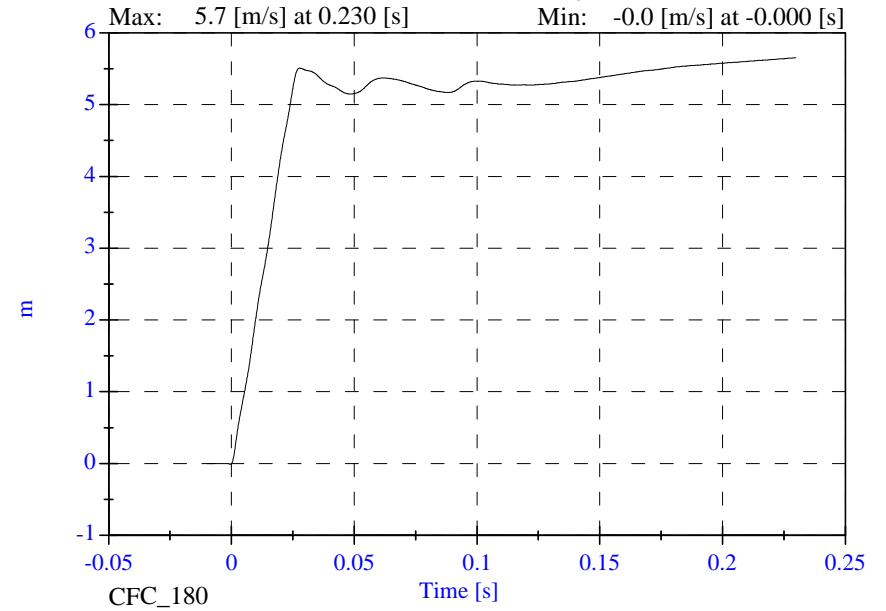
### 044 Neck Flexion

Pendulum Acceleration

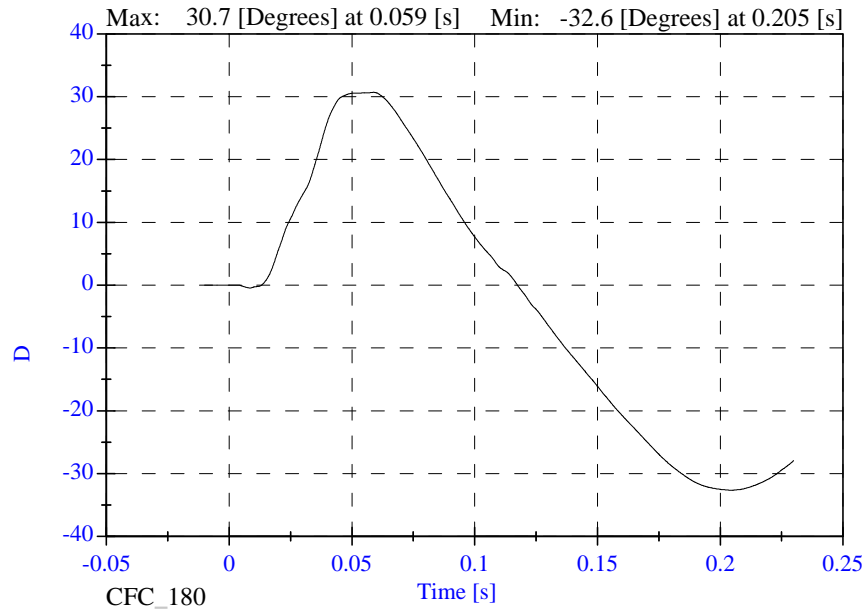


### 70 - 01-27-03

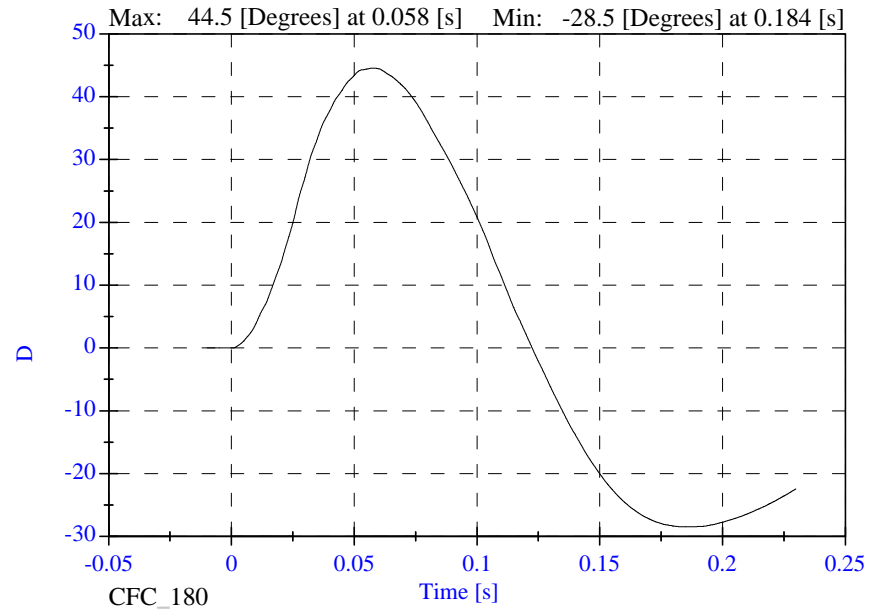
Pendulum Velocity



Head Rotation

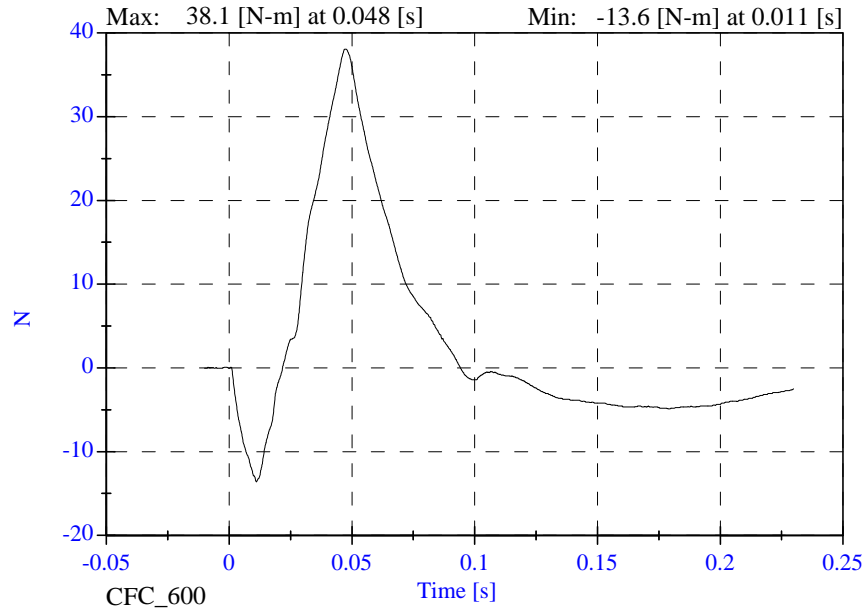


Arm Rotation



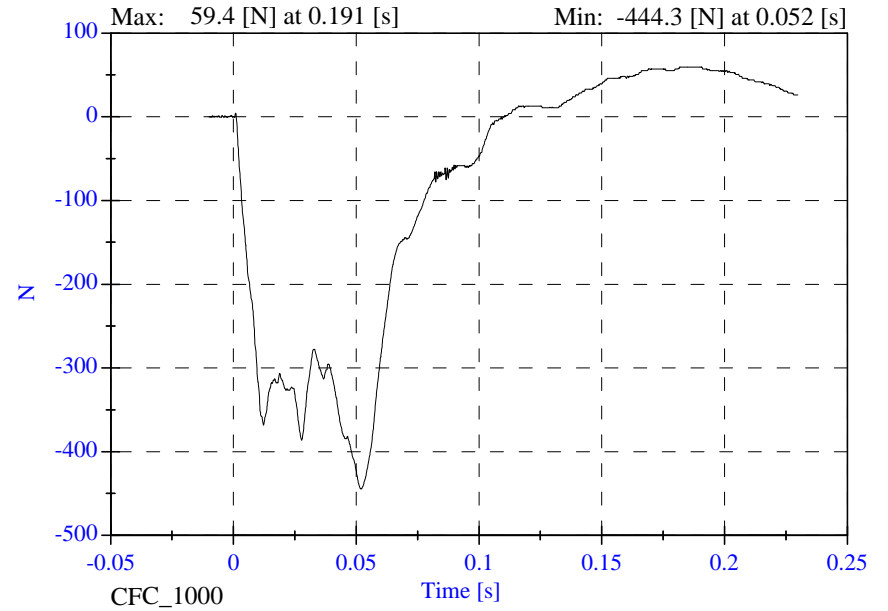
### 044 Neck Flexion

Neck Moment Y

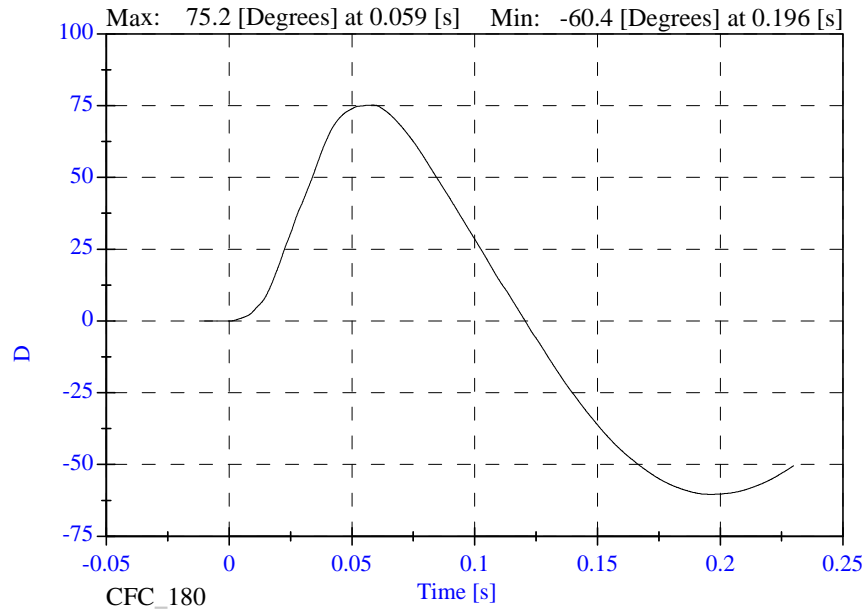


### 70 - 01-27-03

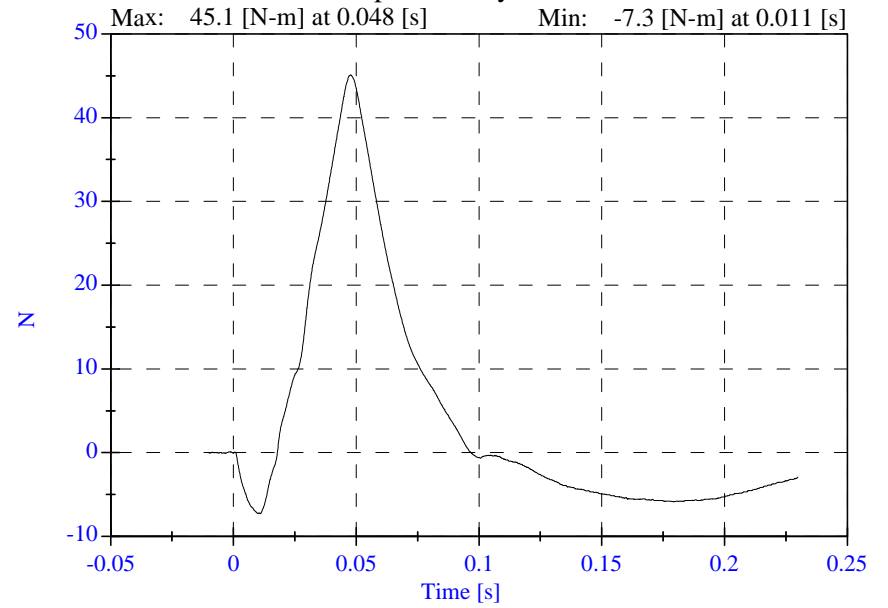
Neck Force X



Total Rotation



Occipital Condyle Moment



# 044 Neck Extension

Part 572P Neck Extension Test Calibration Date: 01-28-03  
Serial No: 044 Work File: 044Ext3 01-28-03

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

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	69.0-72.0 F	71.00 F	Passed
Lab Humidity:	10-70 %	31.00 %	Passed
Test Pendulum Speed:	11.58-12.38 ft/s	12.05 ft/s	Passed

## -----PENDULUM PULSE-----

Pulse at 6 ms:	3.30- 4.60 ft/s	3.69 ft/s	Passed
Pulse at 10 ms:	6.20- 8.20 ft/s	6.62 ft/s	Passed
Pulse at 14 ms:	9.20-11.50 ft/s	9.32 ft/s	Passed

## -----D PLANE ROTATION-----

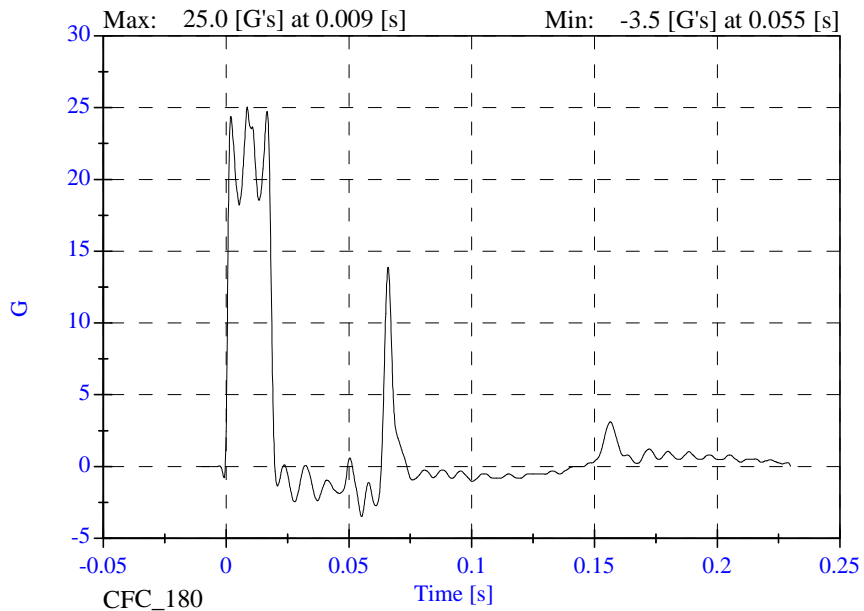
Maximum Rotation:	83.0-93.0 Deg	83.96 Deg	Passed
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## -----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	-53.30--43.70 N-m	-51.96 N-m	Passed
Occipital Moment Decay:	60.0-80.0 ms	74.40 ms	Passed

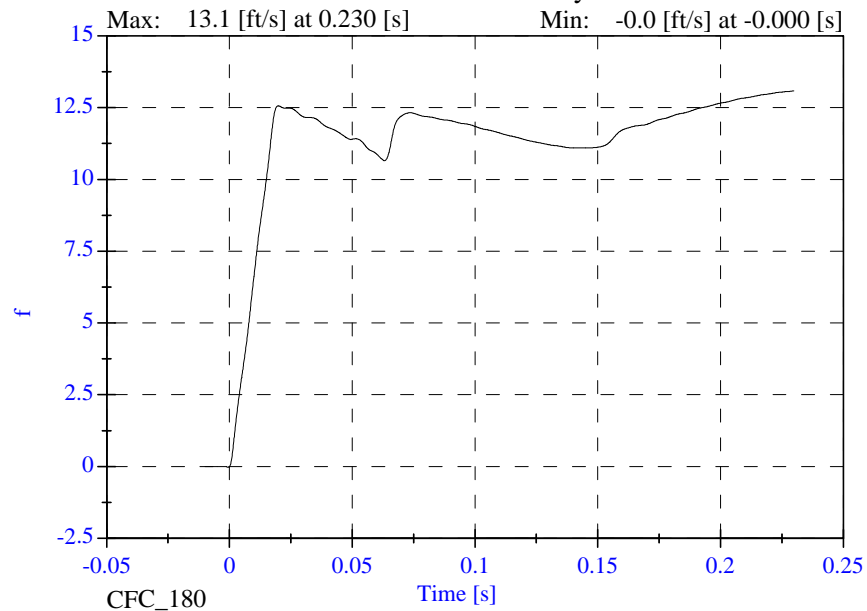
# 044 Neck Extension

## Pendulum Acceleration

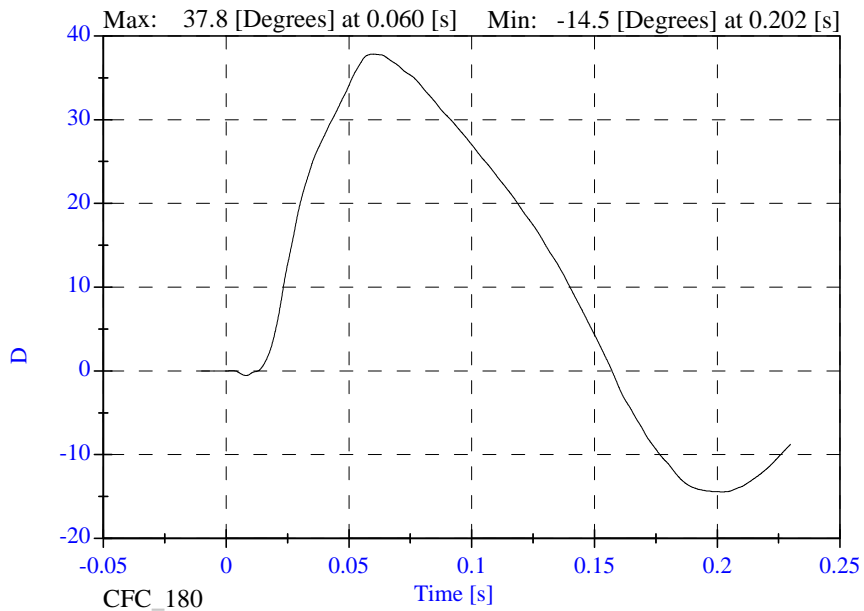


# 71 - 01-28-03

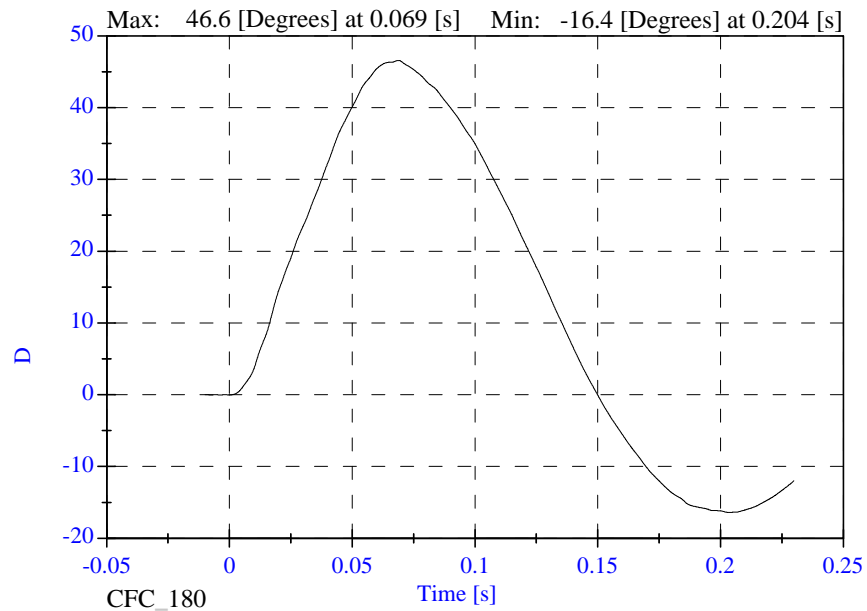
## Pendulum Velocity



## Head Rotation

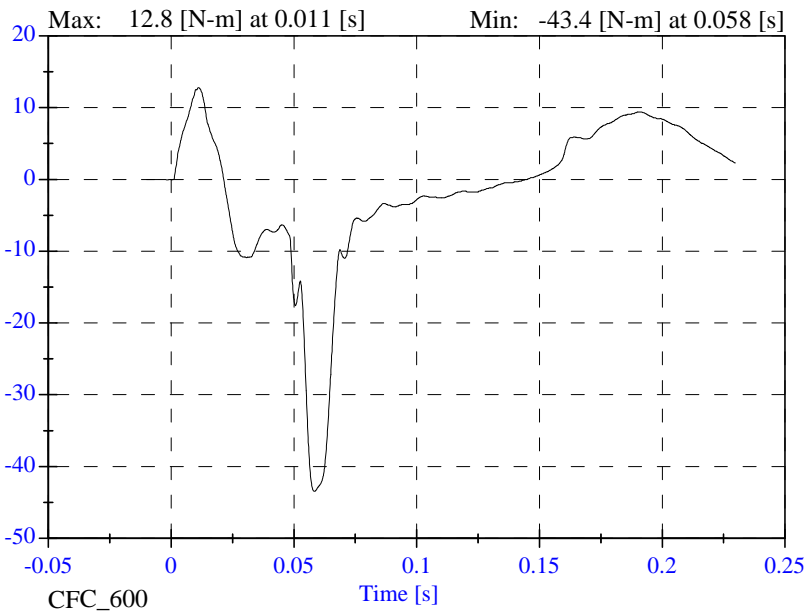


## Arm Rotation



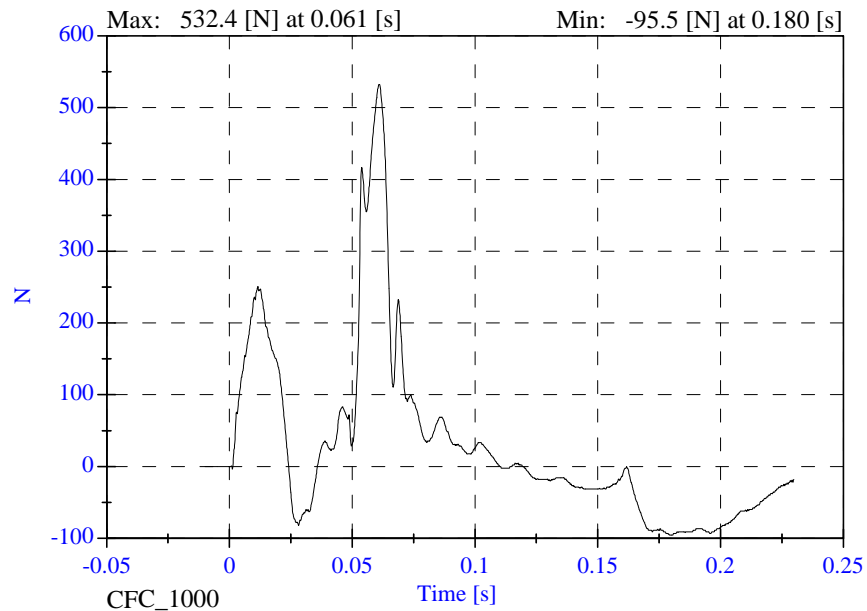
### 044 Neck Extension

Neck Moment Y

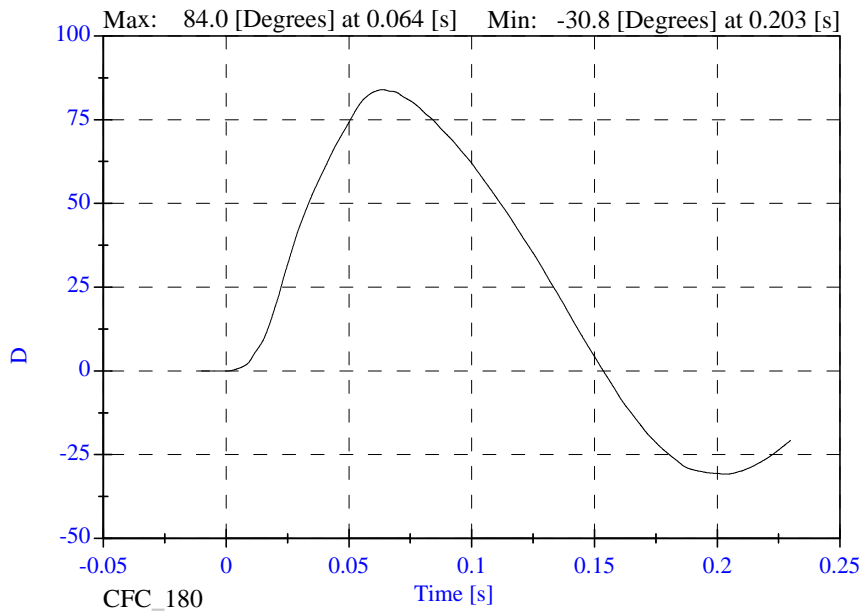


### 71 - 01-28-03

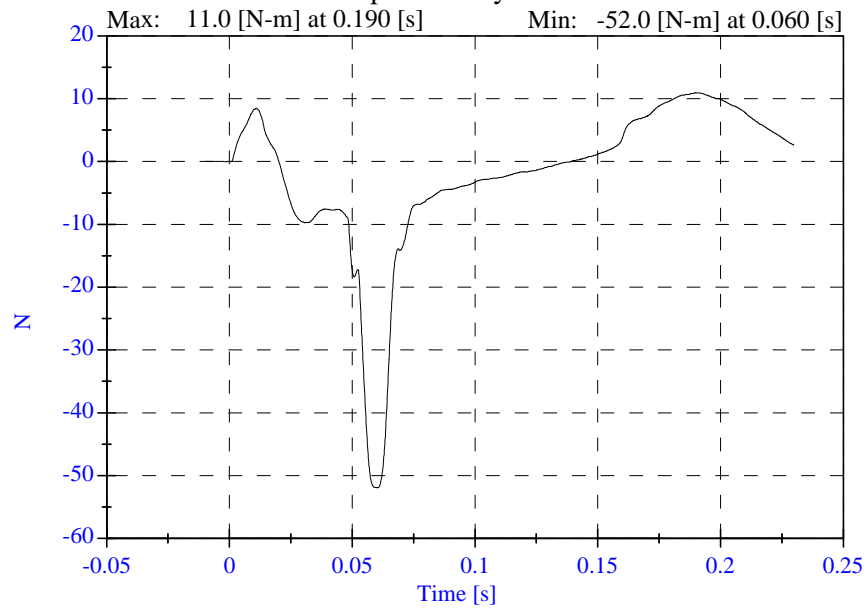
Neck Force X



Total Rotation



Occipital Condyle Moment



Spi ne\_Fl exi on\_test. txt

044 Lumbar Spi ne Fl exi on

Date: 1-28-03

Result: 45 degrees - 38.8 lbf

Certified By: B. Swiecki Date: 01-28-03

# 142 Head Drop

Part 572P Head Drop

Calibration Date: 11-15-02

Serial No: 142

Work File: 142H1 11-15-02

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

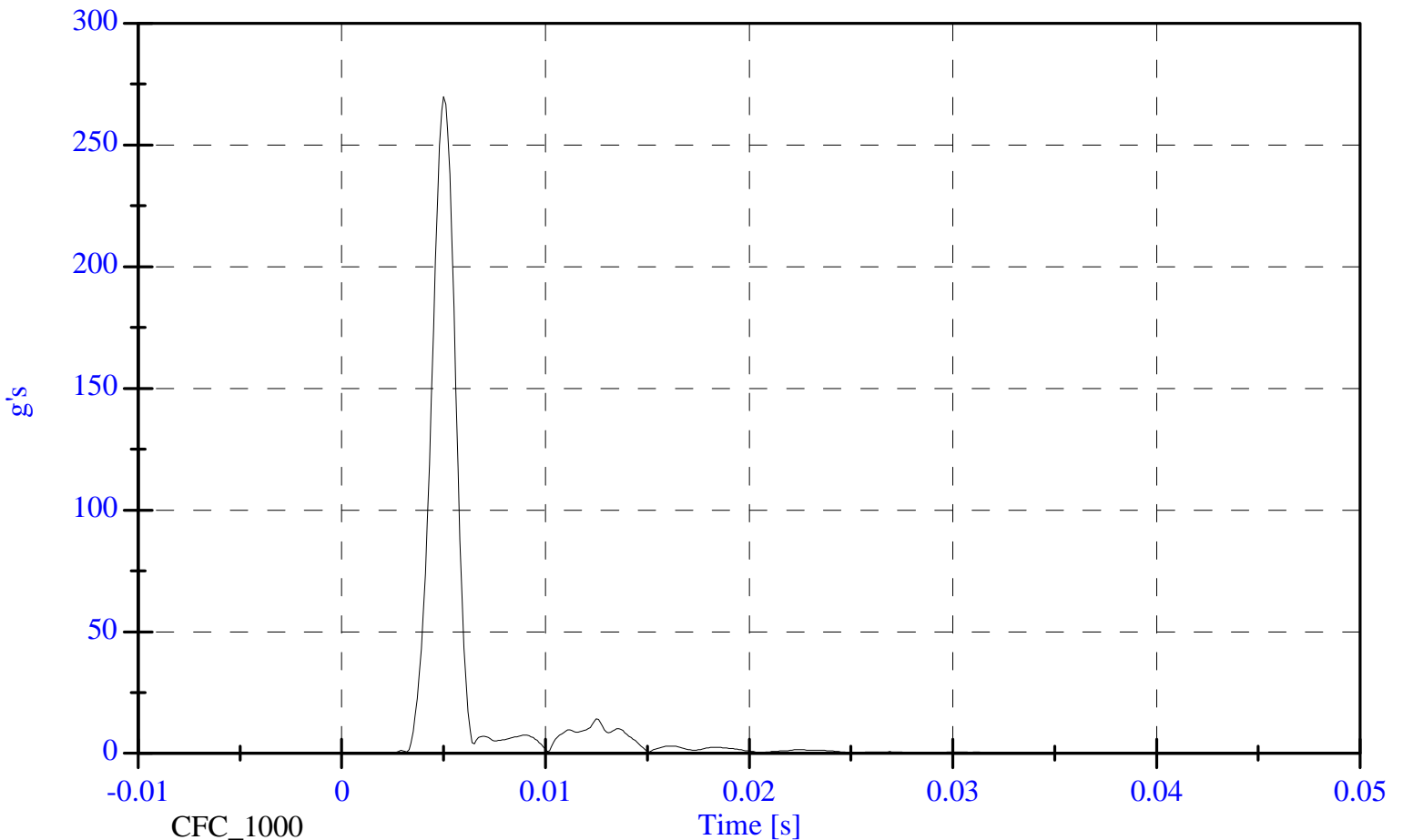
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	69.0 F	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Peak Resultant Accel.:	250-280 Gs	269.74 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	8.65 Gs	Passed
Curve PerCent NonModal:	< 10%	5.27 %	Passed

142 Head Drop

Head Resultant

Max: 269.7 [g's] at 0.005 [s]

Min: 0.0 [g's] at -0.010 [s]



# 142 Chest Impact

Part 572P Thorax Impact

Calibration Date: 11-21-02

Serial No: 142

Work File: 142T 11-21-02

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

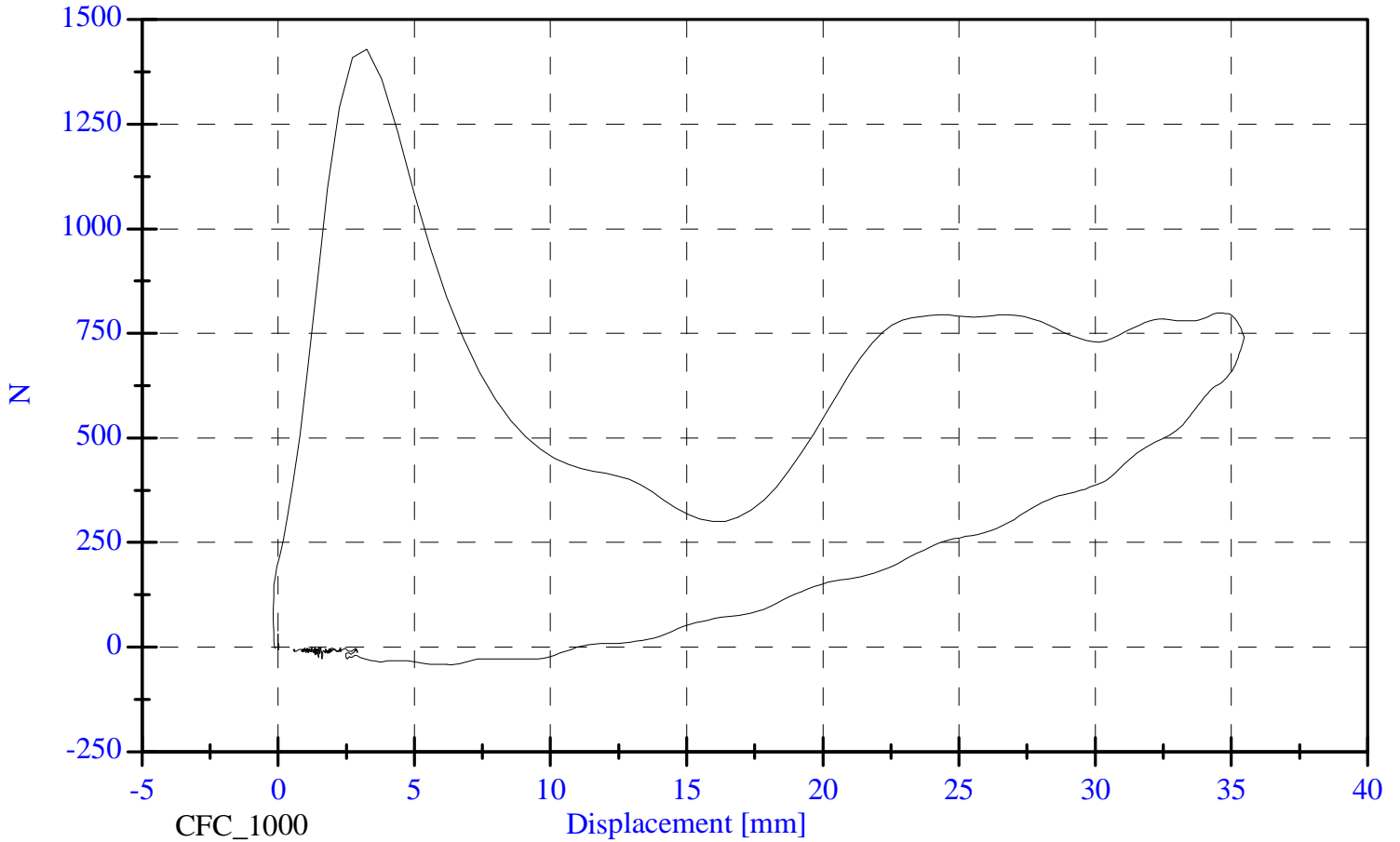
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Pendulum Velocity:	5.90- 6.10 m/s	6.03 m/s	Passed
Maximum Deflection:	32.00-38.00 mm	35.46 mm	Passed
Maximum Res. Force:	680.00- 810.00 N	798.56 N	Passed
Internal Hysteresis:	65-85 %	75.17 %	Passed
Pass Sternum Force Criteria?:	860.00 N	798.56	Passed

142 Chest Impact

Probe Force vs. Displacement

Max: 1429.2 [N] at 3.251 [mm]

Min: -42.0 [N] at 6.333 [mm]



142 Neck Flex  
 Part 572P Neck Flexion Test  
 Part 572P Serial No: 142  
 Calibration Date: 11-20-02  
 Work File: 142Flx1 11-20-02

## -----Neck Test Results-----

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Test Pendulum Speed:	5.40- 5.60 m/s	5.55 m/s	Passed

## -----Pendulum Pulse-----

Pulse at 10 ms:	2.00- 2.70 m/s	2.09 m/s	Passed
Pulse at 15 ms:	3.00- 4.00 m/s	3.13 m/s	Passed
Deceleration at 20 ms:	4.00- 5.10 m/s	4.33 m/s	Passed

## -----D Plane Rotation-----

Maximum Rotation:	70.0-82.0 Deg	77.98 Deg	Passed
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## -----Moment About the Occipital Condyle-----

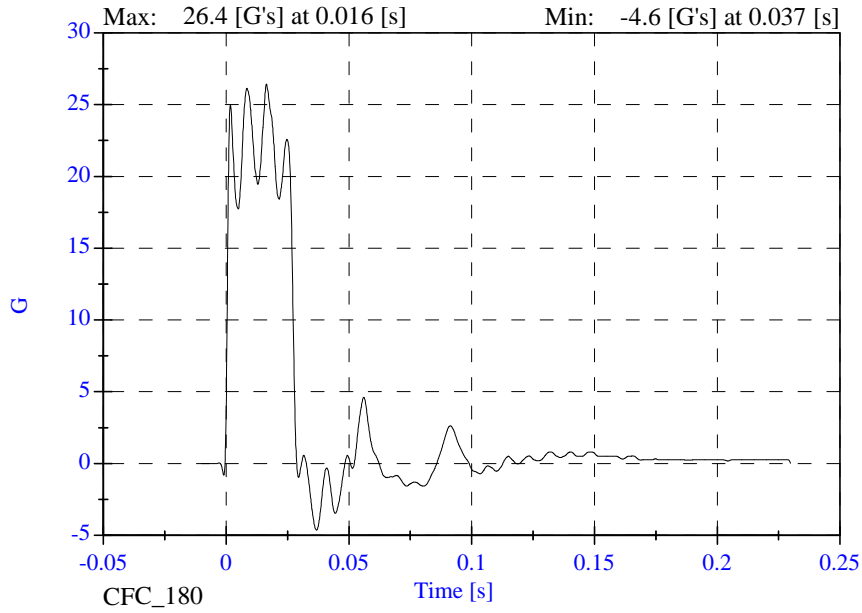
Max Occipital Moment:	42.00- 53.00 N-M	44.98 N-M	Passed
Occipital Moment Decay:	60.0-80.0 ms	71.10 ms	Passed

Certified By: B. Swiecki

Date: 11-20-02

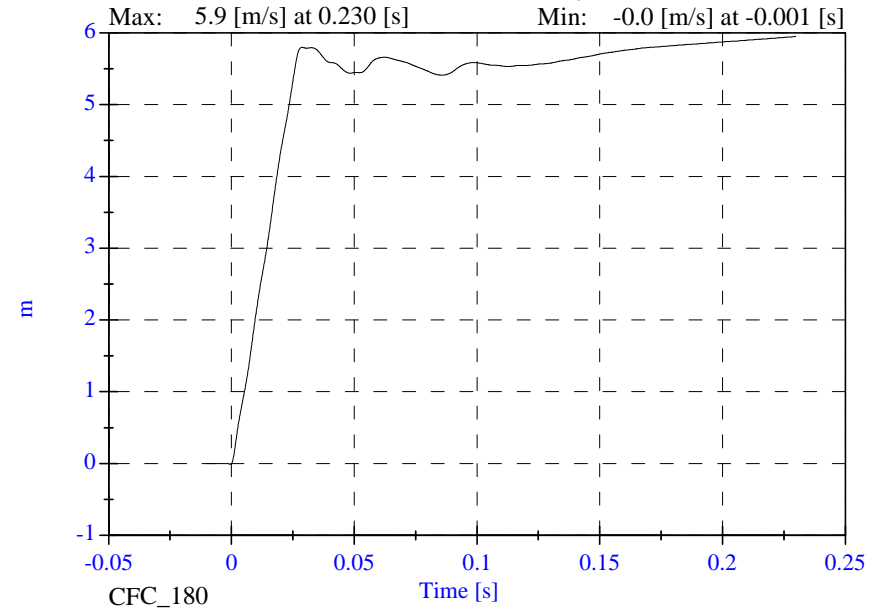
# 142 Neck Flex

## Pendulum Acceleration

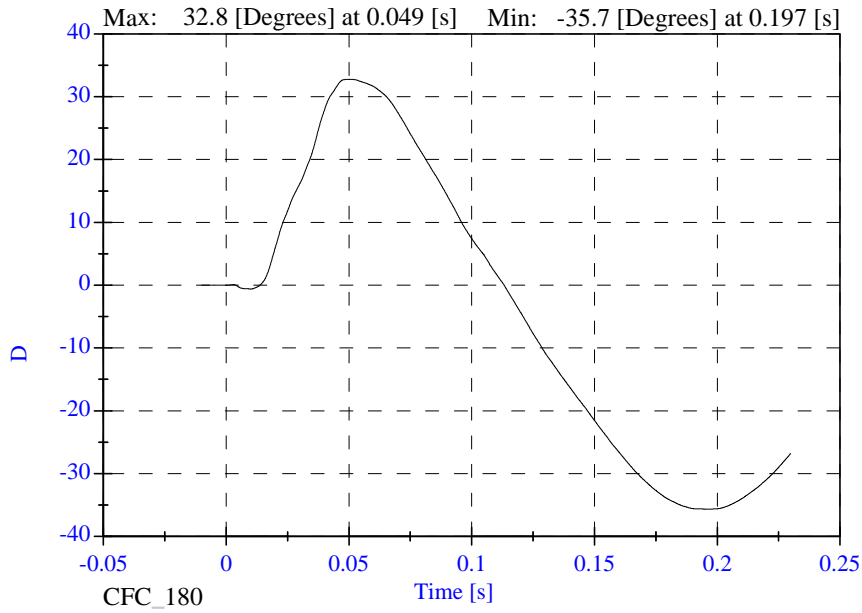


# 11-20-02

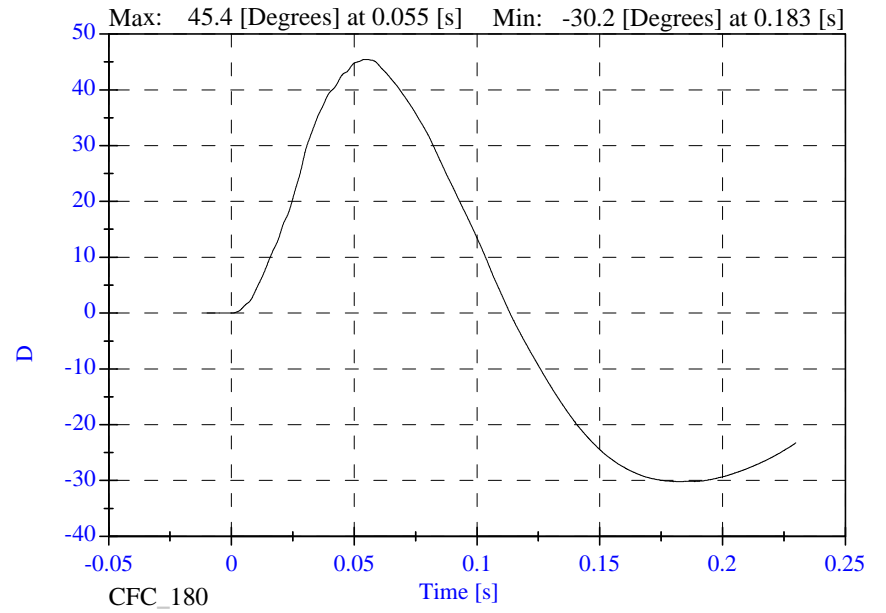
## Pendulum Velocity



## Head Rotation

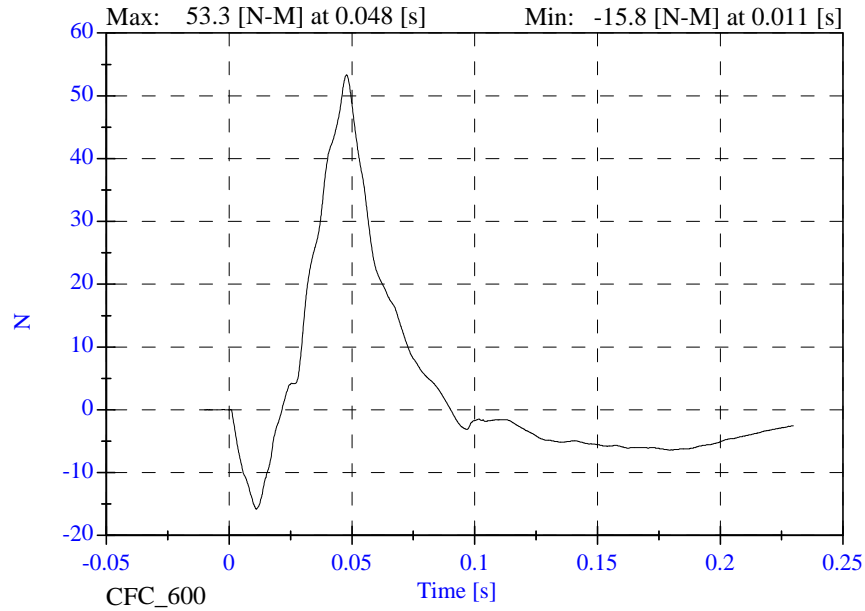


## Arm Rotation



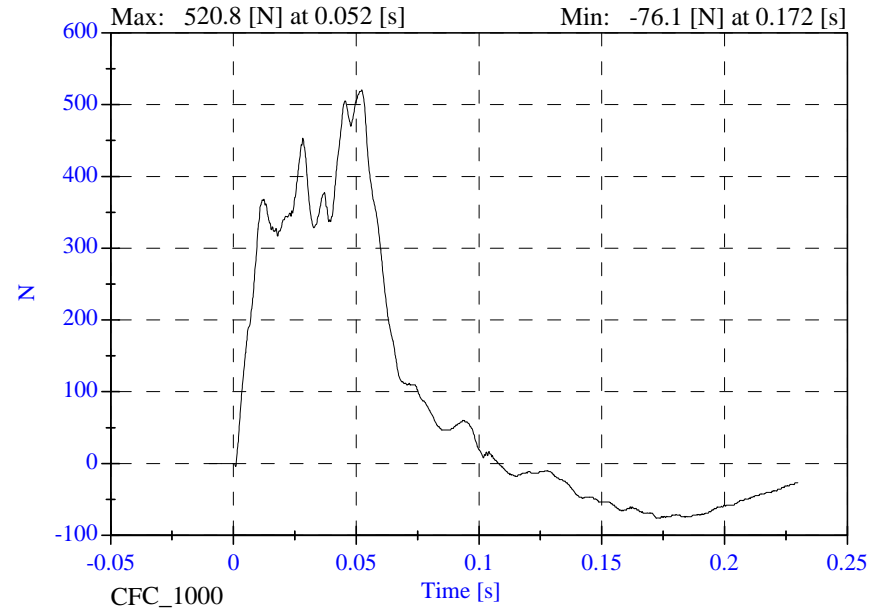
### 142 Neck Flex

Neck Moment Y

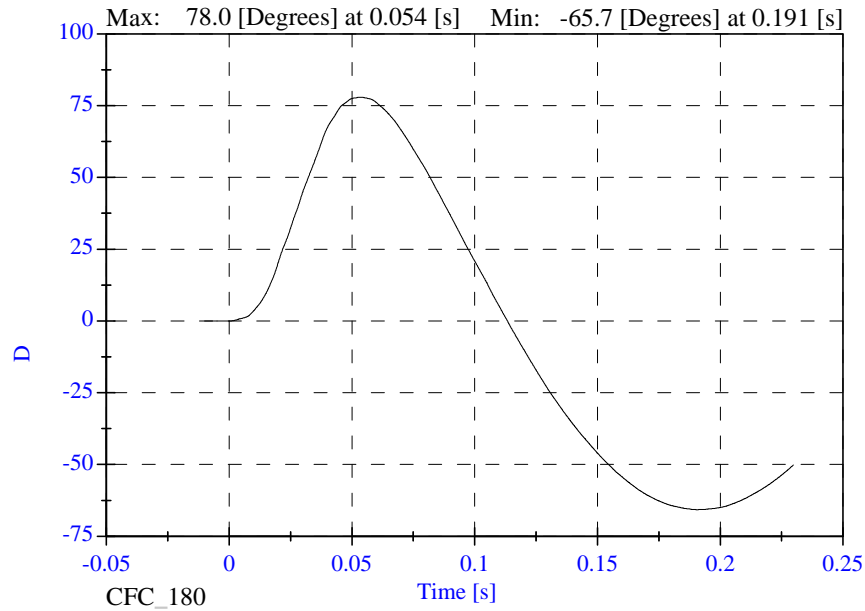


### 11-20-02

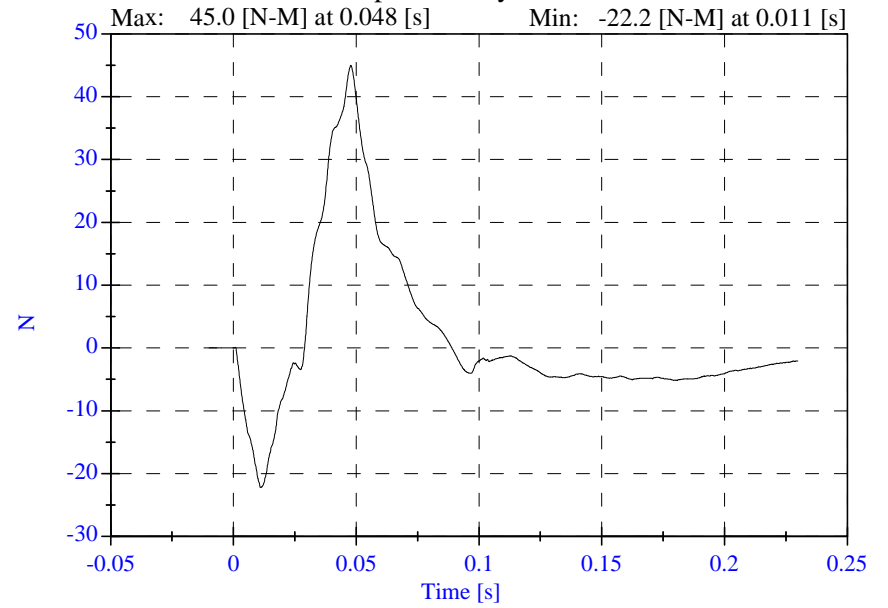
Neck Force X



Total Rotation



Occipital Condyle Moment



142 Neck Ext.  
 Part 572P Neck Extension Test  
 Part 572P Serial No: 142  
 Calibration Date: 11-20-02  
 Work File: 142Ext9 11-20-02

## -----Neck Test Results-----

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	20.6-22.2 C	21.11 F	Passed
Lab Humidity:	10-70 %	33.00 %	Passed
Test Pendulum Speed:	3.55- 3.75 m/s	3.66 m/s	Passed

## -----Pendulum Pulse-----

Pulse at 6 ms:	1.00- 1.40 m/s	1.20 m/s	Passed
Pulse at 10 ms:	1.90- 2.50 m/s	2.12 m/s	Passed
Deceleration at 14 ms:	2.80- 3.50 m/s	2.83 m/s	Passed

## -----D Plane Rotation-----

Maximum Rotation:	83.0-93.0 Deg	84.61 Deg	Passed
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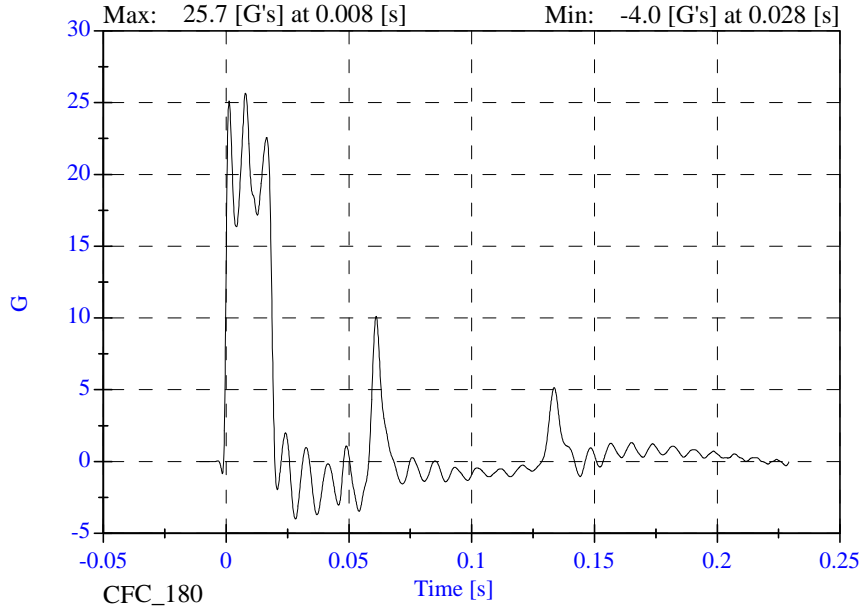
## -----Moment About the Occipital Condyle-----

Max Occipital Moment:	-53.30--43.70 N-m	-49.03 N	Passed
Occipital Moment Decay:	60.0-80.0 ms	67.70 ms	Passed

Certified By: B. Swiecki      Date: 11-20-02

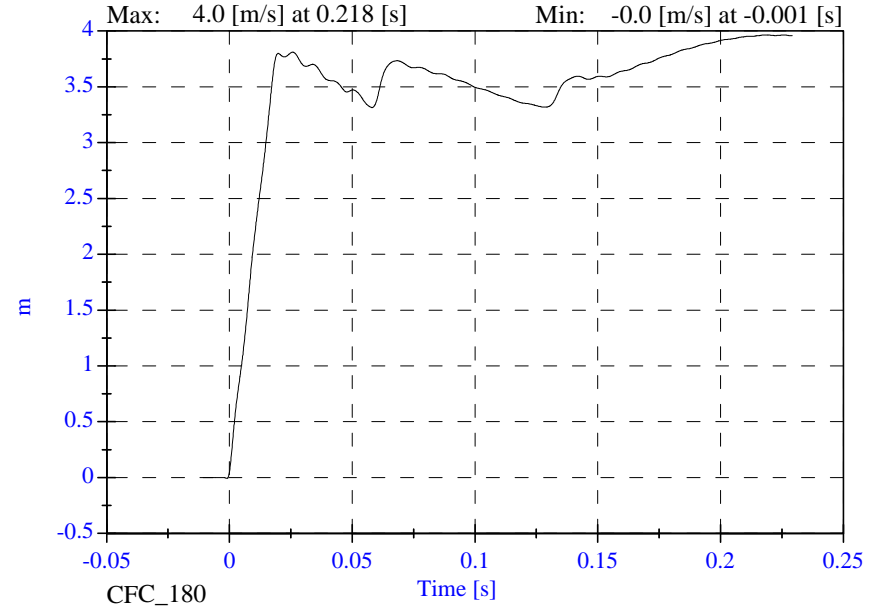
# 142 Neck Ext.

## Pendulum Acceleration

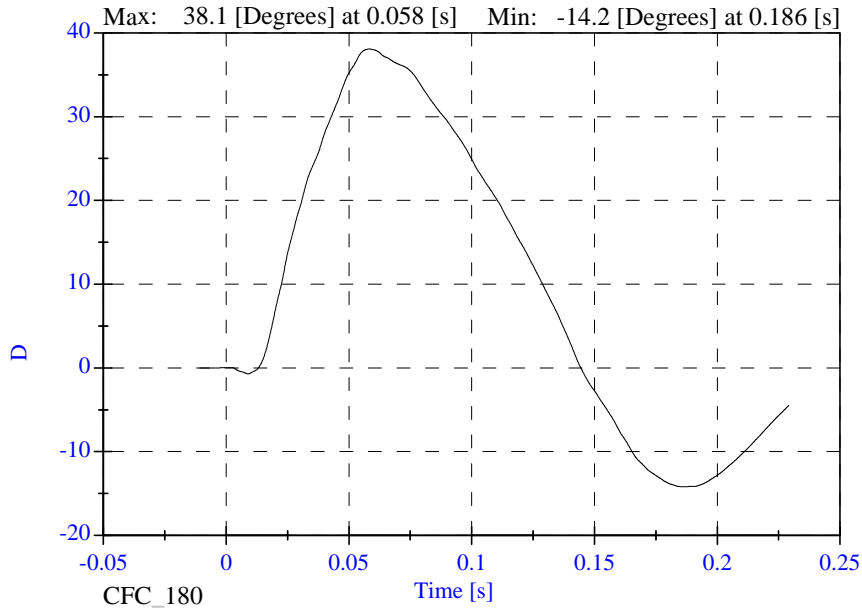


# 11-20-02

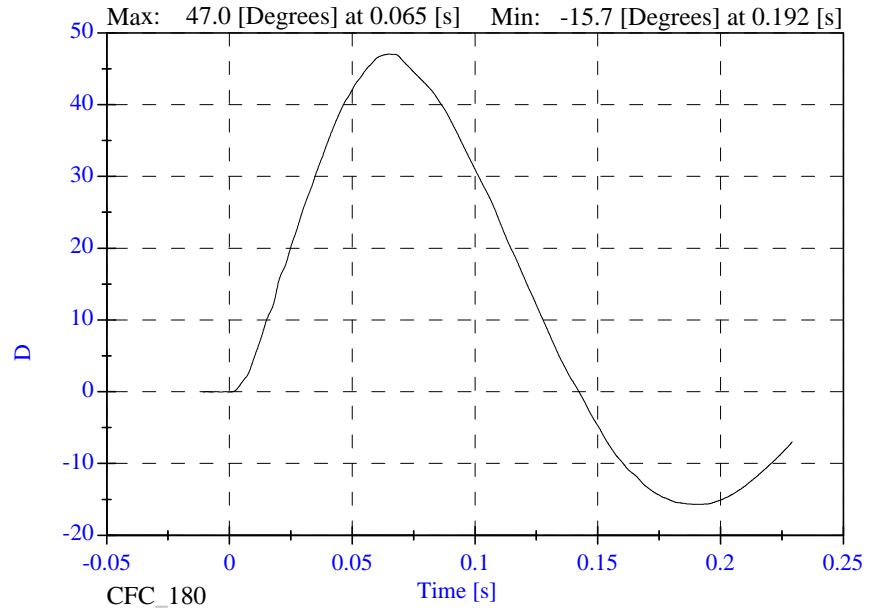
## Pendulum Velocity



## Head Rotation

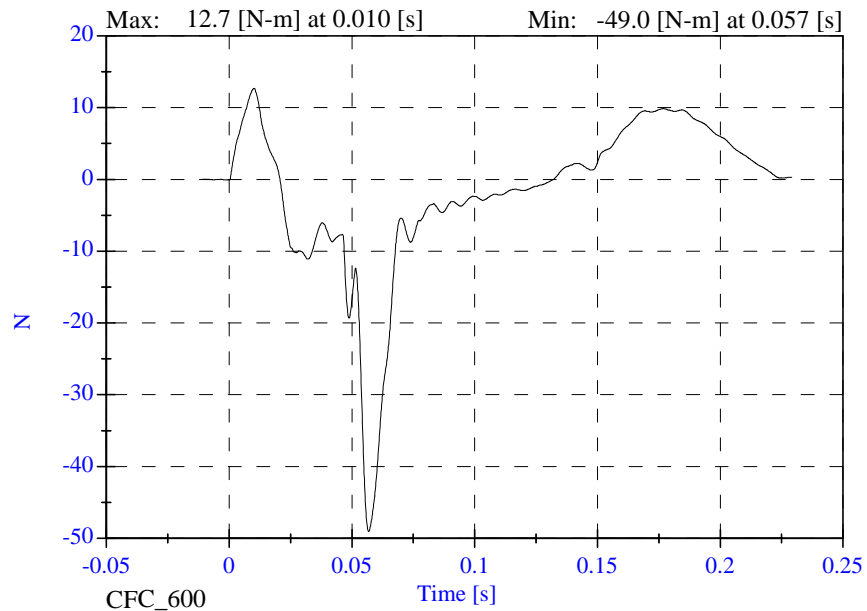


## Arm Rotation



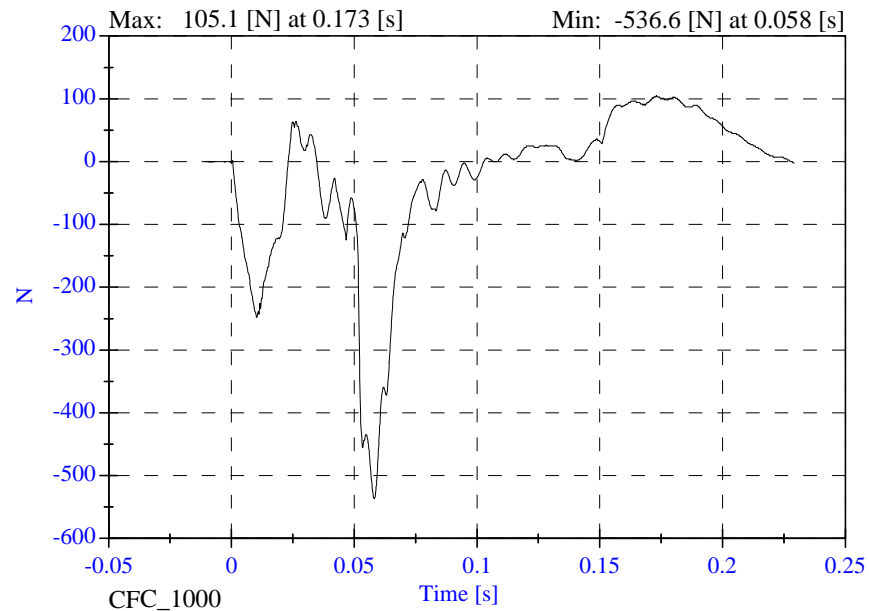
### 142 Neck Ext.

Neck Moment Y

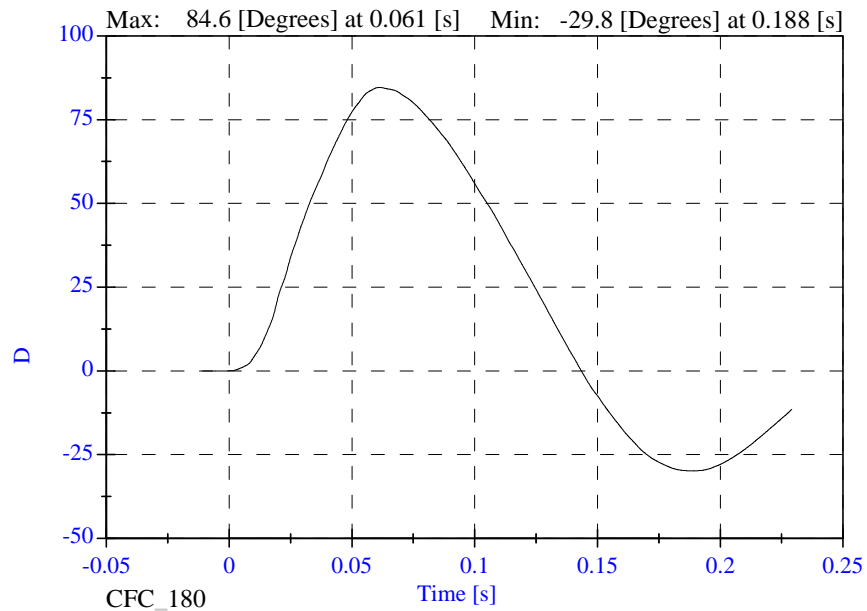


### 11-20-02

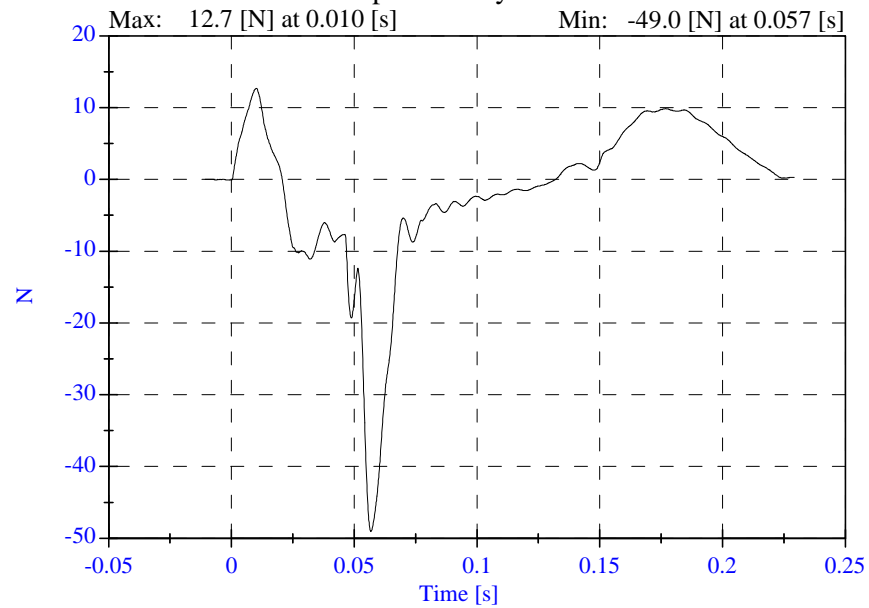
Neck Force X



Total Rotation



Occipital Condyle Moment



Spine\_Flexion\_test.txt

142 Lumbar Spine Flexion

Date: 11-21-02

Result: 45 degrees - 40.8 lbf

Certified By: B. Swiecicki Date: 11-21-02

**SECTION 6**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**P572 P INSTRUMENTATION**

	POSITION #3 (RIGHT) SERIAL NO.: 044		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	ENDEVCO	AC-P17912	11/11/02
HEAD AY	ENDEVCO	AC-P17743	11/11/02
HEAD AZ	ENDEVCO	AC-P15319	11/11/02
UPPER NECK FX	DENTON	LC-248-FX	10/15/02
UPPER NECK FY	DENTON	LC-248-FY	10/15/02
UPPER NECK FZ	DENTON	LC-248-FZ	10/15/02
UPPER NECK MX	DENTON	LC-248-MX	10/15/02
UPPER NECK MY	DENTON	LC-248-MY	10/15/02
UPPER NECK MZ	DENTON	LC-248-MZ	10/15/02
LOWER NECK FX	DENTON	LC-249-FX	10/15/02
LOWER NECK FY	DENTON	LC-249-FY	10/15/02
LOWER NECK FZ	DENTON	LC-249-FZ	10/15/02
LOWER NECK MX	DENTON	LC-249-MX	10/15/02
LOWER NECK MY	DENTON	LC-249-MY	10/15/02
LOWER NECK MZ	DENTON	LC-249-MZ	10/15/02
CHEST AX	ENDEVCO	AC-P15334	11/11/02
CHEST AY	ENDEVCO	AC-P15321	11/11/02
CHEST AZ	ENDEVCO	AC-P17758	11/11/02
CHEST DISPLACEMENT X	SERVO	DS-044	11/12/02
PELVIS AX	ENDEVCO	AC-P16755	11/11/02
PELVIS AY	ENDEVCO	AC-P15591	11/11/02
PELVIS AZ	ENDEVCO	AC-P16155	11/11/02
LAP BELT LOAD	LEBOW	LC-635	11/12/02

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**P572 P INSTRUMENTATION**

	POSITION #4 (LEFT) SERIAL NO.: 142		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	ENTRAN	AC-99108-F29	11/11/02
HEAD AY	ENTRAN	AC-99102-F12	11/11/02
HEAD AZ	ENTRAN	AC-00L13-F03	11/11/02
HEAD RAZ	ENTRAN	AC-98G18-F18	11/11/02
UPPER NECK FX	DENTON	LC-213-FX	10/14/02
UPPER NECK FY	DENTON	LC-213-FY	10/14/02
UPPER NECK FZ	DENTON	LC-213-FZ	10/14/02
UPPER NECK MX	DENTON	LC-213-MX	10/14/02
UPPER NECK MY	DENTON	LC-213-MY	10/14/02
UPPER NECK MZ	DENTON	LC-213-MZ	10/14/02
LOWER NECK FX	DENTON	LC-214FX	10/14/02
LOWER NECK FY	DENTON	LC-214-FY	10/14/02
LOWER NECK FZ	DENTON	LC-214-FZ	10/15/02
LOWER NECK MX	DENTON	LC-214-MX	10/15/02
LOWER NECK MY	DENTON	LC-214-MY	10/15/02
LOWER NECK MZ	DENTON	LC-214-MZ	10/15/02
CHEST AX	ENTRAN	AC-99108-F30	11/11/02
CHEST AY	ENTRAN	AC-99108-F28	11/11/02
CHEST AZ	ENTRAN	AC-99H30-Z04	11/11/02
CHEST DISPLACEMENT X	SERVO	DS-142	11/13/02
PELVIS AX	ENTRAN	AC-99102-F06	11/11/02
PELVIS AY	ENTRAN	AC-99102-F15	11/11/02
PELVIS AZ	ENTRAN	AC-99G29-Q13	11/11/02
LAP BELT LOAD	LEBOW	LC-712	11/12/02

**TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

**VEHICLE AND MDB INSTRUMENTATION**

	VEHICLE AND MDB INSTRUMENTS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS (X)	ENDEVCO	AC-J29805	02/21/03
P3 CRS (Y)	ENDEVCO	AC-J25745	01/21/03
P3 CRS (Z)	ENDEVCO	AC-J32383	01/21/03
P4 CRS (X)	ENDEVCO	AC-P17255	08/19/02
P4 CRS (Y)	ENDEVCO	AC-P17145	08/19/02
P4 CRS (Z)	ENDEVCO	AC-P16813	08/19/02

**REMARKS:** None