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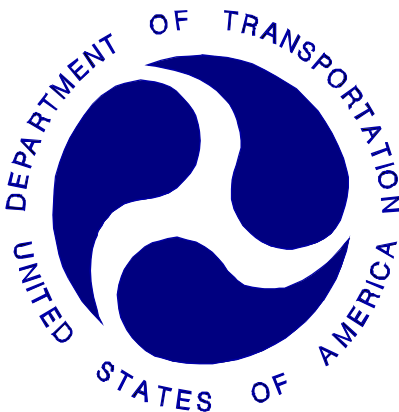
**SAFETY COMPLIANCE TESTING FOR FMVSS 214
SIDE IMPACT PROTECTION
INDICANT**

VOLVO GOTHENBURG SWEDEN
2003 VOLVO XC90
MPV

NHTSA NUMBER: C35901

VERIDIAN ENGINEERING TEST NUMBER: 8675-F214-10

VERIDIAN ENGINEERING
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May 20, 2003

FINAL REPORT

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6111 (NVS-220)
Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-02-D-01114. This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufactures' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

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16. Abstract A 55/28 kph 90° Side Impact (Moving Deformable Barrier) Indicant Test was conducted on the subject Volvo XC90 MPV. This test was performed at the New Car Assessment Program (NCAP) target test velocity of 62.0 kph, which is 8 kph faster than the target velocity required by the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-06, dated July 26, 2001). This test was conducted at the Veridian Engineering Crash Test Facility in Buffalo, New York, on May 20, 2003. The impact velocity of the Moving Deformable Barrier (MDB) was 62.44 kph, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.1°C. The target vehicle post-test maximum crush was 176 mm at level 3. The test or target vehicle's performance is given below: <table border="0"> <thead> <tr> <th></th> <th style="text-align: center;"><u>Front SID H3</u></th> <th></th> <th style="text-align: center;"><u>Rear SID H3</u></th> <th></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration:</td> <td style="text-align: center;">27</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">30</td> <td style="text-align: center;">g's</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td style="text-align: center;">19</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">35</td> <td style="text-align: center;">g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td style="text-align: center;">16</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">30</td> <td style="text-align: center;">g's</td> </tr> <tr> <td>Thoracic Trauma Index (TTI):</td> <td style="text-align: center;">22</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">32</td> <td style="text-align: center;">g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td style="text-align: center;">20</td> <td style="text-align: center;">g's</td> <td style="text-align: center;">42</td> <td style="text-align: center;">g's</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.							<u>Front SID H3</u>		<u>Rear SID H3</u>		Left Upper Rib Acceleration:	27	g's	30	g's	Left Lower Rib Acceleration:	19	g's	35	g's	Lower Spine Acceleration:	16	g's	30	g's	Thoracic Trauma Index (TTI):	22	g's	32	g's	Pelvis Acceleration (PEV):	20	g's	42	g's
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the FMVSS 214 Side Impact Protection Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-02-D-01114. The purpose of this indicant test was to evaluate side impact protection in a 2003 Volvo XC90 MPV when tested at the New Car Assessment Program (NCAP) target test velocity of 62.0 kph, which is 8 kph faster than the target velocity required by the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-06, dated July 26, 2001).

SECTION 2

SUMMARY OF SIDE IMPACT TEST

This Side Impact Protection Indicant Test was performed at the New Car Assessment Program (NCAP) target test velocity of 62.0 kph, which is 8 kph faster than the target velocity required by the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-214D-06, dated July 26, 2001).

A 2003 Volvo XC90 MPV was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 62.44 kph (38.8 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Veridian Engineering Transportation Sciences Center in Buffalo, New York on May 20, 2003. Pre- and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the Side Impact Hybrid III Dummies (SID H3s) are included in Appendix A.

Two restrained Side Impact Hybrid III Dummies (SID H3s) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to the instructions specified in the OCWS Side Impact Laboratory Test Procedure which is dated July, 1997. The side impact test was documented by one real-time camera and 9 high-speed cameras. Camera locations and other pertinent camera information are included in this report.

The SID H3s were instrumented with the following accelerometers:

1. Left Upper Rib (LUR) uniaxial and redundant accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial and redundant accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial and redundant accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial and redundant accelerometer (Y-direction)
5. Nine Axis Array Heads (NAAH)
6. Head triaxial accelerometers (X-, Y- and Z-direction)
7. Upper neck force and moment (X-, Y and Z-direction) load cells

A summary of the Side Impact Hybrid III Dummy (SID H3) configuration and verification test data can be found in Appendix C. A total of 72 channels of data were recorded. Appendix B contains the vehicle, MDB and dummy response data traces.

The following table summarizes the results of the test.

Injury Criteria	Front SID H3	Rear SID H3
TTI (g)	22	32
PEV (g)	20	42

AIR BAG DEPLOYMENT STATUS

	DRIVER	FRONT PASSENGER	REAR PASSENGER
Front Air Bag	No	No	-
Knee Bolster Bag	-	-	-
Side Air Bag	Yes	No	-
Side Curtain Bag	Yes	No	Yes

SECTION 3

SUMMARY OF TEST RESULTS

DATA SHEET 1

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2003 Volvo XC90 MPV

Vehicle Body Color: CrystalGreen VIN: YV1CM91H231019801

Vehicle NHTSA No.: C35901 Month & Year of Manufacture: 02/03

Engine Data: 6 Cylinders; - CID; 2.9 Liters; - cc

Engine Placement: - Longitudinal; or X Lateral

Transmission: 4 Speed; - Manual; X Automatic; X Overdrive

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

Odometer Reading 332 km

Supplemental Airbag Restraints:

Front Occupant: X Frontal; - Knee; X Side; X Curtain

Rear Occupant: - Frontal; - Knee; - Side; X Curtain

Options: X A/C; X Power Steering; X Power Brakes; X Power Windows

DATA FROM TIRE PLACARD

Recommended Tire Size: P235/60R18

*Recommended Cold Tire Pressure: 220 kPa FRONT; 220 kPa REAR

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P235/60R18; Manufacturer: Michelin

Tire Pressure with Maximum Capacity Vehicle Load: Front: 240 kPa; Rear: 240 kPa

Treadwear: 300; Traction: A; Temperature: A

VEHICLE CAPACITY DATA:

Number of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 Total

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

Type of Rear Seats: - Bucket; - Bench; X Split Bench; X Contoured

Type of Front Seat Back: - Fixed; X Adjustable with X Lever or - Knob

Type of Rear Seat Back: X Fixed; - Adjustable with - Lever or - Knob

Vehicle Max Capacity Loading = 525 kg (A)

No. of Occupants x 68.04 kg. = 340.2 kg (B)

Vehicle Cargo Capacity = 184.8 kg (A-B) †

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front = 568.5 kg Left Rear = 484.5 kg

Right Front = 580.0 kg Right Rear = 476.5 kg

TOTAL FRONT = 1148.5 kg TOTAL REAR = 961.0 kg

% of Total Weight = 54.4% % % of Total Weight = 45.6 %

TOTAL WEIGHT = 2109.5 kg

* The tire pressure indicated on the vehicle certification placard exceeded the maximum pressure rating indicated on the tire sidewall (240 kPa). At the request of the COTR, 220 kPa (as indicated on the tire placard, page A-43) was used in the test.

† Maximum value of 136.1 kg was used in the target weight calculation, as specified in the OVSC test procedure.

DATA SHEET 1 (continued)**GENERAL TEST VEHICLE PARAMETER DATA**Vehicle: 2003 Volvo XC90 MPVNHTSA No. C35901CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Max. Fluids	=	<u>2109.5</u>	kg (A)
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>136.1</u>	kg (B)
Weight of instrumented SID H3 Dummies (2 X 81.2 kg)	=	<u>162.4</u>	kg (C)
TEST VEHICLE TARGET WEIGHT:	=	<u>2408</u>	kg (A+B+C)

FULLY LOADED TEST VEHICLE (UDVW + 1 or 2 SID H3(s) + CARGO):

Left Front	=	<u>620.5</u>	kg	Left Rear	=	<u>632.0</u>	kg
Right Front	=	<u>583.0</u>	kg	Right Rear	=	<u>577.0</u>	kg
TOTAL FRONT	=	<u>1203.5</u>	kg	TOTAL REAR	=	<u>1209.0</u>	kg
% of Total Weight	=	<u>49.9%</u>	%	% of Total Weight	=	<u>50.1%</u>	%
TOTAL TEST WEIGHT =		<u>2412.5</u>	kg				

AS TESTED WEIGHT OF TEST VEHICLE (1 OR 2 SID H3(s) + CARGO + EQUIPMENT & INSTRUMENTATION):

Left Front	=	<u>614.0</u>	kg	Left Rear	=	<u>617.8</u>	kg
Right Front	=	<u>595.0</u>	kg	Right Rear	=	<u>578.8</u>	kg
TOTAL FRONT	=	<u>1209.0</u>	kg	TOTAL REAR	=	<u>1196.6</u>	kg
% of Total Weight	=	<u>50.3%</u>	%	% of Total Weight	=	<u>49.7%</u>	%
TOTAL TEST WEIGHT =		<u>2405.6</u>	kg				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):

AS DELIVERED:

Left Front	<u>827</u>	Right Front	<u>822</u>	Left Rear	<u>843</u>	Right Rear	<u>843</u>
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FULLY LOADED:

Left Front	<u>809</u>	Right Front	<u>812</u>	Left Rear	<u>806</u>	Right Rear	<u>814</u>
------------	------------	-------------	------------	-----------	------------	------------	------------

READY FOR TEST:

Left Front	<u>811</u>	Right Front	<u>813</u>	Left Rear	<u>809</u>	Right Rear	<u>814</u>
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Test Vehicle Wheelbase: 2858 millimetersC.G. = 1422 millimeters rearward of front wheel centerlineTOTAL VEHICLE LENGTH:

Right Side =	<u>4742</u>	millimeters
Left Side =	<u>4743</u>	millimeters
Centerline =	<u>4800</u>	millimeters

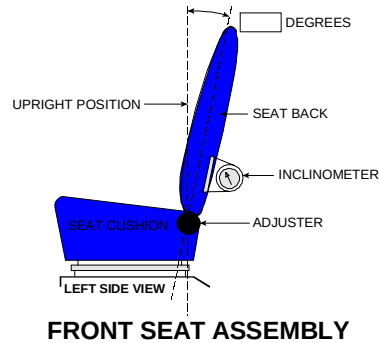
DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901

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 CUSHION PLACEMENT: Full down, mid fore/aft position

Total Length of Adjustment Travel: 232 millimeters

Total Number of Adjustment Positions or Detents: Infinite (power adjuster)

FRONT SEAT BACK ADJUSTMENT POSITION: Span the back of the seatback with a straight edge from top to bottom along its centerline. Set the seatback so that the straight edge is 19 degrees back from vertical with the vehicle sills level.

Seat Back Torso Angle: 19 degrees

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: 0 millimeters

Seat Back Adjustment Position: fixed

ADJUSTABLE STEERING COLUMN POSITION: Mid-telescoping and mid-tilt position.

WINDOW POSITIONS: Left Front: Closed Left Rear: Closed

Right Front: Open Right Rear: Open

Note: Windows will be in closed position on struck side of test vehicle and in open position on opposite side.

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

71.9 liters (Fuel Tank Usable Capacity)

66.6 liters used for test (92%-94% of Fuel Tank Usable Capacity)

LOCATION OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase = 2858 millimeters

Impact Point is 489 millimeters rearward of front axle centerline
(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 489 millimeters rearward of front axle centerline

DATA SHEET 2

TEST VEHICLE SUMMARY OF RESULTS

VEHICLE IDENTIFICATION:

Vehicle Year/Make/Model: 2003 Volvo XC90

Body Style: MPV

VIN: YV1CM91H231019801

NHTSA No.: C35901

Test Date: May 20, 2003

Overall Length = 4800 millimeters; Overall Width = 1877 millimeters

VEHICLE TEST WEIGHT (Pre-Test):

Left Front = 614.0 kg Left Rear = 617.8 kg

Right Front = 595.0 kg Right Rear = 578.8 kg

TOTAL FRONT = 1209.0 kg TOTAL REAR = 1196.6 kg

TOTAL VEHICLE WEIGHT 2405.6 kg

Wheelbase = 2858 millimeters

Longitudinal C.G. from Center of Front Axle = 1421.63 millimeters

Impact Angle with Respect to Impactor = 90 degrees

ACTUAL IMPACT POINT

Actual Impact Point is 0 mm from nominal impact ref. line (Lateral)

Actual Impact Point is 6 mm below nominal impact point (Vertical)

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (364 mm above ground) = 47 millimeters

2. LEVEL 2 (713 mm above ground) = 151 millimeters

3. LEVEL 3 (779 mm above ground) = 176 millimeters

4. LEVEL 4 (1060 mm above ground) = 100 millimeters

5. LEVEL 5 (1670 mm above ground) = 22 millimeters

Maximum Post-Test Intrusion = 176 millimeters

OCCUPANTS:

Front Passenger:

Rear Passenger:

Dummy Identification SID H3/015

SID H3/016

Restraints Used 3-point seat belt, side impact
airbag, side curtain airbag

3-point seatbelt and side curtain
airbag

INSTRUMENTATION:

Number of Vehicle Data Channels: = 21

Number of Cameras: Onboard = 3

Offboard = 7

TOTAL = 10

DATA SHEET 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901

MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore: 038B0403-4; 033A0303

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	=	<u>1250</u>	millimeters
Overall Length of MDB (incl. honeycomb impact face)	=	<u>4120</u>	millimeters
Wheelbase of Framework Carriage	=	<u>2590</u>	millimeters
Tread of Framework Carriage (Front & Rear)	=	<u>1875</u>	millimeters
C.G. Location Rearward of Front Axle	=	<u>1104</u>	millimeters

MDB WEIGHT:

Left Front	=	<u>409.5</u>	kg	Left Rear	=	<u>281.5</u>	kg
Right Front	=	<u>372.5</u>	kg	Right Rear	=	<u>299.0</u>	kg
TOTAL FRONT	=	<u>782.0</u>	kg	TOTAL REAR	=	<u>580.5</u>	kg
TOTAL MDB WEIGHT	=	<u>1362.5</u>	kg				
Impact Angle (MDB C/L to Target Vehicle C/L)	=	<u>90</u>	degrees				
Impact Speed	=	<u>62.44</u>	kph				

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A at Center of Bumper Level	=	<u>248</u>	millimeters
2. Row B at Top of Bumper Level	=	<u>201</u>	millimeters
3. Row C at Mid Level	=	<u>157</u>	millimeters
4. Row D at Top of Stack Level	=	<u>186</u>	millimeters

INSTRUMENTATION:

Number of MDB Data Channels	=	<u>5</u>
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DATA SHEET 4**POST-TEST OBSERVATIONS**Vehicle: 2003 Volvo XC90 MPVNHTSA No. C35901TEST DUMMY INFORMATION AND CONTACT POINTS:

DESCRIPTION	FRONT SEAT	REAR SEAT
ATD Type/Serial No.	SID H3/015	SID H3/016
Head Contact:	Side of head to side curtain airbag, back of head to head restraint	Side of head to side curtain airbag, back of head to head restraint
Upper Torso Contact:	Left arm to side impact airbag	Left arm to door trim above arm rest
Lower Torso Contact:	Pelvis to door trim below arm rest	Pelvis to door trim below arm rest
Left Knee Contact:	Left knee to door trim speaker cover	Left knee to door trim speaker cover
Right Knee Contact:	Right knee to left knee	Right knee to left knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

DESCRIPTION	FRONT	REAR
Left Side Doors	Closed / Latched / Inoperable	Closed / Latched / Inoperable
Right Side Doors	Closed / Latched / Operable	Closed / Latched / Operable
Hatch/Other Door	-	Closed / Latched / Operable
Seat Movement (mm)	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

CRITICAL AREAS OF PERFORMANCE	
Pillar Performance	No visible tears or separations
Sill Separation	None
Windshield Damage	None
Window Damage	Left door windows shattered during the event
Other Notable Effects	None

AIR BAG DEPLOYMENT STATUS:

	DRIVER	FRONT PASSENGER	REAR PASSENGER
Front Air Bag	No	No	-
Knee Bolster Bag	-	-	-
Side Air Bag	Yes	No	-
Side Curtain Bag	Yes	No	Yes

MDB LEFT EDGE IMPACT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	± 50 mm	0 mm
Vertical Offset	mm	± 20 mm	6 mm below target

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5

SID H3 INSTRUMENTATION DATA

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901

	Front Dummy ID# 015				Rear Dummy ID# 016			
	Pos. Direction		Neg. Direction		Pos. Direction		Neg. Direction	
	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
HEAD ACCELERATIONS:								
NAAH X Arm Y	14.1	64.1	-3.3	134.3	24.3	71.1	-5.0	103.4
NAAH X Arm Z	10.1	65.2	-5.5	39.0	3.3	54.9	-11.9	66.1
NAAH Y Arm X	2.4	157.8	-10.5	78.4	5.4	77.2	-12.6	55.1
NAAH Y Arm Z	8.4	65.1	-6.0	46.1	4.9	54.9	-9.0	47.3
NAAH Z Arm X	3.3	157.9	-10.0	80.7	5.2	68.3	-12.8	96.0
NAAH Z Arm Y	25.0	43.2	-4.6	27.1	33.5	51.7	-15.1	83.9
CG Longitudinal X	2.6	158.1	-15.1	76.5	1.8	198.7	-11.9	94.7
CG Lateral Y	13.2	43.3	-1.4	15.8	23.5	55.8	-5.5	89.3
CG Vertical Z	9.0	65.0	-4.2	114.8	10.0	54.9	-13.3	77.8
CG Resultant R	17.8	65.0	-	-	26.0	55.0	-	-
HIC	24.7				60.8			
NECK FORCES:								
Longitudinal X	138.8	170.3	-66.6	39.5	264.4	67.1	-74.2	147.2
Lateral Y	187.4	133.2	-90.9	37.2	33.9	187.1	-763.3	79.0
Vertical Z	229.3	39.5	-177.0	65.2	391.4	55.1	-296.1	78.9
Resultant R	250.1	39.5	-	-	834.9	78.9	-	-
NECK MOMENTS:								
X	24.6	88.3	-8.7	42.7	5.1	175.9	-46.5	65.7
Y	35.4	75.7	-10.4	182.6	11.3	112.0	-39.7	77.9
Z	5.9	148.4	-20.3	72.5	19.5	77.0	-4.9	199.9
Resultant R	40.7	73.9	-	-	51.7	75.4	-	-
RIB ACCELERATIONS:								
Upper Rib Lateral Y	27.1	14.4	-3.5	41.8	30.0	69.4	-2.4	193.7
Upper Rib Lateral Y(R)	26.9	14.4	-3.9	41.3	29.9	69.4	-2.3	193.2
Lower Rib Lateral Y	18.8	18.1	-3.9	43.1	34.7	62.5	-1.9	199.9
Lower Rib Lateral Y(R)	19.6	18.1	-3.3	43.1	36.5	62.5	-1.9	199.9
SPINE ACCELERATIONS:								
Lower Lateral Y	16.4	20.6	-0.7	175.0	29.5	54.3	-1.9	150.0
Lower Lateral Y(R)	16.2	20.6	-0.6	175.0	28.8	54.4	-1.4	199.9
PELVIC ACCELERATIONS:								
Lateral Y	19.7	51.9	-6.4	67.5	42.2	47.5	-4.4	69.4
Lateral Y(R)	20.1	51.8	-6.5	67.5	41.1	46.9	-4.4	69.3

REFERENCE: Positive Direction: Longitudinal (X) = forward; Lateral (Y) = to right; Vertical (Z) = down

Note: Rib, Spine and Pelvis data has been FIR filtered, Y(R) denotes redundant Y direction accelerometer.

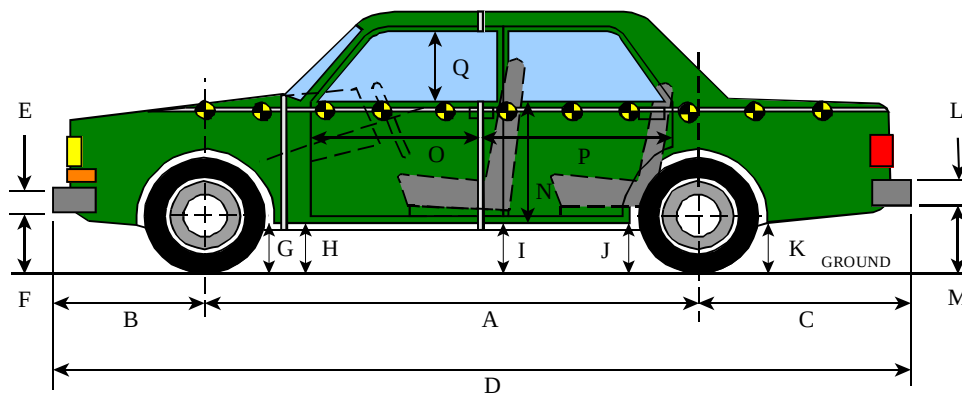
Head Accelerations and Neck Forces are filtered at SAE Class 1000, Neck Moments are filtered at SAE Class 600.

DATA SHEET 6

VEHICLE SIDE MEASUREMENTS

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



LEFT SIDE VIEW

NOTE: all dimensions are in millimeters with tolerance of ± 3 mm

	PRE-TEST (as delivered)	PRE-TEST (as tested)	POST-TEST (as tested)	Δ CHANGE
A	2856	2858	2855	-3
B	897	-	900	3
C	1047	-	1046	-1
D	4800	-	4801	1
E	234	-	234	0
F	481	479	510	31
G	226	213	232	19
H	266	250	270	20
I	308	285	292	7
J1	315	287	282	-5
J2	315	287	282	-5
K	366	333	333	0
L	295	-	295	0
M	395	361	356	-5
N	733	-	744	11
O	786	-	750	-36
P	1241	-	1189	-52
Q	489	-	484	-5
R	4742	-	4743	1
S	4743	-	4739	-4
T	1877	-	1802	-75

D = Length at Centerline
T = Width at B-Pillar

E&L = Bumper Thickness
J1 = To Pinch Weld

R = Right Side Length
J2 = To Sill

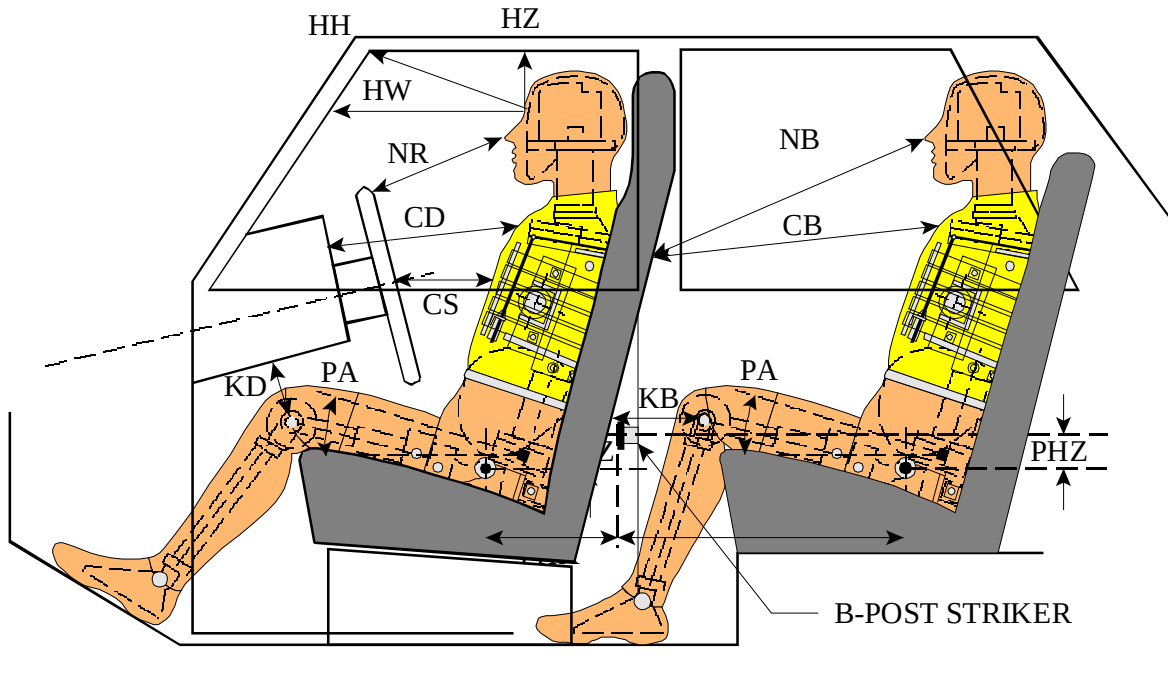
S = Left Side Length

DATA SHEET 7

SID H3 LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

	DRIVER ID# 015	LEFT REAR PASS. ID# 016
HH	358	N/A
HW	653	N/A
HZ	173	189
NR/NB	464	653
CD/CB	581	576
CS	305	N/A
KDL(KDA°)/KBL(KDA°)	183 / (26 °)	208 / (34 °)
KDR(KBA°)/KBR(KBA°)	183 / (26 °)	218 / (36 °)
PA°	24.9°	23.6°
PHX	199	292
PHZ	82	120

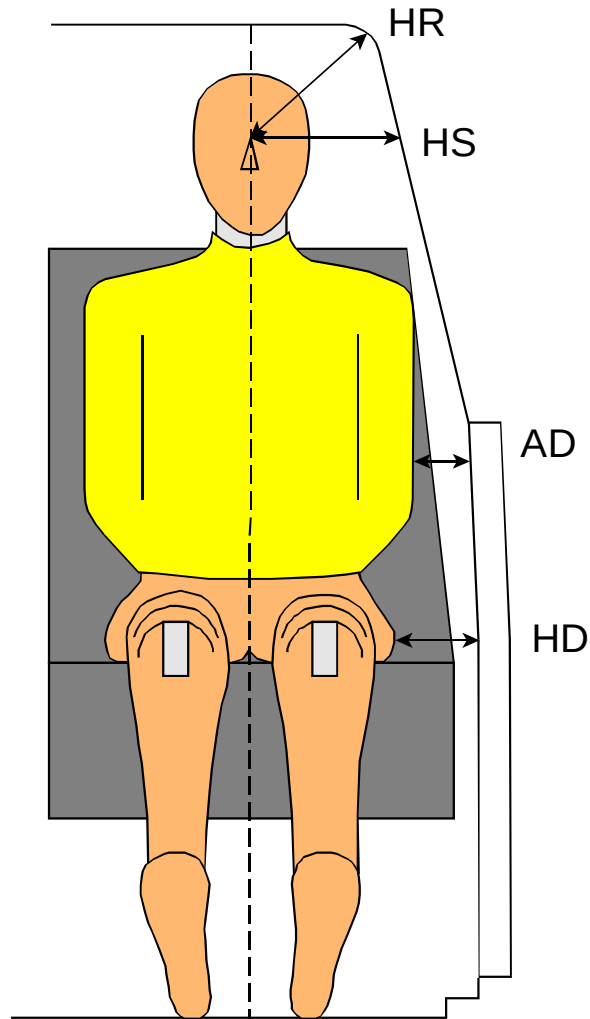
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

DATA SHEET 8

SID H3 LATERAL CLEARANCE DIMENSIONS

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

	DRIVER ID # 015				LEFT REAR PASS. ID # 016			
HR	195				180			
HS	320				298			
AD*	LOWER:	121	UPPER:	107	LOWER:	85	UPPER:	65
HD	145				107			

* Lower measurement is taken laterally at the center of the lower rib accelerometer height from the SID H3 arm segment to the closest part of the vehicle side.

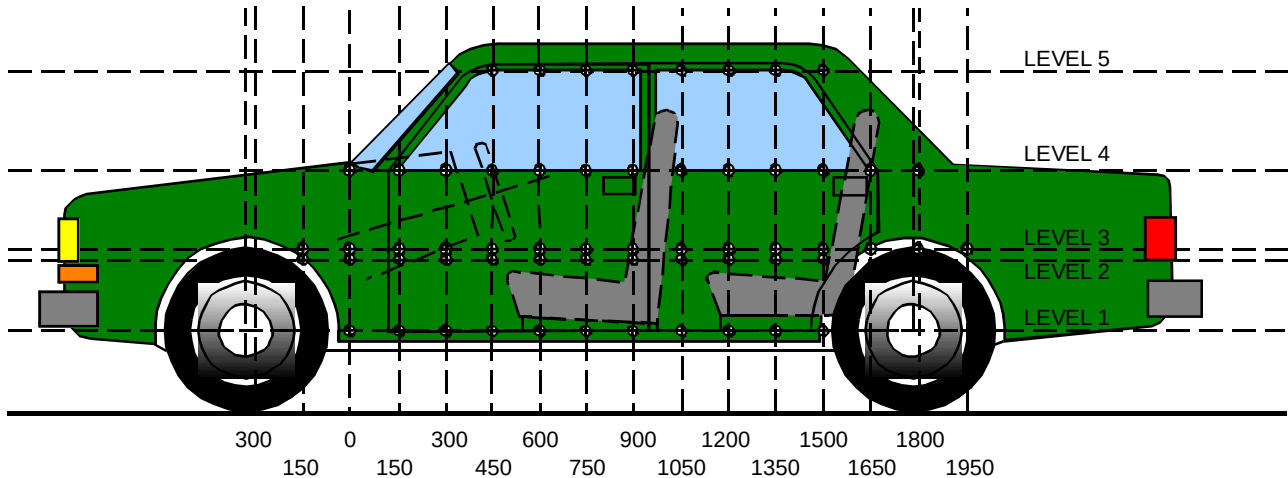
Upper measurement is taken laterally at the center of the upper rib accelerometer height from the SID H3 arm segment to the closest part of the vehicle side.

DATA SHEET 9

VEHICLE SIDE MEASUREMENTS

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



LEFT SIDE VIEW

NOTE: All measurements are in millimeters (mm)

LEVEL 5 - WINDOW TOP
LEVEL 4 - WINDOW SILL
LEVEL 3 - MID-DOOR
LEVEL 2 - OCCUPANT H-POINT
LEVEL 1 - AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION.

Measurements Along the Vertical 750 mm Line Shown Above:

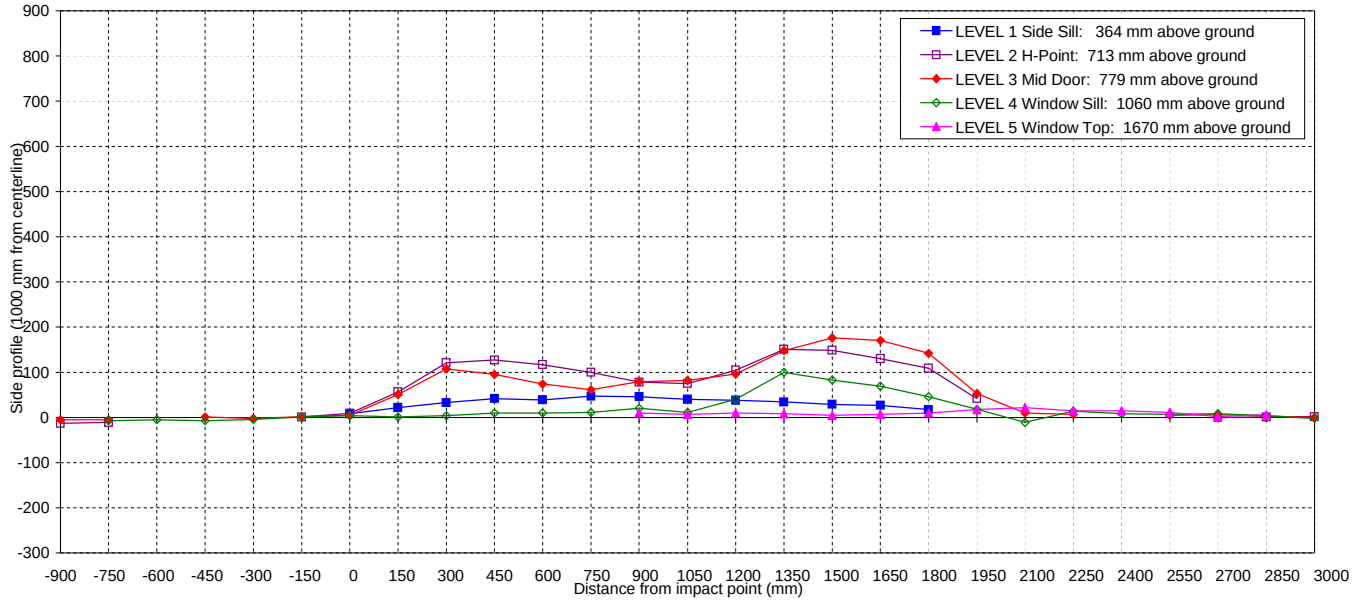
Level 5 @ Window Top	=	<u>1670</u>	millimeters
Level 4 @ Window Sill	=	<u>1060</u>	millimeters
Level 3 @ Mid Door	=	<u>779</u>	millimeters
Level 2 @ Occupant H-Point	=	<u>713</u>	millimeters
Level 1 @ Axle Centerline Height (or Sill Top Height)	=	<u>364</u>	millimeters

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES - ALL LEVELS

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



NOTE: All dimensions are in millimeters with a tolerance of ± 3 mm

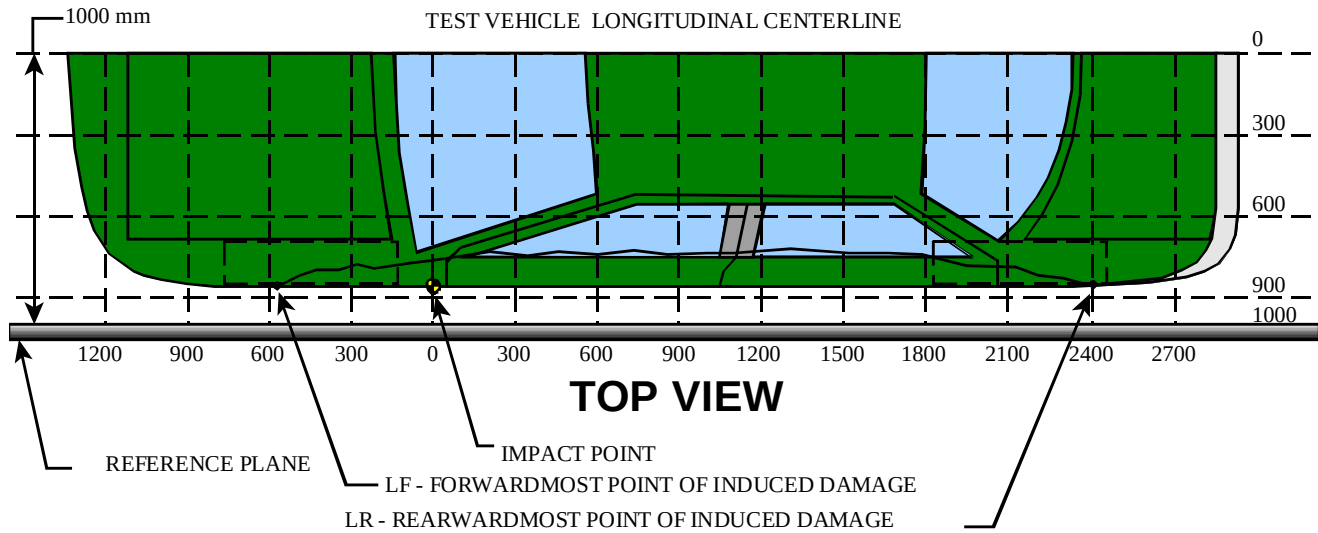
			DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT																											
LEVEL	HEIGHT (mm)		-900	-750	-600	-450	-300	-150	0	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000	
LEVEL 1 SIDE SILL	364	PRE	--	--	--	--	--	--	128	160	163	163	167	166	171	173	173	173	172	165	161	--	--	--	--	--	--	--	--	--
		POST	--	--	--	--	--	--	136	182	196	205	206	213	217	213	211	207	201	192	178	--	--	--	--	--	--	--	--	--
		CRUSH	N/A	N/A	N/A	N/A	N/A	N/A	8	22	33	42	39	47	46	40	38	34	29	27	17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LEVEL 2 H POINT	713	PRE	124	86	--	--	--	74	93	94	89	83	79	77	77	77	79	81	84	87	91	85	--	--	--	--	72	115	140	
		POST	111	75	--	--	--	75	102	151	210	210	196	177	155	152	184	232	233	217	200	127	--	--	--	--	72	116	142	
		CRUSH	-13	-11	N/A	N/A	N/A	1	9	57	121	127	117	100	78	75	105	151	149	130	109	42	N/A	N/A	N/A	N/A	N/A	0	1	2
LEVEL 3 MID DOOR	779	PRE	135	87	--	71	68	84	91	89	85	82	81	79	77	78	79	78	78	80	83	85	66	67	--	65	79	116	134	
		POST	130	82	--	72	66	86	96	140	192	177	155	140	156	160	175	226	254	250	225	138	76	74	--	70	85	119	134	
		CRUSH	-5	-5	N/A	1	-2	2	5	51	107	95	74	61	79	82	96	148	176	170	142	53	10	7	N/A	5	6	3	0	
LEVEL 4 WINDOW SILL	1060	PRE	--	379	331	291	252	216	184	149	126	110	100	96	90	89	86	87	87	89	91	103	90	96	102	109	111	123	136	
		POST	--	372	326	284	248	217	188	150	130	120	110	107	110	100	126	187	170	158	137	121	79	110	110	116	119	127	136	
		CRUSH	N/A	-7	-5	-7	-4	1	4	1	4	10	10	11	20	11	40	100	83	69	46	18	-11	14	8	7	8	4	-2	
LEVEL 5 WINDOW TOP	1670	PRE	--	--	--	--	--	--	--	--	--	--	--	--	468	454	429	417	410	403	401	401	402	408	415	429	451	487	--	
		POST	--	--	--	--	--	--	--	--	--	--	--	--	--	478	461	439	425	415	410	411	418	424	423	430	440	453	493	--
		CRUSH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10	7	10	8	5	7	10	17	22	15	15	11	2	6	N/A	

DATA SHEET 11

VEHICLE DAMAGE PROFILE DISTANCES

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



MEASUREMENT CONVENTIONS:
Forward of the impact point (towards front of vehicle) is considered negative (—).
Rearward of the impact point (toward rearend of vehicle) is considered positive (+).

NOTE: All dimensions are in millimeters with tolerance of ± 3 mm.

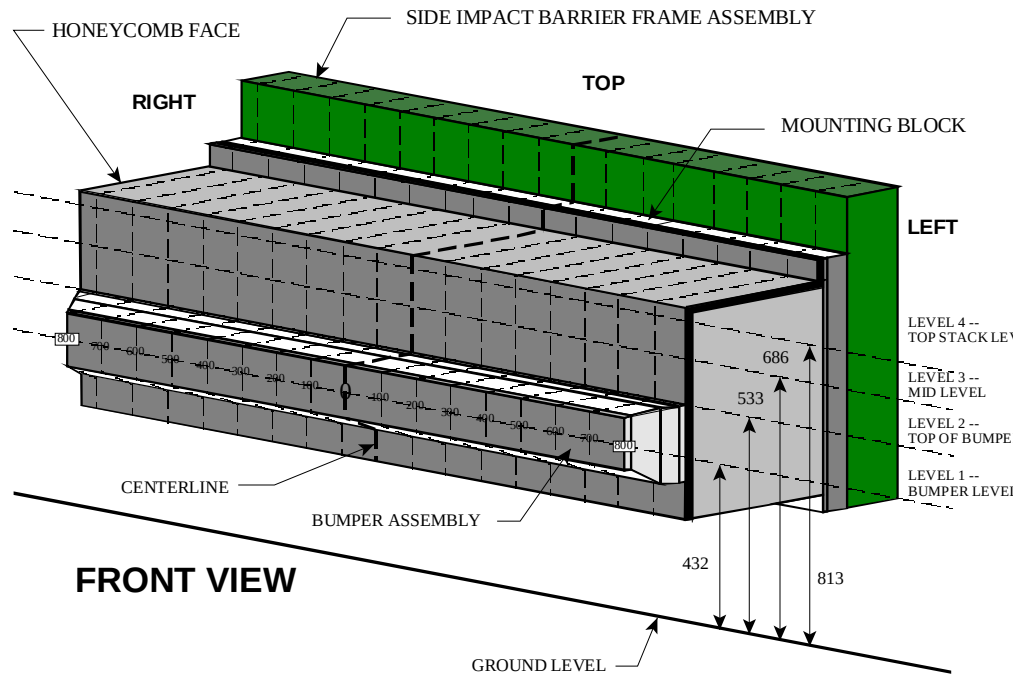
DPD MEASUREMENTS		POST TEST (mm)	PRETEST (mm)	STATIC CRUSH (mm)
1	(LR = 2930 mm)	130	128	2
2	2254	423	408	15
3	1578	252	79	173
4	902	156	77	79
5	226	181	91	90
6	(LF = -450 mm)	72	71	1

DATA SHEET 12

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



NOTE: Dimensions are shown in millimeters, mm

NOTE: All dimensions are in millimeters with a tolerance of ± 3 mm

			DISTANCE RIGHT OF CENTER (mm)											DISTANCE LEFT OF CENTER (mm)							
LEVEL	HEIGHT AT CL (mm)*		800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800		
LEVEL 4 TOP STACK	813	PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619		
		POST	744	722	713	712	729	758	805	804	797	804	794	775	768	760	754	763	793		
		CRUSH	125	103	94	93	110	139	186	185	178	185	175	156	149	141	135	144	174		
LEVEL 3 MID LEVEL	686	PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619		
		POST	776	758	741	729	719	720	748	766	744	727	715	710	698	699	709	724	773		
		CRUSH	157	139	122	110	100	101	129	147	125	108	96	91	79	80	90	105	154		
LEVEL 2 TOP BUMPER	533	PRE	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619	619		
		POST	820	810	805	798	786	785	783	768	769	771	764	763	761	762	761	762	769		
		CRUSH	201	191	186	179	167	166	164	149	150	152	145	144	142	143	142	143	150		
LEVEL 1 MID BUMPER	432	PRE	535	519	518	518	518	518	518	518	518	518	518	518	518	518	518	519	535		
		POST	780	767	755	748	742	733	730	724	722	721	722	716	712	712	715	721	738		
		CRUSH	245	248	237	230	224	215	212	206	204	203	204	198	194	194	197	202	203		

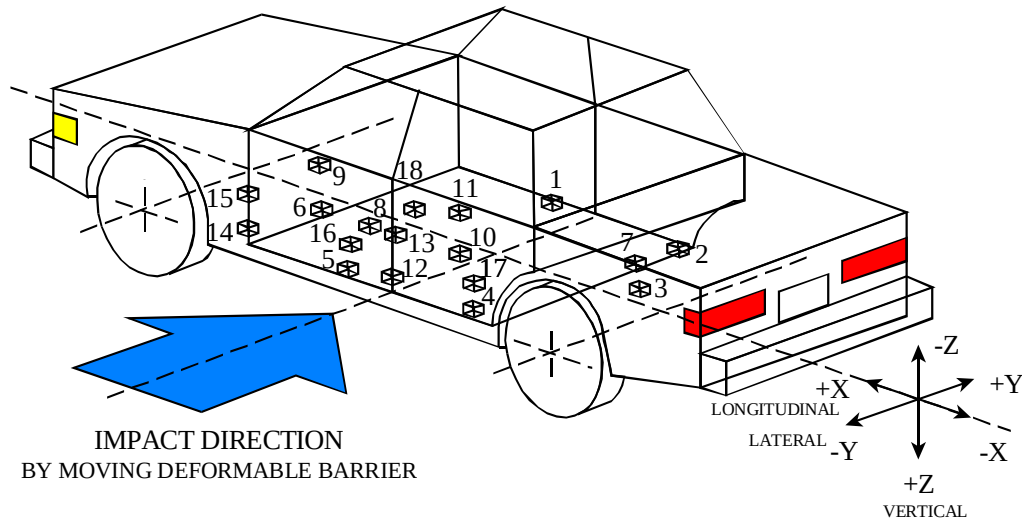
*Heights measured above ground level.

DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



- | | |
|------------------------------------|------------------------------------|
| 1-Right Side Sill @ Front Seat | 10-Midrear of Left Rear Door |
| 2-Right Side Sill @ Rear Seat | 11-Left Rear Door Upper Centerline |
| 3-Rear Floorpan Above Axle | 12-Left Lower B-Pillar |
| 4-Left Side Sill @ Rear Seat | 13-Left Middle B-Pillar |
| 5-Left Side Sill @ Front Seat | 14-Left Lower A-Pillar |
| 6-Left Front Door on Centerline | 15-Left Middle A-Pillar |
| 7-Right Rear Occupant Compartment | 16-Front Seat Track |
| 8-Midrear of Left Front Door | 17-Rear Seat Track |
| 9-Left Front Door Upper Centerline | 18-Vehicle CG |

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901

Accel. No.	Location	Coordinates (mm)±3 mm				Long. (x)		Lat. (y)		Vert. (z)		Resultant	
						Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
		X*	Y*	Z*		Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
1	Right Side Sill at Front Seat	3108	657	-424	pos. neg.	3.4 -4.2	25.5 14.7	36.7 -1.8	8.6 110.9	4.3 -6.6	68.2 8.2	37.3 -	8.5 -
2	Right Side Sill at Rear Seat	2199	657	-443	pos. neg.	2.9 -5.0	25.1 6.0	37.9 -3.2	7.7 89.7	5.1 -11.6	77.6 15.7	38.7 -	7.7 -
3	Rear Floorpan Above Axle	1287	12	-639	pos. neg.	4.2 -7.1	59.3 48.7	25.9 -2.3	7.5 82.0	8.2 -6.6	7.9 14.2	27.5 -	7.6 -
4	Left Side Sill at Rear Seat	2173	-644	-421	pos. neg.	- -	- -	115.9 -39.3	2.7 11.1	- -	- -	- -	- -
5	Left Side Sill at Front Seat	3055	-629	-367	pos. neg.	- -	- -	79.9 -28.4	4.0 10.1	- -	- -	- -	- -
6**	Left Front Door on Centerline	-	-	-	pos. neg.	- -	- -	- -	- -	- -	- -	- -	- -
7	Right Rear Occupant Compartment	2206	427	-399	pos. neg.	- -	- -	29.6 -3.2	7.4 89.8	- -	- -	- -	- -
8**	Midrear of Left Front Door	-	-	-	pos. neg.	- -	- -	- -	- -	- -	- -	- -	- -
9**	Left Front Door Upper Centerline	-	-	-	pos. neg.	- -	- -	- -	- -	- -	- -	- -	- -
10**	Midrear of Left Rear Door	-	-	-	Pos. neg.	- -	- -	- -	- -	- -	- -	- -	- -
11**	Left Rear Door Upper Centerline	-	-	-	pos. neg.	- -	- -	- -	- -	- -	- -	- -	- -

*Reference: X - Rear Bumper (+ Forward)

Y - Vehicle Centerline (+ To Right) Z - Ground Level (+ Down)

**Accelerometer was not requested by COTR.

4-11

8675-F214-10

DATA SHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901

Accel. No.	Location	Coordinates (mm)±3 mm				Long. (x)		Lat. (y)		Vert. (z)		Resultant	
						Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)	Max (g)	Time (msec)
		X*	Y*	Z*									
12	Left Lower B-Pillar	2287	-735	-614	pos.	-	-	194.7	4.4	-	-	-	-
					neg.	-	-	-139.8	11.4	-	-	-	-
13	Left Middle B-Pillar	2236	-718	-974	pos.	-	-	124.2	6.1	-	-	-	-
					neg.	-	-	-75.3	13.3	-	-	-	-
14	Left Lower A-Pillar	3328	-666	-640	pos.	-	-	50.6	4.5	-	-	-	-
					neg.	-	-	-1.9	-1.6	-	-	-	-
15	Left Middle A-Pillar	3340	-672	-1112	pos.	-	-	28.4	11.0	-	-	-	-
					neg.	-	-	-10.8	21.4	-	-	-	-
16	Front Seat Track	2432	-601	-453	pos.	-	-	60.7	9.3	-	-	-	-
					neg.	-	-	-8.7	53.9	-	-	-	-
17	Rear Seat Track	1529	-557	-529	pos.	-	-	49.2	7.4	-	-	-	-
					neg.	-	-	-16.5	11.2	-	-	-	-
18	Vehicle CG	2666	71	-688	pos.	10.2	28.5	35.4	25.3	15.6	22.2	37.2	25.2
					neg.	-11.8	19.0	-21.9	34.7	-25.8	10.2	-	-

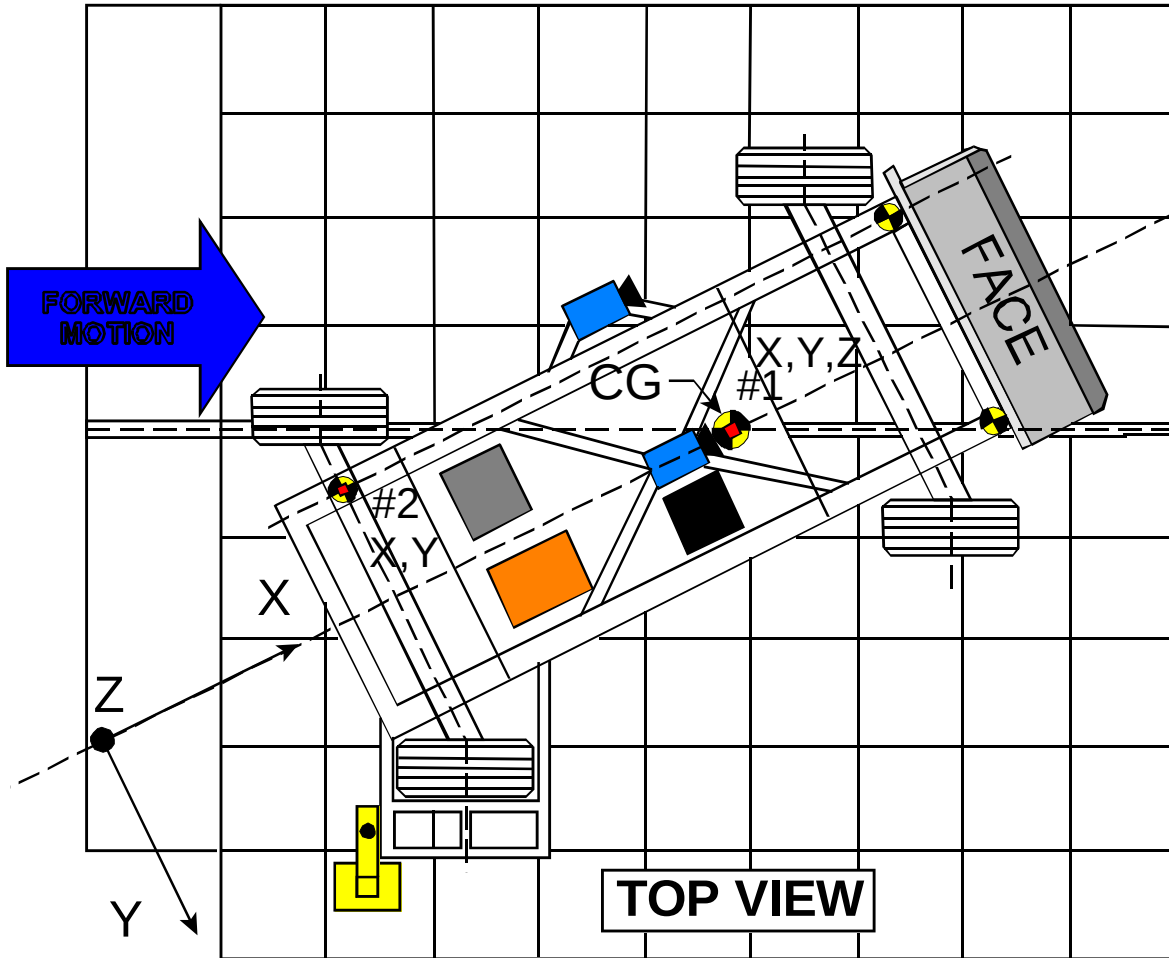
*Reference: X - Rear Bumper (+ Forward) Y - Vehicle Centerline (+ To Right) Z - Ground Level (+ Down)

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



Accel. No.	Location	Coordinates (millimeters)			Pos. Direct.		Neg. Direct.	
					Max (g)	Time (msec)	Max (g)	Time (msec)
		X*	Y*	Z*				
1	MDB Center of Gravity							
	Longitudinal... X	1859	0	-330	1.0	87.6	-23.2	25.0
	Lateral..... Y				2.8	67.6	-8.8	54.8
	Vertical..... Z				12.9	51.6	-15.9	21.2
	Resultant..... R				26.8	21.1	-	-
2	Rear Frame Member							
	Longitudinal... X	386	-660	-660	1.7	98.4	-26.8	36.0
	Lateral..... Y				2.6	10.6	-1.7	67.6

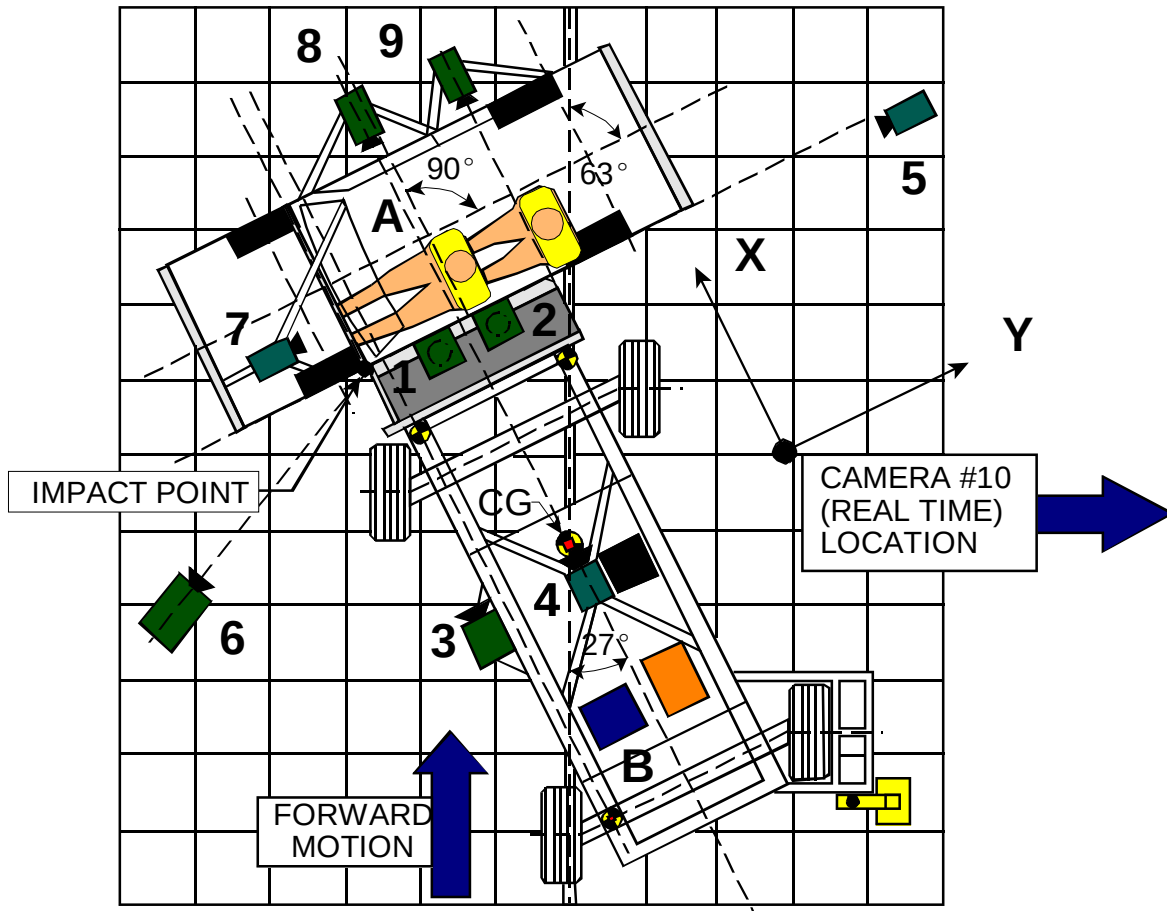
*Reference: X = Rear Bumper (+ Forward)
Y = Vehicle Centerline (+ To Right)
Z = Ground Level (+ Down)
All measurements accurate to within ± 3 mm.

DATA SHEET 15

HIGH SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 2003 Volvo XC90 MPV

NHTSA No. C35901



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead view of test vehicle	103	825	-4880	-90	8	1000
2	Overhead closeup view of impact plane	230	875	-4880	-90	12.5	1000
3	MDB onboard closeup view of impact point	-1470	0	-847	0	13	1010
4	MDB onboard view of driver dummy	-1140	838	-1586	-17	7.5	1015
5	Right side ground level overall view	0	9368	-1095	-1.5	25	1010
6	Left side ground level overall view	-1920	-1678	-1068	-2.0	13	1000
7	Test vehicle onboard driver front view	529	-512	-1441	-11.5	13	890
8	Test vehicle onboard driver side view	1875	699	-1208	-4.0	8	1005
9	Test vehicle onboard passenger side view	1860	1525	-1265	-5.58	8	1010
10	Real time film coverage of test	-	-	-	-	-	24

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

X = (Impact Point) + Forward

Y = (Impact Point) + To Right

Z = (Ground Level) + Down

SECTION 5

FUEL SYSTEM INTEGRITY

DATA SHEET 16

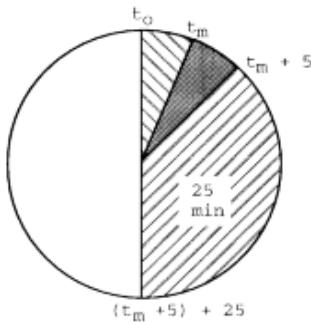
FMVSS 301 FUEL SYSTEM INTEGRITY DATA

NHTSA No.: C35901 TEST DATE: May 20, 2003
 Vehicle Mfgr./Make/Model: Volvo Gothenburg Sweden 2003 Volvo XC90 MPV

TEST VEHICLE IMPACT TYPE:

- Frontal (48.28 kph)
- Oblique (48.28 kph) with - ° barrier face first
 contacting the - side
 (driver/passenger)
- Rear Moving Barrier (48.28 kph)
- Lateral Moving Barrier (32.19 kph)
- X Side Impact Moving Deformable Barrier (62.0 kph)
 contacting the driver side side
 (driver/passenger)

FUEL SPILLAGE MEASUREMENT:



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

ACTUAL	MAX ALLOWED
0 g	28 g
0 g	142 g
0 g	28 g/1 min.

SOLVENT SPILLAGE DETAILS:

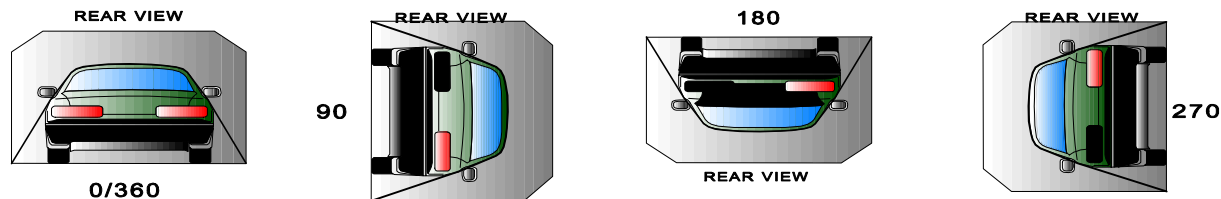
None

DATA SHEET 17

ROLLOVER DATA

Vehicle: 2003 Volvo XC90 MPV

NHTSA No.: C35901



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	
0° - 90°	1	minutes	12	seconds	5	minutes	6	minutes	12	seconds	7	minutes
90° - 180°	1	minutes	5	seconds	5	minutes	6	minutes	5	seconds	7	minutes
180°-270°	1	minutes	5	seconds	5	minutes	6	minutes	5	seconds	7	minutes
270°-360°	1	minutes	8	seconds	5	minutes	6	minutes	8	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	N/A
90° - 180°	0	0	0	N/A
180°-270°	0	0	0	N/A
270°-360°	0	0	0	N/A

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

IV. SOLVENT SPILLAGE LOCATION(S):

Rollover Stage	Spillage Location
0° - 90°	None
90° - 180°	None
180°-270°	None
270°-360°	None

APPENDIX A

PHOTOGRAPHS

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Figure A-1 PRE-TEST FRONTAL VIEW OF TEST VEHICLE



Figure A-2 POST-TEST FRONTAL VIEW OF TEST VEHICLE



Figure A-3 PRE-TEST REAR VIEW OF TEST VEHICLE



Figure A-4 POST-TEST REAR VIEW OF TEST VEHICLE



Figure A-5 PRE-TEST IMPACTED SIDE VIEW OF TEST VEHICLE



Figure A-6 POST-TEST IMPACTED SIDE VIEW OF TEST VEHICLE



Figure A-7 PRE-TEST LEFT FRONT VIEW OF TEST VEHICLE



Figure A-8 POST-TEST LEFT FRONT VIEW OF TEST VEHICLE



Figure A-9 PRE-TEST LEFT REAR VIEW OF TEST VEHICLE



Figure A-10 POST-TEST LEFT REAR VIEW OF TEST VEHICLE



Figure A-11 PRE-TEST RIGHT FRONT VIEW OF TEST VEHICLE



Figure A-12 POST-TEST RIGHT FRONT VIEW OF TEST VEHICLE



Figure A-13 PRE-TEST RIGHT REAR VIEW OF TEST VEHICLE



Figure A-14 POST-TEST RIGHT REAR VIEW OF TEST VEHICLE



Figure A-15 PRE-TEST FRONTAL VIEW OF IMPACTOR FACE



Figure A-16 POST-TEST FRONTAL VIEW OF IMPACTOR FACE



Figure A-17 PRE-TEST LEFT SIDE VIEW OF IMPACTOR FACE



Figure A-18 POST-TEST LEFT SIDE VIEW OF IMPACTOR FACE



Figure A-19 PRE-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



Figure A-20 POST-TEST RIGHT SIDE VIEW OF IMPACTOR FACE



Figure A-21 PRE-TEST TOP VIEW OF IMPACTOR FACE



Figure A-22 POST-TEST TOP VIEW OF IMPACTOR FACE

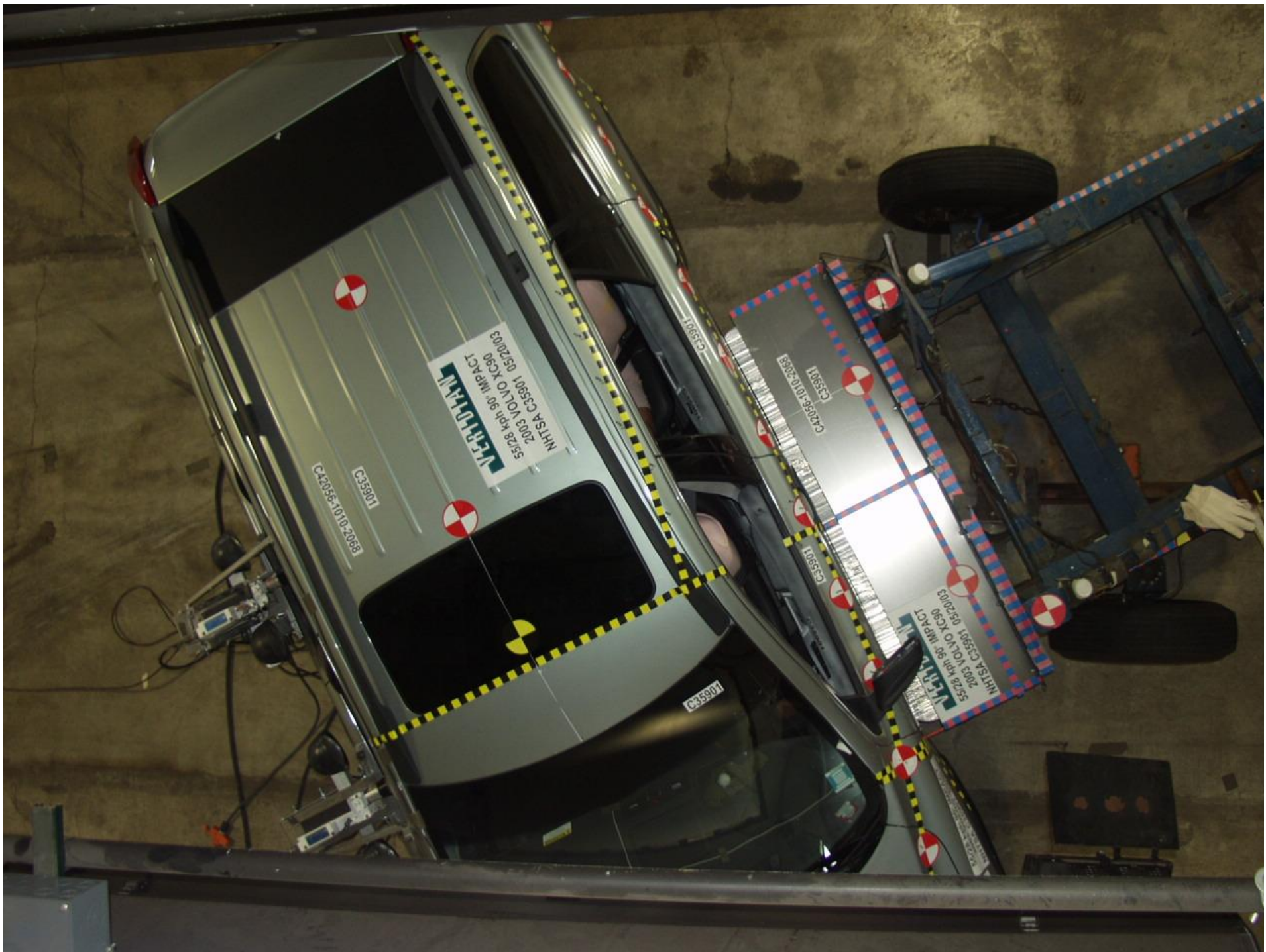


Figure A-23 PRE-TEST OVERHEAD VIEW OF ALIGNED MDB AND VEHICLE



Figure A-24 POST-TEST OVERHEAD VIEW OF MDB AND VEHICLE



Figure A-25 PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



Figure A-26 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



Figure A-27 PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



Figure A-28 POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



Figure A-29 PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID H3



Figure A-30 POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-31 PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



Figure A-32 POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID H3



Figure A-33 PRE-TEST INTERIOR OF FRONT DOOR



Figure A-34 POST-TEST INTERIOR OF FRONT DOOR SHOWING SID H3 IMPACT LOCATIONS



Figure A-35 PRE-TEST INTERIOR OF REAR DOOR



Figure A-36 POST-TEST INTERIOR OF REAR DOOR SHOWING SID H3 IMPACT LOCATIONS



Figure A-37 PRE-TEST LEFT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION



Figure A-38 PRE-TEST RIGHT SIDE VIEW OF MDB WITH IMPACTOR FACE IN POSITION

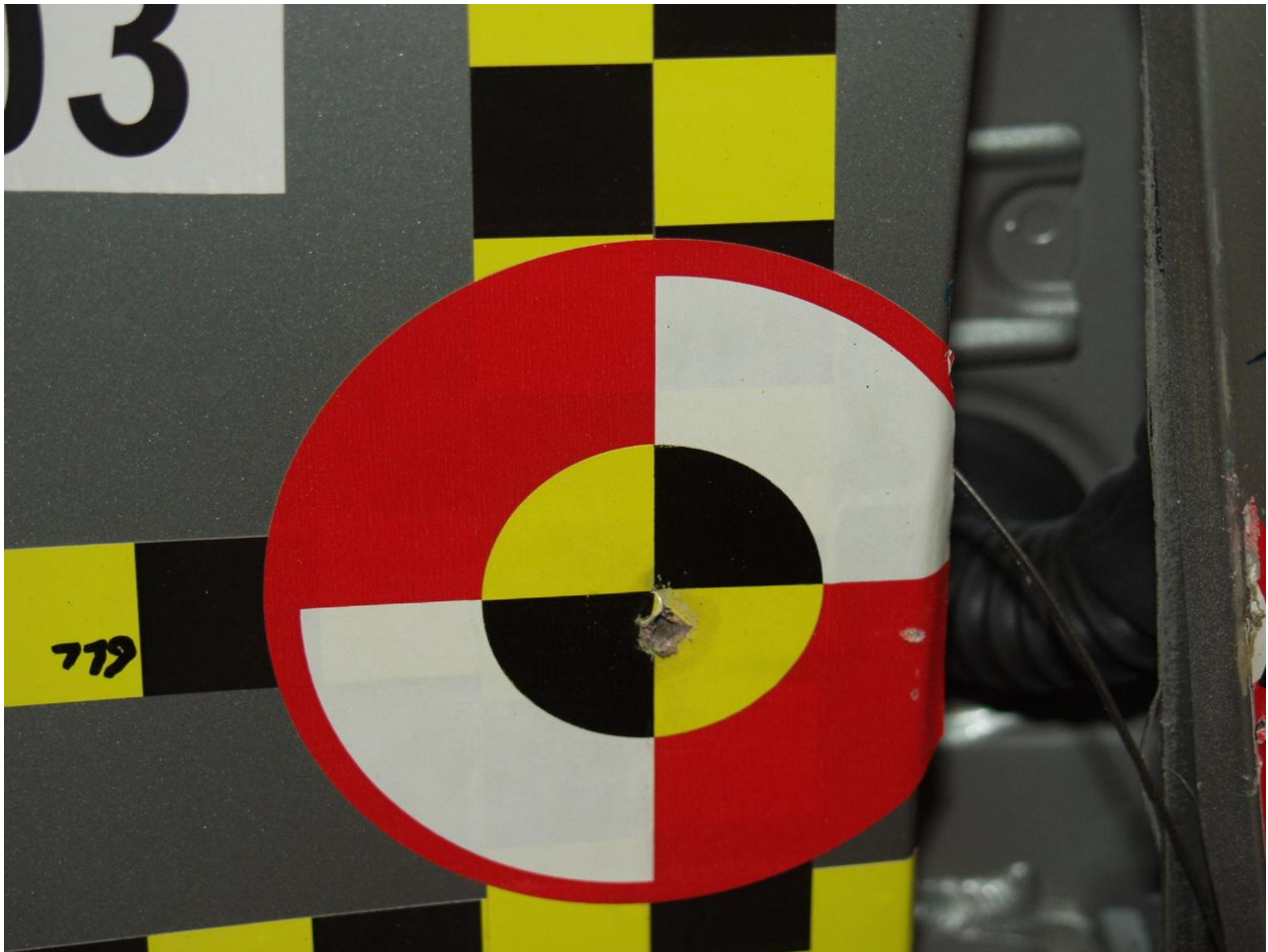


Figure A-39 POST-TEST CLOSE-UP VIEW OF IMPACT POINT TARGET

MFD. BY VOLVO GOTHENBURG SWEDEN

DATE:	GVWR	GAWR FRONT	GAWR REAR
02/03	5900 LB	2860 LB	3150 LB
	2680 KG	1300 KG	1430 KG
TIRES		235/60R18	235/60R18
RIMS		7Jx18x49	7Jx18x49
AT (COLD)		36 PSI	39 PSI
		250 KPa	270 KPa

VIN YV1CM91H231019801

TYPE:MPV



VOLVO

**THIS VEHICLE CONFORMS TO ALL
APPLICABLE FEDERAL MOTOR VEHICLE
SAFETY AND THEFT PREVENTION
STANDARDS IN EFFECT ON THE DATE OF
MANUFACTURE SHOWN ABOVE.**

9454363

Figure A-40 CLOSE-UP VIEW OF VEHICLE'S CERTIFICATION LABEL

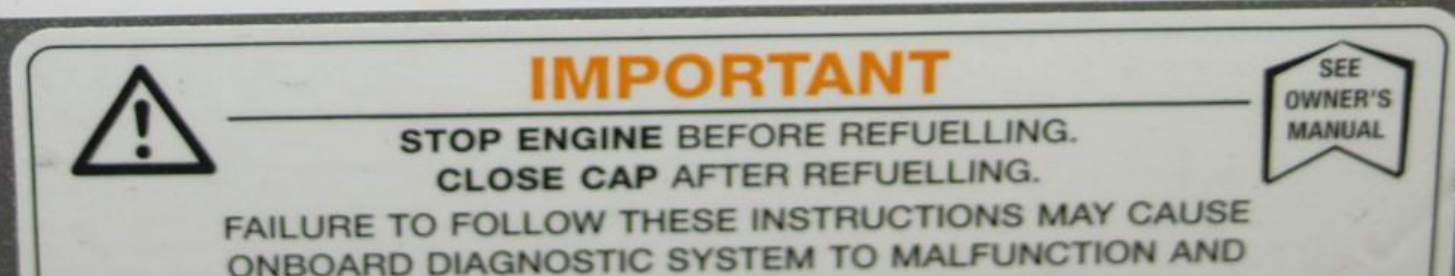
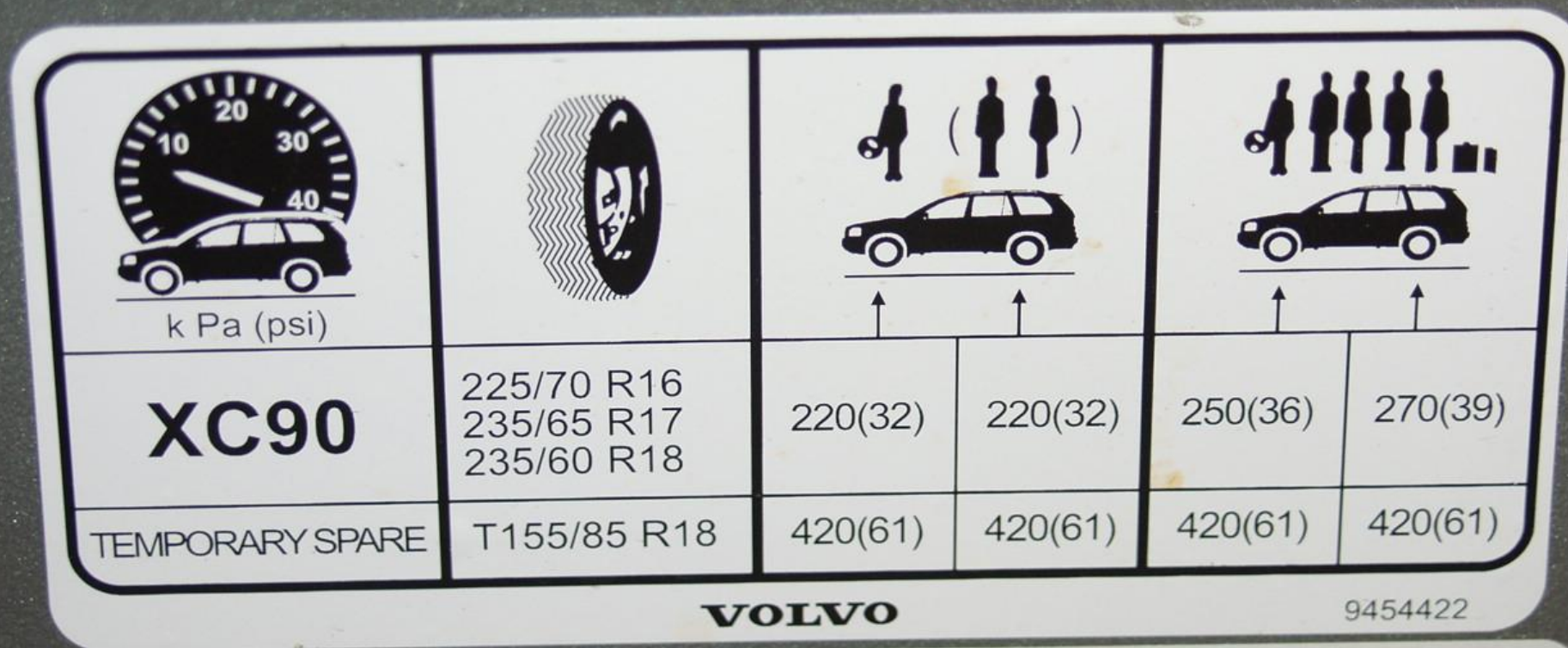


Figure A-41 CLOSE-UP VIEW OF VEHICLE'S TIRE PLACARD LABEL



Figure A-42 IMPACT PHOTO



Figure A-43 ROLLOVER 90 DEGREES



Figure A-44 ROLLOVER 180 DEGREES



Figure A-45 ROLLOVER 270 DEGREES



Figure A-46 ROLLOVER 360 DEGREES

APPENDIX B

VEHICLE, MDB AND SID HYBRID III RESPONSE DATA

TABLE OF DATA PLOTS

DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS ACCELERATION, FORCE AND MOMENT DATA - FILTER CLASS 1000, LOWER SPINE - FILTER CLASS 180 INTEGRATION DATA - FILTER CLASS 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
1	DRIVER HEAD 9 ARRAY X ARM (Y) ACCELERATION VS TIME	B- 7
2	DRIVER HEAD 9 ARRAY X ARM (Y) VELOCITY VS TIME	B- 8
3	DRIVER HEAD 9 ARRAY X ARM (Z) ACCELERATION VS TIME	B- 9
4	DRIVER HEAD 9 ARRAY X ARM (Z) VELOCITY VS TIME	B- 10
5	DRIVER HEAD 9 ARRAY Y ARM (X) ACCELERATION VS TIME	B- 11
6	DRIVER HEAD 9 ARRAY Y ARM (X) VELOCITY VS TIME	B- 12
7	DRIVER HEAD 9 ARRAY Y ARM (Z) ACCELERATION VS TIME	B- 13
8	DRIVER HEAD 9 ARRAY Y ARM (Z) VELOCITY VS TIME	B- 14
9	DRIVER HEAD 9 ARRAY Z ARM (X) ACCELERATION VS TIME	B- 15
10	DRIVER HEAD 9 ARRAY Z ARM (X) VELOCITY VS TIME	B- 16
11	DRIVER HEAD 9 ARRAY Z ARM (Y) ACCELERATION VS TIME	B- 17
12	DRIVER HEAD 9 ARRAY Z ARM (Y) VELOCITY VS TIME	B- 18
13	DRIVER HEAD (X) ACCELERATION VS TIME	B- 19
14	DRIVER HEAD (X) VELOCITY VS TIME	B- 20
15	DRIVER HEAD (Y) ACCELERATION VS TIME	B- 21
16	DRIVER HEAD (Y) VELOCITY VS TIME	B- 22
17	DRIVER HEAD (Z) ACCELERATION VS TIME	B- 23
18	DRIVER HEAD (Z) VELOCITY VS TIME	B- 24
19	DRIVER HEAD RESULTANT ACCELERATION VS TIME	B- 25
20	DRIVER UPPER NECK (X) FORCE VS TIME	B- 26
21	DRIVER UPPER NECK (Y) FORCE VS TIME	B- 27
22	DRIVER UPPER NECK (Z) FORCE VS TIME	B- 28
23	DRIVER UPPER NECK RESULTANT FORCE VS TIME	B- 29
24	DRIVER UPPER NECK (X) MOMENT VS TIME	B- 30
25	DRIVER UPPER NECK (Y) MOMENT VS TIME	B- 31
26	DRIVER UPPER NECK (Z) MOMENT VS TIME	B- 32
27	DRIVER UPPER NECK RESULTANT MOMENT VS TIME	B- 33
28	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 34
29	DRIVER UPPER RIB (Y) VELOCITY VS TIME	B- 35
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31	DRIVER LOWER RIB (Y) VELOCITY VS TIME	B- 37
32	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 38
33	DRIVER LOWER SPINE (Y) VELOCITY VS TIME	B- 39
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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS
ACCELERATION, FORCE AND MOMENT DATA - FILTER CLASS 1000, LOWER SPINE - FILTER CLASS 180
INTEGRATION DATA - FILTER CLASS 180

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37	PASSENGER HEAD 9 ARRAY X ARM (Y) VELOCITY VS TIME	B- 43
38	PASSENGER HEAD 9 ARRAY X ARM (Z) ACCELERATION VS TIME	B- 44
39	PASSENGER HEAD 9 ARRAY X ARM (Z) VELOCITY VS TIME	B- 45
40	PASSENGER HEAD 9 ARRAY Y ARM (X) ACCELERATION VS TIME	B- 46
41	PASSENGER HEAD 9 ARRAY Y ARM (X) VELOCITY VS TIME	B- 47
42	PASSENGER HEAD 9 ARRAY Y ARM (Z) ACCELERATION VS TIME	B- 48
43	PASSENGER HEAD 9 ARRAY Y ARM (Z) VELOCITY VS TIME	B- 49
44	PASSENGER HEAD 9 ARRAY Z ARM (X) ACCELERATION VS TIME	B- 50
45	PASSENGER HEAD 9 ARRAY Z ARM (X) VELOCITY VS TIME	B- 51
46	PASSENGER HEAD 9 ARRAY Z ARM (Y) ACCELERATION VS TIME	B- 52
47	PASSENGER HEAD 9 ARRAY Z ARM (Y) VELOCITY VS TIME	B- 53
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53	PASSENGER HEAD (Z) VELOCITY VS TIME	B- 59
54	PASSENGER HEAD RESULTANT ACCELERATION VS TIME	B- 60
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57	DRIVER UPPER NECK (Z) FORCE VS TIME	B- 63
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59	DRIVER UPPER NECK (X) MOMENT VS TIME	B- 65
60	DRIVER UPPER NECK (Y) MOMENT VS TIME	B- 66
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62	DRIVER UPPER NECK RESULTANT MOMENT VS TIME	B- 68
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66	PASSENGER LOWER RIB (Y) VELOCITY VS TIME	B- 72
67	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 73
68	PASSENGER LOWER SPINE (Y) VELOCITY VS TIME	B- 74
69	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 75
70	PASSENGER PELVIC (Y) VELOCITY VS TIME	B- 76

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS
ACCELERATION DATA - FIR FILTERED

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
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72	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 78
73	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 79
74	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 80
75	PASSENGER UPPER RIB (Y) ACCELERATION VS TIME	B- 81
76	PASSENGER LOWER RIB (Y) ACCELERATION VS TIME	B- 82
77	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 83
78	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 84

TEST VEHICLE INSTRUMENTATION PLOTS
ACCELERATION DATA - FILTER CLASS 60
INTEGRATION DATA - FILTER CLASS 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
79	RIGHT SIDE SILL AT FRONT SEAT (X) ACCELERATION VS TIME	B- 85
80	RIGHT SIDE SILL AT FRONT SEAT (X) VELOCITY VS TIME	B- 86
81	RIGHT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME	B- 87
82	RIGHT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME	B- 88
83	RIGHT SIDE SILL AT FRONT SEAT (Z) ACCELERATION VS TIME	B- 89
84	RIGHT SIDE SILL AT FRONT SEAT (Z) VELOCITY VS TIME	B- 90
85	RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION VS TIME	B- 91
86	RIGHT SIDE SILL AT REAR SEAT (X) ACCELERATION VS TIME	B- 92
87	RIGHT SIDE SILL AT REAR SEAT (X) VELOCITY VS TIME	B- 93
88	RIGHT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME	B- 94
89	RIGHT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME	B- 95
90	RIGHT SIDE SILL AT REAR SEAT (Z) ACCELERATION VS TIME	B- 96
91	RIGHT SIDE SILL AT REAR SEAT (Z) VELOCITY VS TIME	B- 97
92	RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION VS TIME	B- 98
93	REAR FLOORPAN ABOVE AXLE (X) ACCELERATION VS TIME	B- 99
94	REAR FLOORPAN ABOVE AXLE (X) VELOCITY VS TIME	B- 100
95	REAR FLOORPAN ABOVE AXLE (Y) ACCELERATION VS TIME	B- 101
96	REAR FLOORPAN ABOVE AXLE (Y) VELOCITY VS TIME	B- 102
97	REAR FLOORPAN ABOVE AXLE (Z) ACCELERATION VS TIME	B- 103
98	REAR FLOORPAN ABOVE AXLE (Z) VELOCITY VS TIME	B- 104
99	REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION VS TIME	B- 105
100	LEFT SIDE SILL AT REAR SEAT (Y) ACCELERATION VS TIME	B- 106
101	LEFT SIDE SILL AT REAR SEAT (Y) VELOCITY VS TIME	B- 107
102	LEFT SIDE SILL AT FRONT SEAT (Y) ACCELERATION VS TIME	B- 108
103	LEFT SIDE SILL AT FRONT SEAT (Y) VELOCITY VS TIME	B- 109
104	RIGHT REAR OCCUPANT COMPARTMENT (Y) ACCELERATION VS TIME	B- 110
105	RIGHT REAR OCCUPANT COMPARTMENT (Y) VELOCITY VS TIME	B- 111
106	LOWER B-POST (Y) ACCELERATION VS TIME	B- 112
107	LOWER B-POST (Y) VELOCITY VS TIME	B- 113
108	UPPER B-POST (Y) ACCELERATION VS TIME	B- 114
109	UPPER B-POST (Y) VELOCITY VS TIME	B- 115
110	LOWER A-POST (Y) ACCELERATION VS TIME	B- 116
111	LOWER A-POST (Y) VELOCITY VS TIME	B- 117
112	UPPER A-POST (Y) ACCELERATION VS TIME	B- 118
113	UPPER A-POST (Y) VELOCITY VS TIME	B- 119
114	FRONT SEAT TRACK (Y) ACCELERATION VS TIME	B- 120
115	FRONT SEAT TRACK (Y) VELOCITY VS TIME	B- 121
116	REAR SEAT TRACK (Y) ACCELERATION VS TIME	B- 122
117	REAR SEAT TRACK (Y) VELOCITY VS TIME	B- 123

TEST VEHICLE INSTRUMENTATION PLOTS
ACCELERATION DATA - FILTER CLASS 60
INTEGRATION DATA - FILTER CLASS 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
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119	VEHICLE CENTER OF GRAVITY (X) VELOCITY VS TIME	B- 125
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121	VEHICLE CENTER OF GRAVITY (Y) VELOCITY ACCELERATION VS TIME	B- 127
122	VEHICLE CENTER OF GRAVITY (Z) ACCELERATION VS TIME	B- 128
123	VEHICLE CENTER OF GRAVITY (Z) VELOCITY VS TIME	B- 129
124	VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME	B- 130

MDB INSTRUMENTATION PLOTS
ACCELERATION DATA - FILTER CLASS 60
INTEGRATION DATA - FILTER CLASS 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
125	MDB CENTER OF GRAVITY (X) ACCELERATION VS TIME	B- 131
126	MDB CENTER OF GRAVITY (X) VELOCITY VS TIME	B- 132
127	MDB CENTER OF GRAVITY (Y) ACCELERATION VS TIME	B- 133
128	MDB CENTER OF GRAVITY (Y) VELOCITY VS TIME	B- 134
129	MDB CENTER OF GRAVITY (Z) ACCELERATION VS TIME	B- 135
130	MDB CENTER OF GRAVITY (Z) VELOCITY VS TIME	B- 136
131	MDB CENTER OF GRAVITY RESULTANT ACCELERATION VS TIME	B- 137
132	MDB REAR (X) ACCELERATION VS TIME	B- 138
133	MDB REAR (X) VELOCITY VS TIME	B- 139
134	MDB REAR (Y) ACCELERATION VS TIME	B- 140
135	MDB REAR (Y) VELOCITY VS TIME	B- 141

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)
ACCELERATION DATA - FILTER CLASS 1000, LOWER SPINE - FILTER CLASS 180
INTEGRATION DATA - FILTER CLASS 180

<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
136	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 142
137	DRIVER UPPER RIB (Y) VELOCITY VS TIME	B- 143
138	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 144
139	DRIVER LOWER RIB (Y) VELOCITY VS TIME	B- 145
140	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 146
141	DRIVER LOWER SPINE (Y) VELOCITY VS TIME	B- 147
142	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 148
143	DRIVER PELVIC (Y) VELOCITY VS TIME	B- 149
144	PASSENGER UPPER RIB (Y) ACCELERATION VS TIME	B- 150
145	PASSENGER UPPER RIB (Y) VELOCITY VS TIME	B- 151
146	PASSENGER LOWER RIB (Y) ACCELERATION VS TIME	B- 152
147	PASSENGER LOWER RIB (Y) VELOCITY VS TIME	B- 153
148	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 154
149	PASSENGER LOWER SPINE (Y) VELOCITY VS TIME	B- 155
150	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 156
151	PASSENGER PELVIC (Y) VELOCITY VS TIME	B- 157

DRIVER & PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)
ACCELERATION DATA - FIR FILTERED

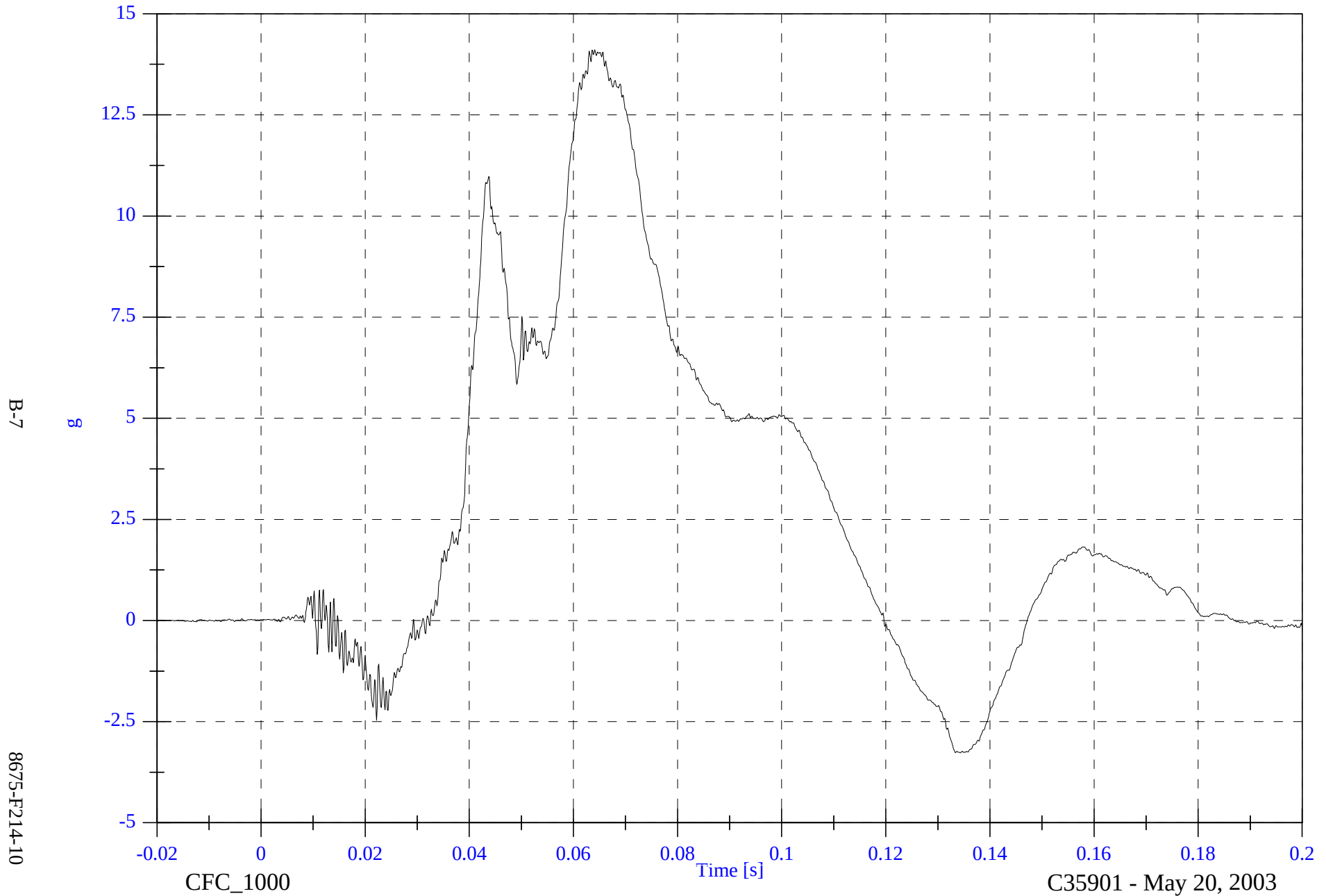
<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
152	DRIVER UPPER RIB (Y) ACCELERATION VS TIME	B- 158
153	DRIVER LOWER RIB (Y) ACCELERATION VS TIME	B- 159
154	DRIVER LOWER SPINE (Y) ACCELERATION VS TIME	B- 160
155	DRIVER PELVIC (Y) ACCELERATION VS TIME	B- 161
156	PASSENGER UPPER RIB (Y) ACCELERATION VS TIME	B- 162
157	PASSENGER LOWER RIB (Y) ACCELERATION VS TIME	B- 163
158	PASSENGER LOWER SPINE (Y) ACCELERATION VS TIME	B- 164
159	PASSENGER PELVIC (Y) ACCELERATION VS TIME	B- 165

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array X Arm Ay

Max: 14.1 [g] at 0.064 [s]

Min: -3.3 [g] at 0.134 [s]

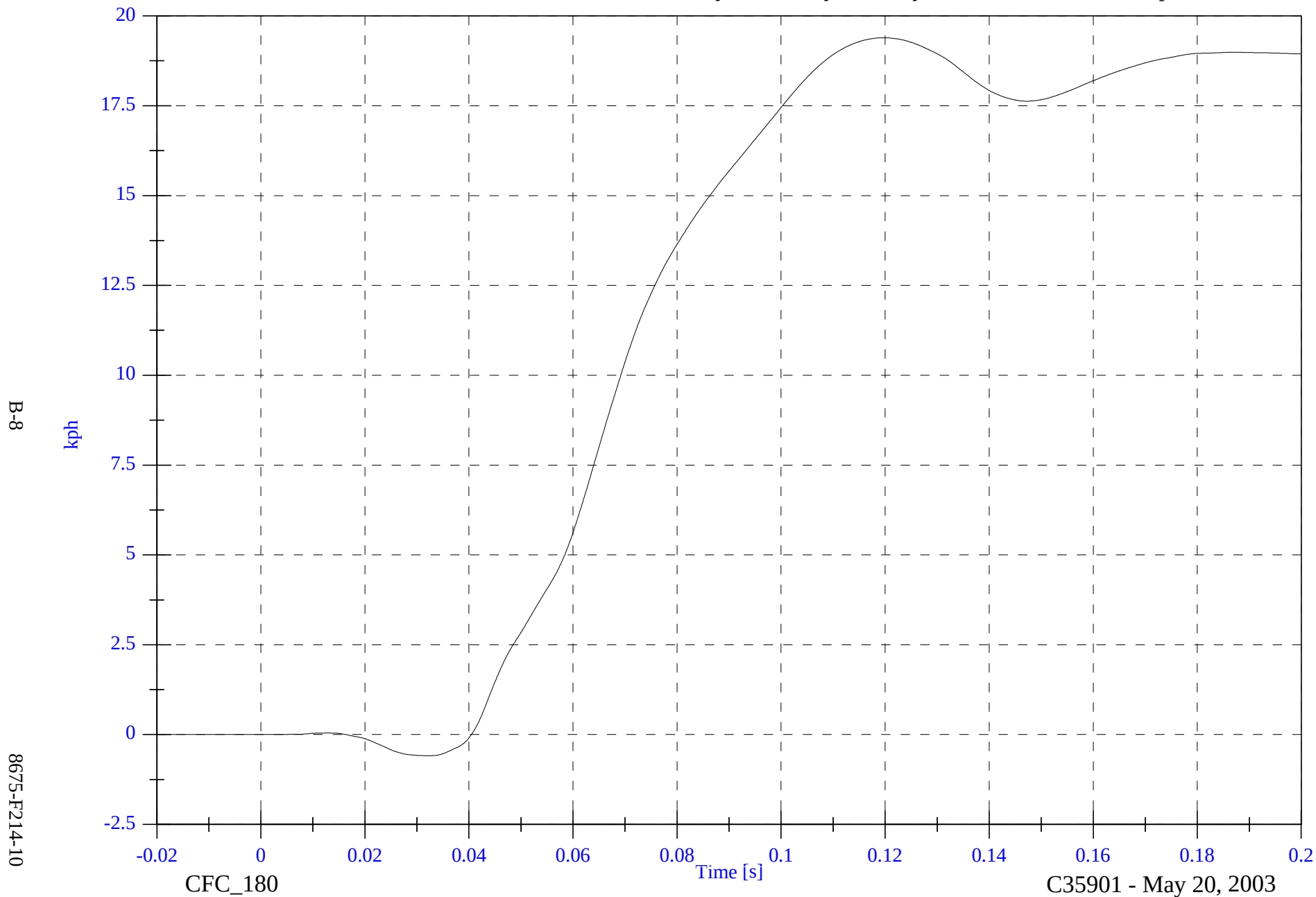


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array X Arm Ay Velocity

Max: 19.4 [kph] at 0.120 [s]

Min: -0.6 [kph] at 0.032 [s]

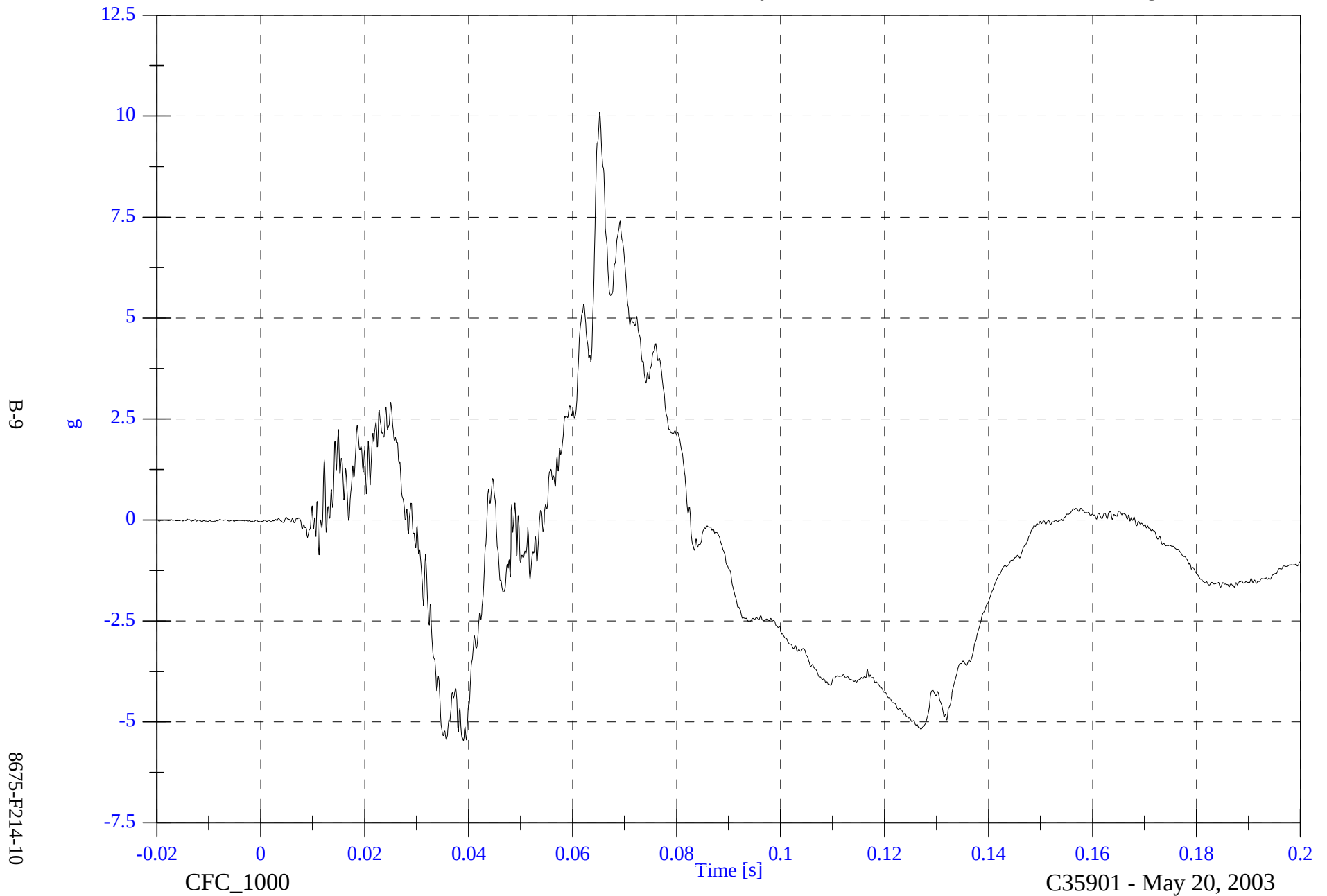


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array X Arm Az

Max: 10.1 [g] at 0.065 [s]

Min: -5.5 [g] at 0.039 [s]

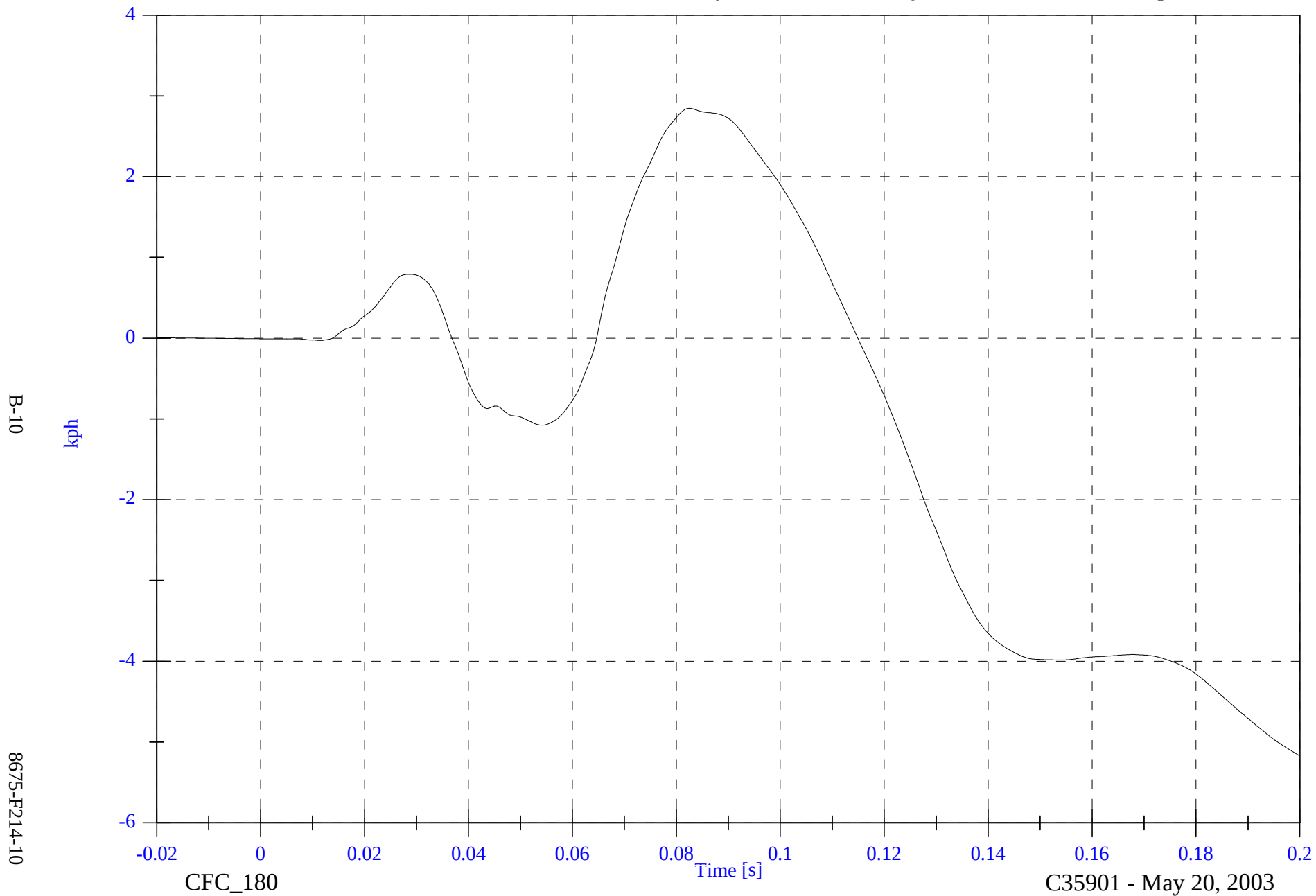


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array X Arm Az Velocity

Max: 2.8 [kph] at 0.082 [s]

Min: -5.2 [kph] at 0.200 [s]

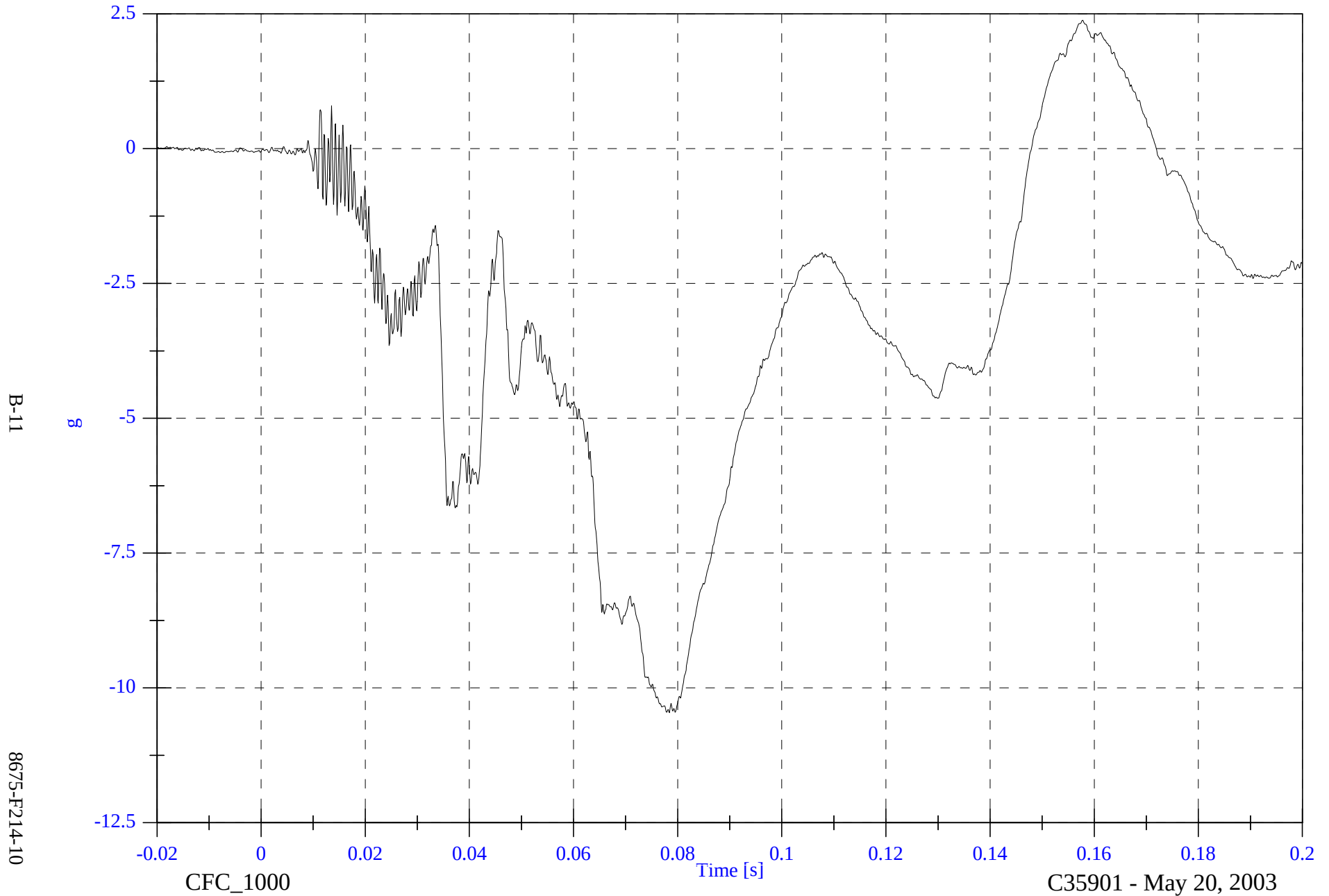


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array Y Arm Ax

Max: 2.4 [g] at 0.158 [s]

Min: -10.5 [g] at 0.078 [s]

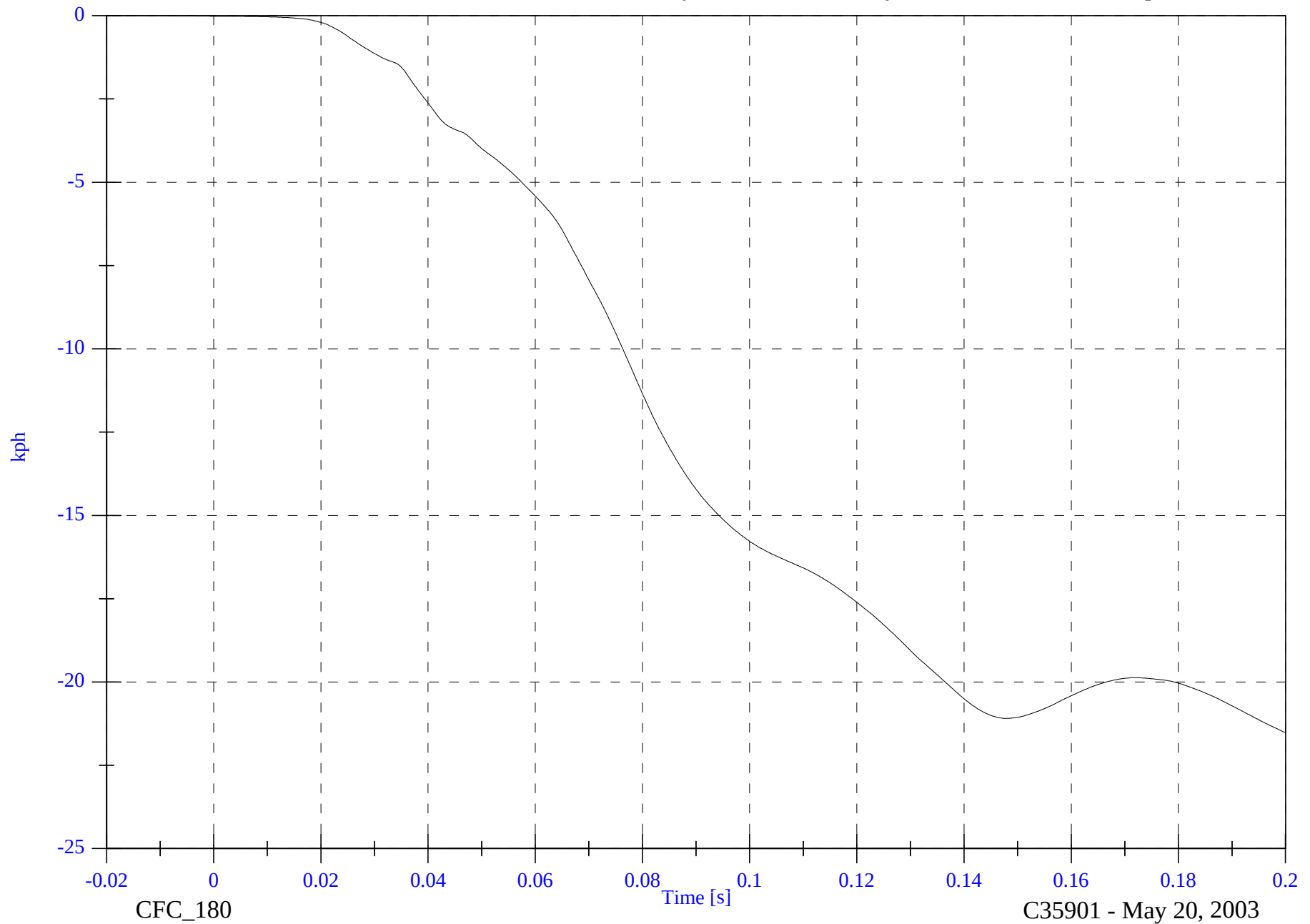


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array Y Arm Ax Velocity

Max: 0.0 [kph] at -0.016 [s]

Min: -21.5 [kph] at 0.200 [s]



B-12

8675-F214-10

CFC_180

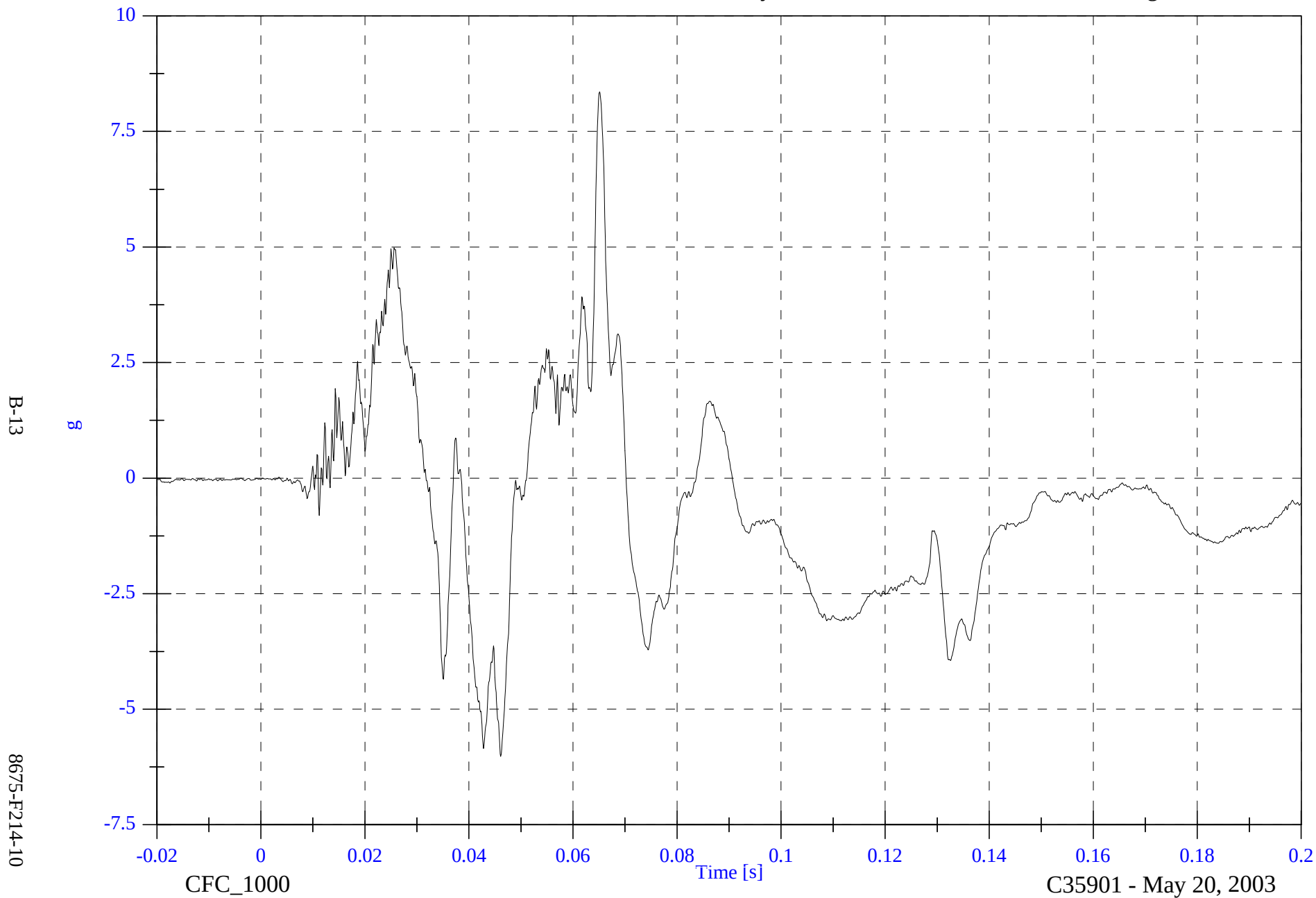
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array Y Arm Az

Max: 8.4 [g] at 0.065 [s]

Min: -6.0 [g] at 0.046 [s]

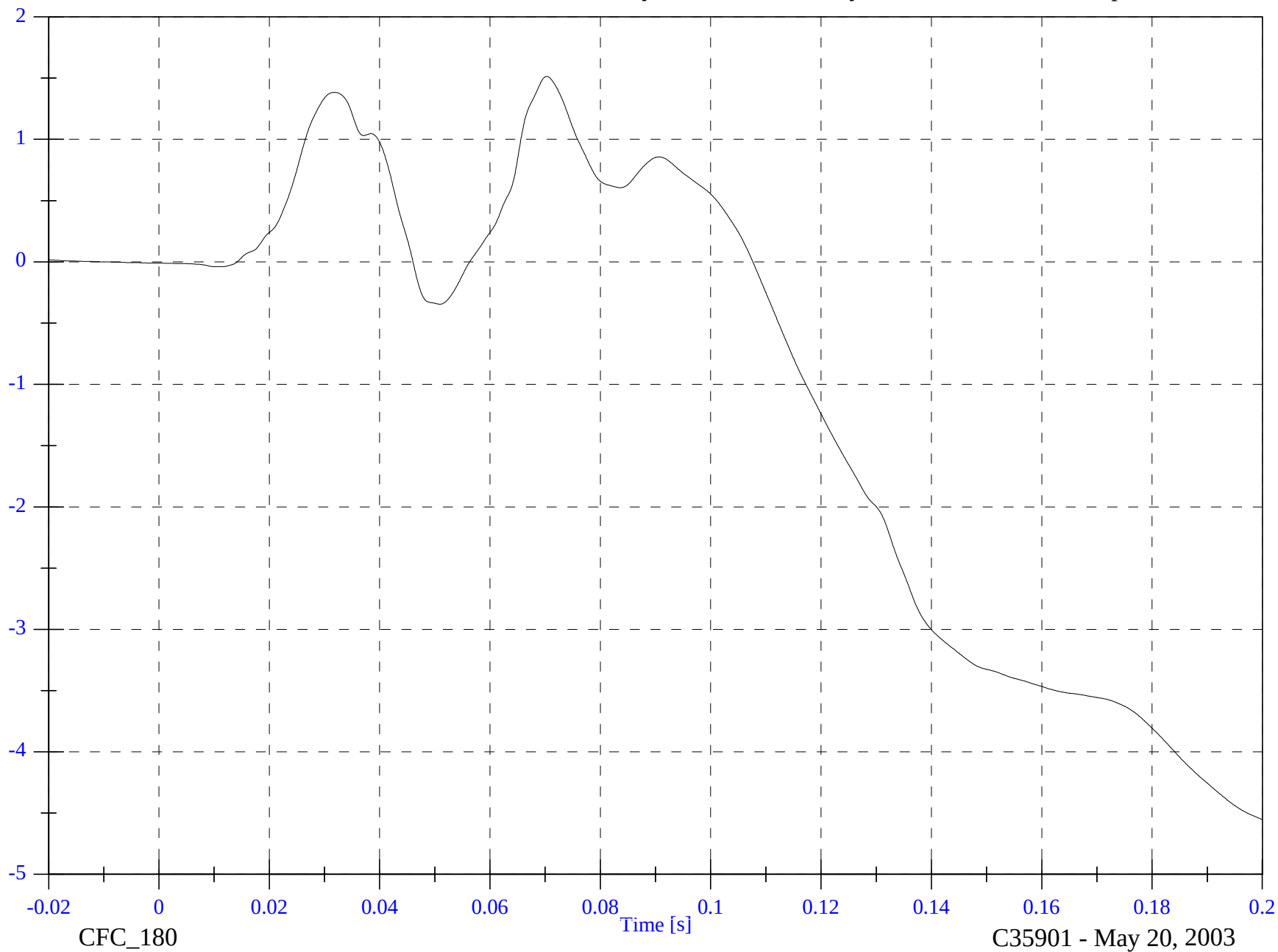


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array Y Arm Az Velocity

Max: 1.5 [kph] at 0.070 [s]

Min: -4.6 [kph] at 0.200 [s]



B-14

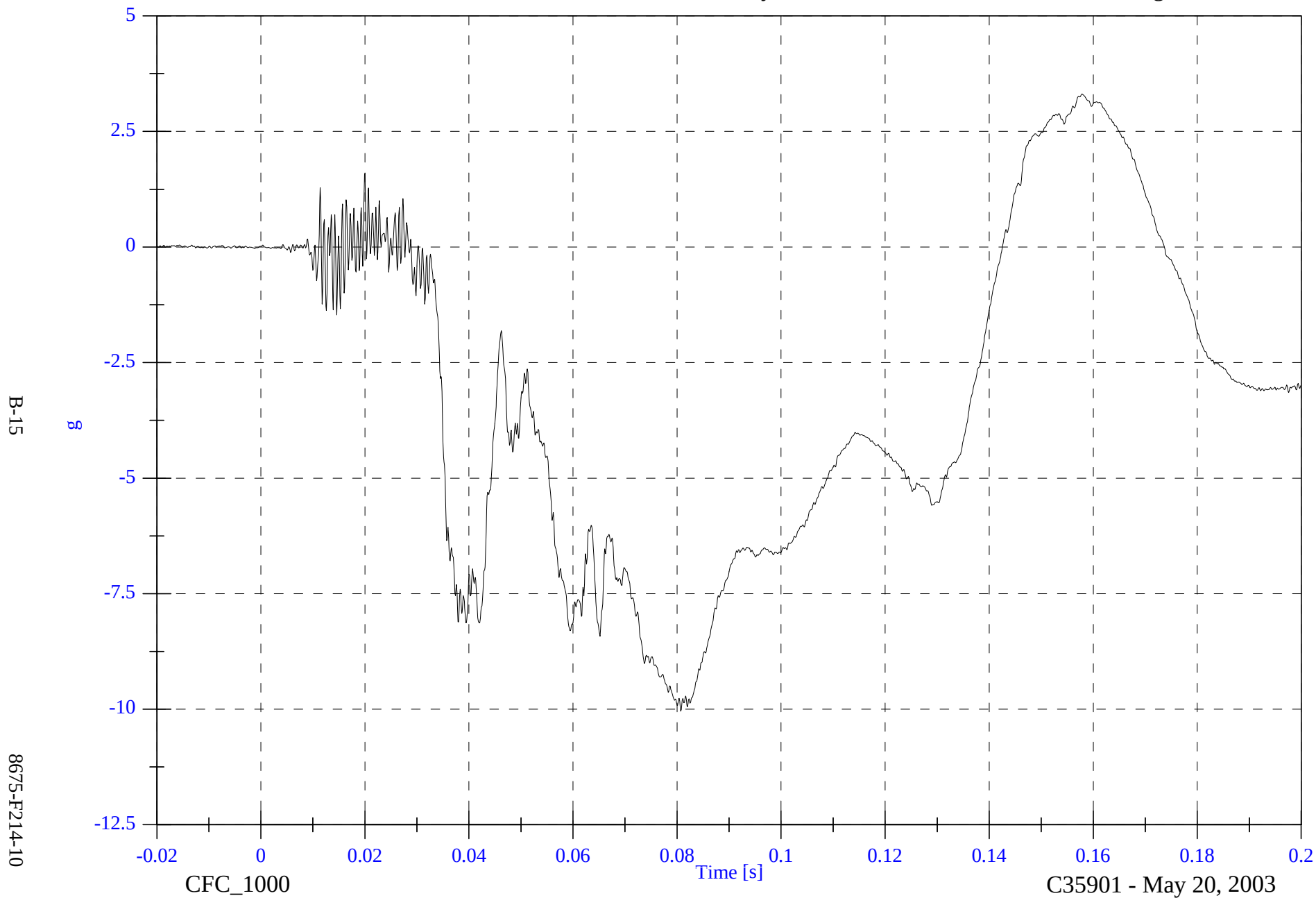
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array Z Arm Ax

Max: 3.3 [g] at 0.158 [s]

Min: -10.0 [g] at 0.081 [s]

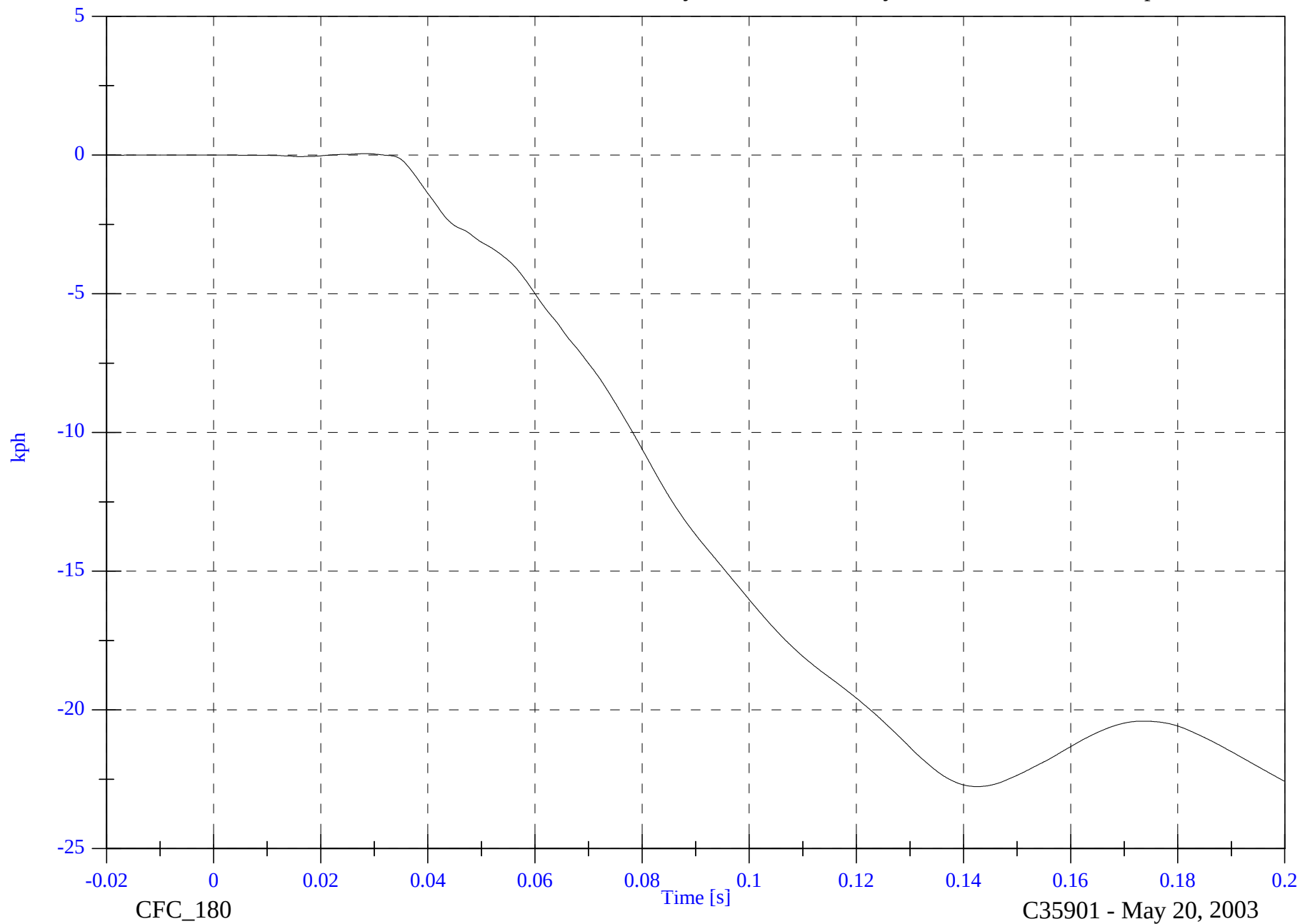


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array Z Arm Ax Velocity

Max: 0.1 [kph] at 0.029 [s]

Min: -22.8 [kph] at 0.143 [s]



B-16

8675-F214-10

CFC_180

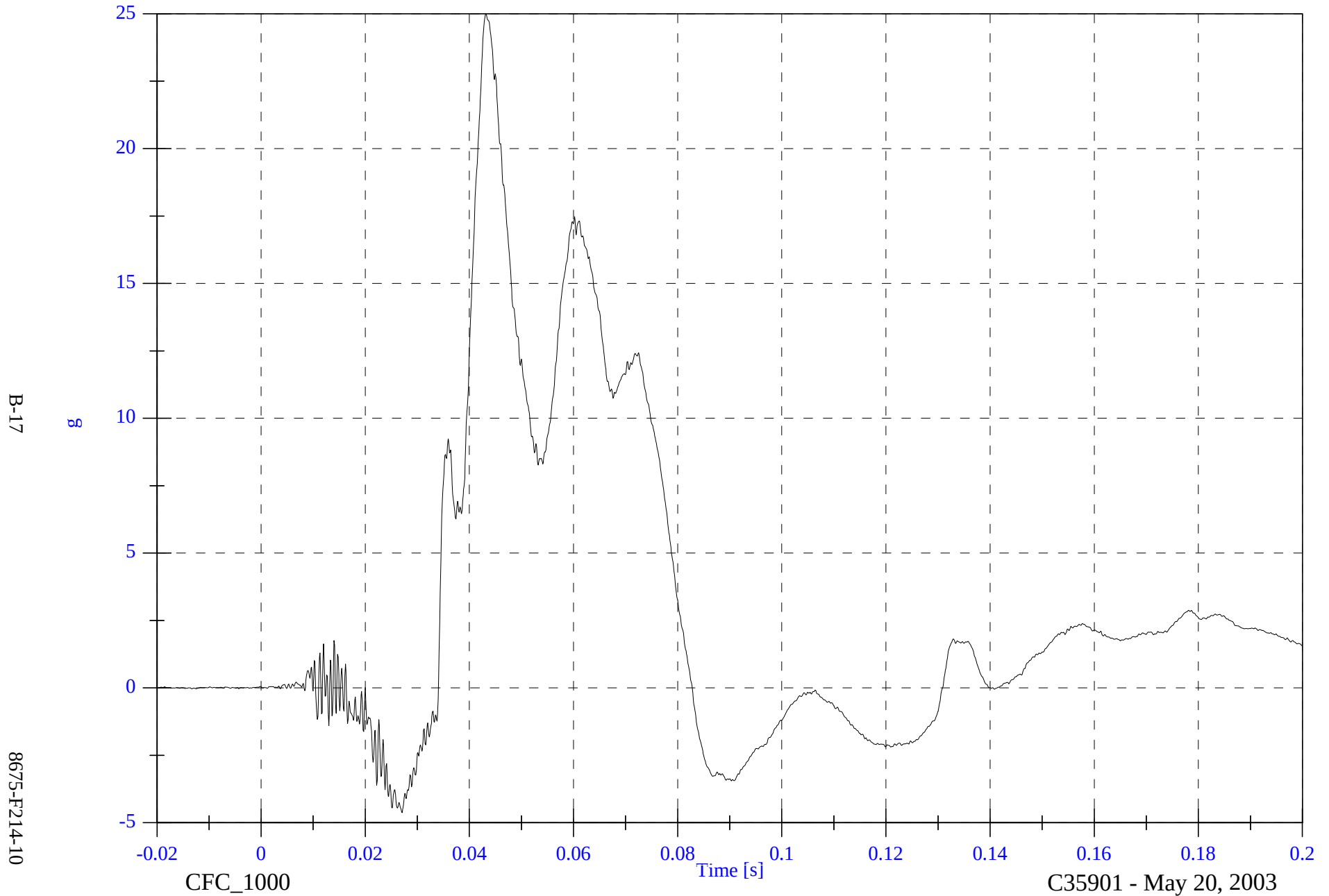
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head 9 Array Z Arm Ay

Max: 25.0 [g] at 0.043 [s]

Min: -4.6 [g] at 0.027 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

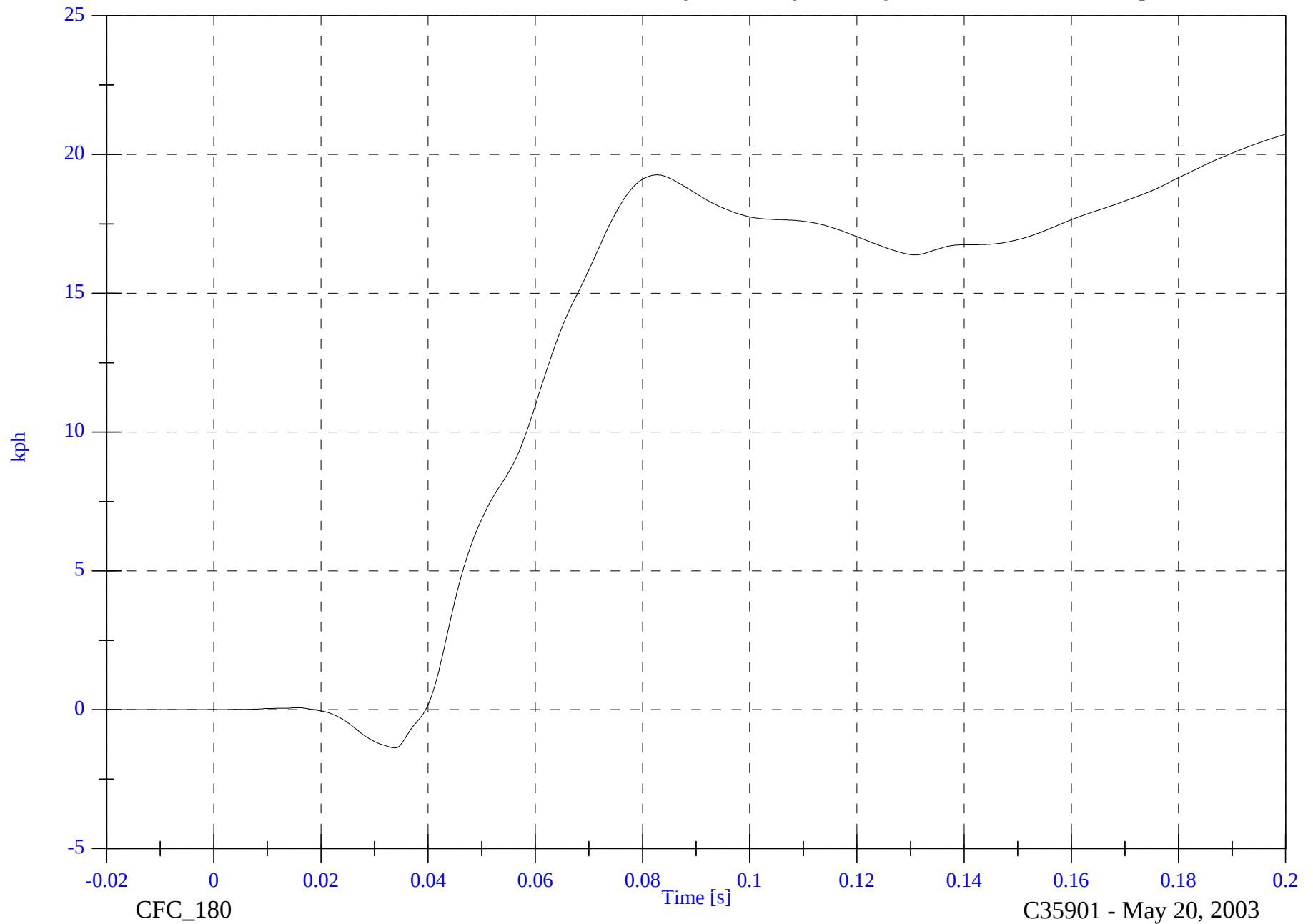
V2P1 Head 9 Array Z Arm Ay Velocity

Max: 20.7 [kph] at 0.200 [s]

Min: -1.4 [kph] at 0.034 [s]

B-18

8675-F214-10

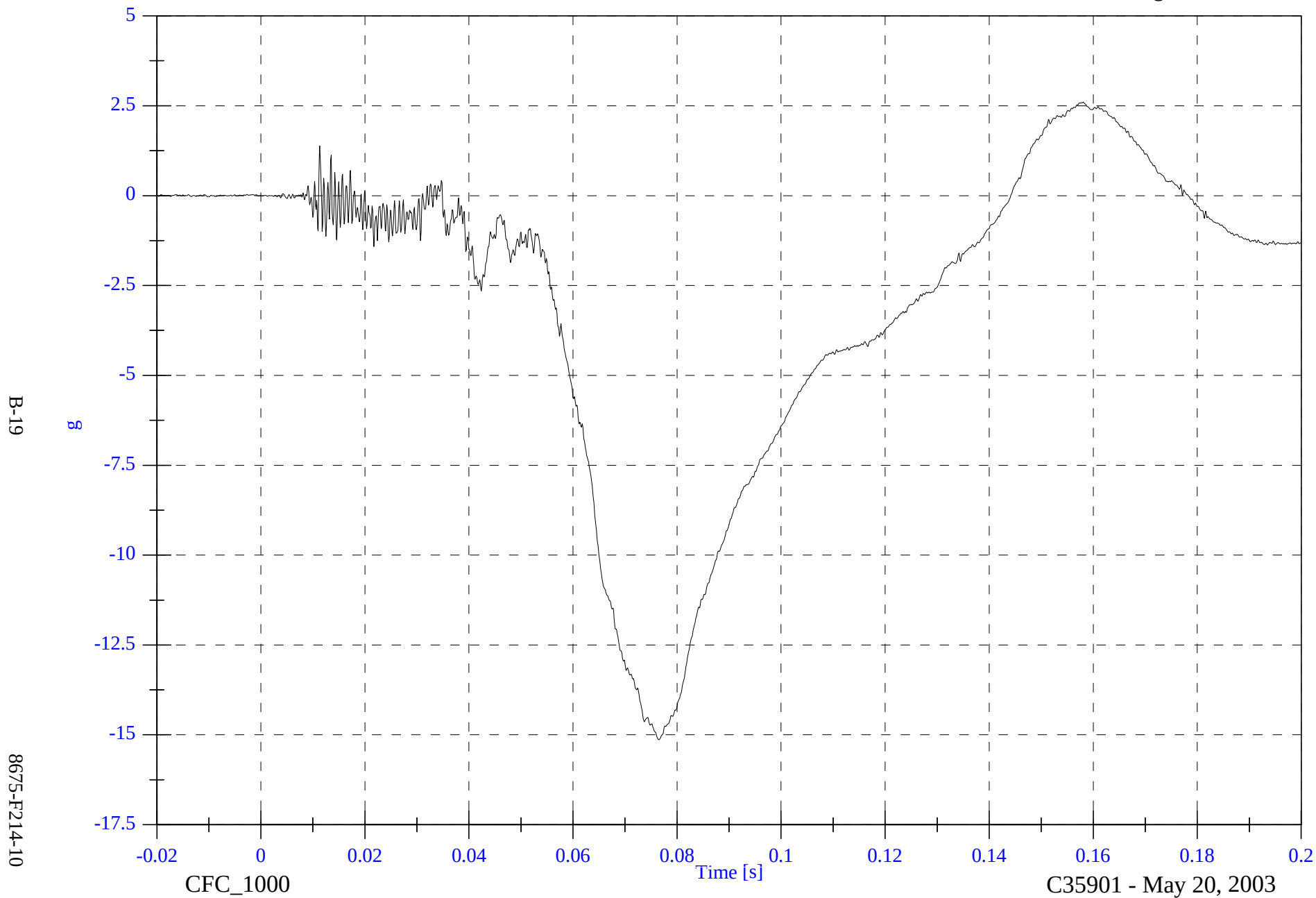


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head x

Max: 2.6 [g] at 0.158 [s]

Min: -15.1 [g] at 0.076 [s]

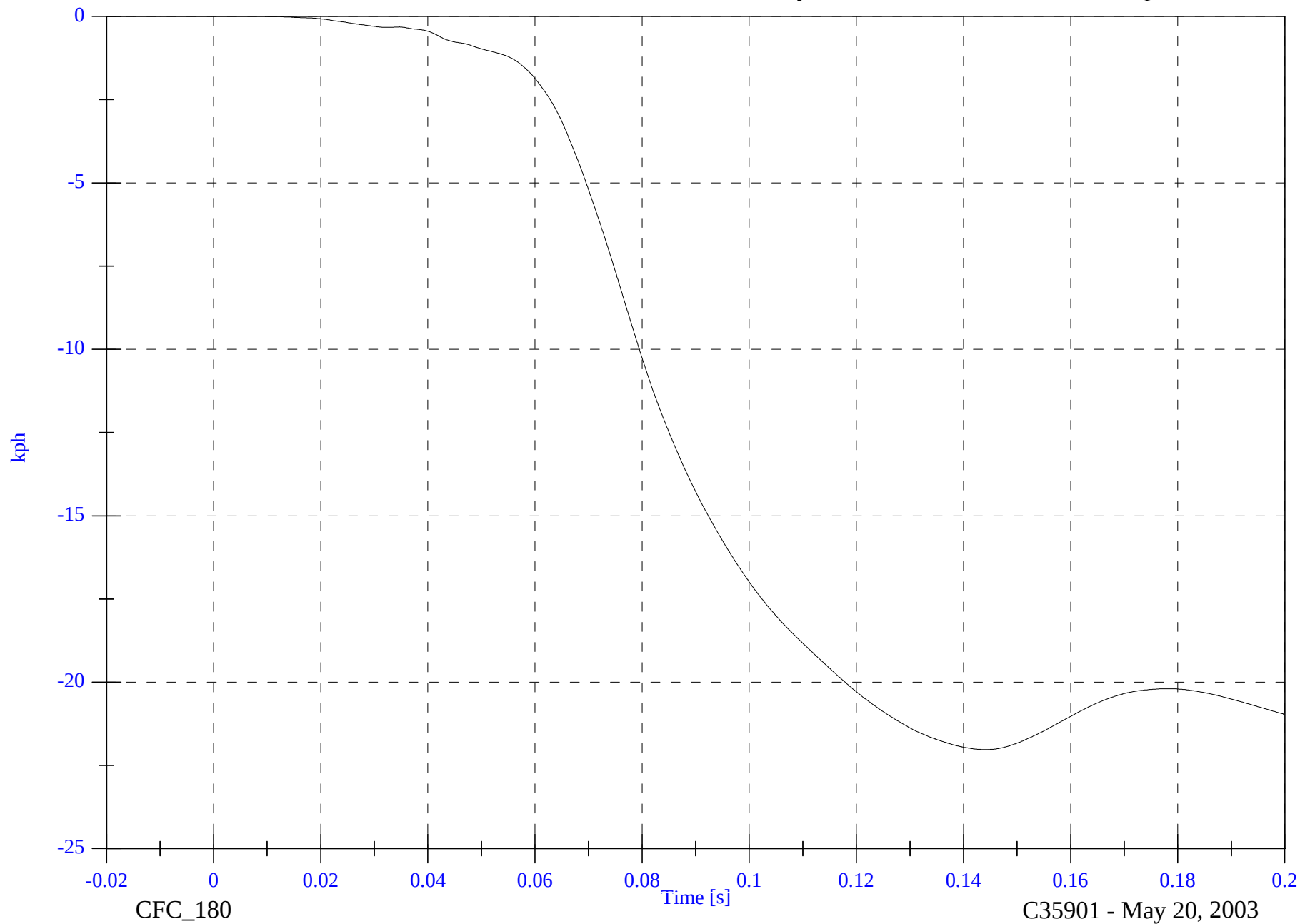


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head x Velocity

Max: 0.0 [kph] at -0.000 [s]

Min: -22.0 [kph] at 0.144 [s]



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8675-F214-10

CFC_180

C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

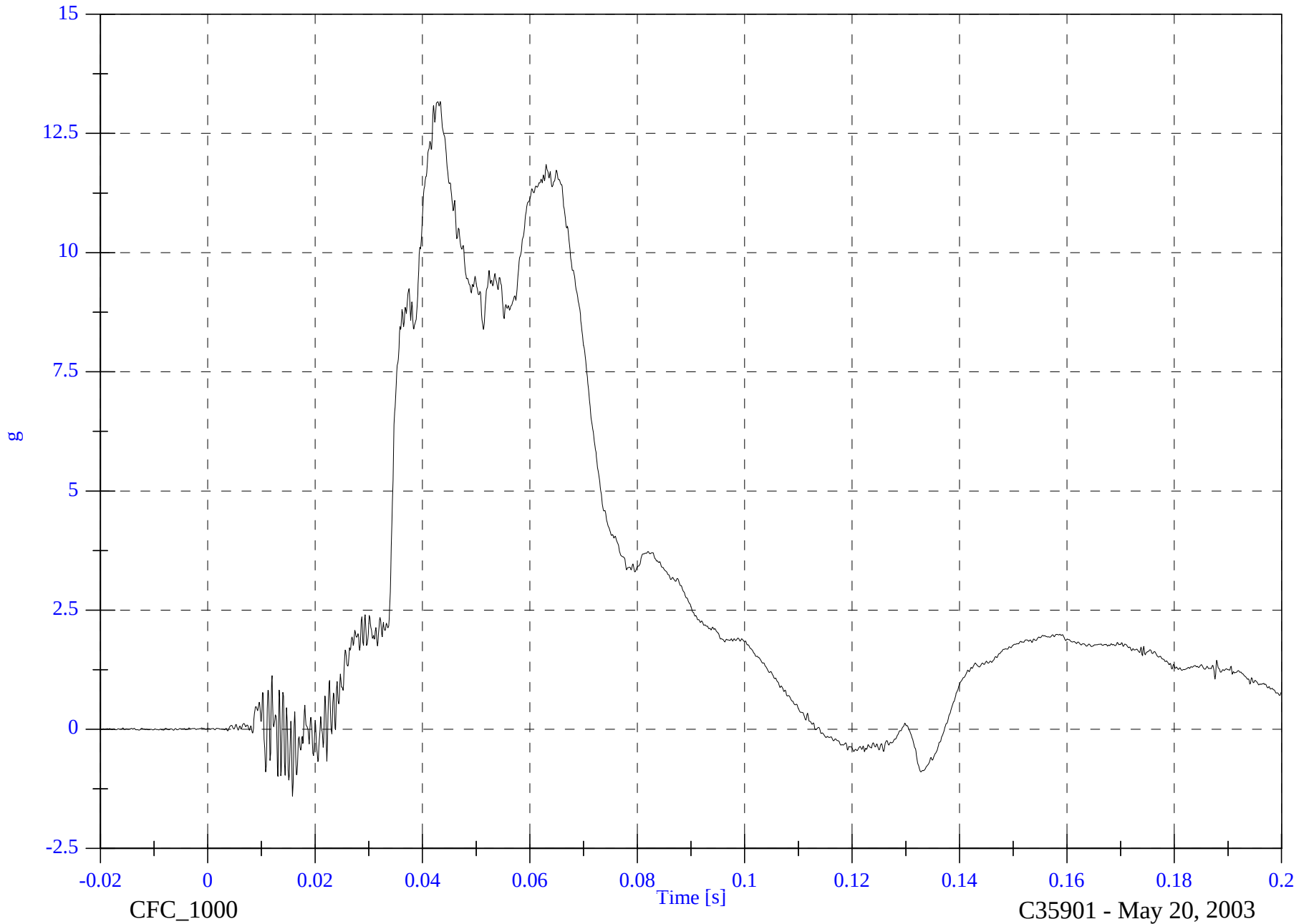
V2P1 Head y

Max: 13.2 [g] at 0.043 [s]

Min: -1.4 [g] at 0.016 [s]

B-21

8675-F214-10

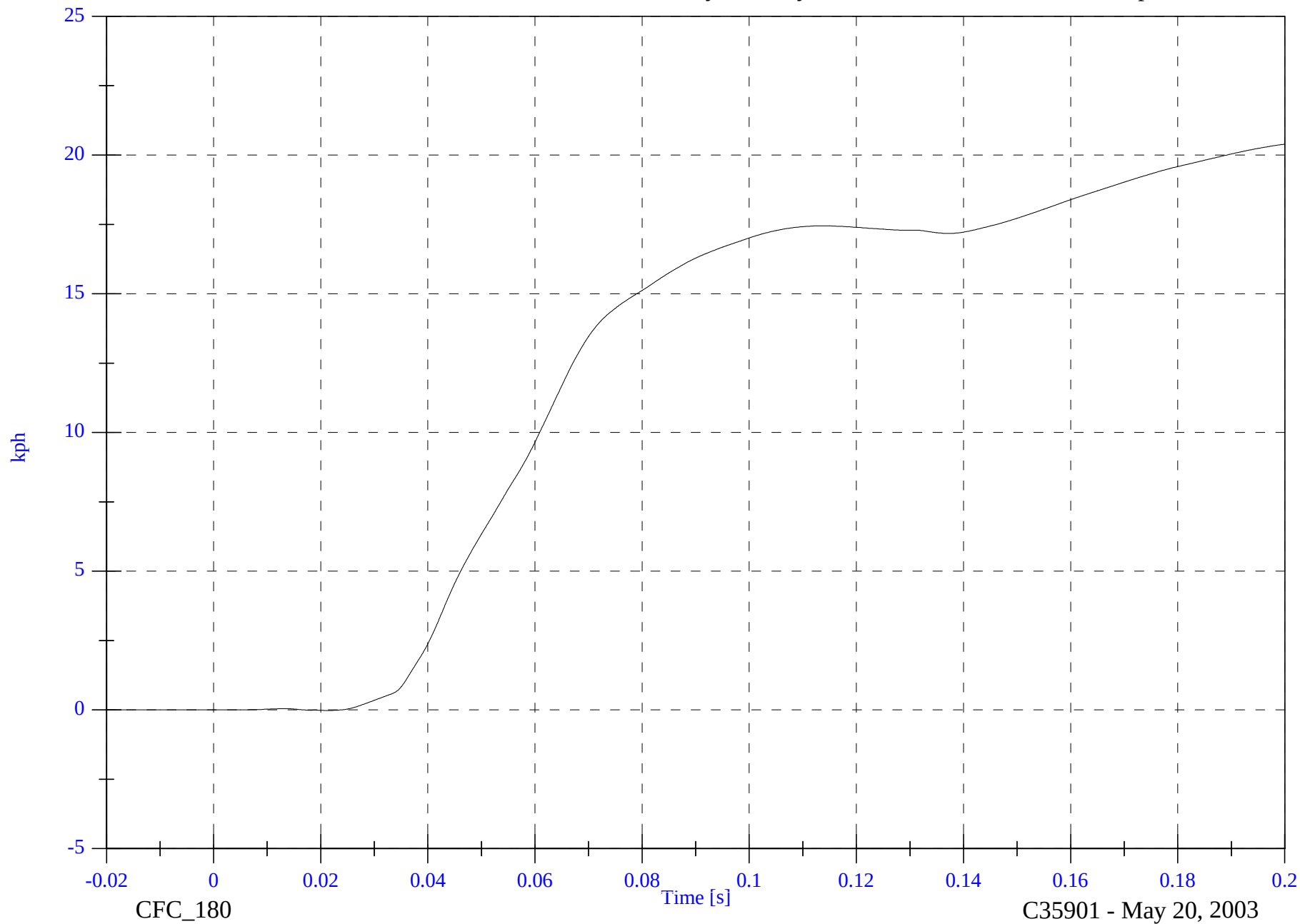


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head y Velocity

Max: 20.4 [kph] at 0.200 [s]

Min: -0.0 [kph] at 0.021 [s]



B-22

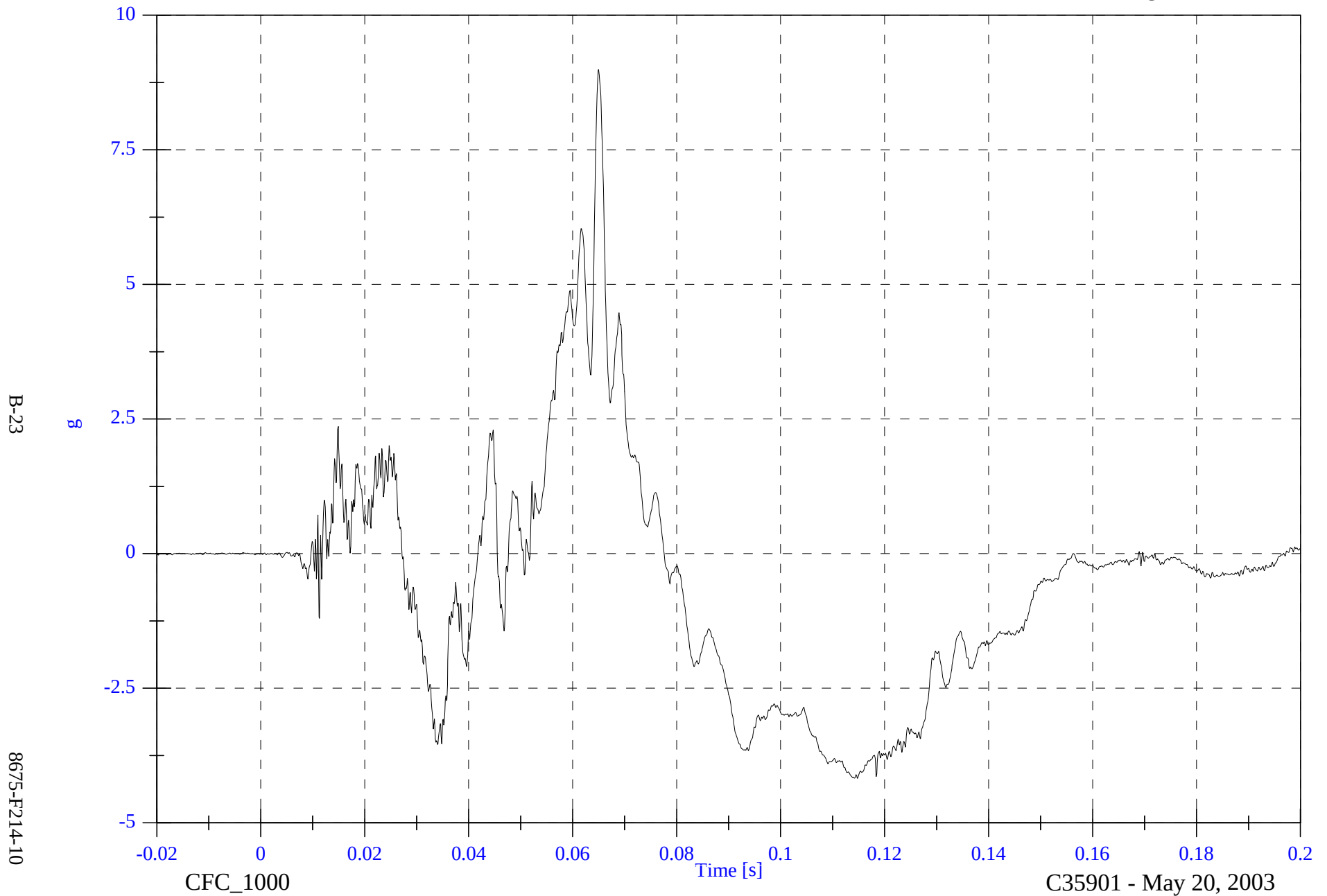
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head z

Max: 9.0 [g] at 0.065 [s]

Min: -4.2 [g] at 0.115 [s]

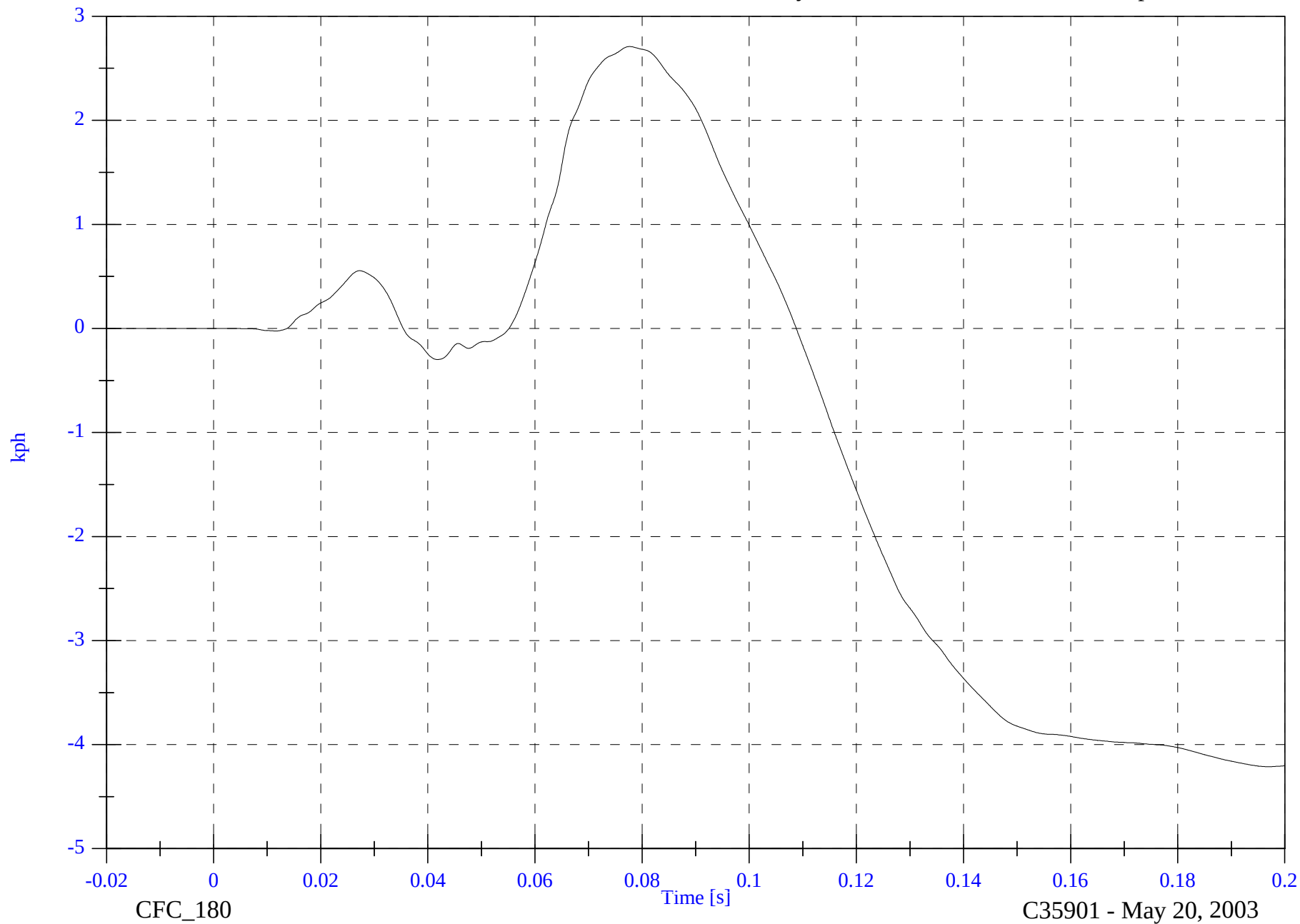


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head z Velocity

Max: 2.7 [kph] at 0.078 [s]

Min: -4.2 [kph] at 0.197 [s]



B-24

8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Head Resultant

Max: 17.8 [g] at 0.065 [s]

Min: 0.0 [g] at -0.015 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck Fx

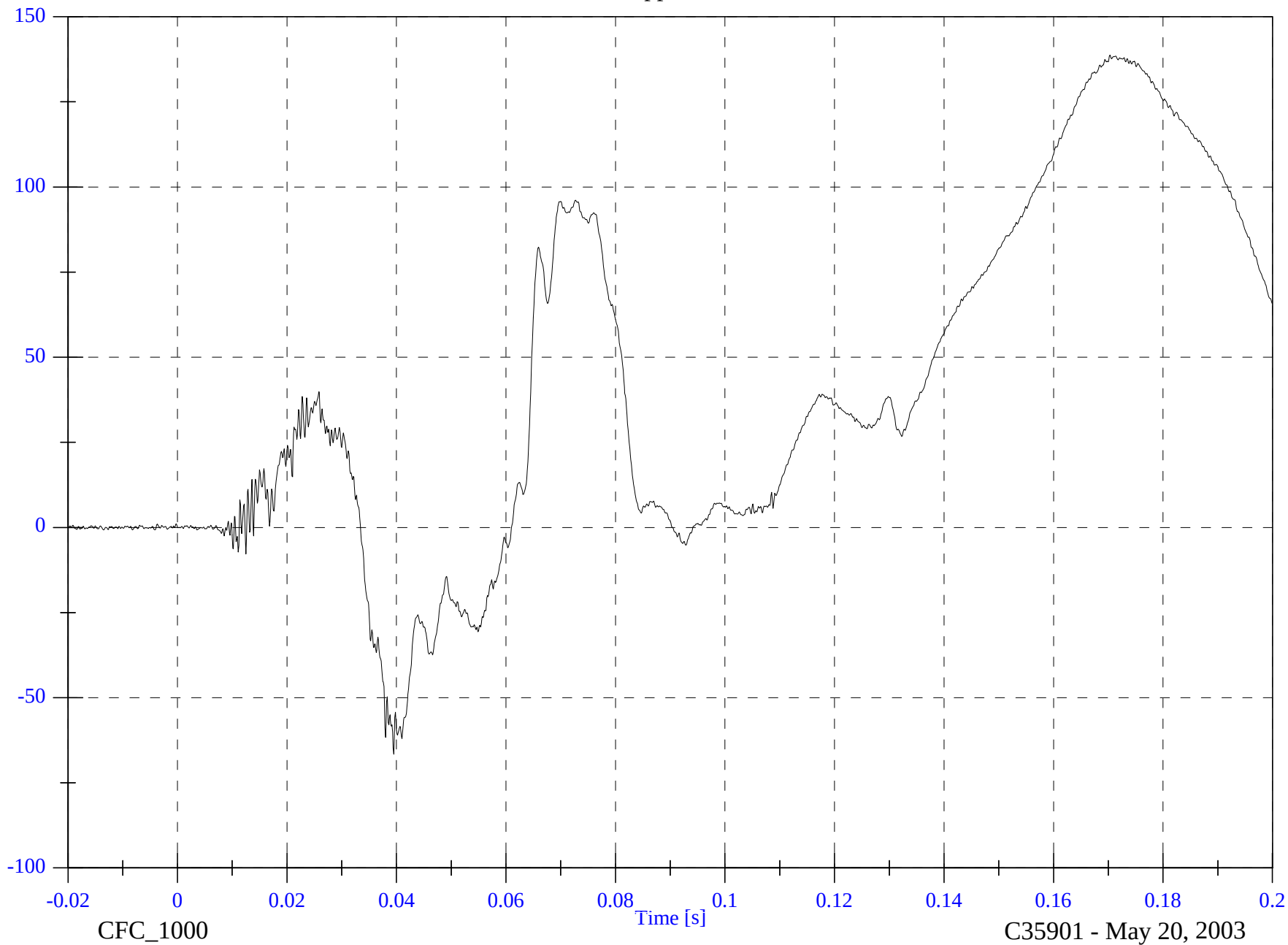
Max: 138.8 [N] at 0.170 [s]

Min: -66.6 [N] at 0.039 [s]

B-26

N

8675-F214-10

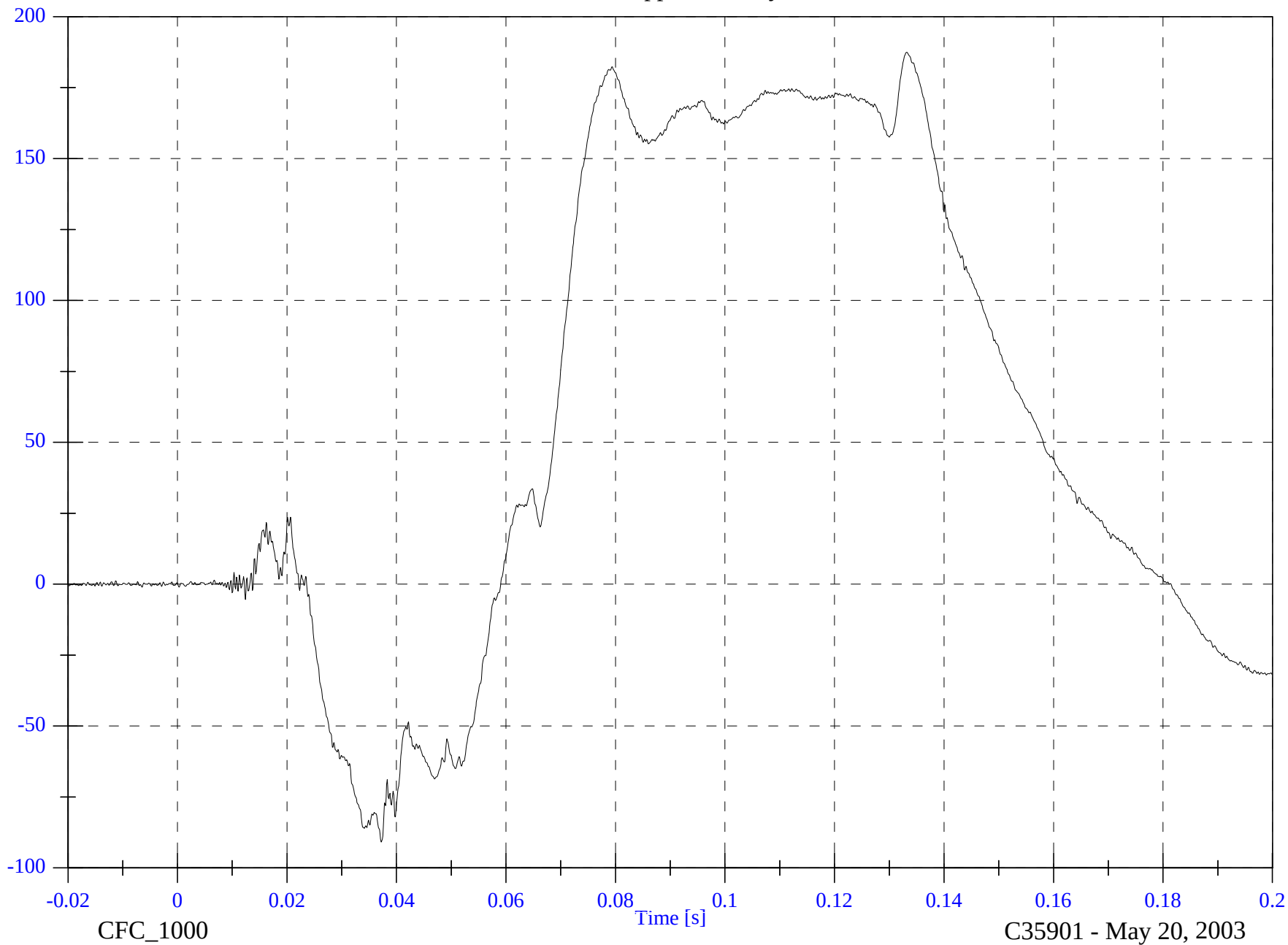


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck Fy

Max: 187.4 [N] at 0.133 [s]

Min: -90.9 [N] at 0.037 [s]



B-27

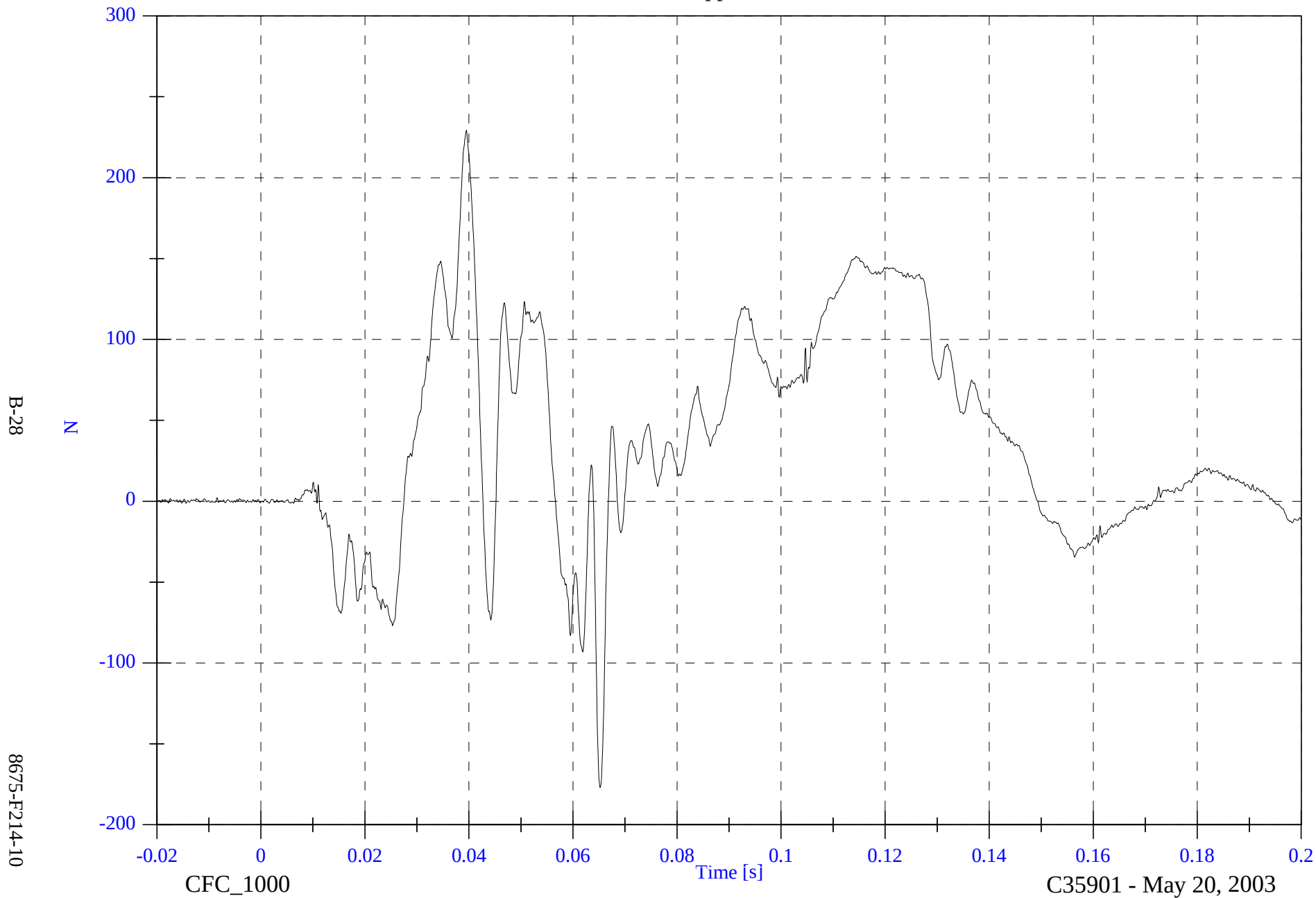
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck Fz

Max: 229.3 [N] at 0.039 [s]

Min: -177.0 [N] at 0.065 [s]

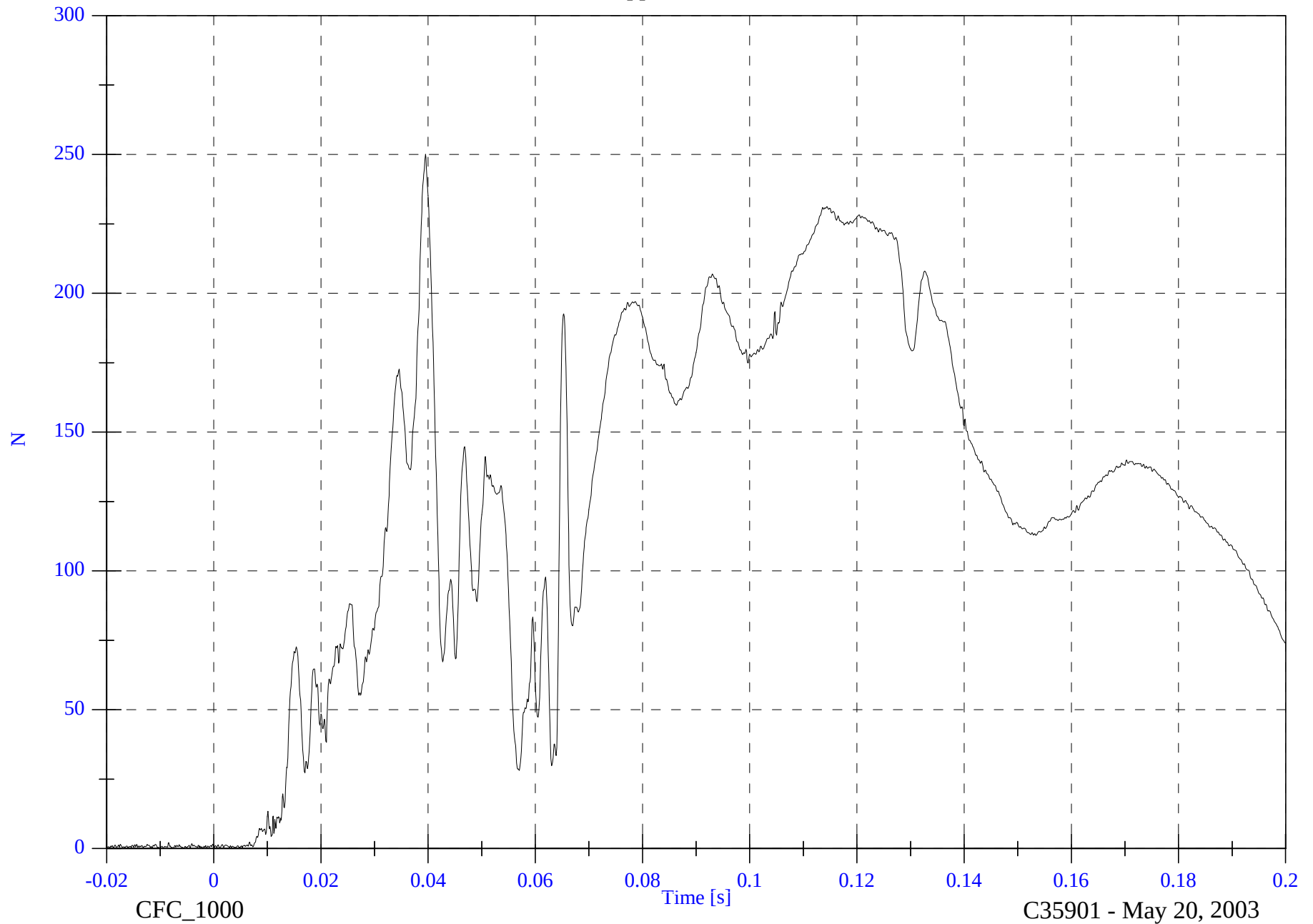


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck F Resultant

Max: 250.1 [N] at 0.039 [s]

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



B-29

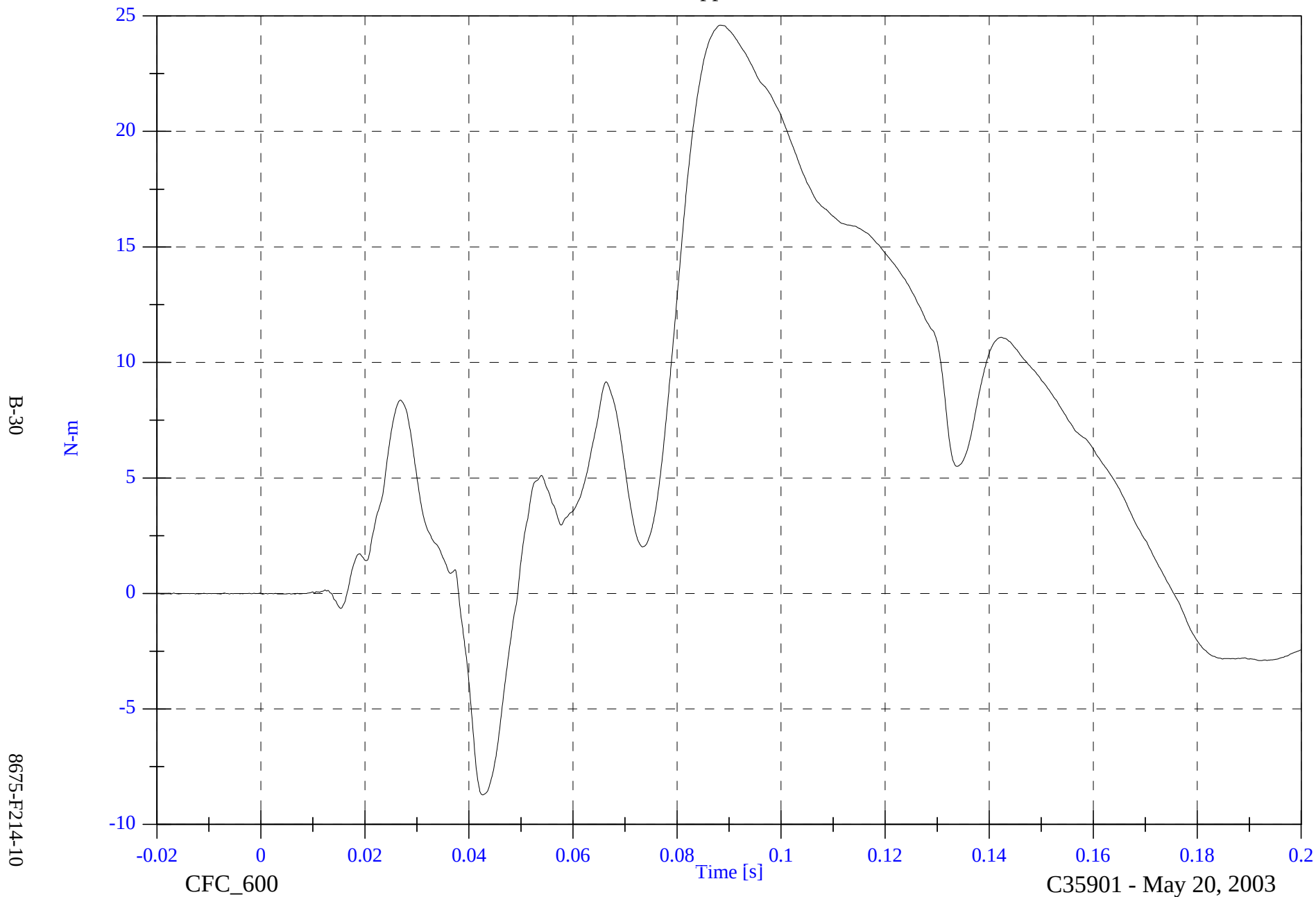
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck Mx

Max: 24.6 [N-m] at 0.088 [s]

Min: -8.7 [N-m] at 0.043 [s]

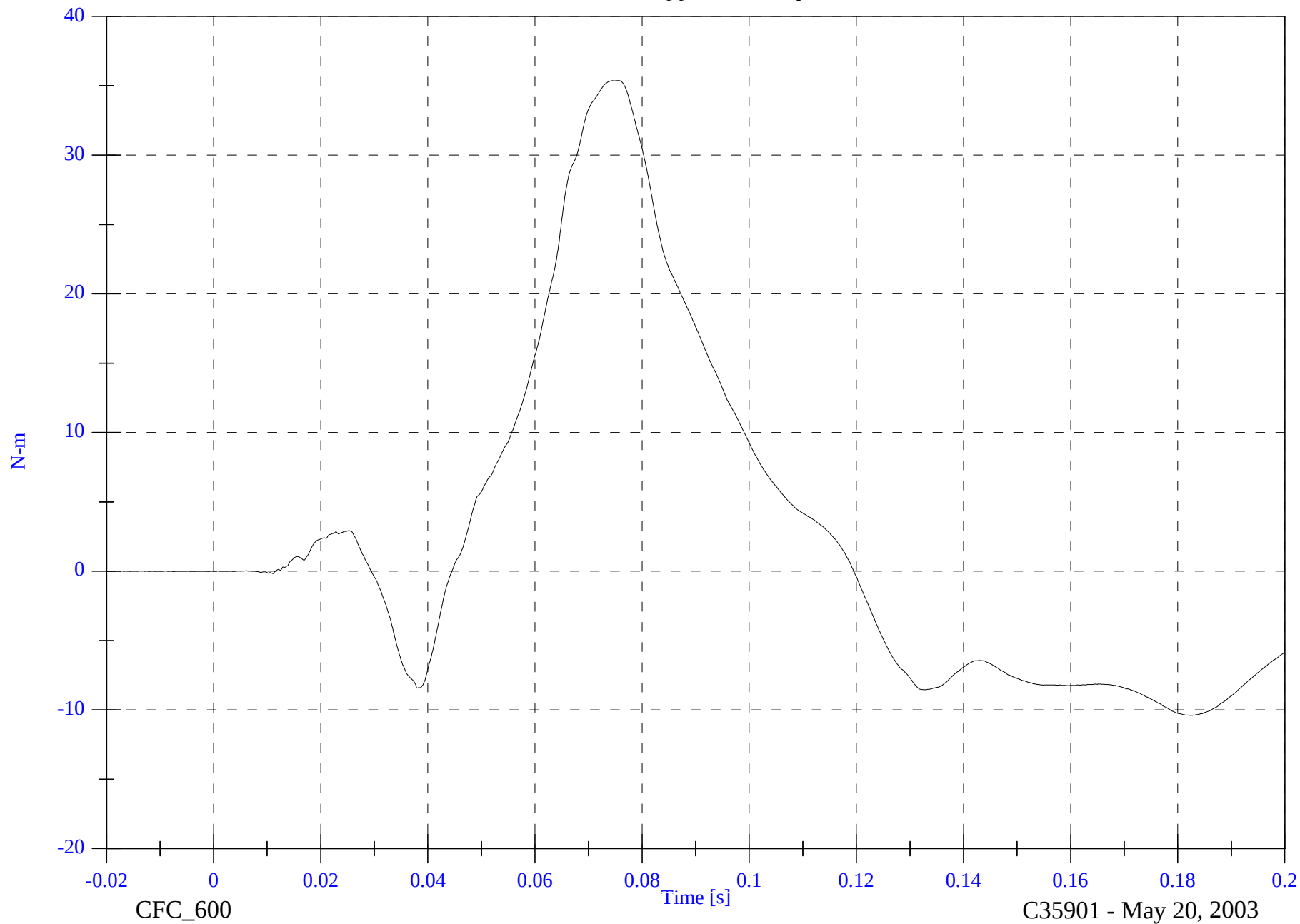


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck My

Max: 35.4 [N-m] at 0.076 [s]

Min: -10.4 [N-m] at 0.183 [s]



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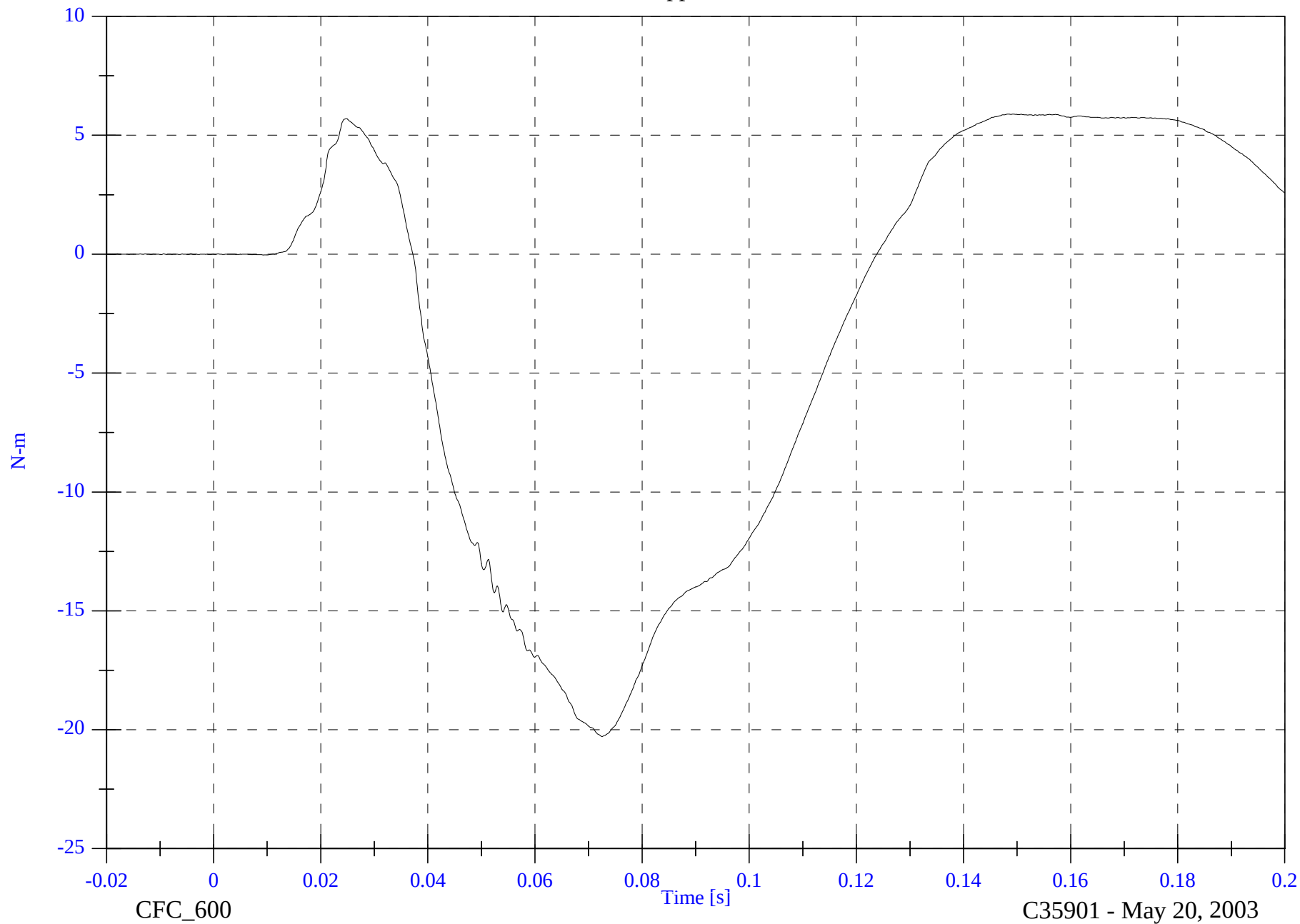
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck Mz

Max: 5.9 [N-m] at 0.148 [s]

Min: -20.3 [N-m] at 0.072 [s]



B-32

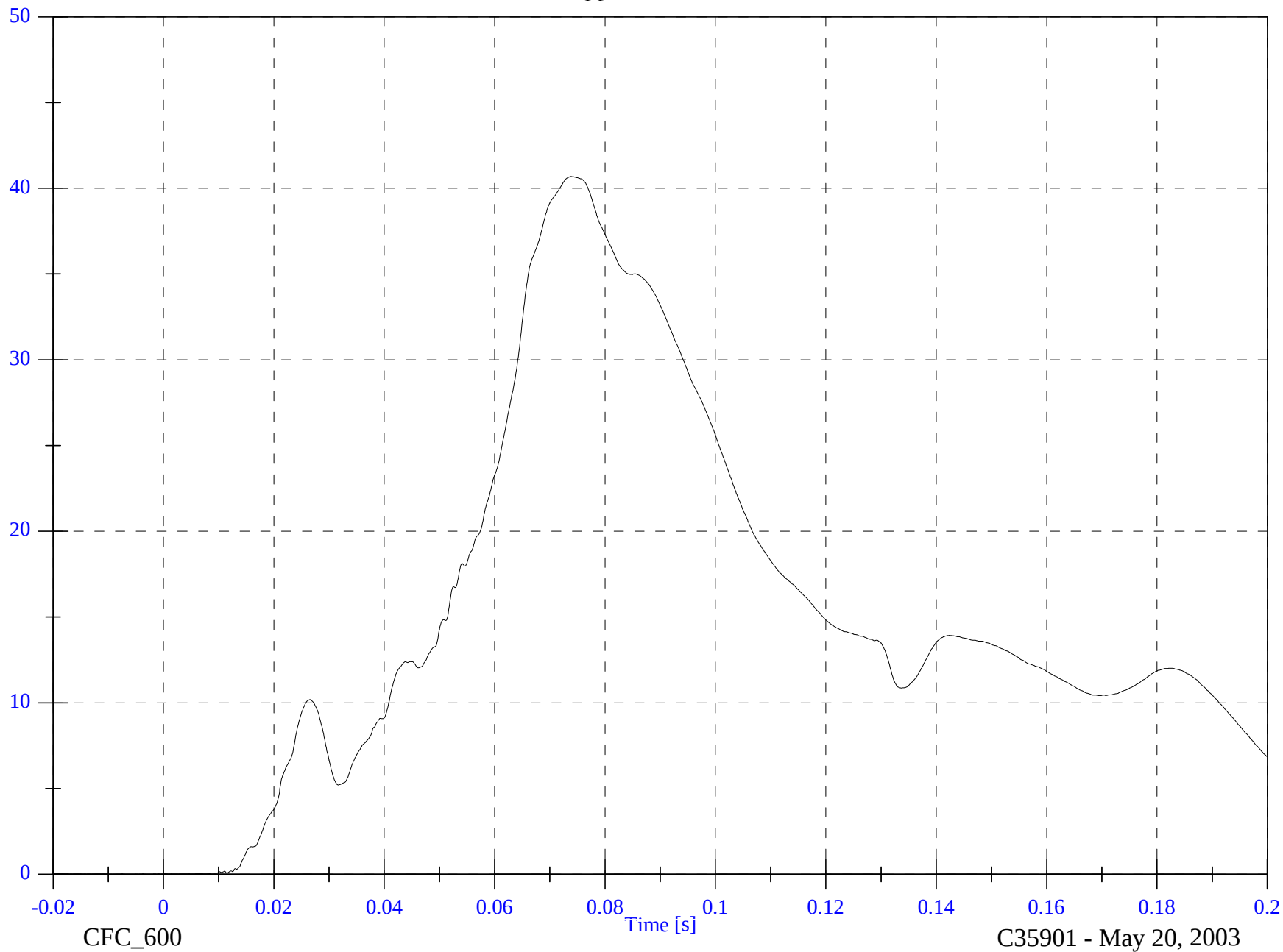
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Neck M Resultant

Max: 40.7 [N-m] at 0.074 [s]

Min: 0.0 [N-m] at -0.020 [s]



B-33

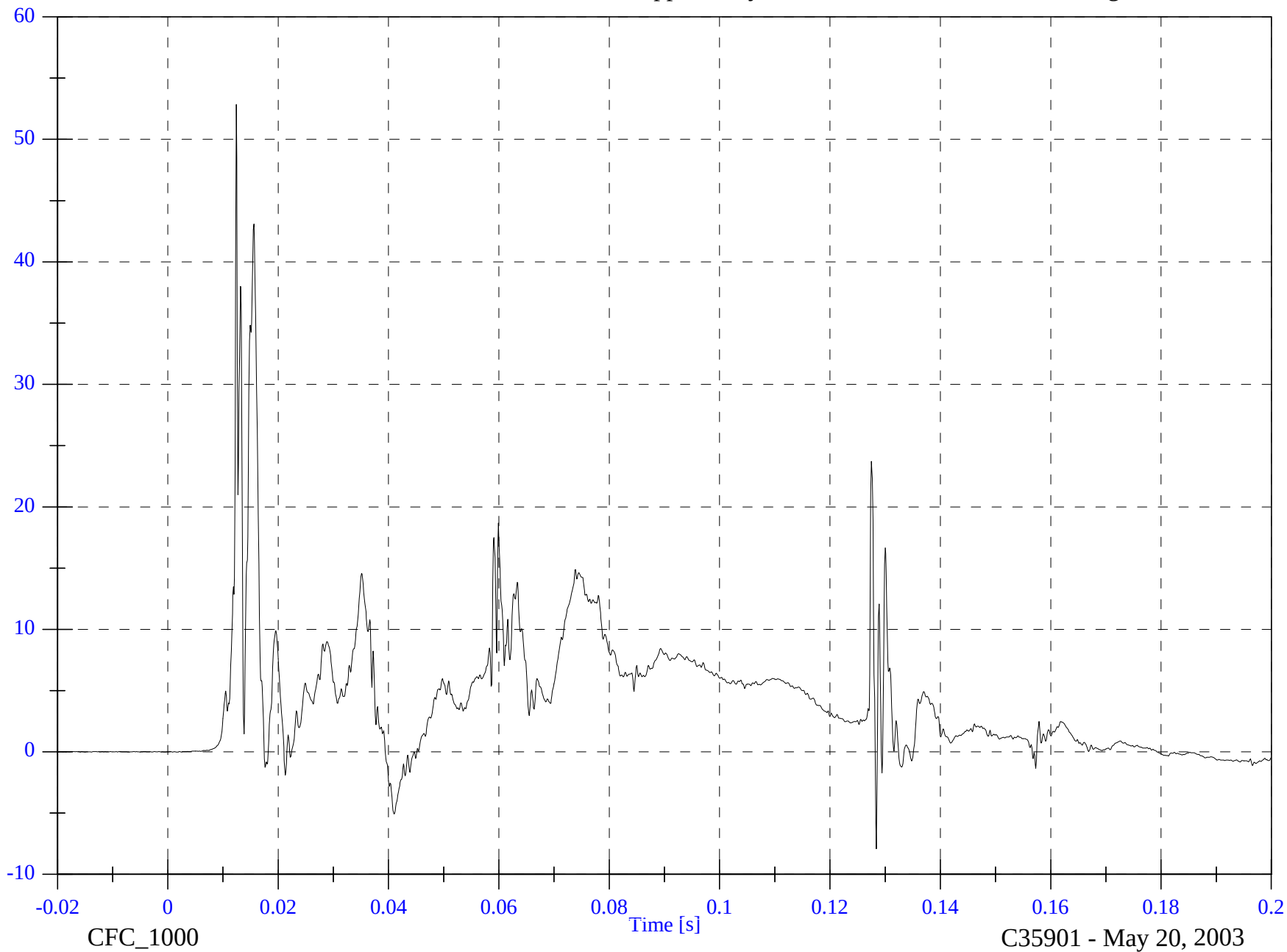
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Rib y

Max: 52.9 [g] at 0.012 [s]

Min: -7.9 [g] at 0.128 [s]

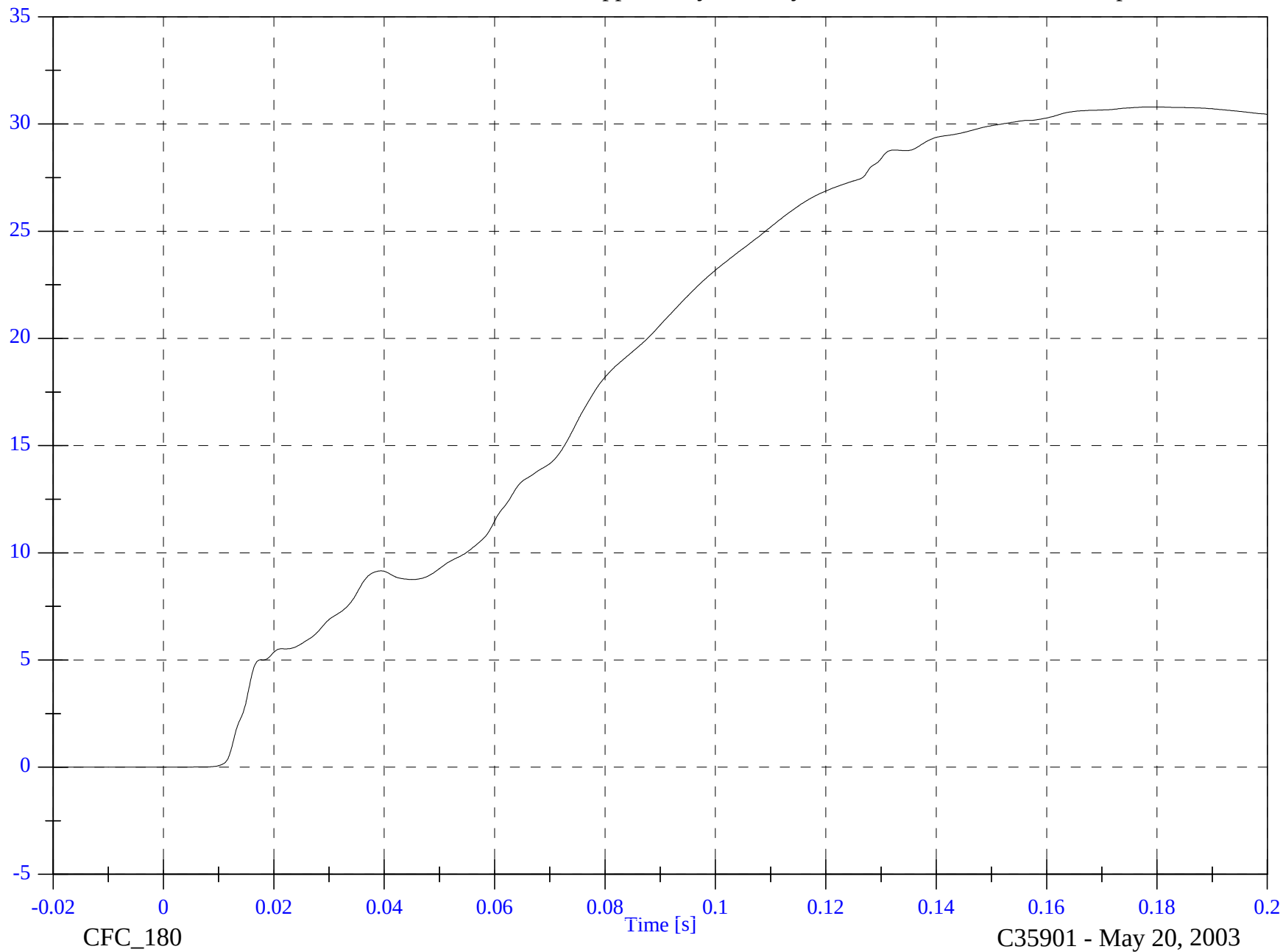


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Rib y Velocity

Max: 30.8 [kph] at 0.179 [s]

Min: -0.0 [kph] at -0.020 [s]



B-35

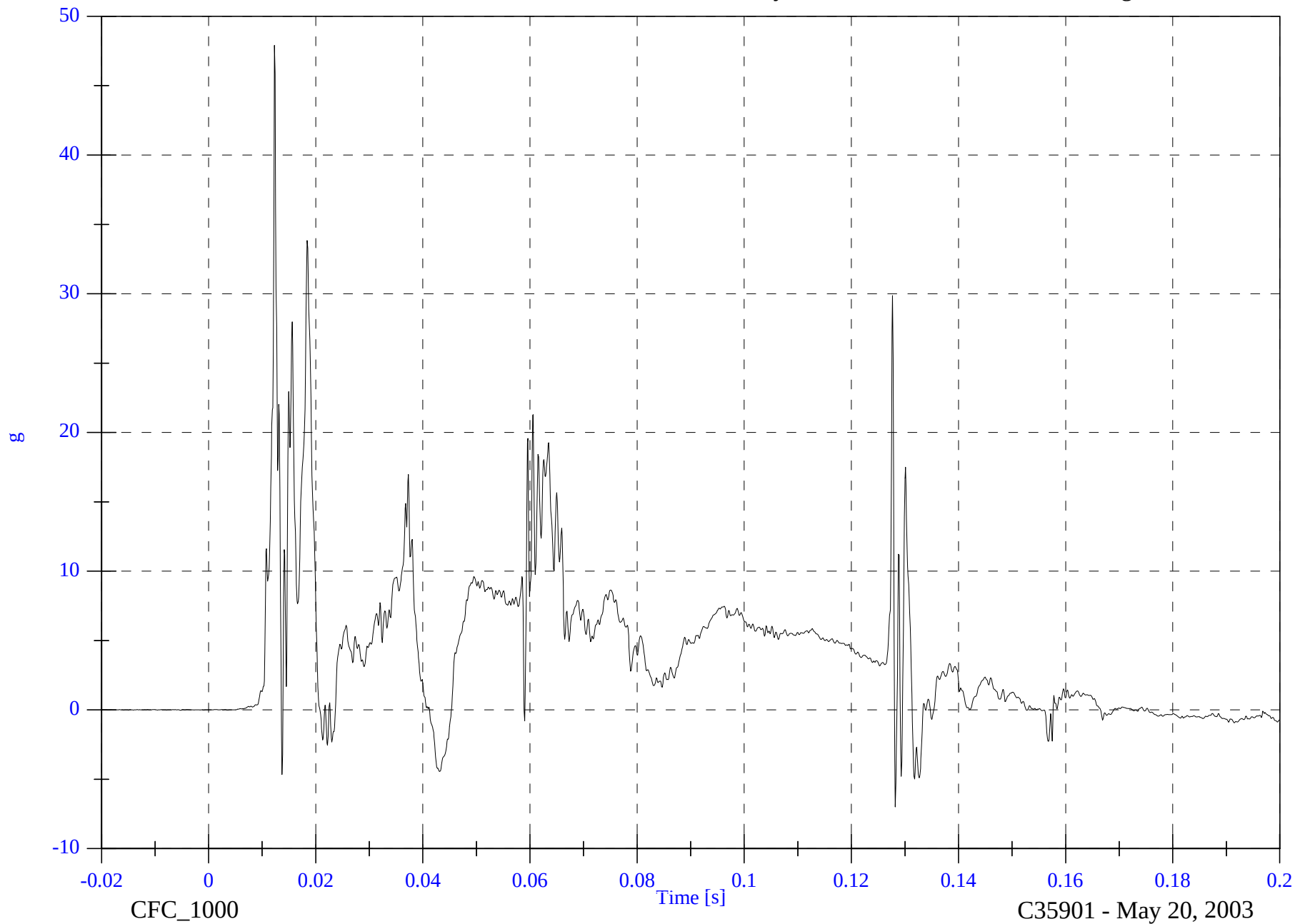
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Rib y

Max: 47.9 [g] at 0.012 [s]

Min: -7.0 [g] at 0.128 [s]



B-36

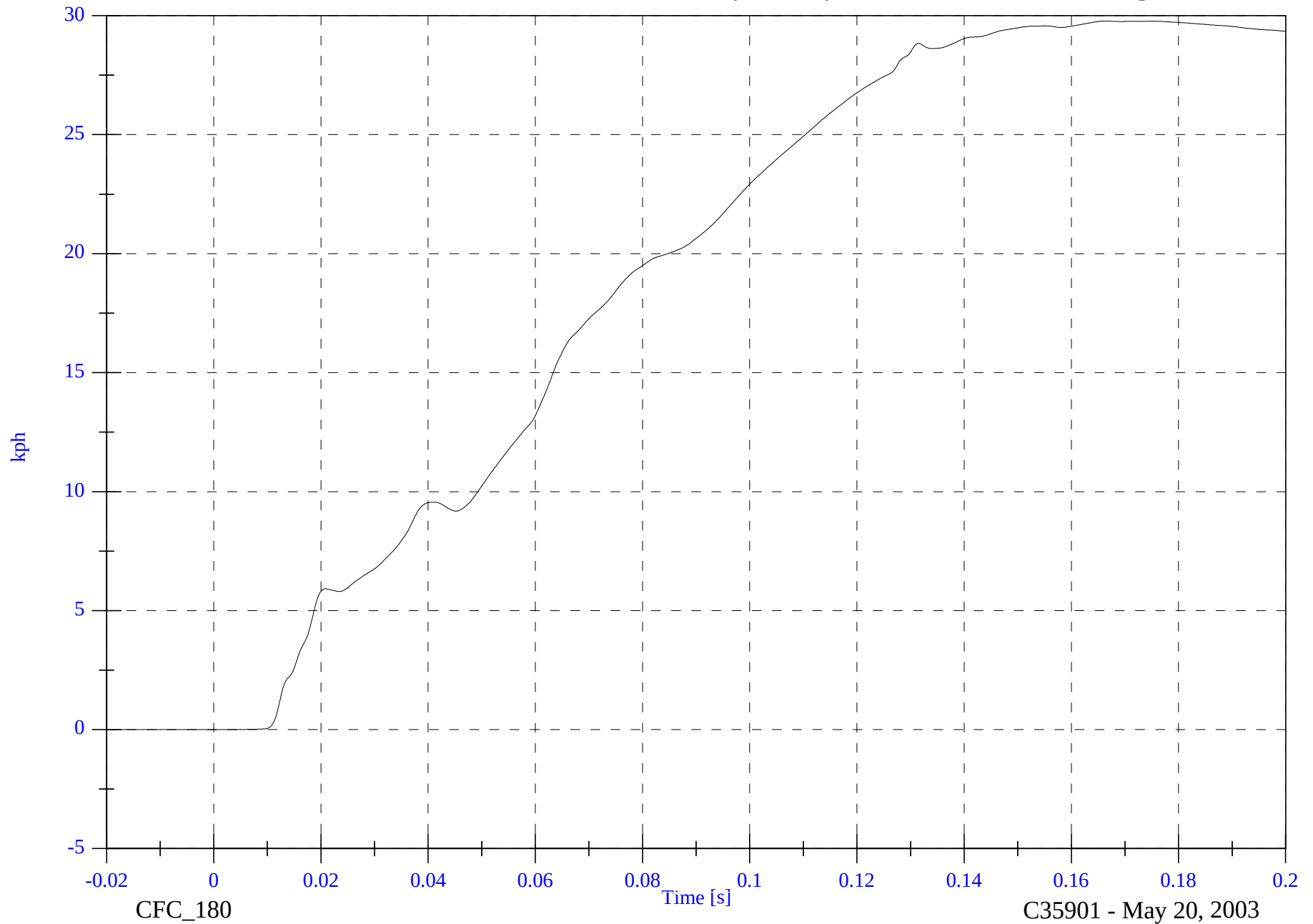
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Rib y Velocity

Max: 29.8 [kph] at 0.166 [s]

Min: -0.0 [kph] at -0.018 [s]



B-37

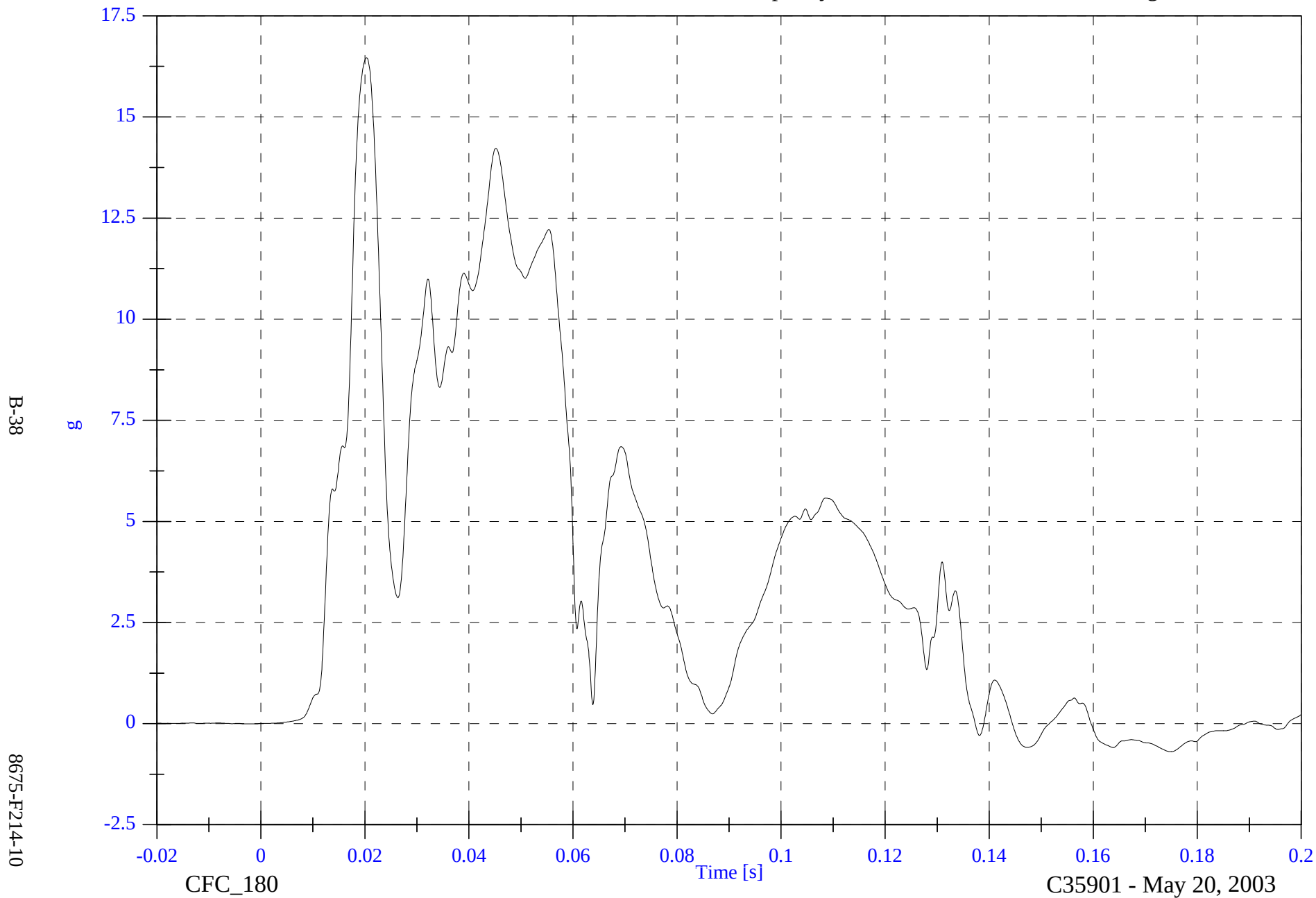
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Spine y

Max: 16.5 [g] at 0.020 [s]

Min: -0.7 [g] at 0.175 [s]

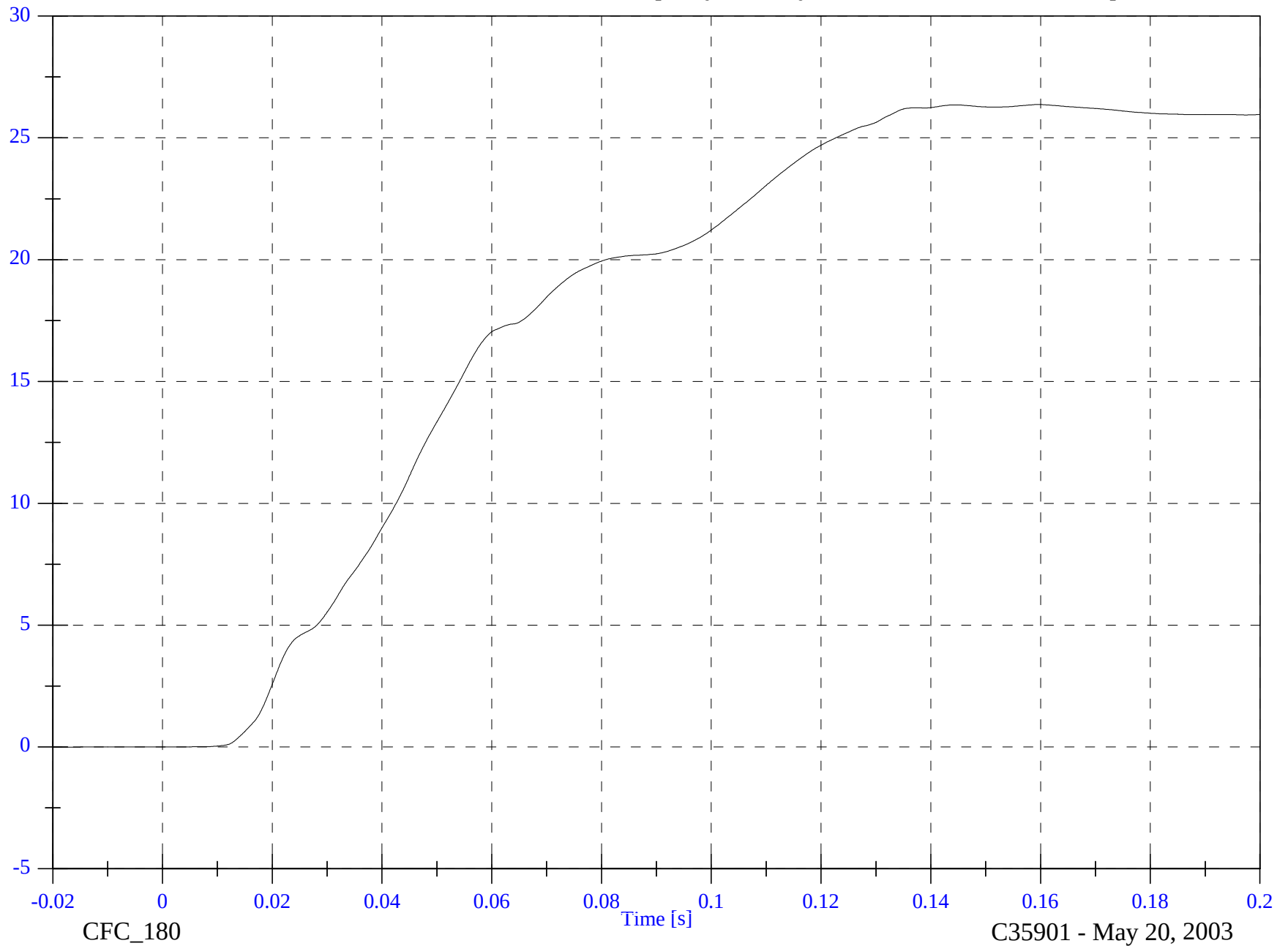


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Spine y Velocity

Max: 26.4 [kph] at 0.160 [s]

Min: -0.0 [kph] at -0.020 [s]



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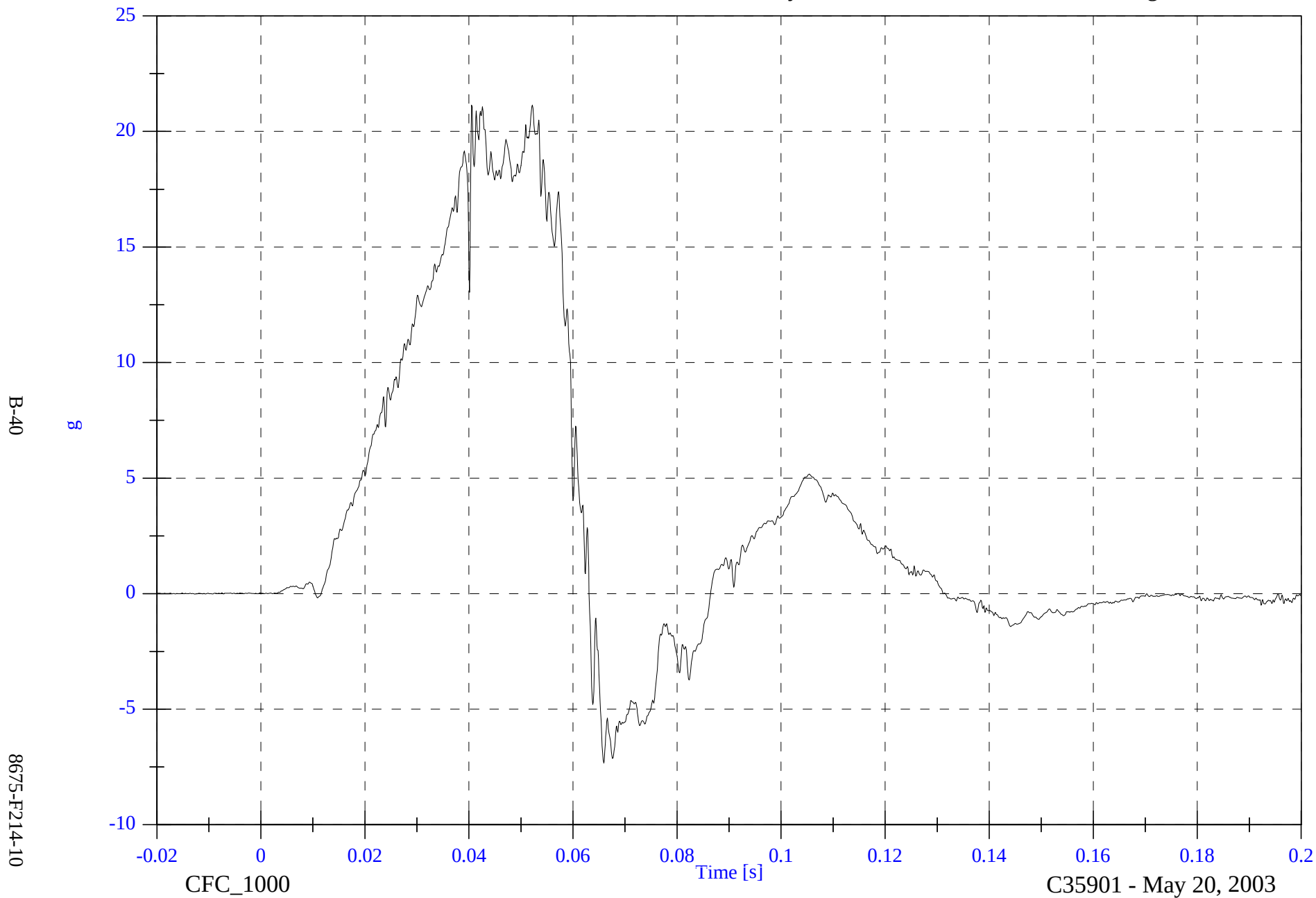
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Pelvic y

Max: 21.1 [g] at 0.052 [s]

Min: -7.3 [g] at 0.066 [s]

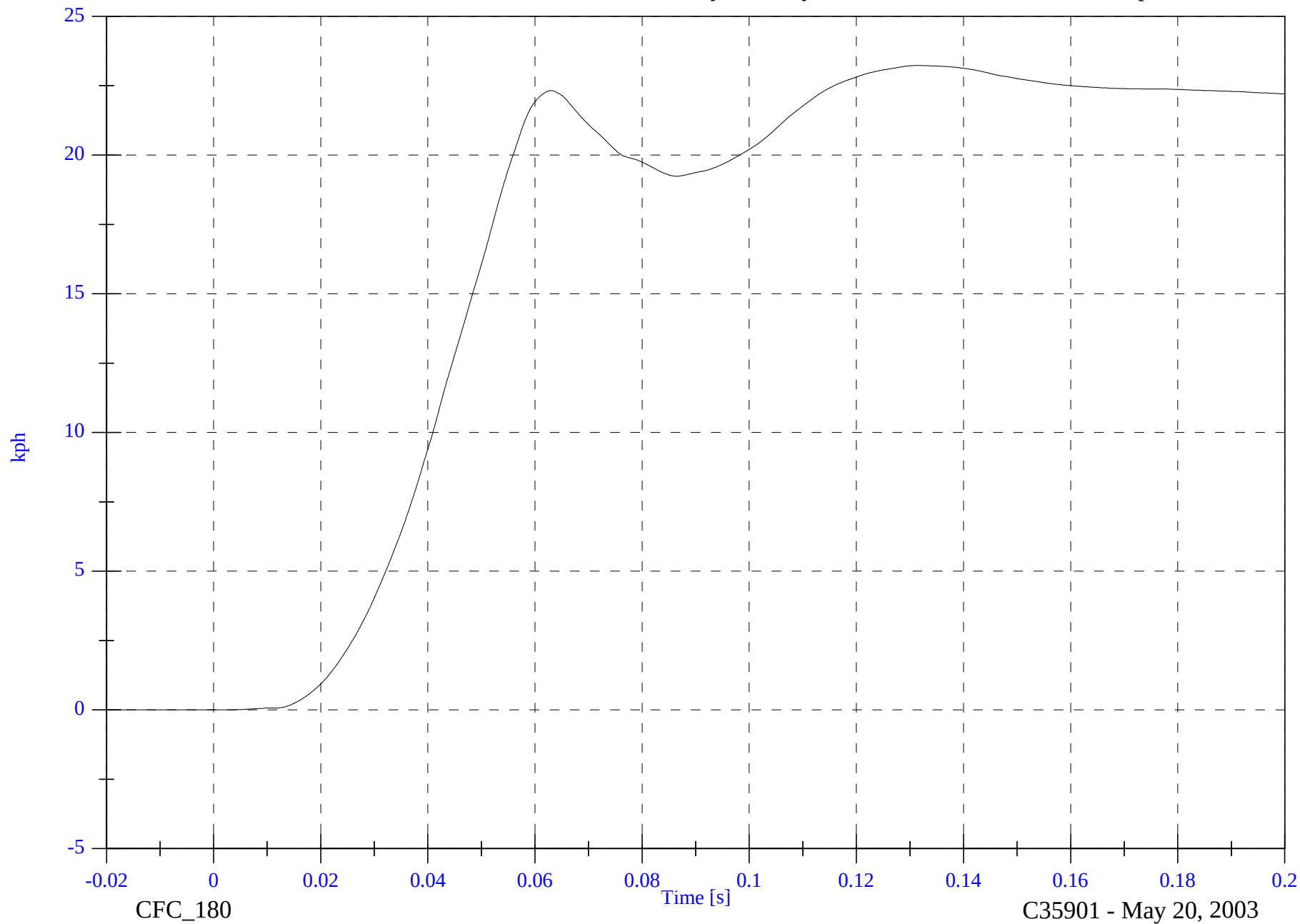


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Pelvic y Velocity

Max: 23.2 [kph] at 0.131 [s]

Min: -0.0 [kph] at -0.020 [s]



B-41

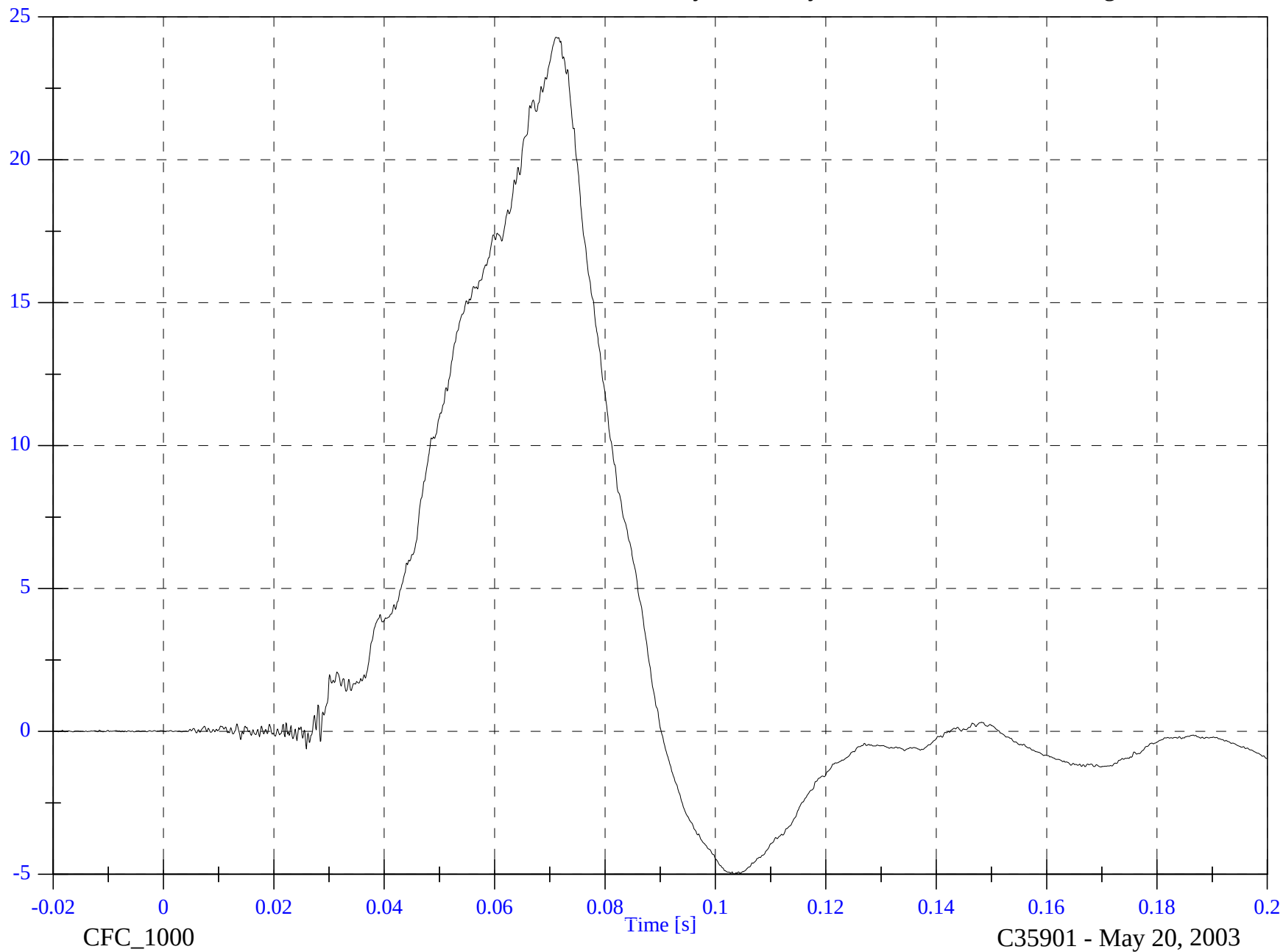
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array X Arm Ay

Max: 24.3 [g] at 0.071 [s]

Min: -5.0 [g] at 0.103 [s]

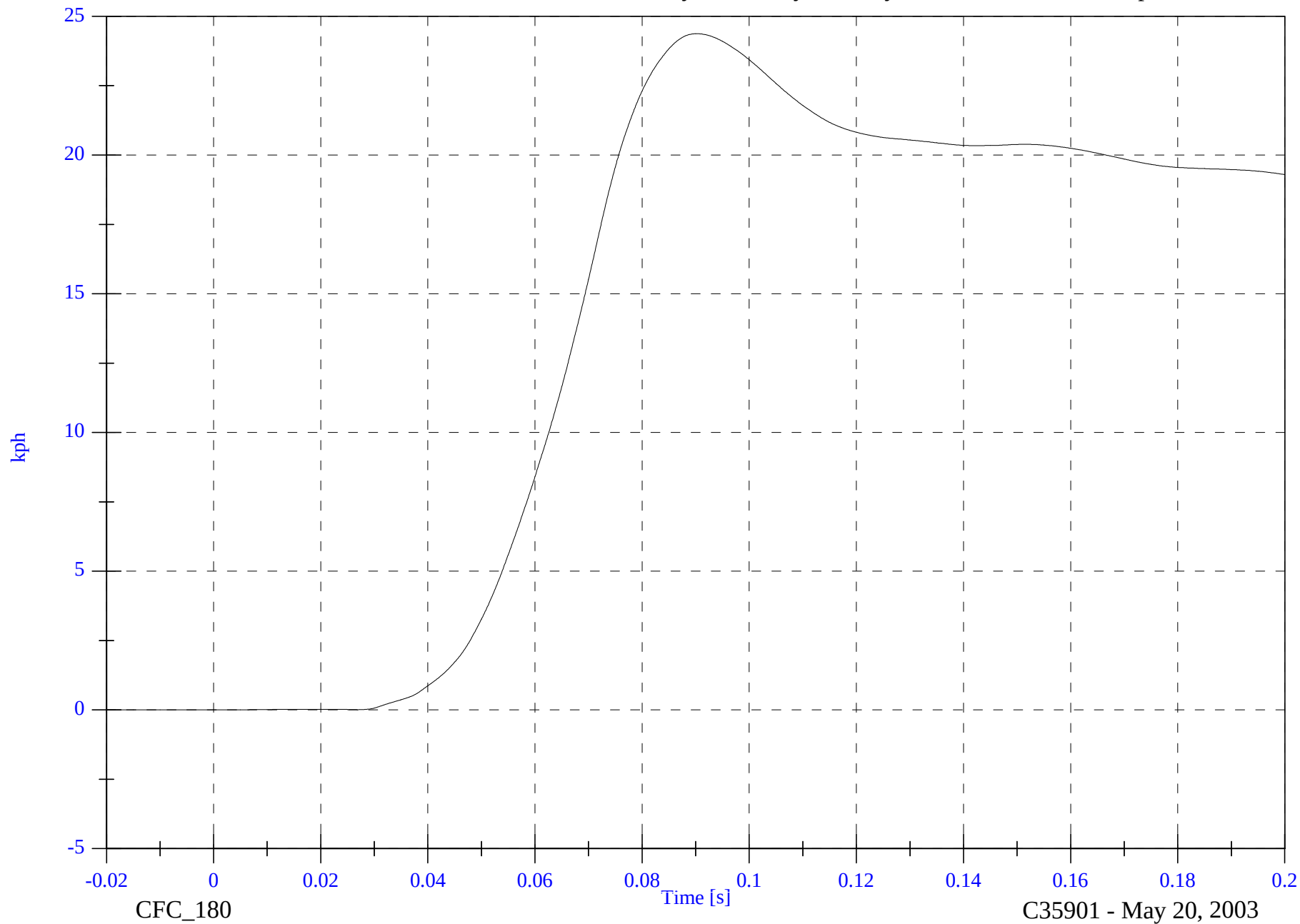


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array X Arm Ay Velocity

Max: 24.4 [kph] at 0.090 [s]

Min: -0.0 [kph] at -0.020 [s]



B-43

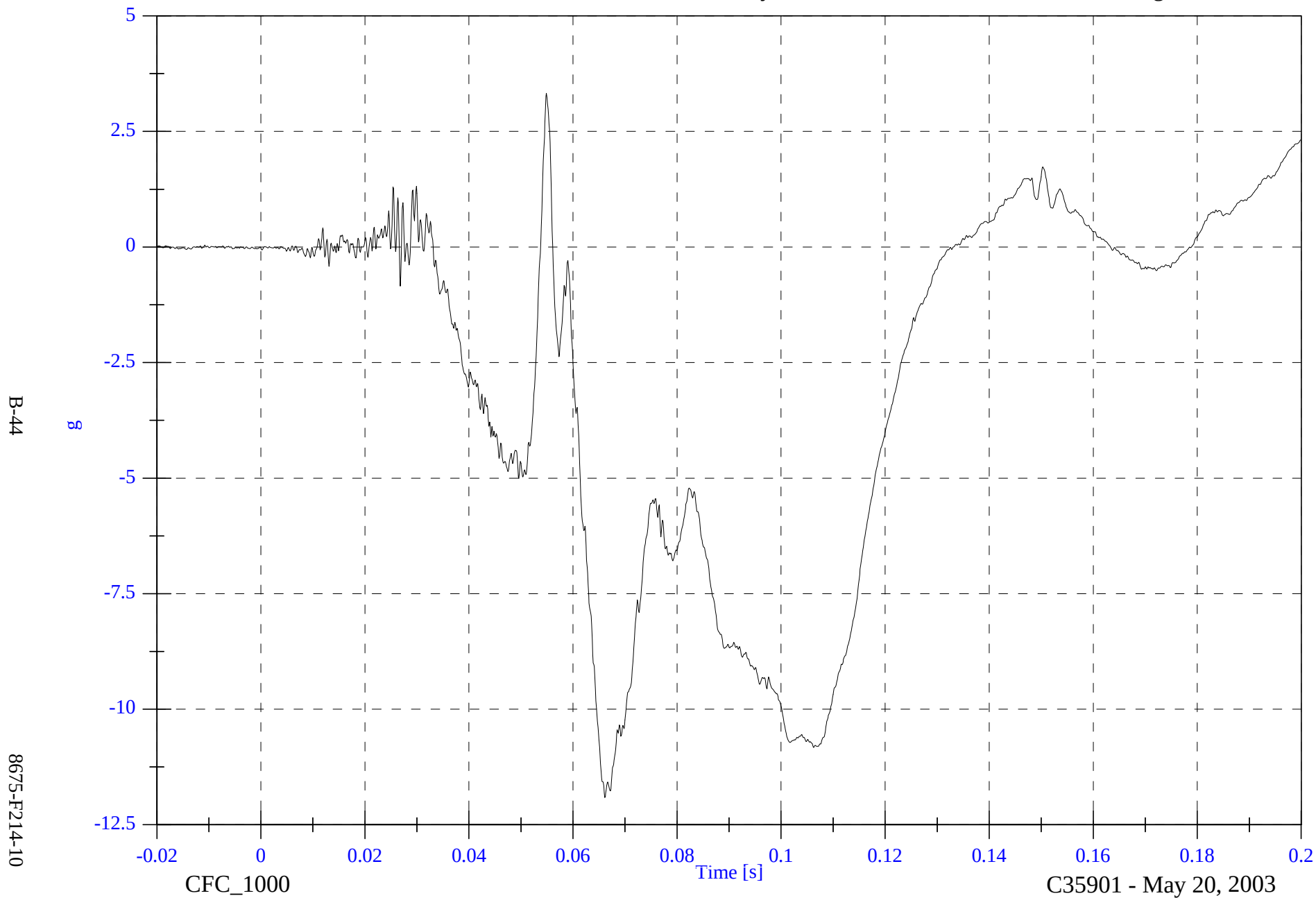
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array X Arm Az

Max: 3.3 [g] at 0.055 [s]

Min: -11.9 [g] at 0.066 [s]

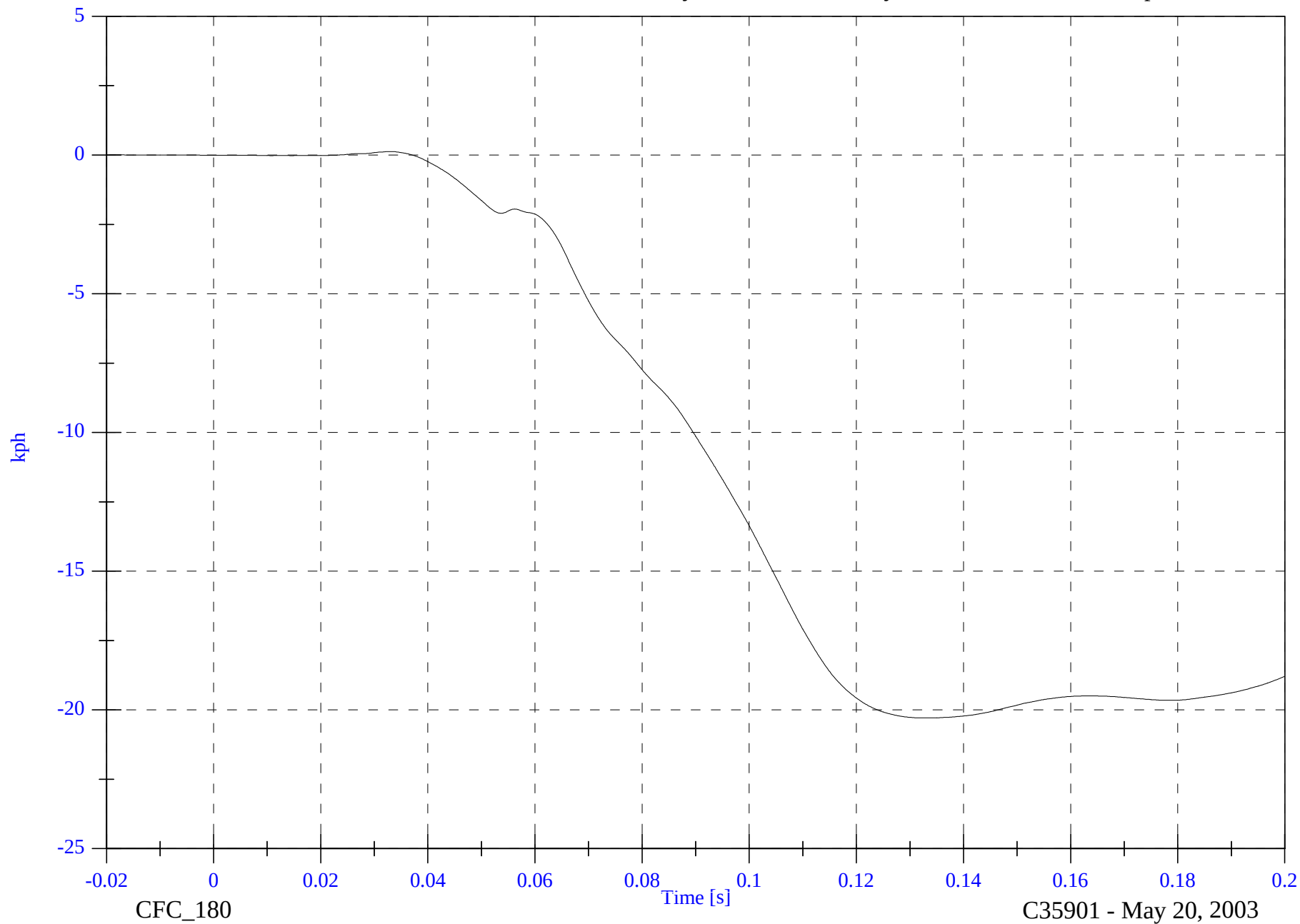


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array X Arm Az Velocity

Max: 0.1 [kph] at 0.033 [s]

Min: -20.3 [kph] at 0.133 [s]



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8675-F214-10

CFC_180

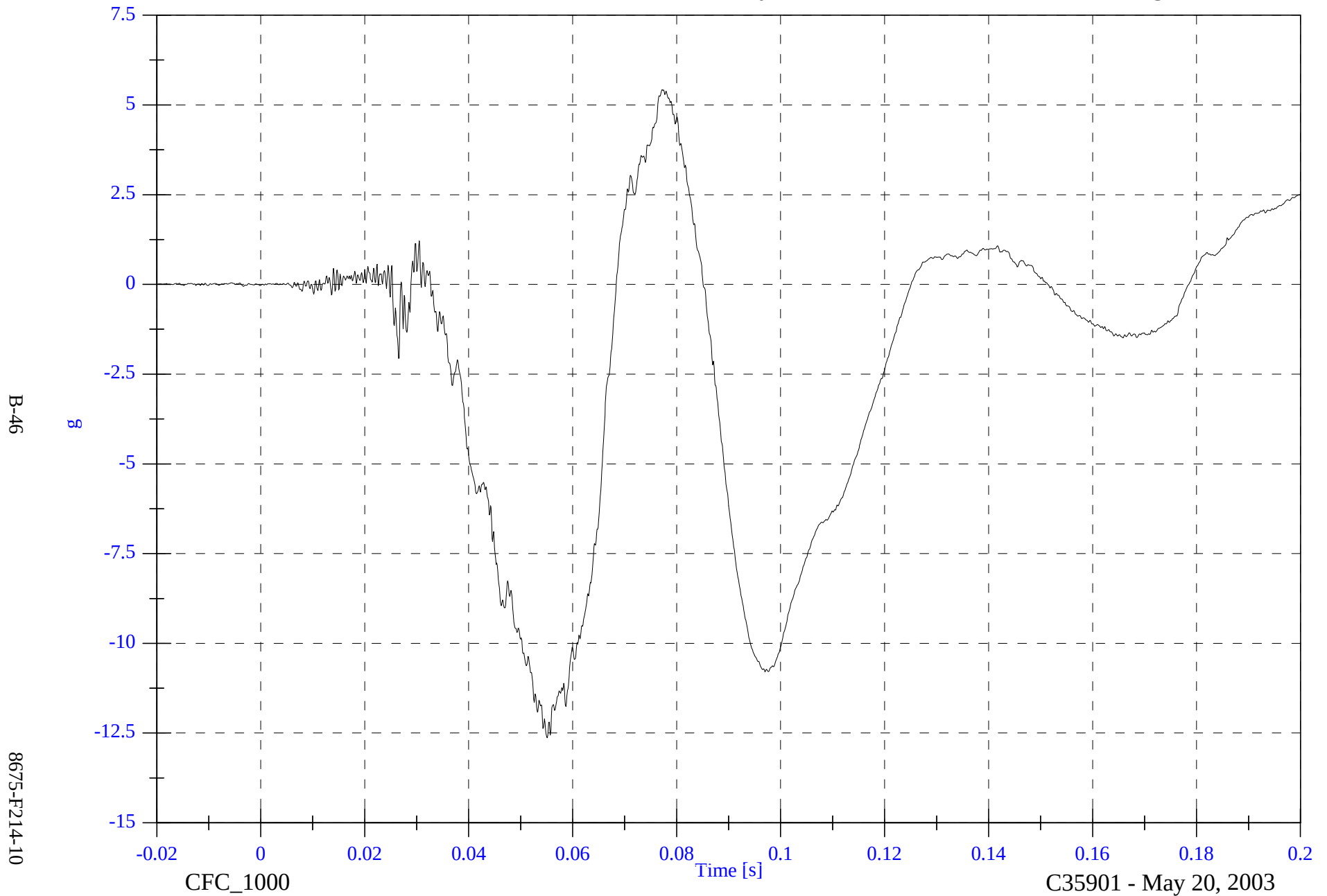
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FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array Y Arm Ax

Max: 5.4 [g] at 0.077 [s]

Min: -12.6 [g] at 0.055 [s]

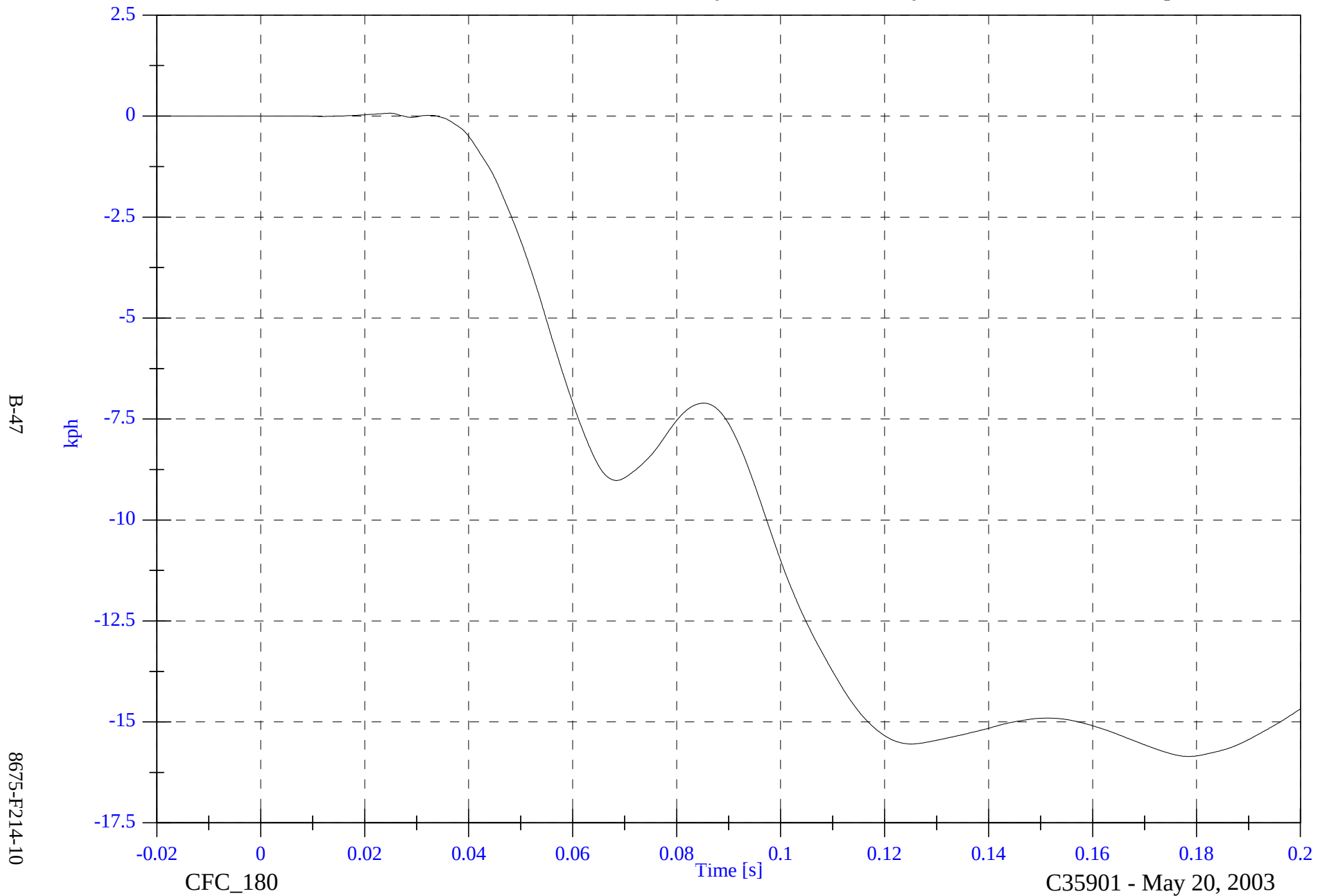


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array Y Arm Ax Velocity

Max: 0.1 [kph] at 0.025 [s]

Min: -15.9 [kph] at 0.178 [s]

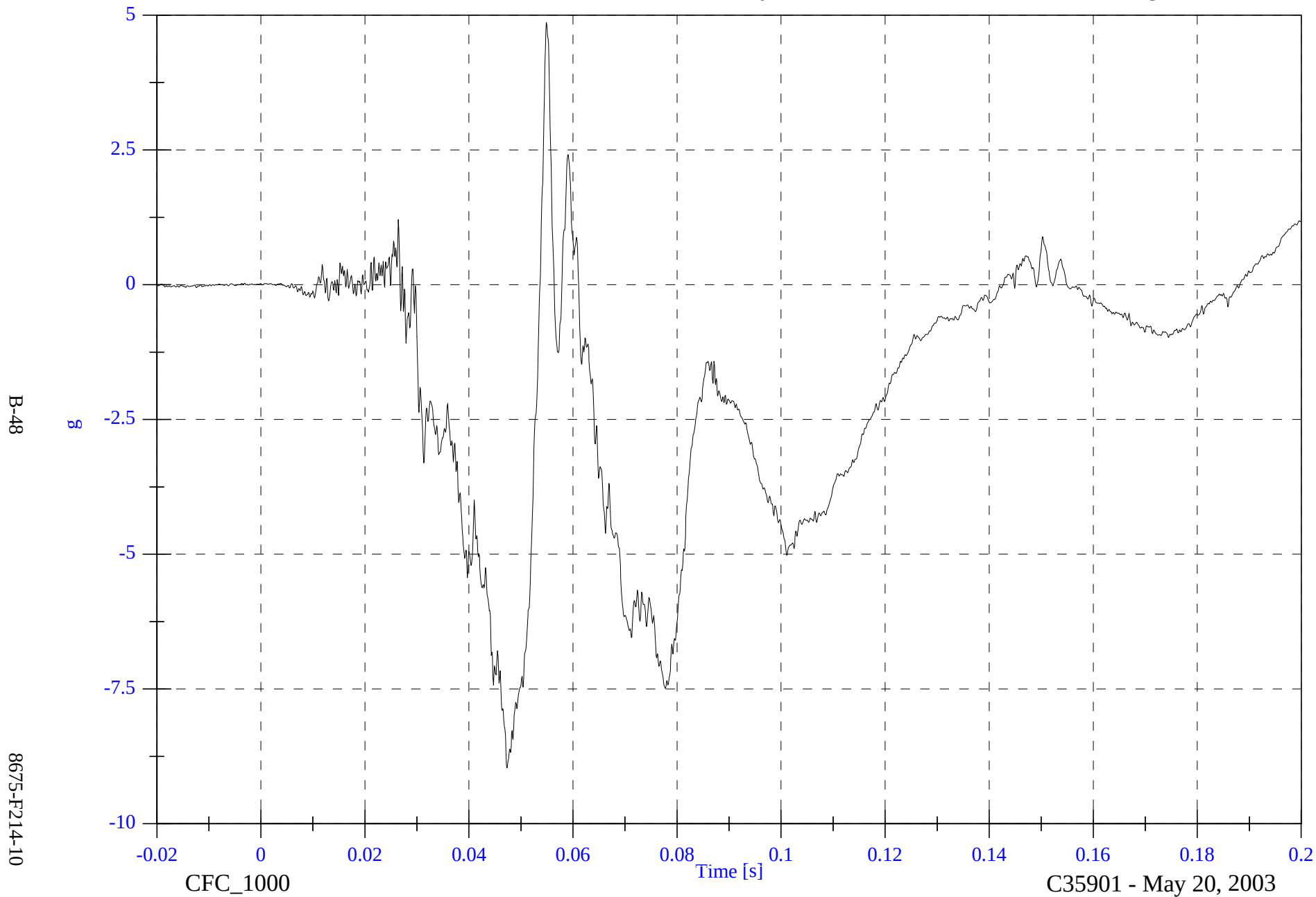


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array Y Arm Az

Max: 4.9 [g] at 0.055 [s]

Min: -9.0 [g] at 0.047 [s]

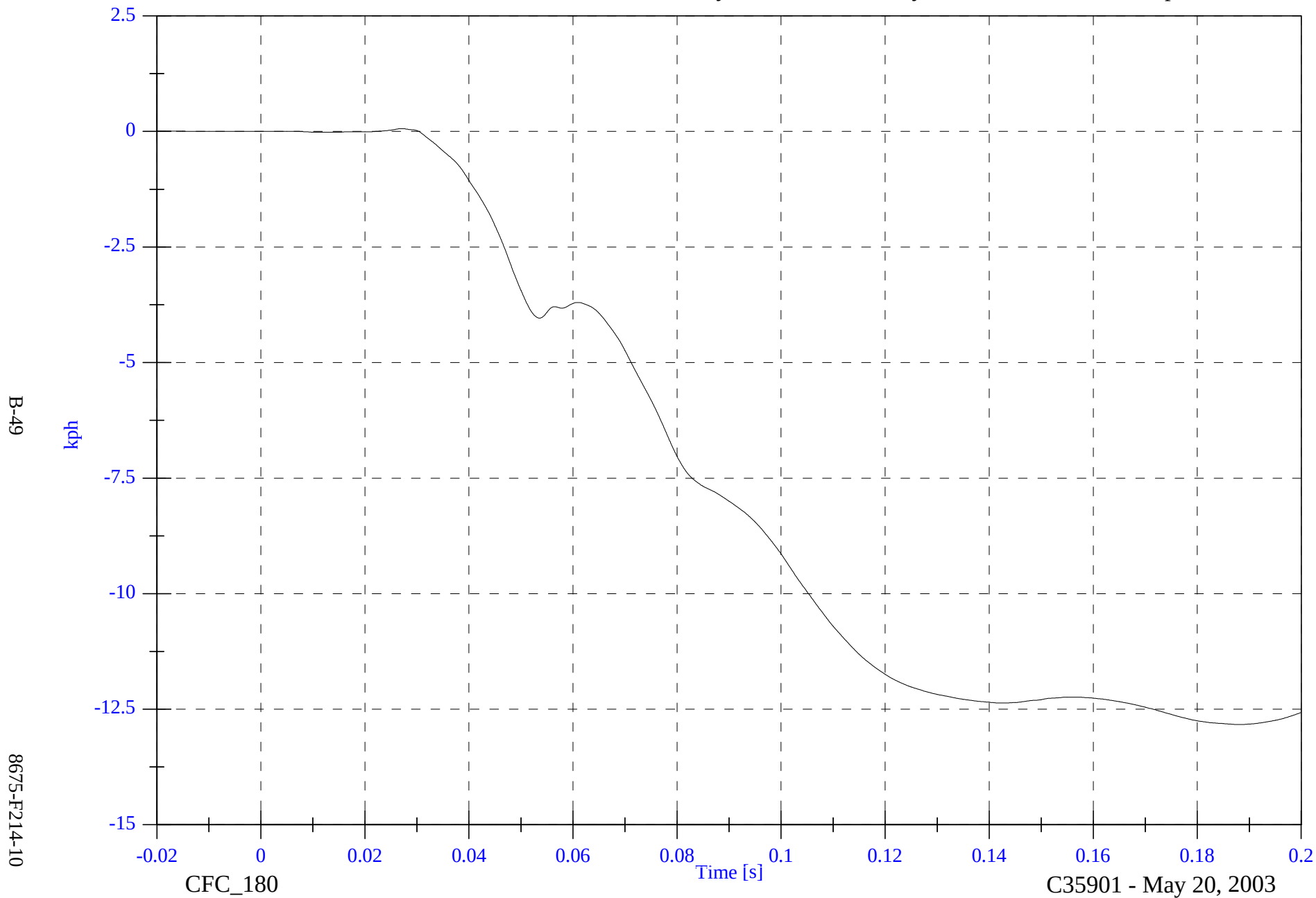


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array Y Arm Az Velocity

Max: 0.1 [kph] at 0.027 [s]

Min: -12.8 [kph] at 0.188 [s]

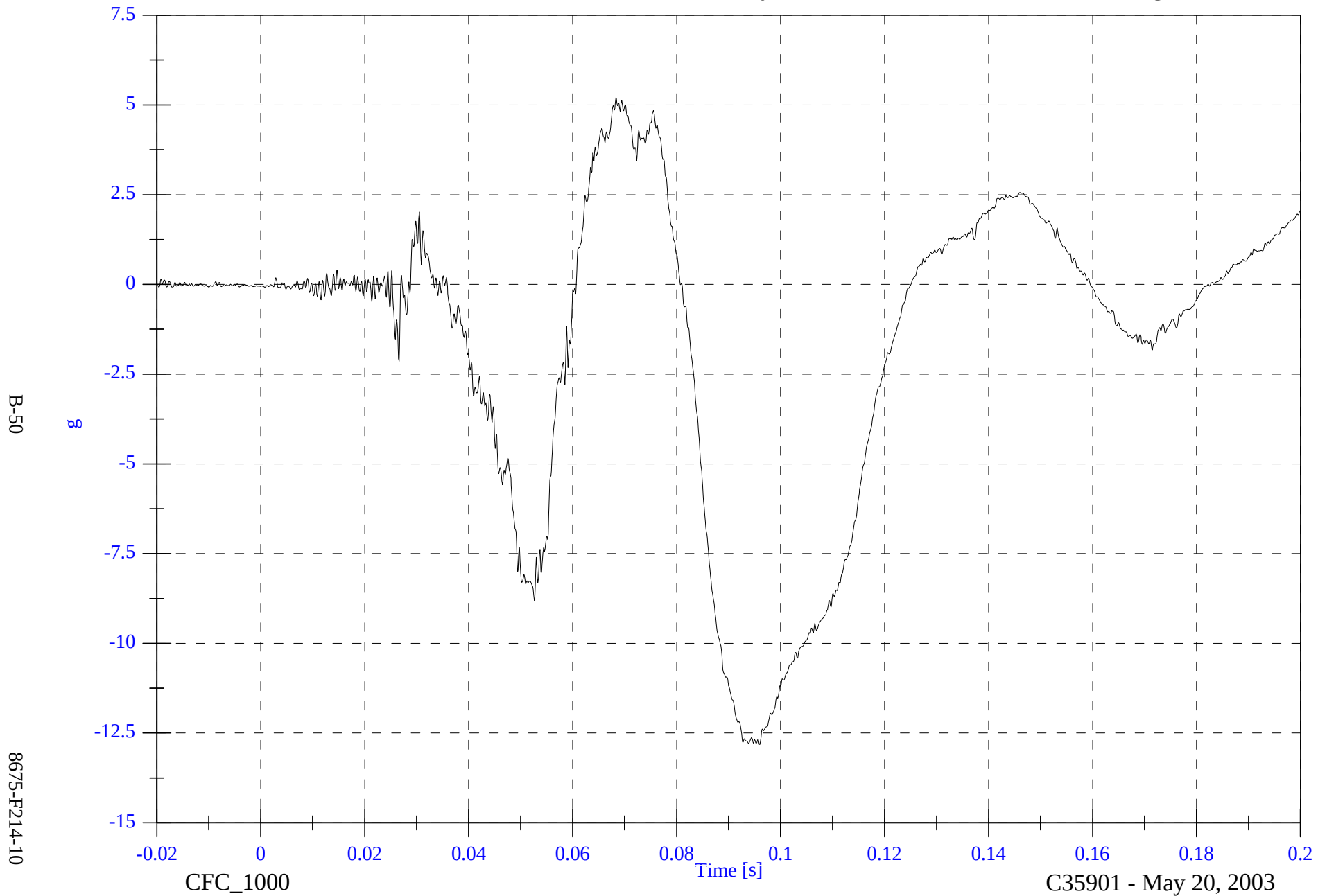


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array Z Arm Ax

Max: 5.2 [g] at 0.068 [s]

Min: -12.8 [g] at 0.096 [s]

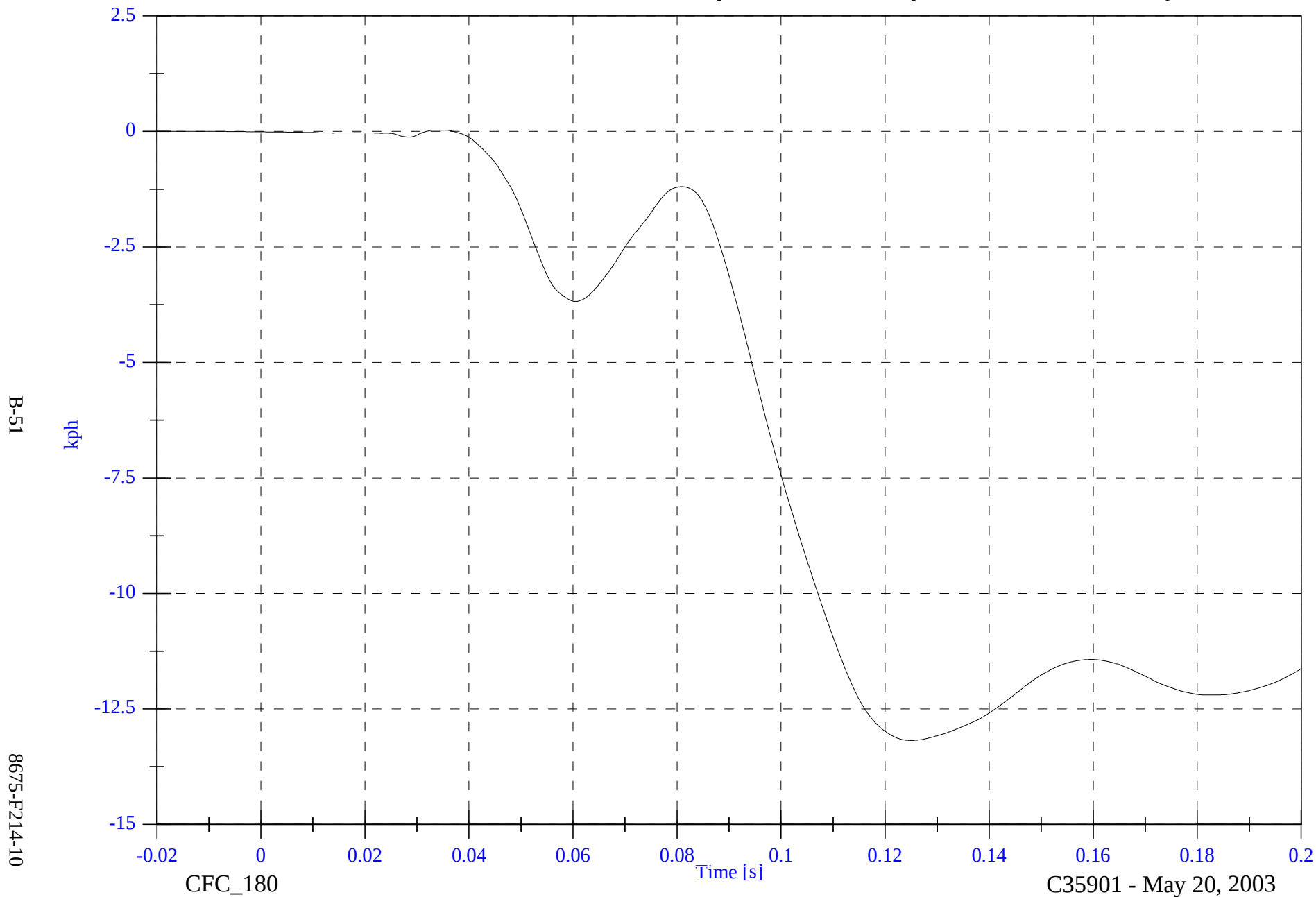


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array Z Arm Ax Velocity

Max: 0.0 [kph] at 0.034 [s]

Min: -13.2 [kph] at 0.125 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

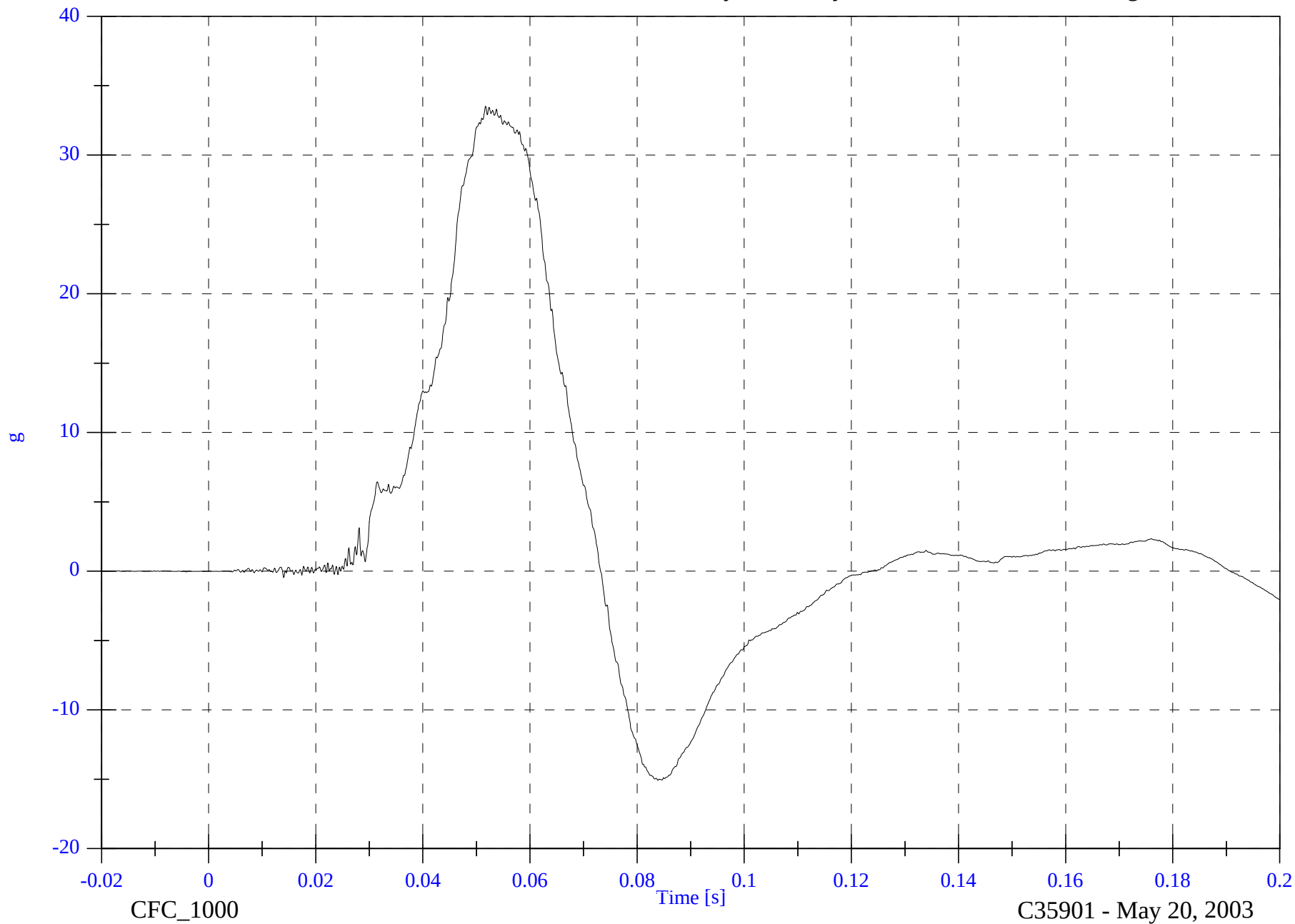
V2P4 Head 9 Array Z Arm Ay

Max: 33.5 [g] at 0.052 [s]

Min: -15.1 [g] at 0.084 [s]

B-52

8675-F214-10

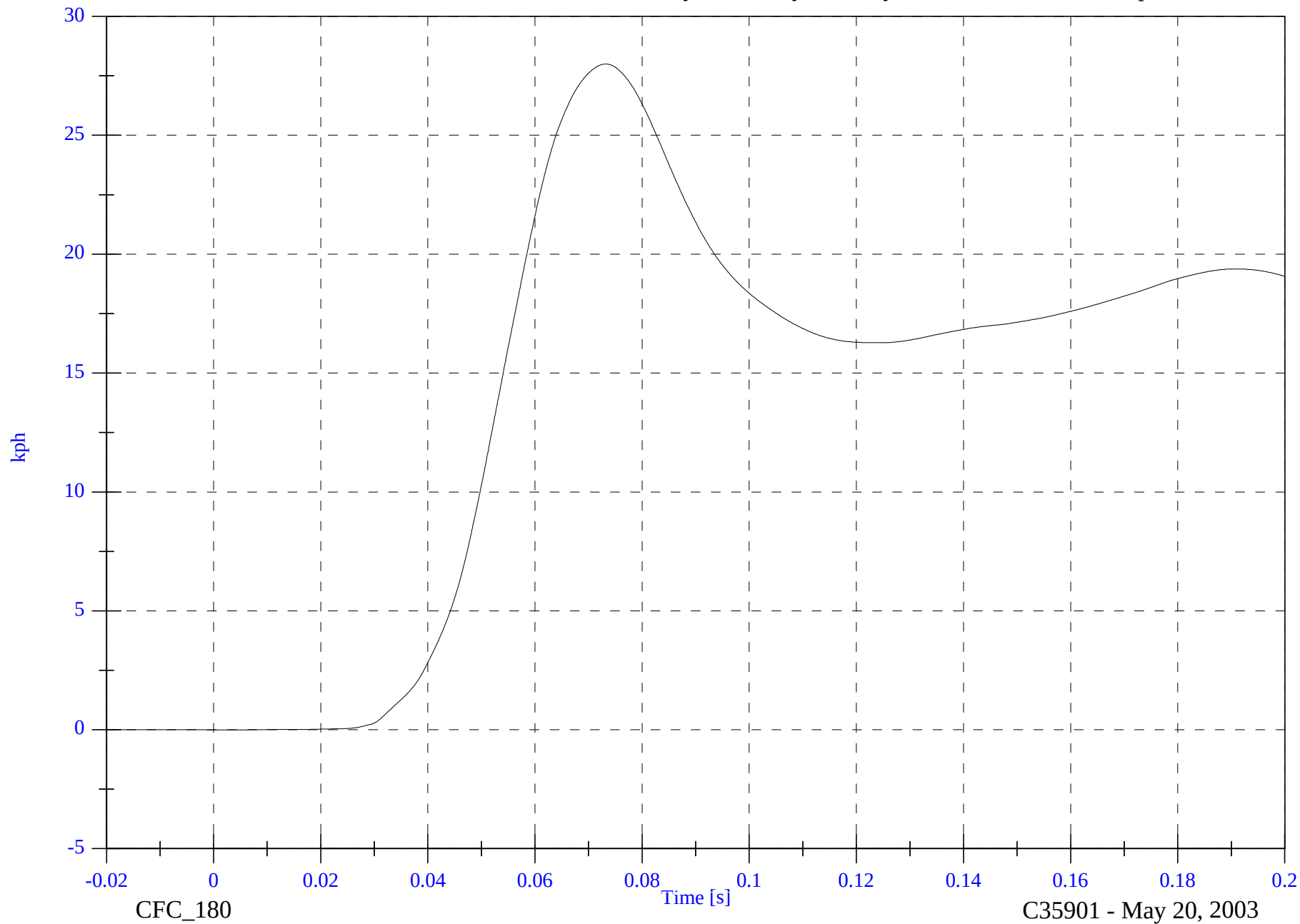


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head 9 Array Z Arm Ay Velocity

Max: 28.0 [kph] at 0.073 [s]

Min: -0.0 [kph] at 0.004 [s]



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8675-F214-10

CFC_180

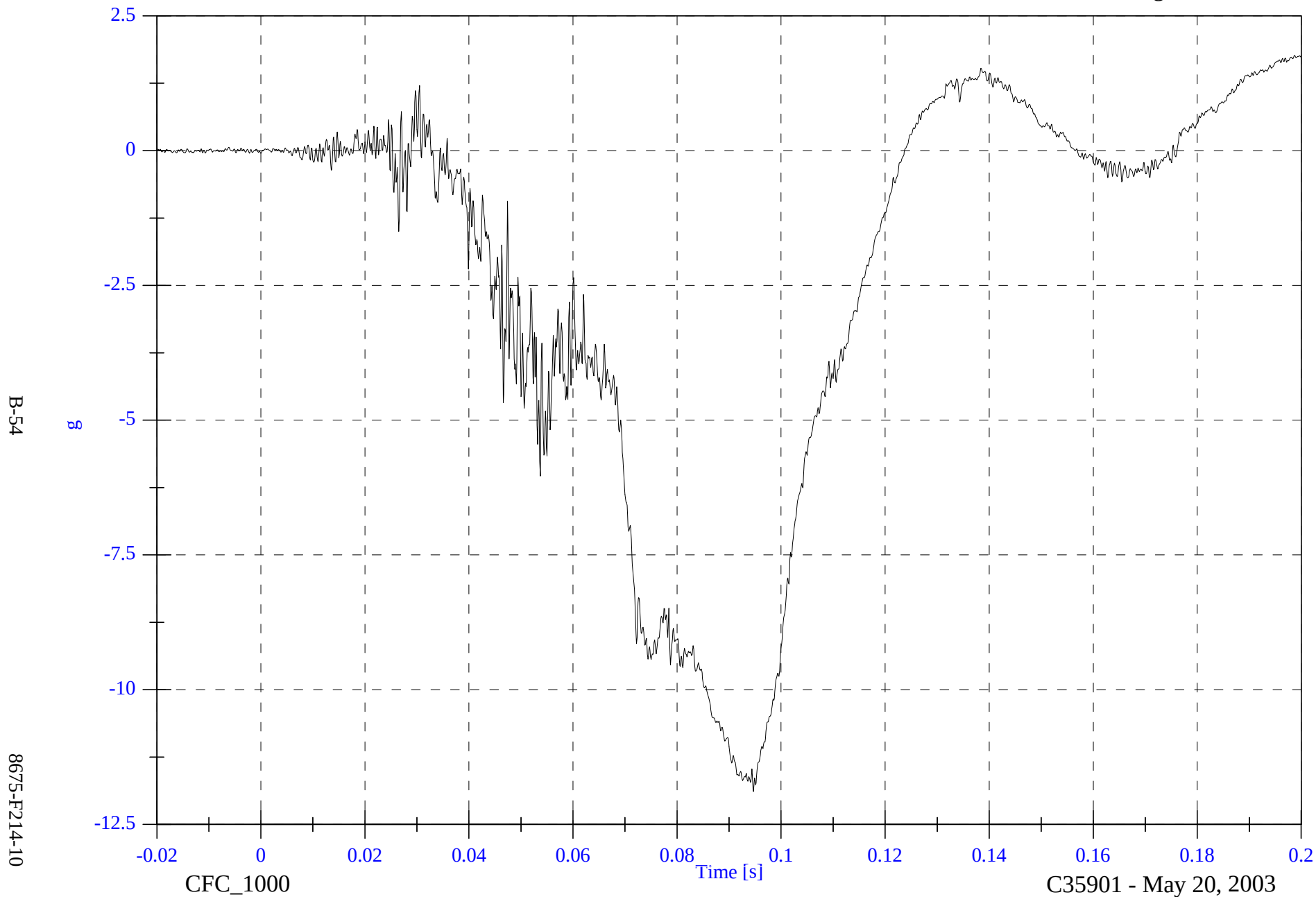
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FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head x

Max: 1.8 [g] at 0.199 [s]

Min: -11.9 [g] at 0.095 [s]

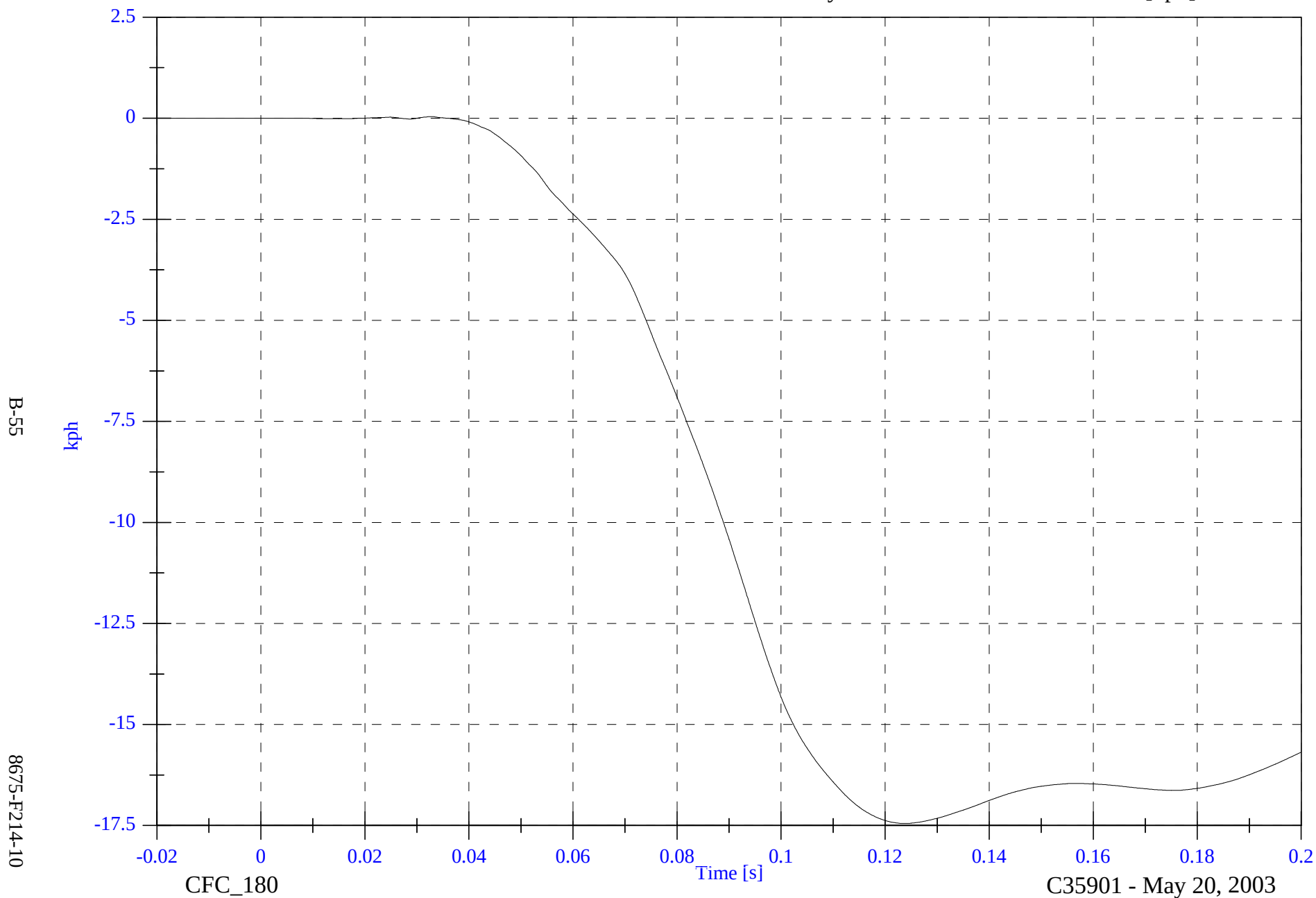


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head x Velocity

Max: 0.0 [kph] at 0.033 [s]

Min: -17.4 [kph] at 0.124 [s]

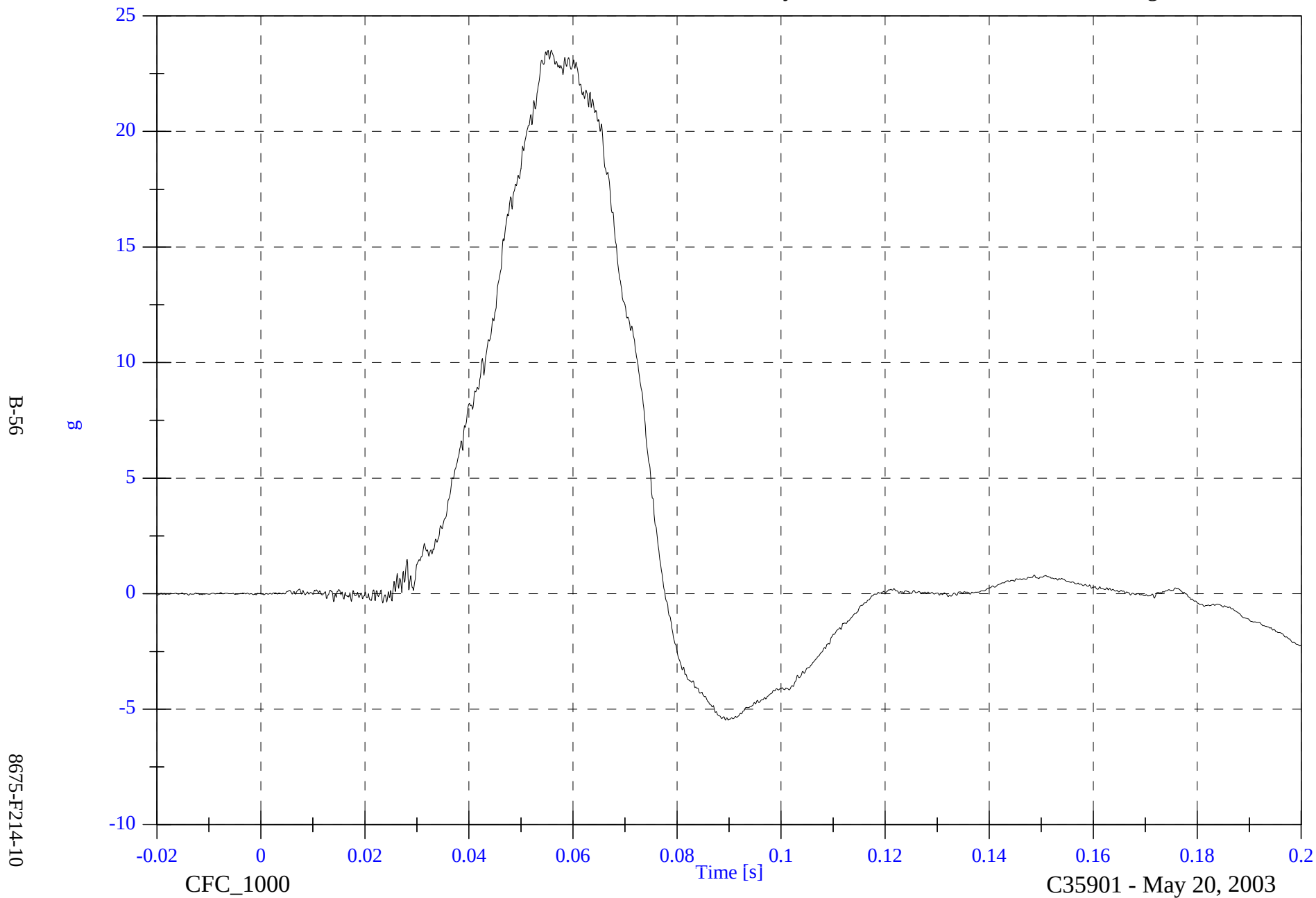


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head y

Max: 23.5 [g] at 0.056 [s]

Min: -5.5 [g] at 0.089 [s]

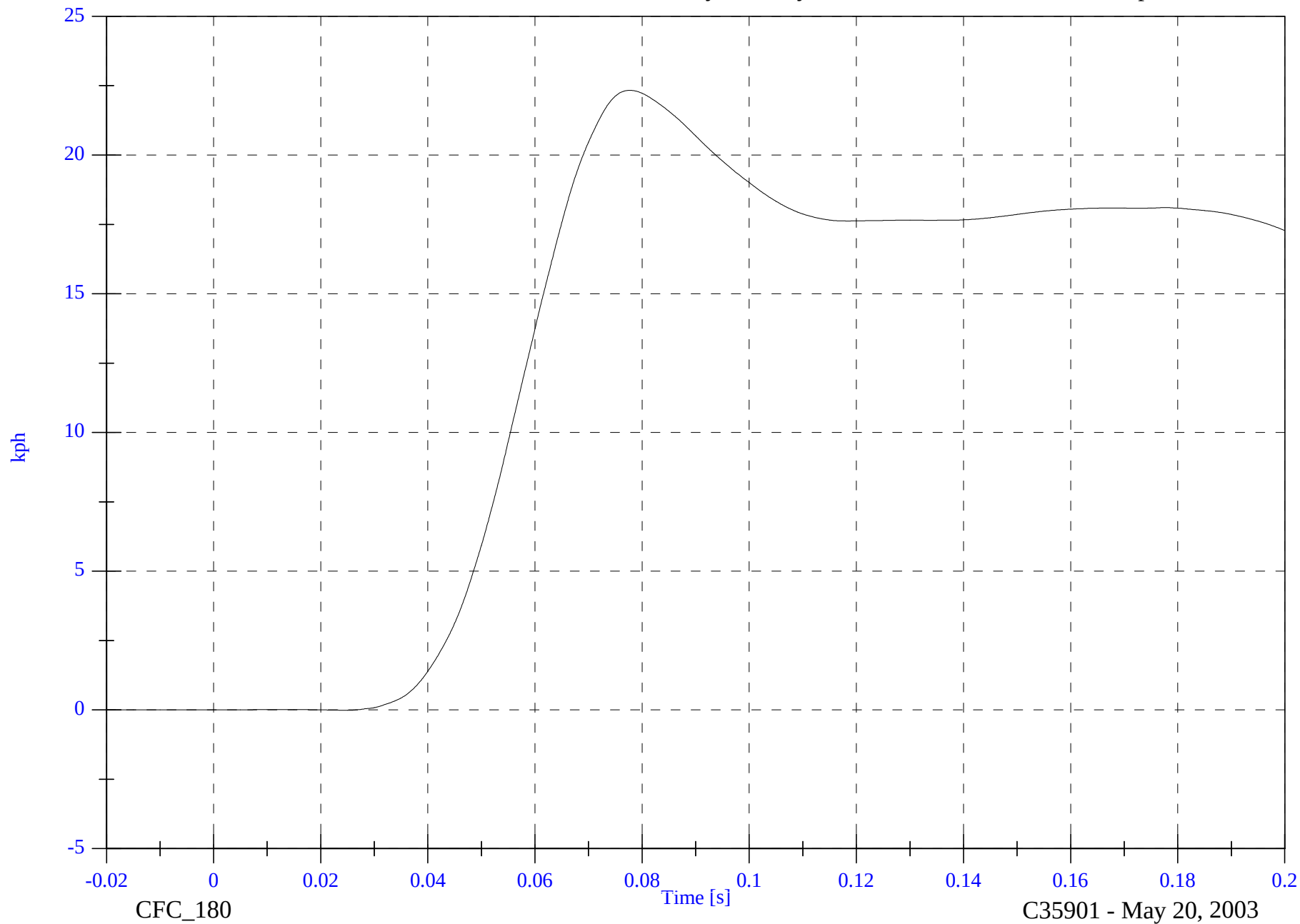


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head y Velocity

Max: 22.3 [kph] at 0.078 [s]

Min: -0.0 [kph] at 0.025 [s]



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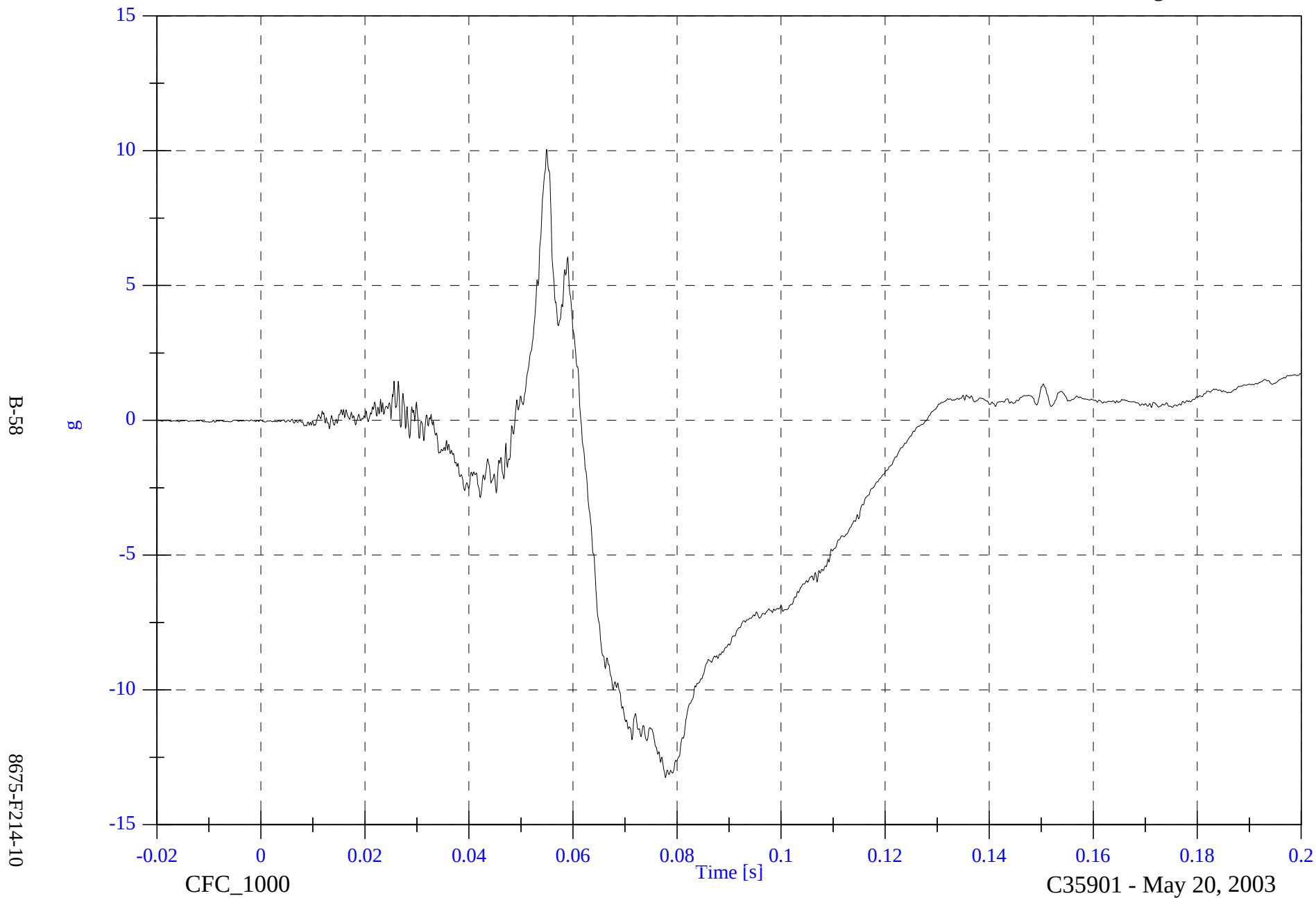
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head z

Max: 10.0 [g] at 0.055 [s]

Min: -13.3 [g] at 0.078 [s]

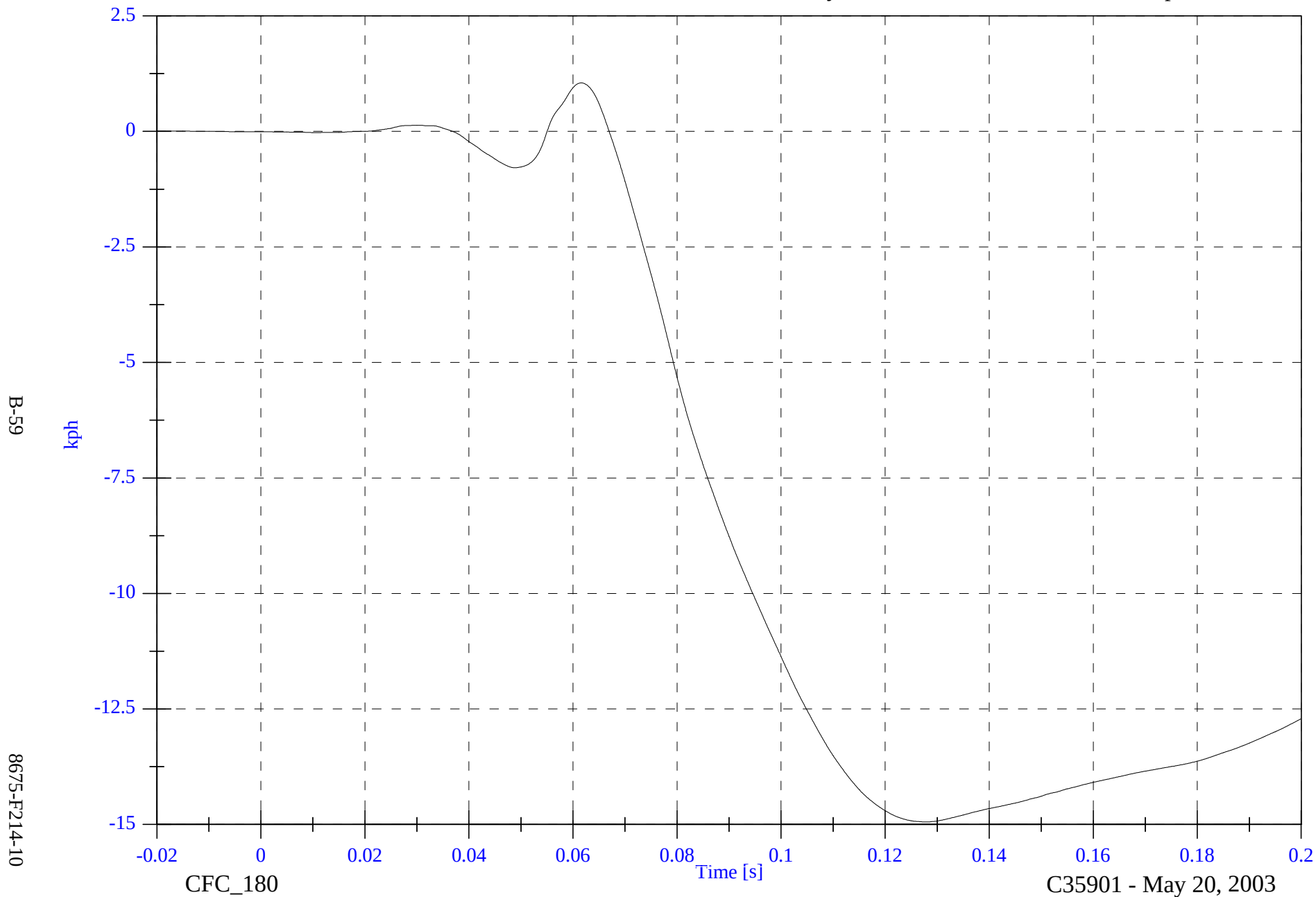


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Head z Velocity

Max: 1.0 [kph] at 0.062 [s]

Min: -14.9 [kph] at 0.128 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

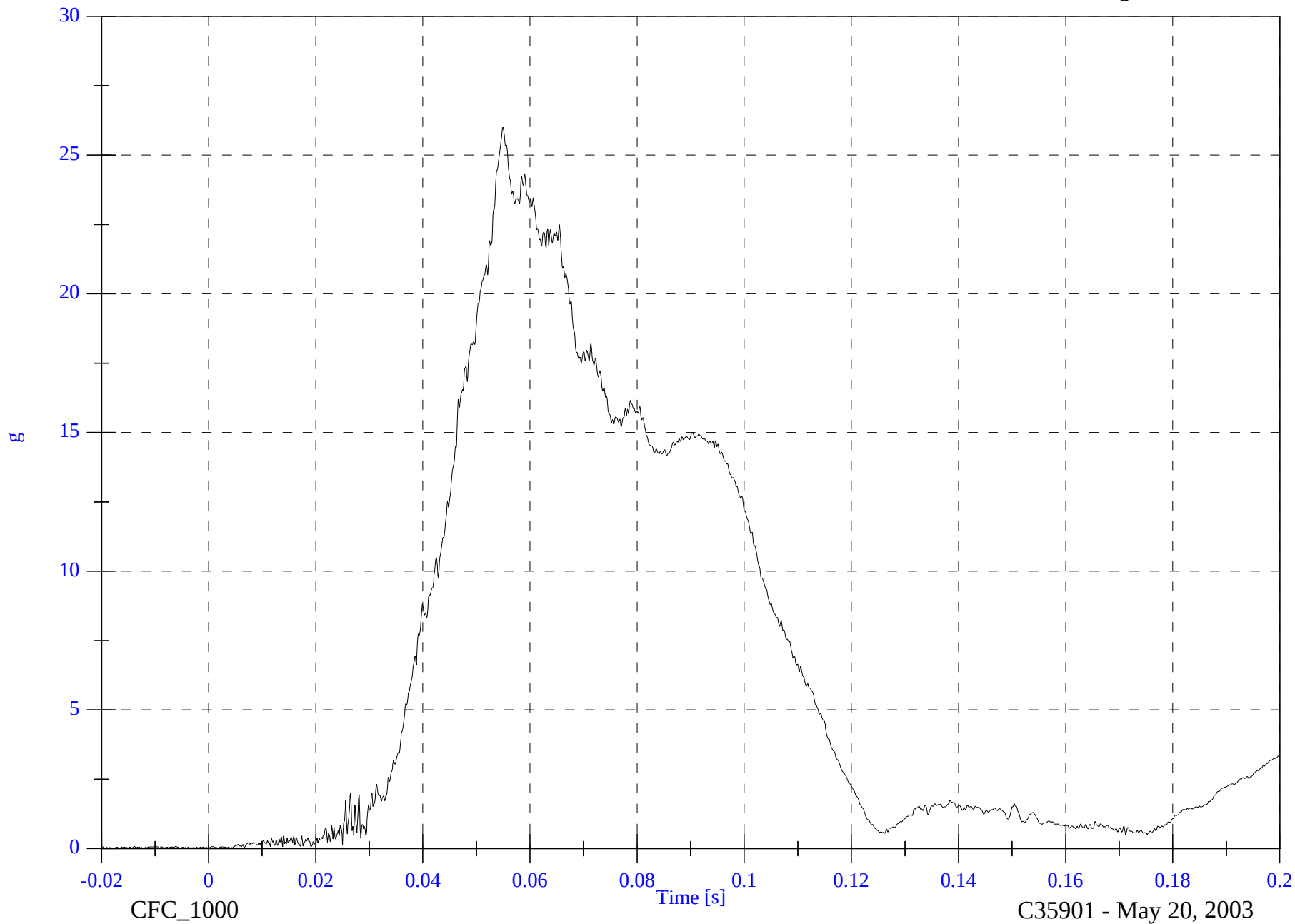
V2P4 Head Resultant

Max: 26.0 [g] at 0.055 [s]

Min: 0.0 [g] at -0.019 [s]

B-60

8675-F214-10

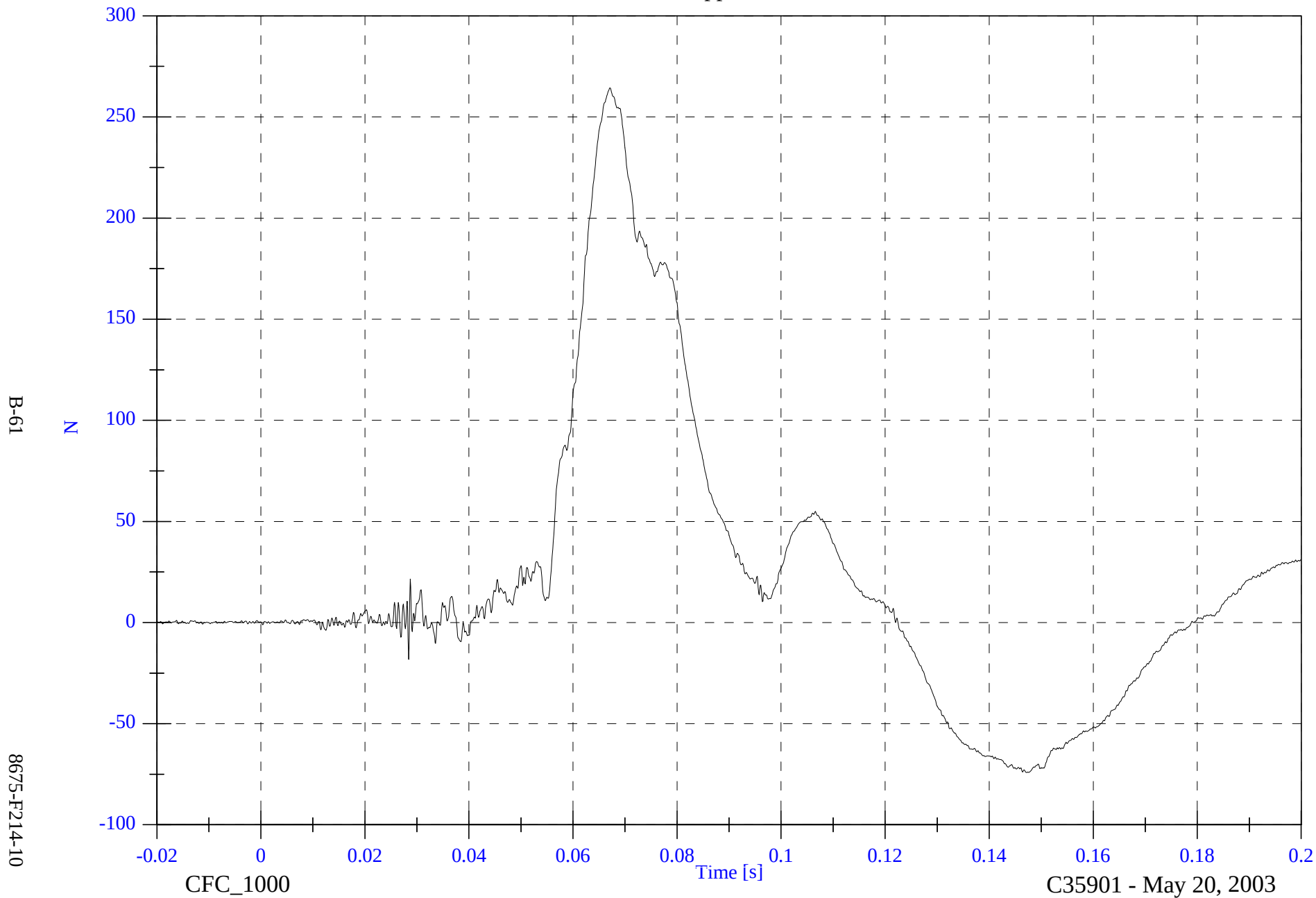


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck Fx

Max: 264.4 [N] at 0.067 [s]

Min: -74.2 [N] at 0.147 [s]

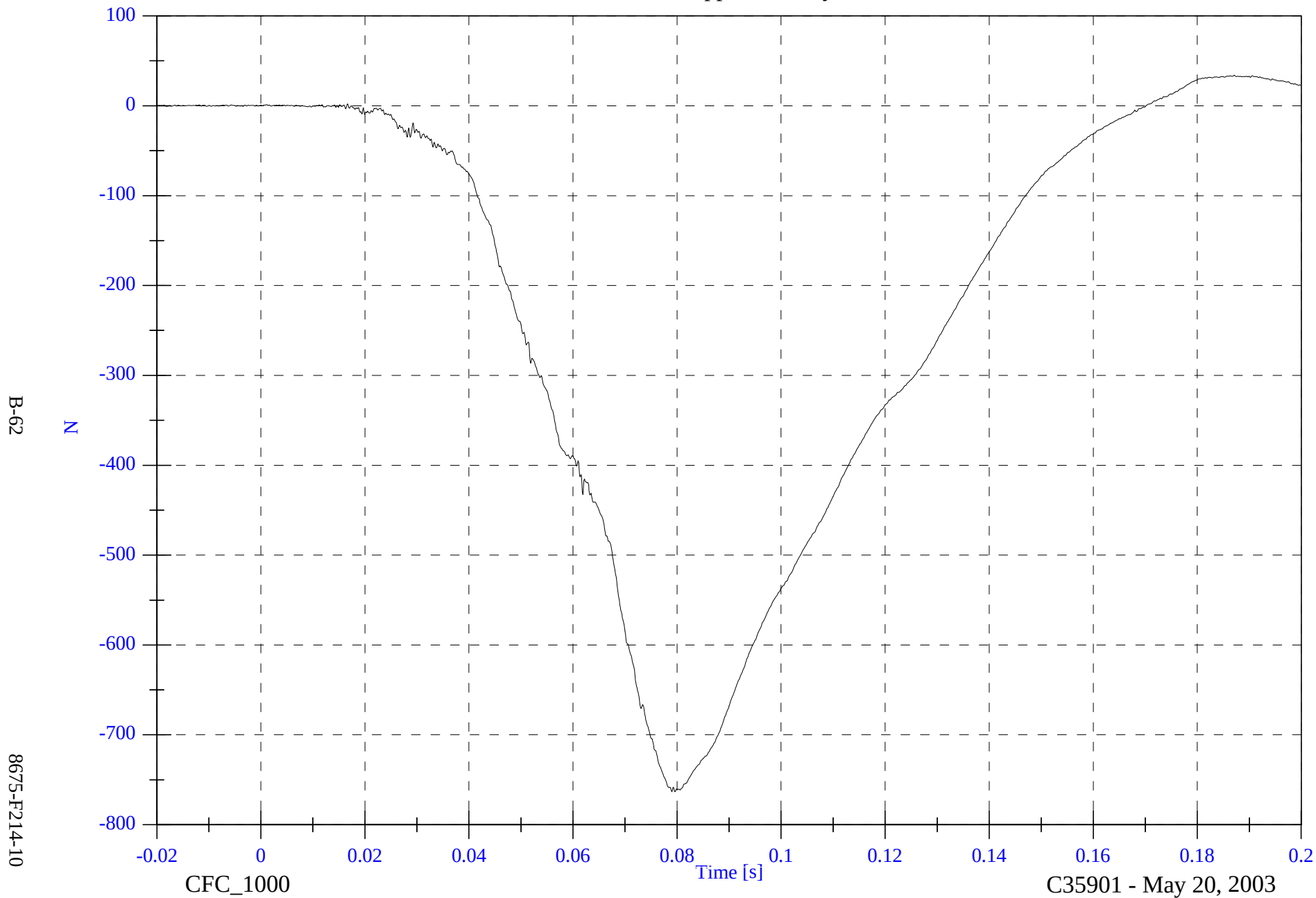


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck Fy

Max: 33.9 [N] at 0.187 [s]

Min: -763.3 [N] at 0.079 [s]

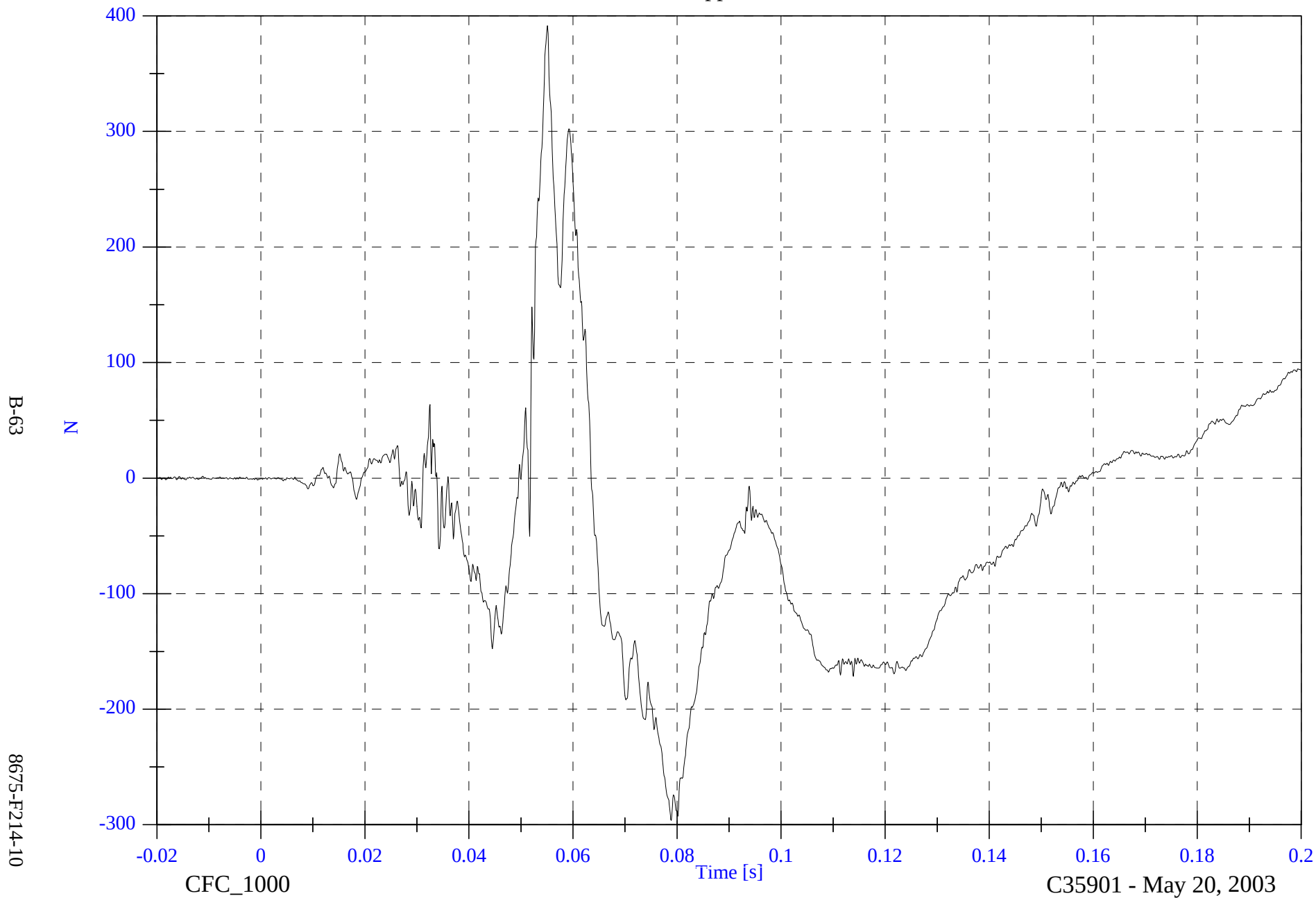


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck Fz

Max: 391.4 [N] at 0.055 [s]

Min: -296.1 [N] at 0.079 [s]

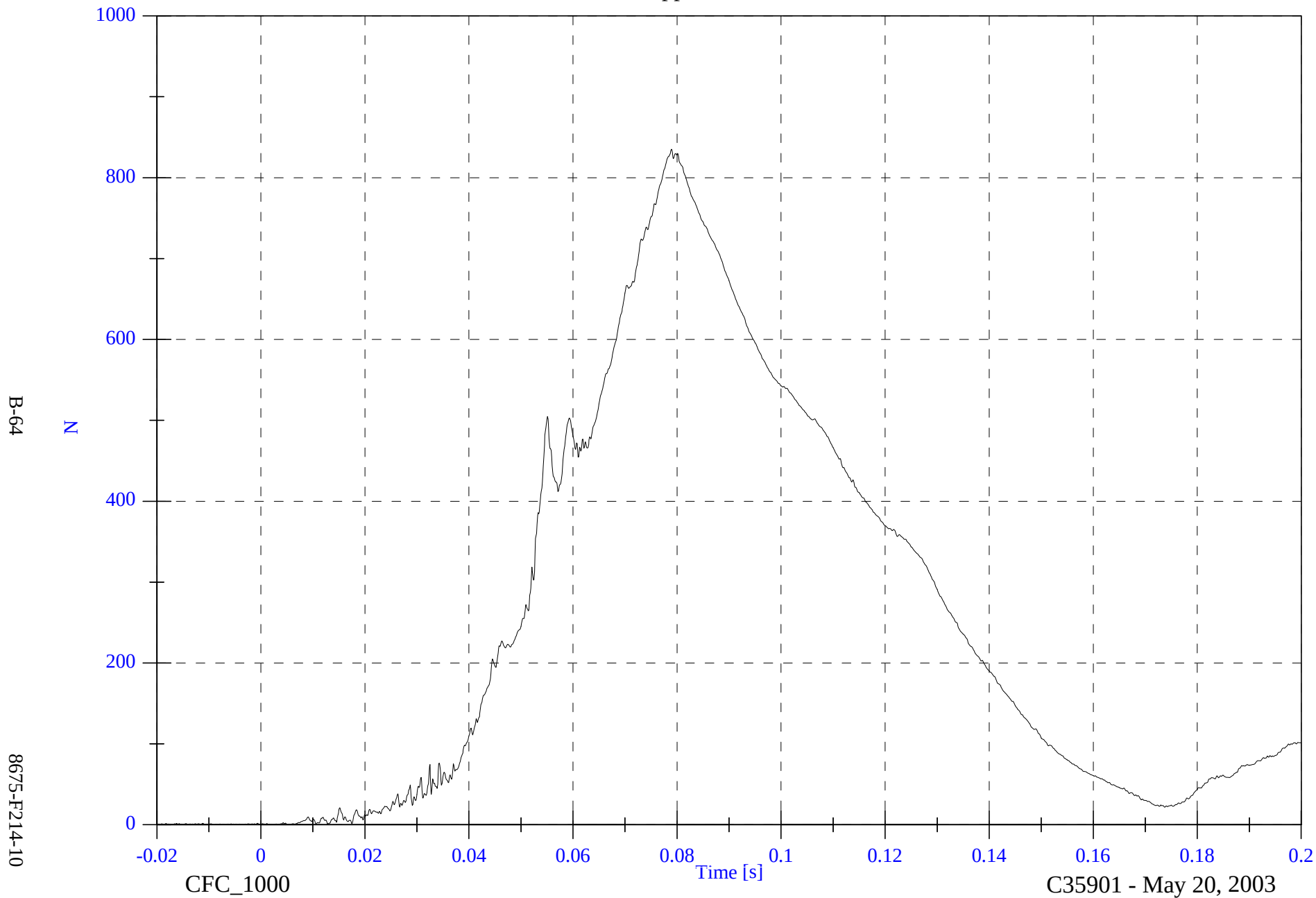


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck F Resultant

Max: 834.9 [N] at 0.079 [s]

Min: 0.2 [N] at -0.009 [s]

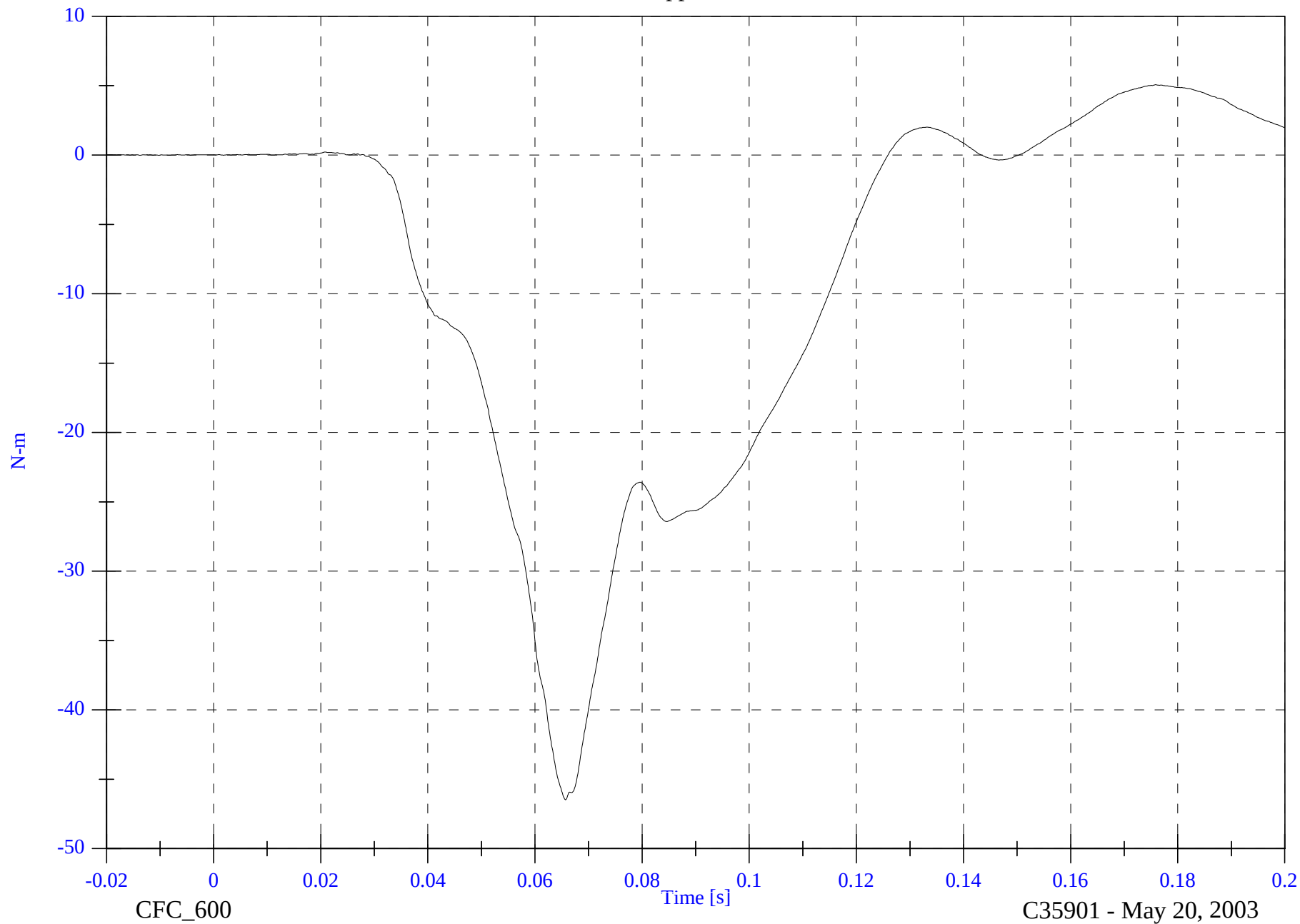


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck Mx

Max: 5.1 [N-m] at 0.176 [s]

Min: -46.5 [N-m] at 0.066 [s]



B-65

8675-F214-10

CFC_600

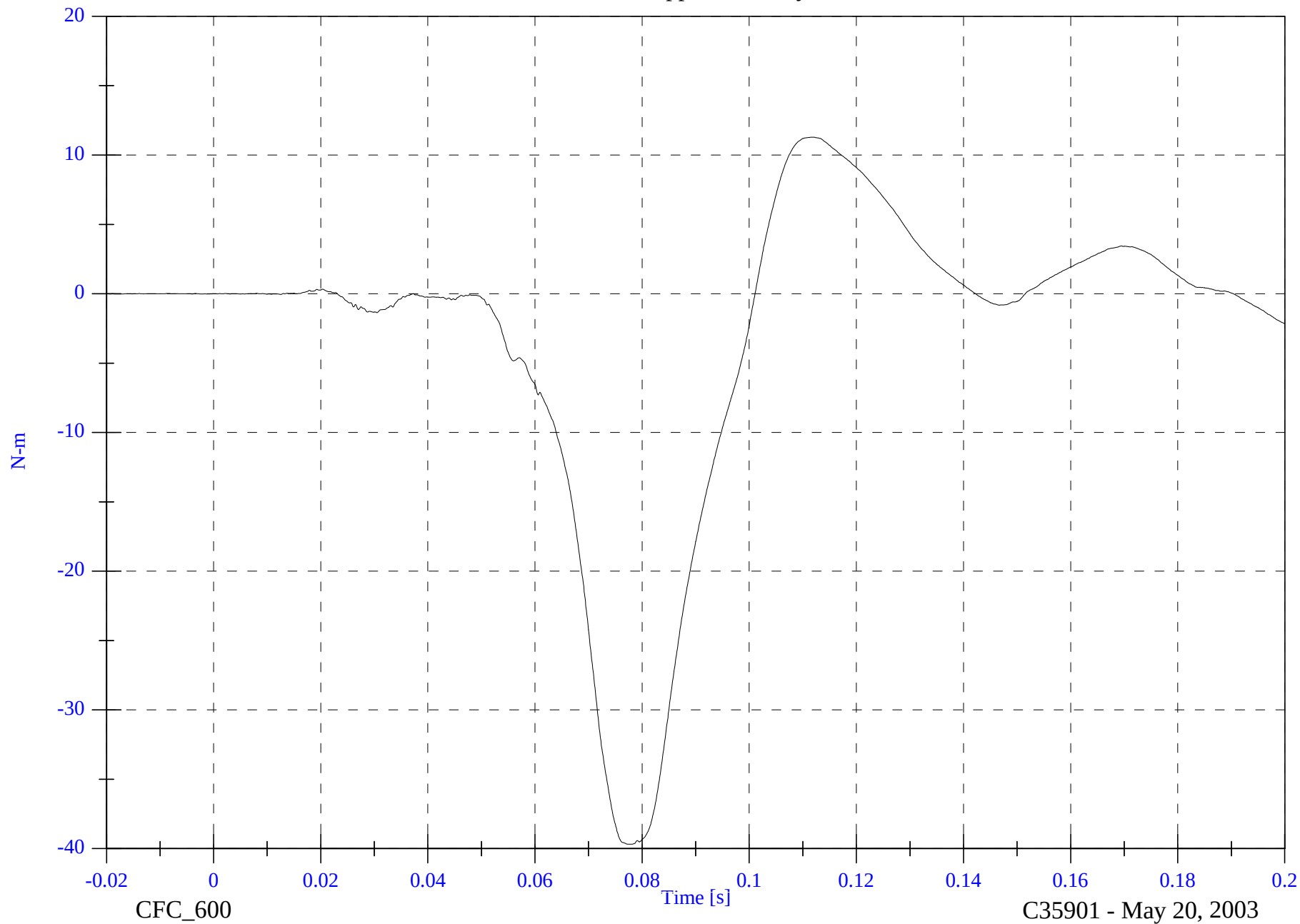
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck My

Max: 11.3 [N-m] at 0.112 [s]

Min: -39.7 [N-m] at 0.078 [s]



B-66

8675-F214-10

CFC_600

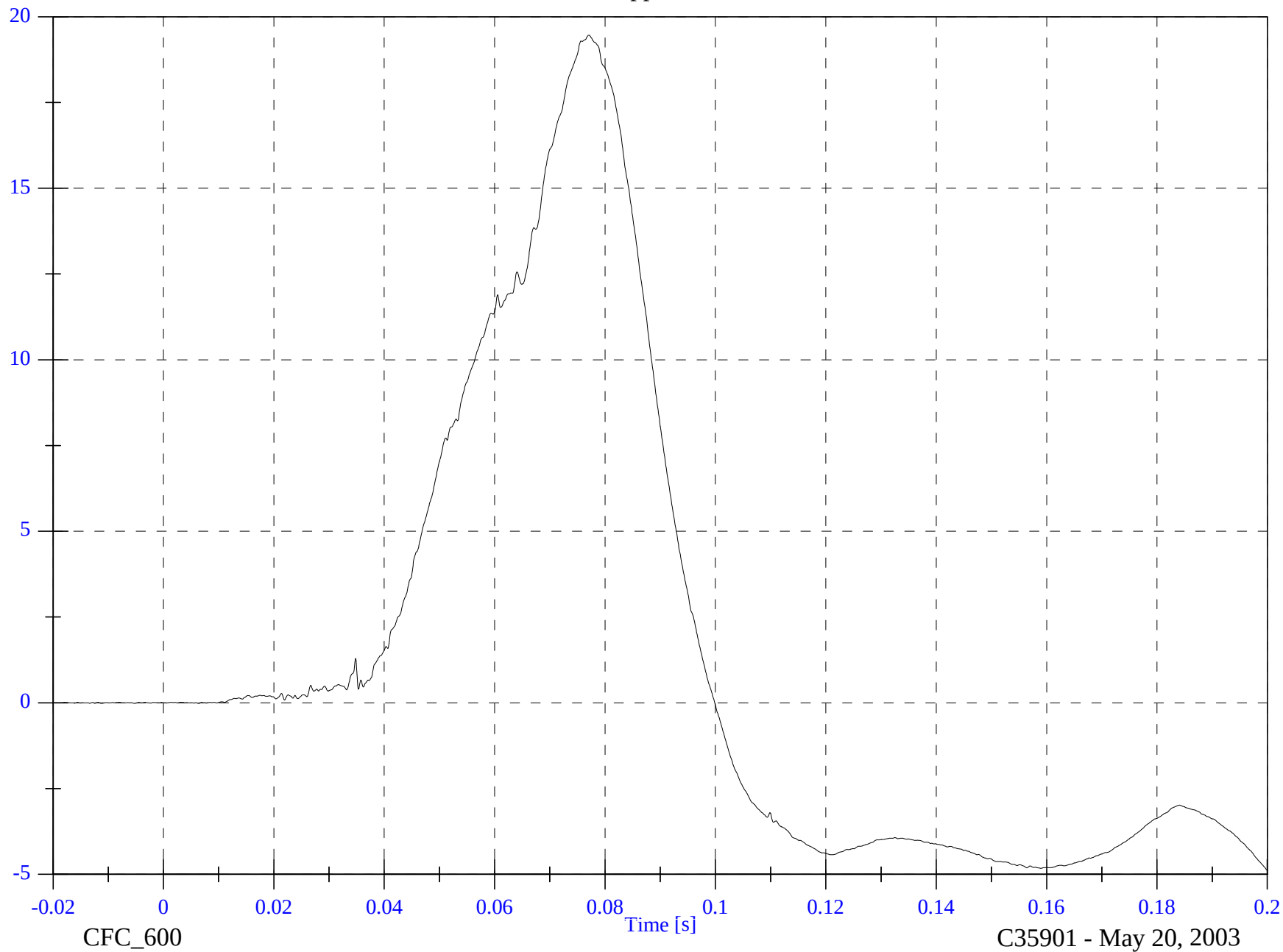
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck Mz

Max: 19.5 [N-m] at 0.077 [s]

Min: -4.9 [N-m] at 0.200 [s]



B-67

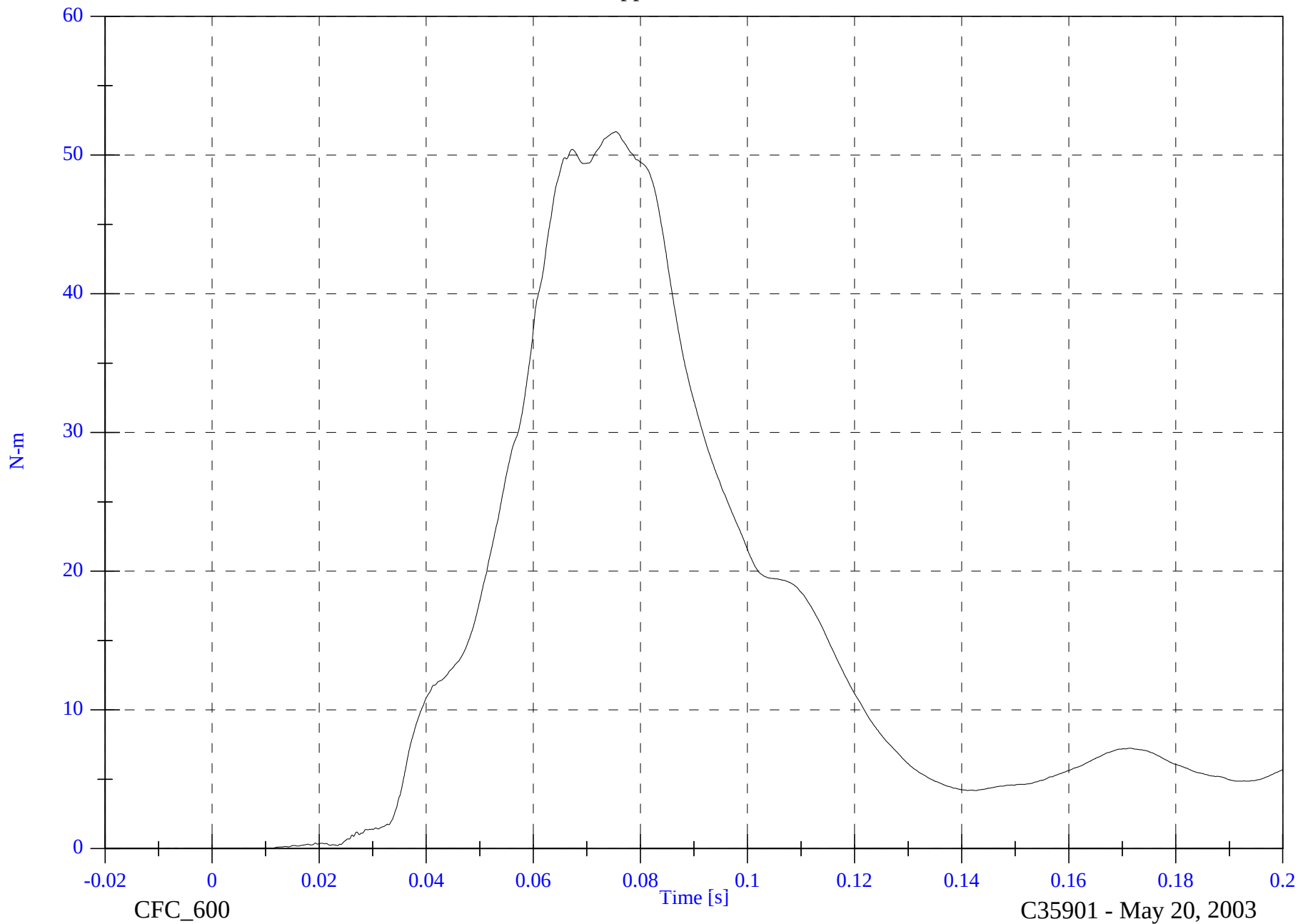
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Neck M Resultant

Max: 51.7 [N-m] at 0.075 [s]

Min: 0.0 [N-m] at -0.006 [s]



B-68

8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

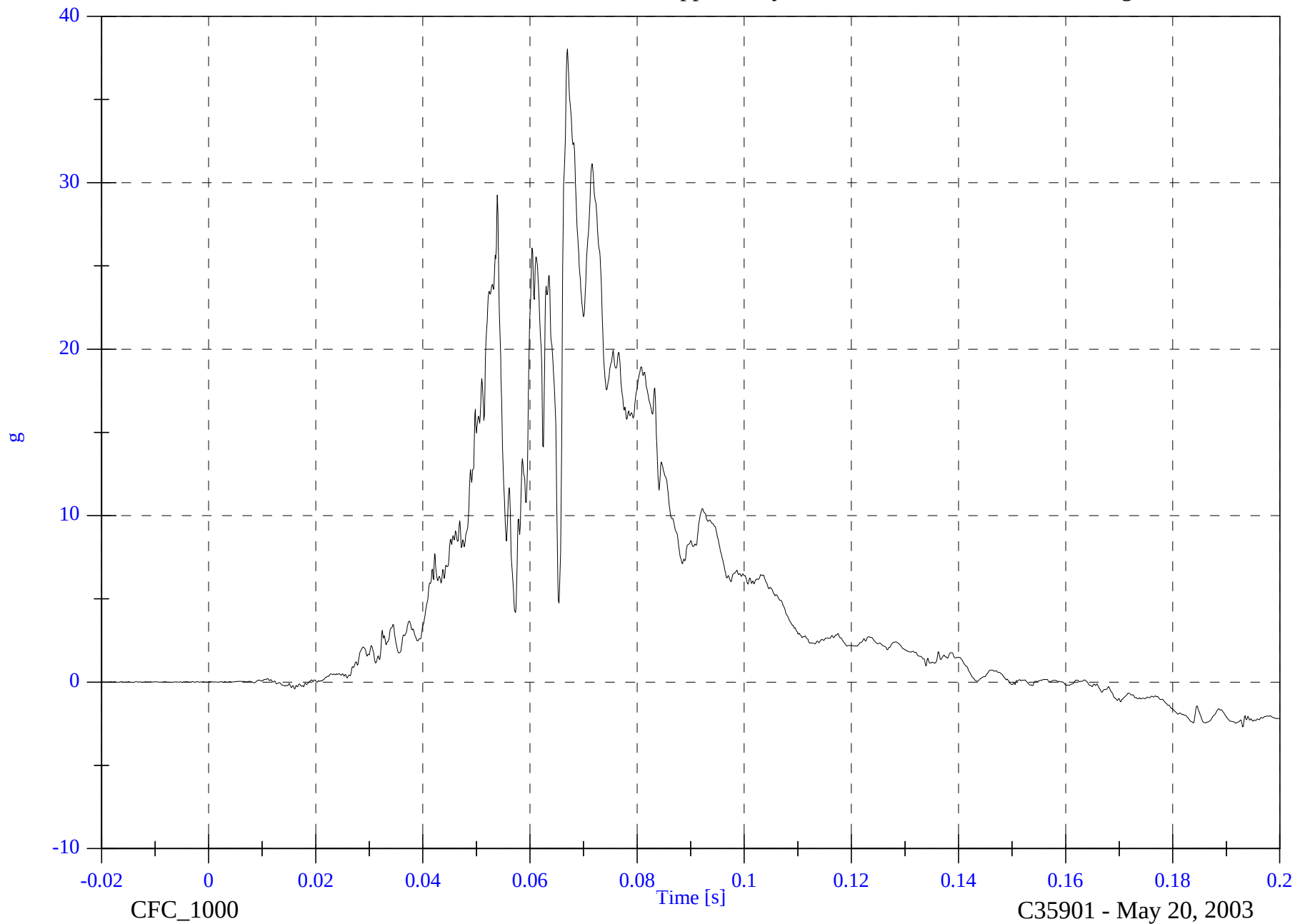
V2P4 Upper Rib y

Max: 38.0 [g] at 0.067 [s]

Min: -2.7 [g] at 0.193 [s]

B-69

8675-F214-10

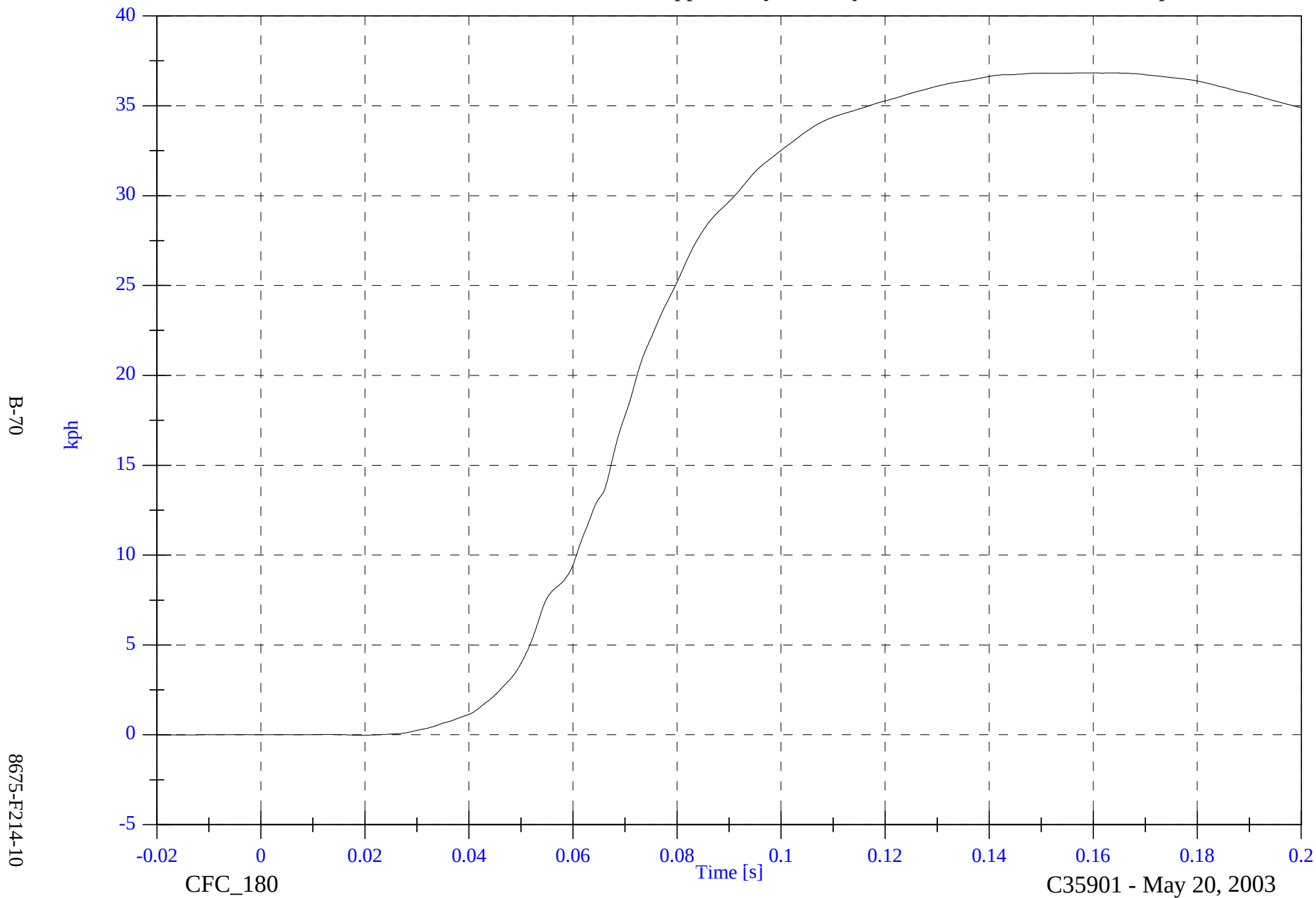


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Rib y Velocity

Max: 36.8 [kph] at 0.159 [s]

Min: -0.0 [kph] at 0.019 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

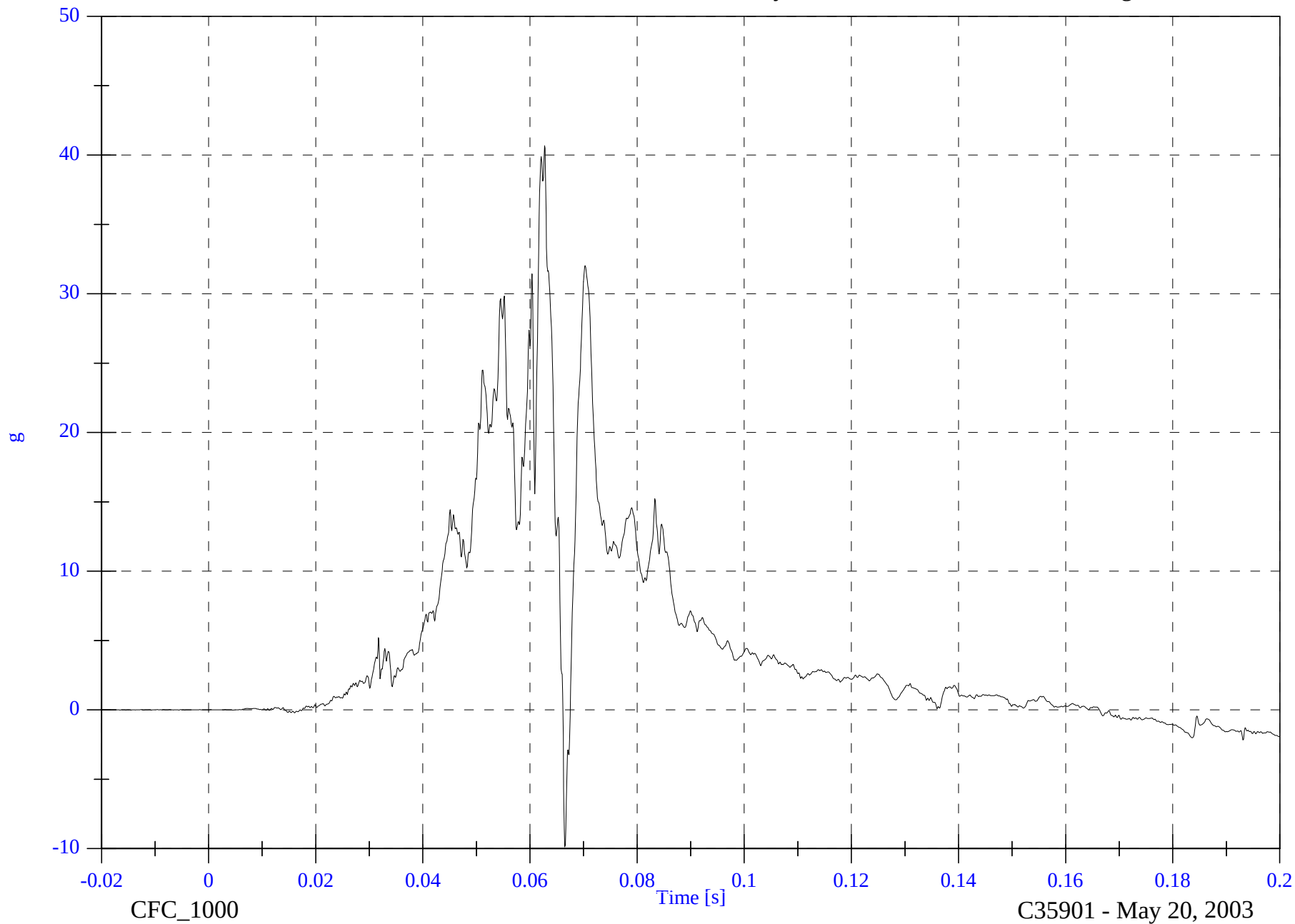
V2P4 Lower Rib y

Max: 40.7 [g] at 0.063 [s]

Min: -9.9 [g] at 0.067 [s]

B-71

8675-F214-10

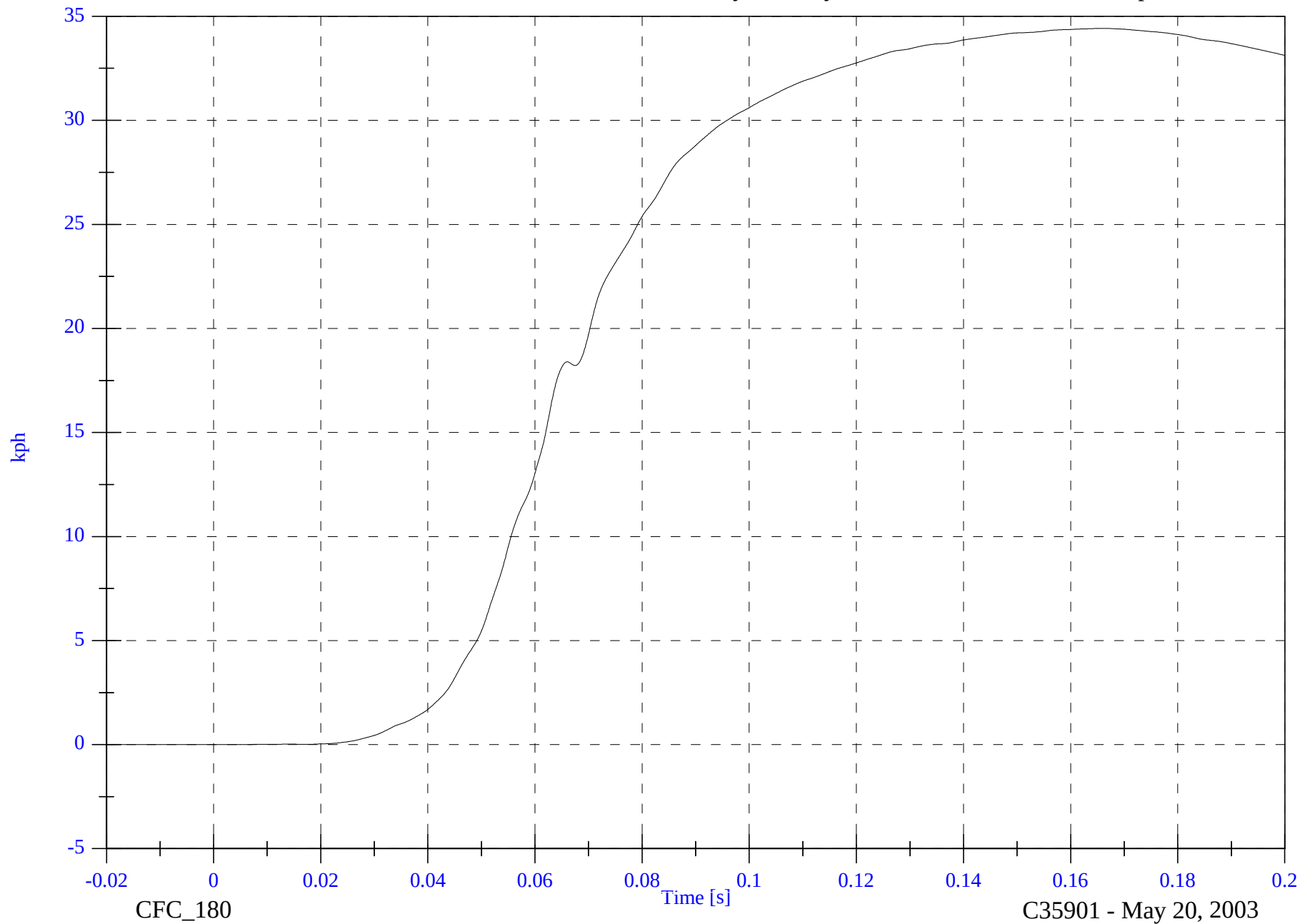


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Rib y Velocity

Max: 34.4 [kph] at 0.166 [s]

Min: -0.0 [kph] at -0.020 [s]



B-72

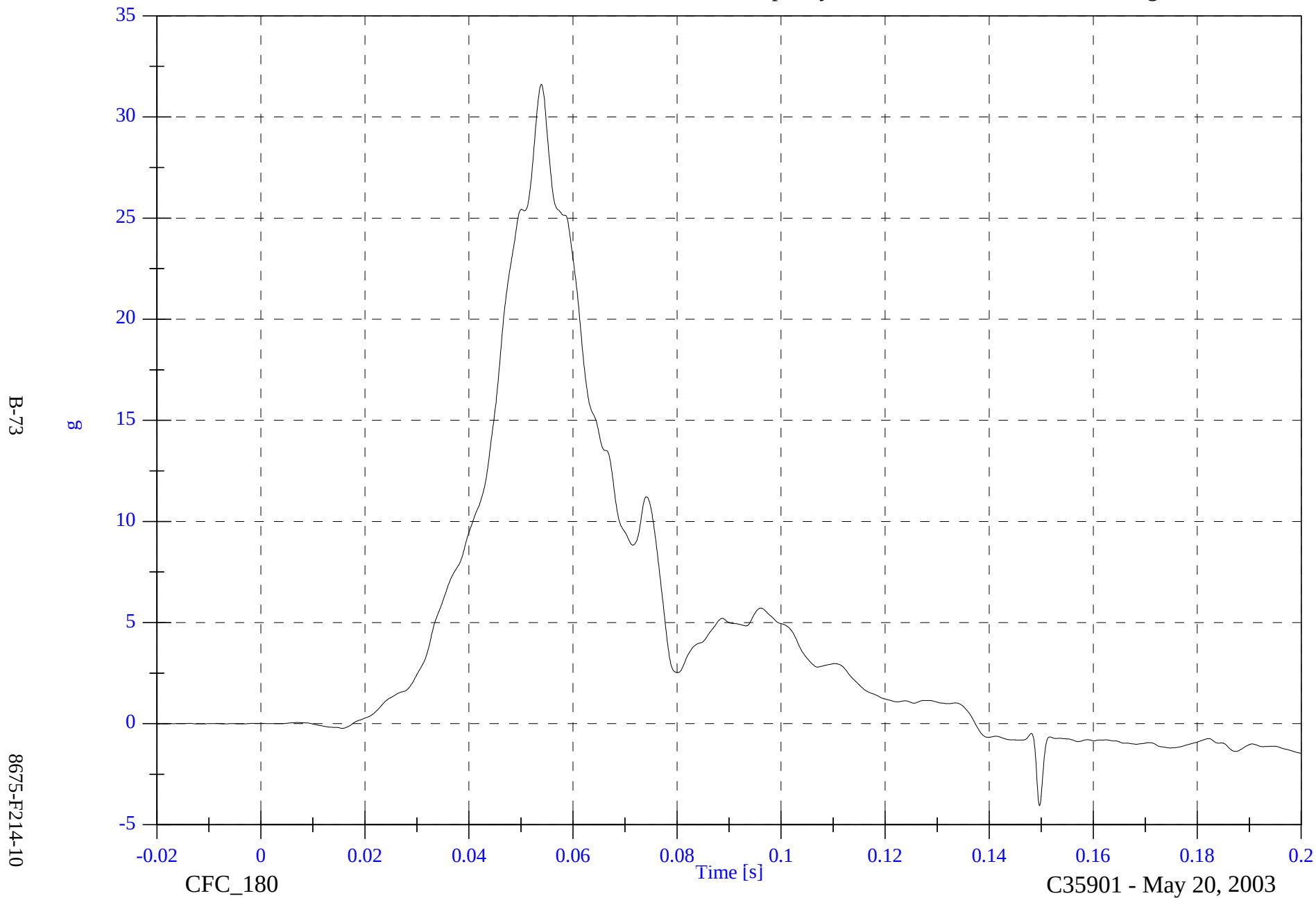
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Spine y

Max: 31.6 [g] at 0.054 [s]

Min: -4.1 [g] at 0.150 [s]

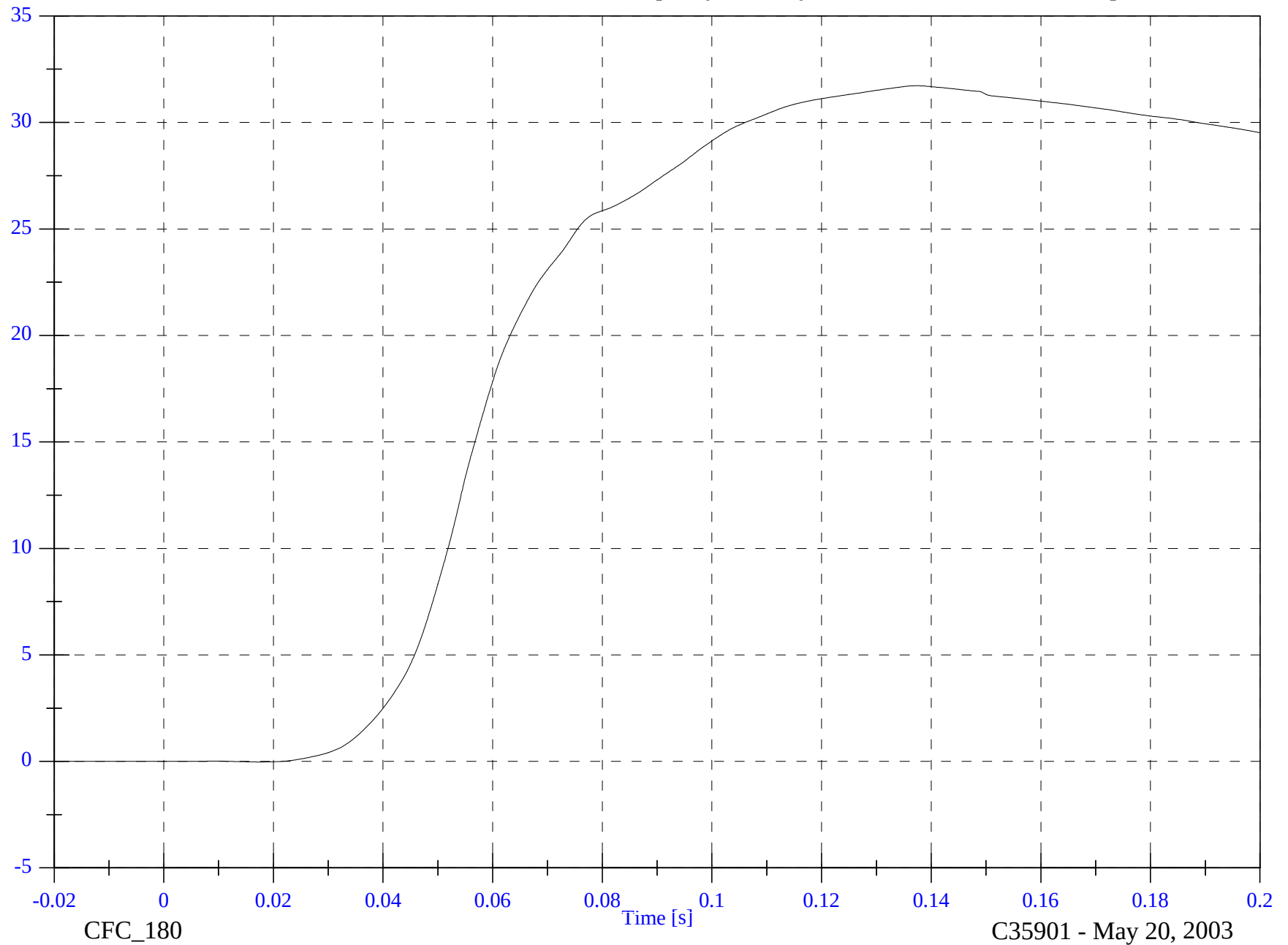


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Spine y Velocity

Max: 31.7 [kph] at 0.137 [s]

Min: -0.0 [kph] at 0.018 [s]



B-74

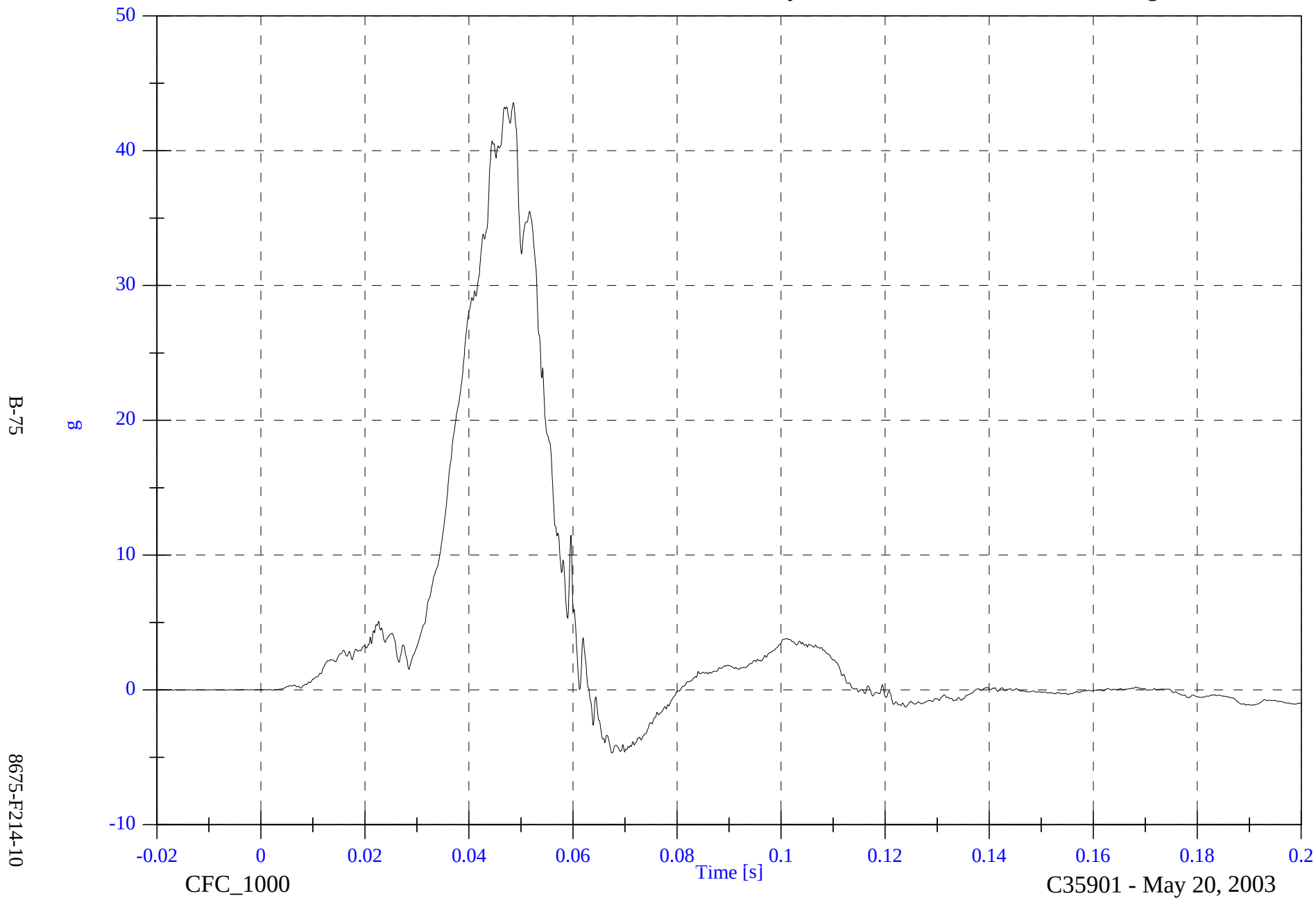
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Pelvic y

Max: 43.5 [g] at 0.049 [s]

Min: -4.7 [g] at 0.067 [s]

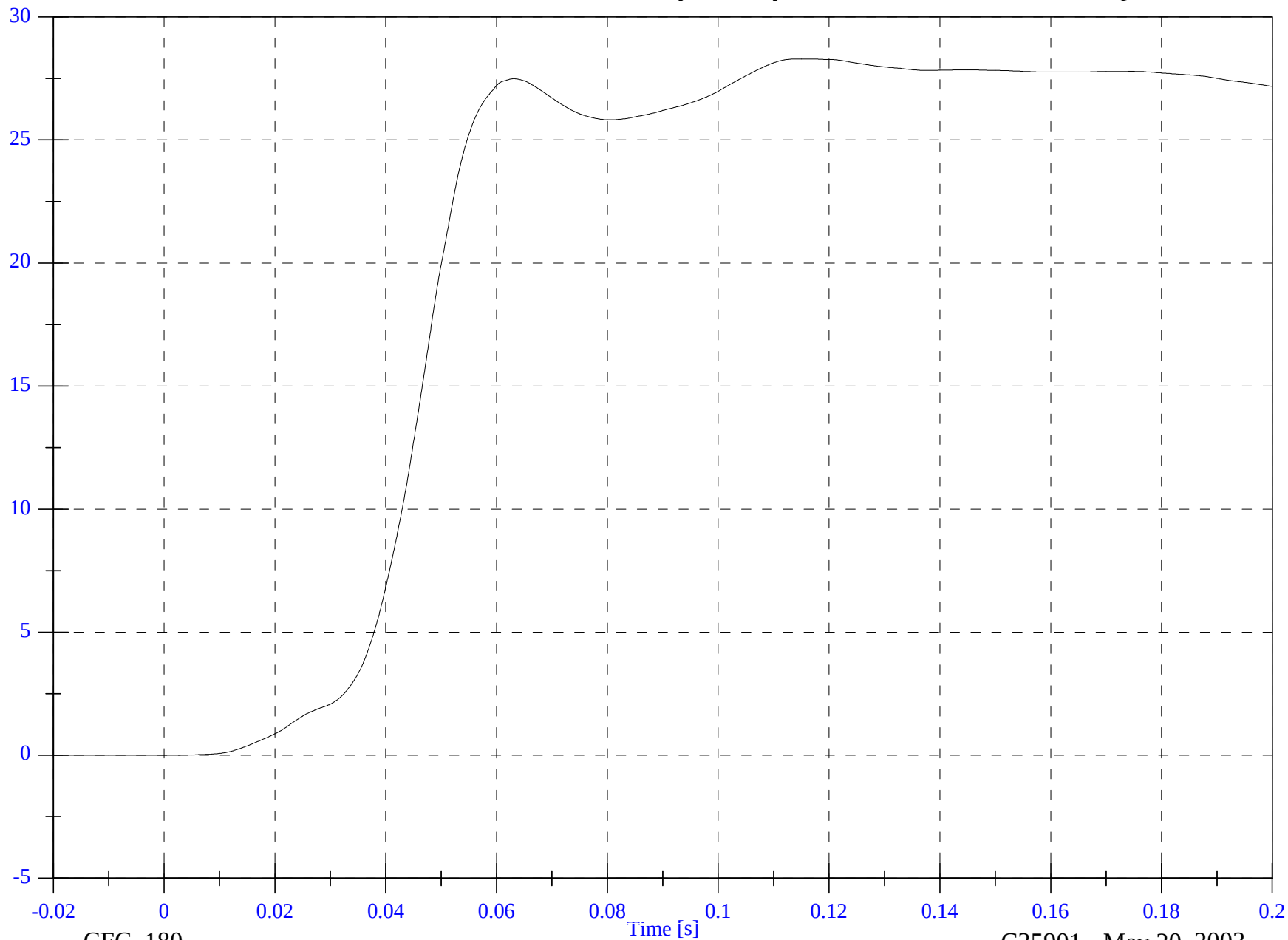


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Pelvic y Velocity

Max: 28.3 [kph] at 0.115 [s]

Min: -0.0 [kph] at -0.010 [s]



B-76

8675-F214-10

CFC_180

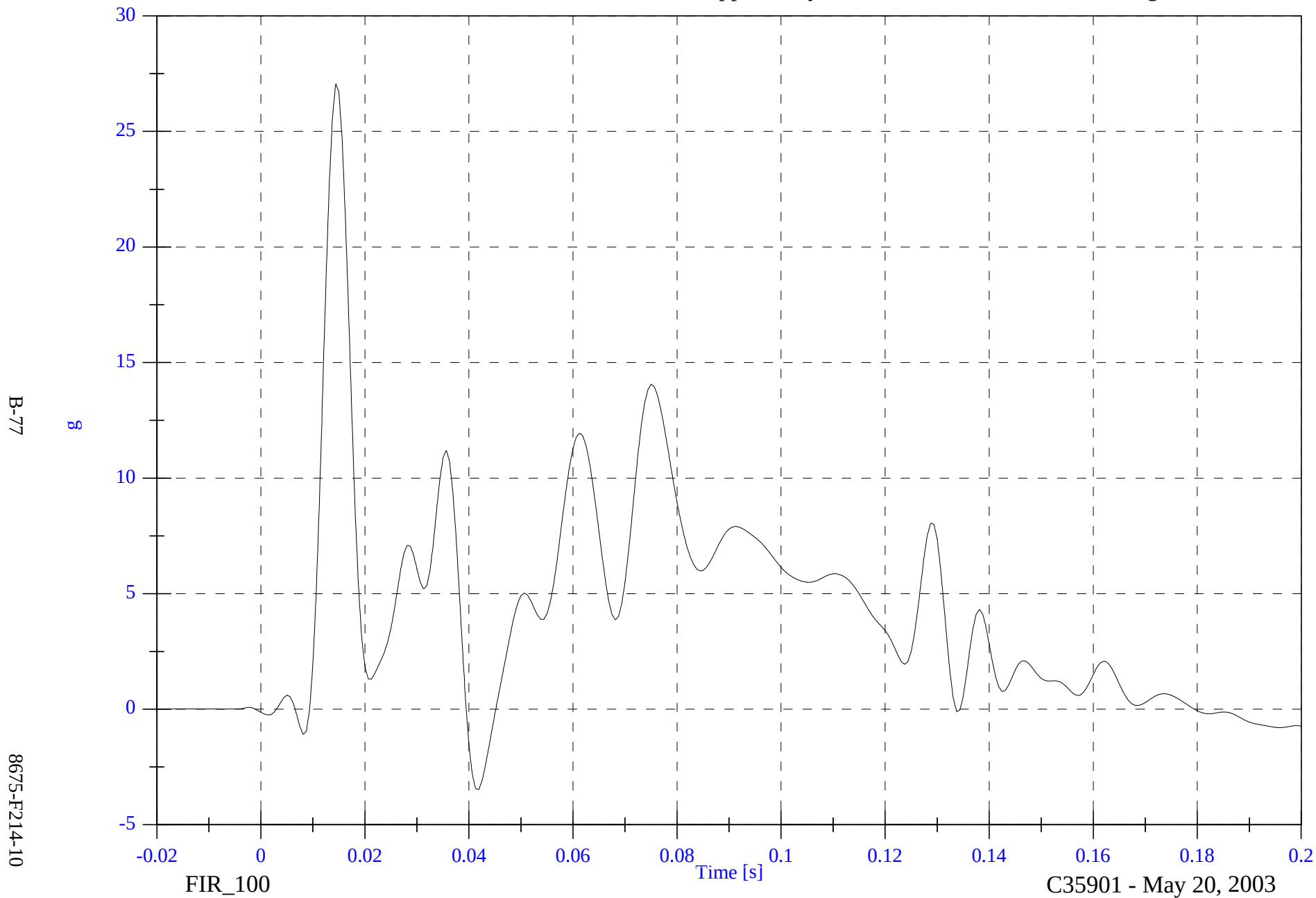
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Rib y

Max: 27.1 [g] at 0.014 [s]

Min: -3.5 [g] at 0.042 [s]

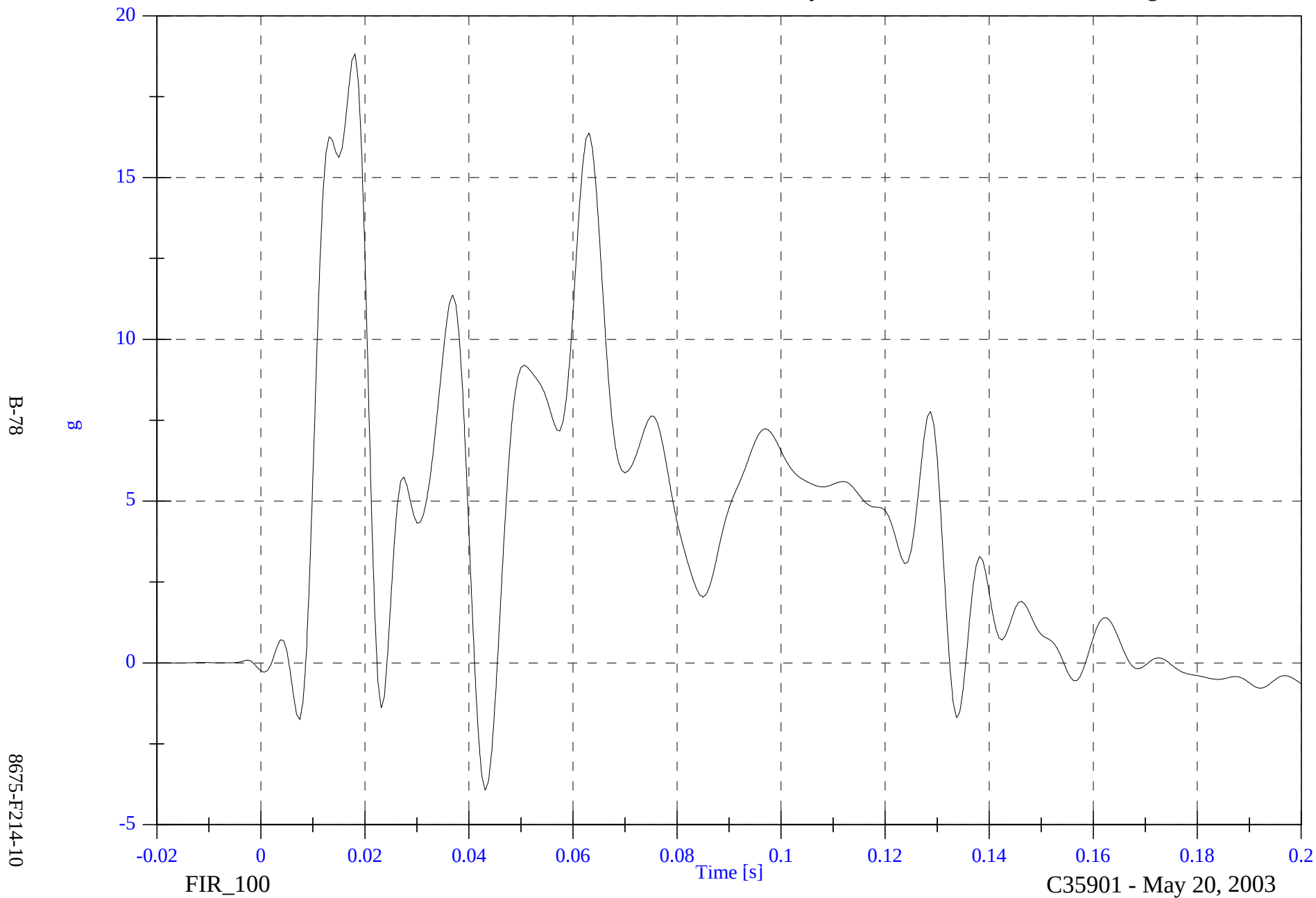


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Rib y

Max: 18.8 [g] at 0.018 [s]

Min: -3.9 [g] at 0.043 [s]

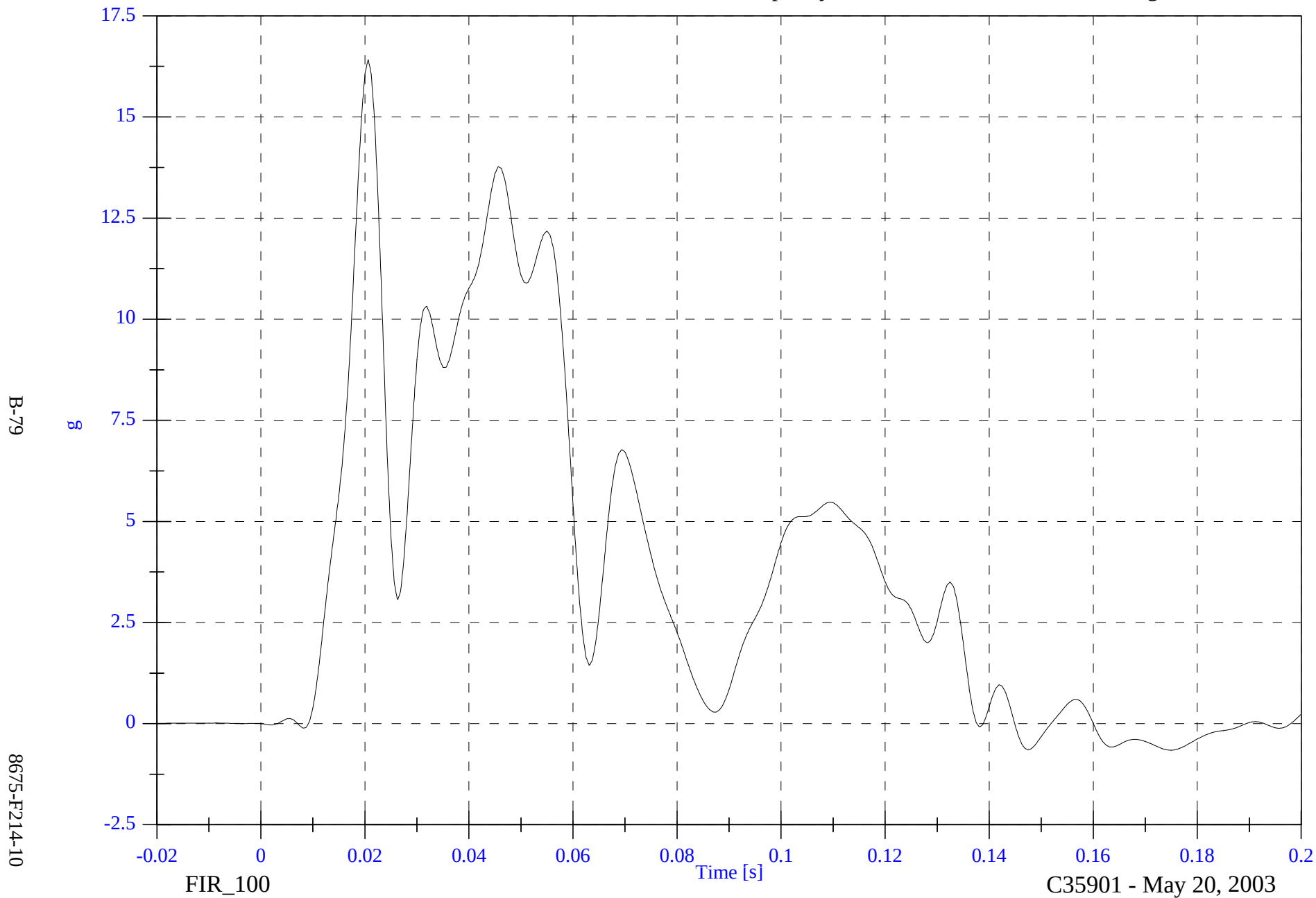


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Spine y

Max: 16.4 [g] at 0.021 [s]

Min: -0.7 [g] at 0.175 [s]

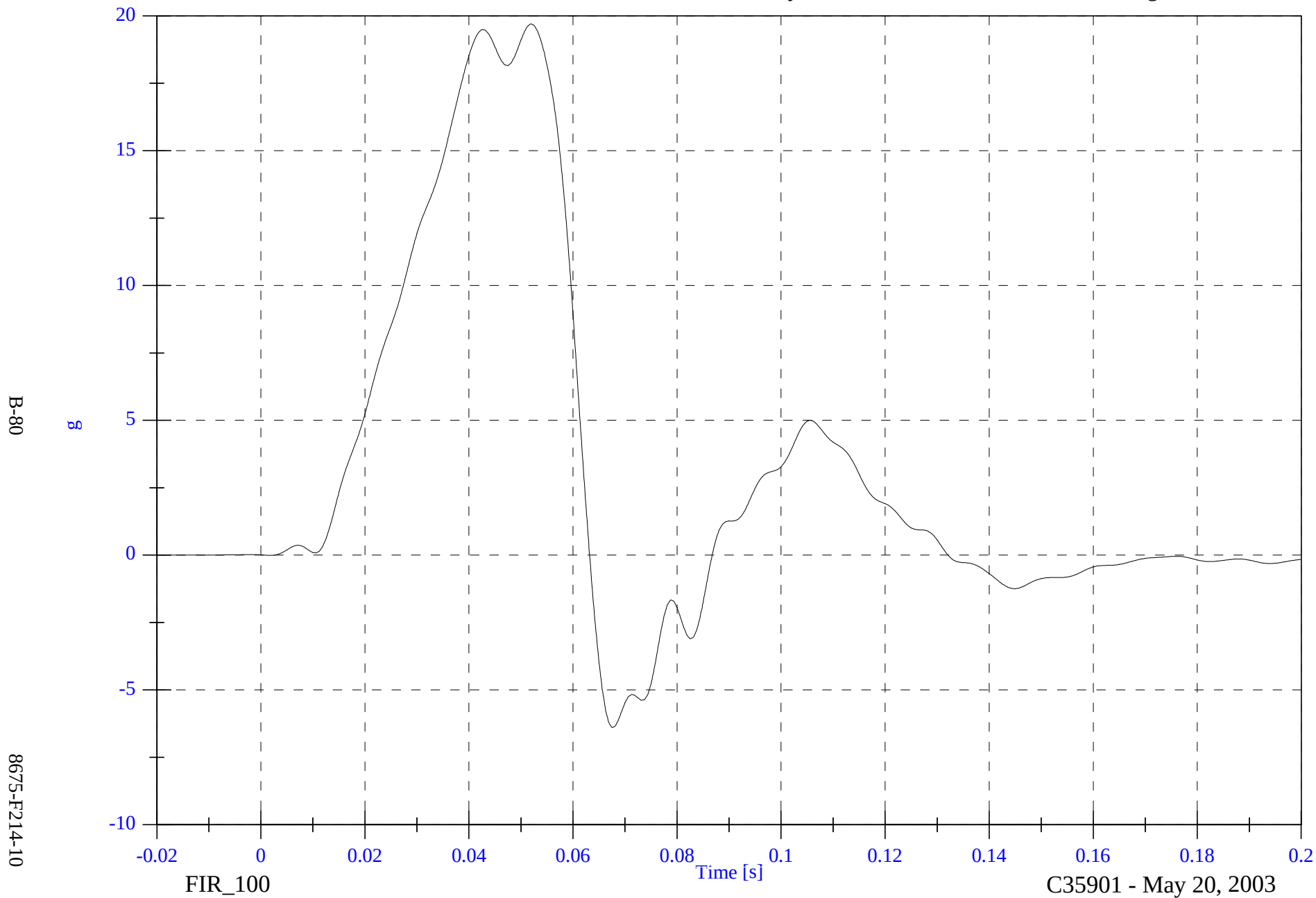


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Pelvic y

Max: 19.7 [g] at 0.052 [s]

Min: -6.4 [g] at 0.067 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Rib y

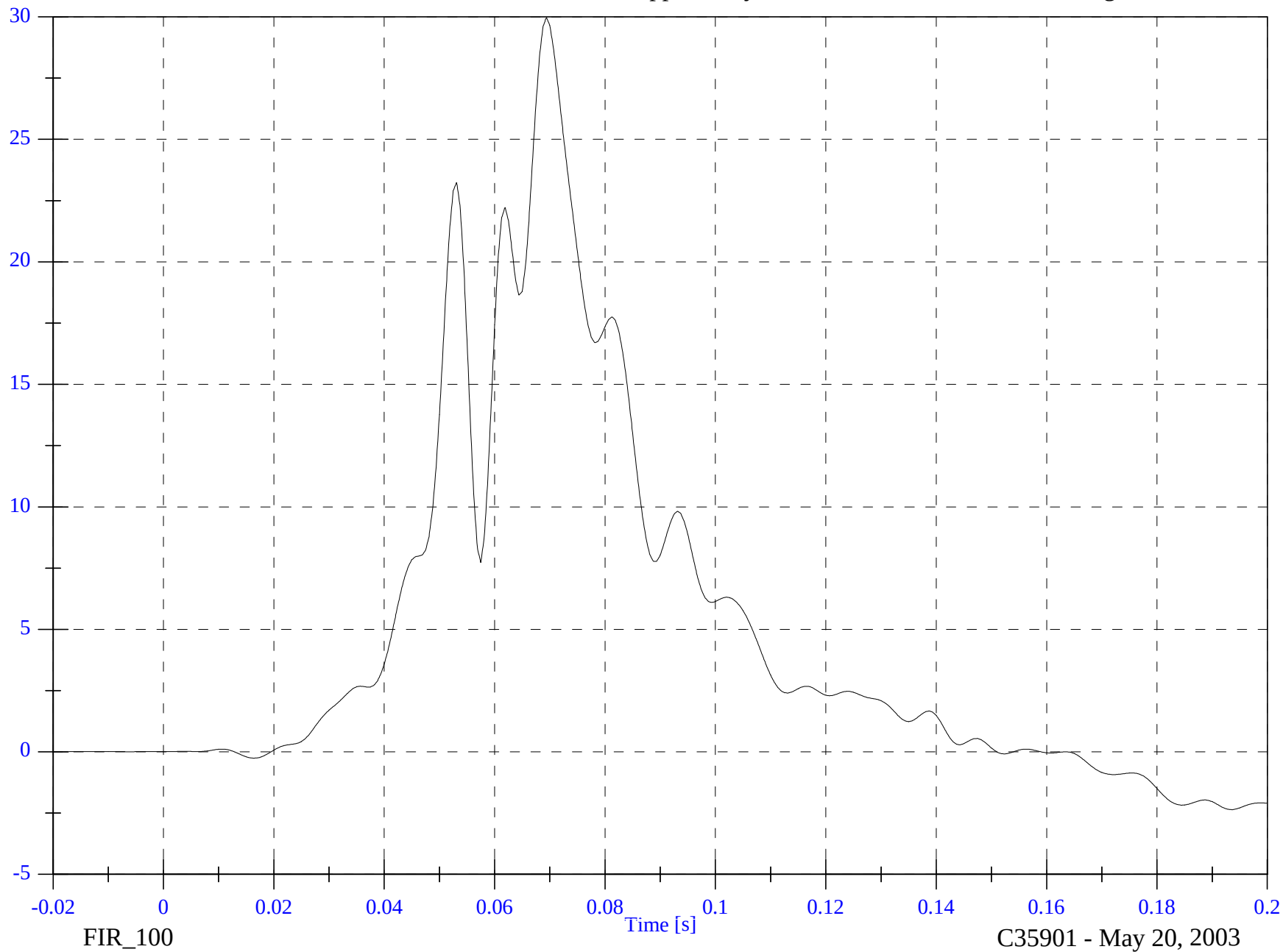
Max: 30.0 [g] at 0.069 [s]

Min: -2.4 [g] at 0.194 [s]

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8675-F214-10

g



FMVSS 214D Indicant - 2003 Volvo XC90

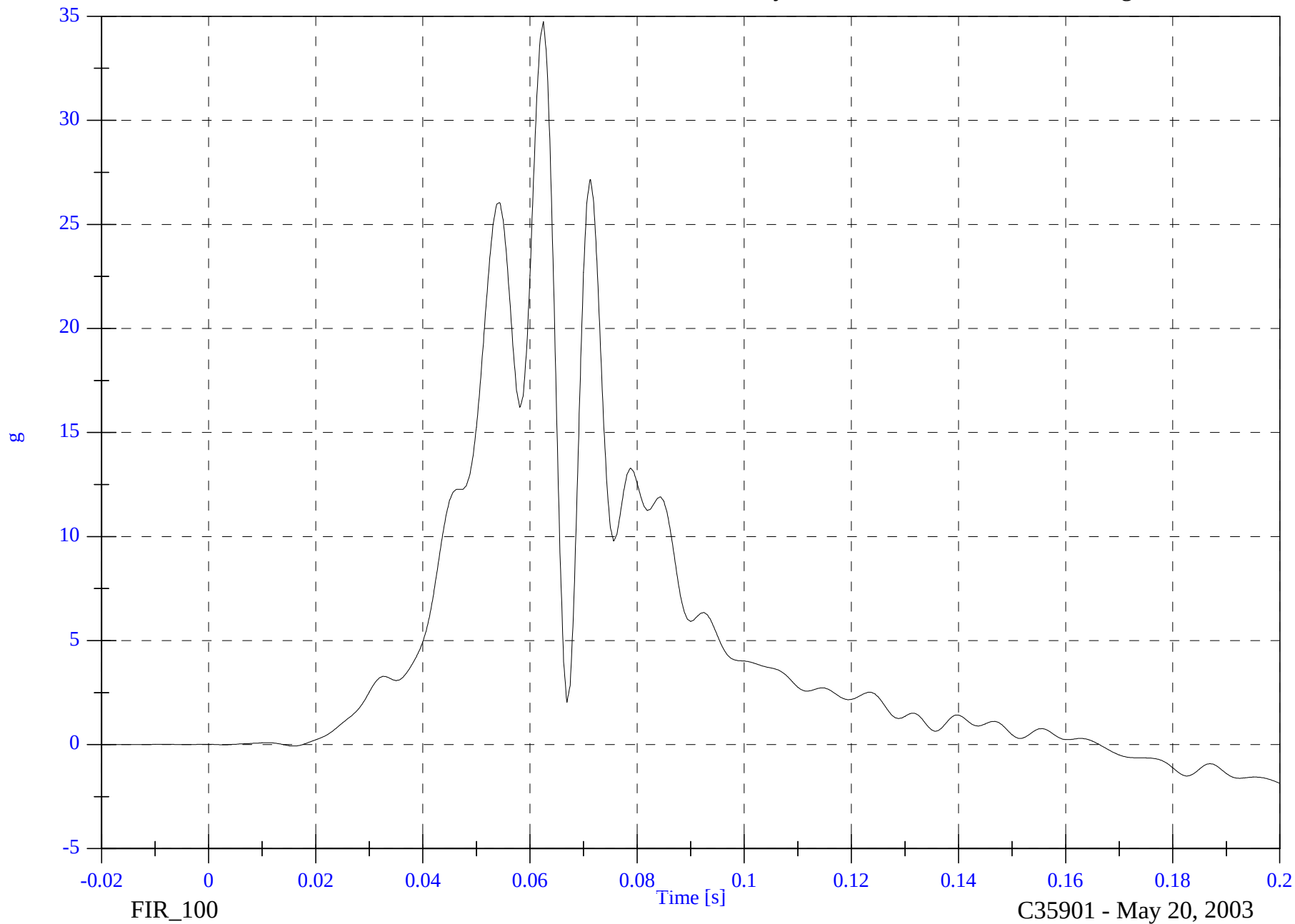
V2P4 Lower Rib y

Max: 34.7 [g] at 0.062 [s]

Min: -1.9 [g] at 0.200 [s]

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8675-F214-10



FMVSS 214D Indicant - 2003 Volvo XC90

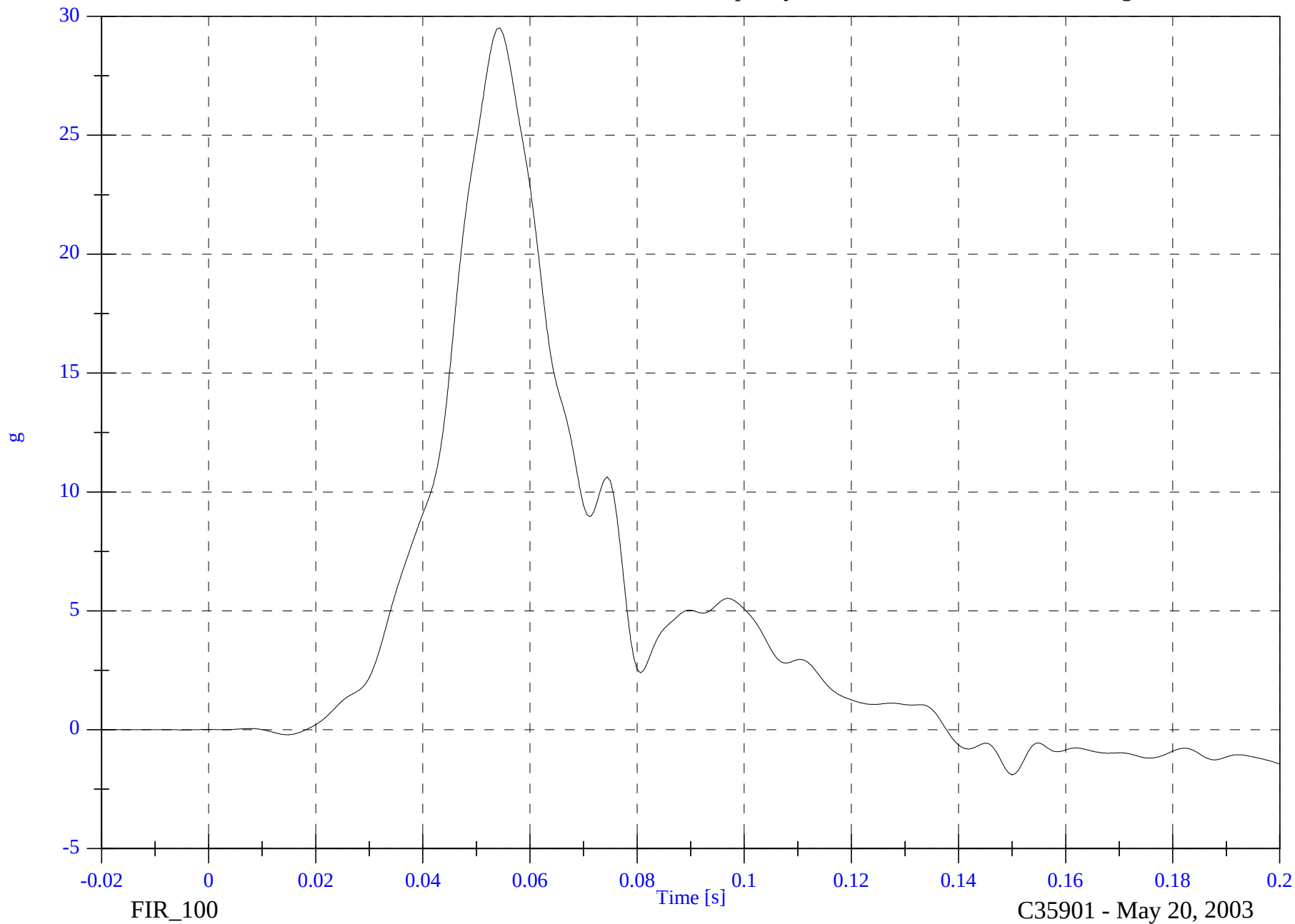
V2P4 Lower Spine y

Max: 29.5 [g] at 0.054 [s]

Min: -1.9 [g] at 0.150 [s]

B-83

8675-F214-10

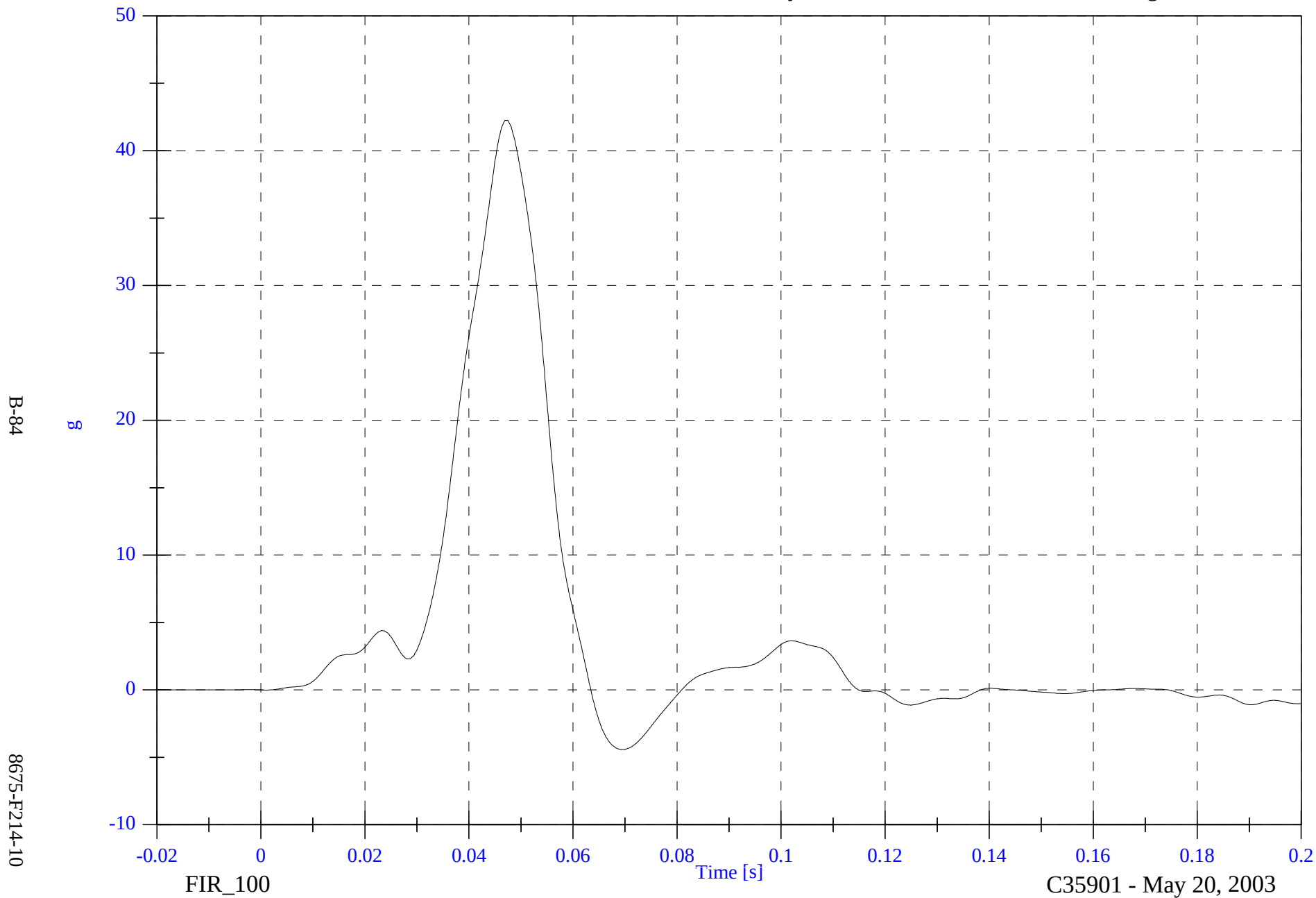


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Pelvic y

Max: 42.2 [g] at 0.048 [s]

Min: -4.4 [g] at 0.069 [s]

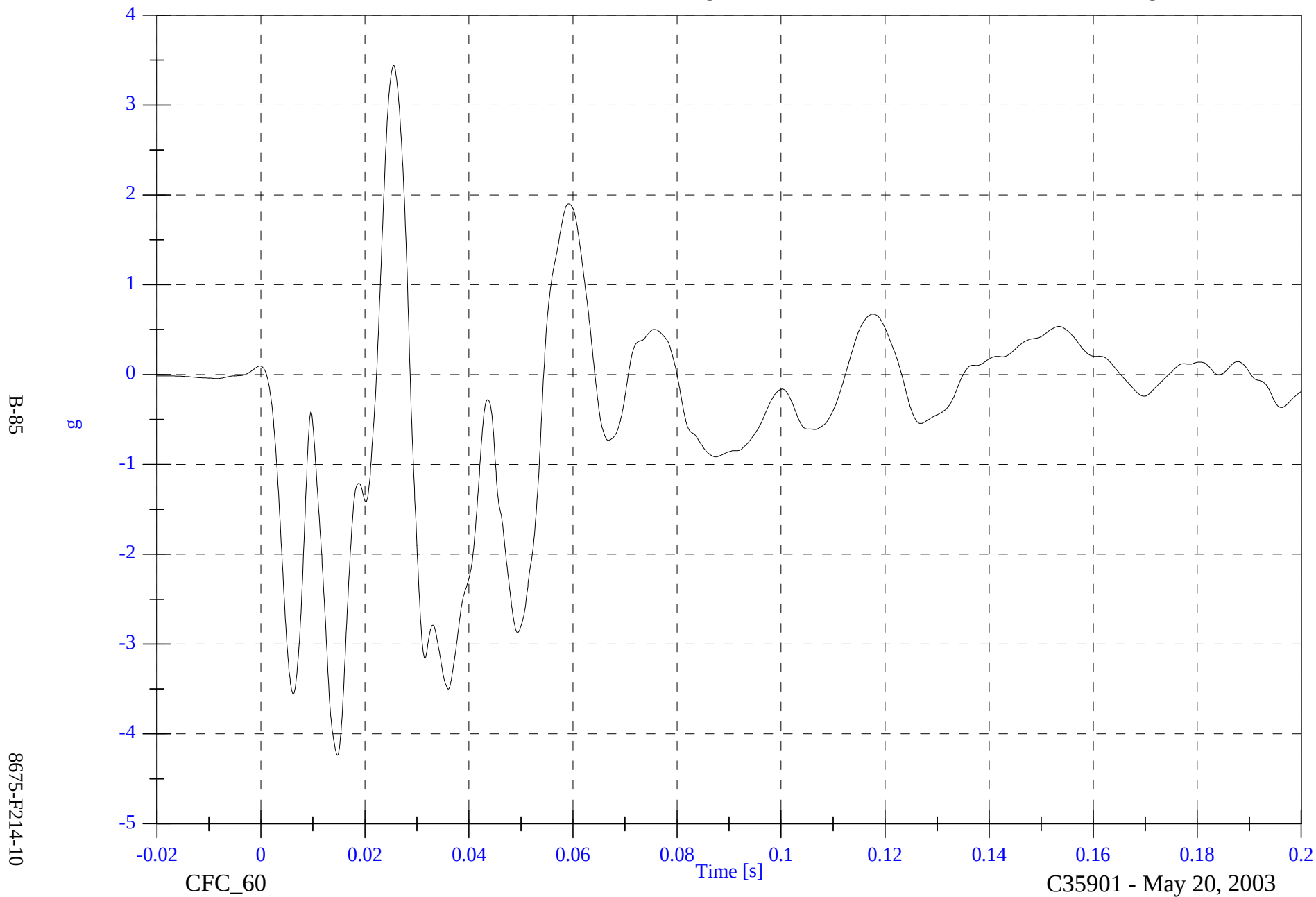


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A1 Right Front Sill x

Max: 3.4 [g] at 0.025 [s]

Min: -4.2 [g] at 0.015 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

V2 A1 Right Front Sill x Velocity

Max: 0.0 [kph] at -0.020 [s]

Min: -3.2 [kph] at 0.112 [s]



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8675-F214-10

CFC_180

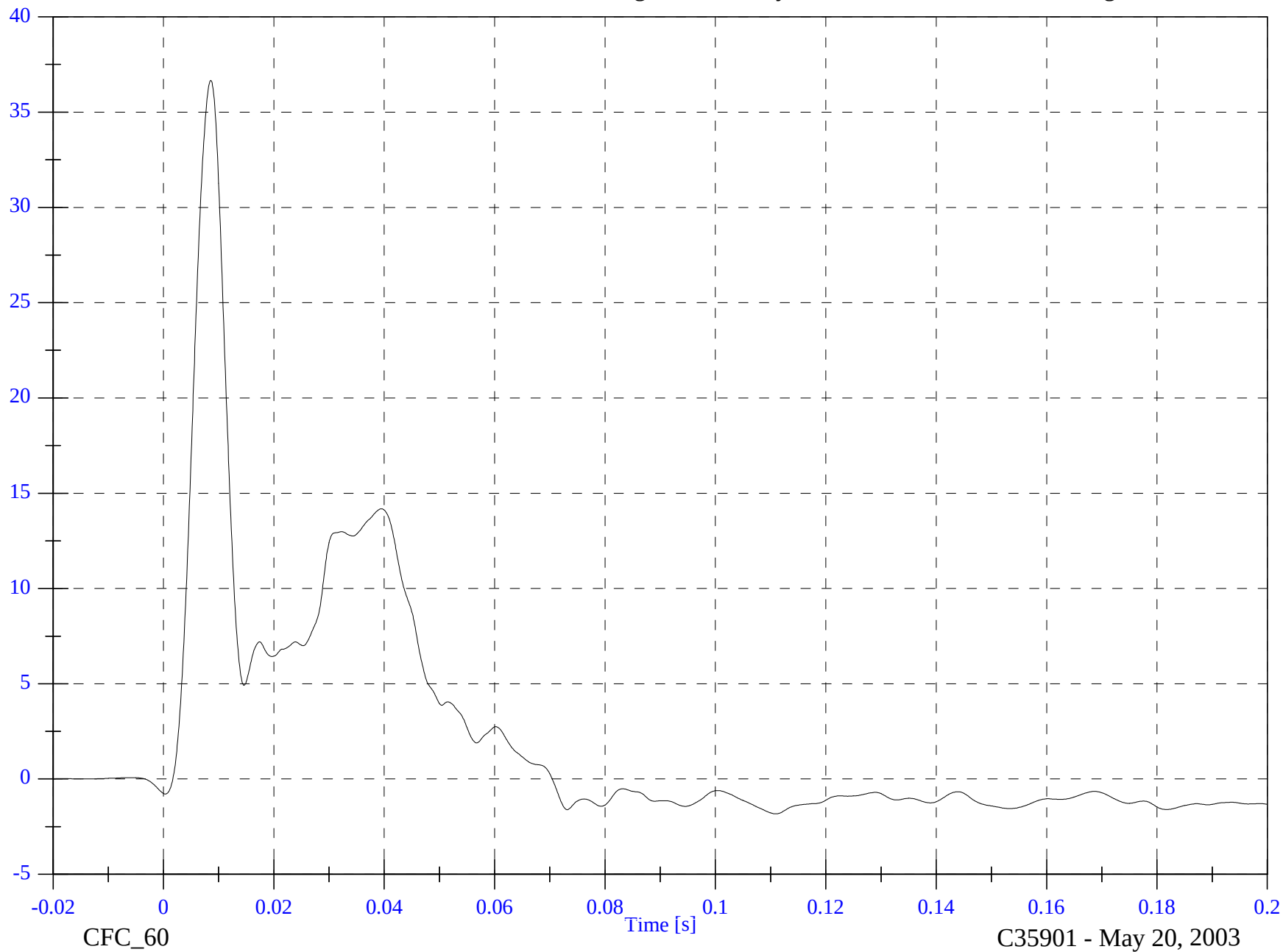
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A1 Right Front Sill y

Max: 36.7 [g] at 0.009 [s]

Min: -1.8 [g] at 0.111 [s]



B-87

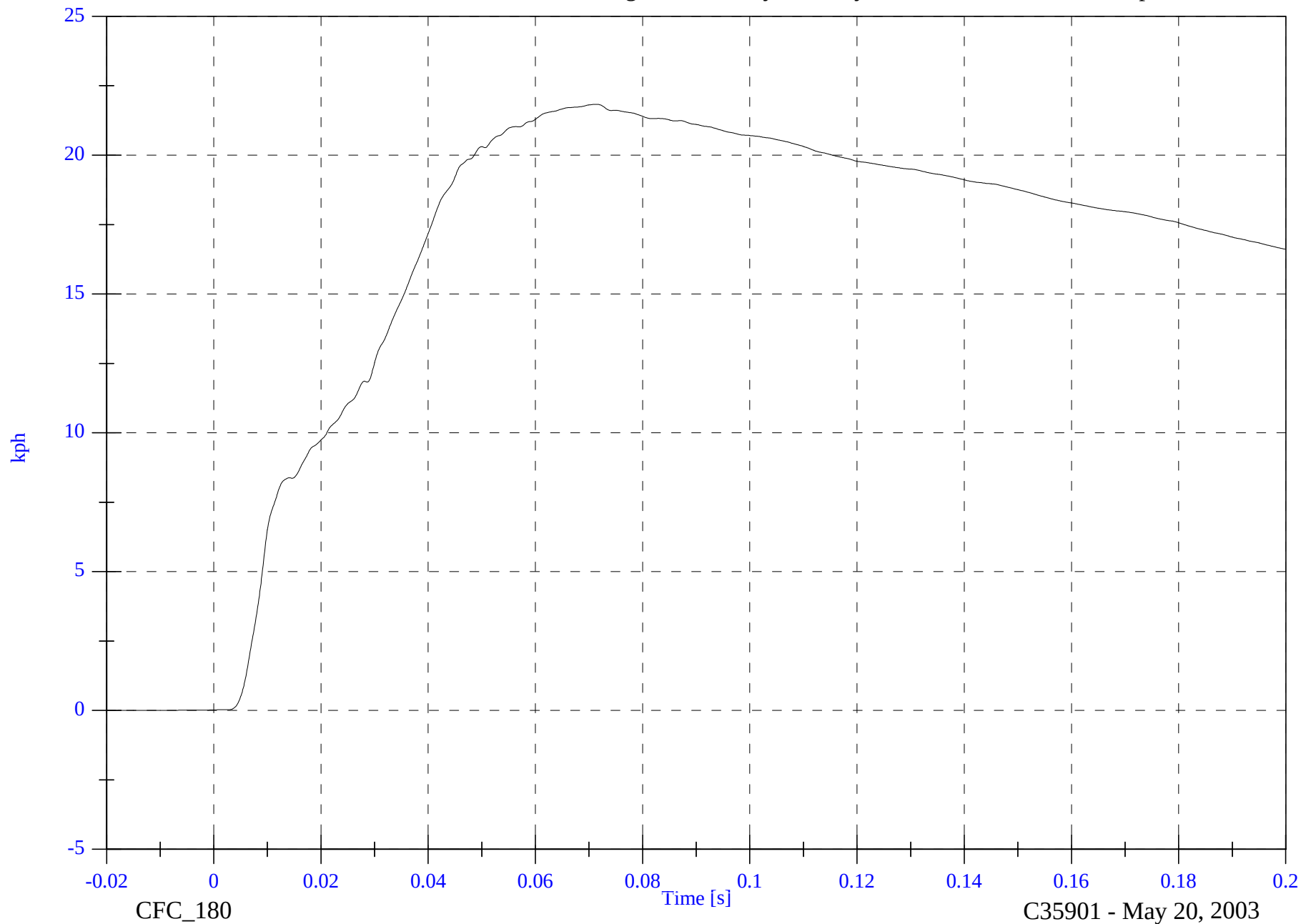
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A1 Right Front Sill y Velocity

Max: 21.8 [kph] at 0.071 [s]

Min: -0.0 [kph] at -0.020 [s]



B-88

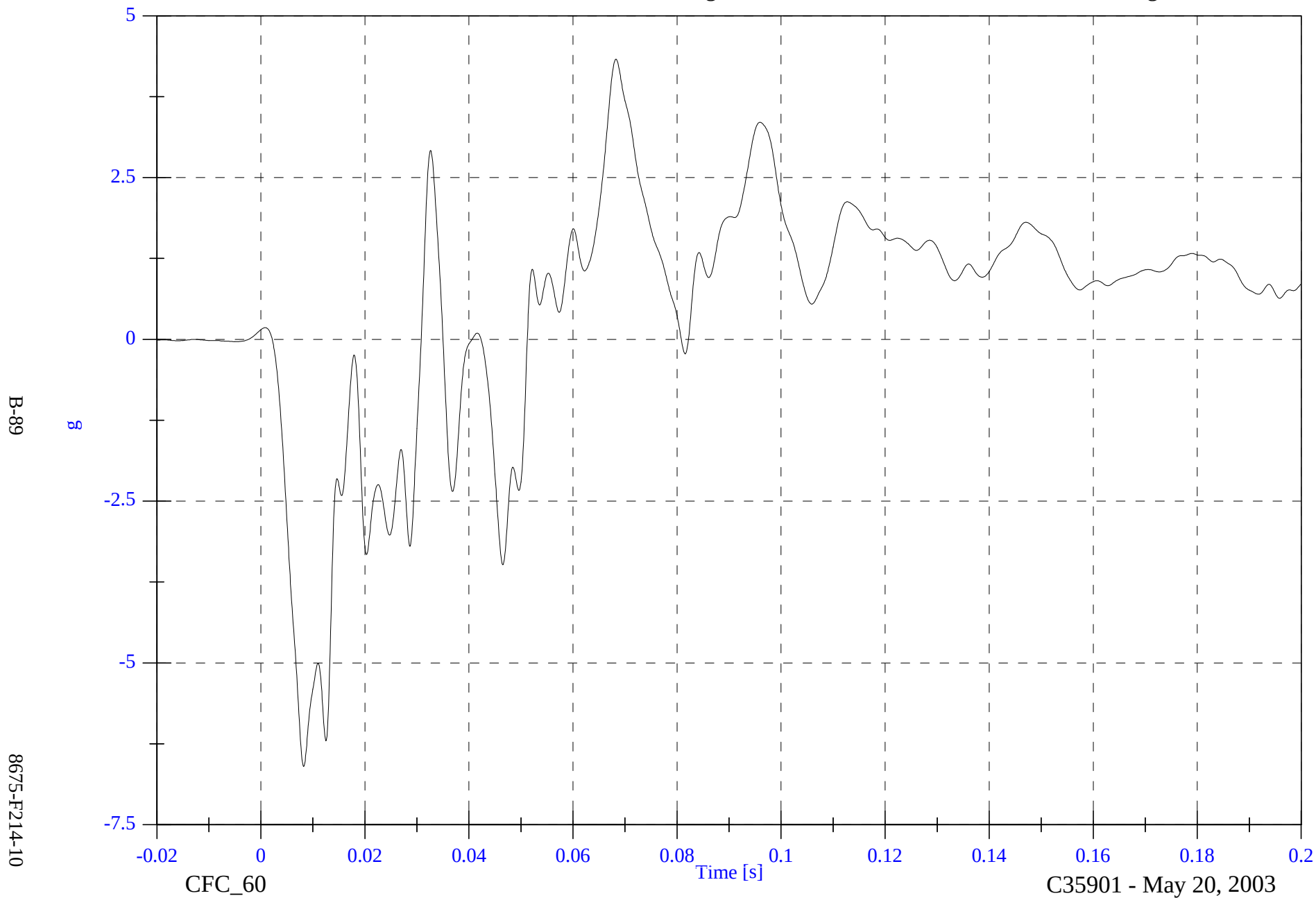
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A1 Right Front Sill z

Max: 4.3 [g] at 0.068 [s]

Min: -6.6 [g] at 0.008 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

V2 A1 Right Front Sill z Velocity

Max: 3.8 [kph] at 0.200 [s]

Min: -3.9 [kph] at 0.051 [s]

B-90

8675-F214-10



FMVSS 214D Indicant - 2003 Volvo XC90

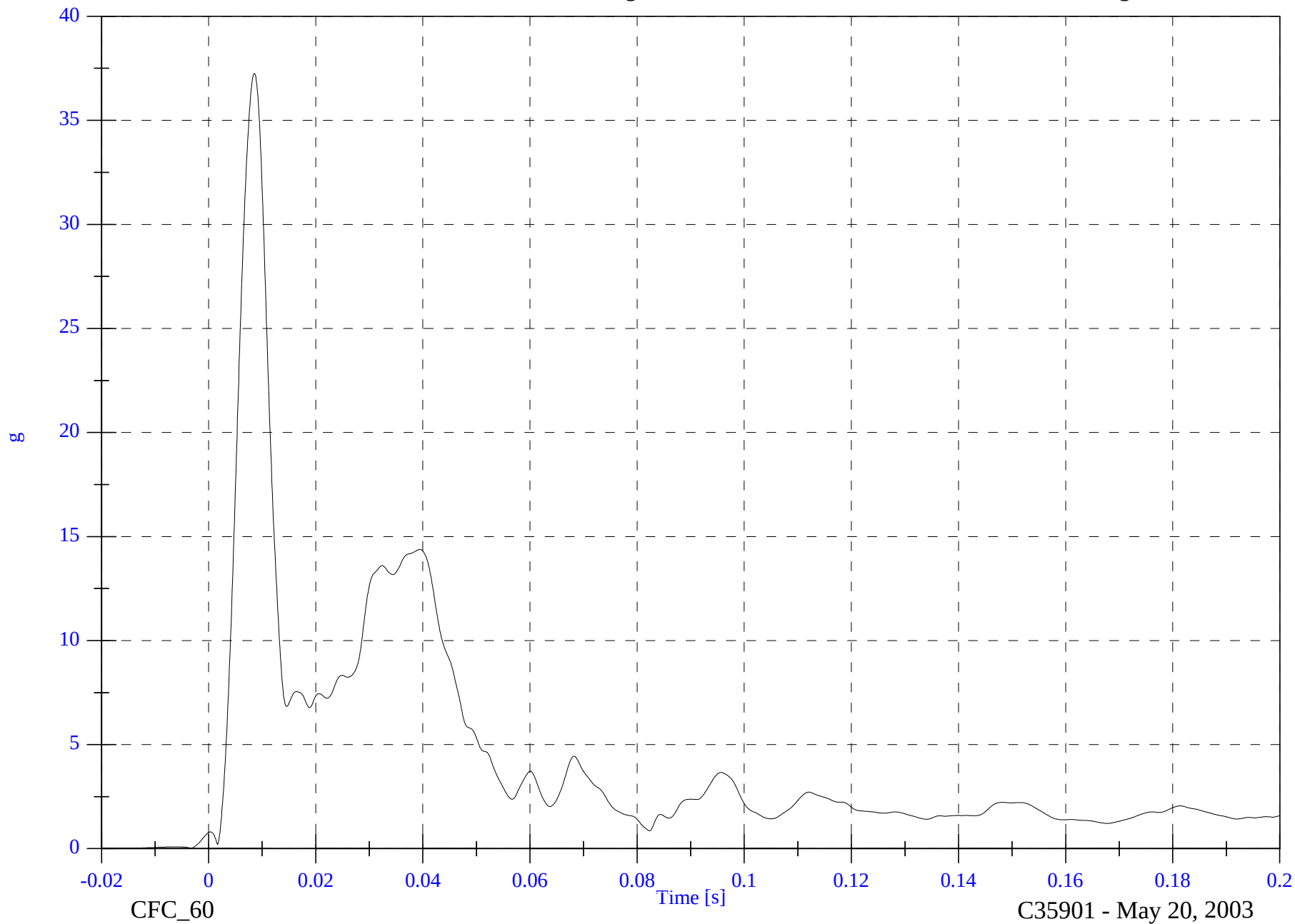
V2 A1 Right Front Sill Resultant

Max: 37.3 [g] at 0.008 [s]

Min: 0.0 [g] at -0.020 [s]

B-91

8675-F214-10



FMVSS 214D Indicant - 2003 Volvo XC90

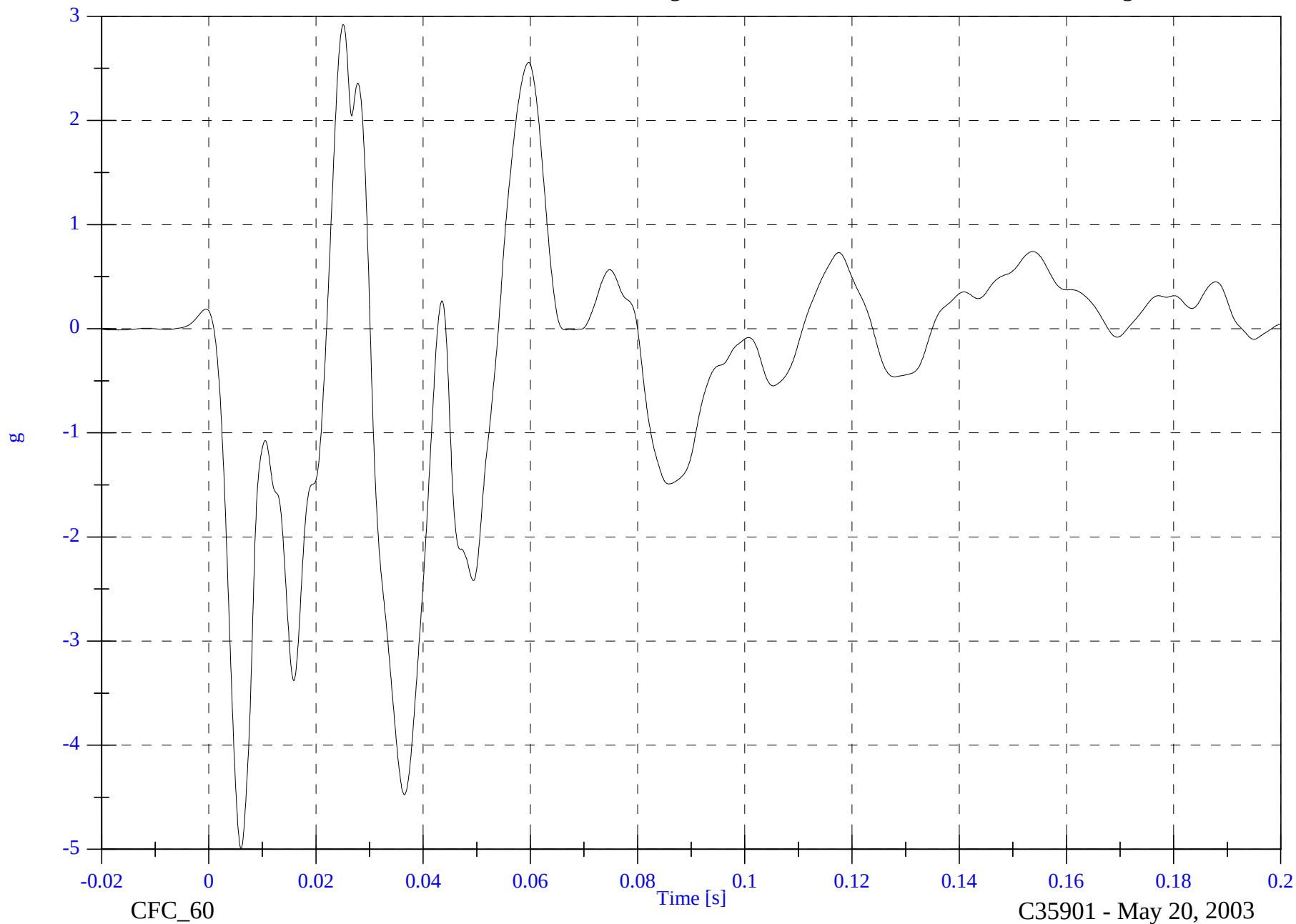
V2 A2 Right Rear Sill x

Max: 2.9 [g] at 0.025 [s]

Min: -5.0 [g] at 0.006 [s]

B-92

8675-F214-10

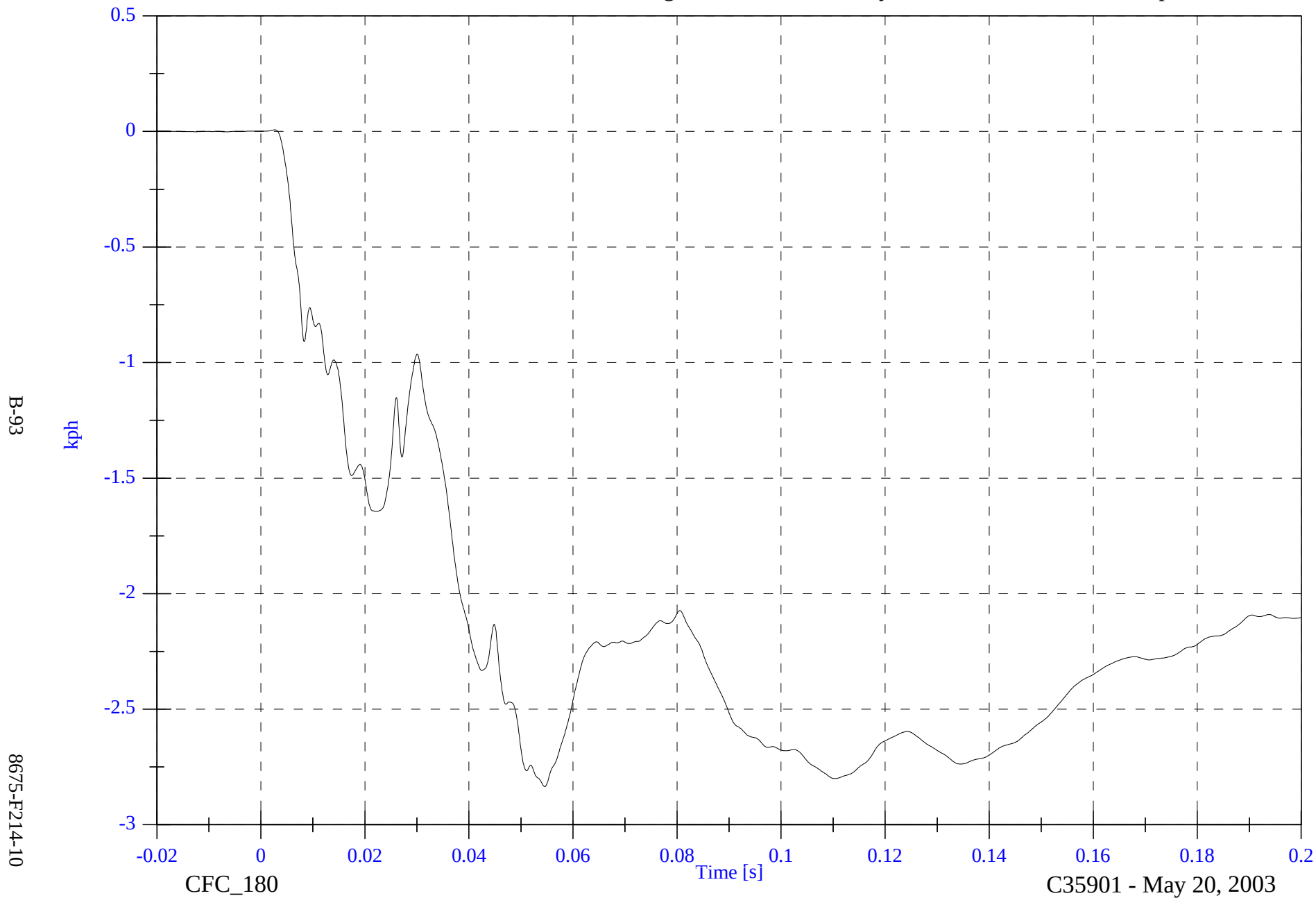


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A2 Right Rear Sill x Velocity

Max: 0.0 [kph] at 0.003 [s]

Min: -2.8 [kph] at 0.055 [s]

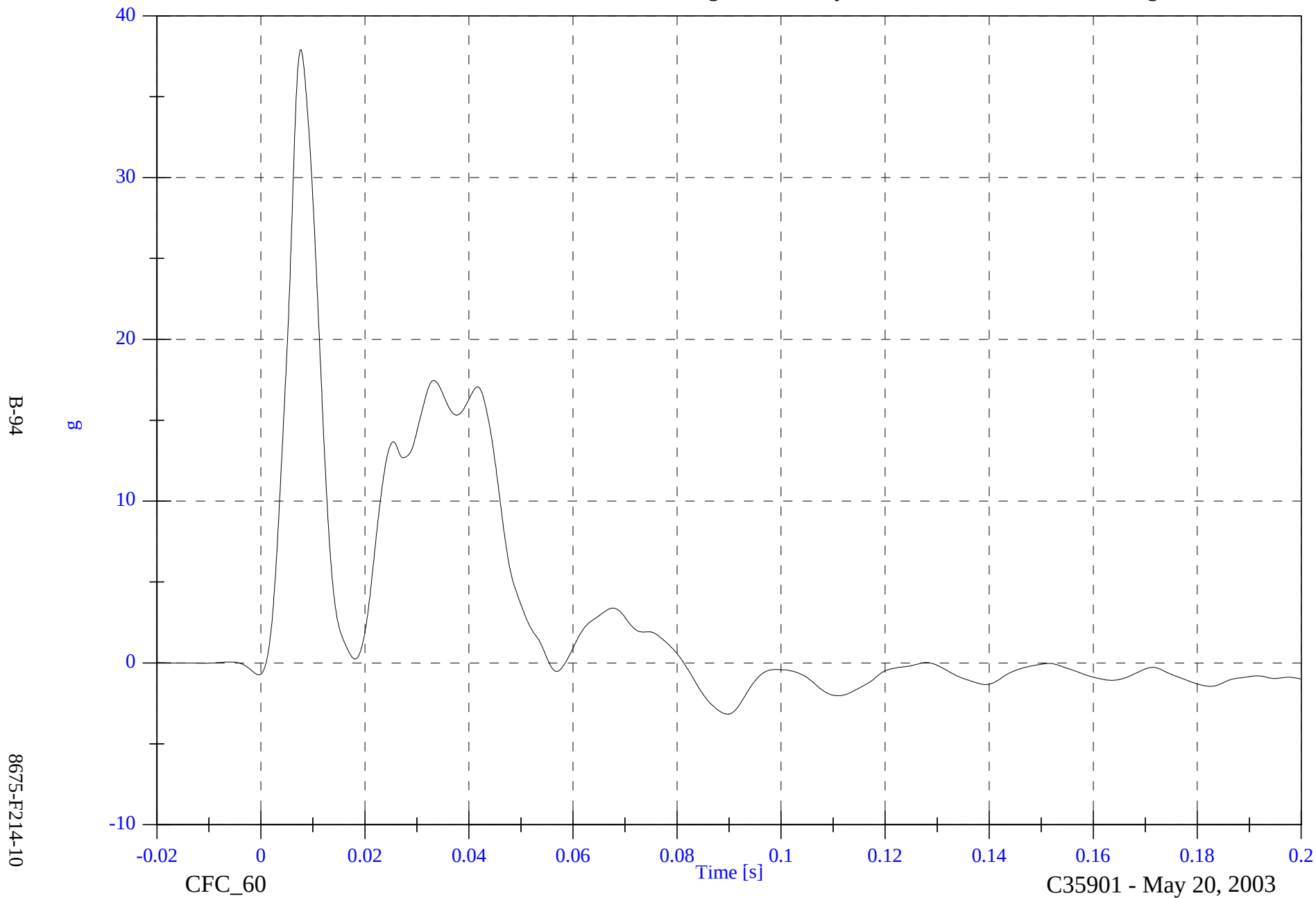


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A2 Right Rear Sill y

Max: 37.9 [g] at 0.008 [s]

Min: -3.2 [g] at 0.090 [s]

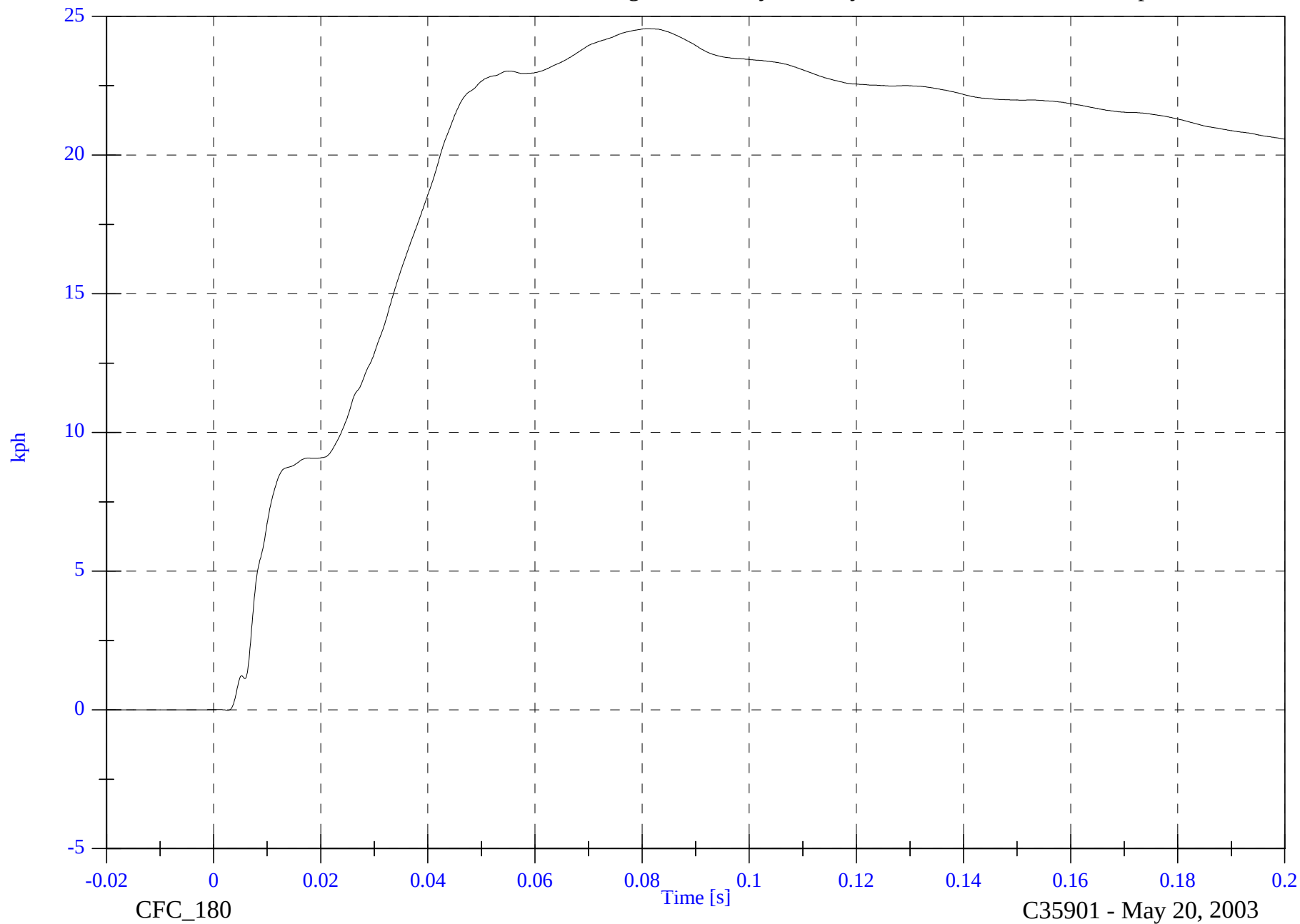


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A2 Right Rear Sill y Velocity

Max: 24.6 [kph] at 0.081 [s]

Min: -0.0 [kph] at 0.003 [s]



B-95

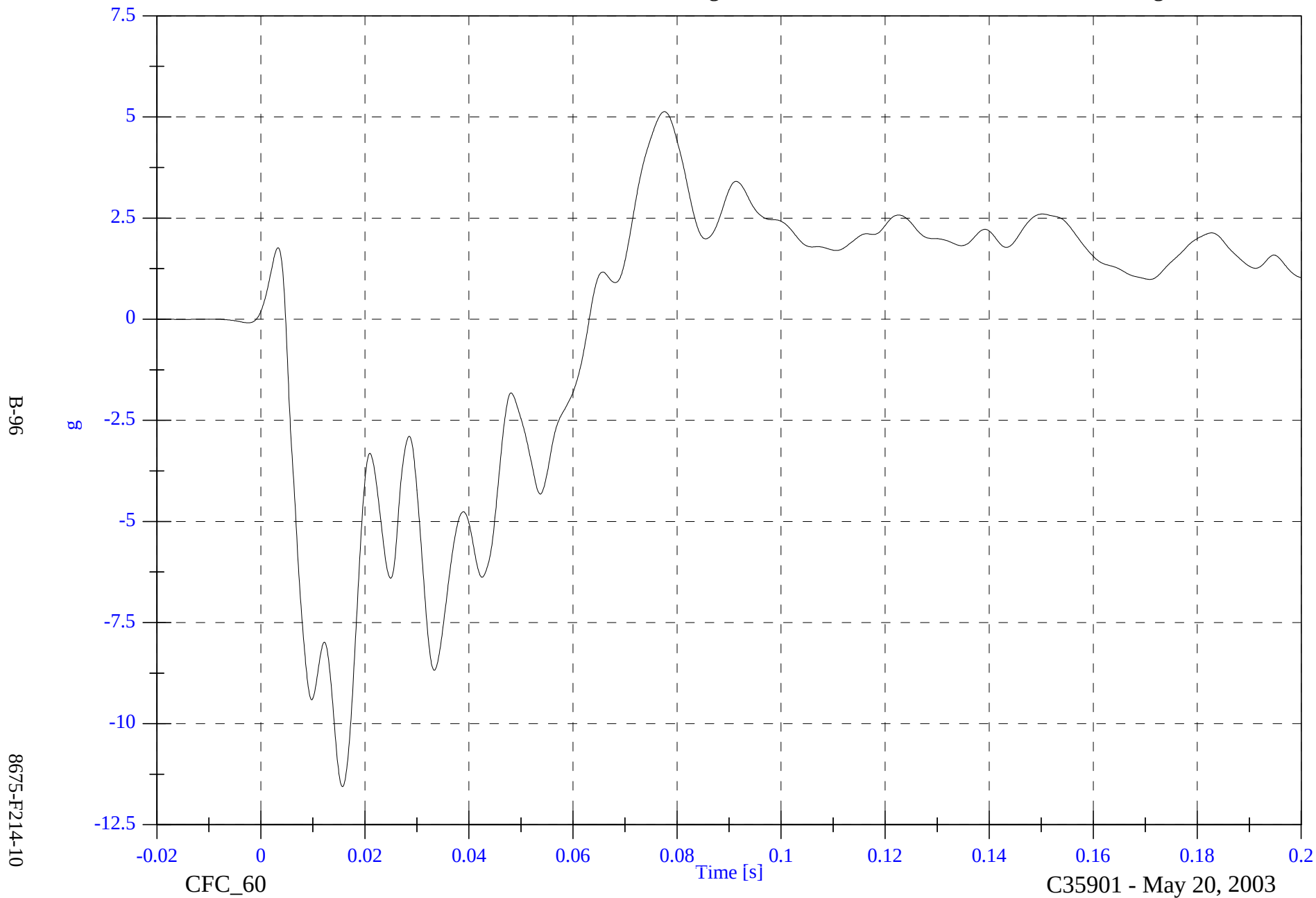
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A2 Right Rear Sill z

Max: 5.1 [g] at 0.078 [s]

Min: -11.6 [g] at 0.016 [s]

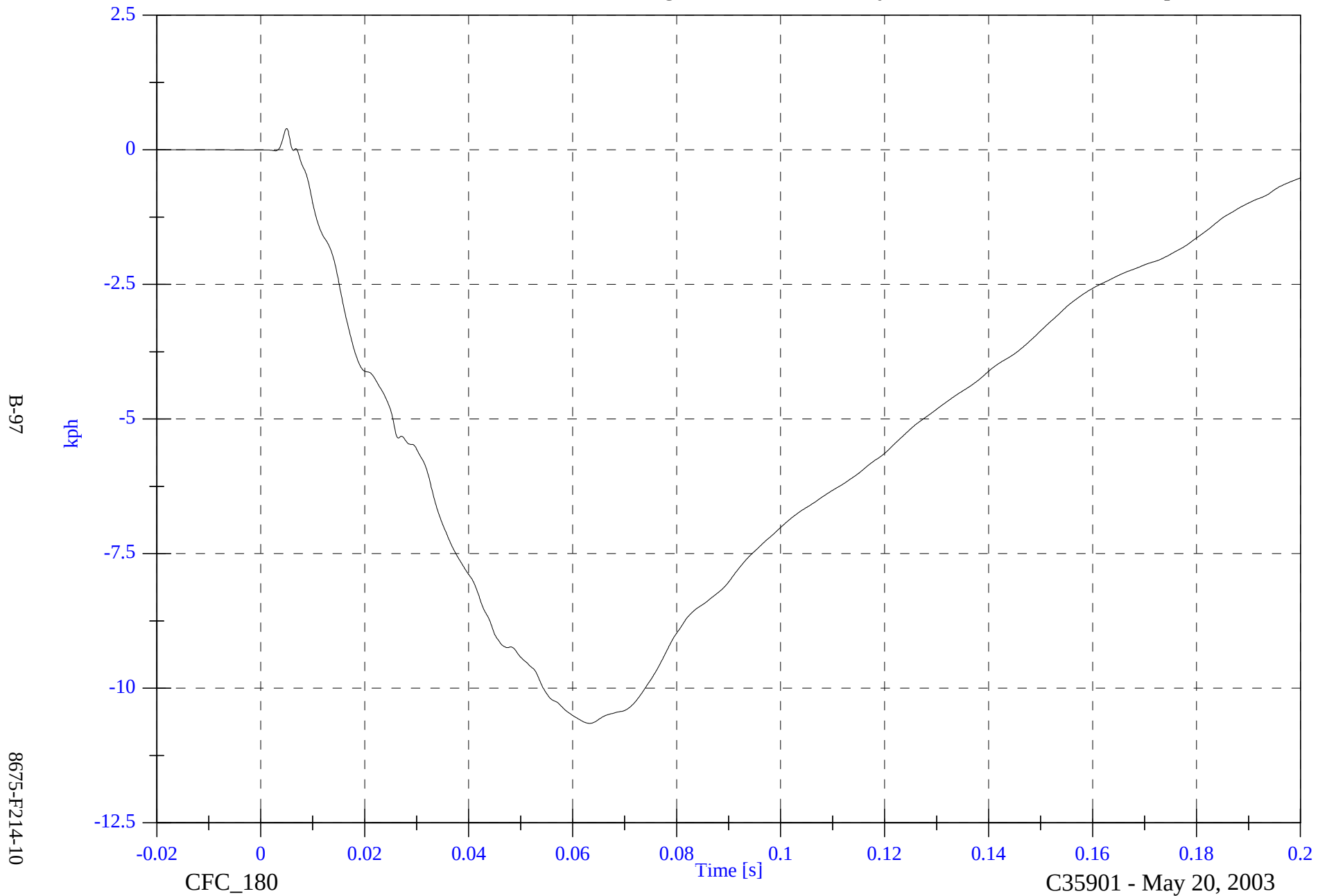


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A2 Right Rear Sill z Velocity

Max: 0.4 [kph] at 0.005 [s]

Min: -10.7 [kph] at 0.063 [s]

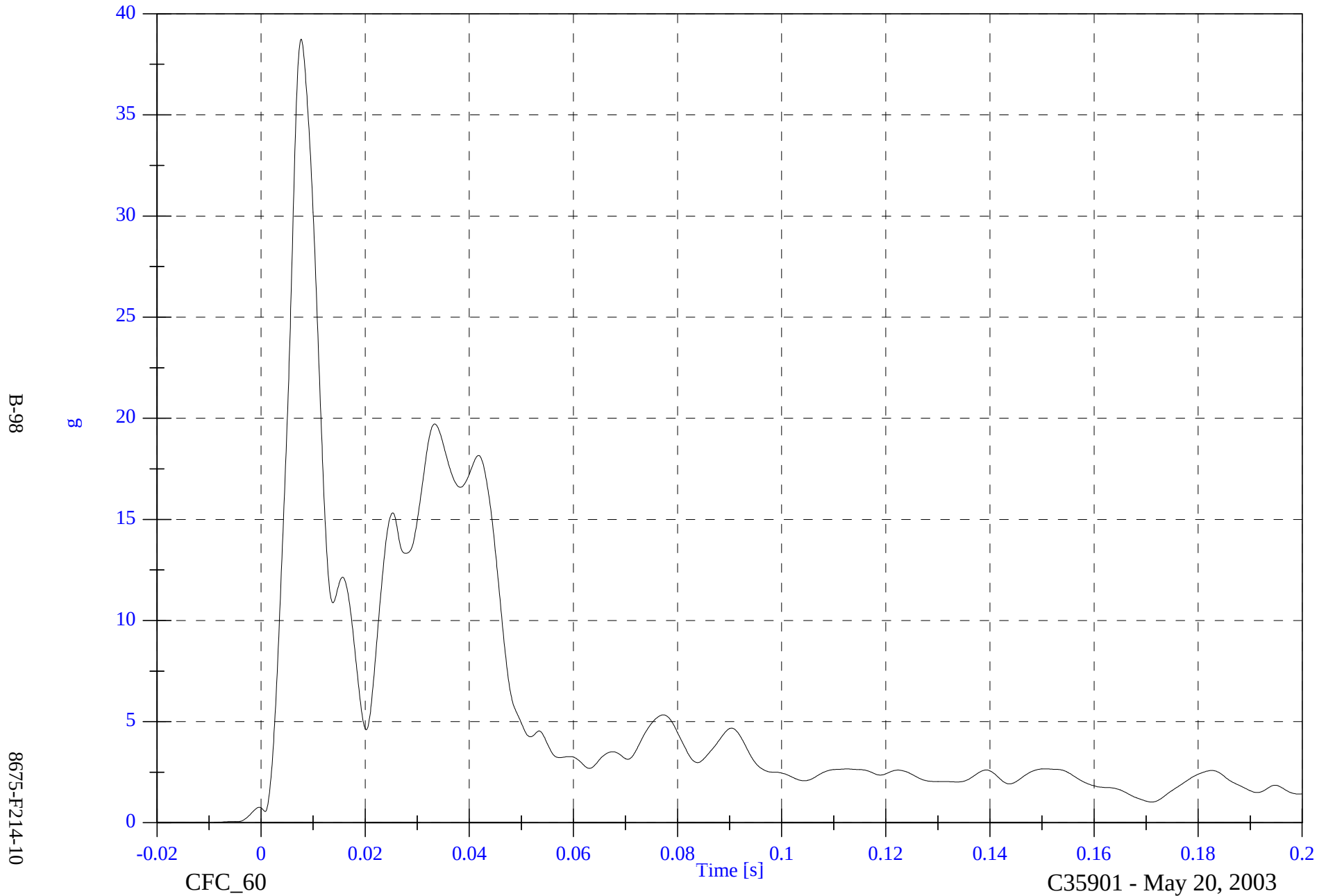


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A2 Right Rear Sill Resultant

Max: 38.7 [g] at 0.008 [s]

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

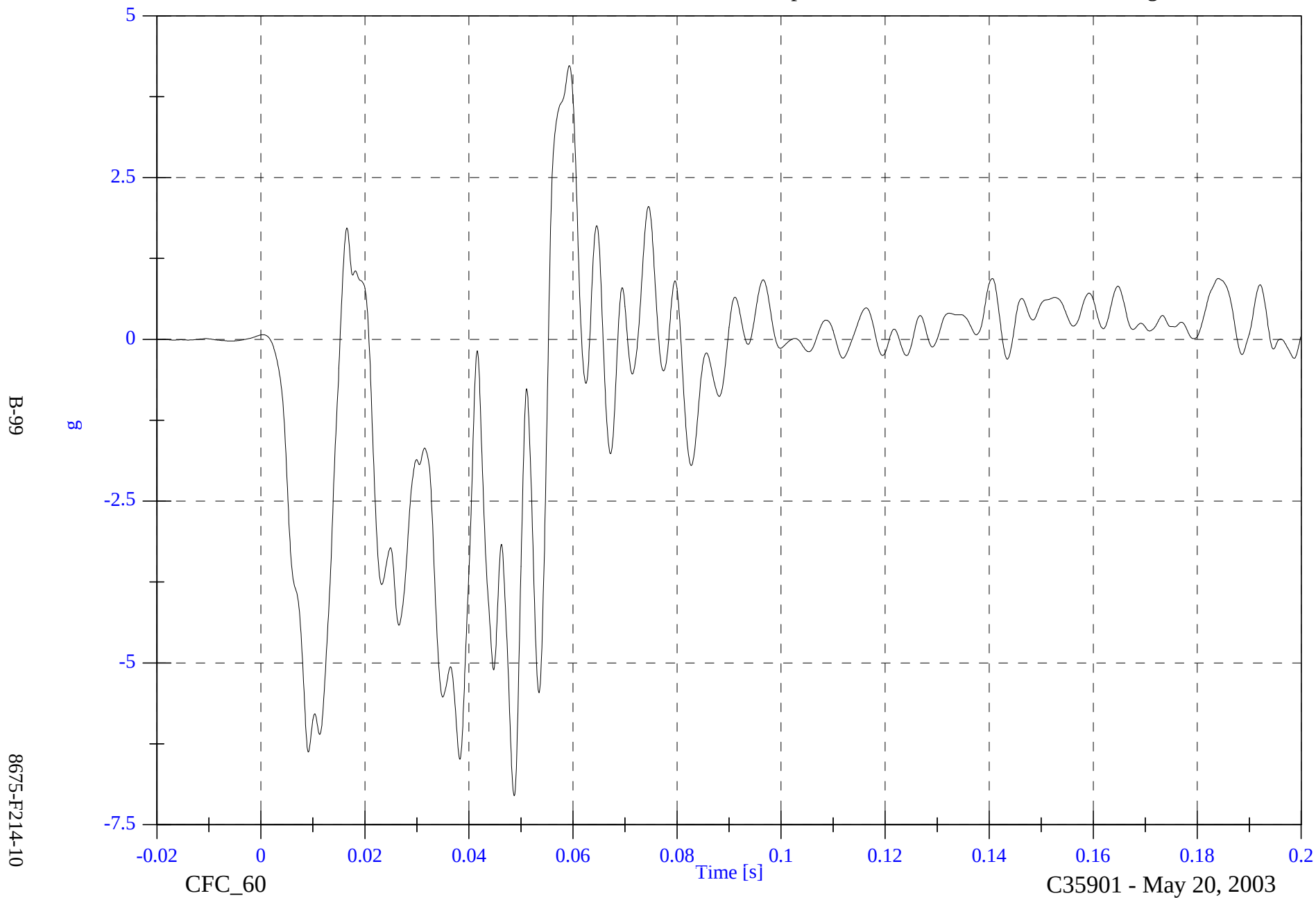


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A3 Rear Floorpan x

Max: 4.2 [g] at 0.059 [s]

Min: -7.1 [g] at 0.049 [s]

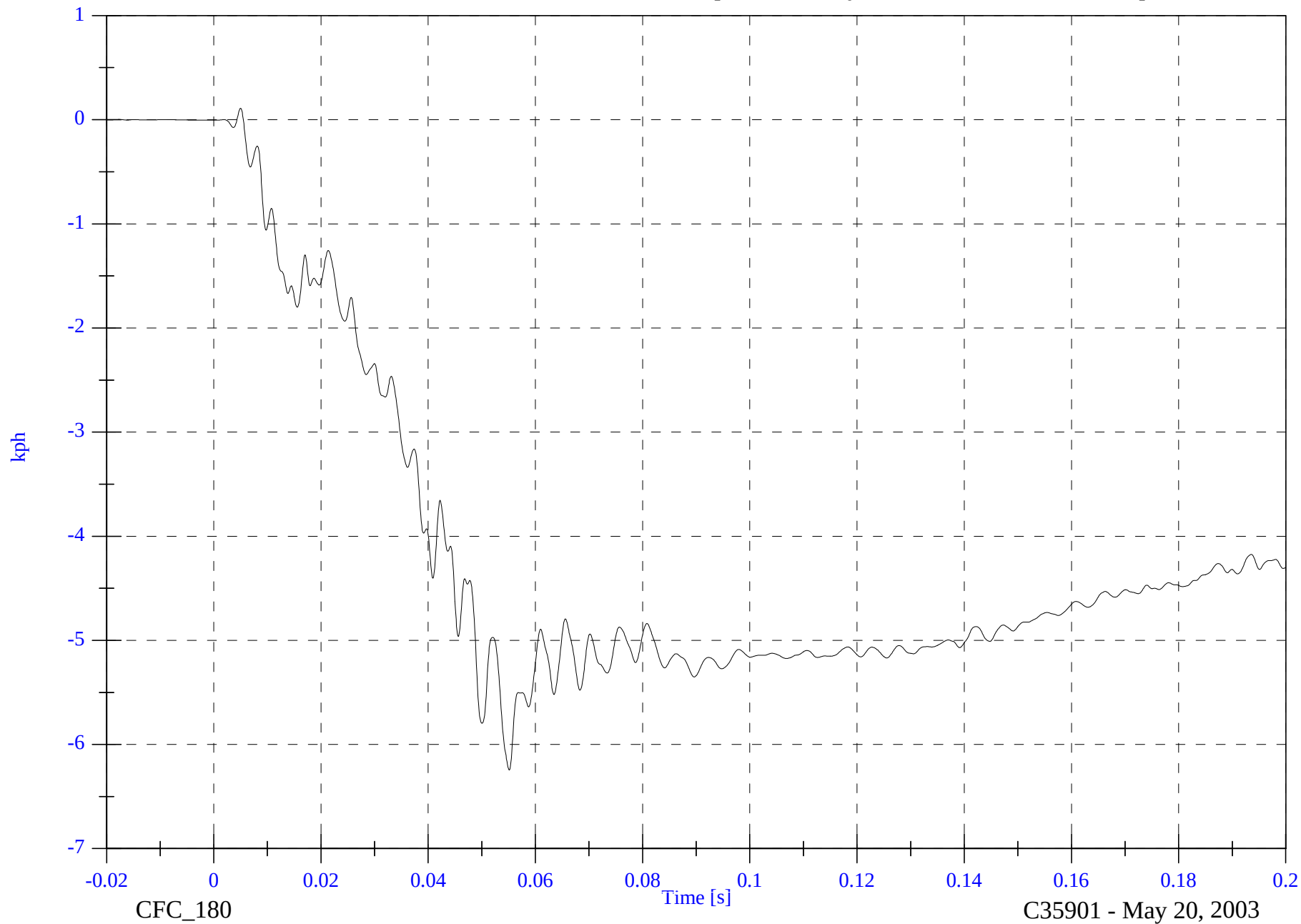


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A3 Rear Floorpan x Velocity

Max: 0.1 [kph] at 0.005 [s]

Min: -6.2 [kph] at 0.055 [s]



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8675-F214-10

CFC_180

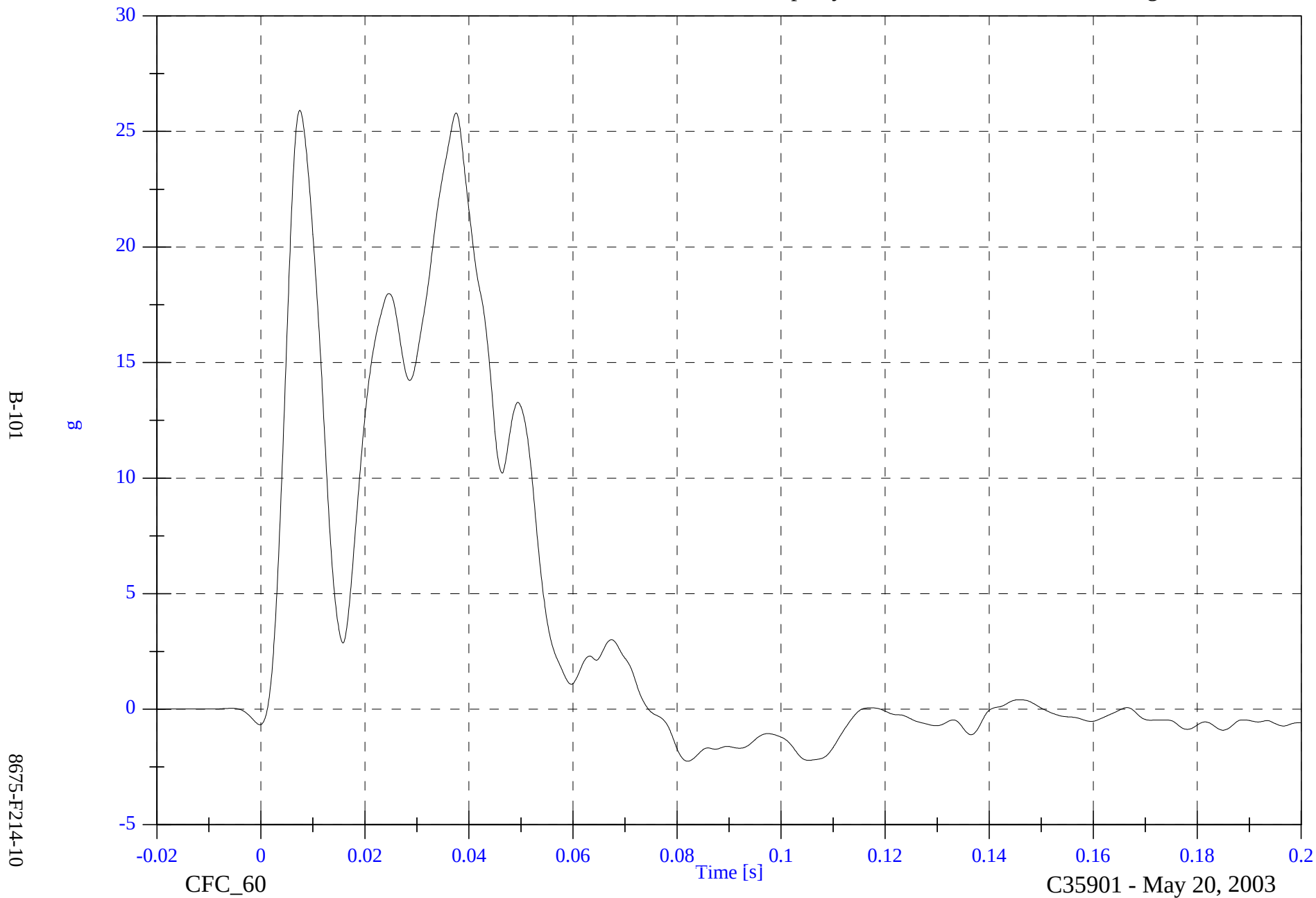
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A3 Rear Floorpan y

Max: 25.9 [g] at 0.007 [s]

Min: -2.3 [g] at 0.082 [s]

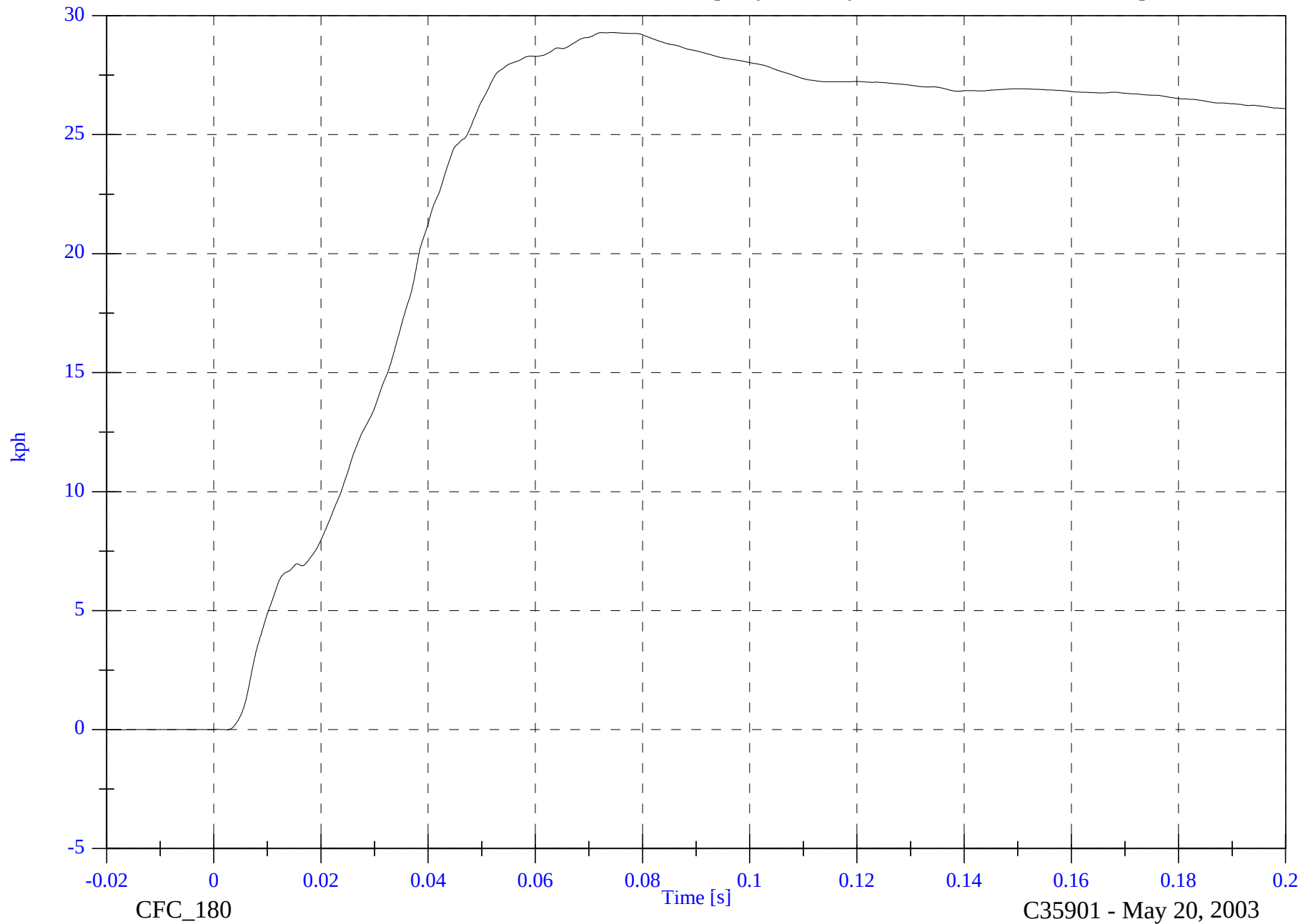


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A3 Rear Floorpan y Velocity

Max: 29.3 [kph] at 0.074 [s]

Min: -0.0 [kph] at 0.002 [s]



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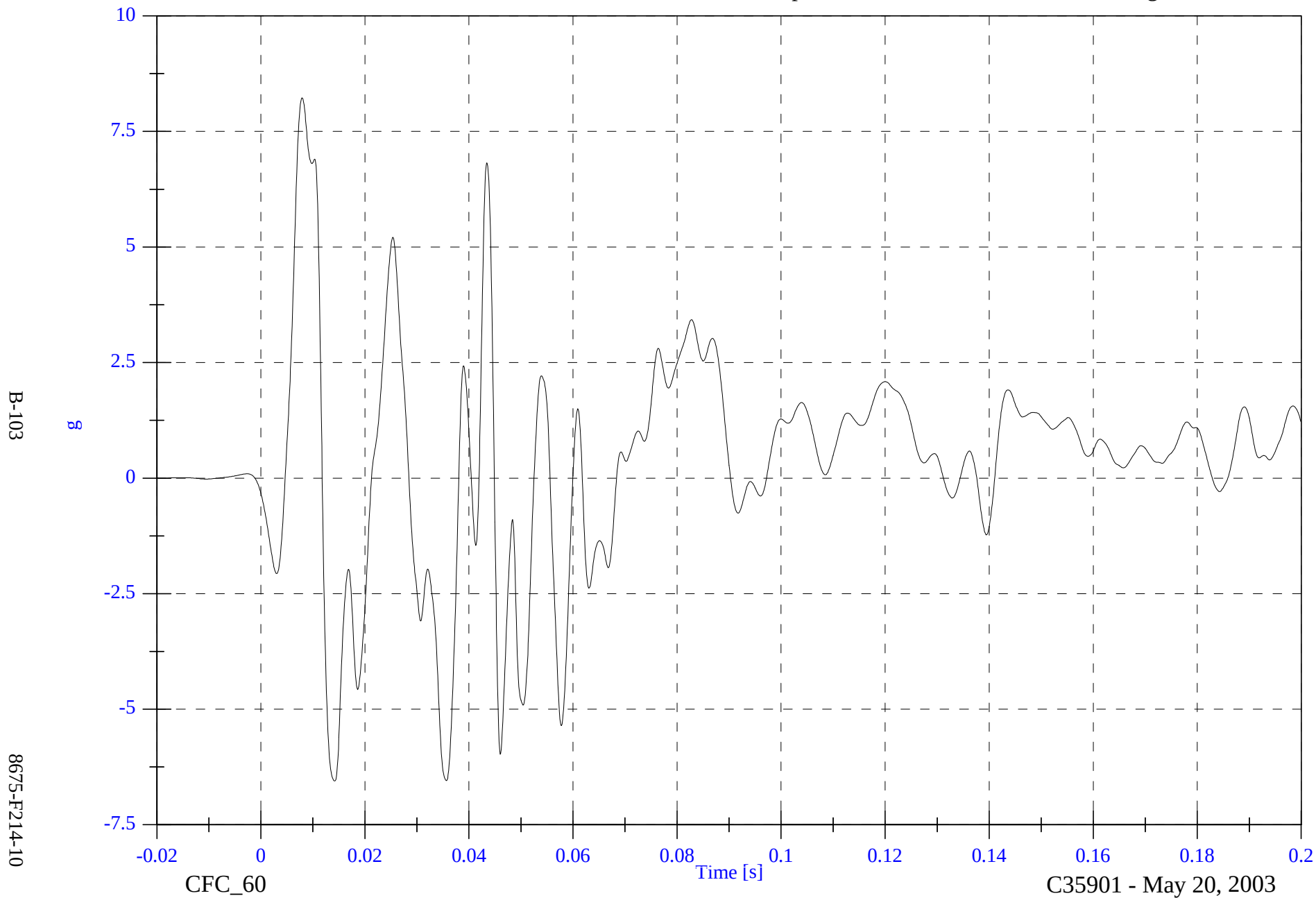
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A3 Rear Floorpan z

Max: 8.2 [g] at 0.008 [s]

Min: -6.6 [g] at 0.014 [s]

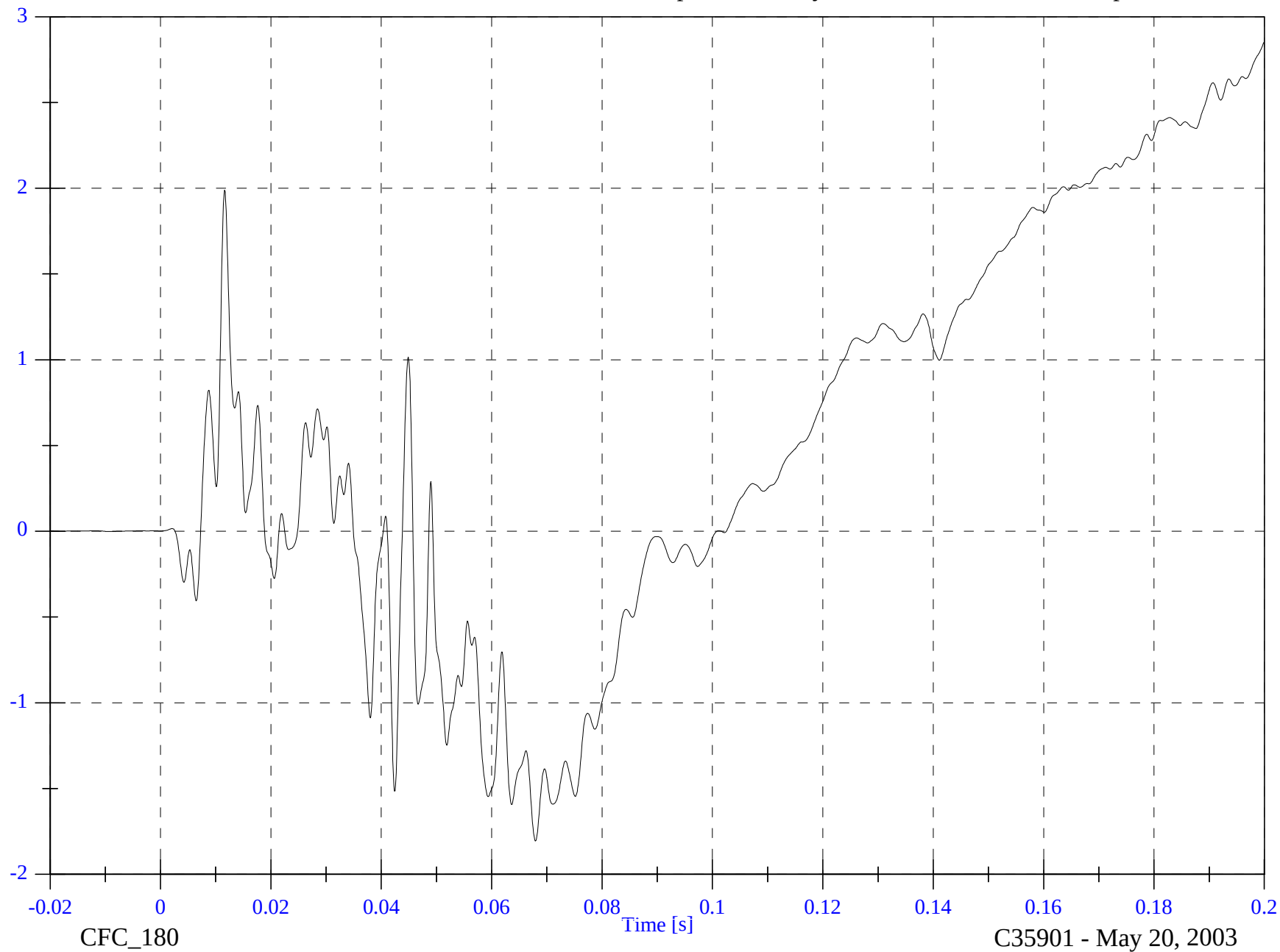


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A3 Rear Floorpan z Velocity

Max: 2.9 [kph] at 0.200 [s]

Min: -1.8 [kph] at 0.068 [s]



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8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

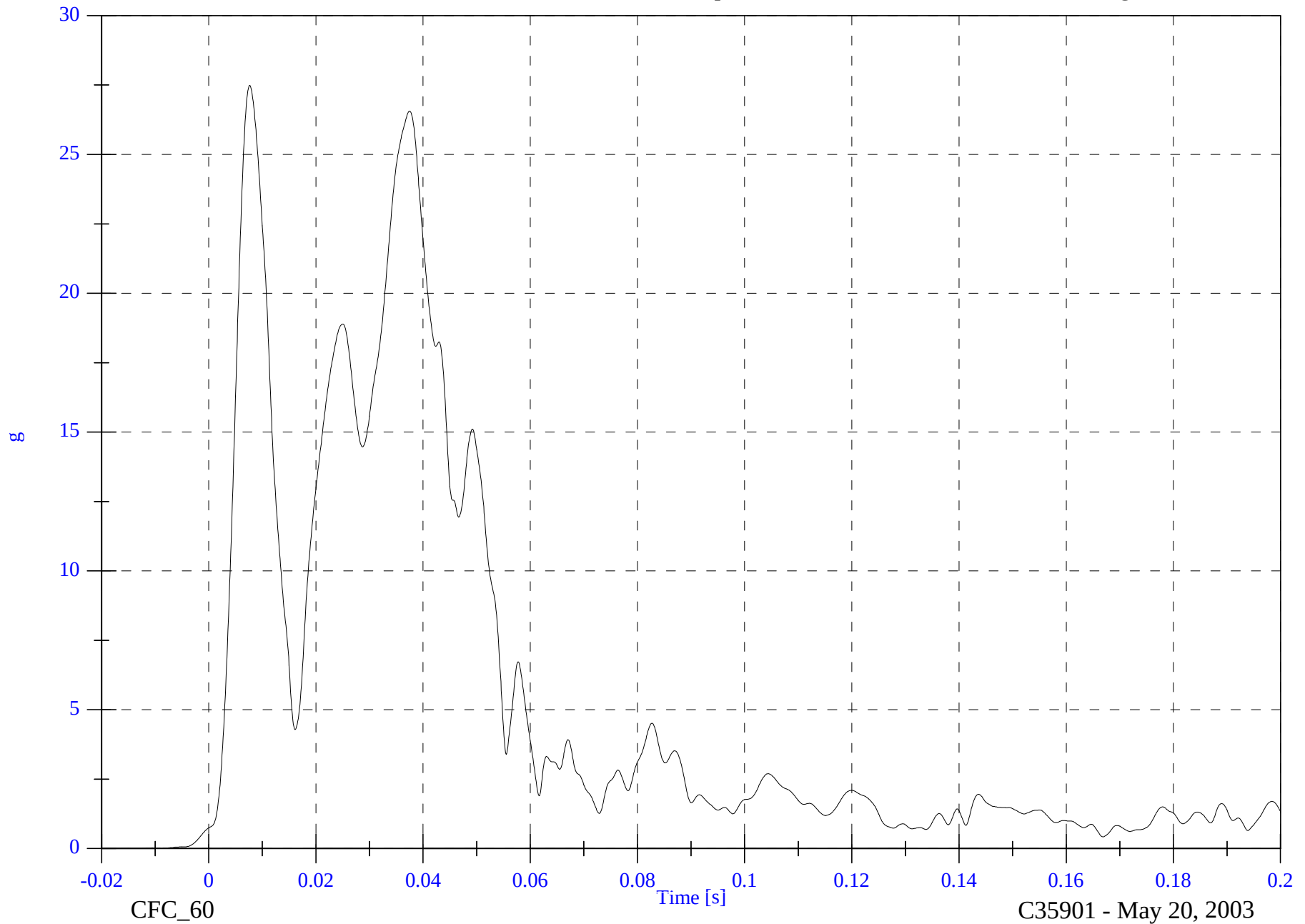
V2 A3 Rear Floorpan Resultant

Max: 27.5 [g] at 0.008 [s]

Min: 0.0 [g] at -0.020 [s]

B-105

8675-F214-10

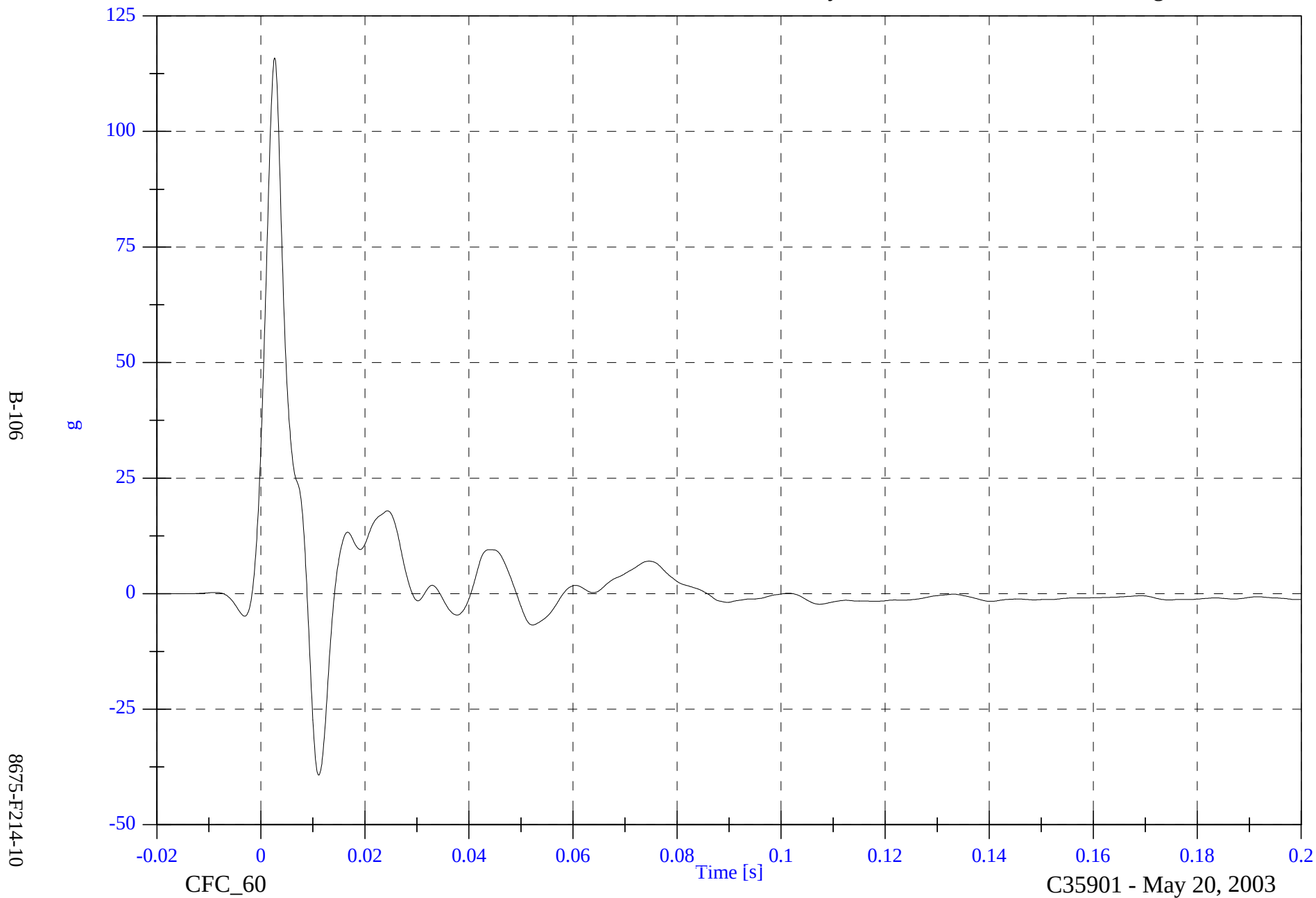


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A4 Left Rear Sill y

Max: 115.9 [g] at 0.003 [s]

Min: -39.3 [g] at 0.011 [s]

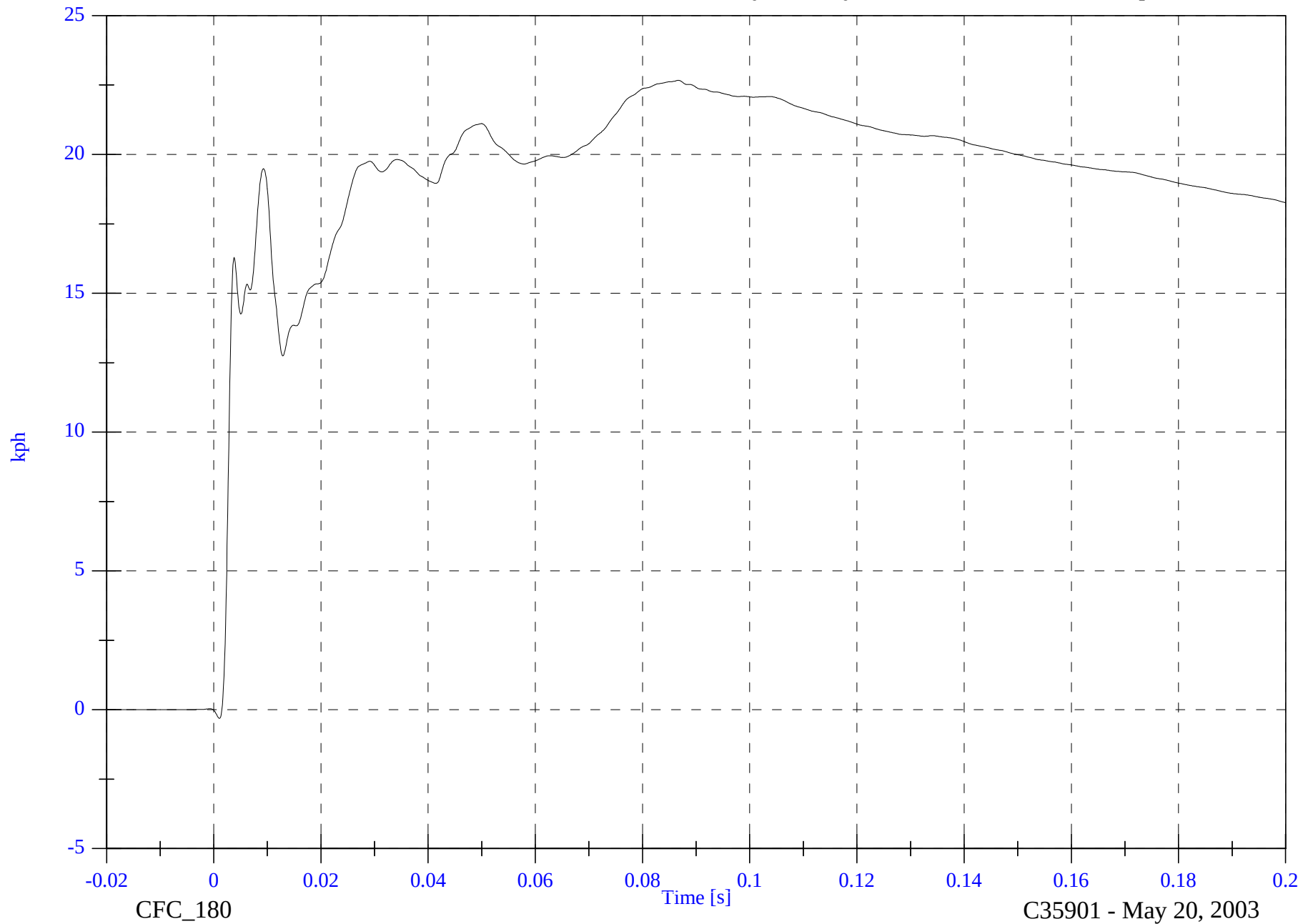


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A4 Left Rear Sill y Velocity

Max: 22.7 [kph] at 0.087 [s]

Min: -0.3 [kph] at 0.001 [s]



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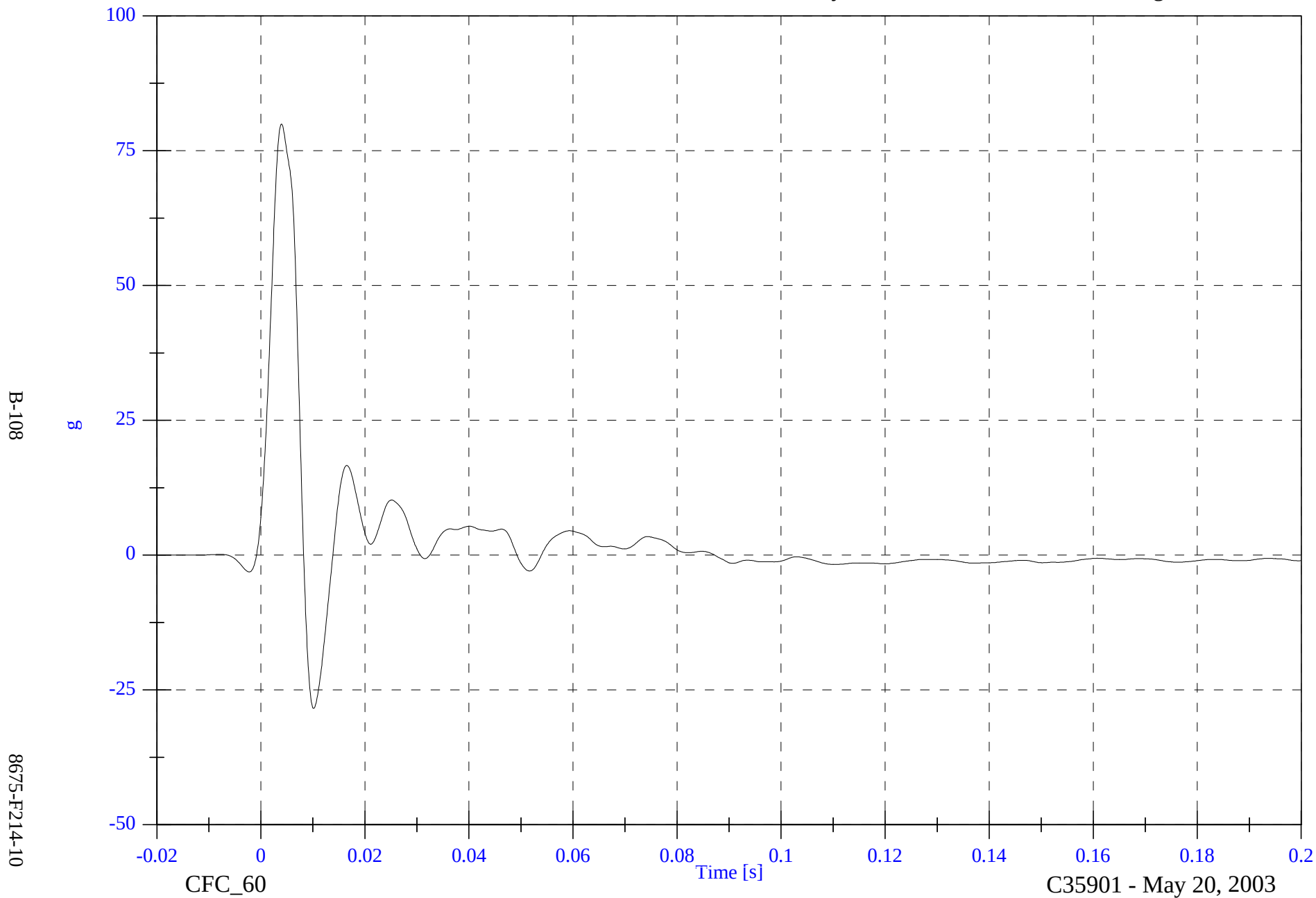
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A5 Left Front Sill y

Max: 79.9 [g] at 0.004 [s]

Min: -28.4 [g] at 0.010 [s]

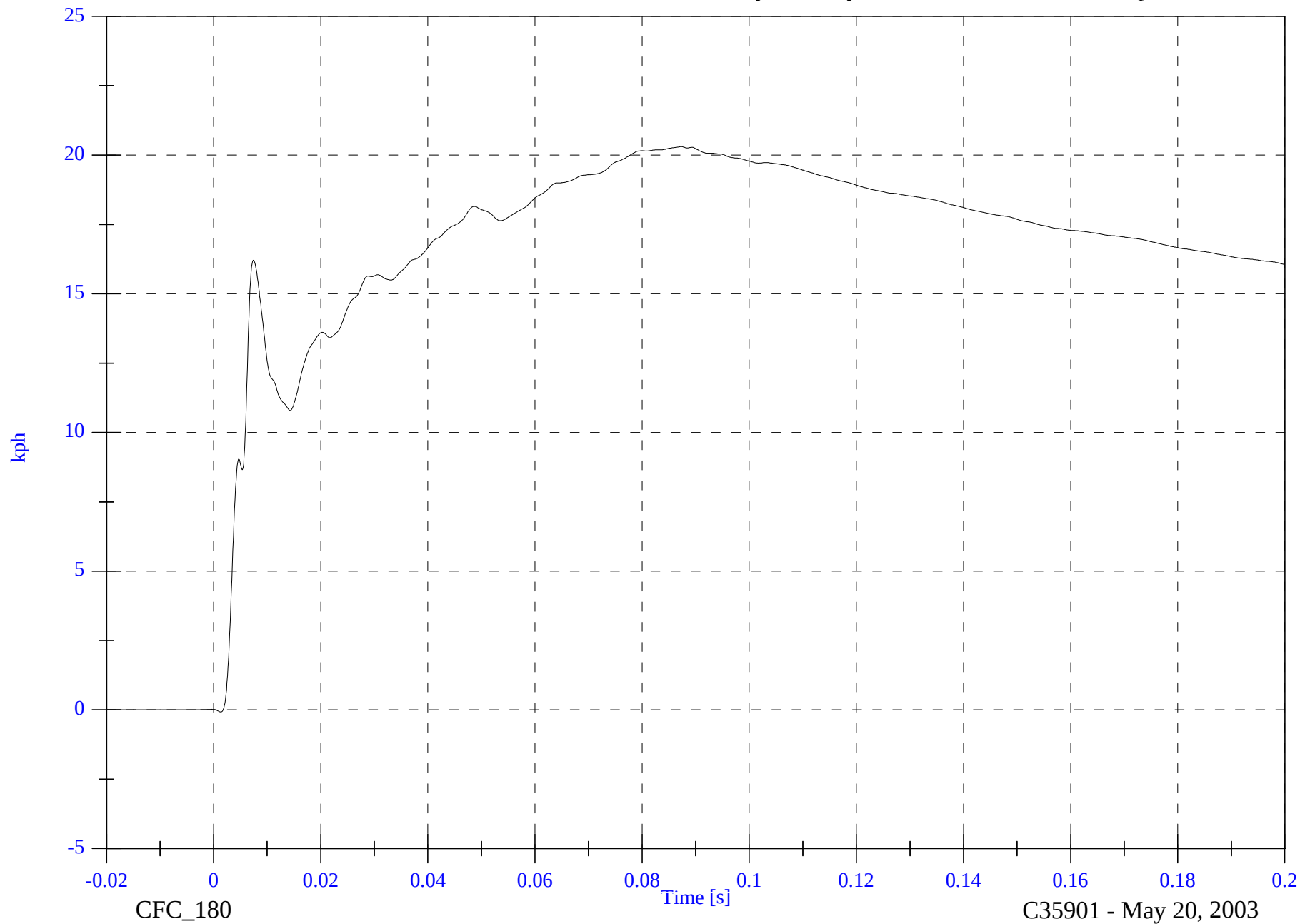


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A5 Left Front Sill y Velocity

Max: 20.3 [kph] at 0.087 [s]

Min: -0.1 [kph] at 0.001 [s]



B-109

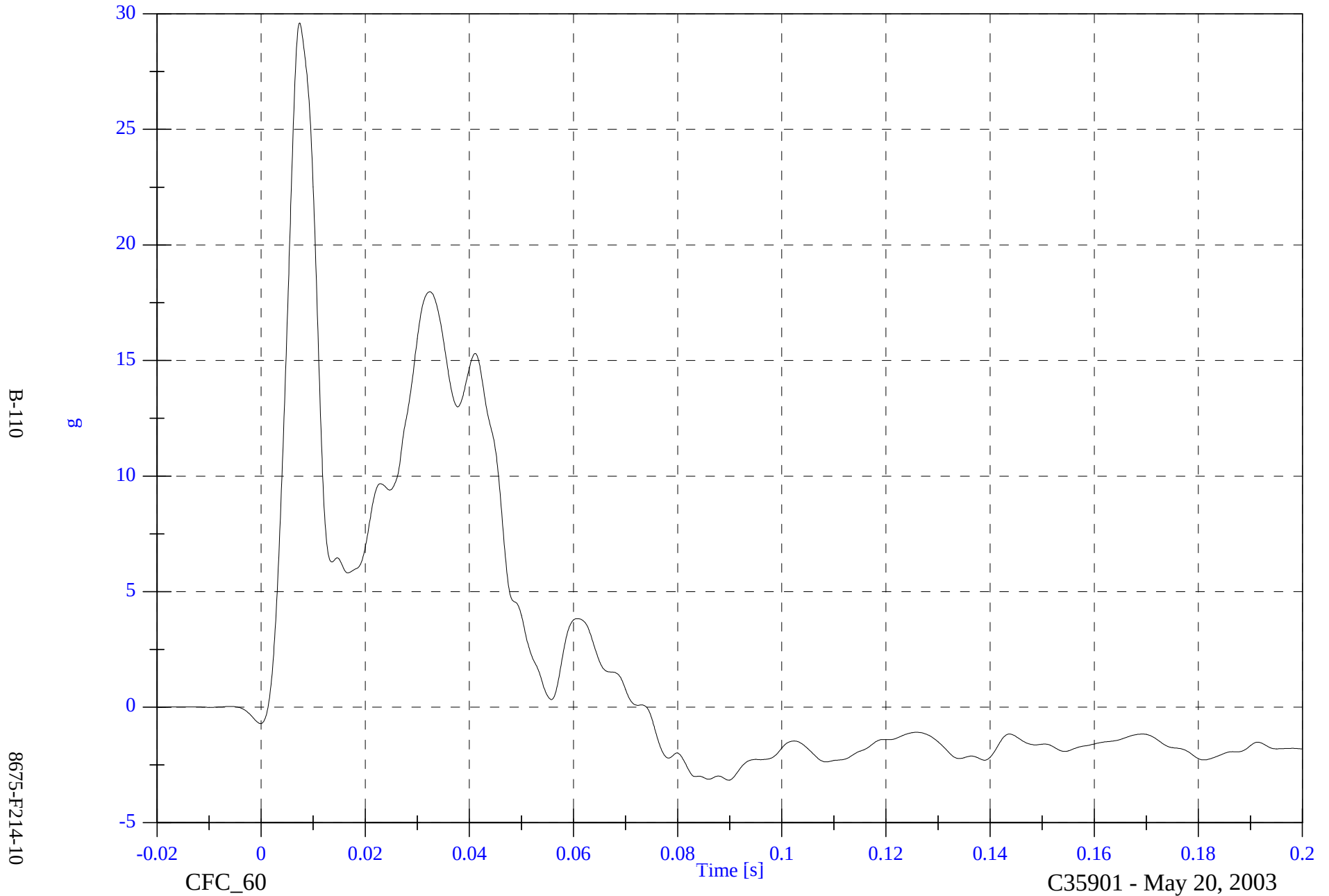
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A7 Right Rear Compartment y

Max: 29.6 [g] at 0.007 [s]

Min: -3.2 [g] at 0.090 [s]

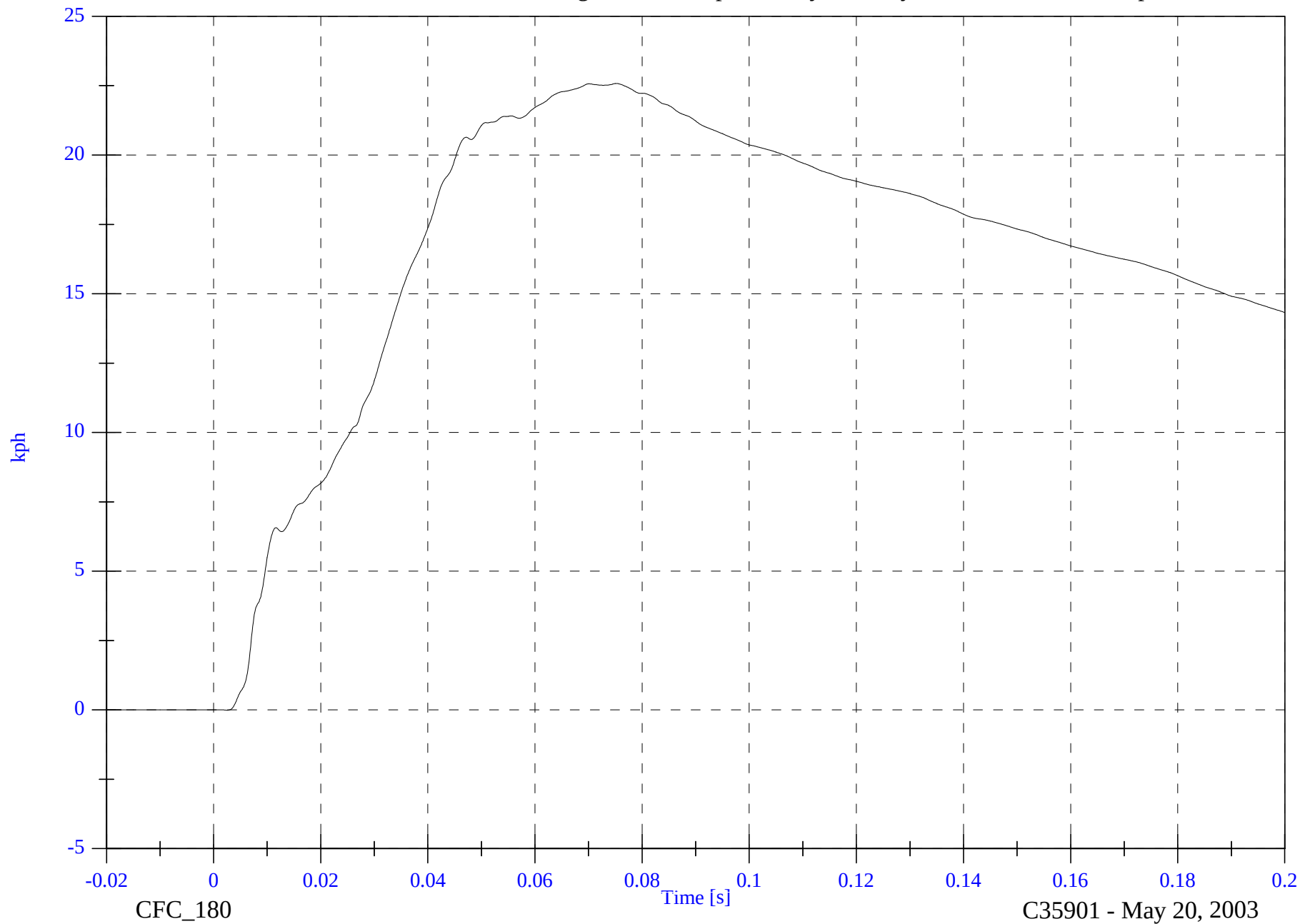


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A7 Right Rear Compartment y Velocity

Max: 22.6 [kph] at 0.075 [s]

Min: -0.0 [kph] at 0.003 [s]



B-111

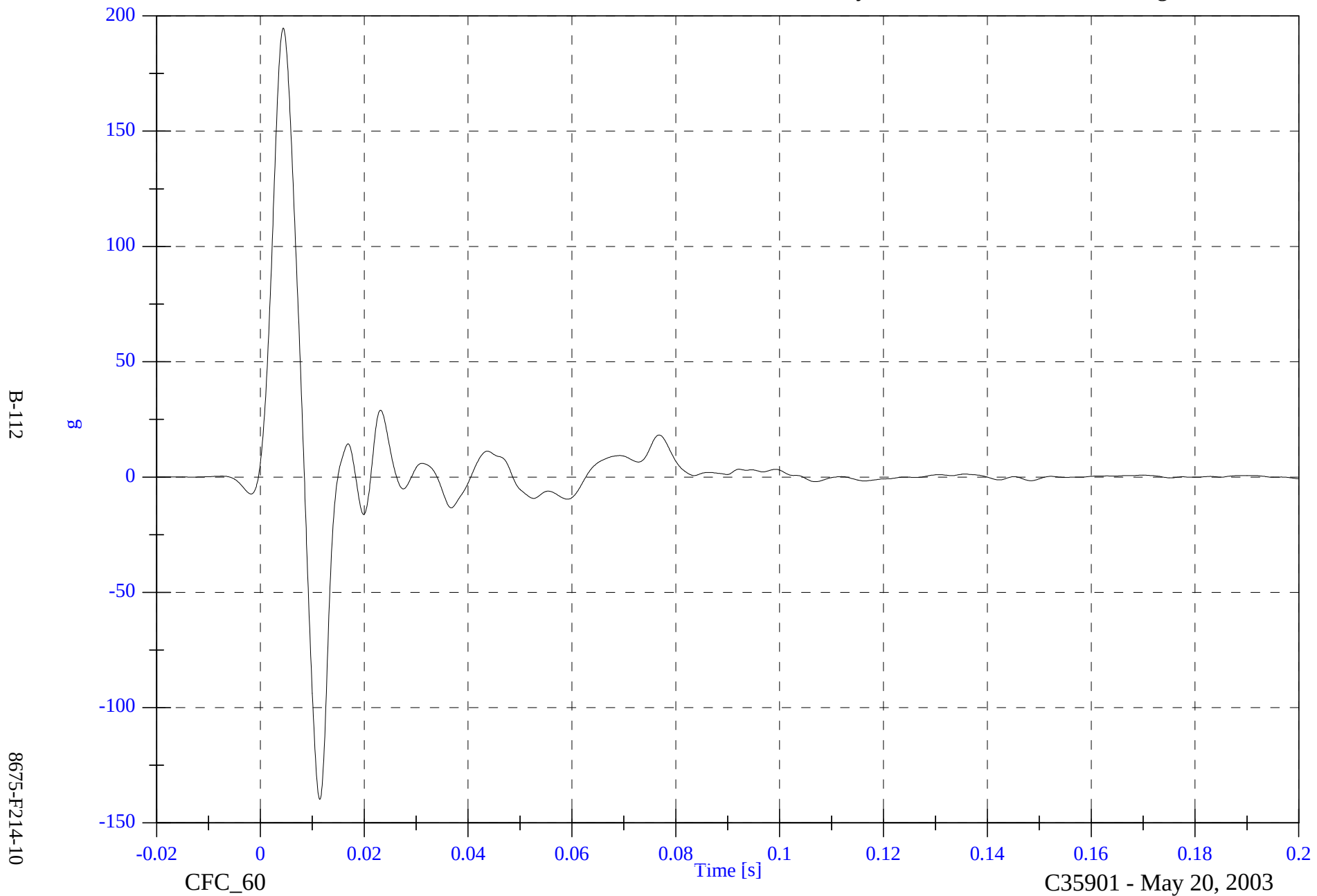
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A12 Left Lower B Post y

Max: 194.7 [g] at 0.004 [s]

Min: -139.8 [g] at 0.011 [s]

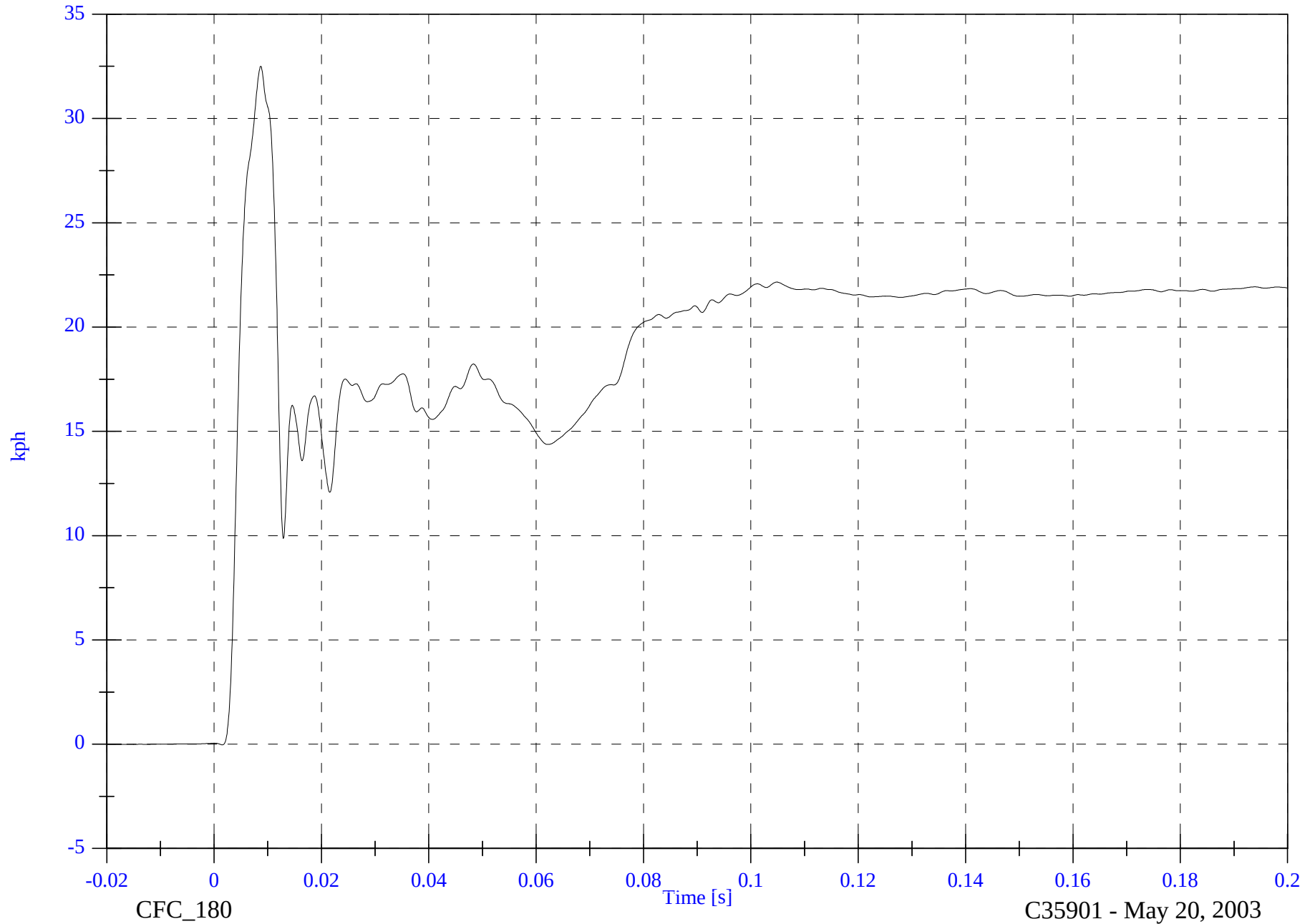


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A12 Left Lower B Post y Velocity

Max: 32.5 [kph] at 0.009 [s]

Min: -0.0 [kph] at 0.001 [s]



B-113

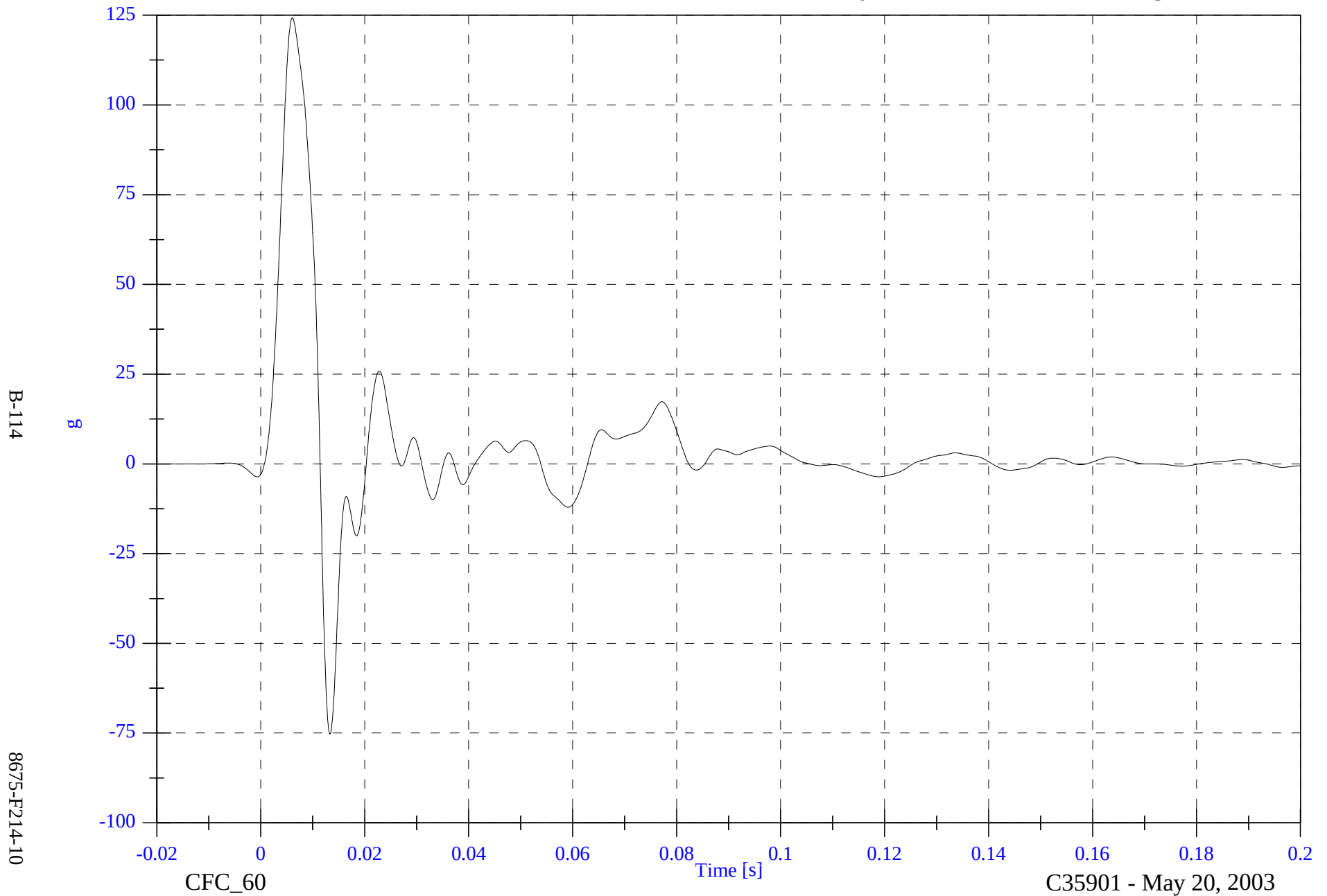
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A13 Left Middle B Post y

Max: 124.2 [g] at 0.006 [s]

Min: -75.3 [g] at 0.013 [s]

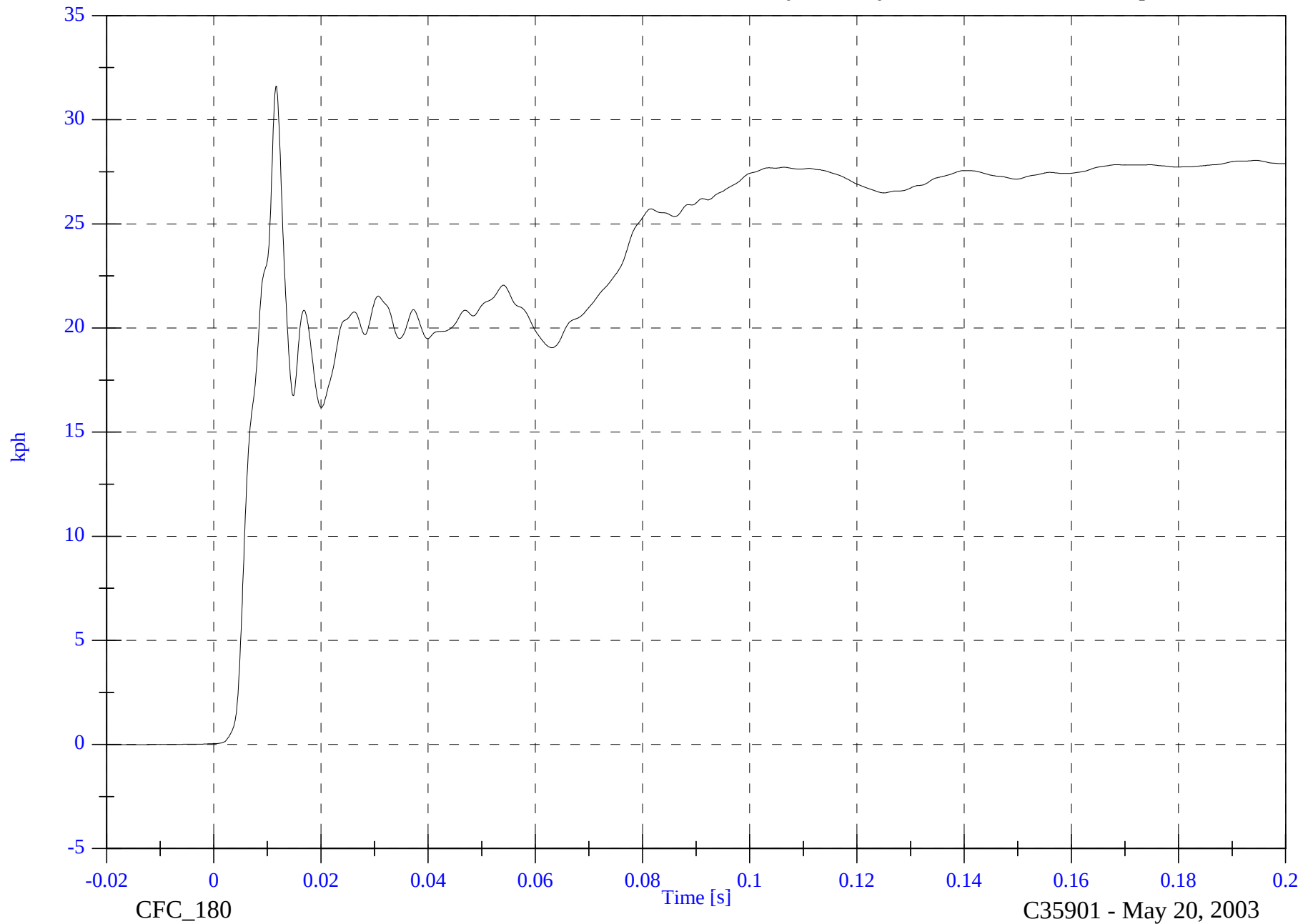


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A13 Left Middle B Post y Velocity

Max: 31.6 [kph] at 0.012 [s]

Min: -0.0 [kph] at -0.018 [s]



B-115

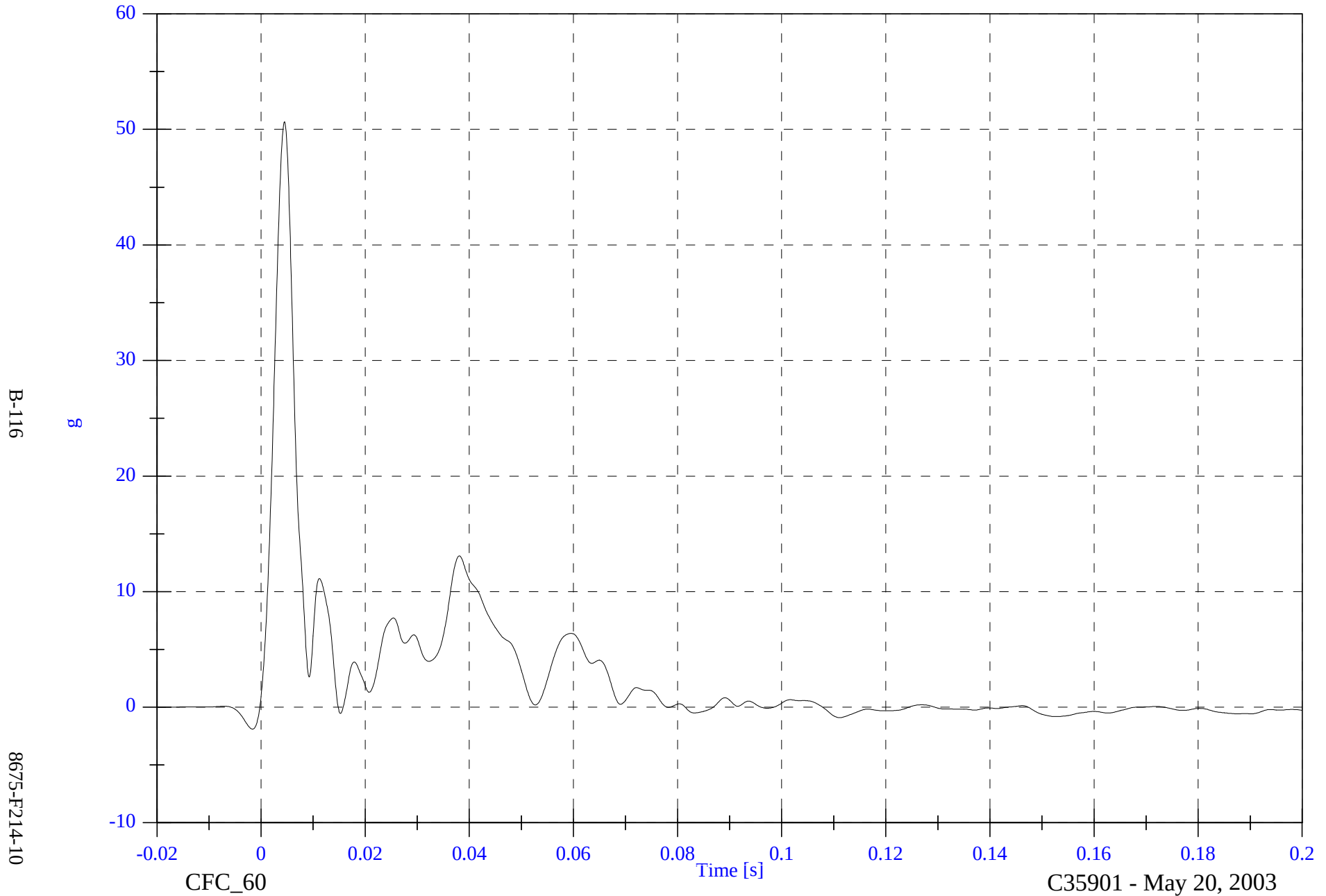
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A14 Left Lower A Post y

Max: 50.6 [g] at 0.004 [s]

Min: -1.9 [g] at -0.002 [s]

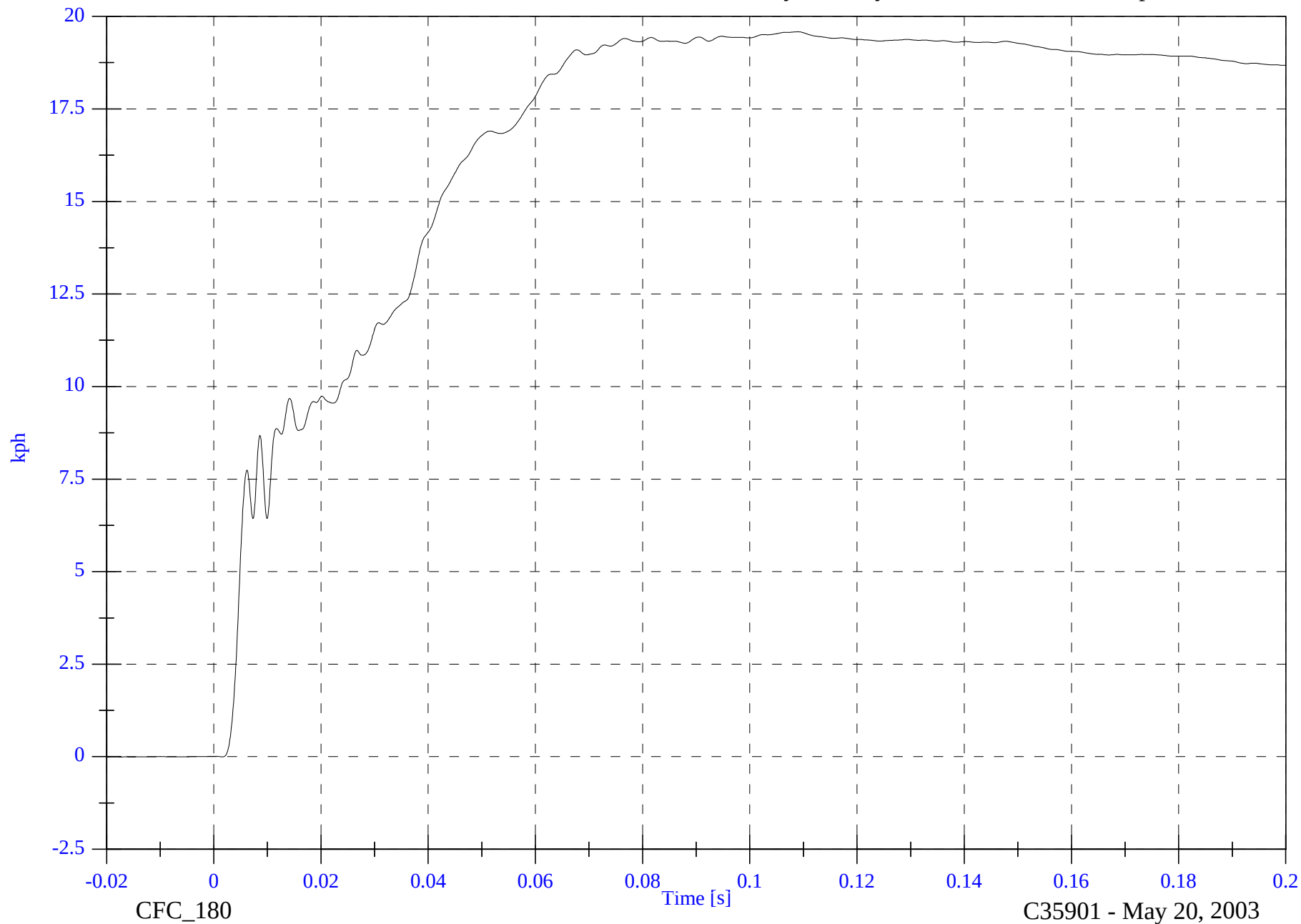


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A14 Left Lower A Post y Velocity

Max: 19.6 [kph] at 0.109 [s]

Min: -0.0 [kph] at -0.015 [s]



B-117

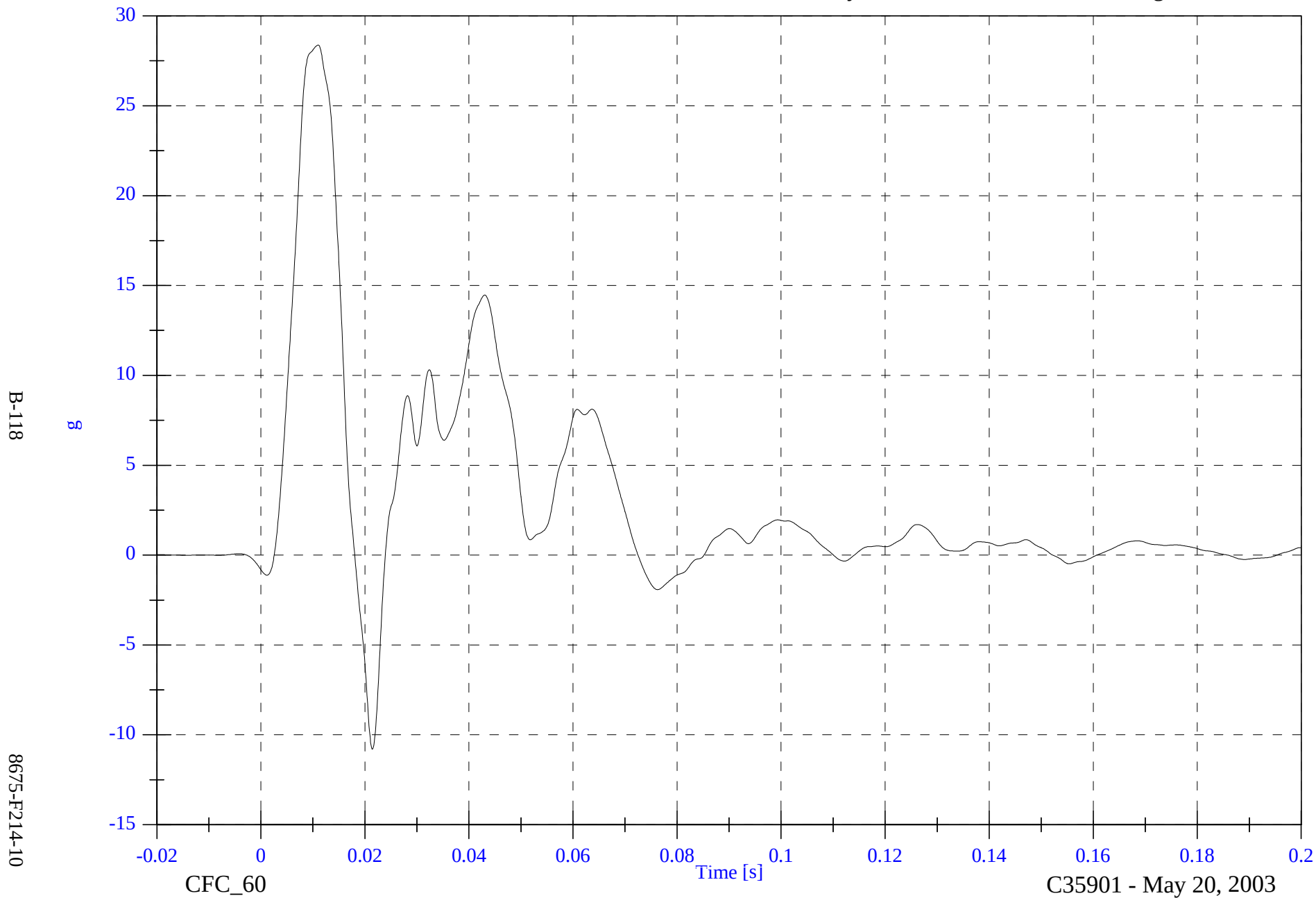
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A15 Left Mid A Post y

Max: 28.4 [g] at 0.011 [s]

Min: -10.8 [g] at 0.021 [s]

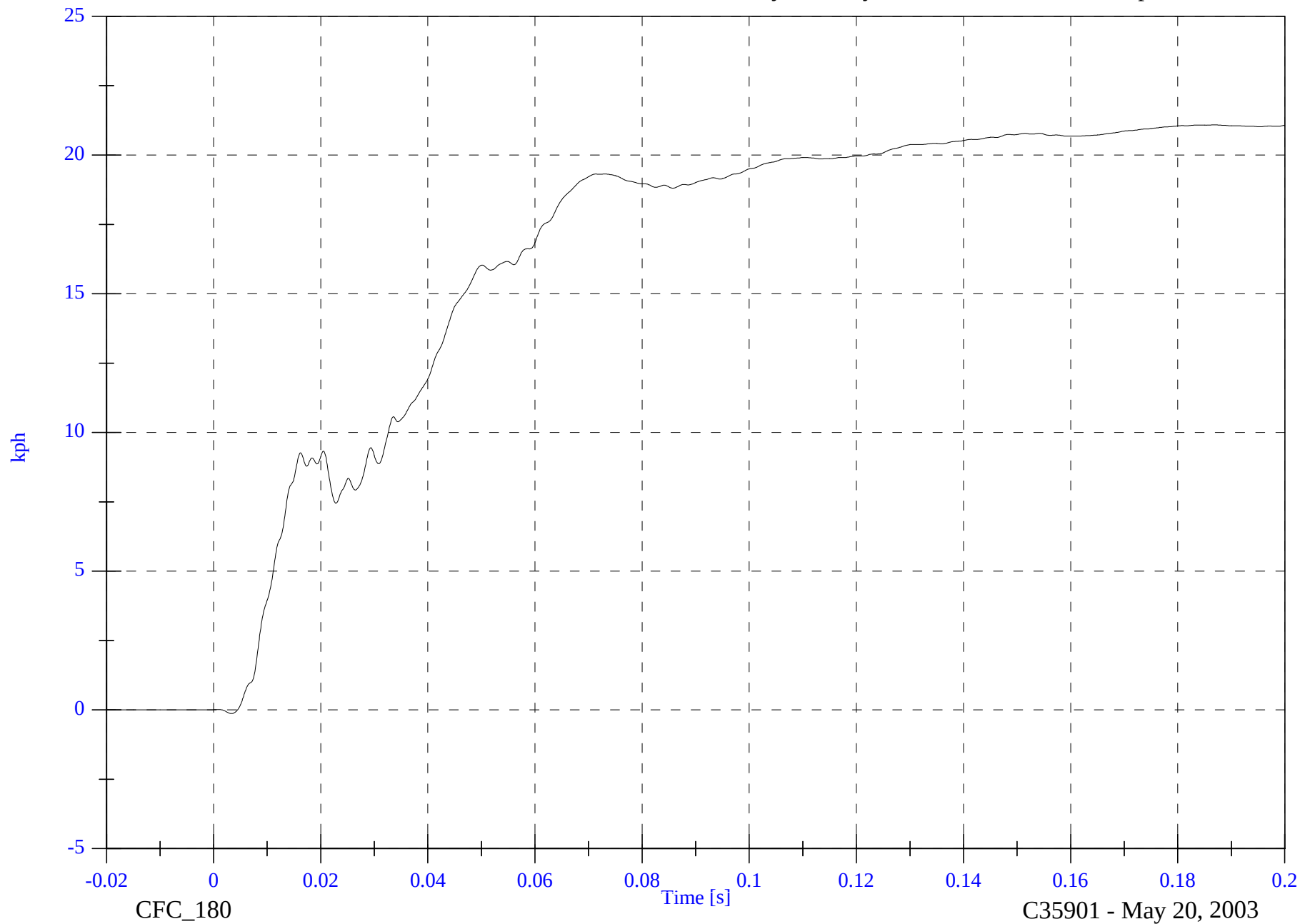


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A15 Left Mid A Post y Velocity

Max: 21.1 [kph] at 0.187 [s]

Min: -0.1 [kph] at 0.003 [s]



B-119

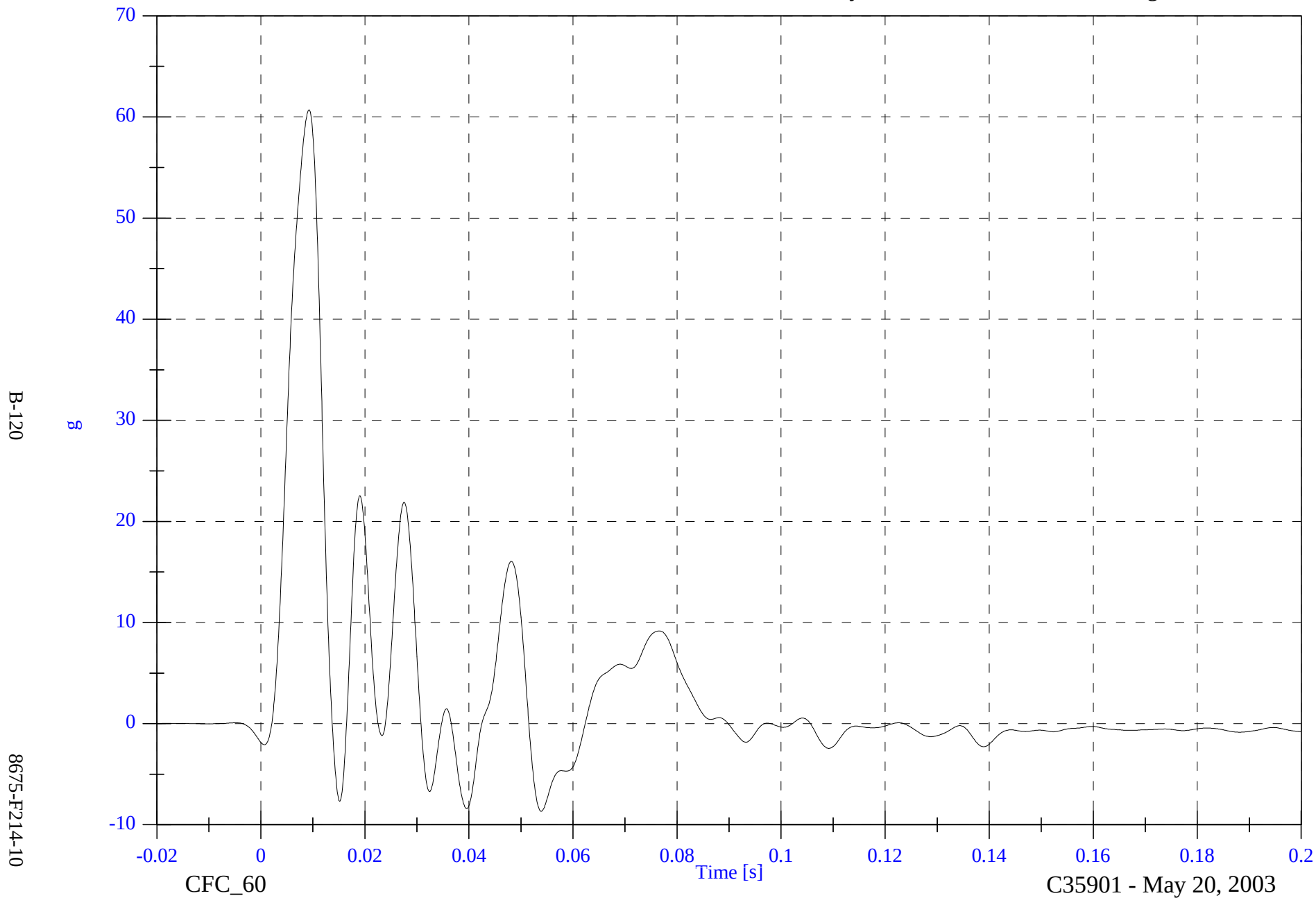
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A16 Front Seat Track y

Max: 60.7 [g] at 0.009 [s]

Min: -8.7 [g] at 0.054 [s]

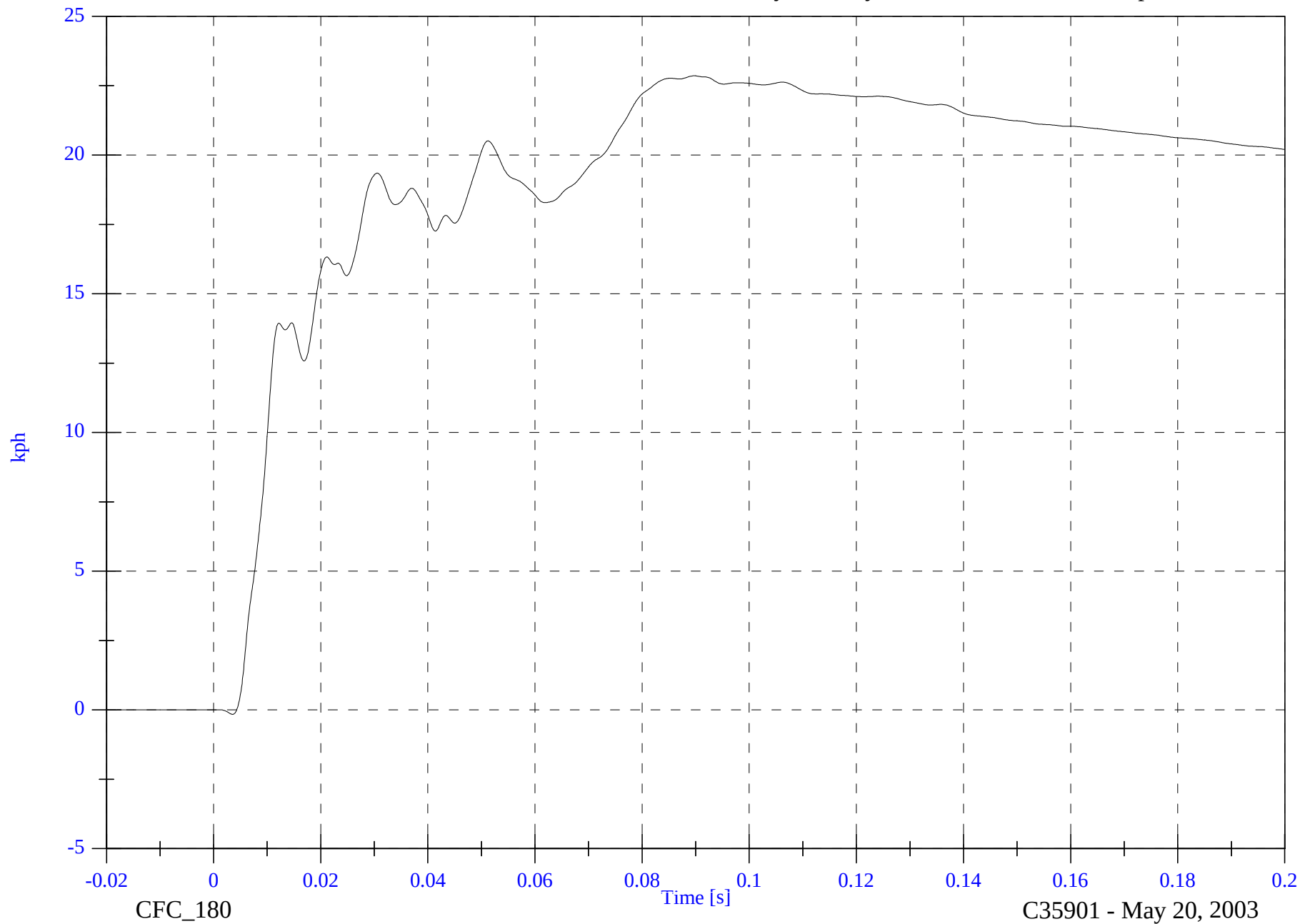


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A16 Front Seat Track y Velocity

Max: 22.9 [kph] at 0.090 [s]

Min: -0.2 [kph] at 0.003 [s]



B-121

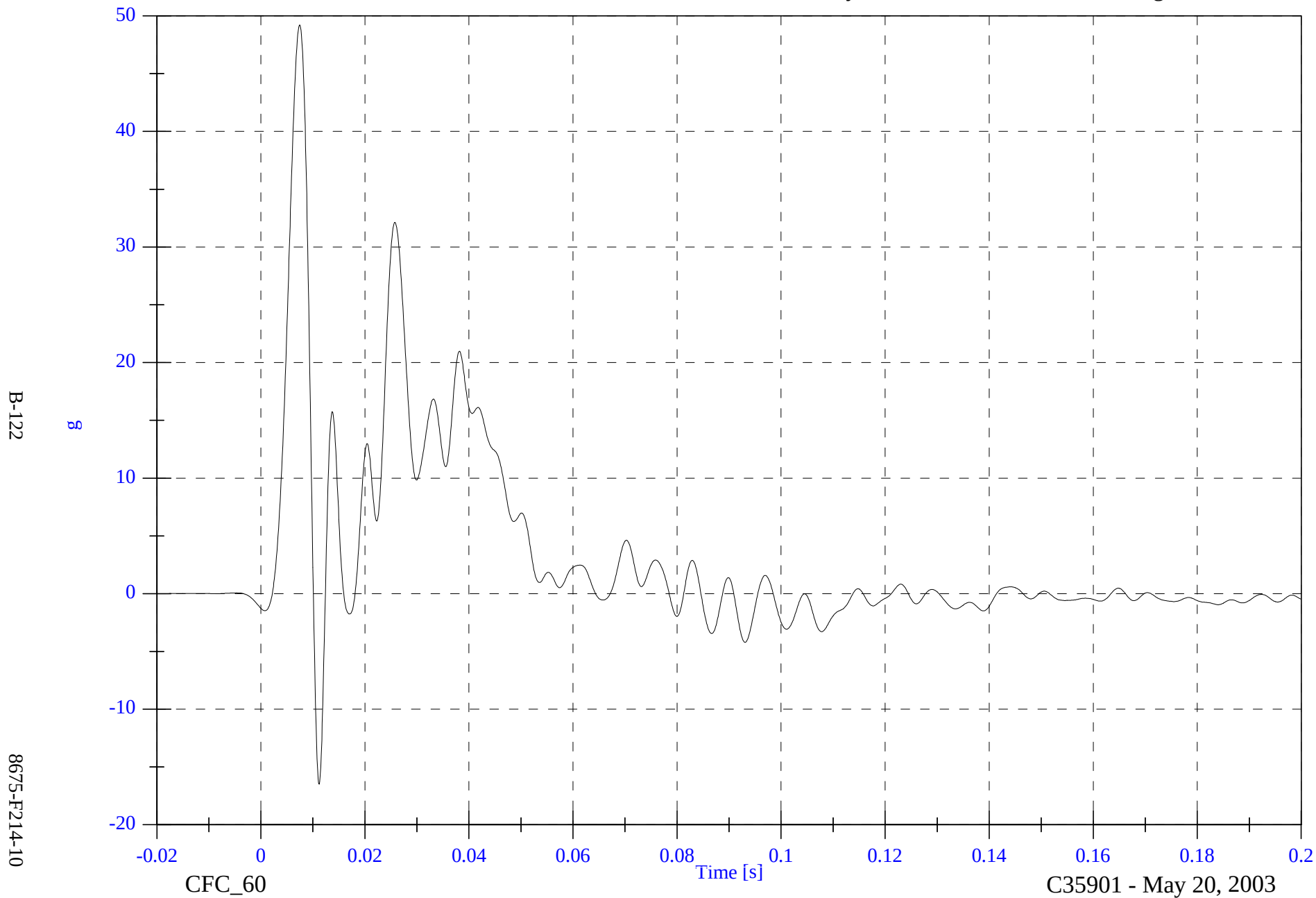
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A17 Rear Seat Track y

Max: 49.2 [g] at 0.007 [s]

Min: -16.5 [g] at 0.011 [s]

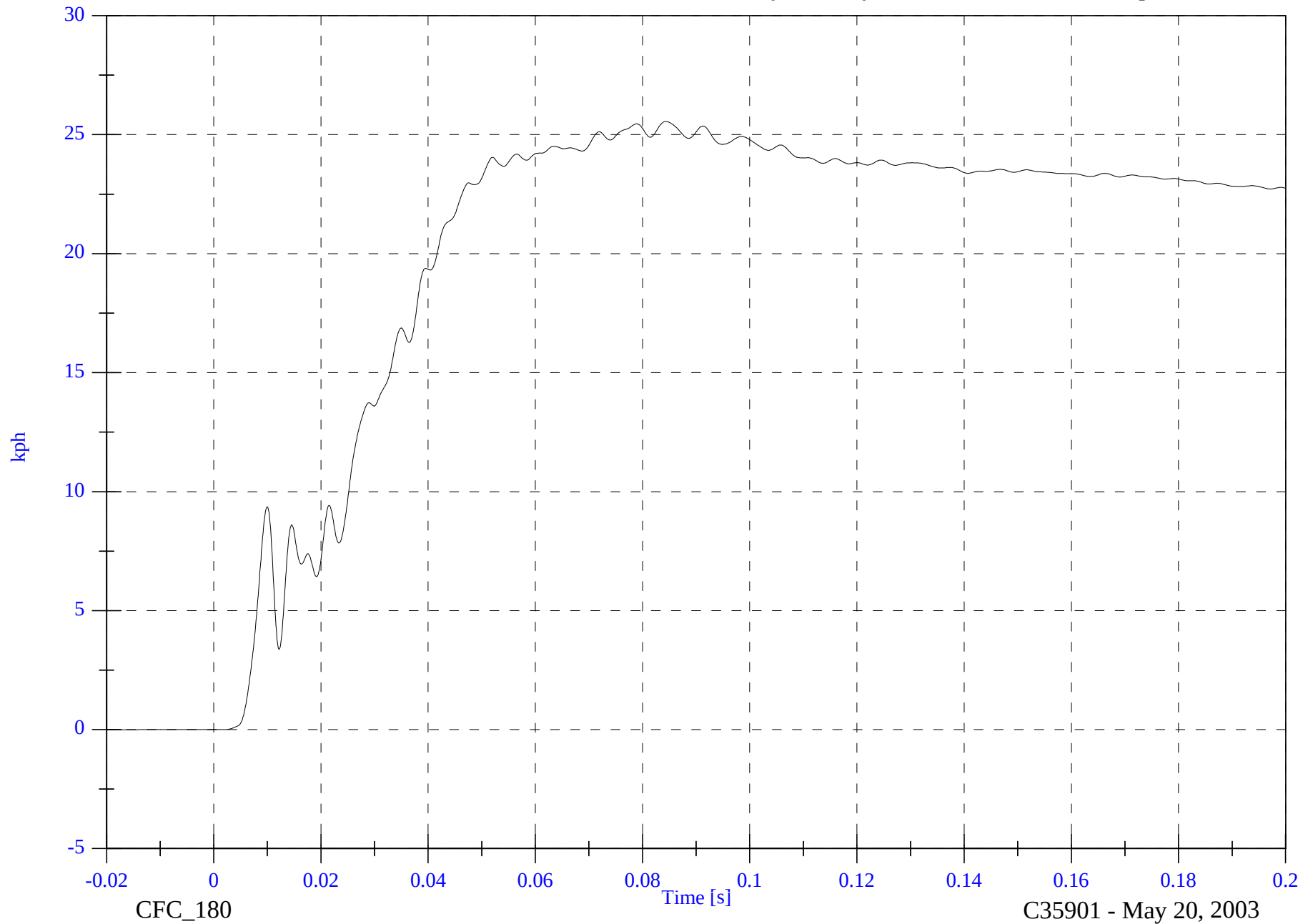


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A17 Rear Seat Track y Velocity

Max: 25.6 [kph] at 0.084 [s]

Min: -0.0 [kph] at -0.018 [s]



B-123

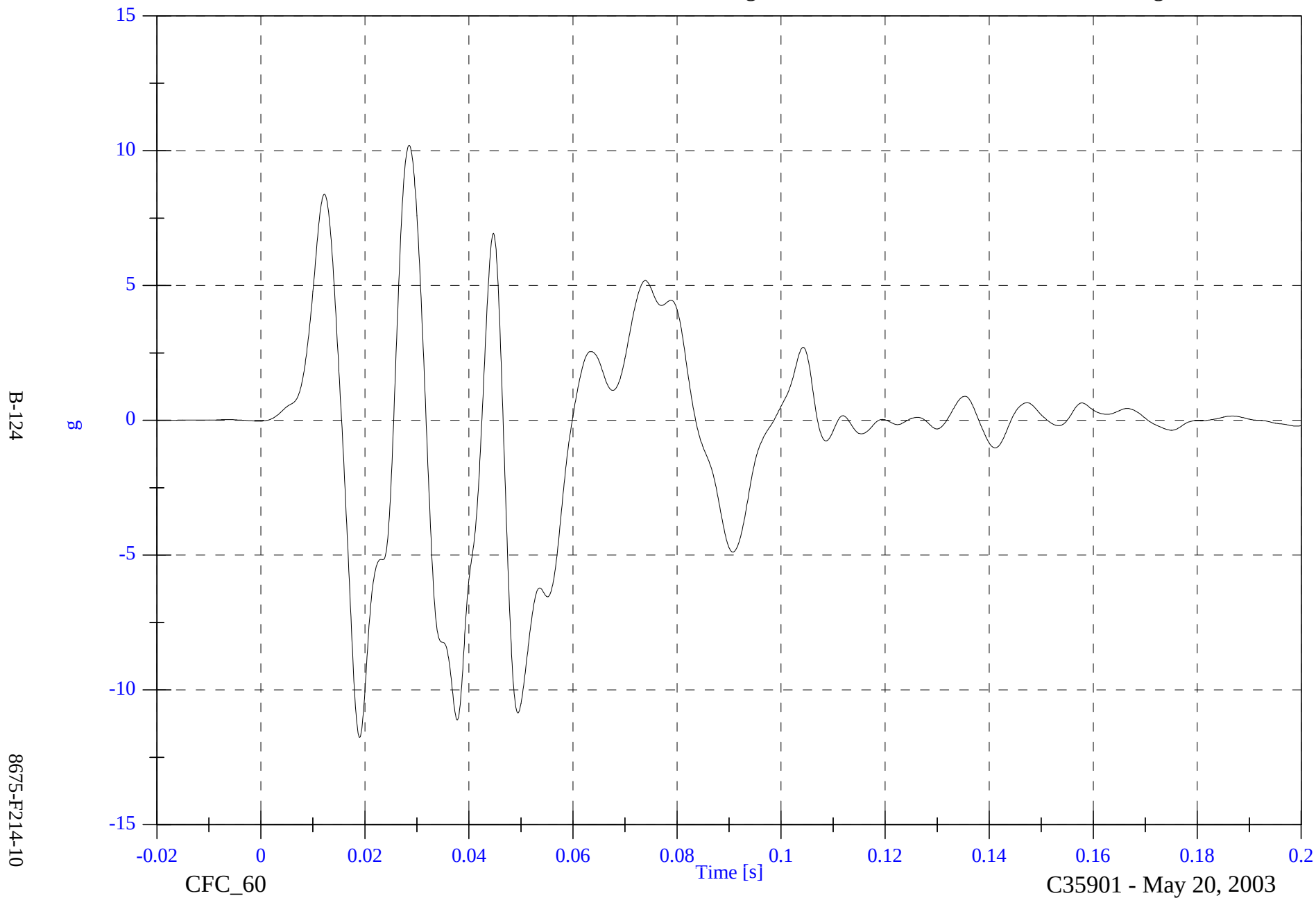
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A18 Target CG x

Max: 10.2 [g] at 0.029 [s]

Min: -11.8 [g] at 0.019 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

V2 A18 Target CG x Velocity

Max: 1.5 [kph] at 0.015 [s]

Min: -4.3 [kph] at 0.058 [s]



B-125

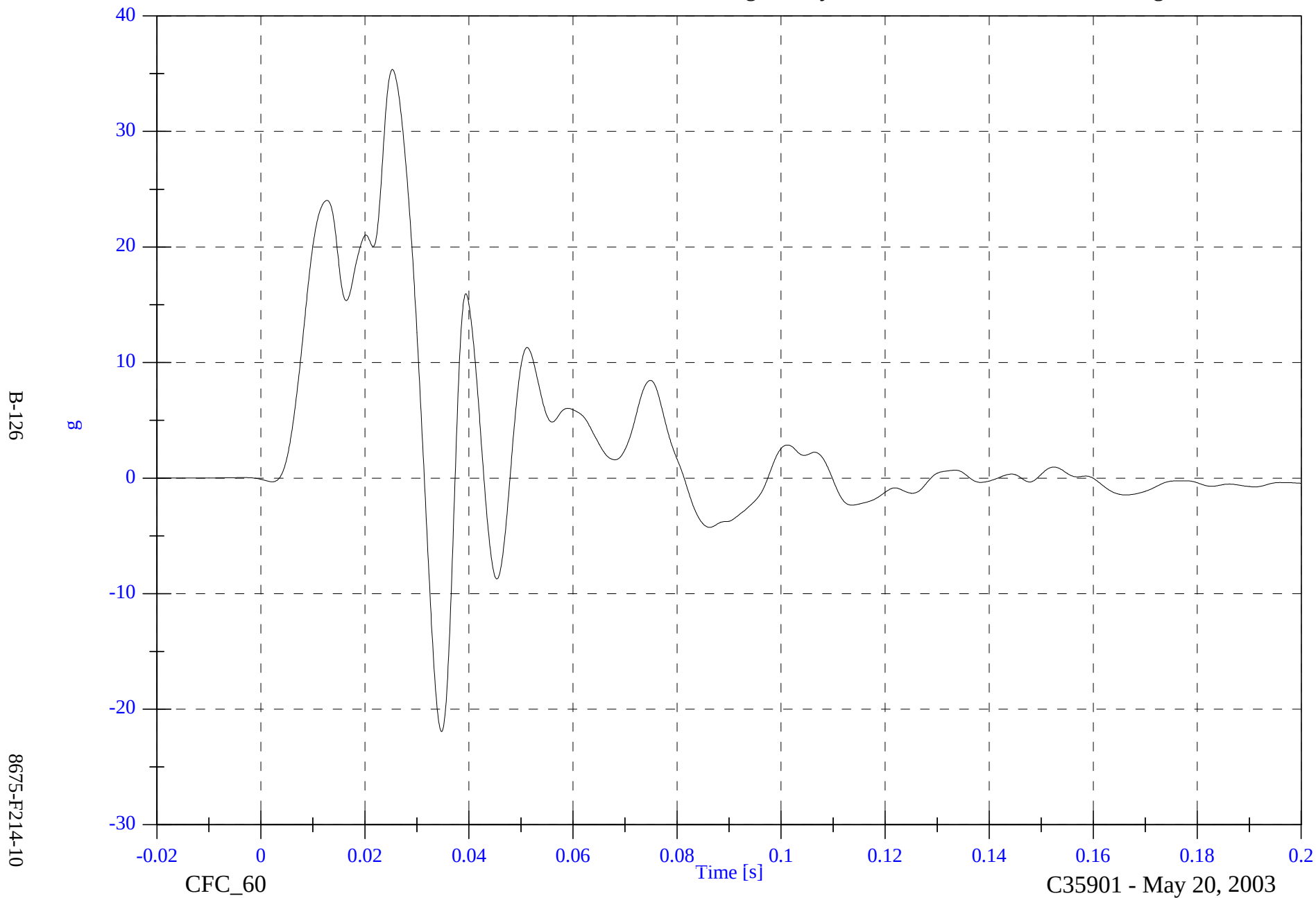
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A18 Target CG y

Max: 35.4 [g] at 0.025 [s]

Min: -21.9 [g] at 0.035 [s]

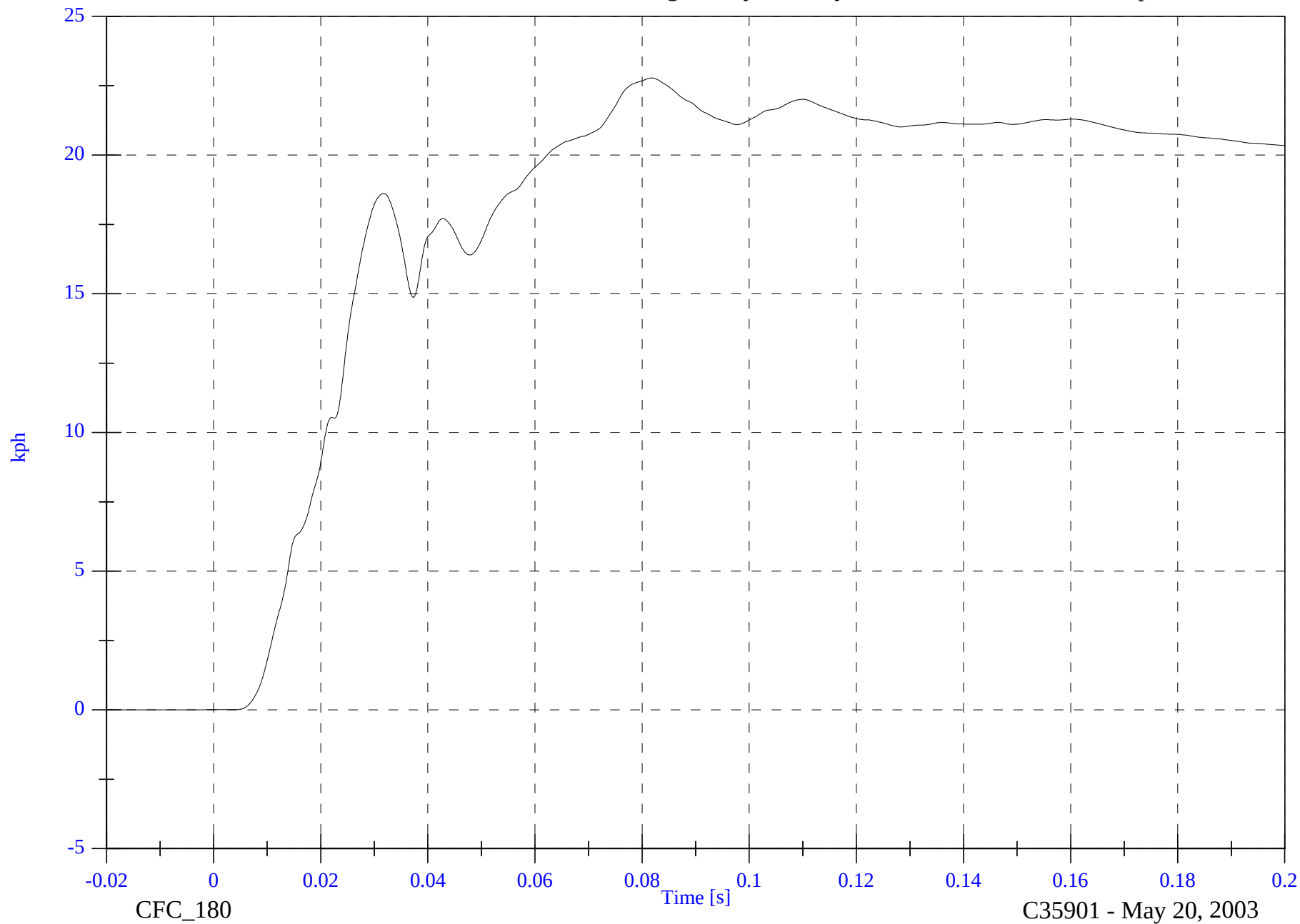


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A18 Target CG y Velocity

Max: 22.8 [kph] at 0.082 [s]

Min: -0.0 [kph] at -0.020 [s]



B-127

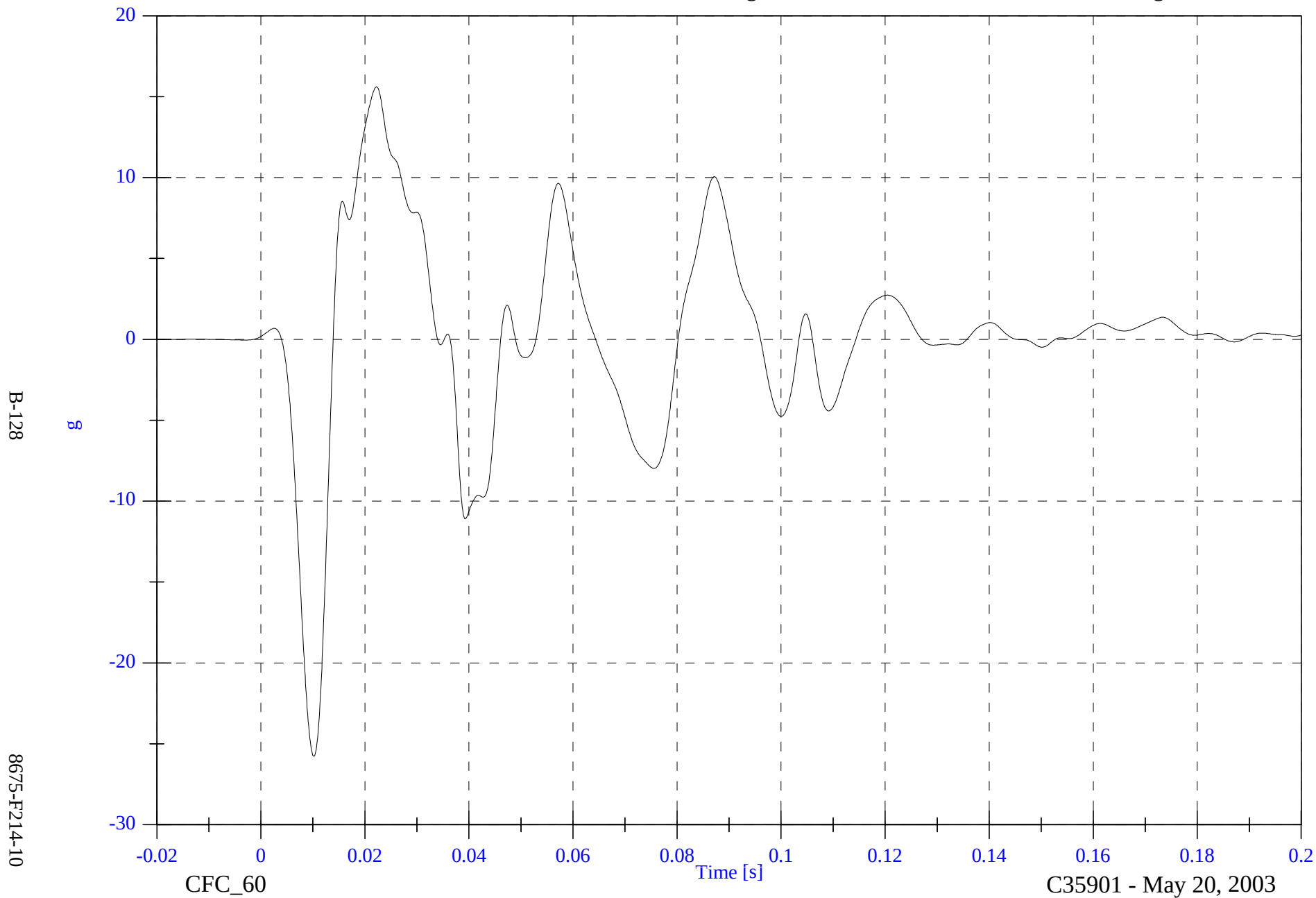
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2 A18 Target CG z

Max: 15.6 [g] at 0.022 [s]

Min: -25.8 [g] at 0.010 [s]

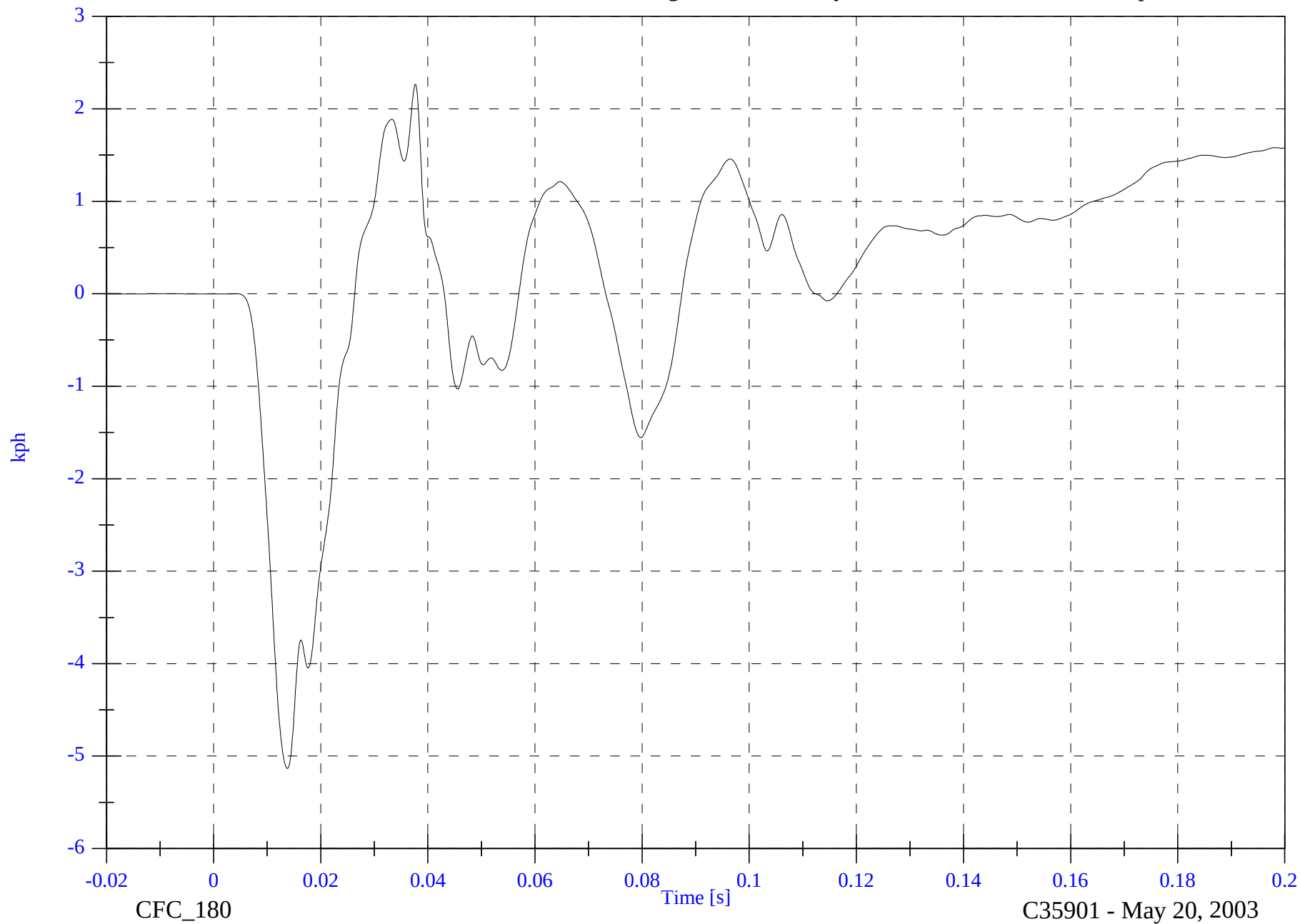


FMVSS 214D Indicant - 2003 Volvo XC90

V2 A18 Target CG z Velocity

Max: 2.3 [kph] at 0.038 [s]

Min: -5.1 [kph] at 0.014 [s]



B-129

8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

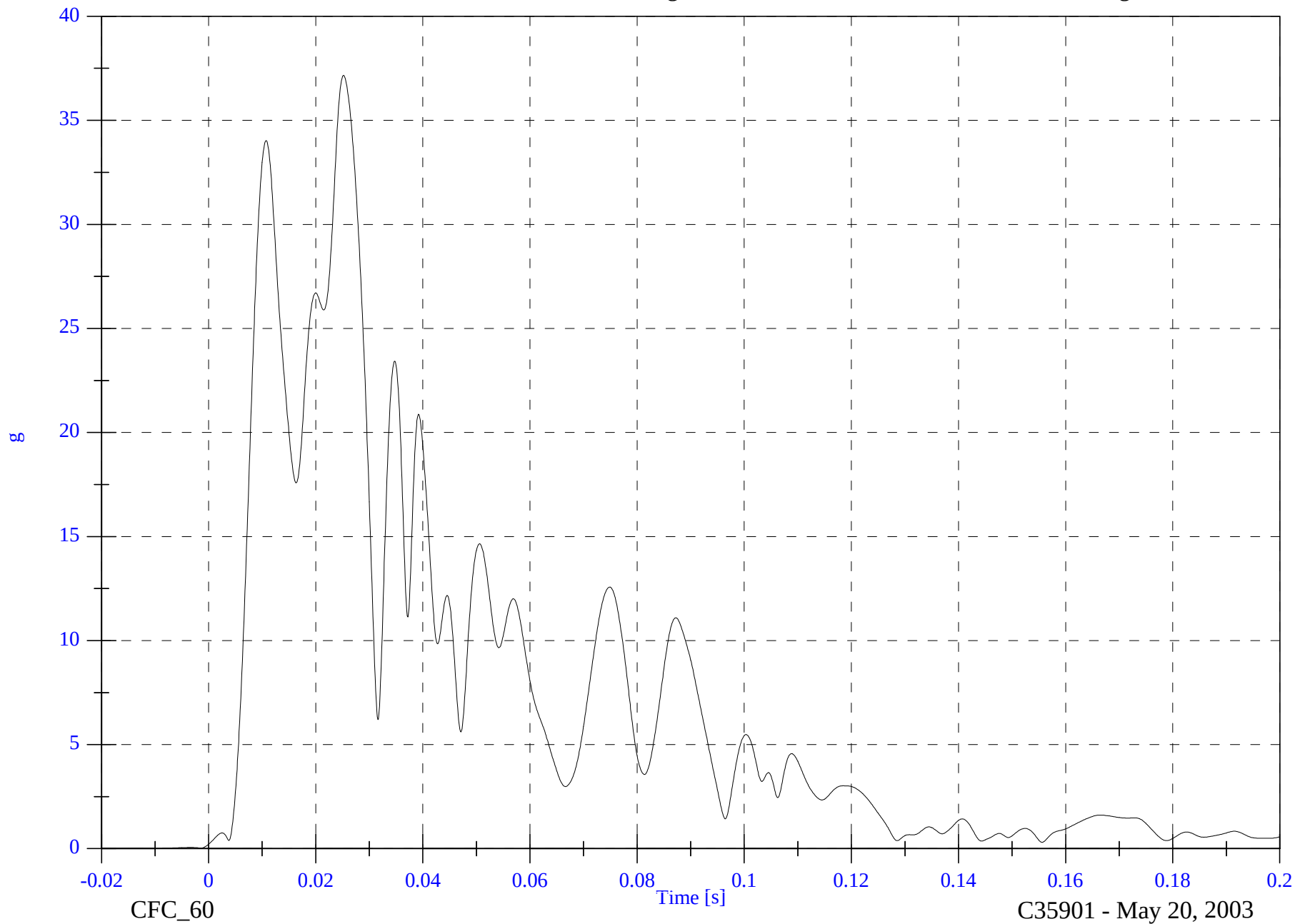
V2 A18 Target CG Resultant

Max: 37.2 [g] at 0.025 [s]

Min: 0.0 [g] at -0.017 [s]

B-130

8675-F214-10



FMVSS 214D Indicant - 2003 Volvo XC90

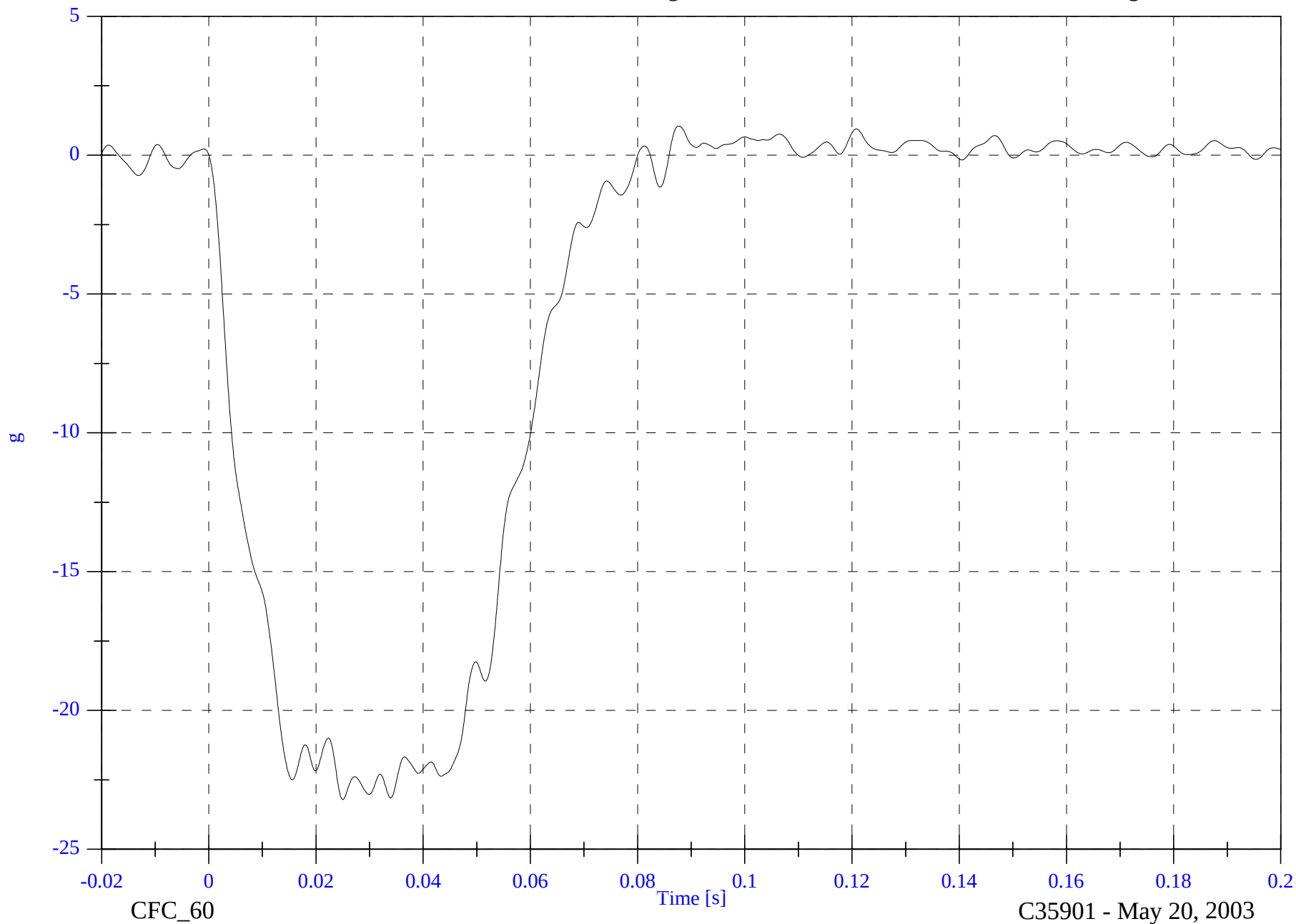
V1 Moving Barrier CG X

Max: 1.0 [g] at 0.088 [s]

Min: -23.2 [g] at 0.025 [s]

B-131

8675-F214-10

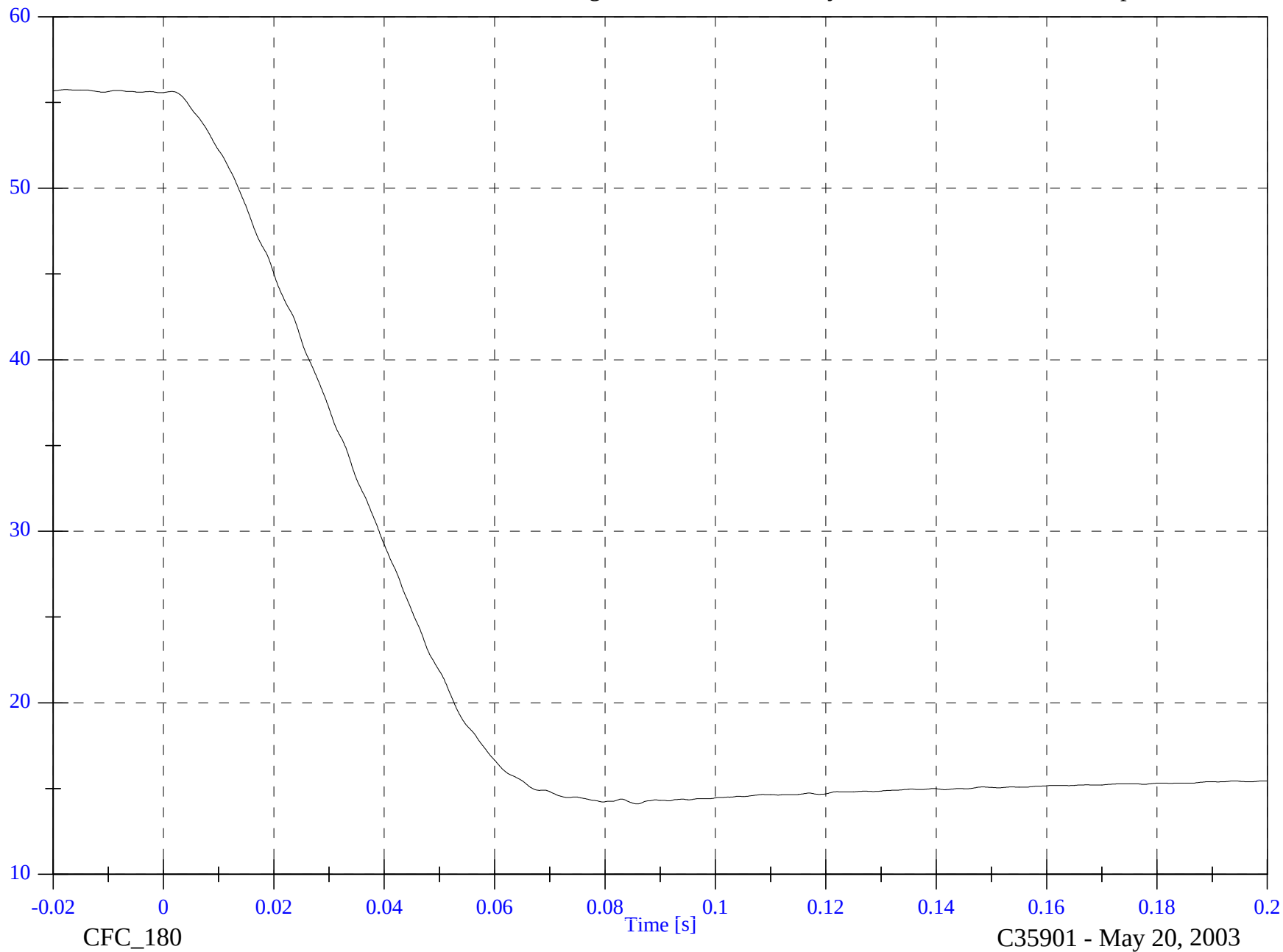


FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier CG X Velocity

Max: 55.8 [kph] at -0.018 [s]

Min: 14.1 [kph] at 0.086 [s]



B-132

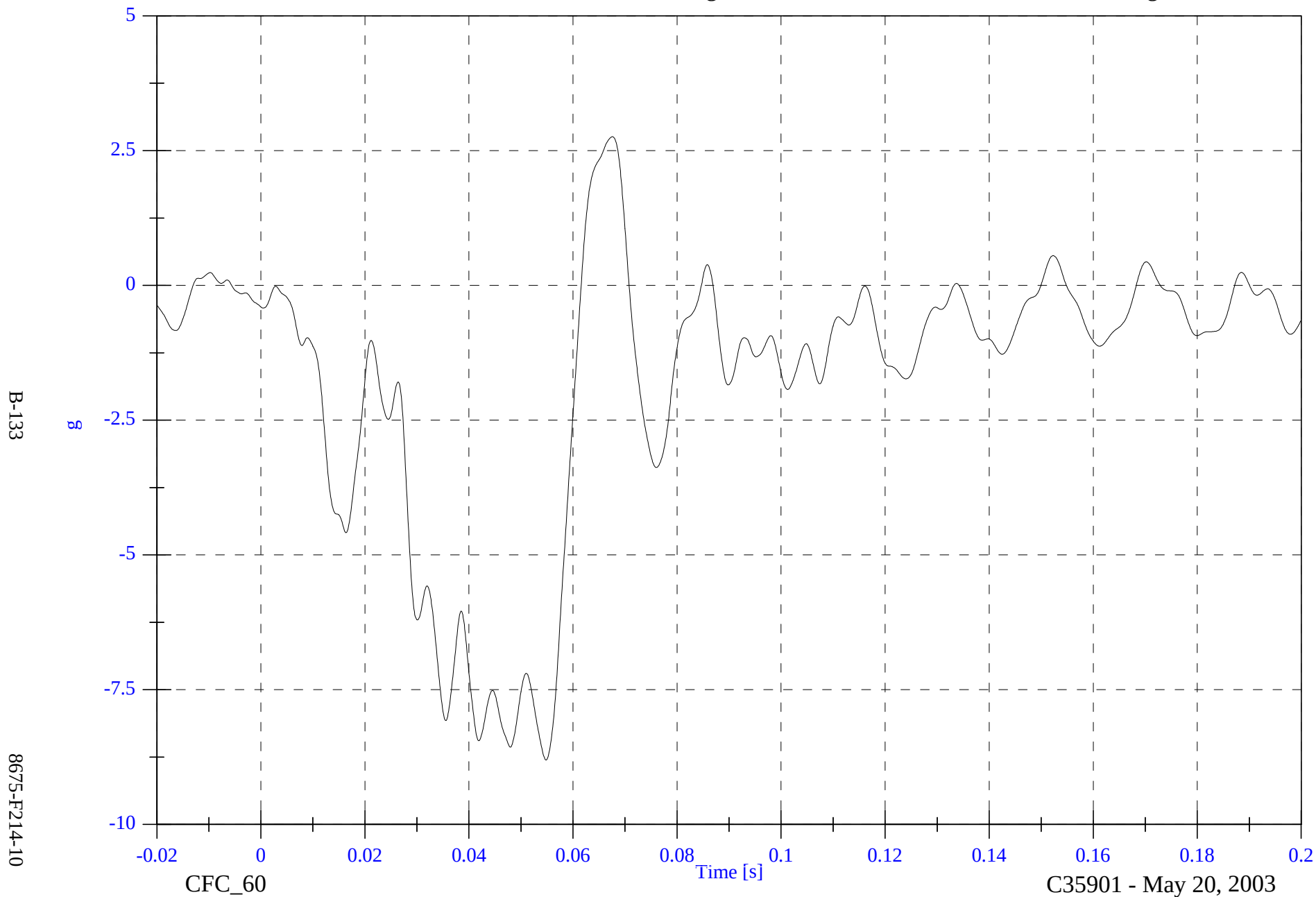
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier CG Y

Max: 2.8 [g] at 0.068 [s]

Min: -8.8 [g] at 0.055 [s]

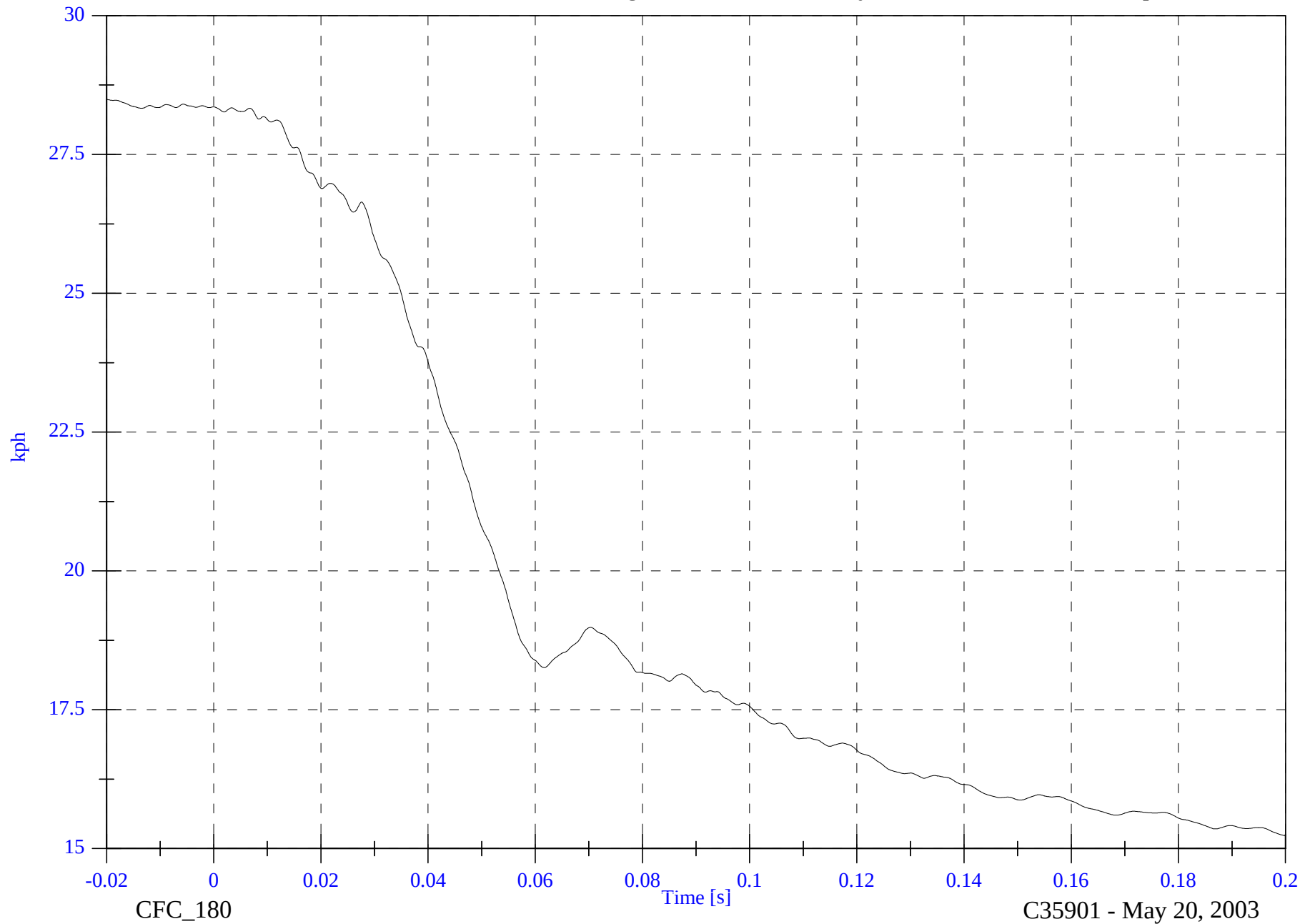


FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier CG Y Velocity

Max: 28.5 [kph] at -0.020 [s]

Min: 15.2 [kph] at 0.200 [s]



B-134

8675-F214-10

CFC_180

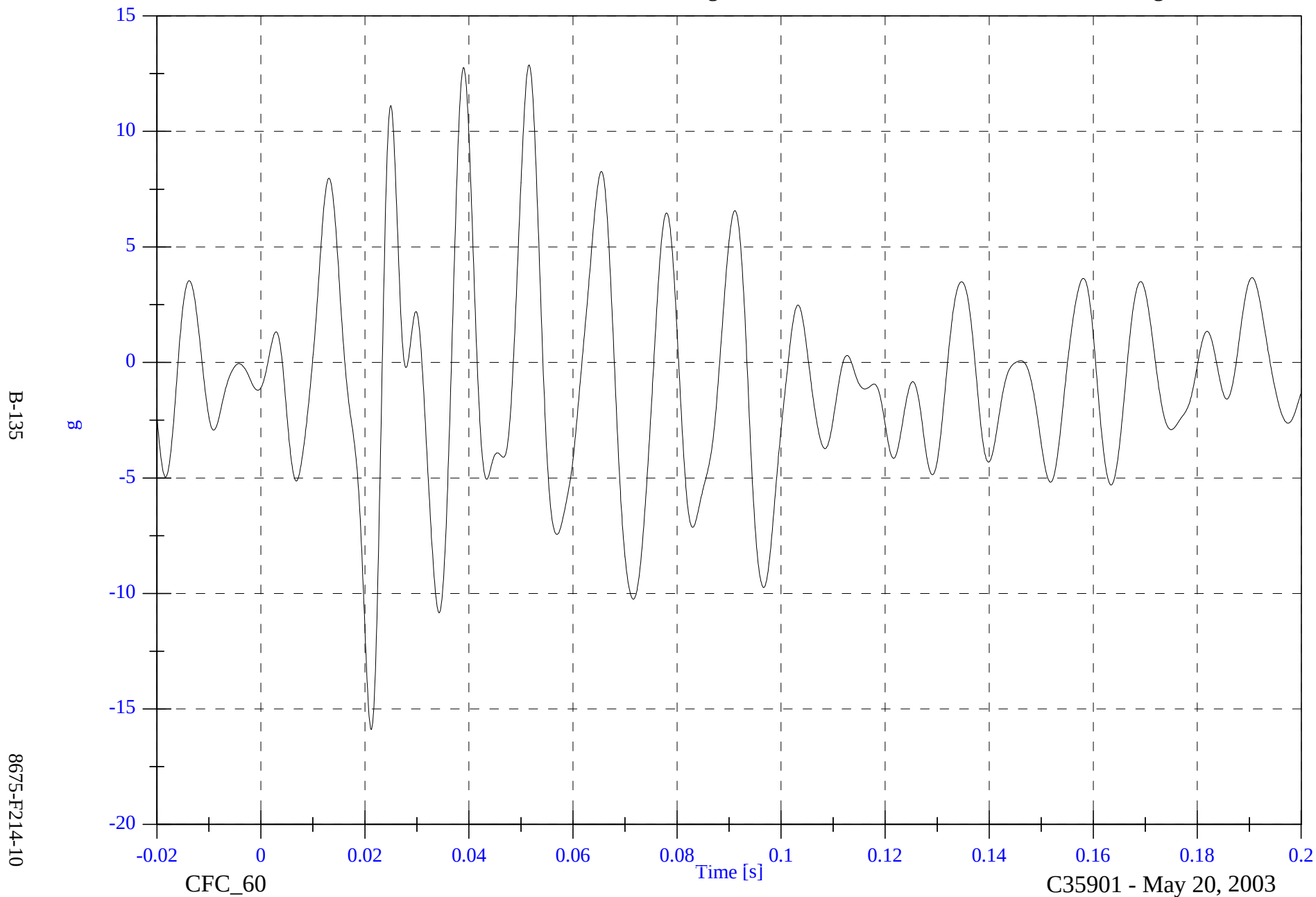
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier CG Z

Max: 12.9 [g] at 0.052 [s]

Min: -15.9 [g] at 0.021 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier CG Z Velocity

Max: 0.3 [kph] at -0.020 [s]

Min: -6.9 [kph] at 0.188 [s]



B-136

8675-F214-10

CFC_180

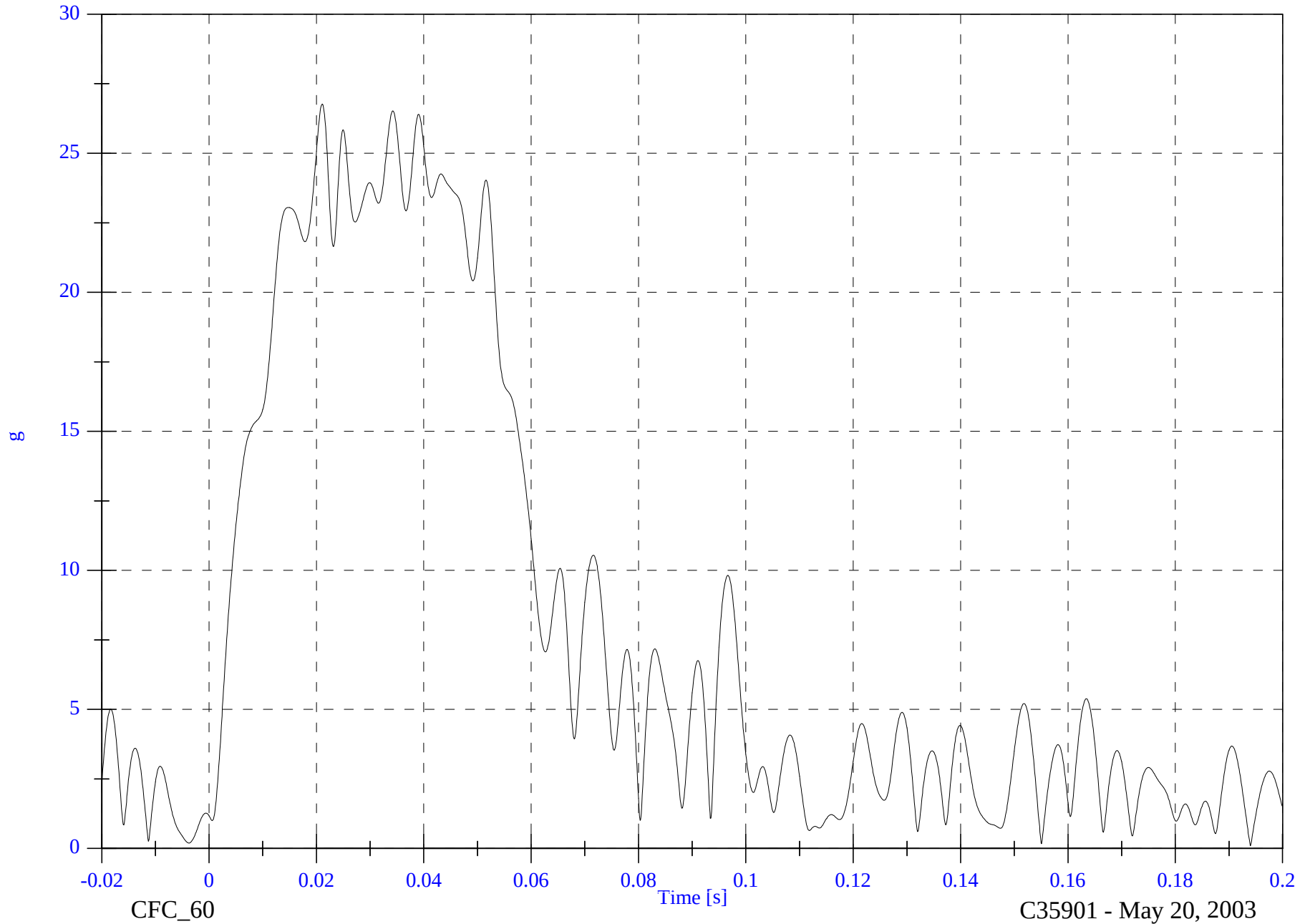
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier CG Resultant

Max: 26.8 [g] at 0.021 [s]

Min: 0.1 [g] at 0.194 [s]



B-137

8675-F214-10

CFC_60

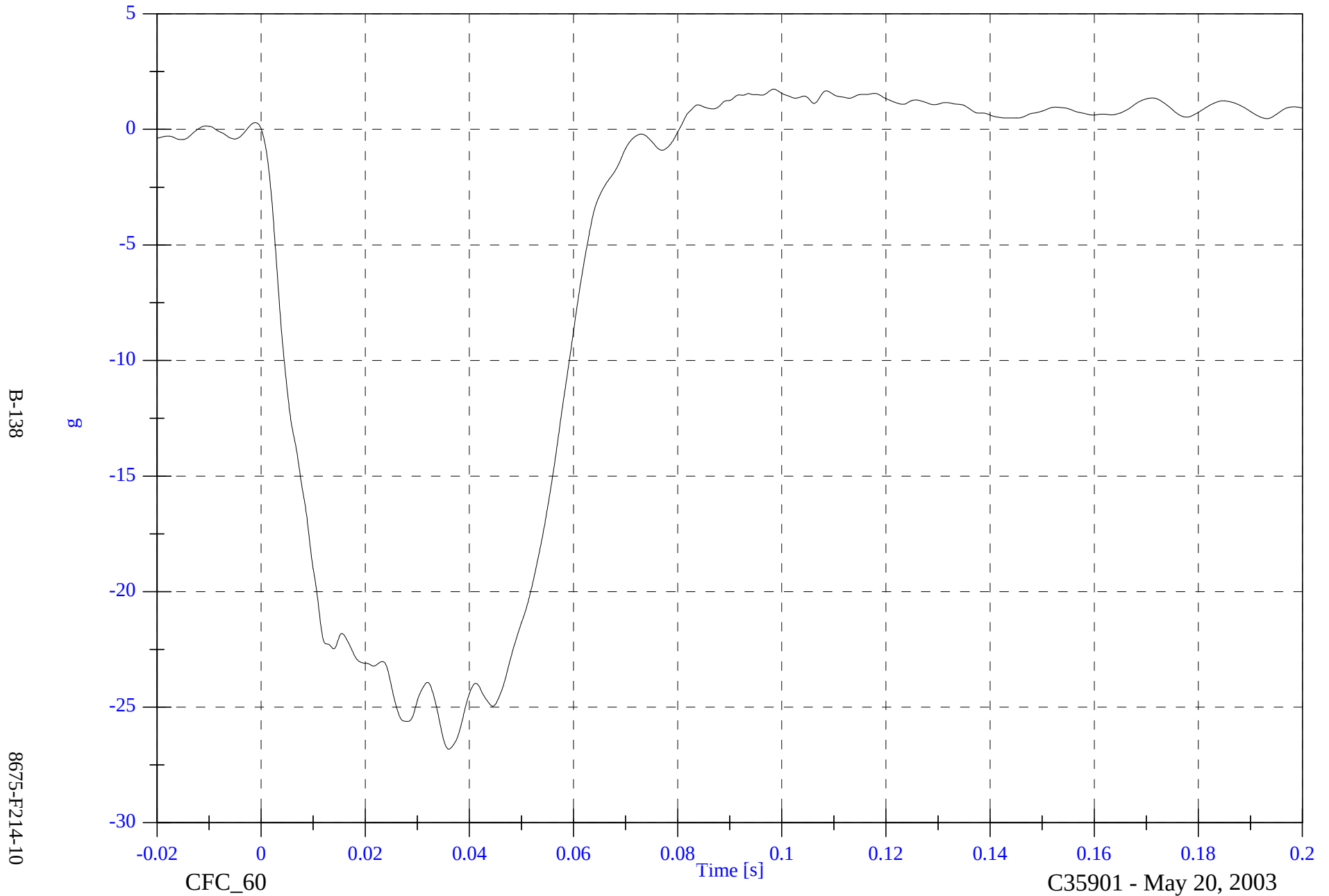
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier Left Rail X

Max: 1.7 [g] at 0.098 [s]

Min: -26.8 [g] at 0.036 [s]

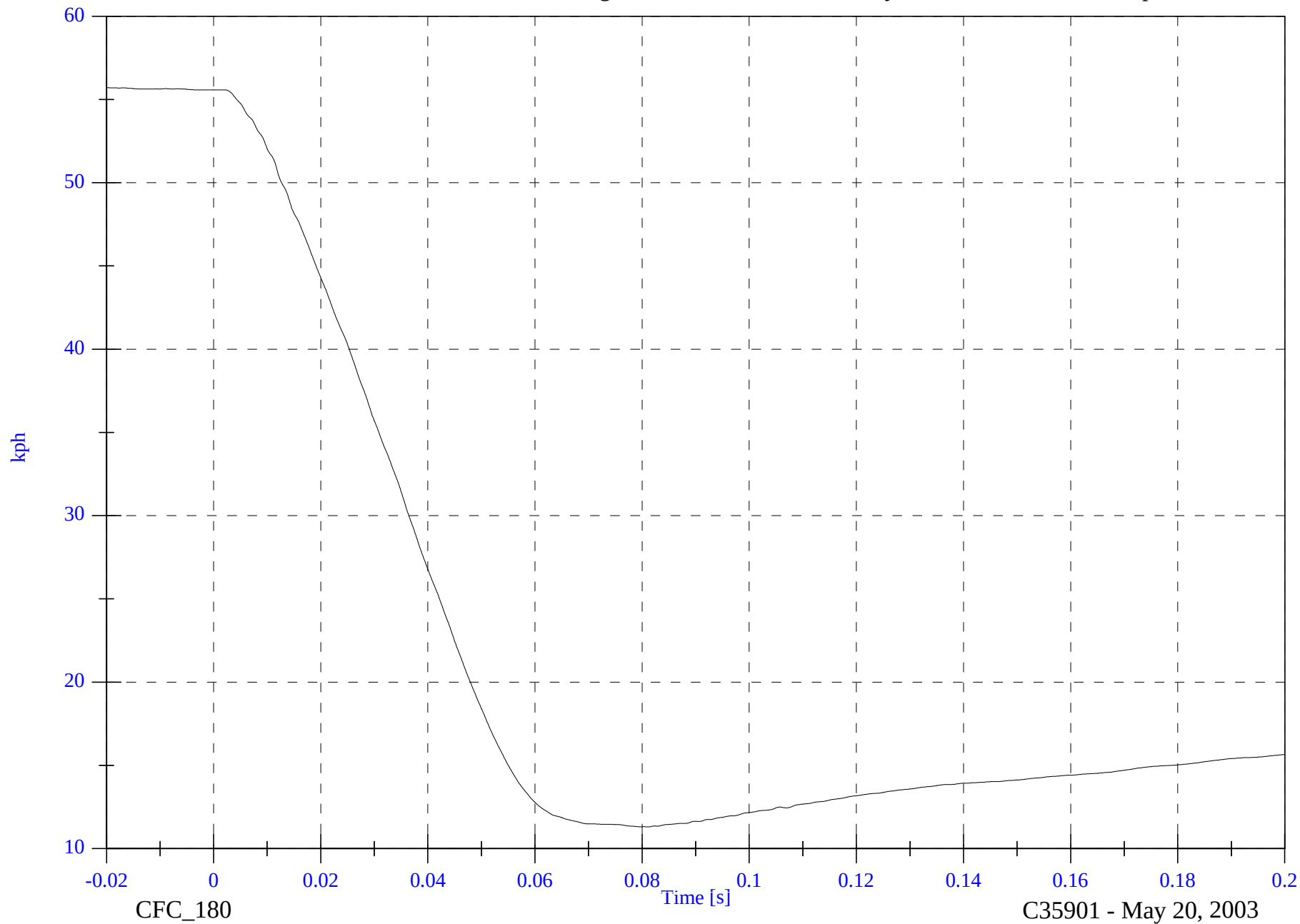


FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier Left Rail X Velocity

Max: 55.7 [kph] at -0.020 [s]

Min: 11.3 [kph] at 0.081 [s]



B-139

8675-F214-10

CFC_180

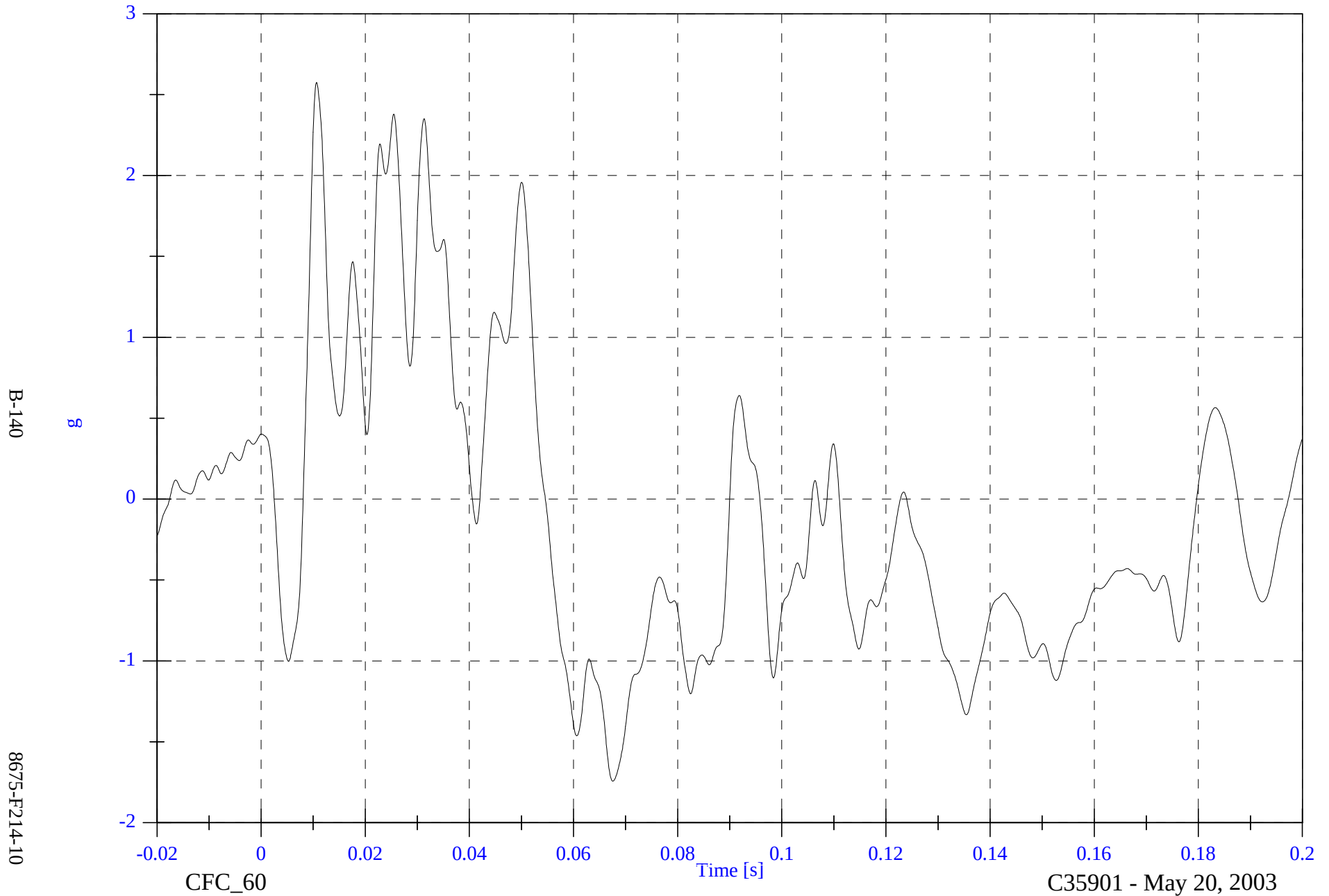
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier Left Rail Y

Max: 2.6 [g] at 0.011 [s]

Min: -1.7 [g] at 0.068 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

V1 Moving Barrier Left Rail Y Velocity

Max: 30.4 [kph] at 0.055 [s]

Min: 27.3 [kph] at 0.198 [s]



B-141

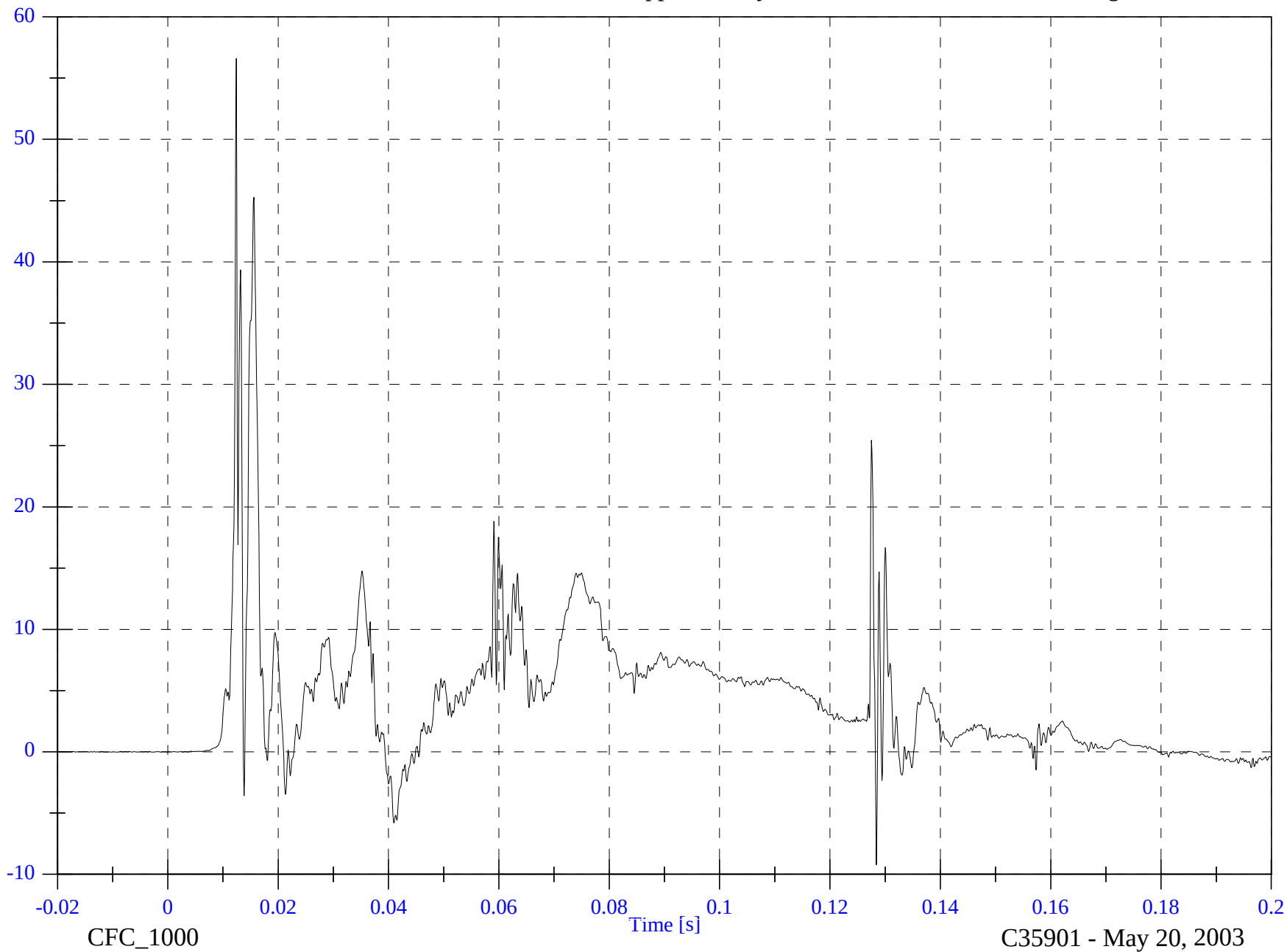
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Rib Ry

Max: 56.6 [g] at 0.012 [s]

Min: -9.2 [g] at 0.128 [s]

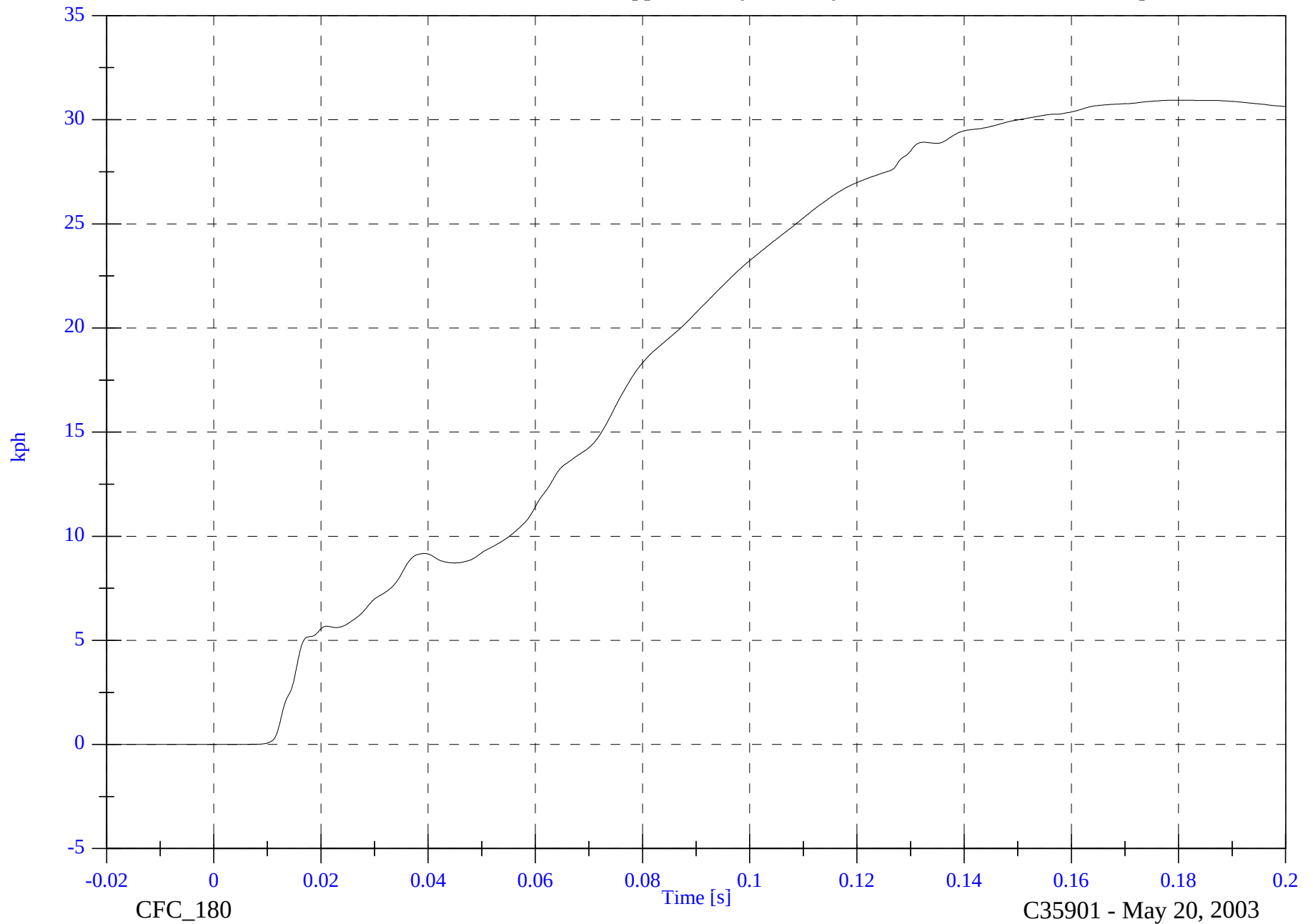


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Rib Ry Velocity

Max: 30.9 [kph] at 0.180 [s]

Min: -0.0 [kph] at -0.020 [s]



B-143

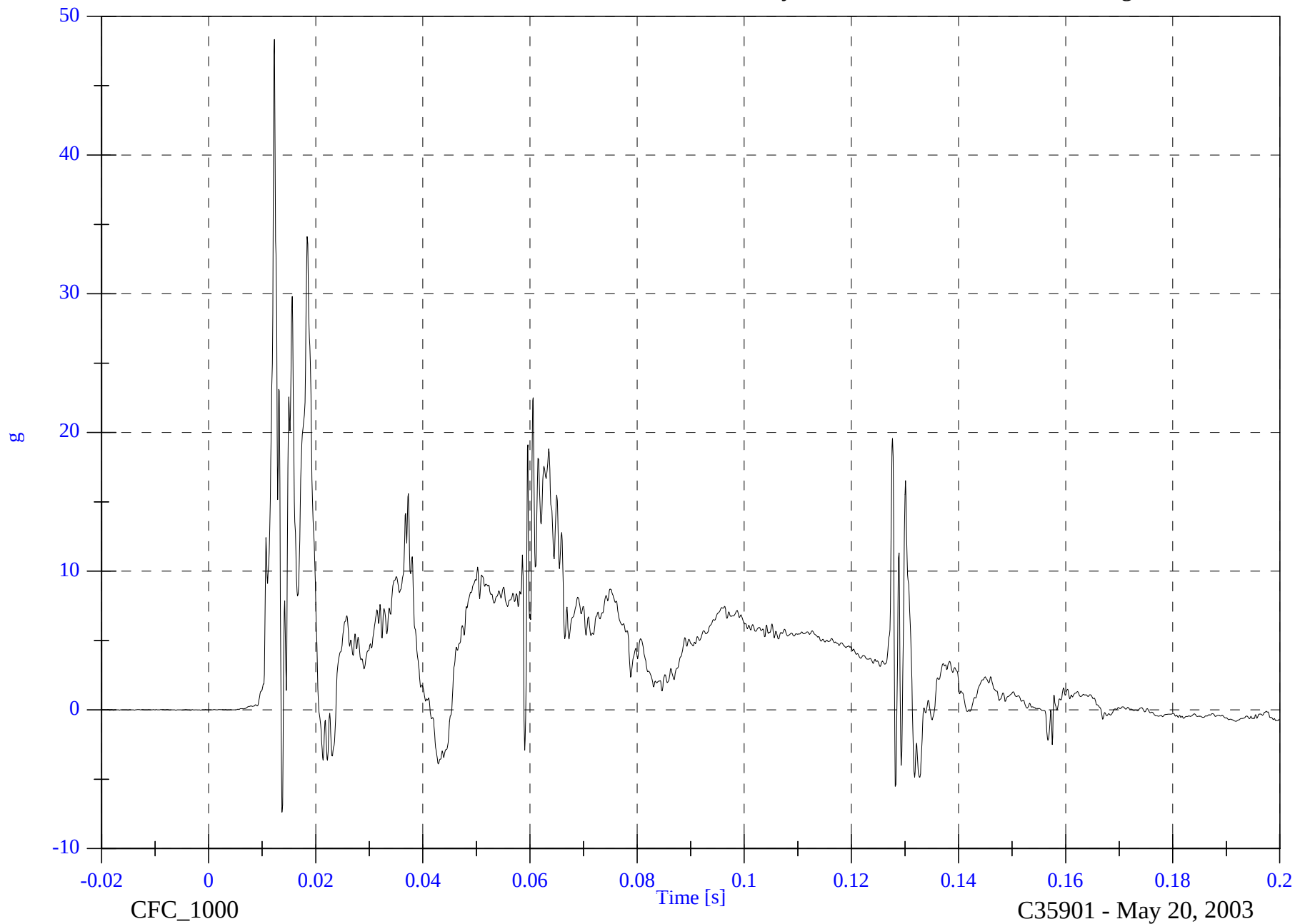
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Rib Ry

Max: 48.3 [g] at 0.012 [s]

Min: -7.4 [g] at 0.014 [s]

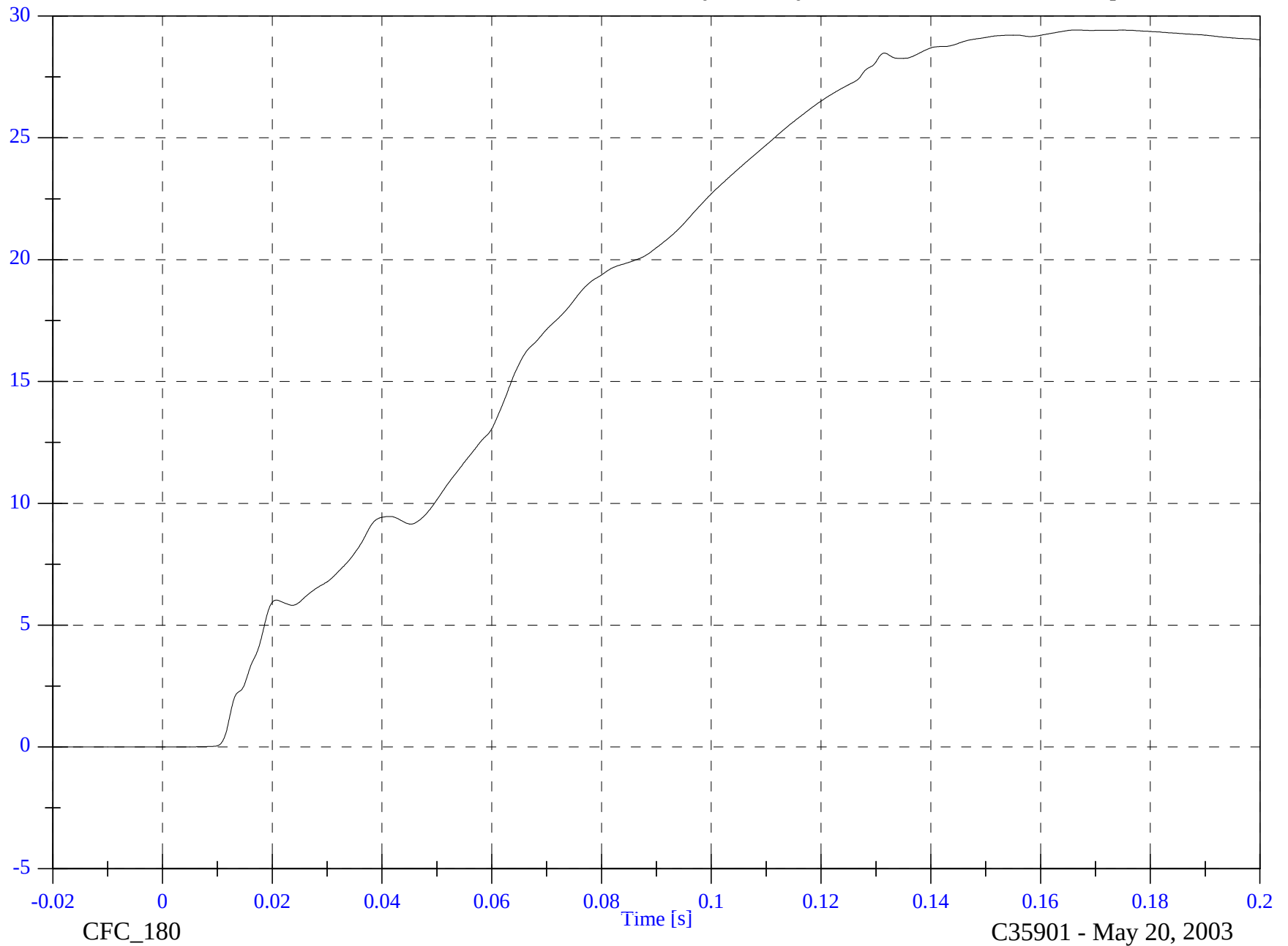


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Rib Ry Velocity

Max: 29.4 [kph] at 0.166 [s]

Min: -0.0 [kph] at -0.017 [s]



B-145

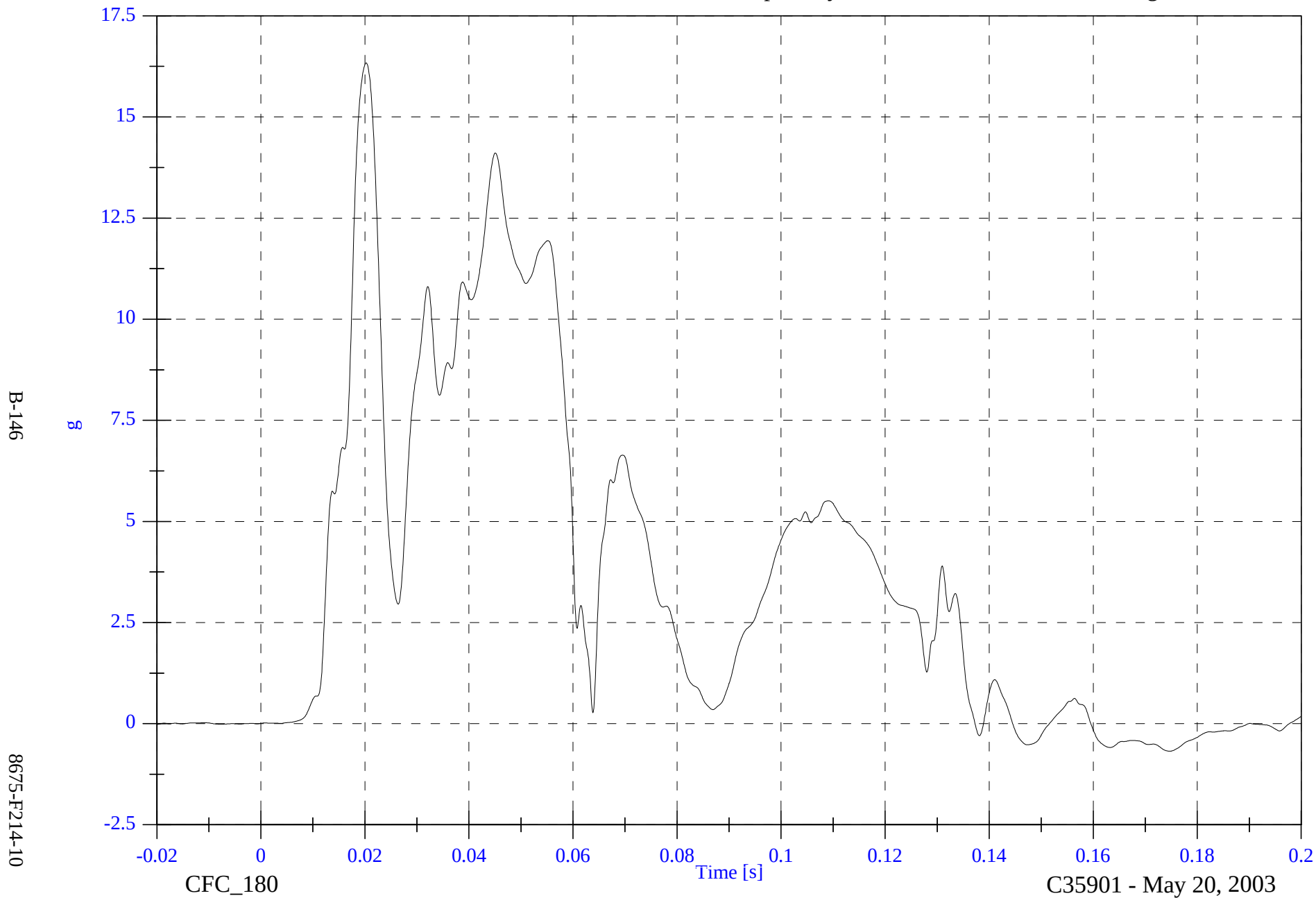
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Spine Ry

Max: 16.3 [g] at 0.020 [s]

Min: -0.7 [g] at 0.175 [s]

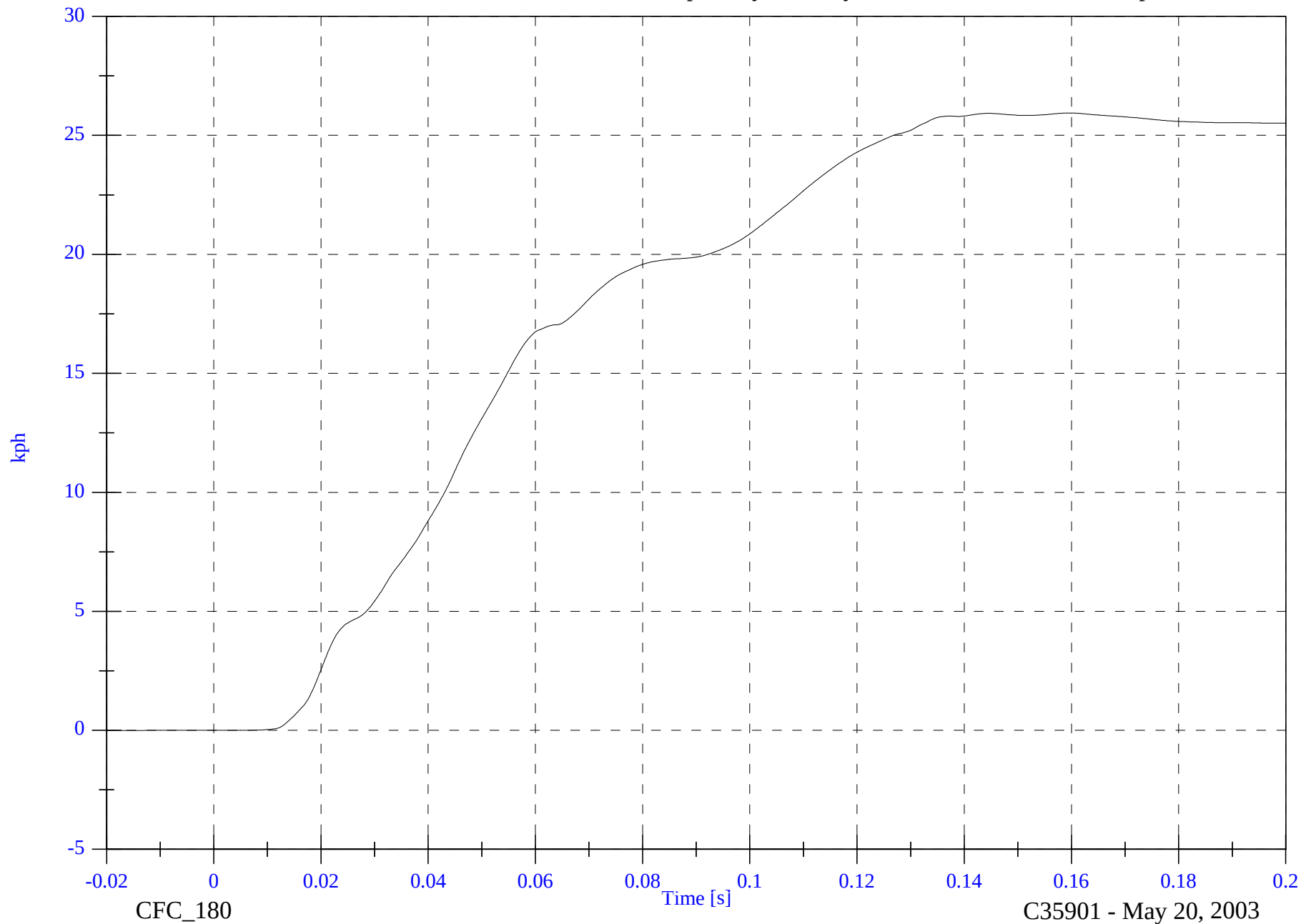


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Spine Ry Velocity

Max: 25.9 [kph] at 0.159 [s]

Min: -0.0 [kph] at -0.019 [s]



B-147

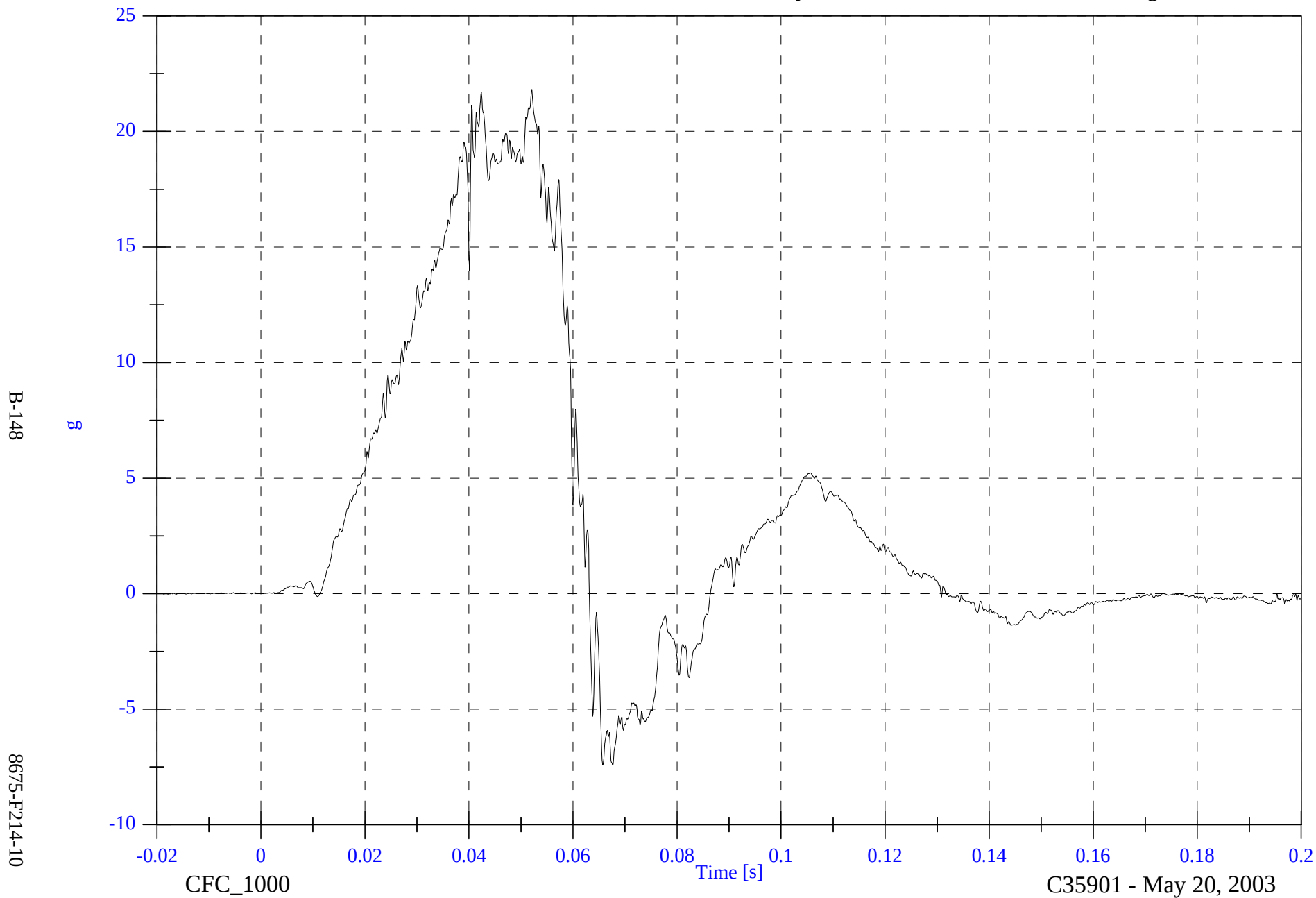
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Pelvic Ry

Max: 21.8 [g] at 0.052 [s]

Min: -7.4 [g] at 0.066 [s]

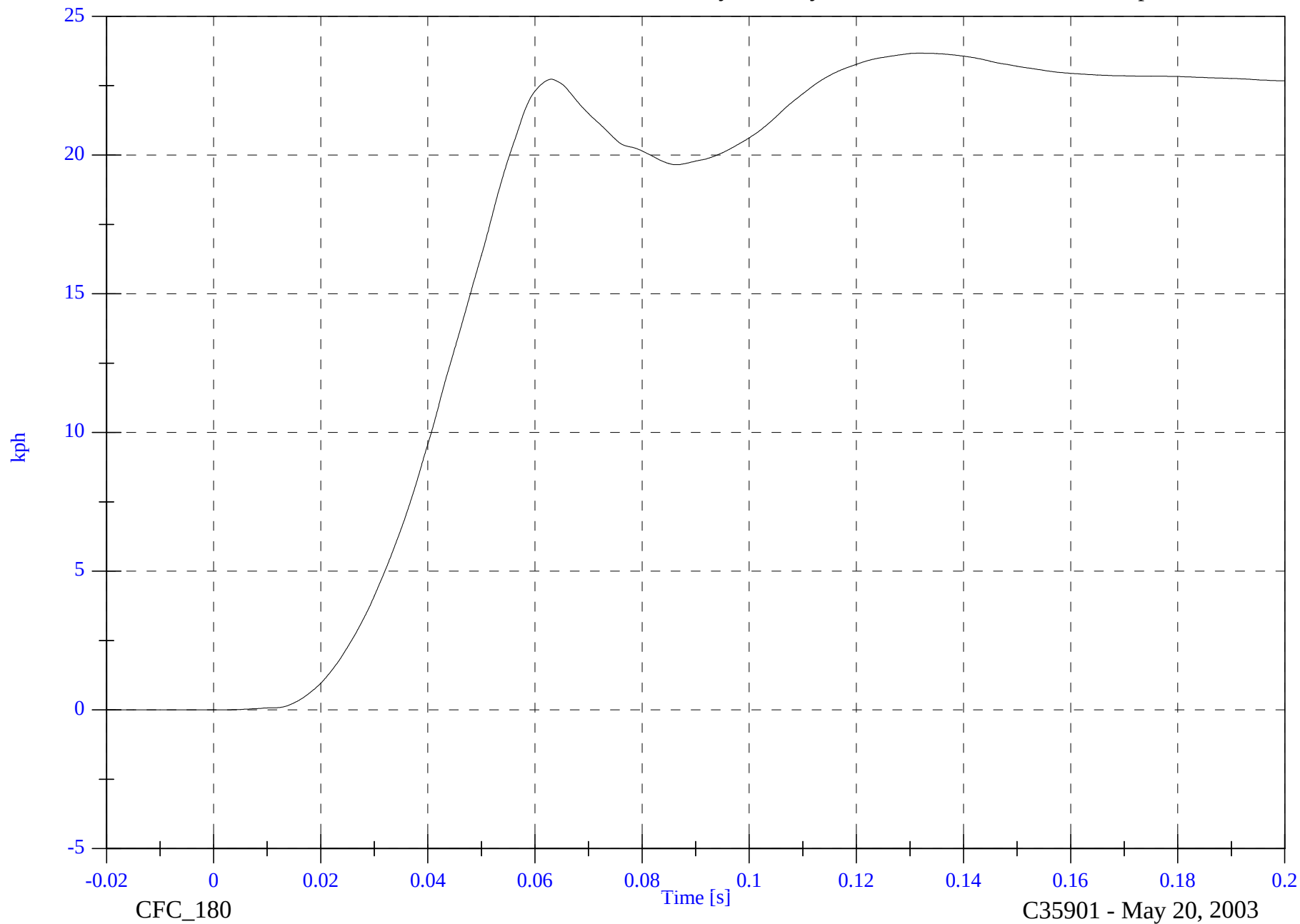


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Pelvic Ry Velocity

Max: 23.7 [kph] at 0.132 [s]

Min: -0.0 [kph] at -0.016 [s]



B-149

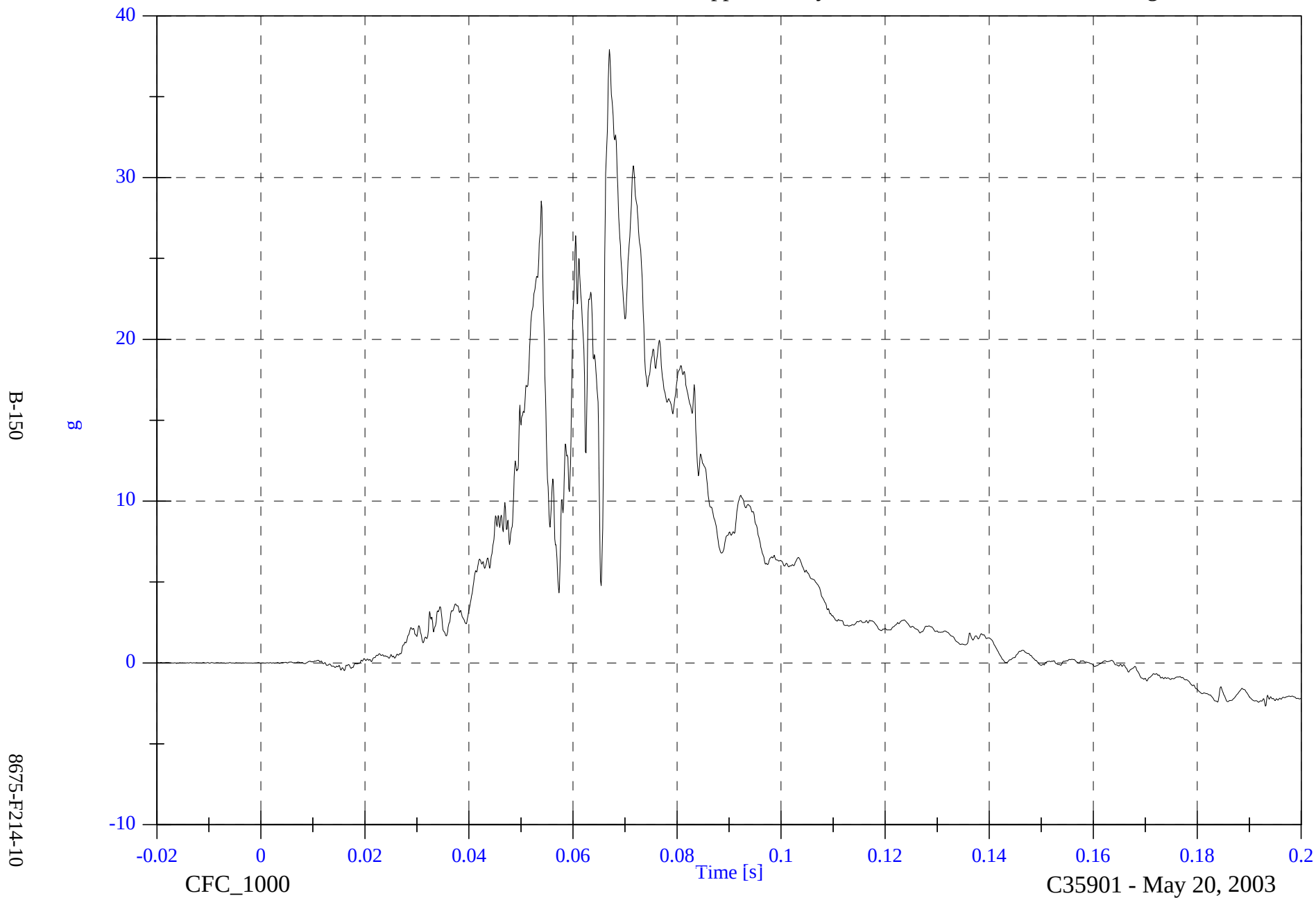
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Rib Ry

Max: 37.9 [g] at 0.067 [s]

Min: -2.7 [g] at 0.193 [s]

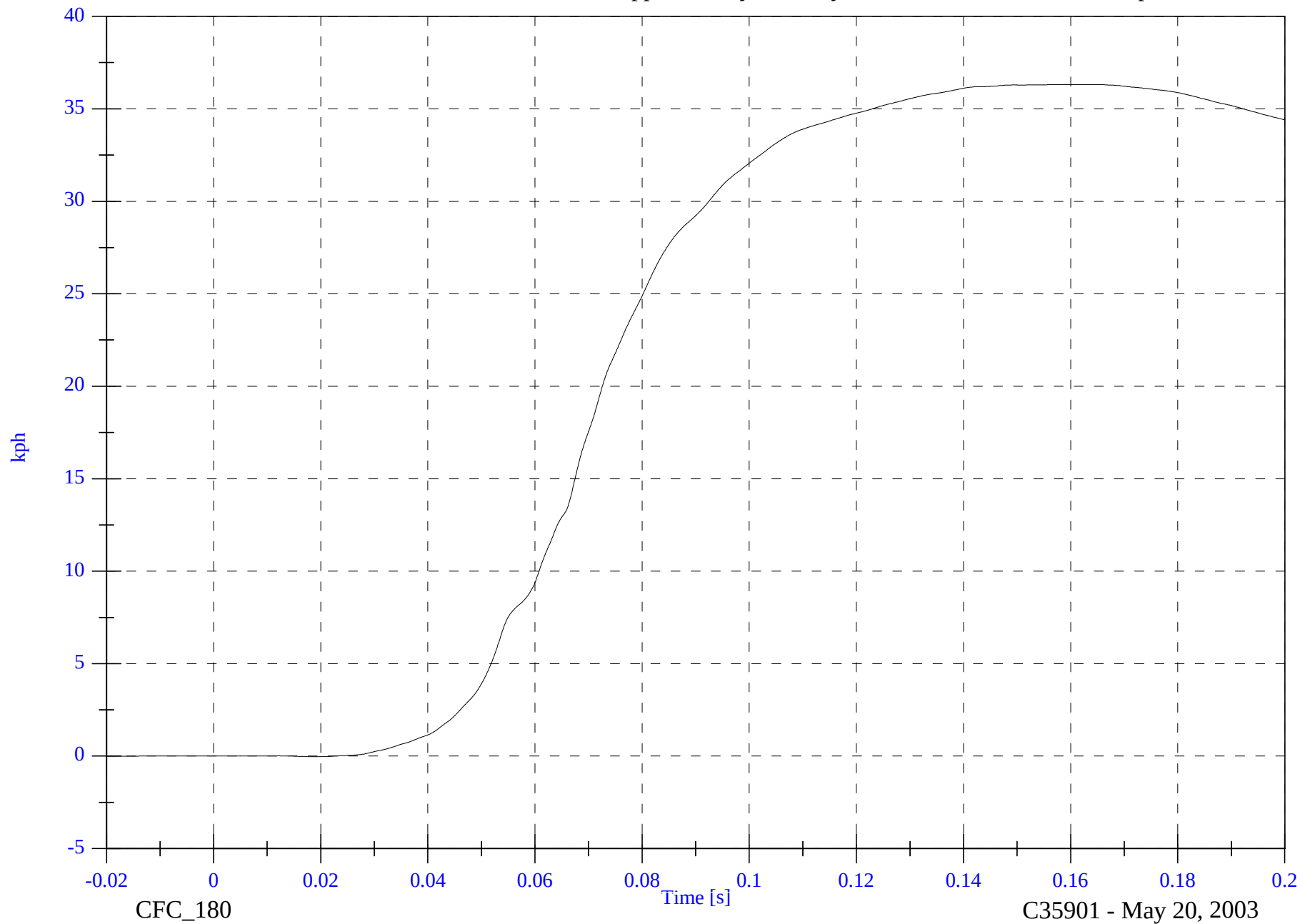


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Upper Rib Ry Velocity

Max: 36.3 [kph] at 0.159 [s]

Min: -0.0 [kph] at 0.019 [s]



B-151

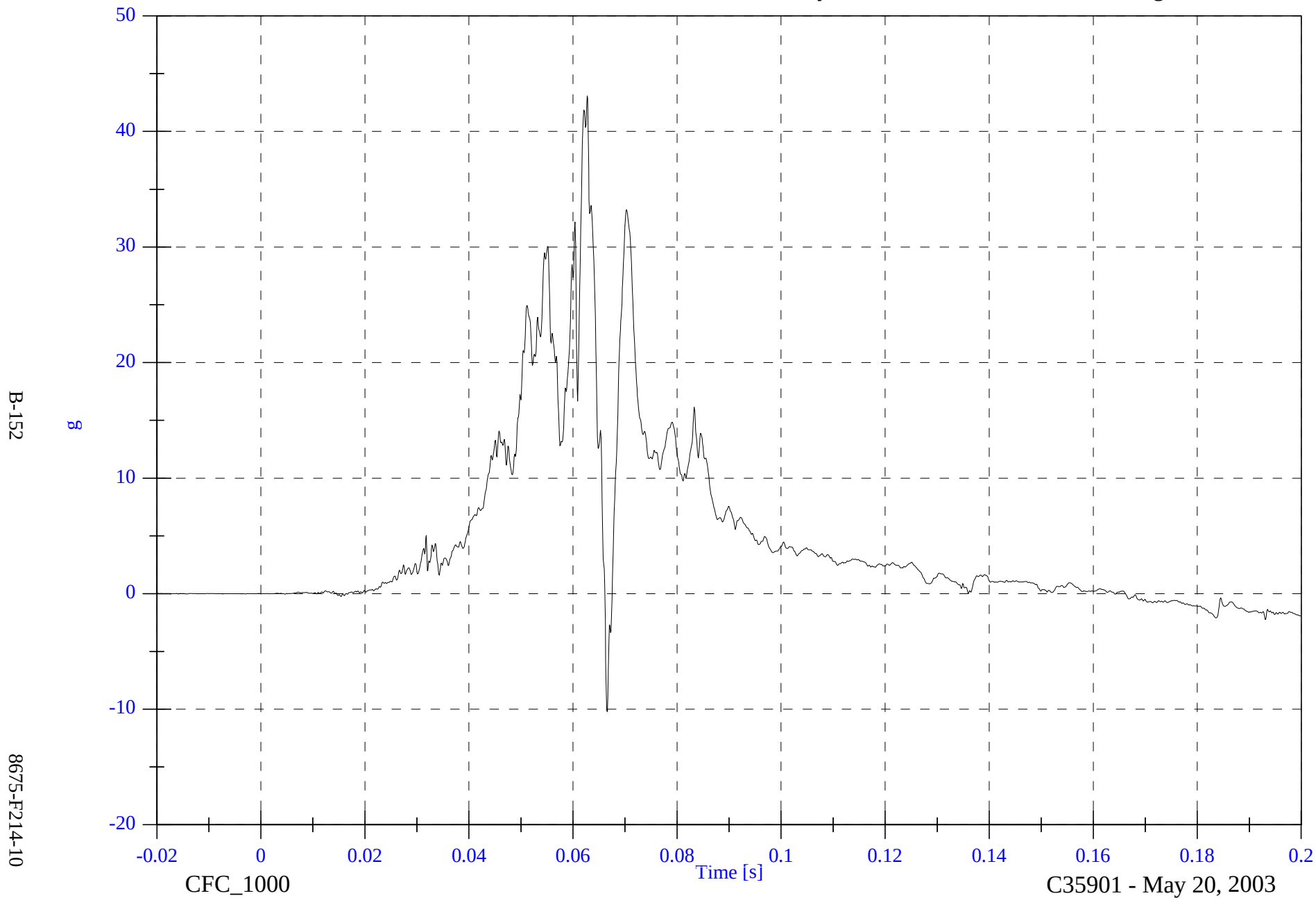
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Rib Ry

Max: 43.1 [g] at 0.063 [s]

Min: -10.2 [g] at 0.067 [s]

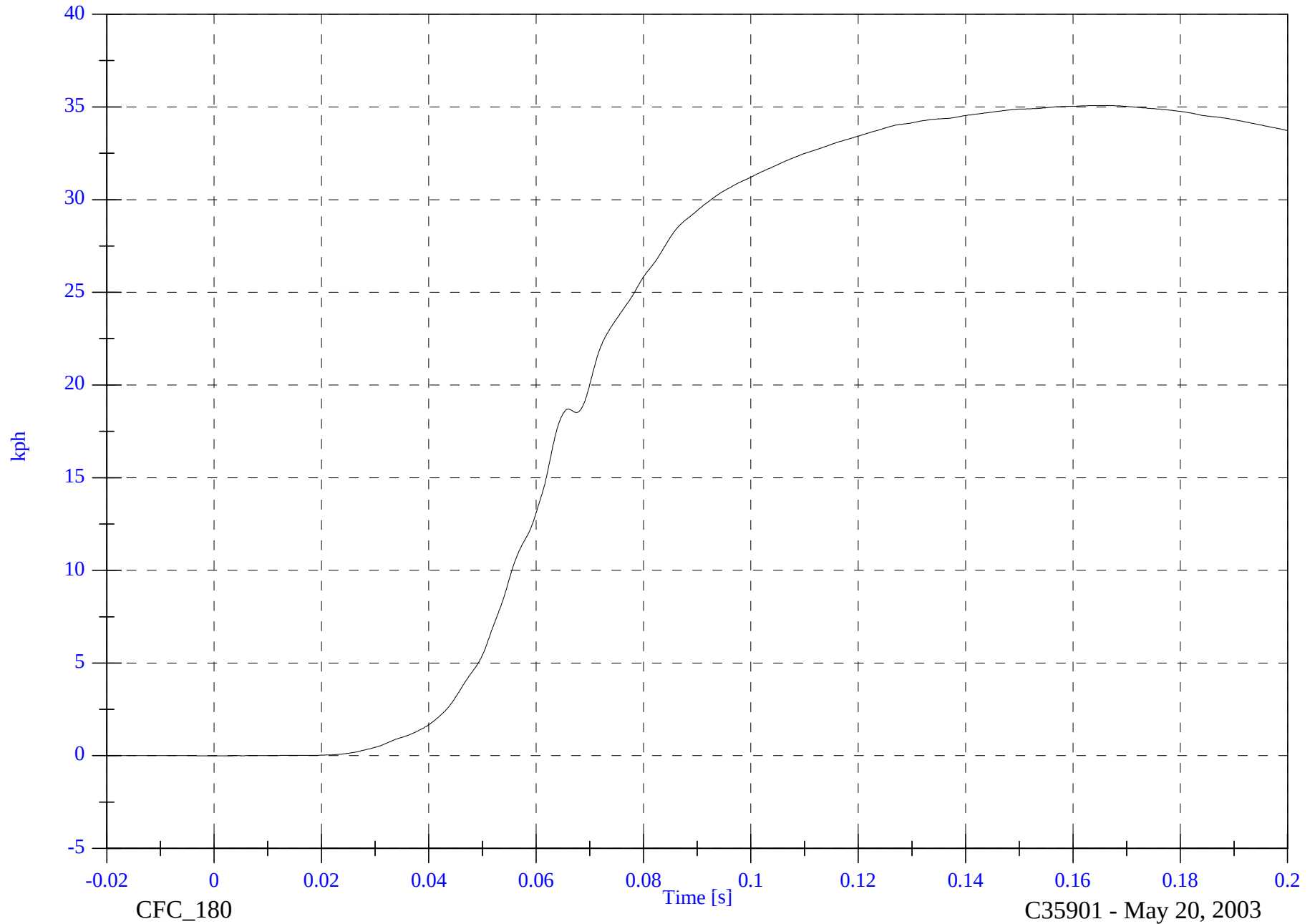


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Rib Ry Velocity

Max: 35.1 [kph] at 0.166 [s]

Min: -0.0 [kph] at 0.002 [s]



B-153

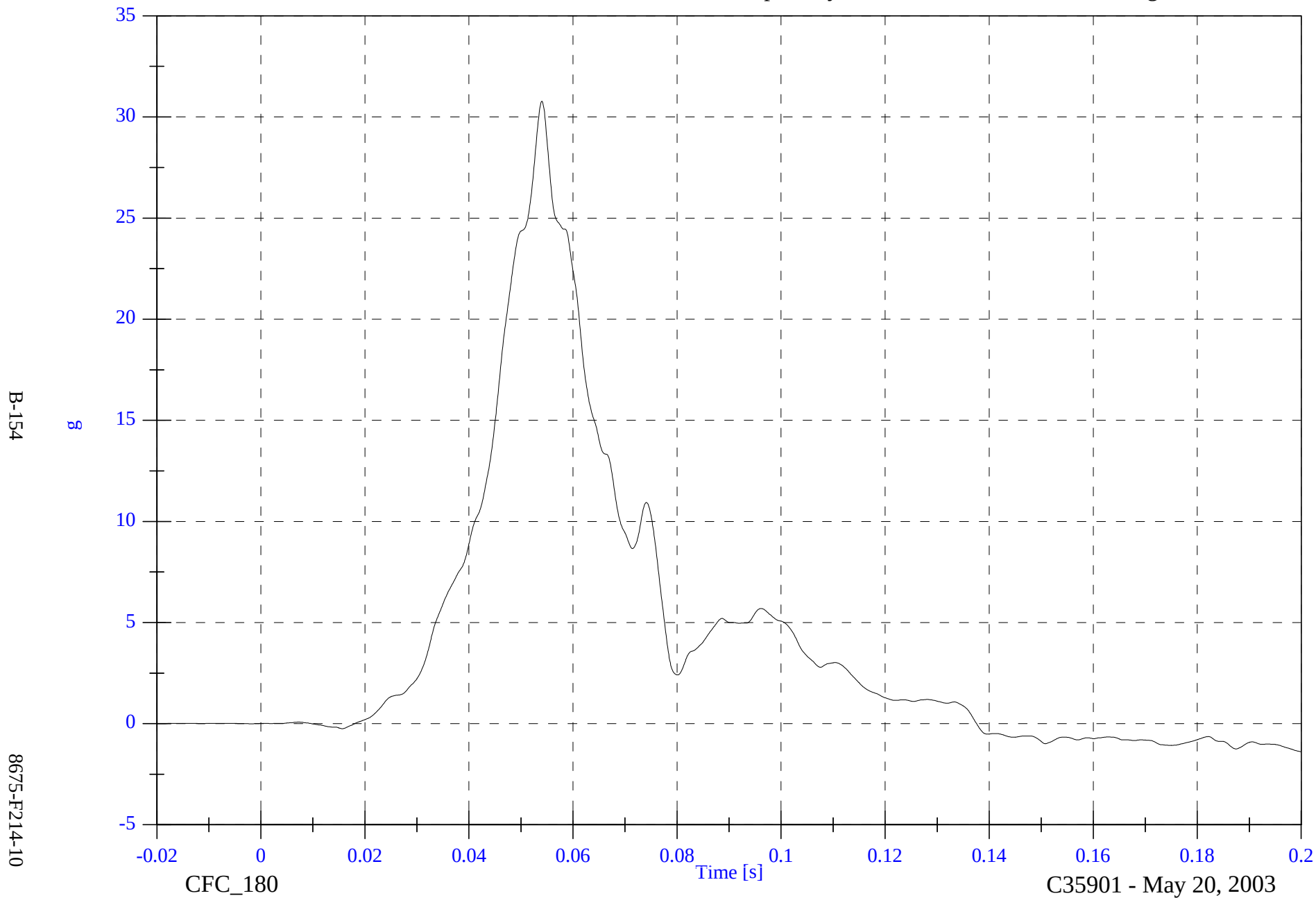
8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Spine Ry

Max: 30.8 [g] at 0.054 [s]

Min: -1.4 [g] at 0.200 [s]

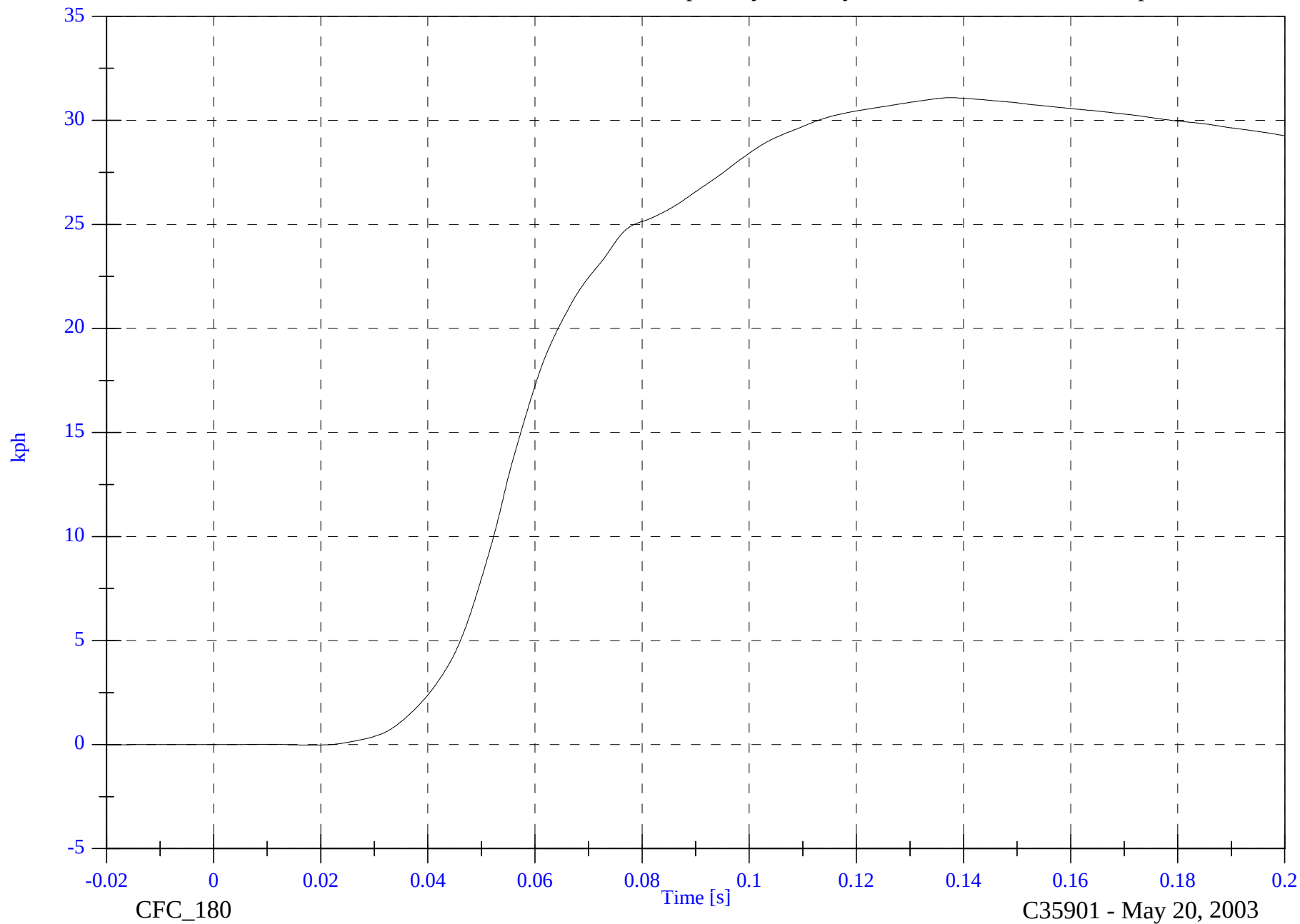


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Spine Ry Velocity

Max: 31.1 [kph] at 0.138 [s]

Min: -0.0 [kph] at 0.018 [s]



B-155

8675-F214-10

FMVSS 214D Indicant - 2003 Volvo XC90

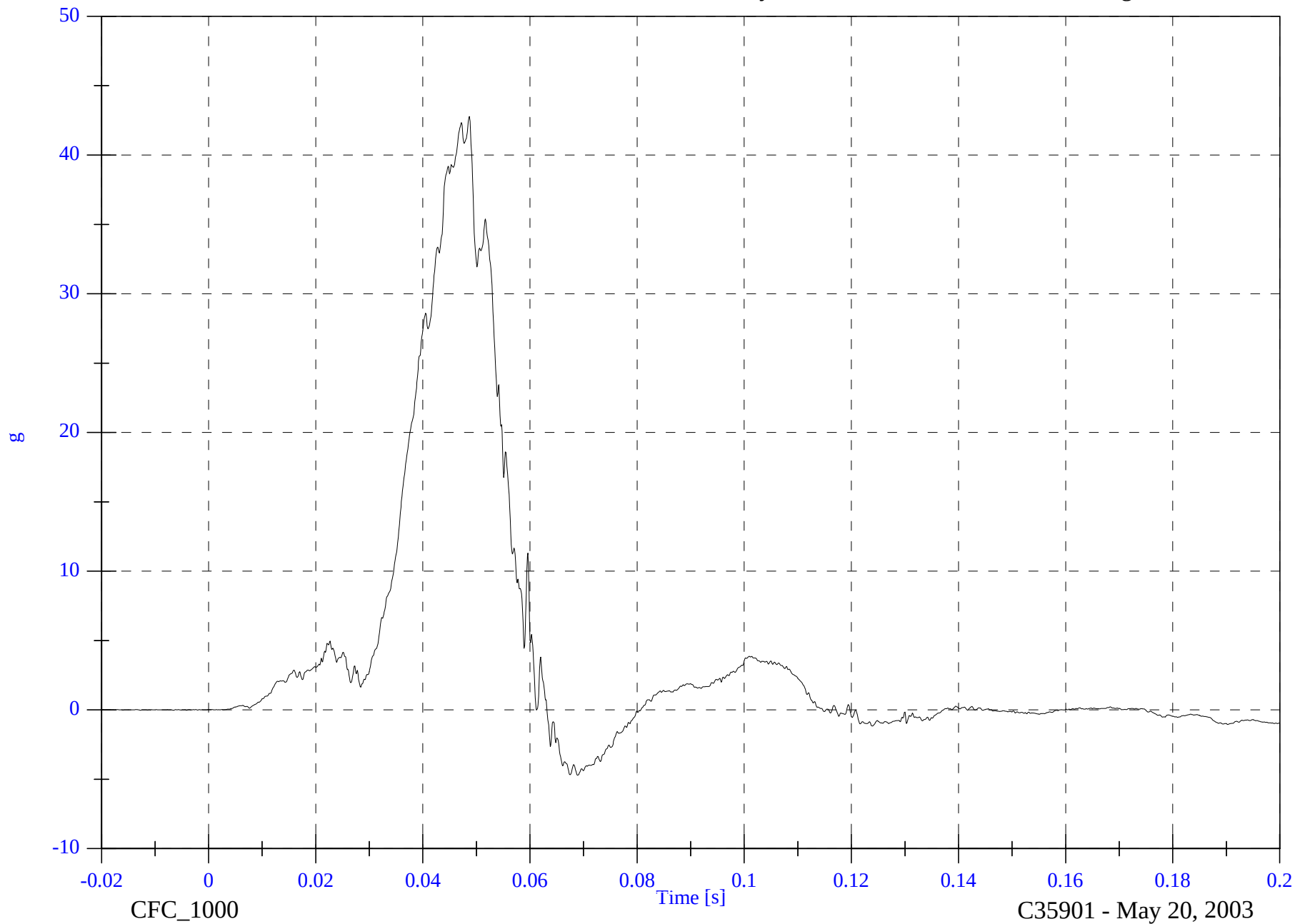
V2P4 Pelvic Ry

Max: 42.8 [g] at 0.049 [s]

Min: -4.7 [g] at 0.069 [s]

B-156

8675-F214-10

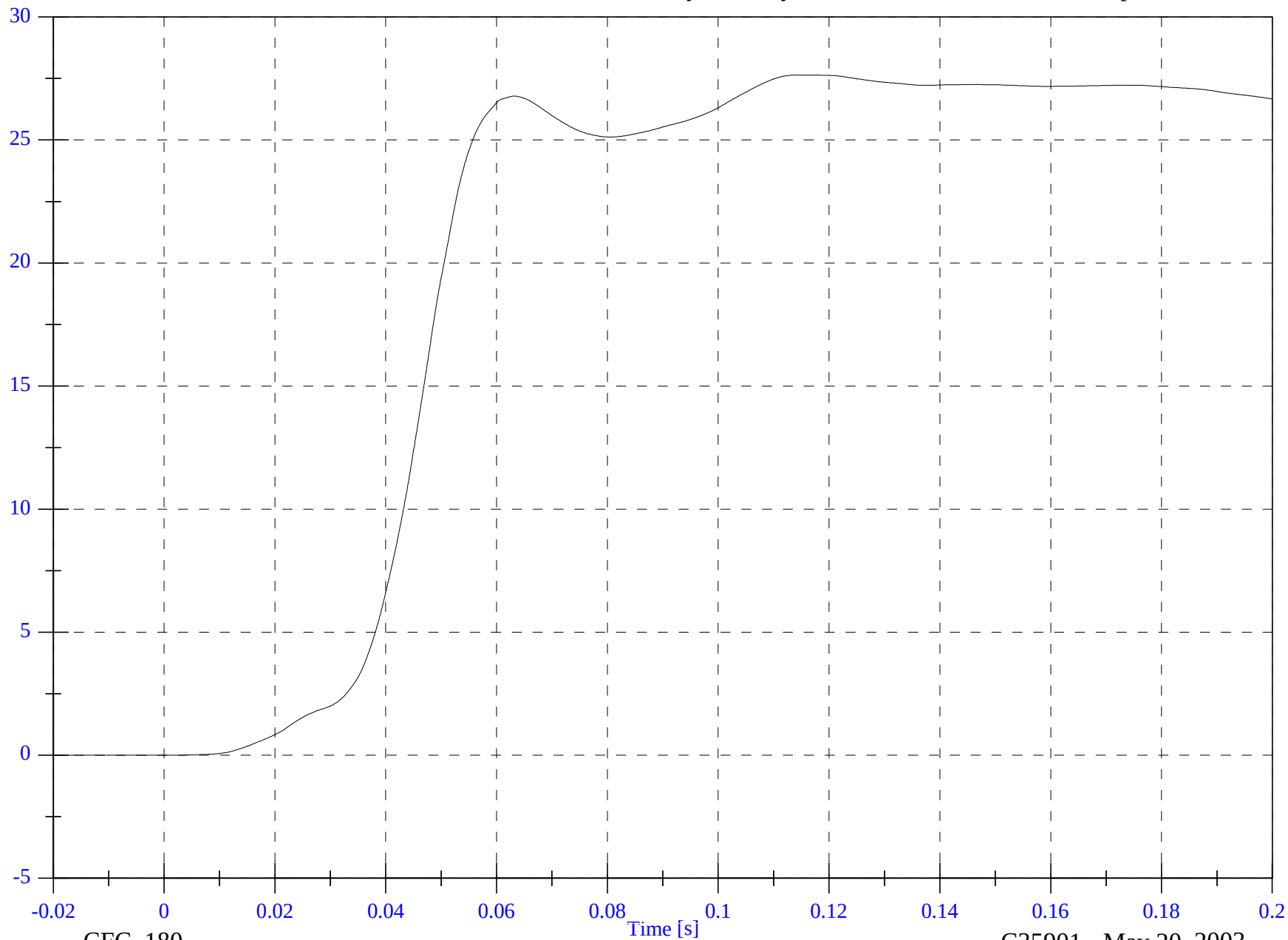


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Pelvic Ry Velocity

Max: 27.6 [kph] at 0.115 [s]

Min: -0.0 [kph] at -0.020 [s]



B-157

8675-F214-10

CFC_180

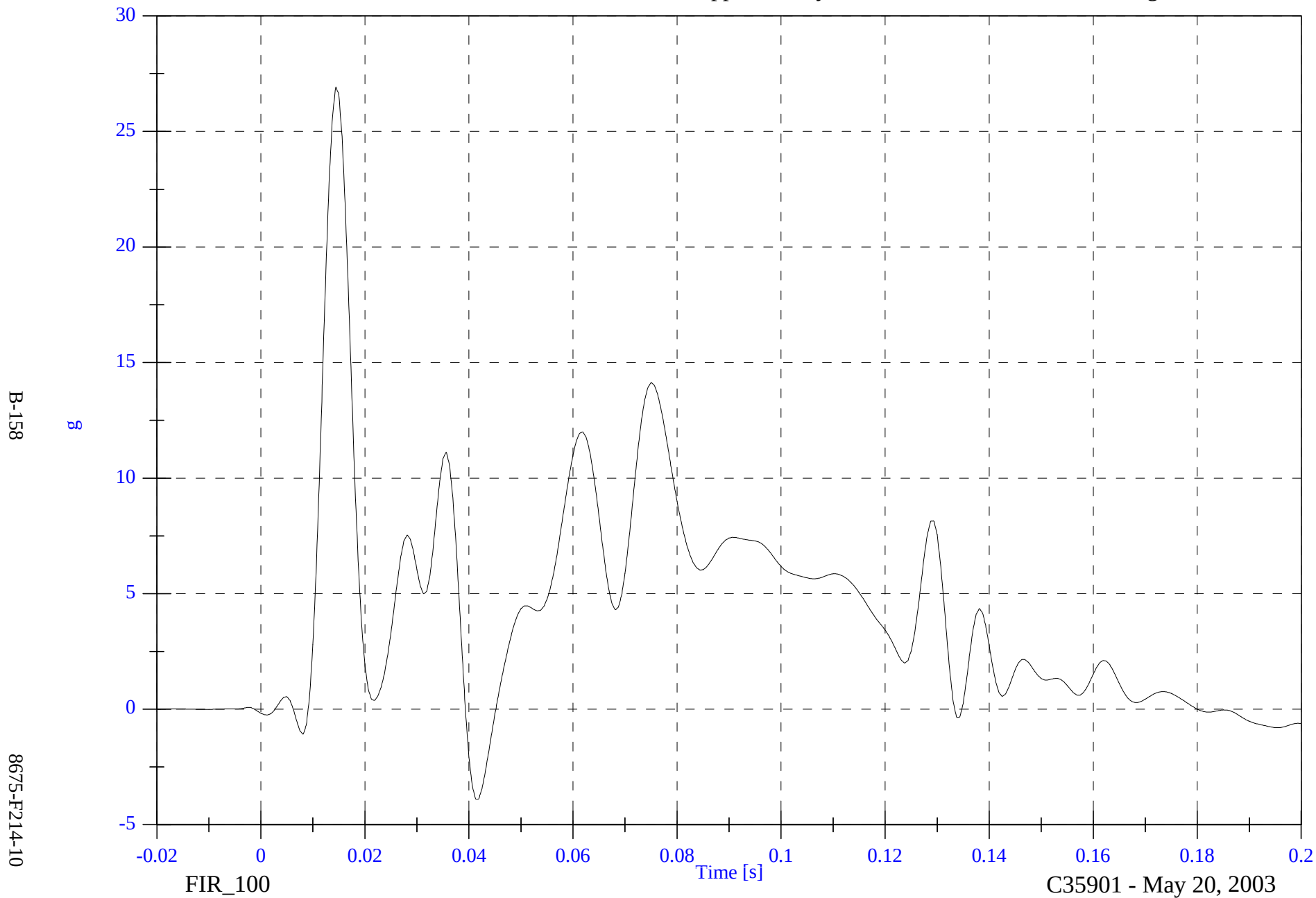
C35901 - May 20, 2003

FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Upper Rib Ry

Max: 26.9 [g] at 0.014 [s]

Min: -3.9 [g] at 0.041 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

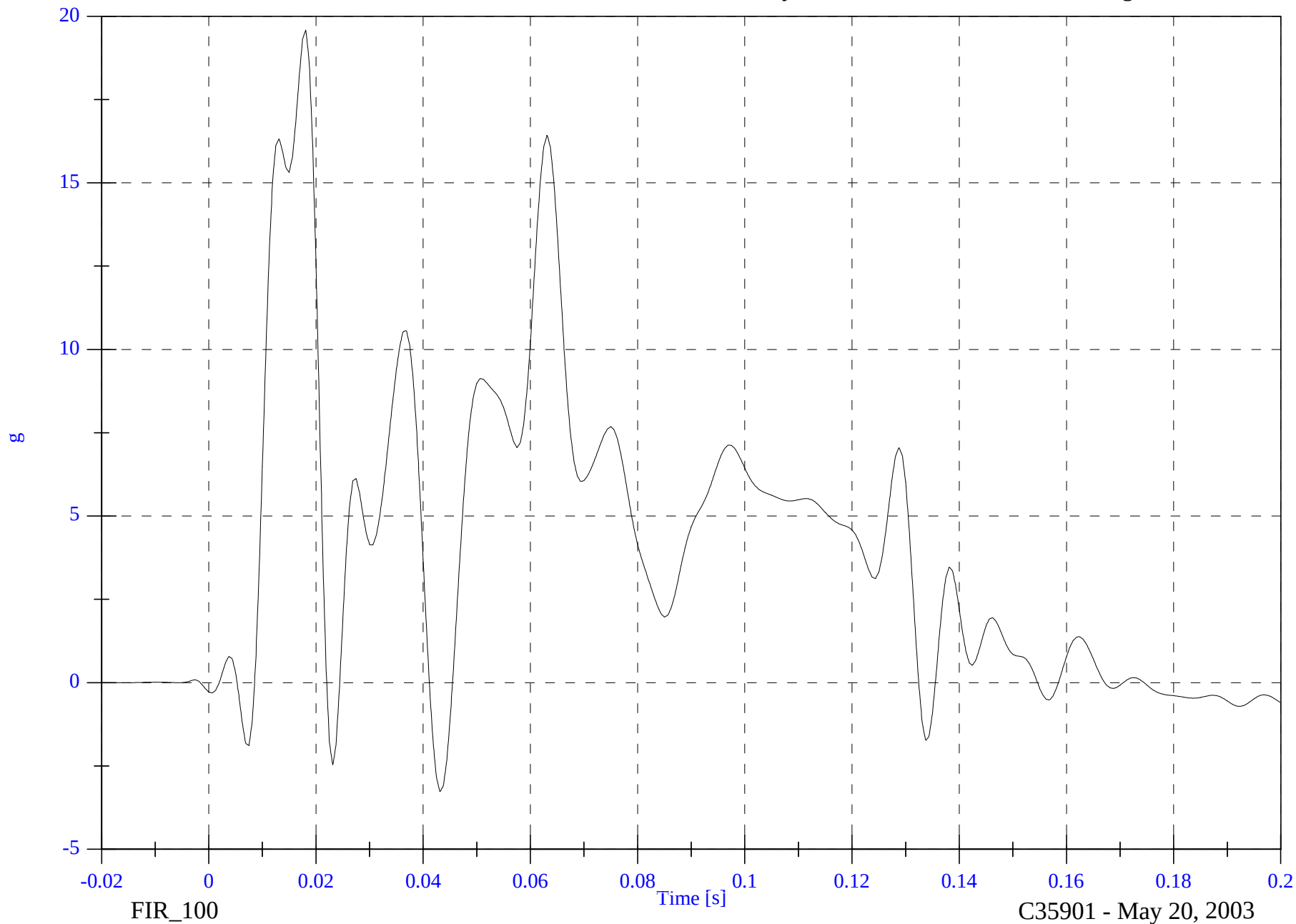
V2P1 Lower Rib Ry

Max: 19.6 [g] at 0.018 [s]

Min: -3.3 [g] at 0.043 [s]

B-159

8675-F214-10

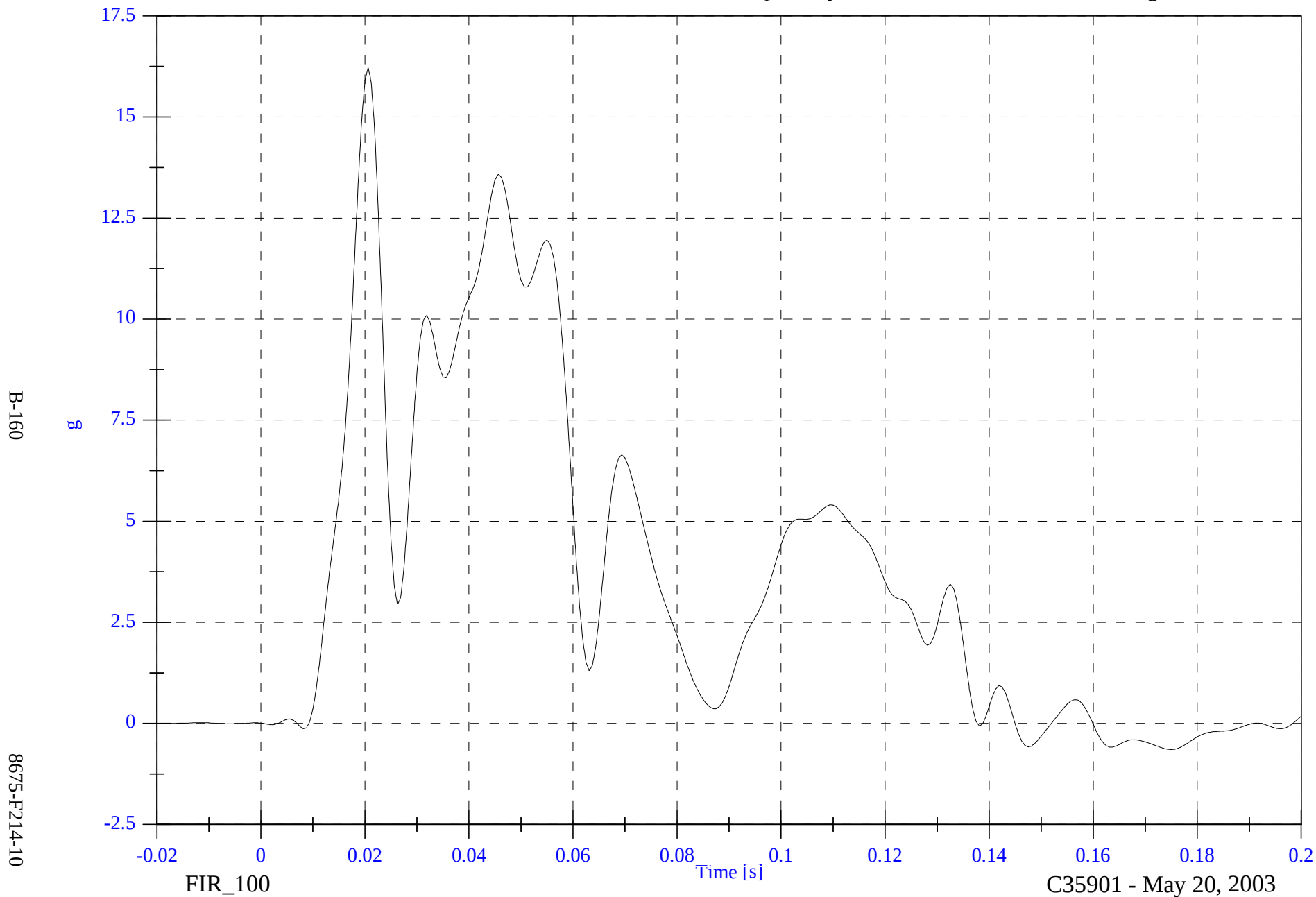


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Lower Spine Ry

Max: 16.2 [g] at 0.021 [s]

Min: -0.6 [g] at 0.175 [s]

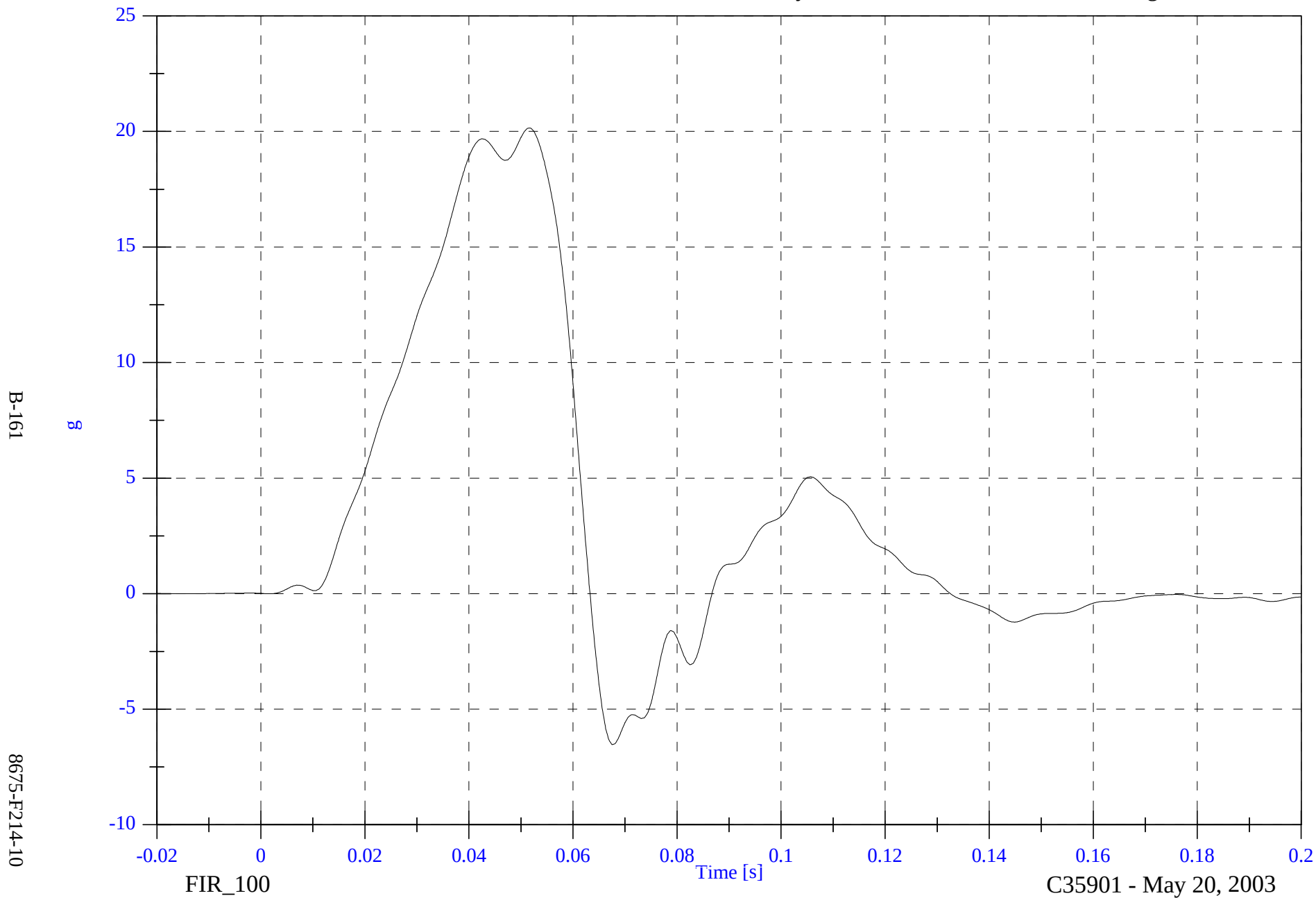


FMVSS 214D Indicant - 2003 Volvo XC90

V2P1 Pelvic Ry

Max: 20.1 [g] at 0.052 [s]

Min: -6.5 [g] at 0.067 [s]



FMVSS 214D Indicant - 2003 Volvo XC90

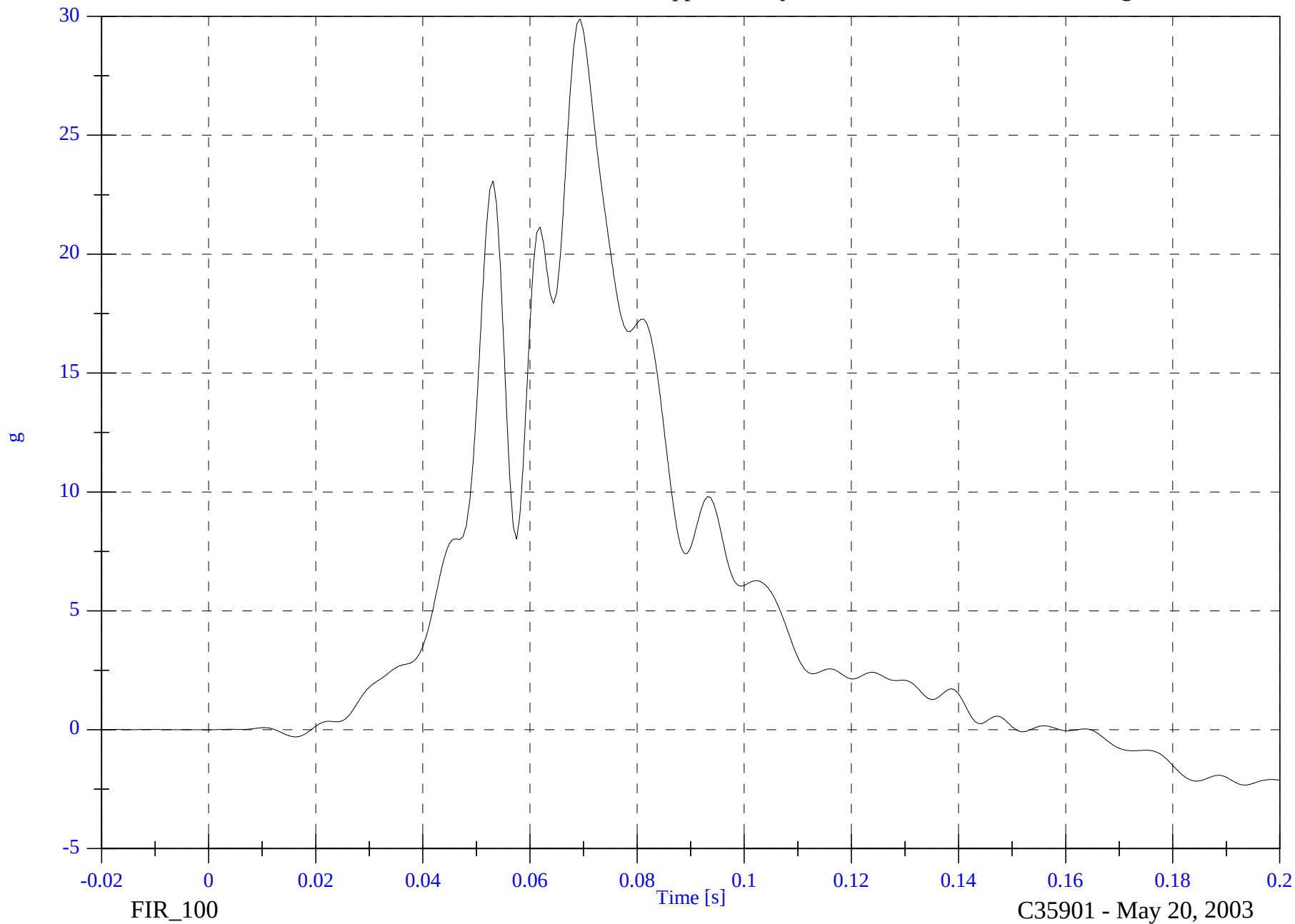
V2P4 Upper Rib Ry

Max: 29.9 [g] at 0.069 [s]

Min: -2.3 [g] at 0.193 [s]

B-162

8675-F214-10



FMVSS 214D Indicant - 2003 Volvo XC90

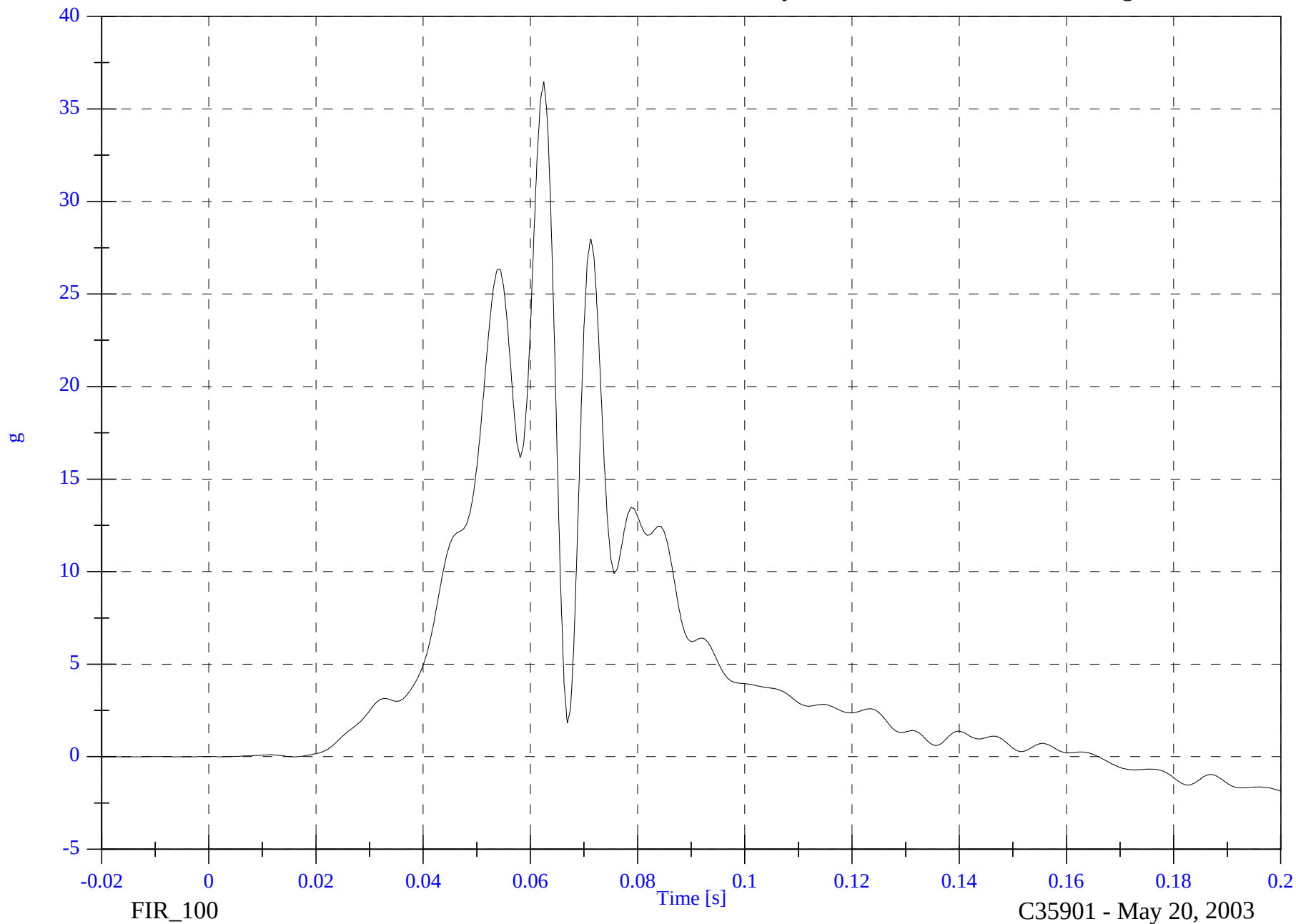
V2P4 Lower Rib Ry

Max: 36.5 [g] at 0.062 [s]

Min: -1.9 [g] at 0.200 [s]

B-163

8675-F214-10



FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Lower Spine Ry

Max: 28.8 [g] at 0.054 [s]

Min: -1.4 [g] at 0.200 [s]

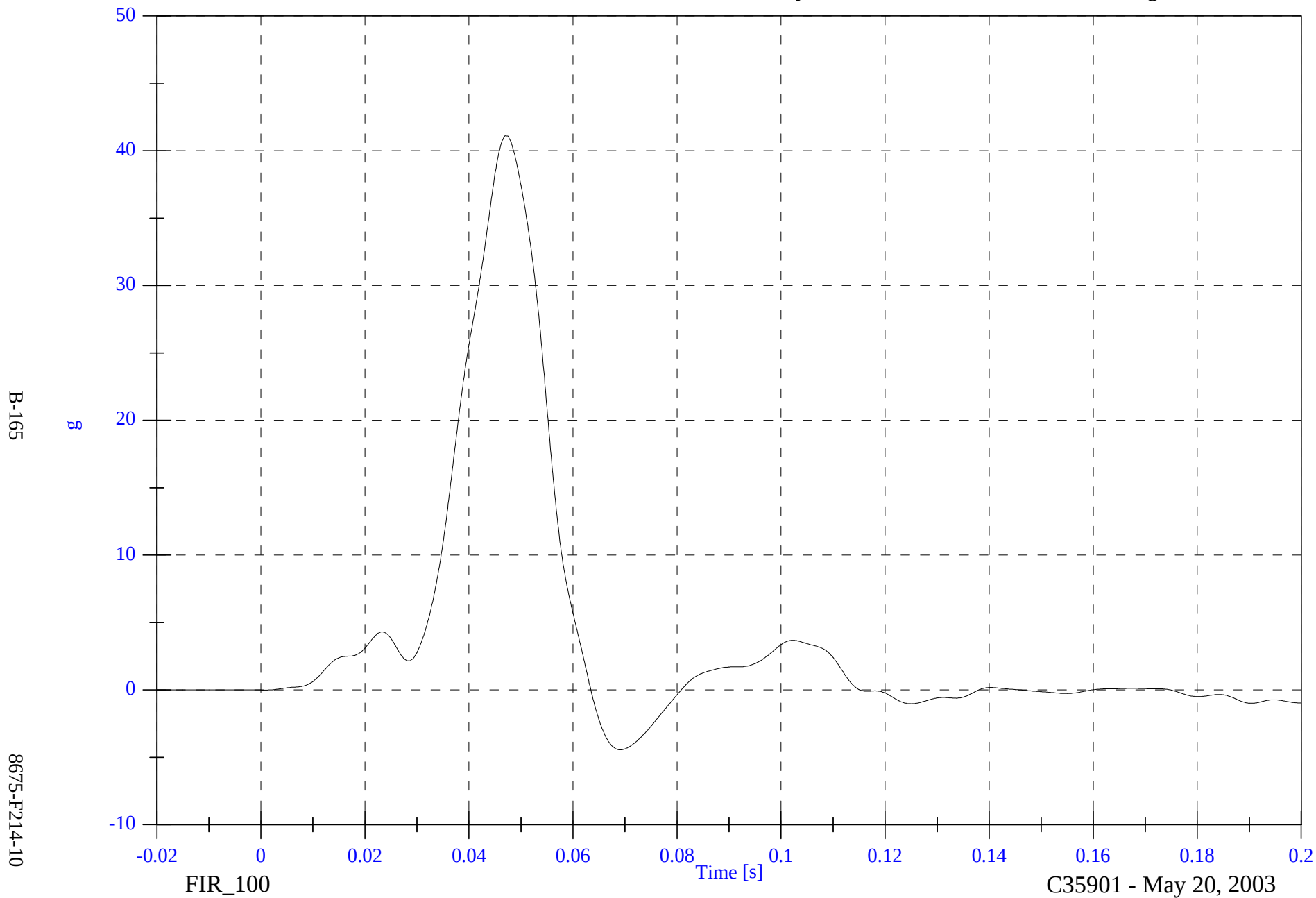


FMVSS 214D Indicant - 2003 Volvo XC90

V2P4 Pelvic Ry

Max: 41.1 [g] at 0.047 [s]

Min: -4.4 [g] at 0.069 [s]



APPENDIX C

SID HYBRID III CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SUMMARY
SID H3 PRE & POST TEST CALIBRATION
CONFIGURED FOR LEFT SIDE IMPACT

Date: 05/17/2003; 05/17/2003

Sequential Test Number:

1.4; 1.4

Laboratory Technician:

B. Swiecicki

TEST PARAMETER	SPECIFICATION	SID H3 015 NO.:		SID H3 016 NO.:	
		PRE TEST	POST TEST	PRE TEST	POST TEST
SH- Seated Height (mm)	889 - 909	902	902	902	899
RH- Rib Height (mm)	501 - 521	511	513	513	513
HP- Hip Pivot Height (mm)	99 ref.	99	99	99	99
RD- Rib from Back Line (mm)	229 - 241	239	239	239	239
KV- Knee Pivot from Back Line (mm)	511 - 526	521	521	521	521
SW- Knee Pivot to Floor (mm)	490 - 505	495	495	495	495
HW- Hip Width (mm)	356 - 391	371	371	371	373
THORAX IMPACTS					
TEMPERATURE (°C)	18.9 - 25.5	21.1	21.1	21.1	21.1
RELATIVE HUMIDITY (%)	10 -70	34	38.0	34	38.0
PROBE SPEED (m/s)	4.27 - 4.33	4.29	4.28	4.27	4.27
UPPER RIB (g's)	37 - 46	38.76	39.54	45.06	45.48
LOWER RIB (g's)	37 - 46	37.72	40.14	40.71	44.36
LOWER SPINE (g's)	15 -22	18.94	20.25	21.67	21.60
PELVIS IMPACT					
TEMPERATURE (°C)	18.9 - 25.5	21.1	21.1	21.1	21.1
RELATIVE HUMIDITY (%)	10 - 70	34	38.0	34	38.0
PROBE SPEED (m/s)	4.27 - 4.33	4.27	4.27	4.28	4.28
PELVIS (g's)	40 -60	43.23	42.79	42.13	43.72

REMARKS: None

CALIBRATION TEST RESULTS

PRE-TEST

SID H3 NO.: 015

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST	COMMENTS
EXTERNAL DIMENSIONS	Passed all requirements.
THORACIC SHOCK ABSORBER TEST	Passed all requirements.
LATERAL THORAX IMPACT TEST	Passed all requirements.
LATERAL PELVIS IMPACT TEST	Passed all requirements.
HEAD DROP TEST*	Passed all requirements.
LATERAL NECK BEND TEST*	Passed all requirements.
ABDOMINAL COMPRESSION TEST*	Passed all requirements.
LUMBAR FLEXION TEST*	Passed all requirements.

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 – 909	902
RH- Rib Height (mm)	502 – 520	511
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 – 241	239
KH- Knee Pivot from Back Line (mm)	511 – 526	521
KV- Knee Pivot to Floor (mm)	490 – 505	495
HW- Hip Width (mm)	356 - 391	371

REMARKS: None

**THORACIC SHOCK ABSORBER TESTS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 1.4
Date: April 24, 2003 Laboratory Technician: B. Swiecicki

DAMPER IDENTIFICATION: 015

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)		18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)		10 - 70	35.0
VELOCITY 3.05 m/s	FORCE (N)	836 - 1125	997.8
	DISPLACEMENT (mm)	30 - 35	32.2
VELOCITY 4.27 m/s	FORCE (N)	1730 - 2099	1909.7
	DISPLACEMENT (mm)	32 - 37	35.0
VELOCITY 6.10 m/s	FORCE (N)	3741 - 4448	4336.4
	DISPLACEMENT (mm)	33 - 40	37.9

DAMPER SETTING: 5

REMARKS: None

Shock Test - Low at 3.05 m/s

Low Part 572F Shock Absorber Impact

Calibration Date:

04-24-03

Serial No: 015

Work File:

015SL 04-23-03

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

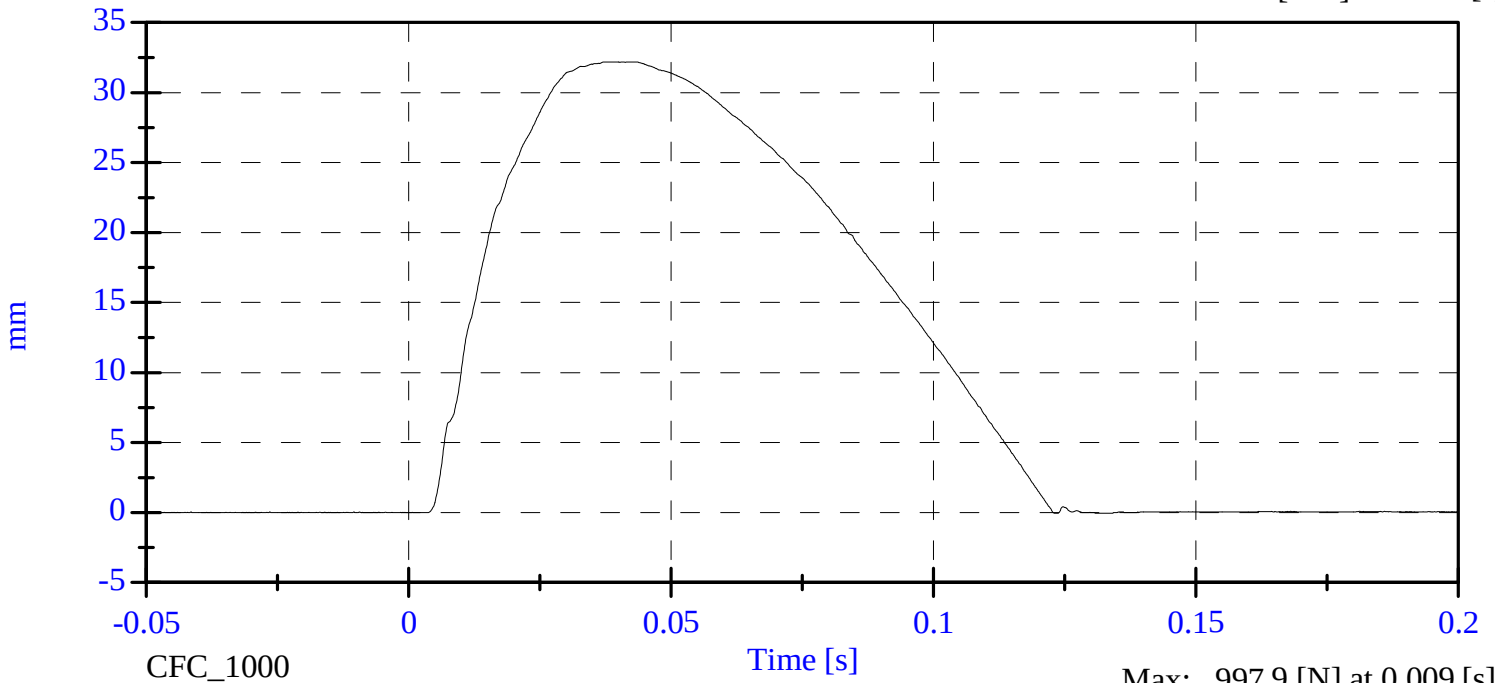
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.5 C	21.1 C	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Displacement:	30.00-35.00 mm	32.18 mm	Passed
Maximum Force:	836.00-1125.00 N	997.85 N	Passed

Shock Test - Low

Displacement vs. Time

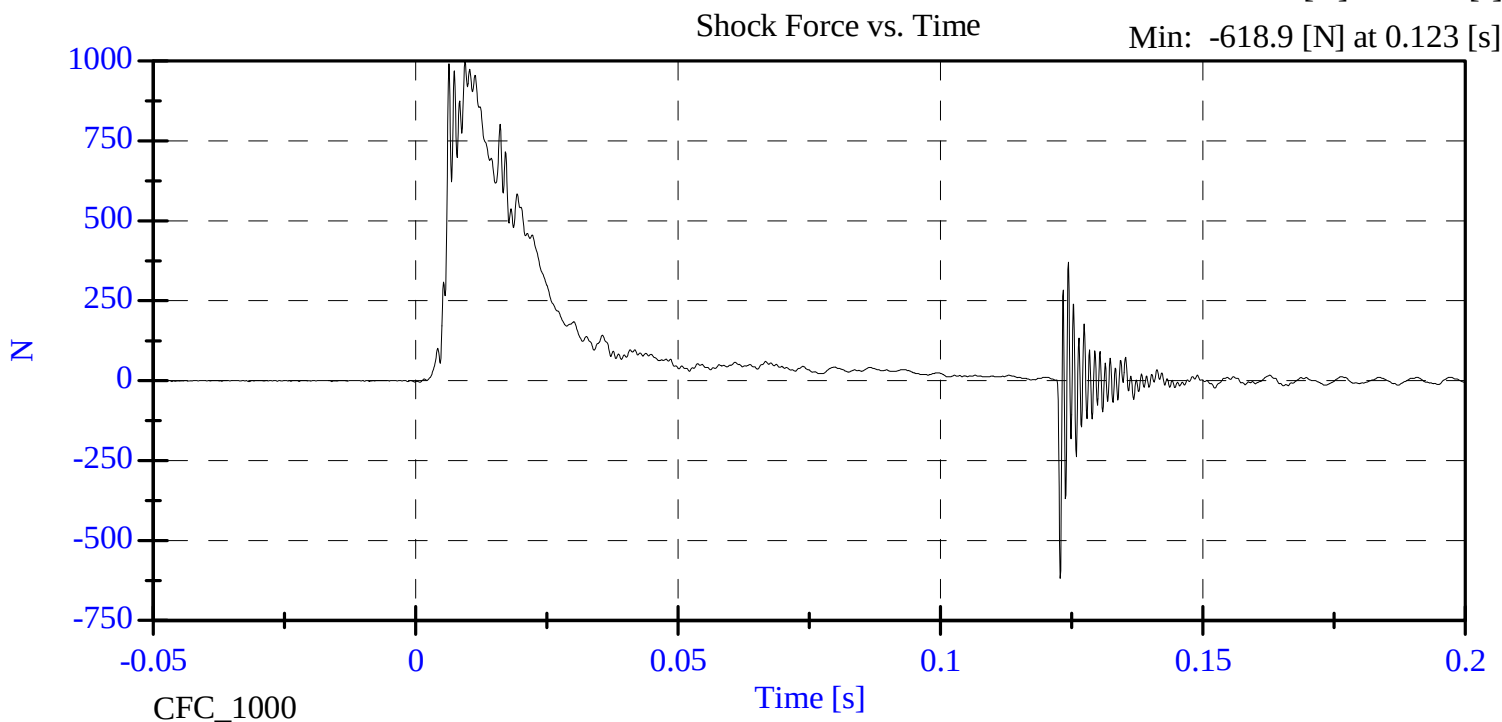
Max: 32.2 [mm] at 0.041 [s]

Min: -0.1 [mm] at 0.124 [s]



Max: 997.9 [N] at 0.009 [s]

Min: -618.9 [N] at 0.123 [s]



Shock Test - Medium at 4.27 m/s

Medium Part 572F Shock Absorber Impact

Calibration Date:

04-24-03

Serial No: 015

Work File:

015SM 04-23-03

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

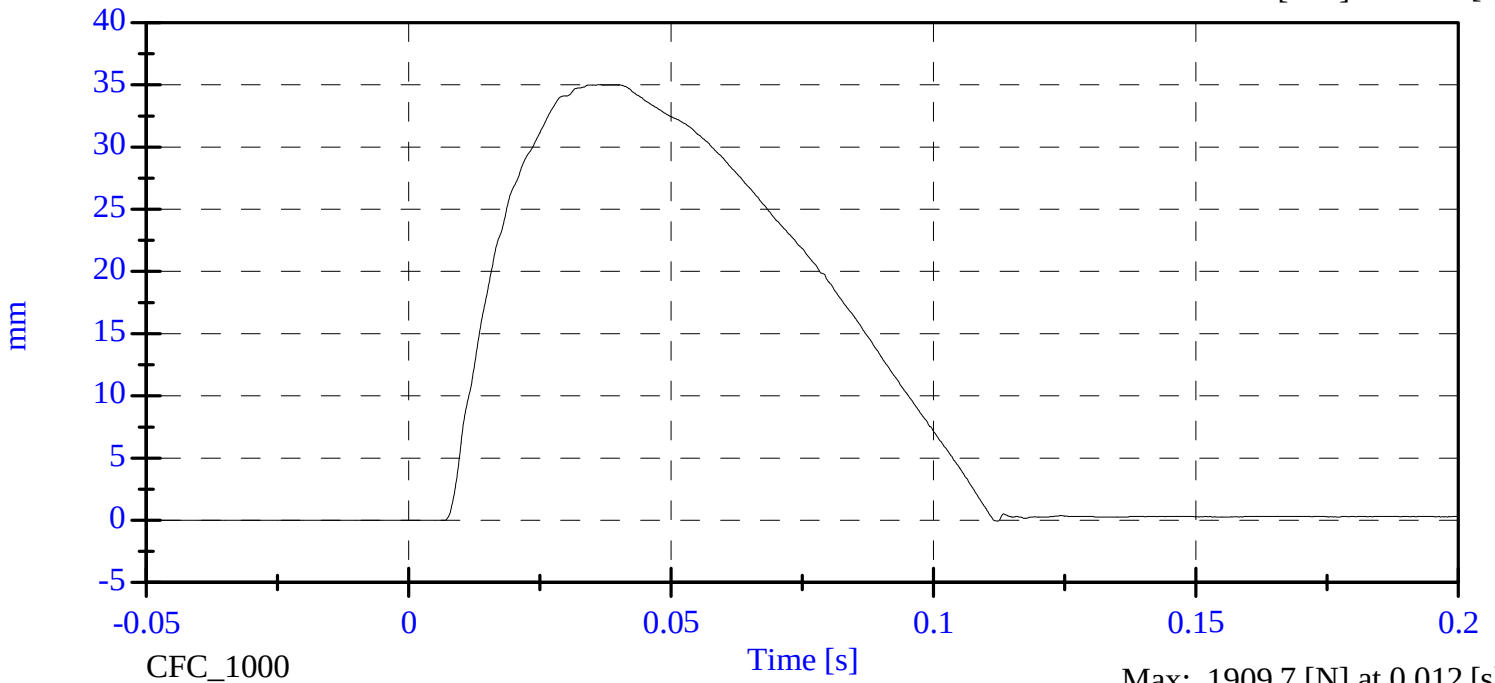
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.5 C	21.1 C	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Displacement:	32.00-37.00 mm	35.02 mm	Passed
Maximum Force:	1730.00-2099.00 N	1909.74 N	Passed

Shock Test - Medium

Displacement vs. Time

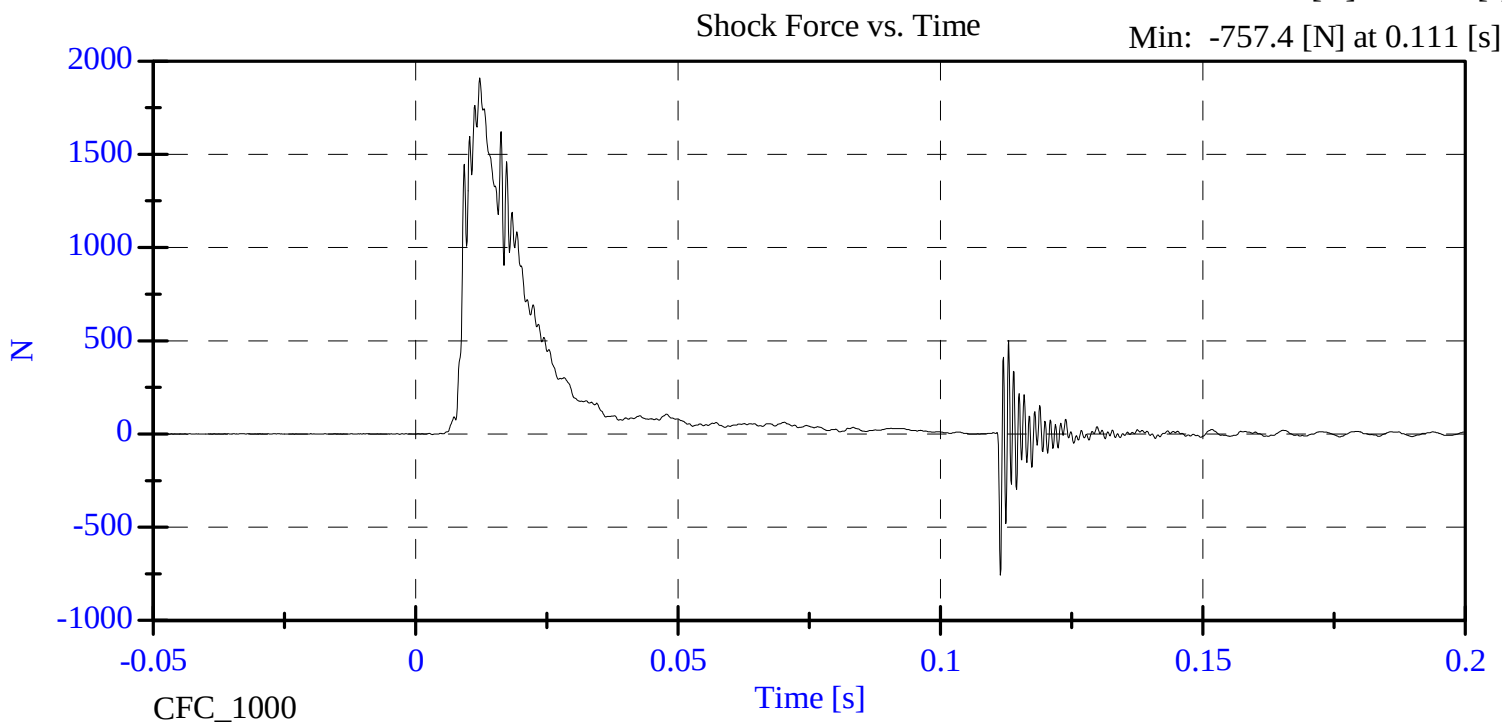
Max: 35.0 [mm] at 0.036 [s]

Min: -0.1 [mm] at 0.112 [s]



Max: 1909.7 [N] at 0.012 [s]

Min: -757.4 [N] at 0.111 [s]



Shock - High at 6.10 m/s

High Part 572F Shock Absorber Impact

Calibration Date:

04-25-03

Serial No: 015

Work File:

015SH2 04-23-03

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

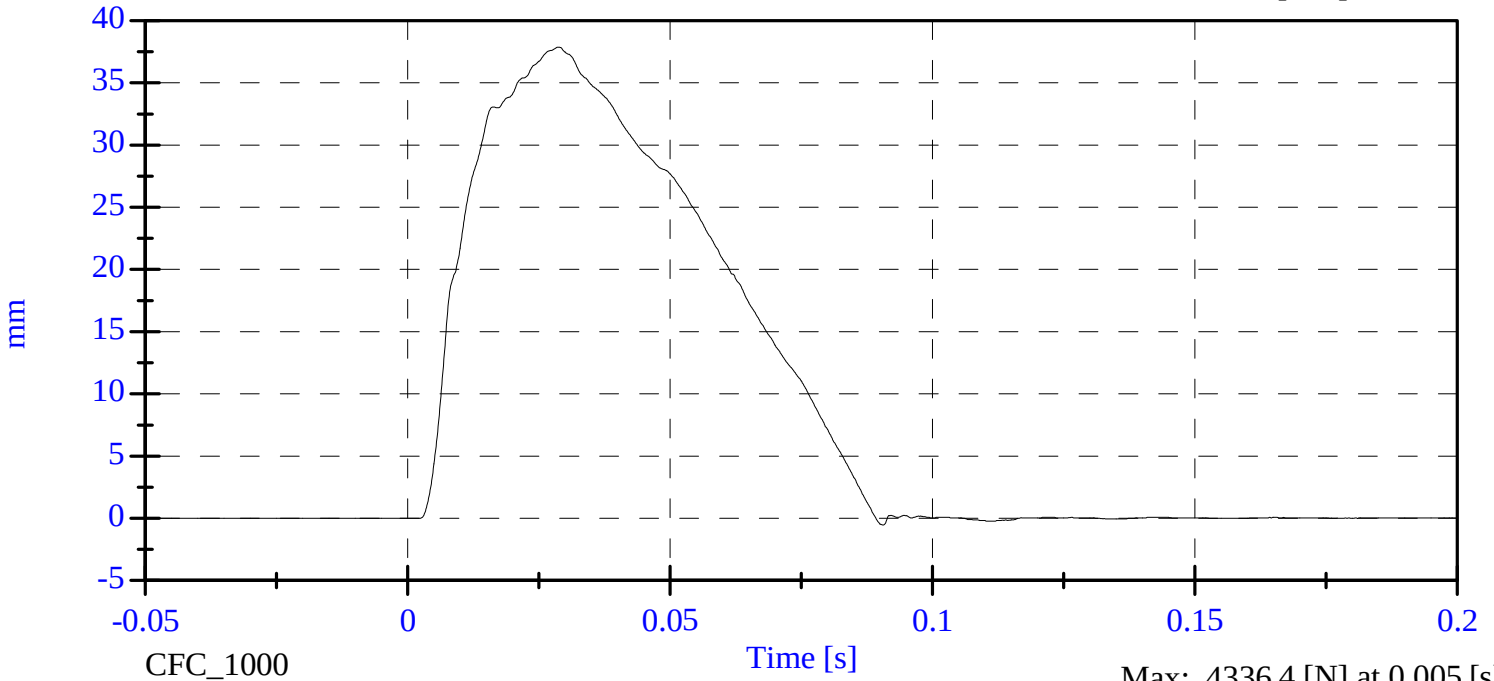
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.5 C	21.1 C	Passed
Lab Humidity:	10-70 %	40.00 %	Passed
Displacement:	33.00-40.00 mm	37.86 mm	Passed
Maximum Force:	3741.00-4448.00 N	4336.39 N	Passed

Shock - High

Displacement vs. Time

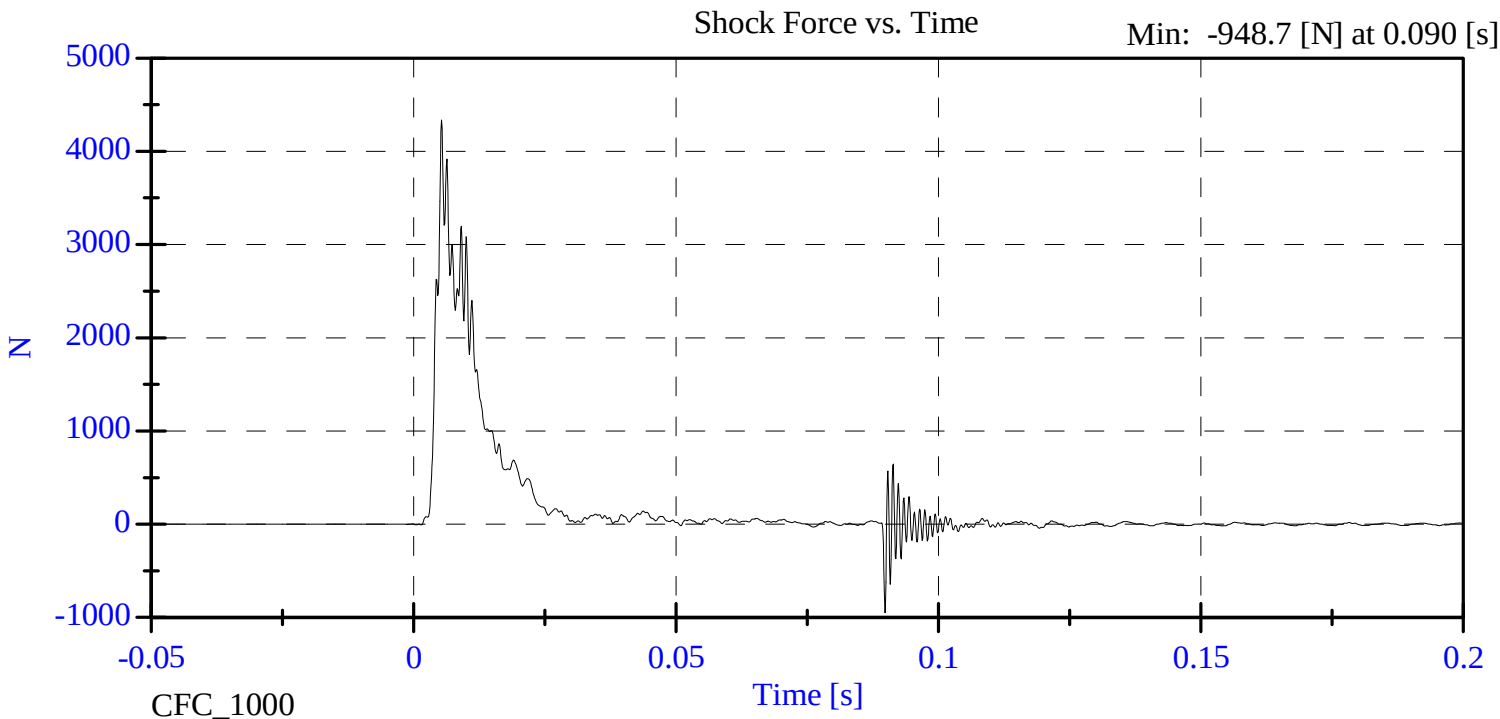
Max: 37.9 [mm] at 0.029 [s]

Min: -0.5 [mm] at 0.091 [s]



Max: 4336.4 [N] at 0.005 [s]

Min: -948.7 [N] at 0.090 [s]



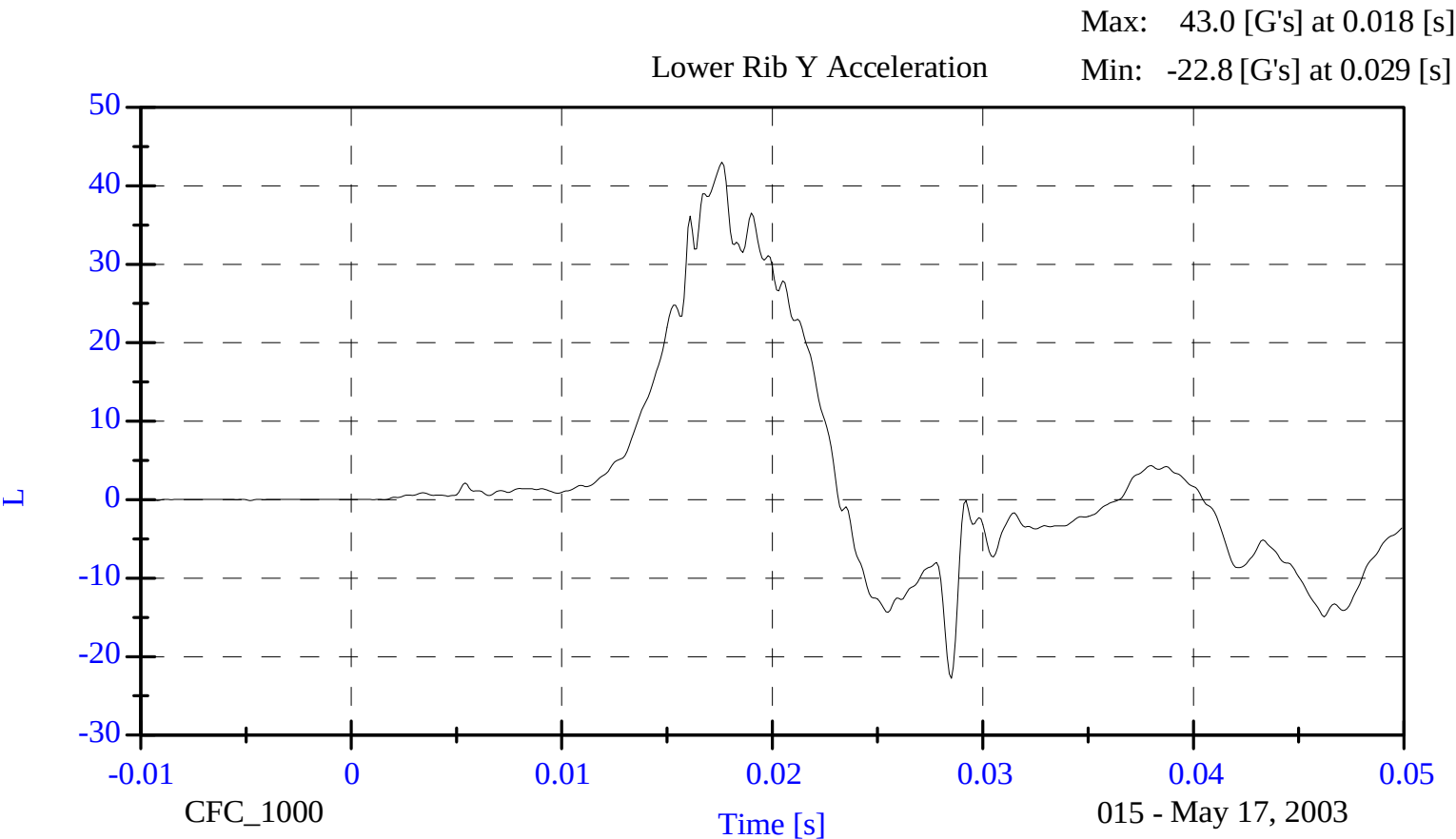
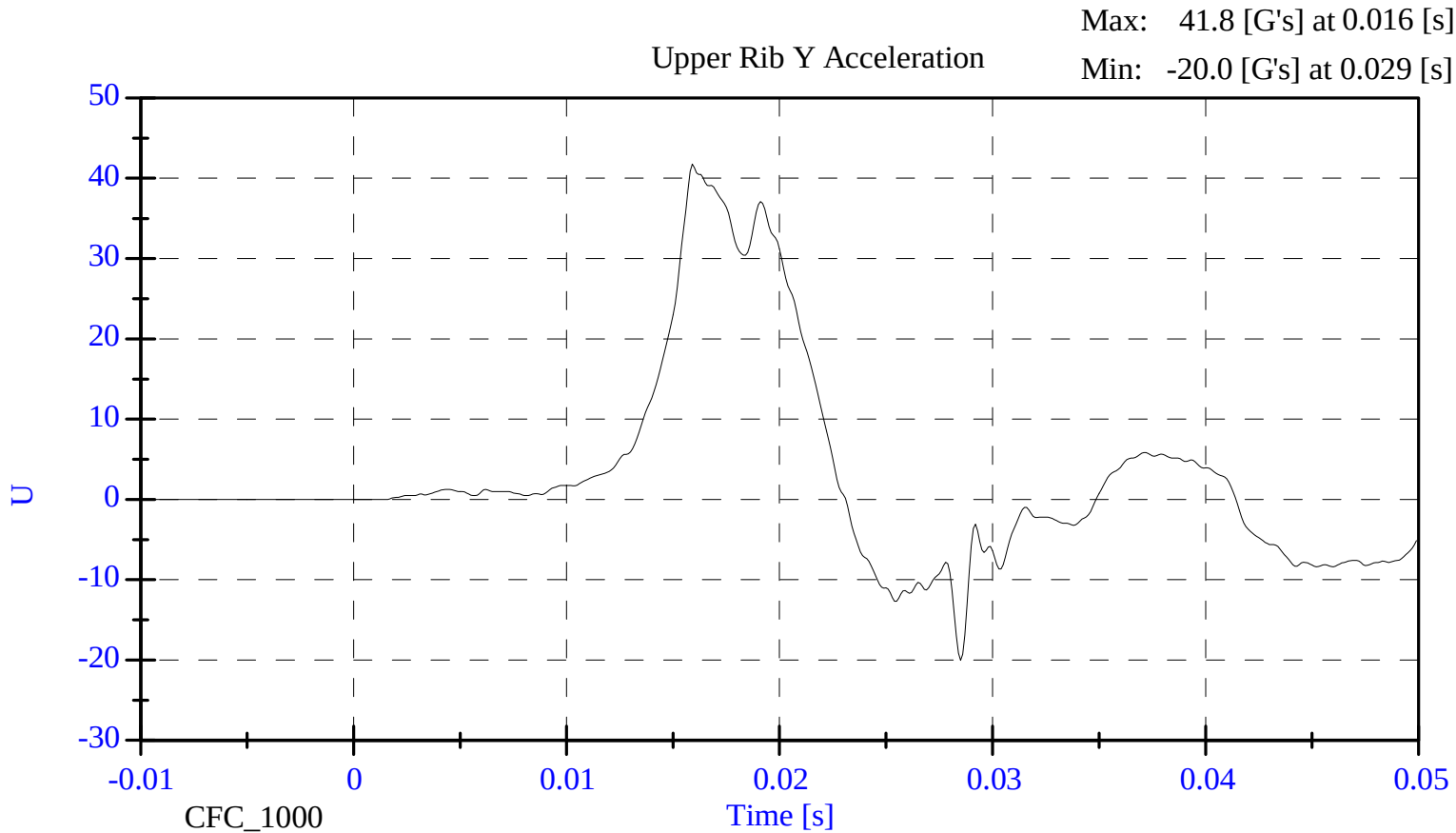
**LATERAL THORAX IMPACT TEST
PRE-TEST**

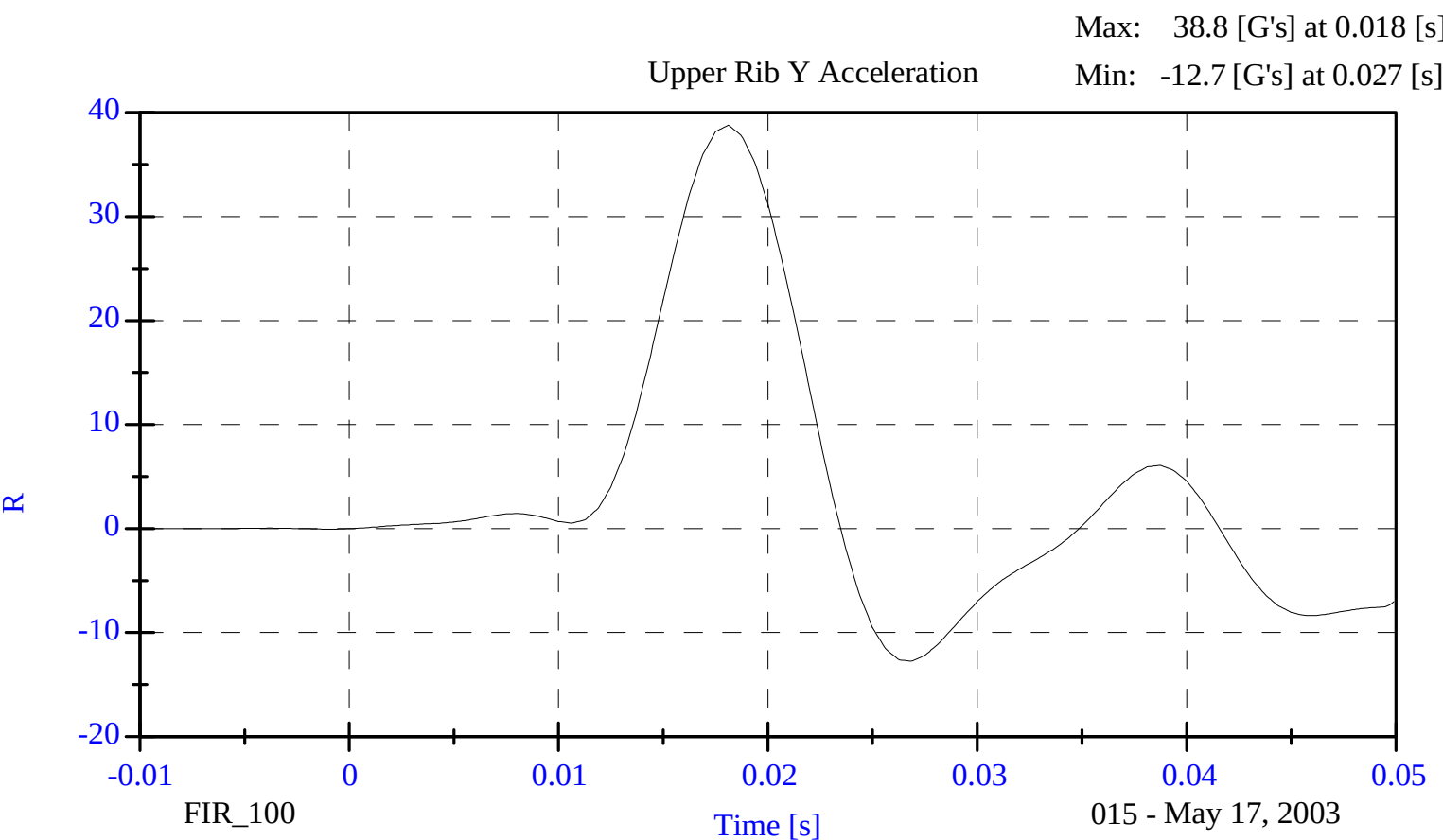
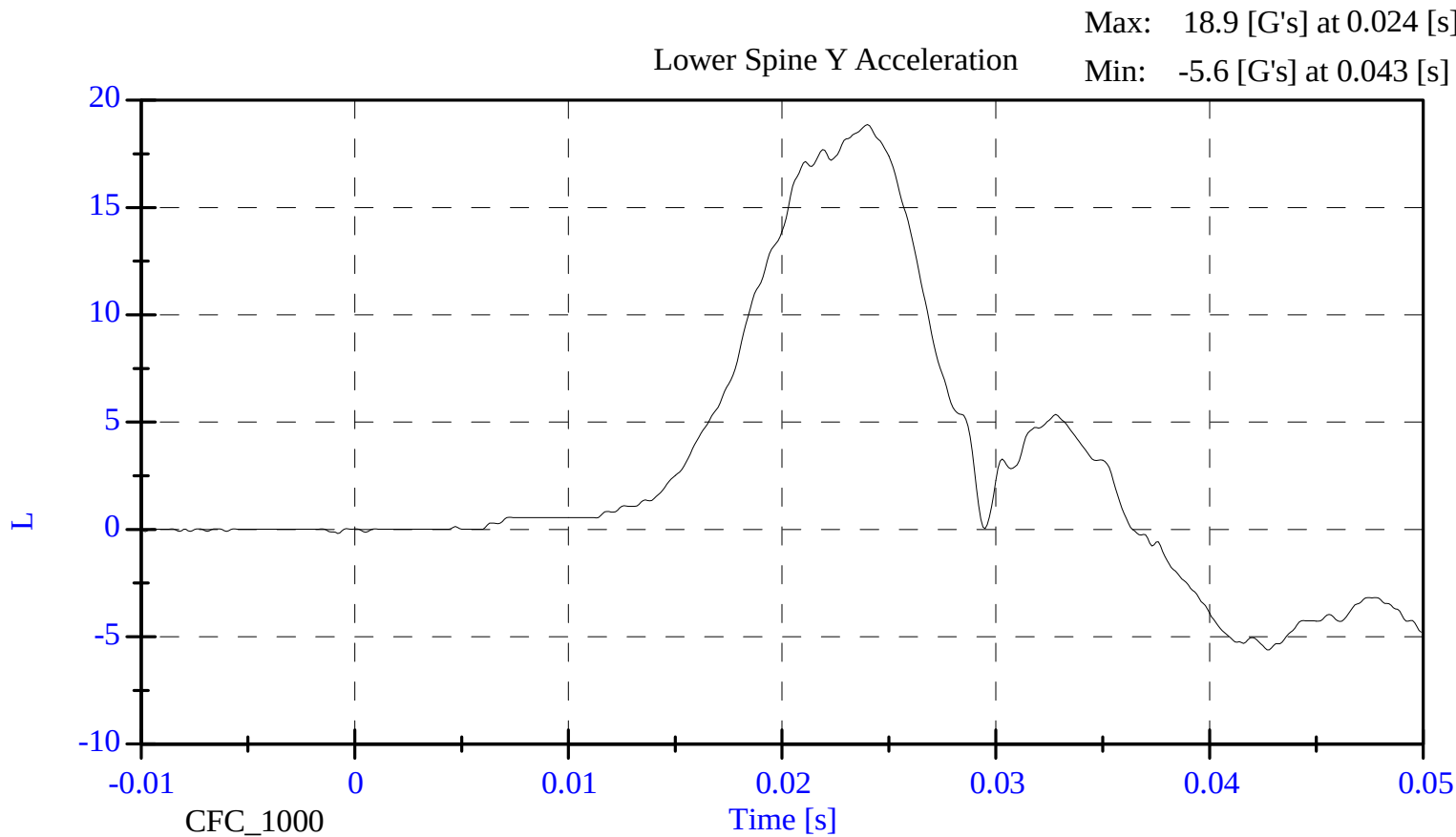
CONFIGURED FOR LEFT SIDE IMPACT

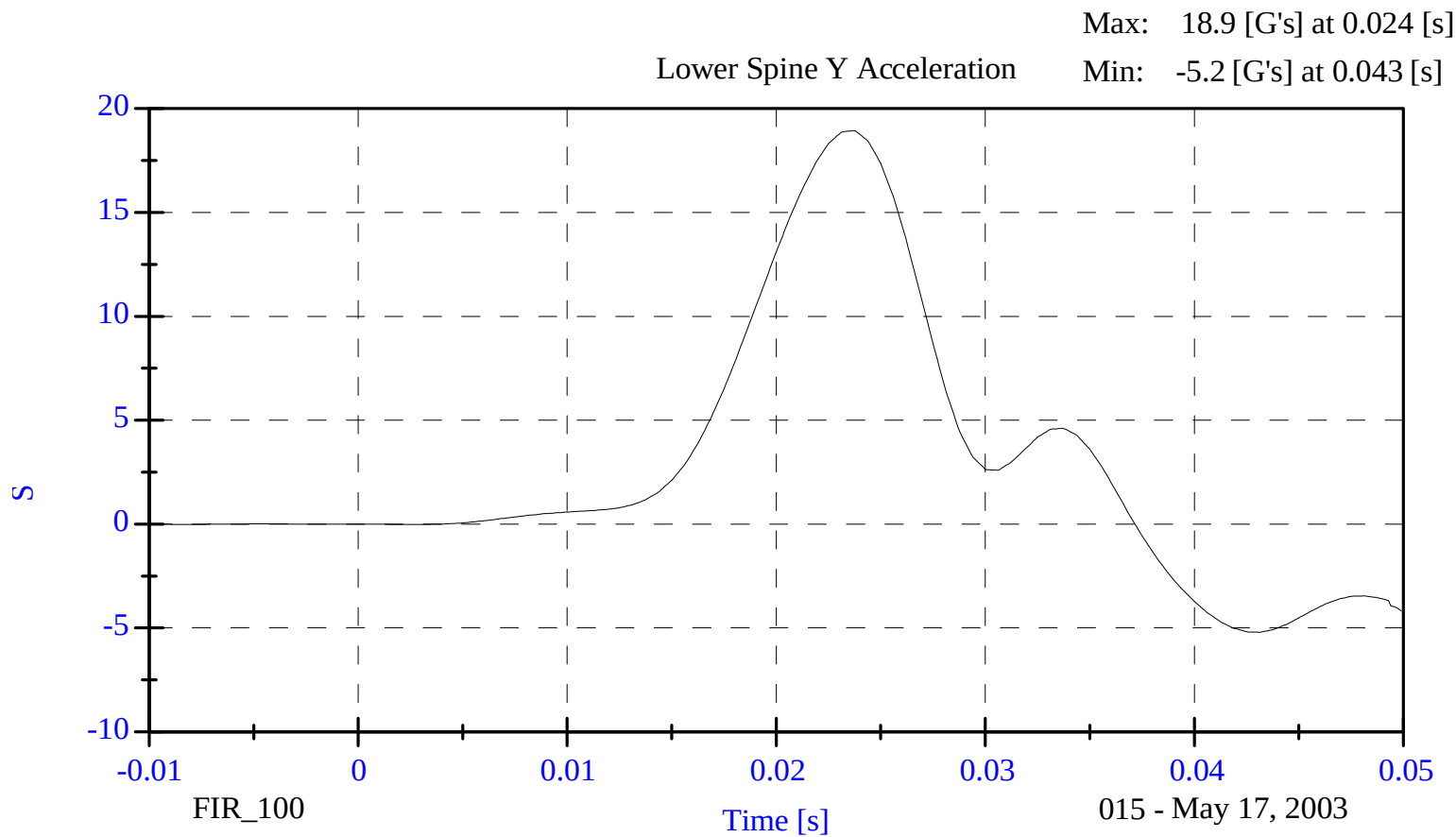
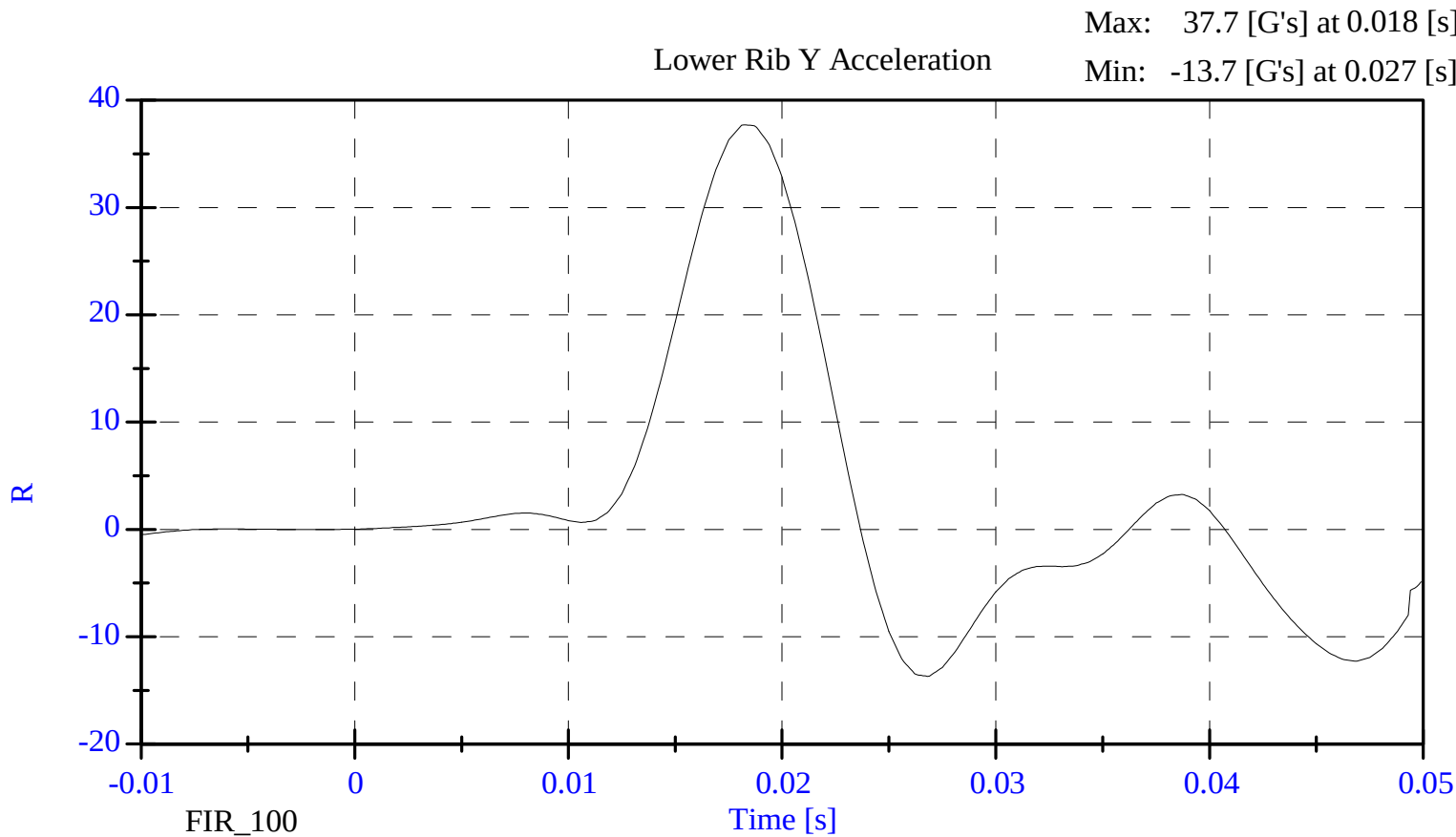
SID H3 Serial No.: 015 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	34.00
PROBE SPEED (m/s)	4.27 - 4.33	4.29
UPPER RIB (g's)	37 - 46	38.76
LOWER RIB (g's)	37 - 46	37.72
LOWER SPINE (g's)	15 - 22	18.94

REMARKS: None







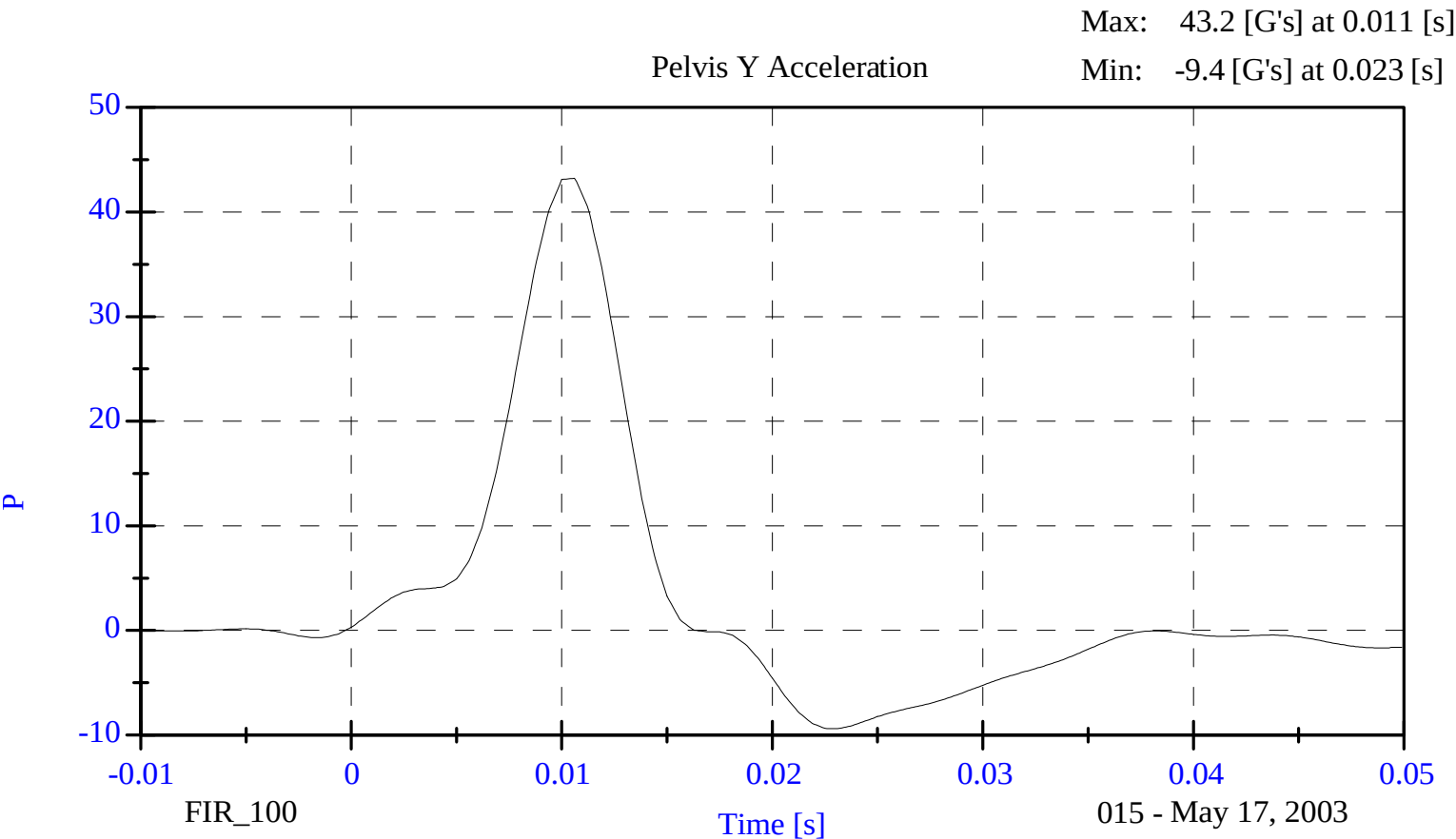
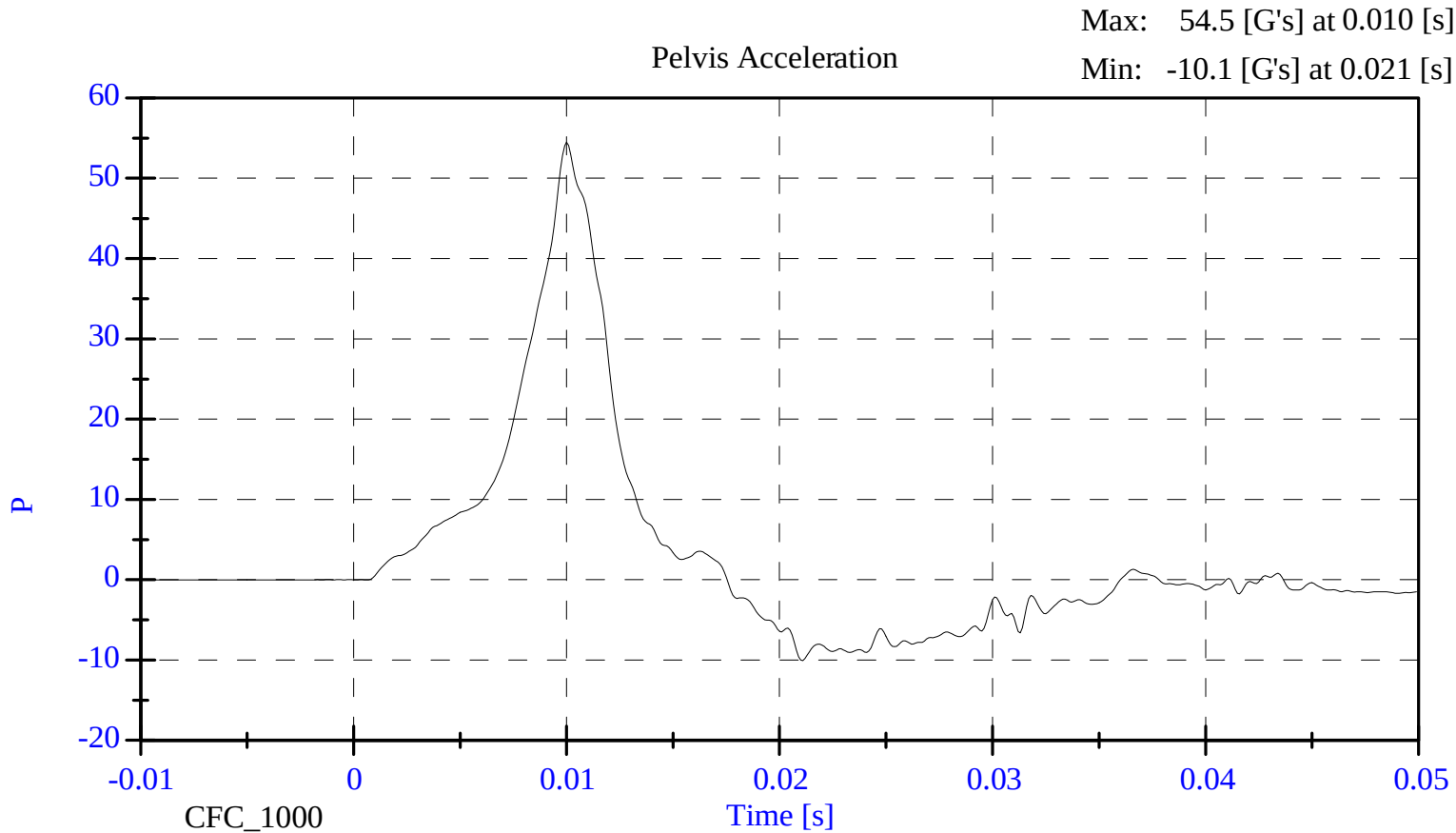
**LATERAL PELVIS IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.:	<u>015</u>	Sequential Test Number:	<u>4</u>
Date:	<u>May 17, 2003</u>	Laboratory Technician:	<u>B. Swiecicki</u>

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	34.00
PROBE SPEED (m/s)	4.27 - 4.33	4.27
PELVIS ACCELERATION (g's)	40 - 60	43.23

REMARKS: None



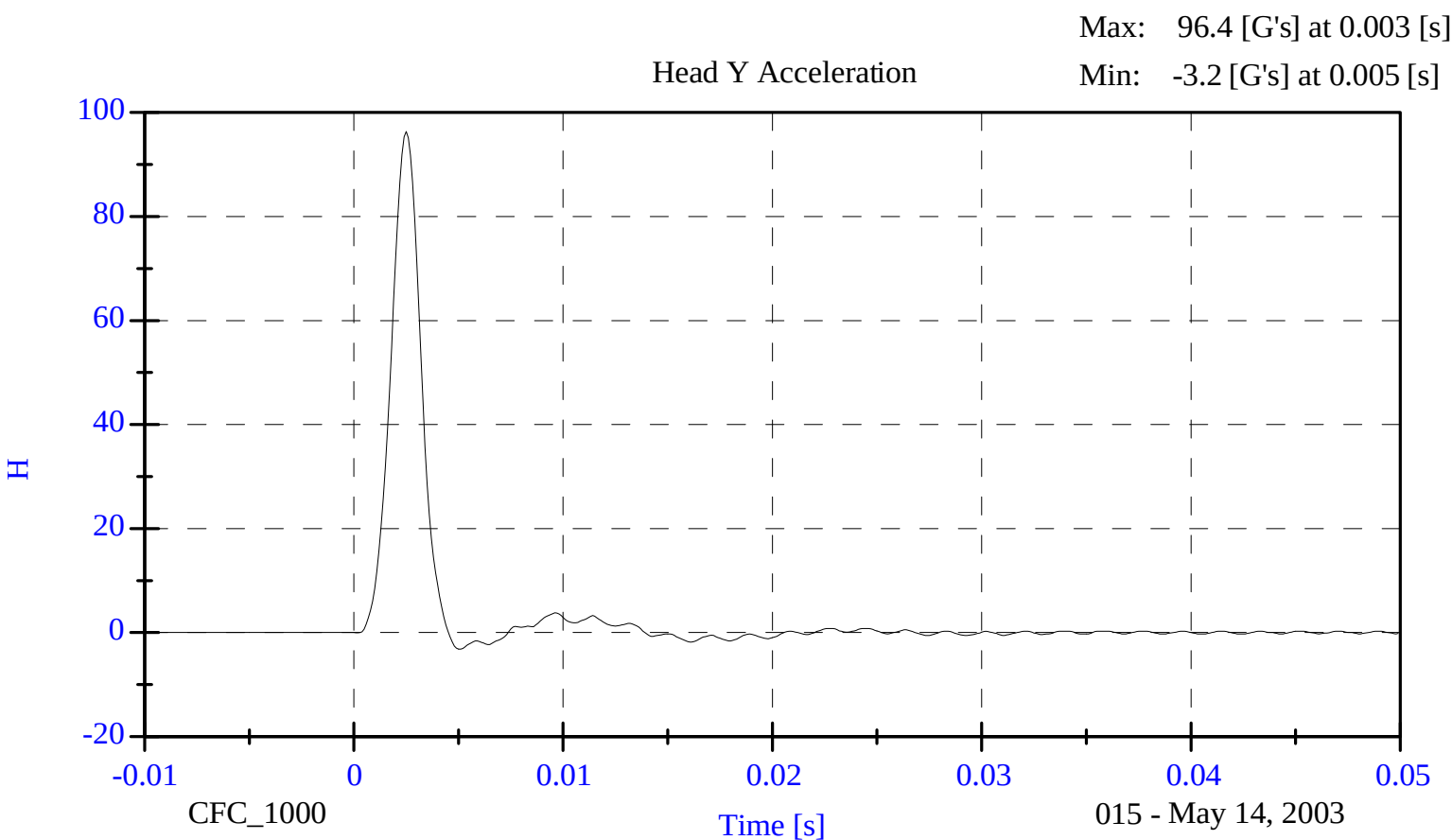
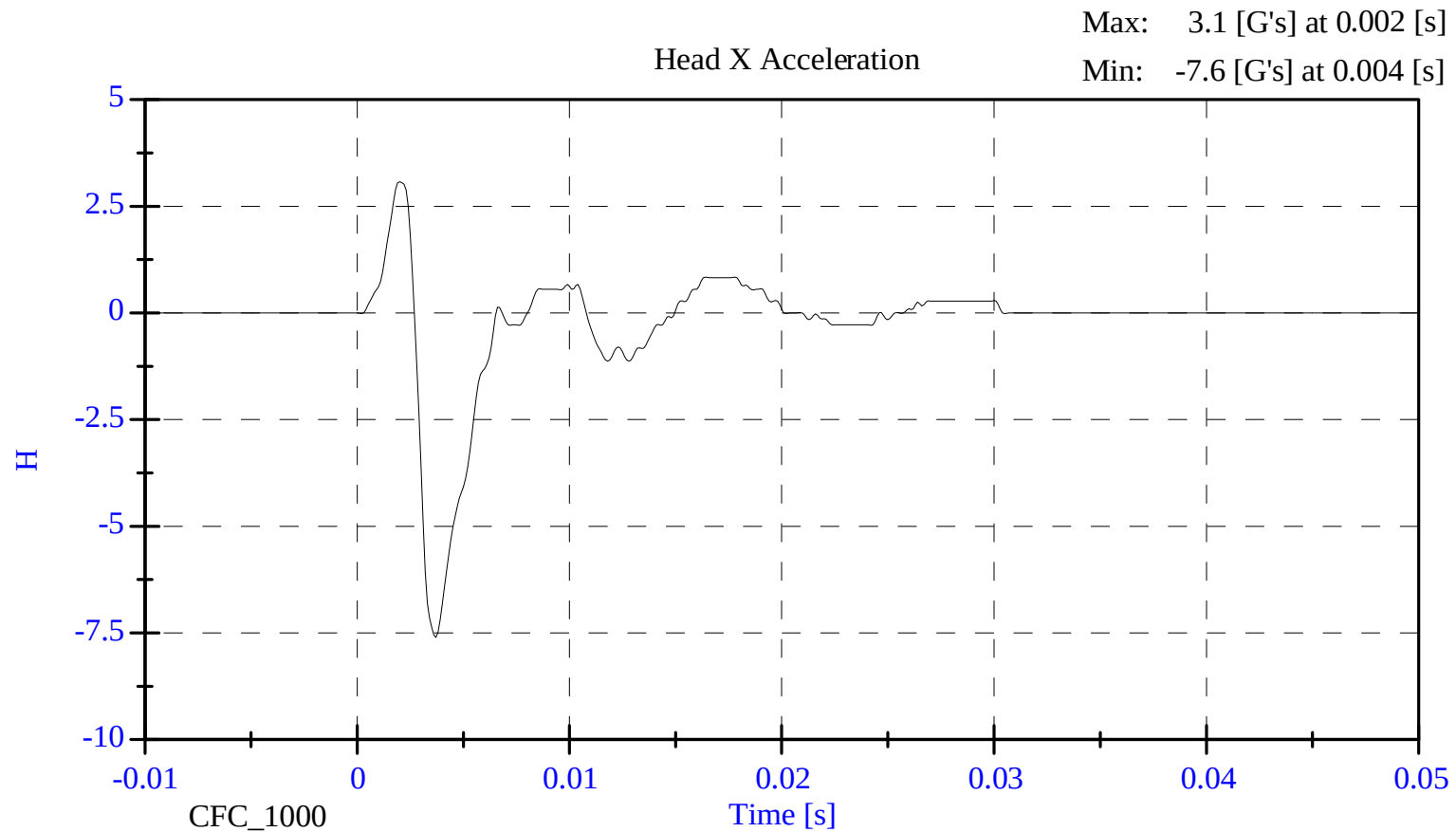
**HEAD DROP TEST
PRE-TEST**
(Test not required for SID certification)

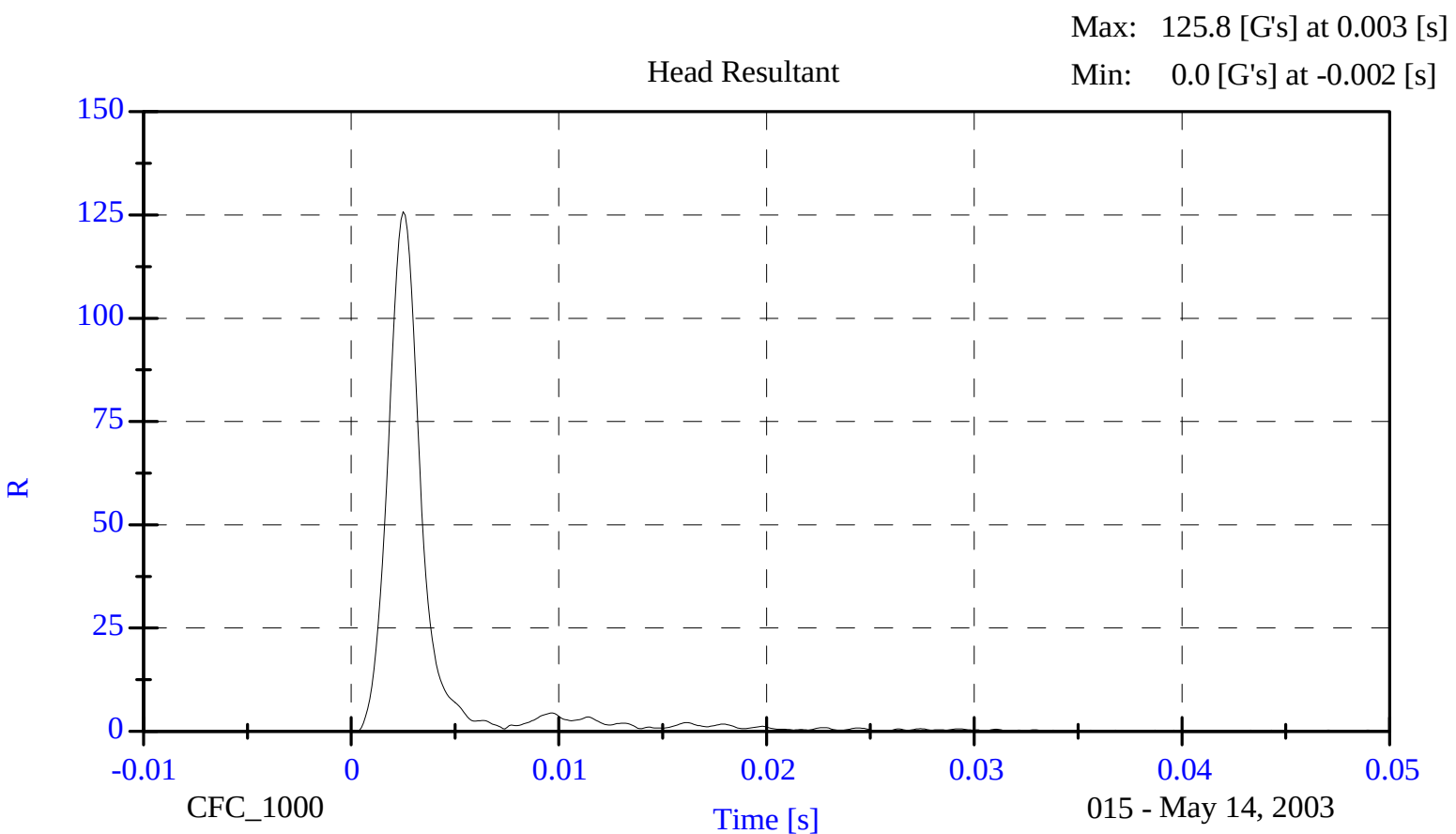
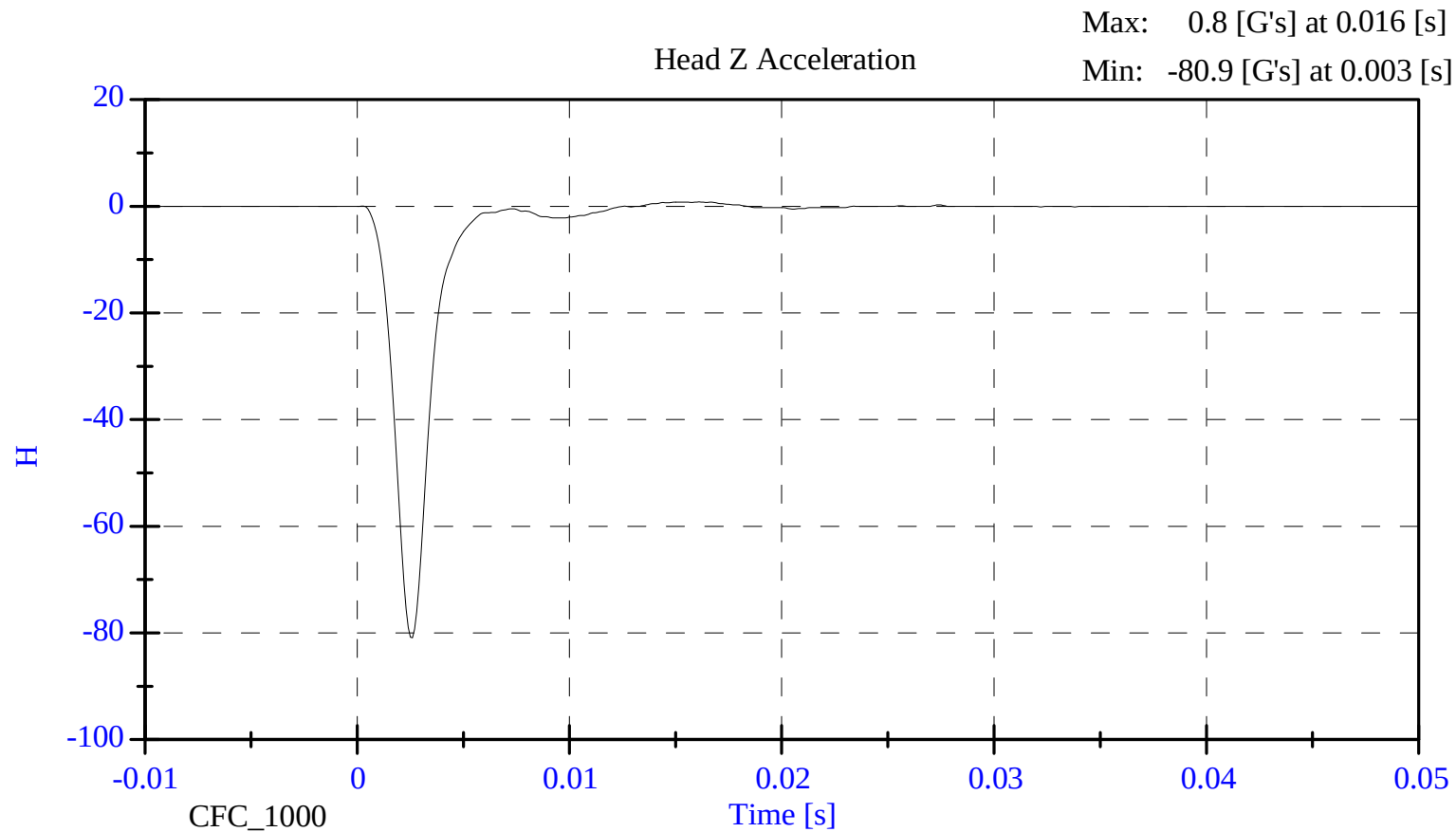
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015 Sequential Test Number: 4
Date: May 14, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 – 22.2	21.1
RELATIVE HUMIDITY (%)	10 – 70	41.00
PEAK RESULTANT ACCELERATION (Gs)	120 – 150	125.78
PEAK LATERAL ACCELERATION (Gs)	Not to Exceed 15	3.07
CURVE PERCENT NONMODAL (%)	< 15	3.50

REMARKS: None





**LATERAL NECK BENDING TEST
PRE-TEST**

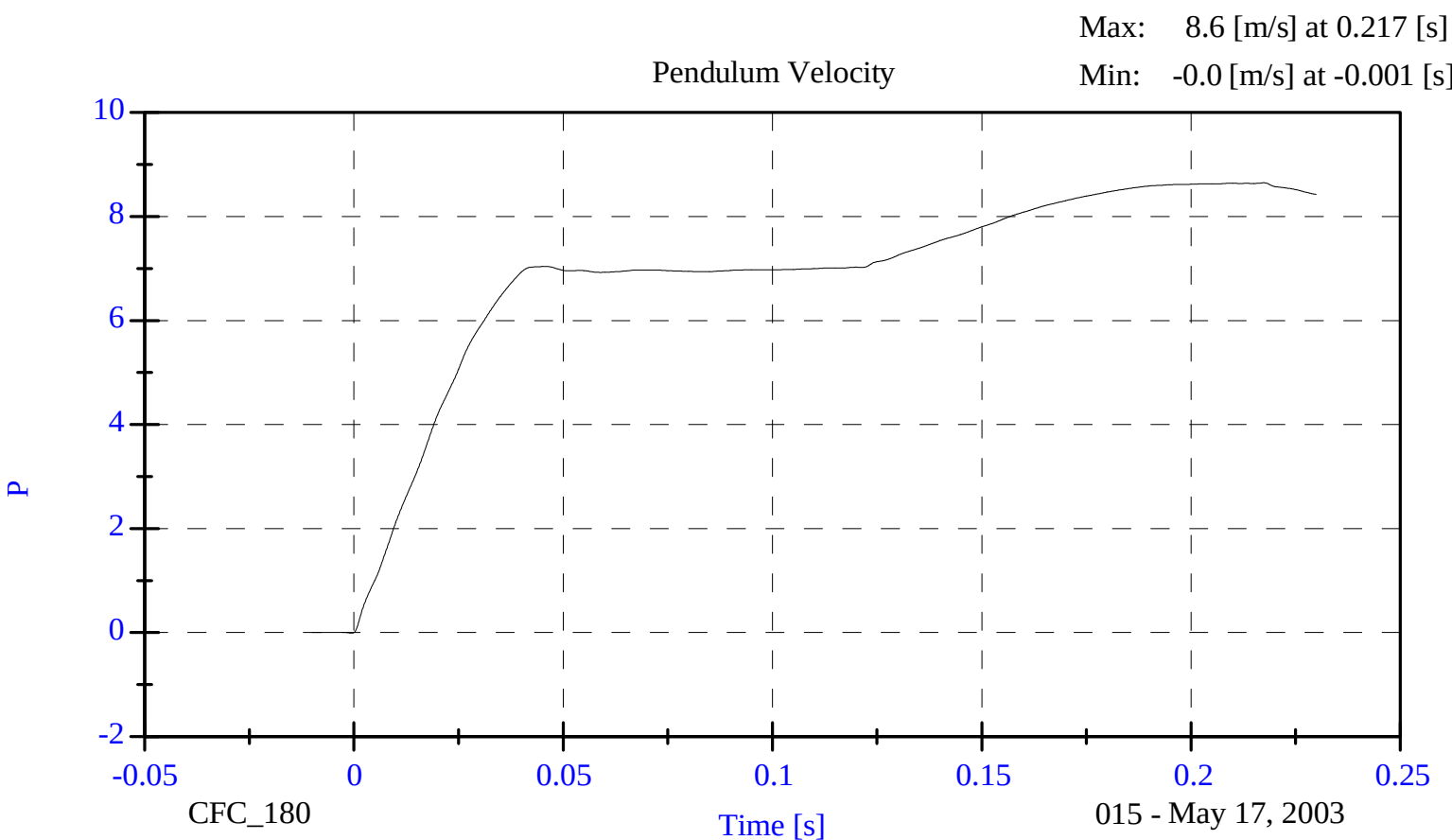
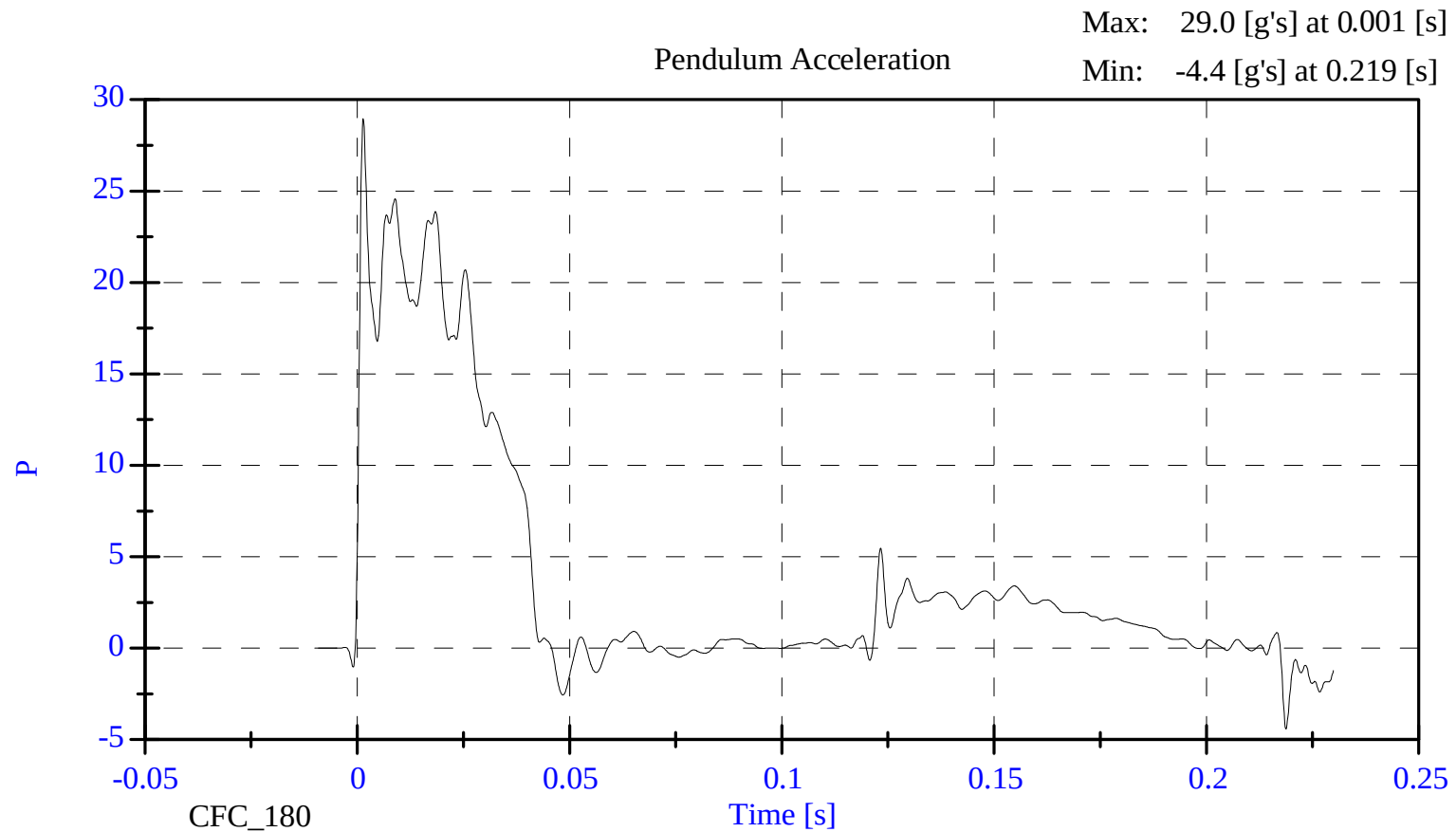
(Test not required for SID certification)

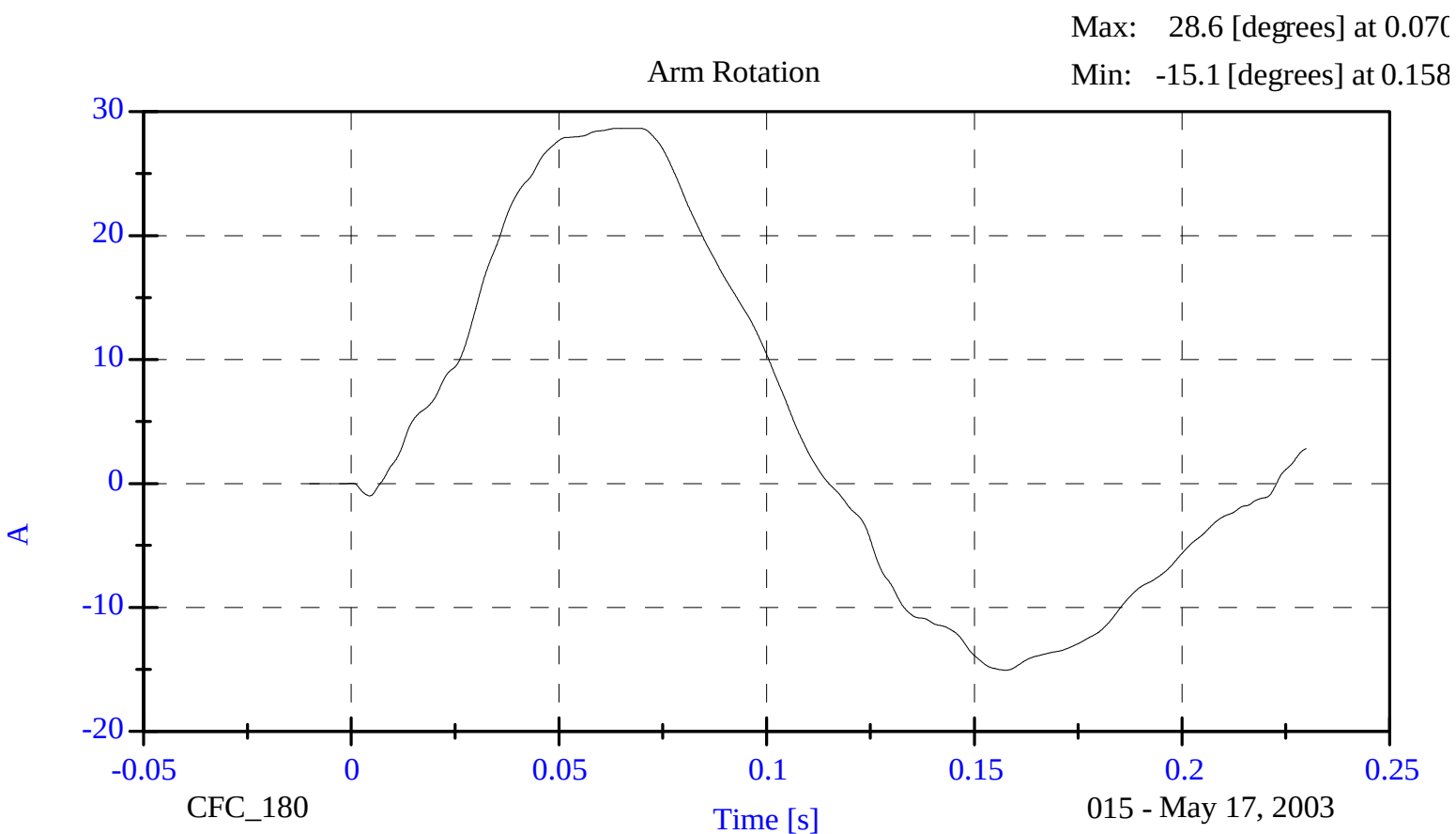
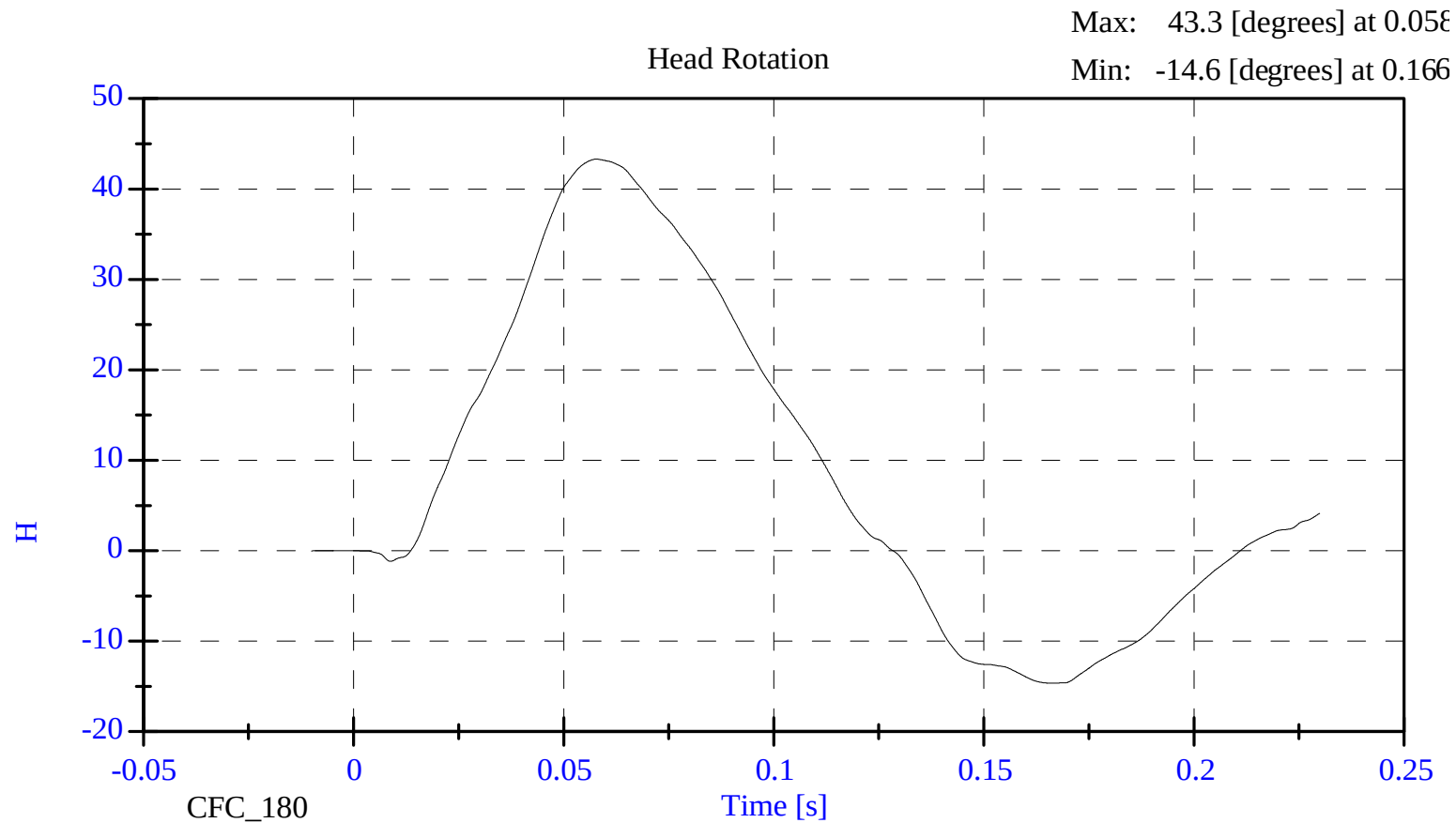
CONFIGURED FOR LEFT SIDE IMPACT

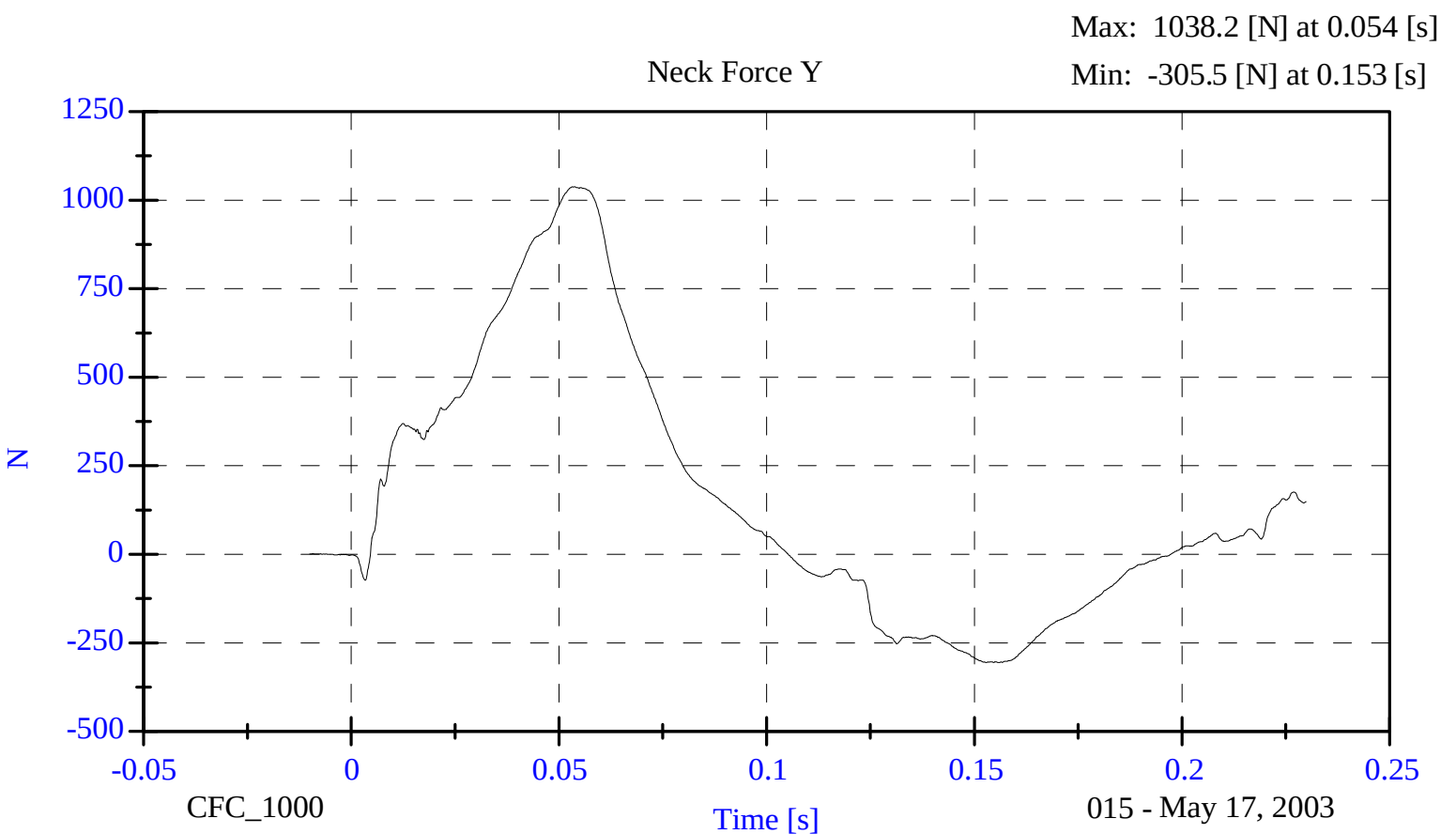
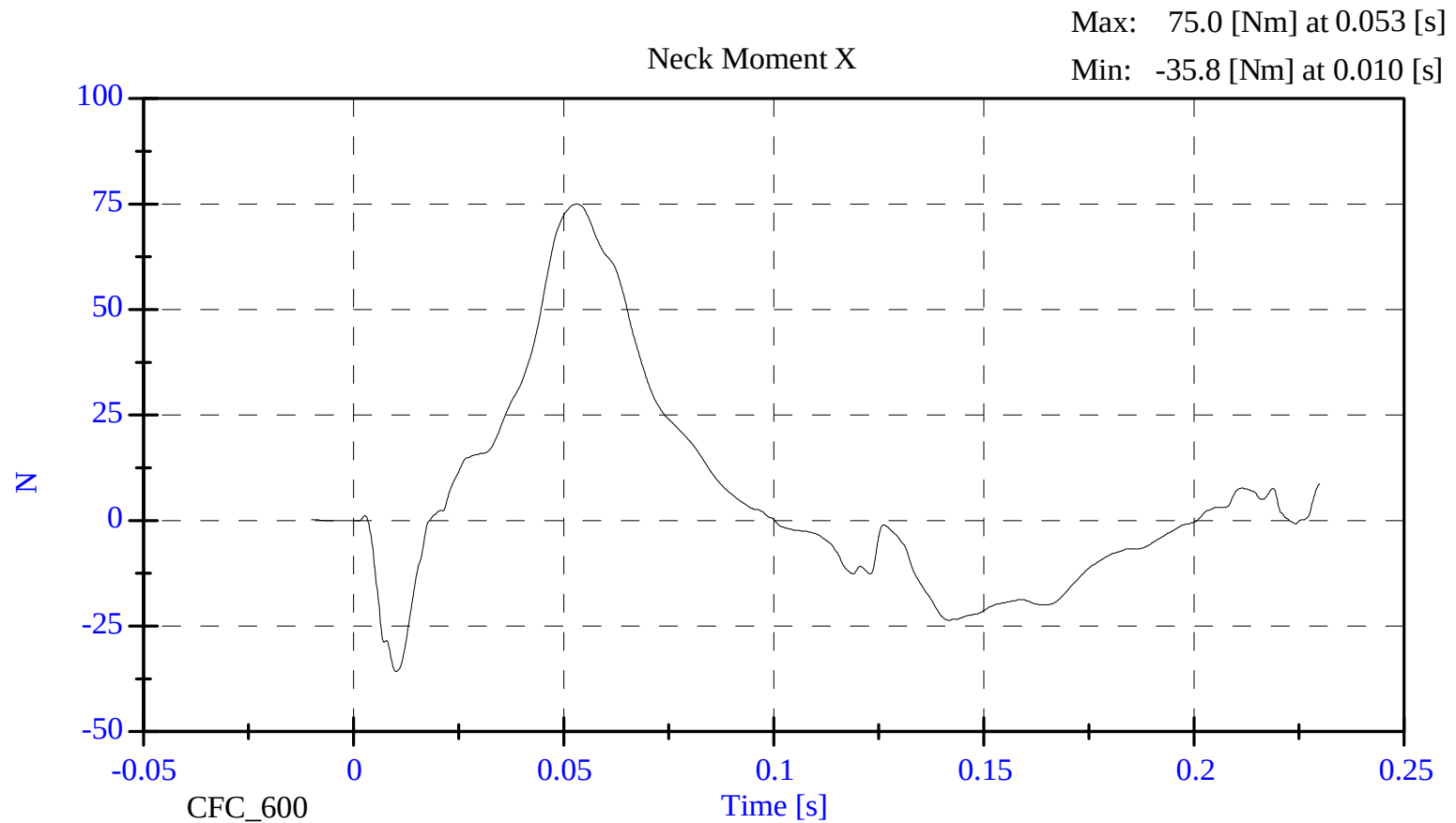
SID Serial No.: 015	Sequential Test Number: 4	
Date: May 17, 2003	Laboratory Technician: B. Swiecicki	

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 - 22.2	21.1
RELATIVE HUMIDITY (%)	10 - 70	33.00
IMPACT VELOCITY (m/s)	6.89 – 7.13	6.99
PENDULUM DELTA V		
DELTA V @ 10 ms (m/s)	1.96 – 2.55	2.12
DELTA V @ 20 ms (m/s)	4.12 – 5.10	4.19
DELTA V @ 30 ms (m/s)	5.73 – 7.01	5.87
DELTA V @ 40-70 ms (m/s)	6.27 – 7.64	7.04
D PLANE ROTATION		
MAXIMUM ROTATION (deg)	64 – 78	71.65
ROT. ANGLE TIME to ZERO (ms)	50 – 70	62.80
MOMENT ABOUT THE OCCIPITAL CONDYLE		
MAX OCCIPITAL MOMENT (Nm)	88 – 108	93.50
OCCIPITAL MOMENT DECAY (ms)	40.0 – 60.0	47.80
HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT		
ROTATION wrt MOMENT (ms)	0 – 20	5.50

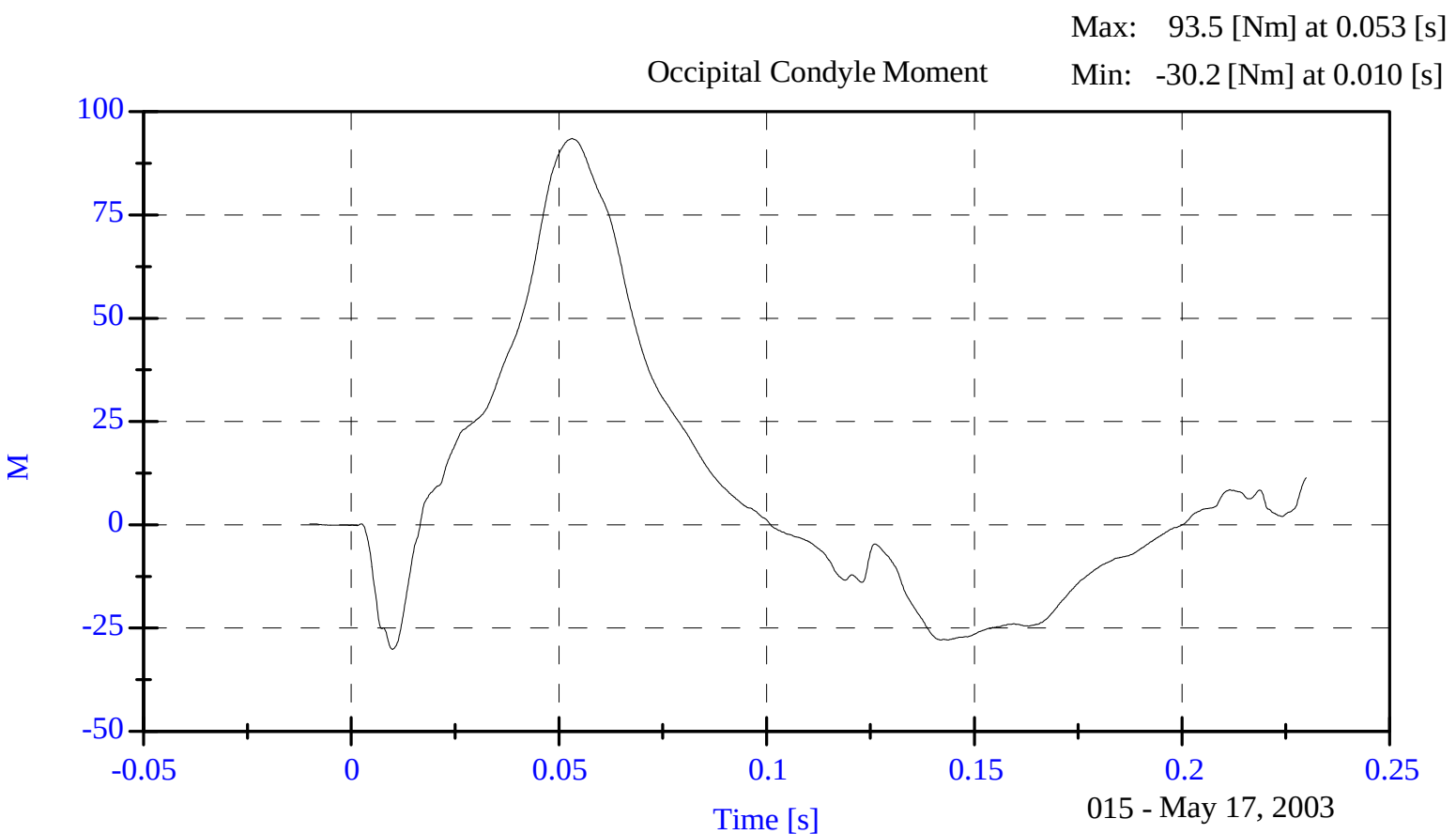
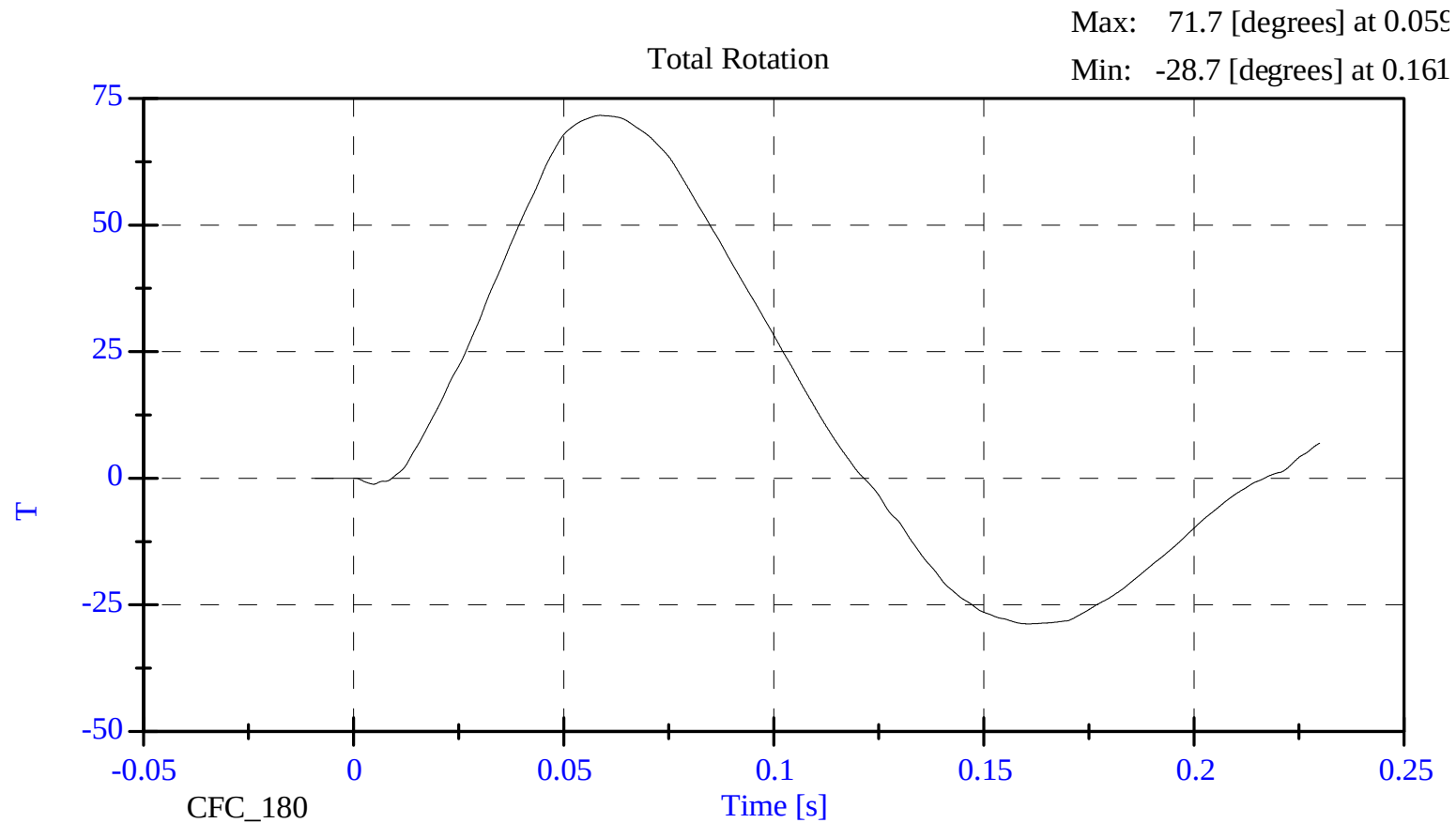
REMARKS: None







015 - May 17, 2003



**ABDOMINAL COMPRESSION TEST
PRE-TEST**

(Test not required for SID certification)

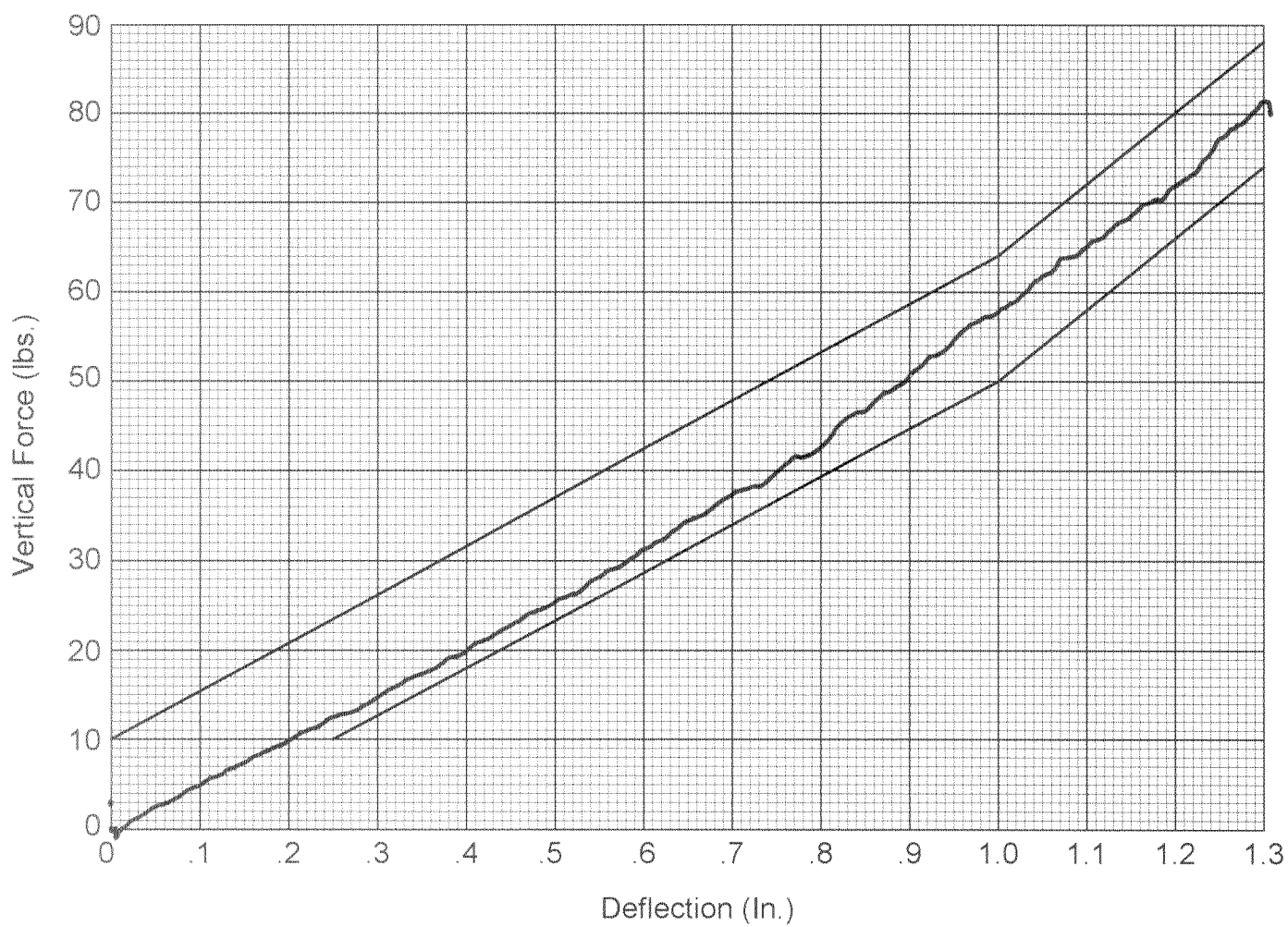
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.7
RELATIVE HUMIDITY (%)	10 - 70	33.0
FORCE @ 13 mm (N)	104 - 162	115.7
FORCE @ 19 mm (N)	163 - 221	177.9
FORCE @ 25 mm (N)	222 - 280	258.0
FORCE @ 33 mm (N)	325 - 391	362.5

REMARKS: None

Dummy S/N 015
W/A _____
Date 5-17-03
Performed By [Signature]
Temp. 71
Humidity 33%



**Hybrid II
Abdomen Static Press**

LUMBAR FLEXION TEST
PRE-TEST
(Test not required for SID certification)

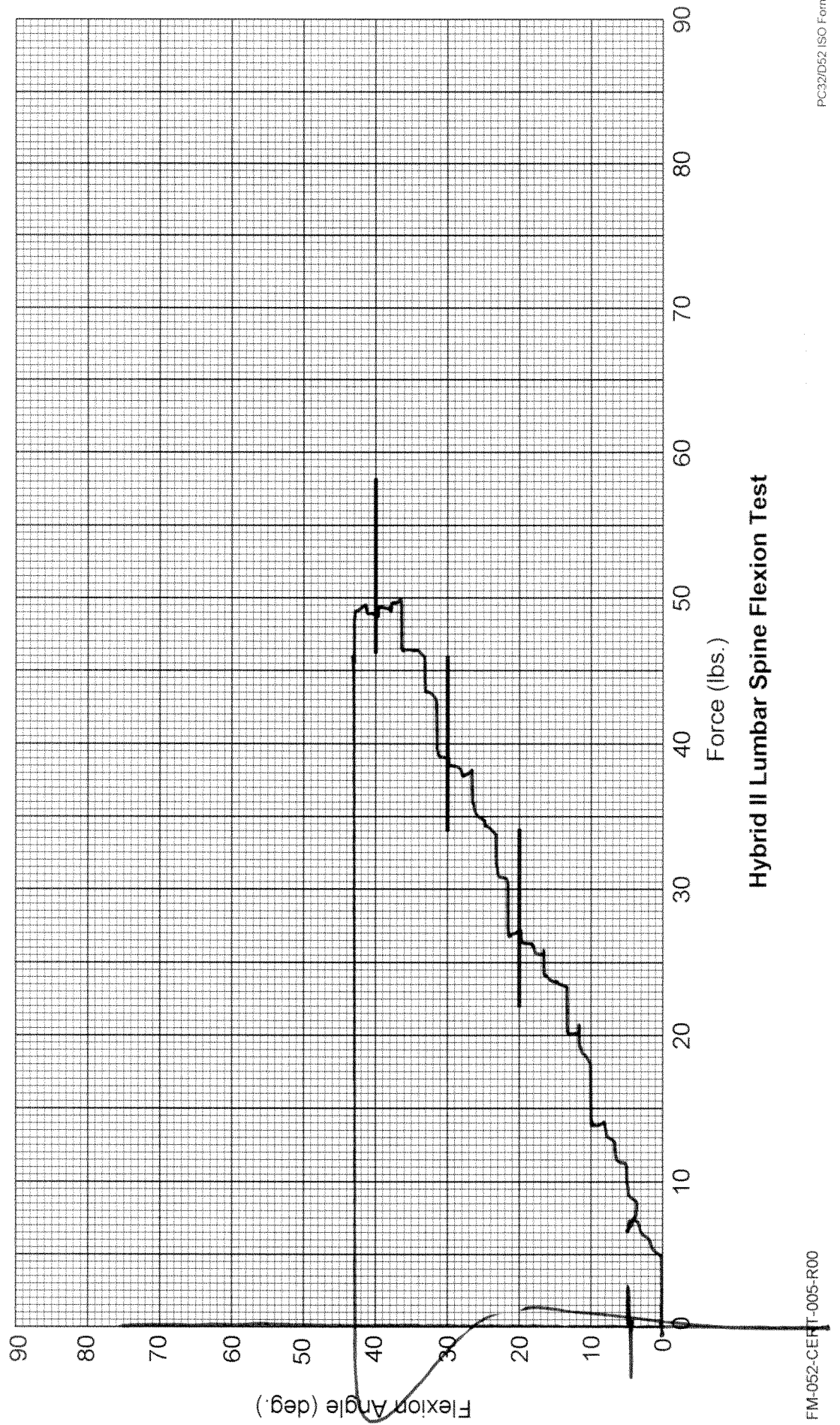
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.7
RELATIVE HUMIDITY (%)	10 - 70	33.00
FORCE @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	117.9
FORCE @ 30° (N)	151.2 - 204.6	171.3
FORCE @ 40° (N)	204.6 - 258	218.0
RETURN ANGLE	12° max.	5.5°

REMARKS: None

Dummy S/N 015
 WIA _____
 Date 5-17-03
 Performed By [Signature]
 Temp. 71°
 Humidity 33%



PRE-TEST DUMMY INSPECTION LIST

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

PART	ITEMS CHECKED	COMMENTS
SKIN	VISUAL INSPECTION	OK
HEAD	VISUAL, BALLAST, ACCELEROMETER MOUNT	OK
NECK	VISUAL, CABLE TORQUE	OK
SPINE BOX	VISUAL, BALLAST, WELDMENT, ACCELEROMETER MOUNT	OK
RIB CAGE	VISUAL, MEASURE, STIFFENERS	OK
STERNUM	VISUAL	OK
LUMBAR SPINE	VISUAL	OK
ABDOMEN	VISUAL	OK
PELVIS	VISUAL, PALPATE, ACCELEROMETER MOUNT	OK
UPPER LEGS	VISUAL	OK
KNEES	VISUAL, STOPS, INSERTS	OK
LOWER LEGS	VISUAL, RANGE OF MOTION	OK
ANKLES	VISUAL, RANGE OF MOTION	OK
FEET	VISUAL, RANGE OF MOTION	OK
JOINTS	1 TO 2 g RANGE	OK
OTHER	NONE	-

REMARKS: None

CALIBRATION TEST RESULTS

PRE-TEST

SID H3 NO.: 016

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST	COMMENTS
EXTERNAL DIMENSIONS	Passed all requirements.
THORACIC SHOCK ABSORBER TEST	Passed all requirements.
LATERAL THORAX IMPACT TEST	Passed all requirements.
LATERAL PELVIS IMPACT TEST	Passed all requirements.
HEAD DROP TEST*	Passed all requirements.
LATERAL NECK BEND TEST*	Passed all requirements.
ABDOMINAL COMPRESSION TEST*	Passed all requirements.
LUMBAR FLEXION TEST*	Passed all requirements.

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 - 909	902
RH- Rib Height (mm)	502 - 520	513
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 - 241	239
KH- Knee Pivot from Back Line (mm)	511 - 526	521
KV- Knee Pivot to Floor (mm)	490 - 505	495
HW- Hip Width (mm)	356 - 391	371

REMARKS: None

**THORACIC SHOCK ABSORBER TESTS
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 1.4
Date: April 25, 2003 Laboratory Technician: B. Swiecicki

DAMPER IDENTIFICATION: _____

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)		18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)		10 - 70	40.0
VELOCITY 3.05 m/s	FORCE (N)	836 - 1125	934.7
	DISPLACEMENT (mm)	30 - 35	31.7
VELOCITY 4.27 m/s	FORCE (N)	1730 - 2099	1867.3
	DISPLACEMENT (mm)	32 - 37	34.9
VELOCITY 6.10 m/s	FORCE (N)	3741 - 4448	4438.7
	DISPLACEMENT (mm)	33 - 40	37.6

DAMPER SETTING: 5

REMARKS: None

Shock Low at 3.05 m/s

Low Part 572F Shock Absorber Impact

Calibration Date:

04-25-03

Serial No: 016

Work File:

016SL1 04-25-03

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

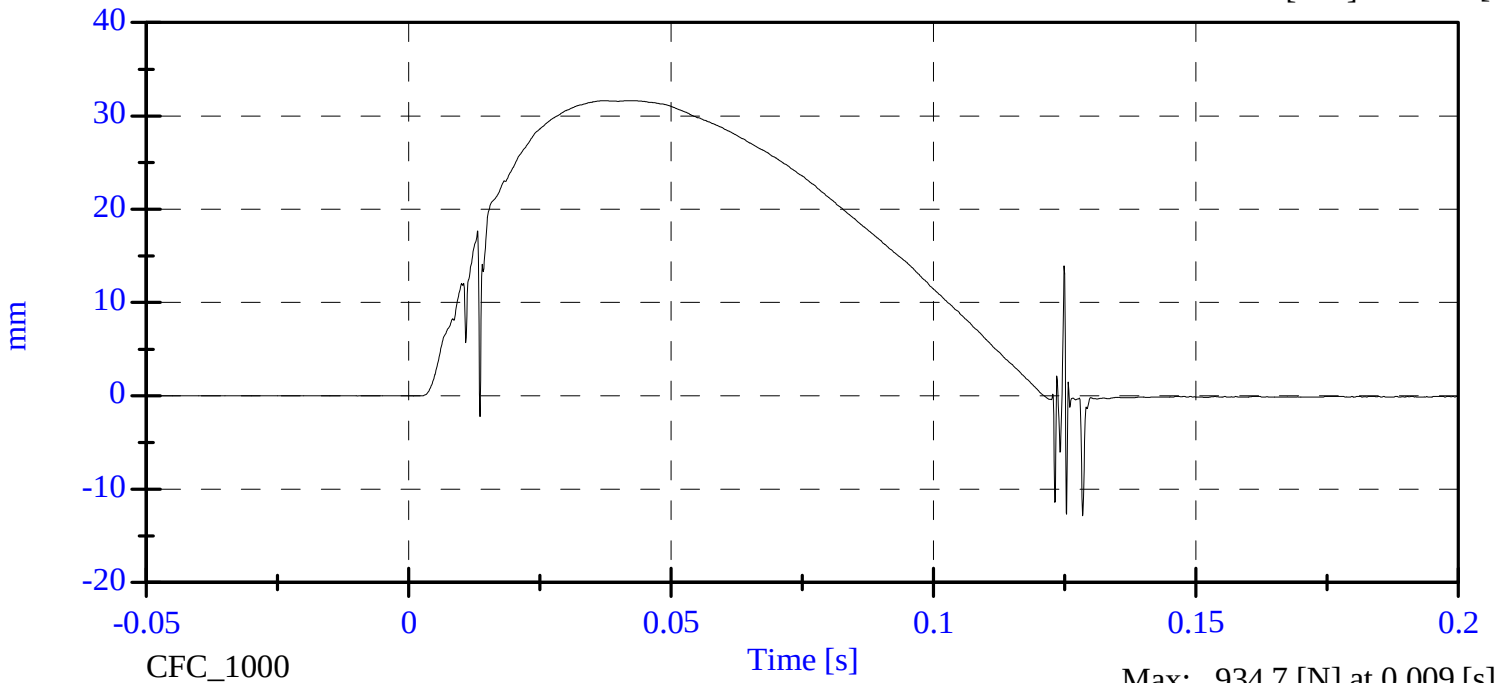
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.5 C	21.1 C	Passed
Lab Humidity:	10-70 %	40.00 %	Passed
Displacement:	30.00-35.00 mm	31.65 mm	Passed
Maximum Force:	836.00-1125.00 N	934.69 N	Passed

Shock Low

Displacement vs. Time

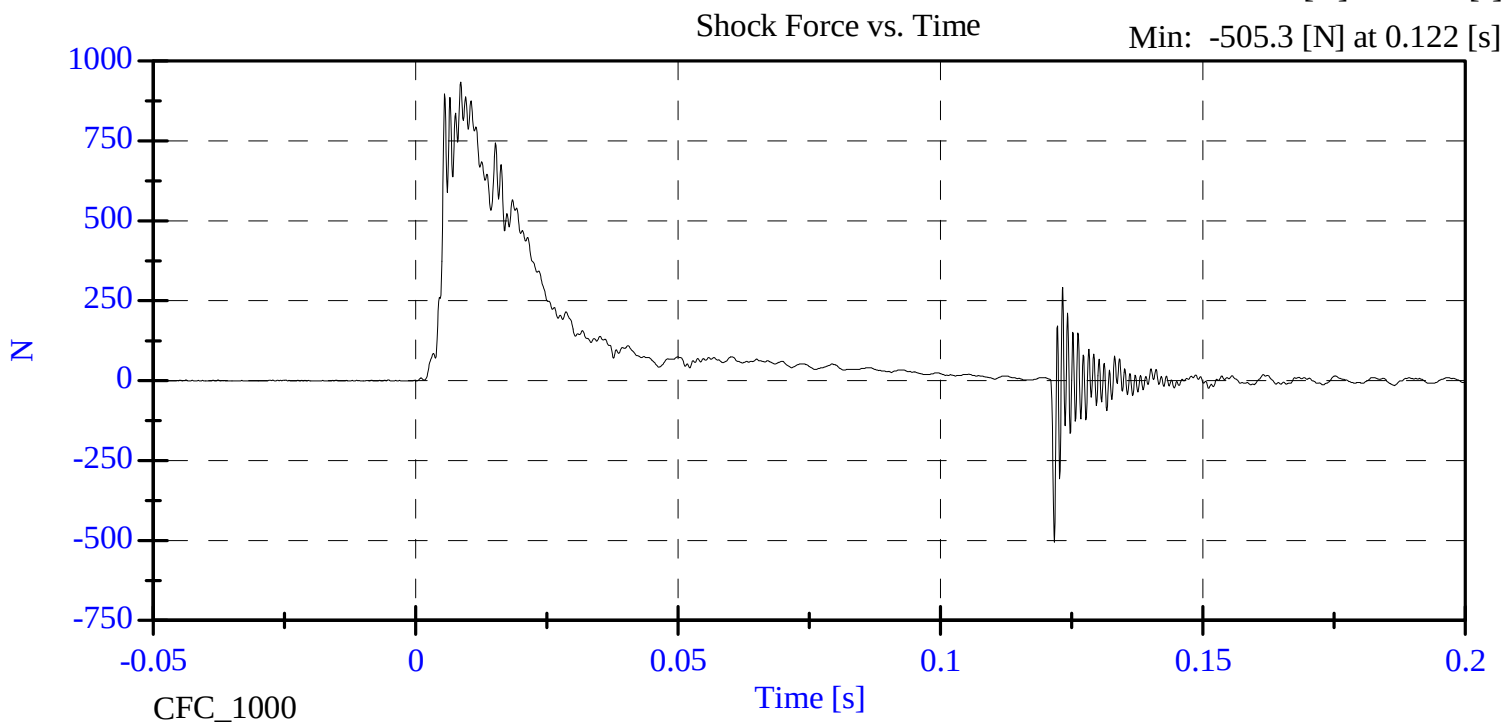
Max: 31.6 [mm] at 0.037 [s]

Min: -12.8 [mm] at 0.128 [s]



Max: 934.7 [N] at 0.009 [s]

Min: -505.3 [N] at 0.122 [s]



Shock Med at 4.27 m/s

Medium Part 572F Shock Absorber Impact

Calibration Date:

04-25-03

Serial No: 016

Work File:

016SM 04-25-03

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

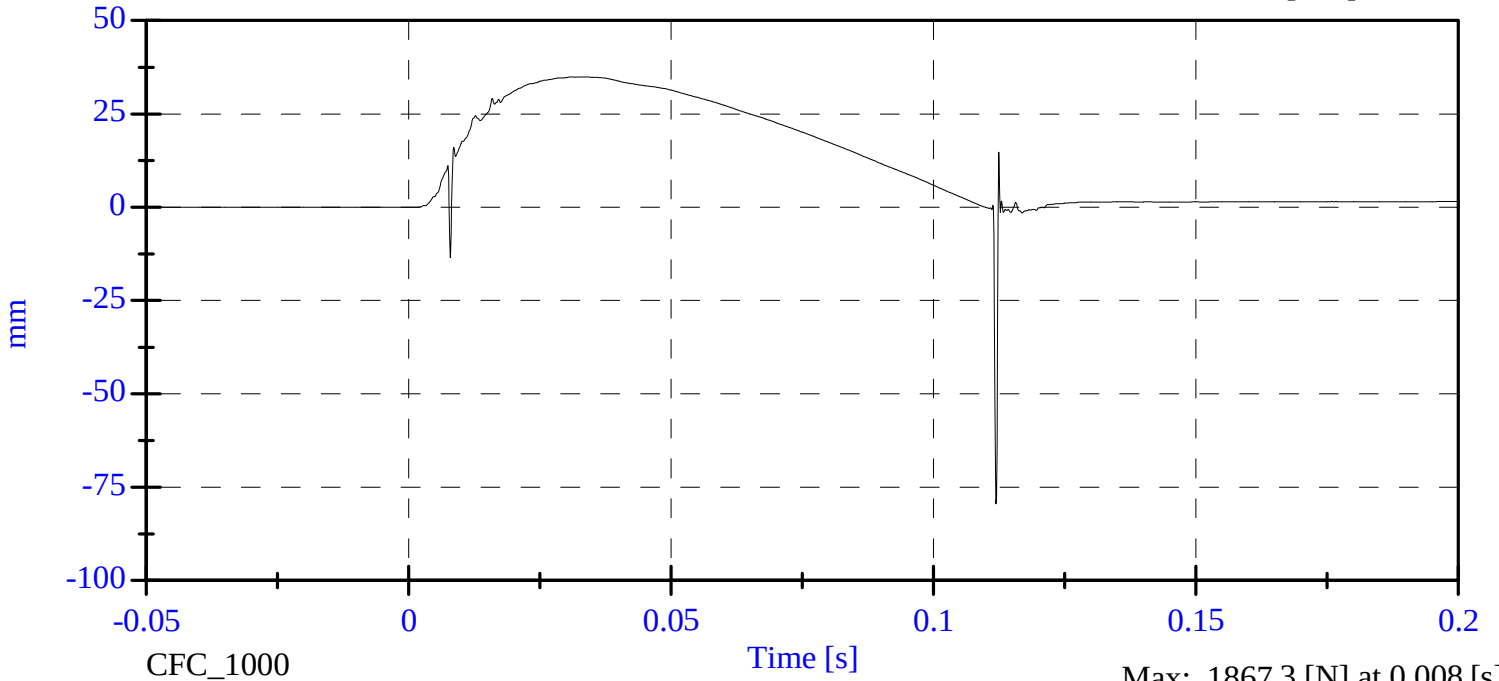
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.5 C	21.1 C	Passed
Lab Humidity:	10-70 %	40.00 %	Passed
Displacement:	32.00-37.00 mm	34.91 mm	Passed
Maximum Force:	1730.00-2099.00 N	1867.29 N	Passed

Shock Med

Displacement vs. Time

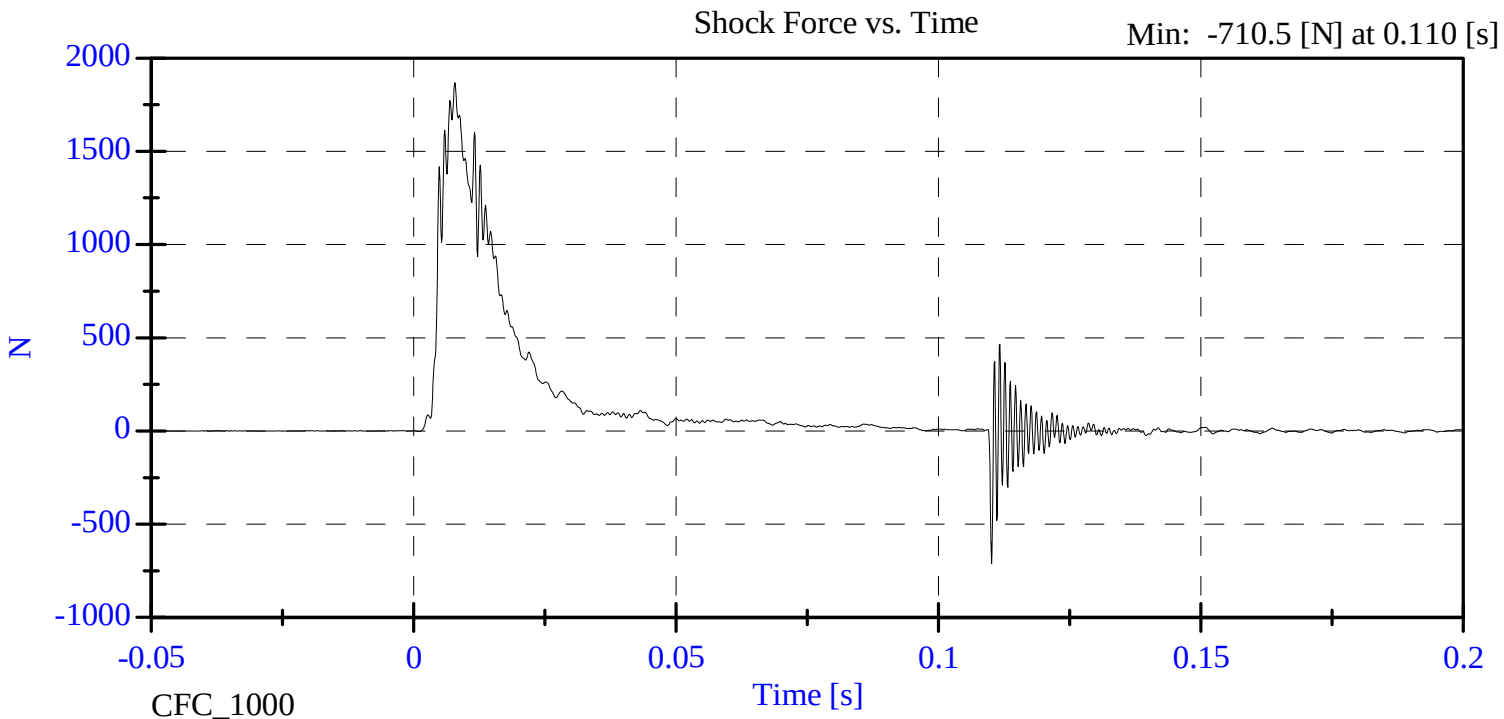
Max: 34.9 [mm] at 0.033 [s]

Min: -79.4 [mm] at 0.112 [s]



Max: 1867.3 [N] at 0.008 [s]

Min: -710.5 [N] at 0.110 [s]



Shock High at 6.10 m/s

High Part 572F Shock Absorber Impact

Calibration Date:

04-25-03

Serial No: 016

Work File:

016SH2 04-25-03

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

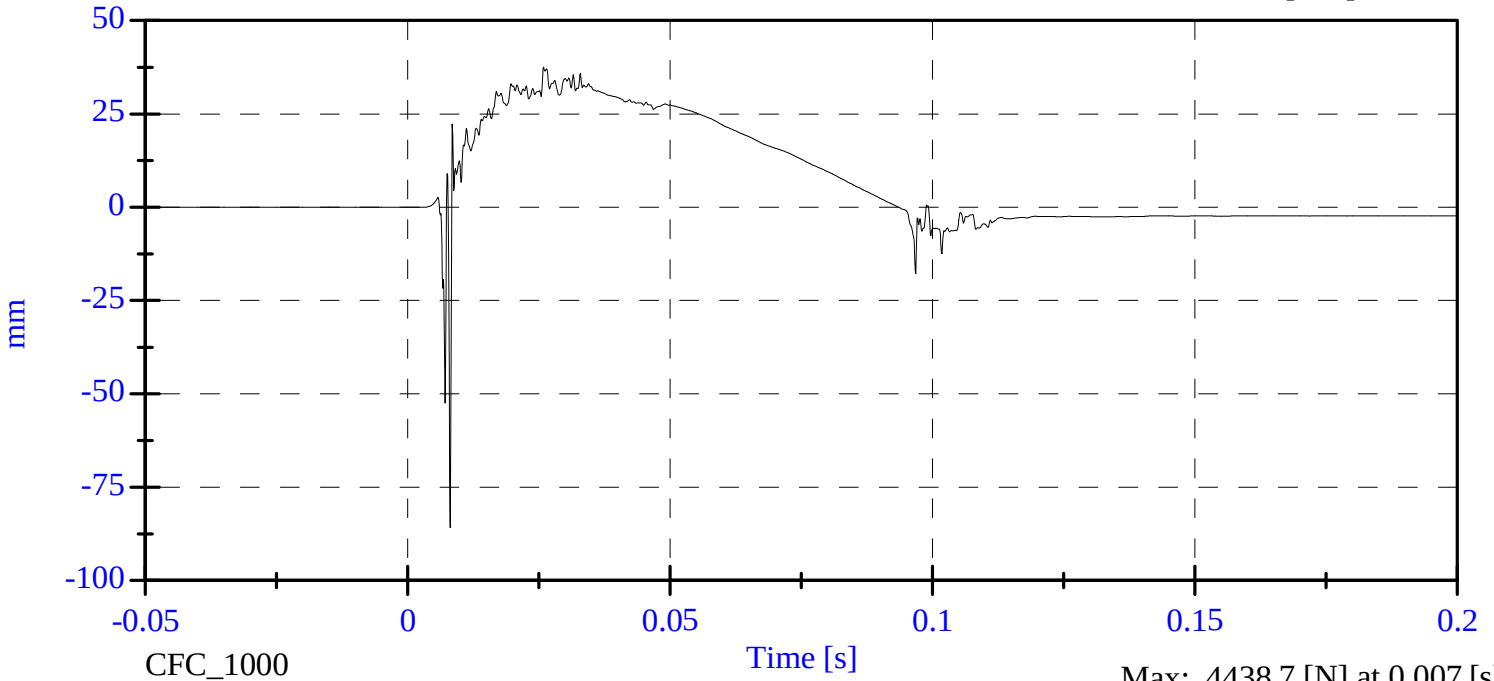
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.5 C	21.1 C	Passed
Lab Humidity:	10-70 %	40.00 %	Passed
Displacement:	33.00-40.00 mm	37.56 mm	Passed
Maximum Force:	3741.00-4448.00 N	4438.69 N	Passed

Shock High

Displacement vs. Time

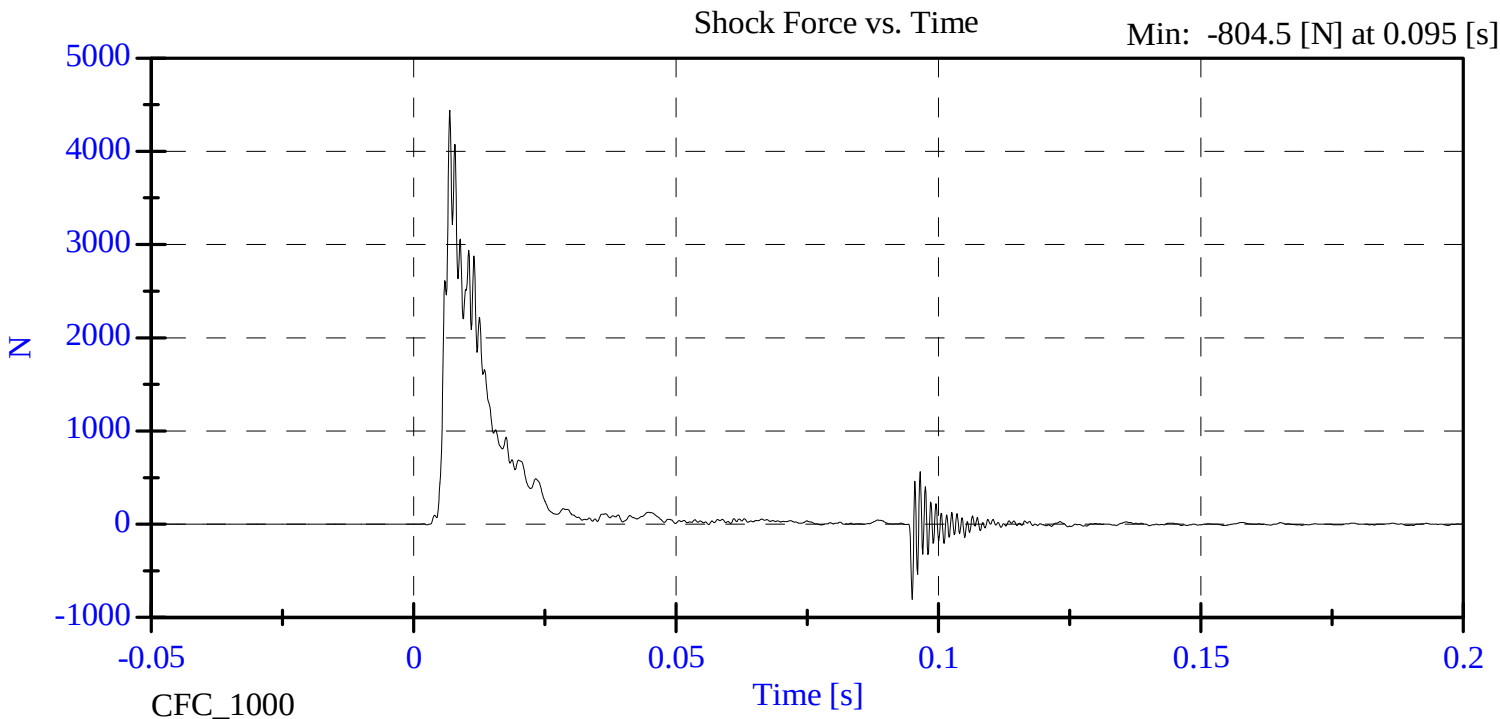
Max: 37.6 [mm] at 0.026 [s]

Min: -85.8 [mm] at 0.008 [s]



Max: 4438.7 [N] at 0.007 [s]

Min: -804.5 [N] at 0.095 [s]



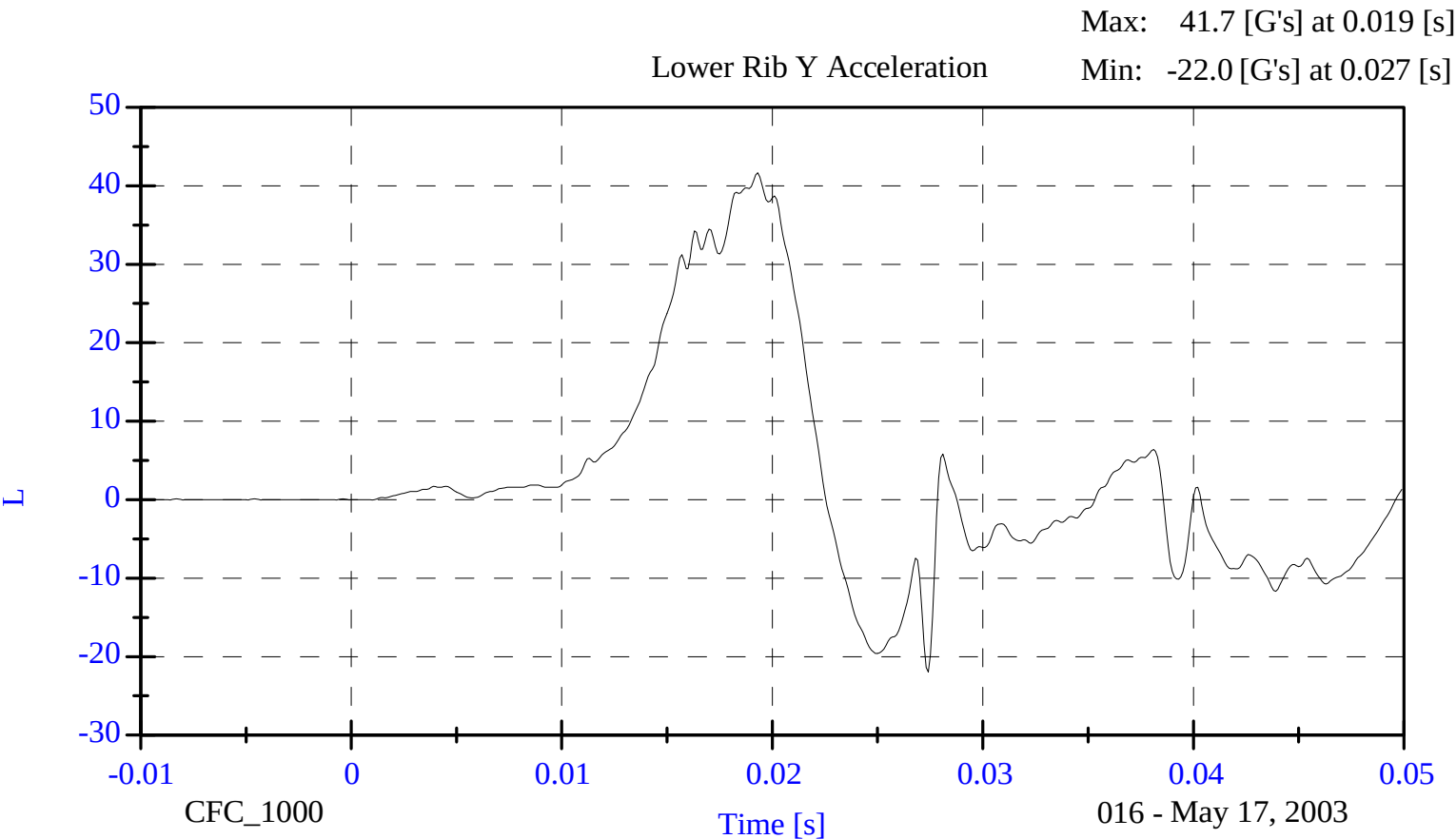
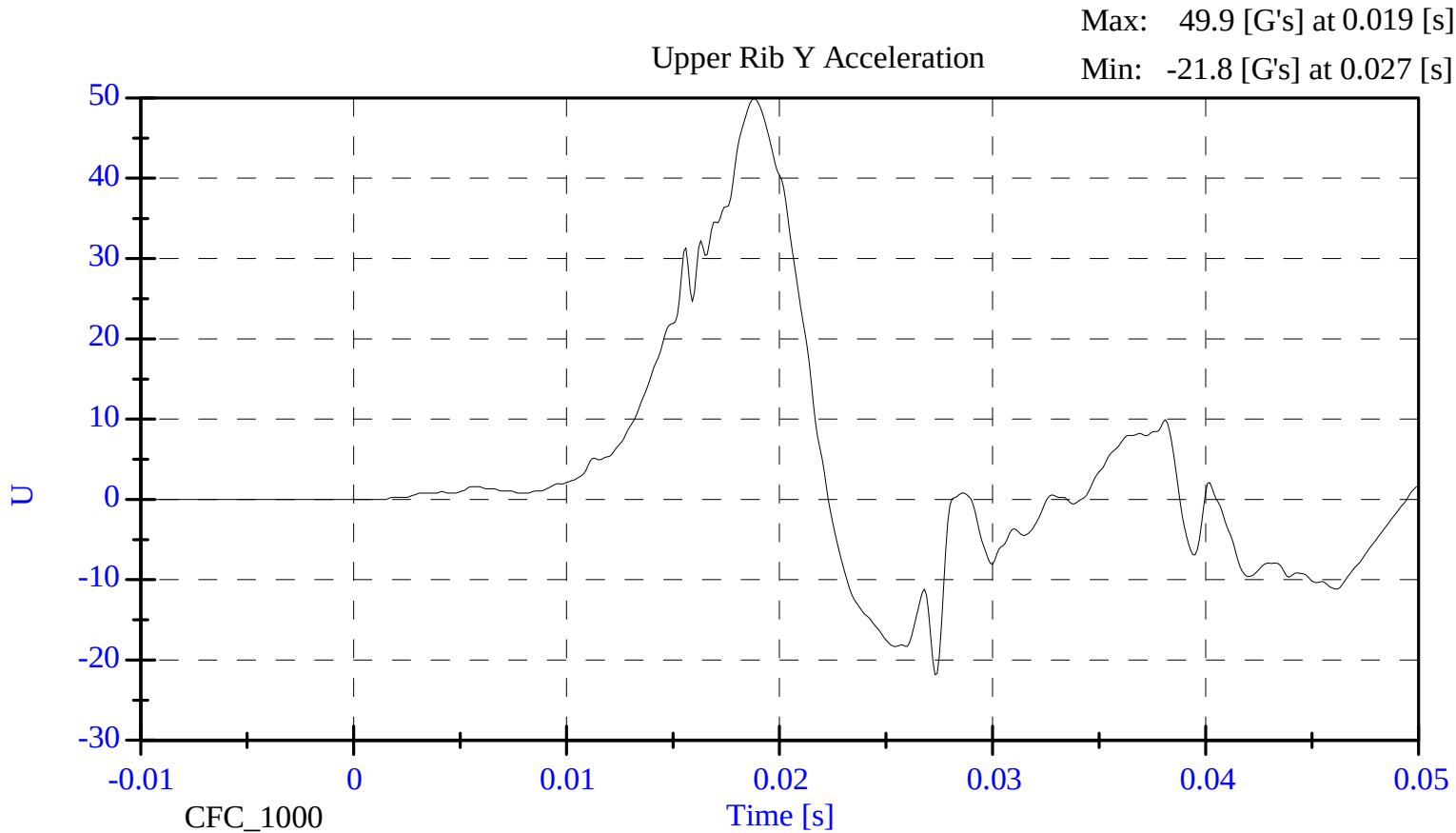
**LATERAL THORAX IMPACT TEST
PRE-TEST**

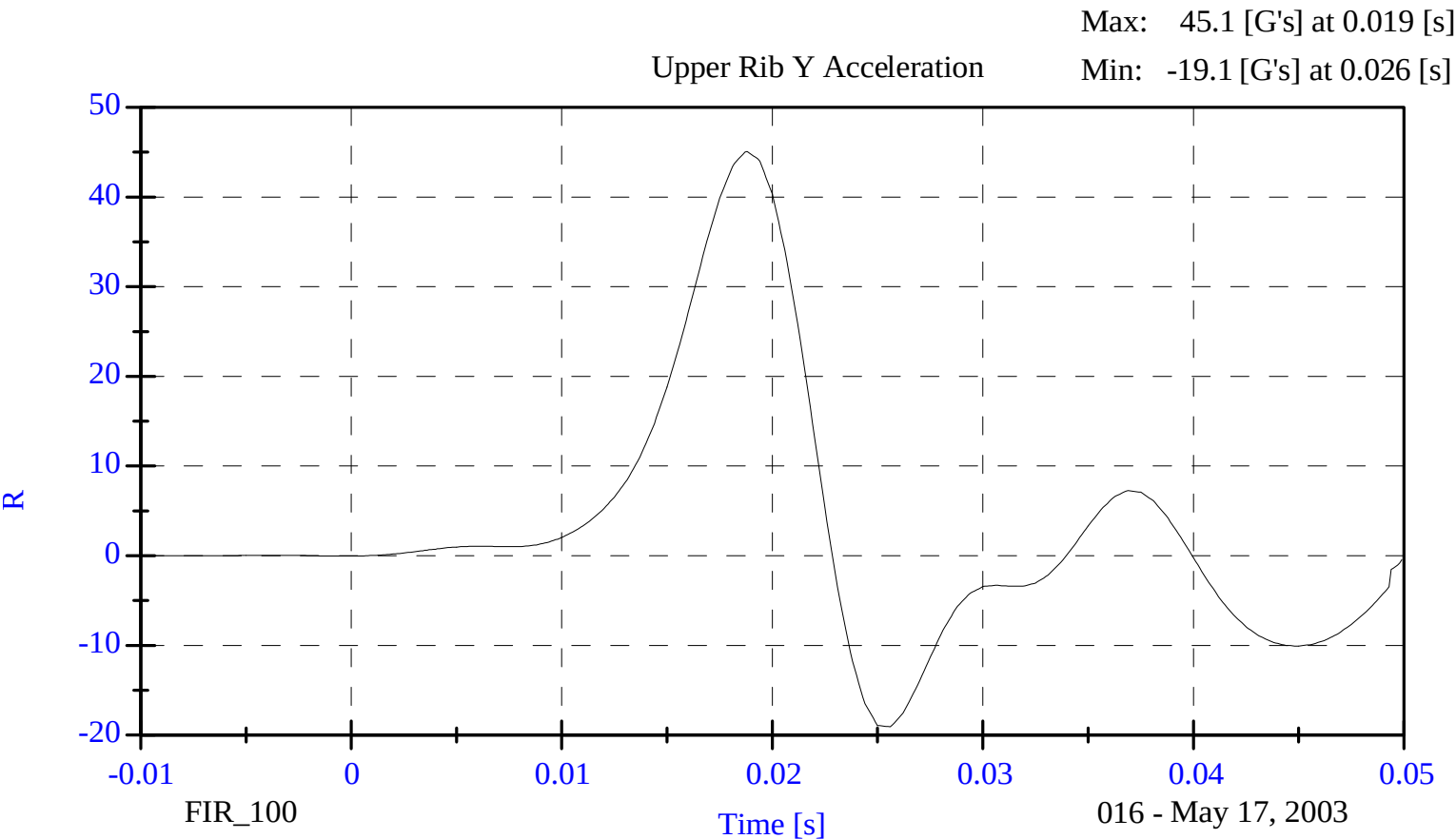
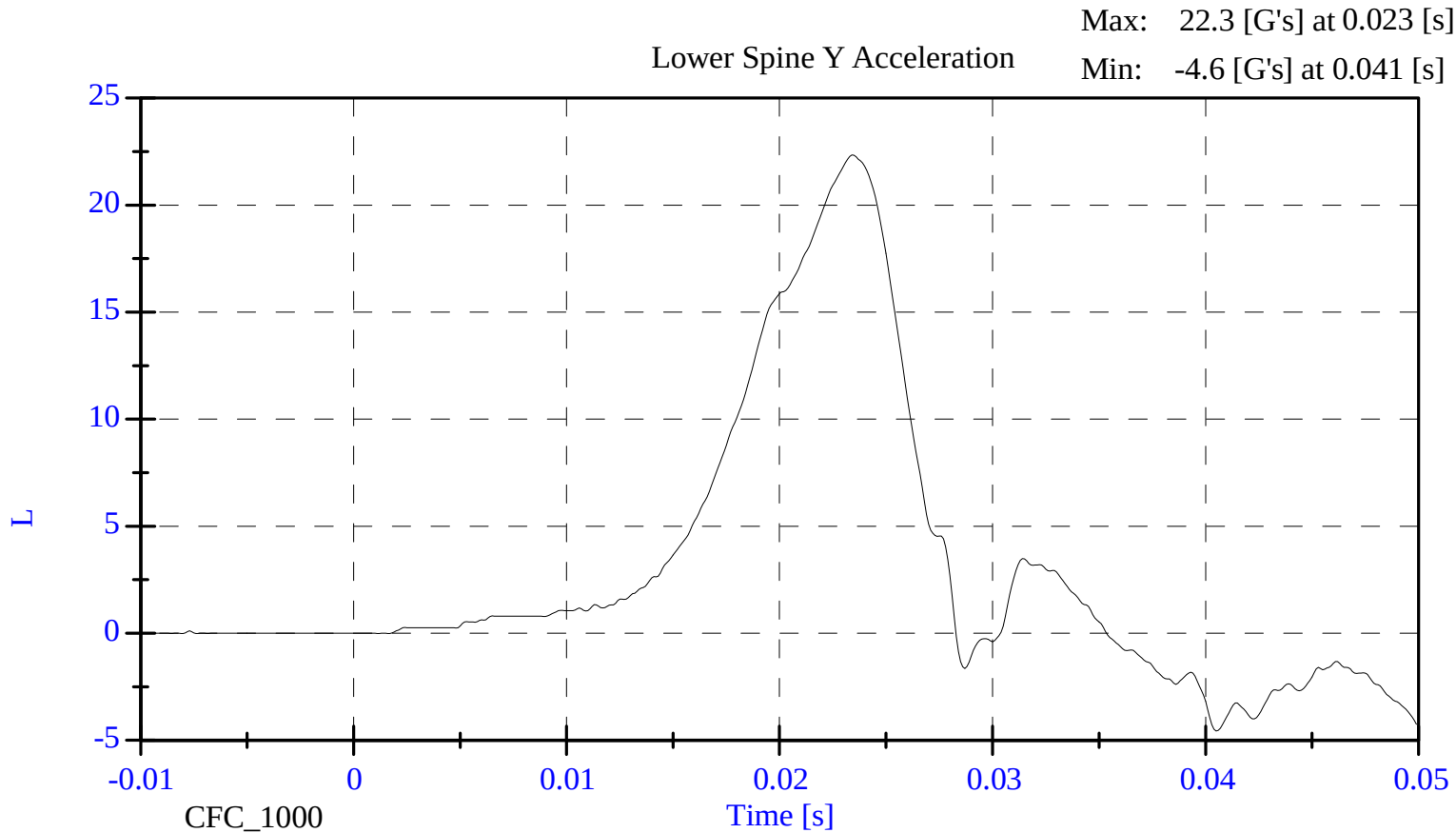
CONFIGURED FOR LEFT SIDE IMPACT

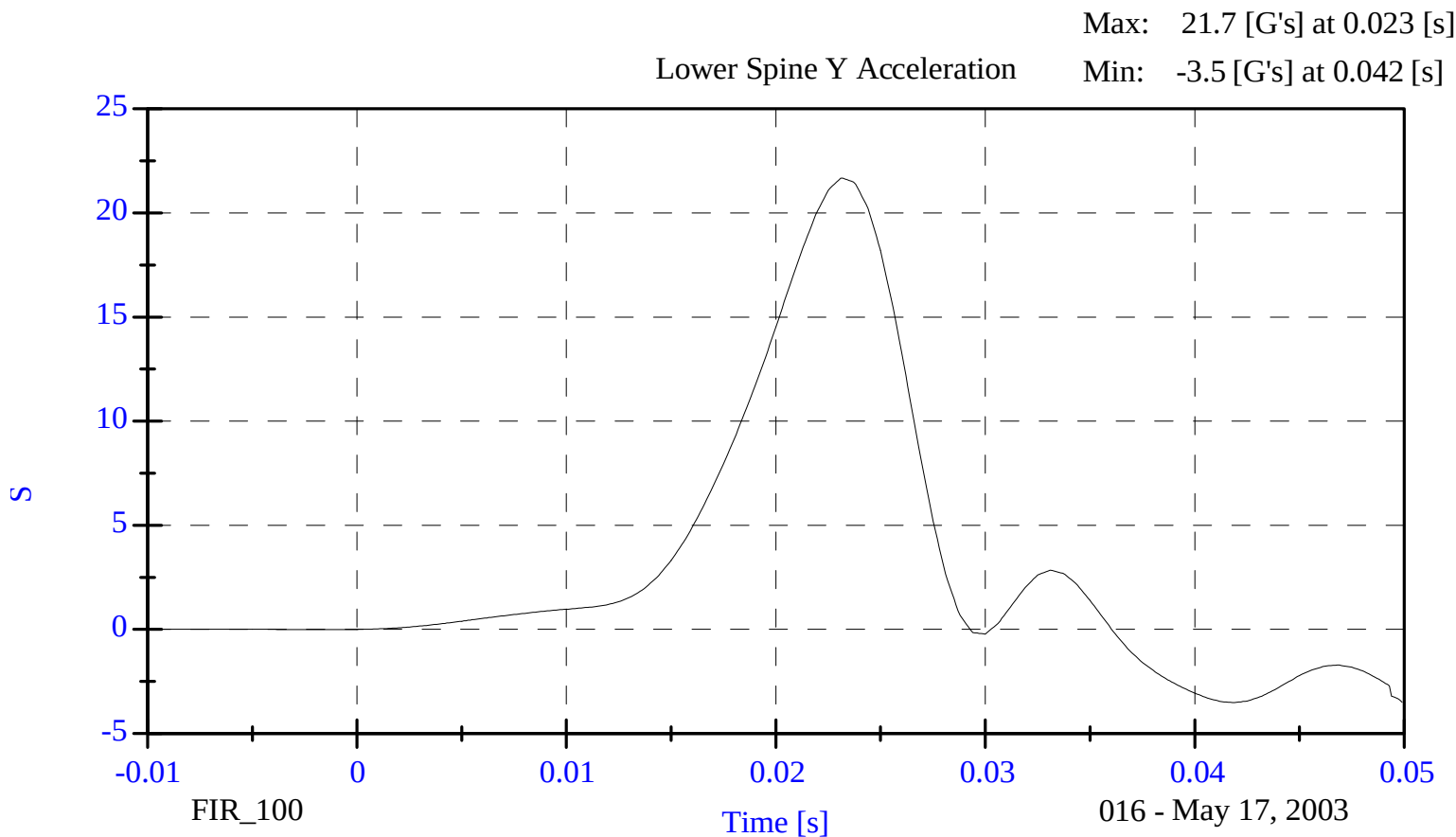
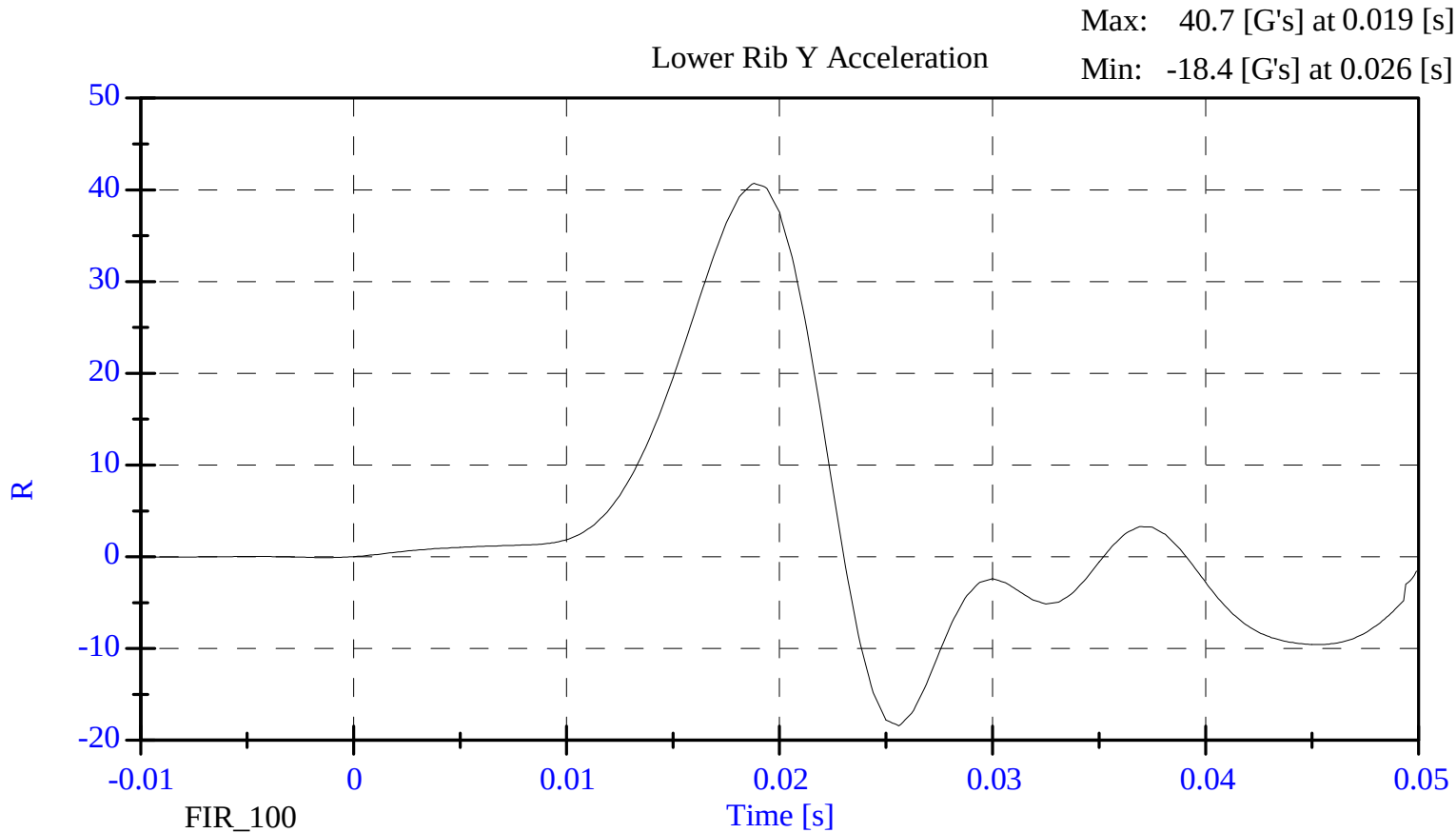
SID H3 Serial No.:	<u>016</u>	Sequential Test Number:	<u>4</u>
Date:	<u>May 17, 2003</u>	Laboratory Technician:	<u>B. Swiecicki</u>

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	34.00
PROBE SPEED (m/s)	4.27 - 4.33	4.27
UPPER RIB (g's)	37 - 46	45.06
LOWER RIB (g's)	37 - 46	40.71
LOWER SPINE (g's)	15 - 22	21.67

REMARKS: None







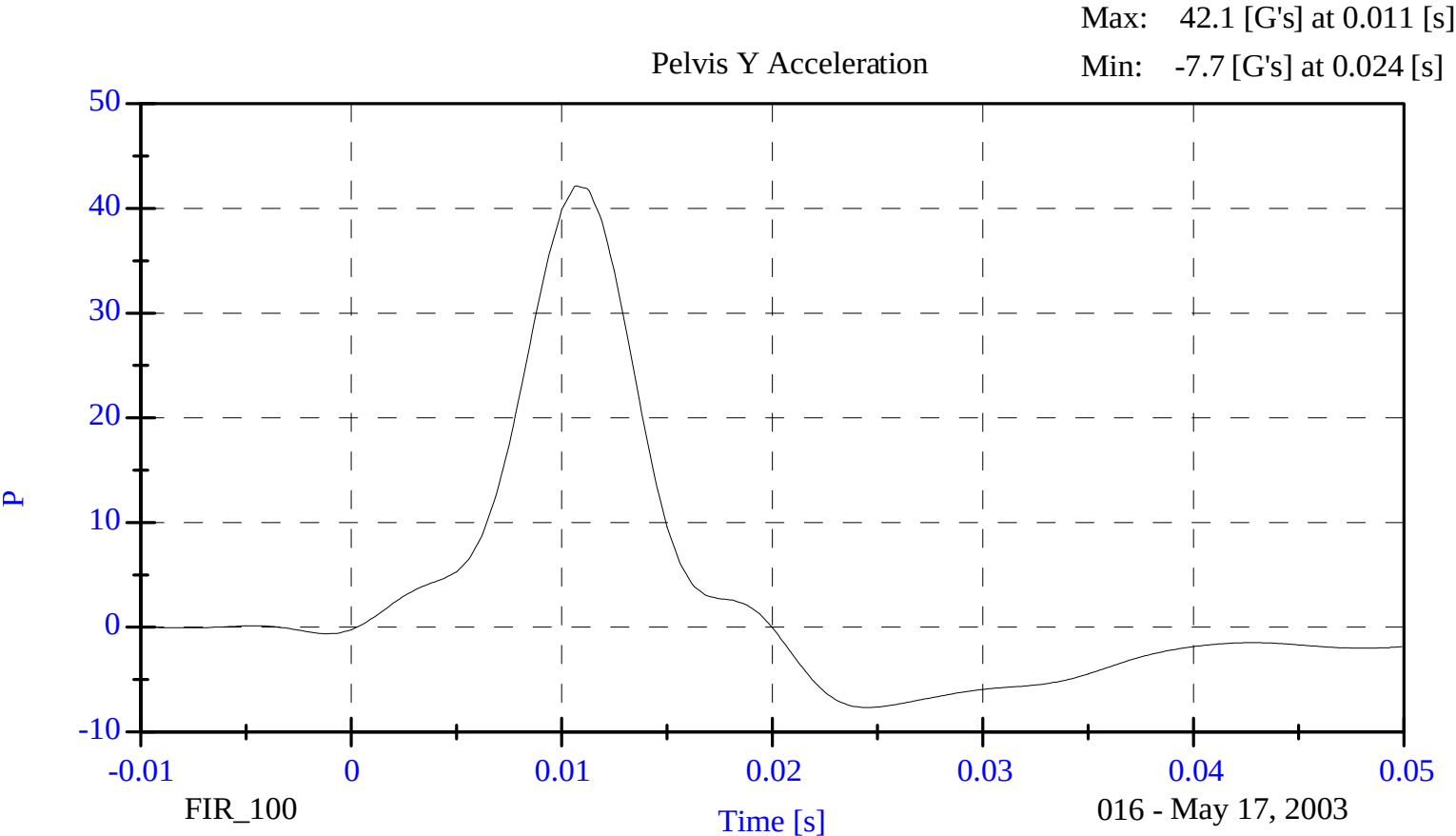
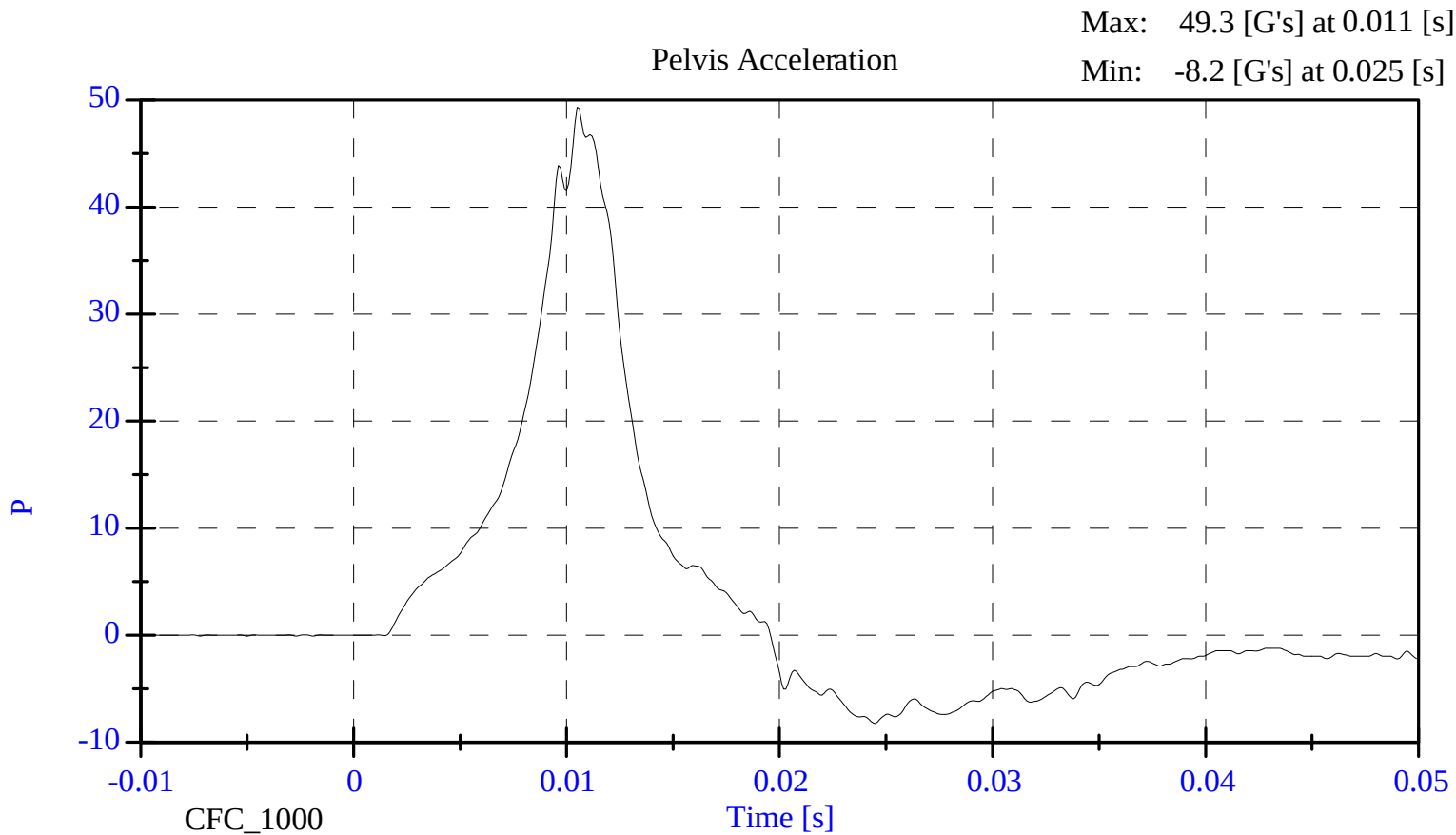
**LATERAL PELVIS IMPACT TEST
PRE-TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.:	<u>016</u>	Sequential Test Number:	<u>4</u>
Date:	<u>May 17, 2003</u>	Laboratory Technician:	<u>B. Swiecicki</u>

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	34.00
PROBE SPEED (m/s)	4.27 - 4.33	4.28
PELVIS ACCELERATION (g's)	40 - 60	42.13

REMARKS: None



**HEAD DROP TEST
PRE-TEST**
(Test not required for SID certification)

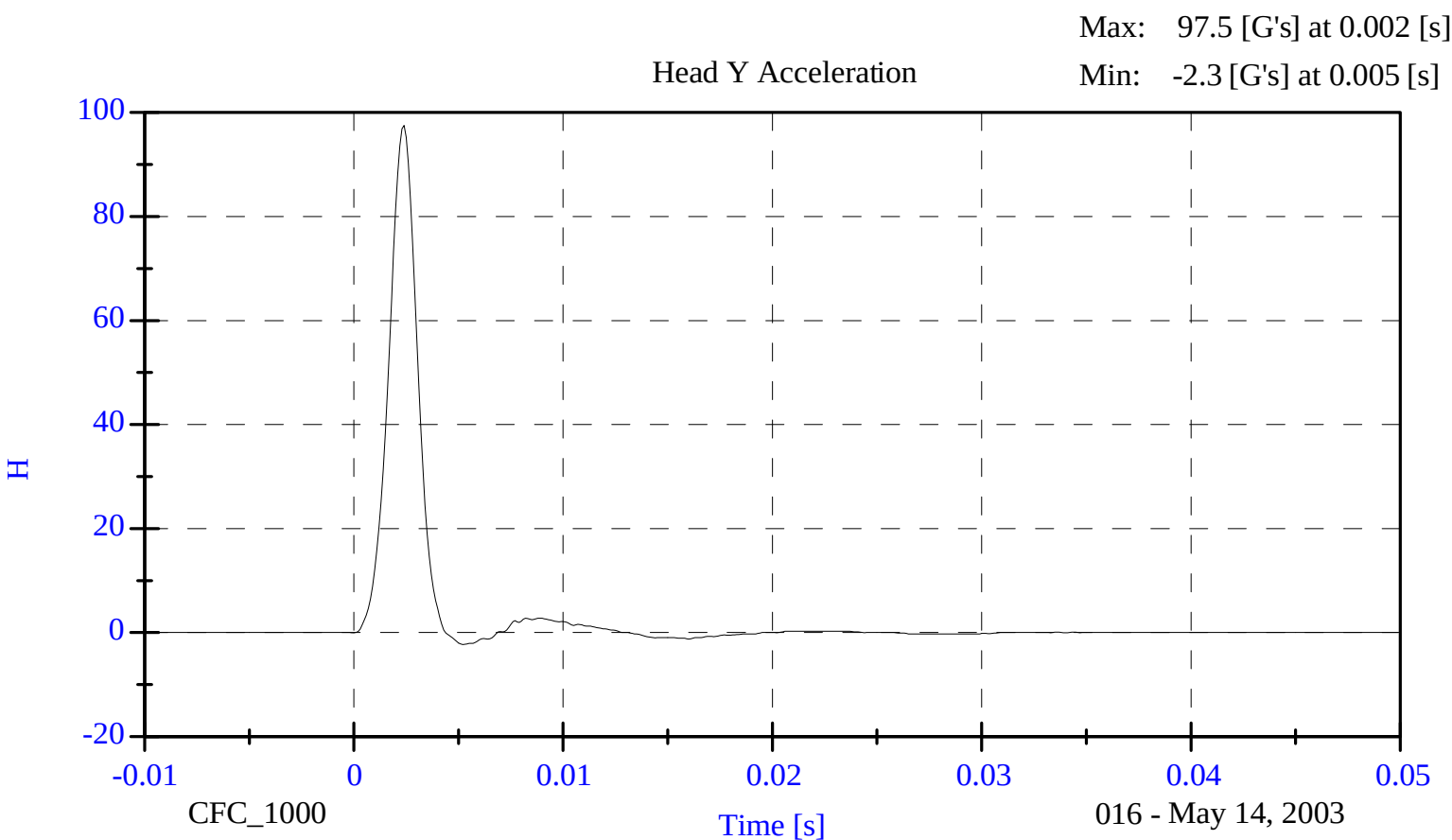
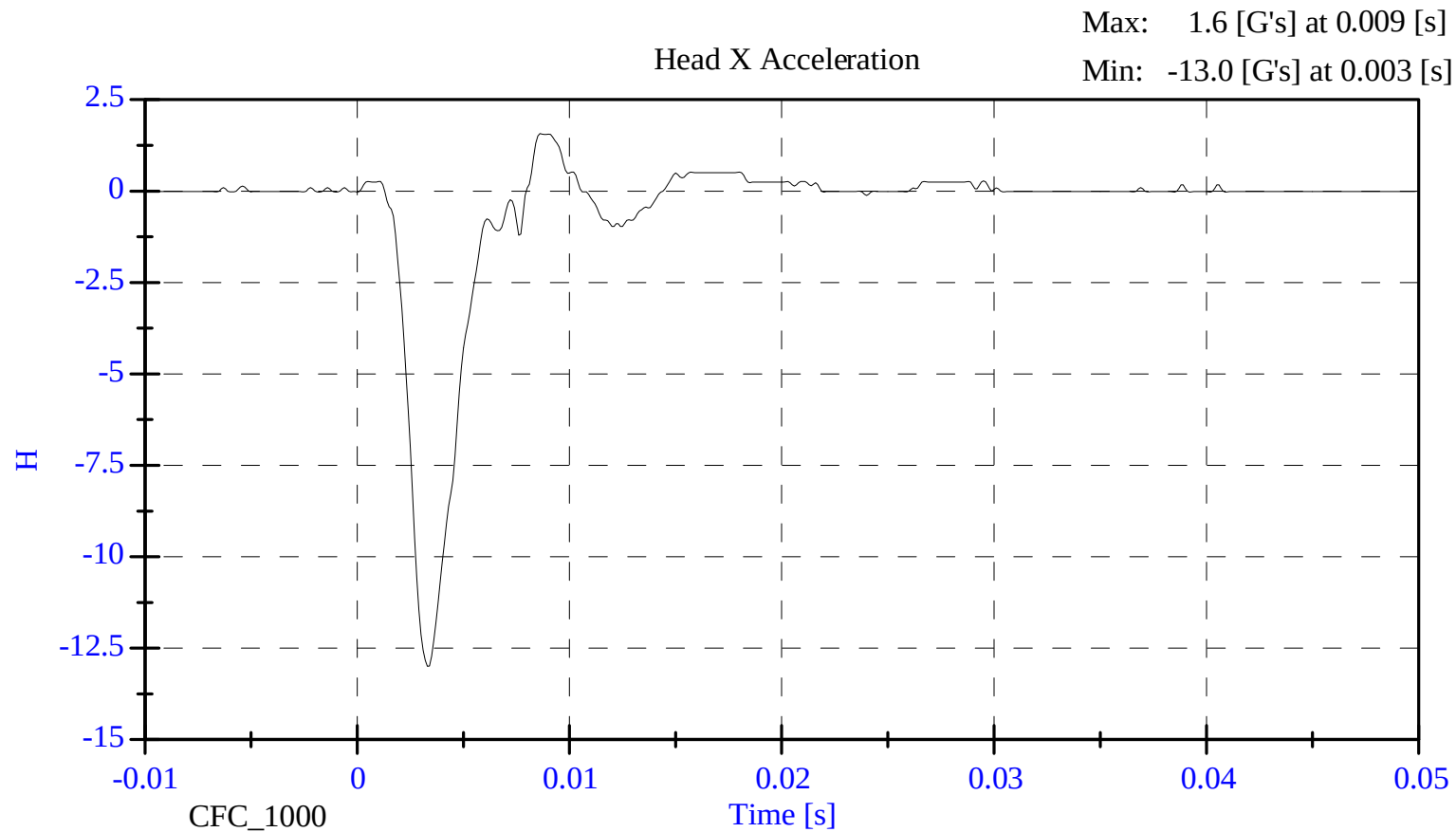
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016 Sequential Test Number: 4
Date: May 14, 2003 Laboratory Technician: B. Swiecicki

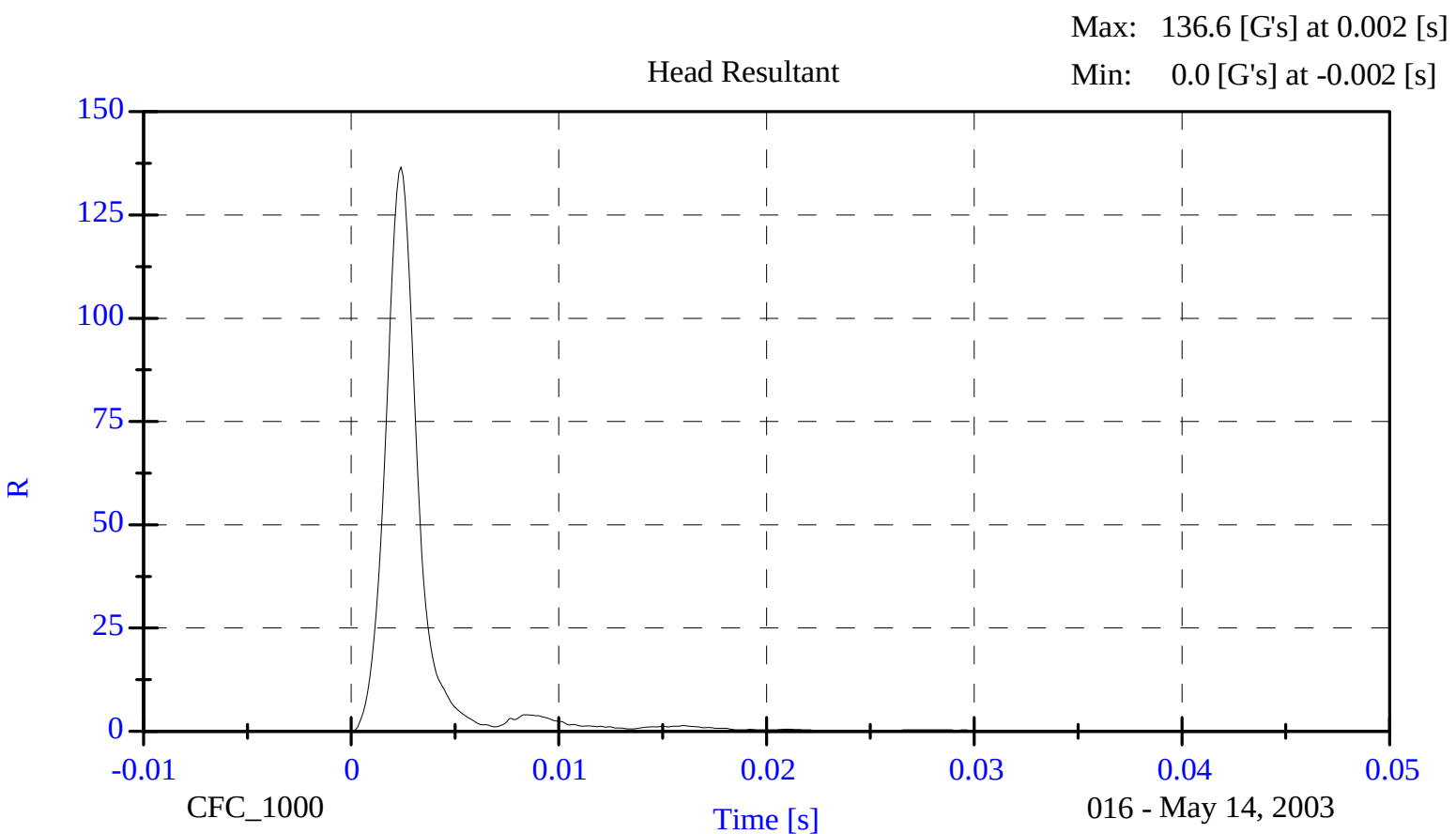
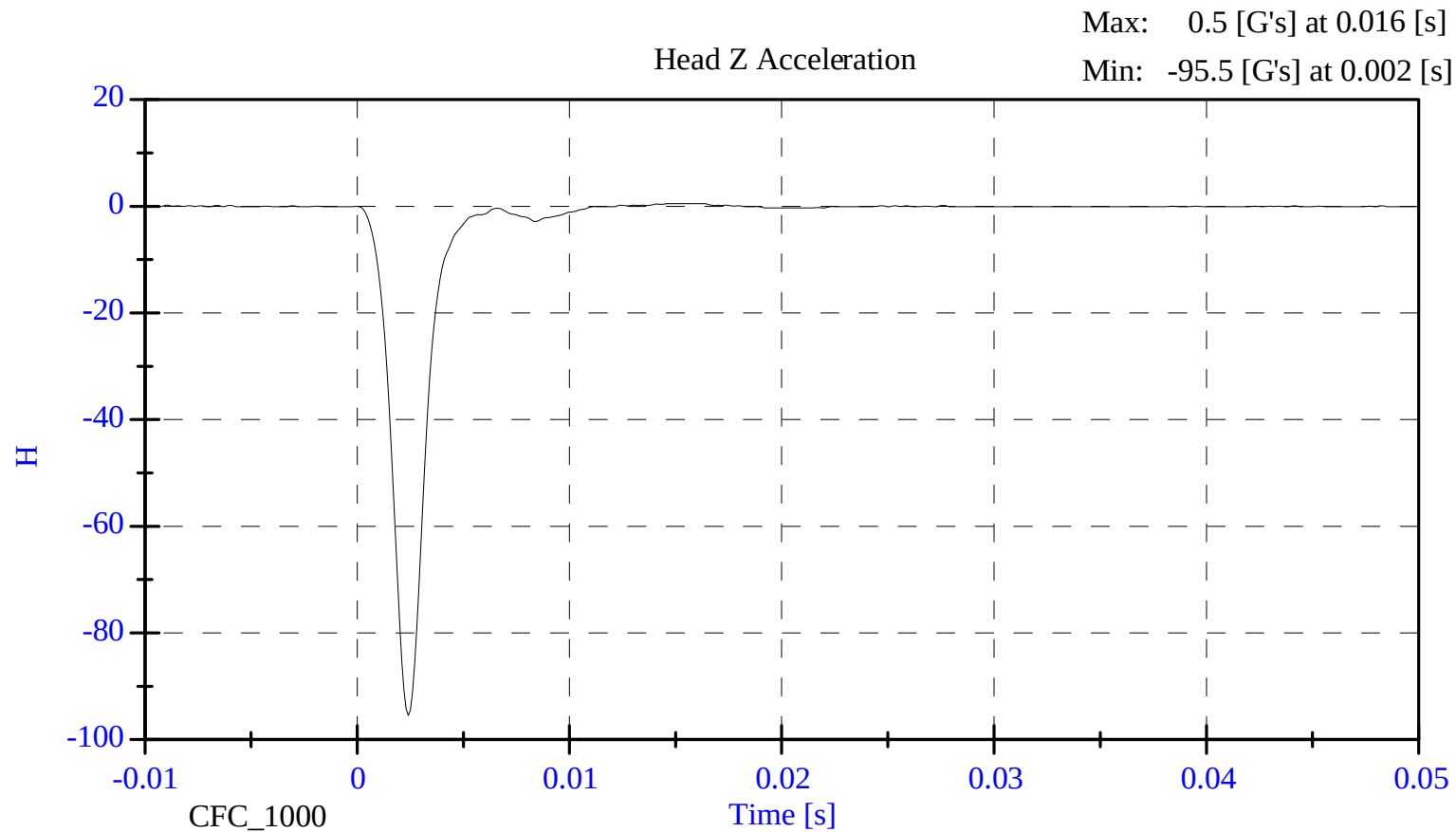
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 – 22.2	21.1
RELATIVE HUMIDITY (%)	10 – 70	40
PEAK RESULTANT ACCELERATION (Gs)	120 – 150	136.63
PEAK LATERAL ACCELERATION (Gs)	Not to Exceed 15	1.57
CURVE PERCENT NONMODAL (%)	< 15	2.97

REMARKS: None

Head Drop



016 - May 14, 2003



**LATERAL NECK BENDING TEST
PRE-TEST**

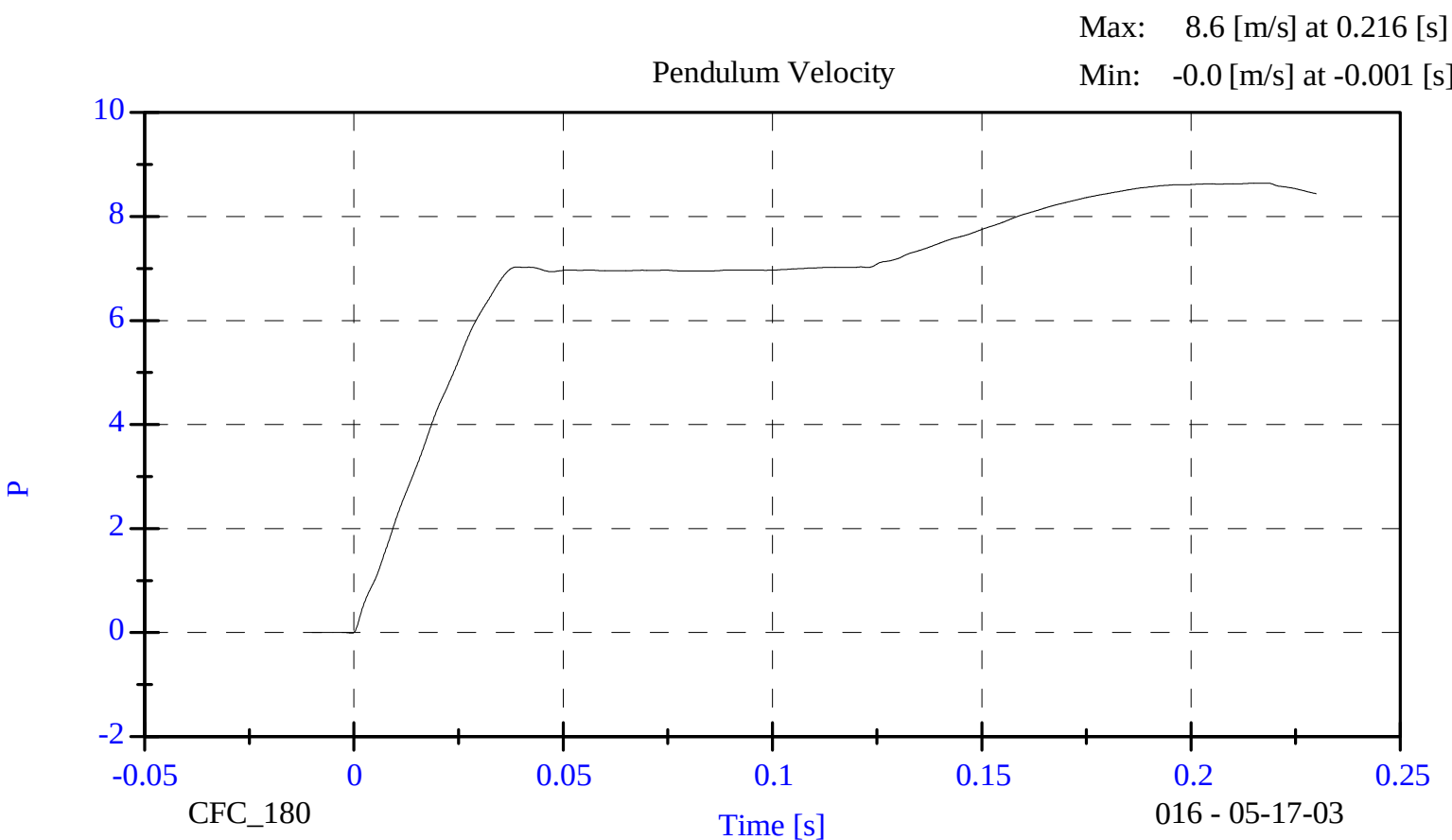
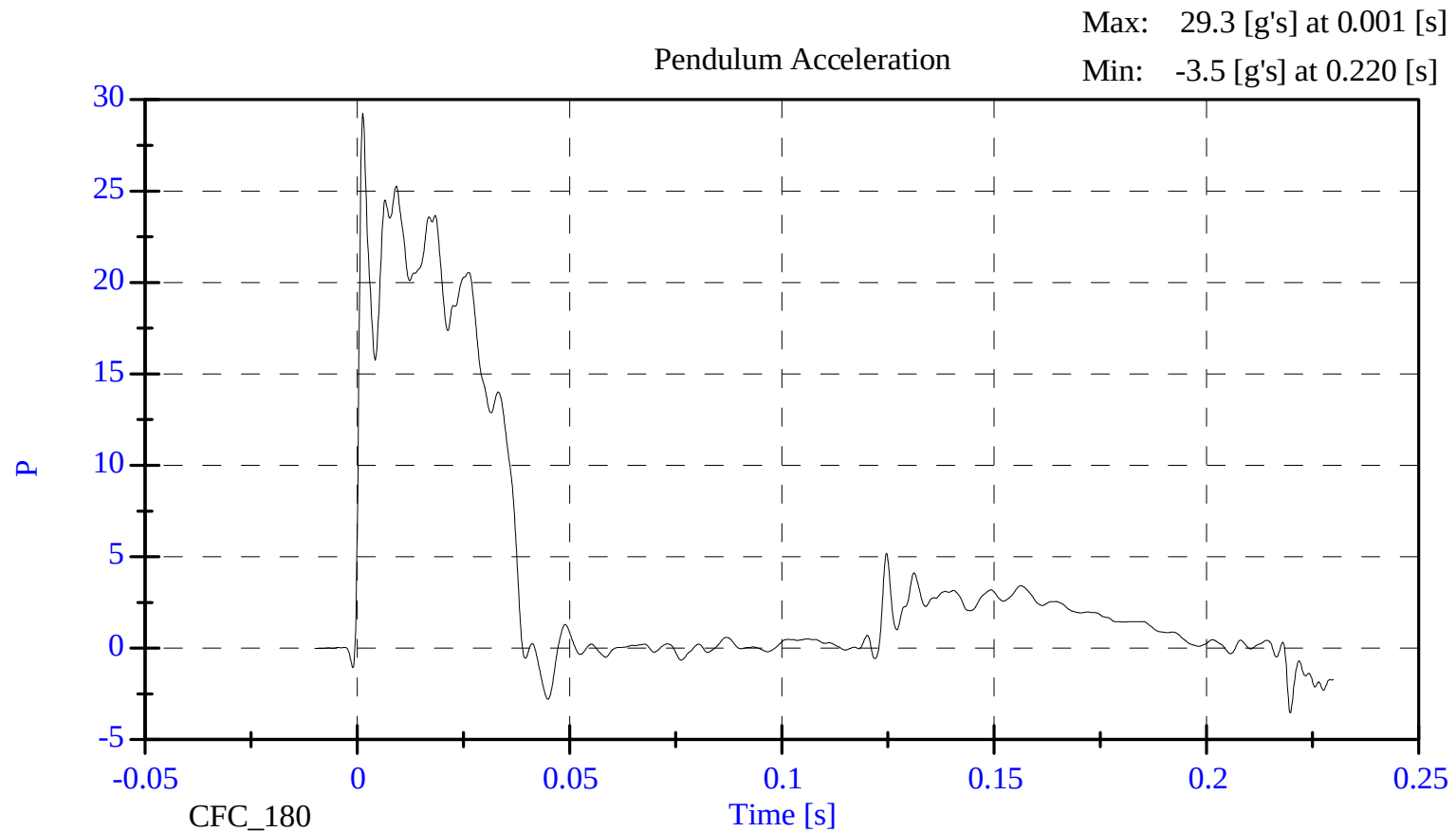
(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

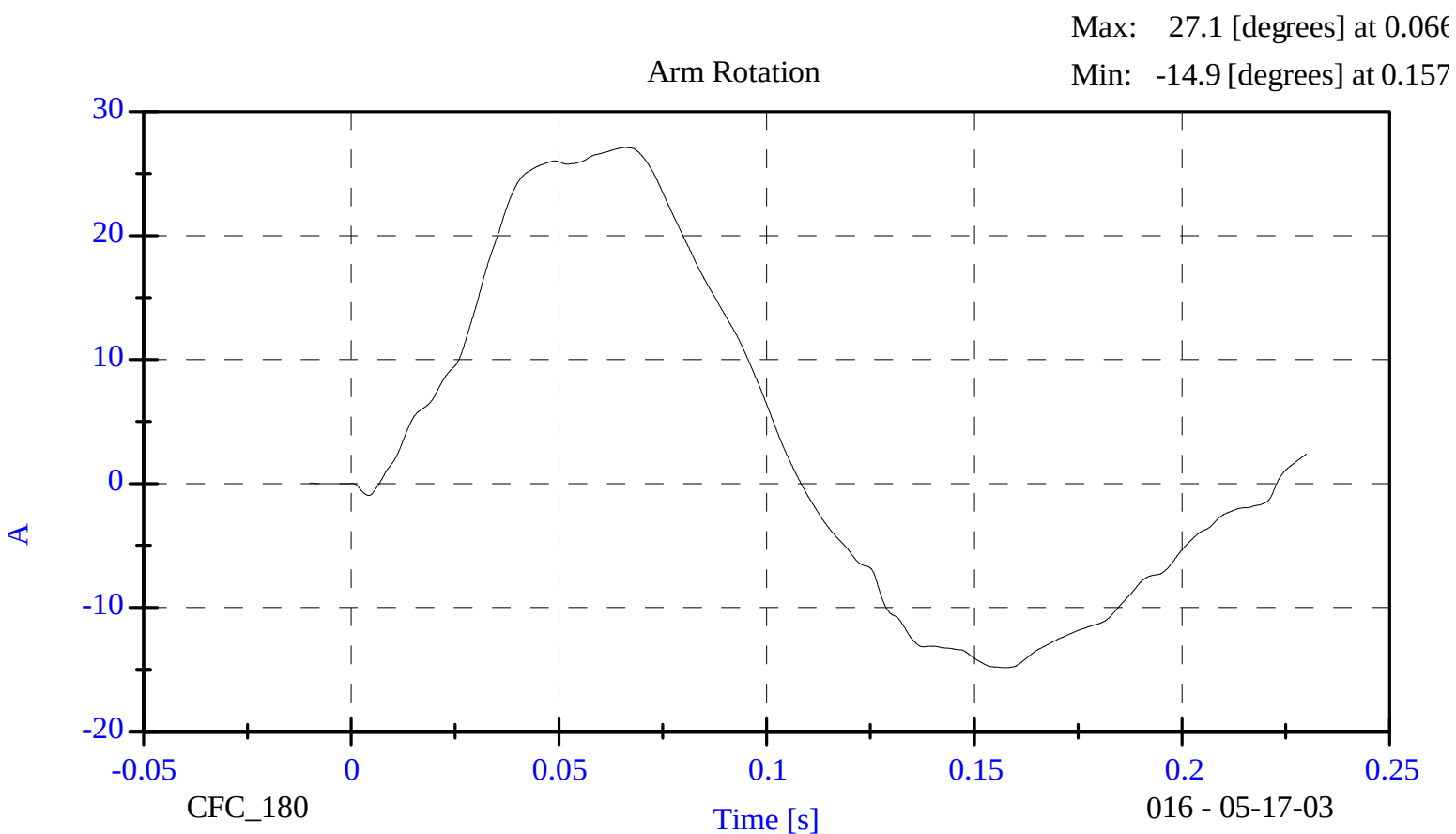
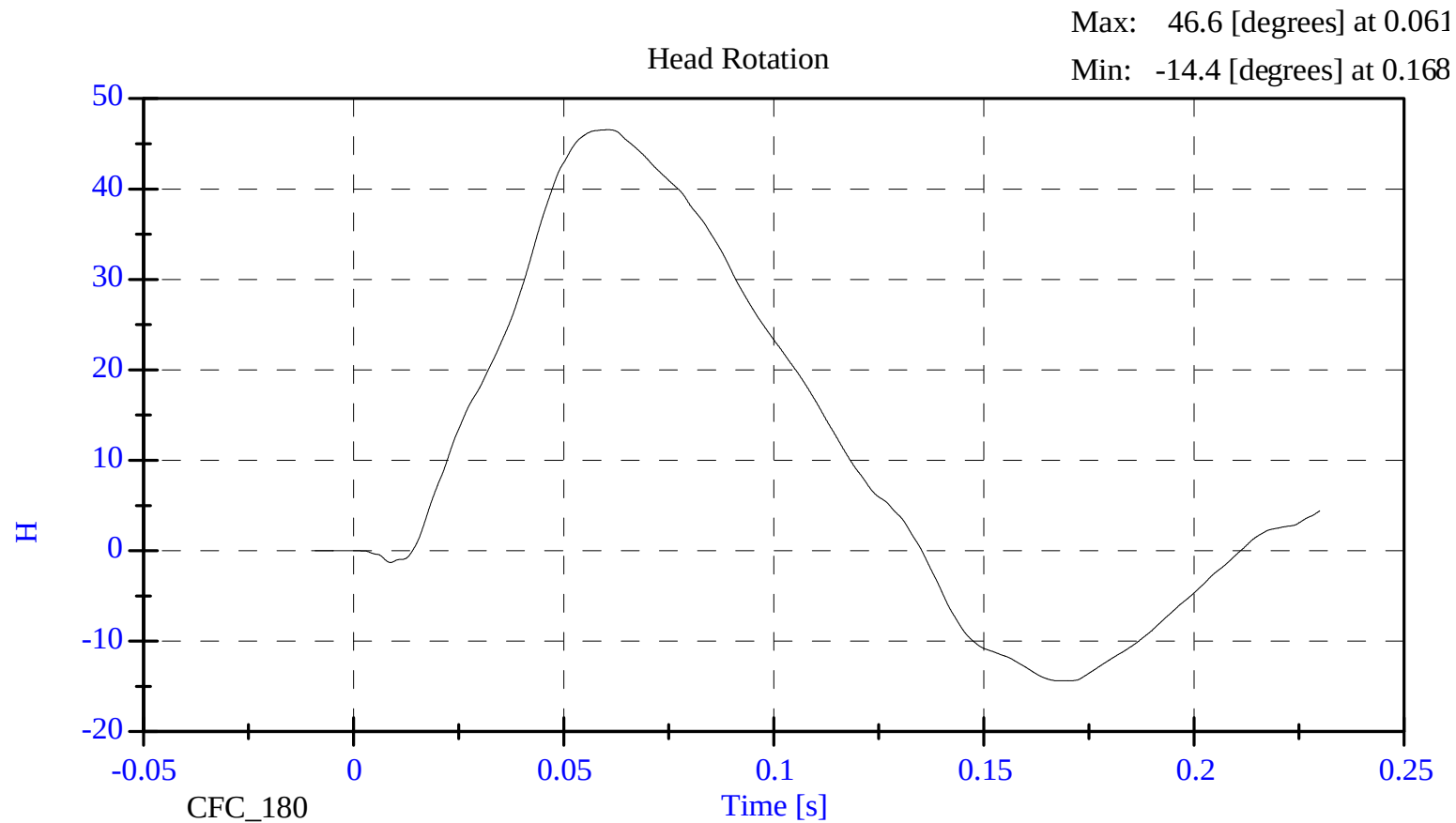
SID Serial No.:	<u>016</u>	Sequential Test Number:	<u>4</u>
Date:	<u>May 17, 2003</u>	Laboratory Technician:	<u>B. Swiecicki</u>

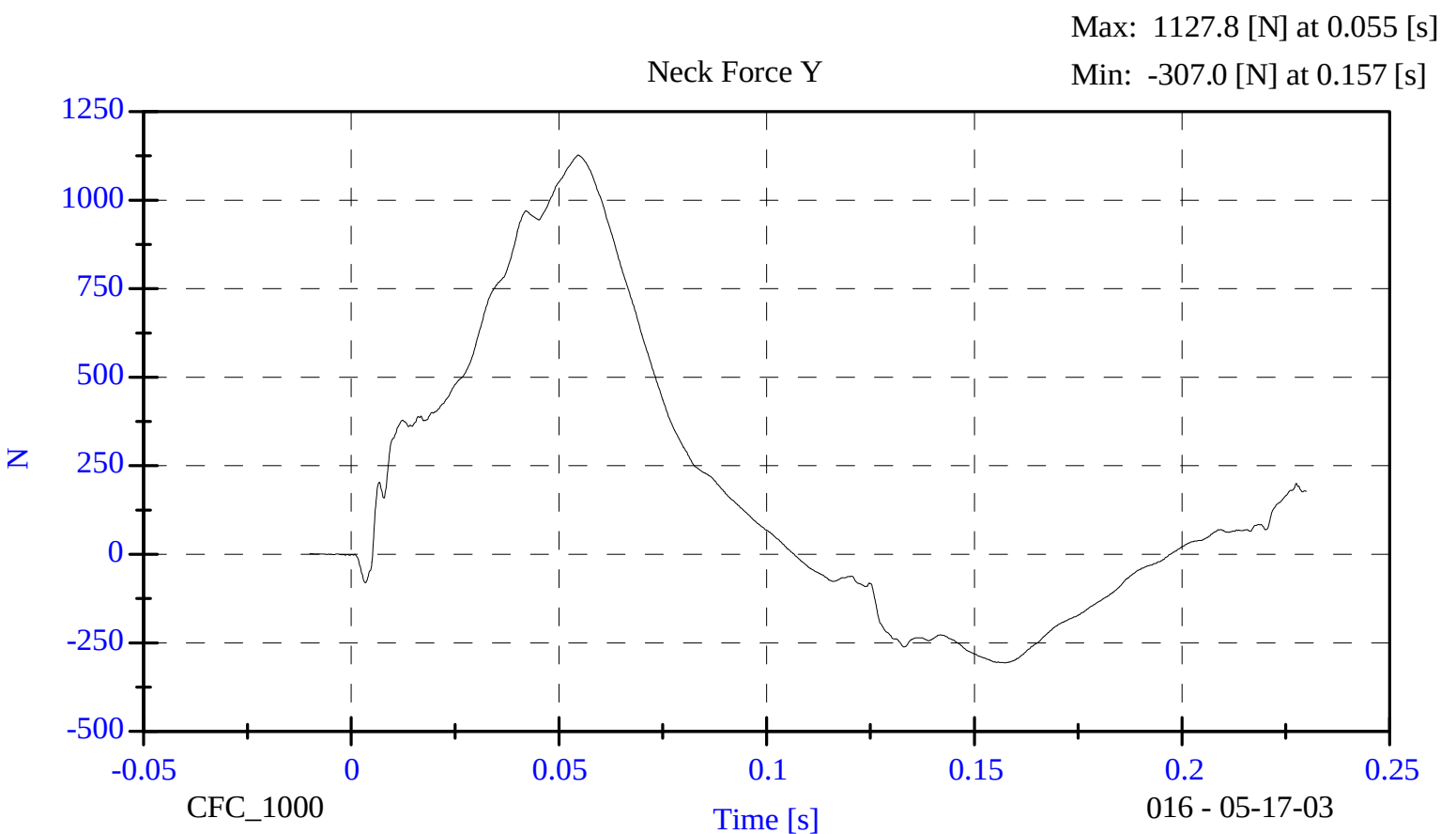
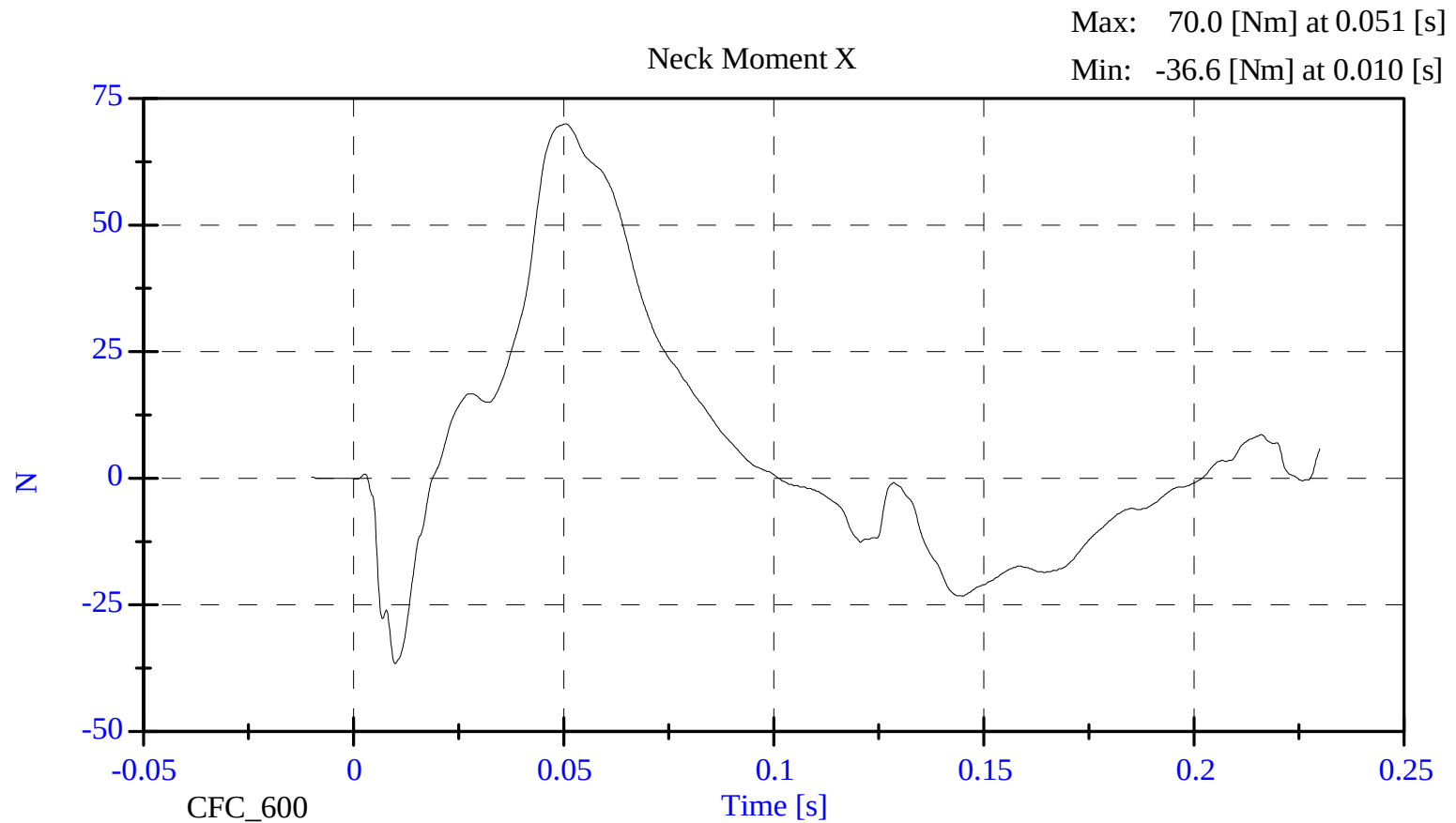
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 - 22.2	21.1
RELATIVE HUMIDITY (%)	10 - 70	33.0
IMPACT VELOCITY (m/s)	6.89 – 7.13	6.88
PENDULUM DELTA V		
DELTA V @ 10 ms (m/s)	1.96 – 2.55	2.16
DELTA V @ 20 ms (m/s)	4.12 – 5.10	4.31
DELTA V @ 30 ms (m/s)	5.73 – 7.01	6.12
DELTA V @ 40-70 ms (m/s)	6.27 – 7.64	7.03
D PLANE ROTATION		
MAXIMUM ROTATION (deg)	64 – 78	73.29
ROT. ANGLE TIME to ZERO (ms)	50 – 70	61.50
MOMENT ABOUT THE OCCIPITAL CONDYLE		
MAX OCCIPITAL MOMENT (Nm)	88 – 108	88.85
OCCIPITAL MOMENT DECAY (ms)	40.0 – 60.0	52.00
HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT		
ROTATION wrt MOMENT (ms)	0 – 20	11.10

REMARKS: None

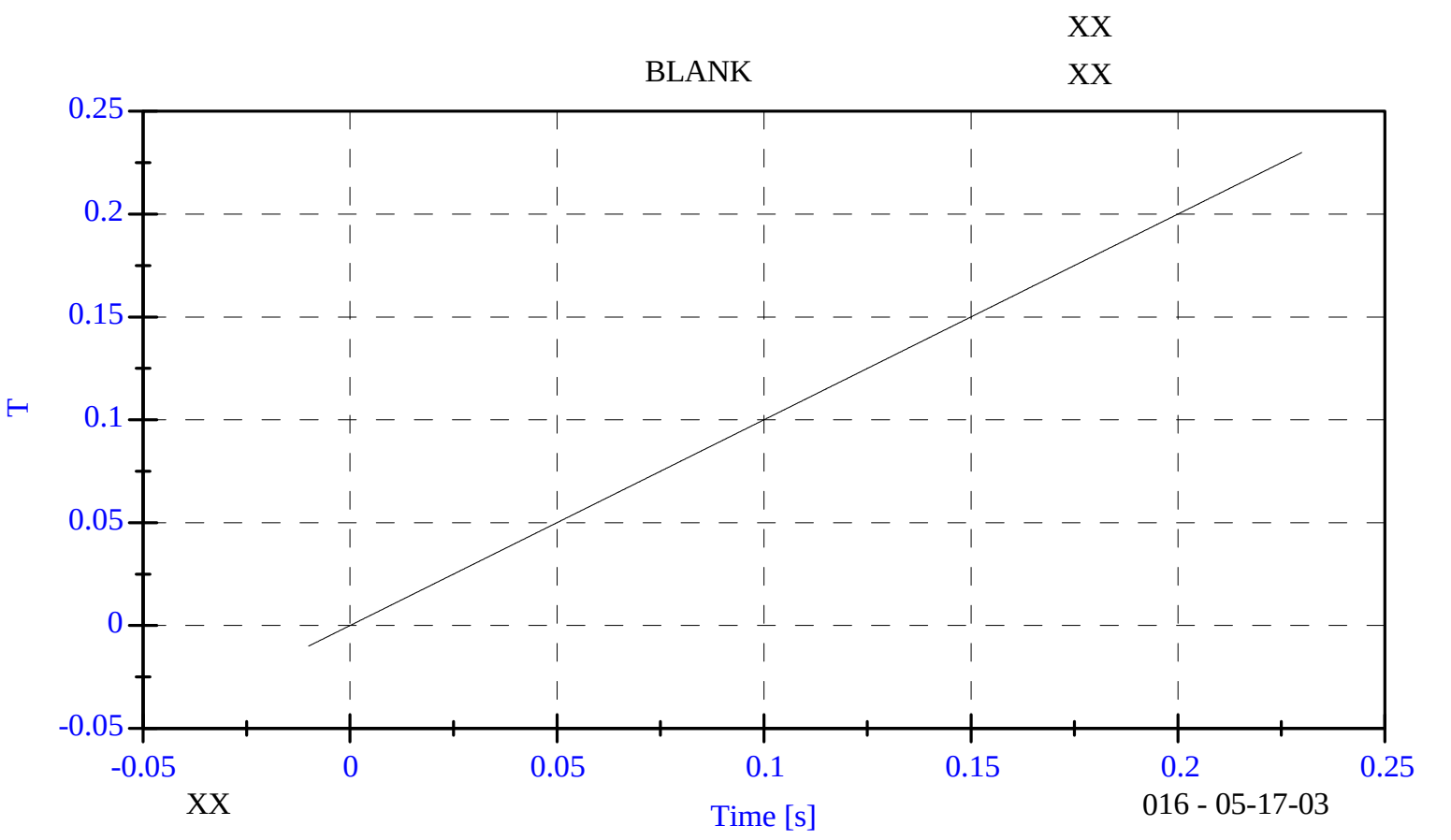
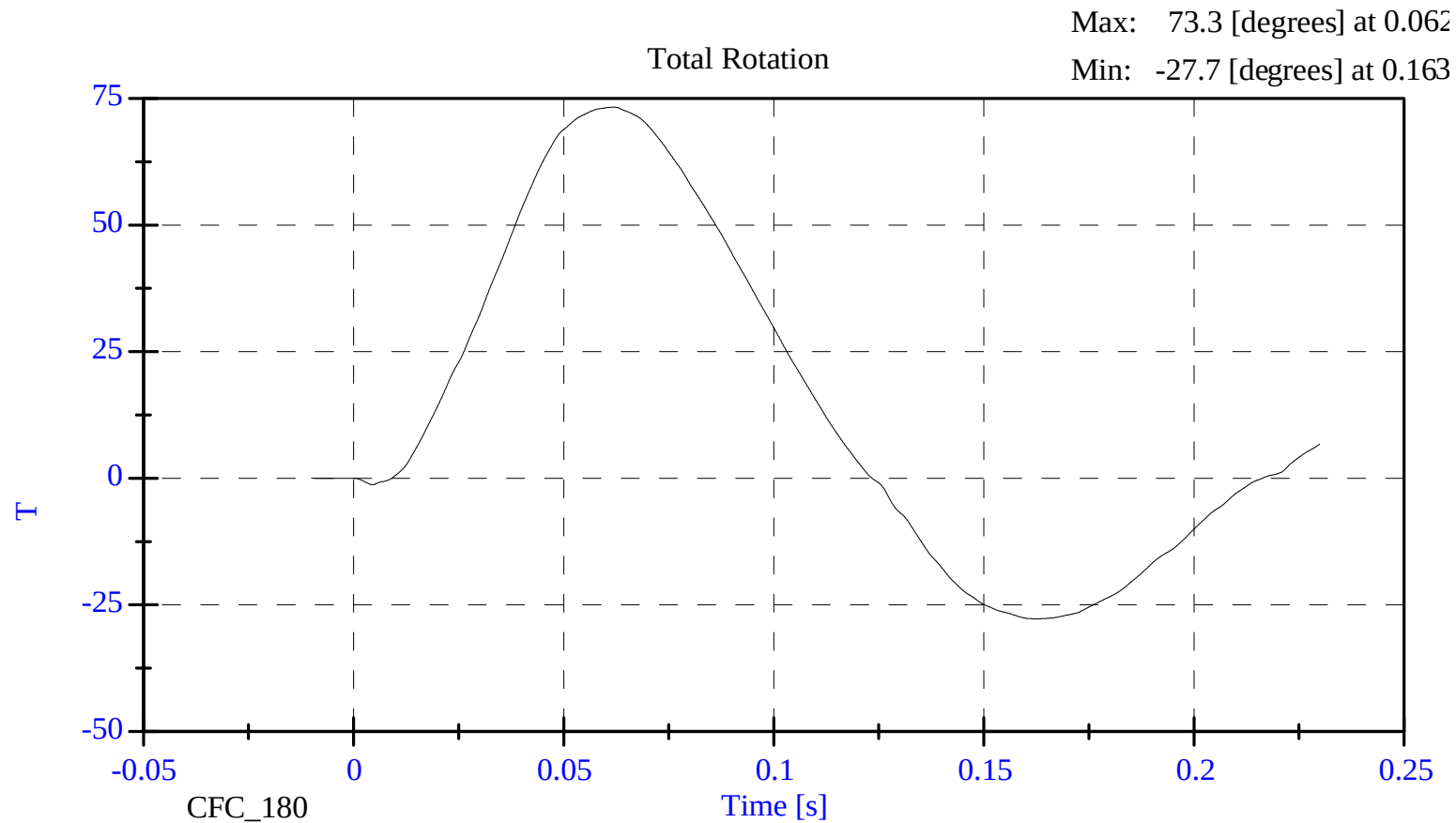


016 - 05-17-03





016 - 05-17-03



**ABDOMINAL COMPRESSION TEST
PRE-TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.7
RELATIVE HUMIDITY (%)	10 - 70	33.00
FORCE @ 13 mm (N)	104 - 162	124.6
FORCE @ 19 mm (N)	163 - 221	191.3
FORCE @ 25 mm (N)	222 - 280	262.4
FORCE @ 33 mm (N)	325 - 391	371.4

REMARKS: None

Dummy S/N 016

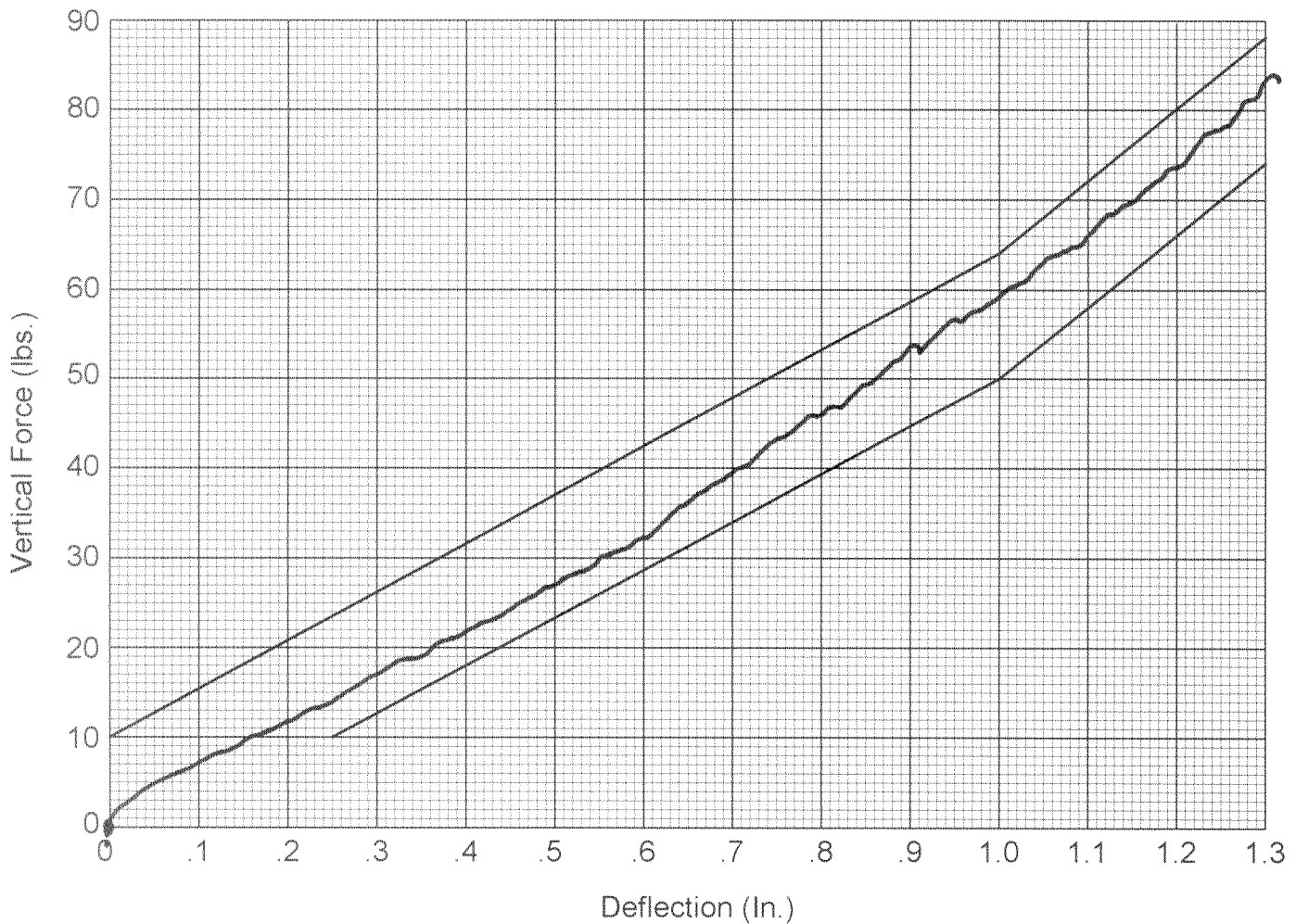
W/A _____

Date 5-17-03

Performed By [Signature]

Temp. 71°

Humidity 33%



Hybrid II
Abdomen Static Press

LUMBAR FLEXION TEST
PRE-TEST
(Test not required for SID certification)

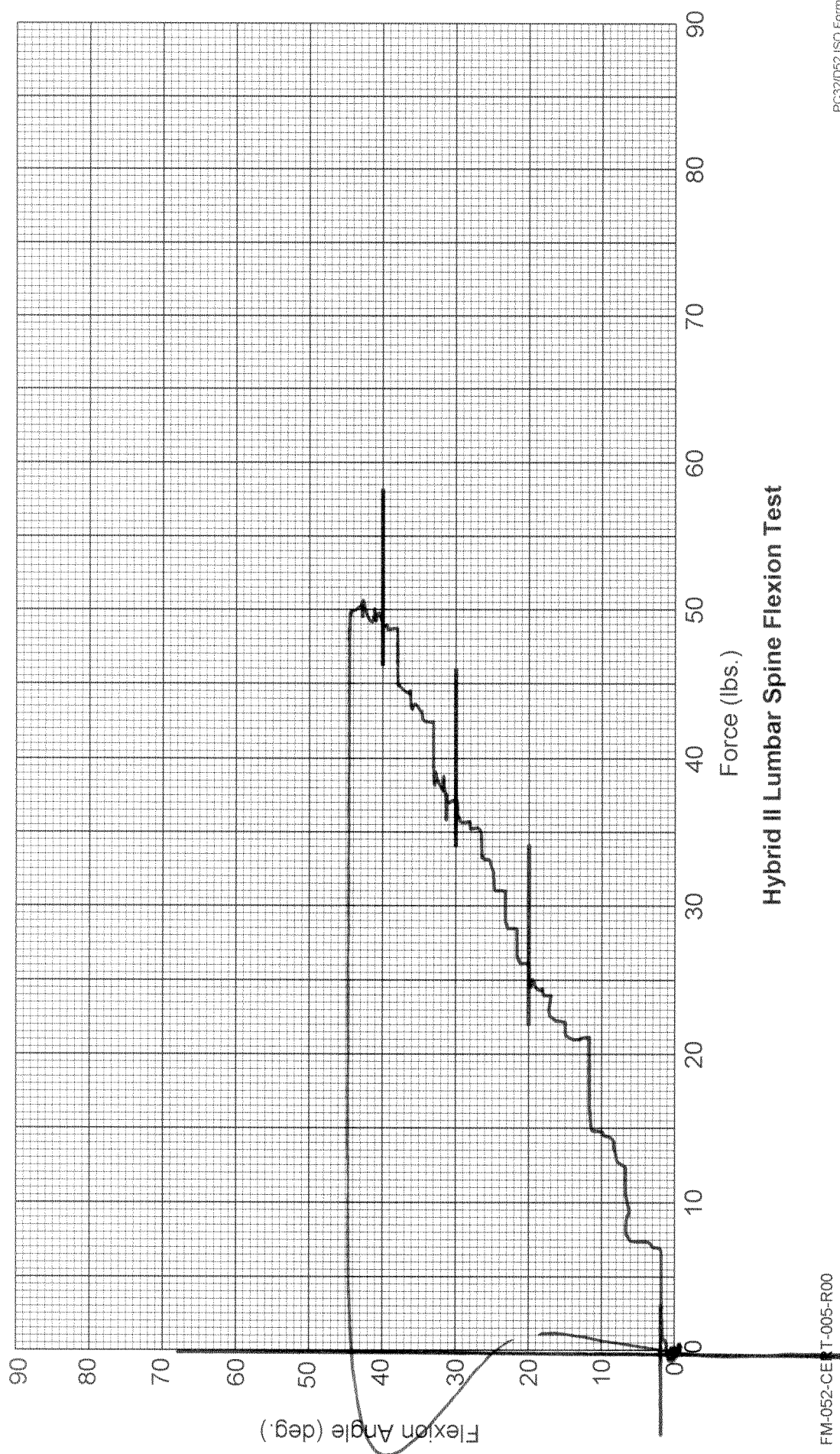
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 4
Date: May 17, 2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.7
RELATIVE HUMIDITY (%)	10 - 70	33.00
FORCE @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	111.2
FORCE @ 30° (N)	151.2 - 204.6	166.8
FORCE @ 40° (N)	204.6 - 258	220.2
RETURN ANGLE	12° max.	3°

REMARKS: None

Dummy S/N 016
W/A _____
Date 5-17-03
Performed By [Signature]
Temp. 71°
Humidity 33%



PRE-TEST DUMMY INSPECTION LIST
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 4
 Date: May 17, 2003 Laboratory Technician: B. Swiecicki

PART	ITEMS CHECKED	COMMENTS
SKIN	VISUAL INSPECTION	OK
HEAD	VISUAL, BALLAST, ACCELEROMETER MOUNT	OK
NECK	VISUAL, CABLE TORQUE	OK
SPINE BOX	VISUAL, BALLAST, WELDMENT, ACCELEROMETER MOUNT	OK
RIB CAGE	VISUAL, MEASURE, STIFFENERS	OK
STERNUM	VISUAL	OK
LUMBAR SPINE	VISUAL	OK
ABDOMEN	VISUAL	OK
PELVIS	VISUAL, PALPATE, ACCELEROMETER MOUNT	OK
UPPER LEGS	VISUAL	OK
KNEES	VISUAL, STOPS, INSERTS	OK
LOWER LEGS	VISUAL, RANGE OF MOTION	OK
ANKLES	VISUAL, RANGE OF MOTION	OK
FEET	VISUAL, RANGE OF MOTION	OK
JOINTS	1 TO 2 g RANGE	OK
OTHER	NONE	-

REMARKS: None

CALIBRATION TEST RESULTS

POST TEST

SID H3 NO.: 015

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST	COMMENTS
EXTERNAL DIMENSIONS	Passed all requirements.
LATERAL THORAX IMPACT TEST	Passed all requirements.
LATERAL PELVIS IMPACT TEST	Passed all requirements.
HEAD DROP TEST*	Passed all requirements.
LATERAL NECK BEND TEST*	Passed all requirements.
ABDOMINAL COMPRESSION TEST*	Passed all requirements.
LUMBAR FLEXION TEST*	Passed all requirements.

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 - 909	902
RH- Rib Height (mm)	502 - 520	513
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 - 241	239
KH- Knee Pivot from Back Line (mm)	511 - 526	521
KV- Knee Pivot to Floor (mm)	490 - 505	495
HW- Hip Width (mm)	356 - 391	371

REMARKS: None

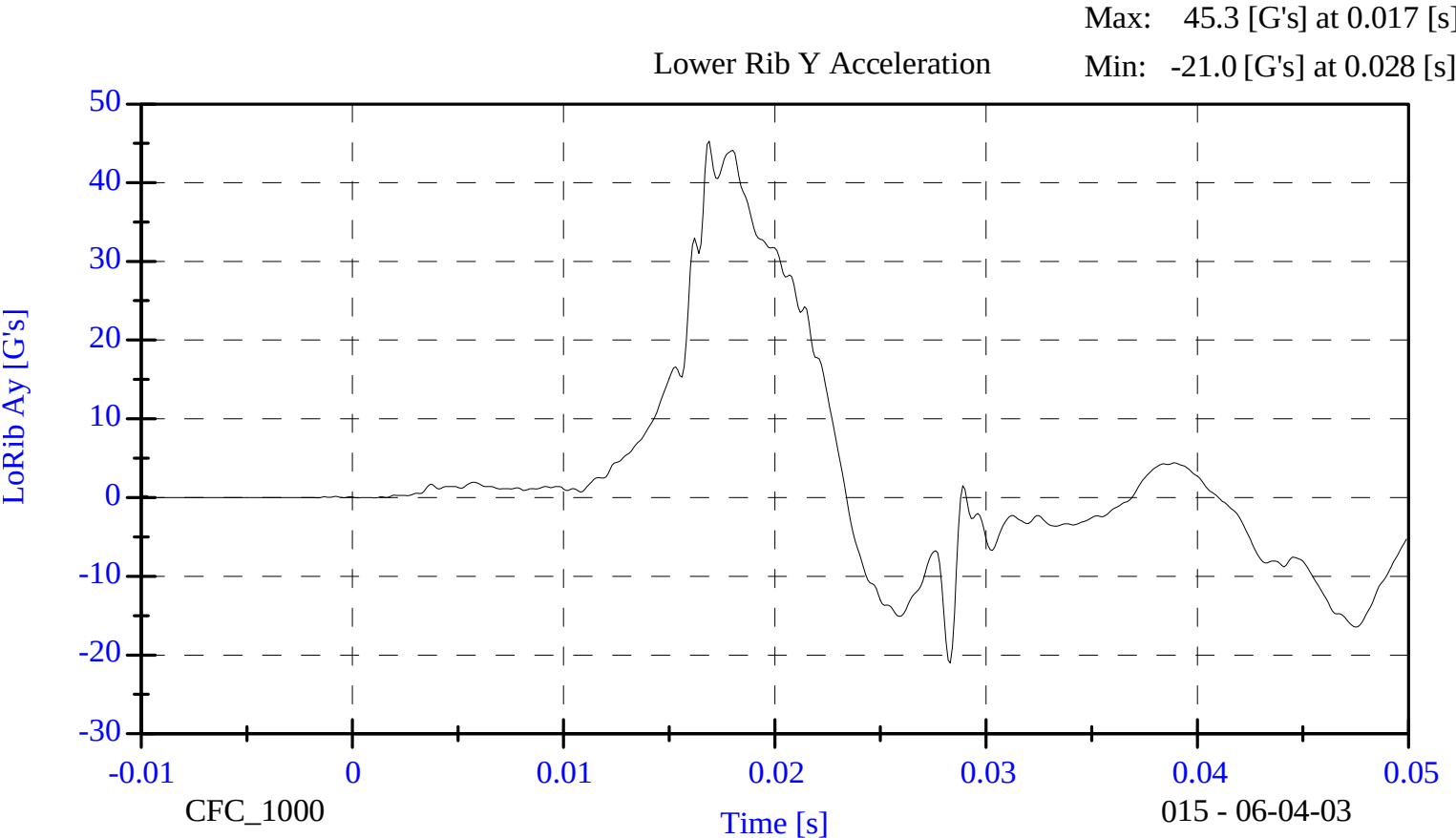
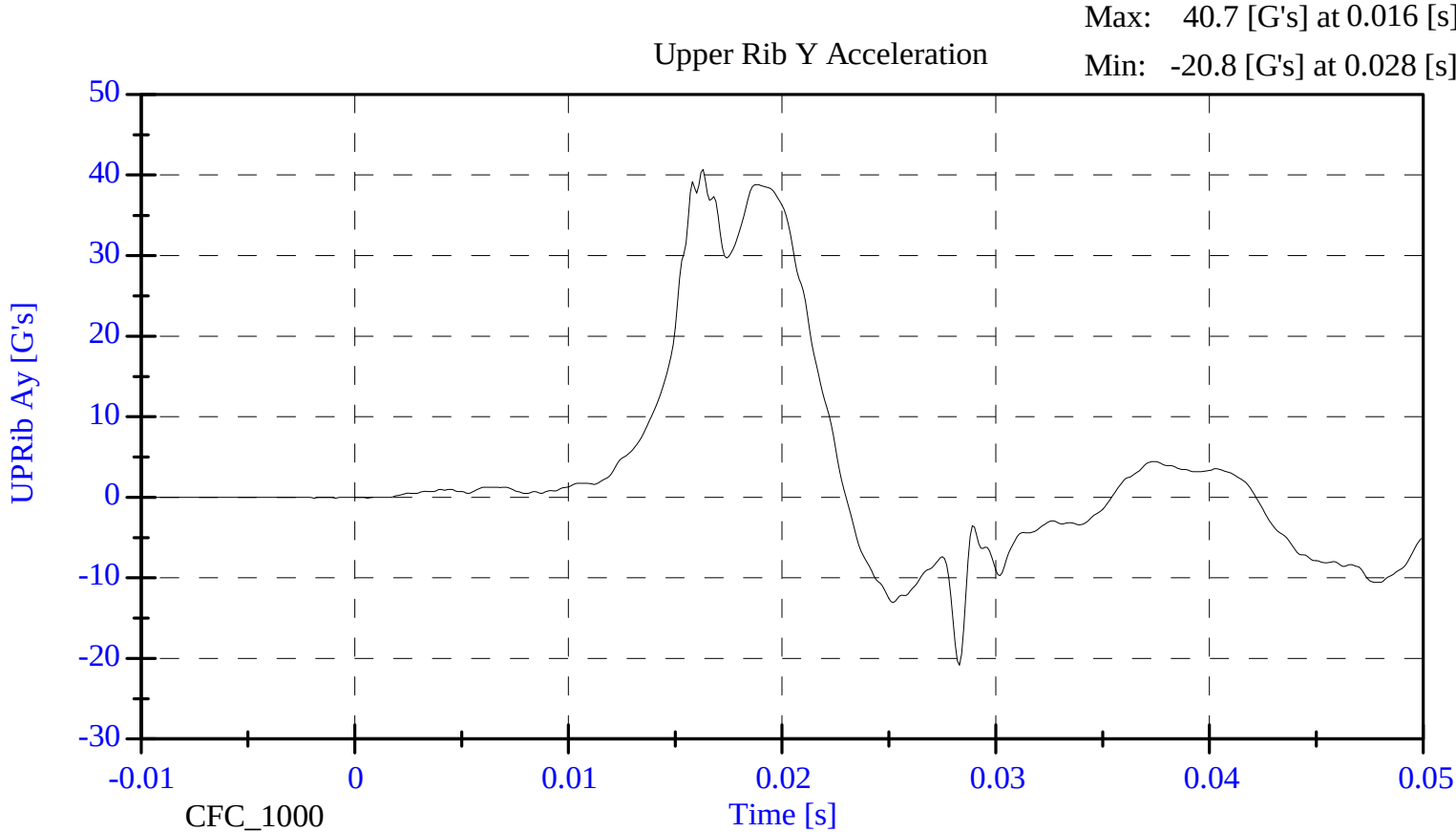
**LATERAL THORAX IMPACT TEST
POST TEST**

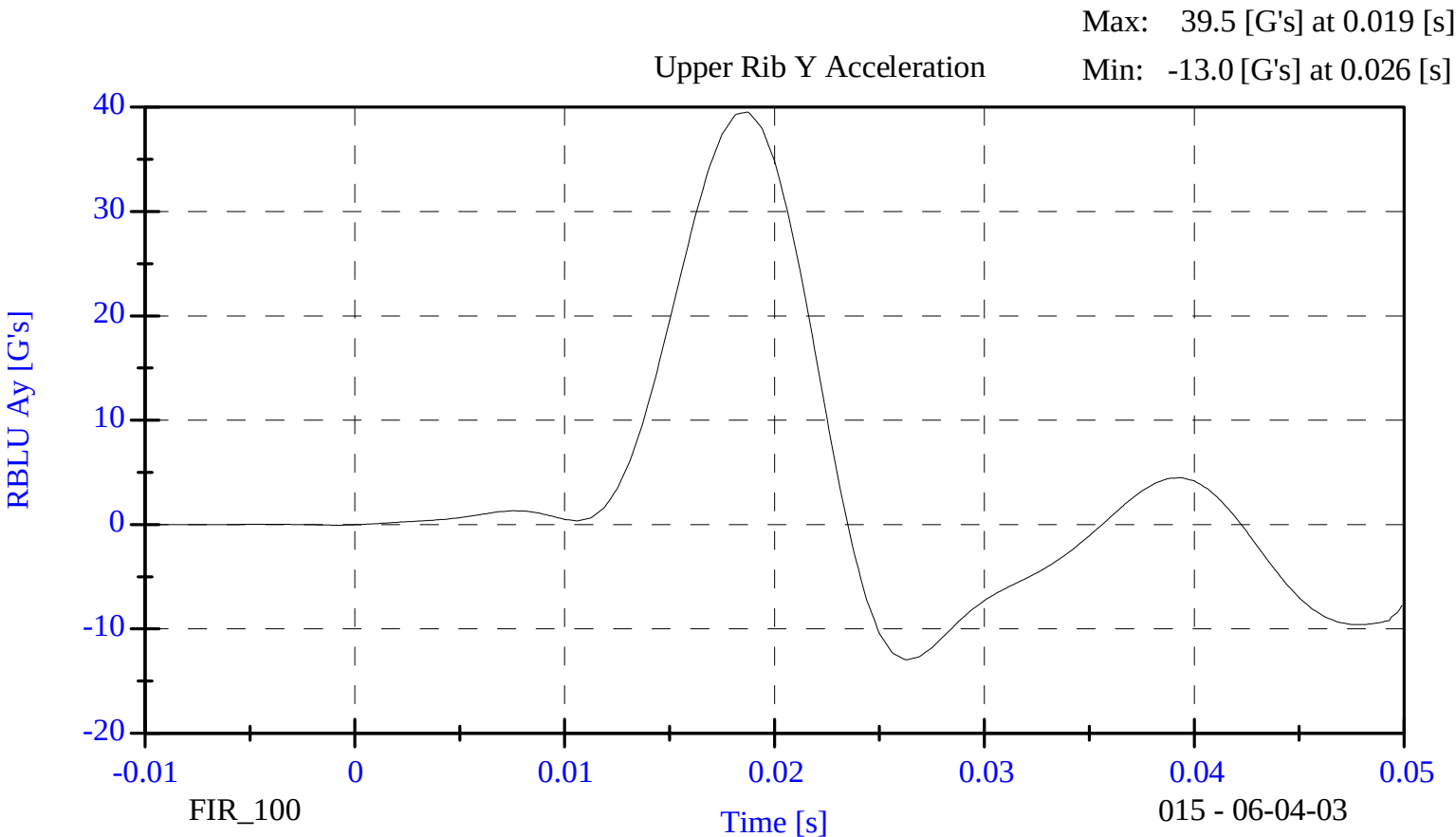
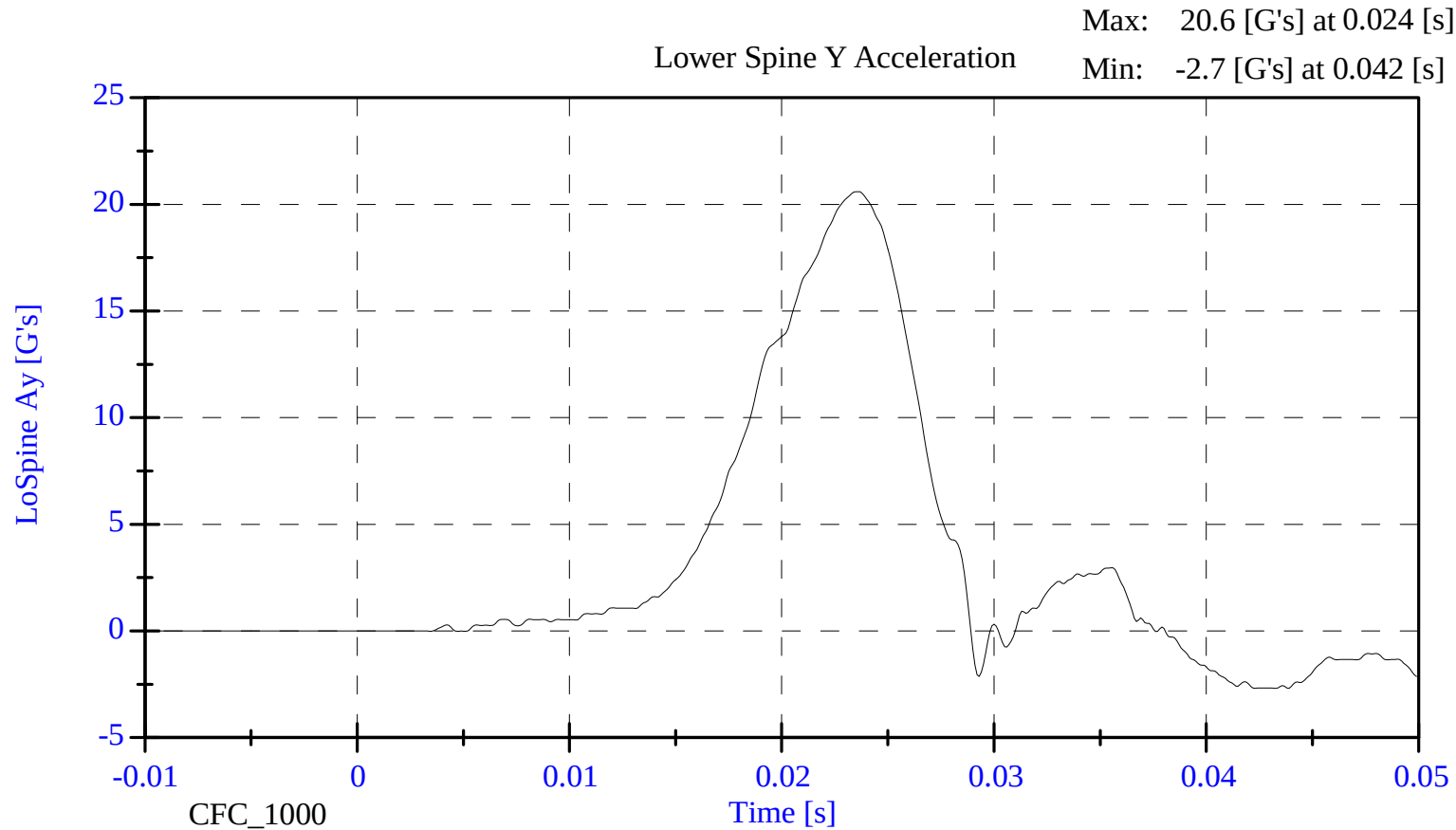
CONFIGURED FOR LEFT SIDE IMPACT

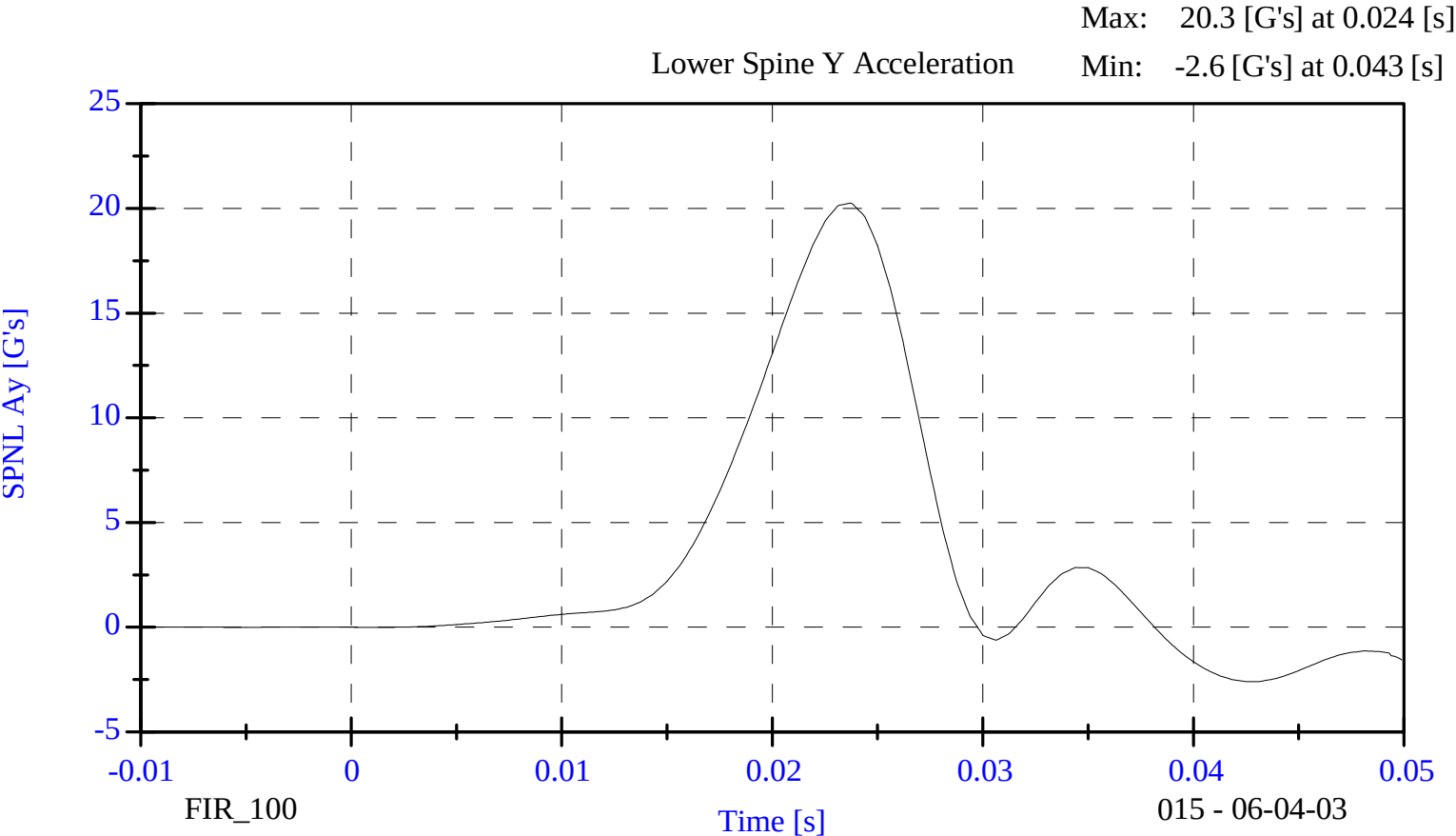
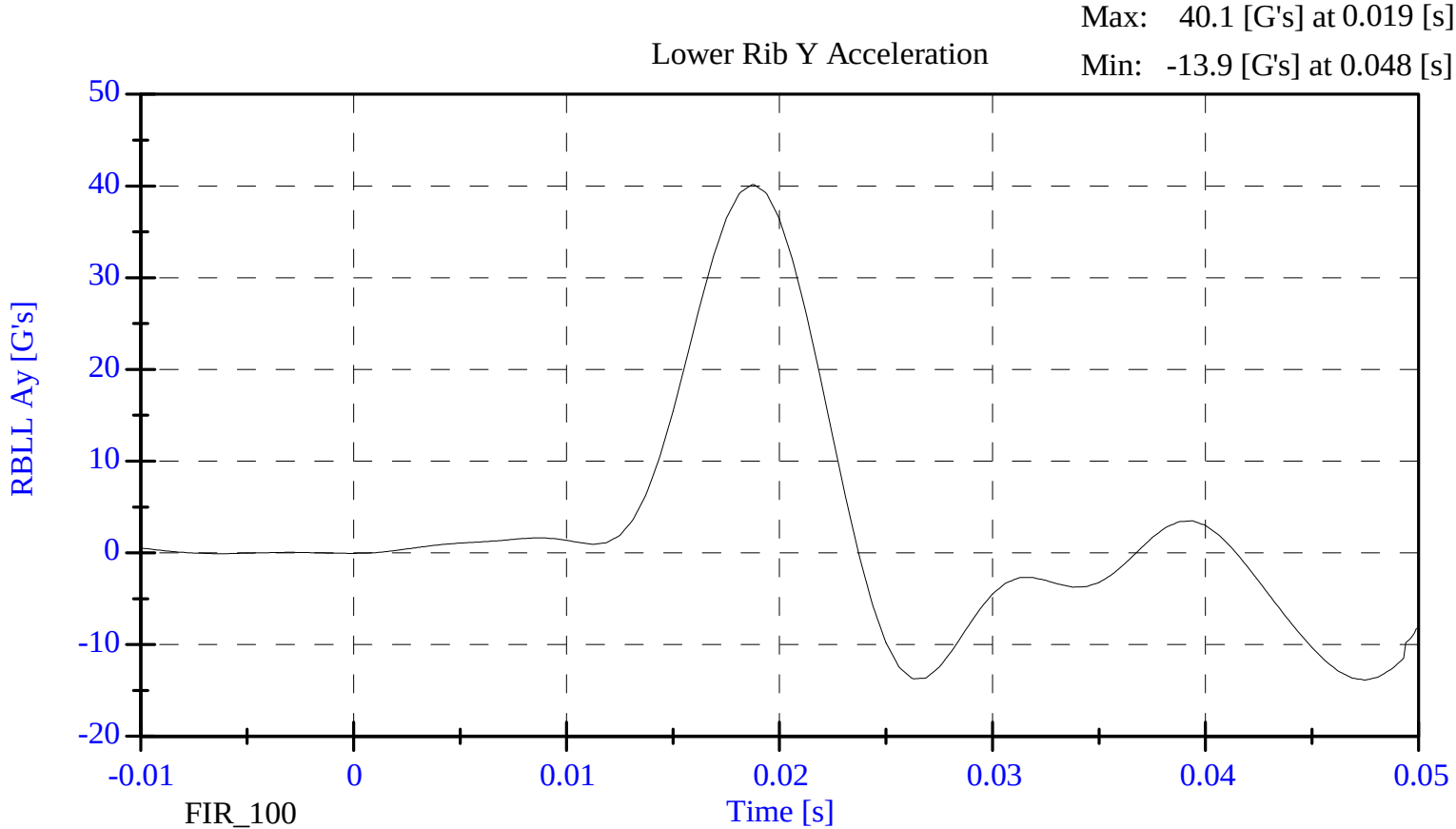
SID H3 Serial No.:	<u>015</u>	Sequential Test Number:	<u>1</u>
Date:	<u>06/04/2003</u>	Laboratory Technician:	<u>B. Swiecicki</u>

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	38.0
PROBE SPEED (m/s)	4.27 - 4.33	4.28
UPPER RIB (g's)	37 - 46	39.54
LOWER RIB (g's)	37 - 46	40.14
LOWER SPINE (g's)	15 - 22	20.25

REMARKS: None







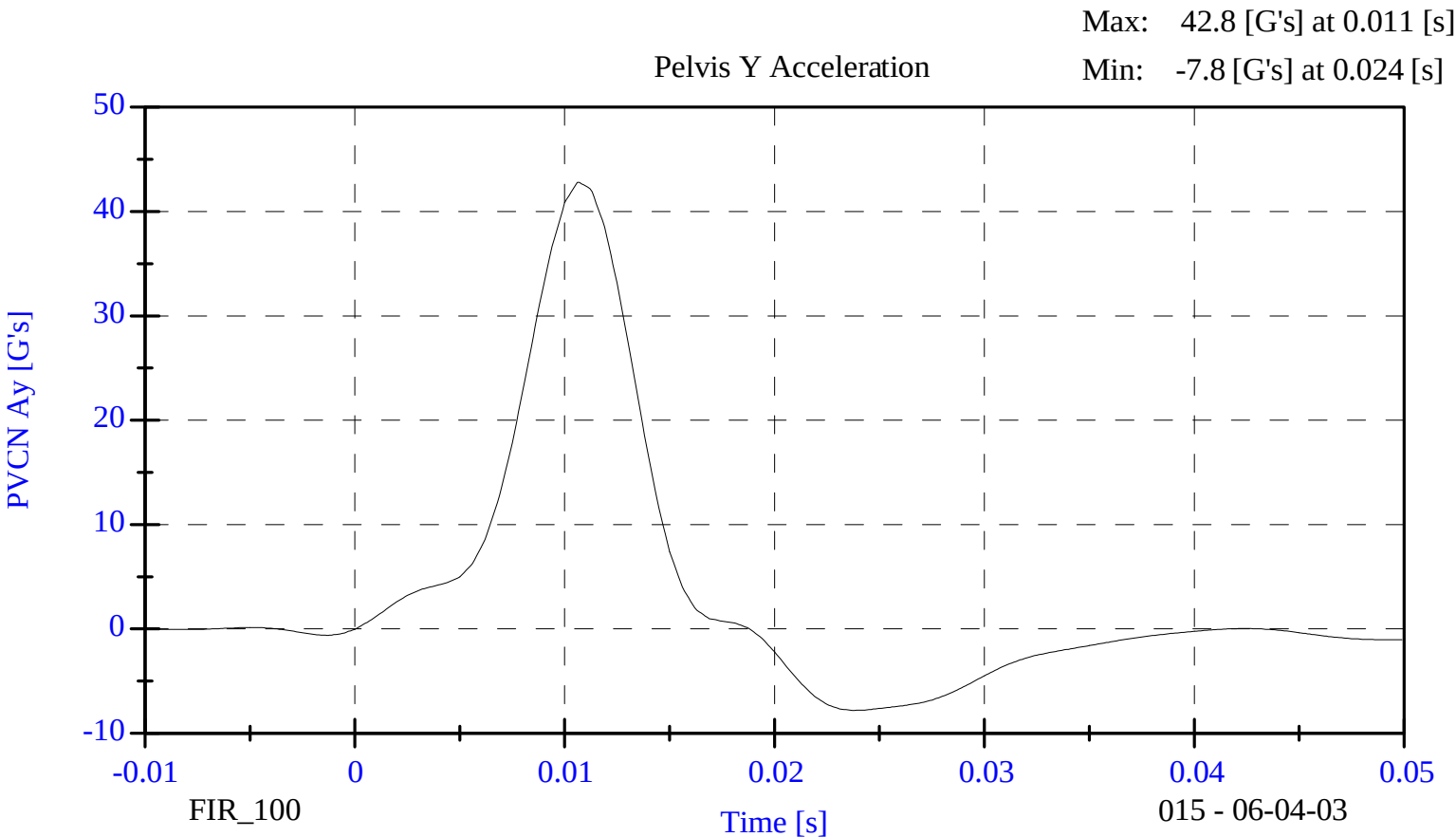
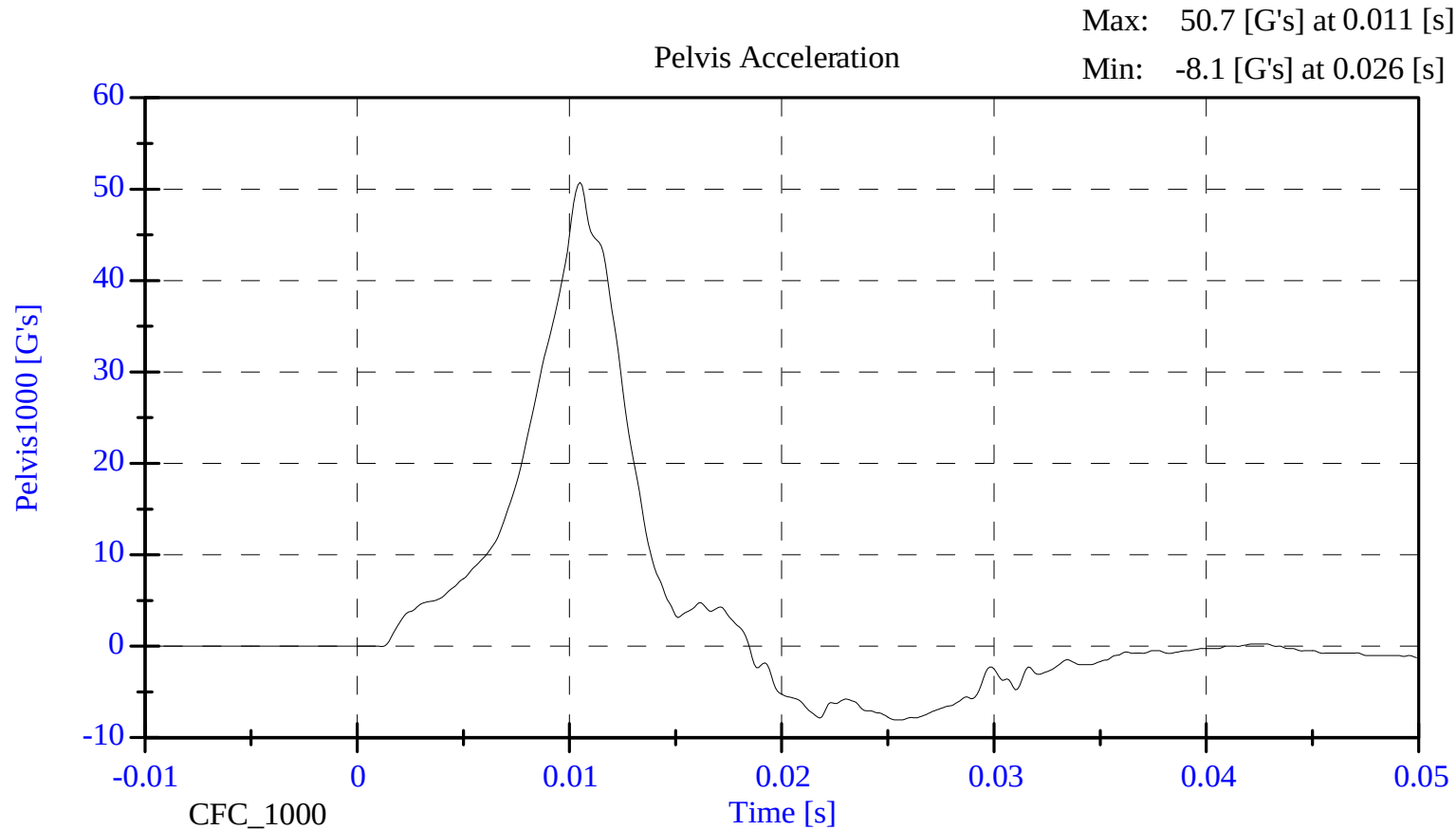
**LATERAL PELVIS IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.:	015	Sequential Test Number:	1
Date:	06/04/2003	Laboratory Technician:	B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	38.0
PROBE SPEED (m/s)	4.27 - 4.33	4.27
PELVIS ACCELERATION (g's)	40 - 60	42.79

REMARKS: None



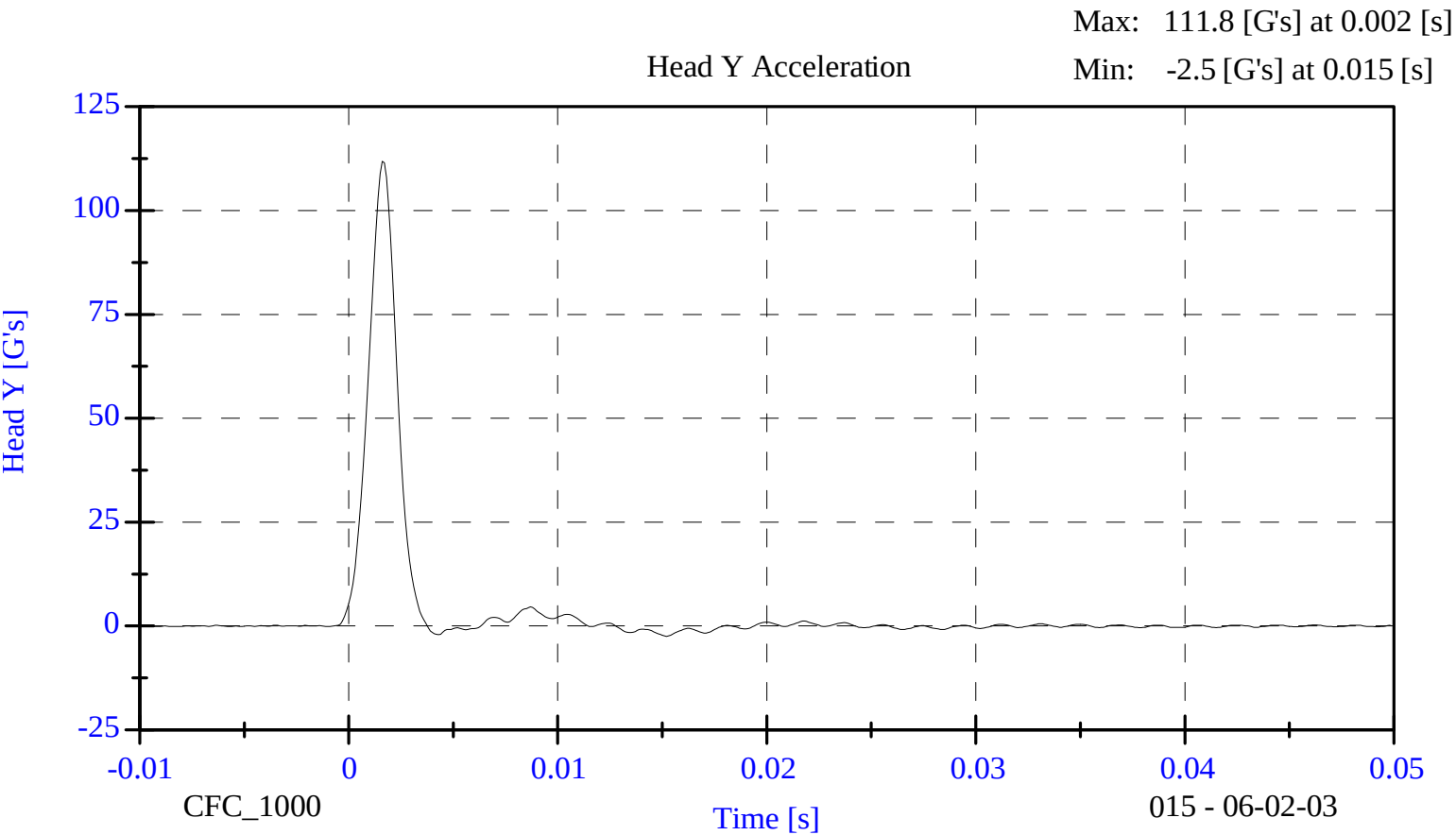
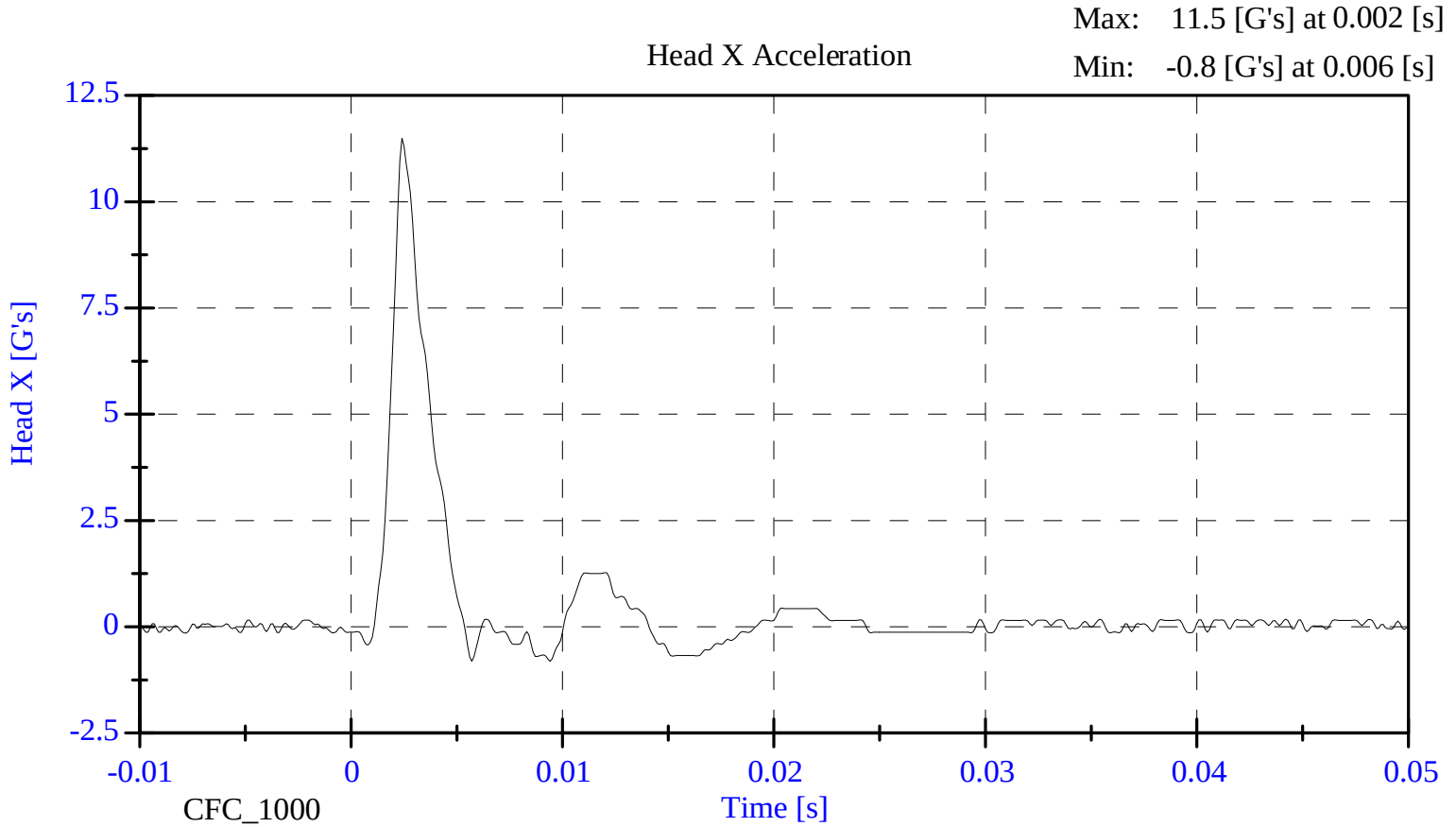
HEAD DROP TEST
POST-TEST
(Test not required for SID certification)

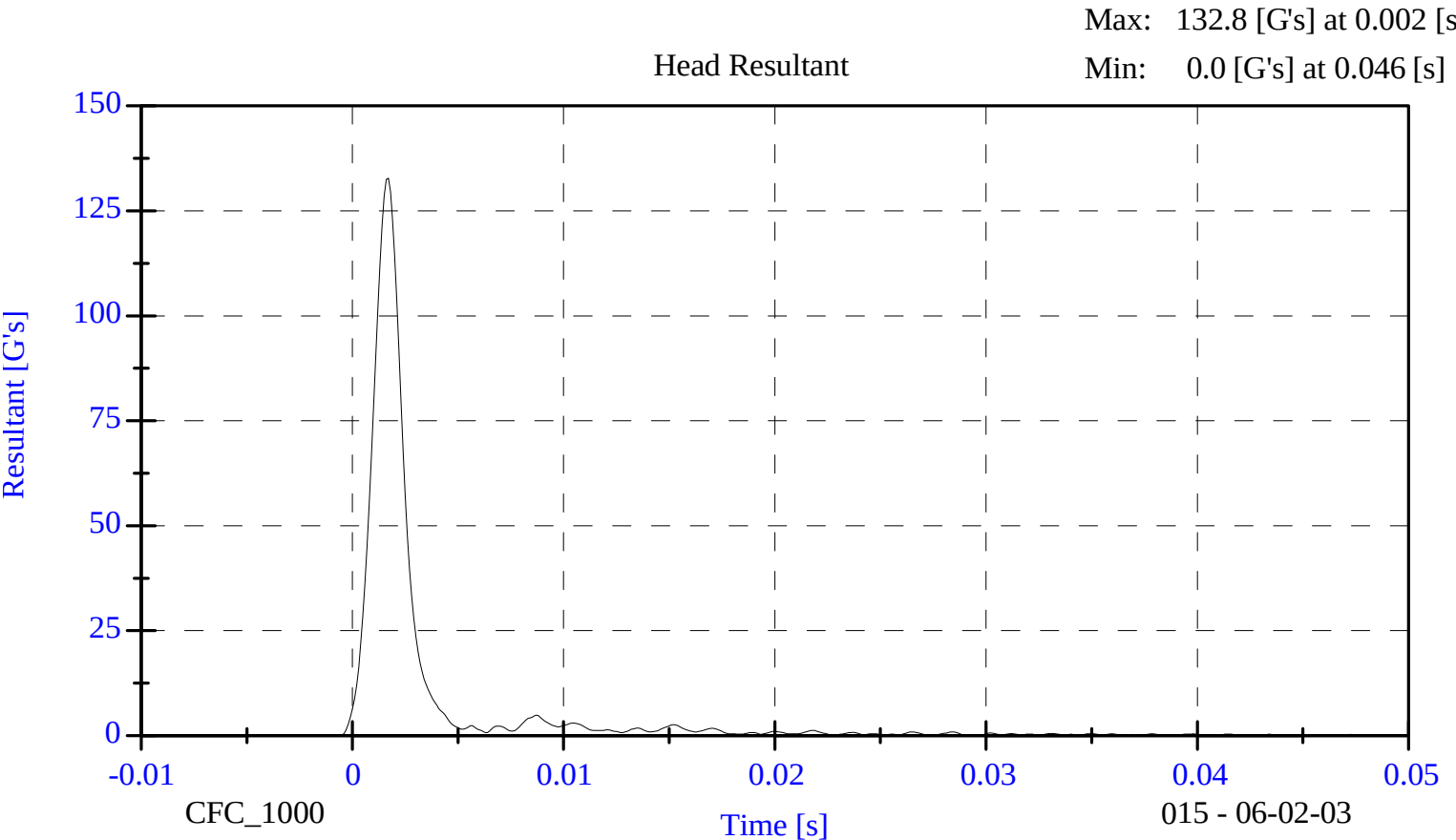
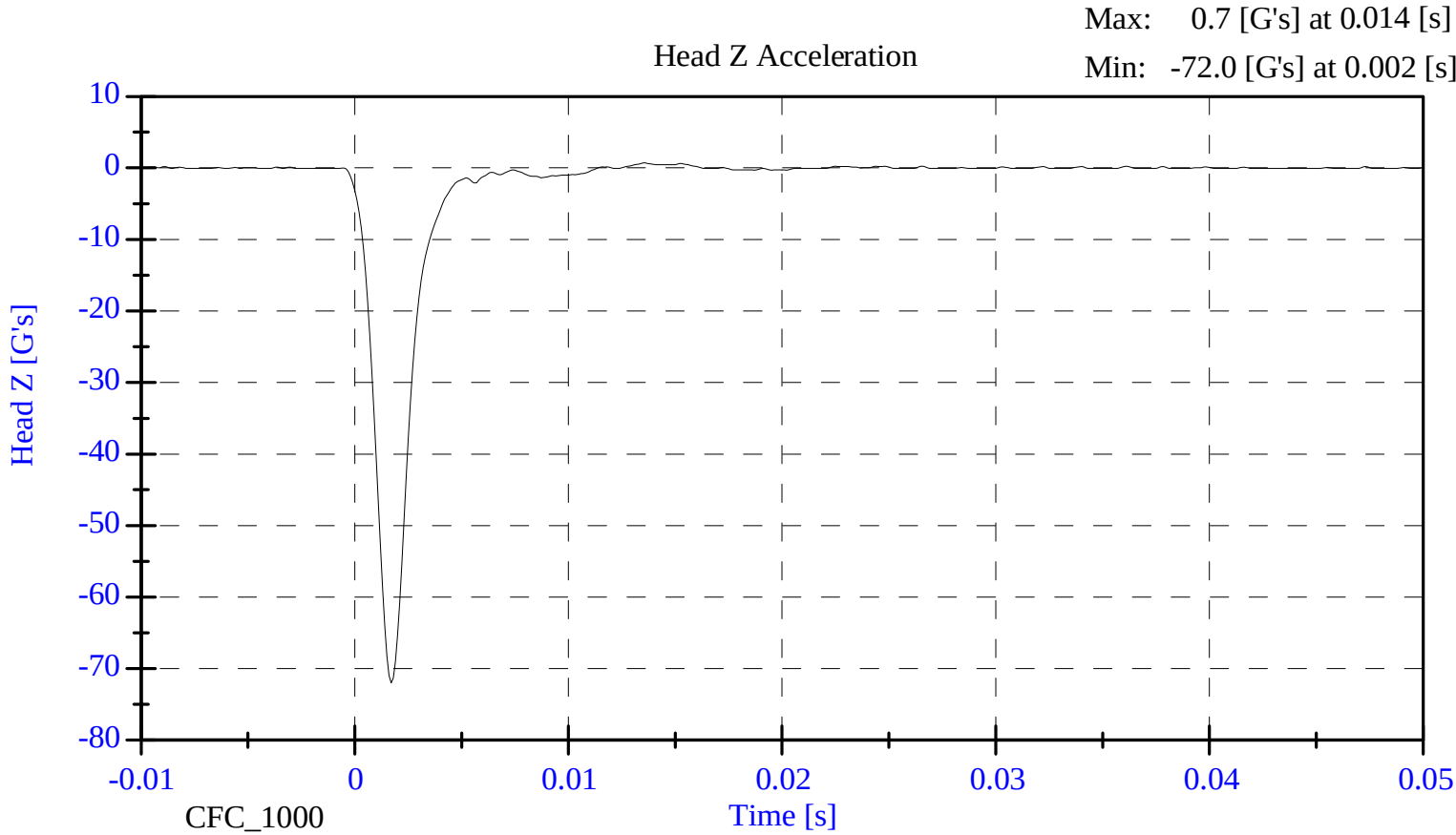
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 015 Sequential Test Number: 1
Date: 06/02/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 – 22.2	21.1
RELATIVE HUMIDITY (%)	10 – 70	37.0
PEAK RESULTANT ACCELERATION (Gs)	120 – 150	132.76
PEAK LATERAL ACCELERATION (Gs)	Not to Exceed 15	11.49
CURVE PERCENT NONMODAL (%)	< 15	3.67

REMARKS: None





**LATERAL NECK BENDING TEST
POST-TEST**

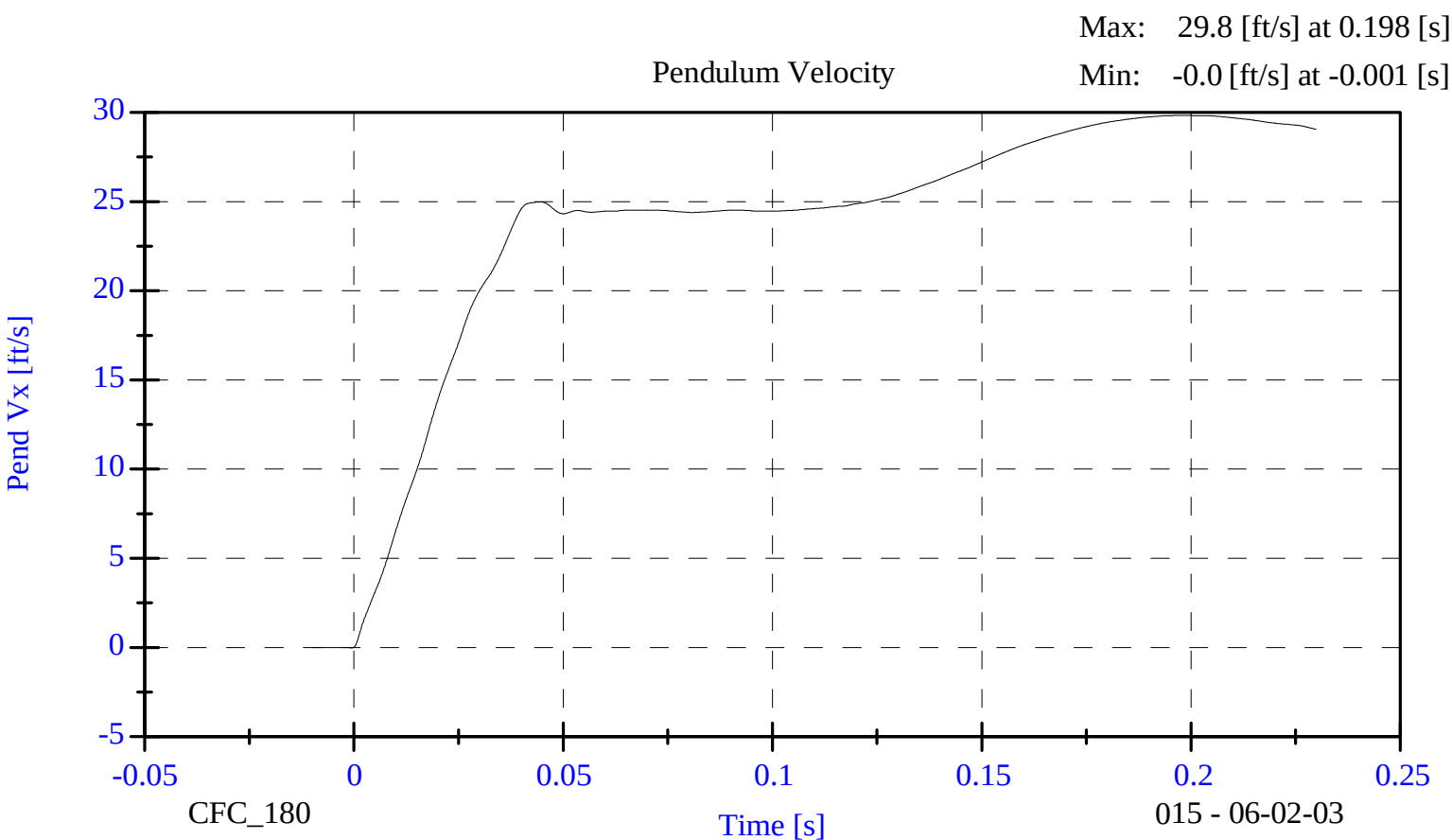
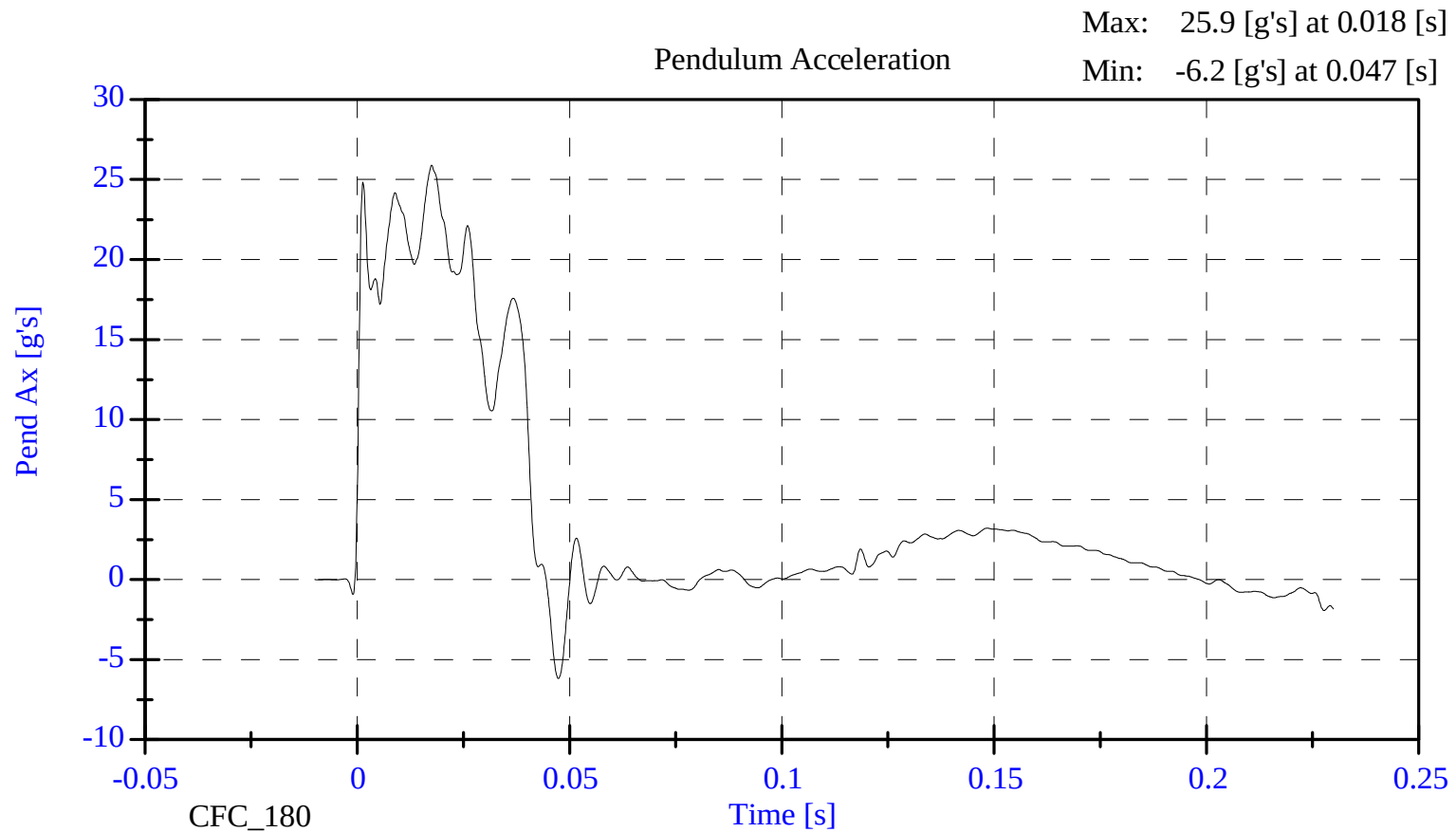
(Test not required for SID certification)

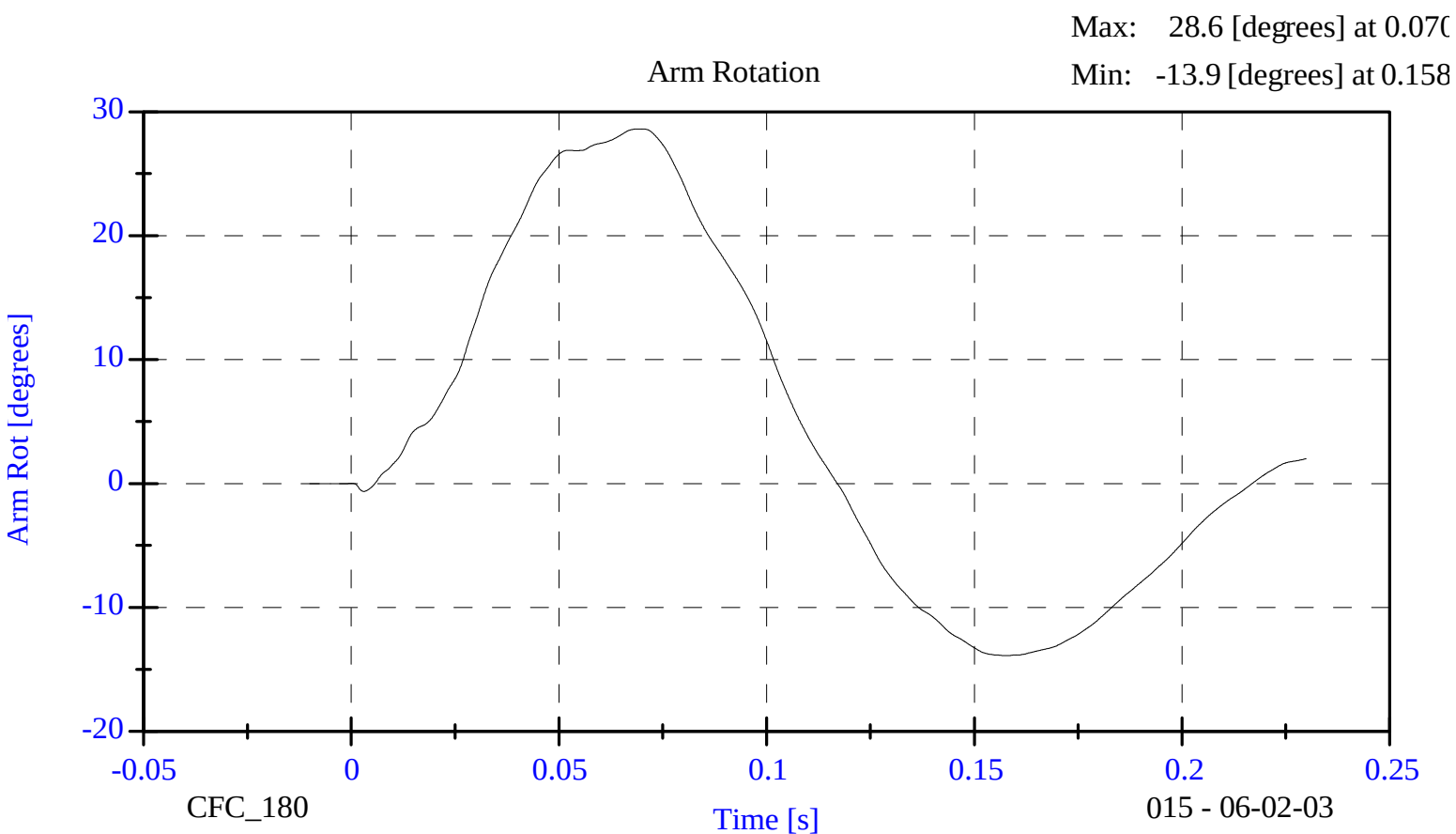
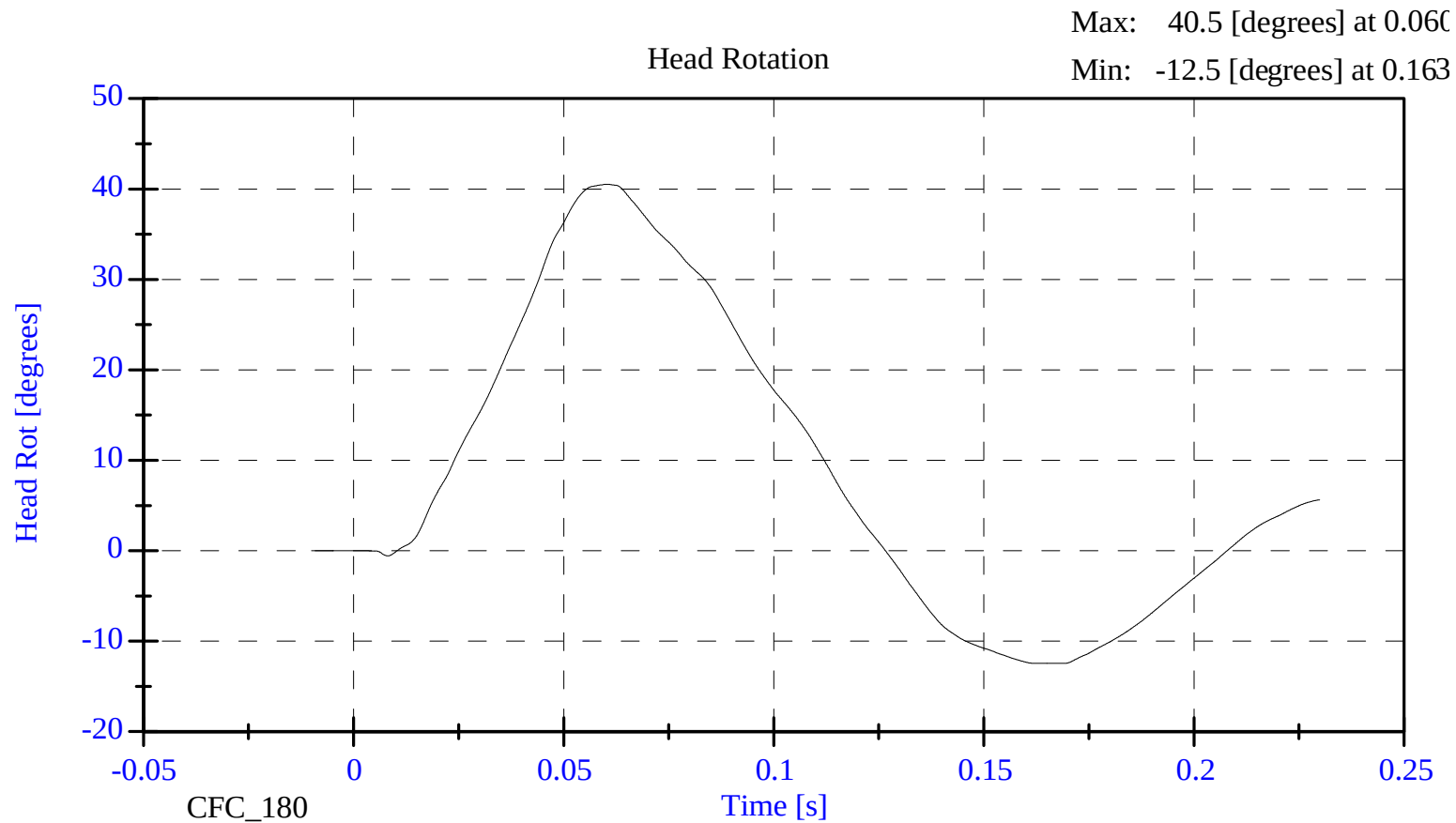
CONFIGURED FOR LEFT SIDE IMPACT

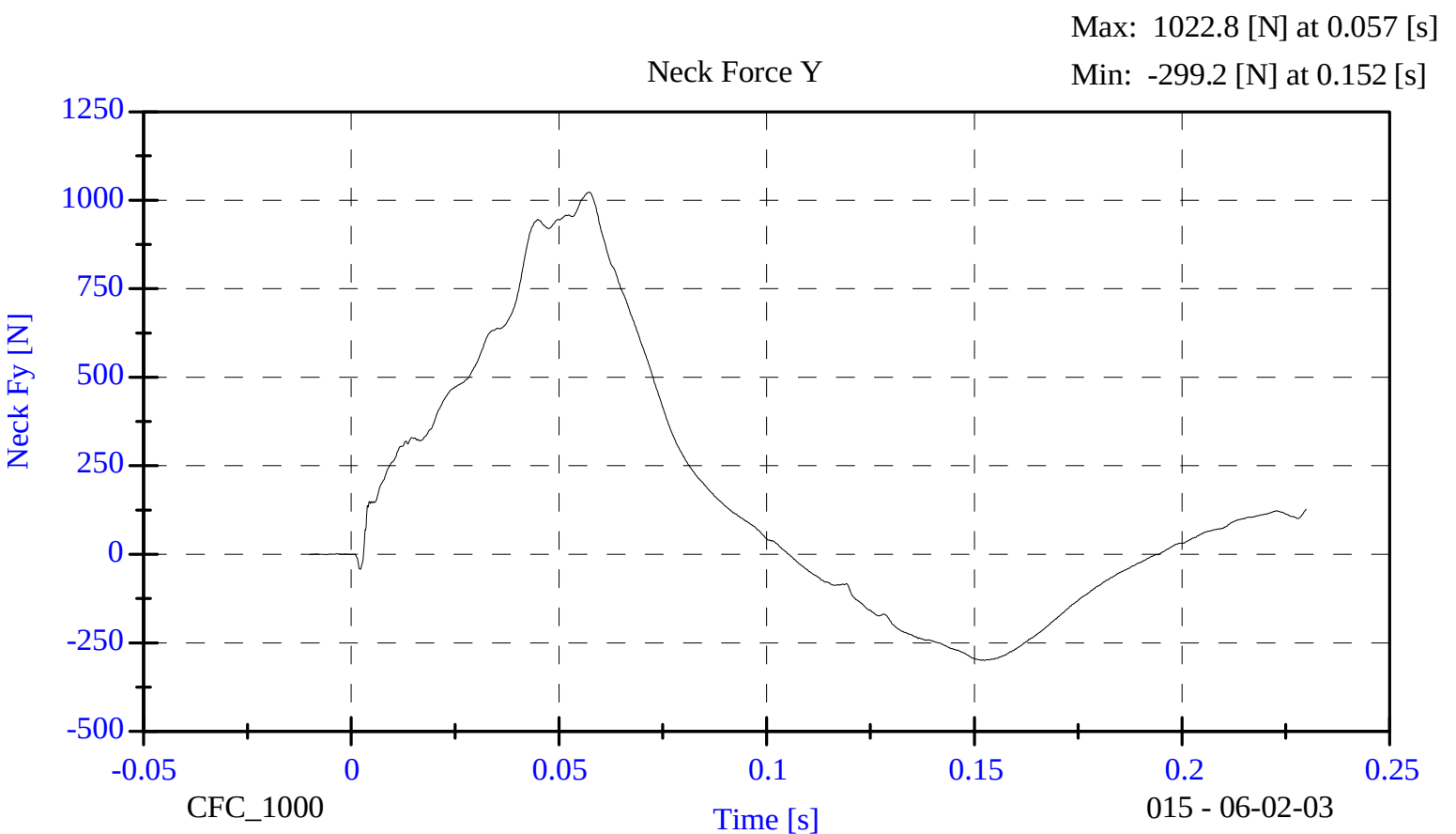
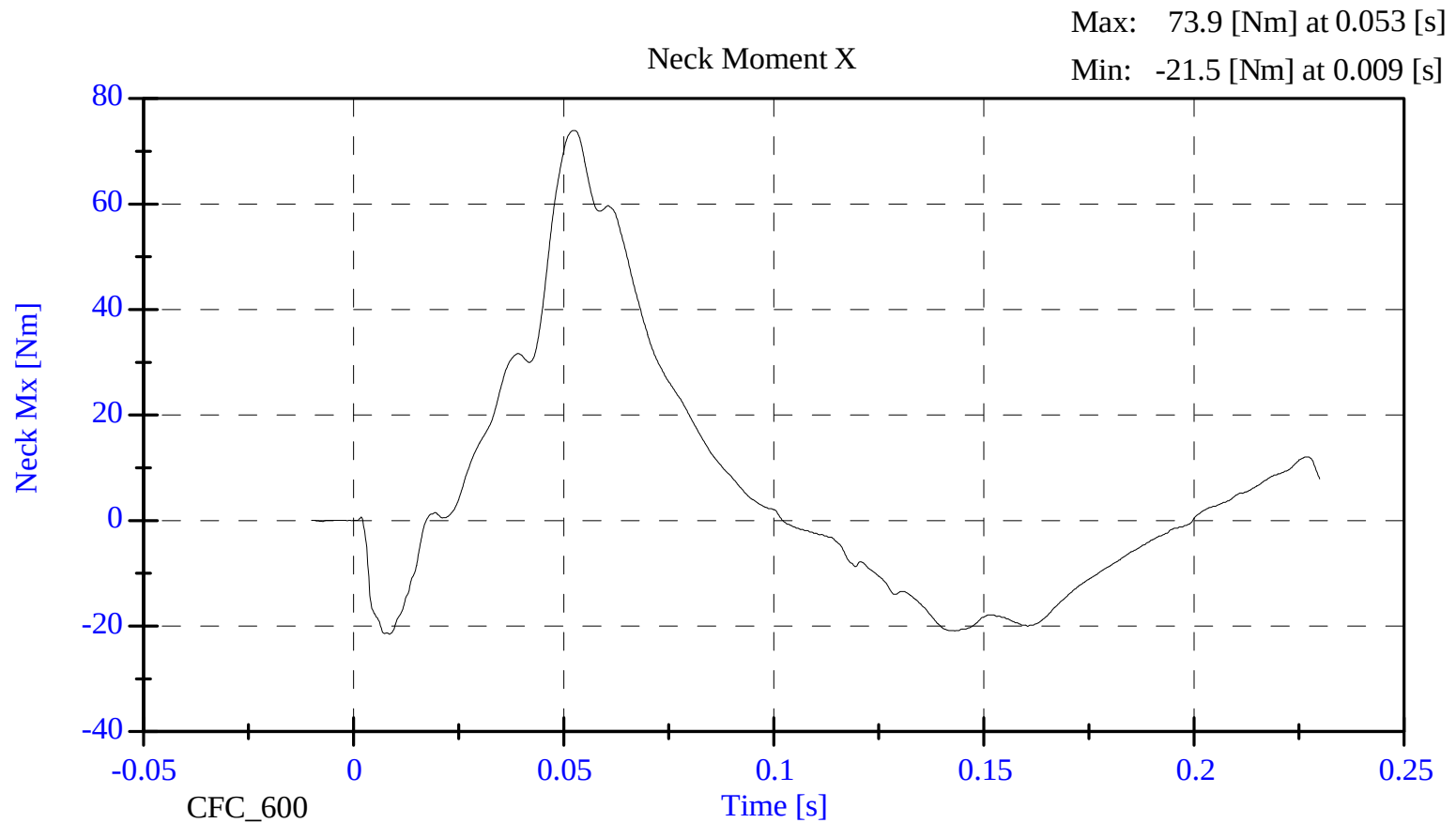
SID Serial No.: 015	Sequential Test Number: 1	
Date: 06/02/2003	Laboratory Technician: B. Swiecicki	

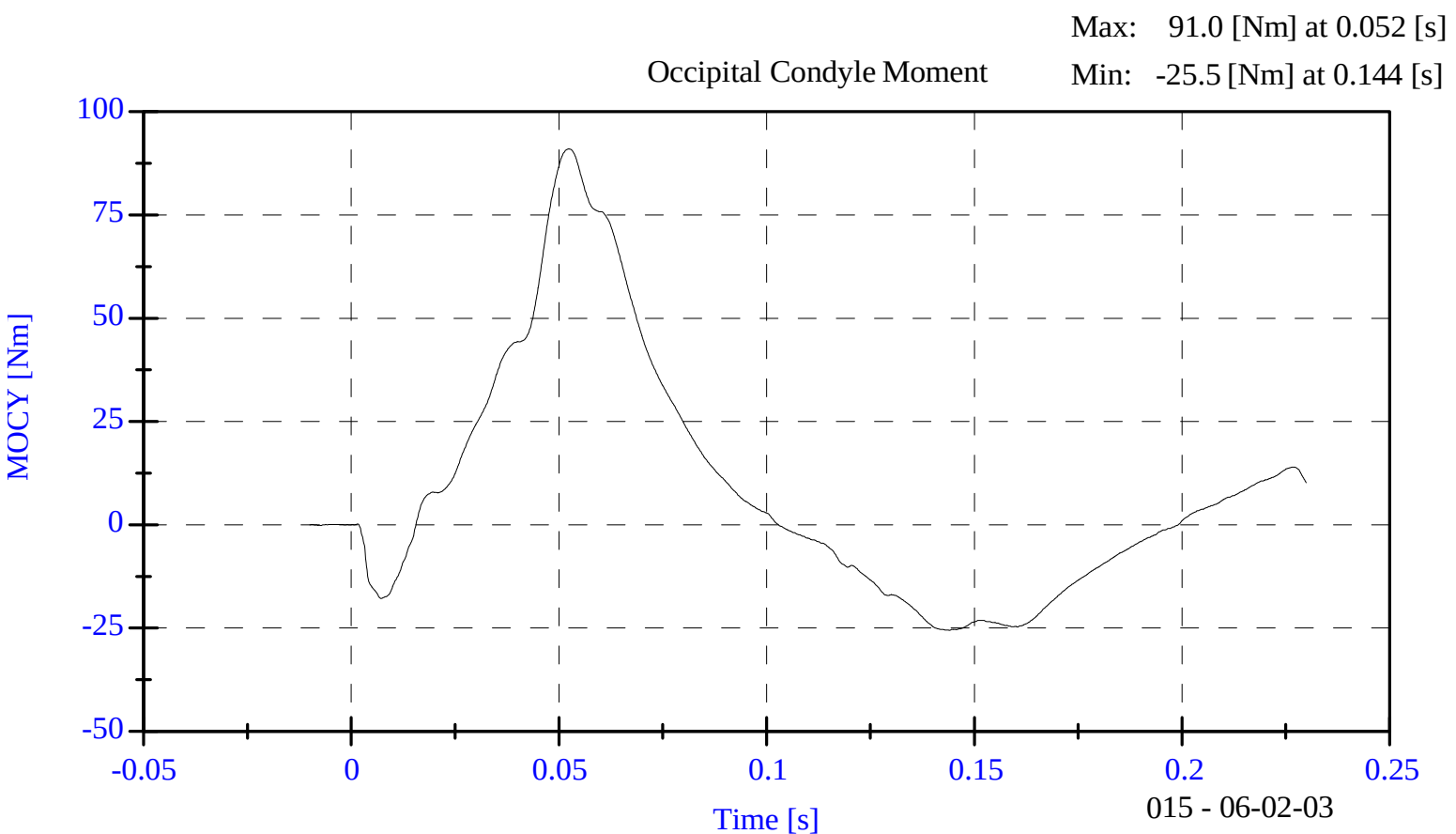
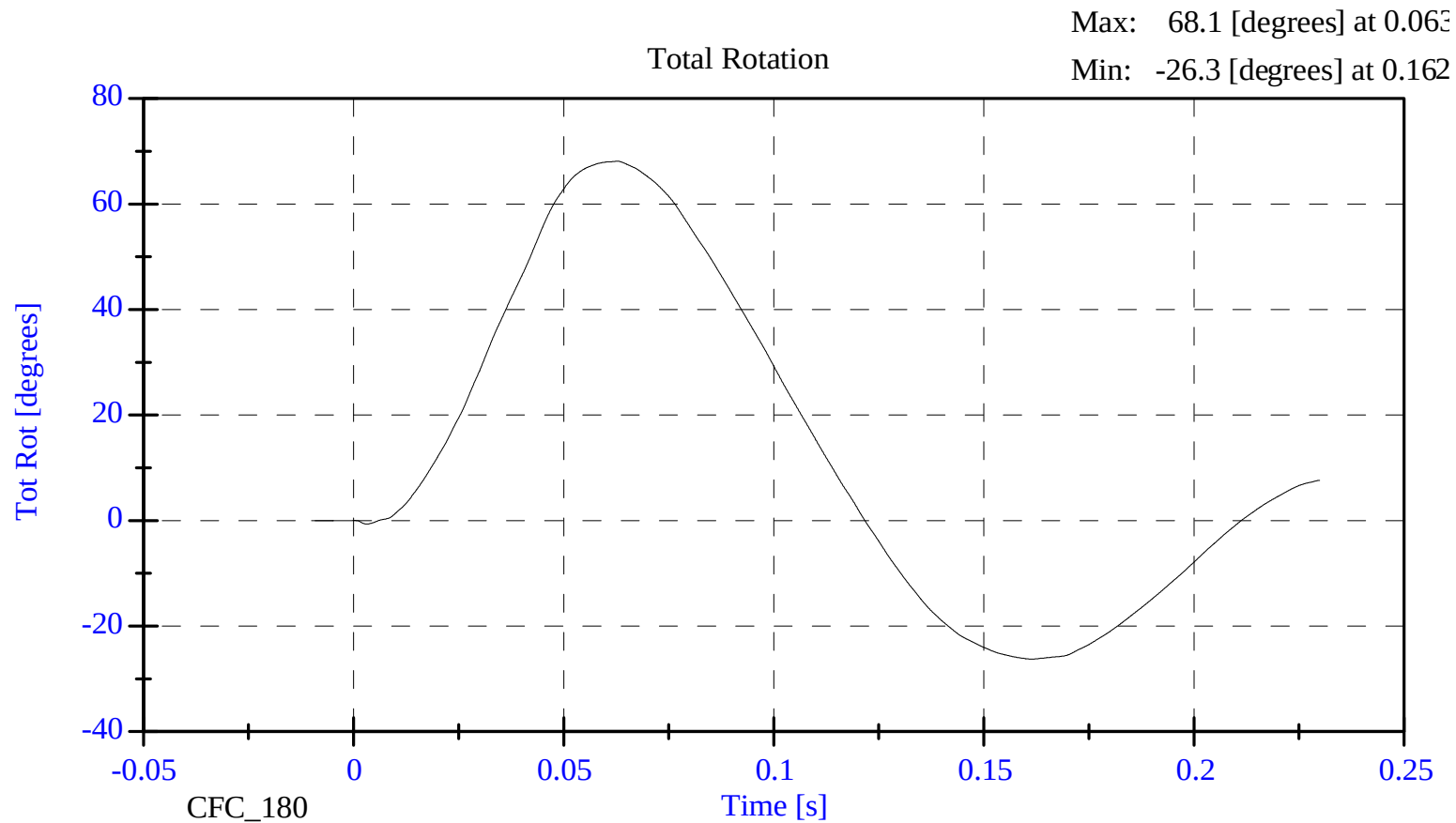
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 - 22.2	21.1
RELATIVE HUMIDITY (%)	10 - 70	37.0
IMPACT VELOCITY (m/s)	6.89 – 7.13	6.97
PENDULUM DELTA V		
DELTA V @ 10 ms (m/s)	1.96 – 2.55	2.00
DELTA V @ 20 ms (m/s)	4.12 – 5.10	4.22
DELTA V @ 30 ms (m/s)	5.73 – 7.01	6.10
DELTA V @ 40-70 ms (m/s)	6.27 – 7.64	7.62
D PLANE ROTATION		
MAXIMUM ROTATION (deg)	64 – 78	68.10
ROT. ANGLE TIME to ZERO (ms)	50 – 70	58.90
MOMENT ABOUT THE OCCIPITAL CONDYLE		
MAX OCCIPITAL MOMENT (Nm)	88 – 108	90.96
OCCIPITAL MOMENT DECAY (ms)	40.0 – 60.0	50.50
HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT		
ROTATION wrt MOMENT (ms)	0 – 20	10.40

REMARKS: None









**ABDOMINAL COMPRESSION TEST
POST TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40.0
FORCE @ 13 mm (N)	104 - 162	112.3
FORCE @ 19 mm (N)	163 - 221	180.6
FORCE @ 25 mm (N)	222 - 280	254.7
FORCE @ 33 mm (N)	325 - 391	359.9

REMARKS: None

Dummy S/N 015

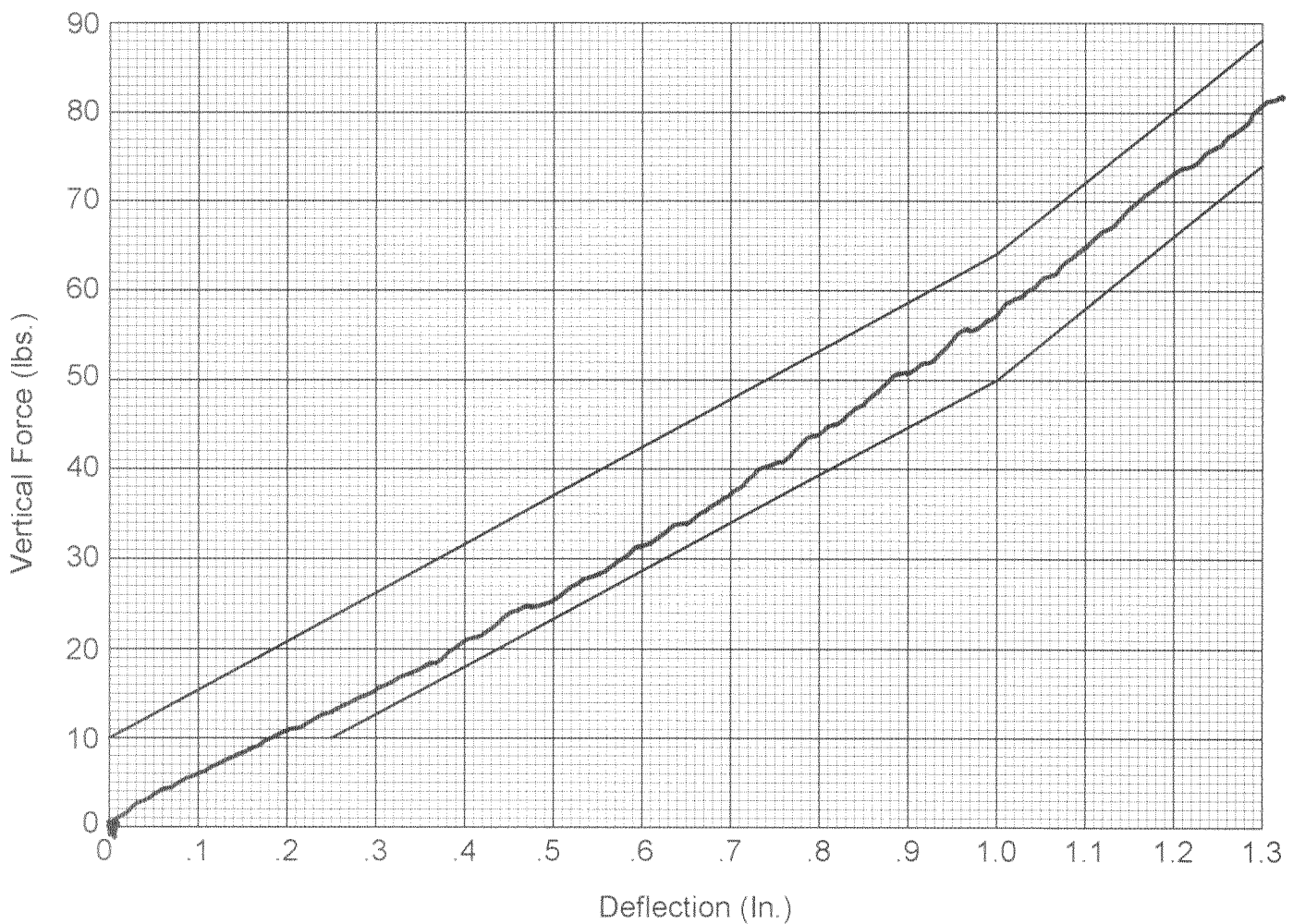
W/A _____

Date 06-04-03

Performed By [Signature]

Temp. 70°

Humidity 40%



Hybrid II
Abdomen Static Press

LUMBAR FLEXION TEST
POST TEST
(Test not required for SID certification)

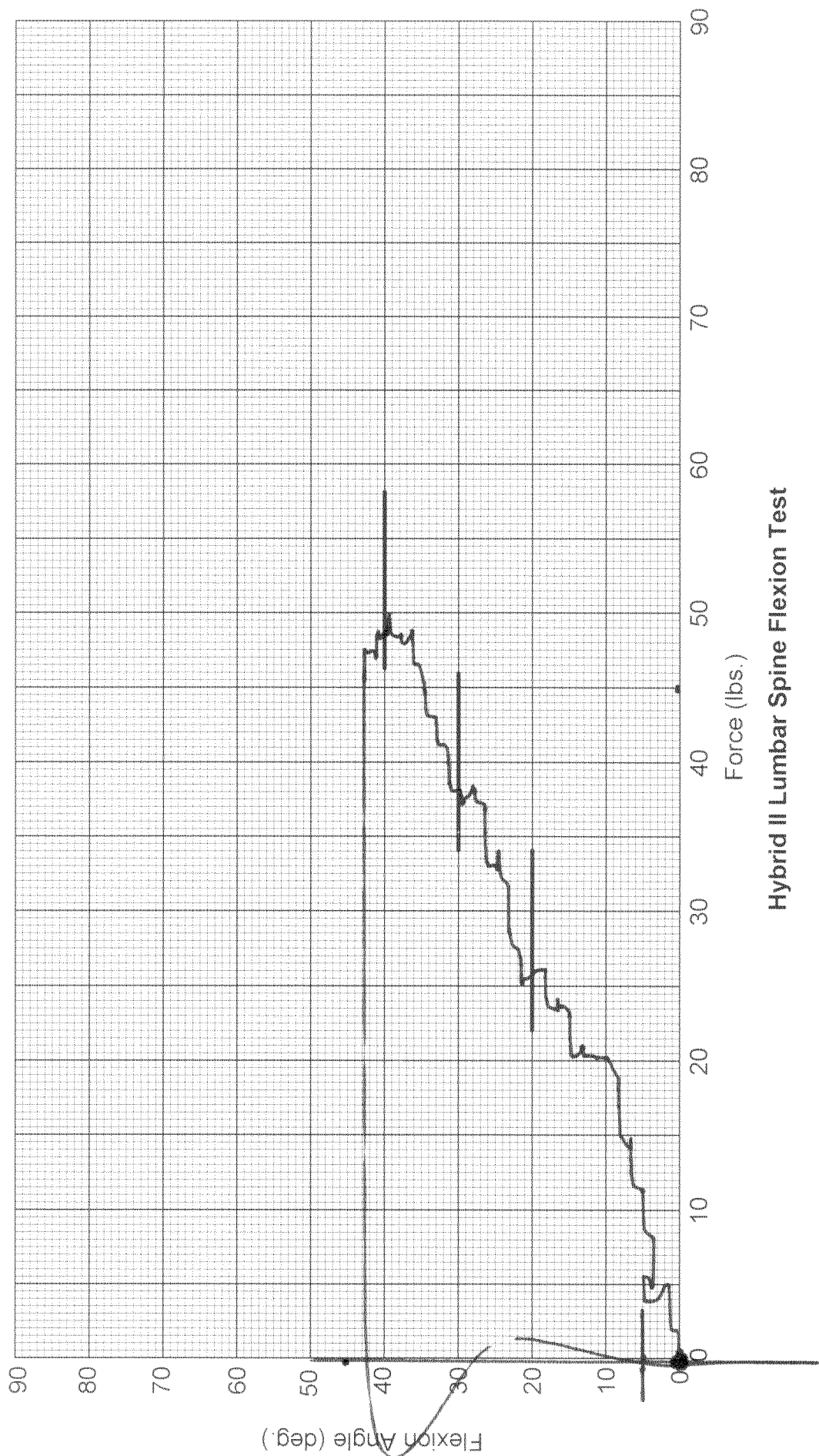
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40.0
FORCE @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	114.5
FORCE @ 30° (N)	151.2 - 204.6	165.0
FORCE @ 40° (N)	204.6 - 258	214.8
RETURN ANGLE	12° max.	5.0°

REMARKS: None

Dummy S/N 015
 W/A _____
 Date 06-04-03
 Performed By [Signature]
 Temp. 70°
 Humidity 40%



POST TEST DUMMY INSPECTION LIST
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 015 Sequential Test Number: 1
 Date: 06/04/2003 Laboratory Technician: B. Swiecicki

PART	ITEMS CHECKED	COMMENTS
SKIN	VISUAL INSPECTION	OK
HEAD	VISUAL, BALLAST, ACCELEROMETER MOUNT	OK
NECK	VISUAL, CABLE TORQUE	OK
SPINE BOX	VISUAL, BALLAST, WELDMENT, ACCELEROMETER MOUNT	OK
RIB CAGE	VISUAL, MEASURE, STIFFENERS	OK
STERNUM	VISUAL	OK
LUMBAR SPINE	VISUAL	OK
ABDOMEN	VISUAL	OK
PELVIS	VISUAL, PALPATE, ACCELEROMETER MOUNT	OK
UPPER LEGS	VISUAL	OK
KNEES	VISUAL, STOPS, INSERTS	OK
LOWER LEGS	VISUAL, RANGE OF MOTION	OK
ANKLES	VISUAL, RANGE OF MOTION	OK
FEET	VISUAL, RANGE OF MOTION	OK
JOINTS	1 TO 2 g RANGE	OK
OTHER	NONE	-

REMARKS: None

CALIBRATION TEST RESULTS

POST TEST

SID H3 NO.: 016

CONFIGURED FOR LEFT SIDE IMPACT

**CALIBRATION TEST RESULTS SUMMARY
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST	COMMENTS
EXTERNAL DIMENSIONS	Passed all requirements.
LATERAL THORAX IMPACT TEST	Passed all requirements.
LATERAL PELVIS IMPACT TEST	Passed all requirements.
HEAD DROP TEST*	Passed all requirements.
LATERAL NECK BEND TEST*	Passed all requirements.
ABDOMINAL COMPRESSION TEST*	Passed all requirements.
LUMBAR FLEXION TEST*	Passed all requirements.

* Test not required for SID certification.

REMARKS: None

**EXTERNAL DIMENSIONS
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
SH- Seated Height (mm)	889 - 909	899
RH- Rib Height (mm)	502 - 520	513
HP- Hip Pivot Height (mm)	99 ref.	99
RD- Rib from Back Line (mm)	229 - 241	239
KH- Knee Pivot from Back Line (mm)	511 - 526	521
KV- Knee Pivot to Floor (mm)	490 - 505	495
HW- Hip Width (mm)	356 - 391	373

REMARKS: None

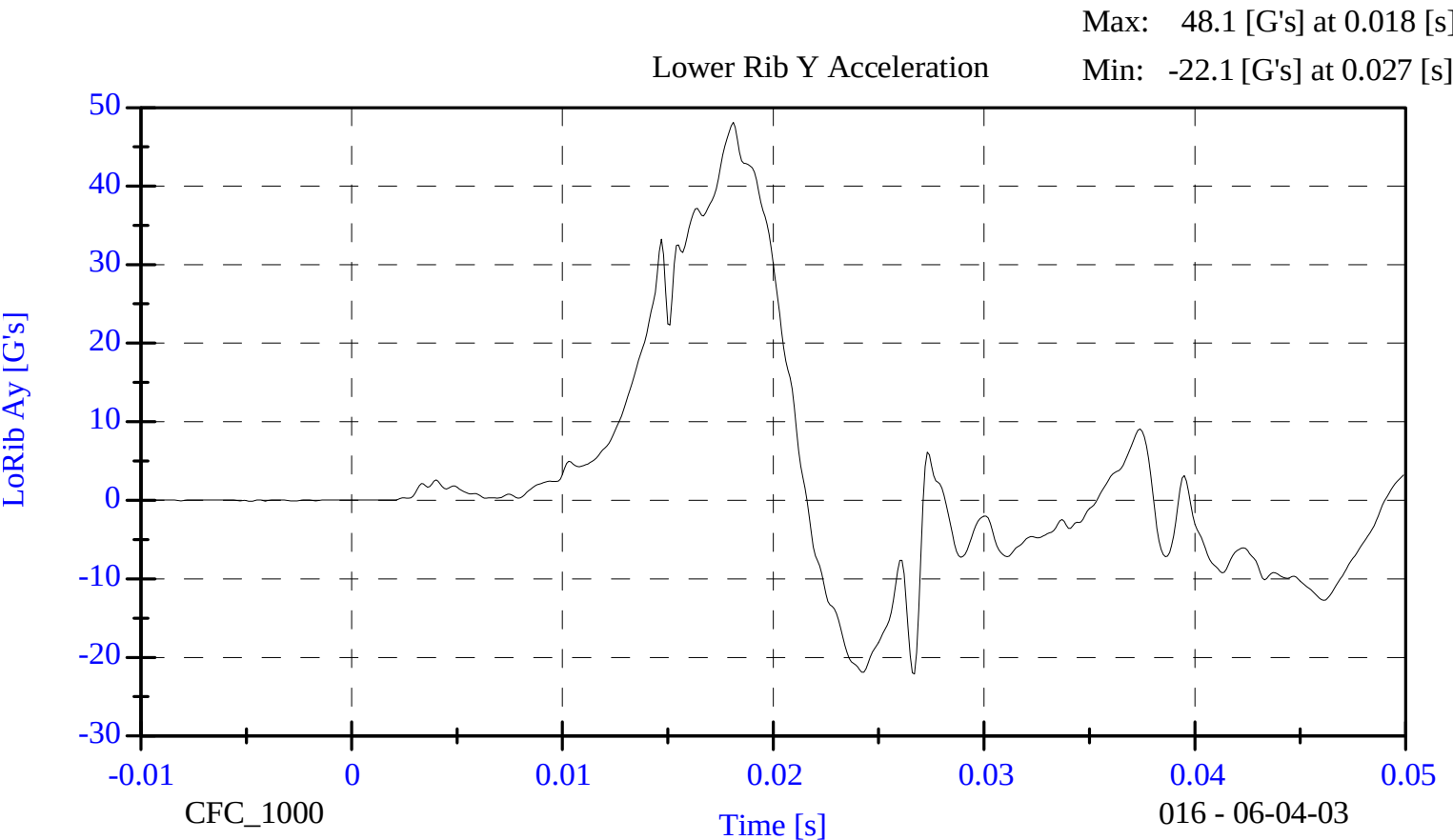
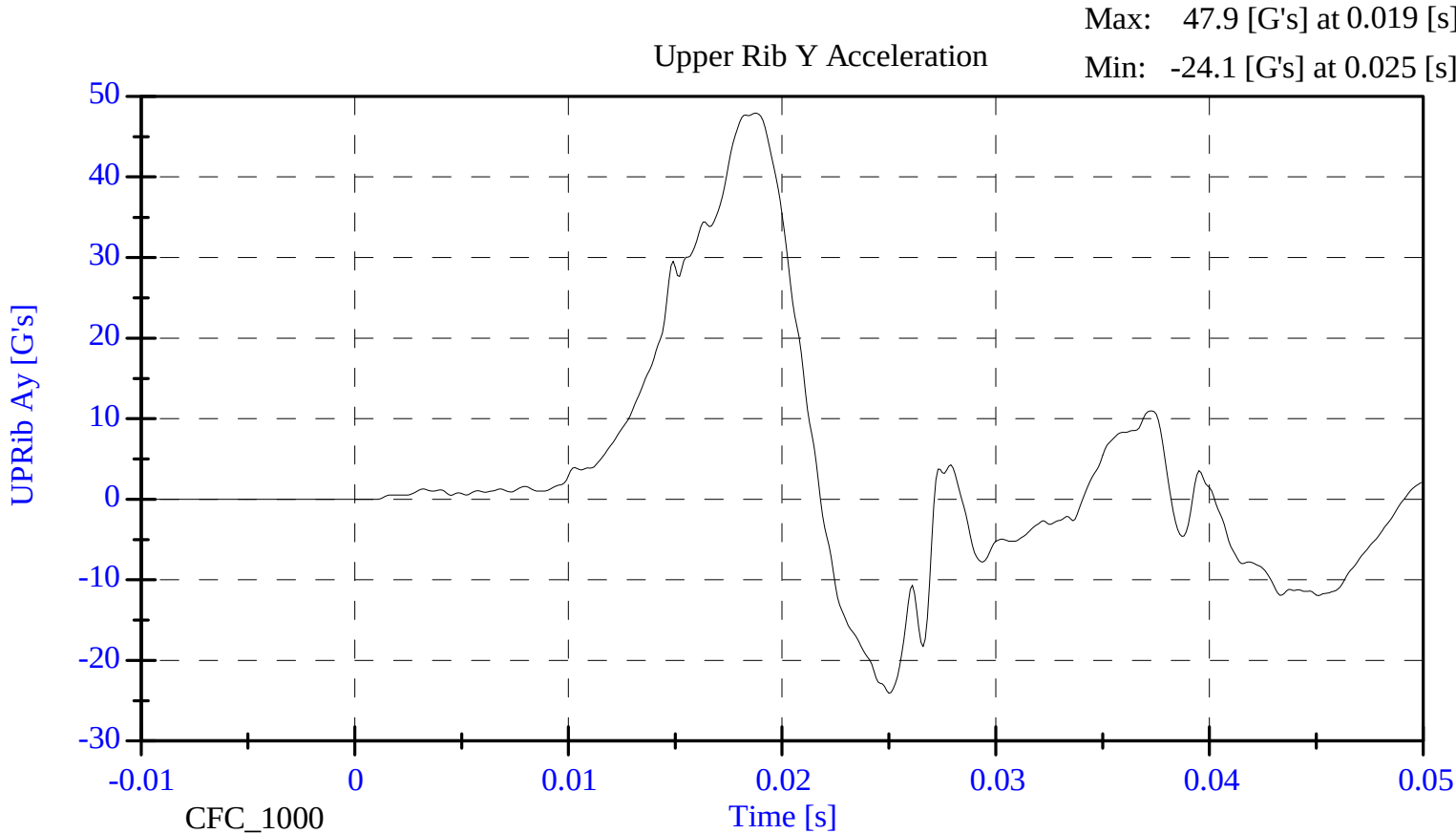
**LATERAL THORAX IMPACT TEST
POST TEST**

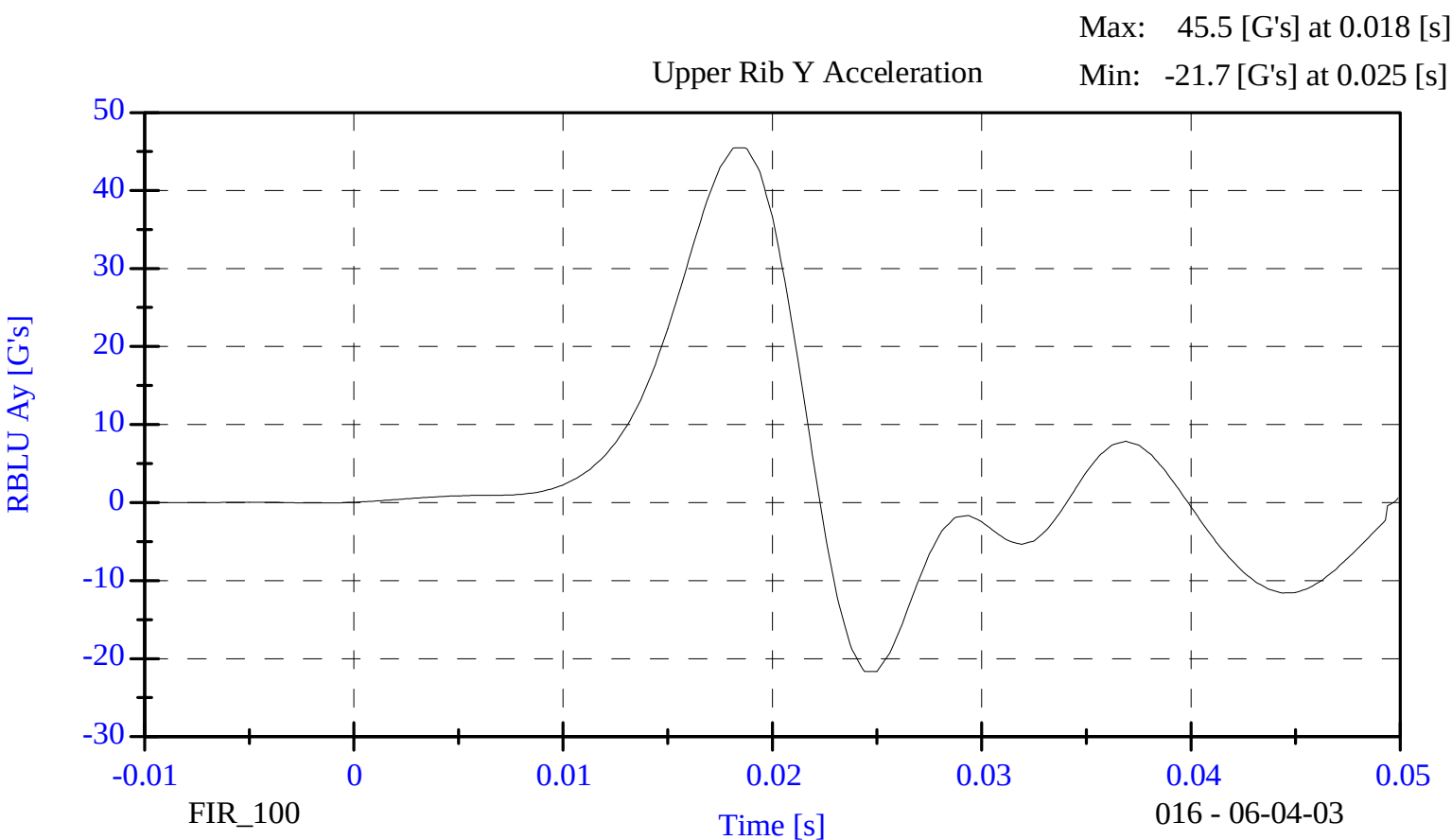
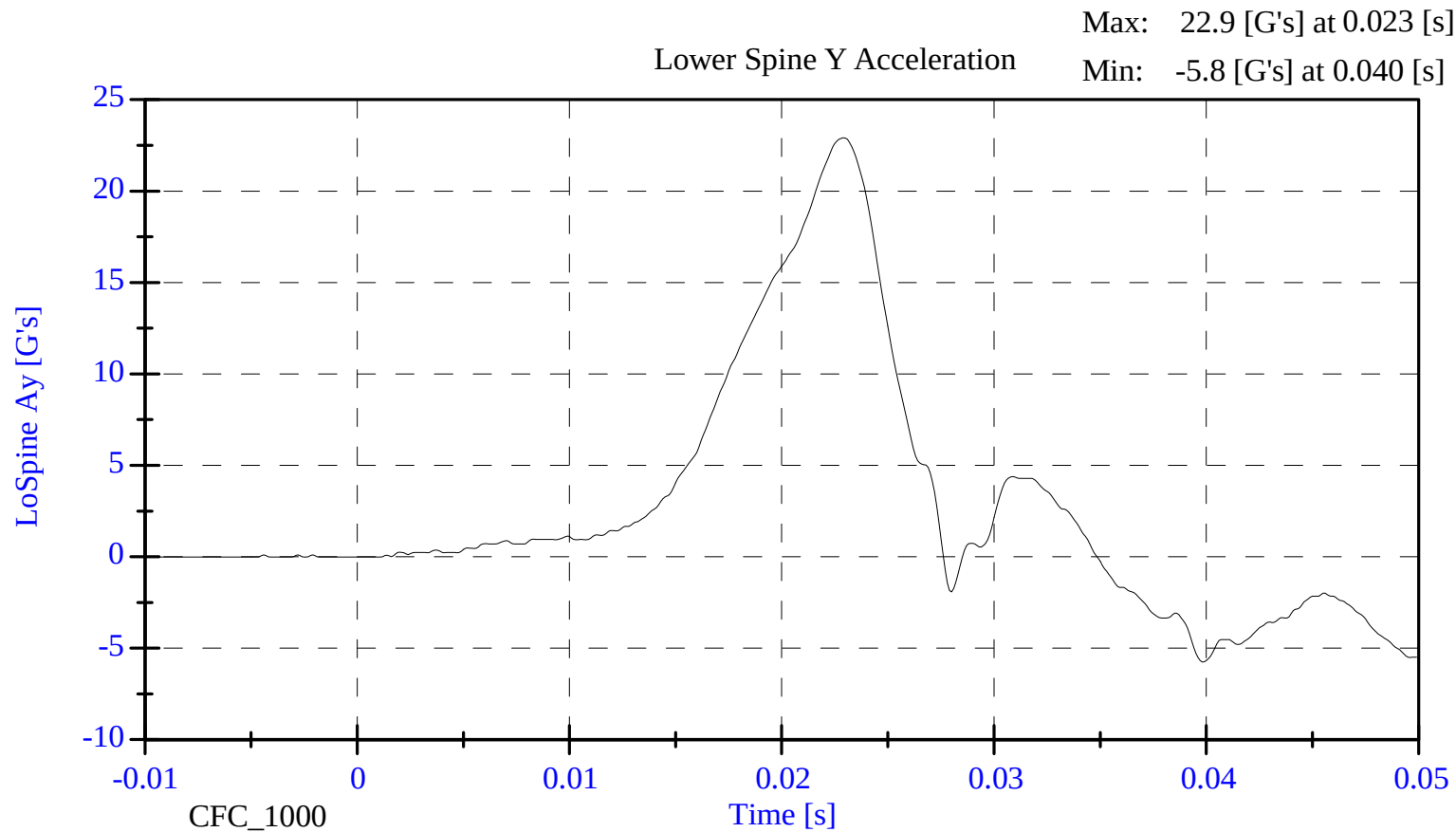
CONFIGURED FOR LEFT SIDE IMPACT

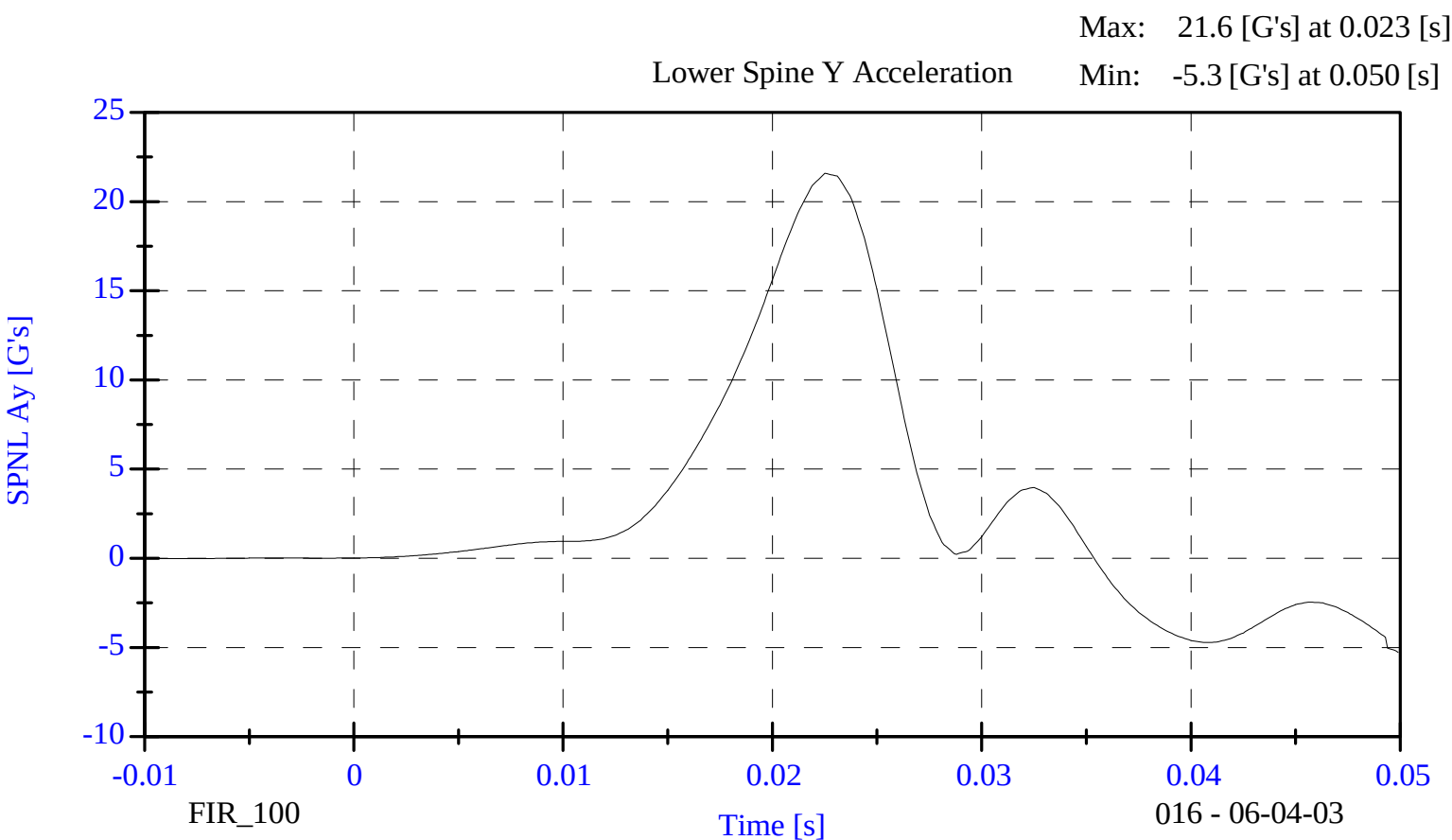
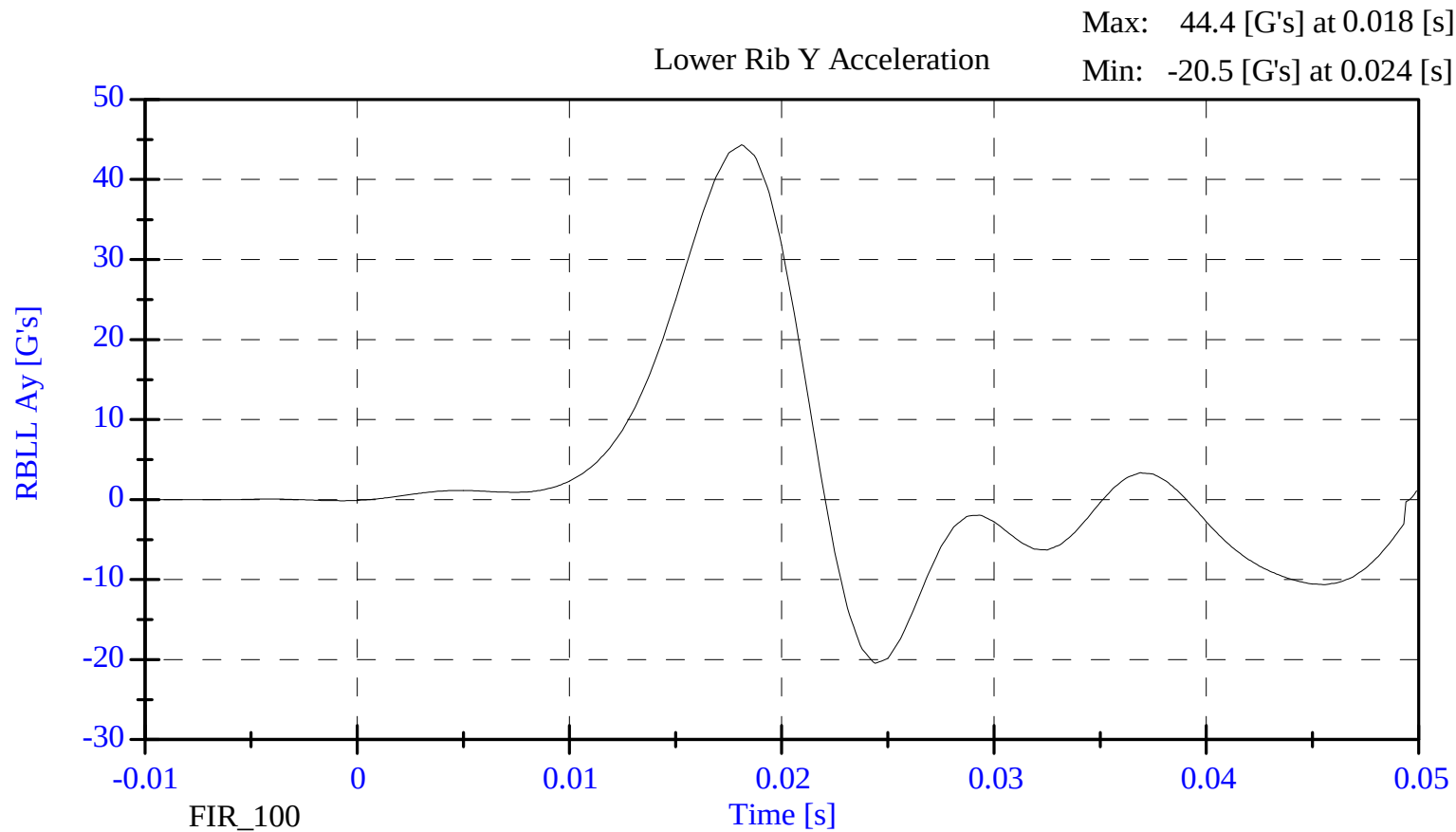
SID H3 Serial No.: 016 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	38.0
PROBE SPEED (m/s)	4.27 - 4.33	4.27
UPPER RIB (g's)	37 - 46	45.48
LOWER RIB (g's)	37 - 46	44.36
LOWER SPINE (g's)	15 - 22	21.60

REMARKS: None







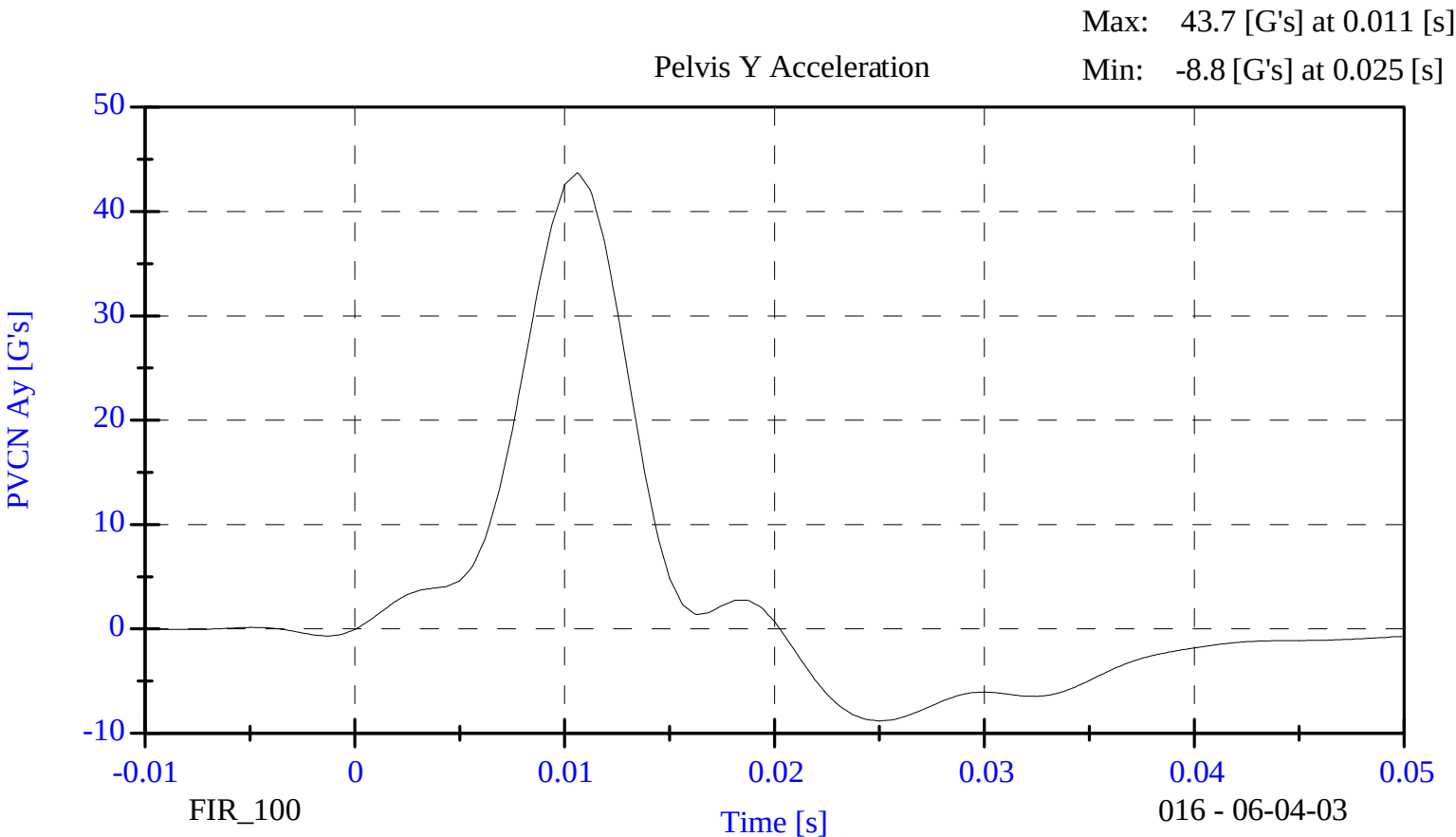
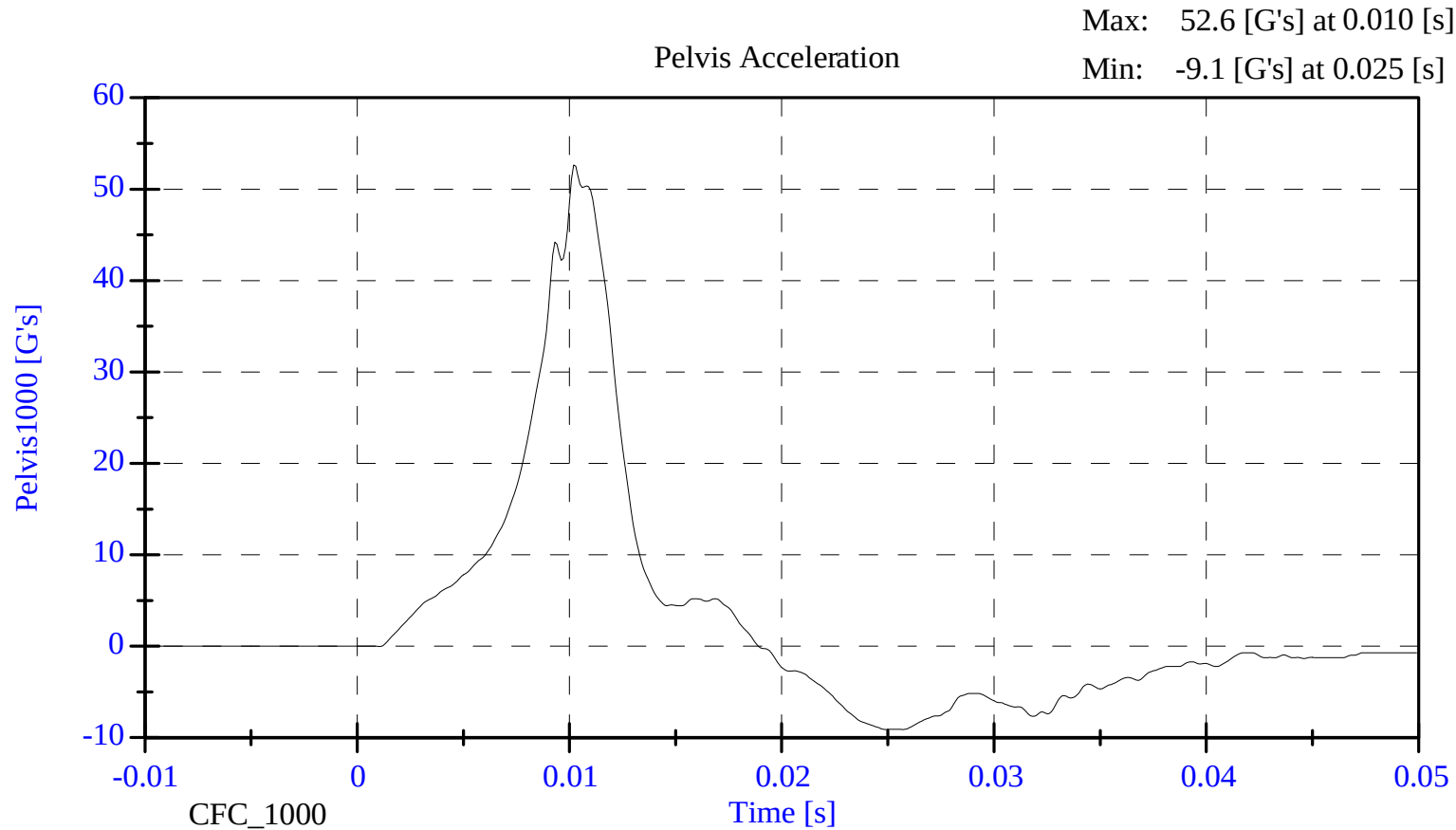
**LATERAL PELVIS IMPACT TEST
POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.:	016	Sequential Test Number:	1
Date:	06/04/2003	Laboratory Technician:	B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	38.0
PROBE SPEED (m/s)	4.27 - 4.33	4.28
PELVIS ACCELERATION (g's)	40 - 60	43.72

REMARKS: None



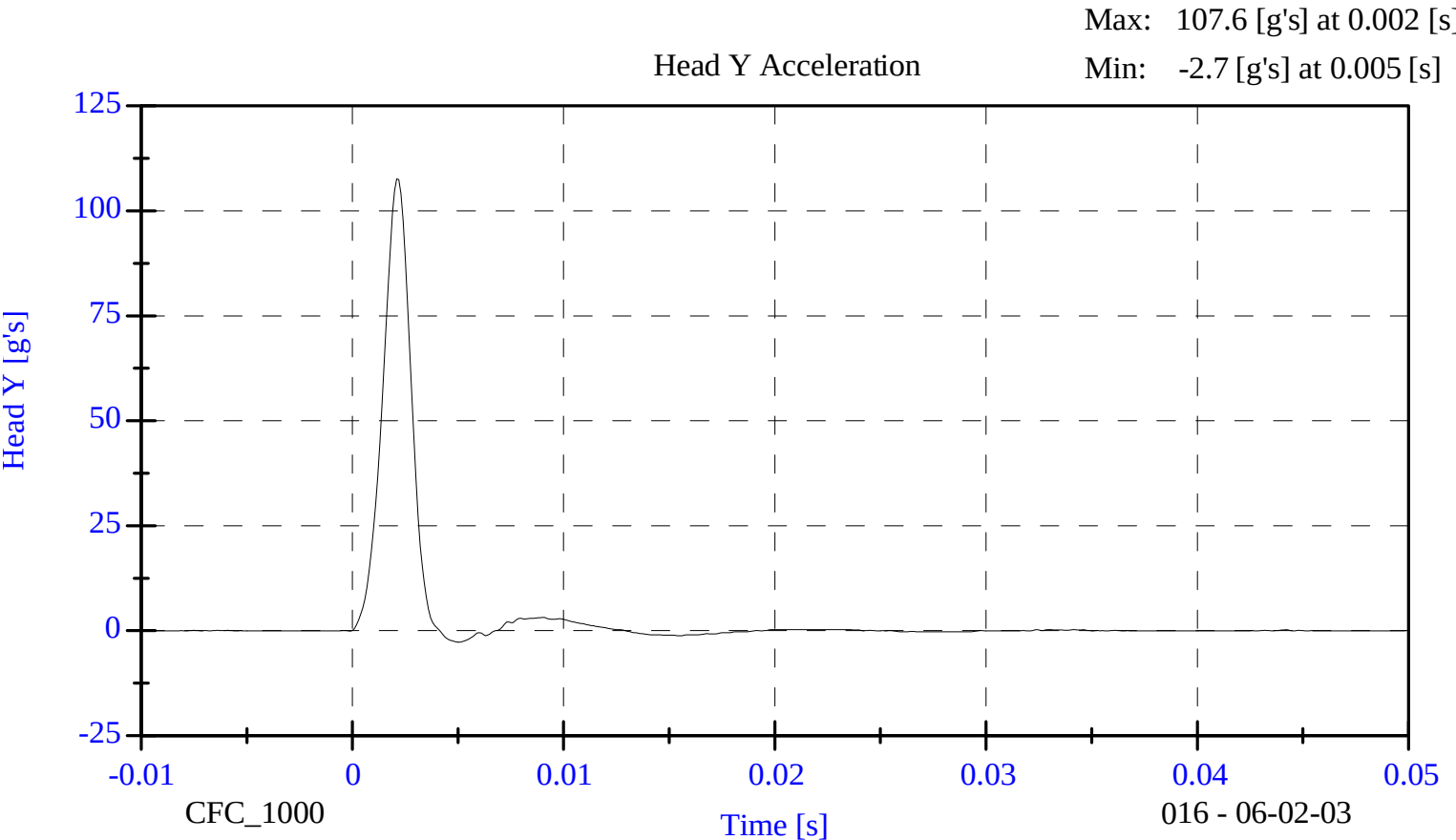
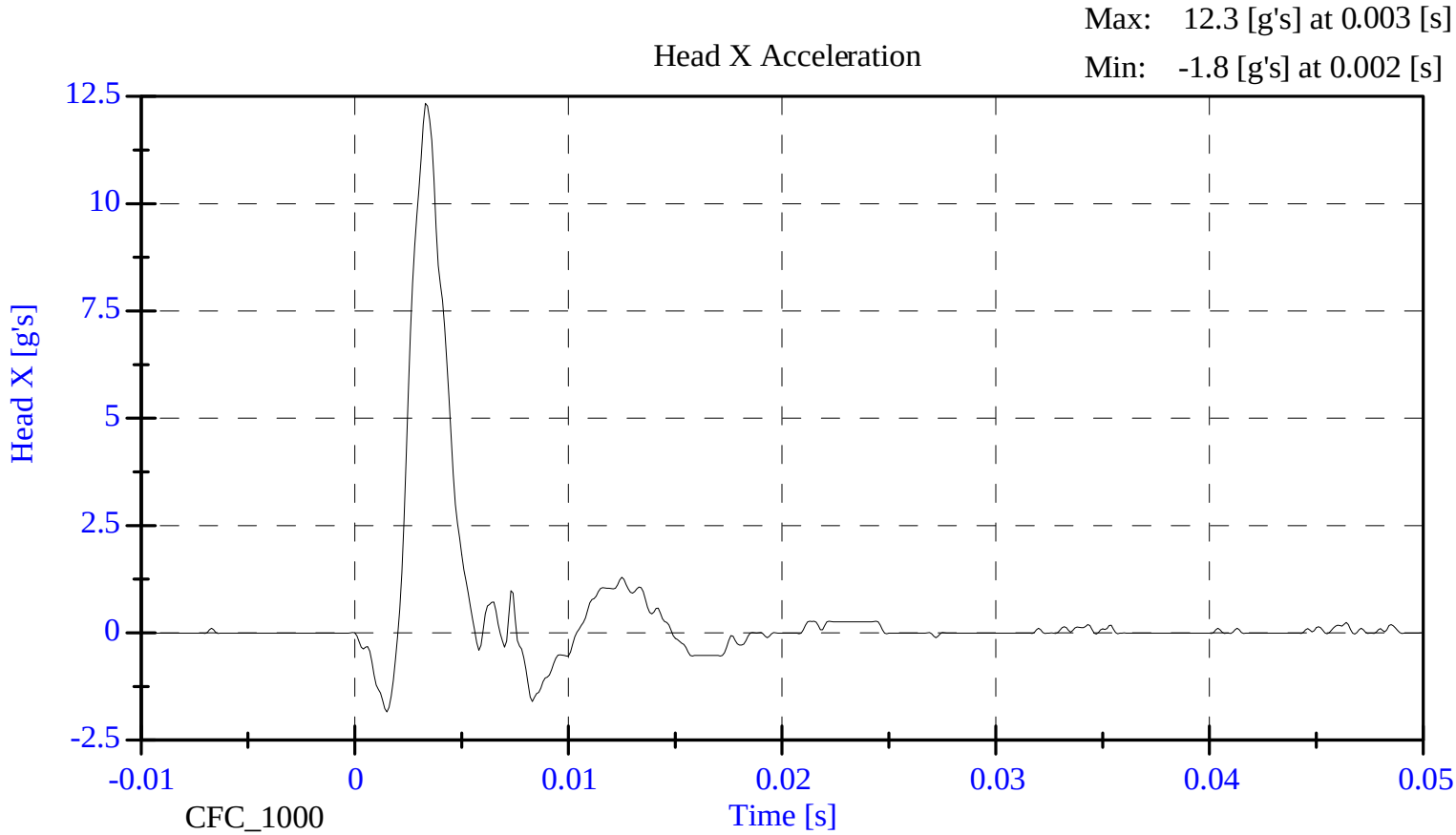
**HEAD DROP TEST
POST-TEST**
(Test not required for SID certification)

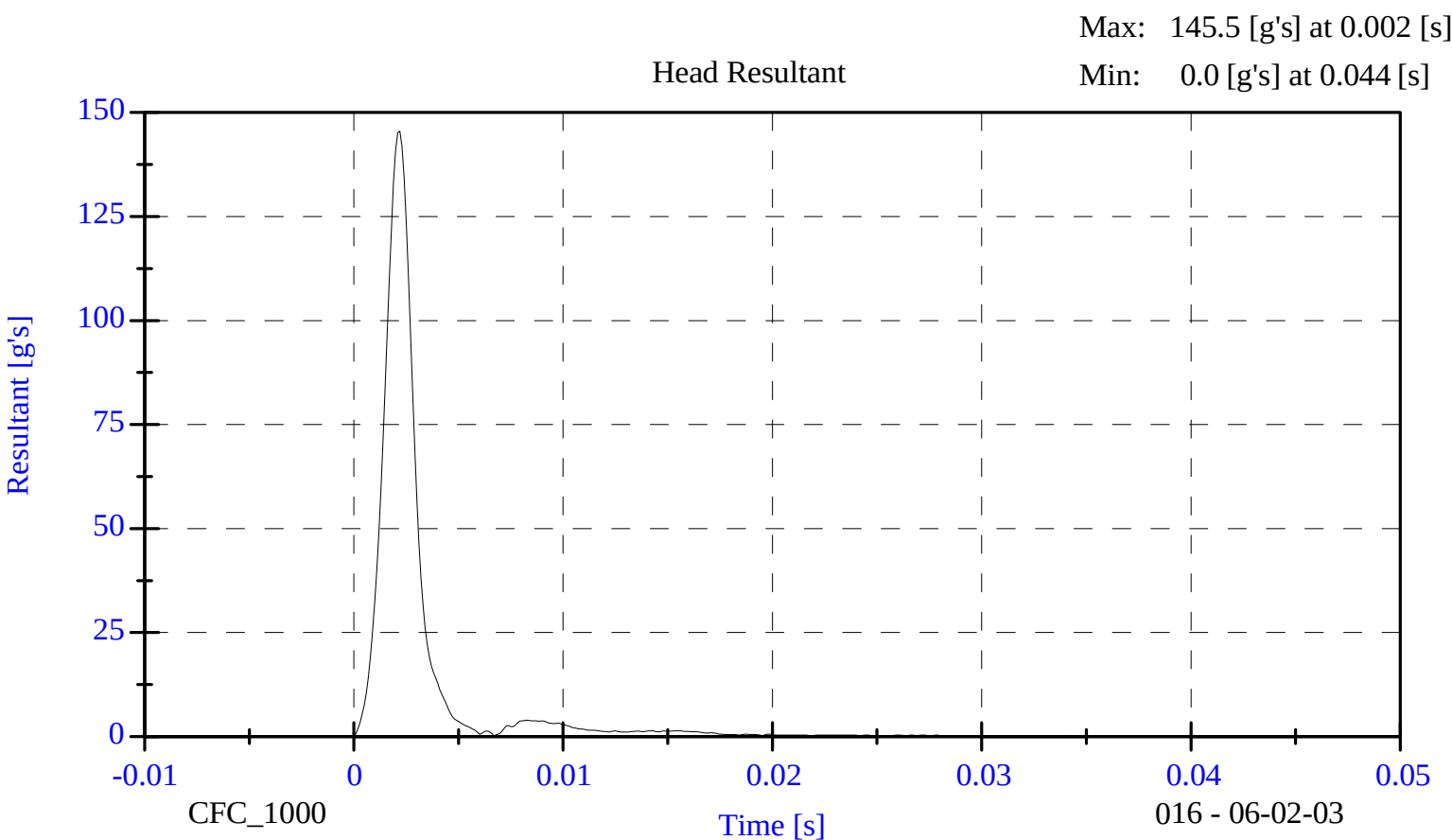
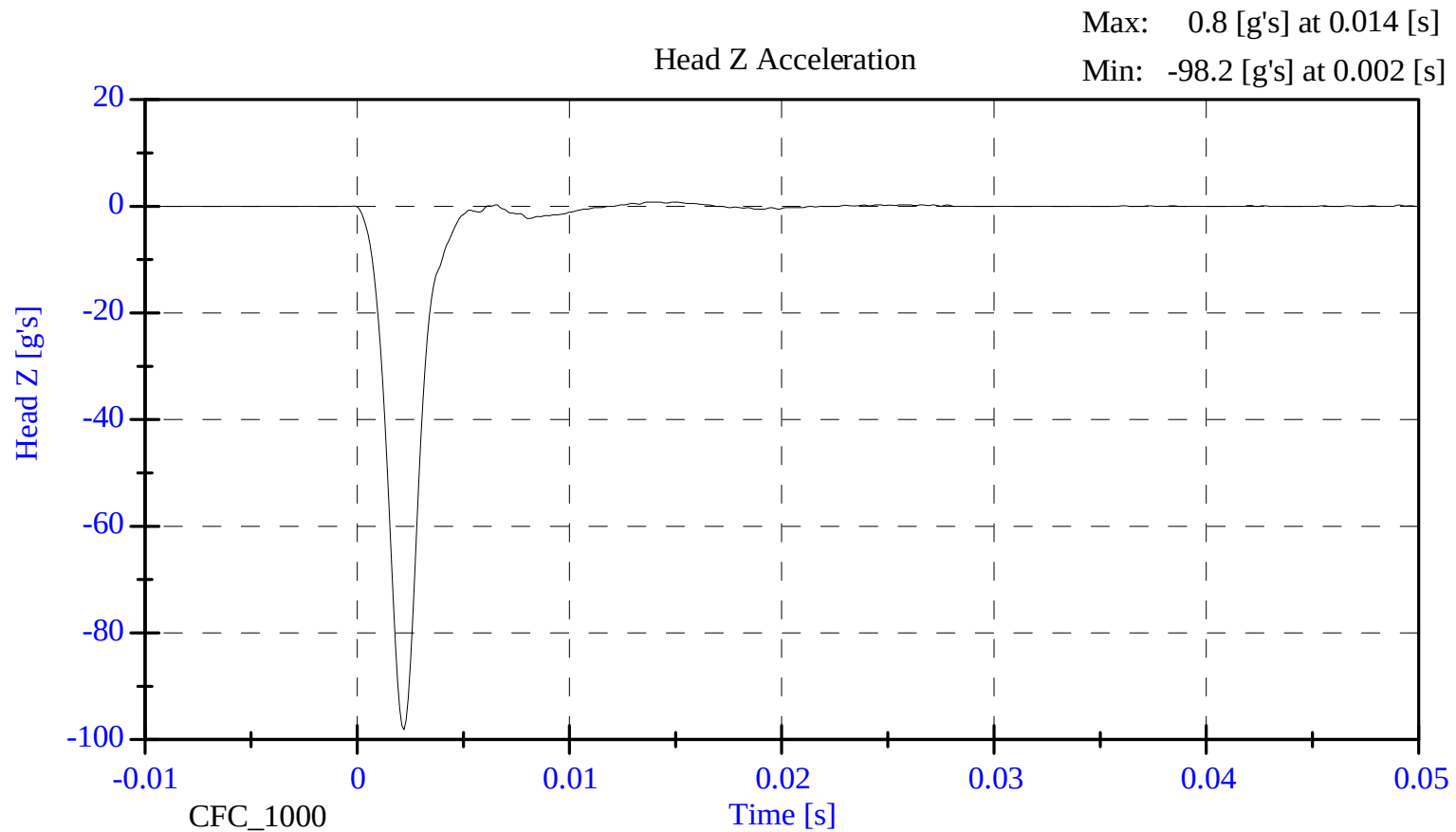
CONFIGURED FOR LEFT SIDE IMPACT

SID Serial No.: 016 Sequential Test Number: 1
Date: 06/02/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 – 22.2	21.1
RELATIVE HUMIDITY (%)	10 – 70	37.0
PEAK RESULTANT ACCELERATION (Gs)	120 – 150	145.51
PEAK LATERAL ACCELERATION (Gs)	Not to Exceed 15	12.34
CURVE PERCENT NONMODAL (%)	< 15	2.70

REMARKS: None





016 - 06-02-03

**LATERAL NECK BENDING TEST
POST-TEST**

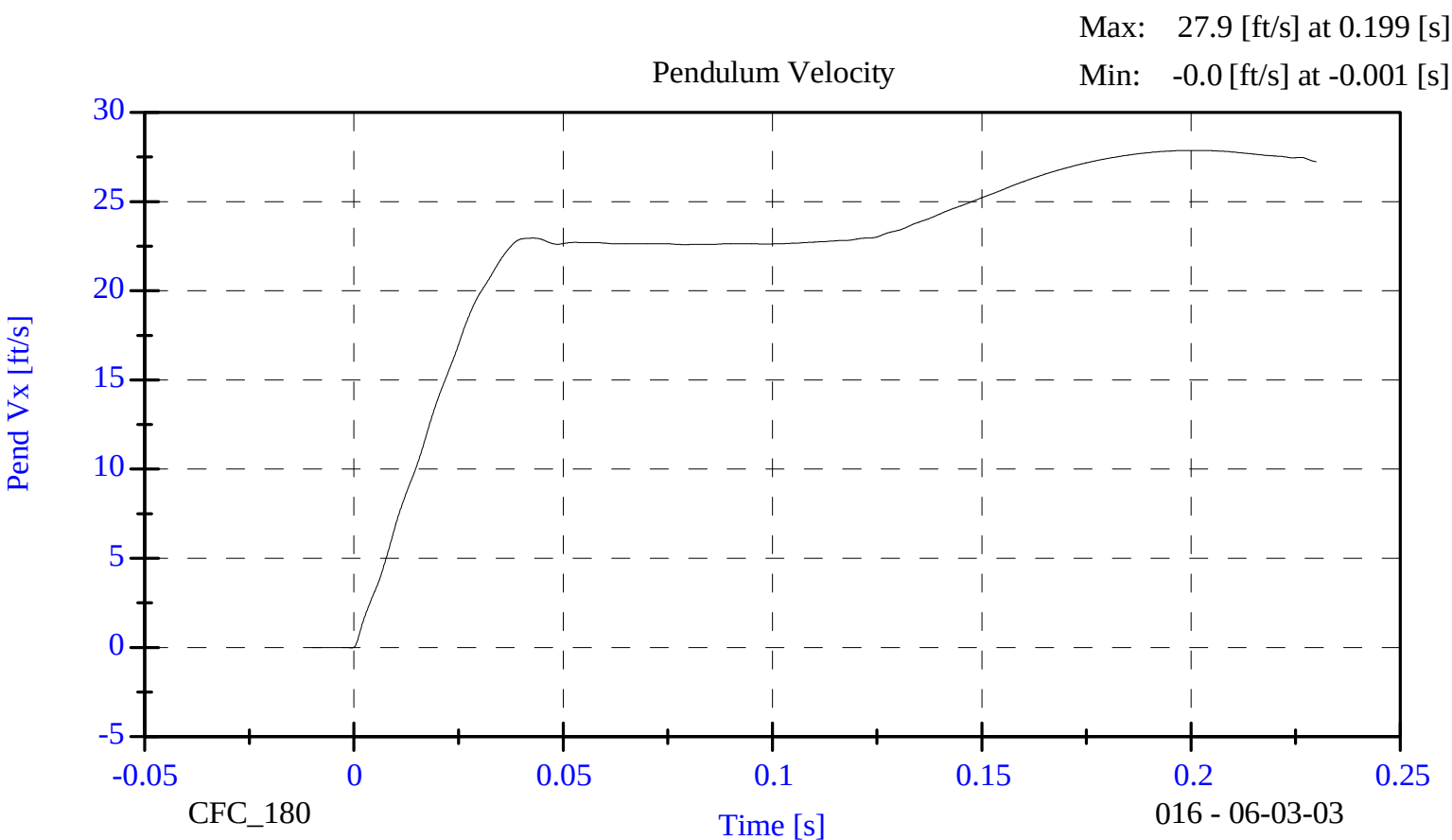
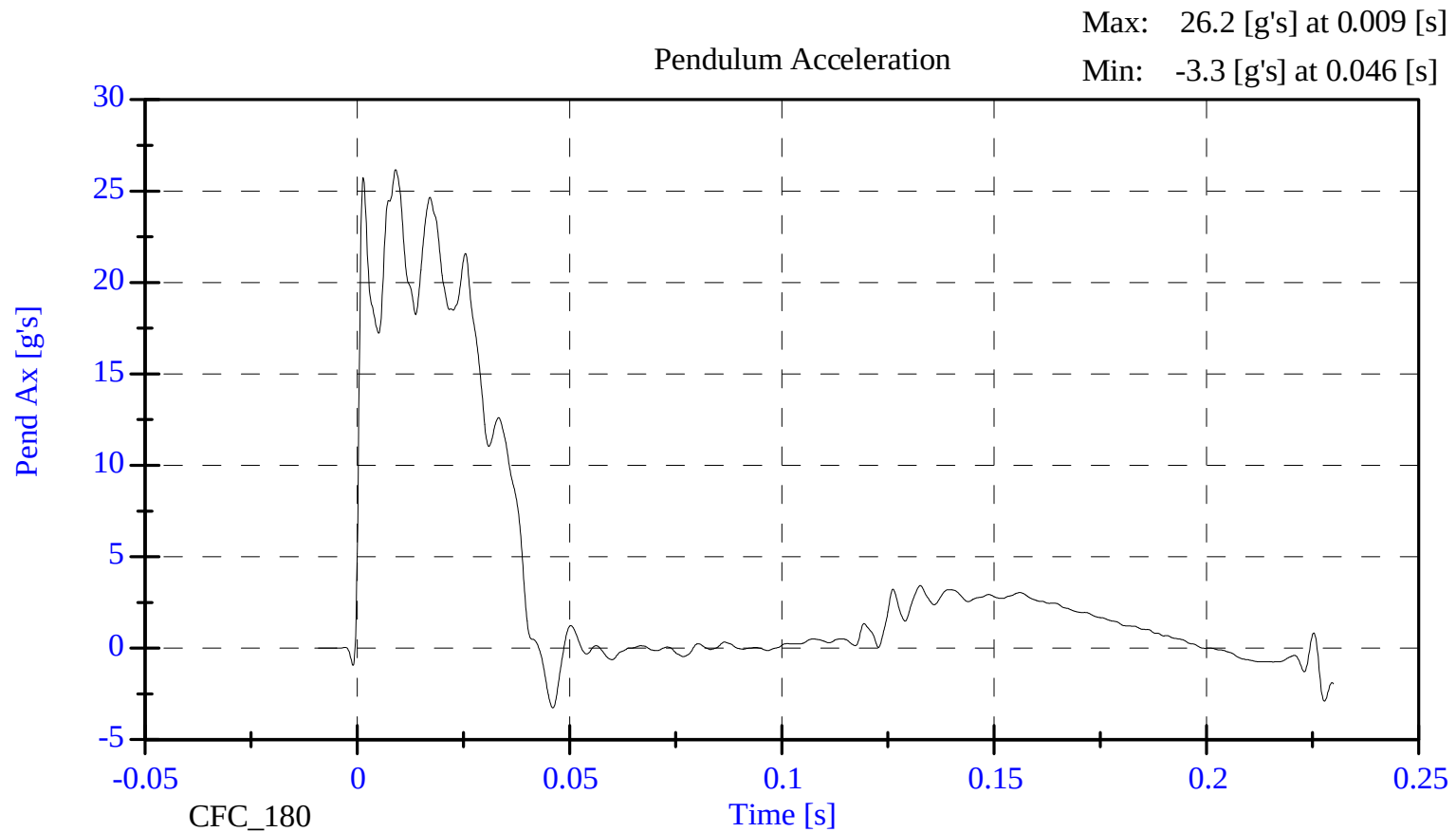
(Test not required for SID certification)

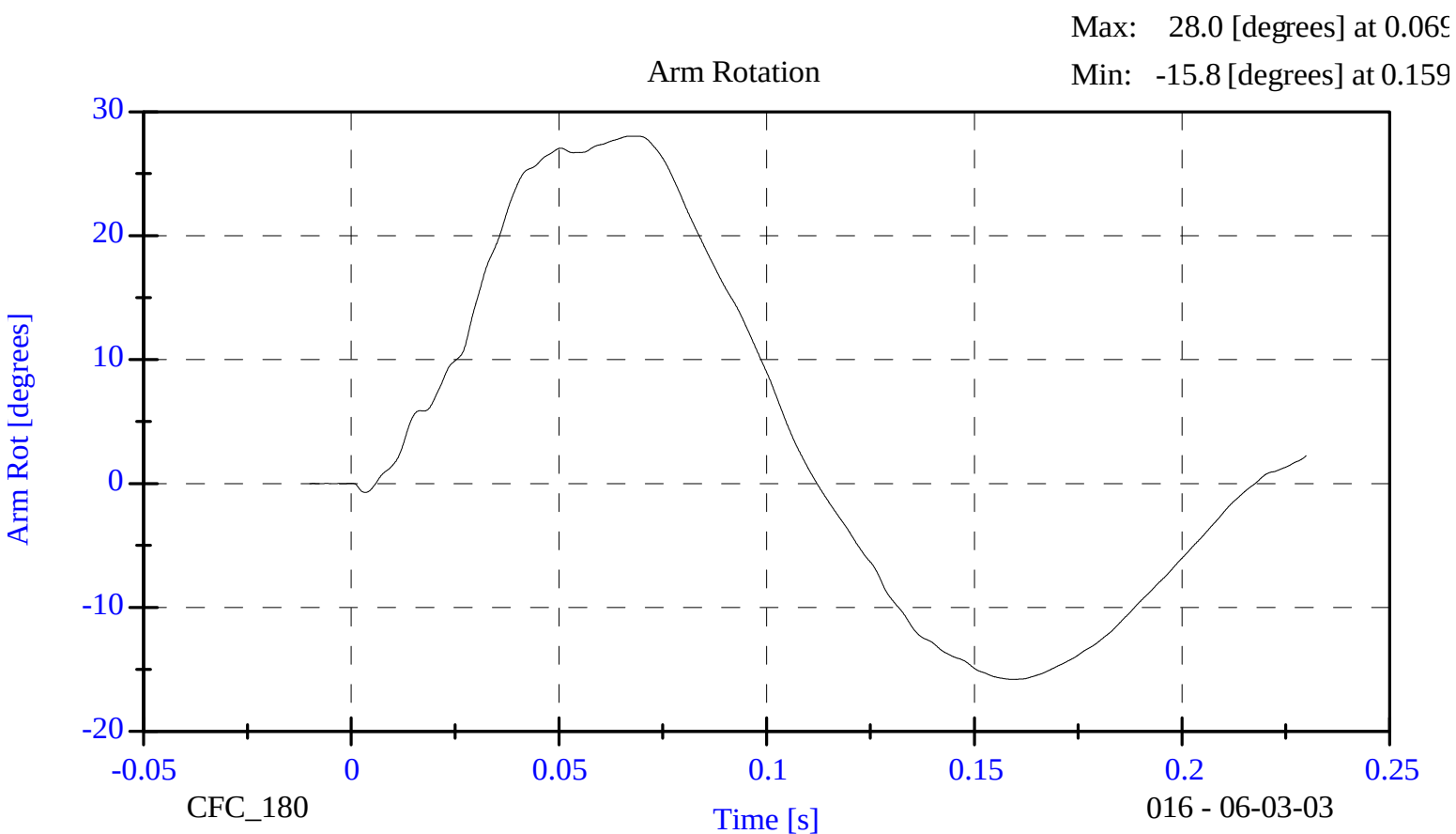
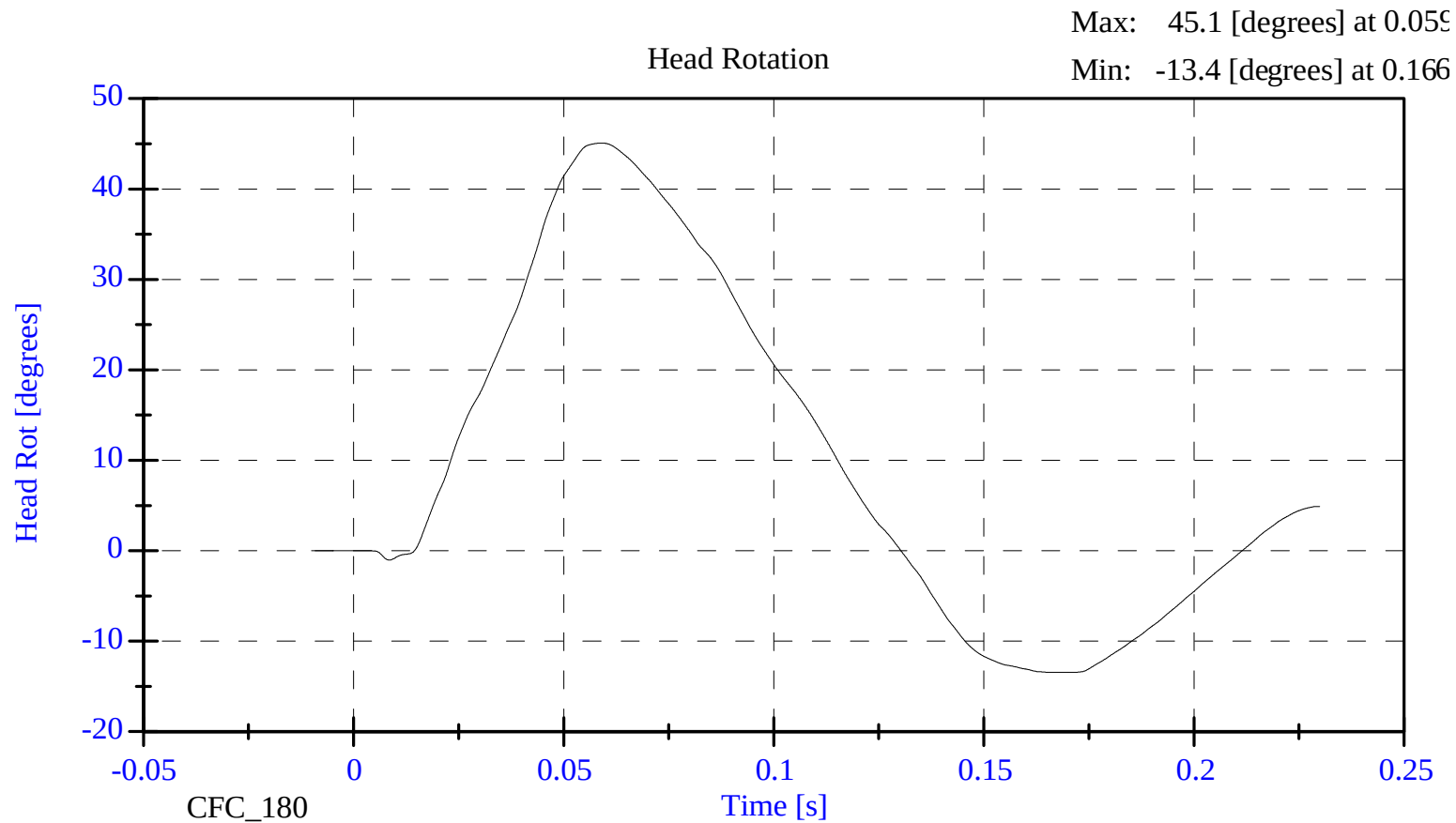
CONFIGURED FOR LEFT SIDE IMPACT

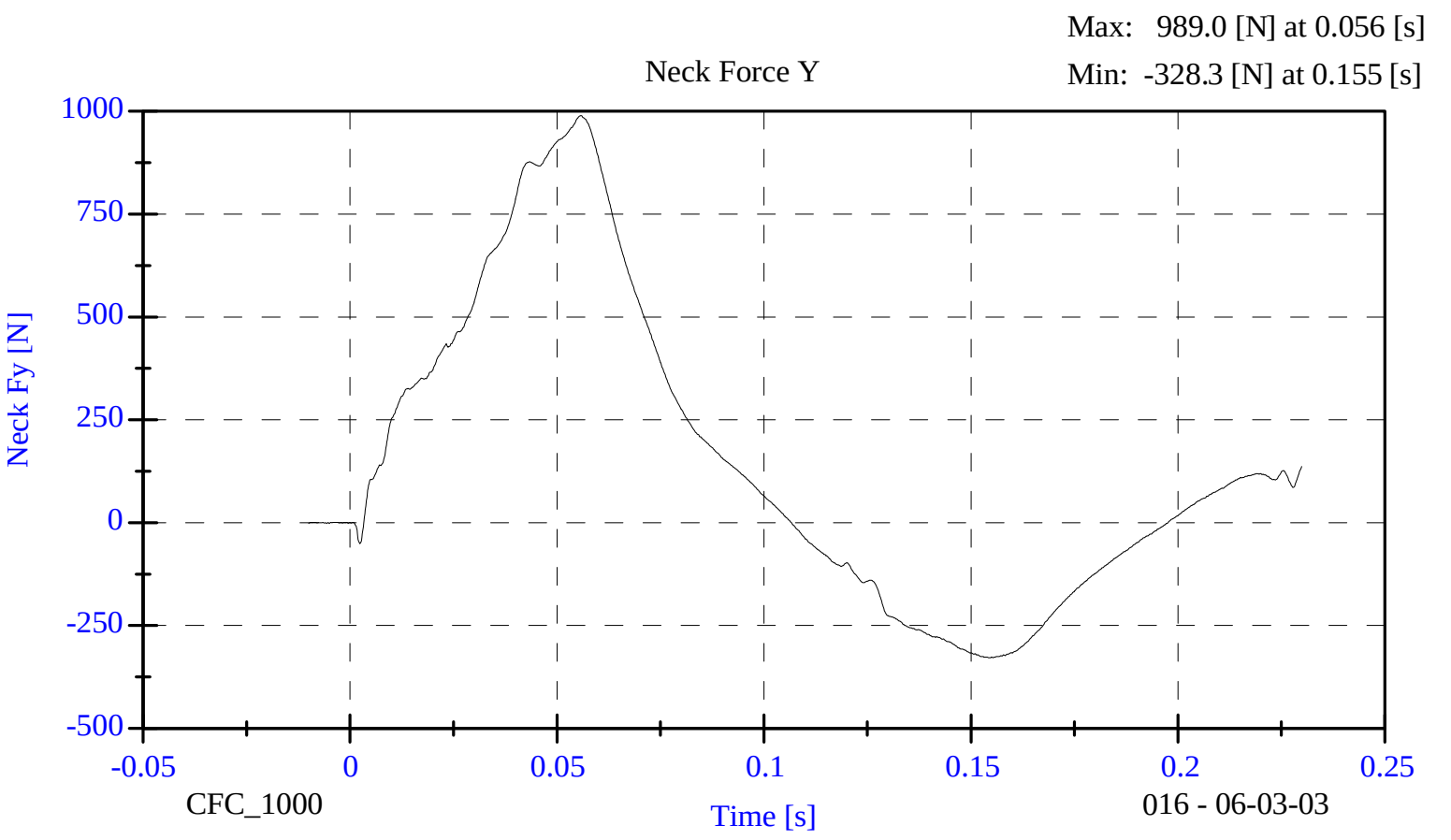
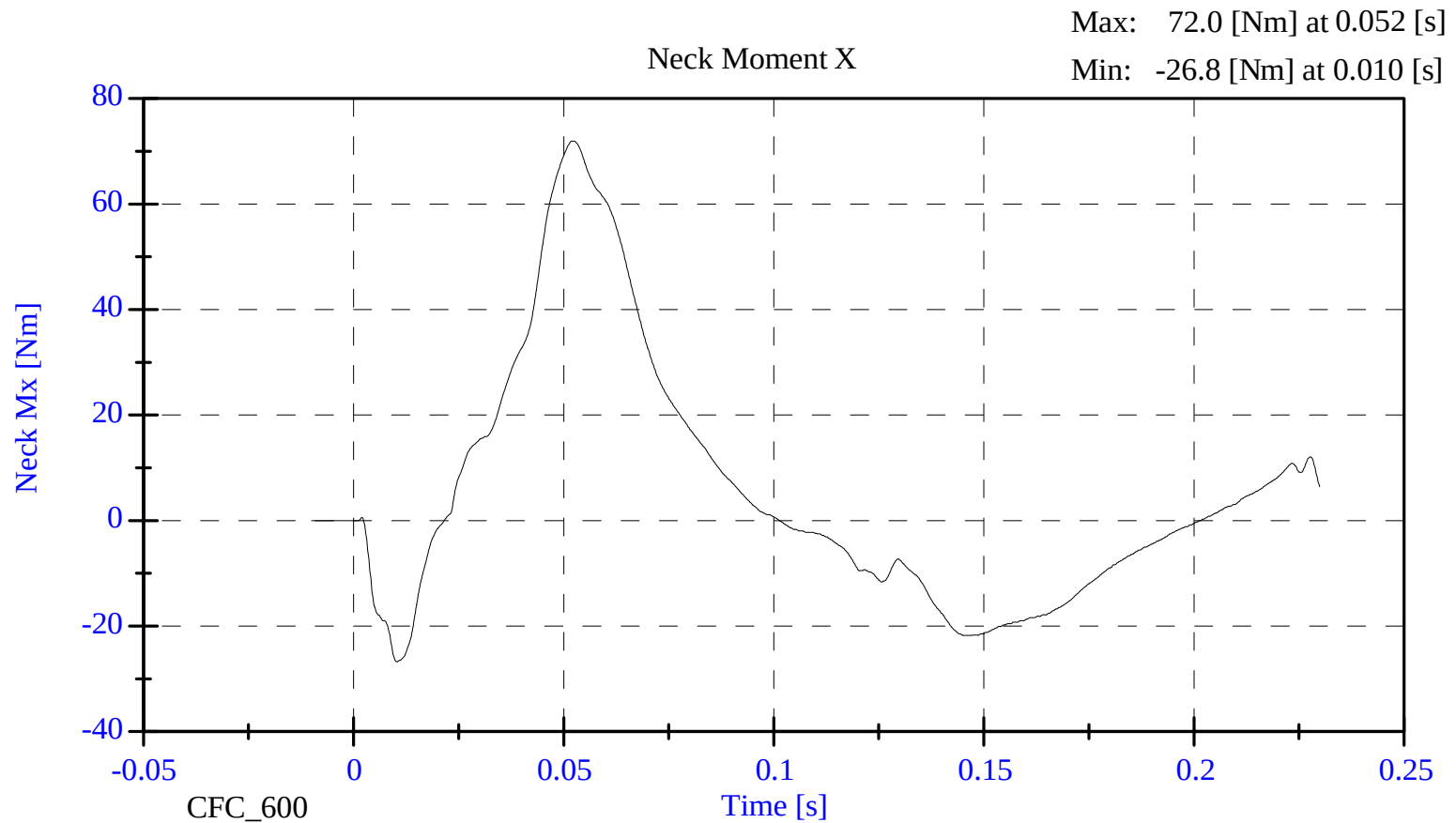
SID Serial No.: <u>016</u>	Sequential Test Number: <u>1</u>	
Date: <u>06/03/2003</u>	Laboratory Technician: <u>B. Swiecicki</u>	

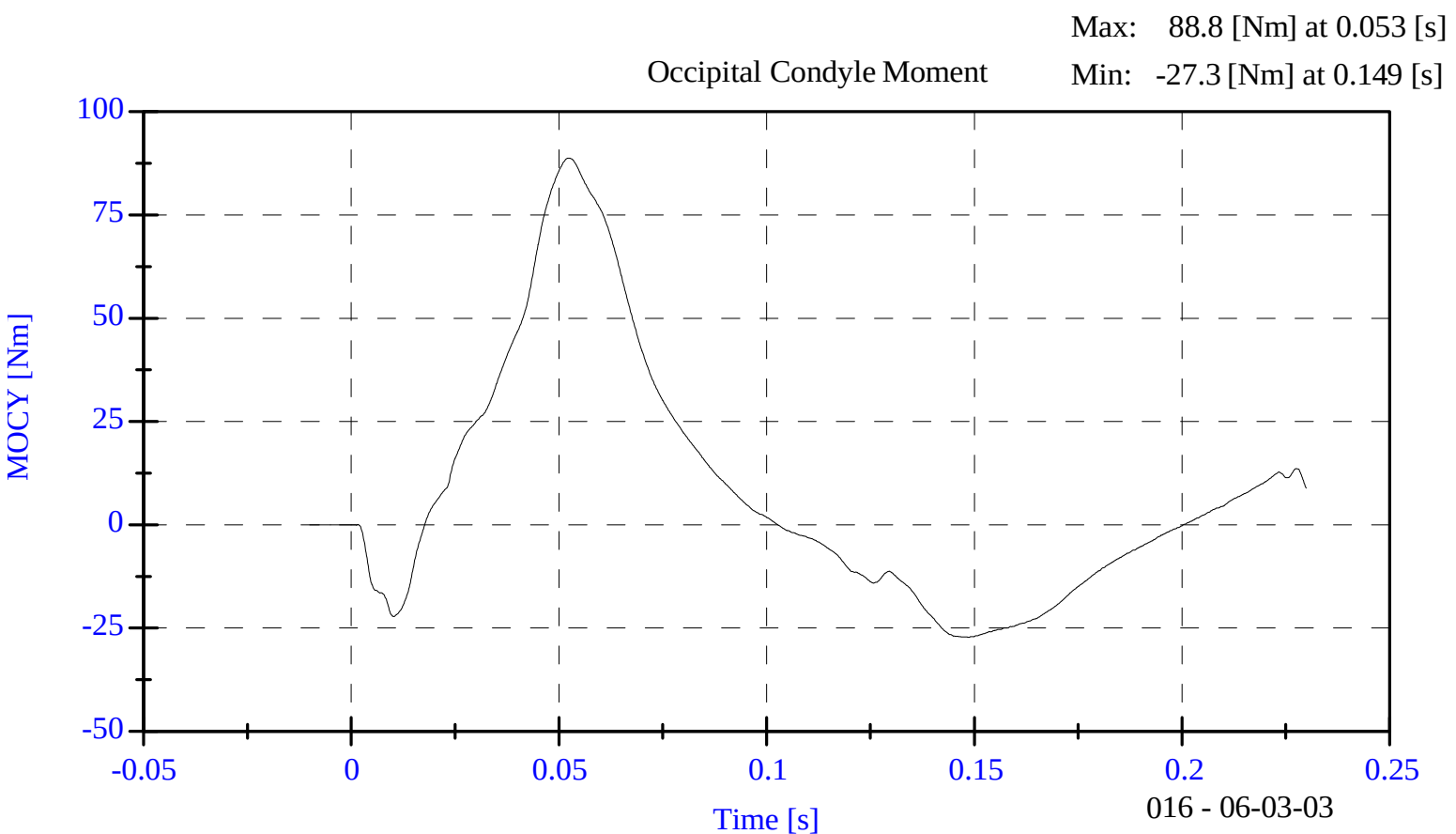
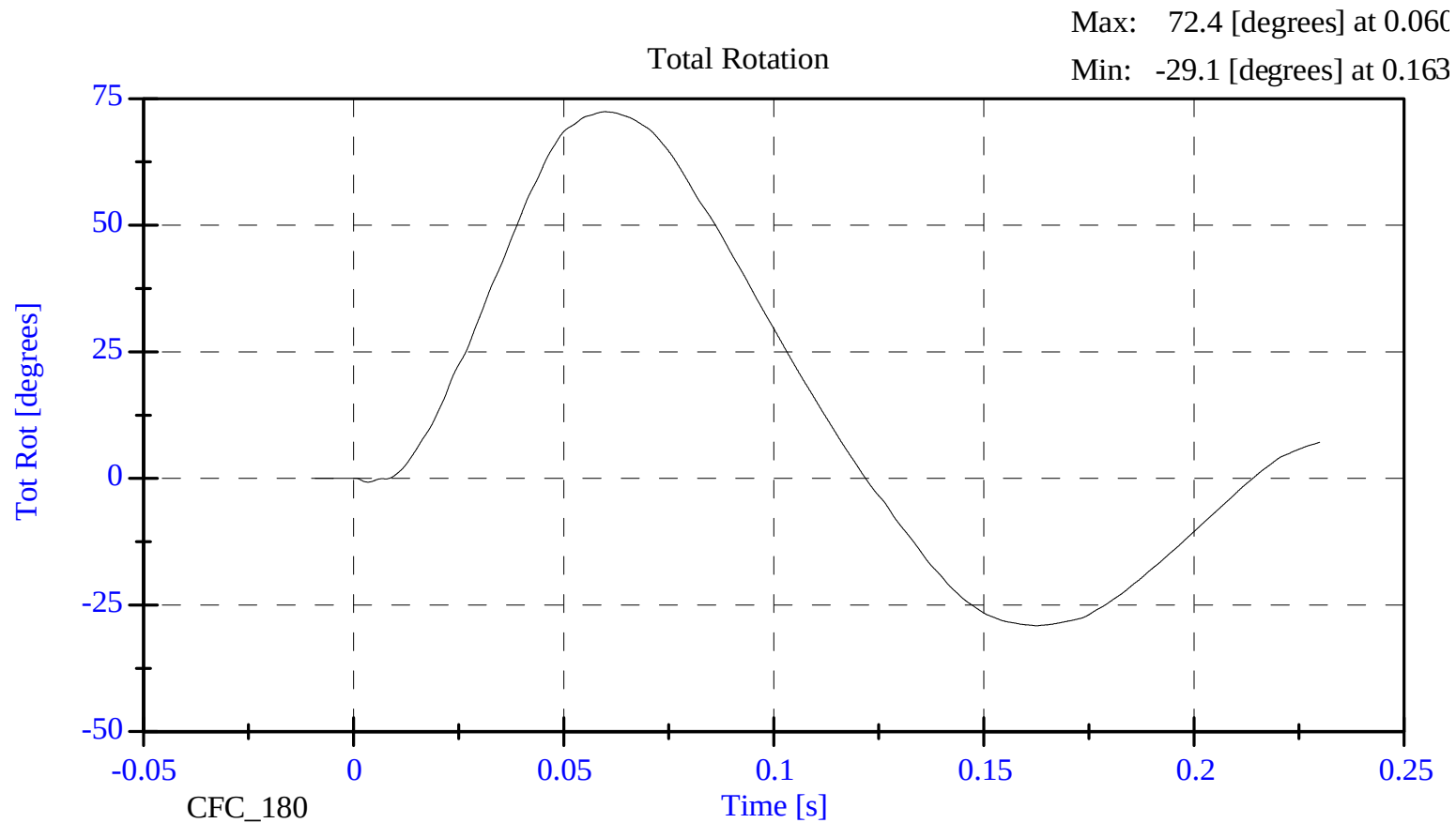
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	20.6 - 22.2	21.1
RELATIVE HUMIDITY (%)	10 - 70	40.0
IMPACT VELOCITY (m/s)	6.89 – 7.13	6.91
PENDULUM DELTA V		
DELTA V @ 10 ms (m/s)	1.96 – 2.55	2.10
DELTA V @ 20 ms (m/s)	4.12 – 5.10	4.23
DELTA V @ 30 ms (m/s)	5.73 – 7.01	6.04
DELTA V @ 40-70 ms (m/s)	6.27 – 7.64	7.00
D PLANE ROTATION		
MAXIMUM ROTATION (deg)	64 – 78	72.37
ROT. ANGLE TIME to ZERO (ms)	50 – 70	62.10
MOMENT ABOUT THE OCCIPITAL CONDYLE		
MAX OCCIPITAL MOMENT (Nm)	88 – 108	88.76
OCCIPITAL MOMENT DECAY (ms)	40.0 – 60.0	50.20
HEAD ROTATION TIME WITH RESPECT TO THE OCCIPITAL CONDYLE MOMENT		
ROTATION wrt MOMENT (ms)	0 – 20	7.30

REMARKS: None









**ABDOMINAL COMPRESSION TEST
POST TEST**

(Test not required for SID certification)

CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40.0
FORCE @ 13 mm (N)	104 - 162	119.2
FORCE @ 19 mm (N)	163 - 221	191.5
FORCE @ 25 mm (N)	222 - 280	264.2
FORCE @ 33 mm (N)	325 - 391	364.7

REMARKS: None

Dummy S/N 016

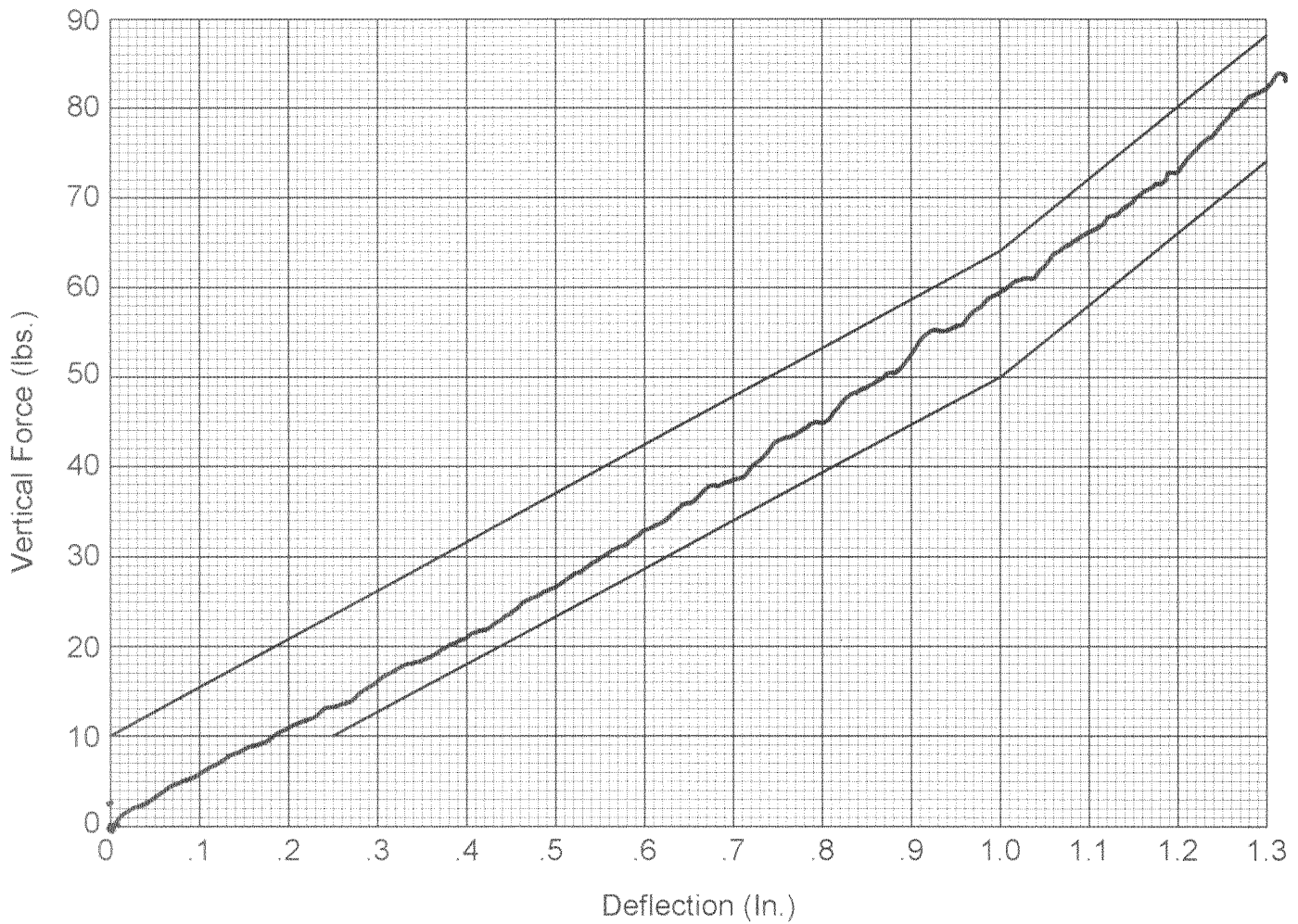
W/A _____

Date 06-04-03

Performed By [Signature]

Temp. 70°

Humidity 40%



Hybrid II
Abdomen Static Press

LUMBAR FLEXION TEST
POST TEST
(Test not required for SID certification)

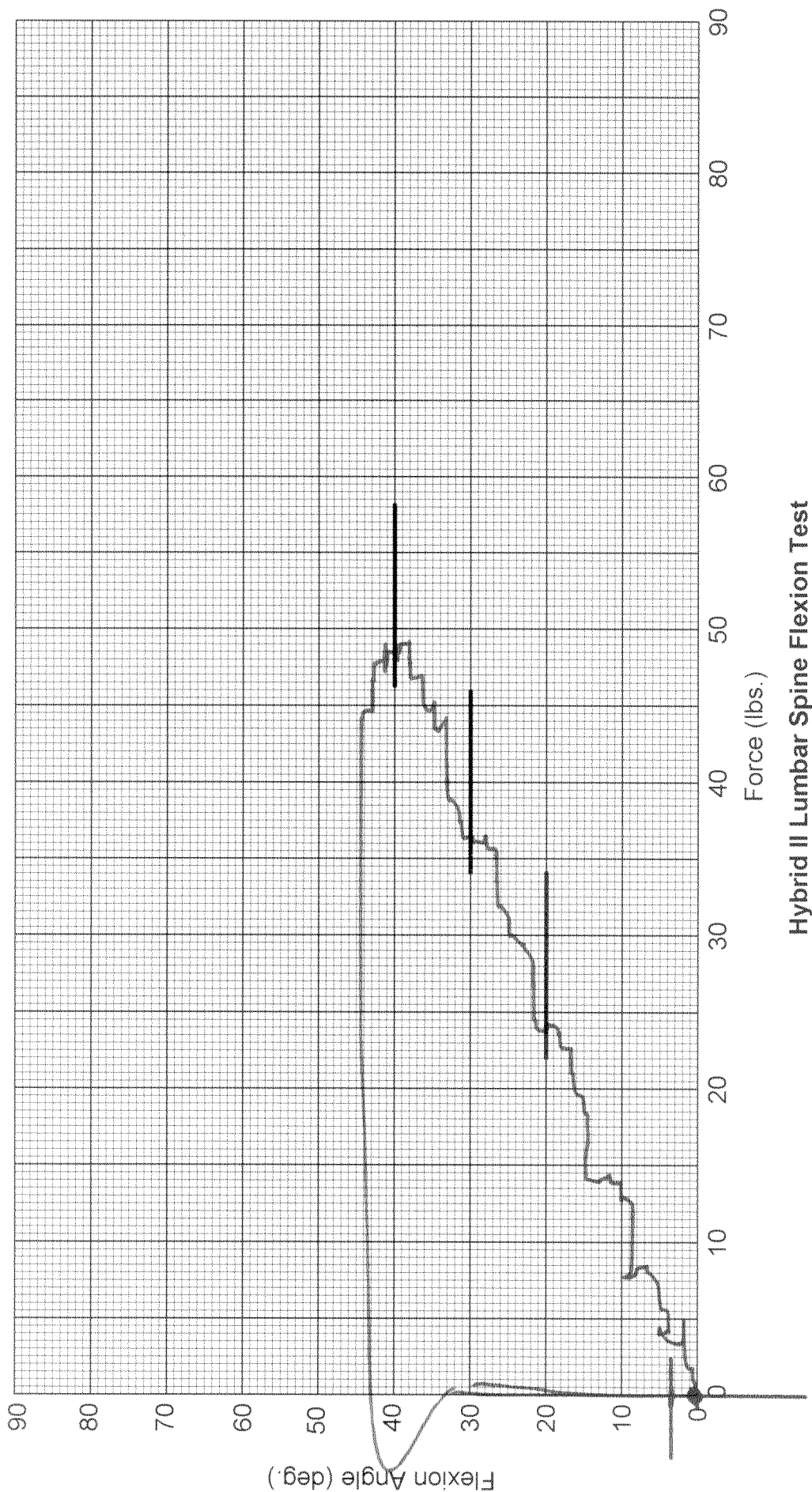
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 1
Date: 06/04/2003 Laboratory Technician: B. Swiecicki

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE (°C)	18.9 - 25.5	21.1
RELATIVE HUMIDITY (%)	10 - 70	40.0
FORCE @ 0° (N)	0 - 26.7	0.0
FORCE @ 20° (N)	97.8 - 151.2	106.3
FORCE @ 30° (N)	151.2 - 204.6	161.9
FORCE @ 40° (N)	204.6 - 258	211.3
RETURN ANGLE	12° max.	3.4°

REMARKS: None

Dummy S/N 016
 W/A _____
 Date 06-04-03
 Performed By BB
 Temp. 70°
 Humidity 40%



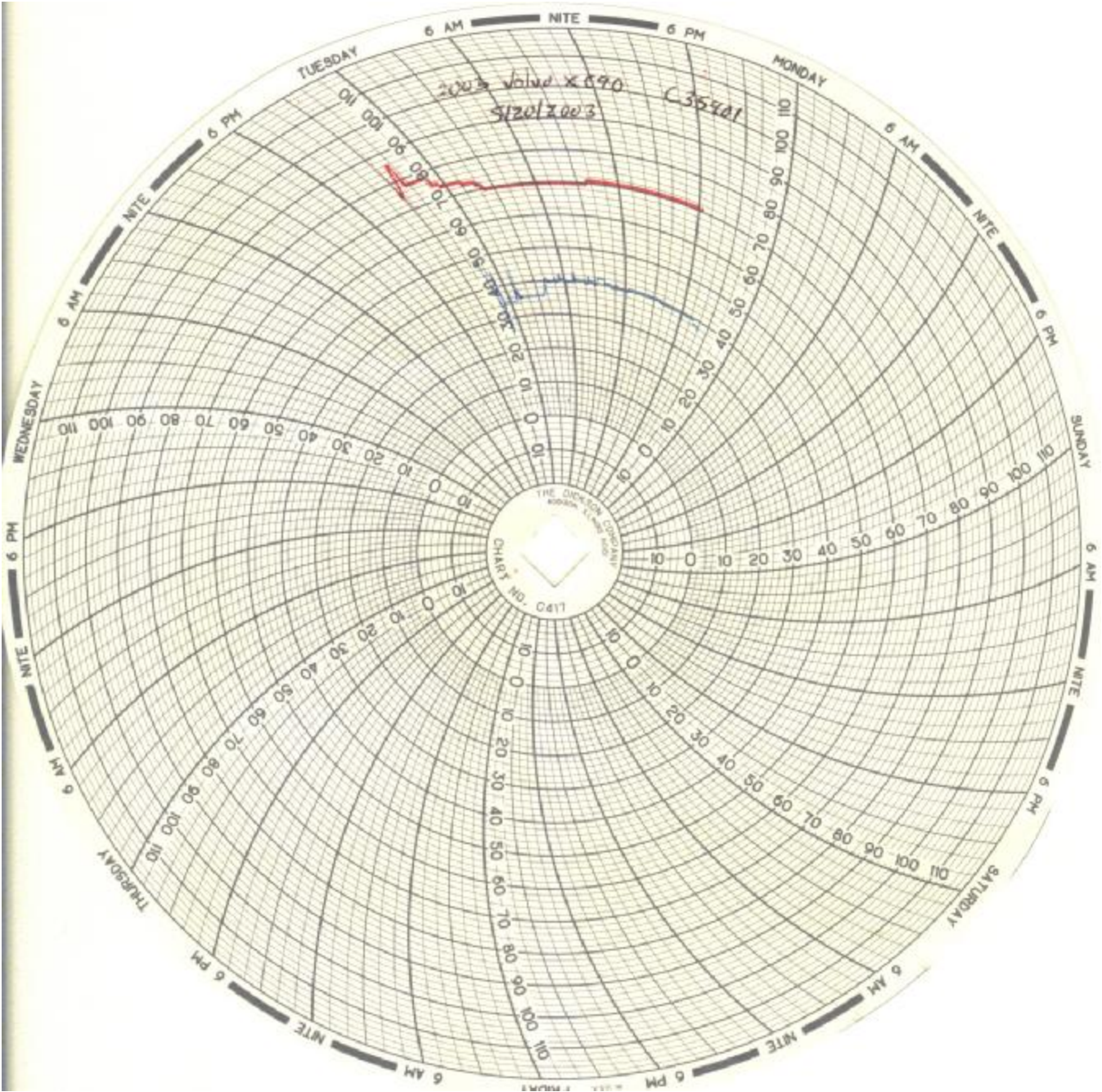
POST TEST DUMMY INSPECTION LIST
CONFIGURED FOR LEFT SIDE IMPACT

SID H3 Serial No.: 016 Sequential Test Number: 1
 Date: 06/04/2003 Laboratory Technician: B. Swiecicki

PART	ITEMS CHECKED	COMMENTS
SKIN	VISUAL INSPECTION	OK
HEAD	VISUAL, BALLAST, ACCELEROMETER MOUNT	OK
NECK	VISUAL, CABLE TORQUE	OK
SPINE BOX	VISUAL, BALLAST, WELDMENT, ACCELEROMETER MOUNT	OK
RIB CAGE	VISUAL, MEASURE, STIFFENERS	OK
STERNUM	VISUAL	OK
LUMBAR SPINE	VISUAL	OK
ABDOMEN	VISUAL	OK
PELVIS	VISUAL, PALPATE, ACCELEROMETER MOUNT	OK
UPPER LEGS	VISUAL	OK
KNEES	VISUAL, STOPS, INSERTS	OK
LOWER LEGS	VISUAL, RANGE OF MOTION	OK
ANKLES	VISUAL, RANGE OF MOTION	OK
FEET	VISUAL, RANGE OF MOTION	OK
JOINTS	1 TO 2 g RANGE	OK
OTHER	NONE	-

REMARKS: None

TEMPERATURE TRACE



APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION
SID INSTRUMENTATION

	FRONT SID NO.: 015		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
NAAH HEAD X ARM Y	AC-01G18-F06	ENTRAN	4/7/2003
NAAH HEAD X ARM Z	AC-01B00L13-F39	ENTRAN	4/7/2003
NAAH HEAD Y ARM X	AC-00L13-F14	ENTRAN	4/7/2003
NAAH HEAD Y ARM Z	AC-01G18-F16	ENTRAN	4/7/2003
NAAH HEAD Z ARM X	AC-01B00L13-F72	ENTRAN	4/7/2003
NAAH HEAD Z ARM Y	AC-01G18-F12	ENTRAN	4/7/2003
HEAD AX	AC-P23993	ENDEVCO	12/4/2002
HEAD AY	AC-P23939	ENDEVCO	12/4/2002
HEAD AZ	AC-P23999	ENDEVCO	12/4/2002
UPPER NECK FX	LC-260FX	DENTON	12/12/2002
UPPER NECK FY	LC-260FY	DENTON	12/12/2002
UPPER NECK FZ	LC-260FZ	DENTON	12/12/2002
UPPER NECK MX	LC-260MX	DENTON	12/12/2002
UPPER NECK MY	LC-260MY	DENTON	12/12/2002
UPPER NECK MZ	LC-260MZ	DENTON	12/12/2002
UPPER RIB	AC-P16862	ENDEVCO	2/18/2003
LOWER RIB	AC-P16656	ENDEVCO	2/18/2003
LOWER SPINE	AC-P16866	ENDEVCO	2/18/2003
PELVIS	AC-P16676	ENDEVCO	2/18/2003
UPPER RIB REDUNDANT	AC-P23156	ENDEVCO	2/18/2003
LOWER RIB REDUNDANT	AC-P16645	ENDEVCO	2/18/2003
LOWER SPINE REDUNDANT	AC-P19343	ENDEVCO	4/18/2003
PELVIS REDUNDANT	AC-P16843	ENDEVCO	2/18/2003

	REAR SID NO.: 016		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
NAAH HEAD X ARM Y	AC-01G18-F08	ENTRAN	4/1/2003
NAAH HEAD X ARM Z	AC-00L20-A13	ENTRAN	4/1/2003
NAAH HEAD Y ARM X	AC-00L20-A08	ENTRAN	3/28/2003
NAAH HEAD Y ARM Z	AC-01G18-F13	ENTRAN	3/28/2003
NAAH HEAD Z ARM X	AC-01J02-F18	ENTRAN	3/28/2003
NAAH HEAD Z ARM Y	AC-01G25-N11	ENTRAN	3/28/2003
HEAD AX	AC-P23960	ENDEVCO	12/10/2002
HEAD AY	AC-P23940	ENDEVCO	12/9/2002
HEAD AZ	AC-P23899	ENDEVCO	12/10/2002
UPPER NECK FX	LC-261FX	DENTON	12/12/2002
UPPER NECK FY	LC-261FY	DENTON	12/12/2002
UPPER NECK FZ	LC-261FZ	DENTON	12/12/2002
UPPER NECK MX	LC-261MX	DENTON	12/12/2002
UPPER NECK MY	LC-261MY	DENTON	12/12/2002
UPPER NECK MZ	LC-261MZ	DENTON	12/12/2002
UPPER RIB	AC-P18524	ENDEVCO	2/17/2003
LOWER RIB	AC-P18533	ENDEVCO	2/17/2003
LOWER SPINE	AC-P18514	ENDEVCO	2/17/2003
PELVIS	AC-P18519	ENDEVCO	2/17/2003
UPPER RIB REDUNDANT	AC-P18528	ENDEVCO	2/17/2003
LOWER RIB REDUNDANT	AC-P18518	ENDEVCO	2/17/2003
LOWER SPINE REDUNDANT	AC-P18688	ENDEVCO	2/17/2003
PELVIS REDUNDANT	AC-P18531	ENDEVCO	2/17/2003

REMARKS: None

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

VEHICLE AND MDB INSTRUMENTATION

	VEHICLE AND MDB INSTRUMENTS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
RIGHT FRONT SILL (X)	AC-J30491	ENDEVCO	4/14/2003
RIGHT FRONT SILL (Y)	AC-J31026	ENDEVCO	4/14/2003
RIGHT FRONT SILL (Z)	AC-J32831	ENDEVCO	4/14/2003
RIGHT REAR SILL (X)	AC-P23926	ENDEVCO	3/13/2003
RIGHT REAR SILL (Y)	AC-P23854	ENDEVCO	3/13/2003
RIGHT REAR SILL (Z)	AC-P23864	ENDEVCO	3/13/2003
REAR FLOORPAN ABOVE AXLE (X)	AC-P23904	ENDEVCO	3/6/2003
REAR FLOORPAN ABOVE AXLE (Y)	AC-P24145	ENDEVCO	3/6/2003
REAR FLOORPAN ABOVE AXLE (Z)	AC-P23895	ENDEVCO	3/6/2003
LEFT REAR SILL (Y)	AC-8084-018	ICS	12/11/2002
LEFT FRONT SILL (Y)	AC-8084-010	ICS	12/8/2002
LEFT FRONT DOOR CENTERLINE (Y)	-	-	-
RIGHT REAR SEAT OCCUPANT COMP. (Y)	AC-AN25	ENDEVCO	4/16/2003
MID REAR OF LEFT FRONT DOOR (Y)	-	-	-
LEFT FRONT DOOR UPPER C/L (Y)	-	-	-
MID REAR OF LEFT REAR DOOR (Y)	-	-	-
LEFT REAR DOOR UPPER C/L (Y)	-	-	-
LOWER LEFT B- PILLAR (Y)	AC-8083-037	ICS	11/30/2002
MIDDLE LEFT B-PILLAR (Y)	AC-8084-045	ICS	12/20/2002
LOWER LEFT A-PILLAR (Y)	AC-J33198	ENDEVCO	4/16/2003
UPPER LEFT A-PILLAR (Y)	AC-P23802	ENDEVCO	3/25/2003
FRONT SEAT TRACK (Y)	AC-8083-032	ICS	12/20/2002
REAR SEAT TRACK (Y)	AC-8084-024	ICS	12/11/2002
VEHICLE CG (X)	AC-J32832	ENDEVCO	4/16/2003
VEHICLE CG (Y)	AC-J33376	ENDEVCO	4/16/2003
VEHICLE CG (Z)	AC-J31095	ENDEVCO	4/14/2003
MDB CG (X)	AC-8083-037	ICS	11/30/2002
MDB CG (Y)	AC-8084-045	ICS	12/20/2002
MDB CG (Z)	AC-J33198	ENDEVCO	4/16/2003
MDB REAR FRAME MEMBER (X)	AC-P23802	ENDEVCO	3/25/2003
MDB REAR FRAME MEMBER (Y)	AC-8083-032	ICS	12/20/2002

REMARKS: None