

REPORT NUMBER TR-P23106-01-NC

**SIDE AIRBAG OCCUPANT RISK PROGRAM
OCCUPANT OUT-OF-POSITION TEST**

**JAGUAR CARS LIMITED
2003 JAGUAR X-TYPE
4 DOOR SEDAN**

NHTSA NUMBER: M30210TWG2

**PREPARED BY:
KARCO ENGINEERING, LLC
9270 HOLLY ROAD
ADELANTO, CALIFORNIA 92301**



OCTOBER 16, 2003

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
400 SEVENTH STREET, SW, ROOM 5311
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-01-D-02005.

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Date of Acceptance

Technical Report Documentation Page

1. Report No. TR-P23106-01-NC	2. Government Accession No.	3. Recipients Catalog No.	
4. Title and Subtitle Final Report of New Car Assessment Program Technical Working Group Side Airbag Risk Program 2003 Jaguar X-Type 4 Door Sedan NHTSA No. M30210TWG2	5. Report Date October 16, 2003		6. Performing Organization Code KAR
	8. Performing Organization Report No. TR-P23106-01-NC		
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9. Performing Organization Name and Address KARCO Engineering, LLC 9270 Holly Road Adelanto, CA 92301	11. Contract or Grant No. DTNH22-01-D-02005		
	13. Type of Report and Period Covered Final Test Report Option Year 2		
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh Street, SW, Room 5311 Washington, D.C 20590	14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS/NVS-111		
	15. Supplementary Notes		
16. Abstract			
<p>A static side airbag deployment was conducted on a 2003 Jaguar X-Type 4 Door Sedan at KARCO Engineering, LLC on 10/16/03. This test was conducted to obtain data indicant of TWG Side Airbag Out-of-Position Injury criteria.</p>			
Measurement Description	Units	Threshold	Hybrid III 3 Year Old ATD
Head Injury Criteria (HIC)	N/A	570	18.0
Max. Thorax Accel. (3 msec clip)	G's	55	29.3
17. Key Words TWG Occupant Out-of-Position Test Section 3.1.10.2 New Car Assessment Program (NCAP) 2003 Jaguar X-Type 4 Door Sedan NHTSA No. M30210TWG2		18. Distribution Statement Copies of this report available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5111 Washington, D.C. 20590	
19. Security Classification (this report)	20. Security Classification (this page)	21. No. Pages	22. Price
Unclassified	Unclassified	59	

Form DOT F1700.7 (8-72)

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SECTION 1
PURPOSE AND SUMMARY OF TEST M30210TWG2

1.1 PURPOSE

This occupant out-of-position injury test is part of the Occupant Injury Risk from Deploying Side Airbags Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-01-D-02005. The purpose of this test was to obtain occupant restraint system performance data for a side airbag deployment under current requirements.

The occupant out-of-position side airbag test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test Procedure.

1.2 SUMMARY

The effects of a seat mounted side airbag deployment in a 2003 Jaguar X-Type 4 Door Sedan with an out-of-position Hybrid III 3 Year-Old Child dummy were evaluated. The test was performed at Karco Engineering, LLC on October 16, 2003. Pre- and post-test photographs of the vehicle and dummy can be found in Appendix A.

One real-time, two high-speed film, and two high-speed digital cameras were used to document the side airbag deployment event. Camera locations and other pertinent camera information can be found in this report.

One Part 572P, Hybrid III 3-Year-Old child anthropomorphic test device (ATD), was placed in the right-front passenger seat oriented in the rearward facing position as according to dummy placement instructions in the July 2003 Revision of the Technical Working Group's 'Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags'.

The ATD was fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers and six-axis upper and lower neck transducers.

Twenty-two (22) channels of data were recorded using an on-board data acquisition system. Appendix A contains Photographs. Appendix B contains dummy response data traces. Appendix C contains the Instrumentation Data Channel assignments.

The passenger side doors remained closed during side air bag deployment and were operable after the impact.

The Hybrid III 3 Year-Old Child Dummy's visible contact points were as follows: The ATD's head, chest, abdomen and pelvis contacted the airbag. These contact points can be observed dynamically on the high-speed video recording of the event.

Occupant of Position Occupant injury data is contained in table below.

OUT OF POSITION OCCUPANT DATA SUMMARY

ATD Position	HIC	Clip (g)	Chest Disp. (mm)
Passenger	18.0	29.3	20.5

Orientation of Hybrid III 3 Year-Old Child Dummy was in the rearward facing position leaning against door. Placement of the dummy in the kneeling position along the outboard edge of the seat cushion maximizes the chest interaction with the seat-mounted side airbag module. The sternum was aligned with the top of the seat-mounted side airbag module to maximize contact. The dummy's head was placed between the seatback and B-pillar. This orientation complies with section 3.1.10.2 of the Technical Working Group (TWG) recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan
 Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG2
 Test Date: 10/16/03

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	=(tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

* Based on the Recommended Practice in SAE J916, May 85

**DATA SHEET NO. 1
TEST SUMMARY**

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan
 Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG2
 Test Date: 10/16/03

TEST DUMMY INFORMATION

Description	Front Passenger Rearward Facing
Dummy Type / Serial No.	Hybrid III 3-Year-Old Child / No. 82
Head Contact	Airbag
Chest Contact	Airbag
Abdomen Contact	Airbag
Pelvis	Airbag
Left Knee Contact	None
Right Knee Contact	None

16mm MOVIE COVERAGE

High Speed Film	2
High Speed Digital	2
Real Time	1
Total	5

DATA CHANNELS

Child ATD Sensors	22
Belt Assessment Sensors	0
Vehicle Structure Accelerometers	0
Total	22

DATA SHEET NO. 2
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan
 Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG2
 Test Date: 10/16/03

TEST VEHICLE INFORMATION

Make	Jaguar
Model	X-Type
Body Style	4 Door Sedan
NHTSA No.	M30210
VIN	SAJEB52D43XC91888
Color	White
Delivery Date	1/29/03
Odometer Reading (mi.)	109
Dealer	Penske
Transmission	5-Speed Manual
Final Drive	Rear
Type/No. Cylinders	V-6
Engine Displacement (L)	2.5
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

TEST VEHICLE OPTIONS

Anti-Lock Brakes (ABS)	Yes
All Wheel Drive	Yes
Power Steering	Yes
Driver Airbag	Yes
Driver Side Bag	Yes
Driver Head Bag	Yes
Pass. Airbag	Yes
Pass. Side Bag	Yes
Pass. Head Bag	Yes
Pre-tensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes
Center Console	Yes
Air Cond.	Yes
AM/Fm Cassette	Yes
Tilt Steering	Yes
Power Door Locks	Yes
Power Windows	Yes
Power Seats	Yes
Other	

DATA FROM CERTIFICATION LABEL

Manufactured By	Jaguar Cars Ltd	GVWR (kg)	2075
Date of Manufacture	June-02	GAWR Front (kg)	1097
		GAWR Rear (kg)	978

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	None	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				502
Cargo Weight (RCLW) (kg)				60

* Vehicle had undergone New Car Assessment Program Frontal Barrier Impact Test on February 7, 2003.

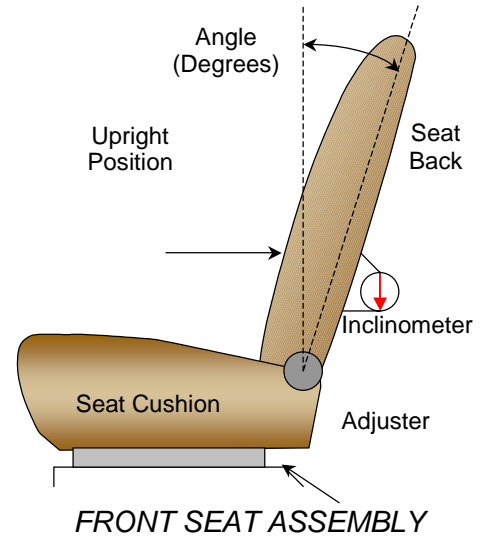
DATA SHEET NO. 3
TEST VEHICLE INFORMATION

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan
 Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG2
 Test Date: 10/16/03

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturers designated angle. The procedure is as follows: A special application tool with pointed probes is inserted through the fabric to make contact with the rigid portion of the lower seat frame assembly, approximately 13 inches above the pivot point of the seat back. An inclinometer is placed against the flat surface of the tool and the seat back angle is measured directly from the dial face.



SEAT BACK ANGLES

Position	Deg.
Passenger w/ Dummy	24

SEAT FORE/AFT POSITIONS

The first or forward most position is counted as number one (1). The fore/aft position is set aft of the middle position for both the driver and passenger.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Passenger Seat	15	8

DATA SHEET NO. 4
DUMMY POSITIONING INFORMATION

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan
 Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG2
 Test Date: 10/16/03

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Hybrid III 3-Year-Old Child Dummy	
		Length (mm)	Angle (°)
SA	Seat Back Angle		24
HZ	Head to Roof (Z)	270	0
HB	Head to B-Pillar	0	0
HSC	Head to Seat Back Centerline	118	0
CD	Chest to Seat Back	50	0
RACL	Right Arm to Seat Back Centerline	16	0
KSCR	Right Knee to Seat Cushion Centerline	75	0
TSCR	Right Toe to Seat Cushion Centerline	65	0
TT	To to Toe	185	0

DATA SHEET NO. 5 - 3 YEAR OLD HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

NHTSA No.: M30210TWG1

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

Test Date: 10/16/03

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Pass.			
			Max	Time	Min	Time
Head CG	X	G's	1.7	6.1	-20.3	7.9
Head CG	Y	G's	24.1	9.4	-3.3	6.0
Head CG	Z	G's	19.7	9.7	-3.8	7.7
Head CG Resultant	N/A	G's	29.2	9.5		

PRIMARY HEAD INJURY CRITERAS (HIC)

Location	Pass.			
	HIC	T ¹	T ²	Avg G
Head CG Primary (HIC15)	18.0	7.7	22.7	17.0

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Pass.			
			Max	Time	Min	Time
Chest CG	X	G's	6.1	18.2	-36.6	7.9
Chest CG	Y	G's	25.5	11.3	-4.5	9.8
Chest CG	Z	G's	5.9	14.2	-3.5	10.8
Chest CG Resultant	N/A	G's	41.0	11.7		

PRIMARY CHEST CLIP (3MSEC)

Location	Pass.		
	CLIP	T ¹	T ²
Chest CG Primary	29.3	9.8	12.8

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Pass.			
			Max	Time	Min	Time
Chest CG	X	MM	1.3	299.7	-20.5	11.1

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Pass.			
			Max	Time	Min	Time
Pelvis	X	G's	3.9	39.2	-15.2	11.7
Pelvis	Y	G's	16.6	16.3	-4.3	33.8
Pelvis	Z	G's	7.8	14.8	-35.2	11.3
Pelvis Resultant	N/A	G's	37.9	11.3		

DATA SHEET NO. 5...(continued)

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

NHTSA No.: M30210TWG1

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

Test Date: 10/16/03

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Pass.			
			Max	Time	Min	Time
Neck Force	X	Newtons	172.3	10.5	-137.1	17.9
Neck Force	Y	Newtons	30.0	31.2	-388.4	10.8
Neck Force	Z	Newtons	565.6	10.7	-44.4	7.1
Neck Force Resultant	N/A	Newtons	700.2	10.8		
Neck Moment	X	Nm	19.2	10.9	-2.6	23.8
Neck Moment	Y	Nm	6.3	9.9	-6.6	17.8
Neck Moment	Z	Nm	2.4	77.1	-13.1	25.8
Neck Moment Resultant	N/A	Nm	20.2	10.9		

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Pass.			
			Max	Time	Min	Time
Neck Force	X	Newtons	86.5	7.6	-215.9	12.2
Neck Force	Y	Newtons	72.5	75.1	-600.1	10.1
Neck Force	Z	Newtons	632.8	10.3	-22.3	6.8
Neck Force Resultant	N/A	Newtons	875.3	10.2		
Neck Moment	X	Nm	4.6	102.3	-22.6	12.0
Neck Moment	Y	Nm	11.2	17.4	-4.5	225.3
Neck Moment	Z	Nm	5.3	74.9	-18.7	25.4
Neck Moment Resultant	N/A	Nm	25.3	12.0		

**DATA SHEET NO. 6
CAMERA LOCATIONS**

Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan
 Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG2
 Test Date: 10/16/03

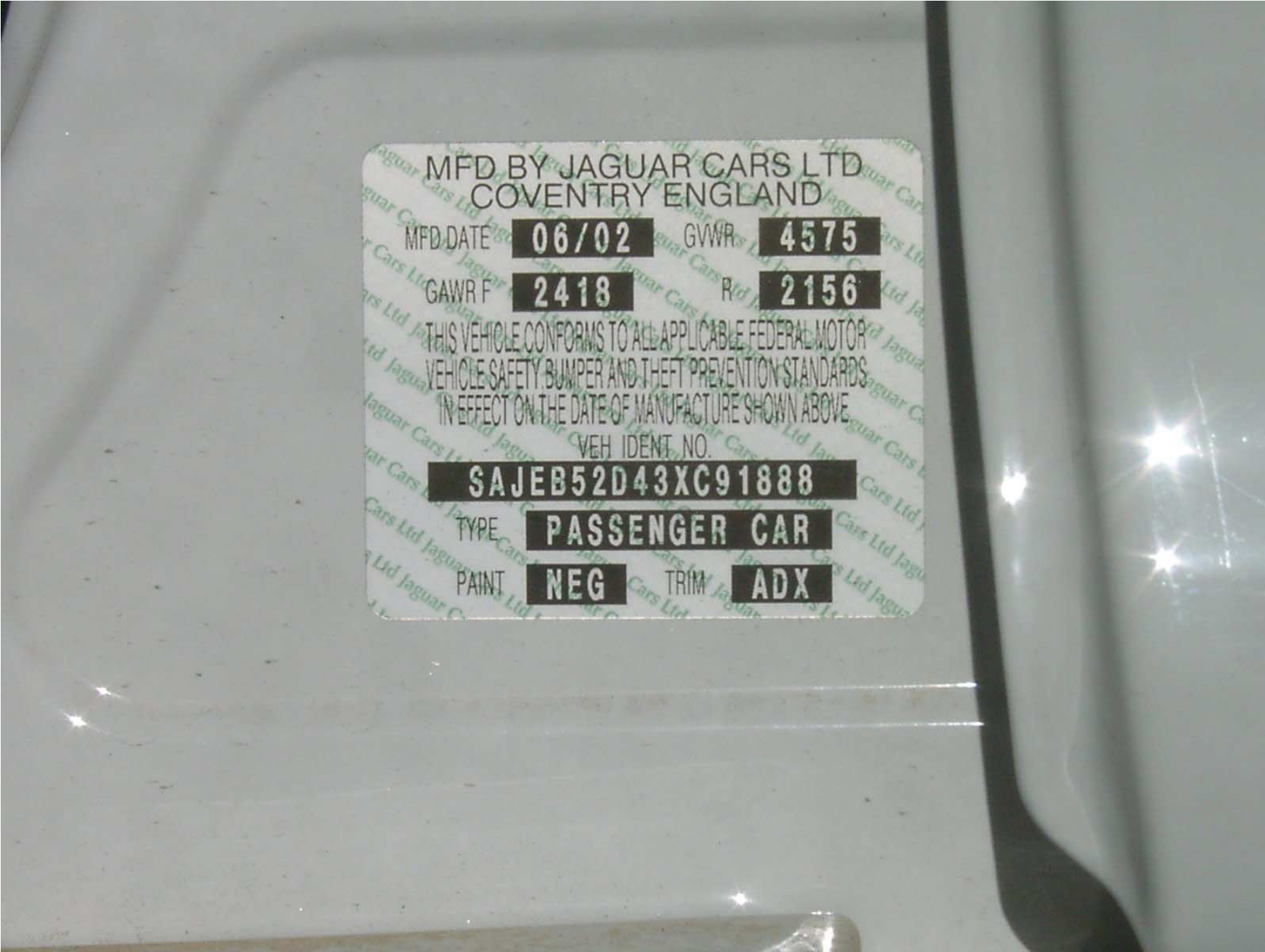
No.	Camera View	Location (mm)			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	Real Time Side View	-14	118	2	0	N/A	30
2	High Speed Film Side View	-14	128	10	2	24	920
3	High Speed Film Front View	-91	0	30.5	12	28	1000
4	High Speed Digital Side View	-14	144	19	10	8	500
5	High Speed Digital Front View	-93	5	34.5	12	35	500

* Cameras aligned to center of seat back as reference.

APPENDIX A
PHOTOGRAPHS



Figure A-1: Right Front $\frac{3}{4}$ View, As Received



MFD BY JAGUAR CARS LTD
COVENTRY ENGLAND

MFD DATE **06/02**

GVWR **4575**

GAWR F **2418**

R **2156**

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

VEH IDENT NO.

SAJEB52D43XC91888

TYPE **PASSENGER CAR**

PAINT **NEG** TRIM **ADX**

A-2

TR-P23106-01-NC

Figure A-2: Vehicle Certification Label



Figure A-3: Post-Test Right Front $\frac{3}{4}$ View of Prior Test



Figure A-4: Post-Test Right Side View of Prior Test



Figure A-5: Pre-Test Dummy Position, Left Side View



Figure A-6: Pre-Test Dummy Position, $\frac{3}{4}$ View from Front



Figure A-7: Pre-Test Dummy Position, Full View from Front



Figure A-8: Post-Test Left Side View



Figure A-9: Post-Test Airbag, $\frac{3}{4}$ View

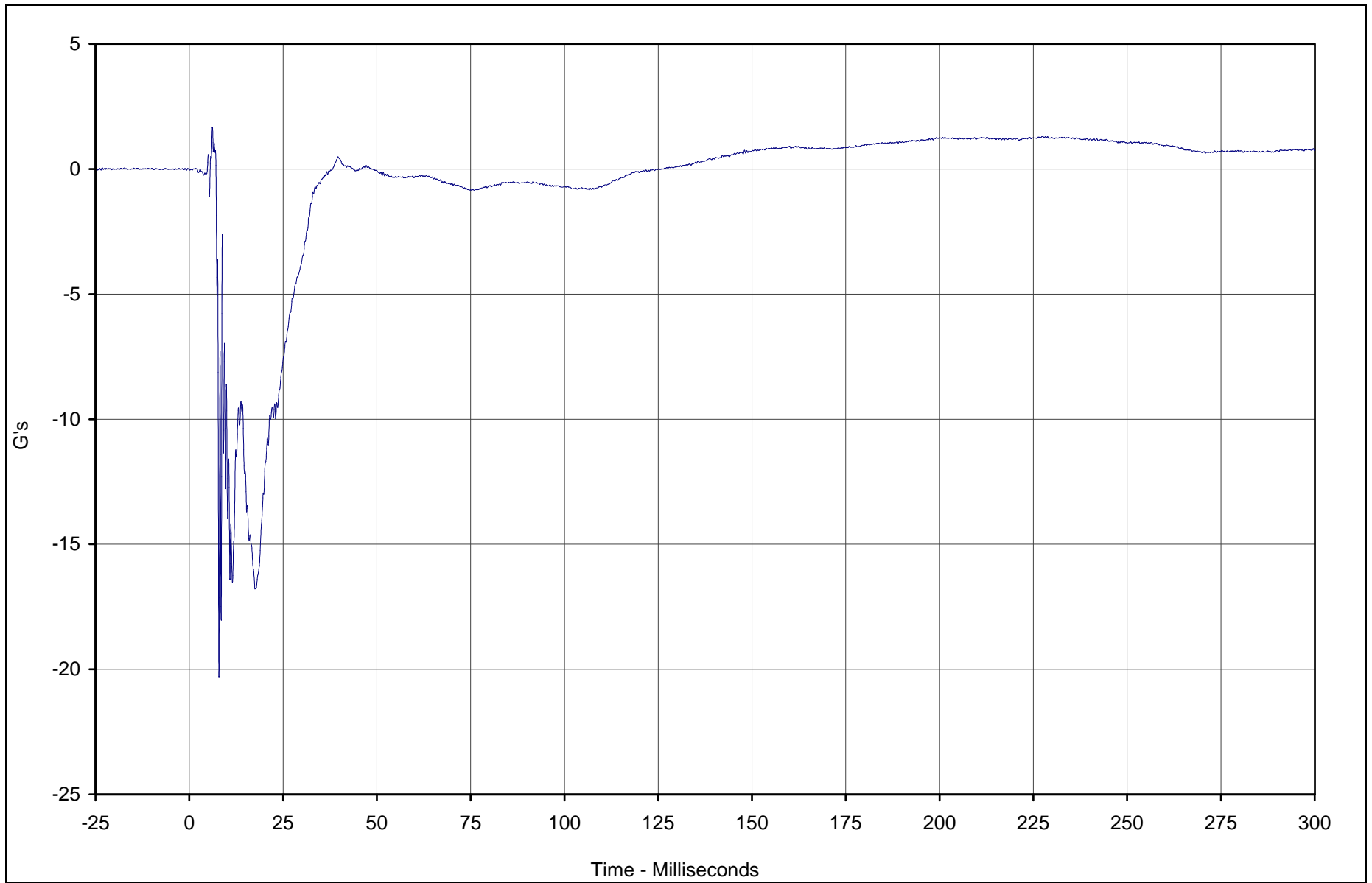


Figure A-10: Post-Test Airbag, Front View

APPENDIX B

DATA PLOTS

B-1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Head X	001	FIL	G's	1.7	6.1	-20.3	7.9	1000



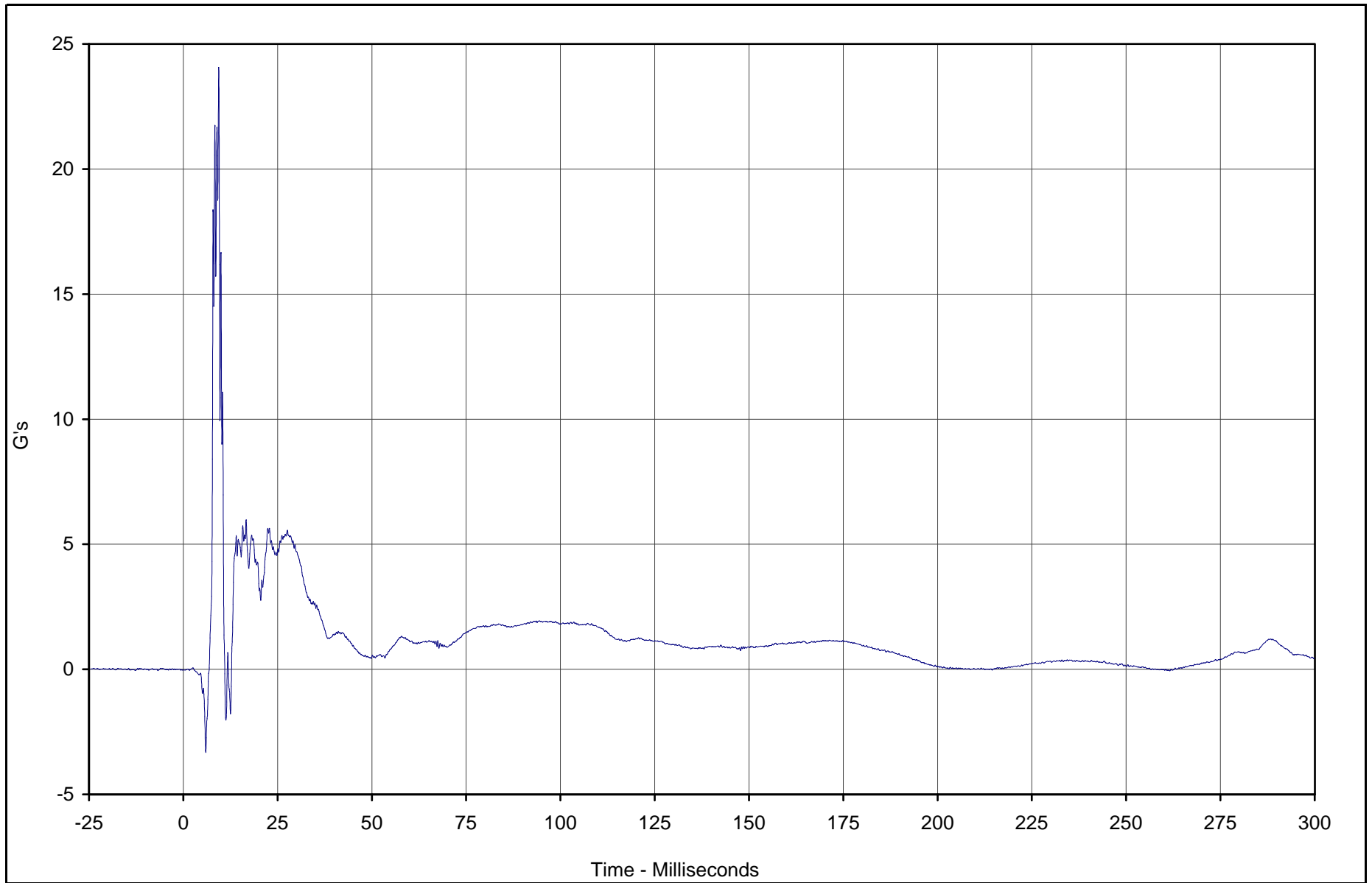
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

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NHTSA No.: M30210TWG1

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Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Head Y	002	FIL	G's	24.1	9.4	-3.3	6.0	1000

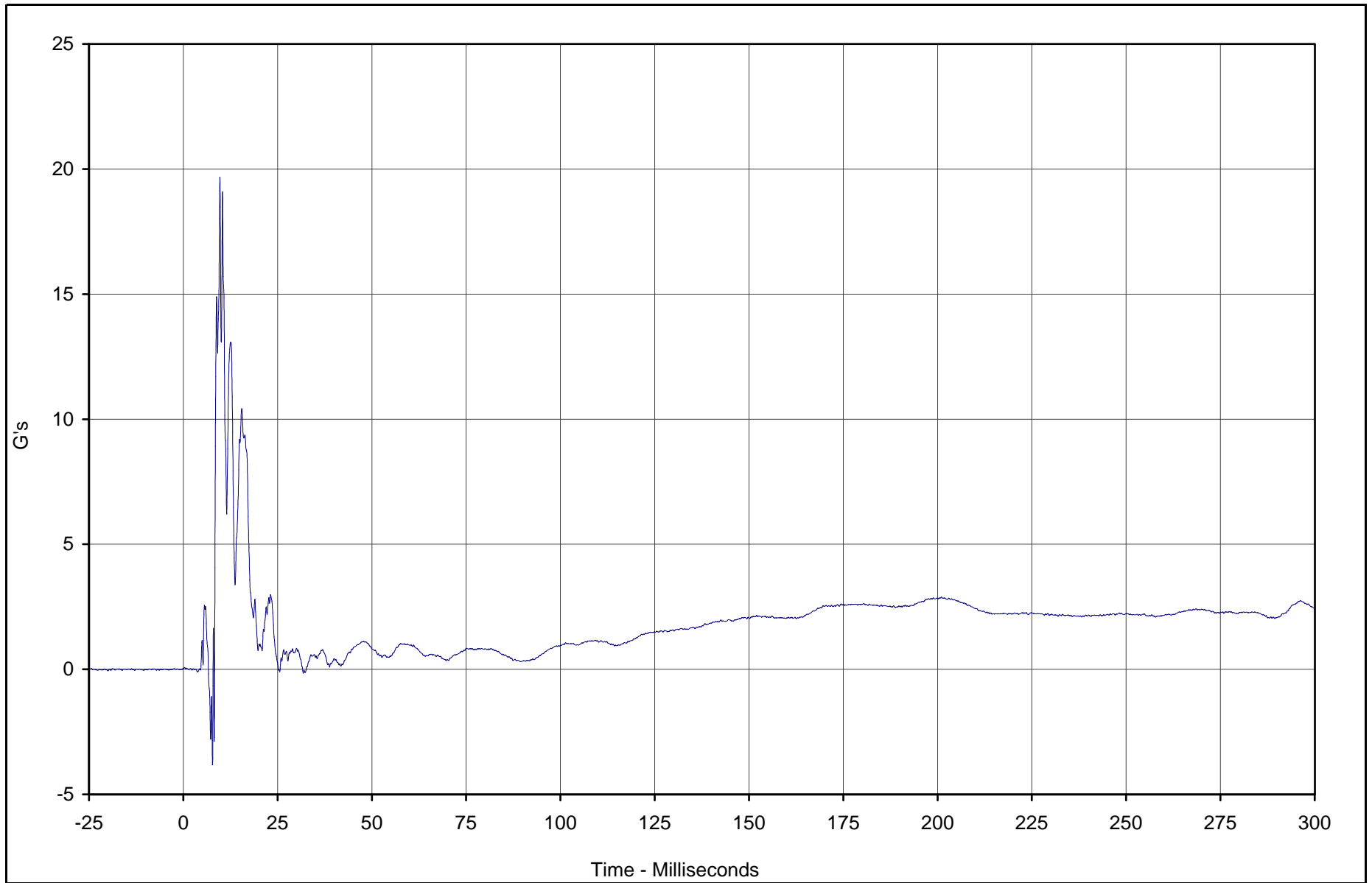


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Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Head Z	003	FIL	G's	19.7	9.7	-3.8	7.7	1000

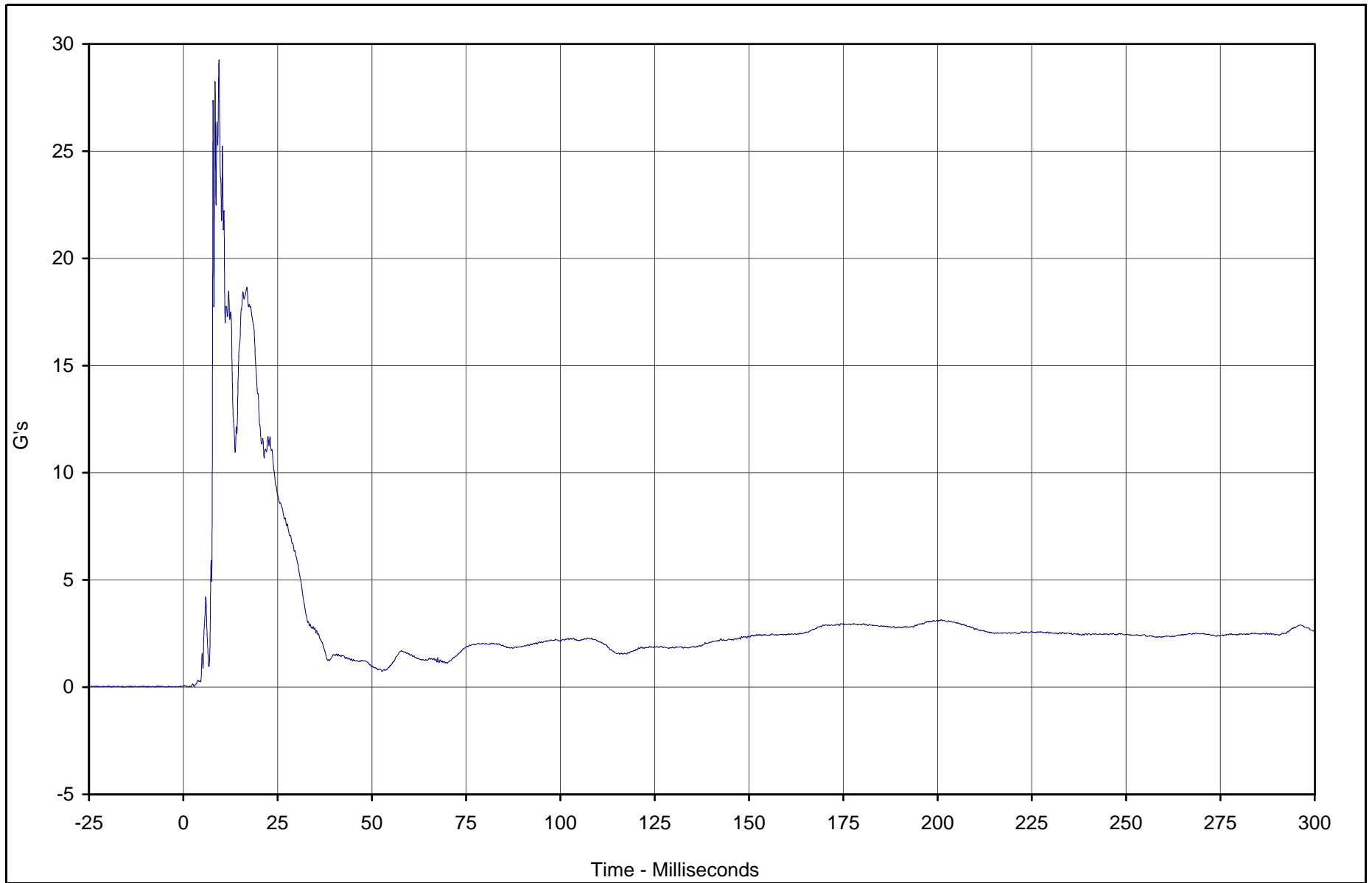


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NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Head Resultant	001	RES	G's	29.2	9.5	0.0	1.4	1000

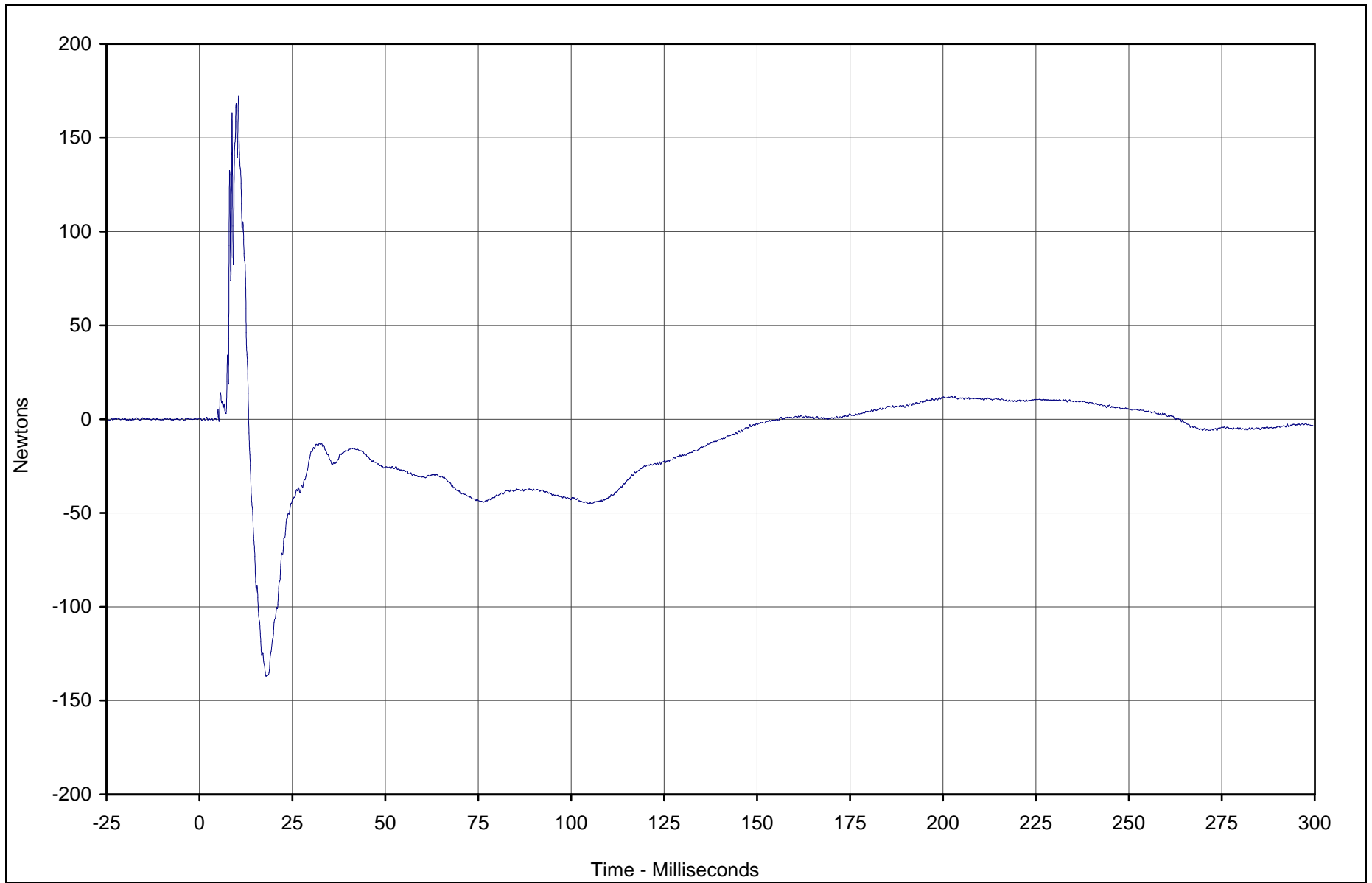


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Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Force X	004	FIL	Newtons	172.3	10.5	-137.1	17.9	1000

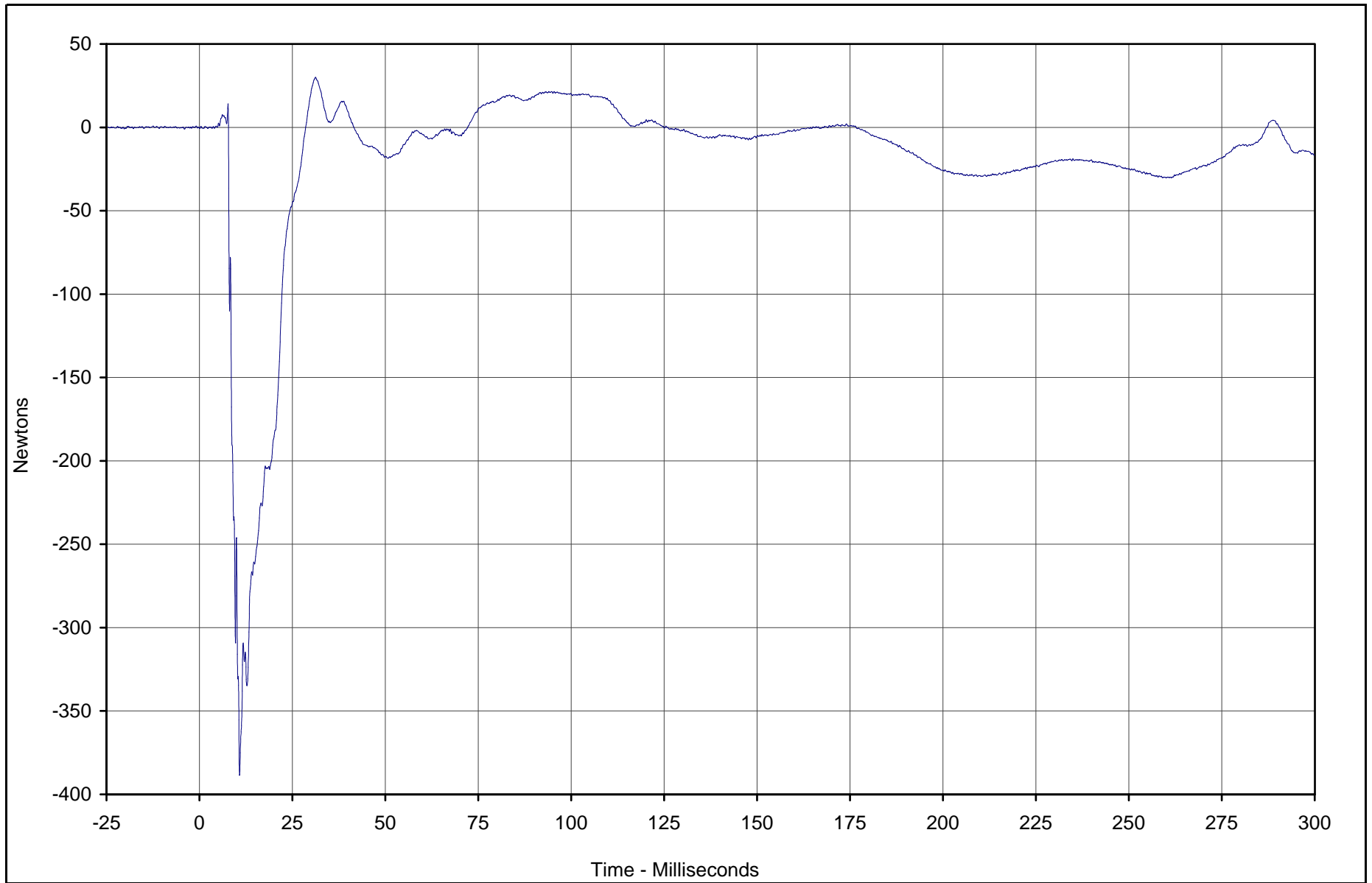


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

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Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Force Y	005	FIL	Newtons	30.0	31.2	-388.4	10.8	1000

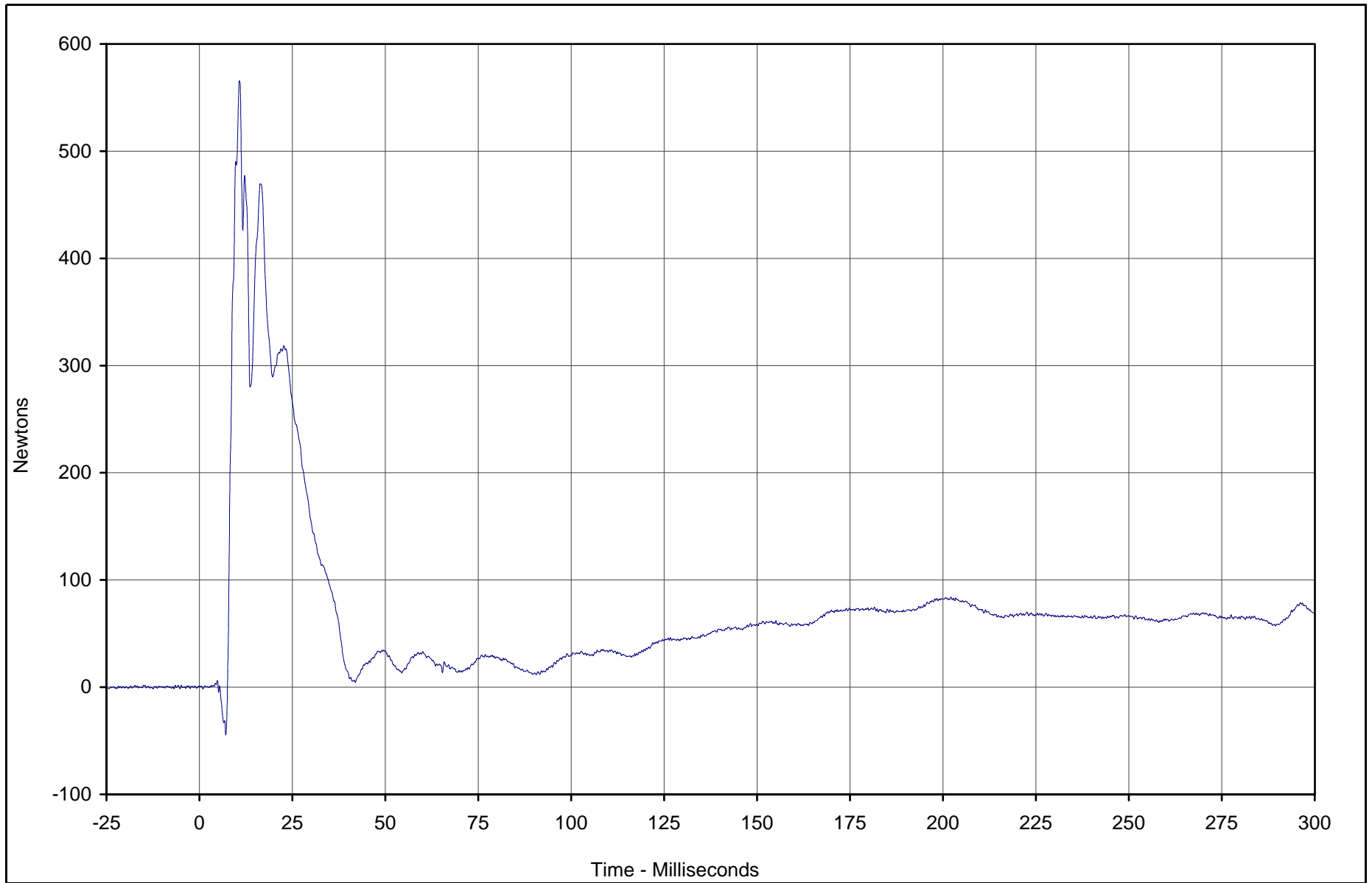


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

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NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Force Z	006	FIL	Newtons	565.6	10.7	-44.4	7.1	1000

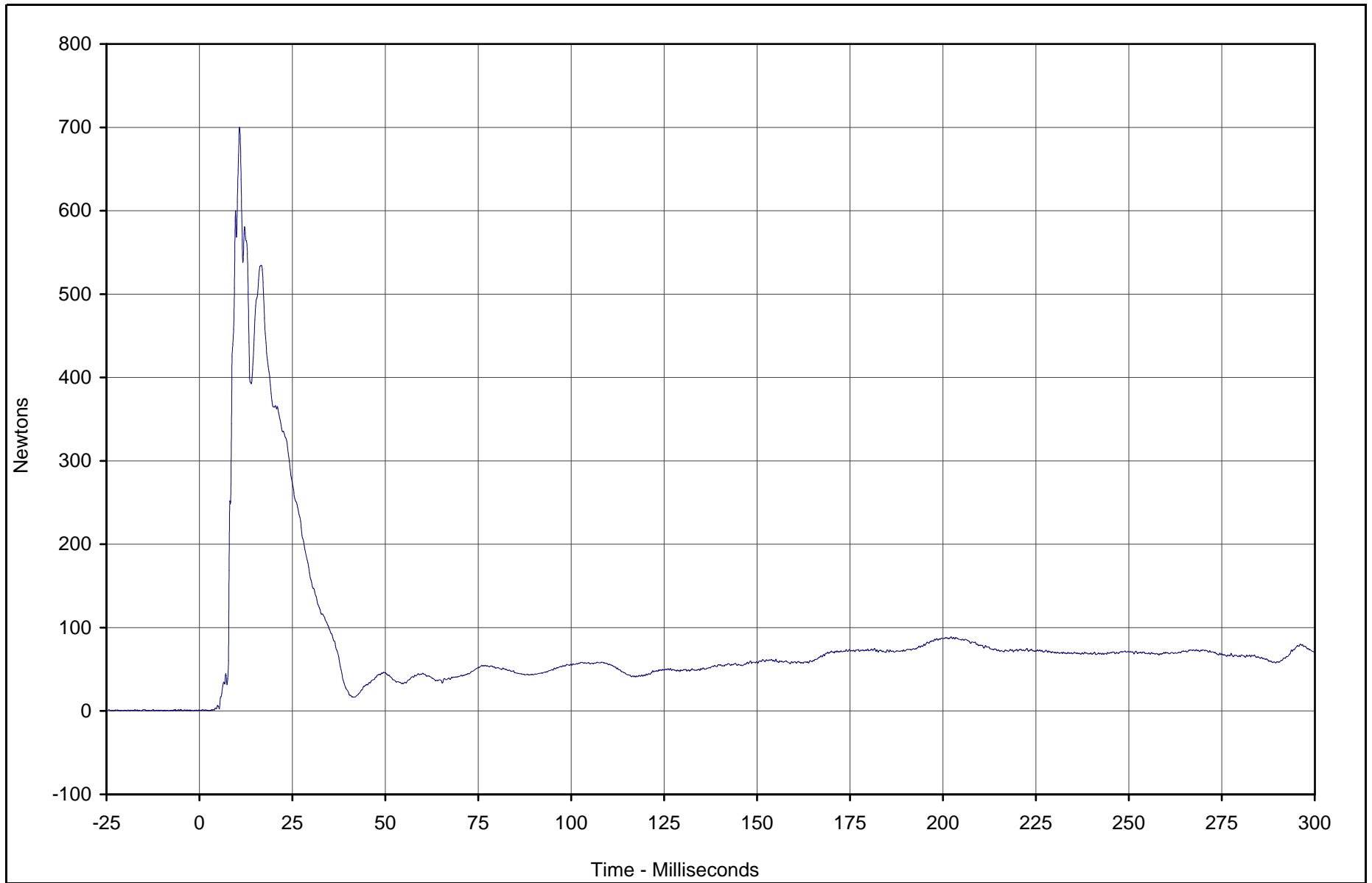


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Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Force Resultant	004	RES	Newtons	700.2	10.8	0.2	2.5	1000

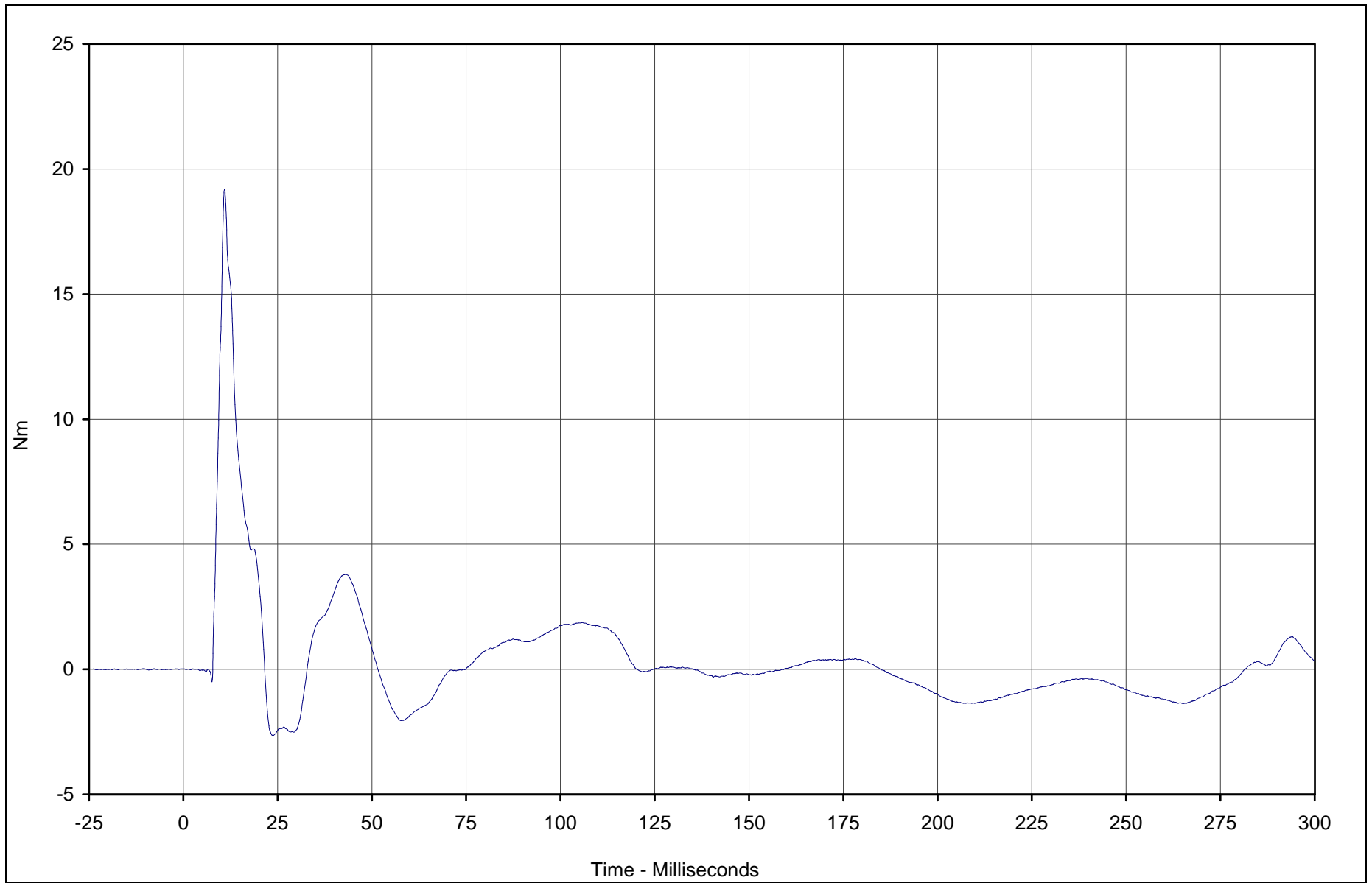


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Moment X	007	FIL	Nm	19.2	10.9	-2.6	23.8	600



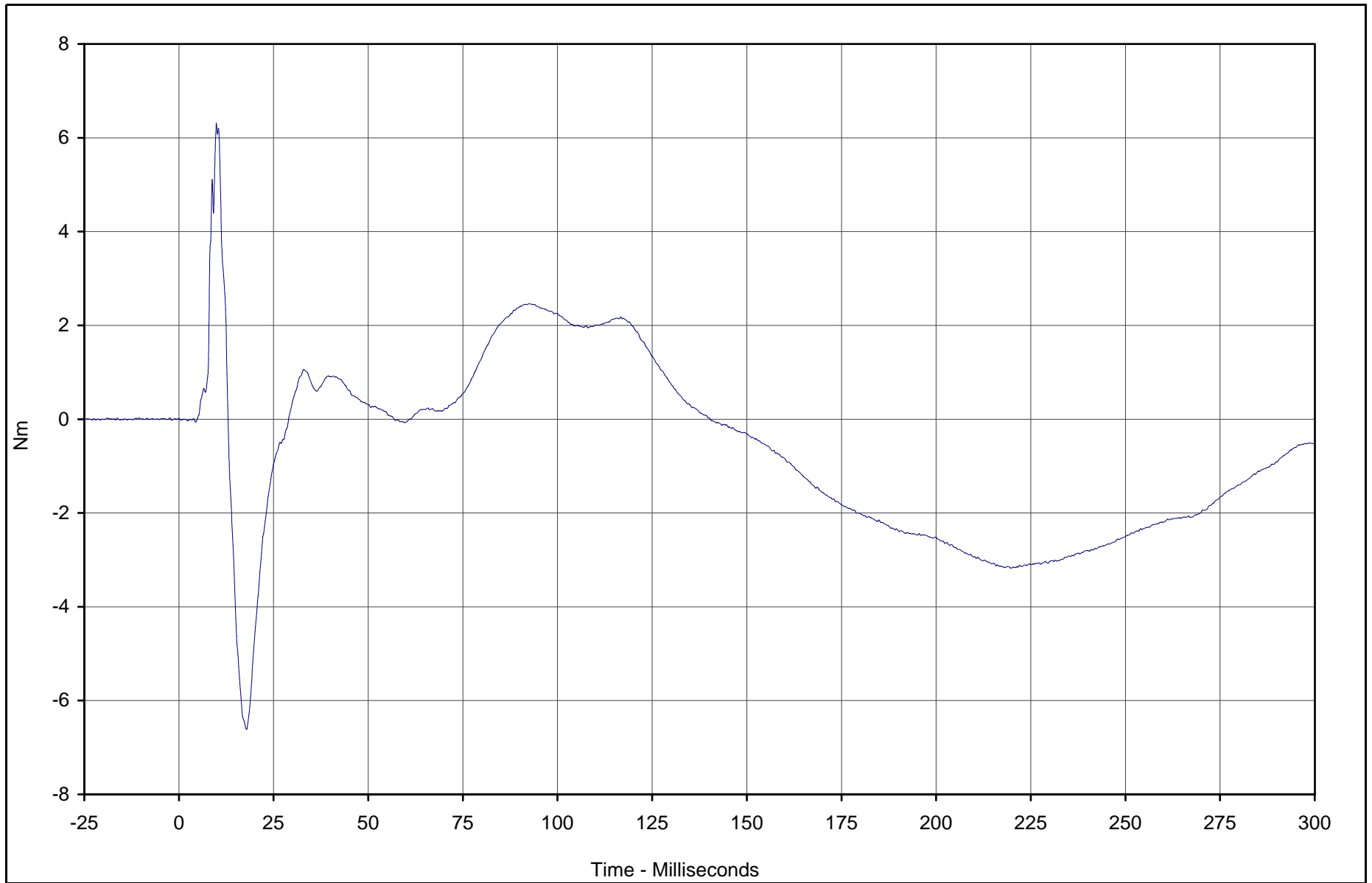
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

B-10



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Moment Y	008	FIL	Nm	6.3	9.9	-6.6	17.8	600



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

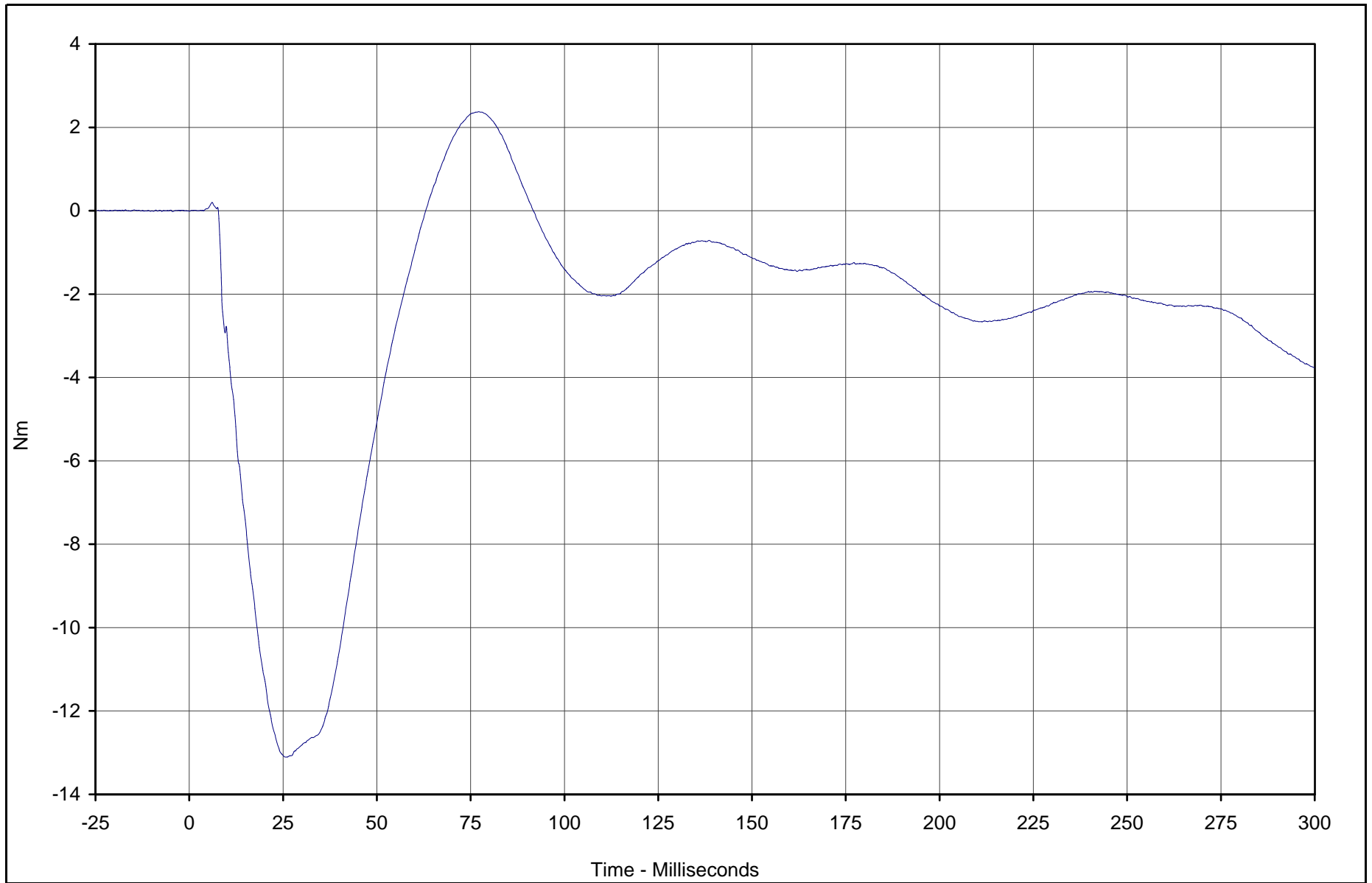
Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC

B-11



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Moment Z	009	FIL	Nm	2.4	77.1	-13.1	25.8	600



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

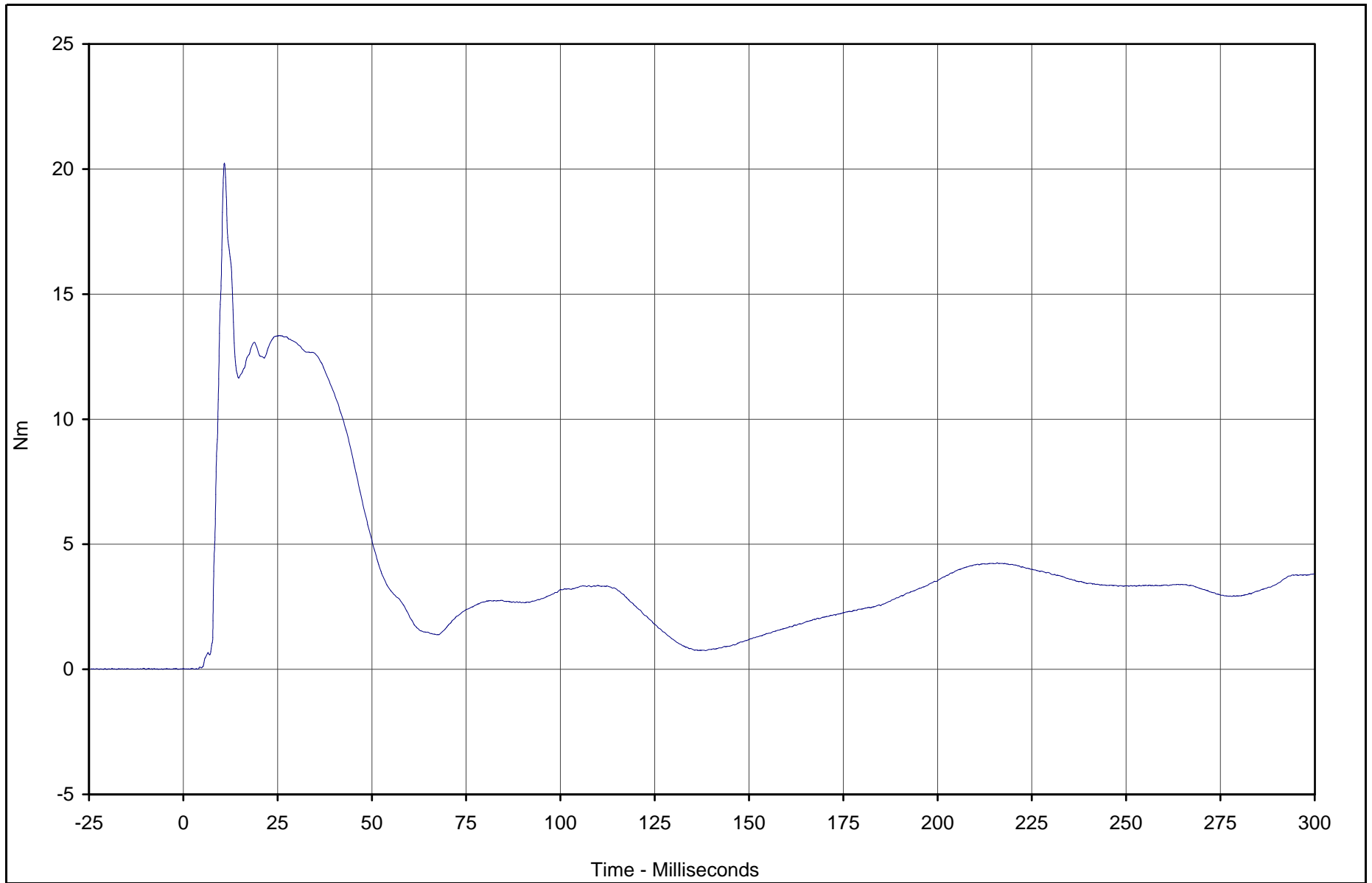
Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC

B-12



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Upper Neck Moment Resultant	007	RES	Nm	20.2	10.9	0.0	3.8	600



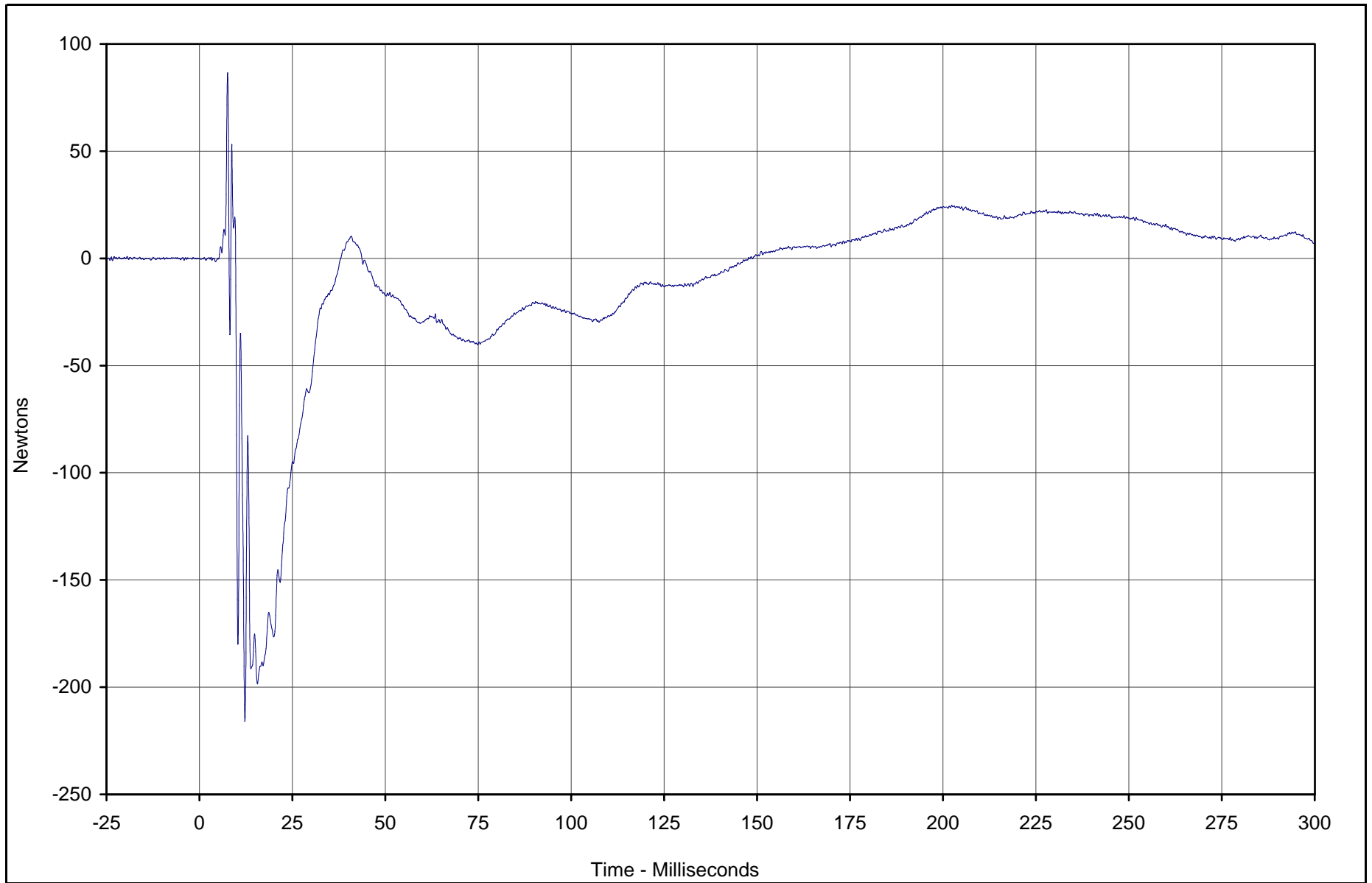
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Force X	010	FIL	Newtons	86.5	7.6	-215.9	12.2	1000



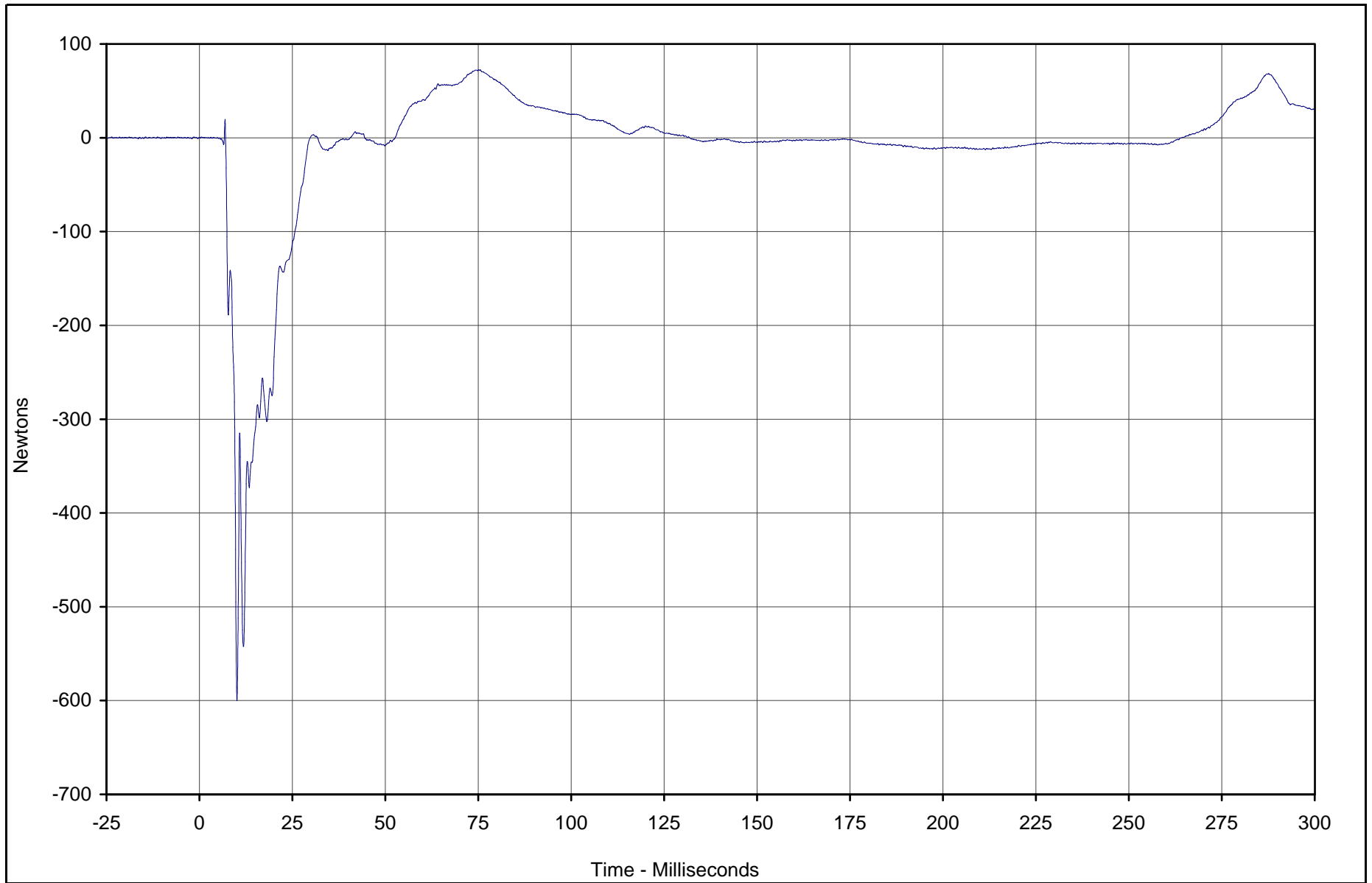
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

B-14



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Force Y	011	FIL	Newtons	72.5	75.1	-600.1	10.1	1000



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

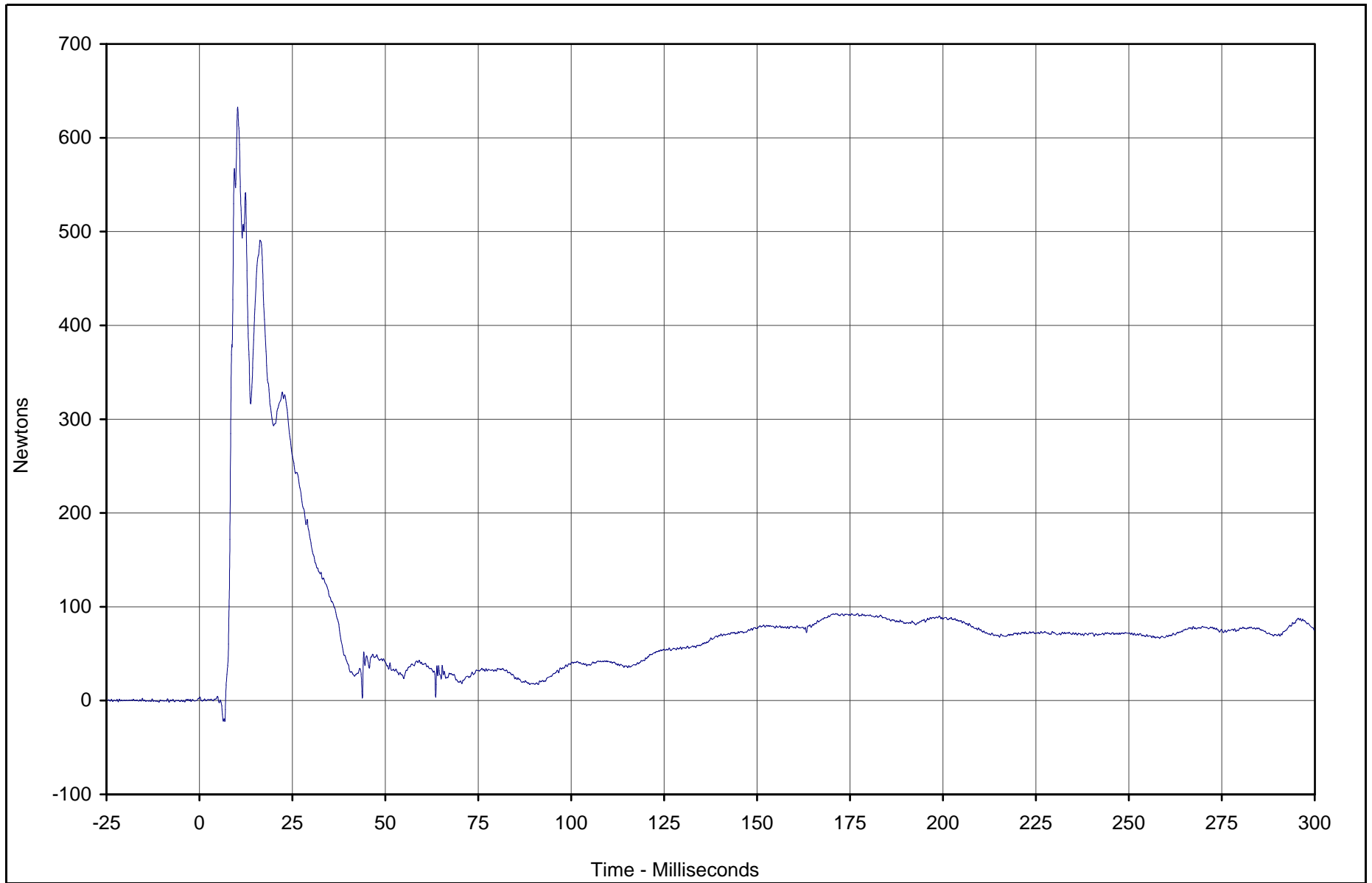
Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC

B-15

TR-P23106-01-NC



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Force Z	012	FIL	Newtons	632.8	10.3	-22.3	6.8	1000



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

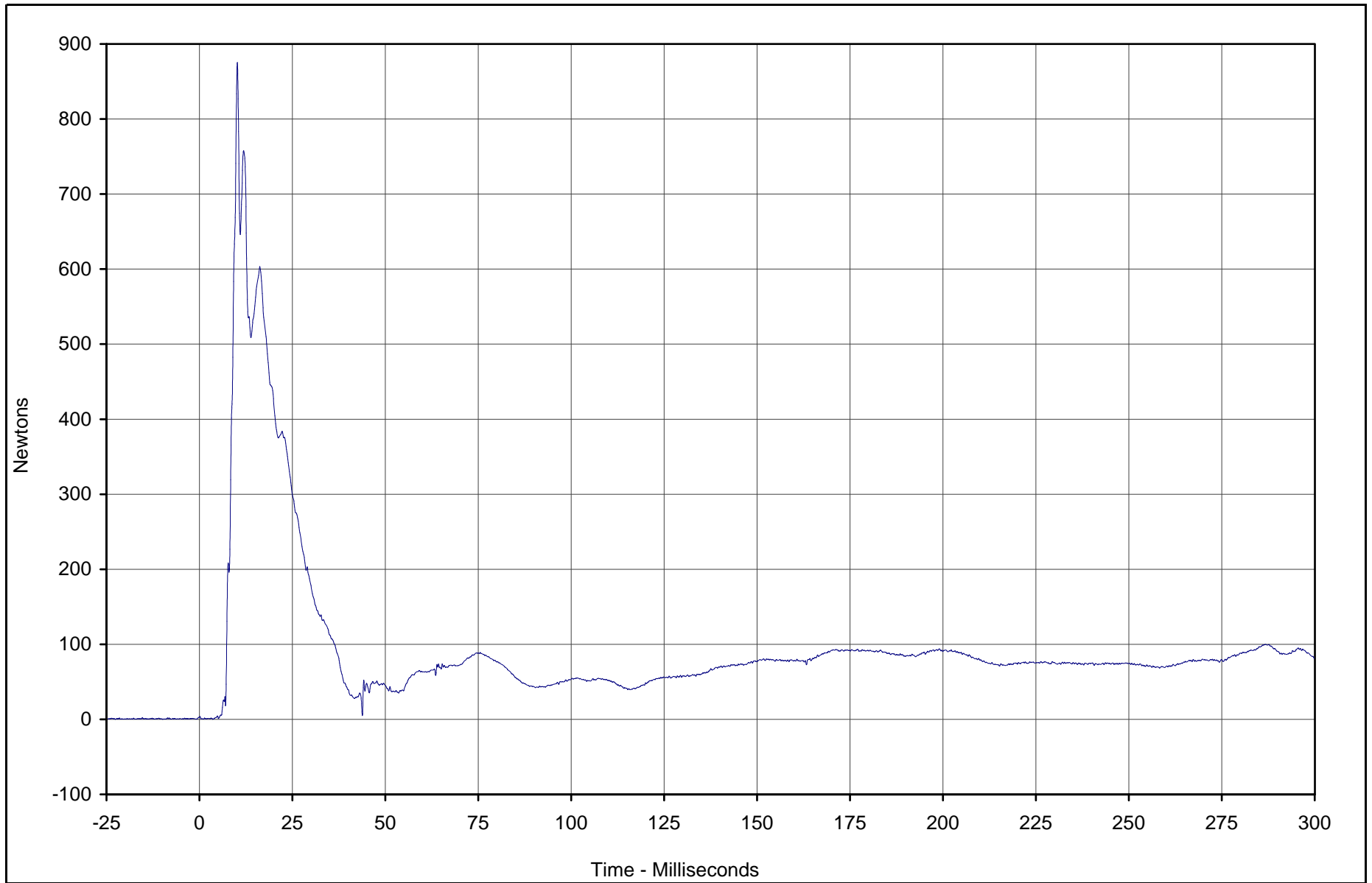
Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

B-16

TR-P23106-01-NC



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Force Resultant	010	RES	Newtons	875.3	10.2	0.1	3.6	1000

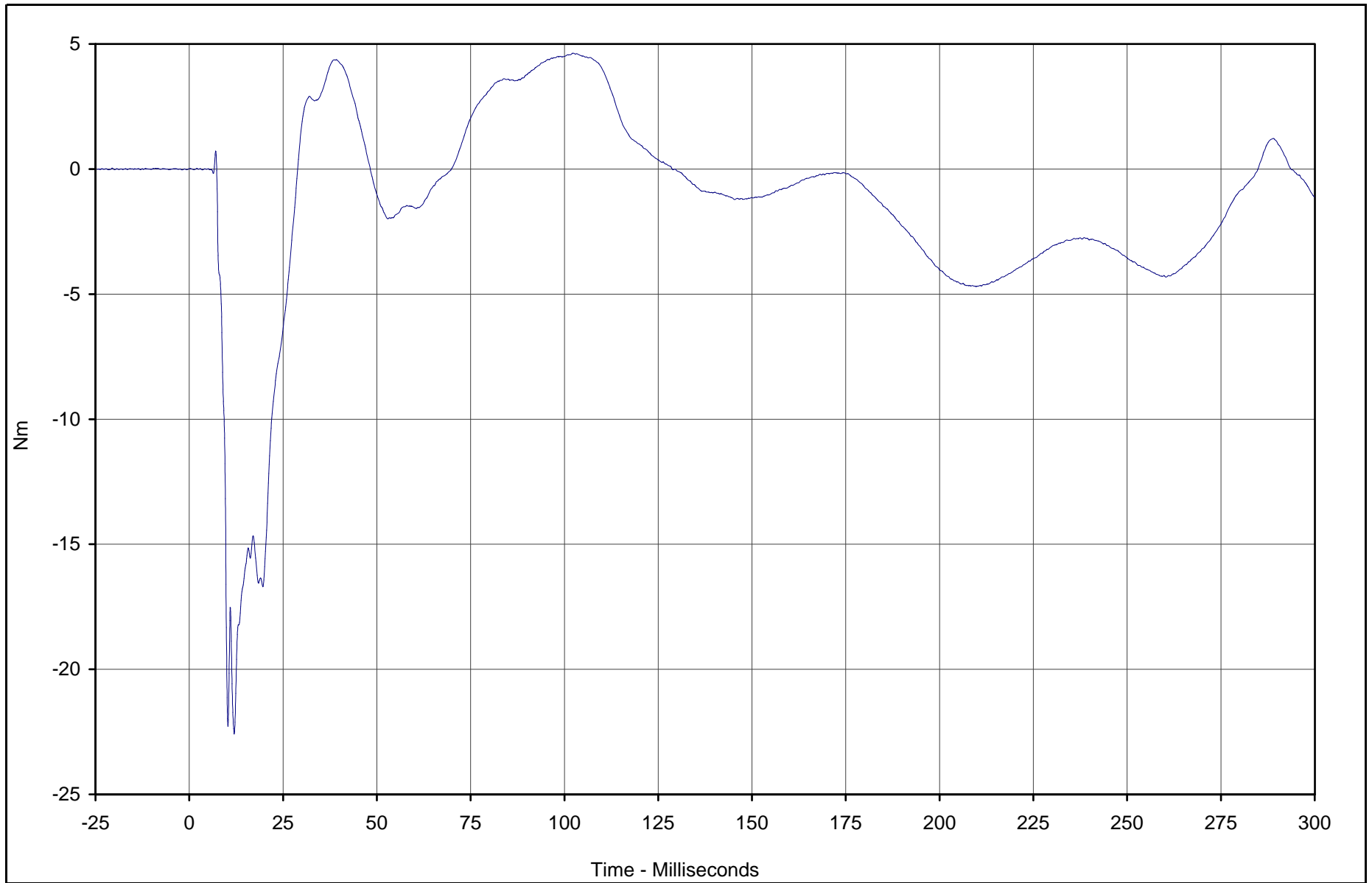


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Moment X	013	FIL	Nm	4.6	102.3	-22.6	12.0	600

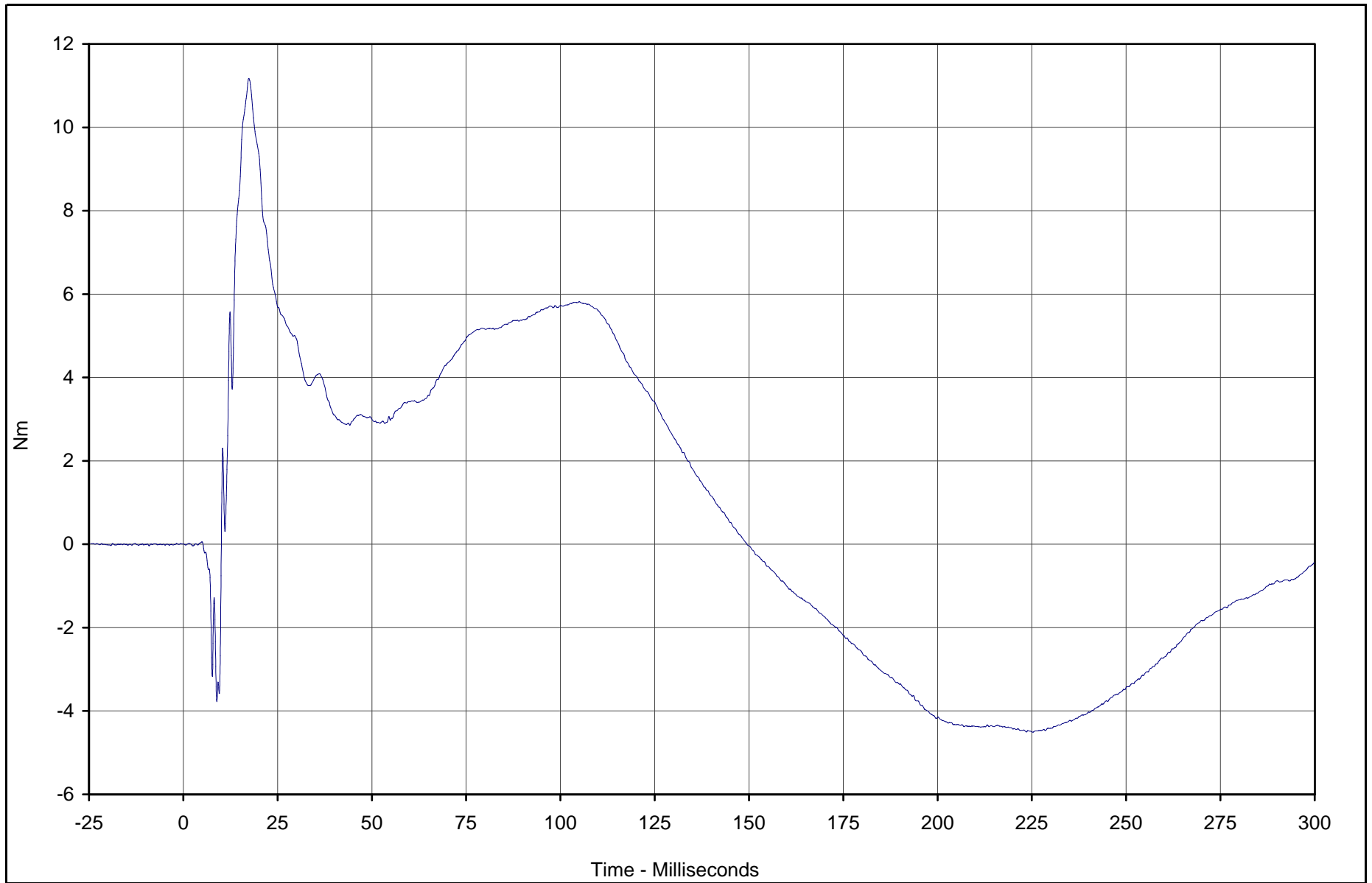


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Moment Y	014	FIL	Nm	11.2	17.4	-4.5	225.3	600



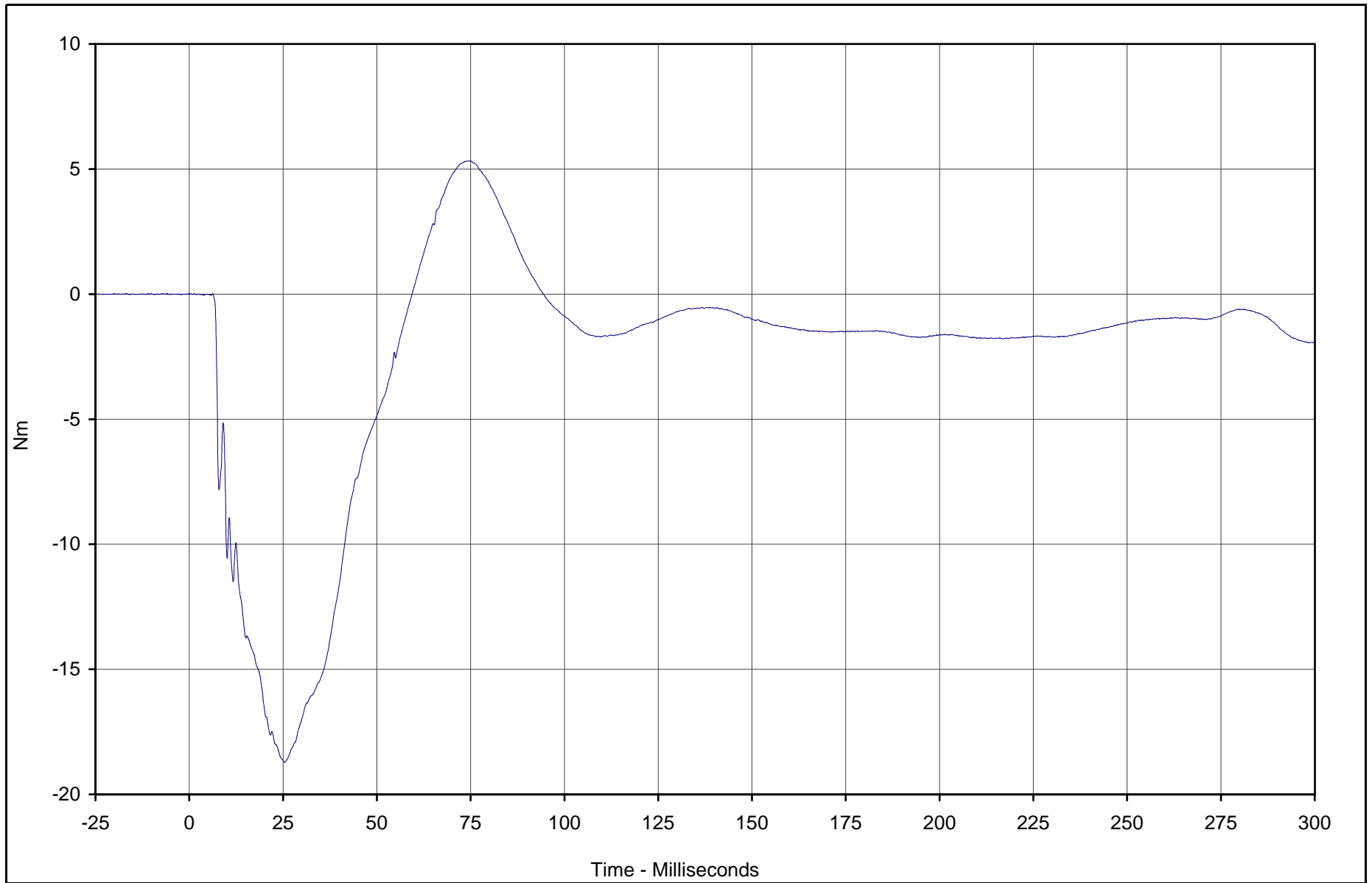
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

B-19



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Moment Z	015	FIL	Nm	5.3	74.9	-18.7	25.4	600



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

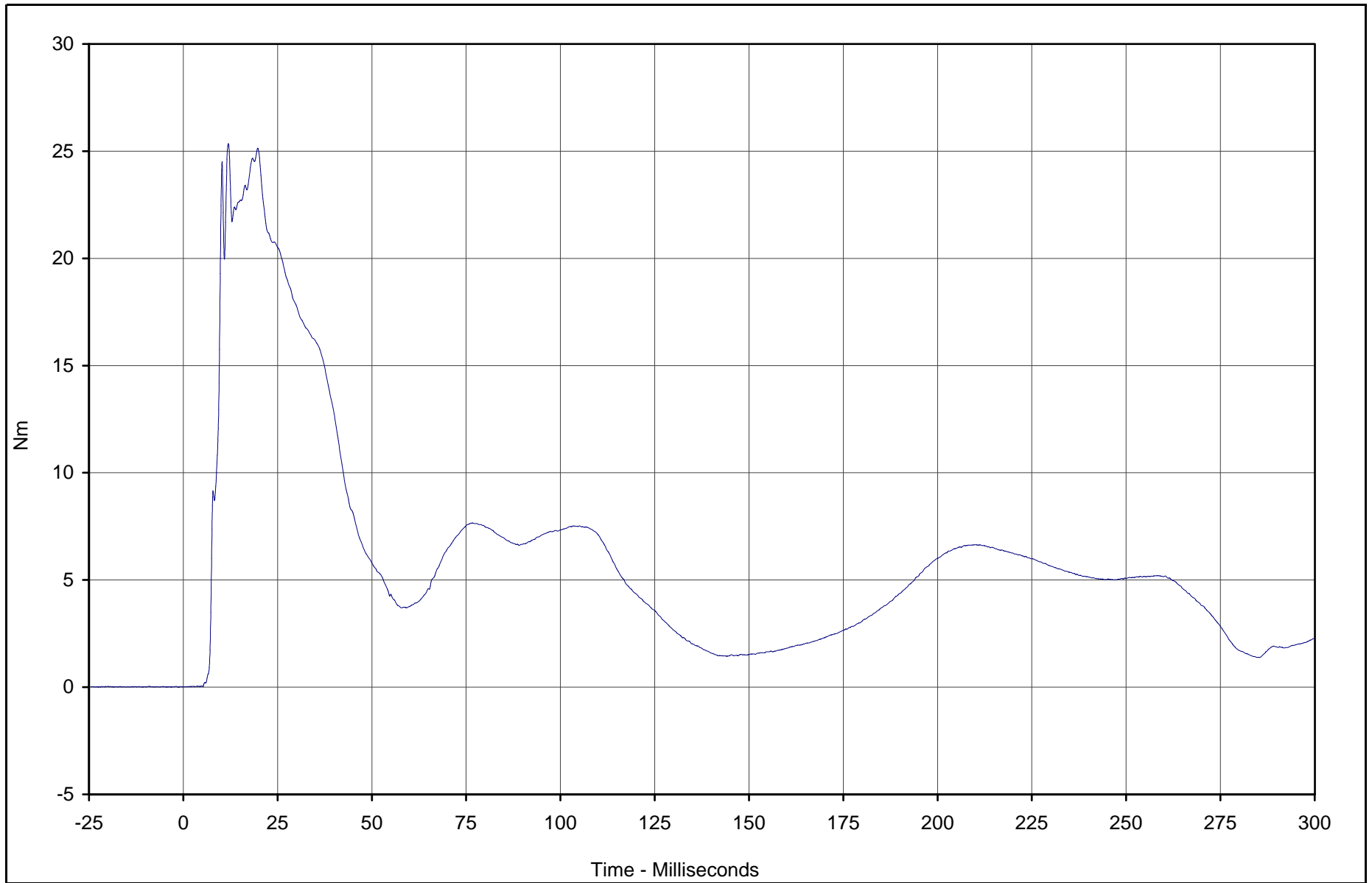
Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC

B-20



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Lower Neck Moment Resultant	013	RES	Nm	25.3	12.0	0.0	5.2	600



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

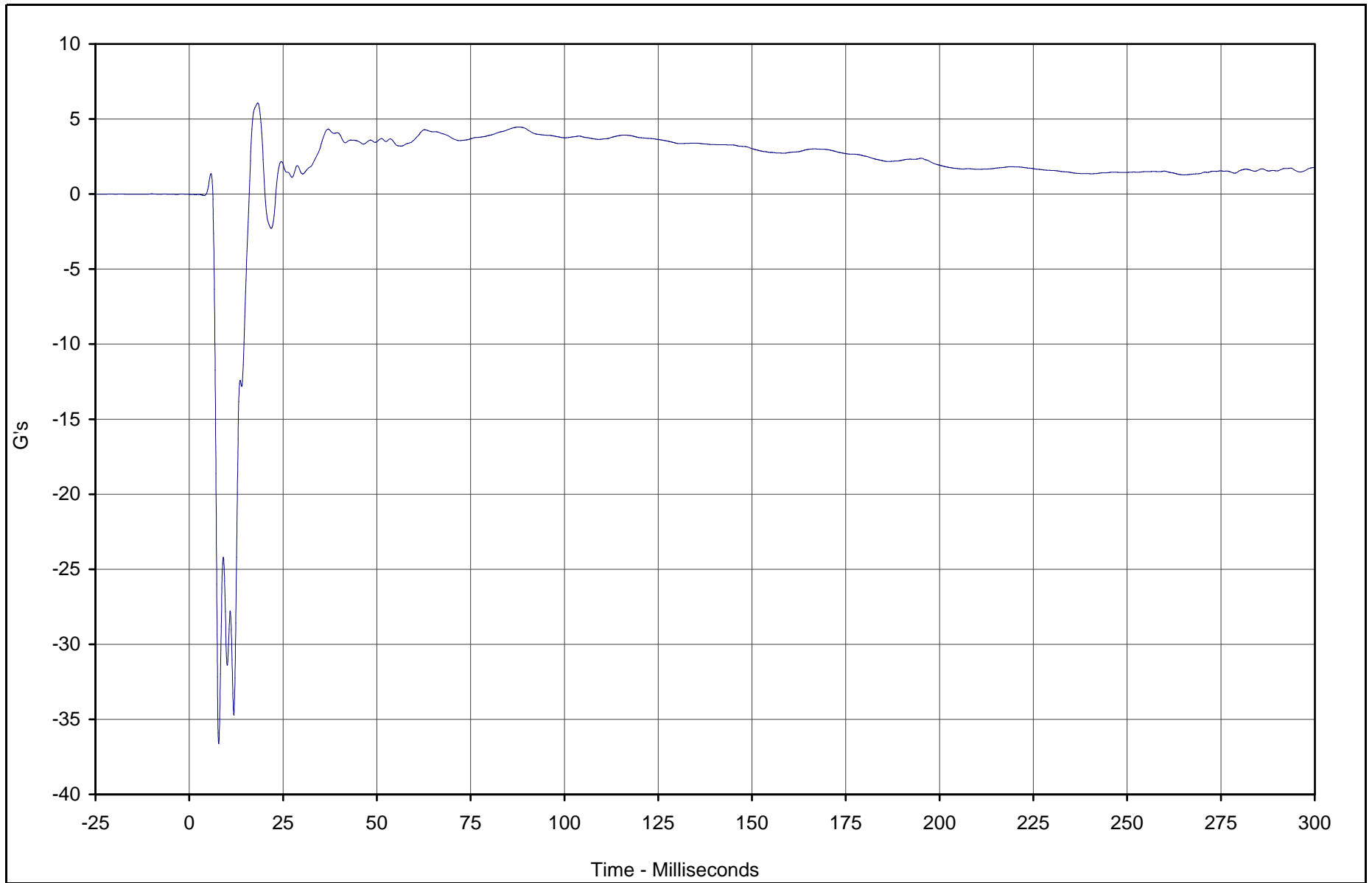
Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC

B-21

TR-P23106-01-NC



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Chest X	016	FIL	G's	6.1	18.2	-36.6	7.9	180



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

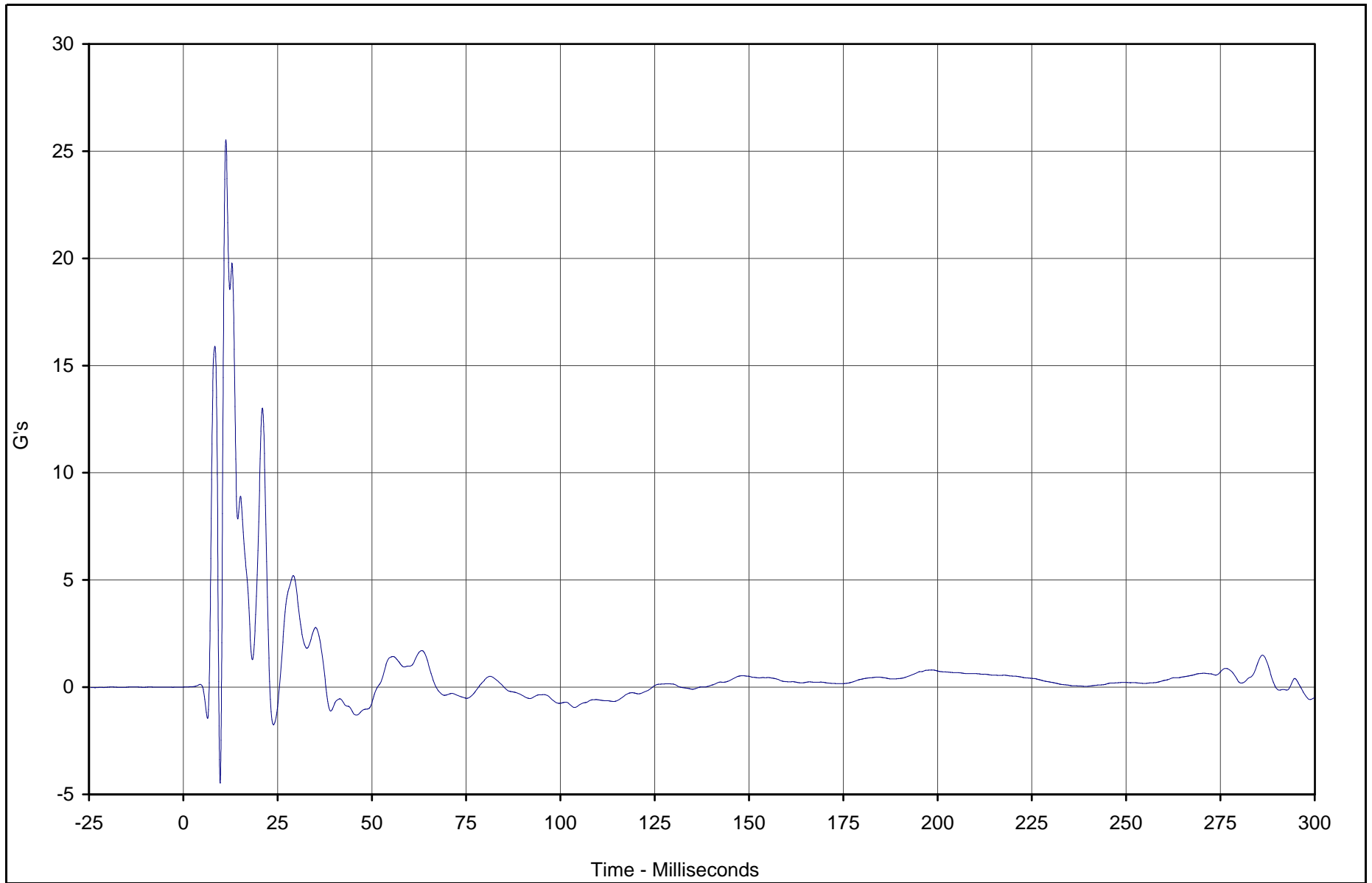
Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

B-22

TR-P23106-01-NC



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Chest Y	017	FIL	G's	25.5	11.3	-4.5	9.8	180



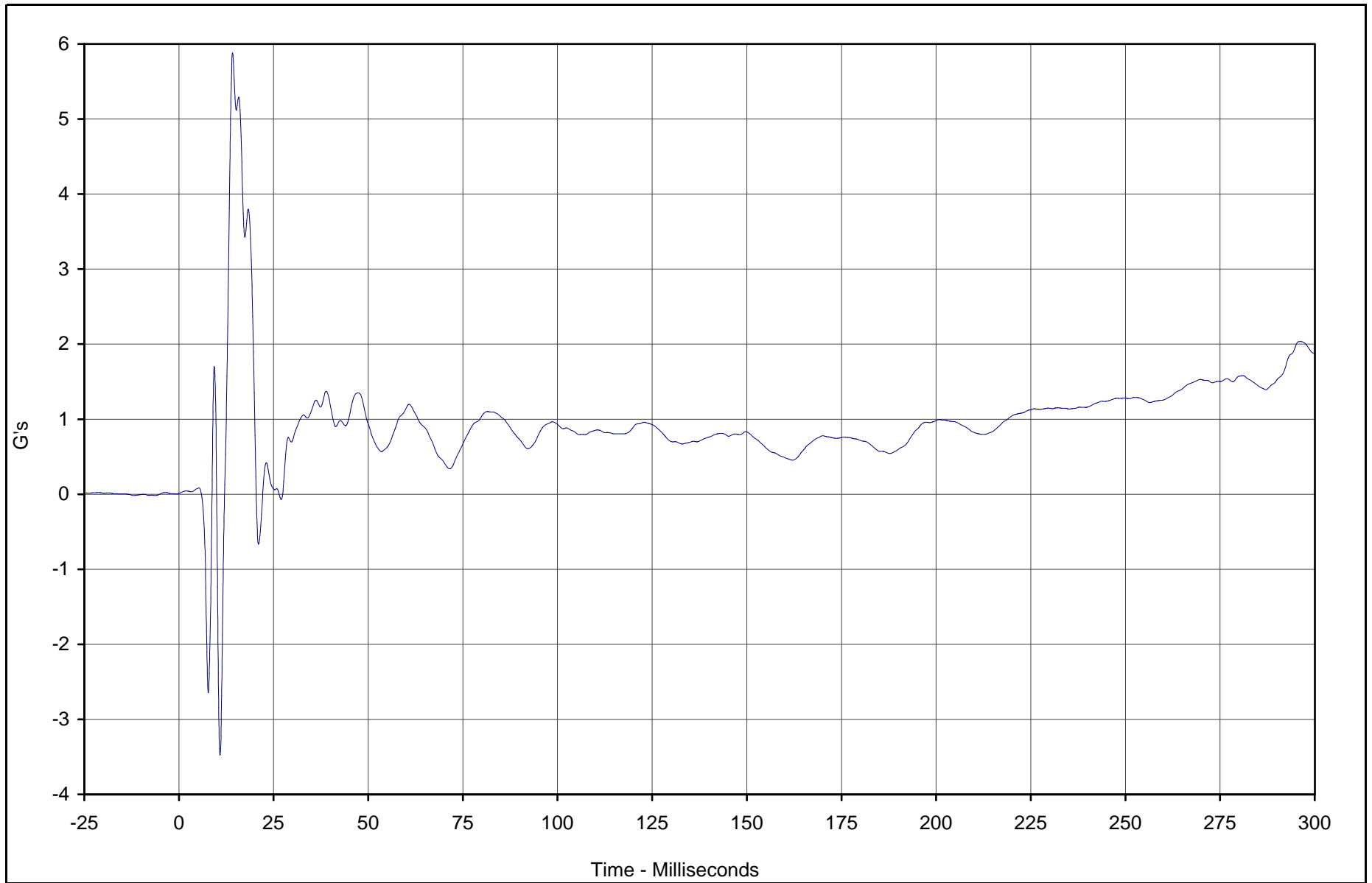
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

B-23



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Chest Z	018	FIL	G's	5.9	14.2	-3.5	10.8	180



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

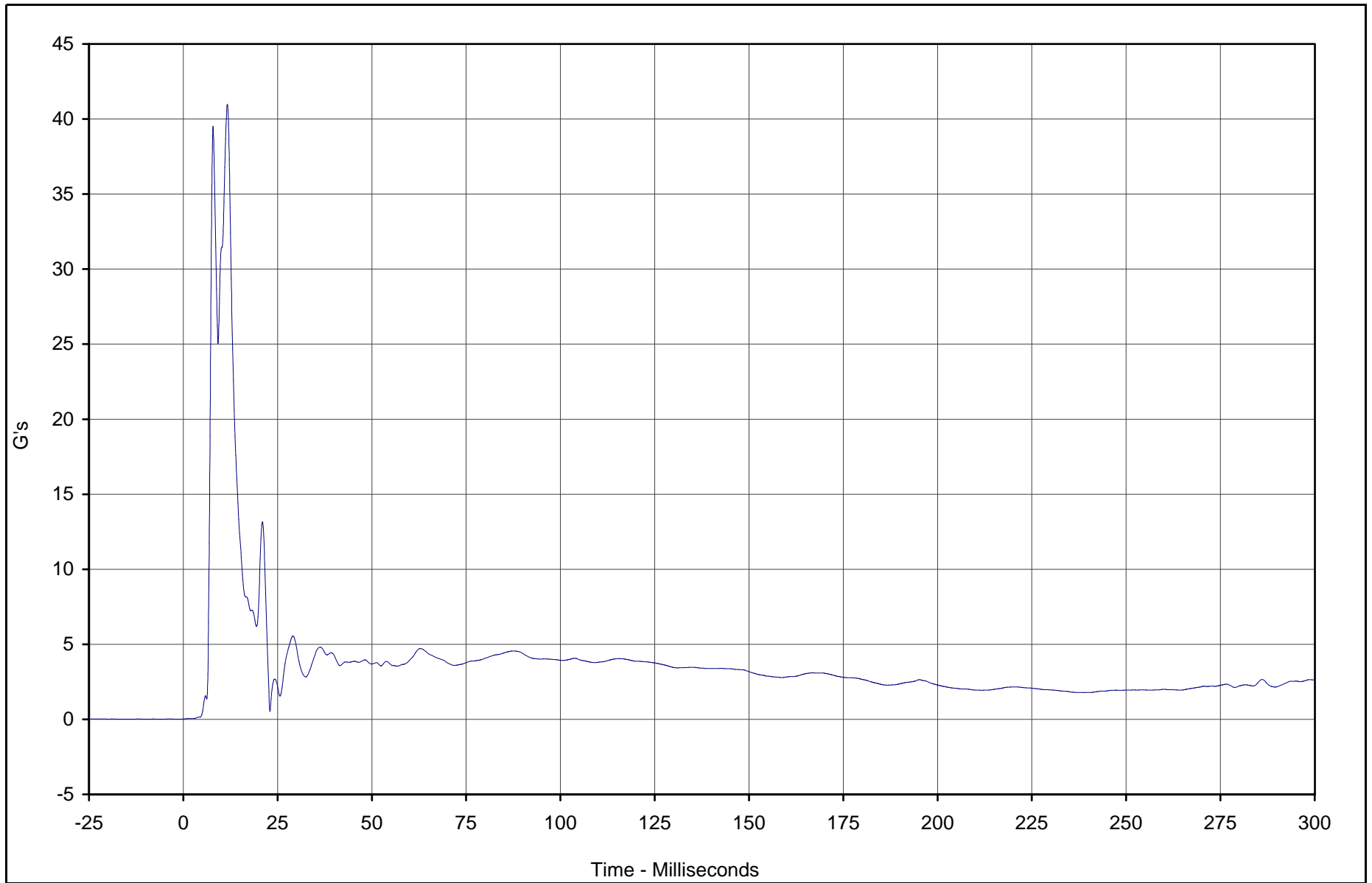
Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC

B-24

TR-P23106-01-NC



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Chest Resultant	016	RES	G's	41.0	11.7	0.0	0.0	180



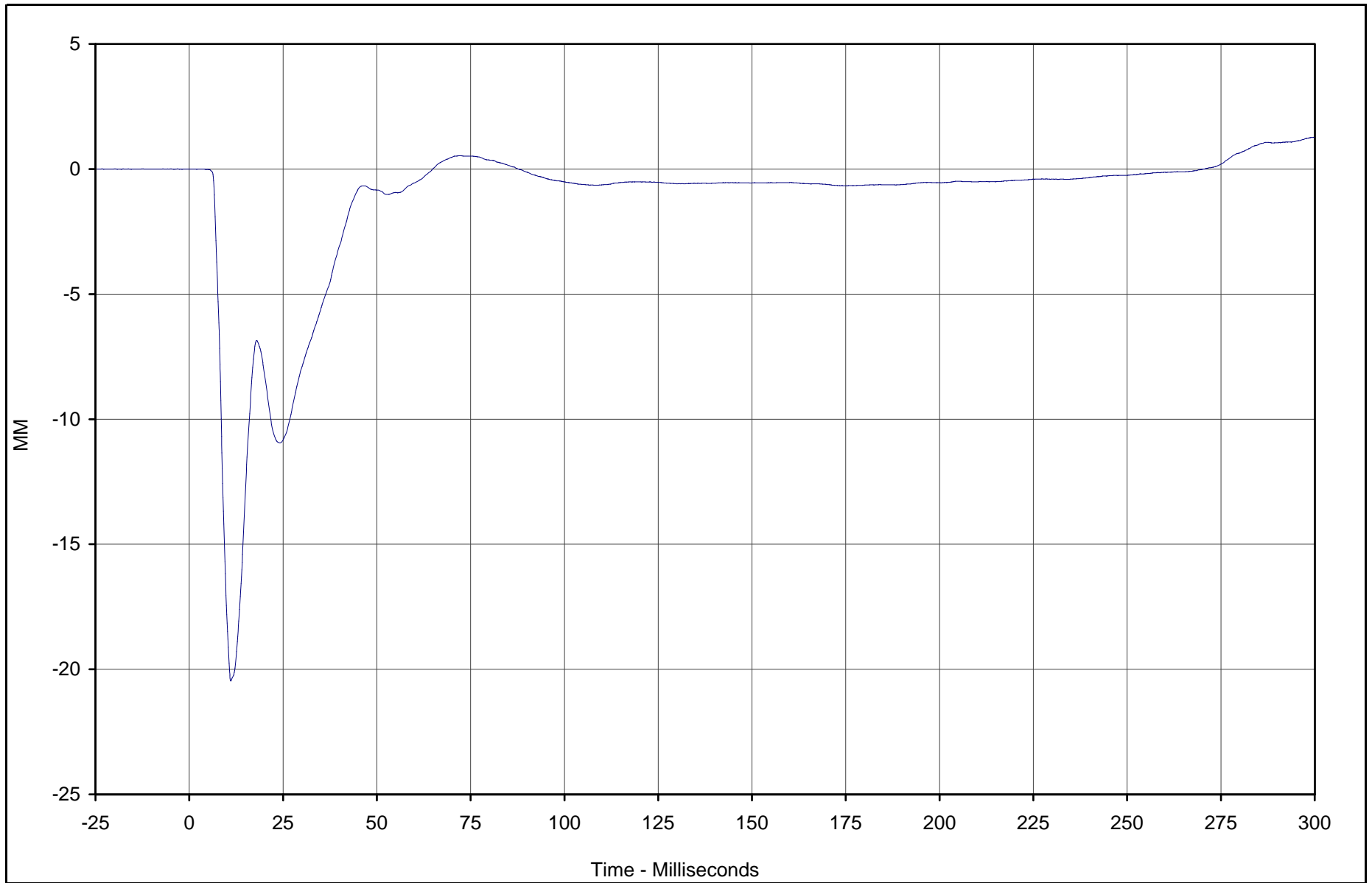
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

B-25



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Chest Displacement	019	FIL	MM	1.3	299.7	-20.5	11.1	600



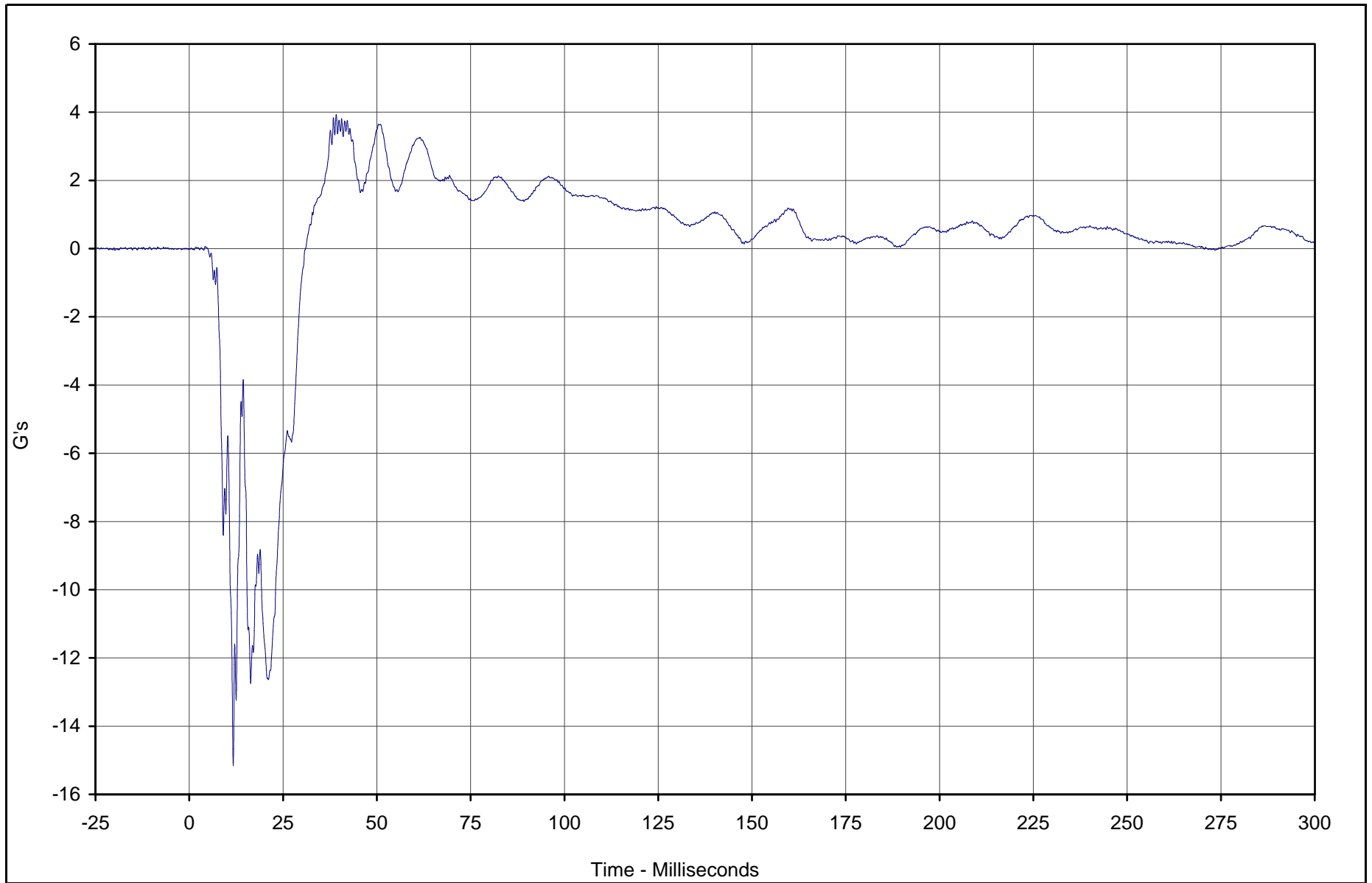
Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

TR-P23106-01-NC



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Pelvis X	020	FIL	G's	3.9	39.2	-15.2	11.7	1000

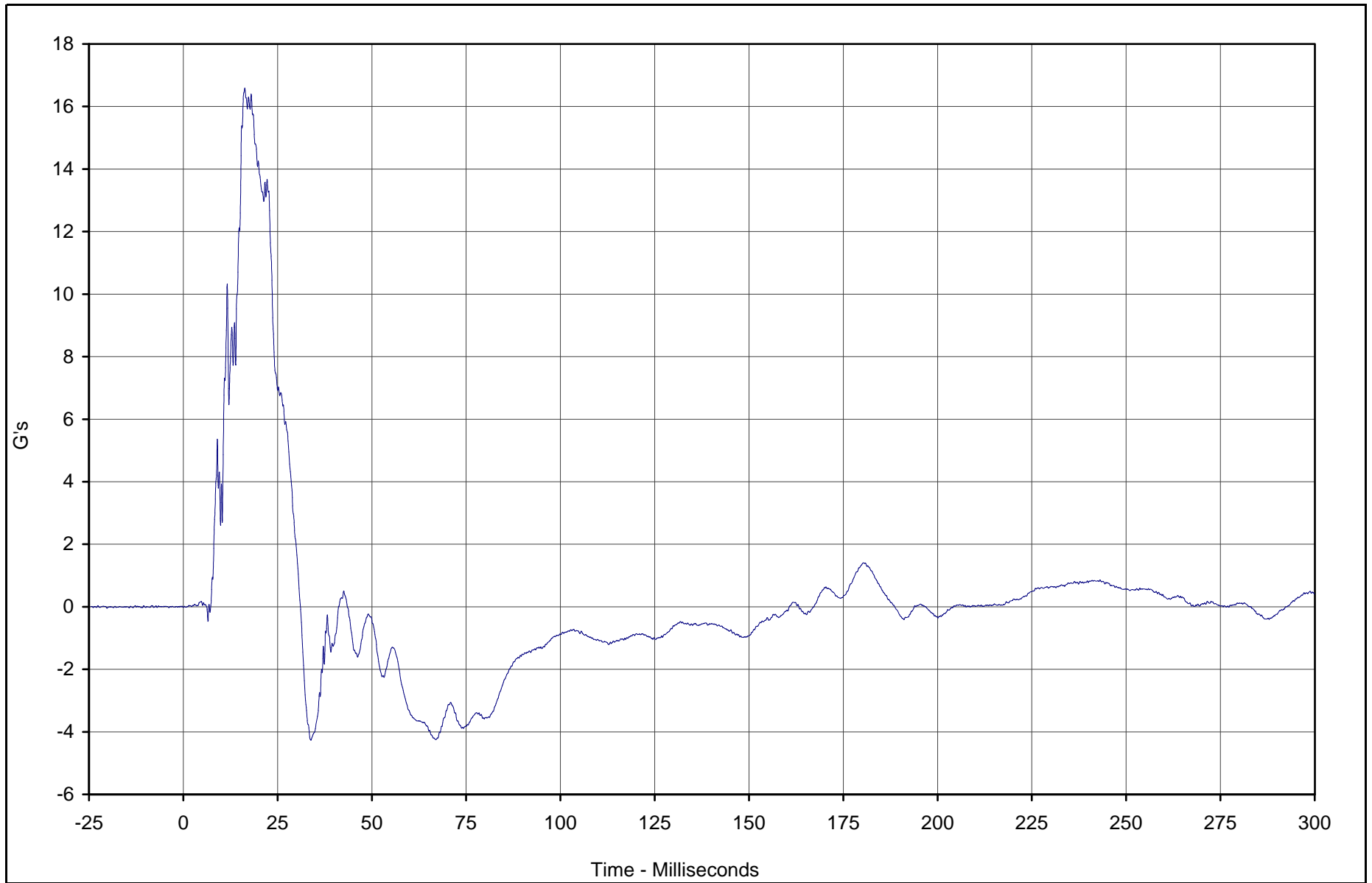


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Pelvis Y	021	FIL	G's	16.6	16.3	-4.3	33.8	1000

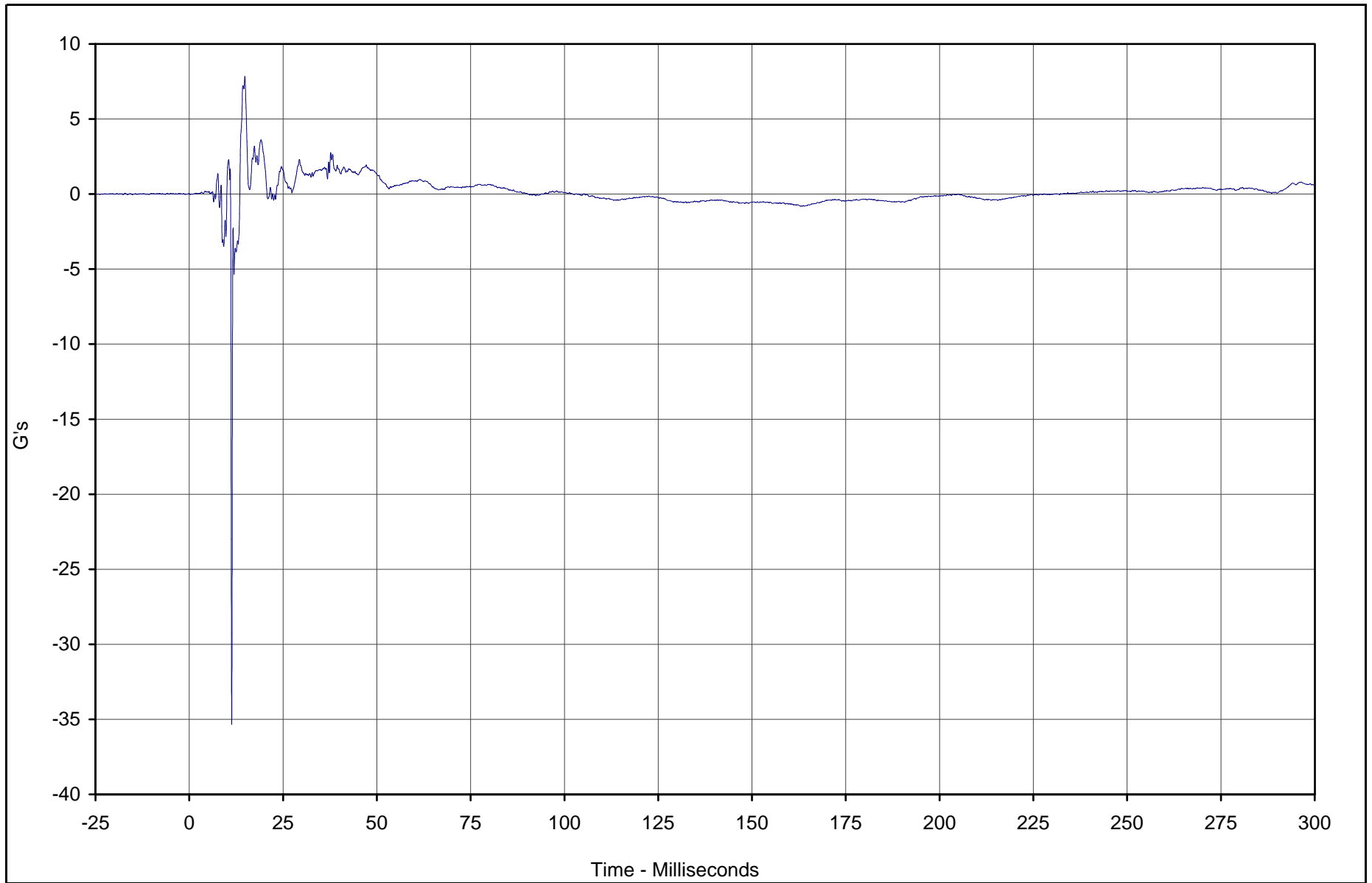


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Pelvis Z	022	FIL	G's	7.8	14.8	-35.2	11.3	1000

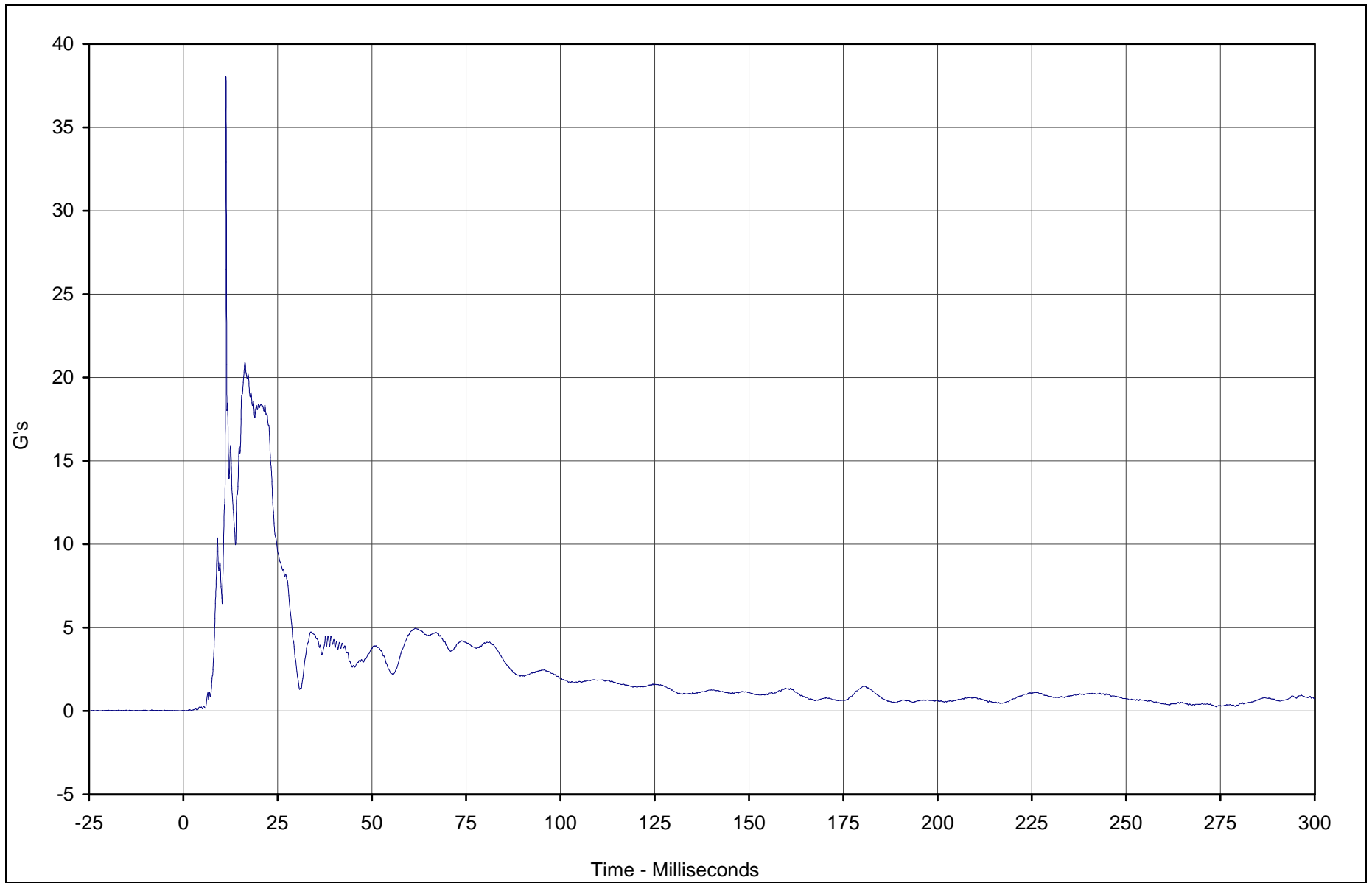


Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pass. Pelvis Resultant	020	RES	G's	37.9	11.3	0.0	1.0	1000



Test Vehicle: 2003 Jaguar X-Type 4 Door Sedan

Test Date: 10/16/03

Test Program: TWG Testing (Rearward Facing Hybrid III 3 Yr.)

NHTSA No.: M30210TWG1

APPENDIX C

INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

TWG Testing (Rearward Facing Hybrid III 3 Yr.)
Instrumentation Data Channel Assignments
A.T.D. Serial Number 082
10/16/03
2003 Jaguar X-Type 4 Door Sedan

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	HEAD, PRIMARY	X	GPAC050	Accel.,1/2 bridge	Endevco	7264-2000	G
2	HEAD, PRIMARY	Y	GPAC051	Accel.,1/2 bridge	Endevco	7264-2000	G
3	HEAD, PRIMARY	Z	GPAC052	Accel.,1/2 bridge	Endevco	7264-2000	G
4	UPPER NECK FORCE	X	082UNFX	Load cell, six axis neck	R. A. Denton	IF-234	N
5	UPPER NECK FORCE	Y	082UNFY	Load cell, six axis neck	R. A. Denton	IF-234	N
6	UPPER NECK FORCE	Z	082UNFZ	Load cell, six axis neck	R. A. Denton	IF-234	N
7	UPPER NECK MOMENT	X	082UNMX	Load cell, six axis neck	R. A. Denton	IF-234	Nm
8	UPPER NECK MOMENT	Y	082UNMY	Load cell, six axis neck	R. A. Denton	IF-234	Nm
9	UPPER NECK MOMENT	Z	082UNMZ	Load cell, six axis neck	R. A. Denton	IF-234	Nm
10	LOWER NECK FORCE	X	082LNFX	Load cell, six axis neck	R. A. Denton	3303	N
11	LOWER NECK FORCE	Y	082LNFY	Load cell, six axis neck	R. A. Denton	3303	N
12	LOWER NECK FORCE	Z	082LNFZ	Load cell, six axis neck	R. A. Denton	3303	N
13	LOWER NECK MOMENT	X	082LNMX	Load cell, six axis neck	R. A. Denton	3303	Nm
14	LOWER NECK MOMENT	Y	082LNMY	Load cell, six axis neck	R. A. Denton	3303	Nm
15	LOWER NECK MOMENT	Z	082LNMZ	Load cell, six axis neck	R. A. Denton	3303	Nm
16	CHEST , PRIMARY	X	2116-A11	Accel., Full Bridge	Entran	2000JF	G
17	CHEST , PRIMARY	Y	2116-A14	Accel., Full Bridge	Entran	2000JF	G
18	CHEST , PRIMARY	Z	2116-A23	Accel., Full Bridge	Entran	2000JF	G
19	CHEST DISPLACEMENT	X	082CP	Rotary Pot Chest	Servo	14CBI	MM
20	PELVIS, PRIMARY	X	2116-A12	Accel., Full Bridge	Entran	2000JF	G
21	PELVIS, PRIMARY	Y	2116-A19	Accel., Full Bridge	Entran	2000JF	G
22	PELVIS, PRIMARY	Z	2116-A17	Accel., Full Bridge	Entran	2000JF	G