

**REPORT NUMBER: 214D-MGA-2001-010**

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

**Audi AG  
2001 Audi TT Roadster  
NHTSA NUMBER:C15800**

**PREPARED BY:  
MGA RESEARCH CORPORATION  
5000 WARREN ROAD  
BURLINGTON, WI 53105**



**February 27, 2001**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
400 SEVENTH STREET, SW, ROOM 6111 (NSA-30)  
WASHINGTON, D.C. 20590**

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**Technical Report Documentation Page**

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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier INDICANT Compliance Test was conducted on the subject 2001 Audi TT Roadster in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-214D-05 Side Impact Protection (except the test was conducted 8kph (5 mph) faster than the standard specifies) for determination of FMVSS No. 214 Side Impact Protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on February 27, 2001.  The impact velocity of the Moving Deformable Barrier (MDB) was 62.1 kph, and the ambient temperature at the struck side (driver's) of the vehicle was 21.7 °C. The target vehicle's maximum post test static crush was 200 mm at level 3. The test vehicle's occupant performance is as follows:  <table border="0" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">42</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">38</td> </tr> <tr> <td>Lower Spine (T<sub>12</sub>) Accel., g</td> <td style="text-align: center;">40</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">41</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">44</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">260</td> </tr> </tbody> </table> The door on the struck side of the vehicle did not separate from the body at the hinges or latch and the opposite door did not open during the side impact event.							<u>DRIVER</u>	Left Upper Rib (LUR) Accel., g	42	Left Lower Rib (LLR) Accel., g	38	Lower Spine (T <sub>12</sub> ) Accel., g	40	Thoracic Trauma Index (TTI)	41	Pelvis (PEV) Accel., g	44	HIC	260
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HIC	260																		
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**SECTION 1**  
**PURPOSE AND TEST PROCEDURE**

**1.1 PURPOSE**

This side impact test is conducted as part of the FY' 2001 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-97-C-11033. The purpose of this test was to evaluate side impact protection in a 2001 Audi TT Roadster manufactured by Audi AG.

**1.2 TEST PROCEDURE**

The side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Vehicle Safety Compliance (OVSC), laboratory test procedure TP-214D-05, dated August 2, 1999 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA2 with the exception of the test speed, which was at the NCAP High Speed Lateral Impact level (61.2 kph, approximately 8 kph faster than compliance speed). The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

## SECTION 2

### SUMMARY OF SIDE IMPACT TEST

#### 2.1 SUMMARY OF SIDE IMPACT TEST

A model year 2001 Audi TT Roadster was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.1 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1608 kg and the test weight of the MDB was 1362 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on February 27, 2001.

One (1) real-time motion picture camera and eight (8) high-speed motion picture cameras were used to document the impact event. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummy (SID) can be found in Appendix A. A 50th percentile adult male SID was placed in the driver designated seating position according to instructions specified in the OVSC Side Impact Laboratory Test Procedure dated August 2, 1999. The SID was instrumented with eleven accelerometers in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y, and Z)

The test vehicle was instrumented with nineteen (19) structural accelerometers and the MDB was instrumented with five (5) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board EME Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

#### 2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 200 mm at level 3, 750 mm rearward of the left vertical impact point. The driver SID, Serial No. 049, was calibrated just prior to this test. The SID's injury criteria is summarized as follows:

Measurements	Units	Driver
Thoracic Trauma Index (TTI)	G's	41
Peak Pelvic G's (PEV)	G's	44
Head Injury Criteria (HIC)	none	260

Test summaries and post-test observations are presented in Section 3. The vehicle, camera, and occupant measurements are presented in Section 4. Appendix A contains the still photograph prints. Appendix B contains the driver SID, vehicle, and MDB response data traces. Appendix C contains the SID's configuration and performance verification data. Appendix D contains the test equipment information.

## TEST NOTES

The following accelerometers were not used for this test:

Left Front Door on Centerline  
Midrear of Left Front Door  
Left Front Door Upper Centerline  
Midrear of Left Rear door  
Left Rear Door Upper Centerline  
Rear Seat Track  
Right Rear Occupant Compartment

\*This is a 2 seat vehicle, left and right front outboard positions, therefore a rear passenger dummy was not used for this test.

### SECTION 3

#### SIDE IMPACT DUMMY (SID) AND VEHICLE TEST DATA

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

#### CONVERSION FACTORS USED IN THIS REPORT\*

Quantity	Typical Application	Old 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 Pressure	lbf/in <sup>2</sup>	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**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

**TEST VEHICLE INFORMATION**

Make	Audi
Model	TT Roadster
Body Style	2 Door Convertible
NHTSA No.	C15800
VIN	TRUTX28N611024390
Color	Green
Delivery Date	February 15, 2001
Odometer Reading (mile)	91
Dealer	Schaumburg Audi
Transmission	5 speed manual
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	1.8
Engine Placement	Transverse

**TEST VEHICLE OPTIONS**

Front Airbags	yes
Side Airbags	yes
Power Windows	yes
Power Steering	yes
Power Door Locks	yes
Tilt Wheel	yes
Air Conditioning	yes
Power Brakes	yes
Disc Brakes, Front	yes
Disc Brakes, Rear	yes
Anti-lock Brakes	yes
AM/FM/Cassette	yes
Anti-theft System	yes
Cruise Control	yes

**DATA FROM CERTIFICATION LABEL**

Manufactured By	Audi AG
Date of Manufacture	12/00

GVWR (kg)	1720
GAWR Front (kg)	750
GAWR Rear (kg)	1000

**DATA FROM TIRE PLACARD**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	240	230
Cold Pressure (kPa)	240	230
Recommend Tire Size	P225/45R17	P225/45R17
Tire Size on Vehicle	P225/45R17	P225/45R17
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	bucket			
Number of Occupants	2			2
Capacity Wt. (VCW) (kg)				250.0
Cargo Weight (RCLW) (kg)				113.4

**DATA SHEET NO. 1...(continued)**  
**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	435.9	278.5		460.9	352.0	
Right	kg	436.4	271.3		463.6	331.1	
Ratio	%	61.3	38.7		57.5	42.5	
Totals	kg	872.3	549.8	1422.1	924.5	683.1	1607.6

**TARGET TEST WEIGHT CALCULATION\***

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1422.1
Weight of P572F Side Impact Dummy	kg	80.7
Rated Cargo/Luggage Weight (RCLW)	kg	113.4
Calculated Vehicle Target Weight (TVTW)	kg	1616.2

\*Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	672	668	680	686	935
As Tested	mm	664	662	656	658	1027
Fully Loaded	mm	664	663	644	657	

**GENERAL TEST VEHICLE DATA**

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2418
Total Vehicle Length at Left Side	mm	3086
Total Vehicle Length at Centerline	mm	3961
Total Vehicle Length at Right Side	mm	3086
Weight of Ballast in Cargo Area	kg	65.8
Amount of Stoddard Solvent in Fuel Tank	liters	51.1

**TEST VEHICLE VERTICAL IMPACT LINE DATA**

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2418
Target Impact Point Aft of Front Axle	mm	269
Actual Impact Point Aft of Front Axle	mm	289

**DATA SHEET NO. 1...(continued)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

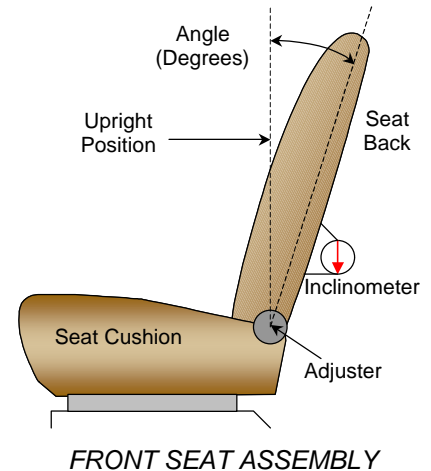
Test Vehicle: 2001/Audi/TT Roadster  
Test Program: FMVSS 214

NHTSA No.: C15800  
Test Date: February 27, 2001

**NORMAL DESIGN RIDING POSITION**

The driver's seat back is positioned to the manufacturer's designated angle. The procedure for the seat is as follows: A straight edge is placed against the vertical centerline of the seatback. The seat is adjusted to get the angle of the straight edge to 15E.

Driver seat back angle: 15 °  
Passenger seat back angle: N/A



**SEAT FORE/AFT POSITIONS**

The driver's seat is electronically operated. The fore/aft is set to the middle position for the driver's seat.

Driver seat fore/aft total travel: 326 mm  
Rear passenger seat fore/aft total travel: N/A  
Driver seat fore/aft position: 163 mm rearward of full forward  
Rear passenger seat fore/aft position: N/A

**SEAT BELT UPPER ANCHORAGE**

The test vehicle is equipped with a non-adjustable "D" ring anchorage for the driver's seat position.

**DATA SHEET NO. 1...(continued)**

**GENERAL TEST AND VEHICLE PARAMETER DATA**

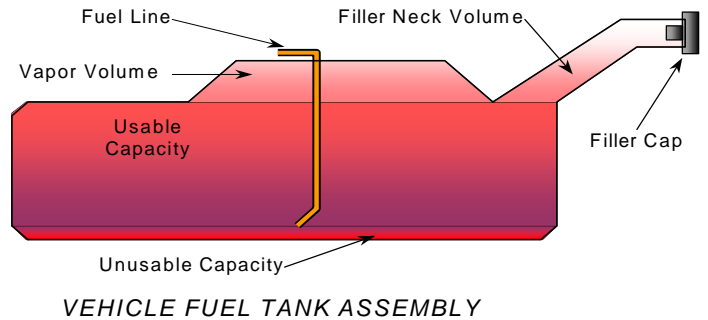
Test Vehicle: 2001/Audi/TT Roadster  
Test Program: FMVSS 214

NHTSA No.: C15800  
Test Date: February 27, 2001

**FUEL TANK CAPACITY DATA**

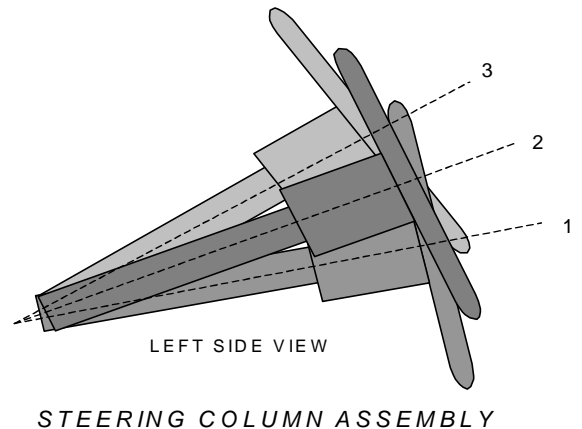
The "Usable Capacity" of the standard equipment fuel tank is: 55.0 liters  
The "Usable Capacity" of any optional equipment fuel tank is: N/A liters  
92-94% of "Usable Capacity" for certification to FMVSS 301 requirement: 50.6-51.7 liters  
Actual amount of Stoddard solvent added to vehicle for certification test: 51.1 liters

The test vehicle is equipped with an electric fuel pump. The fuel pump operates while the engine is running. The fuel filler door is located on the right rear fender.



**STEERING COLUMN ADJUSTMENT**

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of motion. A square is placed across the rim of the steering wheel, and inclinometer is placed onto the square and the angle is measured. The steering column was placed in the mid point of it's range.



Lowermost, position 1: 17.1°  
Geometric center, position 2: 18.3°  
Uppermost, position 3: 19.5°

**DATA SHEET NO. 2**

**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	435.9	278.5		460.9	352.0	
Right	kg	436.4	271.3		463.6	331.1	
Weight Ratio	%	61.3	38.7		57.5	42.5	
Totals	kg	872.3	549.8	1422.1	924.5	683.1	1607.6

**MAXIMUM EXTERIOR STATIC CRUSH**

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	41	251
Level 2	Occupant H-Point	mm	159	455
Level 3	Mid Door	mm	200	615
Level 4	Window Sill	mm	82	912
Level 5	Window Top	mm	64	1222
N/A	Maximum Penetration	mm	200	615

**INSTRUMENTATION**

Driver SID Accelerometers	11
Vehicle Structure Accelerometers	19
MDB Accelerometers	5
Total	35

**DATA SHEET NO. 3**

**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

**MDB SPECIFICATIONS (mm)**

Measurement Description	Length
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2590
C.G. Location aft of Front Axle	1127

**MDB WEIGHTS**

	Units	Front Axle	Rear Axle	Total
Left	kg	395.1	293.8	
Right	kg	385.7	287.4	
Ratio	%	57.3	42.7	
Totals	kg	780.8	581.2	1362.0

**SPEED AND IMPACT ANGLE DATA**

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.1
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.1
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.2

**MAXIMUM STATIC CRUSH OF HONEYCOMB FACE (mm)**

Vertical Location			From Centerline		Max. Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Left	235
B	Top of Bumper	533	800	Left	145
C	Mid Level	686	800	Left	143
D	Top of Stack	813	800	Left	163

**MDB INSTRUMENTATION AND CAMERAS**

Accelerometers	5
Contact Switches	2
High Speed Cameras	2

**DATA SHEET NO. 4**

**POST TEST OBSERVATIONS**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

**TEST DUMMY INFORMATION AND CONTACT POINTS**

Description	Front Seat SID
Dummy Type / Serial No.	SID / 049
Head Contact	Headrest, window sill
Upper Torso Contact	Door panel , side airbag
Lower Torso Contact	Door panel
Left Knee Contact	Door panel
Right Knee Contact	Left knee

**POST TEST DOOR OPENING AND SEAT TRACK INFORMATION**

Description	Front
Left Side Door Opening	Remained closed
Right Side Door Opening	Remained closed
Seat Movement	None
Seat Back Failure	None

**POST TEST STRUCTURAL OBSERVATIONS**

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failure
Sill Separation	No separation
Windshield Damage	No damage
Window Damage	Driver window broke
Other Notable Effects	None noted

**AIRBAG DEPLOYMENT**

	Driver	Front Passenger
Front	Did not deploy	Did not deploy
Side	Deployed properly	Did not deploy

**MDB LEFT EDGE IMPACT POINT DATA**

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	20 rearward
Vertical Offset	mm	+/-20	2 up

**SECTION 4**  
**OCCUPANT AND VEHICLE INFORMATION**

**DATA SHEET NO. 5**

**SID INJURY CRITERIA AND SENSOR DATA**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

**THORAX AND PELVIS PEAK ACCELERATIONS (FIR 100 Filtered)**

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	41.8	40	-6.0	198
Upper Rib (LUR) (R)	Y	G's	41.5	40	-6.2	198
Lower Rib (LLR)	Y	G's	37.9	41	-9.7	86
Lower Rib (LLR) (R)	Y	G's	37.7	48	-9.6	86
Lower Spine (T <sub>12</sub> )	Y	G's	39.7	48	-13.7	81
Lower Spine (T <sub>12</sub> ) (R)	Y	G's	40.2	47	-14.1	81
Pelvis (PEV)	Y	G's	43.8	42	-3.8	198
Pelvis (PEV) (R)	Y	G's	43.2	42	-3.4	198

**THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION (FIR 100 Filtered)**

Location	Driver			
	LUR	T <sub>12</sub>	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	41.8	39.7	40.8	43.8
Rib, Spine, and Pelvis (R)	41.5	40.2	40.9	43.2

**HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)**

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Head CG	X	G's	7.6	100	-26.9	52
Head CG	Y	G's	42.0	52	-6.7	163
Head CG	Z	G's	34.2	57	-7.8	68
Head CG Resultant		G's	52.9	52		

**HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)**

Location	Driver			
	HIC	T <sup>1</sup>	T <sup>2</sup>	Avg G's
Head CG	260	44.7	80.7	35.0

Positive Acceleration Polarities: Longitudinal (X) = Forward  
 (Conforms to SAE J211) Lateral (Y) = Right  
 Vertical (Z) = Down

## DATA SHEET NO. 6

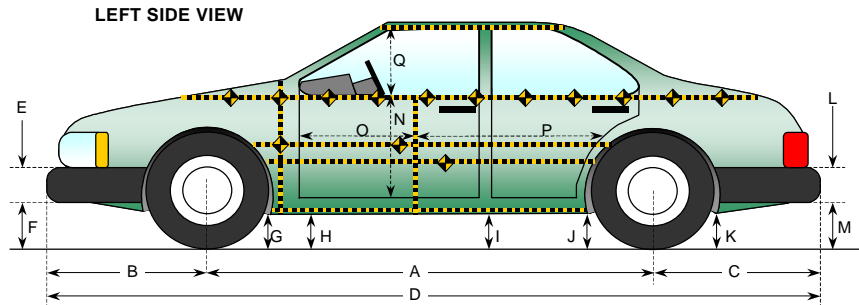
### VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2418	2422	4
B	Front Axle to FSOV	818	835	17
C	Rear Axle to RSOV	725	655	-70
D	Total Length at Centerline	3961	3912	-49
E	Front Bumper Thickness	170	170	0
F	Front Bumper Bottom to Ground	374	369	-5
G	Sill Height at Front Wheel Well	164	179	15
H	Sill Height at Front Door Leading Edge	151	183	32
I	Sill Height at "B" Pillar	152	146	-6
J1	Sill Height at Rear Wheel Well	155	149	-6
J2	Pinch Weld Height at Rear Wheel Well	174	176	2
K	Sill Height Aft of Rear Wheel Well	202	219	17
L	Rear Bumper Thickness	300	300	0
M	Rear Bumper Bottom to Ground	278	300	22
N	Sill Height to Window Bottom Sill	608	575	-33
O	Front Door Leading Edge to Impact CL	639	626	-13
P	Rear Door Trailing Edge to Impact CL	594	588	-6
Q	Front Window Opening	318	300	-18
R	Right Side Length	3086	3090	4
S	Left Side Length	3086	3058	-28
T	Vehicle Width at "B" Post	1736	1704	-32

## DATA SHEET NO. 7

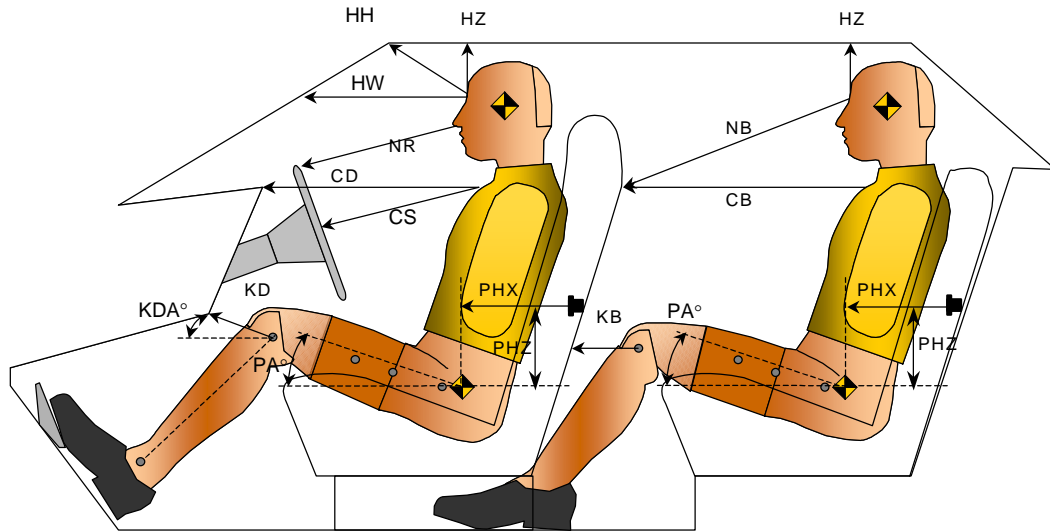
### SID LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



Driver Code	Measurement Description	Driver	
		Length(mm)	Angle(°)
HH	Head to Header	428	
HW	Head to Windshield	642	
HZ	Head to Roof	178	
NR	Nose to Rim/Nose to Seatback	352	
CD	Chest to Dash or Seatback	470	
CS	Chest to Steering Wheel	274	
KDL	Left Knee to Dash or Seatback	276	0.0 °
KDR	Right Knee to Dash or Seatback	252	8.0 °
PA	Pelvic Angle		24.3 °
PHX	H-Point to Striker (X-Axis)	376	
PHZ	H-Point to Striker (Z-Axis)	260	

# DATA SHEET NO. 8

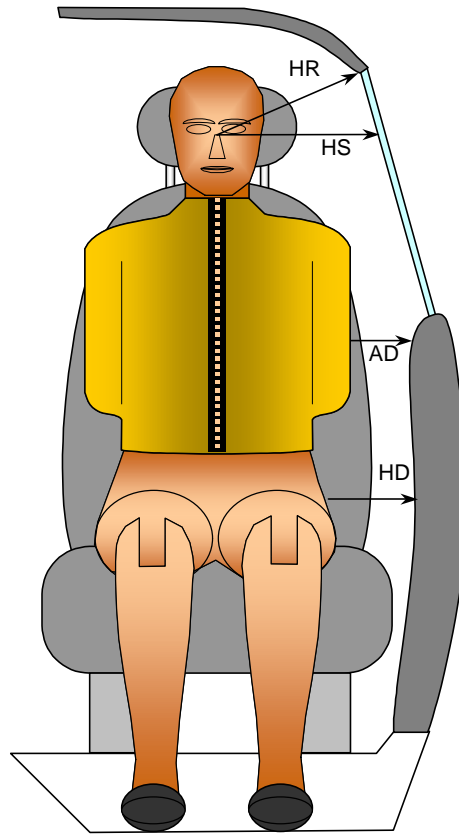
## SID LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	256
HS	Head to Side Window	mm	308
AD	Arm to Door	mm	83
HD	H-Point to Door	mm	186

# DATA SHEET NO. 9

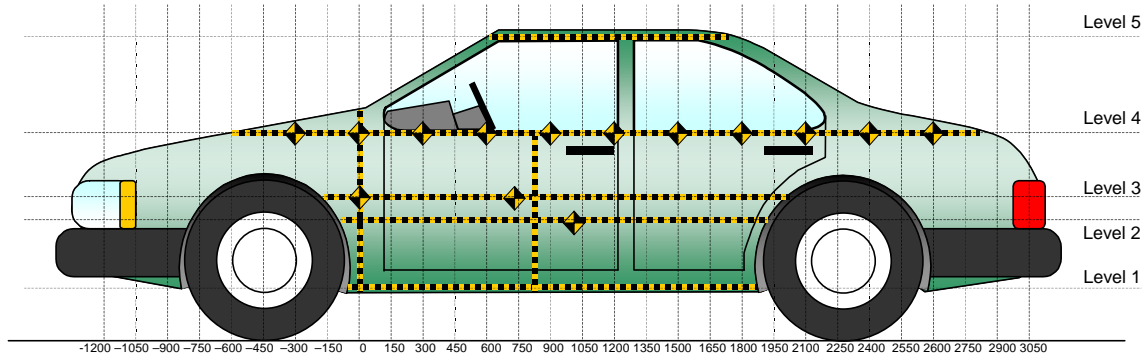
## VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



All Measurements Shown in mm

### LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.

Measurements along the vertical 800 mm.

All measurements below in mm.

Level	Measurement Description	Height Above Ground
5	Window	1222
4	Window Sill	912
3	Mid Door	615
2	Occupant H-Point	455
1	Sill Top	251

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750				562					590					28	
-600			384	545				410	575				26	30	
-450				531					565					34	
-300				518					553					35	
-150				506					544					38	
0			352	497				411	535				59	38	
150	357	364	369	487		388	467	471	531		31	103	102	44	
300	355	365	369	481		387	486	502	537		32	121	133	56	
450	355	365	367	476		387	495	539	542		32	130	172	66	
600	354	365	367		648	390	509	558		710	36	144	191		62
750	354	365	367	473	633	391	519	567	548	697	37	154	200	75	64
900	354	365	368	471	636	393	521	567	551	695	39	156	199	80	59
1050	357	367	370	470	640	397	521	556	549	695	40	154	186	79	55
1200	359	370	372	470	647	400	520	541	543	704	41	150	169	73	57
1350	362	373	375	475	653	400	527	520	536	705	38	154	145	61	52
1500	365	376	379	475	680	402	532	532	557	727	37	156	153	82	47
1650	371	382	384	480		405	541	551	533		34	159	167	53	
1800		365	390	482			523	524	523			158	134	41	
1950			363	490				460	523				97	33	
2100			362	498				415	525				53	27	
2250			365	509				428	532				63	23	
2400				525					545					20	
2550				551					563					12	
2700															
2850															
3000															

Reference plane is parallel to test vehicle longitudinal centerline

Given dimensions = Reference plane to car body

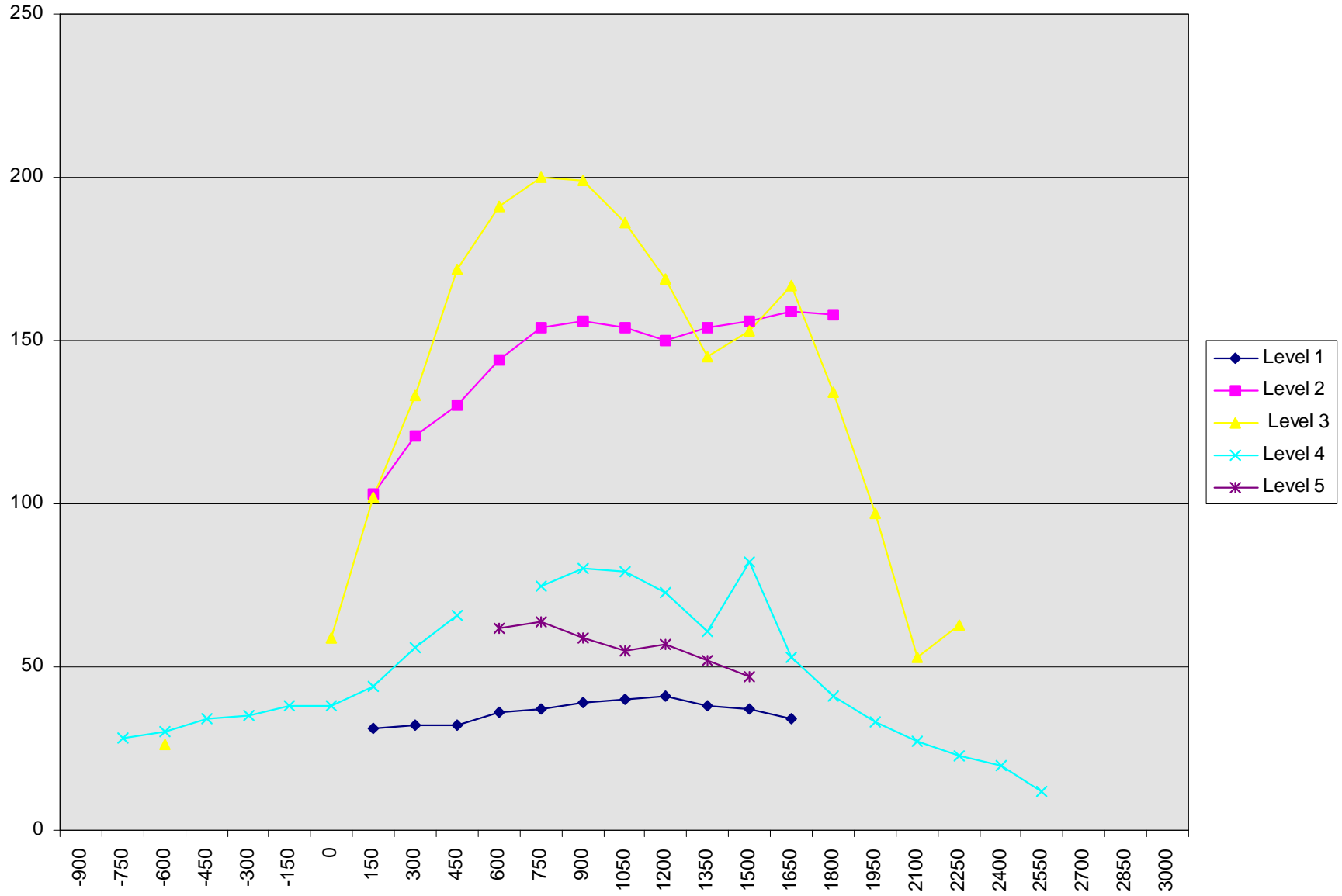
DATA SHEET NO. 10...(continued)

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001/Audi/TT Roadster NHTSA No.: C15800

Test Program: FMVSS 214 Test Date: February 27, 2001

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**DATA SHEET NO. 11**

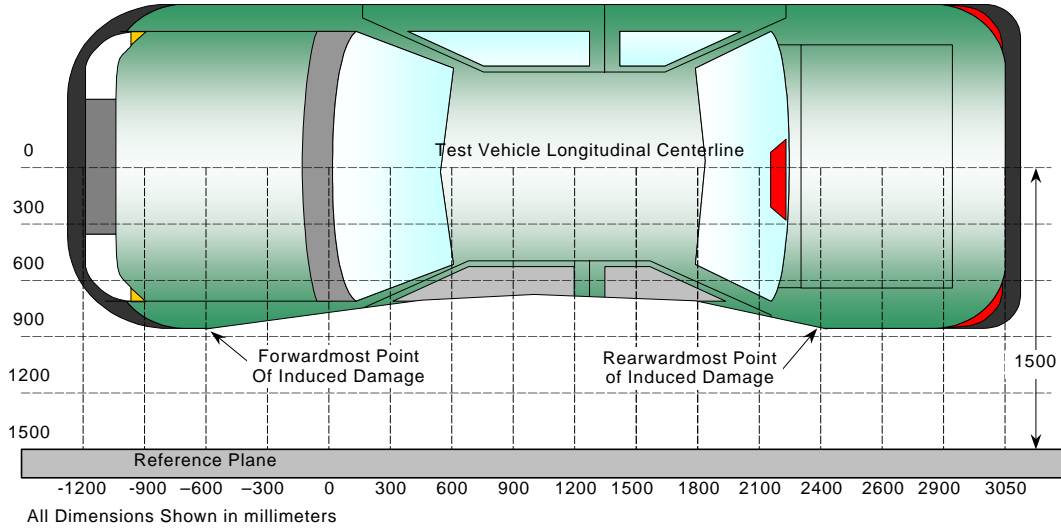
**VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



**TOP VIEW**

**Damage Profile Distances**

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2550 mm	4	551	563	12
2	1852 mm	2.5	370	507	137
3	1163 mm	2.5	370	548	178
4	492 mm	2.5	366	542	176
5	-115 mm	4	500	537	37
6	-750 mm	4	562	590	28

Reference plane is parallel to test vehicle longitudinal centerline  
 Given dimensions = Reference plane to car body

**DATA SHEET NO. 12**

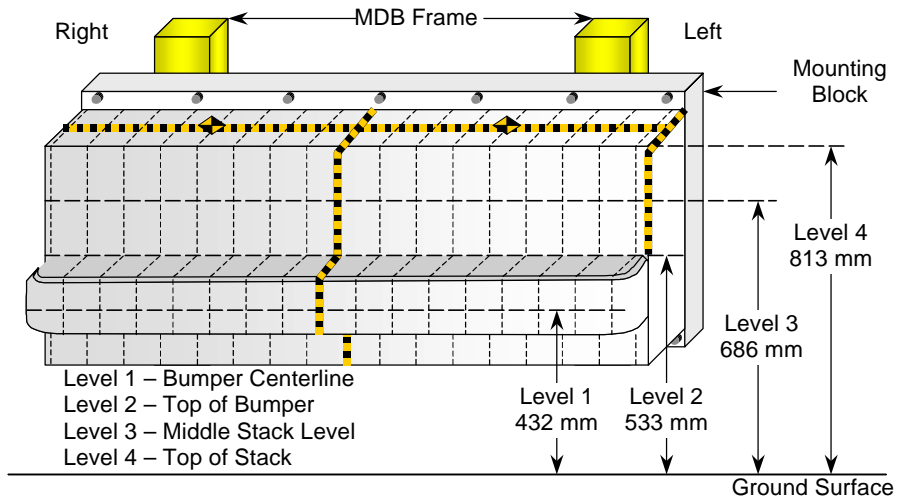
**DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



**DEFORMABLE BARRIER STATIC CRUSH**

Stack Level	Distance Right of Center								C <sub>L</sub>	Distance Left of Center							
	800	700	600	500	400	300	200	100		0	100	200	300	400	500	600	700
1	165	163	165	173	181	178	173	171	173	177	184	187	191	201	217	235	226
2	81	82	80	83	83	81	81	84	85	93	97	102	111	118	124	134	145
3	93	80	84	103	77	43	24	20	20	20	25	30	37	51	48	132	143
4	132	132	132	127	93	56	49	33	35	40	41	49	60	72	86	120	163

All Dimensions in mm

## DATA SHEET NO. 13

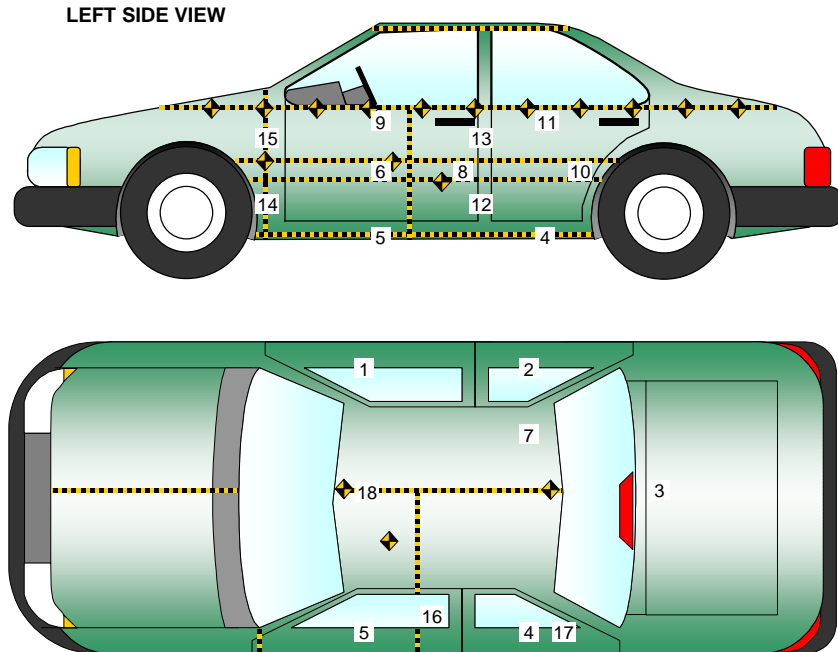
### VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Seat
5	Left Sill at Front Seat
6	Left Front Door Centerline
7	Right Rear Occupant Compartment
8	Left Front Door Mid-Rear
9	Left Front Door Upper Centerline

No.	Location
10	Left Rear Door Mid-Rear
11	Left Rear Door Upper Centerline
12	Left Lower B-Post
13	Left Middle B-Post
14	Left Lower A-Post
15	Left Middle A-Post
16	Left Front Seat Track
17	Rear Seat Track or Structure
18	Vehicle CG

**DATA SHEET NO. 13...(continued)**

**VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY**

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

**VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS**

Loc. No.	Accelerometer Location	Measurements (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	Right Sill at Front Seat	2221	702	165	X	5.6	32	-4.2	11
					Y	29.8	9	-3.2	85
					Z	7.9	34	-5.8	11
					RES	30.4	9		
2	Right Sill at Rear Seat	1428	696	168	X	**	**	**	**
					Y	35.0	9	-3.5	84
					Z	7.9	36	-14.5	10
					RES	**	**		
3	Rear Floorpan Above Axle	815	0	385	X	6.4	49	-10.2	7
					Y	32.0	9	-4.0	82
					Z	26.0	11	-19.2	7
					RES	37.2	10		
4	Left Sill at Rear Seat	1442	-696	163	Y	74.8	6	-16.8	11
5	Left Sill at Front Seat	2208	-702	163	Y	34.2	6	-2.2	74
12	Left B-Post Lower	1579	-672	238	Y	53.6	7	-2.2	144
13	Left B-Post Middle	1400	-628	928	Y	114.0	19	-32.8	24
14	Left A-Post Lower	2658	-700	284	Y	78.3	4	-13.4	13
15	Left A-Post Middle	2632	-740	872	Y	66.0	13	-24.6	17
16	Left Front Seat Track	1724	-535	218	Y	29.6	7	-1.2	175
18	Vehicle CG	2042	0	131	X	3.1	8	-8.2	5
					Y	34.8	8	-1.7	85
					Z	13.0	5	-11.1	9
					RES	35.8	8		

Reference Points    X - Rear of Vehicle (+ forward)  
                           Y - Vehicle Centerline (+ to right)  
                           Z - Ground Plane (+ up)

\*\* No valid data collected.

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

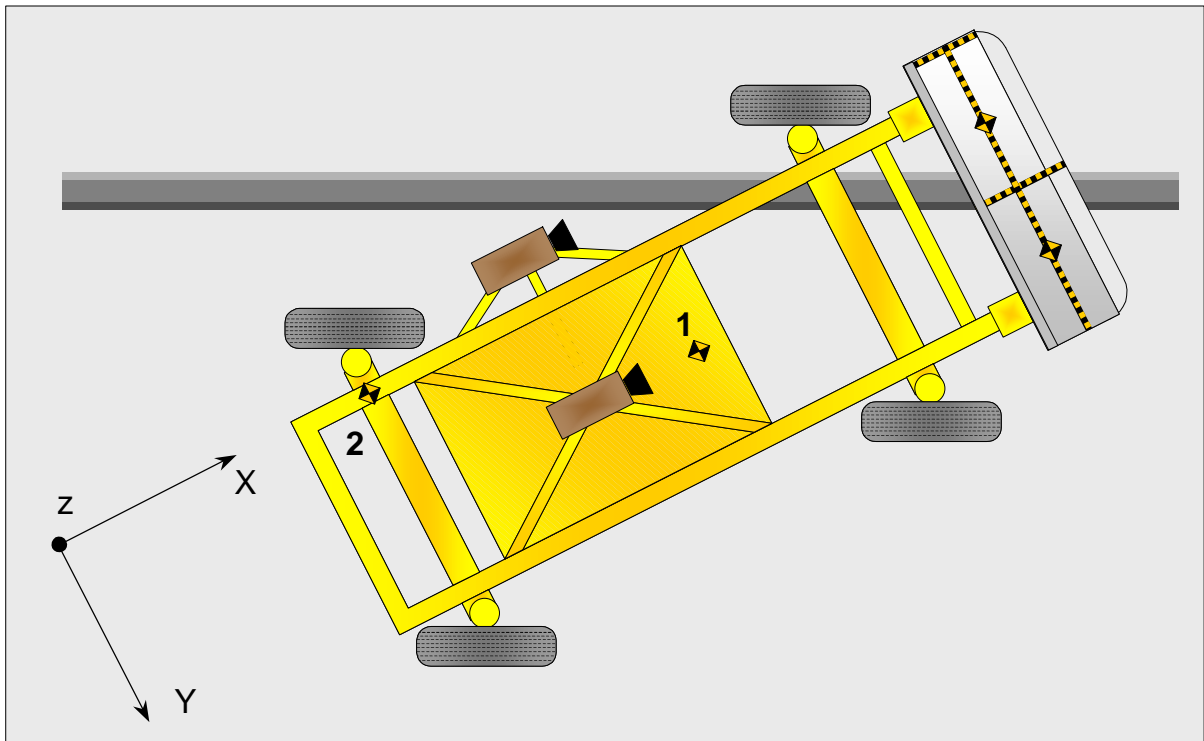
Test Program: FMVSS 214

Test Date: February 27, 2001

MDB ACCELEROMETER PEAK DATA AND LOCATIONS

Loc. No.	Accelerometer Location	Measurement (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	MDB CG	-1092	0	483	X	1.6	82	-21.1	38
					Y	4.4	58	-8.2	31
					Z	23.8	52	-20.8	47
					RES	30.9	32		
2	MDB Rear	-2591	-625	622	X	2.1	81	-25.3	34
					Y	4.4	30	-2.1	109

Reference Points  
 X - MDB Front Axle (+ forward)  
 Y - MDB Centerline (+ to right)  
 Z - Ground Plane (+ up)



DATA SHEET NO. 15

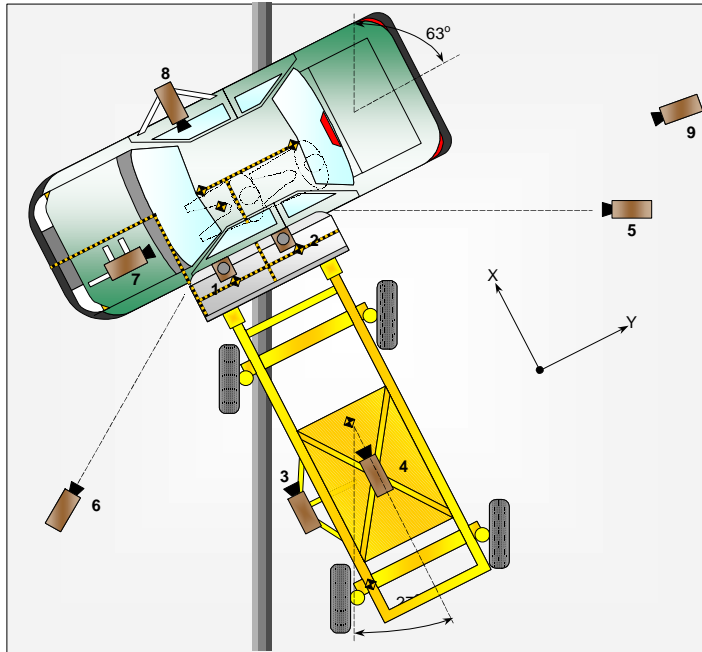
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	1080	-390	5000	8	1010
2	Overhead Close-up	-640	-290	5000	13	990
3	MDB Onboard, Impact Point Close-up				35	1026
4	MDB Onboard, Centerline of Impact				13	1010
5	Right Side, Ground Level, Overall	-600	10100	1810	13	980
6	Left Side, Ground Level, Overall	-850	-2210	1780	8	1015
7	Vehicle Onboard Front SID, Front				8	1081
8	Vehicle Onboard Front SID, Side				8	1020
9	Real Time Coverage				10	24

Reference Points  
 X - MDB Front Axle (+ forward)  
 Y - MDB Centerline (+ to right)  
 Z - Ground Plane (+ up)

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

Test Program: FMVSS 214

Test Date: February 27, 2001

Test Time: 3:30 p.m.

Temperature at Time of Impact: 21.7 °C

**Stoddard Solvent Spillage Measurements**

- A. From impact until vehicle motion ceases: 0 oz.  
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.  
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.  
(Maximum Allowable = 1 oz./minute)
- D. Spillage Details: None

DATA SHEET NO. 17

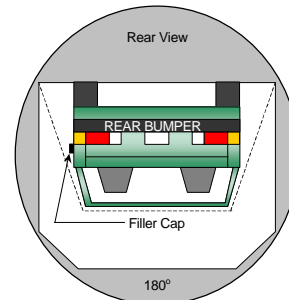
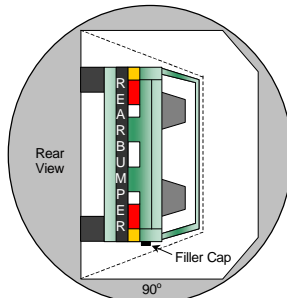
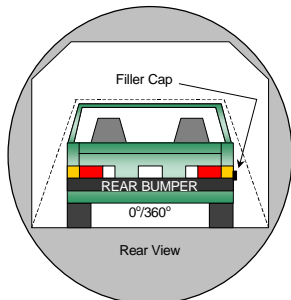
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2001/Audi/TT Roadster

NHTSA No.: C15800

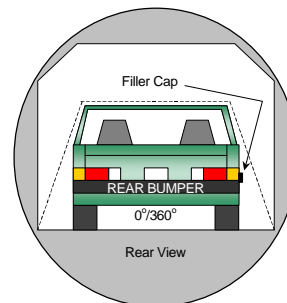
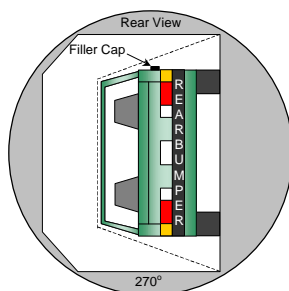
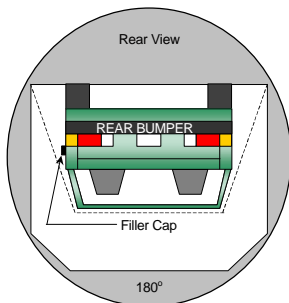
Test Program: FMVSS 214

Test Date: February 27, 2001



0° TO 90°

90° TO 180°



180° TO 270°

270° TO 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum)
3. Details of Stoddard Solvent spillage locations: None

Rollover Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° TO 90°	163	300	0
90° TO 180°	141	300	0
180° TO 270°	137	300	0
270° TO 360°	165	300	0

# **APPENDIX A**

## **PHOTOGRAPHS**

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Photo No. A-41 - Left Rear Attitude Point	A-41
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A-1



Photo No. A-1 - Pre-Test Front View of Test Vehicle

A-2

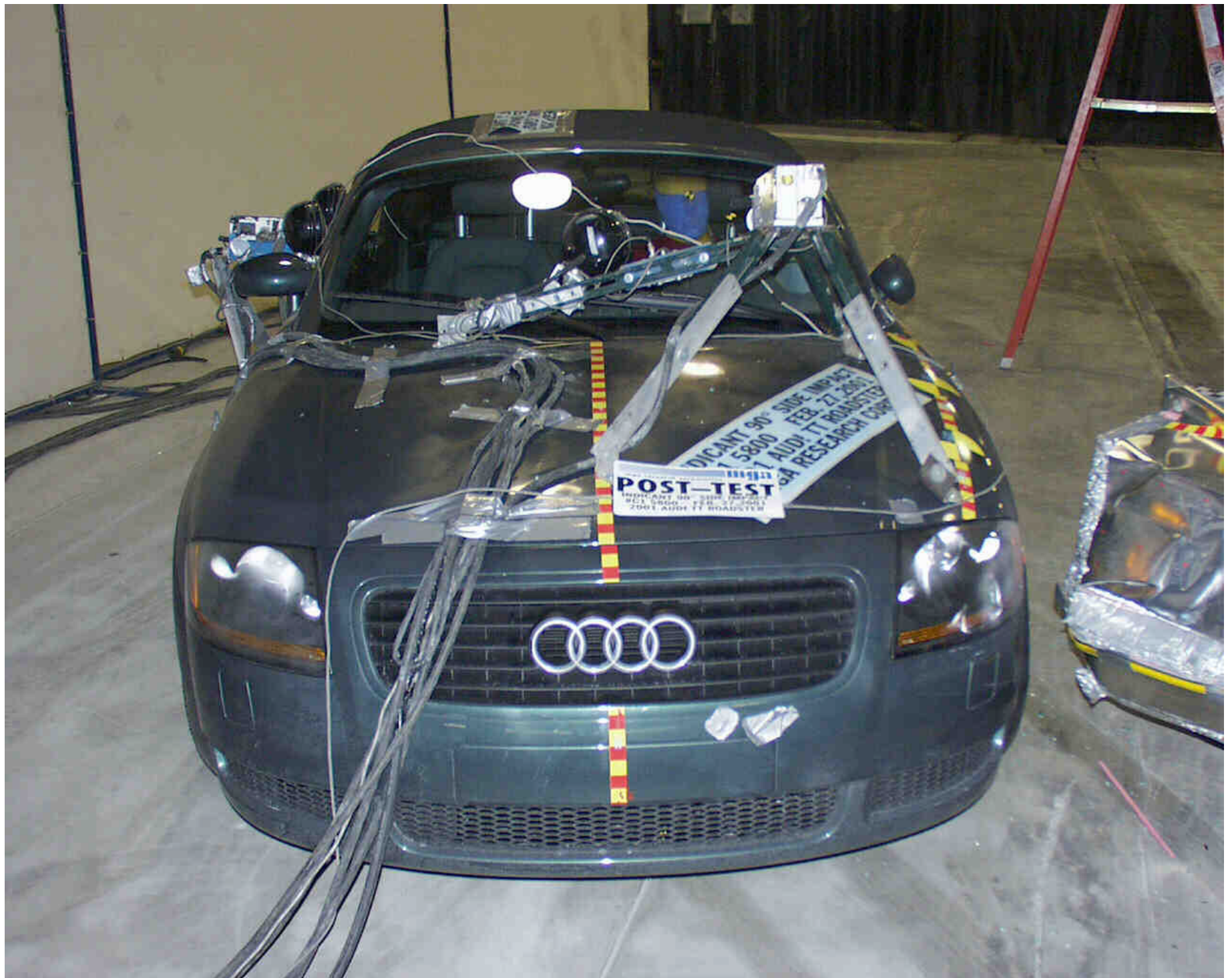


Photo No. A-2 - Post-Test Front View of Test Vehicle

A-3



Photo No. A-3 - Pre-Test Rear View of Test Vehicle

A-4



Photo No. A-4 - Post-Test Rear View of Test Vehicle

A-5



Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

A-6



Photo No. A-6 - Post-Test Left Side View of Test Vehicle



Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

A-8



Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

A-9



Photo No. A-9 - Pre-Test MDB Positioned Against Vehicle Overhead View

A-10



Photo No. A-10 - Post-Test MDB and Vehicle (left side)



Photo No. A-11 - Post-Test MDB and Vehicle (right side)

A-11

mga  
mga research corporation  
**POST-TEST**  
INDICANT 90° SIDE IMPACT  
#C1 5800 FEB. 27, 2001  
2001 AUDI TT ROADSTER



A-12

Photo No. A-12 - Post-Test MDB and Vehicle Overhead View

A-13

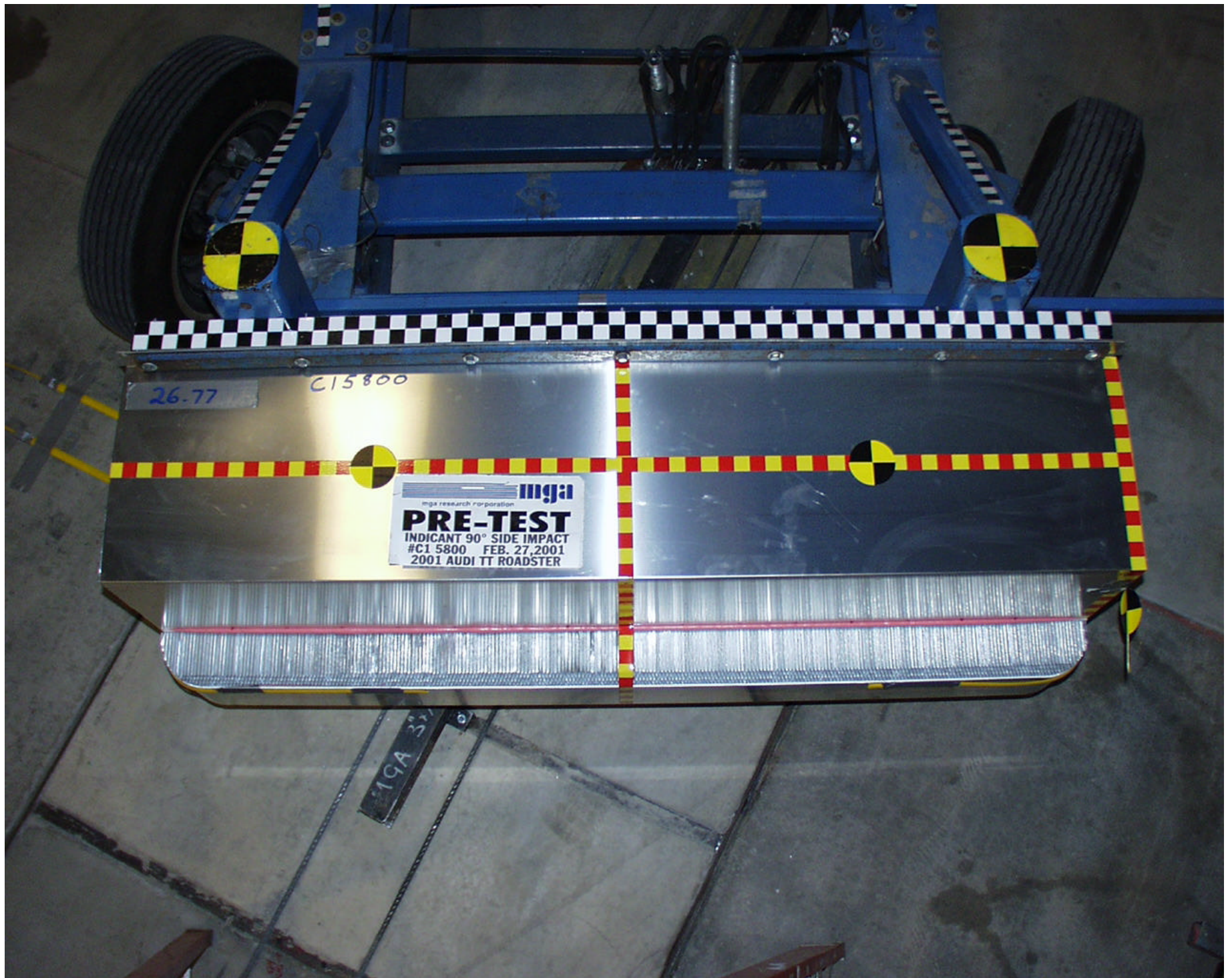


Photo No. A-13 - Pre-Test MDB Top View

A-14



Photo No. A-14 - Post-Test MDB Top View

A-15

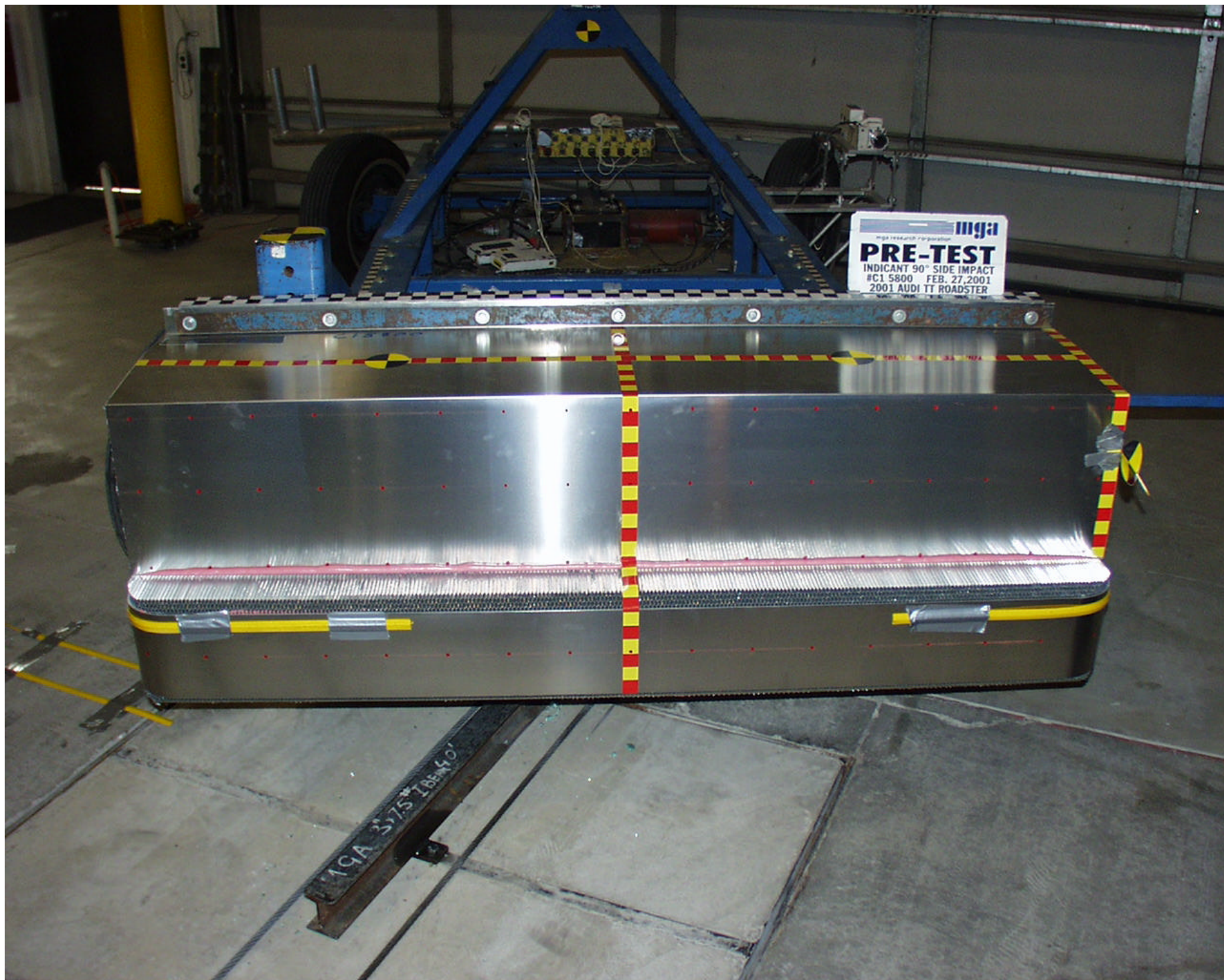


Photo No. A-15 - Pre-Test MDB Front View

A-16



Photo No. A-16 - Post-Test MDB Front View

mga  
mga research corporation  
**PRE-TEST**  
INDICANT 90° SIDE IMPACT  
#C1 5800 FEB. 27, 2001  
2001 AUDI TT ROADSTER

A-17



Photo No. A-17 - Pre-Test MDB Right Side View

mga research corporation **mga**  
**POST-TEST**  
INDICANT 90° SIDE IMPACT  
#C1 5800 FEB. 27, 2001  
2001 AUDI TT ROADSTER



A-18

Photo No. A-18 - Post-Test MDB Right Side View

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Photo No. A-19 - Pre-Test MDB Left Side View

A-20



Photo No. A-20 - Post-Test MDB Left Side View

A-21



Photo No. A-21 - Pre-Test Driver Dummy Left Side View

A-22

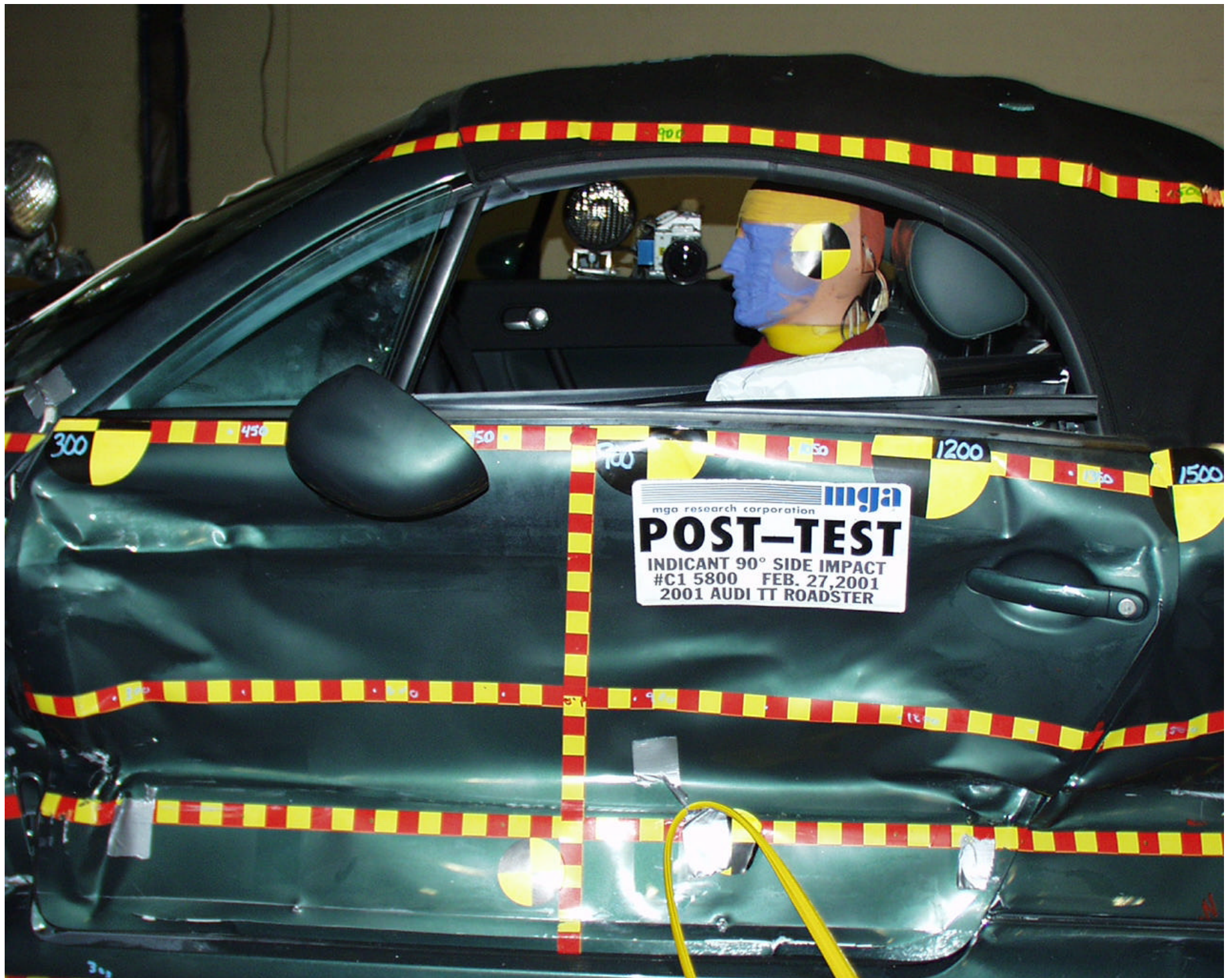


Photo No. A-22 - Post-Test Driver Dummy Left Side View



A-23

Photo No. A-23 - Pre-Test Driver Dummy Right Side View

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Photo No. A-24 - Post-Test Driver Dummy Right Side View

A-25



Photo No. A-25 - Pre-Test Driver Dummy Left Side View (Door Open)

A-26



Photo No. A-26 - Pre-Test Driver Dummy Shoulder and Door Top View

mgja  
INDICANT 90° SIDE IMPACT  
#C1 5800 FEB. 27, 2001  
2001 AUDI TT ROADSTER



A-27

Photo No. A-27 - Post-Test Driver Dummy Shoulder and Door Top View

A-28



Photo No. A-28 - Post-Test Driver Dummy Contact



Photo No. A-29 - Post-Test Driver Dummy Head Contact

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Photo No. A-30 - Pre-Test Left Front Impact Point on Vehicle



A-31

Photo No. A-31 - Post-Test Left Front Impact Point on Vehicle

A-32

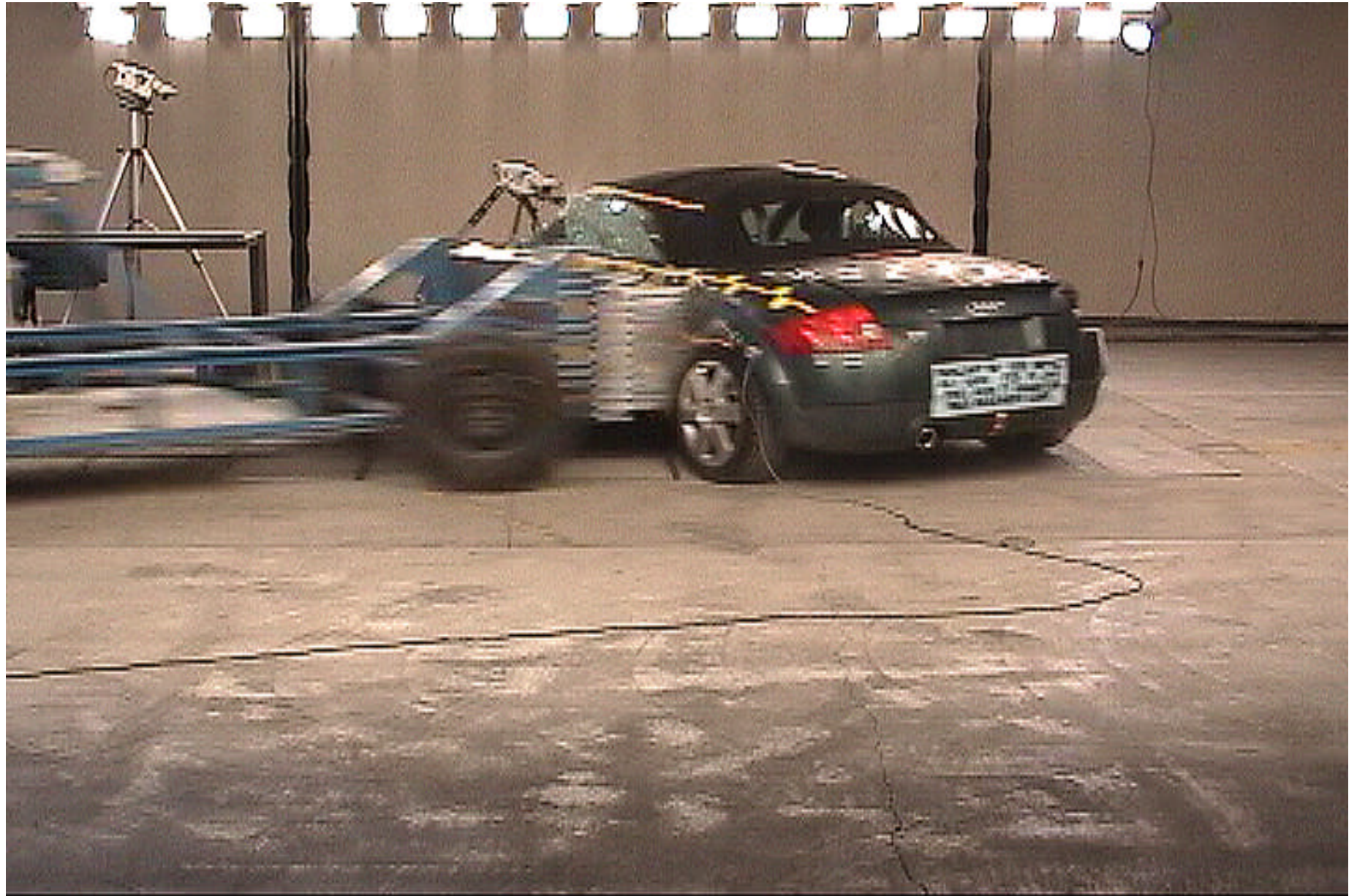


Photo No. A-32 - Impact

A-33

4938143 0117 -

MFD BY AUDI HUNGARIA MOTOR KFT. 12/00 GVWR lbs 3792 GAWR lbs FRONT 1654 /REAR 2205  
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY, BUMPER  
AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE  
TRUTX28N611024390 PASSENGER CAR


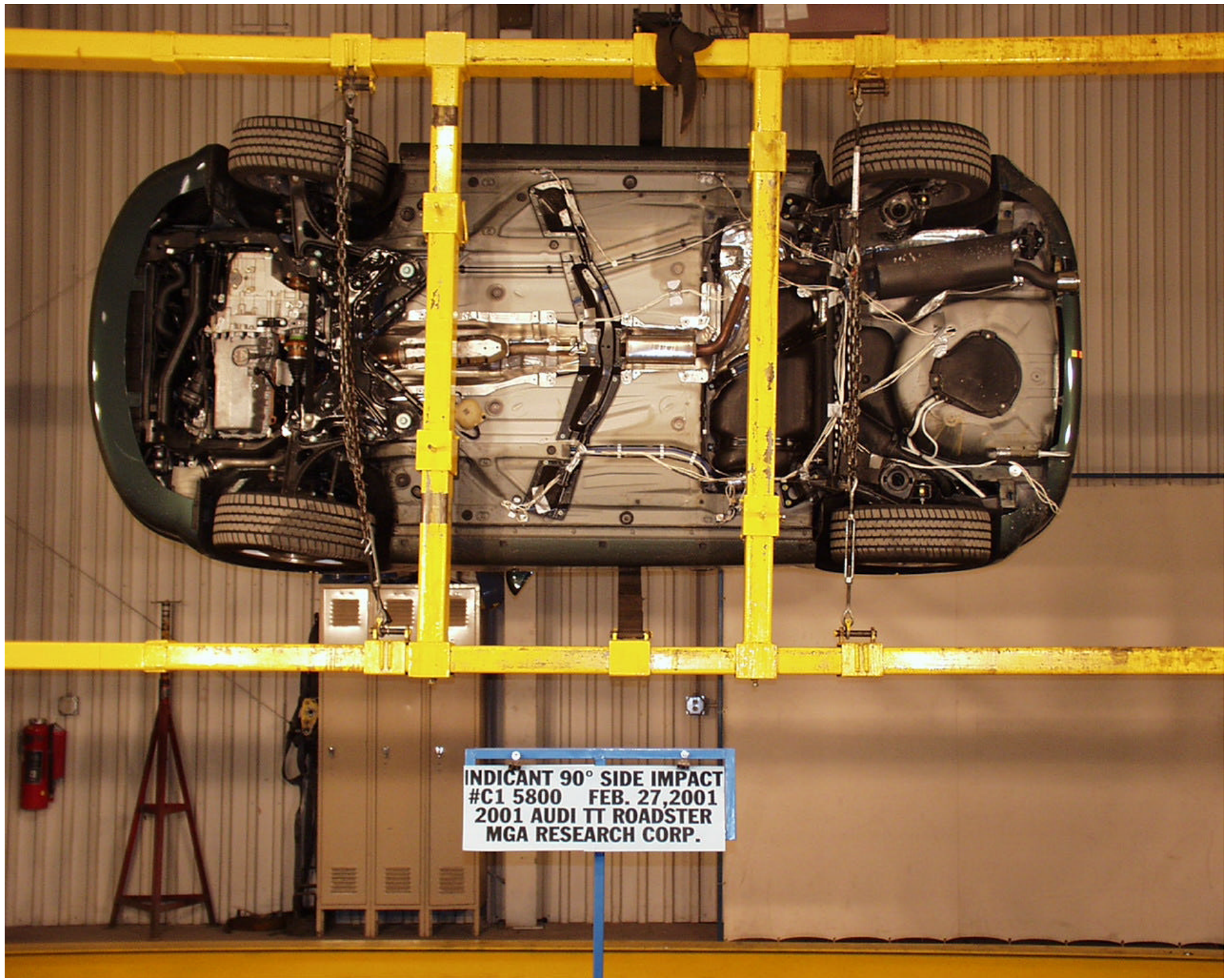


Photo No. A-33 - Vehicle Certification Label



Photo No. A-34 - Tire Placard

A-35



**INDICANT 90° SIDE IMPACT  
#C1 5800 FEB. 27, 2001  
2001 AUDI TT ROADSTER  
MGA RESEARCH CORP.**

Photo No. A-35 - Rollover 90°

A-36



Photo No. A-36 - Rollover 180°

A-37



Photo No. A-37 - Rollover 270°

A-38



**INDICANT 90° SIDE IMPACT  
#C1 5800 FEB. 27, 2001  
2001 AUDI TT ROADSTER  
MGA RESEARCH CORP.**

Photo No. A-38 - Rollover 360°



A-39

Photo No. A-39 - Left Front Attitude Point



A-40

Photo No. A-40 - Right Front Attitude Point

A-41



Photo No. A-41 - Left Rear Attitude Point



A-42

Photo No. A-42 - Right Rear Attitude Point

## **APPENDIX B**

**SID, VEHICLE, AND MDB RESPONSE DATA**

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\* No valid data collected.

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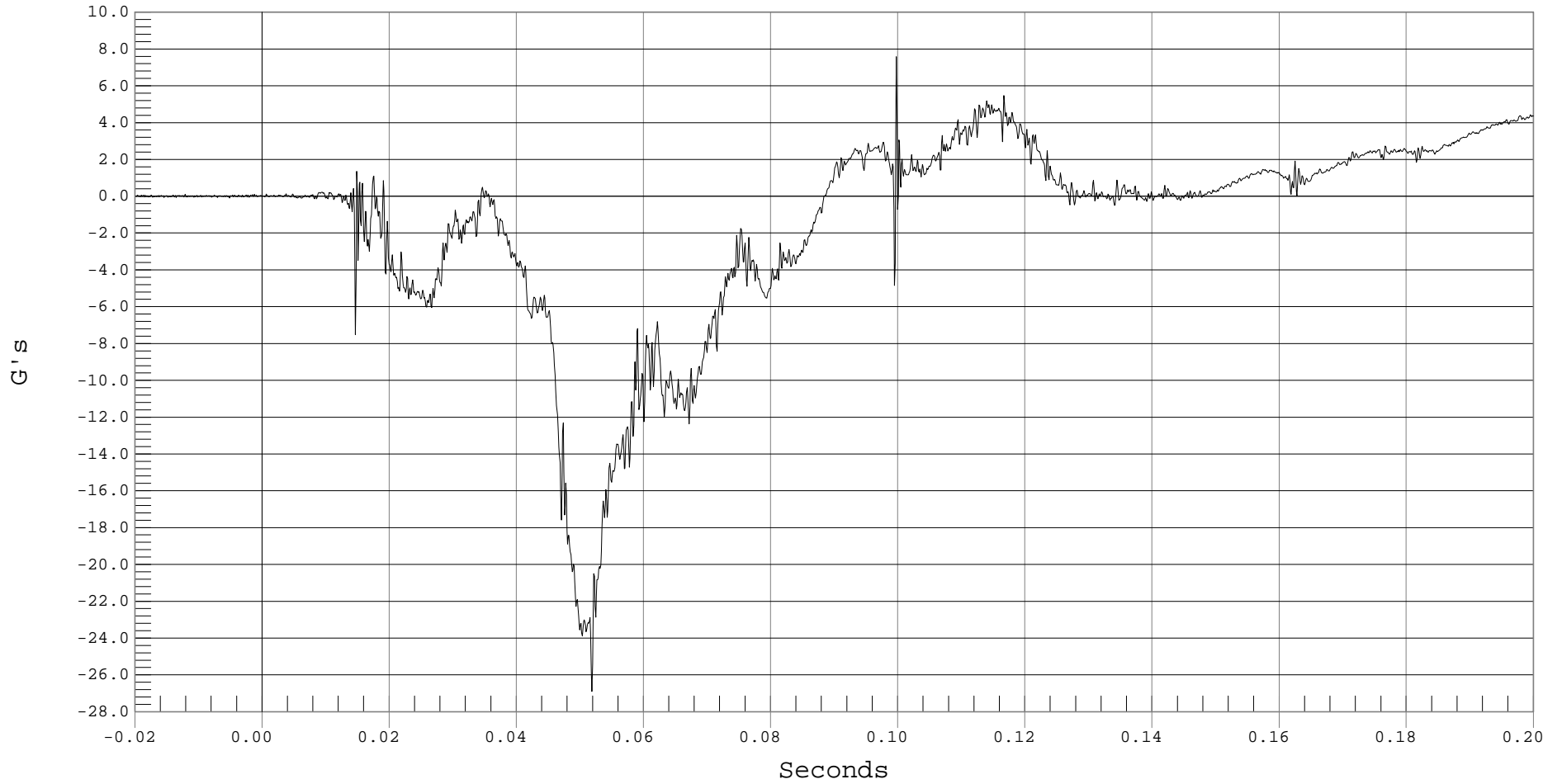
### DRIVER HEAD X ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER HEAD X, B01023AT.A01

Ymin = -26.9 G's @ 0.0518 Seconds, Ymax = 7.58 G's @ 0.0997 Seconds



B-1



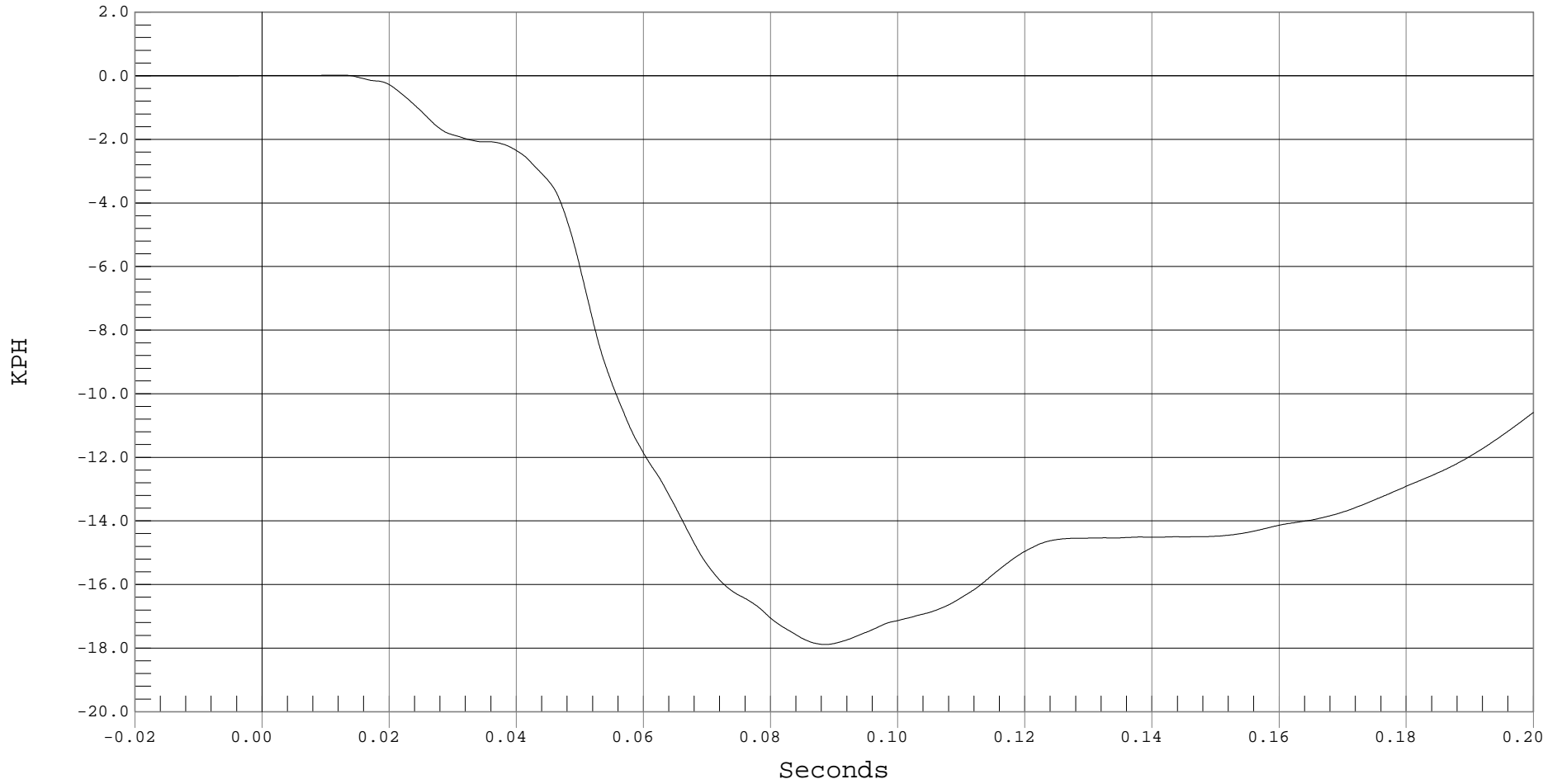
### DRIVER HEAD X VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER HEAD X VELOCITY, B01023AI.V01

Ymin = -17.89 KPH @ 0.0885 Seconds, Ymax = .02 KPH @ 0.0122 Seconds



B-2



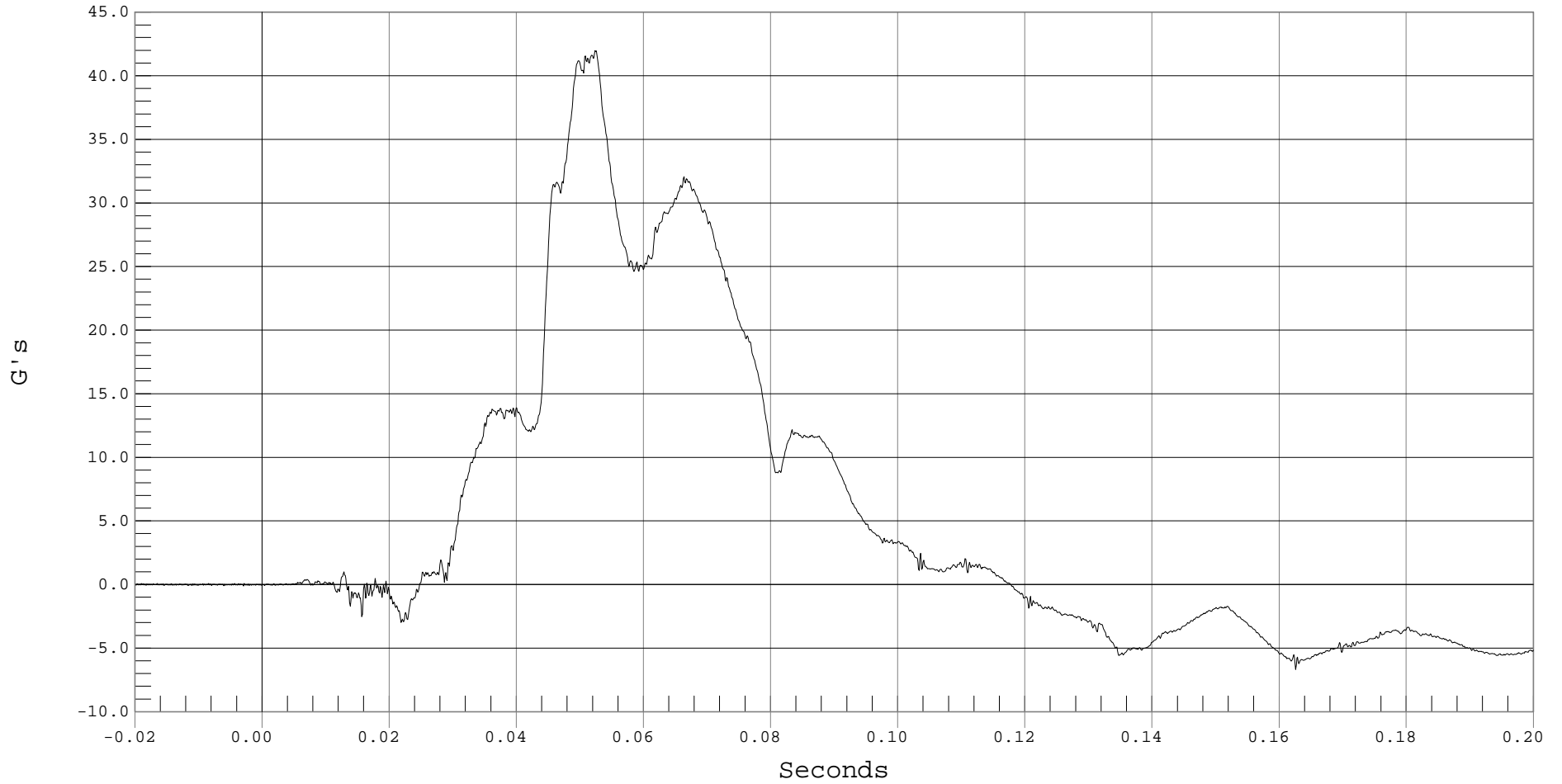
### DRIVER HEAD Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER HEAD Y, B01023AT.A02

Ymin = -6.68 G's @ 0.1625 Seconds, Ymax = 41.97 G's @ 0.0523 Seconds



B-3



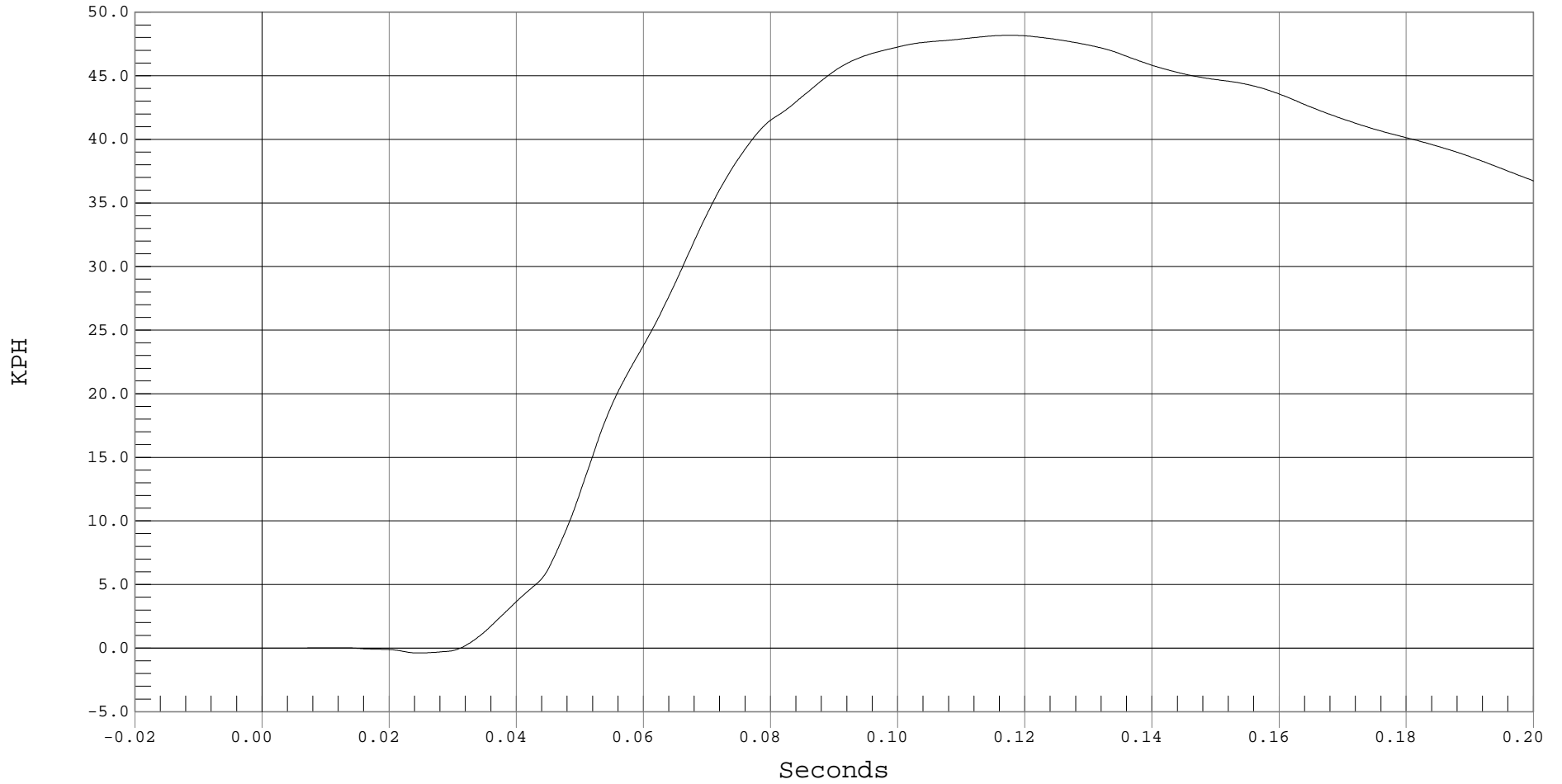
### DRIVER HEAD Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER HEAD Y VELOCITY, B01023AI.V02

Ymin = -.39 KPH @ 0.0247 Seconds, Ymax = 48.18 KPH @ 0.1176 Seconds



B-4



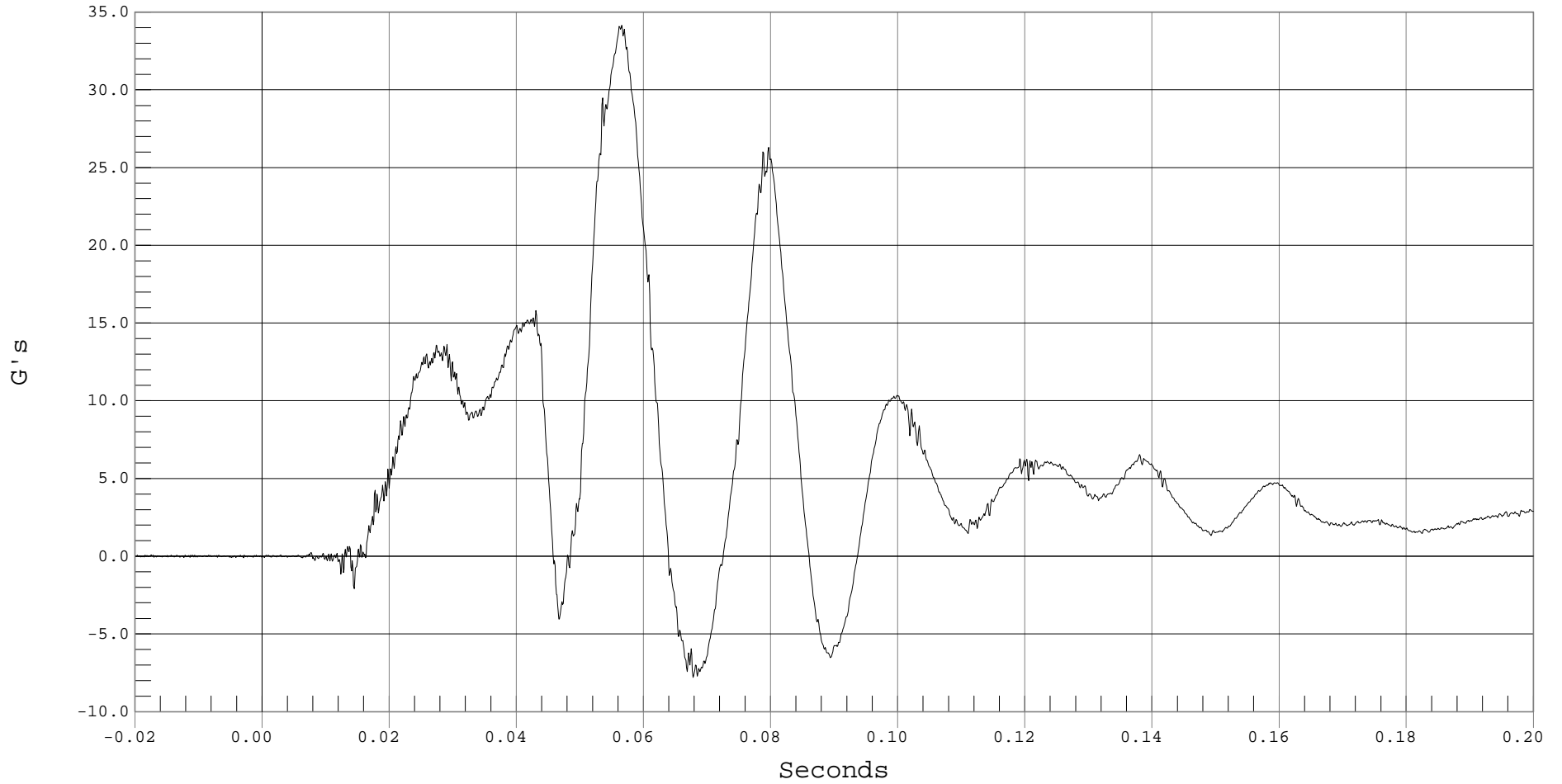
### DRIVER HEAD Z ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER HEAD Z, B01023AT.A03

Ymin = -7.79 G's @ 0.0677 Seconds, Ymax = 34.15 G's @ 0.0565 Seconds



B-5



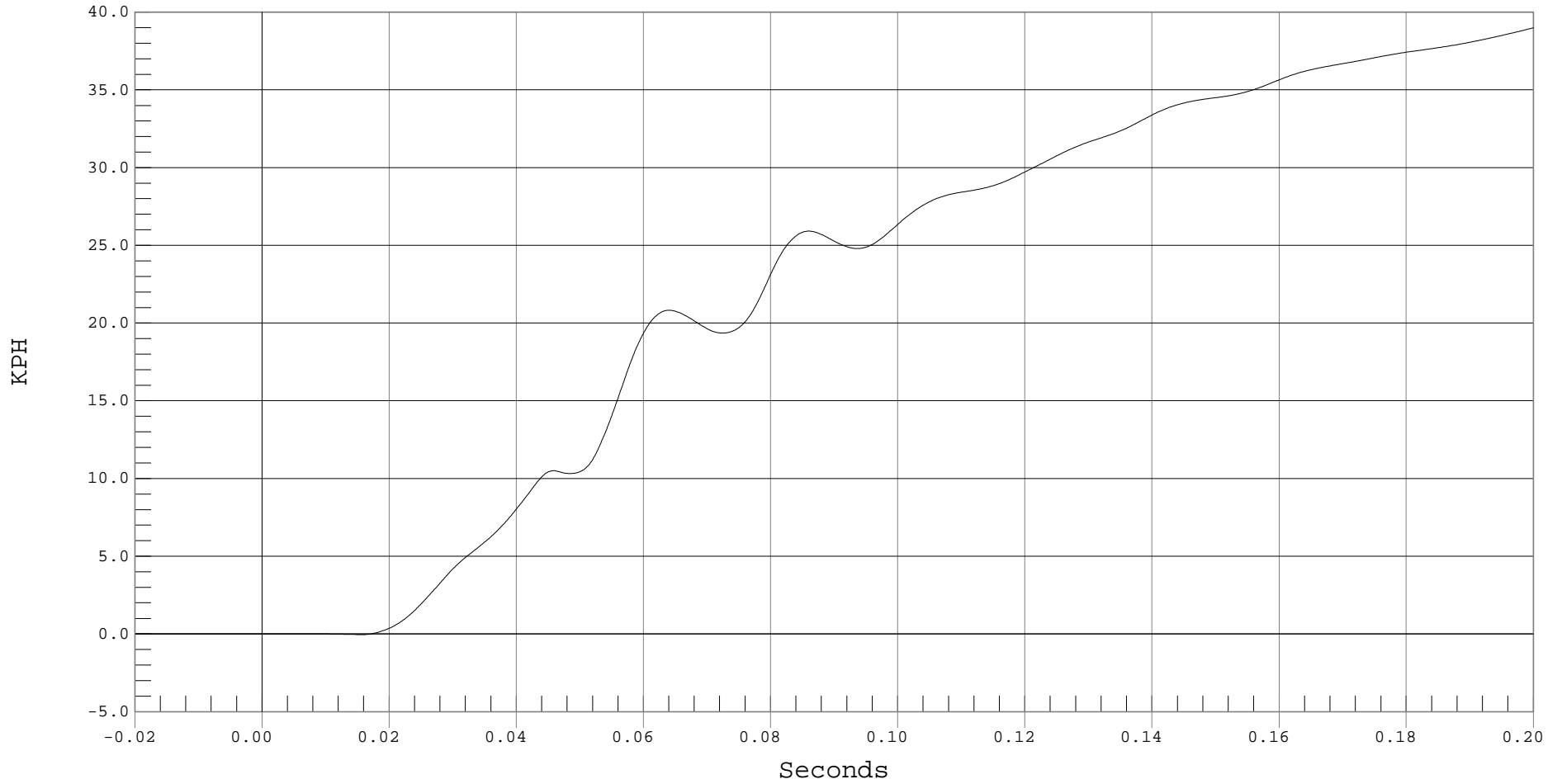
### DRIVER HEAD Z VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER HEAD Z VELOCITY, B01023AI.V03

Ymin = -.05 KPH @ 0.0155 Seconds, Ymax = 39.01 KPH @ 0.2001 Seconds





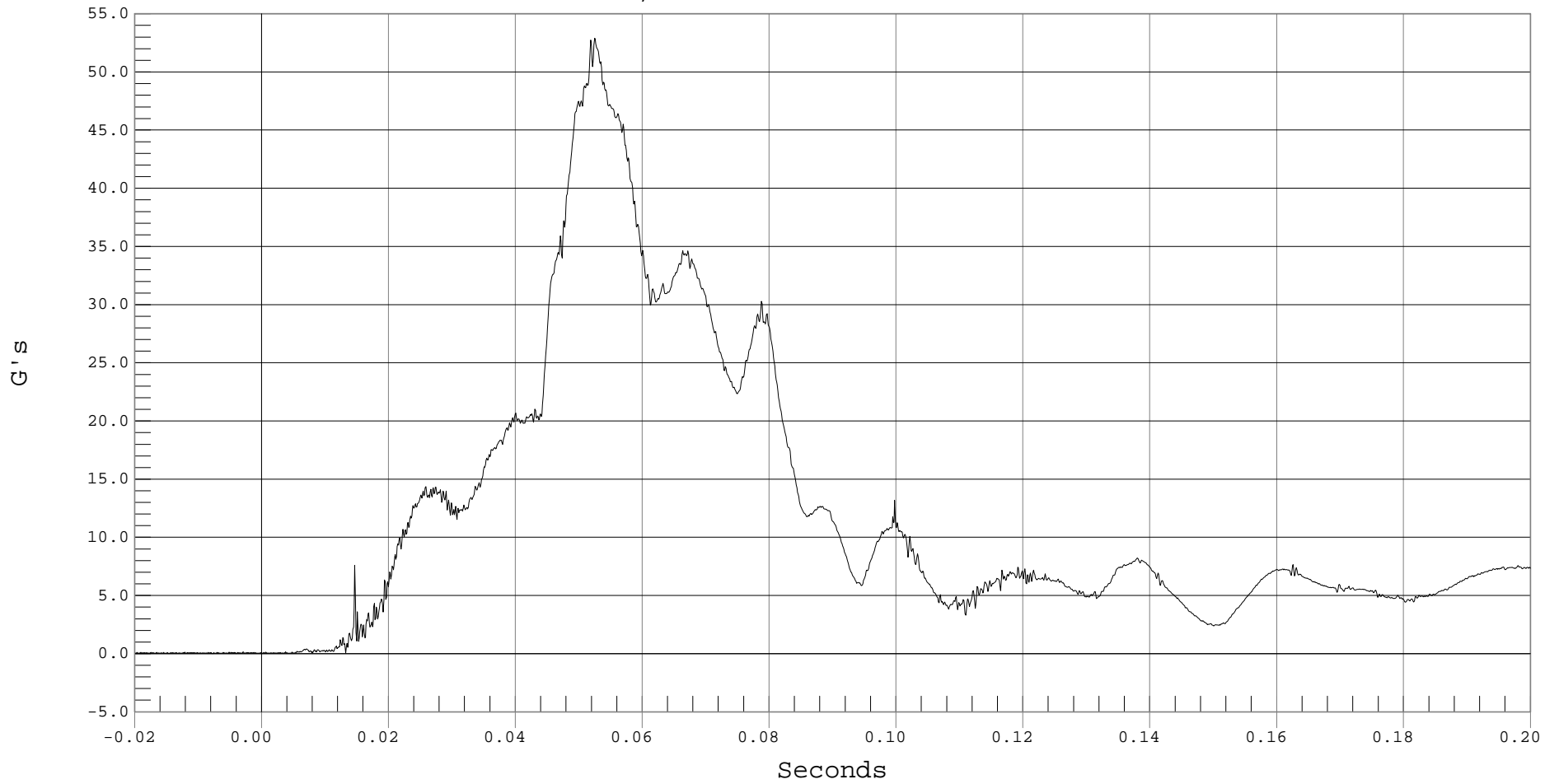
### DRIVER HEAD RESULTANT ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER HEAD RESULTANT, B01023AV.A01

Ymin = .01 G's @ -0.0147 Seconds, Ymax = 52.9 G's @ 0.0524 Seconds



B-7



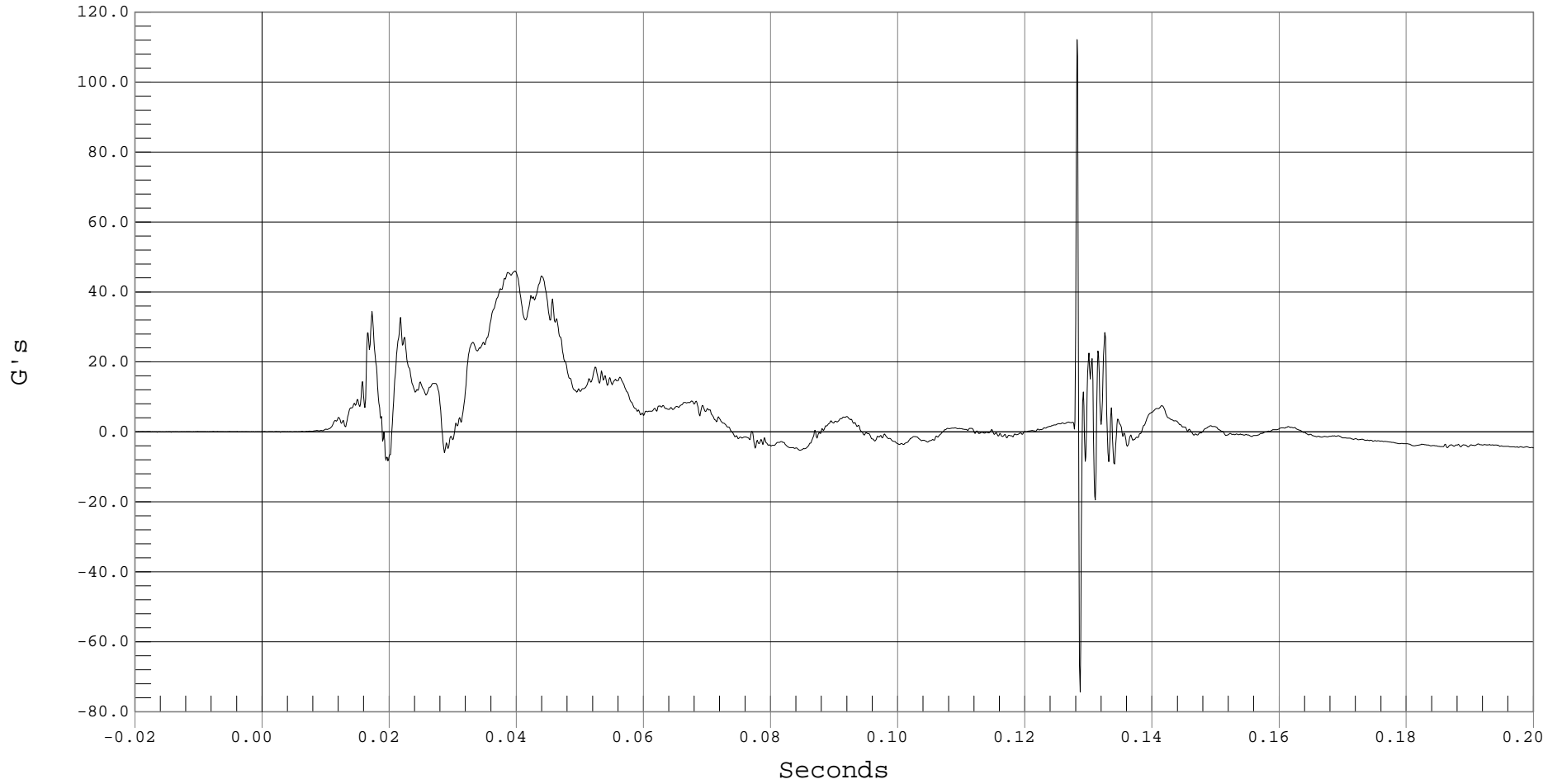
### DRIVER UPPER RIB Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER UPPER RIB Y, B01023AT.A04

Ymin = -74.37 G's @ 0.1286 Seconds, Ymax = 112.17 G's @ 0.1281 Seconds



B-8



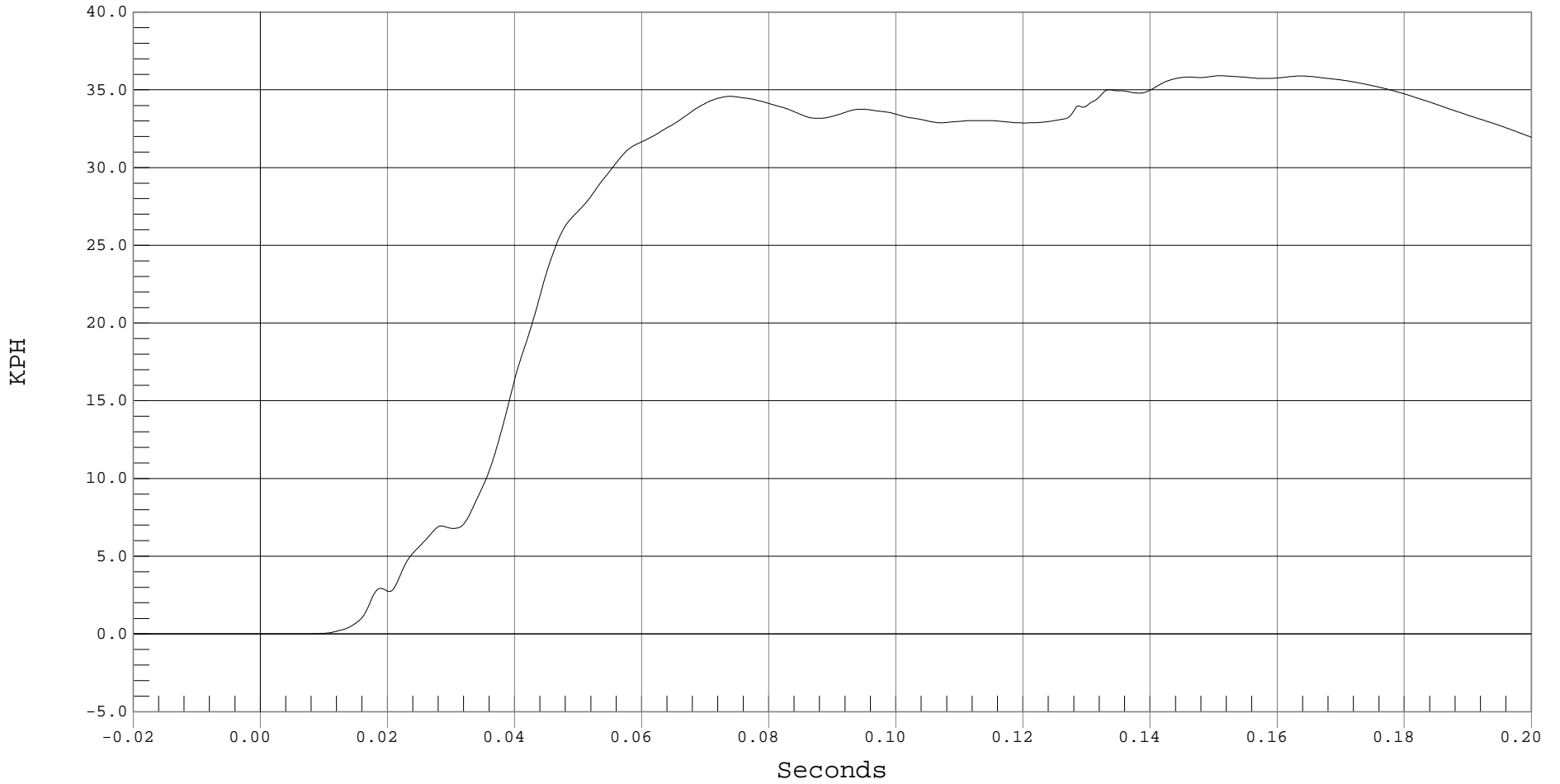
### DRIVER UPPER RIB Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER UPPER RIB Y VELOCITY, B01023AI.V04

Ymin = 0 KPH @ -0.0130 Seconds, Ymax = 35.91 KPH @ 0.1510 Seconds



B-9



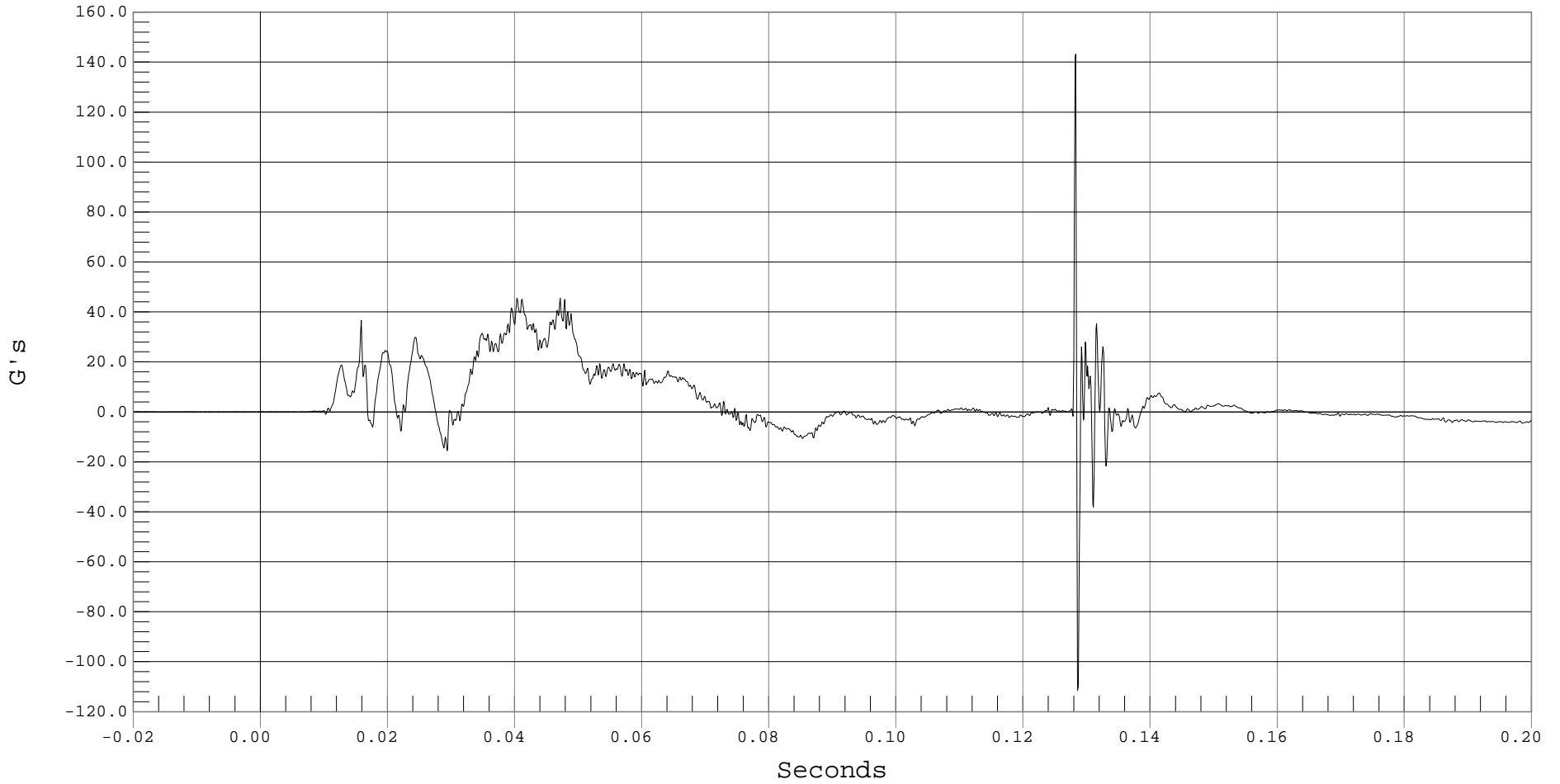
### DRIVER LOWER RIB Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER LOWER RIB Y, B01023AT.A05

Ymin = -111.54 G's @ 0.1285 Seconds, Ymax = 143.19 G's @ 0.1282 Seconds



B-10



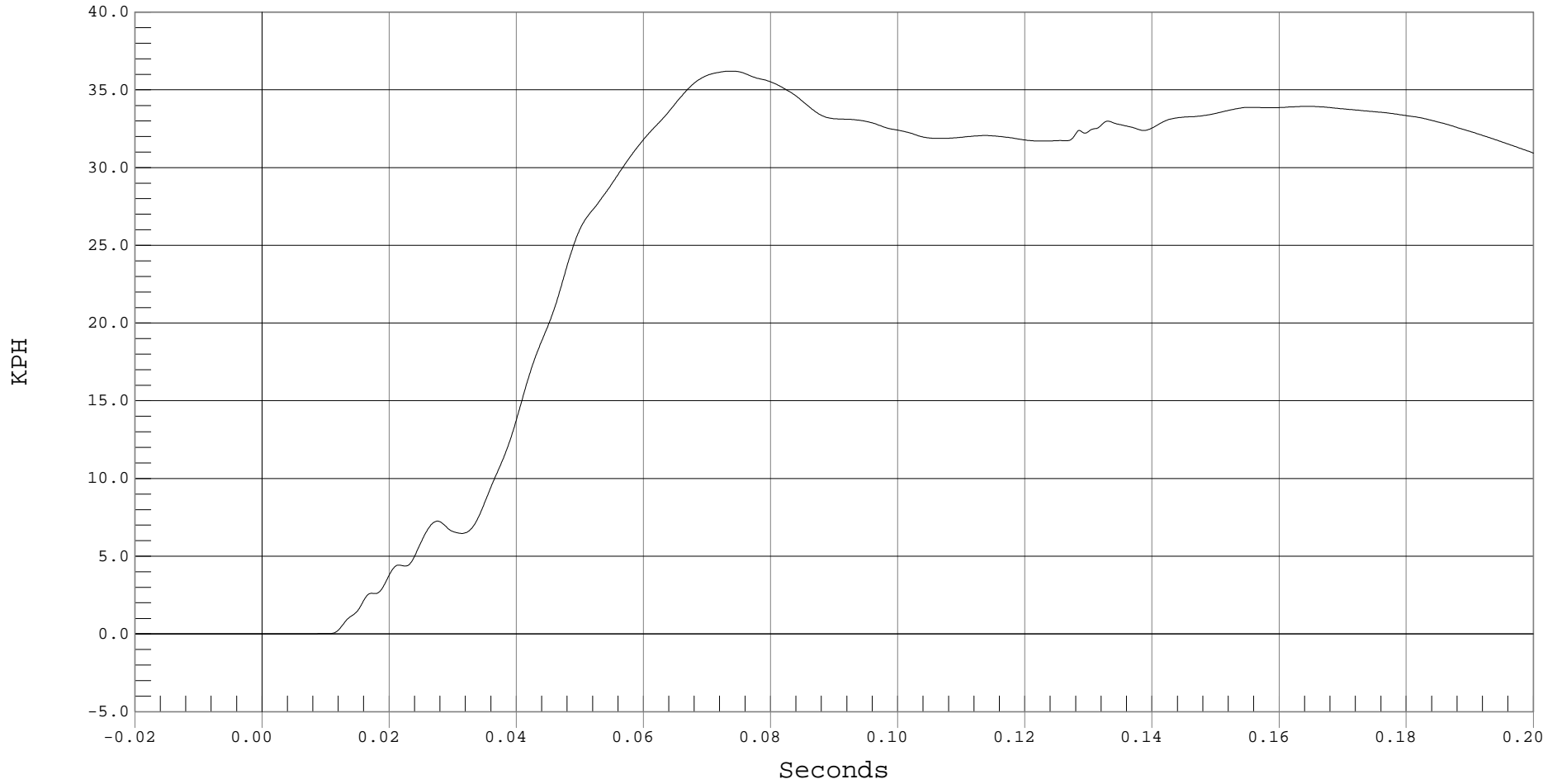
### DRIVER LOWER RIB Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER LOWER RIB Y VELOCITY, B01023AI.V05

Ymin = 0 KPH @ -0.0199 Seconds, Ymax = 36.21 KPH @ 0.0736 Seconds



B-11



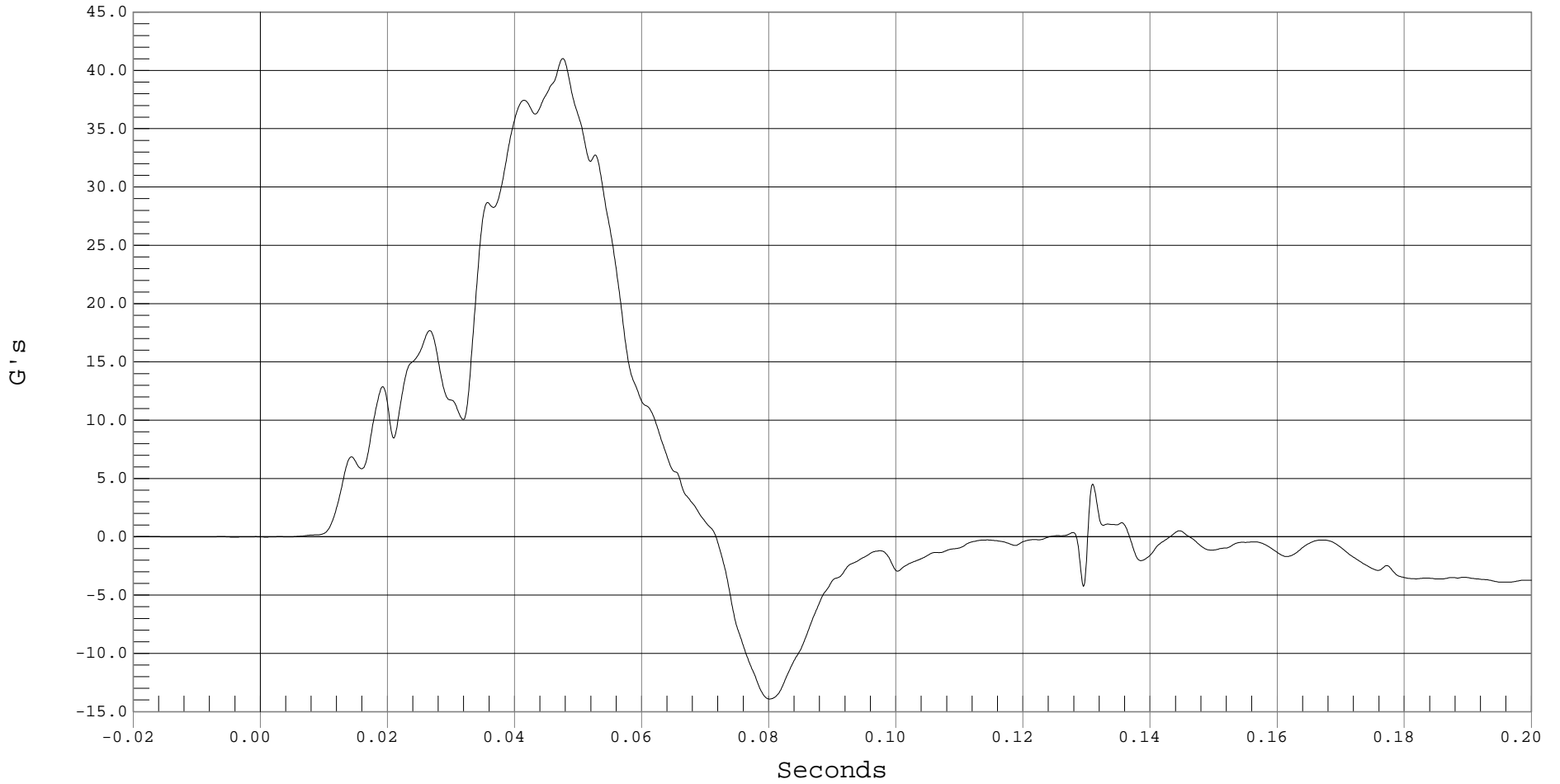
### DRIVER LOWER SPINE Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER LOWER SPINE Y, B01023AF.A06

Ymin = -13.91 G's @ 0.0801 Seconds, Ymax = 41.02 G's @ 0.0475 Seconds



B-12



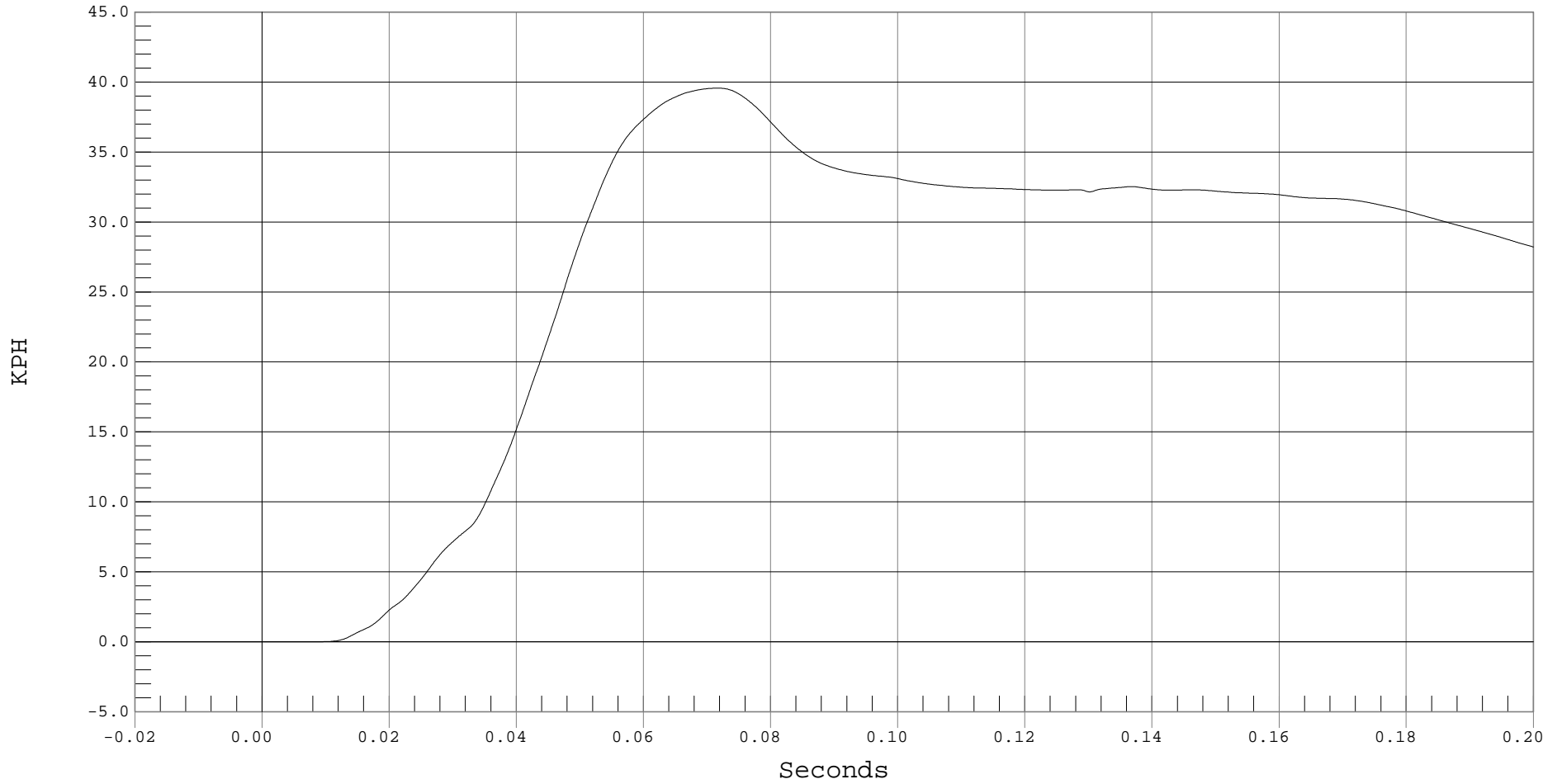
### DRIVER LOWER SPINE Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER LOWER SPINE Y VELOCITY, B01023AI.V06

Ymin = -.01 KPH @ 0.0052 Seconds, Ymax = 39.57 KPH @ 0.0716 Seconds



B-13



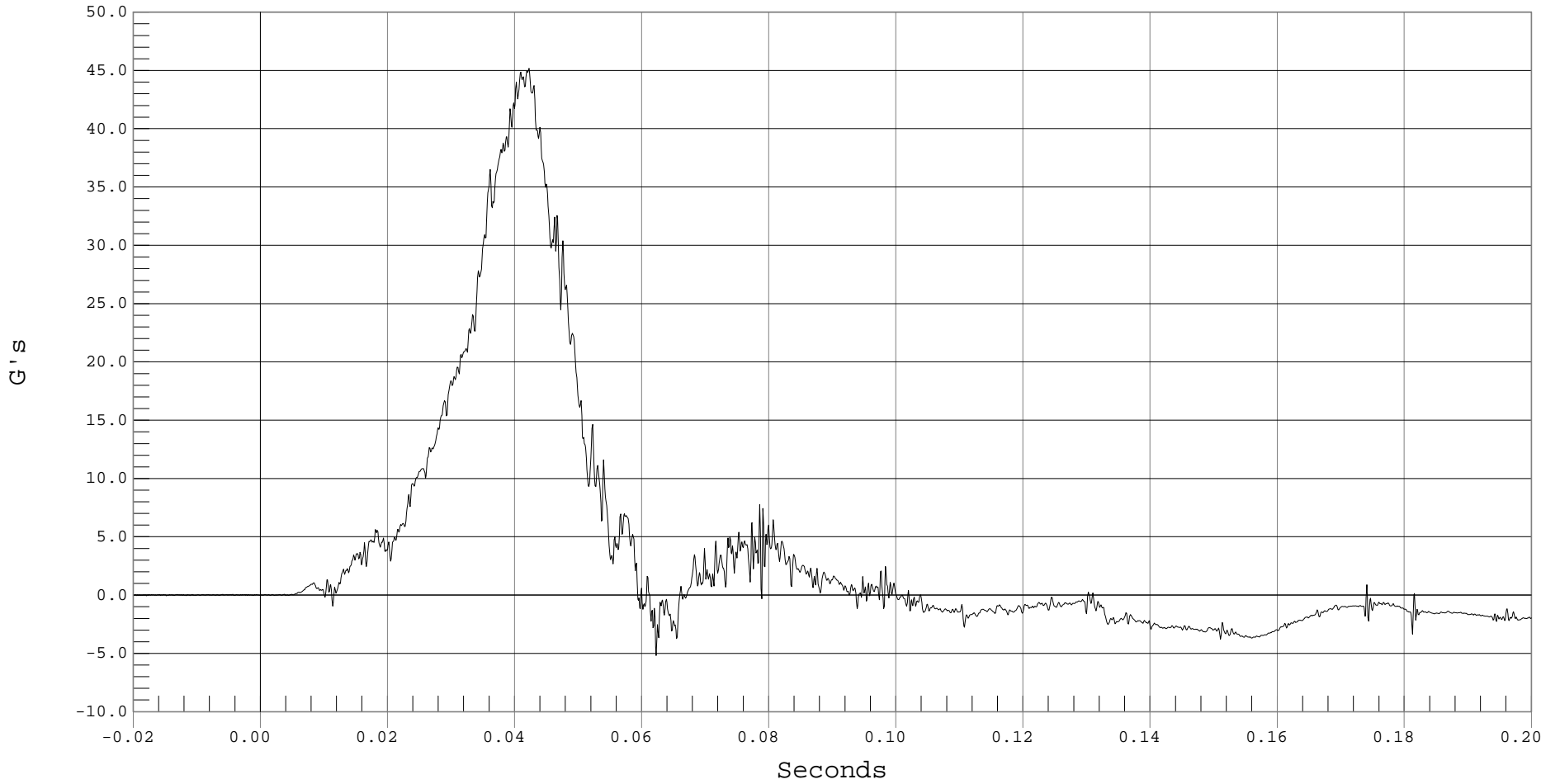
### DRIVER PELVIS Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER PELVIS Y, B01023AT.A07

Ymin = -5.18 G's @ 0.0622 Seconds, Ymax = 45.19 G's @ 0.0422 Seconds



B-14



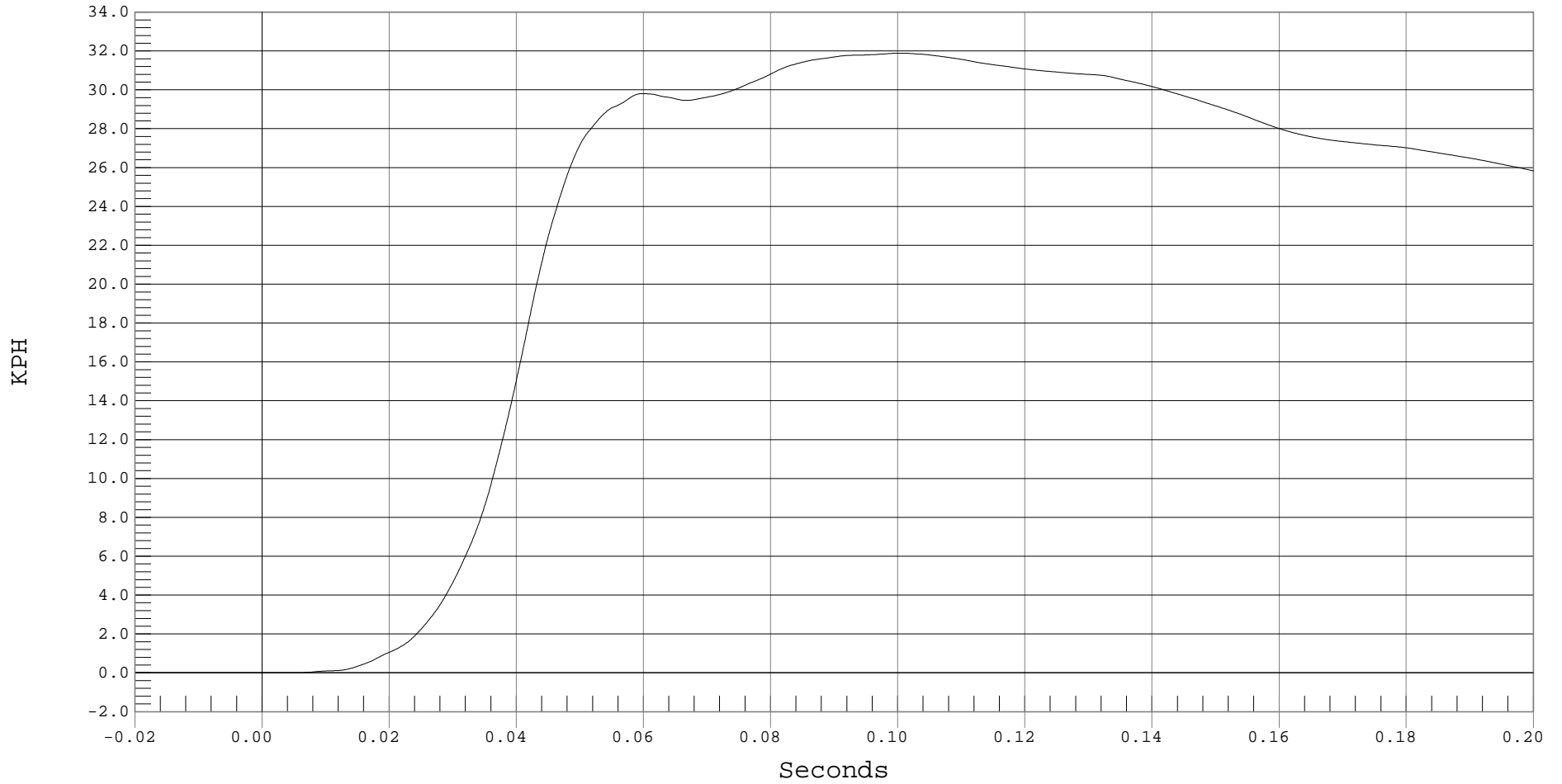
### DRIVER PELVIS Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER PELVIS Y VELOCITY, B01023AI.V07

Ymin = 0 KPH @ -0.0179 Seconds, Ymax = 31.89 KPH @ 0.1002 Seconds



B-15



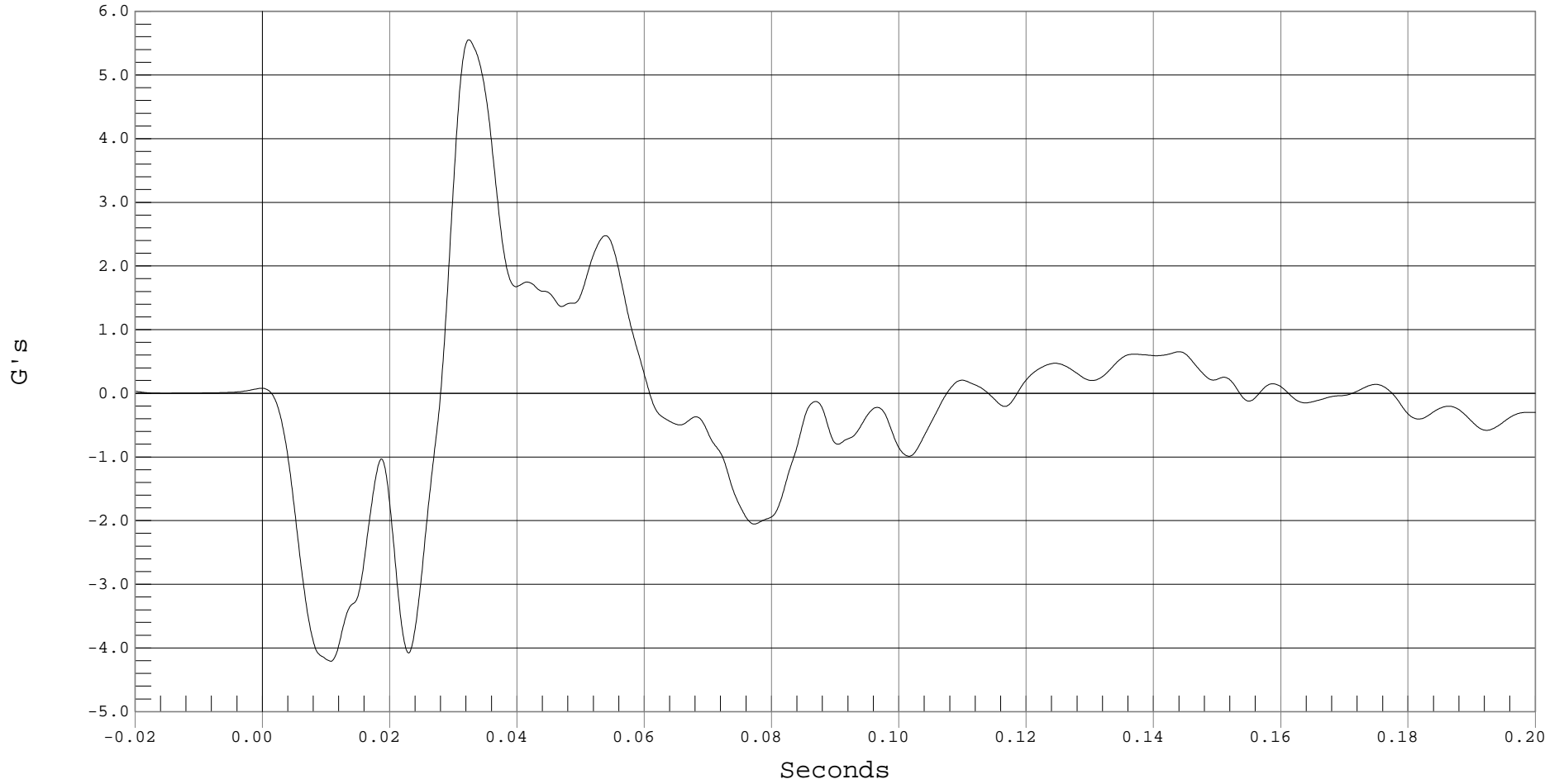
### RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 RIGHT FRONT SILL X, B01023AF.A15

Ymin = -4.21 G's @ 0.0107 Seconds, Ymax = 5.55 G's @ 0.0324 Seconds



B-16



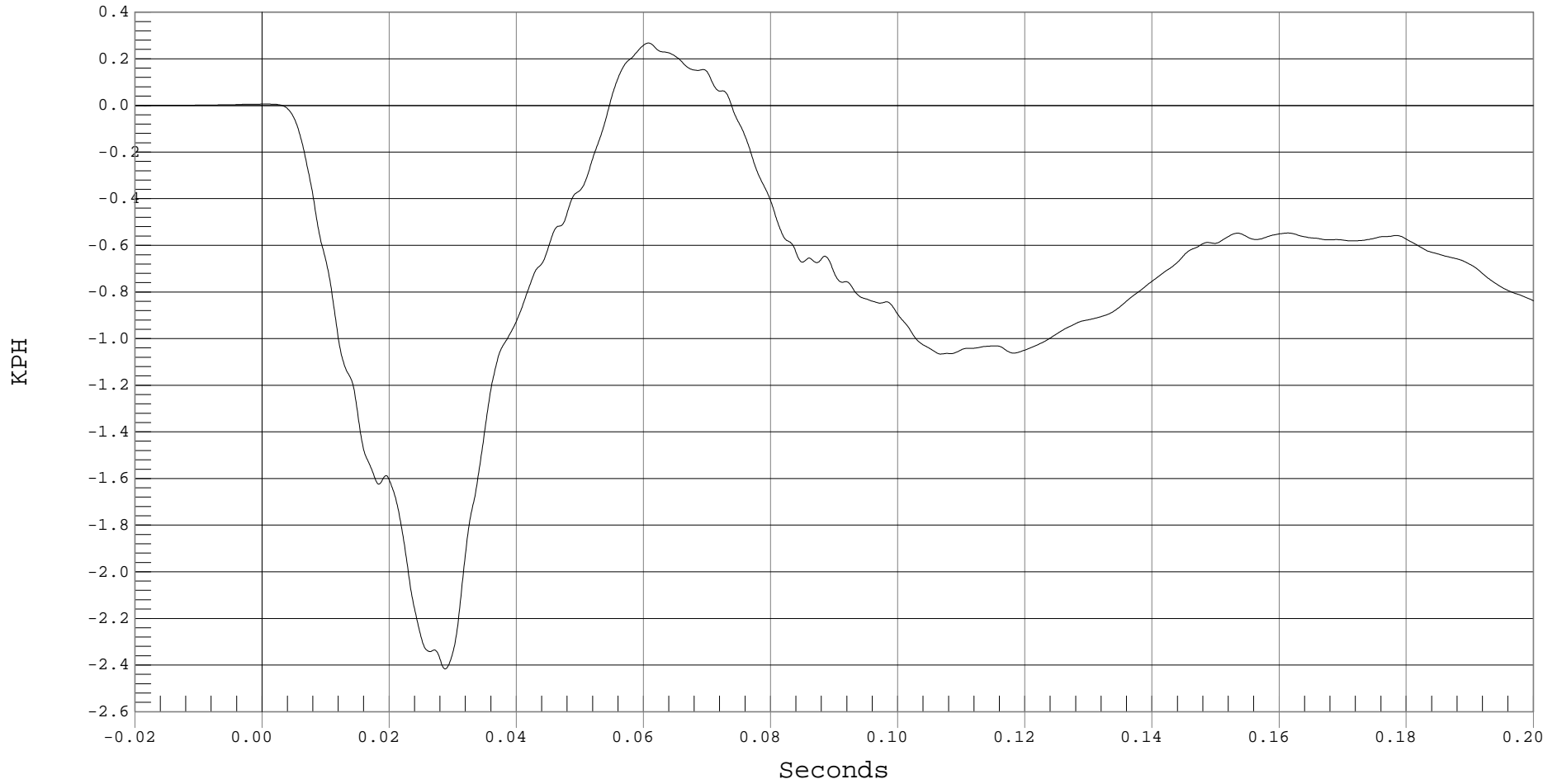
### RIGHT SIDE SILL AT FRONT SEAT X VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 RIGHT SIDE SILL AT FRONT SEAT X VELOCITY, B01023AI.V15

Ymin = -2.42 KPH @ 0.0287 Seconds, Ymax = .27 KPH @ 0.0607 Seconds





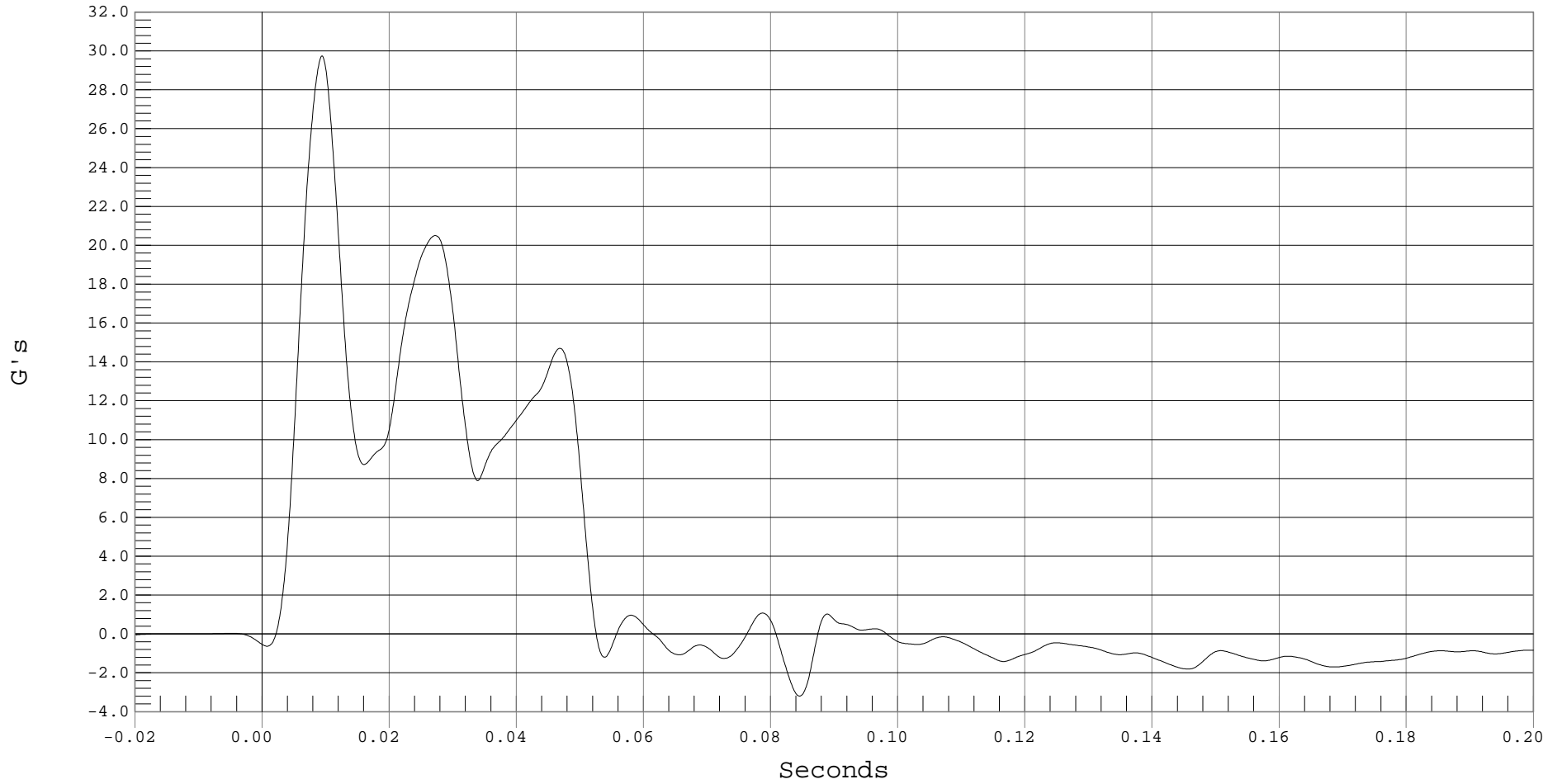
### RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 RIGHT FRONT SILL Y, B01023AF.A16

Ymin = -3.2 G's @ 0.0845 Seconds, Ymax = 29.75 G's @ 0.0093 Seconds



B-18



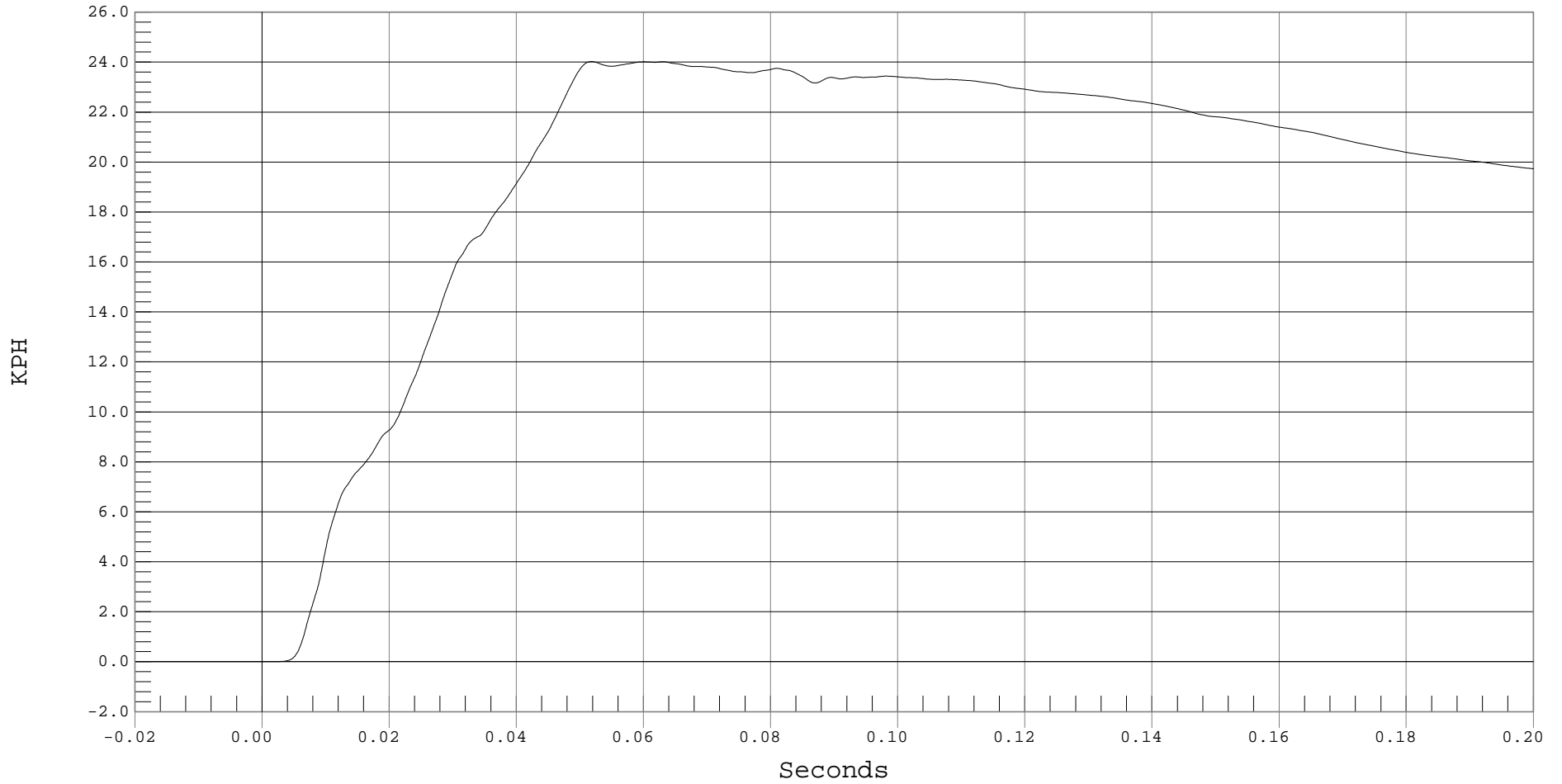
### RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 RIGHT SIDE SILL AT FRONT SEAT Y VELOCITY, B01023AI.V16

Ymin = 0 KPH @ -0.0182 Seconds, Ymax = 24.02 KPH @ 0.0517 Seconds



B-19



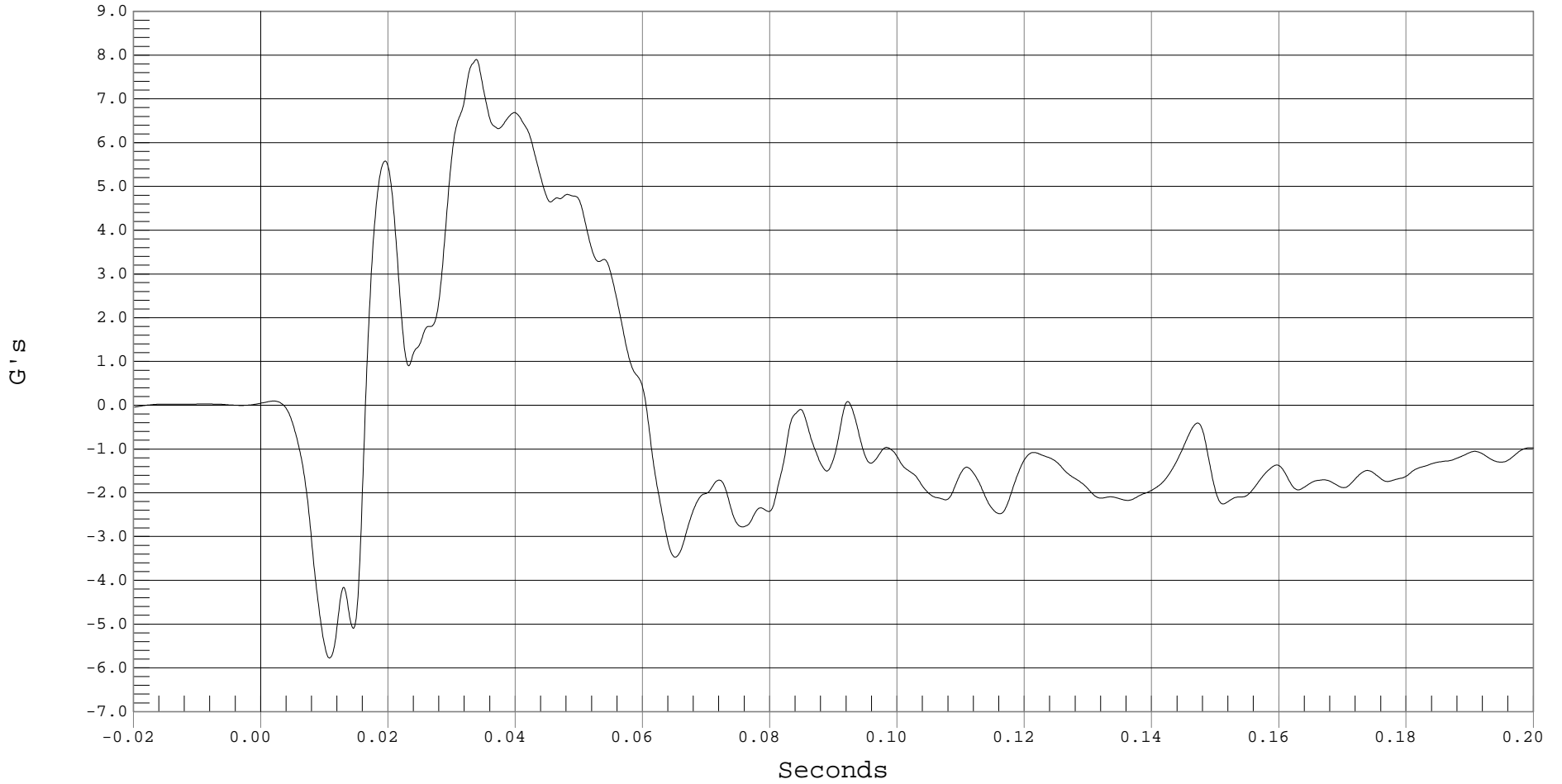
### RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 RIGHT FRONT SILL Z, B01023AF.A17

Ymin = -5.77 G's @ 0.0107 Seconds, Ymax = 7.9 G's @ 0.0338 Seconds



B-20



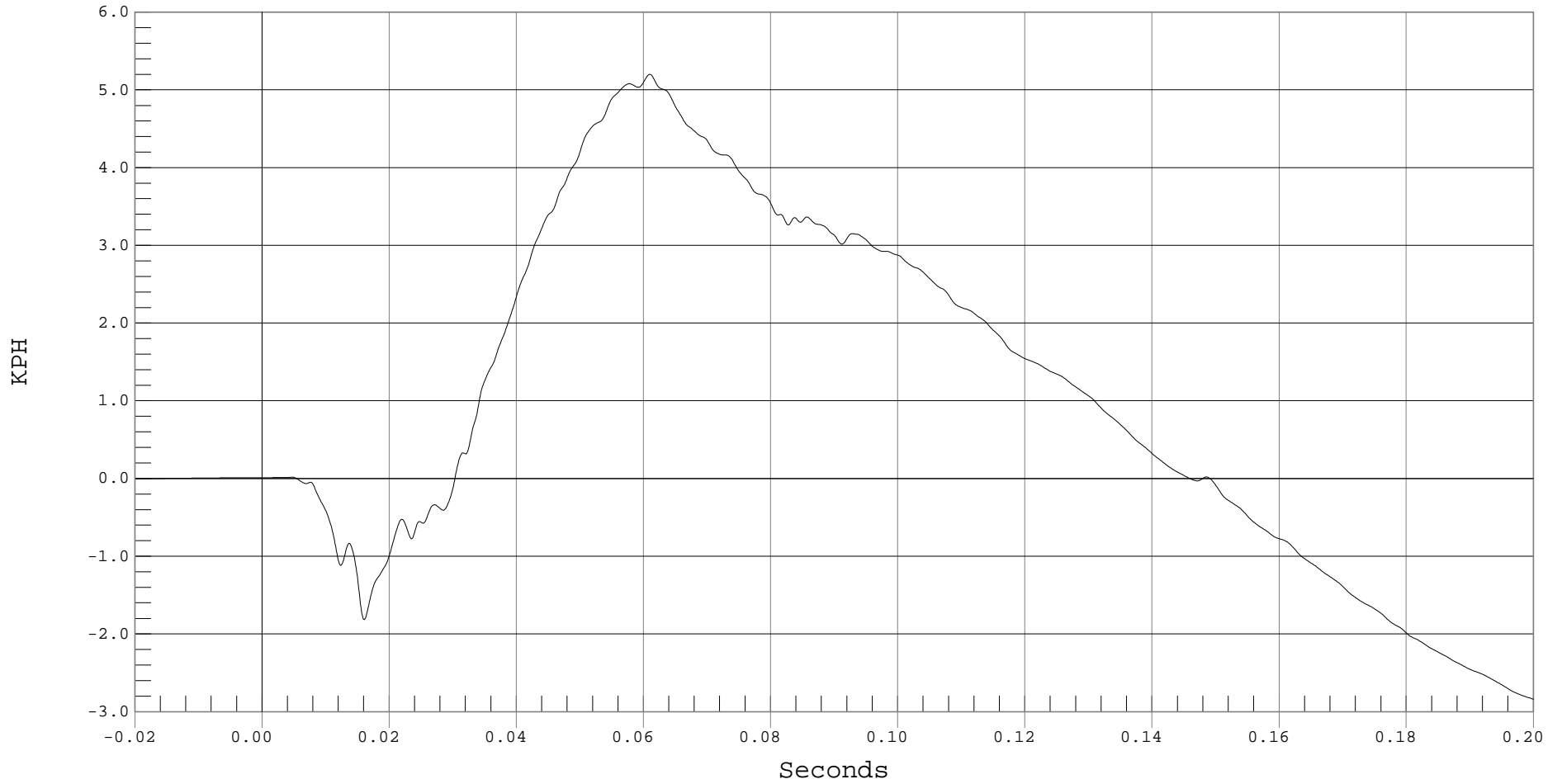
### RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 RIGHT SIDE SILL AT FRONT SEAT Z VELOCITY, B01023AI.V17

Ymin = -2.84 KPH @ 0.2001 Seconds, Ymax = 5.2 KPH @ 0.0609 Seconds



B-21



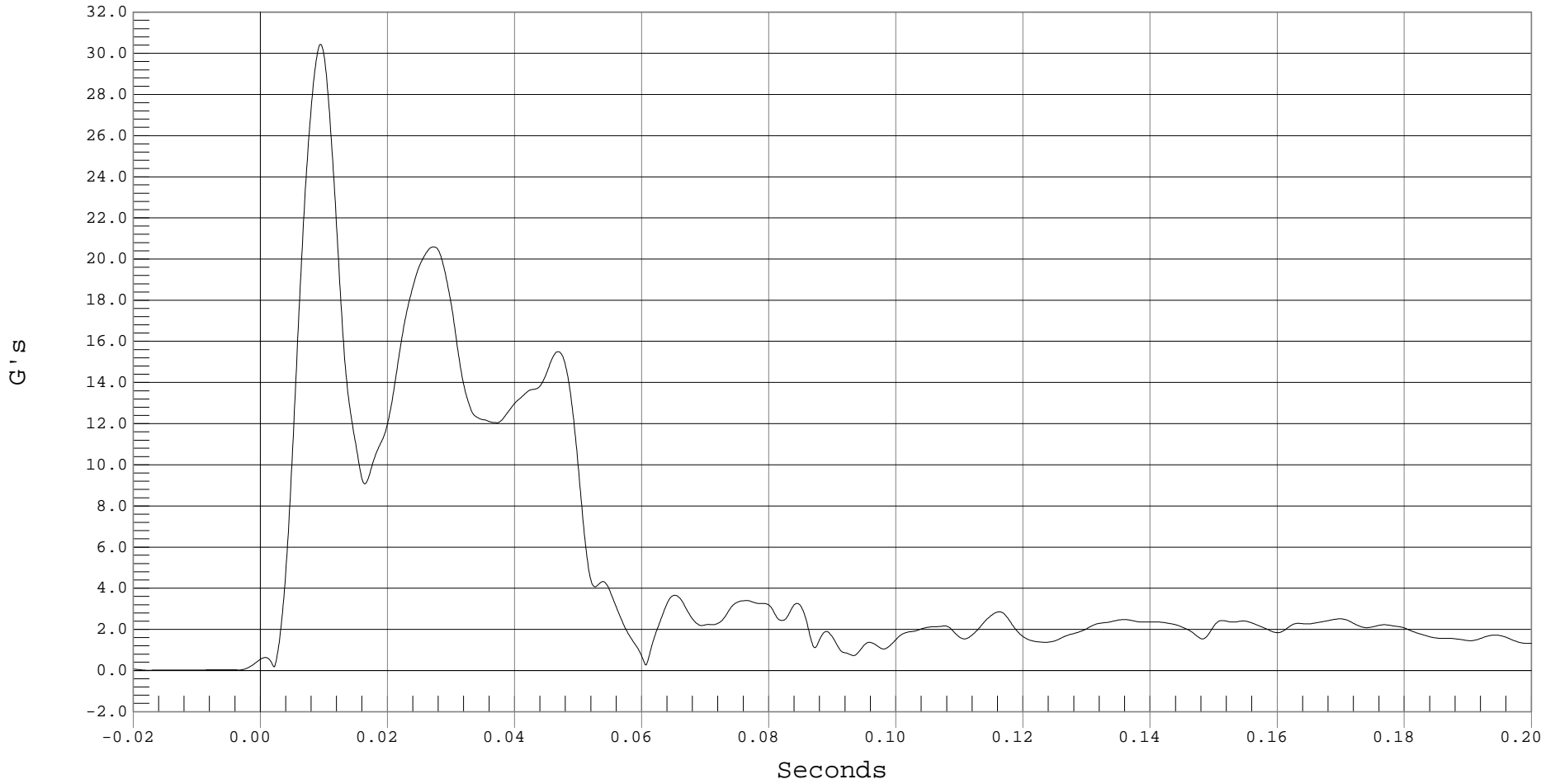
### RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION, B01023AV.A15

Ymin = .01 G's @ -0.0177 Seconds, Ymax = 30.44 G's @ 0.0094 Seconds



B-22

RIGHT SIDE SILL AT REAR SEAT X ACCELERATION VS. TIME  
NO VALID DATA COLLECTED



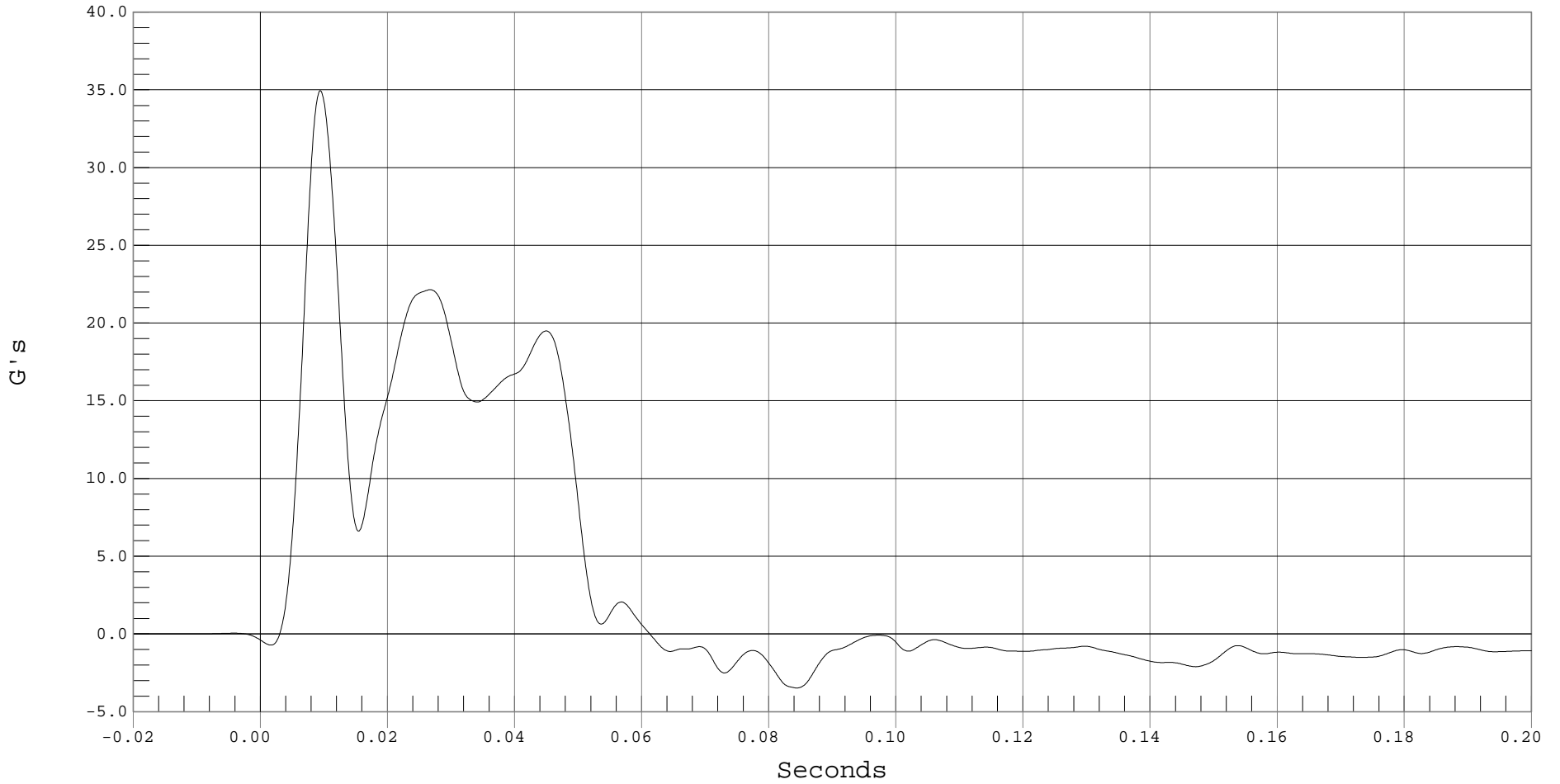
### RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 RIGHT REAR SILL Y, B01023AF.A19

Ymin = -3.47 G's @ 0.0843 Seconds, Ymax = 34.95 G's @ 0.0093 Seconds



B-24



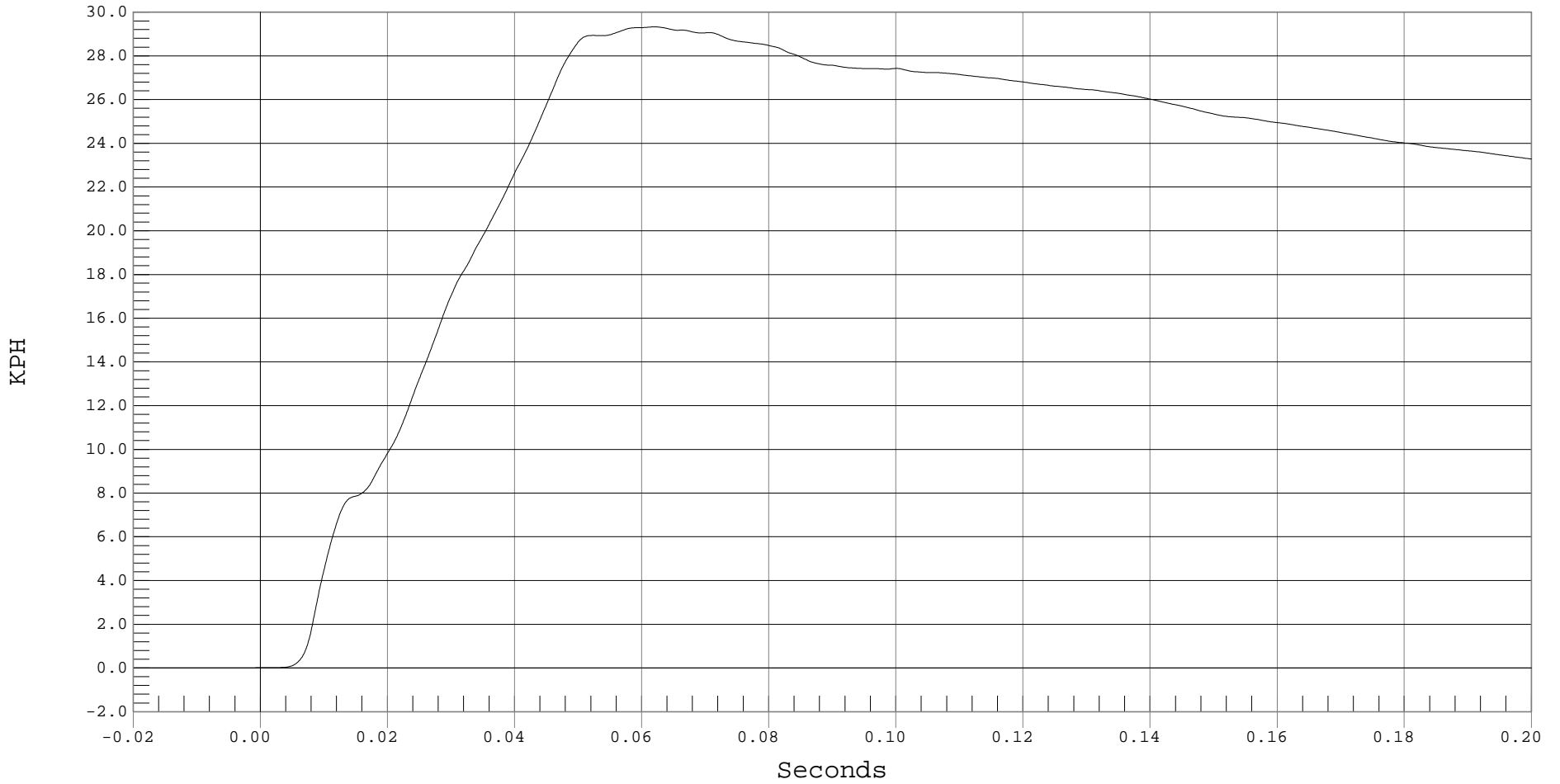
### RIGHT SIDE SILL AT REAR SEAT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 RIGHT SIDE SILL AT REAR SEAT Y VELOCITY, B01023AI.V19

Ymin = 0 KPH @ -0.0199 Seconds, Ymax = 29.33 KPH @ 0.0619 Seconds



B-25



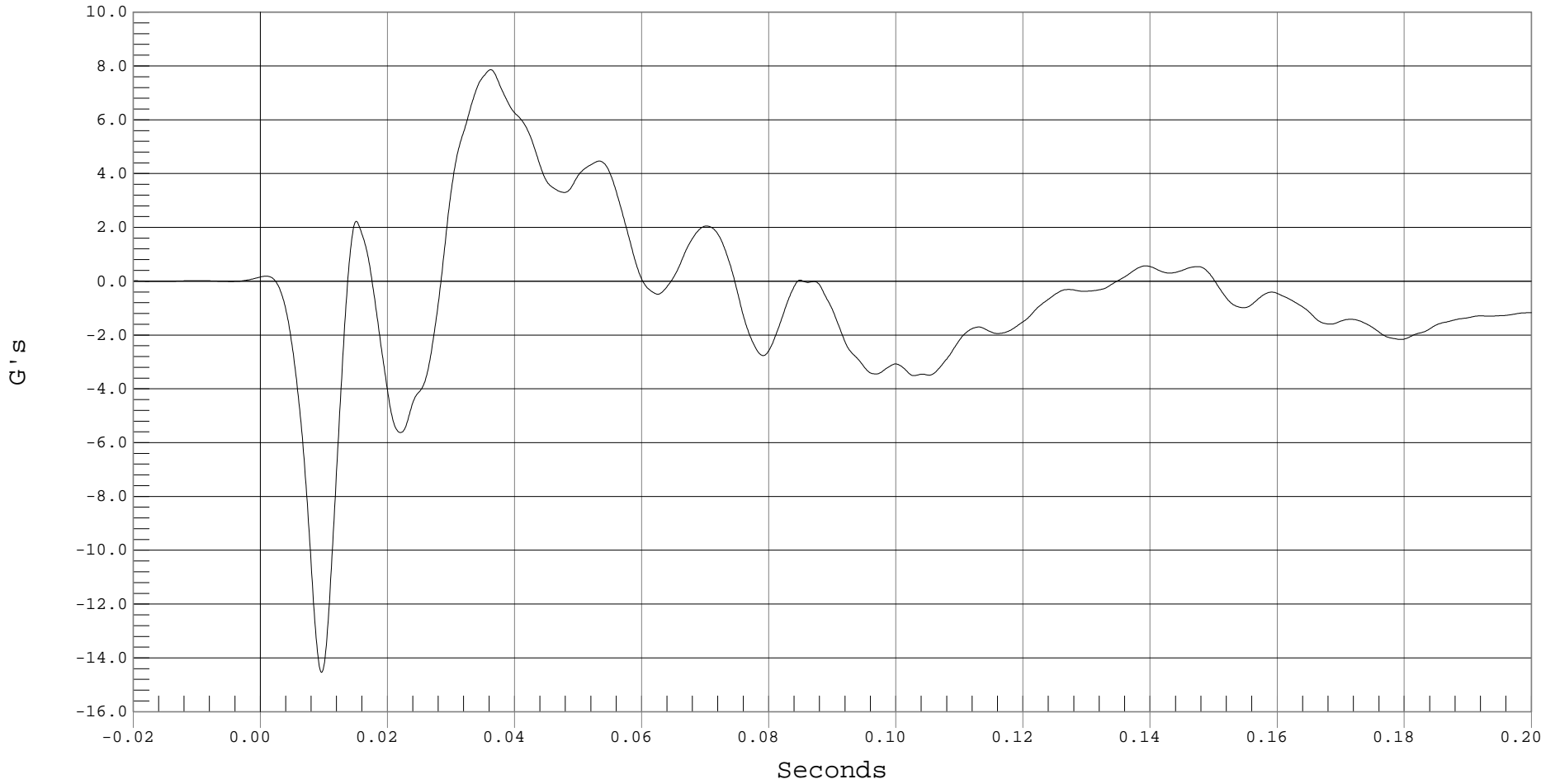
### RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 RIGHT REAR SILL Z, B01023AF.A20

Ymin = -14.54 G's @ 0.0095 Seconds, Ymax = 7.86 G's @ 0.0362 Seconds



B-26



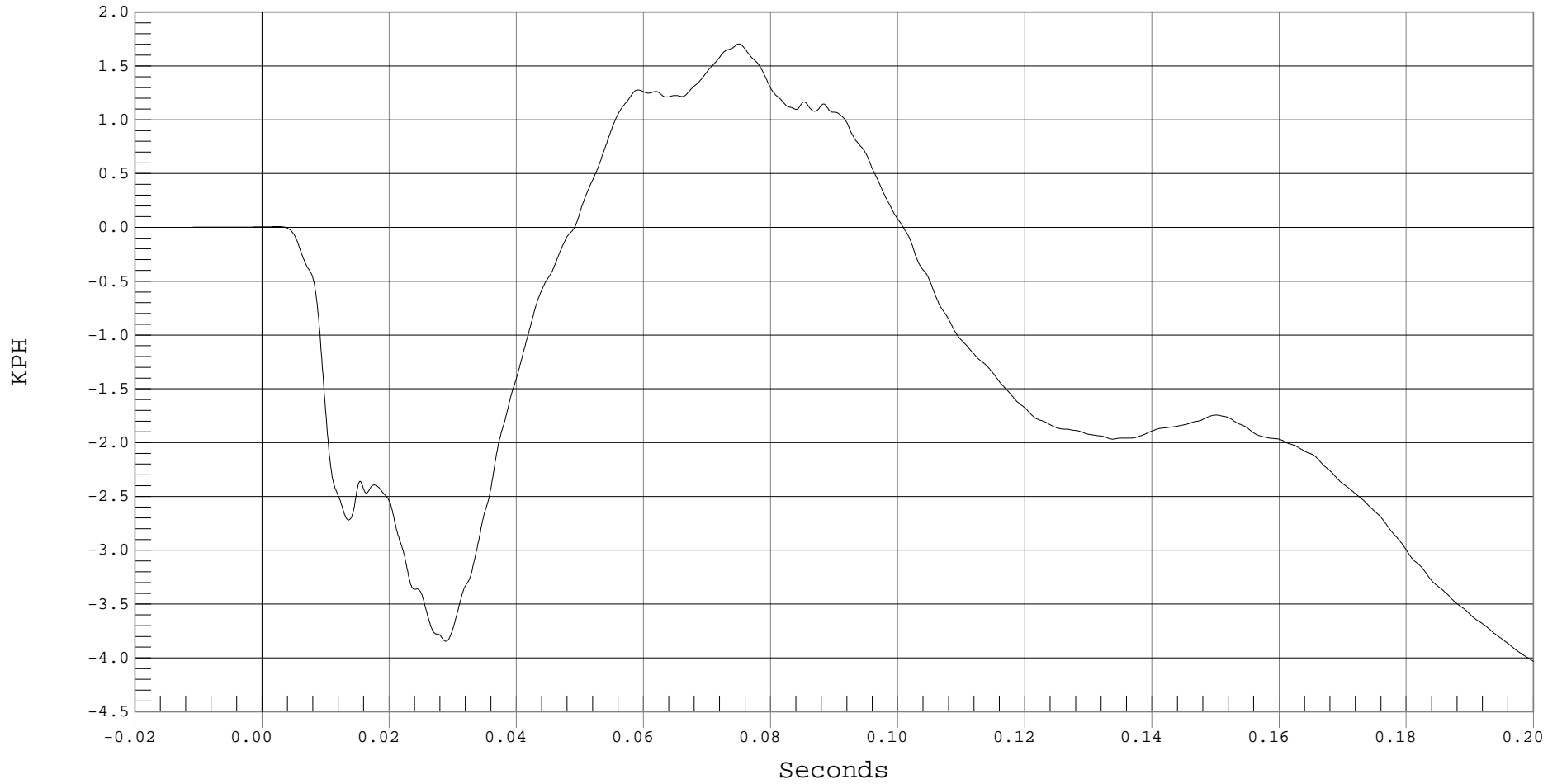
### RIGHT SIDE SILL AT REAR SEAT Z VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 RIGHT SIDE SILL AT REAR SEAT Z VELOCITY, B01023AI.V20

Ymin = -4.04 KPH @ 0.2001 Seconds, Ymax = 1.7 KPH @ 0.0749 Seconds



B-27



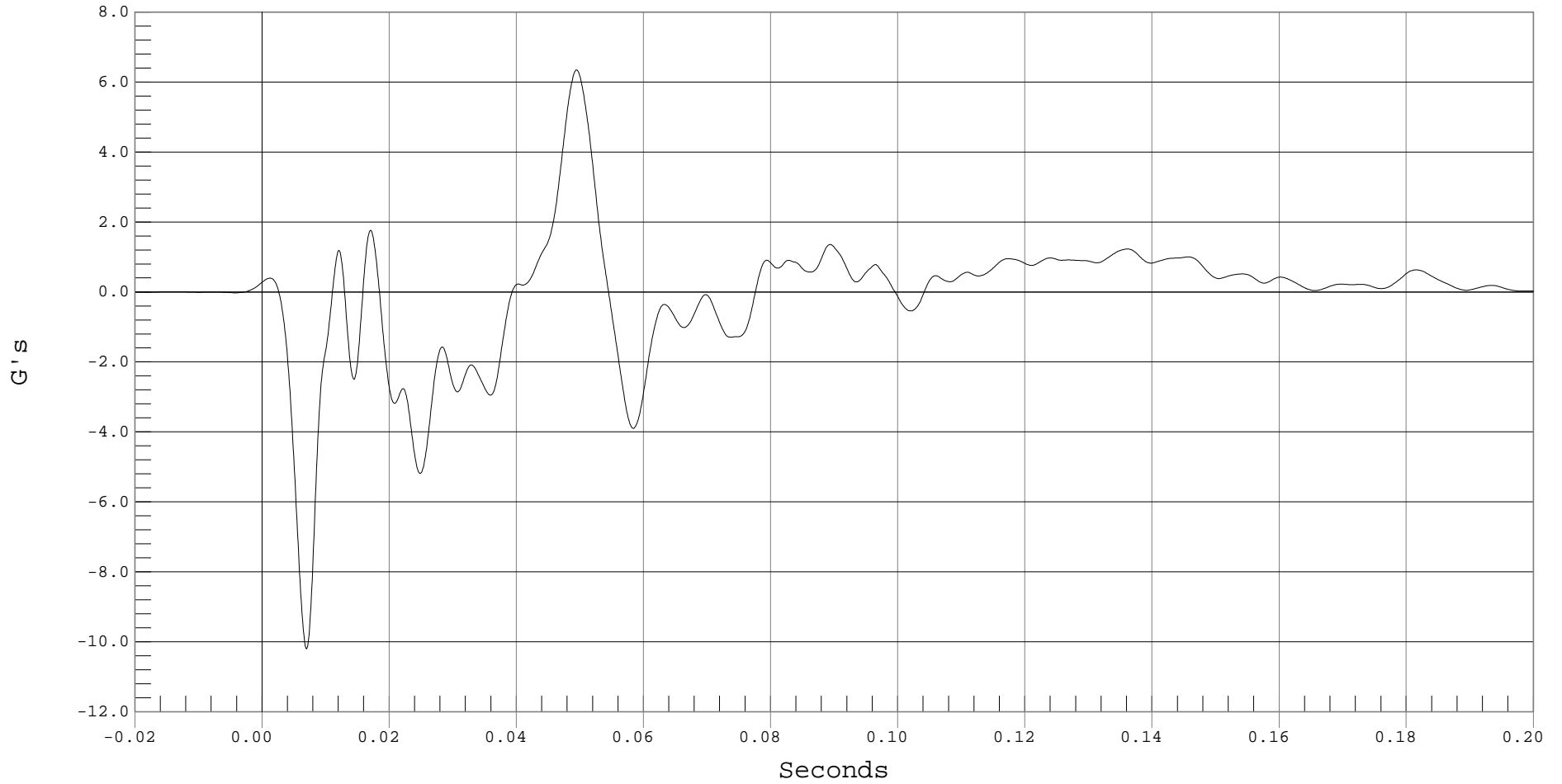
### REAR FLOORPAN ABOVE AXLE X ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE X, B01023AF.A23

Ymin = -10.21 G's @ 0.0069 Seconds, Ymax = 6.35 G's @ 0.0494 Seconds



B-28



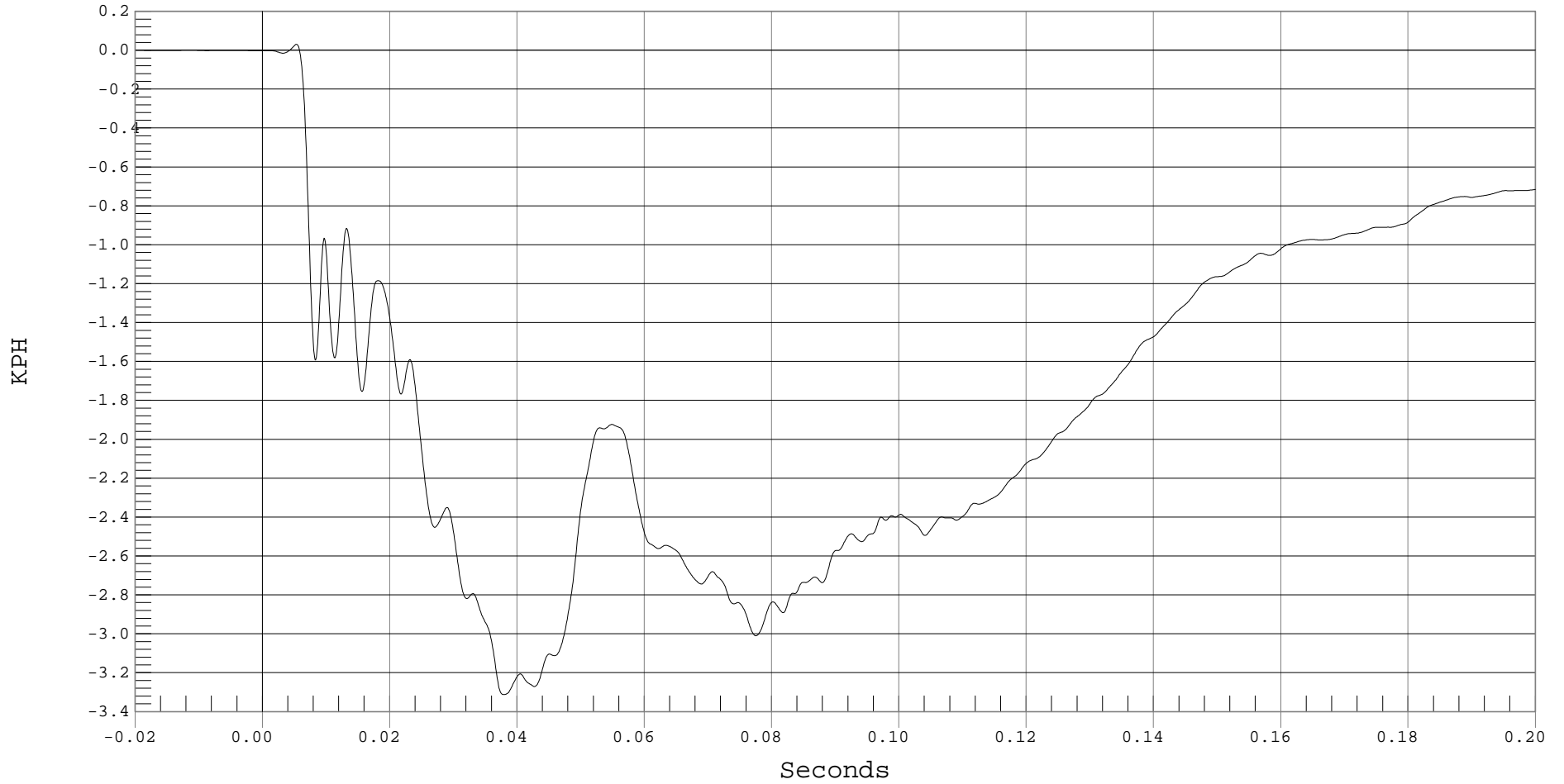
REAR FLOORPAN ABOVE AXLE X VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 REAR FLOORPAN ABOVE AXLE X VELOCITY, B01023AI.V23

Ymin = -3.31 KPH @ 0.0378 Seconds, Ymax = .03 KPH @ 0.0053 Seconds



B-29



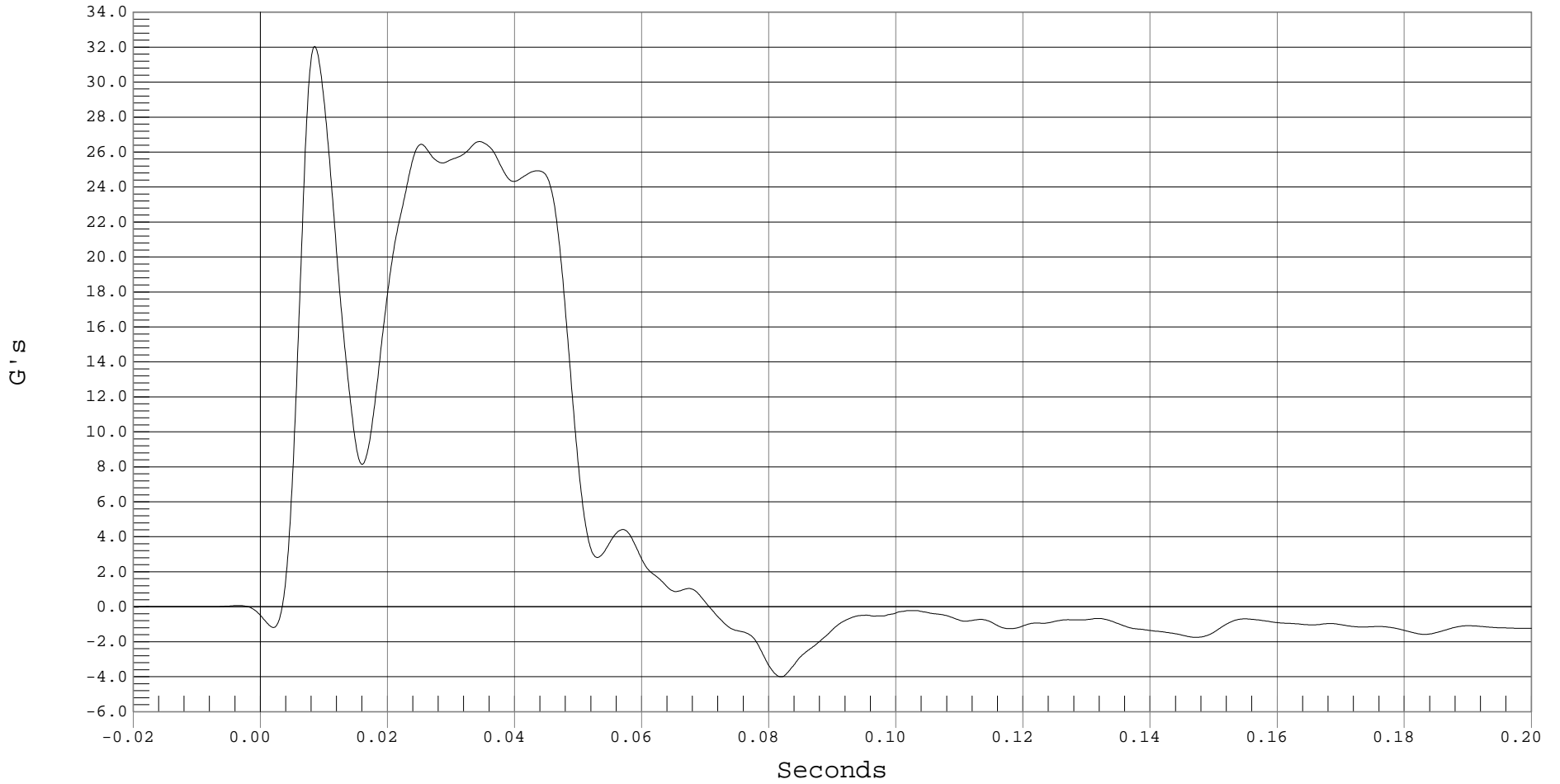
### REAR FLOORPAN ABOVE AXLE Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE Y, B01023AF.A24

Ymin = -4.01 G's @ 0.0818 Seconds, Ymax = 32.04 G's @ 0.0085 Seconds



B-30



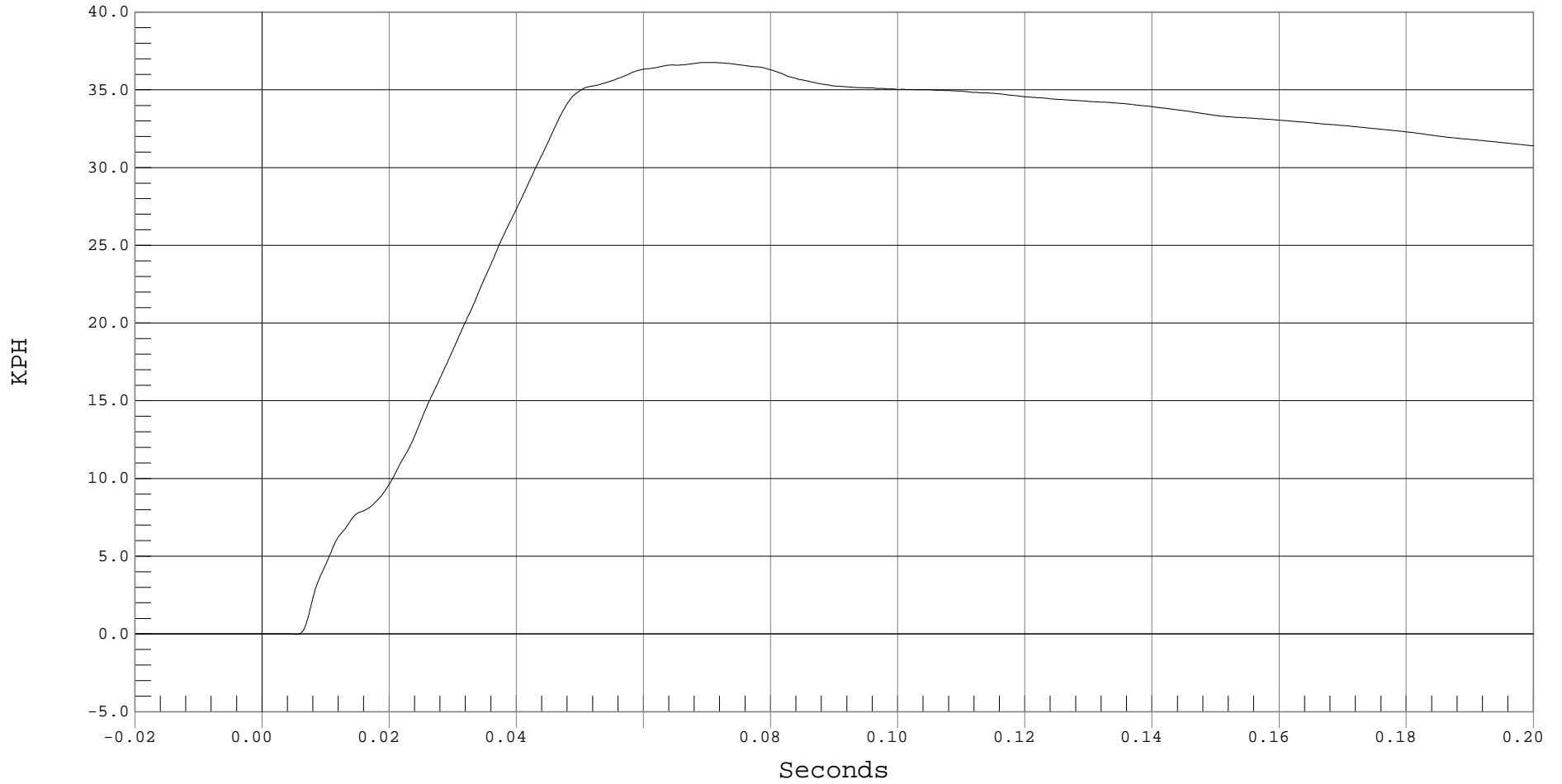
### REAR FLOORPAN ABOVE AXLE Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 REAR FLOORPAN ABOVE AXLE Y VELOCITY, B01023AI.V24

Ymin = -.03 KPH @ 0.0053 Seconds, Ymax = 36.76 KPH @ 0.0695 Seconds





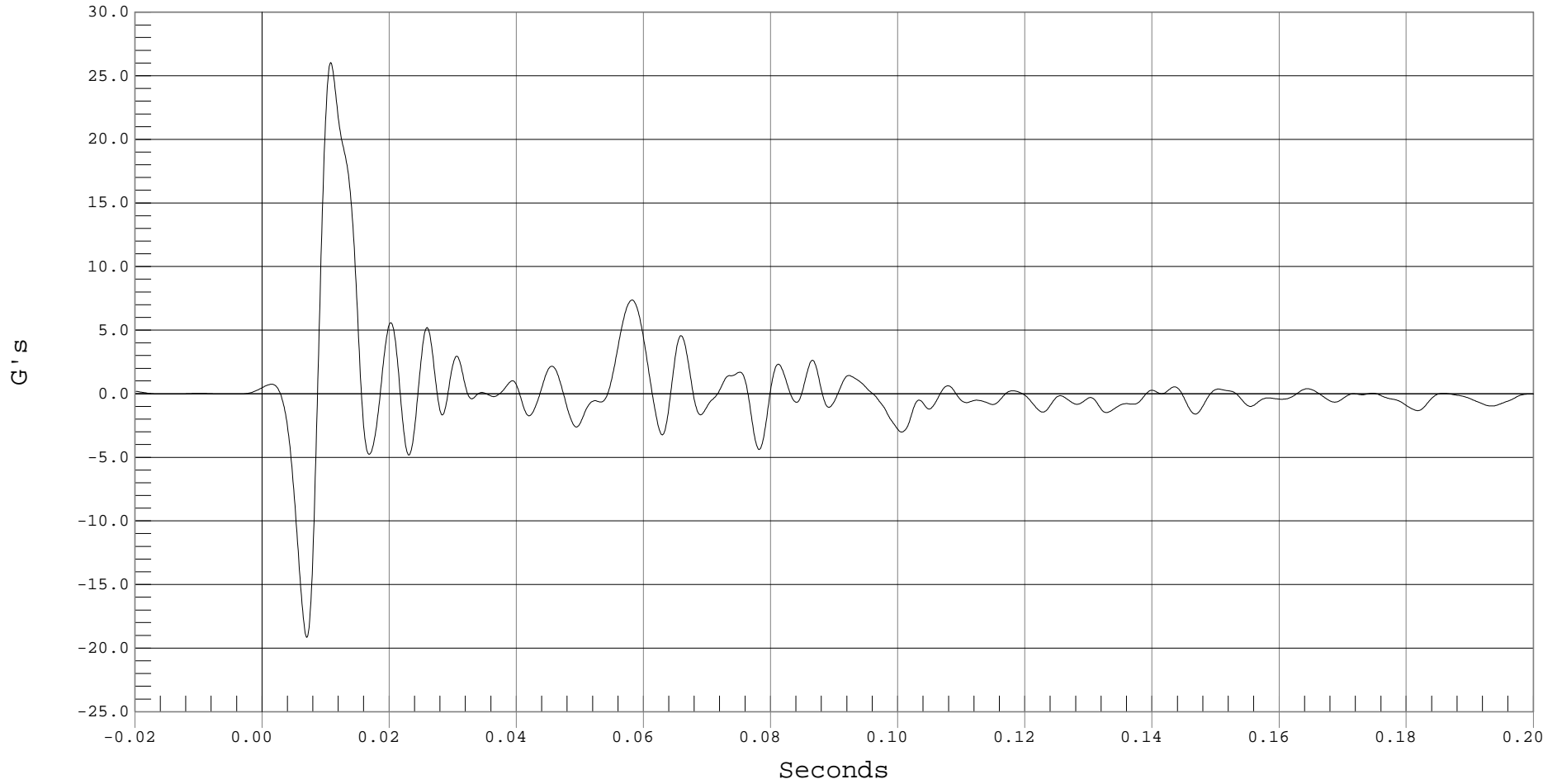
### REAR FLOORPAN ABOVE AXLE Z ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE Z, B01023AF.A25

Ymin = -19.15 G's @ 0.0070 Seconds, Ymax = 26.04 G's @ 0.0107 Seconds



B-32



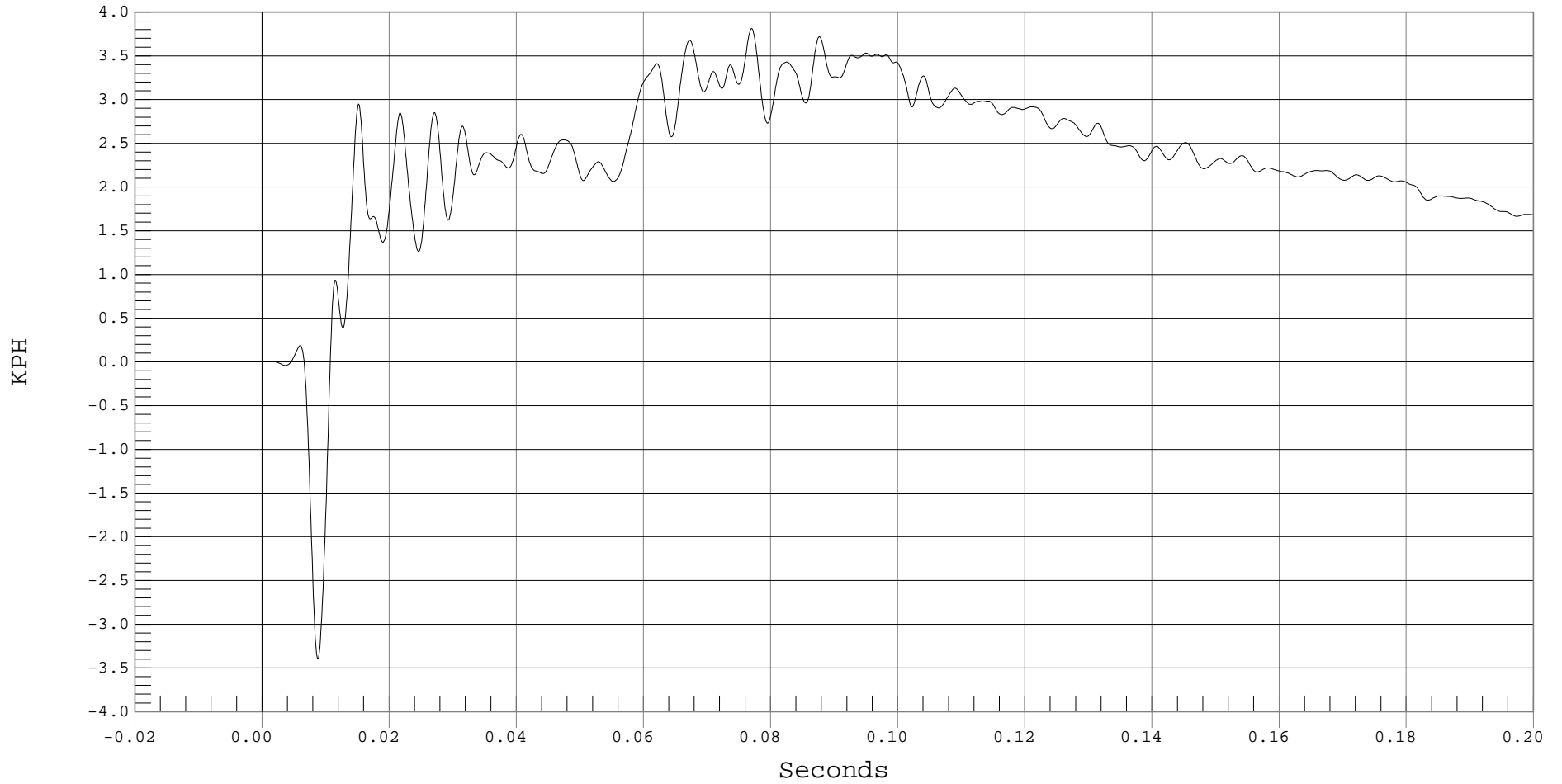
### REAR FLOORPAN ABOVE AXLE Z VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 REAR FLOORPAN ABOVE AXLE Z VELOCITY, B01023AI.V25

Ymin = -3.4 KPH @ 0.0087 Seconds, Ymax = 3.81 KPH @ 0.0769 Seconds





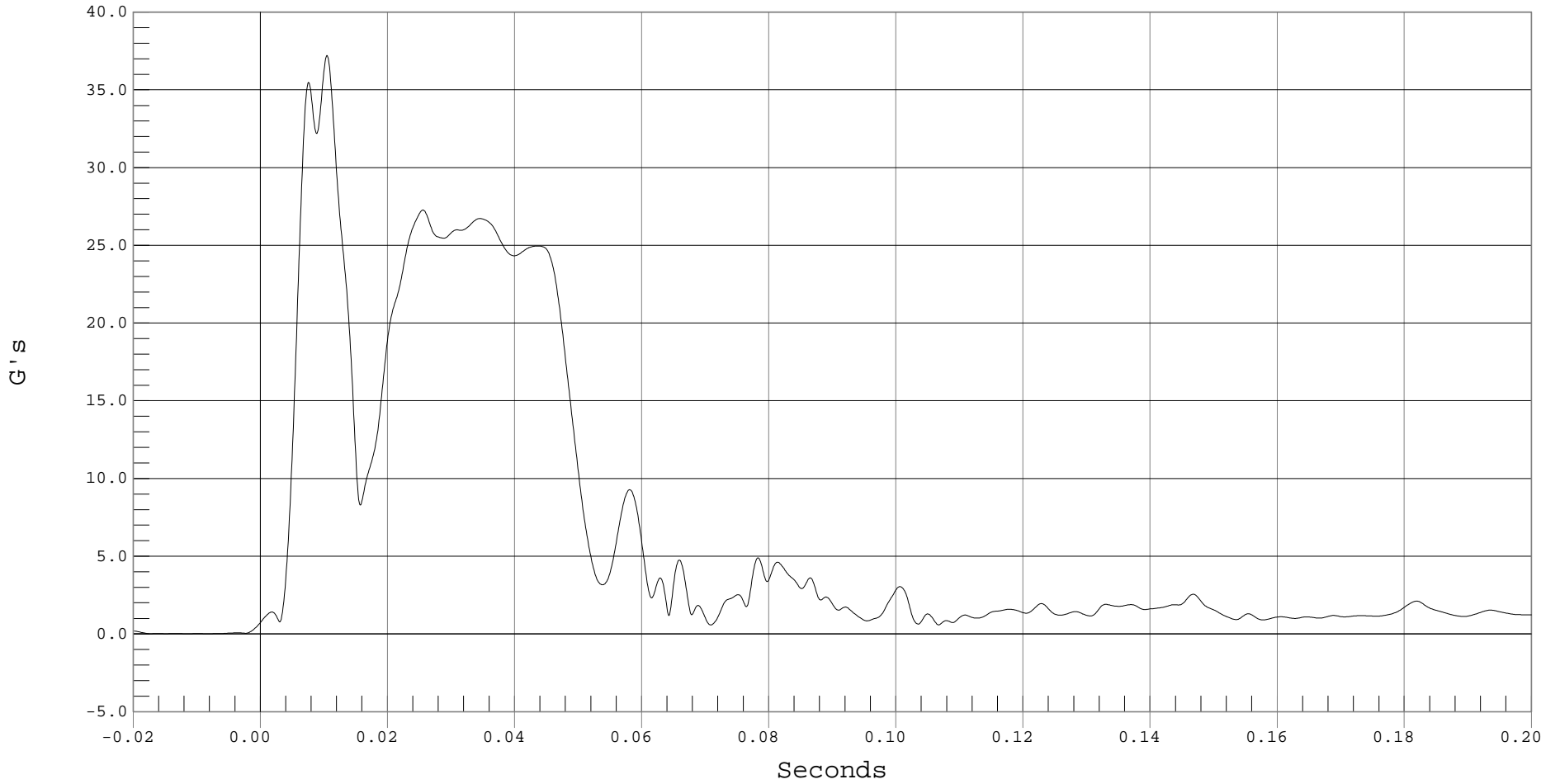
### REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION, B01023AV.A23

Ymin = 0 G's @ -0.0085 Seconds, Ymax = 37.21 G's @ 0.0104 Seconds





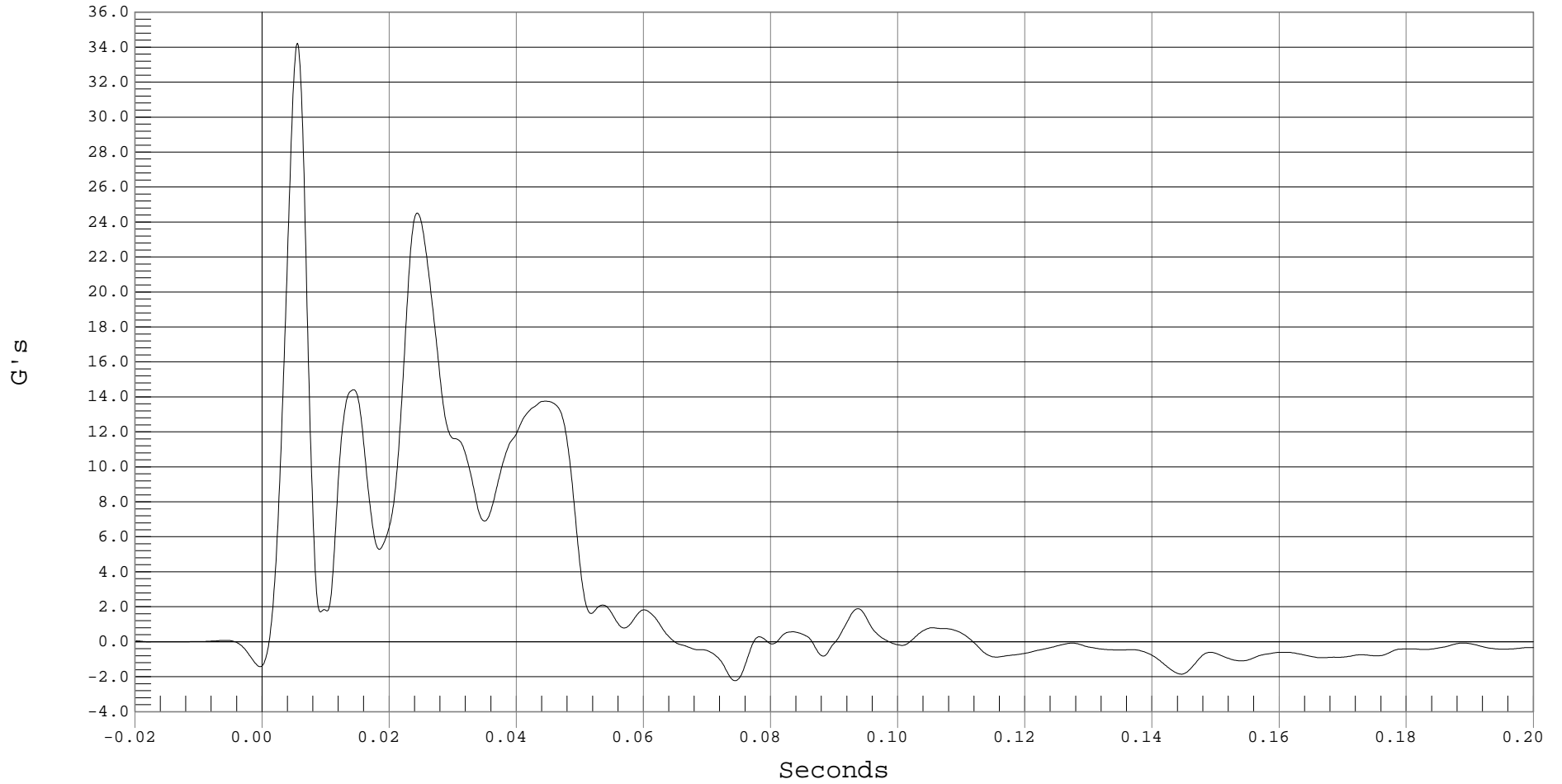
### LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 LEFT FRONT SILL Y, B01023AF.A21

Ymin = -2.23 G's @ 0.0743 Seconds, Ymax = 34.22 G's @ 0.0055 Seconds



B-35



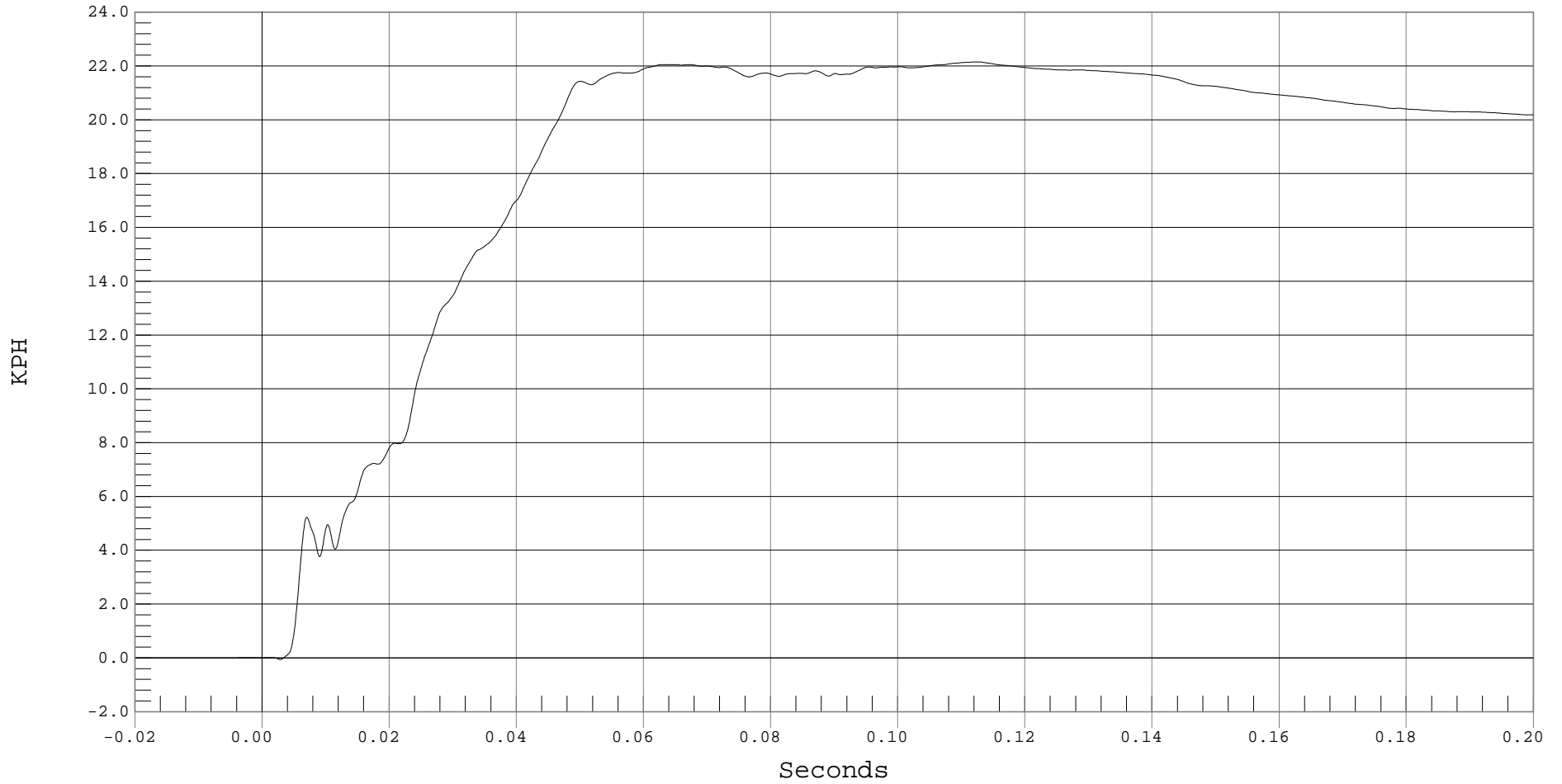
### LEFT SIDE SILL AT FRONT SEAT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 LEFT SIDE SILL AT FRONT SEAT Y VELOCITY, B01023AI.V21

Ymin = -.06 KPH @ 0.0028 Seconds, Ymax = 22.15 KPH @ 0.1125 Seconds





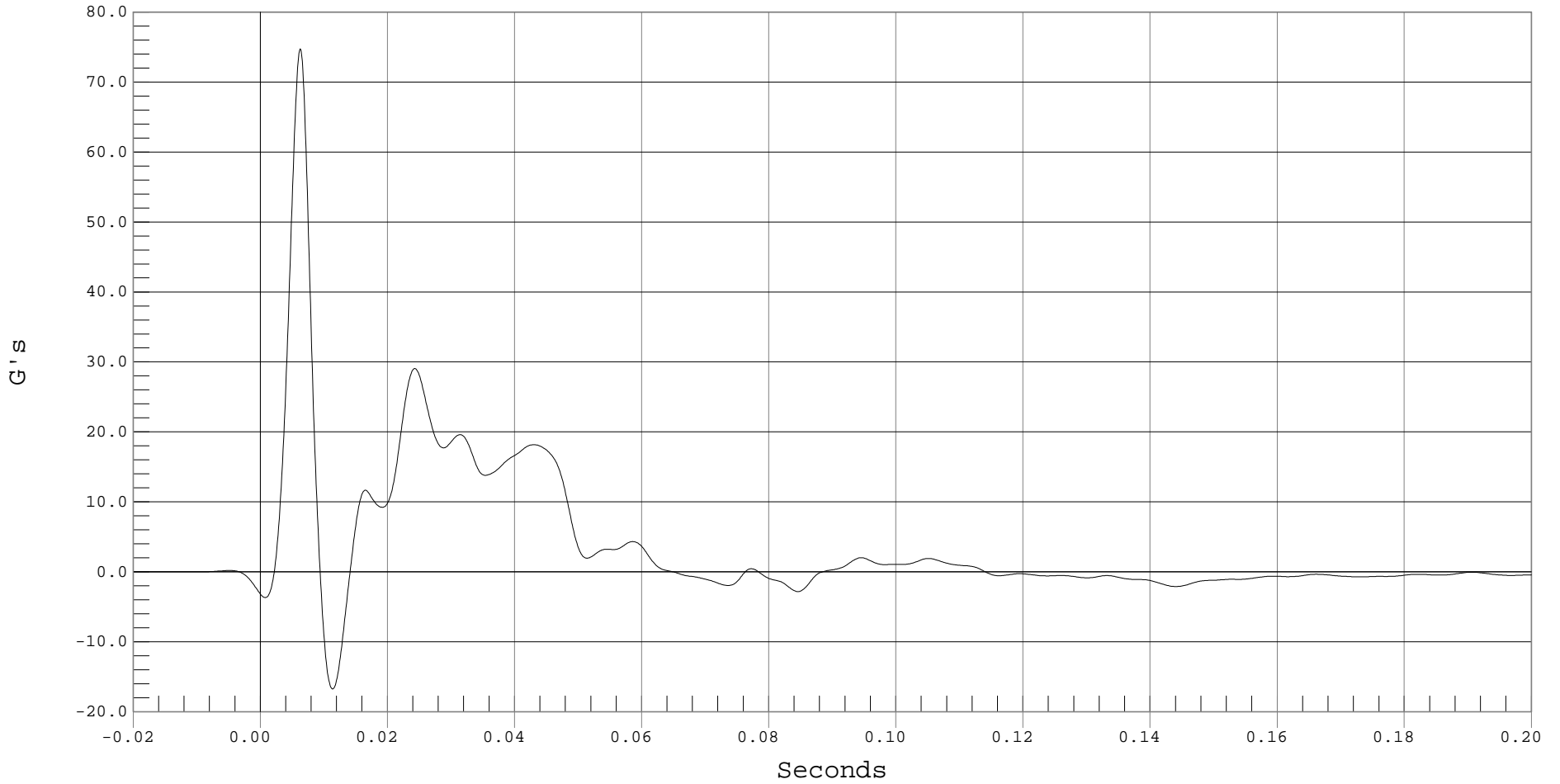
### LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 LEFT REAR SILL Y, B01023AF.A22

Ymin = -16.75 G's @ 0.0113 Seconds, Ymax = 74.77 G's @ 0.0062 Seconds



B-37



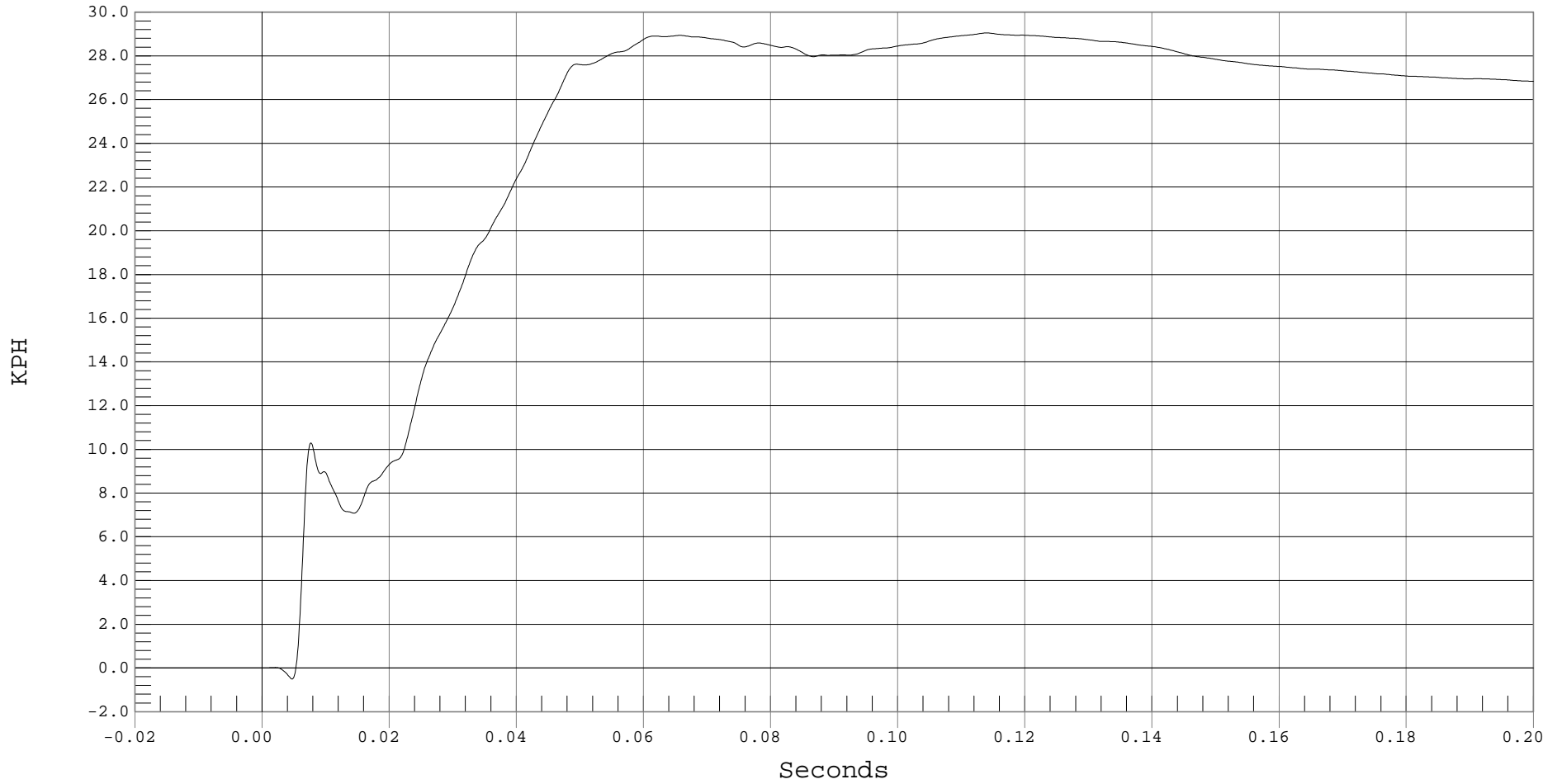
### LEFT SIDE SILL AT REAR SEAT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 LEFT SIDE SILL AT REAR SEAT Y VELOCITY, B01023AI.V22

Ymin = -.51 KPH @ 0.0046 Seconds, Ymax = 29.05 KPH @ 0.1139 Seconds



B-38



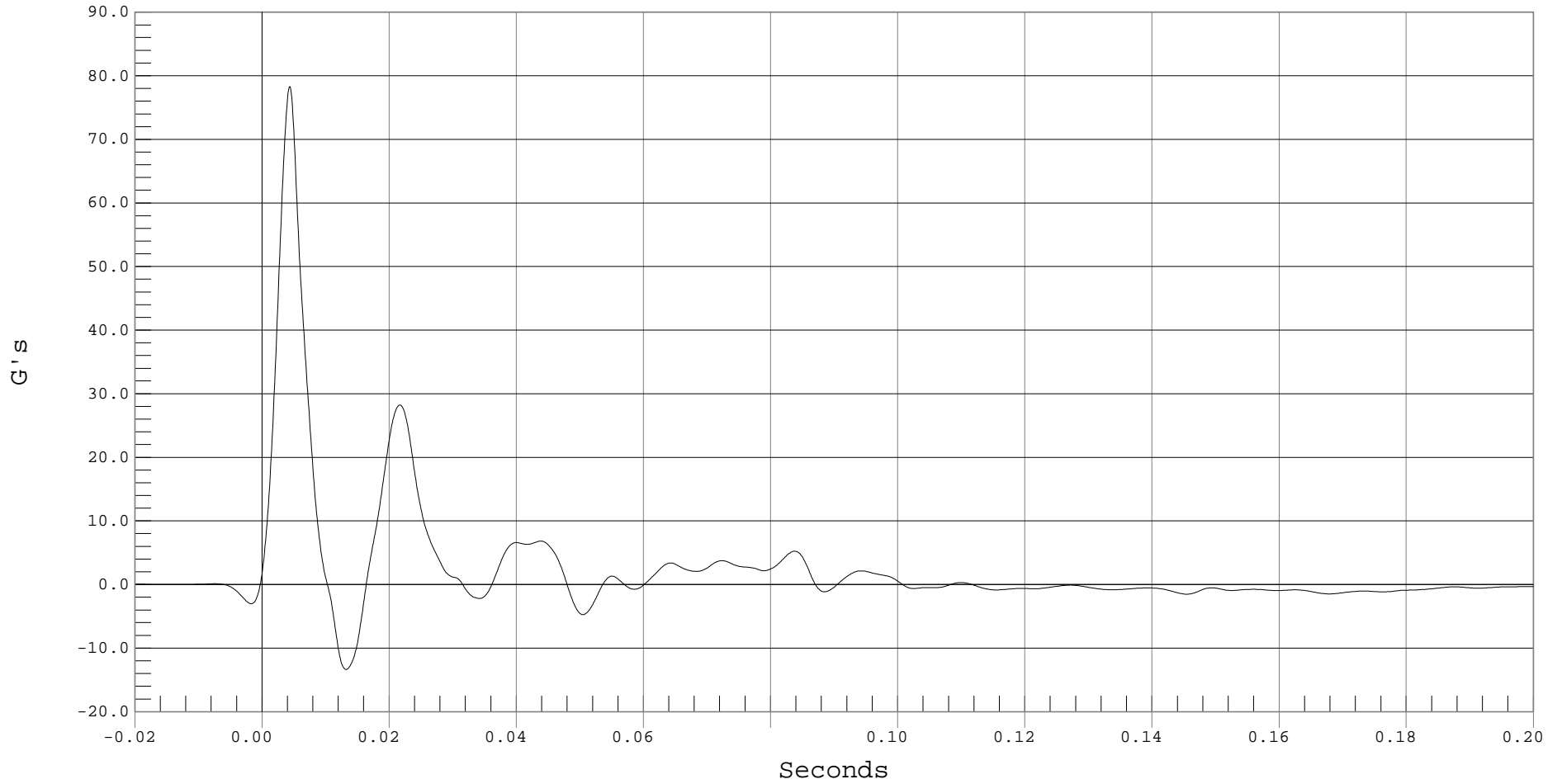
### LEFT LOWER A-POST Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 LEFT LOWER A-POST Y, B01023AF.A27

Ymin = -13.36 G's @ 0.0131 Seconds, Ymax = 78.3 G's @ 0.0043 Seconds



B-39



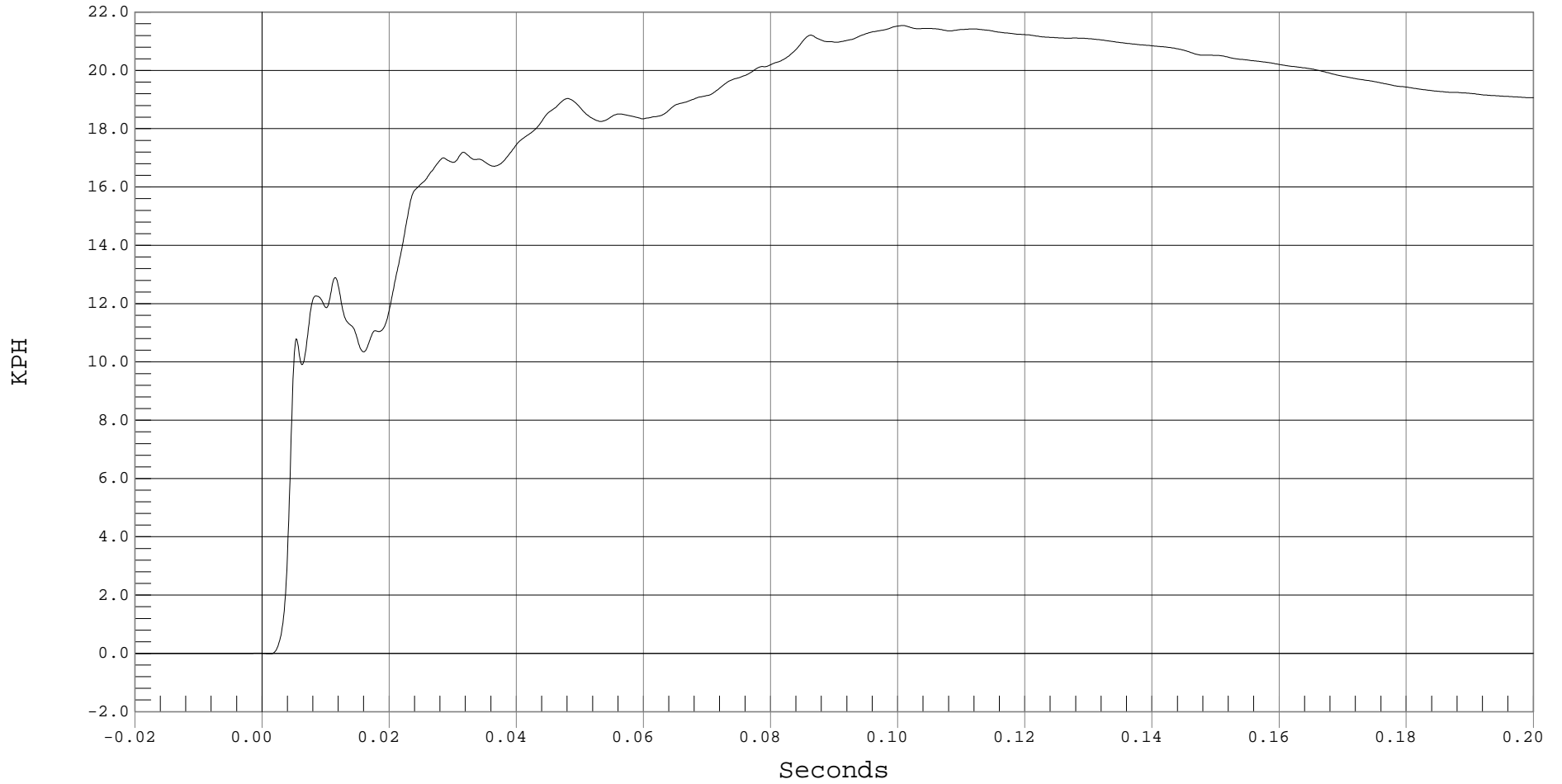
### LEFT LOWER A-POST Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 LEFT LOWER A-POST Y VELOCITY, B01023AI.V27

Ymin = -.01 KPH @ 0.0012 Seconds, Ymax = 21.54 KPH @ 0.1007 Seconds



B-40



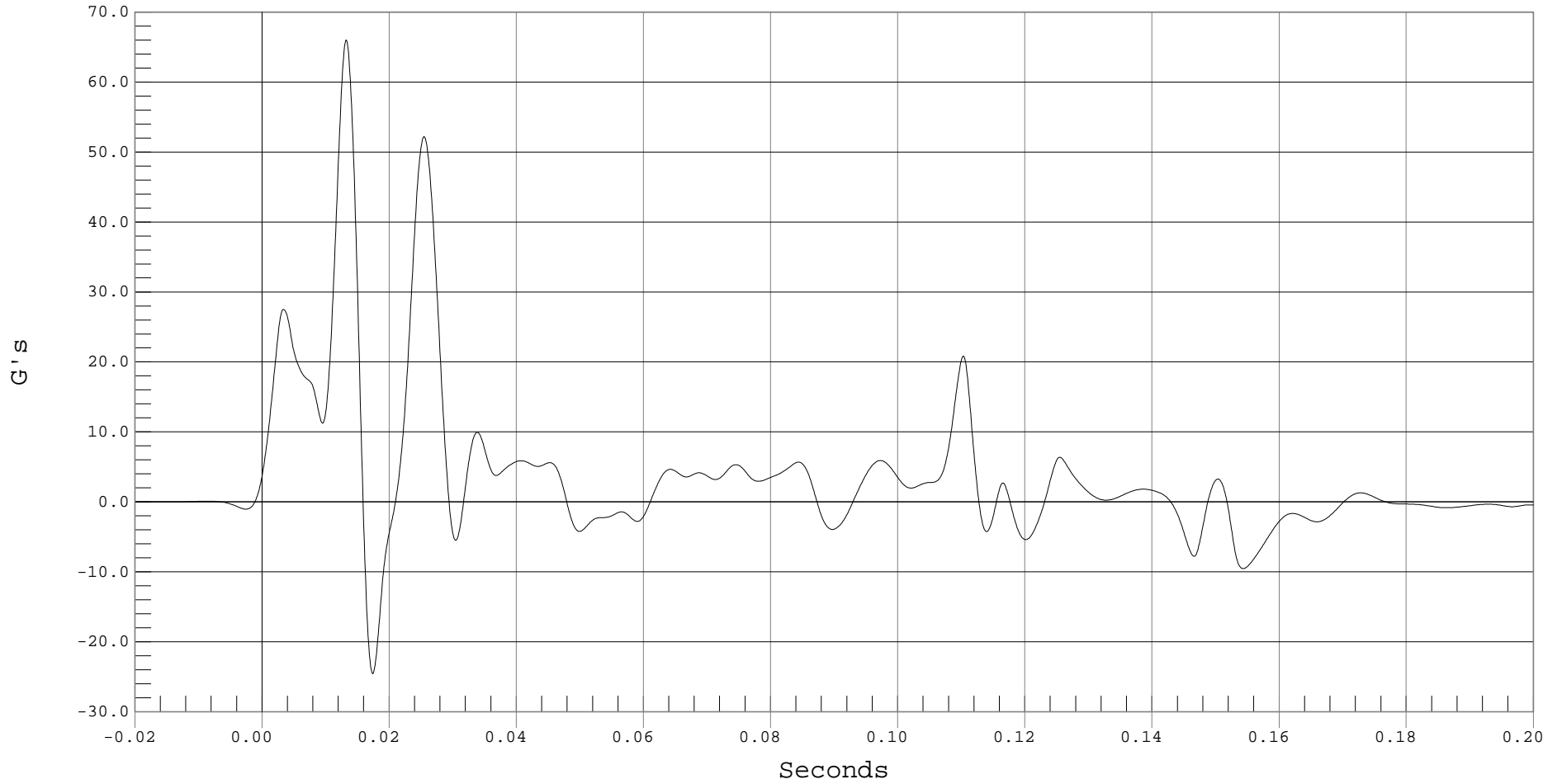
### LEFT MID A-POST Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 LEFT MID A-POST Y, B01023AF.A26

Ymin = -24.57 G's @ 0.0173 Seconds, Ymax = 66.02 G's @ 0.0132 Seconds



B-41



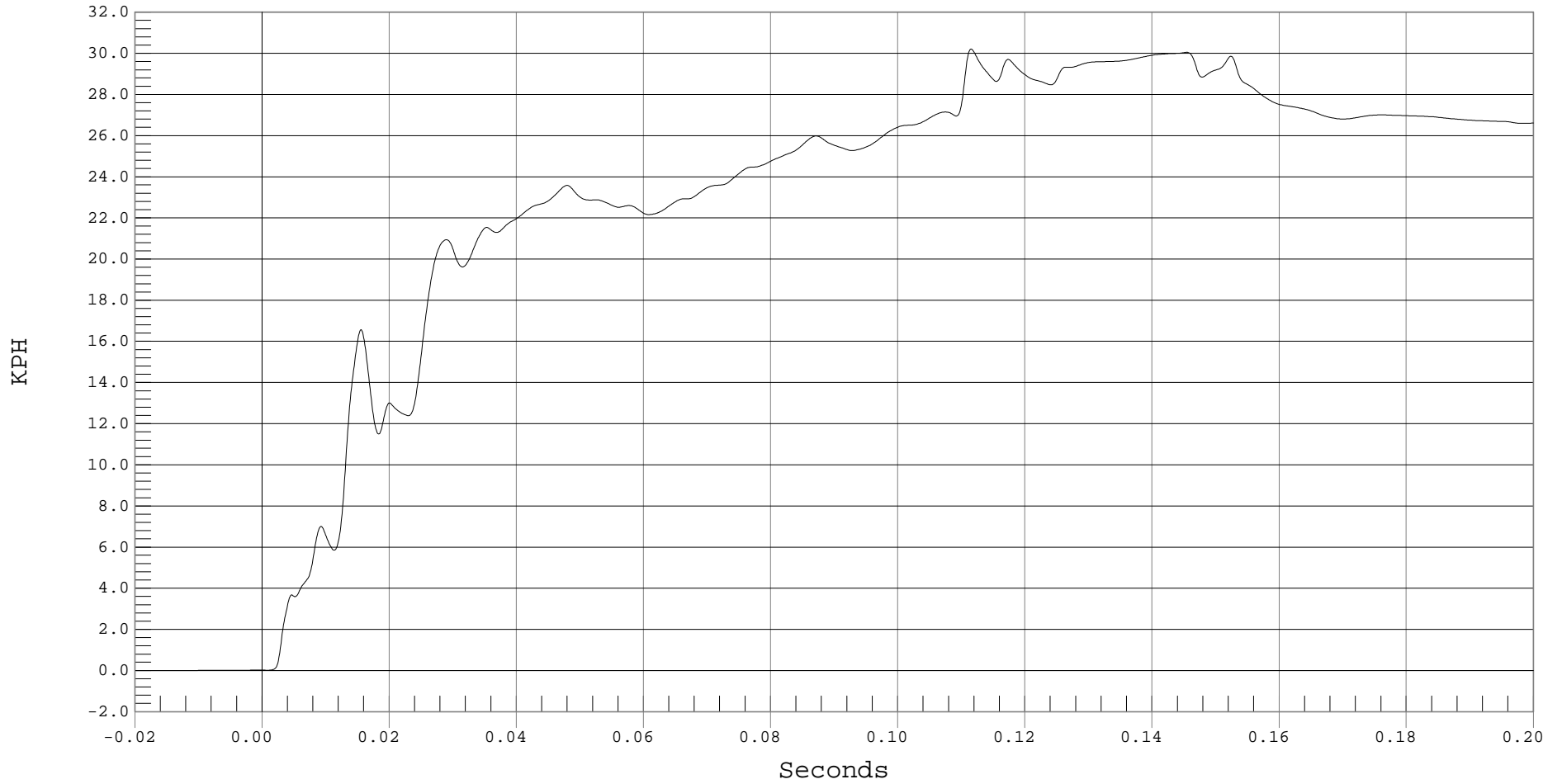
### LEFT MID A-POST Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 LEFT MID A-POST Y VELOCITY, B01023AI.V26

Ymin = 0 KPH @ -0.0185 Seconds, Ymax = 30.2 KPH @ 0.1115 Seconds



B-42



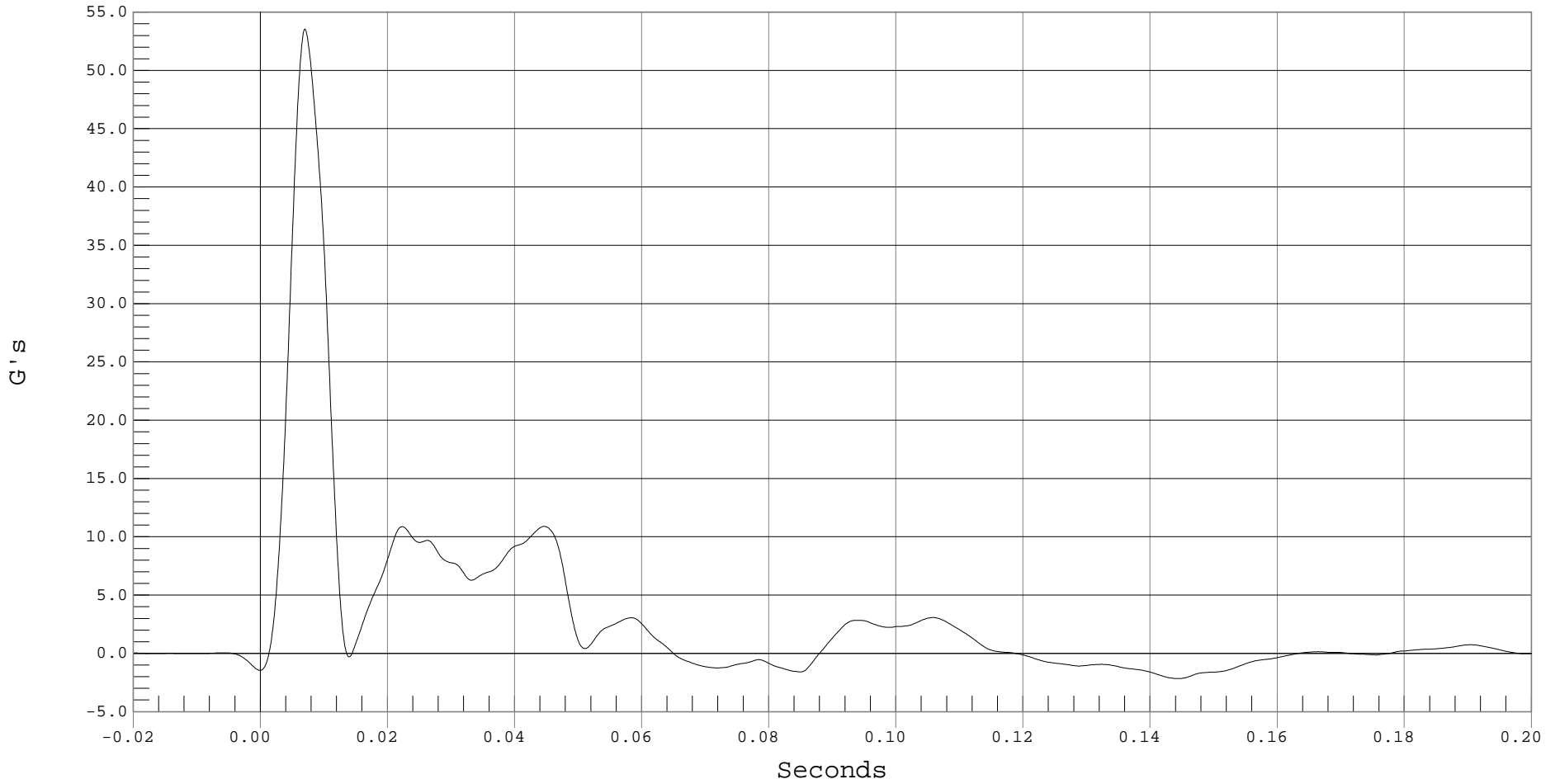
### LEFT LOWER B-POST Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 LEFT LOWER B-POST, B01023AF.A29

Ymin = -2.16 G's @ 0.1444 Seconds, Ymax = 53.55 G's @ 0.0069 Seconds



B-43



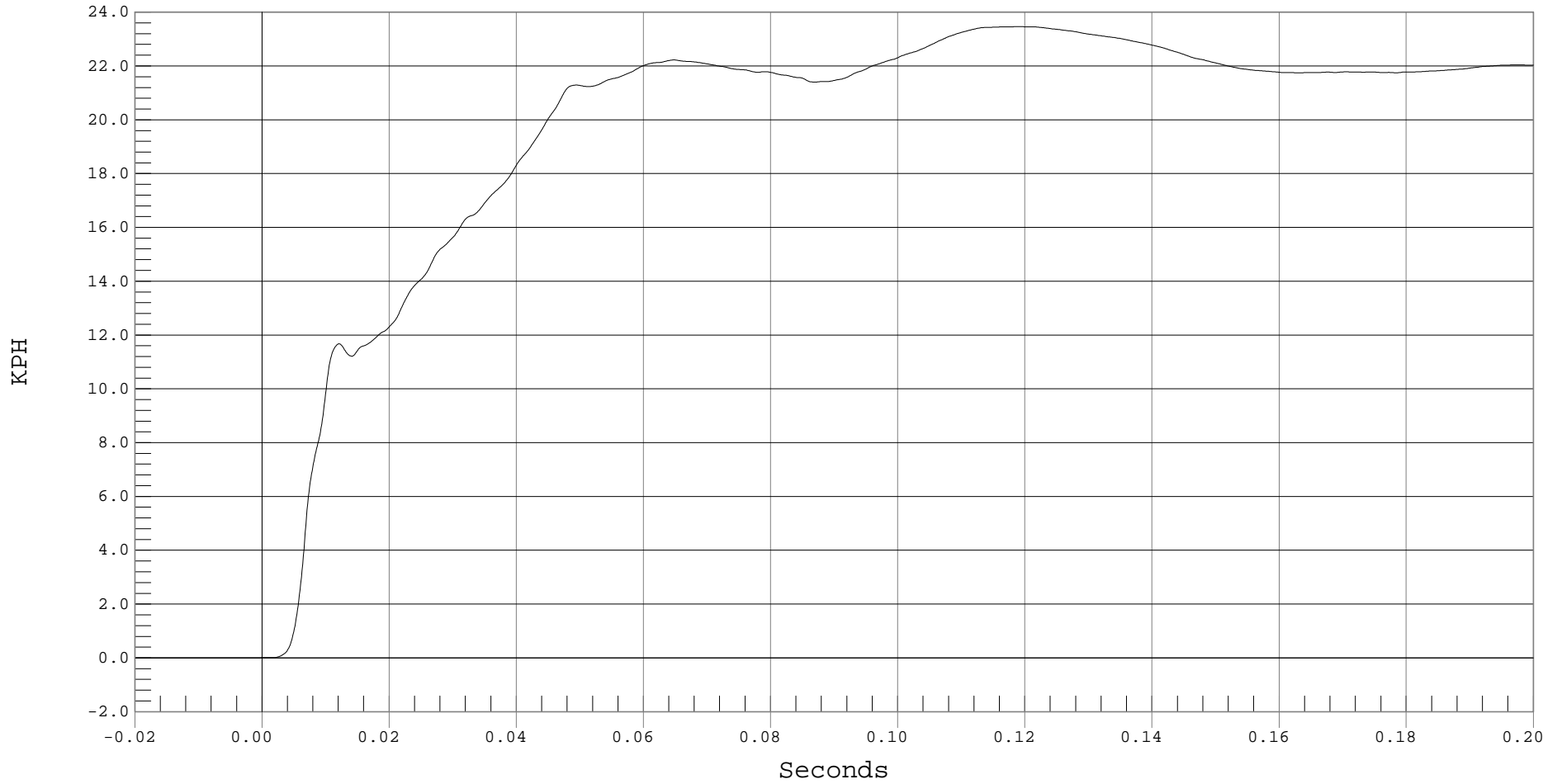
### LEFT LOWER B-POST Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 LEFT LOWER B-POST Y VELOCITY, B01023AI.V29

Ymin = 0 KPH @ -0.0037 Seconds, Ymax = 23.46 KPH @ 0.1190 Seconds



B-44



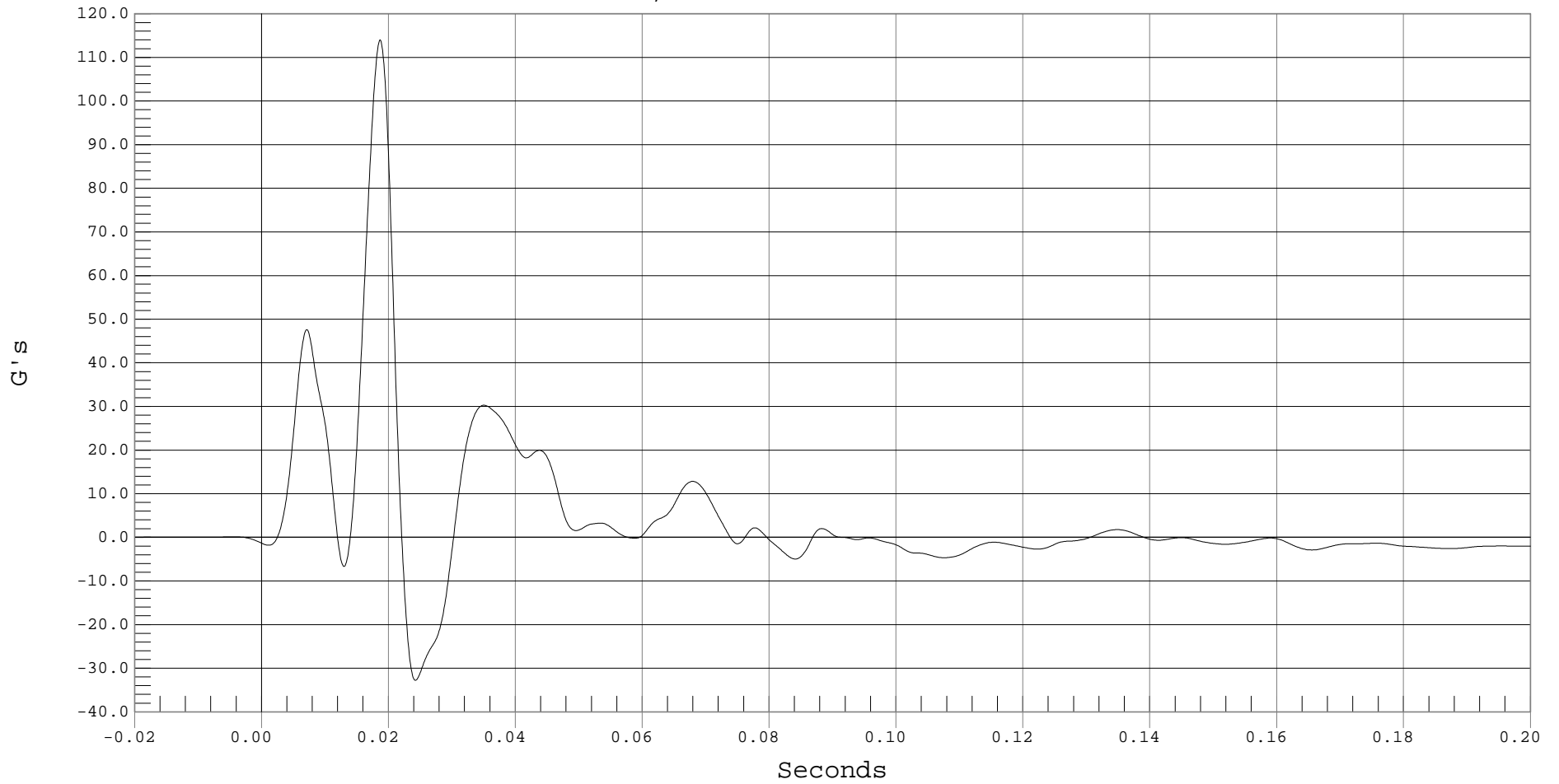
### LEFT MID B-POST Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 LEFT MID B-POST, B01023AF.A28

Ymin = -32.79 G's @ 0.0242 Seconds, Ymax = 114.01 G's @ 0.0186 Seconds



B-45



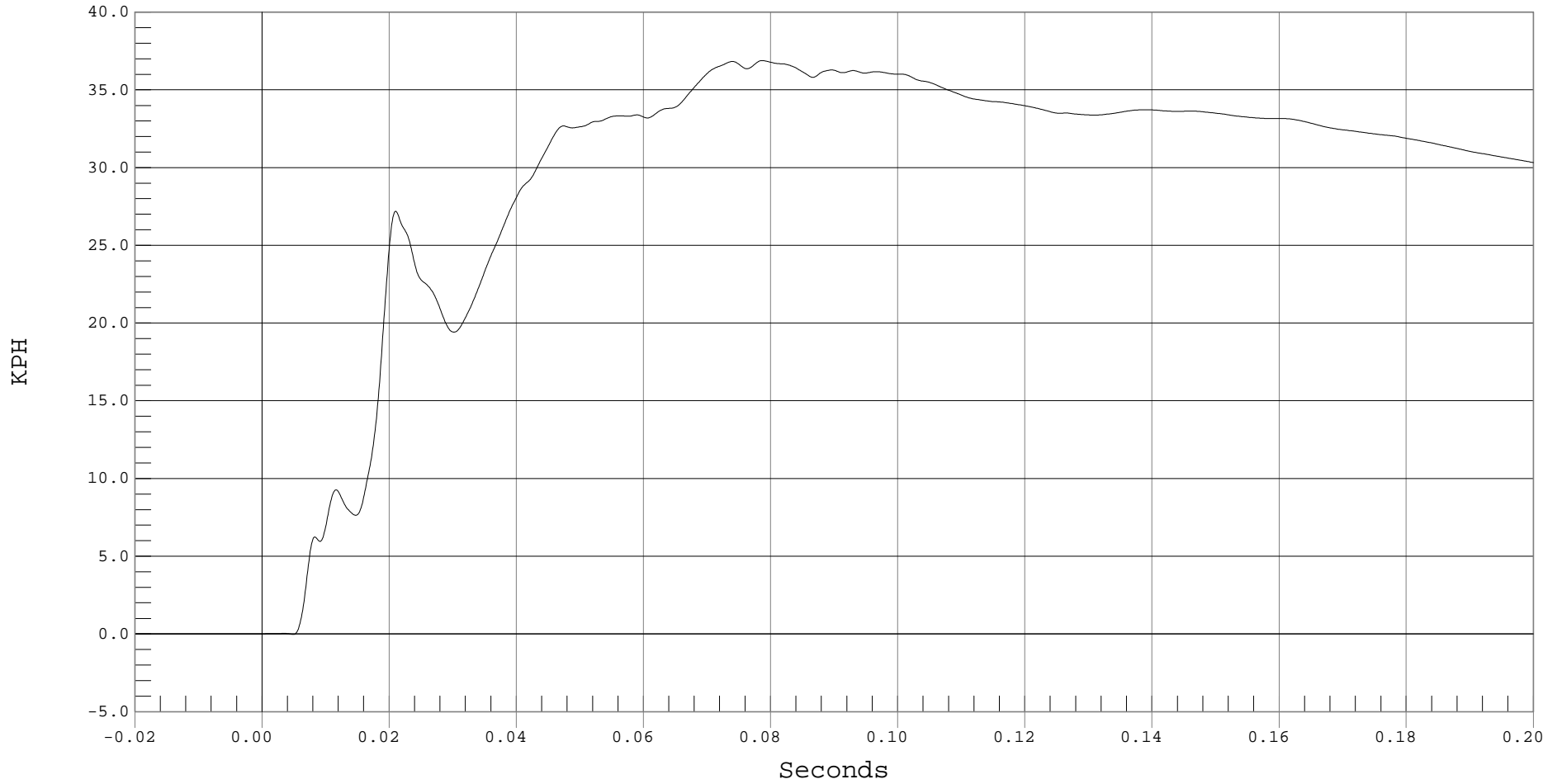
### LEFT MID B-POST Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 LEFT MID B-POST Y VELOCITY, B01023AI.V28

Ymin = -.04 KPH @ 0.0048 Seconds, Ymax = 36.88 KPH @ 0.0786 Seconds



B-46



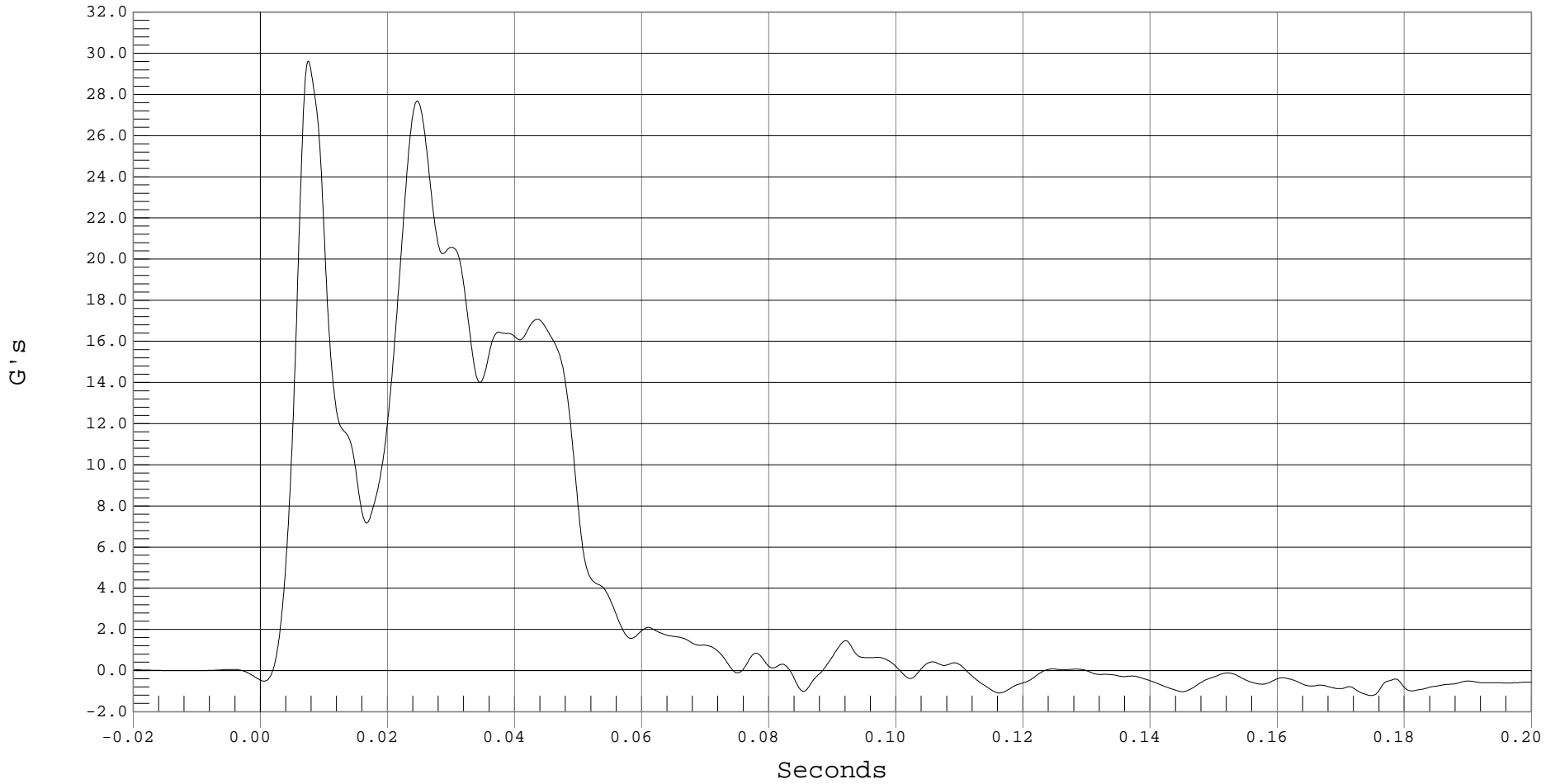
### LEFT DRIVER SEAT TRACK Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 DRIVER SEAT TRACK Y, B01023AF.A30

Ymin = -1.22 G's @ 0.1747 Seconds, Ymax = 29.61 G's @ 0.0074 Seconds



B-47



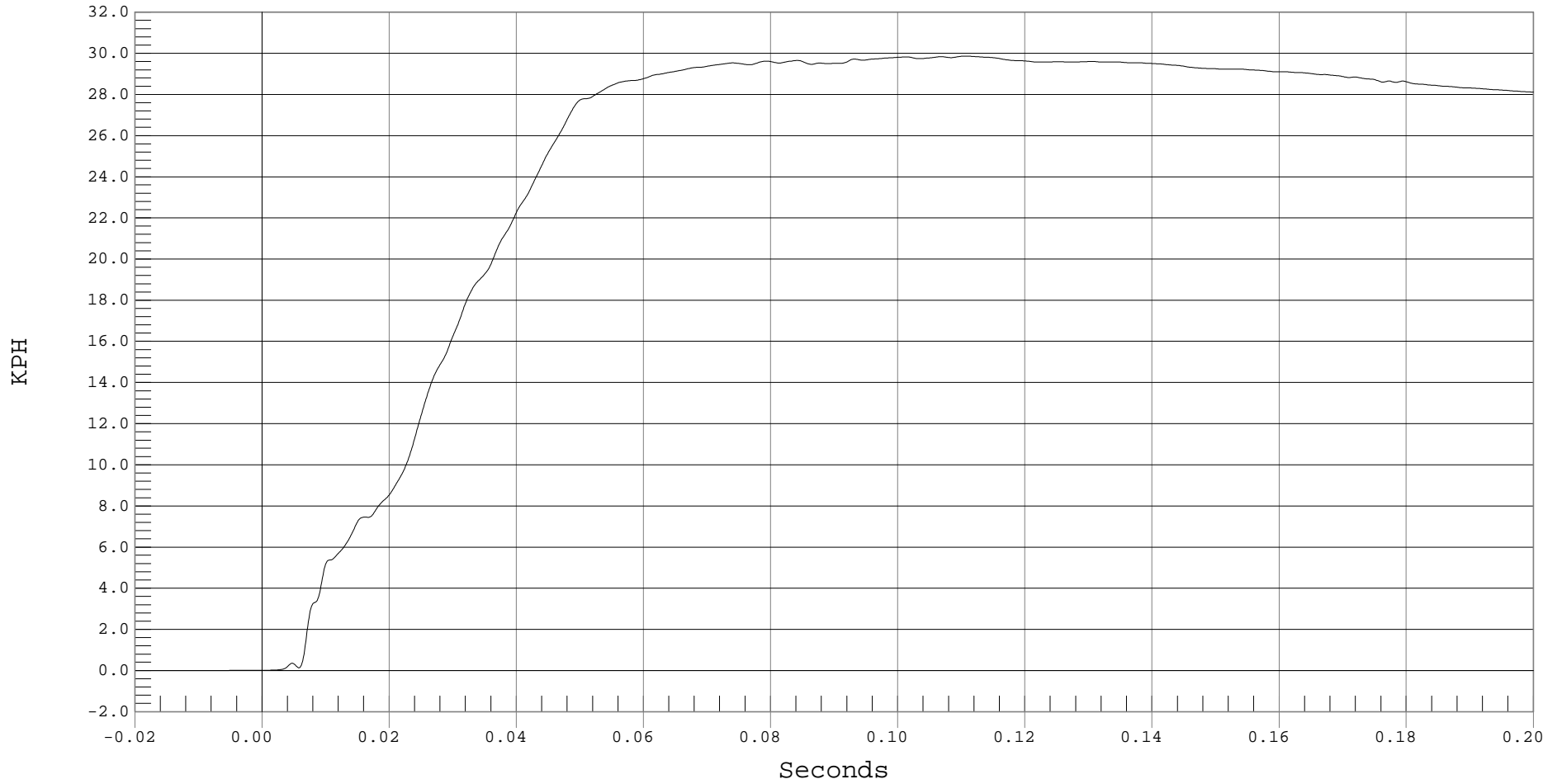
### LEFT DRIVER SEAT TRACK Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER SEAT TRACK Y VELOCITY, B01023AI.V30

Ymin = 0 KPH @ -0.0199 Seconds, Ymax = 29.86 KPH @ 0.1104 Seconds



B-48



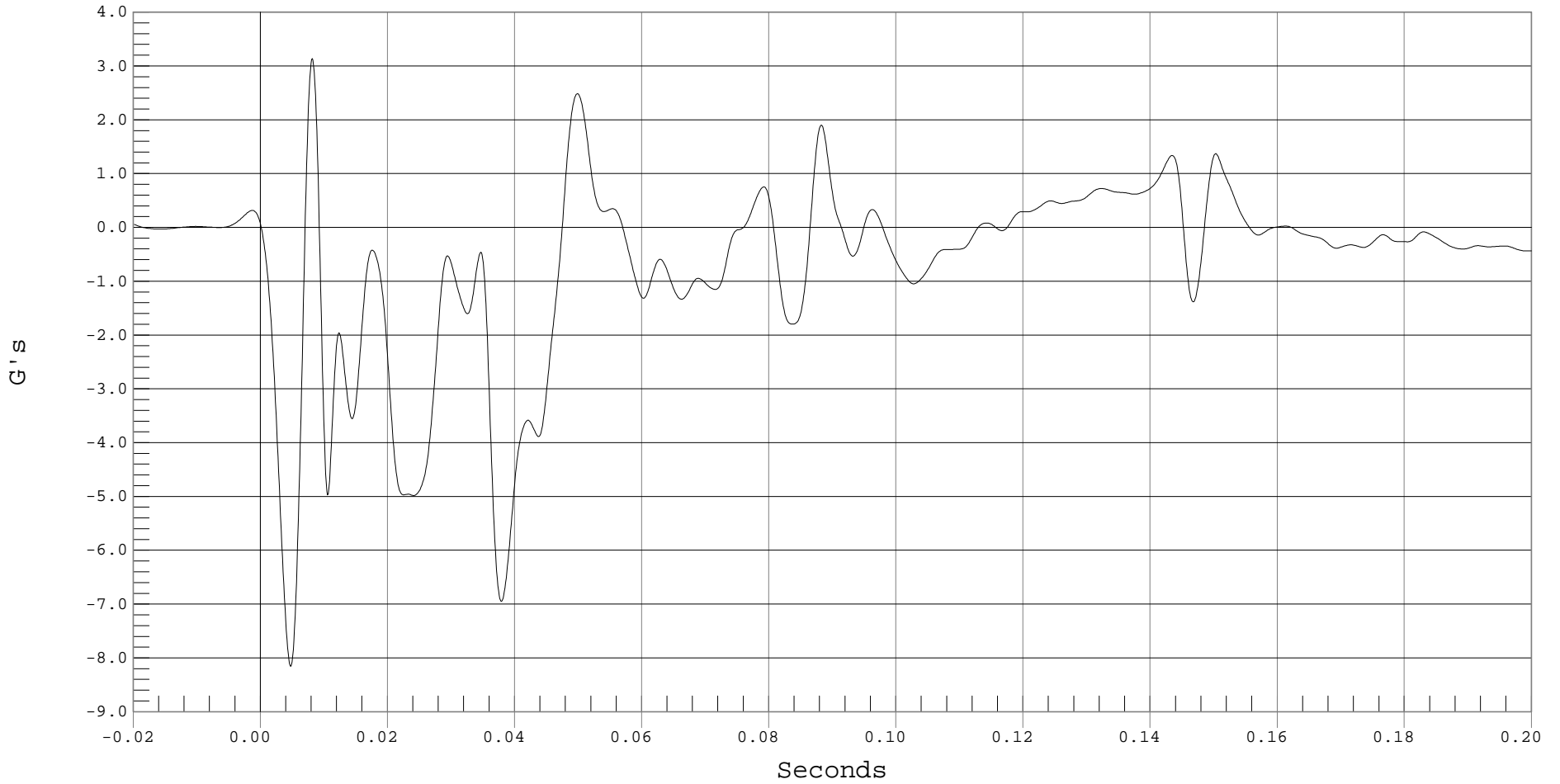
### VEHICLE CG X ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 VEHICLE CG X, B01023AF.A33

Ymin = -8.16 G's @ 0.0047 Seconds, Ymax = 3.14 G's @ 0.0081 Seconds





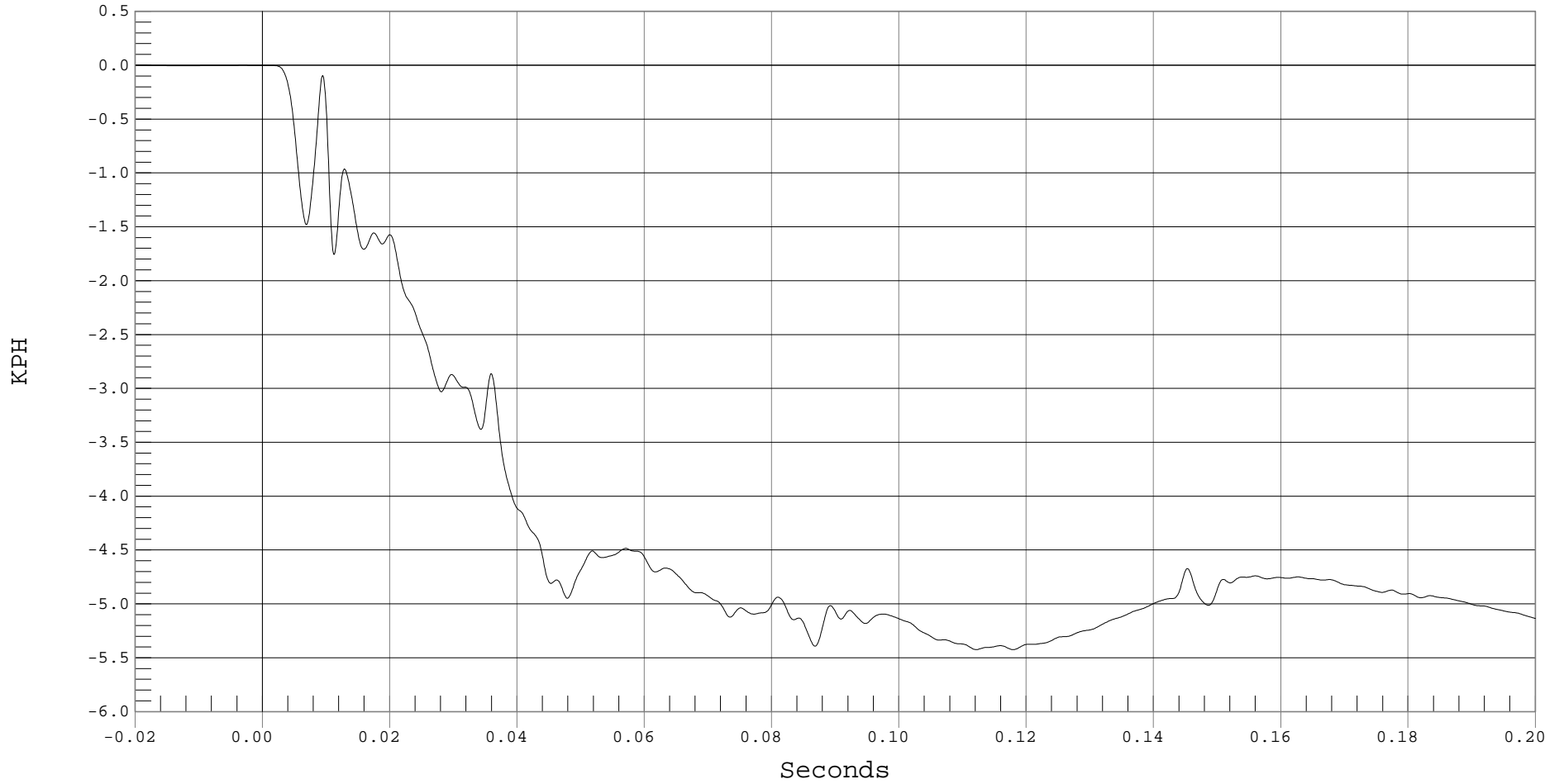
### VEHICLE CG X VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 VEHICLE CG X VELOCITY, B01023AI.V33

Ymin = -5.42 KPH @ 0.1179 Seconds, Ymax = 0 KPH @ -0.0197 Seconds



B-50



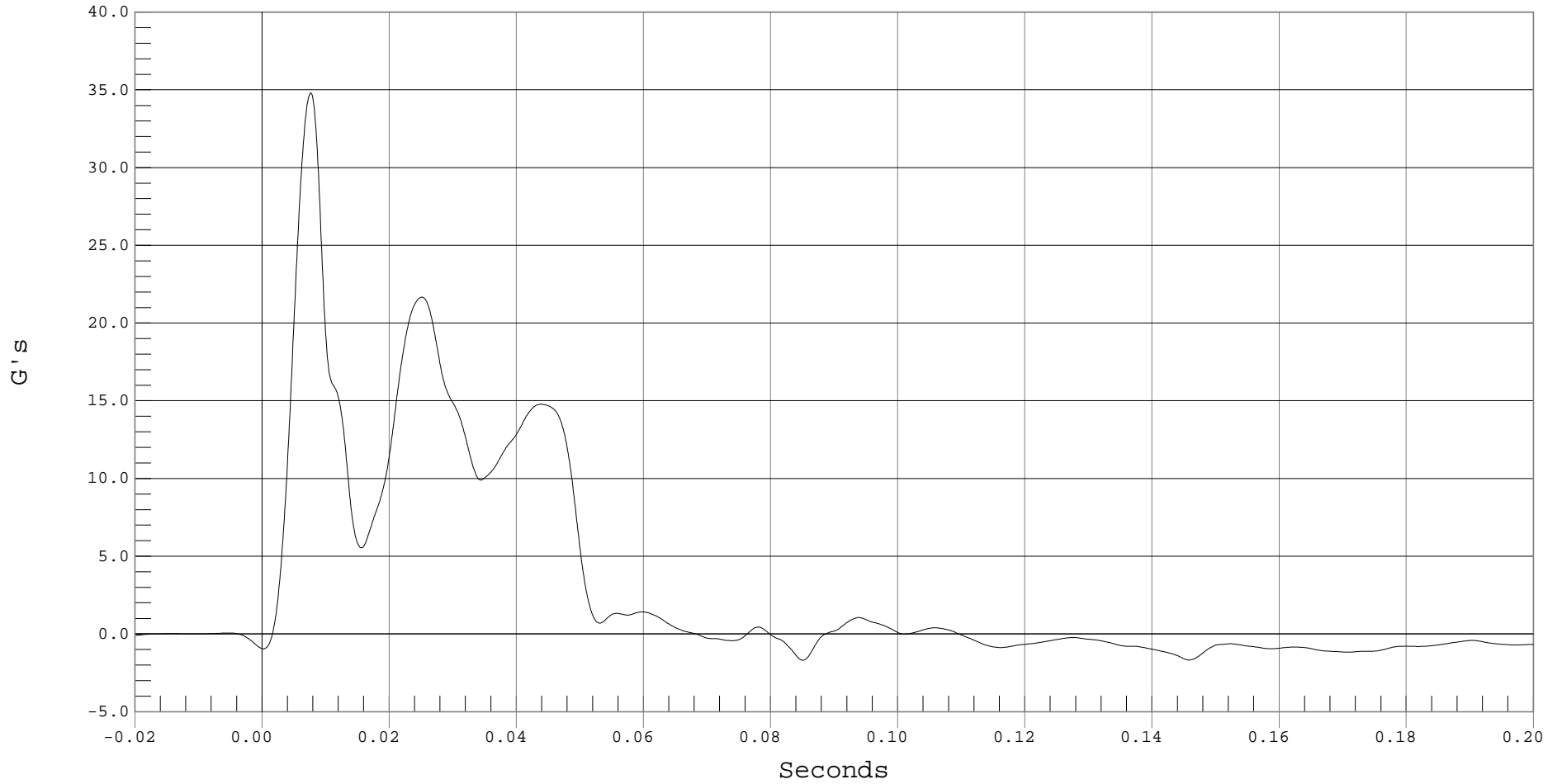
### VEHICLE CG Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 VEHICLE CG Y, B01023AF.A34

Ymin = -1.69 G's @ 0.0850 Seconds, Ymax = 34.79 G's @ 0.0076 Seconds



B-51



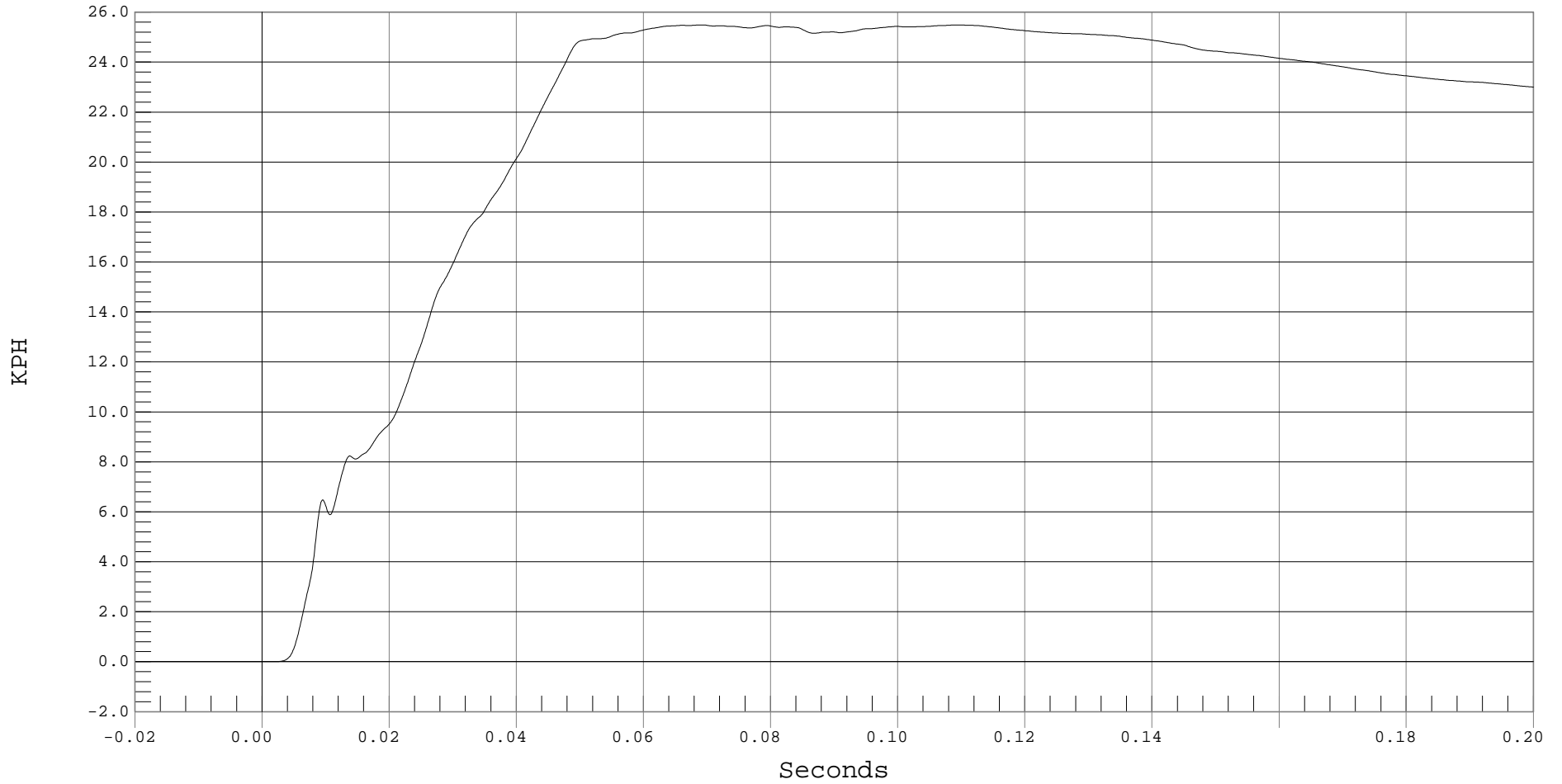
### VEHICLE CG Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 VEHICLE CG Y VELOCITY, B01023AI.V34

Ymin = 0 KPH @ -0.0160 Seconds, Ymax = 25.49 KPH @ 0.0691 Seconds



B-52



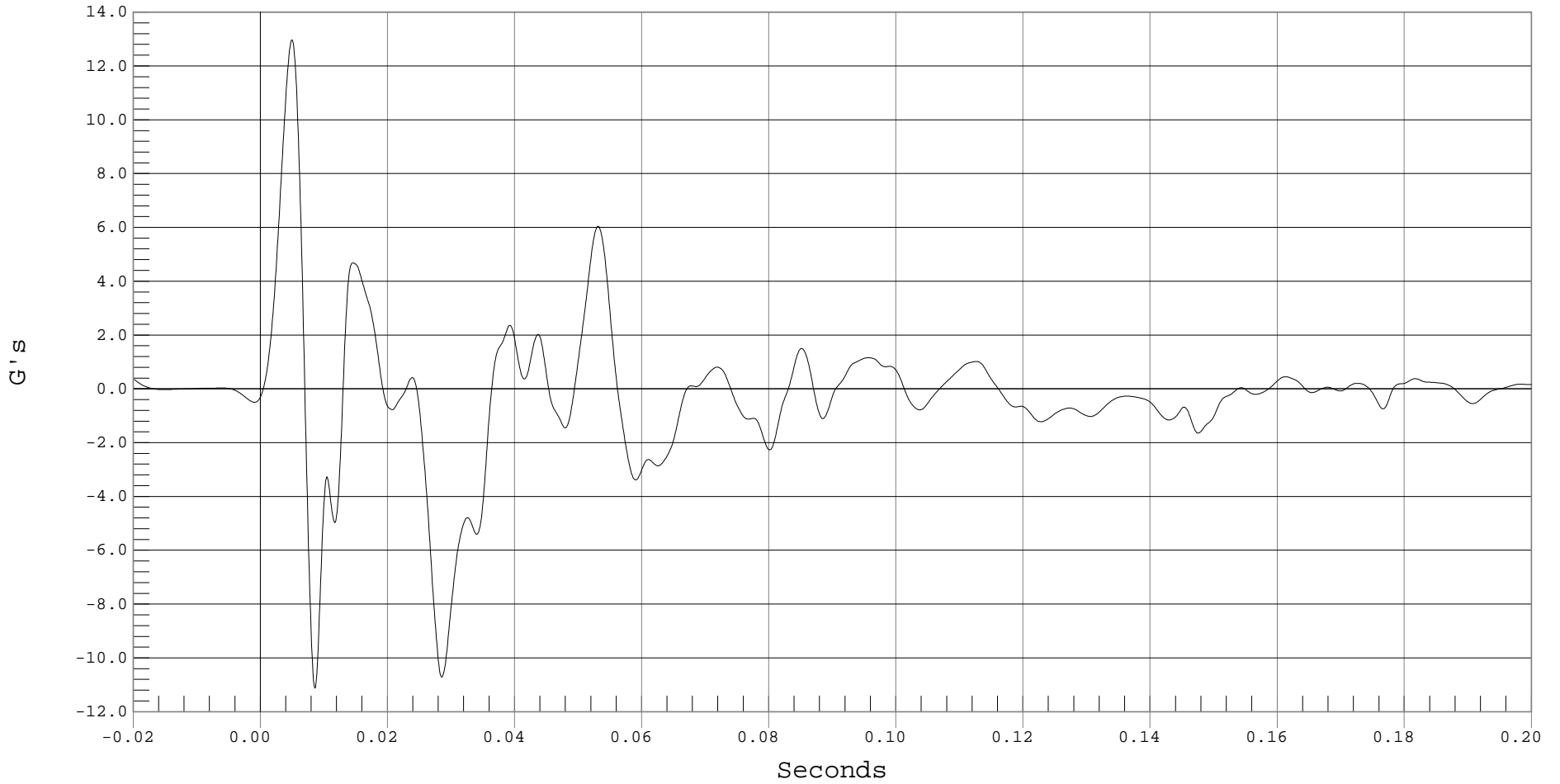
### VEHICLE CG Z ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 VEHICLE CG Z, B01023AF.A35

Ymin = -11.13 G's @ 0.0085 Seconds, Ymax = 12.97 G's @ 0.0049 Seconds





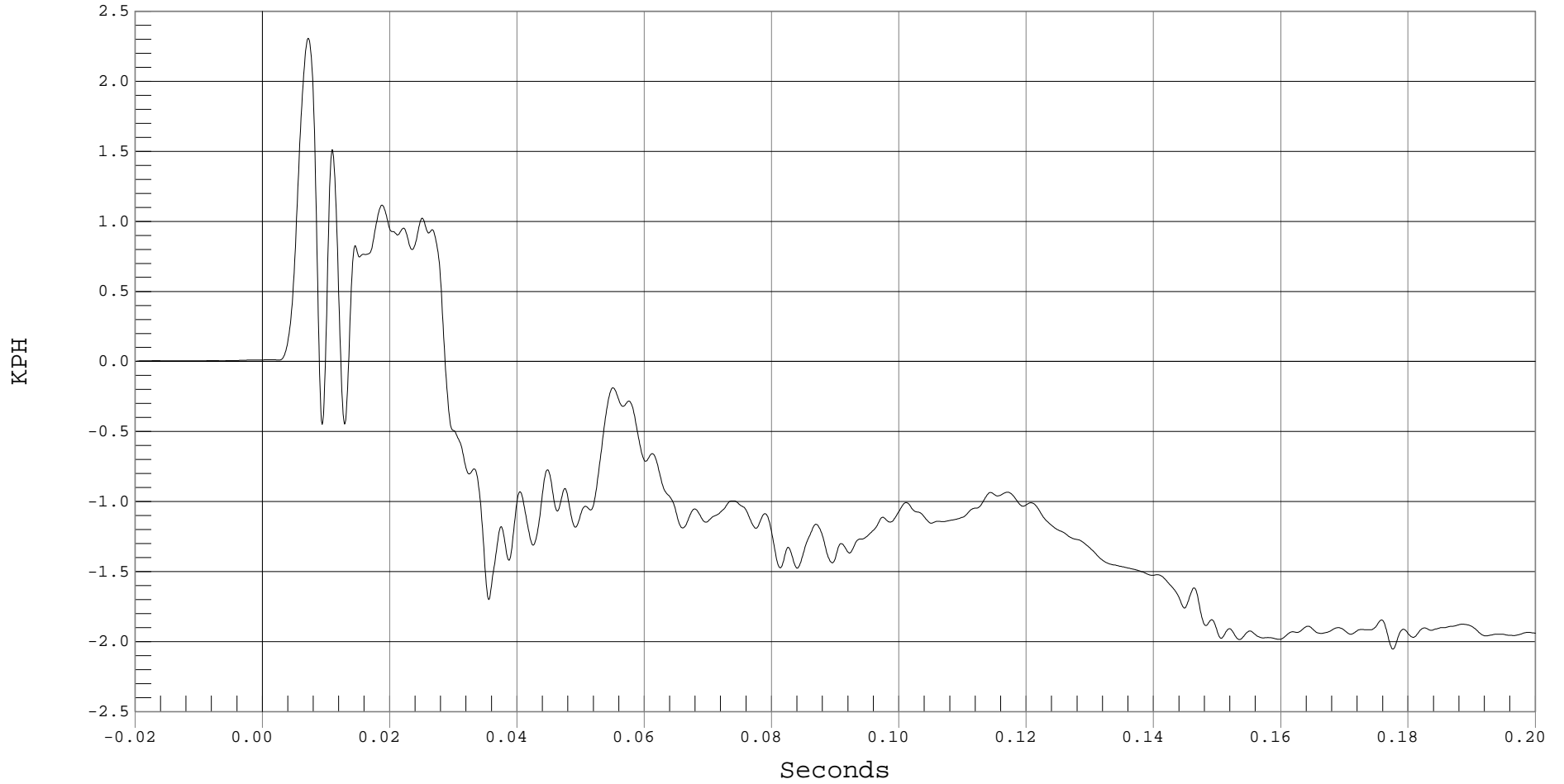
### VEHICLE CG Z VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 VEHICLE CG Z VELOCITY, B01023AI.V35

Ymin = -2.05 KPH @ 0.1775 Seconds, Ymax = 2.31 KPH @ 0.0071 Seconds



B-54



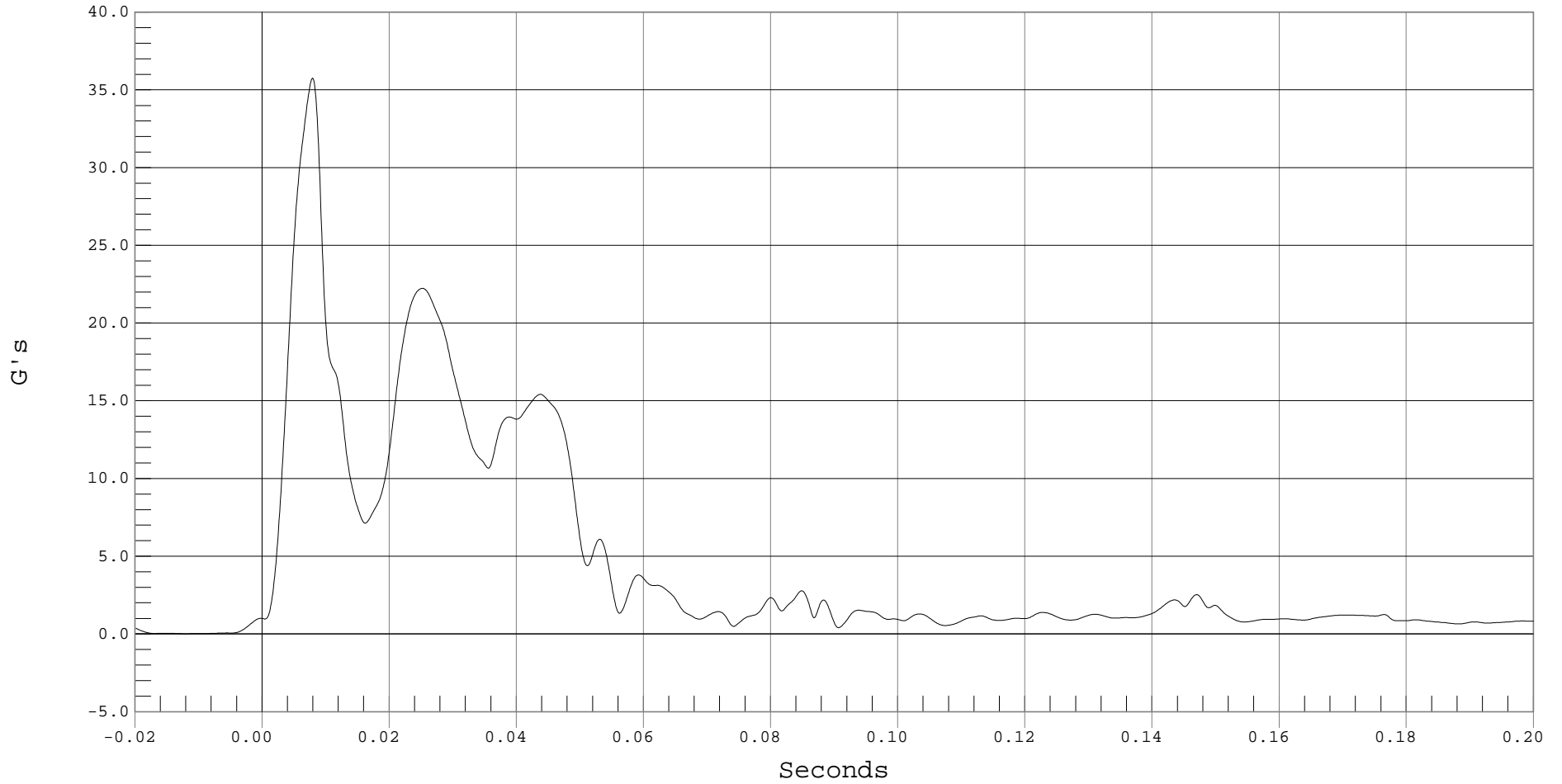
### VEHICLE CG RESULTANT ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 VEHICLE CG RESULTANT ACCELERATION, B01023AV.A33

Ymin = .01 G's @ -0.0121 Seconds, Ymax = 35.76 G's @ 0.0079 Seconds



B-55



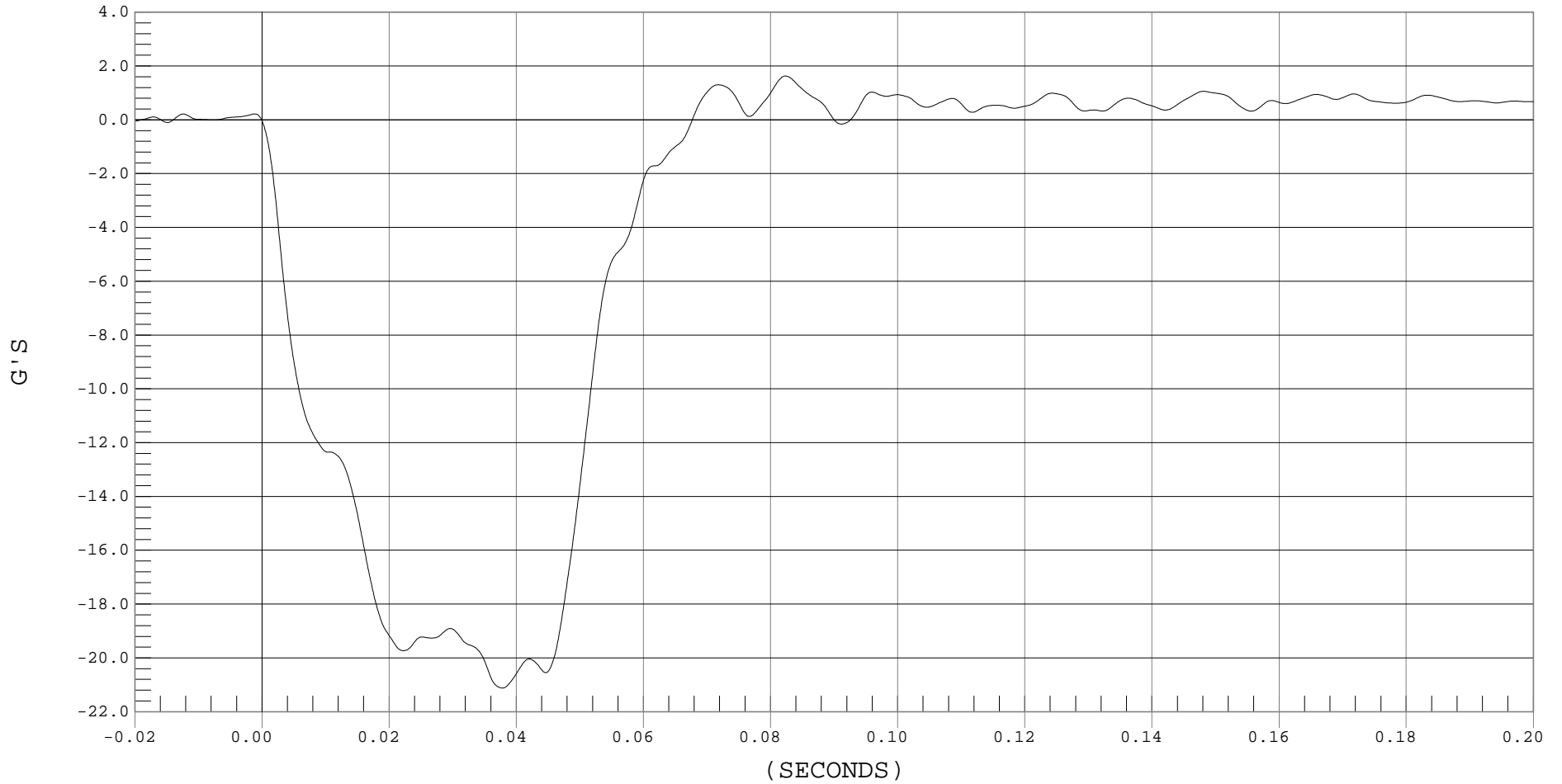
### MOVING BARRIER CG X ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 CART CG X, B01023AF.A02

Ymin = -21.12 G'S @ 0.0377 SECONDS, Ymax = 1.63 G'S @ 0.0823 SECONDS



B-56



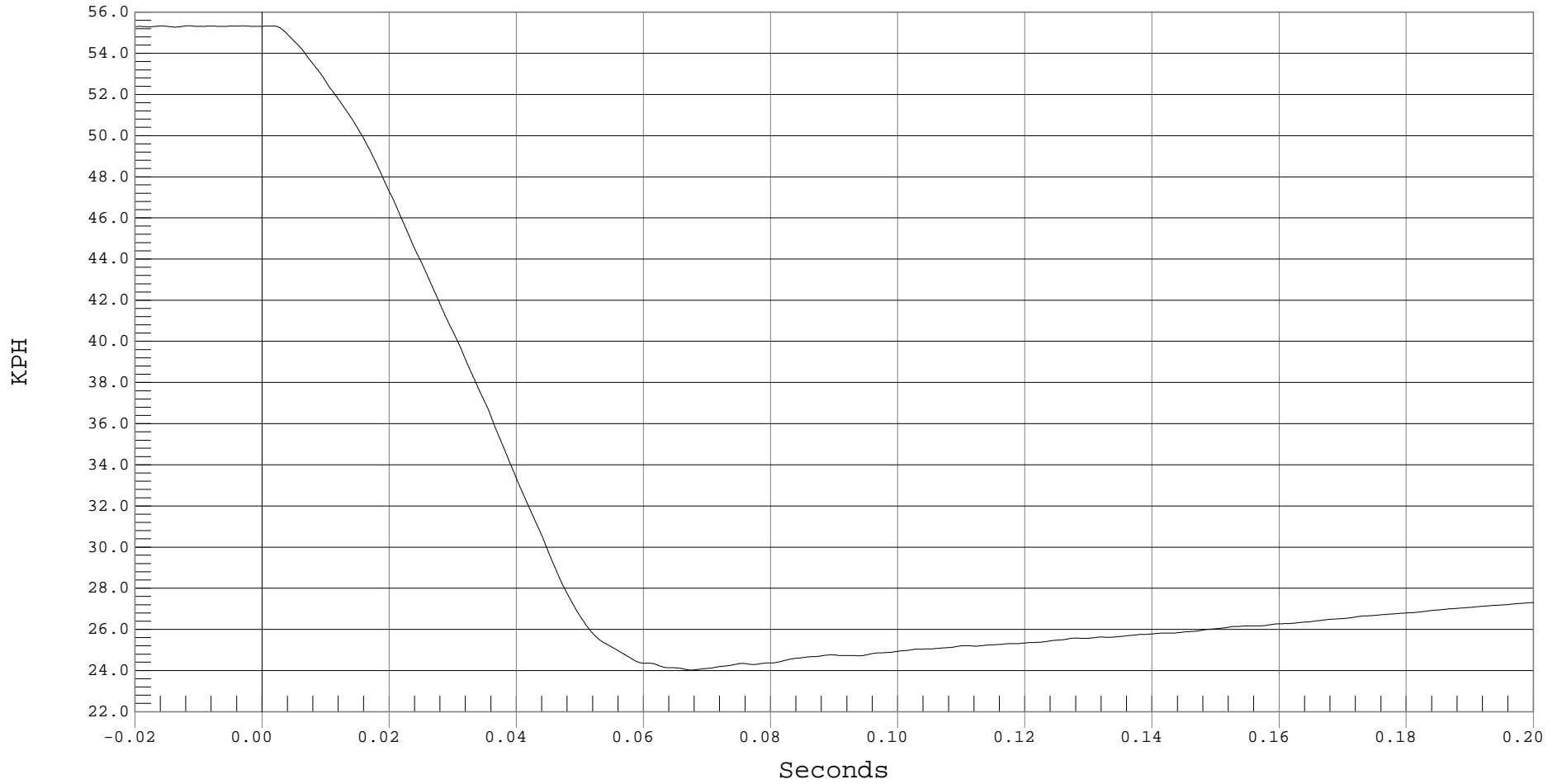
### MOVING BARRIER CG X VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 MOVING BARRIER CG X VELOCITY, B01023AI.V02

Ymin = 24.03 KPH @ 0.0674 Seconds, Ymax = 55.34 KPH @ -0.0116 Seconds



B-57



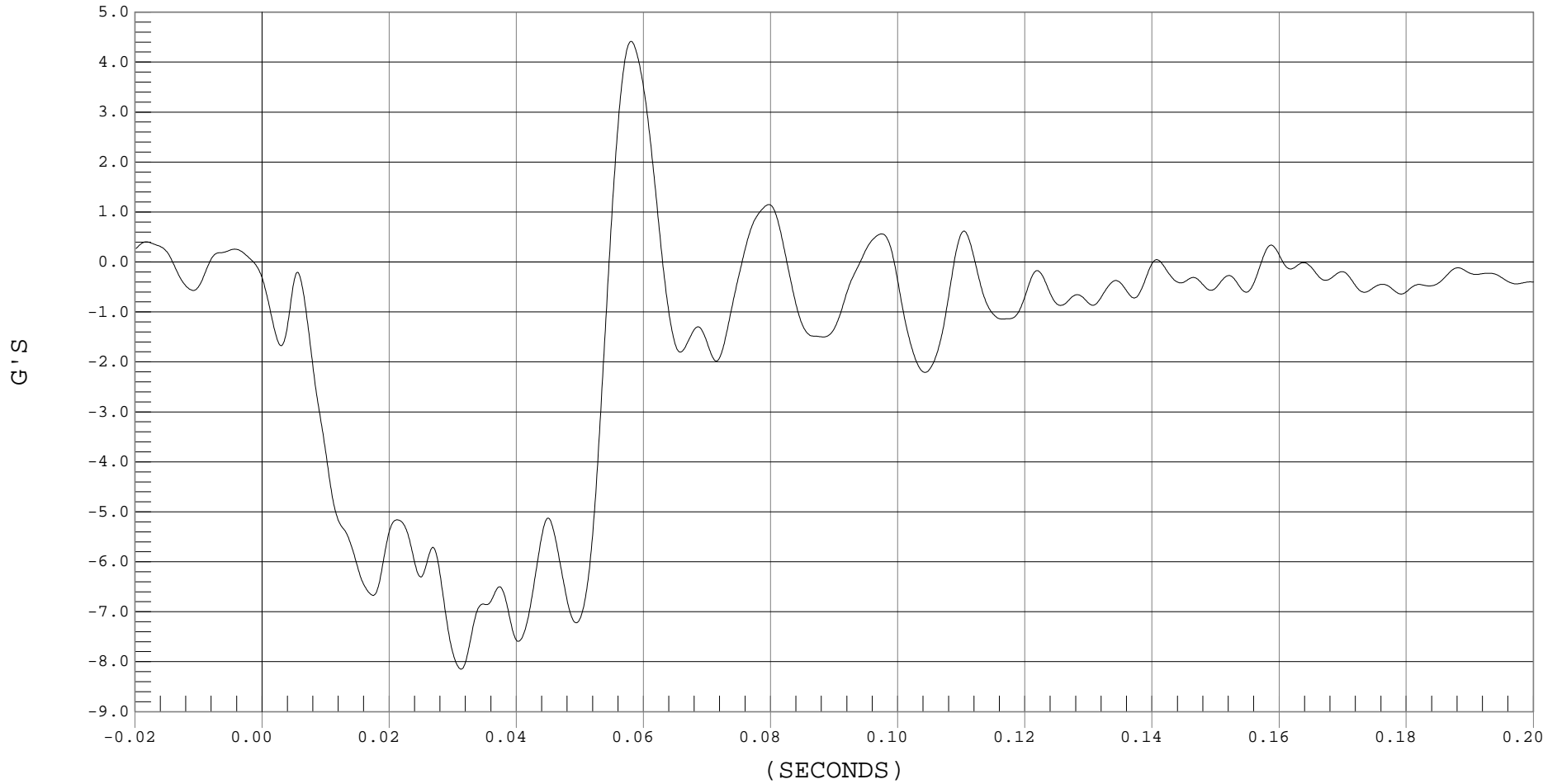
### MOVING BARRIER CG Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 CART CG Y, B01023AF.A03

Ymin = -8.15 G'S @ 0.0312 SECONDS, Ymax = 4.41 G'S @ 0.0580 SECONDS



B-58



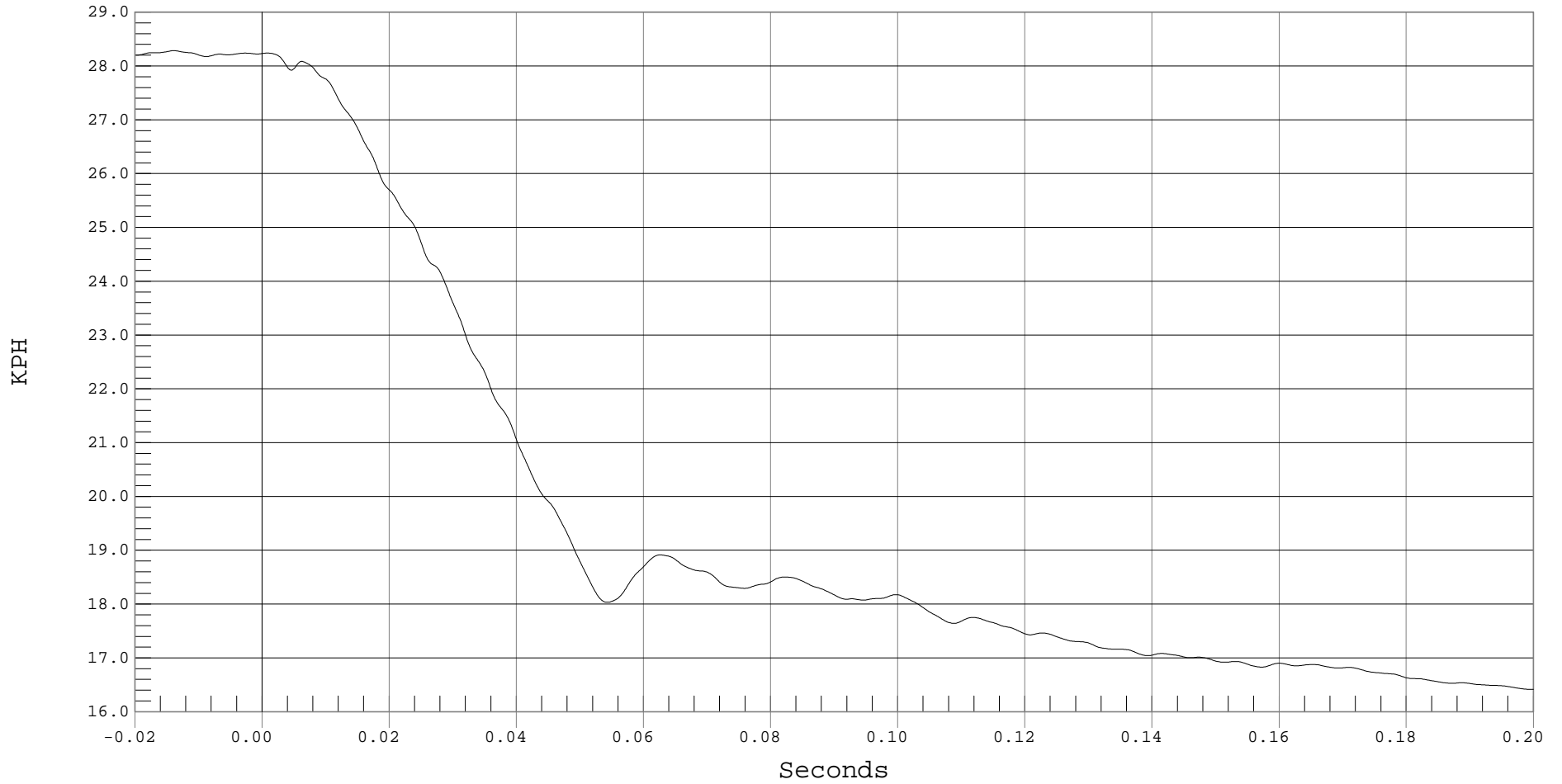
### MOVING BARRIER CG Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 MOVING BARRIER CG Y VELOCITY, B01023AI.V03

Ymin = 16.42 KPH @ 0.2001 Seconds, Ymax = 28.28 KPH @ -0.0140 Seconds



B-59



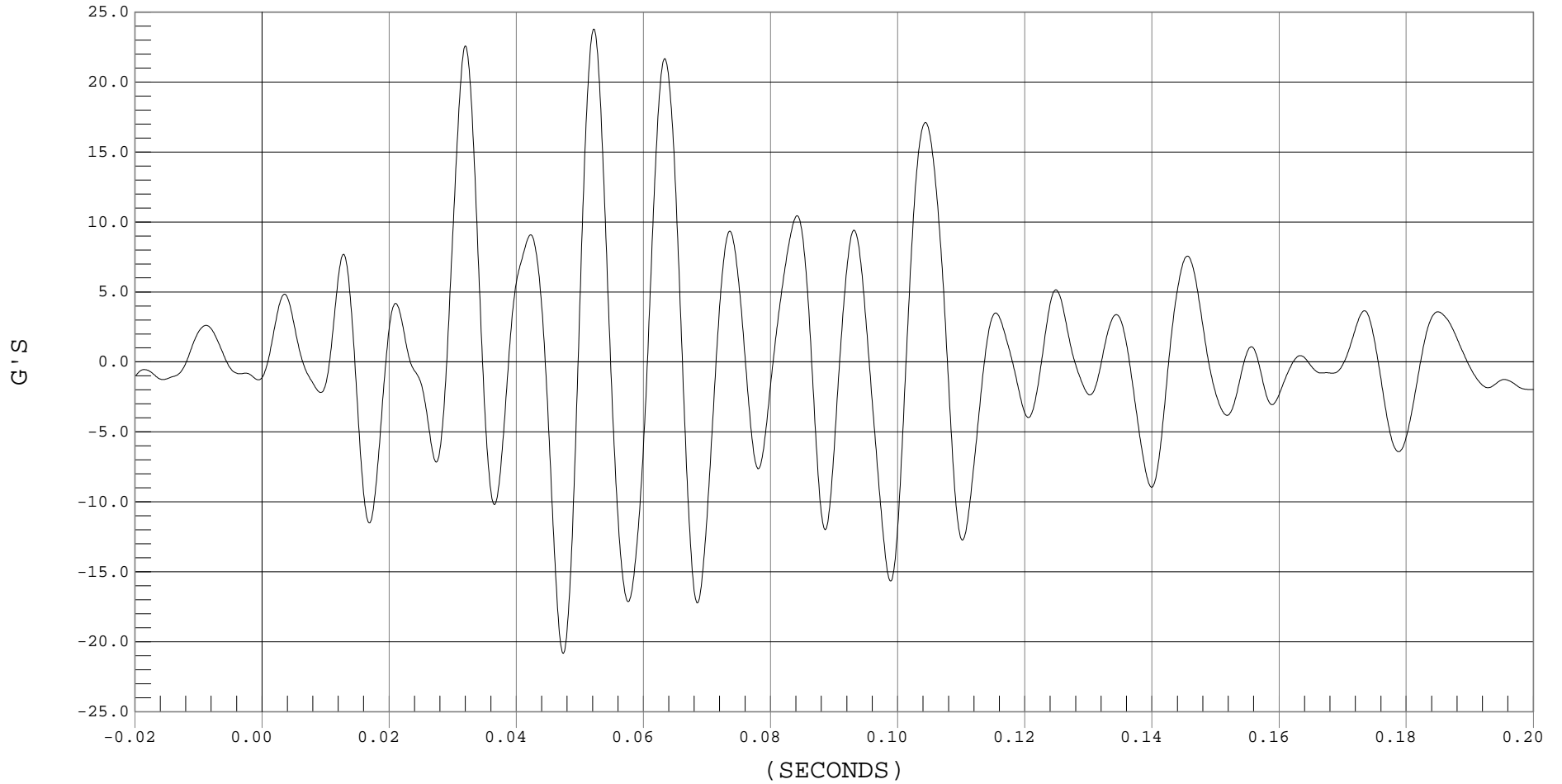
### MOVING BARRIER CG Z ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 CART CG Z, B01023AF.A04

Ymin = -20.84 G'S @ 0.0473 SECONDS, Ymax = 23.8 G'S @ 0.0521 SECONDS



B-60



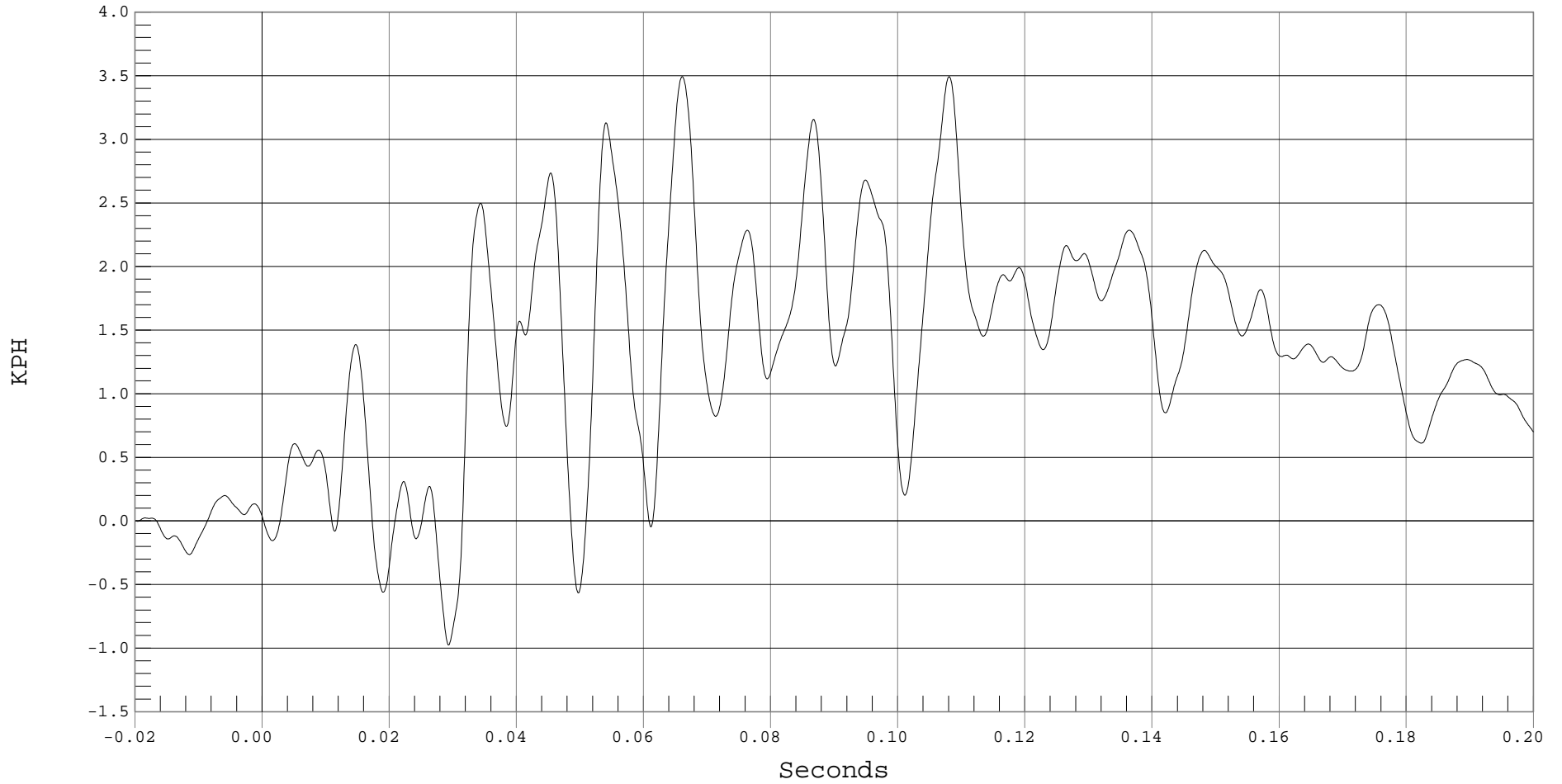
### MOVING BARRIER CG Z VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 MOVING BARRIER CG Z VELOCITY, B01023AI.V04

Ymin = -0.98 KPH @ 0.0293 Seconds, Ymax = 3.49 KPH @ 0.0660 Seconds



B-61



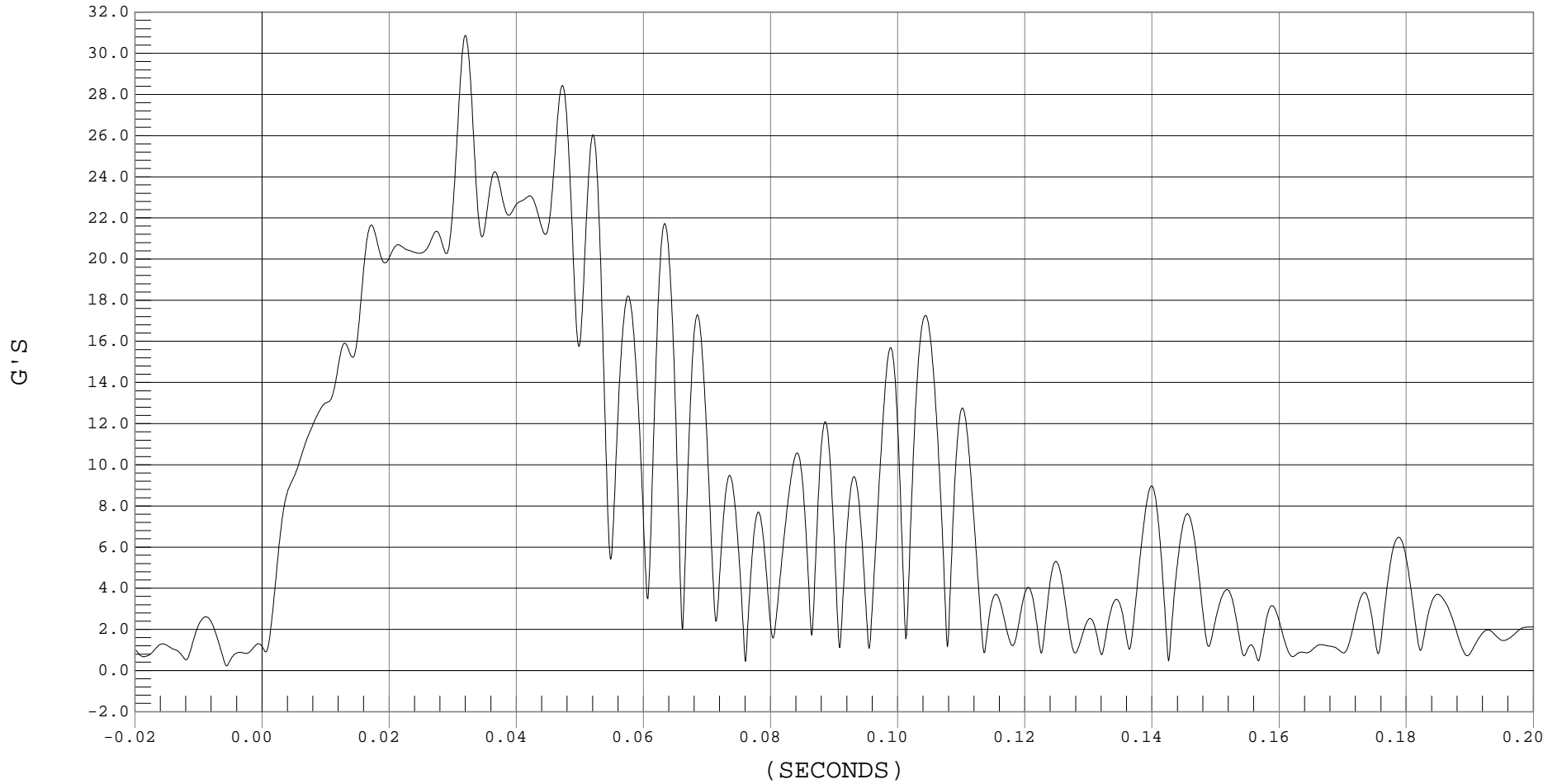
### MOVING BARRIER CG RESULTANT ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 MOVING BARRIER CG RESULTANT ACCELERATION, B01023AV.A02

Ymin = .23 G'S @ -0.0057 SECONDS, Ymax = 30.87 G'S @ 0.0319 SECONDS



B-62



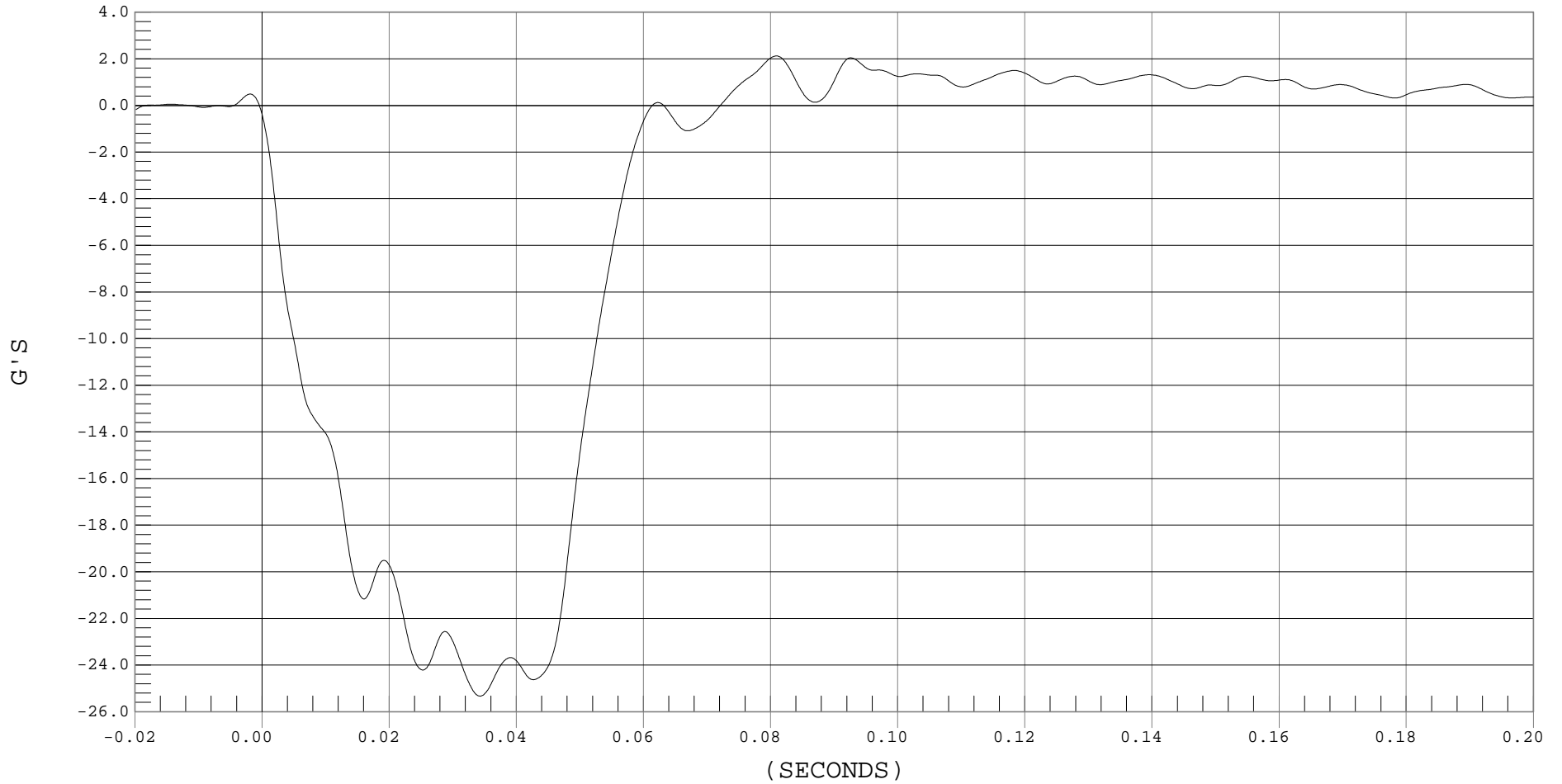
### MOVING BARRIER REAR AXLE X ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 CART REAR X, B01023AF.A05

Ymin = -25.33 G'S @ 0.0342 SECONDS, Ymax = 2.12 G'S @ 0.0808 SECONDS



B-63



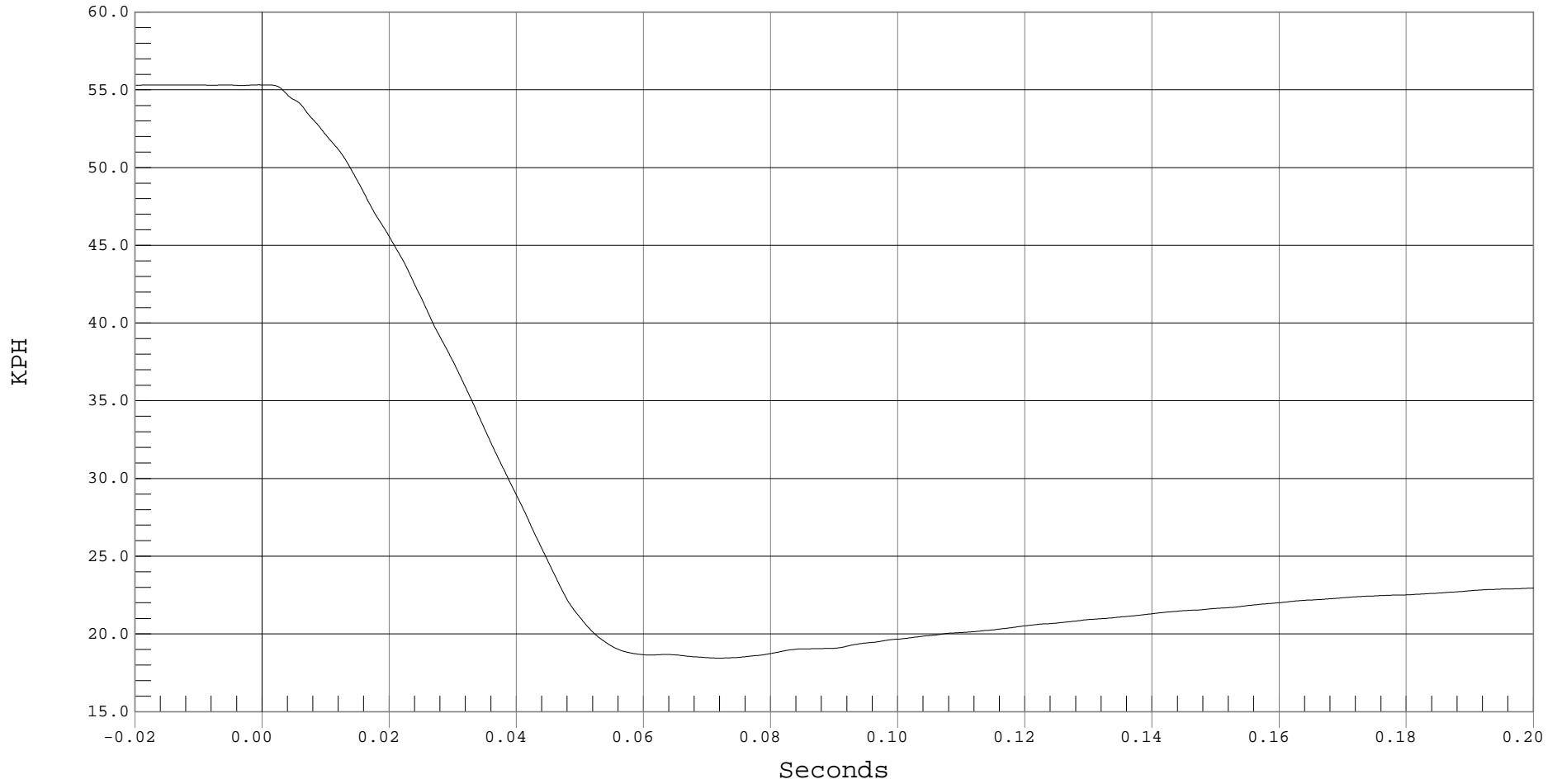
### MOVING BARRIER REAR AXLE X VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 MOVING BARRIER REAR AXLE X VELOCITY, B01023AI.V05

Ymin = 18.45 KPH @ 0.0717 Seconds, Ymax = 55.32 KPH @ -0.0006 Seconds



B-64



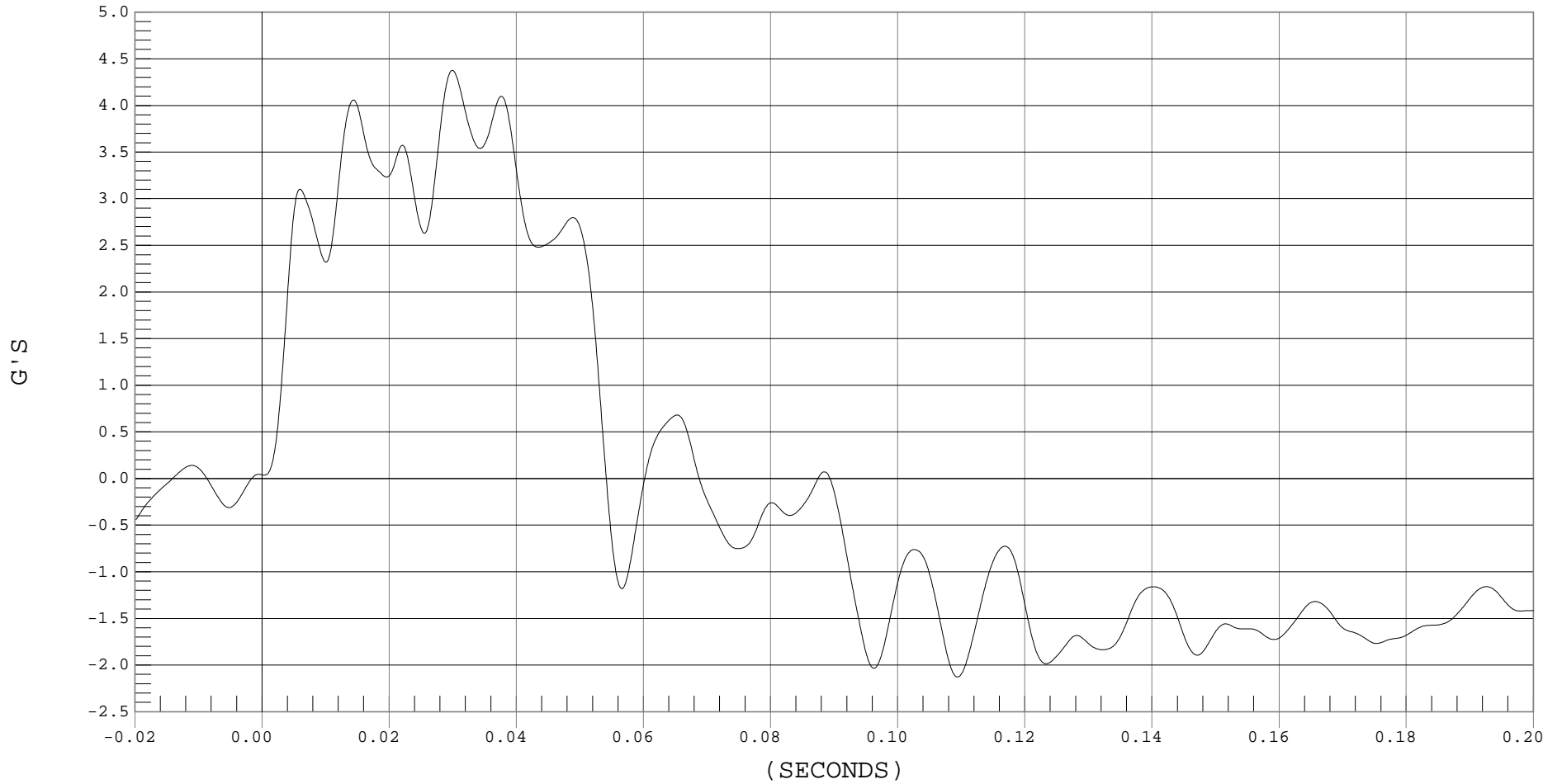
### MOVING BARRIER REAR AXLE Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 60

— 1 CART REAR Y, B01023AF.A06

Ymin = -2.13 G'S @ 0.1093 SECONDS, Ymax = 4.38 G'S @ 0.0298 SECONDS



B-65



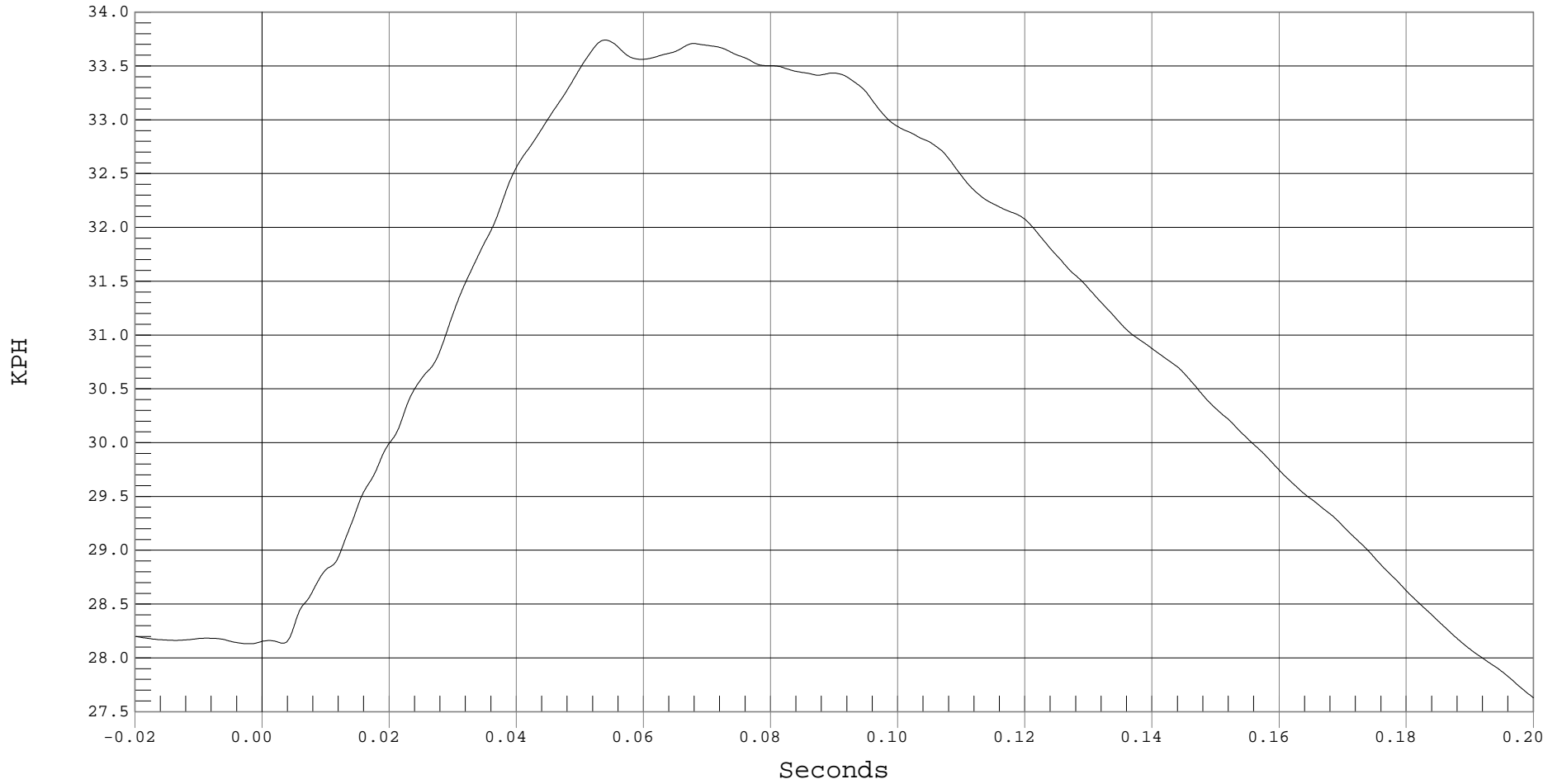
### MOVING BARRIER REAR AXLE Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 MOVING BARRIER REAR AXLE Y VELOCITY, B01023AI.V06

Ymin = 27.62 KPH @ 0.2001 Seconds, Ymax = 33.74 KPH @ 0.0539 Seconds



B-66



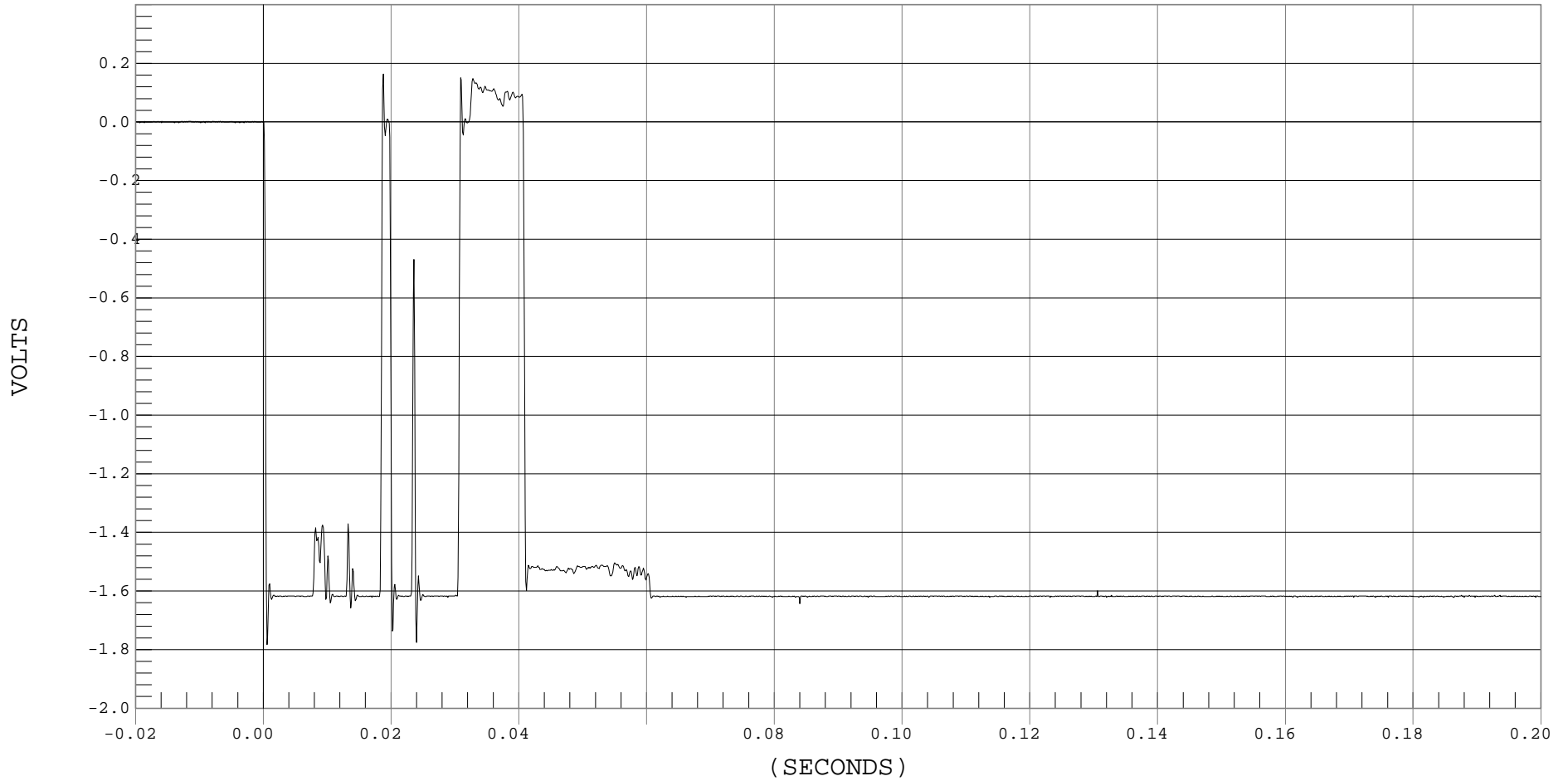
### LEFT BARRIER CONTACT

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 LEFT BARRIER CONTACT, B010230T.009

Ymin = -1.78 VOLTS @ 0.0005 SECONDS, Ymax = .16 VOLTS @ 0.0187 SECONDS



B-67



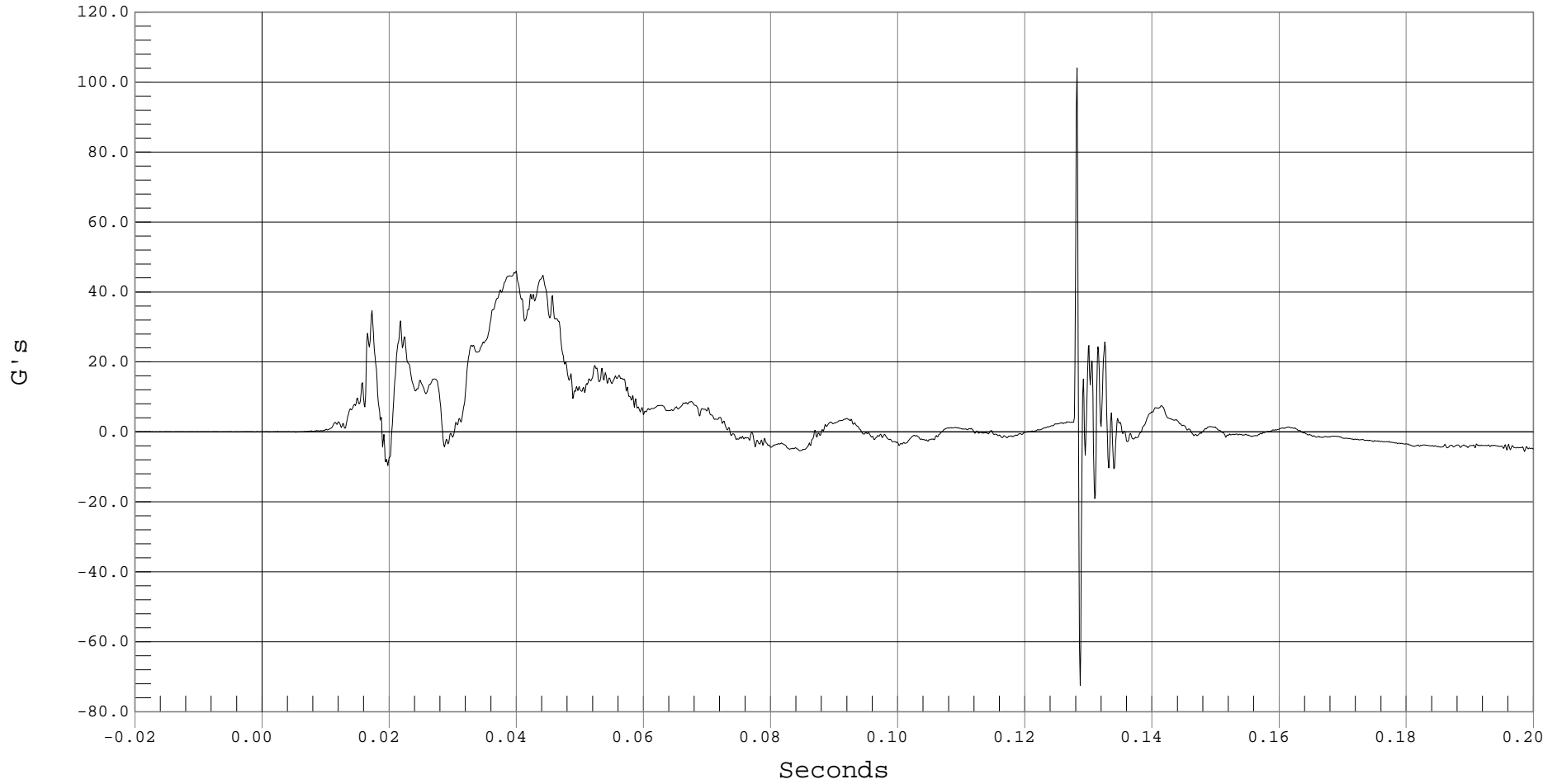
### DRIVER UPPER RIB REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER UPPER RIB Yr, B01023AT.A41

Ymin = -72.49 G's @ 0.1286 Seconds, Ymax = 104.12 G's @ 0.1281 Seconds



B-68



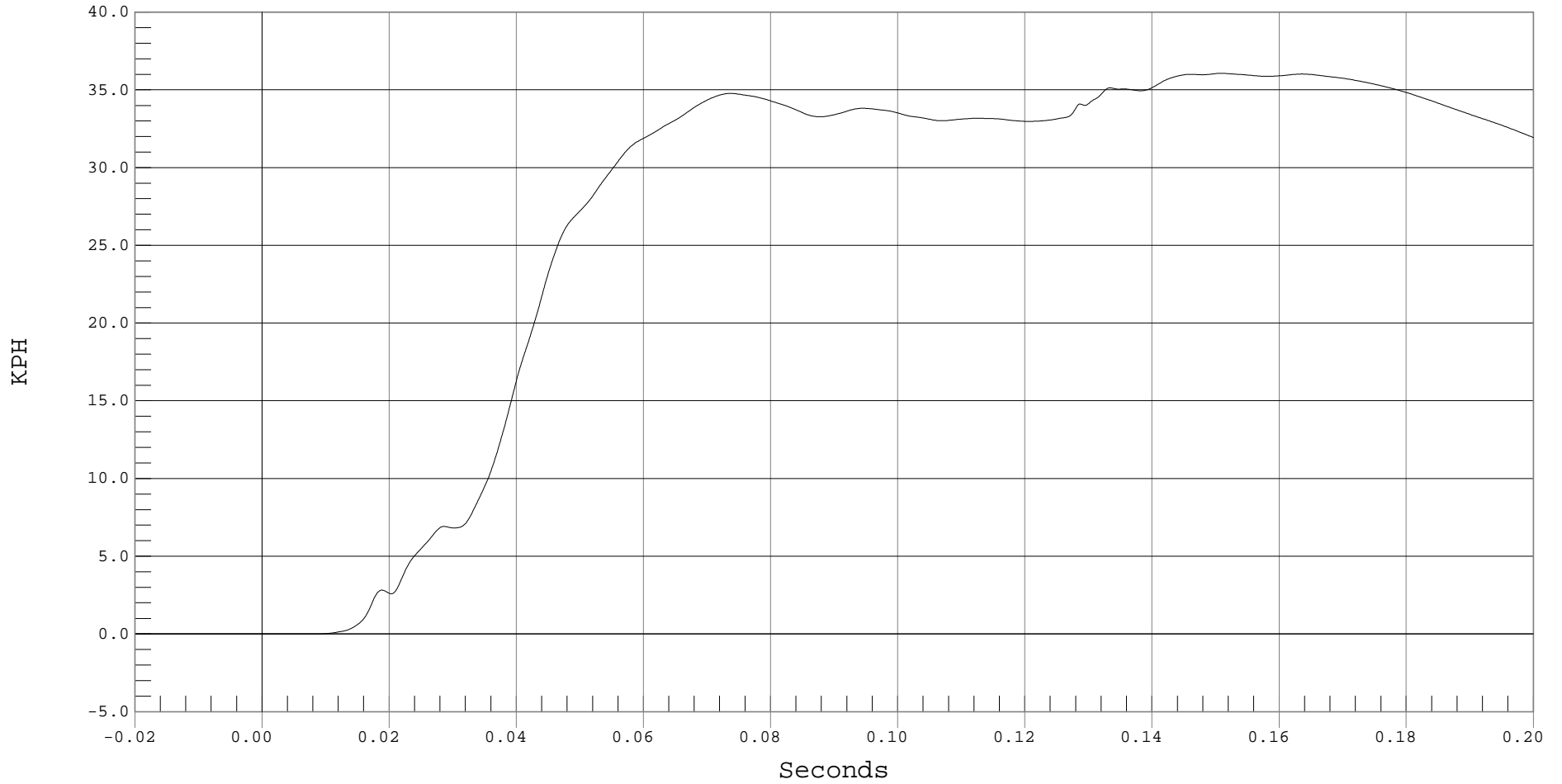
### DRIVER UPPER RIB REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER UPPER RIB Y REDUNDANT VELOCITY, B01023AI.V41

Ymin = 0 KPH @ 0.0059 Seconds, Ymax = 36.07 KPH @ 0.1508 Seconds





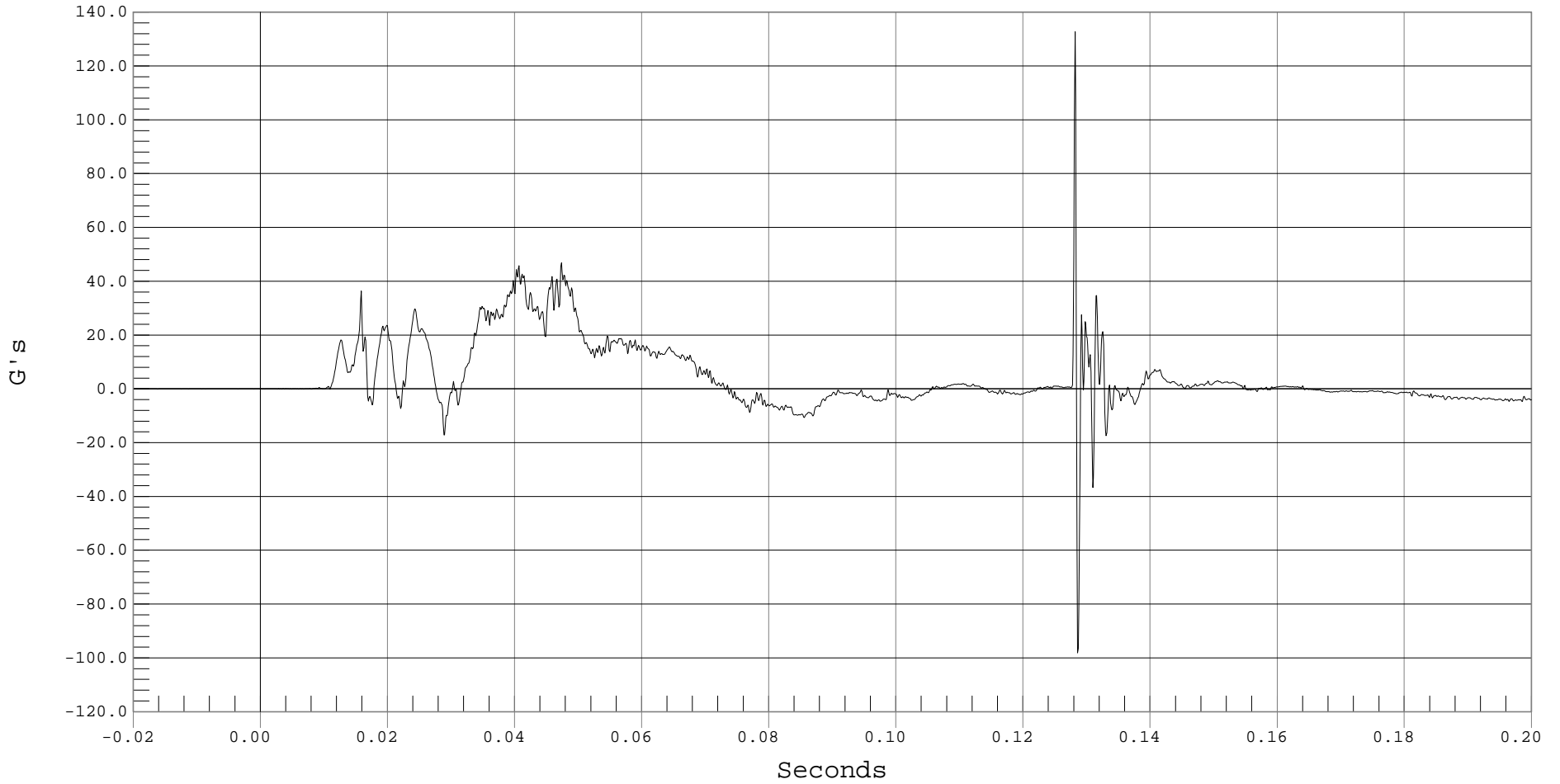
### DRIVER LOWER RIB REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER LOWER RIB Yr, B01023AT.A42

Ymin = -98.17 G's @ 0.1285 Seconds, Ymax = 132.76 G's @ 0.1281 Seconds



B-70



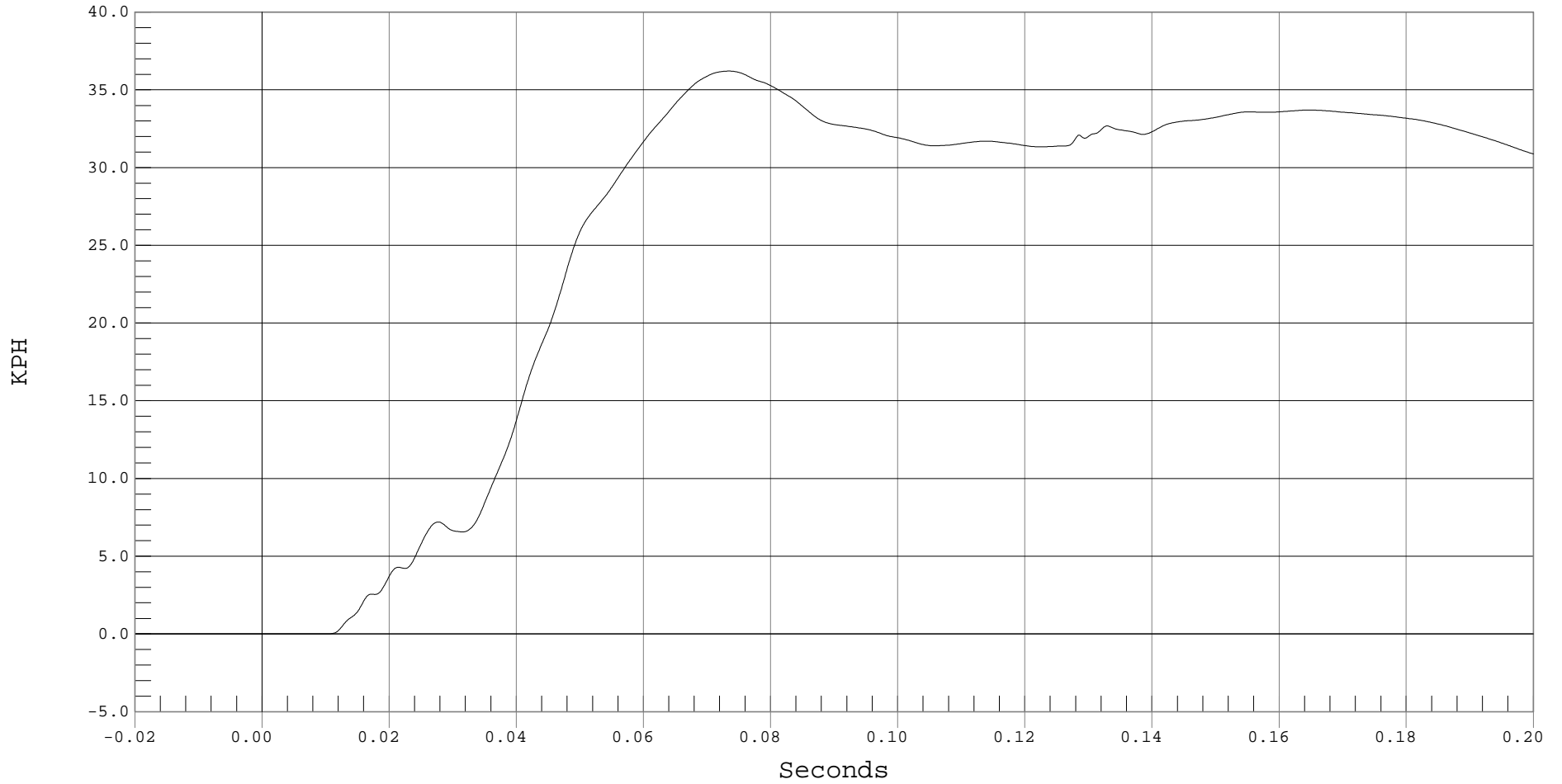
### DRIVER LOWER RIB REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER LOWER RIB Y REDUNDANT VELOCITY, B01023AI.V42

Ymin = 0 KPH @ -0.0199 Seconds, Ymax = 36.21 KPH @ 0.0734 Seconds



B-71

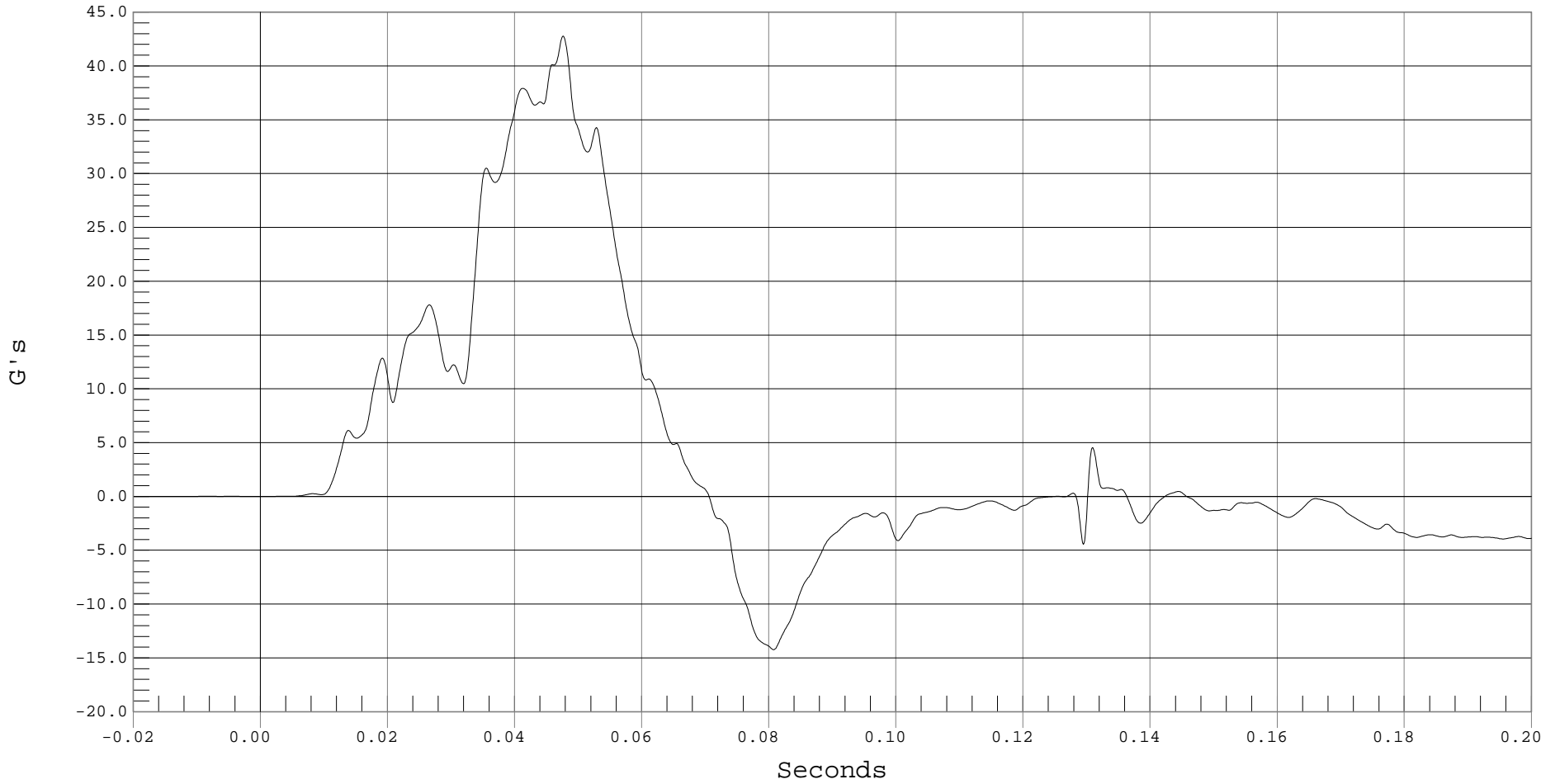


DRIVER LOVER SPINE REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER LOWER SPINE Yr, B01023AF.A43



B-72



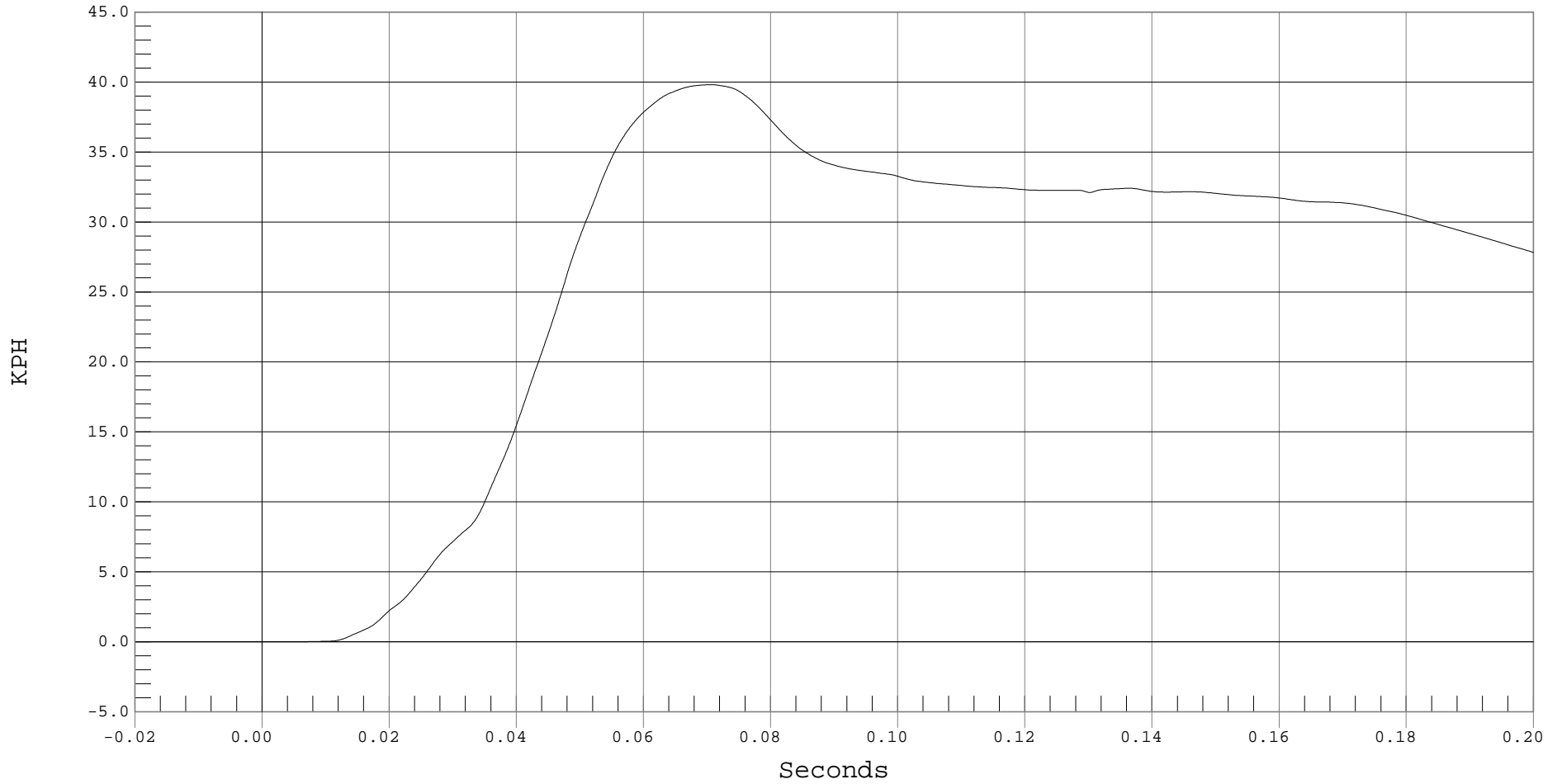
### DRIVER LOWER SPINE REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER LOWER SPINE Y REDUNDANT VELOCITY, B01023AI.V43

Ymin = 0 KPH @ -0.0102 Seconds, Ymax = 39.82 KPH @ 0.0705 Seconds



B-73



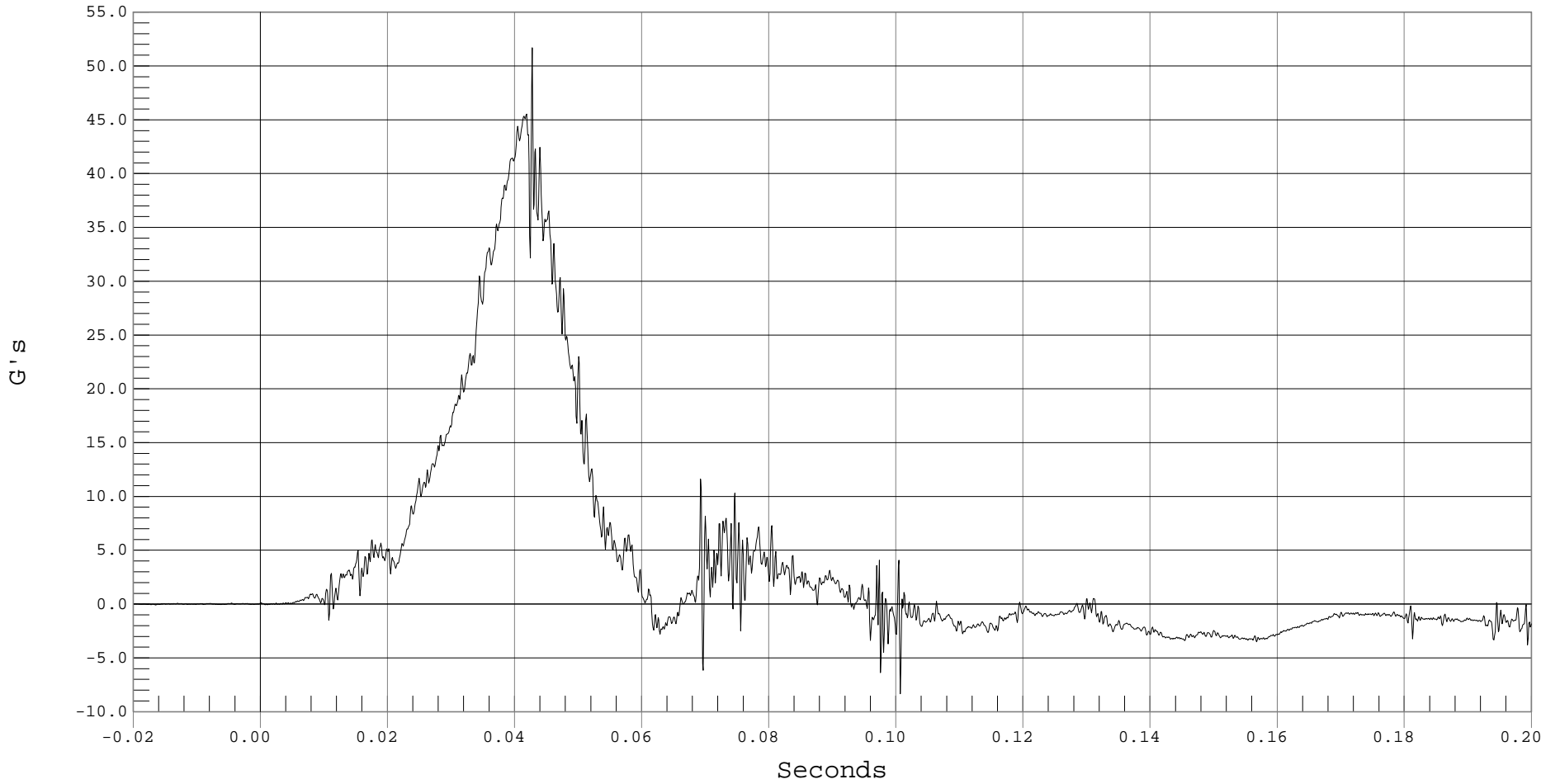
### DRIVER PELVIS REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 1000

— 1 DRIVER PELVIS Yr, B01023AT.A44

Ymin = -8.36 G's @ 0.1006 Seconds, Ymax = 51.69 G's @ 0.0427 Seconds



B-74



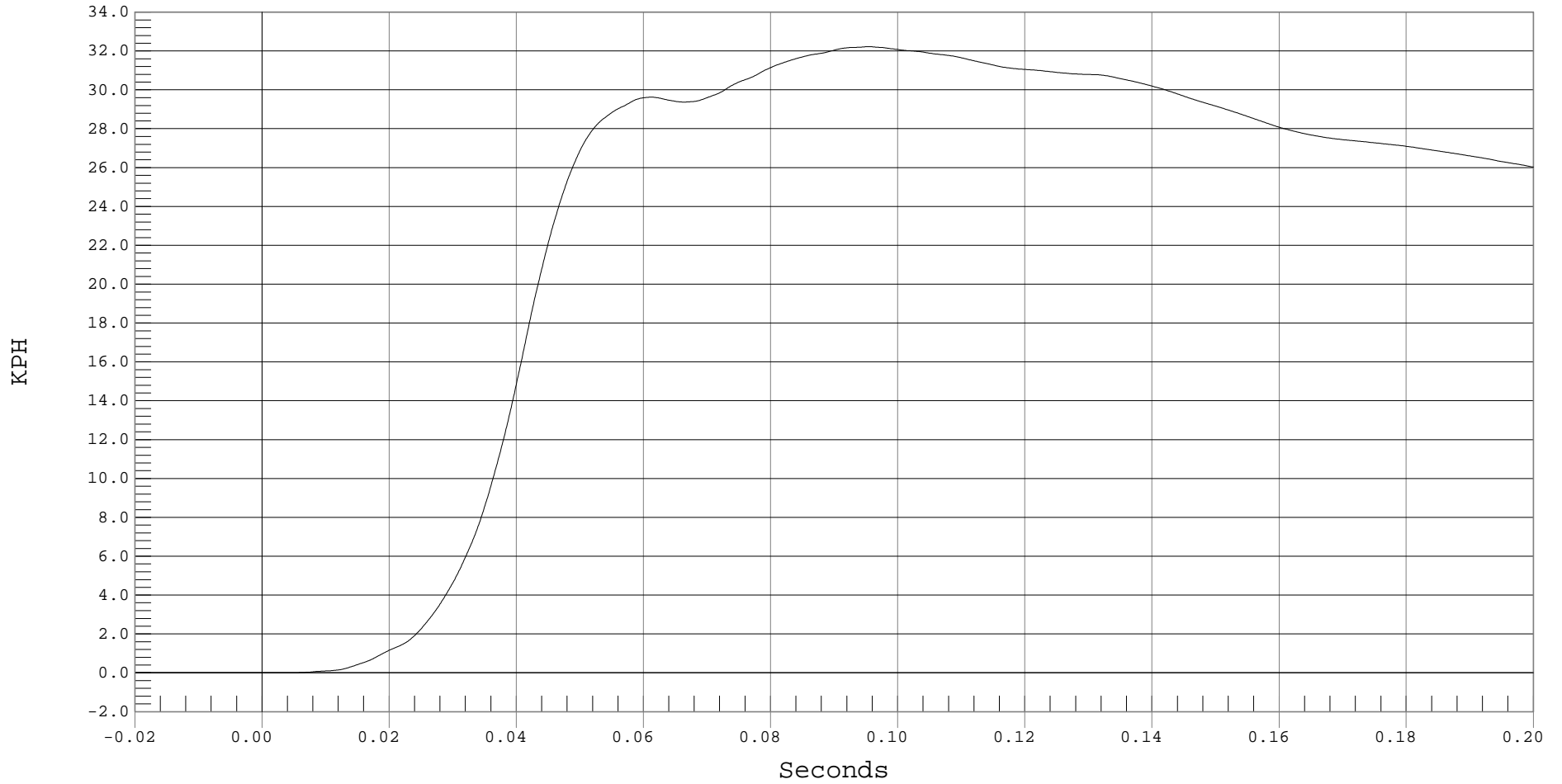
### DRIVER PELVIS REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Filter Class: 180

— 1 DRIVER PELVIS Y REDUNDANT VELOCITY, B01023AI.V44

Ymin = 0 KPH @ -0.0156 Seconds, Ymax = 32.22 KPH @ 0.0954 Seconds



B-75



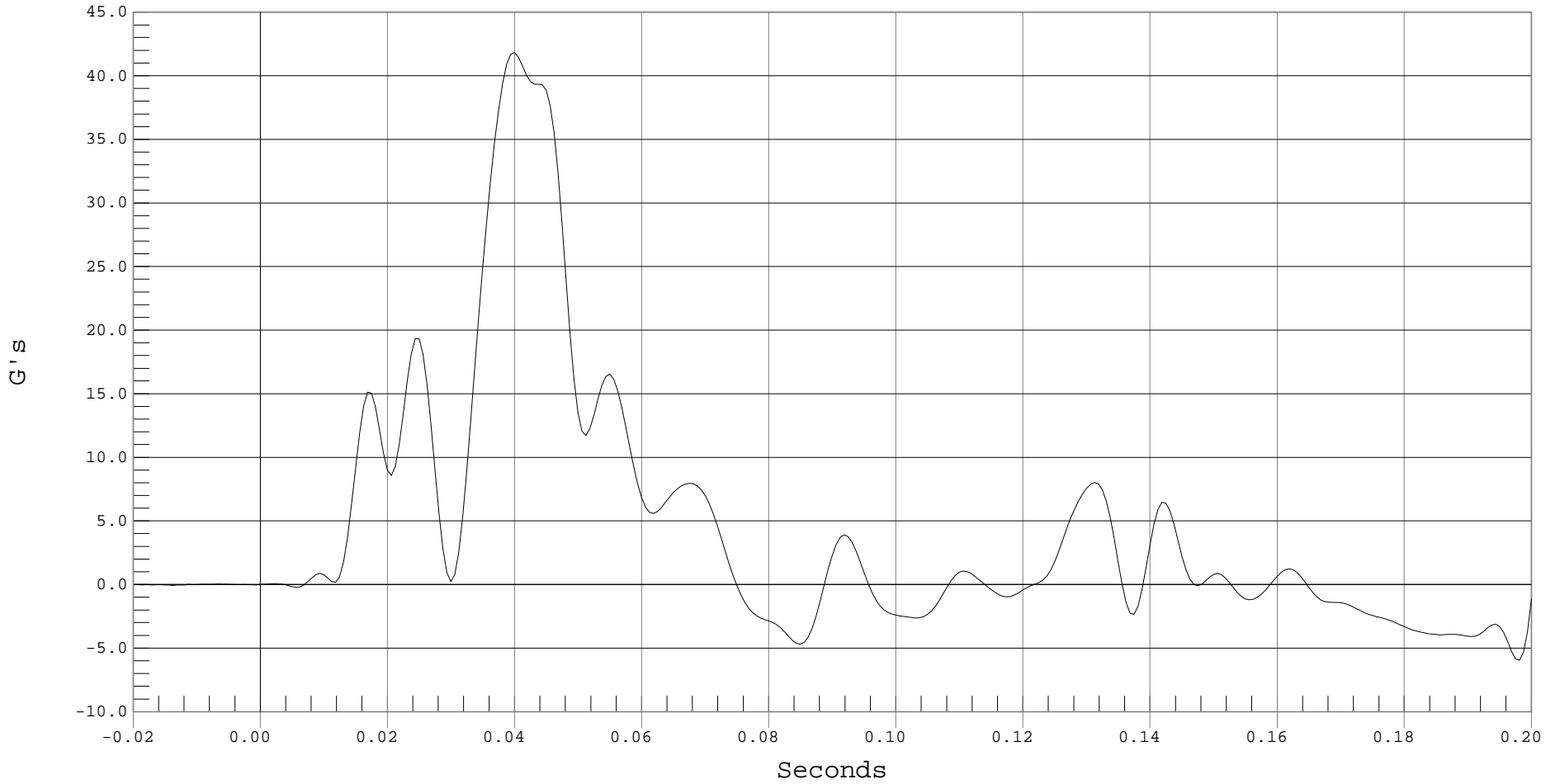
### DRIVER UPPER RIB Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER UPPER RIB Y, B01023FI.R04

Ymin = -5.97 G's @ 0.1980 Seconds, Ymax = 41.83 G's @ 0.0399 Seconds



B-76



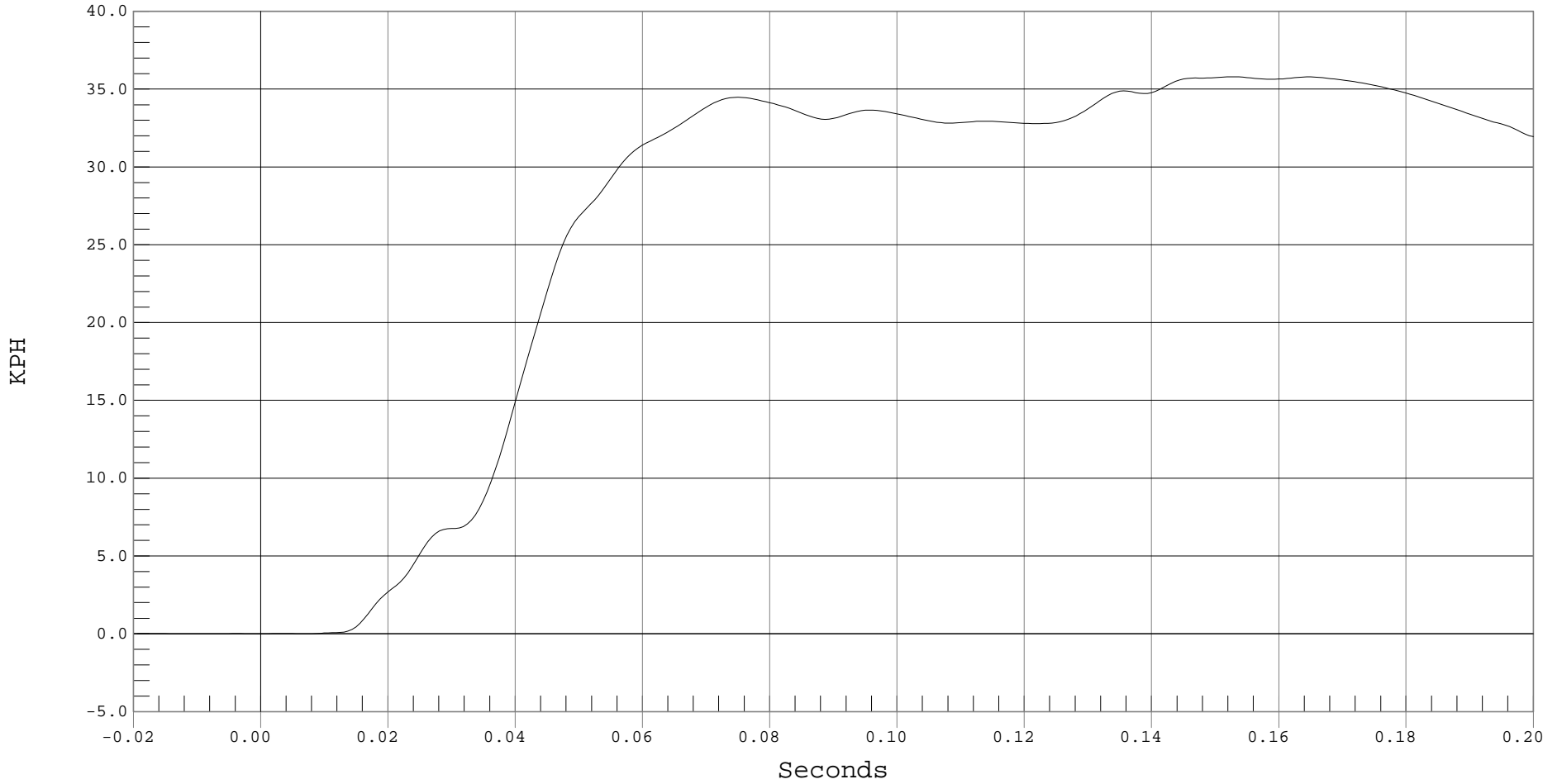
### DRIVER UPPER RIB Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER UPPER RIB Y VELOCITY, B01023FI.V04

Ymin = -.02 KPH @ 0.0068 Seconds, Ymax = 35.8 KPH @ 0.1524 Seconds



B-77



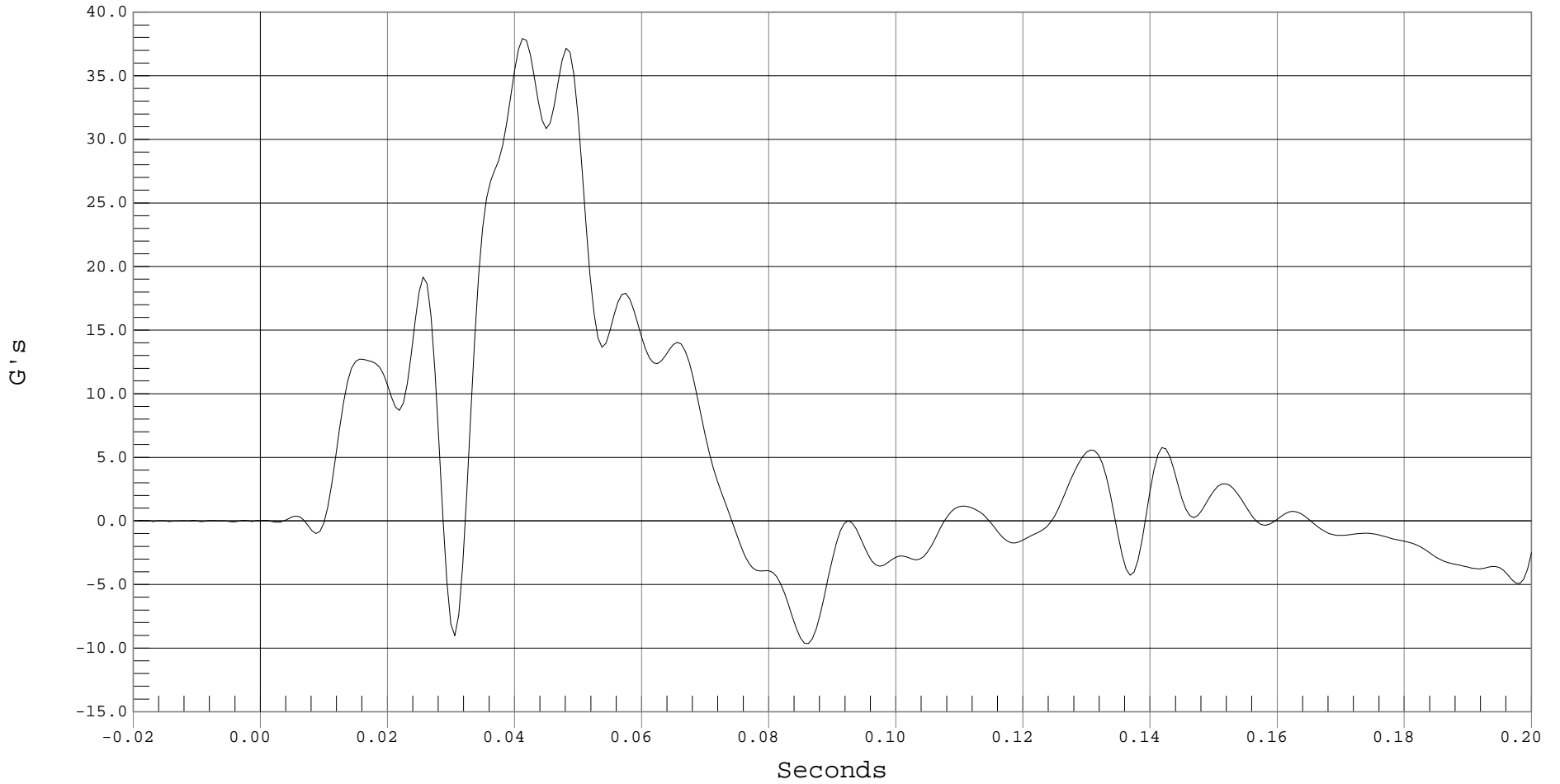
### DRIVER LOWER RIB Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER RIB Y, B01023FI.R05

Ymin = -9.65 G's @ 0.0862 Seconds, Ymax = 37.94 G's @ 0.0412 Seconds



B-78



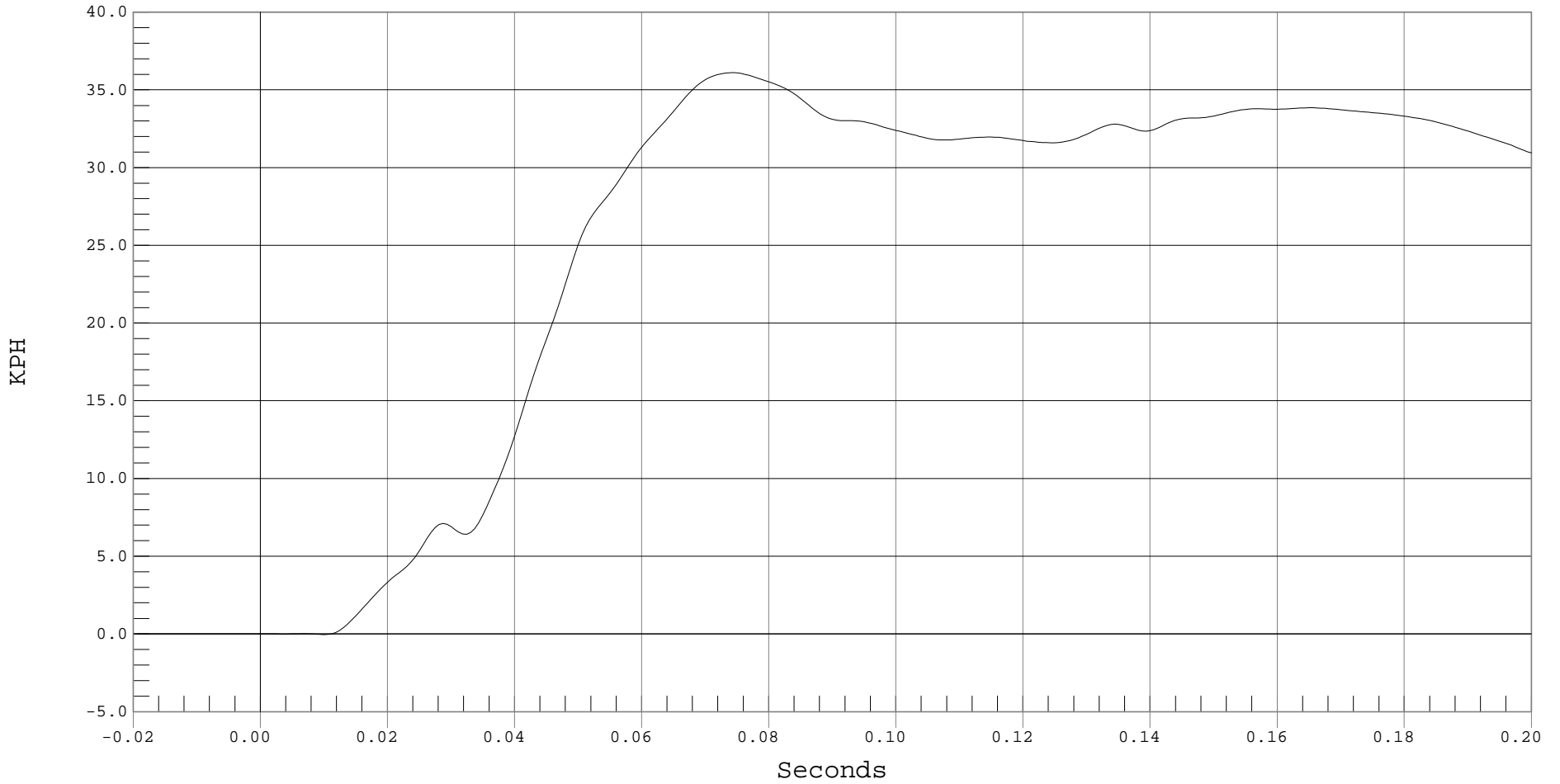
### DRIVER LOWER RIB Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER RIB Y VELOCITY, B01023FI.V05

Ymin = -.05 KPH @ 0.0099 Seconds, Ymax = 36.11 KPH @ 0.0743 Seconds



B-79



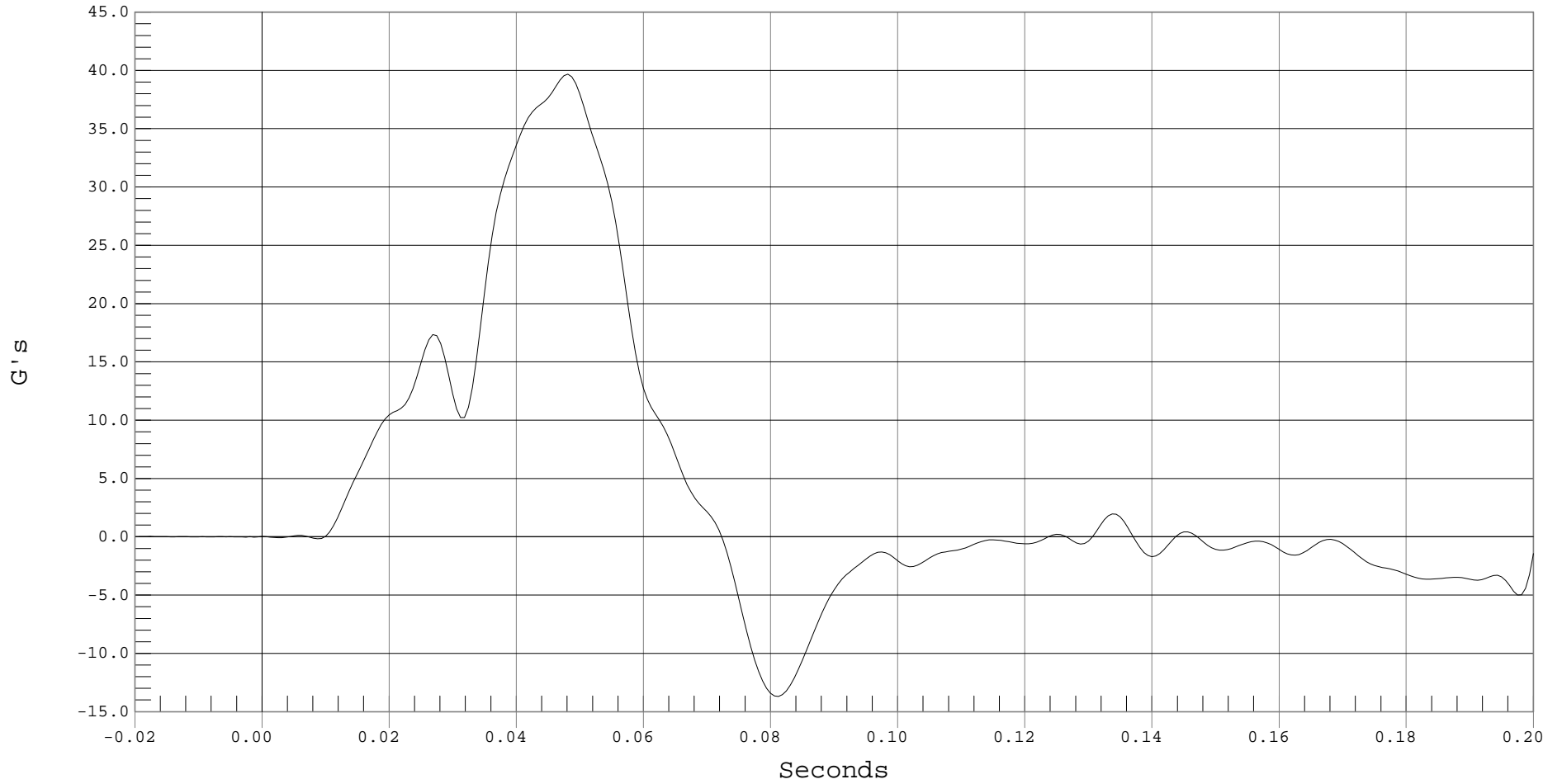
### DRIVER LOWER SPINE Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER SPINE Y, B01023FI.R06

Ymin = -13.7 G's @ 0.0812 Seconds, Ymax = 39.67 G's @ 0.0480 Seconds



B-80



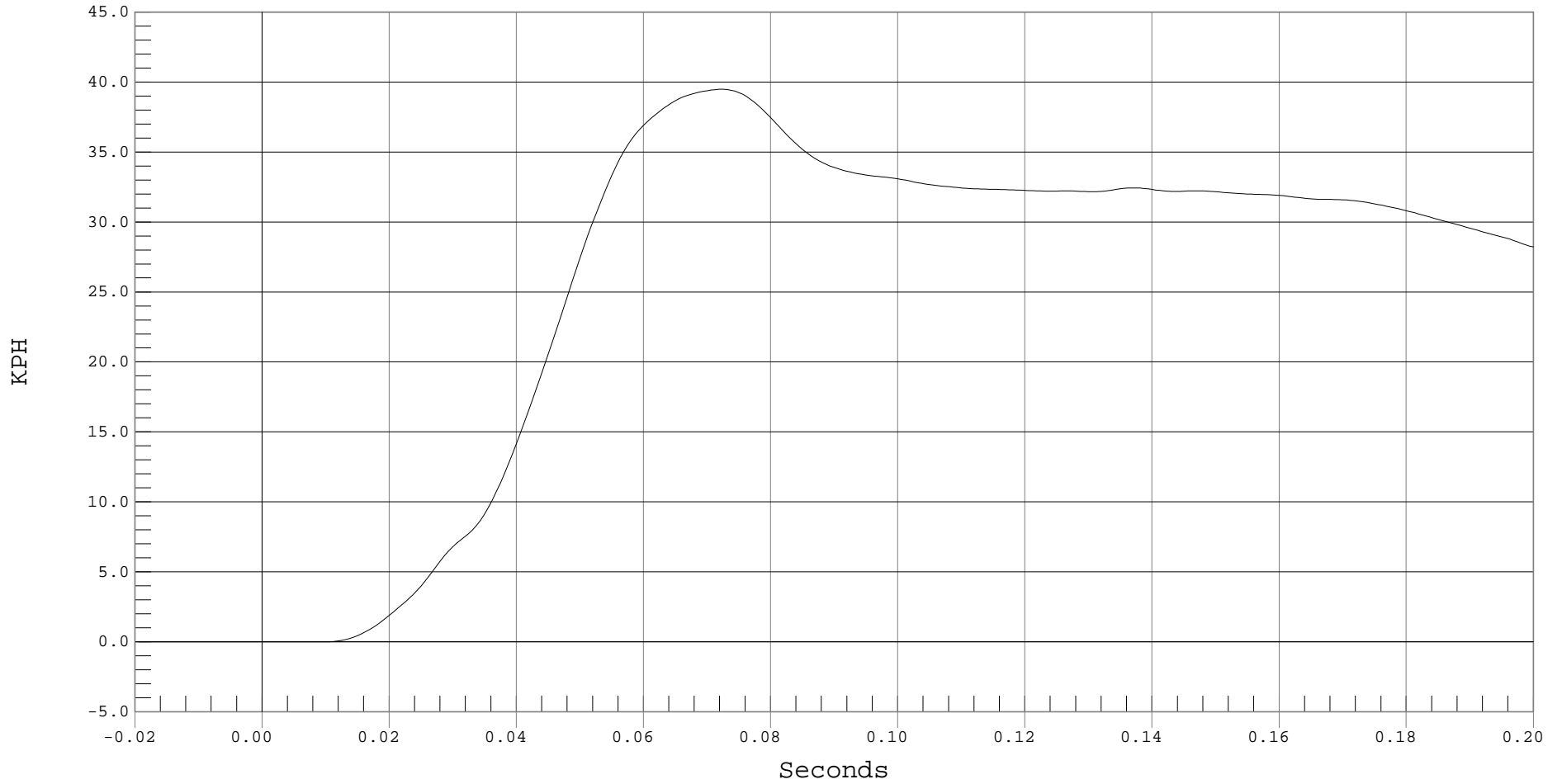
### DRIVER LOWER SPINE Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER SPINE Y VELOCITY, B01023FI.V06

Ymin = -.01 KPH @ 0.0099 Seconds, Ymax = 39.49 KPH @ 0.0724 Seconds



B-81



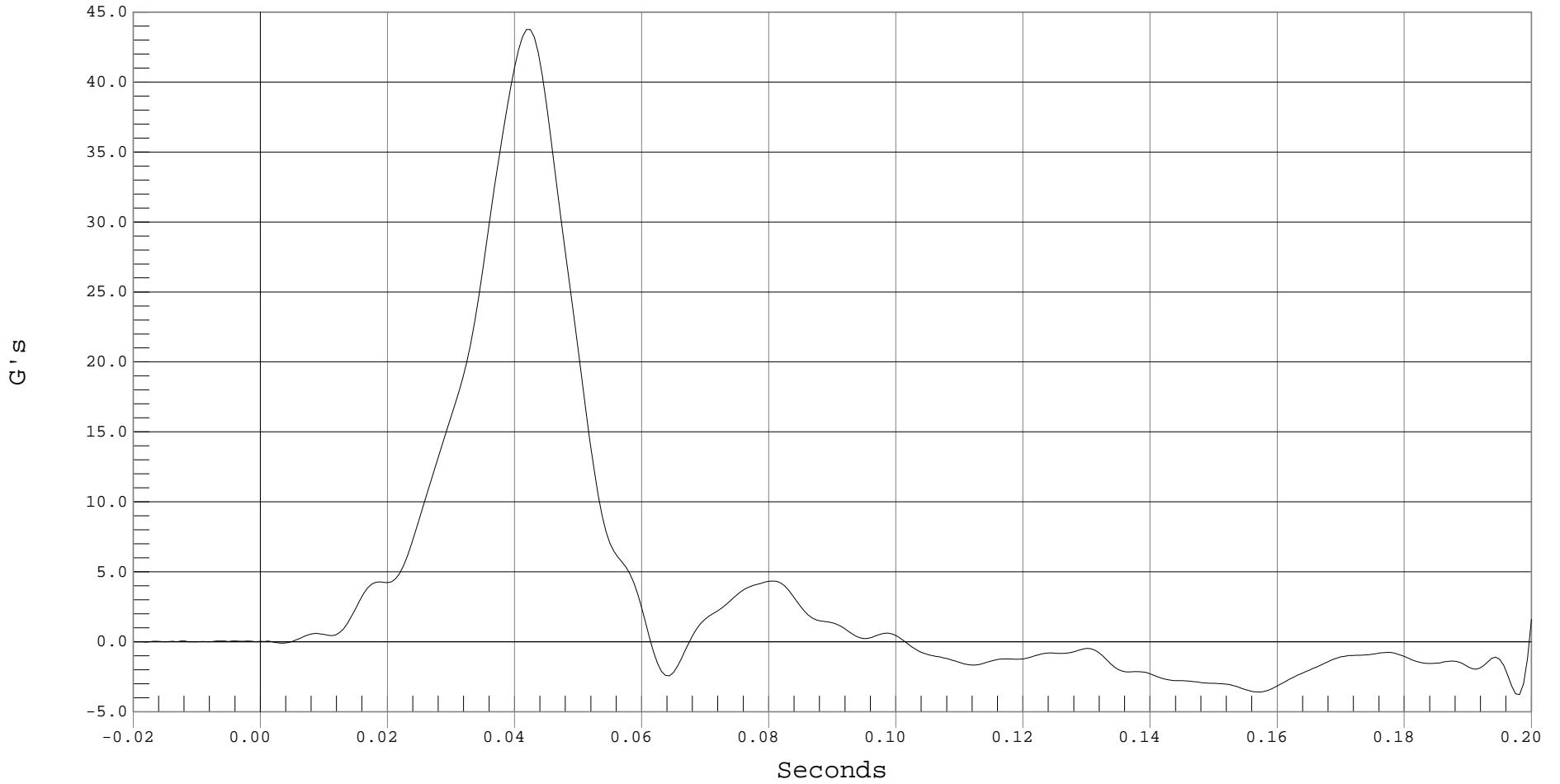
### DRIVER PELVIS Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER PELVIS Y, B01023FI.R07

Ymin = -3.78 G's @ 0.1980 Seconds, Ymax = 43.76 G's @ 0.0424 Seconds



B-82



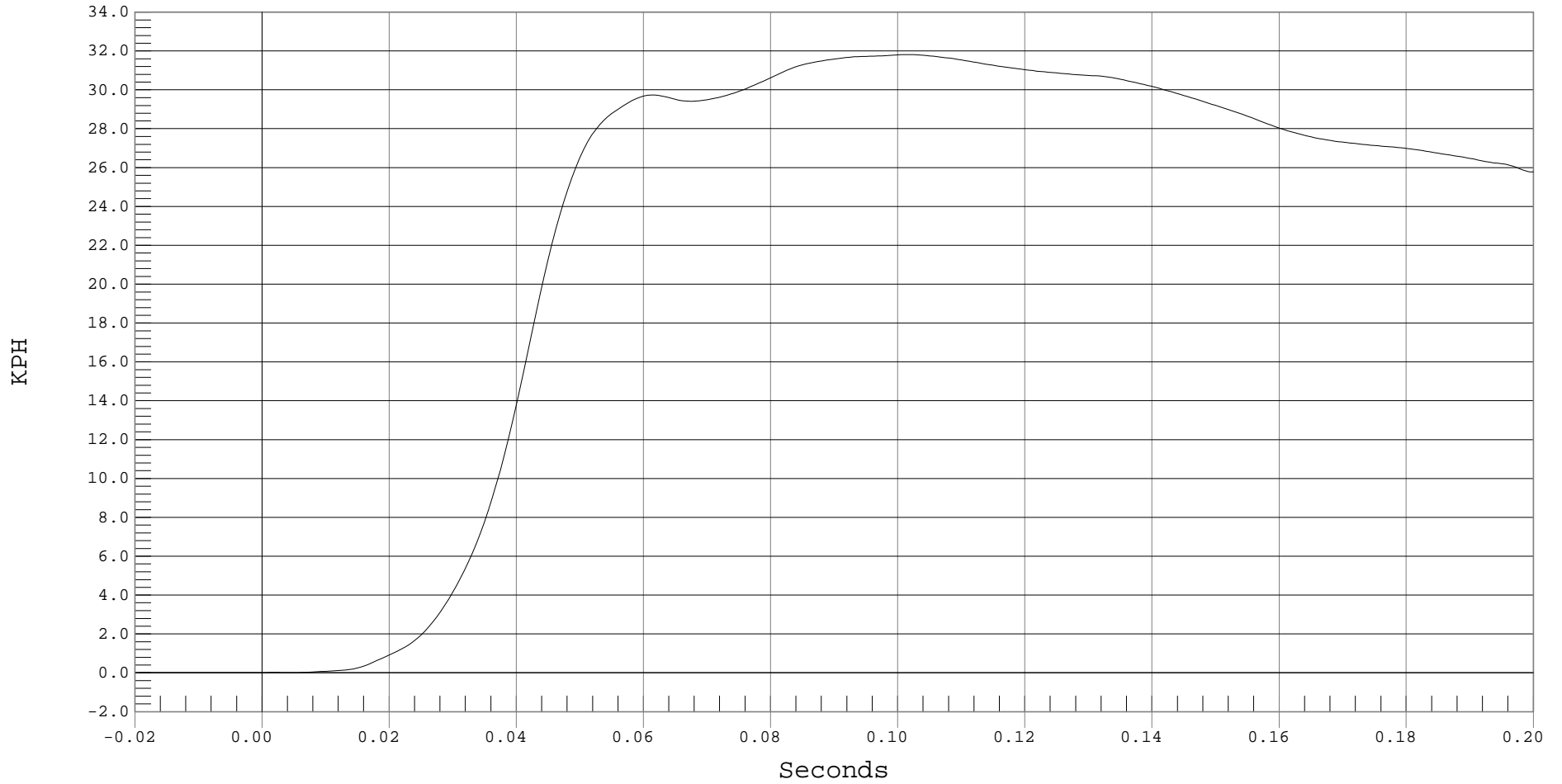
### DRIVER PELVIS Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER PELVIS Y VELOCITY, B01023FI.V07

Ymin = 0 KPH @ -0.0176 Seconds, Ymax = 31.81 KPH @ 0.1012 Seconds





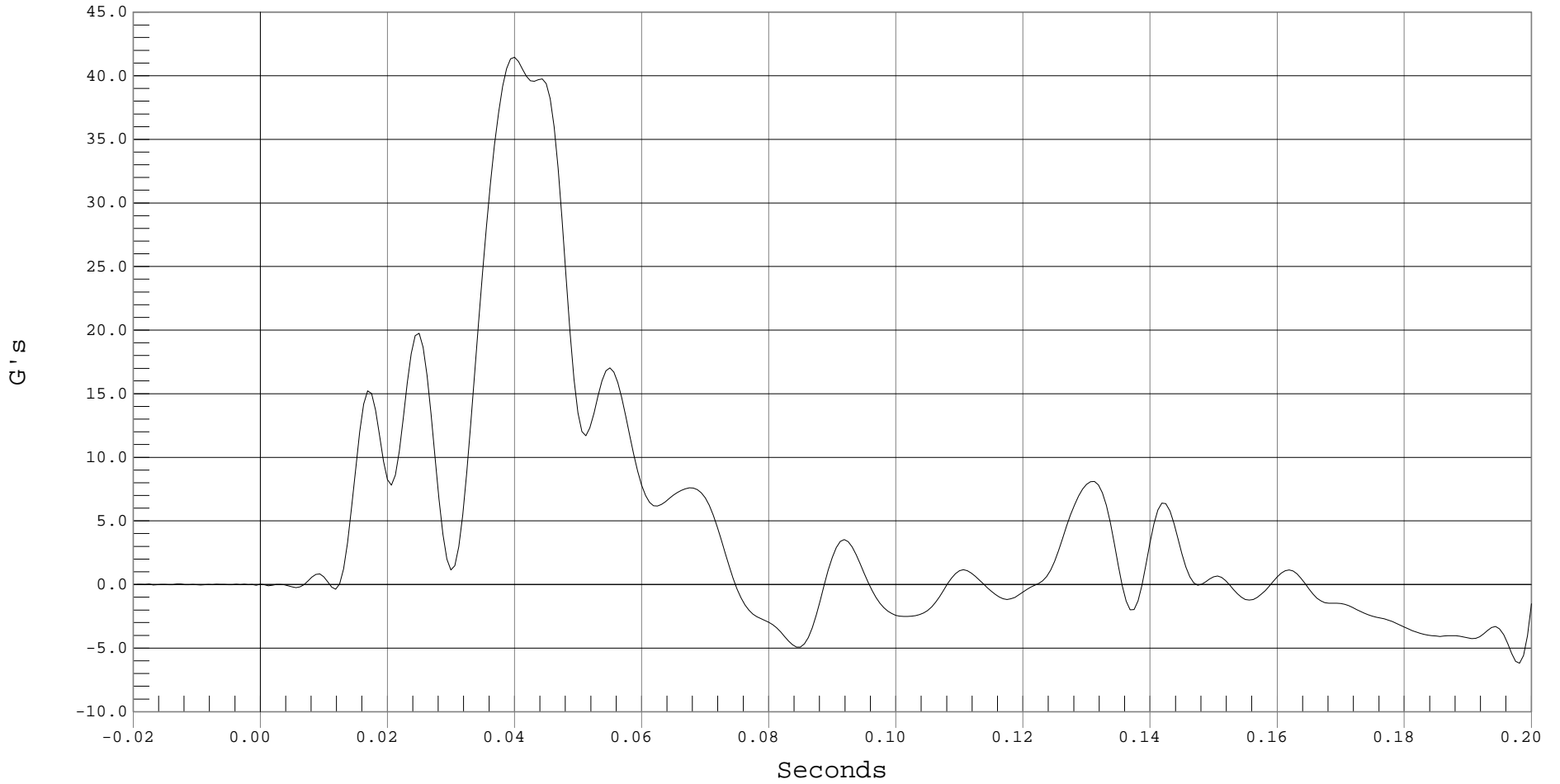
### DRIVER UPPER RIB REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER UPPER RIB Yr, B01023FI.R41

Ymin = -6.18 G's @ 0.1980 Seconds, Ymax = 41.46 G's @ 0.0399 Seconds





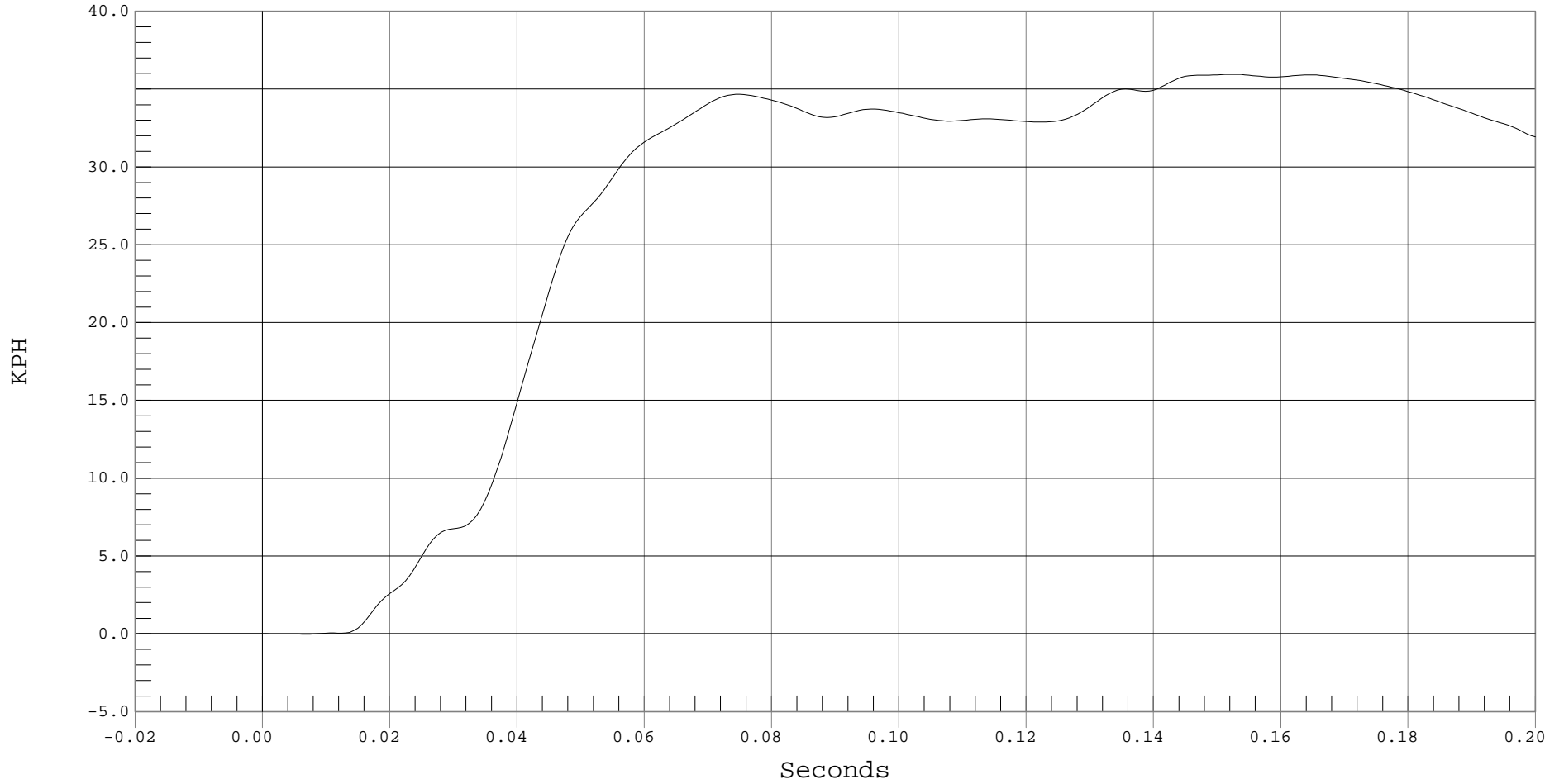
### DRIVER UPPER RIB REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER UPPER RIB Y REDUNDANT VELOCITY, B01023FI.V41

Ymin = -.02 KPH @ 0.0068 Seconds, Ymax = 35.95 KPH @ 0.1524 Seconds



B-85



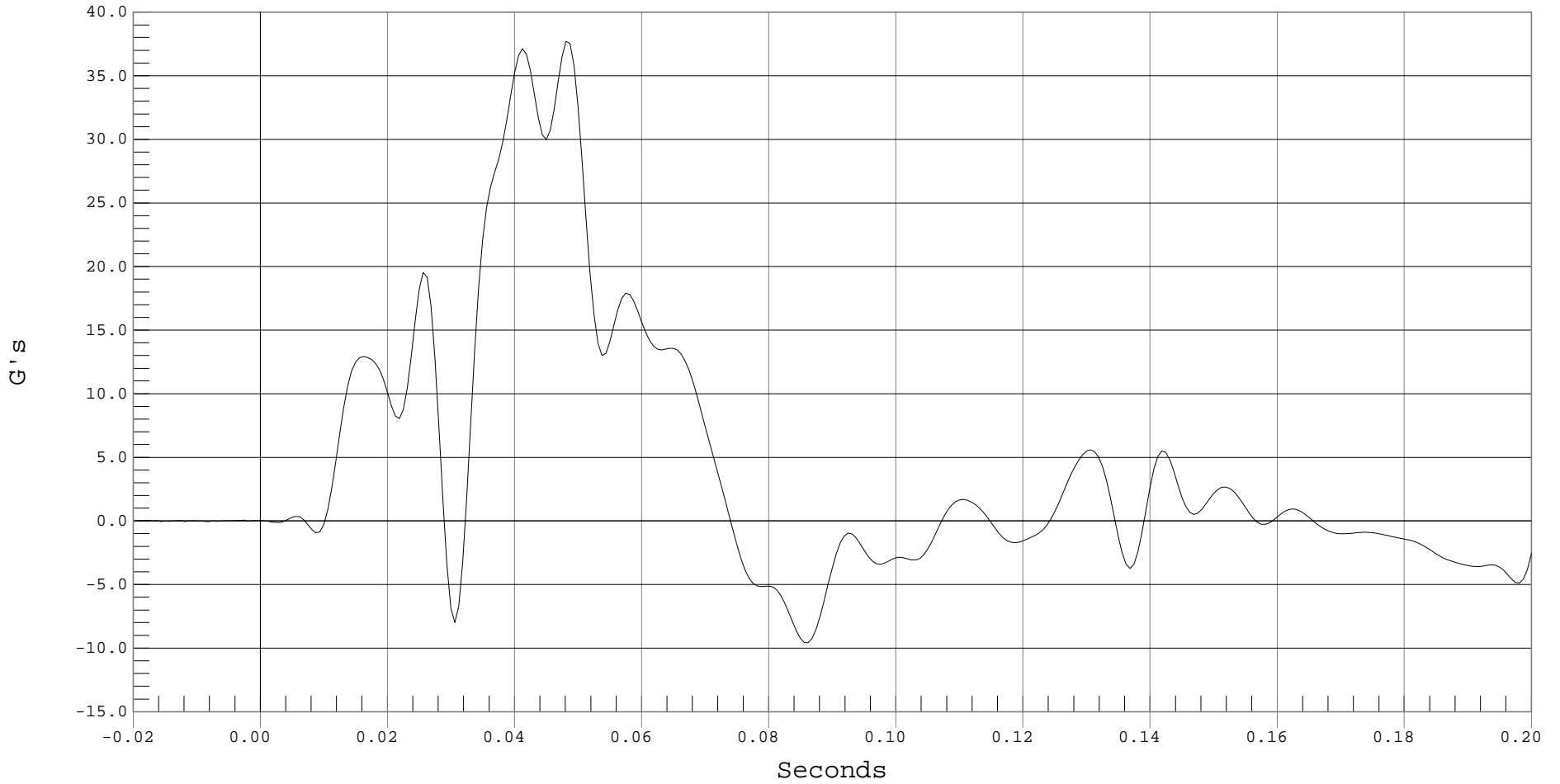
### DRIVER LOWER RIB REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER RIB Yr, B01023FI.R42

Ymin = -9.57 G's @ 0.0862 Seconds, Ymax = 37.69 G's @ 0.0480 Seconds



B-86



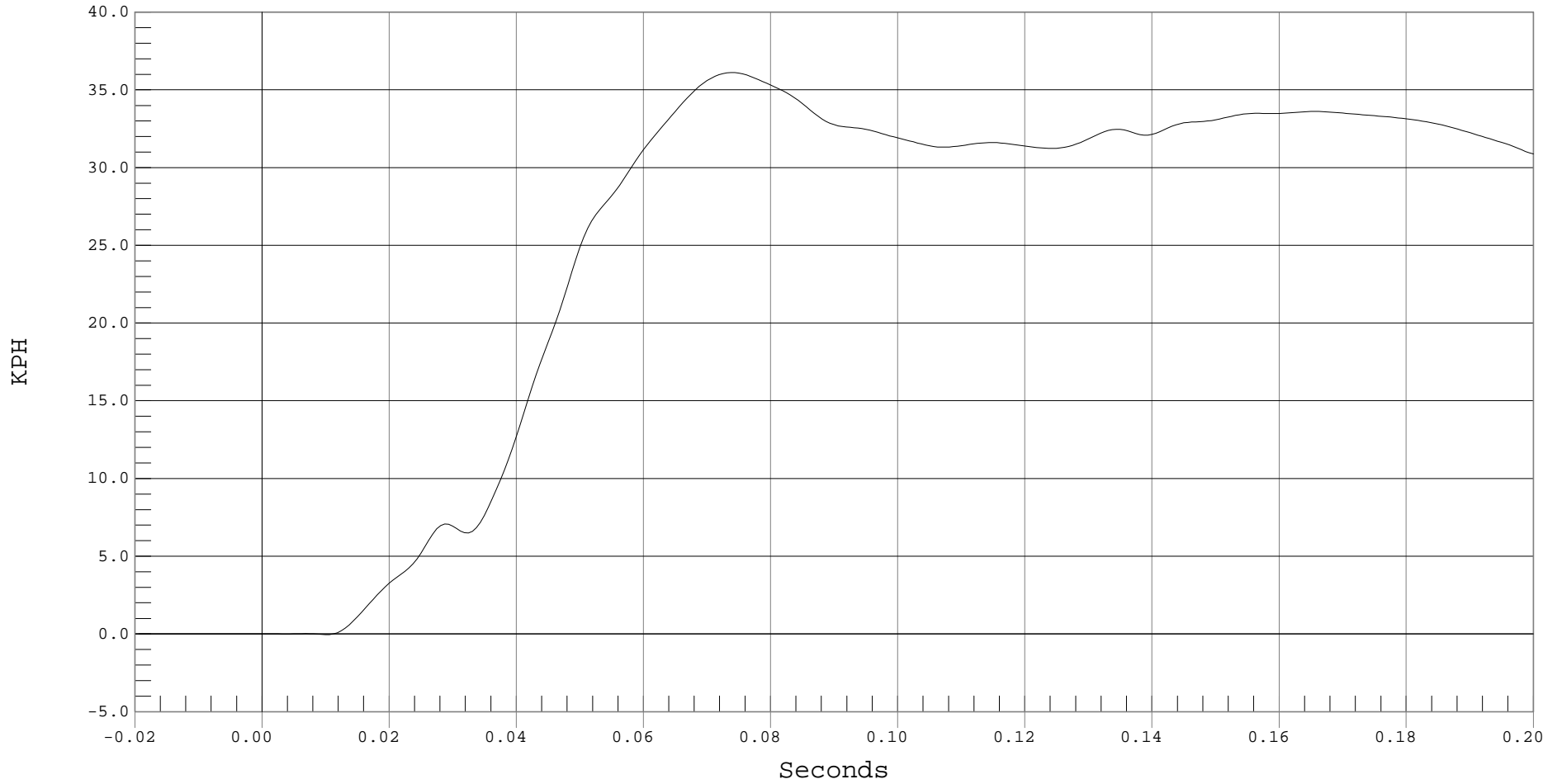
### DRIVER LOWER RIB REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER RIB Y REDUNDANT VELOCITY, B01023FI.V42

Ymin = -.05 KPH @ 0.0099 Seconds, Ymax = 36.12 KPH @ 0.0736 Seconds



B-87



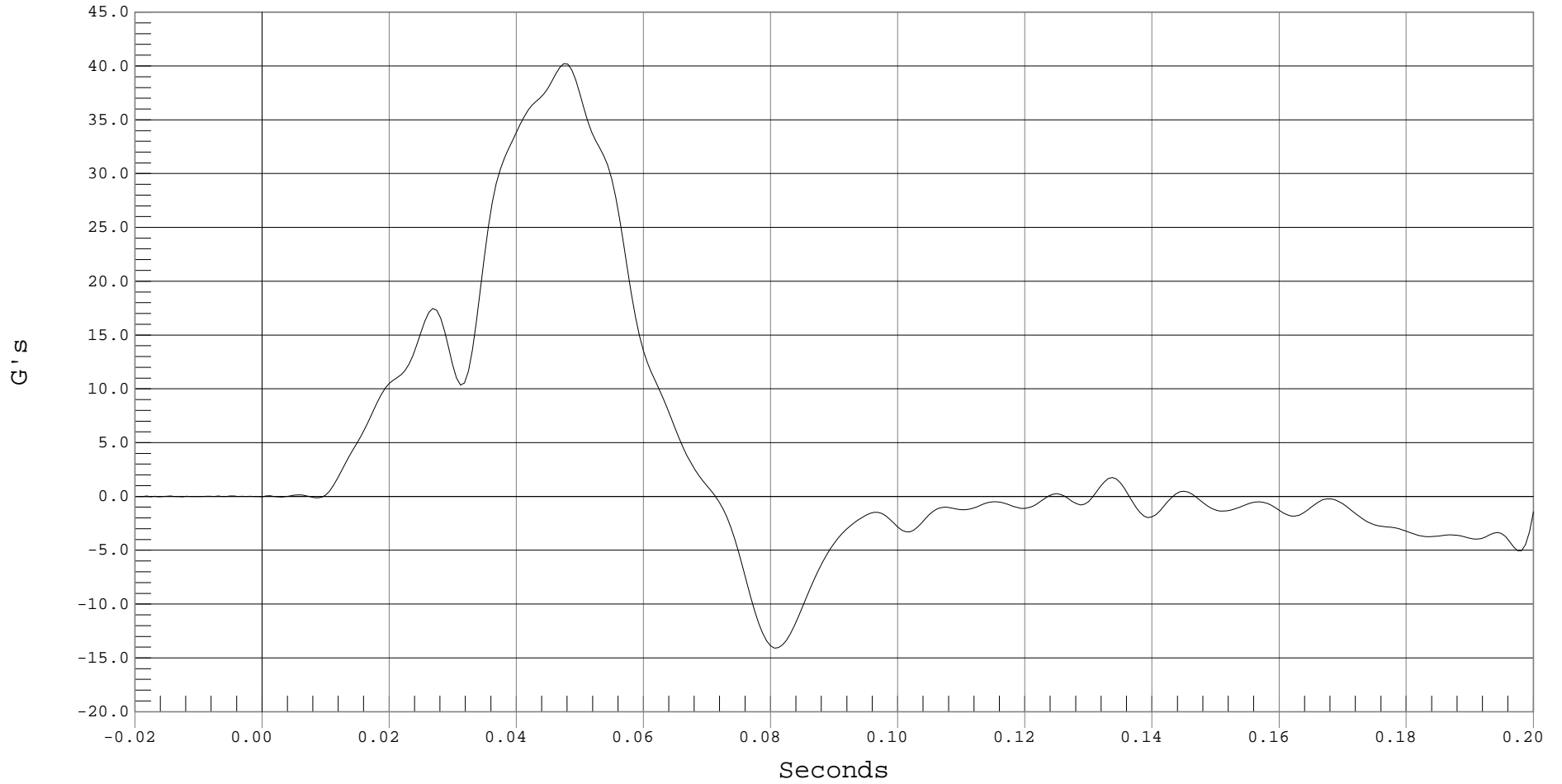
### DRIVER LOWER SPINE REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER SPINE Yr, B01023FI.R43

Ymin = -14.09 G's @ 0.0805 Seconds, Ymax = 40.23 G's @ 0.0474 Seconds





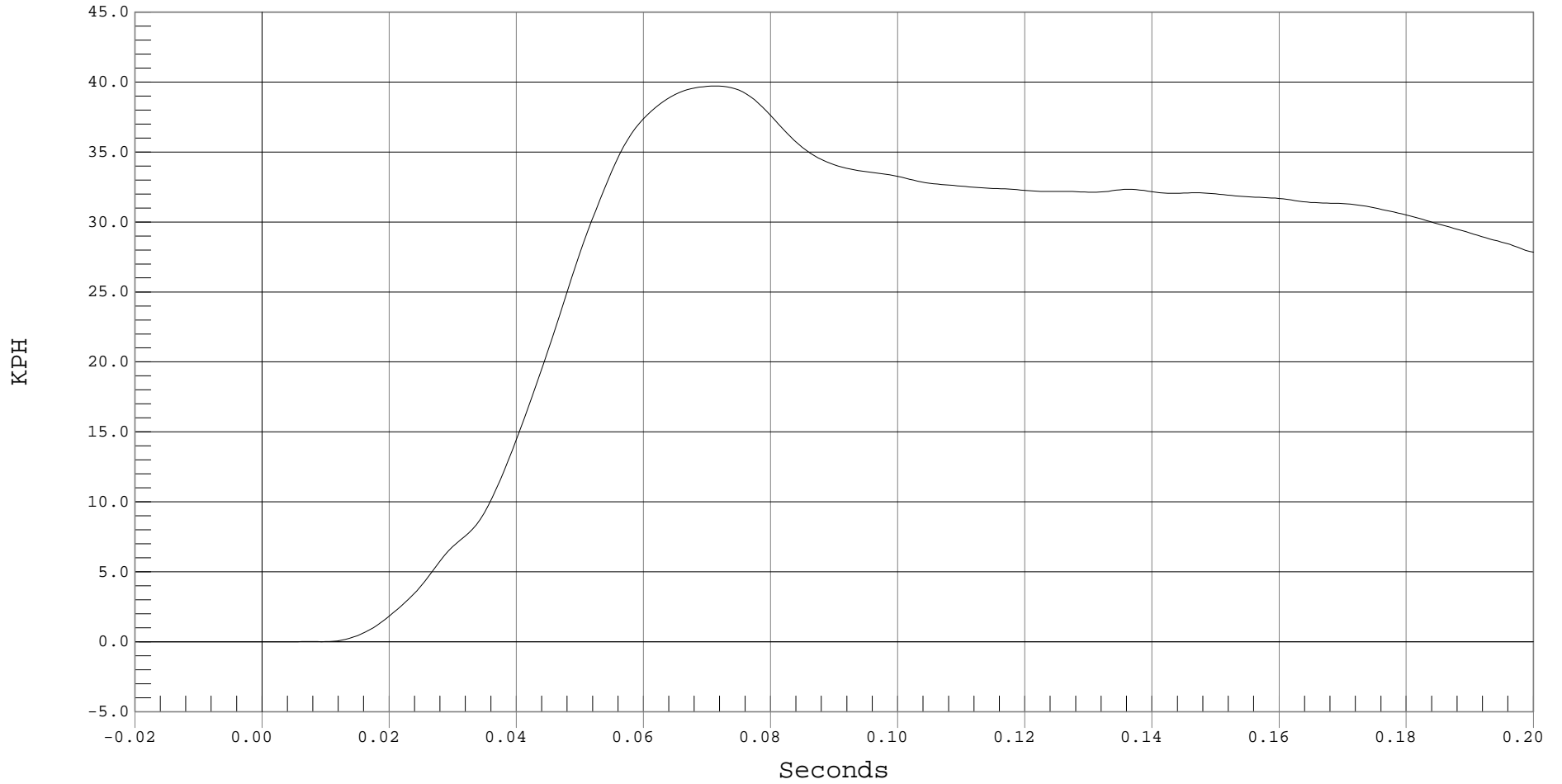
### DRIVER LOWER SPINE REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER LOWER SPINE Y REDUNDANT VELOCITY, B01023FI.V43

Ymin = 0 KPH @ -0.0095 Seconds, Ymax = 39.72 KPH @ 0.0712 Seconds





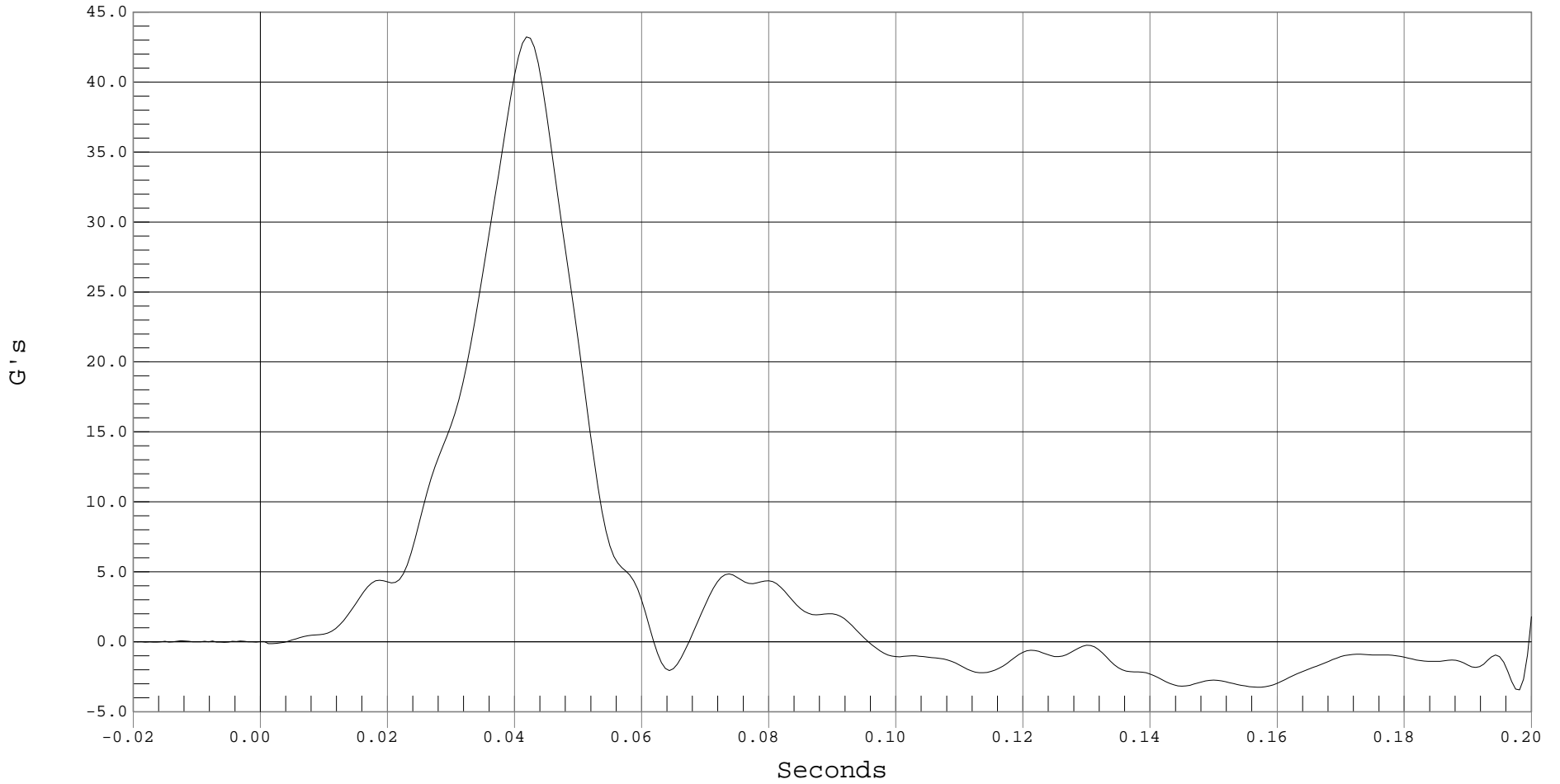
### DRIVER PELVIS REDUNDANT Y ACCELERATION

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER PELVIS Yr, B01023FI.R44

Ymin = -3.43 G's @ 0.1980 Seconds, Ymax = 43.23 G's @ 0.0418 Seconds



B-90



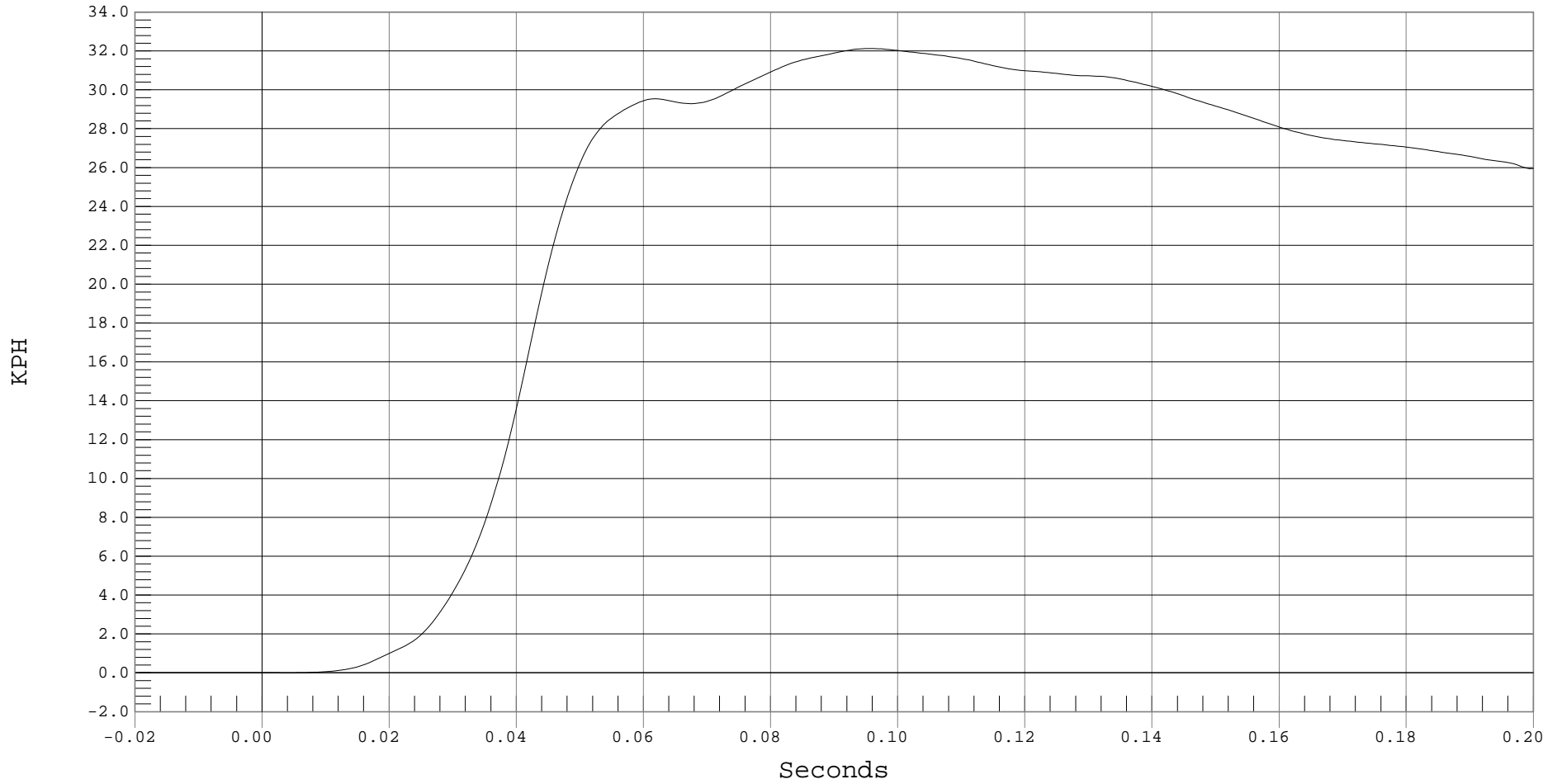
### DRIVER PELVIS REDUNDANT Y VELOCITY

Test Desc.: FMVSS 214 INDICANT  
Component: 2001 AUDI TT ROADSTER (C15800)  
Other Info:

Test Date: 02-27-01  
Speed: 38.6 MPH, 62.1 KPH  
Fir Filtered

— 1 DRIVER PELVIS Y REDUNDANT VELOCITY, B01023FI.V44

Ymin = -.01 KPH @ 0.0037 Seconds, Ymax = 32.13 KPH @ 0.0955 Seconds



B-91

## **APPENDIX C**

### **SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA**

CALIBRATION DATA SUMMARY  
 SIDE IMPACT DUMMY (SID)  
 CONFIGURED TO LEFT SIDE IMPACT

Report Date: March 23, 2001

Technician: Tim Michnay

Test Parameter	Specification	Dummy Serial Number:049	
		Pre-Test	Post-Test
SH-Seated Height (mm)	889 – 909	900	900
RH-Rib Height (mm)	501 – 521	517	517
HP-Hip Pivot Height (mm)	99 ref.	99	99
RD-Rib from Back Line (mm)	229 – 241	234	234
KV-Knee Pivot from Back Line (mm)	511 – 526	522	522
SW-Knee Pivot to Floor (mm)	490 – 505	492	492
HW-Hip Width (mm)	356 - 391	369	369
<b>Thorax Impact</b>			
Temperature (°C)	18.9 – 25.5	21.2	21.6
Relative Humidity (%)	10 – 70	25	22
Probe Speed (m/s)	4.27 – 4.33	4.30	4.28
Upper Rib (g's)	37 – 46	38	38
Lower Rib (g's)	37 – 46	41	41
Lower Spine (g's)	15 – 22	20	20
<b>Pelvis Impact</b>			
Temperature (°C)	18.9 – 25.5	21.2	21.6
Relative Humidity (%)	10 – 70	25	22
Probe Speed (m/s)	4.27 – 4.33	4.30	4.28
Pelvis (g's)	40 - 60	48	48

REMARKS:

CERTIFICATION DATA

Dummy Serial Number: 049

## Calibration Test Results Summary

Dummy Serial Number: 049

### Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Dummy Serial Number: 049  
 Date of Verification: 1/18/01  
 Test Number: D0103

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH-Seated Height (mm)	889 – 909	900
RH-Rib Height (mm)	501 – 521	517
HP-Hip Pivot Height (mm)	99 ref.	99
RD-Rib From Back Line (mm)	229 - 241	234
KV-Knee Pivot From Back Line (mm)	511 – 526	522
SW-Knee Pivot to Floor (mm)	490 – 505	492
HW – Hip Width (mm)	356 – 391	369

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_

MGA RESEARCH CORPORATION  
HEAD DROP TEST  
SIDE IMPACT DUMMY (SID)

Date: 1/18/01

Dummy Serial Number: 049

Test Number: D01031

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 - 25.5	21.3
Relative Humidity (%)	10 - 70	18
Peak Resultant Acceleration	210 - 260 g's	230
Peak Lateral Acceleration	< 10 g's	-5
Time Above 100 g.	0.9 - 1.5 msec.	1.1

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



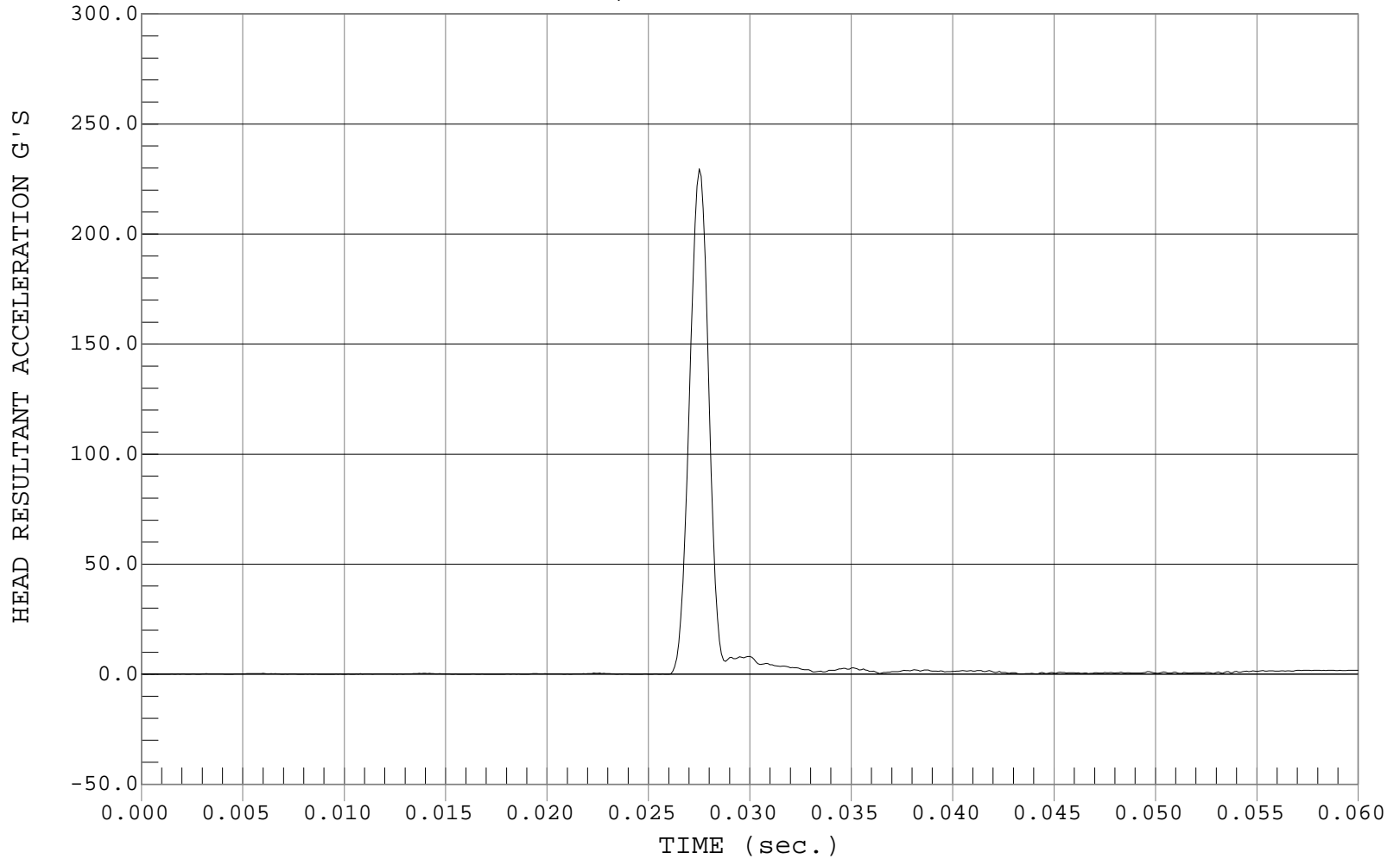
### PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #049

Test Date: 01-18-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT ACCELERATION, D01031av.a01

Ymin = .07 G'S @ 0.0001 sec., Ymax = 229.6 G'S @ 0.0275 sec.





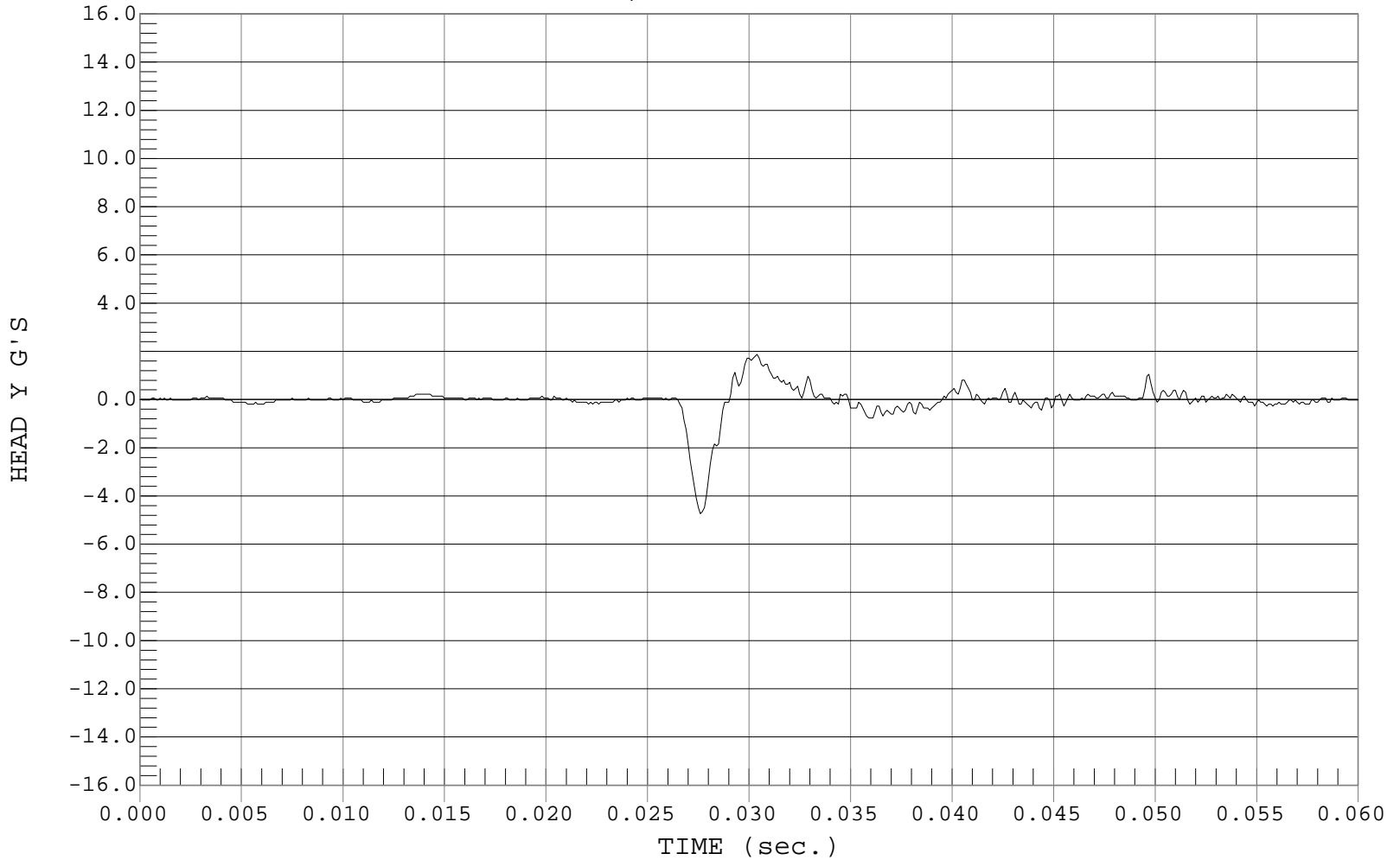
### PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #049

Test Date: 01-18-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01031AR.A02

Ymin = -4.73 G'S @ 0.0276 sec., Ymax = 1.88 G'S @ 0.0304 sec.



MGA RESEARCH CORPORATION  
THORAX IMPACT TEST  
SIDE IMPACT DUMMY (SID)

Date: 1/5/01  
Dummy Serial Number: 049  
Test Number: D01032

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.2
Relative Humidity (%)	10 – 70	25
Probe Speed (m/s)	4.27 – 4.33	4.30
Upper Rib (g's)	37 – 46	38
Lower Rib (g's)	37 – 46	41
Lower Spine (g's)	15 - 22	20

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



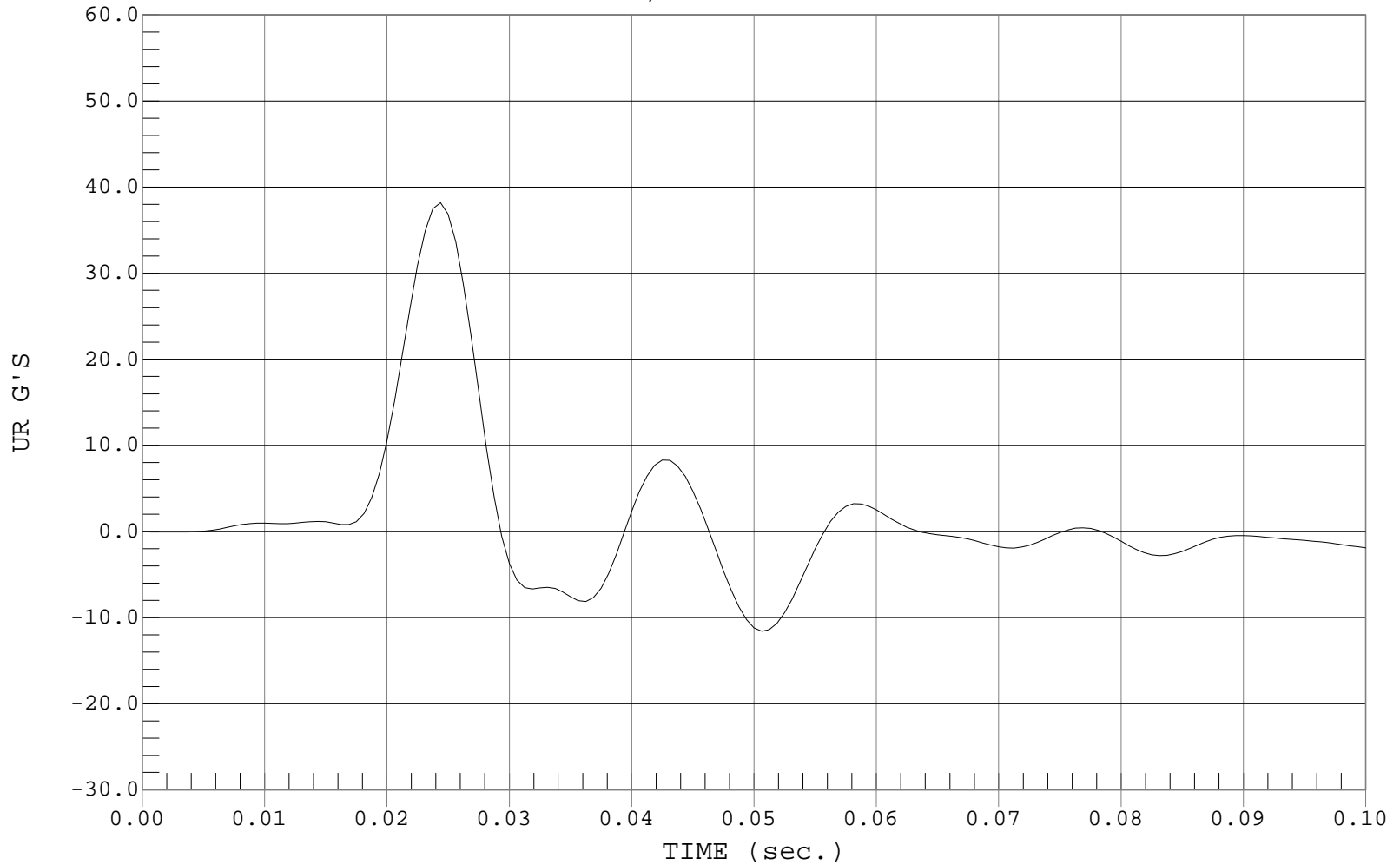
### UPPER RIB ACCELERATION

Test Desc.: Dummy Calibration - Thorax Impact  
Component: Dummy #049

Test Date: 01-05-01  
Speed: 14.12 FT/SEC, 4.30 M/SEC

— 1 UR, D01032FI.R08

Ymin = -11.58 G'S @ 0.0506 sec., Ymax = 38.18 G'S @ 0.0244 sec.





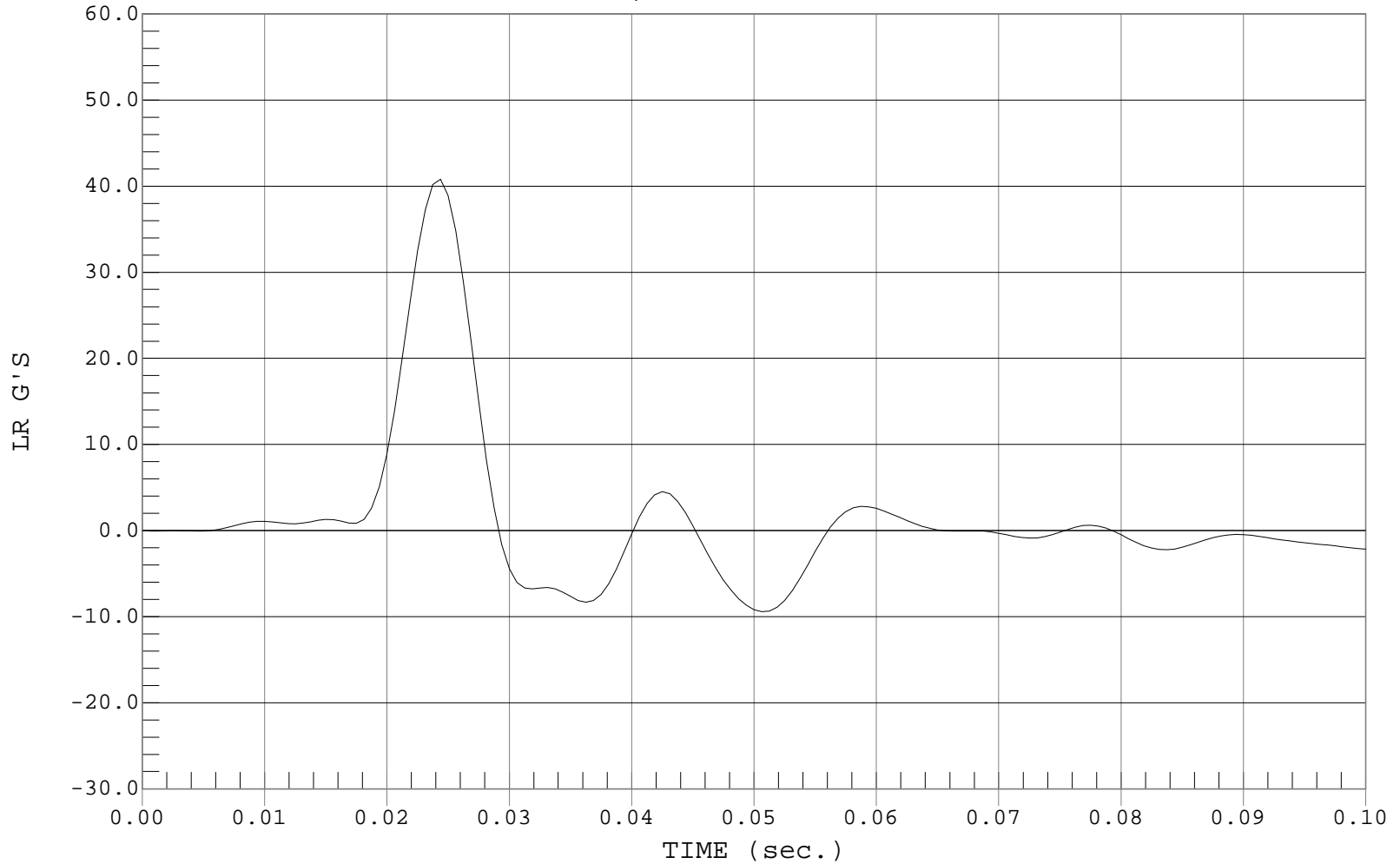
### LOWER RIB ACCELERATION

Test Desc.: Dummy Calibration - Thorax Impact  
Component: Dummy #049

Test Date: 01-05-01  
Speed: 14.12 FT/SEC, 4.30 M/SEC

— 1 LR, D01032FI.R09

Ymin = -9.43 G'S @ 0.0506 sec., Ymax = 40.8 G'S @ 0.0244 sec.



C-10



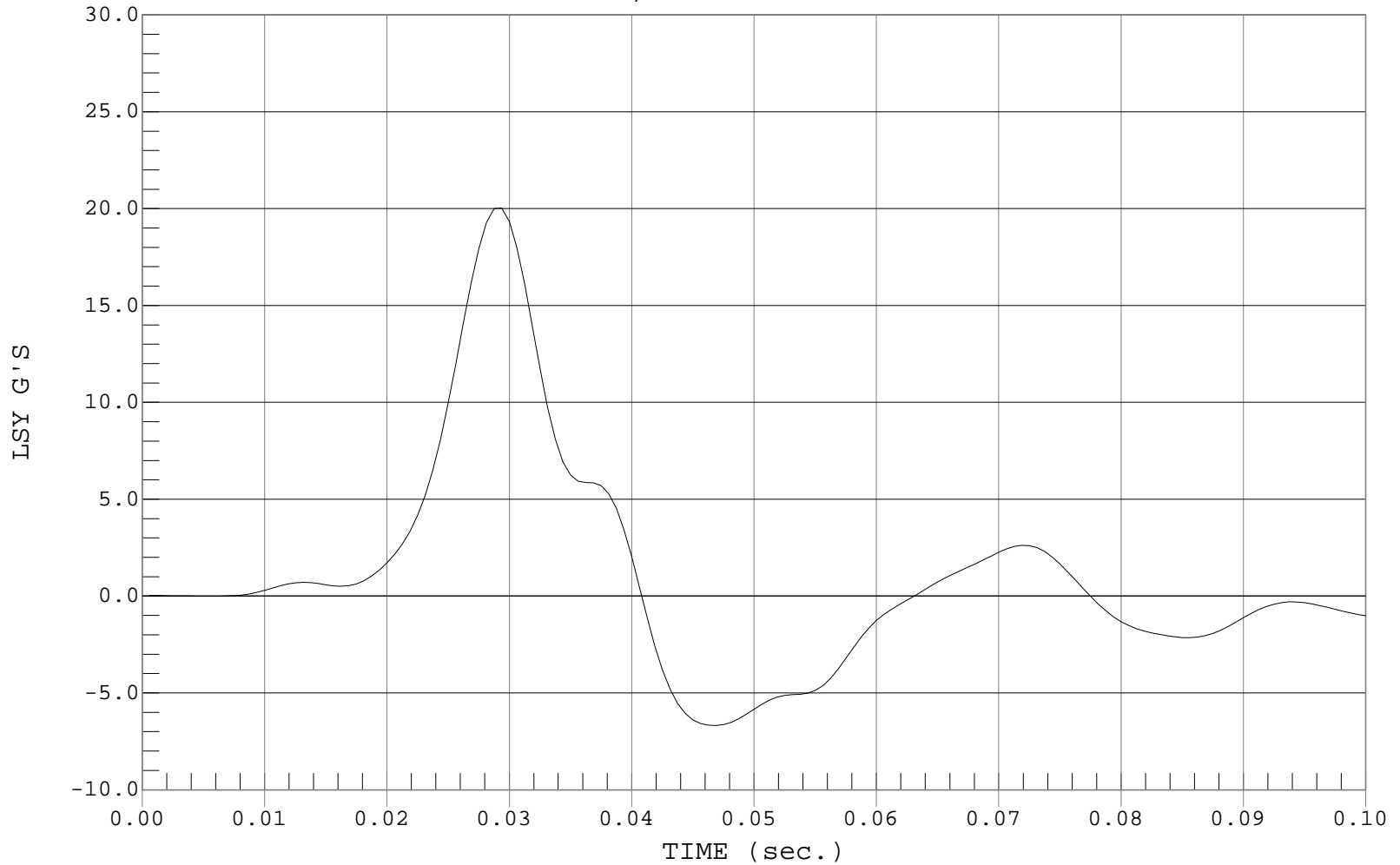
### LOWER SPINE ACCELERATION

Test Desc.: Dummy Calibration - Thorax Impact  
Component: Dummy #049

Test Date: 01-05-01  
Speed: 14.12 FT/SEC, 4.30 M/SEC

— 1 LSY, D01032FI.R10

Ymin = -6.68 G'S @ 0.0469 sec., Ymax = 20.03 G'S @ 0.0294 sec.



MGA RESEARCH CORPORATION  
PELVIS IMPACT TEST  
SIDE IMPACT DUMMY (SID)

Date: 1/5/01  
Dummy Serial Number: 049  
Test Number: D01033

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.2
Relative Humidity (%)	10 – 70	25
Probe Speed (m/s)	4.27 – 4.33	4.30
Pelvis Acceleration (g's)	40 – 60	48

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



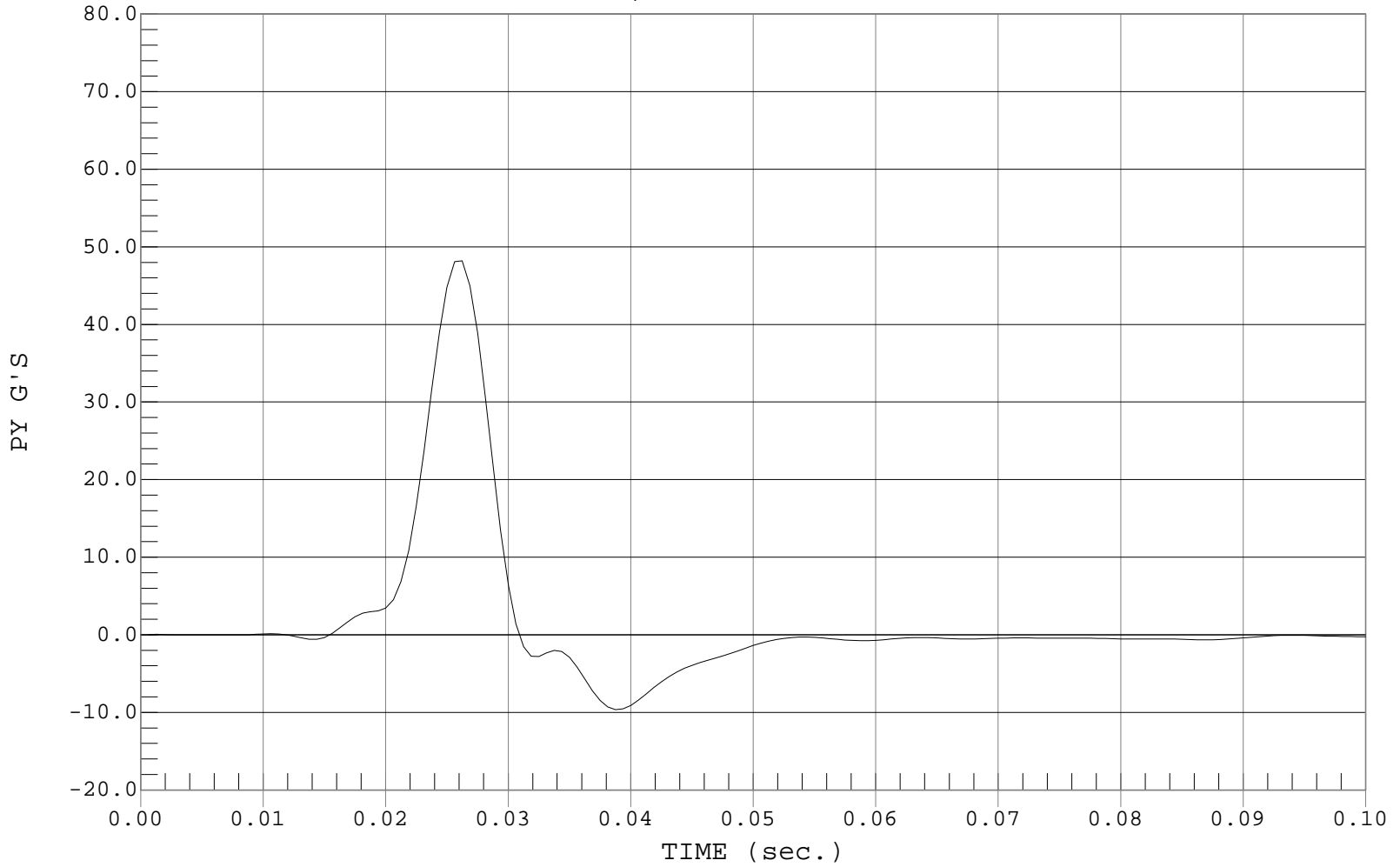
### PELVIS ACCELERATION

Test Desc.: Dummy Calibration - Pelvis Impact  
Component: Dummy #049

Test Date: 01-05-01  
Speed: 14.11 FT/SEC, 4.30 M/SEC

— 1 PY, D01033FI.R11

Ymin = -9.65 G'S @ 0.0388 sec., Ymax = 48.19 G'S @ 0.0263 sec.



MGA RESEARCH CORPORATION  
ABDOMINAL COMPRESSION TEST (PRELOAD = 10 LBS)  
SIDE IMPACT DUMMY (SID)

Date: 1/17/01  
Dummy Serial Number: 049  
Test Number: D01034

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.4
Relative Humidity (%)	10 – 70	20
Force @ 12.7 mm	104 – 162	136
Force @ 19 mm	163 – 222	186
Force @ 25.4 mm	222 – 280	248
Force @ 33 mm	325 - 391	339

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



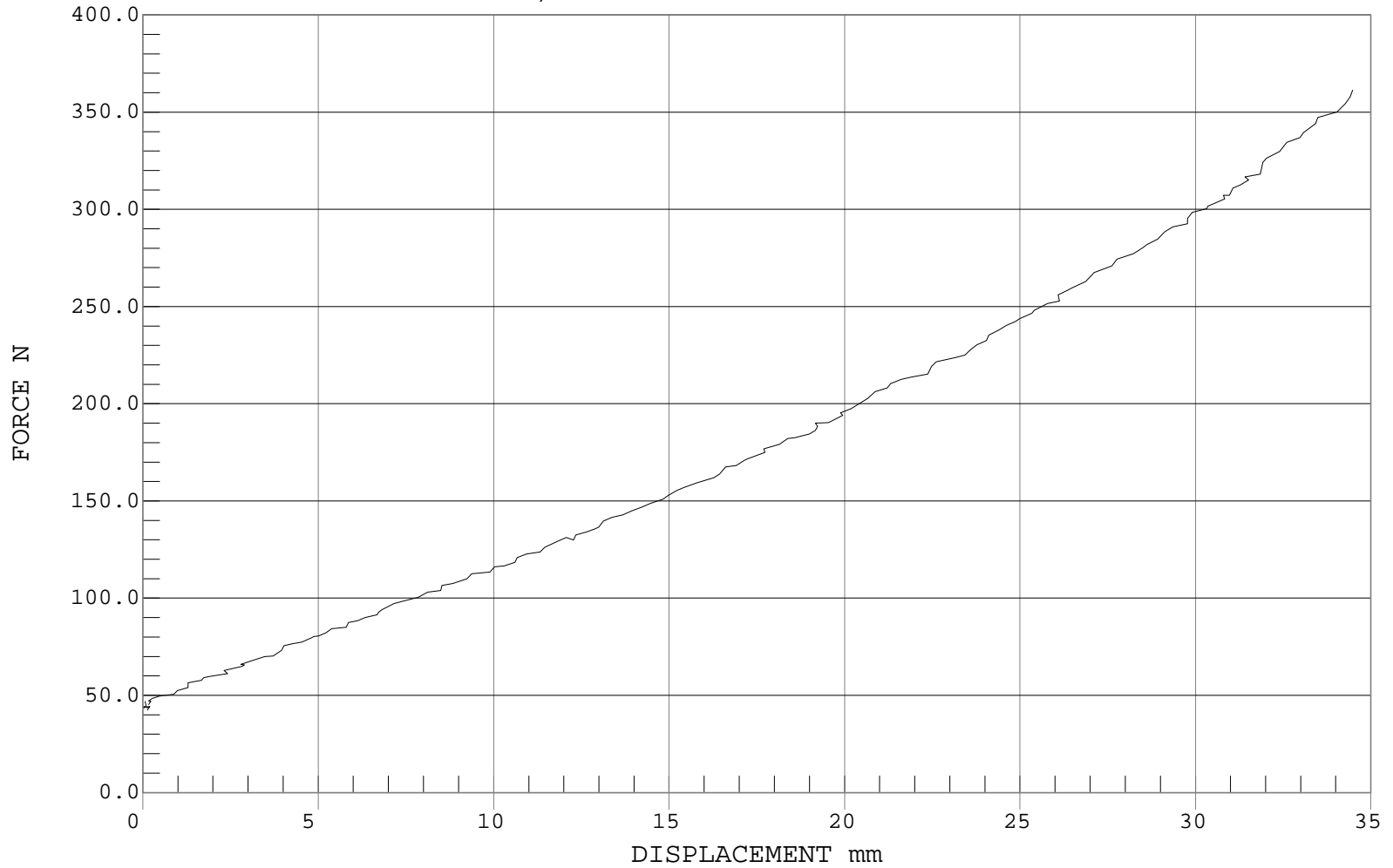
### ABDOMEN COMPRESSION

Test Desc.: DUMMY CALIBRATION - ABDOMEN COMPRESSION  
Component: DUMMY # 049

Test Date: 01-17-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 FORCE, D01034FC.F16

Ymin = 0 N @ 0.0000 mm, Ymax = 510.13 N @ 43.2446 mm



MGA RESEARCH CORPORATION  
LUMBAR FLEXION TEST  
SIDE IMPACT DUMMY (SID)

Date: 1/17/01  
Dummy Serial Number: 049  
Test Number: D01035

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.4
Relative Humidity (%)	10 – 70	20
Force @ 0°	0 – 26.7	0
Force @ 20°	97.9 – 151.2	126.0
Force @ 30°	151.2 – 204.6	173.3
Force @ 40°	204.6 – 258.0	224.5
Return Angle	12° maximum	1

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



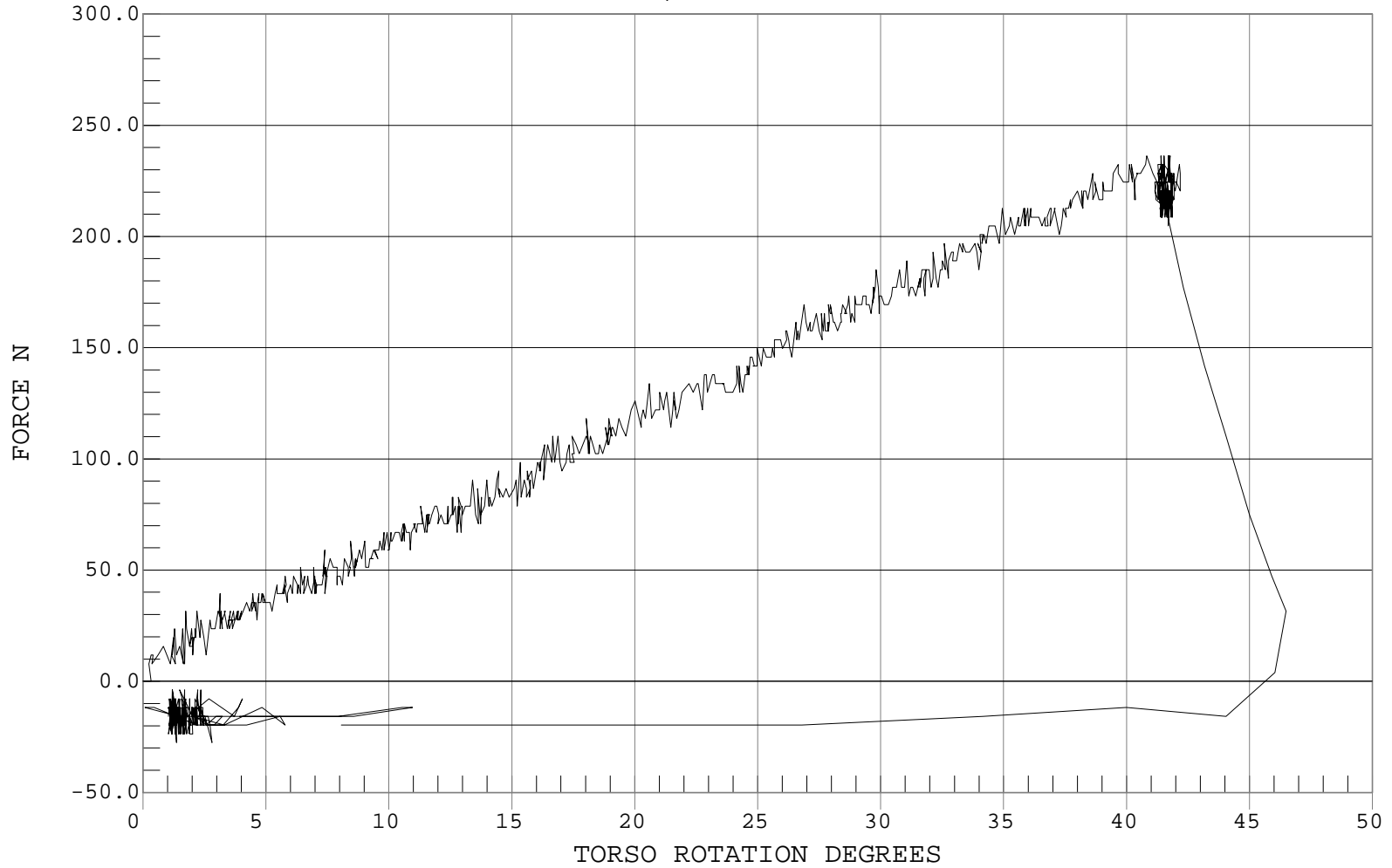
### LUMBAR FLEXION

Test Desc.: DUMMY CALIBRATION - LUMBAR FLEXION  
Component: DUMMY # 049

Test Date: 01-17-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 FORCE, D01035FC.F14

Ymin = -27.56 N @ 2.8123 DEGREES, Ymax = 236.27 N @ 40.8198 DEGREES



## DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Dummy Serial Number: 049

Inspected By: Tim Michnay

Date: 1/18/01

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	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		

Notes (include component/problem/action/reason):

CERTIFICATION DATA

Dummy Serial Number: 049

## Calibration Test Results Summary

Dummy Serial Number: 049

### Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Dummy Serial Number: 049  
 Date of Verification: 3/21/01  
 Test Number: D0135

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH-Seated Height (mm)	889 – 909	900
RH-Rib Height (mm)	501 – 521	517
HP-Hip Pivot Height (mm)	99 ref.	99
RD-Rib From Back Line (mm)	229 - 241	234
KV-Knee Pivot From Back Line (mm)	511 – 526	522
SW-Knee Pivot to Floor (mm)	490 – 505	492
HW – Hip Width (mm)	356 – 391	369

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_

MGA RESEARCH CORPORATION  
HEAD DROP TEST  
SIDE IMPACT DUMMY (SID)

Date: 3/22/01  
Dummy Serial Number: 049  
Test Number: D01351

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 - 25.5	22.7
Relative Humidity (%)	10 - 70	26
Peak Resultant Acceleration	210 - 260 g's	219
Peak Lateral Acceleration	< 10 g's	-5
Time Above 100 g.	0.9 - 1.5 msec.	1.2

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



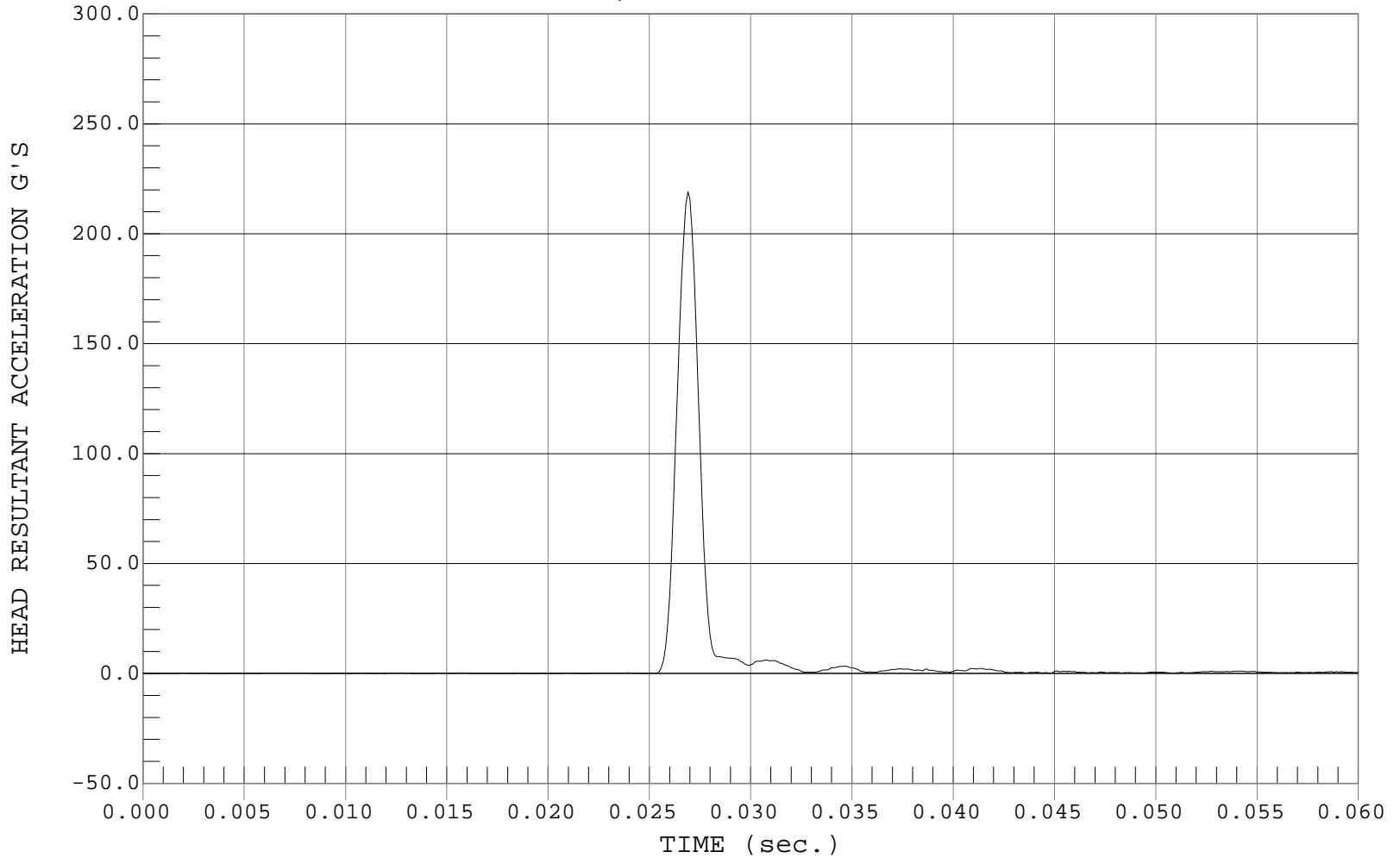
### PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #049

Test Date: 03-22-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT ACCELERATION, D01351av.a01

Ymin = .04 G'S @ 0.0001 sec., Ymax = 219.21 G'S @ 0.0269 sec.





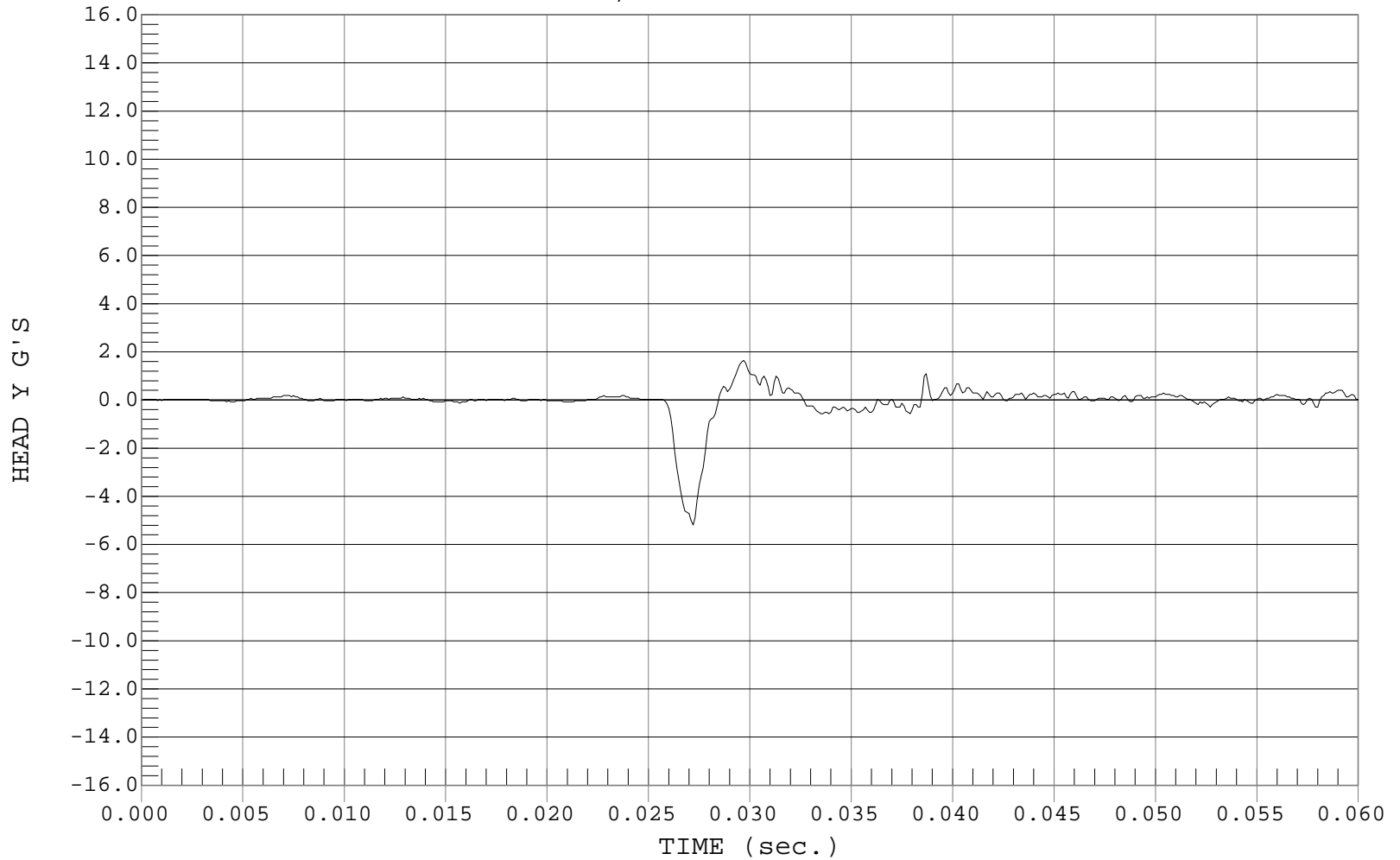
### PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop  
Component: Dummy #049

Test Date: 03-22-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01351AR.A02

Ymin = -5.2 G'S @ 0.0272 sec., Ymax = 1.64 G'S @ 0.0297 sec.



MGA RESEARCH CORPORATION  
THORAX IMPACT TEST  
SIDE IMPACT DUMMY (SID)

Date: 3/21/01

Dummy Serial Number: 049

Test Number: D01352

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.6
Relative Humidity (%)	10 – 70	22
Probe Speed (m/s)	4.27 – 4.33	4.28
Upper Rib (g's)	37 – 46	38
Lower Rib (g's)	37 – 46	41
Lower Spine (g's)	15 - 22	20

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



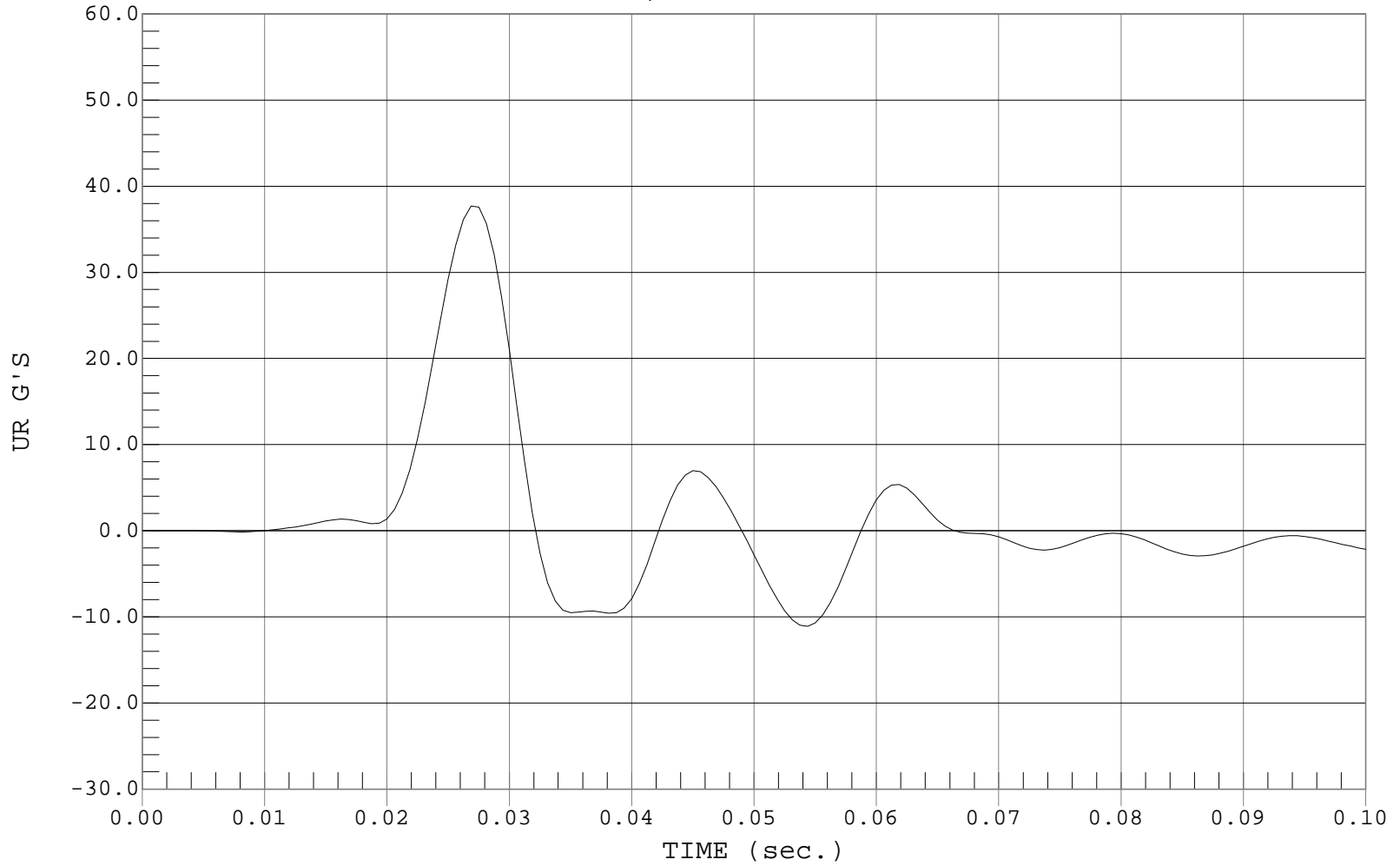
### UPPER RIB ACCELERATION

Test Desc.: Dummy Calibration - Thorax Impact  
Component: Dummy #049

Test Date: 03-21-01  
Speed: 14.04 FT/SEC, 4.28 M/SEC

— 1 UR, D01352FI.R08

Ymin = -11.11 G'S @ 0.0544 sec., Ymax = 37.68 G'S @ 0.0269 sec.





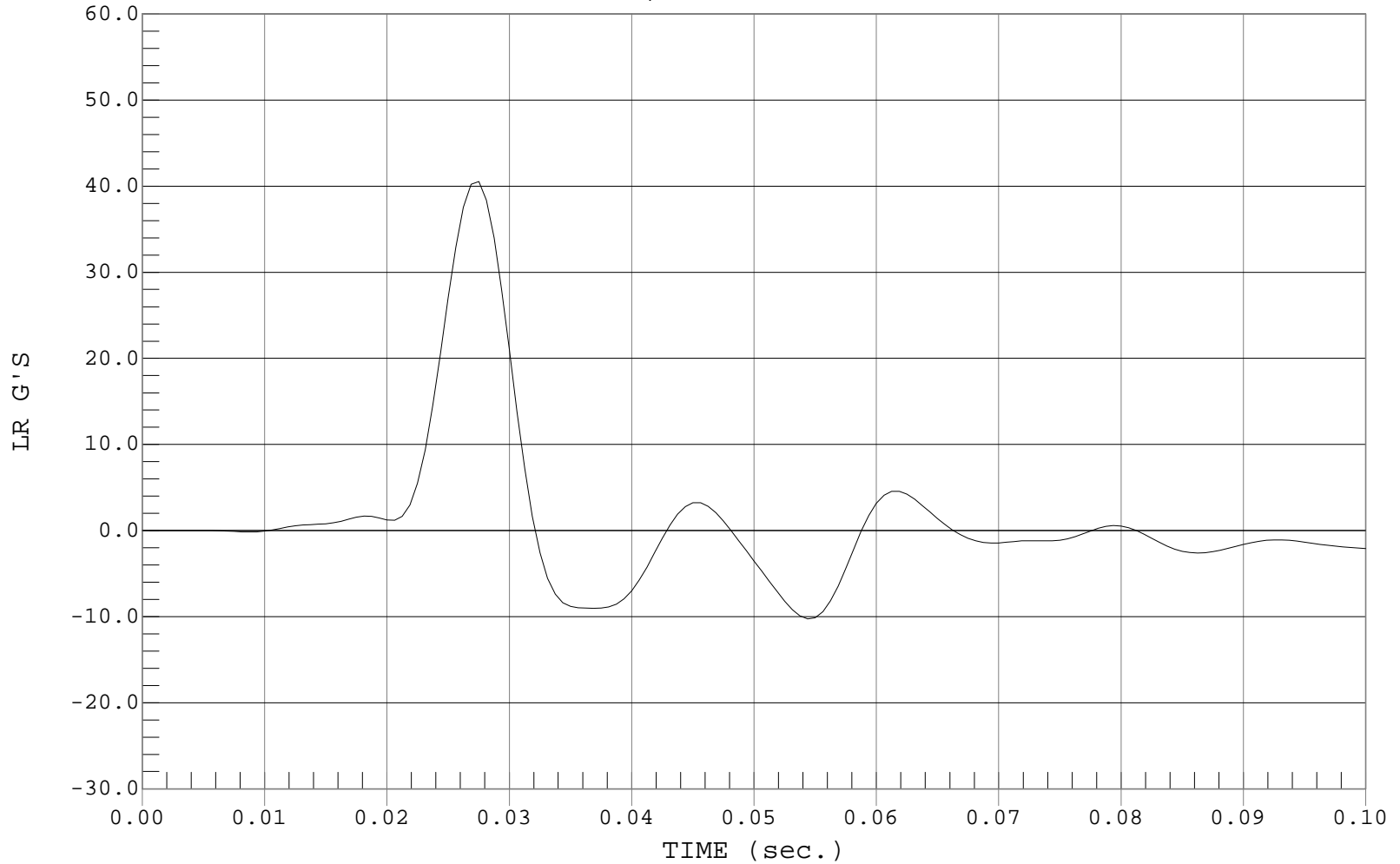
### LOWER RIB ACCELERATION

Test Desc.: Dummy Calibration - Thorax Impact  
Component: Dummy #049

Test Date: 03-21-01  
Speed: 14.04 FT/SEC, 4.28 M/SEC

— 1 LR, D01352FI.R09

Ymin = -10.26 G'S @ 0.0544 sec., Ymax = 40.54 G'S @ 0.0275 sec.





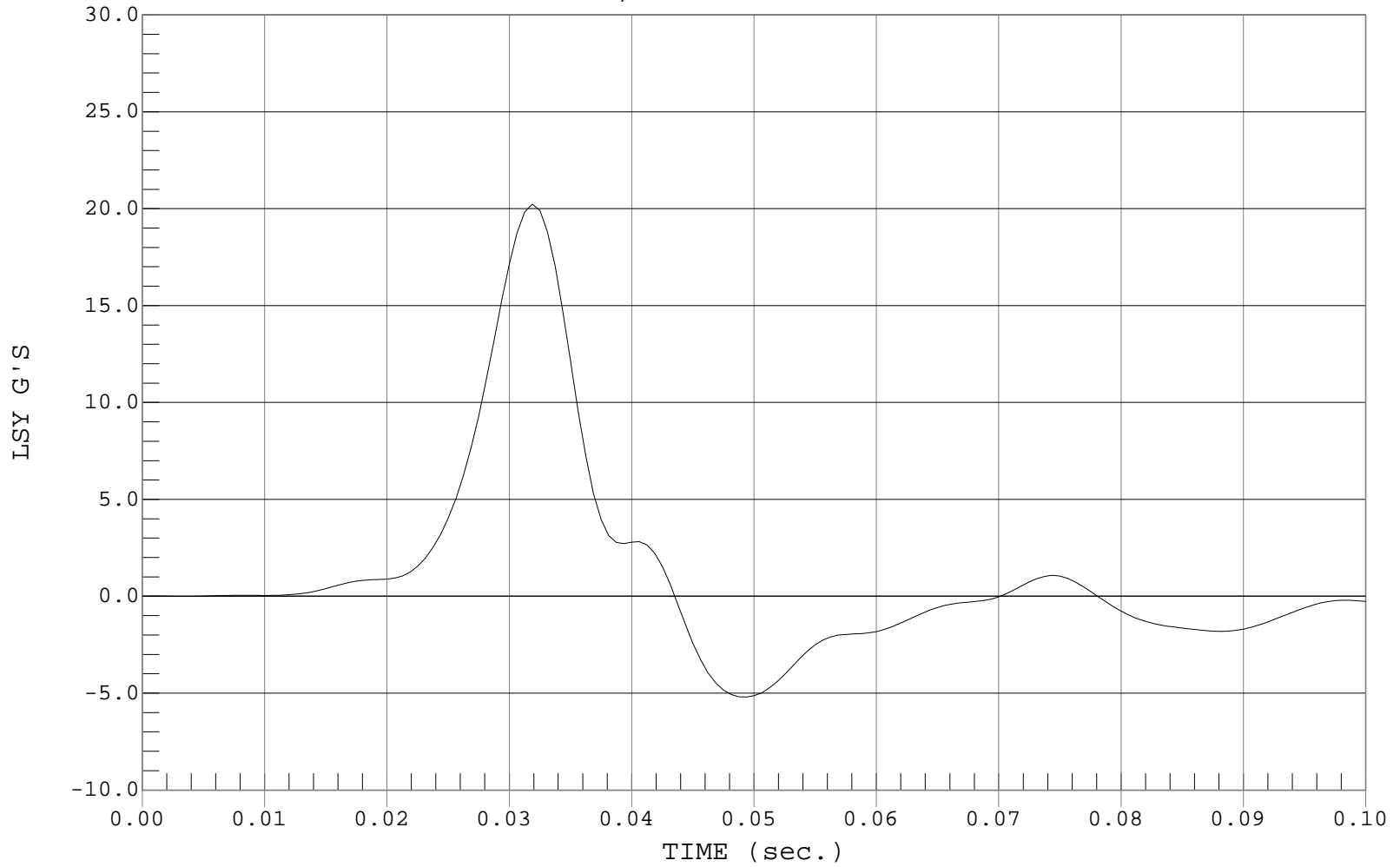
### LOWER SPINE ACCELERATION

Test Desc.: Dummy Calibration - Thorax Impact  
Component: Dummy #049

Test Date: 03-21-01  
Speed: 14.04 FT/SEC, 4.28 M/SEC

— 1 LSY, D01352FI.R10

Ymin = -5.2 G'S @ 0.0494 sec., Ymax = 20.24 G'S @ 0.0319 sec.



MGA RESEARCH CORPORATION  
PELVIS IMPACT TEST  
SIDE IMPACT DUMMY (SID)

Date: 3/21/01

Dummy Serial Number: 049

Test Number: D01353

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.6
Relative Humidity (%)	10 – 70	22
Probe Speed (m/s)	4.27 – 4.33	4.28
Pelvis Acceleration (g's)	40 – 60	48

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



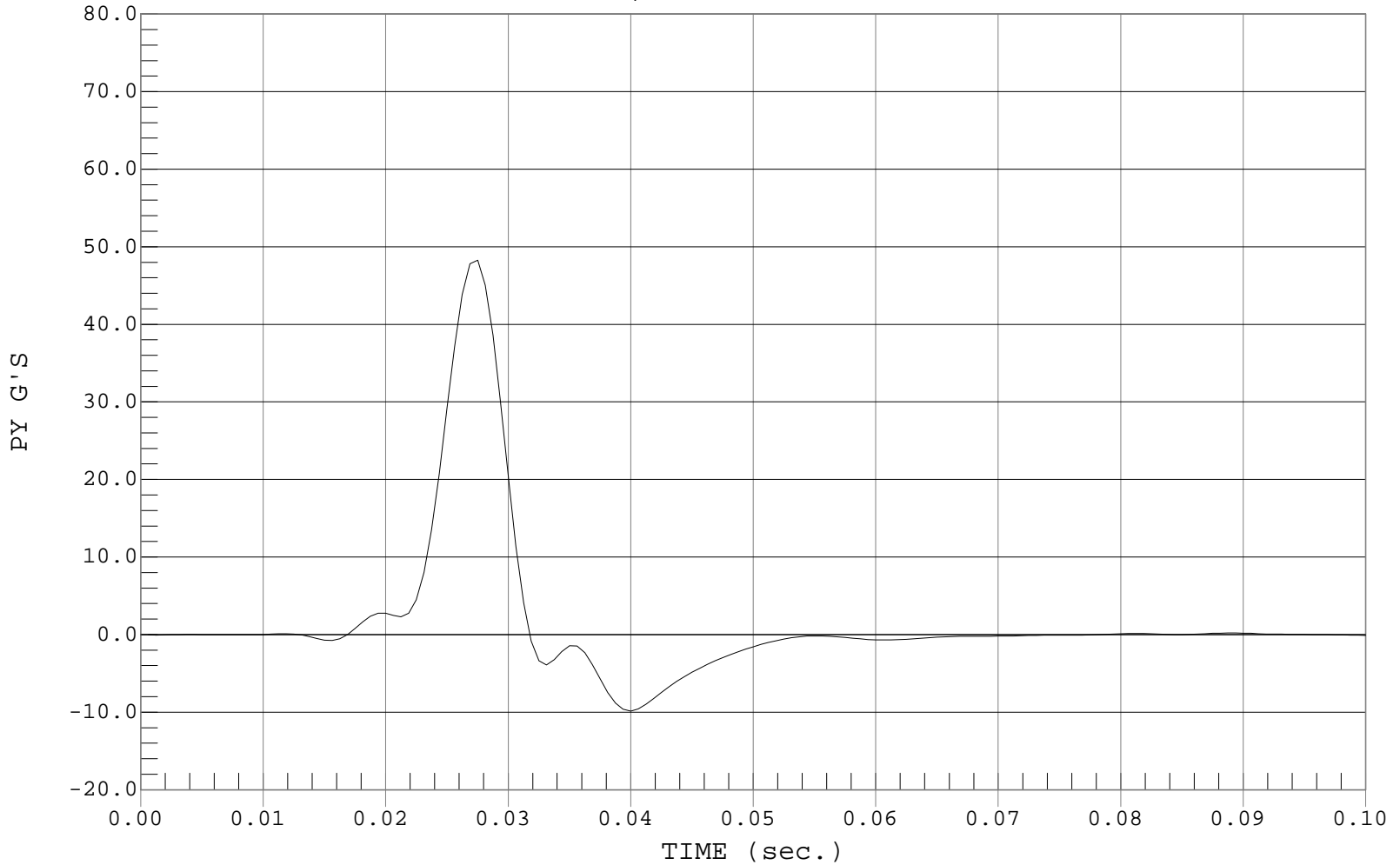
### PELVIS ACCELERATION

Test Desc.: Dummy Calibration - Pelvis Impact  
Component: Dummy #049

Test Date: 03-21-01  
Speed: 14.05 FT/SEC, 4.28 M/SEC

— 1 PY, D01353FI.R11

Ymin = -9.85 G'S @ 0.0400 sec., Ymax = 48.28 G'S @ 0.0275 sec.



MGA RESEARCH CORPORATION  
ABDOMINAL COMPRESSION TEST (PRELOAD = 10 LBS)  
SIDE IMPACT DUMMY (SID)

Date: 3/21/01  
Dummy Serial Number: 049  
Test Number: D01354

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	22.6
Relative Humidity (%)	10 – 70	26
Force @ 12.7 mm	104 – 162	131
Force @ 19 mm	163 – 222	183
Force @ 25.4 mm	222 – 280	242
Force @ 33 mm	325 - 391	333

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_



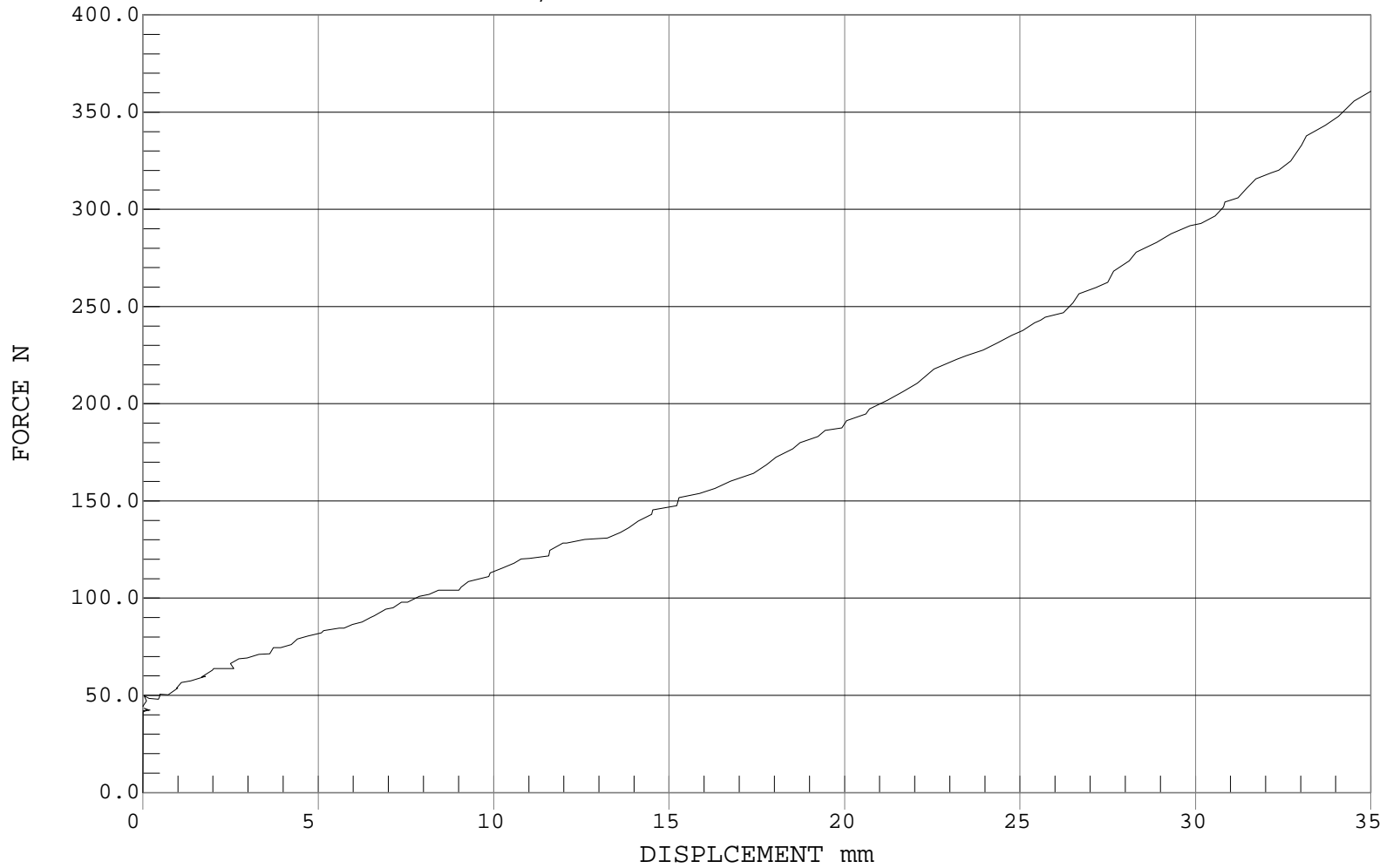
### ABDOMEN COMPRESSION

Test Desc.: DUMMY CALIBRATION - ABDOMEN COMPRESSION  
Component: DUMMY # 049

Test Date: 03-21-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 FORCE, D01354FC.F16

Ymin = 0 N @ 0.0000 mm, Ymax = 437.93 N @ 40.6267 mm





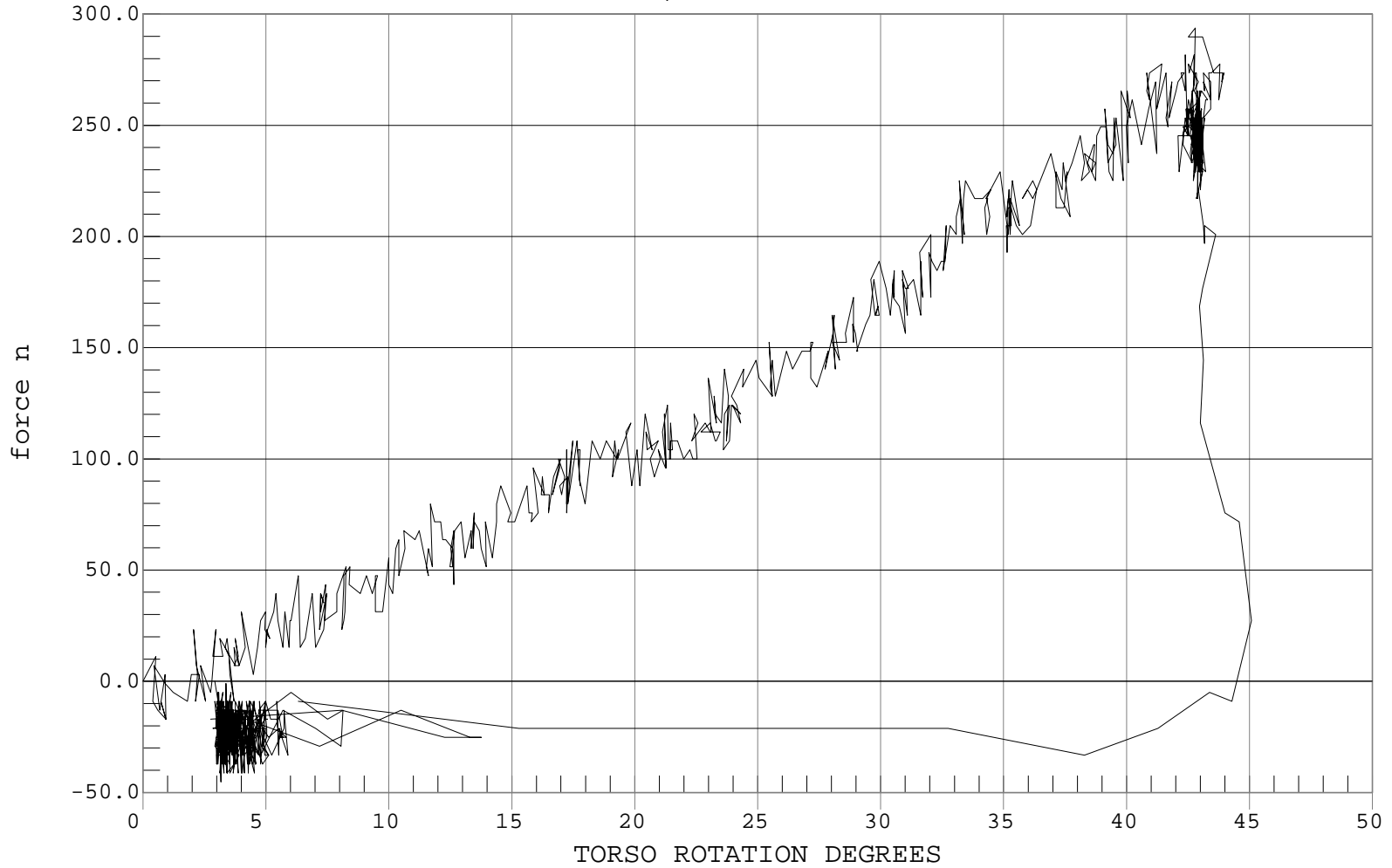
### LUMBAR FLEXION

Test Desc.: DUMMY CALIBRATION - LUMBAR FLEXION  
Component: DUMMY # 049

Test Date: 03-21-01  
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 FORCE, D01355FC.F14

Ymin = -45.34 n @ 3.1702 DEGREES, Ymax = 293.73 n @ 42.7977 DEGREES



MGA RESEARCH CORPORATION  
LUMBAR FLEXION TEST  
SIDE IMPACT DUMMY (SID)

Date: 3/21/01  
Dummy Serial Number: 049  
Test Number: D01355

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	22.8
Relative Humidity (%)	10 – 70	24
Force @ 0°	0 – 26.7	0
Force @ 20°	97.9 – 151.2	104.0
Force @ 30°	151.2 – 204.6	176.7
Force @ 40°	204.6 – 258.0	253.4
Return Angle	12° maximum	3

TEST MEETS SPECIFICATIONS

Technician: \_\_\_\_\_

Approved By: \_\_\_\_\_

## DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Dummy Serial Number: 049

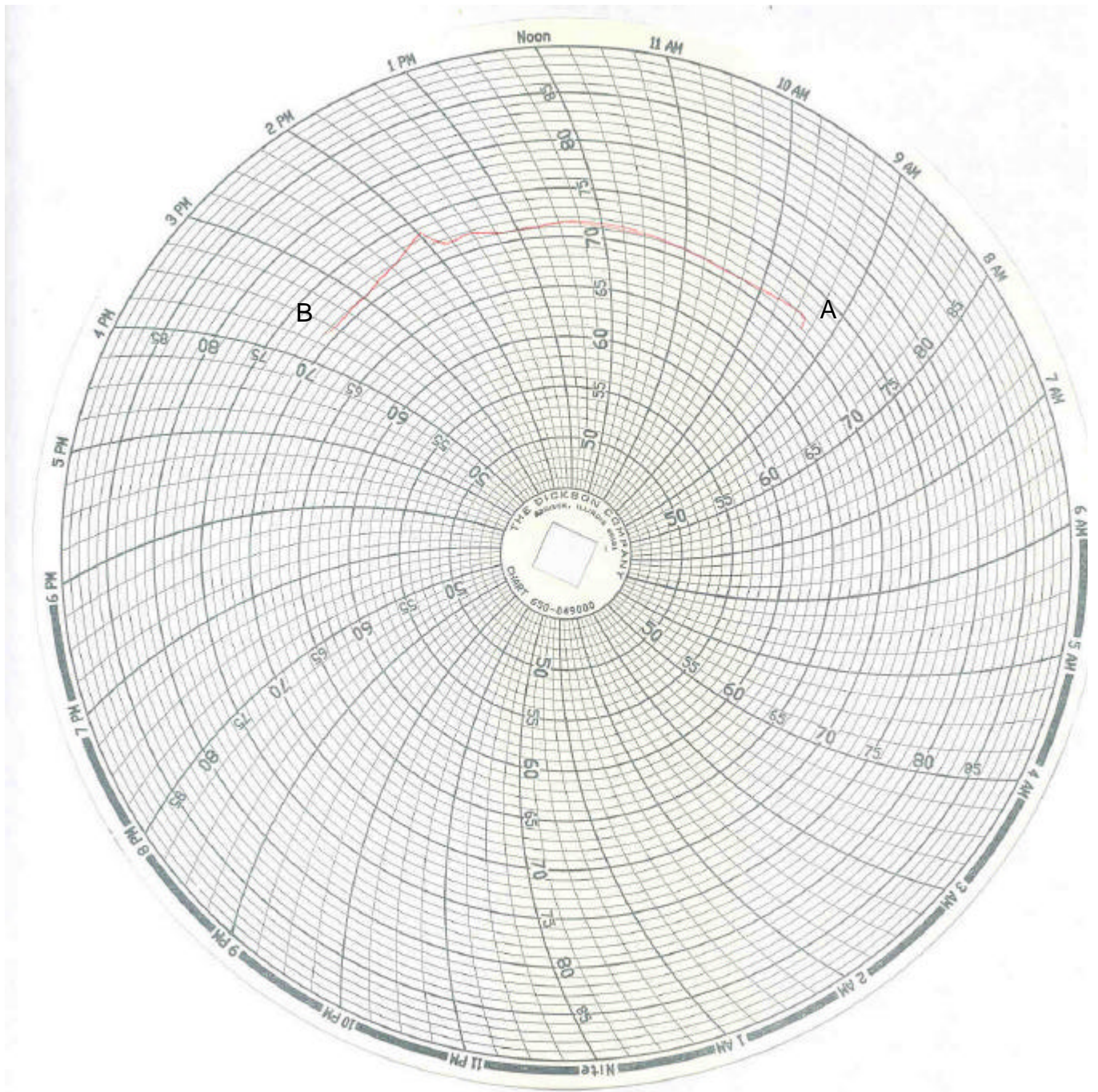
Inspected By: Tim Michnay

Date: 3/22/01

<u>Part</u>	<u>Items Checked</u>	<u>Comments</u>
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual	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		

Notes (include component/problem/action/reason):

# VEHICLE AND DUMMY TEMPERATURE



A = Dummies installed in vehicle at 9:15 a.m.

B = Test conducted at 3:30 p.m.

## **APPENDIX D**

### **TEST EQUIPMENT LIST AND CALIBRATION INFORMATION**

DUMMY AND VEHICLE CALIBRATION DATA

INSTRUMENTS FOR DRIVER DUMMY NO. 049			
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib Y	AN8L6	Endevco	9/5/00
Lower Rib Y	AC913	Endevco	12/14/00
Lower Spine Y	J11784	Endevco	12/12/00
Pelvis Y	J11047	Endevco	12/12/00
Upper Rib Redundant Y	APY13	Endevco	9/5/00
Lower Rib Redundant Y	AGTT3	Endevco	11/17/00
Lower Spine Redundant Y	J11046	Endevco	12/12/00
Pelvis Redundant Y	AMP95	Endevco	10/3/00
Head Center of Gravity X	J13930	Endevco	12/12/00
Head Center of Gravity Y	J13631	Endevco	12/12/00
Head Center of Gravity Z	J13990	Endevco	12/12/00

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Moving Barrier CG X	I25-F09	Entran	12/13/00
Moving Barrier CG Y	I25-F07	Entran	12/13/00
Moving Barrier CG Z	I25-F08	Entran	12/13/00
Moving Barrier Rear Axle X	G13-B07	Entran	12/13/00
Moving Barrier Rear Axle Y	F11-G02	Entran	1/4/01
Left Mid A-Post Y	J04-F10	Entran	2/15/01
Left Lower A-Post Y	K16-X02	Entran	2/7/01
Left Mid B-Post Y	I25-F10	Entran	11/15/00
Left Lower B-Post Y	I25-F12	Entran	11/15/00
Rear Floorpan Above Axle X	G13-F02	Entran	2/7/01
Rear Floorpan Above Axle Y	G13-F15	Entran	2/7/01
Rear Floorpan Above Axle Z	G13-F12	Entran	2/7/01
Driver Seat Track Y	E25-G07	Entran	9/14/00
Right Side Sill at Front Seat X	I14-D18	Entran	11/17/00
Right Side Sill at Front Seat Y	I25-J08	Entran	11/17/00
Right Side Sill at Front Seat Z	C25-A17	Entran	11/17/00
Right Side Sill at Rear Seat X	C05-Z13	Entran	2/7/01
Right Side Sill at Rear Seat Y	C14-Z07	Entran	2/7/01
Right Side Sill at Rear Seat Z	D06-A03	Entran	2/7/01
Left Side Sill at Front Seat Y	I25-J10	Entran	2/7/01
Left Side Sill at Rear Seat Y	D05-R16	Entran	2/7/01
Vehicle CG X	J16-F02	Entran	2/7/01
Vehicle CG Y	H02-J14	Entran	2/7/01
Vehicle CG Z	I18-E02	Entran	2/7/01

Note: All Endevco accelerometers are Model No. 7264-2000

All Entran accelerometers are Model No. EGE-72