V3522

ES-2 – FULL SCALE VEHICLE TESTS
REPORT NO. 4

FMVSS NO. 214
"SIDE IMPACT PROTECTION"

1996 Ford Taurus 4 door

MGA Research Corporation
5000 Warren Road
Burlington, WI 53105

Test Date August 25, 2000

Report Date November 8, 2000

FINAL REPORT

Prepared For.

U.S. Department of Transportation
Volpe National Transportation System Center
55 Broadway, Kendall Square
Cambridge, MA 02142

This Final Report was prepared for the U S Department of Transportation, Volpe National Transportation System Center, under Contract No DTRS57-98-D-00041.

Prepared By _____
Dave Kosloske, Project Engineer

Approved By _____
David Winkelbauer, Program Manager

Approval Date 12/8/00

Technicians: Wayne Dahlke
Erik Nelson
Chris Novak
Kurt Range
John Slatner
John Wistert

Photographic Chris Kulis
Cyndie Clausen

Instrumentation/Calibration Tim Michnay

Administrative Assistant: Donna M Janovicz

FINAL REPORT ACCEPTED BY .

Accepted By _____
Contract Technical Manager

Acceptance Date _____

TABLE OF CONTENTS

SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of Contract No DTRS57-98-D-00041 sponsored by the U S Department of Transportation, Volpe National Transportation System Center The purpose of this test was to evaluate the response of the ES-2 dummies in a 1996 Ford Taurus 4 door when subjected to the FMVSS 214 test procedure (TP-214D-05, dated August 2, 1999). This test is one of six dynamic tests which were conducted on different test vehicles to observe ES-2 responses utilizing different impact devices and impact conditions Specifically, two tests utilizing the European Moving Deformable Barrier, two tests utilizing the FMVSS No. 214 Moving Deformable Barrier and two tests utilizing the FMVSS No. 214 Moving Deformable Barrier under NCAP test impact conditions.

Date	Test Type	Vehicle
August 8, 2000	European Side	1996 Geo Metro 3 Door
August 11, 2000	European Side	1996 Ford Taurus 4 Door
August 15, 2000	FMVSS 214	1996 Ford Taurus 4 Door
August 25, 2000	FMVSS 214	1996 Ford Taurus 4 Door
September 12, 2000	NCAP Side	1998 Chevrolet Cavalier 4 Door
September 14, 2000	NCAP Side	2000 Pontiac Grand Am 2 Door

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

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 1996 Ford Taurus 4 door was impacted on the left 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 52 3 kph (32 5 mph) The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on August 25, 2000 Pre- and post-test photographs of the test vehicle, the MDB and the side impact dummies (ES-2s) are included in Appendix A

Two ES-2 side impact dummies were placed in the left front and left rear designated seating positions according to instructions specified in the OVSC Side Impact Laboratory Test Procedure which is dated August 2, 1999 The side impact event was documented by nine high speed cameras and one real-time camera. Camera locations and other pertinent camera information can be found in this report

Appendix B contains the vehicle and dummy response data traces. A summary of the side impact dummy (ES-2) configuration and performance verification test data is shown in Appendix C Dummy and vehicle calibration data can be found in Appendix D of this report. Appendix E contains a copy of the dummy positioning procedure used Appendix F contains the ES-2 Peak Responses

The following tables summarize the results of the Left Side Impact test:

		Left Front Driver	Left Rear Passenger
1) Head Performance Criteria			
≤ 1000	T_1 (msec)	No contact	25
	T_2 (msec)	No contact	96
	HPC	No contact	75
2) Thorax Performance Criteria			
2 1) Chest Deflection ≤ 42 mm	Upper Rib Deflection	35	22
	Mid Rib Deflection	33	21
	Lower Rib Deflection	24	11
2 2) Viscous Criteria ≤ 1.0 m/sec	Upper Rib	0 36	0.11
	Mid Rib	0 34	0 15
	Lower Rib	0.18	0.05
3) Abdominal Protection Criterion			
Sum ≤ 2500 N	Front Abdominal Force	706	1279
	Mid Abdominal Force	1015	658
	Rear Abdominal Force	826	340
	Sum of Abdominal Force	2513	2167
4) Pelvis Performance Criterion			
≤ 6000 N	Pubic Symphysis Force	1020	2261

		Left Front Driver	Left Rear Passenger
HIC	T_1 (msec)	53 3	44.8
	T_2 (msec)	89.3	71 0
	$T_2 - T_1$ (msec)	36 0	26.2
	HIC	150	154

FIR Filtered	Left Front Driver	Left Rear Passenger
Upper Rib Y (g's)	99	42
Middle Rib Y (g's)	72	61
Lower Rib Y (g's)	74	72
Lower Spine Y (g's)	53	54
Pelvis Y (g's)	80	46
TTI (g's)	76	63

TEST NOTES

The data plots shown in Appendix B relate to the ES-2 injury criteria and the vehicle accelerations A complete data set, including all ES-2 instrumentation, can be found by accessing the electronic data from the U S Department of Transportation.

SECTION 3

SIDE IMPACT DUMMY (ES-2) AND VEHICLE TEST DATA

DATA SHEET NO 1

GENERAL VEHICLE TEST PARAMETER DATA

TEST VEHICLE INFORMATION

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Vehicle Identification No (VIN) 1FALP52U3TG233409

Vehicle Body Color Green

Build Date 3/96

Engine Data 6 cylinders; 3 0 liters;

Placement ___ longitudinal, X lateral

Transmission Data 4 speed

___ manual, X Automatic; X O/D

Final Drive ___ rear wheel drive; X front wheel drive;

___ four wheel drive

Odometer Reading: 130,130 km

Options X air conditioning; X power steering, X power brakes;

X power windows, X cruise control, X tilt wheel,

___ power door locks

DATA FROM TIRE PLACARD

Tire Pressure (at capacity) Front: 33 psi

Rear 33 psi

Recommended Tire Size P205/65R15

Tires on Test Vehicle P205/65R15

Manufacturer Continental

VEHICLE CAPACITY DATA:

Number of Occupants 3 Front, 3 Rear, ___ 3rd Seat; 6 Total

Type of Front Seats ___ Bucket, ___ Bench, X Split Bench

Type of Front Seat Back ___ Fixed; X Adjustable with.

X Lever, ___ Knob, ___ Power

Vehicle Maximum Capacity Loading 499 0 kg (A)

No. of Occupants x 68 04 kg 408 2 kg (B)

Cargo Capacity (A-B) 90.8 kg

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

WEIGHT OF VEHICLE WITH MAXIMUM FLUIDS AND FUEL:

Right Front	490 3	kg	Right Rear	268 5	kg
Left Front:	498.0	kg	Left Rear	275 3	kg
TOTAL FRONT.	988 3	kg	TOTAL REAR	543.8	kg
% of Total Weight:	64 5	%	% of Total Weight:	35 5	%
TOTAL WEIGHT	1532 1	kg			

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	1532 1	kg
Cargo Carrying Capacity of Test Vehicle	=	90 8	kg
Weight of 2 Side Impact Dummies (2 x 80 7 kg)	=	161 4	kg
TEST VEHICLE TARGET WEIGHT	=	1784.3	kg

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO: (FULLY LOADED)

Right Front	500.3	kg	Right Rear	348 4	kg
Left Front	545 2	kg	Left Rear:	390.1	kg
TOTAL FRONT	1045 5	kg	TOTAL REAR:	738.5	kg
% of Total Weight	58.6	%	% of Total Weight	41 4	%
TOTAL WEIGHT	1784 0	kg			

TEST VEHICLE ATTITUDE

	Curb Weight	Fully Loaded Weight Attitude	Test Attitude
Right Front (mm):	700	695	691
Left Front (mm)	694	678	681
Right Rear (mm)	676	638	632
Left Rear (mm)	669	621	622

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)

Test Vehicle Wheelbase 2756 mm

C G As Tested 1136 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH

Right Side: 4332 mm

Centerline 4972 mm

Left Side 4334 mm

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel 250 mm

Test Position 125 mm rearward of 250 mm total

FRONT SEAT BACK ADJUSTMENT POSITION

Seat Back Angle: 24 2 degrees

REAR SEAT.

Total Length of Fore/Aft Adjustment Travel non-adjustable

Seat Back Adjustment Position non-adjustable

ADJUSTABLE STEERING COLUMN POSITION mid position

WINDOW POSITIONS

Left Front	Closed	Left Rear:	Removed
Right Front	Closed	Right Rear:	Removed

AMOUNT OF WATER IN FUEL TANK

Test mass added = 56 8 kg

LOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED

Wheelbase 2756 mm

Impact Point is 438 mm rearward of front axle centerline

DATA SHEET NO 2

TEST VEHICLE SUMMARY OF RESULTS

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date August 25, 2000

Overall Length 4972 mm, Overall Width 1857 mm

TEST WEIGHT

Right Front	507 1	kg	Right Rear	346 1	kg
Left Front	536 6	kg	Left Rear.	386 0	kg
TOTAL FRONT	1043 7	kg	TOTAL REAR	732 1	kg
% of Total Weight	58 8	%	% of Total Weight	41.2	%
TOTAL WEIGHT	1775 8	kg			

Wheelbase 2756 mm

Longitudinal C G from Center of Front Axle 1136 mm

Impact Angle with Respect to Impactor 90 degrees

MAXIMUM EXTERIOR STATIC CRUSH

1	LEVEL 1 (246 mm above ground)	202 mm
2	LEVEL 2 (434 mm above ground)	355 mm
3	LEVEL 3 (561 mm above ground)	368 mm
4	LEVEL 4 (866 mm above ground)	254 mm
5	LEVEL 5 (1312 mm above ground)	70 mm
	Maximum Post-Test Intrusion	368 mm @ Level 3

OCCUPANTS	Left Front Driver	Left Rear Passenger
Type of Dummy	ES-2	ES-2
Restraints Used	Type II belt	Type II belt

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)

INSTRUMENTATION

Number of Vehicle Data Channels 29

Number of Cameras.

Onboard Vehicle	3
Offboard Vehicle	4
Deformable Barrier:	2
TOTAL	9

DATA SHEET NO 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Impactor FMVSS 214 Moving Deformable Barrier

Test Date August 25, 2000

POSITION OF IMPACT (MDB) ON MONORAIL

Crabbed 27 degrees to left

MDB DETAILS:

Overall Width of Framework Carriage·	1252	mm
Overall Length of MDB (incl. Honeycomb impact face).	4115	mm
Wheelbase of Framework Carriage	2591	mm
Tread of Framework Carriage (Front & Rear)	1880	mm
C G. Location Rearward of Front Axle	1100	mm
C G Location From Centerline	-10	mm
C G Location Above Ground Level	477	mm
Tire Manufacturer	Fidelity	
Tire Size.	P215/75D15	
Tire Pressure·	25 psi	

MDB WEIGHT:

Right Front:	458 8	kg	Right Rear·	230 3	kg
Left Front.	324.4	kg	Left Rear.	350 6	kg
TOTAL FRONT	783.2	kg	TOTAL REAR	580.9	kg
TOTAL MDB WEIGHT:	1364.1	kg			

Impact Angle (MDB C/L to Target Vehicle C/L) = 90 degrees

Impact Speed = Primary 32 5 mph (52 3 kph), Secondary: 32 4 mph (52.1 kph)

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

1	Row A Top of Stack (813 mm)	=	111	mm
2	Row B Mid Stack (686 mm)	=	73	mm
3	Row C Top of Bumper (533 mm)	=	57	mm
4	Row D Center of Bumper (432 mm)	=	111	mm

INSTRUMENTATION:

Number of MDB Data Channels 5

DATA SHEET NO. 4

POST TEST OBSERVATIONS

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date August 25, 2000

VISIBLE DUMMY CONTACT POINTS

	Left Front Driver	Right Rear Passenger
Head	Side header	C post
Arm	Door above armrest	Window sill
Upper Rib	Door above armrest	Armrest
Mid Rib	Door above armrest	Armrest
Lower Rib	Door above armrest	Armrest
Abdomen	Door below armrest	Armrest
Pelvis	Door below armrest	Door below armrest

DOOR OPENING

	Left Side	Right Side
Front	Remained closed	Remained closed
Rear	Remained closed	Remained closed

MDB DISTANCE FROM TARGET IMPACT POINT

Horizontal 8 mm forward

Vertical 0 mm

ARM REST LOCATIONS

Front 228 mm from bottom of window

Rear 214 mm from bottom of window

SEAT CRUSH

Front Seat Back 39 mm Front Seat Cushion 61 mm

Left Rear Seat Back 126 mm Rear Seat Cushion 119 mm

POST TEST OBSERVATIONS (Cont'd)

GLAZING DAMAGE

Both left side windows broke, windshield cracked

PILLAR PERFORMANCE:

No failures noted

SILL SEPARATION

None noted

OTHER NOTABLE IMPACT EFFECTS

None noted

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO 5

SIDE IMPACT DUMMY (ES-2) INSTRUMENTATION DATA

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

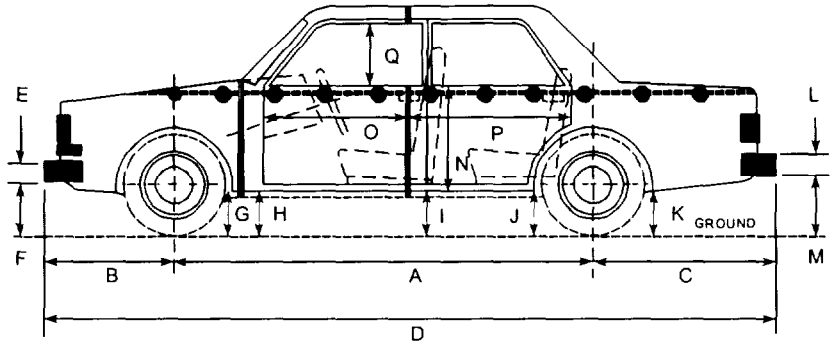
Test Date. August 25, 2000

	LEFT FRONT DRIVER ID #001			
	Positive		Negative	
	Max	Time (msec)	Max	Time (msec)
RIB ACCELERATIONS (g's)				
Left Upper Rib (LUR) Y	98 9	34	15.4	90
Left Middle Rib (LMR) Y	71 8	69	25 8	81
Left Lower Rib (LLR) Y	73 9	39	22 0	70
SPINE ACCELERATIONS (g's)				
Lower Lateral Y	53 6	42	12.4	88
PELVIS ACCELERATIONS (g's)				
Lateral Y	79 5	33	18.3	66
	LEFT REAR PASSENGER ID#002			
	Positive		Negative	
	Max	Time (msec)	Max	Time (msec)
RIB ACCELERATIONS (g's)				
Left Upper Rib (LUR) Y	42 3	44	6 6	71
Left Middle Rib (LMR) Y	61 4	48	10 5	98
Left Lower Rib (LLR) Y	71 8	49	8 1	97
SPINE ACCELERATIONS (g's)				
Lower Lateral Y	53 5	48	4 5	84
PELVIS ACCELERATIONS (g's)				
Lateral Y	46 4	40	15 1	52

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

DATA SHEET NO. 6

VEHICLE PRE AND POST-TEST MEASUREMENTS



LEFT SIDE VIEW

D=Length at Centerline R=Right Side Length S=Left Side Length
T=Width at B Post J1=To Pinch Weld J2= To Sill E&L=Bumper Thickness

	PRE-TEST	POST-TEST	Δ CHANGE
A	2756	2733	23
B	1046	1074	28
C	1170	1148	22
D	4972	4955	17
E	100	100	0
F	386	394	8
G	165	175	10
H	162	164	2
I	142	144	2
J1	128	85	43
J2	132	133	1
K	216	216	0
L	200	200	0
M	298	298	0
N	678	672	6
O	806	765	41
P	1185	1090	95
Q	473	450	23
R	4332	4282	50
S	4334	4340	6
T	1857	1514	343

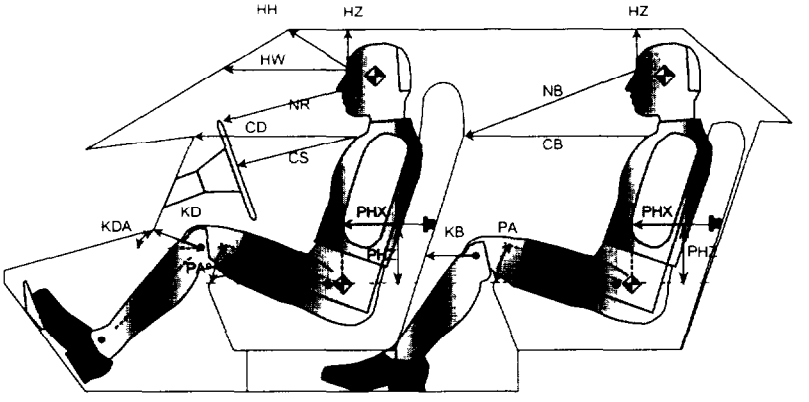
All measurements in millimeters

DATA SHEET NO 7

SIDE IMPACT DUMMY (ES-2) LONGITUDINAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date August 25, 2000



Note All dimensions are in millimeters with tolerance of ± 3 mm

	Left Front Driver ID #001	Left Rear Passenger ID #002
HH	300	NA
HW	557	NA
HZ	150	126
NR/NB	420	661
CD/CB	545	611
CS	335	NA
KDL/(KDA)	190 (0 0)	300 (0 0)
KDR/(KDA)	192 (0 0)	298 (0 0)
PA (longitudinal)	22 5	27 0
PA (lateral)	0.7	2.7
Spine Angle (longitudinal)	23.3	29 5
Spine Angle (lateral)	0 2	2.3
PHX	226	298
PHZ	126	270

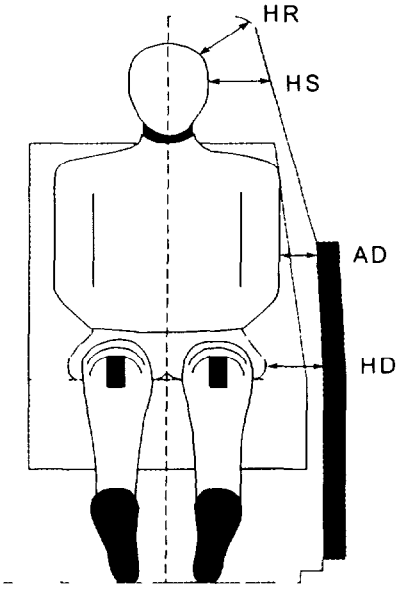
Two door vehicle shown Rear dummy PHX & PHZ measurements for 4-door vehicle use the C-Post striker as reference point

DATA SHEET NO 8

SIDE IMPACT DUMMY (ES-2) LATERAL CLEARANCE DIMENSIONS

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date: August 25, 2000



Note All dimensions are in millimeters

	Left Front Driver ID #001	Left Rear Passenger ID #002
HR	195	180
HS	298	327
AD	115	96
HD	158	148
Abdomen to Door	160	211
Shoulder to Door	140	138
Shoulder to Window	206	188

Door Thickness (mm)	Thorax	Pelvis H Point
Front	190	210
Rear	205	190

DATA SHEET NO. 9

DUMMY POSITIONING

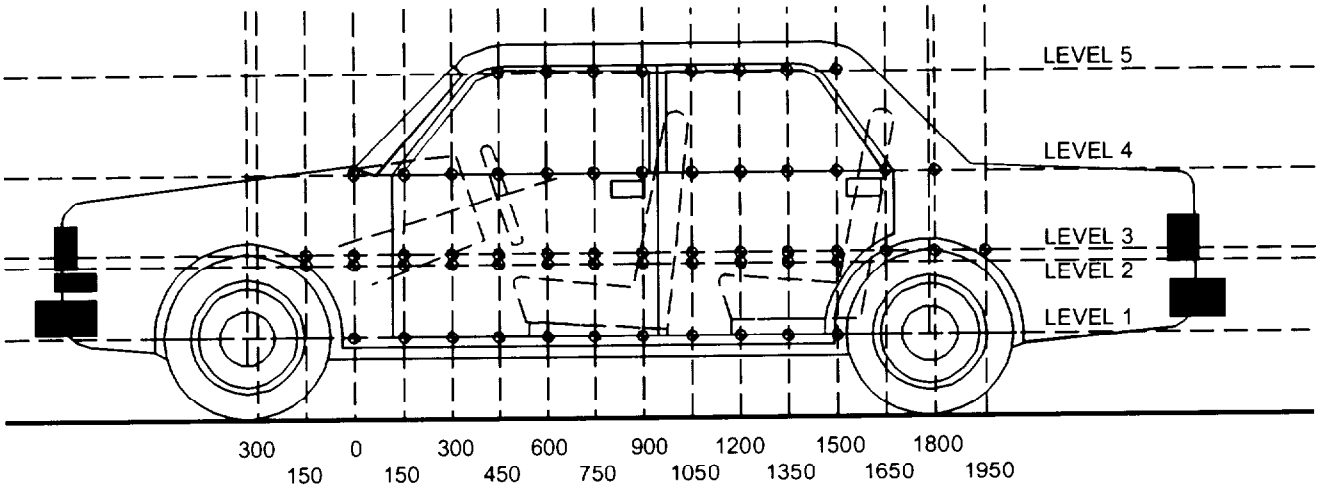
	Left Front Driver ID #001		Left Rear Passenger ID #002	
	H-point	Dummy	H-point	Dummy
HP to Floor Z	163	185	50	54
HP to Hinge X	736	742	653	645
HP to Sill Y	197	204	200	210
HP to Striker X	377	370	485	480
HP to Dash X	487	489	624	613
HP to Header Z	743	726	714	710
HP to Front Axle		1258		2206
HP to Ground		505		556
H-POINT MACHINE (deg)				
Left Knee	125		109	
Right Knee	124		107	
Left Foot	109		127	
Right Foot	113		130	
Left Leg (mm)	84		148	
Right Leg (mm)	120		150	
Hip Angle	98		98	
Back Angle	24		25	

DATA SHEET NO 10

VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date: August 25, 2000



LEFT SIDE VIEW

NOTE: All measurements are in millimeters (mm)

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

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE "AS TESTED" CONFIGURATION
MEASUREMENTS ALONG THE VERTICAL 750 mm LINE SHOWN ABOVE

Level 1 @ Axle Centerline Height (or Sill Top Height)	246	mm
Level 2 @ Occupant H-Point	434	mm
Level 3 @ Mid Door:	561	mm
Level 4 @ Window Sill:	866	mm
Level 5 @ Window Top	1312	mm

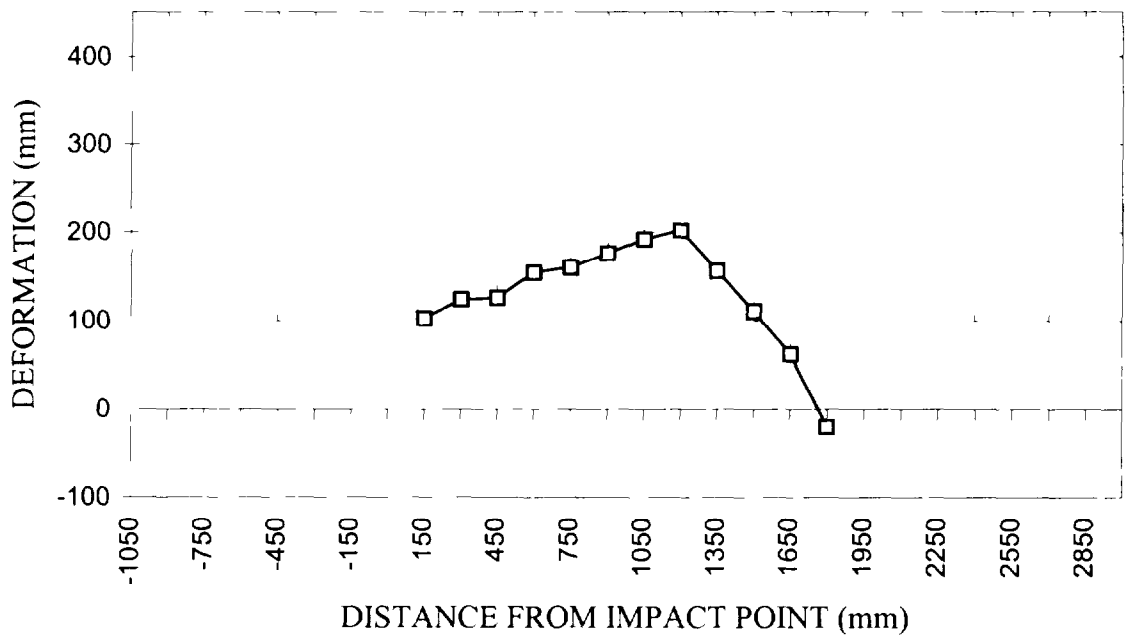
DATA SHEET NO 11
VEHICLE EXTERIOR CRUSH PROFILES

	Level 1 – Axle Centerline		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150	671	774	103
300	667	791	124
450	667	793	126
600	662	816	154
750	665	825	160
900	665	841	176
1050	666	858	192
1200	668	870	202
1350	669	825	156
1500	671	782	111
1650	664	727	63
1800	664	644	-20
1950			
2100			
2250			
2400			
2550			
2700			
2850			
3000			

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

VEHICLE EXTERIOR CRUSH PROFILES (Cont'd)

LEVEL 1 – AXLE CENTERLINE



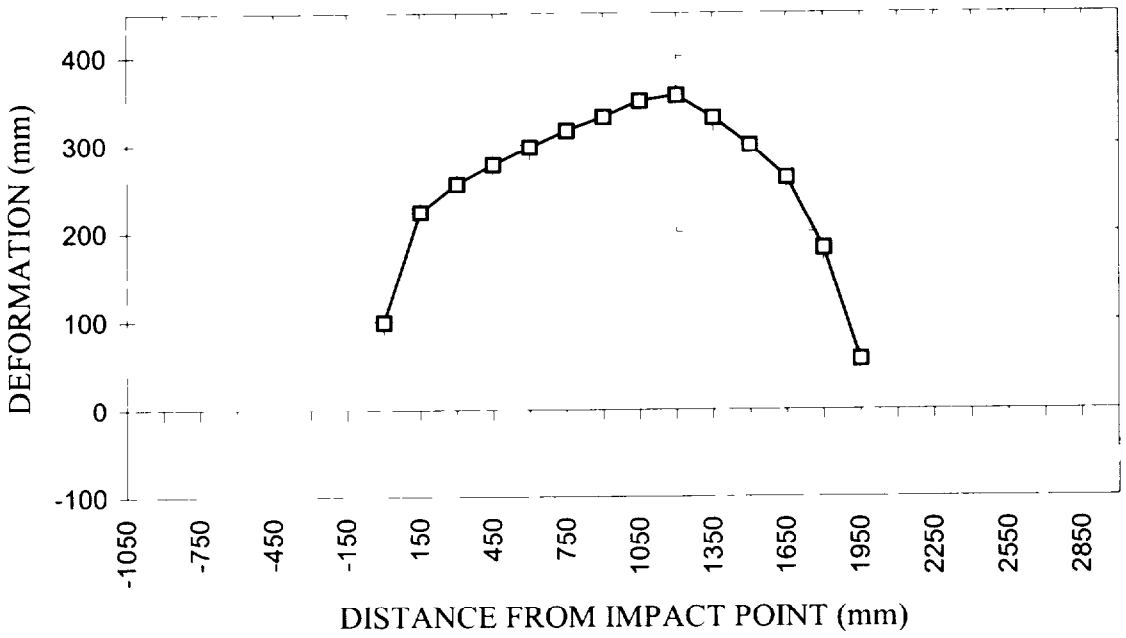
DATA SHEET NO 11 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

	Level 2 – Occupant H Point		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	618	717	99
150	613	836	223
300	608	863	255
450	603	880	277
600	598	895	297
750	594	910	316
900	591	922	331
1050	589	938	349
1200	592	947	355
1350	590	920	330
1500	591	890	299
1650	590	852	262
1800	591	773	182
1950	596	652	56
2100			
2250			
2400			
2550			
2700			
2850			
3000			

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

VEHICLE EXTERIOR CRUSH PROFILES (Cont'd)

LEVEL 2 – OCCUPANT H POINT



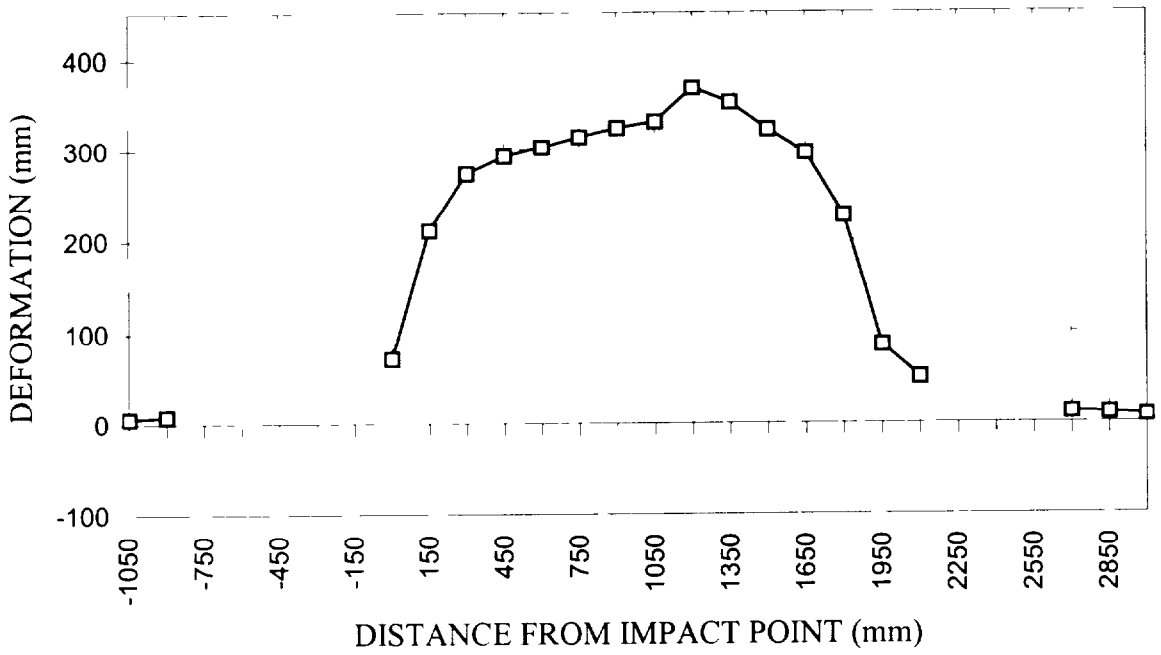
DATA SHEET NO 11 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

	Level 3 – Mid Door		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	713	719	6
-900	673	681	8
-750			
-600			
-450			
-300			
-150			
0 (impact point)	616	688	72
150	613	824	211
300	610	884	274
450	607	900	293
600	604	907	303
750	601	915	314
900	599	923	324
1050	596	927	331
1200	599	967	368
1350	598	950	352
1500	595	917	322
1650	594	890	296
1800	594	821	227
1950	594	680	86
2100	589	640	51
2250			
2400			
2550			
2700	638	650	12
2850	662	673	11
3000	690	698	8

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

VEHICLE EXTERIOR CRUSH PROFILES (Cont'd)

LEVEL 3 – MID DOOR



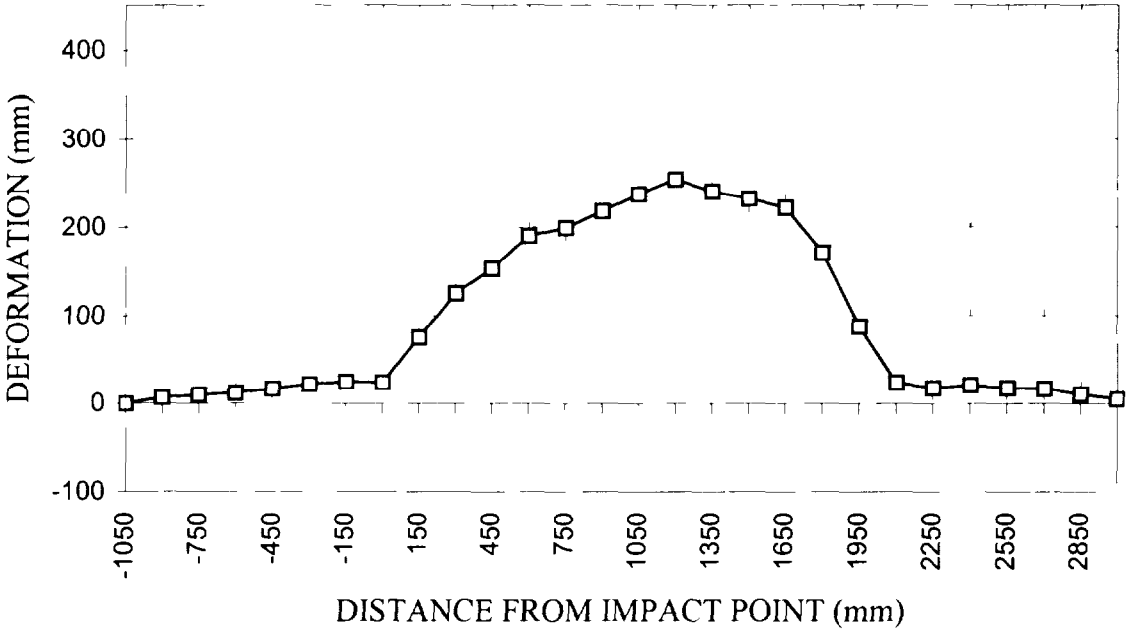
DATA SHEET NO 11 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

	Level 4 – Window Sill		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	775	775	0
-900	746	753	7
-750	727	737	10
-600	710	722	12
-450	696	713	17
-300	685	707	22
-150	676	701	25
0 (impact point)	670	694	24
150	665	741	76
300	660	785	125
450	665	818	153
600	650	840	190
750	648	847	199
900	642	860	218
1050	642	879	237
1200	642	896	254
1350	644	884	240
1500	642	874	232
1650	642	864	222
1800	644	815	171
1950	652	740	88
2100	658	682	24
2250	698	716	18
2400	679	700	21
2550	698	716	18
2700	713	730	17
2850	726	737	11
3000	758	763	5

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

VEHICLE EXTERIOR CRUSH PROFILES (Cont'd)

LEVEL 4 – WINDOW SILL



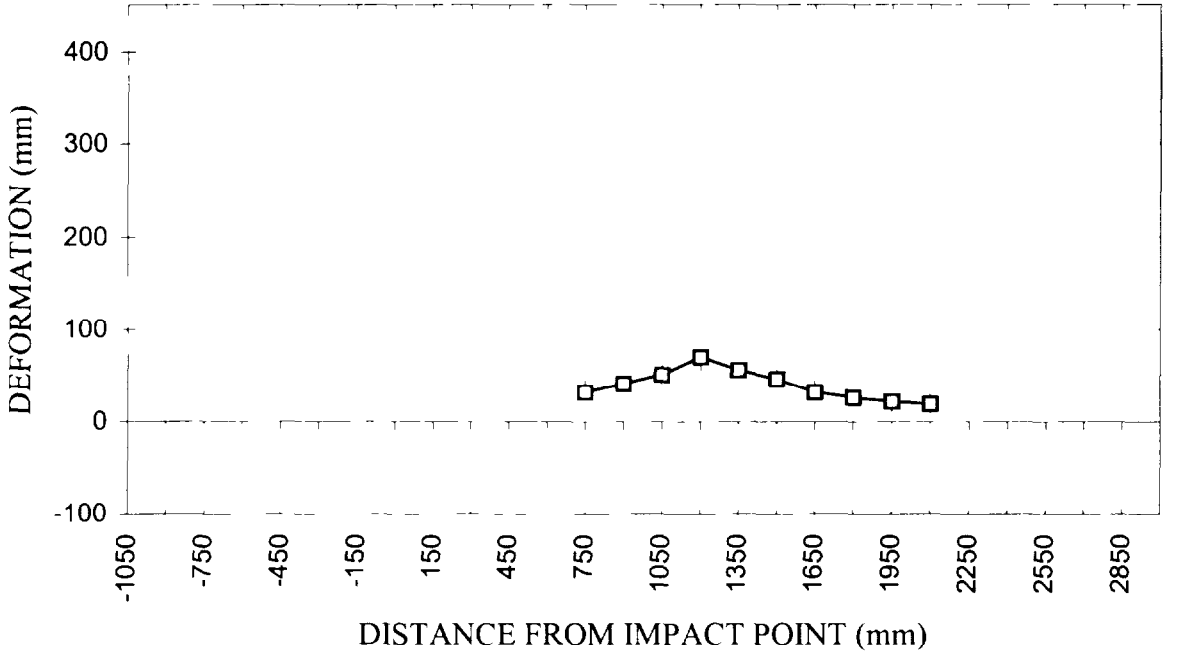
DATA SHEET NO. 11 (Cont'd)
VEHICLE EXTERIOR CRUSH PROFILES

	Level 5 – Window Top		
Longitudinal Distance (mm)	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750	924	956	32
900	924	965	41
1050	924	975	51
1200	928	998	70
1350	924	980	56
1500	922	968	46
1650	918	950	32
1800	914	940	26
1950	907	929	22
2100	906	925	19
2250			
2400			
2550			
2700			
2850			
3000			

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

VEHICLE EXTERIOR CRUSH PROFILES (Cont'd)

LEVEL 5 – WINDOW TOP

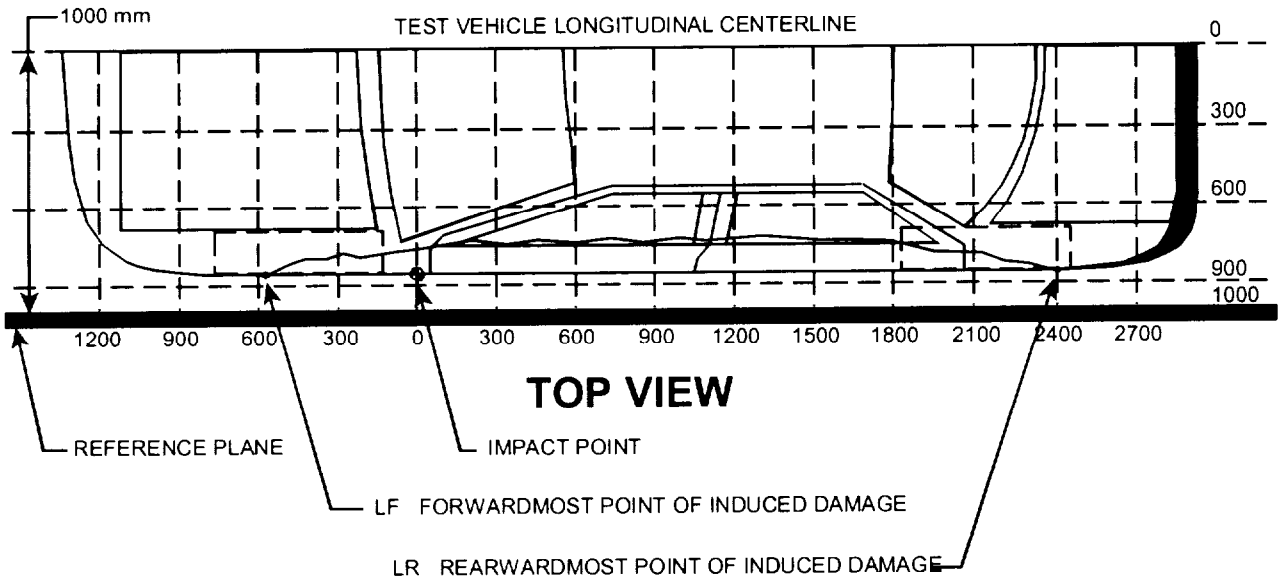


DATA SHEET NO 12

VEHICLE DAMAGE PROFILE DISTANCES

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date: August 25, 2000



MEASUREMENT CONVENTIONS

Forward of the impact point (towards front of vehicle) is considered negative (—)

Rearward of the impact point (toward rearend of vehicle) is considered positive (+)

DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1 (LR = 3150 mm)	730	726	4
2 2325 mm	698	672	26
3 1390 mm	947	644	303
4 593 mm	923	604	319
5 –232 mm	705	681	24
6 (LF = -1050 mm)	705	696	9

DATA SHEET NO 13

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

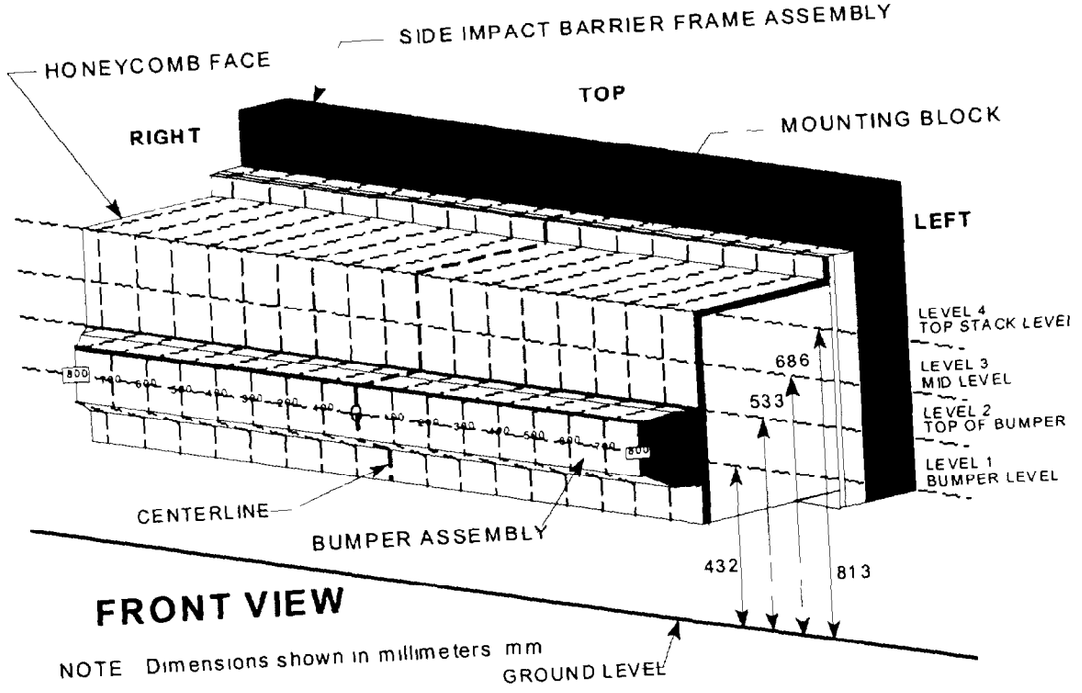
Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date· August 25, 2000

		Distance Right of Center (mm)									Distance Left of Center (mm)							
Location	Height At CL*	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
Top Stack Level 4	813 mm	24	11	1	-1	-1	0	0	1	1	1	1	3	7	9	28	61	111
Mid Level Level 3	686 mm	4	0	-2	-2	-2	1	5	4	2	1	2	3	3	5	6	13	73
Top Bumper Level 2	533 mm	36	18	9	-3	-1	-1	0	-1	1	5	10	14	18	24	33	44	57
Mid Bumper Level 1	432 mm	97	76	55	39	25	23	22	23	27	33	37	41	48	57	69	89	111

* See next page for Barrier Face Graphic

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR (Cont'd)

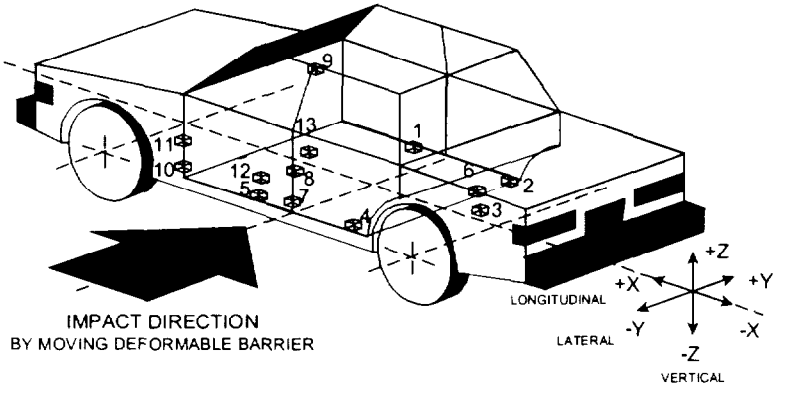


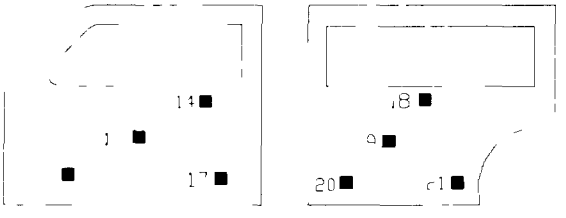
DATA SHEET NO. 14

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date August 25, 2000





1 – Right Side Sill @ Front Seat
2 – Right Side Sill @ Rear Seat
3 – Rear Floorpan Above Axle
4 – Left Side Sill @ Rear Seat
5 – Left Side Sill @ Front Seat
6 – Right Rear Occ Compartment
7 – Left Lower B Post
8 – Left Mid B Post
9 – Left Upper B Post
10 – Left Lower A Post
11 – Left Mid A Post
12 – Driver Seat Track
13 – Vehicle C G
14 – Left Front Door Upper
15 – Left Front Door Mid
16 – Left Front Door Lower
17 – Left Front Door Rear Lower
18 – Left Rear Door Upper
19 – Left Rear Door Mid
20 – Left Rear Door Lower
21 – Left Rear Door Rear Lower

DATA SHEET NO. 14 (Cont'd)

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date August 25, 2000

Accel No	Description	Long (X) Maximums (g's) (CFC 60)		Lat. (Y) Maximums (g's) (CFC 60)		Vert (Z) Maximums (g's) (CFC 60)		Resultant (g's) (CFC 60)
		Pos	Neg	Pos	Neg	Pos.	Neg	Max
1	Right Side Sill @ Front Seat	3 5	3 9	29 2	1 6	4 3	3 4	29 4
2	Right Side Sill @ Rear Seat	3 4	4 6	30 2	4 2	4.6	5 1	30 4
3	Rear Floorpan Above Axle	2 5	8 5	17.1	1.8	18 0	13 6	20.4
4	Left Side Sill @ Rear Seat	---	---	*	*	---	---	---
5	Left Side Sill @ Front Seat	---	---	*	*	---	---	---
6	Right Rear Occ Compartment	---	---	23 4	1 4	---	---	---
7	Left Lower B Post	---	---	125 2	38 2	---	---	---
8	Left Mid B Post	---	---	174.7	39.5	---	---	---
9	Left Upper B Post	---	---	45 3	15	---	---	---
10	Left Lower A Post	---	---	33 5	9 4	---	---	---
11	Left Mid A Post	---	---	48 0	14 8	---	---	---
12	Driver Left Seat Track	---	---	46 0	27.1	---	---	---
13	Vehicle CG	3 4	8 6	24 5	1 4	19 9	16.4	25 5
14	Left Front Door Upper	---	---	105 9	61 2	---	---	---
15	Left Front Door Mid	---	---	167 8	179.8	---	---	---
16	Left Front Door Lower			79 9	75.4		---	---
17	Left Front Door Rear Lower	---	---	172 7	182.3	---	---	---
18	Left Rear Door Upper	---	---	117 2	38 2	---	---	---
19	Left Rear Door Mid	---	---	232.8	127 0	---	---	---
20	Left Rear Door Lower	---	---	172 0	55 7	---	---	---
21	Left Rear Door Rear Lower	---	---	247 4	214 7	---	---	---

* No Valid Data Collected

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY (Cont'd)

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date August 25, 2000

Accel No	Description	Coordinates (mm)*		
		X	Y	Z
1	Right Side Sill @ Front Seat	2892	680	174
2	Right Side Sill @ Rear Seat	2015	675	177
3	Rear Floorpan Above Axle	1140	0	490
4	Left Side Sill @ Rear Seat	2033	-675	175
5	Left Side Sill @ Front Seat	2884	-680	177
6	Right Rear Occ. Compartment	2045	706	255
7	Left Lower B Post	2300	-745	409
8	Left Mid B Post	2309	-745	744
9	Left Upper B Post	2240	-705	1292
10	Left Lower A Post	3350	-728	318
11	Left Mid A Post	3420	-775	862
12	Driver Left Seat Track	2495	-535	231
13	Vehicle CG	2870	0	305
14	Left Front Door Upper	2607	-778	868
15	Left Front Door Mid	2900	-763	610
16	Left Front Door Lower	3082	-771	421
17	Left Front Door Rear Lower	2650	-780	470
18	Left Rear Door Upper	1700	-775	875
19	Left Rear Door Mid	1997	-770	580
20	Left Rear Door Lower	2191	-770	432
21	Left Rear Door Rear Lower	1761	-775	477

* Reference X – Rear Bumper (+ Forward)

Y – Vehicle Centerline (+ to right)

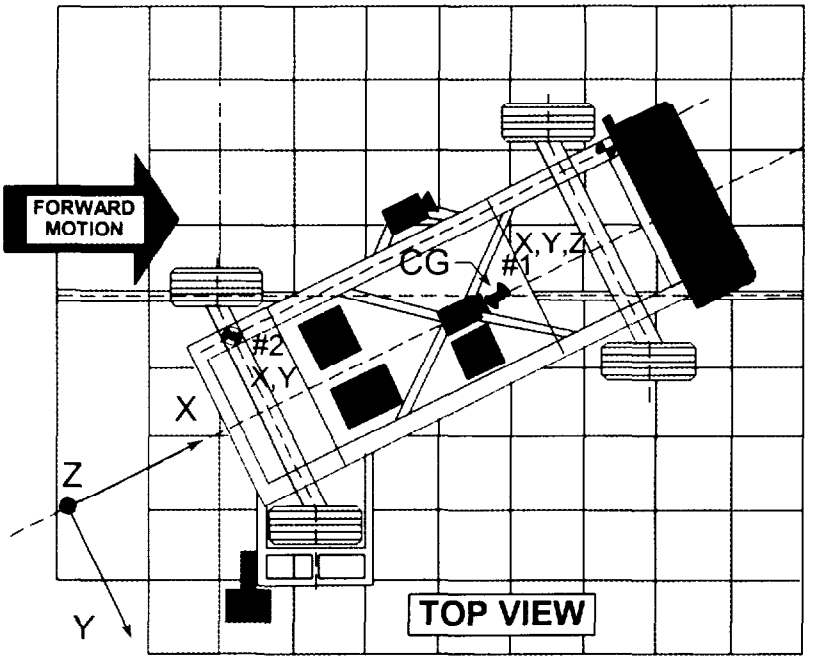
Z – Ground Level (+ up)

DATA SHEET NO. 15

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1996/Ford/Taurus/4 door

Test Date August 25, 2000



Accel No	Description	Coordinates (mm)* X	Y	Z	(+) Positive Max. (g) (CFC 60)	Time (msec)	(-) Negative Max. (g) (CFC 60)	Time (msec)
1	MDB Center of Gravity	-1092	0	483				
	Longitudinal (X)	---	---	---	1 0	129	14.9	34
	Lateral (Y)	---	---	---	1 0	83	6 8	37
	Vertical (Z)	---	---	---	**	**	**	**
	Resultant (R)	---	---	---	--	--	--	--
2	Rear Frame Member	-2591	-625	622				
	Longitudinal (X)	---	---	---	1 7	180	18 7	40
	Lateral (Y)	---	---	---	**	**	**	**

Reference X – Front Axle (+ Forward)
Y – Vehicle Centerline (+ to Right)
Z – Ground Level (+ Up)

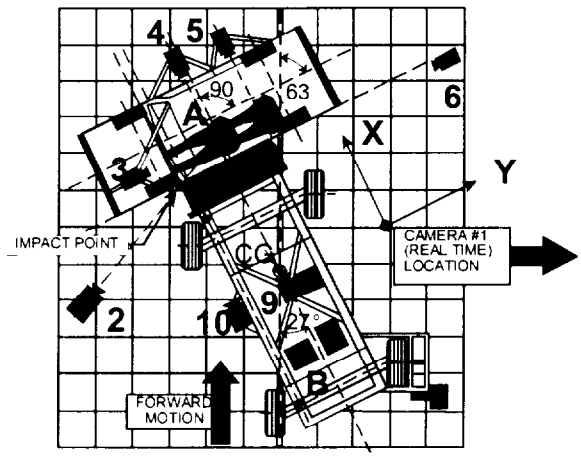
** No Valid Data Collected

DATA SHEET NO 16

HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door

Test Date August 25, 2000



Camera No.	View	Coordinates (mm)*			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Real Time				10	24
2	Left Impact	-1120	-2420	1610	13	1005
3	Onboard Hood				13	1015
4	Onboard Front Occupant				8	521
5	Onboard Rear Occupant				8	514
6	Right Impact	-150	10400	1840	25	1005
6	Right Impact (negative)	-150	10400	1840	25	NT
6	Right Impact	-150	10400	1840	25	489
7	Top Overall	-720	970	5000	8	833
7	Top Overall (negative)	-720	970	5000	8	426
8	Top Impact	-690	-340	5000	13	870
9	Cart Overall				13	637
10	Cart Impact				35	571

* Reference (from impact point)
+X = Forward
+Y = To Right
+Z = Upward from floor level

NT – No timing

APPENDIX A – PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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

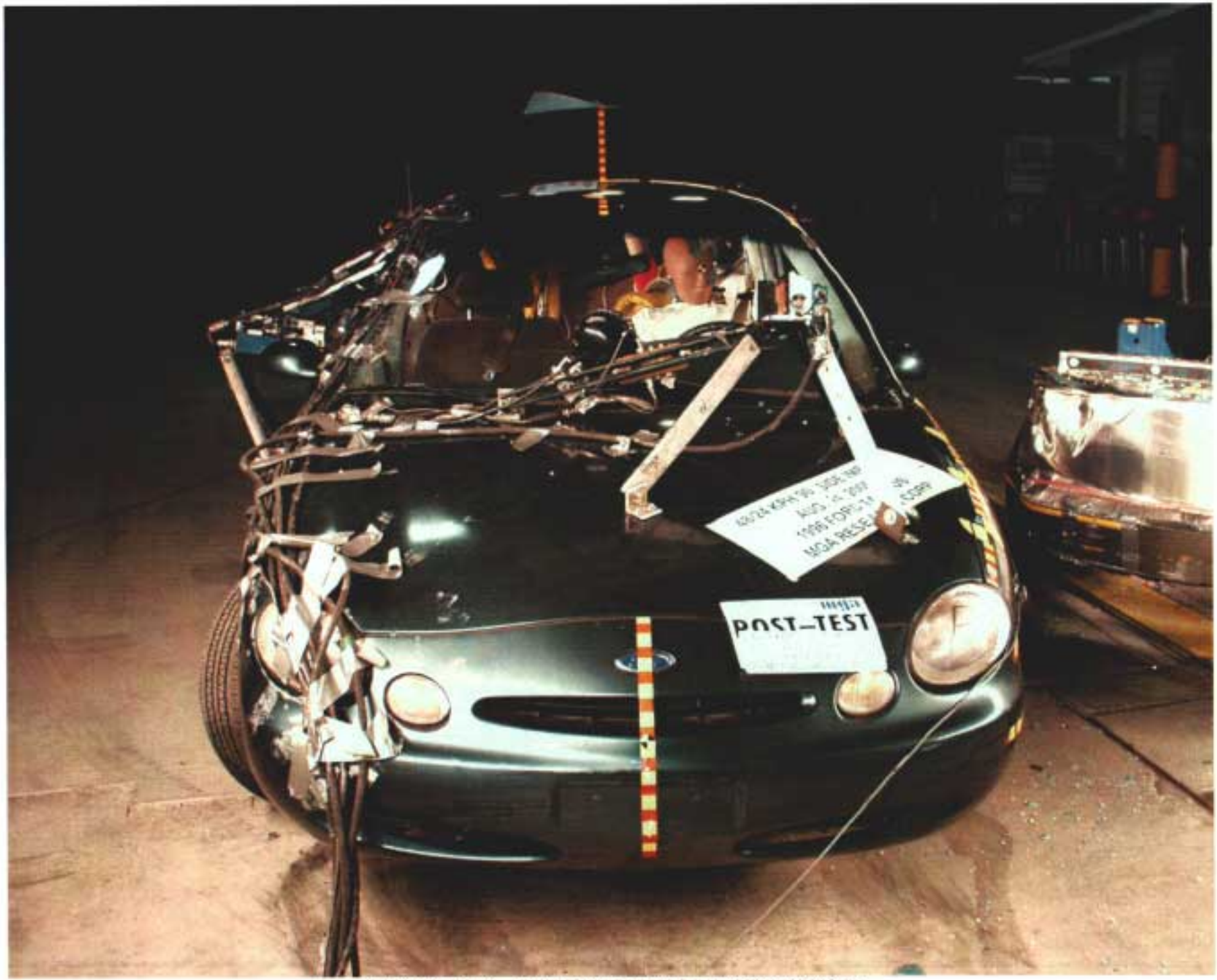


Photo No. A-2 – Post-Test Front View of Test Vehicle

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

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

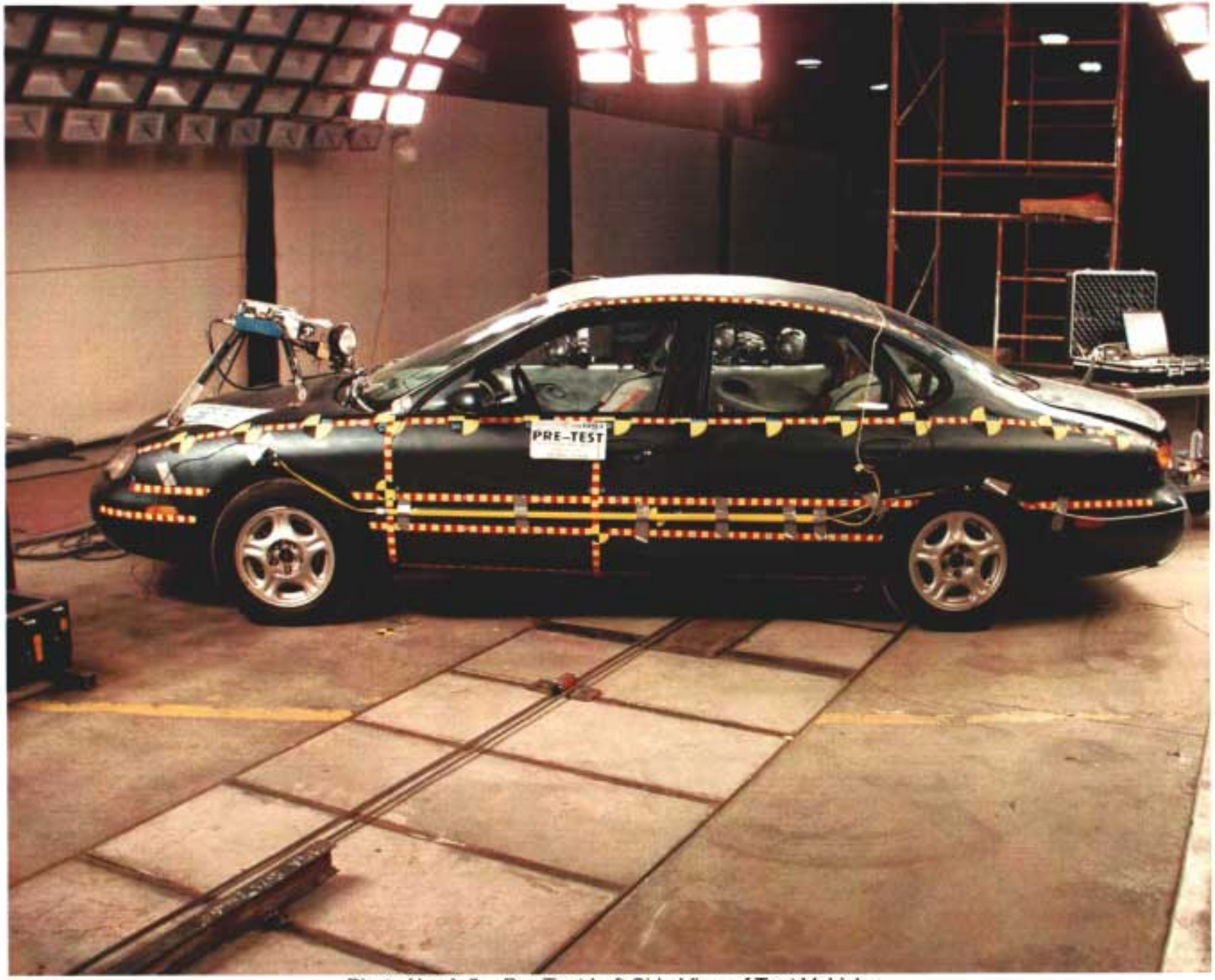


Photo No. A-5 – Pre-Test Left Side View of Test Vehicle

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

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

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

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

Photo No. A-10 – Post-Test MDB Positioned Against Vehicle (left side)

Photo No. A-11 – Post-Test MDB Positioned Against Vehicle (right side)

Photo No. A-12 – Pre-Test MDB Top View

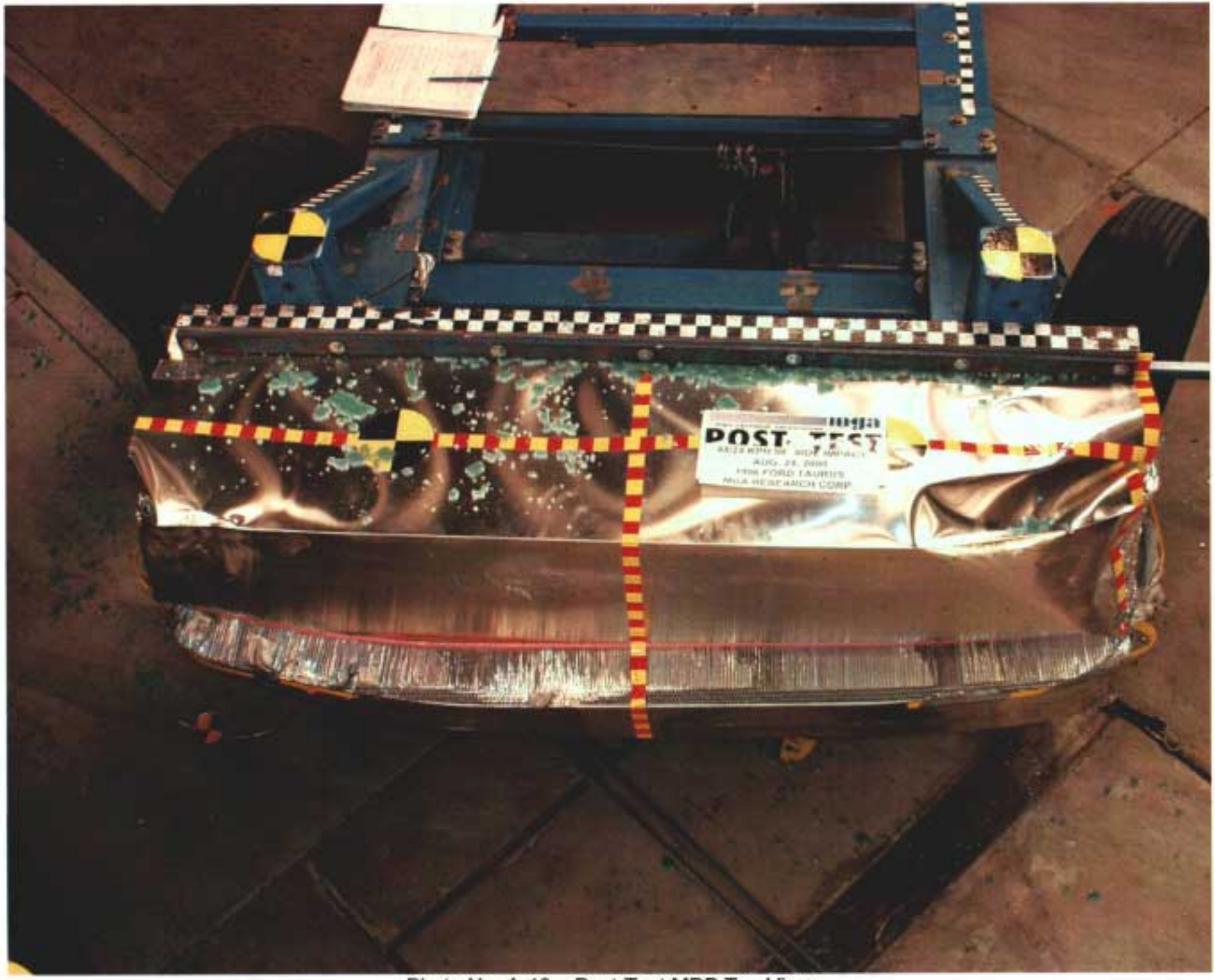


Photo No. A-13 – Post-Test MDB Top View

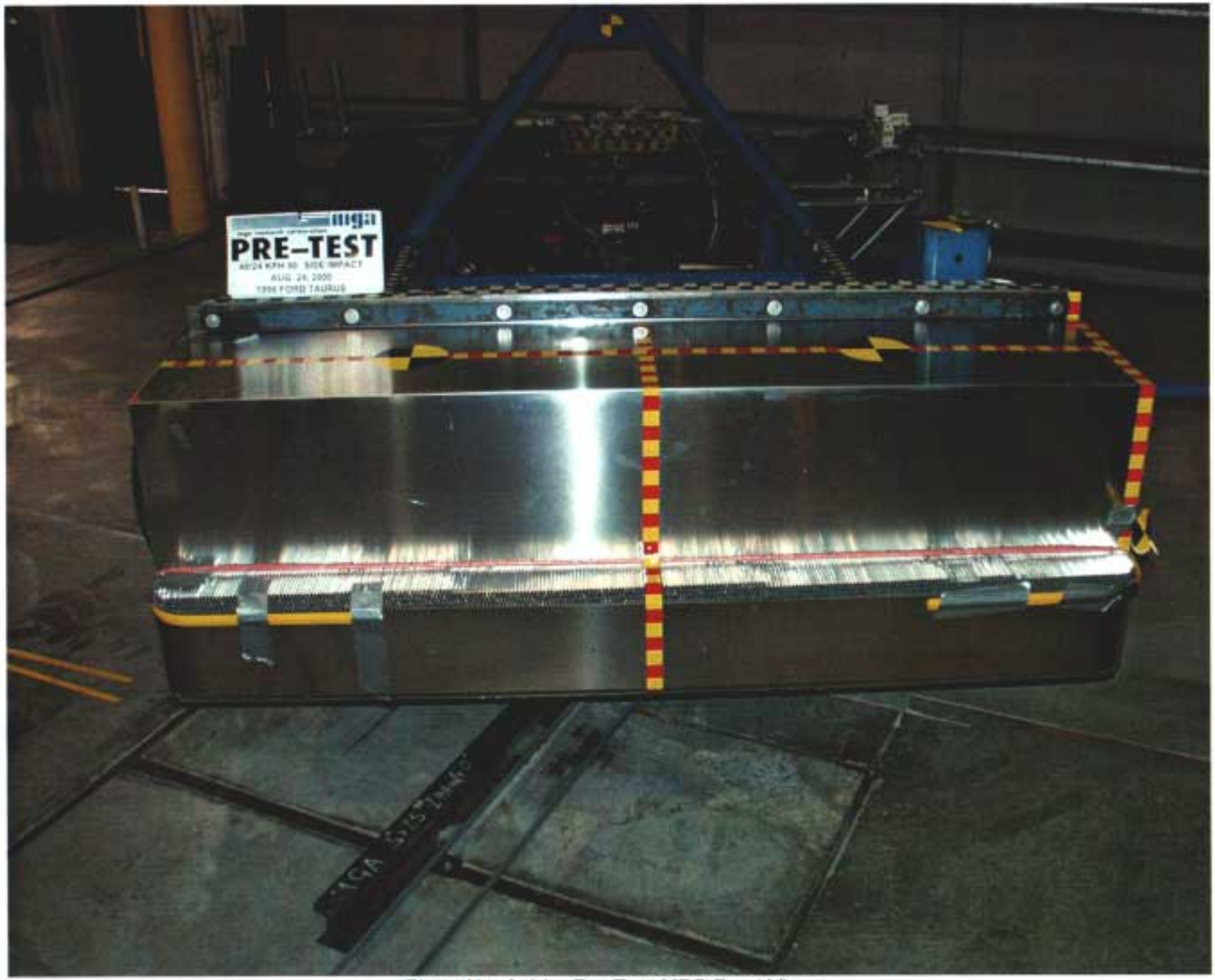


Photo No. A-14 – Pre-Test MDB Front View

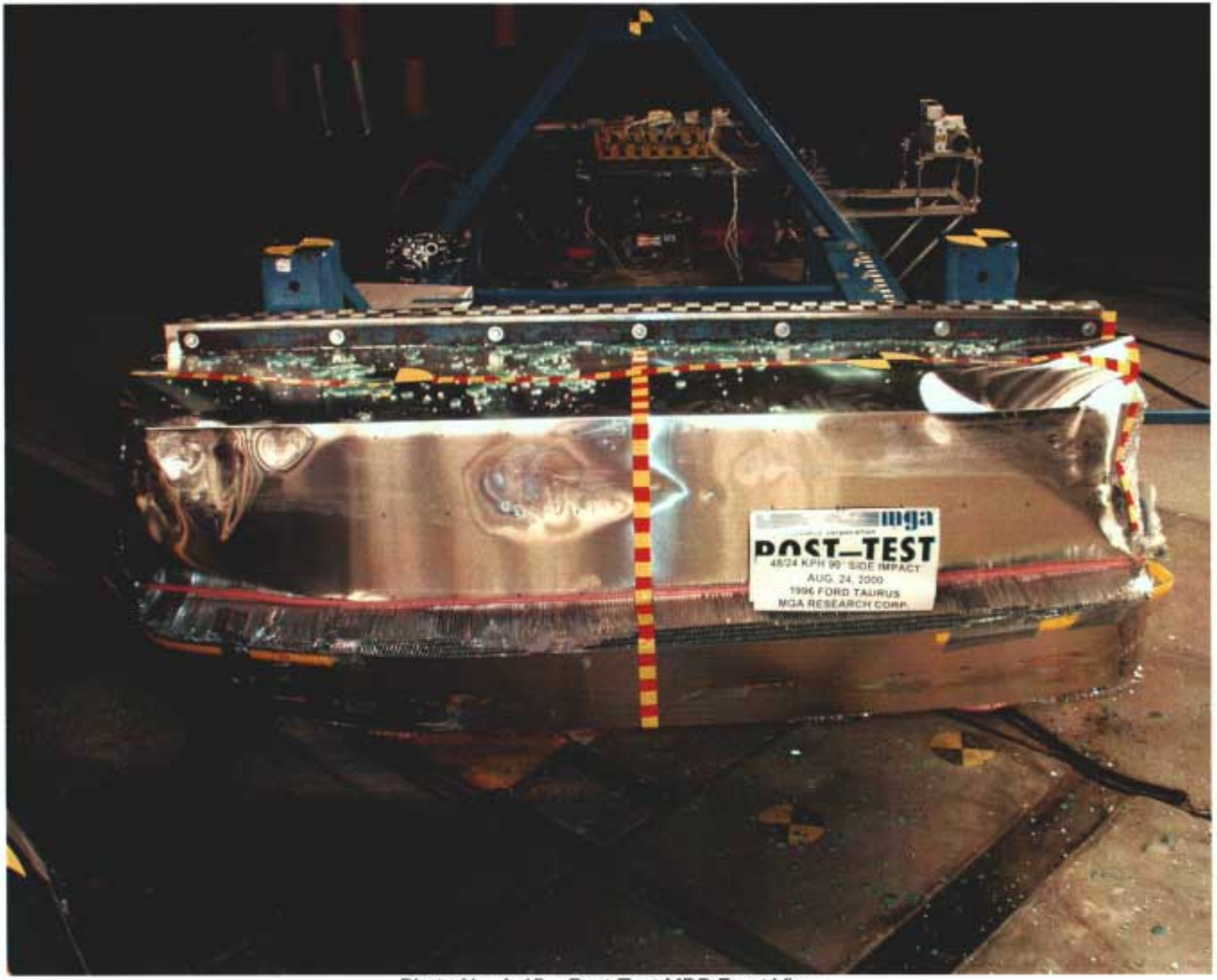


Photo No. A-15 – Post-Test MDB Front View

Photo No. A-16 – Post-Test MDB Left Side View

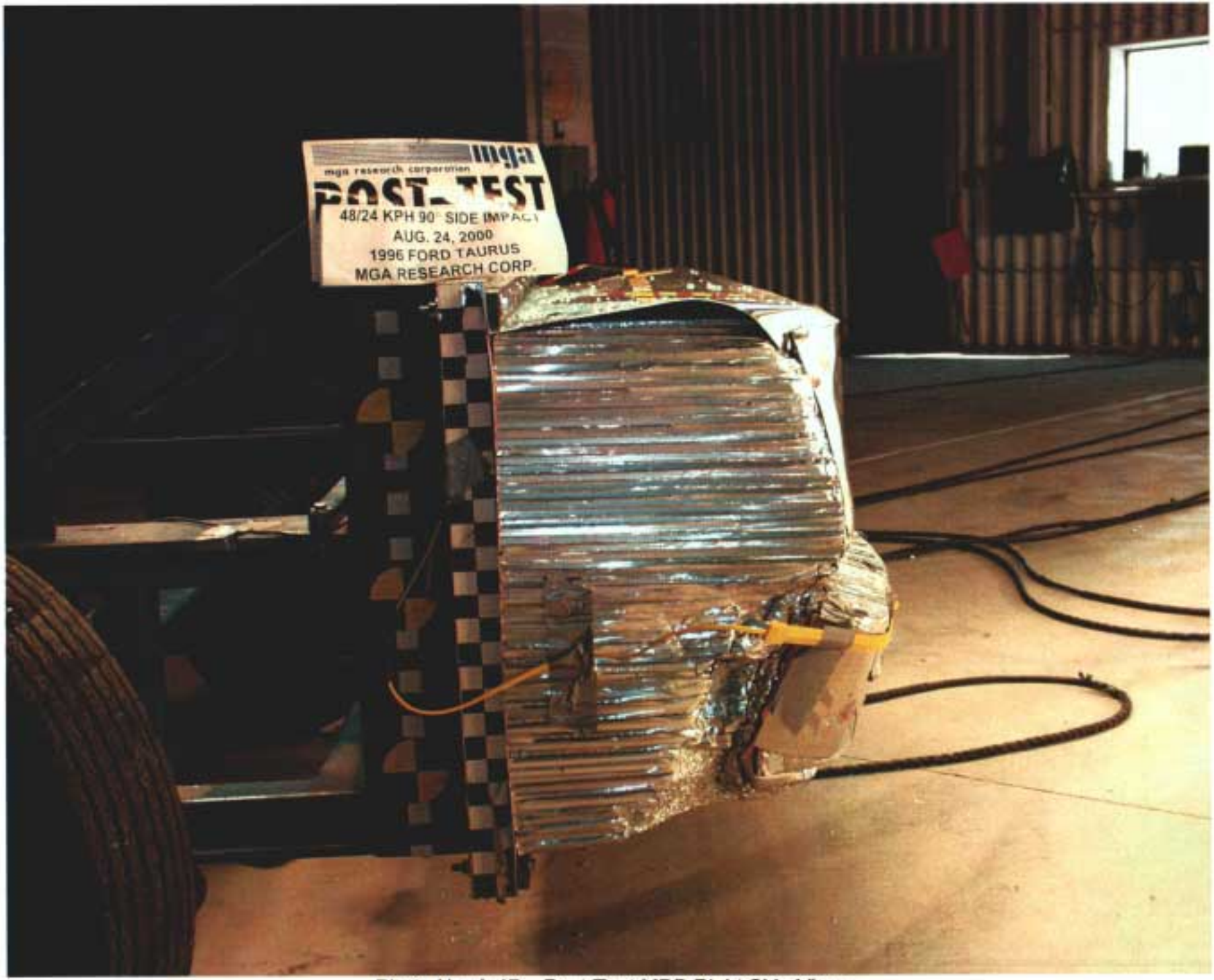


Photo No. A-17 – Post-Test MDB Right Side View

Photo No. A-18 – Pre-Test Driver Dummy Right Side View

Photo No. A-19 – Post-Test Driver Dummy Right Side View

Photo No. A-20 – Pre-Test Driver Dummy Left Side View

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

Photo No. A-22 – Pre-Test Driver Dummy Seat Track

Photo No. A-23 – Pre-Test Driver Dummy Left Side View (Door Open)

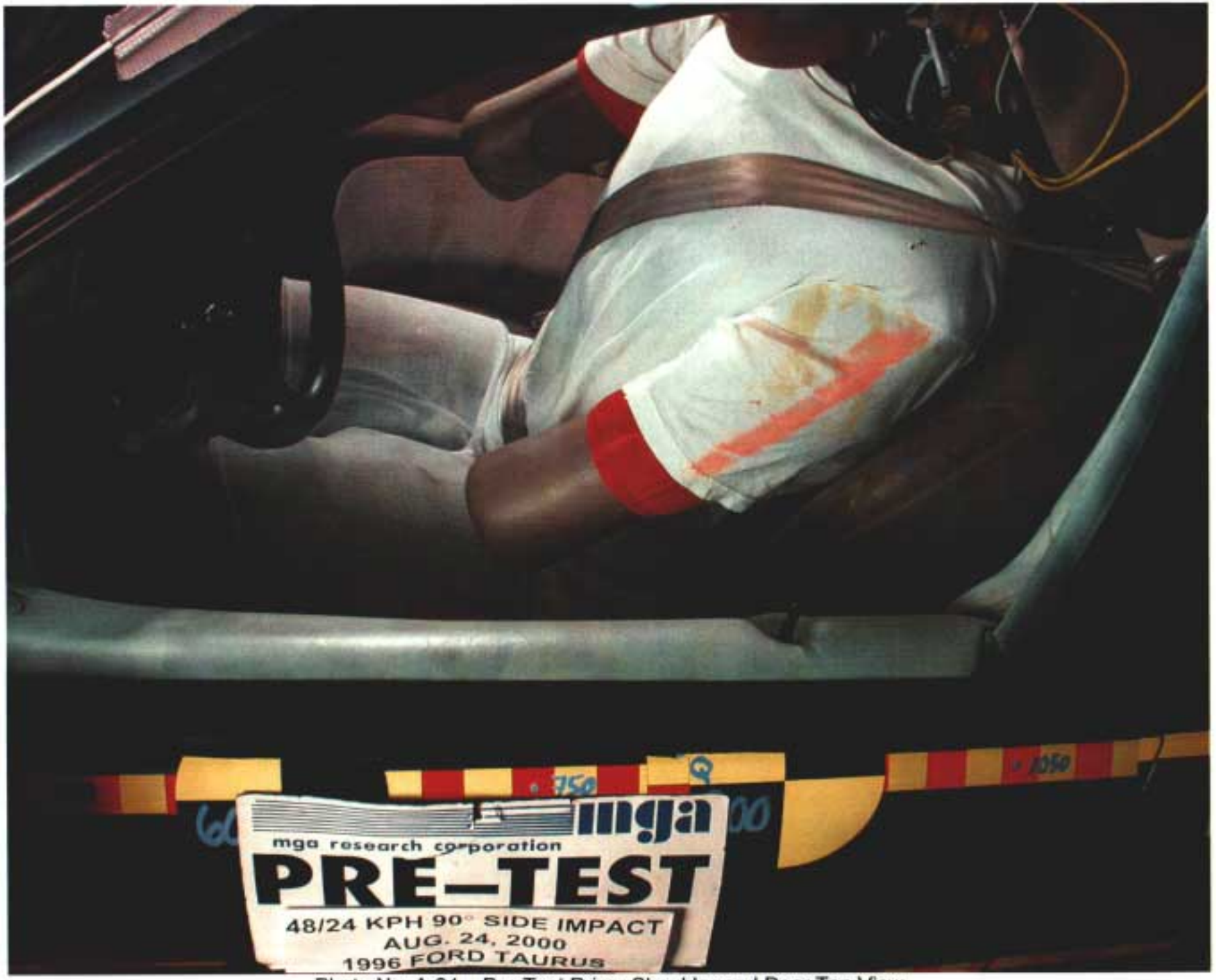


Photo No. A-24 – Pre-Test Driver Shoulder and Door Top View

Photo No. A-25 – Post-Test Driver Shoulder and Door Top View

Photo No. A-26 – Post-Test Driver Dummy Contact

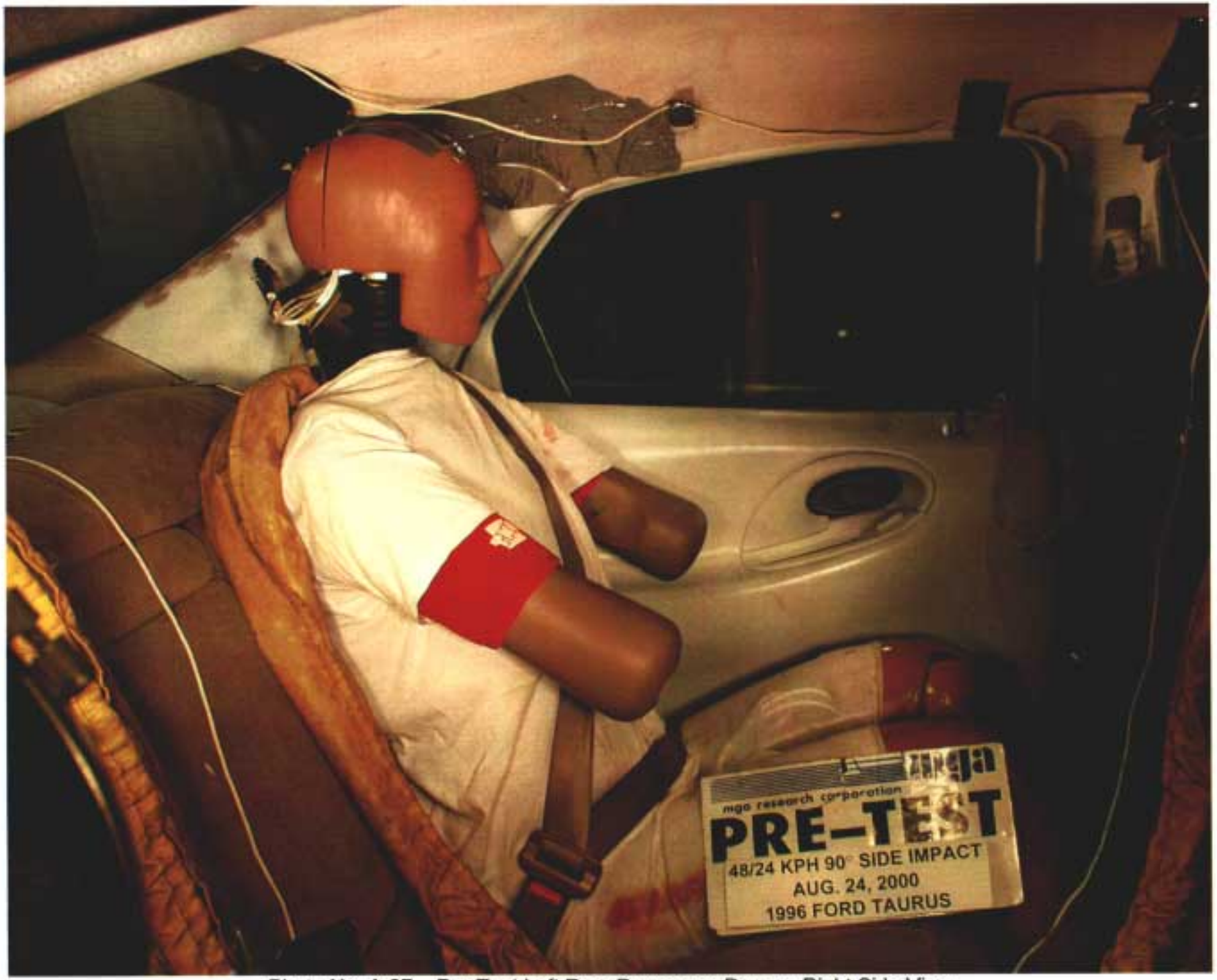


Photo No. A-27 – Pre-Test Left Rear Passenger Dummy Right Side View

Photo No. A-28 – Post-Test Left Rear Passenger Dummy Right Side View

Photo No. A-29 – Pre-Test Left Rear Passenger Dummy Left Side View

Photo No. A-30 – Post-Test Left Rear Passenger Dummy Left Side View

Photo No. A-31 – Pre-Test Left Rear Passenger Dummy Left Side View (Door Open)

Photo No. A-32 – Pre-Test Left Rear Passenger Shoulder and Door Top View

Photo No. A-33 – Post-Test Left Rear Passenger Shoulder and Door Top View

Photo No. A-34 – Post-Test Left Rear Passenger Dummy Contact

Photo No. A-35 – Pre-Test Left Front Impact Point on Vehicle

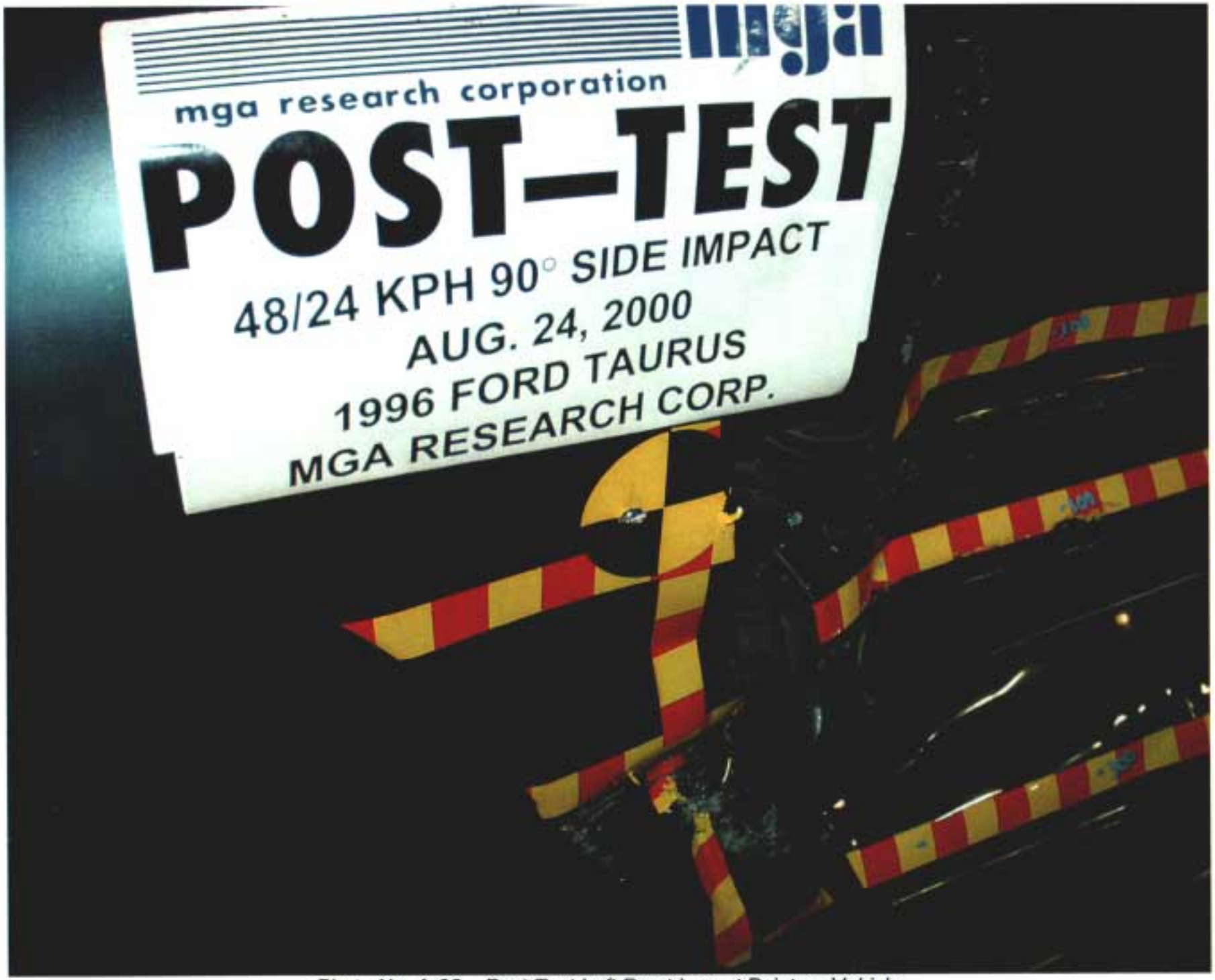


Photo No. A-36 – Post-Test Left Front Impact Point on Vehicle

Photo No. A-37 – Left Front Attitude Point

Photo No. A-38 – Right Front Attitude Point

Photo No. A-39 – Left Rear Attitude Point

Photo No. A-40 – Right Rear Attitude Point

APPENDIX B – VEHICLE AND ES-2 RESPONSE DATA

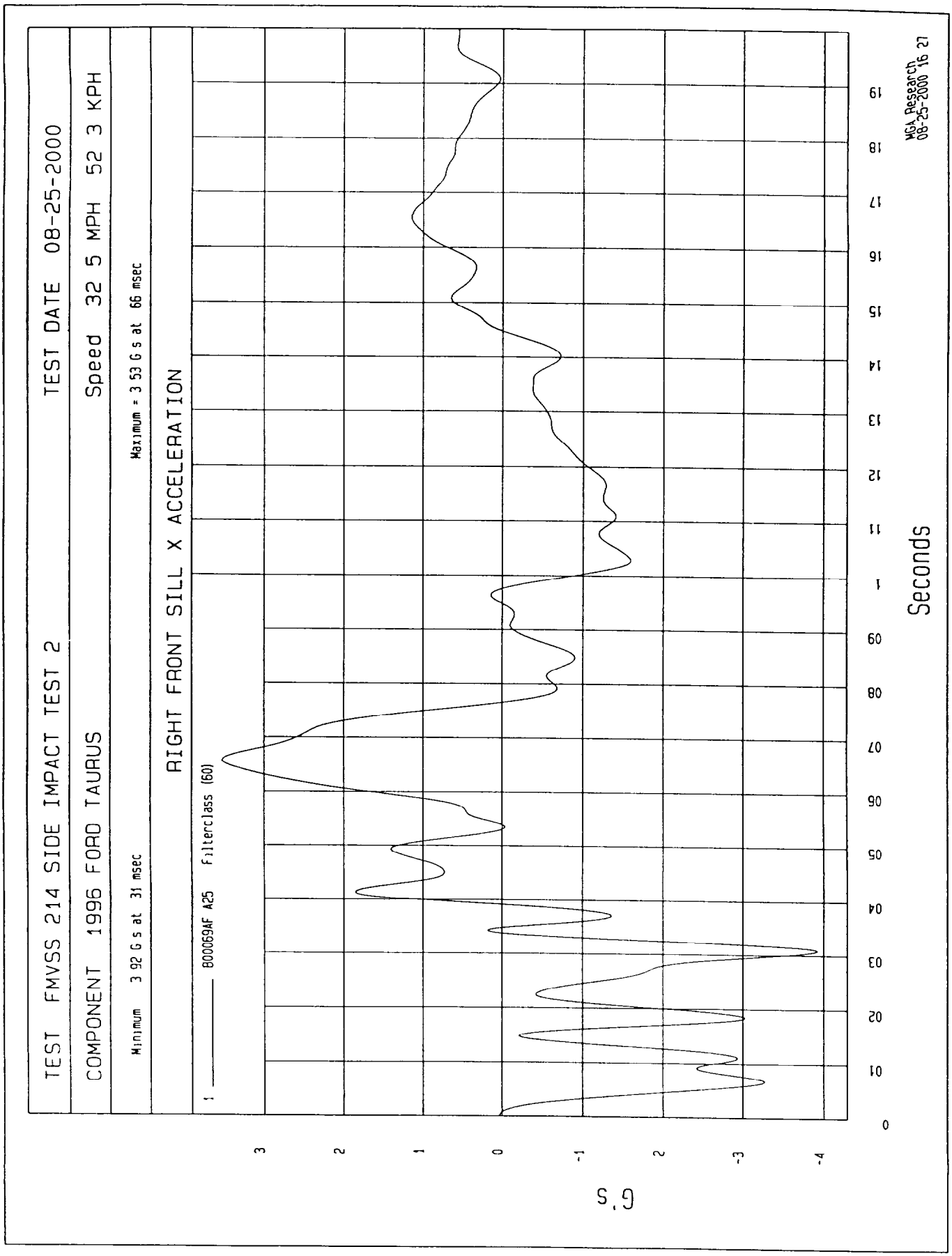
TABLE OF DATA PLOTS

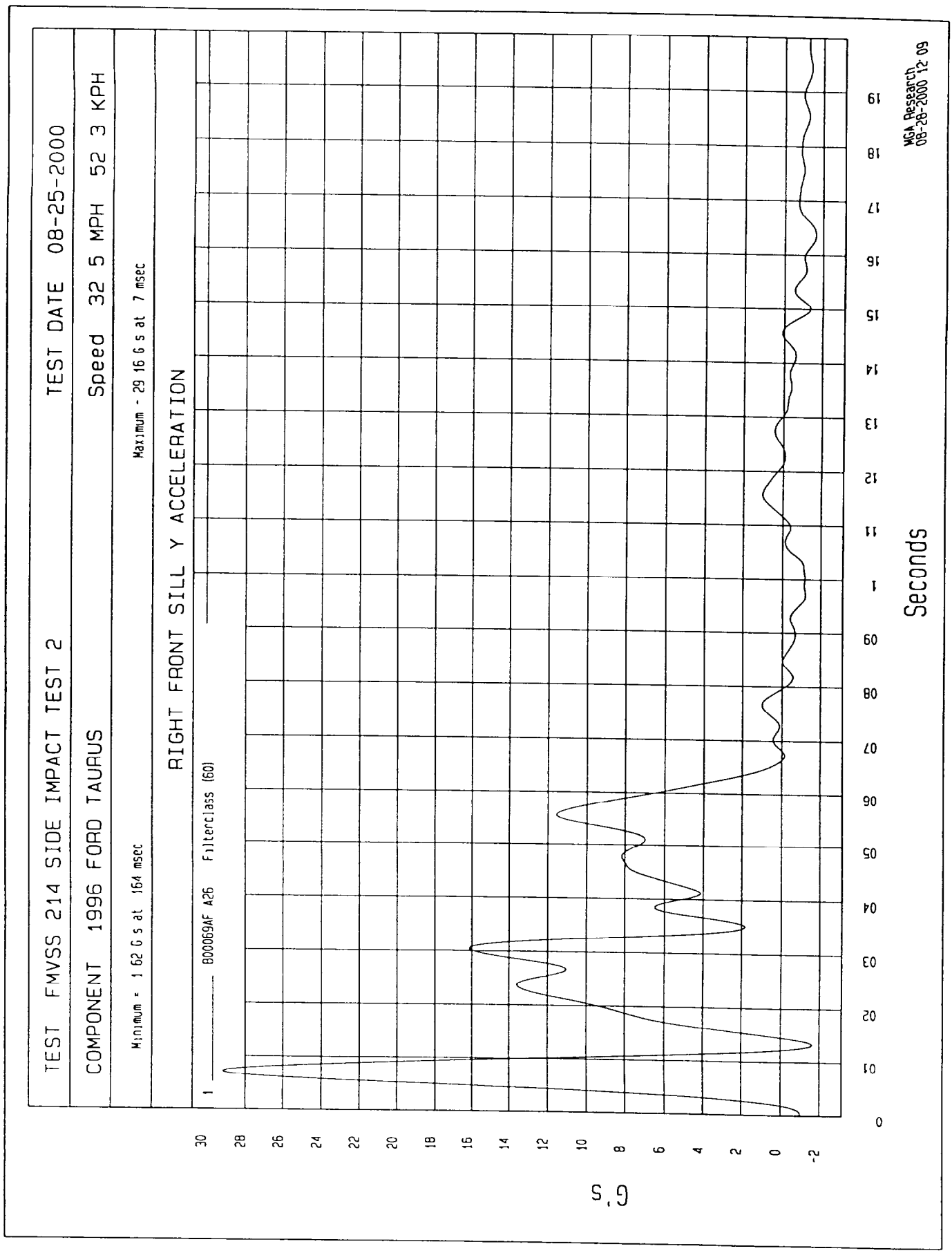
* No Valid Data Collected

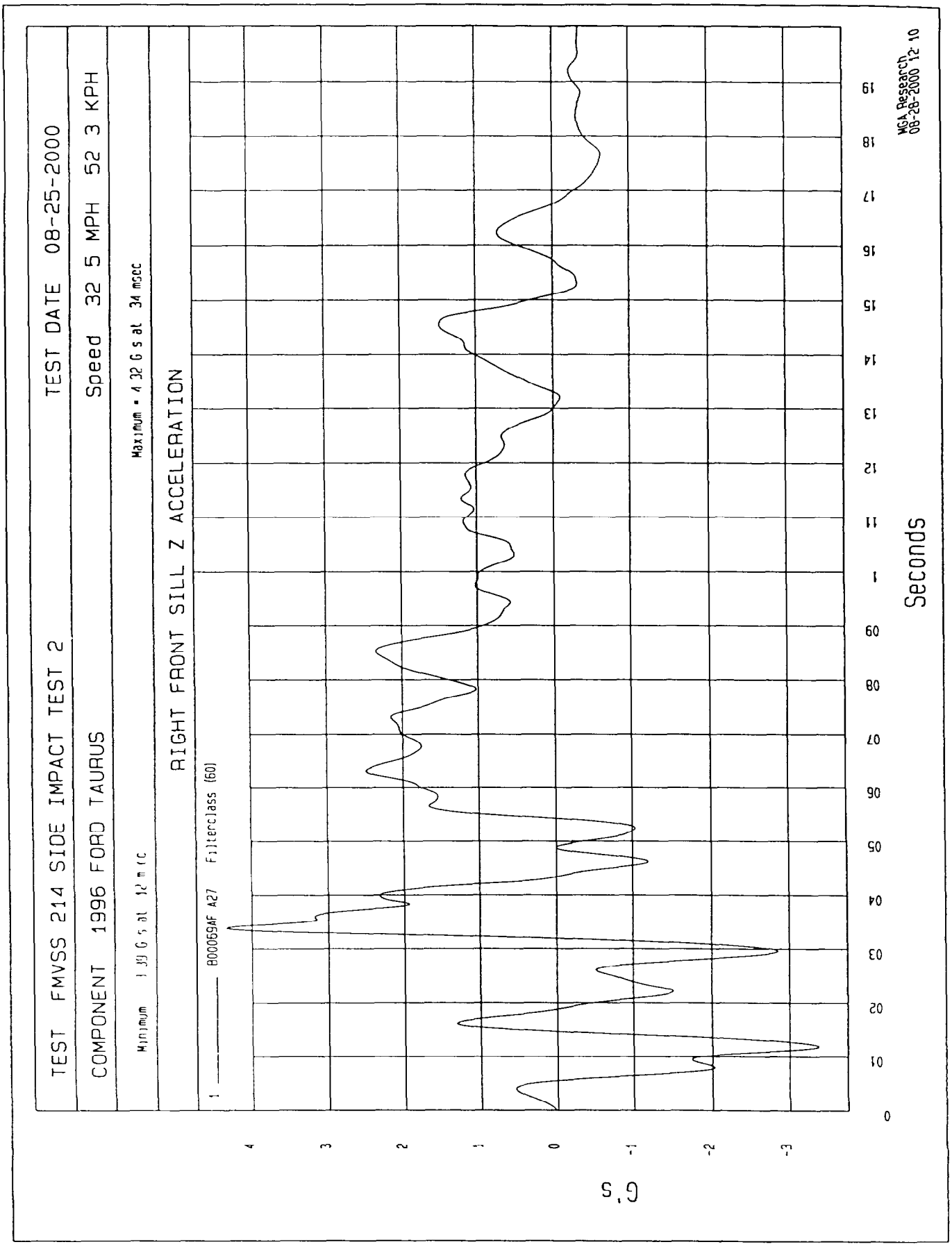
TABLE OF DATA PLOTS (Cont'd)

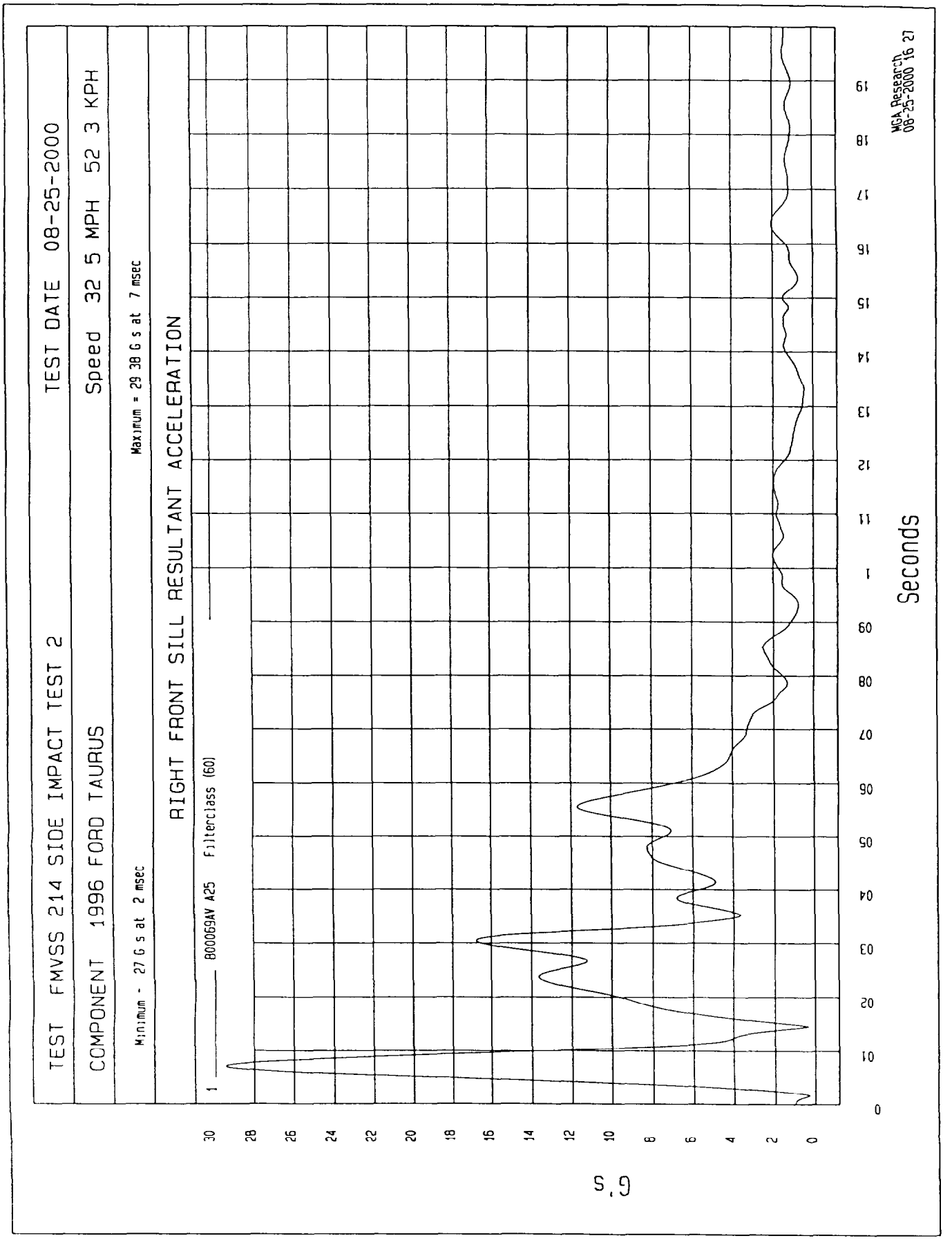
* No Valid Data Collected

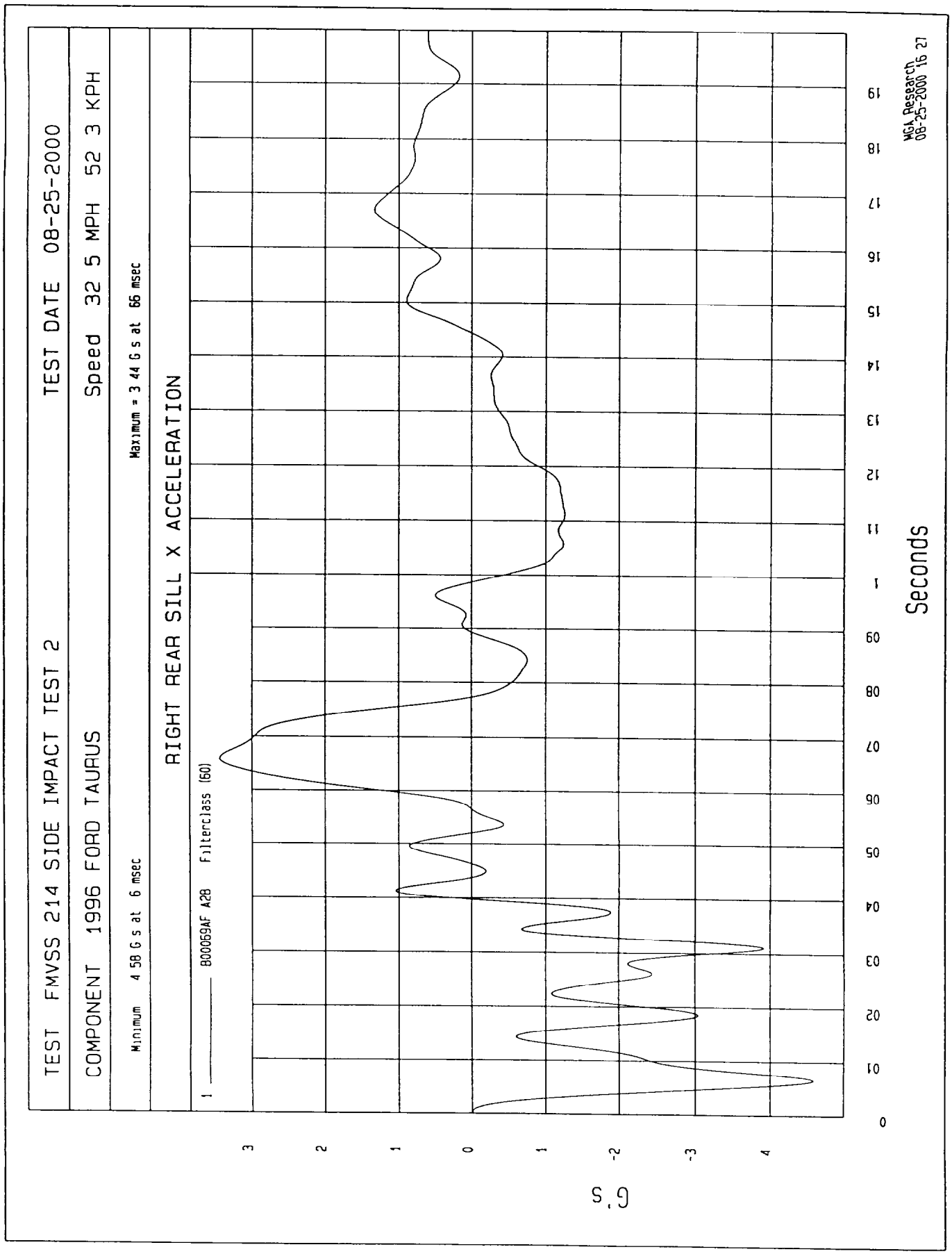
TABLE OF DATA PLOTS (Cont'd)

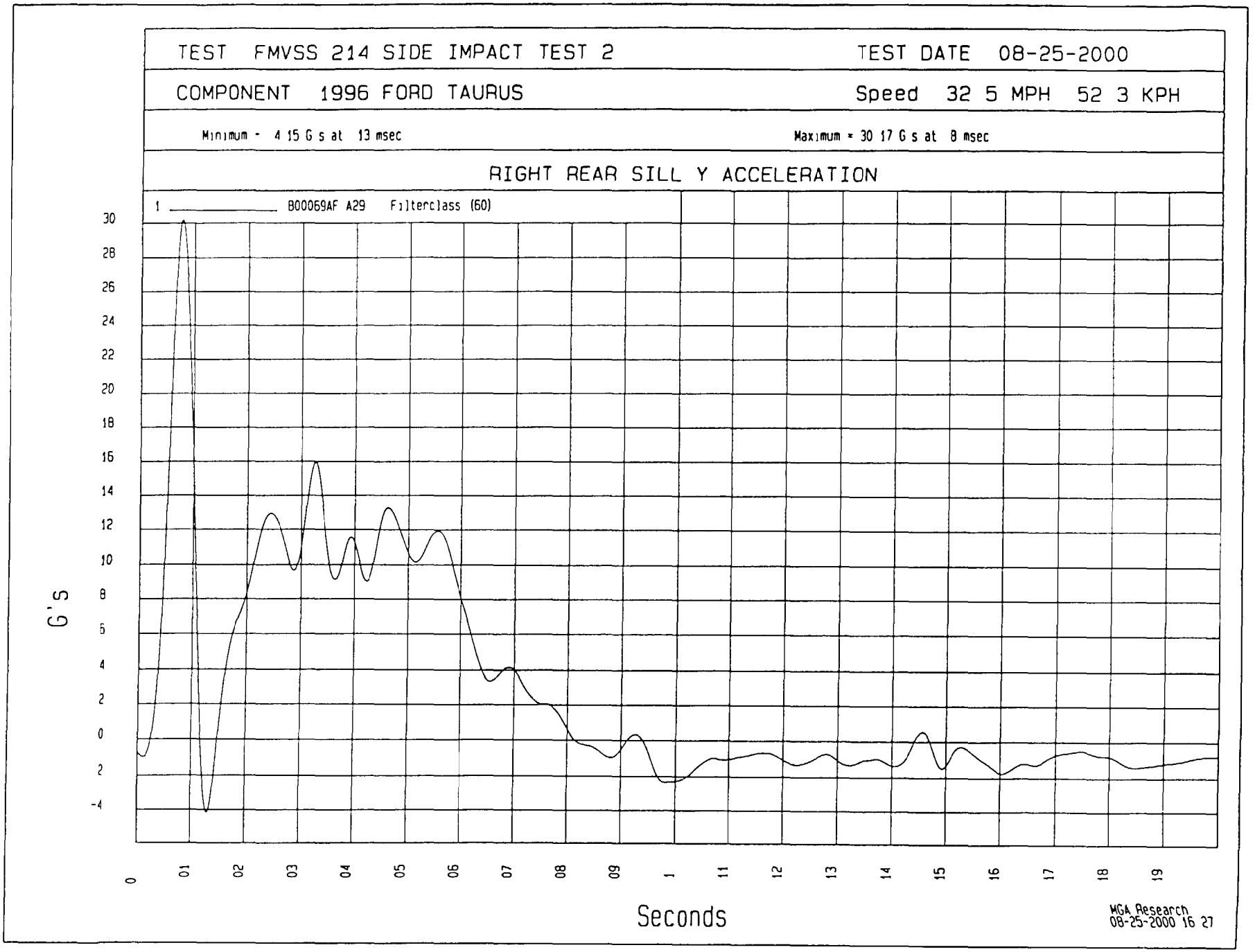

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 3 92 G s at 31 msec
Maximum = 3 53 G s at 66 msec
RIGHT FRONT SILL X ACCELERATION
1 B00069AF A25 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 27

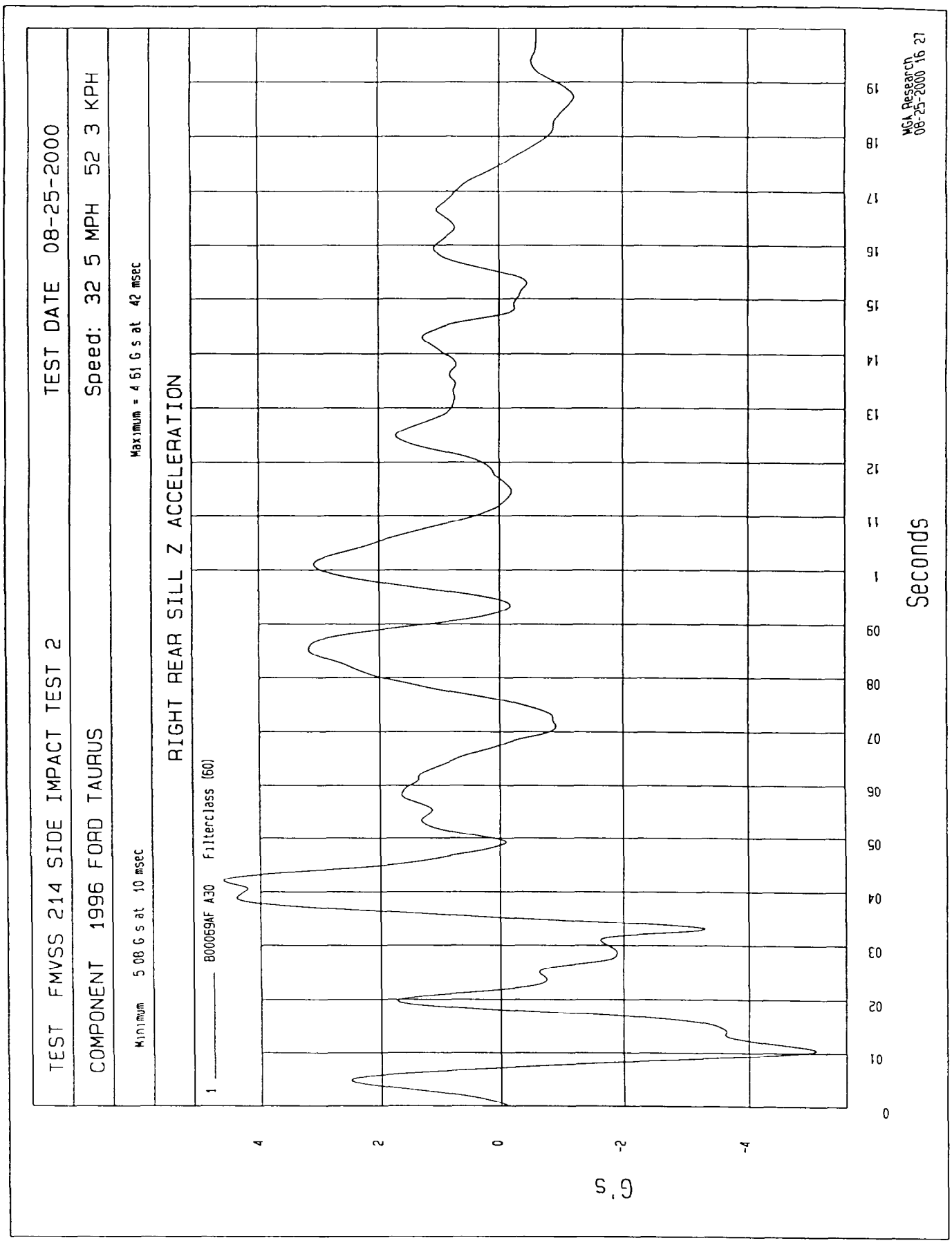

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = 1 62 G s at 164 msec
Maximum = 29 16 G s at 7 msec
RIGHT FRONT SILL Y ACCELERATION
1 B00059AF A26 Filterclass (60)
G's
Seconds
MGA Research
08-28-2000 12 09

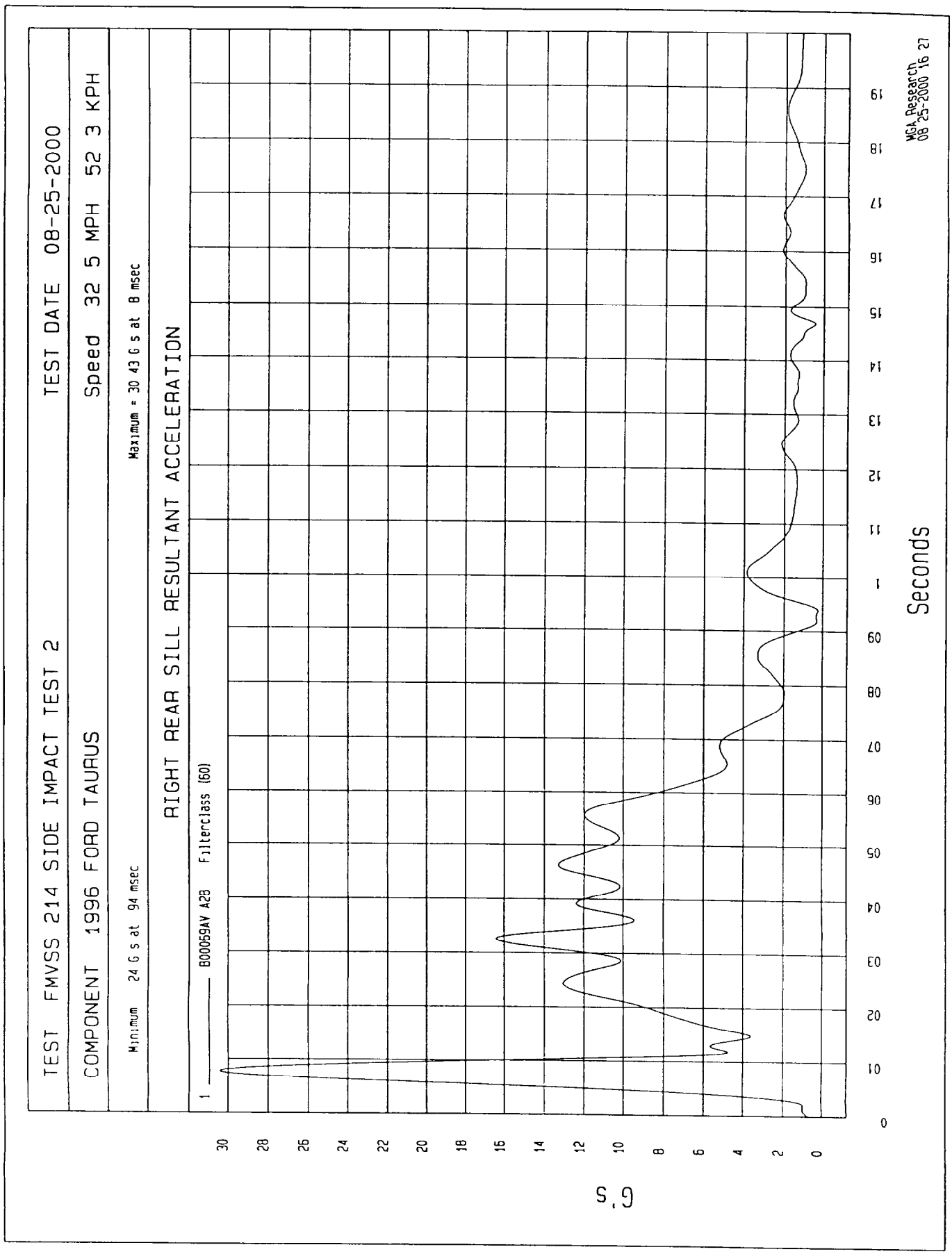

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Maximum = 4 32 G s at 34 msec
RIGHT FRONT SILL Z ACCELERATION
1 B00069AF A27 Filterclass (60)
G's
Seconds
MGA Research
08-28-2000 12 10


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 27 G s at 2 msec
Maximum = 29 38 G s at 7 msec
RIGHT FRONT SILL RESULTANT ACCELERATION
1 B0006AV A25 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 27


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 4 58 G s at 6 msec
Maximum = 3 44 G s at 66 msec
RIGHT REAR SILL X ACCELERATION
1 B00069AF A2B Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 27


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = 4 15 G s at 13 msec
Maximum = 30 17 G s at 8 msec
RIGHT REAR SILL Y ACCELERATION
1 B00069AF A29 Filterclass (60)
G's
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
2
-4
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 27


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed: 32 5 MPH 52 3 KPH
Maximum = 4 61 G s at 42 msec
Minimum 5 08 G s at 10 msec
RIGHT REAR SILL Z ACCELERATION
1 B00069AF A30 Filterclass (60)
MGA Research
08-25-2000 16 27
Seconds
G's
4
2
0
-2
-4
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

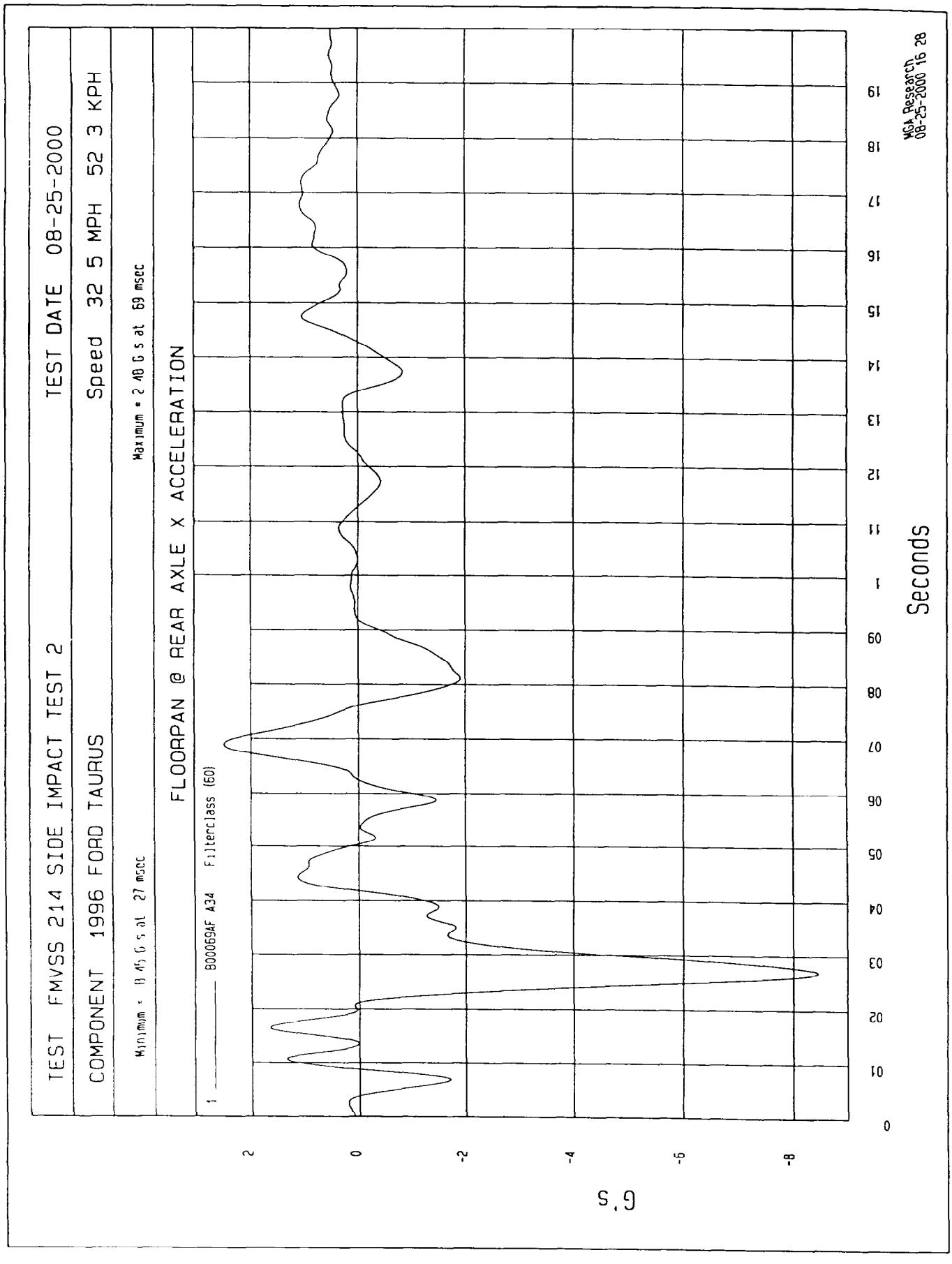

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 24 G s at 94 msec
Maximum = 30 43 G s at 8 msec
RIGHT REAR SILL RESULTANT ACCELERATION
1 B00059AV A2B Filterclass (60)
MGA Research
08 25-2000 16 27
Gs
Seconds
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0
10
20
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

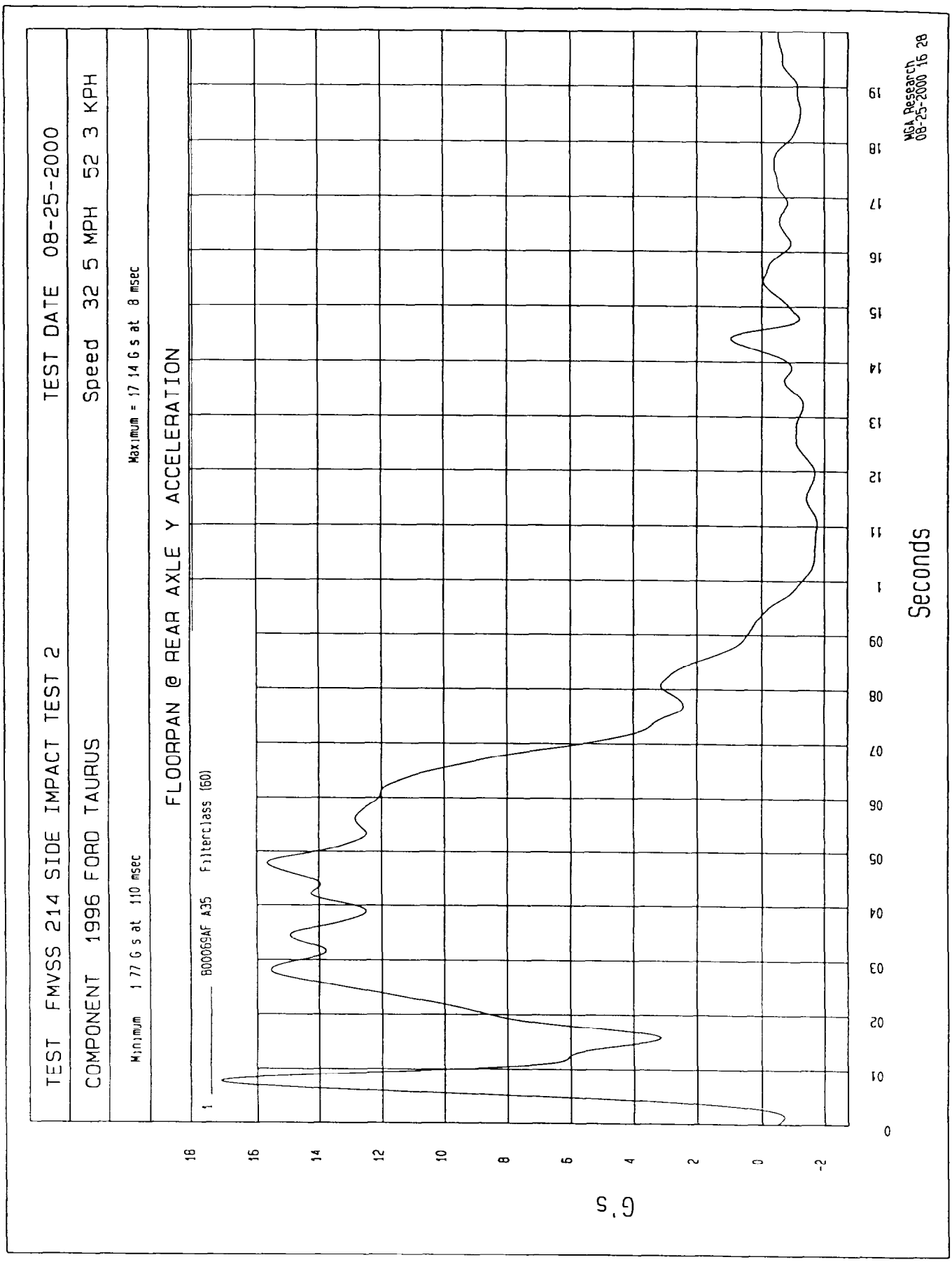
LEFT FRONT SILL Y ACCELERATION VS TIME

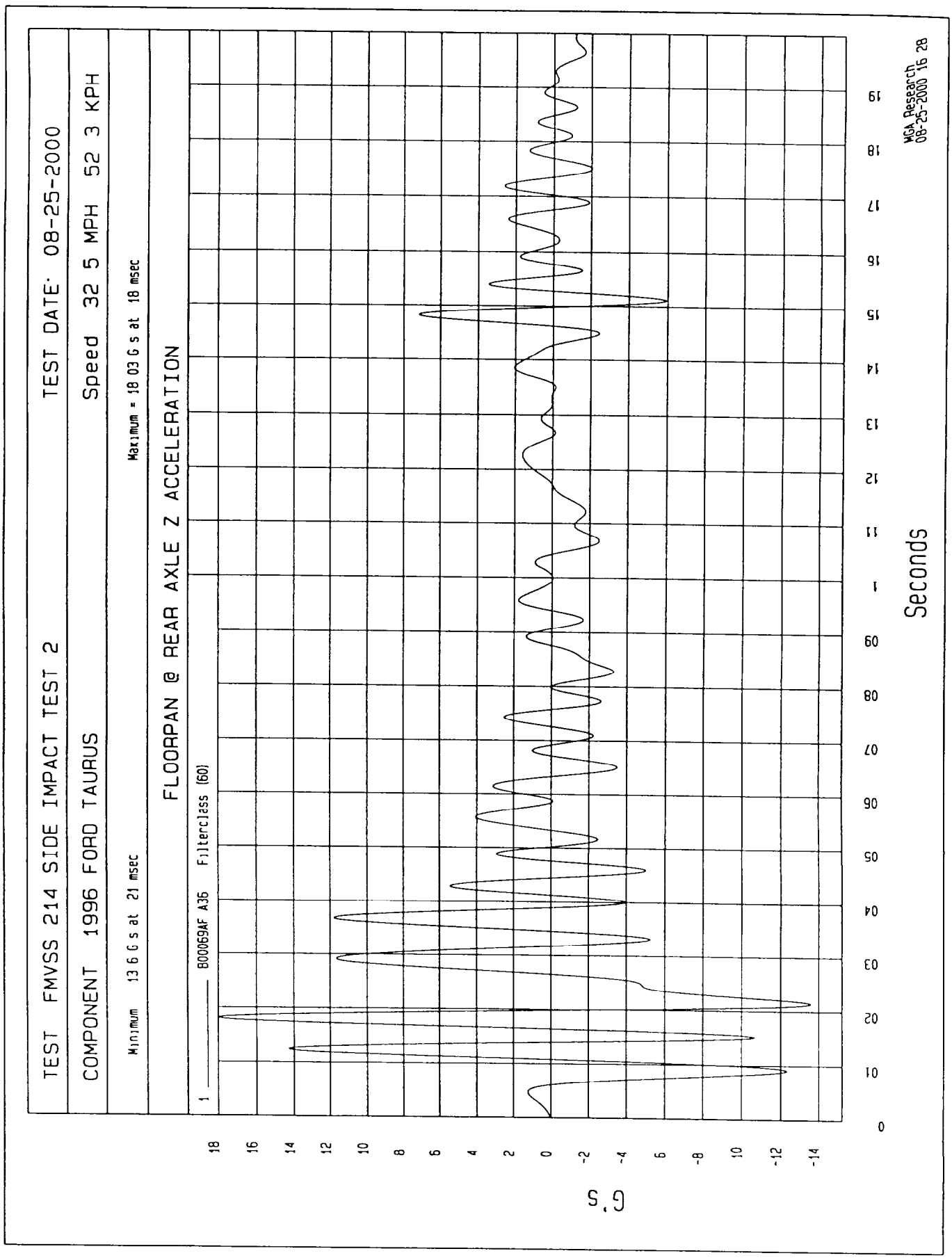
NO VALID DATA COLLECTED

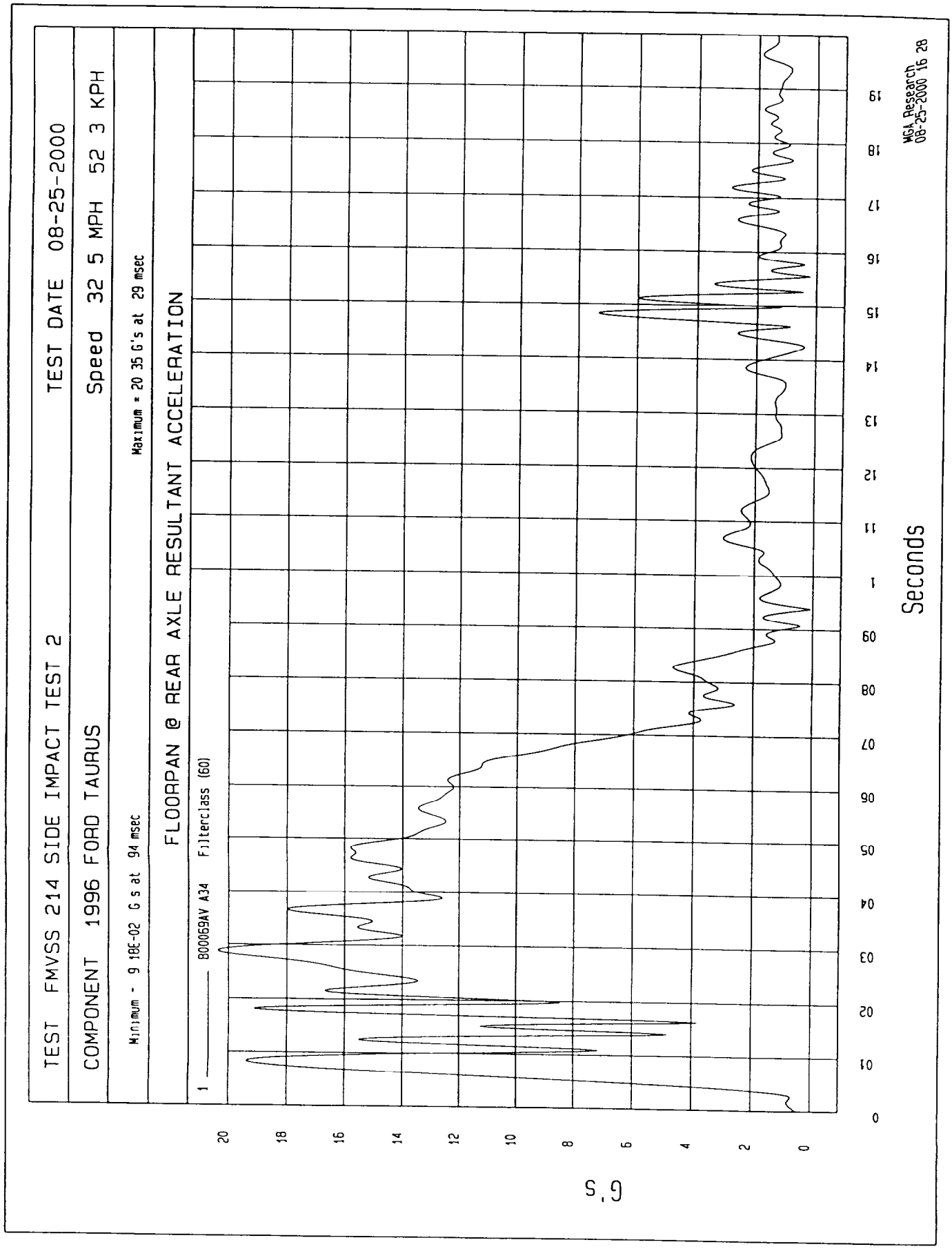
LEFT REAR SILL Y ACCELERATION VS. TIME

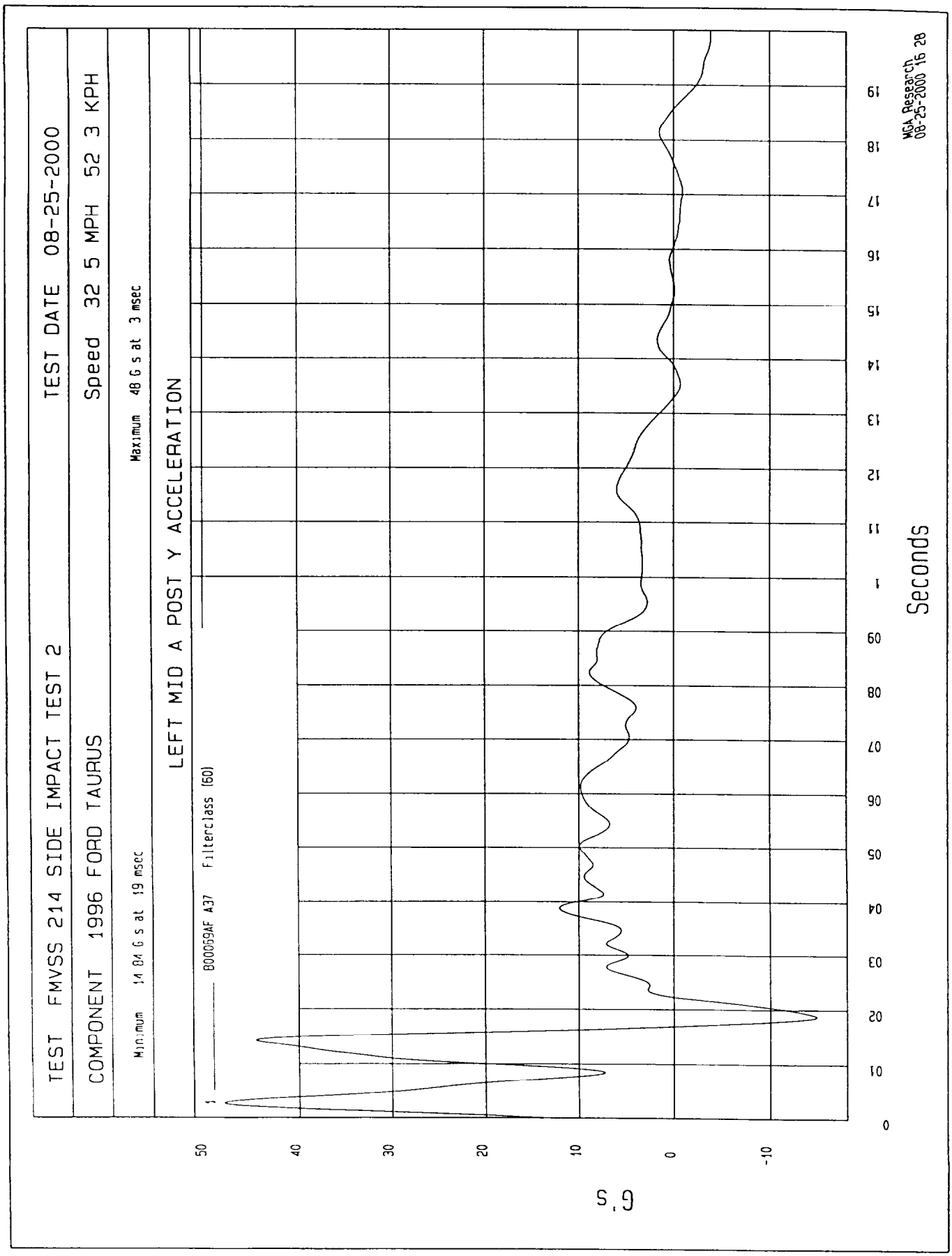
NO VALID DATA COLLECTED

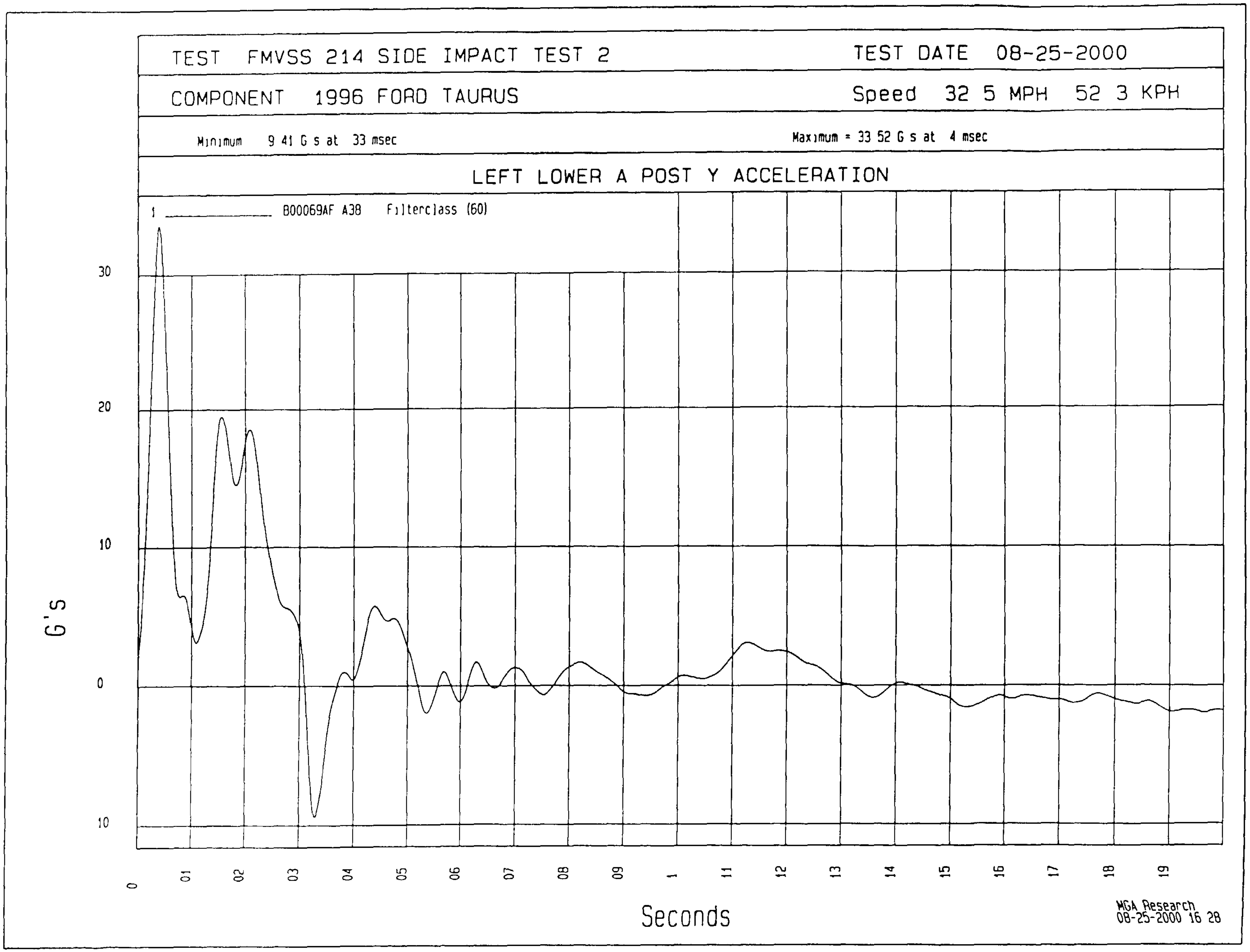

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = 0 45 G s at 27 msec
Maximum = 2 48 G s at 69 msec
FLOORPAN @ REAR AXLE X ACCELERATION
1 B0006A4F A34 Filterclass (60)
G's
2
0
-2
-4
-6
-8
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 28

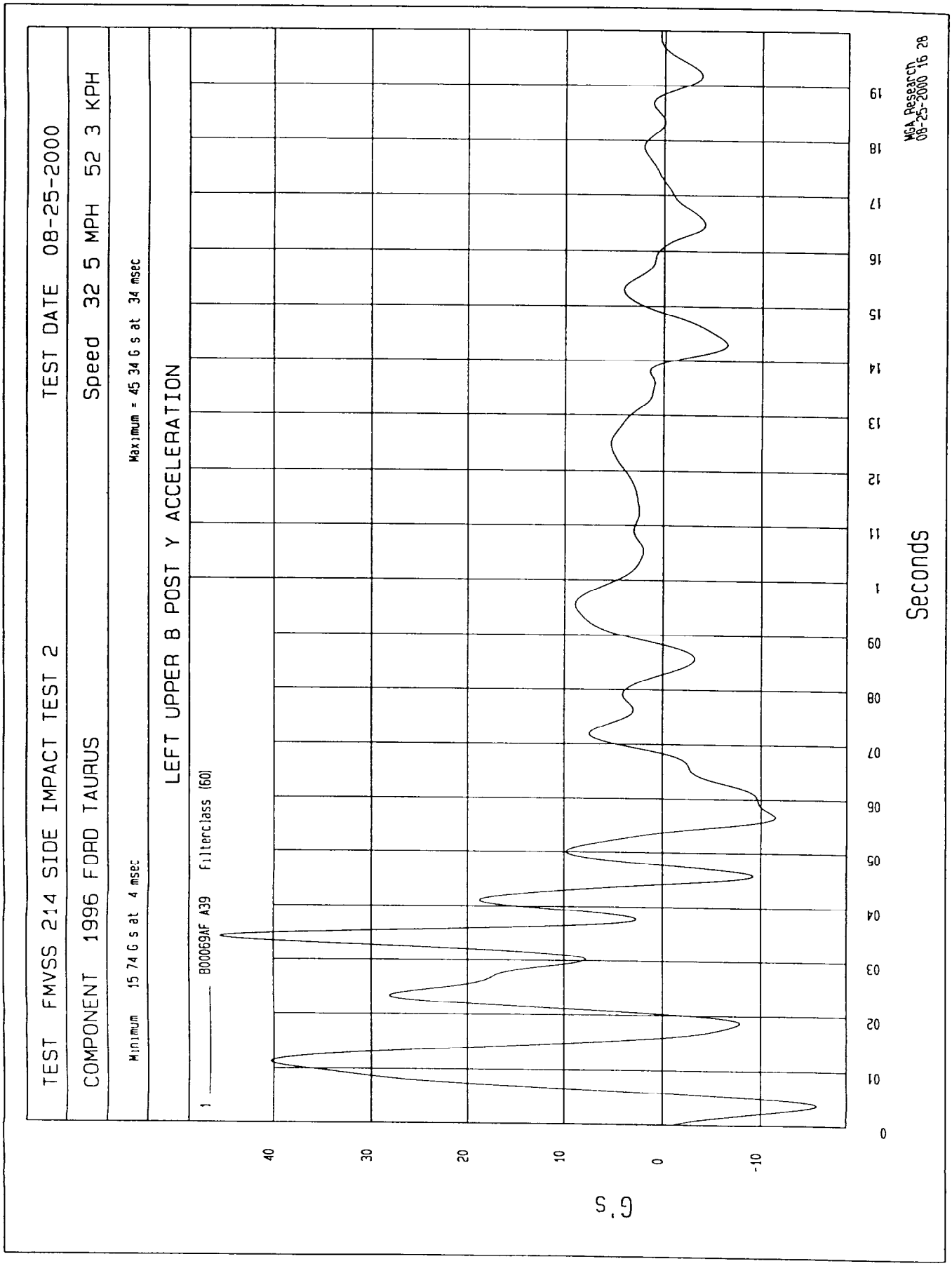

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 1 77 G s at 110 msec
Maximum = 17 14 G s at 8 msec
FLOORPAN @ REAR AXLE Y ACCELERATION
1 B0006GAF A35 Filterclass (60)
MGA Research
08-25-2000 16 28
G's
Seconds

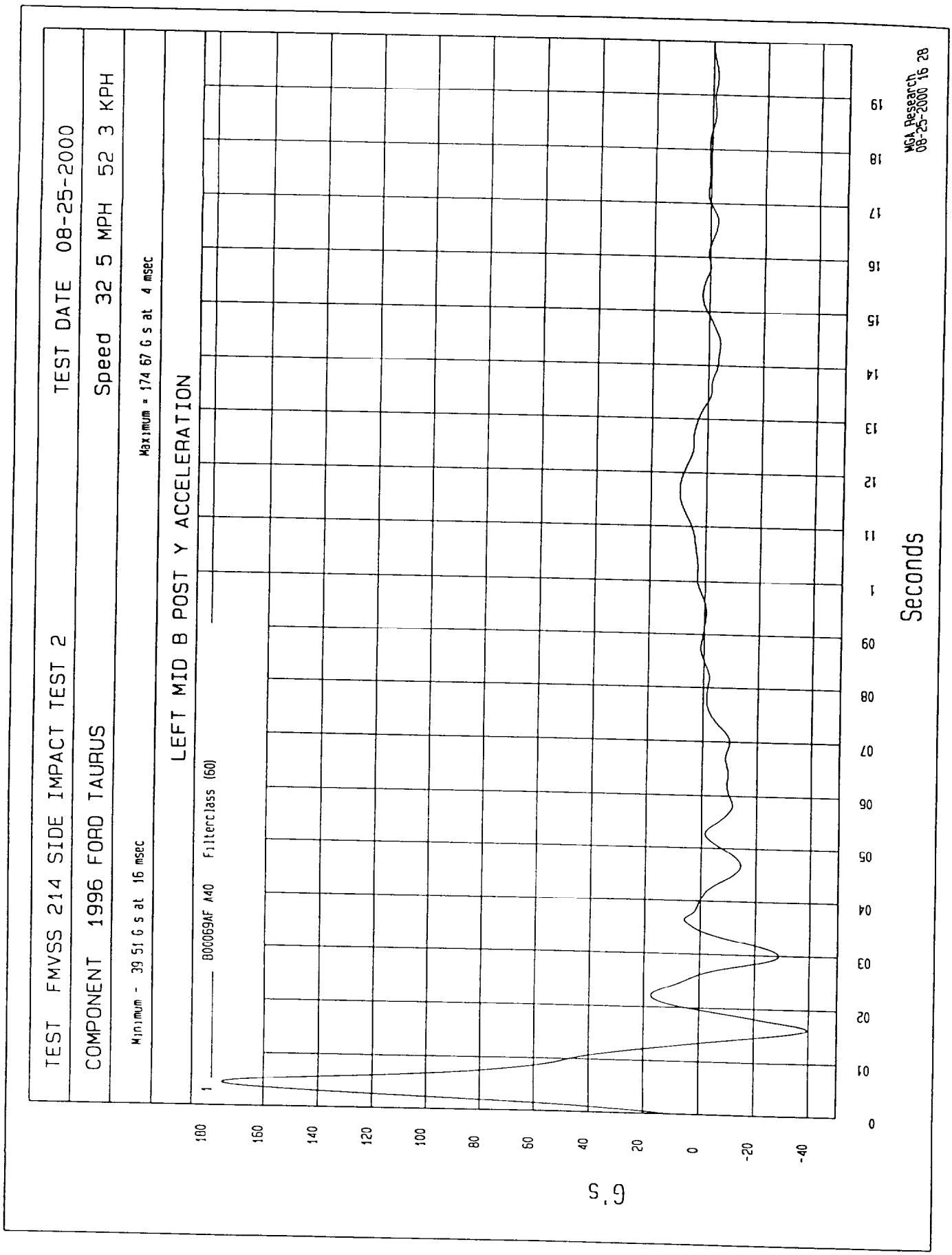

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE: 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 13 6 G s at 21 msec
Maximum = 18 03 G s at 18 msec
FLOORPAN @ REAR AXLE Z ACCELERATION
1 B00069AF A36 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 28

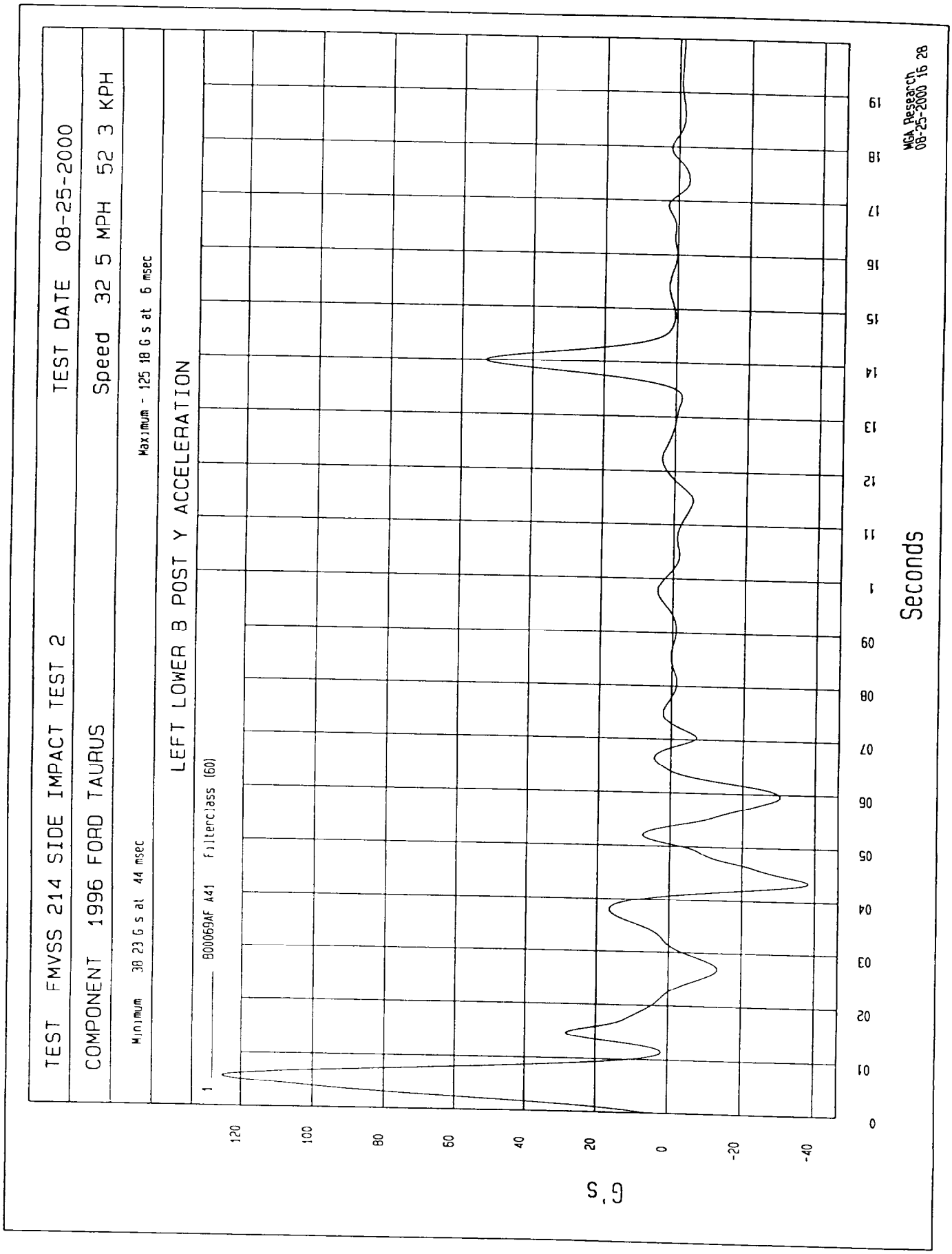

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 9 18E-02 G s at 94 msec
Maximum = 20 35 G's at 29 msec
FLOORPAN @ REAR AXLE RESULTANT ACCELERATION
1 B0006BAV A34 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 28

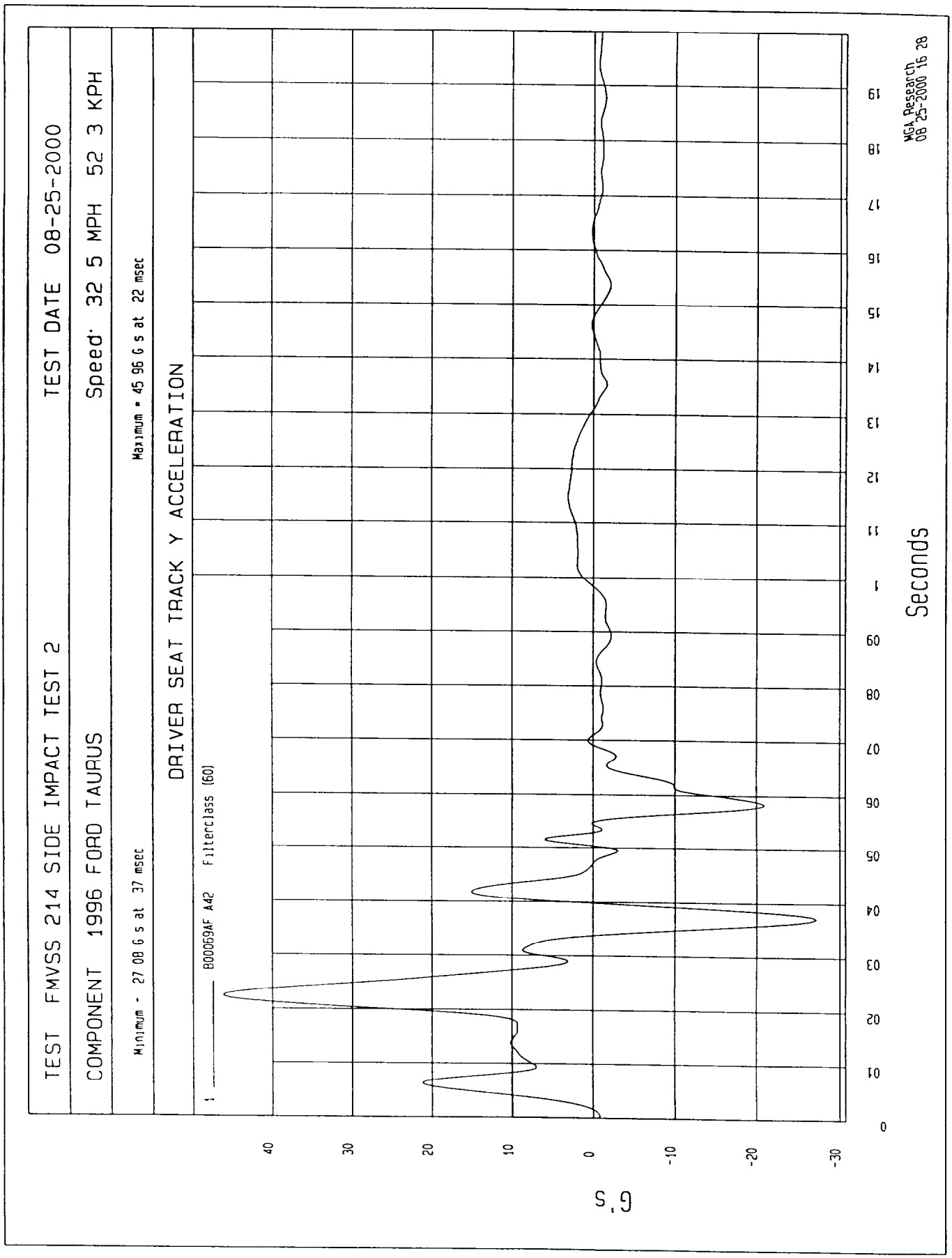

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 14 84 G s at 19 msec
Maximum 48 G s at 3 msec
LEFT MID A POST Y ACCELERATION
1 B00059AF A37 Filterclass (60)
MGA Research
08-25-2000 16 28
G's
Seconds
50
40
30
20
10
0
-10
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

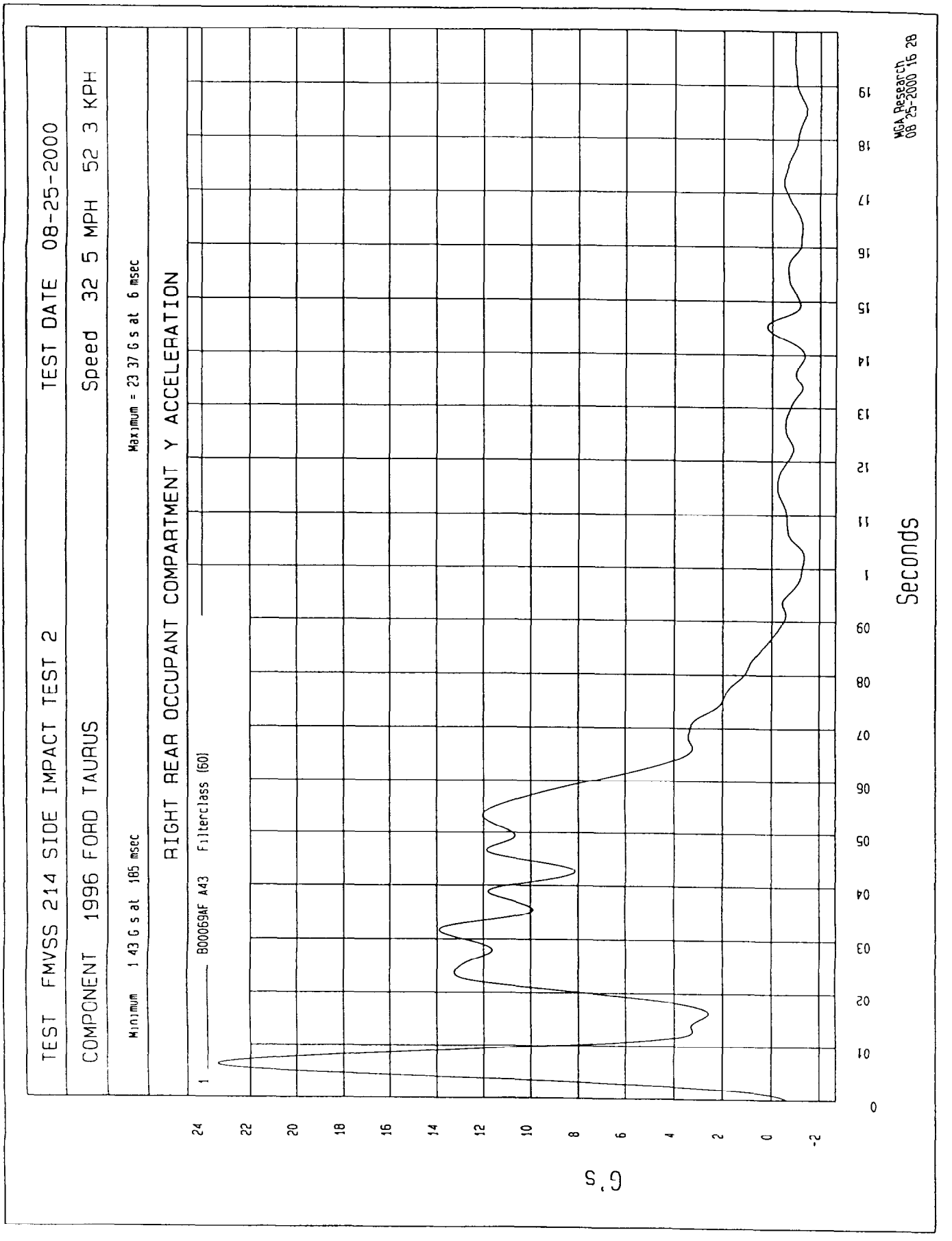

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 9 41 G s at 33 msec
Maximum = 33 52 G s at 4 msec
LEFT LOWER A POST Y ACCELERATION
1 B00069AF A38 Filterclass (60)
30
20
10
0
10
G's
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 28

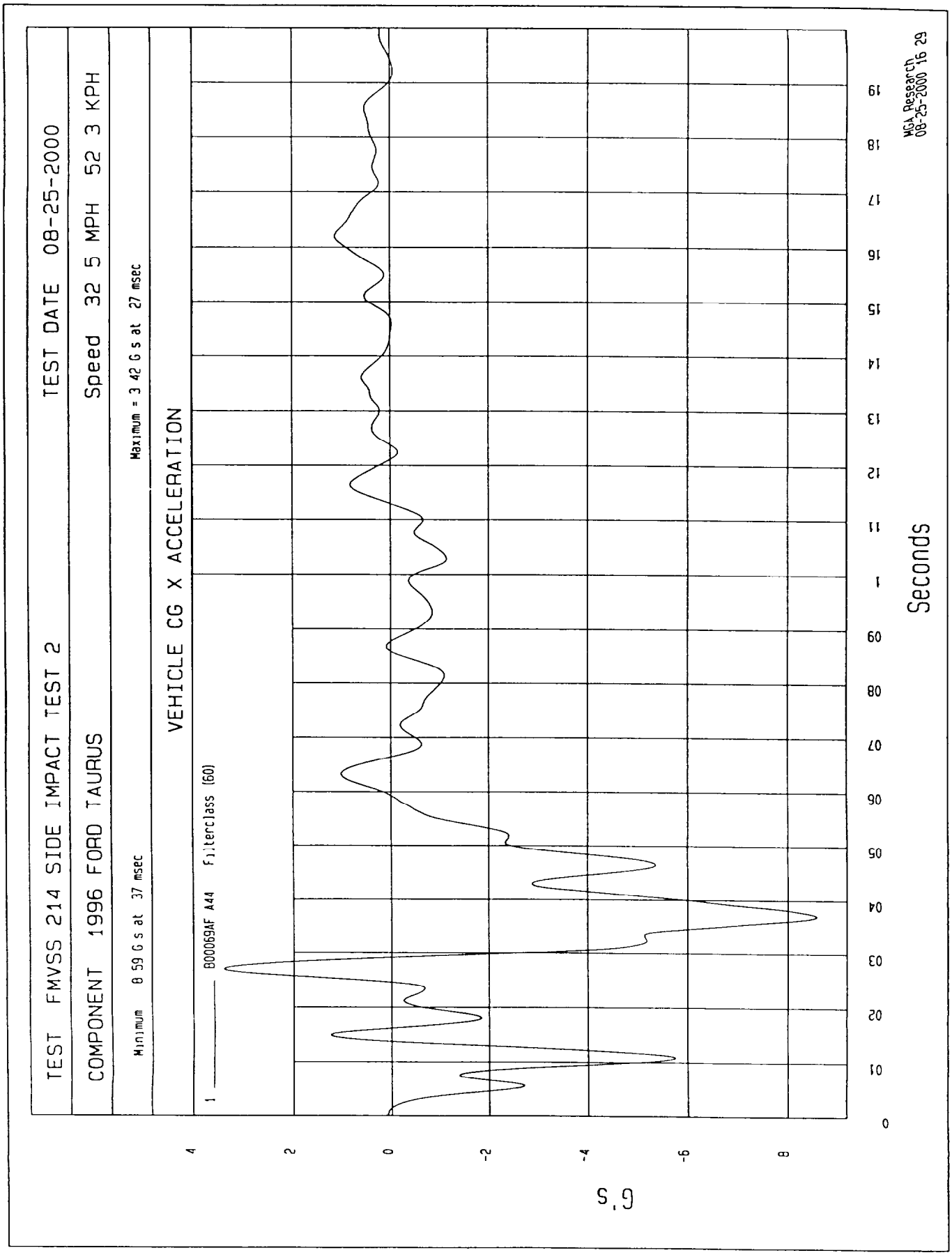

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 15 74 G s at 4 msec
Maximum = 45 34 G s at 34 msec
LEFT UPPER B POST Y ACCELERATION
1 B00069AF A39 Filterclass (60)
G's
40
30
20
10
0
-10
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 28

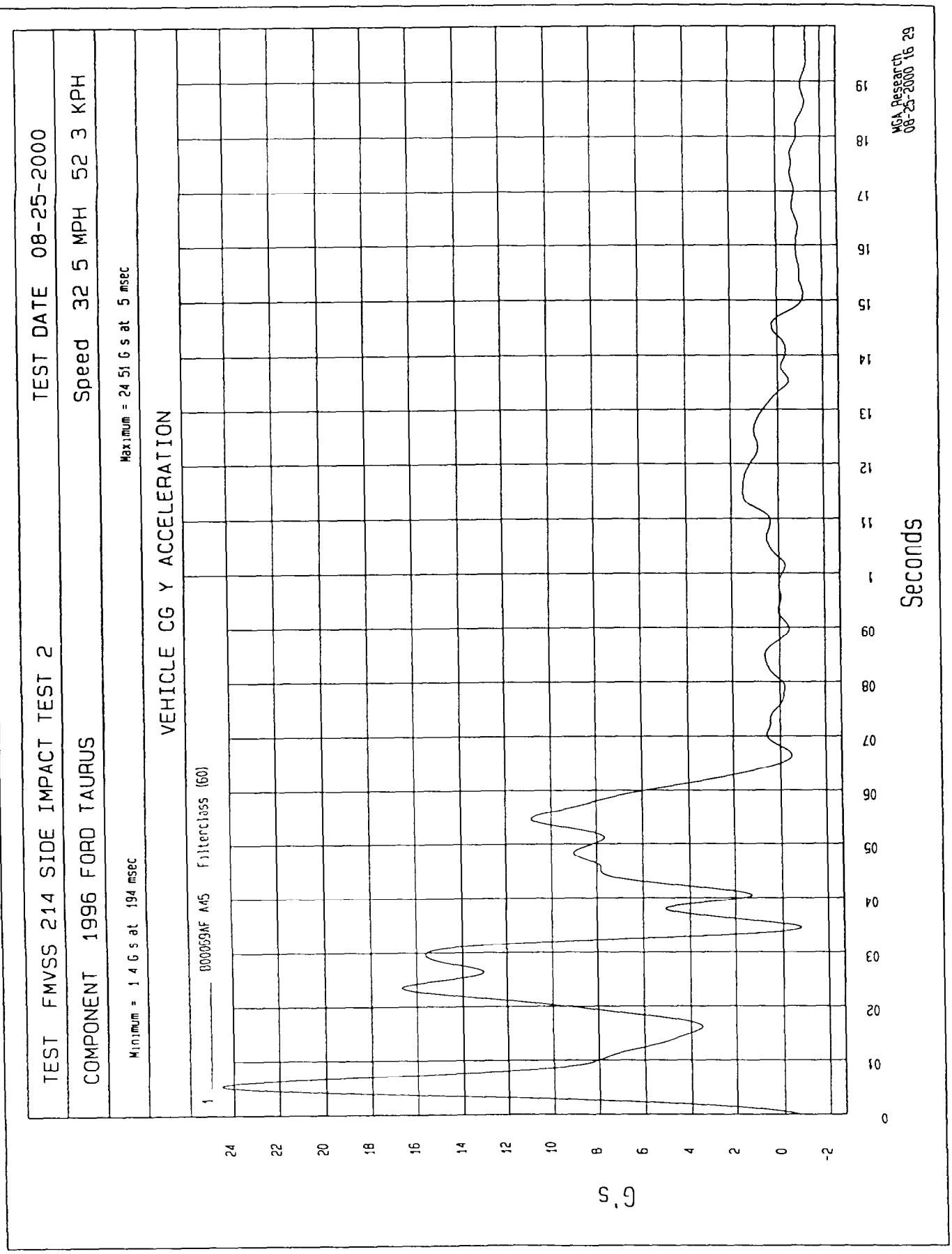

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = 39 51 G s at 16 msec
Maximum = 174 67 G s at 4 msec
LEFT MID B POST Y ACCELERATION
1 B00069AF A40 Filterclass (60)
MGA Research
08-25-2000 16 28
Gs
Seconds
180
160
140
120
100
80
60
40
20
0
-20
-40
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

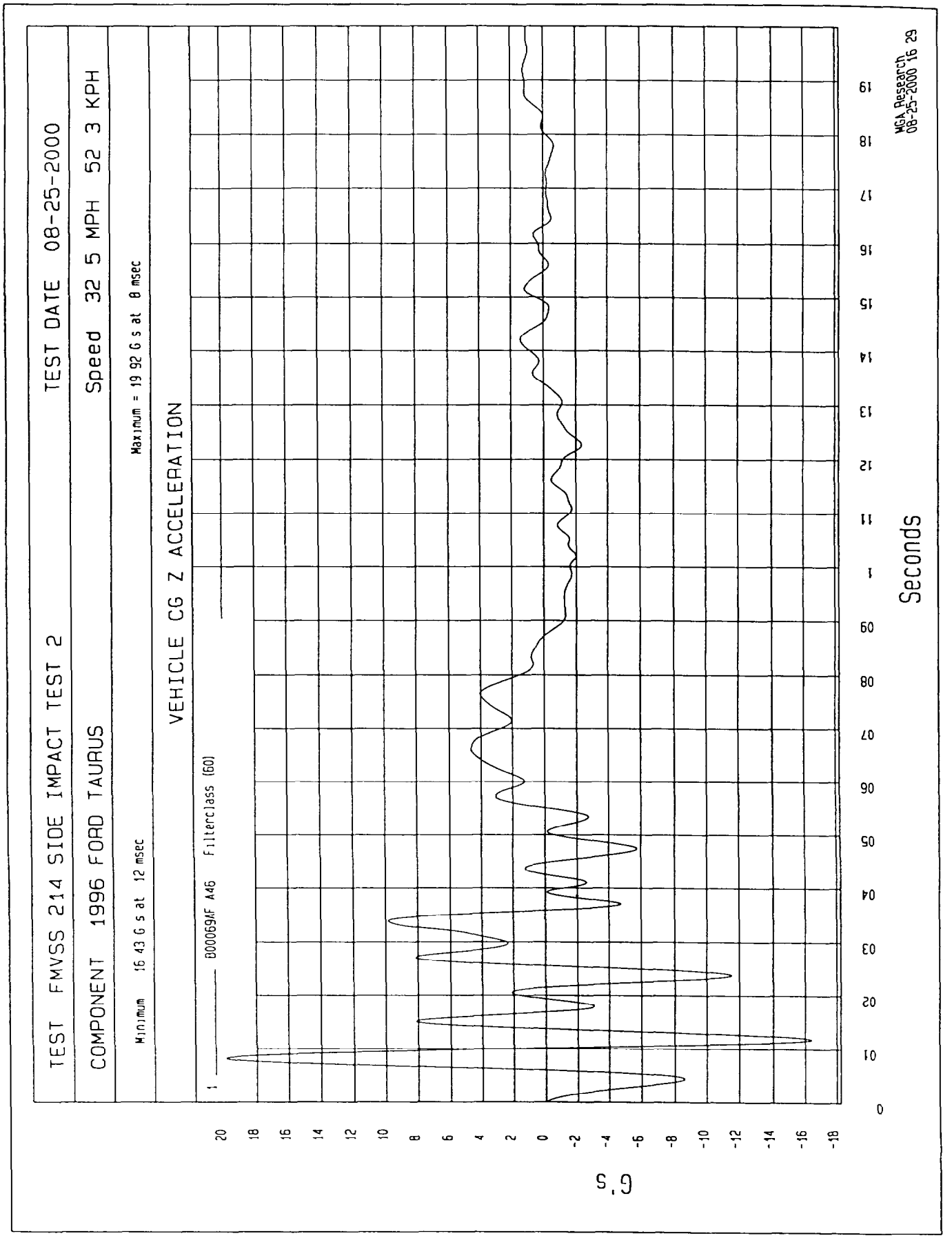

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 38 23 G s at 44 msec
Maximum - 125 18 G s at 6 msec
LEFT LOWER B POST Y ACCELERATION
1 B00069AF A41 Filterclass (60)
G's
120
100
80
60
40
20
0
-20
-40
Seconds
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
MGA Research
08-25-2000 16 28

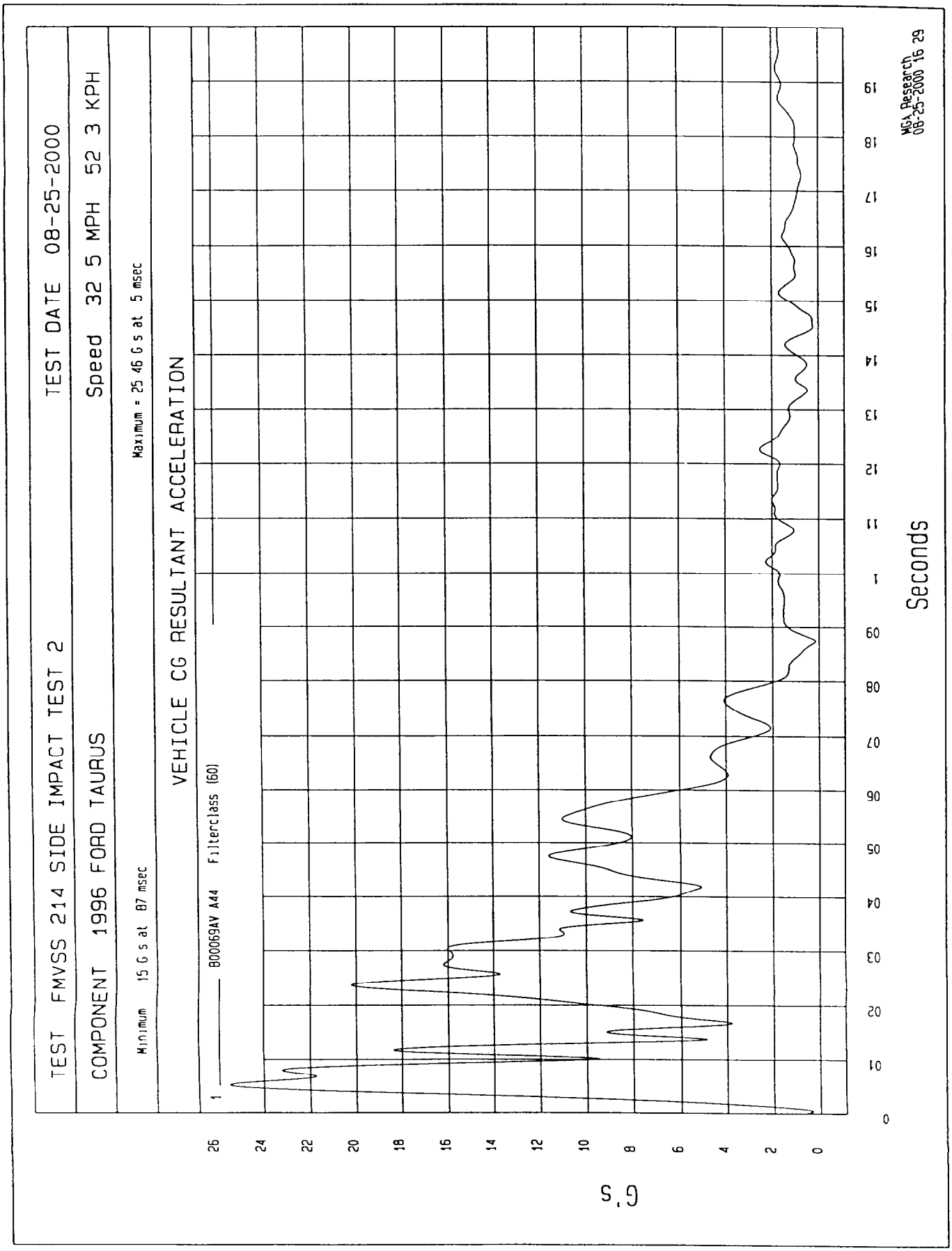

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed: 32 5 MPH 52 3 KPH
Minimum = 27 08 G s at 37 msec
Maximum = 45 96 G s at 22 msec
DRIVER SEAT TRACK Y ACCELERATION
1 B00069AF A42 Filterclass (60)
G's
40
30
20
10
0
-10
-20
-30
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 28

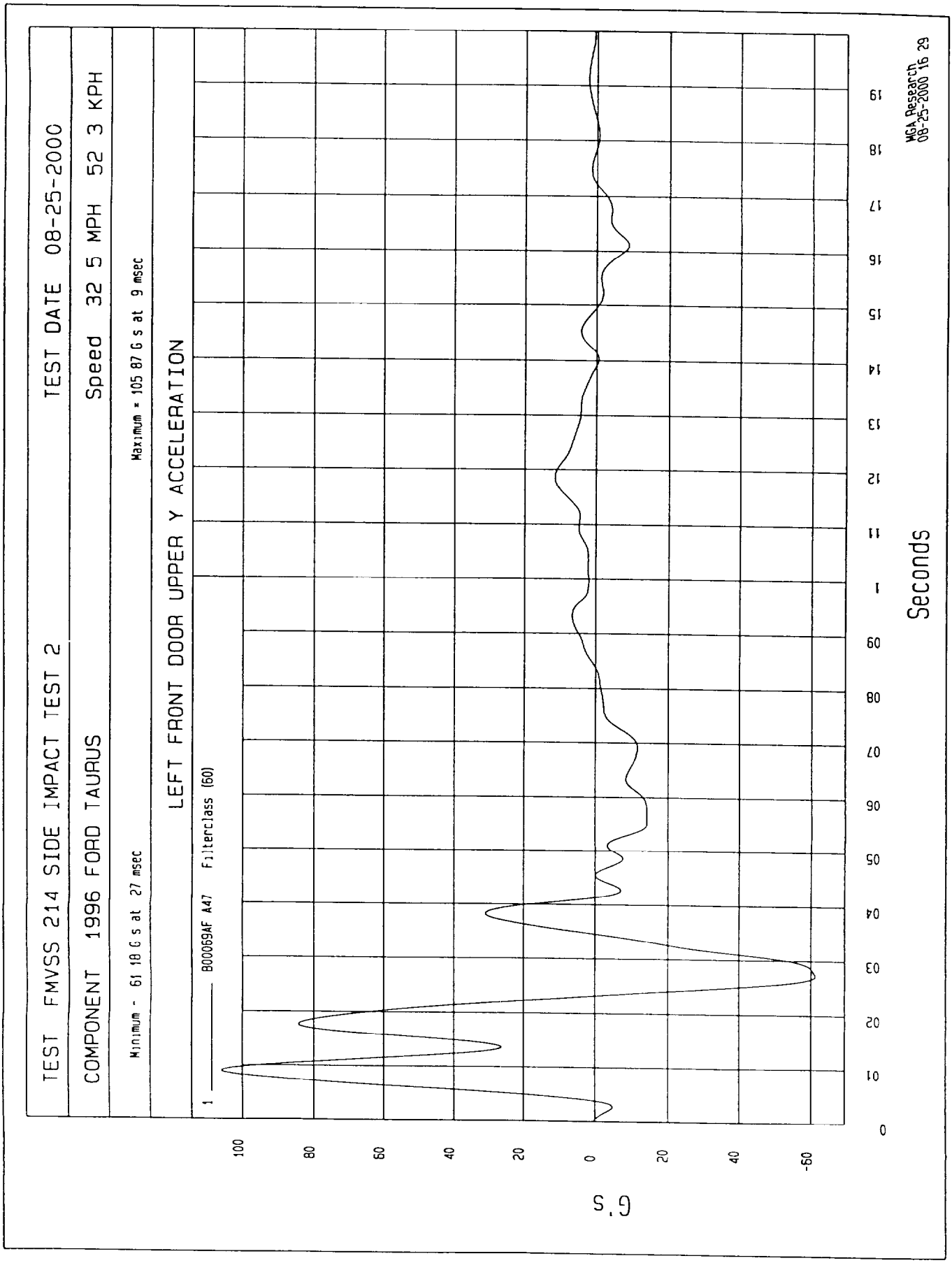

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 1 43 G s at 185 msec
Maximum = 23 37 G s at 6 msec
RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION
1 B00069AF A43 Filterclass (60)
G's
Seconds
MGA Research
08 25-2000 16 28

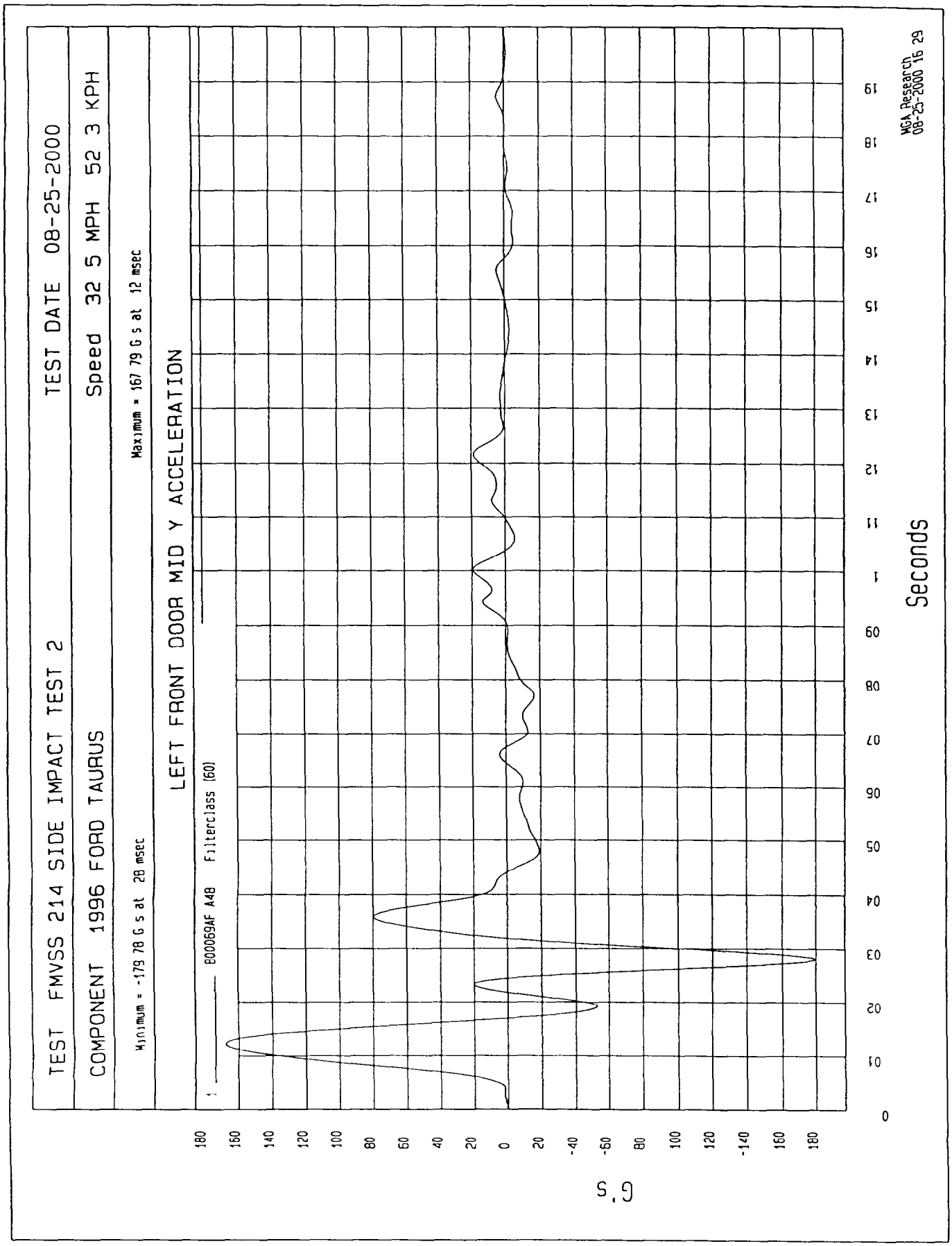

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 0 59 G s at 37 msec
Maximum = 3 42 G s at 27 msec
VEHICLE CG X ACCELERATION
1 B00069AF A44 Filterclass (60)
MGA Research
08-25-2000 16 29
Seconds
G's
4
2
0
-2
-4
-6
-8
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

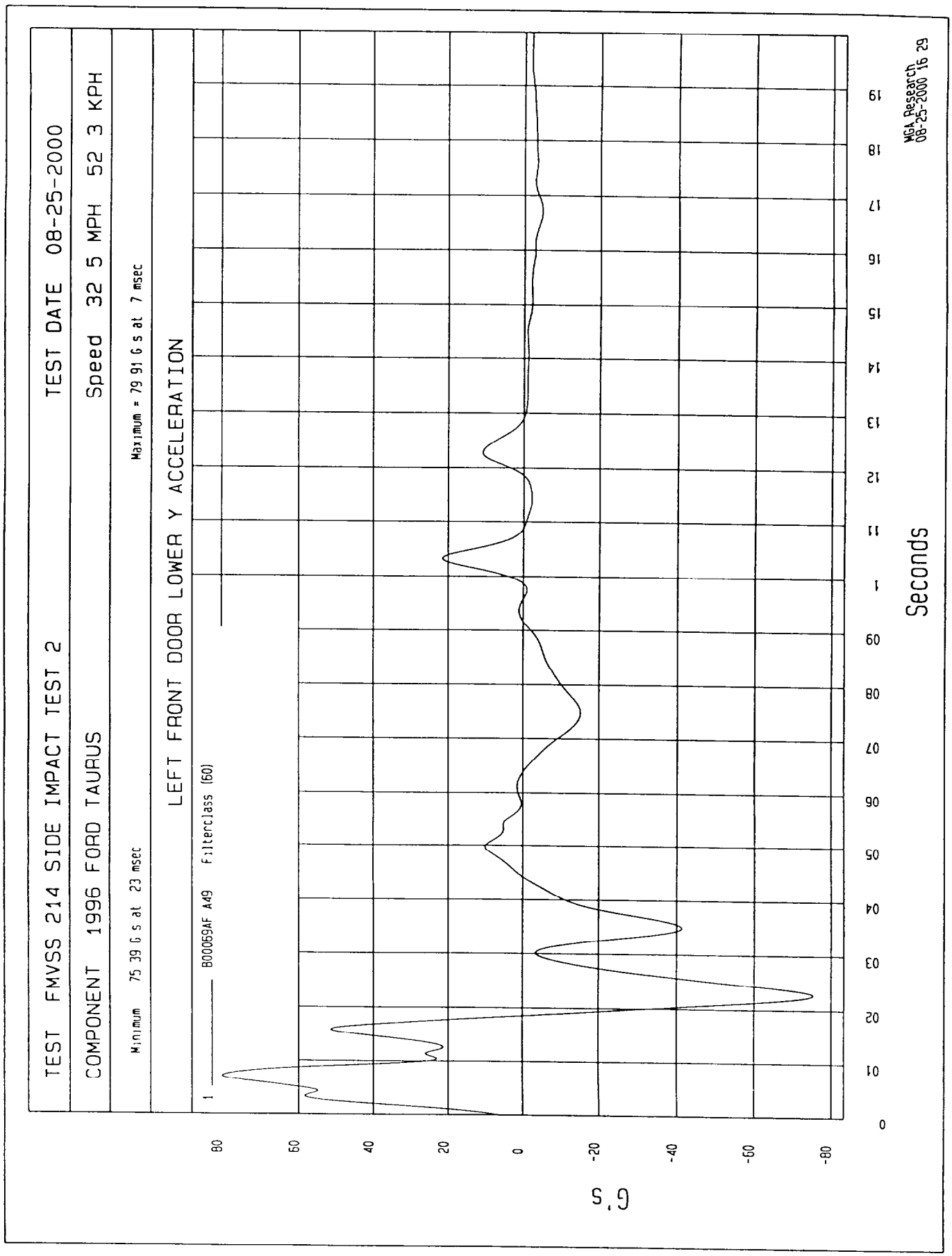

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = 1 4 G s at 194 msec
Maximum = 24 51 G s at 5 msec
VEHICLE CG Y ACCELERATION
1 _____ 000059AF A45 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 29

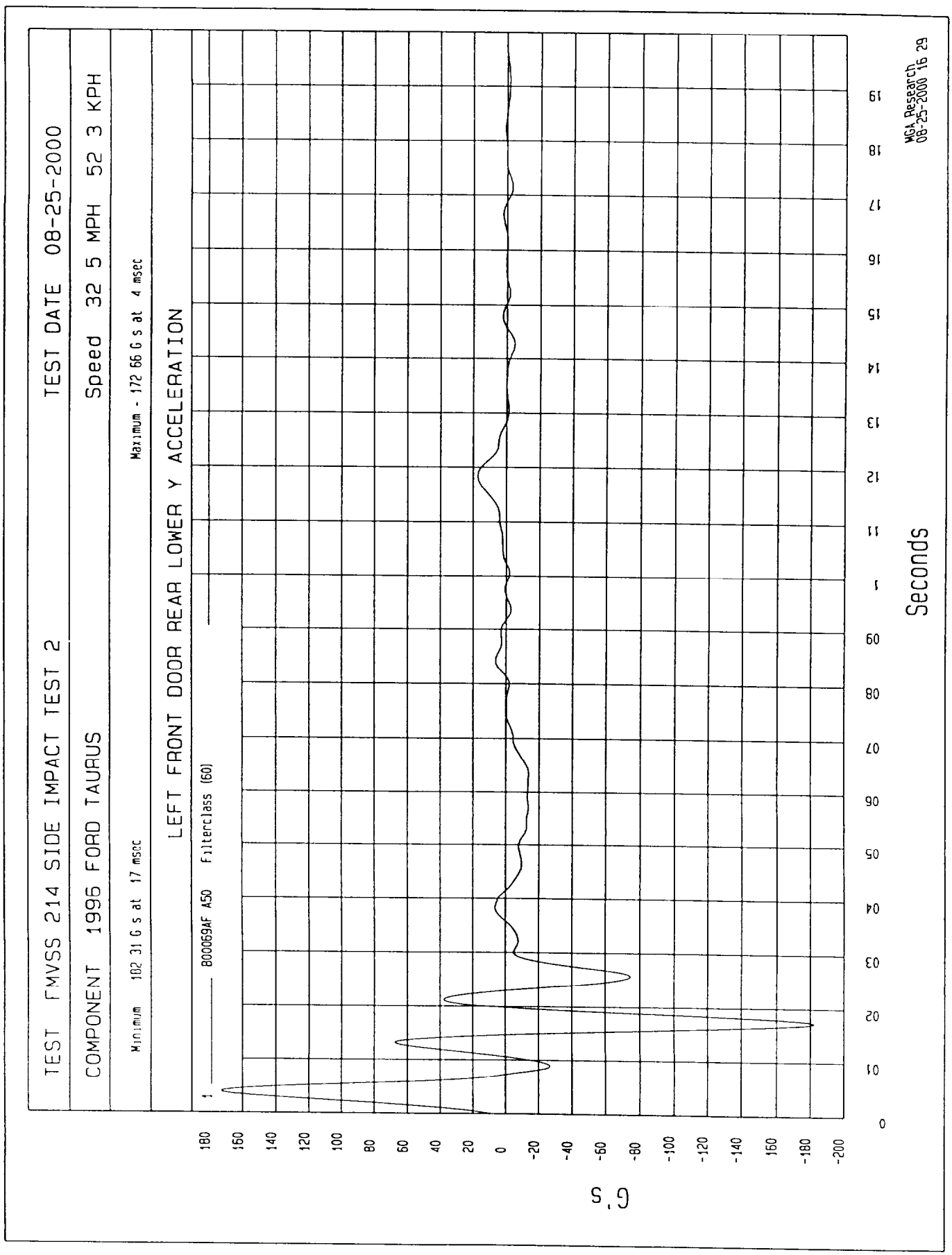

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 16 43 G s at 12 msec
Maximum = 19 92 G s at 0 msec
VEHICLE CG Z ACCELERATION
1 B00069AF A46 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 29

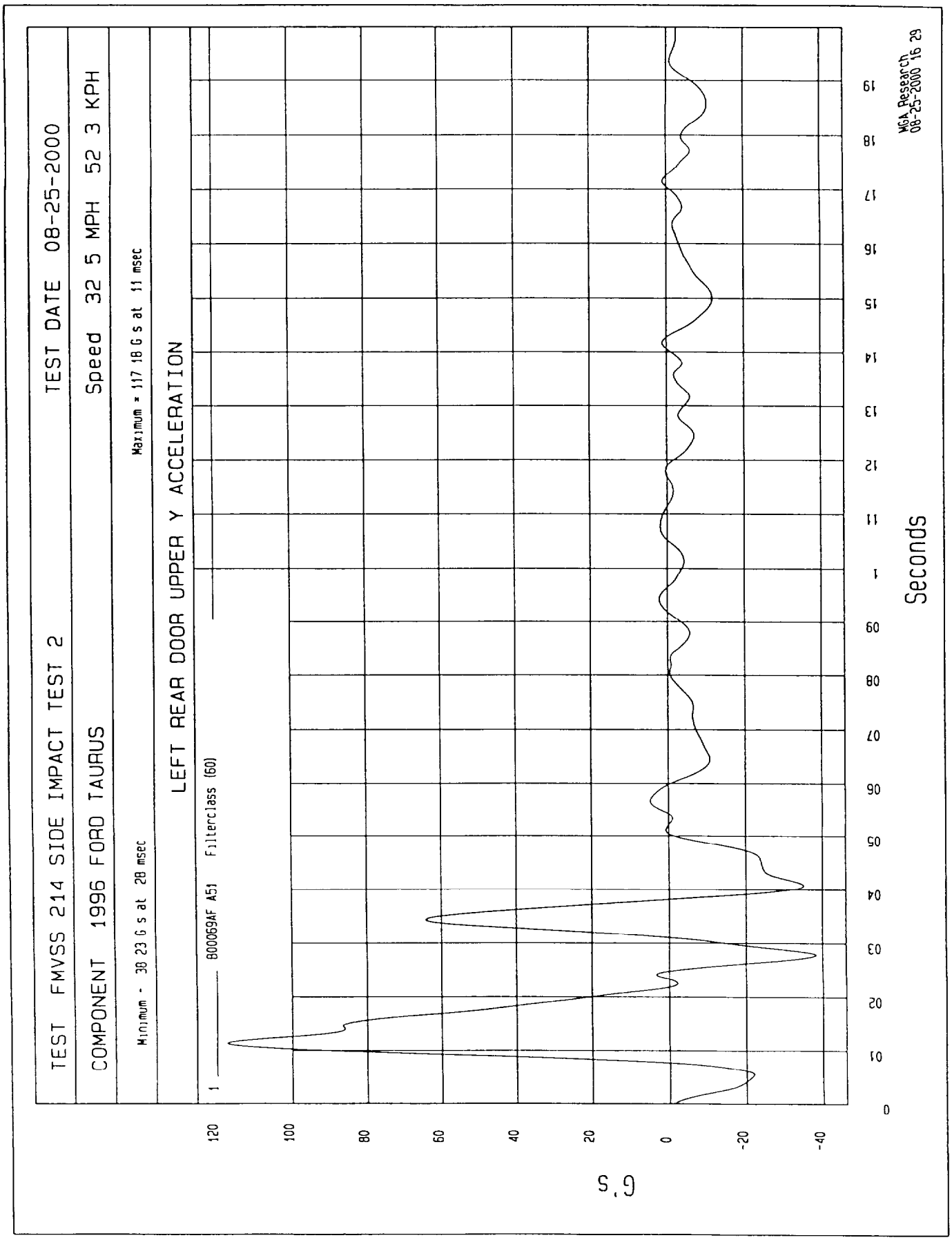

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 15 G s at 87 msec
Maximum = 25 46 G s at 5 msec
VEHICLE CG RESULTANT ACCELERATION
1 B00069AV A44 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 29

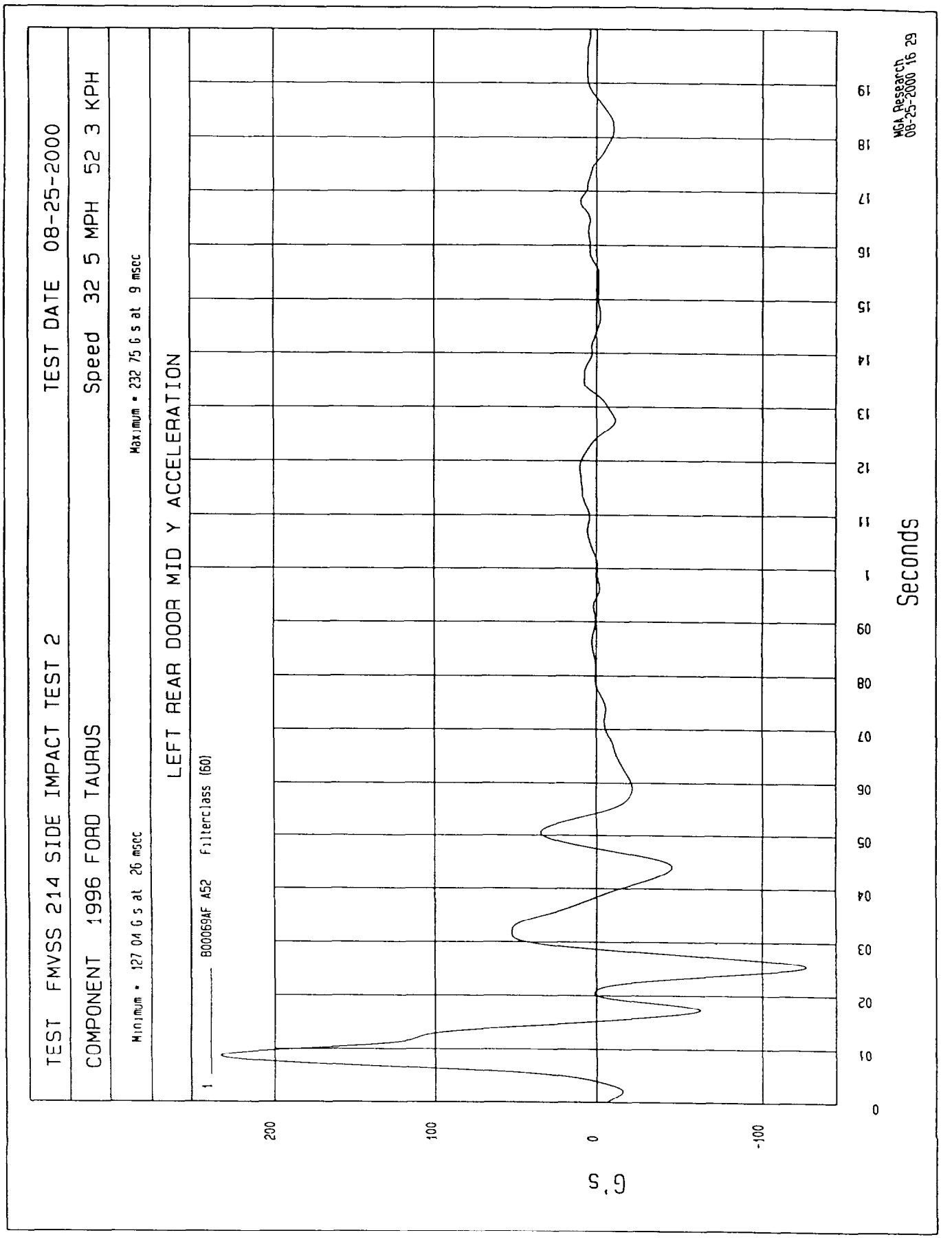

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 61 18 G s at 27 msec
Maximum = 105 87 G s at 9 msec
LEFT FRONT DOOR UPPER Y ACCELERATION
1 B00069AF A47 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 29

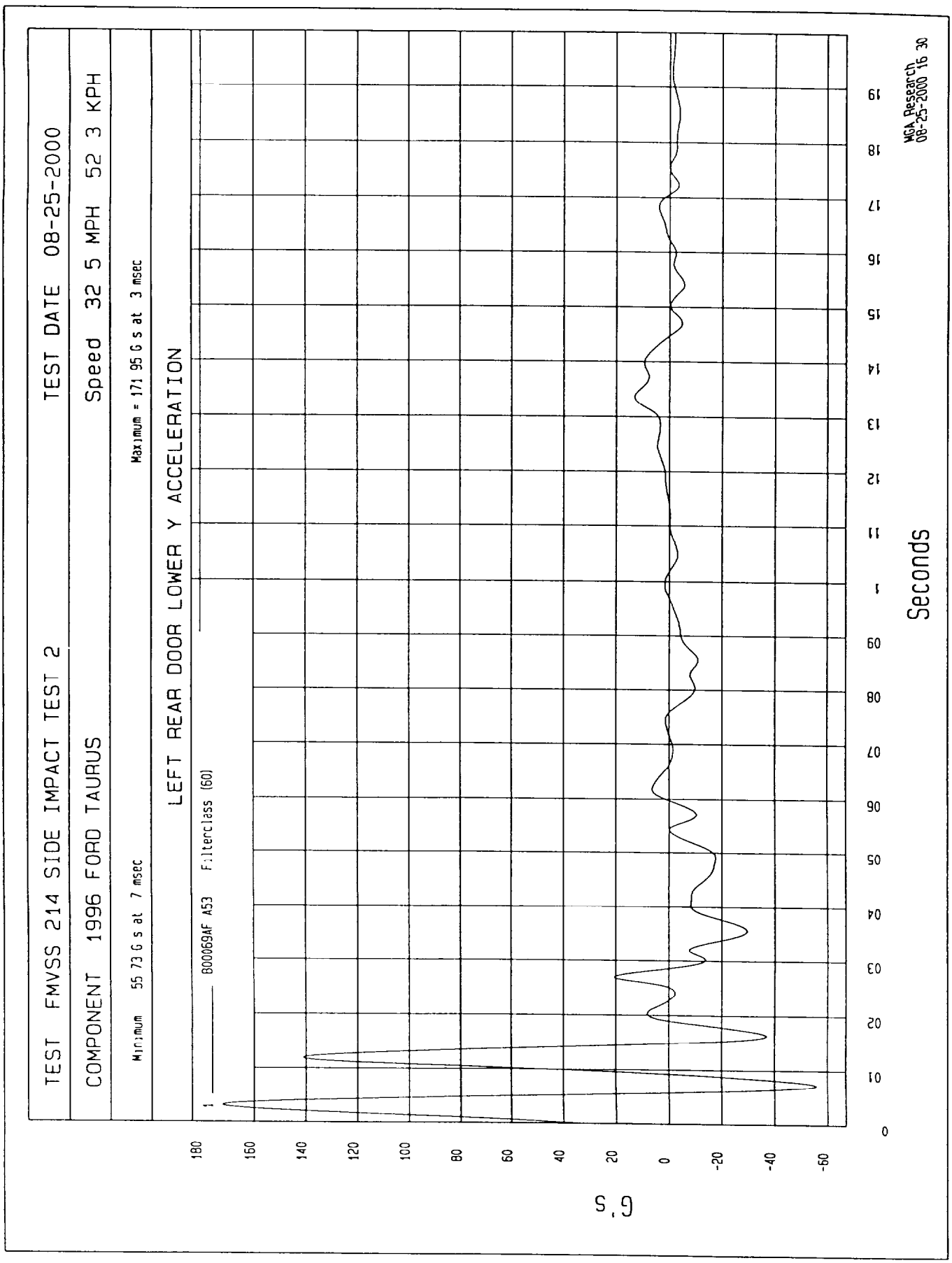

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = -179 78 G s at 28 msec
Maximum = 167 79 G s at 12 msec
LEFT FRONT DOOR MID Y ACCELERATION
B00069AF A4B Filterclass (60)
MGA Research
08-25-2000 16 29
G's
Seconds

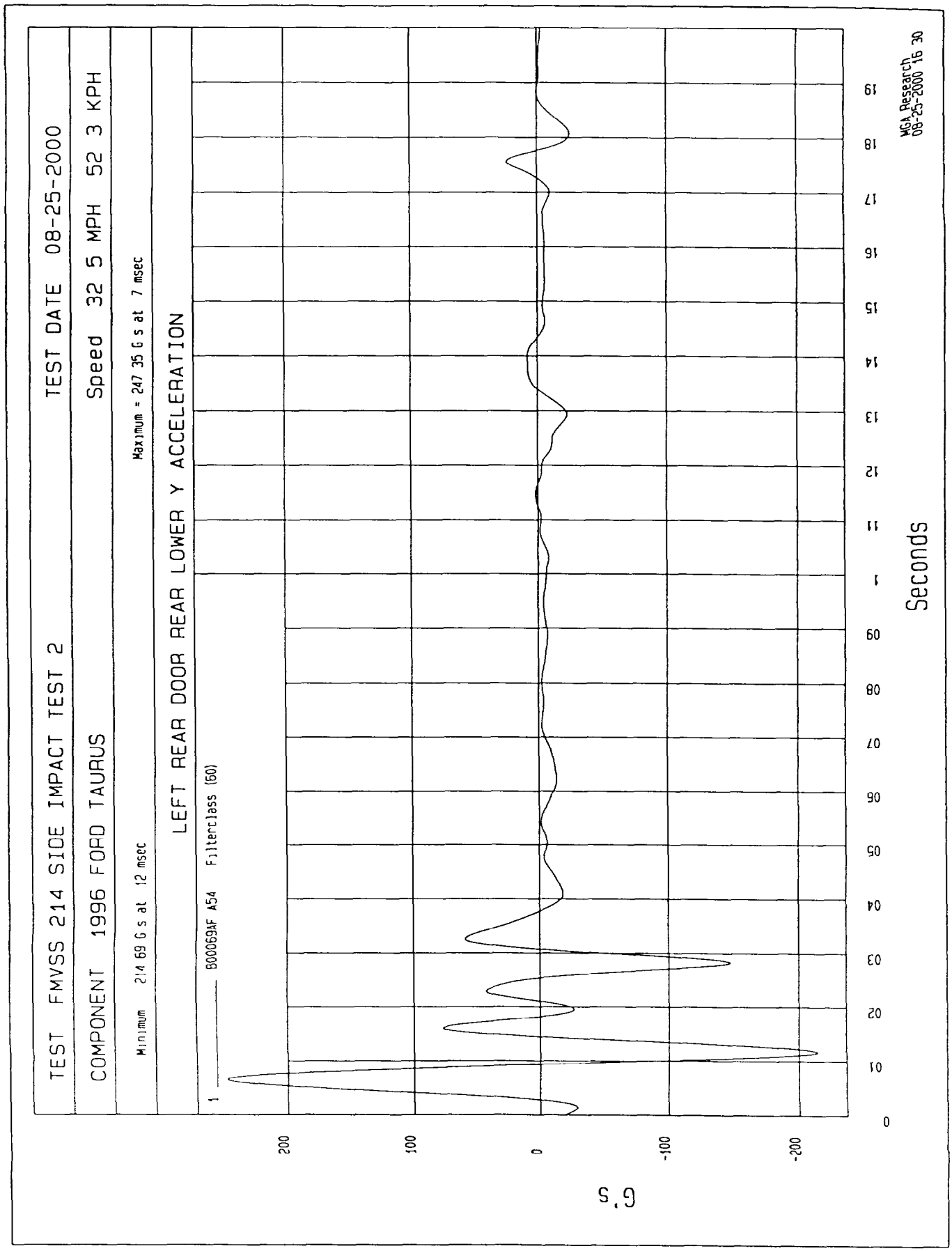

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 75 39 G s at 23 msec
Maximum = 79 91 G s at 7 msec
LEFT FRONT DOOR LOWER Y ACCELERATION
1 B00069AF A49 Filterclass (60)
G's
80
60
40
20
0
-20
-40
-60
-80
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 29

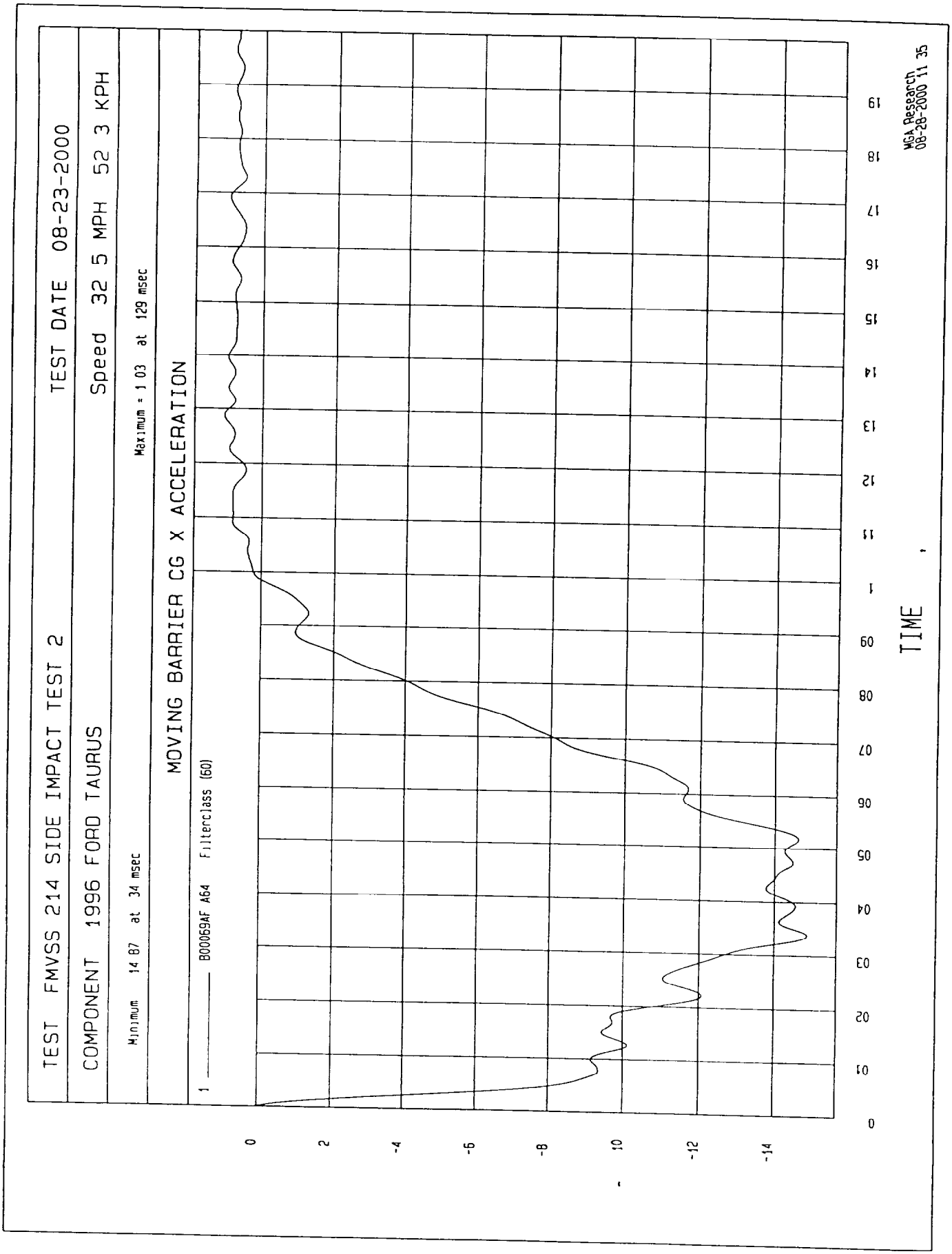

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 102 31 G s at 17 msec
Maximum - 172 66 G s at 4 msec
LEFT FRONT DOOR REAR LOWER Y ACCELERATION
1 B00069AF A50 Filterclass (60)
MGA Research
08-25-2000 16 29
G's
Seconds
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
150
-180
-200
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

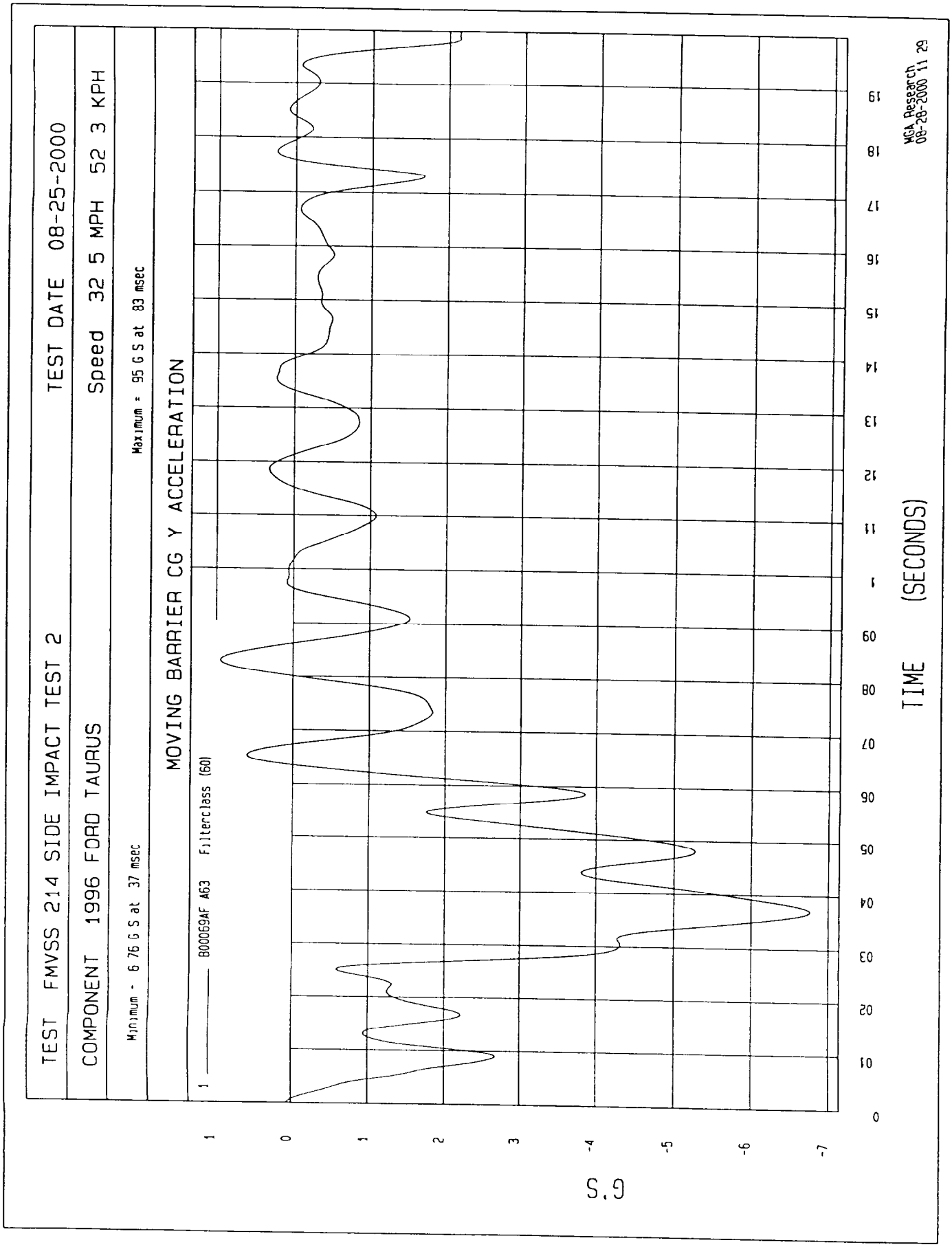

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 38 23 G s at 28 msec
Maximum = 117 18 G s at 11 msec
LEFT REAR DOOR UPPER Y ACCELERATION
1 B00069AF A51 Filterclass (60)
G's
Seconds
MGA Research
08-25-2000 16 29


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum • 127 04 G s at 26 msec
Maximum • 232 75 G s at 9 msec
LEFT REAR DOOR MID Y ACCELERATION
1 B000694F A52 Filterclass (60)
200
100
0
-100
G's
0
10
20
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 29


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 55 73 G s at 7 msec
Maximum = 171 95 G s at 3 msec
LEFT REAR DOOR LOWER Y ACCELERATION
1 B00069AF A53 Filterclass (60)
MGA Research
08-25-2000 16 30
Gs
Seconds
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

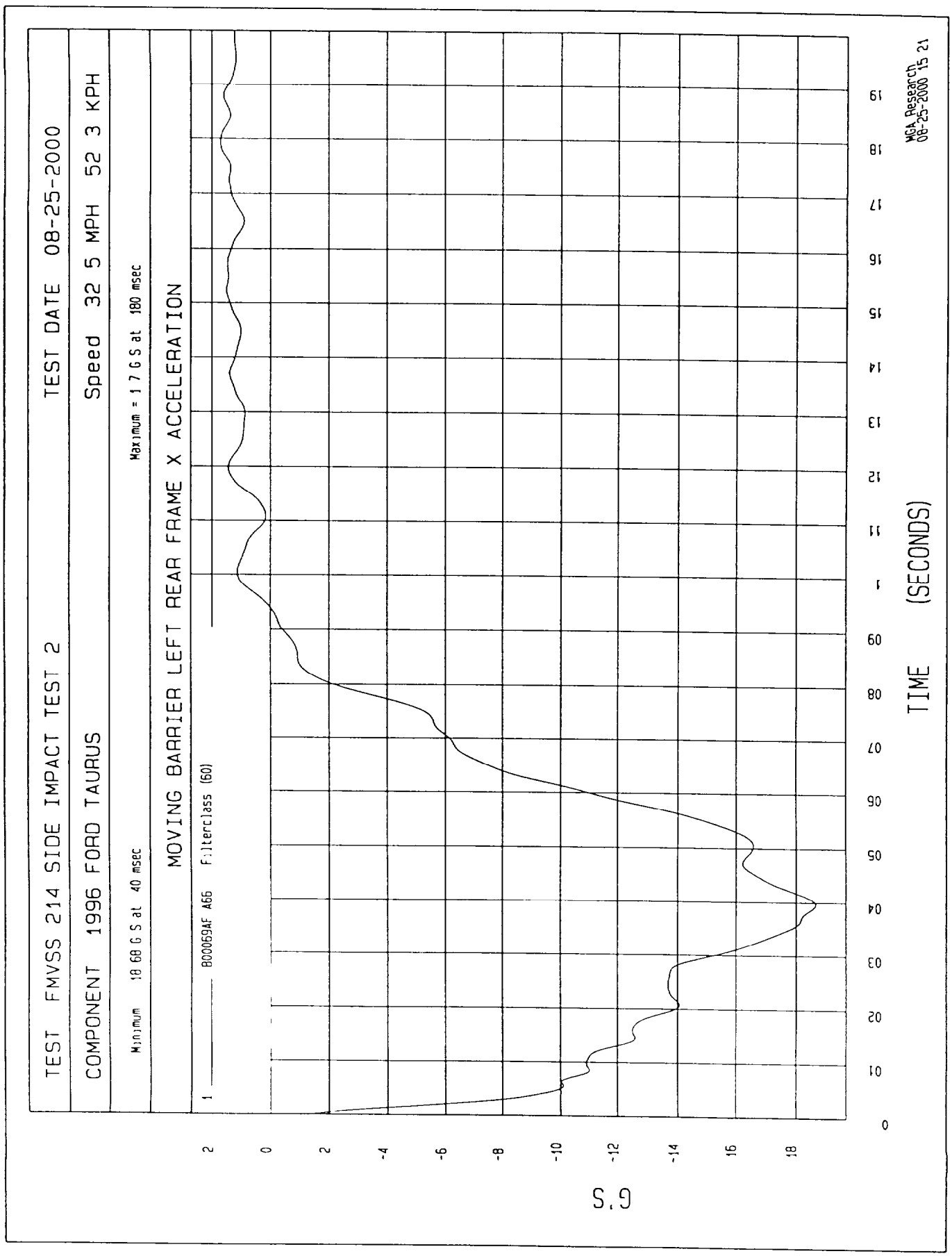

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 214 69 G s at 12 msec
Maximum = 247 35 G s at 7 msec
LEFT REAR DOOR REAR LOWER Y ACCELERATION
1 B00069AF A54 Filterclass (60)
200
100
0
-100
-200
G's
0
10
20
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 30


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-23-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 14 87 at 34 msec
Maximum = 1 03 at 129 msec
MOVING BARRIER CG X ACCELERATION
1 B00069AF A64 Filterclass (60)
0
2
-4
-6
-8
10
-12
-14
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
TIME
MGA Research
08-28-2000 11 35


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 6 76 G S at 37 msec
Maximum = 95 G S at 83 msec
MOVING BARRIER CG Y ACCELERATION
1 B000069AF A63 Filterclass (60)
G's
TIME (SECONDS)
MGA Research
08-28-2000 11 29

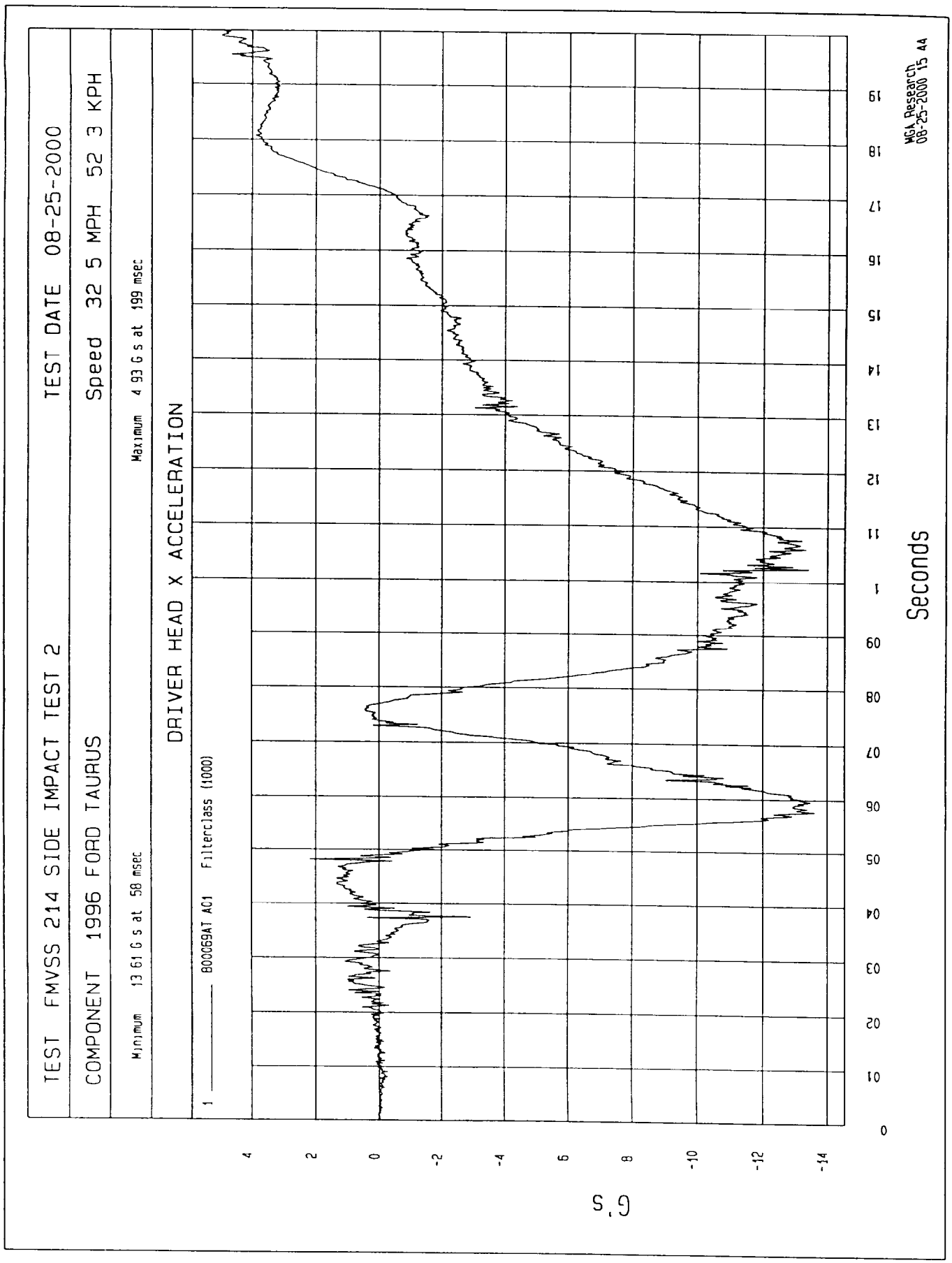
MOVING BARRIER CG Z ACCCELERATION VS TIME

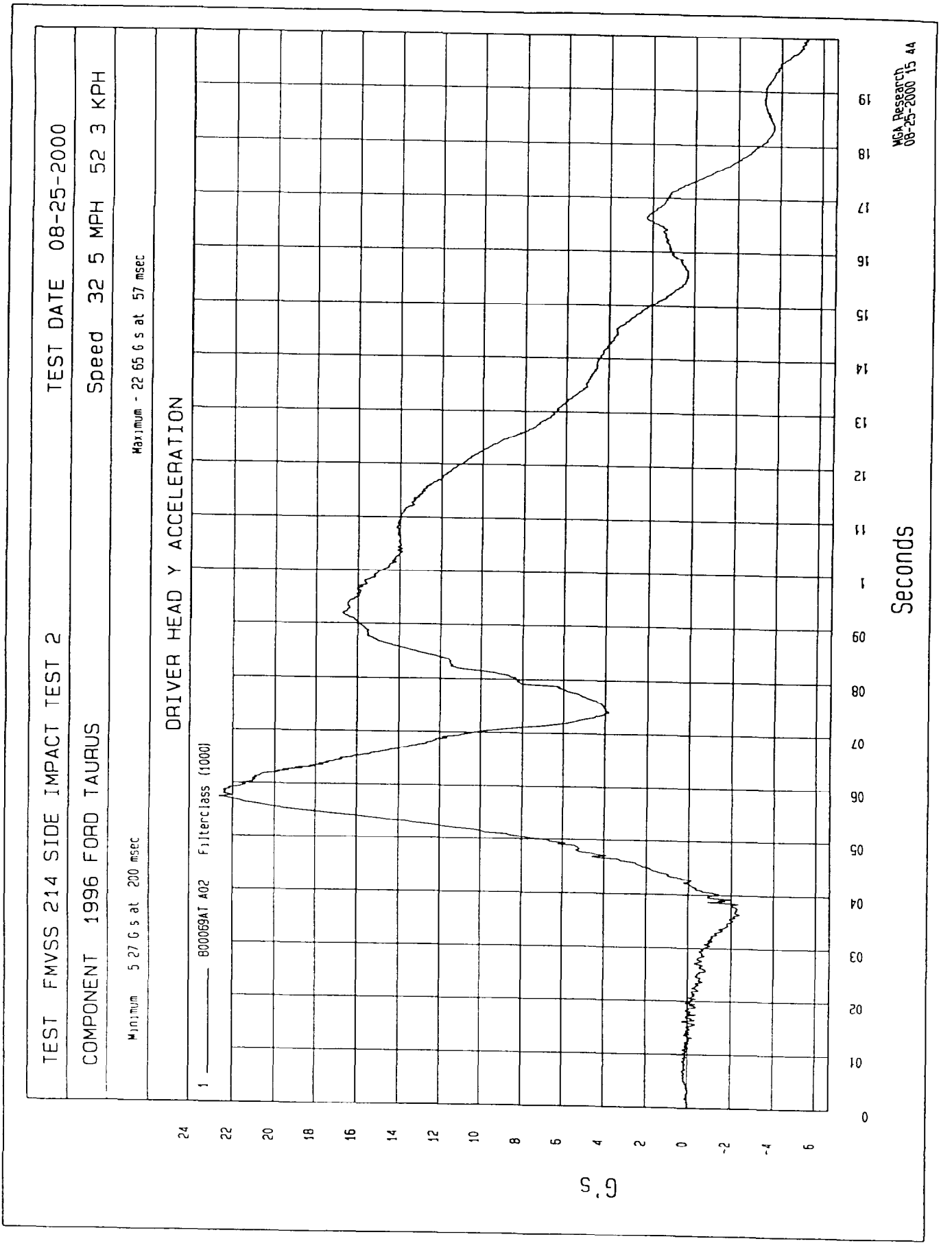
NO VALID DATA COLLECTED

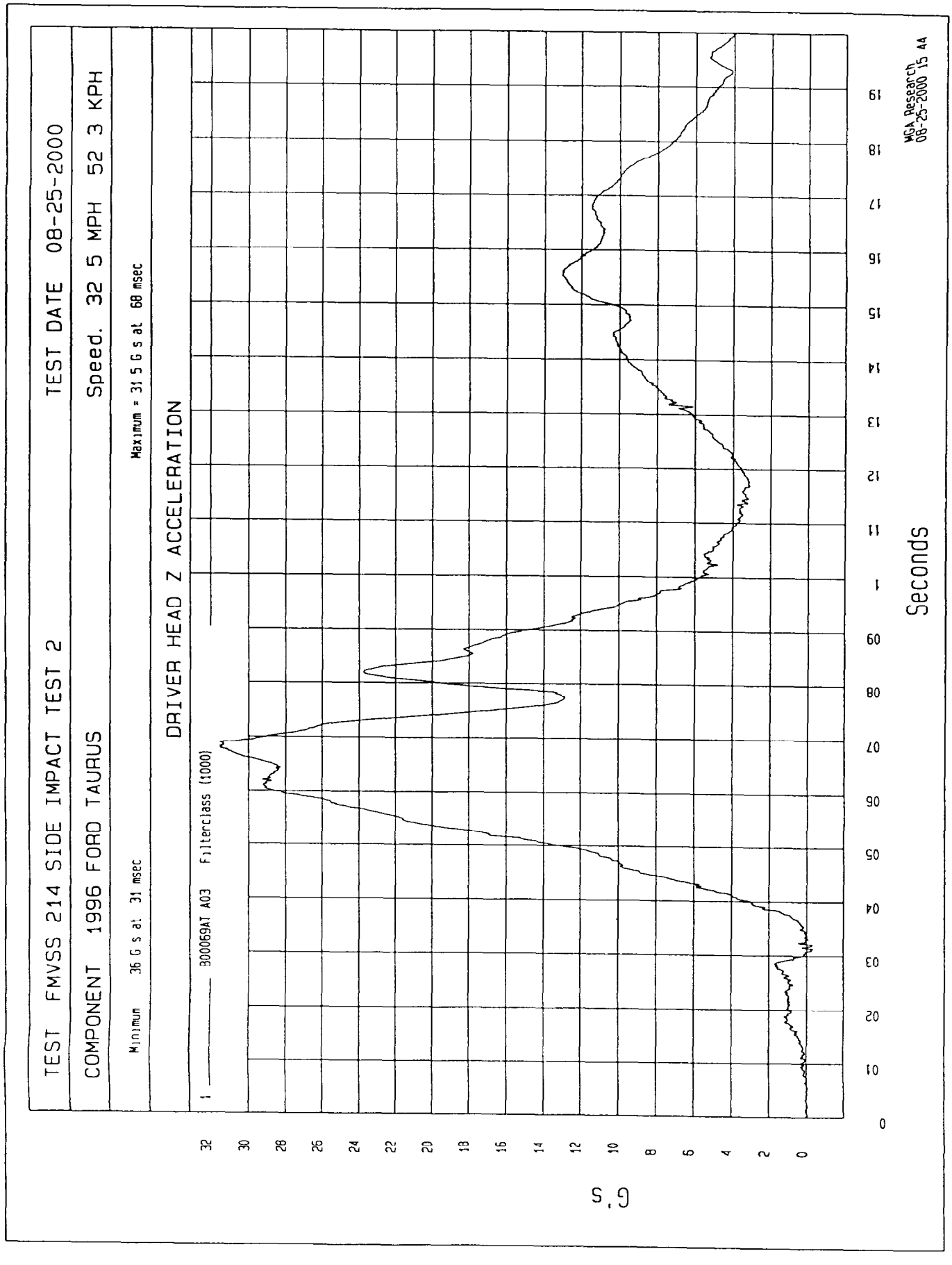

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 18 68 G S at 40 msec
Maximum = 1 7 6 S at 180 msec
MOVING BARRIER LEFT REAR FRAME X ACCELERATION
1 B00069AF A66 Filterclass (60)
MGA Research
08-25-2000 15 21
6.9
TIME (SECONDS)

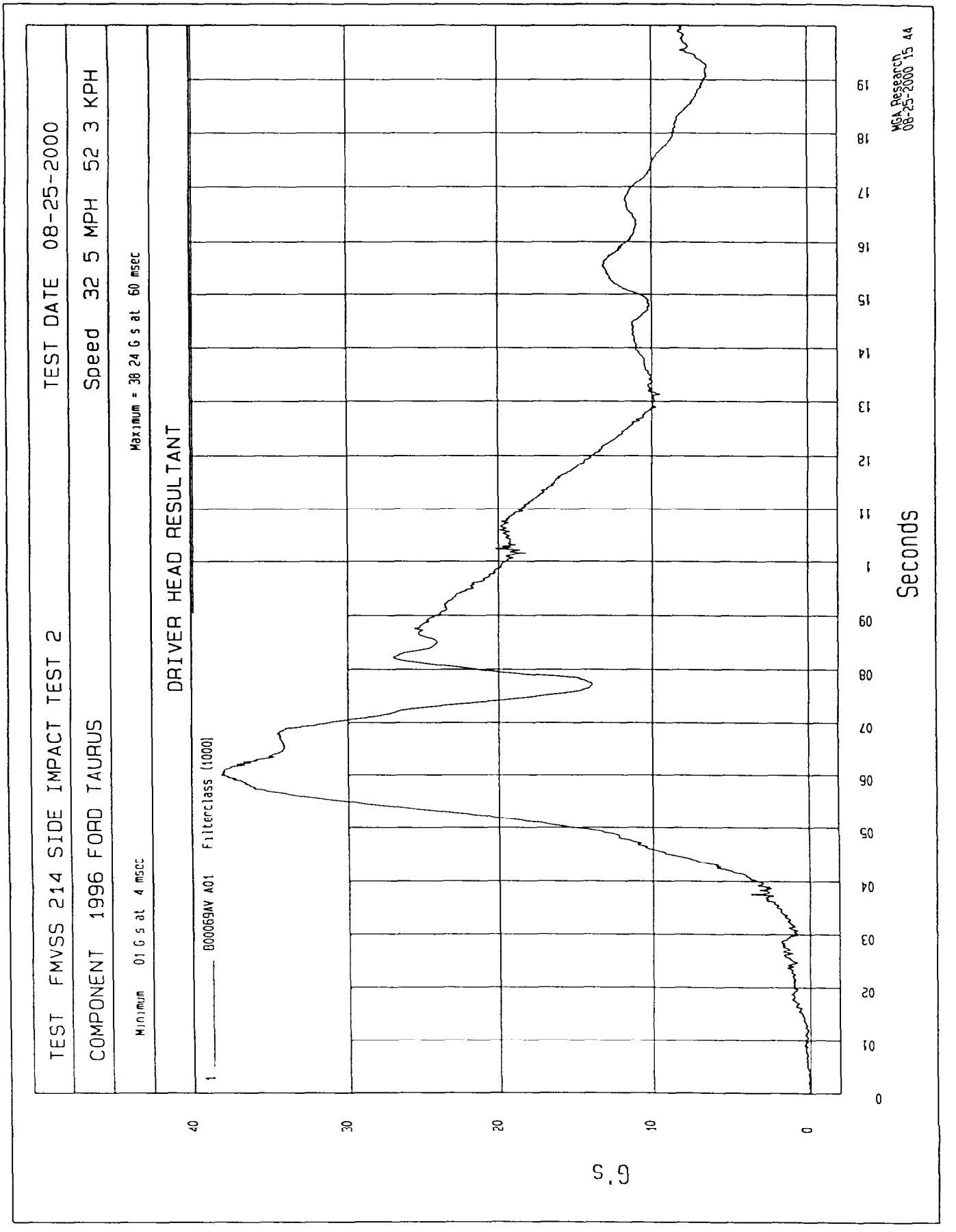
MOVING BARRIER LEFT REAR FRAME Y ACCCELERATION VS TIME

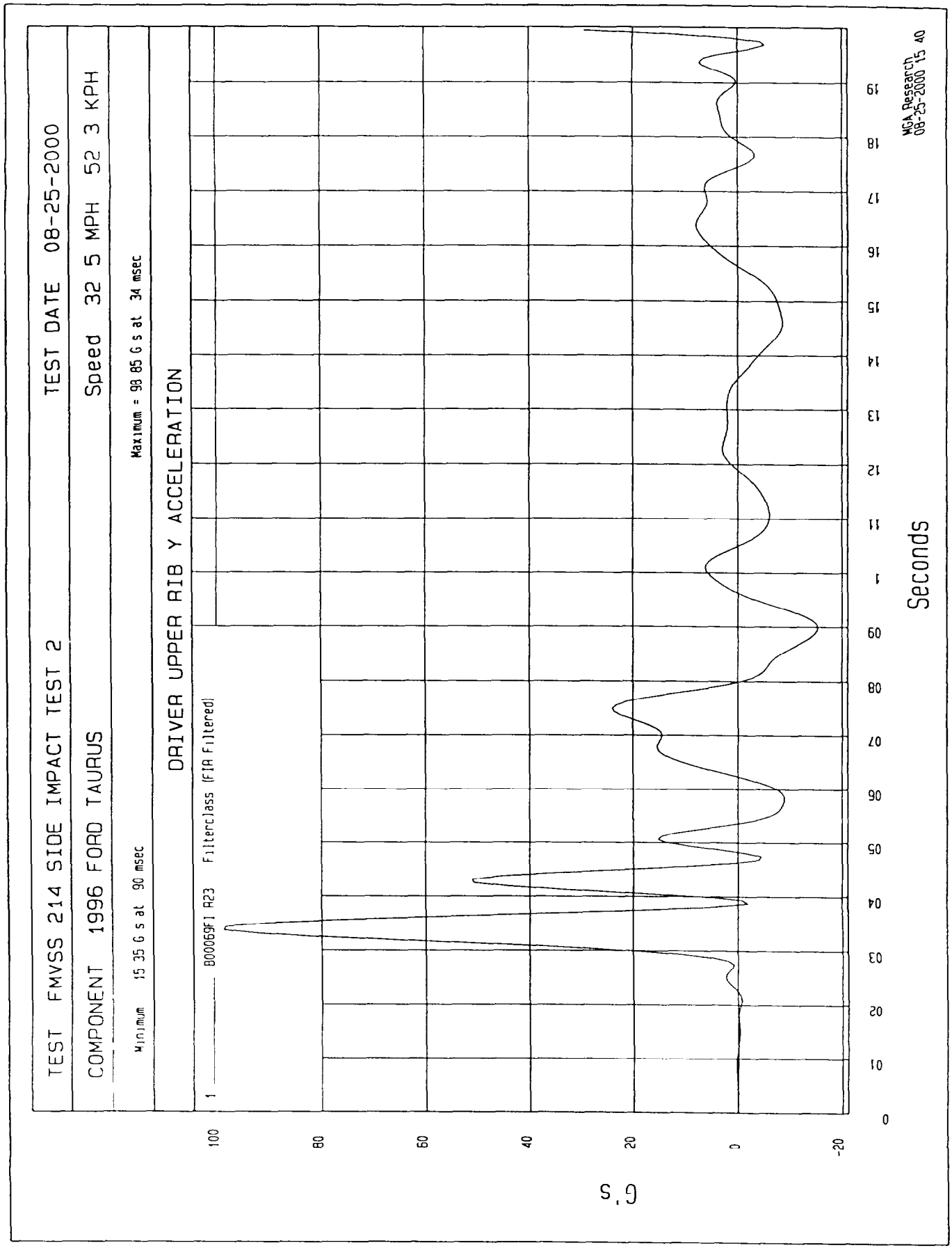
NO VALID DATA COLLECTED

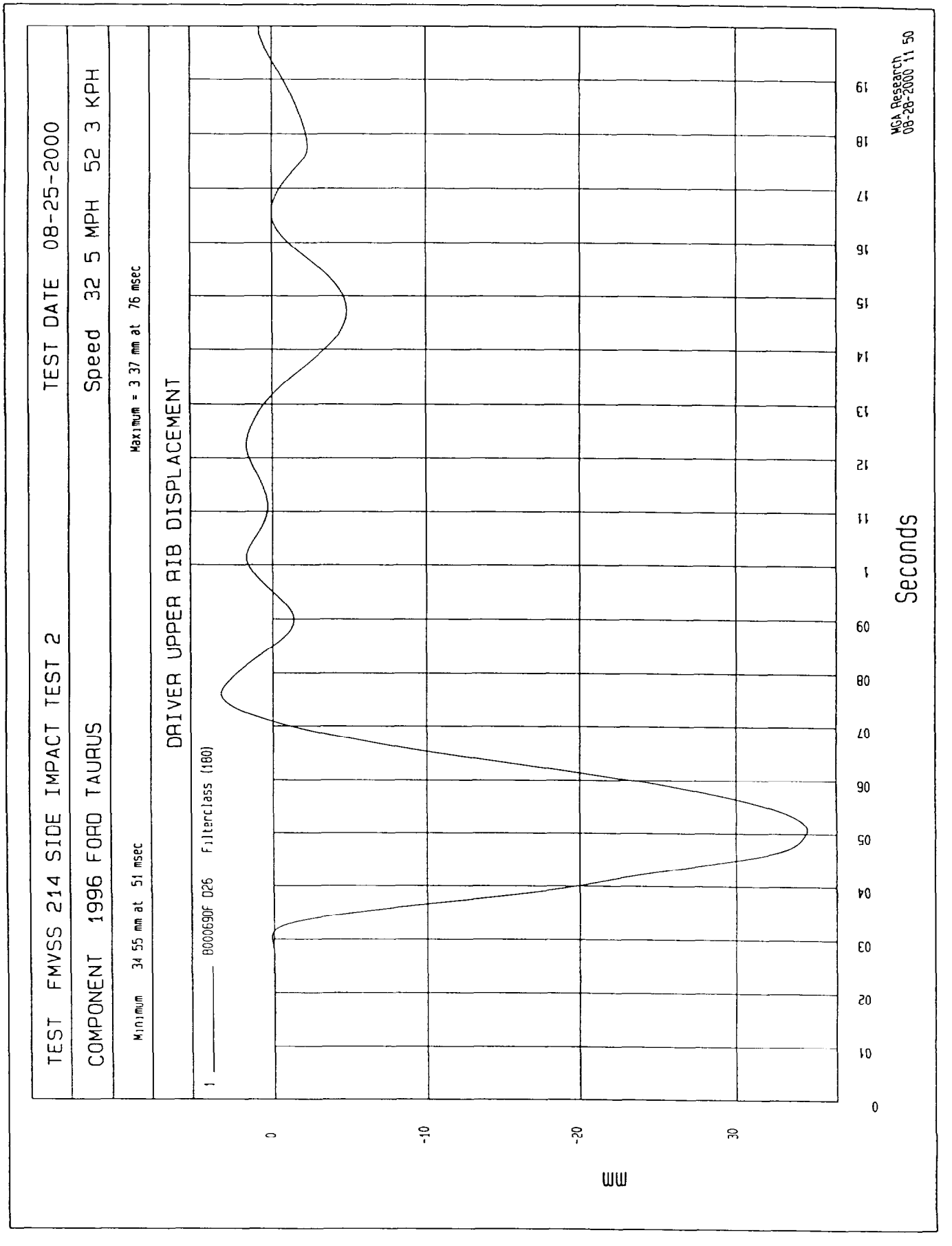

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 13 61 G s at 58 msec
Maximum 4 93 G s at 199 msec
DRIVER HEAD X ACCELERATION
1 B0006GAT A01 Filterclass (1000)
MGA Research
08-25-2000 15 44
G's
Seconds
4
2
0
-2
-4
6
8
-10
-12
-14
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

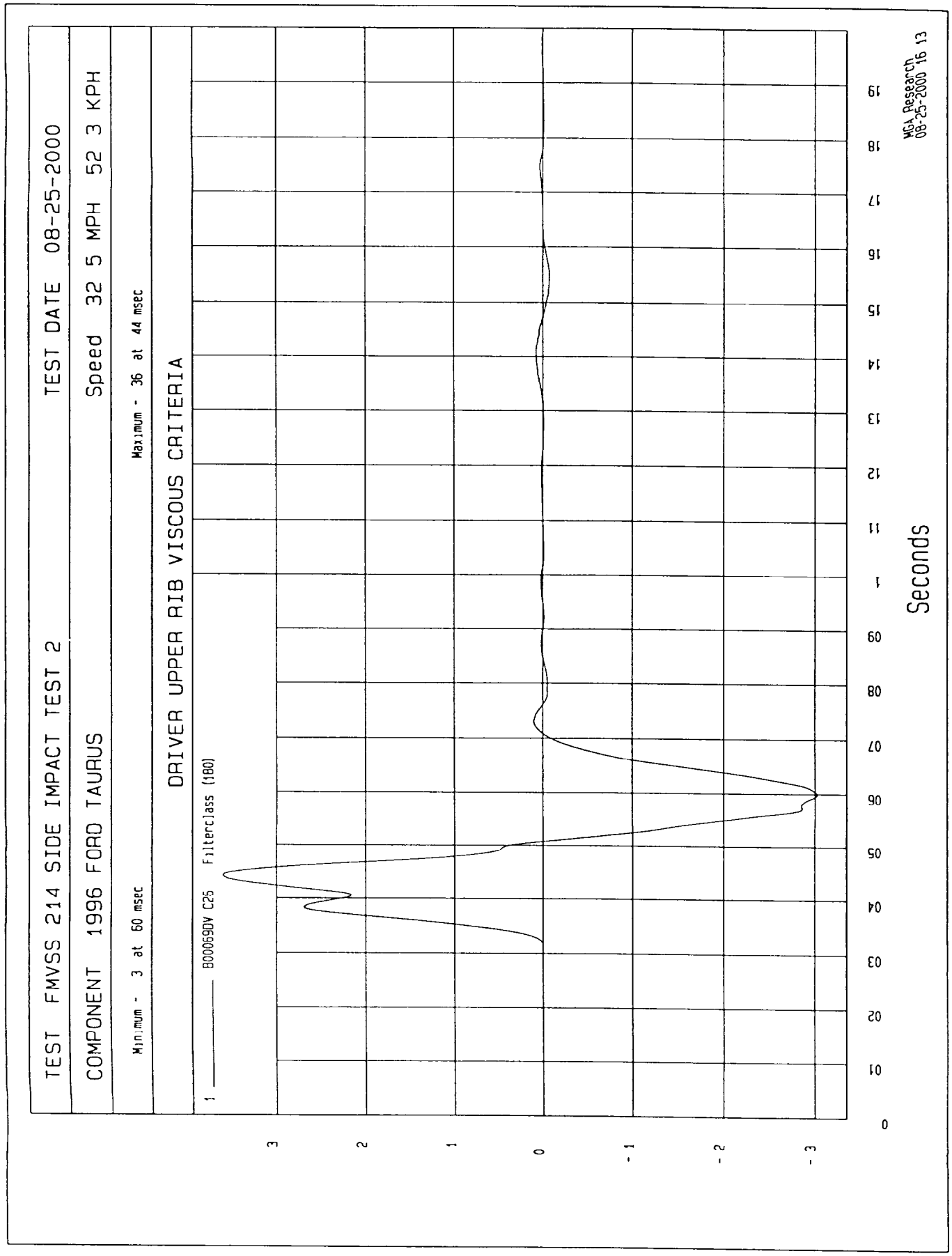

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 5 27 G s at 200 msec
Maximum - 22 65 G s at 57 msec
DRIVER HEAD Y ACCELERATION
1 B00069AT A02 Filterclass (1000)
G's
Seconds
MGA Research
08-25-2000 15 44

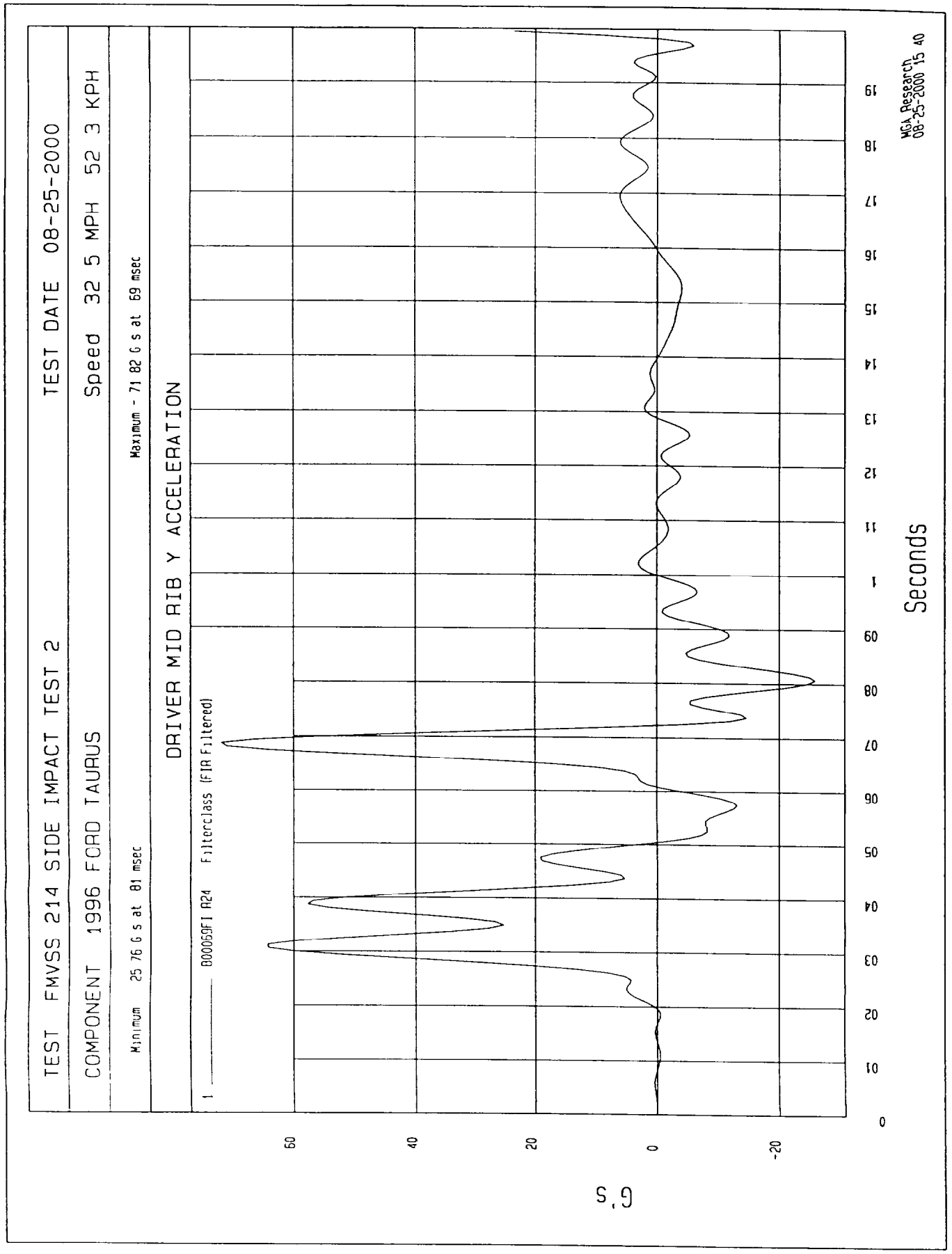

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed. 32 5 MPH 52 3 KPH
Minimum 36 G s at 31 msec
Maximum = 31 5 G s at 68 msec
DRIVER HEAD Z ACCELERATION
1 ——— 3000G9AT A03 Filterclass (1000)
G's
Seconds
MGA Research
08-25-2000 15 44

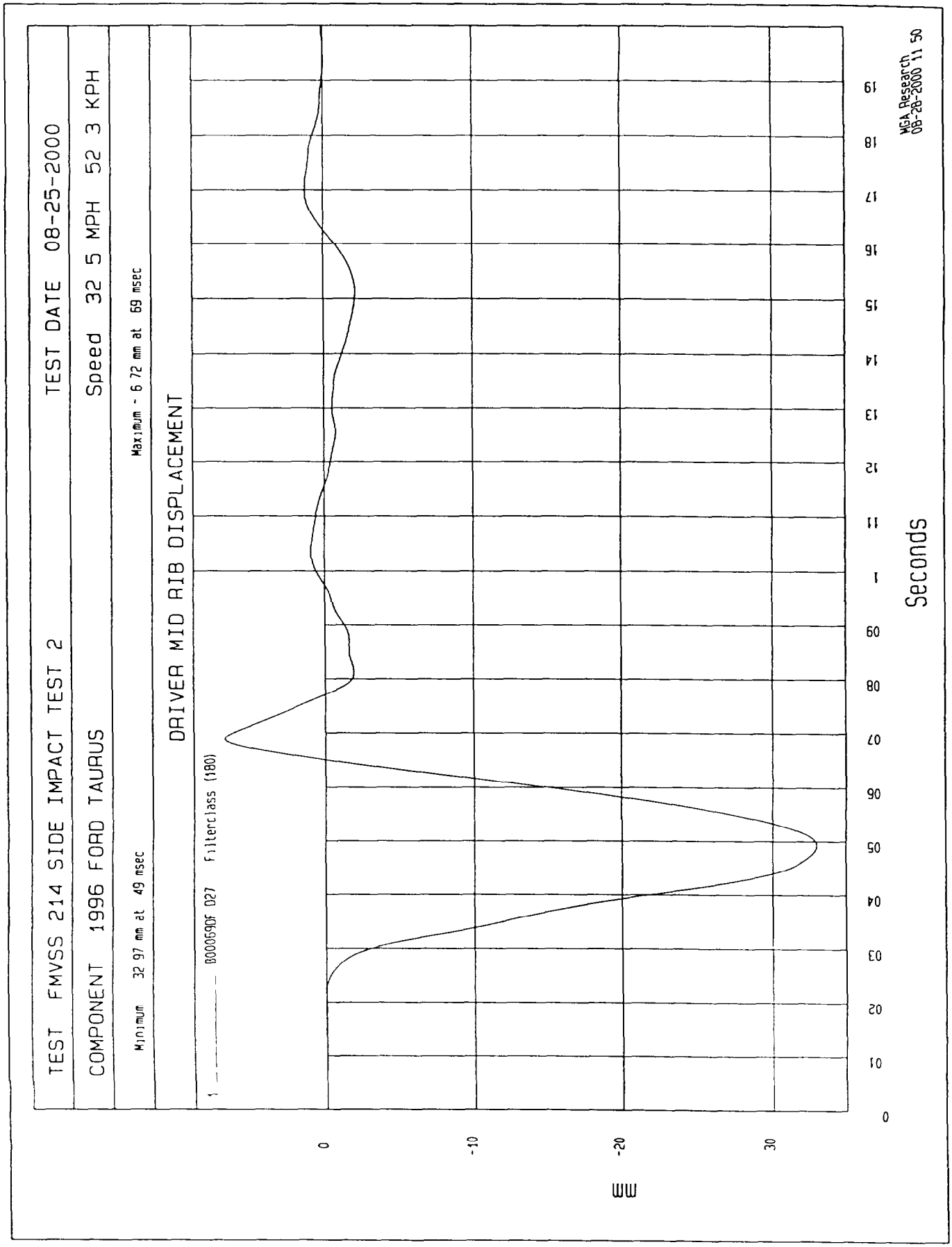

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 01 G s at 4 msec
Maximum = 38 24 G s at 60 msec
DRIVER HEAD RESULTANT
1 B0006DAV A01 Filterclass (1000)
MGA Research
08-25-2000 15 44
Seconds
G's
0
10
20
30
40
01
02
03
04
05
06
07
08
09
60
1
11
12
13
14
15
16
17
18
19

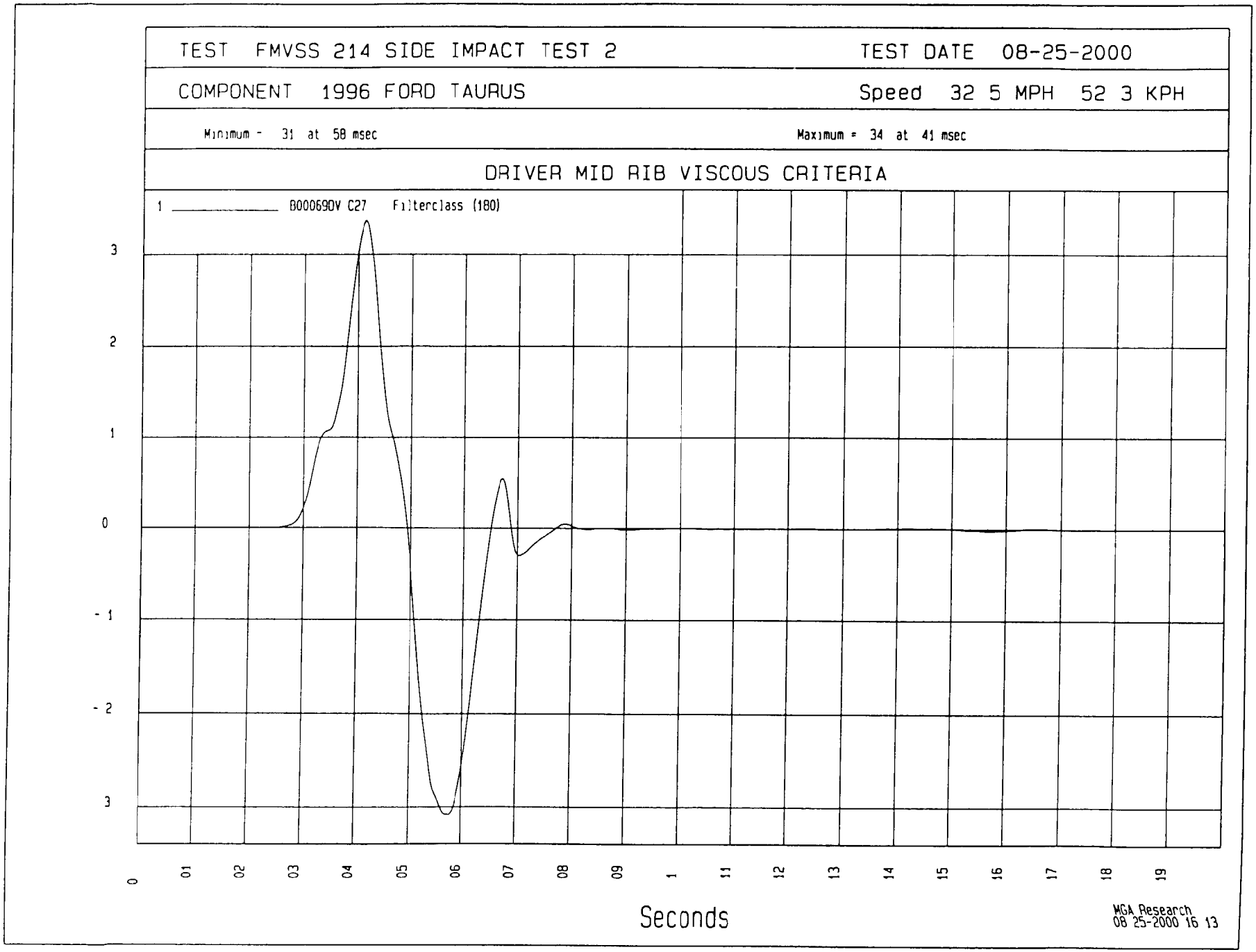

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 15 35 G s at 90 msec
Maximum = 98 85 G s at 34 msec
DRIVER UPPER RIB Y ACCELERATION
1 B00069F1 R23 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 40
G's
Seconds
100
80
60
40
20
0
-20
0
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19

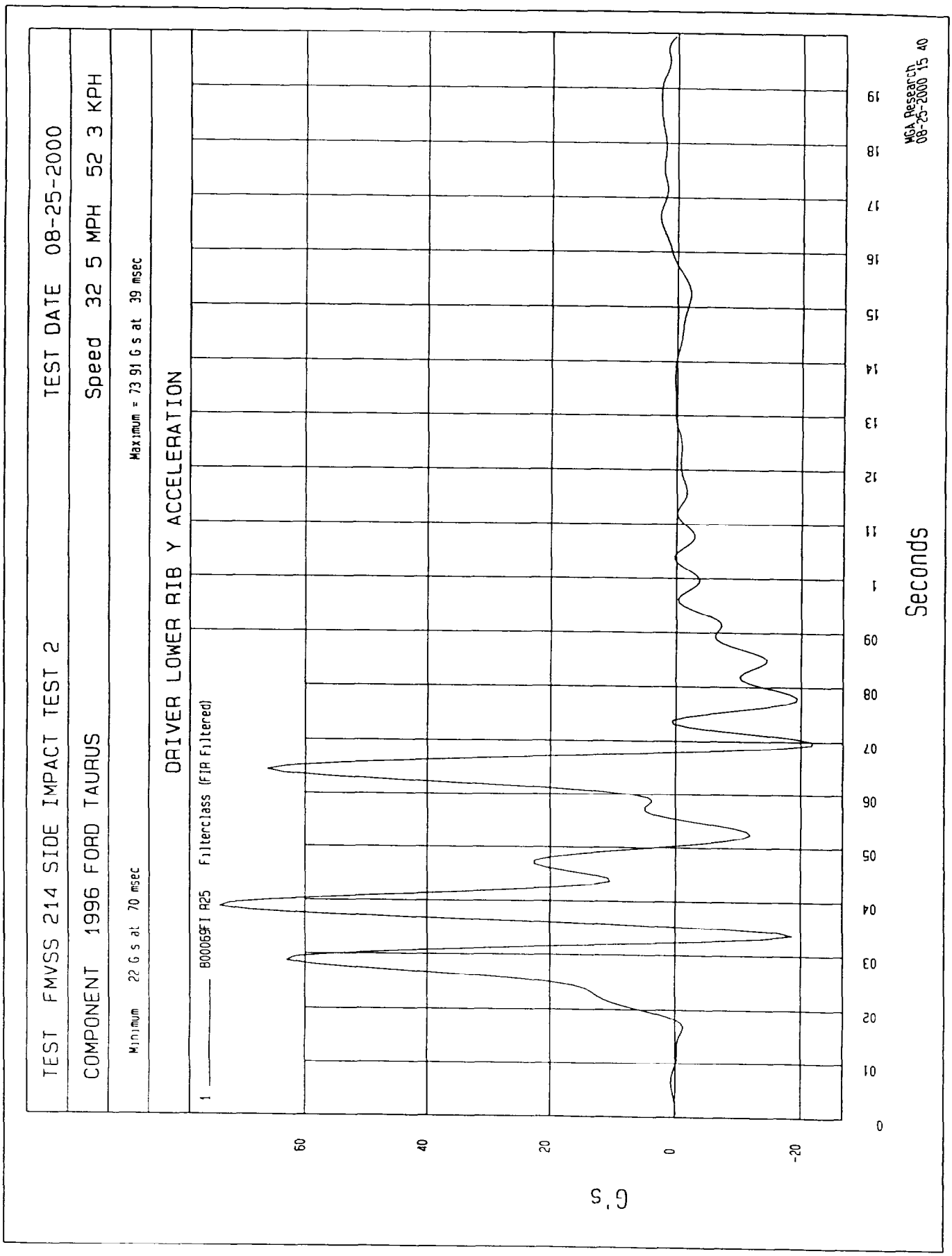

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 34 55 mm at 51 msec
Maximum = 3 37 mm at 76 msec
DRIVER UPPER RIB DISPLACEMENT
1 B000690F D26 Filterclass (180)
MGA Research
08-28-2000 11 50
mm
0
-10
-20
30
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds

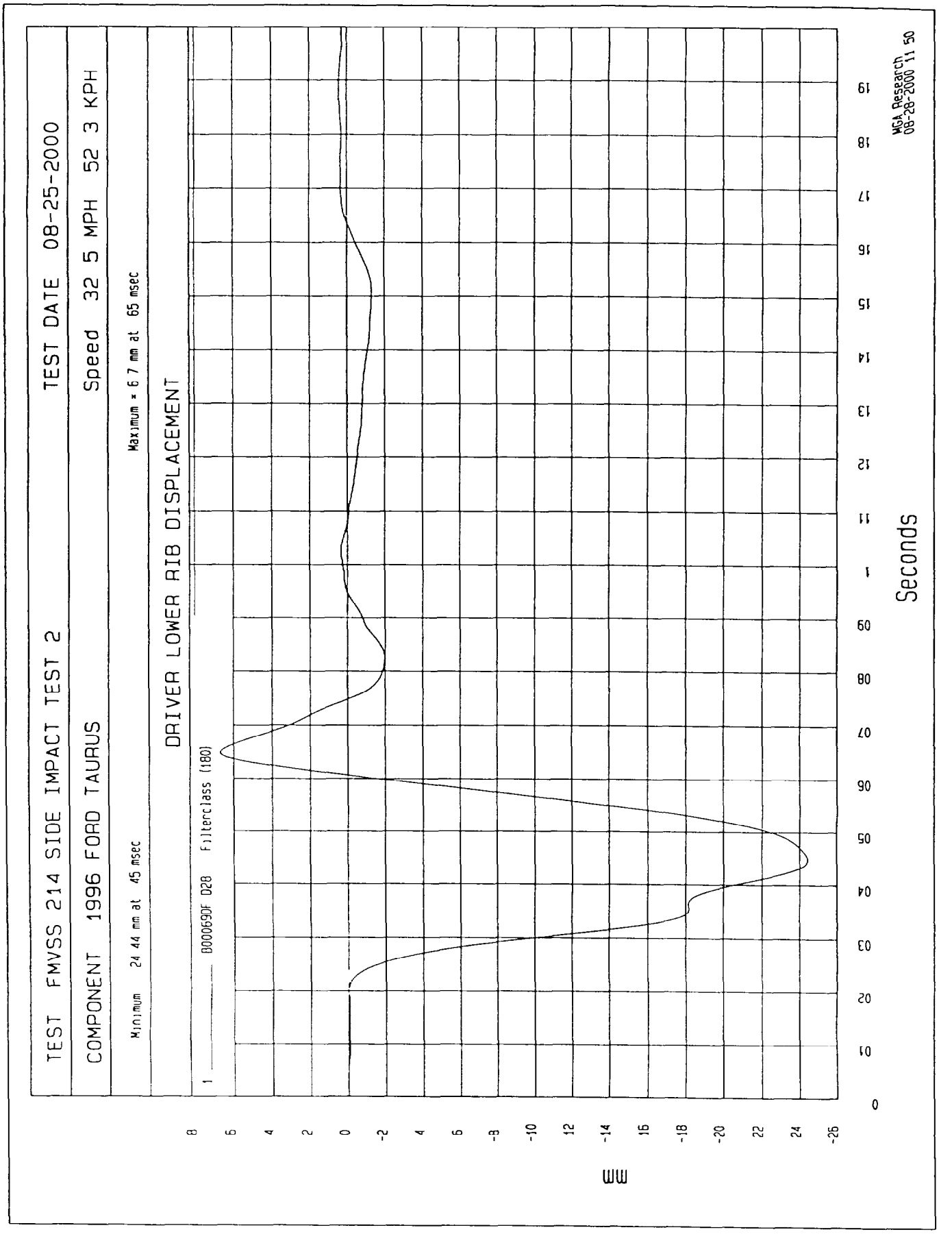

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 3 at 60 msec
Maximum - 36 at 44 msec
DRIVER UPPER RIB VISCOUS CRITERIA
1 B000590V C25 Filterclass (180)
3
2
1
0
- 1
- 2
- 3
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 13

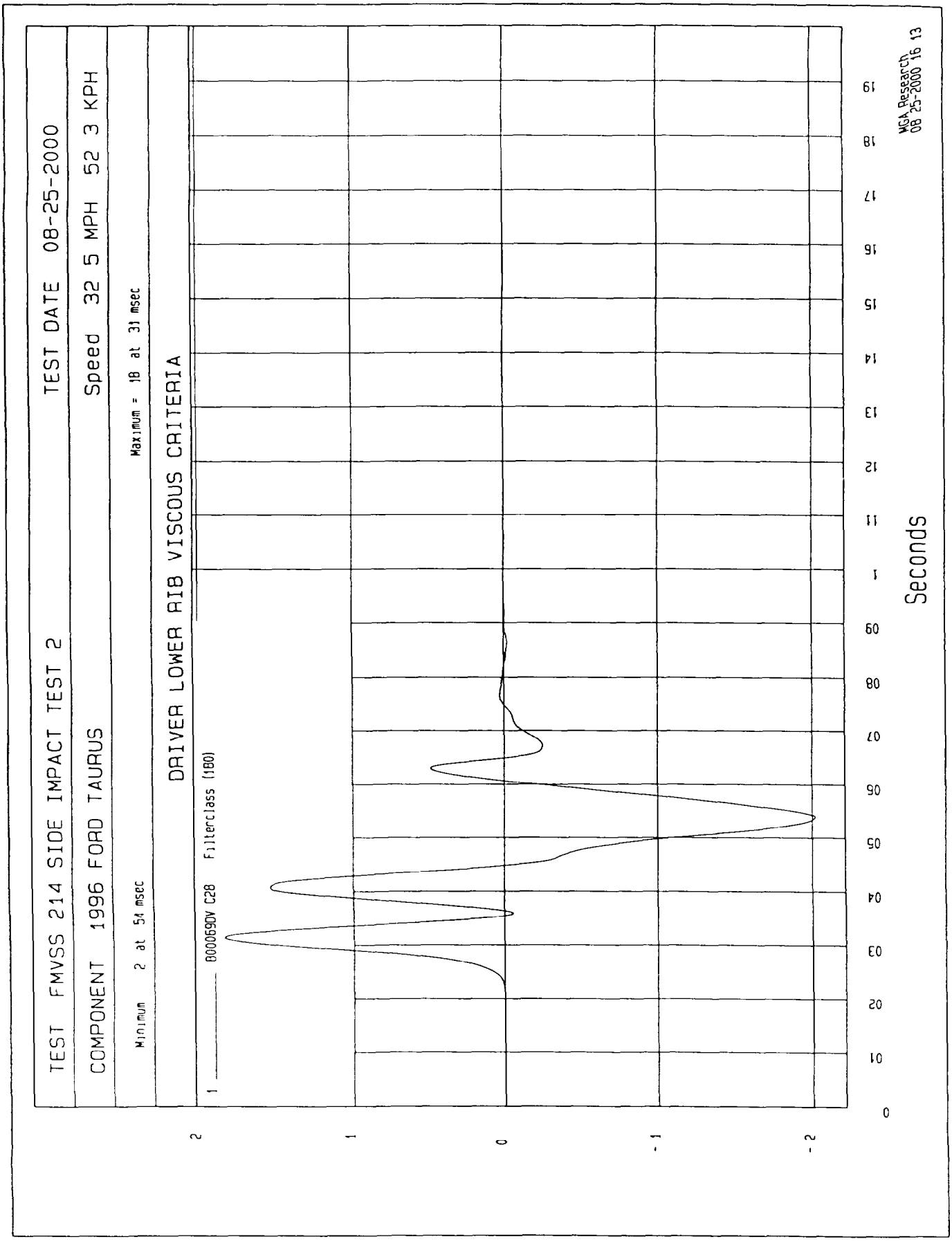

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 25 76 G s at 81 msec
Maximum - 71 82 G s at 69 msec
DRIVER MID RIB Y ACCELERATION
1 B00059FI A24 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 40
G's
60
40
20
0
-20
Seconds
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

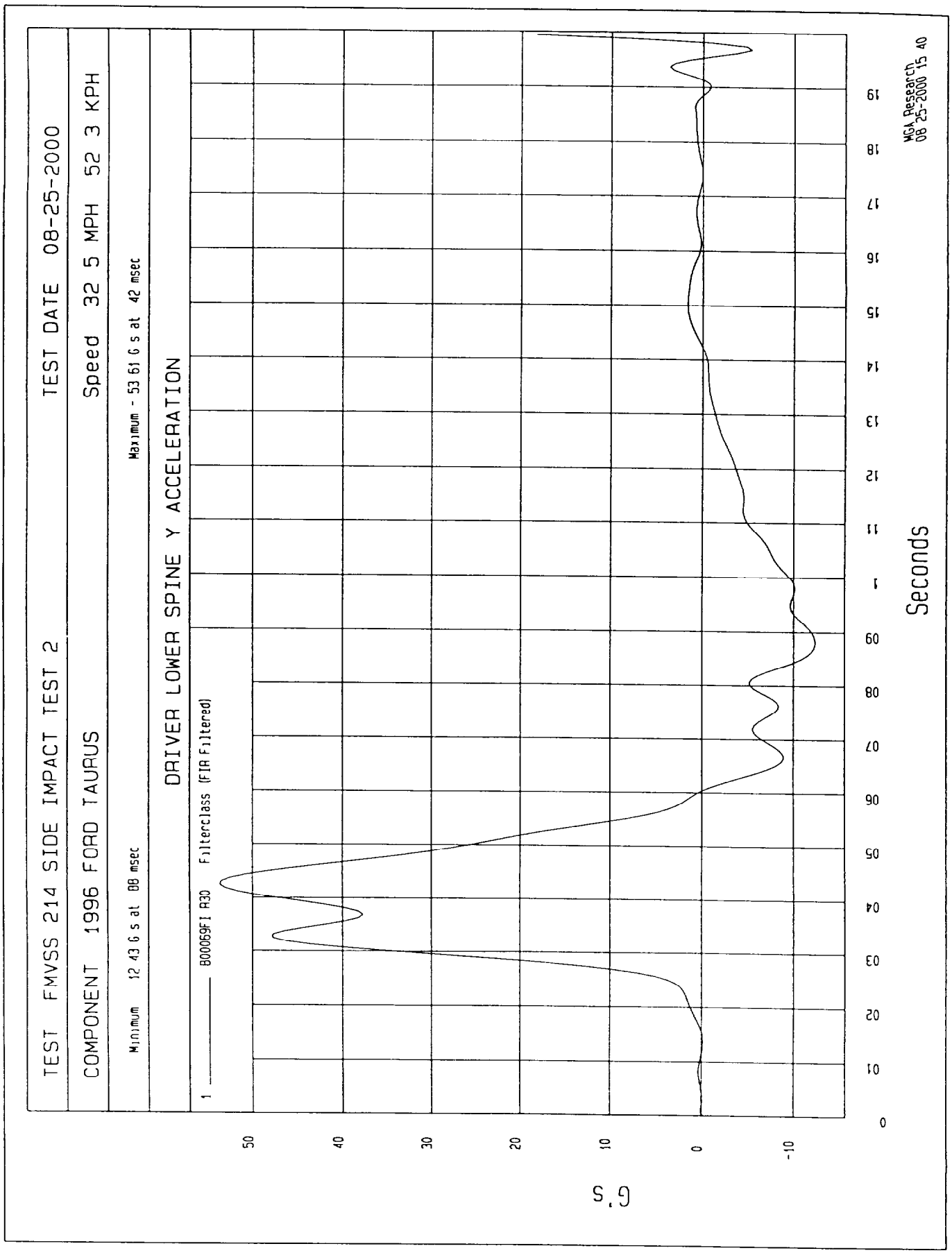

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 32 97 mm at 49 msec
Maximum - 6 72 mm at 69 msec
DRIVER MID RIB DISPLACEMENT
1 _____ 00000690F 027 Filterclass (180)
MGA Research
08-28-2000 11 50
mm
0
-10
-20
30
Seconds
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

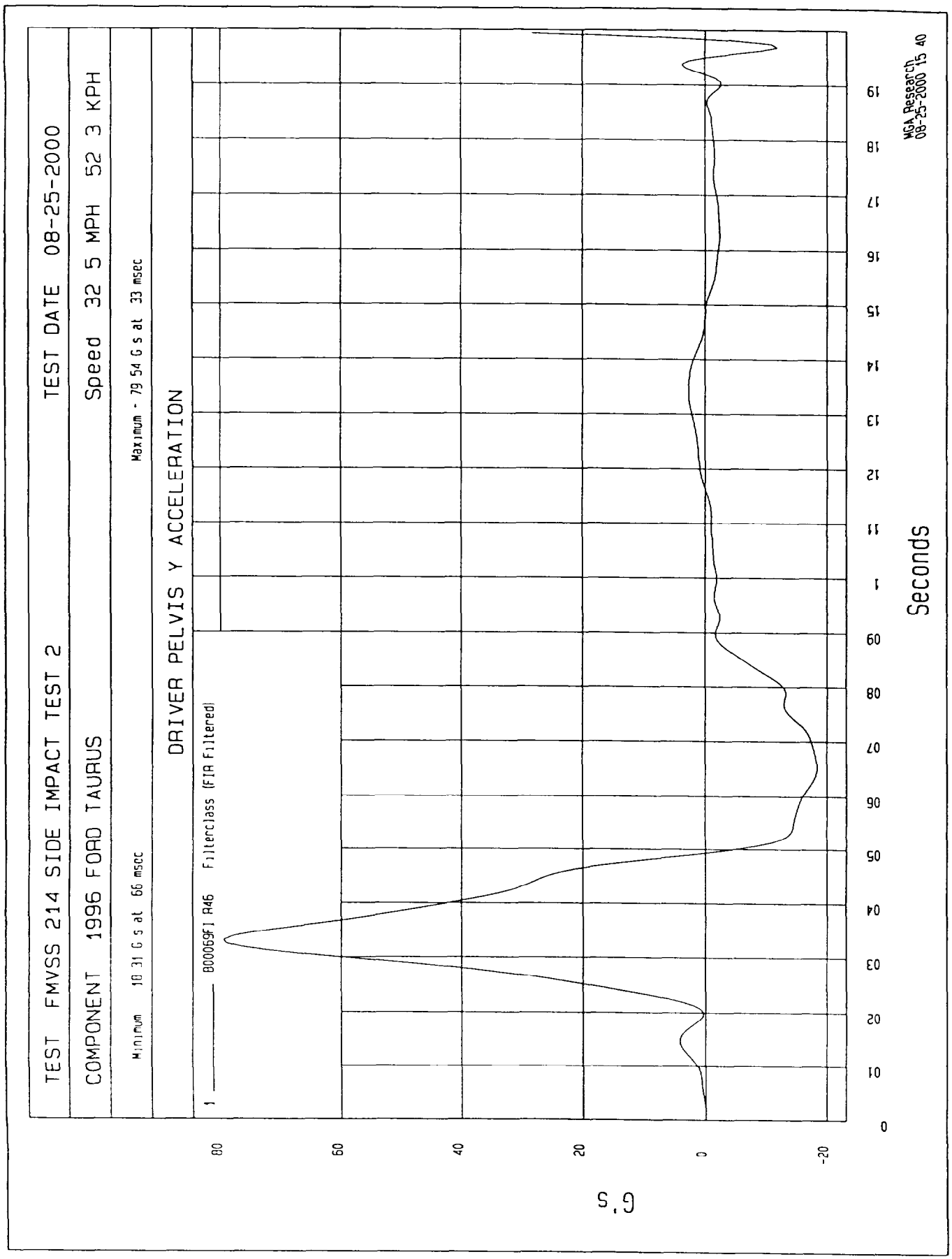

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 31 at 58 msec
Maximum = 34 at 41 msec
DRIVER MID RIB VISCOUS CRITERIA
1 B000690V C27 Filterclass (180)
3
2
1
0
- 1
- 2
3
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08 25-2000 16 13

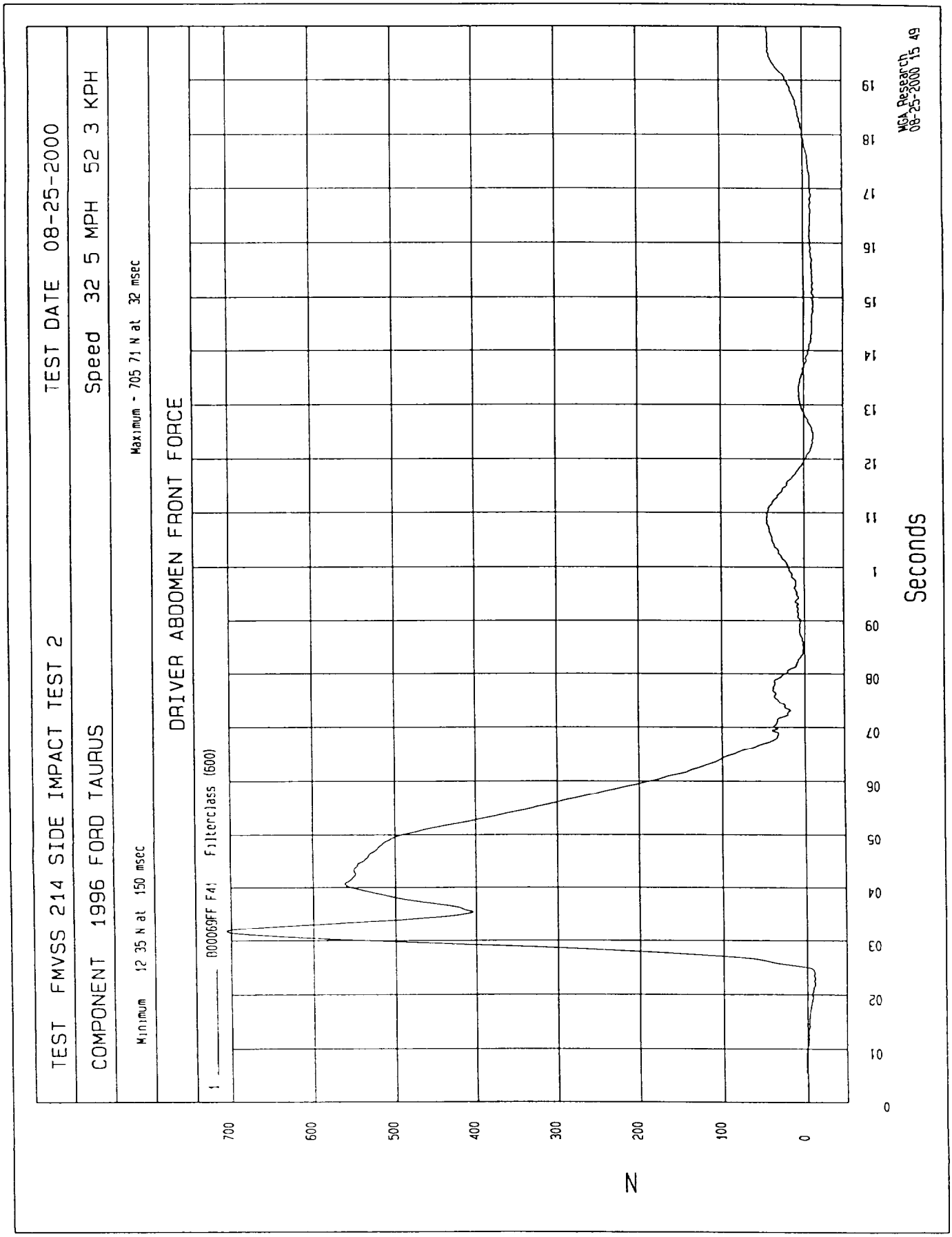

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 22 G s at 70 msec
Maximum = 73 91 G s at 39 msec
DRIVER LOWER RIB Y ACCELERATION
1 B00069FI R25 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 40
G's
60
40
20
0
-20
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds

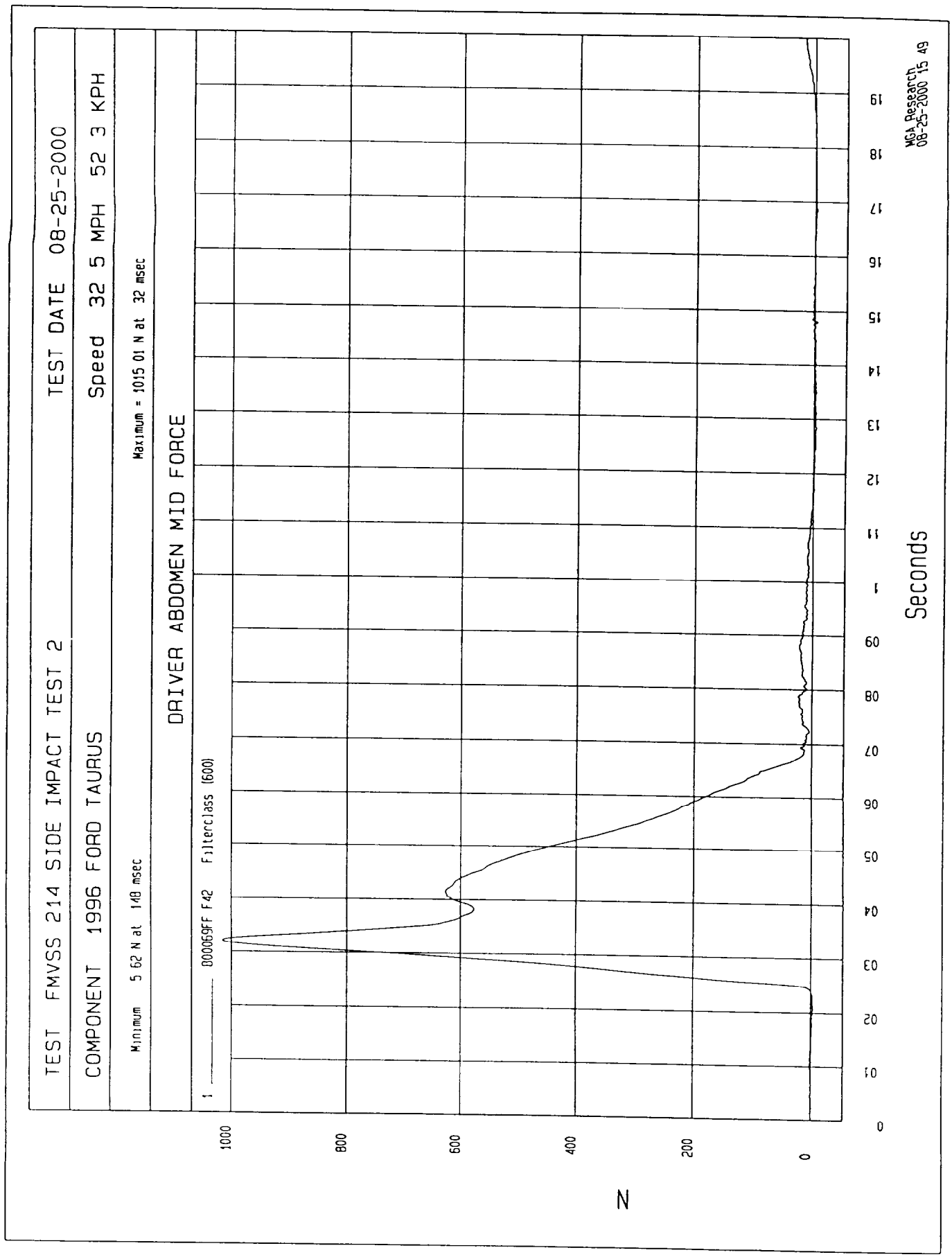

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 24 44 mm at 45 msec
Maximum = 6 7 mm at 65 msec
DRIVER LOWER RIB DISPLACEMENT
1 B000690F 02B Filterclass (180)
MGA Research
08-28-2000 11 50
mm
Seconds

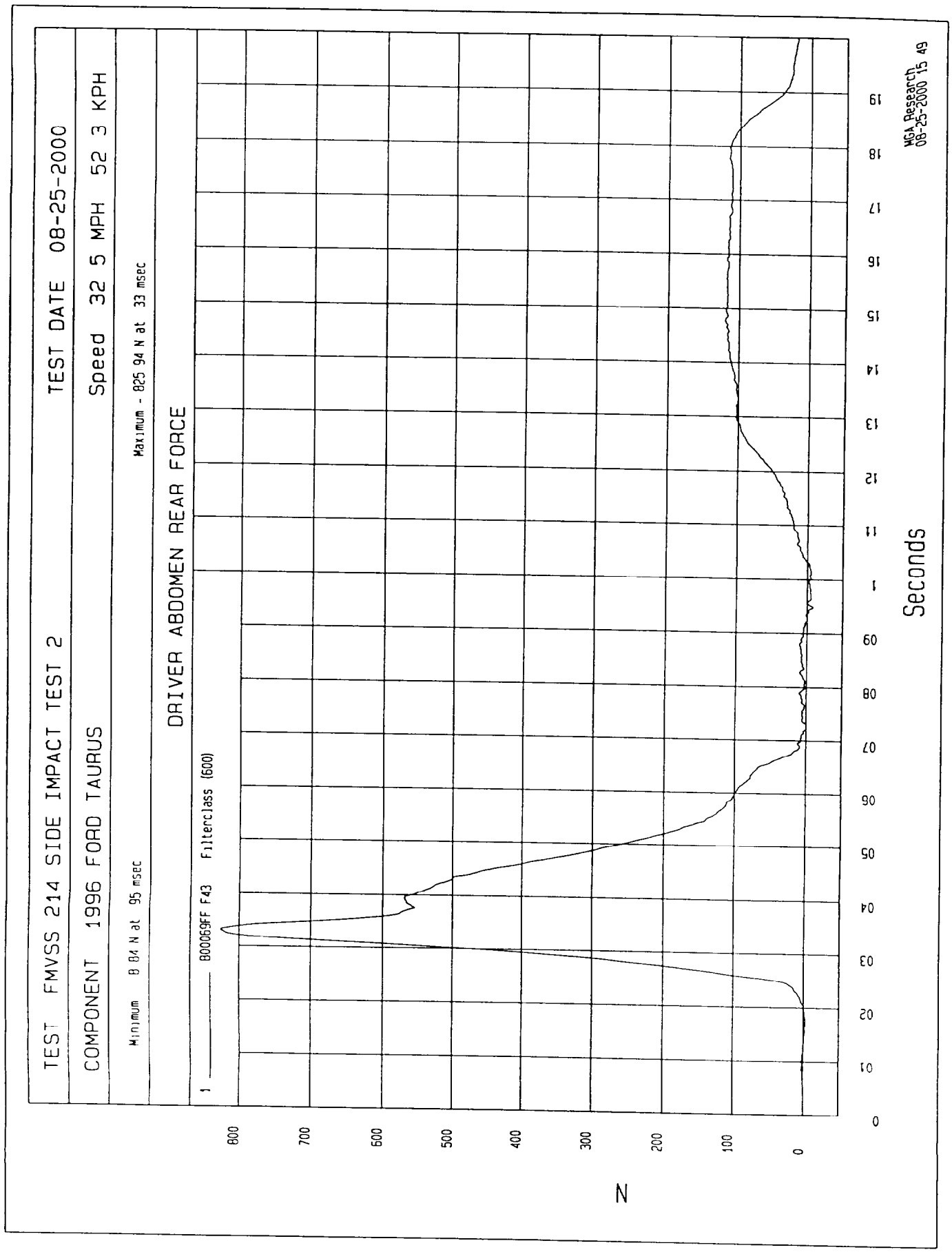

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 2 at 54 msec
Maximum = 18 at 31 msec
DRIVER LOWER RIB VISCOUS CRITERIA
1 B0006900 C28 Filterclass (180)
MGA Research
08 25-2000 16 13
2
1
0
-1
-2
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds

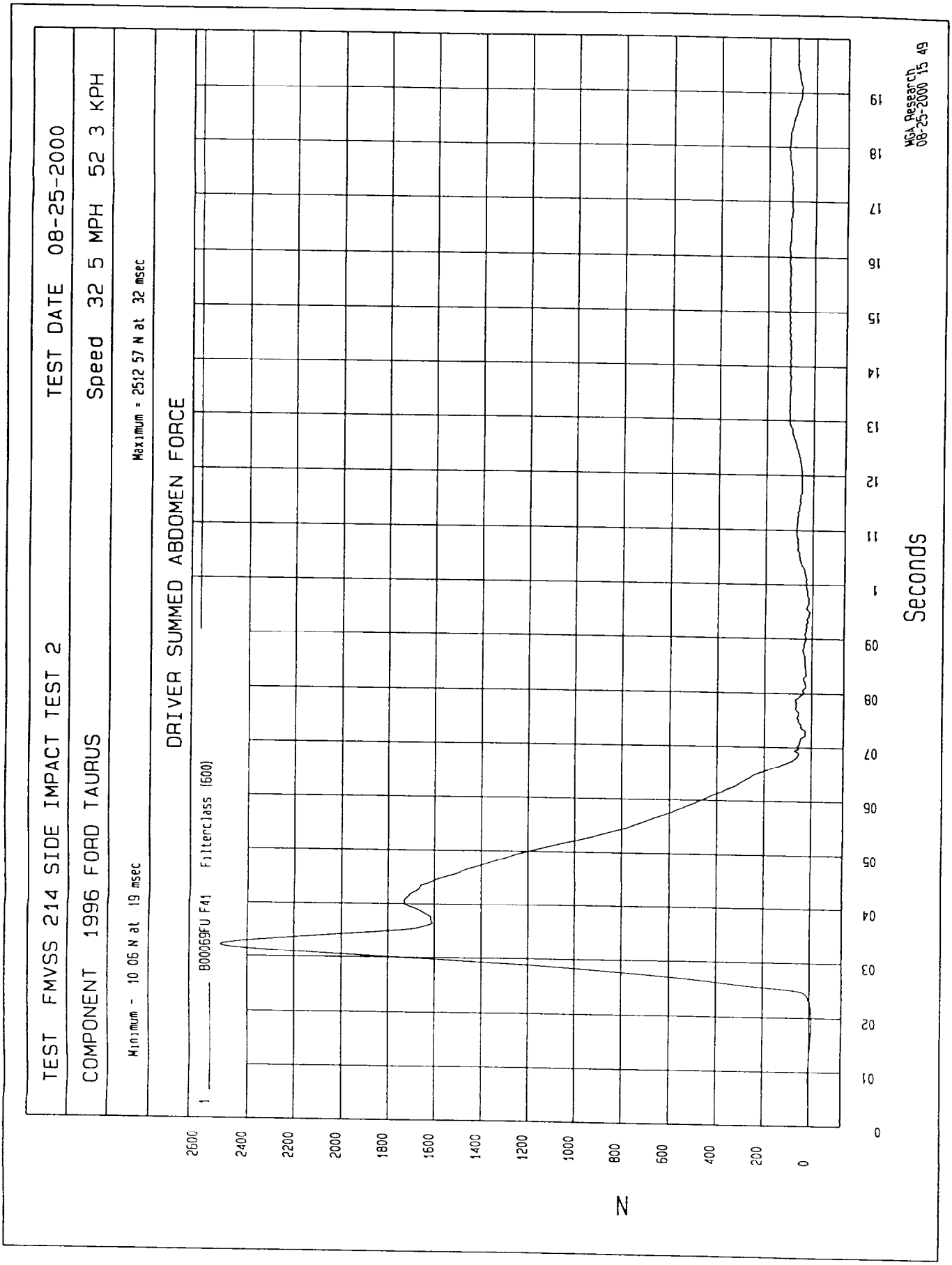

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 12 43 G s at 08 msec
Maximum - 53 61 G s at 42 msec
DRIVER LOWER SPINE Y ACCELERATION
1 B00069FI R30 Filterclass (FIA Filtered)
MGA Research
08-25-2000 15 40
G's
Seconds
50
40
30
20
10
0
-10
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

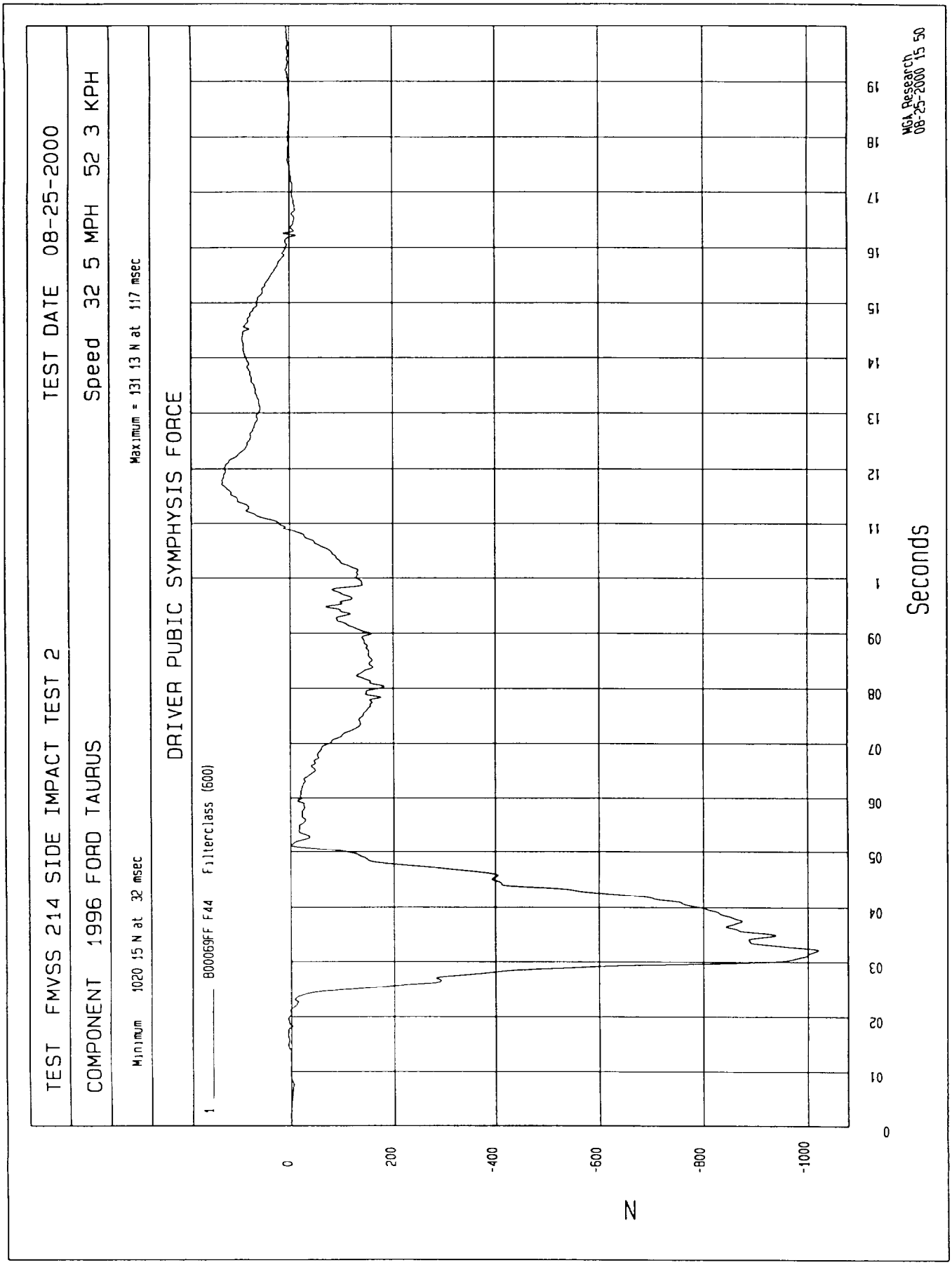

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 10 31 G s at 66 msec
Maximum - 79 54 G s at 33 msec
DRIVER PELVIS Y ACCELERATION
1 B00069F1 R46 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 40
G's
Seconds
80
60
40
20
0
-20
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

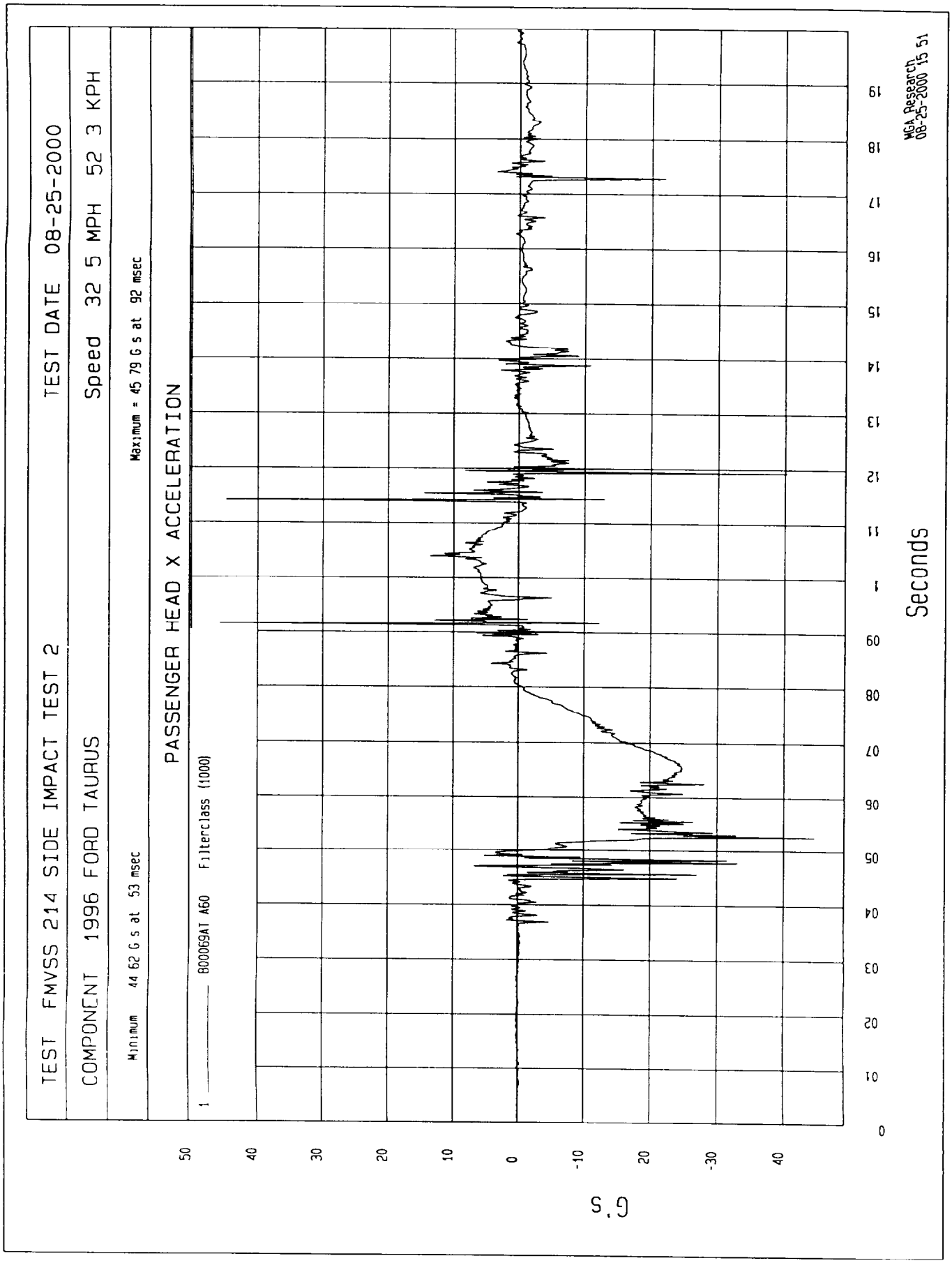

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 12 35 N at 150 msec
Maximum - 705 71 N at 32 msec
DRIVER ABDOMEN FRONT FORCE
1 000069FF F41 Filterclass (600)
N
Seconds
MGA Research
08-25-2000 15 49

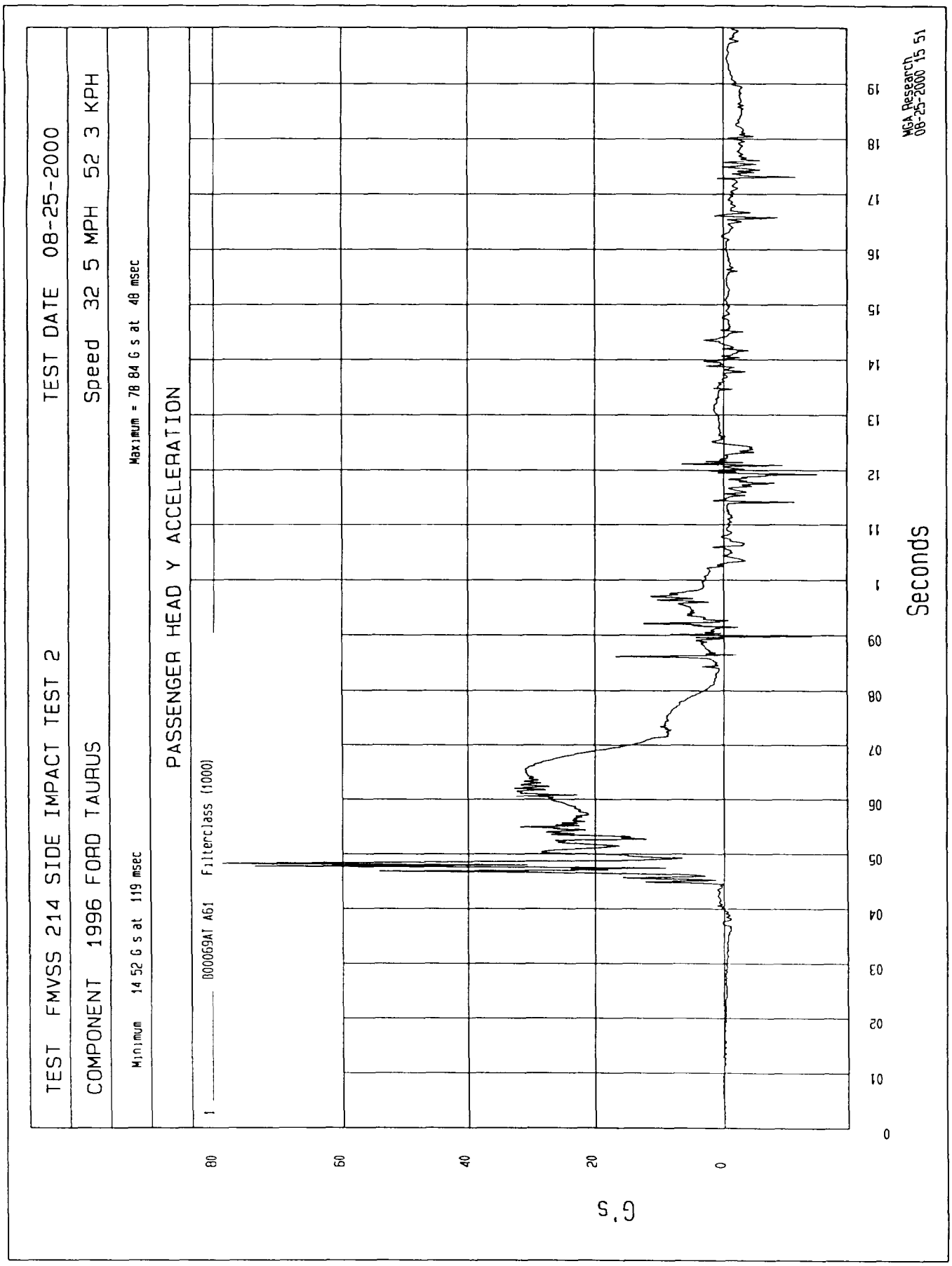

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 5 62 N at 148 msec
Maximum = 1015 01 N at 32 msec
DRIVER ABDOMEN MID FORCE
1 ——— 800069FF F42 Filterclass (600)
N
Seconds
MGA Research
08-25-2000 15 49

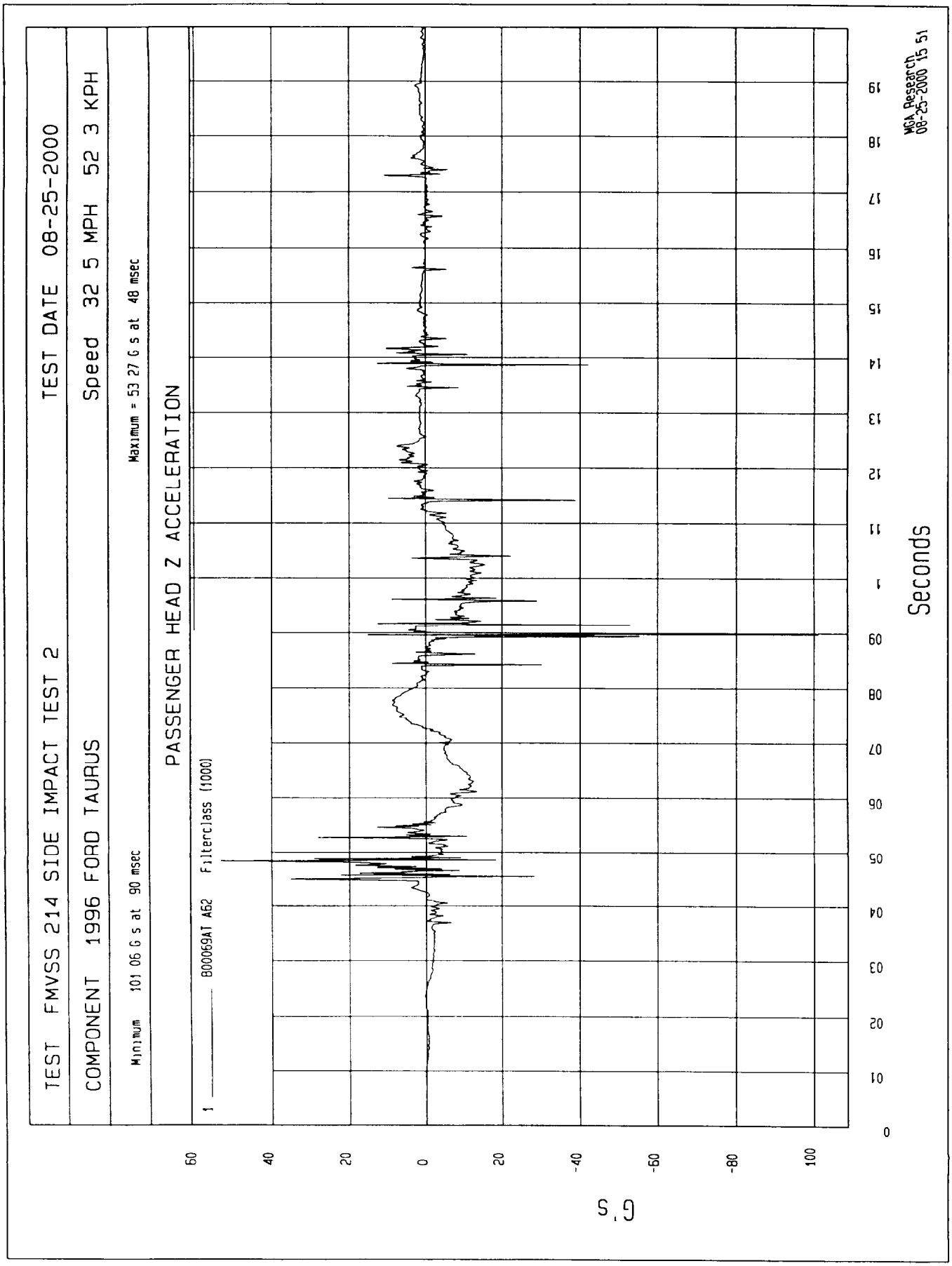

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum B 84 N at 95 msec
Maximum - 825 94 N at 33 msec
DRIVER ABDOMEN REAR FORCE
1 ——— B00069FF F43 Filterclass (600)
N
Seconds
MGA Research
08-25-2000 15 49

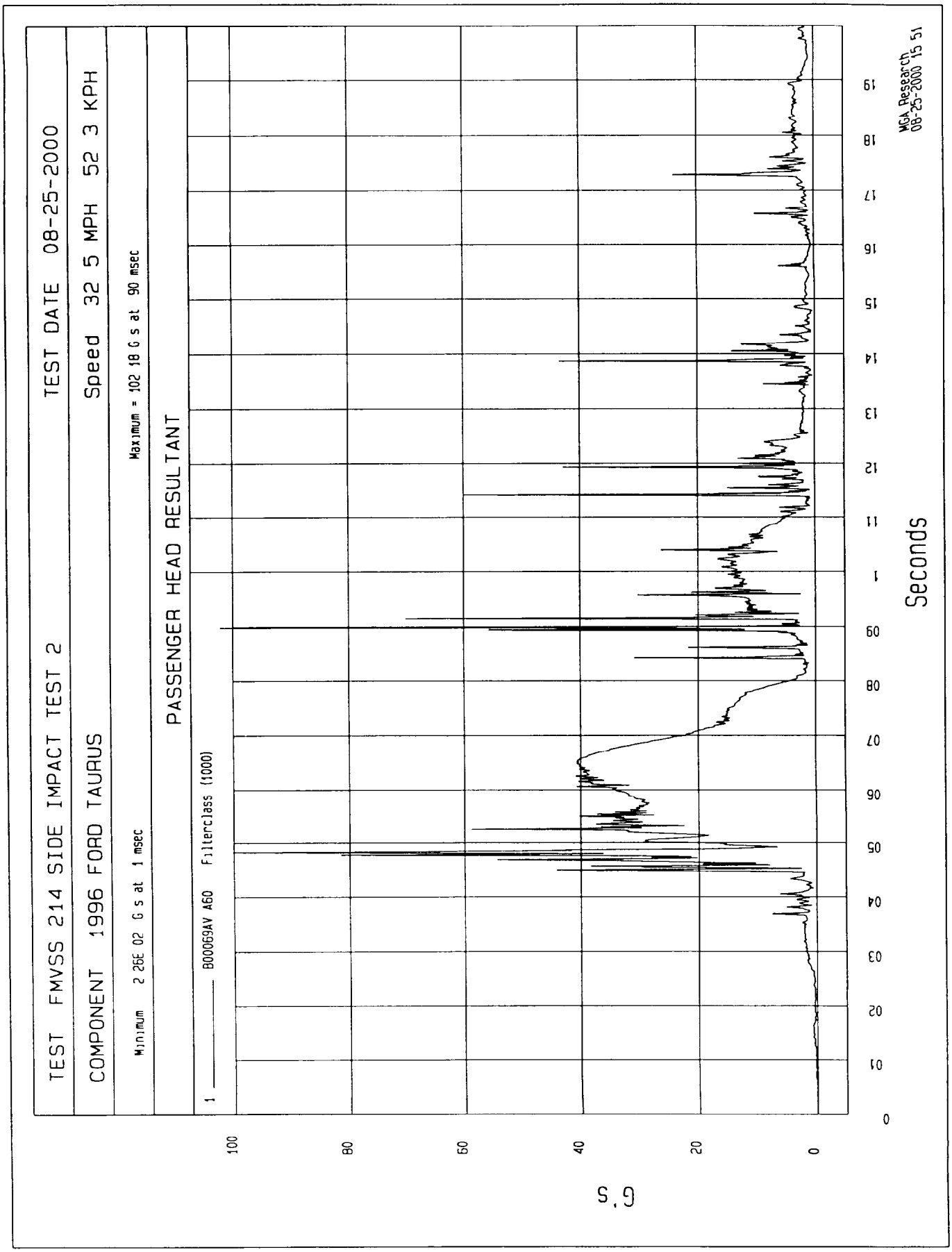

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 10 06 N at 19 msec
Maximum = 2512 57 N at 32 msec
DRIVER SUMMED ABDOMEN FORCE
1 B00069FU F41 Filterclass (600)
N
Seconds
MGA Research
08-25-2000 15 49

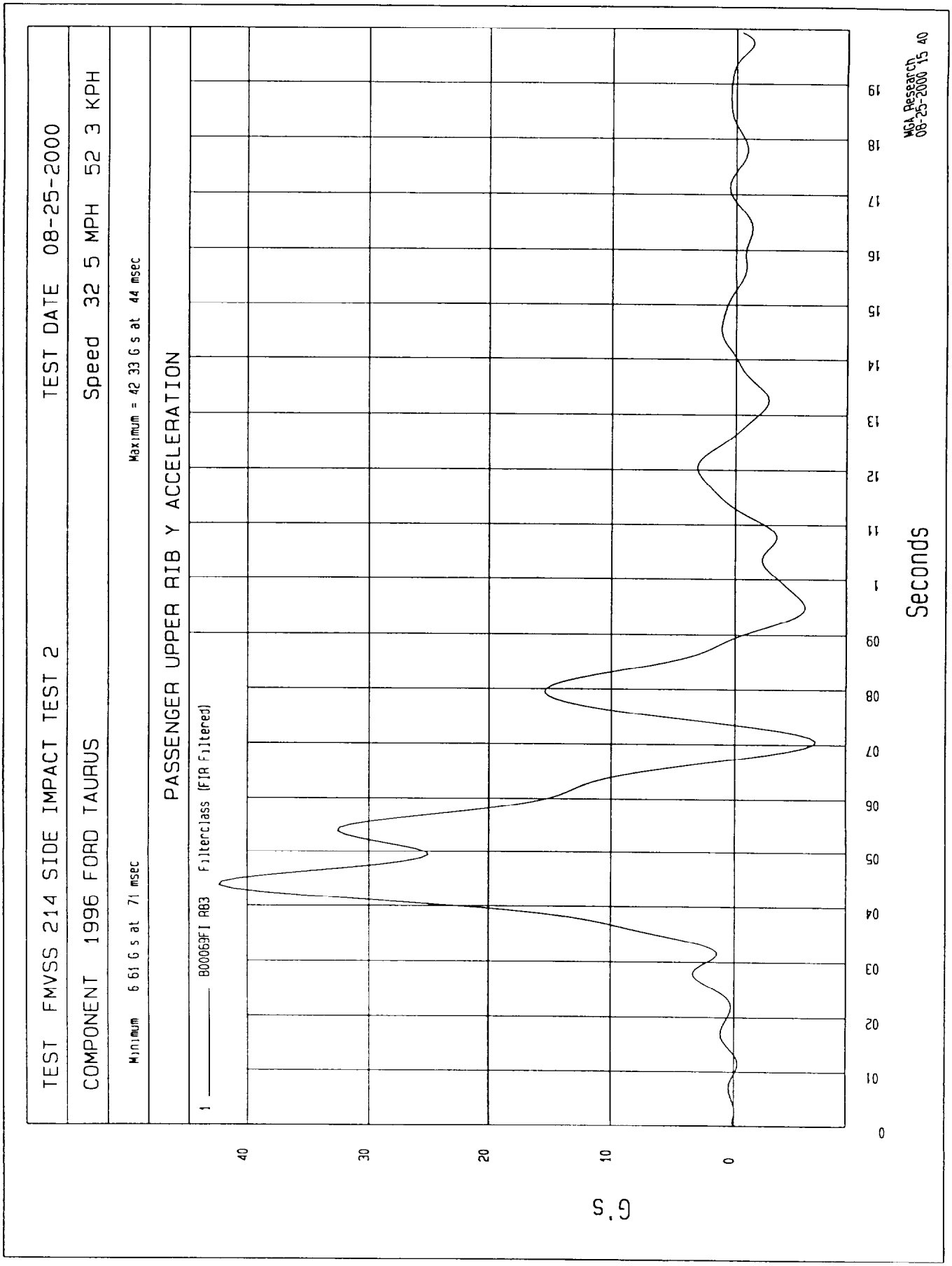

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 1020 15 N at 32 msec
Maximum = 131 13 N at 117 msec
DRIVER PUBIC SYMPHYSIS FORCE
1 B00069FF F44 Filterclass (600)
N
0
200
-400
-600
-800
-1000
Seconds
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
MGA Research
08-25-2000 15 50

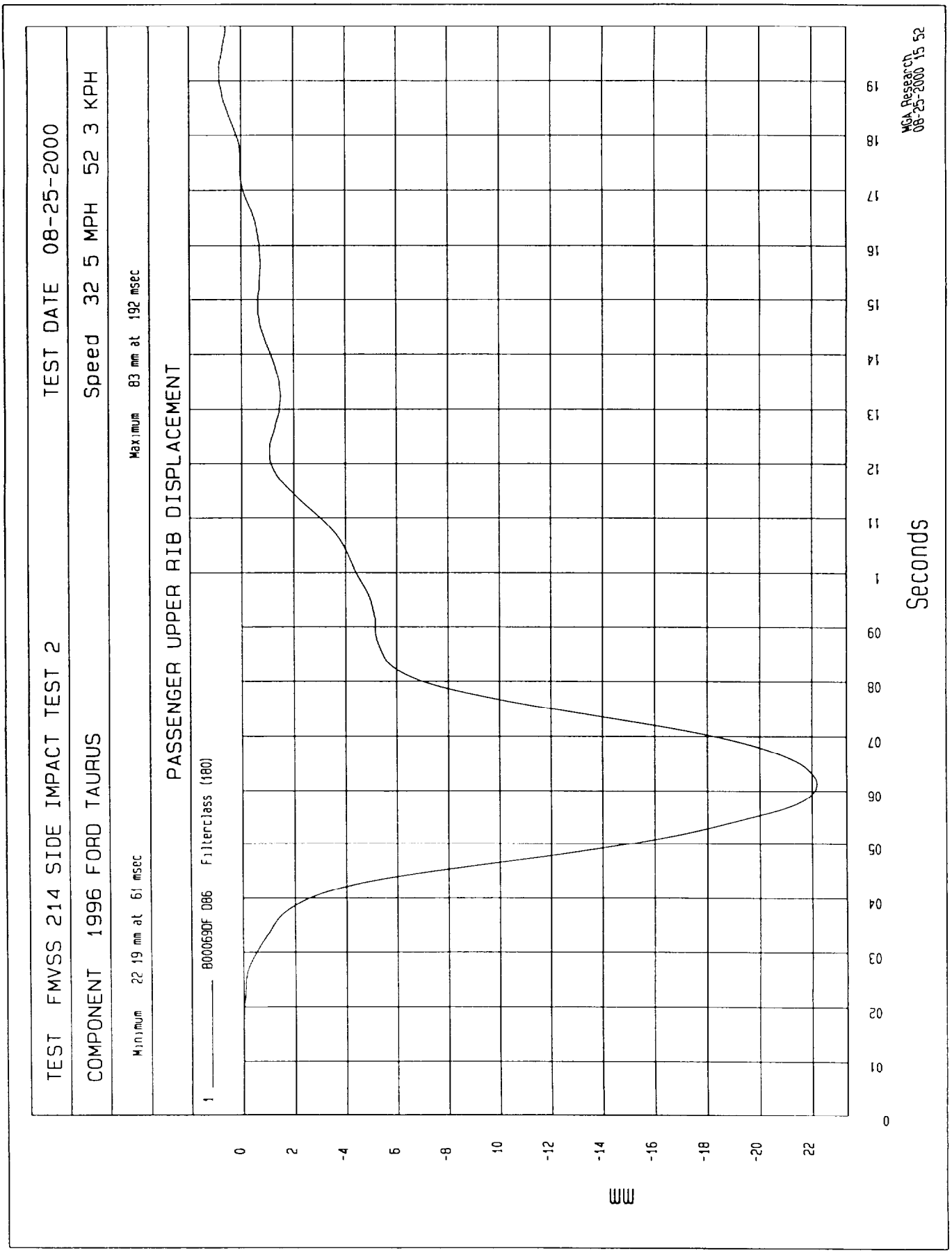

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 44 62 G s at 53 msec
Maximum = 45 79 G s at 92 msec
PASSENGER HEAD X ACCELERATION
1 B0006GAT A60 Filterclass (1000)
MGA Research
08-25-2000 15 51
G's
Seconds
50
40
30
20
10
0
-10
-20
-30
-40
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

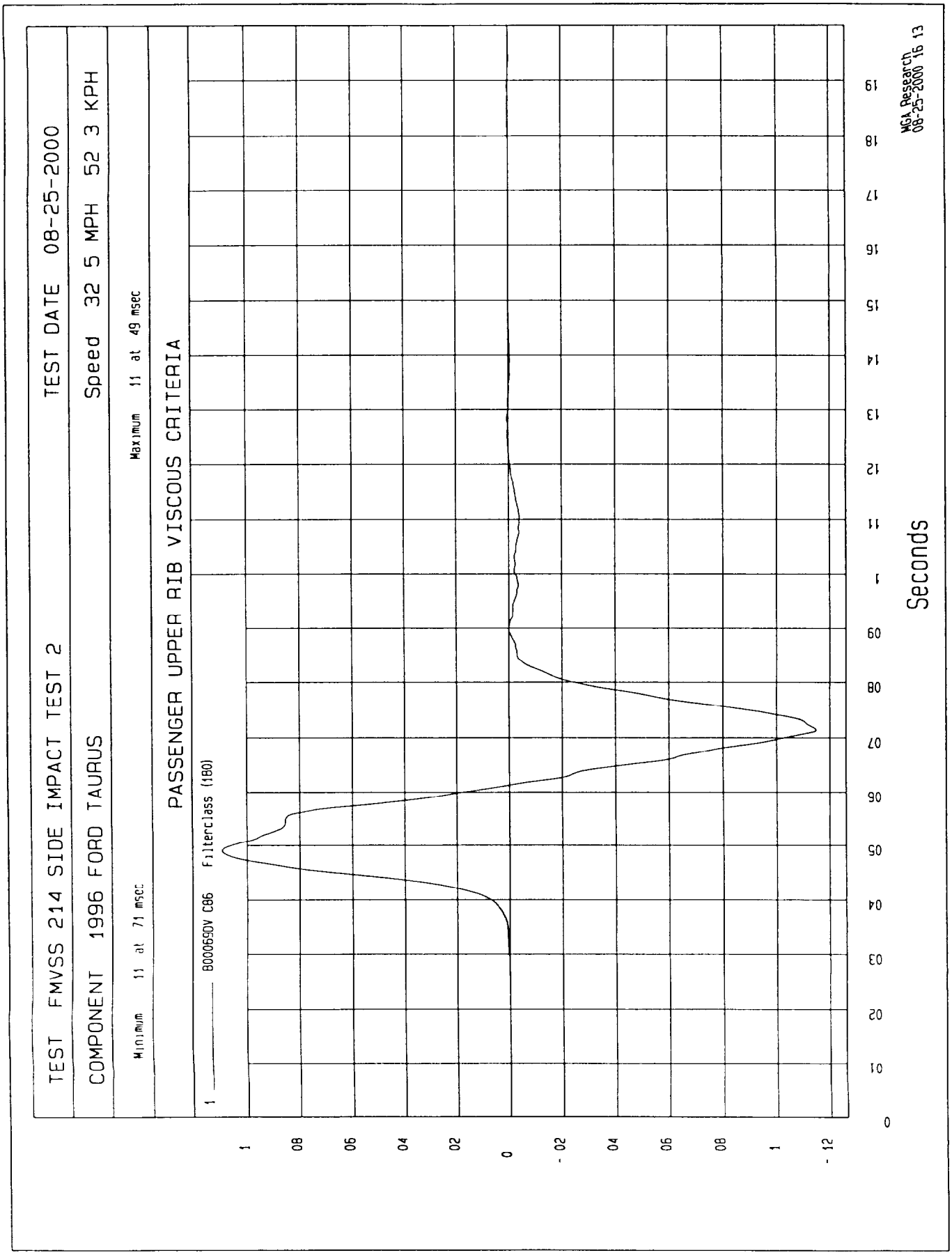

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 14 52 G s at 119 msec
Maximum = 78 84 G s at 48 msec
PASSENGER HEAD Y ACCELERATION
1 D0006GAI A61 Filterclass (1000)
MGA Research
08-25-2000 15 51
G's
Seconds
80
60
40
20
0
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

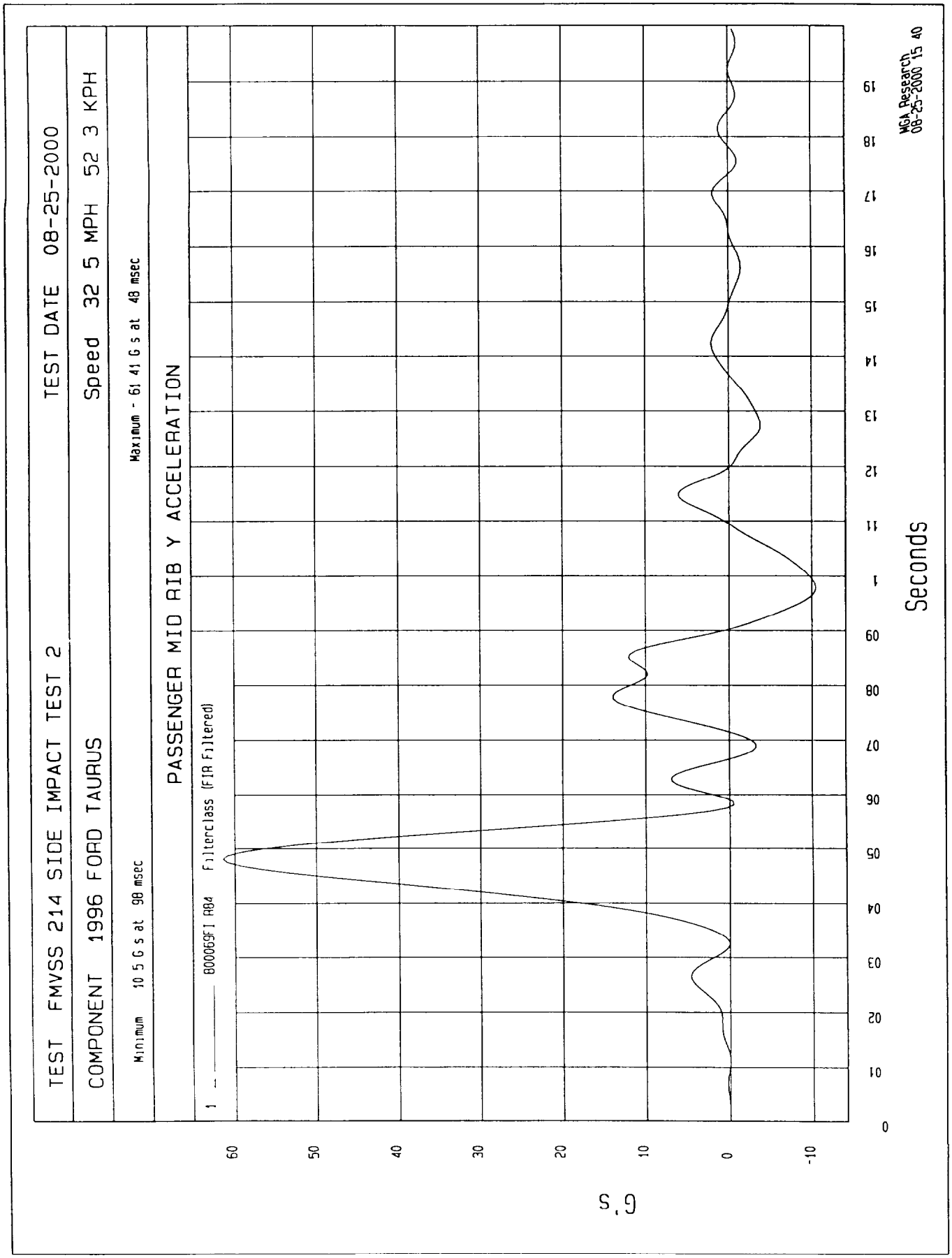

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 101 06 G s at 90 msec
Maximum = 53 27 G s at 48 msec
PASSENGER HEAD Z ACCELERATION
1 B00069AT A62 Filterclass (1000)
MGA Research
08-25-2000 15 51
G's
Seconds
60
40
20
0
-20
-40
-60
-80
-100
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

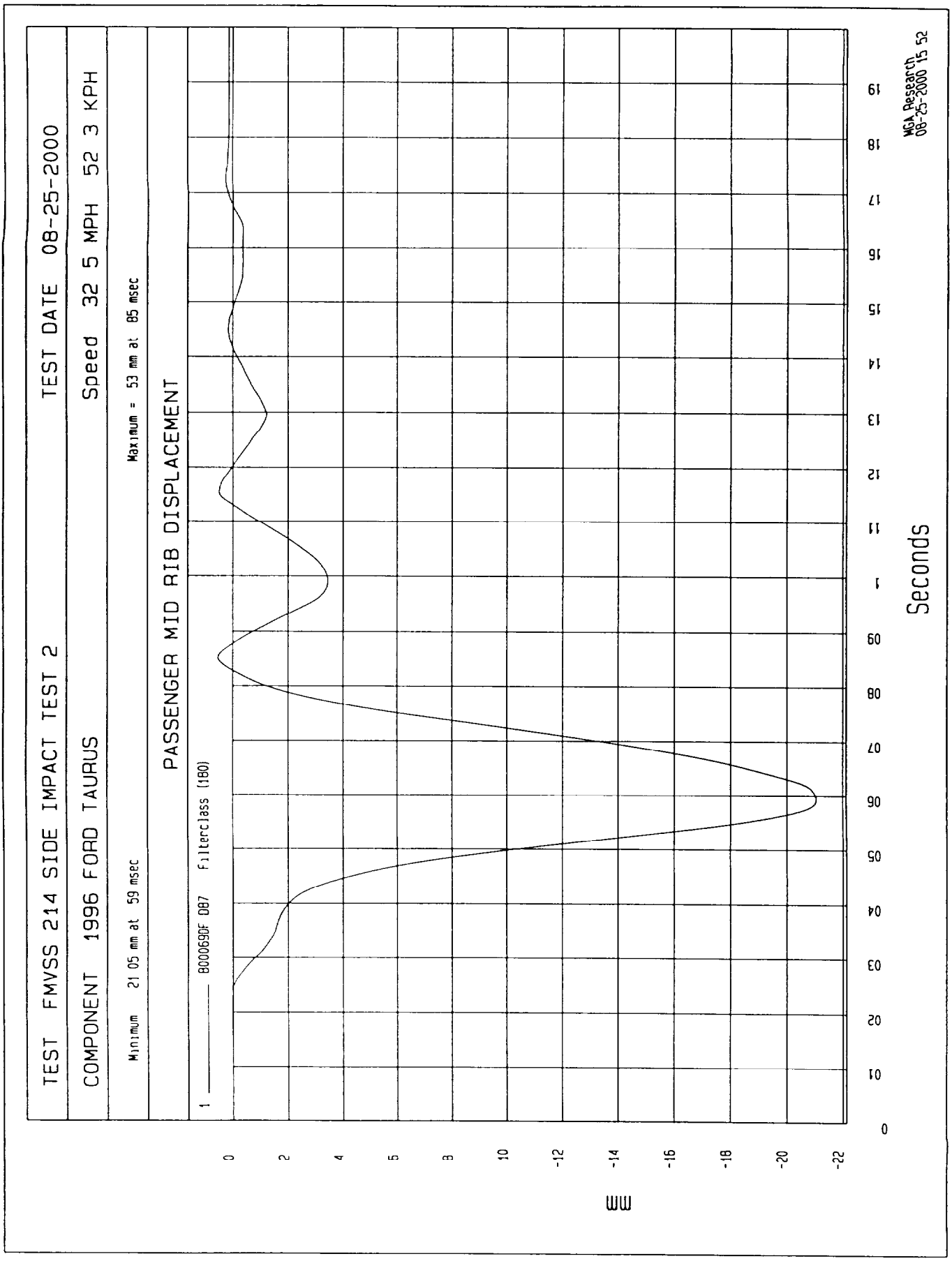

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 2 26E 02 G s at 1 msec
Maximum = 102 18 G s at 90 msec
PASSENGER HEAD RESULTANT
1 B00069AV A6D Filterclass (1000)
G's
Seconds
MGA Research
08-25-2000 15 51

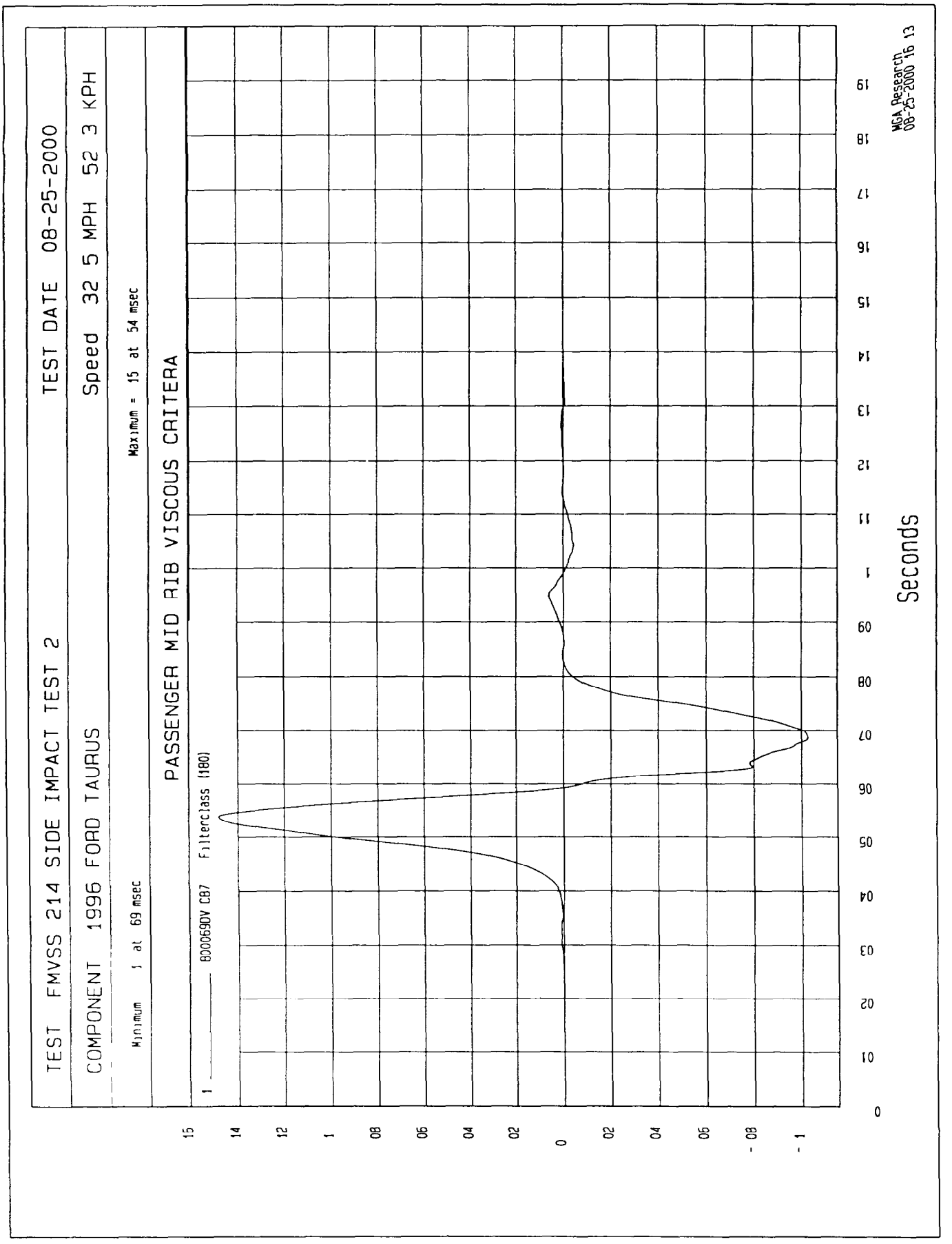

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 6 61 G s at 71 msec
Maximum = 42 33 G s at 44 msec
PASSENGER UPPER RIB Y ACCELERATION
1 B00069FI RB3 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 40
G's
Seconds
40
30
20
10
0
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

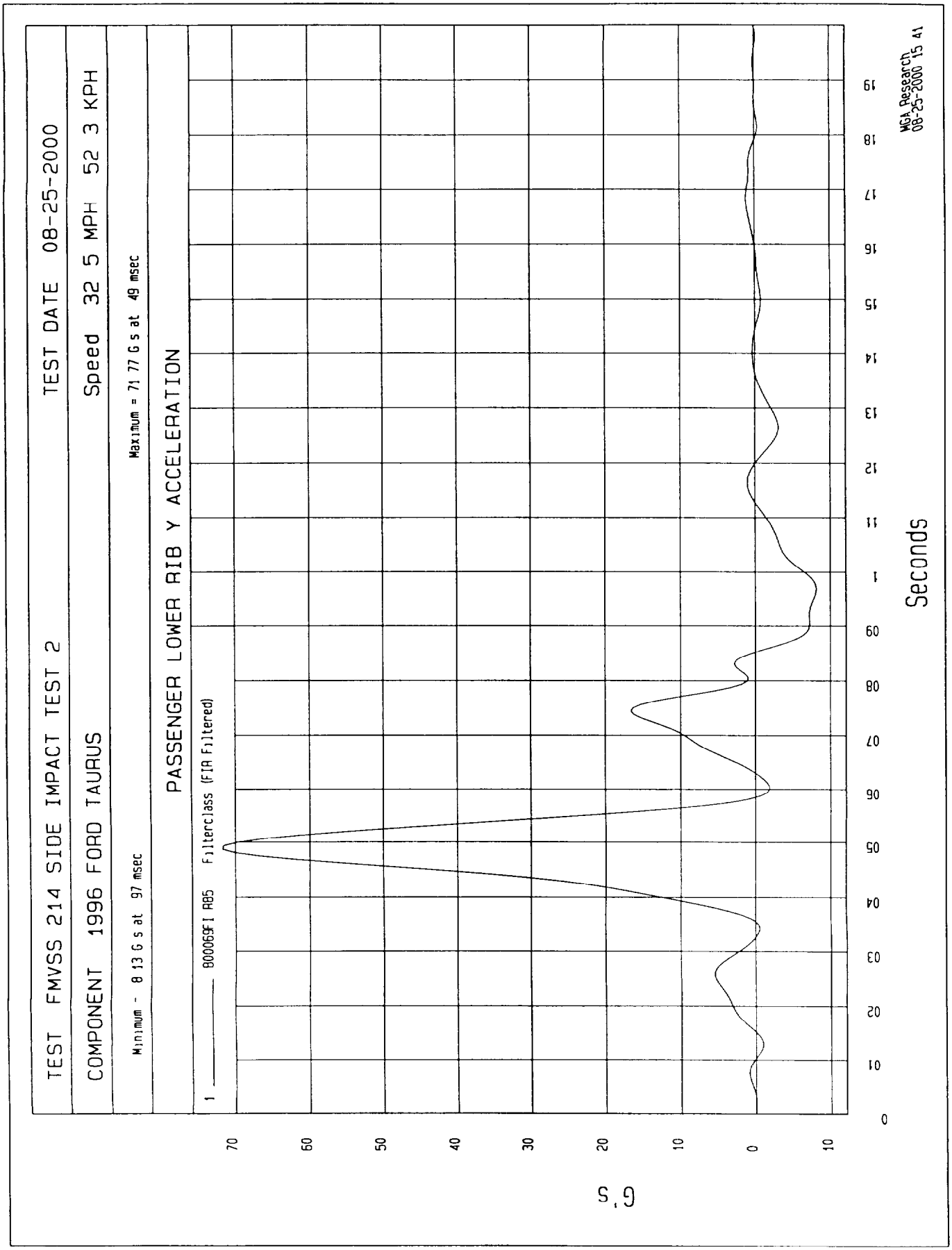

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 22 19 mm at 61 msec
Maximum 83 mm at 192 msec
PASSENGER UPPER RIB DISPLACEMENT
1 B00069DF 0B6 Filterclass (180)
MGA Research
08-25-2000 15 52
mm
Seconds
0
2
-4
6
-8
10
-12
-14
-16
-18
-20
22
01
02
03
04
05
06
07
08
09
11
12
13
14
15
16
17
18
19

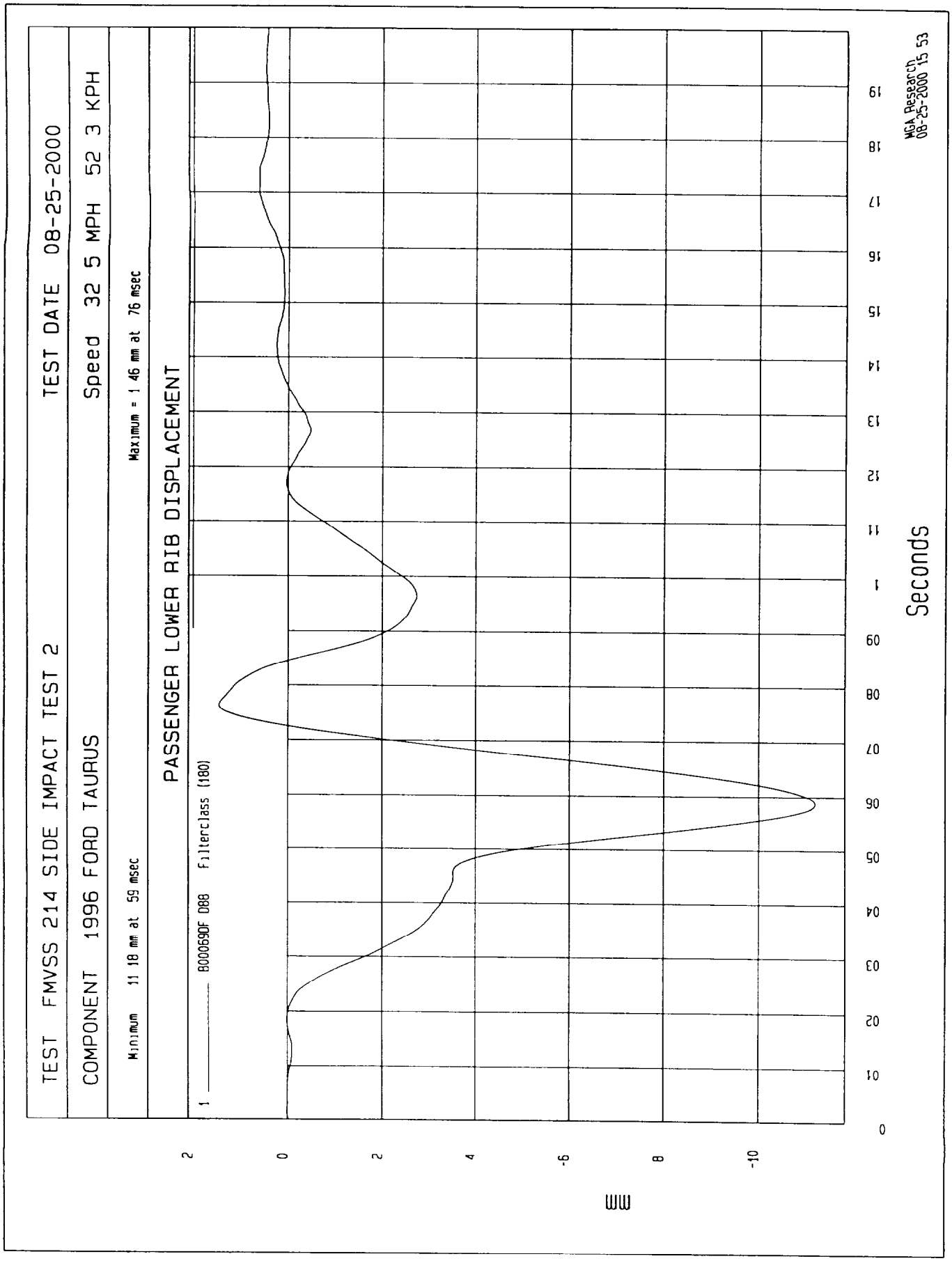

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 11 at 71 msec
Maximum 11 at 49 msec
PASSENGER UPPER RIB VISCOUS CRITERIA
1 B0006900 C86 Filterclass (180)
1
08
06
04
02
0
- 02
- 04
- 06
- 08
1
- 12
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 13

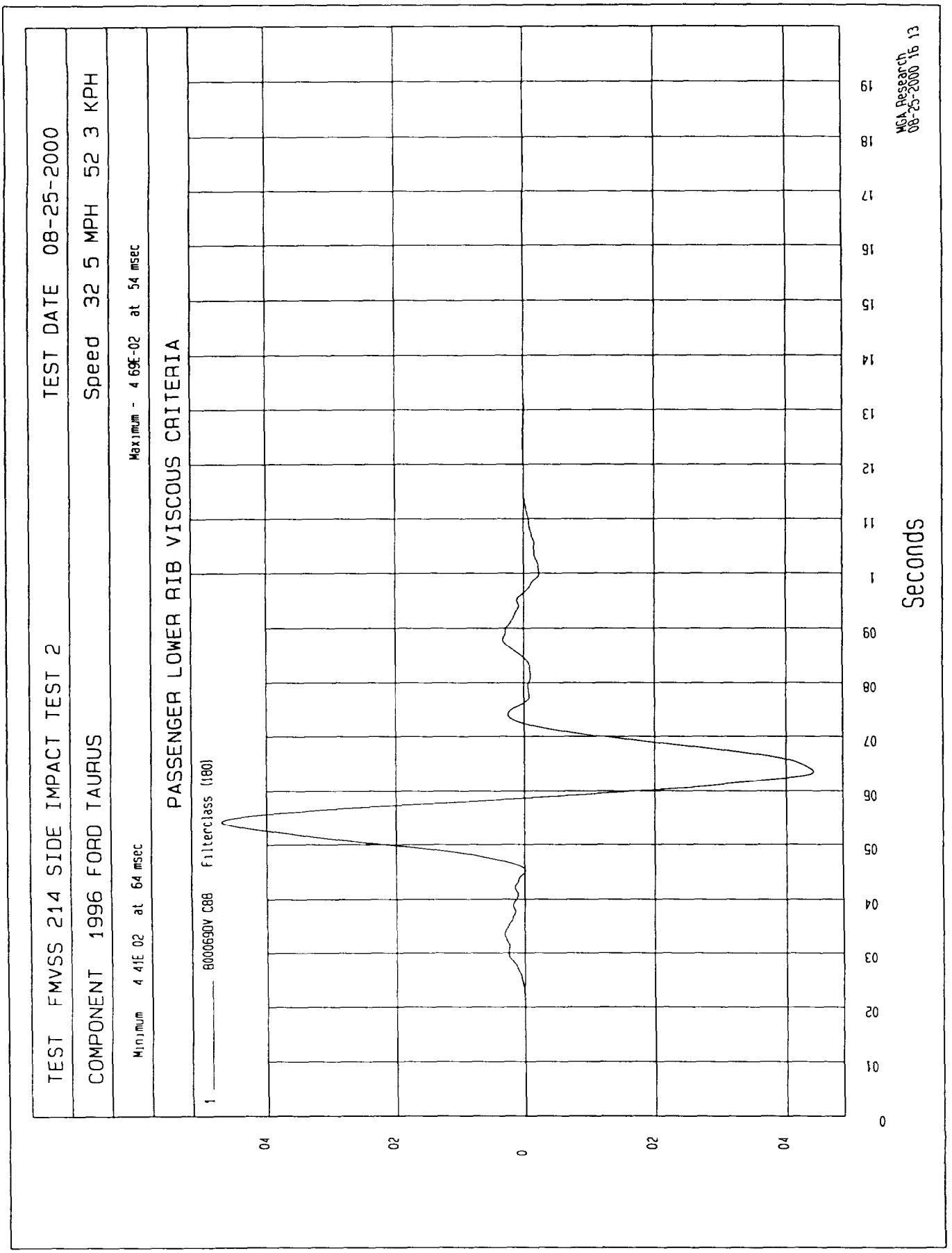

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 10 5 G s at 98 msec
Maximum - 61 41 G s at 48 msec
PASSENGER MID RIB Y ACCELERATION
1 ---- B0006GFI A04 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 40
G's
Seconds
60
50
40
30
20
10
0
-10
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

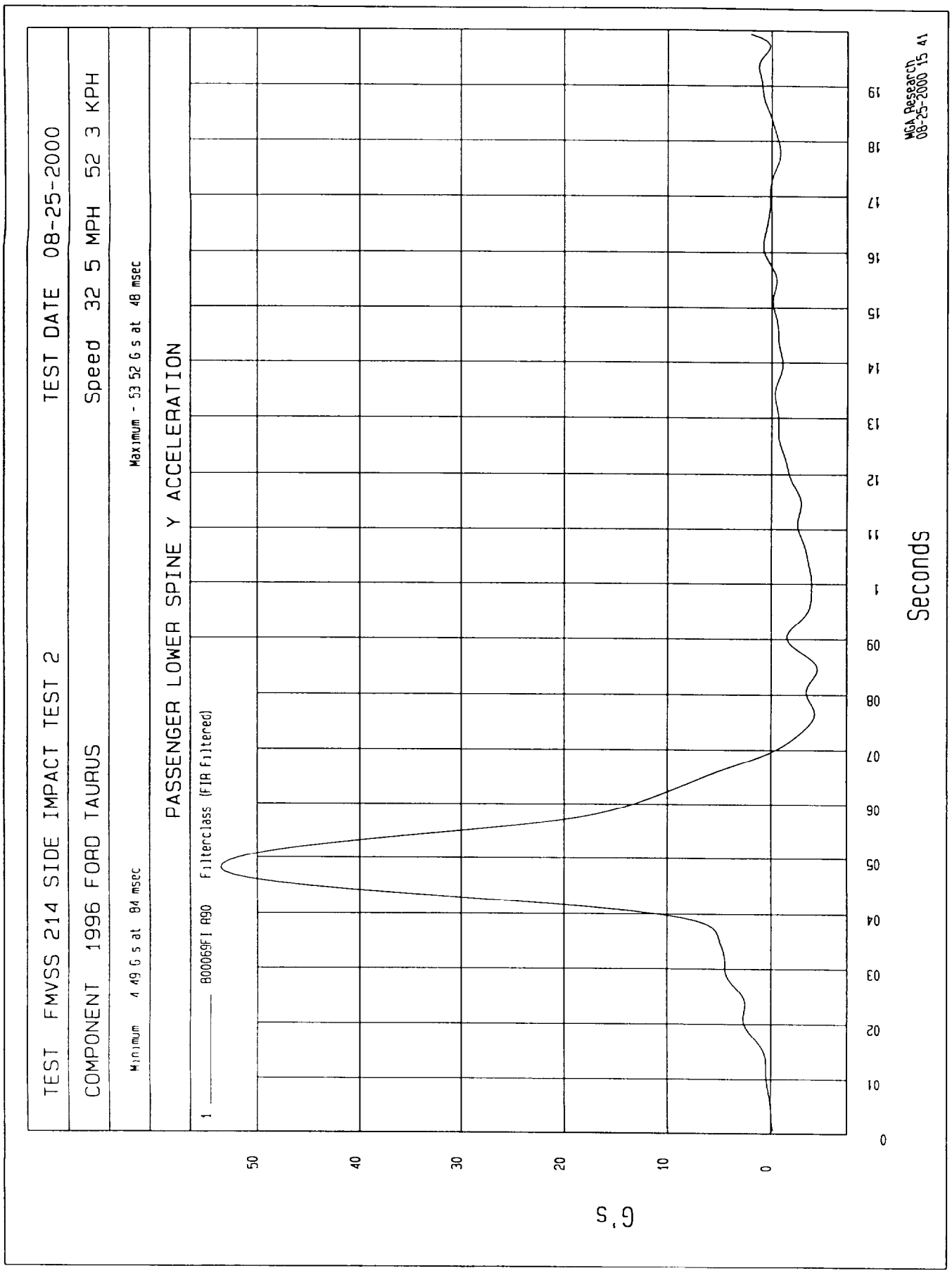

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 21 05 mm at 59 msec
Maximum = 53 mm at 85 msec
PASSENGER MID RIB DISPLACEMENT
1 B0006900F 087 Filterclass (180)
mm
0
2
4
6
8
10
-12
-14
-16
-18
-20
-22
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 15 52

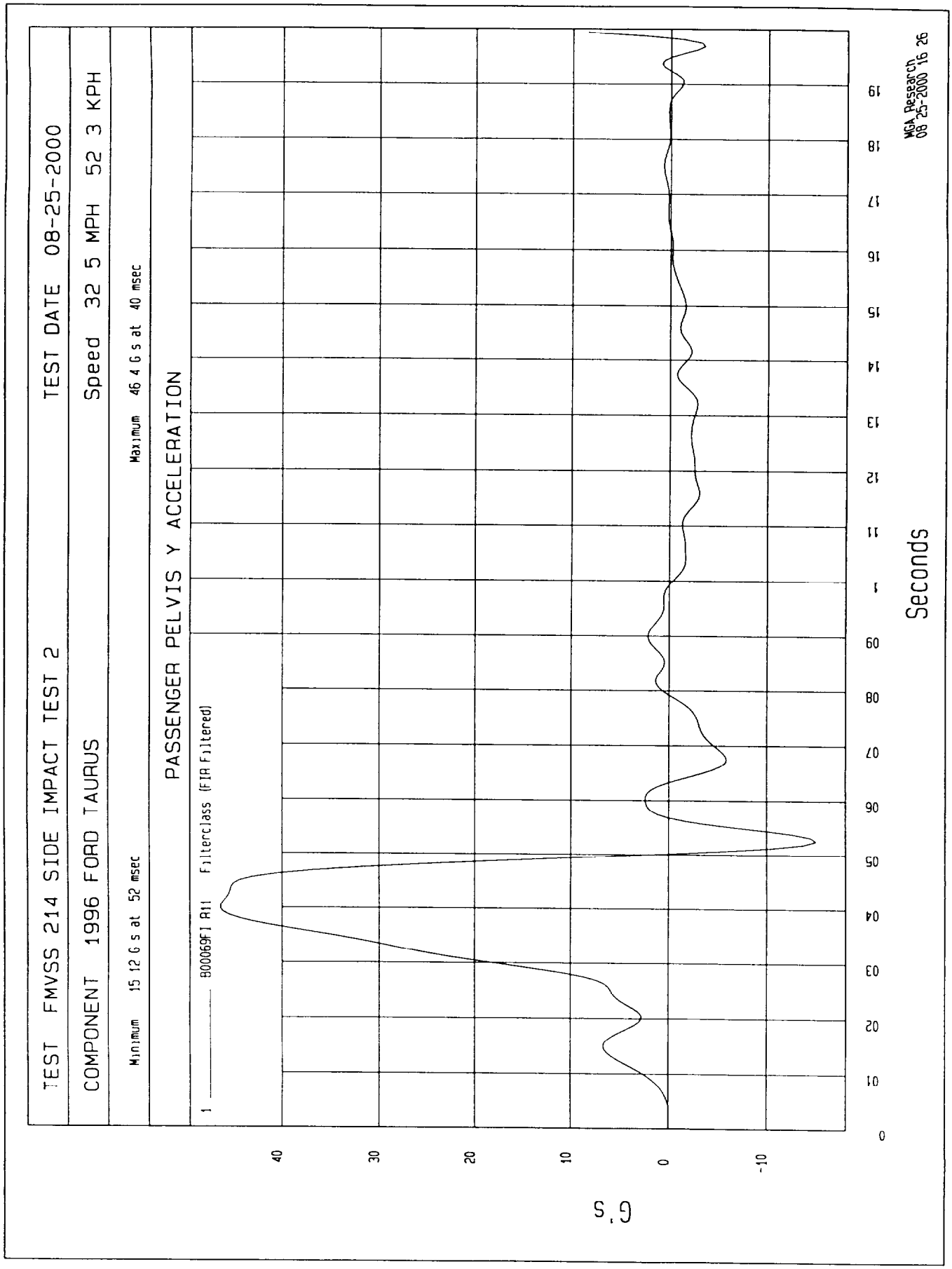

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 1 at 69 msec
Maximum = 15 at 54 msec
PASSENGER MID RIB VISCOUS CRITERA
1 B000690V CB7 Filterclass (180)
MGA Research
08-25-2000 16 13
Seconds
15
14
12
1
08
06
04
02
0
02
04
06
08
- 1
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

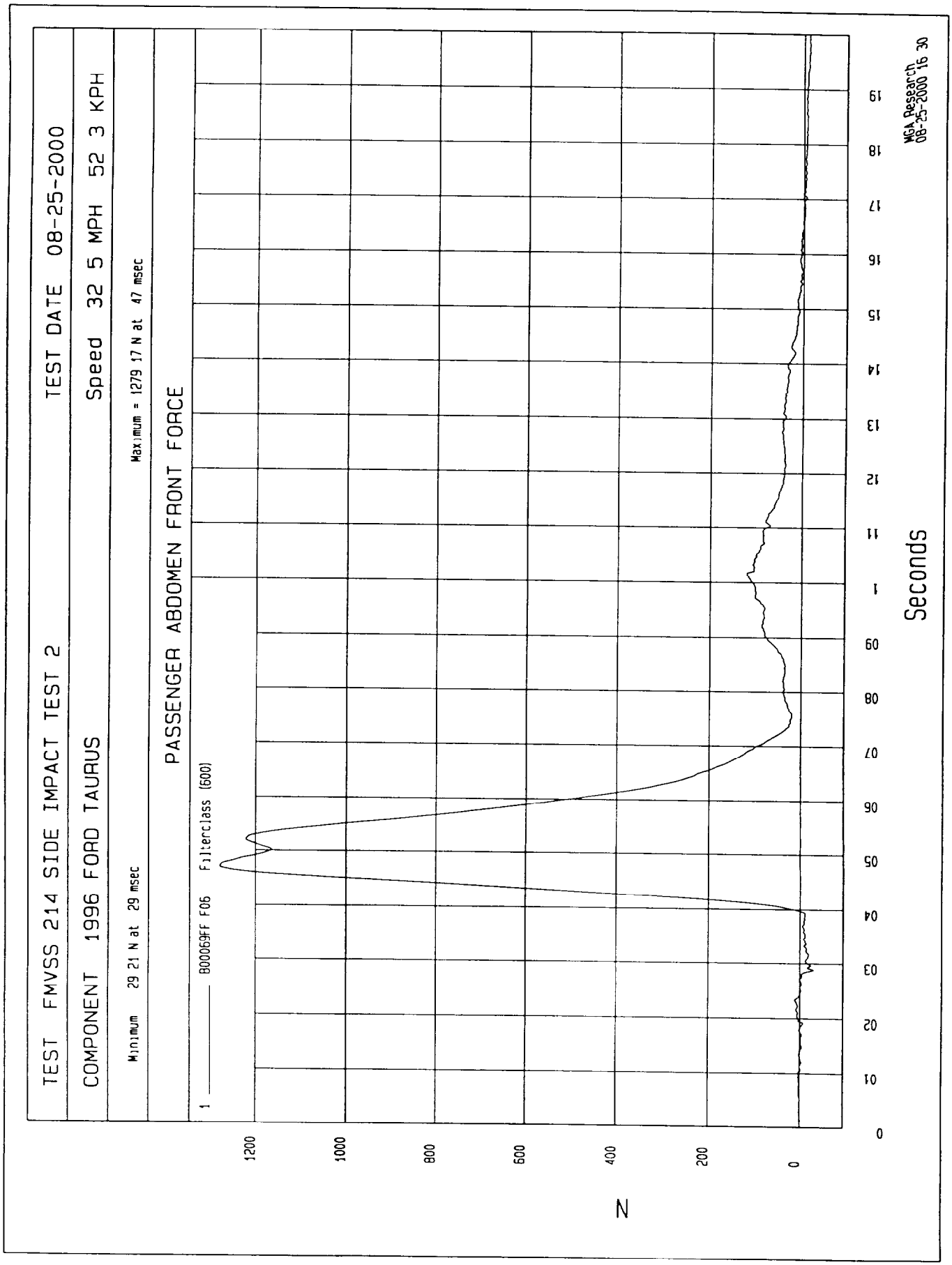

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = 8 13 G s at 97 msec
Maximum = 71 77 G s at 49 msec
PASSENGER LOWER RIB Y ACCELERATION
1 B00069FI RB5 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 41
G's
Seconds
70
60
50
40
30
20
10
0
10
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

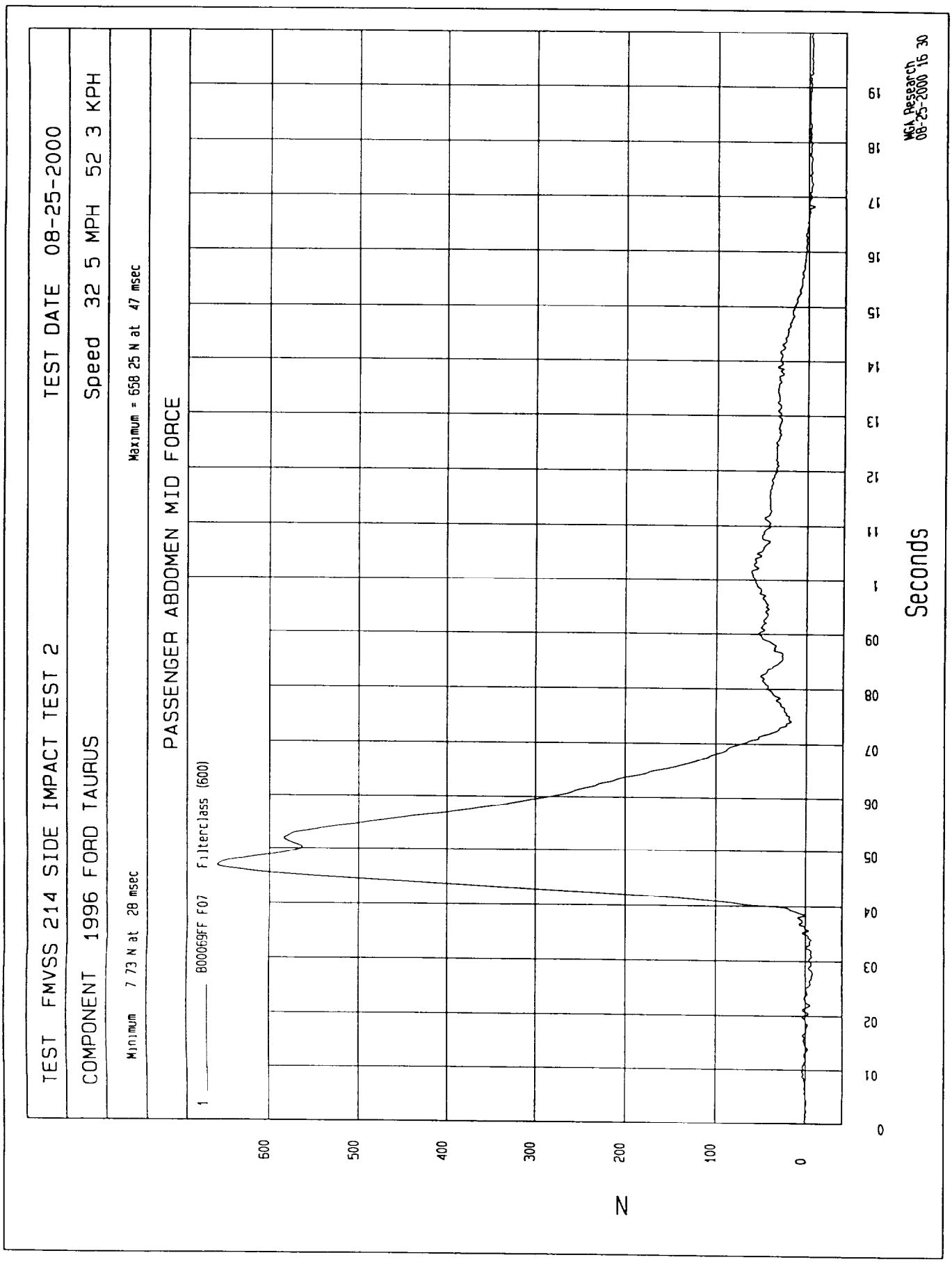

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 11 18 mm at 59 msec
Maximum = 1 46 mm at 76 msec
PASSENGER LOWER RIB DISPLACEMENT
1 B000690F 000 Filterclass (180)
MGA Research
08-25-2000 15 53
mm
2
0
2
4
-6
8
-10
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds

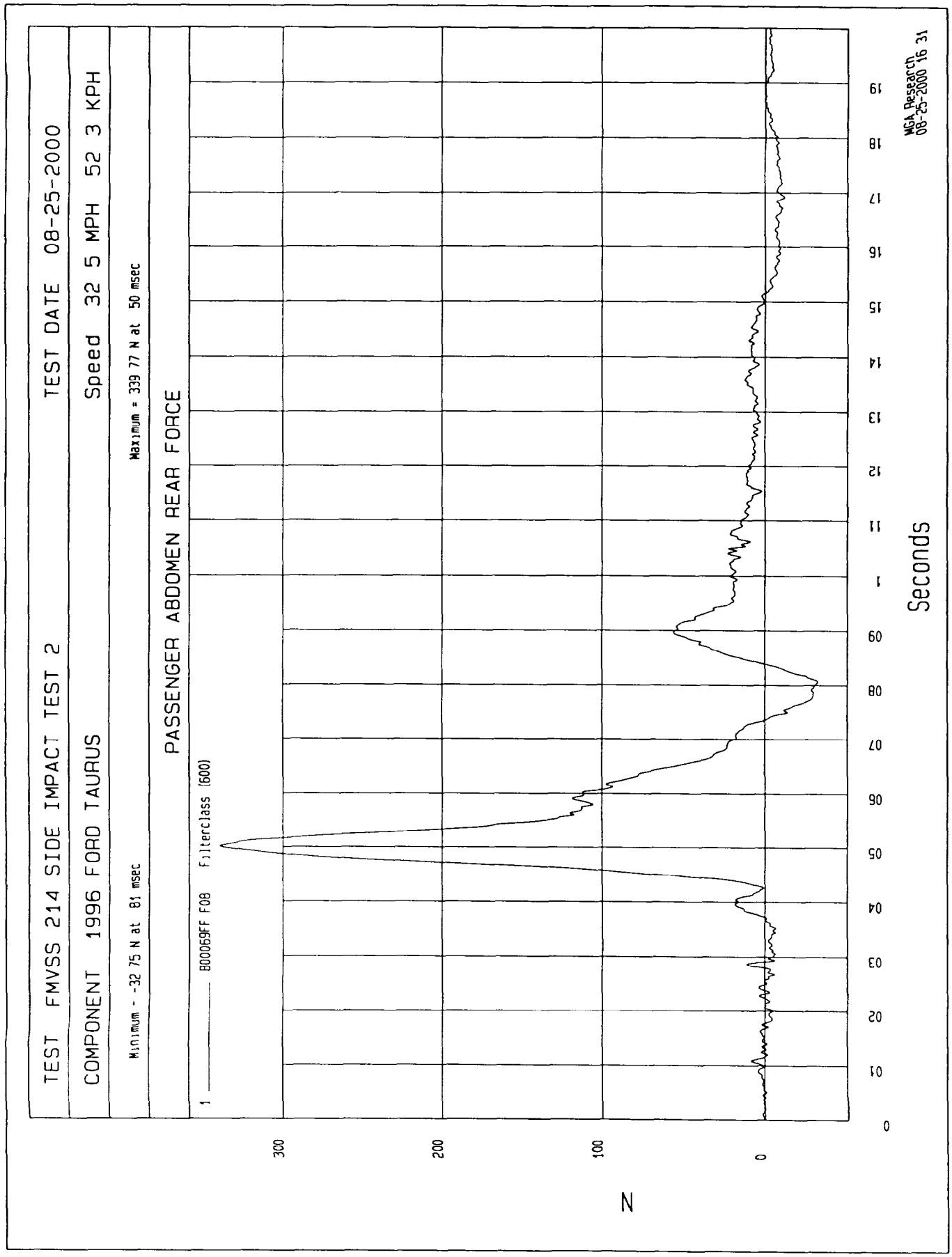

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 4 41E 02 at 64 msec
Maximum - 4 69E-02 at 54 msec
PASSENGER LOWER RIB VISCOUS CRITERIA
1 B000690V C8B Filterclass (180)
MGA Research
08-25-2000 16 13
Seconds
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
04
02
0
02
04

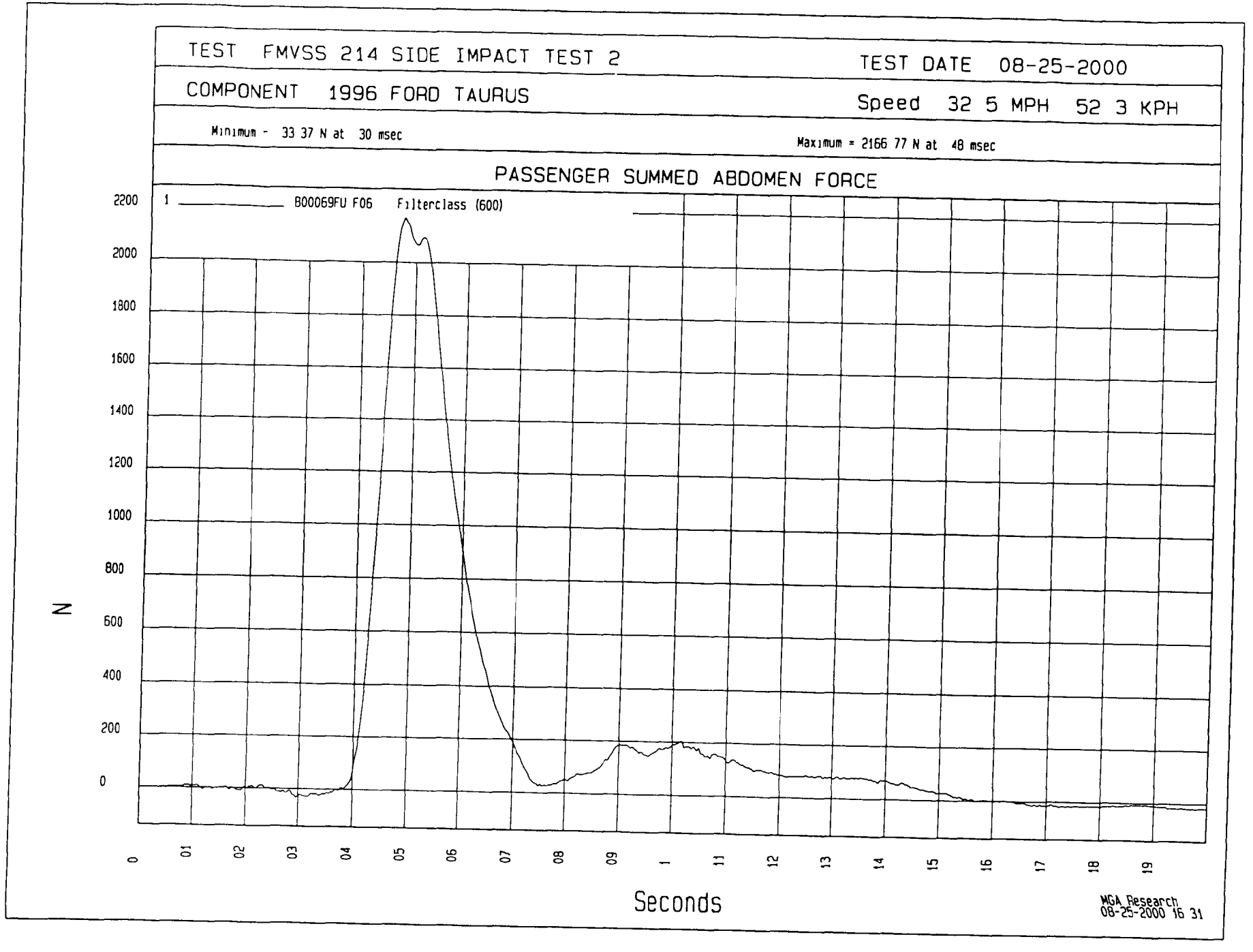

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 4 49 G s at 84 msec
Maximum - 53 52 G s at 48 msec
PASSENGER LOWER SPINE Y ACCELERATION
1 _____ B00069FI A90 Filterclass (FIR Filtered)
MGA Research
08-25-2000 15 41
G's
Seconds
50
40
30
20
10
0
0
10
20
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19

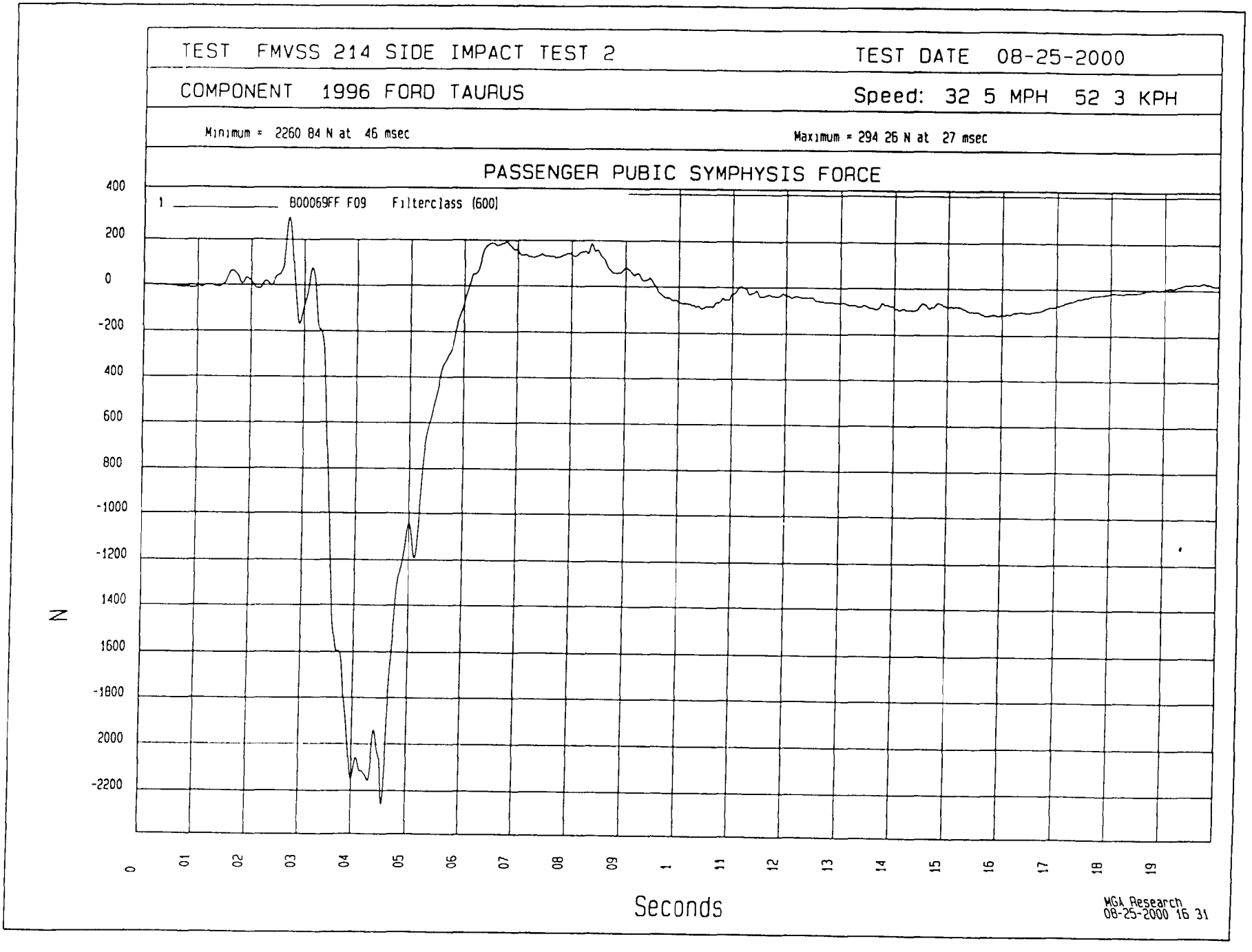

TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 15 12 G s at 52 msec
Maximum 46 4 G s at 40 msec
PASSENGER PELVIS Y ACCELERATION
1 _____ 800069F1 R11 Filterclass (FIR Filtered)
G's
40
30
20
10
0
-10
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 26


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 29 21 N at 29 msec
Maximum = 1279 17 N at 47 msec
PASSENGER ABDOMEN FRONT FORCE
1 B00069FF F06 Filterclass (600)
N
Seconds
MGA Research
08-25-2000 16 30


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum 7 73 N at 28 msec
Maximum = 658 25 N at 47 msec
PASSENGER ABDOMEN MID FORCE
1 B0006GFF F07 Filterclass (600)
N
600
500
400
300
200
100
0
Seconds
0
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
MGA Research
08-25-2000 16 30


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum = -32 75 N at 81 msec
Maximum = 339 77 N at 50 msec
PASSENGER ABDOMEN REAR FORCE
1 B00069FF F08 Filterclass (600)
300
200
100
0
N
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 31


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed 32 5 MPH 52 3 KPH
Minimum - 33 37 N at 30 msec
Maximum = 2166 77 N at 48 msec
PASSENGER SUMMED ABDOMEN FORCE
1 B00069FU F06 Filterclass (600)
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
N
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 31


TEST FMVSS 214 SIDE IMPACT TEST 2
TEST DATE 08-25-2000
COMPONENT 1996 FORD TAURUS
Speed: 32 5 MPH 52 3 KPH
Minimum = 2260 84 N at 46 msec
Maximum = 294 26 N at 27 msec
PASSENGER PUBIC SYMPHYSIS FORCE
1 B00069FF F09 Filterclass (600)
400
200
0
-200
400
600
800
-1000
-1200
1400
1600
-1800
2000
-2200
N
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
15
16
17
18
19
Seconds
MGA Research
08-25-2000 16 31

APPENDIX C – ES-2 CONFIGURATION AND PERFORMANCE VERIFICATION

CERTIFICATION DATA

Dummy Serial Number ES2-001

Calibration Test Results Summary

Dummy Serial Number ES2-001

Pre-Test Calibration

External Dimensions·	The dummy passed all external dimension requirements.
Head Drop Test	The head passed all drop test requirements.
Neck Pendulum Test	The neck did not pass all impact test requirements.
Shoulder Impact Test	The shoulder passed all impact test requirements
Rib Tests·	All ribs did not pass all impact test requirements
Abdomen Test	The abdomen passed all impact test requirements
Lumbar Spine Test	The lumbar spine passed all impact test requirements
Pelvis Test:	The pelvis passed all impact test requirements

MGA RESEARCH CORPORATION

HEAD DROP TEST

EUROSID 2 DUMMY

Date August 23, 2000

Dummy Serial Number ES2-001

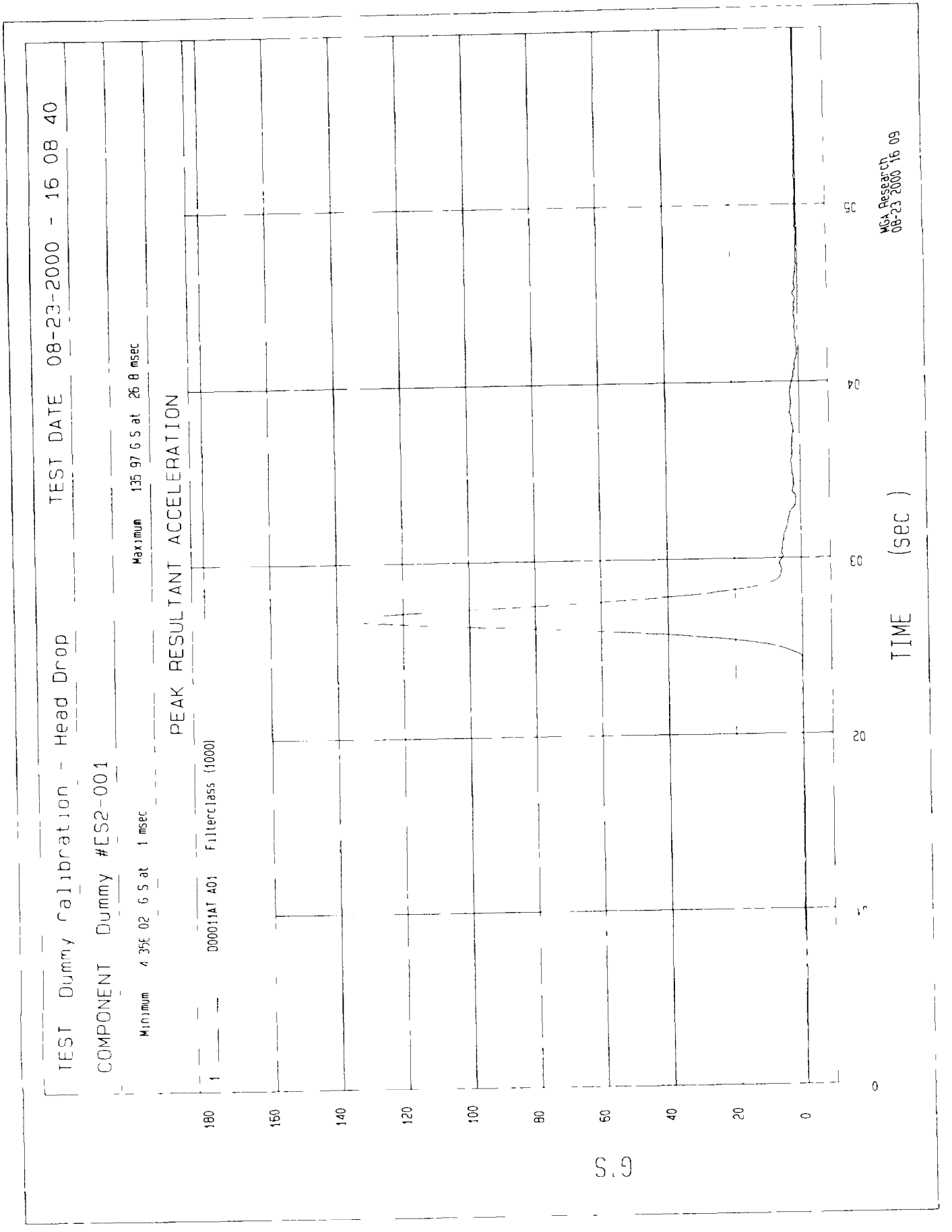
Test Number: D001011

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Peak Resultant Acceleration	100 – 150 g's	136
Time of Max. Res Acceleration		26 8 ms

TEST MEETS SPECIFICATIONS

Technician _____

Approved By David Winkelbauer


TEST Dummy calibration - Head Drop
TEST DATE 08-23-2000 - 16 08 40
COMPONENT Dummy #ES2-001
Minimum 4 356 02 G S at 1 msec
Maximum 135 97 G S at 26 8 msec
PEAK RESULTANT ACCELERATION
1 D00011AT A01 Filterclass (1000)
180
160
140
120
100
80
60
40
20
0
0
02
04
06
08
20
TIME (sec)
MGA Research
08-23 2000 16 09

S.9

MGA RESEARCH CORPORATION

NECK PENDULUM TEST

EUROSID 2 DUMMY

Date August 23, 2000

Dummy Serial Number ES2-001

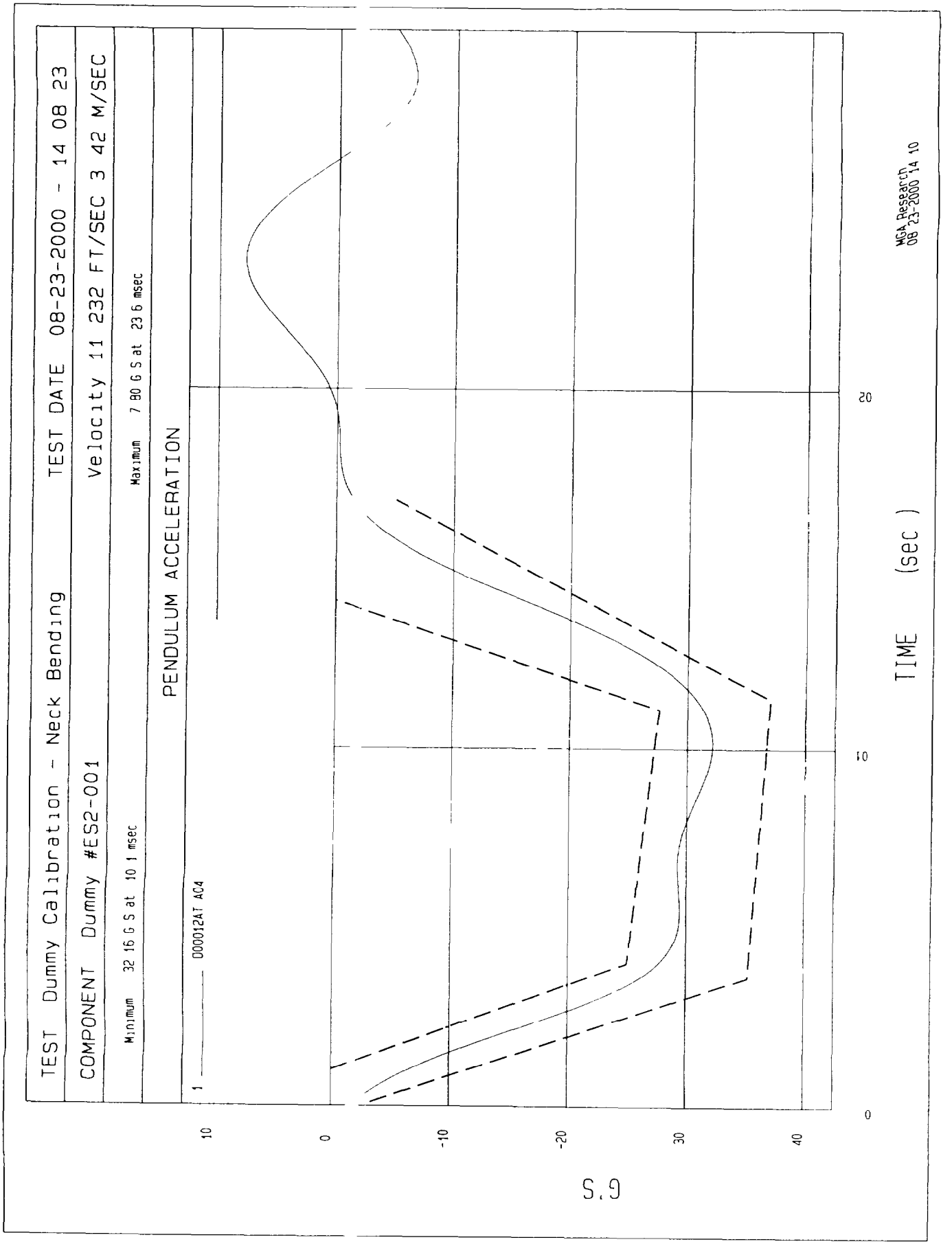
Test Number D001012

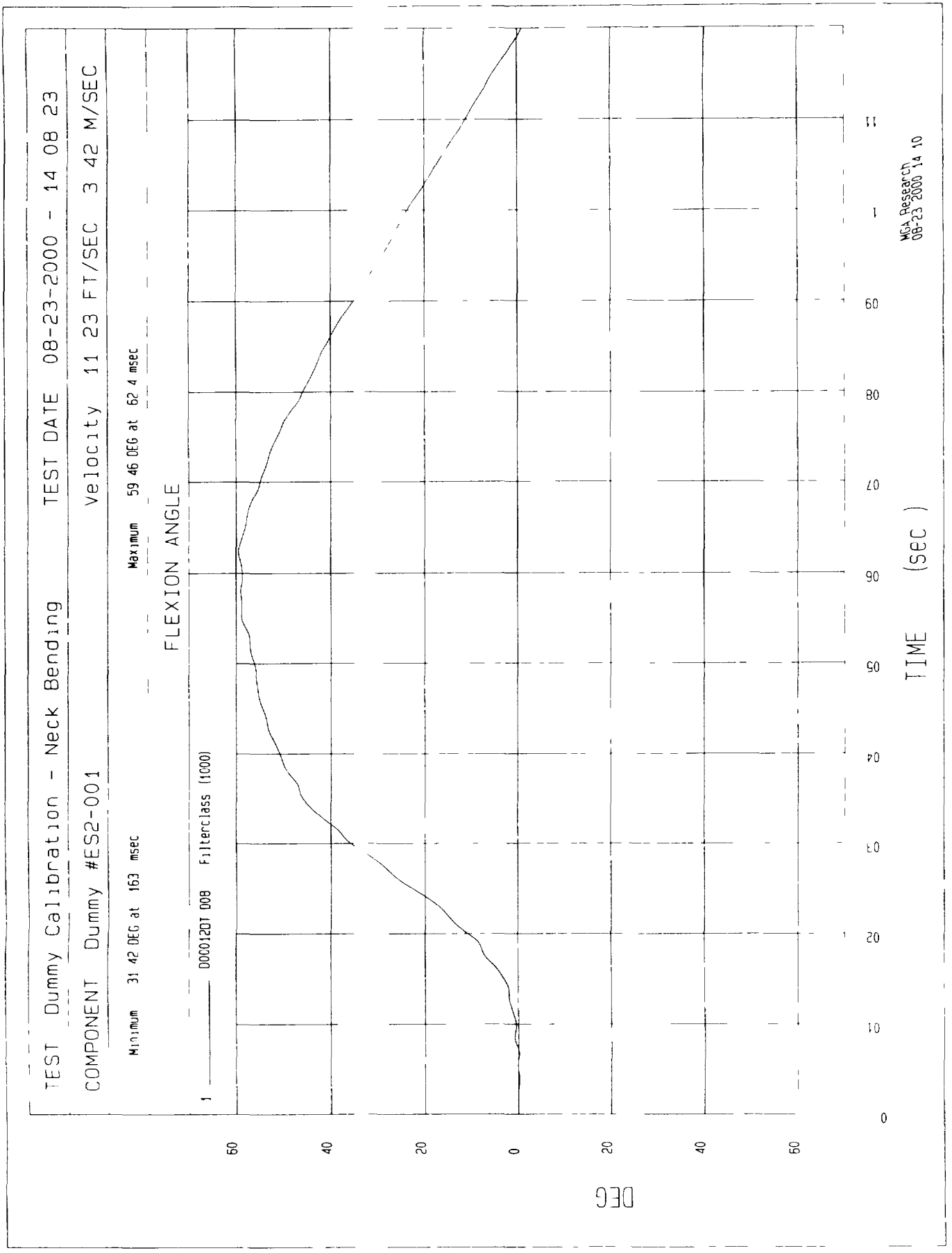
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Pendulum Speed	3 3 - 3 5	3.4
Max. Pendulum Acceleration		-32.2 g's
Time Max Pendulum Acceleration		10 1 ms
Maximum Flexion Angle	51 0 – 59.0 deg	59 5 *
Time of Max Flexion Angle	53 0 – 65.0 ms	62 4
Maximum Angle Theta (A)	32 5 – 36 5 deg	35 9
Time of Max Theta (A)	54 0 – 64.0 ms	62 7
Maximum Angle Theta (B)	28 0 – 32 0 deg	31.8
Time of Max Theta (B)	54 0 – 64 0 ms	59.0

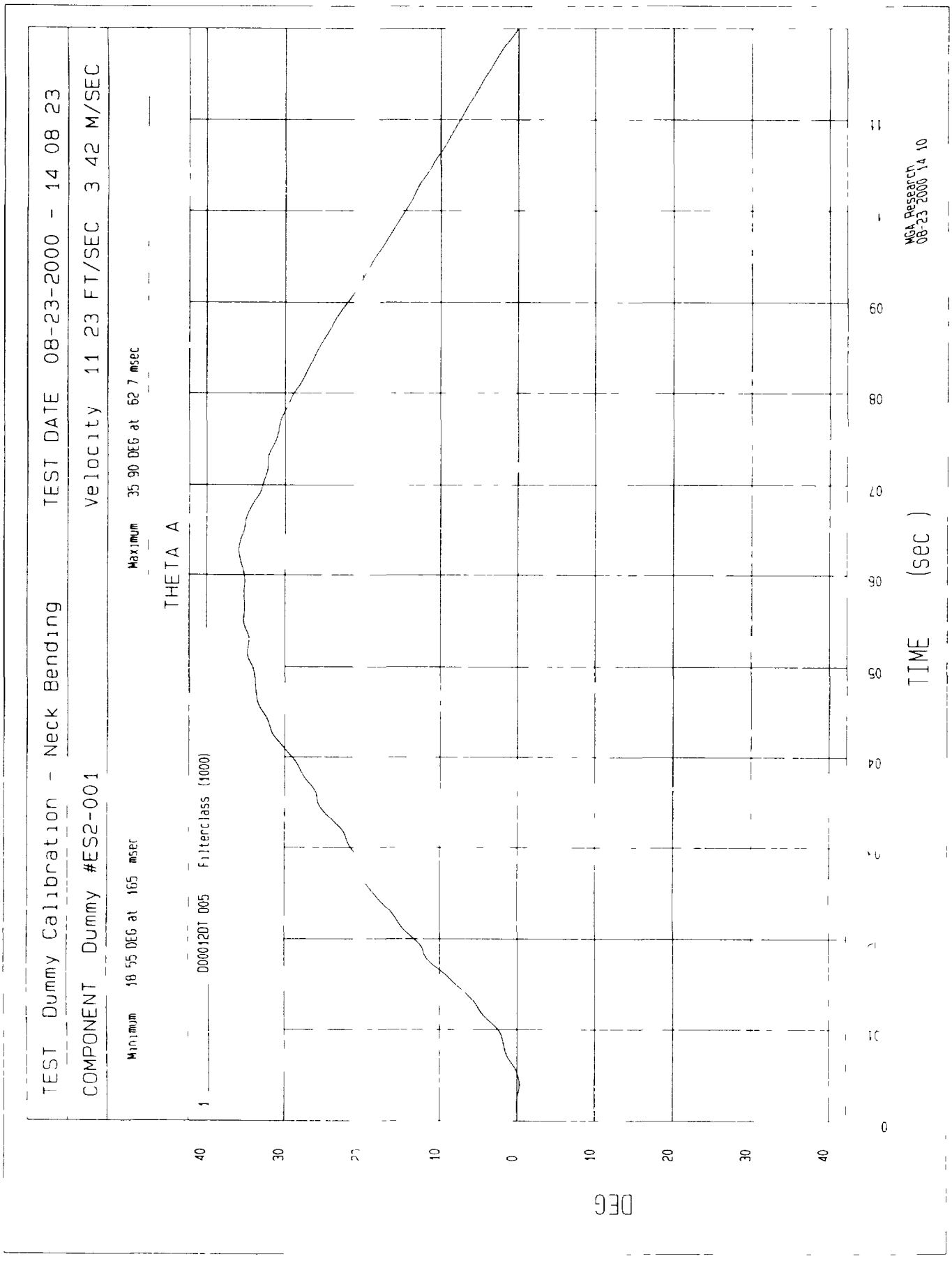
* DID NOT MEET SPECIFICATIONS

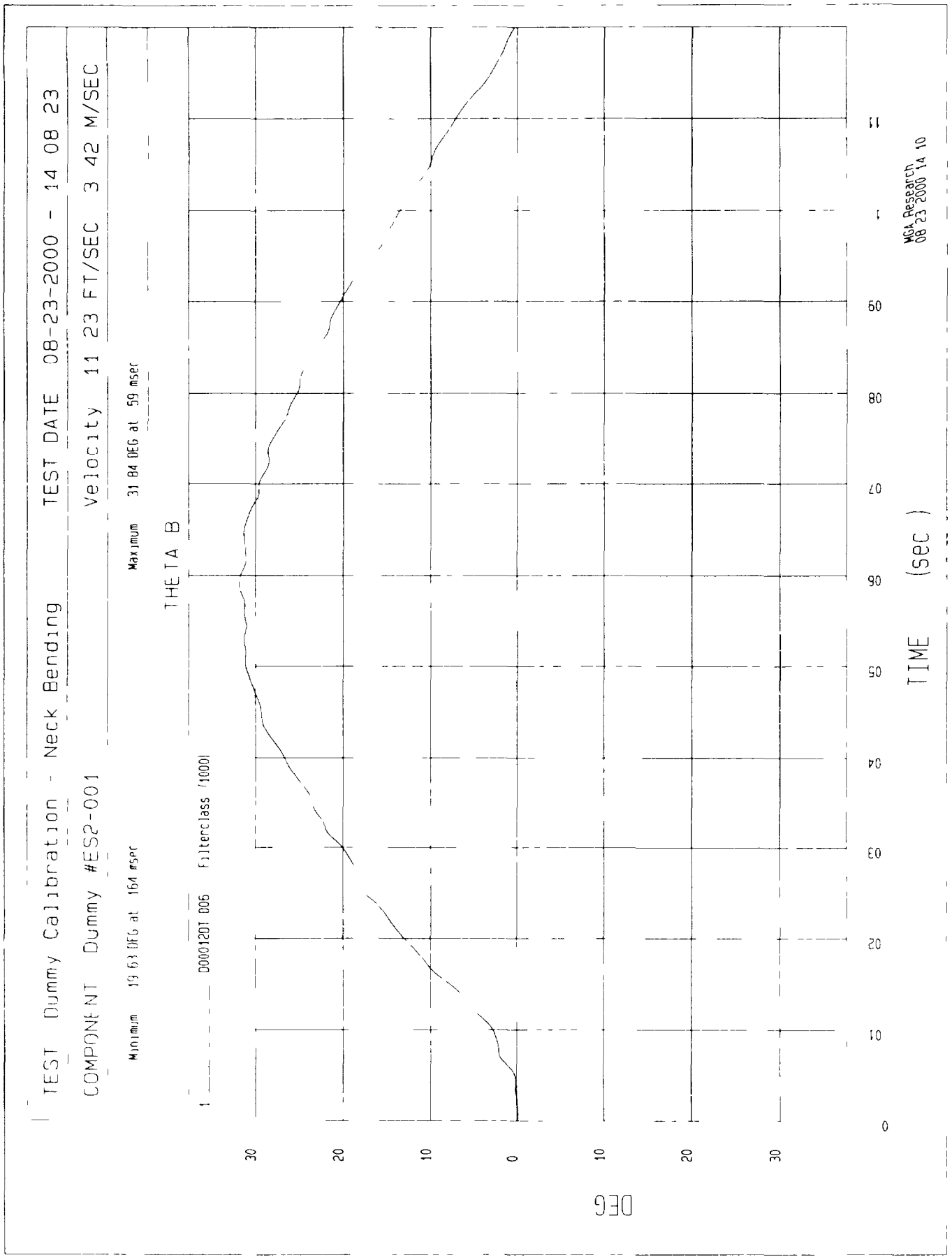
Technician 

Approved By: David Winkelbauer


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 08 23
COMPONENT Dummy #ES2-001
Velocity 11 232 FT/SEC 3 42 M/SEC
Minimum 32 16 G S at 10 1 msec
Maximum 7 80 G S at 23 6 msec
PENDULUM ACCELERATION
1 ——— D00012AT AC4
MGA Research
08 23-2000 14 10
TIME (sec)
G'S
10
0
-10
-20
30
40
0
10
20


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 08 23
COMPONENT Dummy #ES2-001
Velocity 11 23 FT/SEC 3 42 M/SEC
Minimum 31 42 DEG at 163 msec
Maximum 59 46 DEG at 62 4 msec
FLEXION ANGLE
1 _____ 000012DT 00B Filterclass (1000)
DEG
60
40
20
0
20
40
60
TIME (SEC)
0
10
20
30
40
50
60
70
80
90
100
110
MGA Research
08-23 2000 14 10


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 08 23
COMPONENT Dummy #ES2-001
Velocity 11 23 FT/SEC 3 42 M/SEC
Minimum 18 55 DEG at 165 msec
Maximum 35 90 DEG at 62 7 msec
THETA A
1 D000120T 005 Filterclass (1000)
DEG
TIME (sec)
MGA Research
08-23 2000 14 10


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 08 23
COMPONENT Dummy #ES2-001
Velocity 11 23 FT/SEC 3 42 M/SEC
Minimum 19 63 DEG at 164 msec
Maximum 31 84 DEG at 59 msec
THETA B
1 ____ 0001201 005 Filterclass (1000)
DEG
TIME (sec)
MGA Research
08 23 2000 14 10

MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

EUROSID 2 DUMMY

Date August 21, 2000

Dummy Serial Number ES2-001

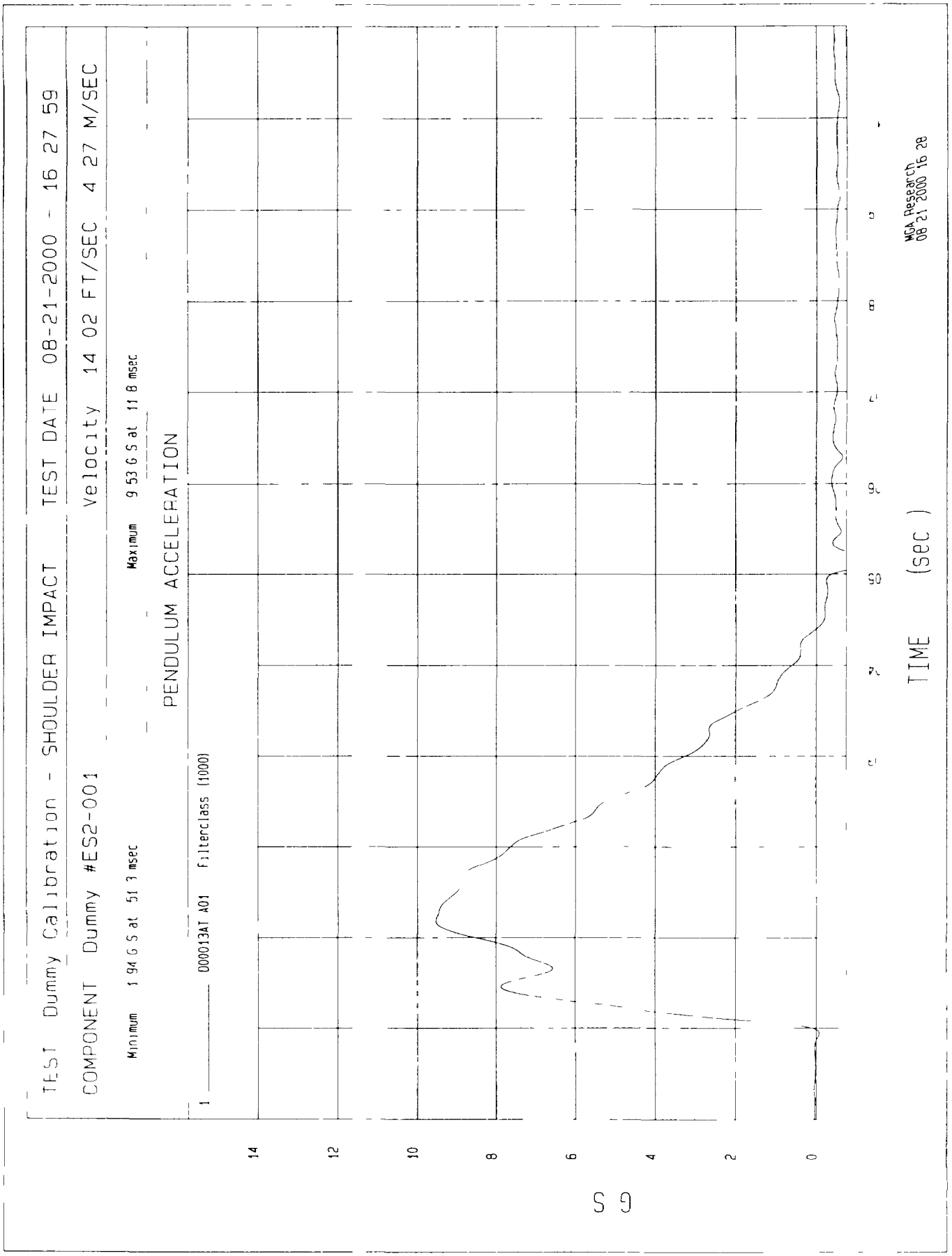
Test Number D001013

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	46
Pendulum Speed	4.2 – 4 4 m/s	4 3
Max Resultant Acceleration	7.5 – 10 5 g's	9 5
Time of Max Pendulum Acceleration		12 ms

TEST MEETS SPECIFICATIONS

Technician _____

Approved By David Wunbelbauer


TEST Dummy Calibration - SHOULDER IMPACT TEST DATE 08-21-2000 - 16 27 59
COMPONENT Dummy #ES2-001 Velocity 14 02 FT/SEC 4 27 M/SEC
Minimum 1 94 G S at 51 3 msec
Maximum 9 53 G S at 11 8 msec
PENDULUM ACCELERATION
1 000013AT A01 Filterclass (1000)
G S
TIME (sec)
MGA Research
08 21 2000 16 28

MGA RESEARCH CORPORATION

UPPER/MIDDLE/LOWER RIB TESTS

EUROSID 2 DUMMY

Date August 24, 2000

Dummy Serial Number ES2-001

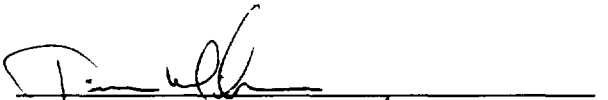
Test Number D001014/5/6

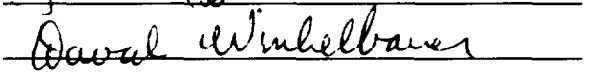
UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Displacement at 2 m/s	23 5 – 27.5 mm	27 4
Displacement at 3 m/s	36 0 – 40.0 mm	39 1
Displacement at 4 m/s	46 0 – 51 0 mm	50 5

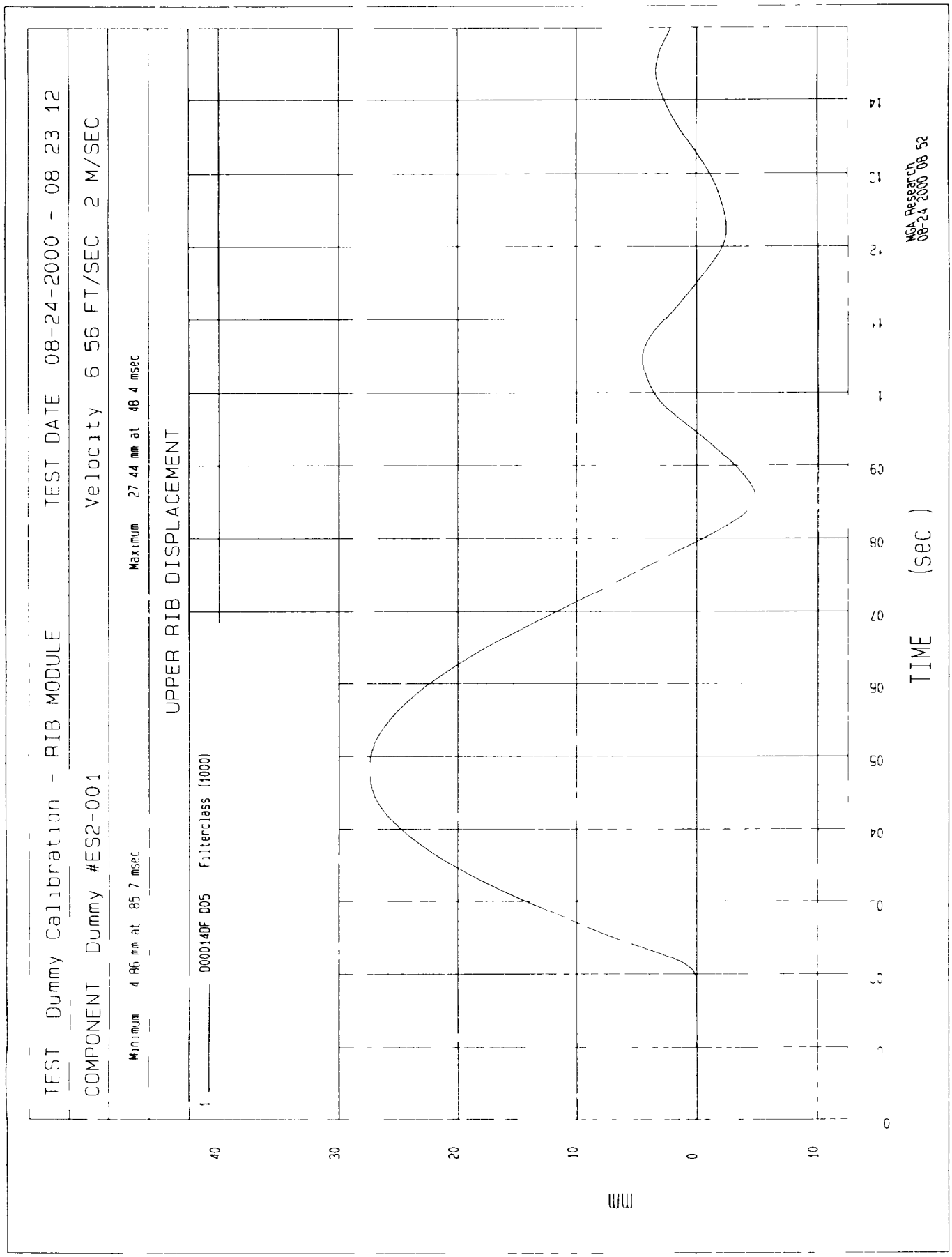
MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Displacement at 2 m/s	23 5 – 27 5 mm	26.8
Displacement at 3 m/s	36 0 – 40.0 mm	38 8
Displacement at 4 m/s	46 0 – 51 0 mm	50.1

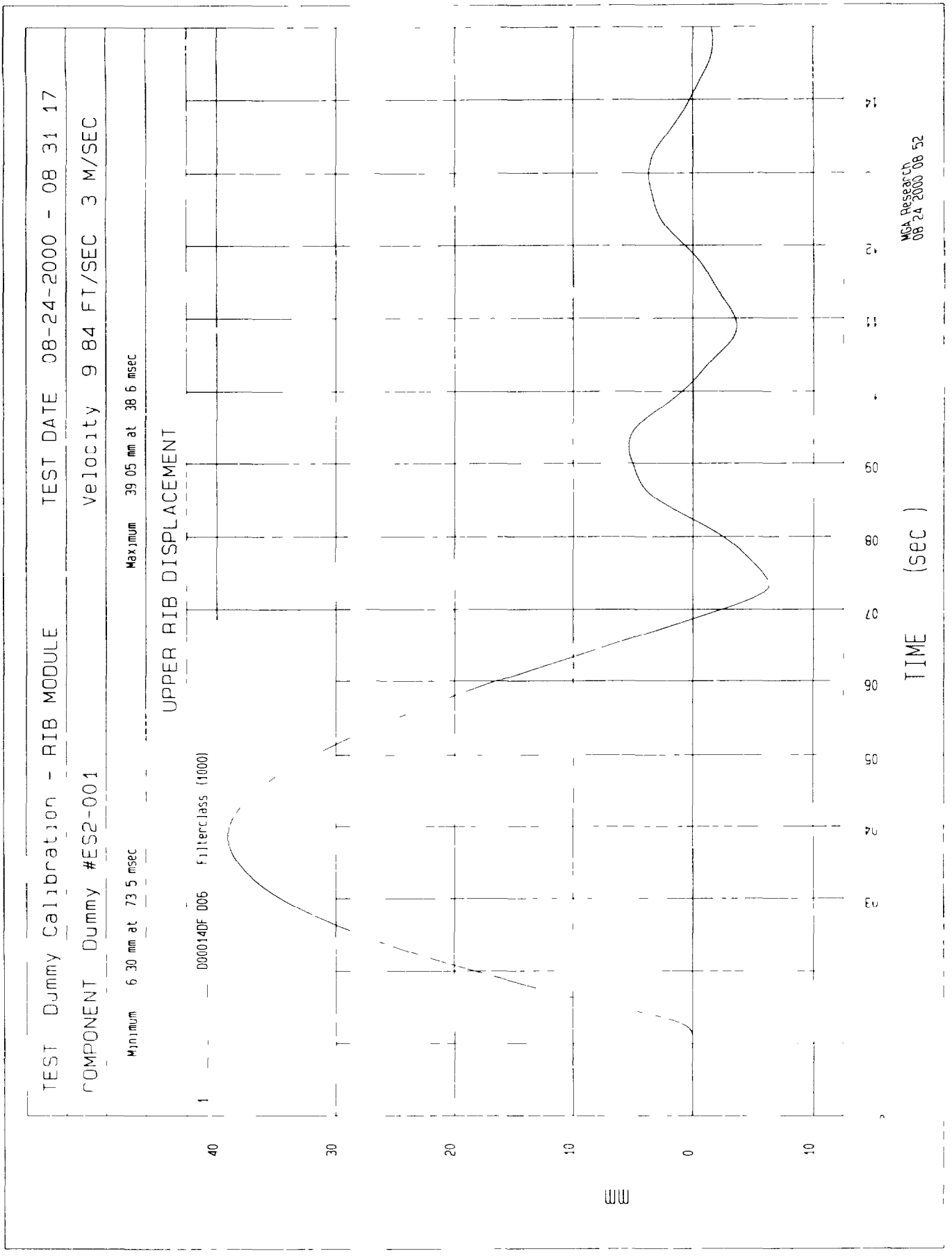
LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Displacement at 2 m/s	23.5 – 27 5 mm	27 3
Displacement at 3 m/s	36.0 – 40.0 mm	39.8
Displacement at 4 m/s	46.0 – 51.0 mm	51 6 *

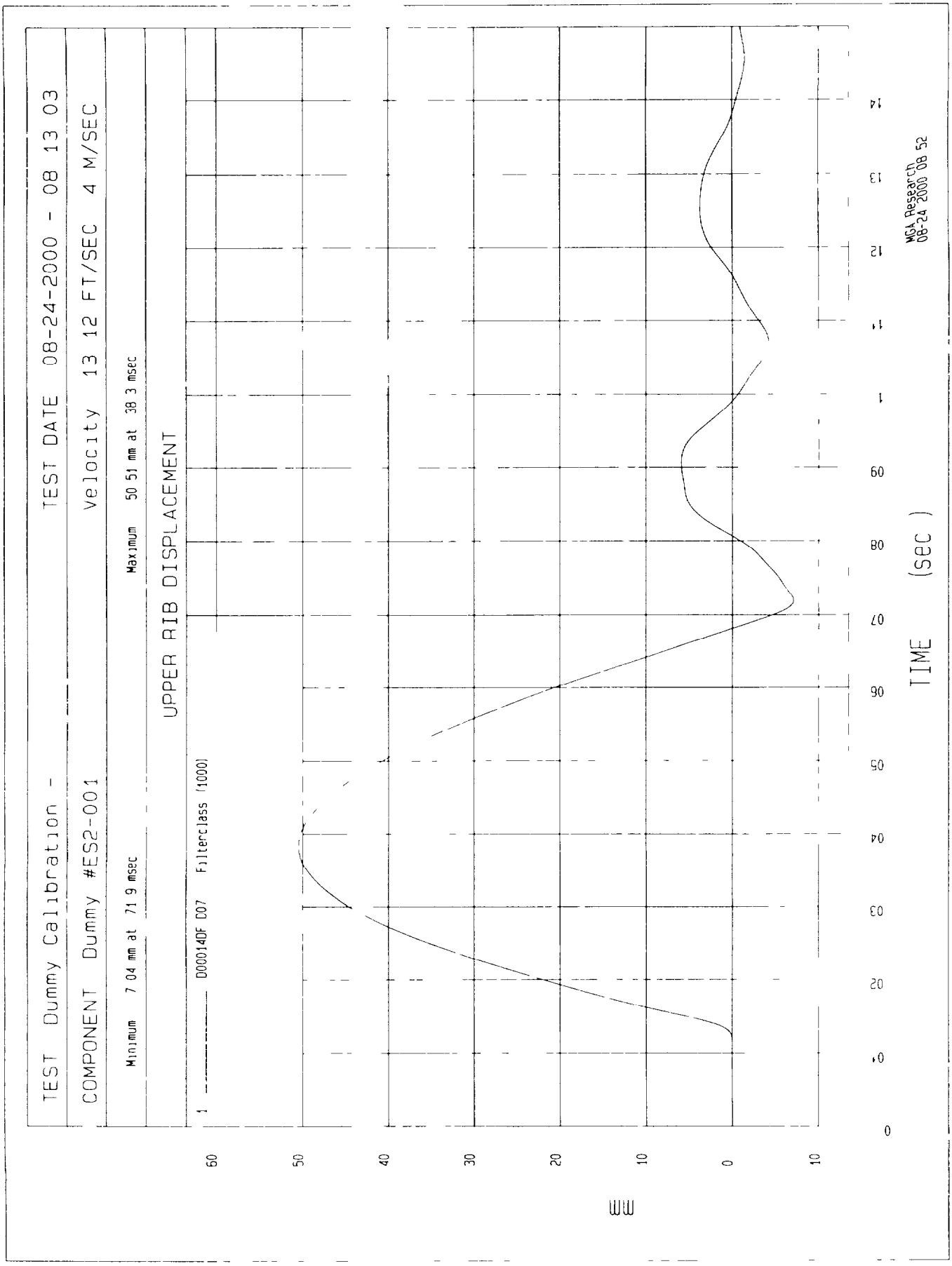
* DID NOT MEET SPECIFICATIONS

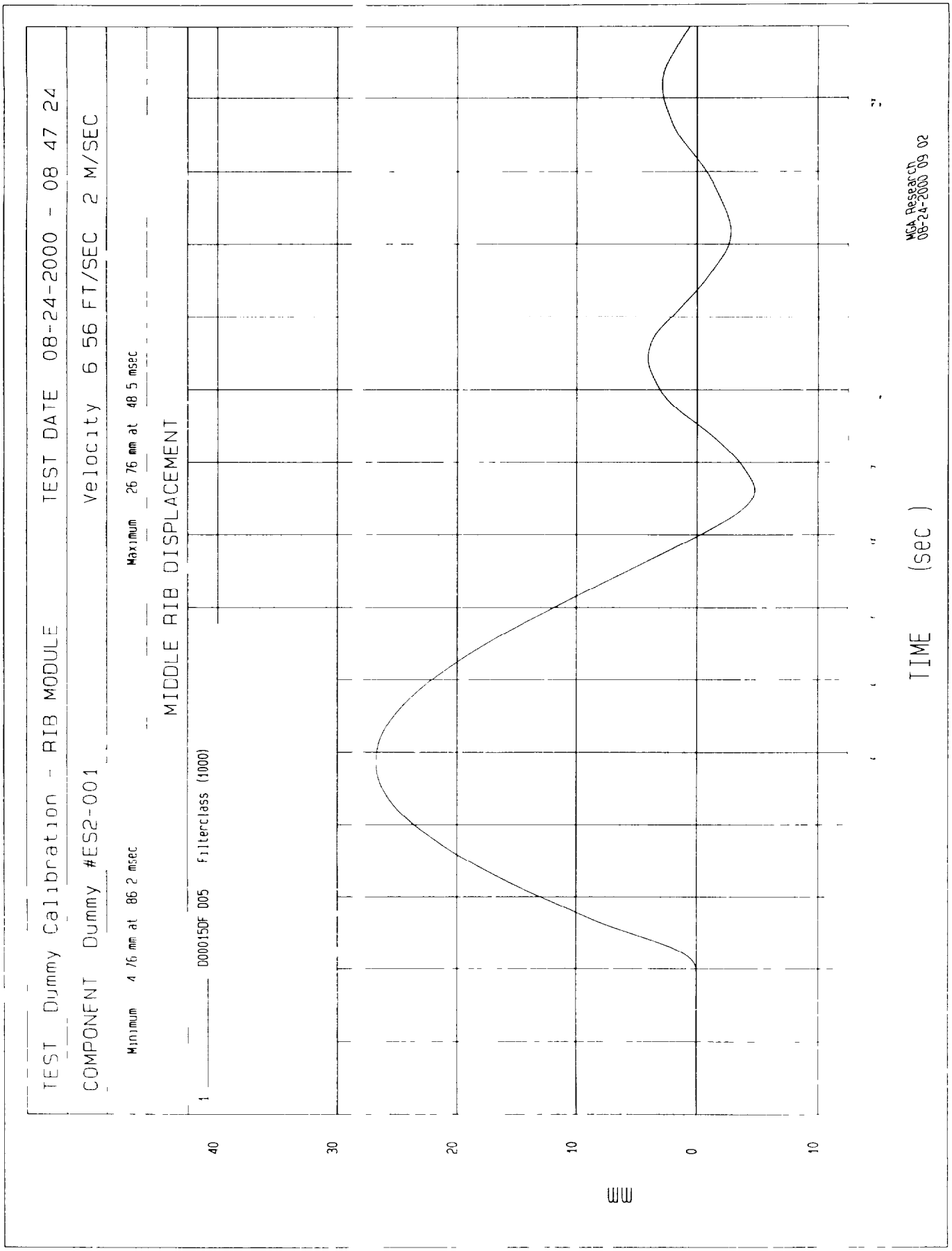
Technician 

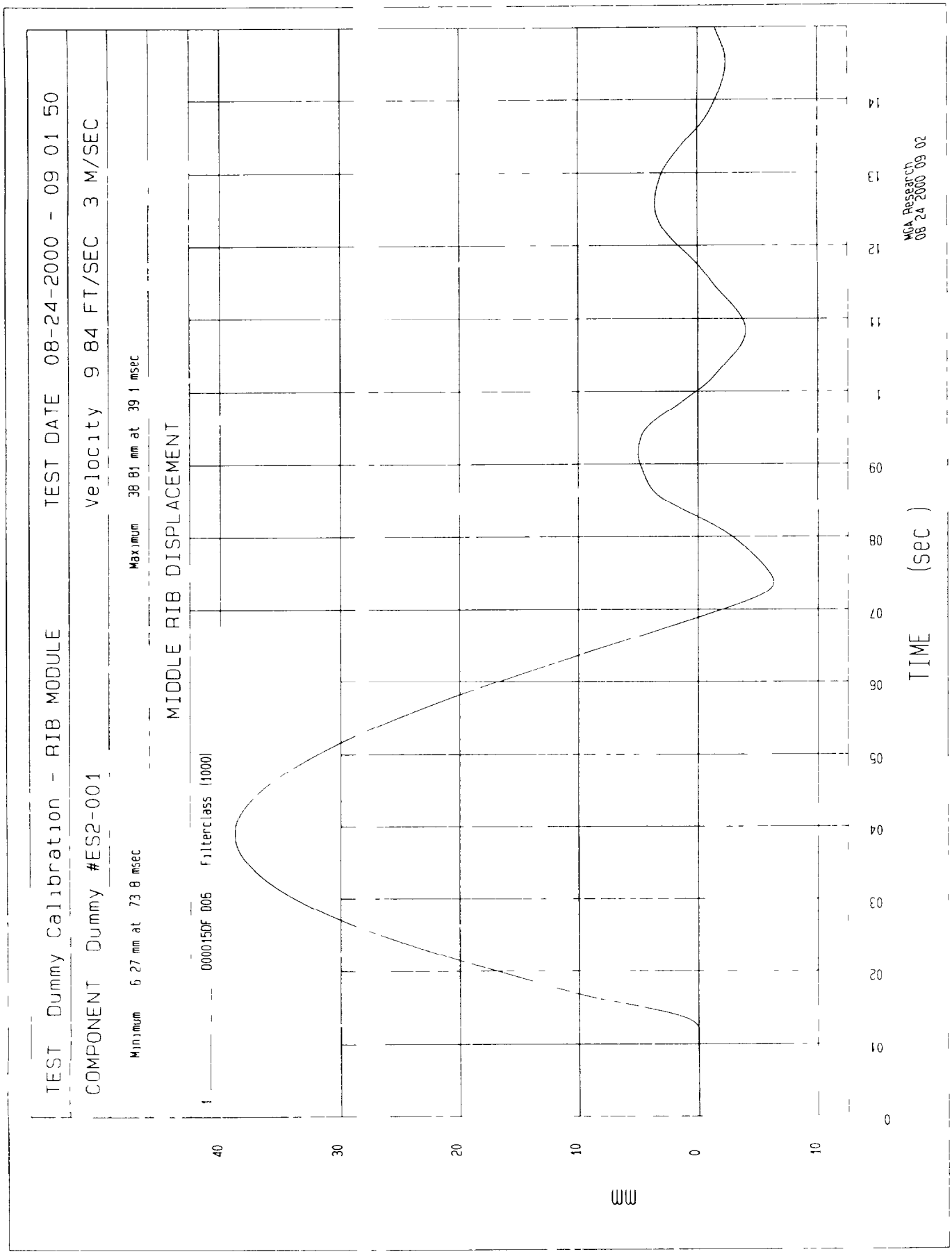
Approved By 

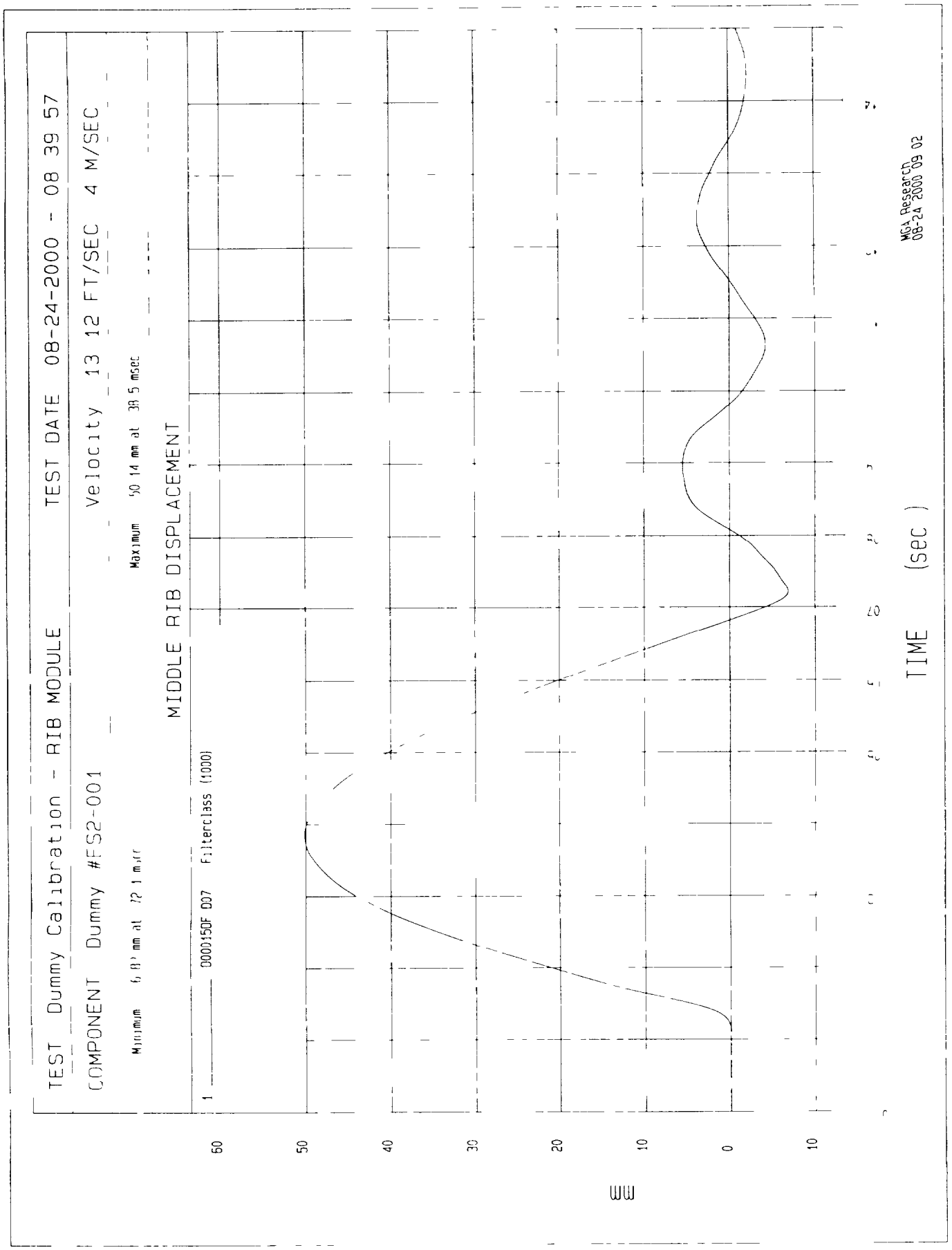

TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 08 23 12
COMPONENT Dummy #ES2-001
Velocity 6 56 FT/SEC 2 M/SEC
Minimum 4 86 mm at 85 7 msec
Maximum 27 44 mm at 48 4 msec
UPPER RIB DISPLACEMENT
1 D000140F 005 Filterclass (1000)
MGA Research
08-24 2000 08 52
mm
TIME (sec)

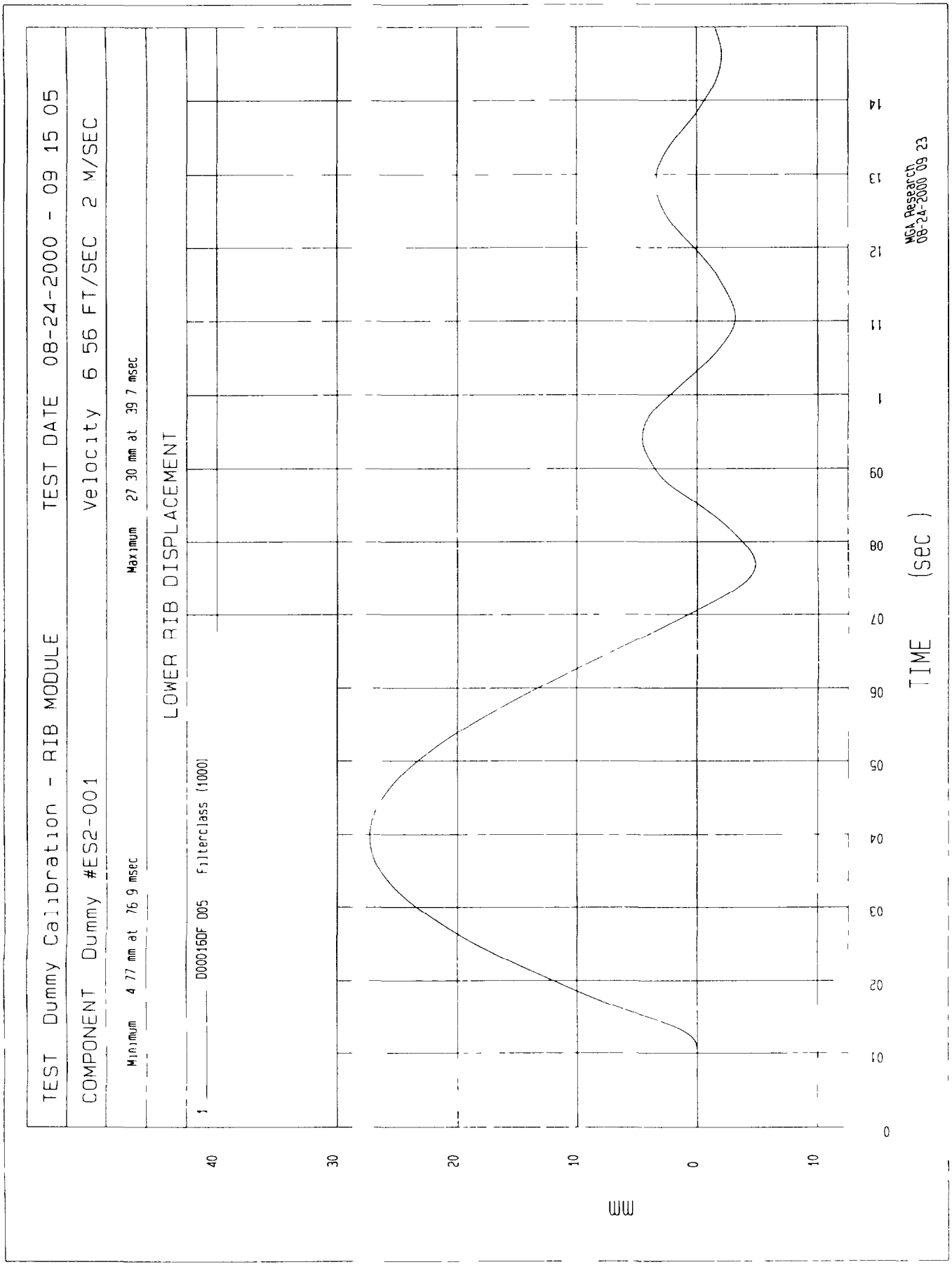

TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 08 31 17
COMPONENT Dummy #ES2-001
Velocity 9 84 FT/SEC 3 M/SEC
Minimum 6 30 mm at 73 5 msec
Maximum 39 05 mm at 38 6 msec
UPPER RIB DISPLACEMENT
1 — — 0000140F 006 Filterclass (1000)
MGA Research
08 24 2000 08 52
MM
TIME (SEC)
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90

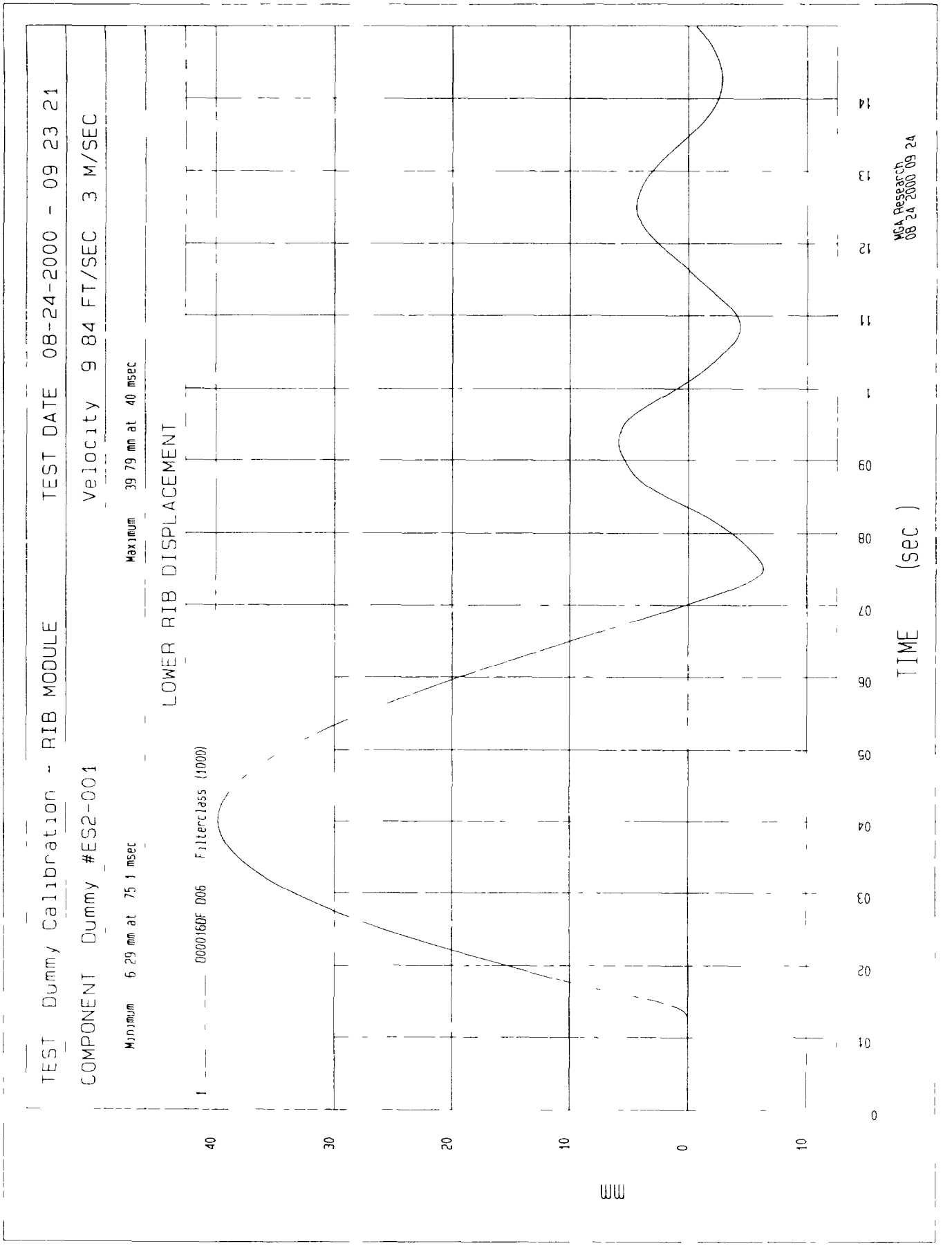

TEST Dummy Calibration -
TEST DATE 08-24-2000 - 08 13 03
COMPONENT Dummy #ES2-001
Velocity 13 12 FT/SEC 4 M/SEC
Minimum 7 04 mm at 71 9 msec
Maximum 50 51 mm at 38 3 msec
UPPER RIB DISPLACEMENT
1 ——— D00014DF C07 Filterclass (1000)
MGA Research
08-24 2000 08 52
mm
TIME (sec)
60
50
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140

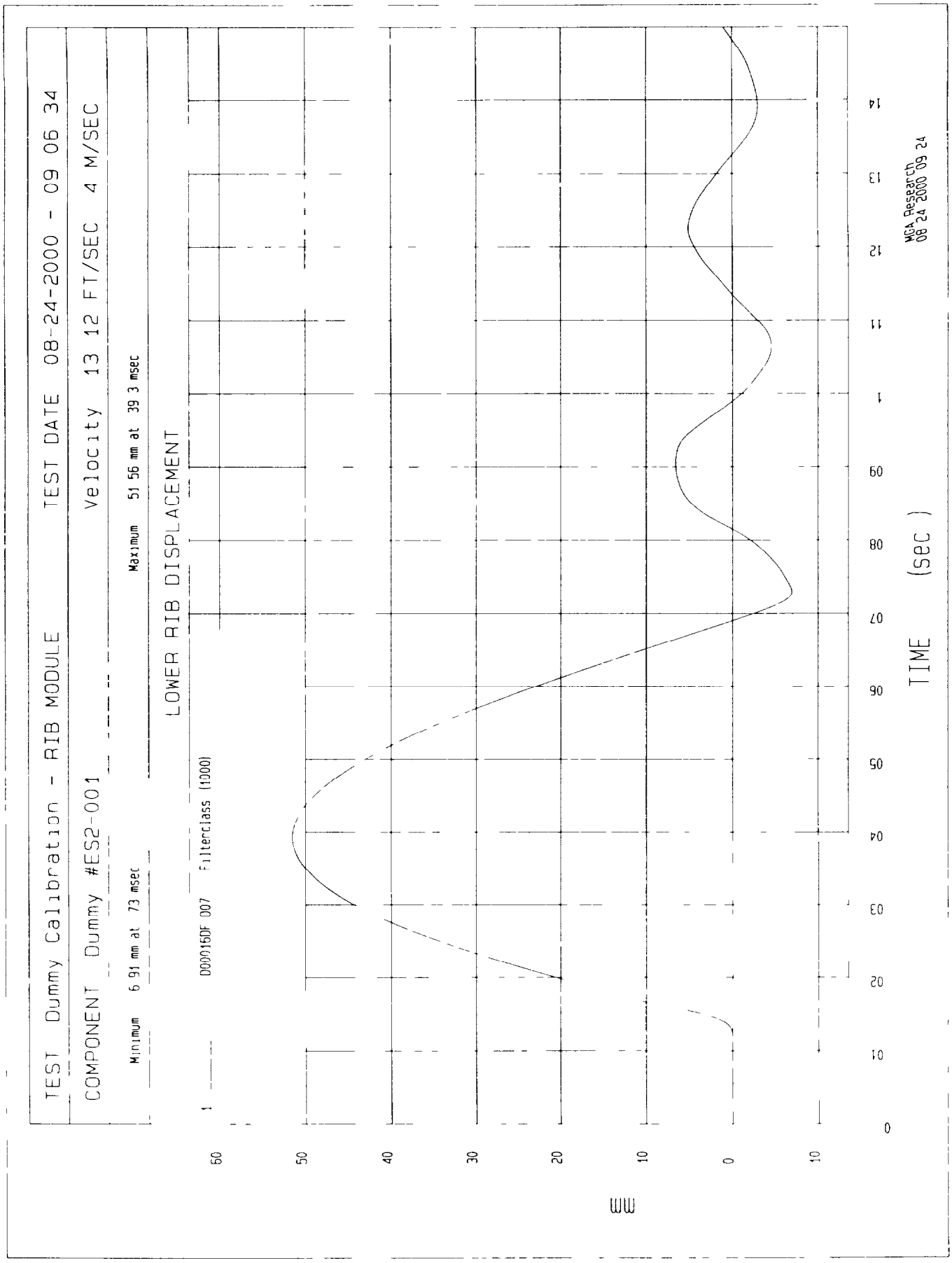

TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 08 47 24
COMPONENT Dummy #ES2-001
Velocity 6 56 FT/SEC 2 M/SEC
MIDDLE RIB DISPLACEMENT
Minimum 4 76 mm at 86 2 msec
Maximum 26 76 mm at 48 5 msec
1 D00015DF 005 Filterclass (1000)
MM
40
30
20
10
0
10
TIME (sec)
MGA Research
08-24-2000 09 02


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 09 01 50
COMPONENT Dummy #ES2-001
Velocity 9 84 FT/SEC 3 M/SEC
Minimum 6 27 mm at 73 8 msec
Maximum 38 81 mm at 39 1 msec
MIDDLE RIB DISPLACEMENT
1 000015DF 006 Filterclass (1000)
MGA Research
08 24 2000 09 02
mm
TIME (sec)
40
30
20
10
0
10
0
01
02
03
04
05
06
07
08
09
10
11
12
13
14


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 08 39 57
COMPONENT Dummy #FS2-001
Velocity 13 12 FT/SEC 4 M/SEC
Minimum 6 87 mm at 72 1 msec
Maximum 50 14 mm at 38 5 msec
MIDDLE RIB DISPLACEMENT
1 ——— 0000150F 007 Filterclass (1000)
MGA Research
08-24 2000 09 02
mm
TIME (sec)
60
50
40
30
20
10
0
10


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 09 15 05
COMPONENT Dummy #ES2-001
Velocity 6 56 FT/SEC 2 M/SEC
Minimum 4 77 mm at 76 9 msec
Maximum 27 30 mm at 39 7 msec
LOWER RIB DISPLACEMENT
1 D00016DF 005 Filterclass (1000)
MGA Research
08-24-2000 09 23
mm
TIME (sec)
40
30
20
10
0
10
0
01
02
03
04
05
06
07
08
09
10
11
12
13
14


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 09 23 21
COMPONENT Dummy #ES2-001
Velocity 9 84 FT/SEC 3 M/SEC
Minimum 6 29 mm at 75 1 msec
Maximum 39 79 mm at 40 msec
LOWER RIB DISPLACEMENT
1 ---- 0000160F D06 Filterclass (1000)
MGA Research
08 24 2000 09 24
mm
TIME (SEC)
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 09 06 34
COMPONENT Dummy #ES2-001
Velocity 13 12 FT/SEC 4 M/SEC
Minimum 6 91 mm at 73 msec
Maximum 51 56 mm at 39 3 msec
LOWER RIB DISPLACEMENT
D000156DF 007 Filterclass (1000)
mm
TIME (sec)
MGA Research
08 24 2000 09 24

MGA RESEARCH CORPORATION

ABDOMEN TEST

EUROSID 2 DUMMY

Date August 31, 2000

Dummy Serial Number. ES2-001

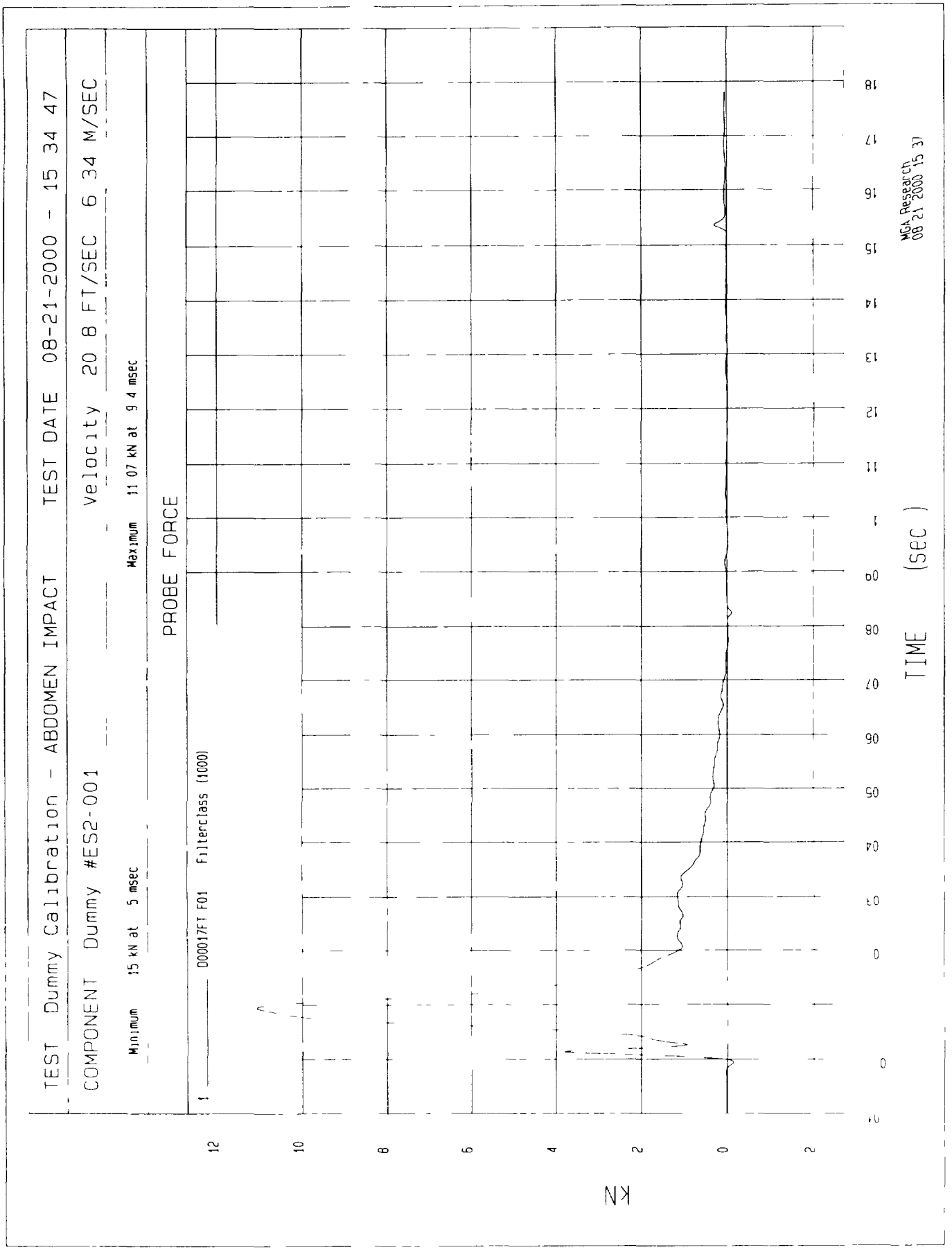
Test Number D001017

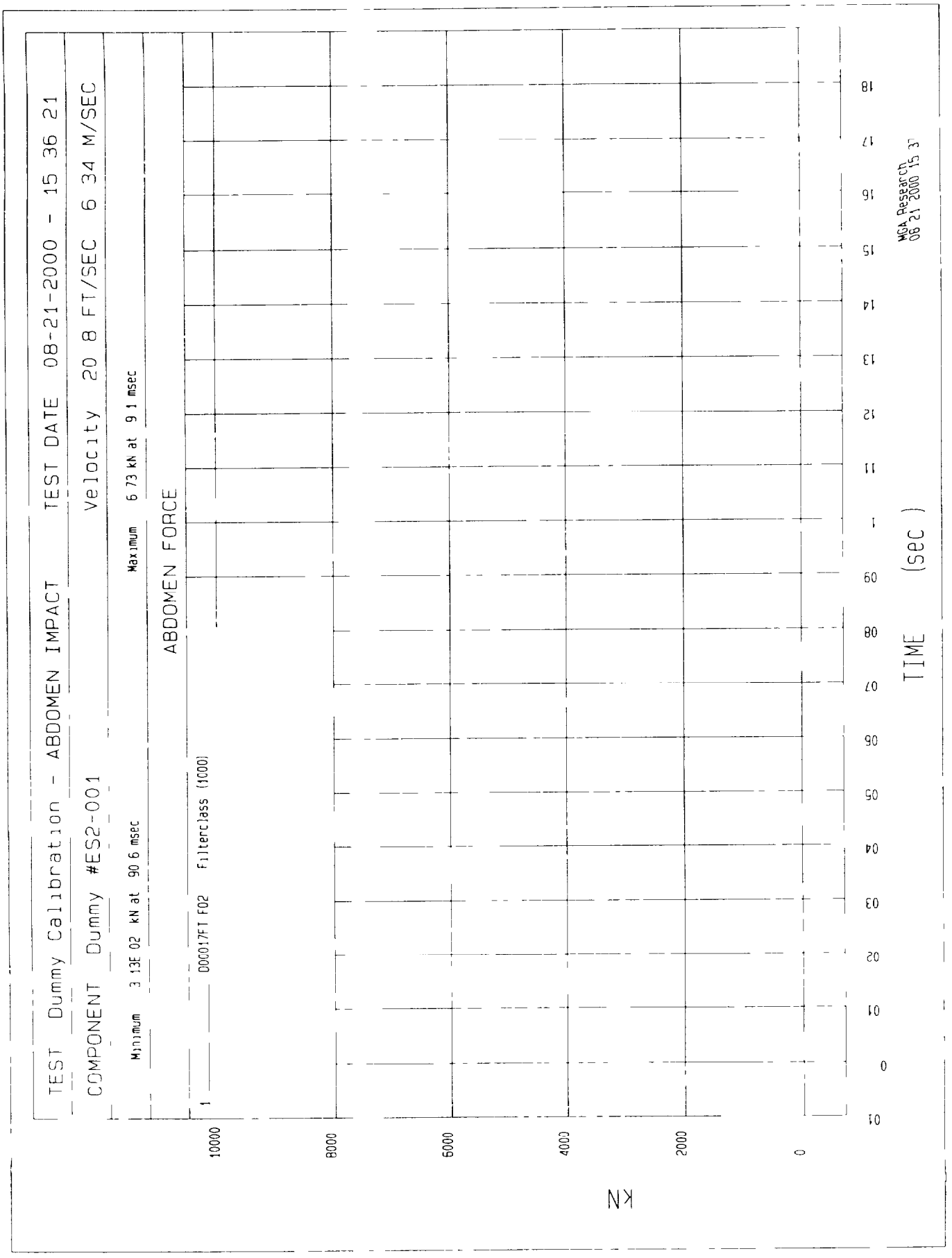
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	43
Probe Speed (m/s)	6 2 – 6.4	6 3
Maximum Impact Force	9 5 – 11 1 kN	11.1
Time of Maximum Force	8 8 – 10 4 ms	9 4
Maximum Total Abdomen Force	5 9 – 7 9 kN	6 7
Time of Max Total Force	8 5 – 10 1 ms	9 1

TEST MEETS SPECIFICATIONS

Technician _____

Approved By David Winkelbauer


TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-21-2000 - 15 34 47
COMPONENT Dummy #ES2-001 Velocity 20 8 FT/SEC 6 34 M/SEC
Minimum 15 kN at 5 msec
Maximum 11 07 kN at 9 4 msec
PROBE FORCE
1 D00017FT F01 Filterclass (1000)
KN
TIME (SEC)
MGA Research
08 21 2000 15 37


TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-21-2000 - 15 36 21
COMPONENT Dummy #ES2-001 Velocity 20 8 FT/SEC 6 34 M/SEC
Minimum 3 13E 02 kN at 90 6 msec Maximum 6 73 kN at 9 1 msec
ABDOMEN FORCE
1 DOOO17FT FO2 Filterclass (1000)
KN
10000
8000
6000
4000
2000
0
TIME (sec)
WGA Research
08 21 2000 15 37

MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

EUROSID 2 DUMMY

Date August 23, 2000

Dummy Serial Number ES2-001

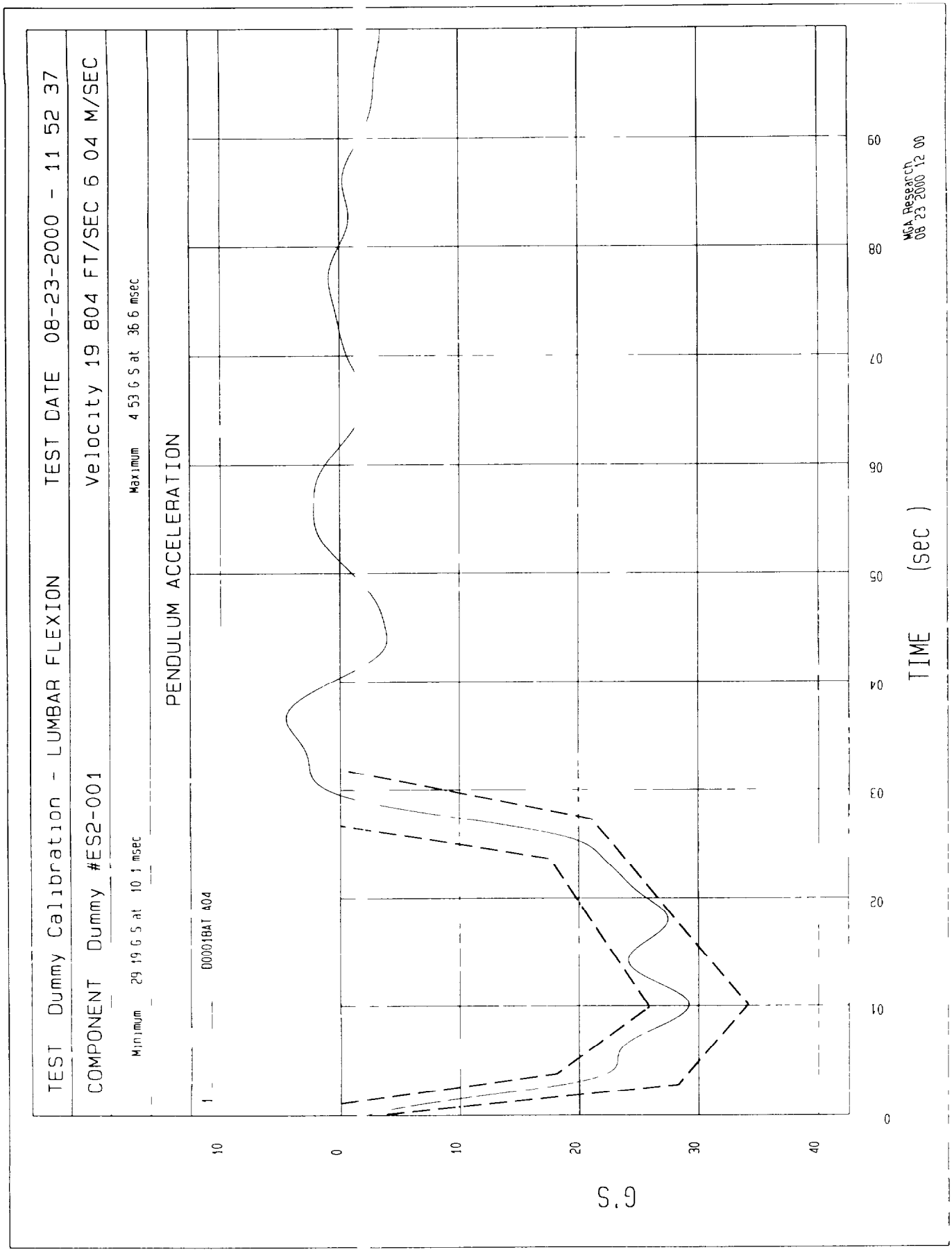
Test Number D001018

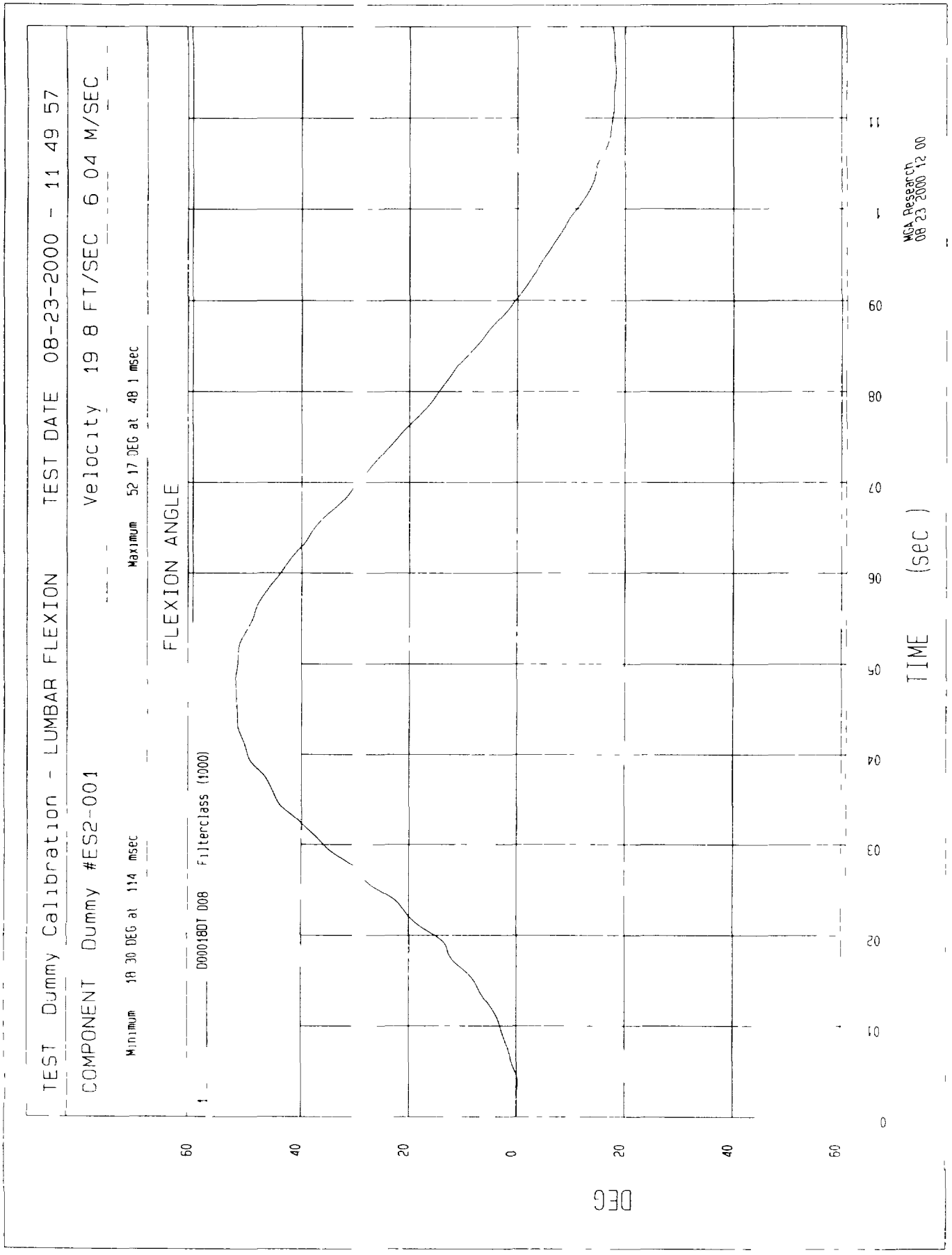
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	43
Pendulum Speed	5.95 – 6 15 m/s	6 04
Max Pendulum Acceleration		-29 2 g's
Time Max Pendulum Acceleration		10 1 ms
Maximum Flexion Angle	45 0 – 55 0 deg	52.2
Time of Max Flexion Angle	39 0 – 53 0 ms	48 1
Maximum Angle Theta (A)	31.0 – 35 0 deg	32 7
Time of Max Theta (A)	45 0 – 55 0 ms	46 1
Maximum Angle Theta (B)	27 0 – 31 0 deg	29 7
Time of Max Theta (B)	45.0 – 55 0 ms	47 6

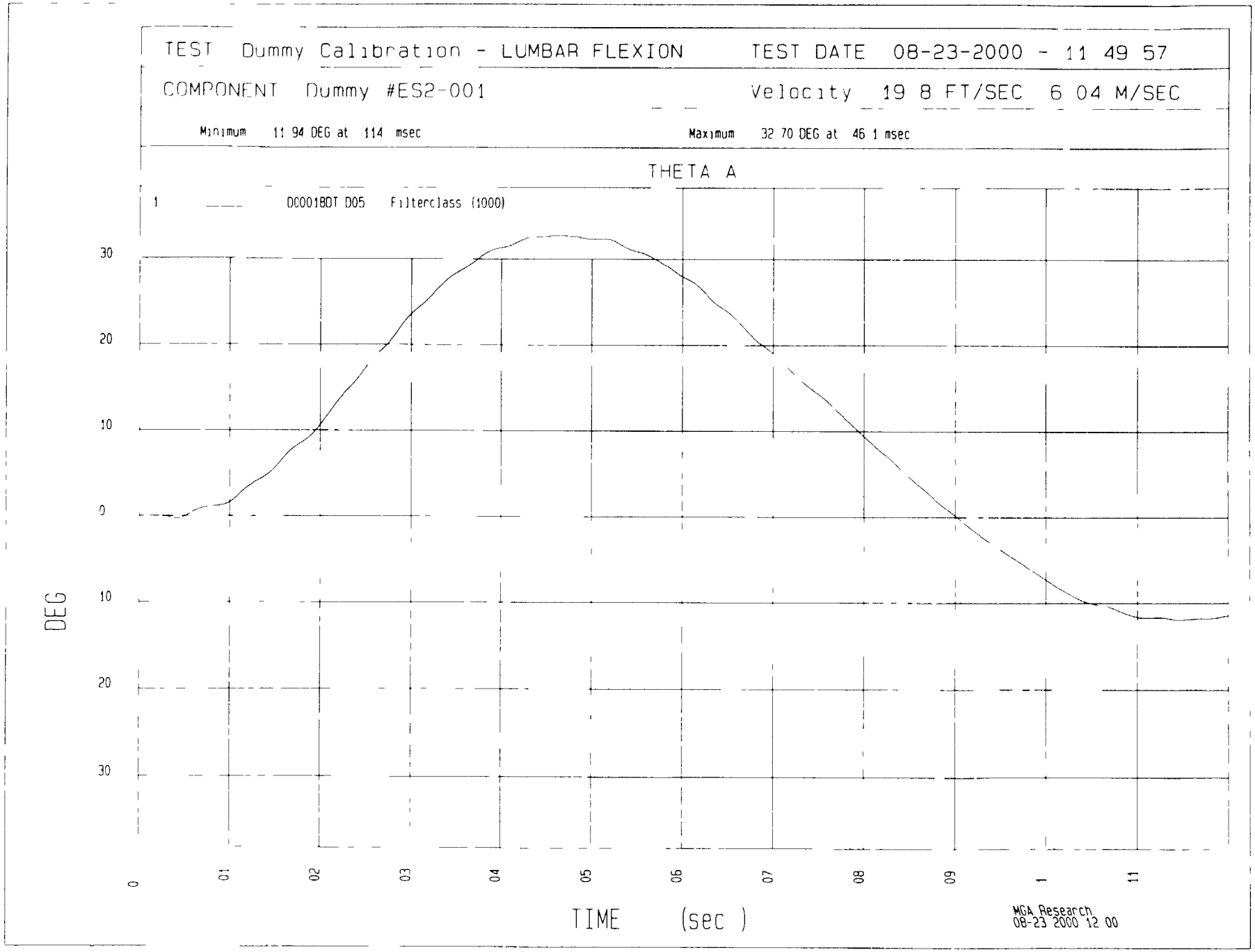
TEST MEETS SPECIFICATIONS

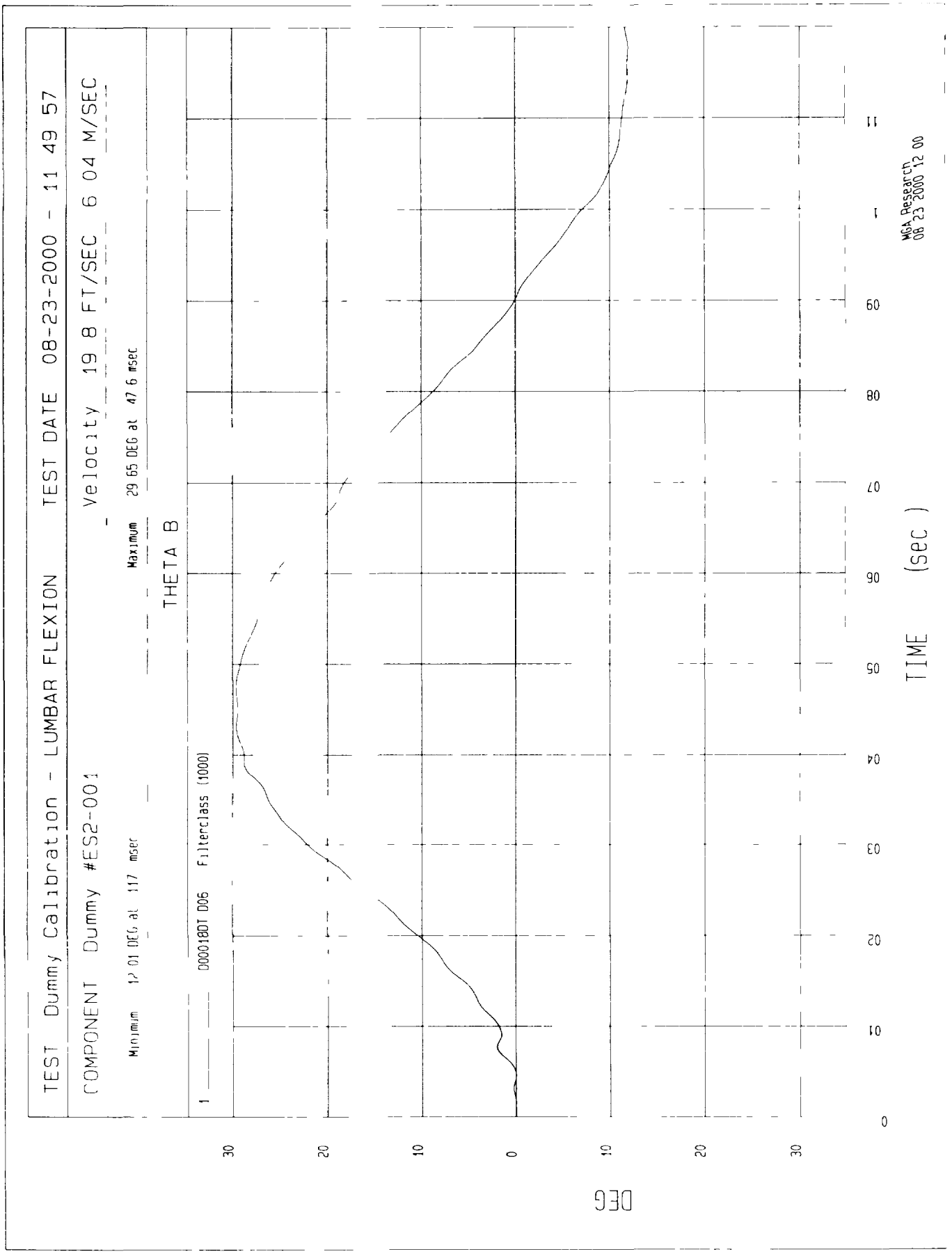
Technician _____

Approved By _____


TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-23-2000 - 11 52 37
COMPONENT Dummy #ES2-001 Velocity 19 804 FT/SEC 6 04 M/SEC
Minimum 29 19 G S at 10 1 msec
Maximum 4 53 G S at 36 6 msec
PENDULUM ACCELERATION
1 D0001BAT A04
MGA Research 08 23 2000 12 00
TIME (sec)
G's


TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-23-2000 - 11 49 57
COMPONENT Dummy #ES2-001
Velocity 19 8 FT/SEC 6 04 M/SEC
Minimum 10 30 DEG at 114 msec
Maximum 52 17 DEG at 48 1 msec
FLEXION ANGLE
D0001801 000 Filterclass (1000)
MGA Research
08 23 2000 12 00
DEG
TIME (sec)
60
40
20
0
20
40
60
0
10
20
30
40
50
60
70
80
90
1
11


TEST Dummy Calibration - LUMBAR FLEXION
TEST DATE 08-23-2000 - 11 49 57
COMPONENT Dummy #ES2-001
Velocity 19 8 FT/SEC 6 04 M/SEC
Minimum 11 94 DEG at 114 msec
Maximum 32 70 DEG at 46 1 msec
THETA A
1 DC0018DT D05 Filterclass (1000)
30
20
10
0
10
20
30
DEG
0
01
02
03
04
05
06
07
08
09
1
11
TIME (sec)
MGA Research
08-23 2000 12 00


TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-23-2000 - 11 49 57
COMPONENT Dummy #ES2-001
Velocity 19 8 FT/SEC 6 04 M/SEC
Minimum 12 01 DEG at 117 msec
Maximum 29 65 DEG at 47 6 msec
THETA B
1 0000180T D06 Filterclass (1000)
DEG
TIME (sec)
MGA Research
08 23 2000 12 00

MGA RESEARCH CORPORATION

PELVIS TEST

EUROSID 2 DUMMY

Date August 21, 2000

Dummy Serial Number ES2-001

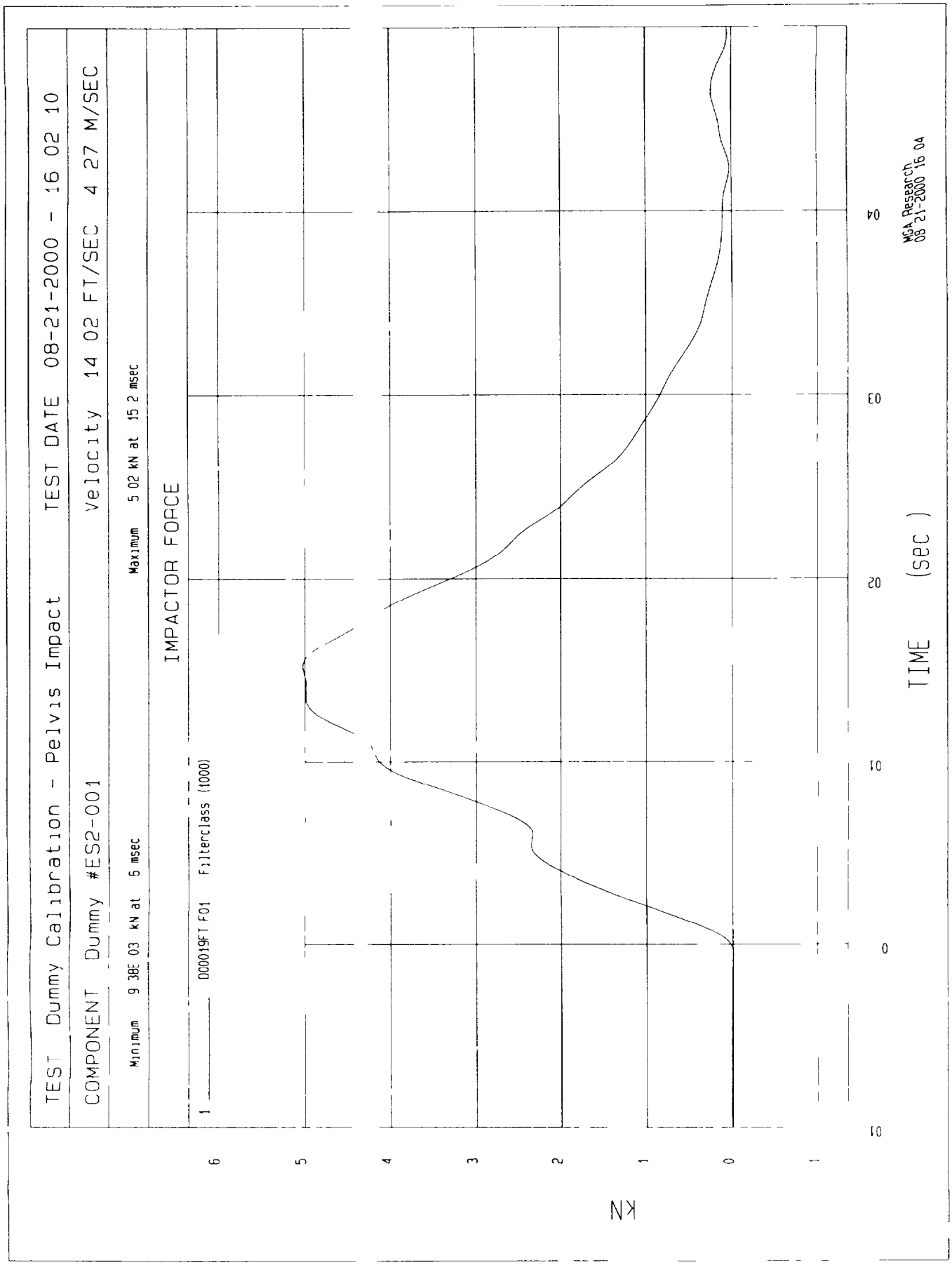
Test Number D001019

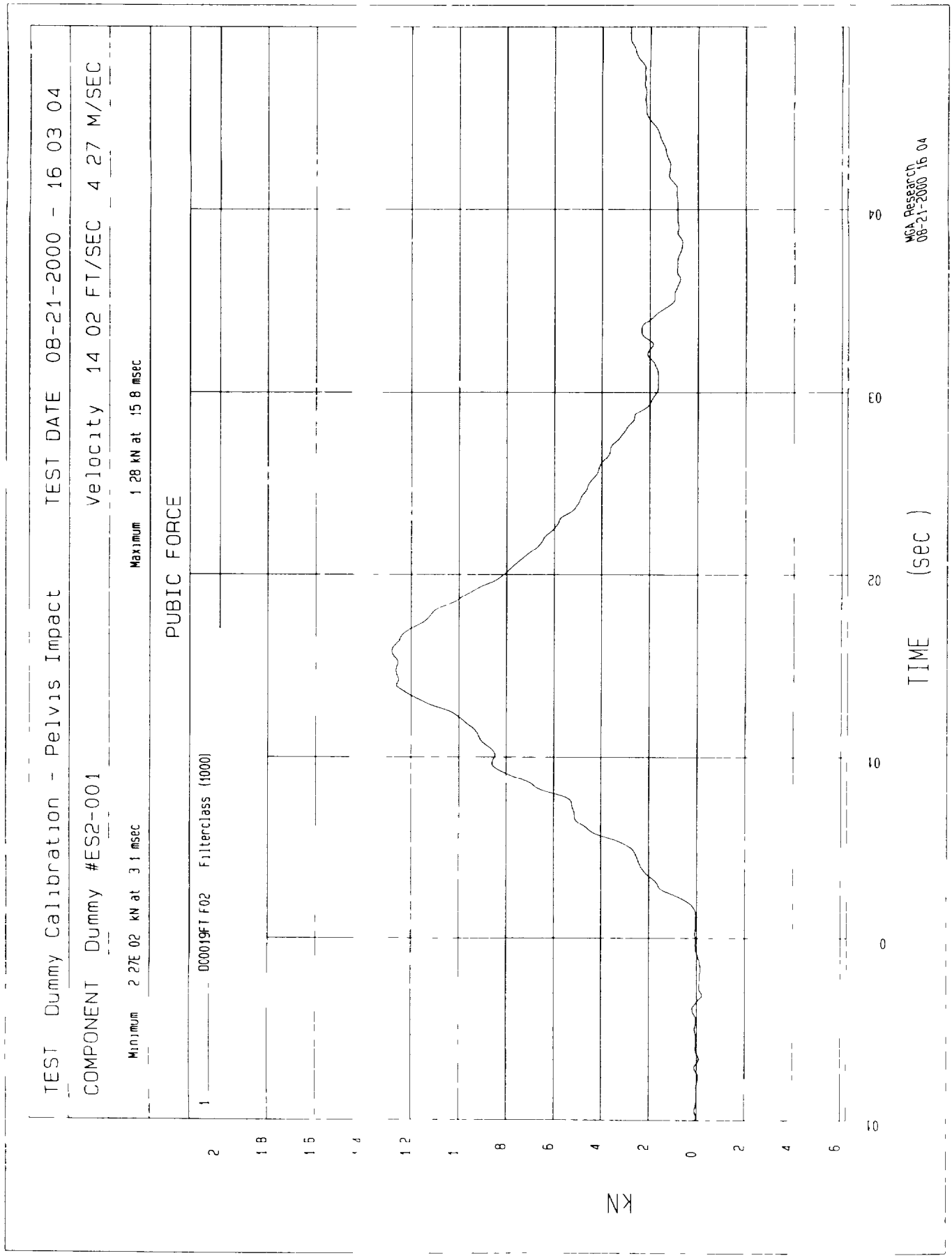
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	46
Pendulum Speed	4.2 – 4.4 m/s	4 3
Maximum Impactor Force	4 4 – 5.1 kN	5 0
Time of Max Impactor Force	10 3 – 15 5 ms	15 2
Maximum Pubic Force	1 04 – 1.64 kN	1 28
Time of Max Pubic Force	9.9 – 15 9 ms	15 8

TEST MEETS SPECIFICATIONS

Technician _____

Approved By David Winkelbauer


TEST Dummy Calibration - Pelvis Impact TEST DATE 08-21-2000 - 16 02 10
COMPONENT Dummy #ES2-001 Velocity 14 02 FT/SEC 4 27 M/SEC
Minimum 9 38E 03 kN at 6 msec
Maximum 5 02 kN at 15 2 msec
IMPACTOR FORCE
1 D00019FT F01 Filterclass (1000)
KN
TIME (SEC)
MGA Research
08 21-2000 16 04


TEST Dummy Calibration - Pelvis Impact
TEST DATE 08-21-2000 - 16 03 04
COMPONENT Dummy #ES2-001
Velocity 14 02 FT/SEC 4 27 M/SEC
Minimum 2 27E 02 kN at 3 1 msec
Maximum 1 28 kN at 15 8 msec
PUBIC FORCE
1 DC0019FT F02 Filterclass (1000)
KN
TIME (sec)
MGA Research
08-21-2000 16 04

CERTIFICATION DATA

Dummy Serial Number: ES2-002

Calibration Test Results Summary

Dummy Serial Number ES2-002

Pre-Test Calibration

External Dimensions	The dummy passed all external dimension requirements
Head Drop Test	The head passed all drop test requirements
Neck Pendulum Test	The neck did not pass all impact test requirements
Shoulder Impact Test	The shoulder passed all impact test requirements
Rib Tests	All ribs passed all impact test requirements.
Abdomen Test	The abdomen passed all impact test requirements.
Lumbar Spine Test	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements

MGA RESEARCH CORPORATION

HEAD DROP TEST

EUROSID 2 DUMMY

Date August 23, 2000

Dummy Serial Number ES2-002

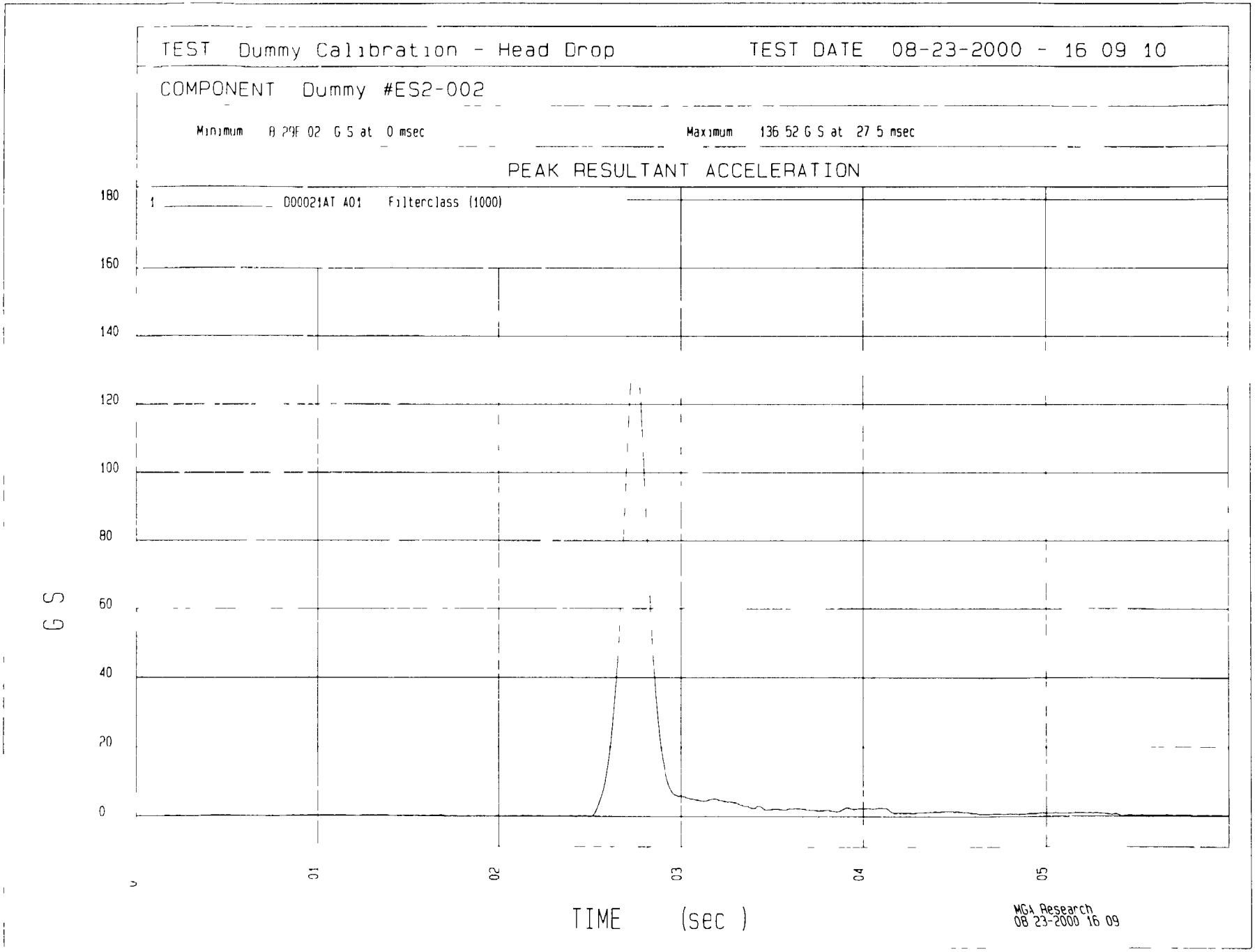
Test Number D001021

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Peak Resultant Acceleration	100 – 150 g's	137
Time of Max. Res Acceleration		27 5 ms

TEST MEETS SPECIFICATIONS

Technician _____

Approved By: David Winkelbauer


TEST Dummy Calibration - Head Drop
TEST DATE 08-23-2000 - 16 09 10
COMPONENT Dummy #ES2-002
Minimum 8 29E 02 G S at 0 msec
Maximum 136 52 G S at 27 5 msec
PEAK RESULTANT ACCELERATION
1 D00021AT A01 Filterclass (1000)
180
160
140
120
100
80
60
40
20
0
G S
01
02
03
04
05
TIME (sec)
MGA Research
08 23-2000 16 09

MGA RESEARCH CORPORATION

NECK PENDULUM TEST

EUROSID 2 DUMMY

Date August 23, 2000

Dummy Serial Number ES2-002

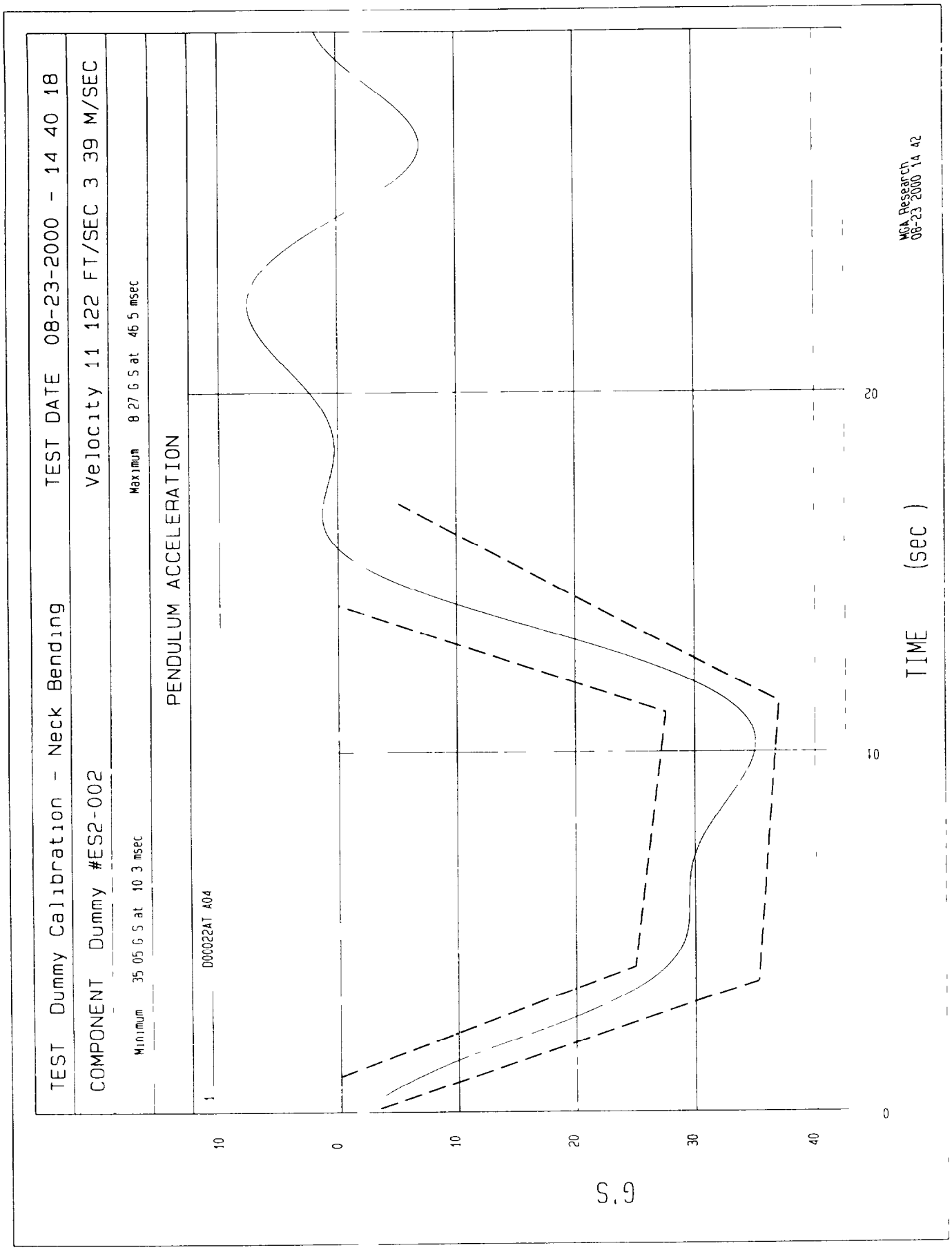
Test Number D001022

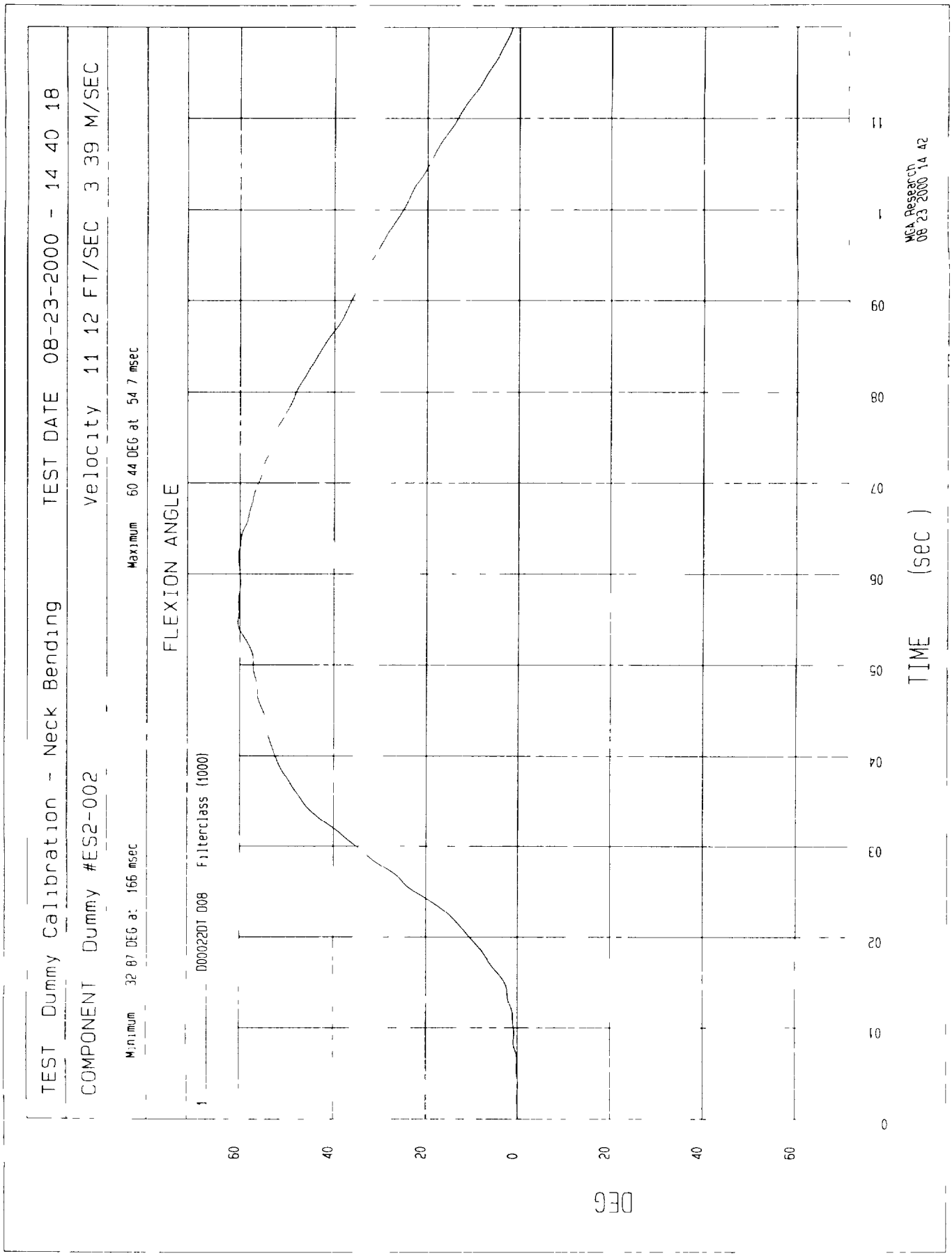
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Pendulum Speed	3 3 - 3.5	3 4
Max Pendulum Acceleration		-35.1
Time Max Pendulum Acceleration		10 3
Maximum Flexion Angle	51 0 – 59 0 deg	60.4*
Time of Max Flexion Angle	53 0 – 65 0 ms	54 7
Maximum Angle Theta (A)	32.5 – 36.5 deg	36.1
Time of Max Theta (A)	54 0 – 64 0 ms	62 5
Maximum Angle Theta (B)	28 0 – 32 0 deg	32.2*
Time of Max Theta (B)	54.0 – 64.0 ms	61.9

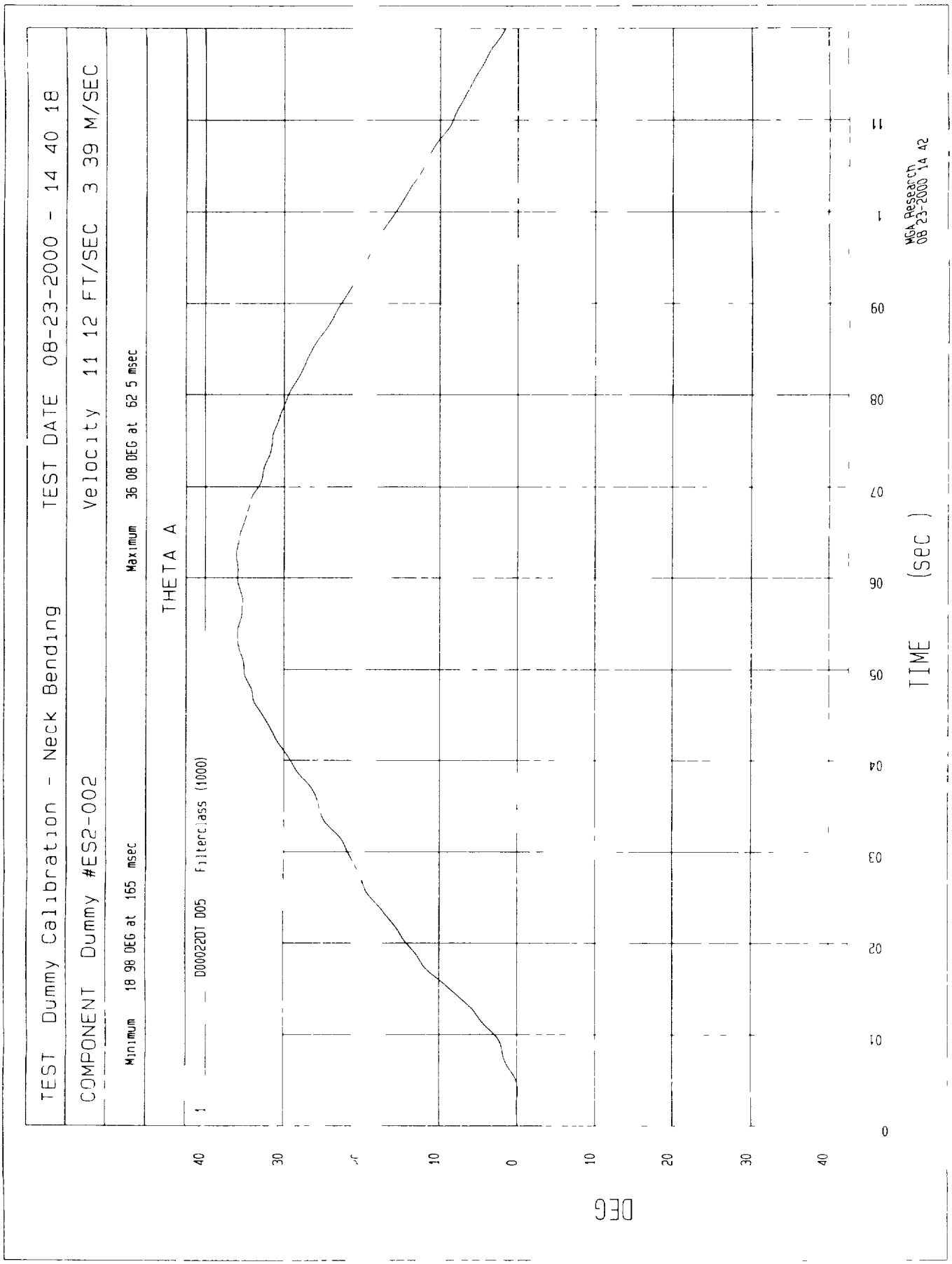
* DID NOT MEET SPECIFICATIONS

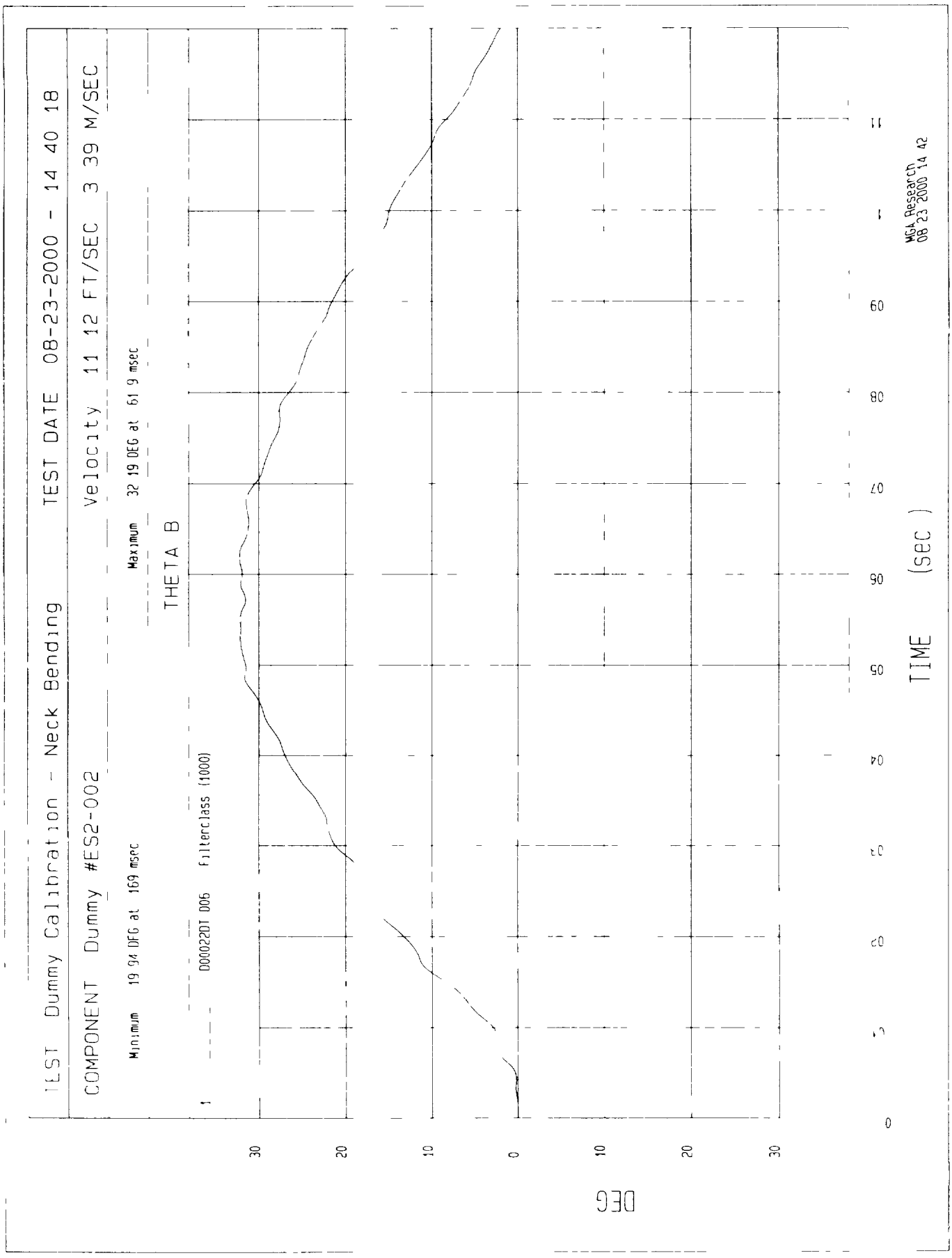
Technician _____

Approved By David Winkelbauer


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 40 18
COMPONENT Dummy #ES2-002
Velocity 11 122 FT/SEC 3 39 M/SEC
Minimum 35 05 G S at 10 3 msec
Maximum 8 27 G S at 46 5 msec
PENDULUM ACCELERATION
1 D00022AT A04
MGA Research
08-23 2000 14 42
TIME (sec)
G's


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 40 18
COMPONENT Dummy #ES2-002
Velocity 11 12 FT/SEC 3 39 M/SEC
Minimum 32 87 DEG at 166 msec
Maximum 60 44 DEG at 54 7 msec
FLEXION ANGLE
1 D00022DT 008 Filterclass (1000)
DEG
60
40
20
0
20
40
60
TIME (sec)
0
10
20
30
40
50
60
70
80
90
1
11
MGA Research
08 23 2000 14 42


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 40 18
COMPONENT Dummy #ES2-002
Velocity 11 12 FT/SEC 3 39 M/SEC
Minimum 18 98 DEG at 165 msec
Maximum 36 08 DEG at 62 5 msec
THETA A
1 D0002201 005 Filterclass (1000)
DEG
TIME (SEC)
MGA Research
08 23-2000 14 42


TEST Dummy Calibration - Neck Bending
TEST DATE 08-23-2000 - 14 40 18
COMPONENT Dummy #ES2-002
Velocity 11 12 FT/SEC 3 39 M/SEC
Maximum 32 19 DEG at 61 9 msec
Minimum 19 94 DEG at 169 msec
THETA B
1 D0002201 006 Filterclass (1000)
DEG
30
20
10
0
10
20
30
TIME (SEC)
0
5
10
20
30
40
50
60
70
80
90
MGA Research
08 23 2000 14 42

MGA RESEARCH CORPORATION

SHOULDER IMPACT TEST

EUROSID 2 DUMMY

Date August 21, 2000

Dummy Serial Number ES2-002

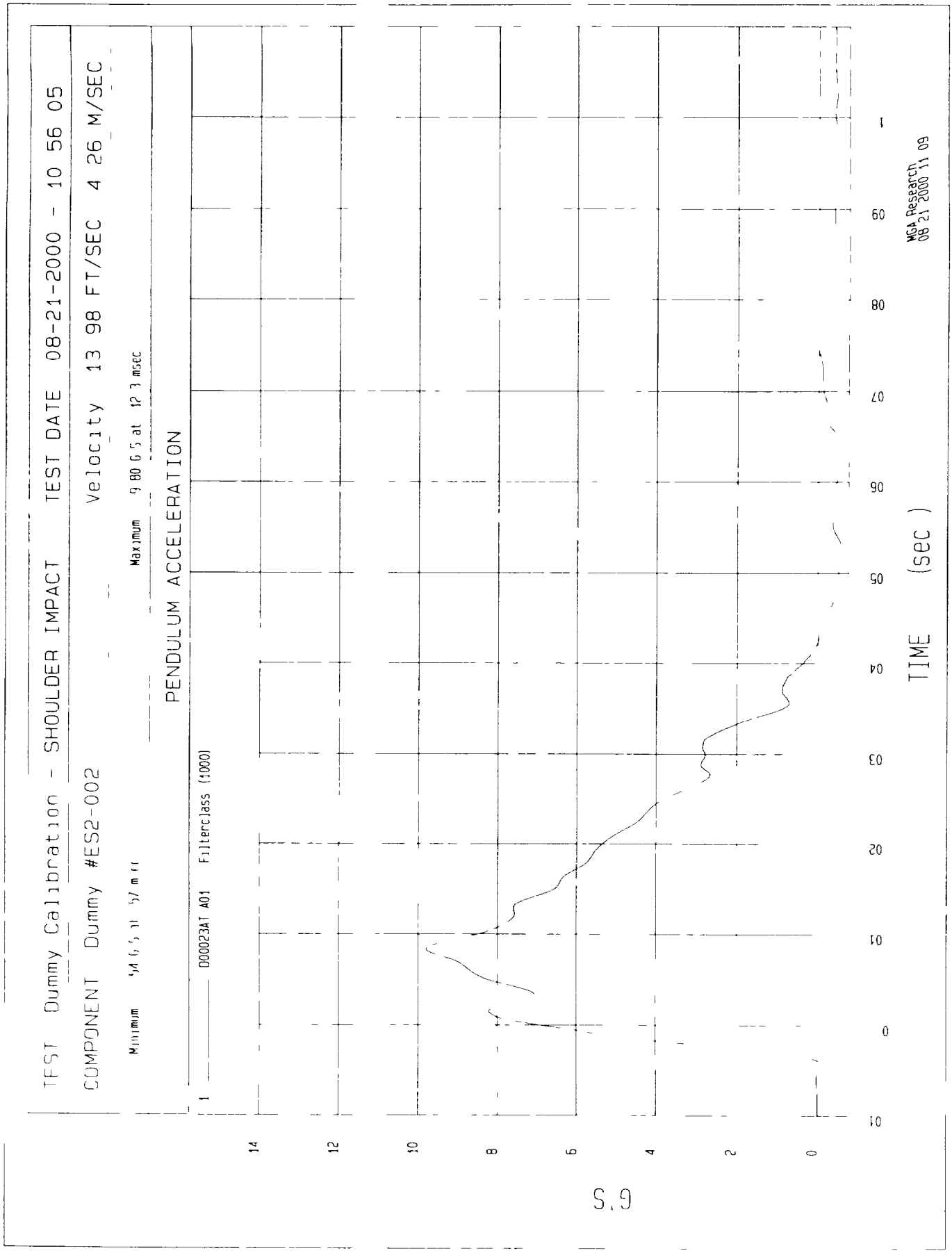
Test Number D001023

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	46
Pendulum Speed	4 2 – 4.4 m/s	4 3
Max Resultant Acceleration	7.5 – 10 5 g's	9 8
Time of Max Pendulum Acceleration		12.3

TEST MEETS SPECIFICATIONS

Technician _____

Approved By _____


TEST Dummy Calibration - SHOULDER IMPACT TEST DATE 08-21-2000 - 10 56 05
COMPONENT Dummy #ES2-002 Velocity 13 98 FT/SEC 4 26 M/SEC
PENDULUM ACCELERATION
Maximum 9 80 G's at 12 3 msec
D00023AT A01 Filterclass (1000)
MGA Research 08 21 2000 11 09
TIME (sec)
14
12
10
8
6
4
2
0
-10
0
10
20
30
40
50
60
70
80
90
100
S.9

MGA RESEARCH CORPORATION

UPPER/MIDDLE/LOWER RIB TESTS

EUROSID 2 DUMMY

Date August 24, 2000

Dummy Serial Number ES2-002

Test Number D001024/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21.0
Relative Humidity (%)	10 – 70	46
Displacement at 2 m/s	23 5 – 27.5 mm	26.2
Displacement at 3 m/s	36 0 – 40.0 mm	39.0
Displacement at 4 m/s	46 0 – 51.0 mm	50.8

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21.0
Relative Humidity (%)	10 – 70	46
Displacement at 2 m/s	23 5 – 27.5 mm	25 5
Displacement at 3 m/s	36 0 – 40 0 mm	38 6
Displacement at 4 m/s	46.0 – 51 0 mm	50 9

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21 0
Relative Humidity (%)	10 – 70	46
Displacement at 2 m/s	23.5 – 27.5 mm	24.4
Displacement at 3 m/s	36.0 – 40.0 mm	38 0
Displacement at 4 m/s	46.0 – 51.0 mm	50.5

TEST MEETS SPECIFICATIONS

Technician _____

Approved By David Wunbelbaer

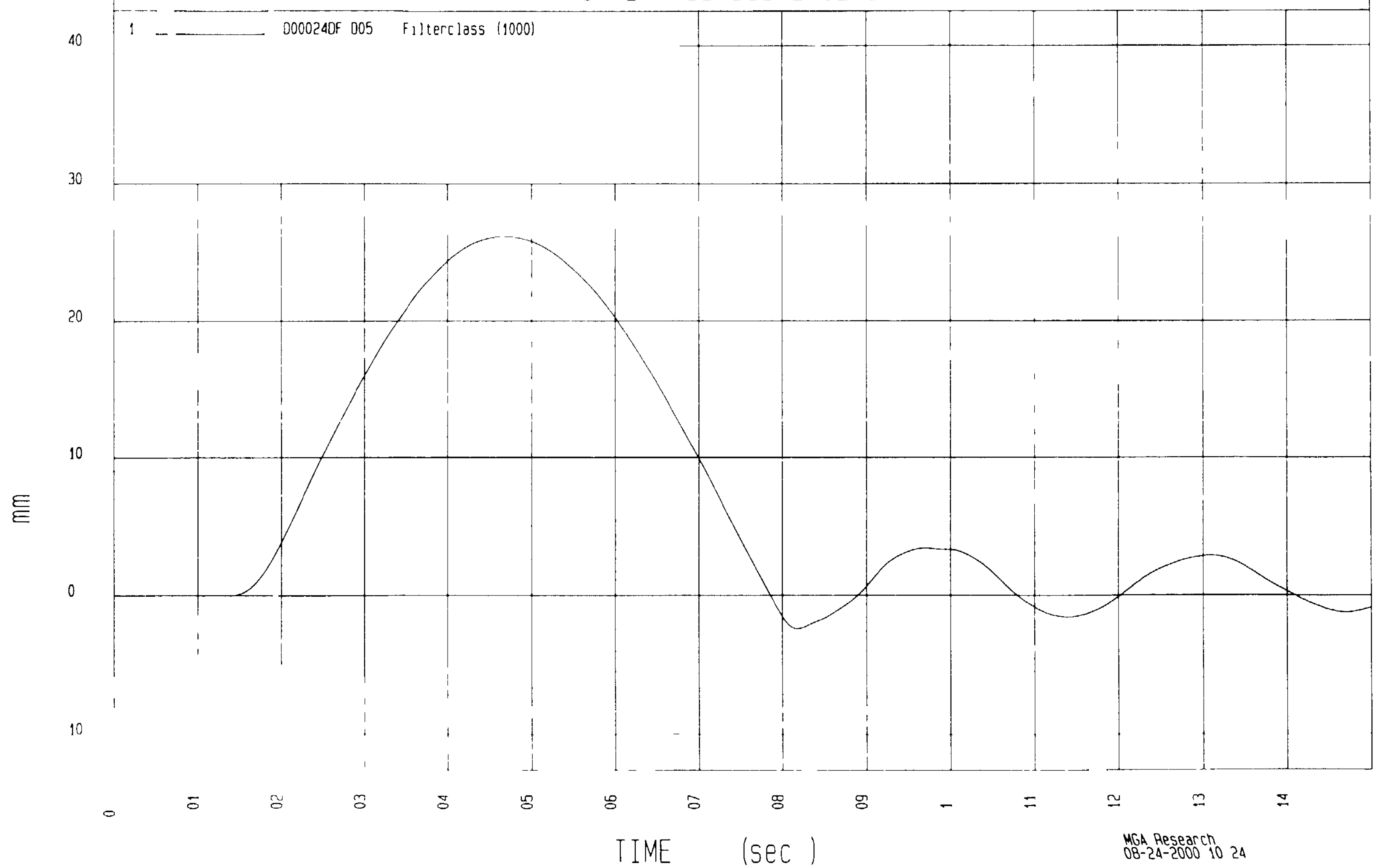
TEST Dummy Calibration - RIB MODULE TEST DATE 08-24-2000 - 10 14 34

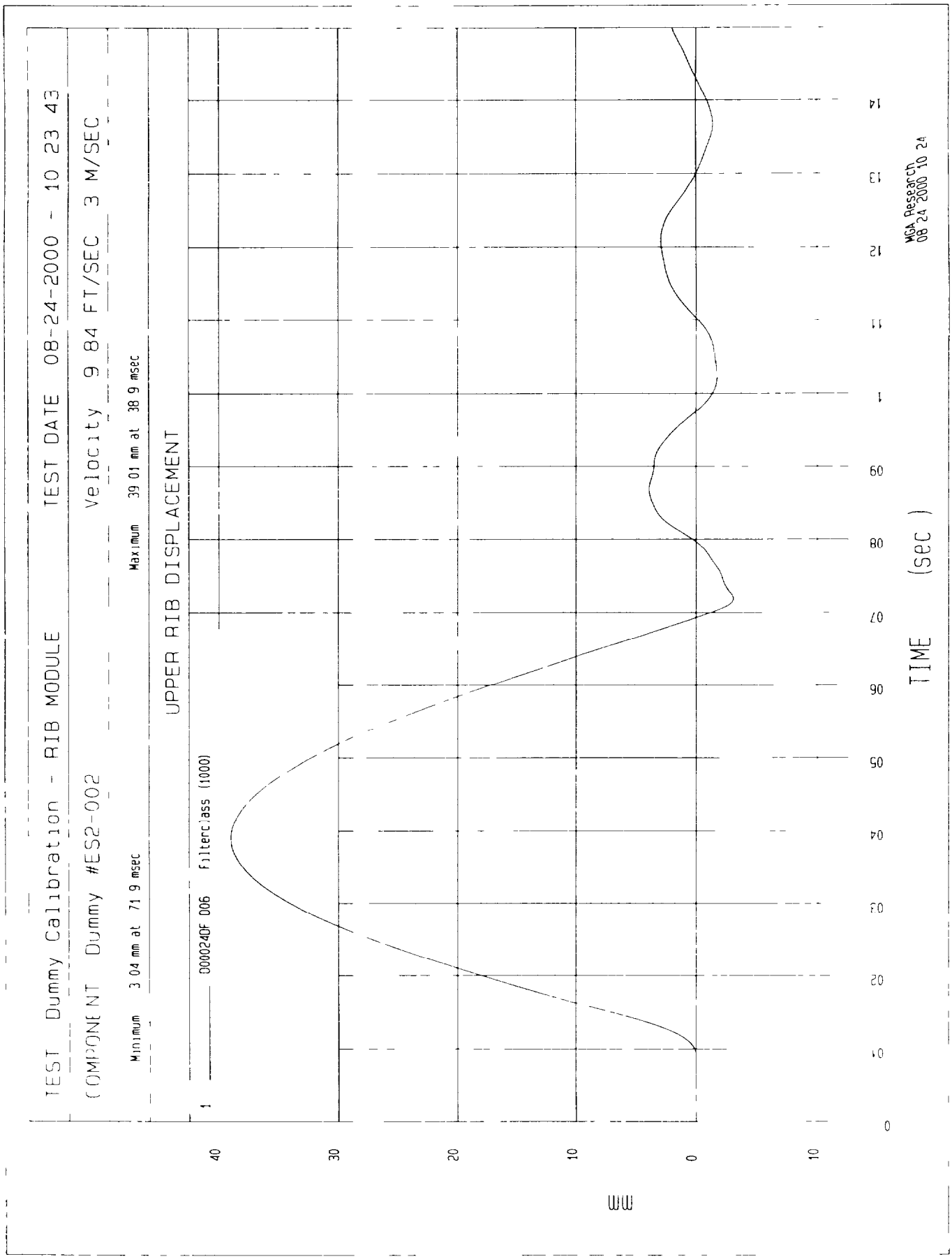
COMPONENT Dummy #ES2-002 Velocity 6 56 FT/SEC 2 M/SEC

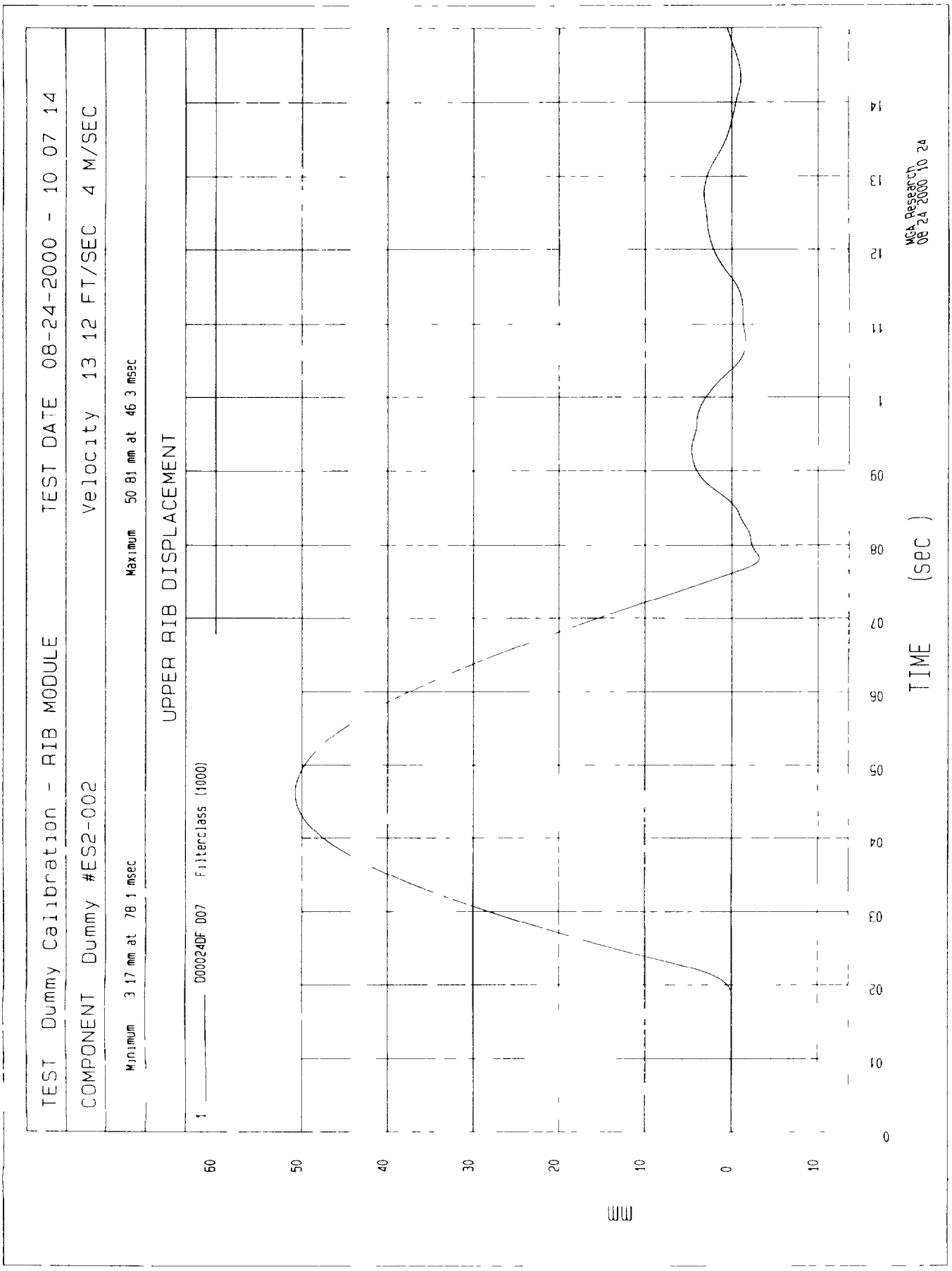
Minimum 2 37 mm at 81 8 msec Maximum 26 16 mm at 46 7 msec

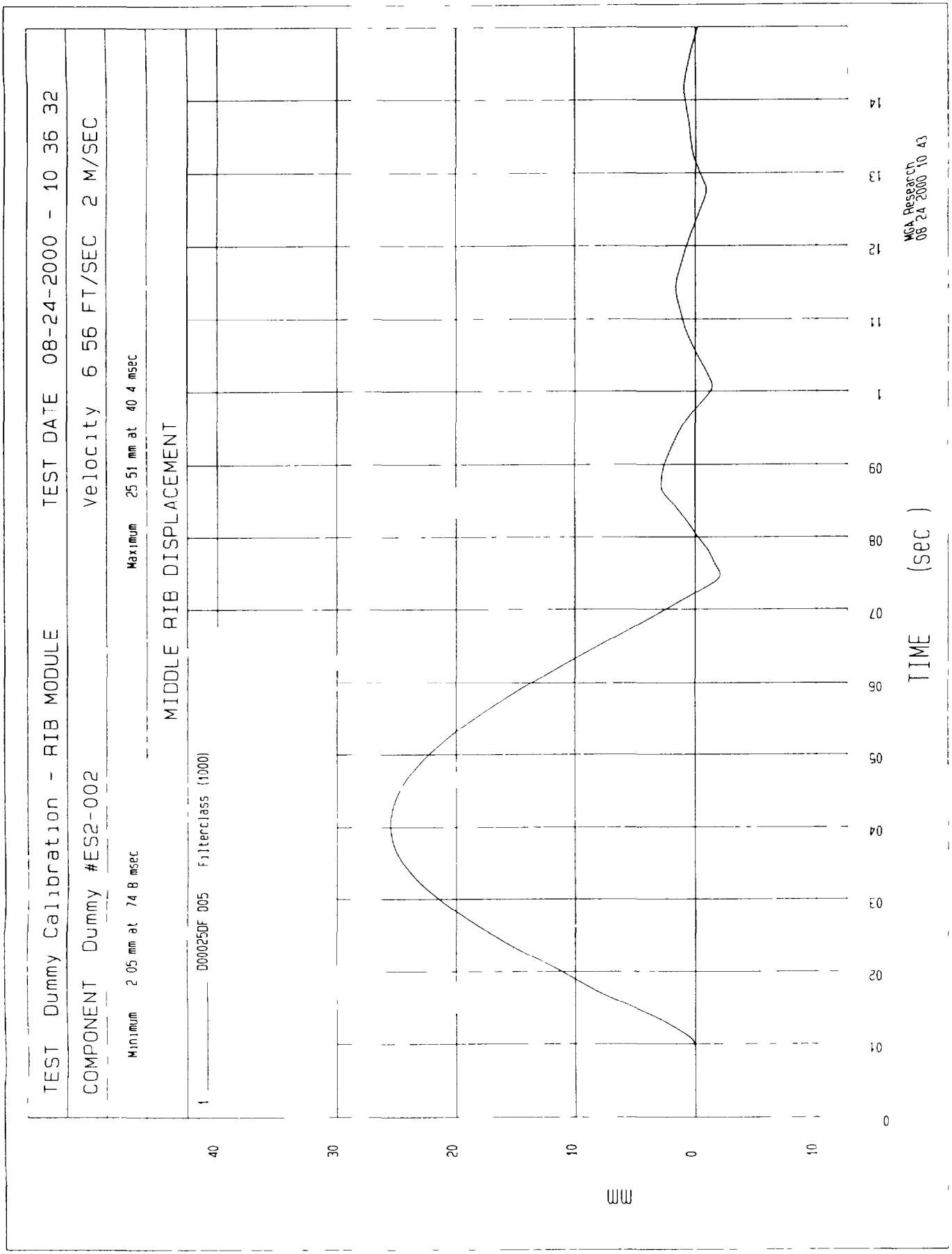
UPPER RIB DISPLACEMENT

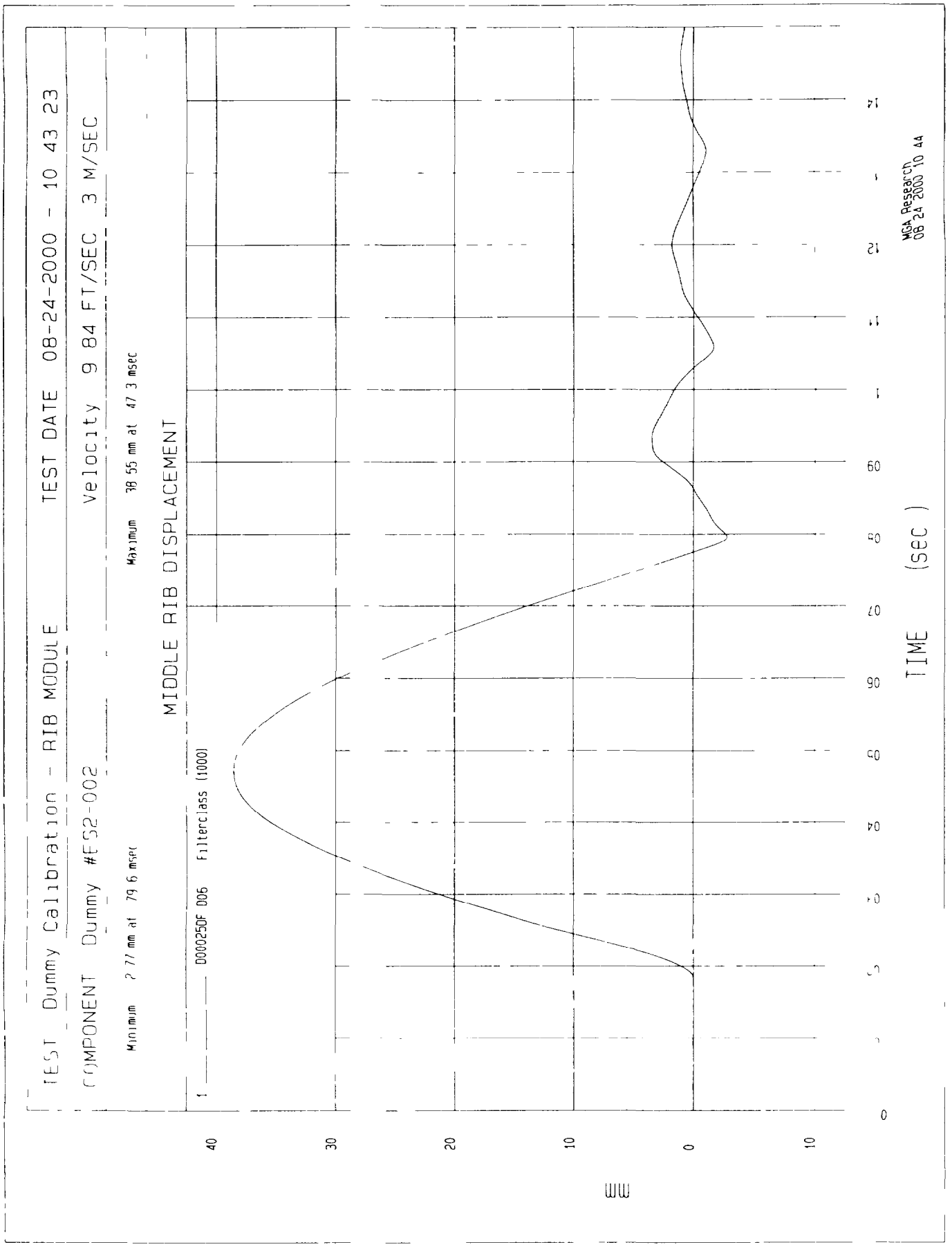
1 000024DF 005 Filterclass (1000)

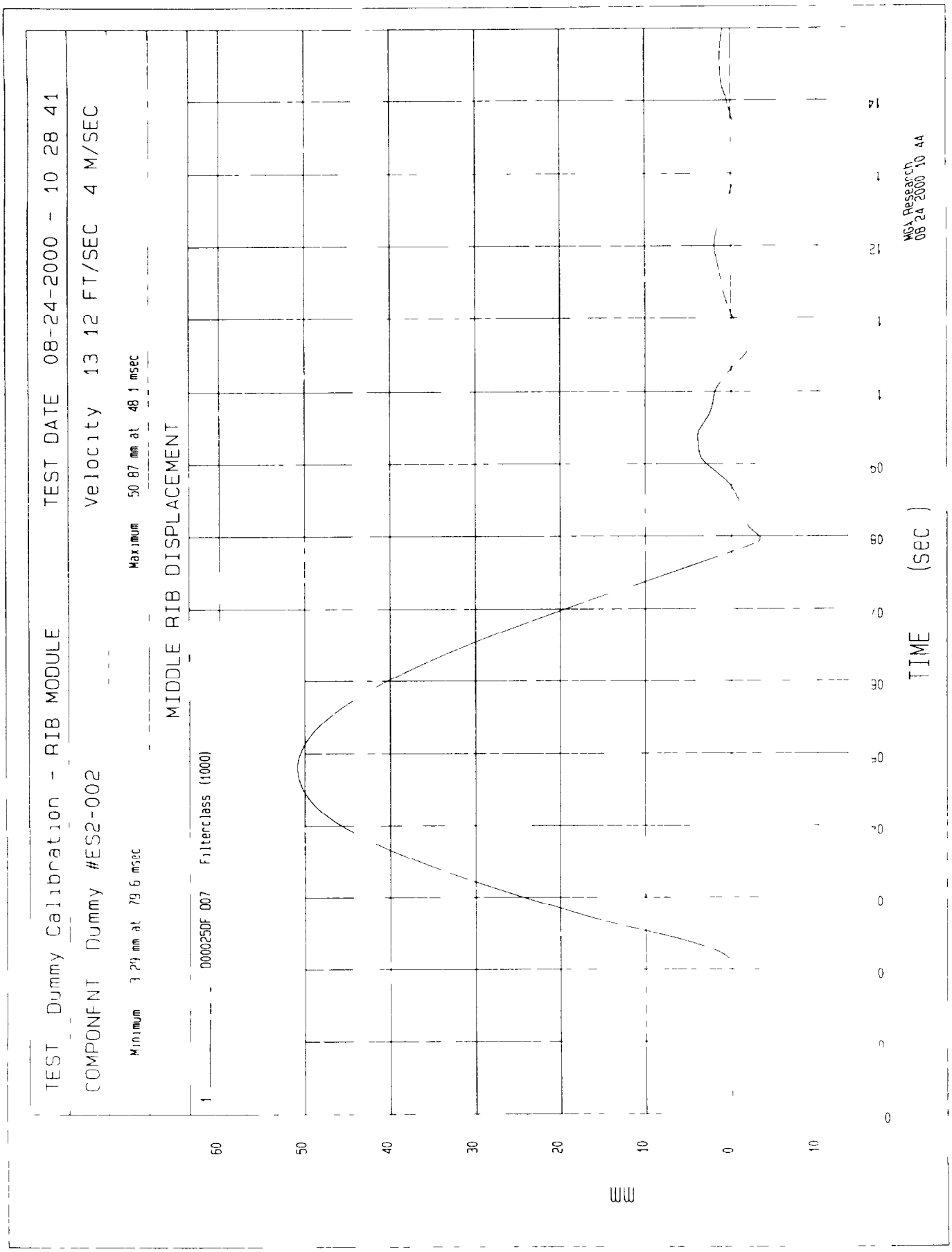


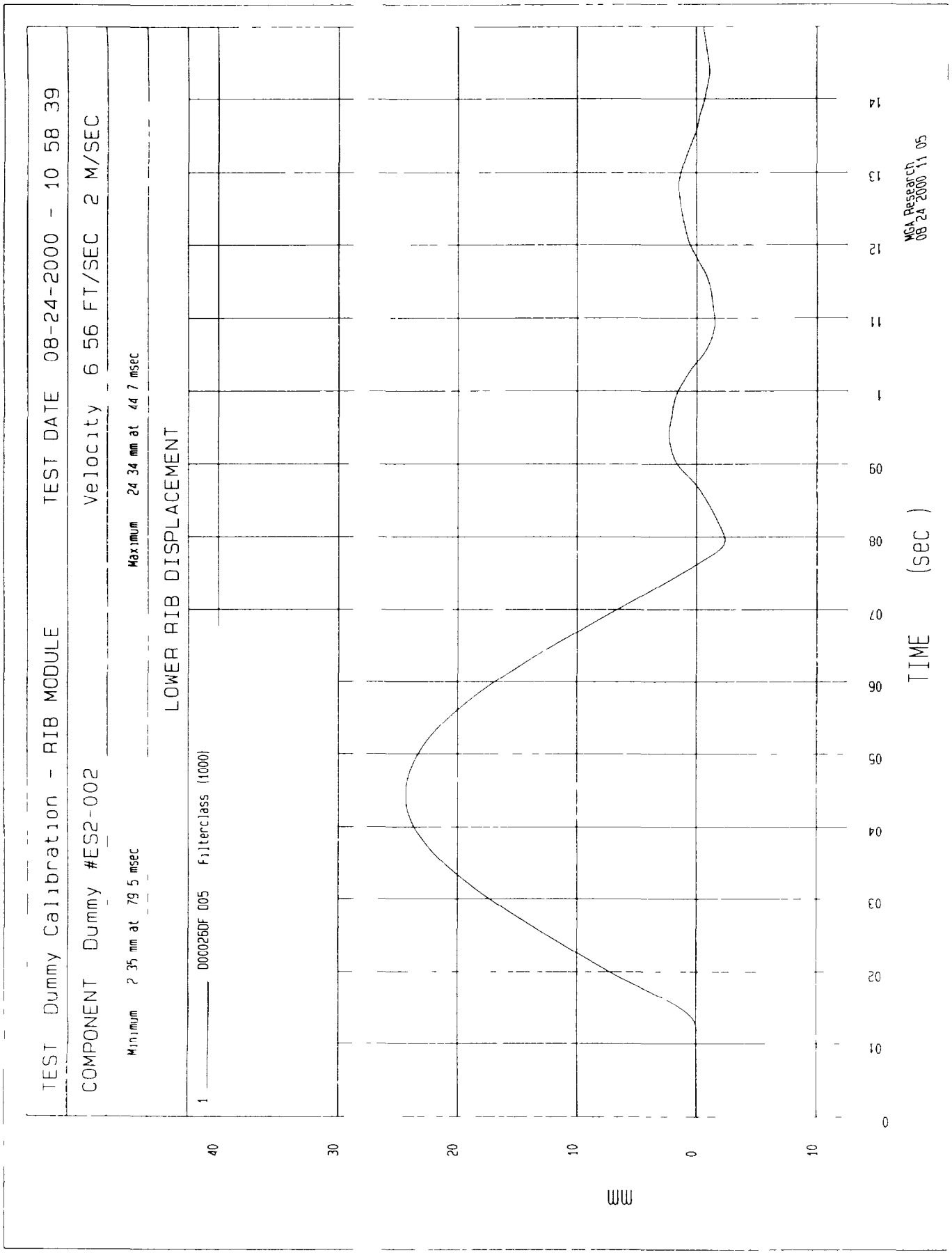

TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 10 23 43
COMPONENT Dummy #ES2-002
Velocity 9 84 FT/SEC 3 M/SEC
Minimum 3 04 mm at 71 9 msec
Maximum 39 01 mm at 38 9 msec
UPPER RIB DISPLACEMENT
1 000024OF 006 Filterclass (1000)
mm
TIME (sec)
MGA Research
08 24 2000 10 24

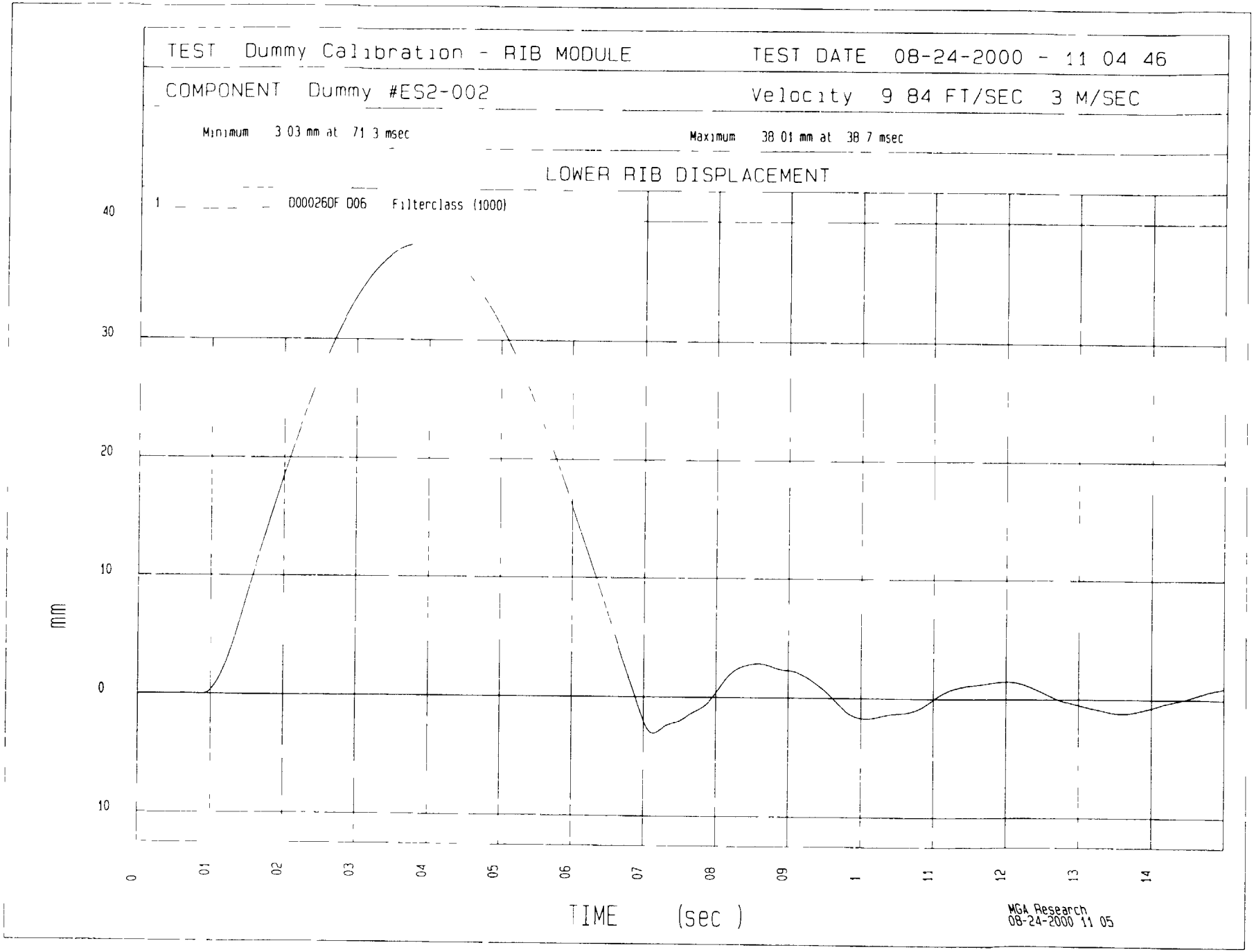

TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 10 07 14
COMPONENT Dummy #ES2-002
Velocity 13 12 FT/SEC 4 M/SEC
Minimum 3 17 mm at 78 1 msec
Maximum 50 81 mm at 46 3 msec
UPPER RIB DISPLACEMENT
1 D00024DF 007 Filterclass (1000)
MGA Research
08 24 2000 10 24
TIME (SEC)
mm
60
50
40
30
20
10
0
10
0
01
02
03
04
05
06
07
08
09
10
11
12
13
14

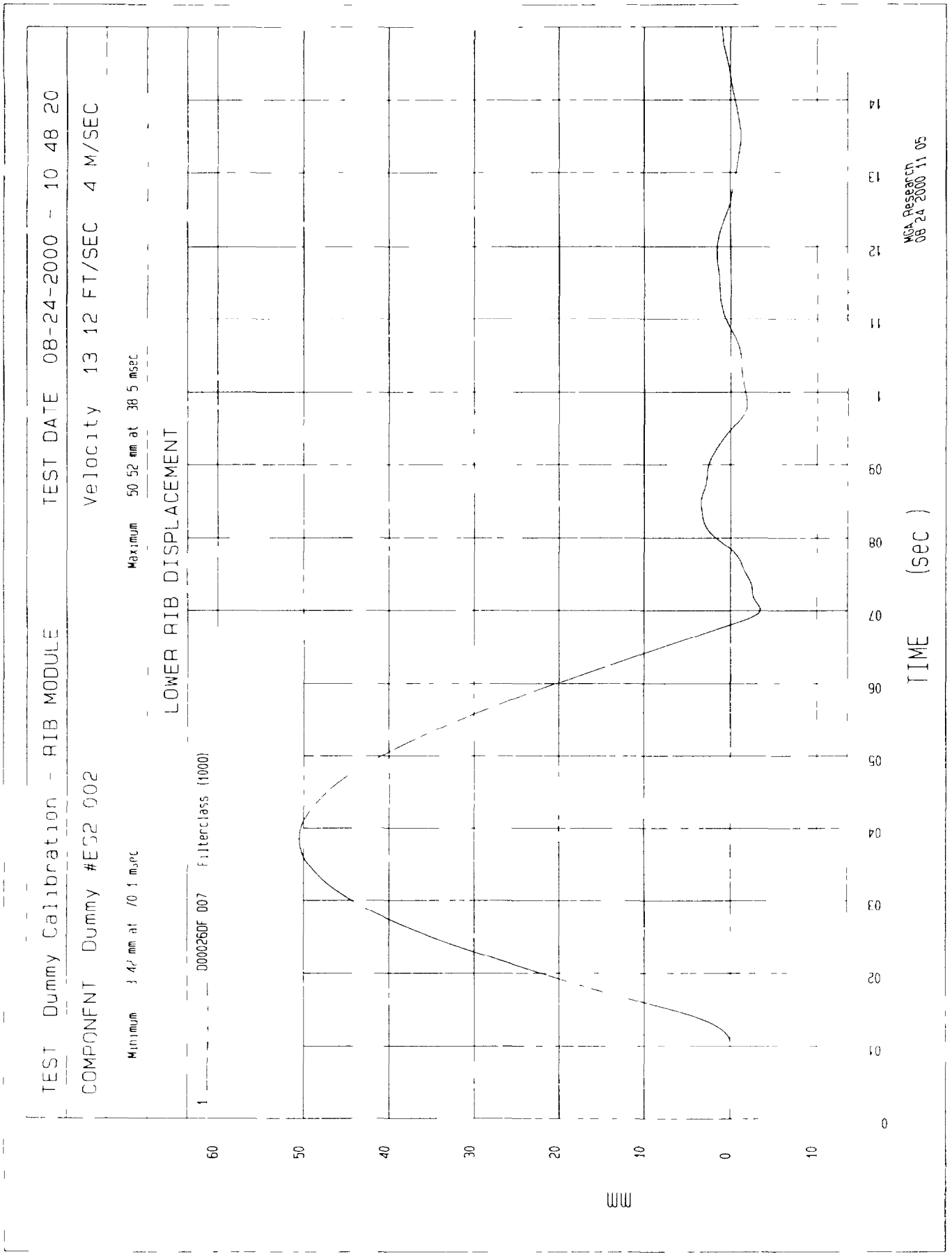

TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 10 36 32
COMPONENT Dummy #ES2-002
Velocity 6 56 FT/SEC 2 M/SEC
Minimum 2 05 mm at 74 8 msec
Maximum 25 51 mm at 40 4 msec
MIDDLE RIB DISPLACEMENT
1 D00025DF 005 Filterclass (1000)
MGA Research
08 24 2000 10 43
mm
TIME (sec)
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 10 43 23
COMPONENT Dummy #FS2-002
Velocity 9 84 FT/SEC 3 M/SEC
Minimum 2 77 mm at 79 6 msec
Maximum 38 55 mm at 47 3 msec
MIDDLE RIB DISPLACEMENT
1 ____ D000250F 006 Filterclass (1000)
MGA Research
08 24 2000 10 44
mm
TIME (SEC)
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90
00
10
20
30
40
50
60


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 10 28 41
COMPONENT Dummy #ES2-002
Velocity 13 12 FT/SEC 4 M/SEC
Minimum 3 271 mm at 79 6 msec
Maximum 50 87 mm at 48 1 msec
MIDDLE RIB DISPLACEMENT
1 0000250F 007 Filterclass (1000)
MGA Research
08 24 2000 10 44
mm
TIME (SEC)
60
50
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90
100
110
120


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 10 58 39
COMPONENT Dummy #ES2-002
Velocity 6 56 FT/SEC 2 M/SEC
Minimum 2 35 mm at 79 5 msec
Maximum 24 34 mm at 44 7 msec
LOWER RIB DISPLACEMENT
1 D00026DF 005 Filterclass (1000)
MGA Research
08 24 2000 11 05
mm
TIME (sec)
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 11 04 46
COMPONENT Dummy #ES2-002
Velocity 9 84 FT/SEC 3 M/SEC
Minimum 3 03 mm at 71 3 msec
Maximum 38 01 mm at 38 7 msec
LOWER RIB DISPLACEMENT
1 D00026DF D06 Filterclass (1000)
40
30
20
10
0
10
mm
0
01
02
03
04
05
06
07
08
09
1
11
12
13
14
TIME (sec)
MGA Research
08-24-2000 11 05


TEST Dummy Calibration - RIB MODULE
TEST DATE 08-24-2000 - 10 48 20
COMPONENT Dummy #E52 002
Velocity 13 12 FT/SEC 4 M/SEC
LOWER RIB DISPLACEMENT
Maximum 50 52 mm at 38 5 msec
Minimum 3 42 mm at 70 1 msec
1 D000260F 007 Filterclass (1000)
MGA Research
08 24 2000 11 05
mm
TIME (sec)
60
50
40
30
20
10
0
10
0
10
20
30
40
50
60
70
80
90
00
01
02
03
04
05
06
07
08
09
10
11
12
13
14

MGA RESEARCH CORPORATION

ABDOMEN TEST

EUROSID 2 DUMMY

Date August 21, 2000

Dummy Serial Number ES2-002

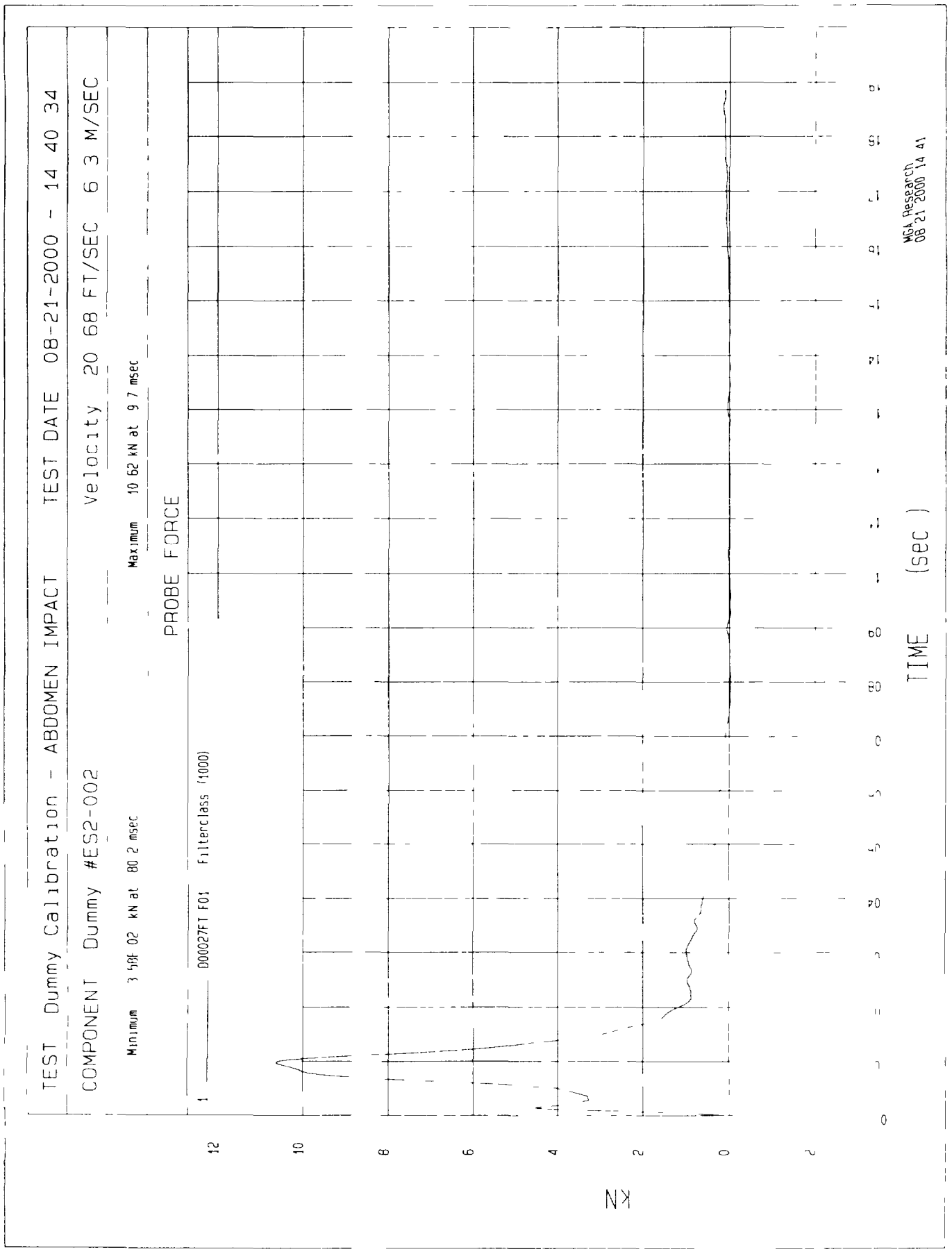
Test Number D001027

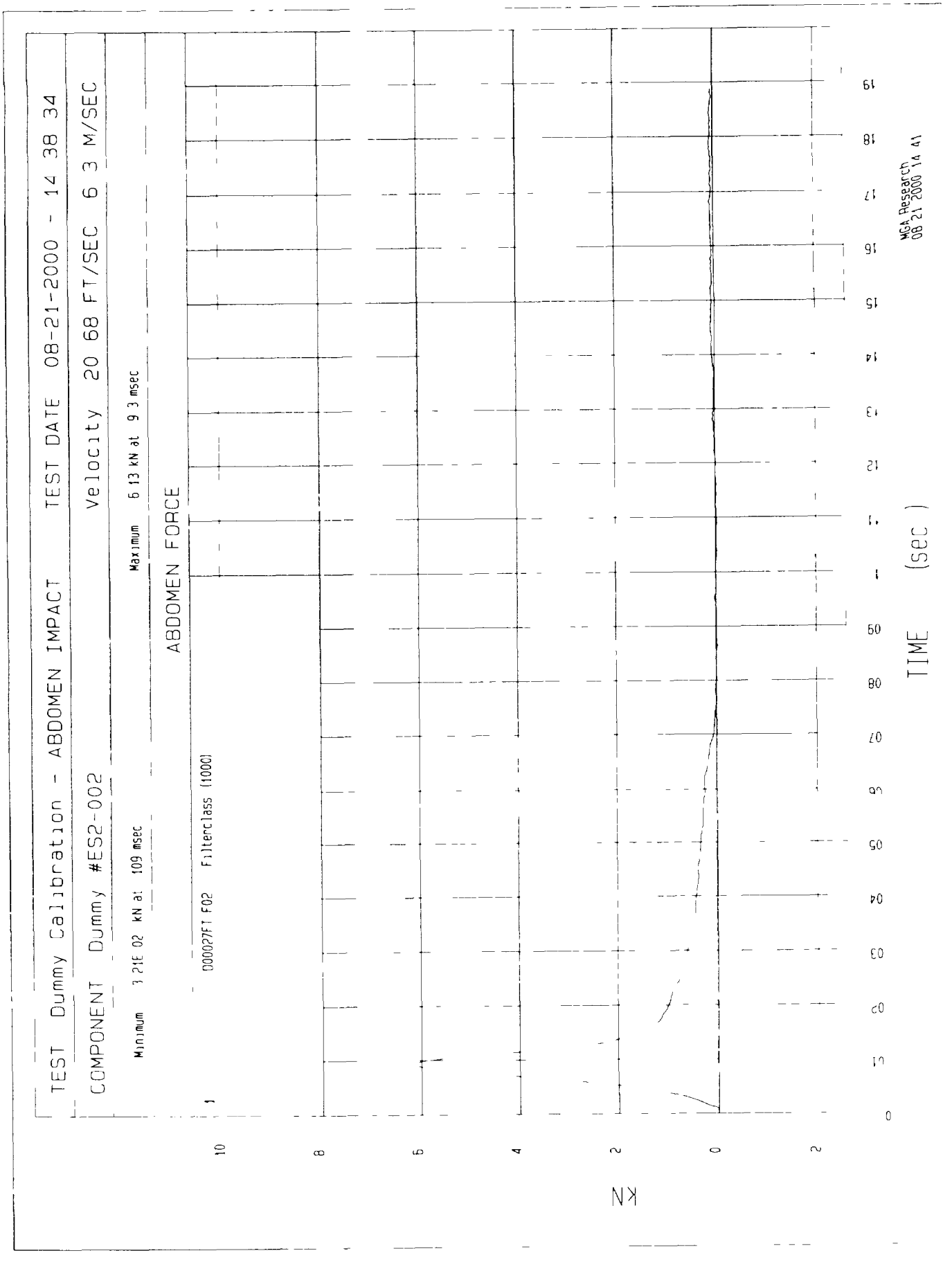
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	43
Probe Speed (m/s)	6 2 – 6 4	6 3
Maximum Impact Force	9 5 – 11.1 kN	10 6
Time of Maximum Force	8 8 – 10 4 ms	9 7
Maximum Total Abdomen Force	5 9 – 7 9 kN	6 1
Time of Max Total Force	8 5 – 10 1 ms	9 3

TEST MEETS SPECIFICATIONS

Technician _____

Approved By David Winkelbauer


TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-21-2000 - 14 40 34
COMPONENT Dummy #ES2-002 Velocity 20 68 FT/SEC 6 3 M/SEC
Minimum 3 58F 02 kN at 80 2 msec
Maximum 10 62 kN at 9 7 msec
PROBE FORCE
1 D00027FT F01 Filterclass (1000)
KN
TIME (sec)
MGA Research
08 21 2000 14 41


TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-21-2000 - 14 38 34
COMPONENT Dummy #ES2-002 Velocity 20 68 FT/SEC 6 3 M/SEC
Minimum 3 21E 02 kN at 109 msec
Maximum 6 13 kN at 9 3 msec
ABDOMEN FORCE
0000027F1 F02 Filterclass (1000)
KN
TIME (sec)
MGA Research
08 21 2000 14 41

MGA RESEARCH CORPORATION

LUMBAR SPINE TEST

EUROSID 2 DUMMY

Date August 23, 2000

Dummy Serial Number ES2-002

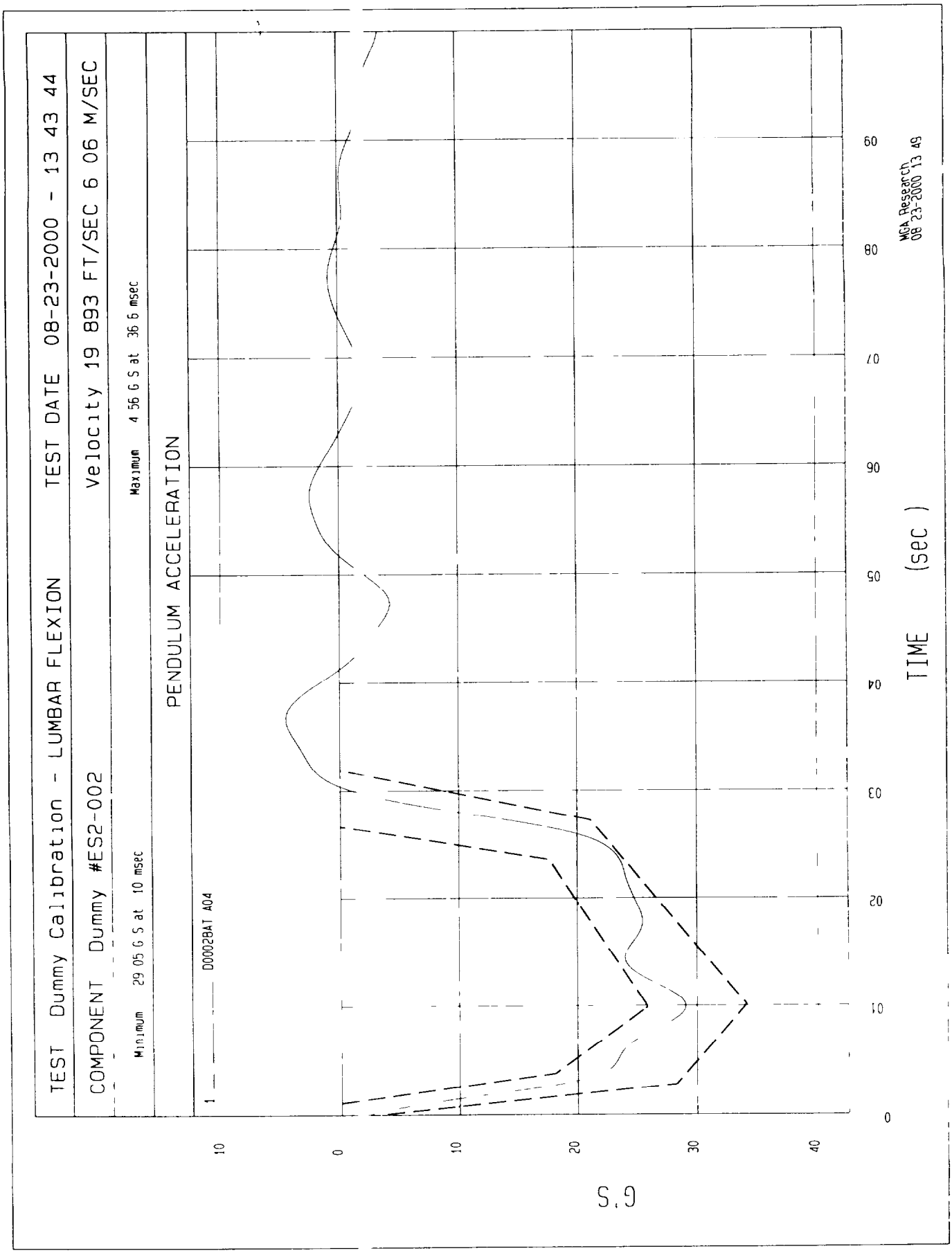
Test Number. D001028

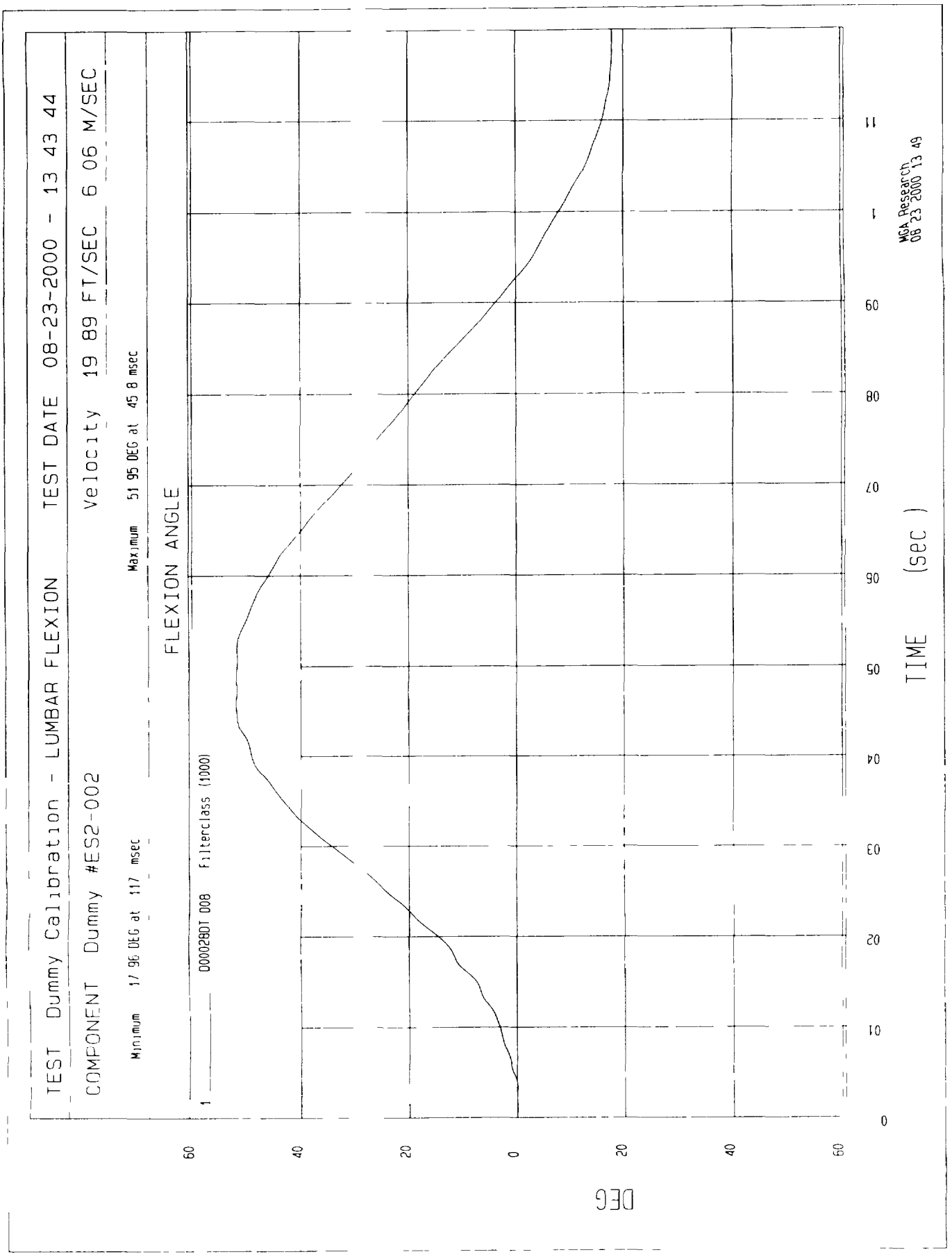
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	54
Pendulum Speed	5 95 – 6 15 m/s	6 06
Max Pendulum Acceleration		-29.1 g's
Time Max. Pendulum Acceleration		10 0 ms
Maximum Flexion Angle	45 0 – 55 0 deg	52 0
Time of Max Flexion Angle	39.0 – 53 0 ms	45 8
Maximum Angle Theta (A)	31 0 – 35.0 deg	32 7
Time of Max Theta (A)	45 0 – 55 0 ms	48 8
Maximum Angle Theta (B)	27 0 – 31 0 deg	29 7
Time of Max Theta (B)	45 0 – 55.0 ms	45 5

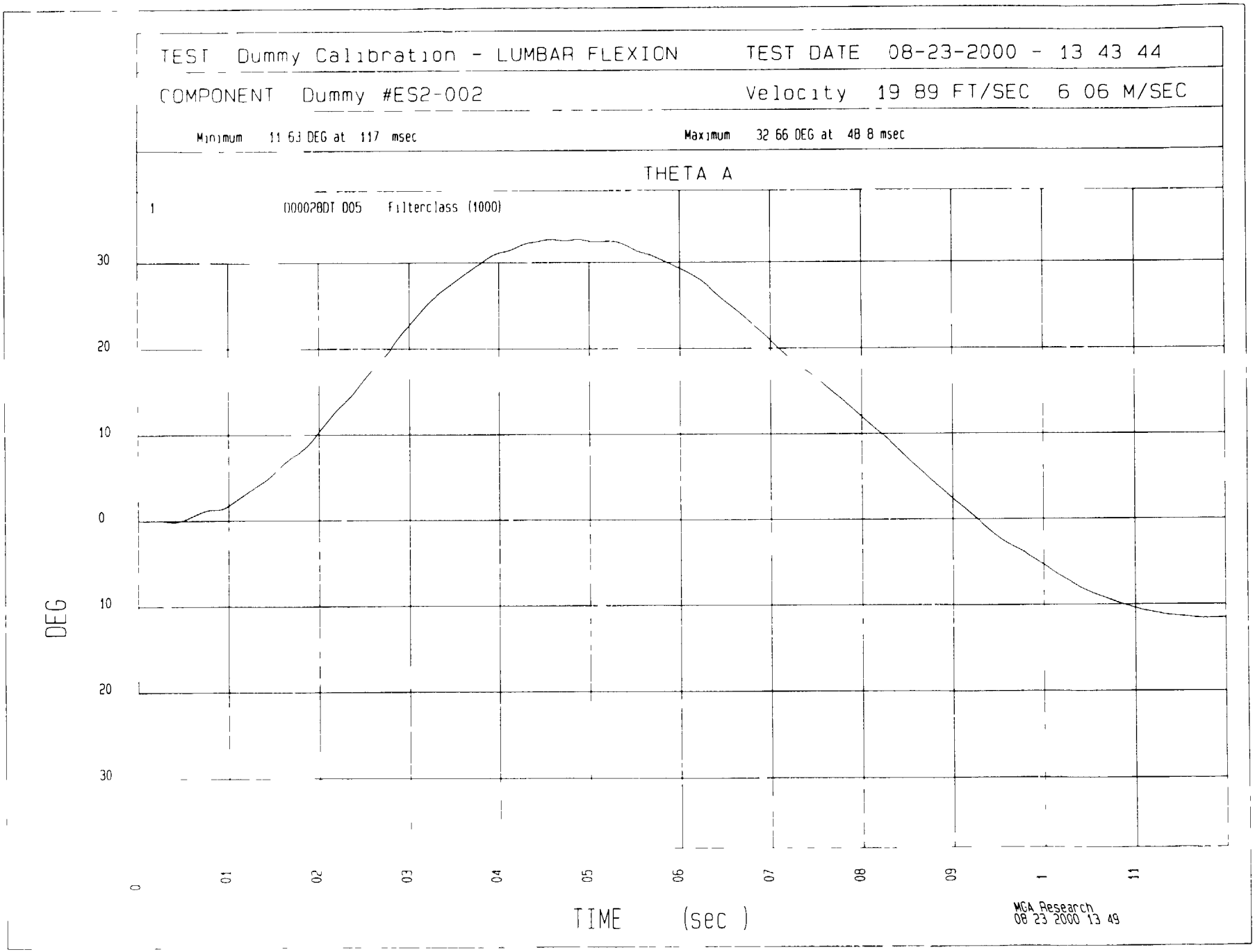
TEST MEETS SPECIFICATIONS

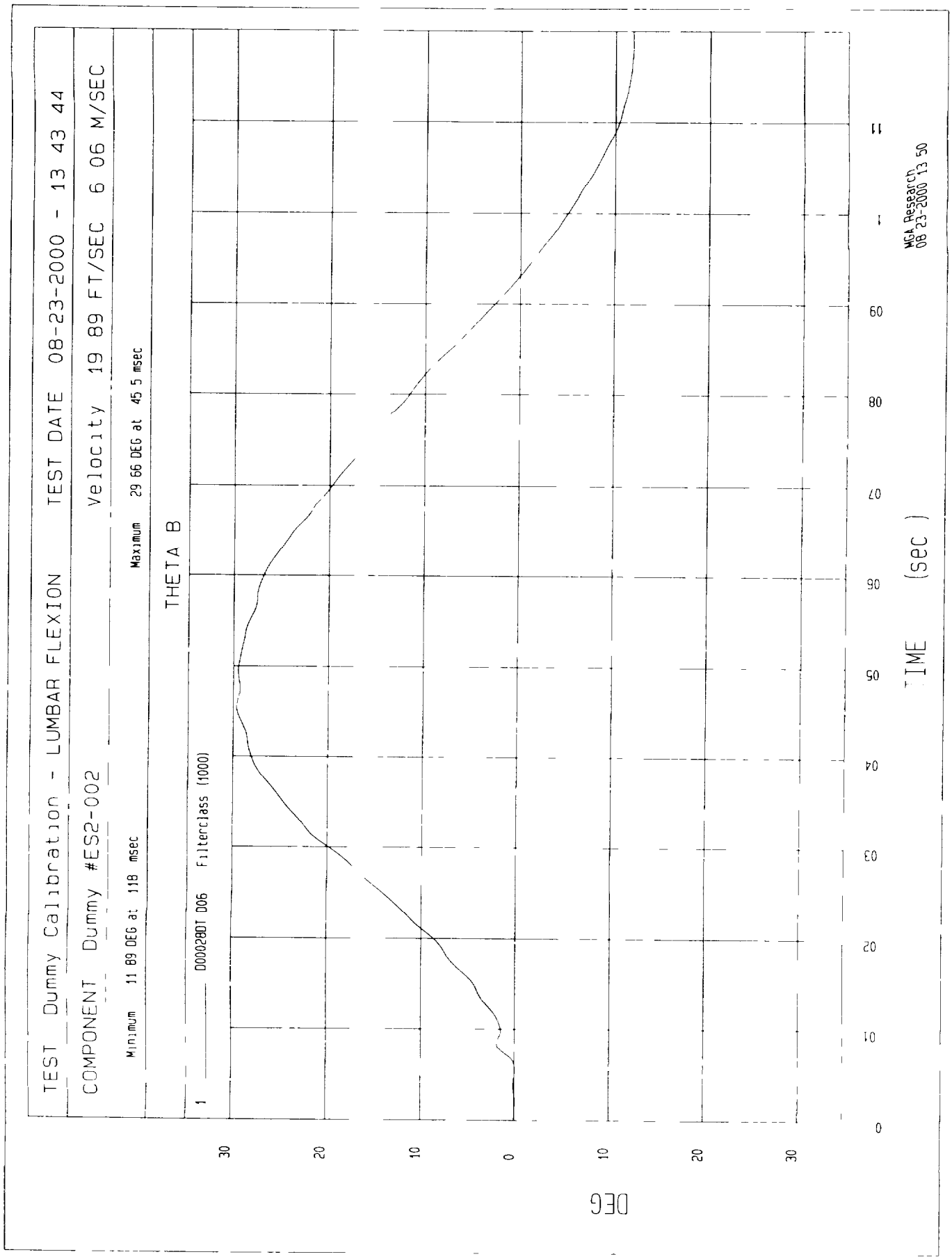
Technician _____

Approved By David Wuhelbauer


TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-23-2000 - 13 43 44
COMPONENT Dummy #ES2-002 Velocity 19 893 FT/SEC 6 06 M/SEC
Minimum 29 05 G S at 10 msec
Maximum 4 56 G S at 36 6 msec
PENDULUM ACCELERATION
1 D0002BAT A04
MGA Research 08 23-2000 13 49
TIME (sec)
G's


TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-23-2000 - 13 43 44
COMPONENT Dummy #ES2-002 Velocity 19 89 FT/SEC 6 06 M/SEC
Minimum 11 96 DEG at 117 msec
Maximum 51 95 DEG at 45 8 msec
FLEXION ANGLE
1 D0002BDT 000 Filterclass (1000)
DEG
TIME (sec)
MGA Research 08 23 2000 13 49


TEST Dummy Calibration - LUMBAR FLEXION
TEST DATE 08-23-2000 - 13 43 44
COMPONENT Dummy #ES2-002
Velocity 19 89 FT/SEC 6 06 M/SEC
Minimum 11 63 DEG at 117 msec
Maximum 32 66 DEG at 48 8 msec
THETA A
1 000028DT 005 Filterclass (1000)
30
20
10
0
10
20
30
DEG
0
01
02
03
04
05
06
07
08
09
1
11
TIME (sec)
MGA Research
08 23 2000 13 49


TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-23-2000 - 13 43 44
COMPONENT Dummy #ES2-002 Velocity 19 89 FT/SEC 6 06 M/SEC
Minimum 11 89 DEG at 118 msec
Maximum 29 66 DEG at 45 5 msec
THETA B
1 D0002B0T D06 Filterclass (1000)
DEG
TIME (SEC)
MGA Research
08 23-2000 13 50

MGA RESEARCH CORPORATION

PELVIS TEST

EUROSID 2 DUMMY

Date August 21, 2000

Dummy Serial Number ES2-002

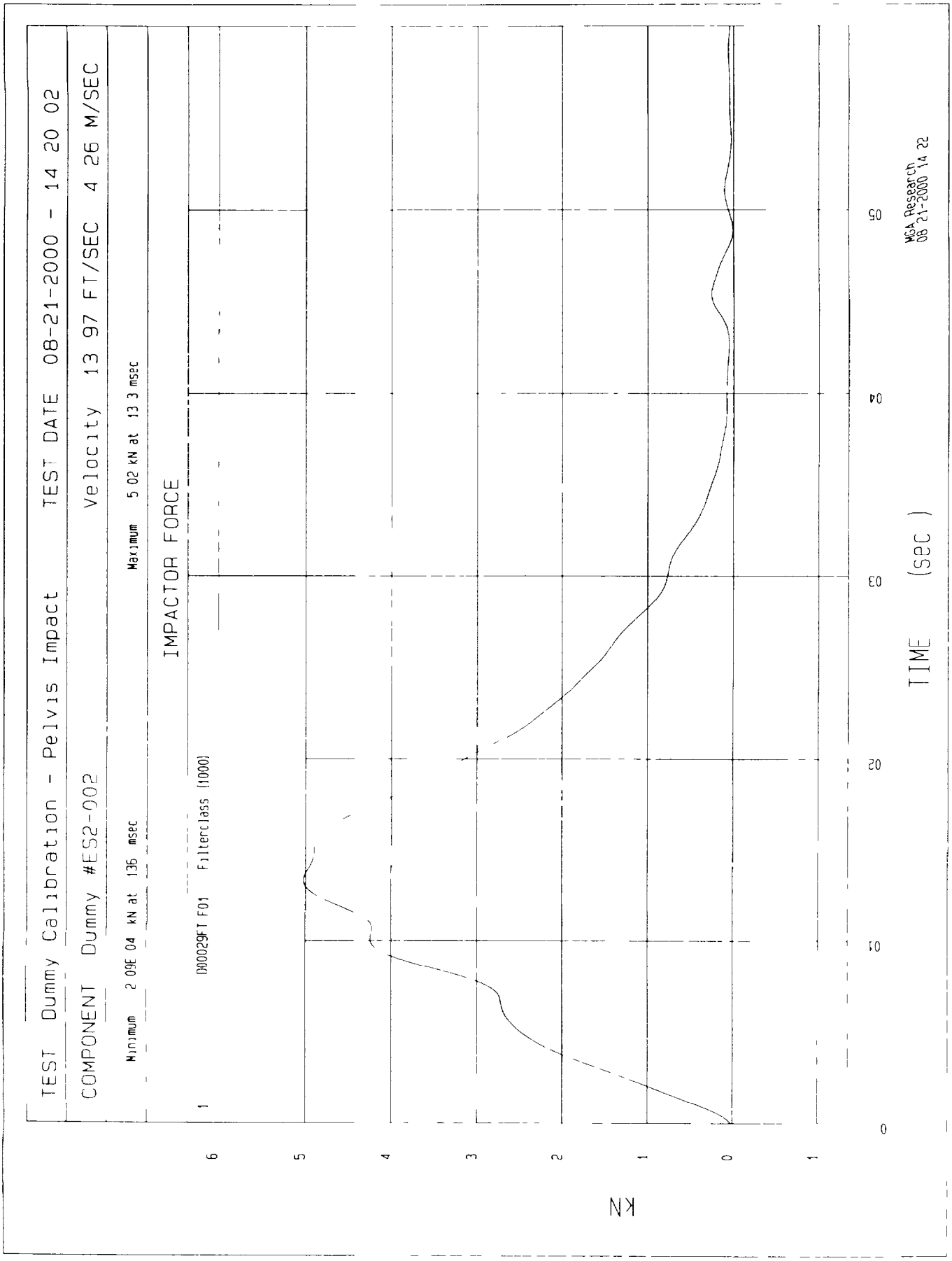
Test Number D001029

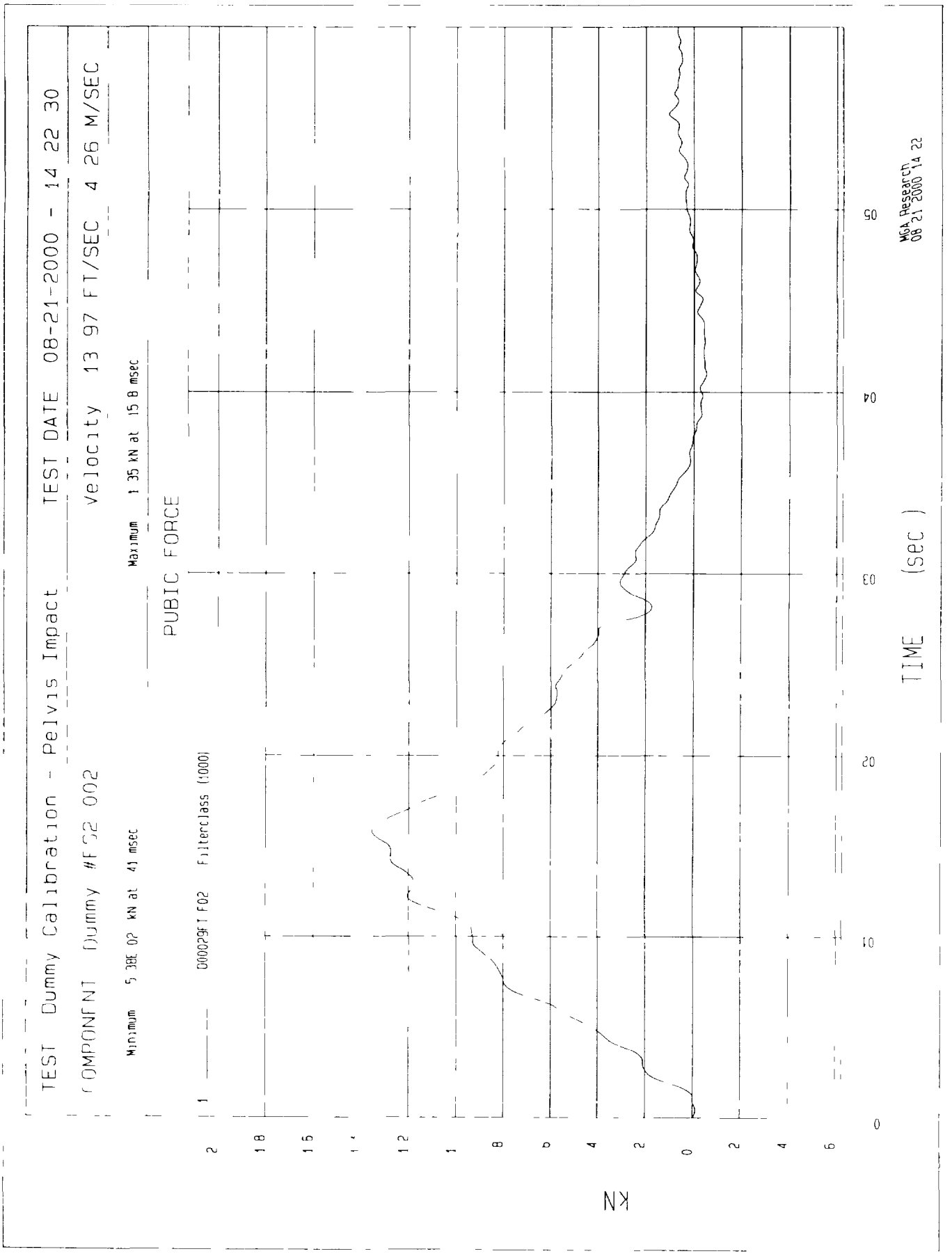
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	46
Pendulum Speed	4 2 – 4.4 m/s	4 3
Maximum Impactor Force	4.4 – 5 1 kN	5.0
Time of Max Impactor Force	10 3 – 15 5 ms	13 3
Maximum Pubic Force	1 04 – 1.64 kN	1.35
Time of Max Pubic Force	9 9 – 15 9 ms	15.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By David Winkelbauer


TEST Dummy Calibration - Pelvis Impact TEST DATE 08-21-2000 - 14 20 02
COMPONENT Dummy #ES2-002 Velocity 13 97 FT/SEC 4 26 M/SEC
Minimum 2 09E 04 kN at 136 msec Maximum 5 02 kN at 13 3 msec
IMPACTOR FORCE
D0002SFT F01 Filterclass (1000)
KN
TIME (SEC)
MGA Research
08 21-2000 14 22


TEST Dummy Calibration - Pelvis Impact
TEST DATE 08-21-2000 - 14 22 30
COMPONENT Dummy #F52 002
Velocity 13 97 FT/SEC 4 26 M/SEC
Minimum 5 38E 02 kN at 41 msec
Maximum 1 35 kN at 15 8 msec
PUBIC FORCE
000629F1F02 Filterclass (1000)
KN
TIME (SEC)
MGA Research
08 21 2000 14 22

APPENDIX D – CALIBRATION INFORMATION

ES-2 INSTRUMENT CALIBRATION DATA

DRIVER	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	J13930	Endevco	June 2, 2000
Head Y Accelerometer	J13631	Endevco	June 2, 2000
Head Z Accelerometer	J13990	Endevco	June 2, 2000
Upper Neck Load Cell	076	Denton	November 1, 1999
Lower Neck Load Cell	102	First Technologies	December 21, 1999
Shoulder Load Cell	104	First Technologies	February 17, 2000
Shoulder Rotation	001	Space Age Controls	August 1, 2000
Upper Spine X Accelerometer	J13710	Endevco	June 1, 2000
Upper Spine Y Accelerometer	J13547	Endevco	June 1, 2000
Upper Spine Z Accelerometer	J13705	Endevco	June 1, 2000
Upper Rib Y Accelerometer	J11625	Endevco	June 1, 2000
Mid Rib Y Accelerometer	J10730	Endevco	June 1, 2000
Lower Rib Y Accelerometer	J11014	Endevco	June 1, 2000
Upper Rib Displacement	ES2-001UR	Data Systems	March 1, 2000
Mid Rib Displacement	ES2-001MR	Data Systems	March 1, 2000
Lower Rib Displacement	ES2-001LR	Data Systems	March 1, 2000
Lower Spine X Accelerometer	J11046	Endevco	June 1, 2000
Lower Spine Y Accelerometer	J11784	Endevco	June 1, 2000
Lower Spine Z Accelerometer	J11047	Endevco	June 1, 2000
Torso Load Cell	096	Denton	November 1, 1999
T-12 Load Cell	078	Denton	October 29, 1999
Abdomen Front Load Cell	692	Denton	March 1, 2000
Abdomen Mid Load Cell	702	Denton	March 1, 2000
Abdomen Rear Load Cell	706	Denton	March 1, 2000
Pubic Symphysis Load Cell	144	Denton	June 7, 2000
Pelvis X Accelerometer	ALDM8	Endevco	July 12, 2000
Pelvis Y Accelerometer	ALDC3	Endevco	July 12, 2000
Pelvis Z Accelerometer	ALA92	Endevco	July 12, 2000
Right Femur Load Cell	121	First Technologies	July 13, 2000
Left Femur Load Cell	124	First Technologies	July 13, 2000

ES-2 INSTRUMENT CALIBRATION DATA

LEFT REAR PASSENGER	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	AMR94	Endevco	June 1, 2000
Head Y Accelerometer	AMTB1	Endevco	June 1, 2000
Head Z Accelerometer	AC9B7	Endevco	June 1, 2000
Upper Neck Load Cell	079	Denton	December 10, 1999
Lower Neck Load Cell	103	First Technologies	July 14, 2000
Shoulder Load Cell	108	First Technologies	March 16, 2000
Shoulder Rotation	002	Space Age Controls	August 1, 2000
Upper Spine X Accelerometer	J14896	Endevco	July 7, 2000
Upper Spine Y Accelerometer	J14771	Endevco	July 7, 2000
Upper Spine Z Accelerometer	J14774	Endevco	July 7, 2000
Upper Rib Y Accelerometer	AHTN3	Endevco	July 7, 2000
Mid Rib Y Accelerometer	AHT12	Endevco	July 7, 2000
Lower Rib Y Accelerometer	AH0C3	Endevco	July 7, 2000
Upper Rib Displacement	ES2-002UR	Data Systems	March 1, 2000
Mid Rib Displacement	ES2-002UR	Data Systems	March 1, 2000
Lower Rib Displacement	ES2-002UR	Data Systems	March 1, 2000
Lower Spine X Accelerometer	J13653	Endevco	June 2, 2000
Lower Spine Y Accelerometer	J13713	Endevco	June 2, 2000
Lower Spine Z Accelerometer	J13649	Endevco	June 2, 2000
Torso Load Cell	100	Denton	December 10, 1999
T-12 Load Cell	079	Denton	June 2, 2000
Abdomen Front Load Cell	110	First Technologies	July 11, 2000
Abdomen Mid Load Cell	111	First Technologies	March 1, 2000
Abdomen Rear Load Cell	112	First Technologies	March 1, 2000
Pubic Symphysis Load Cell	108	First Technologies	November 1, 1999
Pelvis X Accelerometer	AGRW3	Endevco	June 2, 2000
Pelvis Y Accelerometer	AHY71	Endevco	June 2, 2000
Pelvis Z Accelerometer	AMPY0	Endevco	June 2, 2000
Right Femur Load Cell	125	First Technologies	July 13, 2000
Left Femur Load Cell	126	First Technologies	July 13, 2000

VEHICLE INSTRUMENT CALIBRATION DATA

	VEHICLE ACCELEROMETERS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
Right Front Sill X	G01-J18	Entran	August 10, 2000
Right Front Sill Y	D05-R16	Entran	August 10, 2000
Right Front Sill Z	I18-E02	Entran	August 10, 2000
Right Rear Sill X	K11-J11	Entran	August 10, 2000
Right Rear Sill Y	J04-F10	Entran	August 10, 2000
Right Rear Sill Z	C06-G01	Entran	August 10, 2000
Left Front Sill Y	I18-E03	Entran	April 7, 2000
Left Rear Sill Y	E10-F18	Entran	July 11, 2000
Floorpan @ Rear Axle X	H07-A01	Entran	August 15, 2000
Floorpan @ Rear Axle Y	I18-E15	Entran	August 10, 2000
Floorpan @ Rear Axle Z	D05-R11	Entran	May 18, 2000
Left Mid A Post Y	I18-E05	Entran	April 7, 2000
Left Lower A Post Y	D05-R20	Entran	May 18, 2000
Left Upper B Post Y	I25-J06	Entran	August 10, 2000
Left Mid B Post Y	A09-G09	Entran	July 11, 2000
Left Lower B Post Y	C25-A09	Entran	August 15, 2000
Driver Seat Track Y	E24-G08	Entran	August 15, 2000
Right Rear Occupant Compartment Y	L22-G05	Entran	March 20, 2000
Vehicle CG X	I26-D17	Entran	March 16, 2000
Vehicle CG Y	C25-A06	Entran	May 18, 2000
Vehicle CG Z	G13-F07	Entran	August 15, 2000
Left Front Door Upper Y	K11-J12	Entran	June 2, 2000
Left Front Door Mid Y	F20-G03	Entran	August 8, 2000
Left Front Door Lower Y	E10-F07	Entran	August 8, 2000

Note All Entran accelerometers are Model No. EGE-72

VEHICLE INSTRUMENT CALIBRATION DATA

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
Left Front Door Rear Lower Y	E10-F19	Entran	August 8, 2000
Left Rear Door Upper Y	MGA-095	Entran	August 10, 2000
Left Rear Door Mid Y	F07-A17	Entran	August 10, 2000
Left Rear Door Lower Y	E13-D06	Entran	August 8, 2000
Left Rear Door Rear Lower Y	F11-G08	Entran	March 20, 2000

Note All Entran accelerometers are Model No EGE-72

APPENDIX E – PROCEDURE USED FOR ES-2 POSITIONING

APPENDIX E – PROCEDURE USED FOR ES-2 POSITIONING

Installation of the Side-Impact Dummy (recommended practice)

1 GENERAL

1.1 The dummy to be used for the following installation procedure is described in Annex 6 to this regulation

1.2 Adjust the knee joints so that they just support the leg when it is extended horizontally (1 to 2 g)

1 3 Clothe the dummy in form fitting cotton stretch mid-calf length pants. Each foot is equipped with a shoe

2 INSTALLATION

2 1 Place the dummy in the outboard front seat of the impact side as described in the test specifications

2 2 The mid-sagittal plane of the dummy shall coincide with the centerplane of the occupant (as determined according to Annex 3, paragraph 2.8) with a tolerance of 2°

2 3 The pelvis of the dummy shall be positioned according to the following:

2 3 1 The pelvis pitch angle shall be 20 0° +/- 2.5°.

2 3 2 A line passing through the dummy H-points shall pass through an imaginary circle in the mid-sagittal plane of the dummy. This circle has a radius of 10 mm and is located 20 mm horizontally forward and 5 mm vertically above the reference H-point, determined by the 3D H-point machine

2 4 The upper torso of the dummy shall be positioned according to the following

2 4 1 The upper torso shall be bent forward and then laid back against the seat back The shoulder of the dummy shall be set fully rearward

2 4 2 The torso reference line pitch angle shall be 25 0° +/- 2.5° The torso reference line is defined as the thoracic spine center line.

2 5 The arms shall be positioned in such a way that the angle between the projection of the arm centerline on the mid-sagittal plane of the dummy and the torso reference line is 40° +/- 5°.

2 6 For the driver's seating position, without inducing pelvis or torso movement, place the right foot of the dummy on the undepressed accelerator pedal with the heel resting as far forward as possible on the floorpan Set the left foot perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel. Set the knees of the dummy such that their outside surfaces are 150 +/- 10 mm from the plane of symmetry of the dummy If possible, within these constraints, place the thighs of the dummy in contact with the seat cushion.

2 7 For other seating positions, without inducing pelvis or torso movement, place the heels of the dummy as far forward as possible on the floorpan without compressing the seat cushion more than the compression due to the weight of the leg Set the knees of the dummy such that their outside surfaces are 150 +/- 10 mm from the plane of symmetry of the dummy.

APPENDIX F – ES-2 PEAK REPONSES

DRIVER (ES-2) PEAK RESPONSE TABLE

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Head	1000	X	G	-13.6	58
	1000	Y	G	22 7	57
	1000	Z	G	31.5	68
	1000	RES	G	38.2	60
Head Injury Criteria (HIC)				150	
Upper Neck Force	1000	X	N	-520.33	106
	1000	Y	N	600.39	98
	1000	Z	N	-1262.46	68
	1000	RES	N	1336.72	67
Upper Neck Moment	600	X	Nm	-59.4	55
	600	Y	Nm	-37 44	57
	600	Z	Nm	9.52	77
	600	RES	Nm	67.98	56
Lower Neck Force	1000	X	N	514 09	60
	1000	Y	N	*	*
	1000	Z	N	1042.28	64
Lower Neck Moment	600	X	Nm	-183.7	89
	600	Y	Nm	-66.96	106
	600	Z	Nm	*	*
Shoulder Force	1000	X	N	340 9	34
	1000	Y	N	770.78	47
	1000	Z	N	1451	48

* No Valid Data Collected

DRIVER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Upper Spine	180	X	G	-10.92	48
	180	Y	G	53.55	45
	180	Z	G	3 68	86
Lower Spine	180	X	G	7 46	32
	180	Y	G	52 93	42
	180	Z	G	-3 7	47
Upper Rib	180	Y	G	106 64	34
Mid Rib	180	Y	G	110 47	58
Lower Rib	180	Y	G	90.22	64
Upper Rib Deflection	180	Y	mm	-34.57	51
Mid Rib Deflection	180	Y	mm	-32.97	49
Lower Rib Deflection	180	Y	mm	-24 46	45
Upper Rib VC	180	Y	m/sec	0 36	44
Mid Rib VC	180	Y	m/sec	0 34	41
Lower Rib VC	180	Y	m/sec	0.18	31
Torso Force	600	X	N	399 51	45
	600	Y	N	733 64	44
Torso Moment	600	Y	Nm	17 56	43
	600	Z	Nm	13.06	44
T12 Force	600	X	N	-951.36	39
	600	Y	N	2617 9	32
T12 Moment	600	X	Nm	254 31	92
	600	Y	Nm	114.6	101

DRIVER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Abdomen Front Force	600	Y	N	705.71	32
Abdomen Mid Force	600	Y	N	1015.01	32
Abdomen Rear Force	600	Y	N	825 94	33
Abdomen Summed Force	600	Y	N	2542.57	32
Pubic Symphysis Force	600	Y	N	-1020.15	32
Right Femur Force	600	X	N	-434 21	49
	600	Y	N	1521.12	48
	600	Z	N	-1156.74	45
	600	RES	N	1869.05	47
Right Femur Moment	600	X	Nm	127.71	33
	600	Y	Nm	-73.18	49
	600	Z	Nm	-22.67	142
	600	RES	Nm	128.19	33
Left Femur Force	600	X	N	-357.29	52
	600	Y	N	1408.99	31
	600	Z	N	-839 72	56
	600	RES	N	1624.16	31
Left Femur Moment	600	X	Nm	-183.82	31
	600	Y	Nm	51.64	31
	600	Z	Nm	-23.37	42
	600	RES	Nm	188.37	31
Pelvis	1000	X	G	16.62	45
	1000	Y	G	86.11	33
	1000	Z	G	-22.06	70

PASSENGER (ES-2) PEAK RESPONSE TABLE

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Upper Neck Force	1000	X	N	-348.25	62
	1000	Y	N	-822.03	82
	1000	Z	N	1544 8	62
	1000	RES	N	1599.6	82
Upper Neck Moment	600	X	Nm	-82.6	62
	600	Y	Nm	51.66	73
	600	Z	Nm	-43 48	63
	600	RES	Nm	102.31	63
Lower Neck Force	1000	X	N	-635.64	100
	1000	Y	N	-1440 57	62
	1000	Z	N	-1643 41	62
	1000	RES	N	2232 5	62
Lower Neck Moment	600	X	Nm	-49.95	62
	600	Y	Nm	-53.63	82
	600	Z	Nm	-27.64	77
	600	RES	Nm	72.66	62
Shoulder Force	1000	X	N	663.18	44
	1000	Y	N	1439 09	61
	1000	Z	N	2184.28	59
	1000	RES	N	2665.82	61

PASSENGER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Upper Spine	180	X	G	-17 69	60
	180	Y	G	39 53	57
	180	Z	G	7.48	82
Lower Spine	180	X	G	-19.71	47
	180	Y	G	53 27	48
	180	Z	G	-9.05	53
Upper Rib	180	Y	G	43 51	43
Mid Rib	180	Y	G	63 28	47
Lower Rib	180	Y	G	72 05	48
Upper Rib Deflection	180	Y	mm	-22 19	61
Mid Rib Deflection	180	Y	mm	-21 05	59
Lower Rib Deflection	180	Y	mm	-11 18	59
Upper Rib VC	180	Y	m/sec	0 11	49
Mid Rib VC	180	Y	m/sec	0 15	54
Lower Rib VC	180	Y	m/sec	0.047	64
Torso Force	600	X	N	1687.23	98
	600	Y	N	-843.43	99
Torso Moment	600	Y	Nm	-119.78	99
	600	Z	Nm	-82	100
T12 Force	600	X	N	-785.63	46
	600	Y	N	2436.71	49
T12 Moment	600	X	Nm	-260.56	48
	600	Y	Nm	-183 84	47

PASSENGER (ES-2) PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Abdomen Front Force	600	Y	N	1279.17	47
Abdomen Mid Force	600	Y	N	658 25	47
Abdomen Rear Force	600	Y	N	339 77	50
Abdomen Summed Force	600	Y	N	2166 7	48
Pubic Symphysis Force	600	Y	N	-2260.84	46
Right Femur Force	600	X	N	-350.04	46
	600	Y	N	-641 64	44
	600	Z	N	-1768.41	44
	600	RES	N	1985.09	44
Right Femur Moment	600	X	Nm	-127.02	44
	600	Y	Nm	-56.25	49
	600	Z	Nm	-23 96	47
	600	RES	Nm	134.98	44
Left Femur Force	600	X	N	-276 74	26
	600	Y	N	1615 66	46
	600	Z	N	2256 31	44
	600	RES	N	2954.75	44
Left Femur Moment	600	X	Nm	187.5	45
	600	Y	Nm	66.78	44
	600	Z	Nm	41.2	45
	600	RES	Nm	199.81	45
Pelvis	1000	X	G	-46.81	45
	1000	Y	G	49.06	40
	1000	Z	G	-16.53	45