

V 3445

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

TESTING FOR EU 96/27/EC  
EUROPEAN SIDE IMPACT

1996 Ford Taurus 4 door

MGA Research Corporation  
5000 Warren Road  
Burlington, WI 53105



Test Date: August 11, 2000

Report Date: August 15, 2000

FINAL REPORT

Prepared For

U.S. Department of Transportation  
Volpe National Transportation System Center  
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Cambridge, MA 02142

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## SECTION 1

PURPOSE AND TEST PROCEDURE

This lateral impact test is part of Contract No DTRS57-98-D-00041 sponsored by the U S Department of Transportation, Volpe National Transportation Systems 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 a 50 kph lateral impact in accordance with Directive 97/27/EC of the European Parliament and of the council of May 20, 1996 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

<b>Date</b>	<b>Test Type</b>	<b>Vehicle</b>
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 LATERAL IMPACT TEST

A 1996 Ford Taurus 4 door was impacted on the left side or driver's side by a Moving Deformable Barrier (MDB) which was moving forward at a velocity of 30.6 mph (49.2 kph). The target vehicle was stationary and was positioned perpendicular to the line of forward motion of the moving deformable barrier. The lateral impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on August 11, 2000. Pre- and post-test photographs of the test vehicle, the MDB and the European Side Impact Dummies (ES-2s) are included in Appendix A.

Two European Side Impact Dummies (ES-2s) were placed in the driver and left rear designated seating positions according to instructions specified in the Lateral Impact Directive which is dated May 20, 1996 and Evaluation of Eurosid-1 Positioning Procedure Appendix A dated February 5, 1997. The lateral impact event was documented by ten 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 lateral impact dummy 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 Lateral Side Impact test:

		Left Front Driver	Left Rear Passenger
1) Head Performance Criteria			
$\leq 1000$	T <sub>1</sub> (msec)	No contact	60
	T <sub>2</sub> (msec)	No contact	111
	HPC	No contact	52
2) Thorax Performance Criteria			
2.1) Chest Deflection $\leq 42$ mm	Upper Rib Deflection	38	23
	Mid Rib Deflection	47	18
	Lower Rib Deflection	51	17
2.2) Viscous Criteria $\leq 1.0$ m/sec	Upper Rib	0.75	0.11
	Mid Rib	1.26	0.06
	Lower Rib	1.43	0.06
3) Abdominal Protection Criterion			
$\leq 2500$ N	Front Abdominal Force	296	324
	Mid Abdominal Force	649	200
	Rear Abdominal Force	834	279
	Sum of Abdominal Force	1740	785
4) Pelvis Performance Criterion			
$\leq 6000$ N	Pubic Symphysis Force	917	647

		Left Front Passenger	Left Rear Passenger
HIC	T <sub>1</sub> (msec)	57.3	60.7
	T <sub>2</sub> (msec)	93.3	93.1
	T <sub>2</sub> - T <sub>1</sub> (msec)	36.0	32.4
	HIC	106	69

Fir Filtered	Left Front Driver	Left Rear Passenger
Upper Rib Y (g's)	98.9	22.3
Middle Rib Y (g's)	163.0	22.6
Lower Rib Y (g's)	158.7	21.6
Lower Spine Y (g's)	58.7	24.0
Pelvis Y (g's)	69.2	27.0
TTI (g's)	111	23

Contacts	Left Front Driver	Left Rear Passenger
Head (ms)	No contact	60
Arm (ms)	23	31
Rib (ms)	27	52
Pelvis (ms)	26	59

## TEST NOTES

Although not used in the European Lateral Impact testing, a rear struck side (passenger) ES-2 dummy was placed in the target test vehicle for information purposes. The driver, passenger and vehicle were instrumented with additional transducers to provide data beyond the requirements of the European Lateral Impact requirements. Whenever possible, the European Lateral Impact Standards were followed.

The following sensors were not used for this test due to malfunctions prior to the test: passenger shoulder rotation, passenger lower neck force, and moving barrier angular acceleration.

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

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

## DATA SHEET NO. 1

GENERAL VEHICLE TEST PARAMETER DATATEST VEHICLE INFORMATION

Year/Make/Model/Body Style 1996/Ford/Taurus/4 door  
 Vehicle Identification No (VIN) 1FALP52U5TG126409  
 Vehicle Body Color Green  
 Build Date 9/95  
 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 150,555 km  
 Options: X air conditioning, X power steering, X power brakes;  
X power windows, X cruise control; X tilt wheel,  
X 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 Firestone

VEHICLE CAPACITY DATA

Number of Occupants: 3 Front, 3 Rear;     3<sup>rd</sup> 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	<u>495.3</u> kg	Right Rear	<u>264.9</u> kg
Left Front	<u>493.1</u> kg	Left Rear	<u>272.6</u> kg
TOTAL FRONT	<u>988.4</u> kg	TOTAL REAR	<u>537.5</u> kg
% of Total Weight	<u>64.8</u> %	% of Total Weight	<u>35.2</u> %
TOTAL WEIGHT	<u>1525.9</u> kg		

WEIGHT OF TEST VEHICLE WITHOUT FUEL

TOTAL WEIGHT = 1481.5 kg

WEIGHT OF FUEL

TOTAL WEIGHT = 44.4 kg

WEIGHT OF TEST VEHICLE WITH 90 % OF FUEL MASS (UNLADEN WEIGHT):

TOTAL WEIGHT = 1521.5 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT

Weight of Test Vehicle with 90 % Fuel Mass	= <u>1521.5</u> kg
Weight of 2 ES-2 Dummies and Instrumentation	= <u>200.0</u> kg
TEST VEHICLE TARGET WEIGHT	= <u>1721.5</u> kg

TEST VEHICLE ATTITUDE

	Curb Weight	Ready For Test
Right Front	708 mm	697 mm
Left Front	702 mm	691 mm
Right Rear	682 mm	639 mm
Left Rear	685 mm	638 mm
Test Vehicle Wheelbase	<u>2760</u> mm	
C G As Tested	<u>1107</u> mm rearward of front wheel centerline	

GENERAL VEHICLE TEST PARAMETER DATA (Cont'd)TOTAL VEHICLE LENGTHRight Side 4330 mmCenterline: 5000 mmLeft Side. 4330 mmFRONT SEAT CUSHION PLACEMENT:Total Length of Adjustment Travel 255 mmTest Position: 127 mm rearward of 255 totalFRONT SEAT BACK ADJUSTMENT POSITION.Seat Back Angle 26 5 degreesREAR SEATTotal Length of Fore/Aft Adjustment Travel non adjustableSeat Back Adjustment Position. non-adjustableADJUSTABLE STEERING COLUMN POSITIONmid positionWINDOW POSITIONSLeft Front ClosedLeft Rear RemovedRight Front ClosedRight Rear RemovedAMOUNT OF WATER IN FUEL TANKTest mass added = 40 0 kgLOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:Impact Point is 440 mm rearward of front axle centerline

## DATA SHEET NO 2

TEST VEHICLE SUMMARY OF RESULTSYear/Make/Model/Body Style. 1996/Ford/Taurus/4 doorTest Date: August 11, 2000Overall Length 5000 mm, Overall Width at B-Post 1856 mmTEST WEIGHT

Right Front	<u>495.8</u> kg	Right Rear	<u>330.2</u> kg
Left Front	<u>543.9</u> kg	Left Rear:	<u>366.5</u> kg
TOTAL FRONT	<u>1039.7</u> kg	TOTAL REAR:	<u>696.7</u> kg
% of Total Weight	<u>59.9</u> %	% of Total Weight	<u>40.1</u> %
TOTAL WEIGHT	<u>1736.4</u> kg		

Wheelbase 2760 mmLongitudinal C G from Center of Front Axle 1107 mmImpact Angle with Respect to Impactor: 90 degreesMAXIMUM EXTERIOR STATIC CRUSH

1	LEVEL 1 ( <u>250</u> mm above ground)	<u>270</u> mm
2	LEVEL 2 ( <u>458</u> mm above ground)	<u>415</u> mm
3.	LEVEL 3 ( <u>605</u> mm above ground)	<u>406</u> mm
4.	LEVEL 4 ( <u>880</u> mm above ground)	<u>308</u> mm
5	LEVEL 5 ( <u>1345</u> mm above ground)	<u>81</u> mm

Maximum Post-Test Intrusion 415 mm @ Level 2OCCUPANTS

	<u>Left Front Driver</u>	<u>Left Rear Passenger</u>
Type of Dummy	<u>ES-2</u>	<u>ES-2</u>
Restraints Used	<u>Type II belt</u>	<u>Type II belt</u>

TEST VEHICLE SUMMARY OF RESULTS (Cont'd)INSTRUMENTATION

Number of Vehicle Data Channels: 29

Number of Cameras

Onboard Vehicle	<u>3</u>
Offboard Vehicle	<u>6</u>
Deformable Barrier	<u>1</u>
TOTAL	<u>10</u>

## DATA SHEET NO 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTSImpactor European Moving Deformable BarrierTest Date August 11, 2000POSITION OF IMPACT (MDB) ON MONORAILCrabbed: 0 degreesMDB DETAILS

Wheelbase of Framework Carriage:	<u>2998</u> mm
Track Width (Front & Rear)	<u>1500</u> mm
C.G Location Rearward of Front Axle:	<u>995</u> mm
C G Location From Centerline	<u>1</u> mm
C G Location Above Ground Level	<u>481</u> mm
Tire Manufacturer	<u>Firestone</u>
Tire Size	<u>P155/80R13</u>
Tire Pressure:	<u>25</u> psi

MDB WEIGHT

Right Front.	<u>378.8</u> kg	Right Rear.	<u>97.5</u> kg
Left Front	<u>251.3</u> kg	Left Rear	<u>223.2</u> kg
TOTAL FRONT	<u>630.1</u> kg	TOTAL REAR	<u>320.7</u> kg
% of Total Weight	<u>66.3</u> %	% of Total Weight	<u>33.7</u> %
TOTAL MDB WEIGHT	<u>950.8</u> kg		

Impact Angle (MDB C/L to Target Vehicle C/L) = 0 degreesImpact Speed = Primary 49.2 kph; Secondary: 49.2 kph

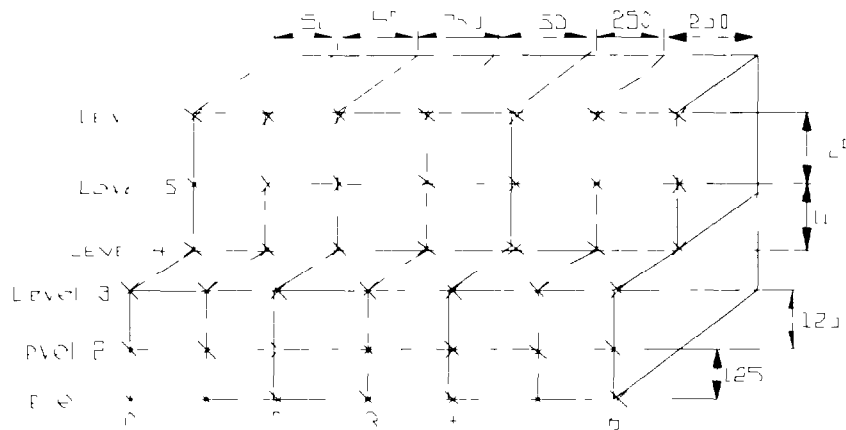
MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS (Cont'd)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

Level 1	Column 0	<u>376</u> mm
Level 2	Column 6	<u>368</u> mm
Level 3	Column 6	<u>343</u> mm
Level 4	Column 6	<u>242</u> mm
Level 5	Column 6	<u>254</u> mm
Level 6	Column 6	<u>284</u> mm

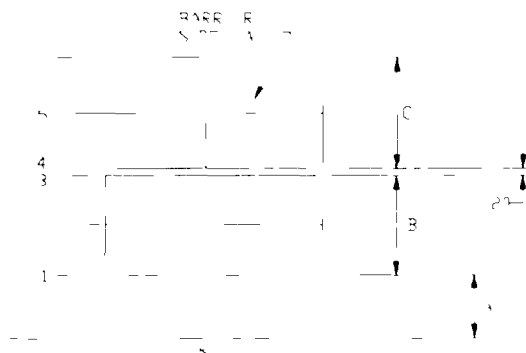
INSTRUMENTATION

Number of MDB Data Channels: 13



BARRIER FACE MEASUREMENTS POSITIONED AGAINST VEHICLE:

Dimensions in millimeters	Right	Left
A	301	298
B	247	247
C	247	247



## DATA SHEET NO 4

POST TEST OBSERVATIONSYear/Make/Model/Body Style 1996/Ford/Taurus/4 doorTest Date August 11, 2000VISIBLE DUMMY CONTACT POINTS

	<u>Left Front Driver</u>	<u>Left Rear Passenger</u>
Head	<u>Side header</u>	<u>C post</u>
Arm	<u>Window sill</u>	<u>Window sill</u>
Upper Rib	<u>Rear of door above armrest</u>	<u>Rear of door above armrest</u>
Mid Rib	<u>Rear of door above armrest</u>	<u>Rear of door above armrest</u>
Lower Rib	<u>Rear of door above armrest</u>	<u>Rear of door above armrest</u>
Abdomen	<u>Armrest</u>	<u>Armrest</u>
Pelvis	<u>Door trim below armrest</u>	<u>Rear of door below armrest</u>

DOOR OPENING

	<u>Left Side</u>	<u>Right Side</u>
Front	<u>Remained closed</u>	<u>Remained closed</u>
Rear	<u>Remained closed</u>	<u>Remained closed</u>

MDB DISTANCE FROM TARGET IMPACT POINTHorizontal 24 mm forwardVertical 11 mm upARM REST LOCATIONSFront 227 mm from bottom of windowRear 218 mm from bottom of windowSEAT CRUSH:Front Seat Back 76 mm      Front Seat Cushion 53 mmLeft Rear Seat Back 18 mm      Rear Seat Cushion 103 mm

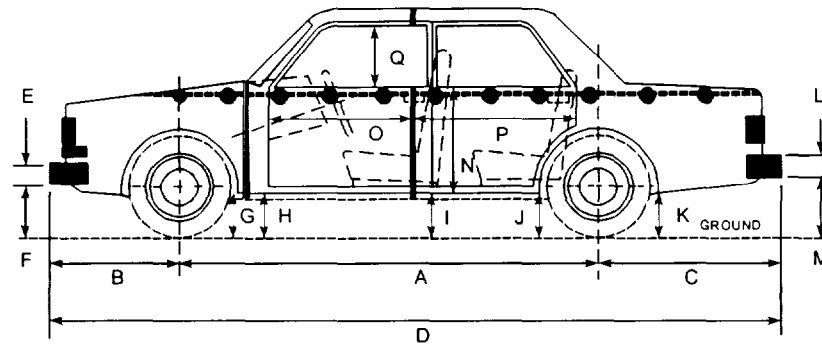
POST TEST OBSERVATIONS (Cont'd)GLAZING DAMAGE:Both left side windows broke, windshield crackedPILLAR PERFORMANCENo failures notedSILL SEPARATIONNone notedOTHER NOTABLE IMPACT EFFECTS:None noted

SECTION 4

OCCUPANT AND VEHICLE INFORMATION



## DATA SHEET NO 6

VEHICLE PRE AND POST-TEST MEASUREMENTS

LEFT SIDE VIEW

D=Length at Centerline  
T=Width at B Post

R=Right Side Length  
J1=To Pinch Weld

S=Left Side Length  
J2= To Sill

E&L=Bumper Thickness

	PRE-TEST	POST-TEST	$\Delta$ CHANGE
A	2760	2765	-5
B	1065	1060	5
C	1175	1165	10
D	5000	4990	10
E	140	140	0
F	364	378	-14
G	164	173	-9
H	164	123	41
I	154	112	42
J1	140	149	-9
J2	140	138	2
K	218	204	14
L	205	205	0
M	314	302	12
N	670	710	-40
O	812	775	37
P	1224	1180	44
Q	468	453	15
R	4330	4326	4
S	4330	4246	84
T	1856	1540	316

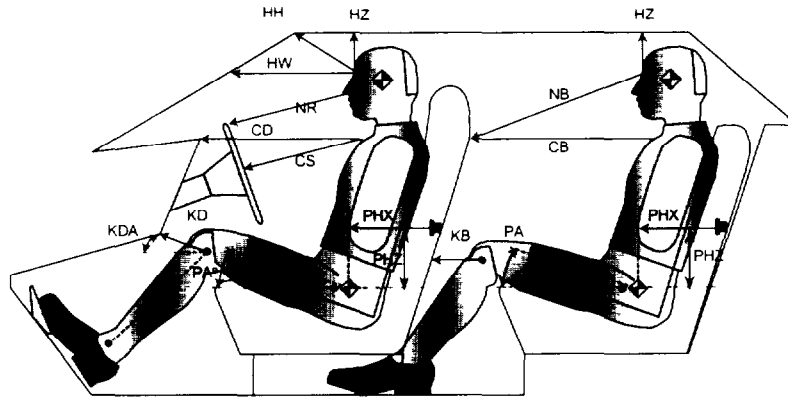
All measurements in millimeters

DATA SHEET NO 7

LATERAL IMPACT DUMMY (EUROSID) LONGITUDINAL CLEARANCE DIMENSIONS

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

Test Date August 11, 2000



Note All dimensions are in millimeters with tolerance of  $\pm 3$  mm

	Left Front Driver ID # 001	Left Rear Passenger ID # 002
HH	337	NA
HW	523	NA
HZ	152	116
NR/NB	468	661
CD/CB	568	608
CS	299	NA
KDL/(KDA)	159 (0.0)	293 (0 0)
KDR/(KDA)	163 (0 0)	281 (0 0)
PA (longitudinal)	22 4	25 6
PA (lateral)	0.3	1 3
Spine Angle (longitudinal)	26 0	28 9
Spine Angle (lateral)	0 9	1 0
PHX	230	265
PHZ	103	300

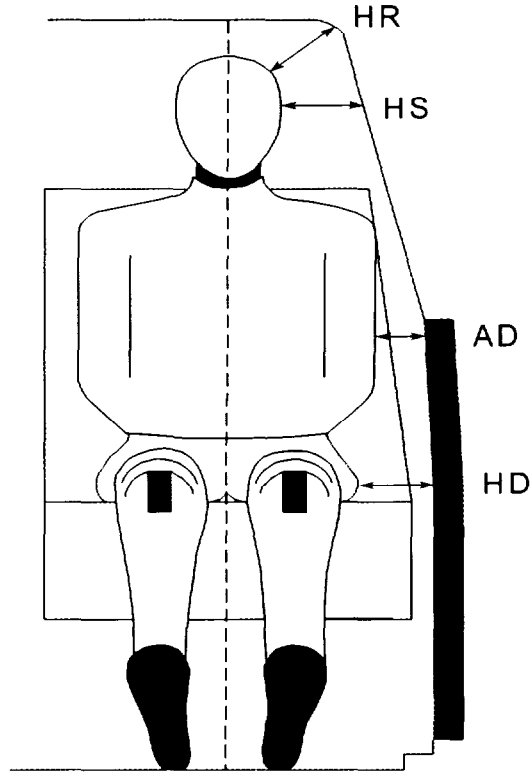
Two door vehicle shown Rear dummy PHX & PHZ measurements for 4-door vehicle use the C-Post striker as reference point

DATA SHEET NO 8

LATERAL IMPACT DUMMY (EUROSID) LATERAL CLEARANCE DIMENSIONS

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

Test Date    August 11, 2000



Note All dimensions are in millimeters

	Left Front Driver ID#001	Left Rear Passenger ID#002
HR	205	150
HS	315	214
AD	203	89
HD	157	169
Knee to Knee	295	270

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

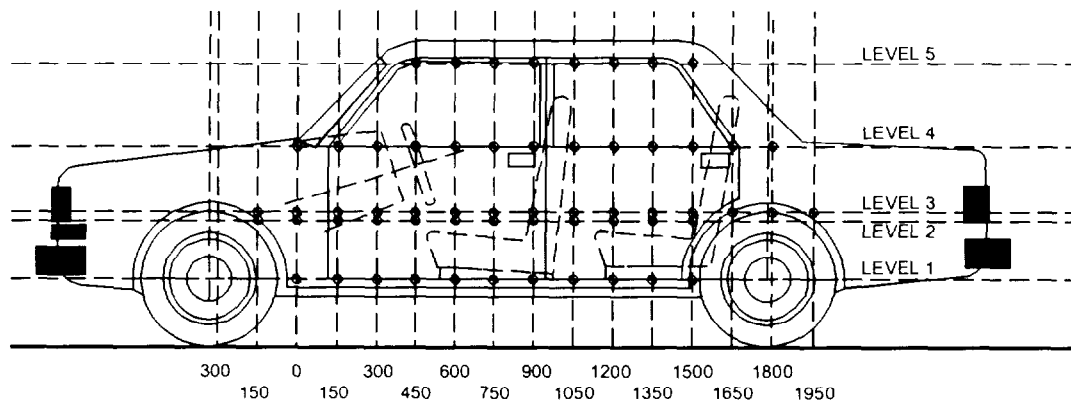
## DATA SHEET NO 9

DUMMY POSITIONING

	Left Front Driver ID#001		Left Rear Passenger ID#002	
	H-point	Dummy	H-point	Dummy
HP to Floor Z	170	182	54	50
HP to Hinge X	733	736	646	639
HP to Sill Y	200	204	200	210
HP to Striker X	371	369	485	490
HP to Dash X	491	490	628	620
HP to Header Z	749	738	714	705
HP to Front Axle		1254		2239
HP to Ground		528		526
<b>H-POINT MACHINE (deg)</b>				
Left Knee	119		103	
Right Knee	118		103	
Left Foot	111		128	
Right Foot	123		128	
Left Leg	103		114	
Right Leg	154		94	
Hip Angle	94		97	
Back Angle	24		25	

The H-Point measurements were obtained from the H-Point machine. The dummy measurements are for the dummies H-Point

## DATA SHEET NO 10

VEHICLE SIDE MEASUREMENTSYear/Make/Model/Body Style 1996/Ford/Taurus/4 doorTest Date. August 11, 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 IMPACT LINE

Level 5 @ Window Top	<u>1345</u> mm
Level 4 @ Window Sill	<u>880</u> mm
Level 3 @ Mid Door	<u>605</u> mm
Level 2 @ Occupant H-Point	<u>458</u> mm
Level 1 @ Axle Centerline Height (or Sill Top Height)	<u>250</u> mm

Vehicle Pitch Angle (measured at the left side sill) 0.5 Nose upVehicle Roll Angle (measured at the center of hood): 0.0

The "Zero Point" for the measurements is 440 mm rearward of the front spindle centerline. It is the same as the "Zero Point" for the FMVSS 214D test on this vehicle.

DATA SHEET NO 11  
VEHICLE EXTERIOR CRUSH PROFILES

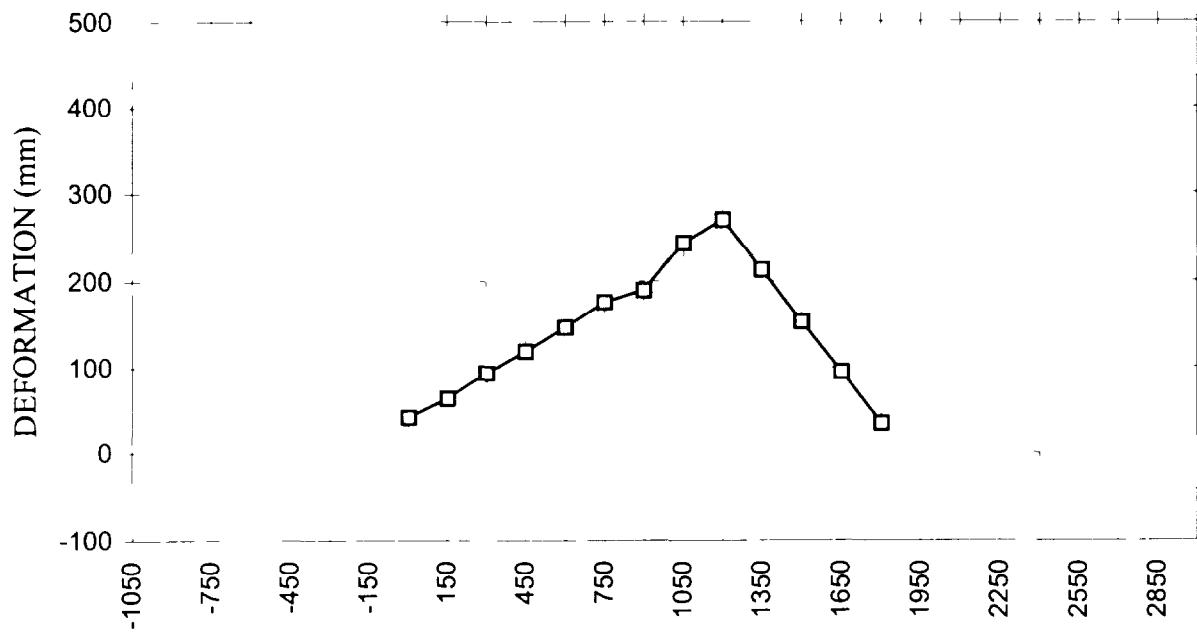
Longitudinal Distance (mm)	Level 1 – Axle Centerline		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	771	813	42
150	771	835	64
300	768	862	94
450	767	886	119
600	764	911	147
750	763	939	176
900	760	950	190
1050	757	1001	244
1200	759	1029	270
1350	757	970	213
1500	757	910	153
1650	756	851	95
1800	756	791	35
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

DISTANCE FROM IMPACT POINT (mm)



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

Longitudinal Distance (mm)	Level 2 – Occupant H Point		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)	704	745	41
150	698	805	107
300	693	876	183
450	690	923	233
600	686	967	281
750	682	1015	333
900	680	1067	387
1050	679	1094	415
1200	678	1047	369
1350	678	1031	353
1500	679	972	293
1650	679	918	239
1800	678	852	174
1950	680	736	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

DISTANCE FROM IMPACT POINT (mm)



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

Longitudinal Distance (mm)	Level 3 – Mid Door		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	793	802	9
-900	756	775	19
-750	733	762	29
-600			
-450			
-300			
-150	708	746	38
0 (impact point)	704	745	41
150	701	815	114
300	699	904	205
450	696	963	267
600	694	1018	324
750	692	1066	374
900	690	1068	378
1050	689	1095	406
1200	689	1046	357
1350	689	1057	368
1500	686	1017	331
1650	683	967	284
1800	681	906	225
1950	679	810	131
2100	674	730	56
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 3 – MID DOOR

DISTANCE FROM IMPACT POINT (mm)



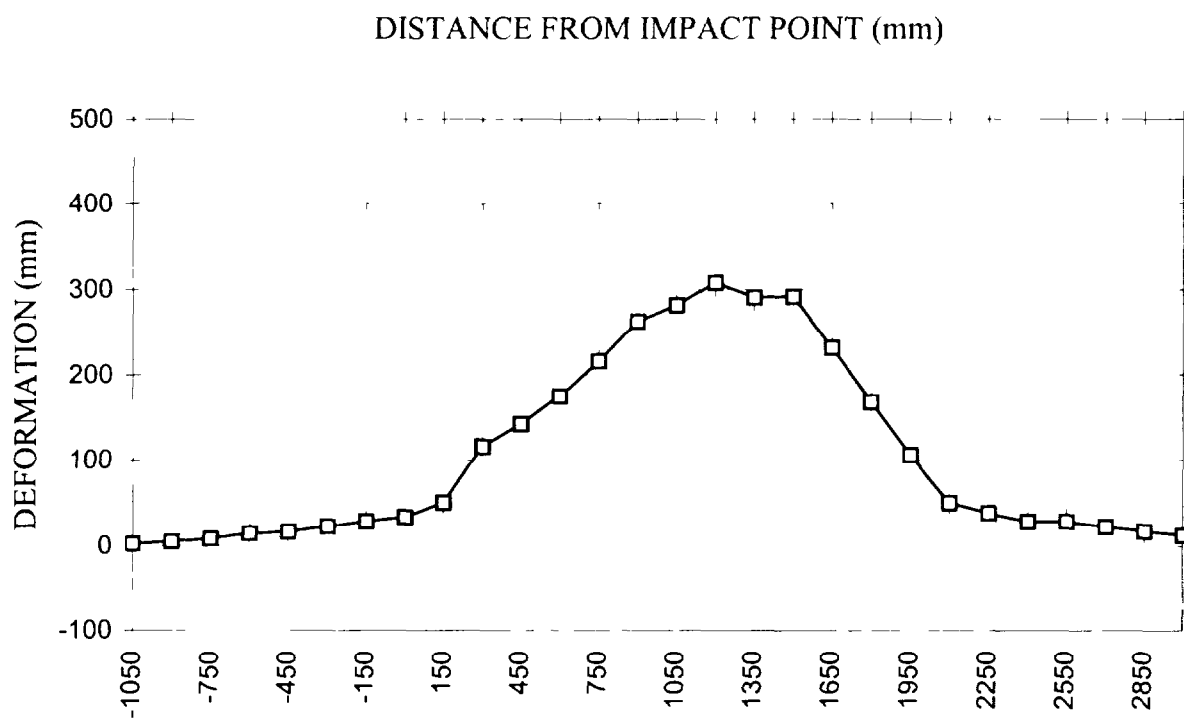
DATA SHEET NO 11 (Cont'd)  
VEHICLE EXTERIOR CRUSH PROFILES

Longitudinal Distance (mm)	Level 4 – Window Sill		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050	863	866	3
-900	844	849	5
-750	827	836	9
-600	808	823	15
-450	799	816	17
-300	787	810	23
-150	776	805	29
0 (impact point)	767	801	34
150	759	810	51
300	750	866	116
450	746	888	142
600	741	916	175
750	738	954	216
900	733	996	263
1050	732	1014	282
1200	730	1038	308
1350	731	1022	291
1500	732	1024	292
1650	732	964	232
1800	729	897	168
1950	730	836	106
2100	734	785	51
2250	742	781	39
2400	748	777	29
2550	760	789	29
2700	777	800	23
2850	796	814	18
3000	819	832	13

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

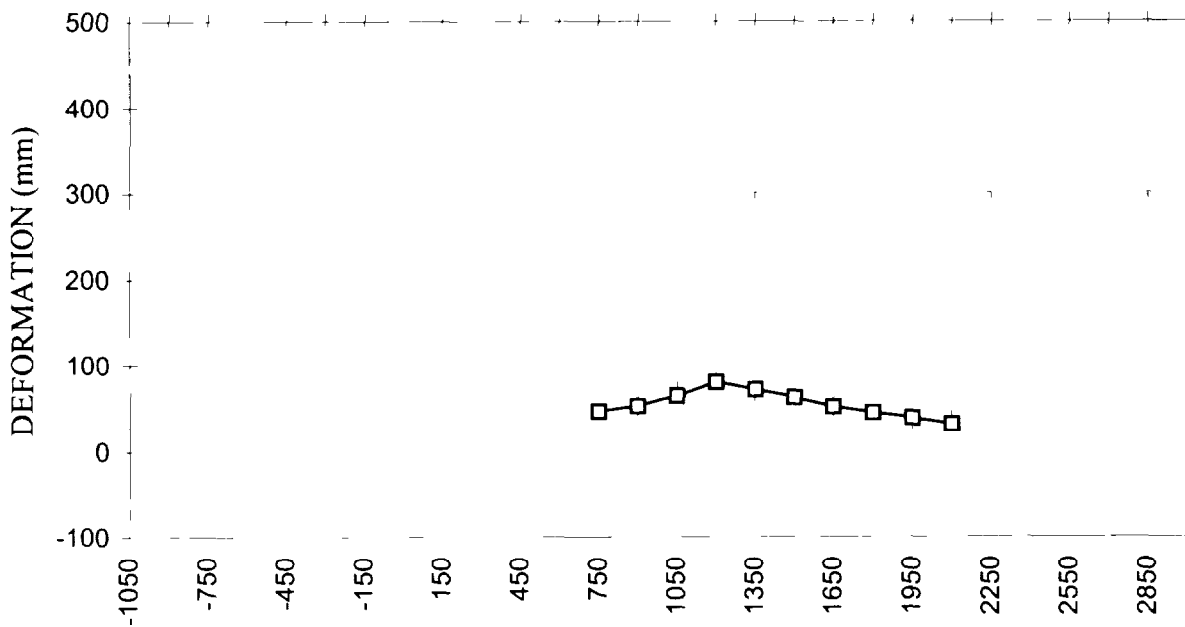
Longitudinal Distance (mm)	Level 5 – Window Top		
	Pre-Test (mm)	Post-Test (mm)	Static Crush (mm)
-1050			
-900			
-750			
-600			
-450			
-300			
-150			
0 (impact point)			
150			
300			
450			
600			
750	1023	1070	47
900	1015	1068	53
1050	1011	1076	65
1200	1008	1089	81
1350	1005	1077	72
1500	1001	1064	63
1650	998	1050	52
1800	997	1042	45
1950	1003	1042	39
2100	1009	1041	32
2250			
2400			
2550			
2700			
2850			
3000			

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

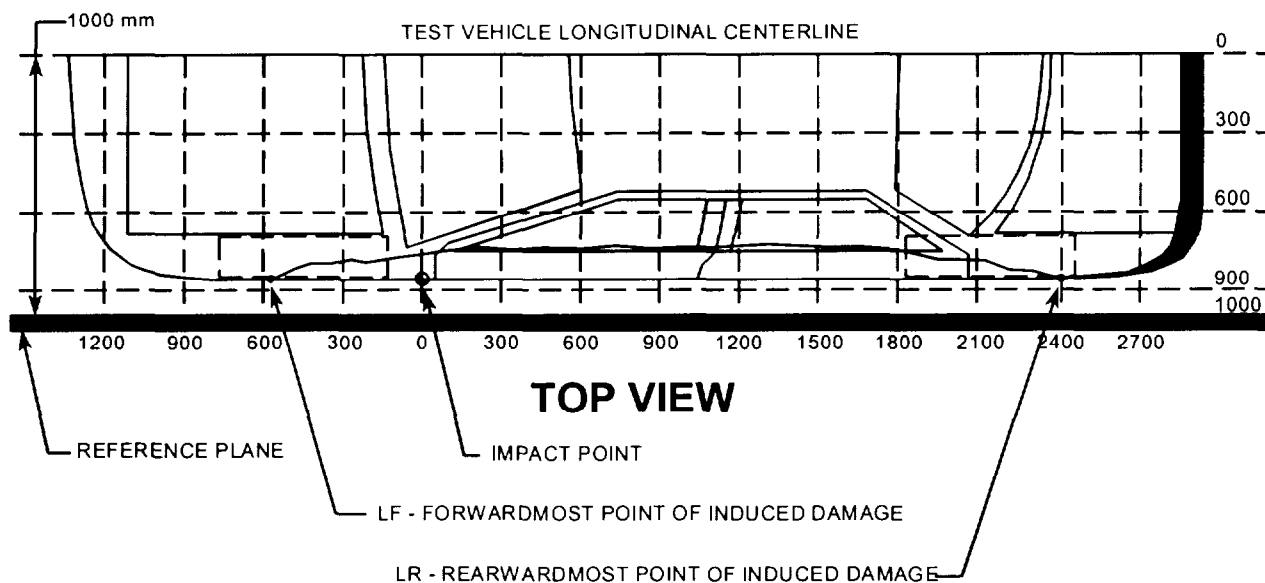
VEHICLE EXTERIOR CRUSH PROFILES (Cont'd)

LEVEL 5 – WINDOW TOP

DISTANCE FROM IMPACT POINT (mm)



## DATA SHEET NO 12

VEHICLE DAMAGE PROFILE DISTANCESYear/Make/Model/Body Style 1996/Ford/Taurus/4 doorTest Date August 11, 2000

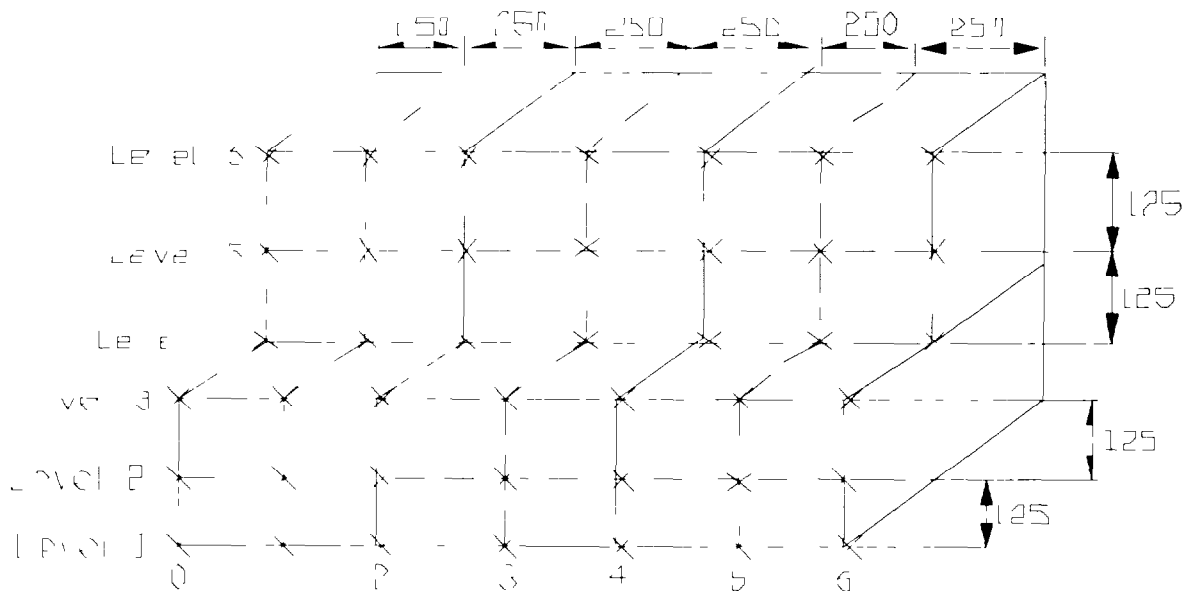
## MEASUREMENT CONVENTIONS

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

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

LEVEL	DPD MEASUREMENTS	POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
3	1 (LR = 2550 mm)	726	694	32
3	2 1950 mm	810	679	131
3	3 920 mm	1072	690	382
3	4. 414 mm	949	696	253
4	5. -310 mm	811	788	23
3	6 (LF = -1050 mm)	802	793	9

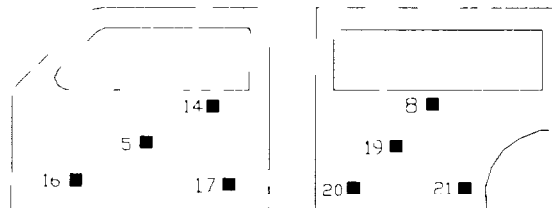
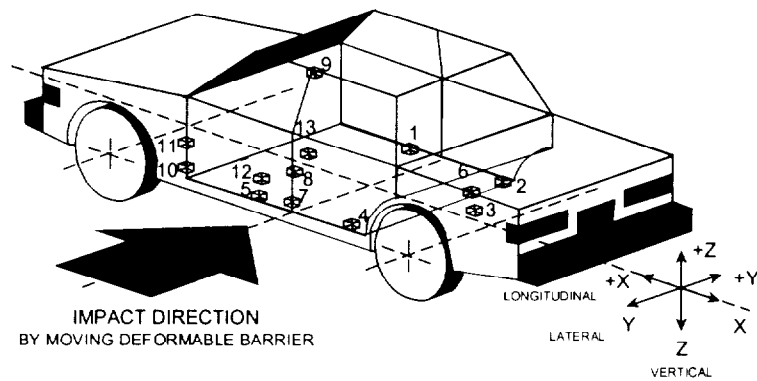
## DATA SHEET NO 13

EXTERIOR STATIC CRUSH FOR SIDE IMPACTORYear/Make/Model/Body Style 1996/Ford/Taurus/4 doorTest Date August 11, 2000

## Post-Test Static Deformation (mm)

LEVEL	COLUMN						
	0	1	2	3	4	5	6
6	202	94	124	124	130	200	284
5	194	98	80	76	66	56	254
4	191	107	59	26	74	168	242
3	260	175	121	83	134	232	343
2	340	230	130	89	192	278	368
1	376	257	155	160	218	279	371

## DATA SHEET NO. 14

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARYYear/Make/Model/Body Style     1996/Ford/Taurus/4 doorTest Date     August 11, 2000

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

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

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

Test Date     August 11, 2000

Accel No.	Description	Long (X)		Lat. (Y)		Vert. (Z)		Resultant (g's) (CFC 60)
		Maximums (g's) (CFC 60)		Maximums (g's) (CFC 60)		Maximums (g's) (CFC 60)		
		Pos	Neg	Pos	Neg	Pos	Neg.	Max
1	Right Side Sill @ Front Seat	2.3	1.1	17.3	3.6	3.0	4.8	17.4
2	Right Side Sill @ Rear Seat	3.2	1.2	14.7	2.7	3.0	3.3	15.1
3	Rear Floorpan Above Axle	3.4	2.4	13.2	1.8	7.8	8.9	15.3
4	Left Side Sill @ Rear Seat	---	---	43.1	5.7	---	---	---
5	Left Side Sill @ Front Seat	---	---	41.1	49.9	---	---	---
6	Right Rear Occ Compartment	---	---	14.2	1.5	---	---	---
7	Left Lower B Post	---	---	68.6	61.1	---	---	---
8	Left Mid B Post	---	---	70.0	46.8	---	---	---
9	Left Upper B Post	---	---	33.3	8.0	---	---	---
10	Left Lower A Post	---	---	11.9	2.1	---	---	---
11	Left Mid A Post	---	---	14.1	3.6	---	---	---
12	Driver Left Seat Track	---	---	35.4	20.3	---	---	---
13	Vehicle CG	3.5	4.0	19.8	3.0	19.4	17.3	23.8
14	Left Front Door Upper	---	---	94.0	57.9	---	---	---
15	Left Front Door Mid	---	---	98.7	54.3	---	---	---
16	Left Front Door Lower	---	---	89.6	31.5	---	---	---
17	Left Front Door Rear Lower	---	---	131.4	79.6	---	---	---
18	Left Rear Door Upper	---	---	137.8	29.3	---	---	---
19	Left Rear Door Mid	---	---	165.9	101.8	---	---	---
20	Left Rear Door Lower	---	---	174.2	157.2	---	---	---
21	Left Rear Door Rear Lower	---	---	158.2	96.3	---	---	---

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY (Cont'd)Year/Make/Model/Body Style     1996/Ford/Taurus/4 doorTest Date     August 11, 2000

Accel No.	Description	Coordinates		
		(mm)*		
		X	Y	Z
1	Right Side Sill @ Front Seat	2624	670	190
2	Right Side Sill @ Rear Seat	1647	662	186
3	Rear Floorpan Above Axle	1222	0	498
4	Left Side Sill @ Rear Seat	1683	-662	172
5	Left Side Sill @ Front Seat	2670	-670	184
6	Right Rear Occ Compartment	2000	365	310
7	Left Lower B Post	2275	-710	380
8	Left Mid B Post	2272	-736	779
9	Left Upper B Post	2285	-544	1306
10	Left Lower A Post	3068	-700	350
11	Left Mid A Post	3068	-700	350
12	Driver Left Seat Track	2203	-572	240
13	Vehicle CG	2698	0	260
14	Left Front Door Upper	2600	-766	837
15	Left Front Door Mid	2850	-775	677
16	Left Front Door Lower	3044	-759	519
17	Left Front Door Rear Lower	2550	-770	560
18	Left Rear Door Upper	1817	-765	840
19	Left Rear Door Mid	2012	-782	673
20	Left Rear Door Lower	2182	-780	546
21	Left Rear Door Rear Lower	1768	-805	518

\* Reference X – Rear Bumper (+ Forward)

Y – Vehicle Centerline (+ to right)

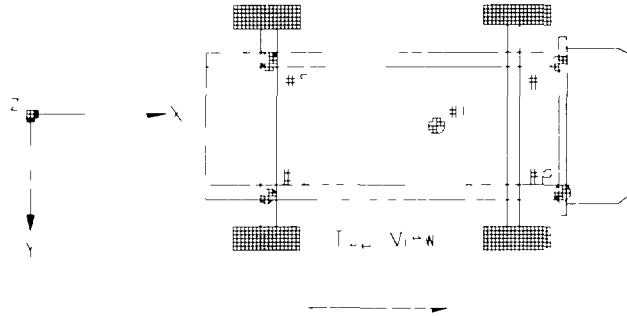
Z – Ground Level (+ up)

DATA SHEET NO 15

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS AND DATA SUMMARY

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

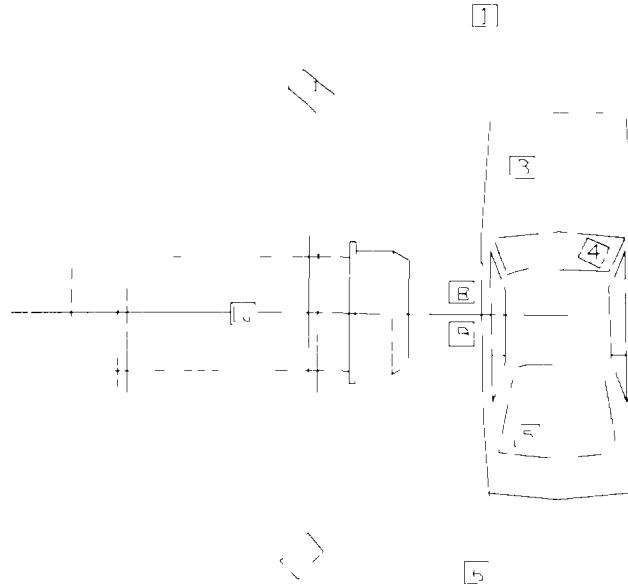
Test Date     August 11, 2000



Accel No.	Description	Coordinates (mm)*			(+ ) Positive		(-) Negative	
		X	Y	Z	Max. (g) (CFC 60)	Time (msec)	Max. (g) (CFC 60)	Time (msec)
1	MDB Center of Gravity	2215	0	540				
	Longitudinal (X)	---	---	---	1.1	158	17.5	45
	Lateral (Y)	---	---	---	1.7	16	0.8	25
	Vertical (Z)	---	---	---	2.5	54	2.3	18
	Resultant (R)	---	---	---	17.6	45	--	--
4	Right Rear Frame Member	216	505	685				
	Right Longitudinal (X)	---	---	---	0.7	136	17.9	43
	Right Lateral (Y)	---	---	---	2.4	86	1.6	180
5	Left Rear Frame Member	216	-505	685				
	Left Longitudinal (X)	---	---	---	0.8	141	17.7	44
	Left Lateral (Y)	---	---	---	2.1	87	1.9	42
2	Right Front Face	3650	770	765				
	Right Face (X)	---	---	---	1.0	130	18.8	43
3	Left Front Face	3650	-770	765				
	Left Face (X)	---	---	---	2.5	1	18.1	45

\* Reference X – Rear of Cart (+ Forward)  
 Y – Vehicle Centerline (+ to Right)  
 Z – Ground Level (+ Up)

## DATA SHEET NO. 12

HIGH SPEED CAMERA LOCATIONS AND DATAYear/Make/Model/Body Style: 1996/Ford/Taurus/4 doorTest Date August 11, 2000

Cam #	View	Coordinates (mm)*			Lens (mm)	Film Speed (fps)
		X	Y	Z		
	Real Time				10	24
1	Left Overall	560	-6180	1600	13	909
2	Left Impact Oblique	-3520	-5860	1460	25	1005
3	Onboard Hood				13	1010
4	Onboard Hood Angle				13	1005
5	Onboard Rear				13	990
6	Right Overall	730	7180	1680	13	803
7	Right Impact Oblique	-4240	4760	1390	25	1005
8	Top Overall	290	0	5000	8	870
9	Top Impact	-220	0	5000	13	NR
10	Cart				13	1000

\* Reference (from impact point)

+X = Forward

+Y = To Right

+Z = Upward from floor level

NR – No Run

## APPENDIX A – PHOTOGRAPHS

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

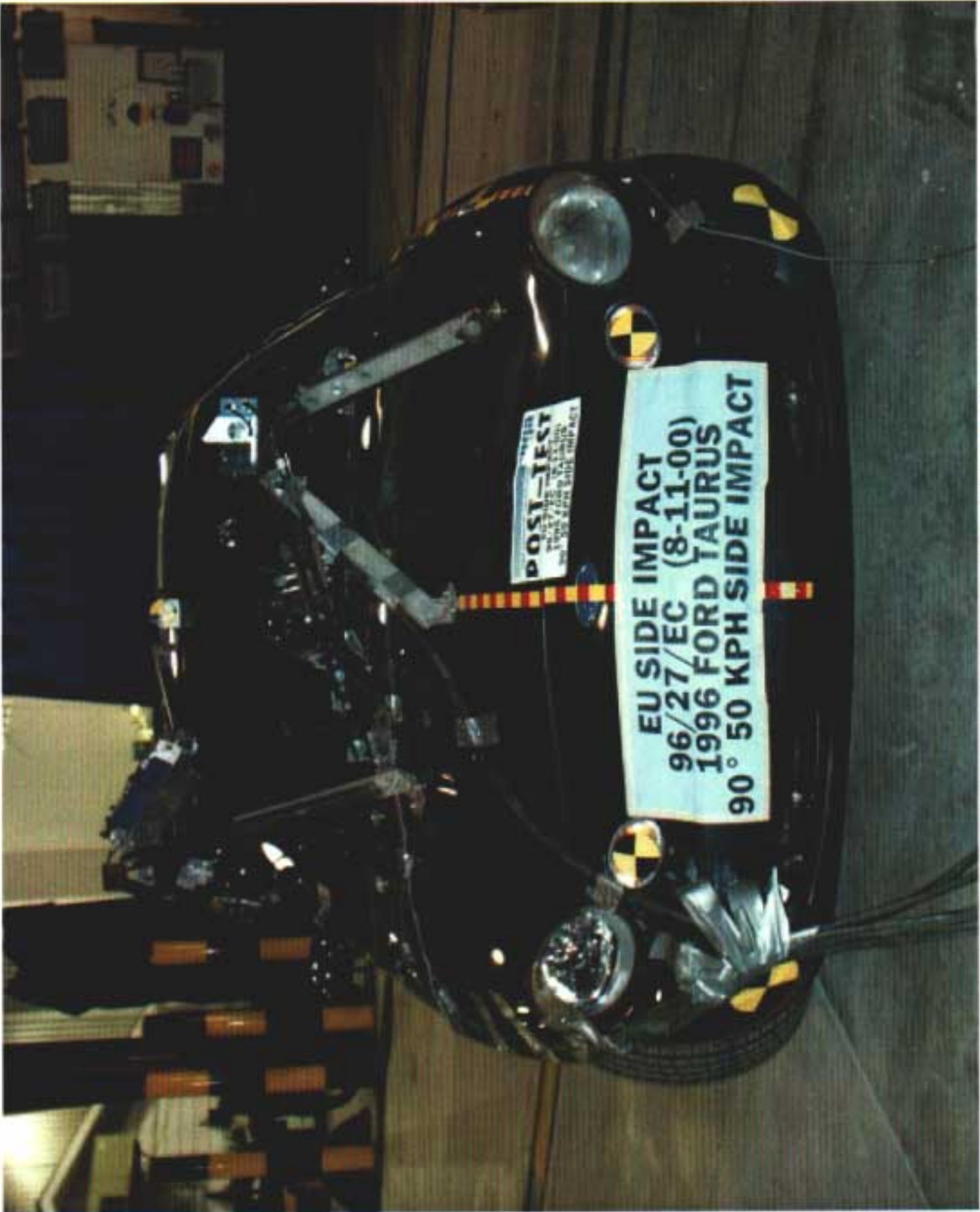


Photo No. A-2 – Post-Test Front View of Test Vehicle



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

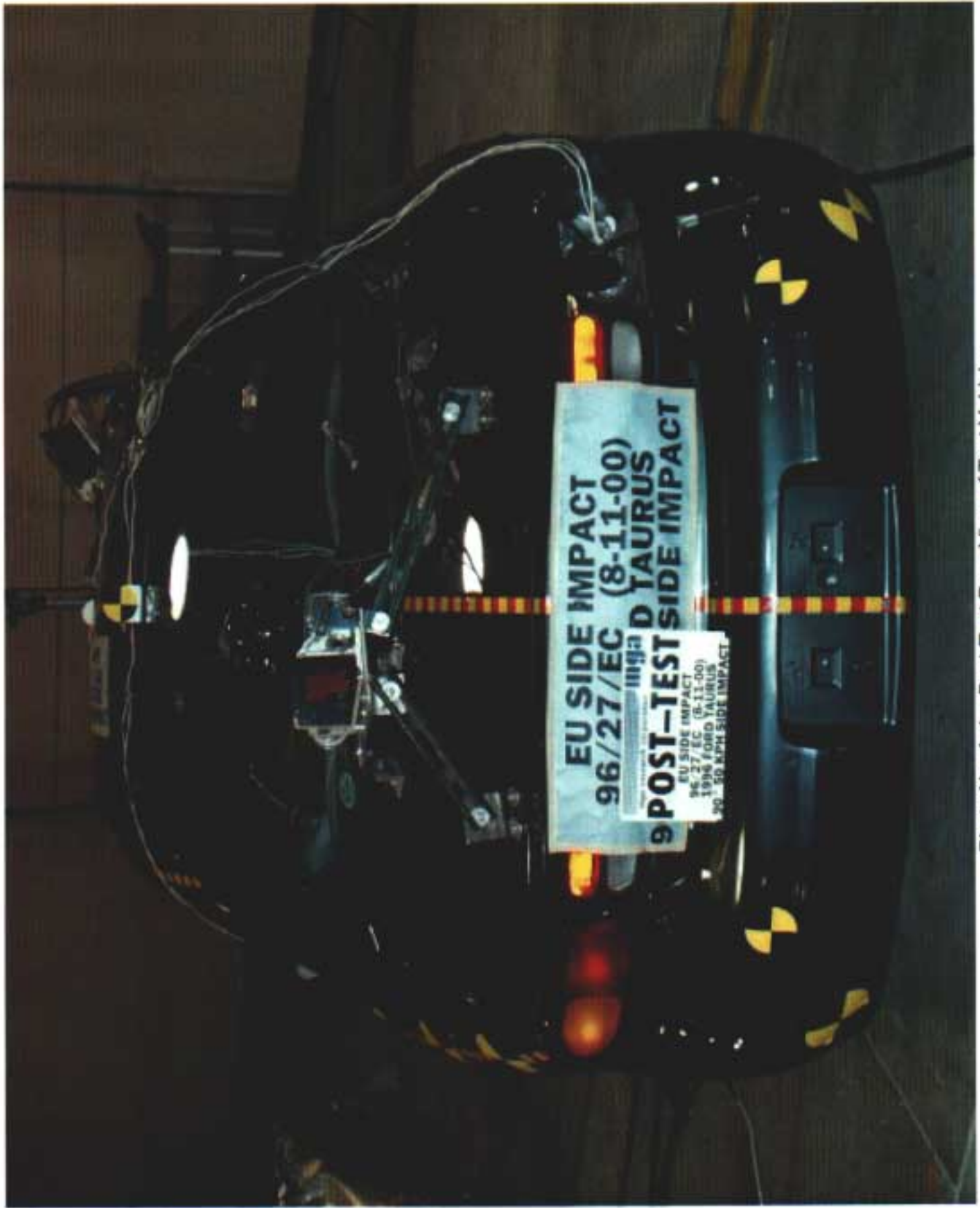


Photo No. A-4 – Post-Test Rear View of Test Vehicle

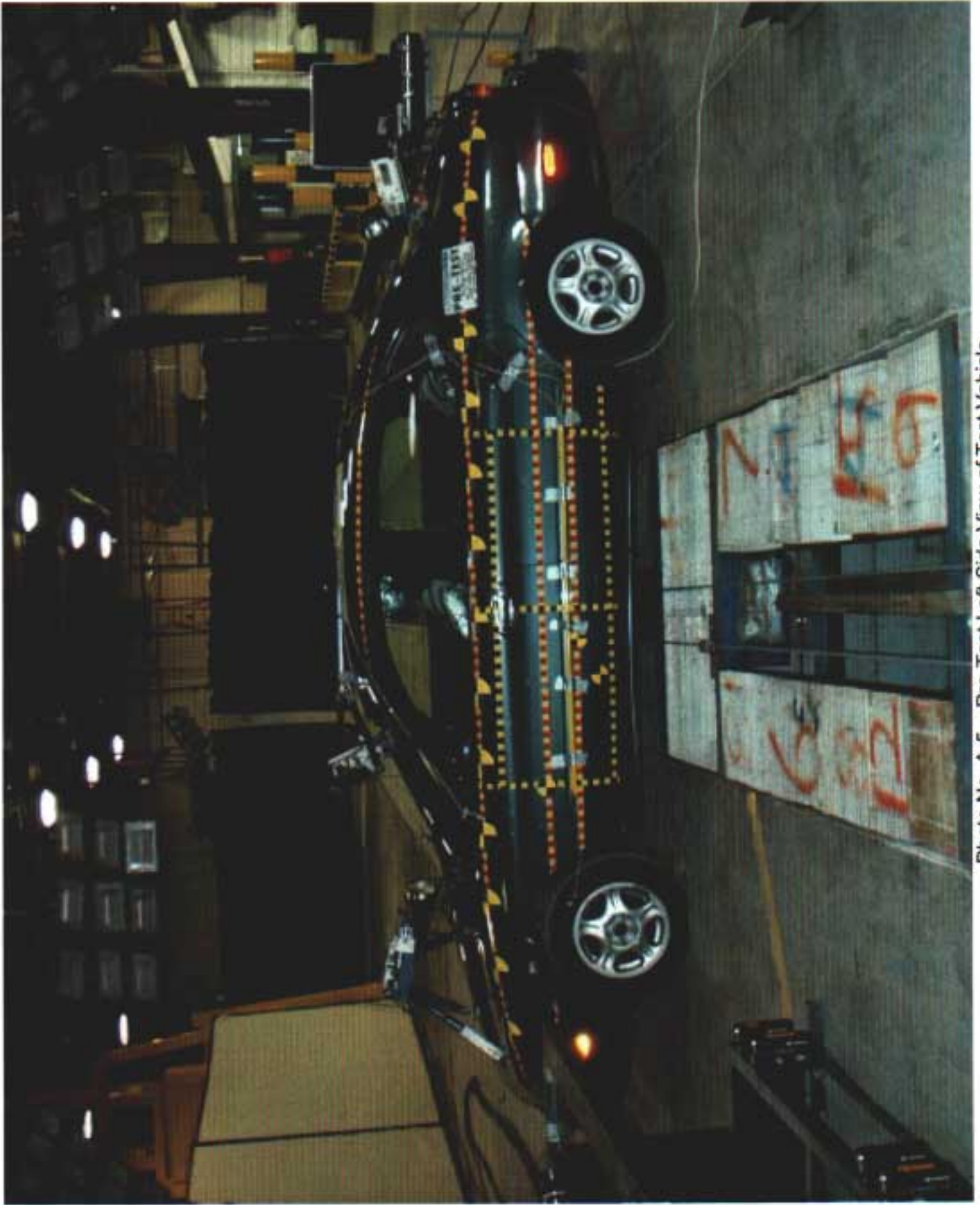


Photo No. A-5 – Pre-Test Left Side View of Test Vehicle



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

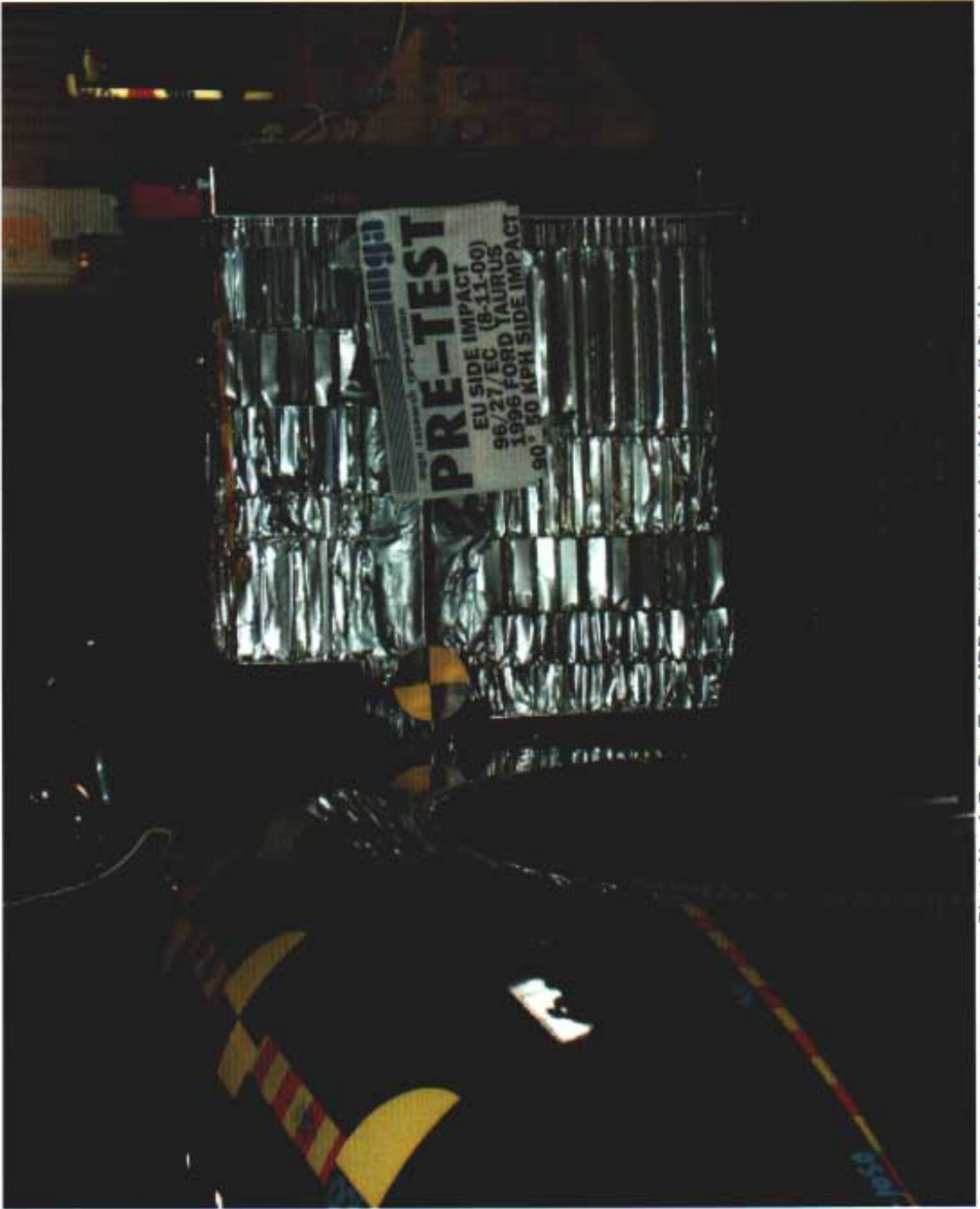


Photo No. A-7 – Pre-Test MDB Positioned Against Vehicle (left side)

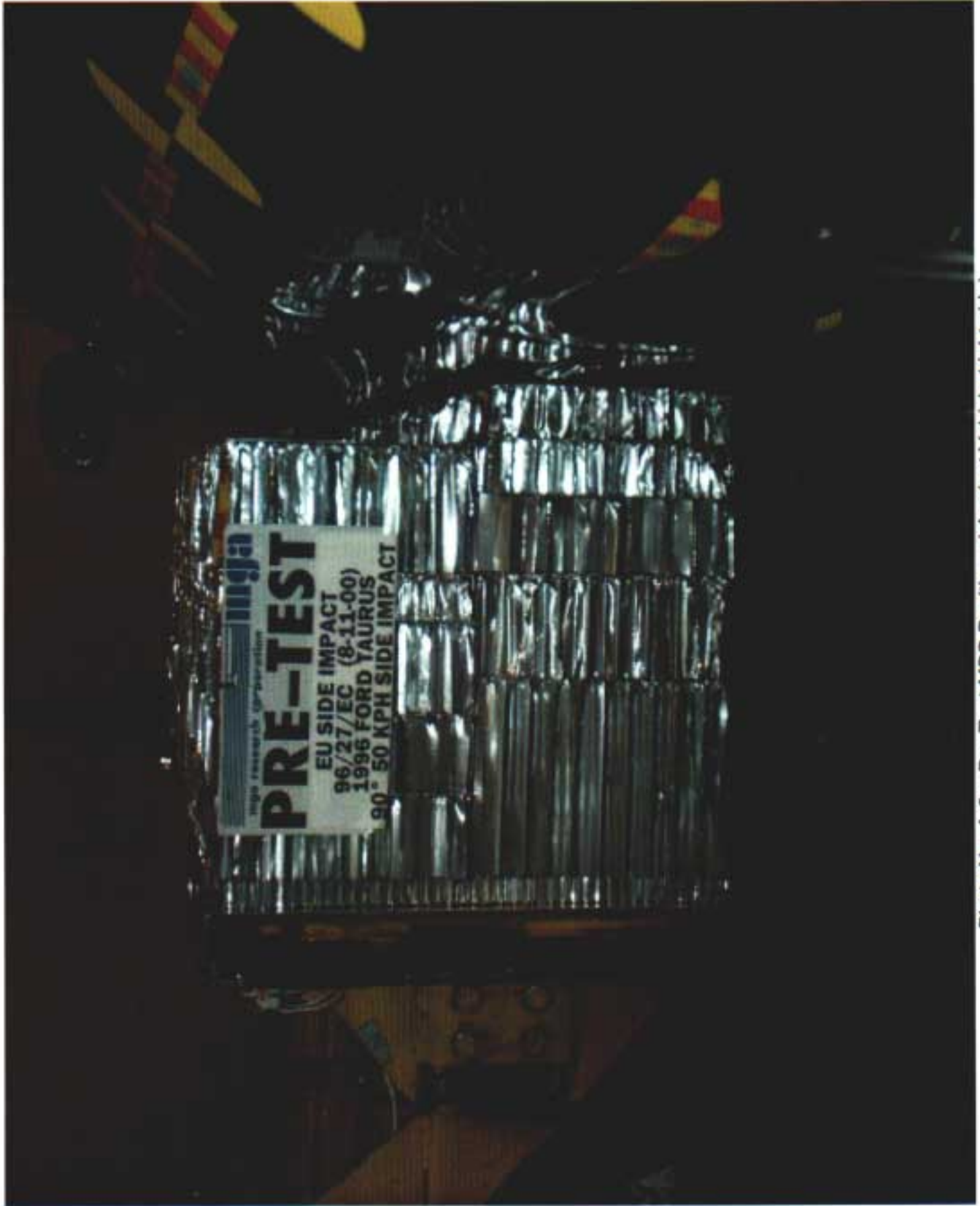


Photo No. A-8 – Pre-Test MDB Positioned Against Vehicle (right side)

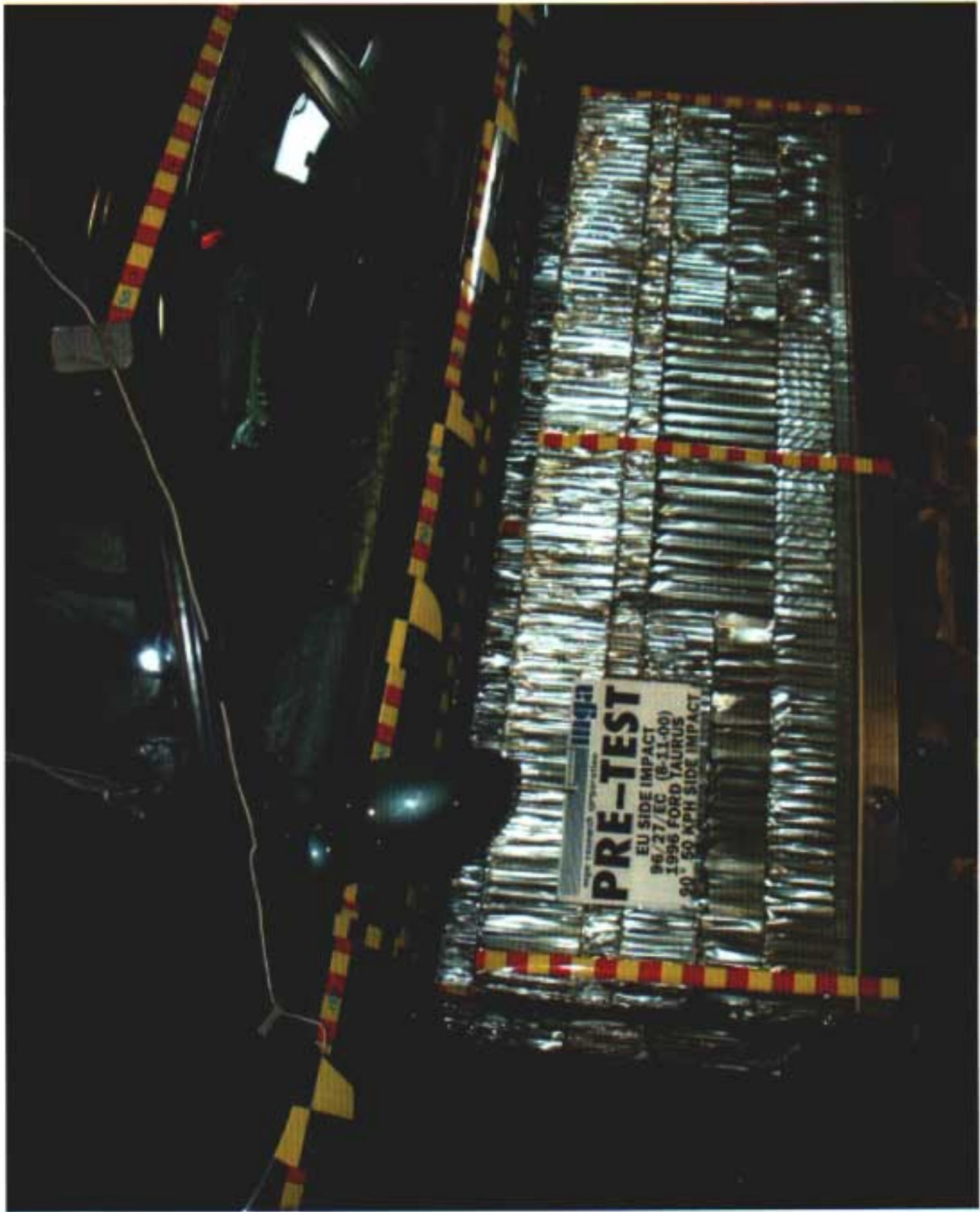


Photo No. A-9 – Pre-Test MDB Positioned Against Vehicle Overhead View



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 – Post-Test MDB Positioned Against Vehicle Overhead View

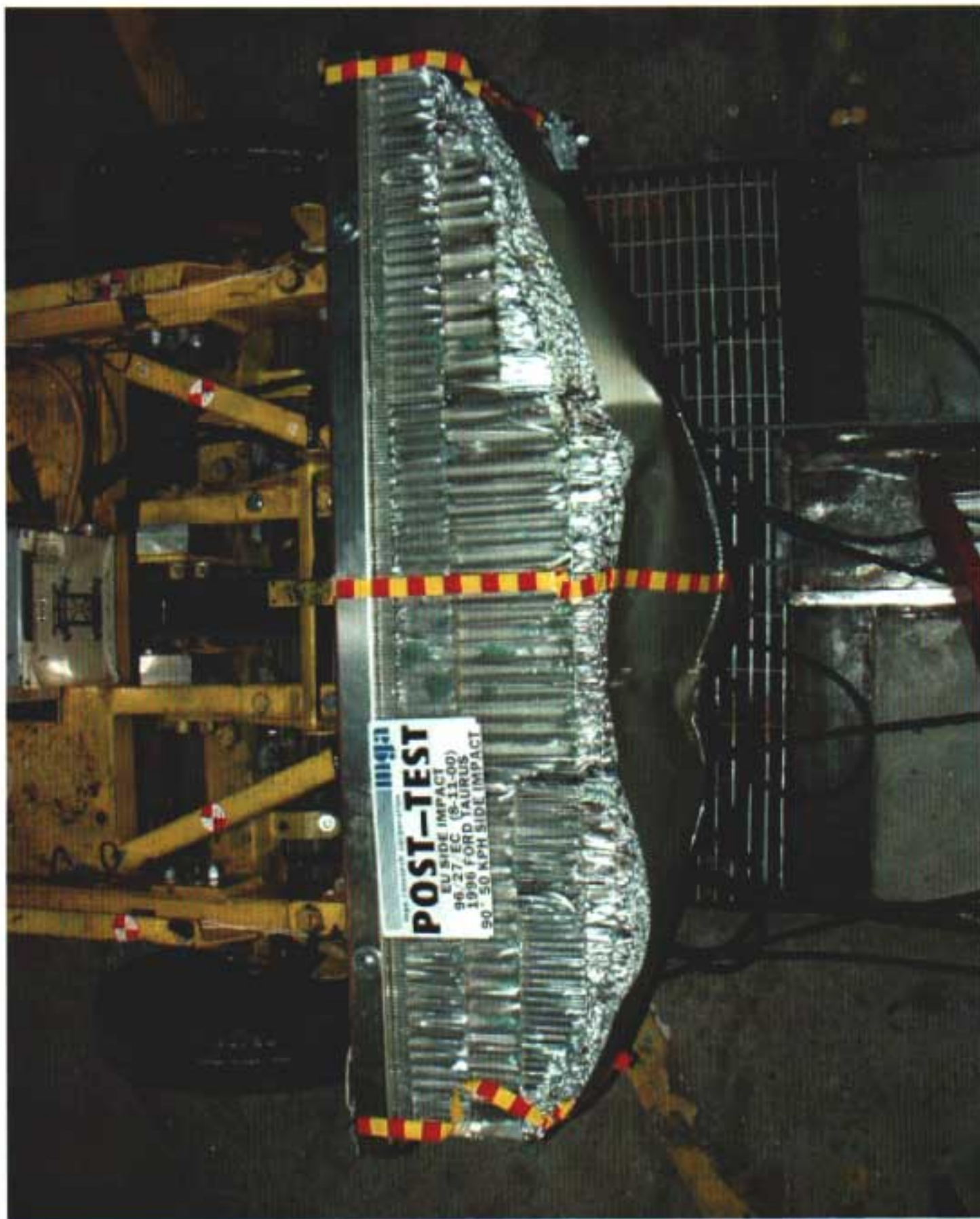


Photo No. A-13 – Post-Test MDB Top View



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



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

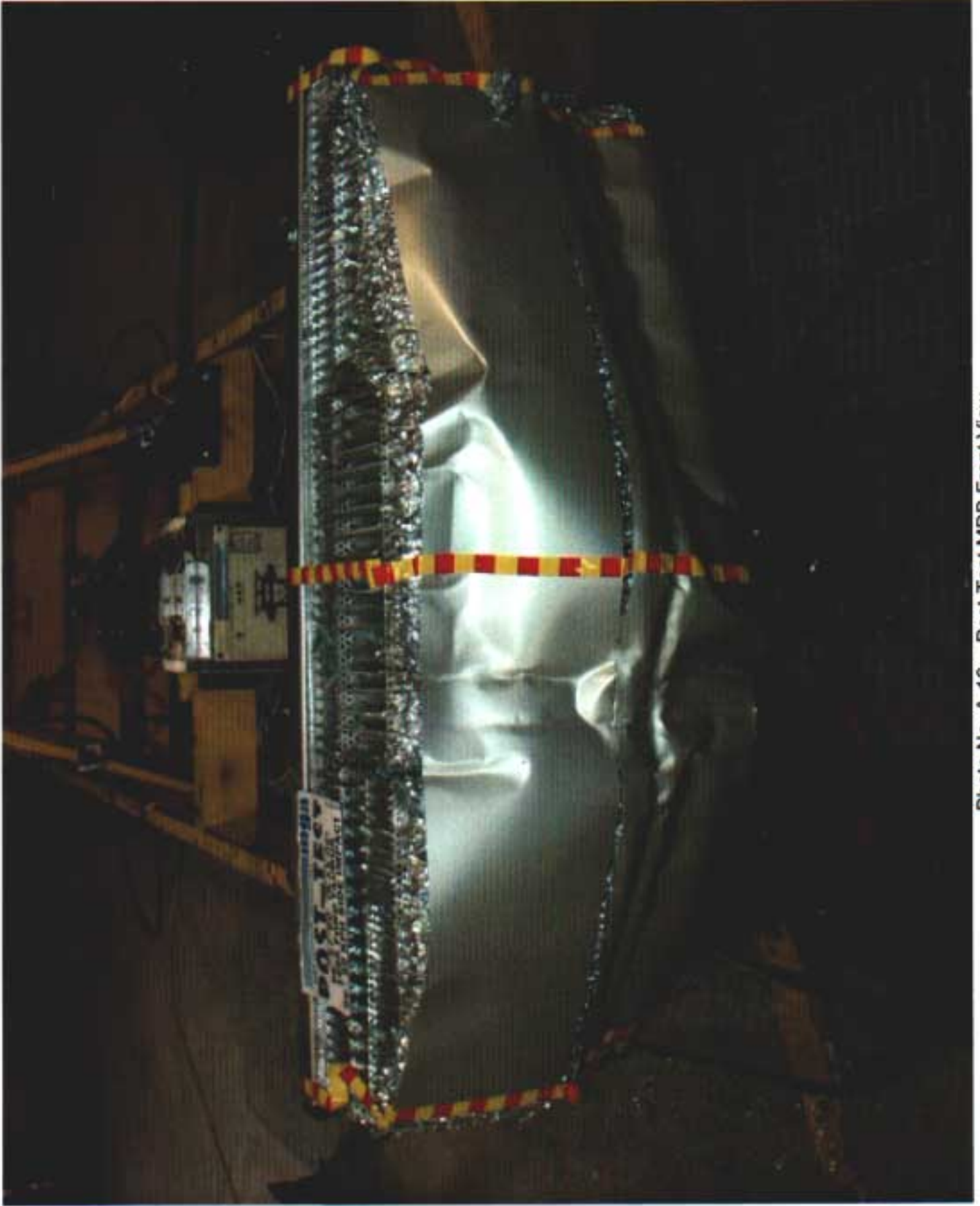


Photo No. A-16 – Post-Test MDB Front View



Photo No. A-17 – Pre-Test MDB Left Side View

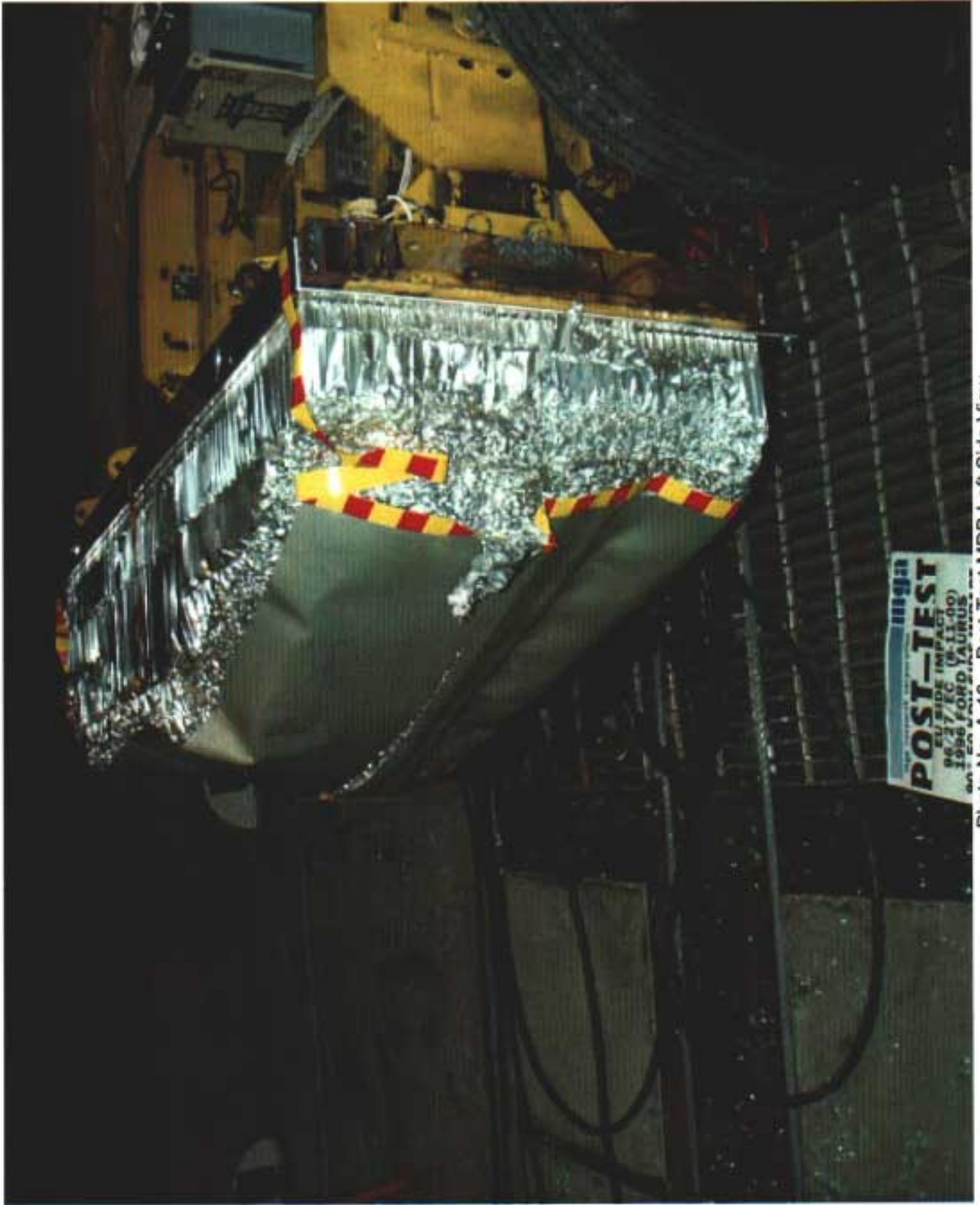


Photo No. A-18 – Post-Test MDB Left Side View



Photo No. A-19 – Pre-Test MDB Right Side View

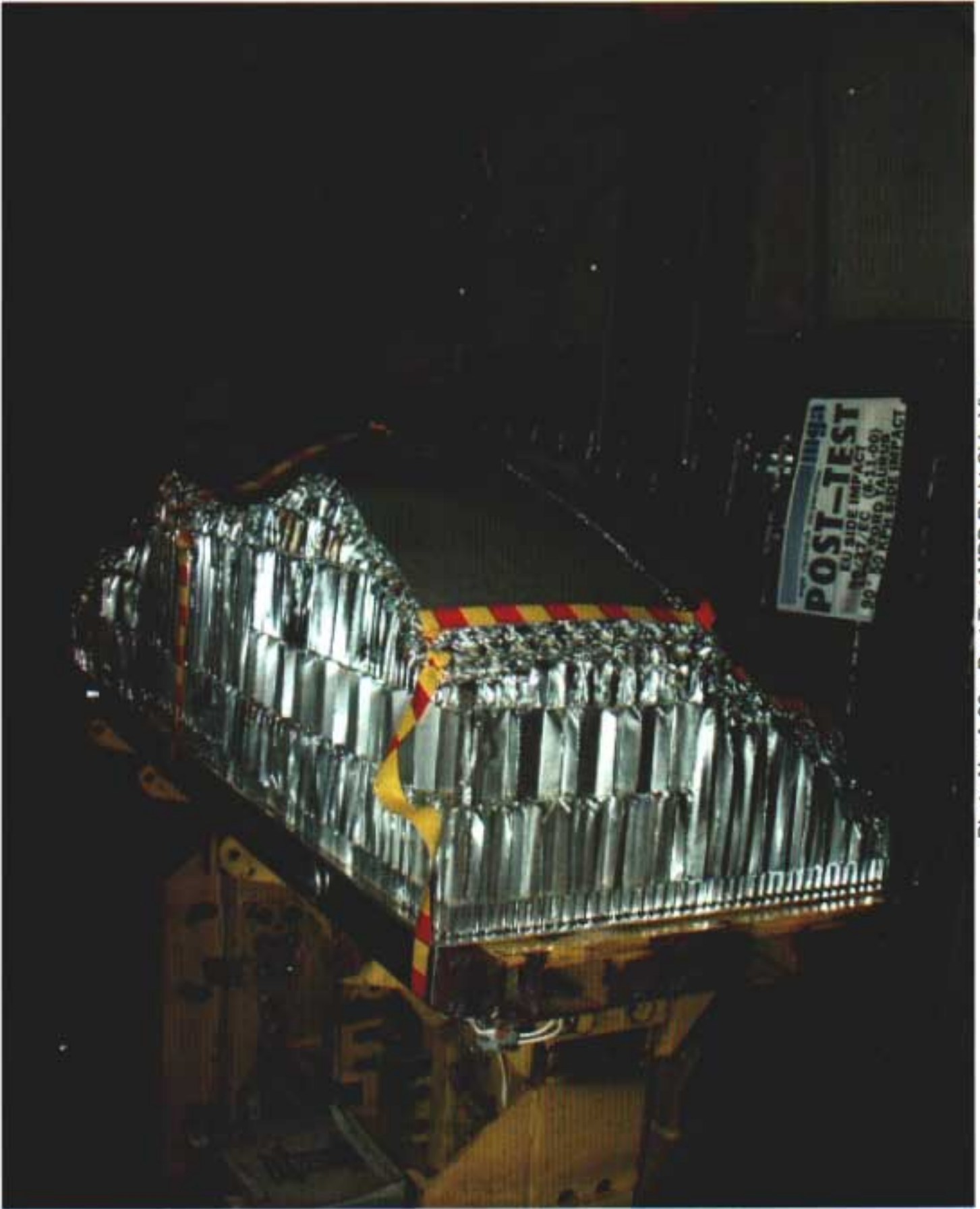


Photo No. A-20 – Post-Test MDB Right Side View



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

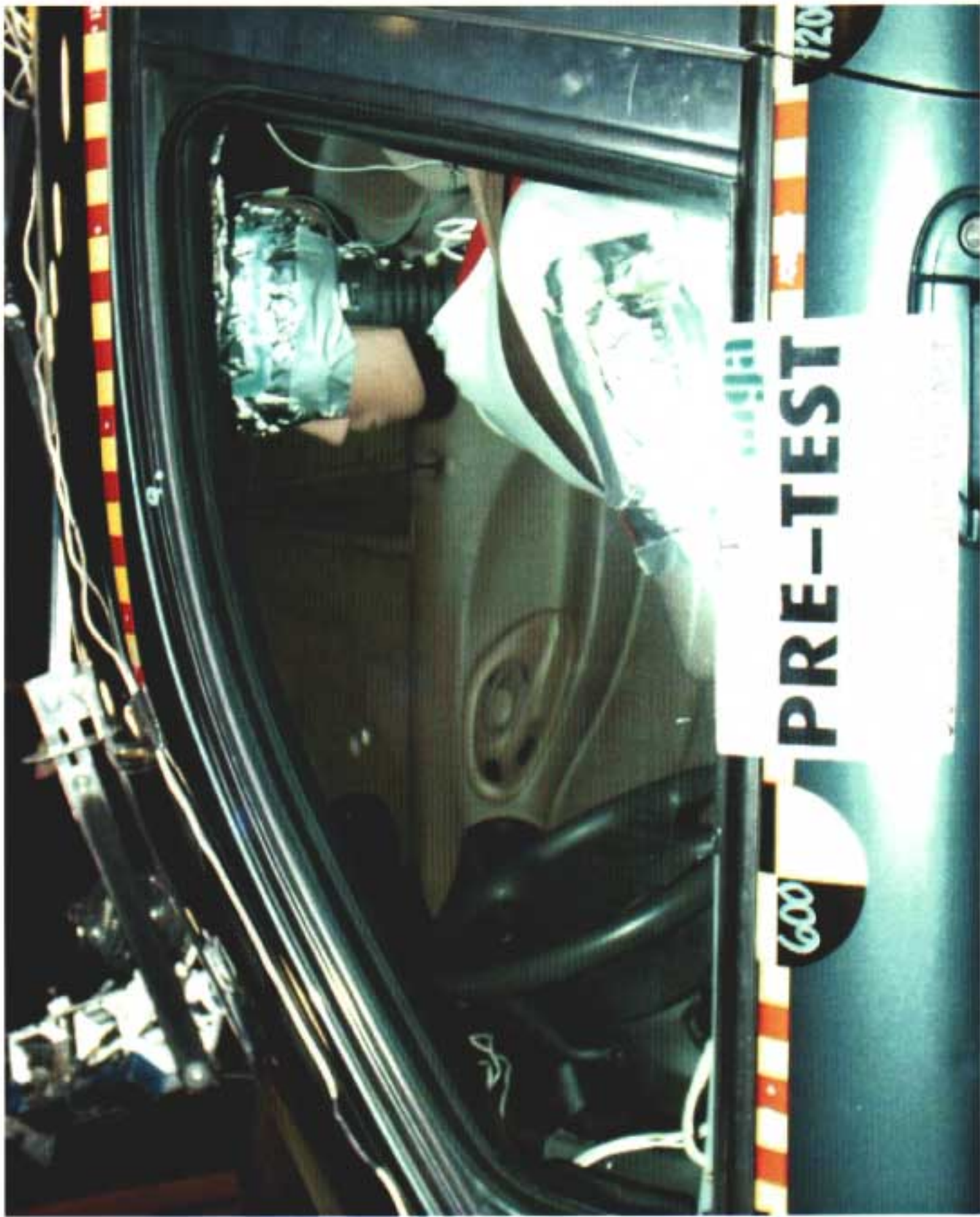


Photo No. A-22 – Pre-Test Driver Dummy Left Side View



Photo No. A-23 - Post-Test Driver Dummy Left Side View

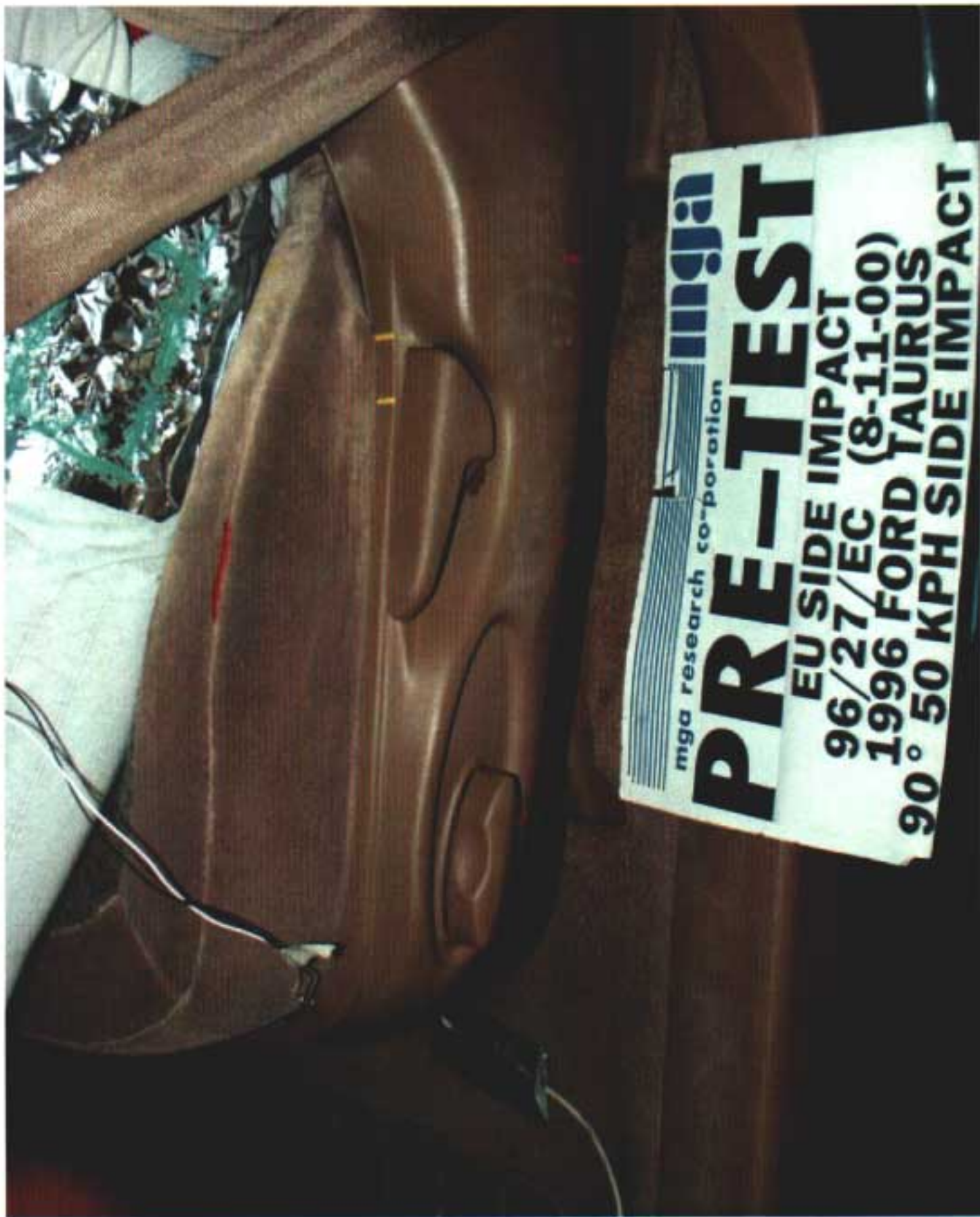


Photo No. A-24 – Pre-Test Driver Dummy Seat Track



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

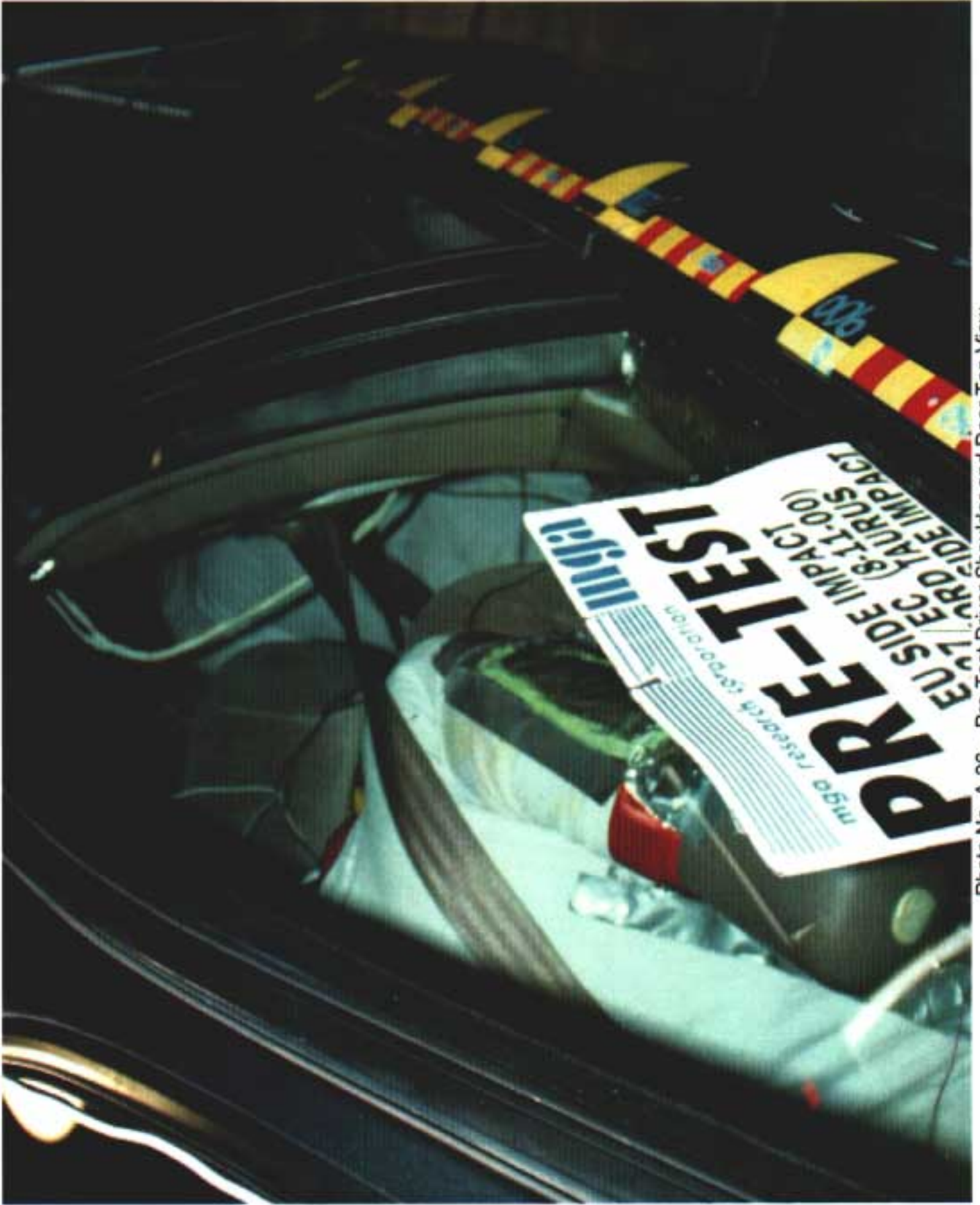


Photo No. A-26 – Pre-Test Driver Shoulder and Door Top View

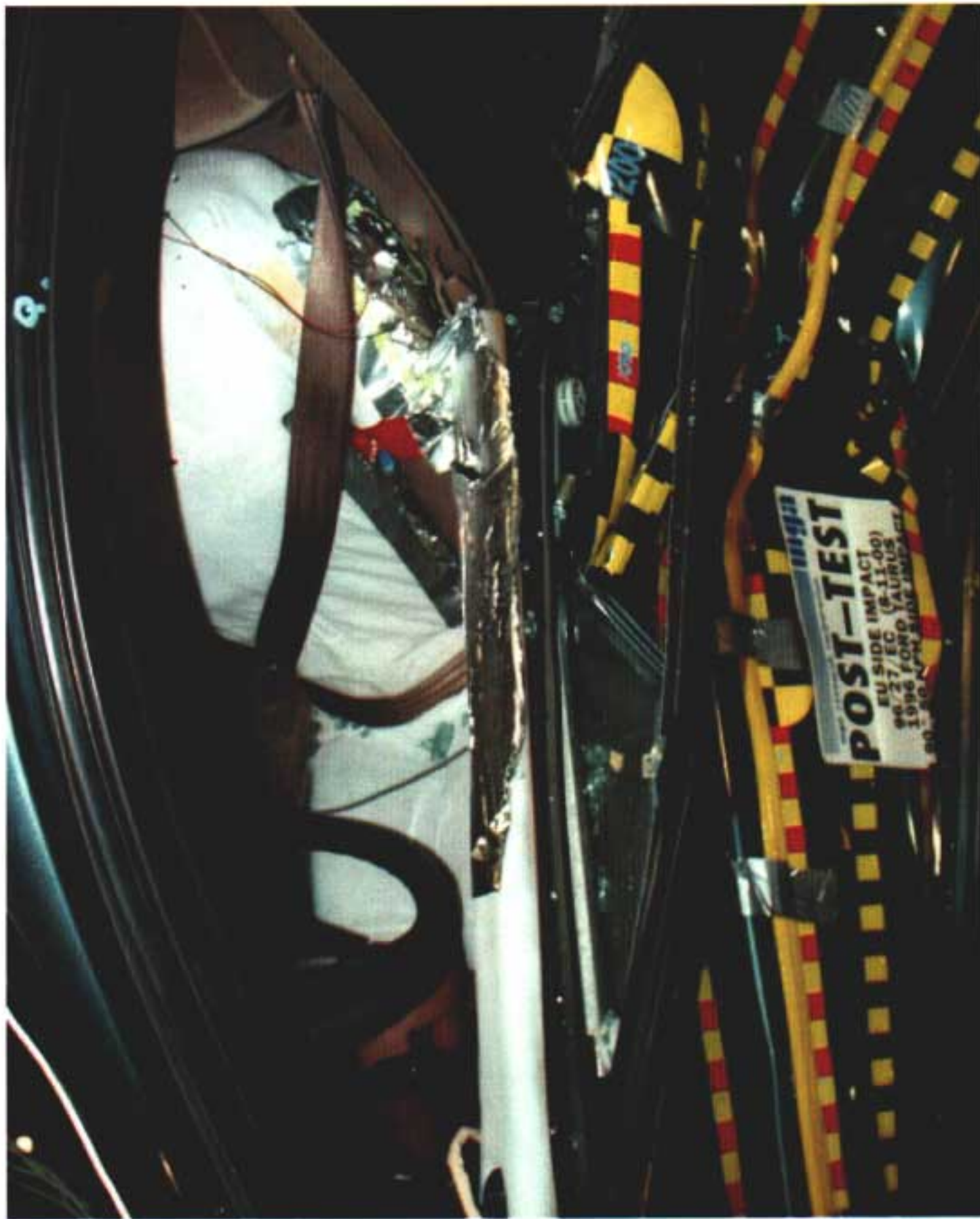


Photo No. A-27 – Post-Test Driver Shoulder and Door Top View



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

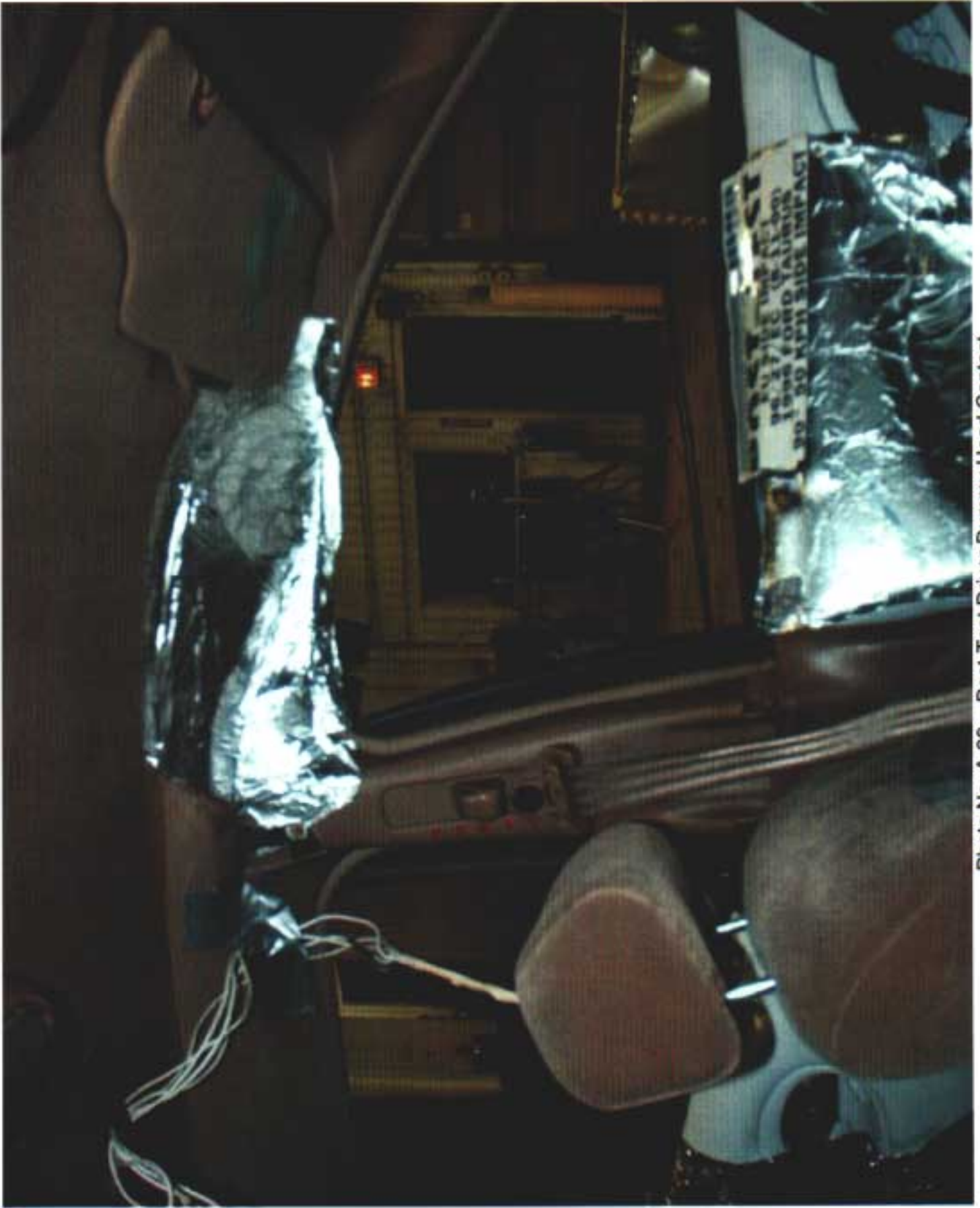


Photo No. A-29 – Post-Test Driver Dummy Head Contact



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

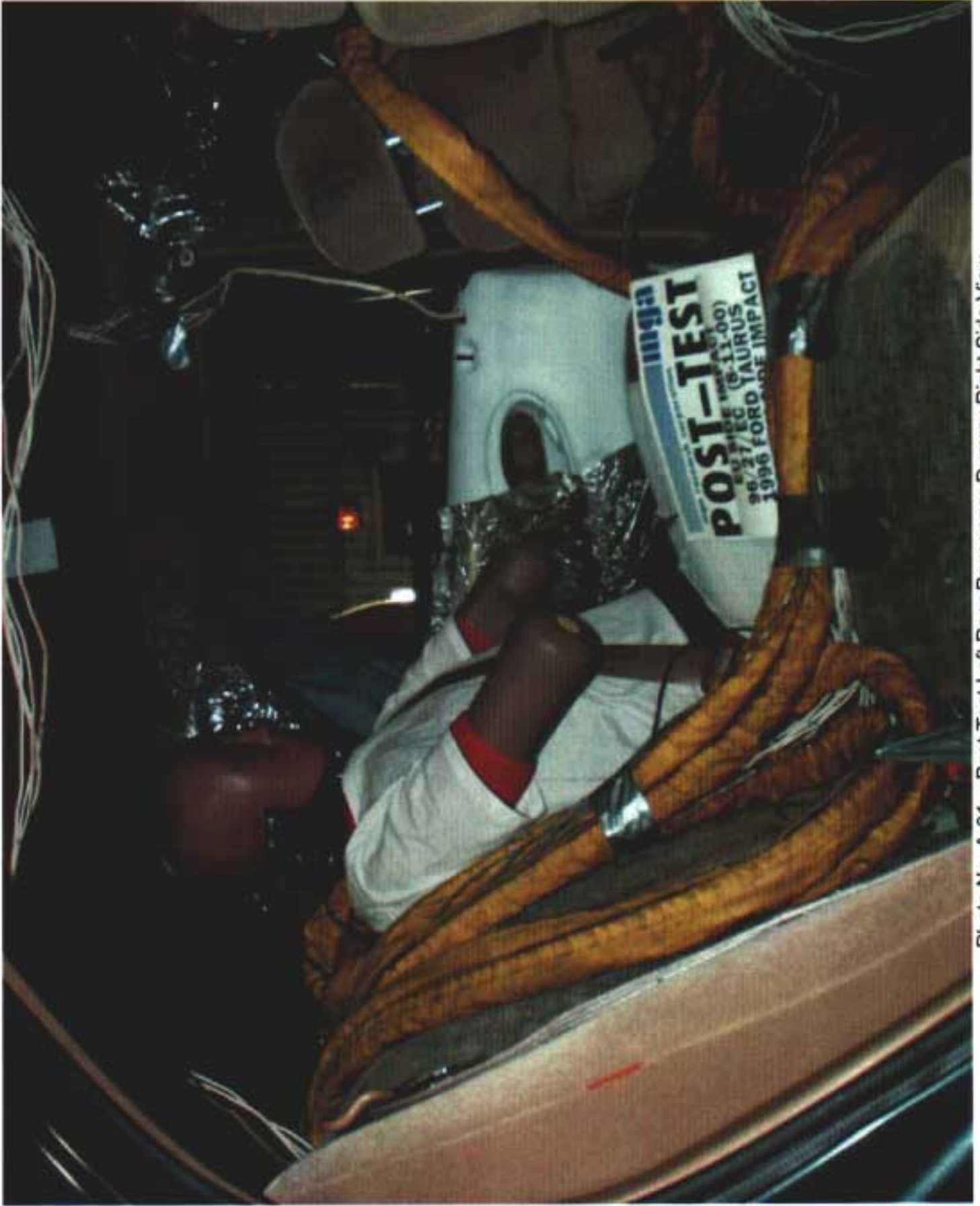


Photo No. A-31 – Post-Test Left Rear Passenger Dummy Right Side View



Photo No. A-32 – Pre-Test Left Rear Passenger Dummy Left Side View

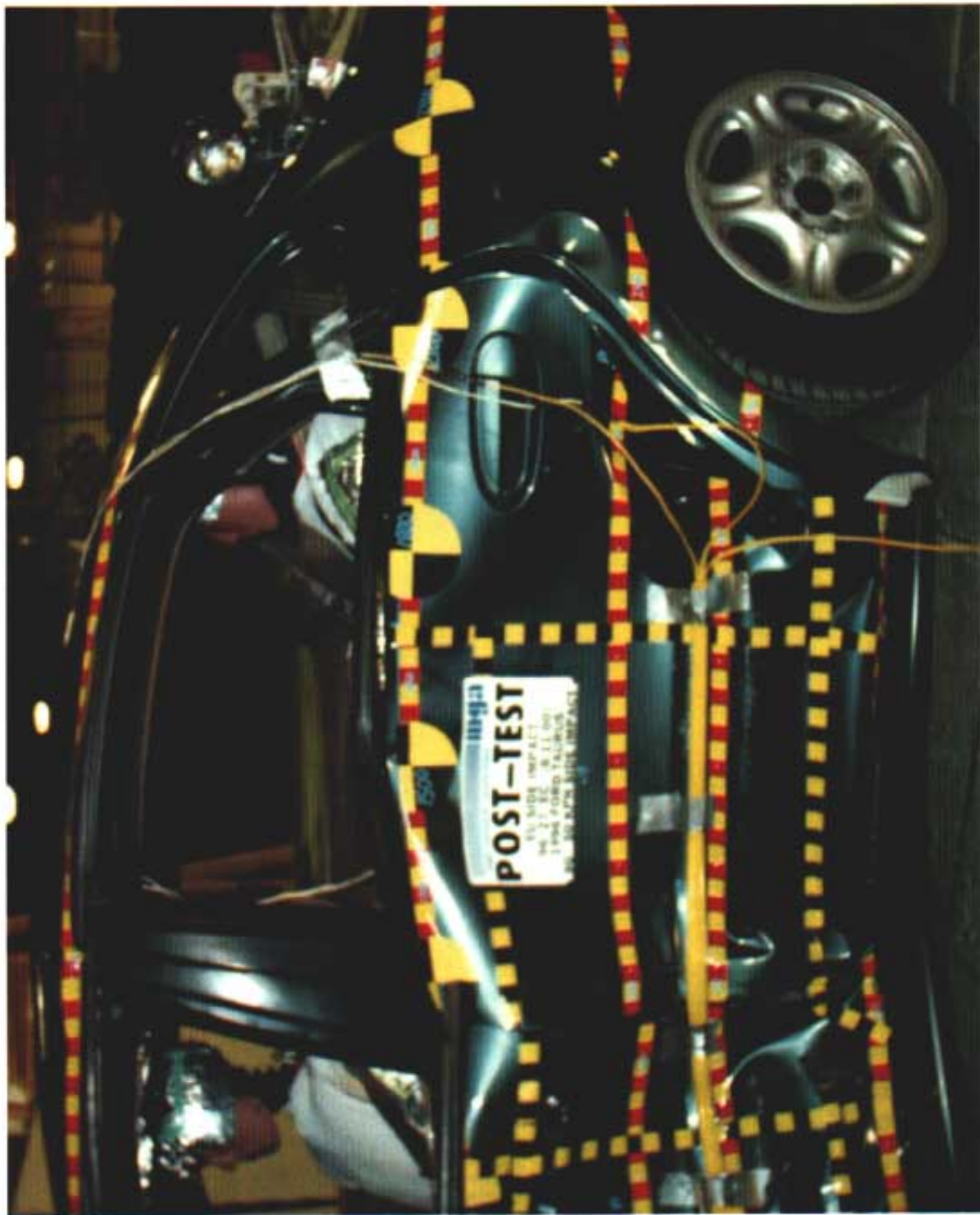


Photo No. A-33 – Post-Test Left Rear Passenger Dummy Left Side View

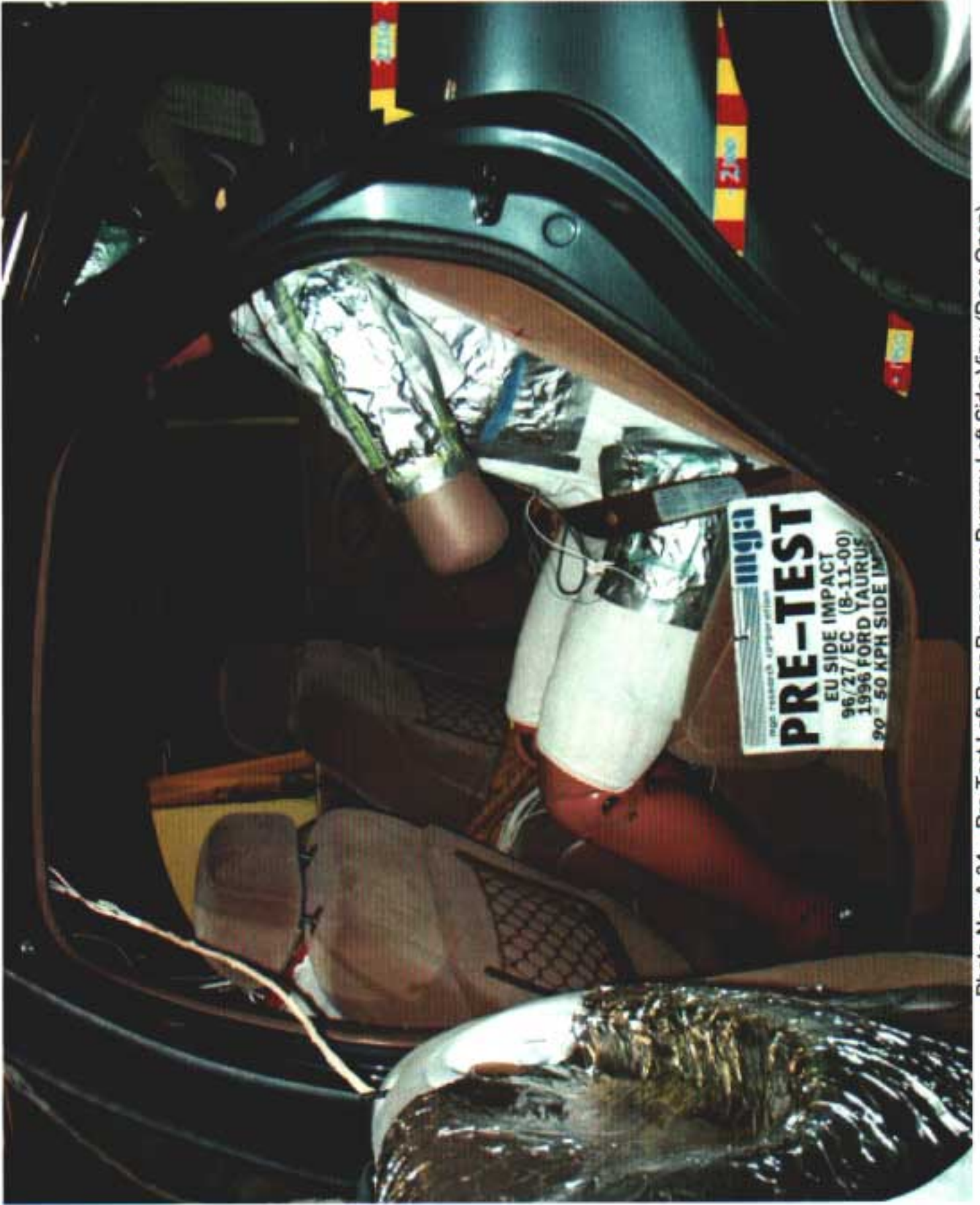


Photo No. A-34 – Pre-Test Left Rear Passenger Dummy Left Side View (Door Open)

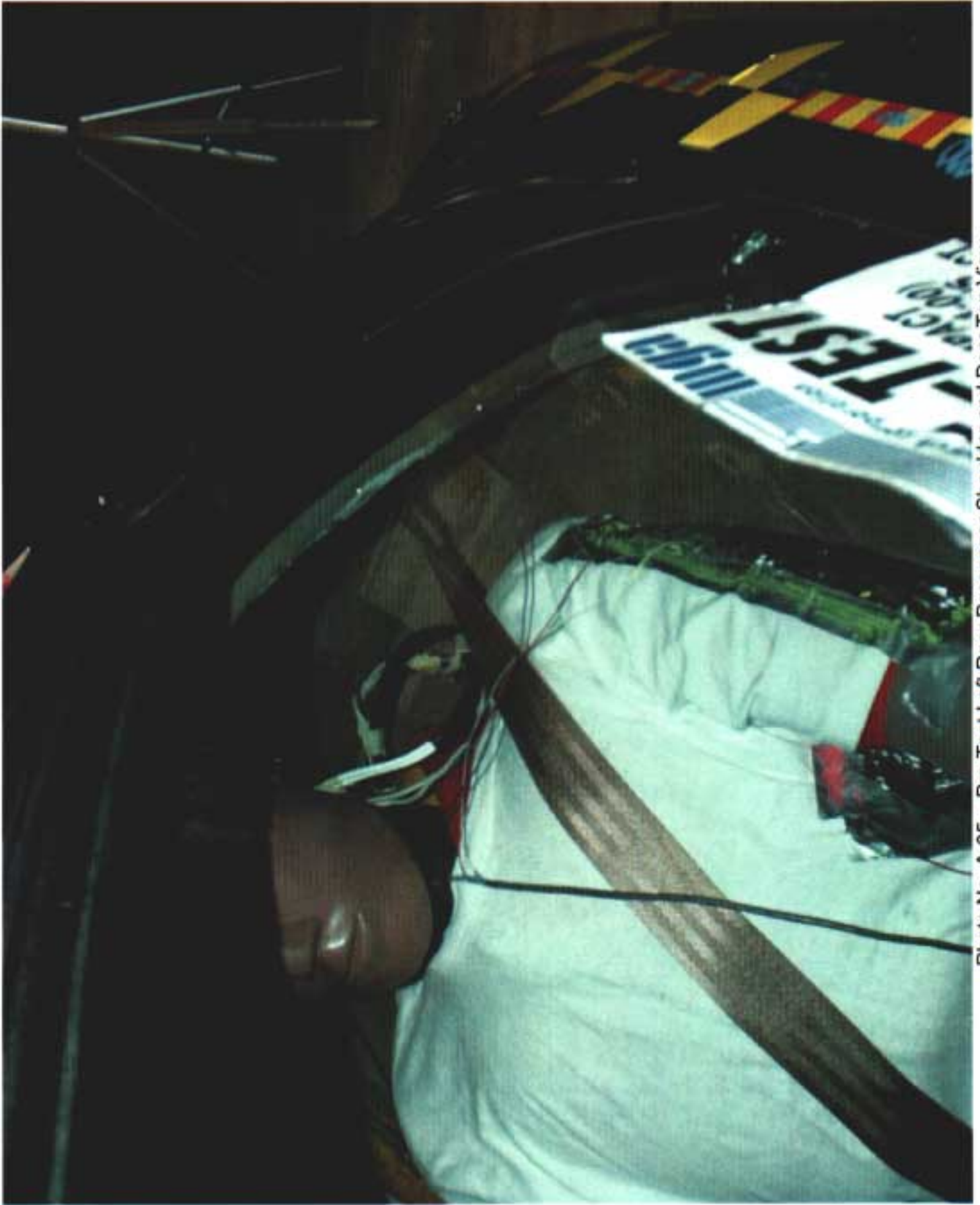


Photo No. A-35 – Pre-Test Left Rear Passenger Shoulder and Door Top View



Photo No. A-36 – Post-Test Left Rear Passenger Shoulder and Door Top View



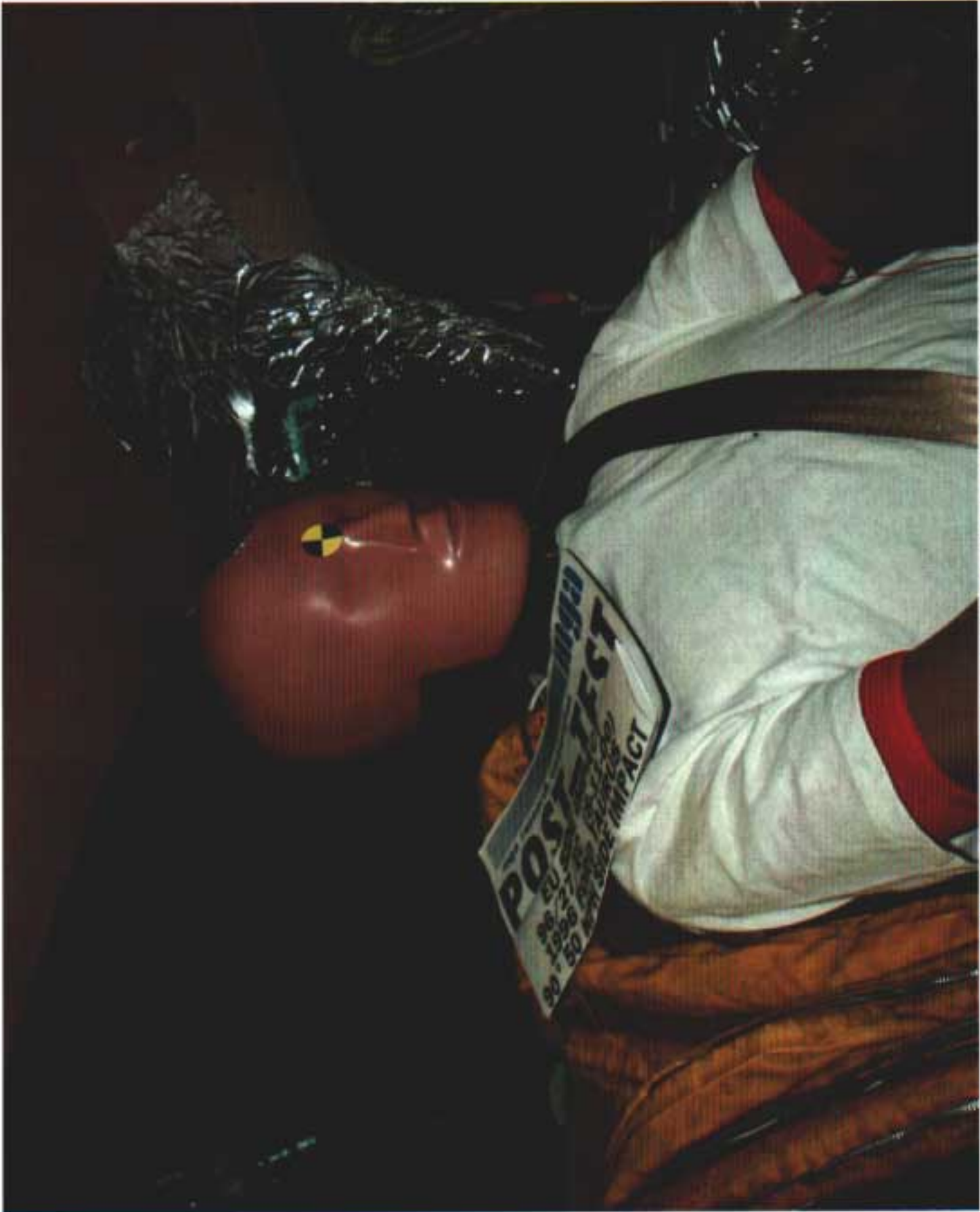


Photo No. A-38 – Post-Test Left Rear Passenger Dummy Head Contact



Photo No. A-39 – Post-Test Left Rear Passenger Dummy Head Contact



Photo No. A-40 – Pre-Test Left Front Impact Point on Vehicle

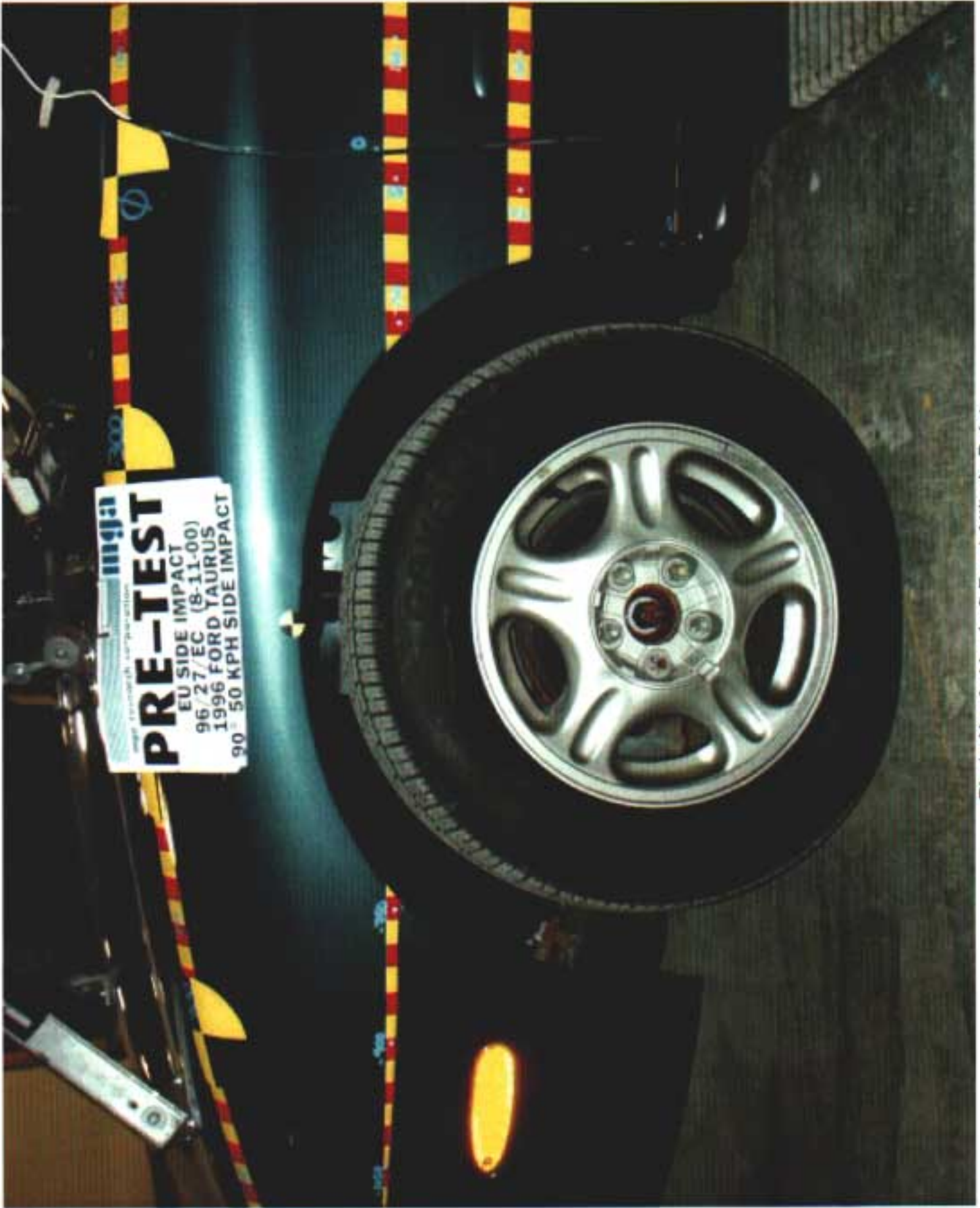


Photo No. A-41 – Left Front Attitude Point



Photo No. A-42 – Right Front Attitude Point



Photo No. A-43 – Left Rear Attitude Point

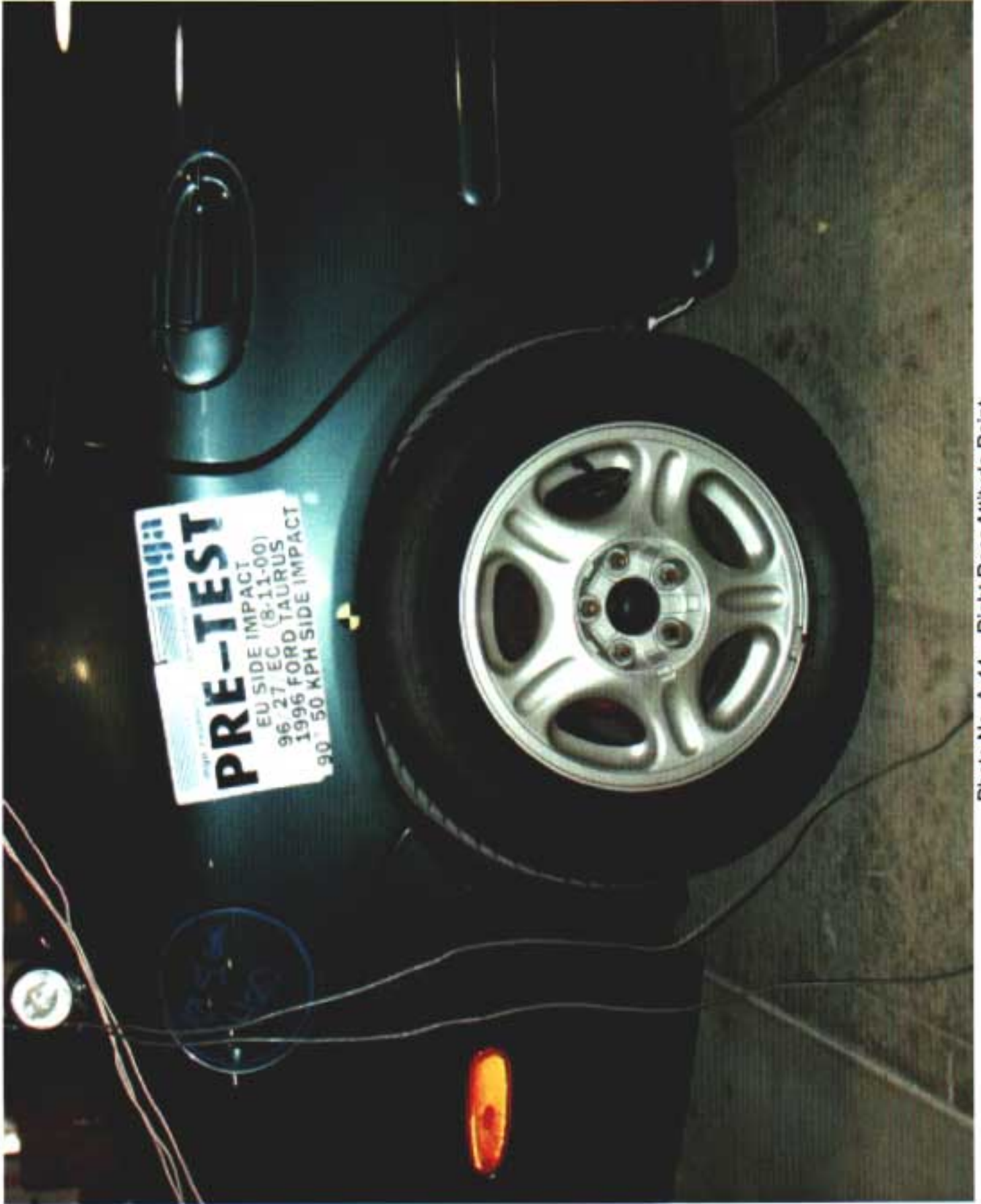


Photo No. A-44 – Right Rear Attitude Point



Photo No. A-45 – Left Front Sill Accelerometer



Photo No. A-46 - Left Rear Sill Accelerometer

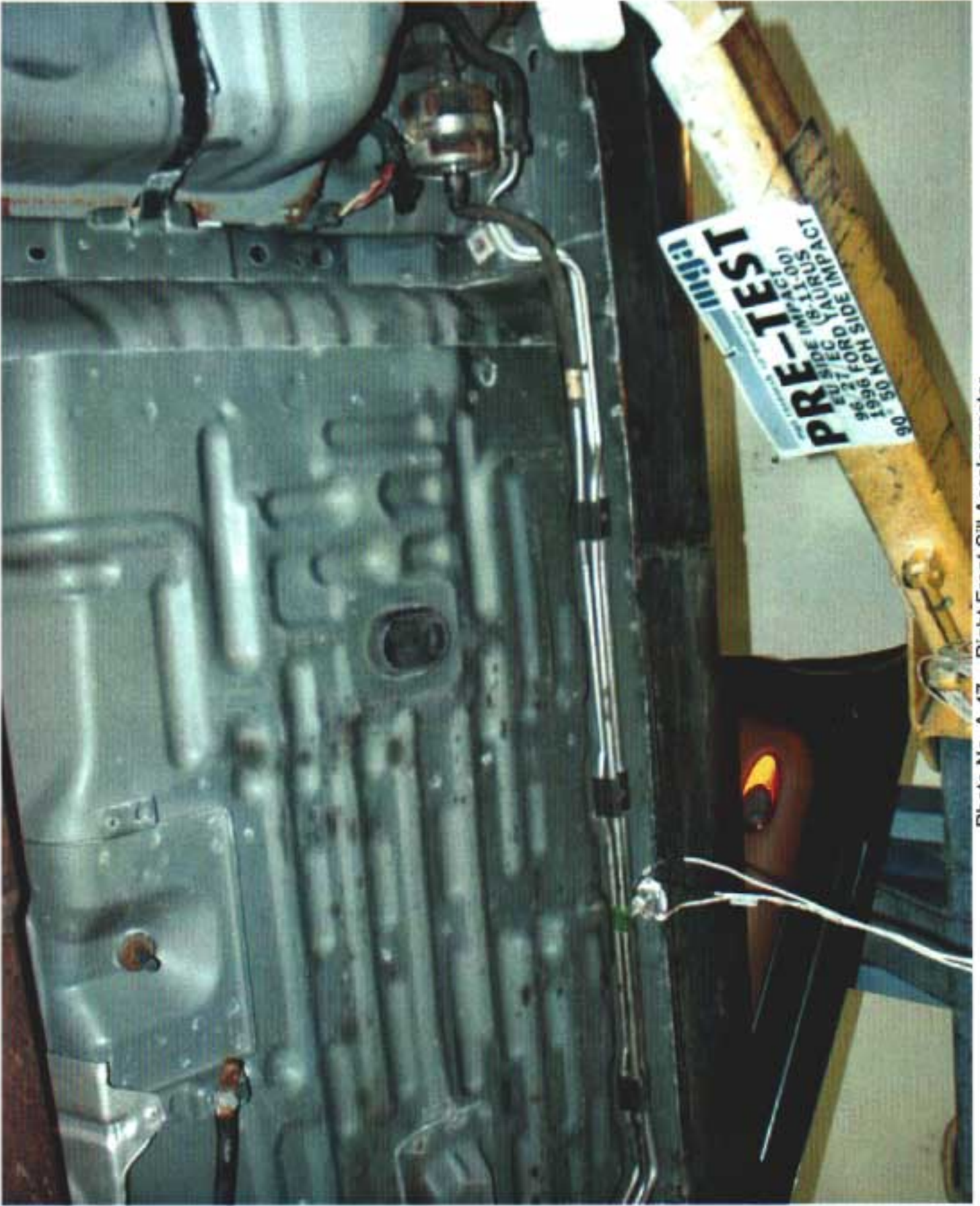


Photo No. A-47 - Right Front Sill Accelerometer



Photo No. A-48 – Right Rear Sill Accelerometer



Photo No. A-49 – Left Lower A Post Accelerometer



Photo No. A-50 - Left Front Door Accelerometers



Photo No. A-51 – Left Upper B Post Accelerometer

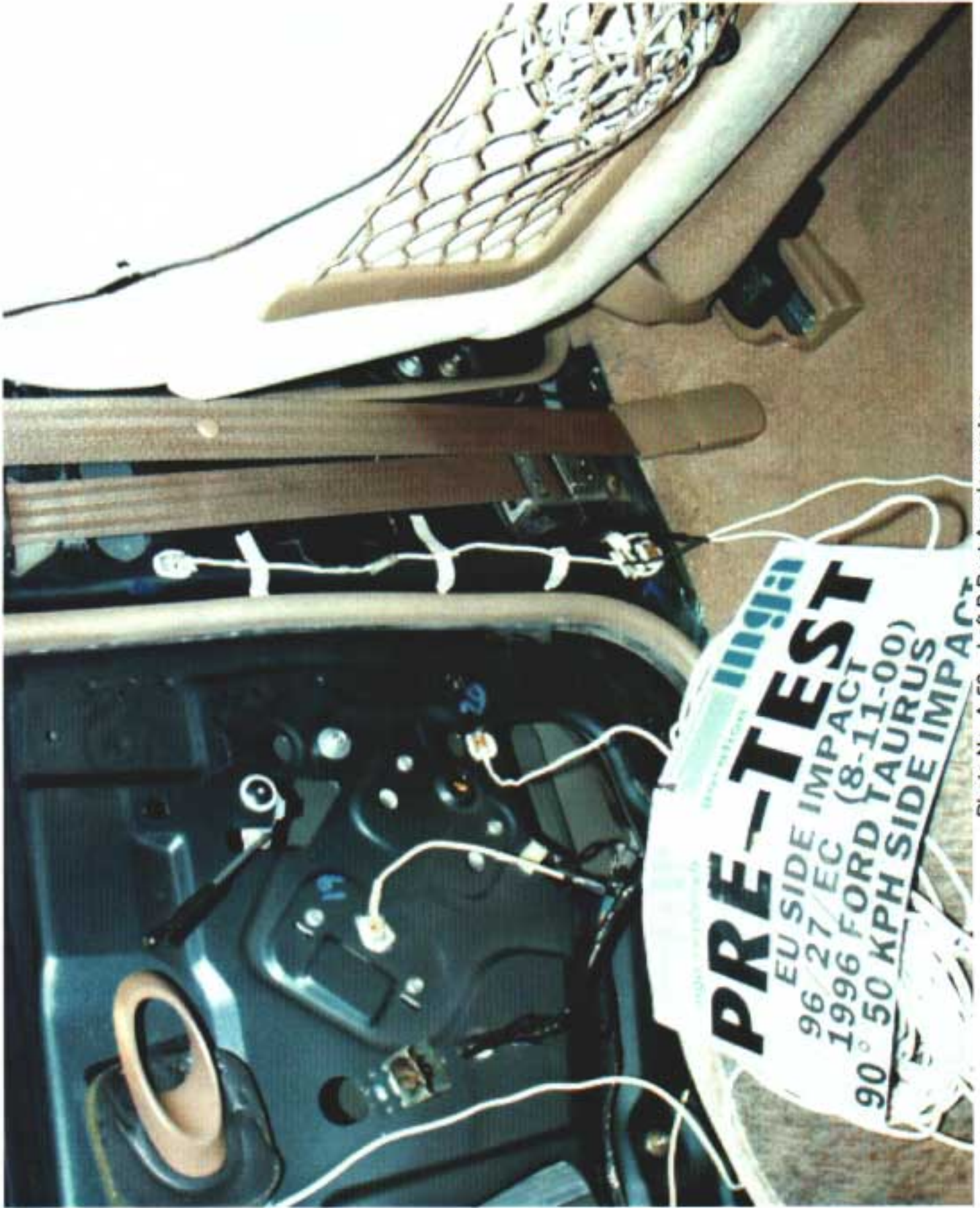


Photo No. A-52 - Left B Post Accelerometers

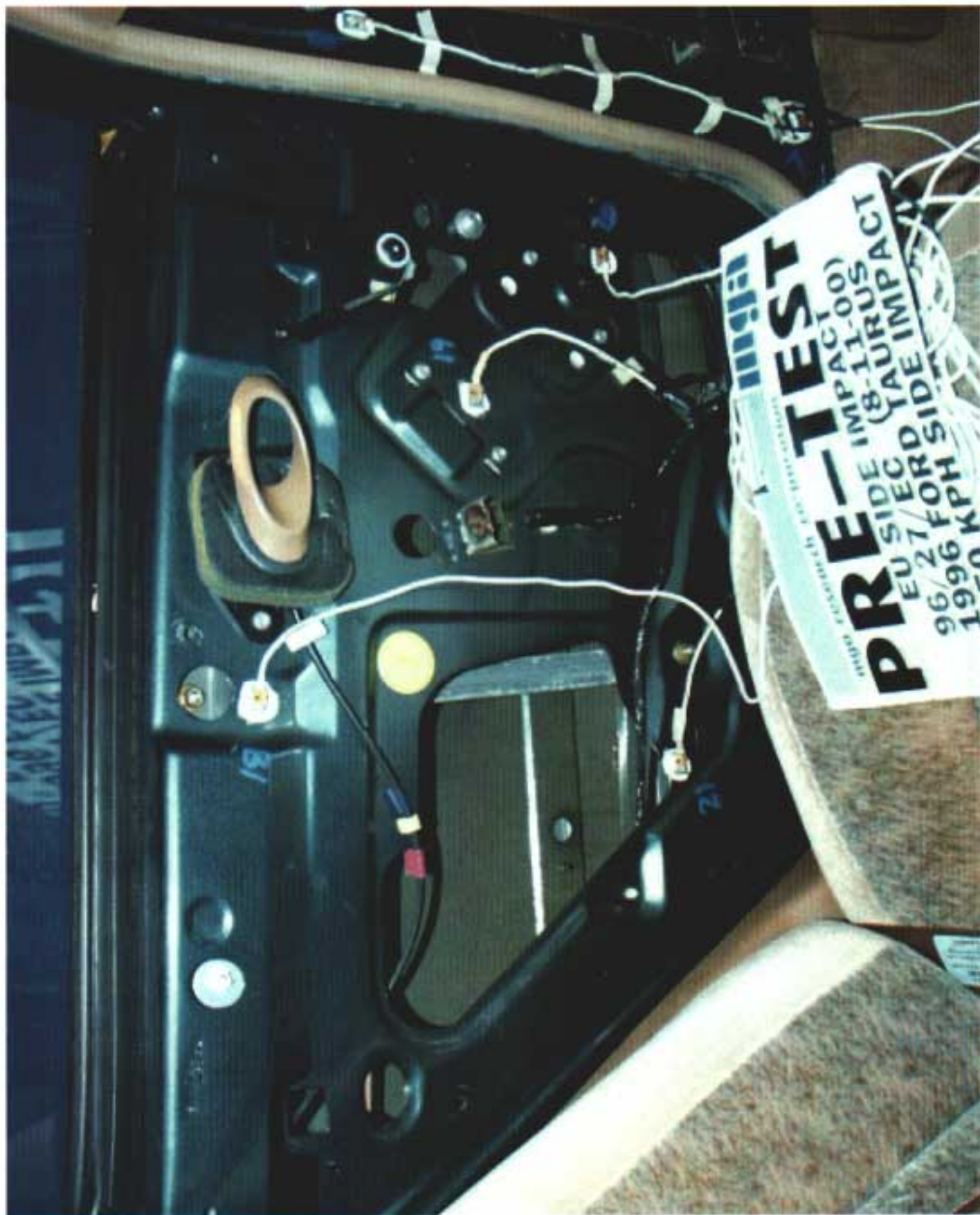


Photo No. A-53 - Left Rear Door Accelerometers

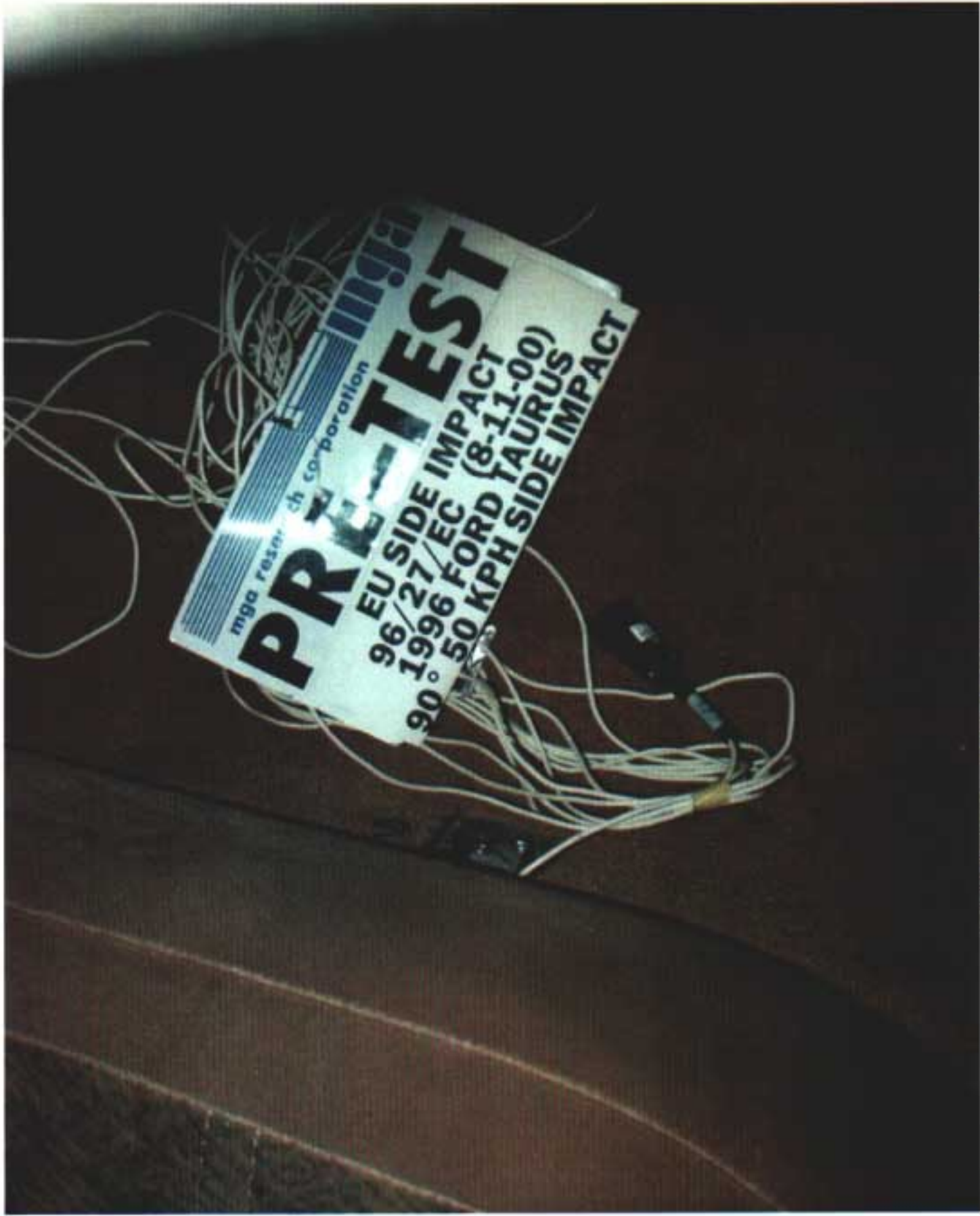


Photo No. A-54 – Right Rear Occupant Compartment Accelerometer

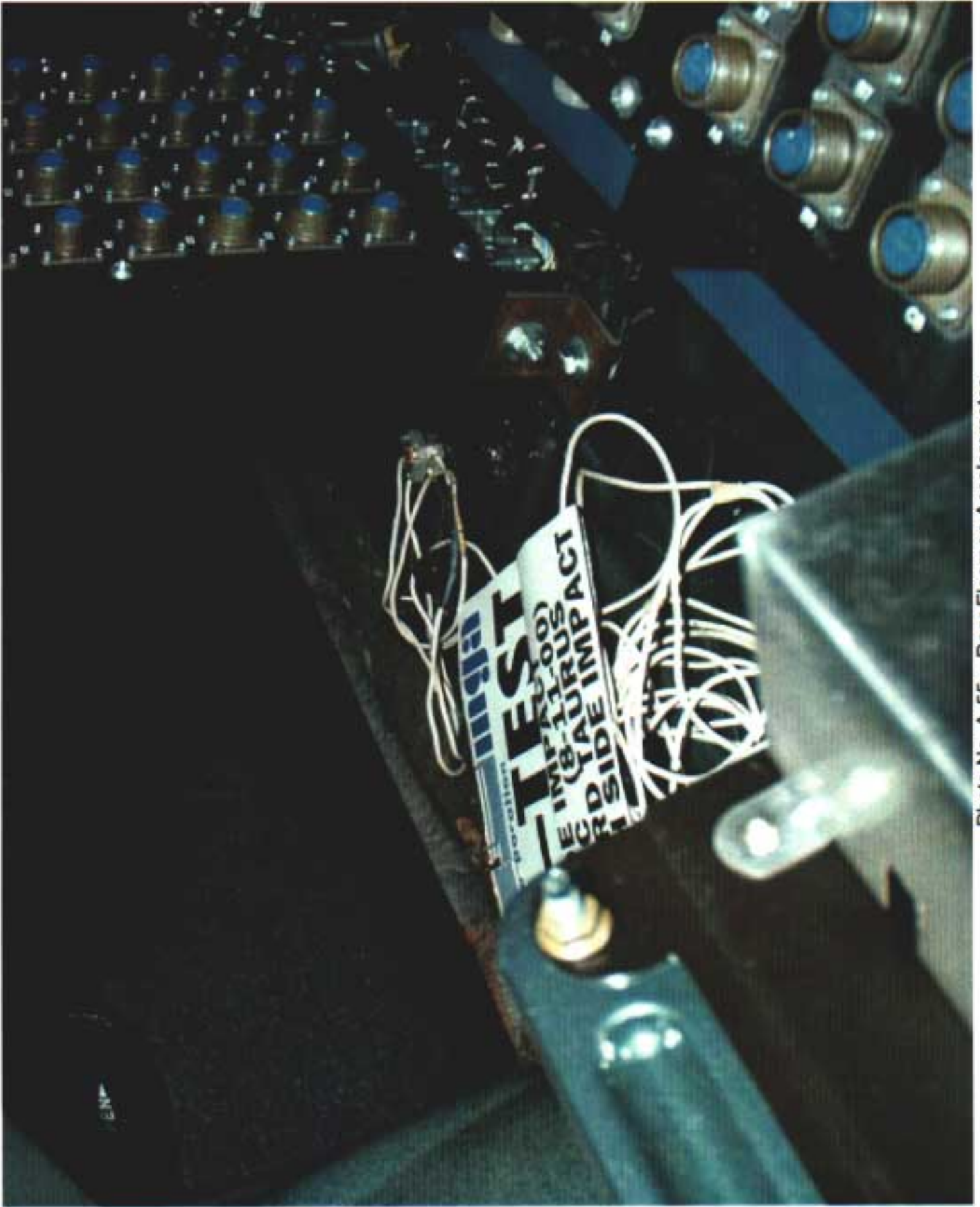


Photo No. A-55 – Rear Floorpan Accelerometer

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TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

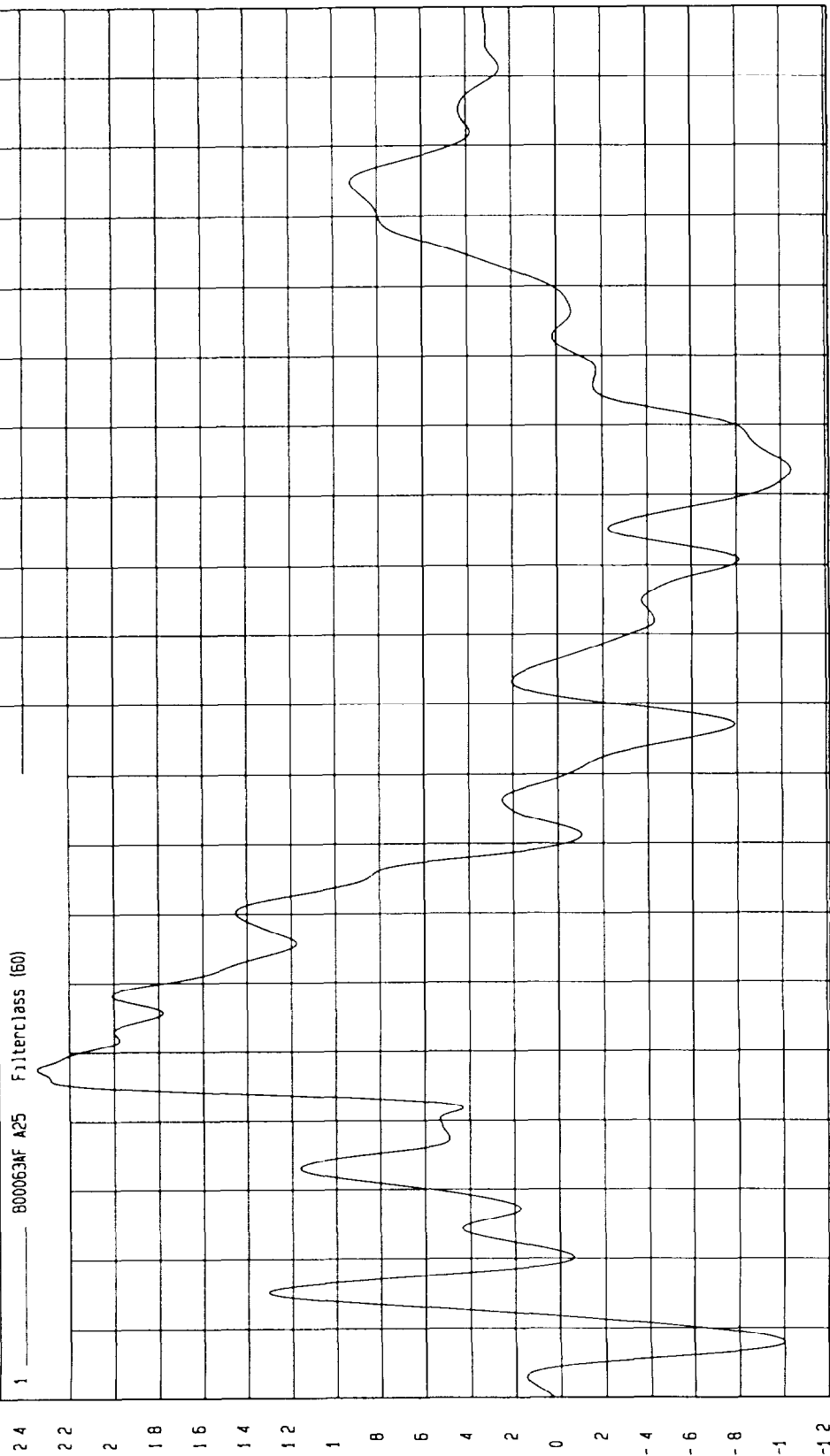
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 1.05 G s at 134 msec

Maximum 2.34 G s at 48 msec

### RIGHT FRONT SILL X ACCELERATION

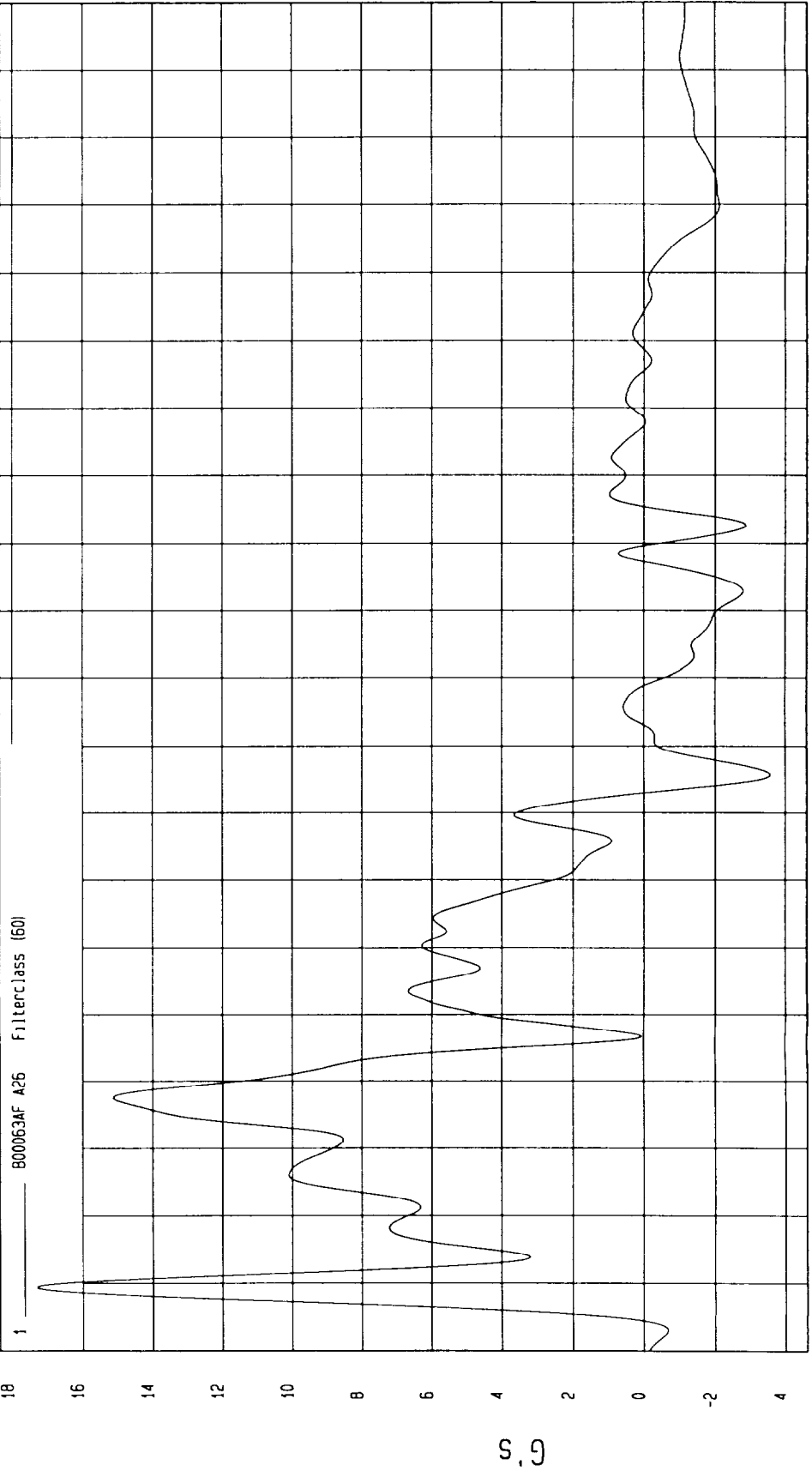
1 800063AF A25 Filterclass (60)



TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000  
 COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 3.57 G s at 86 msec  
 Maximum 17.31 G s at 9 msec

RIGHT FRONT SILL Y ACCELERATION



MCA Research  
 08-11-2000 18 46

Seconds

G's

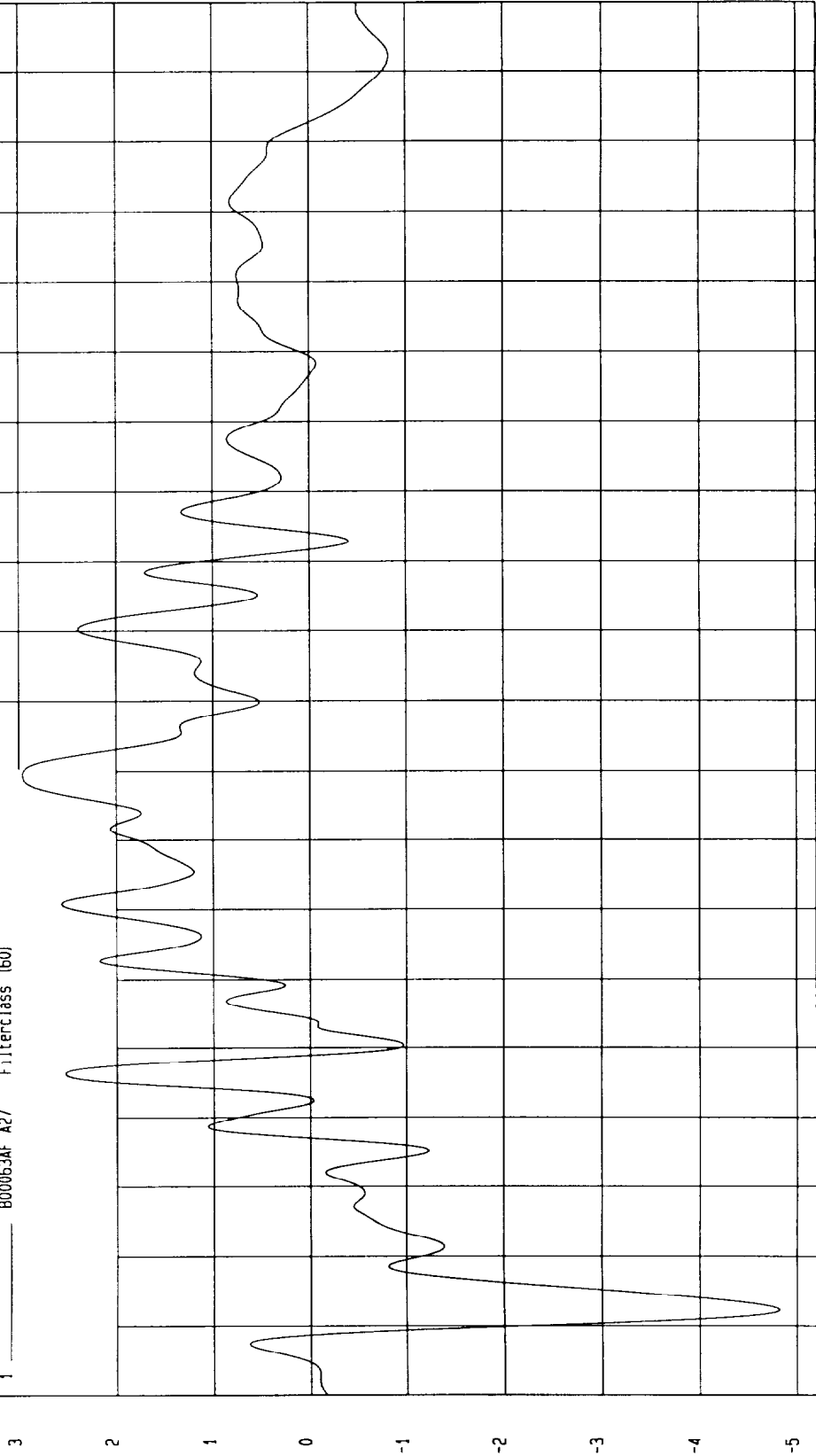
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 4.82 G s at 12 msec Maximum - 2.96 G s at 89 msec

RIGHT FRONT SILL Z ACCELERATION

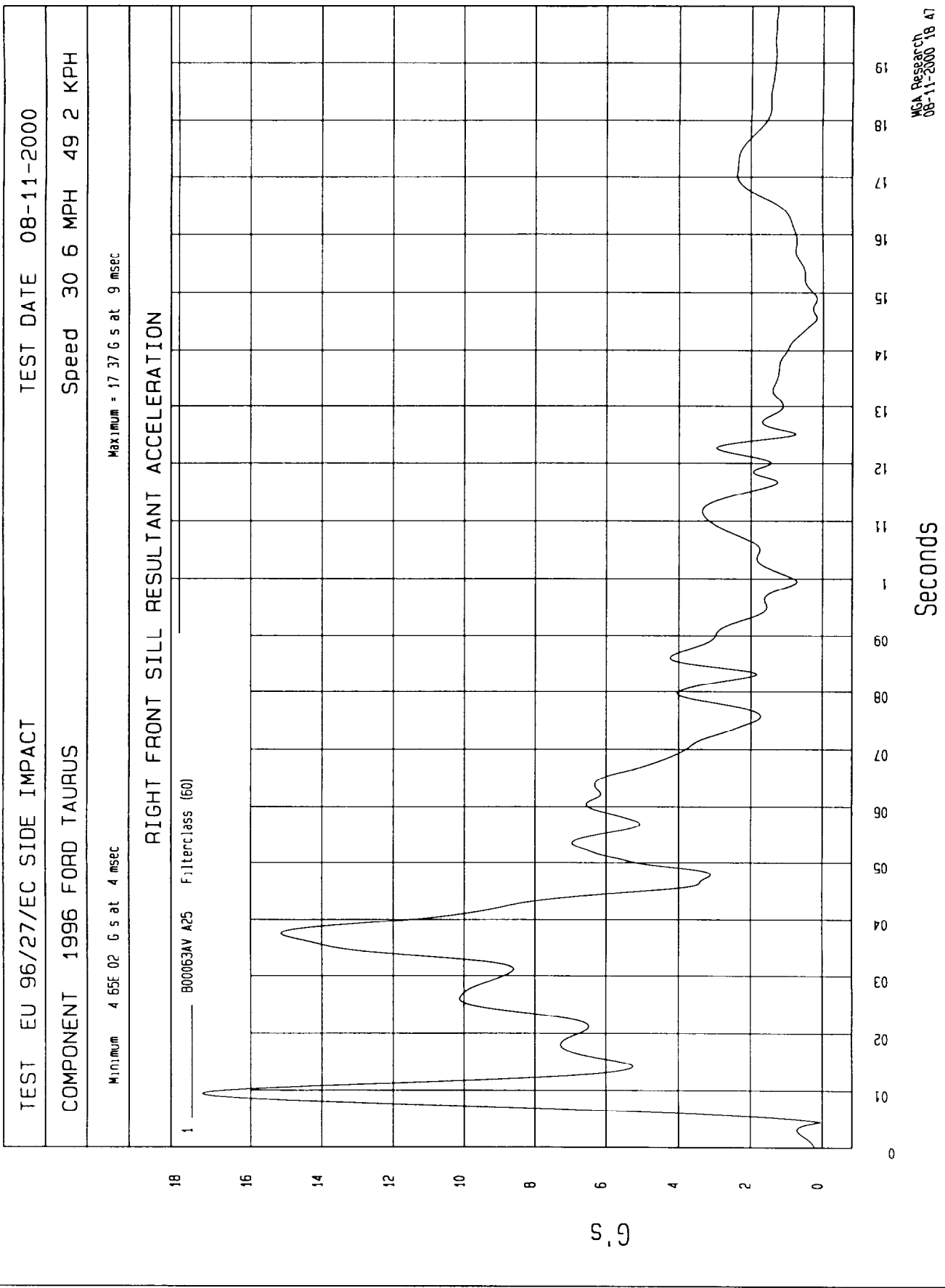
1 80063AF A27 Filterclass (60)



MCA Research  
08-11-2000 1B 46

Seconds

G's



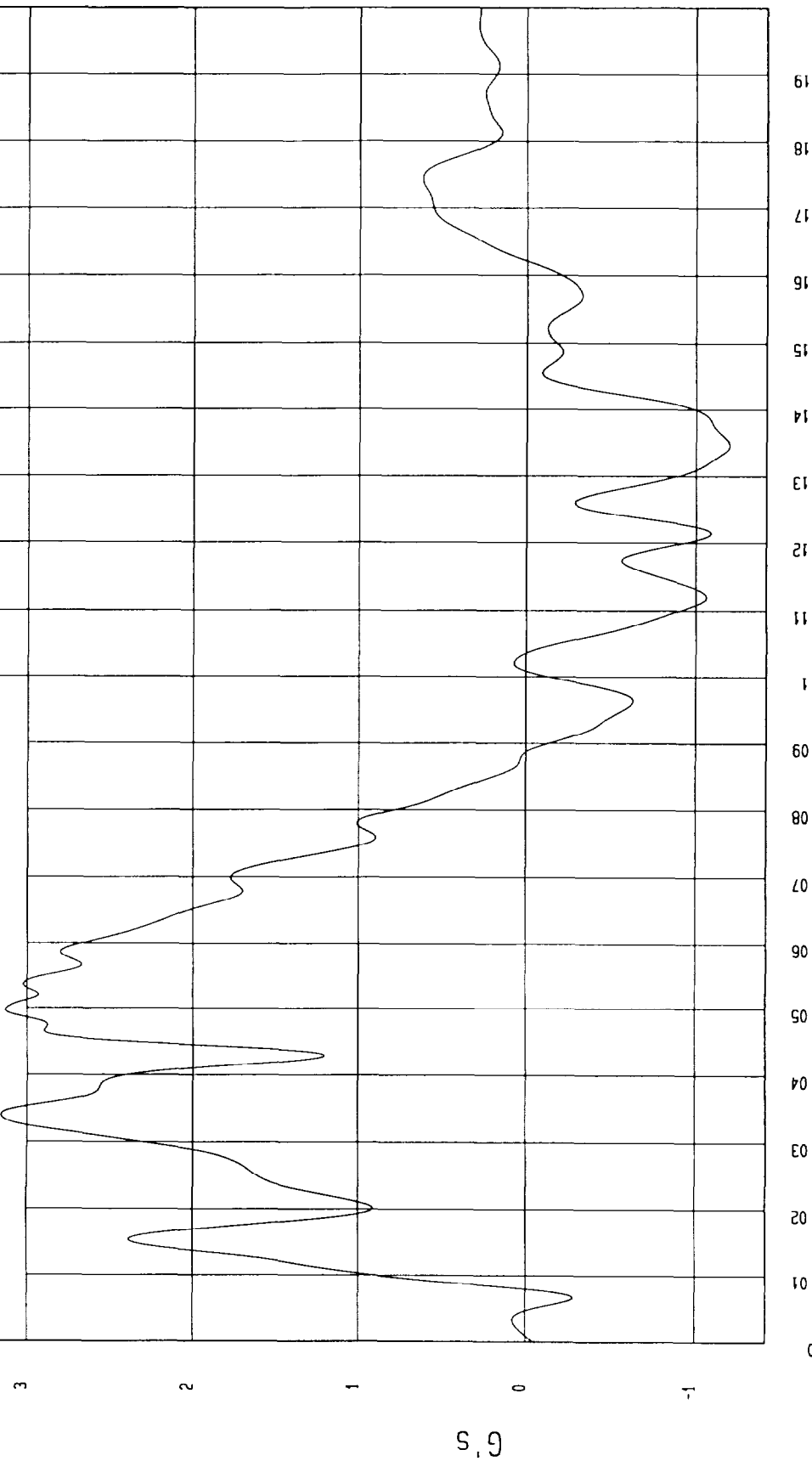
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = -1.2 G s at 135 msec  
Maximum = 3.16 G s at 34 msec

RIGHT REAR SILL X ACCELERATION

1 800063AF A28 Filterclass (60)



MCA Research  
08-11-2000 18 47

Seconds

G's

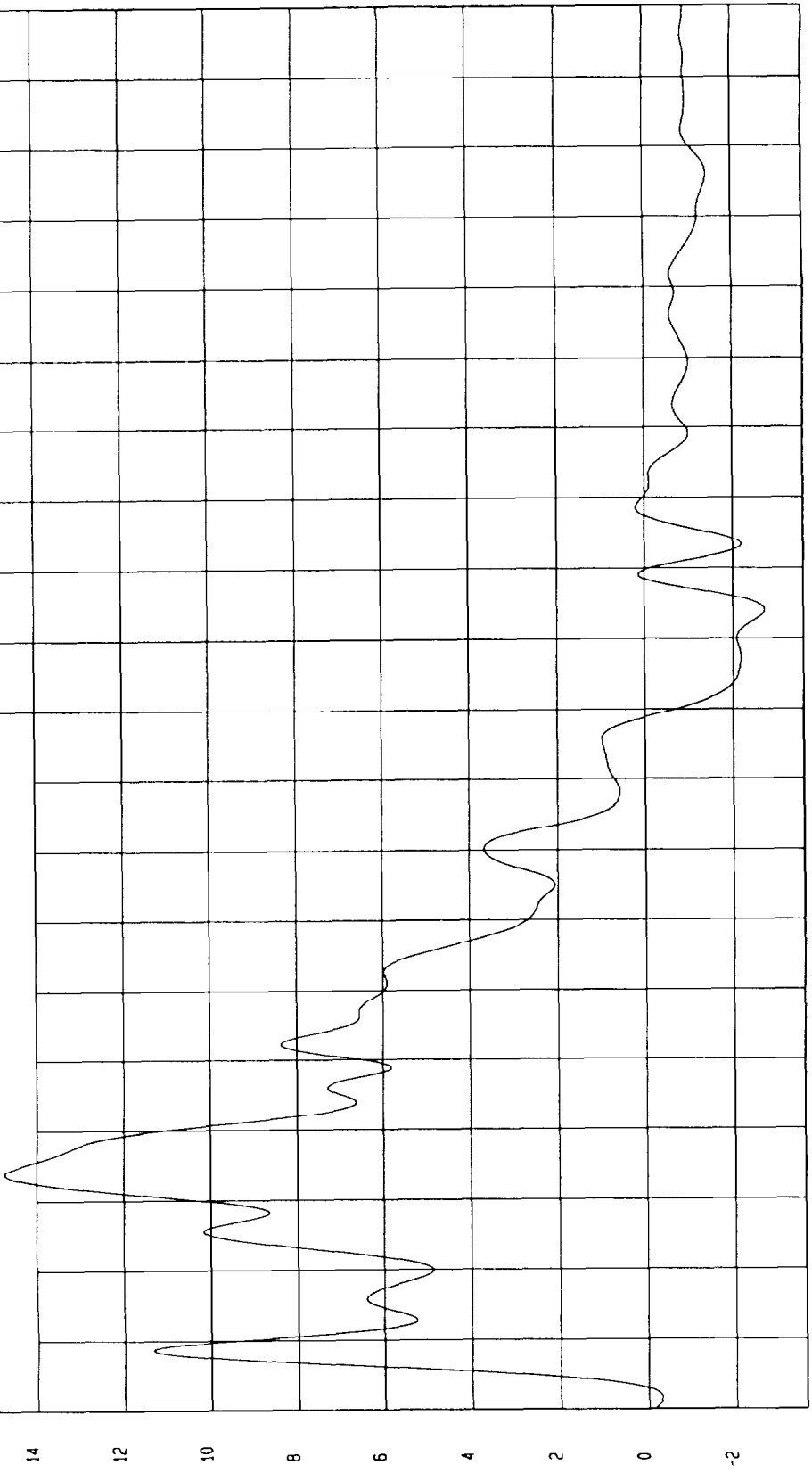
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 2.72 G s at 114 msec Maximum = 14.74 G s at 34 msec

RIGHT REAR SILL Y ACCELERATION

1 800063AF A29 F11terclass (60)



MCA Research  
08-11-2000 18 47

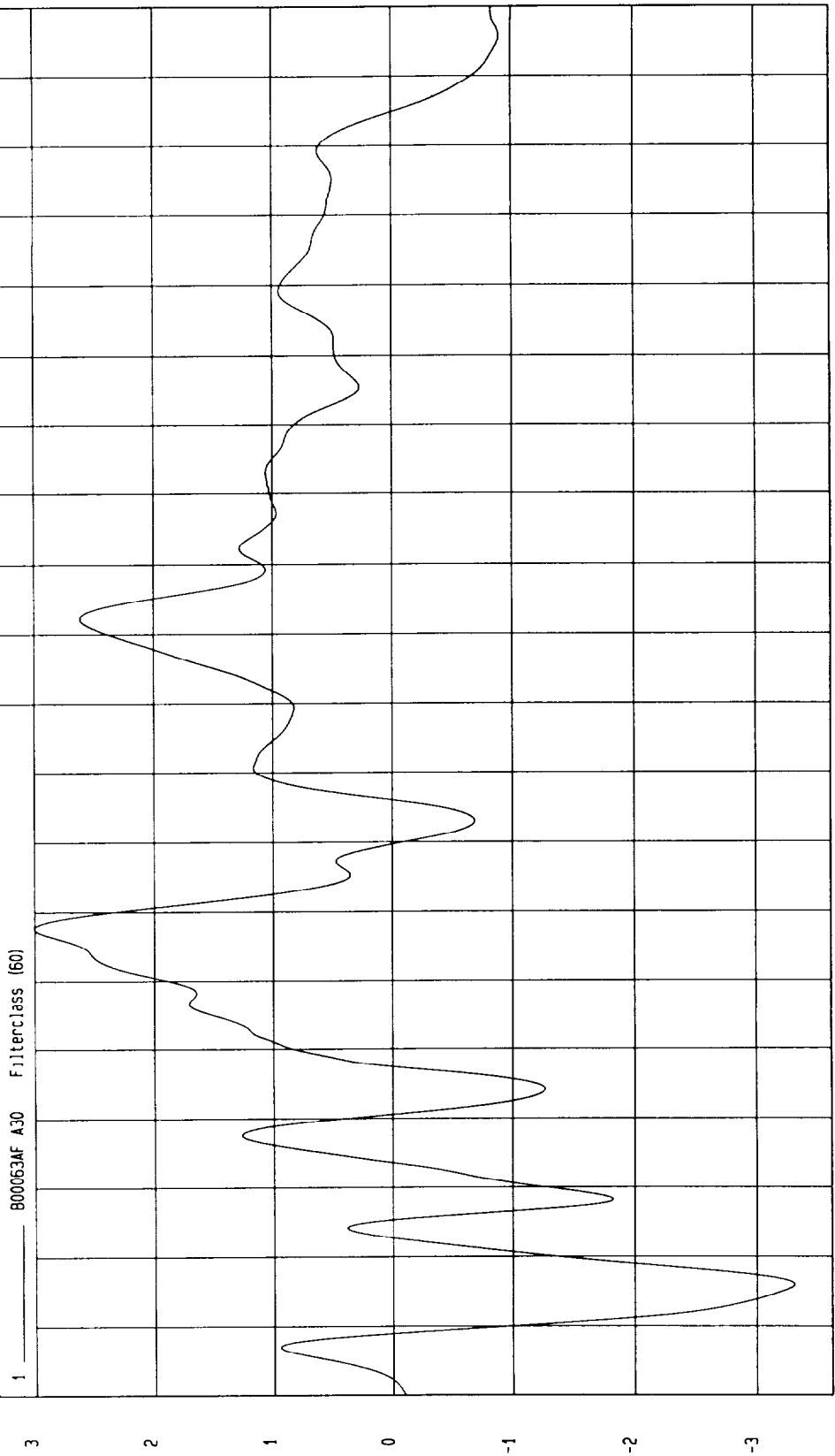
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 3 31 G s at 16 msec Maximum 3 6 s at 68 msec

RIGHT REAR SILL Z ACCELERATION

1 800063AF A30 Filterclass (60)



Seconds

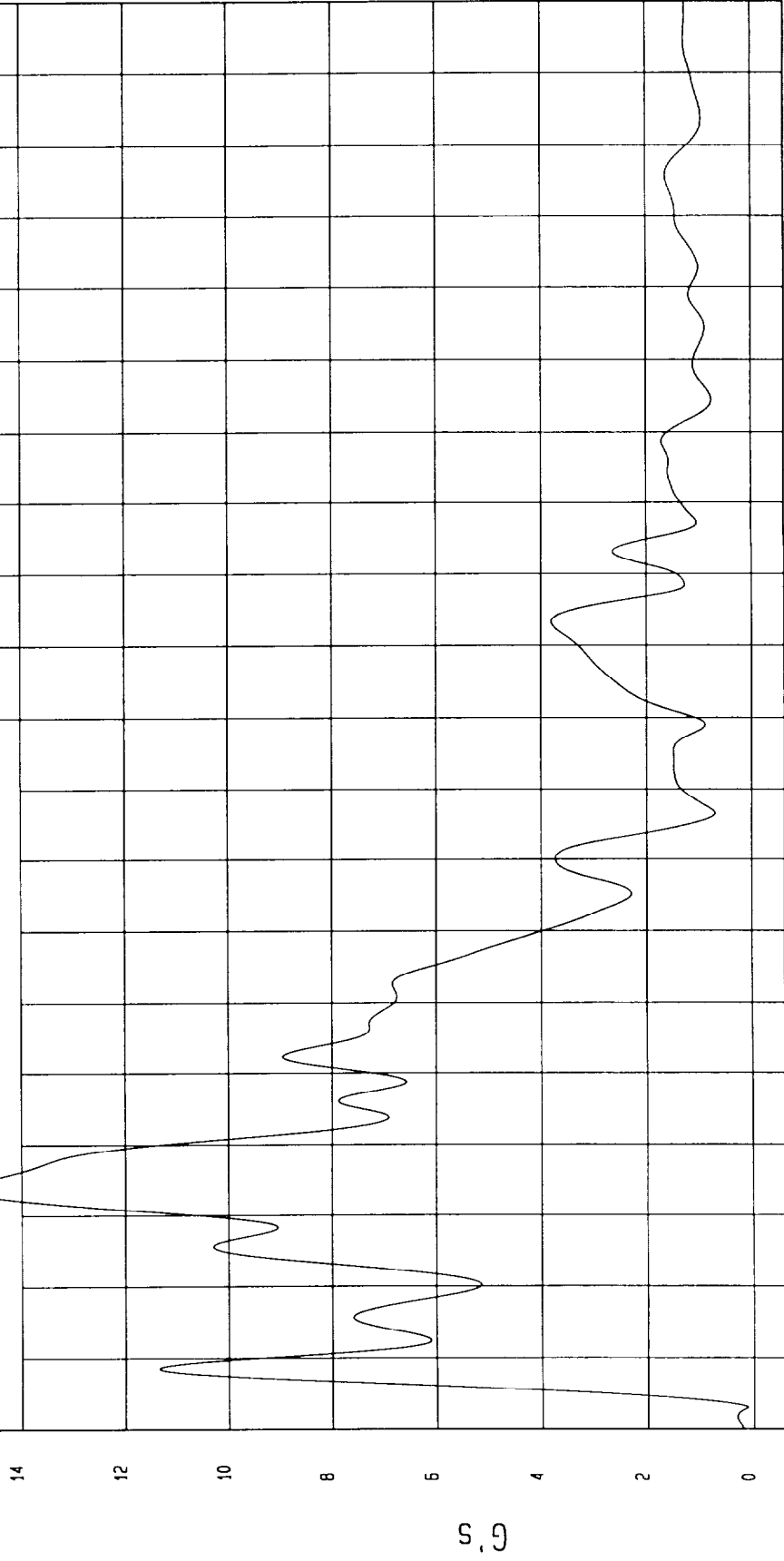
MGA Research  
08-11-2000 18 47

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000  
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 12 G s at 3 msec  
Maximum 15 08 G s at 34 msec

RIGHT REAR SILL RESULTANT ACCELERATION

1 ——— B00063AV A28 Filterclass (60)



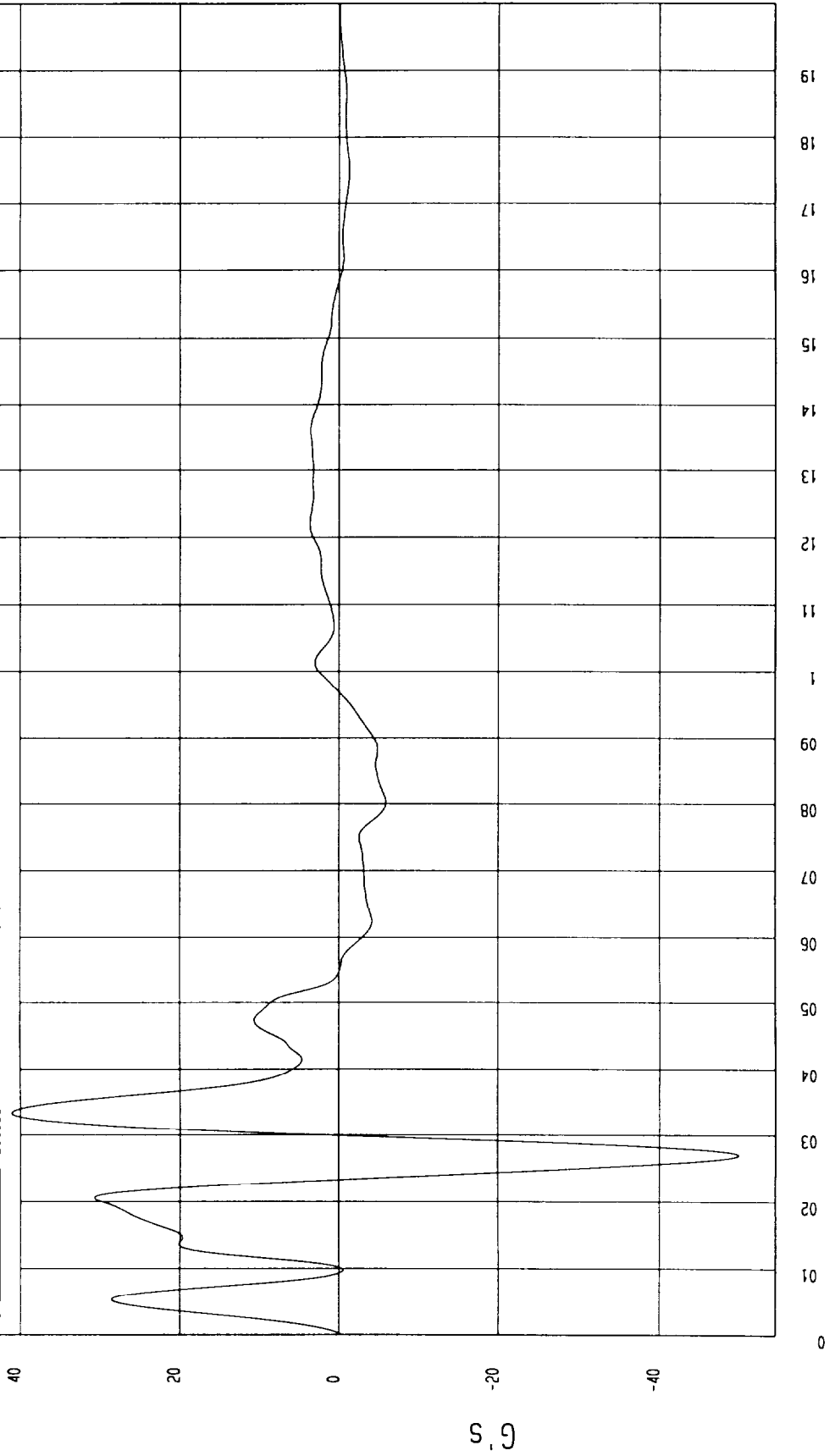
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 49.92 G s at 27 msec  
Maximum = 41.06 G s at 33 msec

LEFT FRONT SILL Y ACCELERATION

1 — B00063AF A31 Filterclass (60)



MGA Research  
08-11-2000 18 47

Seconds

G's

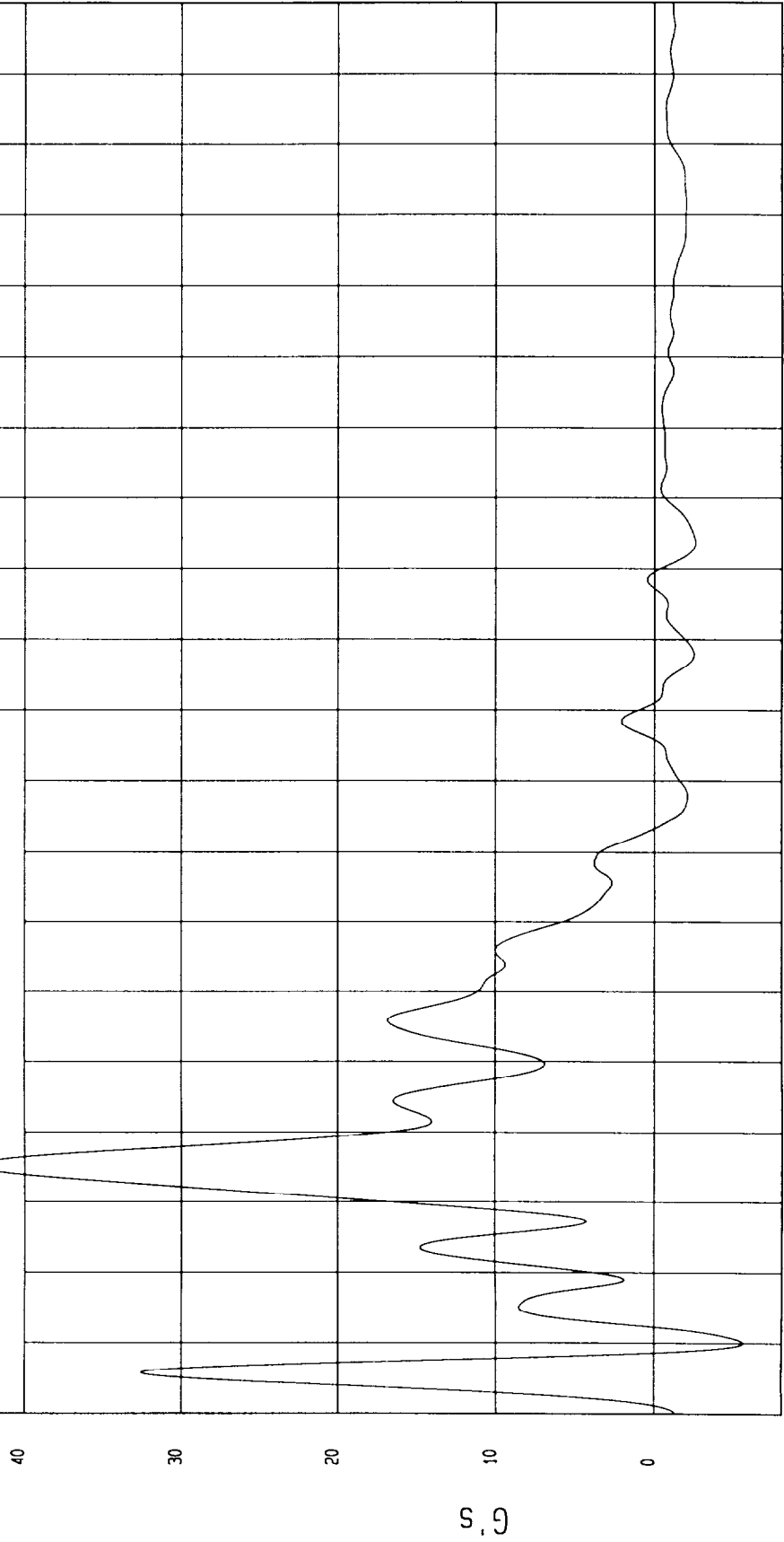
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 5.69 G s at 10 msec Maximum = 43.08 G s at 35 msec

LEFT REAR SILL Y ACCELERATION

1 — 800063AF A33 Filterclass (60)



WCA Research  
08-11-2000 16 47

Seconds

G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

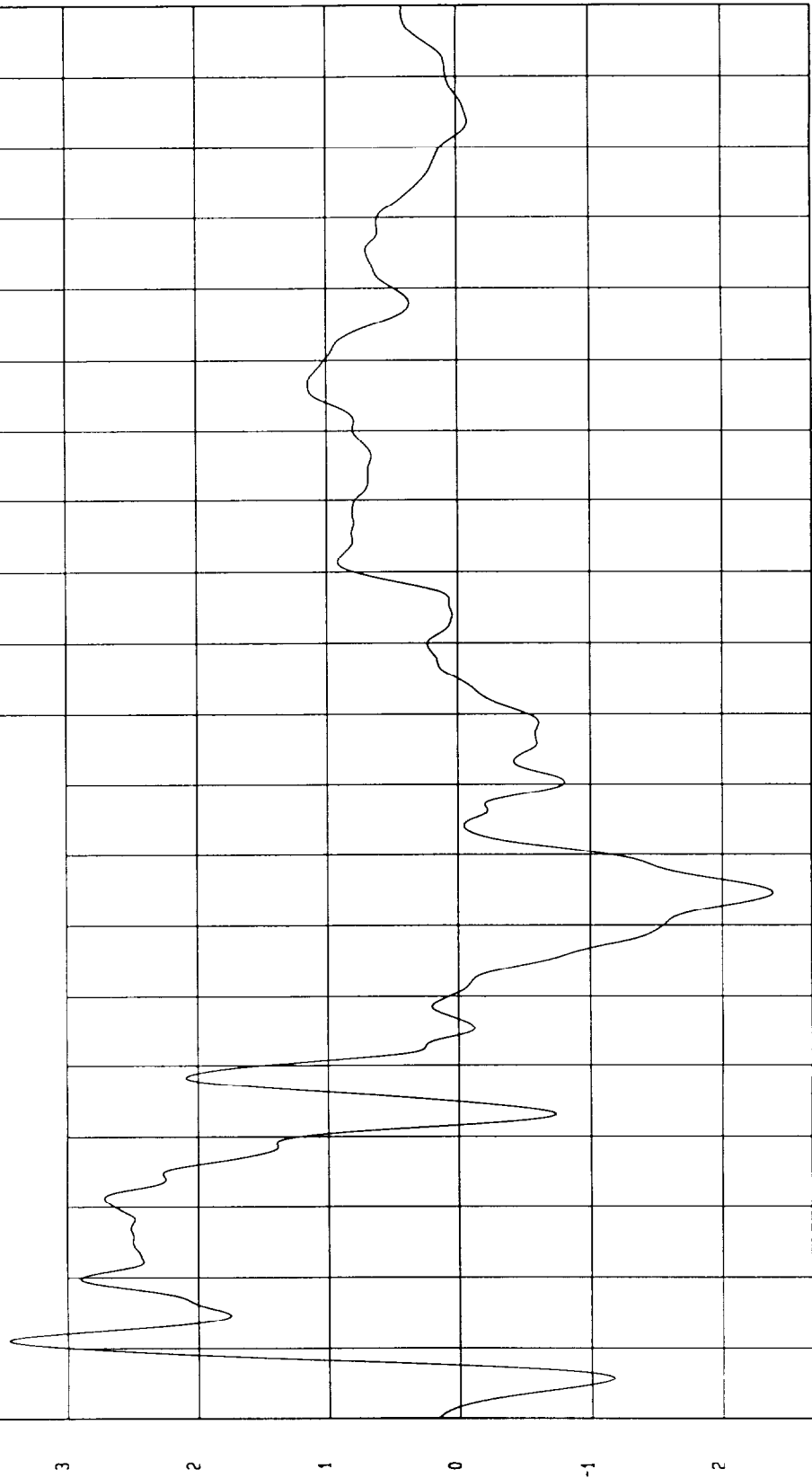
COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 2.39 G s at 75 msec

Maximum 3.44 G s at 11 msec

FLOORPAN @ REAR AXLE X ACCELERATION

1 800063AF A34 Filterclass (60)



Seconds

MCA Research  
08-11-2000 18 47

G's

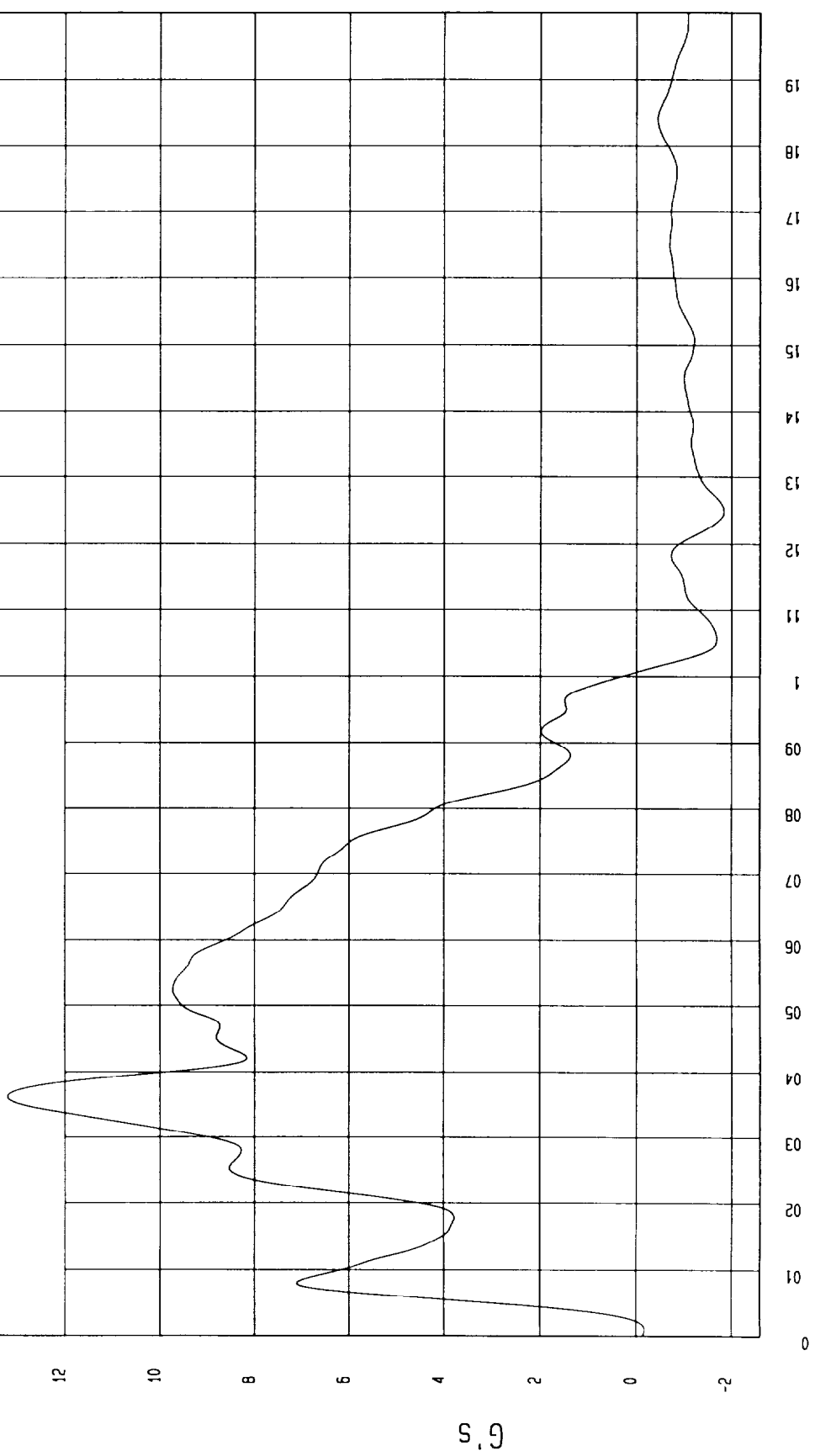
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 1 84 G s at 125 msec Maximum = 13 2 G s at 36 msec

FLOORPAN @ REAR AXLE Y ACCELERATION

1 800063AF A35 Filterclass (60)



MGA Research  
08-11-2000 18 47

Seconds

G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

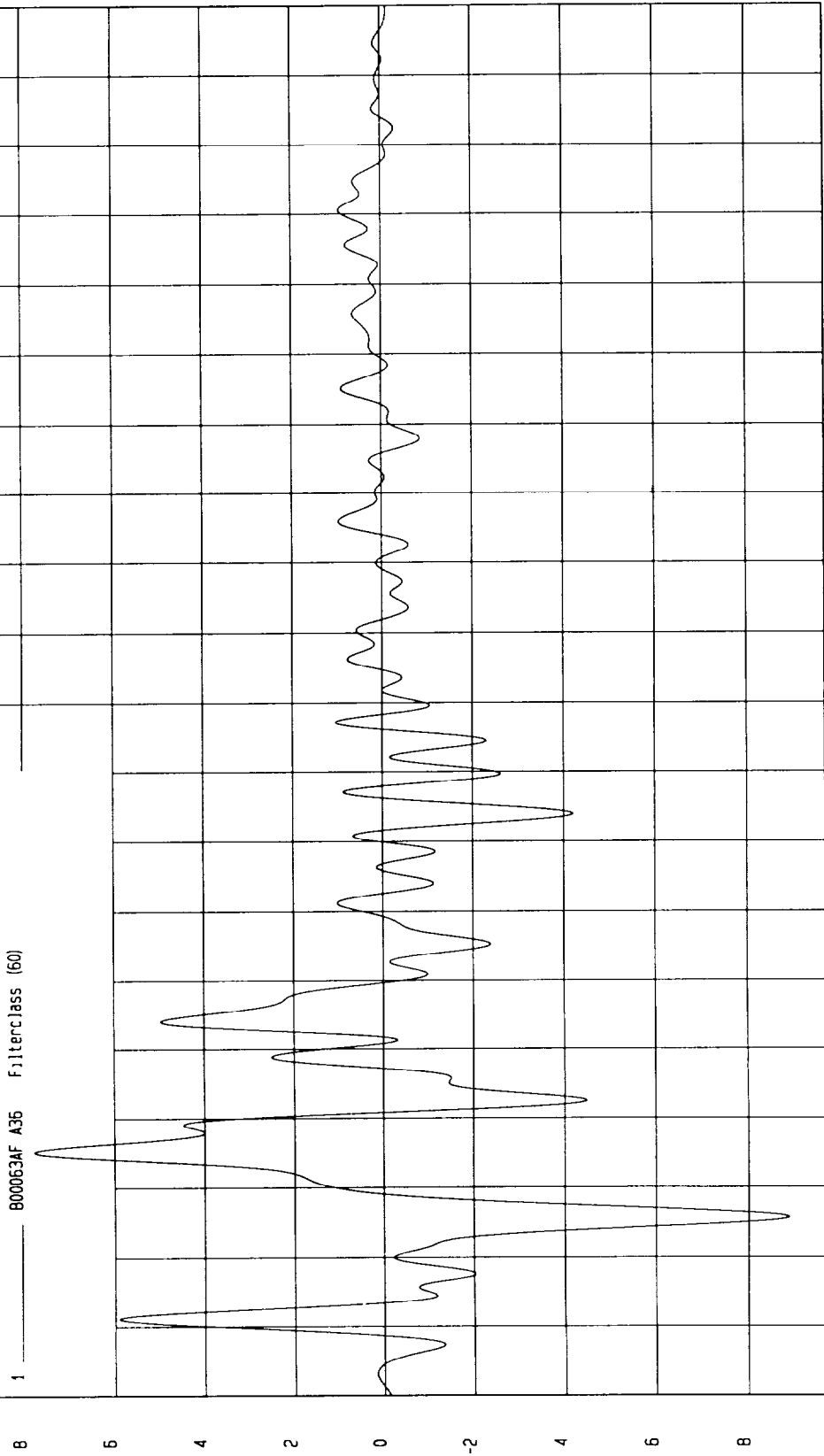
COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 8.91 G s at 26 msec

Maximum -7.78 G s at 35 msec

FLOORPAN @ REAR AXLE Z ACCELERATION

1 800063AF A36 Filterclass (60)



Seconds

MCA Research  
08-11-2000 18 47

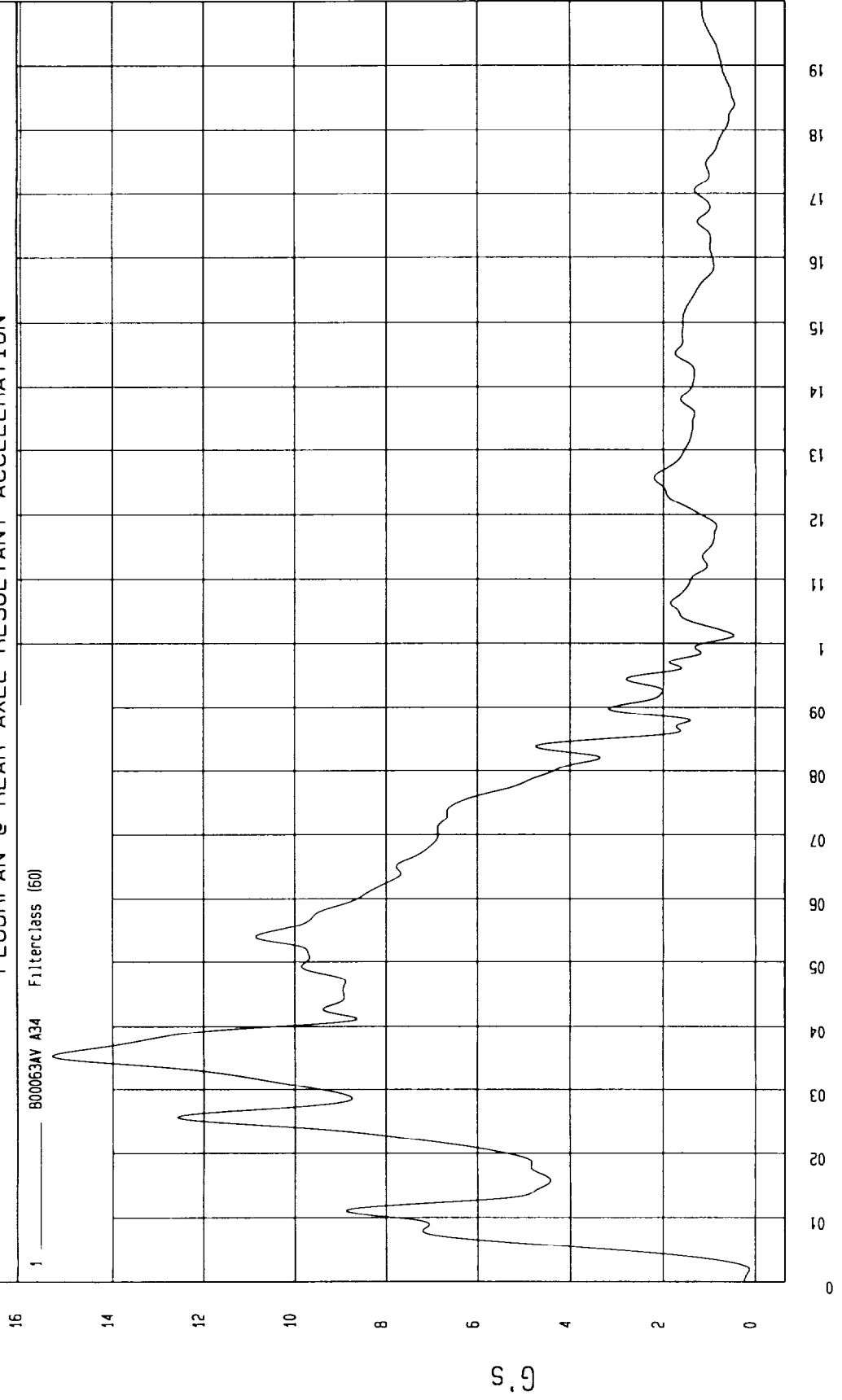
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 13 G s at 2 msec Maximum 15.33 G s at 35 msec

FLOORPAN @ REAR AXLE RESULTANT ACCELERATION

1 B00063AV A34 Filterclass (60)



Seconds

MGA Research  
08-11-2000 18 47

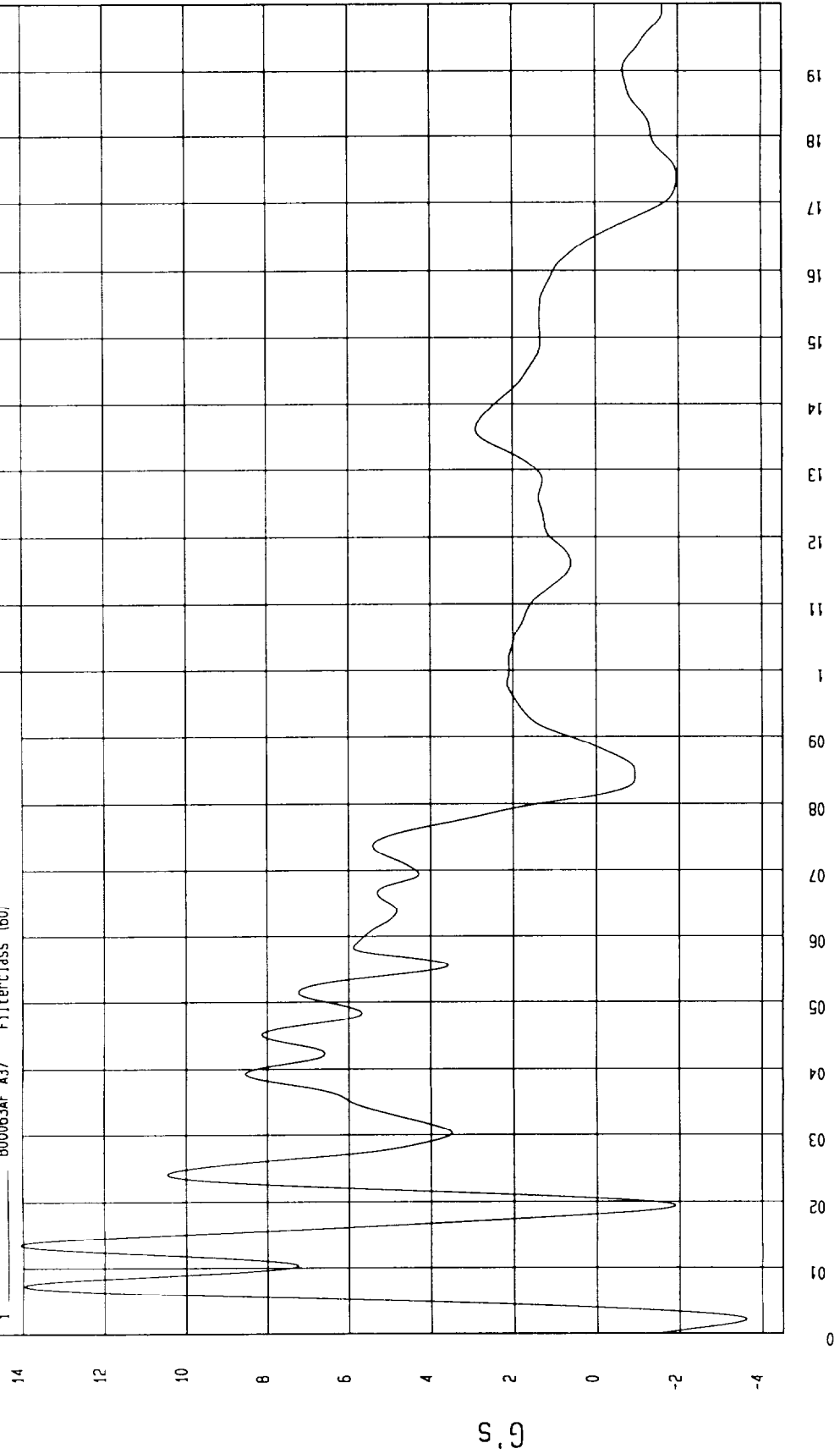
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 3.62 G s at 2 msec Maximum 14.07 G s at 14 msec

LEFT MID A POST Y ACCELERATION

1 800063AF A37 Filterclass (60)



MCA Research  
08-14-2000 07:59

Seconds

G's

TEST EU 96/27/EC SIDE IMPACT

TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS

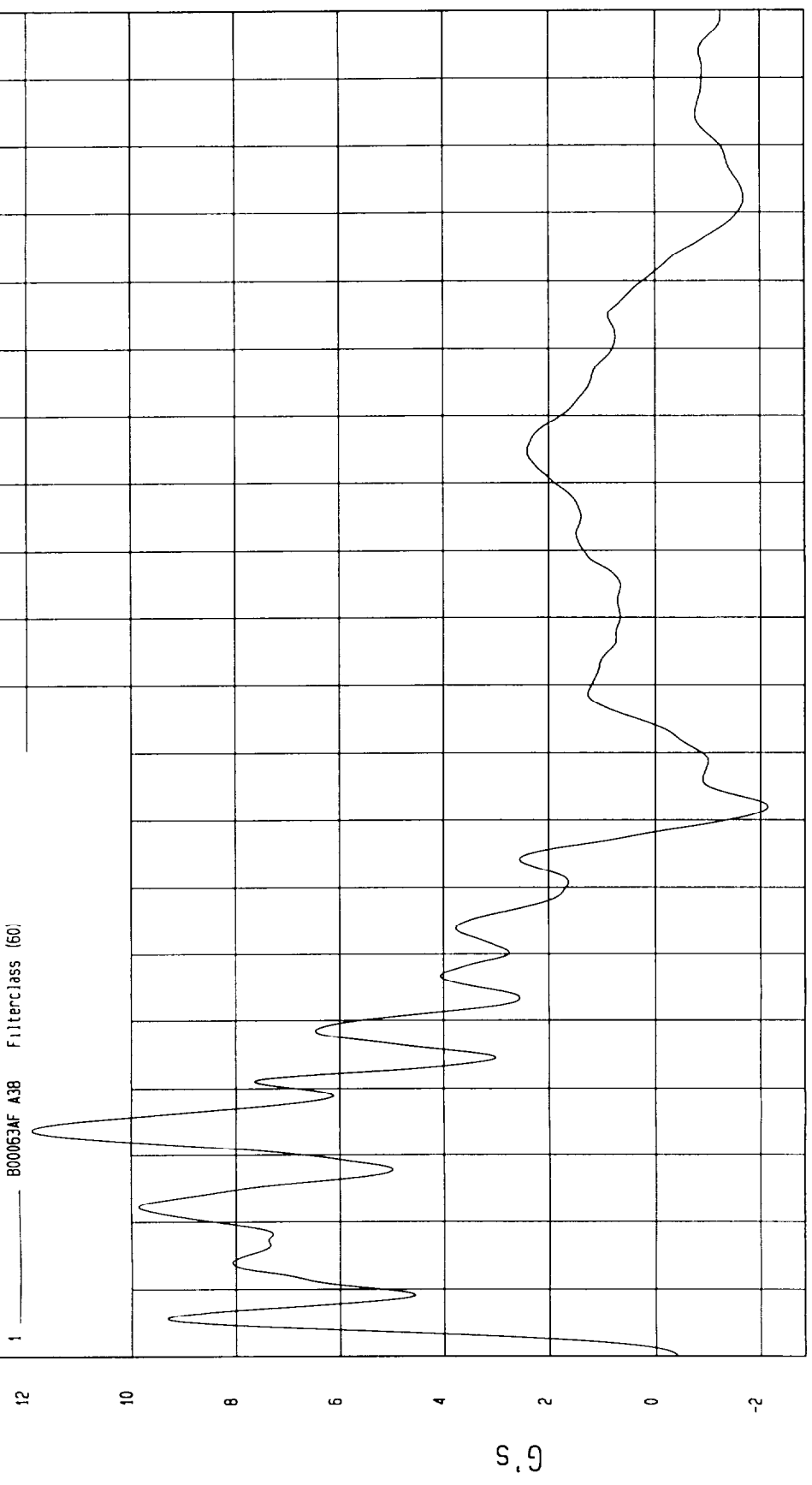
Speed 30.6 MPH 49.2 KPH

Minimum - 2.14 G s at 82 msec

Maximum = 11.92 G s at 34 msec

LEFT LOWER A POST Y ACCELERATION

1 B00063AF A38 Filterclass (50)



MCA Research  
08-11-2000 18 48

Seconds

G's

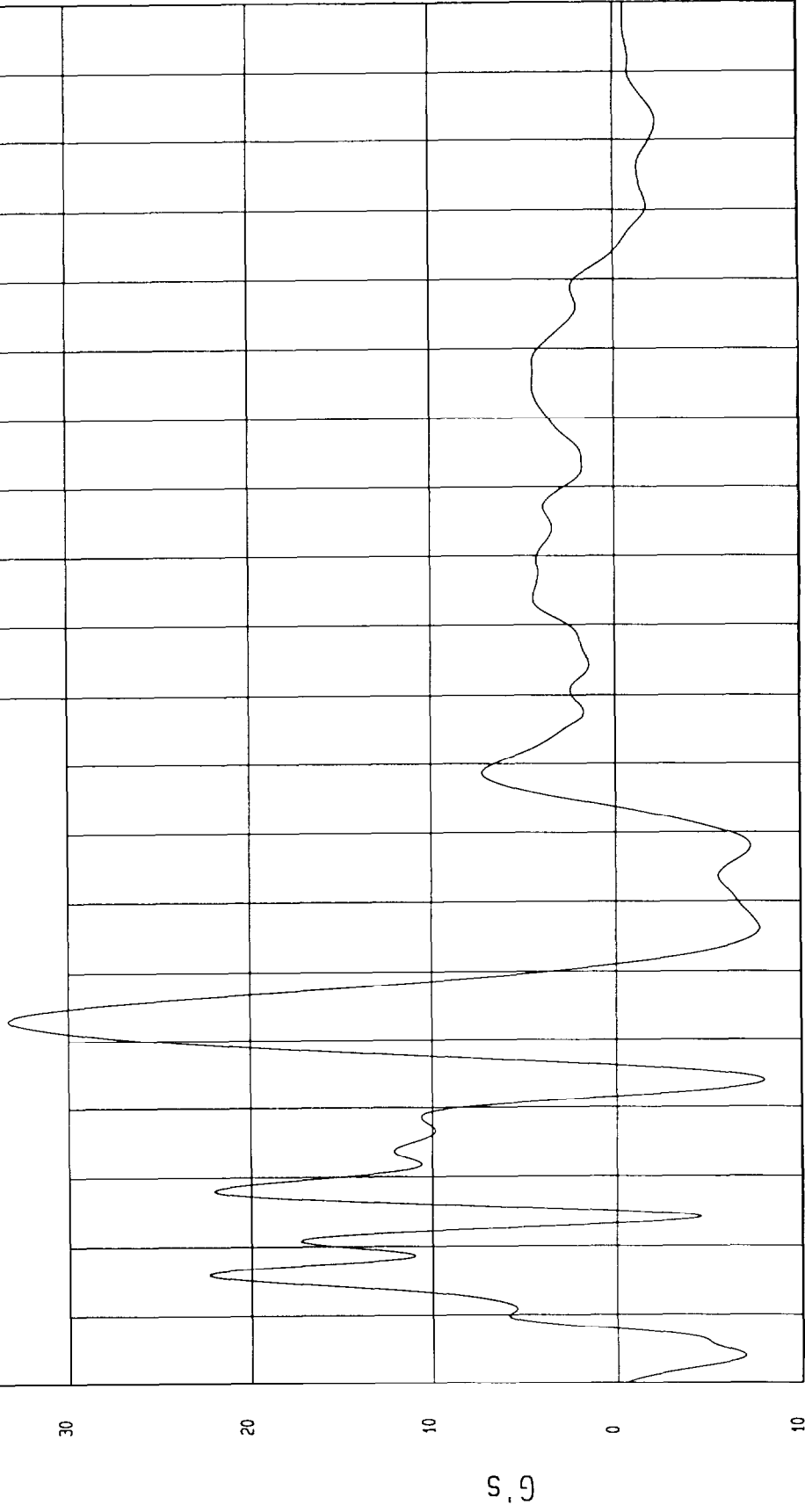
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum = -7.99 G s at 44 msec Maximum = 33.276 s at 53 msec

LEFT UPPER B POST Y ACCELERATION

1 ——— 800063AF A39 FilterClass (60)



Seconds

MGA Research  
08-11-2000 18 48

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

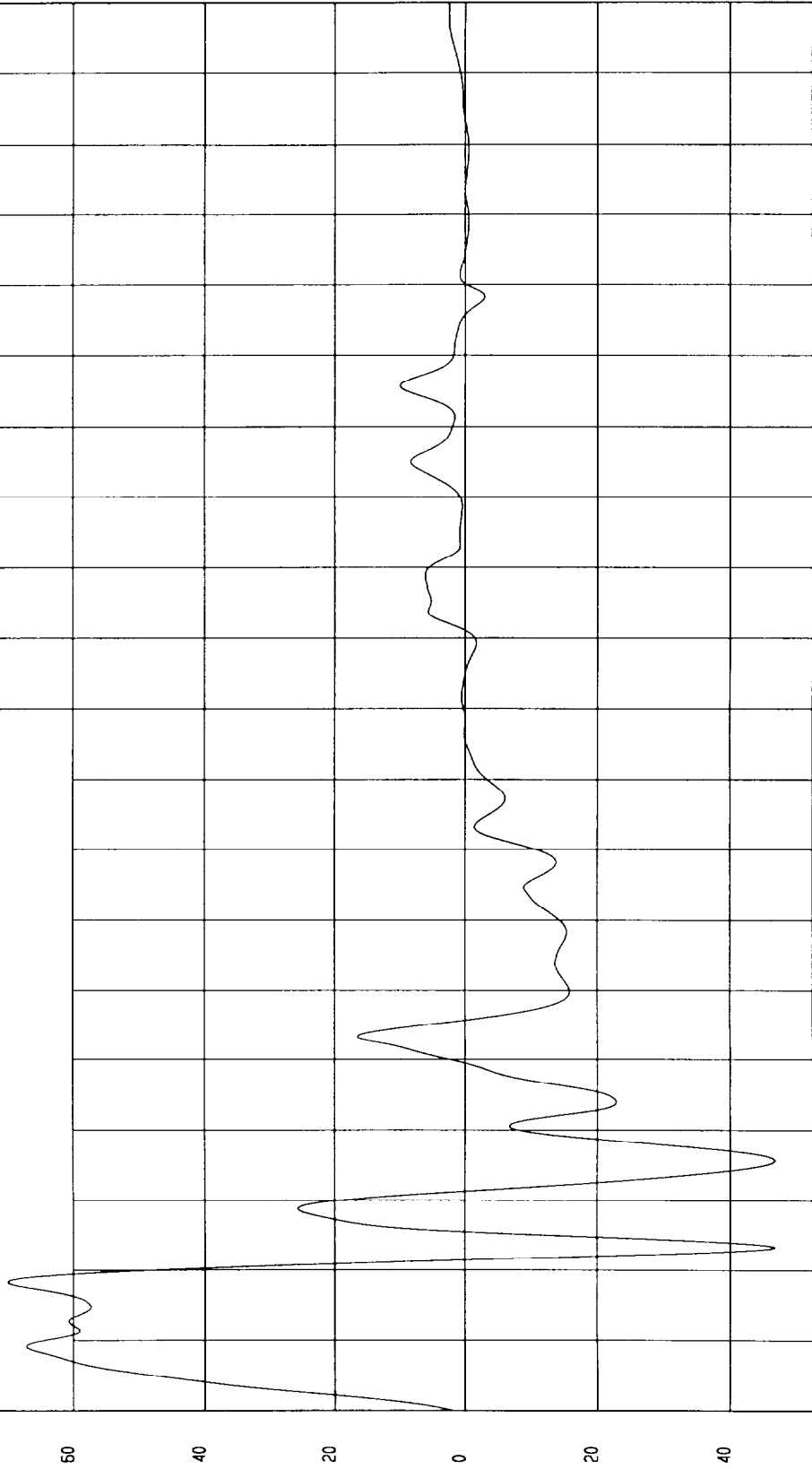
COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - -46.79 G s at 23 msec

Maximum = 69.99 G s at 18 msec

LEFT MID B POST Y ACCELERATION

1 800063AF A40 Filterclass (60)



Seconds

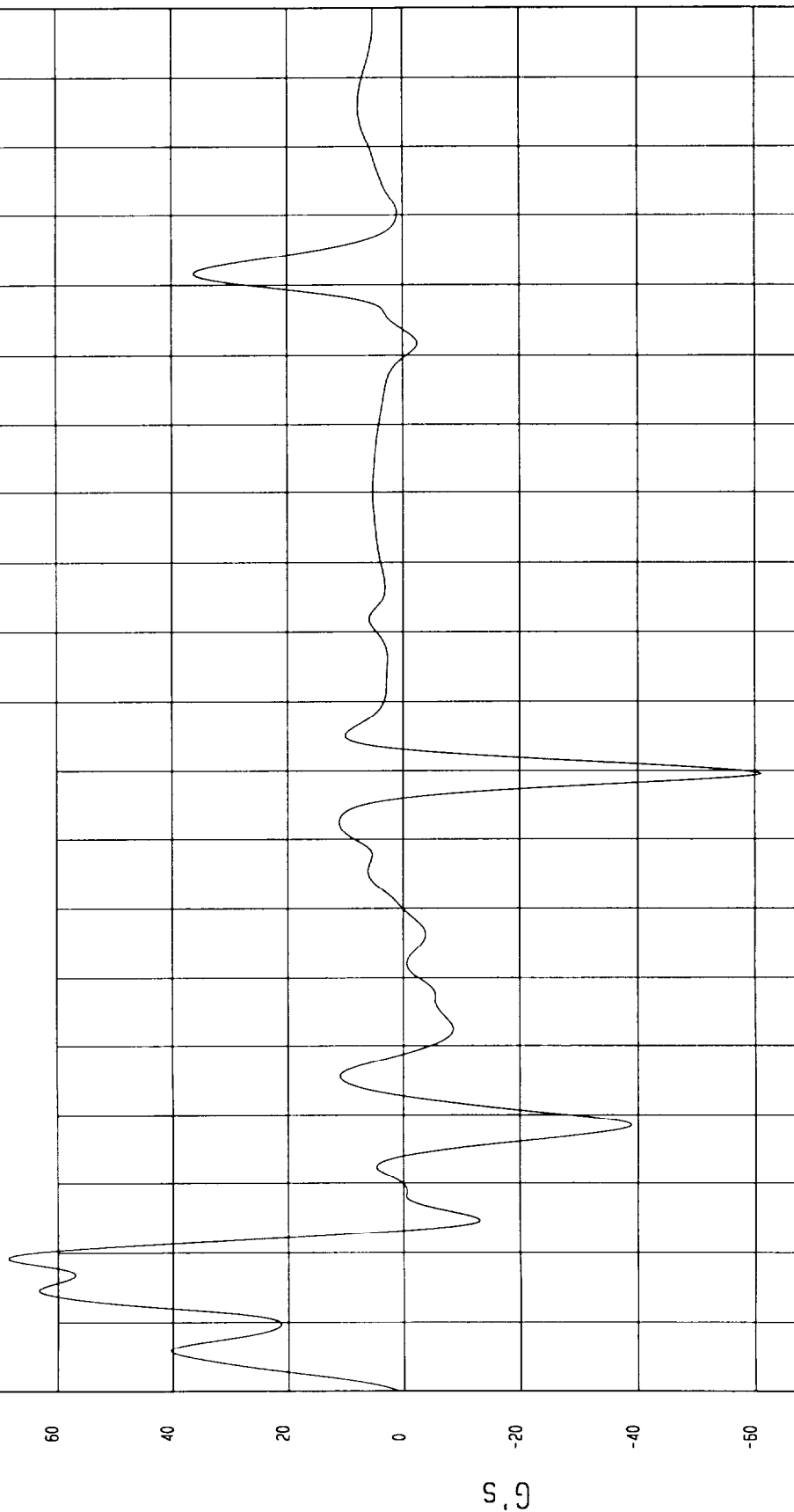
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum = -61.1 G s at 90 msec  
Maximum = 68.61 G s at 19 msec

LEFT LOWER B POST Y ACCELERATION

1 ——— BC0063AF A41 Filterclass (60)



MGA Research  
08-11-2000 18 AB

Seconds

G's

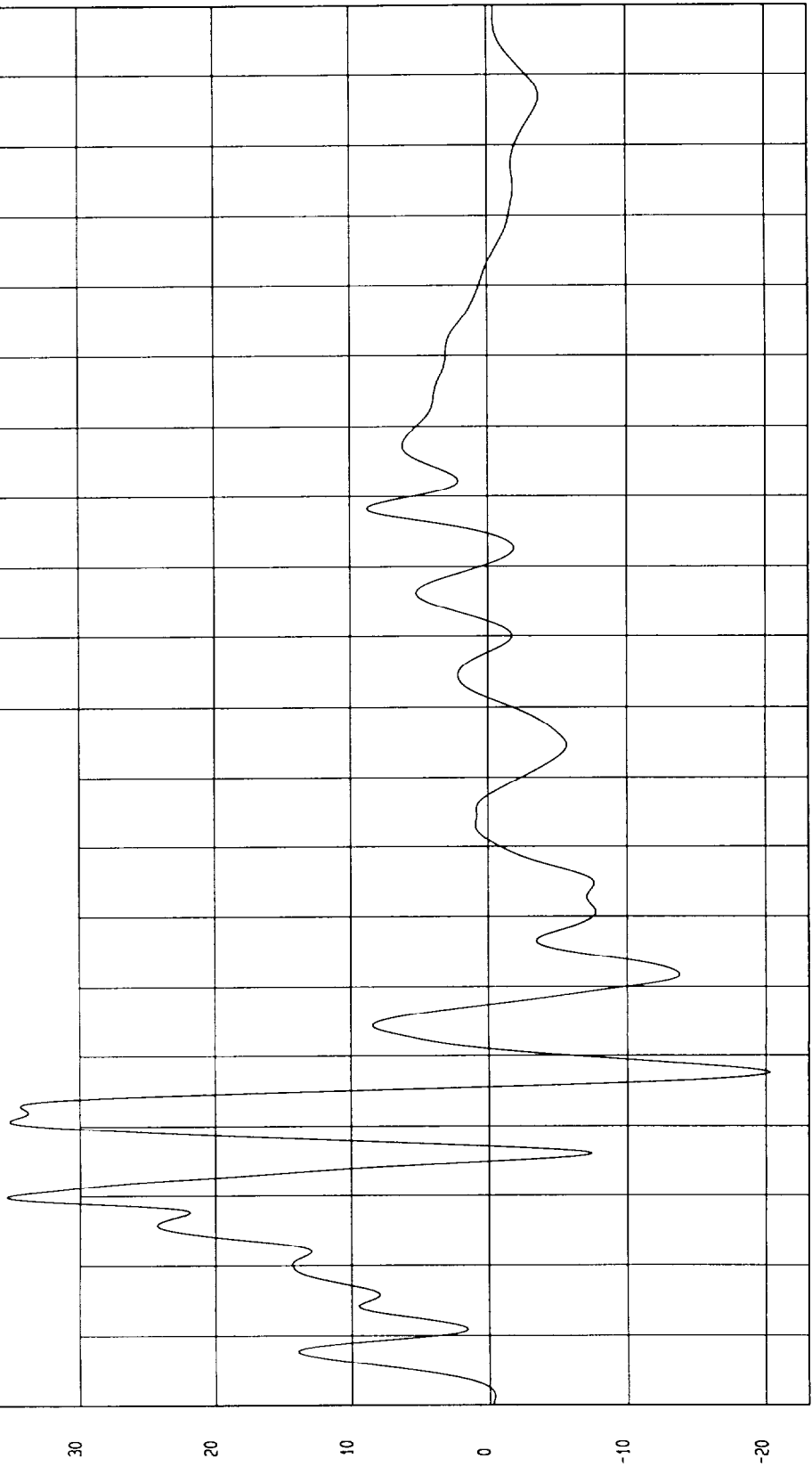
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 20.33 G s at 48 msec Maximum 35.37 G s at 30 msec

DRIVER SEAT TRACK Y ACCELERATION

1 ——— B00063AF A42 Filterclass (60)



Seconds

MGA Research  
08-11-2000 1B 4B

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

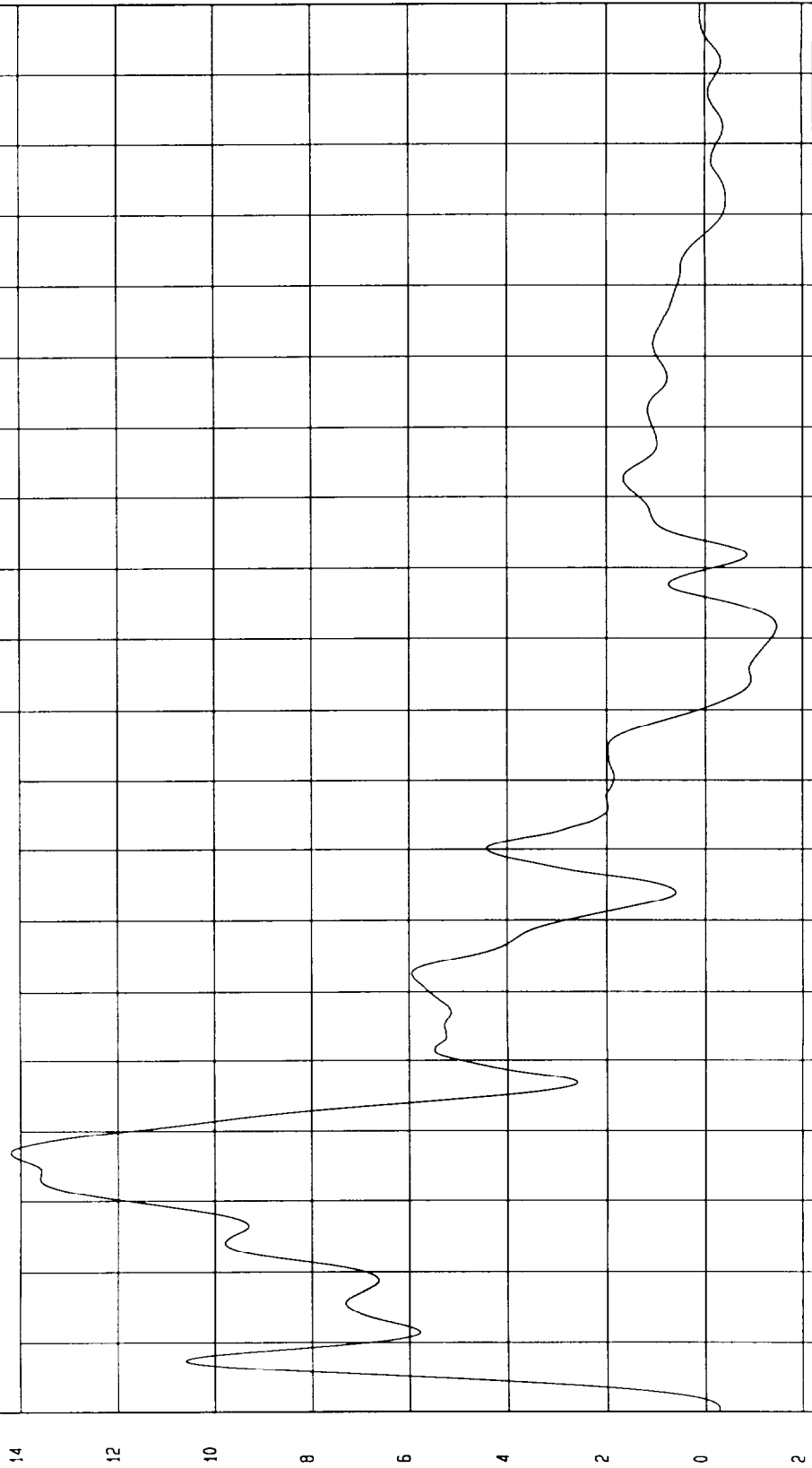
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum - 1.46 G s at 112 msec

Maximum - 14.26 G s at 37 msec

RIGHT REAR OCCUPANT COMPARTMENT Y ACCELERATION

1 B00063AF A43 Filterclass (60)



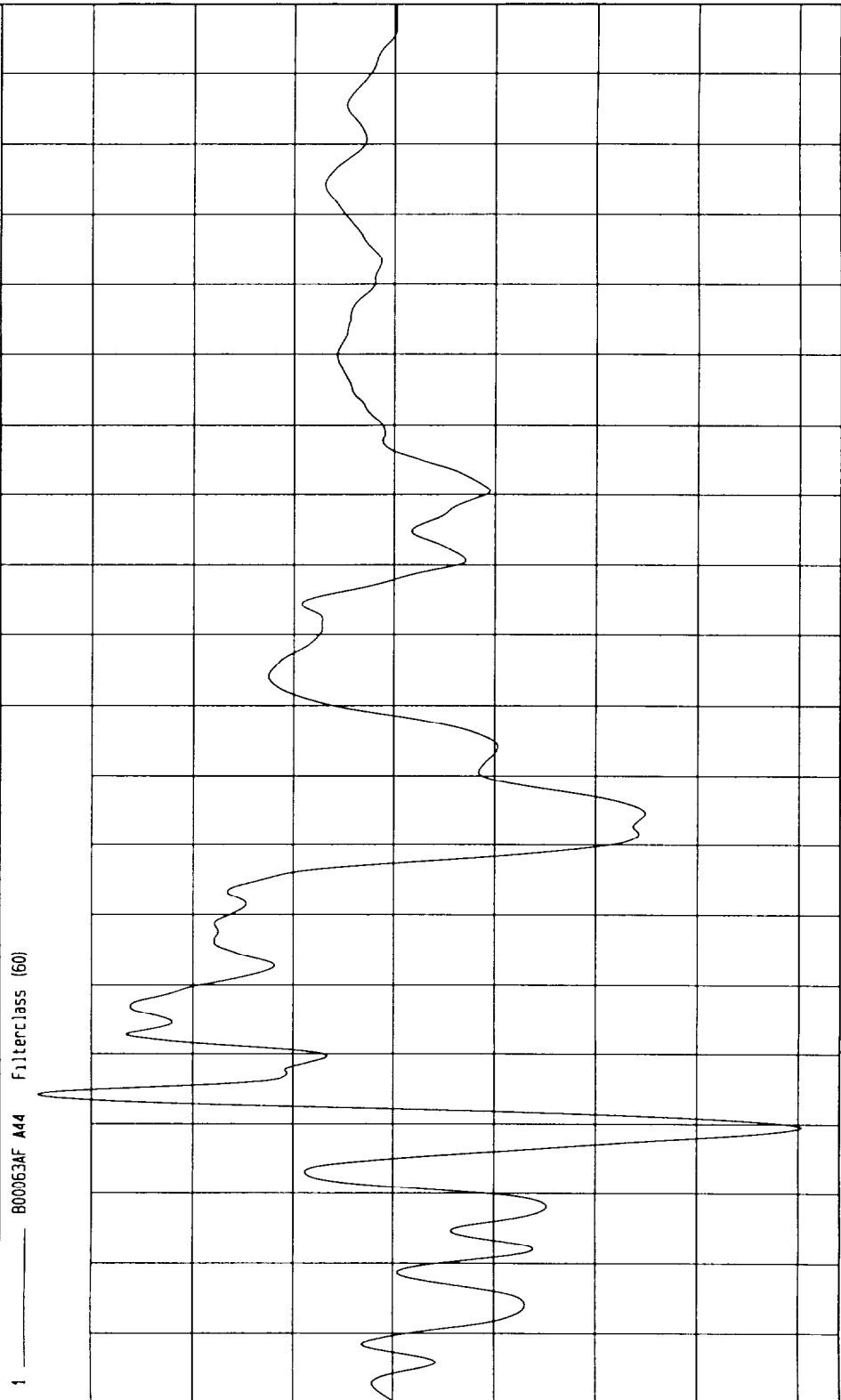
MGA Research  
08-11-2000 18 AB

Seconds

G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000  
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH  
Minimum -4 03 G s at 40 msec Maximum -3 53 G s at 44 msec

VEHICLE CG X ACCELERATION



MGA Research  
08-11-2000 18 48  
Seconds

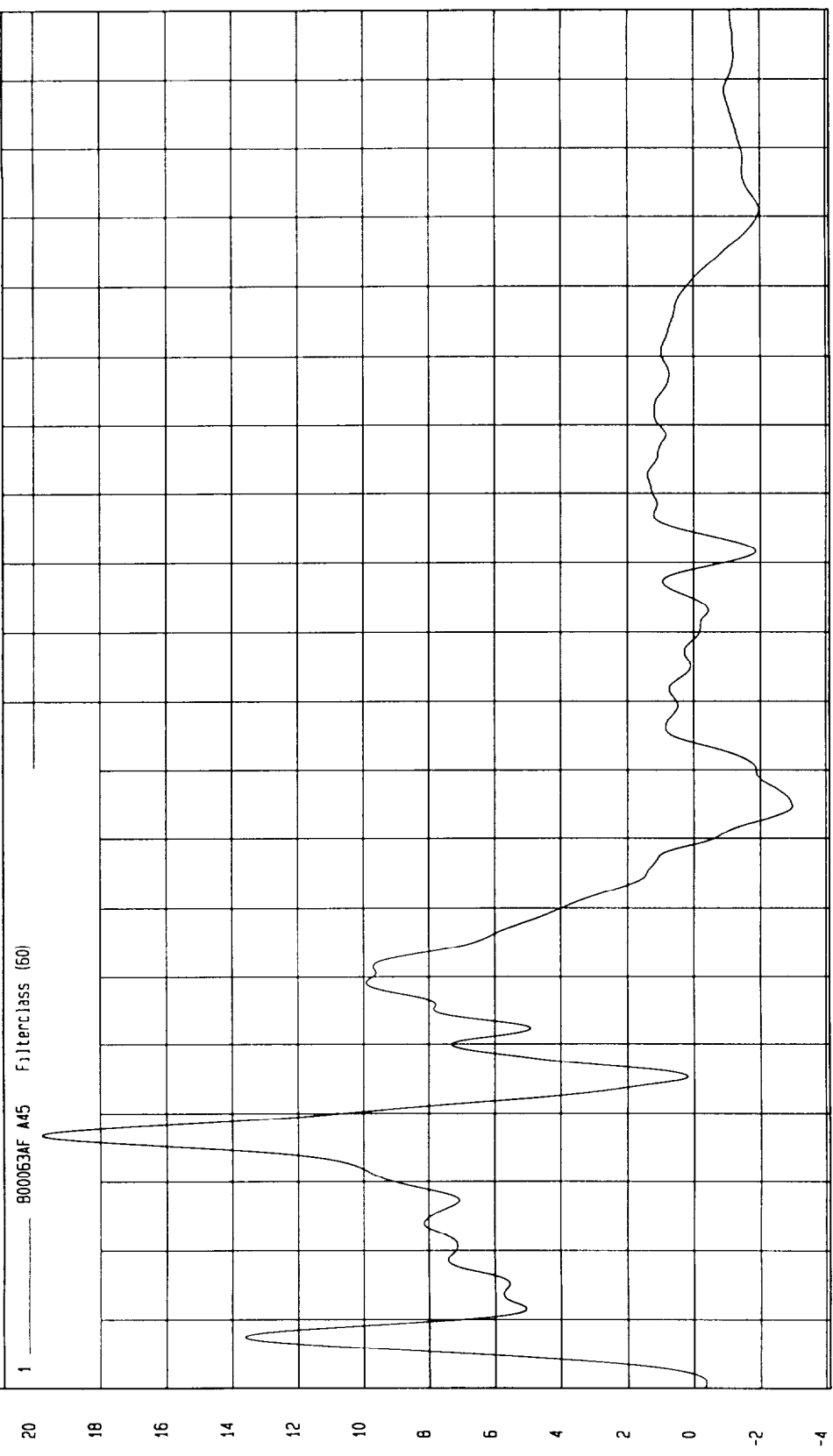
G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum = 2.98 G s at 85 msec  
Maximum = 19.79 G s at 37 msec

VEHICLE CG Y ACCELERATION



MCA Research  
08-11-2000 18.48

Seconds

G's

TEST EU 96/27/EC SIDE IMPACT

TEST DATE 08-11-2000

Speed 30.6 MPH 49.2 KPH

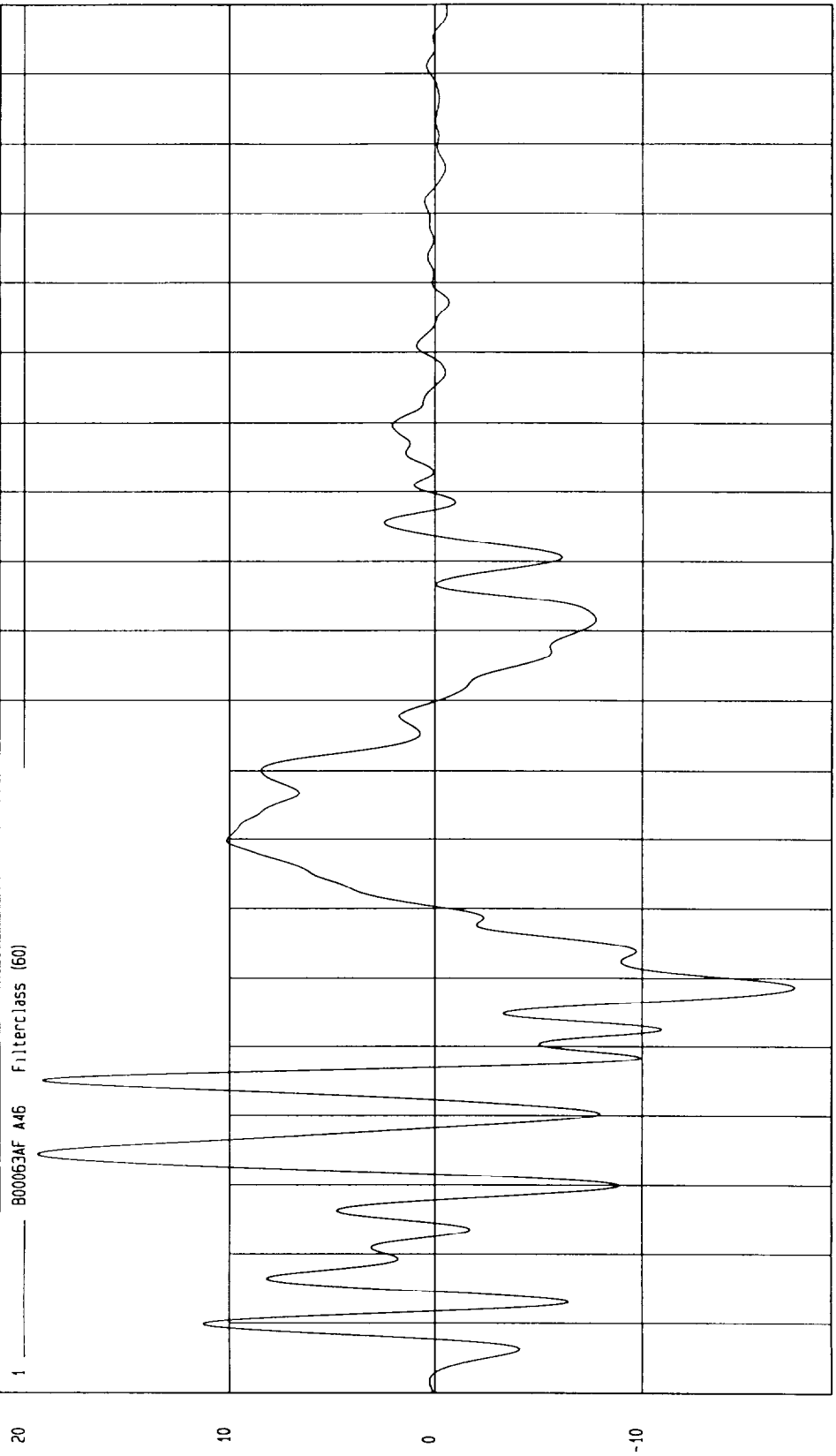
COMPONENT 1996 FORD TAURUS

Minimum 17.33 G s at 59 msec

Maximum 19.35 G s at 34 msec

VEHICLE CG Z ACCELERATION

1 B00063AF A46 Filterclass (60)



MCA Research  
08-11-2000 18 46

Seconds

G's



TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

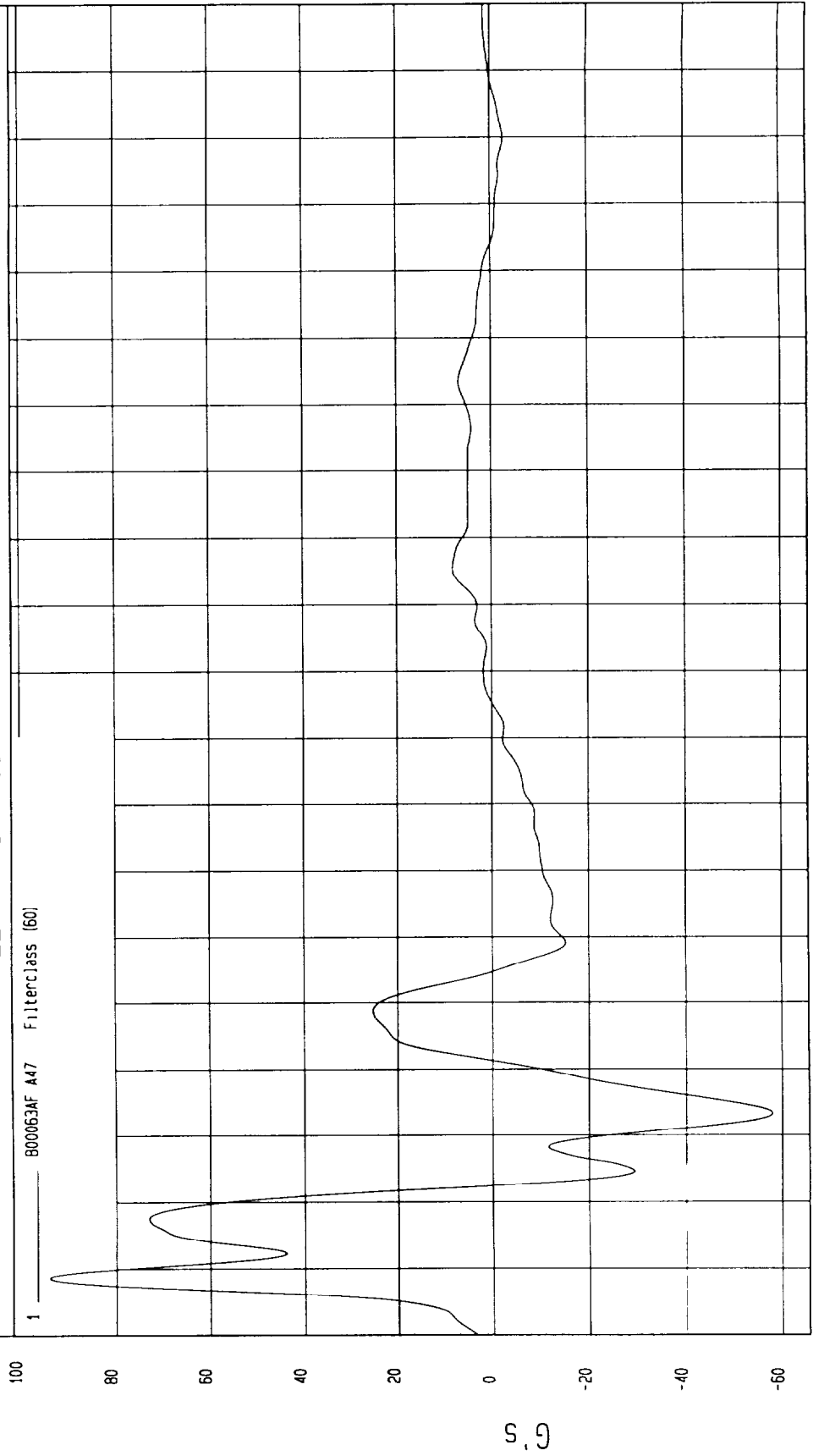
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum - 57.93 G s at 33 msec

Maximum = 94.04 G s at 9 msec

LEFT FRONT DOOR UPPER Y ACCELERATION

1 800063AF A47 Filterclass (60)



MGA Research  
08-11-2000 18 49

Seconds

G's

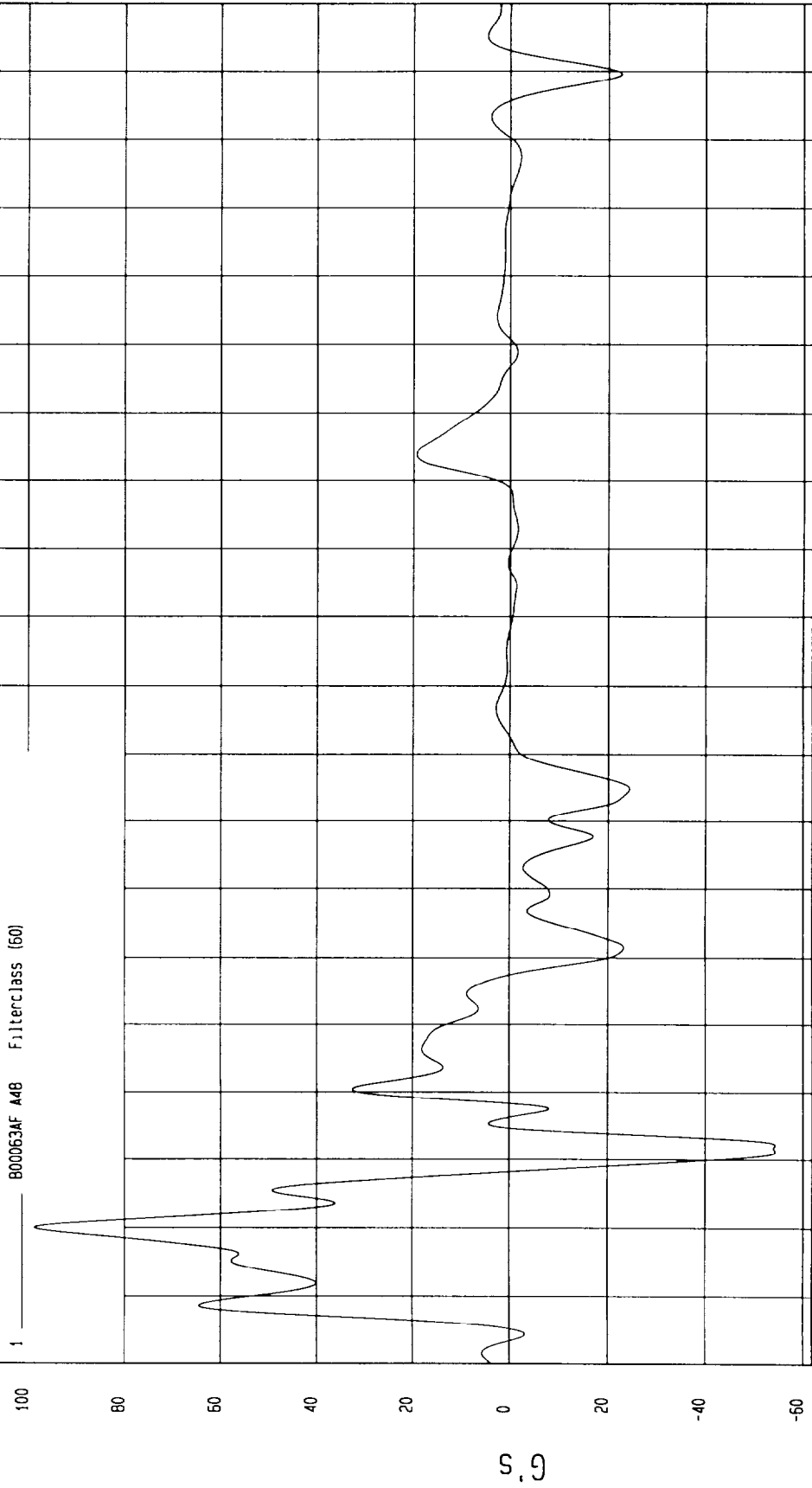
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 54.28 G s at 31 msec Maximum 98.73 G s at 20 msec

LEFT FRONT DOOR MID Y ACCELERATION

1 800063AF A48 Filterclass (50)



MGA Research 08-11-2000 18 49 Seconds

TEST EU 96/27/EC SIDE IMPACT

TEST DATE 08-11-2000

Speed 30 6 MPH 49 2 KPH

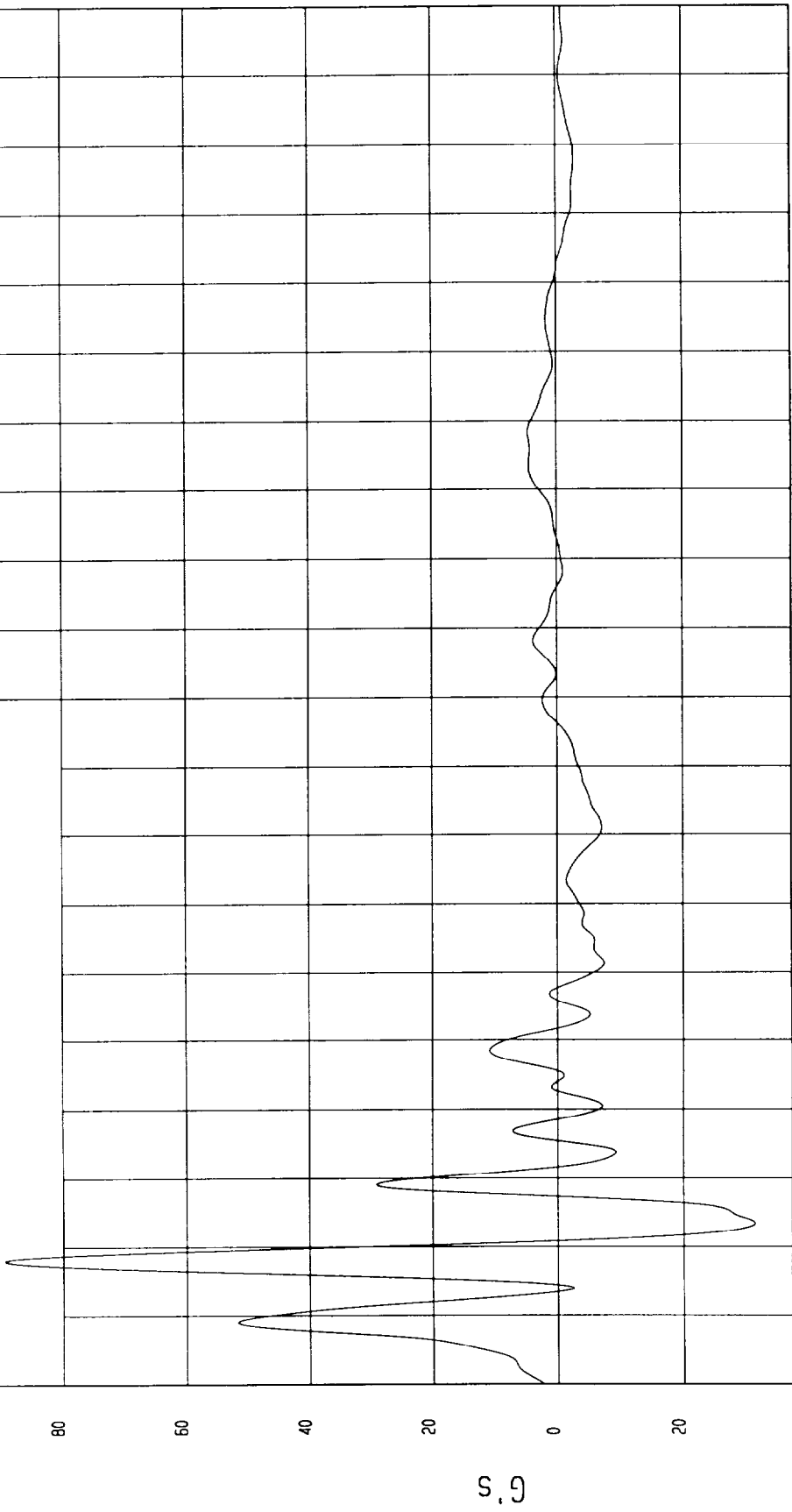
COMPONENT 1996 FORD TAURUS

Minimum - 89 56 G s at 18 msec

Minimum 31 51 G s at 23 msec

LEFT FRONT DOOR LOWER Y ACCELERATION

1 B00063AF A49 Filterclass (60)

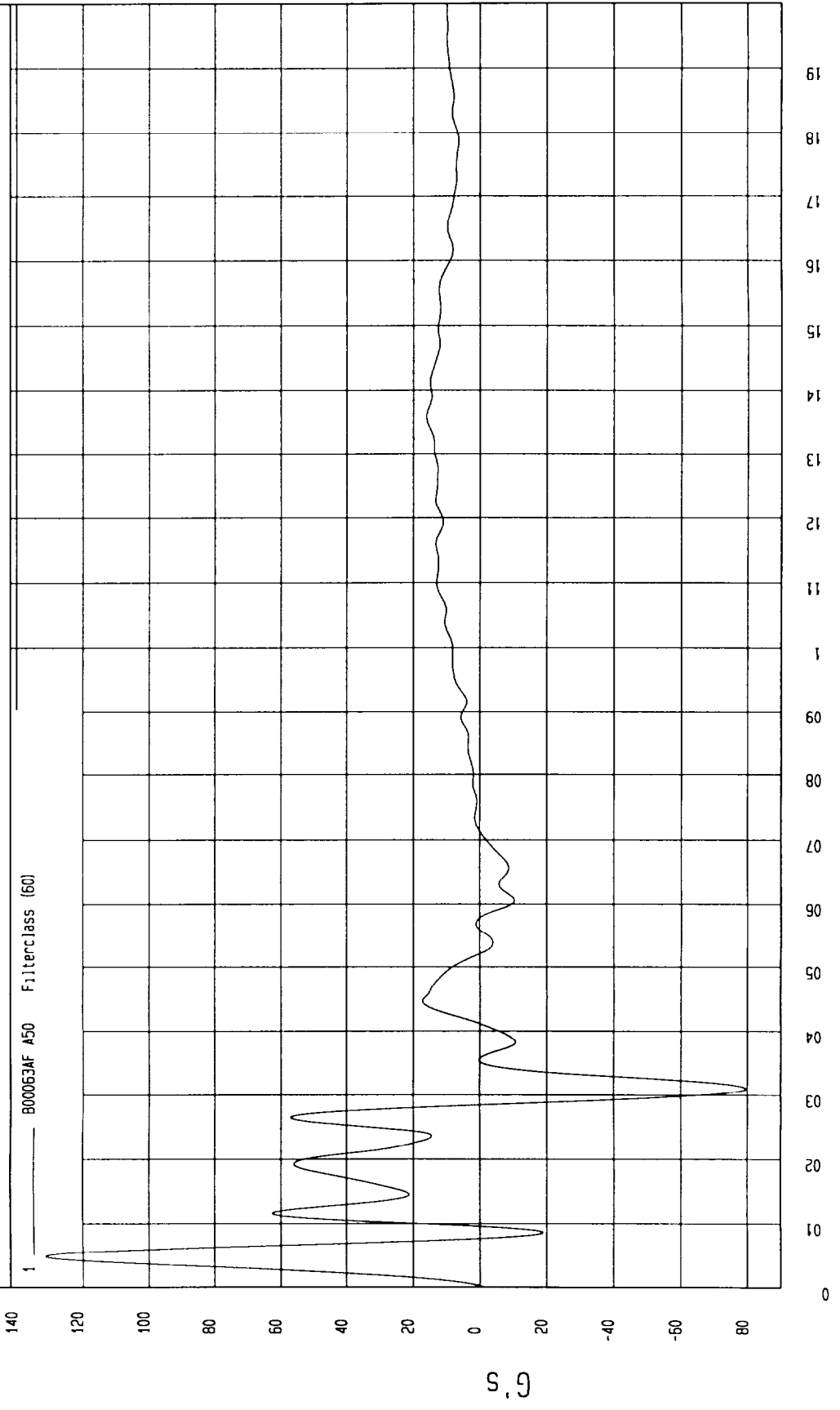


TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 79.63 G s at 31 msec Maximum 131.36 G s at 5 msec

LEFT FRONT DOOR REAR LOWER Y ACCELERATION



Seconds

MGA Research  
08-11-2000 18 49

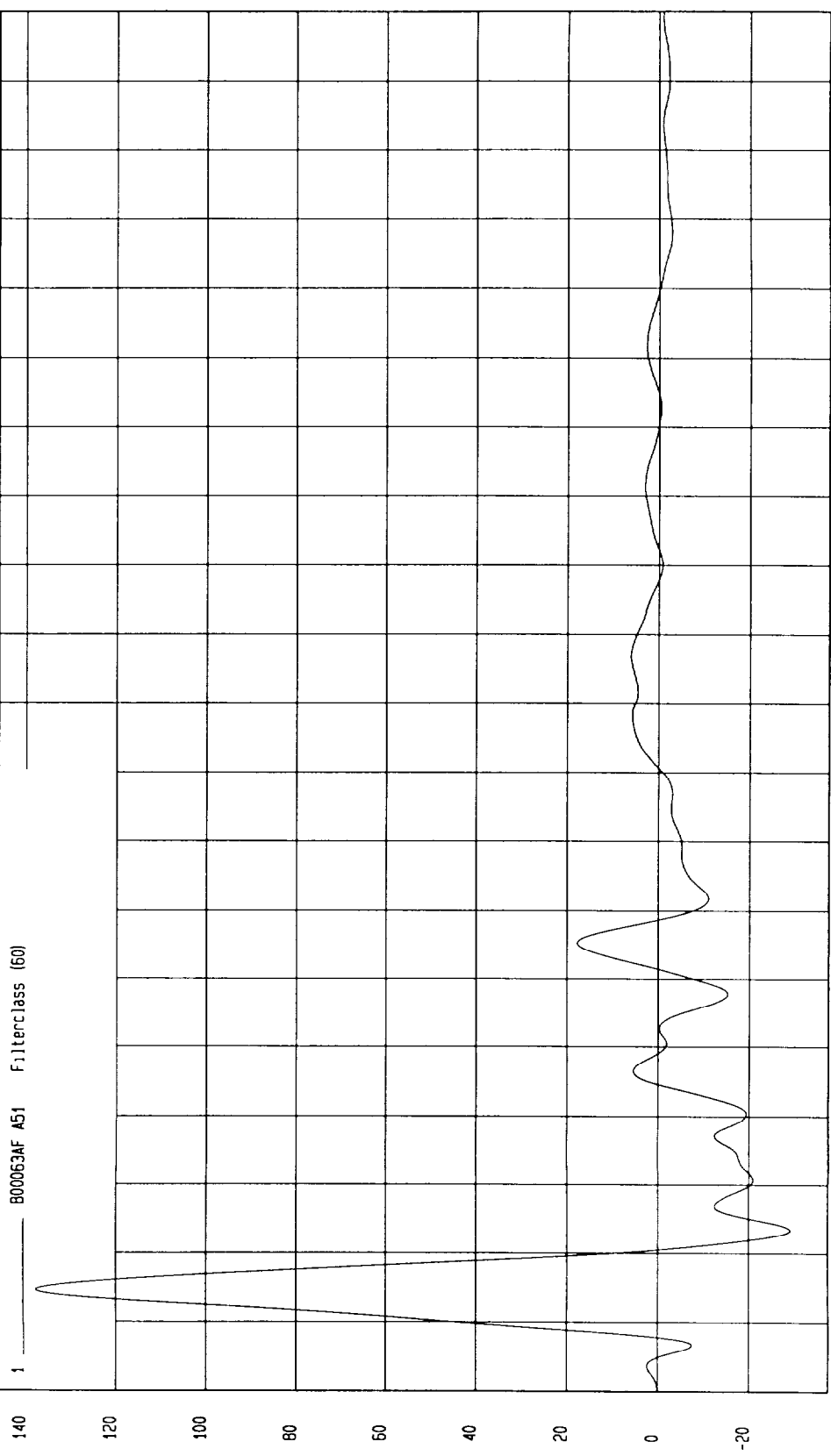
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 29.6 g at 23 msec Maximum 137.77 g at 15 msec

LEFT REAR DOOR UPPER Y ACCELERATION

1 800063AF A51 Filterclass (60)



Seconds

MCA Research  
08-11-2000 18:49

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

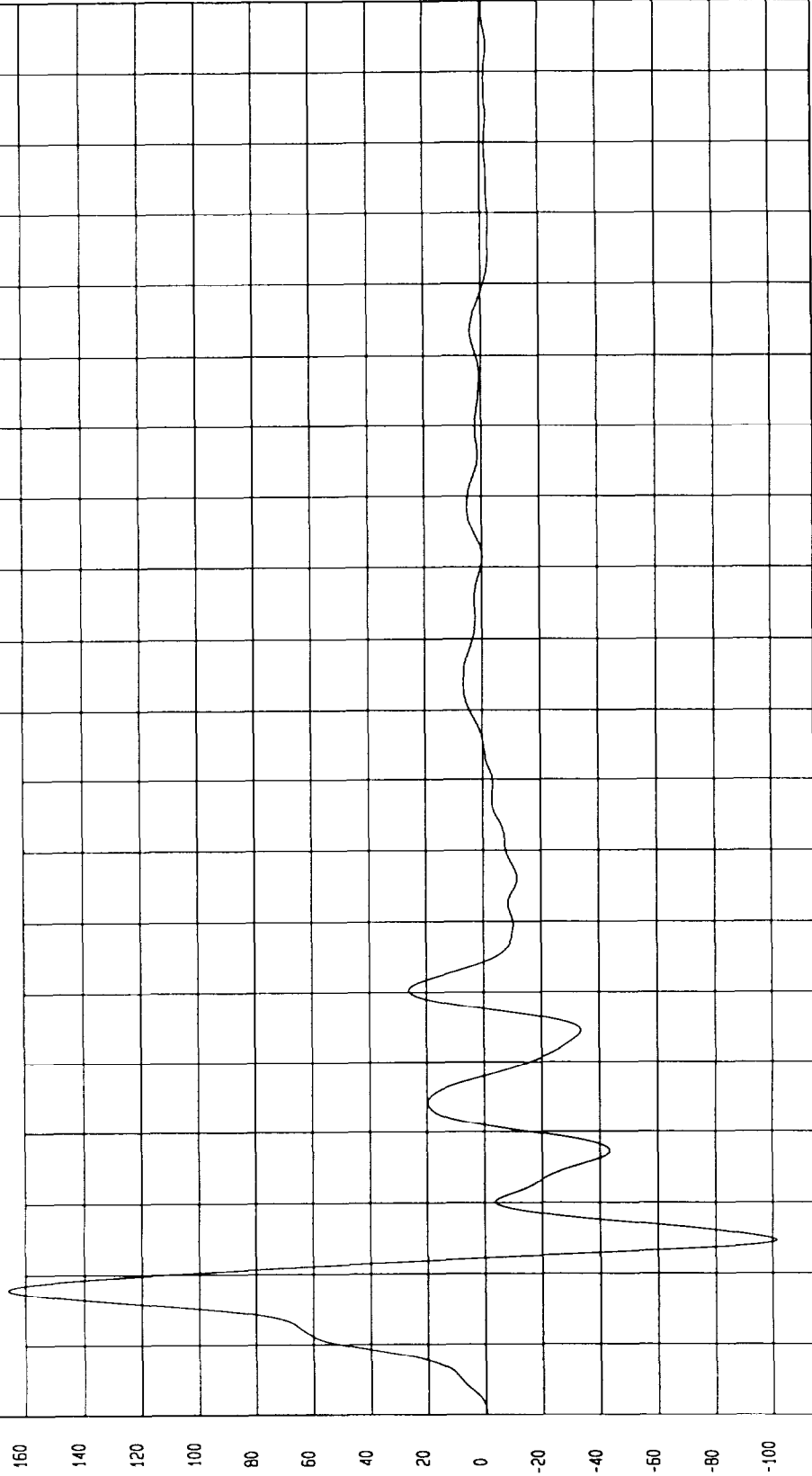
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = 101.75 G s at 25 msec

Maximum = 165.87 G s at 18 msec

LEFT REAR DOOR MID Y ACCELERATION

1 800063AF A52 Filterclass (60)



MCA Research  
08-11-2000 18 49

Seconds

G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

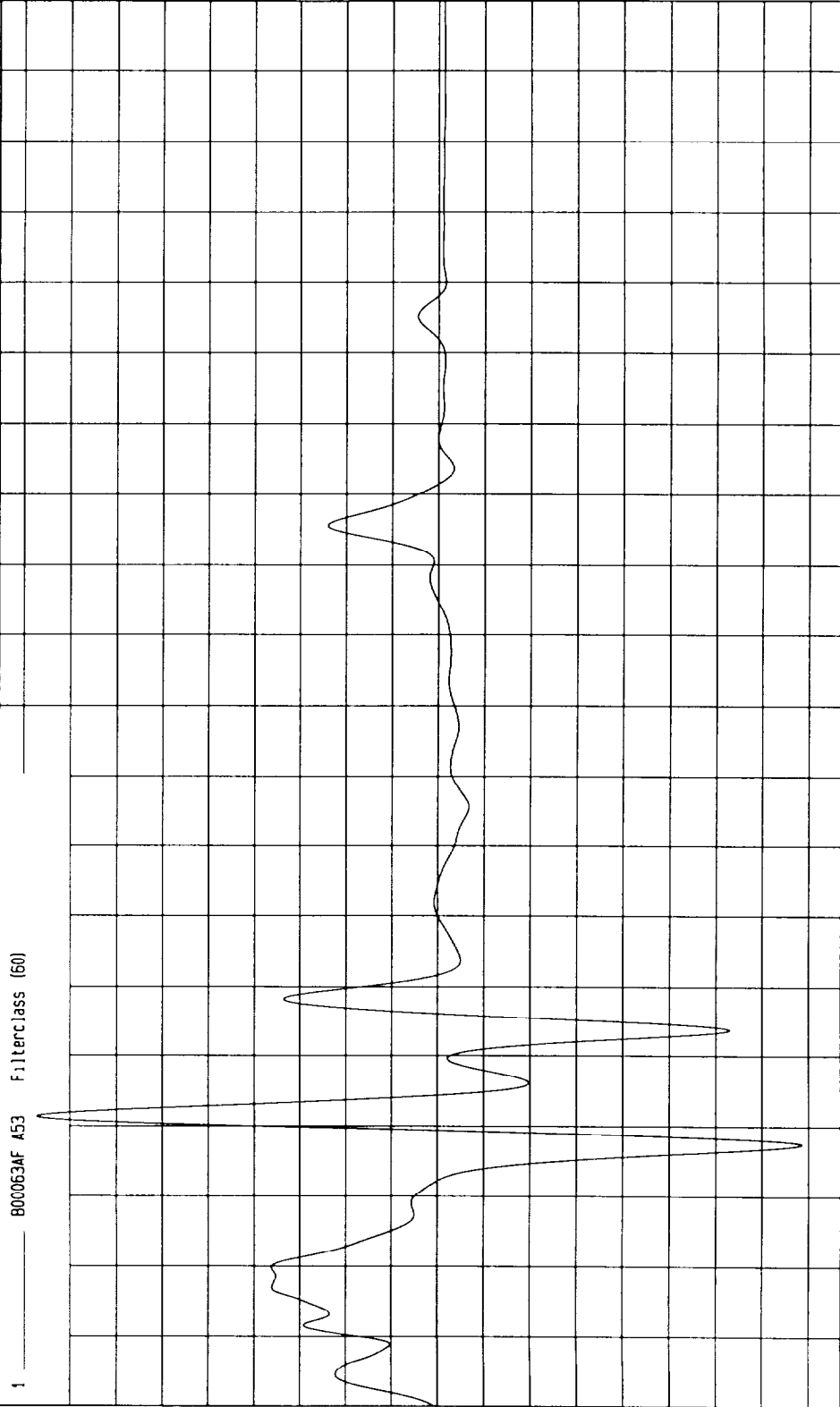
COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 157.19 G s at 38 msec Maximum = 174.16 G s at 41 msec

LEFT REAR DOOR LOWER Y ACCELERATION

1 800063AF A53 Filterclass (60)

G.S  
180  
160  
140  
120  
100  
80  
60  
40  
20  
0  
-20  
-40  
-60  
-80  
-100  
-120  
-140  
-160



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Seconds

MGA Research  
08-11-2000 18.49

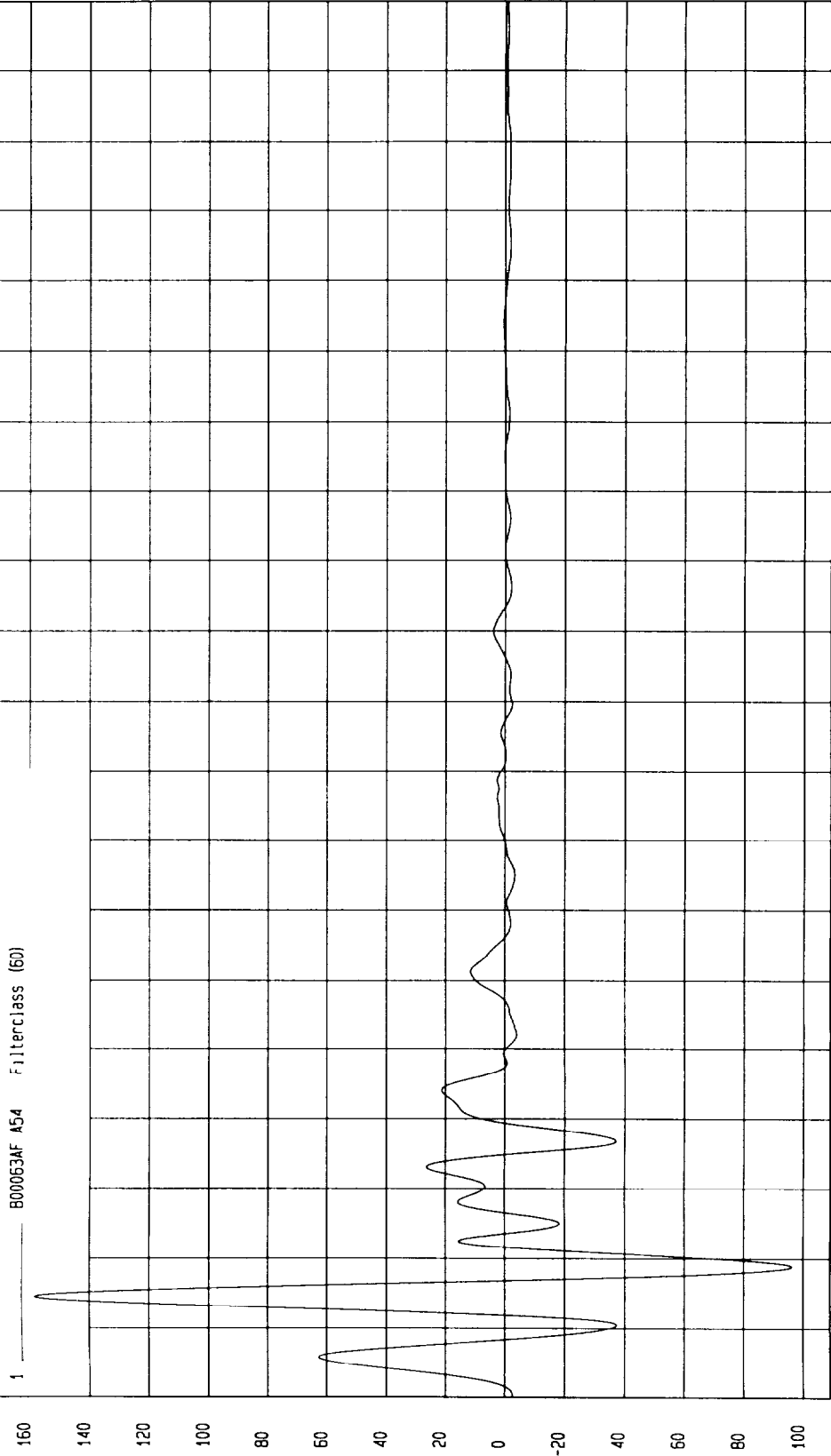
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 96.28 G s at 19 msec Maximum 158.23 G s at 14 msec

LEFT REAR DOOR REAR LOWER Y ACCELERATION

1 B00063AF A54 Filterclass (60)



Seconds

MGA Research  
08-11-2000 16 49

G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

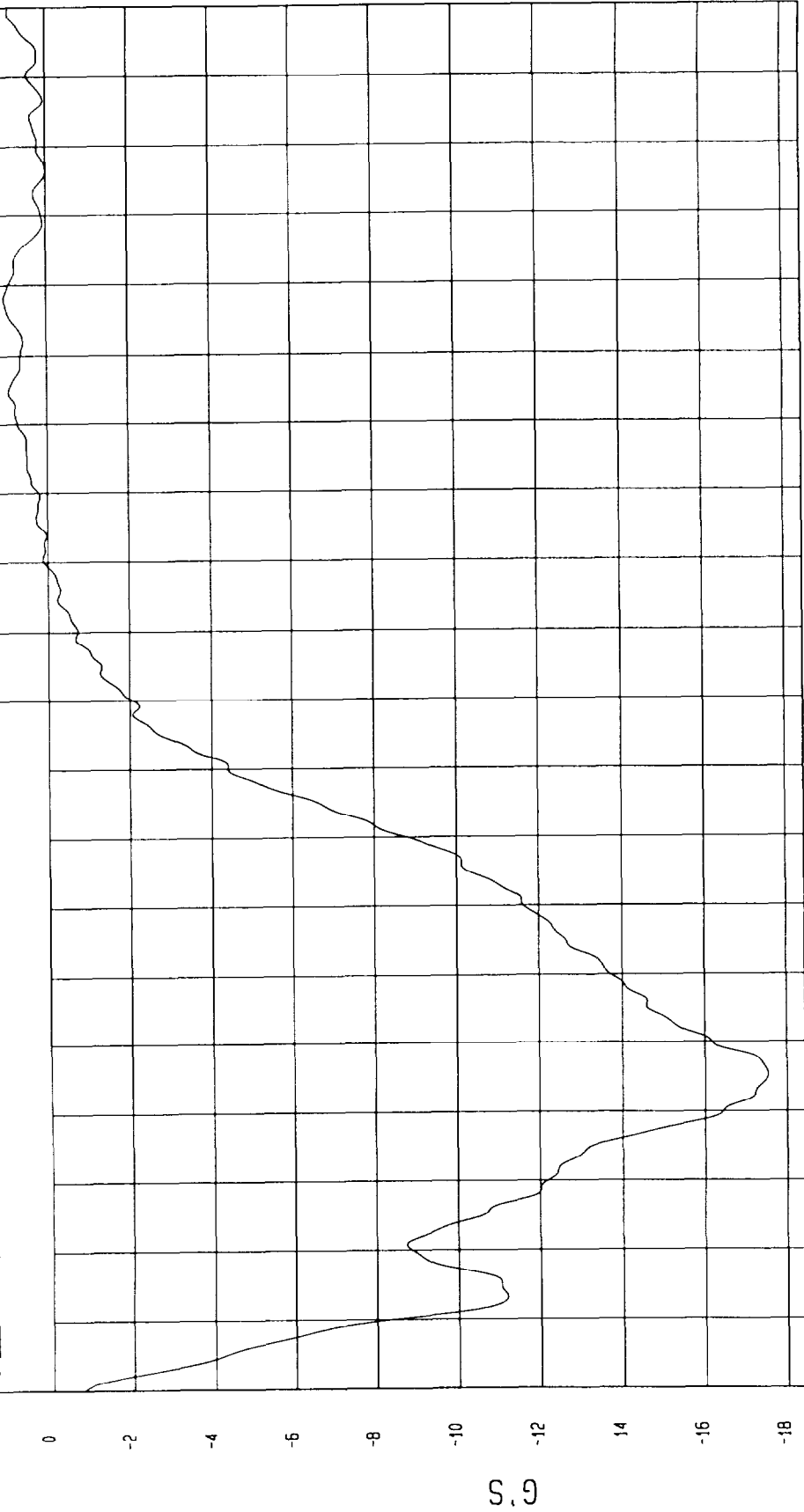
COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 17.53 G S at 45 msec

Maximum -1.05 G S at 158 msec

MOVING BARRIER CG X ACCELERATION

1 B00063AF A02 Filterclass (60)



TIME (SECONDS)

MGA Research  
08-11-2000 16 02

G.S.

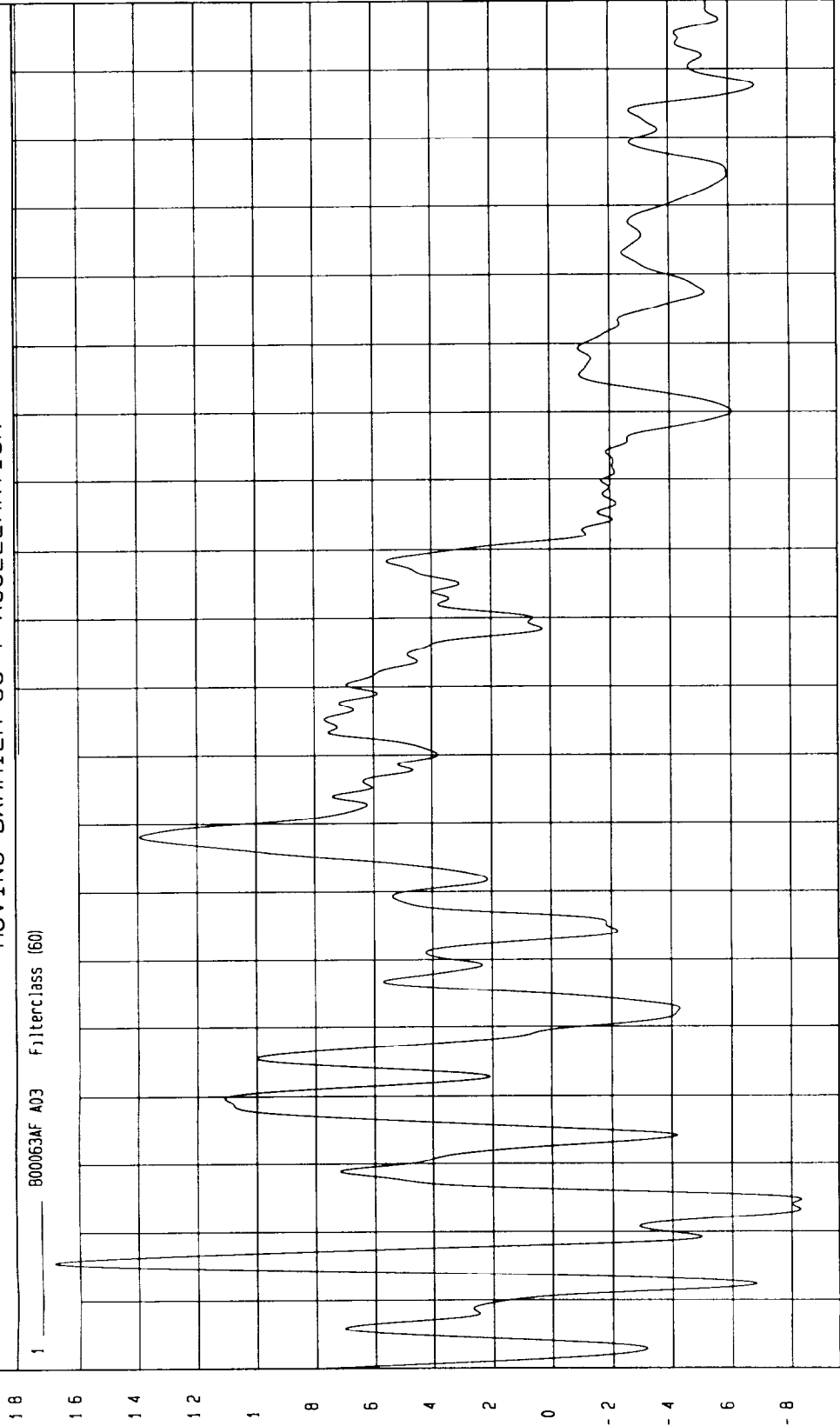
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 83 G S at 25 msec Maximum = 1.69 G S at 16 msec

MOVING BARRIER CG Y ACCELERATION

1 800063AF A03 Filterclass (60)



G.S.

TIME (SECONDS)

MCA Research  
08-11-2000 18 02

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

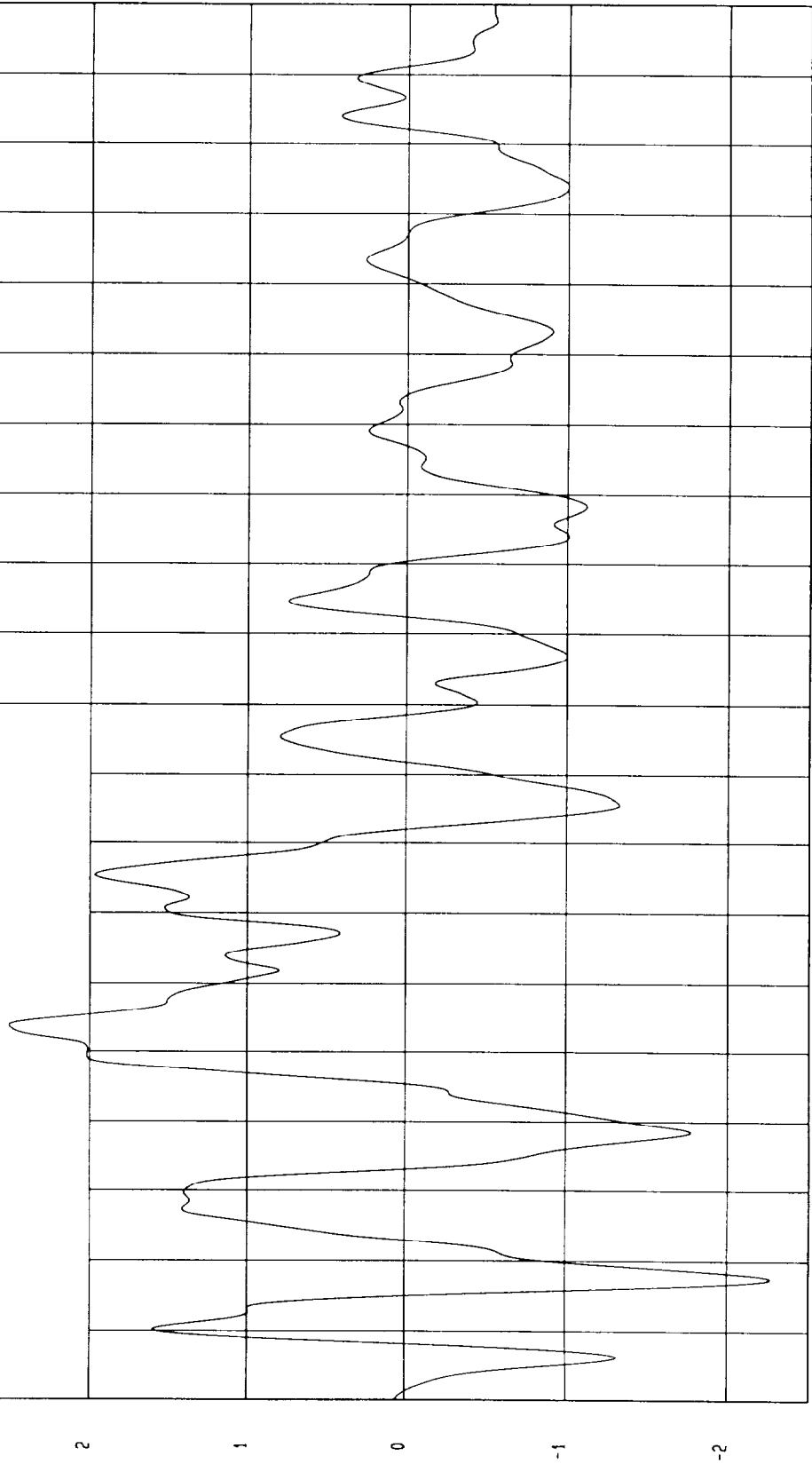
COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 2.27 G S at 18 msec

Maximum = 2.51 G S at 54 msec

MOVING BARRIER CG Z ACCELERATION

1 800063AF A04 Filterclass (60)



MGA Research  
08-11-2000 18 02

TIME (SECONDS)

G.S.

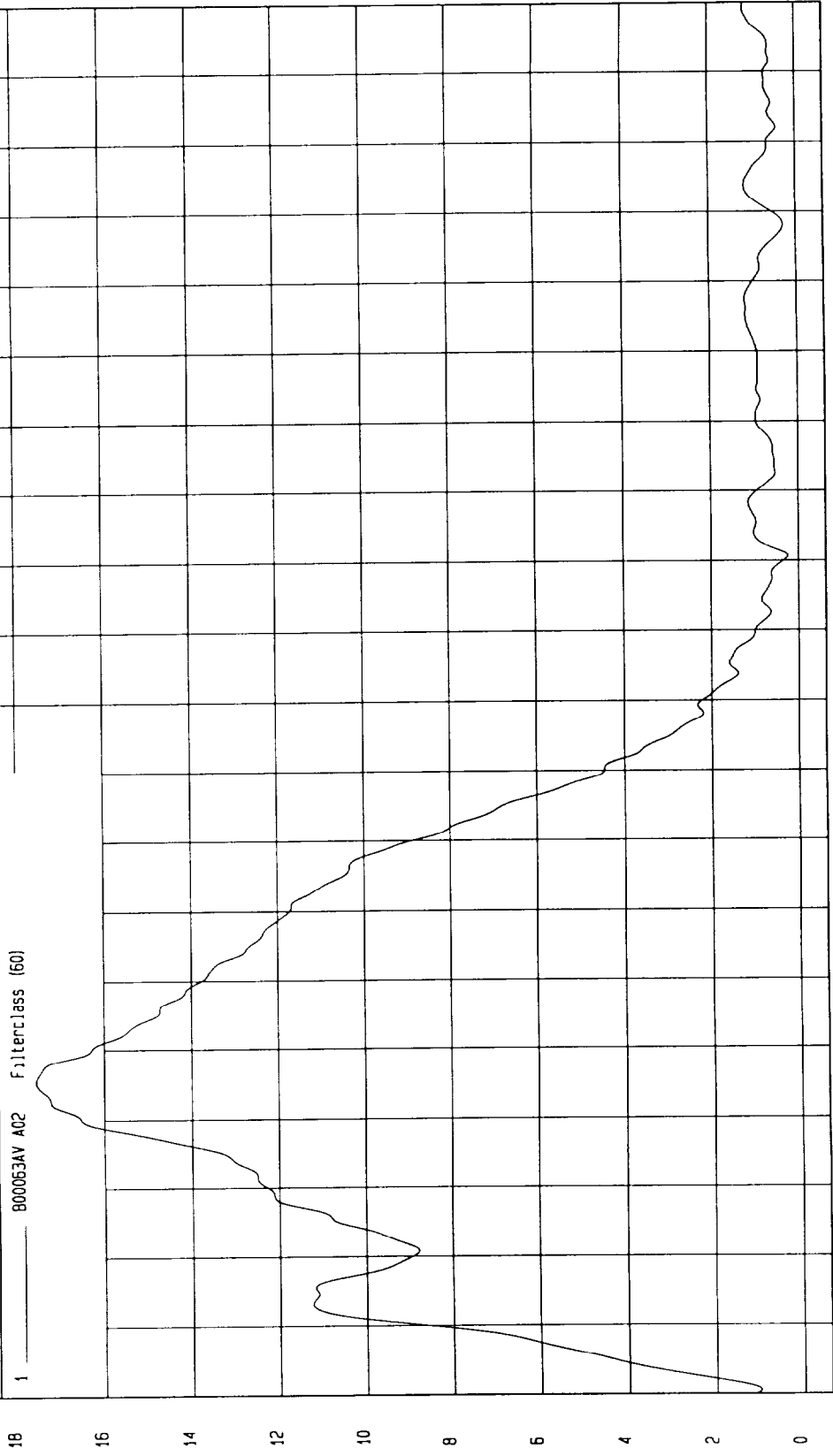
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 24 G S at 121 msec Maximum = 17.56 G S at 45 msec

MOVING BARRIER CG RESULTANT ACCELERATION

1 800063AV A02 Filterclass (60)



MGA Research  
08-11-2000 18 02

TEST DATE 08-11-2000

Speed 30.6 MPH 49.2 KPH

TEST EU 96/27/EC SIDE IMPACT

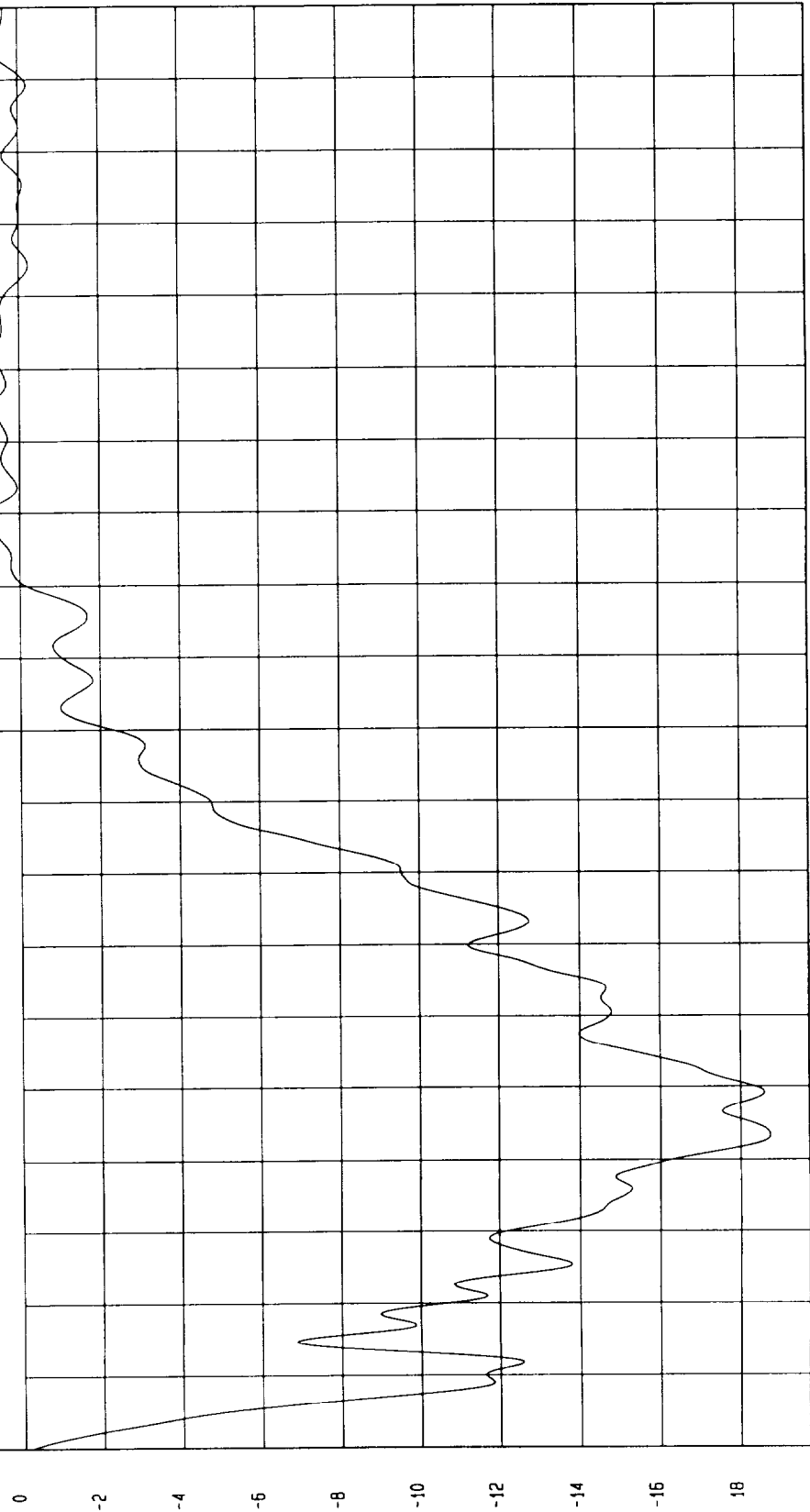
COMPONENT 1996 FORD TAURUS

Maximum = 95.6 G at 130 msec

Minimum 18.76 G S at 43 msec

MOVING BARRIER RIGHT FACE X ACCELERATION

1 800063AF A05 FilterClass (60)



G.S

TIME (SECONDS)

MGA Research  
08-11-2000 18 05

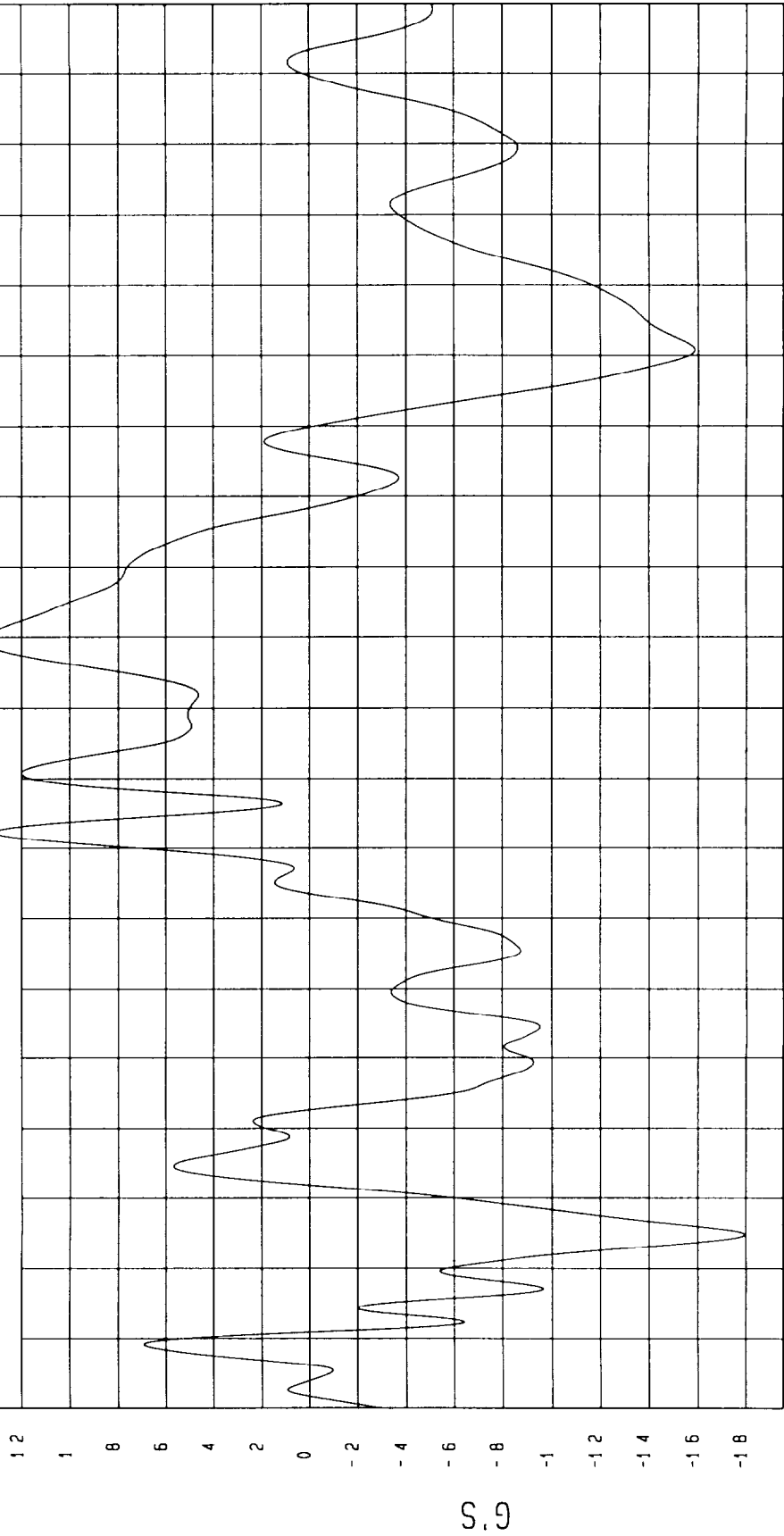
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum - 1 8 G S at 25 msec Maximum = 1 36 G S at 110 msec

MOVING BARRIER RIGHT FACE Y ACCELERATION

1 ——— B00063AF A06 Filterclass (60)



TIME (SECONDS)

MGA Research  
08-11-2000 18 02

TEST EU 96/27/EC SIDE IMPACT  
TEST DATE 08-11-2000  
Speed 30 6 MPH 49 2 KPH

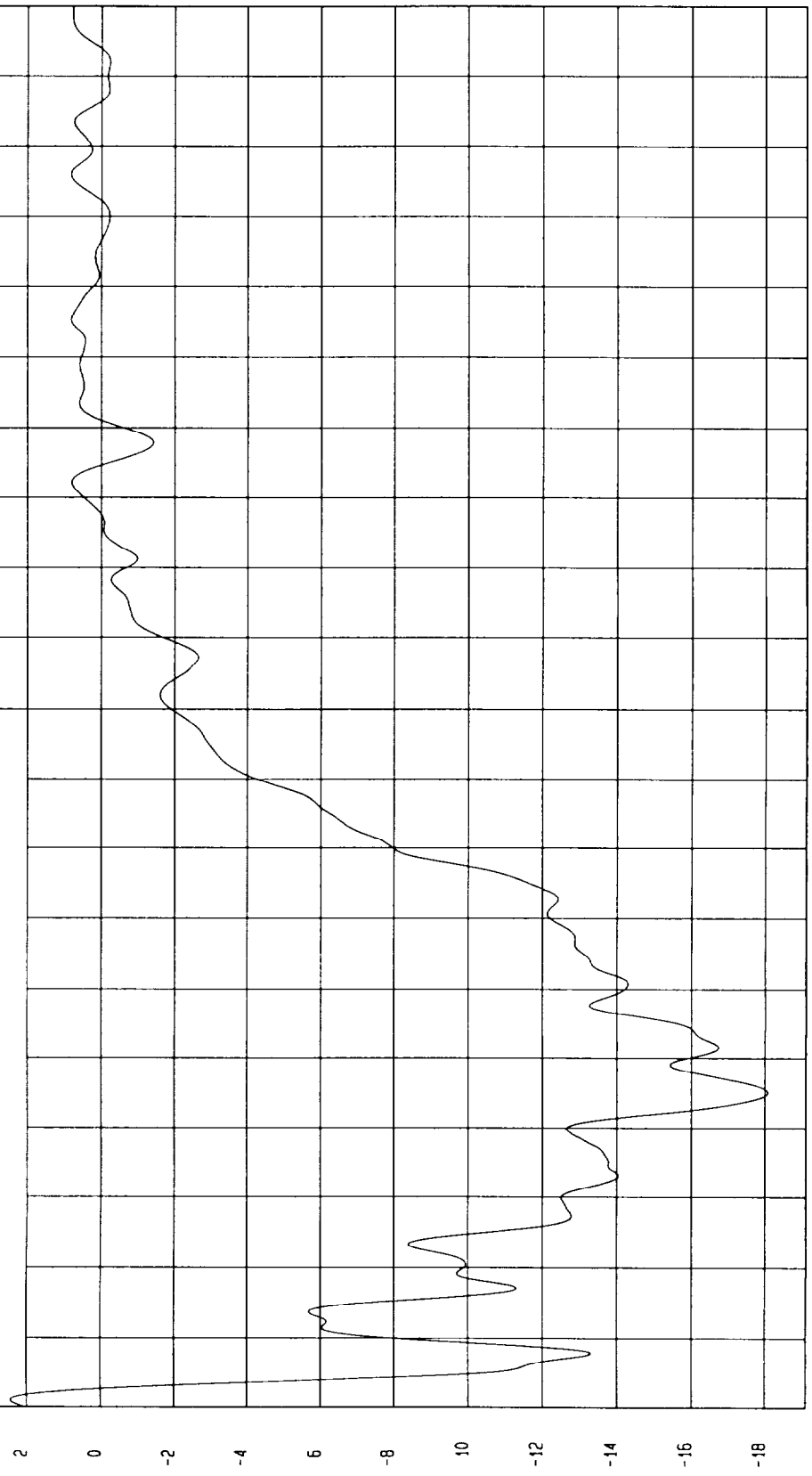
COMPONENT 1996 FORD TAURUS

Minimum -18.08 G S at 45 msec

Maximum 2.45 G S at 1 msec

MOVING BARRIER LEFT FACE X ACCELERATION

1 ——— 800063AF A07 FilterClass (60)



TIME (SECONDS)

MGA Research  
08-11-2000 18 02

G.S

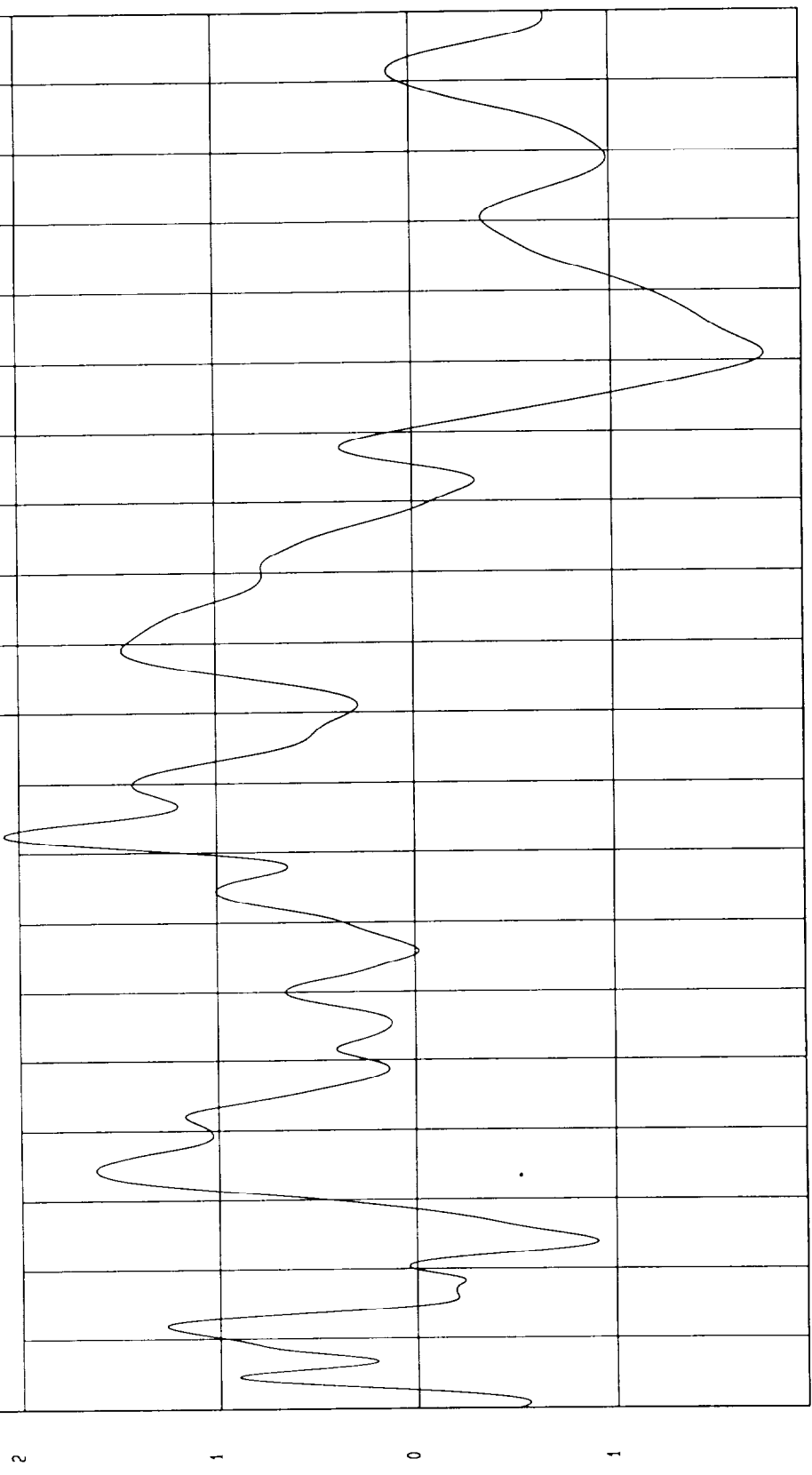
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 1.76 G S at 151 msec Maximum = 2.08 G S at 83 msec

MOVING BARRIER LEFT FACE Y ACCELERATION

1 ——— B00063AF A08 Filterclass (60)



WGA Research  
08-11-2000 18.02

TIME (SECONDS)

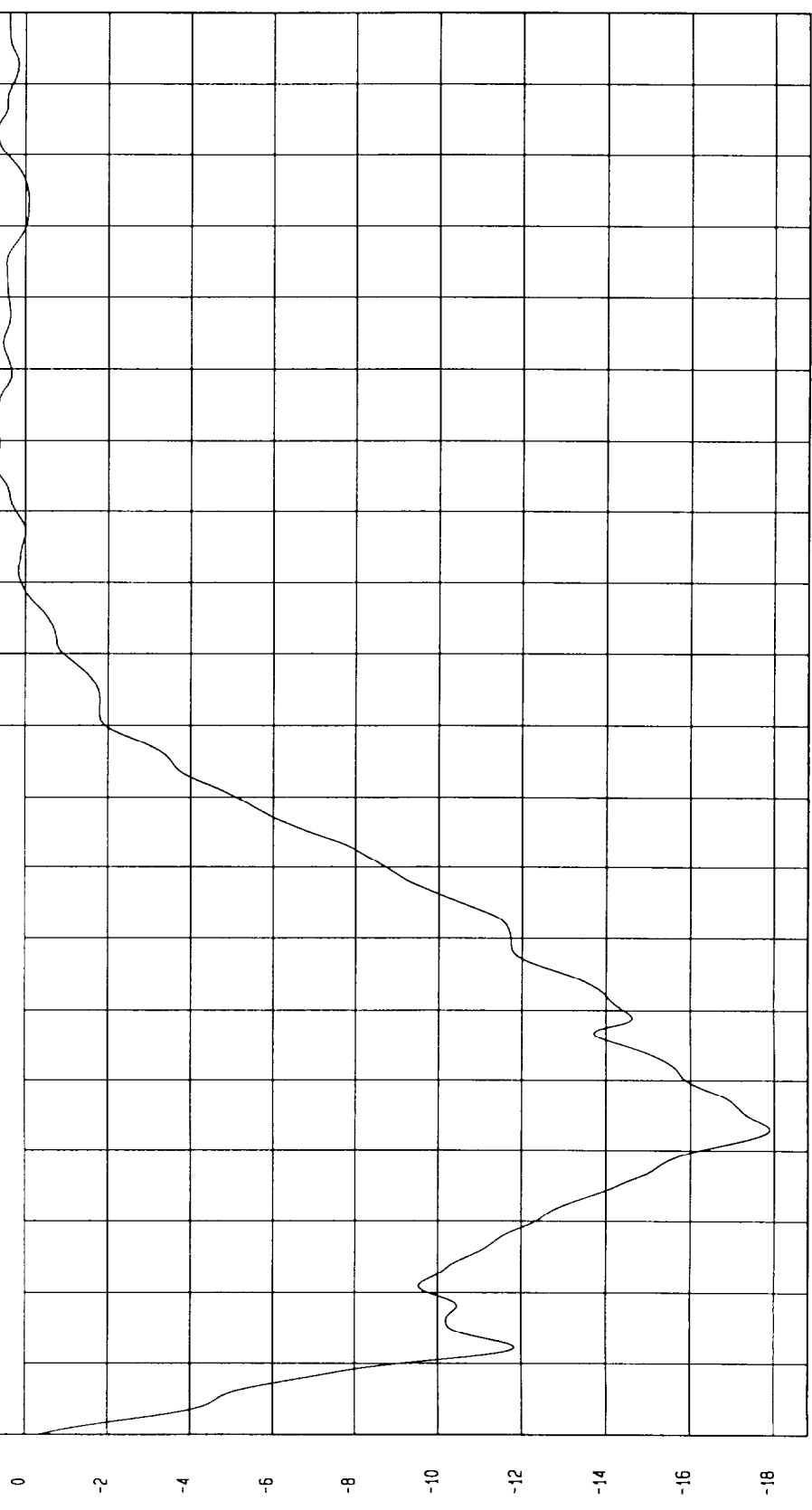
G.S.

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000  
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 17.9 G S at 43 msec Maximum = 73 G S at 136 msec

MOVING BARRIER RIGHT REAR FRAME X ACCELERATION

1 B00063AF A63 Filterclass (60)



MCA Research  
08-11-2000 18 02

TIME (SECONDS)

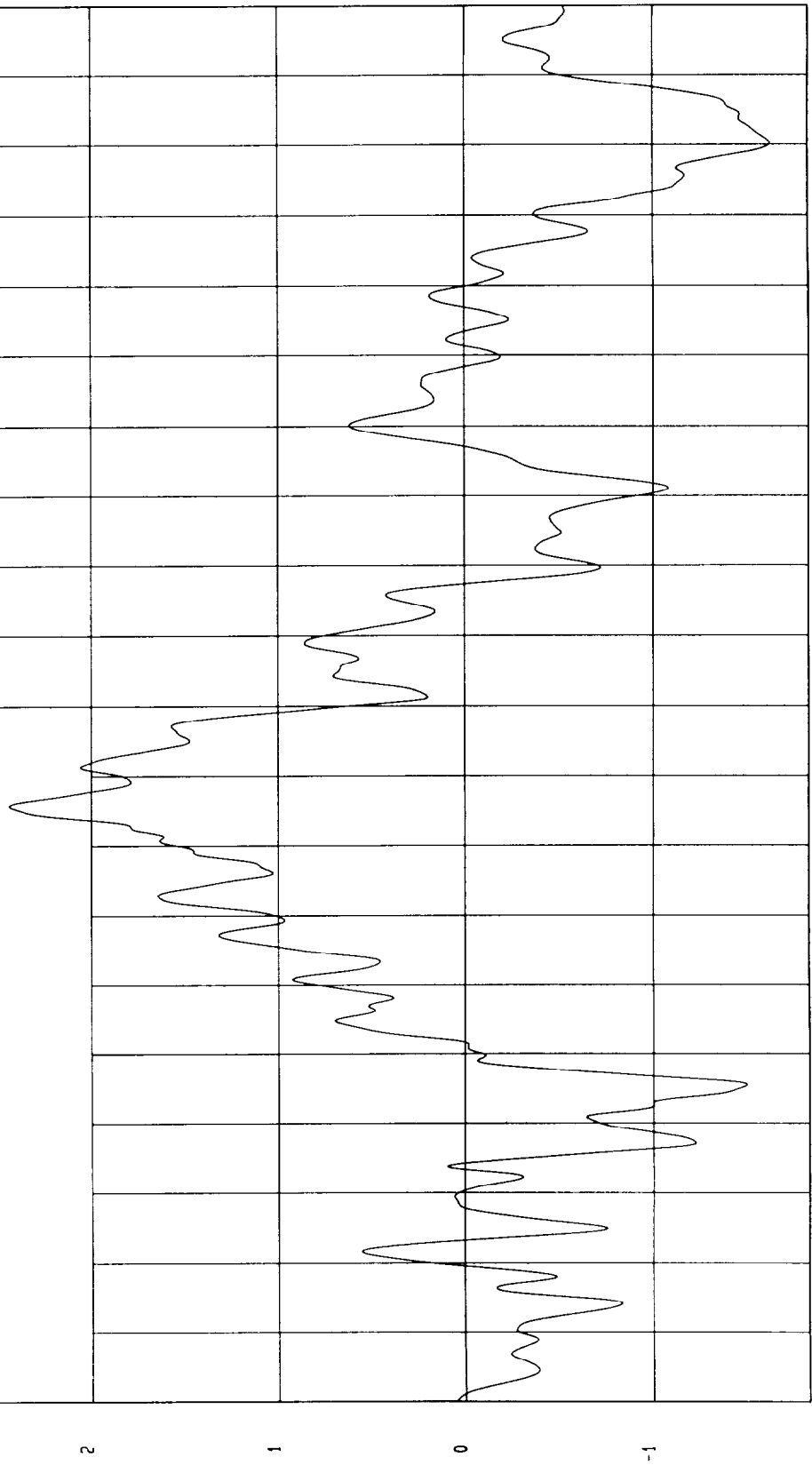
G.S.

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000  
 COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 1 63 G S at 180 msec  
 Maximum - 2 44 G S at 86 msec

MOVING BARRIER RIGHT REAR FRAME Y ACCELERATION

1 ——— 800063AF A64 Filterclass (60)



MCA Research  
 08-11-2000 18 02

TIME (SECONDS)

G.S.

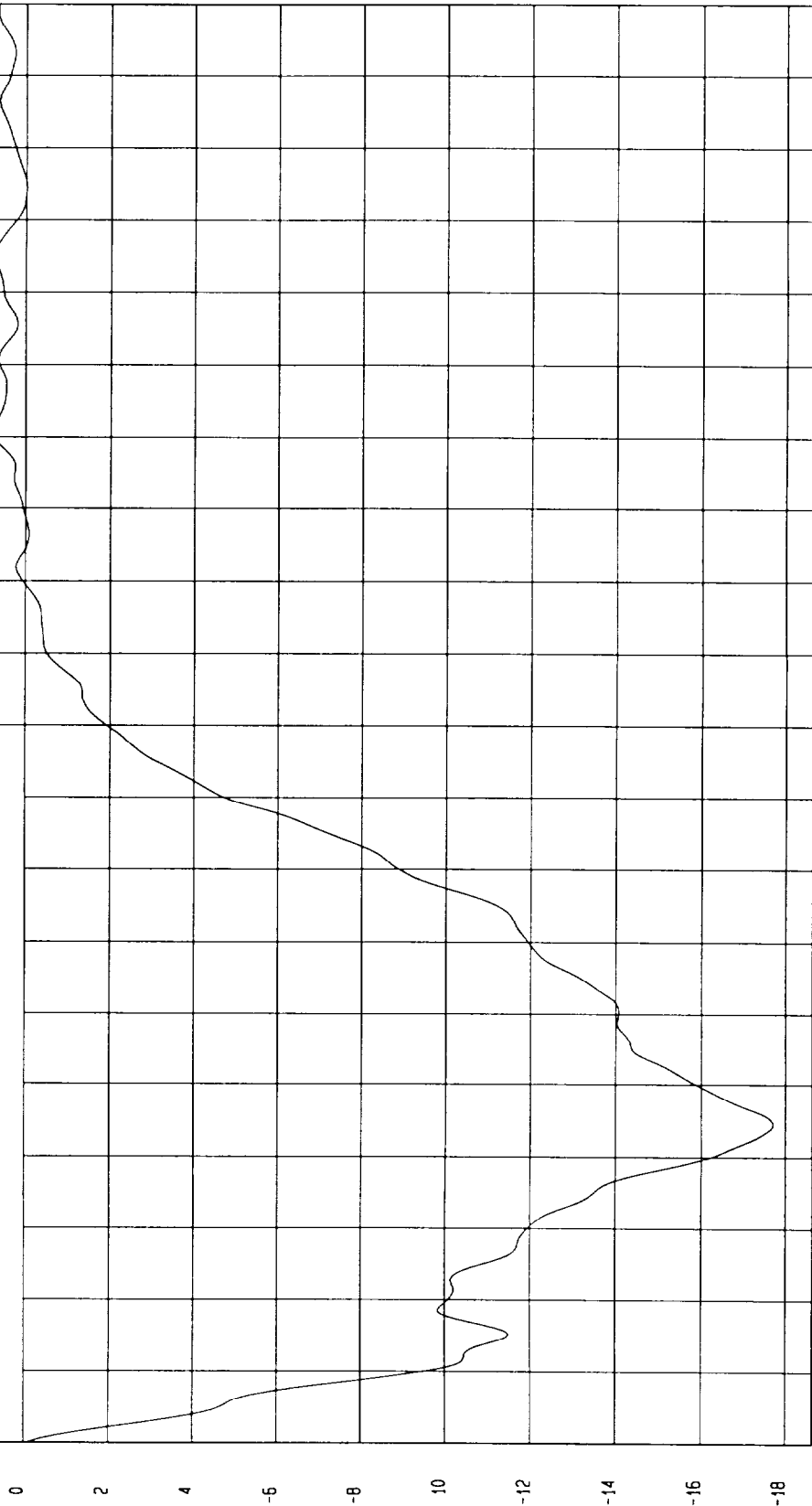
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = 17.71 G S at 44 msec Maximum 8.65 at 141 msec

MOVING BARRIER LEFT REAR FRAME X ACCELERATION

1 800063AF A65 Filterclass (60)



TIME (SECONDS)

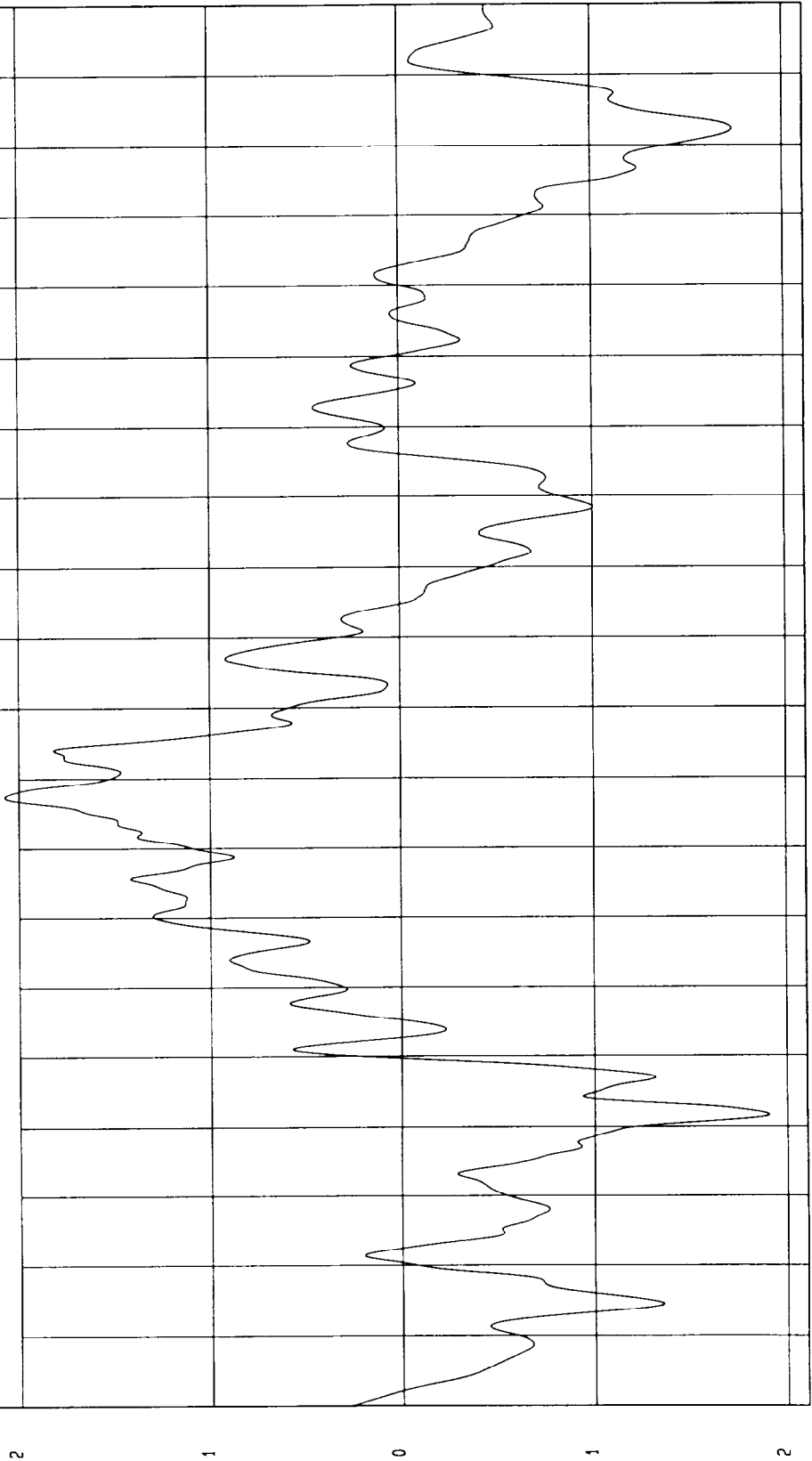
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 1.91 G S at 42 msec Maximum - 2.08 G S at 87 msec

MOVING BARRIER LEFT REAR FRAME Y ACCELERATION

1 B00063AF A65 Filterclass (60)



TIME (SECONDS)

MCA Research  
08-11-2000 18 03

G.S.

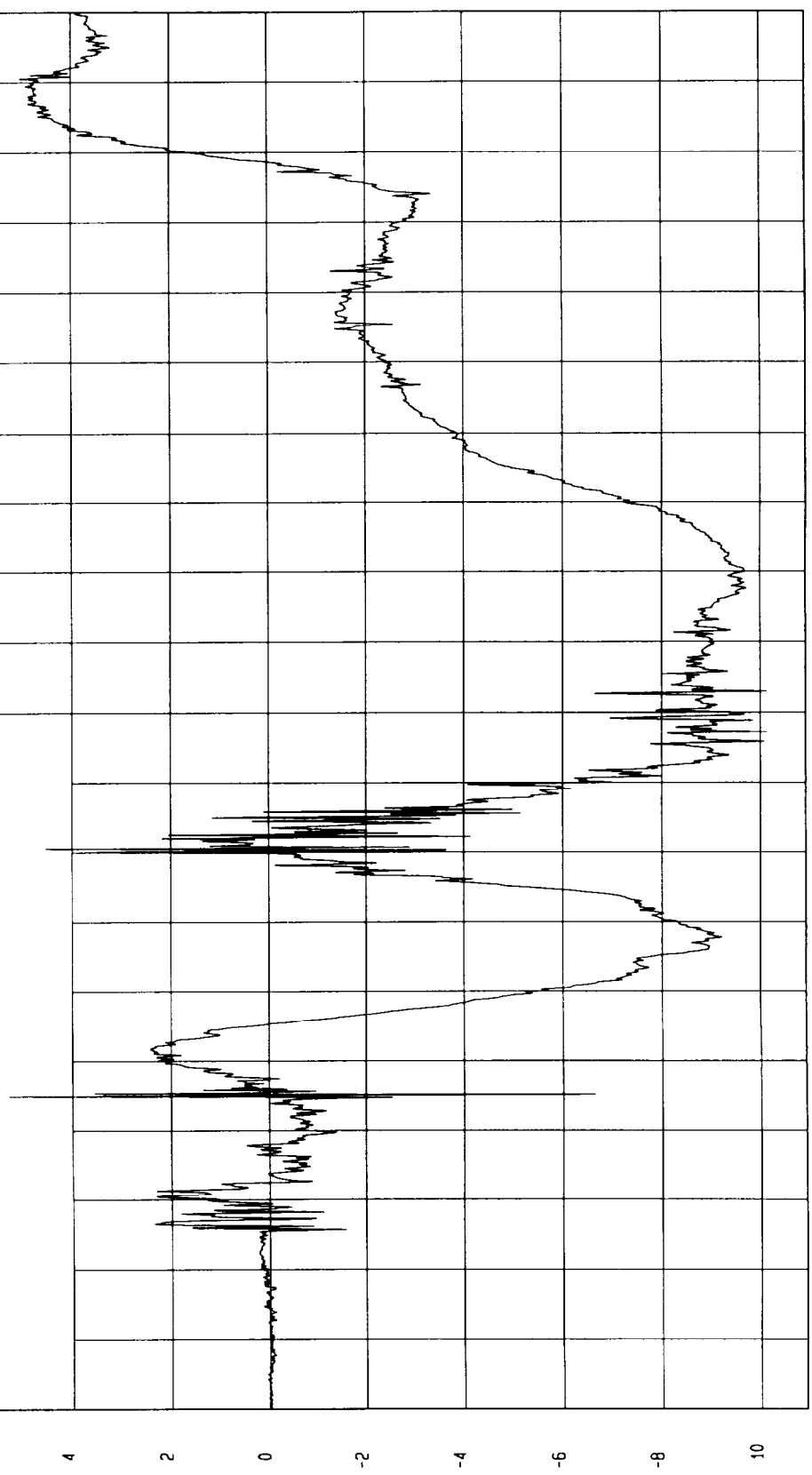
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 10 15 G s at 97 msec Maximum 5 3 6 s at 45 msec

DRIVER HEAD X ACCELERATION

1 B00063AT A01 Filterclass (1000)



Seconds

MCA Research  
08-11-2000 18 27

G's

TEST EU 96/27/EC SIDE IMPACT

TEST DATE 08-11-2000

Speed 30.6 MPH 49.2 KPH

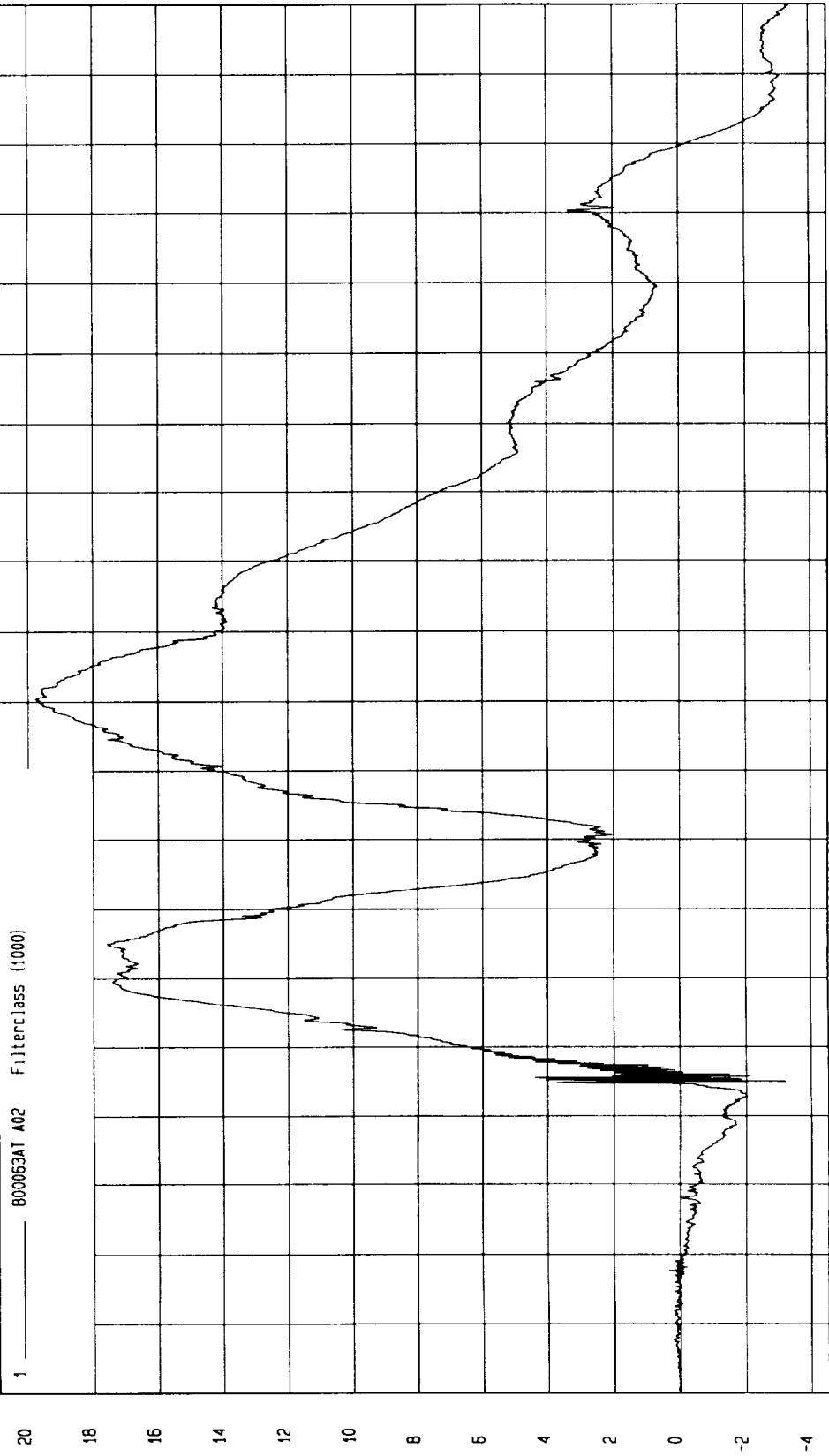
COMPONENT 1996 FORD TAURUS

Minimum 3.38 G s at 200 msec

Maximum -19.77 G s at 100 msec

DRIVER HEAD Y ACCELERATION

1 800063AT A02 Filterclass (1000)



Seconds

MCA Research  
08-11-2000 18 27

G.S

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

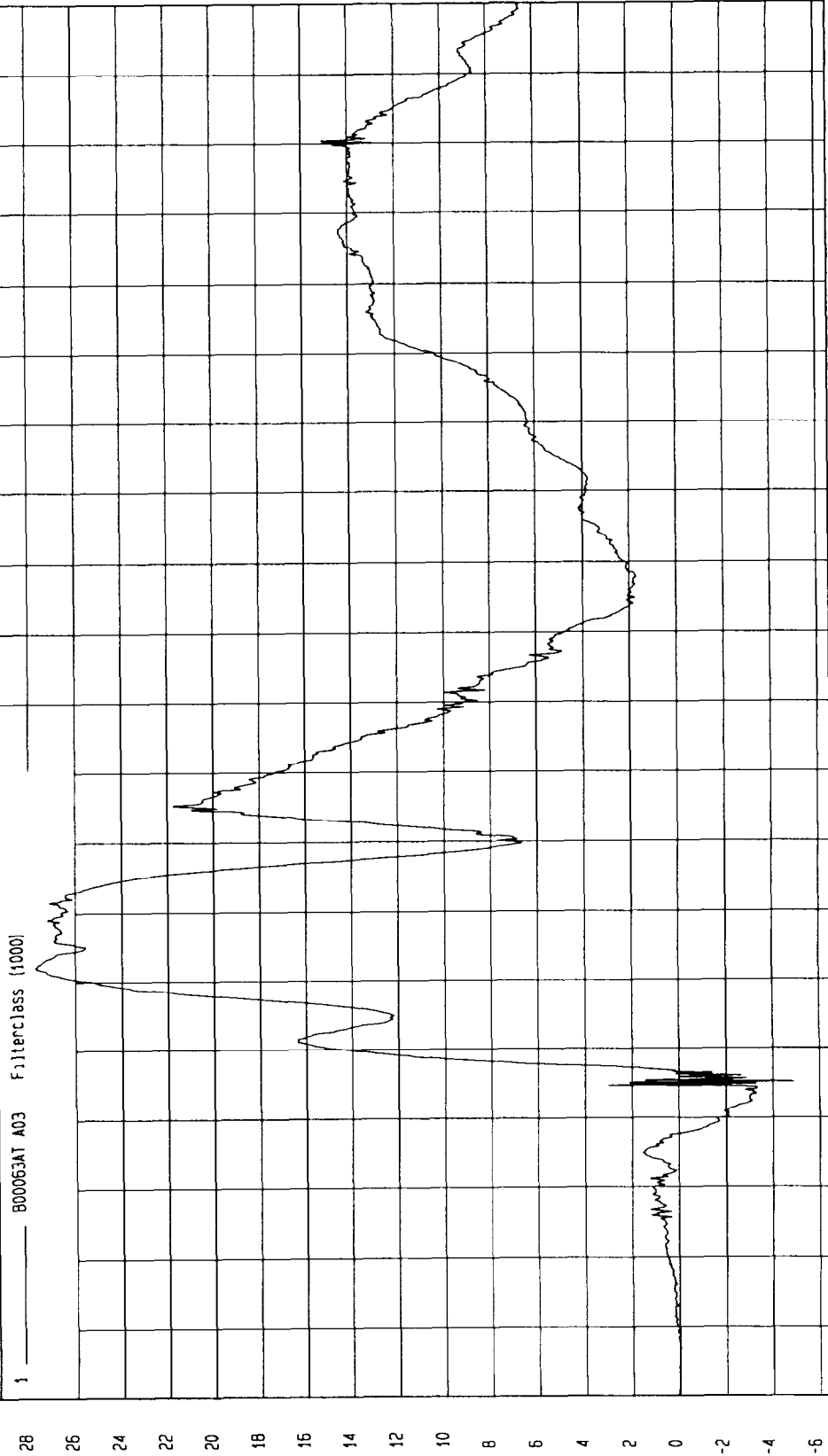
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = 4.9 G s at 45 msec

Maximum = 27.72 G s at 62 msec

DRIVER HEAD Z ACCELERATION

1 ——— B00063AT A03 FilterClass (1000)



MGA Research  
08-11-2000 18 28

Seconds

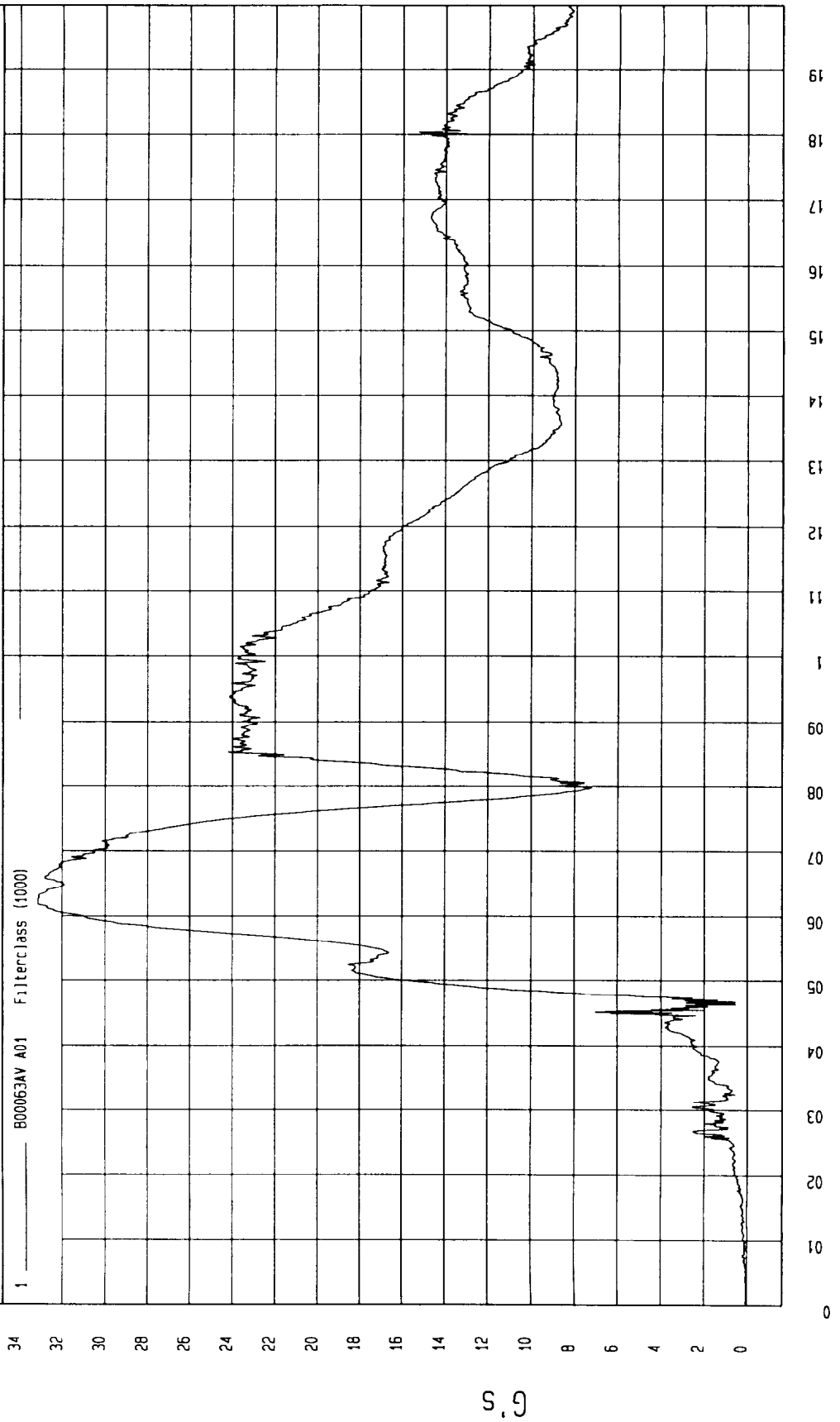
G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 1 59E 02 G s at 2 msec Maximum = 33 15 G s at 62 msec

DRIVER HEAD RESULTANT



MGA Research  
08-11-2000 16 28

Seconds

G's

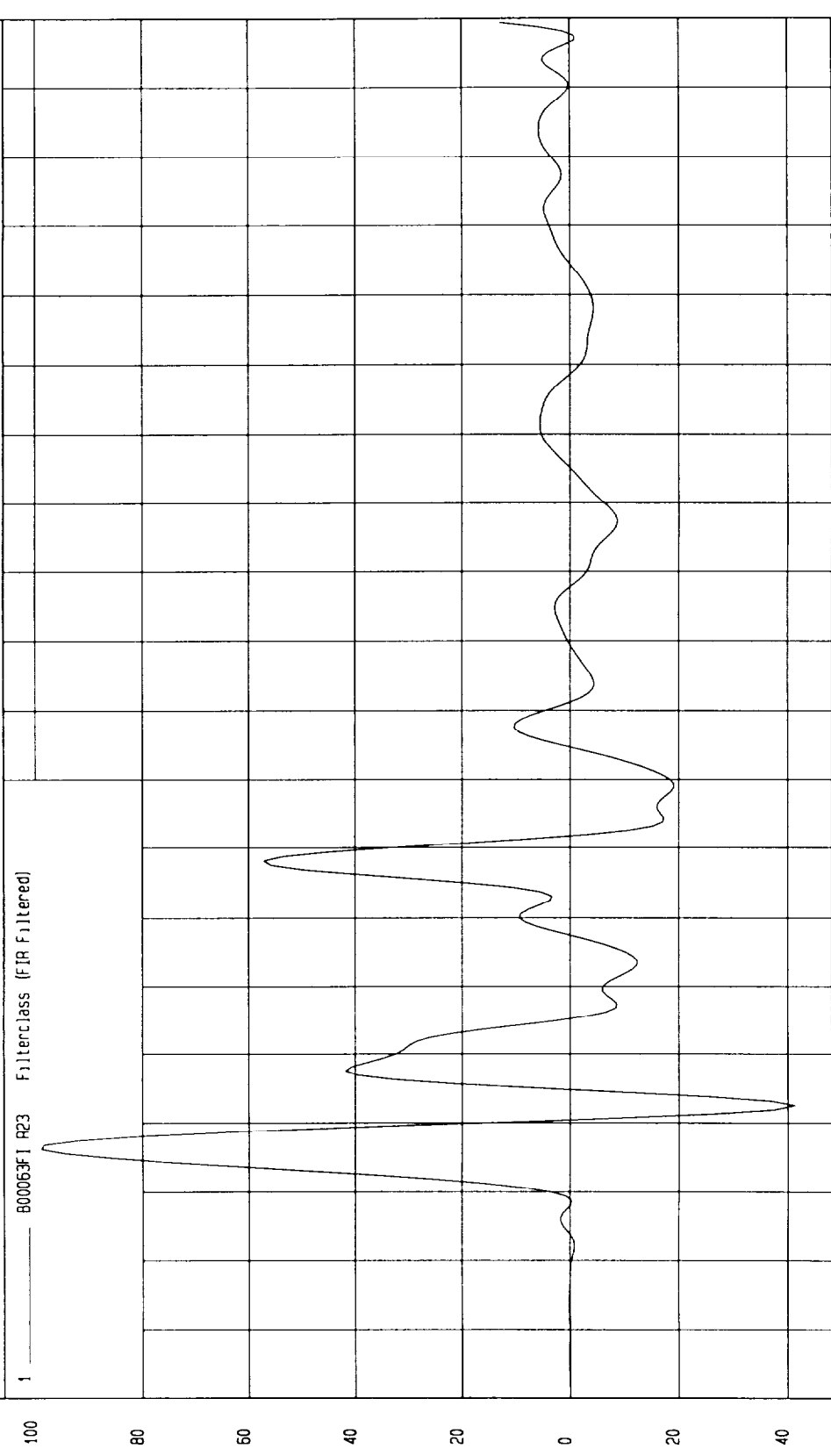
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 41.3 G's at 42 msec Maximum 98.9 G's at 36 msec

DRIVER UPPER RIB Y ACCELERATION

1 800063F1 R23 Filterclass (FIR Filtered)



Seconds

MCA Research  
08-11-2000 18 19

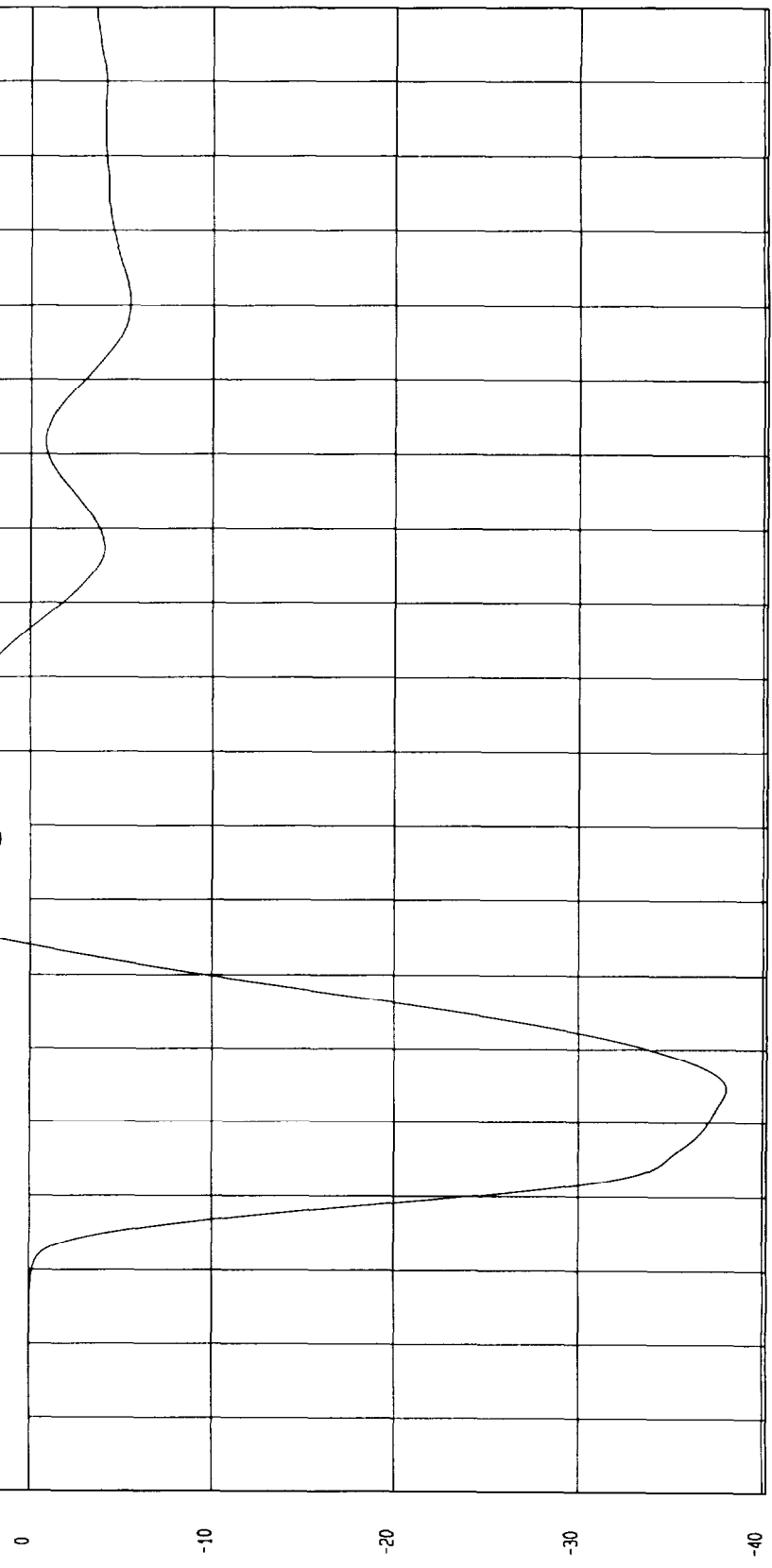
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 38.01 mm at 55 msec Maximum = 6.22 mm at 78 msec

DRIVER UPPER RIB DISPLACEMENT

1 800063AF A26 Filterclass (180)



MCA Research  
08-11-2000 18.29

Seconds

mm

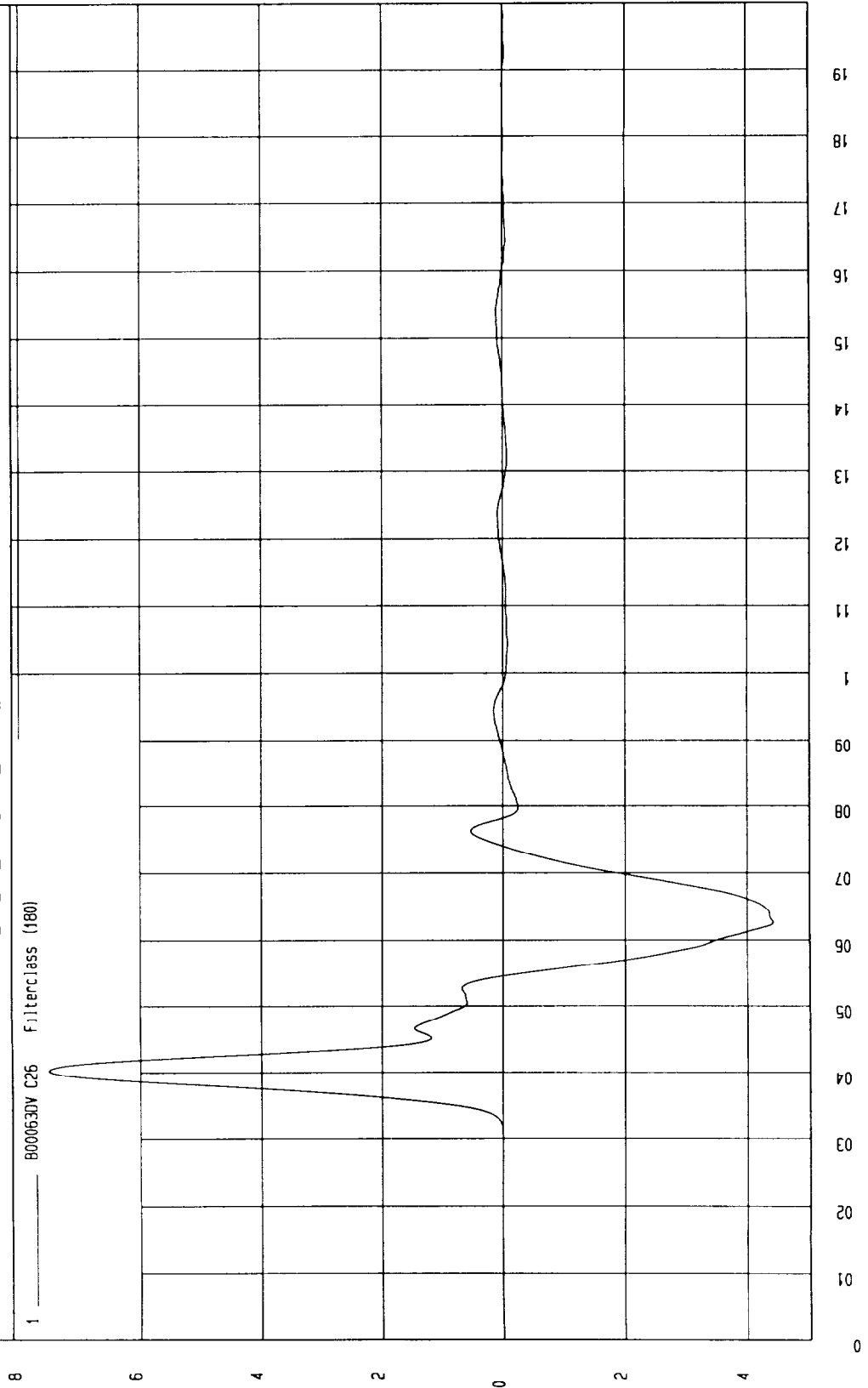
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 44 at 63 msec Maximum 75 at 40 msec

DRIVER UPPER RIB VISCOUS CRITERIA

1 \_\_\_\_\_ B000630V C26 Filterclass (180)



MGA Research  
08-11-2000 18 39

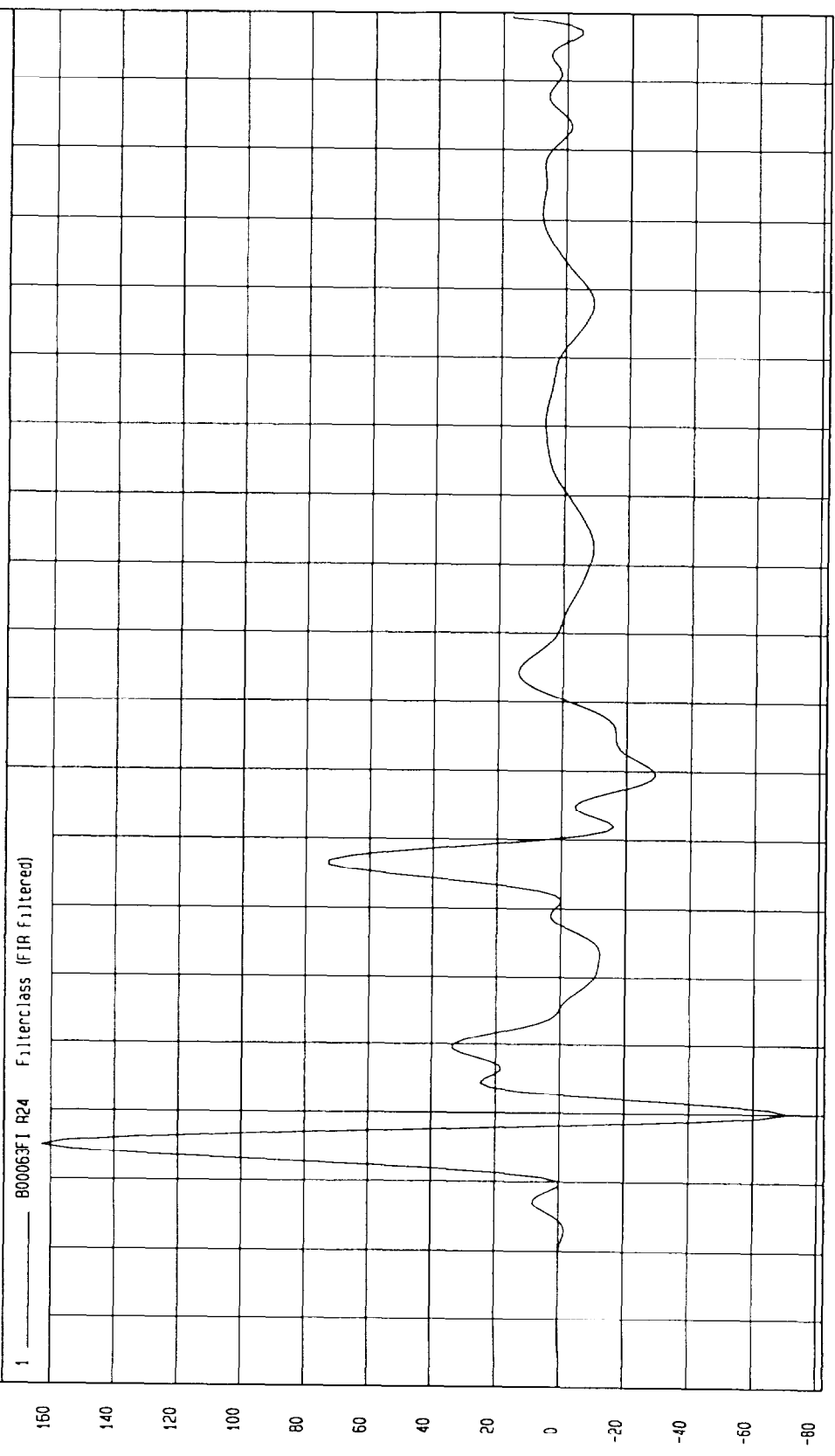
Seconds

TEST EU 96/27/EC SIDE IMPACT  
COMPONENT 1996 FORD TAURUS

TEST DATE 08-11-2000  
Speed 30 6 MPH 49 2 KPH

Minimum 70 64 G s at 40 msec  
Maximum = 162 95 G s at 35 msec

DRIVER MID RIB Y ACCELERATION



MCA Research  
08-11-2000 18 20

Seconds

G's

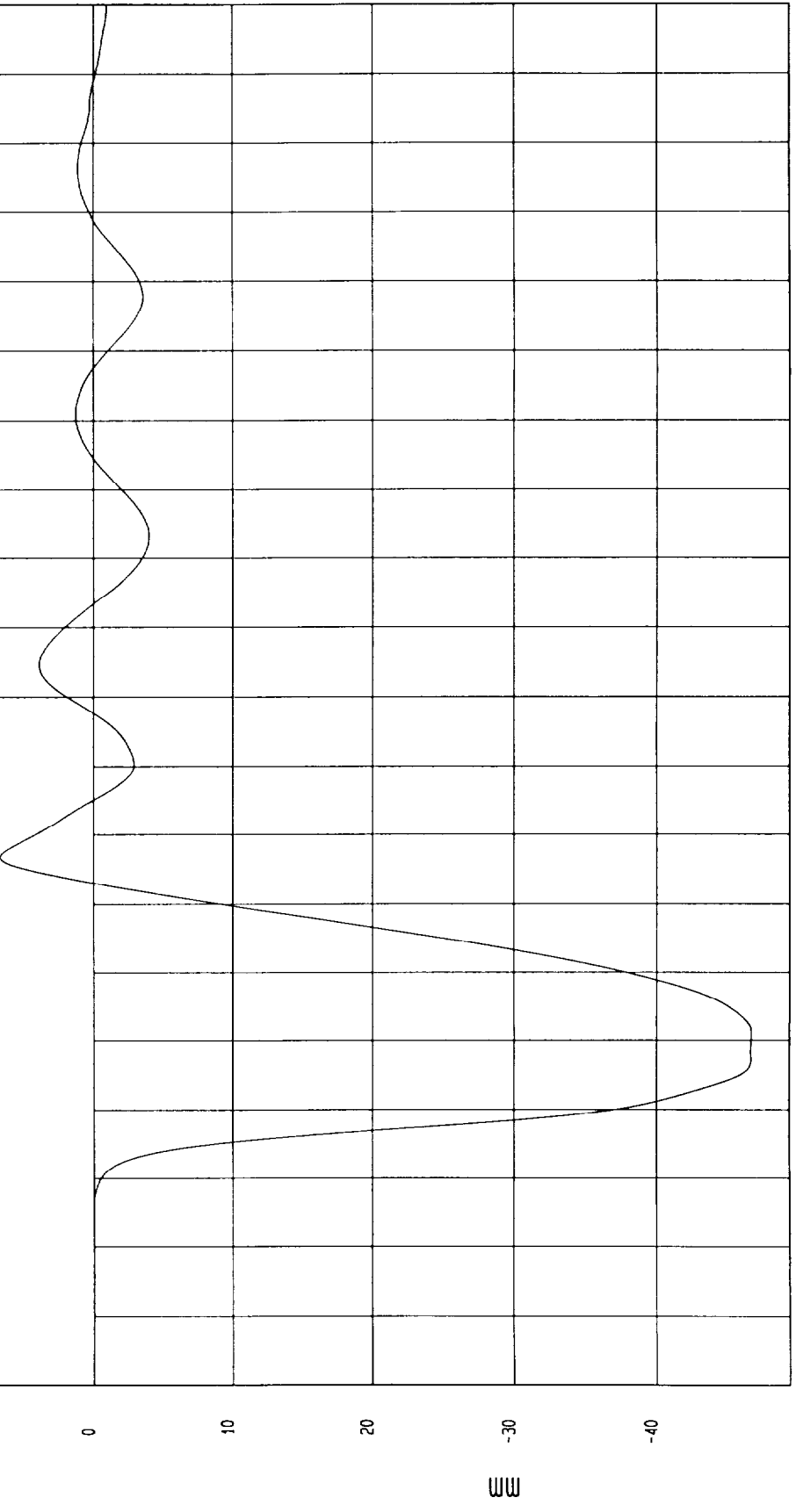
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = 46.7 mm at 51 msec  
Maximum = 6.64 mm at 77 msec

DRIVER MID RIB DISPLACEMENT

1 \_\_\_\_\_ 800063AF A27 Filterclass (100)



0 10 20 -30 -40 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Seconds

MCA Research  
08-11-2000 18 29



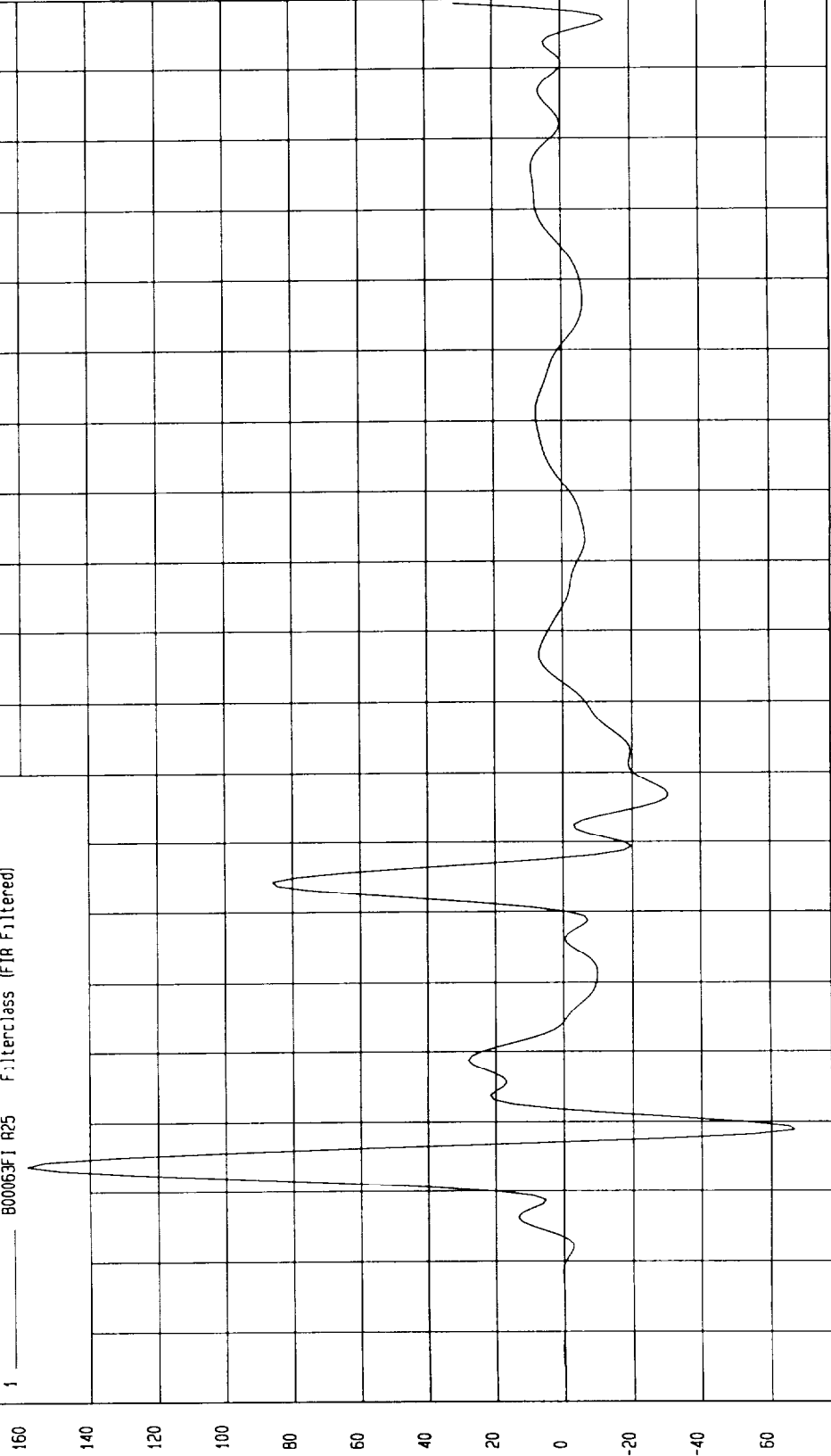
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum - 66.78 G s at 39 msec Maximum = 158.71 G s at 34 msec

DRIVER LOWER RIB Y ACCELERATION

1 800063F1 R25 Filterclass (FIR Filtered)



G.s

Seconds

MGA Research  
08-11-2000 18 20

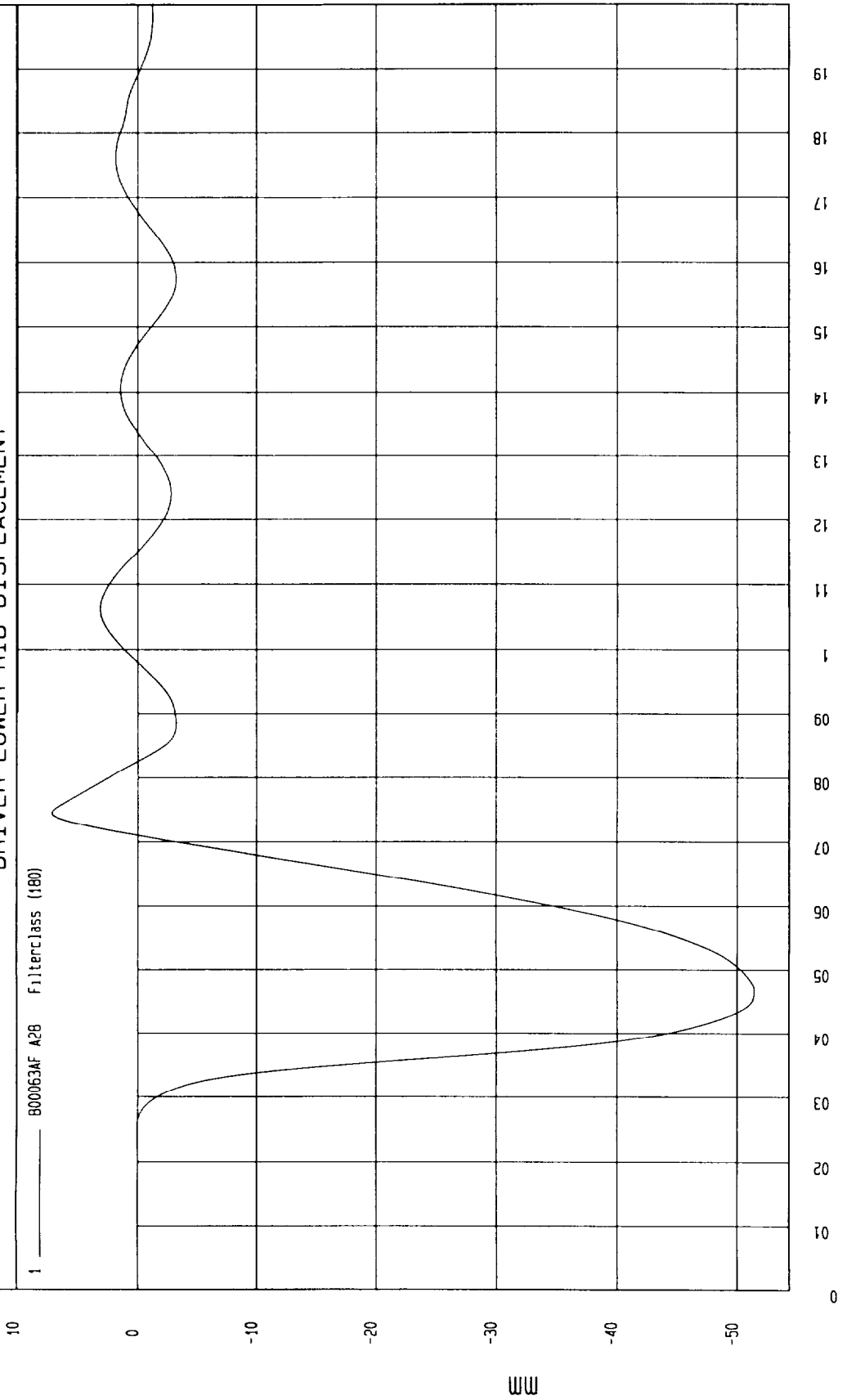
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = 51.41 mm at 46 msec Maximum 7.18 mm at 74 msec

DRIVER LOWER RIB DISPLACEMENT

1 ——— 800063AF A28 Filterclass (180)



Seconds

MGA Research  
08-11-2000 18 29

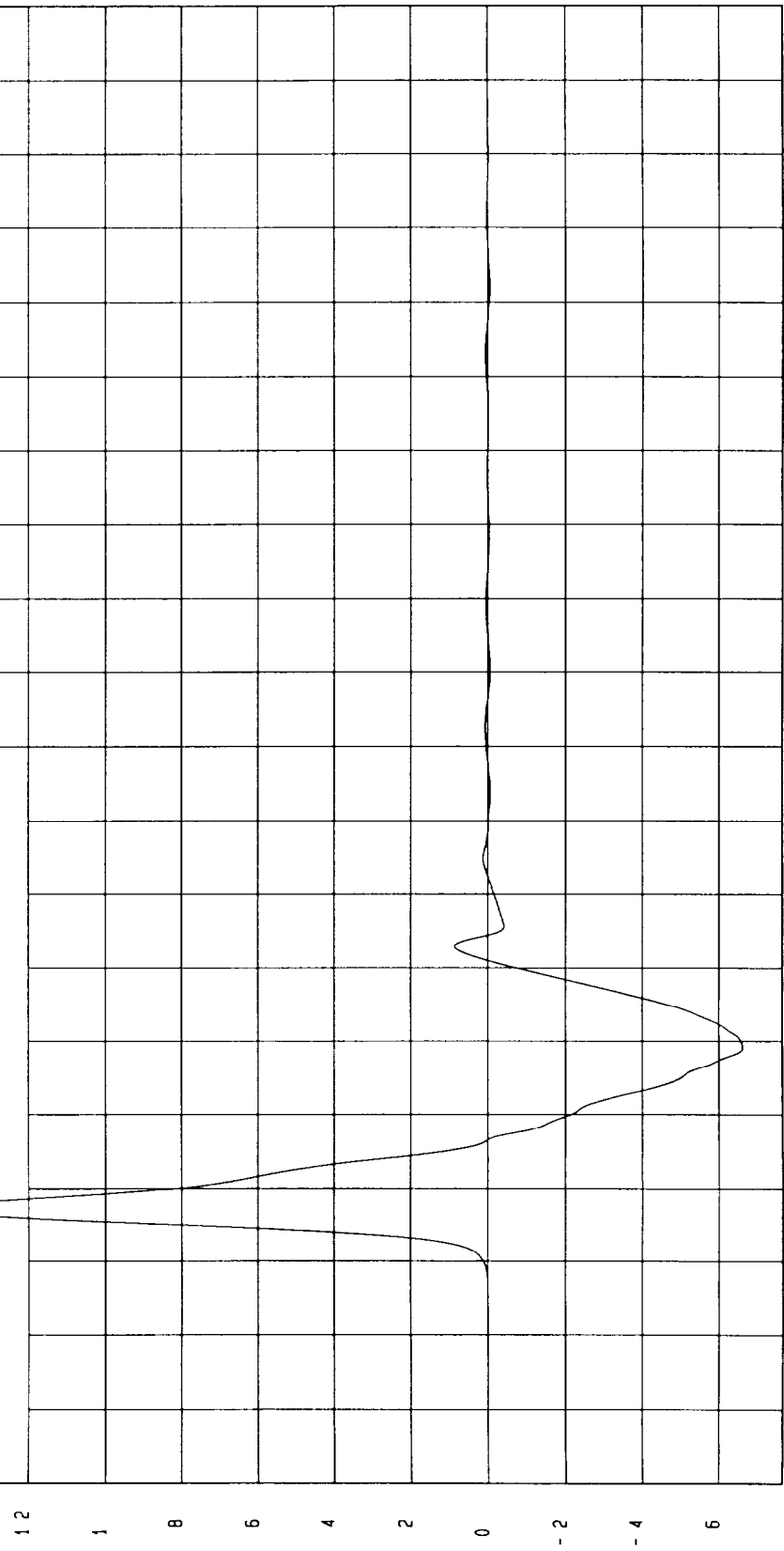
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 66 at 59 msec Maximum = 1.43 at 37 msec

DRIVER LOWER RIB VISCOUS CRITERIA

1 \_\_\_\_\_ B000630V C28 Filterclass (180)



MCA Research 08-11-2000 16:39

Seconds

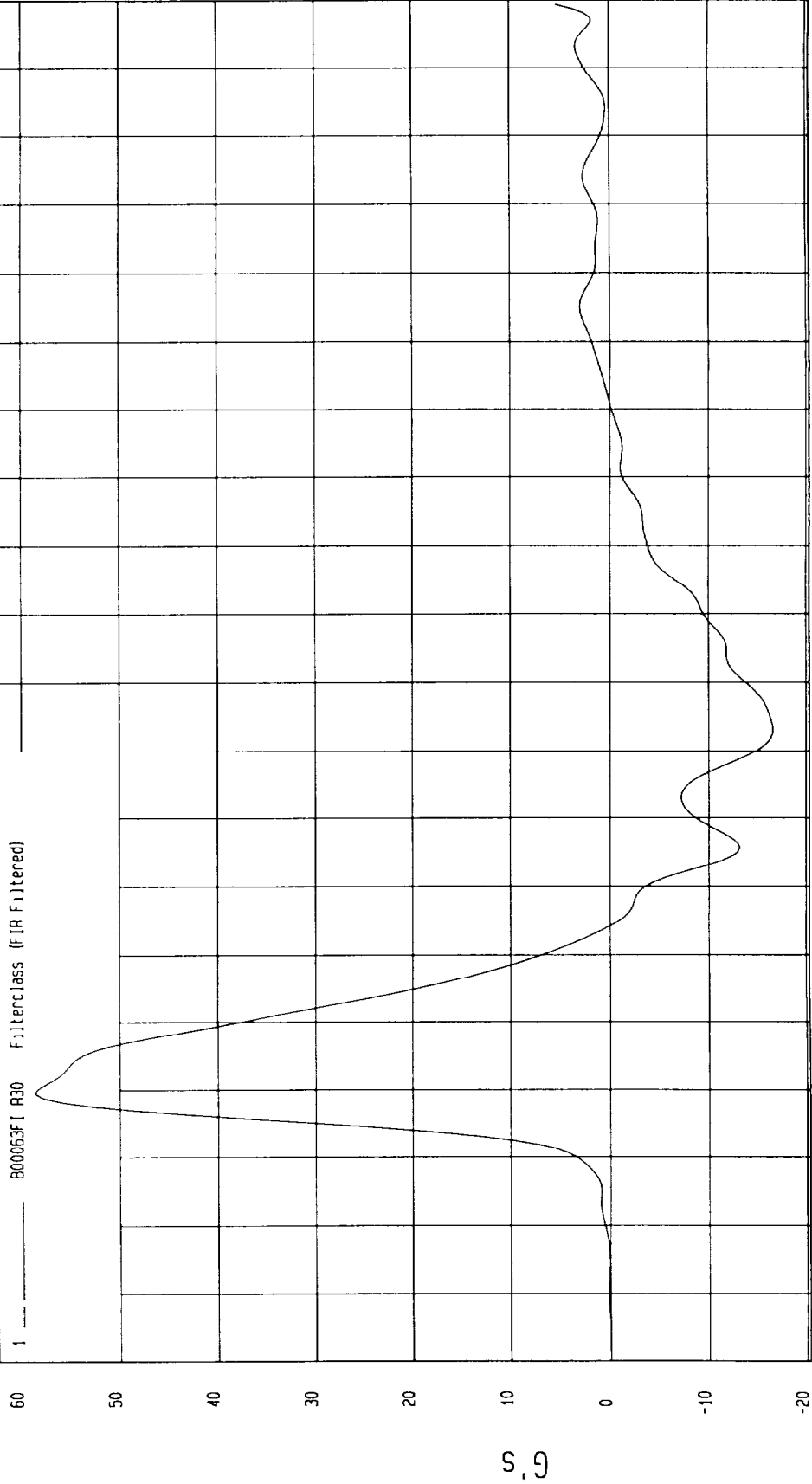
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 16.57 G s at 93 msec Maximum 58.65 G s at 39 msec

DRIVER LOWER SPINE Y ACCELERATION

1 800063FI R30 Filter(class (FR Filtered)



MGA Research  
08-11-2000 16 20

Seconds

G's

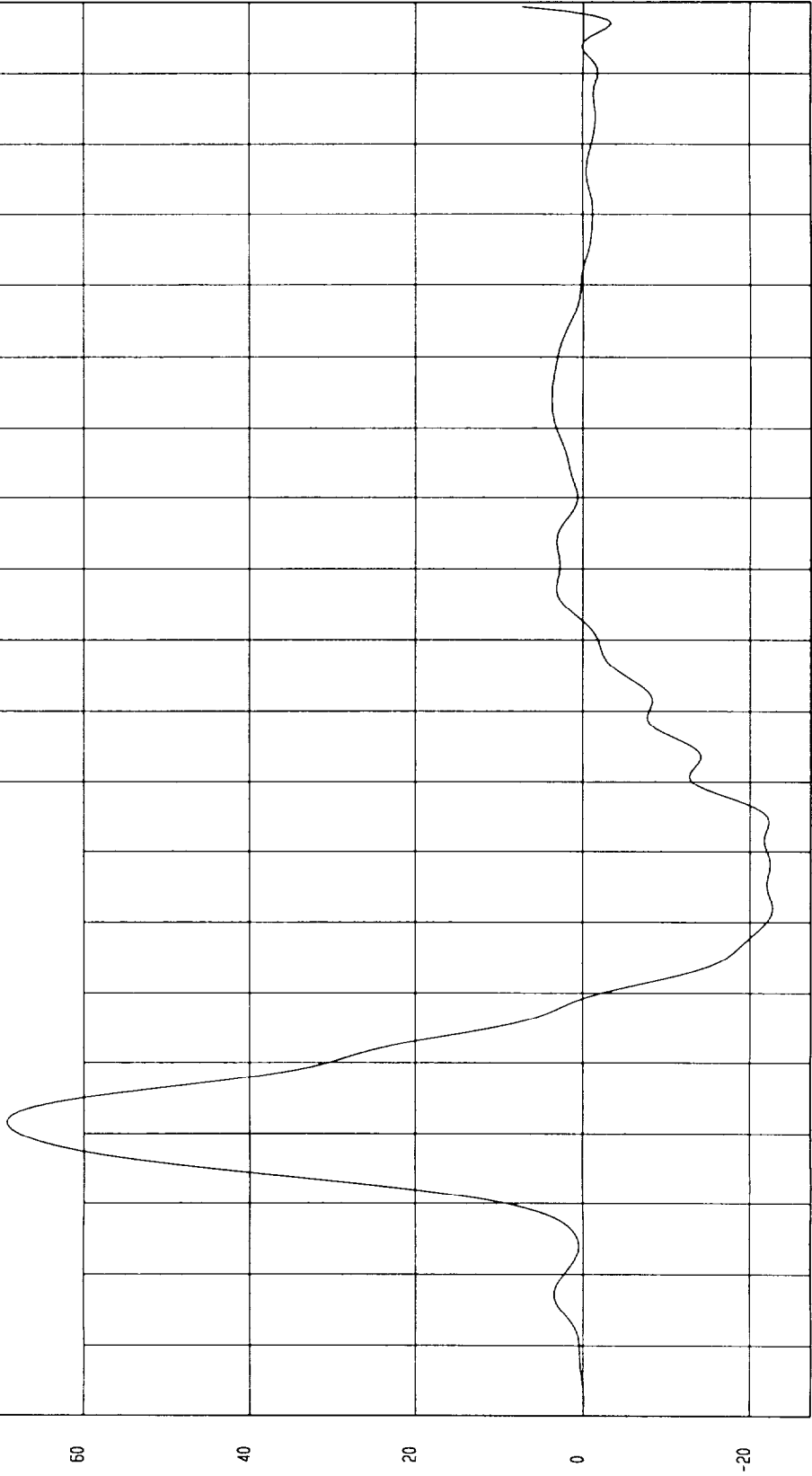
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 22 76 G s at 72 msec Maximum 69 2 6 s at 42 msec

DRIVER PELVIS Y ACCELERATION

1 ——— B00063F1 R46 Filterclass (FIR Filtered)



Seconds  
MGA Research  
08-11-2000 16 20

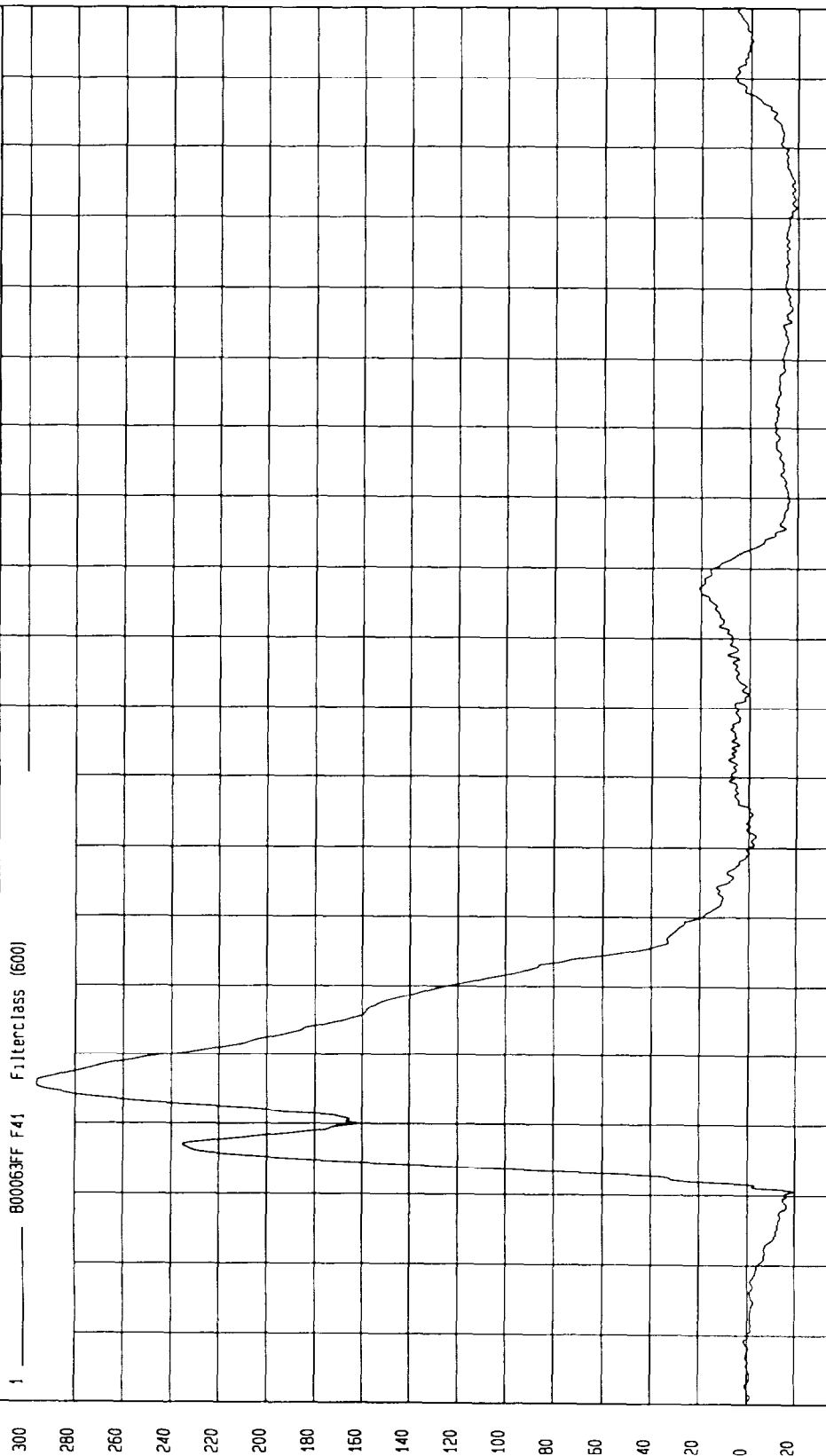
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 19 74 N at 31 msec Maximum 296 48 N at 46 msec

DRIVER ABDOMEN FRONT FORCE

1 — 800063FF F41 Filterclass (600)



MCA Research  
08-11-2000 18 30

Seconds

N

TEST EU 96/27/EC SIDE IMPACT

TEST DATE 08-11-2000

Speed 30.6 MPH 49.2 KPH

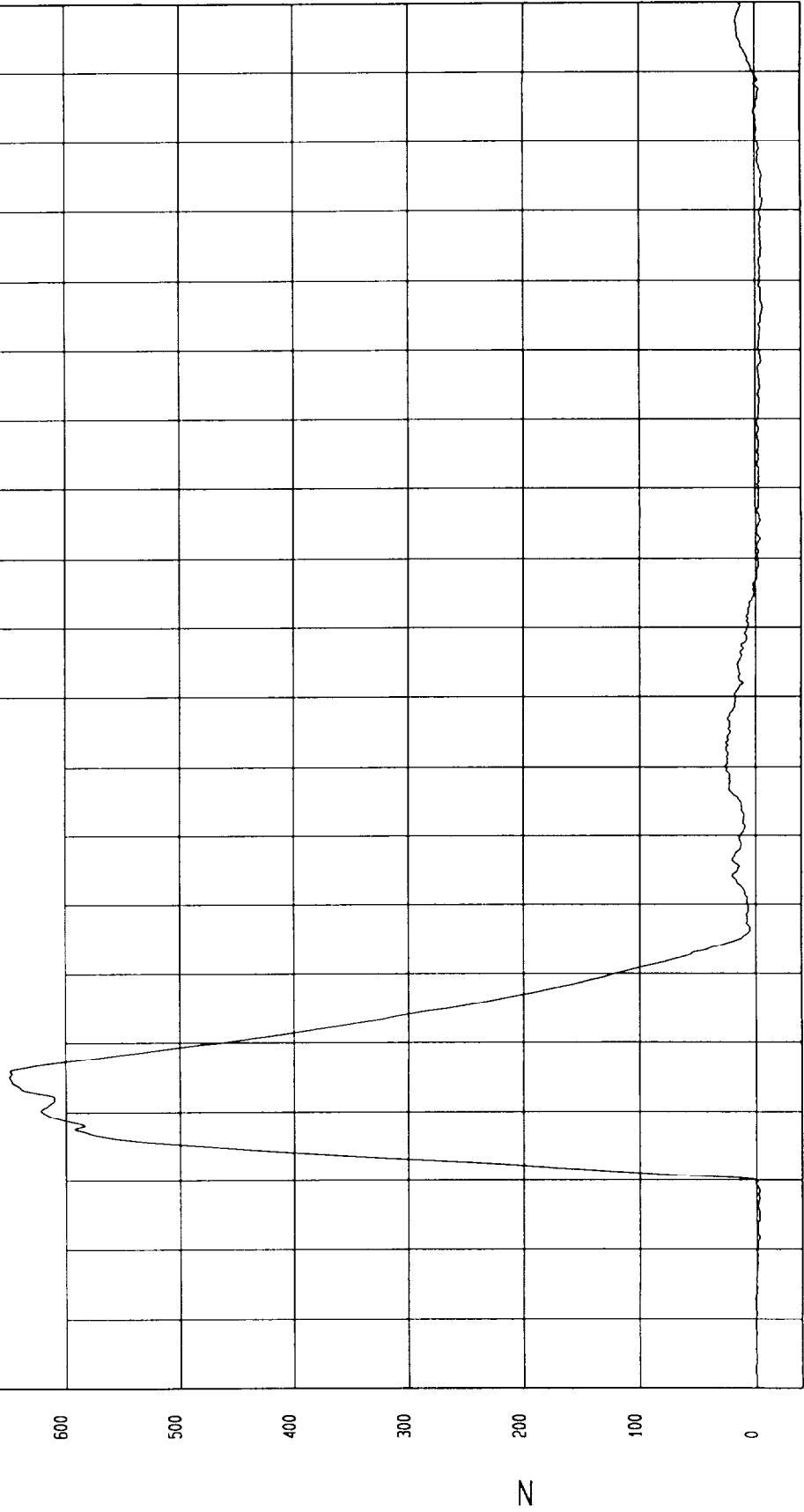
COMPONENT 1996 FORD TAURUS

Maximum = 649.44 N at 45 msec

Minimum = 7.03 N at 172 msec

DRIVER ABDOMEN MID FORCE

1 ——— 800063FF F42 Filterclass (600)



Seconds

MGA Research  
08-11-2000 18 30

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

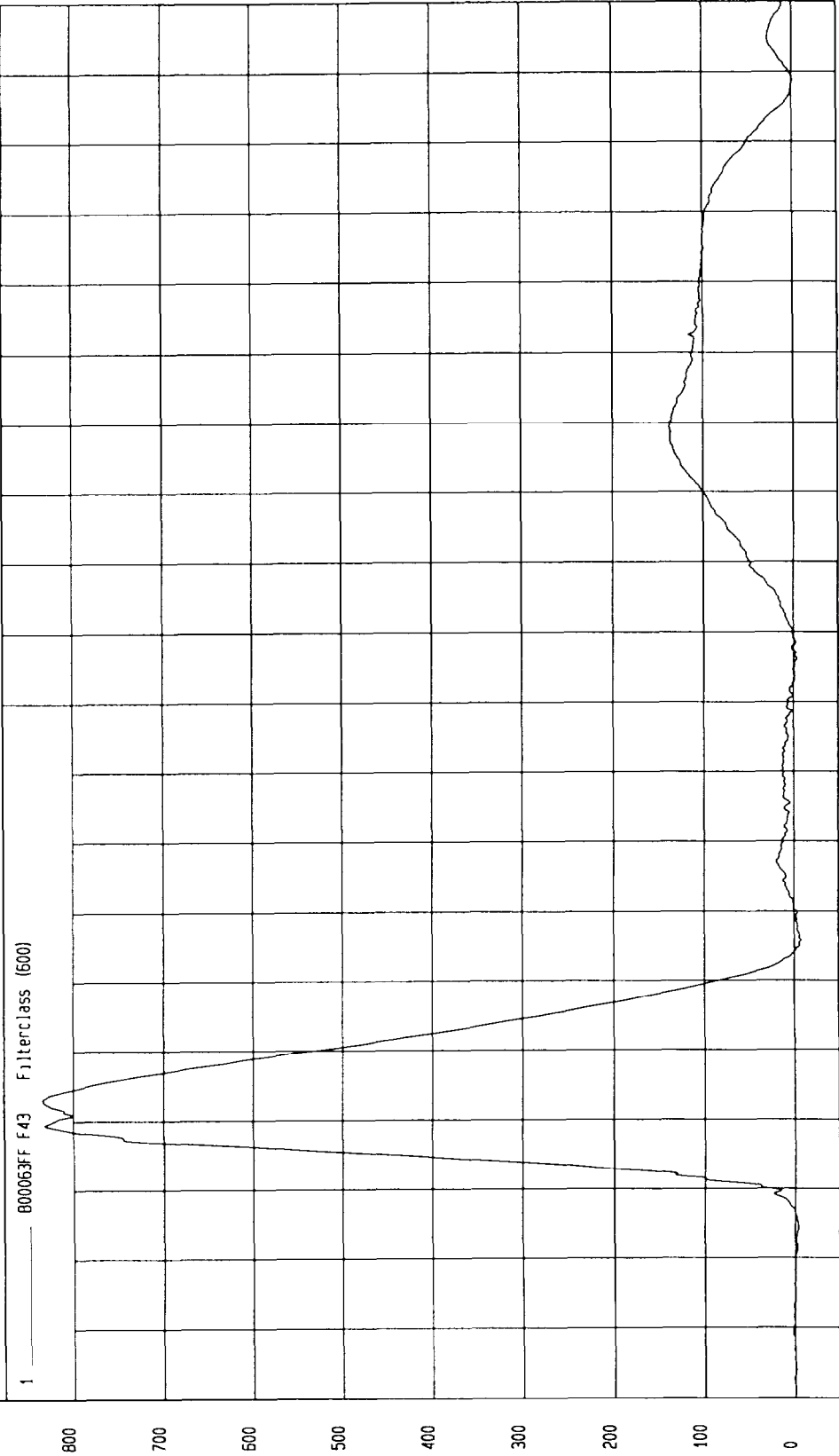
COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 7.2 N at 56 msec

Maximum 834.13 N at 43 msec

DRIVER ABDOMEN REAR FORCE

1 800063FF F43 Filterclass (600)



Seconds

WCA Research  
08-11-2000 18:30

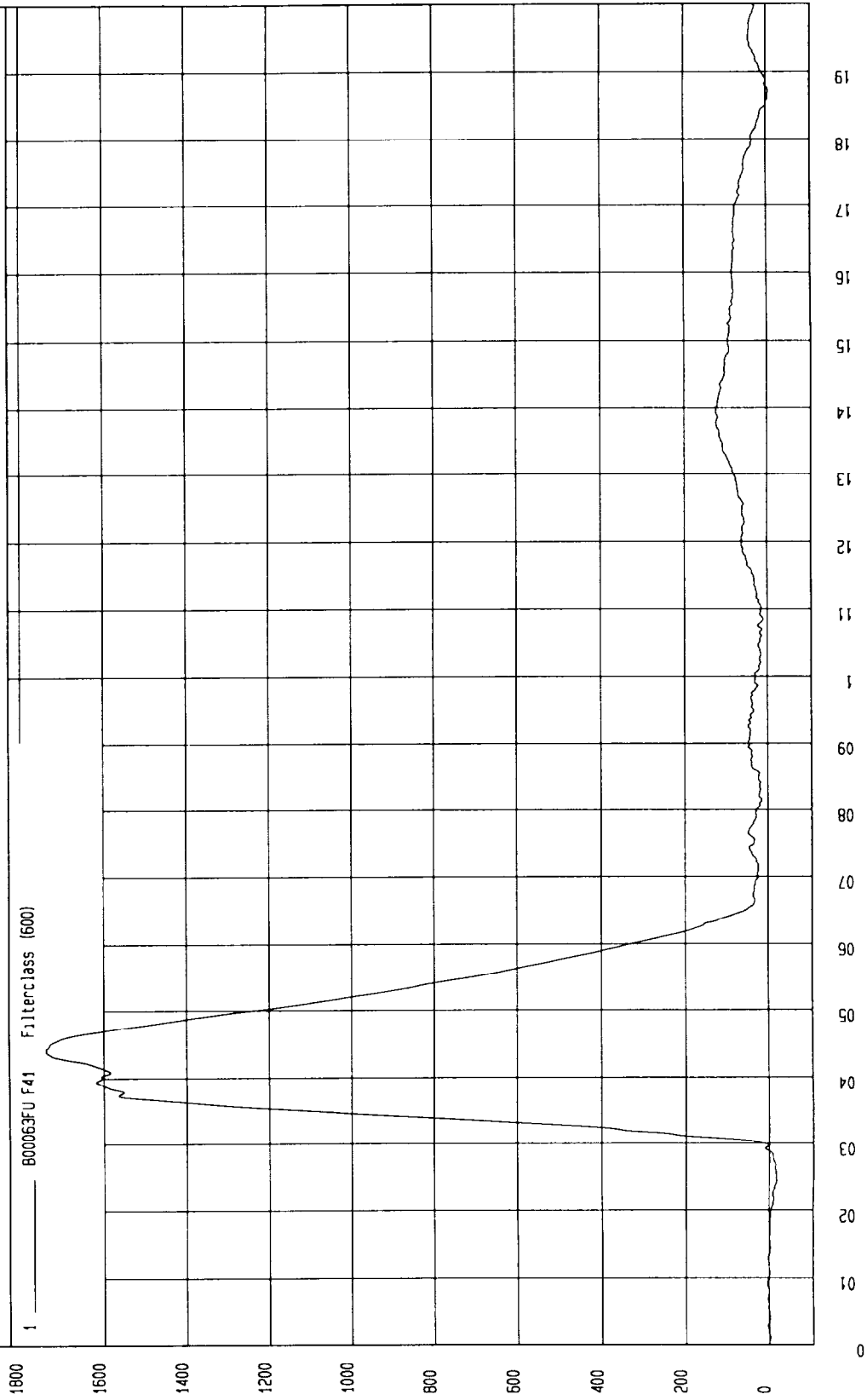
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = 18 62 N at 24 msec

Maximum = 1739 86 N at 44 msec

DRIVER SUMMED ABDOMEN FORCE



MCA Research  
08-11-2000 18 30

Seconds

N

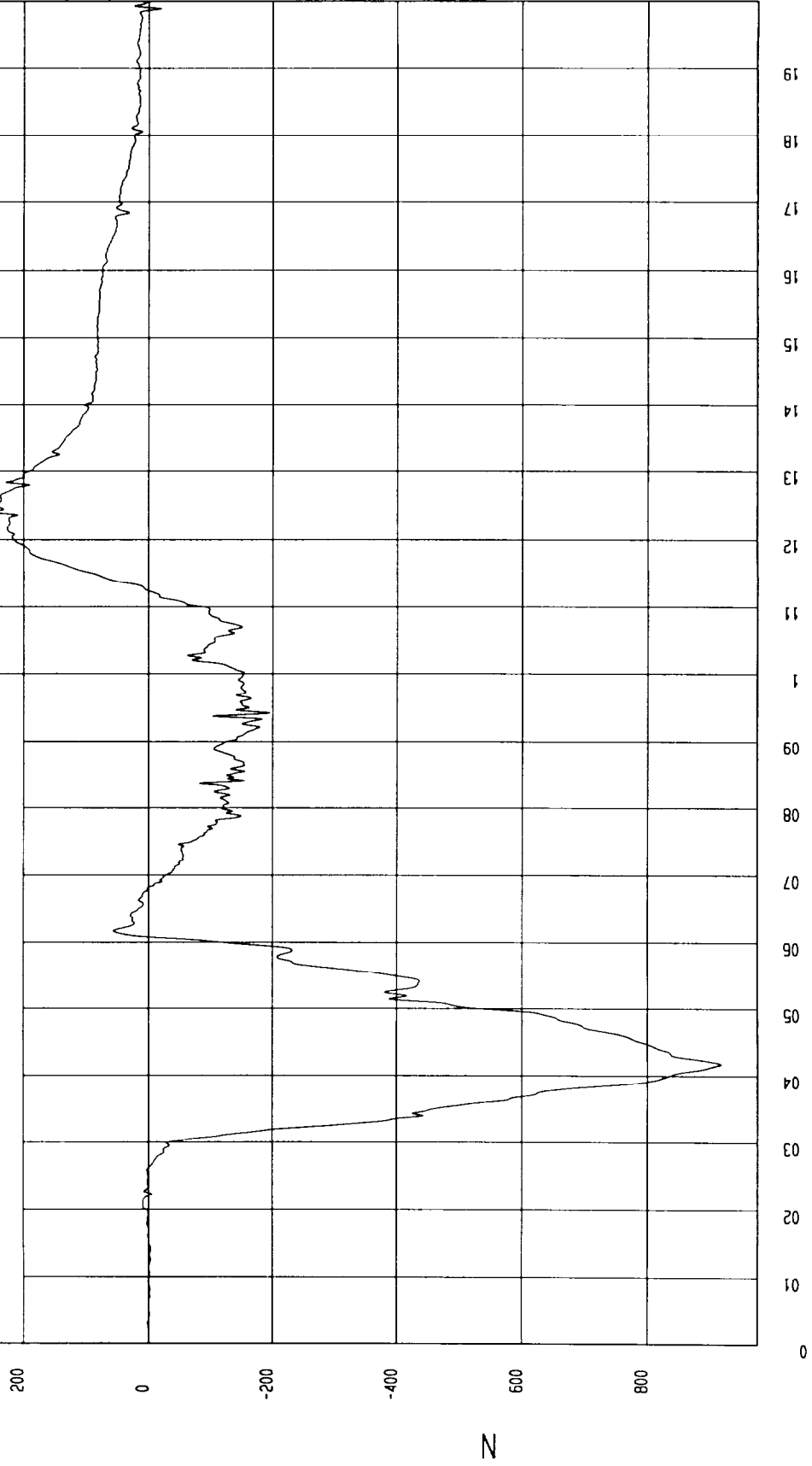
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 917.33 N at 42 msec  
Maximum - 254.5 N at 124 msec

DRIVER PUBIC SYMPHYSIS FORCE

1 ——— 800053FF F44 Filterclass (500)



MCA Research  
08-11-2000 18 30

Seconds

N

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

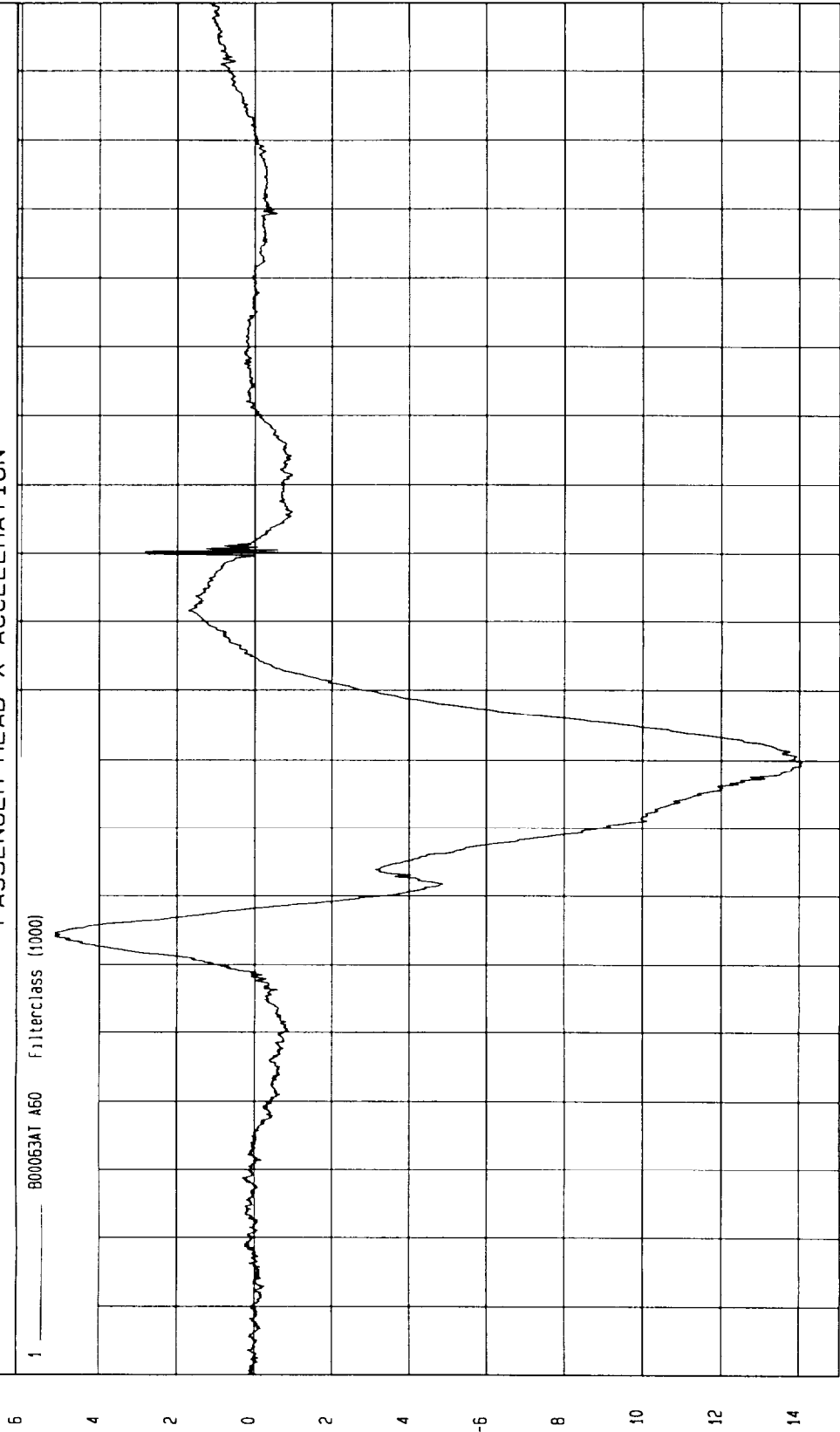
COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum = 14 08 G s at 90 msec

Maximum = 5 15 G s at 64 msec

PASSENGER HEAD X ACCELERATION

1 800063AT 460 Filterclass (1000)



MGA Research  
08-11-2000 18 31

Seconds

G's

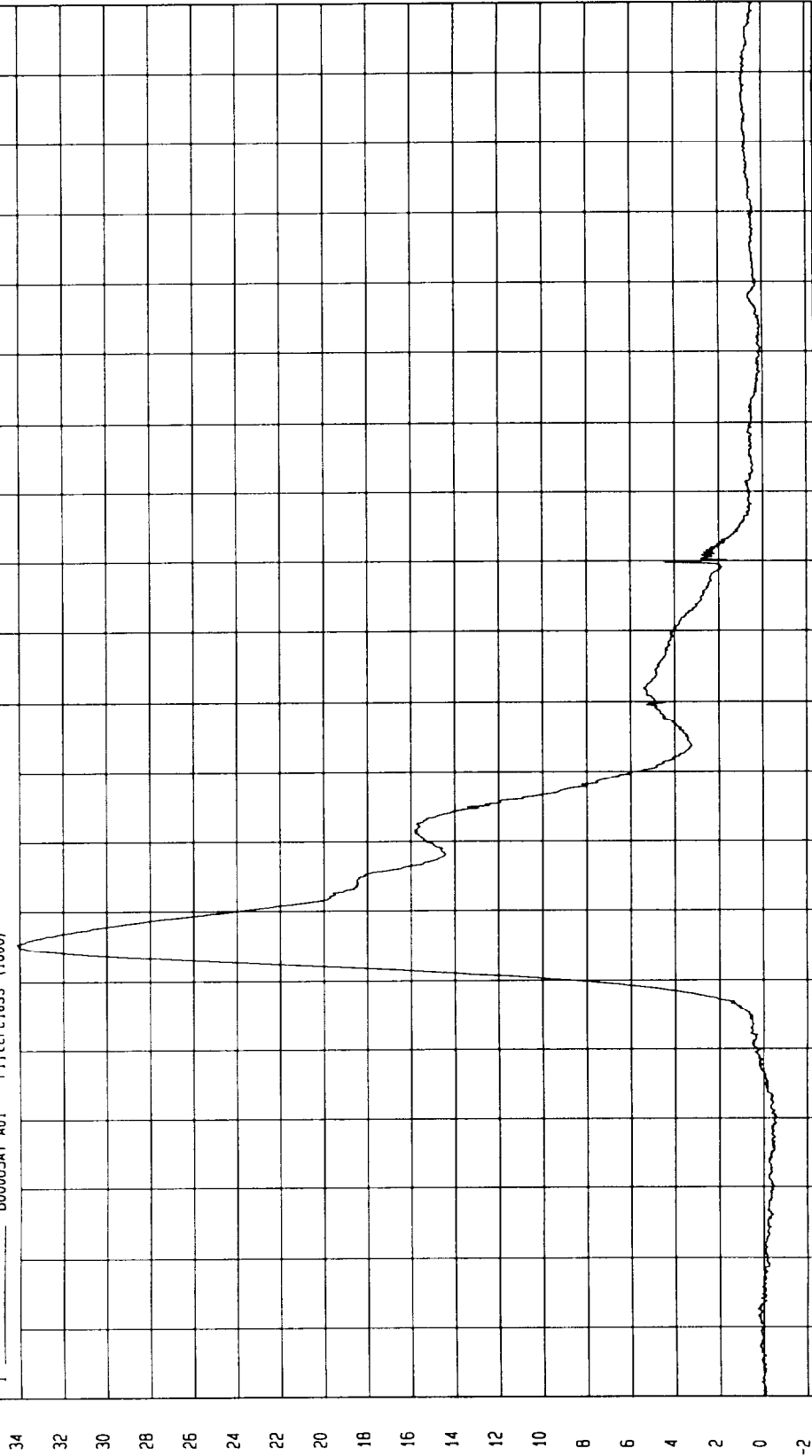
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 62 G s at 40 msec Maximum = 34 15 G s at 65 msec

PASSENGER HEAD Y ACCELERATION

1 800063AT A61 Filterclass (1000)



Seconds

MGA Research  
08-11-2000 18 31

G's

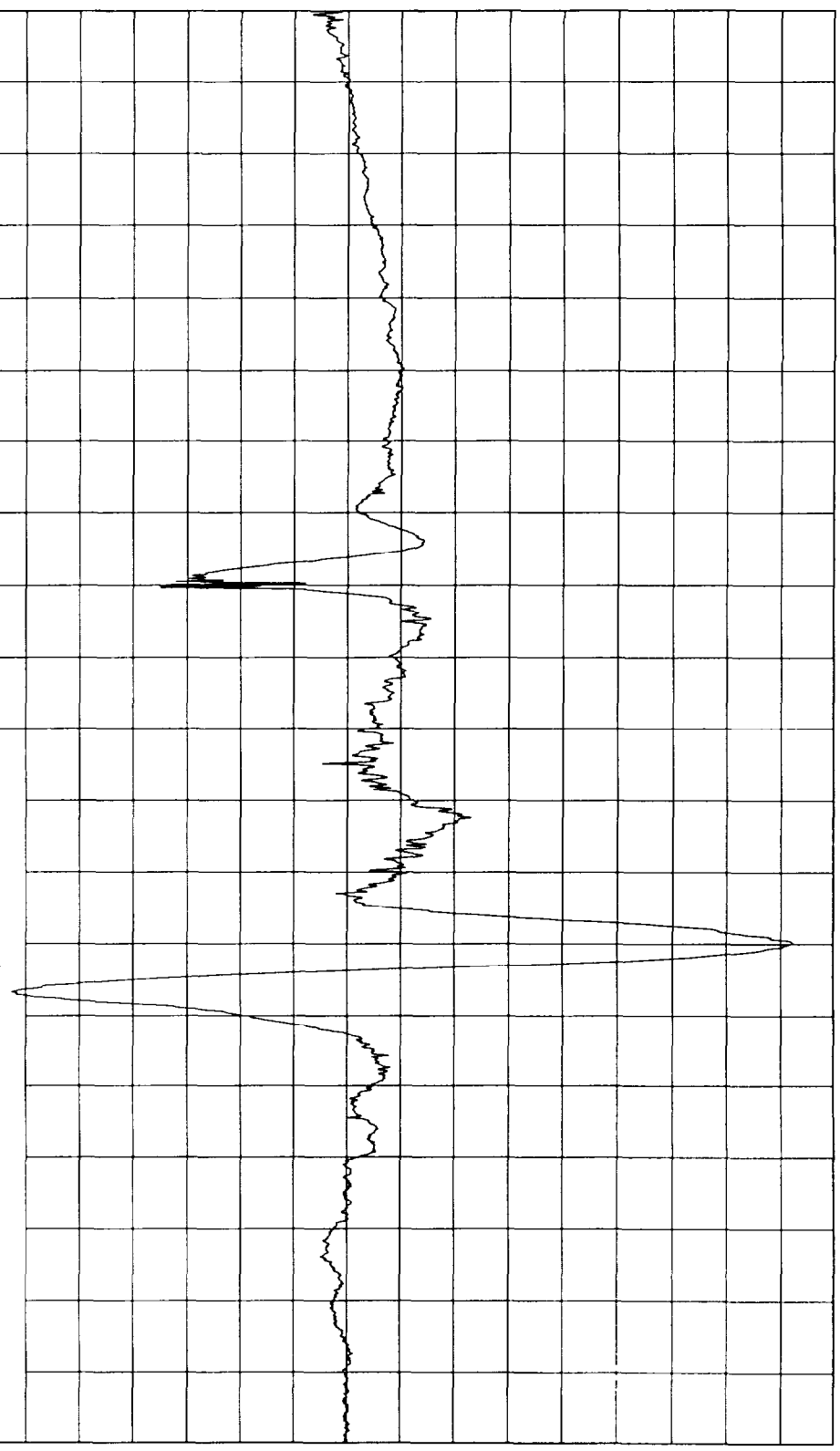
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum - 16.49 G s at 70 msec Maximum = 12.53 G s at 63 msec

PASSENGER HEAD Z ACCELERATION

1 800063AT A62 Filterclass (1000)



Seconds 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

MCA Research  
08-11-2000 18 31

G's

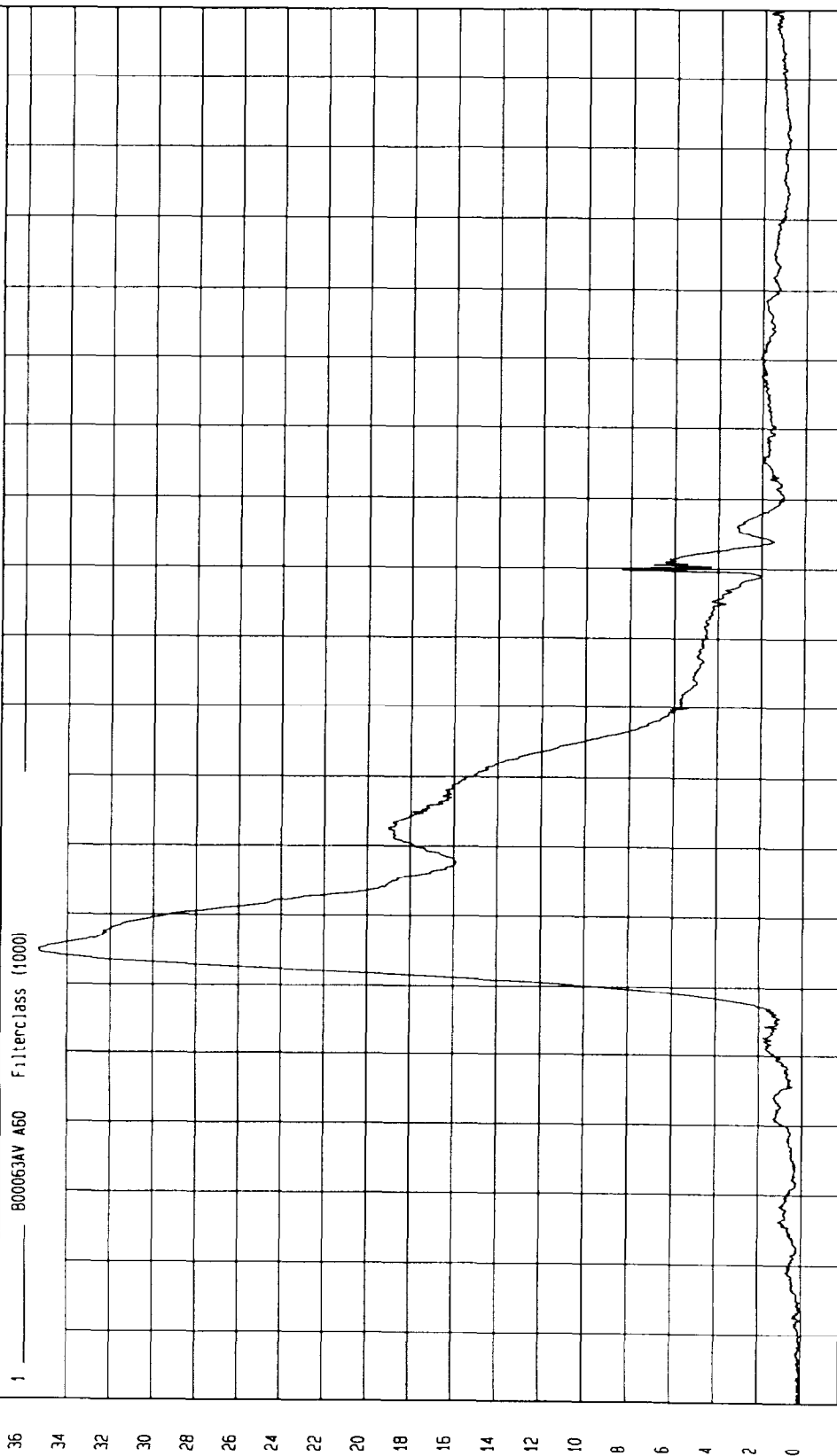
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 1.03E-02 G s at 2 msec Maximum = 35.32 G s at 65 msec

PASSENGER HEAD RESULTANT

1 800063AV A60 Filterclass (1000)



Seconds

MGA Research  
08-11-2000 18:32

G.s

TEST EU 96/27/EC SIDE IMPACT

TEST DATE 08-11-2000

Speed 30.6 MPH 49.2 KPH

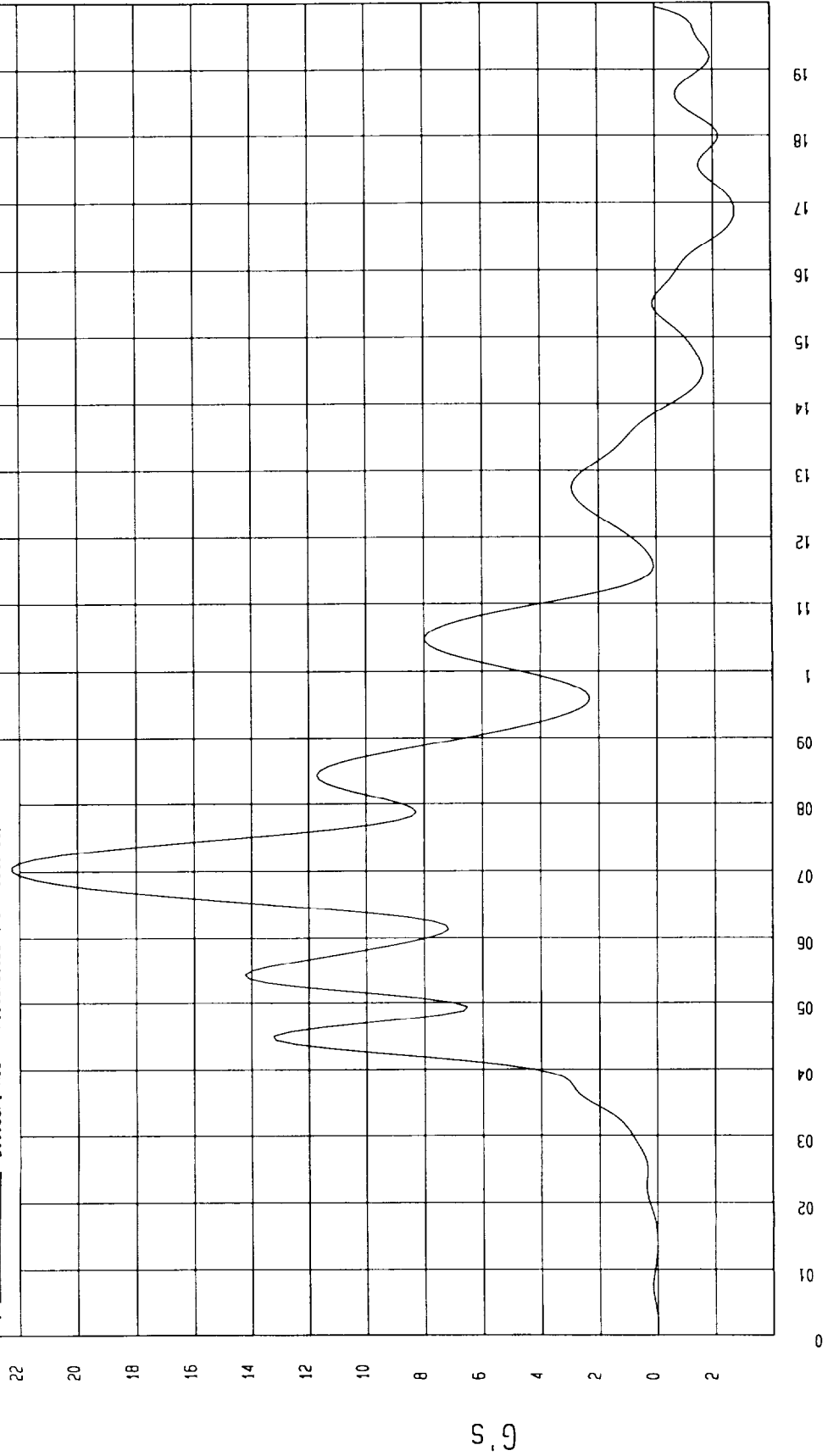
COMPONENT 1996 FORD TAURUS

Maximum = 22.27 G s at 71 msec

Minimum = 2.74 G s at 169 msec

PASSENGER UPPER RIB Y ACCELERATION

1 — B00063F1 R83 Filterclass (FIR Filtered)



Seconds

MGA Research  
08-11-2000 18 20

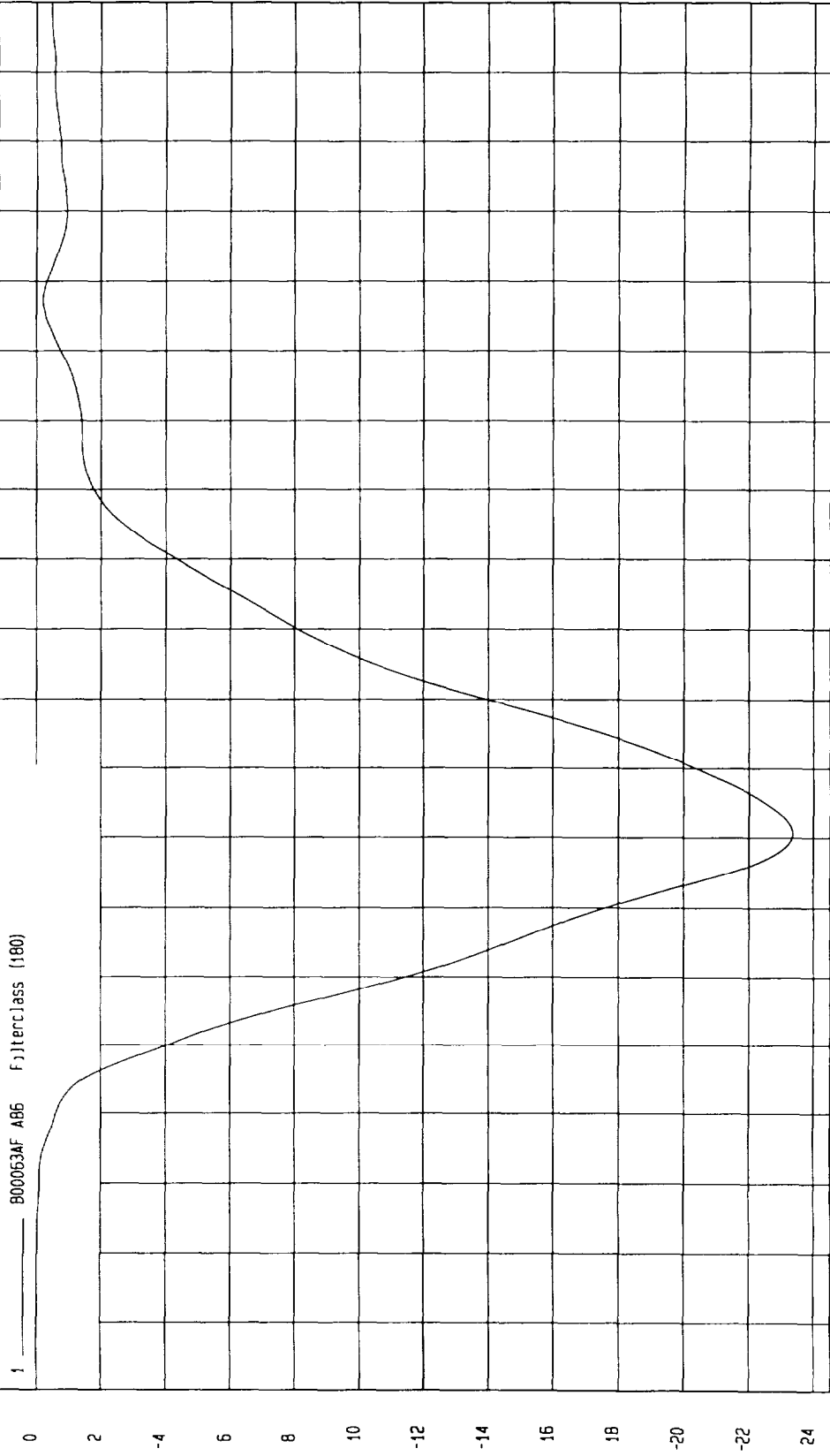
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 23.36 mm at 81 msec Maximum 1.34E 03 mm at 2 msec

PASSENGER UPPER RIB DISPLACEMENT

1 800053AF AB6 Filterclass (180)



MCA Research  
08-11-2000 18:33

Seconds

mm

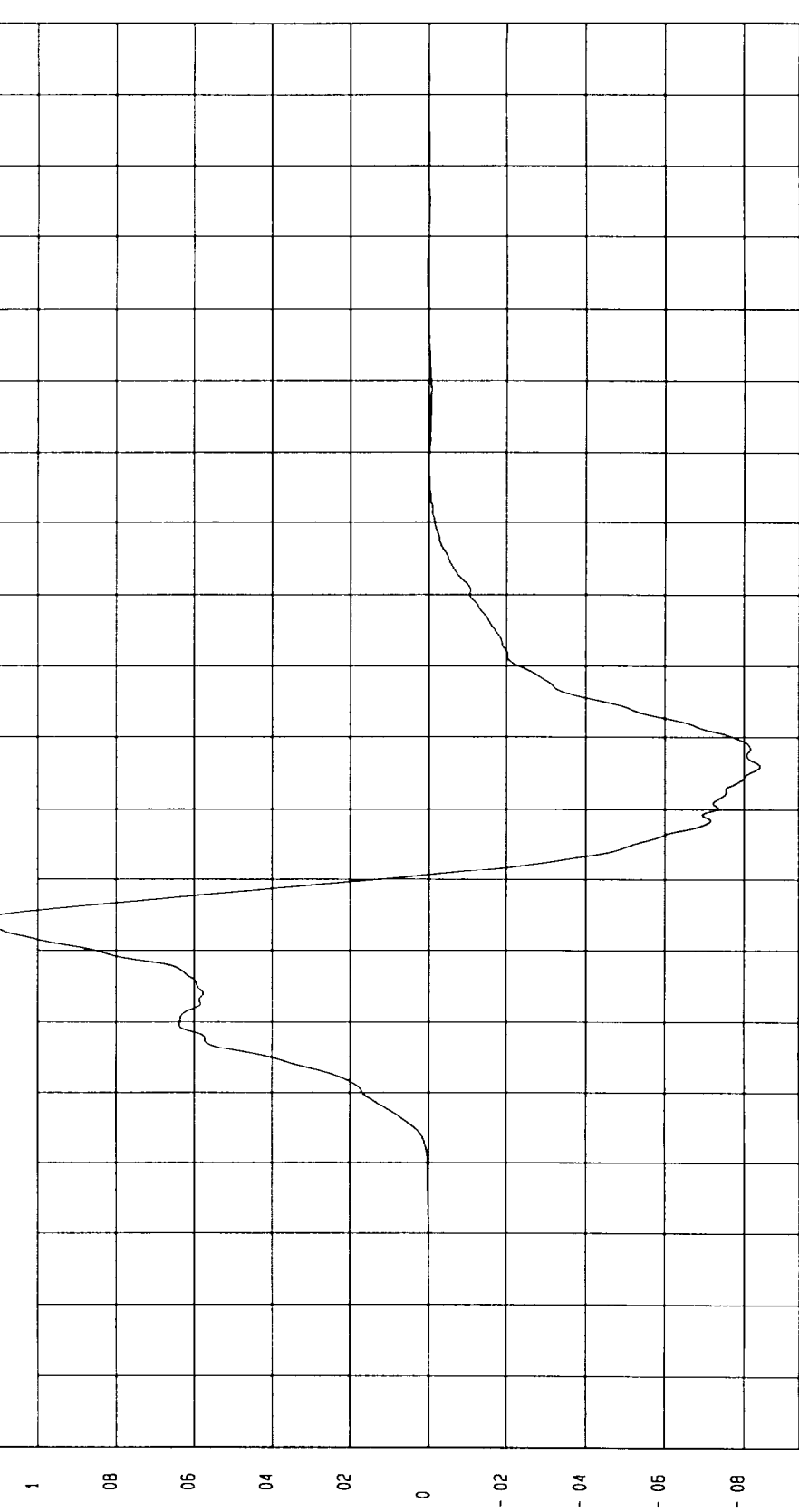
TEST EU 96/27/EC SIDE IMPACT  
TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS  
Speed 30 6 MPH 49 2 KPH

Minimum 8 42E 02 at 96 msec  
Maximum 11 at 74 msec

PASSENGER UPPER RIB VISCOUS CRITERIA

1 ——— 8000630V C86 Filterclass (180)



Seconds  
MGA Research  
08-11-2000 18 39

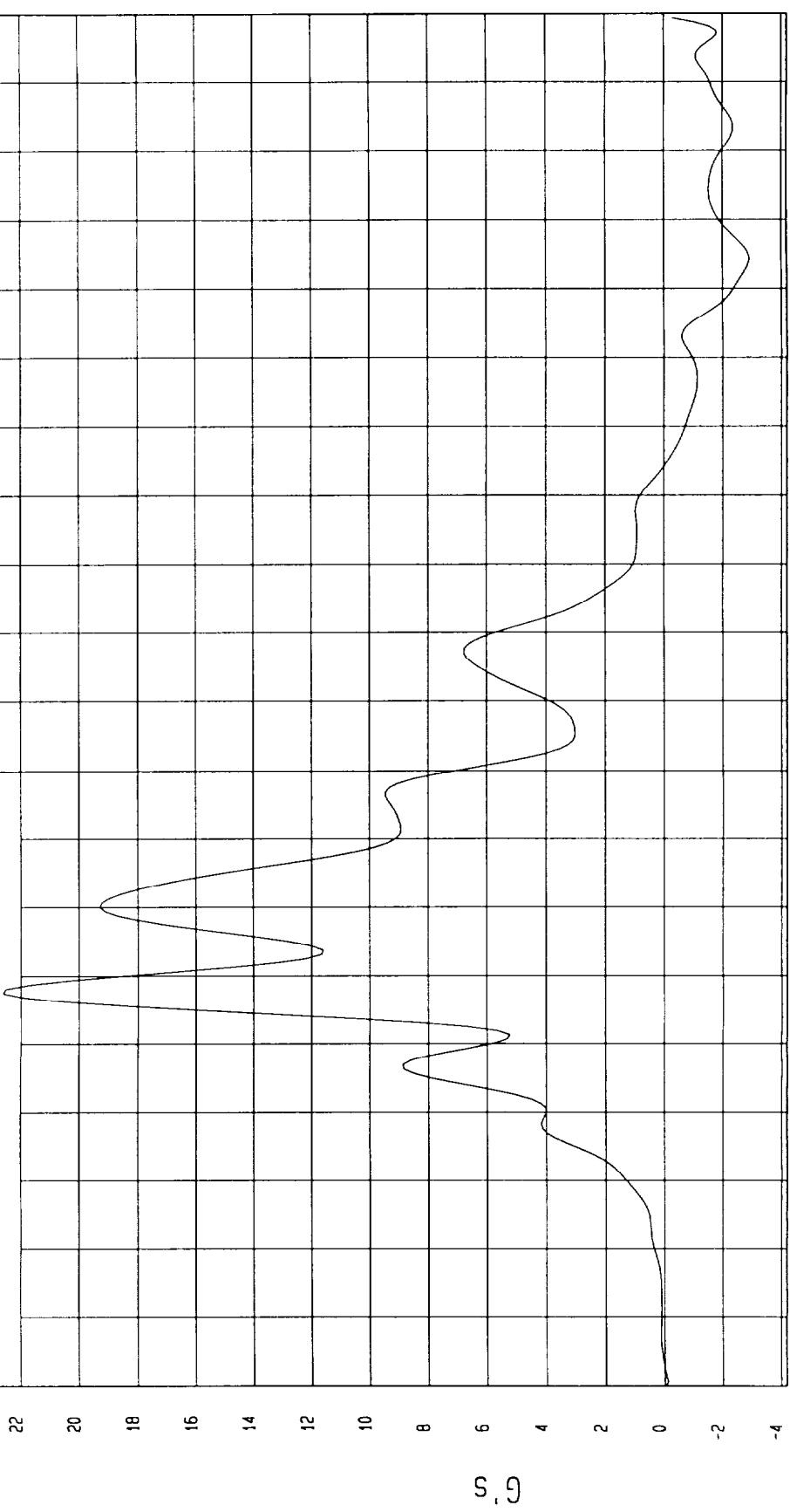
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 2.91 G s at 164 msec Maximum 22.61 G s at 58 msec

PASSENGER MID RIB Y ACCELERATION

1 800063FI R84 Filterclass (FIR Filtered)



MCA Research  
08-11-2000 18 20

Seconds

G's

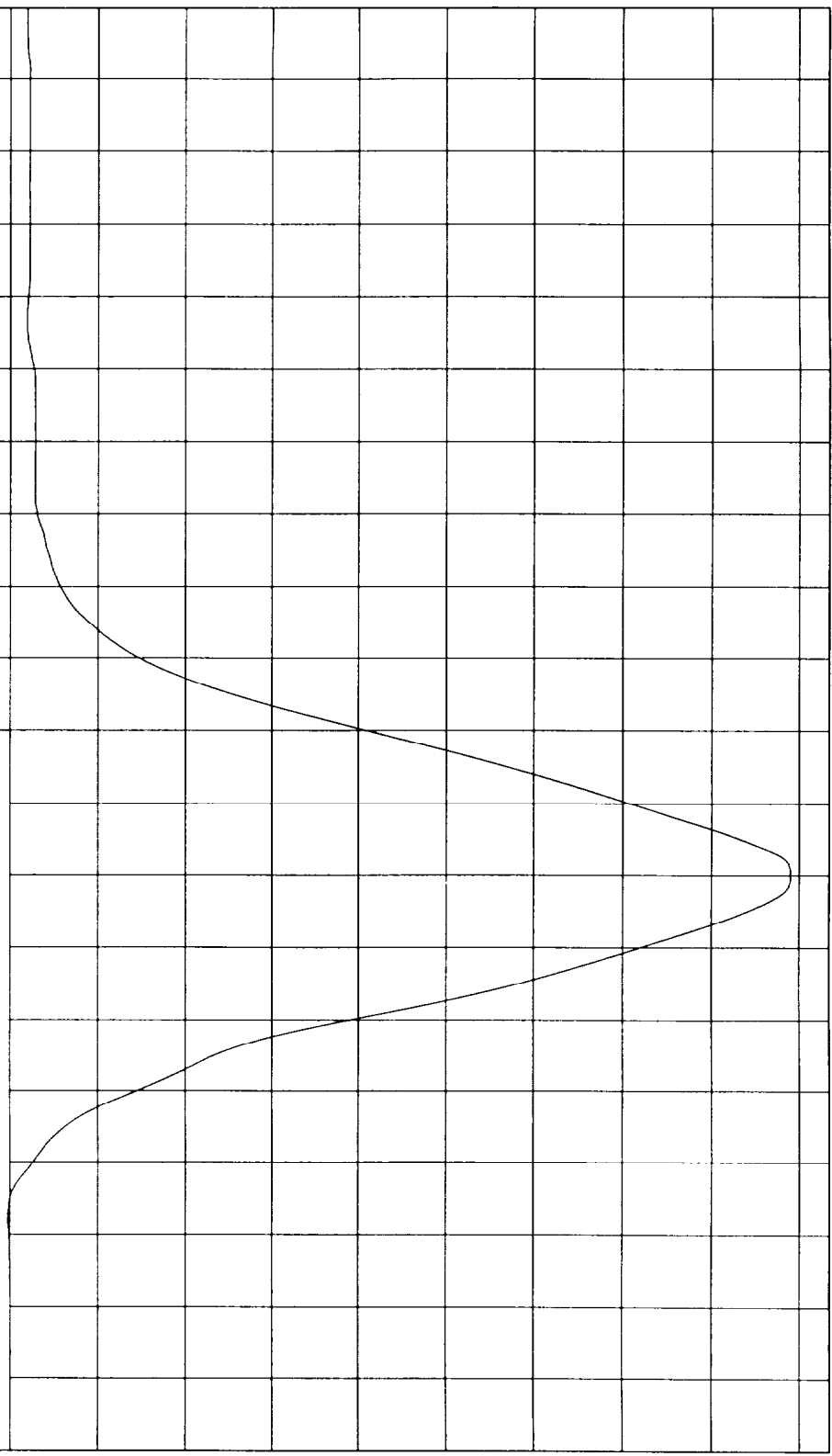
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 17.8 mm at 80 msec Maximum = 5.09E-02 mm at 32 msec

PASSENGER MID RIB DISPLACEMENT

1 800063AF AB7 Filterclass (180)



MCA Research  
08-11-2000 18 33

Seconds

mm

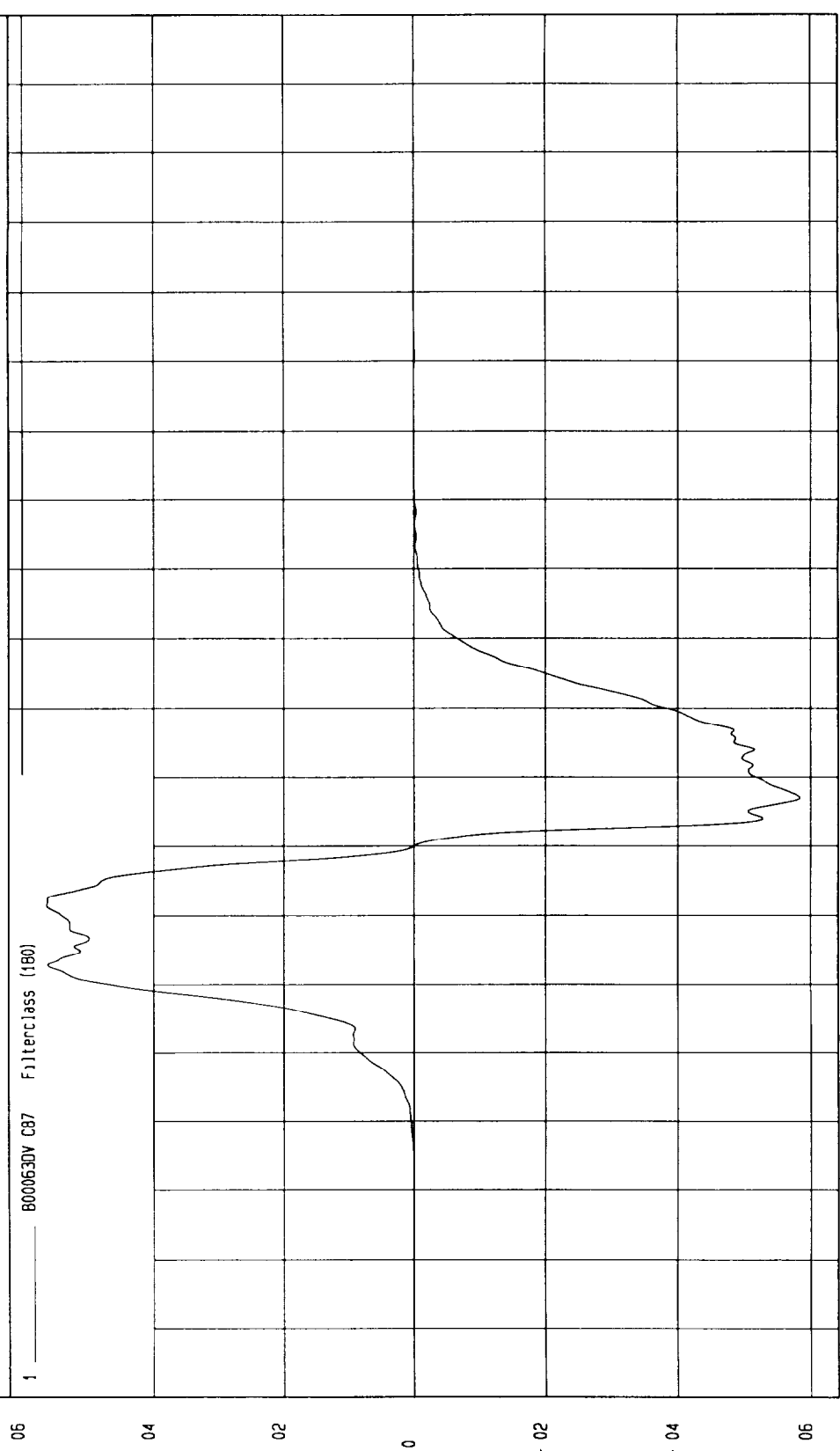
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum - 5 84E-02 at 87 msec Maximum = 5 63E-02 at 72 msec

PASSENGER MID RIB VISCOUS CRITERIA

1 8000630V C87 Filterclass (180)



Seconds

MCA Research  
08-11-2000 16 39

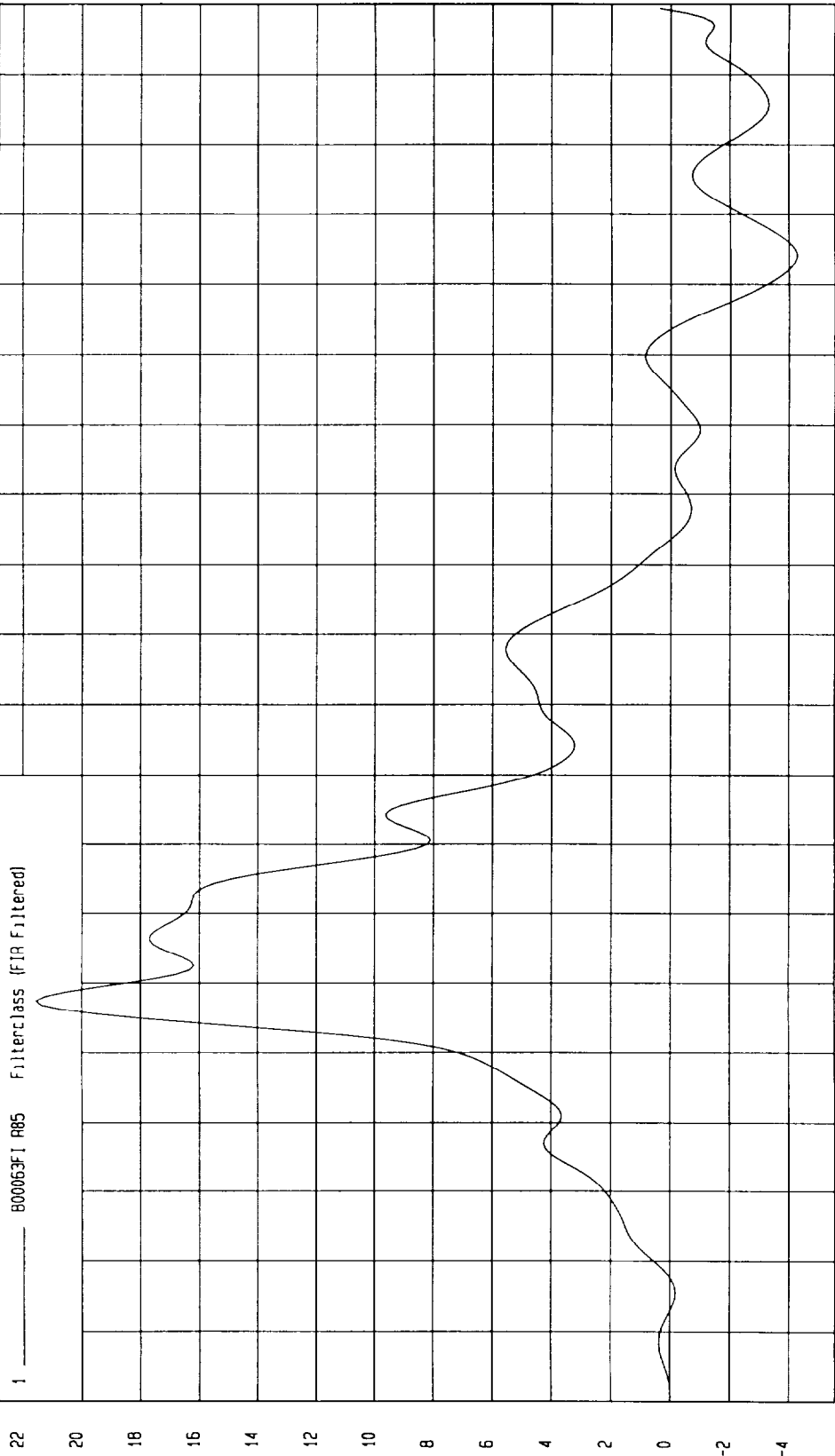
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 4.28 G s at 164 msec Maximum = 21.55 G s at 58 msec

PASSENGER LOWER RIB Y ACCELERATION

1 800063F1 R85 Filterclass (FIR Filtered)



MGA Research 08-11-2000 18 20

Seconds

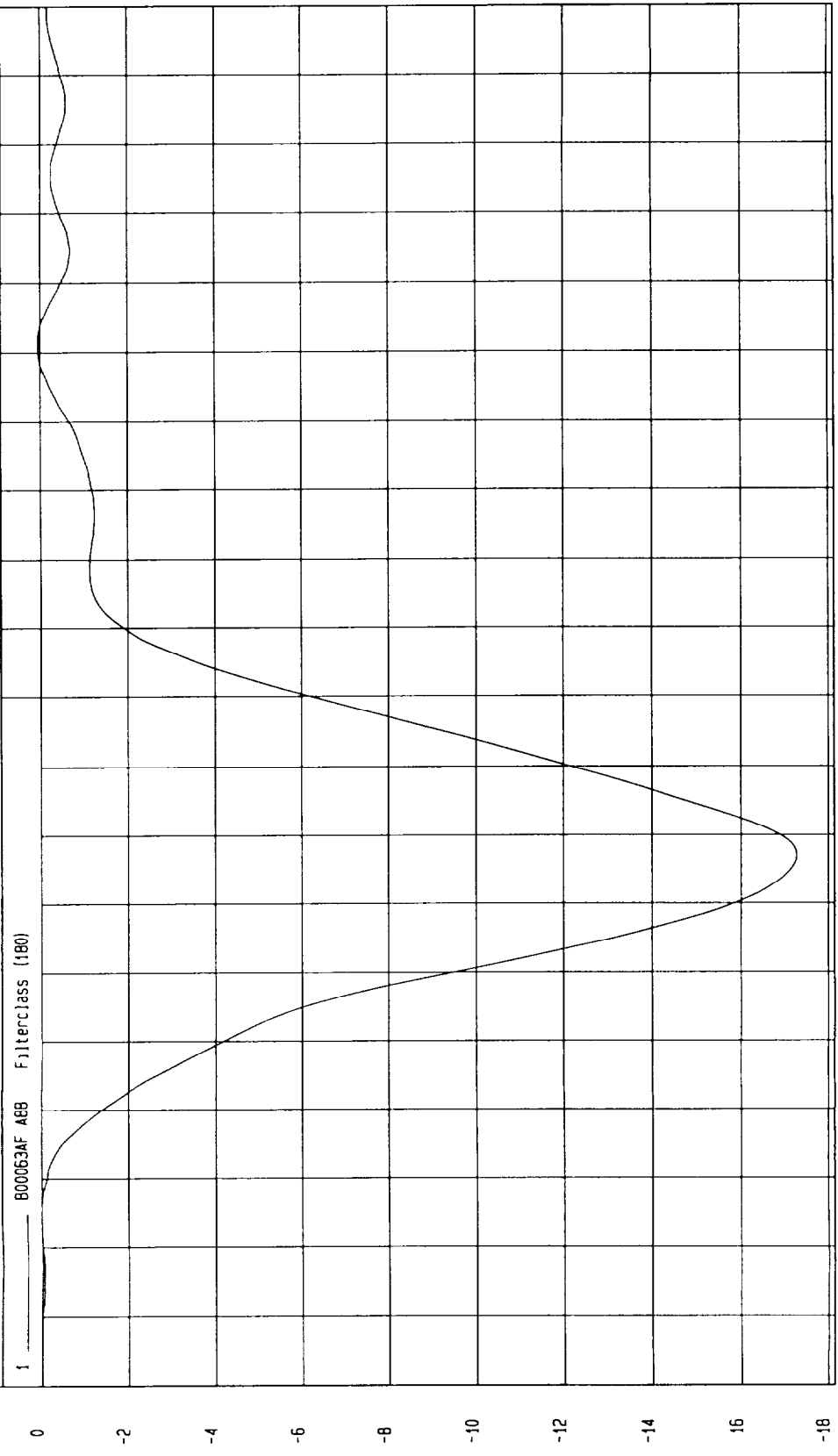
G's

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 17.27 mm at 77 msec Maximum = 5.51E-02 mm at 151 msec

PASSENGER LOWER RIB DISPLACEMENT



MCA Research  
08-11-2000 18:33

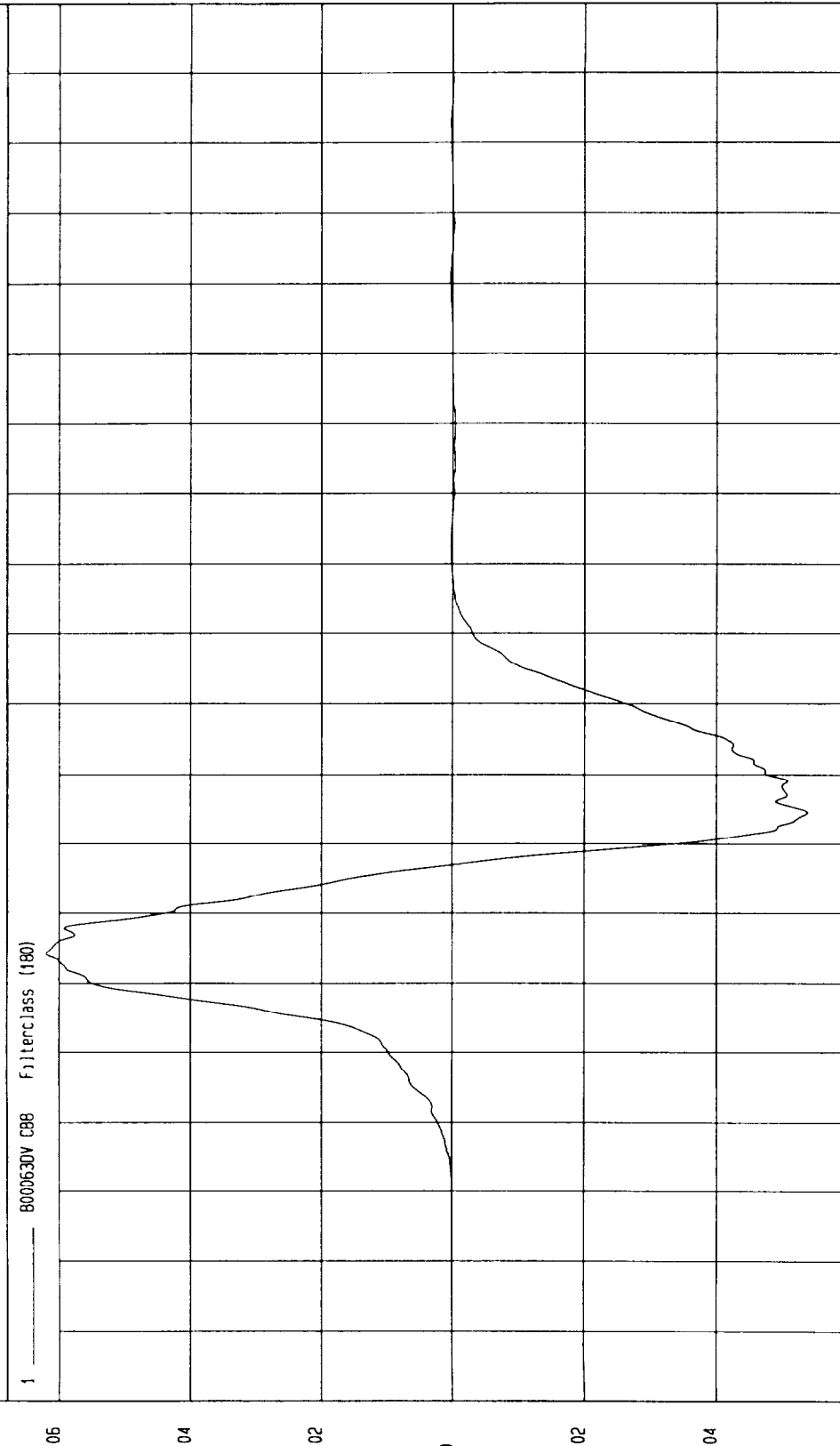
Seconds

mm

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000  
 COMPONENT 1996 FORD TAURUS Speed 30 6 MPH 49 2 KPH

Minimum 5.39E-02 at 84 msec Maximum 6.20E-02 at 64 msec

PASSENGER LOWER RIB VISCOUS CRITERIA



1 ——— 8000630V C88 Filterclass (180)

Seconds

MGA Research  
08-11-2000 18 40

TEST EU 96/27/EC SIDE IMPACT

TEST DATE 08-11-2000

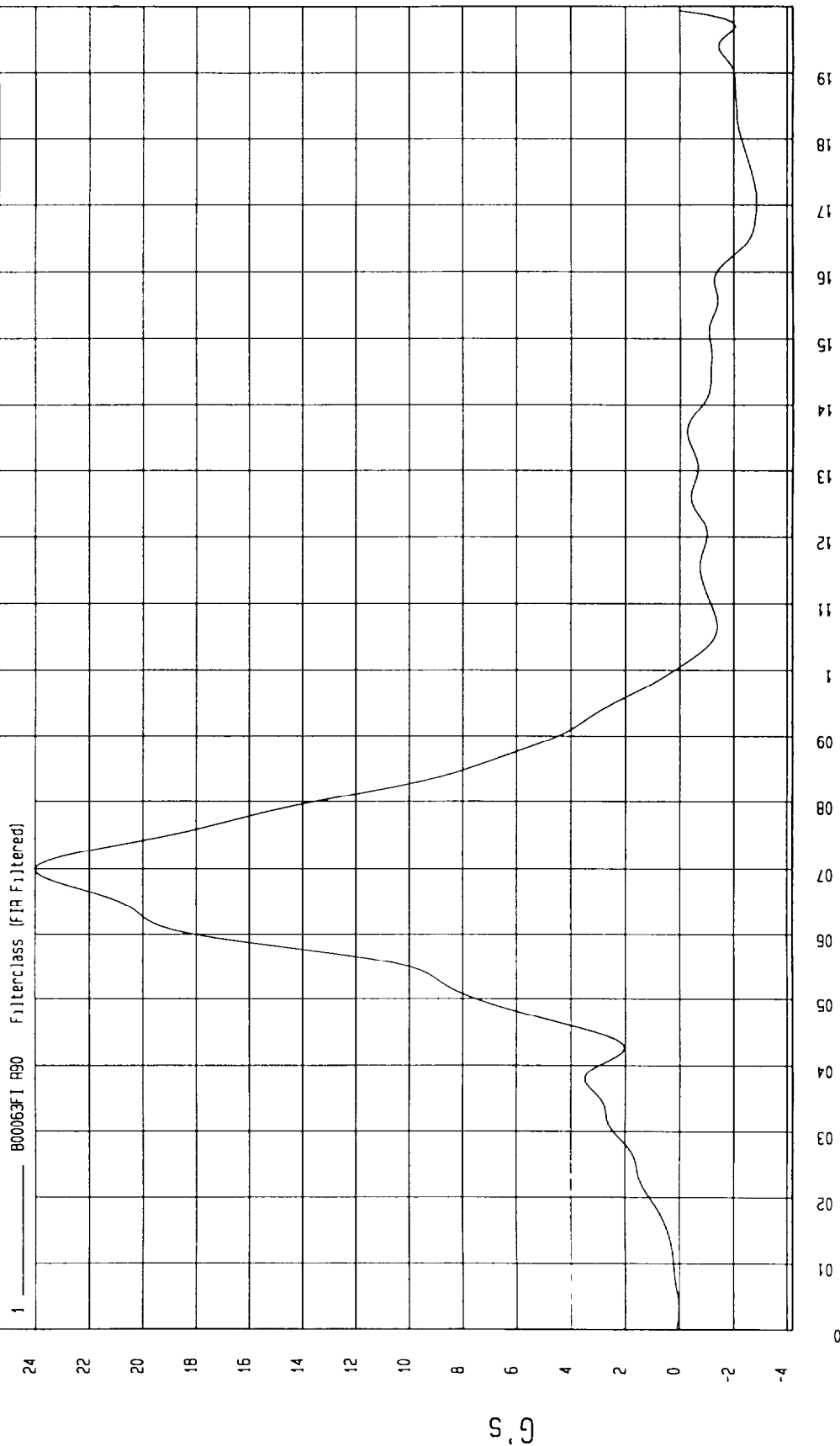
COMPONENT 1996 FORD TAURUS

Speed 30.6 MPH 49.2 KPH

Minimum 2.87 G s at 171 msec

Maximum = 24.02 G s at 70 msec

PASSENGER LOWER SPINE Y ACCELERATION



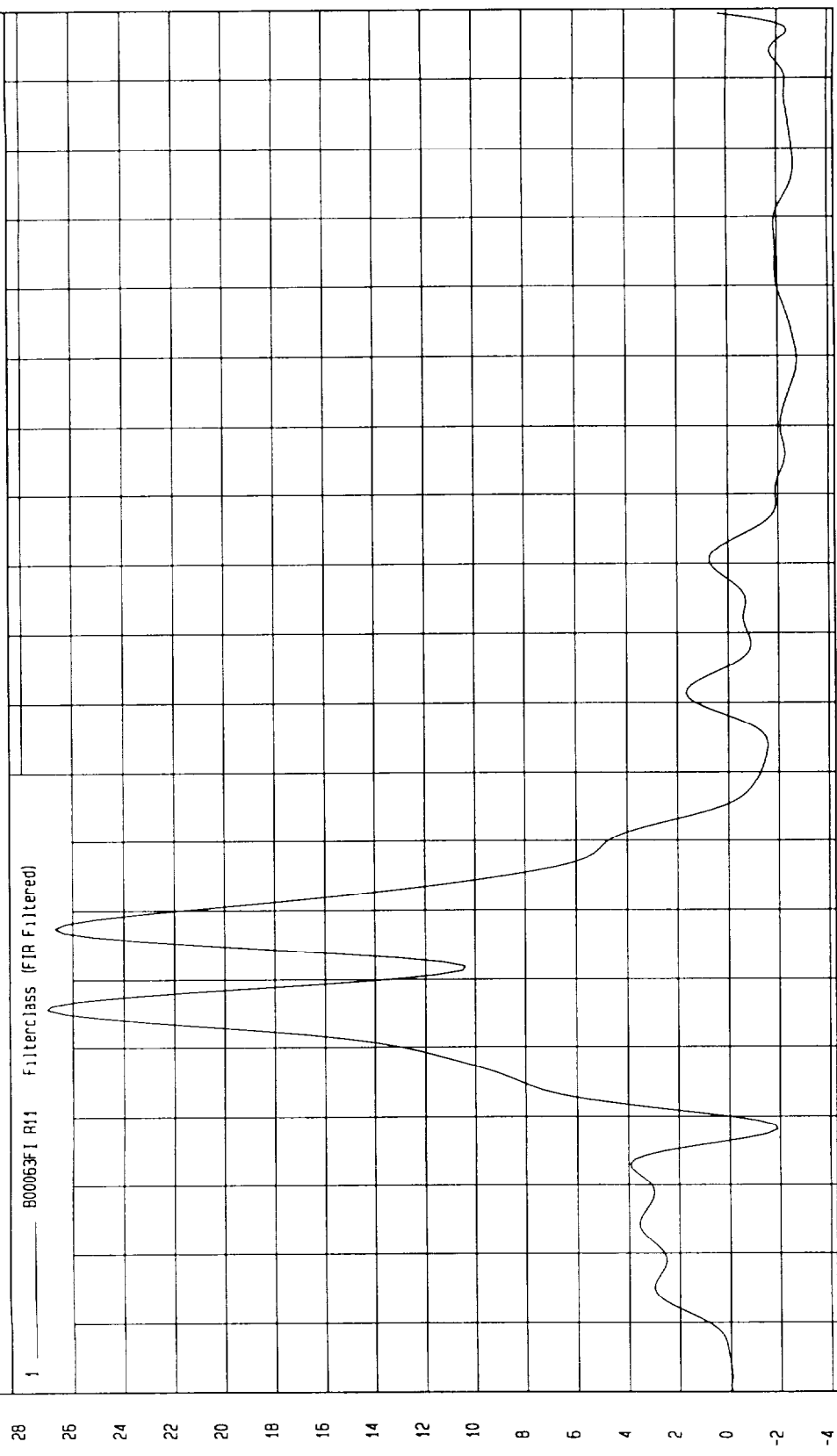
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed. 30 6 MPH 49 2 KPH

Minimum 2 75 G s at 149 msec Maximum = 27 G s at 56 msec

PASSENGER PELVIS Y ACCELERATION

1 B00063F1 R11 Filterclass (FIR Filtered)



MGA Research  
08-11-2000 18 45

Seconds

G's

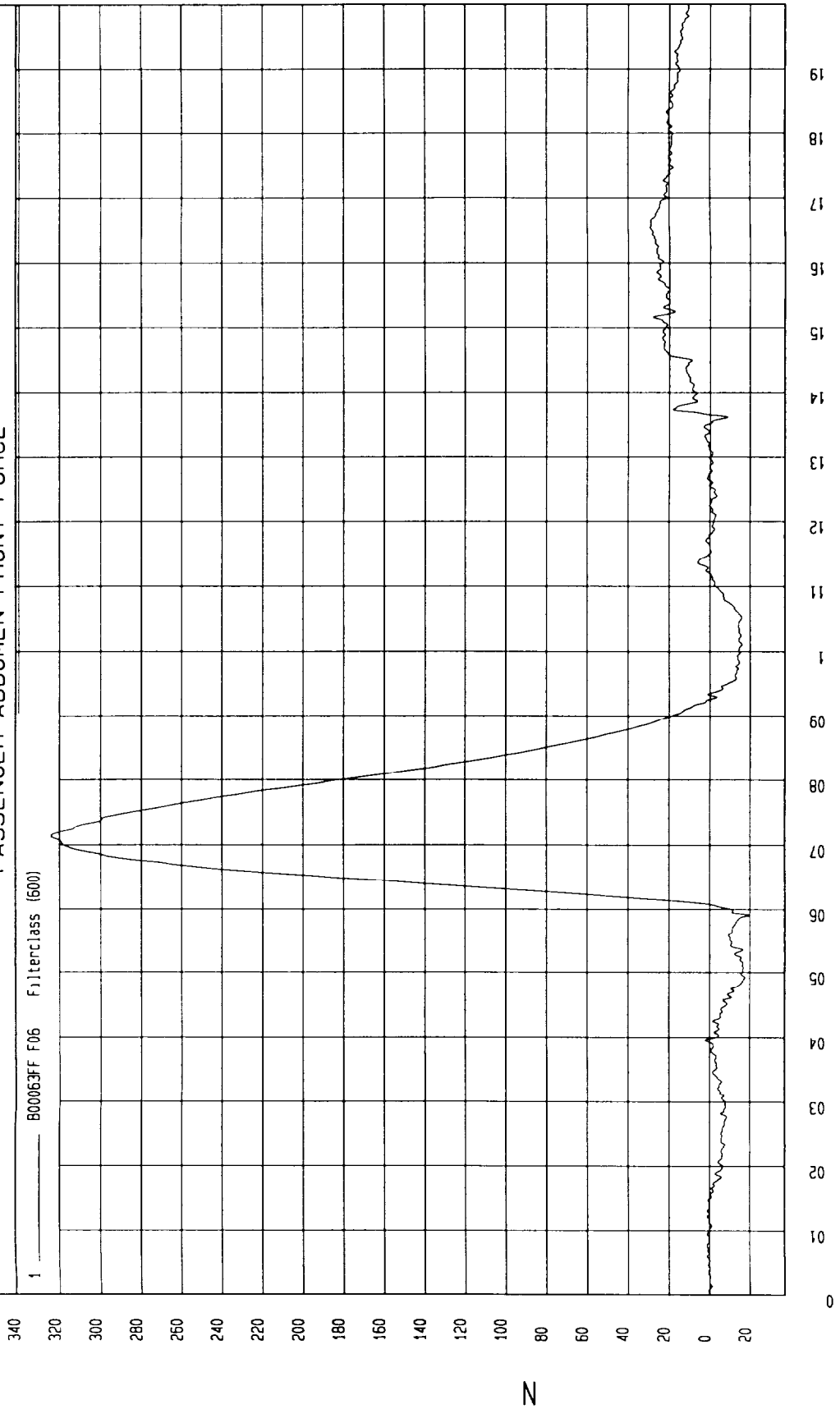
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 20.06 N at 59 msec

Maximum 324.37 N at 71 msec

PASSENGER ABDOMEN FRONT FORCE



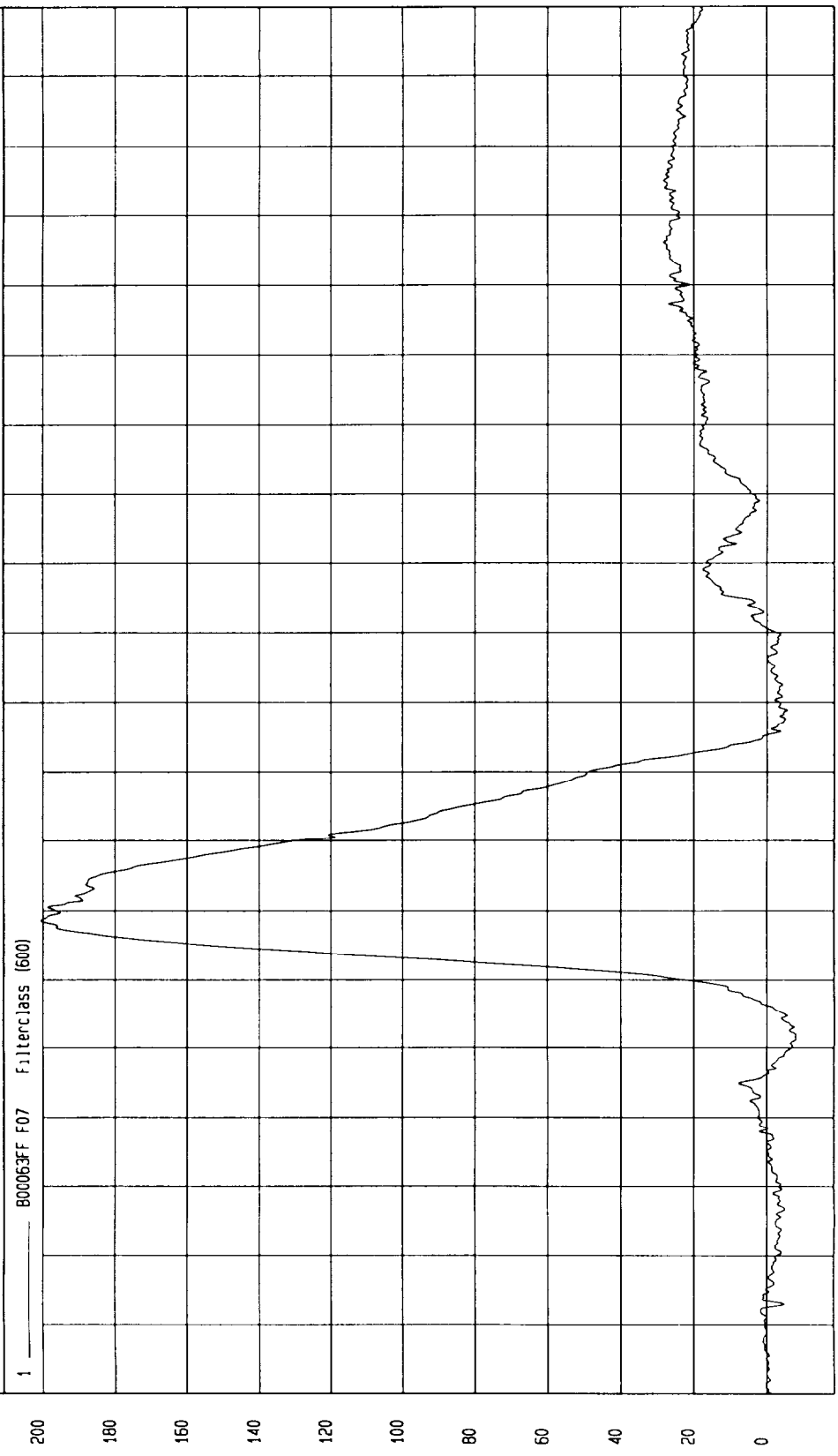
MCA Research  
08-11-2000 16 51

Seconds

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000  
 COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum = 7.9 N at 51 msec Maximum = 200.43 N at 69 msec

PASSENGER ABDOMEN MID FORCE



MEV Research  
 08-11-2000 18 51

Seconds

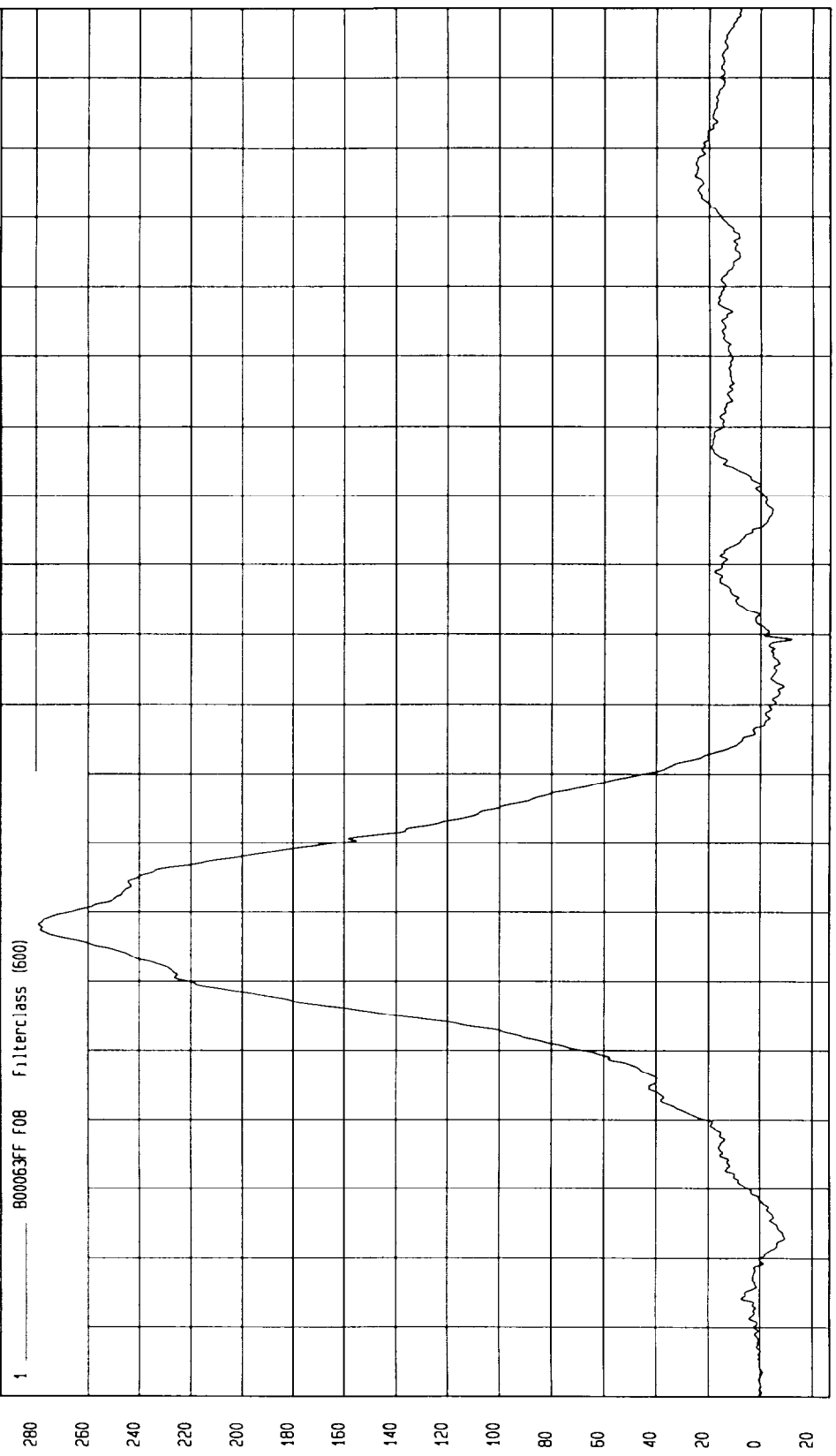
N

TEST EU 96/27/EC SIDE IMPACT  
COMPONENT 1996 FORD TAURUS

TEST DATE 08-11-2000  
Speed 30.6 MPH 49.2 KPH

Minimum = 12.14 N at 109 msec  
Maximum = 279.1 N at 68 msec

PASSENGER ABDOMEN REAR FORCE



Seconds

MGA Research  
08-11-2000 18 51

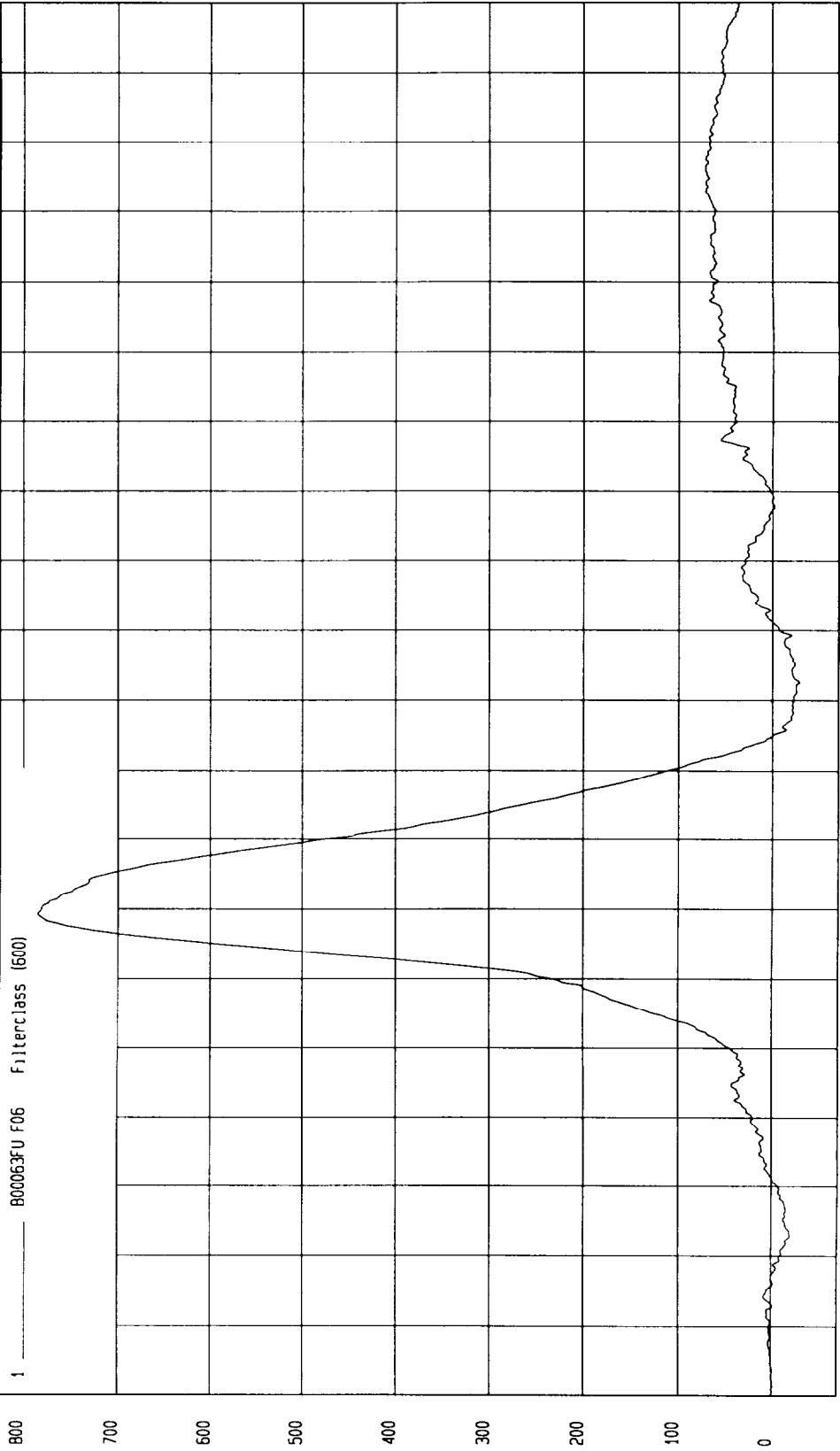
N

TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 28.72 N at 103 msec  
Maximum 784.79 N at 69 msec

PASSENGER SUMMED ABDOMEN FORCE



MCA Research  
08-11-2000 18 51

Seconds

N

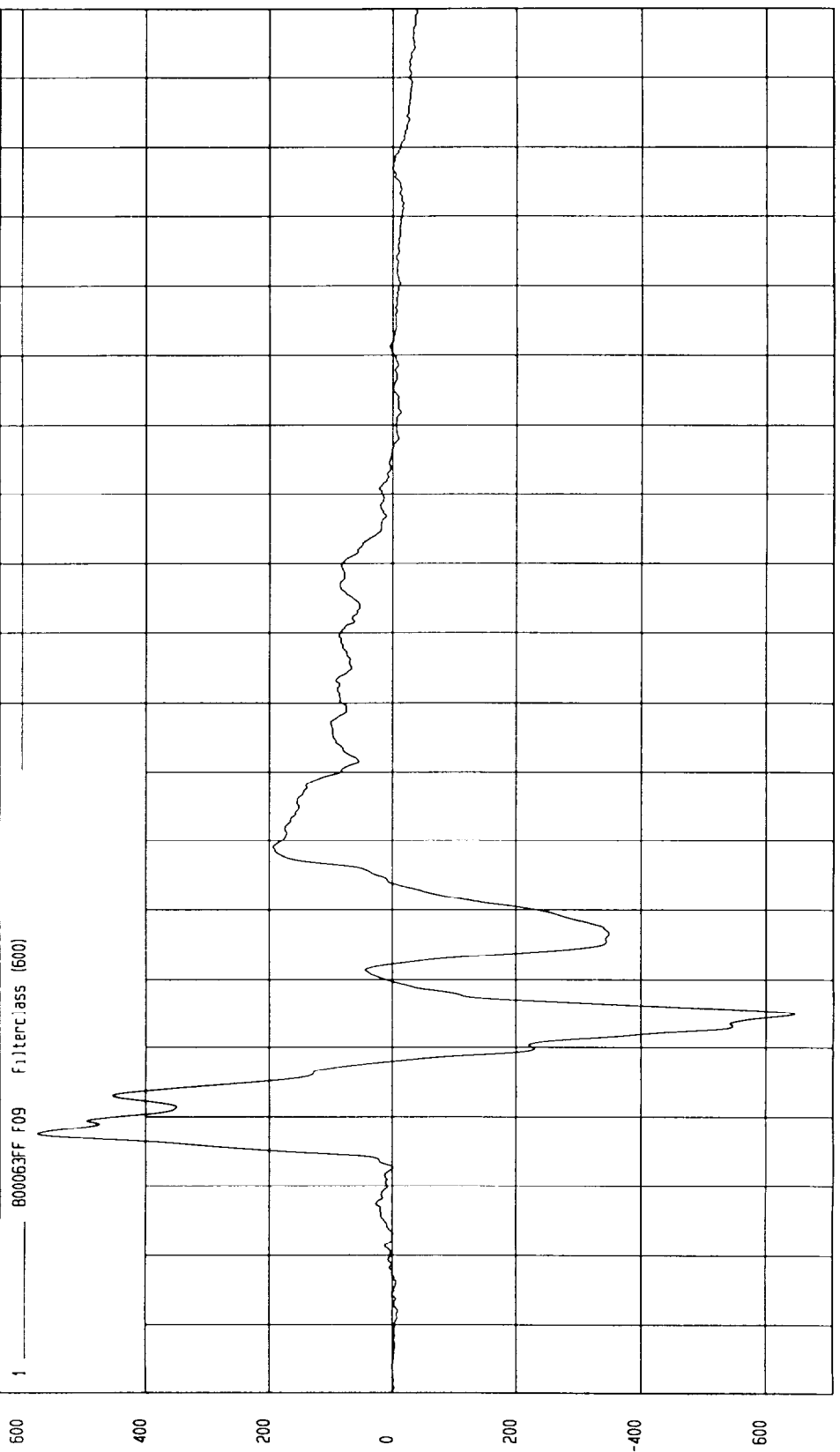
TEST EU 96/27/EC SIDE IMPACT TEST DATE 08-11-2000

COMPONENT 1996 FORD TAURUS Speed 30.6 MPH 49.2 KPH

Minimum 646.7 N at .55 msec Maximum 575.51 N at .38 msec

PASSENGER PUBIC SYMPHYSIS FORCE

1 800063FF F09 Filter:ass (600)



Seconds

MGA Research  
08-11-2000 18 51

APPENDIX C – ES-2 CONFIGURATION AND PERFORMANCE VERIFICATION

CERTIFICATION DATA

Dummy Serial Number: ES2-001

Calibration Test Results SummaryDummy 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 passed 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

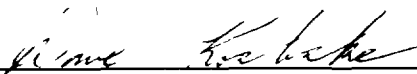
MGA RESEARCH CORPORATION  
HEAD DROP TEST  
EUROSID 2 DUMMY

Date August 10, 2000  
 Dummy Serial Number ES2-001  
 Test Number D00951

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	22
Relative Humidity (%)	10 – 70	48
Peak Resultant Acceleration	100 – 150 g's	135
Time of Max Res Acceleration		2.5 ms

TEST MEETS SPECIFICATIONS

Technician 

Approved By 

TEST Dummy Calibration - Head Drop TEST DATE 08-10-2000 - 14 29 31

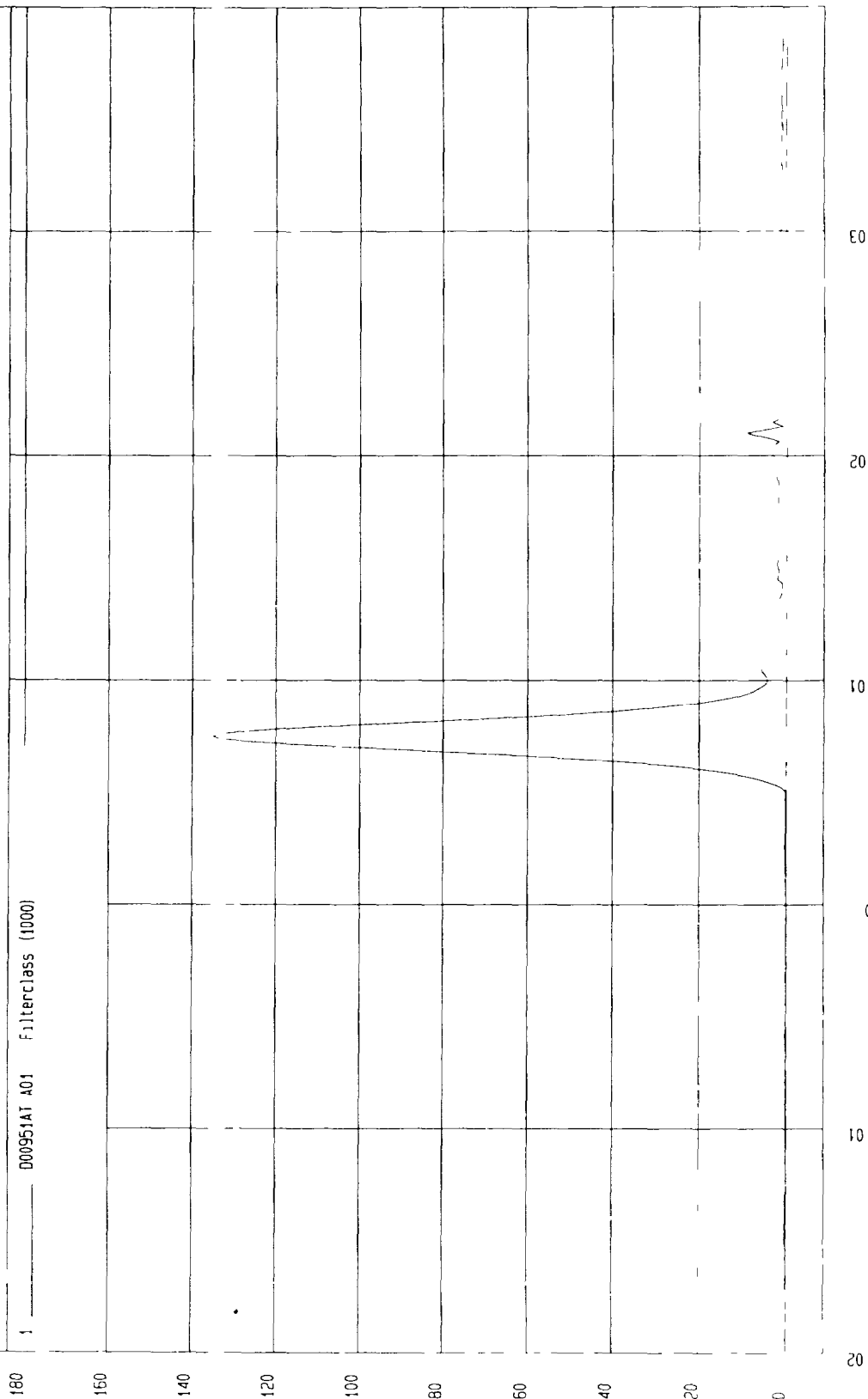
COMPONENT Dummy #ES2-001

Minimum - 7 02E-02 G S at -24 2 msec

Maximum 135 09 G S at 2 5 msec

PEAK RESULTANT ACCELERATION

1 \_\_\_\_\_ D00951AT A01 Filterclass (1000)



G.S.

TIME (sec)

MSA Research  
08 10 2000 14 29

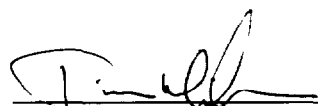
MGA RESEARCH CORPORATION  
NECK PENDULUM TEST  
EUROSID 2 DUMMY

Date August 10, 2000  
 Dummy Serial Number ES2-001  
 Test Number D00952

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	22
Relative Humidity (%)	10 – 70	47
Pendulum Speed	3.3 - 3.5	3.5
Max. Pendulum Acceleration		-34.3 g's
Time Max Pendulum Acceleration		10.3 ms
Maximum Flexion Angle	51.0 – 59.0 deg	59.0
Time of Max Flexion Angle	53.0 – 65.0 ms	58.9
Maximum Angle Theta (A)	32.5 – 36.5 deg	34.7
Time of Max. Theta (A)	54.0 – 64.0 ms	58.9
Maximum Angle Theta (B)	28.0 – 32.0 deg	31.5
Time of Max. Theta (B)	54.0 – 64.0 ms	59.3

TEST MEETS SPECIFICATIONS

Technician



Approved By



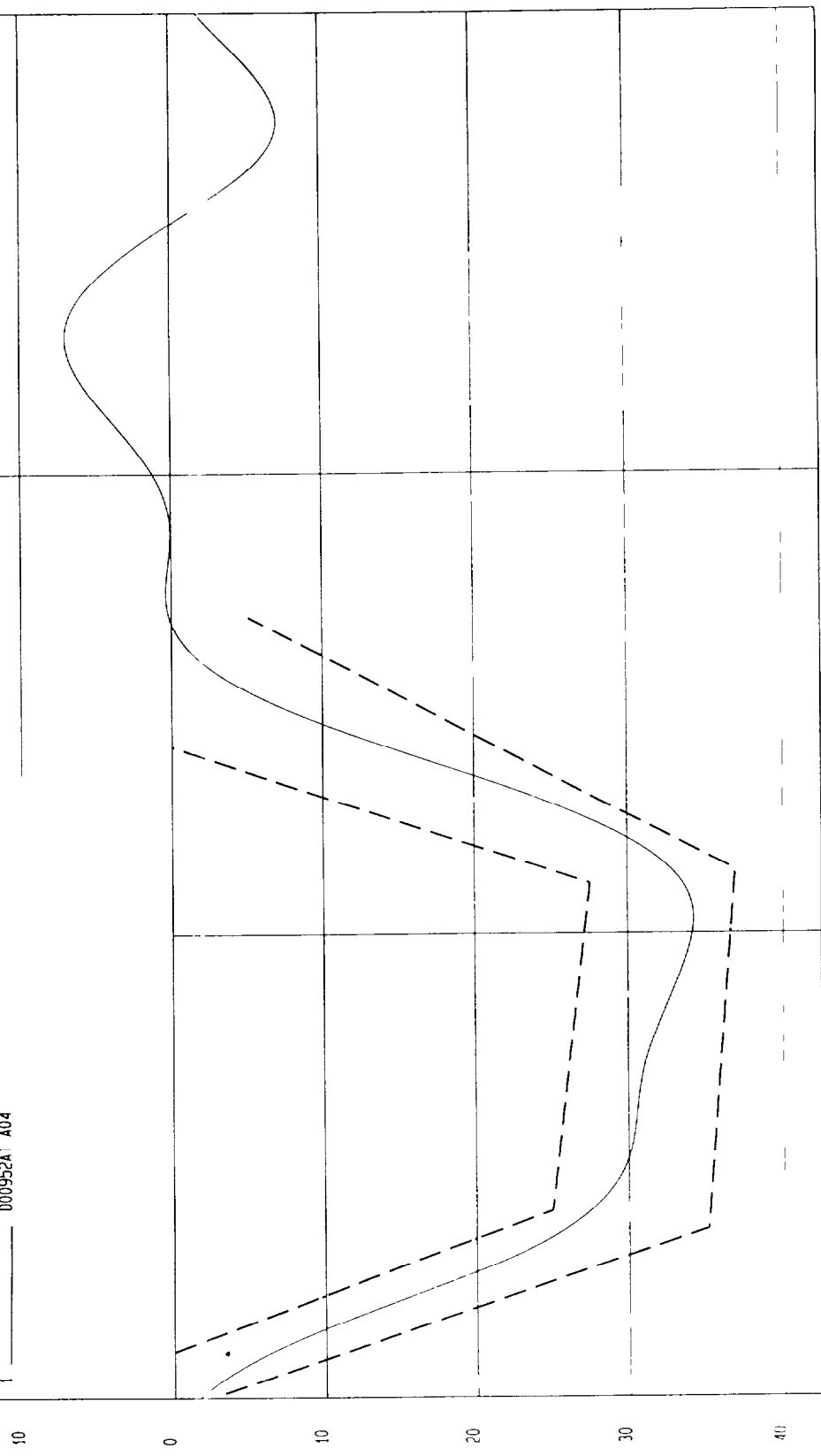
TEST Dummy Calibration - Neck Bending      TEST DATE 08-10-2000 - 16 03 01

COMPONENT Dummy #ES2-001      Velocity 11 424 FT/SEC 3 48 M/SEC

Minimum 34 30 G S at 10 3 msec      Maximum 8 14 G S at 46 9 msec

PENDULUM ACCELERATION

1 ——— 000952AT A04



20

10

0

TIME (sec)

S.G

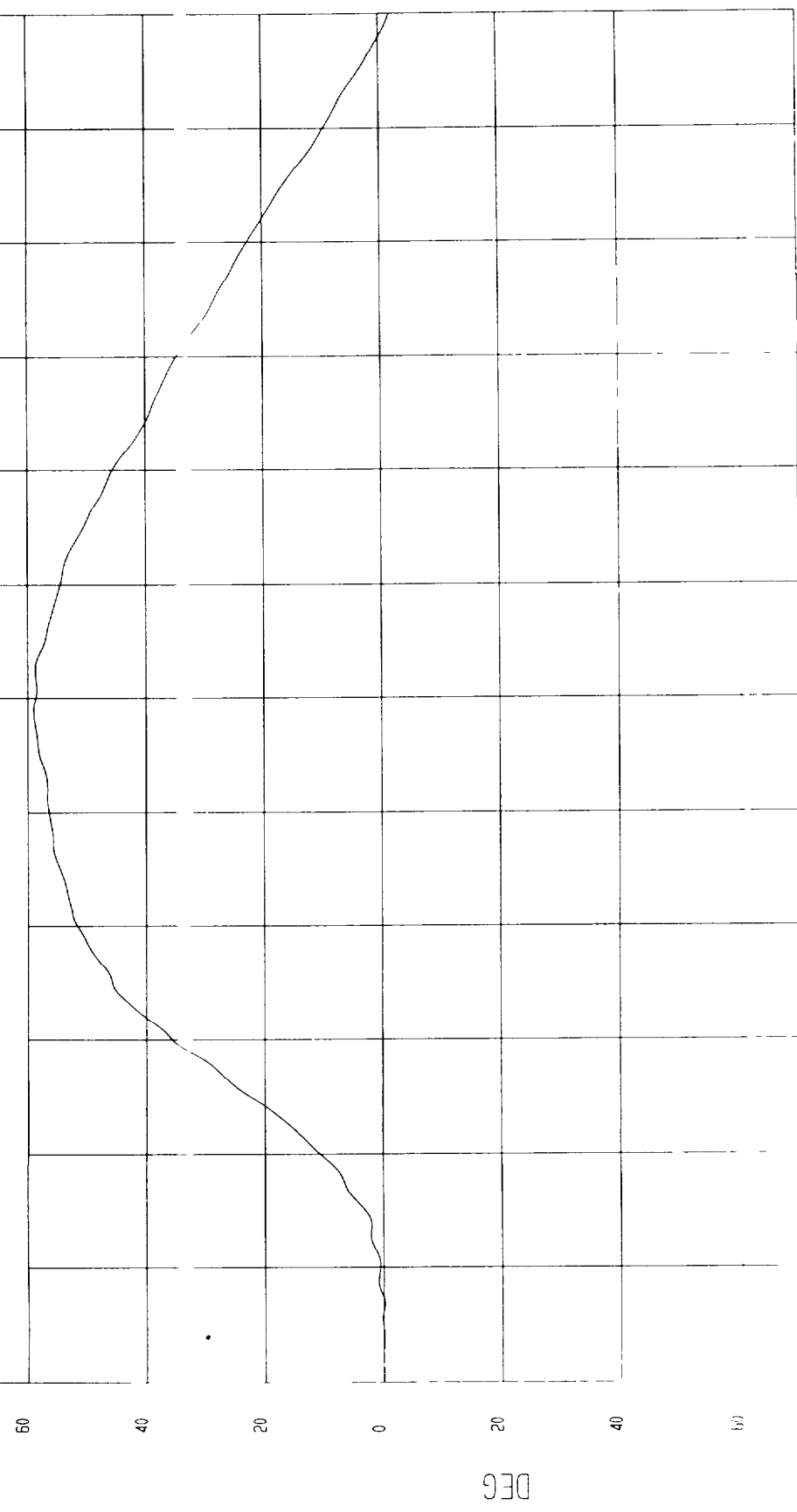
TEST Dummy Calibration - Neck Bending TEST DATE 08-10-2000 - 16 03 01

COMPONENT Dummy #ES2-001 Velocity 11 42 FT/SEC 3 48 M/SEC

Minimum 32 87 DEG at 165 msec Maximum - 58 98 DEG at 58 9 msec

FLEXION ANGLE

1 ——— 0009520T D08 Filterclass (1000)



TIME (SEC)

MCA Research  
08 10 2000 16 08

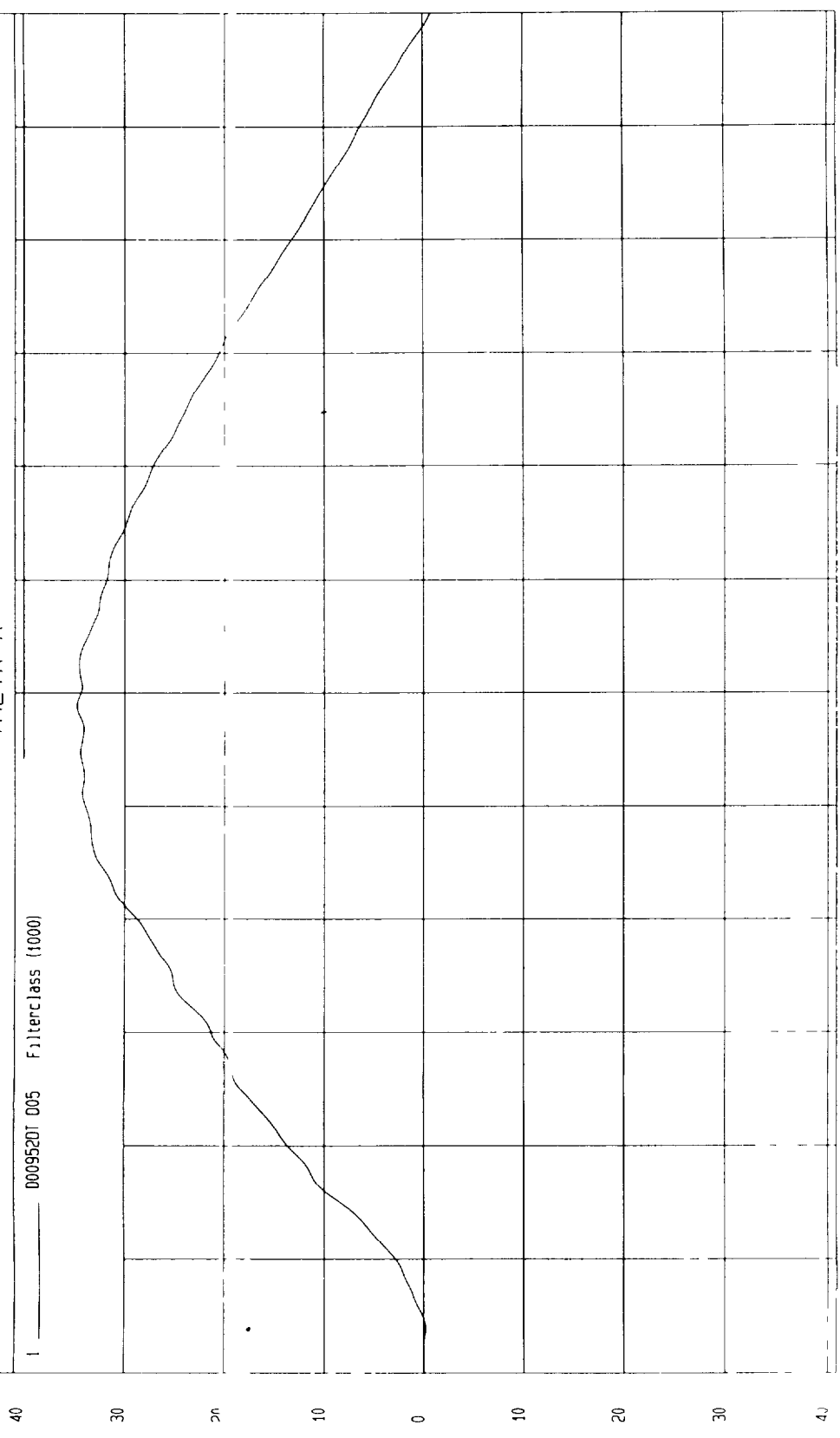
DEG

TEST Dummy Calibration - Neck Bending TEST DATE 08-10-2000 - 16 03 01  
 COMPONENT Dummy #ES2-001 Velocity 11 42 FT/SEC 3 48 M/SEC

Minimum = 18 94 DEG at 165 msec Maximum 34 70 DEG at 58 9 msec

THETA A

1 ——— 0009520T 005 Filterclass (1000)



MGA Research  
08 10 2000 16 08

DEG

TIME (SEC)

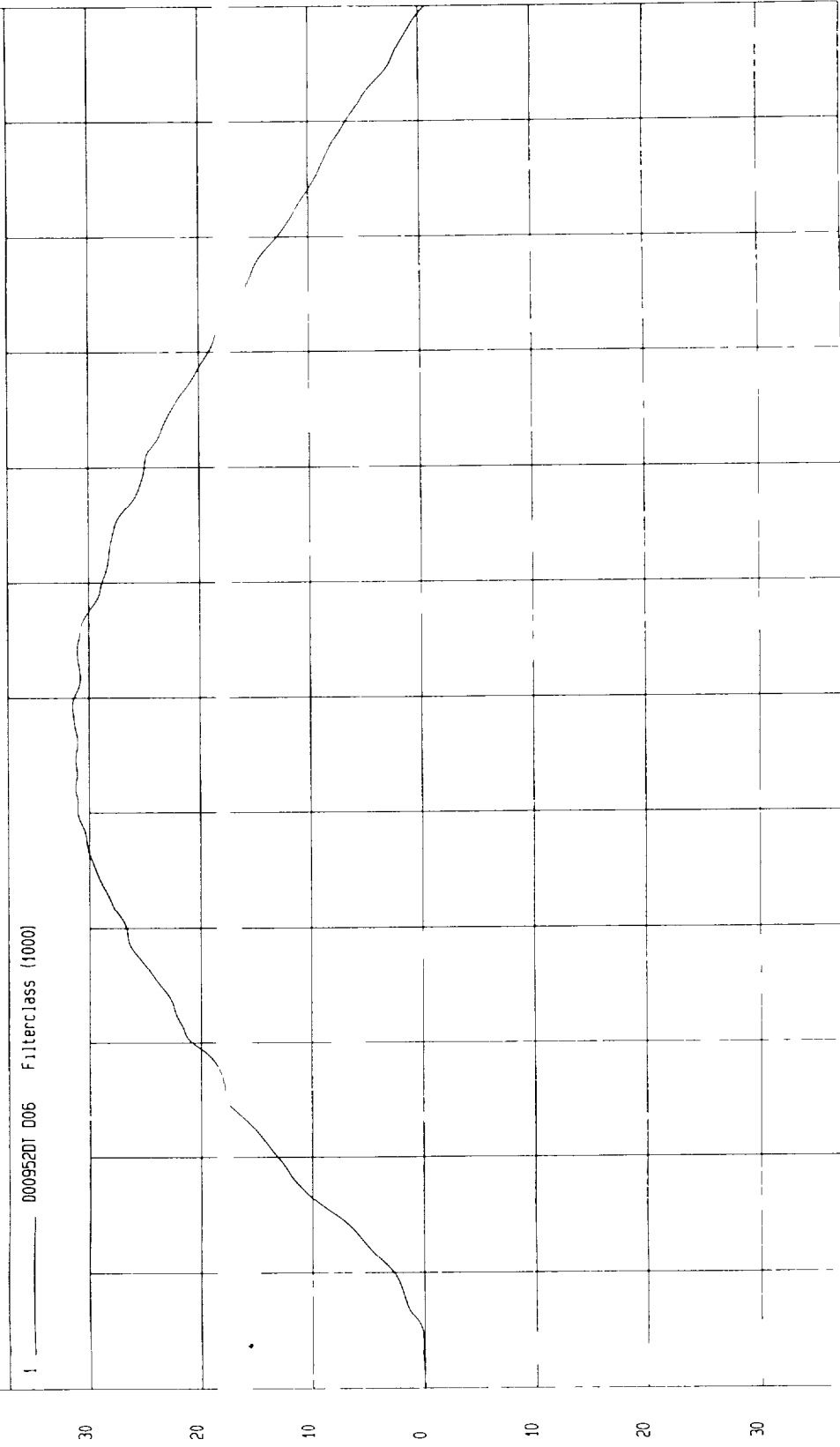
TEST Dummy Calibration - Neck Bending TEST DATE 08-10-2000 - 16 03 01

COMPONENT Dummy #ES2-001 Velocity 11 42 FT/SEC 3 48 M/SEC

Minimum 20 01 DEG at 166 msec Maximum 31 46 DEG at 59 3 msec

THETA B

1 0009520T D06 FilterClass (1000)



MCA Research  
08-10-2000 16 08

MGA RESEARCH CORPORATION  
SHOULDER IMPACT TEST  
EUROSID 2 DUMMY

Date August 10, 2000  
Dummy Serial Number ES2-001  
Test Number D00953

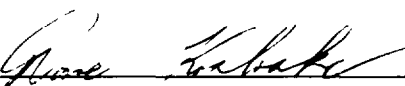
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	51
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	8.9
Time of Max. Pendulum Acceleration		12 ms

TEST MEETS SPECIFICATIONS

Technician



Approved By:



TEST Dummy Calibration - SHOULDER IMPACT TEST DATE 08-10-2000 - 11 26 17

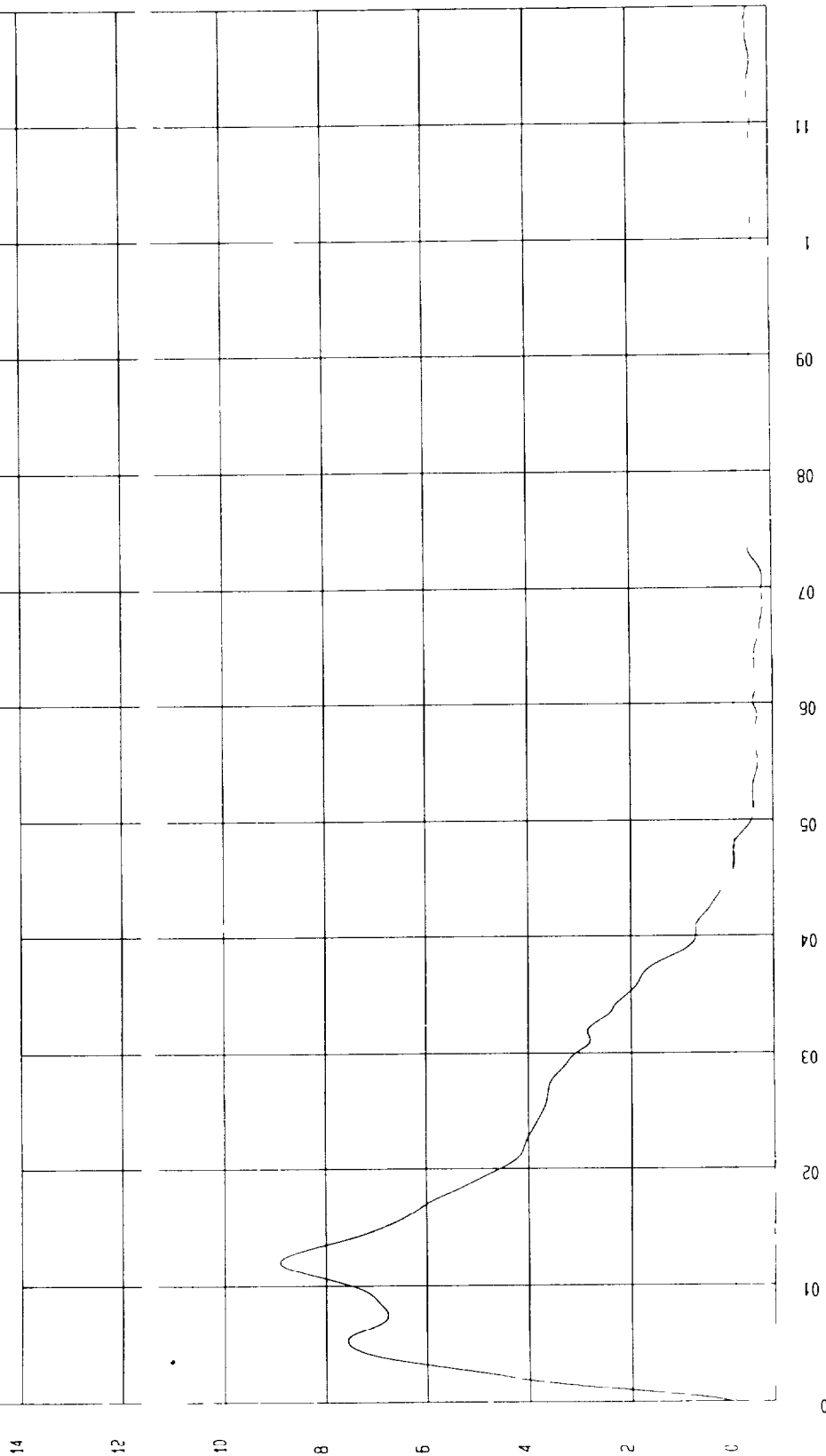
COMPONENT Dummy #ES2-001 Velocity 14 02 FT/SEC 4 27 M/SEC

Minimum - 57 G S at 68.7 msec

Maximum 8 89 G S at 12 msec

PENDULUM ACCELERATION

1 ——— 000953AT A01 Filterclass (1000)



MGA Research  
08-10-2000 11 26

G.S

MGA RESEARCH CORPORATION  
UPPER/MIDDLE/LOWER RIB TESTS  
EUROSID 2 DUMMY

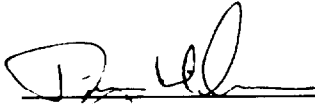
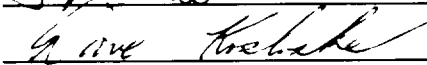
Date August 10, 2000  
Dummy Serial Number ES2-001  
Test Number D00954/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	47
Displacement at 2 m/s	23.5 – 27.5 mm	27.1
Displacement at 3 m/s	36.0 – 40.0 mm	39.4
Displacement at 4 m/s	46.0 – 51.0 mm	50.6

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	47
Displacement at 2 m/s	23.5 – 27.5 mm	27.2
Displacement at 3 m/s	36.0 – 40.0 mm	39.3
Displacement at 4 m/s	46.0 – 51.0 mm	50.8

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	47
Displacement at 2 m/s	23.5 – 27.5 mm	27.3
Displacement at 3 m/s	36.0 – 40.0 mm	40.2*
Displacement at 4 m/s	46.0 – 51.0 mm	52.2*

\* DID NOT MEET SPECIFICATIONS

Technician:   
Approved By 

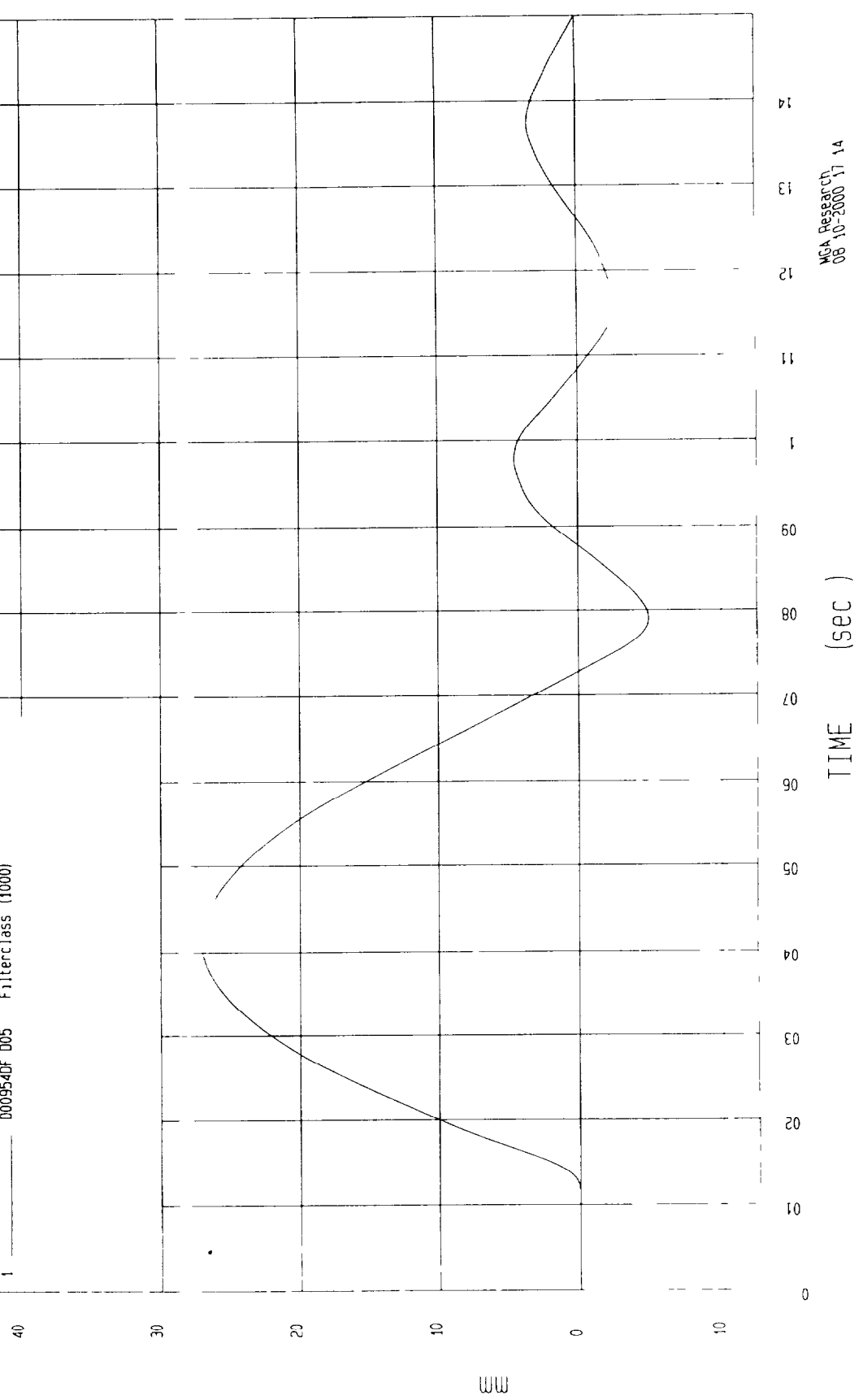
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 17 06 47

COMPONENT Dummy #ES2-001 Velocity 6 56 FT/SEC 2 M/SEC

Minimum - 4 92 mm at 79 1 msec Maximum 27 06 mm at 41 3 msec

UPPER RIB DISPLACEMENT

1 \_\_\_\_\_ 000954DF D05 Filterclass (1000)



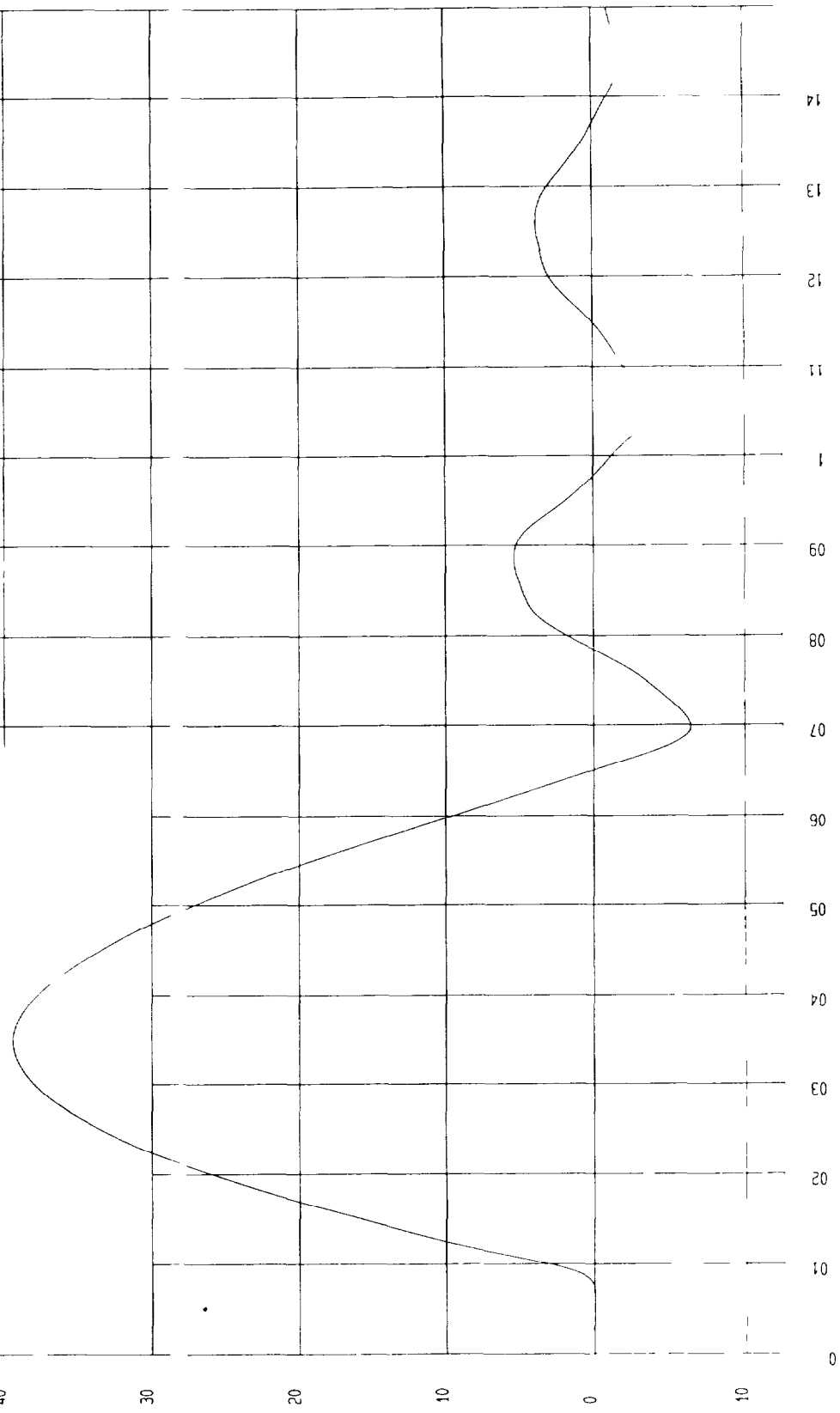
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 17 13 54

COMPONENT Dummy #ES2-001 Velocity 9 84 FT/SEC 3 M/SEC

Minimum 6 35 mm at 69 9 msec Maximum 39 39 mm at 34 8 msec

UPPER RIB DISPLACEMENT

1 0009540F 006 Filterclass (1000)



MCA Research  
08-10-2000 17 14

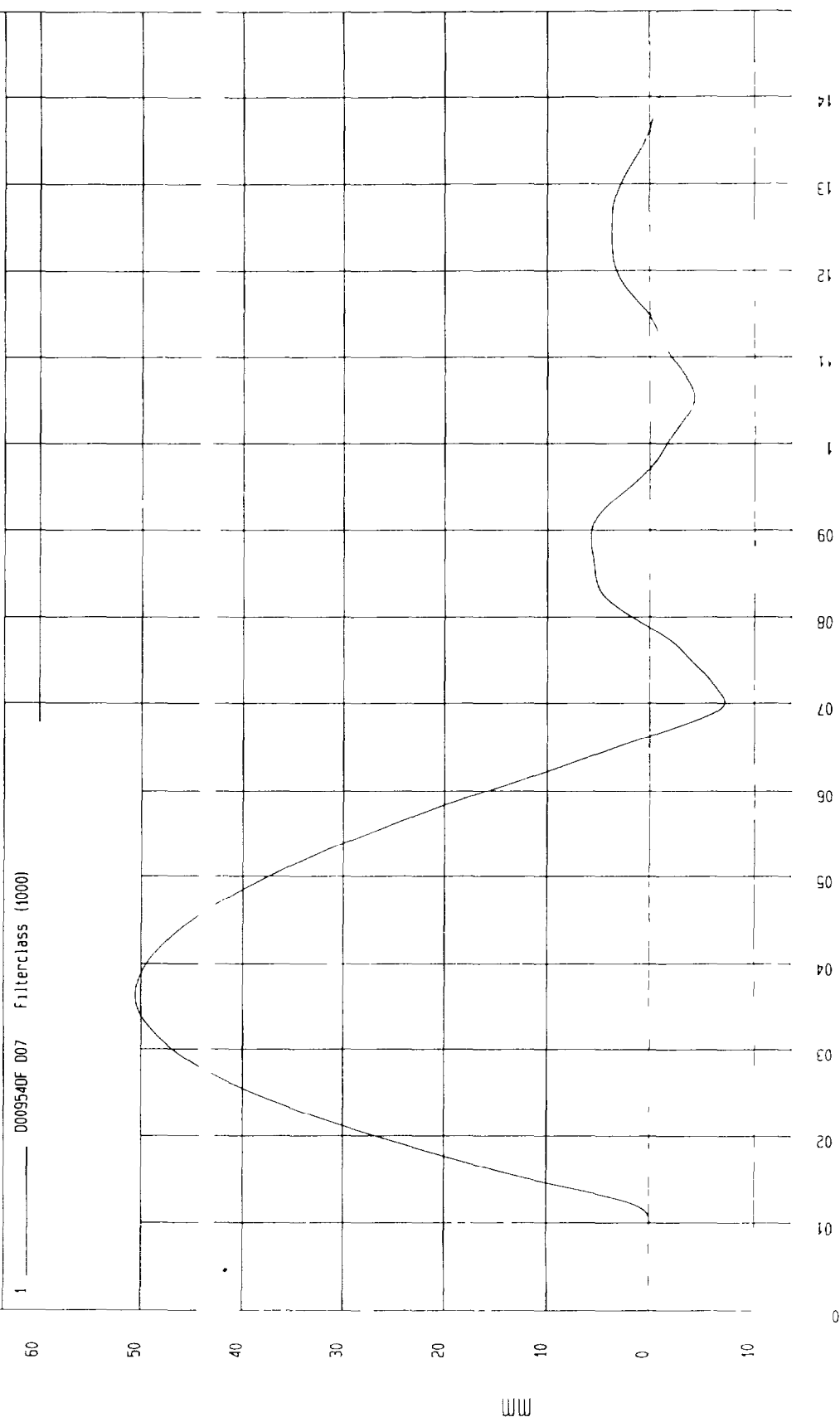
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 16 58 12

COMPONENT Dummy #ES2-001 Velocity 13 12 FT/SEC 4 M/SEC

Minimum 7 14 mm at 70 2 msec Maximum 50 56 mm at 36 3 msec

UPPER RIB DISPLACEMENT

1 ——— 0009540F 007 filterclass (1000)



WCA Resacct  
08-10-2000 17 14

TIME (sec)

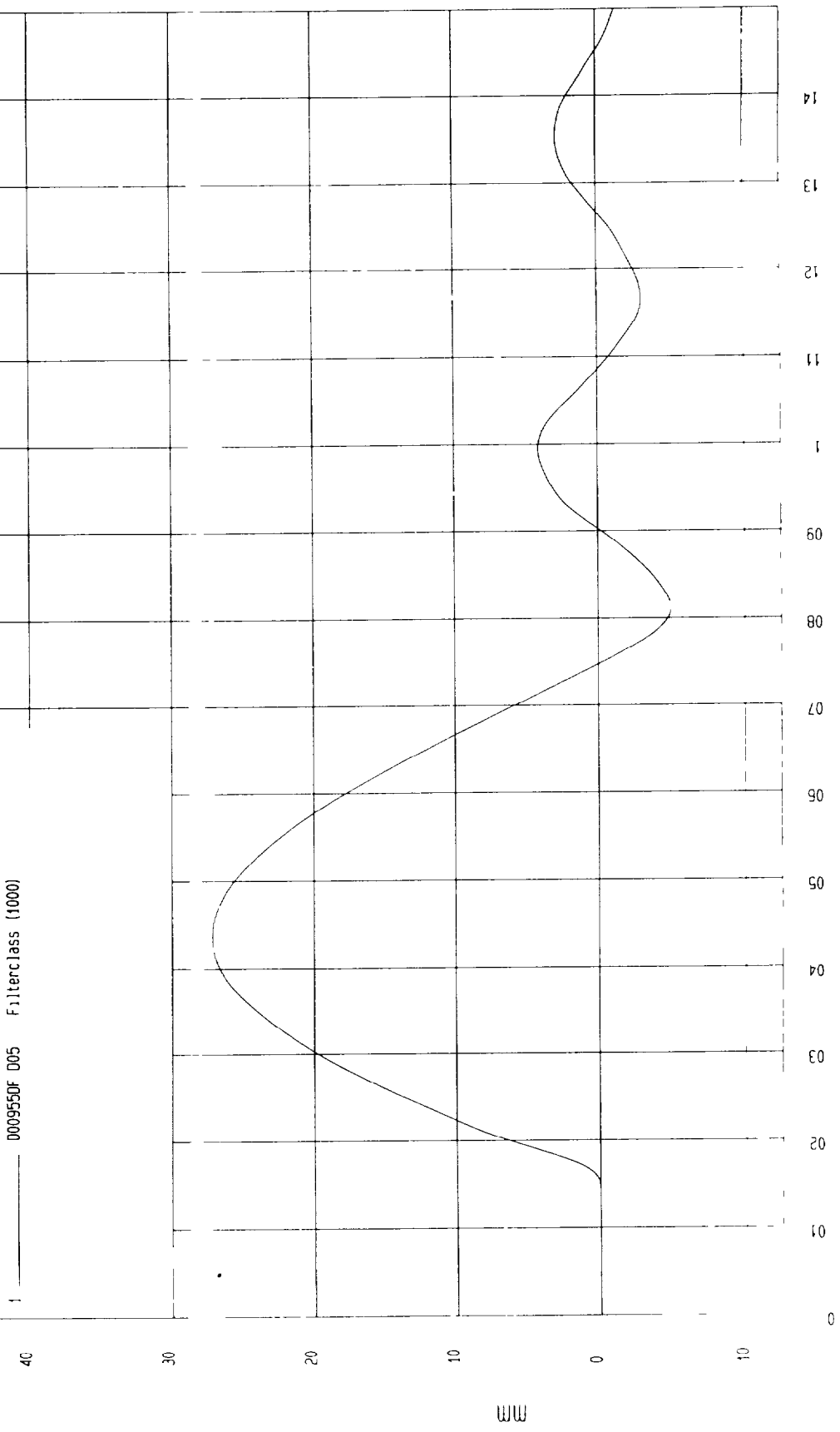
mm

TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 17 37 25  
COMPONENT Dummy #ES2-001 Velocity 6 56 FT/SEC 2 M/SEC

Minimum - 4 96 mm at 81 2 msec Maximum - 27 18 mm at 43 5 msec

MIDDLE RIB DISPLACEMENT

1 0009550F 005 Filterclass (1000)



MGA Research  
08-10-2000 17 48

TIME (sec)

mm

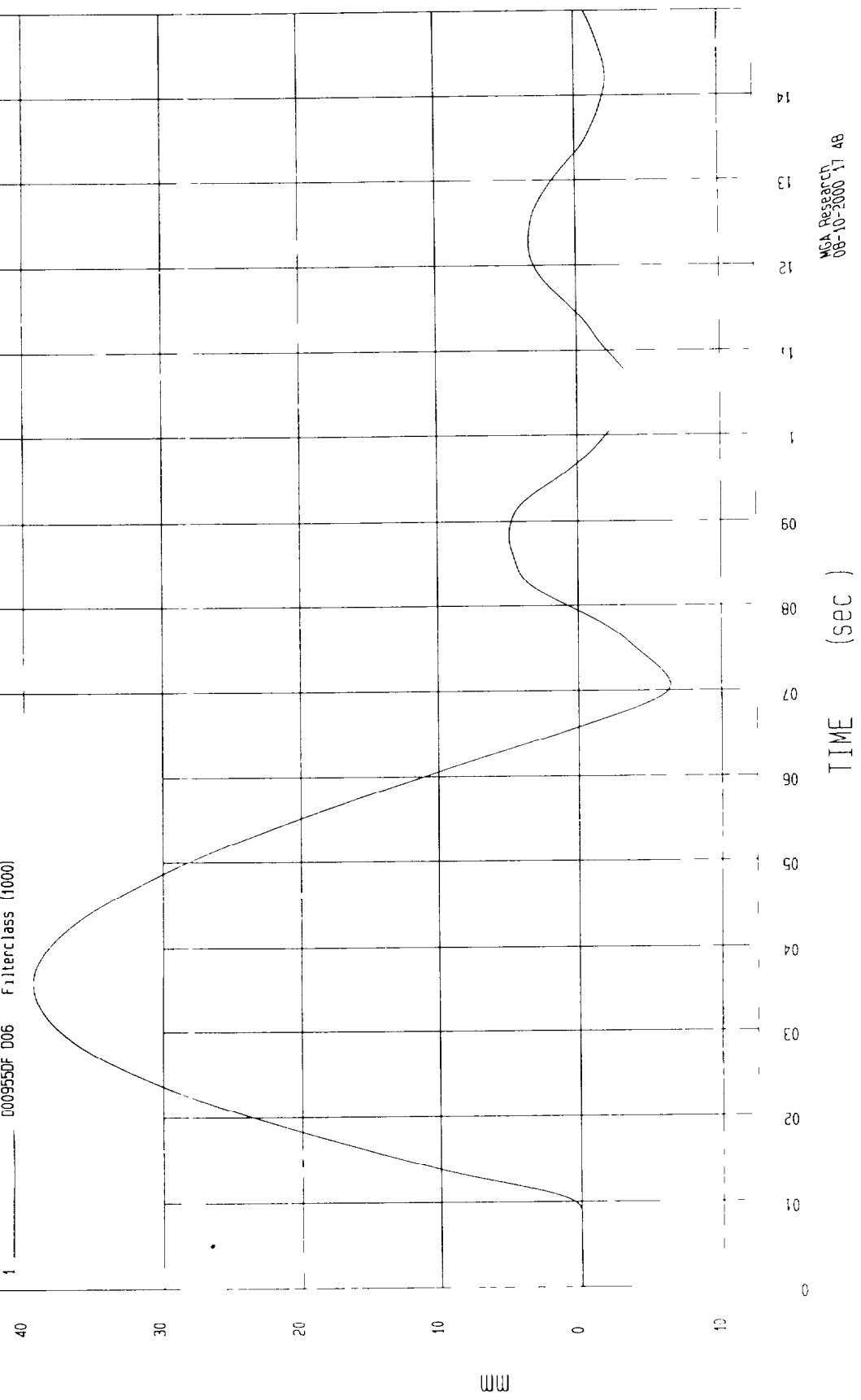
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 17 48 03

COMPONENT Dummy #ES2-001 Velocity 9 84 FT/SEC 3 M/SEC

Minimum 6 39 mm at 70 7 msec Maximum - 39 34 mm at 35 8 msec

MIDDLE RIB DISPLACEMENT

1 000955DF D06 Filterclass (1000)



MCA Research  
08-10-2000 17 48

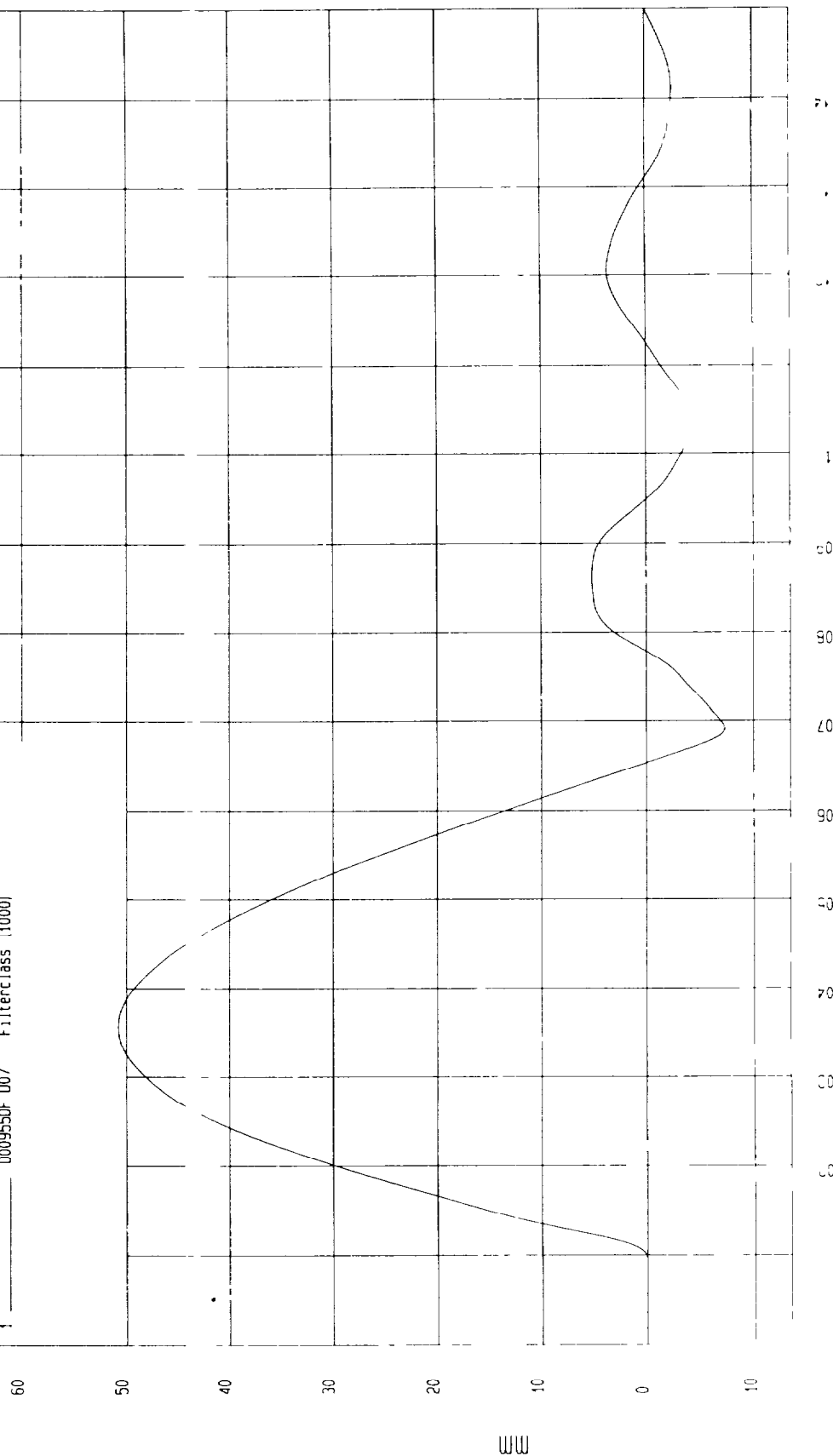
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 17 27 24

COMPONENT Dummy #ES2-001 Velocity 13 12 FT/SEC 4 M/SEC

Minimum 7 24 mm at 69 2 msec Maximum 50 78 mm at 35 5 msec

MIDDLE RIB DISPLACEMENT

1 0009550F 007 Filterclass (1000)



MCA Research  
08 10 2000 17 48

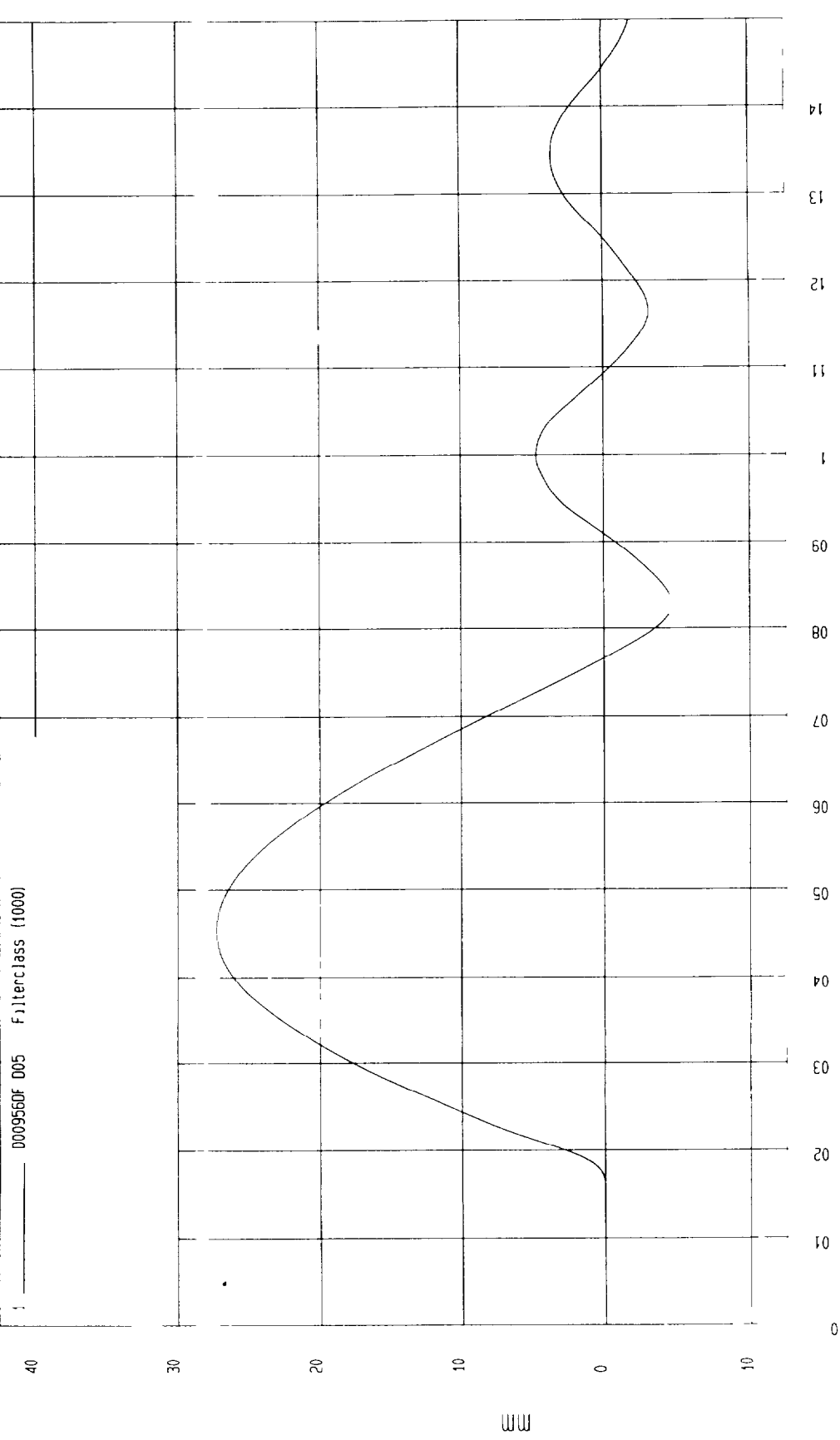
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 02 48

COMPONENT Dummy #ES2-001 Velocity 6 56 FT/SEC 2 M/SEC

Minimum 4 67 mm at 82 8 msec Maximum 27 26 mm at 45 5 msec

LOWER RIB DISPLACEMENT

1 0009560F 005 Filterclass (1000)



MGA Research  
08 10 2000 18 10

TIME (sec )

mm

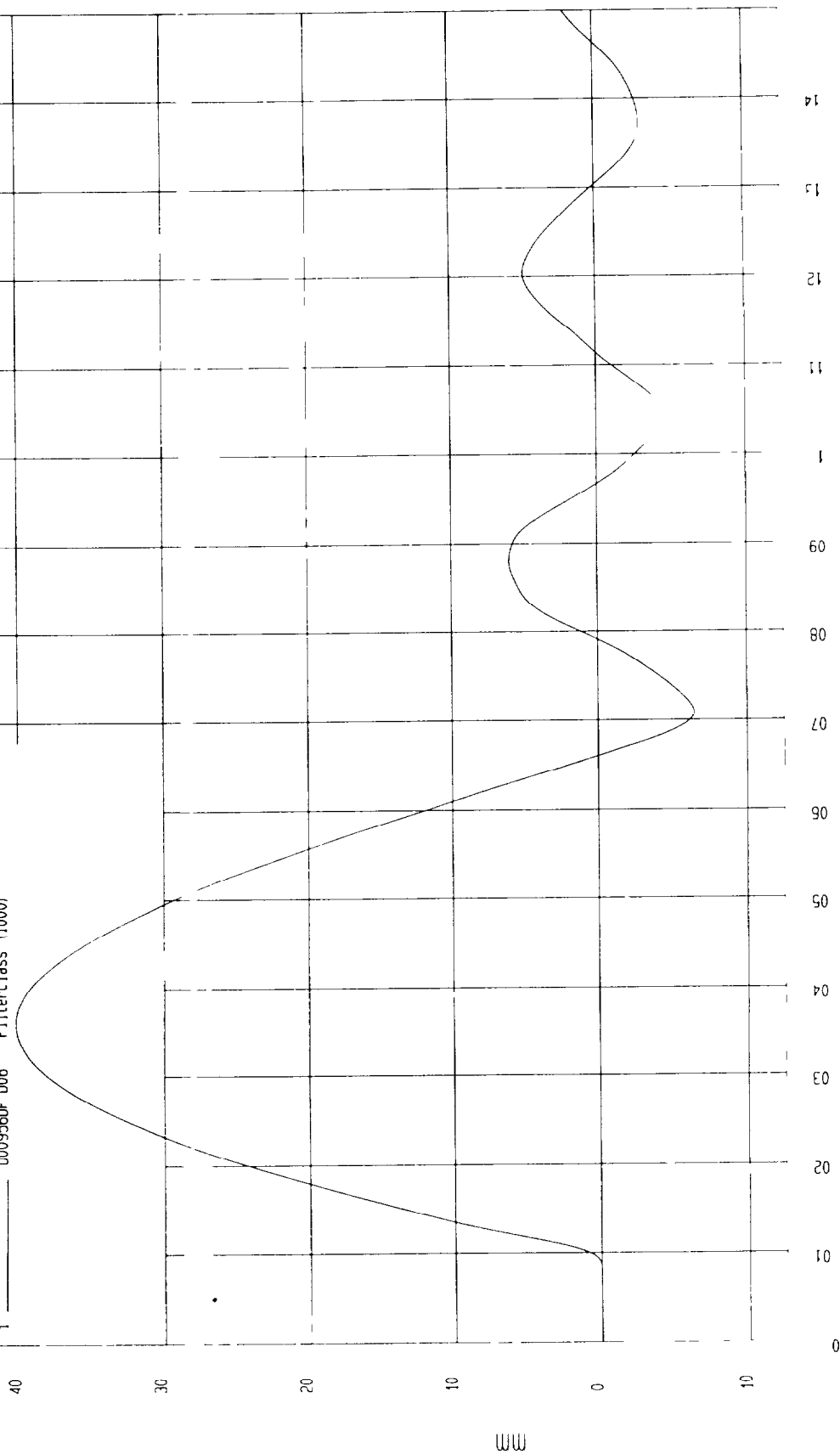
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 10 02

COMPONENT Dummy #ES2-001 Velocity 9 84 FT/SEC 3 M/SEC

Minimum 6.42 mm at 70.9 msec Maximum 40.17 mm at 36.1 msec

LOWER RIB DISPLACEMENT

1 0009560F D06 Filterclass (1000)



MGA Research  
08 10 2000 18 10

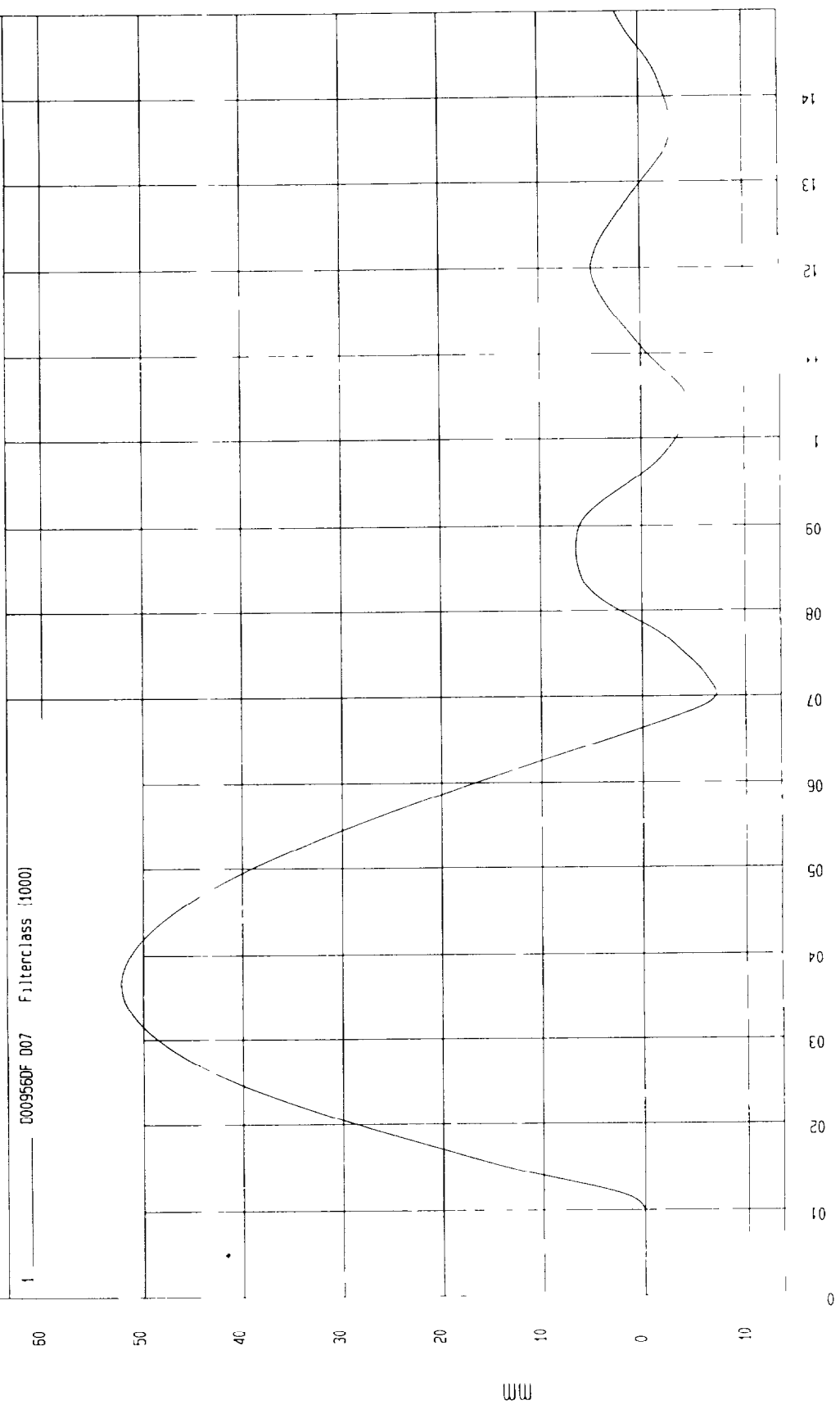
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 17 52 33

COMPONENT Dummy #ES2-001 Velocity 13 12 FT/SEC 4 M/SEC

Minimum 7 15 mm at 70 4 msec Maximum 52 17 mm at 36 6 msec

LOWER RIB DISPLACEMENT

1 0009560F 007 Filterclass (1000)



MCA Research  
08-10-2000 18 10

MGA RESEARCH CORPORATION  
 ABDOMEN TEST  
 EUROSID 2 DUMMY

Date August 10, 2000  
 Dummy Serial Number ES2-001  
 Test Number D00957

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	51
Probe Speed (m/s)	6.2 – 6.4	6.3
Maximum Impact Force	9.5 – 11.1 kN	11.0
Time of Maximum Force	8.8 – 10.4 ms	9.2
Maximum Total Abdomen Force	5.9 – 7.9 kN	6.2
Time of Max Total Force	8.5 – 10.1 ms	8.9

TEST MEETS SPECIFICATIONS

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

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

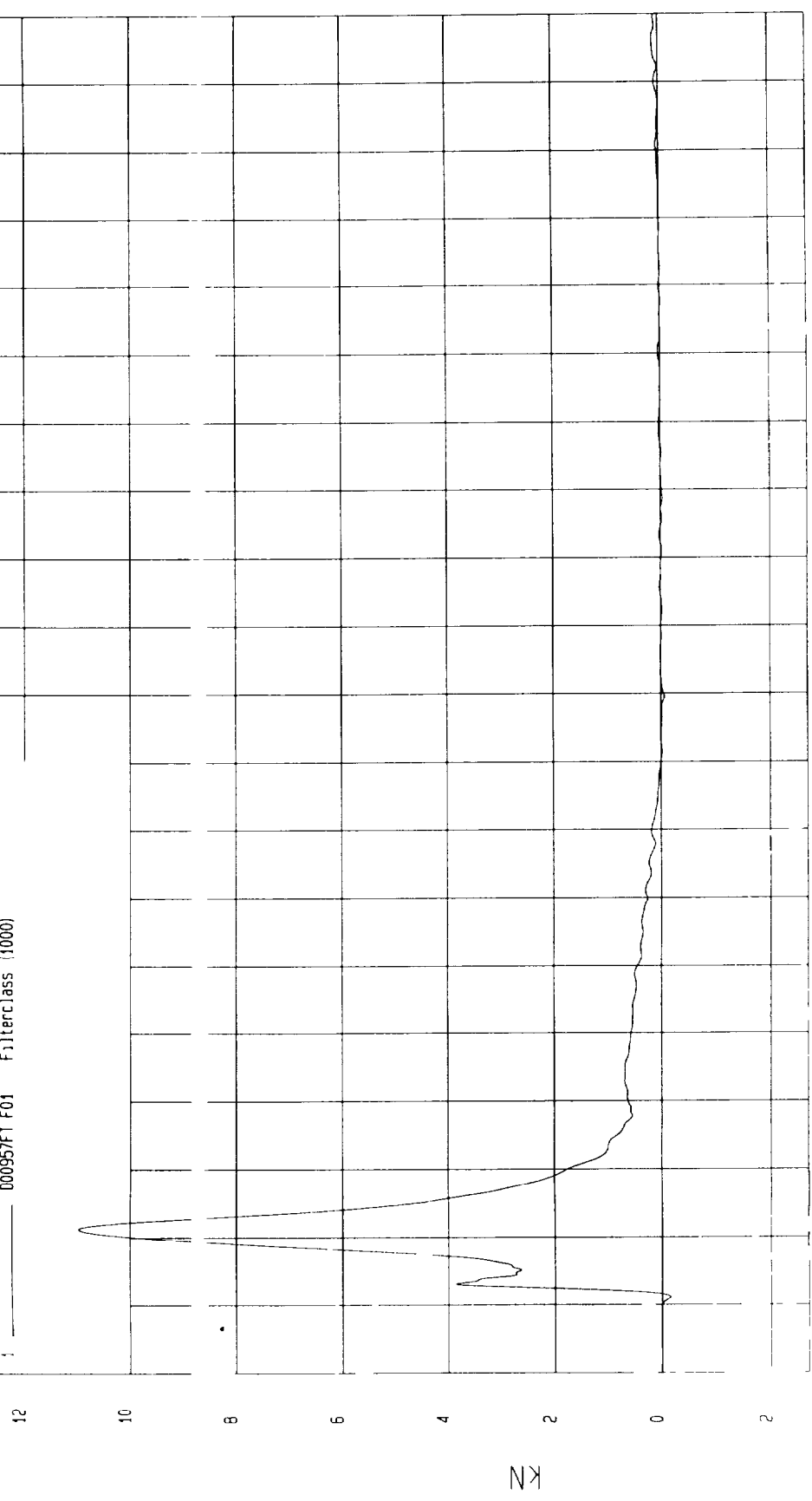
TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-10-2000 - 11 11 33

COMPONENT Dummy #ES2-001 Velocity 20 51 FT/SEC 6 25 M/SEC

Minimum 15 kN at 8 msec Maximum 10 97 kN at 9 2 msec

PROBE FORCE

1 000957F1 F01 FilterClass (1000)



TIME (SEC) MCA Research 08-10-2000 11 13

TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-10-2000 - 11 12 38

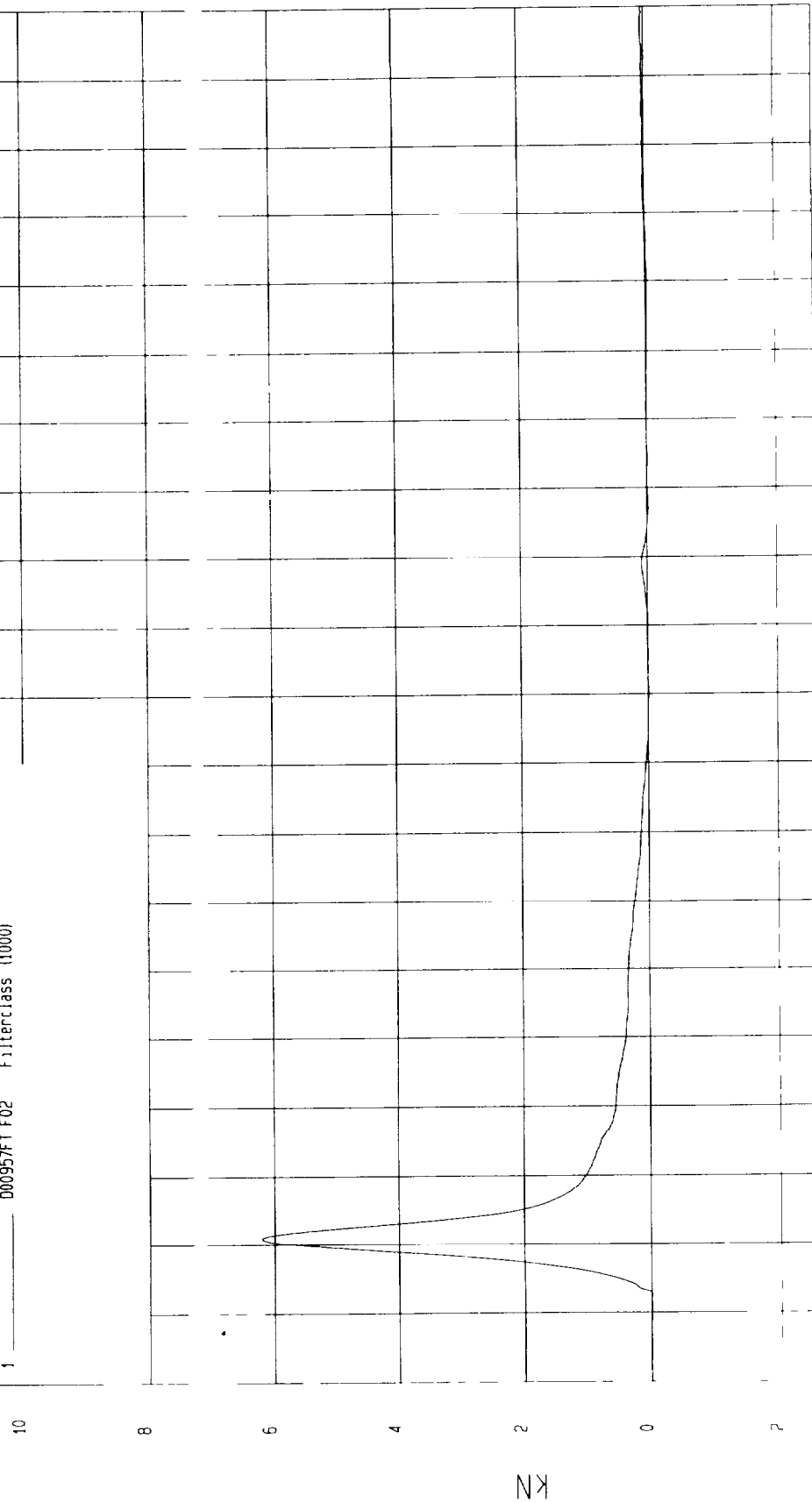
COMPONENT Dummy #ES2-001 Velocity 20 51 FT/SEC 6 25 M/SEC

Minimum 2 69E 02 KN at 148 msec

Maximum 6 20 KN at 8 9 msec

ABDOMEN FORCE

1 000957F1 F02 Filterclass (1000)



TIME (SEC)

MCA Research  
08-10-2000 11 13

MGA RESEARCH CORPORATION  
LUMBAR SPINE TEST  
EUROSID 2 DUMMY

Date: August 10, 2000

Dummy Serial Number. ES2-001

Test Number: D00958

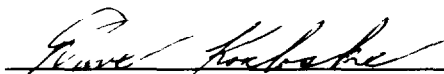
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	47
Pendulum Speed	5.95 – 6.15 m/s	6.07
Max Pendulum Acceleration		-28.6 g's
Time Max Pendulum Acceleration		10.2 ms
Maximum Flexion Angle	45.0 – 55.0 deg	52.4
Time of Max Flexion Angle	39.0 – 53.0 ms	45.1
Maximum Angle Theta (A)	31.0 – 35.0 deg	33.1
Time of Max Theta (A)	45.0 – 55.0 ms	45.1
Maximum Angle Theta (B)	27.0 – 31.0 deg	29.6
Time of Max Theta (B)	45.0 – 55.0 ms	45.7

TEST MEETS SPECIFICATIONS

Technician



Approved By



TEST Dummy Calibration - lumbar flexion TEST DATE 08-10-2000 - 15 09 29

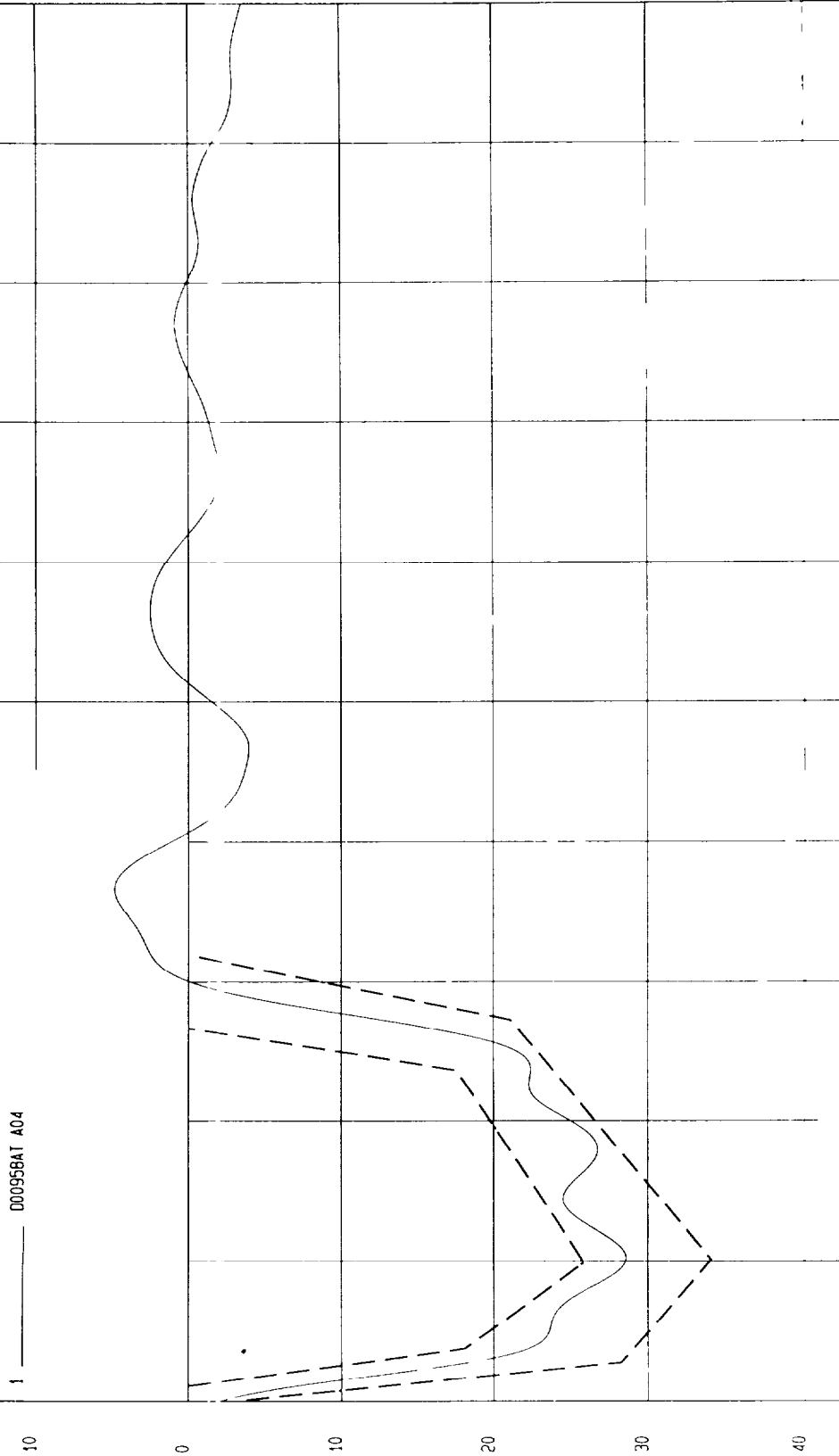
COMPONENT Dummy #ES2-001 Velocity 19 917 FT/SEC 6 07 M/SEC

Minimum = 28 63 G S at 10 2 msec

Maximum 4 83 G S at 36 5 msec

PENDULUM ACCELERATION

1 ——— 000958AT A04



G.S

MGA Research  
08-10-2000 17 59

TIME (sec)

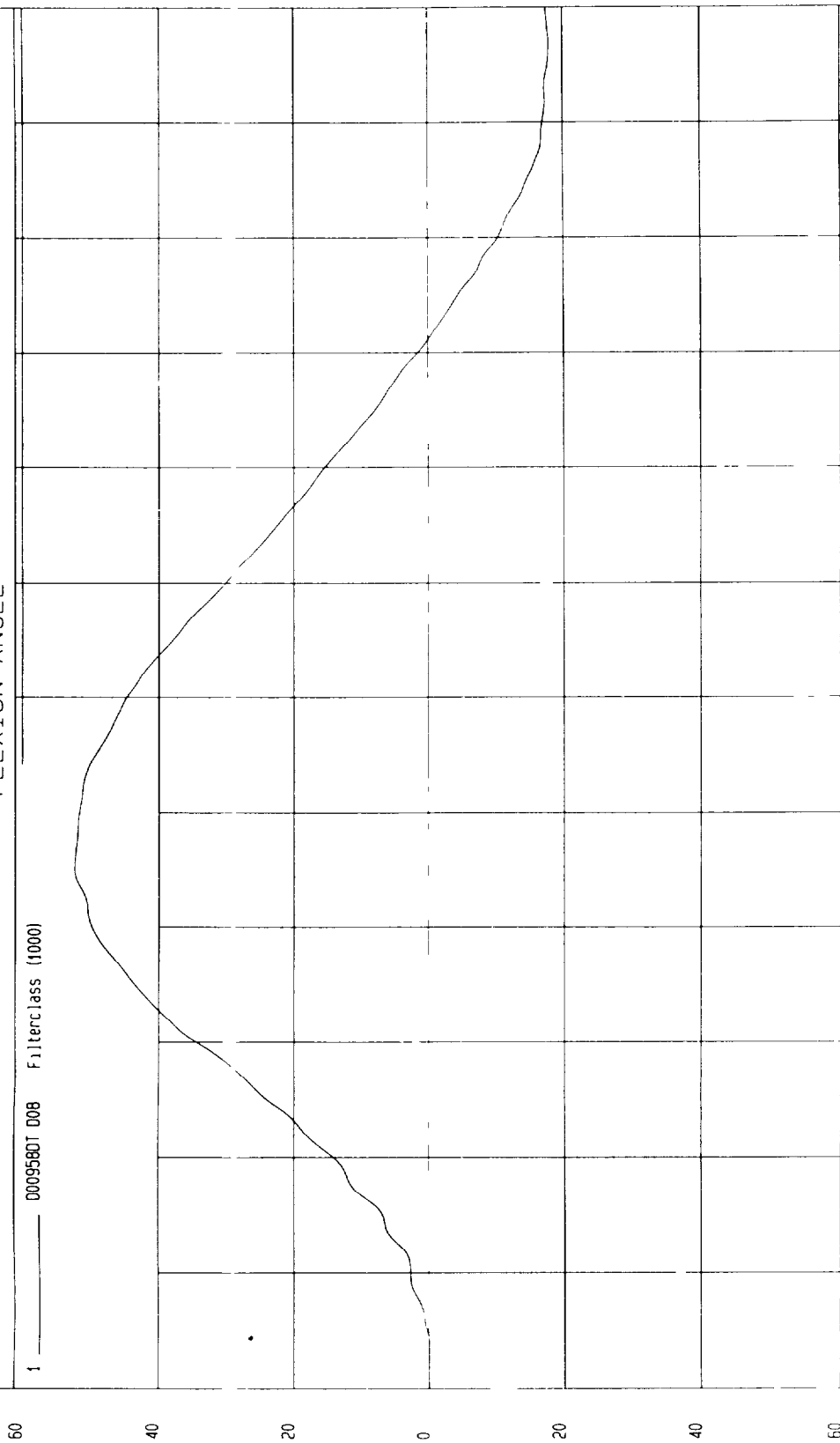
TEST Dummy Calibration - Lumbar Flexion TEST DATE 08-10-2000 - 15 09 29

COMPONENT Dummy #ES2-001 Velocity 19 92 FT/SEC 6 07 M/SEC

Minimum 17 97 DEG at 116 msec Maximum 52 36 DEG at 45 1 msec

FLEXION ANGLE

1 00095801 008 Filterclass (1000)



MCA Research  
08 10 2000 18 00

DEG

TIME (sec)

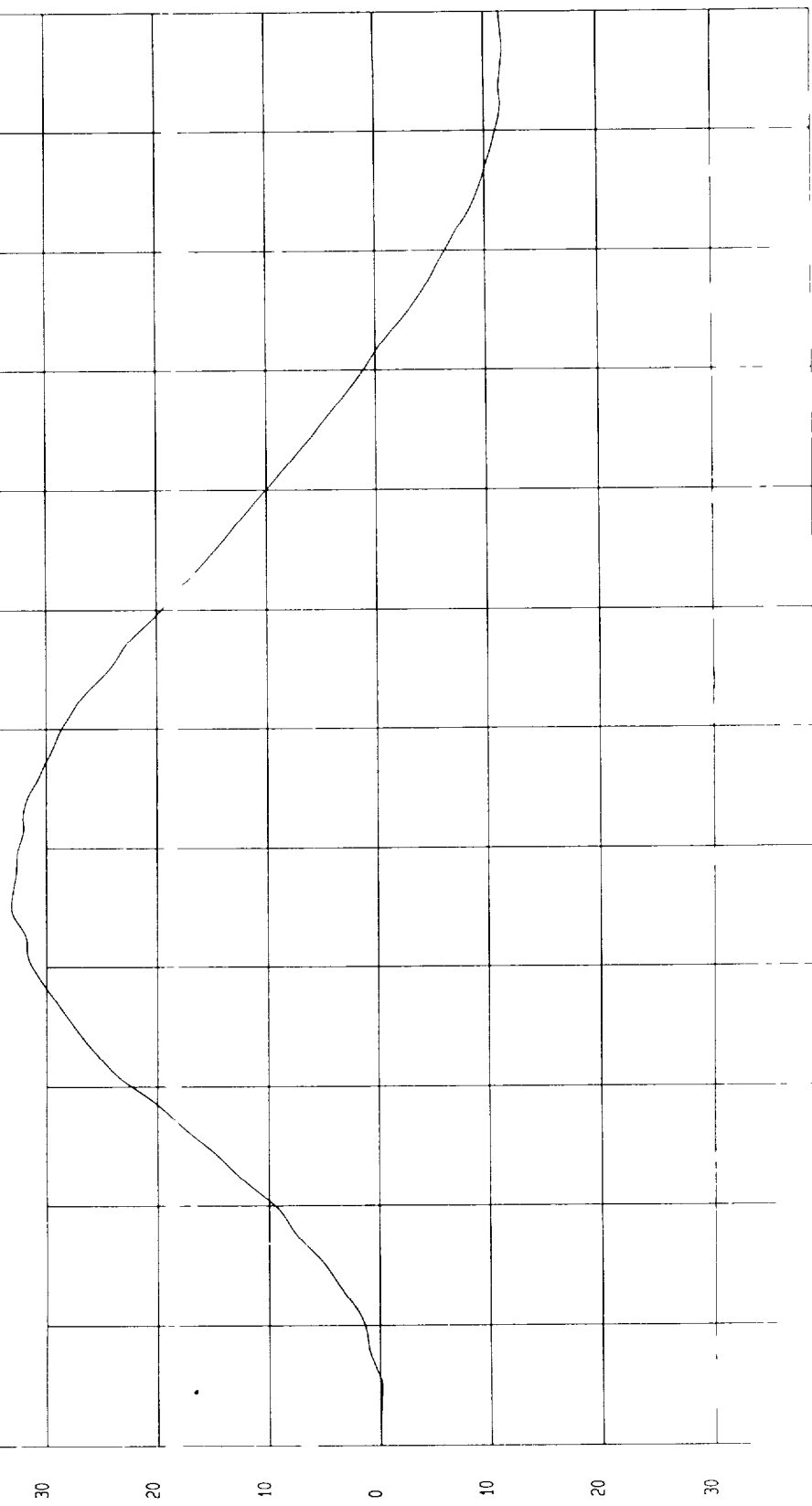
TEST Dummy Calibration - Lumbar Flexion TEST DATE 08-10-2000 - 15 09 29

COMPONENT Dummy #ES2-001 Velocity 19 92 FT/SEC 6 07 M/SEC

Minimum - 11 63 DEG at 117 msec Maximum 33 14 DEG at 45 1 msec

THETA A

1 ——— D0095BDT D05 Filterclass (1000)



MCA Research  
08 10 2000 18 00

DEG

TIME (SEC)

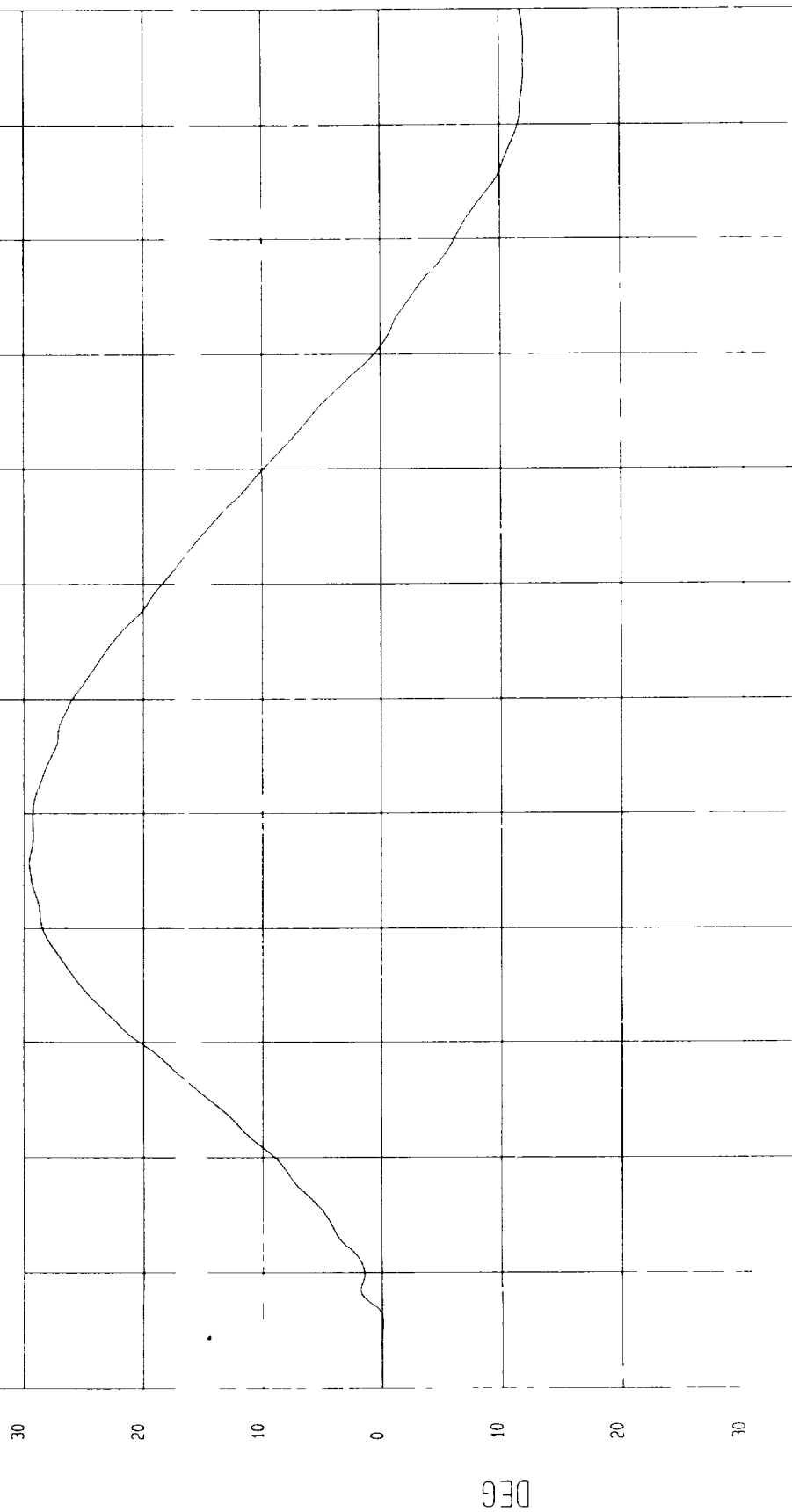
TEST Dummy Calibration - Lumbar Flexion TEST DATE 08-10-2000 - 15 09 29

COMPONENT Dummy #ES2-001 Velocity 19 92 FT/SEC 6 07 M/SEC

Minimum 12 02 DEG at 117 msec Maximum 29 55 DEG at 45 7 msec

THETA B

1 0005601 D06 Filterclass (1000)



MGA Research  
08 10 2000 18 00

TIME (SEC)

DEG

## MGA RESEARCH CORPORATION


## PELVIS TEST

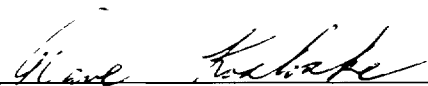
## EUROSID 2 DUMMY

Date August 10, 2000  
 Dummy Serial Number ES2-001  
 Test Number D00959

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	51
Pendulum Speed	4.2 – 4.4 m/s	4.3
Maximum Impactor Force	4.4 – 5.1 kN	5.1
Time of Max Impactor Force	10.3 – 15.5 ms	14.1
Maximum Pubic Force	1.04 – 1.64 kN	1.38
Time of Max Pubic Force	9.9 – 15.9 ms	15.8

TEST MEETS SPECIFICATIONS

Technician 

Approved By 

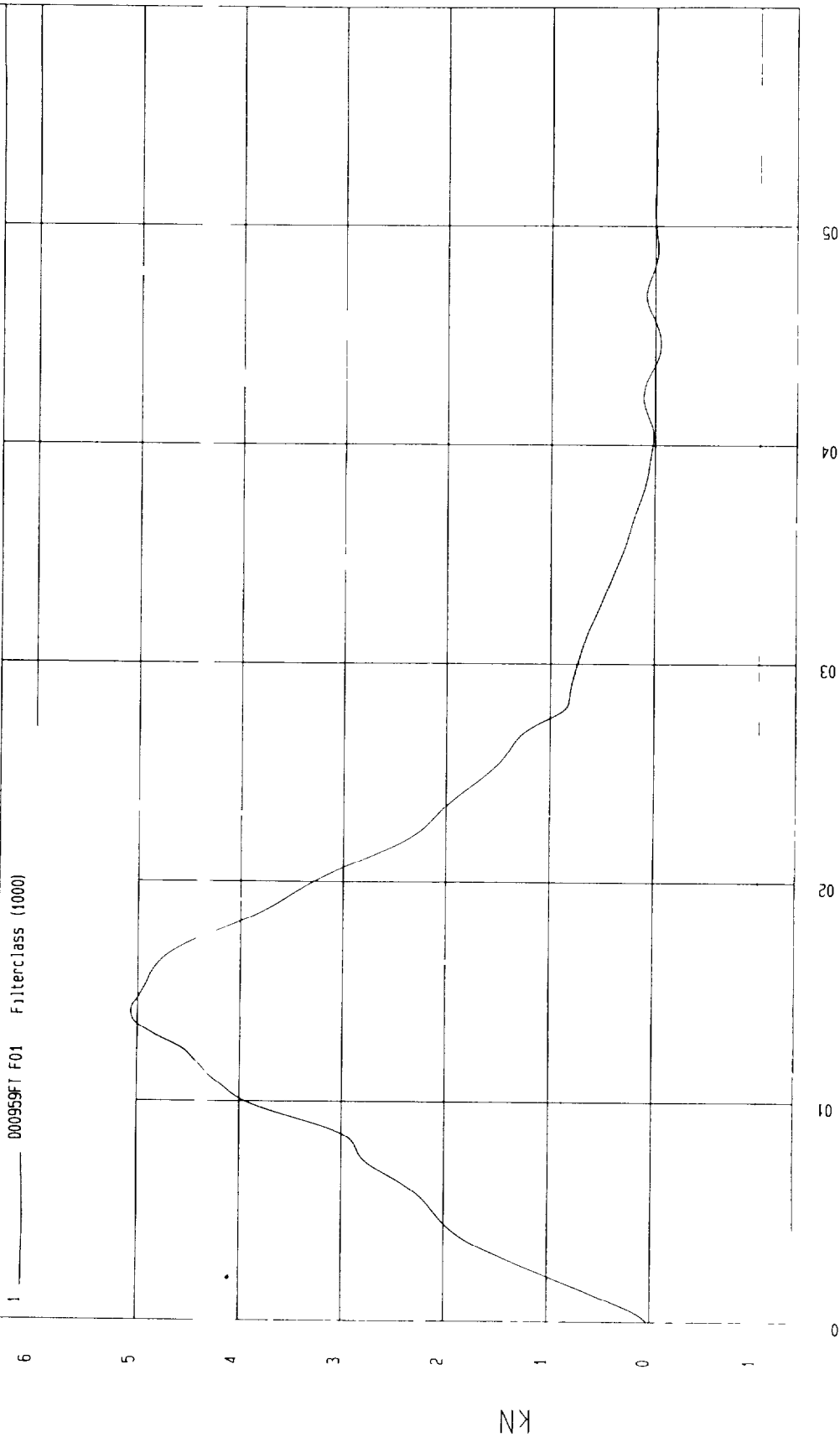
TEST Dummy Calibration - Pelvis Impact TEST DATE 08-10-2000 - 11 48 14

COMPONENT Dummy #ES2-001 Velocity 14 1 FT/SEC 4 3 M/SEC

Minimum = -5.37E-02 kN at 44.6 msec Maximum 5.06 kN at 14.1 msec

IMPACTOR FORCE

1 ——— 000959FT F01 Filterclass (1000)



TEST Dummy Calibration - Pelvis Impact TEST DATE 08-10-2000 - 11 48 45

COMPONENT Dummy #ES2-001 Velocity 14 1 FT/SEC 4 3 M/SEC

Minimum 4 40E-02 kN at 39 8 msec Maximum 1 38 kN at 15 8 msec

PUBIC FORCE

1 000959FT F02 Filterclass (1000)

2  
18  
16  
14  
12  
10  
8  
6  
4  
2  
0  
2  
4  
6  
8  
KN



CERTIFICATION DATA

Dummy Serial Number ES2-002

Calibration Test Results SummaryDummy 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 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 10, 2000

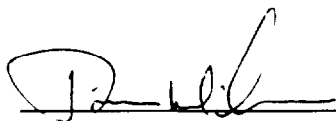
Dummy Serial Number ES2-002

Test Number D00961

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	48
Peak Resultant Acceleration	100 – 150 g's	136
Time of Max Res Acceleration		29 ms

TEST MEETS SPECIFICATIONS

Technician



Approved By



TEST Dummy Calibration - Head Drop TEST DATE 08-10-2000 - 14 37 02

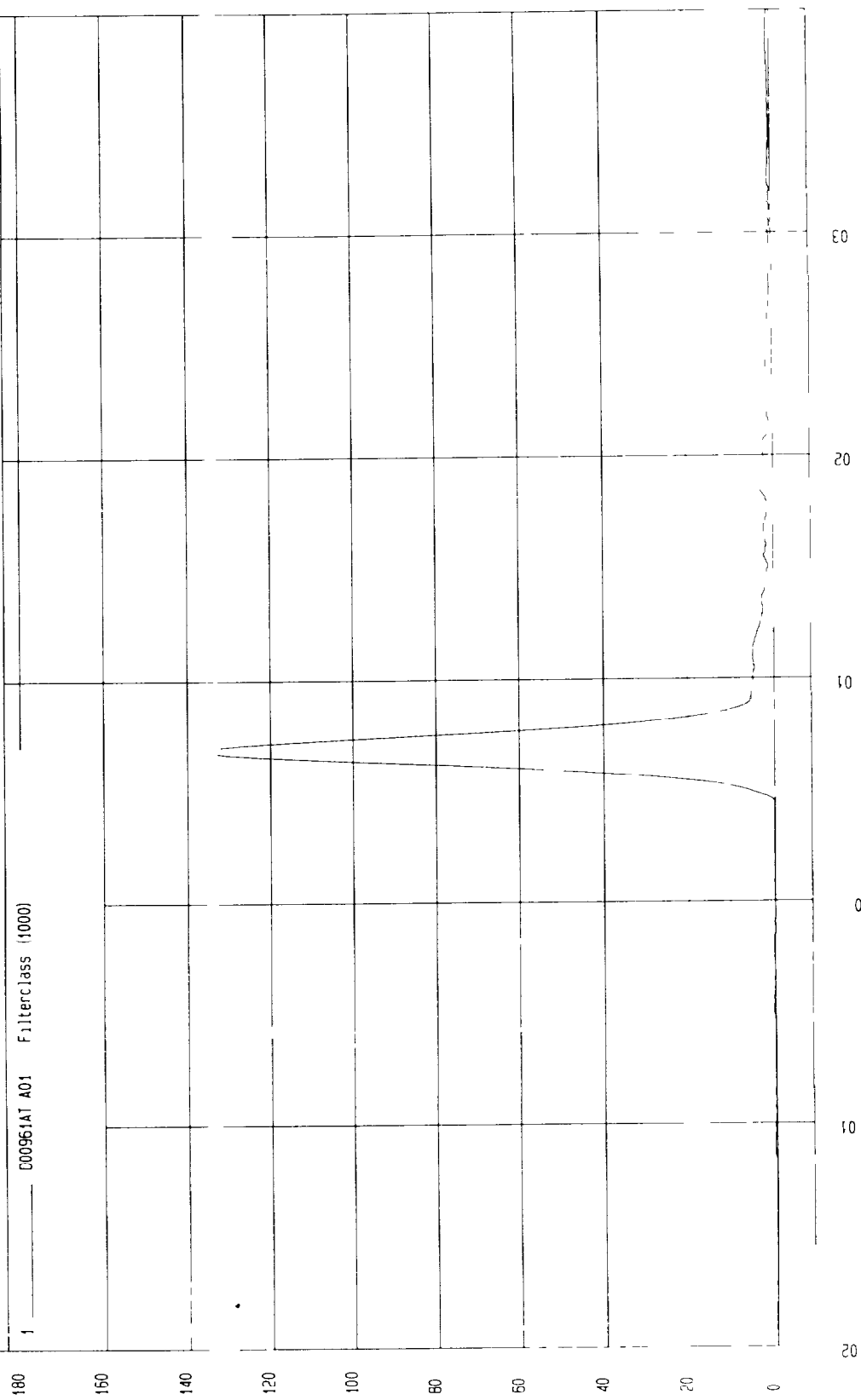
COMPONENT Dummy #ES2-002

Minimum 11 G S at 23.7 msec

Maximum 136.07 G S at 2.9 msec

PEAK RESULTANT ACCELERATION

1 000961AT A01 Filterclass (1000)



MCA Research  
08-10-2000 14 37

MGA RESEARCH CORPORATION  
NECK PENDULUM TEST  
EUROSID 2 DUMMY

Date August 10, 2000  
Dummy Serial Number ES2-002  
Test Number D00962

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	22
Relative Humidity (%)	10 – 70	47
Pendulum Speed	3.3 - 3.5	3.5
Max Pendulum Acceleration		-36.0 g's
Time Max. Pendulum Acceleration		10.0 ms
Maximum Flexion Angle	51.0 – 59.0 deg	61.0 *
Time of Max Flexion Angle	53.0 – 65.0 ms	59.9
Maximum Angle Theta (A)	32.5 – 36.5 deg	35.7
Time of Max Theta (A)	54.0 – 64.0 ms	60.9
Maximum Angle Theta (B)	28.0 – 32.0 deg	32.3 *
Time of Max Theta (B)	54.0 – 64.0 ms	58.2

\* DID NOT MEET SPECIFICATIONS

Technician 

Approved By 

TEST Dummy Calibration - Neck Bending TEST DATE 08-10-2000 - 16 29 02

COMPONENT Dummy #ES2-002 Velocity 11 319 FT/SEC 3 45 M/SEC

Minimum -35.96 G S at 10 msec Maximum 7.98 G S at 46.3 msec

PENDULUM ACCELERATION

1 \_\_\_\_\_ 000962AT A04

10

0

10

20

30

40

G.S

20

10

TIME (SEC)

MGA Research  
08-10-2000 17 41

0

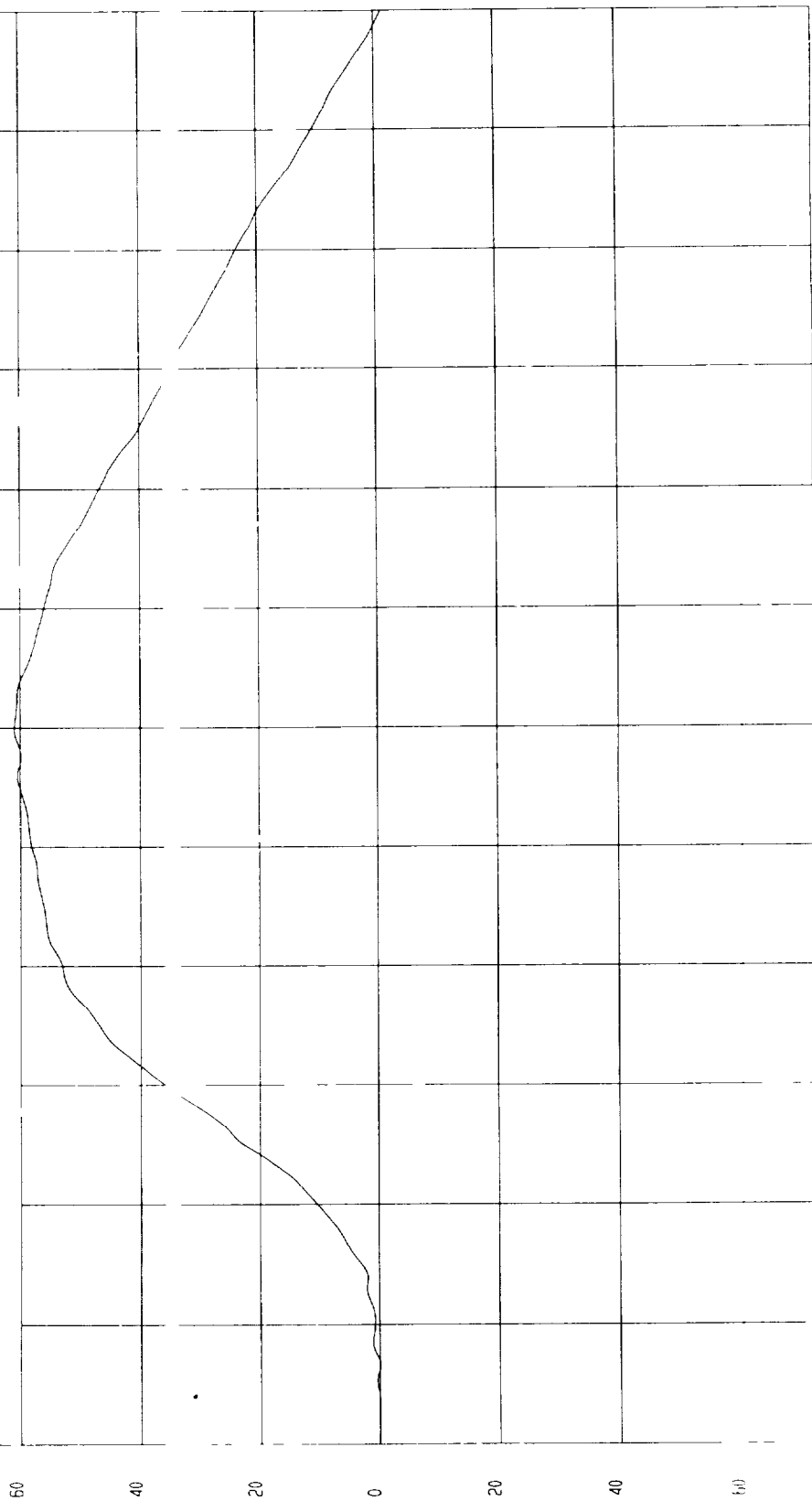
TEST Dummy Calibration - Neck Bending TEST DATE 08-10-2000 - 16 25 22

COMPONENT Dummy #ES2-002 Velocity 11 32 FT/SEC 3 45 M/SEC

Minimum 33 94 DEG at 167 msec Maximum 61 01 DEG at 59 9 msec

FLEXION ANGLE

1 000962DT 008 Filterclass (1000)



MGA Research  
08 10 2000 17 41

DEG

TIME (SEC)

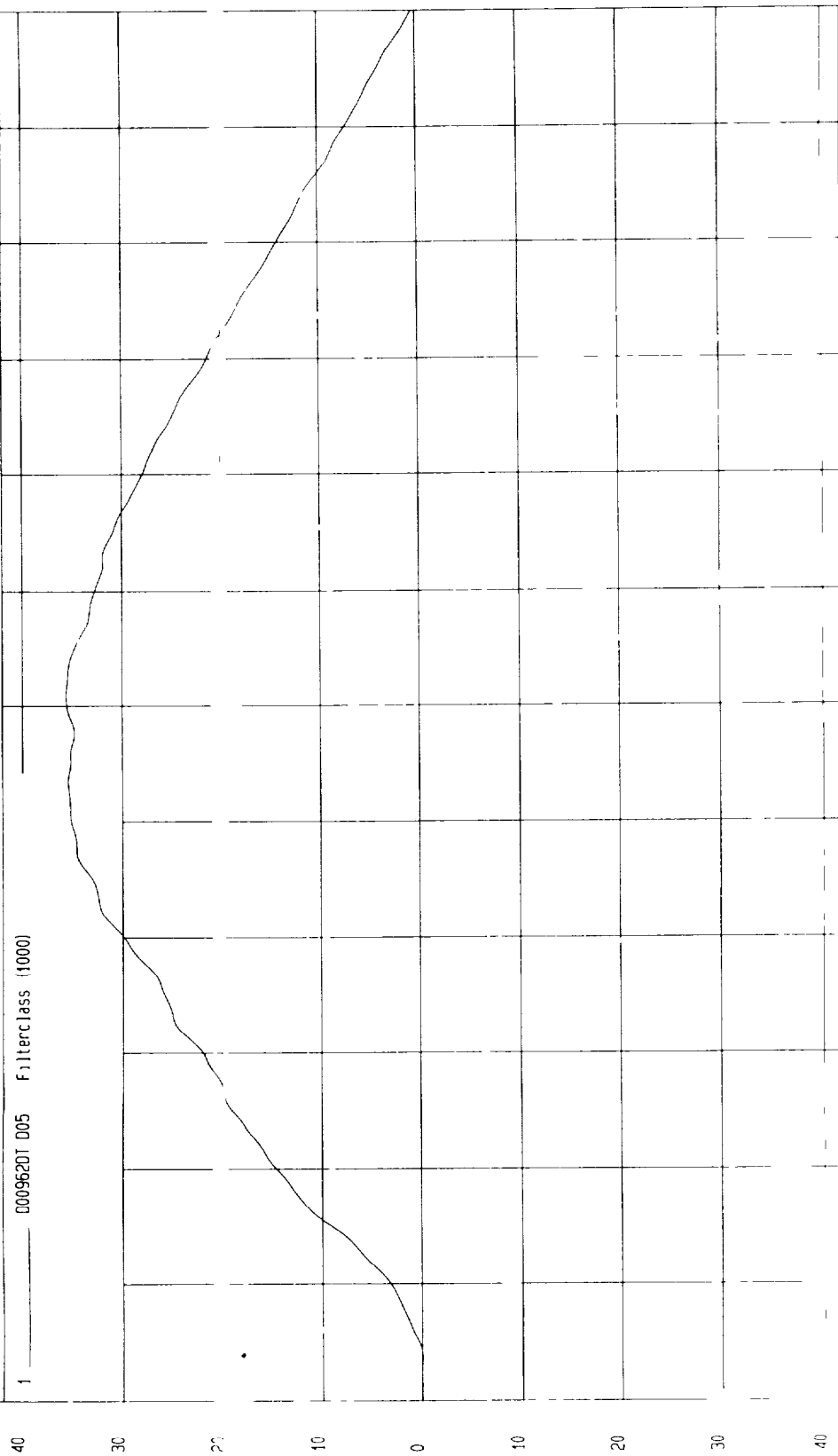
TEST Dummy Calibration - Neck Bending TEST DATE 08-10-2000 - 16 25 22

COMPONENT Dummy #ES2-002 Velocity 11 32 FT/SEC 3 45 M/SEC

Minimum 19 20 DEG at 167 msec Maximum 35 66 DEG at 60 9 msec

THETA A

1 00096201 005 Filterclass (1000)



MCA Research  
08 10 2000 17 41

TIME (SEC)

DEG

TEST Dummy Calibration - Neck Bending TEST DATE 08-10-2000 - 16 25 22

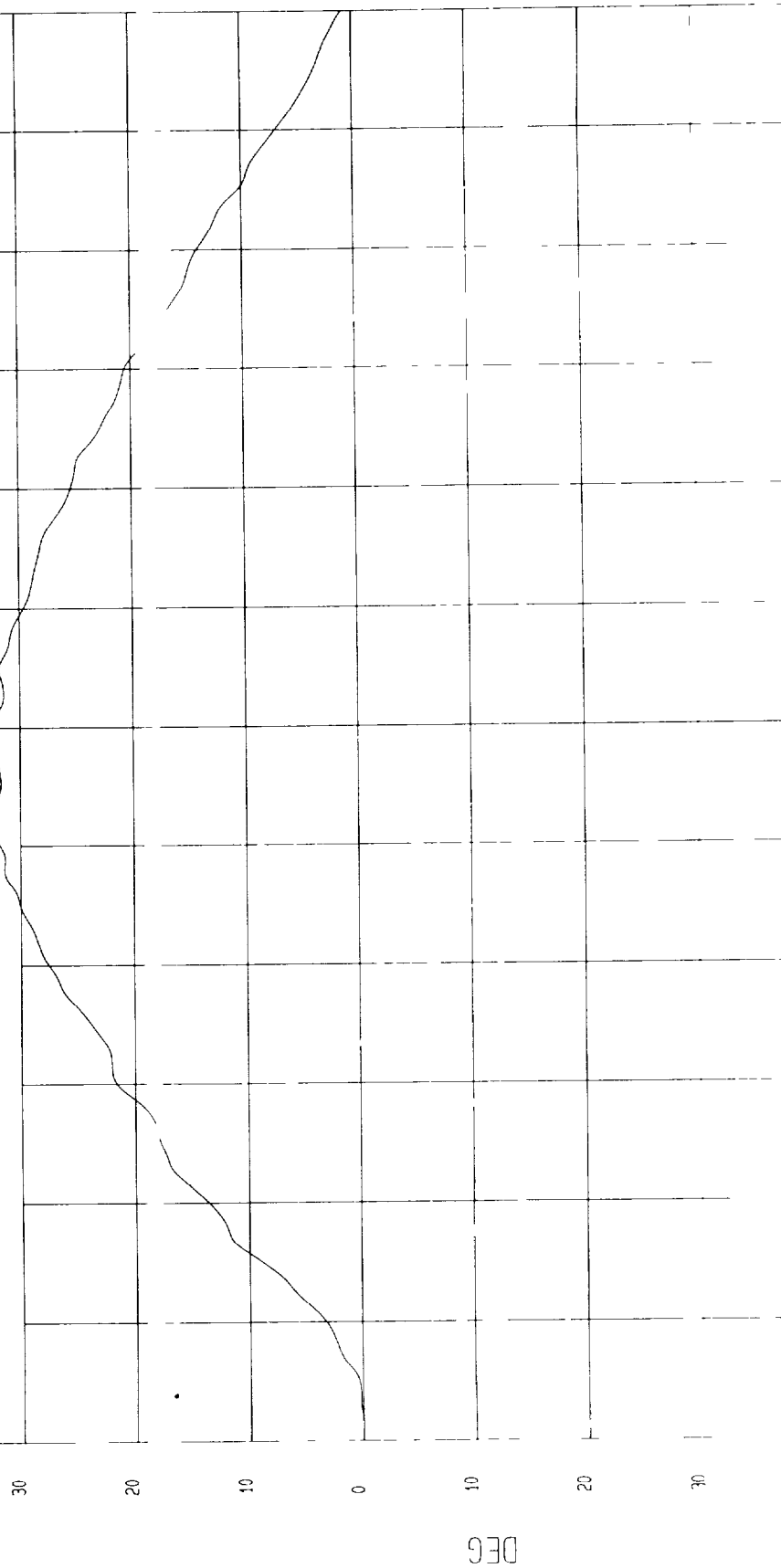
COMPONENT Dummy #ES2-002 Velocity 11 32 FT/SEC 3 45 M/SEC

Minimum 20 56 DEG at 167 msec

Maximum 32 31 DEG at 58 2 msec

THETA B

1 00096201 D06 Filterclass (1000)



MCA Research  
08 10 2000 17 41

TIME (sec)

DEG

MGA RESEARCH CORPORATION  
SHOULDER IMPACT TEST  
EUROSID 2 DUMMY

Date August 10, 2000

Dummy Serial Number ES2-002

Test Number D00963

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	51
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max Resultant Acceleration	7.5 – 10.5 g's	8.3
Time of Max Pendulum Acceleration		5.0 ms

TEST MEETS SPECIFICATIONS

Technician: 

Approved By: 

TEST Dummy Calibration - SHOULDER IMPACT TEST DATE 08-10-2000 - 09 53 57

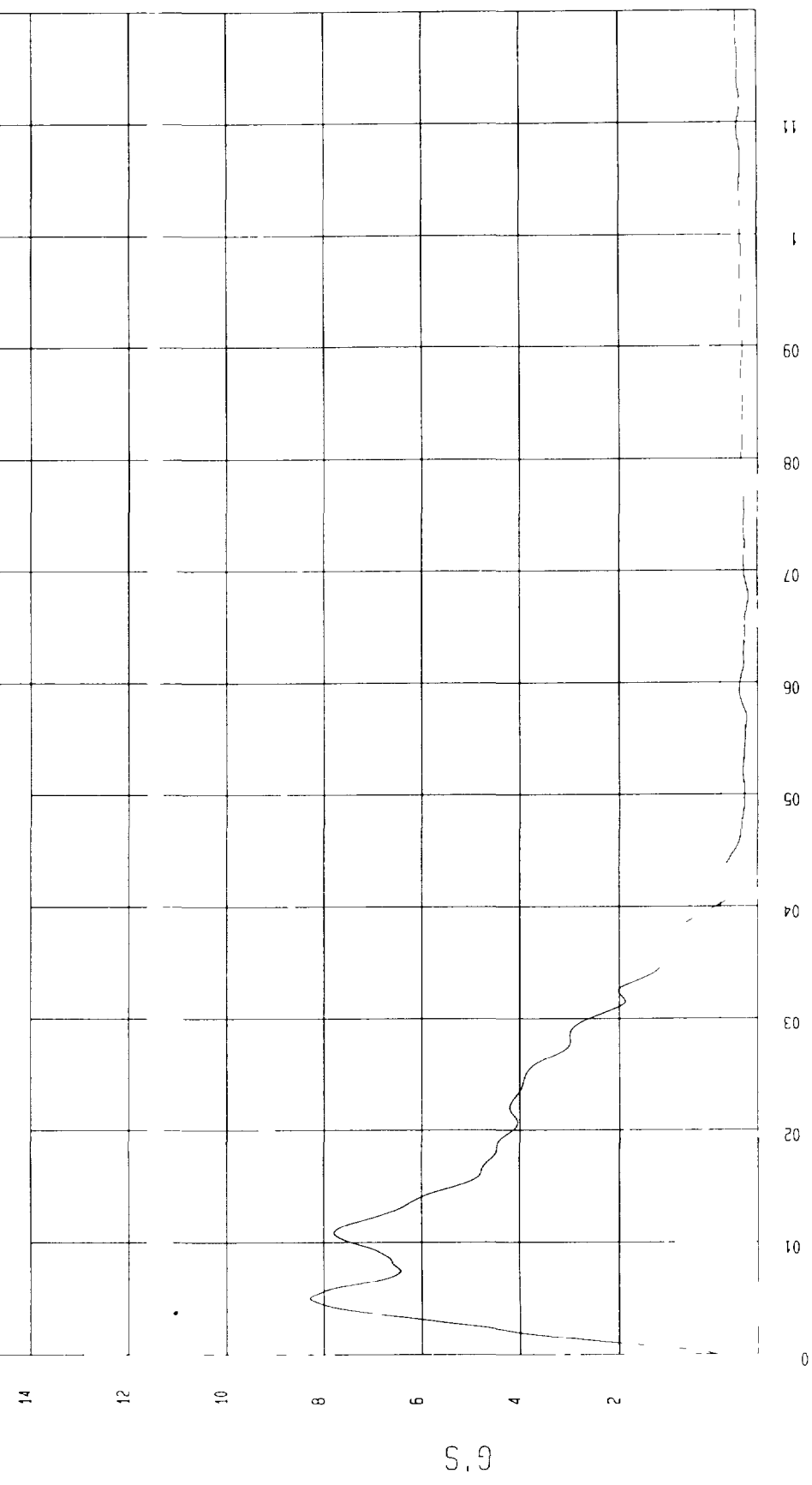
COMPONENT Dummy #ES2-002 Velocity 14 01 FT/SEC 4 27 M/SEC

Minimum - 56 G S at 67.7 msec

Maximum 8.28 G S at 5 msec

PENDULUM ACCELERATION

1 000963AT A01 Filterclass (1000)



MGA Research  
08 10 2000 09 54

MGA RESEARCH CORPORATION  
UPPER/MIDDLE/LOWER RIB TESTS  
EUROSID 2 DUMMY

Date August 10, 2000  
Dummy Serial Number ES2-002  
Test Number D00964/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 - 22	21
Relative Humidity (%)	10 - 70	47
Displacement at 2 m/s	23.5 - 27.5 mm	25.7
Displacement at 3 m/s	36.0 - 40.0 mm	39.6
Displacement at 4 m/s	46.0 - 51.0 mm	51.1 *

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 - 22	21
Relative Humidity (%)	10 - 70	47
Displacement at 2 m/s	23.5 - 27.5 mm	25.3
Displacement at 3 m/s	36.0 - 40.0 mm	38.2
Displacement at 4 m/s	46.0 - 51.0 mm	50.8

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 - 22	21
Relative Humidity (%)	10 - 70	51
Displacement at 2 m/s	23.5 - 27.5 mm	25.0
Displacement at 3 m/s	36.0 - 40.0 mm	38.2
Displacement at 4 m/s	46.0 - 51.0 mm	50.8

\* DID NOT MEET SPECIFICATIONS

Technician 

Approved By 

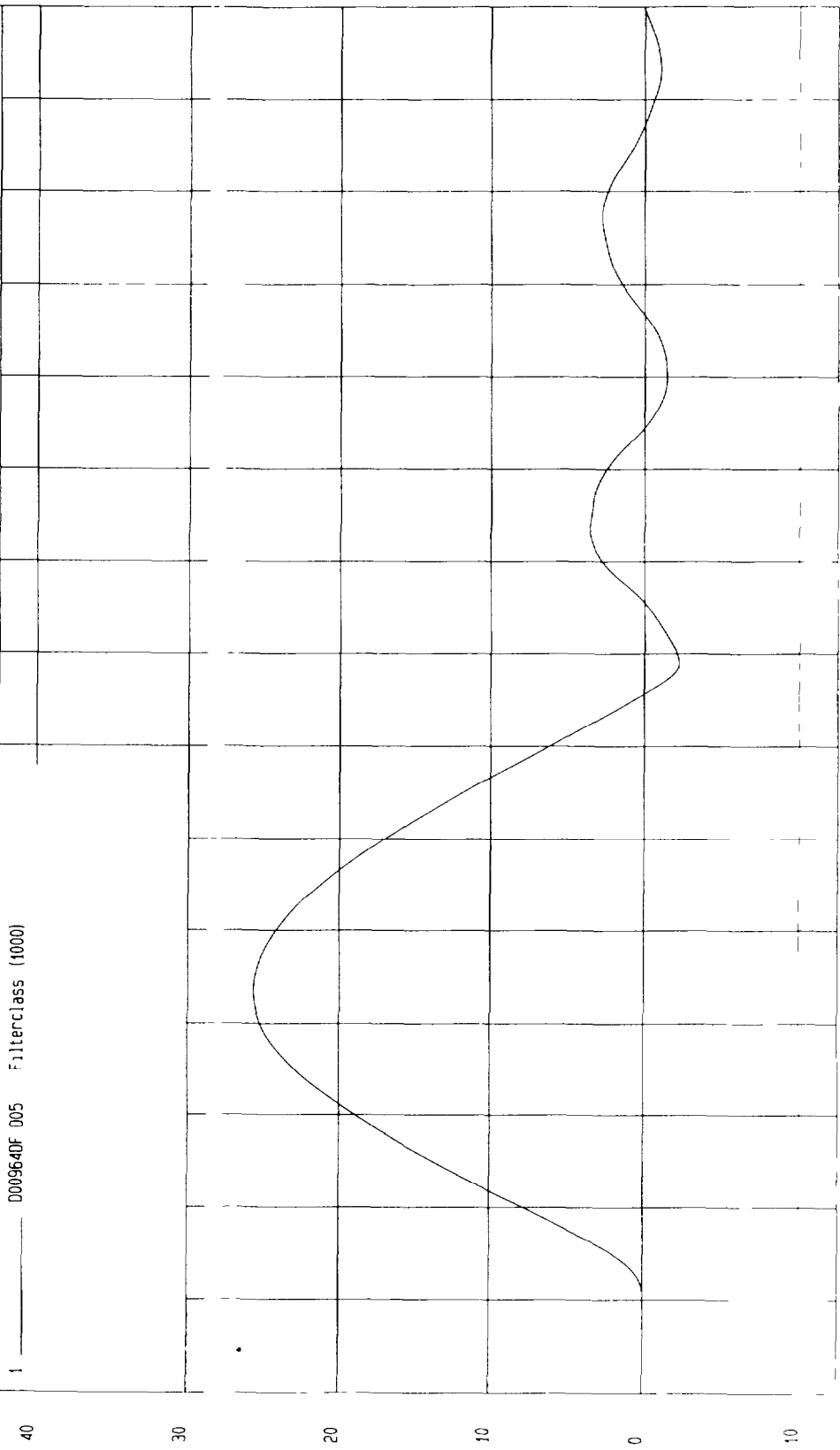
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 26 50

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

Minimum - 2 27 mm at 79 msec Maximum 25 67 mm at 43 5 msec

UPPER RIB DISPLACEMENT

1 ——— 0009640F 005 Filterclass (1000)



MCA Research  
08 10 2000 18 37

mm

TIME (SEC)

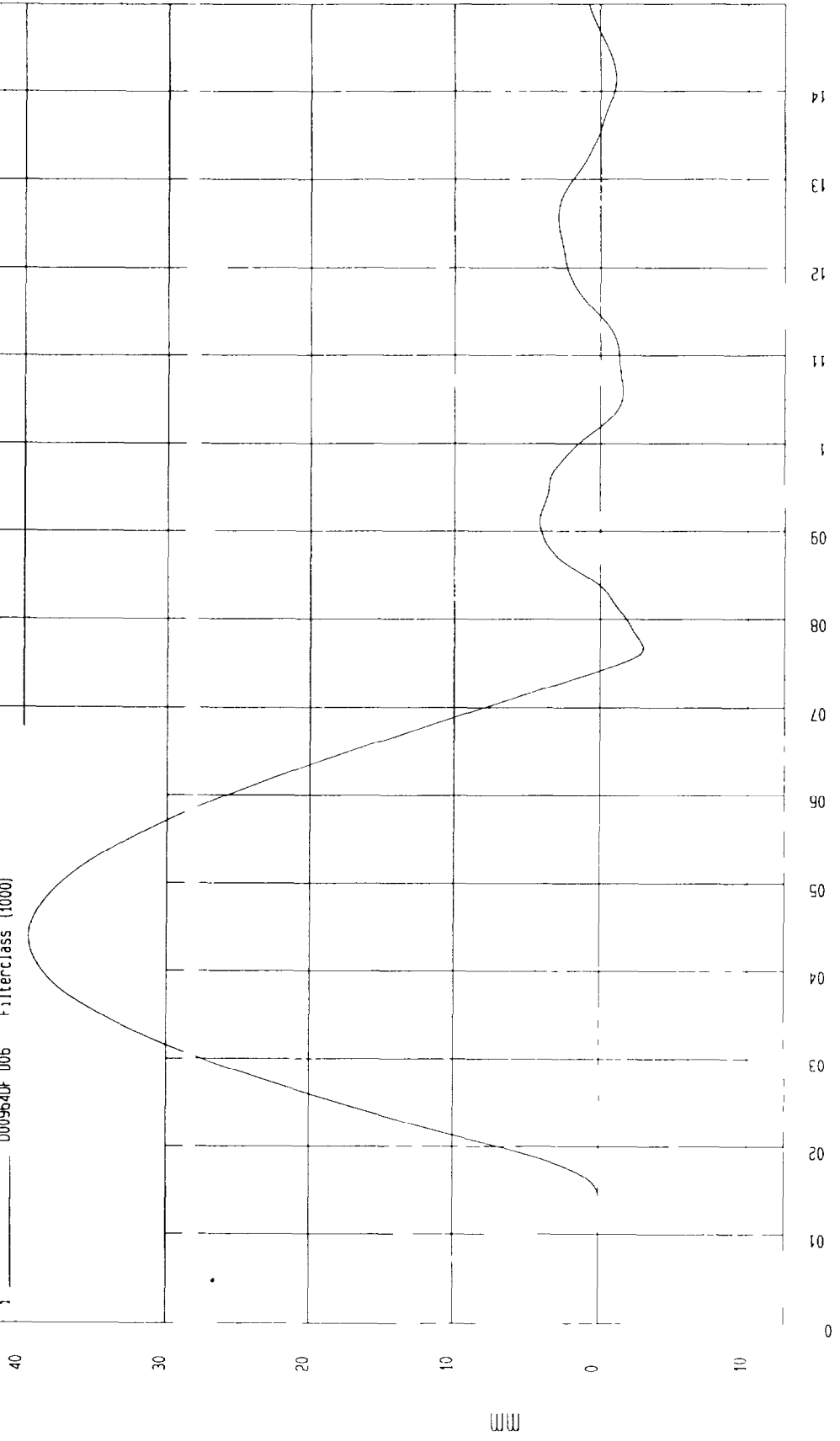
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 36 54

COMPONENT Dummy #ES2-002 Velocity 9 84 FT/SEC 3 M/SEC

Minimum 2 95 mm at 76 6 msec Maximum - 39 59 mm at 43 8 msec

UPPER RIB DISPLACEMENT

1 0009640F 006 Filterclass (1000)

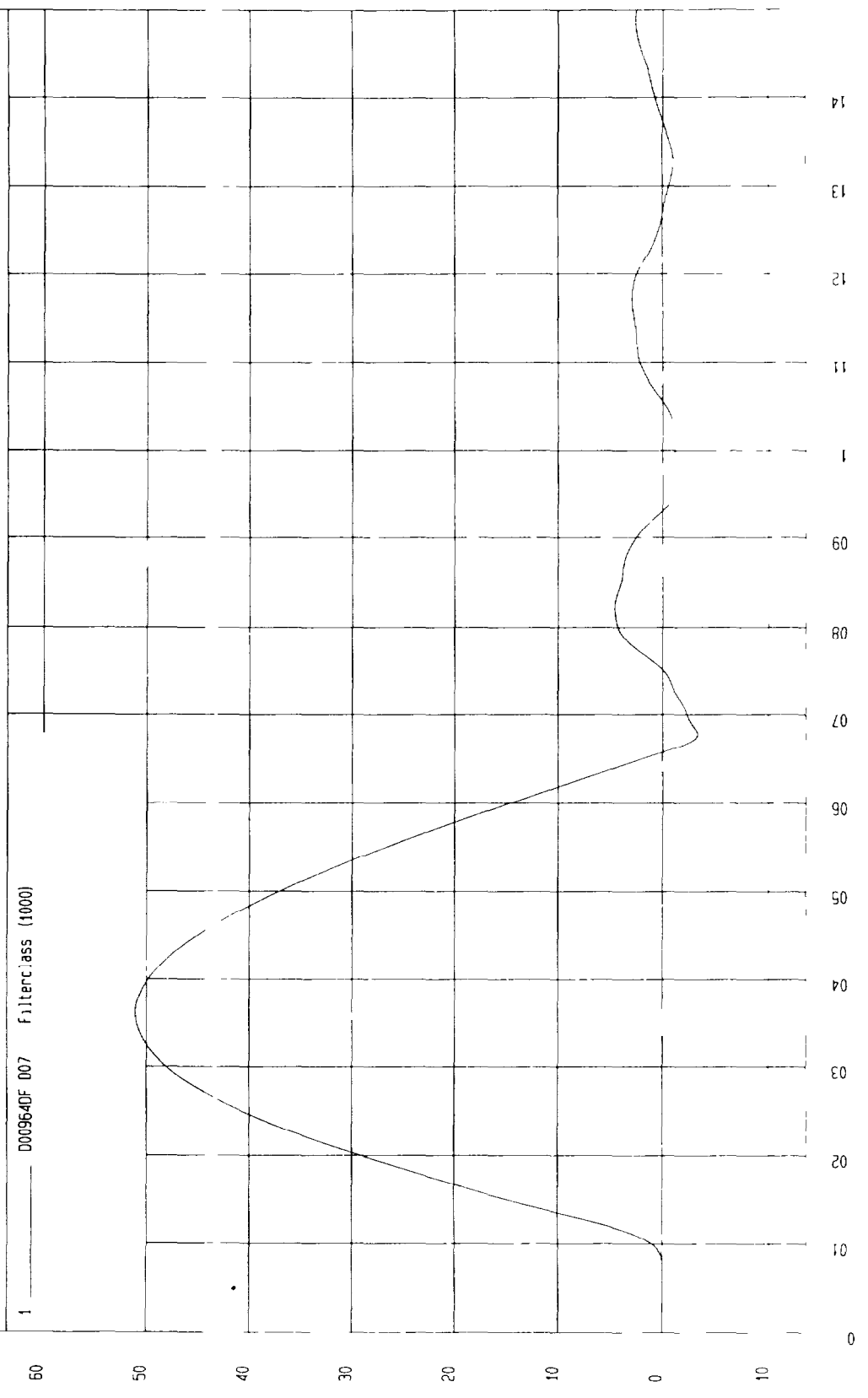


MCA Research  
08-10-2000 18 37

TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 17 38  
COMPONENT Dummy #ES2-002 Velocity 13 12 FT/SEC 4 M/SEC

Minimum - 3 26 mm at 67 8 msec Maximum 51 08 mm at 36 1 msec

UPPER RIB DISPLACEMENT



MCA Research  
08-10-2000 18 37

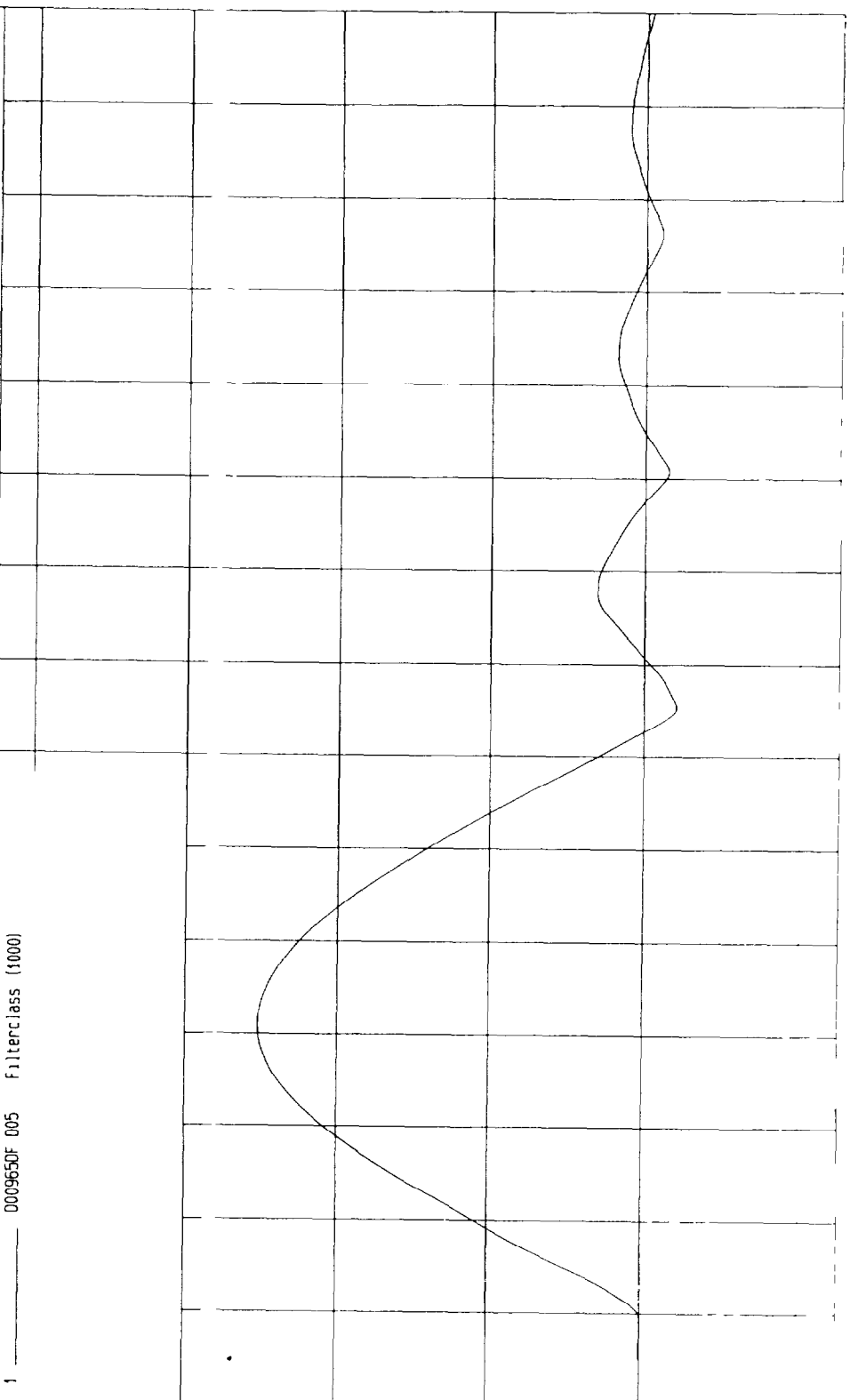
TIME (sec)

mm

TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 46 28  
COMPONENT Dummy #ES2-002 Velocity 6 56 FT/SEC 2 M/SEC

Minimum 2 07 mm at 75 3 msec Maximum 25 26 mm at 40 9 msec

MIDDLE RIB DISPLACEMENT



TIME (sec)

MGA Research  
08 10 2000 18 57

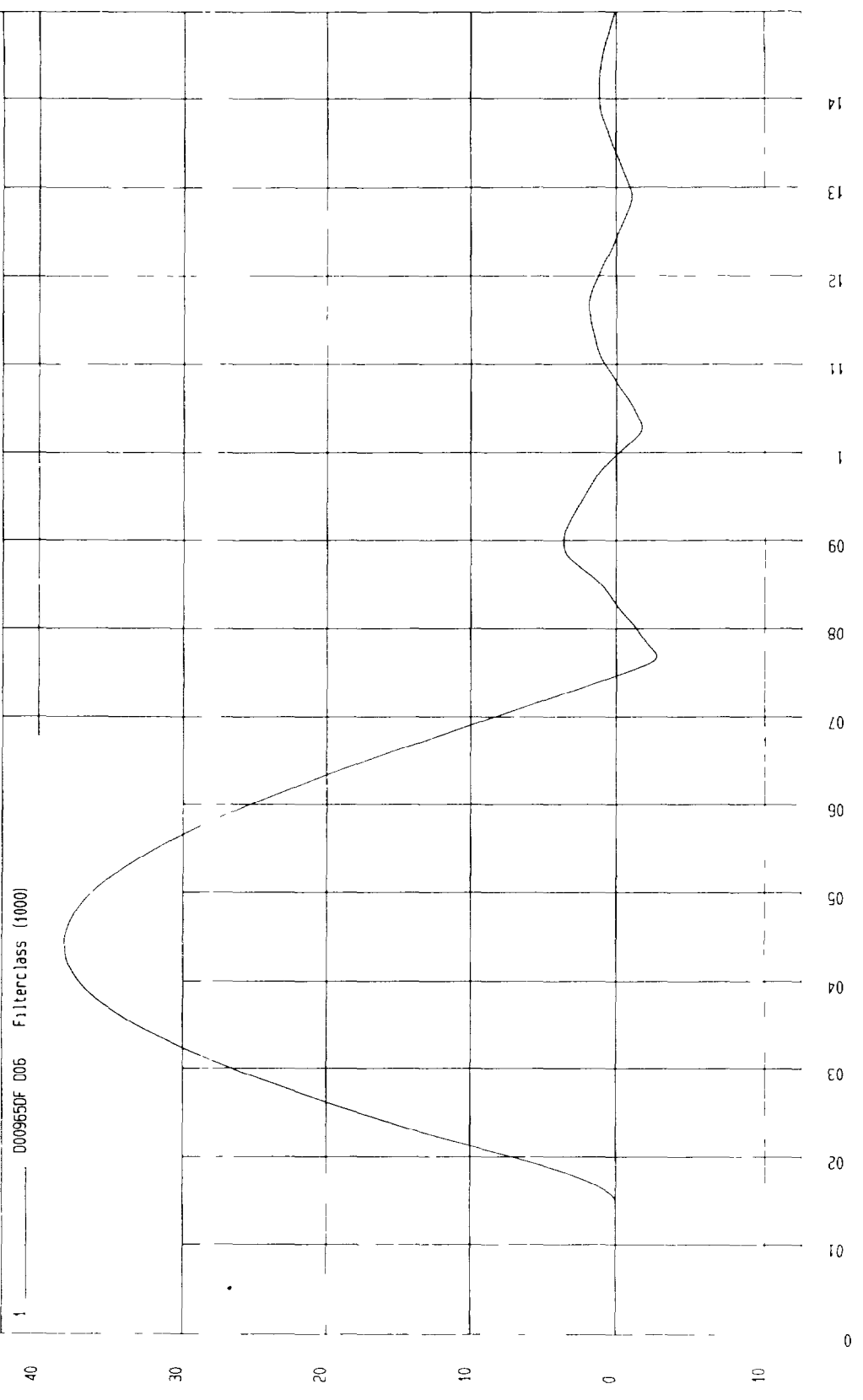
mm

TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 56 26  
COMPONENT Dummy #ES2-002 Velocity 9 84 FT/SEC 3 M/SEC

Minimum 2 75 mm at 76 8 msec Maximum 38 16 mm at 44 5 msec

MIDDLE RIB DISPLACEMENT

1 0009650F 006 Filterclass (1000)



MCA Research  
08 10-2000 18 57

TIME (sec)

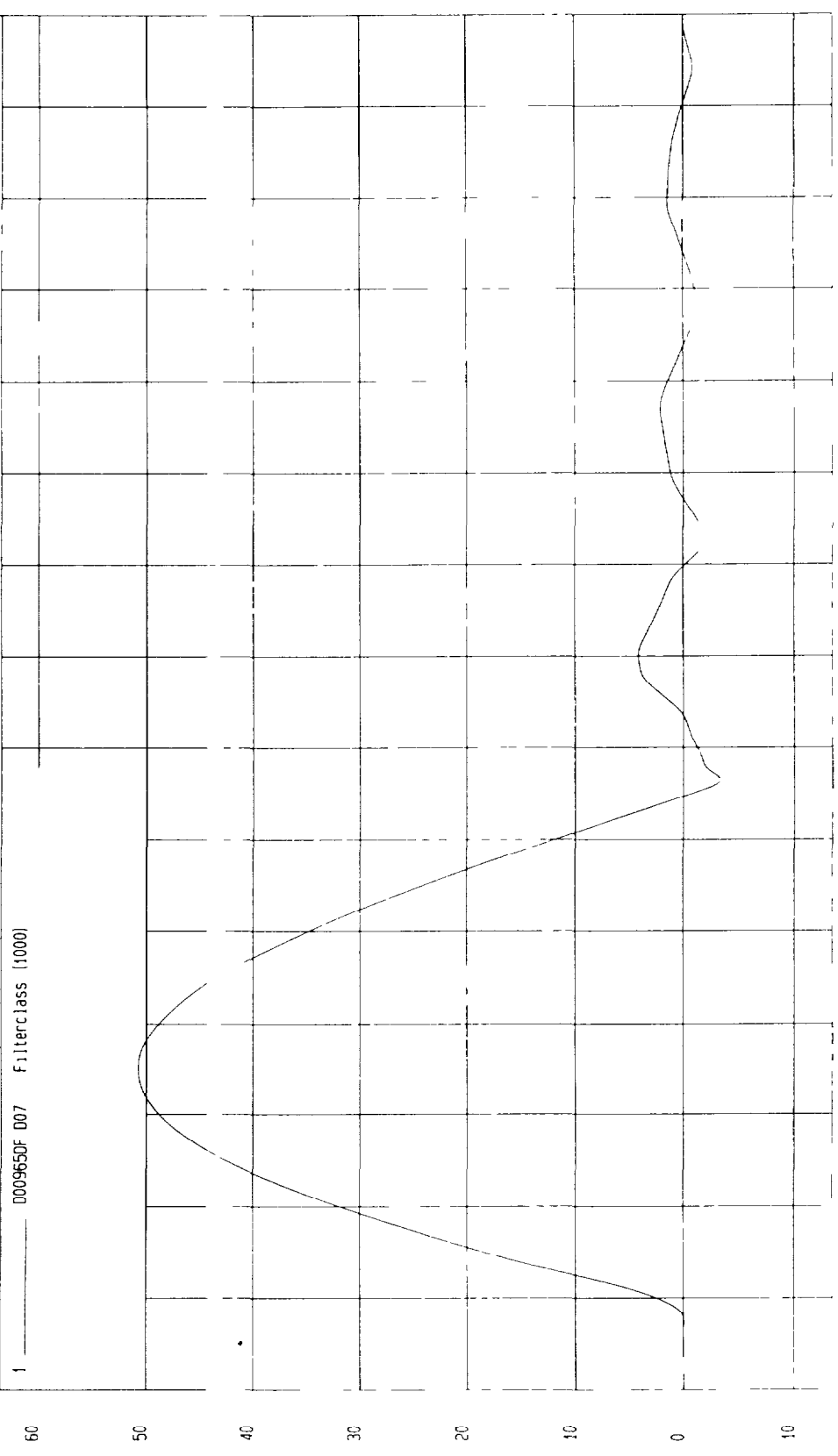
mm

TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 18 41 53  
 COMPONENT Dummy #ES2-002 Velocity 13 12 FT/SEC 4 M/SEC

Minimum 3 26 mm at 66 5 msec Maximum 50 76 mm at 35 1 msec

MIDDLE RIB DISPLACEMENT

1 0009650F 007 Filterclass (1000)



TIME (SEC)

MCA Research  
08 10 2000 18 57

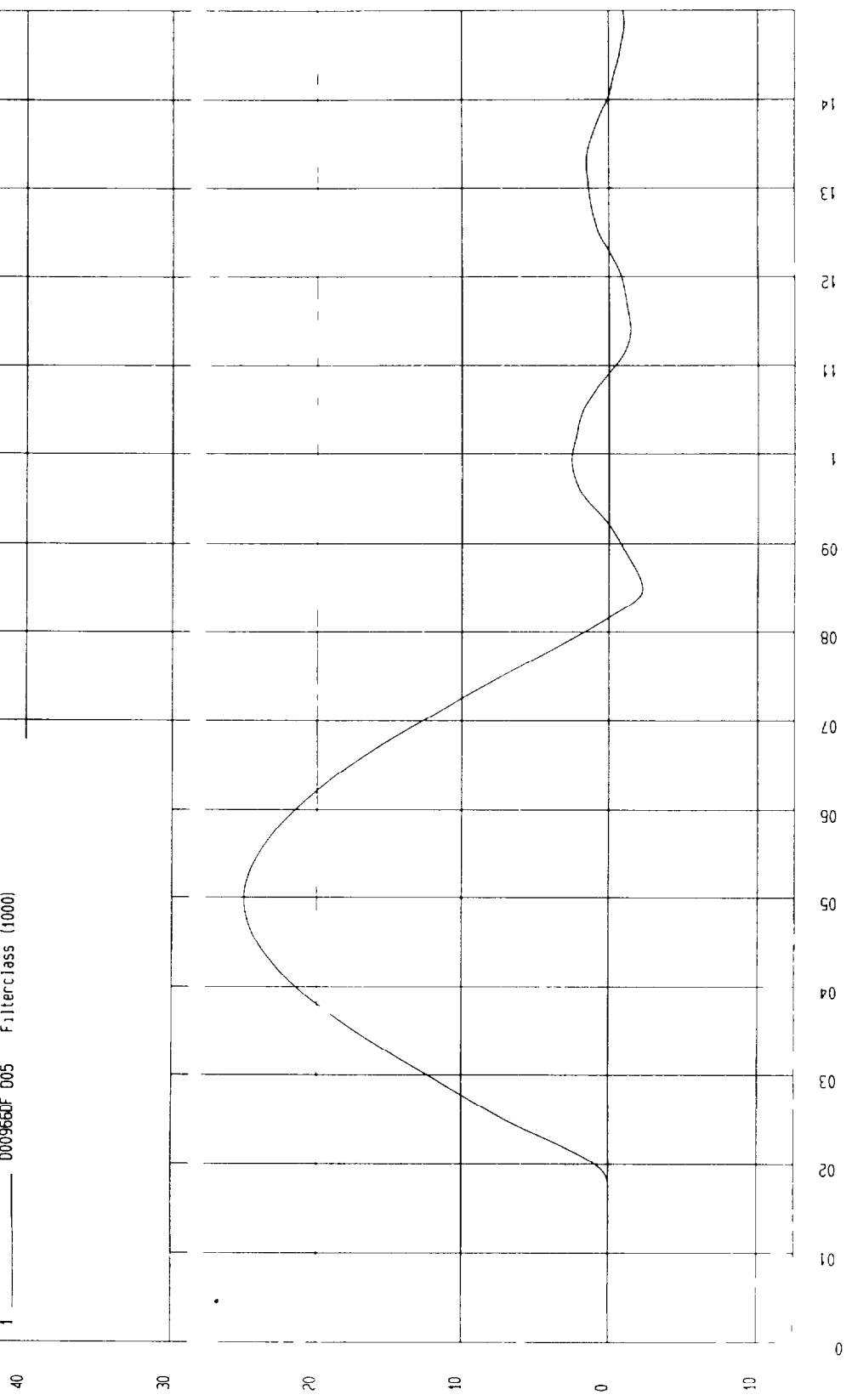
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 19 09 02

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

Minimum 2 33 mm at 84 9 msec Maximum 24 97 mm at 50 1 msec

LOWER RIB DISPLACEMENT

1 ——— D009660F 005 Filterclass (1000)



MGA Research  
08-15-2000 09 03

TIME (sec)

mm

TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 19 17 34

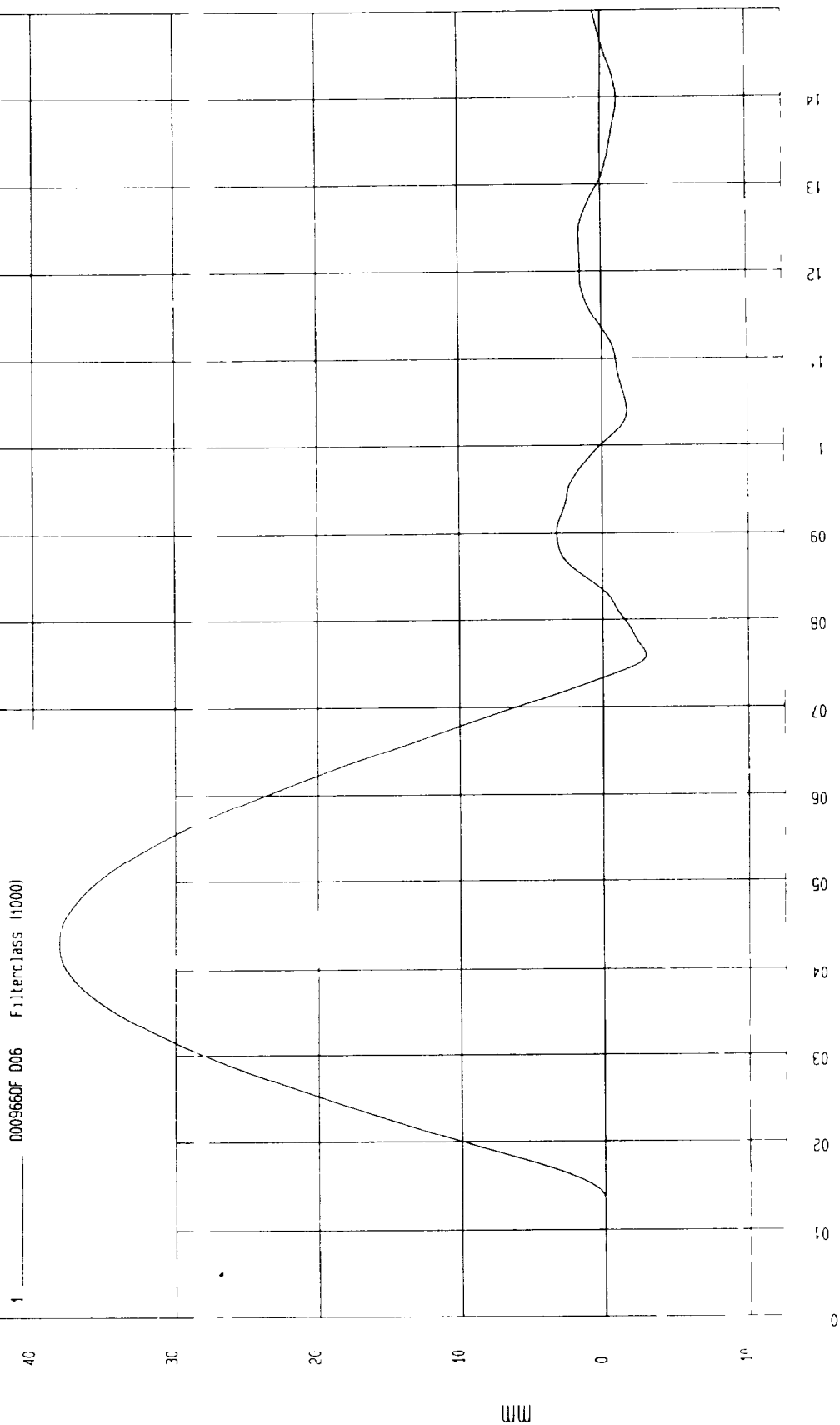
COMPONENT Dummy #ES2-002 Velocity 9 84 FT/SEC 3 M/SEC

Minimum 2 99 mm at 75 9 msec

Maximum 38 16 mm at 43 msec

LOWER RIB DISPLACEMENT

1 0009660F 006 Filterclass (1000)



MCA Research  
08-15-2000 09 03

TIME (sec)

mm

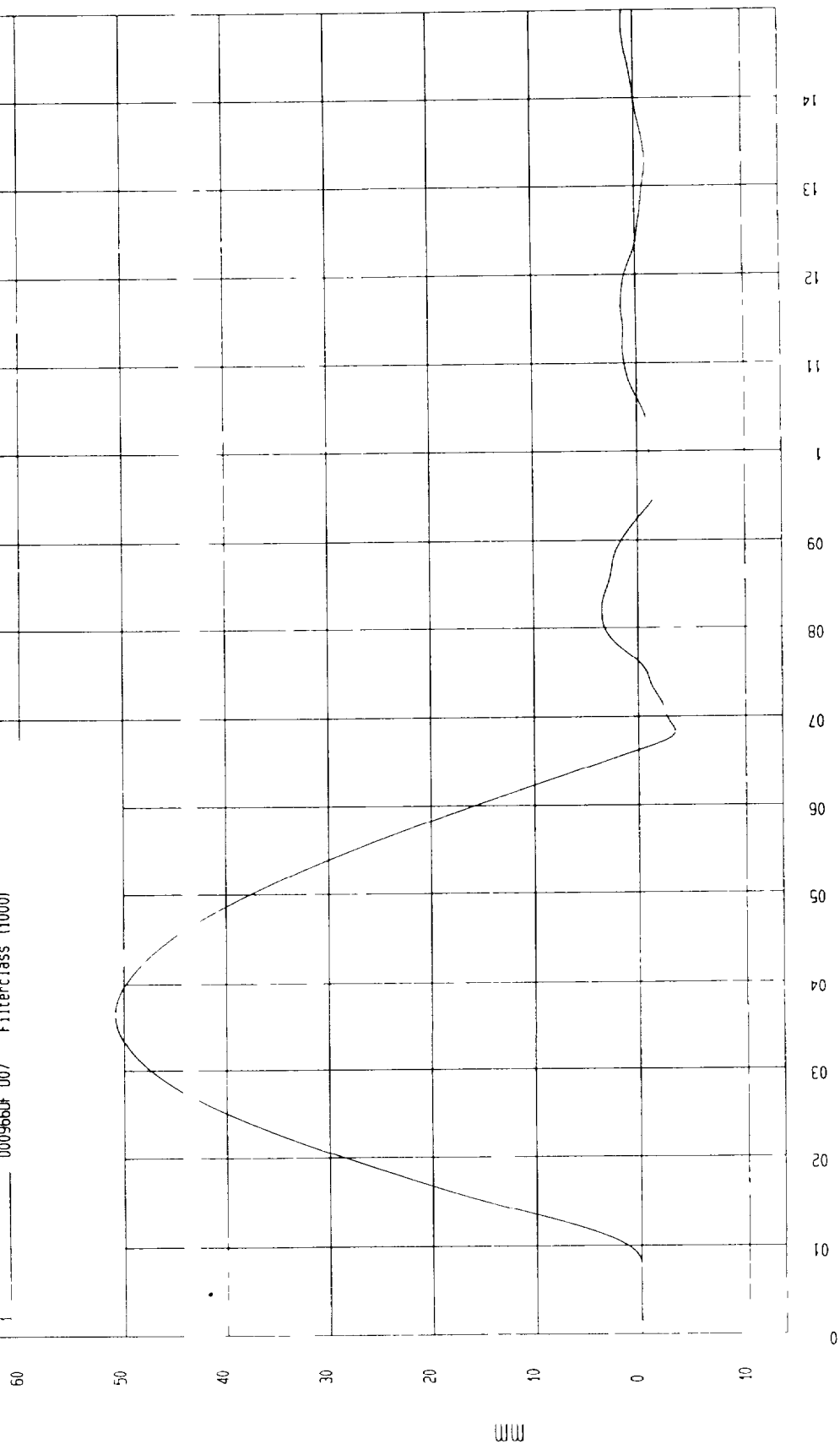
TEST Dummy Calibration - RIB MODULE TEST DATE 08-10-2000 - 19 01 51

COMPONENT Dummy #ES2-002 Velocity 13 12 FT/SEC 4 M/SEC

Minimum 3 38 mm at 68 4 msec Maximum 50 82 mm at 36 4 msec

LOWER RIB DISPLACEMENT

1 0009660F 007 Filterclass (f1000)



MGA Research  
08-15-2000 09 03

MGA RESEARCH CORPORATION  
ABDOMEN TEST  
EUROSID 2 DUMMY

Date August 10, 2000

Dummy Serial Number ES2-002

Test Number D00967

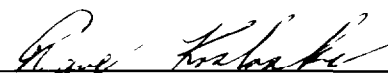
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	51
Probe Speed (m/s)	6.2 – 6.4	6.3
Maximum Impact Force	9.5 – 11.1 kN	11.0
Time of Maximum Force	8.8 – 10.4 ms	9.6
Maximum Total Abdomen Force	5.9 – 7.9 kN	6.6
Time of Max Total Force	8.5 – 10.1 ms	9.4

TEST MEETS SPECIFICATIONS

Technician



Approved By

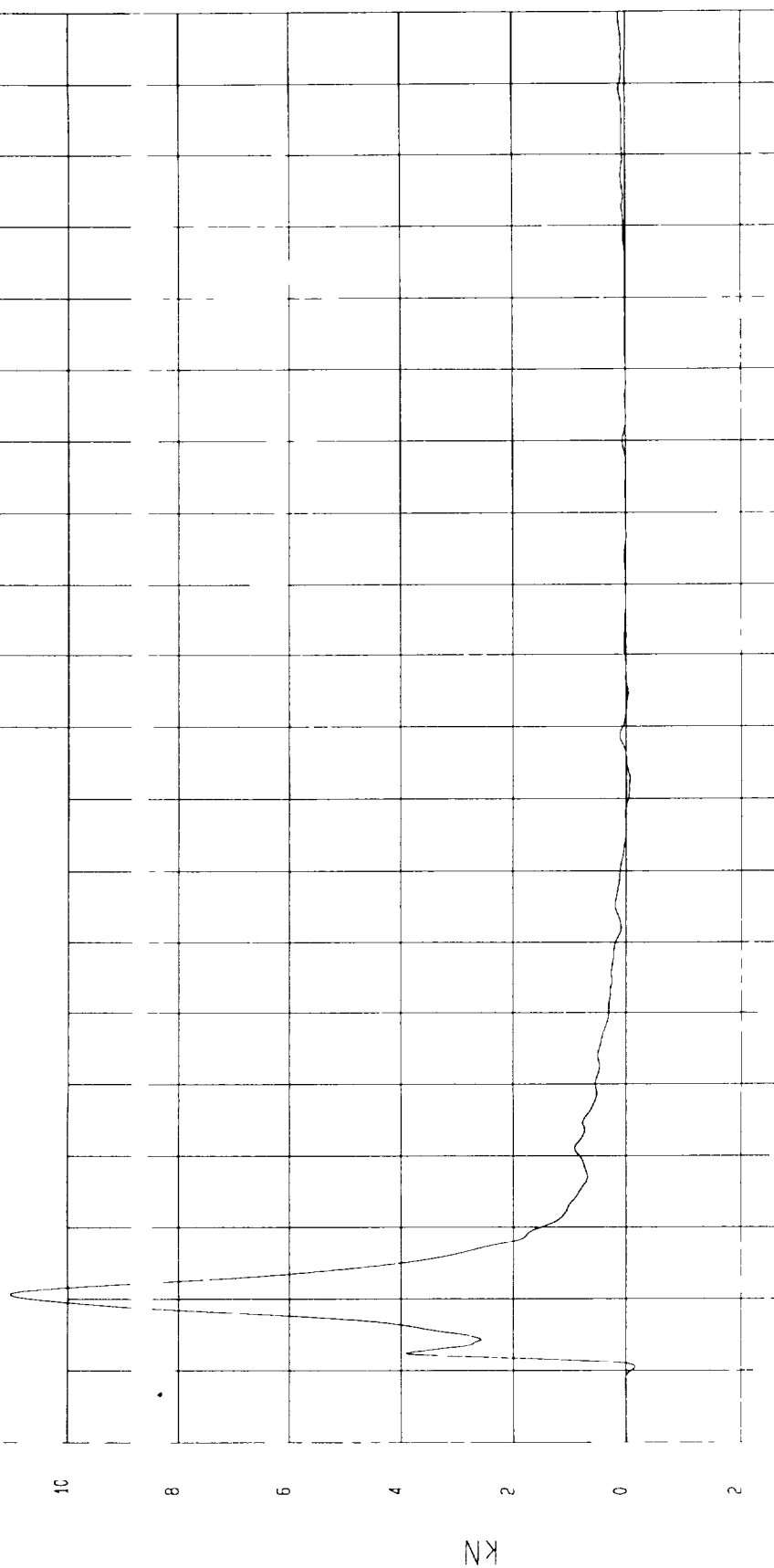


TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-10-2000 - 10 26 22  
COMPONENT Dummy #ES2-002 Velocity 20 6 FT/SEC 6 28 M/SEC

Minimum 16 kN at - 5 msec  
Maximum 11 02 kN at 9 6 msec

PROBE FORCE

1 000967FT F01 Filterclass (1000)



WGA Research  
08 10-2000 10 29

TIME (sec)

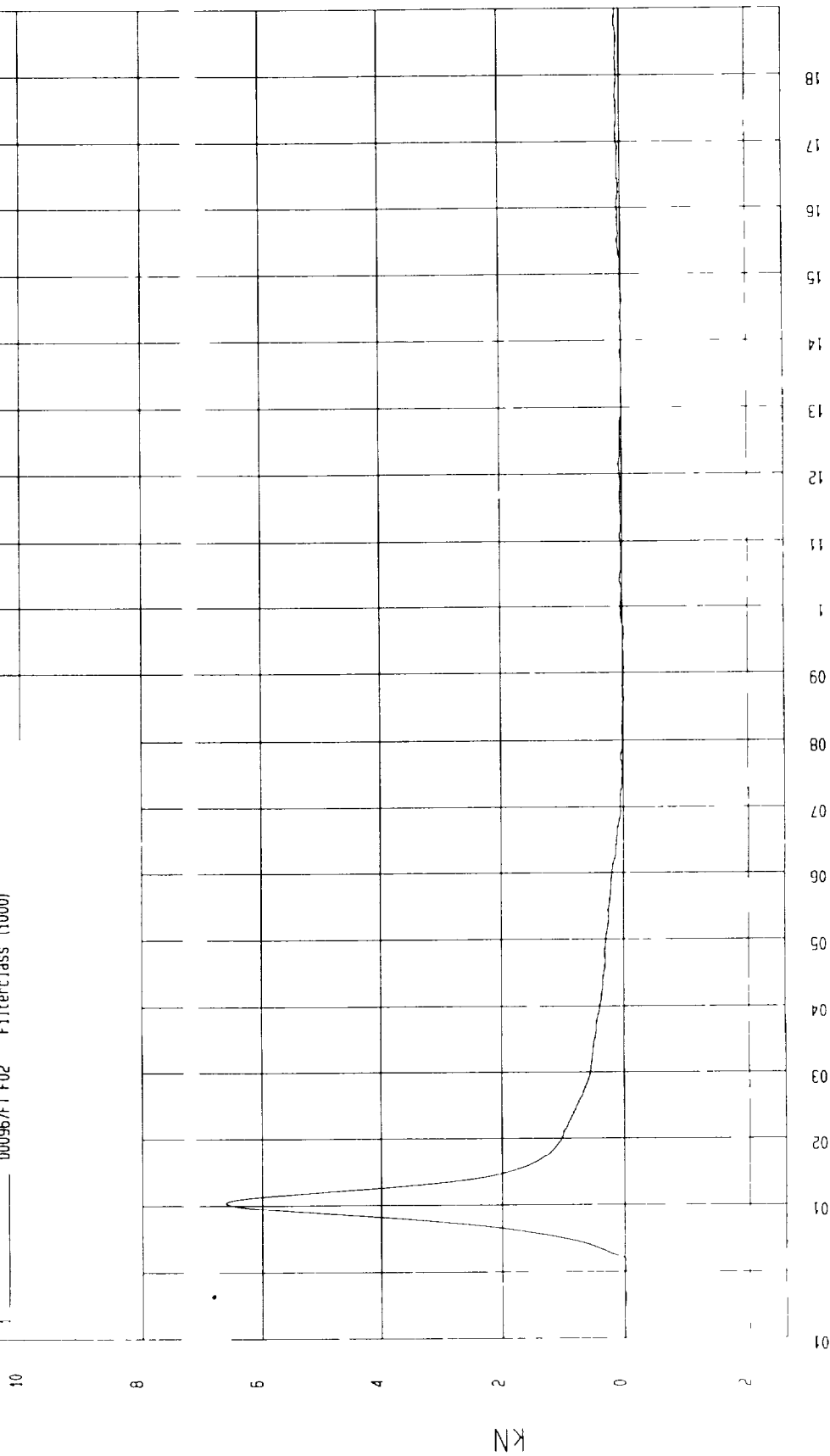
KN

TEST Dummy Calibration - ABDOMEN IMPACT TEST DATE 08-10-2000 - 10 28 38  
COMPONENT Dummy #ES2-002 Velocity 20 6 FT/SEC 6 28 M/SEC

Minimum 2 04E-02 kN at 4 9 msec Maximum 6 59 kN at 9 4 msec

ABDOMEN FORCE

1 000967F1 F02 Filterclass (1000)



MGA Research  
08\_10-2000\_10\_44

TIME (sec)

KN

MGA RESEARCH CORPORATION  
LUMBAR SPINE TEST  
EUROSID 2 DUMMY

Date August 10, 2000  
 Dummy Serial Number ES2-002  
 Test Number D00968

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	22
Relative Humidity (%)	10 – 70	47
Pendulum Speed	5.95 – 6.15 m/s	6.07
Max. Pendulum Acceleration		-29.1 g's
Time Max Pendulum Acceleration		10.1 ms
Maximum Flexion Angle	45.0 – 55.0 deg	52.6
Time of Max Flexion Angle	39.0 – 53.0 ms	50.8
Maximum Angle Theta (A)	31.0 – 35.0 deg	33.1
Time of Max. Theta (A)	45.0 – 55.0 ms	50.5
Maximum Angle Theta (B)	27.0 – 31.0 deg	30.0
Time of Max Theta (B)	45.0 – 55.0 ms	50.9

TEST MEETS SPECIFICATIONS

Technician 

Approved By 

TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-10-2000 - 15 30 01

COMPONENT Dummy #ES2-002 Velocity 19 901 FT/SEC 6 07 M/SEC

Minimum 29.12 G S at .10 1 msec Maximum 4.51 G S at .36 4 msec

PENDULUM ACCELERATION

1 ——— 000968AT A04



G.S.

TIME (sec)

MSA Research  
08 10 2000 11 46

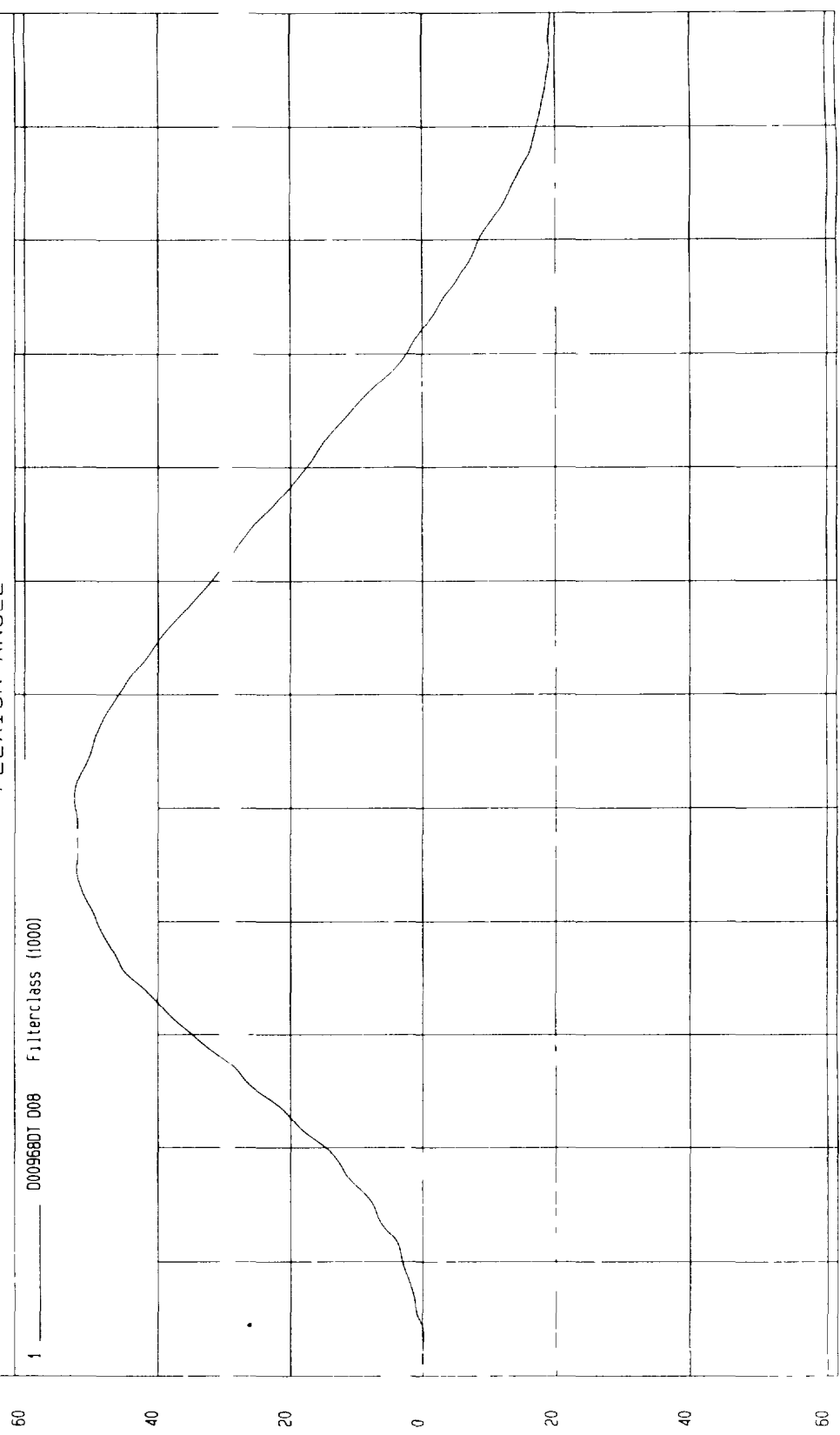
TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-10-2000 - 15 30 01

COMPONENT Dummy #ES2-002 Velocity 19 9 FT/SEC 6 07 M/SEC

Minimum 19 29 DEG at 119 msec Maximum 52 63 DEG at 50 8 msec

FLEXION ANGLE

1 000968DT 008 Filterclass (1000)



TIME (SEC)

MCA Research  
08 10 2000 17 46

DEG

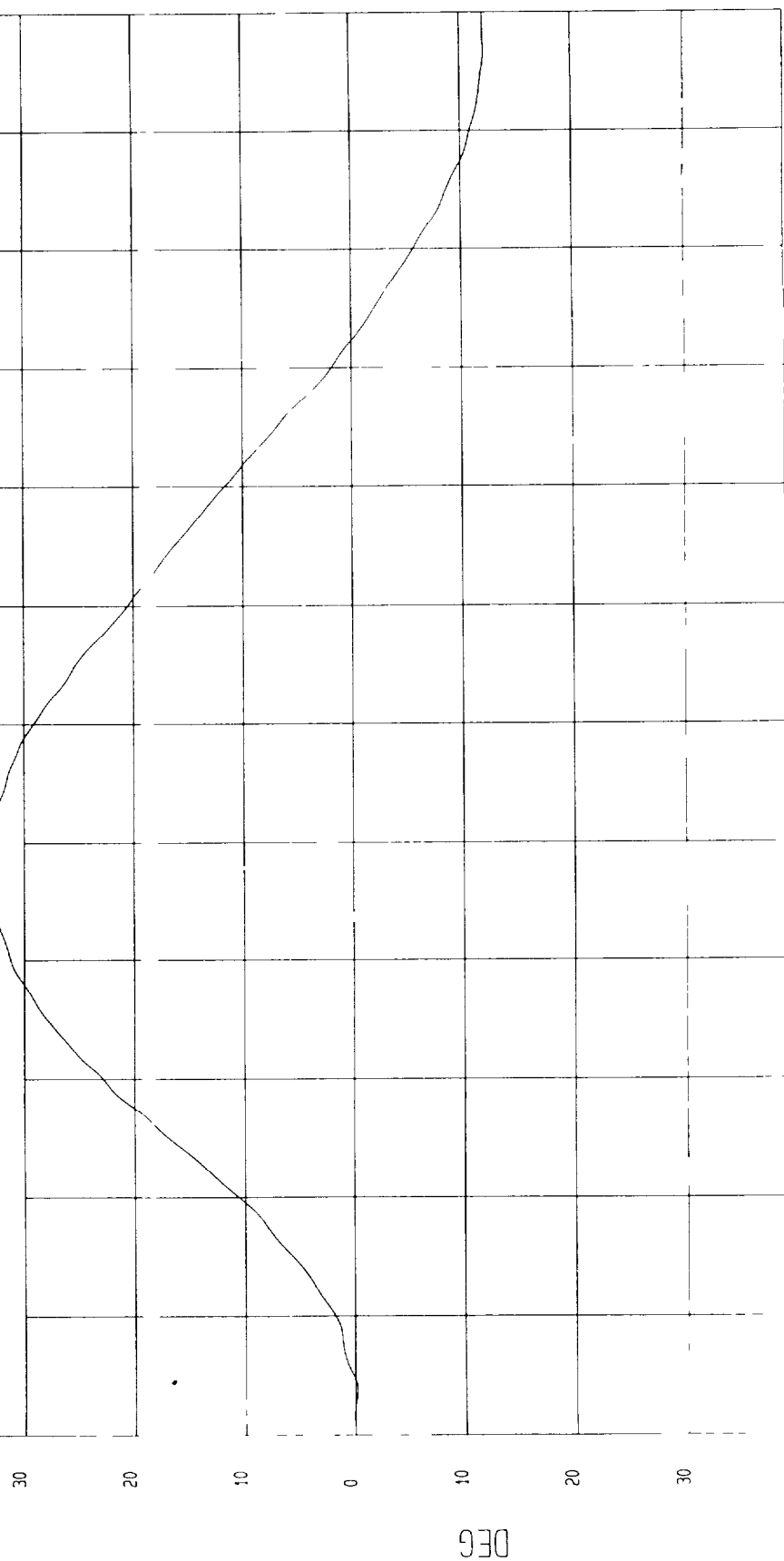
TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-10-2000 - 15 30 01

COMPONENT Dummy #ES2-002 Velocity 19 9 FT/SEC 6 07 M/SEC

Minimum - 12 15 DEG at 116 msec Maximum 33 12 DEG at 50 5 msec

THETA A

1 \_\_\_\_\_ D009680T 005 FilterClass (1000)



TIME (SEC) MGA Research 08 10 2000 17 47

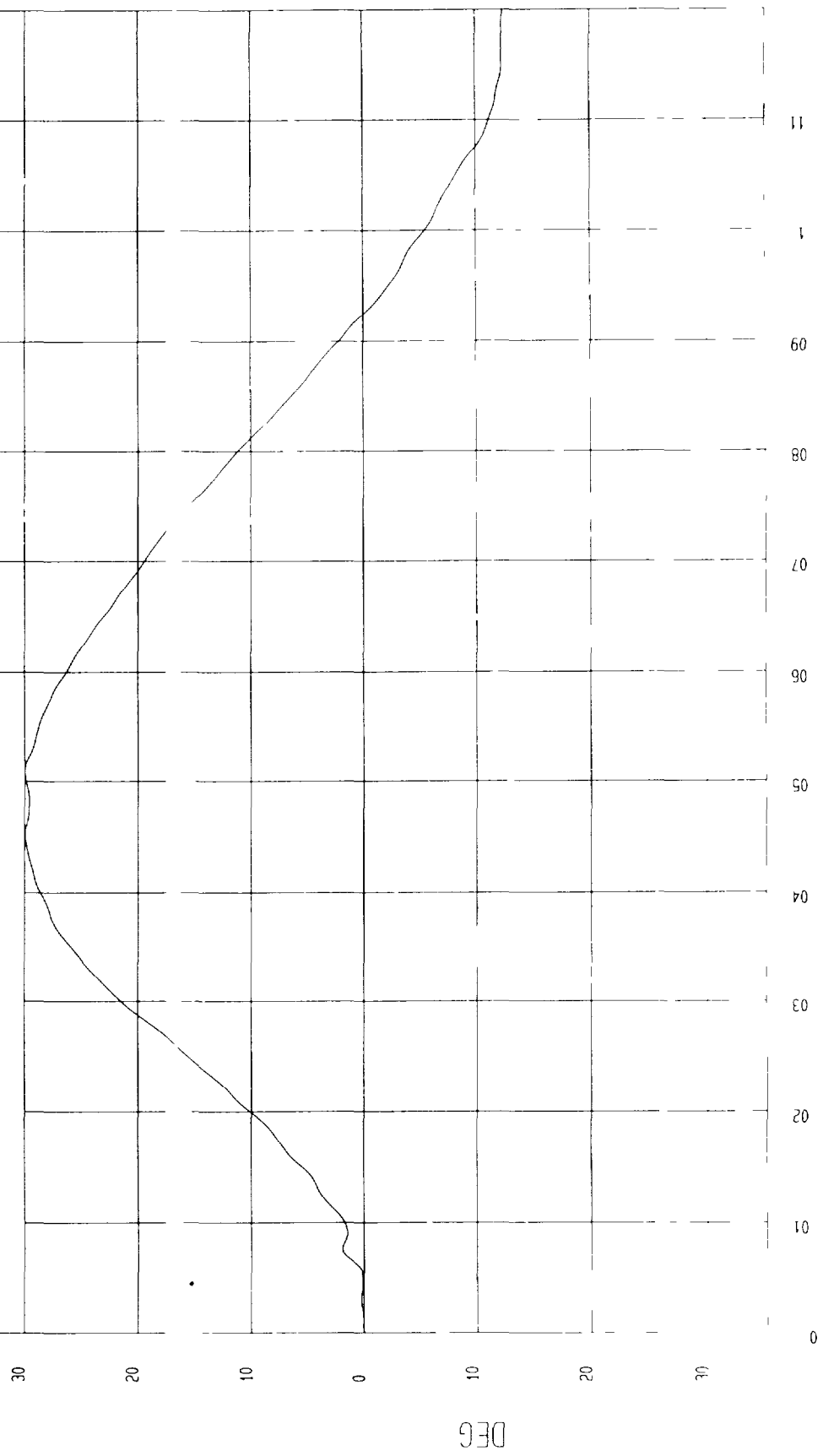
DEG

TEST Dummy Calibration - LUMBAR FLEXION TEST DATE 08-10-2000 - 15 30 01  
 COMPONENT Dummy #ES2-002 Velocity 19 9 FT/SEC 6 07 M/SEC

Minimum - 12 46 DEG at 120 msec Maximum 29 98 DEG at 50 9 msec

THETA B

1 ——— 000968DT D06 Filterclass (1000)




MCA Research  
08-10-2000 17 47

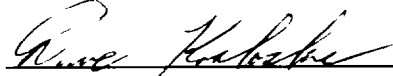
MGA RESEARCH CORPORATION  
 PELVIS TEST  
 EUROSID 2 DUMMY

Date August 10, 2000  
 Dummy Serial Number ES2-002  
 Test Number D00969

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18 – 22	21
Relative Humidity (%)	10 – 70	51
Pendulum Speed	4.2 – 4.4 m/s	4.3
Maximum Impactor Force	4.4 – 5.1 kN	5.1
Time of Max Impactor Force	10.3 – 15.5 ms	14.5
Maximum Pubic Force	1.04 – 1.64 kN	1.38
Time of Max Pubic Force	9.9 – 15.9 ms	10.5

TEST MEETS SPECIFICATIONS

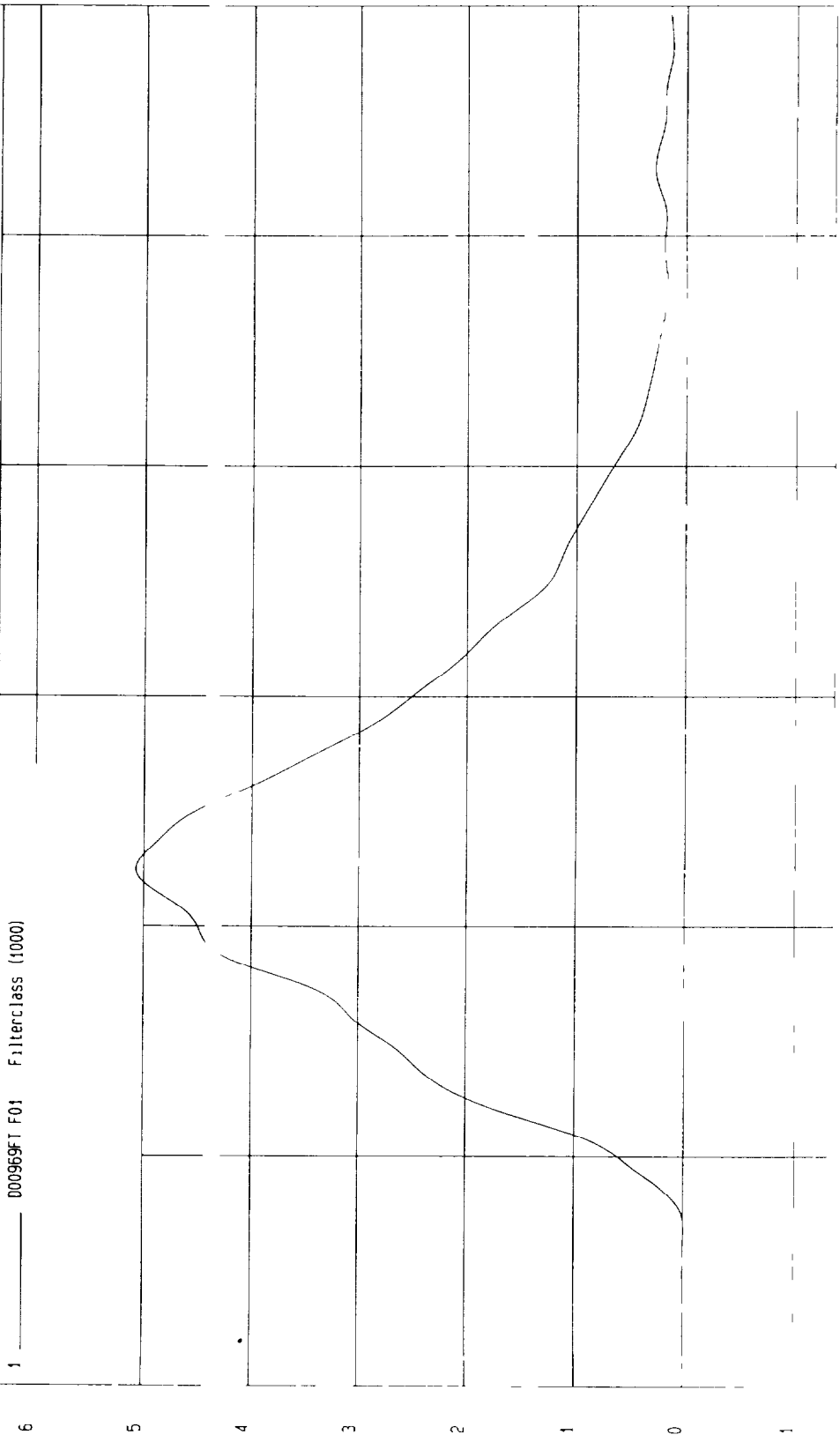
Technician 

Approved By 

TEST Dummy Calibration - Pelvis Impact TEST DATE 08-10-2000 - 09 41 17  
COMPONENT Dummy #ES2-002 Velocity 14 08 FT/SEC 4 29 M/SEC

Minimum 5 96E 03 kN at -1 2 msec Maximum 5 07 kN at 14 5 msec

IMPACTOR FORCE



1 000969FT F01 Filterclass (1000)

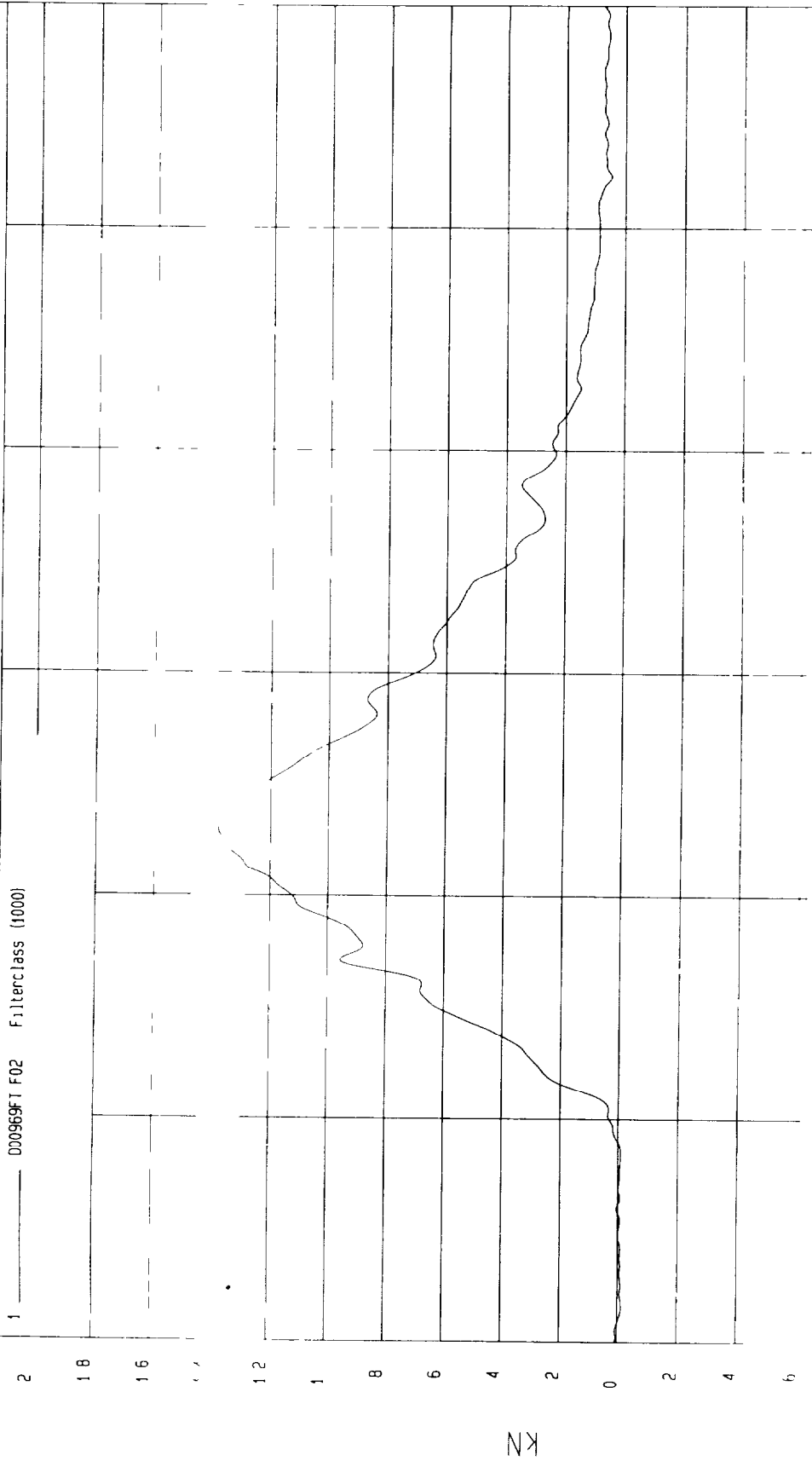
TEST Dummy Calibration - Pelvis Impact TEST DATE 08-10-2000 - 09 42 23

COMPONENT Dummy #ES2-002 Velocity 14 08 FT/SEC 4 29 M/SEC

Minimum 1 75E-02 kN at 72 5 msec Maximum 1 38 kN at 10 5 msec

PUBIC FORCE

1 ——— 000969FT F02 Filterclass (1000)



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	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	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	J10-E12	Entran	February 11, 2000
Right Front Sill Y	D05-R11	Entran	May 18, 2000
Right Front Sill Z	G13-B03	Entran	March 17, 2000
Right Rear Sill X	G01-J04	Entran	June 2, 2000
Right Rear Sill Y	J10-E03	Entran	March 16, 2000
Right Rear Sill Z	A09-G02	Entran	February 11, 2000
Left Front Sill Y	E10-F07	Entran	August 8, 2000
Left Rear Sill Y	I18-E05	Entran	April 7, 2000
Floorpan @ Rear Axle X	D05-R10	Entran	July 11, 2000
Floorpan @ Rear Axle Y	G01-J09	Entran	July 11, 2000
Floorpan @ Rear Axle Z	F20-G06	Entran	July 11, 2000
Left Mid A Post Y	C18-G12	Entran	February 11, 2000
Left Lower A Post Y	F20-G03	Entran	August 8, 2000
Left Upper B Post Y	H02-J06	Entran	June 2, 2000
Left Mid B Post Y	E10-F19	Entran	August 8, 2000
Left Lower B Post Y	E13-D06	Entran	February 11, 2000
Driver Seat Track Y	I26-D11	Entran	February 11, 2000
Right Rear Occupant Compartment Y	K11-G07	Entran	August 8, 2000
Vehicle CG X	C25-A06	Entran	May 18, 2000
Vehicle CG Y	H02-J04	Entran	March 20, 2000
Vehicle CG Z	F07-A24	Entran	February 11, 2000
Left Front Door Upper Y	E10-F17	Entran	February 11, 2000
Left Front Door Mid Y	D05-R20	Entran	May 18, 2000
Left Front Door Lower Y	F12-G08	Entran	June 2, 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	K11-J12	Entran	June 2, 2000
Left Rear Door Upper Y	K16-X05	Entran	August 8, 2000
Left Rear Door Mid Y	F18-G08	Entran	June 2, 2000
Left Rear Door Lower Y	G01-J19	Entran	August 8, 2000
Left Rear Door Rear Lower Y	D05-R25	Entran	August 8, 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  $20^{\circ} \pm 2.5^{\circ}$
  - 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  $25^{\circ} \pm 2.5^{\circ}$ . 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  $40^{\circ} \pm 5^{\circ}$ .

- 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  $150 \pm 10$  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  $150 \pm 10$  mm from the plane of symmetry of the dummy.

APPENDIX F – ES-2 PEAK REPOSSES

## DRIVER (ES-2) PEAK RESPONSE TABLE

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Head	1000	X	G	-10.15	97
	1000	Y	G	19.77	100
	1000	Z	G	27.72	62
	1000	RES	G	33.15	62
Head Injury Criteria (HIC)				106	
Upper Neck Force	1000	X	N	-485.42	118
	1000	Y	N	569.62	104
	1000	Z	N	-1167.51	72
	1000	RES	N	1246.22	68
Upper Neck Moment	600	X	Nm	53.07	79
	600	Y	Nm	-34.38	135
	600	Z	Nm	12.68	182
	600	RES	Nm	54.71	79
Lower Neck Force	1000	X	N	464.33	100
	1000	Y	N	-927.53	88
	1000	Z	N	1083.73	64
	1000	RES	N	1342.89	64
Lower Neck Moment	600	X	Nm	-174.18	97
	600	Y	Nm	-83.59	119
	600	Z	Nm	17.45	109
	600	RES	Nm	183.84	99
Shoulder Force	1000	X	N	271.15	152
	1000	Y	N	309.08	37
	1000	Z	N	542.89	54
	1000	RES	N	561.77	38
Shoulder Rotation	1000		deg	12.9	99

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

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Upper Spine	180	X	G	7.99	41
	180	Y	G	45.79	46
	180	Z	G	4.06	107
Lower Spine	180	X	G	10.66	37
	180	Y	G	57.89	39
	180	Z	G	-3.54	128
Upper Rib	180	Y	G	105.38	35
Mid Rib	180	Y	G	190.19	35
Lower Rib	180	Y	G	199.32	34
Upper Rib Deflection	180	Y	mm	-38.01	55
Mid Rib Deflection	180	Y	mm	-46.7	51
Lower Rib Deflection	180	Y	mm	-51.41	46
Upper Rib VC	180	Y	m/sec	0.75	40
Mid Rib VC	180	Y	m/sec	1.26	38
Lower Rib VC	180	Y	m/sec	1.43	37
Torso Force	600	X	N	179.42	42
	600	Y	N	-316.27	38
Torso Moment	600	Y	Nm	-8.24	47
	600	Z	Nm	10.96	41
T12 Force	600	X	N	399.14	107
	600	Y	N	1770.07	37
T12 Moment	600	X	Nm	284.77	93
	600	Y	Nm	173.85	108

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

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Abdomen Front Force	600	Y	N	296.48	46
Abdomen Mid Force	600	Y	N	649.44	45
Abdomen Rear Force	600	Y	N	834.13	43
Abdomen Summed Force	600	Y	N	1739.86	44
Pubic Symphysis Force	600	Y	N	-917.33	42
Right Femur Force	600	X	N	-466.07	56
	600	Y	N	1465.81	56
	600	Z	N	-956.54	56
	600	RES	N	1811.22	56
Right Femur Moment	600	X	Nm	109.26	42
	600	Y	Nm	-68.78	61
	600	Z	Nm	-26.91	127
	600	RES	Nm	115.99	62
Left Femur Force	600	X	N	-569.41	45
	600	Y	N	1267.48	41
	600	Z	N	-852.05	114
	600	RES	N	1441.56	48
Left Femur Moment	600	X	Nm	-126.03	47
	600	Y	Nm	-56.64	62
	600	Z	Nm	25.58	38
	600	RES	Nm	133.95	47
Pelvis	1000	X	G	23.11	51
	1000	Y	G	70.79	42
	1000	Z	G	-11.27	64

## PASSENGER (ES-2) PEAK RESPONSE TABLE

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Head	1000	X	G	-14.08	90
	1000	Y	G	34.15	65
	1000	Z	G	-16.49	70
	1000	RES	G	35.32	65
Head Injury Criteria (HIC)				52	
Upper Neck Force	1000	X	N	-256.75	72
	1000	Y	N	-533.58	88
	1000	Z	N	1629	72
	1000	RES	N	1663.51	72
Upper Neck Moment	600	X	Nm	-41.34	71
	600	Y	Nm	36.36	89
	600	Z	Nm	-11.62	84
	600	RES	Nm	44.3	71
Lower Neck Moment	600	X	Nm	7.5	66
	600	Y	Nm	-27.24	71
	600	Z	Nm	18.02	72
	600	RES	Nm	32.21	71
Shoulder Force	1000	X	N	345.05	73
	1000	Y	N	798.63	79
	1000	Z	N	1088.72	81
	1000	RES	N	1377.51	80

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

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Upper Spine	180	X	G	-6.34	86
	180	Y	G	24.58	79
	180	Z	G	2.55	61
Lower Spine	180	X	G	-8.29	75
	180	Y	G	24.28	70
	180	Z	G	2.58	89
Upper Rib	180	Y	G	22.52	71
Mid Rib	180	Y	G	23.06	57
Lower Rib	180	Y	G	22	57
Upper Rib Deflection	180	Y	mm	-23.36	81
Mid Rib Deflection	180	Y	mm	-17.8	80
Lower Rib Deflection	180	Y	mm	-17.27	77
Upper Rib VC	180	Y	m/sec	0.11	74
Mid Rib VC	180	Y	m/sec	0.0563	72
Lower Rib VC	180	Y	m/sec	0.062	64
Torso Force	600	X	N	316.85	72
	600	Y	N	197.15	56
Torso Moment	600	Y	Nm	-7.25	159
	600	Z	Nm	12.96	93
T12 Force	600	X	N	-601.55	82
	600	Y	N	485.19	72
T12 Moment	600	X	Nm	-68.07	59
	600	Y	Nm	-112.94	75

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

Location	Peak Values (G's)				
	Class	Axis	Units	Peak	Time (msec)
Abdomen Front Force	600	Y	N	324.37	71
Abdomen Mid Force	600	Y	N	200.43	69
Abdomen Rear Force	600	Y	N	279.1	68
Abdomen Summed Force	600	Y	N	784.79	69
Pubic Symphysis Force	600	Y	N	-646.7	55
Right Femur Force	600	X	N	-179.41	55
	600	Y	N	-873.72	52
	600	Z	N	365.65	38
	600	RES	N	990.33	52
Right Femur Moment	600	X	Nm	-102.63	52
	600	Y	Nm	-33.76	38
	600	Z	Nm	20.27	53
	600	RES	Nm	104.5	52
Left Femur Force	600	X	N	121.83	63
	600	Y	N	-950.45	43
	600	Z	N	1216	37
	600	RES	N	1471	37
Left Femur Moment	600	X	Nm	-174.2	37
	600	Y	Nm	15.97	35
	600	Z	Nm	29.14	53
	600	RES	Nm	174.41	37
Pelvis	1000	X	G	-13.31	54
	1000	Y	G	30.53	55
	1000	Z	G	6.06	69