

FINAL REPORT NUMBER 201U-MGA-03-003

SAFETY COMPLIANCE TESTING FOR FMVSS 201U
Occupant Protection In Interior Impact
Upper Interior Head Impact Protection

VOLKSWAGEN AG GERMANY
2003 Volkswagen Passat 4-Door Sedan
NHTSA No. C35802

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083



Test Dates: December 17-18, 2002
Report Date: December, 19, 2002

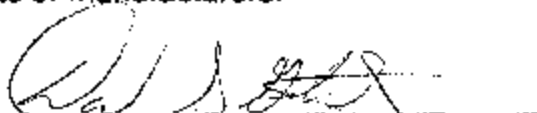
FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY ASSURANCE
OFFICE OF VEHICLE SAFETY COMPLIANCE
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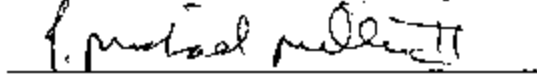
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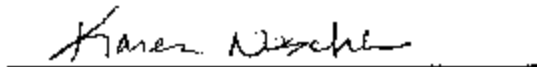


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16. Abstract A compliance test was conducted on the subject 2003 Volkswagen Passat 4-Door Sedan, NHTSA No. C35802, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201U compliance. The test was conducted at the MGA Research Corporation in Troy, Michigan on December 17-18, 2002. Test failures identified were as follows: NONE The data recorded seems to indicate that the 2003 Volkswagen Passat tested appears to comply with the requirements for FMVSS 201U which were set forth by the National Highway Traffic Safety Administration.			
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2003 Volkswagen Passat 4-Door Sedan, meets the performance requirements of FMVSS 201U, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted during December 17-18, 2002 on a 2003 Volkswagen Passat, manufactured by Volkswagen AG Germany (Volkswagen).

All tests were conducted in accordance with the U. S. Department of Transportation, National Highway Traffic Safety Administration's Laboratory Test Procedure TP-201U-01 dated April 3, 1998 and the corresponding MGA Research Corporation's FMVSS 201U procedure number MGATP201U_FRAME#2 dated October 18, 2001.

All tests were conducted at MGA Research Corporation in Troy, Michigan and were performed by MGA engineers and technicians. The FMVSS 201U impactor test machine was used to conduct the testing. Target locations were determined by using a Coordinate Measurement Machine in conjunction with the MGA EZ-Target™ program and MGA procedure MGATP201U_Test Series dated September 20, 2002. Per COTR instructions, only the passenger side of the vehicle was targeted and tested.

2.0 COMPLIANCE TEST DATA SUMMARY

The 2003 Volkswageon Passat was equipped with A, B, C, and D-Pillars, side rail curtain airbags, an adjustable seat belt anchorage on each B-Pillar, a grab handle above each front and rear door, a front sunroof console, and a map light located on the side rail above each rear door.

Upon completion of targeting the test vehicle, ten (10) targets were chosen to be impacted based upon engineering judgement and certification test data provided by Volkswagen. Targets were chosen which appeared most likely to give high HIC(d) values. The ten (10) targets chosen were:

AP1	OP2	UR2	UR5
AP3	SR2B	UR3	
BP4	SR3A	UR4	

The 2003 Volkswagen Passat tested appears to comply with the performance criteria for FMVSS 201U. The HIC(d) measured using the Part 572L (Free Motion Headform) was below 1000 for each tested component.

TABLE 2-1
SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 Volkswagen Passat 4-Door Sedan

VEH. NHTSA NO.: C35802 VIN: WVWPD63B63P252141 COLOR: Silver

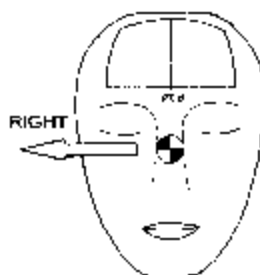
VEH. BUILD DATE: October, 2002 TEST DATE: December 17-18, 2002

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Michael Smith, David Gotwals

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP1	Right	111	31	18.6	543	499	16	3 Left
AP3	Right	159	45	19.1	608	585	17	0
BP4	Right	145	-4	23.9	679	680	15	7 Left
OP2	Right	90	6	23.6	521	470	16	3 Right
SR2B	Right	90	45	18.6	642	630	14	0
SR3A	Right	90	50	18.9	313	194	32	0
UR2	Right	90	50	23.7	516	464	31	10 Left
UR3	Right	65	47	23.7	702	709	23	1 Left
UR4	Right	90	50	23.6	439	362	30	0
UR5	Right	90	50	23.8	611	590	23	3 Left

Above and left/right refers to the position relative to reference pt. 0 where the target made contact with the Free Motion Headform. See the diagram below for details.



POST TEST COMMENTS:

The following description lists any post-test damage or other test observations for each target.

AP3: The pillar trim was compressed into the pillar.

SR3A: The grab handle was compressed into the side rail.

No damage was observed for any other targets.

REMARKS:

The targets listed were impacted in the following order:

Left: N/A

Right: BP4, OP2, UR3, UR2, UR4, SR3A, UR5, SR2B, AP3, AP1

At the request of the COTR, the test series was conducted under S6.2(b). For any target point located within the periphery of the stowed side airbag system, the impact speed was reduced to 19 kph for that test. The targets determined to be within the airbag system periphery were:

Left: N/A

Right: AP1, AP2, AP3, BP1, RP1, RP2, SR1, SR2A, SR2B, SR3A, SR3B

The 150 mm rule was observed for targets horizontal to each other and the 200 mm rule was observed for vertical components.

RECORDED BY: David G. Gotwals

DATE: December 17, 2002

APPROVED BY: Helen A. Kaleto

TABLE 2-2
GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2003 Volkswagen Passat 4-Door Sedan

VEH. NHTSA NO.: C35802 VIN: WVWPD63B63P252141 COLOR: Silver

VEH. BUILD DATE: October, 2002 TEST DATE: December 17-18, 2002

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Michael Smith, David Gotwals

INTERIOR TRIM INFORMATION: A, B, C, and D-Pillars, side rail curtain airbags, an adjustable seat belt anchorage on each B-Pillar, a grab handle above each front and rear door, a front sunroof console, and a map light located on the side rail above each rear door.

SUNROOF INFORMATION:

Installed: X Yes No
Operation: X Electric Manual

ROLL-BAR INFORMATION:

Installed: Yes X No
Padded: Yes X No
Braces: Yes X No

GENERAL INFORMATION:

Date Received: 12/12/02; Odometer Reading: 19 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Volkswagen AG Germany

Date of Manufacture: October, 2002 VIN: WVWPD63B63P252141

GVWR: 2030 kg;

GAWR FRONT: 1070 kg

GAWR REAR: 990 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 207 kpa REAR: 269 kpaRecommended Tire Size: 195/65R15

Recommended Cold Tire Pressure:

FRONT: 193 kpa REAR: 193 kpaSize of Tire on Test Vehicle: 195/65R15Type of Spare Tire: 195/65R15; Space Saver: ; Standard: X

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ; Bucket X; Split Bench Number of Occupants: Front 2; Rear 3; TOTAL 5VEHICLE CAPACITY WEIGHT (VCW) = 480 kgNo. of Occupants x 68 kg = 340 kgRated Cargo/Luggage Weight (RCLW) = 140 kg (difference)Maximum Cargo/Luggage Weight (RCLW) = 136 kg

WEIGHT OF TEST VEHICLE AS DELIVERED AT LABORATORY: (with maximum fluids)

Right Front = 442.0 kg Right Rear = 299.0 kgLeft Front = 433.0 kg Left Rear = 303.0 kgTOTAL FRONT = 875.0 kg TOTAL REAR = 602.0 kg% Total Weight = 59.2 % % Total Weight = 40.8 %TOTAL DELIVERED WEIGHT = 1477.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1477.0 kgMaximum Cargo/Luggage Wt. = 136.0 kgTARGET TEST WEIGHT 1613.0 kg

WEIGHT OF TEST VEHICLE:

Right Front =	<u>436.5</u> kg	Right Rear =	<u>369.5</u> kg
Left Front =	<u>433.5</u> kg	Left Rear =	<u>373.5</u> kg
TOTAL FRONT =	<u>870.0</u> kg	TOTAL REAR =	<u>743.0</u> kg
% Total Weight =	<u>53.9</u> %	% Total Weight =	<u>46.1</u> %
TOTAL TEST WEIGHT = <u>1613.0</u> kg			
Weight of ballast secured in vehicle's cargo area = <u>136.0</u> kg			

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 705 mm; Left Front 706 mm;
 Right Rear 714 mm; Left Rear 711 mm;
 Pitch Angle at Right Door Sill = 0.6° rear higher
 Pitch Angle at Left Door Sill = 0.5° rear higher
 Roll Angle at Front Bumper = 1.3° right higher
 Roll Angle at Rear Bumper = 0.3° right higher

FULLY LOADED: Right Front 705 mm; Left Front 706 mm;
 Right Rear 684 mm; Left Rear 682 mm;
 Pitch Angle at Right Door Sill = 0.1° rear higher
 Pitch Angle at Left Door Sill = 0.2° rear higher
 Roll Angle at Front Bumper = 1.1° right higher
 Roll Angle at Rear Bumper = 0.3° right higher

AS TARGETED:

Pitch Angle at Right Door Sill = 0.4° rear higher
 Pitch Angle at Left Door Sill = 0.3° rear higher
 Roll Angle at Front Bumper = 1.2° right higher
 Roll Angle at Rear Bumper = 0.3° right higher

AS TESTED (Targets Impacted on Right Side):

Pitch Angle at Right Door Sill = 0.4° rear higherPitch Angle at Left Door Sill = 0.3° rear higherRoll Angle at Front Bumper = 1.2° right higherRoll Angle at Rear Bumper = 0.3° right higherVEHICLE WHEELBASE = 2710 mm

REMARKS: The seat travel distance was measured to be 243 mm for the driver and passenger front seats.

RECORDED BY: David G. GotwalsDATE: December 17, 2002APPROVED BY: Helen A. Kaleto

TABLE 2-3
HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 Volkswagen Passat 4-Door Sedan

VEH. NHTSA NO.: C35802 VIN: WVWPD63B63P252141 COLOR: Silver

VEH. BUILD DATE: October, 2002 TEST DATE: December 17-18, 2002

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Michael Smith, David Gotwals

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195°-255°	L 201.7°	L 248.8°
	R 105°-165°	R 110.5°	R 159.1°
B-PILLAR	L 195°-345°	L 201.8°	L 288.7°
	R 15°-165°	R 71.5°	R 158.1°

AS DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: David G. Gotwals

DATE: December 17, 2002

APPROVED BY: Helen A. Kaleto

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2003 Volkswagen Passat 4-Door SedanVEH. NHTSA NO.: C35802 VIN: WVWPD63B63P252141 COLOR: SilverVEH. BUILD DATE: October, 2002 TEST DATE: December 17-18, 2002TEST LABORATORY: MGA Research CorporationOBSERVERS: Michael Smith, David Gotwals

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE		MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	R	0°-50°	R 0°	R 50°
	FH2	R	0°-50°	R 0°	R 50°
SIDE RAIL	SR1	R	0°-50°	R 0°	R 31°
	SR2A	R	0°-50°	R 0°	R 45°
	SR2B	R	0°-50°	R 0°	R 45°
	SR3A	R	0°-50°	R 0°	R 50°
	SR3B	R	0°-50°	R 0°	R 50°
REAR HEADER	RH	R	0°-50°	R 0°	R 50°
A-PILLAR	AP1	R	-5°-50°	R -5°	R 31°
	AP2	R	-5°-50°	R -5°	R 50°
	AP3	R	-5°-50°	R -5°	R 45°
B-PILLAR	BP1	R	-10°-50°	R -10°	R 19°
	BP2*	R	0°-50°	R 0°	R 17°
	BP3	R	-10°-50°	R -10°	R 0°
	BP4	R	-10°-50°	R -10°	R -4°
OTHER PILLAR	OP1	R	-10°-50°	R -10°	R 34°
	OP2	R	-10°-50°	R -10°	R 6°
REAR PILLAR	RP1	R	-10°-50°	R -10°	R 7°
	RP2	R	-10°-50°	R -10°	R -4°
UPPER ROOF 1			0°-50°	0°	50°

UPPER ROOF 2	0°-50°	0°	50°
UPPER ROOF 3	0°-50°	0°	47°
UPPER ROOF 4	0°-50°	0°	50°
UPPER ROOF 5	0°-50°	0°	50°

As determined using the Procedures specified in S8.13.4.2. The target BP2 is a seat belt anchor point.

RECORDED BY: David G. Gotwals

DATE: December 17, 2002

APPROVED BY: Helen A. Kaleto

TABLE 2-5
TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 Volkswagen Passat 4-Door Sedan

VEH. NHTSA NO.: C35802 VIN: WVWPD63B63P252141 COLOR: Silver

VEH. BUILD DATE: October, 2002 TEST DATE: December 17, 2002

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Michael Smith, David Gotwals

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	243 mm	243 mm
T°	Horizontal ∠ {CG-F1 (Left Seat) to (Right A-Pillar)}	111.2°	--
A1°	360° - T°	248.8°	--
W°	Horizontal ∠ {CG-2 (Left Seat) to (Left A-Pillar)}	201.7°	--
A2°	A2° = W°	201.7°	--
U°	Horizontal ∠ {CG-2 (Left Seat) to (Left B-Pillar)}	288.7°	--
B1°	B1° = U°	288.7°	--
V°	Horizontal ∠ {CG-R (Left Seat) to (Left B-Pillar)}	201.8°	--
B2°	B2° = V°	201.8°	--
W° (right)	Horizontal ∠ {CG-F2 (Right Seat) to (Right A-Pir)}	--	159.1°
A1° (right)	A1° (right) = W° (right)	--	159.1°
T° (right)	Horizontal ∠ {CG-F1 (Right Seat) to (Left A-Pillar)}	--	249.5°
A2° (right)	360° - T° (right)	--	110.5°
V° (right)	Horizontal ∠ {CG-R (Right Seat) to (Right B-Pillar)}	--	158.1°
B1° (right)	B1° (right) = V° (right)	--	158.1°
U° (right)	Horizontal ∠ {CG-F2 (Right Seat) to (Right B-Pir)}	--	71.5°
B2° (right)	B2° (right) = U° (right)	--	71.5°
J	A-Pillar {(Plane 3) - (Plane 5)}	--	363.4 mm
J/2	J + 2	--	181.7 mm
D1	Upper Roof {(Plane A) - (Plane B)}	1623.1 mm	
D1/2	D1 + 2	811.6 mm	
D2	Upper Roof {(Plane C) - (Plane D)}	1110.8 mm	

Measurement	Description	Left Side	Right Side
D2/2	D2 + 2	555.4 mm	
.35D1	.35 x D1	568.1 mm	
.35D2	.35 x D2	388.8 mm	
N	B-Pillar {(BPR) - (lowest point on daylight opening forward of B-Pillar)}	--	398.8 mm
N/2	B-Pillar {(BP3) - (lowest point on daylight opening forward of B-Pillar)}	--	199.4 mm
N/4	B-Pillar {(BP4) - (lowest point on daylight opening forward of B-Pillar)}	--	99.7 mm
Q	O-Pillar (Plane 13 - Place 14)	--	343.4 mm
Q/2	Q/2	--	171.7 mm
D	R-Pillar (Point 7 - Point M)	--	690 mm
3D/7	3D/7	--	295.7 mm

As determined using the Procedures specified in S10.1-10.13.

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1274.0	-350.0	203.0	1274.0	350.0	203.0
Rear	2123.0	-350.0	203.0	2123.0	350.0	203.0

SgRP Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1823.4	-350.5	822.4	1823.7	349.7	822.4
Rear	2671.9	-350.7	822.1	2672.2	349.6	822.1

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	1740.4	-350.5	1482.4	1740.7	349.7	1482.4
CGF2	1983.4	-350.5	1482.4	1983.7	349.7	1482.4
CGR	2831.9	-350.7	1482.1	2832.2	349.6	1482.1

REMARKS:

RECORDED BY: David G. GotwalsDATE: December 17, 2002APPROVED BY: Helen A. Kaleto

TABLE 2-6
SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2003 Volkswagen Passat 4-Door Sedan

VEH. NHTSA NO.: C35802 VIN: WVWPD63B63P252141 COLOR: Silver

VEH. BUILD DATE: October, 2002 TEST DATE: December 17, 2002

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Michael Smith, David Gotwals

SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
A-Pillar Right Side								
AP1	1032.2	494.2	1000.8			Yes		
REL	1057.9	508.0	957.0	111	31		2	Yes
AP2	960.8	542.6	912.4	159	50	No		No
AP3	802.4	609.7	819.0	159	45	No		Yes
B-Pillar Right Side								
BP1	1592.1	458.8	1034.5	90	19	No		No
BP2	1565.3	589.2	826.8	90	17	No		No
BP3	1509.3	609.0	835.1	80	0	No		No
BP4	1623.4	861.8	735.6	145	-4	No		Yes
Other Pillar Right Side								
OPR	2332.0	405.9	1019.3					
OP1	2332.0	405.9	1019.3	90	34	No		No
OP2	2363.4	582.9	848.5	90	6	No		Yes
Rear Pillar Right Side								
RP1	2372.5	469.2	988.0	80	7	No		No
RP2	2601.6	567.2	837.9			Yes		
REL	2577.8	524.5	891.7	90	-4		3	No
Front Header Right Side								
FH1	955.4	371.3	986.0	150	50	No		No

SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
FH2	933.3	223.6	995.9	180	50	No		No
Side Rail Right Side								
SR1	1182.3	469.8	1000.1	90	31	No		No
SR2(A)	1331.7	472.1	1031.9			Yes		
REL	1334.0	488.4	1006.2	90	45		1	No
SR2(B)	1282.6	472.1	1027.8			Yes		
REL	1292.6	485.9	1002.7	90	45		1	Yes
SR3A	1946.0	449.2	1020.0	90	50	No		Yes
SR3B	2112.9	464.7	1001.3	90	50	No		No
Rear Header Right Side								
RH	2349.5	350.5	1022.8	0	50	No		No
Upper Roof Left Side								
UR1	1682.2	389.2	1637.9	90	50	No		No
UR2	2147.5	387.1	1657.6	90	50	No		Yes
UR3	2802.2	384.2	1660.2	65	47	No		Yes
UR4	1758.2	390.7	1038.8	90	50	No		Yes
UR5	2103.7	384.9	1020.9	90	50	No		Yes

As determined using the Procedures specified in S10.1-10.13.

REMARKS: The horizontal and vertical approach angles listed in this table are the impact angles judged by the test engineer most likely to give high HIC(d) values.

RECORDED BY: David G. Gotwals

DATE: December 17, 2002

APPROVED BY: Helen A. Kaleto

C35802
FM2404
R/S AP1
11/1/01

MGA RESEARCH CORP
FMVSS 201U TESTING
2001 VOLKSWAGEN
PASSAT

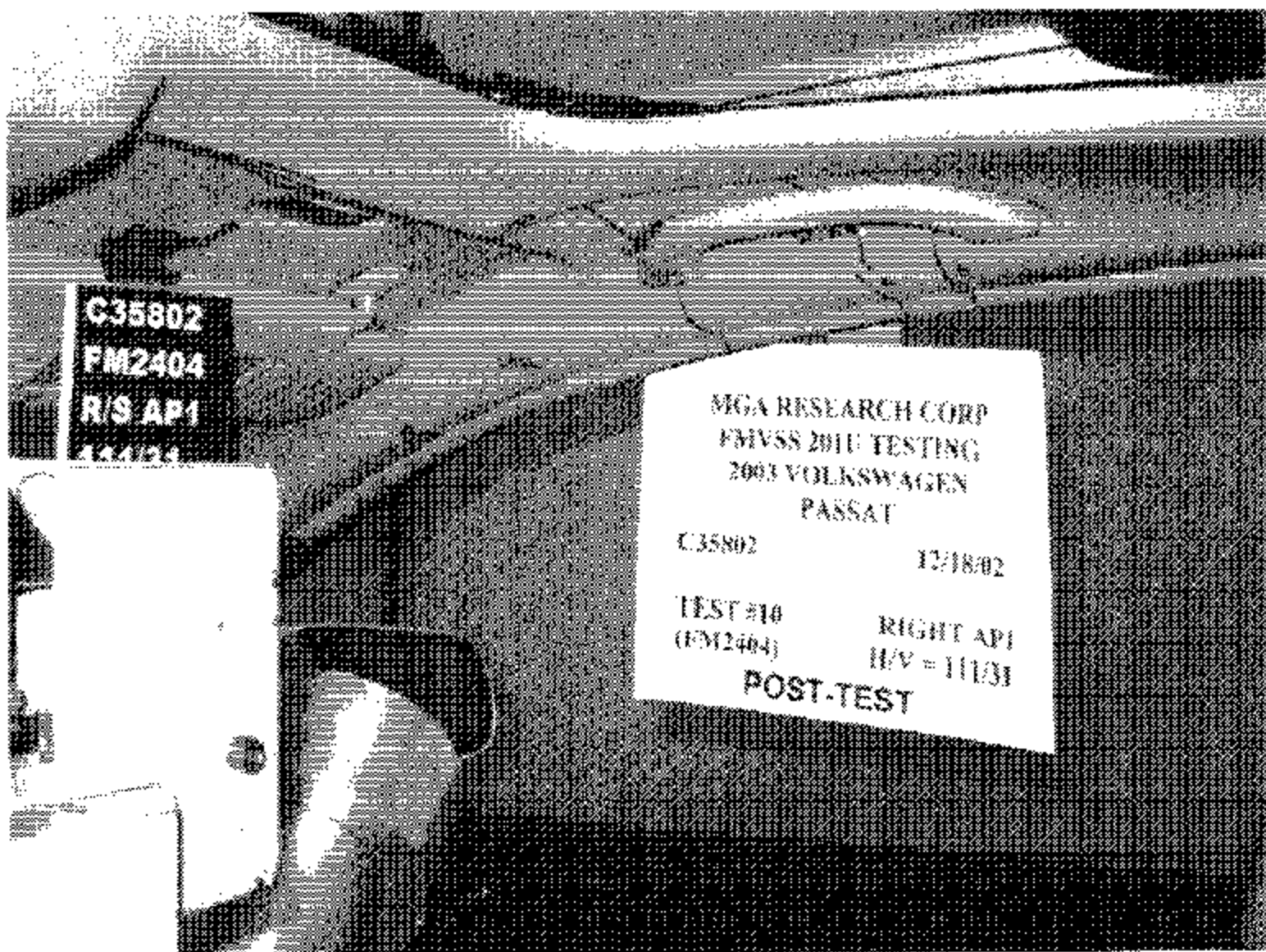
C35802

12/18/02

TEST #10
(FM2404)

RIGHT API
HV = 11/2/01

PRE-TEST



MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/18/02

TEST #10
(FM2404)

RIGHT API
H/V = 111/31

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES: MGATP201U_FRAME #2.3

DOC. NO.: MGATP201U_FRAME #2
REVISION NO.: 4
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: C35802 VEHICLE YR/MAKE/MODEL: 2003 Volkswagen Passat

GENERAL TEST PARAMETERS:

Test Number: 10

Target (Vehicle Side): left/right APL

Temperature: 75 °C

MGA Test Reference No.: Em2824

Humidity: 22 %

Approach Angles: Horizontal 11 °

Time of Test: 1:55 am/pm pm

Vertical 31 °

FMH Serial No: 35

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
543	479	4.3	18.6	16	3

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-93.1	1.21	1.21
Y	6	J35915	95.3	1.23	1.23
Z	7	J31051	95.1	1.51	1.51

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.): _____

NO VISIBLE DAMAGE

Recorded By: D/K Approved By*: _____ Date: 12/18/02

*Only necessary for NHTSA (Government) Compliance testing.

RESULTS OF HIC36 PROGRAM

The input file is \NHTSA\FM2404AV.A05

e HIC = 499.08 calculated over 4.3 msec

T1 = 5.98 msec T2 = 10.26 msec

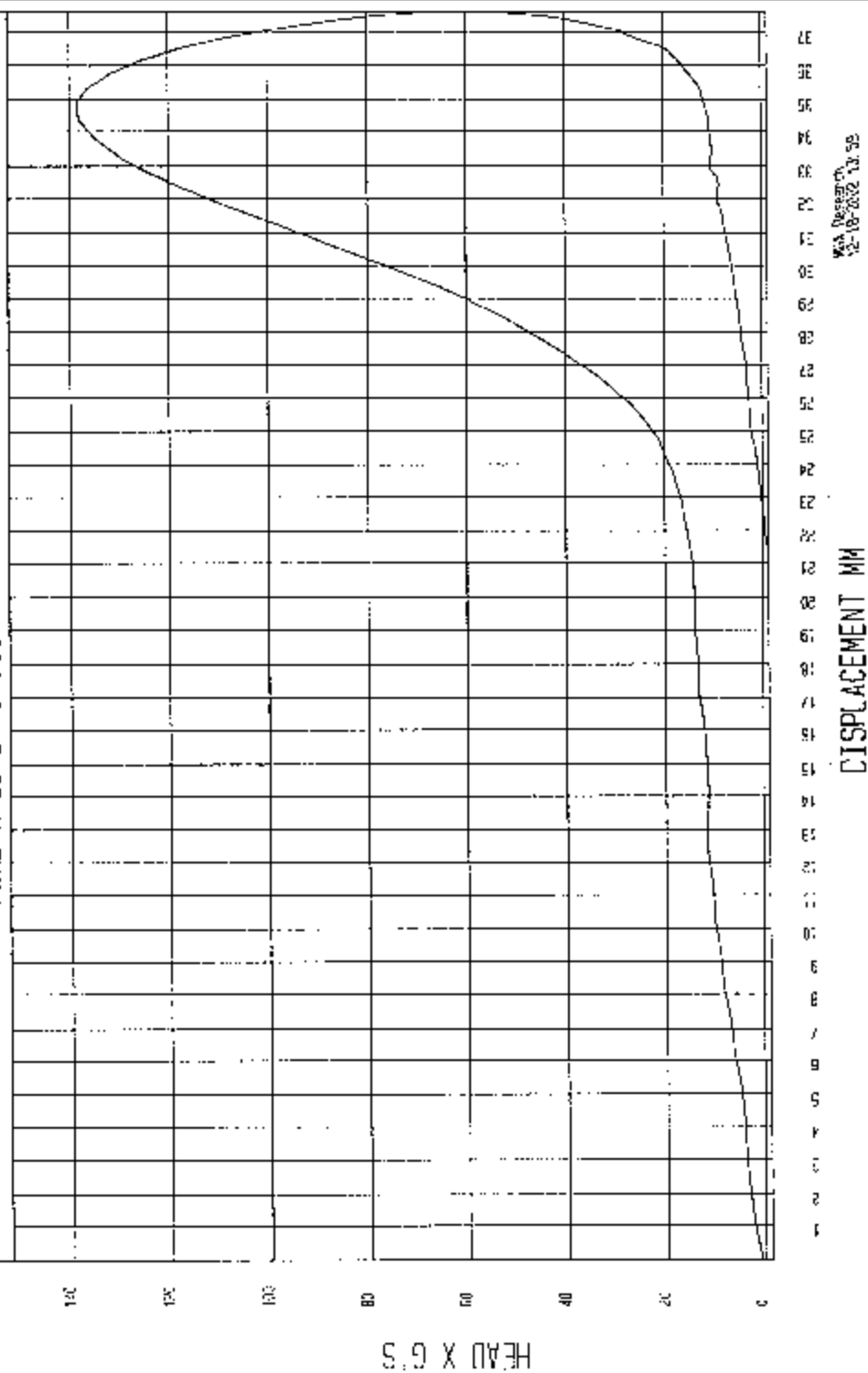
HIC(d) = 543

Impact Velocity = 18.6 (kph)

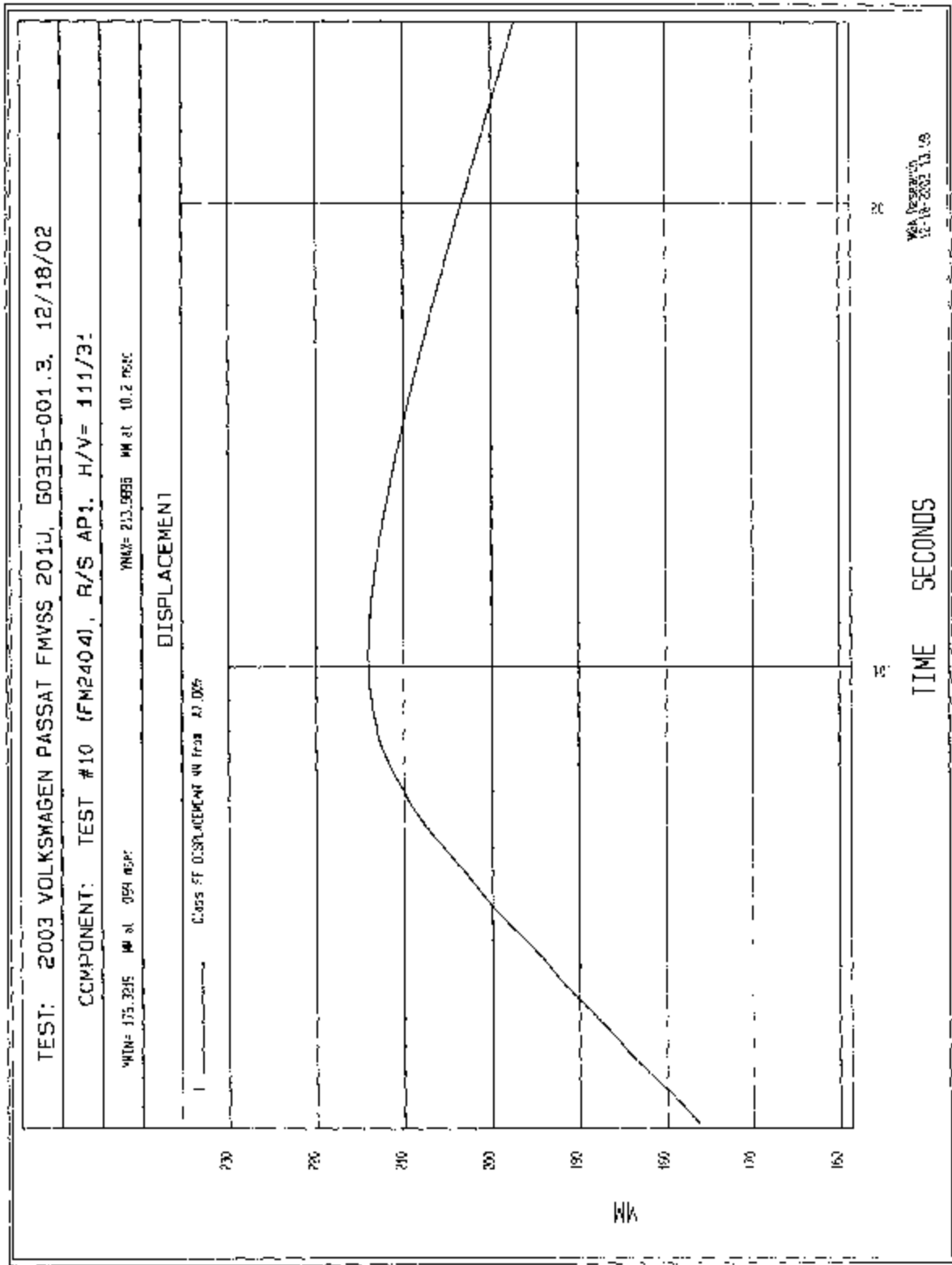
TEST: 2003 VOLKSWAGEN PASSAT FMYSS 201U, 60315-001.3, 12/18/02

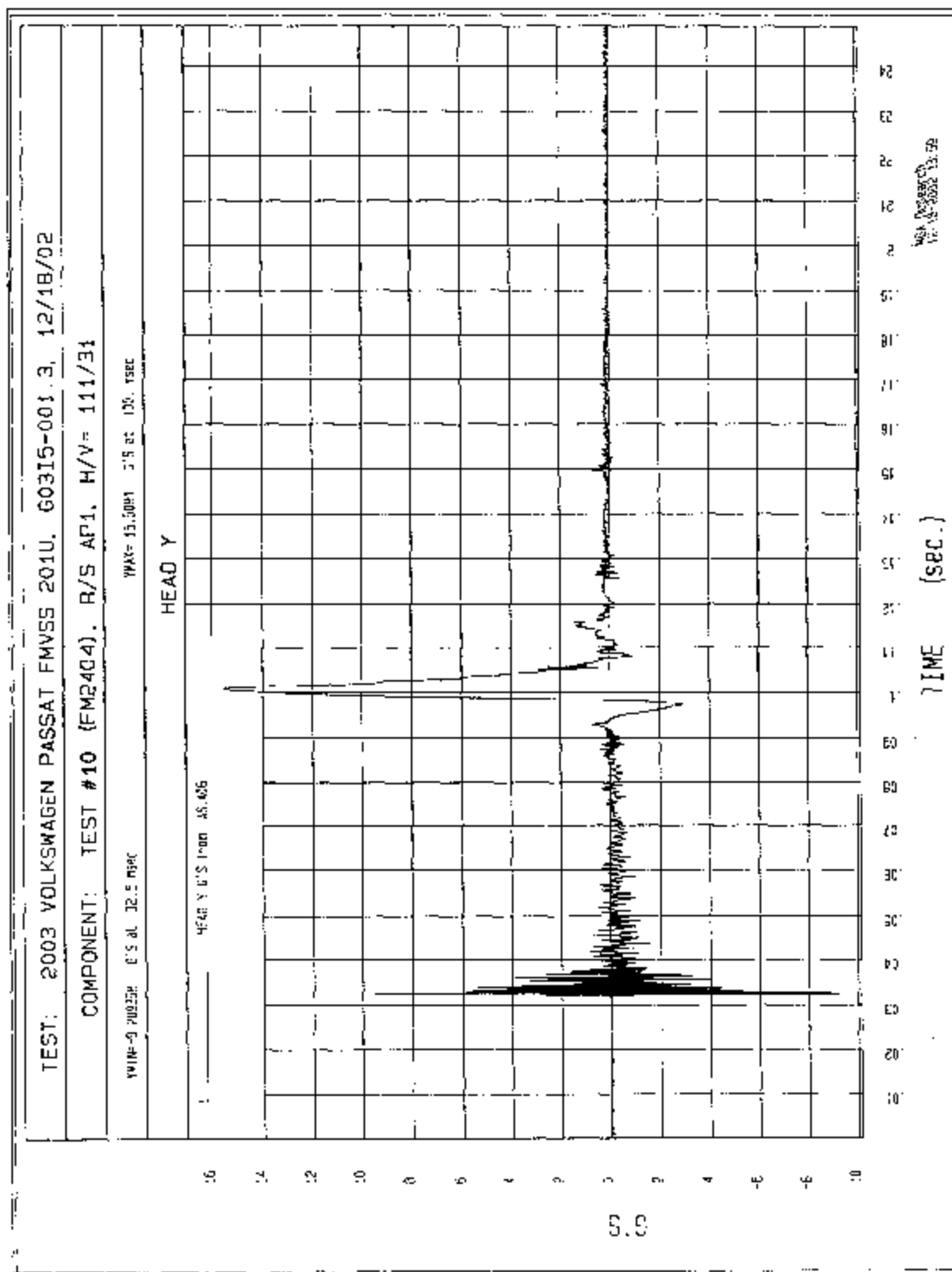
COMPONENT: TEST #10 (FM2404), R/S AP1, R/V= 111/31

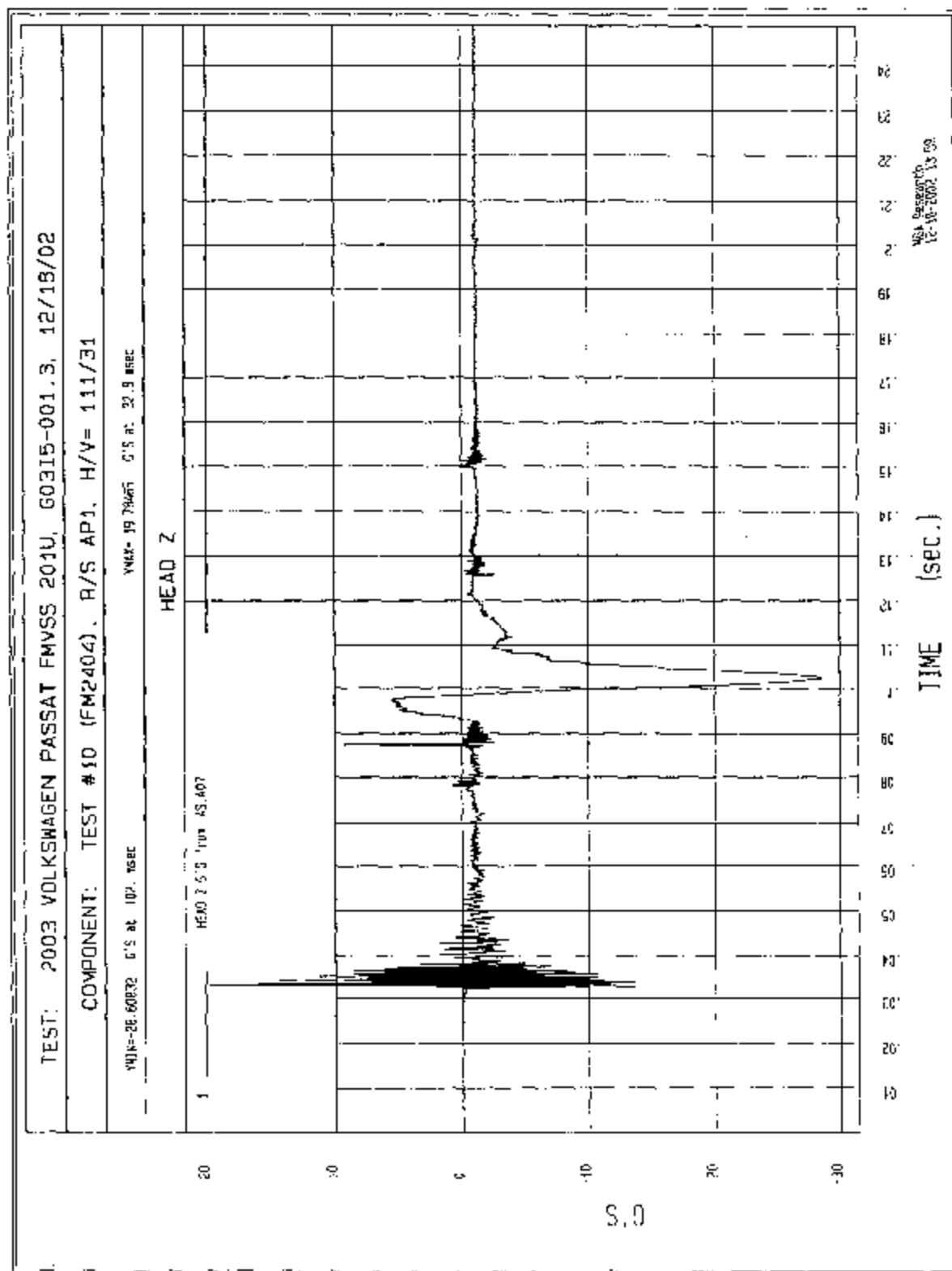
HEAD X as a function of DISPLACEMENT



W&A Research
12-18-02 13:59







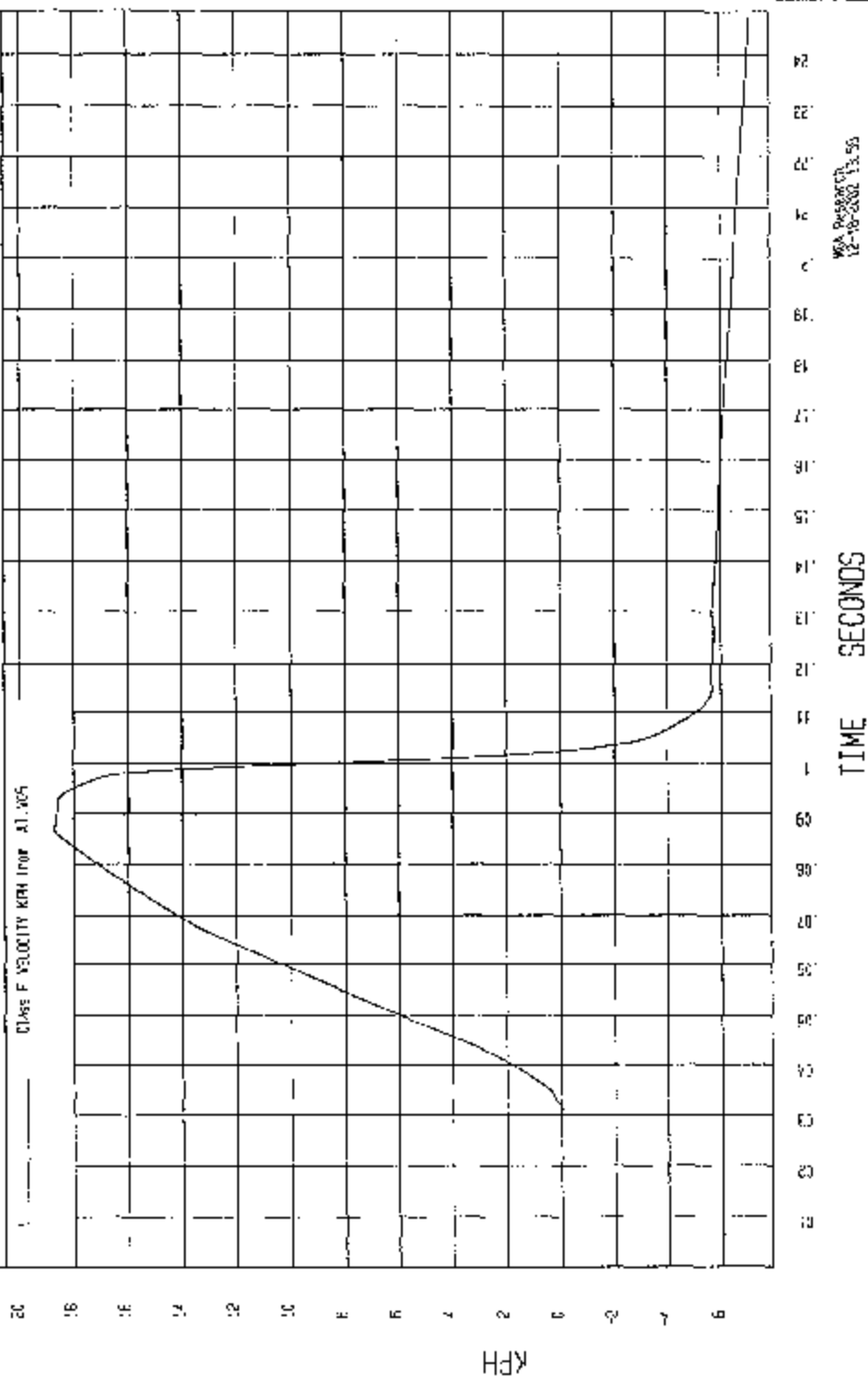
TEST: 2003 VOLKSWAGEN PASSAT FMYSS 201U, G0315-001.3, 12/18/02

COMPONENT: TEST #10 (FM2404), R/S AP1, H/V= 111/31

WIND=7.1325% MPH at 243 msec

*MAX= 18.72325 MPH at 07.198sec

VELOCITY



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FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

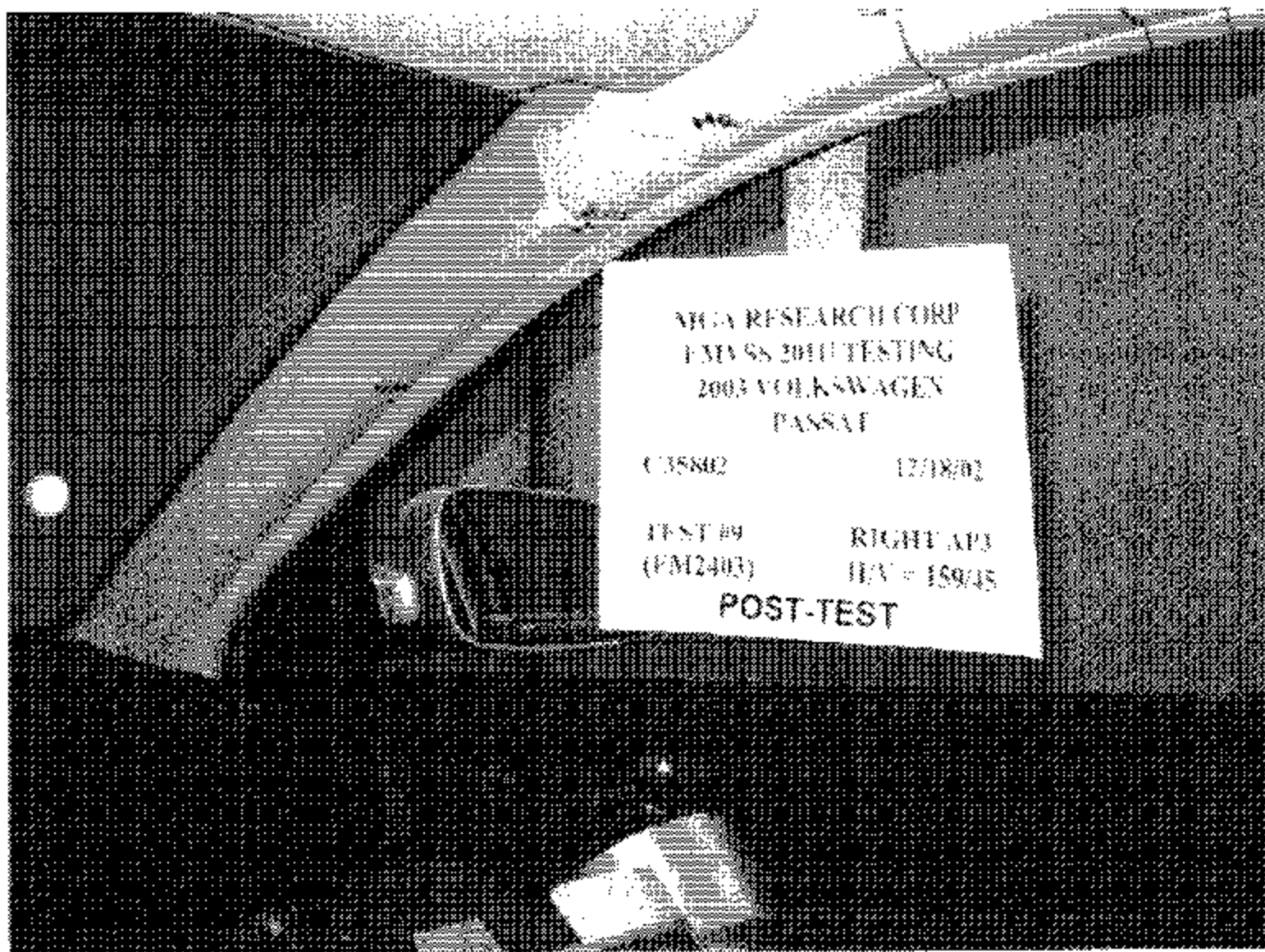
C35802

12/18/02

TEST #9
(FM2403)

RIGHT AP3
H/V = 159/45

PRE-TEST



**MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT**

C35802

12/18/02

**TEST #9
(FM2403)**

**RIGHT AP3
H/V = 159/45**

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES: MGATP201U_FRAME #2.3

DOC. NO.: MGA1P201U_FRAME #2
REVISION NO.: 4
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO.: 135402 VEHICLE YR/MAKE/MODEL: 2003 VOLVO S40 2.0 PASS/1

GENERAL TEST PARAMETERS:

Test Number: 9

Target (Vehicle Side): left/right AP.3

Temperature: 73 °F/°C

MGA Test Reference No.: FM2403

Humidity: 22 %

Approach Angles: Horizontal 155 °

Time of Test: 1:20 am/pm pm

Vertical 55 °

FMH Serial No: 33

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
<u>608</u>	<u>585</u>	<u>54</u>	<u>19.1</u>	<u>17</u>	<u>0</u>

INSTRUMENTAION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
<u>X</u>	<u>5</u>	<u>J36197</u>	<u>-108.2</u>	<u>1.21</u>	<u>1.21</u>
<u>Y</u>	<u>6</u>	<u>J36193</u>	<u>102.0</u>	<u>1.23</u>	<u>1.23</u>
<u>Z</u>	<u>7</u>	<u>J36353</u>	<u>97.5</u>	<u>1.51</u>	<u>1.51</u>

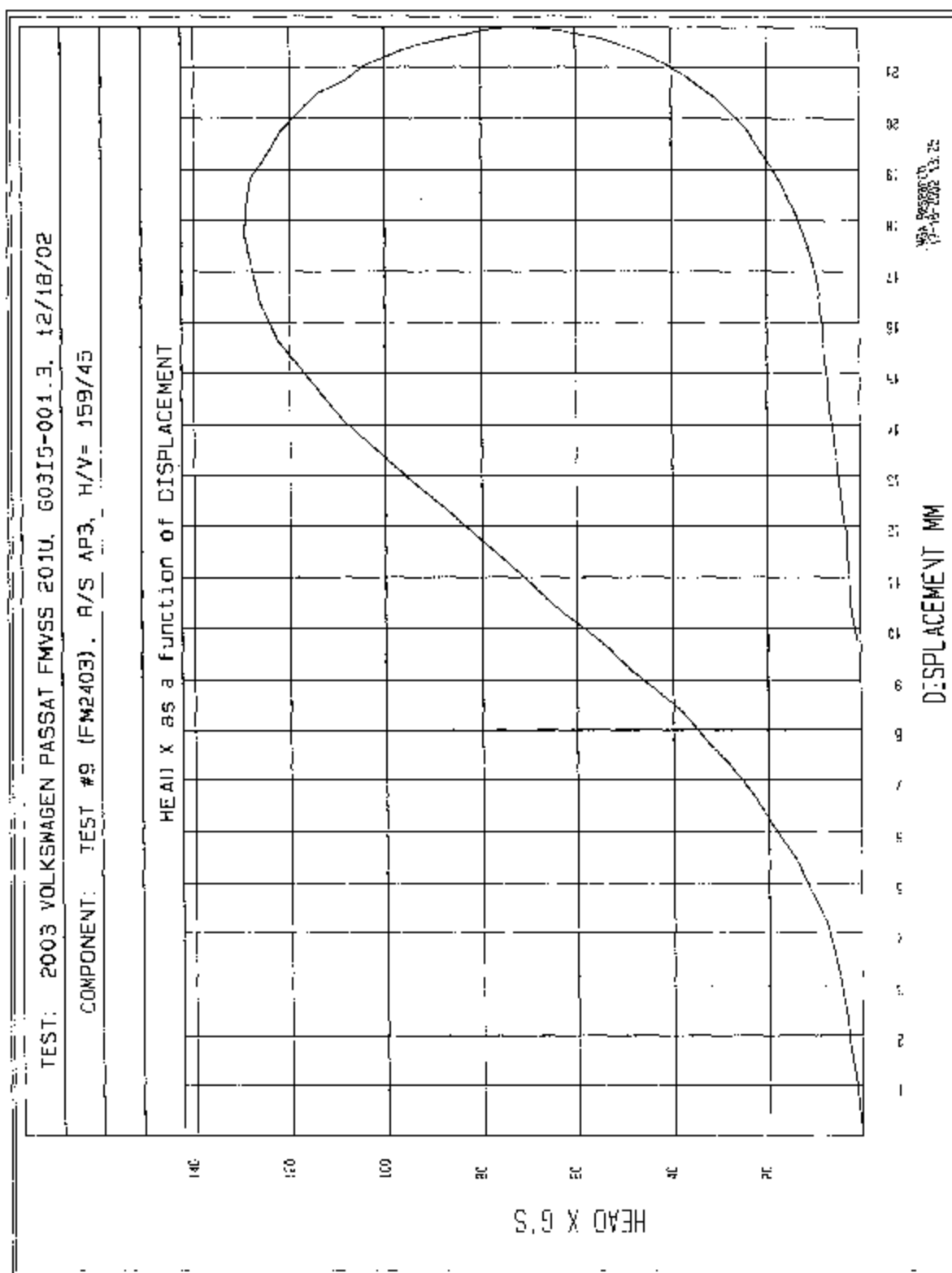
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

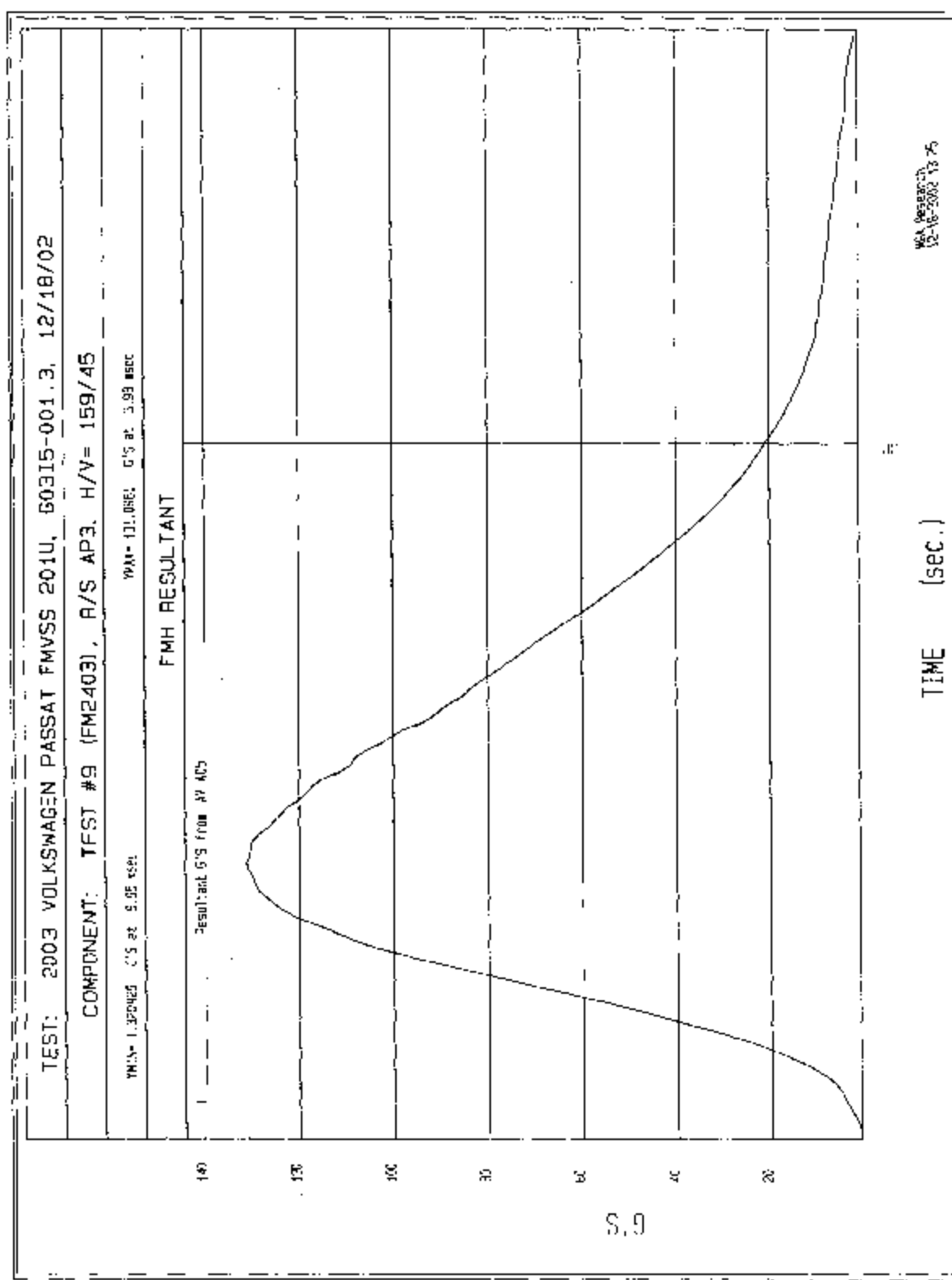
ALL PULPIL TRIM WAS COMPRESSED INTO PULPIL

Recorded By: [Signature] Approved By*: [Signature] Date: 10/18/01

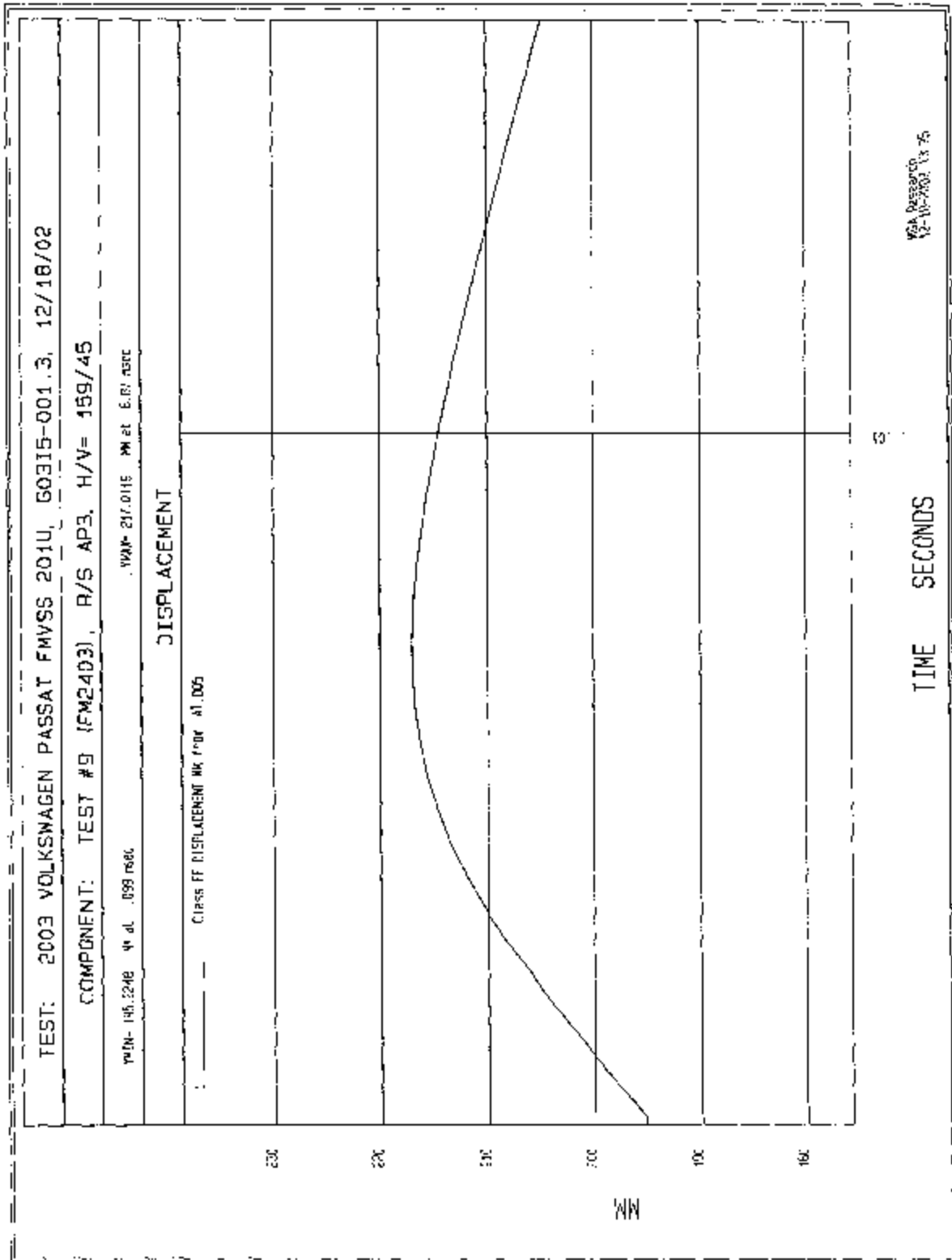
*Only necessary for NHTSA (Government) Compliance testing.

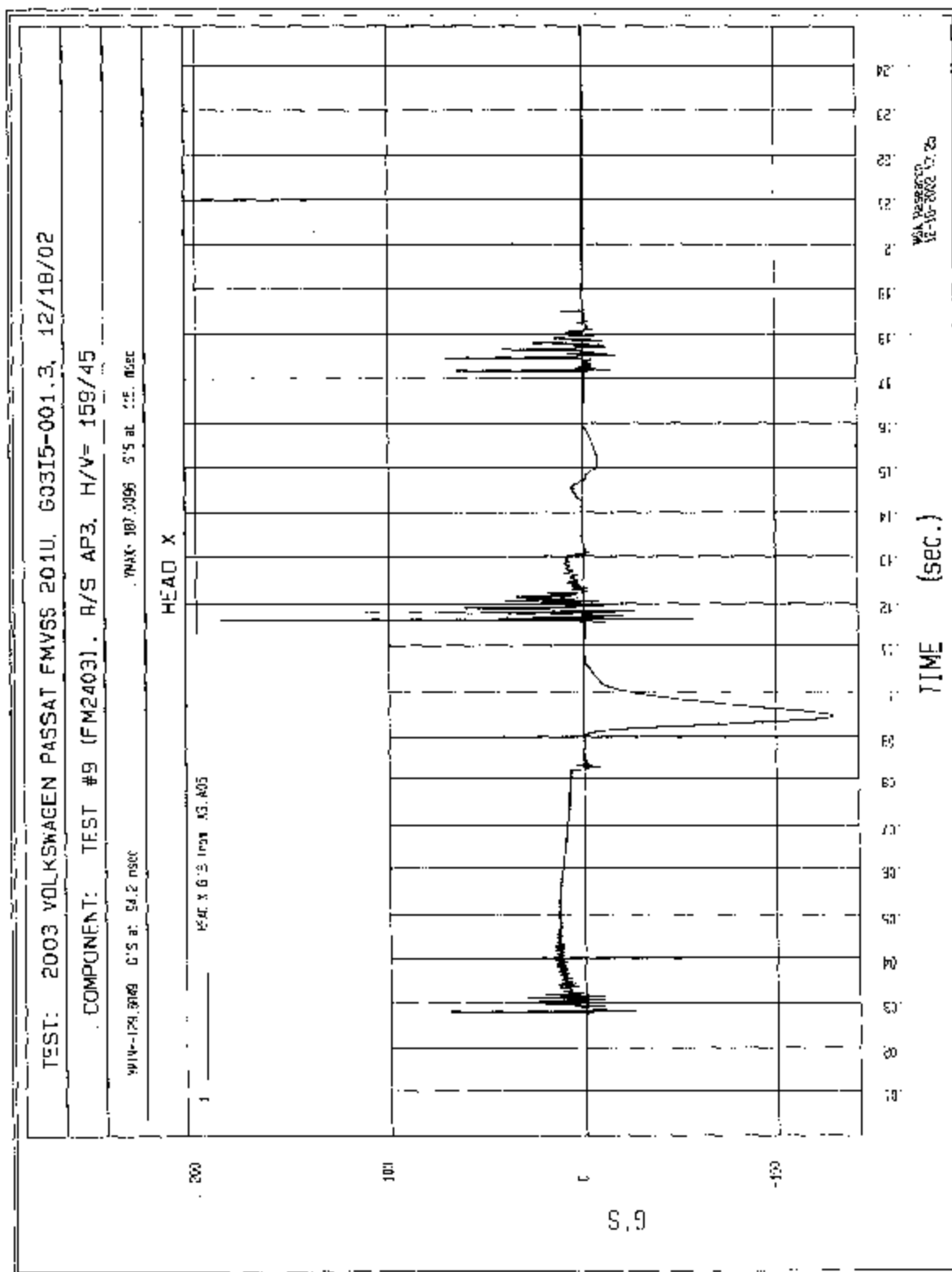
```
*****
RESULTS OF HIC36 PROGRAM
*****
input file is \NHTSA\FM2403AV.A05
HIC = 585.39 calculated over 5.4 msec
T1 = 1.99 msec T2 = 7.37 msec
*****
HIC(d) = 608
Impact Velocity = 19.1 (kph)
```

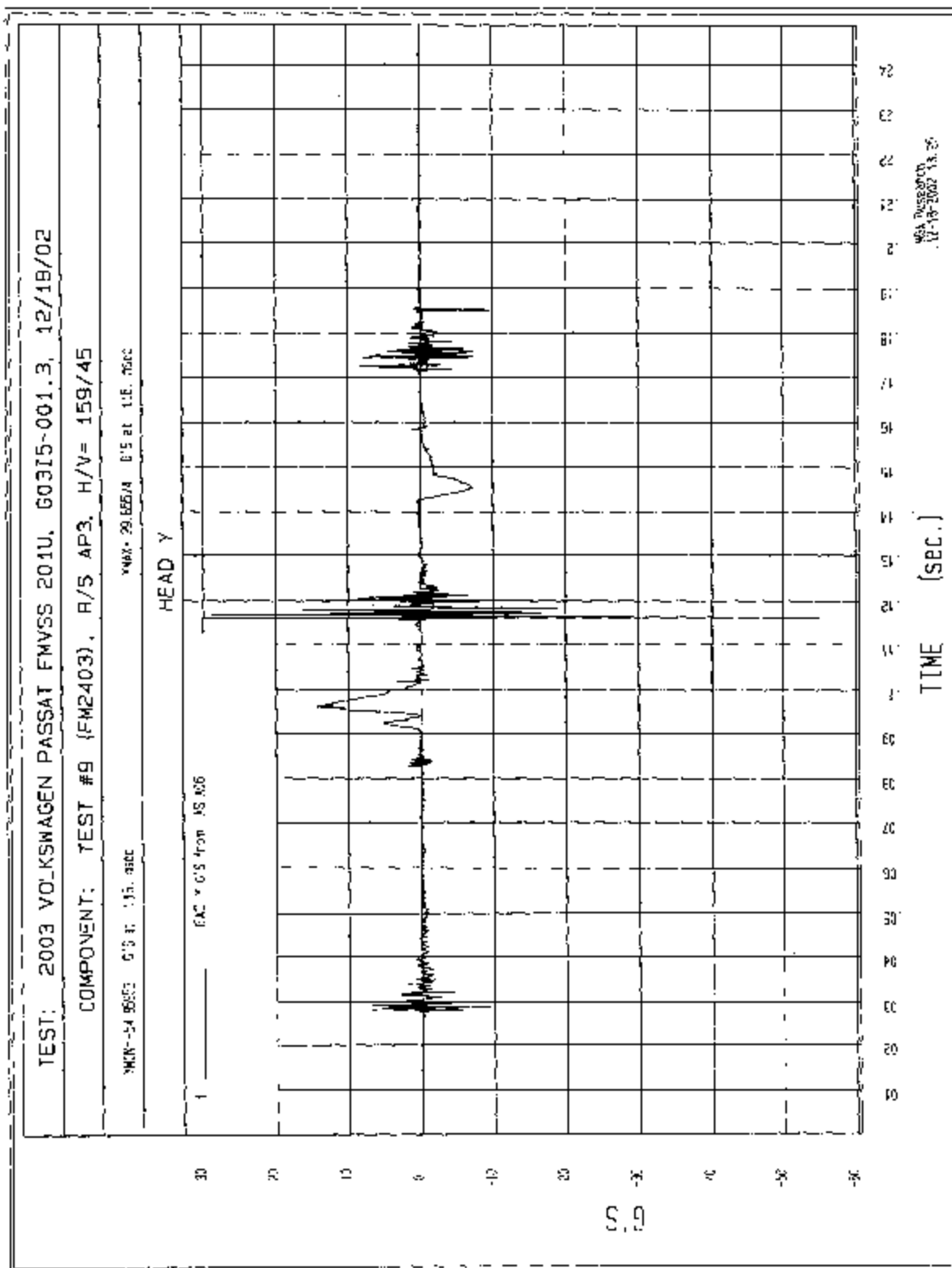


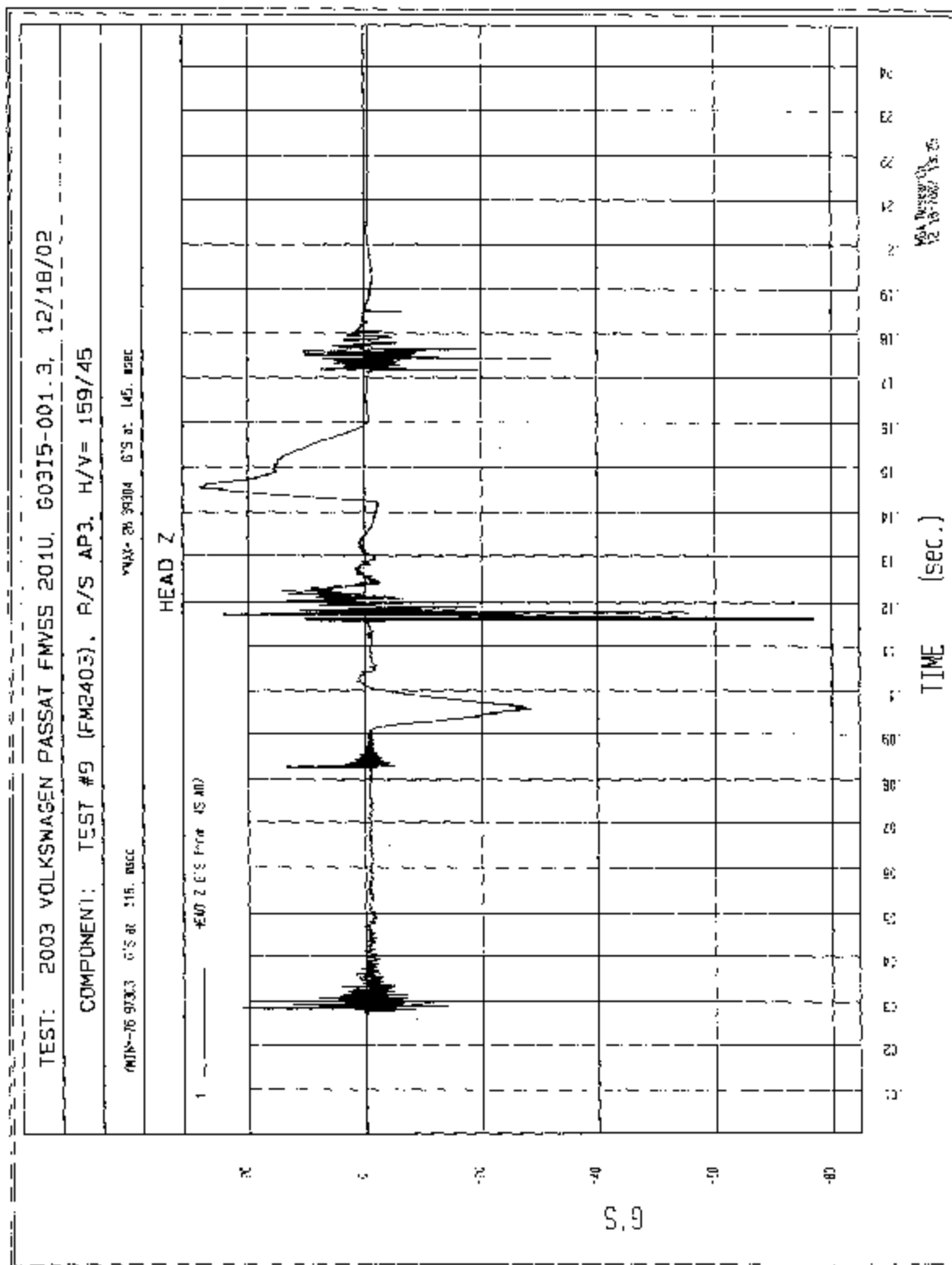


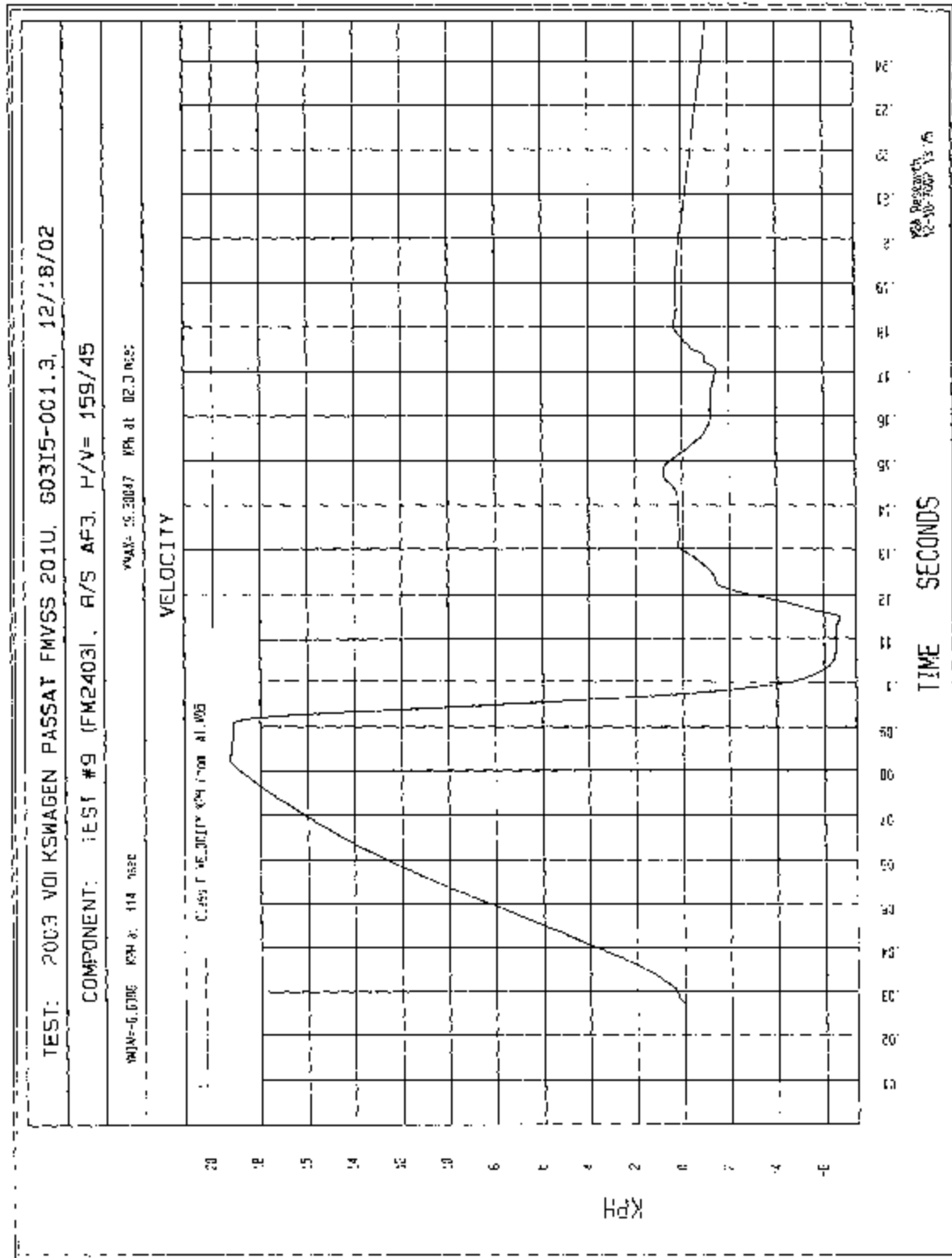
WGA Research
12-18-2002 13:45

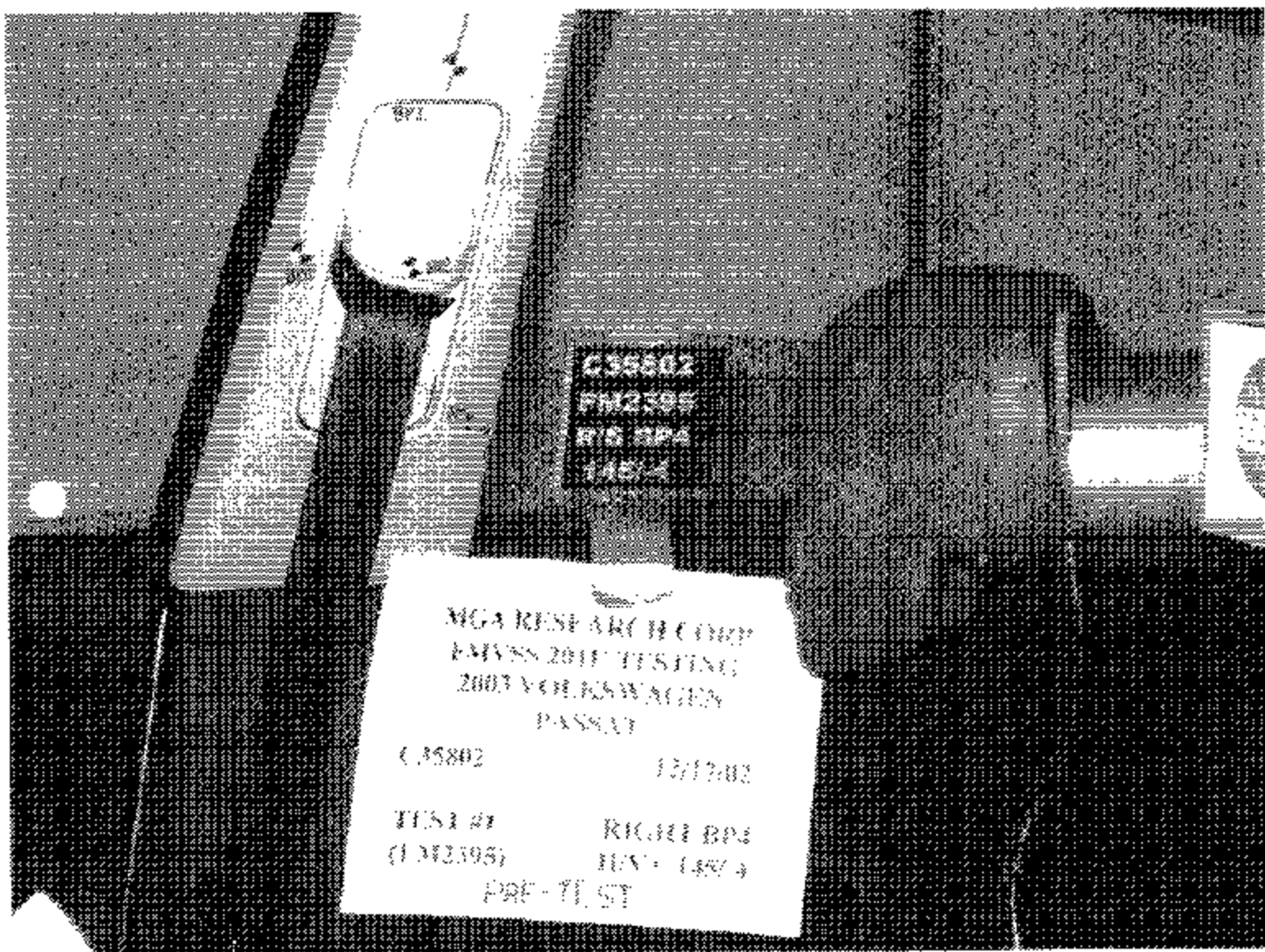












BVL

C35802

FM2395

RIG BPA

14874

MGA RESEARCH CORP.
EMVSS 2011 TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/17/02

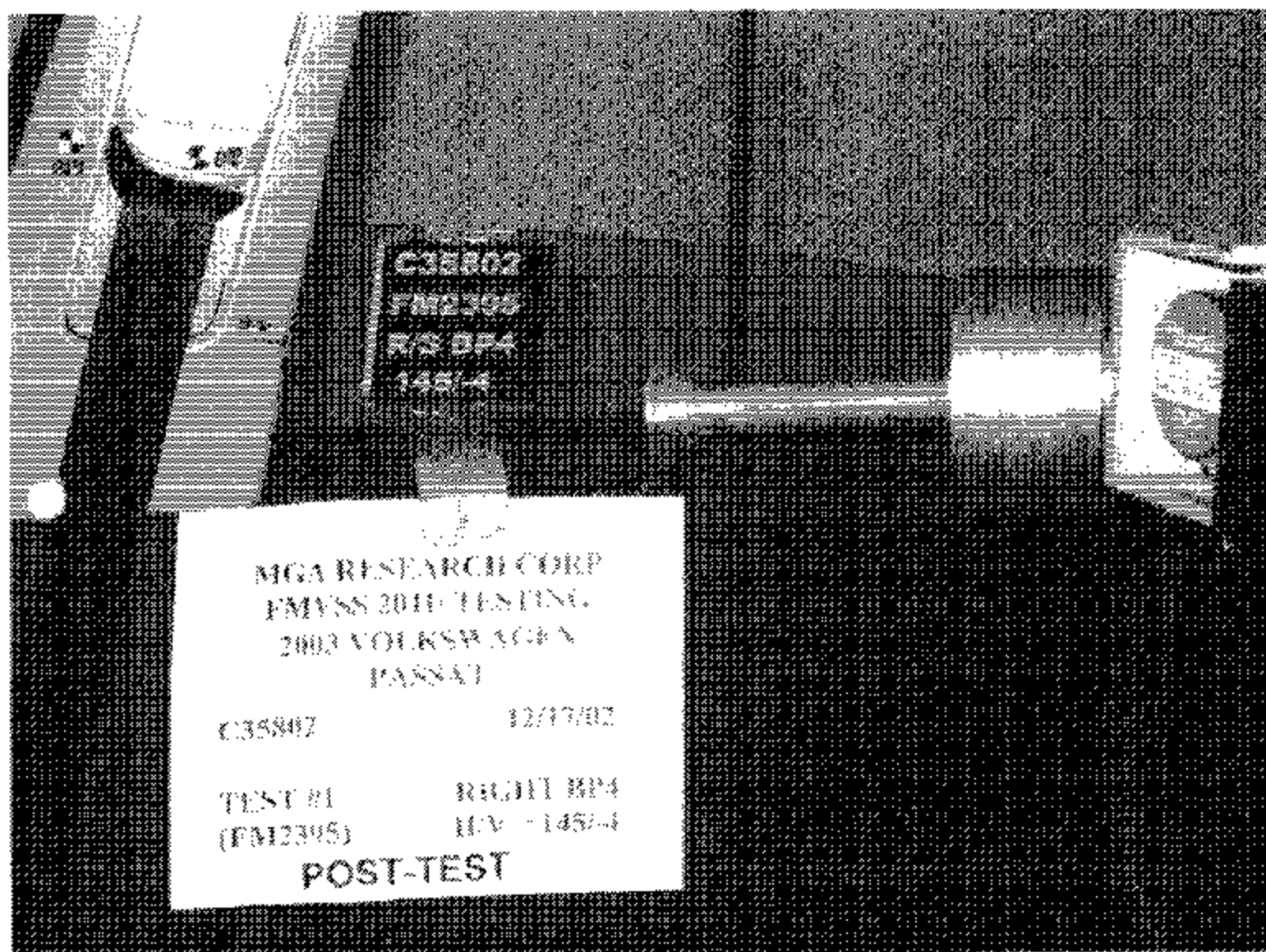
TEST #1

RIG BPA

(1312395)

REV: 14874

PRE-TEST



**MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT**

C35802

12/17/02

**TEST #1
(FM12395)**

**RIGHT BP4
H/V = 145/-4**

POST-TEST

MICHIGAN OPERATIONS
 DATE: 10/18/01
 SUPERCHOOES: MGATP201U_FRAME #2.3

DOC. NO.: MGATP201U_FRAME #2
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO.: C 35872 VEHICLE YR/MAKE/MODEL: 2003 Vauxhall Astra+

GENERAL TEST PARAMETERS:

Test Number: 1

Target (Vehicle Side): left/right BP4

Temperature: 74 °F

MGA Test Reference No.: FM2395

Humidity: 22 %

Approach Angles: Horizontal 195 °

Time of Test: 12:28 am/pm

Vertical -4 °

FMH Serial No: 35

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
679	680	5.6	23.9	15	7

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-93.1	1.21	1.21
Y	6	J35919	95.3	1.23	1.23
Z	7	J31051	99.1	1.51	1.51

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.): _____

NO VISIBLE DAMAGE

Recorded By: [Signature] Approved By*: _____ Date: 12/11/02

*Only necessary for NHTSA (Government) Compliance testing.

RESULTS OF HIC36 PROGRAM

input file is \NETSA\FM2395AV.A05

the HIC = 679.50 calculated over 5.6 msec

T1 = 2.79 msec T2 = 8.37 msec

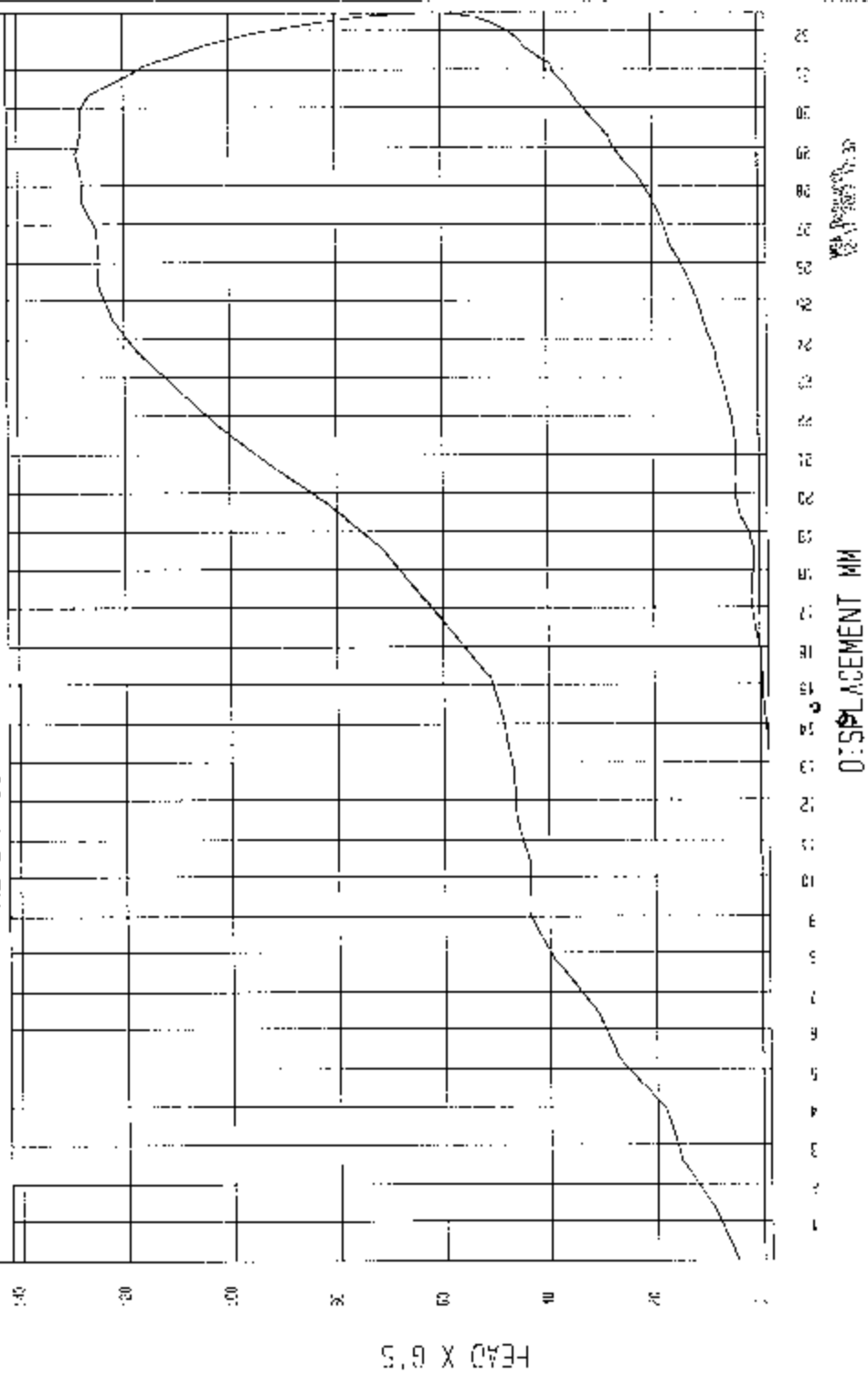
HIC(d) = 679

Impact Velocity = 23.9 (kph)

TEST: 2003 VOLKSWAGEN PASSAT FMVSS 201J, G03I5-001.3, 12/17/02

COMPONENT: TEST #1 (FM2395), R/S HP4, H/V=145/-4

HEAD X as a function of DISPLACEMENT



TEST: 2003 VOLKSWAGEN PASSAT FMYSS 201U, G0315-001.3, 12/17/02

COMPONENT: TEST #1 (FM2395), R/S HP4, H/V=145/-4

WIX- 1.20555 6'S at 17.5 950C

WIX- 134 5500 5'S at 5.77 950C

FMH RESULTANT

Resultant 5.0 4000 40 0.25

140

120

100

80

60

40

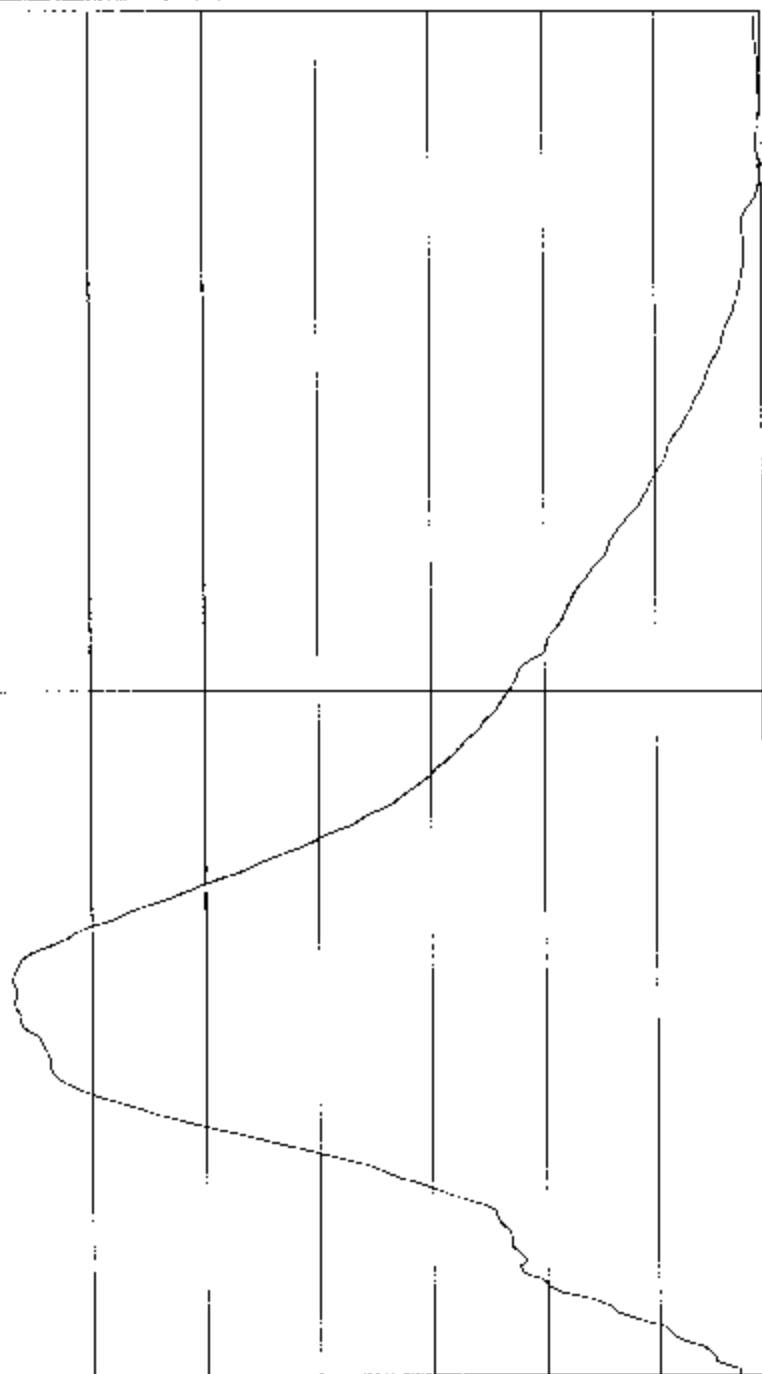
20

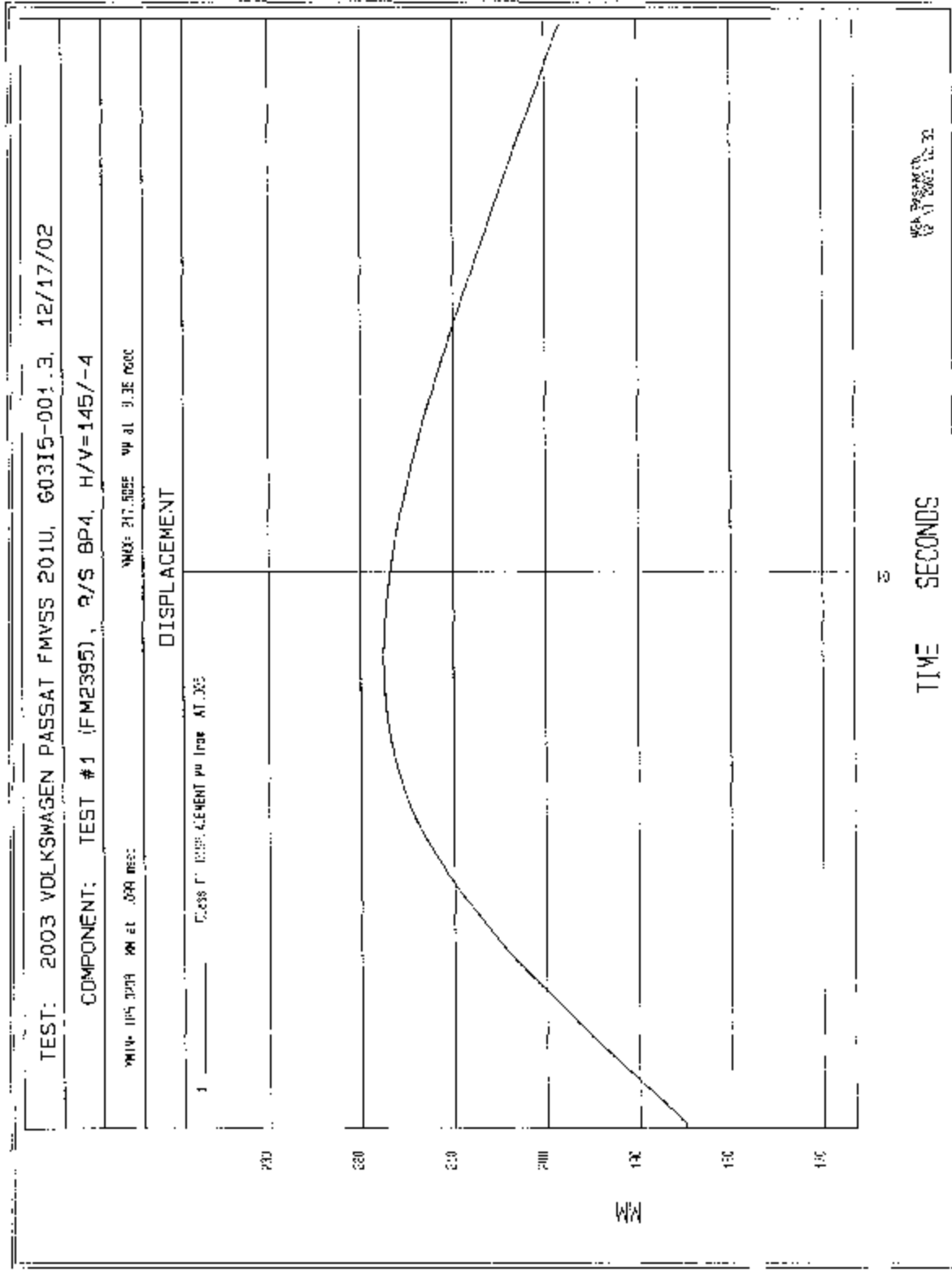
S.S

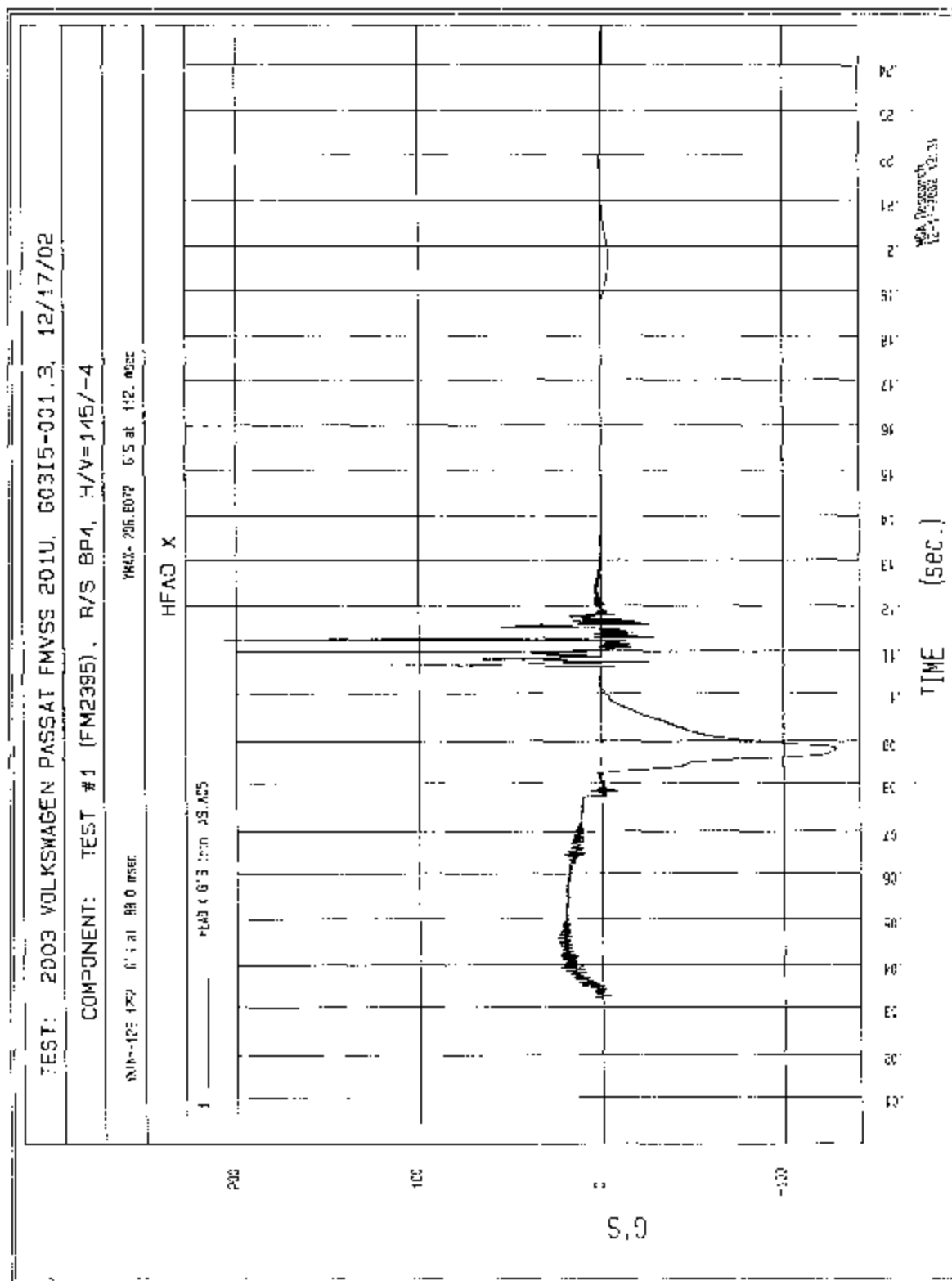
WGA, Pasadena, CA
12-17-2002 17:47

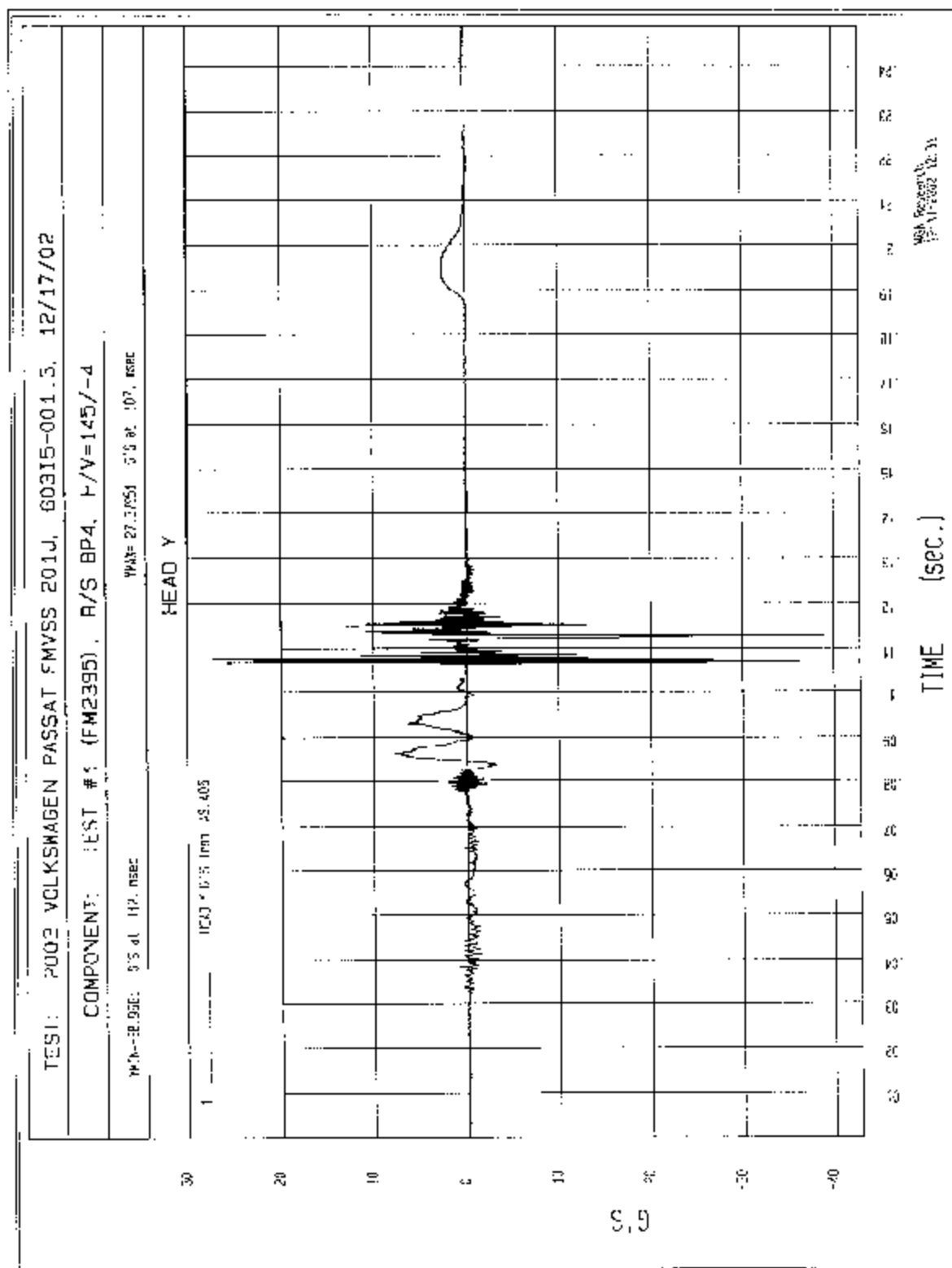
TIME (sec.)

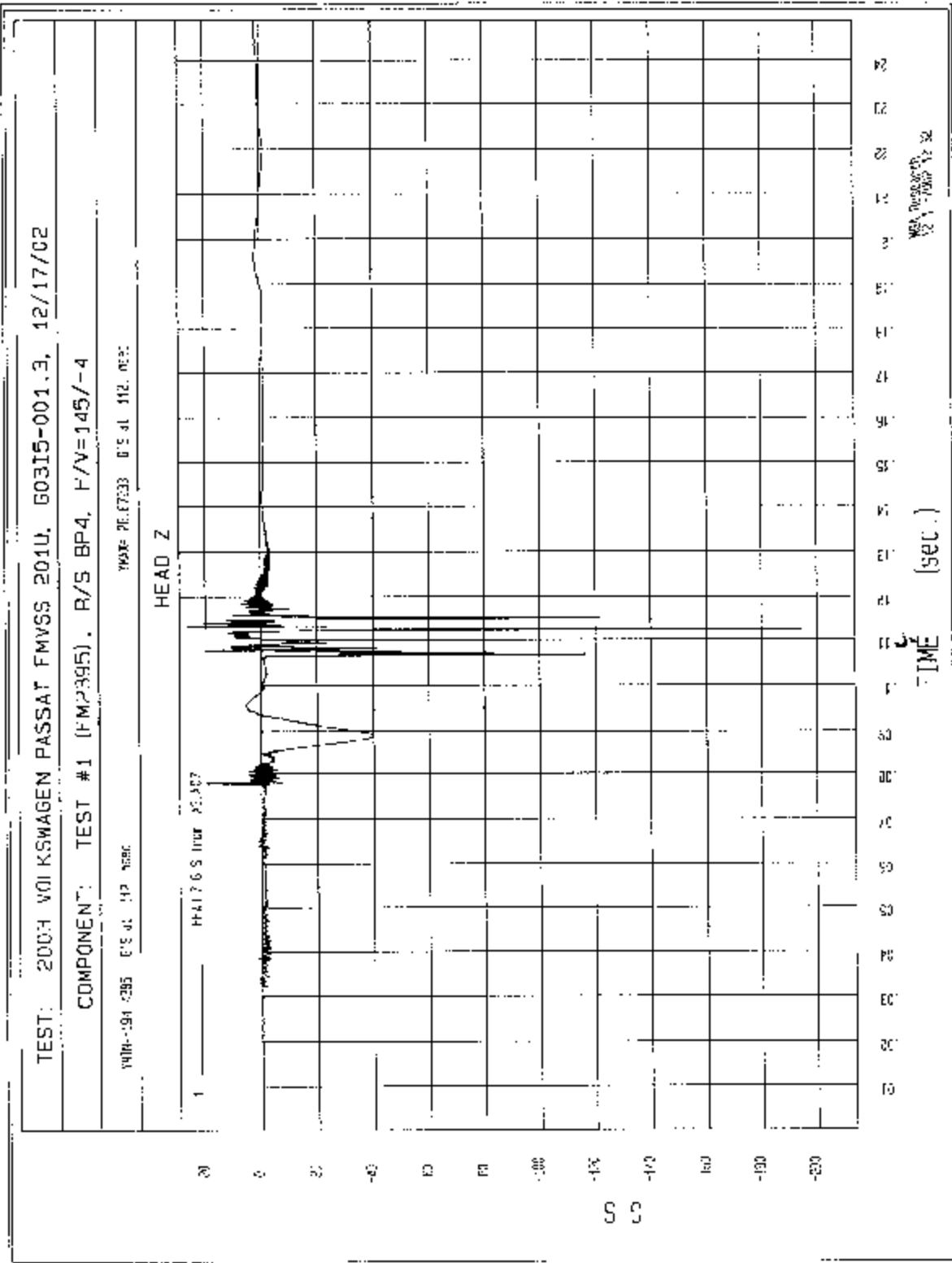
25

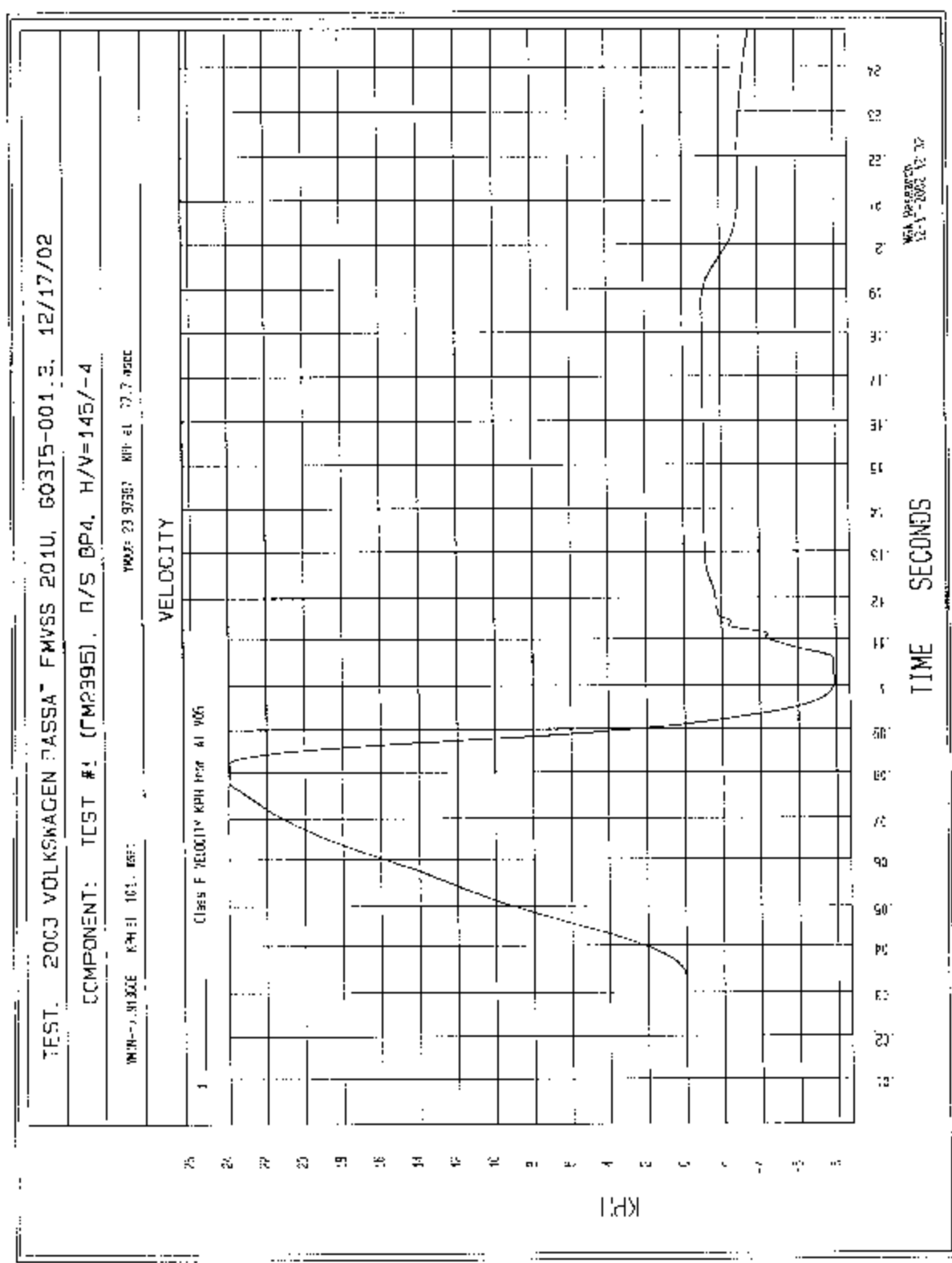












MCA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C35802 12/17/02

TEST #2 RIGHT OF2
(FM2396) H/A = 90/6

PRE-TEST

MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/17/02

TEST #2
(FM2396)

RIGHT OP2
H/V = 90/6

POST-TEST

MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/17/02

TEST #2
(FM2396)

RIGHT OP2
H/V = 90/6

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES: MGA1P201U_FRAME#2.3

DOC. NO: MGA1P201U_FRAME#2
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: C3802 VEHICLE YR/MAKE/MODEL: 2003 Vw PASSAT

GENERAL TEST PARAMETERS:

Test Number: 2

Target (Vehicle Side): left/right: OPZ

Temperature: 74 °C

MGA Test Reference No.: FM2396

Humidity: 22 %

Approach Angles: Horizontal: 270 °

Time of Test: 2:01 any/pm

Vertical: 6 °

FMH Serial No: 36

TEST RESULTS:

HIC(d)	HIC	At (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
521	470	89	236	16	3

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	AV Pre-Test	AV Post-Test
X	5	J35923	-100.9	1.21	1.21
Y	6	J35916	100.7	1.23	1.23
Z	7	J35918	100.8	1.51	1.51

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

NO VISIBLE DAMAGE

Recorded By: [Signature] Approved By*: _____ Date: 12/17/02

*Only necessary for NHTSA (Government) Compliance testing.

RESULTS OF HIC36 PROGRAM

The input file is \NHTSA\FM2396AV.A05

he HTC = 459.82 calculated over 8.9 msec

T1 = 1.10 msec T2 = 9.96 msec

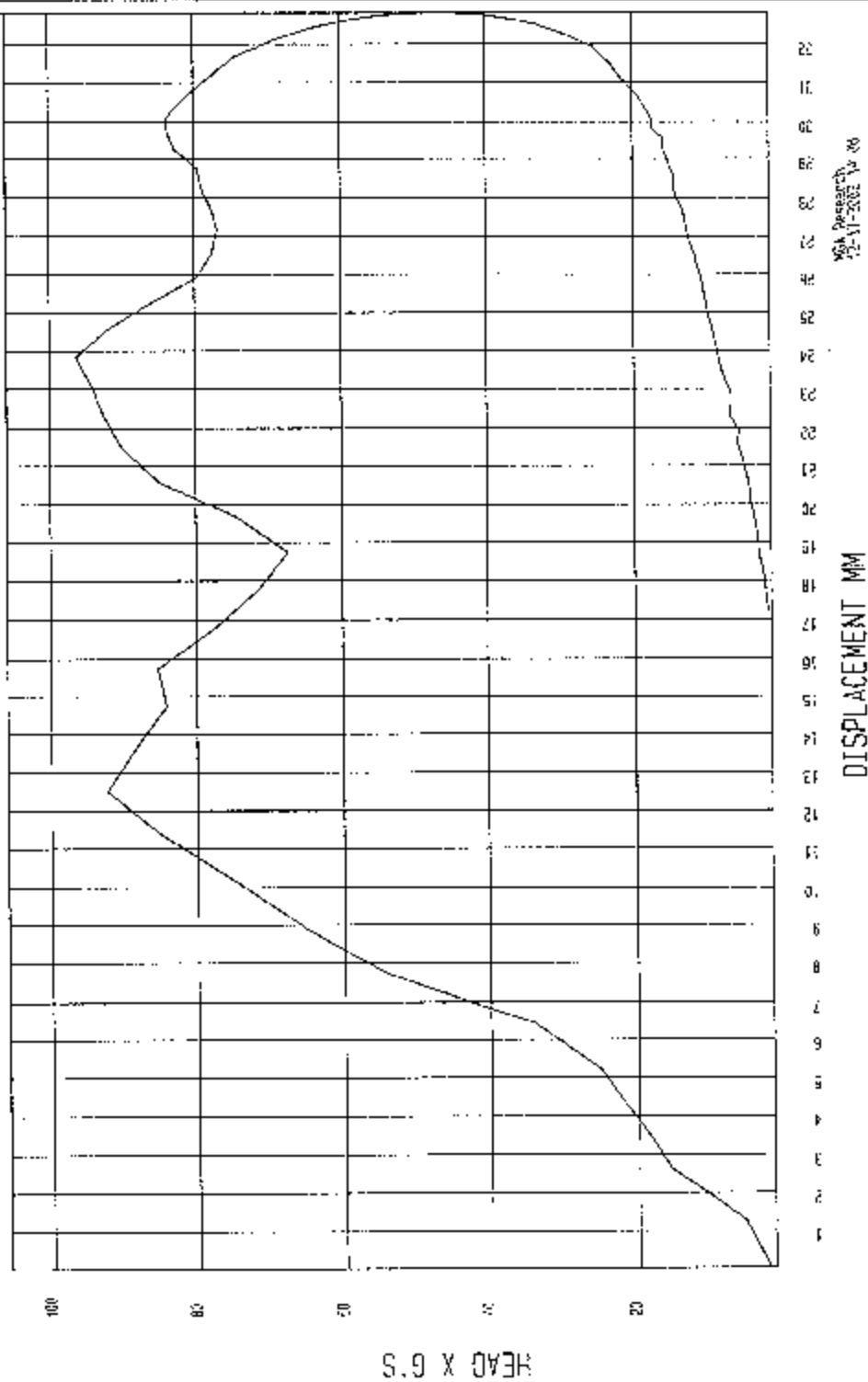
HTC(d) = 521

Impact Velocity = 23.6 (kph)

TEST: 2003 VOLKSWAGEN PASSAT FMVSS 2010, G03I5-001.3, 12/17/02

COMPONENT: TEST #2 (FM2396), R/S OF2, H/V= 90/5

HEAD X as a function of DISPLACEMENT



TEST: 2003 VOLKSWAGEN PASSAT FMVSS 201U, C0315-001.3, 12/17/02

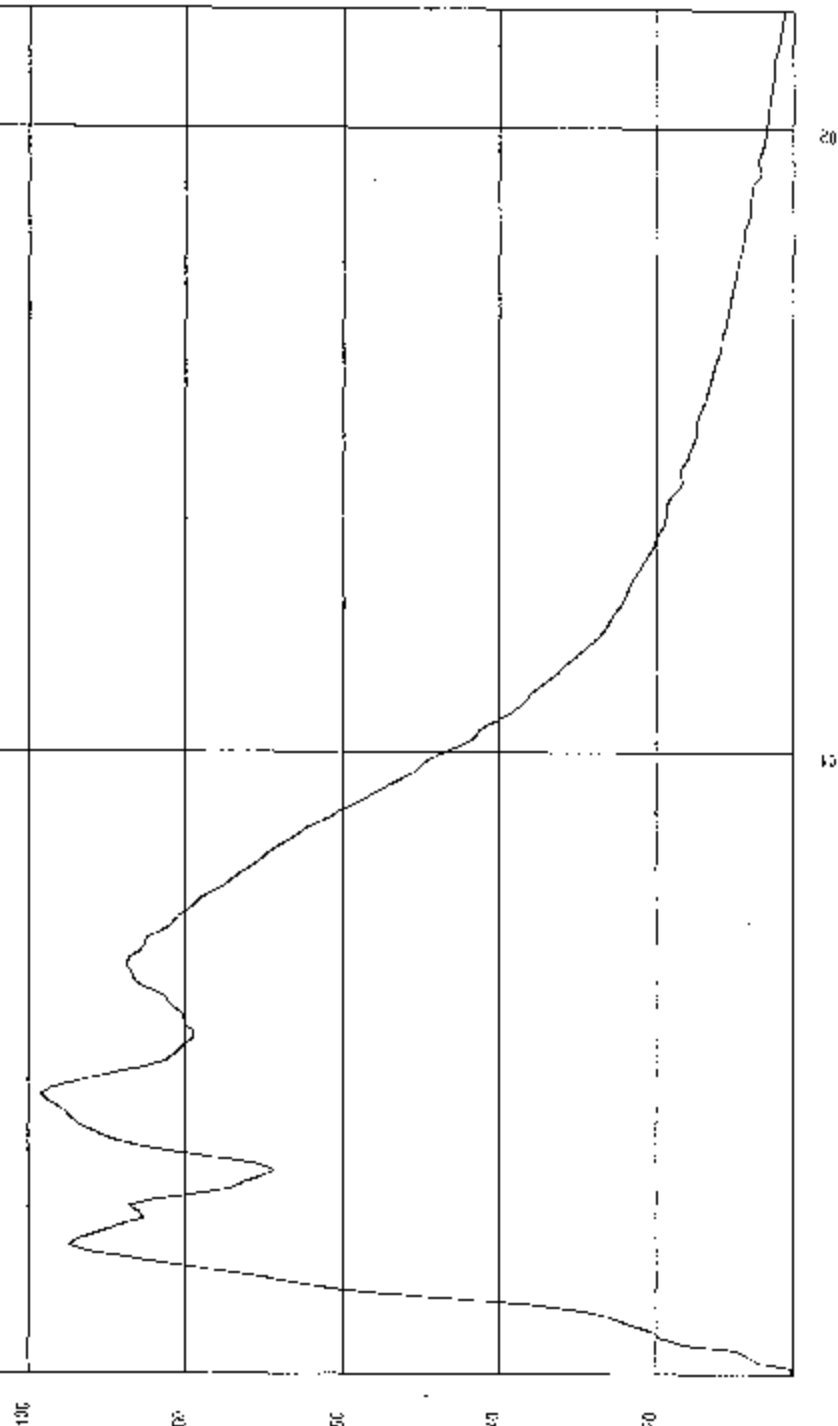
COMPONENT: TEST #2 (FM2396), R/S DP2, H/V= 90/6

WDM- 2 430(1) 0'S at 3.55 TSEC

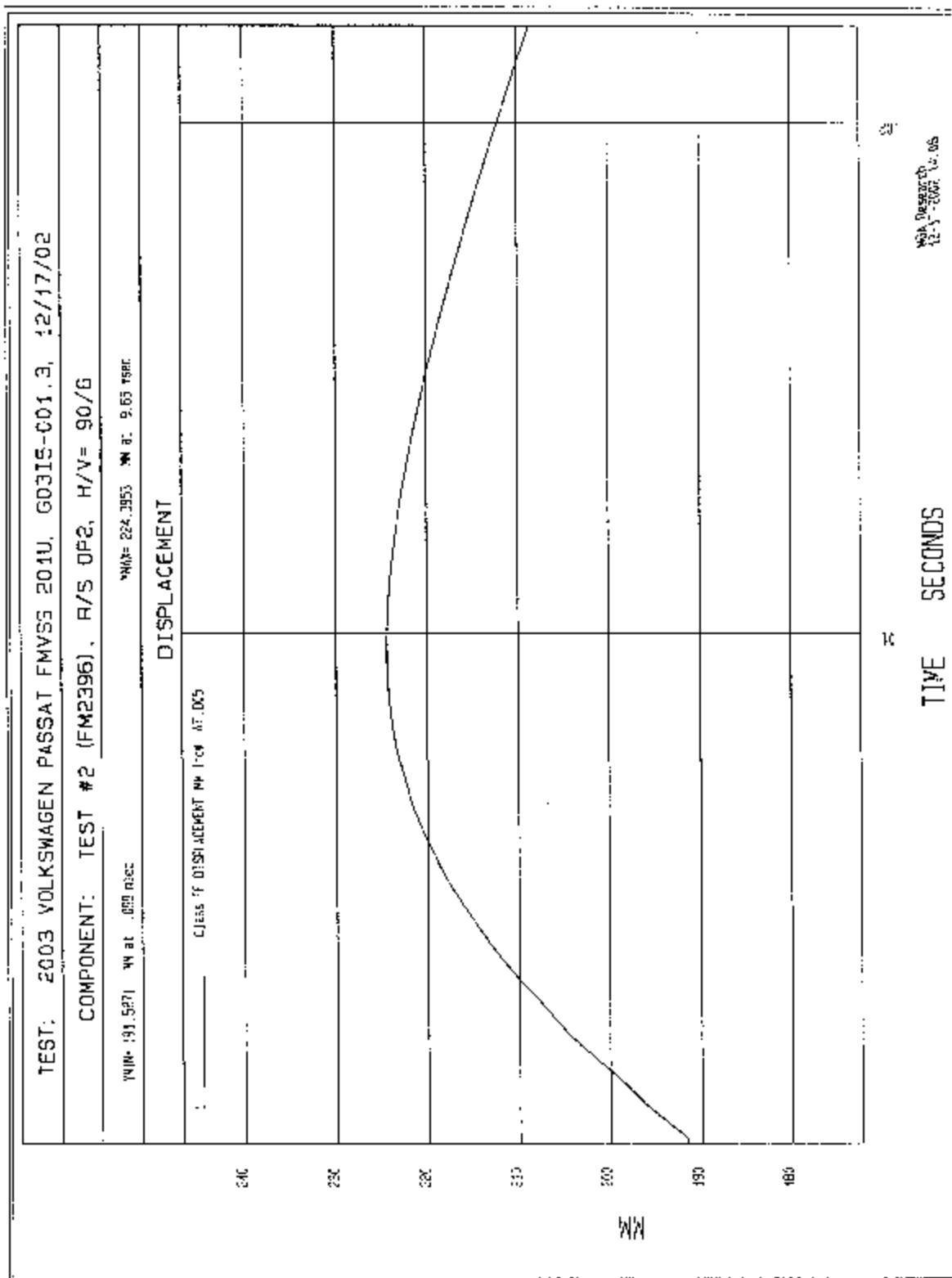
NAME= 90.45324 0'S at 4.46 TSEC

FMH RESULTANT

1 Resultant 0'S from AV 406



WDM- 2 430(1)
12/17/2002 11:00



TEST: 2003 VOLKSWAGEN PASSAT FMVSS 201U, G03I5-001.3, 12/17/02

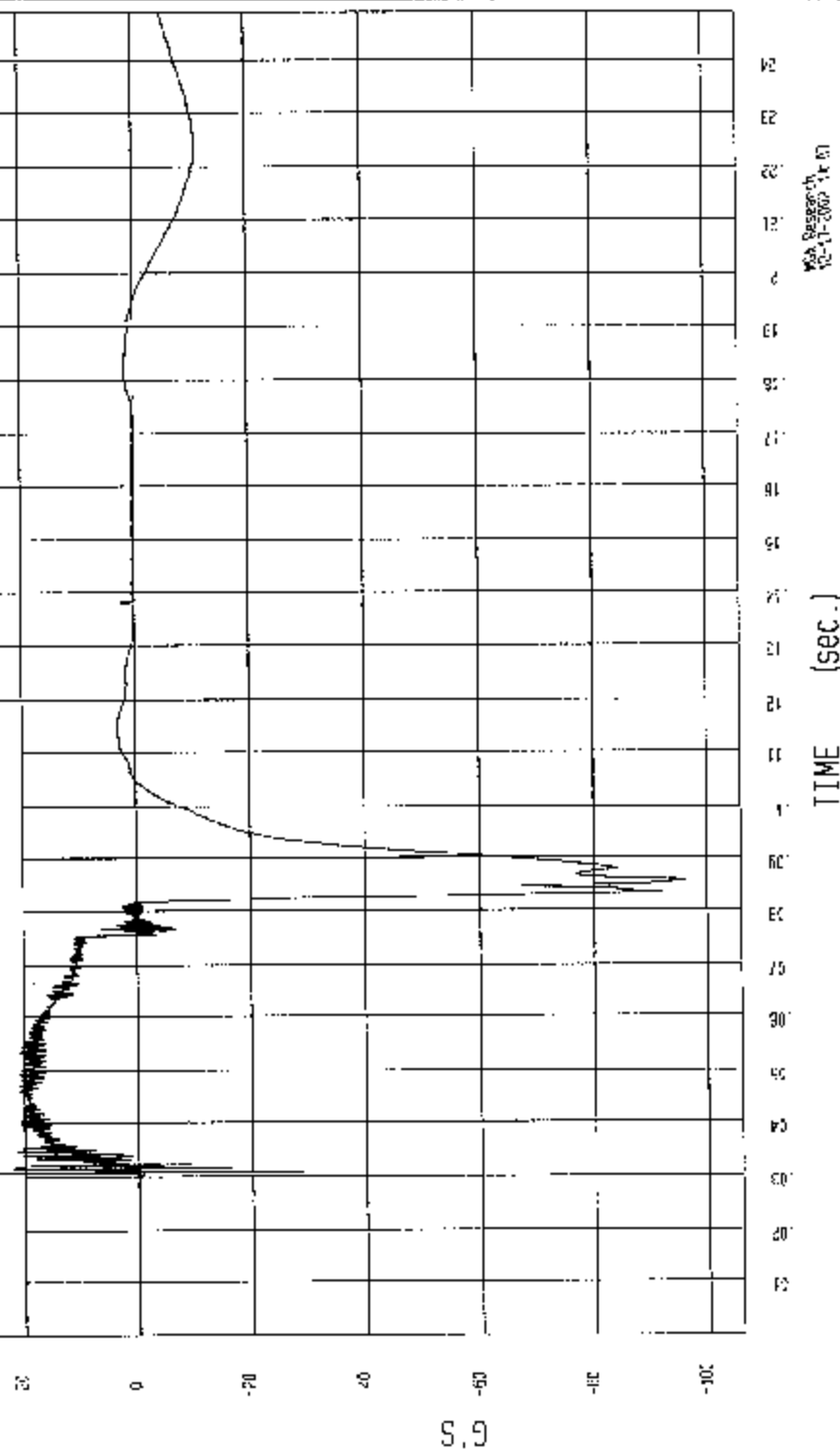
COMPONENT: TEST #2 (FM2396), R/S DP2, H/V= 90/6

WVW- GE 75319 5'S at 06.0 75sec

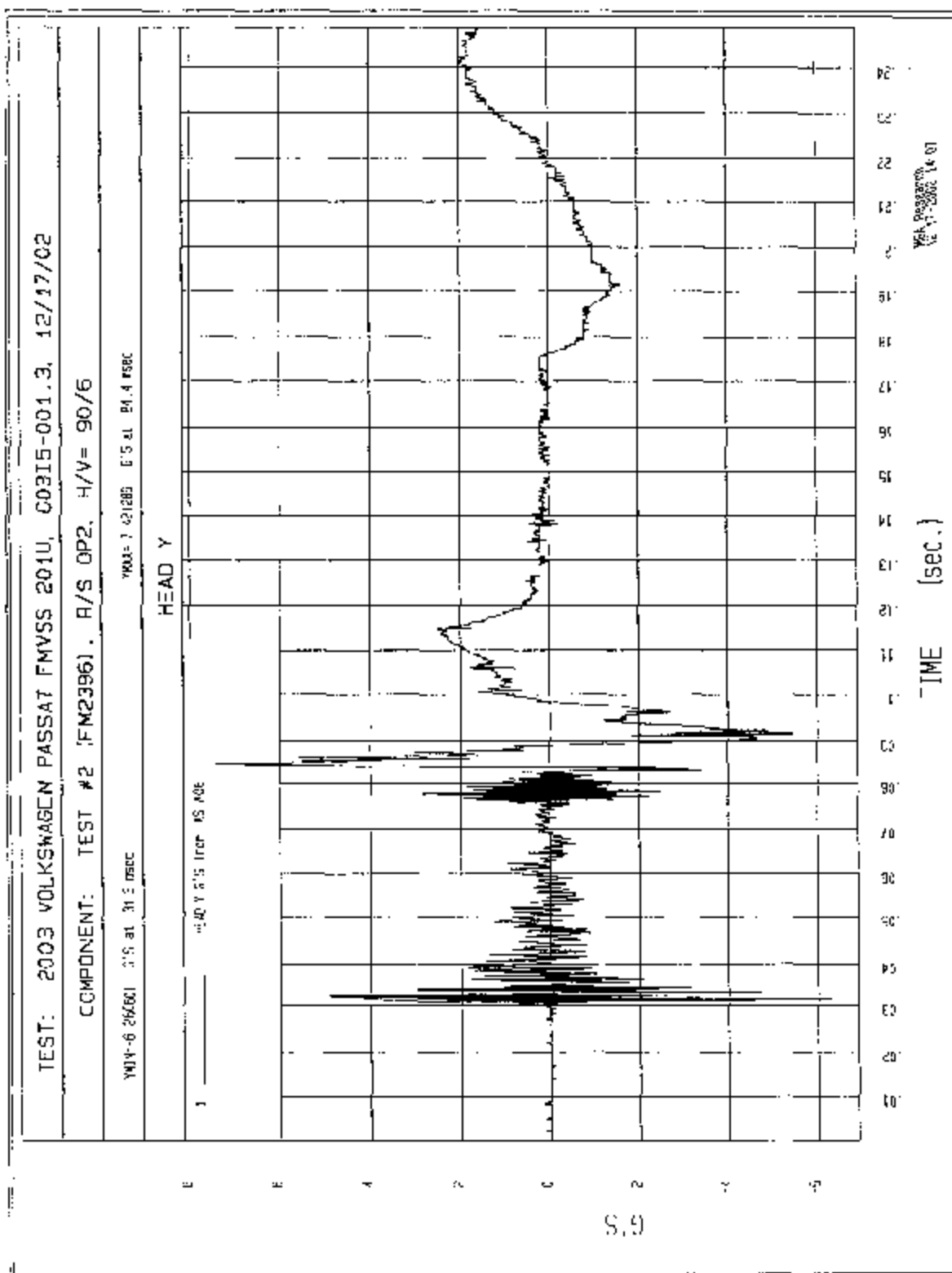
WVW- 32 4432 6'S at 30.6 75sec

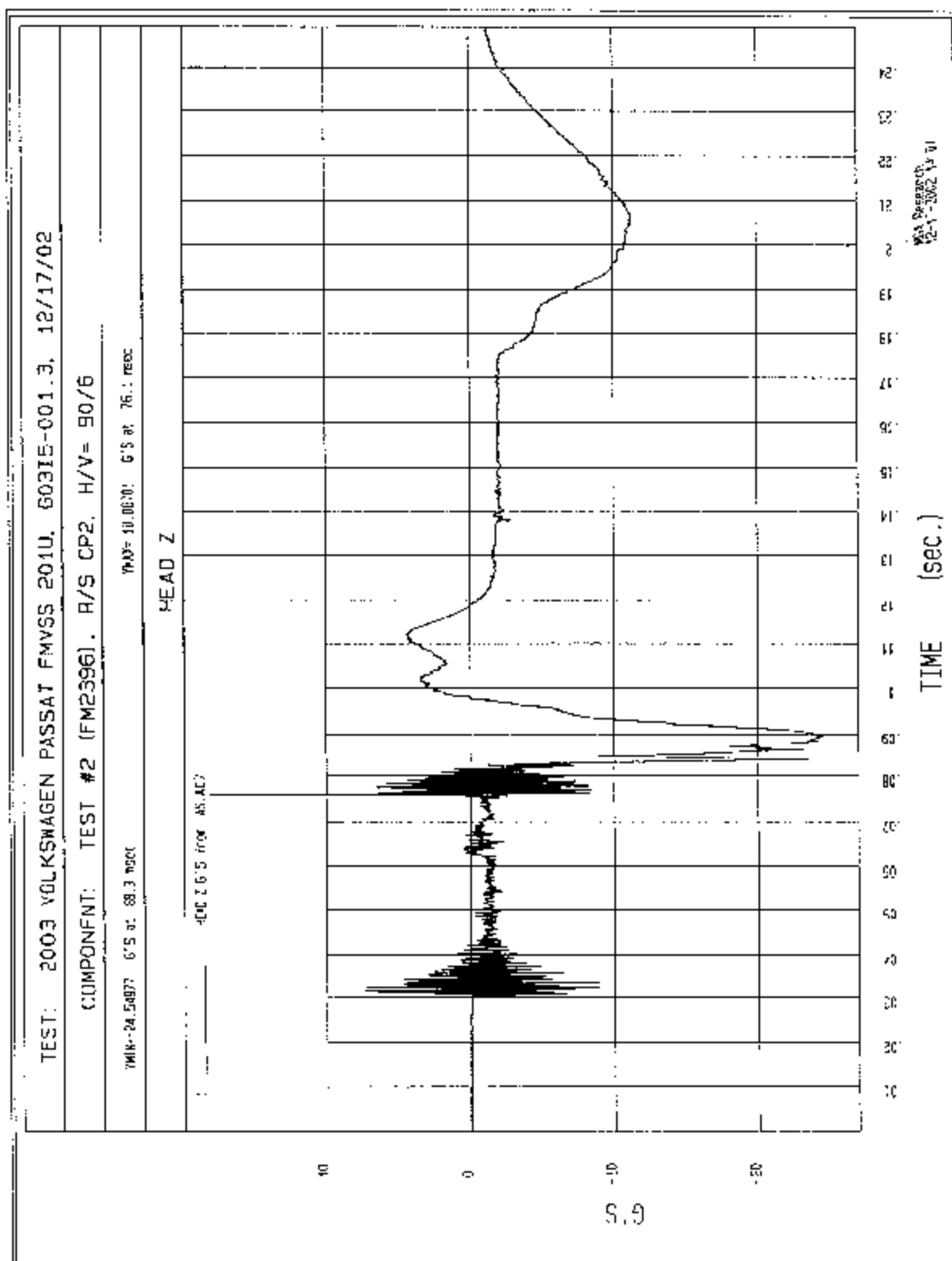
HEAD X

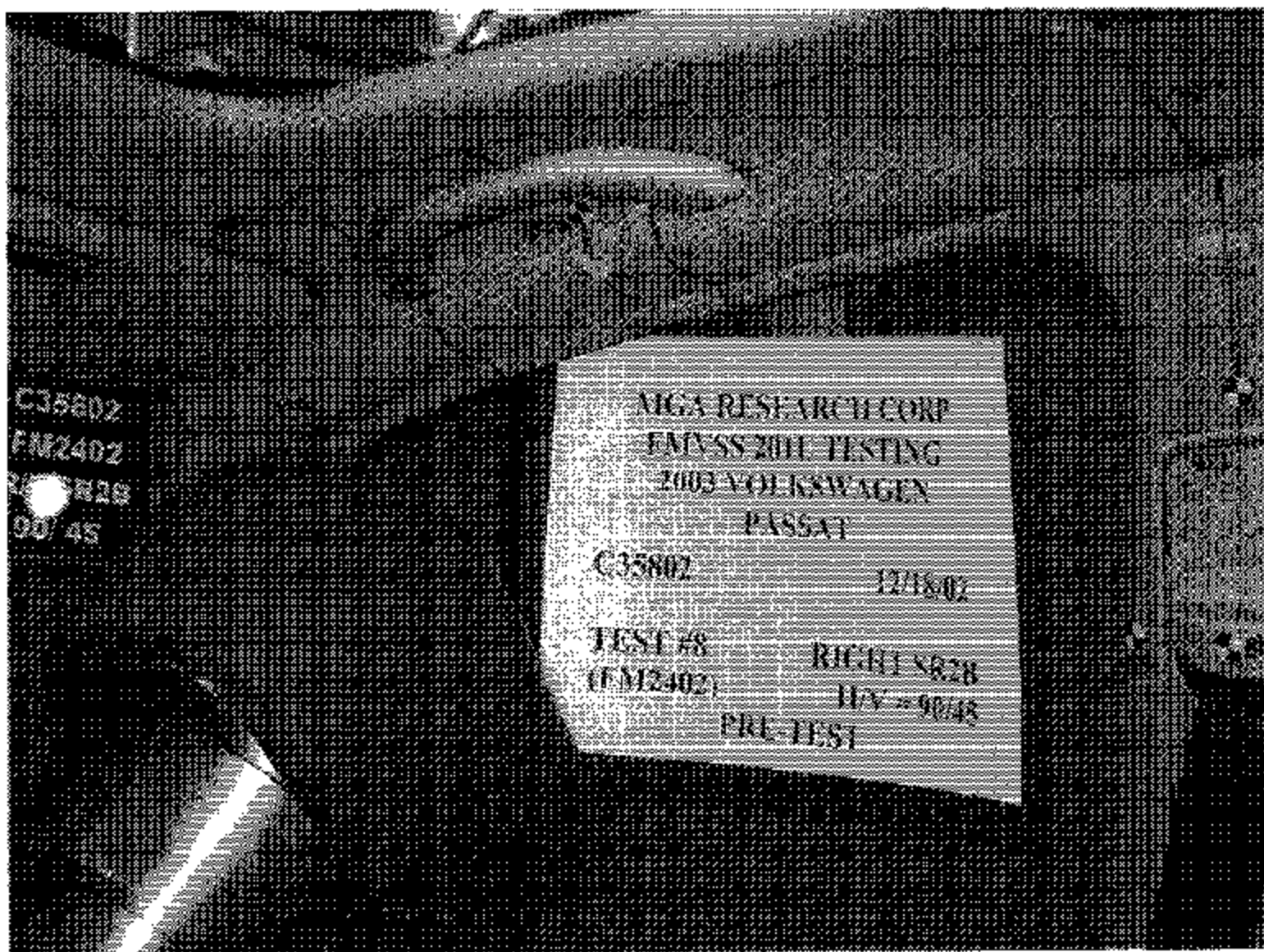
HEAD X 6'S from 45.405

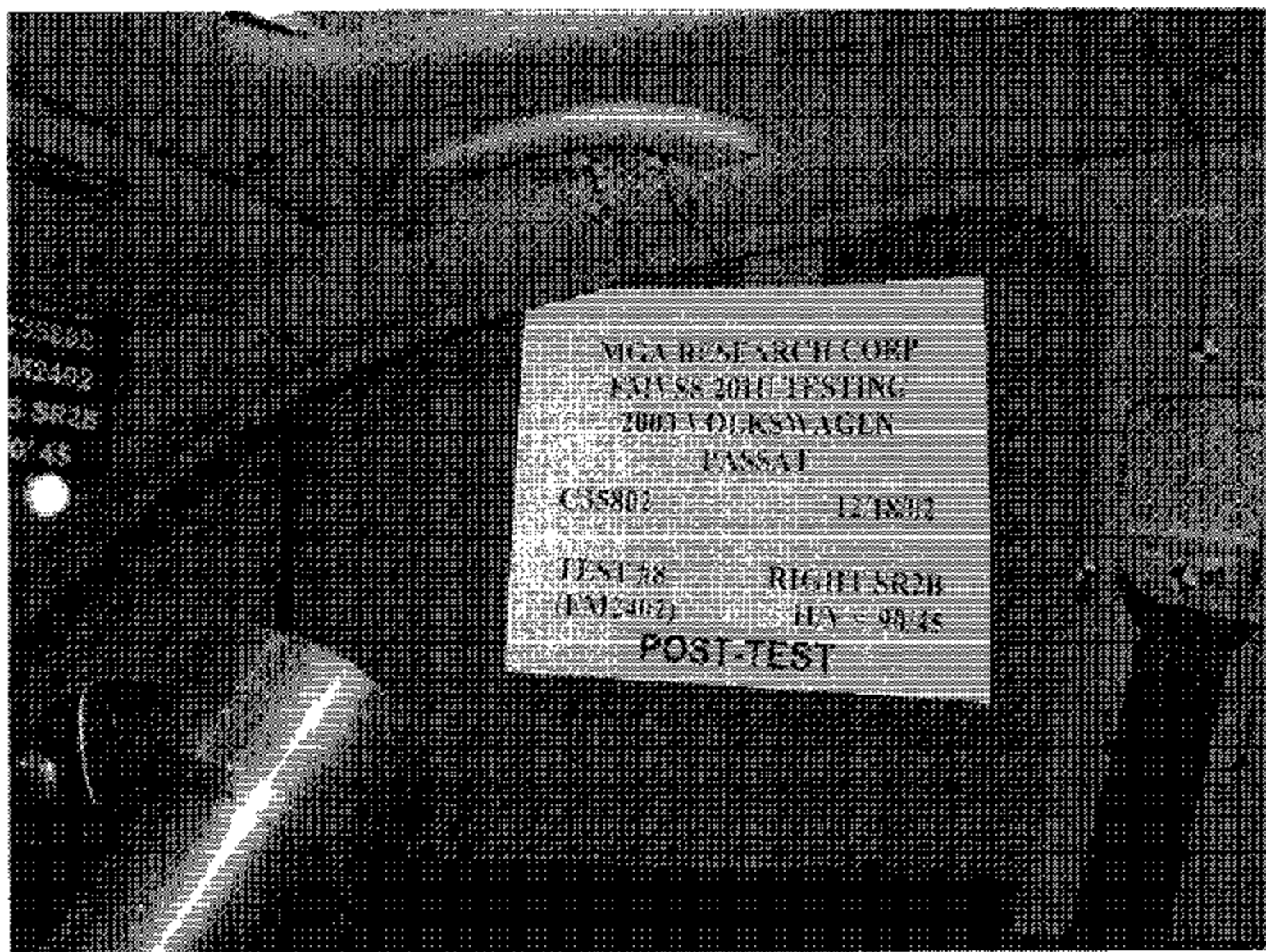


WVA Research
10-17-2002 11:47









**MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT**

C35802

12/18/02

**TEST #8
(FM2402)**

**RIGHT SR2B
H/V = 90/45**

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES: MGATP201U FRAME #2.3

DOC. NO.: MGATP201U_FRAME #2
REVISION NO. 4
PAGE 9 of 9

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: CBSF02 VEHICLE YR/MAKE/MODEL: 2003 VOLKSWAGEN PASSAT

GENERAL TEST PARAMETERS:

Test Number: 8

Target (Vehicle Side): left/right SL2B

Temperature: 74 °C/°F

MGA Test Reference No.: FM2402

Humidity: 22 %

Approach Angles: Horizontal 90 °

Time of Test: 10:14 (am/pm)

Vertical 4 °

FMH Serial No: 36

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
<u>642</u>	<u>630</u>	<u>4.2</u>	<u>18.6</u>	<u>14</u>	<u>0</u>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
<u>X</u>	<u>5</u>	<u>338923</u>	<u>100.9</u>	<u>1.21</u>	<u>1.21</u>
<u>Y</u>	<u>6</u>	<u>338916</u>	<u>100.7</u>	<u>1.23</u>	<u>1.23</u>
<u>Z</u>	<u>7</u>	<u>338913</u>	<u>100.8</u>	<u>1.51</u>	<u>1.51</u>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.): _____

NO VISIBLE DAMAGE

Recorded By: [Signature] Approved By*: _____ Date: 12/14/02

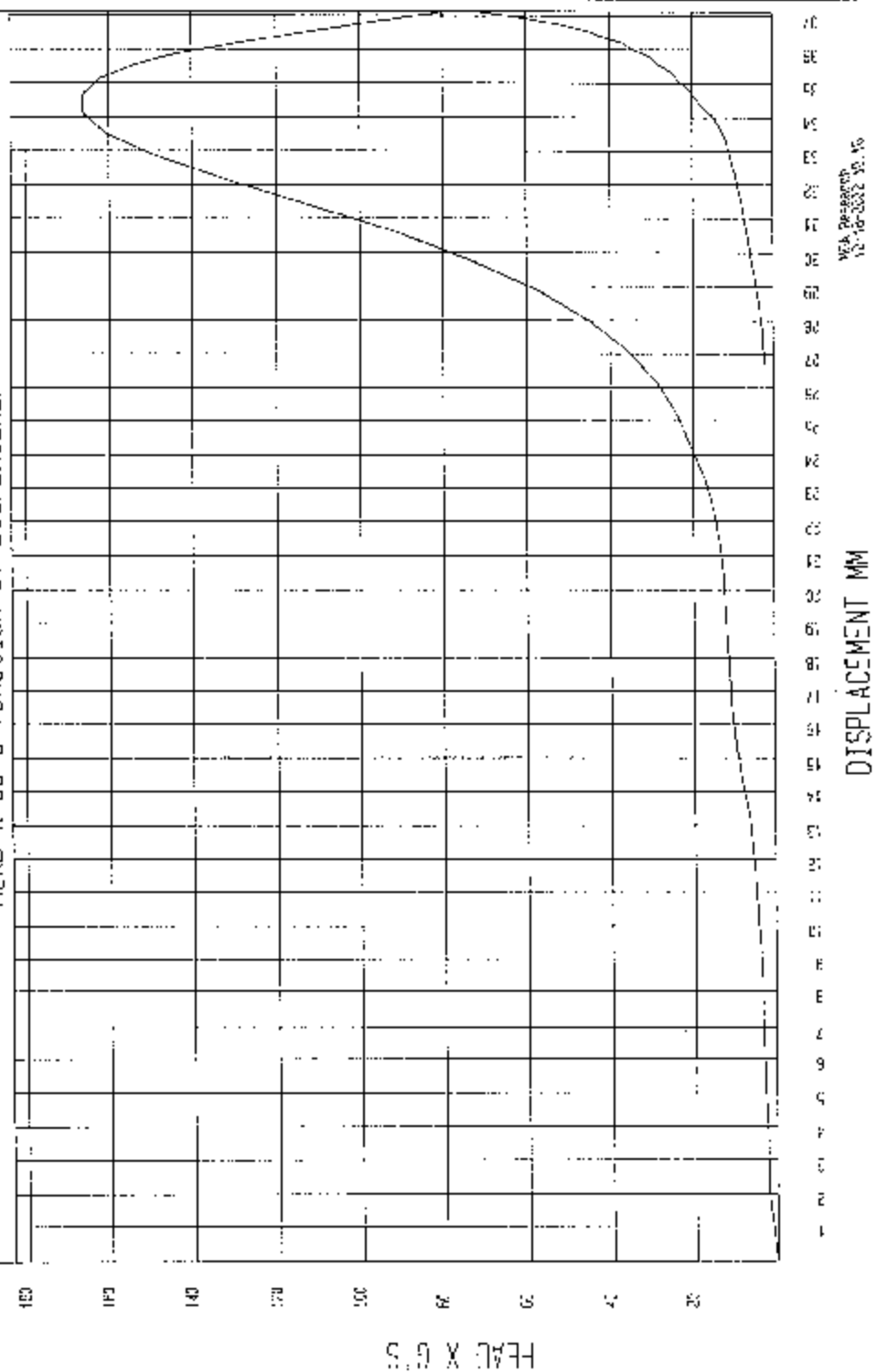
*Only necessary for NHTSA (Government) Compliance testing.

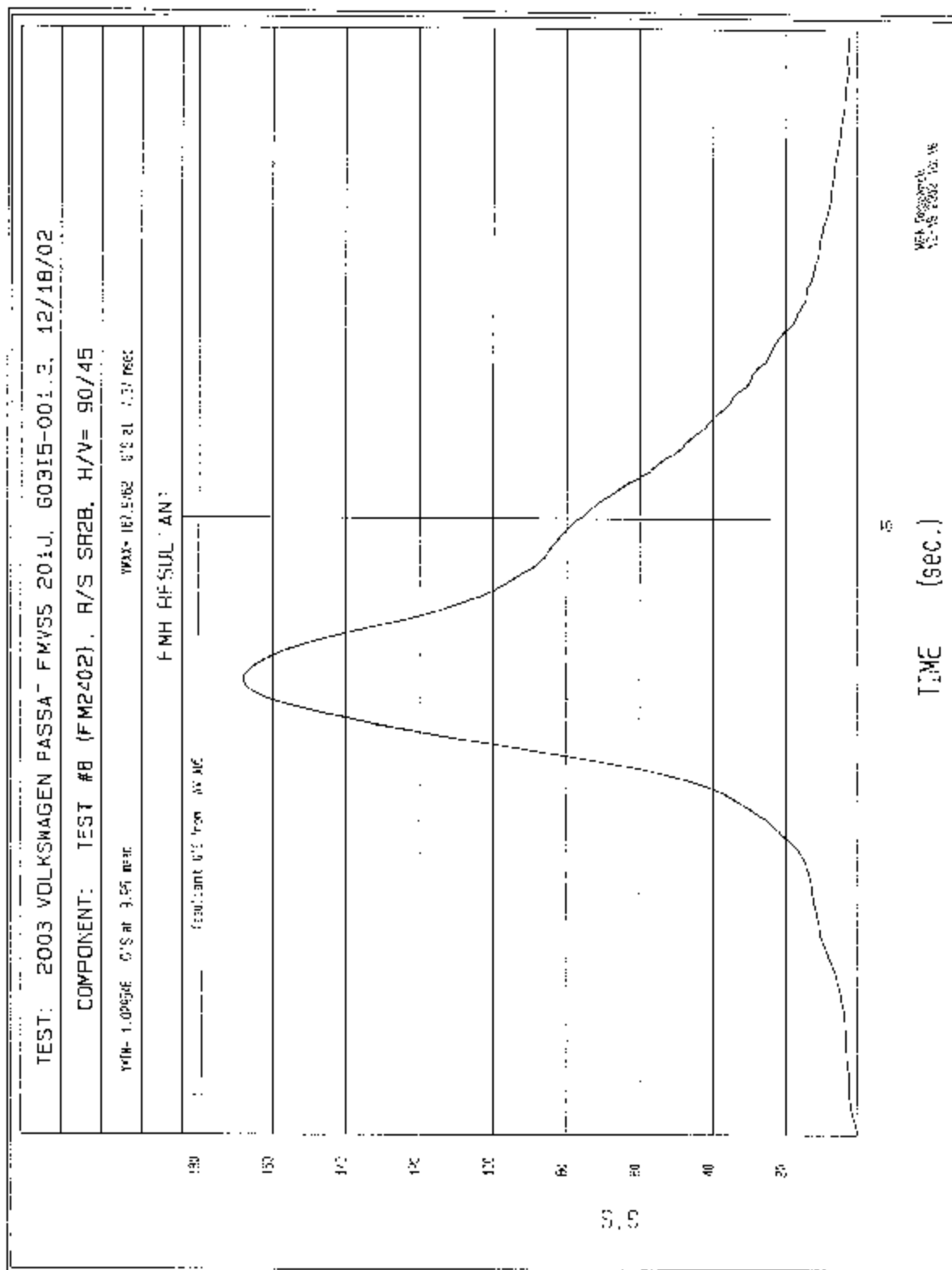
```
*****
RESULTS OF HIC36 PROGRAM
*****
The input file is \NHTSA\FM2402AV.A05
    HIC = 630.16 calculated over 4.2 msec
T1 = 5.98 msec T2 = 10.16 msec
*****
    HIC(d) = 642
    Impact Velocity = 18.6 (kph)
```

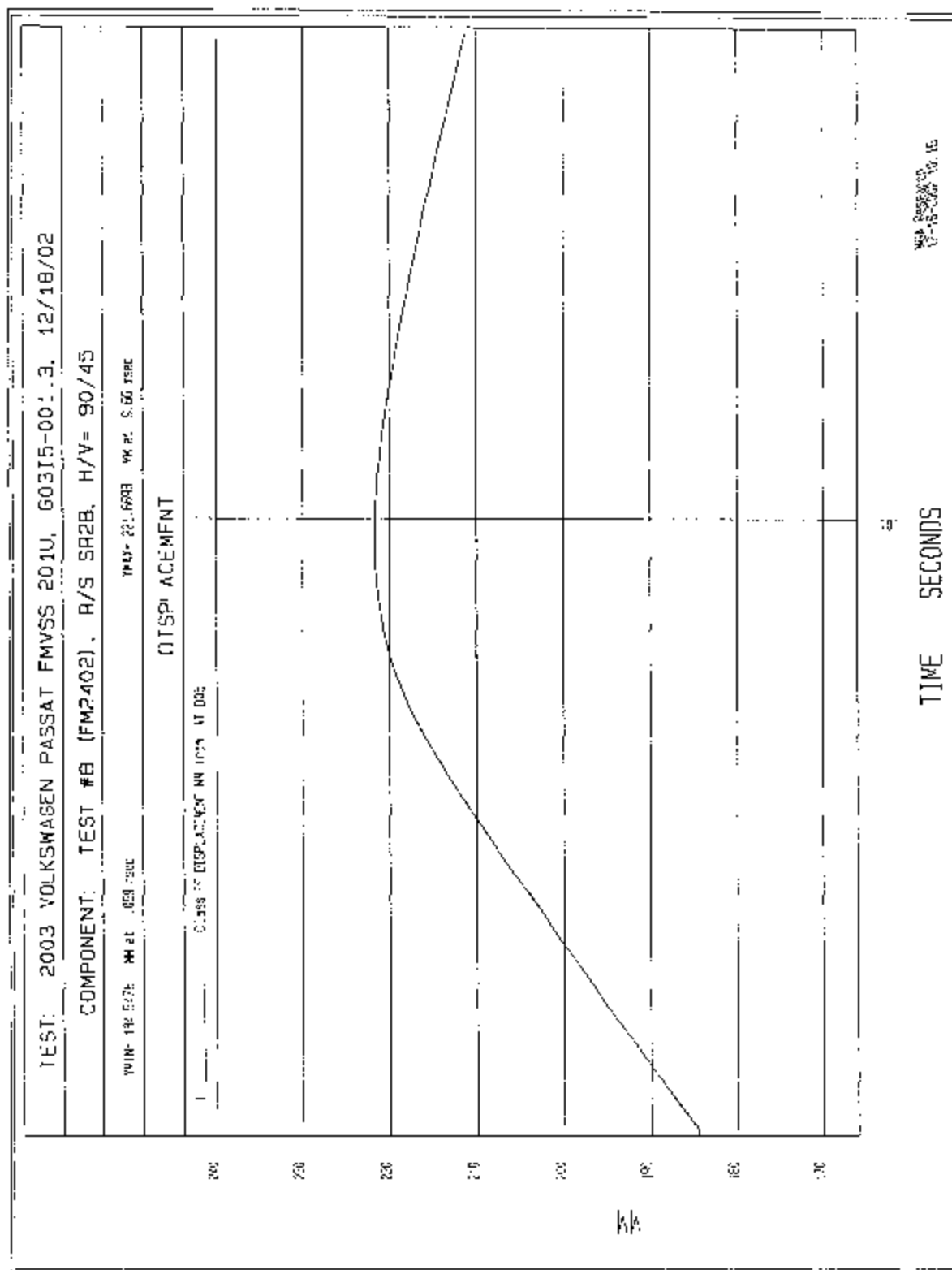
TEST: 2003 VOLKSWAGEN PASSAT FMVSS 2010, G0315-001.3, 12/18/02

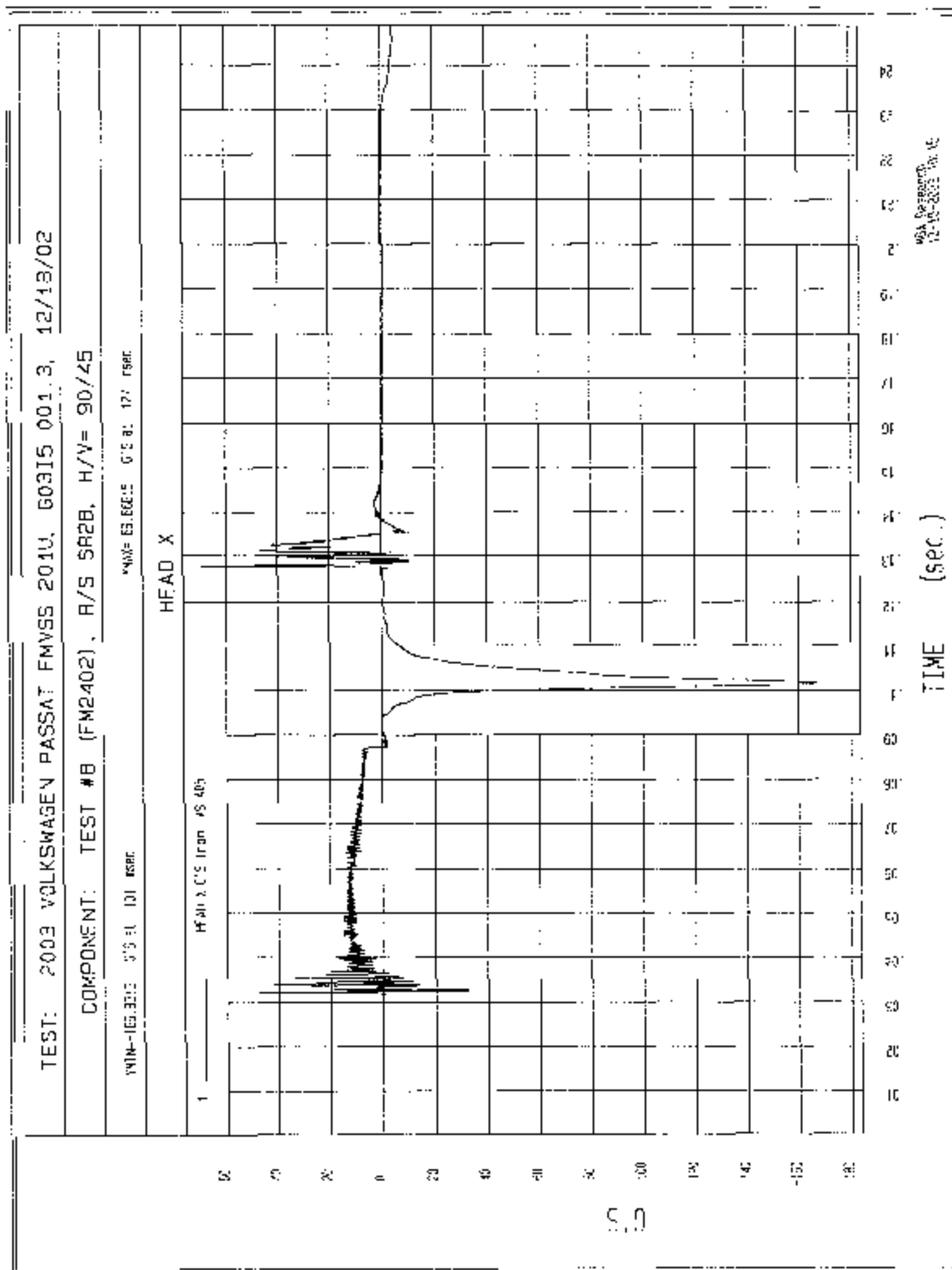
COMPONENT: TEST #8 (FM2402), R/S S92B, H/V= 90/45

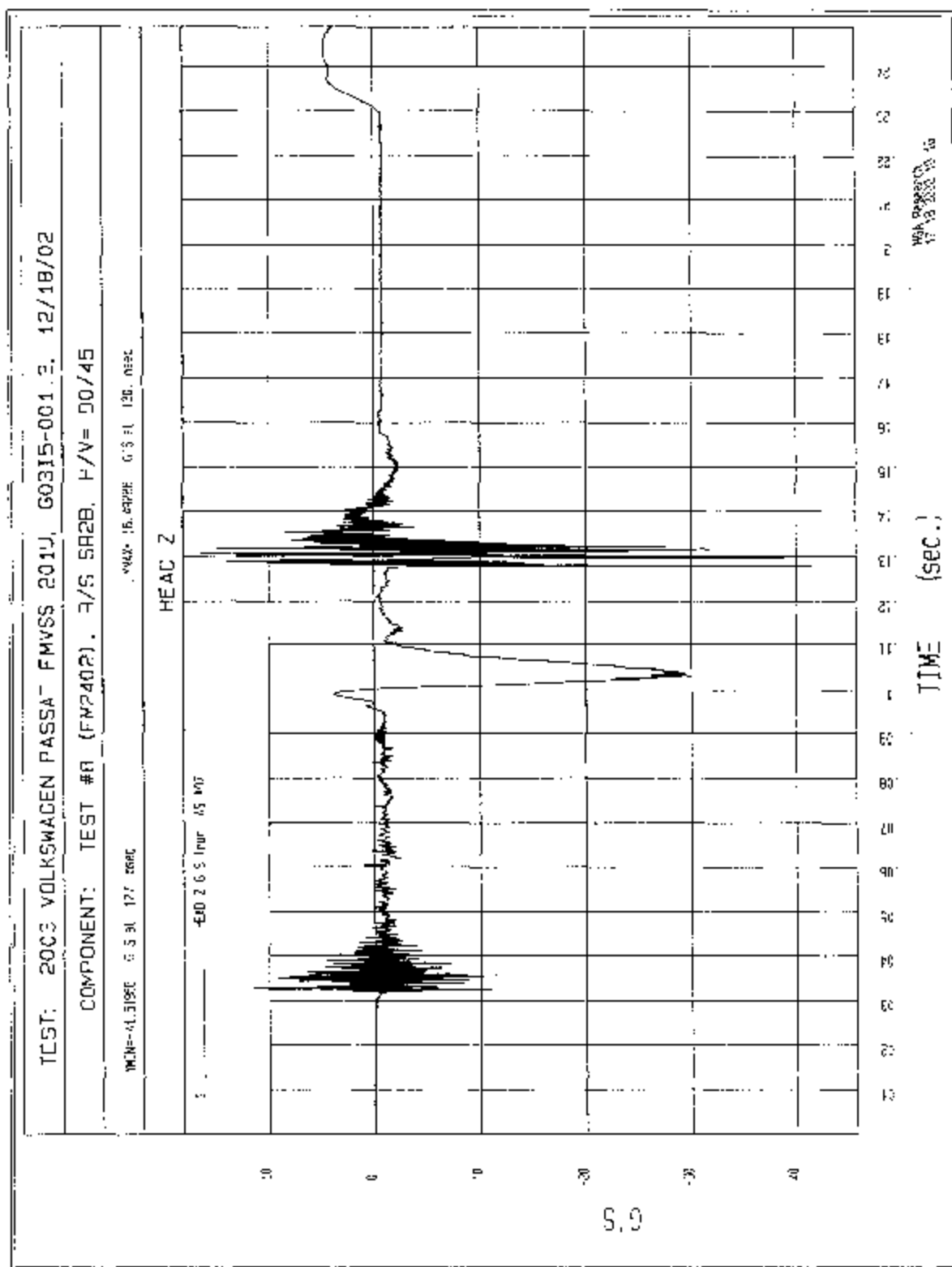
HEAD X as a function of DISPLACEMENT

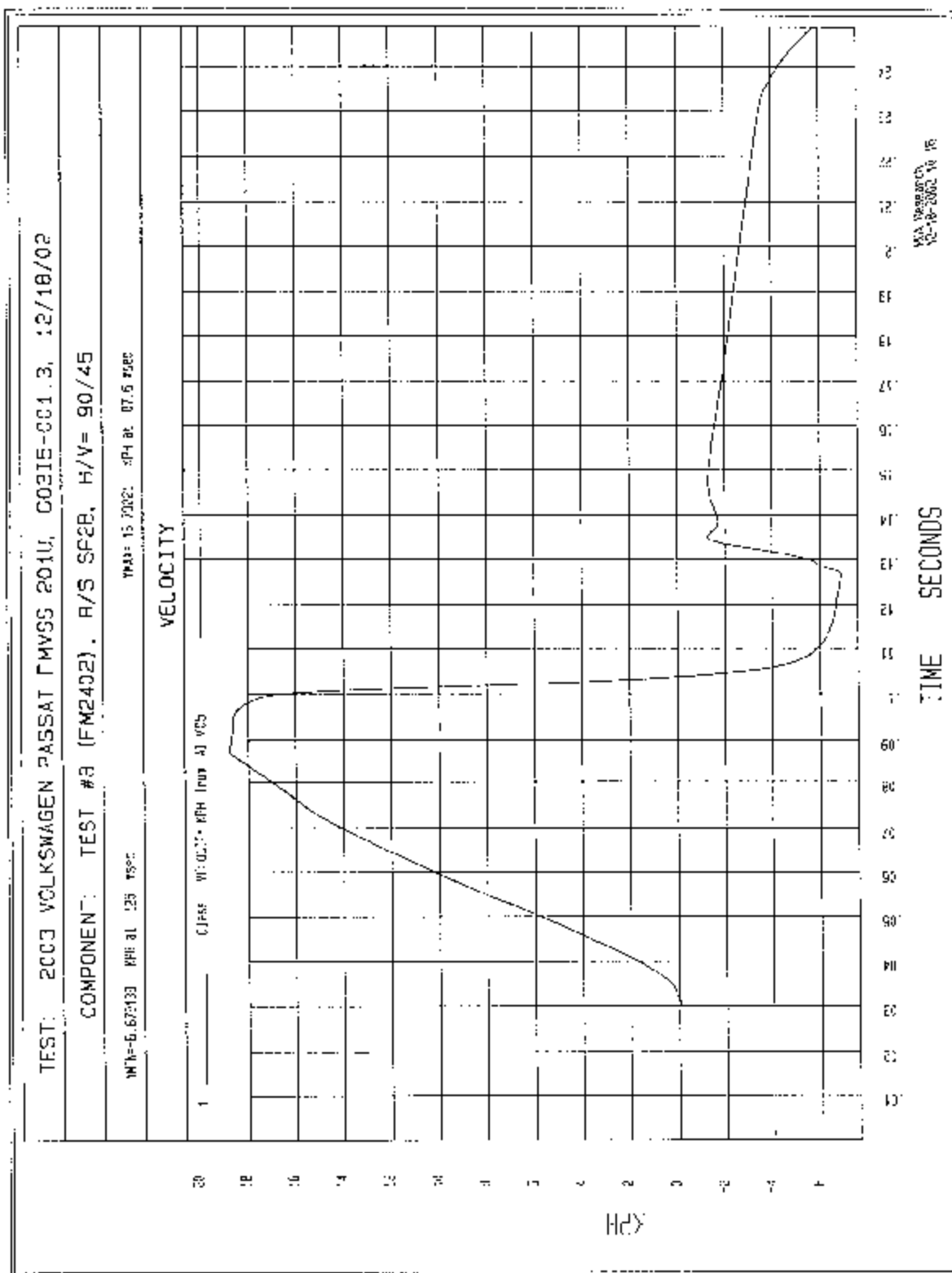


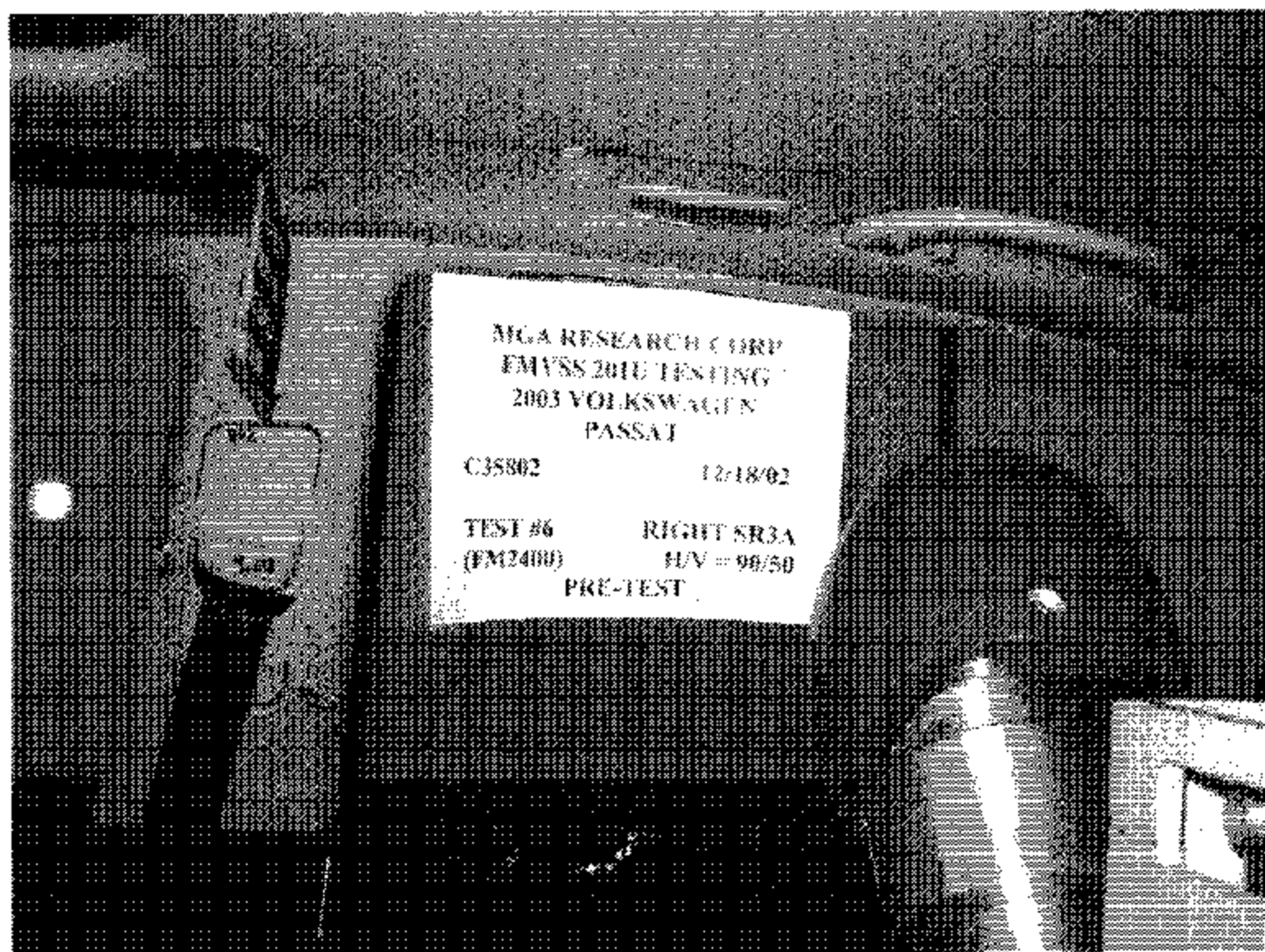












MGA RESEARCH CORP
FMVSS 2010 TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/18/02

TEST #6
(FM2400)

RIGHT SR3A
H/V - 90/50

POST-TEST

**MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT**

C35802

12/18/02

**TEST #6
(FM2400)**

**RIGHT SR3A
H/V = 90/50**

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES: MGATP201U, FRAME #2.3

DOC. NO.: MGATP201U, FRAME #2
REVISION NO.: 4
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: C35802- VEHICLE YR/MAKE/MODEL: 2003 VOLKSWAGEN PASSAT

GENERAL TEST PARAMETERS:

Test Number: 6

Target (Vehicle Side): left/right: Left

Temperature: 74 °F/C

MGA Test Reference No.: FM2400

Humidity: 22 %

Approach Angles: Horizontal 90 °

Time of Test: 9:03 am/pm

Vertical 50 °

FMH Serial No: 38

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
313	194	6.8	18.9	32	0

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	100.9	1.21	1.21
Y	6	J36193	100.7	1.23	1.23
Z	7	J36353	100.8	1.51	1.51

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

THE CRASH HADN'T WAS (COMPRESS) INTO THE SIDE RAIL

Recorded By: [Signature] Approved By*: _____ Date: 12/1/02

*Only necessary for NHTSA (Government) Compliance testing.

RESULTS OF HIC36 PROGRAM

The input file is \NHTSA\FM2400AV.A05

The HIC = 194.44 calculated over 6.8 msec

T1 = 2.09 msec T2 = 8.86 msec

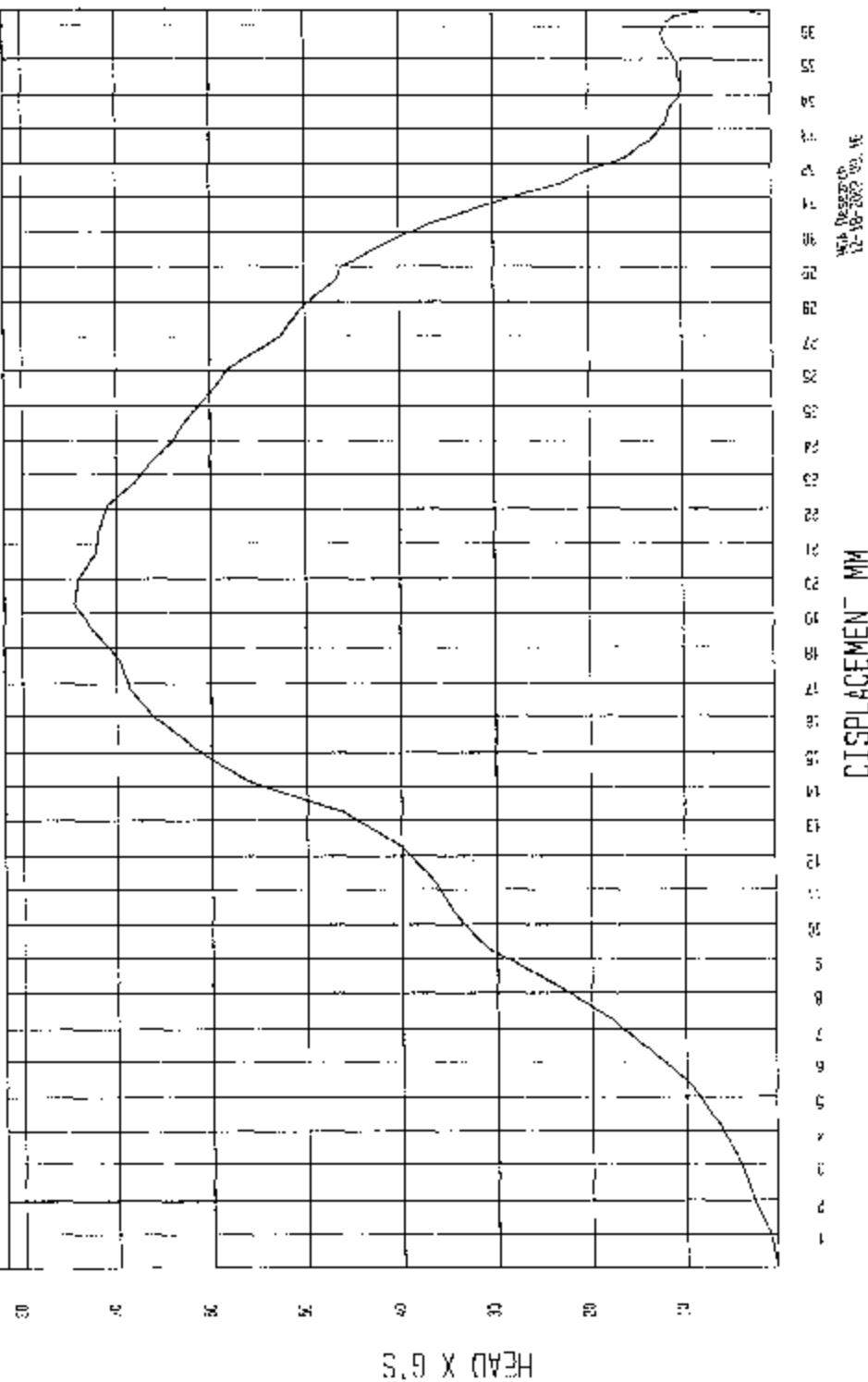
HIC(d) = 313

Impact Velocity = 18.9 (kph)

TEST: 2003 VOLKSWAGEN PASSAT FVSS 201J, G0315-001.3, 12/18/02

COMPONENT: TFST #6 (FM2400), R/S SR3A, H/V= 90/50

HEAD X as a function of DISPLACEMENT



TFST: 2003 VOLKSWAGEN PASSAT FMVSS 201U, G0315-001.3, 12/18/02

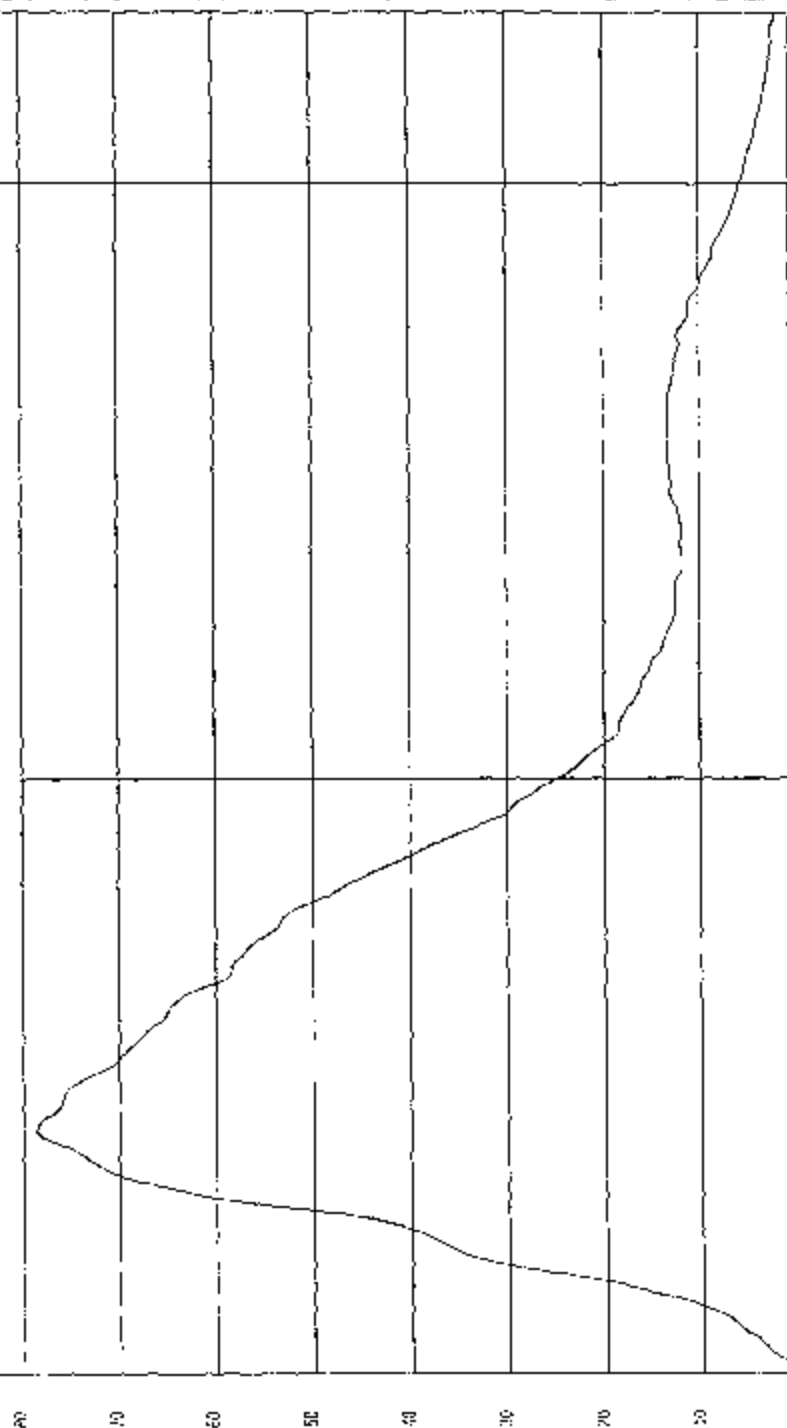
COMPONENT: TEST #6 (FM2400), R/S SR3A, H/V= 90/50

WTV# 7448357 6'S at 9 OF 858F

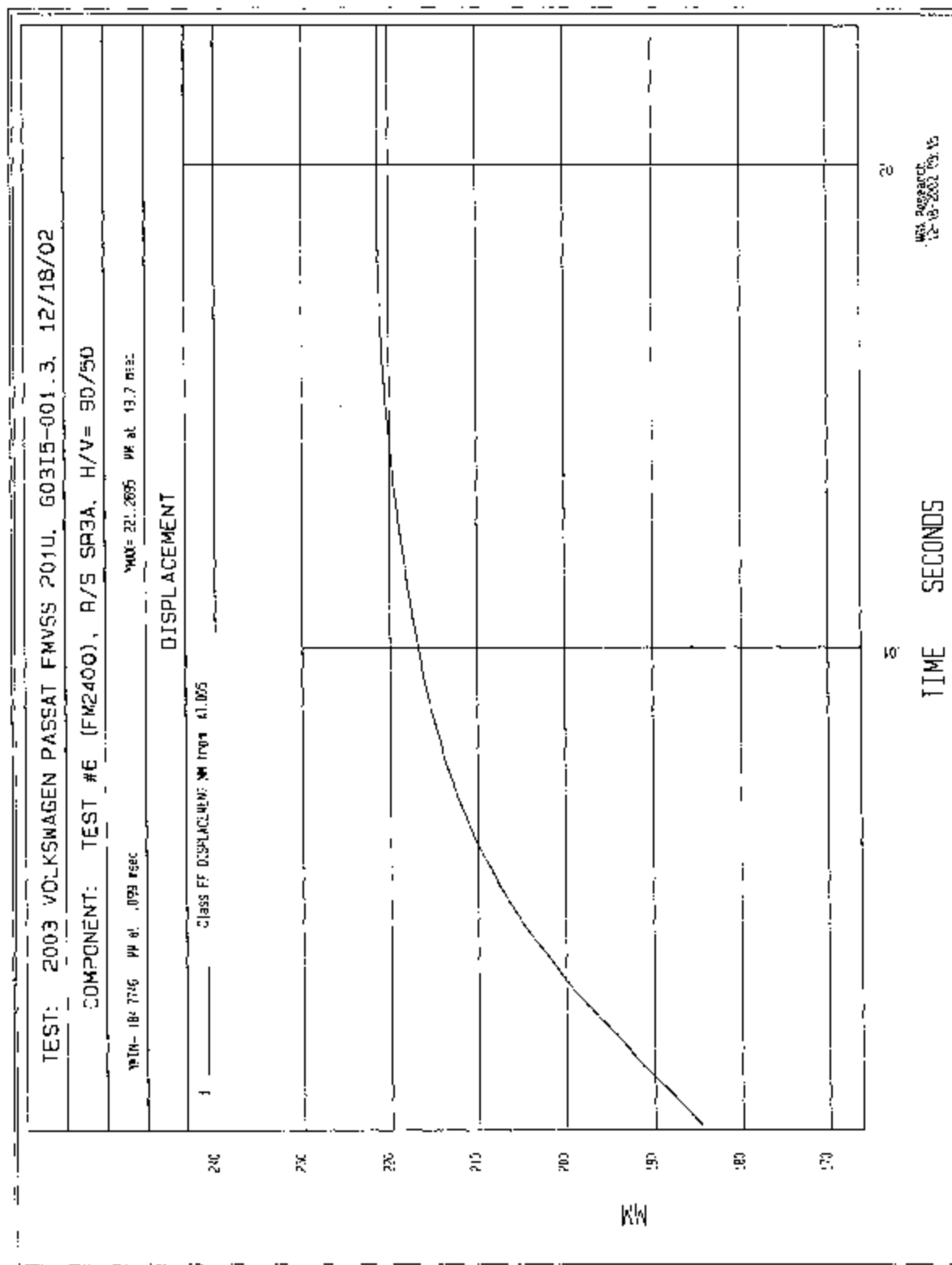
MAX= 78.2864 6'S at 4.38 NSEC

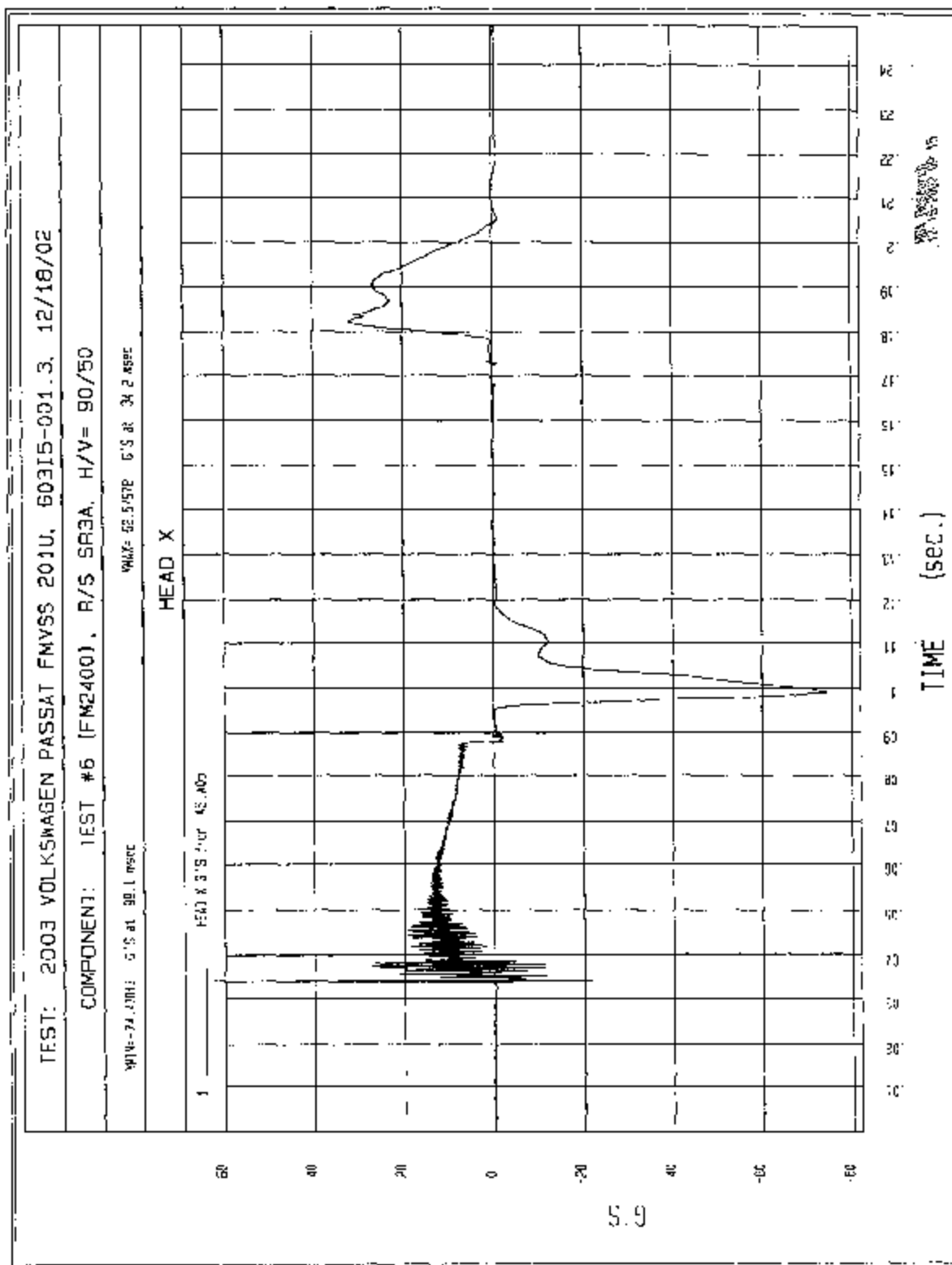
FMH RESULTANT

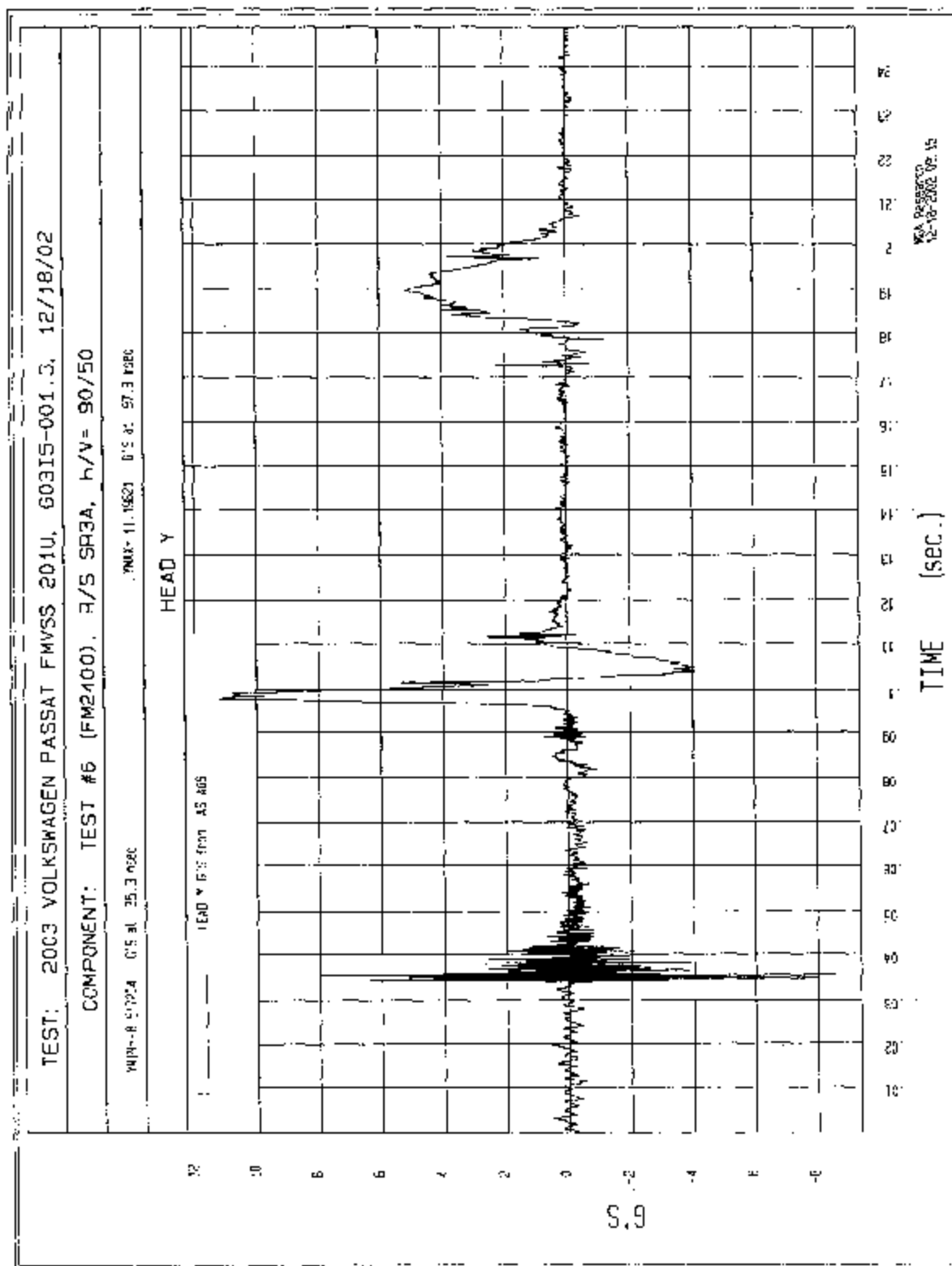
Reduction, 3'S from ANLOS

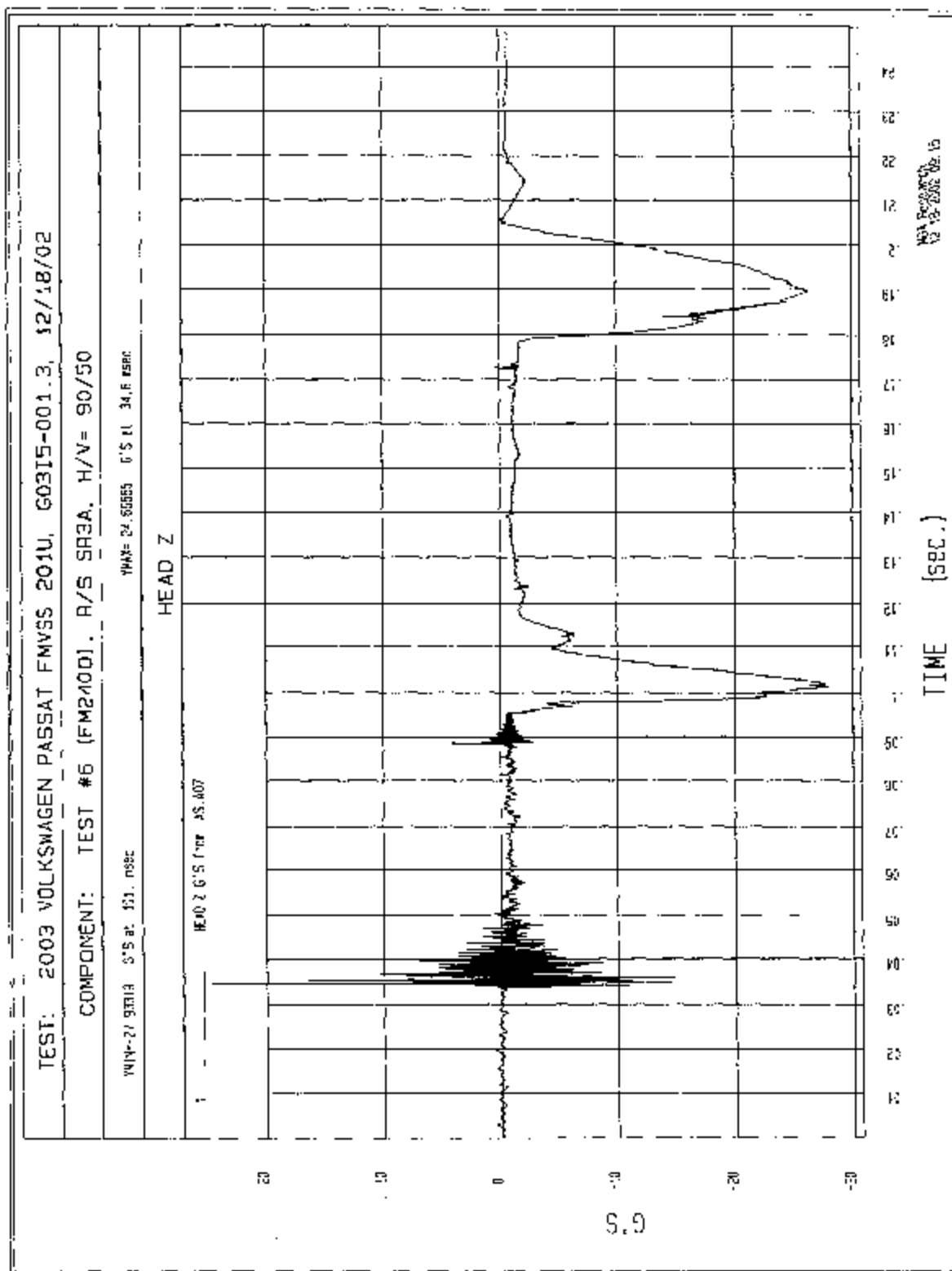


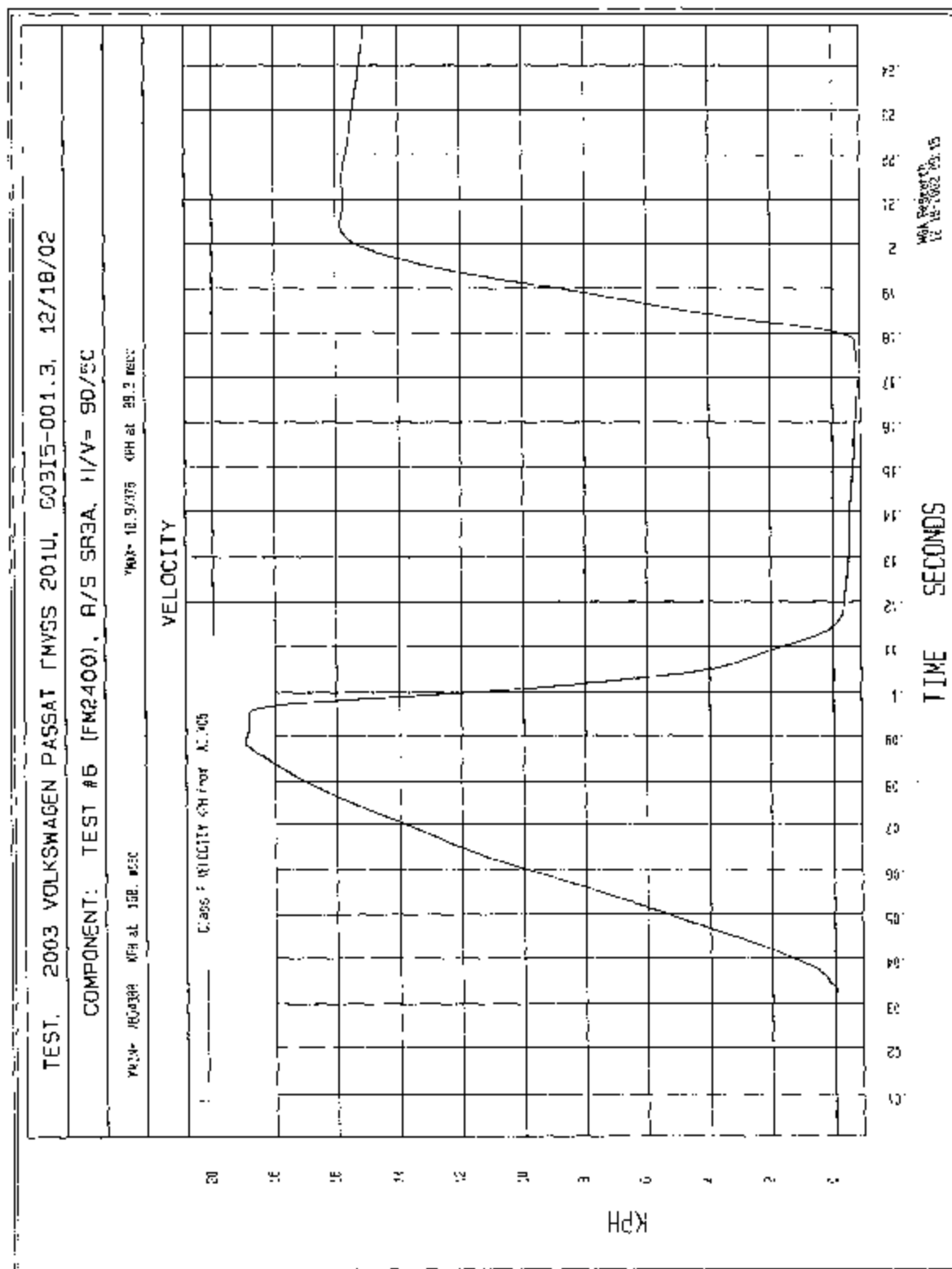
WDA Research
12-18-2002 08:15

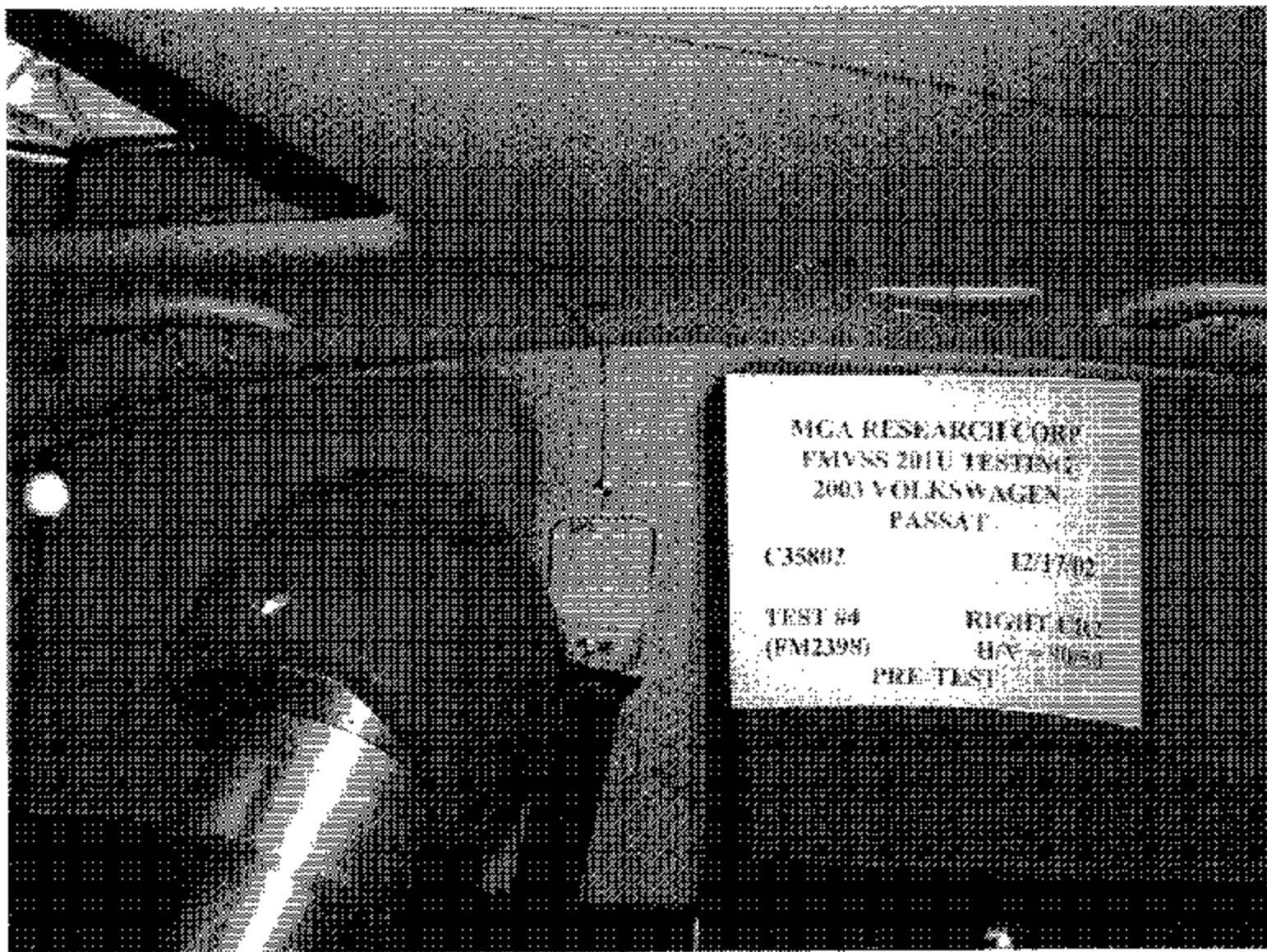












MICARESEARCH CORP
PASS 882011 TESTING
2003 VOLKSWAGEN
PASSAT

C35802 12/17/02

TEST 44 RIGHT UR?
(UM2398) Q/A 90/50

POC TEST

**MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT**

C35802

12/17/02

TEST #4

RIGHT UR2

(FM2398)

H/V = 90/50

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES MGATP201U_FRAME #2.3

DOC. NO.: MGATP201U_FRAME #2
REVISION NO.: 4
PAGE 9 of 9

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: C35E02 VEHICLE YR/MAKE/MODEL: 2003 VOLKSWAGEN PASSAT

GENERAL TEST PARAMETERS:

Test Number: 4

Target (Vehicle Side): left/right RIGHT

Temperature: 74 °C

MGA Test Reference No: M2392

Humidity: 22 %

Approach Angles: Horizontal: 90 °

Time of Test: 3:46 a.m./p.m.

Vertical: 50 °

FMH Serial No: 35

TEST RESULTS:

HIC(d)	HIC	At (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
<u>56</u>	<u>464</u>	<u>10.5</u>	<u>237</u>	<u>31</u>	<u>10</u>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No	DLR Value	ΔV Pre-Test	ΔV Post-Test
<u>X</u>	<u>5</u>	<u>J35924</u>	<u>-108.2</u>	<u>1.21</u>	<u>1.21</u>
<u>Y</u>	<u>6</u>	<u>J35919</u>	<u>107.0</u>	<u>1.23</u>	<u>1.25</u>
<u>Z</u>	<u>7</u>	<u>J51051</u>	<u>97.3</u>	<u>1.31</u>	<u>1.51</u>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No Visible Damage

Recorded By: [Signature] Approved By*: _____ Date: 12/17/01

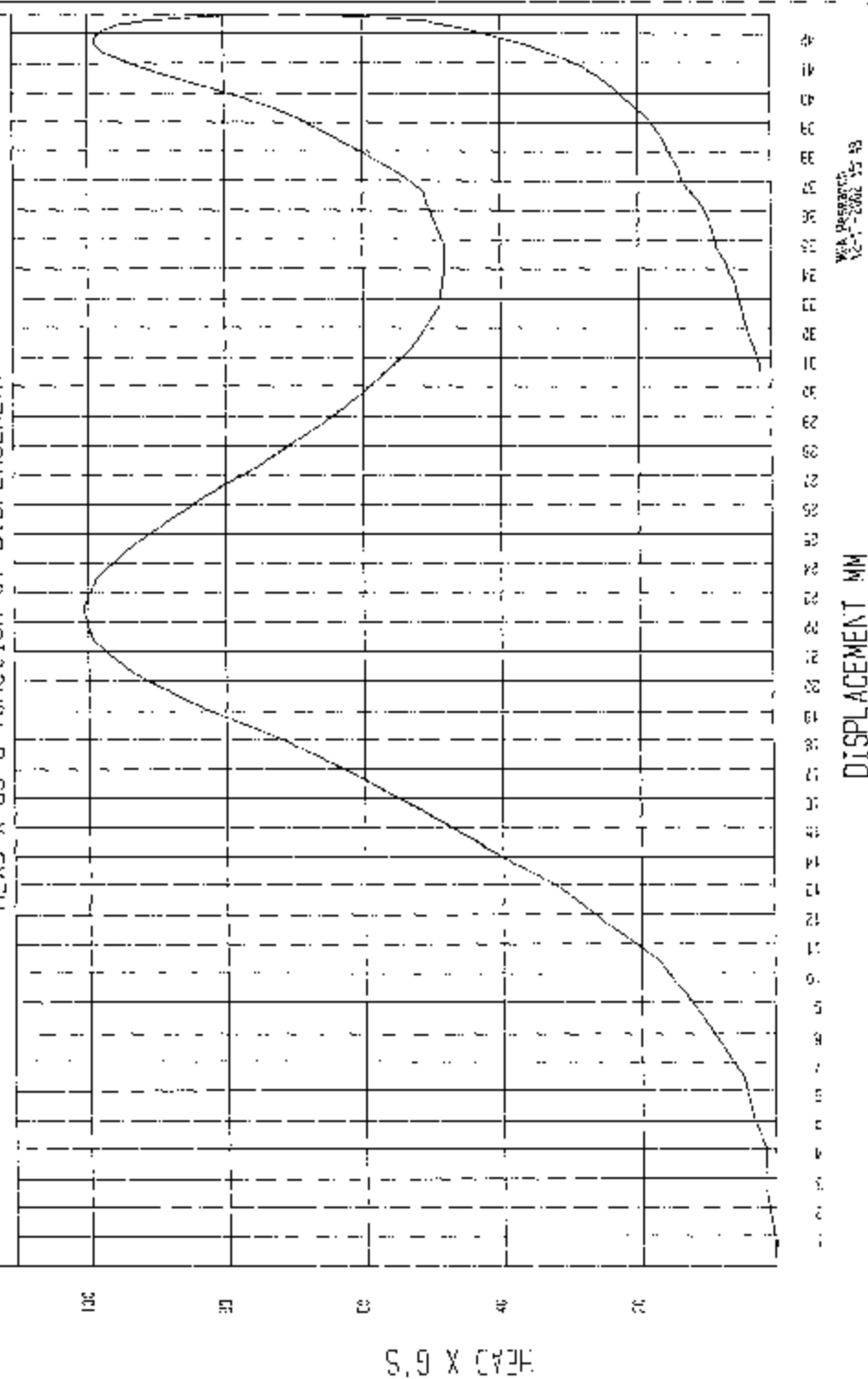
*Only necessary for NHTSA (Government) Compliance testing.

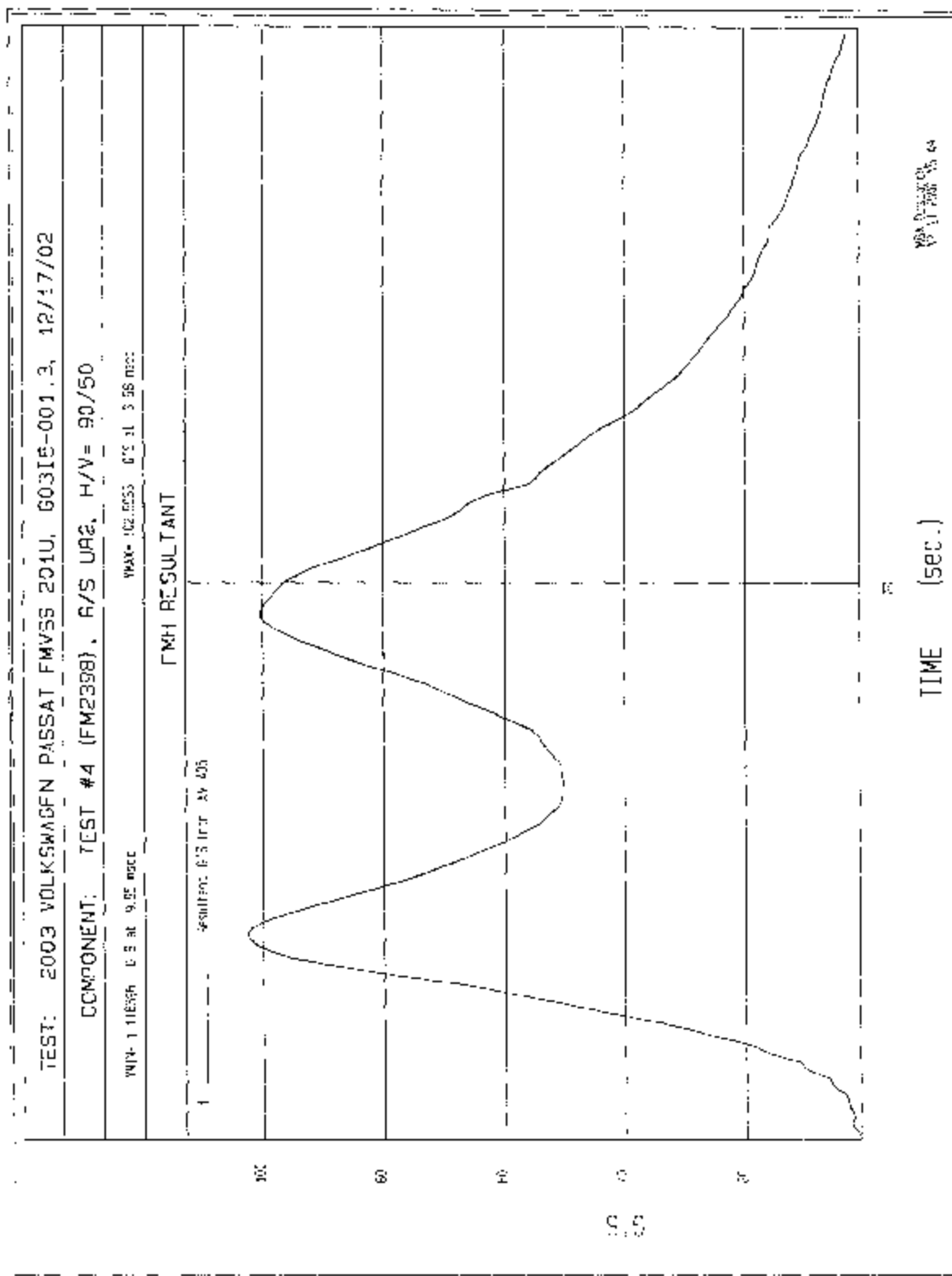
```
*****
RESULTS OF HIC36 PROGRAM
*****
input file is \NHTSA\FM2398AV.A05
HIC = 463.64 calculated over 10.5 msec
T1 = 2.19 msec T2 = 12.65 msec
*****
HIC(d) = 516
Impact Velocity = 23.7 (kph)
```

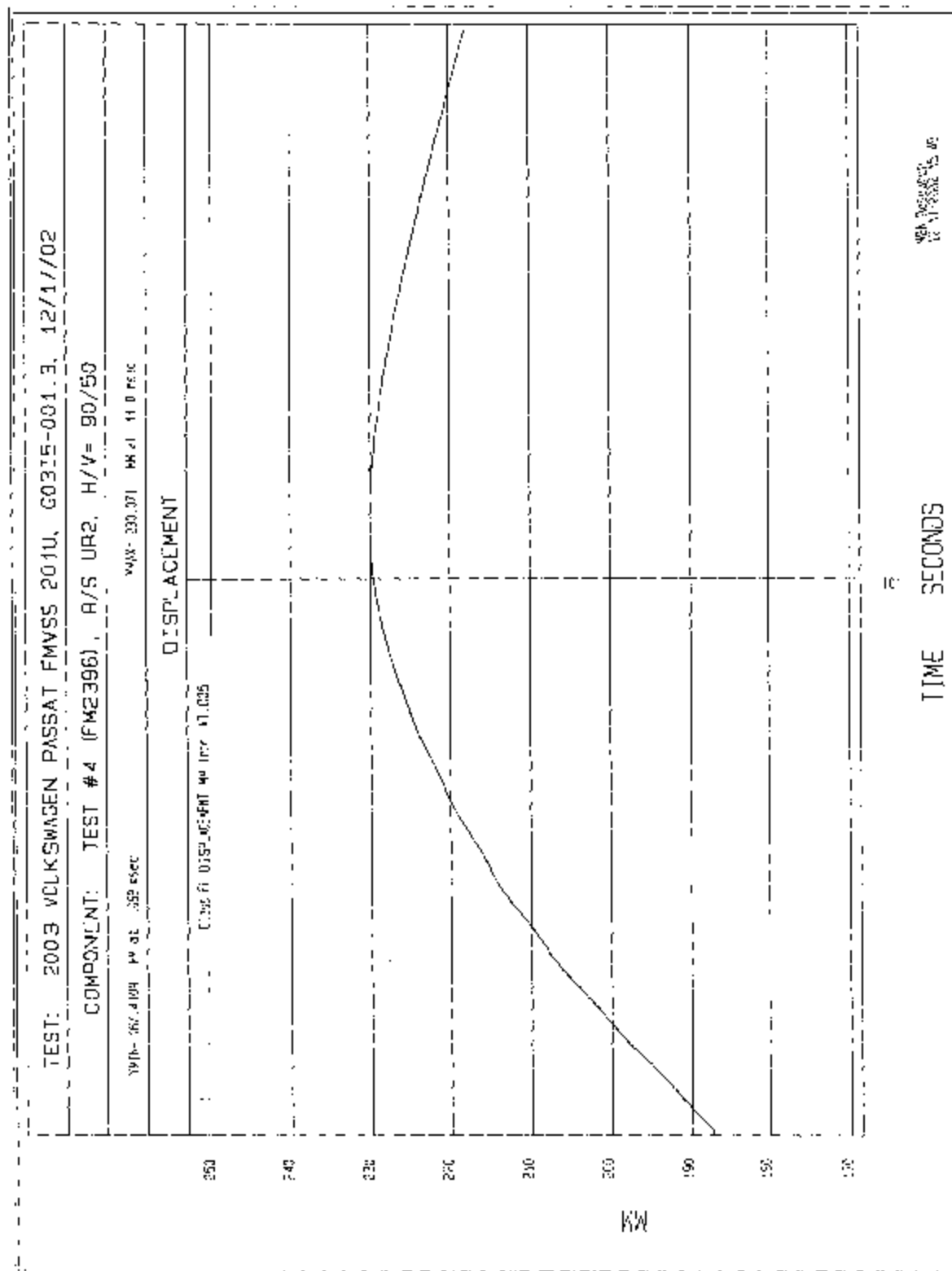
TEST: 2003 VOLKSWAGEN PASSAT FNVSS 201U, 60315-001.3, 12/17/02

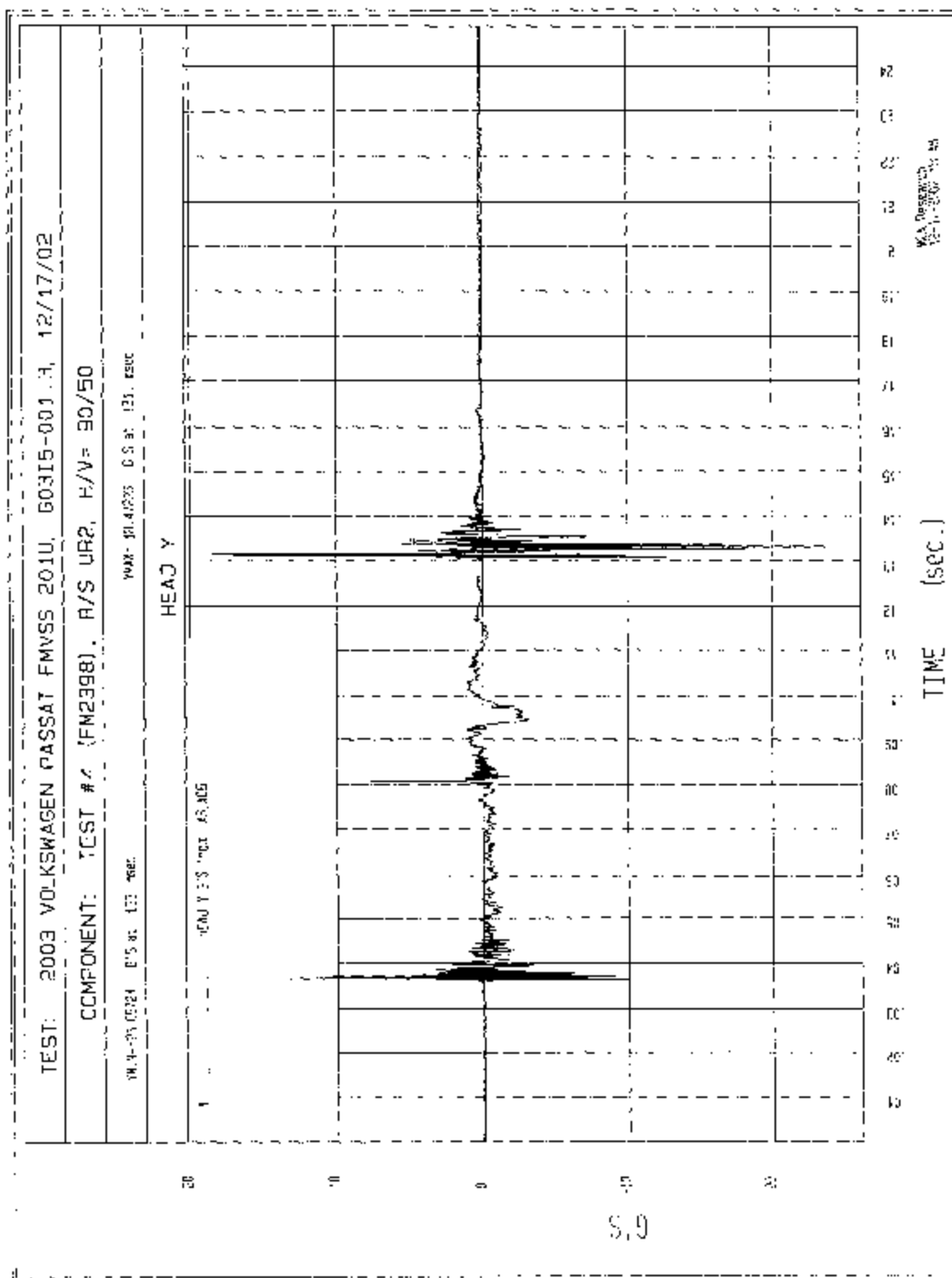
COMPONENT: TEST #4 (FM2398), R/S UR2, H/V= 90/50

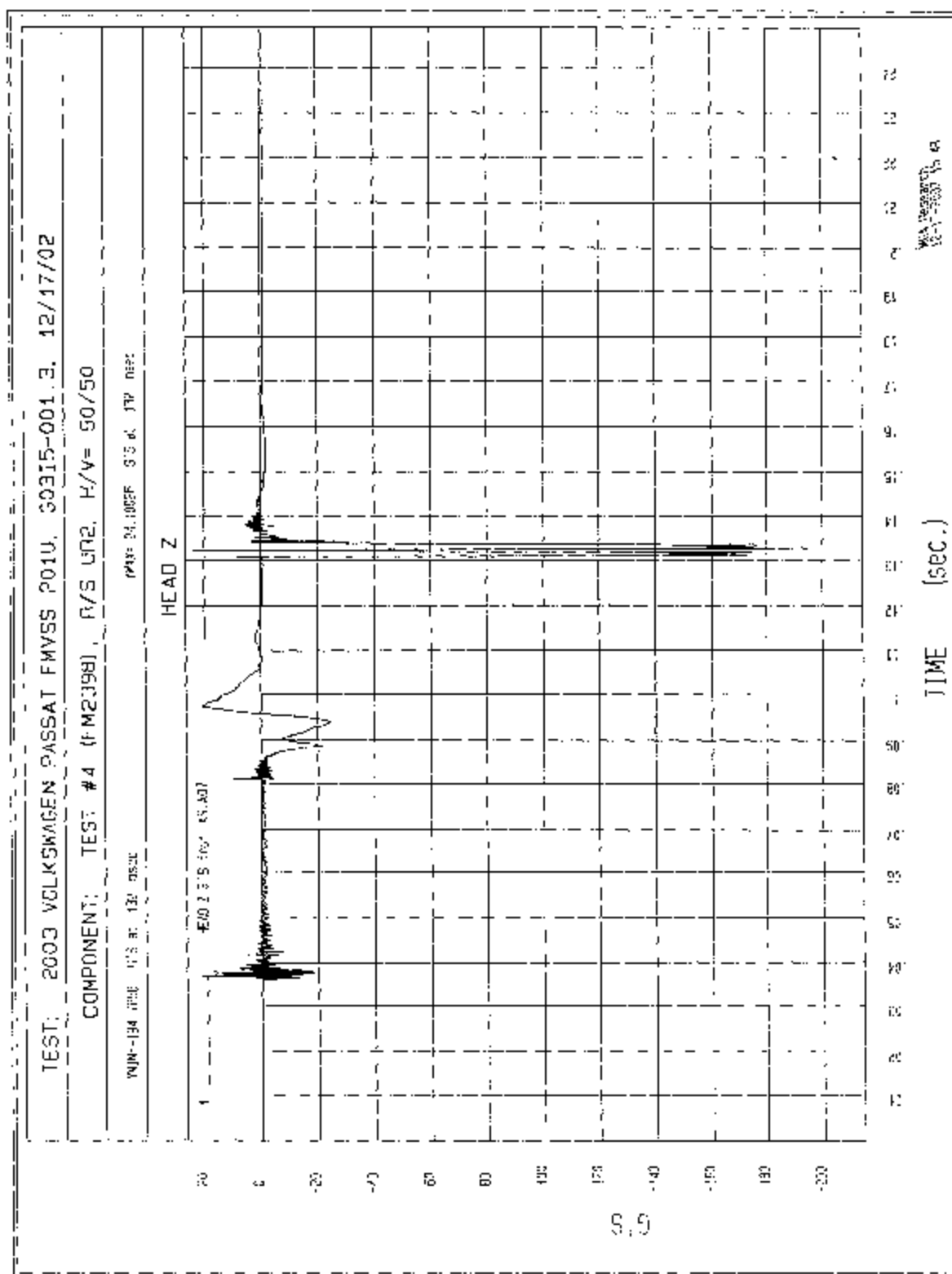
HEAD X as a function of DISPLACEMENT

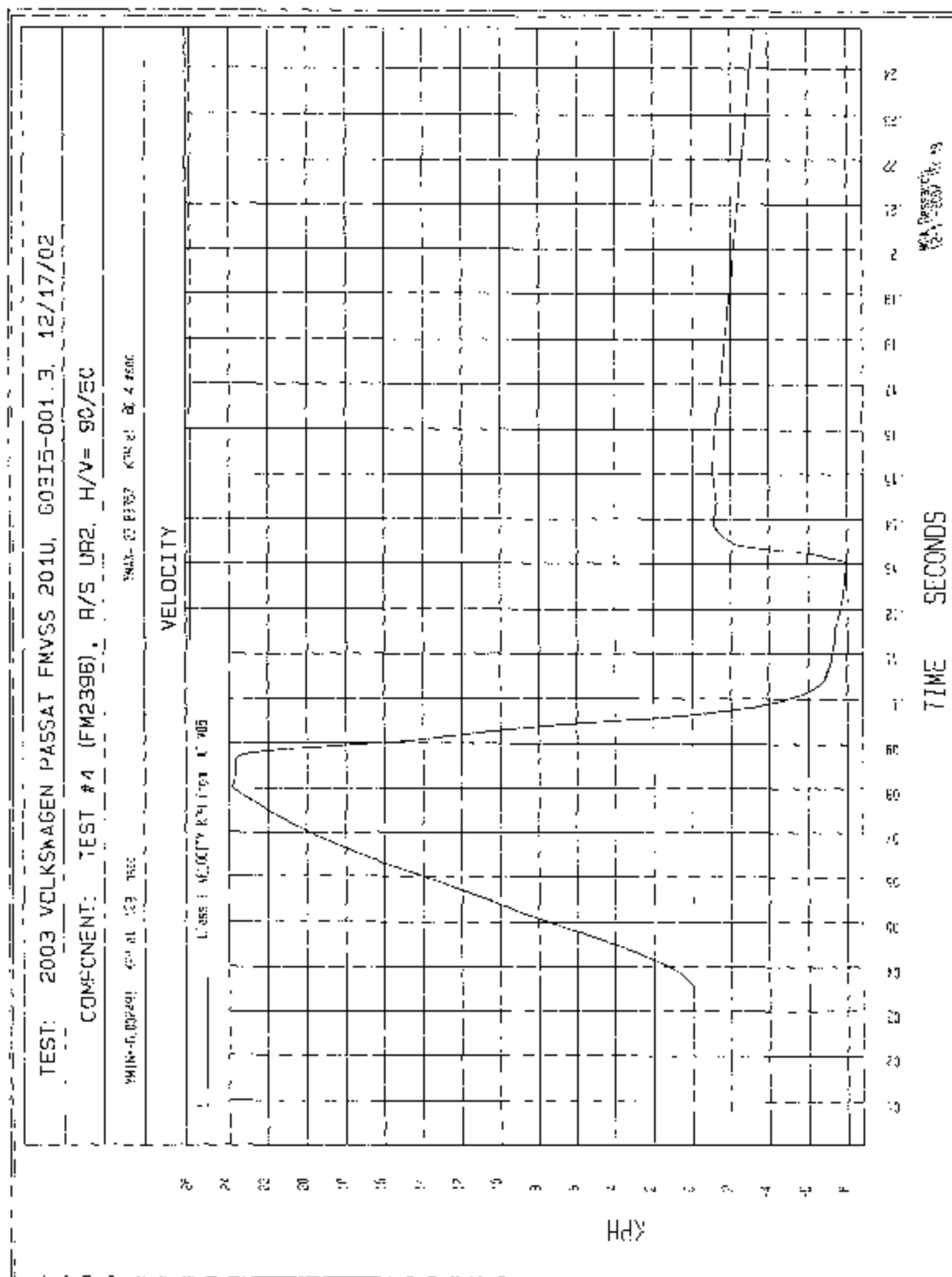












MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/17/02

TEST #3
(FM2397)

RIGHT UR3
H/V = 65/47

PRE-TEST

MGA RESEARCH CORP.
PAVSS 2011 TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/17/02

TEST #1

RIGHT URJ

(FM2397)

H/V = 65/47

POST-TEST

C35802
FM2397
RS URJ

**MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT**

C35802

12/17/02

**TEST #3
(FM2397)**

**RIGHT UR3
H/V = 65/47**

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCLIDES: MGATP201U_FRAME #2.3

DOC. NO.: MGATP201U_FRAME #2
REVISION NO.: 4
PAGE 9 of 9

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: C35802 VEHICLE YR/MAKE/MODEL: 2003 Volkswagen

GENERAL TEST PARAMETERS:

Test Number: 3

Target (Vehicle Side): left (right) UR3

Temperature: 77 (°F)°C

MGA Test Reference No.: FM237

Humidity: 22 %

Approach Angles: Horizontal 65 °

Time of Test: 2:49 am/pm pm

Vertical 47 °

FMH Serial No: 38

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
<u>702</u>	<u>709</u>	<u>4.4</u>	<u>23.7</u>	<u>23</u>	<u>1</u>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
<u>X</u>	<u>5</u>	<u>J36197</u>	<u>108.8</u>	<u>1.21</u>	<u>1.21</u>
<u>Y</u>	<u>6</u>	<u>J36193</u>	<u>102.0</u>	<u>1.23</u>	<u>1.23</u>
<u>Z</u>	<u>7</u>	<u>J36353</u>	<u>97.8</u>	<u>1.51</u>	<u>1.51</u>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

NO VISIBLE DAMAGE

Recorded By: WKL Approved By*: _____ Date: 12/17/02

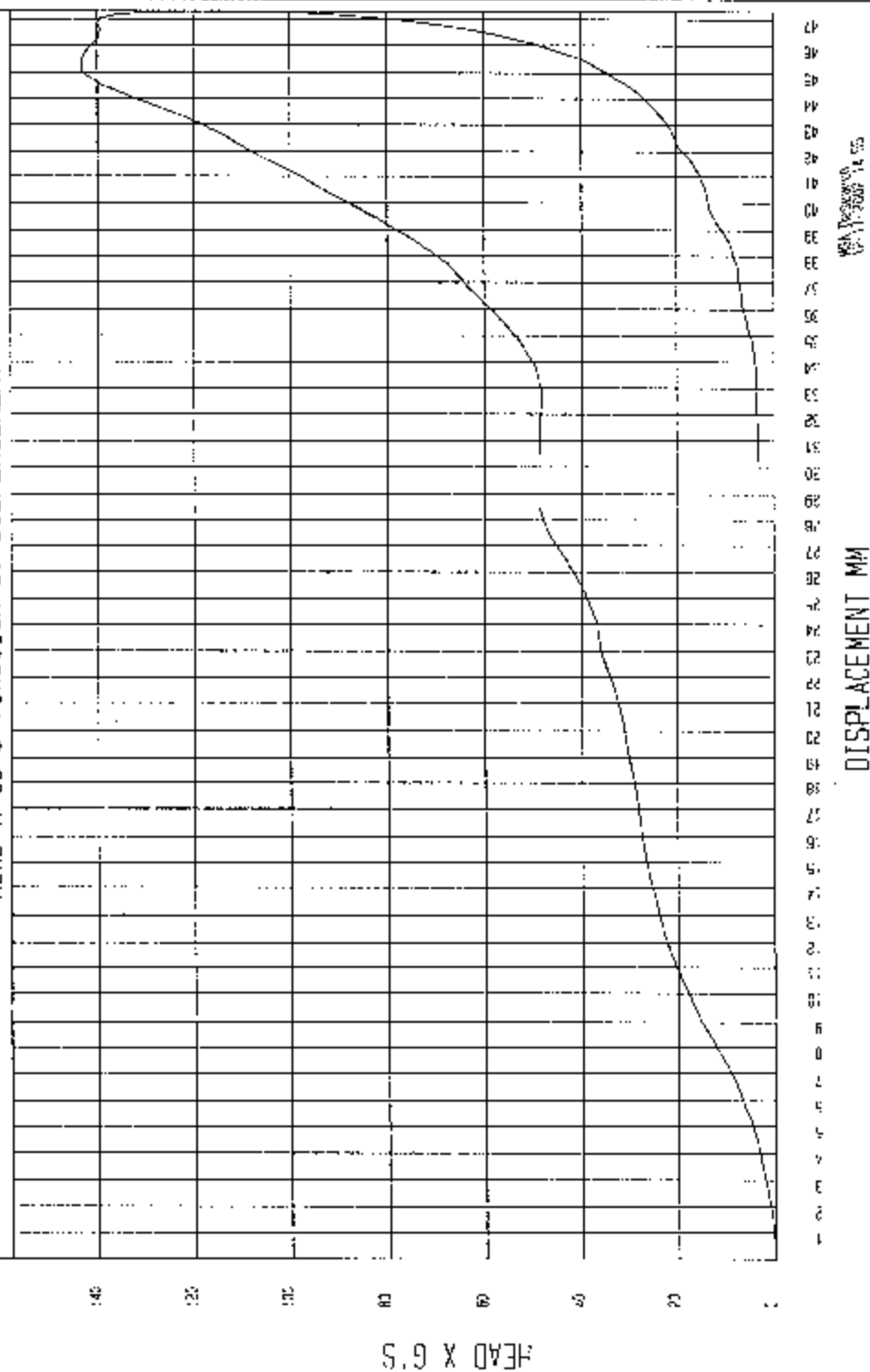
*Only necessary for NHTSA (Government) Compliance testing.

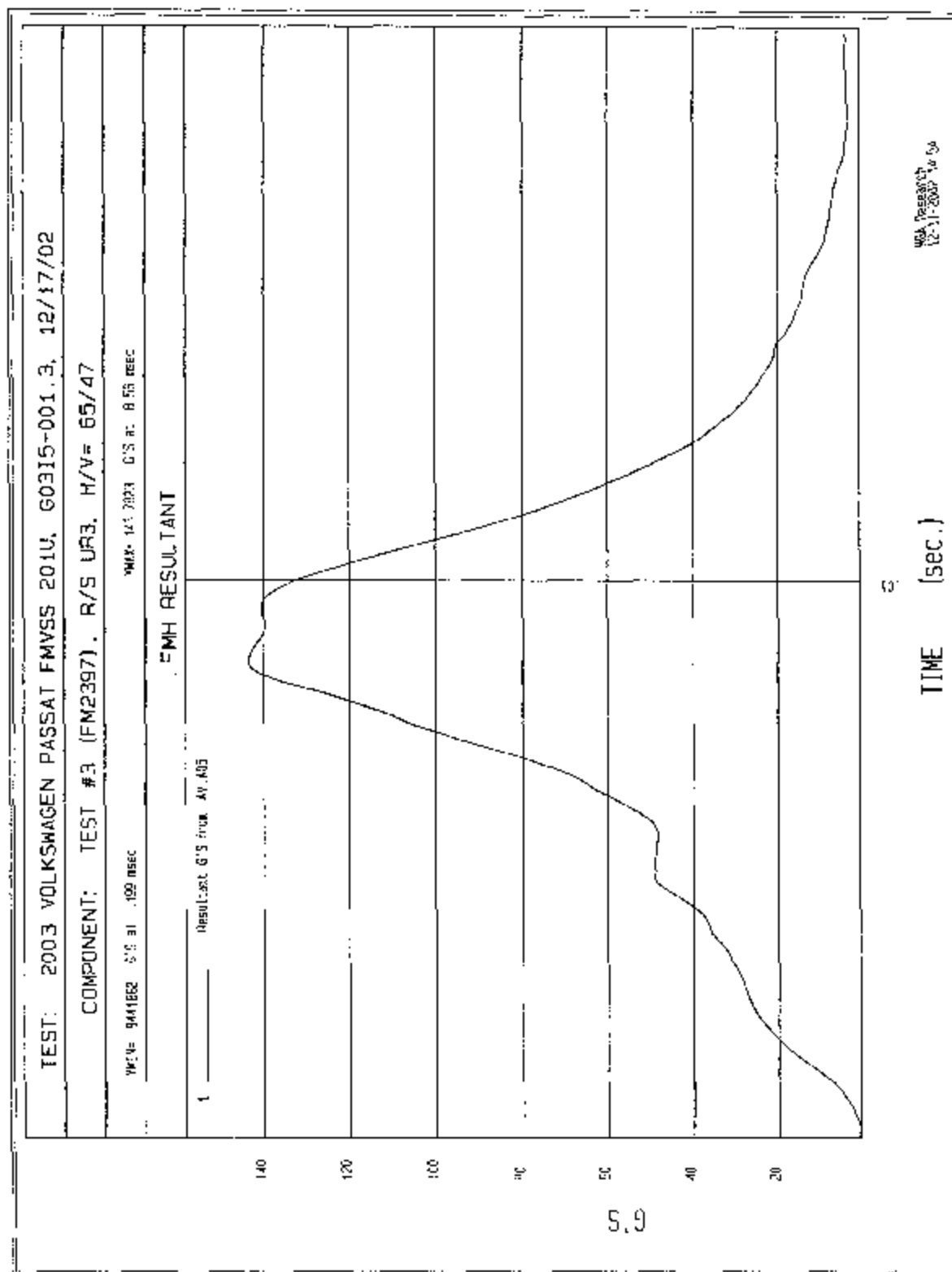
```
*****
RESULTS OF HIC36 PROGRAM
*****
input file is \NHTSA\FM2397AV.A05
HIC = 709.26 calculated over 4.9 msec
T1 = 6.47 msec T2 = 11.35 msec
*****
HIC(d) = 702
Impact Velocity = 23.7 (kph)
```

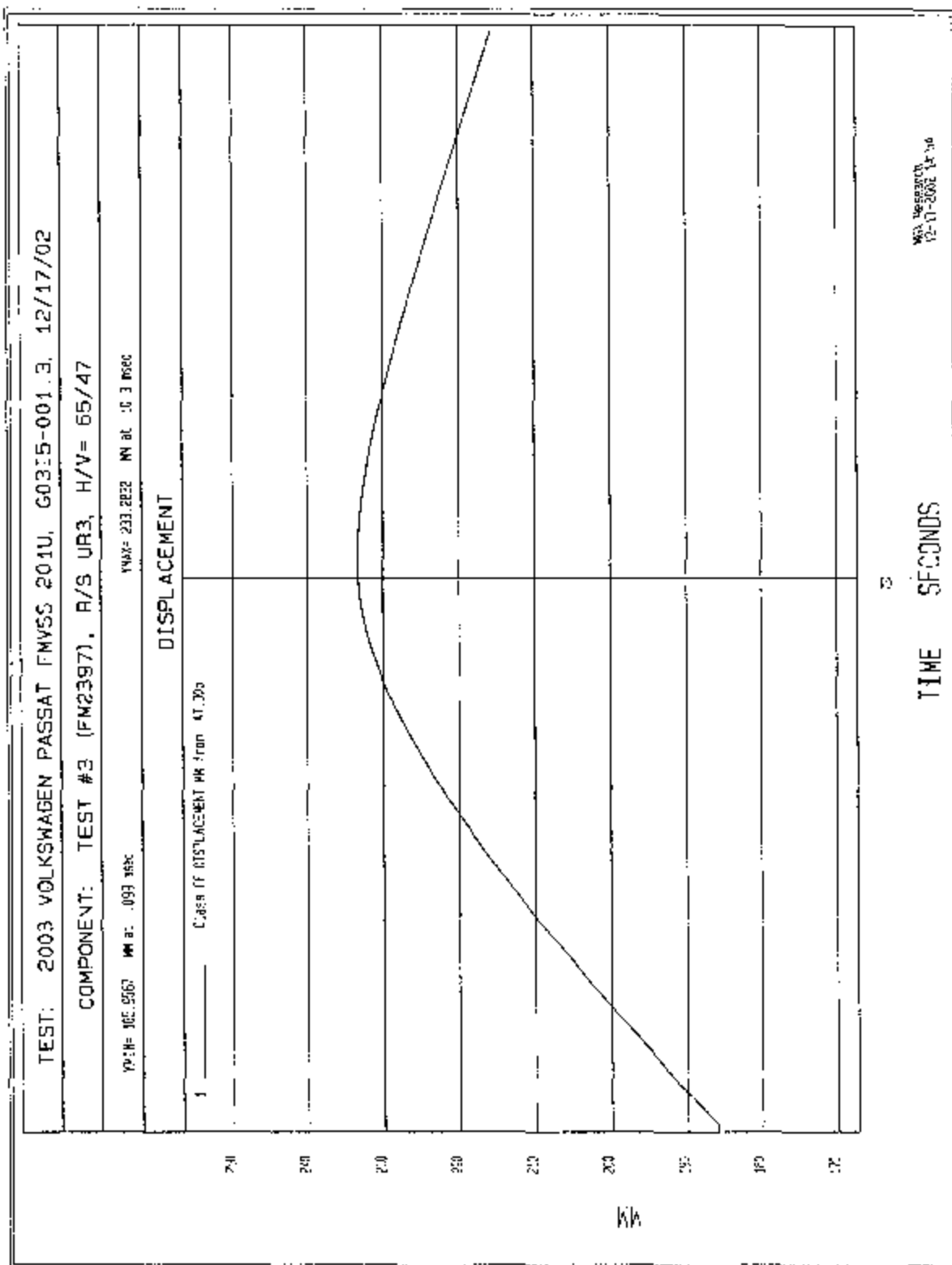
TEST: 2003 VOLKSWAGEN PASSAT FMVSS 201U, G0315-001.3, 12/7/02

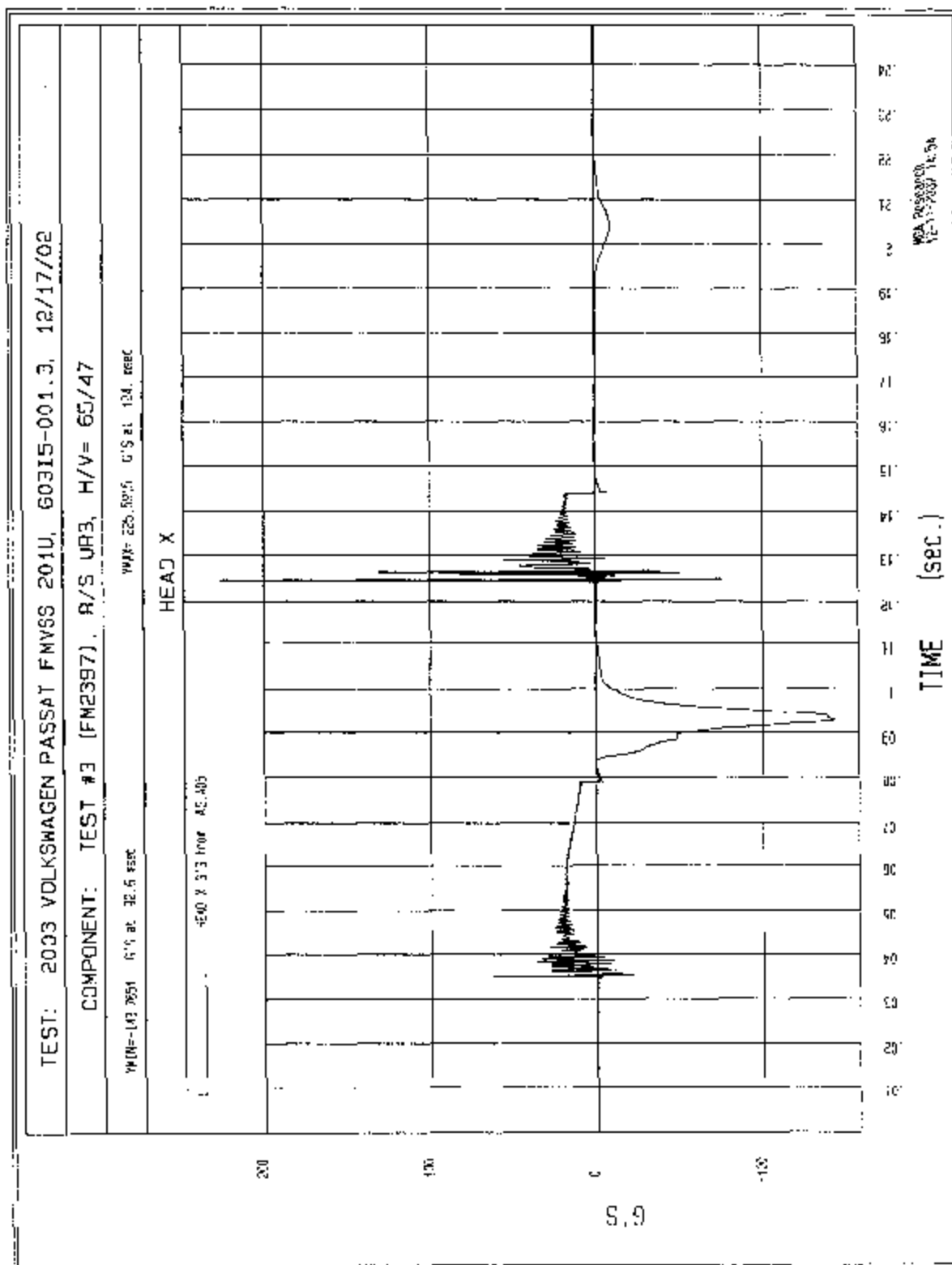
COMPONENT: TEST #3 (FM2397), R/S UR3, H/V= 65/41

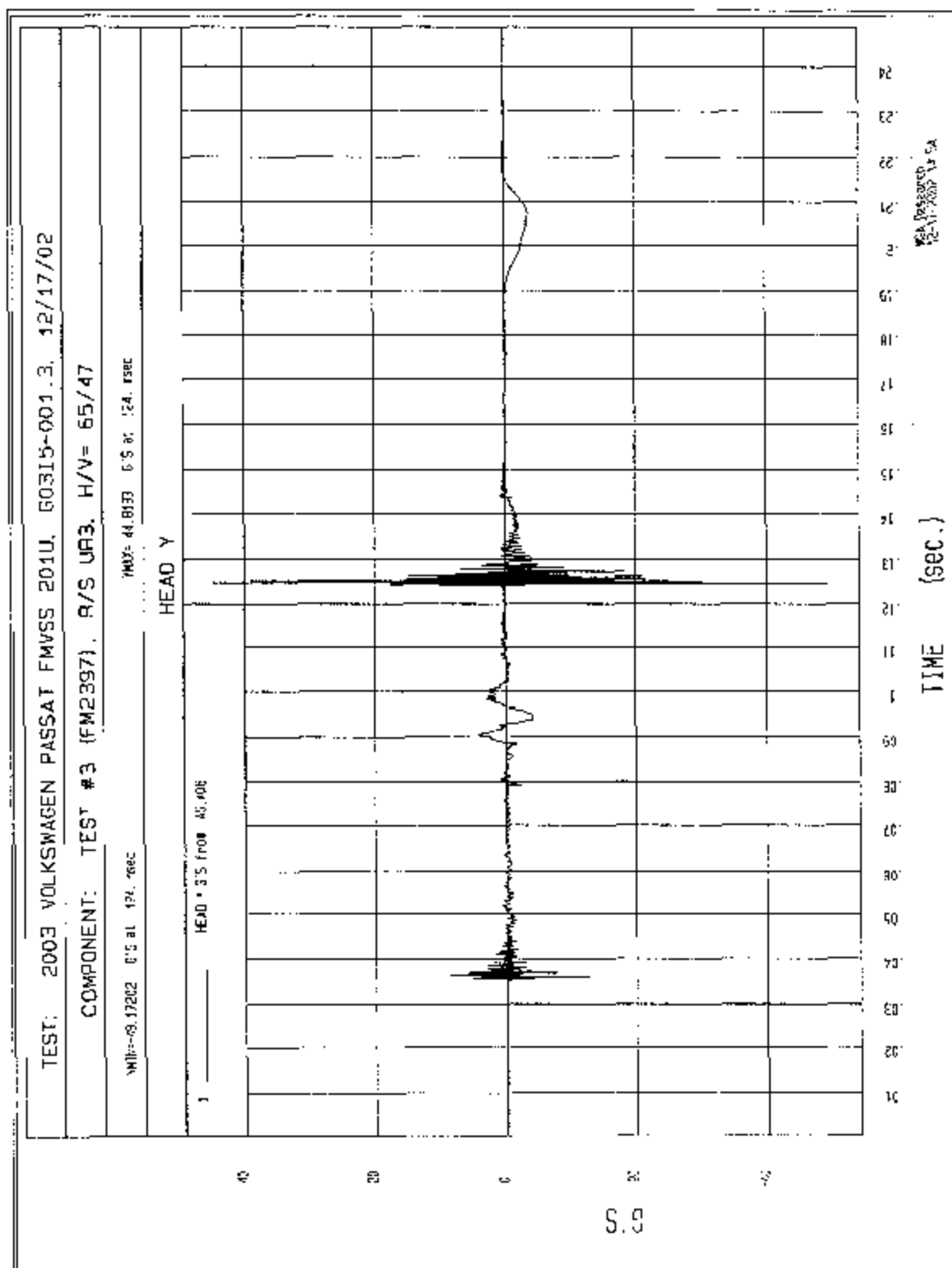
HEAD X as a function of DISPLACEMENT

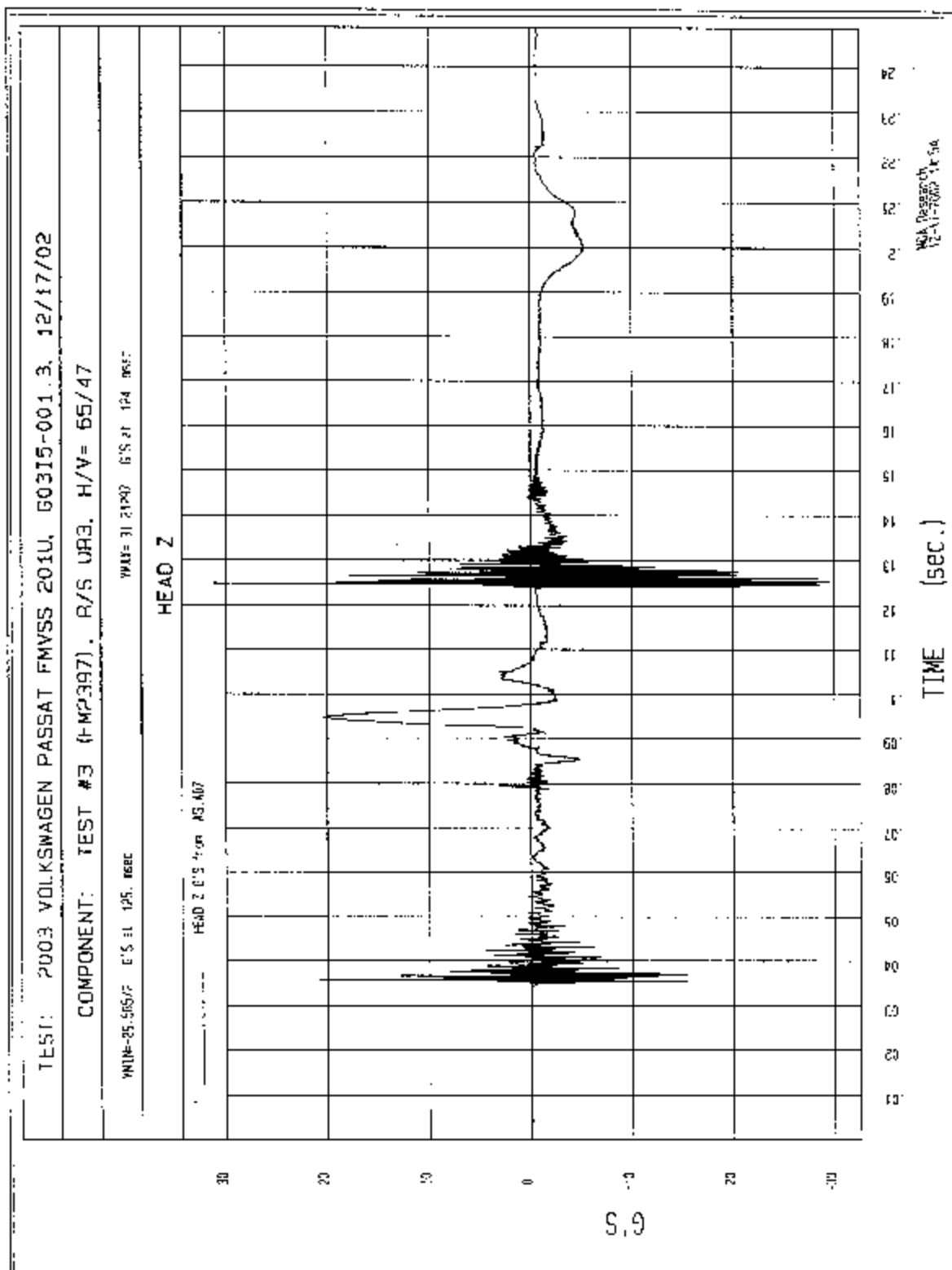


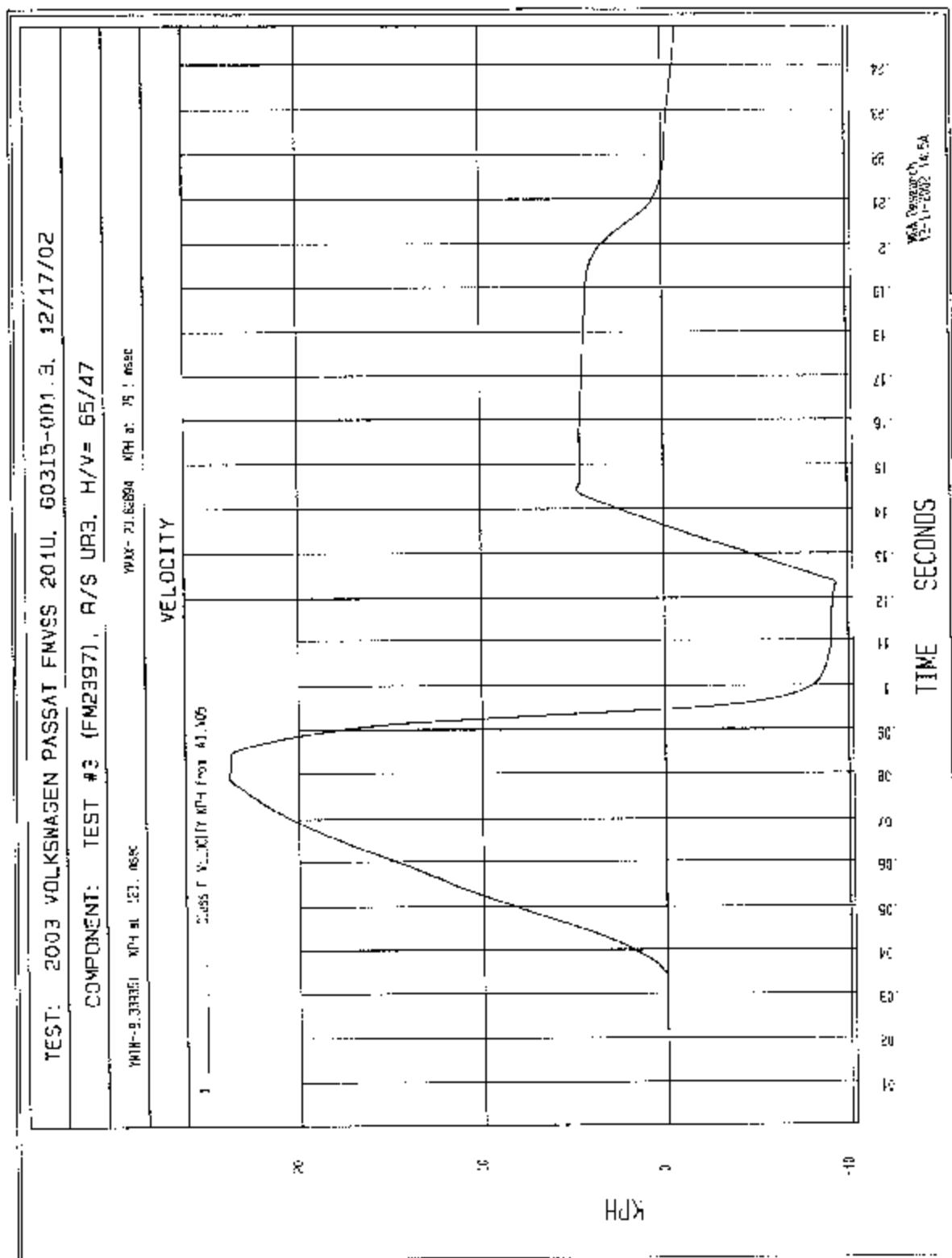










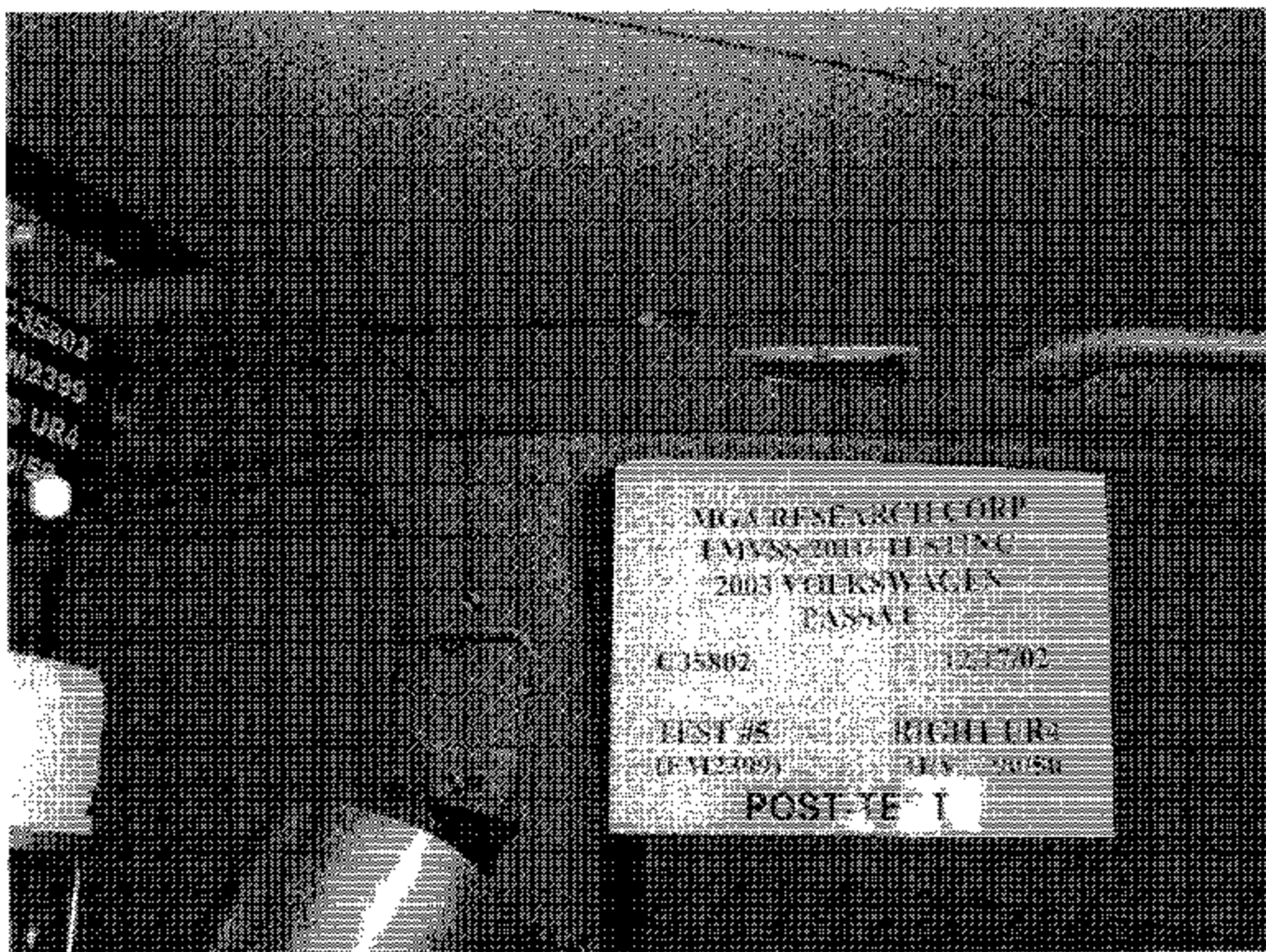


MOA RESEARCH CORP
EMISS 2010 TESTING
2003 VOLKSWAGEN
PASSAT

C-35802 12/17/02

TEST #5 RESISTOR
(FM2300) LVA = 90/50

PRI TEST



MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/17/02

TEST #5
(FM2399)

RIGHT UR4
H/V = 90/50

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES: MGATP201U_FRAME #2.3

DOC. NO.: MGATP201U_FRAME #2
REVISION NO.: 4
PAGE 9 of 9

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: C35802

VEHICLE YR/MAKE/MODEL: 2005 Volkswagen Passat

GENERAL TEST PARAMETERS:

Test Number: 5

Target (Vehicle Side): left (right) ~~UR~~ Y

Temperature: 74 °F

MGA Test Reference No.: Fm2394

Humidity: 22 %

Approach Angles: Horizontal 90 °

Time of Test: 5:01 am (pm)

Vertical 50 °

FMH Serial No: 34

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
439	362	13.2	23.6	30	0

INSTRUMENTAION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	100.9	1.21	1.21
Y	6	J35916	100.7	1.23	1.23
Z	7	J35919	100.8	1.51	1.51

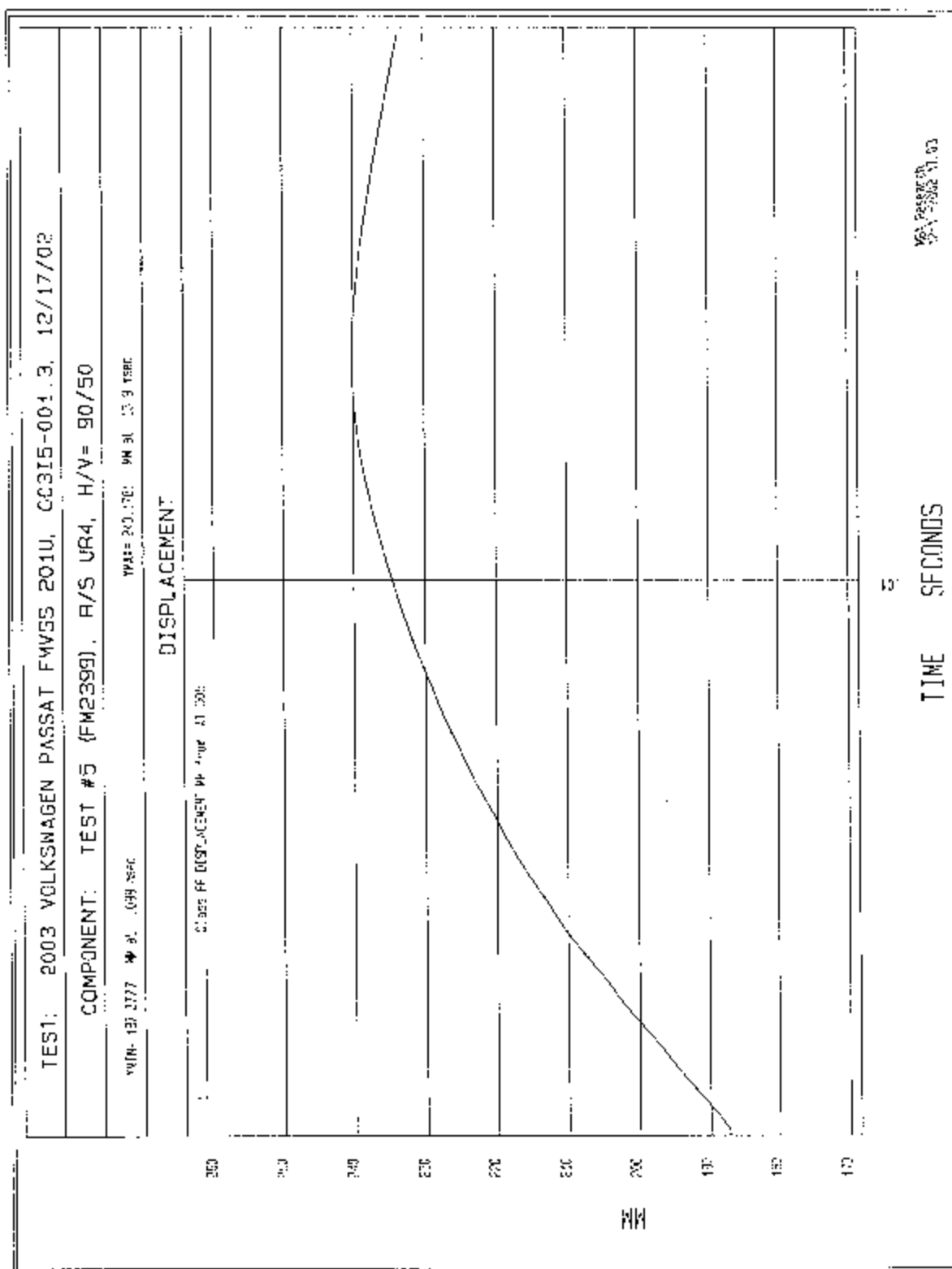
REMARKS (Summary of test, damage, non-compliance, invalid test, etc.): _____

NO VISIBLE DAMAGE

Recorded By: [Signature] Approved By*: _____ Date: 12/17/02

*Only necessary for NHTSA (Government) Compliance testing.

```
*****
      RESULTS OF HIC36 PROGRAM
*****
The input file is \NHTSA\FM2399AV.A05
  e HIC =   361.70  calculated over  13.2 msec
T1 =    2.59 msec  T2 =   15.84 msec
*****
      HIC(d) = 439
      Impact Velocity = 23.6 (kph)
```

3-104

TEST: 2003 VOLKSWAGEN PASSAT FMYSS 201U, G0315-001.3, 12/17/02

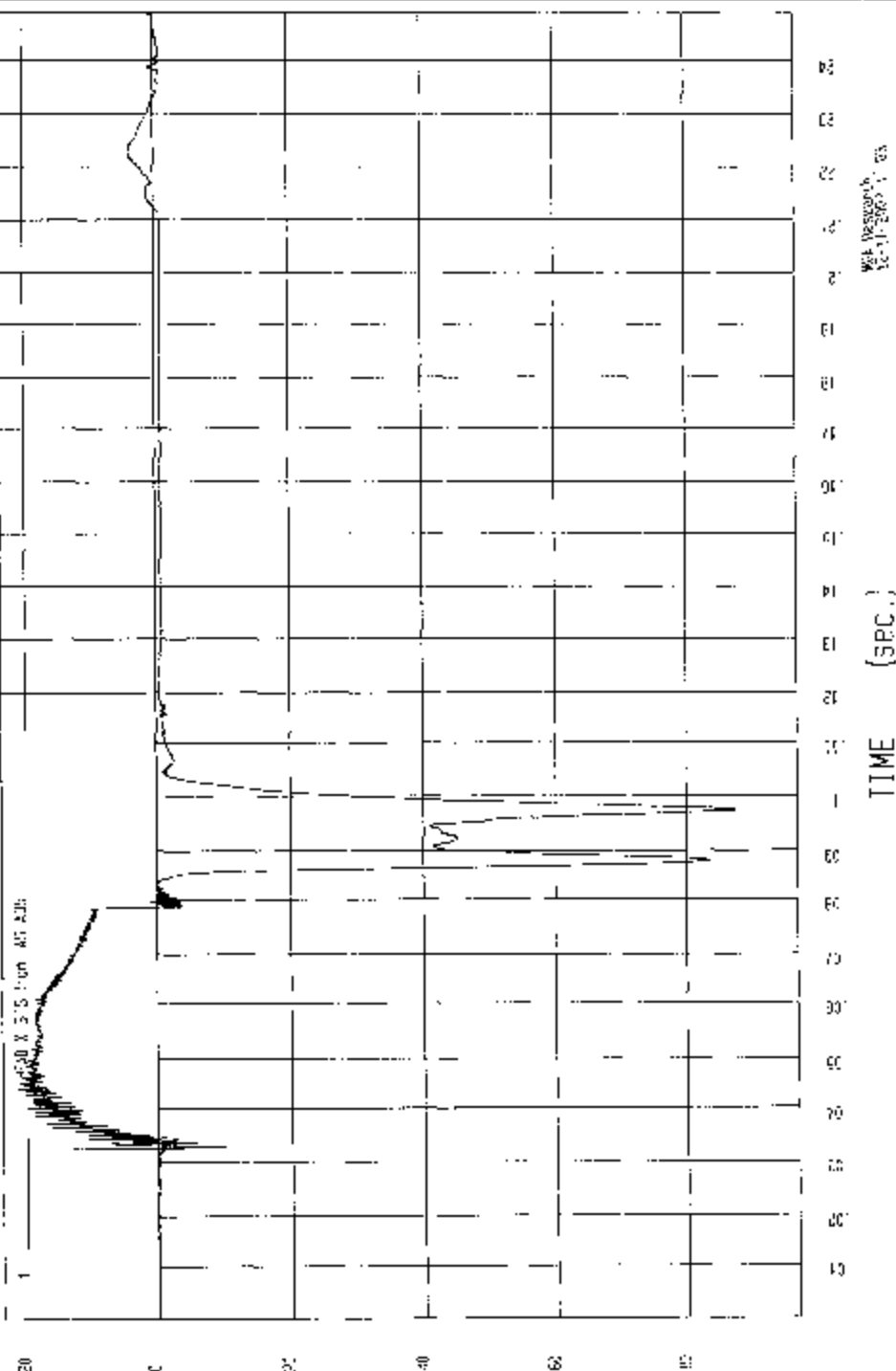
COMPONENT: TEST #5 (FM2389), R/S UR4, H/V- 90/50

*TIME=07.3037: G'S at 97.2 K50C

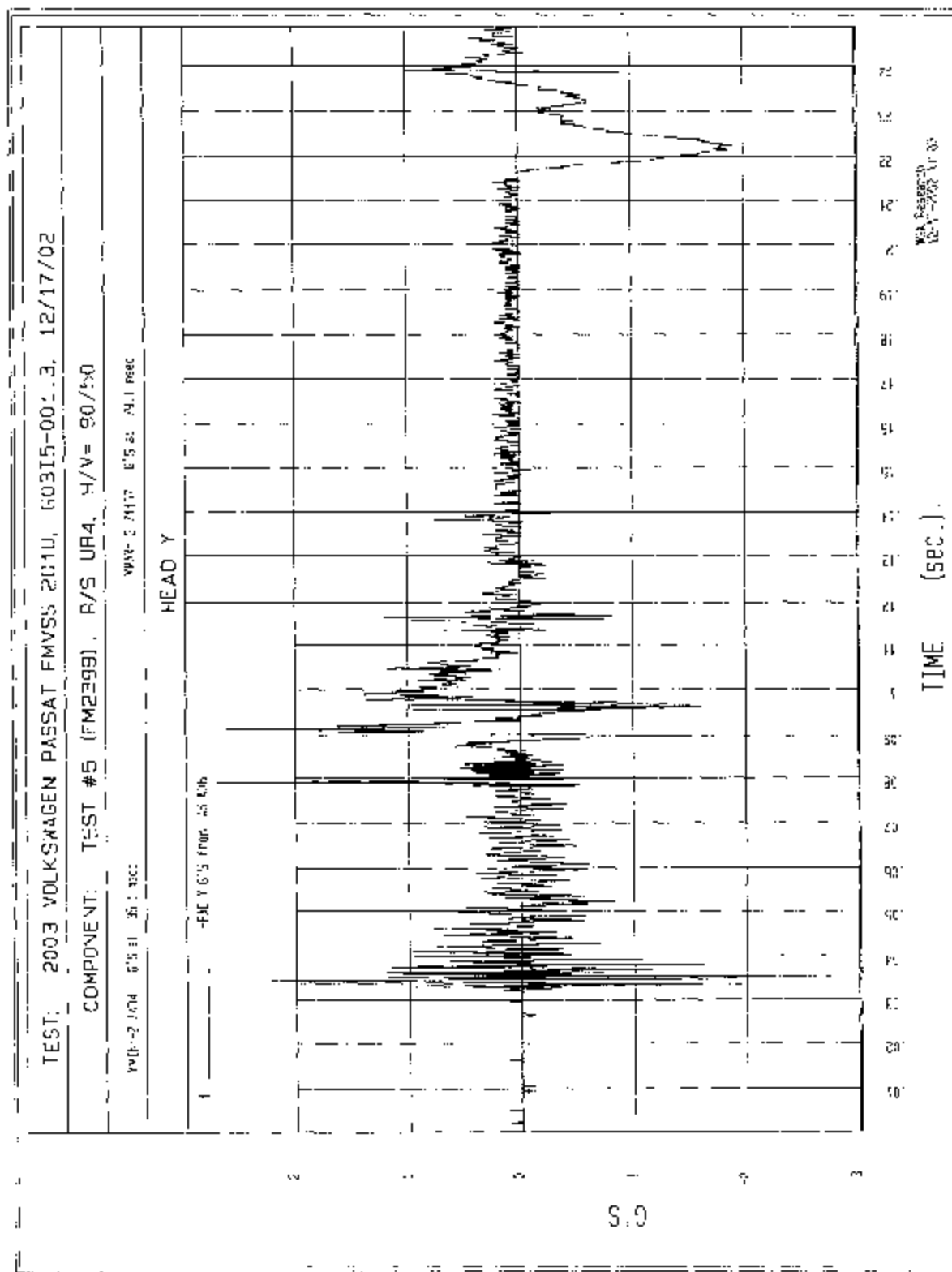
*MAX= 21 G's at 42.7 K50C

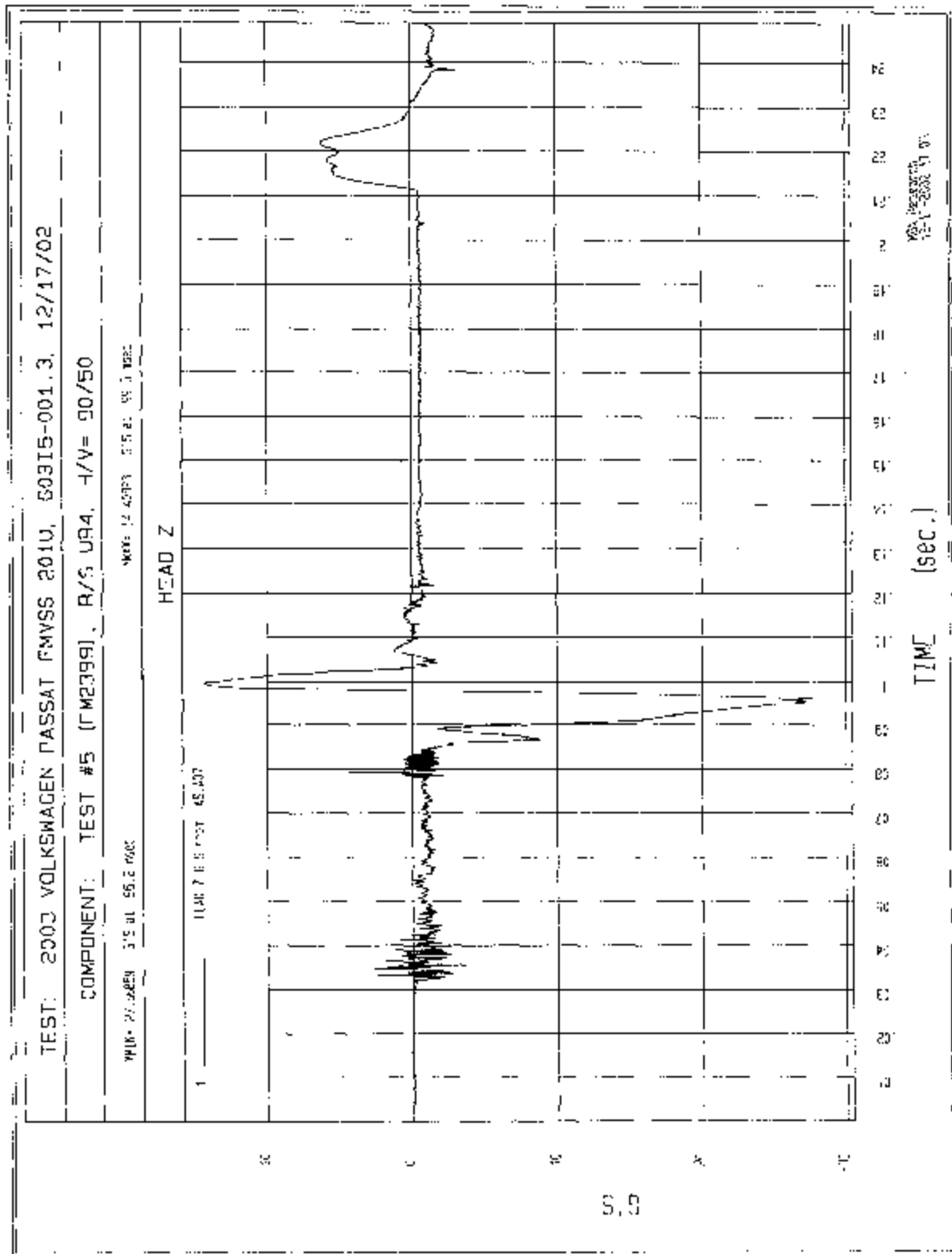
HEAD X

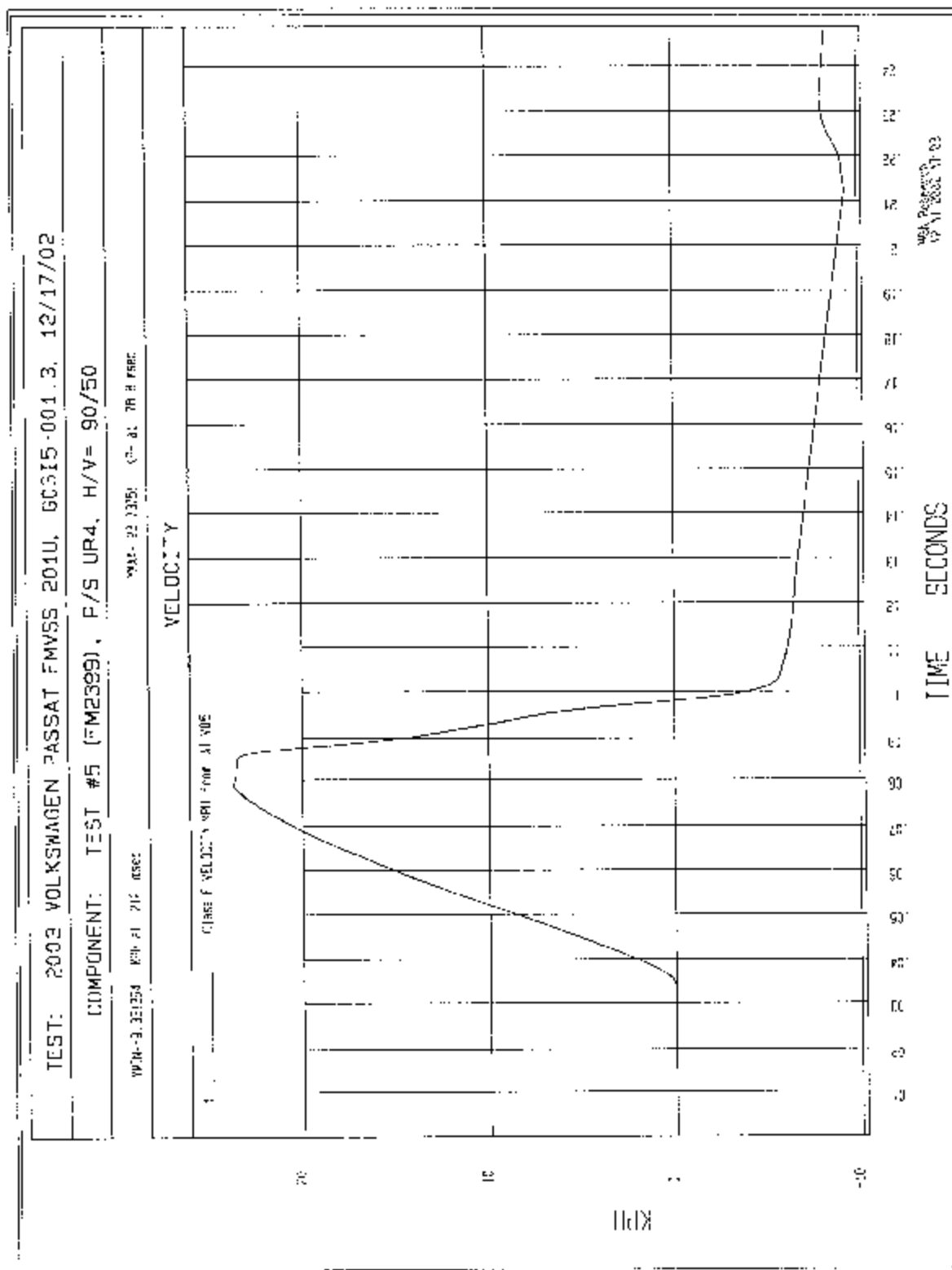
1
20 X 3.5 Ton AT 225



5.9







MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C33802

12/18/02

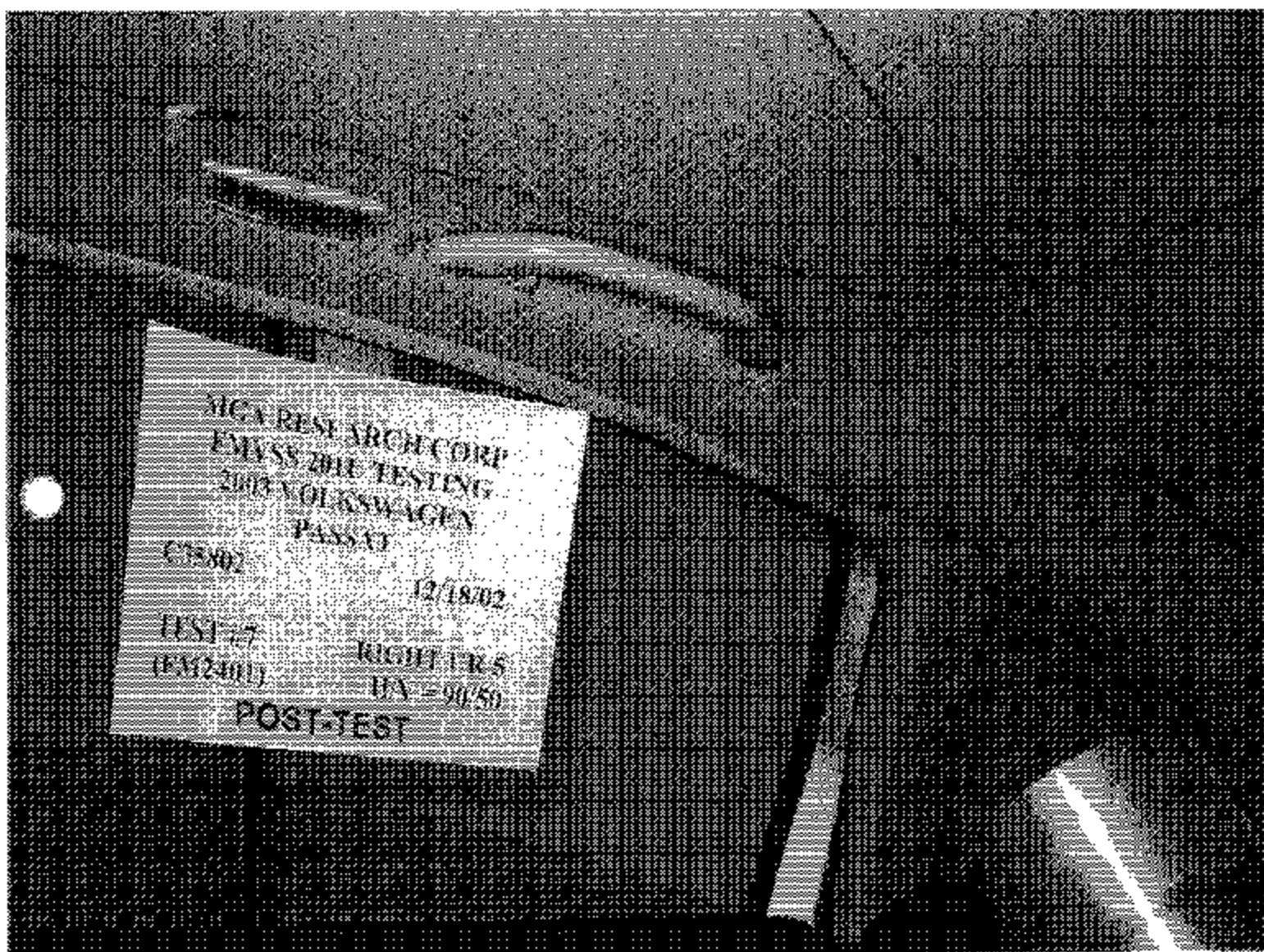
TEST #7

(PM2401)

RIGHT UR 5

H/V = 90/50

PRE-TEST



MGA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

C35802

12/18/02

TEST #7
(FM2401)

RIGHT UR 5
H/V = 90/50

POST-TEST

MICHIGAN OPERATIONS
DATE: 10/18/01
SUPERCEDES: MGATP201U_FRAME #2.3

DOC. NO.: MGATP201U_FRAME #2
REVISION NO.: 4
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: 60513 D01 VEHICLE YR/MAKE/MODEL: 2003 Volvo 460 GLE
23802

GENERAL TEST PARAMETERS:

Test Number: 7

Target (Vehicle Side): left/high URS

Temperature: 74 °F/C

MGA Test Reference No.: FM2401

Humidity: 22 %

Approach Angles: Horizontal 90 °

Time of Test: 9:40 am/pm

Vertical 40 °

FMH Serial No: 35

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	<u>Left</u> Right Pt. O
<u>611</u>	<u>590</u>	<u>9.0</u>	<u>238</u>	<u>23</u>	<u>.3</u>

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7254-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
<u>X</u>	<u>5</u>	<u>J35924</u>	<u>-93.1</u>	<u>1.21</u>	<u>1.21</u>
<u>Y</u>	<u>6</u>	<u>J35919</u>	<u>93.3</u>	<u>1.23</u>	<u>1.23</u>
<u>Z</u>	<u>7</u>	<u>J31021</u>	<u>93.1</u>	<u>1.51</u>	<u>1.51</u>

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

NO VEHICLE DAMAGE

Recorded By: [Signature] Approved By*: _____ Date: 12/18/01

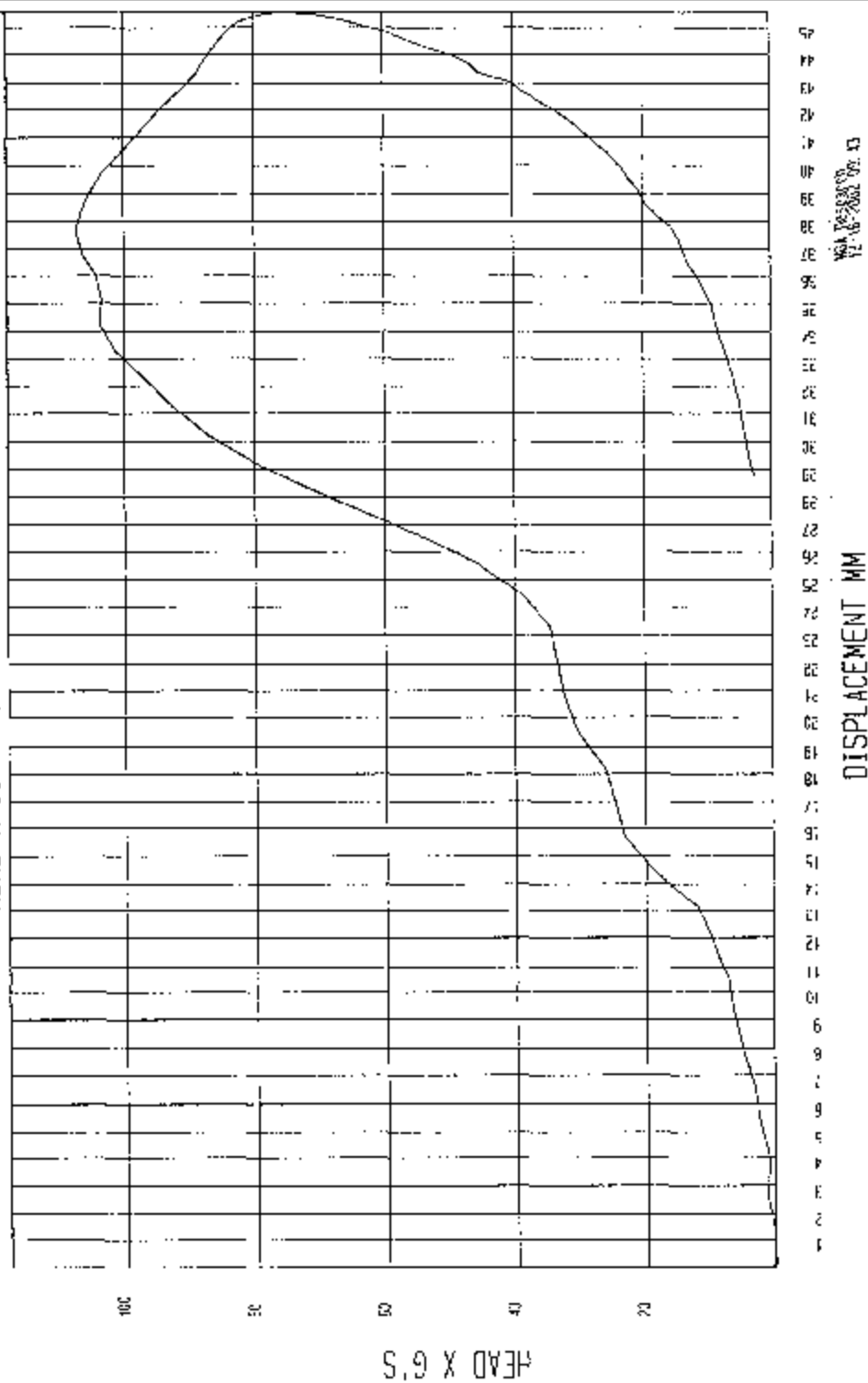
*Only necessary for NHTSA (Government) Compliance testing.

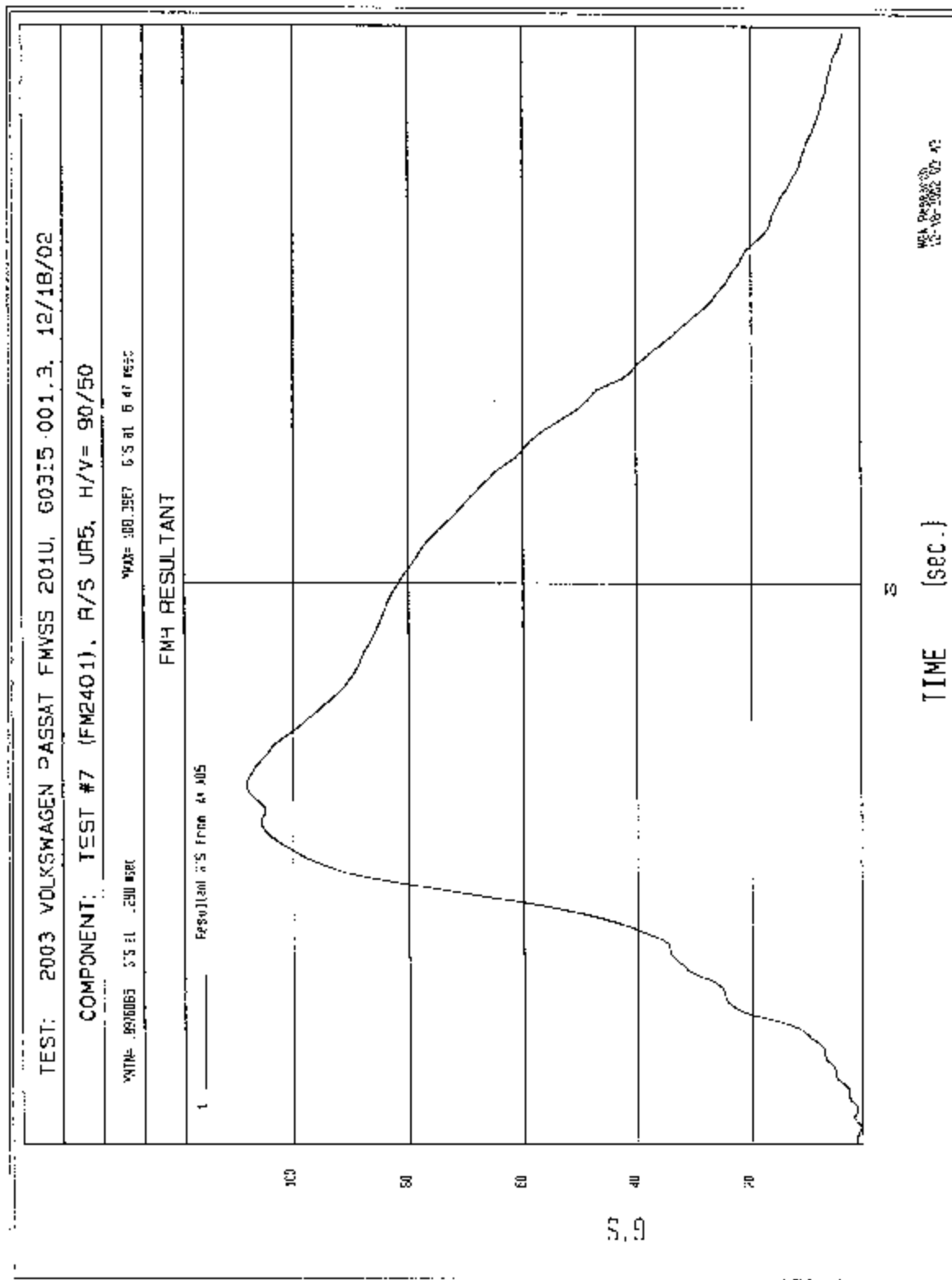
```
*****
RESULTS OF HIC35 PROGRAM
*****
The input file is \NHTSA\FM2401AV.A05
  HIC = 589.56 calculated over 9.0 msec
  T1 = 3.95 msec T2 = 12.95 msec
*****
HIC(d) = 611
Impact Velocity = 23.8 (kph)
```

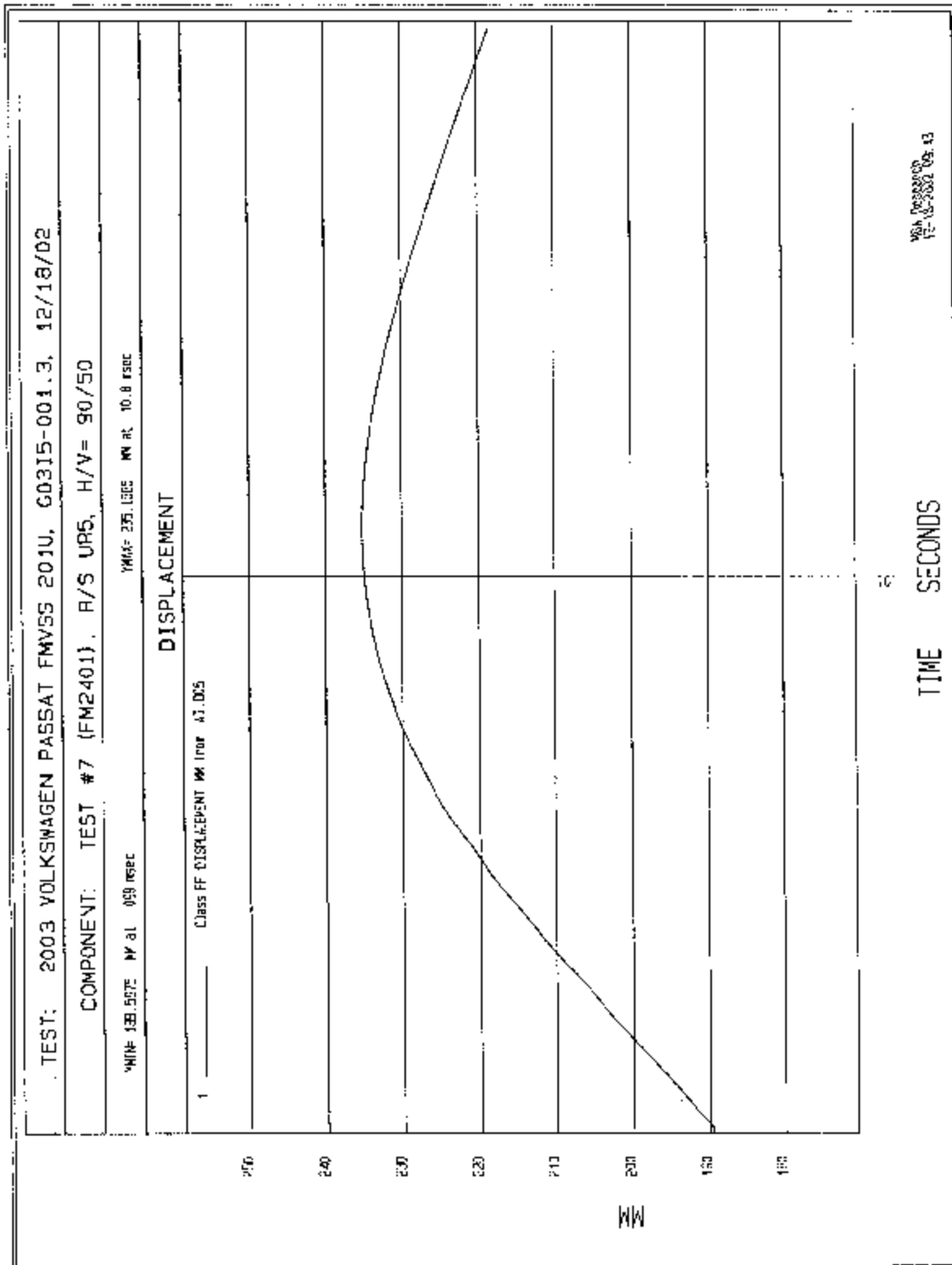
TEST: 2003 VOLKSWAGEN PASSAT FMVSS 201U, G03I5-001.3, :2/18/02

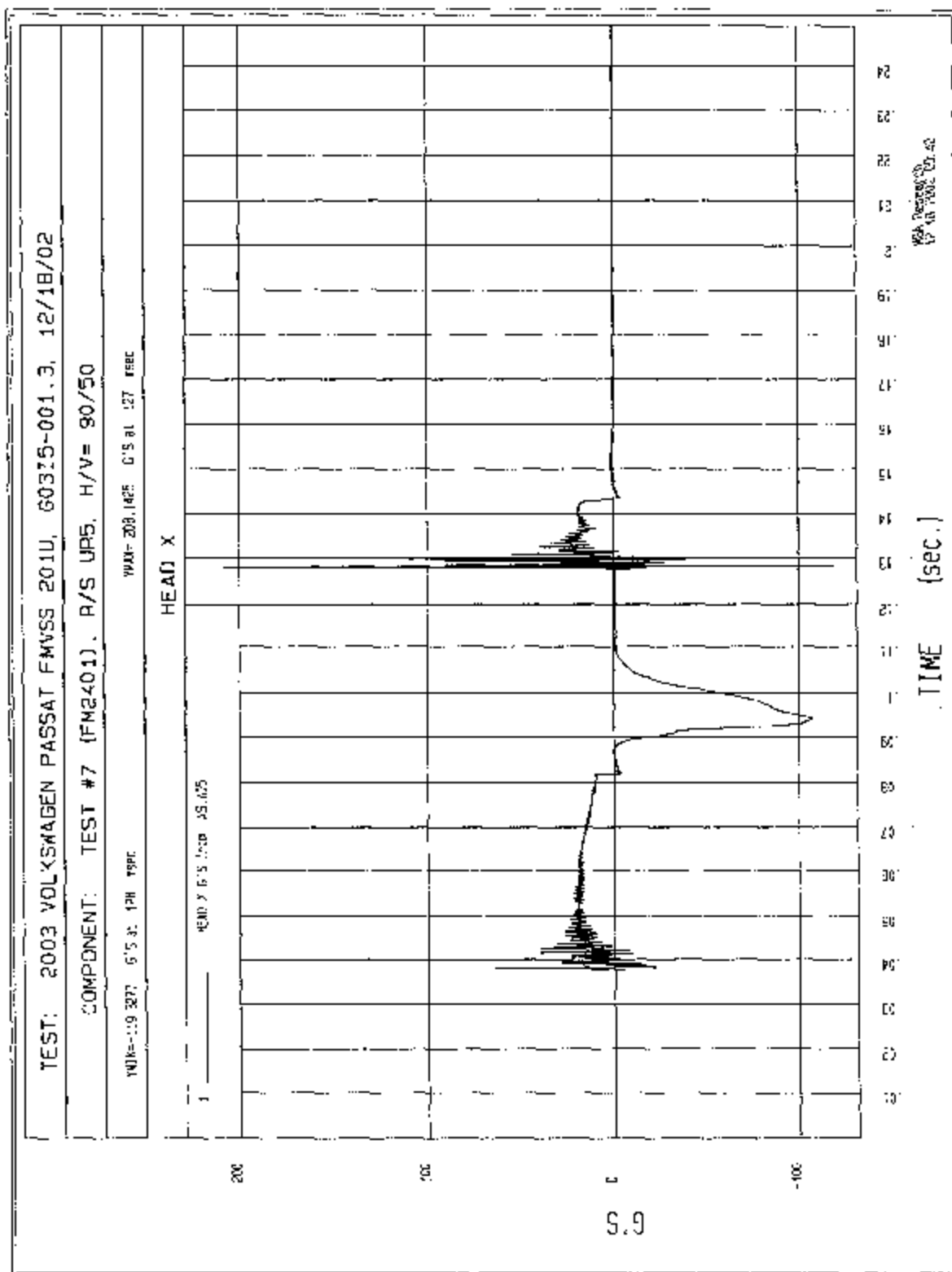
COMPONENT: TEST #7 (FM2401), R/S UP5, H/V= 90/50

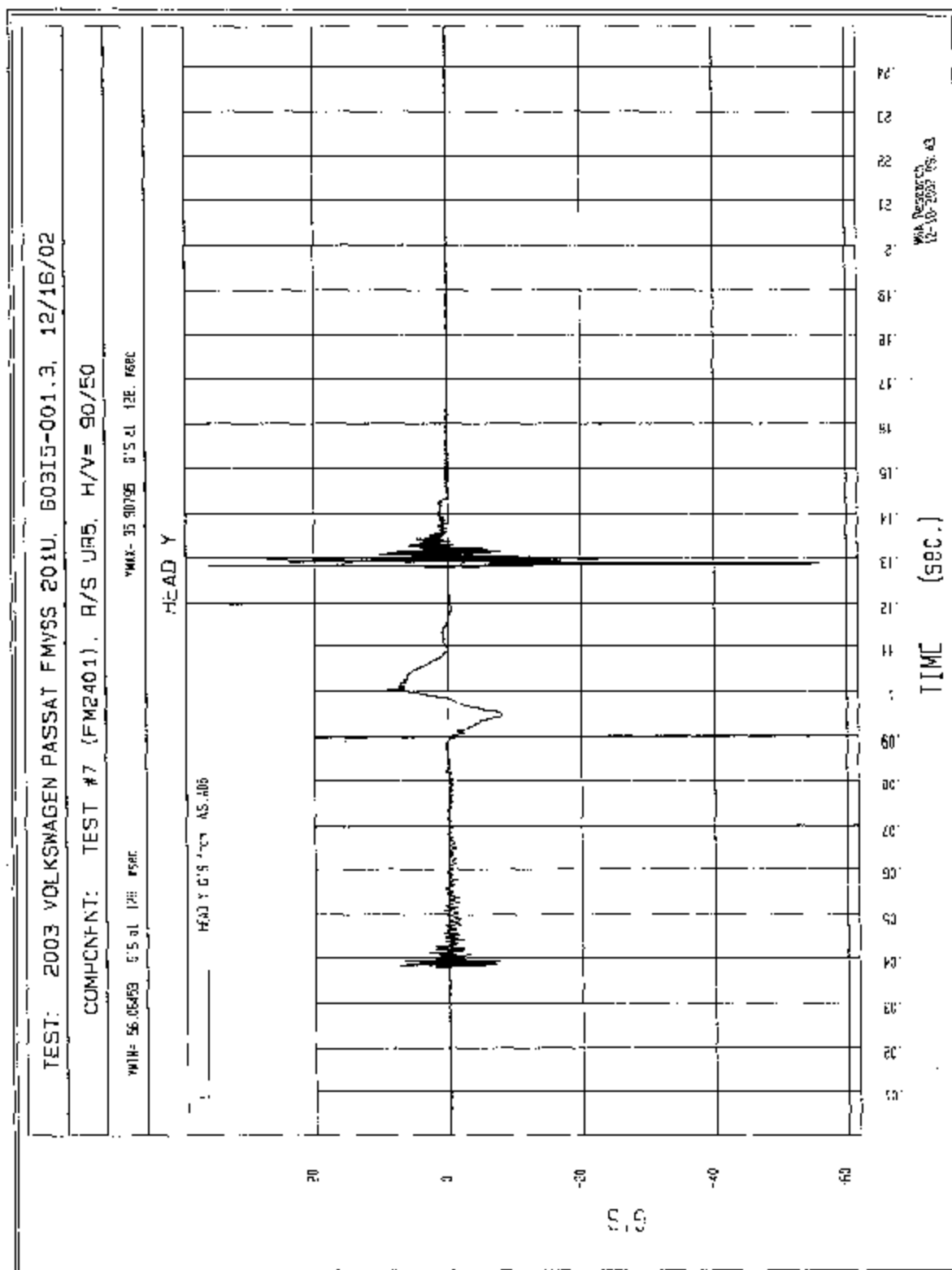
HEAD X as a function of DISPLACEMENT

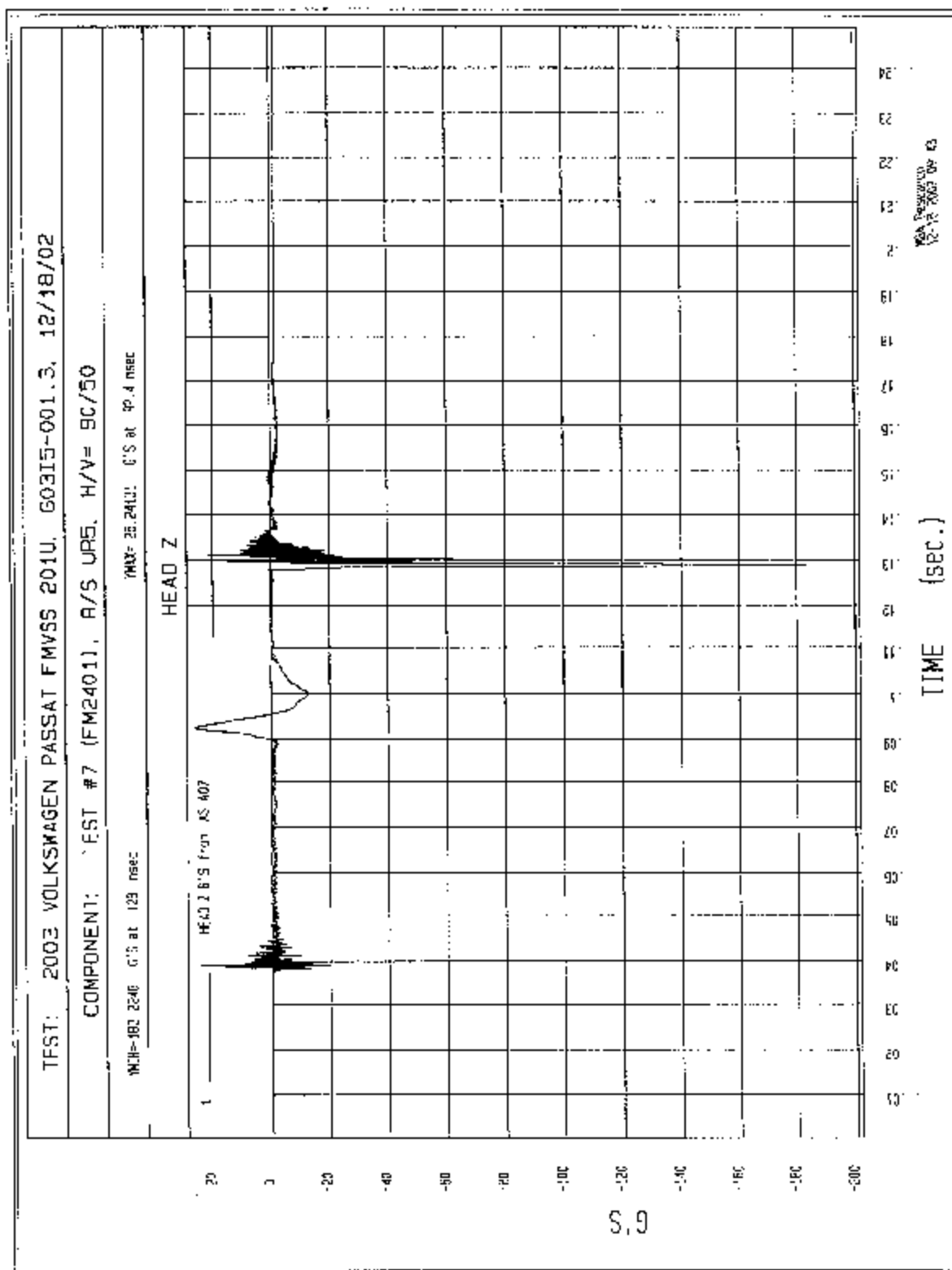












TEST: 2003 VOLKSWAGEN PASSAT FMVSS 201U. S0315-001.3, 12/18/02

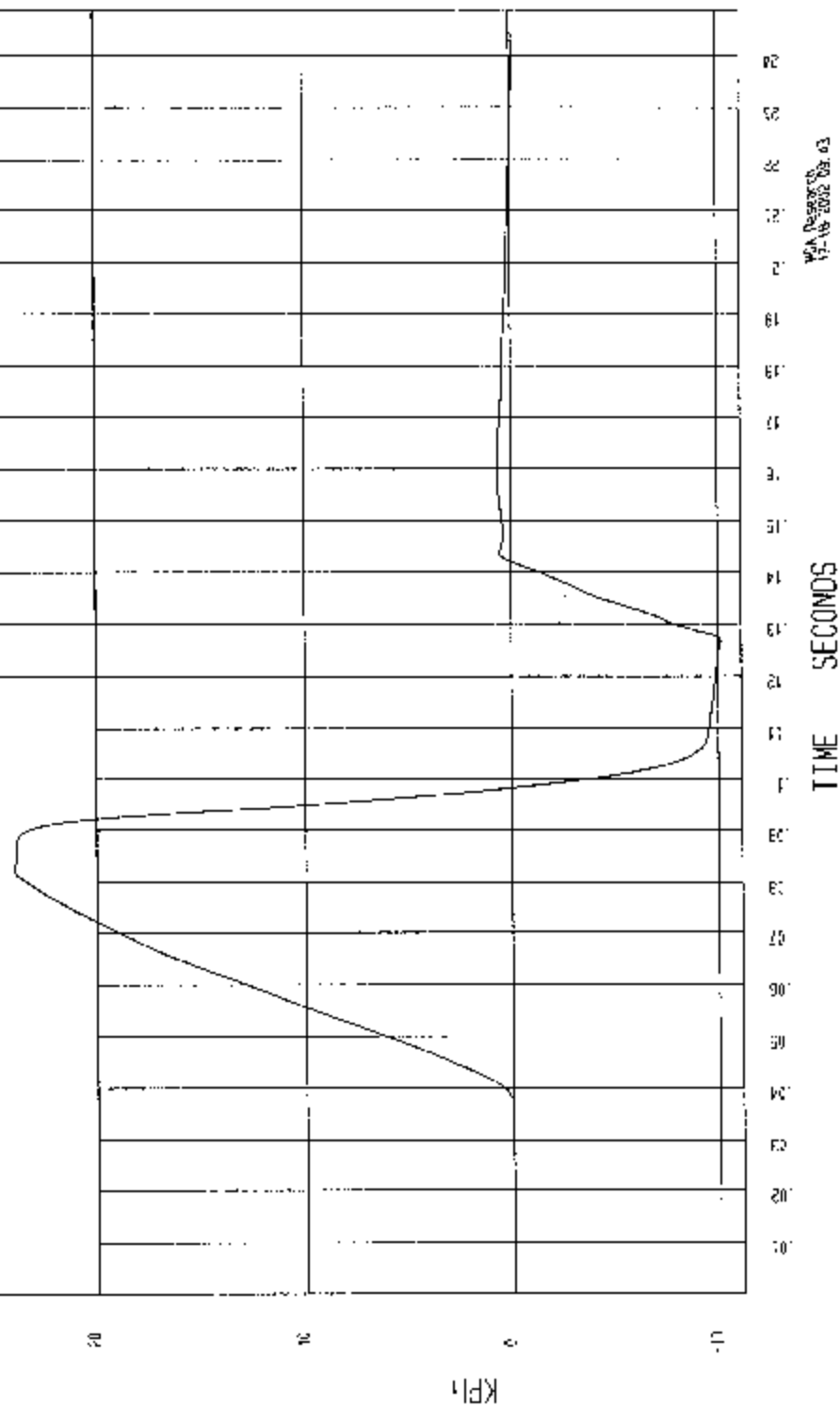
COMPONENT: TEST #7 (FM2401), R/S UR5, H/V= S0/50

YMIN=-10.1425 G-H at 12% KSEC

YMAX= 21.5699 KPH at 85.2 msec

VELOCITY

1 Class 7 VELOCITY KPH from 43.025



4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

The following section lists the test equipment for the compliance test series. Items marked with an asterisk are calibrated by an external lab. An additional summary table is given for the pre and post-test calibration data for the Free Motion Headforms. The temperature trace to confirm testing was conducted between 66°F and 78°F (19°C - 26°C) is included in Appendix A.

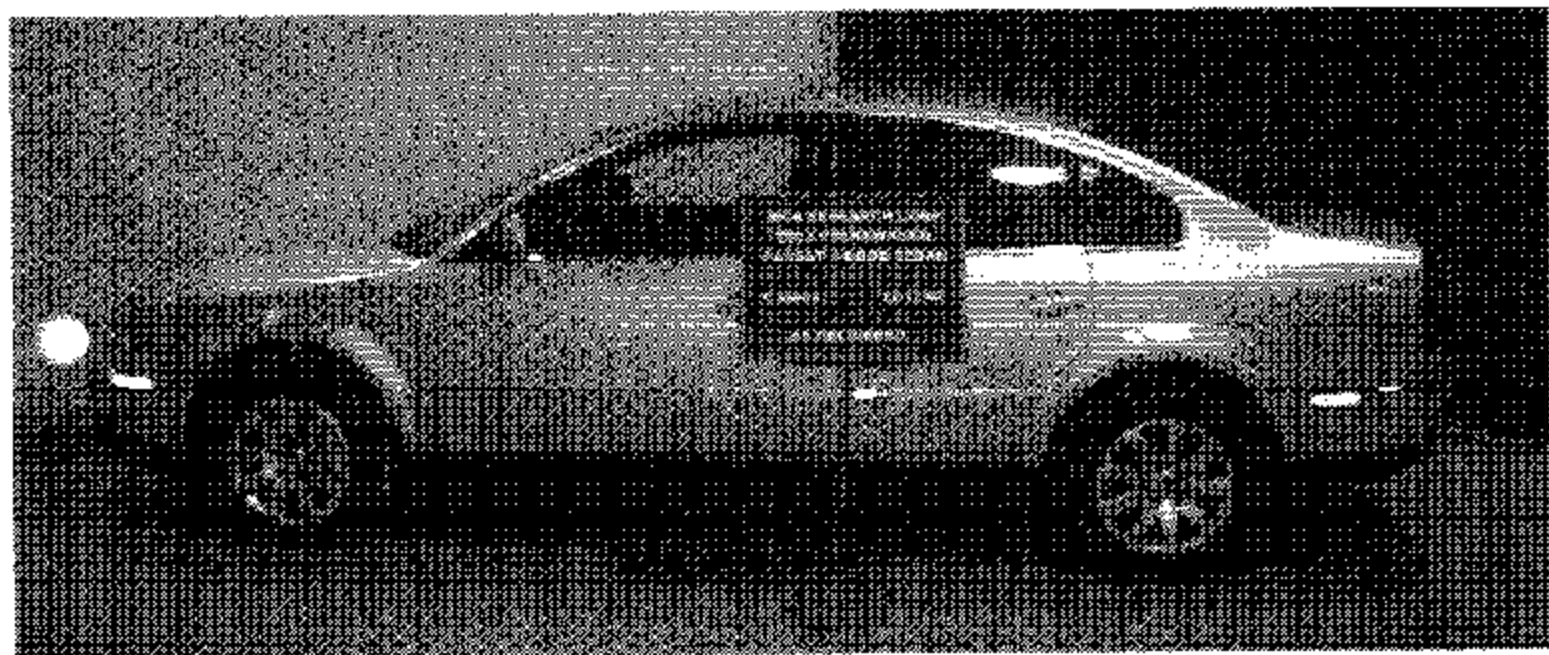
TABLE 4-1 LIST OF ITEMS USED

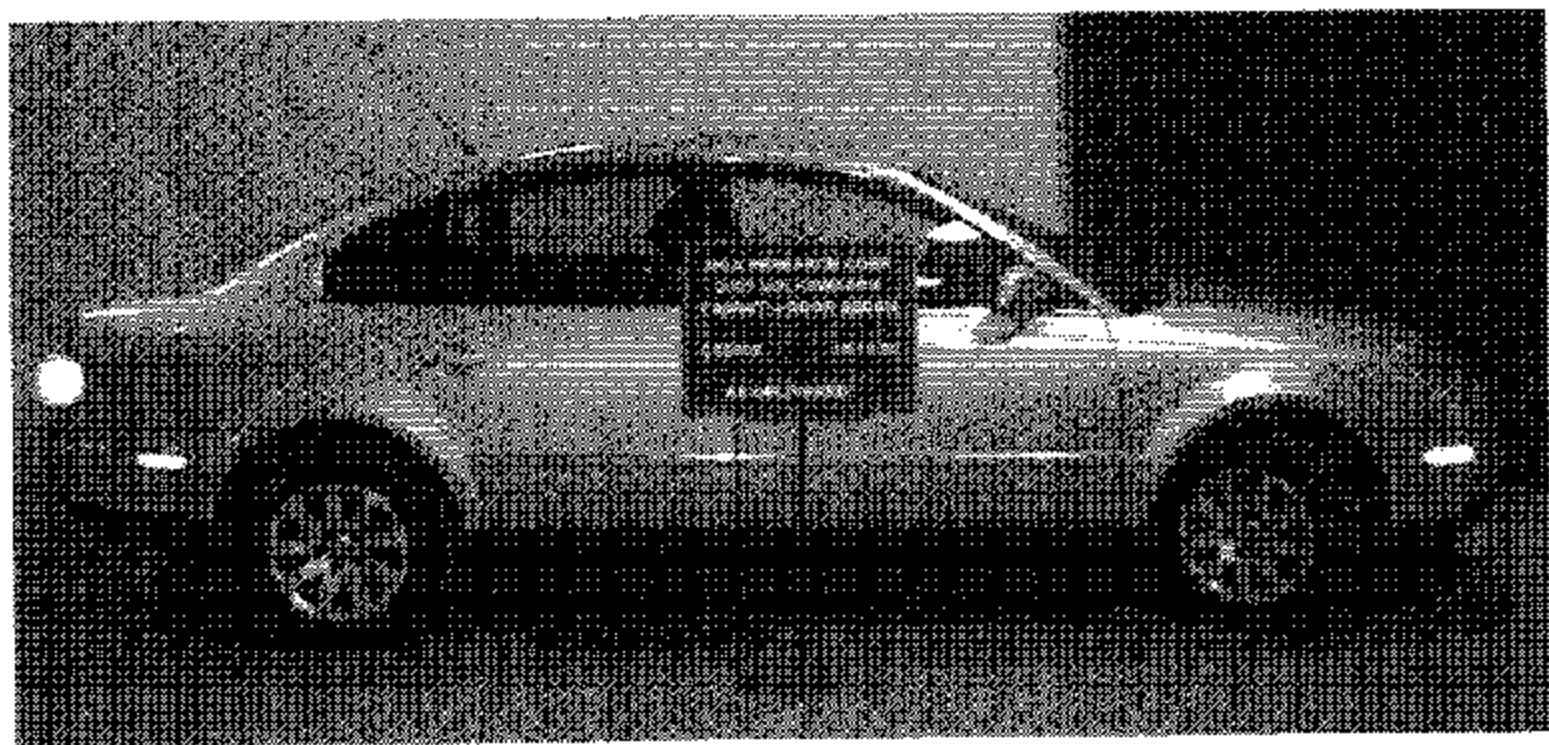
ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
*Digital Inclinator	Macklanburg-Duncan	PRO 360	Set Angle of FMH/Targeting	0.1°	Annual
FMVSS 201U Test Frame (includes the propulsion control system, actuator, test frame, and DAS)	MGA Research Corp.	MGA-100-FMH	Test System	N/A	N/A
Free Motion Headforms	UTAMA UTAMA UTAMA	035 036 038	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Kodak	RO1000	Record Event	N/A	N/A
*FARO™	Faro Technologies	S08/REV 19	Targeting	0.1 mm	Annual
Measuring Devices: - Tape Measure - Plumb Bobs - Protractor	Stanley N/A Craftsman	33-215 -- --	Measurement Targeting FMH setup Horizontal Measurement	1 mm N/A 0.5°	Annual
*Vehicle Scale 9804-022/9805-175	Cardinal	8950F	Weighing Vehicle	± .5 kg	Annual
* Scale	Detecto	AP-20	Weigh FMH Head	± 0.01 lb	Annual
*Temperature Recorder	Dickson	TL120	Record Temperature and Humidity	± .5°C ± 1% RH	Annual

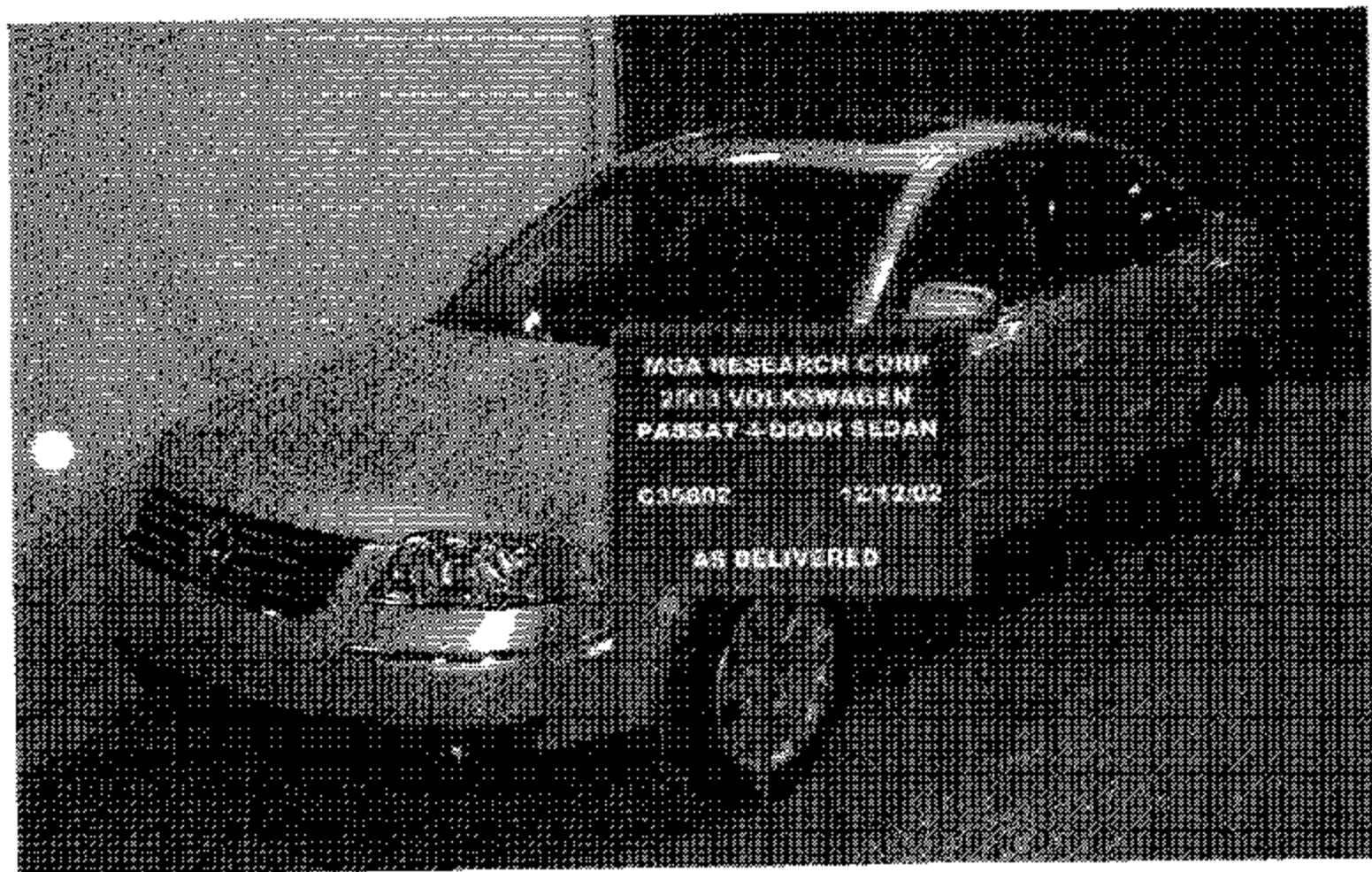
TABLE 4-2 FMH CALIBRATION SUMMARY DATA SUMMARY TABLE

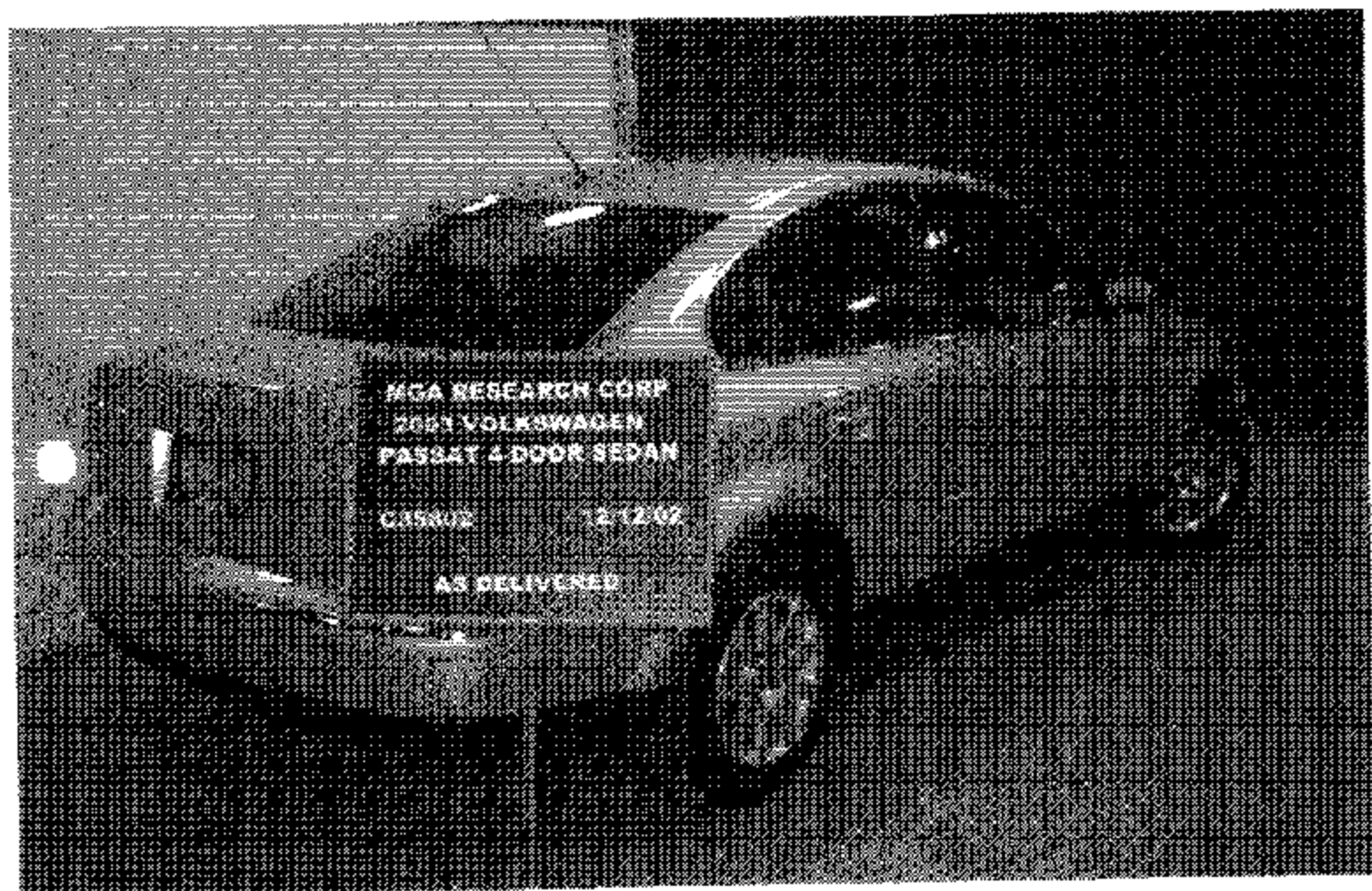
FMH Serial #		Weight (lbs)	Temp (°C)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#35	10.02	23.0	22.0	236.4	12.6	Yes
Post	#35	10.02	23.0	22.0	238.6	6.2	Yes
Pre	#36	10.03	23.0	22.0	247.8	6.0	Yes
Post	#36	10.03	23.0	22.0	251.7	6.2	Yes
Pre	#38	9.99	23.0	22.0	245.8	5.4	Yes
Post	#38	9.99	23.0	22.0	252.0	7.2	Yes

Calibration certificates and headform calibration information can be found in the P572L Performance Calibration report which accompanies this report.





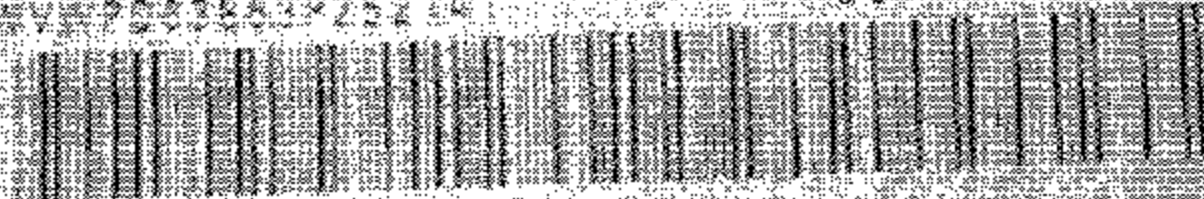




10/02 21
MFD BY VOLKSWAGEN AG GERMANY
GVWR 4475 GAWR FRONT 2345 / REAR 2100 LBS
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.
FEDERAL MOTOR VEHICLE SAFETY BUMPER AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE

WV#P043843P252141

PASSENGER CAR



UNLEADED FUEL ONLY
 PREMIUM $\text{RON} (R+M)/2$ 91
 CARBURANT SANS PLOMB
 SUPER MIN. RON 95

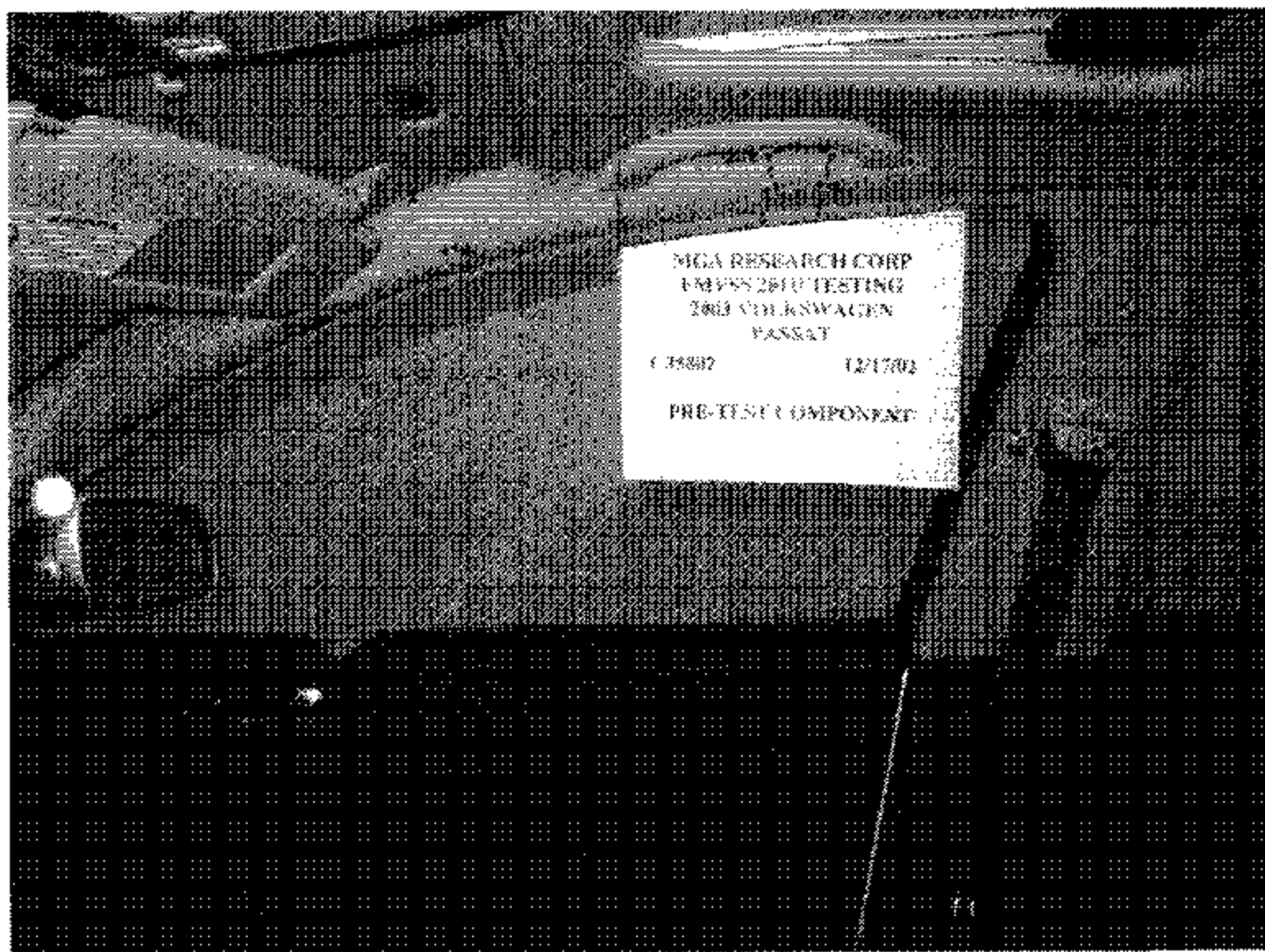
MAX. LOAD VEHICLE CAPACITY WEIGHTS

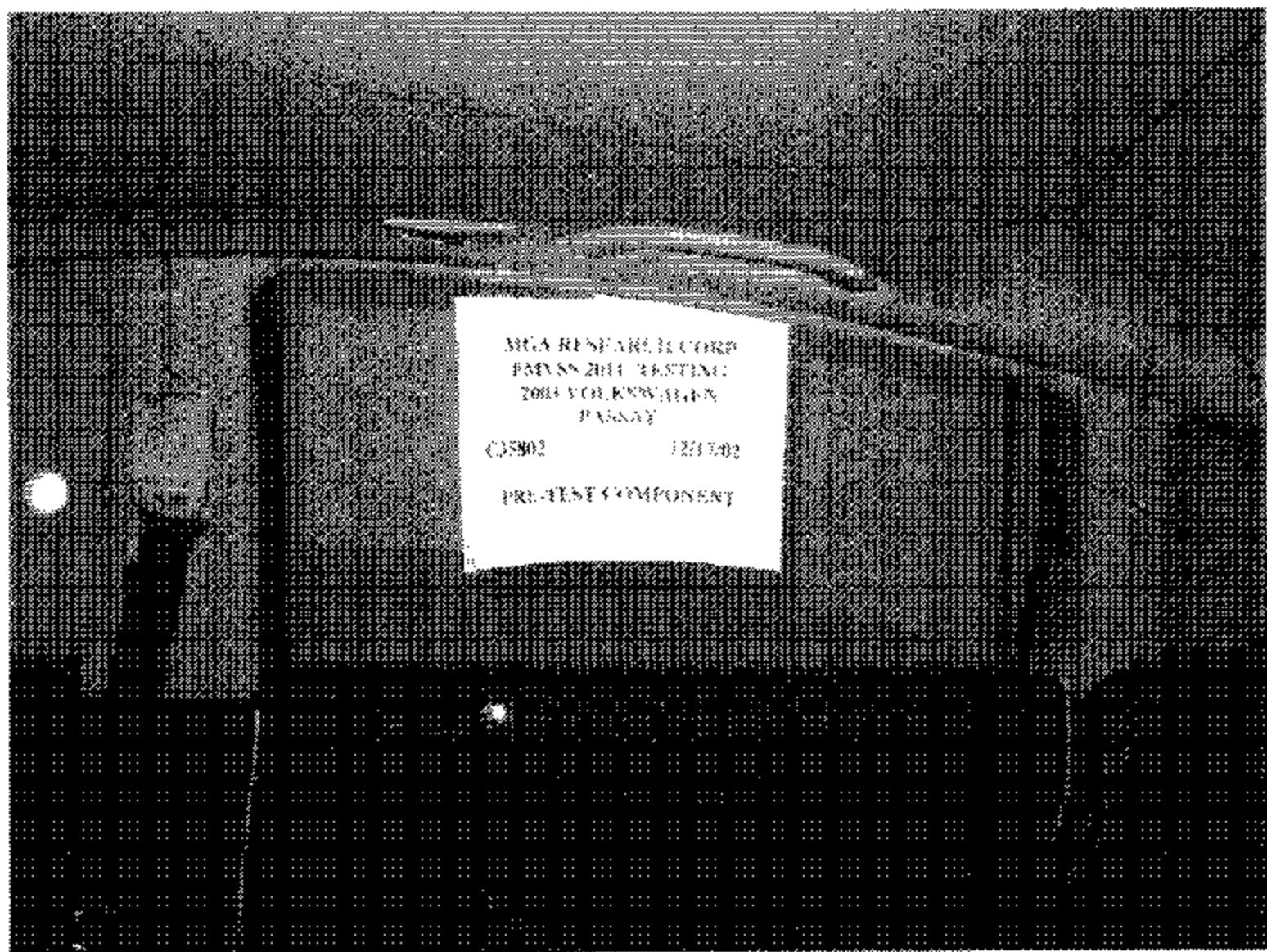
If provided	5000 lb	Max. Wt.
SLD	1070	1060

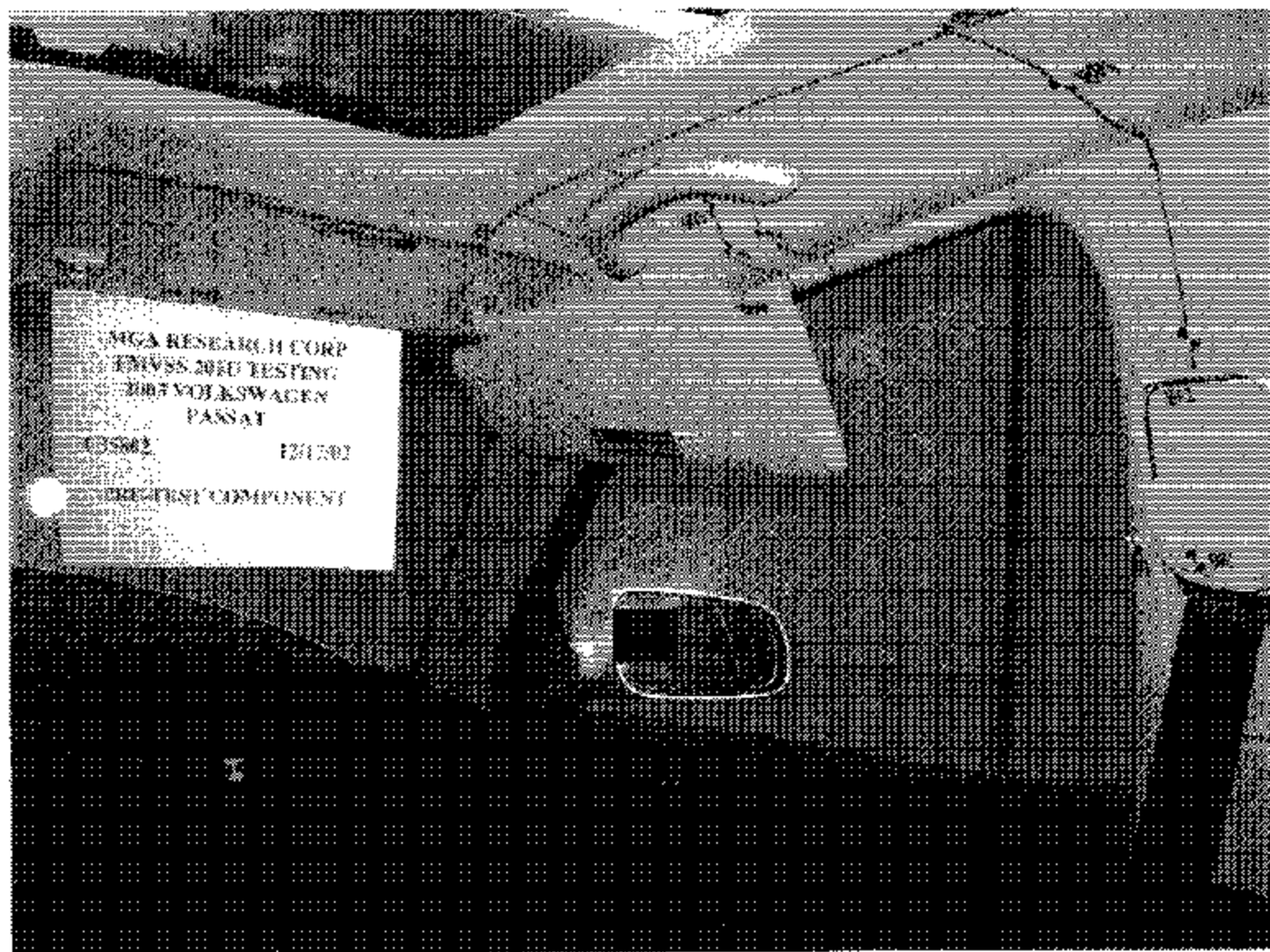
DESIGNATED SEATING CAPACITY 5 2 Pass / 3 Pass

COLD TIRE INFLATION PRESSURE

Tire Size		PSI	Standard 275			
135/70R13 91S		63	ball load		max load	
275/50R16 91S		73	front	rear	ball	rear
275/50R16 91H		73				
400	400 ball	73	28	28	30	30
400	400 ball					
400	400 ball					
max load	400 ball	73	30	28	30	30





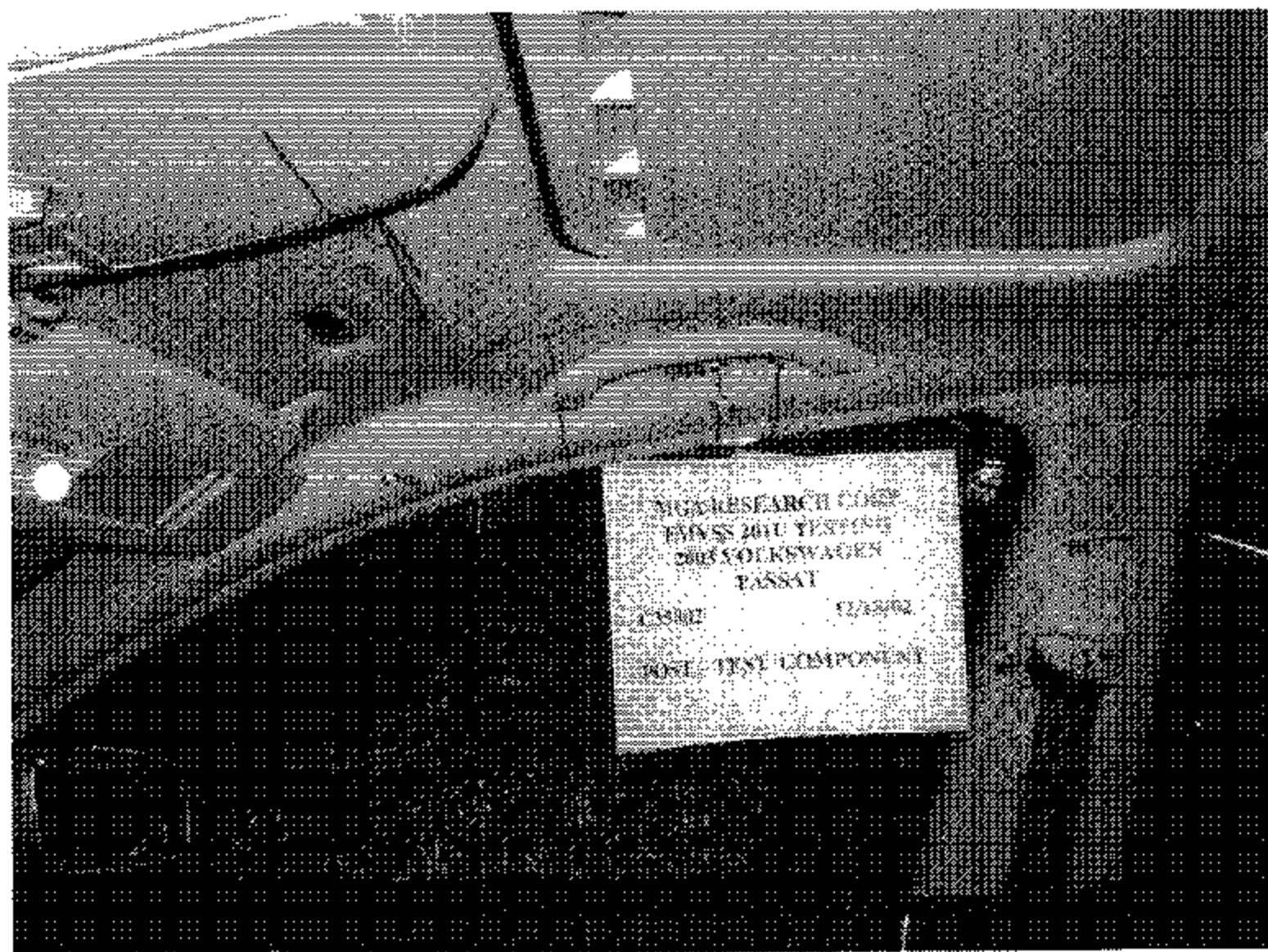


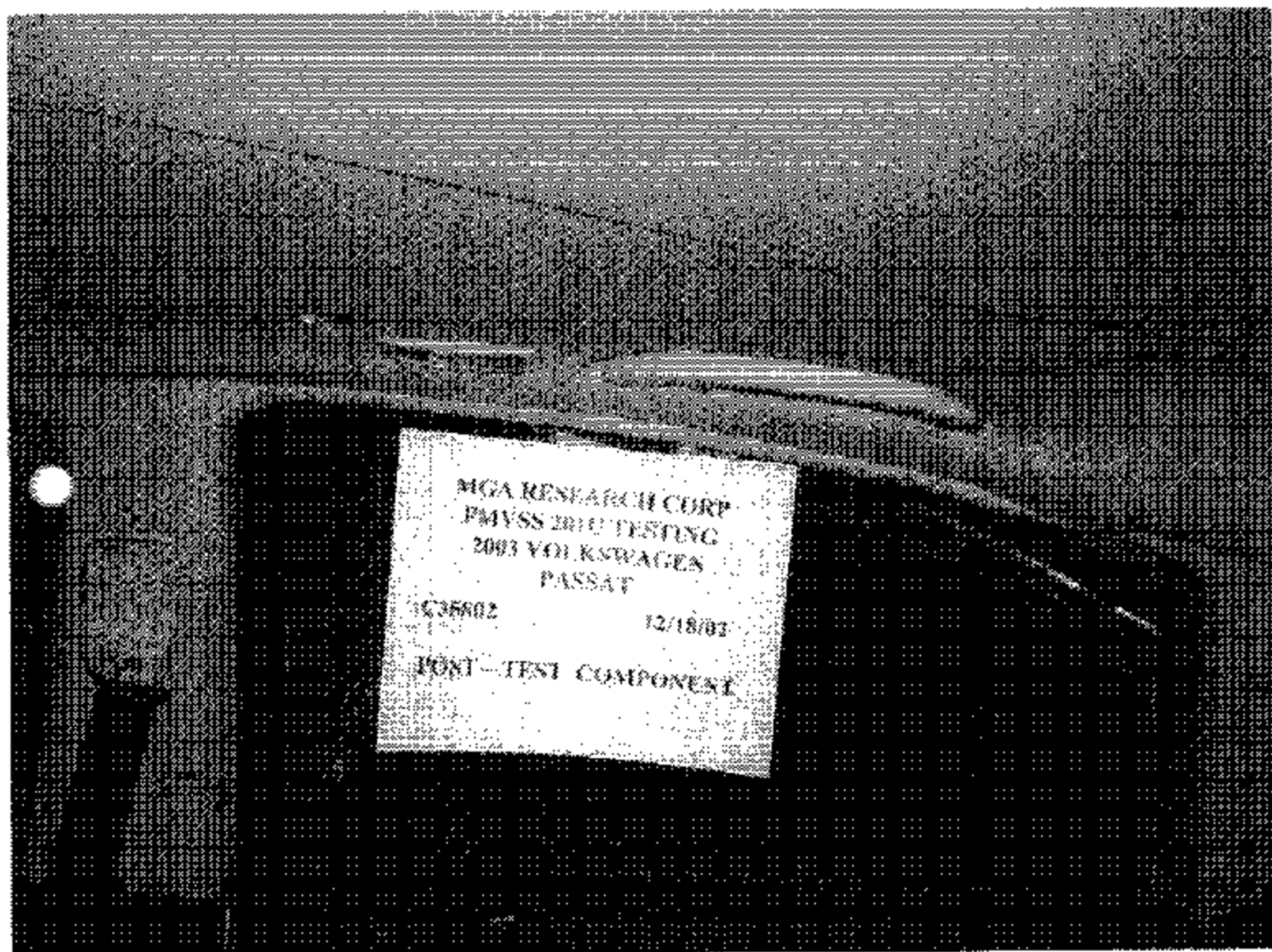
MCA RESEARCH CORP
FMVSS 201U TESTING
2003 VOLKSWAGEN
PASSAT

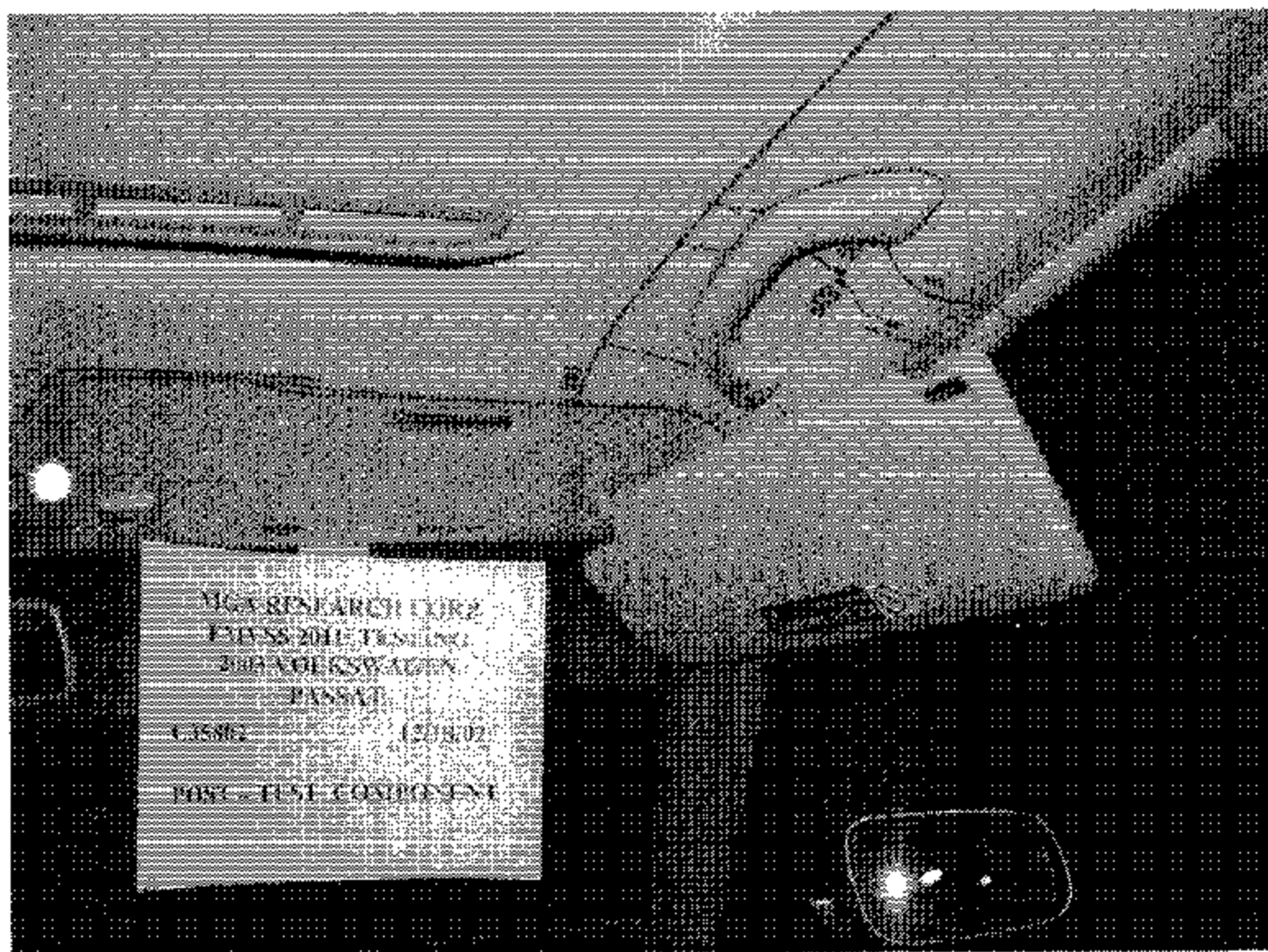
C35802

12/17/02

PRE-TEST COMPONENT







MICHAEL B. RESEARCH CORP
FBI/DOJ 2011 TESTING
2003 COLLEGE AGEN
P. 1001

1001 12/18/01

POST TEST COMPONENT

C35802 Temperature Trace 12/17-19/02

