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V4624

**REPORT NO. 208-MGA-2003-005**

**SAFETY COMPLIANCE SLED TESTING FOR FMVSS 208**  
**OCCUPANT CRASH PROTECTION**

General Motors Corporation  
2003 Chevrolet Cavalier 4 Door  
NHTSA NO. C30110

MGA RESEARCH CORPORATION  
5000 WARREN ROAD  
BURLINGTON, WI 53105



Test Date: May 2, 2003

Report Date: May 15, 2003

**FINAL REPORT**

Prepared For:  
**U.S. DEPARTMENT OF TRANSPORTATION**  
**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**  
**OFFICE OF ENFORCEMENT**  
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# TECHNICAL REPORT STANDARD TITLE PAGE

|                                                                                                                                                                                                                                                                                                                                  |                                                         |                             |                         |                                                                                                                                                                                                                   |           |
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| 15. Supplementary Notes                                                                                                                                                                                                                                                                                                          |                                                         |                             |                         |                                                                                                                                                                                                                   |           |
| 16. Abstract<br><br>A compliance test (sled test) was conducted on the subject 2003 Chevrolet Cavalier 4 Door in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208S-01 for the determination of FMVSS 208 compliance. Test failures identified were as follows:<br><br>NONE |                                                         |                             |                         |                                                                                                                                                                                                                   |           |
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### Purpose

This FMVSS 208 compliance sled test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by MGA Research Corporation (MGA) under Contract No. DTNH22-98-D-11055. The purpose of this test was to determine if the subject vehicle, a 2003 Chevrolet Cavalier 4 Door, NHTSA No. C30110, meets the performance requirements of FMVSS 208, "Occupant Crash Protection," in the impact simulation sled test mode.

## Test Procedure

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208S-01 dated January 15, 1998. Data was obtained relative to FMVSS 208, "Occupant Crash Protection," performance.

The test vehicle was instrumented with four (4) accelerometers to measure longitudinal axis accelerations.

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard seating positions according to the dummy placement procedures specified in Appendix B of the Laboratory Test Procedure. The dummies were not restrained by seat belts.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations; chest deflection potentiometers; left and right femur load cells to measure axial forces; and upper neck load cells to measure longitudinal, lateral, and vertical forces and moments.

The thirty-seven (37) data channels were digitally sampled at 10,000 samples per second and processed per Sections 11.7 through 11.9 of the Laboratory Test Procedure.

The crash event was recorded by six (6) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

### Test Results Summary

This FMVSS 208 compliance sled test was conducted at MGA Research Corporation on May 2, 2003.

The test vehicle, a 2003 Chevrolet Cavalier 4 Door, NHTSA No. C30110, appeared to comply with the performance requirements of FMVSS 208 in the impact simulation sled test mode as measured by Hybrid III 50th percentile male dummies.

|                    | FMVSS 208 Max. Allowable<br>Injury Assessment Values | Driver<br>(Serial #401) | Passenger<br>(Serial #403) |
|--------------------|------------------------------------------------------|-------------------------|----------------------------|
| HIC                | 1000                                                 | 273                     | 281                        |
| Chest g            | 60 g                                                 | 36.3 g                  | 34.0 g                     |
| Chest displacement | 3 in.                                                | 1.3 in.                 | 0.3 in.                    |
| Left Femur         | 2250 lb                                              | 994 lb                  | 1114 lb                    |
| Right Femur        | 2250 lb                                              | 1060 lb                 | 929 lb                     |
| Neck Extension     | 57 Nm                                                | 13.1 Nm                 | 39.4 Nm                    |
| Neck Flexion       | 190 Nm                                               | 82.3 Nm                 | 18.5 Nm                    |
| Neck Tension       | 3300 N                                               | 279 N                   | 716 N                      |
| Neck Compression   | 4000 N                                               | 2230 N                  | 1735 N                     |
| Neck Shear         | 3100 N                                               | 1476 N                  | 1433 N                     |

The vehicle also appears to meet the other FMVSS 208 requirements for which it was tested. These results are shown in the data sheets that are included in this report.

The test vehicle was equipped with air bags at the driver and passenger seating positions. The dummies were not restrained by seat belts. The sled carriage was accelerated to 17.1 g with an integrated velocity change of 29.3 mph. After filtering the acceleration signal to Channel Class 60, the airbag system was triggered 20.6 milliseconds after 0.5 g acceleration.

**INCLUDE DISCUSSION OF LOST CHANNELS OR OTHER TEST ISSUES.**

- The airbag warning label on the dash was not with the vehicle when it was received. It is not known whether the label was removed by the dealer, by a potential customer, or not installed at all.

### Sled Test Summary

Vehicle NHTSA No.: C30110 Test Mode: FMVSS 208 SLED TEST

Vehicle Yr/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Test Date: May 2, 2003

Time: 2:45 p.m.

Temp: 71°F

Vehicle Test Weight: 3179 lbs.

#### **DUMMY INFO.**

#### **DRIVER**

#### **PASSENGER**

Dummy Type

Part 572E

Part 572E

Serial Number

401

403

Restraint System

Frontal airbag

Frontal airbag

No. Data Channels

15

15

Number of Cameras:

1 Real Time

6 High Speed

Door Opening Data:

yes Left Front

yes Right Front

#### **FRONT SEAT(S) DATA**

#### **DRIVER**

#### **PASSENGER**

Seat Track Failure -

0.0 inches shift;

0.0 inches shift

Seat Back Failure -

no

no

#### **VISIBLE DUMMY CONTACT POINTS:**

#### **DRIVER**

#### **PASSENGER**

Head

Airbag/windshield/

Airbag/windshield/

sun visor

sun visor

Chest

Airbag

Airbag

Left Knee

Knee bolster

Glove box

Right Knee

Knee bolster

Glove box

General Test And Vehicle Parameter Data

Vehicle Yr/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Vehicle NHTSA No.: C30110 VIN: 1G1JC52F137248949 Color: Black

**Engine Data:**

No. Cylinders: 4; CID:       ; Liters: 2.2; CCs:       

Placement: Longitudinal/Inline:       ; Transverse/Lateral: X

**Transmission Data:**

Speeds: 4; Manual:       ; Automatic: X; Overdrive: X

**Final Drive:**

Rear Wheel Drive:       ; Front Wheel Drive: X; Four Wheel Drive:       

**Major Options:**

A/C: X; Pwr. Strg.: X; Pwr. Brakes: X; Pwr. Windows:       

Pwr. Dr. Locks:       ; Other: Rear defogger

Date Received: 3/26/03; Odometer Reading: 45 miles

Selling Dealer: Hartnell Chevrolet, Inc., 7800 Antioch Road, Salem, WI 53168

**REMARKS:** None

General Test And Vehicle Parameter Data (Cont.)

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: General Motors Corporation

Date of Manufacture: 1/03; VIN: 1G1JC52F137248949

GVWR: 3643 lbs; GAWR Front: 1981 lbs.

GAWR Rear: 1662 lbs.

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 30 psi REAR: 30 psi

Recommended Tire Size: P195/70R14;

Recommended Cold Tire Pressure:

FRONT: 30 psi REAR: 30 psi

Size of Tires on Test Vehicle: P195/70R14

Type of Spare Tire: T115/70D14; Space Saver: X; Standard:       

Vehicle Capacity Data:

Type of Front Seats: X Bucket;        Bench;        Split Bench

Number of Occupants: 2 Front; 3 Rear;        3rd Seat; 5 TOTAL

REMARKS: None

VEHICLE CAPACITY WEIGHT (VCW) = 882 lbs.

No. Of Occupants x 150 lbs = 750 lbs.

Rated Cargo/Luggage Weight (RCWL) = 132 lbs. (Difference)

General Test And Vehicle Parameter Data (Cont.)

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

|                                           |                  |                  |                 |
|-------------------------------------------|------------------|------------------|-----------------|
| Right Front =                             | <u>859</u> lbs.  | Right Rear =     | <u>478</u> lbs. |
| Left Front =                              | <u>876</u> lbs.  | Left Rear =      | <u>490</u> lbs. |
| TOTAL FRONT =                             | <u>1735</u> lbs. | TOTAL REAR =     | <u>968</u> lbs. |
| % Total Weight =                          | <u>64.2</u> %    | % Total Weight = | <u>35.8</u> %   |
| TOTAL DELIVERED WEIGHT = <u>2703</u> lbs. |                  |                  |                 |

**WEIGHT OF FULLY LOADED TEST VEHICLE WITH TWO DUMMIES (344 LB) AND 132 POUNDS OF CARGO WEIGHT:**

|                                 |                  |                  |                  |
|---------------------------------|------------------|------------------|------------------|
| Right Front =                   | <u>936</u> lbs.  | Right Rear =     | <u>637</u> lbs.  |
| Left Front =                    | <u>954</u> lbs.  | Left Rear =      | <u>652</u> lbs.  |
| TOTAL FRONT =                   | <u>1890</u> lbs. | TOTAL REAR =     | <u>1289</u> lbs. |
| % Total Weight =                | <u>59.5</u> %    | % Total Weight = | <u>40.5</u> %    |
| TOTAL WEIGHT = <u>3179</u> lbs. |                  |                  |                  |

**TEST VEHICLE ATTITUDE: (all measurements in degrees)**

|                               |                       |
|-------------------------------|-----------------------|
| AS DELIVERED DOOR SILL ANGLE: | <u>0.2° nose down</u> |
| AS TESTED DOOR SILL ANGLE:    | <u>0.0°</u>           |
| FULLY LOADED DOOR SILL ANGLE: | <u>0.5° nose up</u>   |

**FUEL SYSTEM DATA:**

Fuel System Capacity From Owner's Manual = 14.1 gallons  
Usable Capacity Figure Furnished by COTR = 14.1 gallons

REMARKS: None

### Post-Impact Data

Test number: HT03050201  
NHTSA number: C30110  
Test date: May 2, 2003  
Test time: 2:45 p.m.  
Test type: FMVSS 208 Compliance Sled Test  
Impact angle: 0°  
Ambient Temperature  
at Impact Area: 71°F  
Temperature in  
Occupant Compartment: 71°F

**Impact Velocity:**

Integrated velocity from the integration of the entire sled acceleration: 29.3 mph  
Specified integrated velocity range: 28 to 30 mph

**Sled Carriage Acceleration:**

Acceleration: 17.1 g  
Specified Acceleration Range: 16.0 - 18.2 g

**Sled Carriage Acceleration Duration:**

Time from T-0 (-0.5 g) to 0.0 g: 122.6 msec  
Specified Acceleration Duration: 120.0 to 130.0 msec

The sled acceleration corridor was achieved.

## Seat and Steering Column Positioning Data

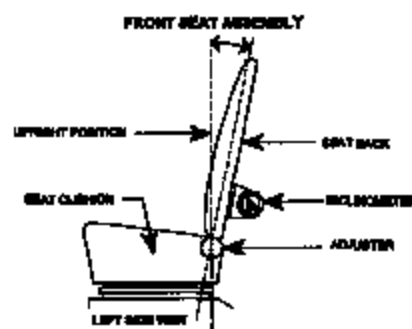
Vehicle Yr/Make/Model/Body Style: 2003/Chevrolet/Cavaller/4 Door

Vehicle NHTSA No.: C30110 Test Date: May 2, 2003

### NOMINAL DESIGN RIDING POSITION:

Driver Seat: Seat Back Angle =  $27.6^{\circ}$

Passenger Seat: Seat Back Angle =  $27.4^{\circ}$



### SEAT FORE AND AFT POSITIONS:

Driver Seat: The seat track had a total position movement of 21 notches and was positioned 10 notches rearward from the foremost position with the forward most locking position as zero.

Passenger Seat: The seat track had a total position movement of 10 notches and was positioned 5 notches rearward from the foremost position with the forward most locking position as zero.

### STEERING COLUMN ADJUSTMENTS:

The steering column was placed in the mid position (3rd position of 5).

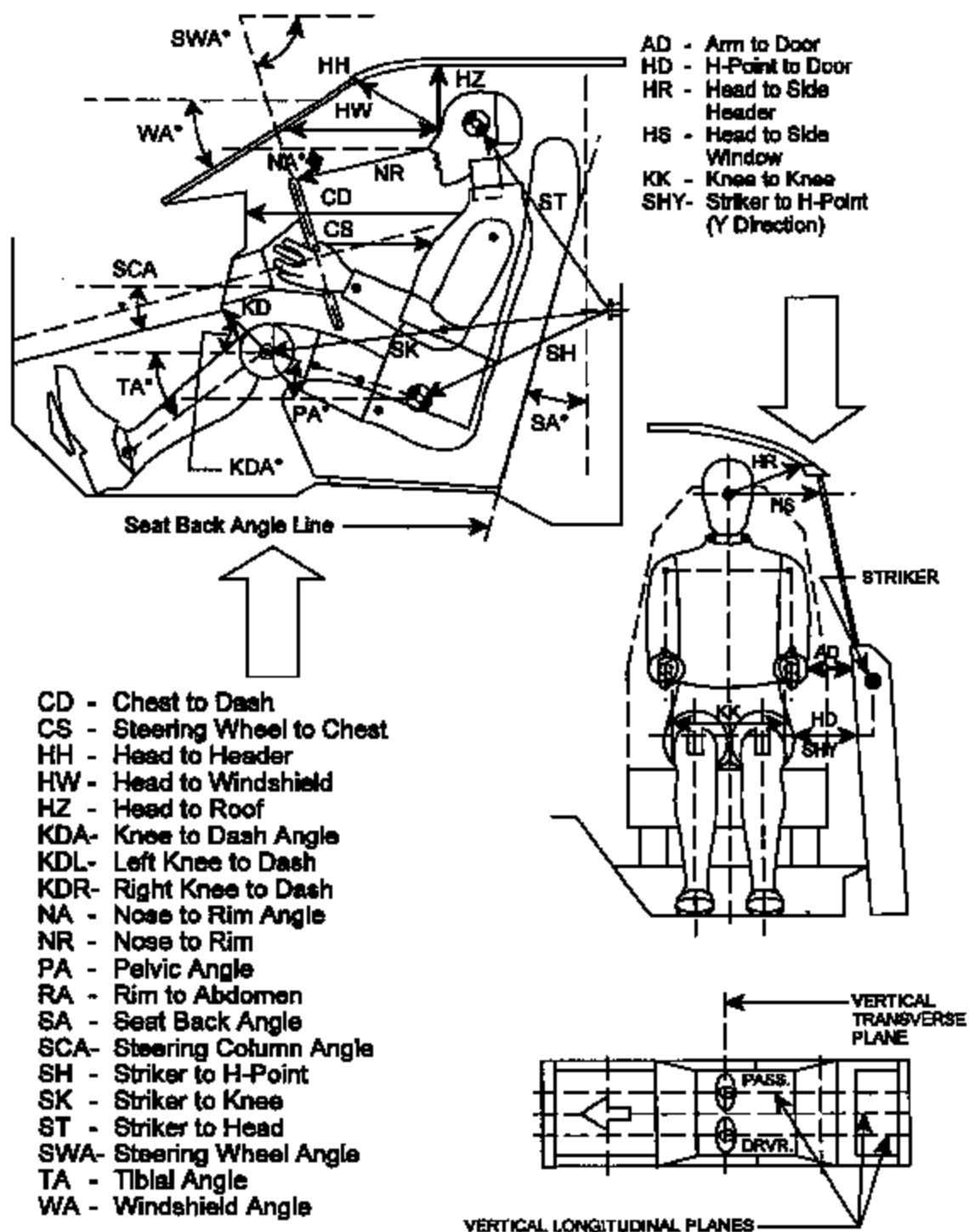
# Dummy Positioning Measurement Table

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Vehicle NHTSA No.: C30110 Test Date: May 2, 2003

|      | DRIVER (Serial #401)   | PASSENGER (Serial #403) |
|------|------------------------|-------------------------|
| WA°  | 26.8°                  |                         |
| SWA° | 68.5°                  |                         |
| SCA° | 21.9°                  |                         |
| SA°  | 27.6°                  |                         |
| HZ   | 5.9                    | 6.3                     |
| HH   | 11.7                   | 12.8                    |
| HW   | 22.1                   | 23.9                    |
| HR   | 5.5                    | 5.7                     |
| NR   | 15.5 Angle (NA°) 11.6° |                         |
| CD   | 20.2                   |                         |
| CS   | 12.9                   |                         |
| RA   | 7.6                    |                         |
| KDL  | 7.3 Angle (KDA°) 0.0°  |                         |
| KDR  | 7.5                    |                         |
| PA°  | 23.9°                  | 24.8°                   |
| TA°  | 39.3°                  | 38.5°                   |
| KK   | 12.6                   | 10.6                    |
| ST   | 21.1 Angle 7.2°        | 18.4 Angle 7.5°         |
| SK   | 22.6 Angle 91.3°       | 22.0 Angle 91.5°        |
| SH   | 8.8 Angle 126.2°       | 7.9 Angle 123.9°        |
| SHY  | 10.4                   | 10.7                    |
| HS   | 11.7                   | 11.7                    |
| HD   | 5.8                    | 5.9                     |
| AD   | 4.8                    | 5.0                     |

## DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



### Description of Dummy Measurements

When a level is to be used, it is to ensure that the line containing the two points described is either parallel or perpendicular to the ground. If a measurement to be made is less than 10 inches ignore the directions to use a level and approximate a level measurement. Also, when a measurement is to be taken to or from the center of a bolt on the dummy, take the measurement from the center of the bolt hole if the bolt is recessed.

**The following measurements are to be made within a vertical longitudinal plane.**

- \* HH Head to Header, taken from the point where the dummy's nose meets his forehead (between his eyes) to the furthest point forward on the header.
- \* HW Head to Windshield, taken from the point where the dummy's nose meets his forehead (between his eyes) to a point on the windshield. Use a level.
- HZ Head to Roof, taken from the point where the dummy's nose meets his forehead (between his eyes) to the point on the roof directly above it. Use a level.
- \* CS Steering Wheel to Chest, taken from the center of the steering wheel hub to the dummy's chest. Use a level.
- \* CD Chest to Dash, place a tape measure on the tip of the dummy's chin and rotate five inches of it downward toward the dummy to the point of contact on the transverse center of the dummy's chest. Then measure from this point to the closest point on the dashboard either between the upper part of the steering wheel between the hub and the rim, or measure to the dashboard placing the tape measure above the rim, whichever is a shorter measurement. See photograph.
- RA Steering Wheel Rim to Abdomen, taken from the bottommost point of the steering wheel rim horizontally rearward to the dummy. Use a level.
- NR Nose to Rim, taken from the tip of the dummy's nose to the closest point on the top of the steering wheel rim. Also indicate the angle this line makes with respect to the horizontal (NA).
- \*1 KDL, KDR Left and Right Knees to Dashboard, taken from the center of the knee pivot bolt's outer surface to the closest point forward acquired by swinging the tape measure in continually larger arcs until it contacts the dashboard. Also reference the angle of this measurement with respect to the horizontal for the outboard knee (KDA). See photograph.

\* Measurement used in Data Tape Reference Guide

\*1 Only outboard measurement is referenced in Data Tape Reference Guide

### Description of Dummy Measurements (Cont.)

**SH, SK, ST** Striker to Hip, Knee, and Head, these measurements are to be taken in the X-Z plane measured from the forward most center point on the striker to the center of the H-point, outer knee bolt, and head target. When taking this measurement a firm device that can be rigidly connected to the striker should be used. Use a level. The angles of these measurements with respect to the horizontal should also be recorded. The measurement in the Y (transverse) direction from the striker to the H-point should also be taken (SHY). See photograph.

**The following measurements are to be made within a vertical transverse plane.**

- |             |                                                                                                                                                                                                                                                                                                                                                 |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>HS</b>   | <b>Head to Side Window</b> , taken from the point where the dummy's nose meets his forehead (between his eyes) to the outside of the side window. In order to make this measurement, roll the window down to the exact height which allows a level measurement. Use a level. See photograph.                                                    |
| * <b>AD</b> | <b>Arm to Door</b> , taken from the outer surface of the elbow pivot bolt on a Hybrid II dummy to the first point it hits on the door. In the case of a Hybrid III dummy, measure from the bolt on the outer biceps. When a SID is used make the measurement from the center of the bottom of the arm segment where it meets the dummy's torso. |
| * <b>HD</b> | <b>H-point to Door</b> , taken from the H-point on the dummy to the closest point on the door. Use a level.                                                                                                                                                                                                                                     |
| * <b>HR</b> | <b>Head to Side Header</b> , measure the shortest distance from the point where the dummy's nose meets his forehead (between his eyes) to the side edge of the header just above the window frame, directly adjacent to the dummy.                                                                                                              |
| <b>SHY</b>  | <b>Striker to H-point</b> , taken from a rod rigidly connected to the forward most center point on the striker to the H-point. Use a level. See photograph.                                                                                                                                                                                     |
| <b>KK</b>   | <b>Knee to Knee</b> , for Hybrid II dummies measure the distance between knee pivot bolt head outer surfaces. For Hybrid III dummies measure the distance between the outboard knee clevis flange surfaces. (This measurement may not be exactly transverse)                                                                                    |

\* Measurement used in Data Tape Reference Guide

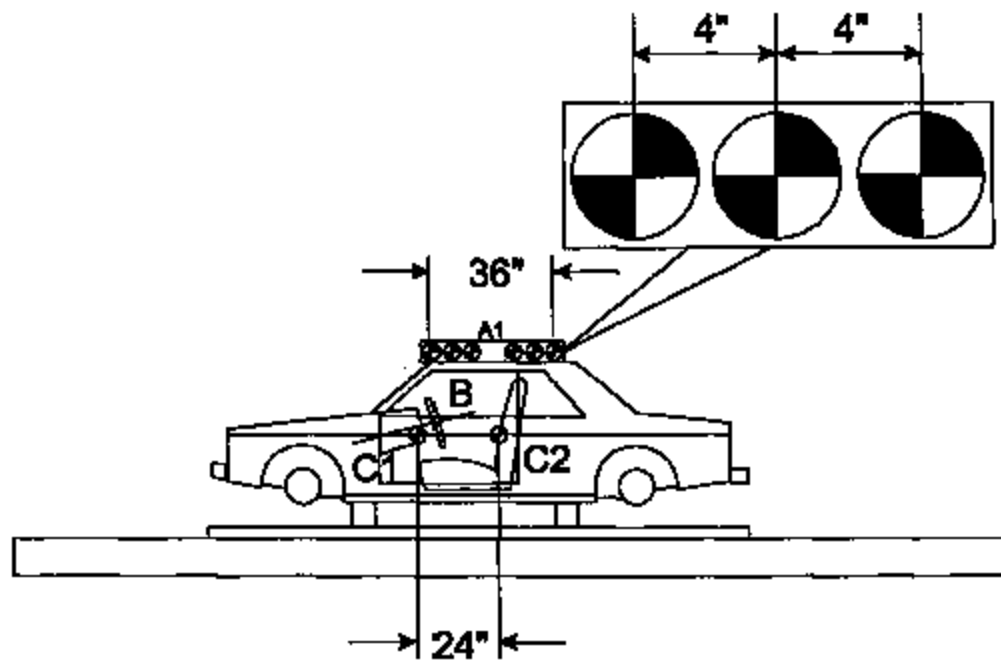
## Description of Dummy Measurements (Cont.)

### **Angles**

|            |                                                                                                                                                                                                                                                                                                                                                                              |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SA</b>  | <b>Seat Back Angle</b> , find this angle using the instructions provided by the manufacturer. If the manufacturer doesn't provide clear instructions contact the COTR.                                                                                                                                                                                                       |
| <b>PA</b>  | <b>Pelvic or Femur Angle</b> , taken by inserting the pelvic angle gauge into the H-point gauging hole on the SID or the Hybrid III dummies and taking this angle with respect to the horizontal. Measure the angle of the line connecting the H-point hole and the outer knee pivot bolt hole on a Hybrid II dummy with respect to the horizontal, to find the femur angle. |
| <b>SWA</b> | <b>Steering Wheel Angle</b> , find this by placing a straight edge against the steering wheel rim along the longitudinal plane. Then measure the acute angle of the straight edge with respect to the horizontal.                                                                                                                                                            |
| <b>SCA</b> | <b>Steering Column Angle</b> , measured with respect to the horizontal by placing an inclinometer on the center of the underside of the steering column.                                                                                                                                                                                                                     |
| <b>NA</b>  | Measure the angle made when taking the measurement NR with respect to the horizontal.                                                                                                                                                                                                                                                                                        |
| <b>KDA</b> | <b>Knee to Dash Angle</b> , the angle that the measurement KD is taken at with respect to the horizontal. Only get this angle for the outboard knee. See photograph.                                                                                                                                                                                                         |
| <b>WA</b>  | <b>Windshield Angle</b> , place an inclinometer along the transverse center of the windshield exterior (measurement is made with respect to horizontal).                                                                                                                                                                                                                     |
| <b>TA</b>  | <b>Tibial Angle</b> , use a straight edge to connect the dummy's knee and ankle bolts. Then place an inclinometer on the straight edge and measure the angle with respect to the horizontal.                                                                                                                                                                                 |

## Vehicle Targeting Measurements

### REFERENCE PHOTO TARGETS

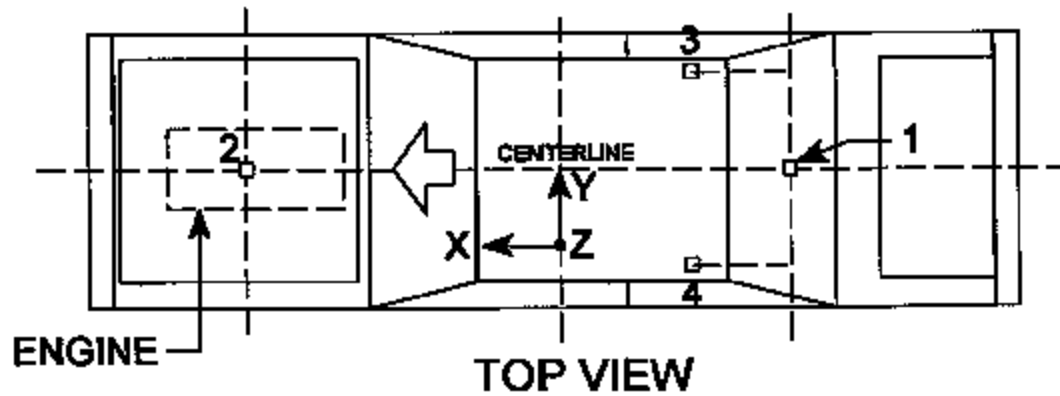


LEFT SIDE VIEW

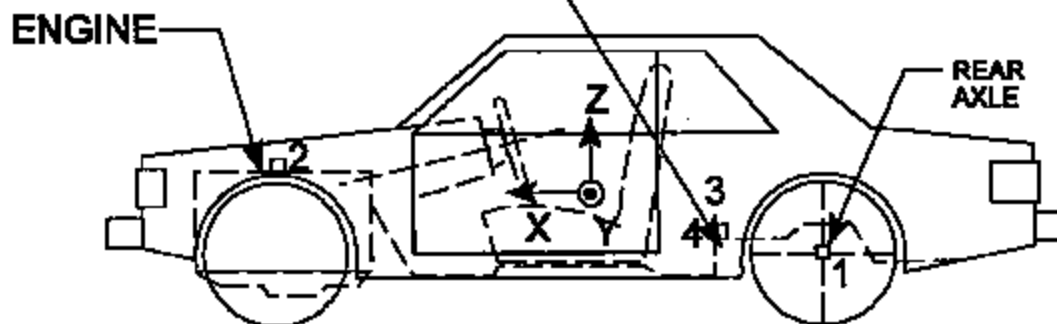
Vehicle Accelerometer Placement and Data Summary

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Vehicle NHTSA No.: C30110 Test Date: May 2, 2003



REAR SEAT CUSHION  
ASSY. FRONT ATTACHMENT  
BRACKET SUPPORT



LEFT SIDE VIEW

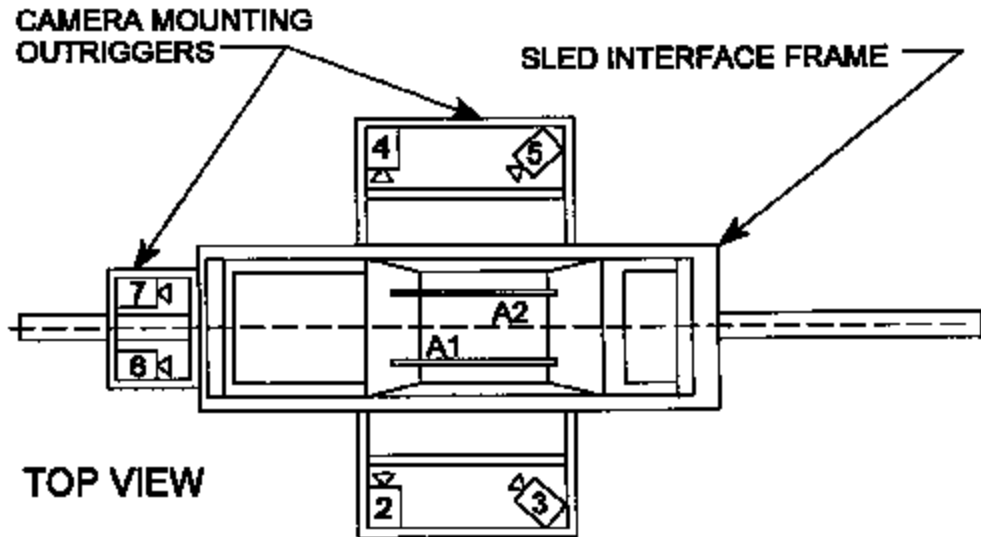
Vehicle Accelerometer Location Measurements and Data Summary

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Vehicle NHTSA No.: C30110 Test Date: May 2, 2003

| No. | Location                               | X (in) | Y (in) | Positive Direction |             | Negative Direction |             |
|-----|----------------------------------------|--------|--------|--------------------|-------------|--------------------|-------------|
|     |                                        |        |        | Value              | Time (msec) | Value              | Time (msec) |
|     | Sled Primary Longitudinal              | 67.0   | 0      | 17.1 g             | 58          | -1.4 g             | 126         |
|     | Sled Redundant Longitudinal            | 67.0   | 4.0    | 17.3 g             | 58          | -1.2 g             | 126         |
|     | Sled Velocity<br>Measured Integrated   | 67.0   | 0      | 29.3 mph           | 123         | -                  | -           |
| 1   | Rear Axle Longitudinal                 | 48.0   | 0      | 18.8 g             | 69          | -3.2 g             | 128         |
| 2   | Top Engine Longitudinal                | 141.0  | 0      | 18.9 g             | 73          | -2.9 g             | 155         |
| 3   | Right Rear Seat Member<br>Longitudinal | 68.0   | 13.5   | 18.3 g             | 56          | -1.4 g             | 187         |
| 4   | Left Rear Seat Member<br>Longitudinal  | 68.0   | 13.5   | 17.8 g             | 56          | -1.6 g             | 149         |

## Camera Positions



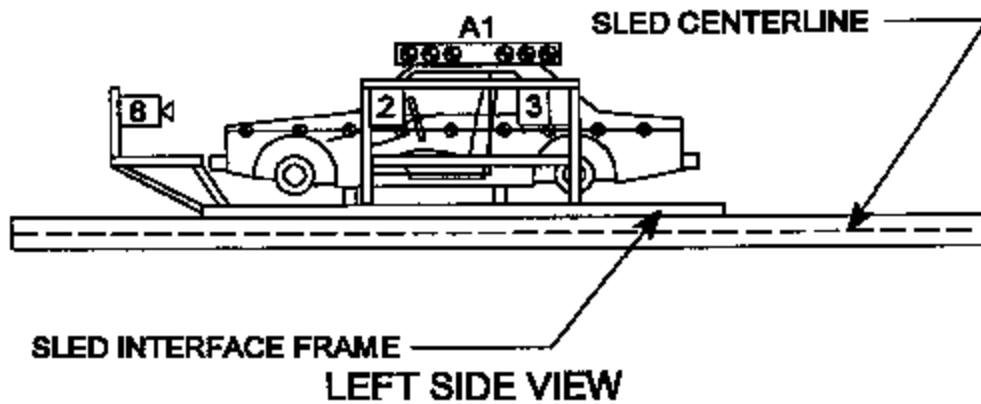
### CAMERA FRAME RATES:

#1 = 24 fps

All Others = 1,000 fps



REAL TIME CAMERA



### Camera Location Measurements

| Camera No. | VIEW                         | Camera Positions (inches)* |      |      | Angle (deg) | Film Plane To Head Target | Lens (mm) | Speed (fps) |
|------------|------------------------------|----------------------------|------|------|-------------|---------------------------|-----------|-------------|
|            |                              | X                          | Y    | Z    |             |                           |           |             |
| 1          | Real-Time (Pre and Post)     |                            |      |      |             |                           | 10        | 24          |
| 2          | Onboard Driver               | 70.6                       | 88.6 | 38.4 | 90          | 72.4                      | 13        | 1031        |
| 3          | Onboard Driver Angle         | 150.9                      | 91.1 | 47.8 |             |                           | 13        | 909         |
| 4          | Onboard Passenger            | 71.8                       | 89.6 | 38.5 | 90          | 71.1                      | 13        | 1005        |
| 5          | Onboard Passenger Angle      | 146.7                      | 88.5 | 47.9 |             |                           | 13        | 1010        |
| 6          | Onboard Windshield Driver    | 18.3                       | 14.1 | 42.9 |             |                           | 13        | 1005        |
| 7          | Onboard Windshield Passenger | 18.3                       | 13.9 | 42.9 |             |                           | 13        | 873         |

Reference\* X = Front of sled carriage  
Y = Center of sled carriage  
Z = Top of sled carriage

Occupant Injury Data

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Vehicle NHTSA No.: C30110 Test Date: May 2, 2003

| MAXIMUM ACCELERATION<br>VALUES: (g's) | DRIVER<br>DUMMY #401 | PASSENGER<br>DUMMY #403 |
|---------------------------------------|----------------------|-------------------------|
| Head Channel X                        | -54.3                | -76.6                   |
| Head Channel Y                        | 15.4                 | -8.9                    |
| Head Channel Z                        | 44.7                 | 29.2                    |
| HEAD RESULTANT                        | 71.7                 | 80.6                    |
| Chest Channel X                       | -32.3                | -25.4                   |
| Chest Channel Y                       | 3.9                  | -7.1                    |
| Chest Channel Z                       | 22.4                 | 26.7                    |
| CHEST RESULTANT                       | 36.9                 | 35.2                    |

**HEAD INJURY CRITERIA (HIC) VALUES:**

|                |       |       |
|----------------|-------|-------|
| HIC            | 273   | 261   |
| $t_1$ = (msec) | 81.2  | 84.5  |
| $t_2$ = (msec) | 110.4 | 115.2 |

[The maximum time interval from  $t_1$  to  $t_2$  is 36 milliseconds.]

**CHEST INJURY CRITERIA (CLIP) VALUES: (g's)**

|                       |       |       |
|-----------------------|-------|-------|
| CLIP                  | 36.3  | 34.0  |
| $t_1$ = (msec)        | 100.2 | 98.7  |
| $t_2$ = (msec)        | 103.2 | 101.7 |
| CHEST DEFLECTION (In) | 1.3   | 0.3   |

Occupant Injury Data (Cont.)

| <b>MAX. COMPRESSIVE FEMUR FORCES:</b> | <b>DRIVER<br/>DUMMY #401</b> | <b>PASSENGER<br/>DUMMY #403</b> |
|---------------------------------------|------------------------------|---------------------------------|
| <b>Left Side (lbs)</b>                | <b>994</b>                   | <b>1114</b>                     |
| <b>Right Side (lbs)</b>               | <b>1060</b>                  | <b>929</b>                      |

**NECK INJURY CRITERIA:**

|                                                                        |             |             |
|------------------------------------------------------------------------|-------------|-------------|
| <b>Peak Flexion Bending Moment about the Occipital Condyle (N-m)</b>   | <b>82.3</b> | <b>18.5</b> |
| <b>Peak Extension Bending Moment about the Occipital Condyle (N-m)</b> | <b>13.1</b> | <b>39.4</b> |
| <b>Peak Axial Tension (N)</b>                                          | <b>279</b>  | <b>716</b>  |
| <b>Peak Axial Compression (N)</b>                                      | <b>2230</b> | <b>1735</b> |
| <b>Peak Fore Shear (N)</b>                                             | <b>1476</b> | <b>1433</b> |
| <b>Peak Aft Shear (N)</b>                                              | <b>202</b>  | <b>170</b>  |

Seat Belt Warning System Data

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

NHTSA No.: C30110 ; Technician: Chad Gadberry ; Date: April 11, 2003

Complete the following to determine which seat belt warning system option (S7.3(a)(1) or S7.3(a)(2)) is used. (Manufacturers may use either option.)

- A. With occupant in driver's position and lap belt in stowed position and ignition switch placed in "Start/On" position:
- A.1 S7.3(a)(1)  
Time duration of audible warning signal = 8 seconds  
(4 to 8 seconds)  
  
Time duration of reminder light operation = >60 seconds  
(no less than 60 seconds)
- A.2 S7.3(a)(2)  
Time duration of audible warning signal =        seconds  
(4 to 8 seconds)(see 49 USCS @ 30124)  
  
Time duration of reminder light operation =        seconds  
(4 to 8 seconds)
- B. With occupant in driver's position and lap belt in use and ignition switch placed in "Start/On" position:
- B.1 S7.3(a)(1)  
Time duration of audible warning signal = 0 seconds  
(audible warning not required)  
  
Time duration of reminder light operation = 0 seconds  
(reminder light not required)
- B.2 S7.3(a)(2)  
Time duration of audible warning signal =        seconds  
(audible warning not required)  
  
Time duration of reminder light operation =        seconds  
(4 to 8 seconds)
- C. Note wording of visual warning:  
Fasten seat belt \_\_\_\_\_  
Fasten Belt \_\_\_\_\_  
Symbol 101 X \_\_\_\_\_

### Readiness Indicator

**Vehicle Year/Make/Model/Body Style:** 2003/Chevrolet/Cavaller/4 Door

NHTSA No.: C30110 : Technician: Chad Gadberry : Date: April 11, 2003

**An occupant restraint system that deploys in the event of a crash shall have a monitoring system with a readiness indicator. A totally mechanical system is exempt from this requirement. (11/8/94 legal interpretation)**

- 1.** Is the system totally mechanical?      (☐)Yes          (☒)No  
**(If YES this Data Sheet is complete.)**
- 2.** Describe the location of the readiness indicator: left side of instrument panel
- 
- 3.** Is the readiness indicator clearly visible to the driver?  
                                                                              (☒)Yes-Pass          (☐)No-FAIL
- 4.** Is a list of the elements in the occupant restraint system, being monitored by the readiness indicator, provided?  
                                                                              (☒)Yes-Pass          (☐)No-FAIL

**Air Bag Labels Data**

**Vehicle Year/Make/Model/Body Style:** 2003/Chevrolet/Cavalier/4 Door

**NHTSA No.:** C30110 ; **Technician:** Chad Gadberry ; **Date:** April 11, 2003

1. **Air bag maintenance label and owner's manual instructions (S4.5.1(a)):**
  - 1.1. Does the manufacturer recommend periodic maintenance or replacement of the airbag?  
( ) Yes, go to 1.2 (X) No, go to 2
  - 1.2. Does the vehicle have a maintenance or replacement label?  
( ) Yes-Pass ( ) No-FAIL
  - 1.3. Does the label contain one of the following?  
( ) Yes-Pass ( ) No-FAIL
    - ( ) Schedule on label specifies month and year (Date:\_\_\_\_\_)
    - ( ) Schedule on label specifies vehicle mileage (Mileage:\_\_\_\_\_)
    - ( ) Schedule on label specifies interval measured from date on certification label (Date:\_\_\_\_\_)
  - 1.4. Is the label permanently affixed within the passenger compartment?  
( ) Yes-Pass ( ) No-FAIL
  - 1.5. Is the label lettered in English?  
( ) Yes-Pass ( ) No-FAIL
  - 1.6. Is the label in block capitals and numerals?  
( ) Yes-Pass ( ) No-FAIL
  - 1.7. Are the letters and numerals at least 3/32 inches high?  
( ) Yes-Pass ( ) No-FAIL
  - 1.8. Does the owner's manual set forth the recommended schedule for maintenance or replacement?  
( ) Yes-Pass ( ) No-FAIL
2. **Does the owner's manual (S4.5.1(f)):**
  - 2.1. Include a description of the vehicle's airbag system in an easily understandable format?  
(X) Yes-Pass ( ) No-FAIL
  - 2.2. Include a statement that the vehicle is equipped with an airbag and a lap/shoulder belt at the front outboard seating positions?  
(X) Yes-Pass ( ) No-FAIL

### Air Bag Labels Data (Cont.)

- 2.3 Include a statement that the air bag is a supplemental restraint at the front outboard seating positions?  
(X)Yes-Pass ( ) No-FAIL
- 2.4 Emphasize that all occupants, including the driver, should always wear their seat belts whether or not an airbag is also provided at their seating positions to minimize the risk of severe injury or death in the event of a crash?  
(X)Yes-Pass ( ) No-FAIL
- 2.5 Provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to insure maximum safety protection for those occupants?  
(X)Yes-Pass ( ) No-FAIL
- 2.6 Explain that no objects should be placed over or near the air bag on the steering wheel or on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate?  
(X)Yes-Pass ( ) No-FAIL
3. Does the vehicle:
- 3.1. Provide an automatic means to ensure that the airbag does not deploy when a child seat or child with a total mass of 30 kg or less is present on the front outboard passenger?  
( ) Yes (X) No
- 3.2. Incorporate sensors, other than or in addition to weight sensors, which automatically prevent the passenger air bag from deploying in situations in which it might have an adverse effect on infants in rear-facing child seats, and unbelted or improperly belted children?  
( ) Yes (X) No
- 3.3. Have a passenger air bag designed to deploy in a manner that does not create a risk of serious injury to infants in rear-facing child seats, and unbelted or improperly belted children?  
( ) Yes (X) No

If yes to 3.1, or 3.2, or 3.3, the vehicle is not required to have a sunvisor warning label (S4.5.1(6)), an airbag alert label (S4.5.1(c)) or a label on the dash (S4.5.2(e)) and this check sheet is complete (S4.5.1). If no to 3.1, 3.2, and 3.3, go to 4.

#### 4. Sun Visor Warning Label

- 4.1. Is the label permanently affixed (may be permanent marking or molding) to either side of the sunvisor at each front outboard seating position with an airbag?  
(S4.5.1(b)(2))
- |                  |                     |             |
|------------------|---------------------|-------------|
| Driver Side -    | (X)Yes-Pass         | ( ) No-FAIL |
| Passenger Side - | ( ) N/A (X)Yes-Pass | ( ) No-FAIL |

Air Bag Labels Data (Cont.)

- 4.2. Does the label conform in content (vehicles without back seats may omit the statement: "The back seat is the safest place for children.") (S4.5.1(b)(2)(v))) to either label shown on the next page as appropriate at each front outboard seating position with an air bag? (S4.5.1(b)(2))

4.2.1 Dual air bags: ☐ Not Applicable  
Driver Side - ☒ Yes-Pass ☐ No-FAIL  
Passenger Side - ☒ Yes-Pass ☐ No-FAIL

4.2.2 Vehicle with driver air bag ONLY - either 4.2.2.1 or 4.2.2.2 is applicable, not both. (S4.5.1(b)(2)(iv))

4.2.2.1 Does the label conform in content to either label shown on the following page as appropriate?  
☒ Not Applicable  
Driver Side - ☐ Yes-Pass ☐ No-FAIL

4.2.2.2 Does the label conform in content to the first label shown on the following page where the label can be modified to omit the pictogram and the message text may read:

DEATH or SERIOUS INJURY can occur.

- Sit as far back as possible from the air bag.
- ALWAYS use SEAT BELTS and CHILD RESTRAINTS
- The BACK SEAT is the SAFEST place for children.

☒ Not Applicable  
Driver Side - ☐ Yes-Pass ☐ No-FAIL

## Air Bag Labels Data (Cont.)

### SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK



Figure 6a (S4.5.1(b)(2))

### SUN VISOR LABEL VISIBLE WHEN VISOR IS IN DOWN POSITION

LABEL OUTLINE, VERTICAL AND HORIZONTAL LINE BLACK



Figure 6b (S4.5.1(b)(2))

- 4.3 Is the label heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1(b)(2)(i))
- |                  |                |                          |
|------------------|----------------|--------------------------|
| Driver Side -    | (X) Yes-Pass   | ( ) No-FAIL              |
| Passenger Side - | ( ) No air bag | (X) Yes-Pass ( ) No-FAIL |
- 4.4 Is the message white with black text? (S4.5.1(b)(2)(ii))
- |                  |                |                          |
|------------------|----------------|--------------------------|
| Driver Side -    | (X) Yes-Pass   | ( ) No-FAIL              |
| Passenger Side - | ( ) No air bag | (X) Yes-Pass ( ) No-FAIL |

### Air Bag Labels Data (Cont.)

- 4.5 Is the message area at least 30 cm<sup>2</sup>? (S4.5.1(b)(2)(ii))  
Actual message area: 30.0 cm<sup>2</sup>
- |                                 |             |             |
|---------------------------------|-------------|-------------|
| Driver Side -                   | (X)Yes-Pass | ( ) No-FAIL |
| Passenger Side - ( ) No air bag | (X)Yes-Pass | ( ) No-FAIL |
- 4.6 Is the pictogram black with a red circle and slash on a white background?  
(S4.5.1(b)(2)(iii) & (S4.5.1(b)(2)(iv)))
- |                                            |                    |             |
|--------------------------------------------|--------------------|-------------|
| For vehicles with driver side air bag ONLY | ( ) Not Applicable |             |
| Driver Side -                              | (X)Yes-Pass        | ( ) No-FAIL |
| Passenger Side - ( ) No air bag            | (X)Yes-Pass        | ( ) No-FAIL |
- 4.7 Is the pictogram at least 30 mm in diameter? (S4.5.1(b)(2)(iii))  
Actual diameter: 32 mm
- |                                            |                    |             |
|--------------------------------------------|--------------------|-------------|
| For vehicles with driver side air bag ONLY | ( ) Not Applicable |             |
| Driver Side -                              | (X)Yes-Pass        | ( ) No-FAIL |
| Passenger Side - ( ) No air bag            | (X)Yes-Pass        | ( ) No-FAIL |
- 4.8 Is the same side of the sun visor to which the sun visor label is affixed free of other information with the exception of an air bag maintenance label?  
(S4.5.1(b)(3))
- |                                 |             |             |
|---------------------------------|-------------|-------------|
| Driver Side -                   | (X)Yes-Pass | ( ) No-FAIL |
| Passenger Side - ( ) No air bag | (X)Yes-Pass | ( ) No-FAIL |
- 4.9 Is the sun visor free of other information about air bags or the need to wear seat belts with the exception of the air bag alert label or the utility vehicle label?  
(S4.5.1(b)(3))
- |                                 |             |             |
|---------------------------------|-------------|-------------|
| Driver Side -                   | (X)Yes-Pass | ( ) No-FAIL |
| Passenger Side - ( ) No air bag | (X)Yes-Pass | ( ) No-FAIL |
5. Air Bag Alert Label
- 5.1 Is the Sun Visor Warning Label visible when the sunvisor is in the stowed position?
- |                                 |                 |        |
|---------------------------------|-----------------|--------|
| Driver Side -                   | (X)Yes, go to 6 | ( ) No |
| Passenger Side - ( ) No air bag | (X)Yes          | ( ) No |
- 5.2 Does the label conform in content to the label shown below? (S4.5.1(c)(2))
- |                                 |              |             |
|---------------------------------|--------------|-------------|
| Driver Side -                   | ( ) Yes-Pass | ( ) No-FAIL |
| Passenger Side - ( ) No air bag | ( ) Yes-Pass | ( ) No-FAIL |
- 5.3 Is the message area black with yellow text? (S4.5.1(c)(2)(i))
- |                                 |              |             |
|---------------------------------|--------------|-------------|
| Driver Side -                   | ( ) Yes-Pass | ( ) No-FAIL |
| Passenger Side - ( ) No air bag | ( ) Yes-Pass | ( ) No-FAIL |

### Air Bag Labels Data (Cont.)

- 5.4 Is the message area at least 20 cm<sup>2</sup>? (S4.5.1(c)(2)(i))  
Actual message area: \_\_\_\_\_ cm<sup>2</sup>  
Driver Side - ( ) Yes-Pass ( ) No-FAIL  
Passenger Side - ( ) No air bag ( ) Yes-Pass ( ) No-FAIL
- 5.5 Is the pictogram black with a red circle and slash on a white background?  
(S4.5.1(c)(2)(ii))  
For vehicles with driver side air bag ONLY ( ) Not Applicable  
( ) Yes-Pass ( ) No-FAIL
- 5.6 Is the pictogram at least 20 mm in diameter? (S4.5.1(c)(2)(ii))  
Actual diameter \_\_\_\_\_ mm  
For vehicles with driver side air bag ONLY ( ) Not Applicable  
( ) Yes-Pass ( ) No-FAIL

#### **SUN VISOR LABEL VISIBLE WHEN VISOR IS IN UP POSITION**



Figure 6c (S4.5.1(c)(2))

8. Label On the Dash
- 6.1 Does the vehicle have a passenger side air bag?  
(X) Yes ( ) No, check sheet is complete.
- 6.2 Does the vehicle have a label on the dash or steering wheel hub? (S4.5.1(e))  
( ) Yes-Pass (X\*) No

\* The airbag warning label on the dash was not with the vehicle when it was received. It is not known whether the label was removed by the dealer, by a potential customer, or not installed at all.

Air Bag Labels Data (Cont.)

- 6.3 Does the label conform in content (vehicles without back seats may omit the statement: "The back seat is the safest place for children 12 and under." (S4.5.1(e)(iii)) to the label shown below. (S4.5.1(e))  
( ) Yes-Pass ( ) No-FAIL
- 6.4 Is the heading area yellow with the word "warning" and the alert symbol in black? (S4.5.1(e)(i))  
( ) Yes-Pass ( ) No-FAIL
- 6.5 Is the message white with black text? (S4.5.1(e)(ii))  
( ) Yes-Pass ( ) No-FAIL
- 6.6 Is the message area at least 30 cm<sup>2</sup>? (S4.5.1(e)(ii))  
Actual message area: \_\_\_\_ cm<sup>2</sup>  
( ) Yes-Pass ( ) No-FAIL

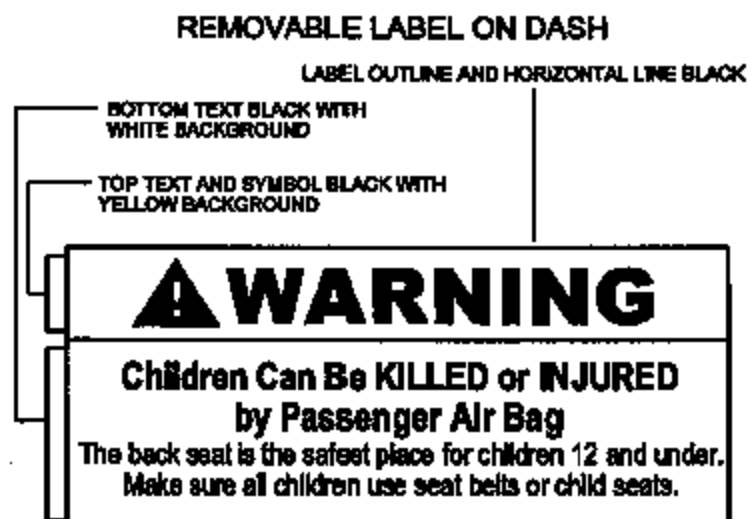


Figure 7 (S4.5.1(e))

Rear Outboard Seating Position Seat Belt Data

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

NHTSA No.: C30110 ; Technician: Chad Gadberry ; Date: April 11, 2003

Do all rear outboard seating positions have type 2 seat belts?

☒ Yes

☐ No

If NO, describe the seat belt installed, the seat location, and any other information about the seat that would explain why a type 2 belt was not installed.

---

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Lap Belt Lockability Data

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

NHTSA No.: C30110 ; Technician: Chad Gadberry ; Date: April 11, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for each designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing and that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Right Front

1. Record the seating position. Fully rearward  
(S7.1.1.5(c)(1))  
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))  

(X)Yes-Pass      ( ) No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))  

(X)Yes-Pass      ( ) No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?  

(X)Yes, go to 6.1      ( ) No, go to 7.

  - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))  

(X)Yes-Pass      ( ) No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

### Lap Belt Lockability Data (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 61.0 Inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)

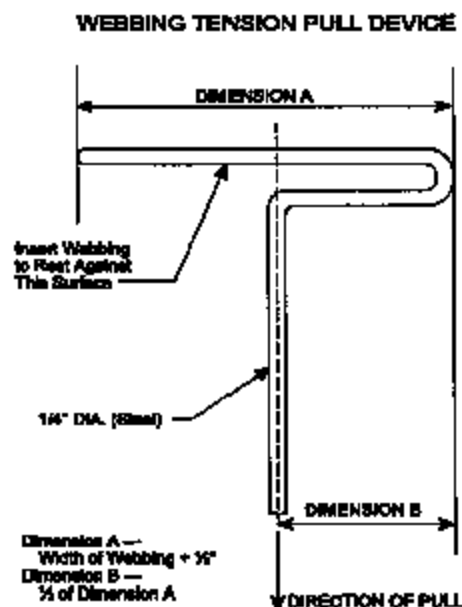


Figure 5 (S7.1.1.5(c)(4))

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 30.6 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 30.6 Inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 0.0 inches

(X)Yes-Pass

( ) No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 30.4 inches

(X)Yes-Pass

( ) No-FAIL

REMARKS: None

Lap Belt Lockability Data (Cont.)

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

NHTSA No.: C30110; Technician: Chad Gadberry; Date: April 11, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for each designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing and that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Left Rear

1. Record the seating position. Non-adjustable  
(S7.1.1.5(c)(1))  
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))  

(X) Yes-Pass      ( ) No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))  

(X) Yes-Pass      ( ) No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?      ( ) Yes, go to 6.1      (X) No, go to 7.
  - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))  

( ) Yes-Pass      ( ) No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

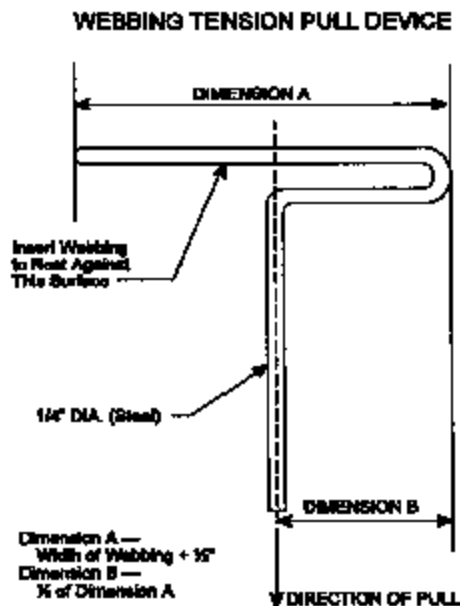
**Lap Belt Lockability Data (Cont.)**

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 58.8 inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)



**Figure 5 (S7.1.1.5(c)(4))**

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 24.8 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 24.9 inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 0.1 inches

(X)Yes-Pass

( ) No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 33.9 inches

(X)Yes-Pass

( ) No-FAIL

REMARKS: None

Lap Belt Lockability Data (Cont.)

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

NHTSA No.: C30110; Technician: Chad Gadberry; Date: April 11, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for each designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing and that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Center Rear

1. Record the seating position. Non-adjustable  
(S7.1.1.5(c)(1))  
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))  

(X)Yes-Pass      ( ) No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))  

(X)Yes-Pass      ( ) No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?      ( ) Yes, go to 6.1      (X) No, go to 7.
  - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))  

( ) Yes-Pass      ( ) No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

### Lap Belt Lockability Data (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 56.2 inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)

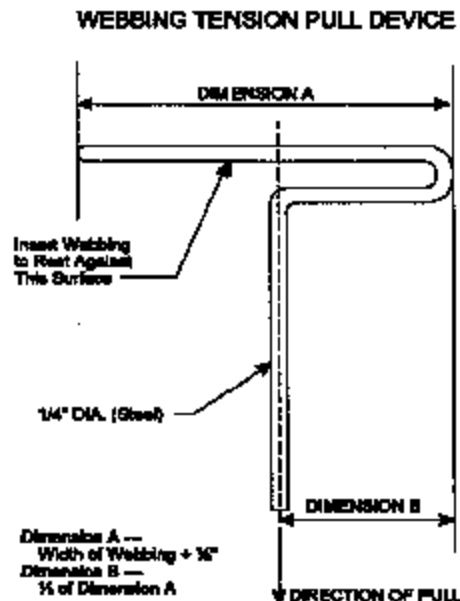


Figure 5 (S7.1.1.5(c)(4))

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 19.4 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 19.4 inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 0.0 inches

(X)Yes-Pass

( ) No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 36.8 inches

(X)Yes-Pass

( ) No-FAIL

REMARKS: None

Lap Belt Lockability Data (Cont.)

Vehicle Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

NHTSA No.: C30110 ; Technician: Chad Gadberry ; Date: April 11, 2003

Passenger cars, trucks, buses, and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less. (S7.1.1.5)

Complete one of these forms for each designated seating position with forward-facing seats, other than the driver's seat, or seats that can be adjusted to forward-facing and that has seat belt retractors that are not automatic locking retractors. (S7.1.1.5(c))

Designated Seating Position (DSP): Right Rear

1. Record the seating position. Non-adjustable  
(S7.1.1.5(c)(1))  
(Any position is acceptable.)
2. Buckle the seat belt. (S7.1.1.5(c)(1))
3. Complete any procedures recommended in the vehicle owner's manual to activate any locking feature. (S7.1.1.5(c)(1))
4. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT have to be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. (S7.1.1.5(a))  

(X)Yes-Pass      ( ) No-FAIL
5. Does the lap belt portion of the seat belt in the forward-facing seat or seat that can be adjusted to forward-facing consist of a locking device that does NOT require inverting, twisting or deforming of the belt webbing. (S7.1.1.5(a))  

(X)Yes-Pass      ( ) No-FAIL
6. Does the vehicle user need to take some action to activate the locking feature on the lap belt portion of the seat belt in any forward-facing seat or seat that can be adjusted to forward-facing?      ( ) Yes, go to 6.1      (X) No, go to 7.
  - 6.1 Does the vehicle owner's manual include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system. (S7.1.1.5(b))  

( ) Yes-Pass      ( ) No-FAIL
7. Locate a reference point A on the seat belt buckle. (S7.1.1.5(c)(2))

### Lap Belt Lockability Data (Cont.)

8. Locate a reference point B on the attachment hardware or retractor assembly at the other end of the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))
9. Adjust the lap belt or lap belt portion of the seat belt assembly according to any procedures recommended in the vehicle owner's manual to activate any locking feature so that the webbing between points A and B is at the maximum length allowed by the belt system. (S7.1.1.5(c)(2))
10. Measure and record the distance between points A and B along the longitudinal centerline of the webbing for the lap belt or lap belt portion of the seat belt assembly. (S7.1.1.5(c)(2))

Measured distance between A and B is 58.8 inches.

11. Readjust the belt system so that the webbing between points A and B is at any length that is 5 inches or more shorter than the maximum length of the webbing. (S7.1.1.5(c)(3))
12. To the lap belt or lap belt portion of the seat belt assembly, apply a preload of 10 pounds using the webbing tension pull device. Apply the load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the designated seating position. Apply the preload in a horizontal direction toward the front of the vehicle with a force application angle of not less than 5 degrees nor more than 15 degrees above the horizontal. (S7.1.1.5(c)(4))

The measured force application angle = 10 (spec. 5-15 degrees)

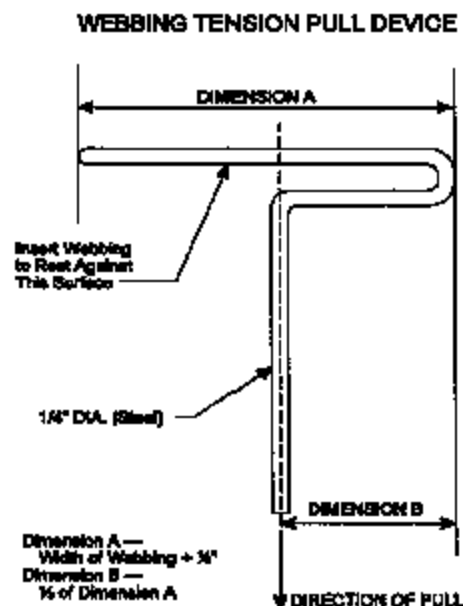


Figure 5 (S7.1.1.5(c)(4))

Lap Belt Lockability Data (Cont.)

13. Measure the length between points A and B along the longitudinal centerline of the webbing while the preload is being applied. (S7.1.1.5(c)(4))

Measured distance between A and B is 24.8 inches.

14. Increase the load to 50 pounds at a rate of no more than 50 pounds per second. Attain the load in not more than 5 seconds. (If webbing sensitive emergency locking retractors are installed as part of the lap belt or lap belt portion of the seat belt assembly, apply the load at a rate less than the threshold value for lock-up specified by the manufacturer.) Maintain the load for at least 5 seconds. Measure and record the distance between points A and B along the longitudinal centerline of the webbing. (S7.1.1.5(c)(5))

Record onset rate: 10 lb/sec (Spec. 10 to 50 lb/sec)

Measure distance between points A and B 24.9 inches (S7.1.1.5(c)(6))

15. Subtract the measurement in 13 from the measurement in 14. Is the difference 2 inches or less? (S7.1.1.5(c)(7))

14-13 = 0.1 inches

(X)Yes-Pass

( ) No-FAIL

16. Subtract the measurement in 14 from the measurement in 10. Is the difference 3 inches or more?

10-14 = 33.9 inches

(X)Yes-Pass

( ) No-FAIL

REMARKS: None

### Seat Belt Comfort and Convenience Data

**1. BELT CONTACT FORCE (S7.4.3)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Left Rear

Date of Comfort/Convenience Check: April 11, 2003

Technician Performing Check: Chad Gadberry

GVWR: 3643 lb

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?  
( ) Yes - go to latchplate access  
(X) No - continue with this check sheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)  
( ) Check  
(X) N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.  
( ) Check  
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.  
( ) Check  
(X) N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.  
( ) Check  
(X) N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.  
( ) Check  
(X) N/A

**Seat Belt Comfort and Convenience Data (Cont.)**

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)  
☐ Check  
☒ N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.  
☒ Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.6) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.  
Contact Force 0.5 lb. ☒ 0.0 to 0.7 pounds - Pass  
☐ greater than 0.7 pounds - FAIL\*
- \* If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

**Seat Belt Comfort and Convenience Data (Cont.)**

**1. BELT CONTACT FORCE (S7.4.3)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Center Rear

Date of Comfort/Convenience Check: April 11, 2003

Technician Performing Check: Chad Gadberry

GVWR: 3643 lb

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?  
( ) Yes - go to latchplate access  
(X) No - continue with this check sheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)  
( ) Check  
(X) N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.  
( ) Check  
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.  
( ) Check  
(X) N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.  
( ) Check  
(X) N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.  
( ) Check  
(X) N/A

**Seat Belt Comfort and Convenience Data (Cont.)**

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)  
( ) Check  
(X) N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.  
(X) Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.  
Contact Force 0.5 lb. (X) 0.0 to 0.7 pounds - Pass  
( ) greater than 0.7 pounds - FAIL\*
- \* If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

**Seat Belt Comfort and Convenience Data (Cont.)**

**1. BELT CONTACT FORCE (S7.4.3)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Right Rear

Date of Comfort/Convenience Check: April 11, 2003

Technician Performing Check: Chad Gadberry

GVWR: 3643 lb

Test all Type 2 seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 1.1 Does the vehicle incorporate a webbing tension-relieving device?  
( ) Yes - go to latchplate access  
(X) No - continue with this check sheet
- 1.2 Adjustable seats are in adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)  
( ) Check  
(X) N/A
- 1.3 If separately adjustable in a vertical direction, the seats are at the lowest position.  
( ) Check  
(X) N/A
- 1.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.  
( ) Check  
(X) N/A
- 1.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.  
( ) Check  
(X) N/A
- 1.6 Place each adjustable head restraint in its highest adjustment position.  
( ) Check  
(X) N/A

**Seat Belt Comfort and Convenience Data (Cont.)**

- 1.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position. (S8.1.3)  
☐ Check  
☒ N/A
- 1.8 Position the test dummies according to dummy position placement instructions in Appendix B.  
☒ Check
- 1.9 Fasten the seat belt latch. Pull either 12 inches of belt webbing or the maximum available amount of belt webbing, whichever is less, from the retractor and then release it, allowing the belt webbing to return to the dummy's chest. Locate the point where the centerline of the upper torso belt webbing crosses the midsagittal line on the dummy's chest. At that point, pull the belt webbing out 3 inches from the dummy's chest and release until it is within one inch from the dummy's chest. (S10.8) Measure the contact force exerted by the belt webbing on the dummy's chest. Contact the COTR if the contact force exceeds 0.7 pounds.  
Contact Force 0.5 lb. ☒ 0.0 to 0.7 pounds - Pass  
☐ greater than 0.7 pounds - FAIL\*
- \* If the seat belts are voluntarily installed by the manufacturer they do not have to comply.

## Seat Belt Comfort and Convenience Data (Cont.)

### **2. LATCHPLATE ACCESS (S7.4.4)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Not applicable - passenger car

Date of Comfort/Convenience Check: \_\_\_\_\_

Technician Performing Check: \_\_\_\_\_

GVWR: \_\_\_\_\_

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 2.1 Position the seat in its forward most adjustment position.  
( ) Check
- 2.2 Position the test dummy using the procedures in Appendix B. (Some modifications to the positioning procedure may need to be made because the seat is in its forward most position.)  
( ) Check
- 2.3 Position the adjustable seat belt anchorage in the manufacturer's nominal design position for a 50th percentile adult male occupant.  
( ) Check
- 2.4 Attach the inboard and outboard reach string following the instructions on Figure 1C.  
( ) Check
- 2.5 Place the latch plate in the stowed position.  
( ) Check
- 2.6 Extend each line backward and outboard to generate arcs of the reach envelope of the test dummy's arms. Is the latch plate within the reach envelope?  
( ) Yes-Pass ( ) No-FAIL
- 2.7 Using the clearance test block, specified in Figure 2C, is there sufficient clearance between the vehicle seat and the side of vehicle interior to allow the test block to move unhindered to the latch plate or buckle?  
( ) Yes-Pass ( ) No-FAIL

Seat Belt Comfort and Convenience Data (Cont.)

**3. RETRACTION (S7.4.5)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Not applicable - passenger car

Date of Comfort/Convenience Check: \_\_\_\_\_

Technician Performing Check: \_\_\_\_\_

GVWR: \_\_\_\_\_

Test all front outboard seat belts other than those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

- 3.1 Is the vehicle a passenger car or walk-in van-type vehicle?  
( ) Yes If yes, go to seat belt guides and hardware.  
( ) No
- 3.2 Adjustable seats are in the adjustment position midway between the forward most and rearmost positions. If an adjustment position does not exist midway between the forward most and rearmost positions, the next closest adjustment position to the rear of the midpoint is used. (S8.1.2)  
( ) Check
- 3.3 If separately adjustable in a vertical direction, the seats are at the lowest position.  
( ) Check
- 3.4 Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer.  
( ) Check
- 3.5 Place any adjustable anchorages at the manufacturer's nominal design position for a 50th percentile adult male (50M) occupant. This information will be furnished by the COTR.  
( ) Check
- 3.6 Place each adjustable head restraint in its highest adjustment position.  
( ) Check
- 3.7 Adjustable lumbar supports are positioned so that the lumbar support is in its lowest adjustment position (S8.1.3)  
( ) Check

### Seat Belt Comfort and Convenience Data (Cont.)

- 3.8 Use anthropomorphic test dummies whose arms have been removed and position the dummies in the front outboard designated seating positions according to instructions in Appendix B.  
( ) Check
- 3.9 Restrain the dummies using the belt systems for the position being tested.  
( ) Check
- 3.10 Stow outboard armrests which are capable of being stowed.  
( ) Check
- 3.11 Check the statement that applies to this test vehicle:
- (A) The torso and lap belt webbing of the seat belt system automatically retracts to a stowed position when the adjacent vehicle door is in an open position and the seat belt latch plate is released.  
( ) Pass
- (B) The torso and lap belt webbing of the seat belt system automatically retracts when the seat belt latch plate is released.  
( ) Pass
- (C) Neither A or B apply.  
( ) FAIL
- 3.12 With the webbing and hardware in the stowed position are the webbing and hardware prevented from being pinched when the door is closed?  
( ) Yes - Pass  
( ) No - FAIL
- 3.13 If this test vehicle has an open body (without doors) and has a seat belt system with a tension-relieving device, does the belt system fully retract when the tension-relieving device is deactivated?  
( ) N/A  
( ) Yes - Pass  
( ) No - FAIL

Seat Belt Comfort and Convenience Data (Cont.)

**4. SEAT BELT GUIDES AND HARDWARE (S7.4.6)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Left Rear

Date of Comfort/Convenience Check: April 11, 2003

Technician Performing Check: Chad Gadberry

GVWR: 3643 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?  
☐ Yes - Go to 4.2.  
☒ No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?  
☐ Yes - Pass  
☐ No - **FAIL**
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?  
☐ Yes - Pass  
☐ No - **FAIL**

**Seat Belt Comfort and Convenience Data (Cont.)**

- 4.4** The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check
  - (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
  - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- ☐ Yes - Pass  
☐ No - **FAIL**
- 4.5** Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?
- ☐ Yes - Pass  
☐ No - **FAIL**

Seat Belt Comfort and Convenience Data (Cont.)

**4. SEAT BELT GUIDES AND HARDWARE (S7.4.6)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Center Rear

Date of Comfort/Convenience Check: April 11, 2003

Technician Performing Check: Chad Gadberry

GVWR: 3643 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
  - ( ) Yes - Go to 4.2.
  - (X) No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?
  - ( ) Yes - Pass
  - ( ) No - FAIL
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
  - ( ) Yes - Pass
  - ( ) No - FAIL

**Seat Belt Comfort and Convenience Data (Cont.)**

- 4.4 The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:**
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ( ) Check**
  - (B) The seat is moved to any position to which it is designed to be adjusted. ( ) Check**
  - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ( ) Check**
- ( ) Yes - Pass**  
**( ) No - FAIL**
- 4.5 Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?**
- ( ) Yes - Pass**  
**( ) No - FAIL**

**Seat Belt Comfort and Convenience Data (Cont.)**

**4. SEAT BELT GUIDES AND HARDWARE (S7.4.6)**

Test Vehicle NHTSA No.: C30110

Vehicle Model Year/Make/Model/Body Style: 2003/Chevrolet/Cavalier/4 Door

Designated Seating Position Tested: Right Rear

Date of Comfort/Convenience Check: April 11, 2003

Technician Performing Check: Chad Gadberry

GVWR: 3643 lb

Test seat belts except those in walk-in van-type vehicles and those at front outboard designated seating positions in passenger cars. Complete a form for each applicable seat belt.

The requirements for accessibility **DO NOT APPLY** to:

- A. Seats whose seat cushions are movable so that the seat back serves a function other than seating (S7.4.6.1(b))
- B. Seats which are removable.
- C. Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function.

If the seats in this vehicle are different than the criteria above determine the following:

- 4.1 Is the webbing designed to pass through the seat cushion or between the seat cushion and seat back?
  - ☐ Yes - Go to 4.2.
  - ☒ No - this form is complete
- 4.2 Does one of the following three parts, the seat belt latch plate, the buckle, or the seat belt webbing, stay on top of or above the seat cushion under normal conditions (i.e., conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant)?
  - ☐ Yes - Pass
  - ☐ No - FAIL
- 4.3 Are the remaining two seat belt parts accessible under normal conditions?
  - ☐ Yes - Pass
  - ☐ No - FAIL

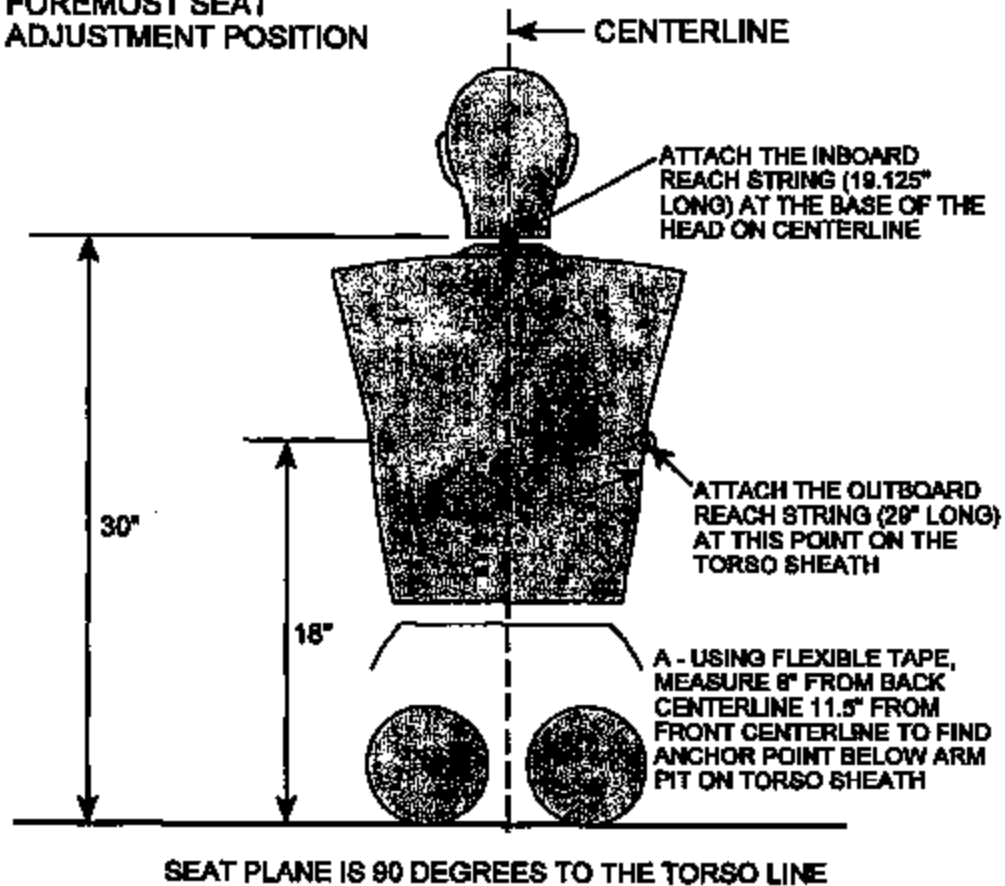
### Seat Belt Comfort and Convenience Data (Cont.)

- 4.4** The buckle and latch plate do not pass through the guides or conduits provided and fall behind the seat when the following events occur in order:
- (A) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched. ☐ Check
  - (B) The seat is moved to any position to which it is designed to be adjusted. ☐ Check
  - (C) The seat back, if foldable, is folded forward as far as possible and then moved backward into position. ☐ Check
- ☐ Yes - Pass  
☐ No - FAIL
- 4.5** Is the inboard receptacle end of the seat belt assembly, installed in the outboard designated seating position, accessible with the center arm rest in any position to which it can be adjusted (without moving the armrest)?
- ☐ Yes - Pass  
☐ No - FAIL

**LOCATION OF ANCHORING POINTS FOR  
LATCHPLATE REACH LIMITING CHAINS OR STRINGS  
TO TEST FOR LATCHPLATE ACCESSIBILITY**

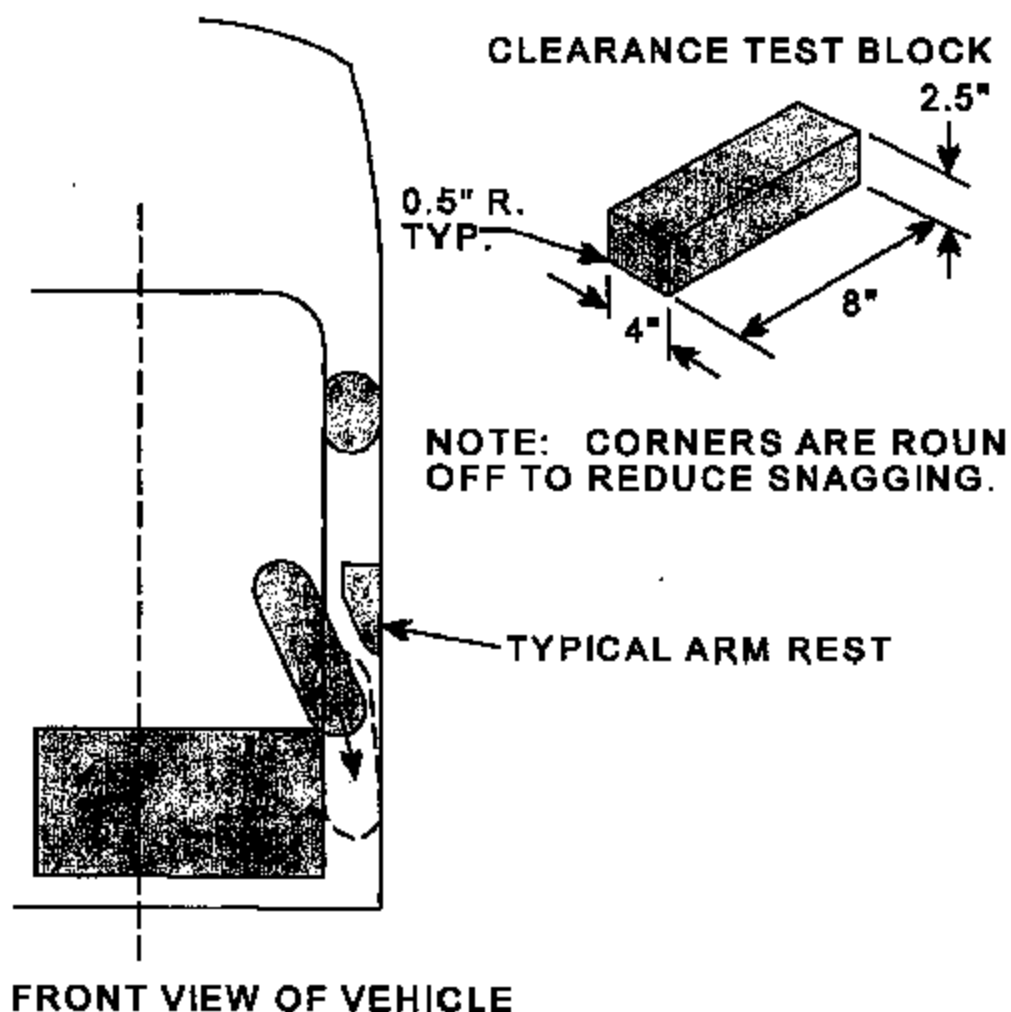
**PART 572E DUMMY**

50TH PERCENTILE  
DUMMY SEATED IN  
FOREMOST SEAT  
ADJUSTMENT POSITION



**REAR VIEW**

## USE OF CLEARANCE TEST BLOCK TO DETERMINE HAND/ARM ACCESS



**APPENDIX A**  
**PHOTOGRAPHS**

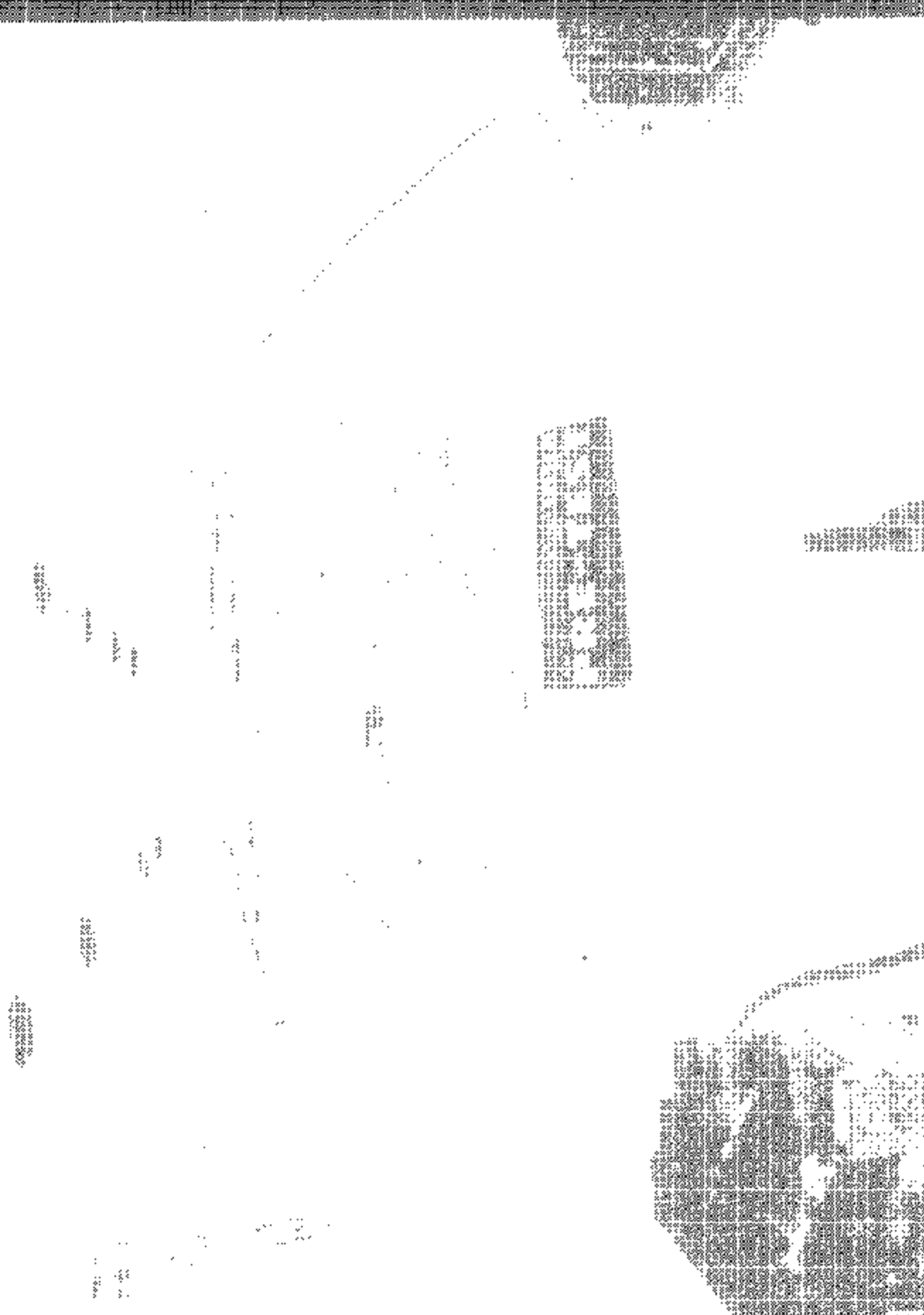
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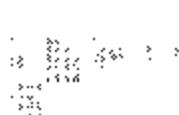
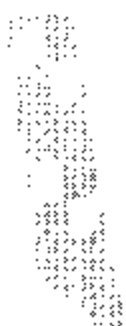








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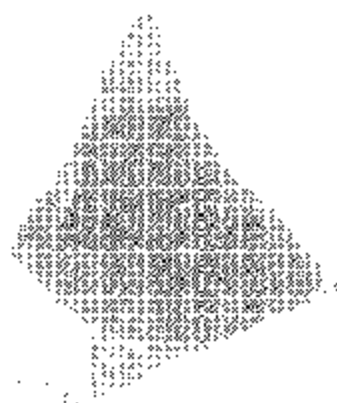
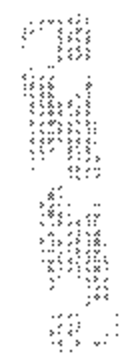
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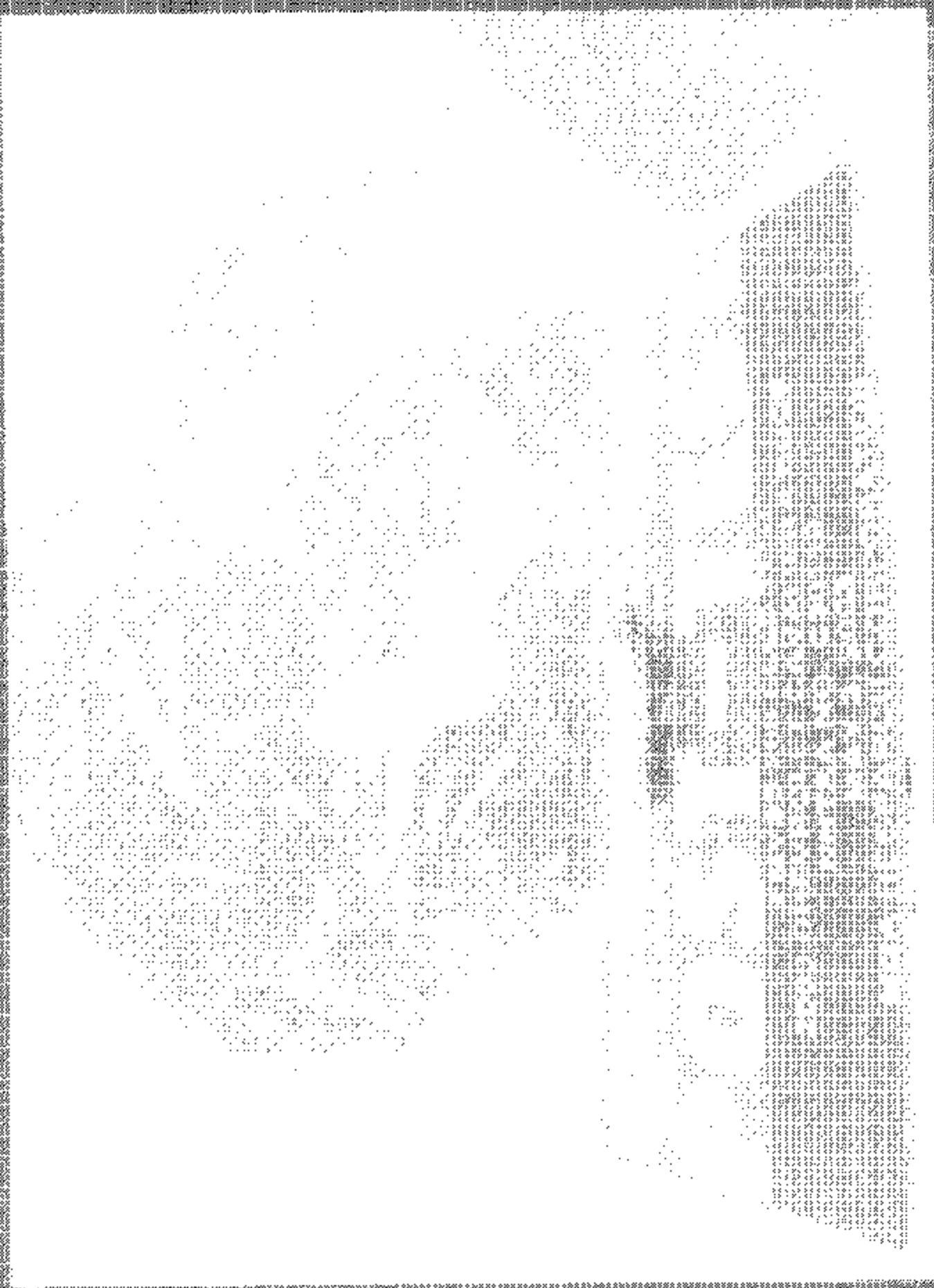
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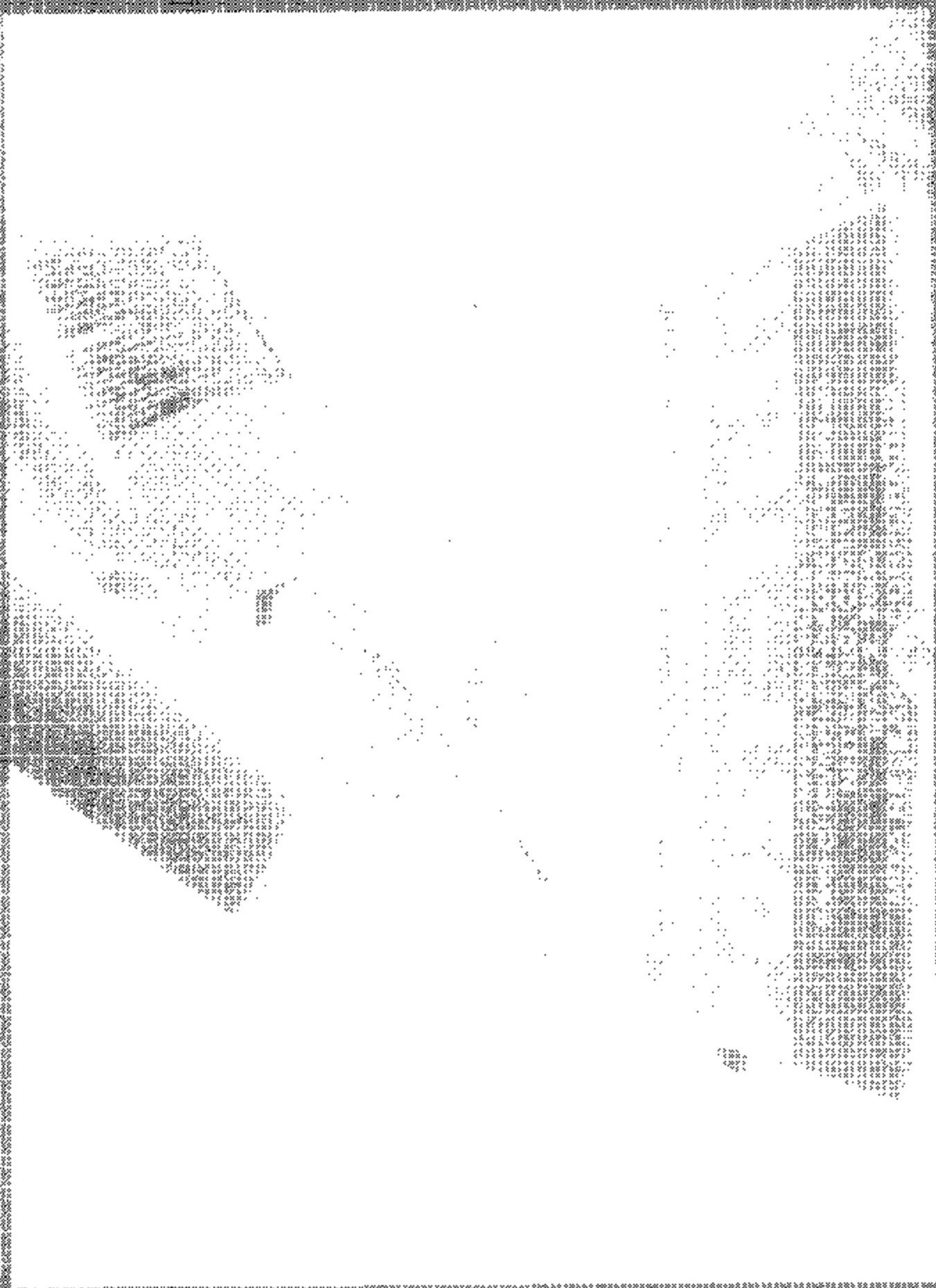
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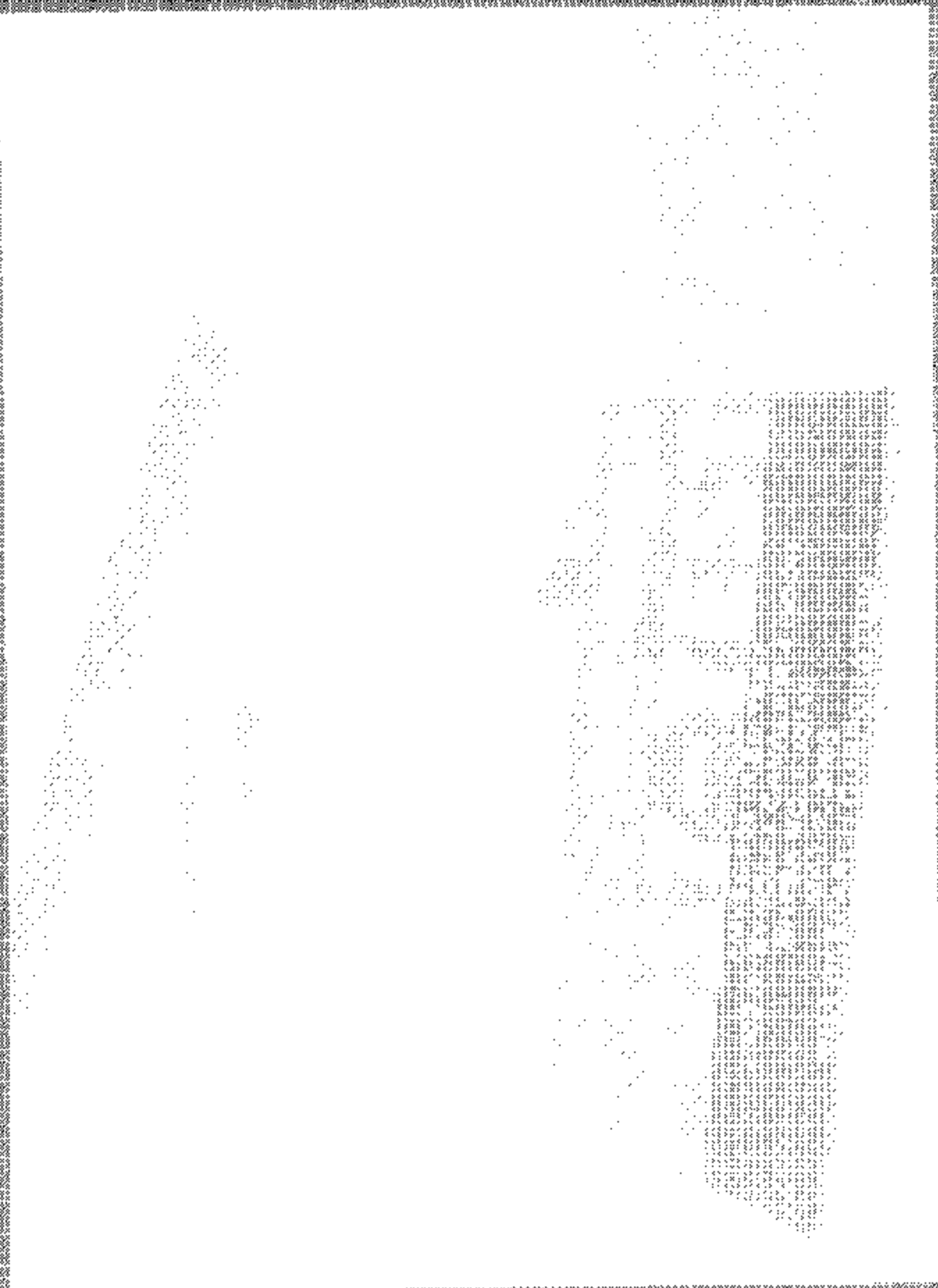
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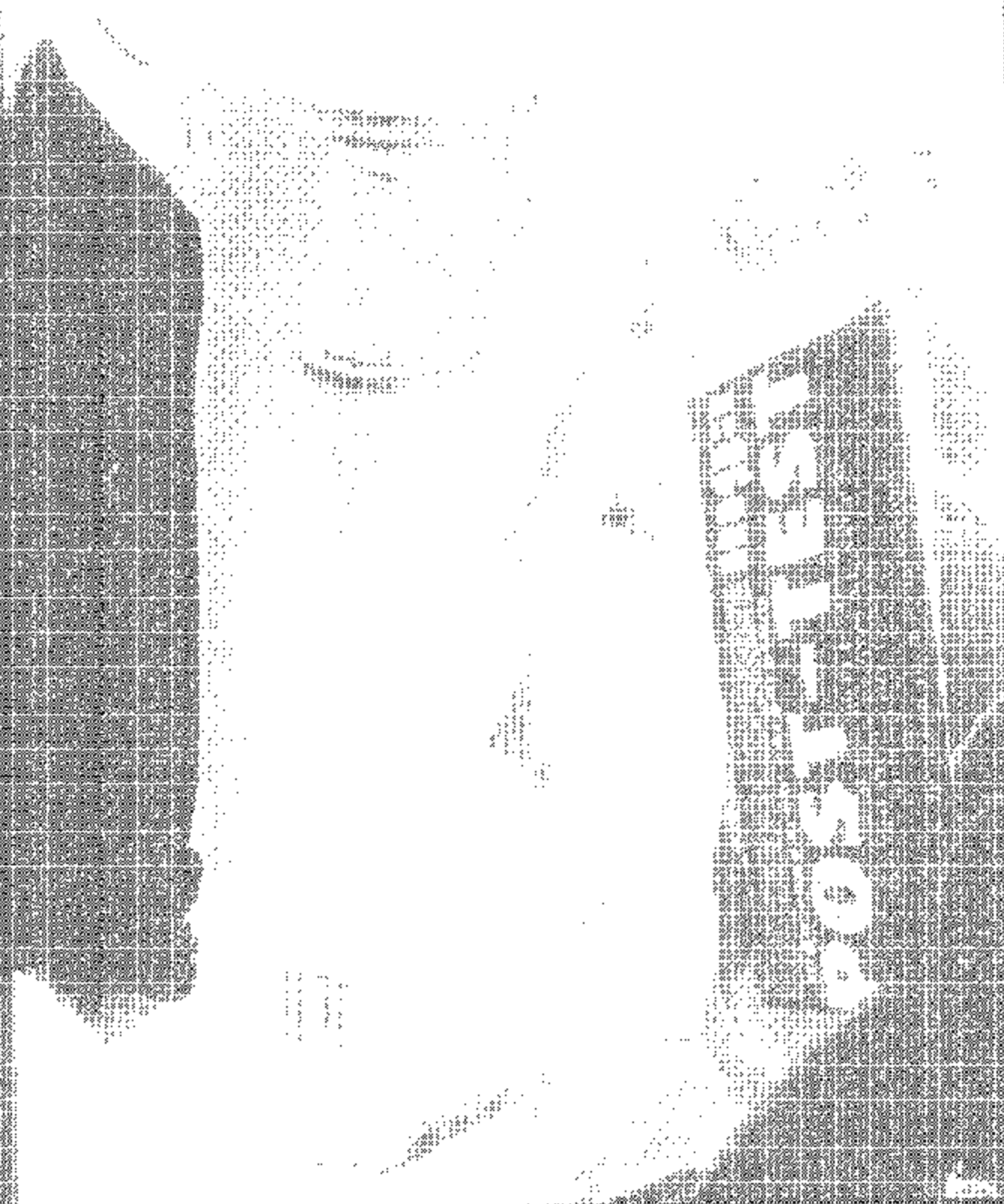








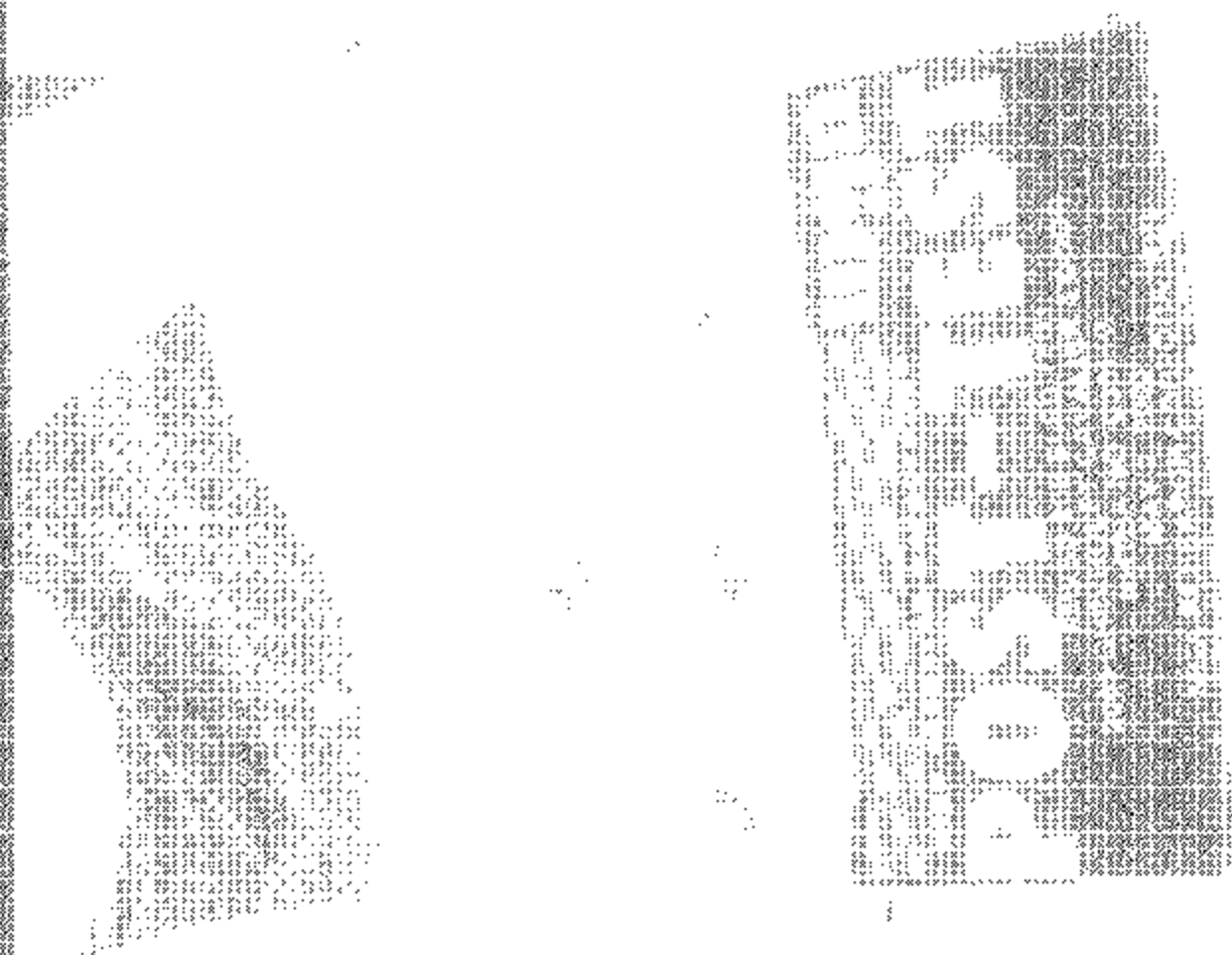


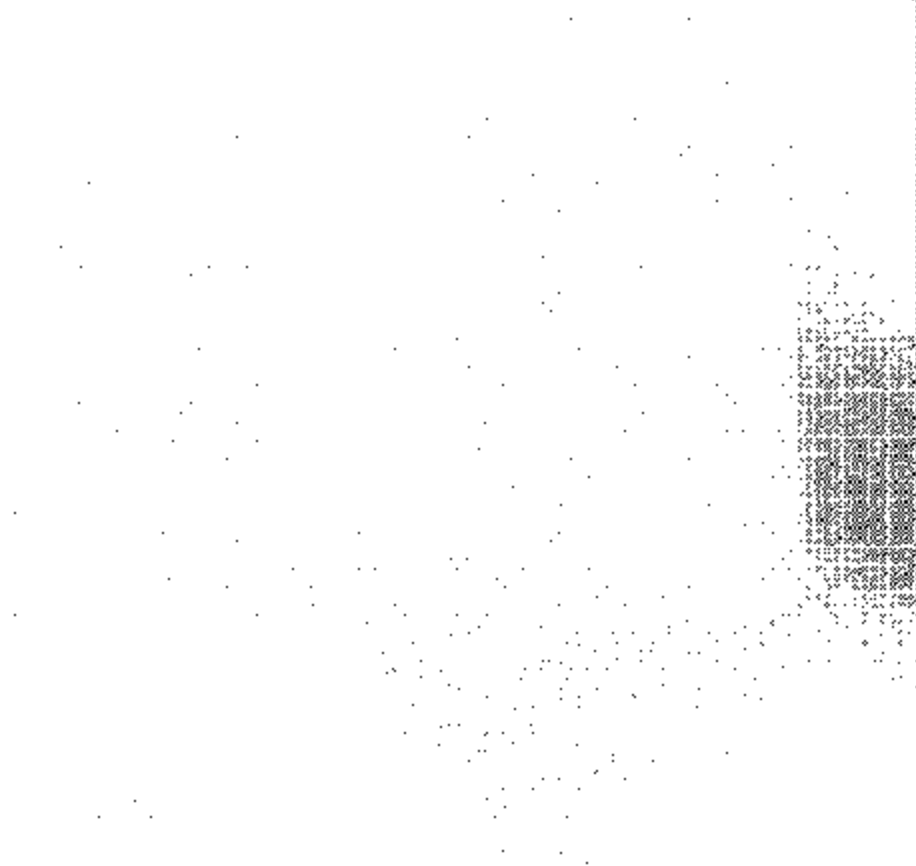


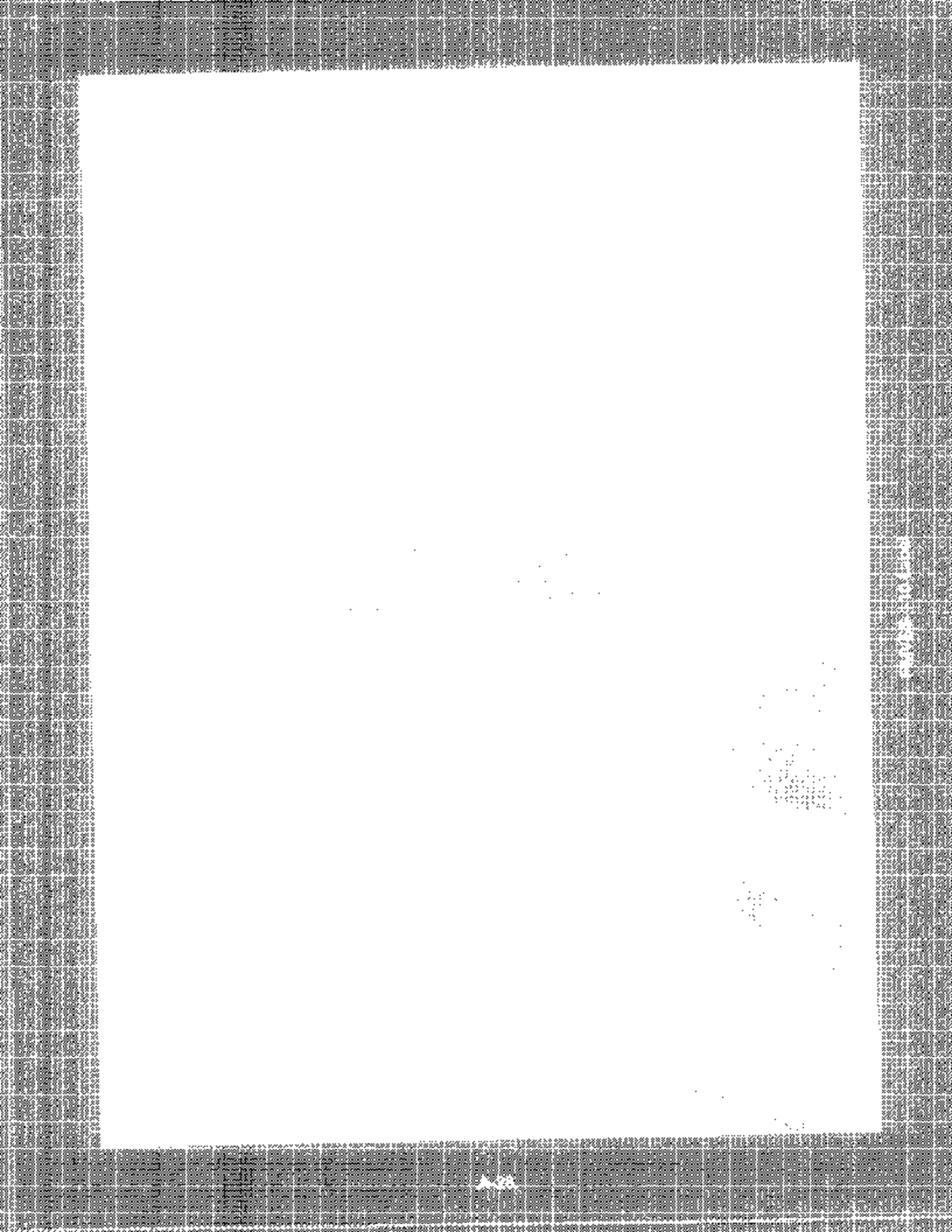
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## **APPENDIX B**

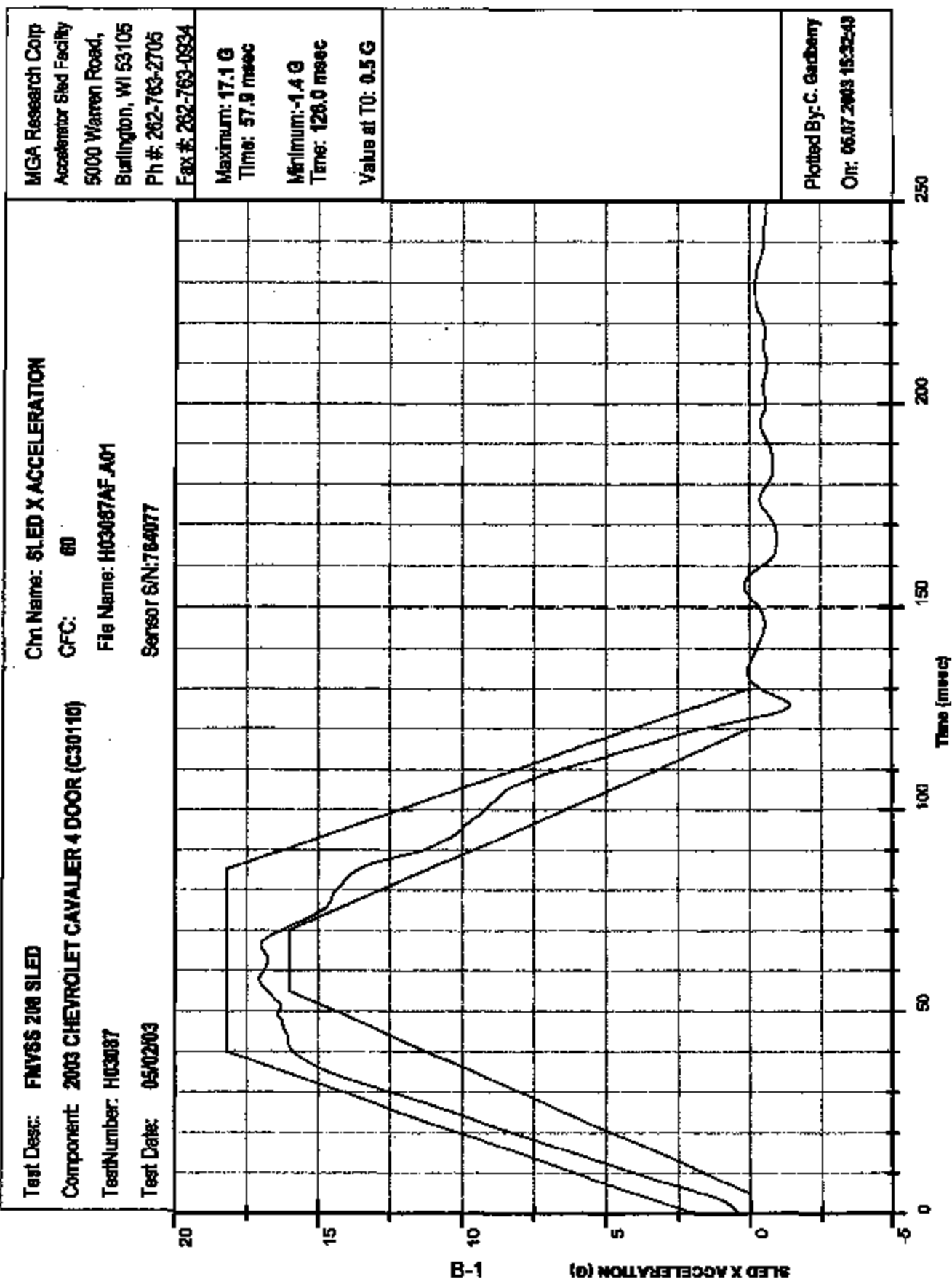
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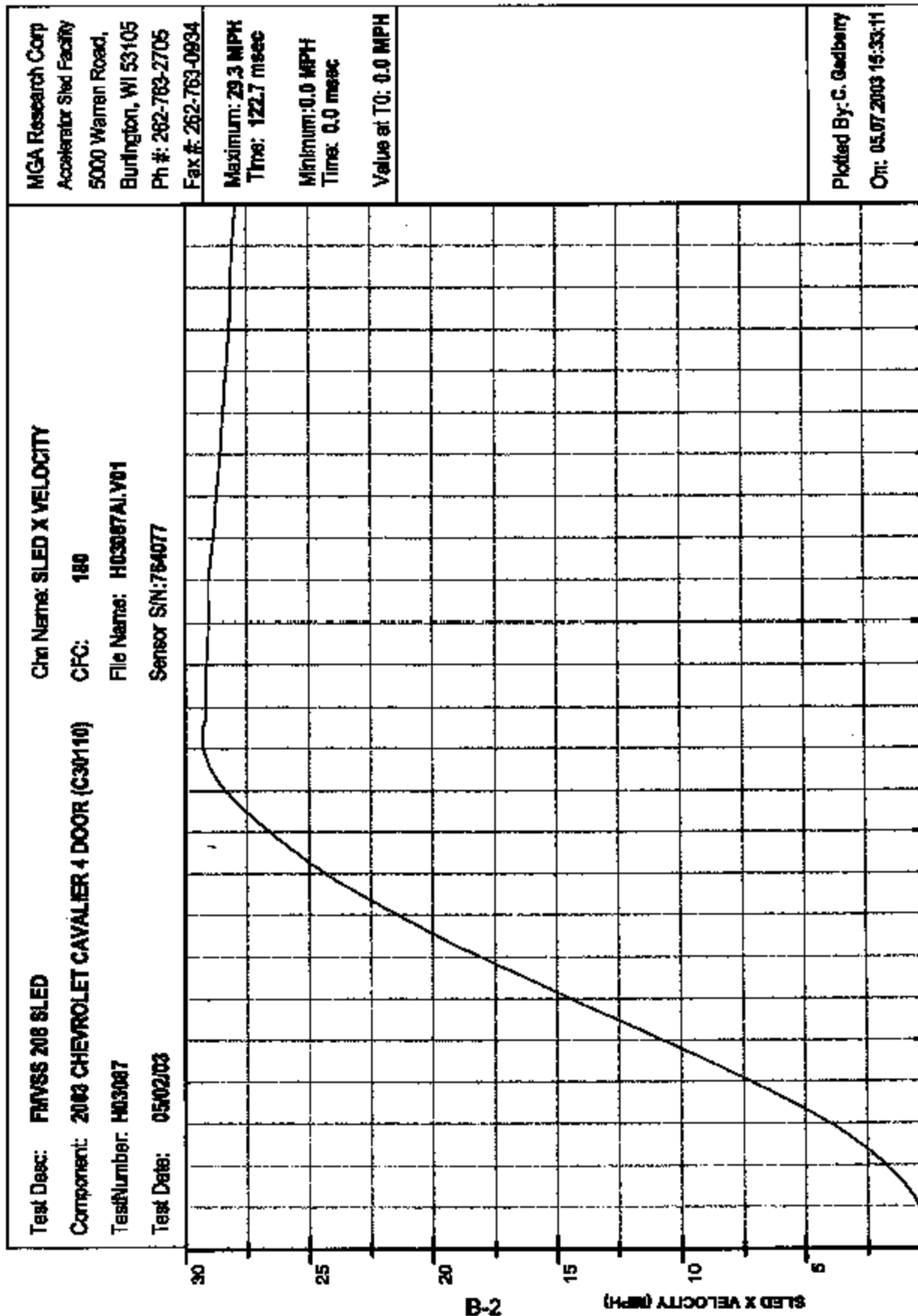
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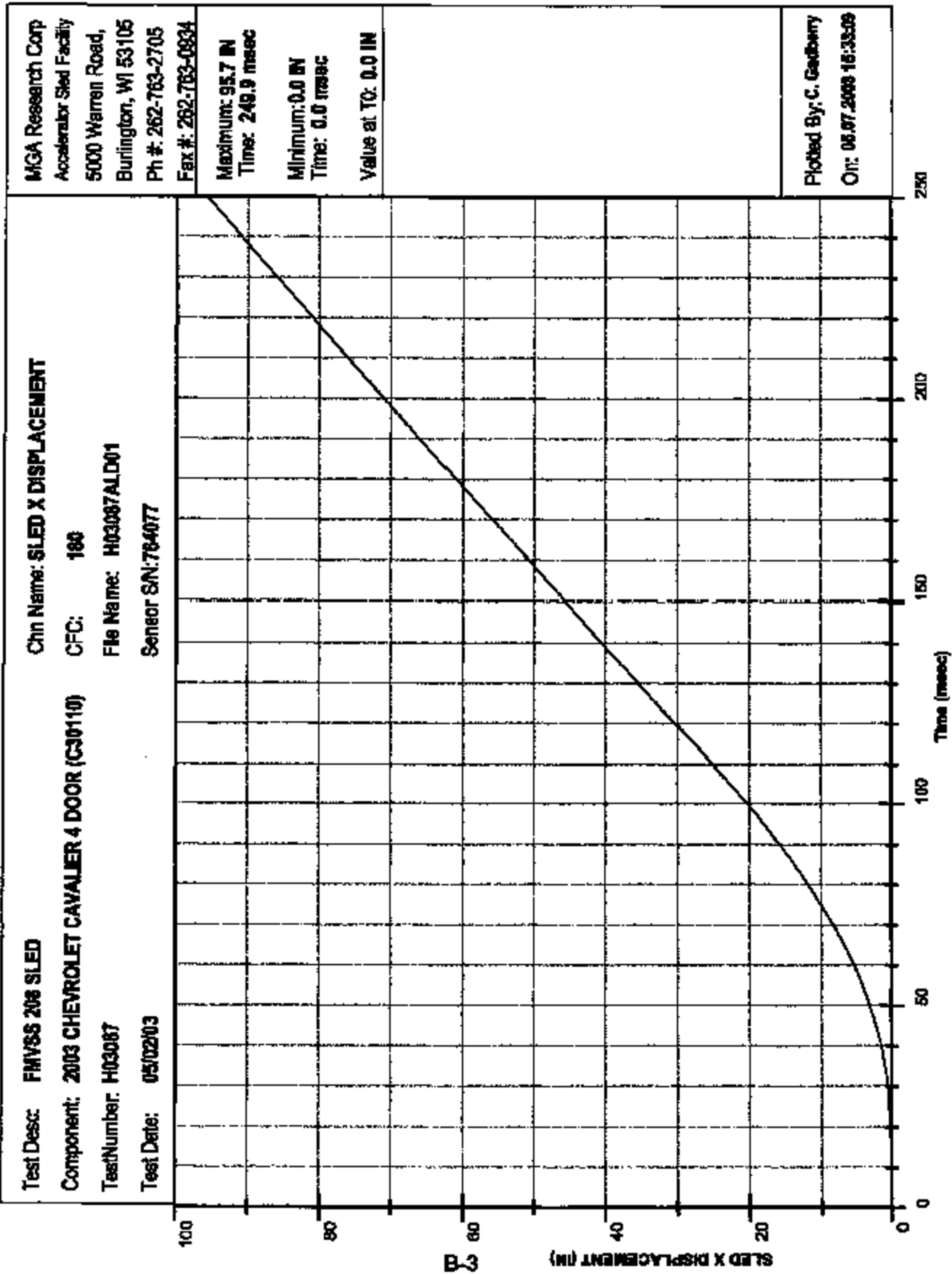
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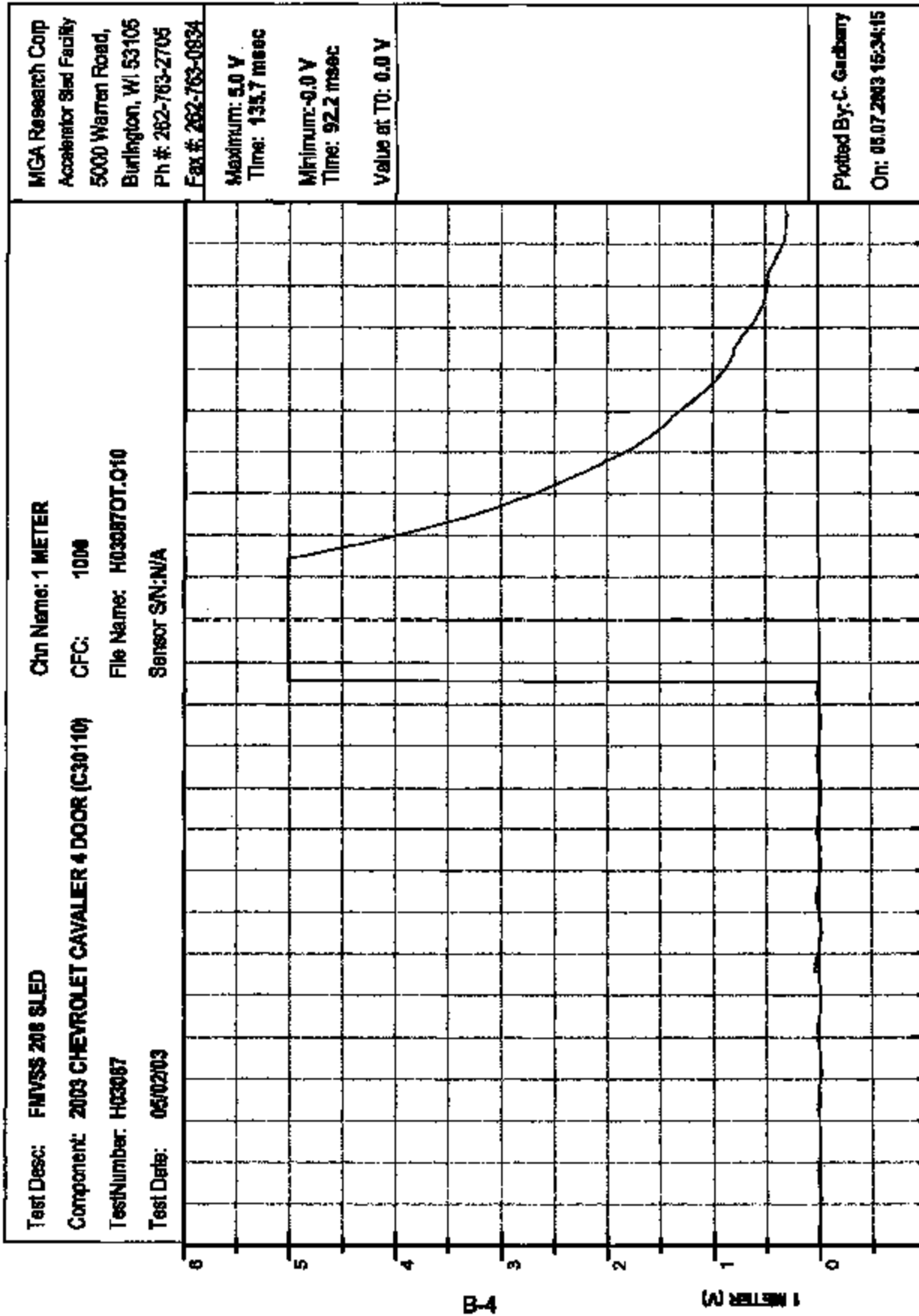
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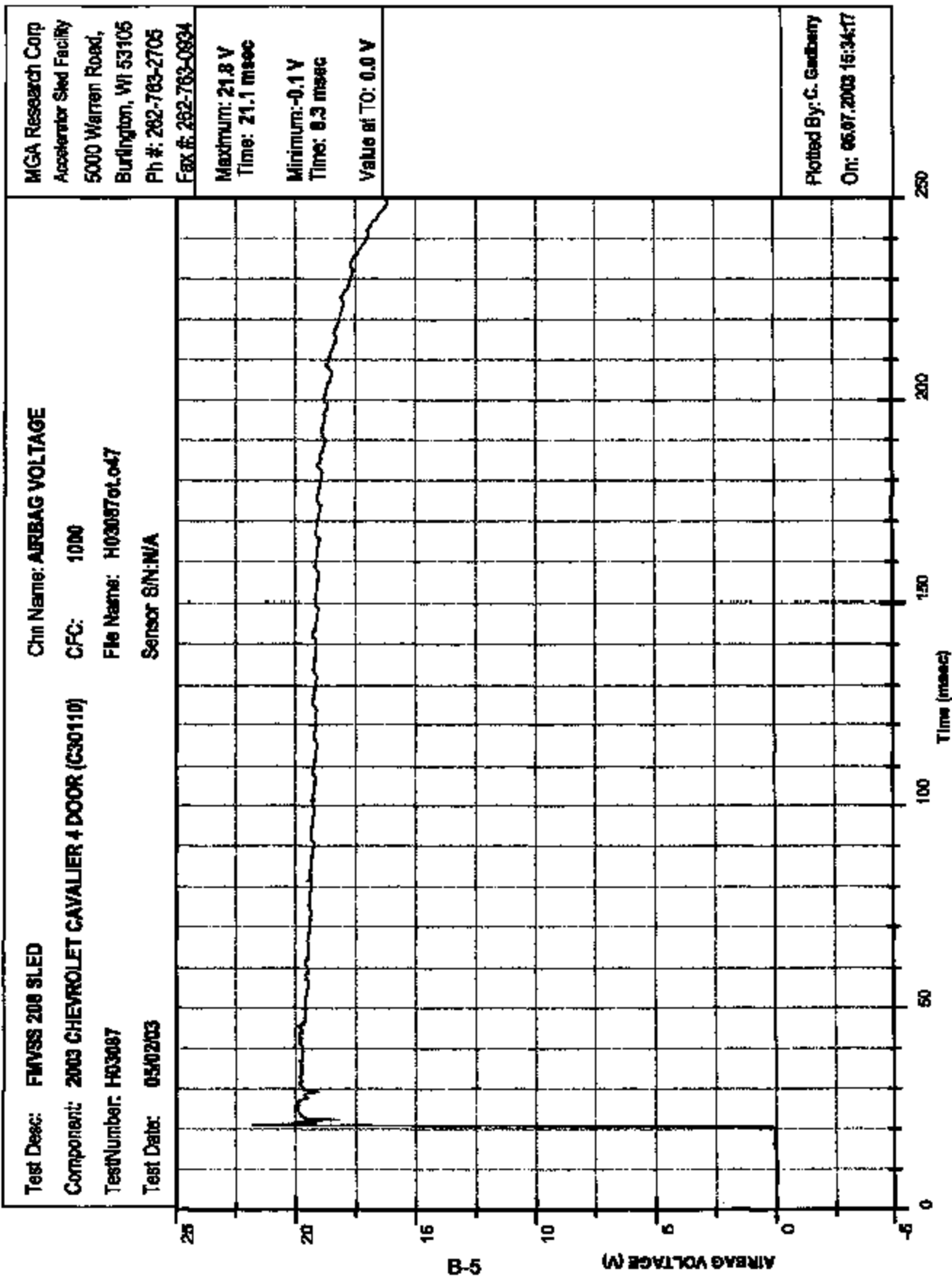
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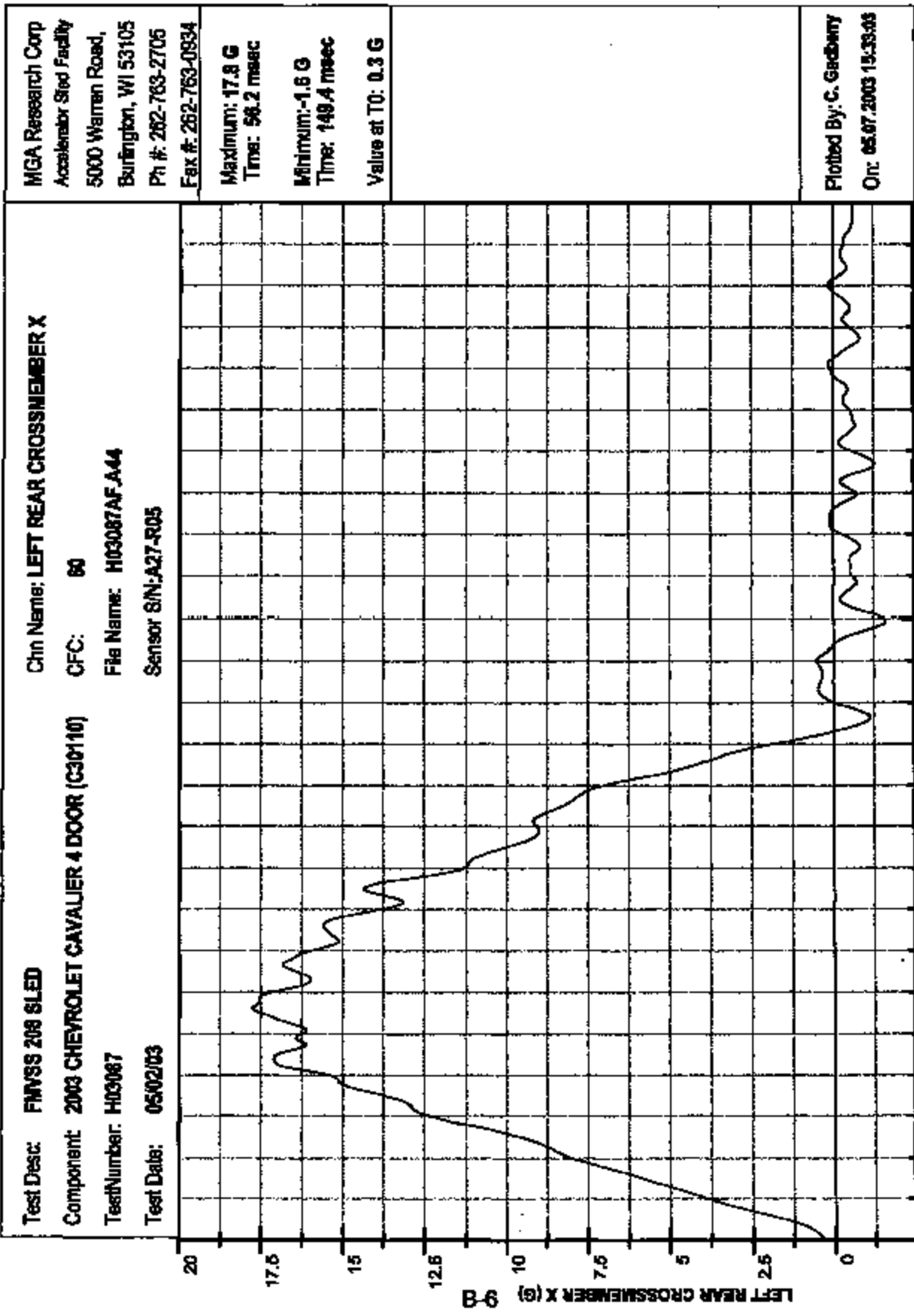


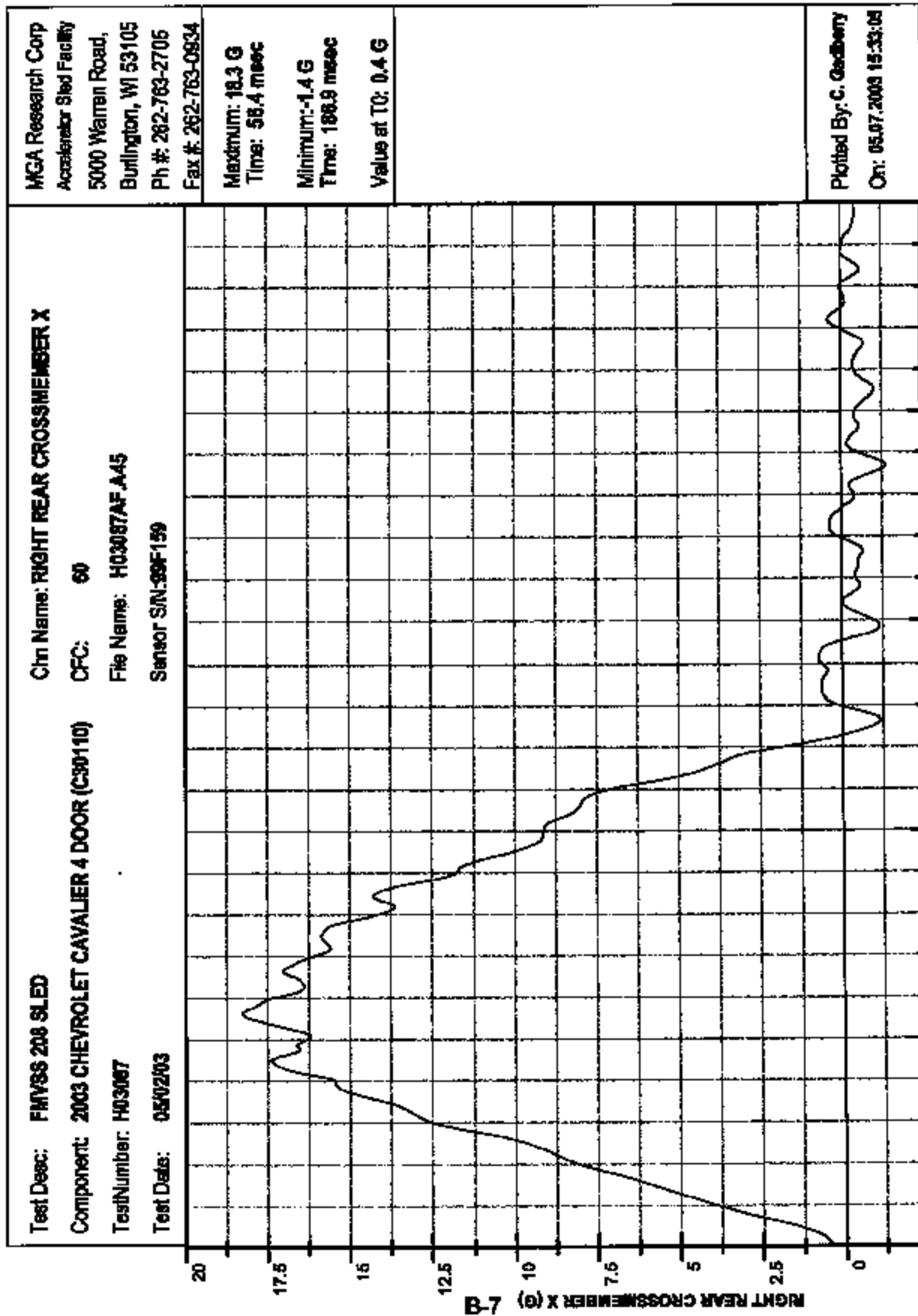


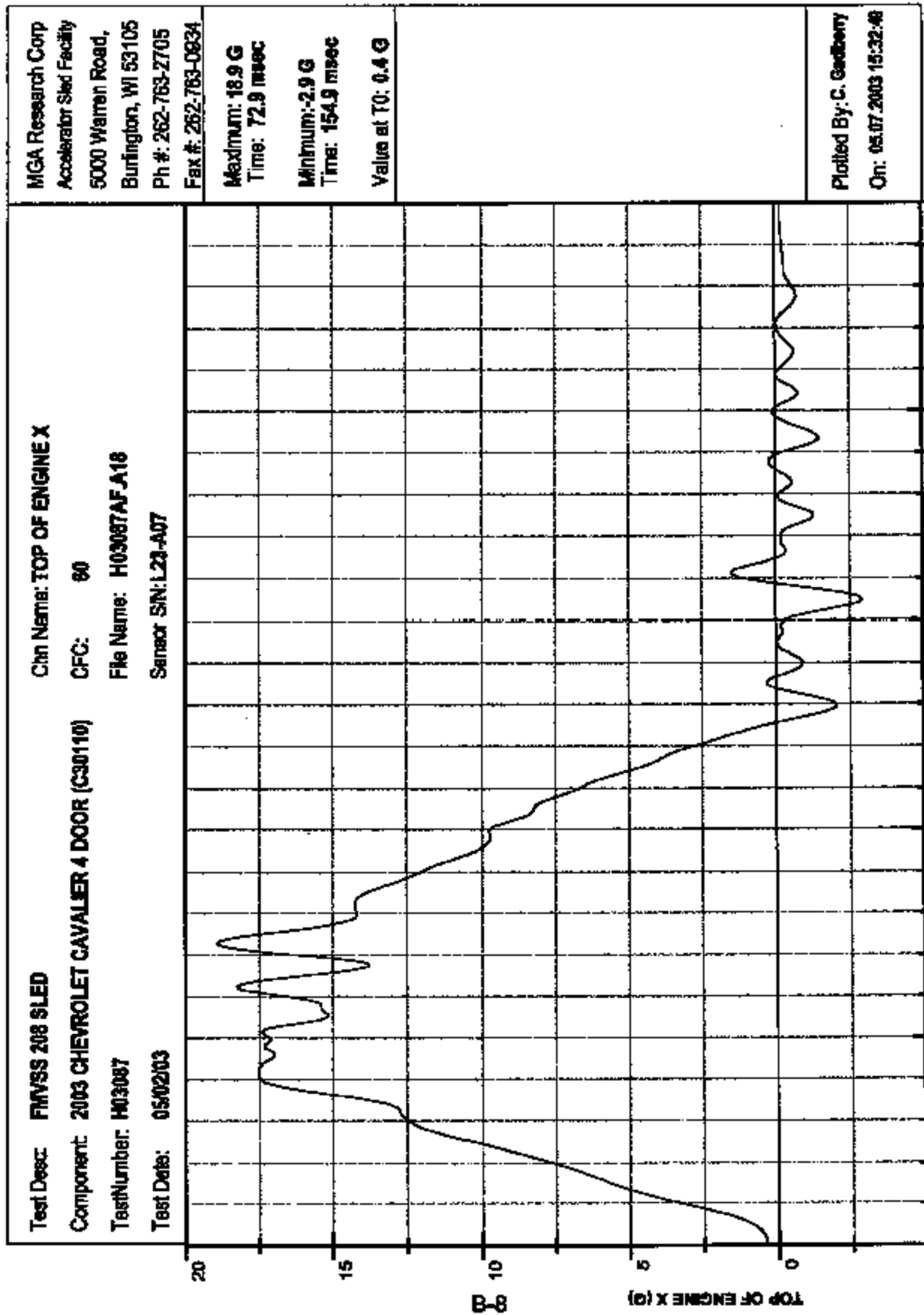


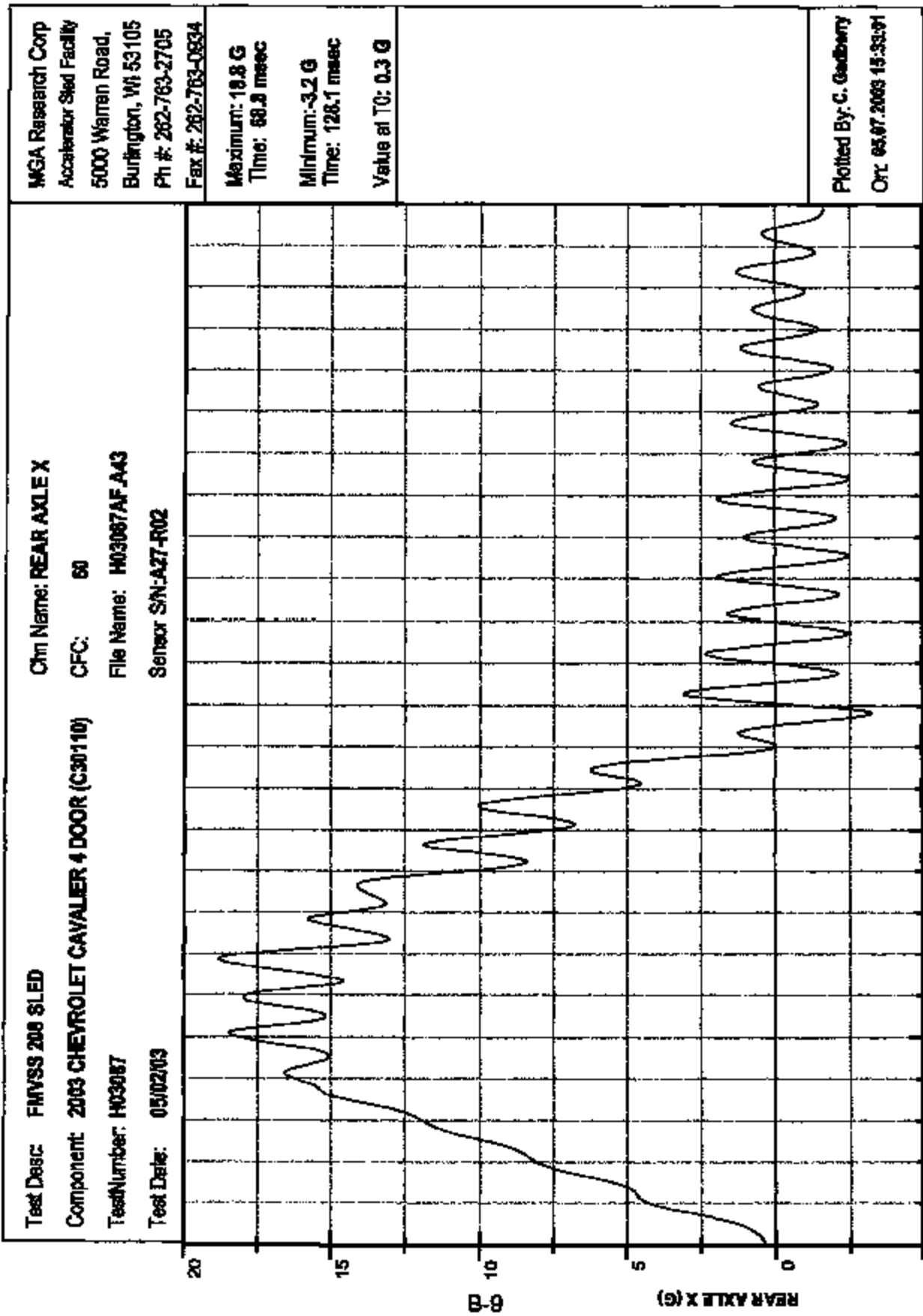


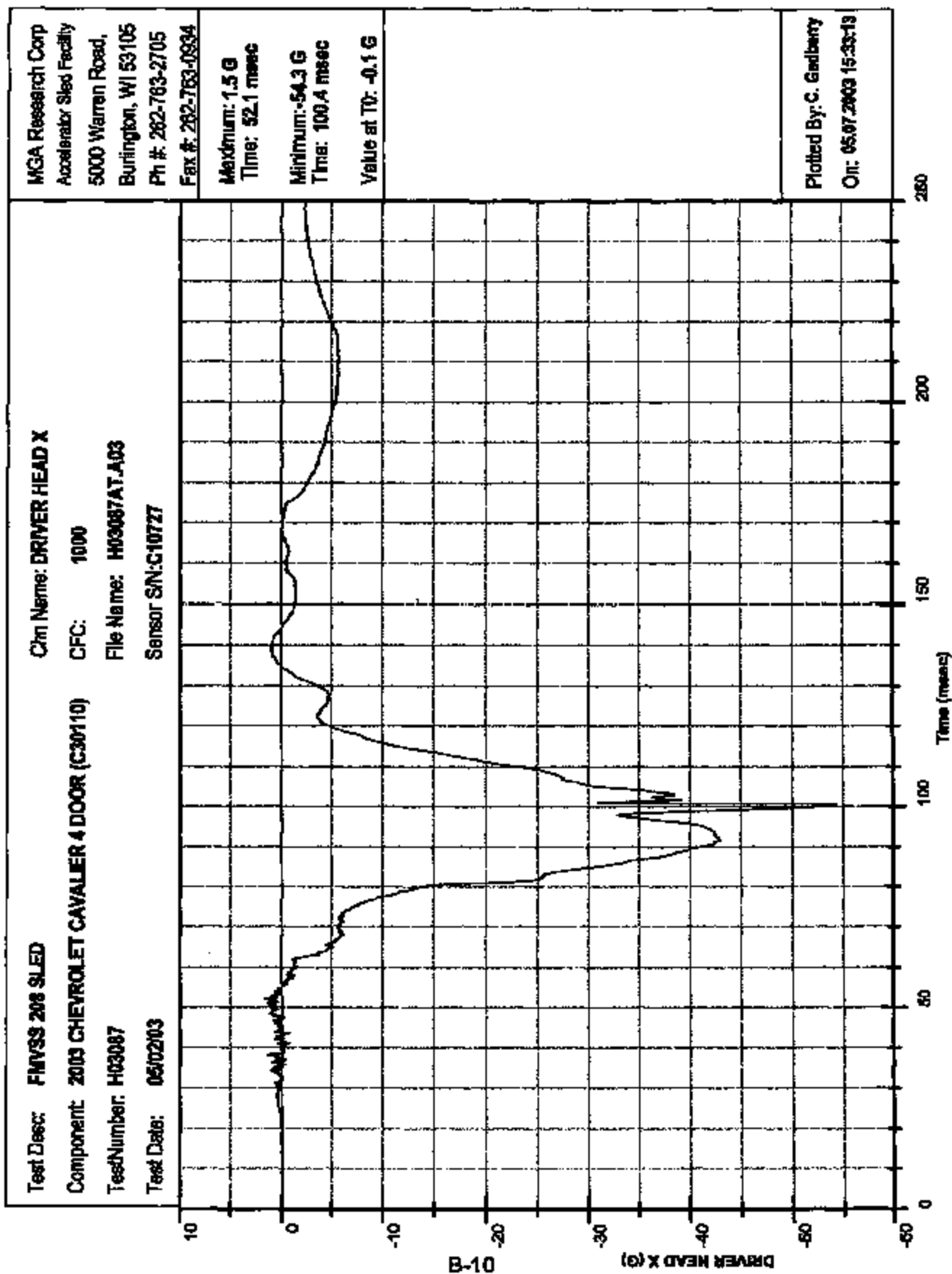


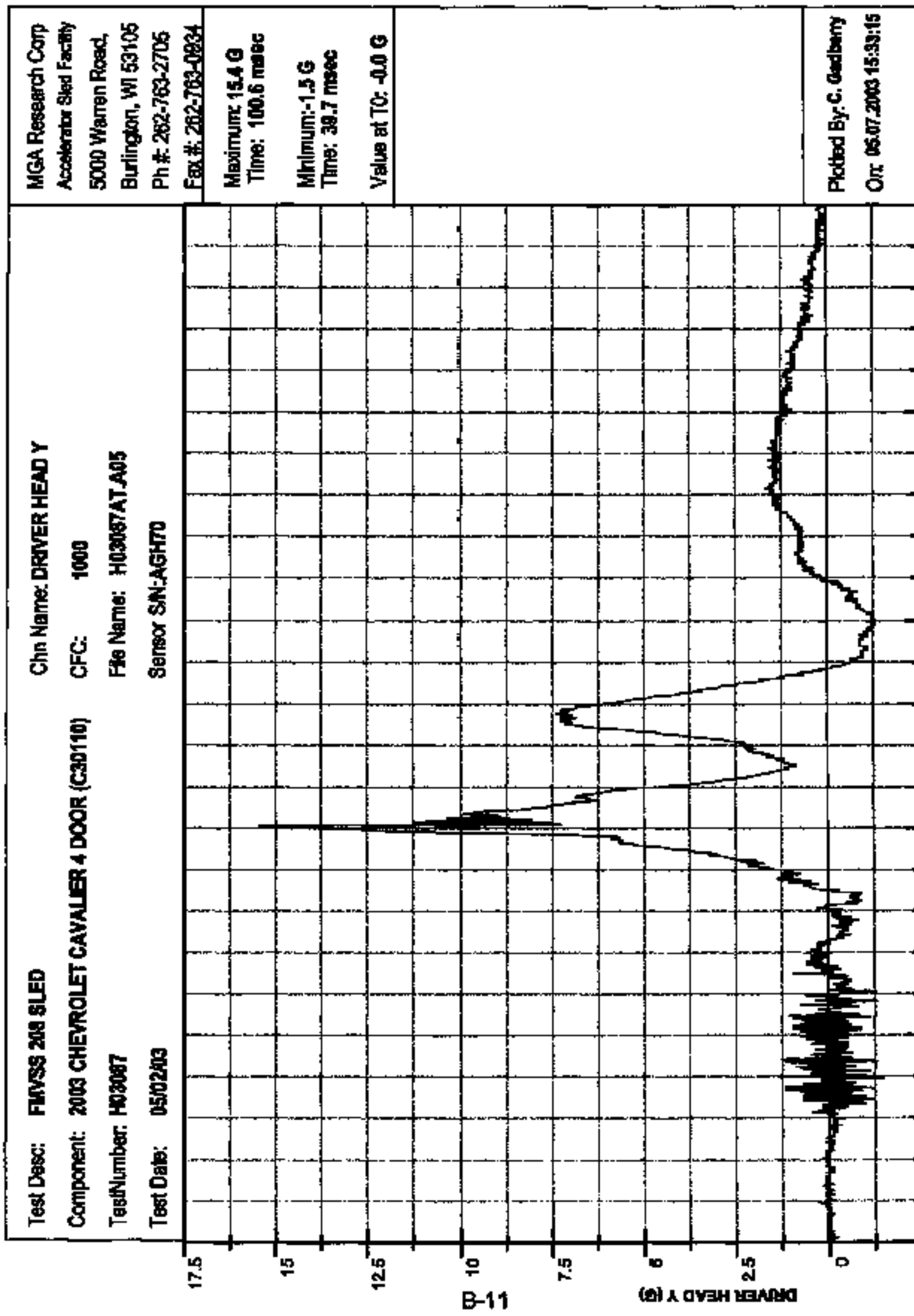


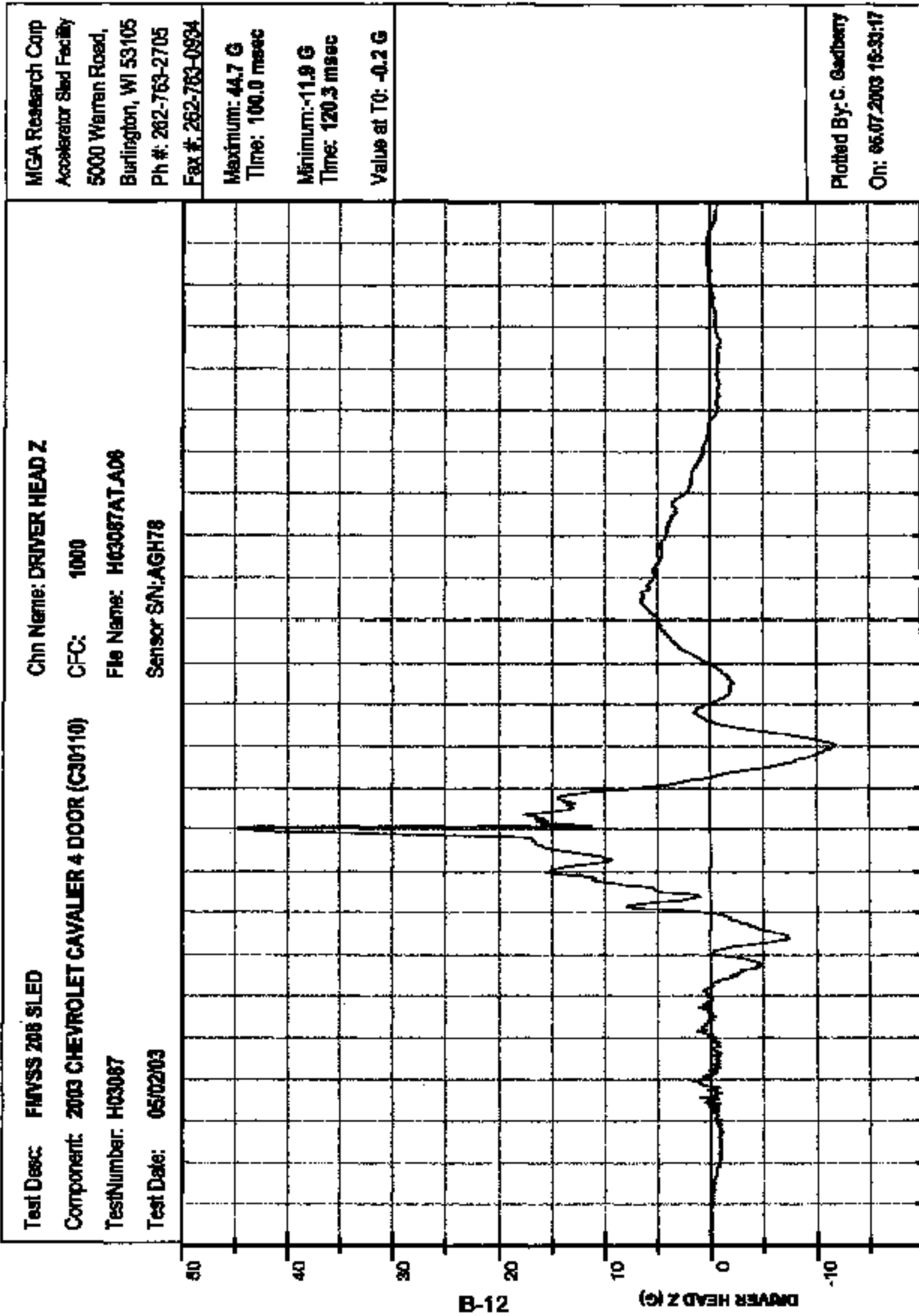


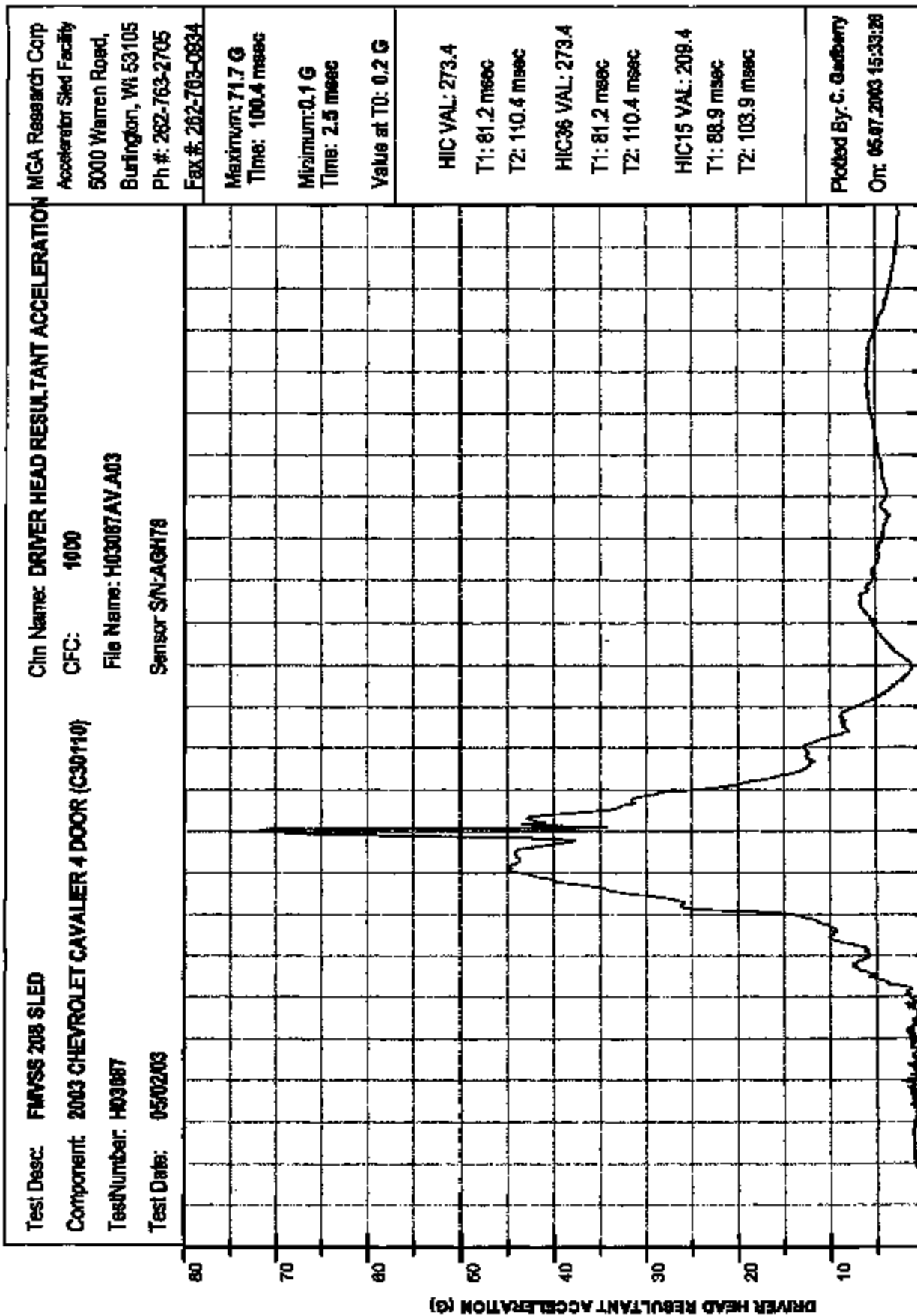


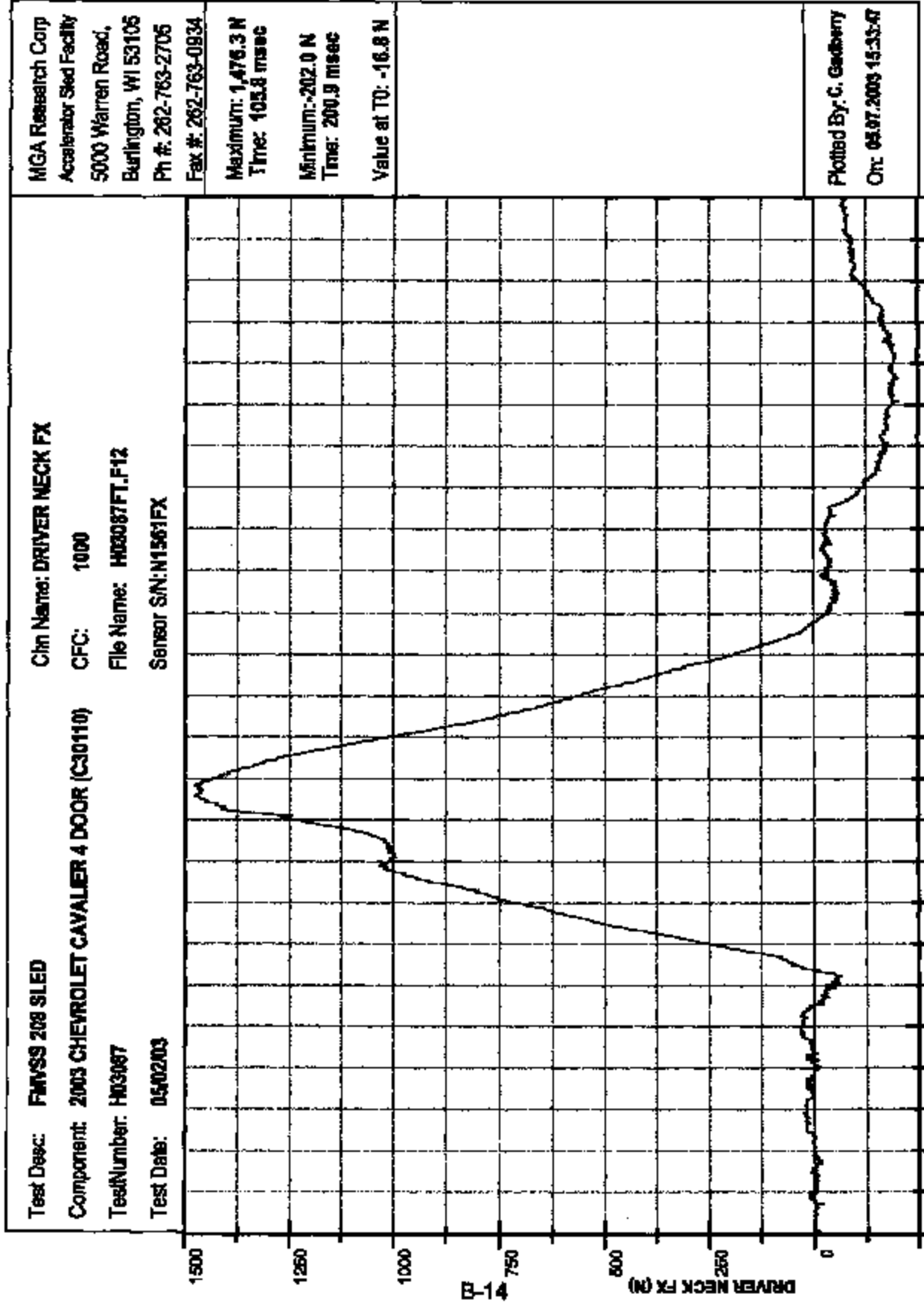


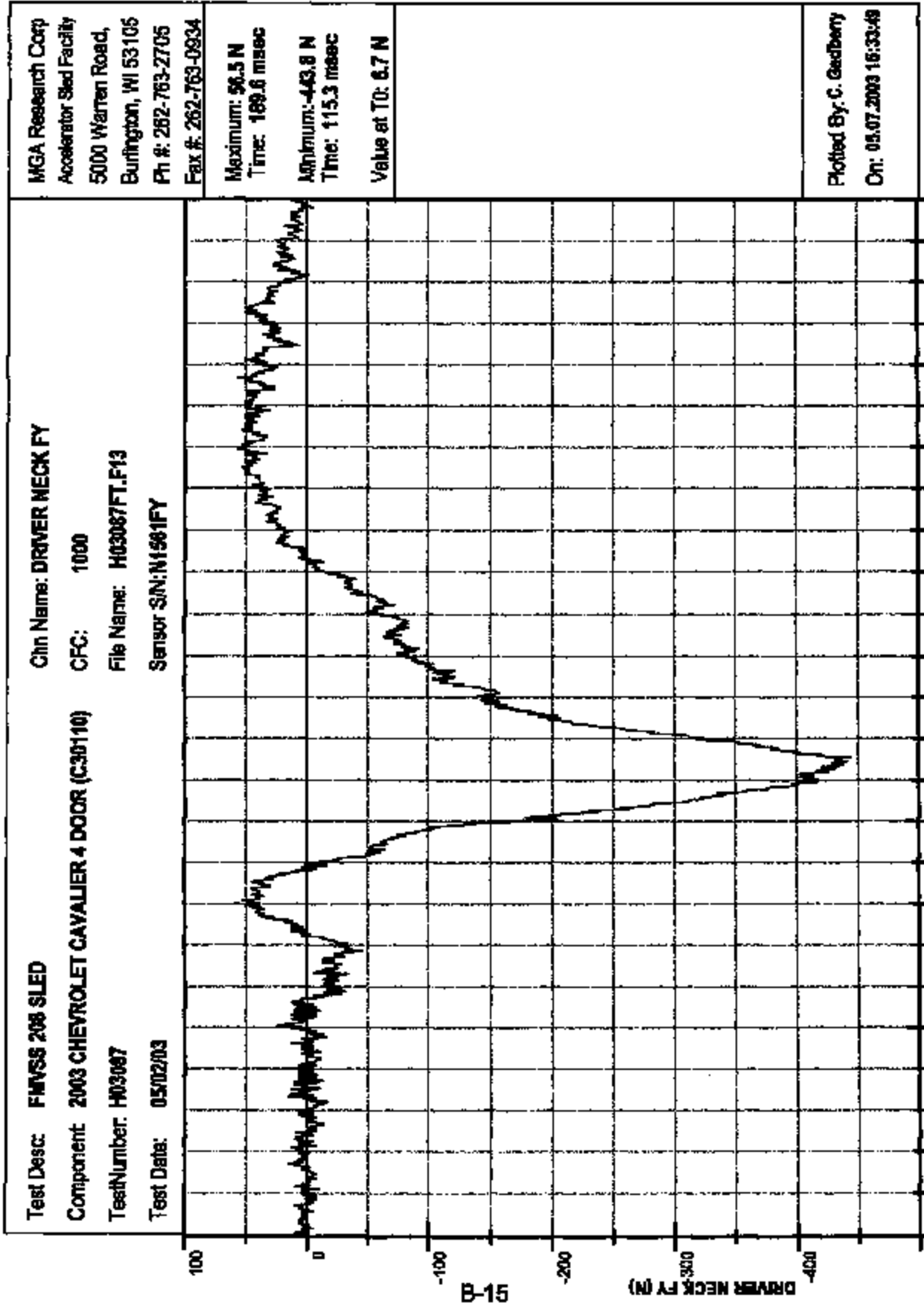


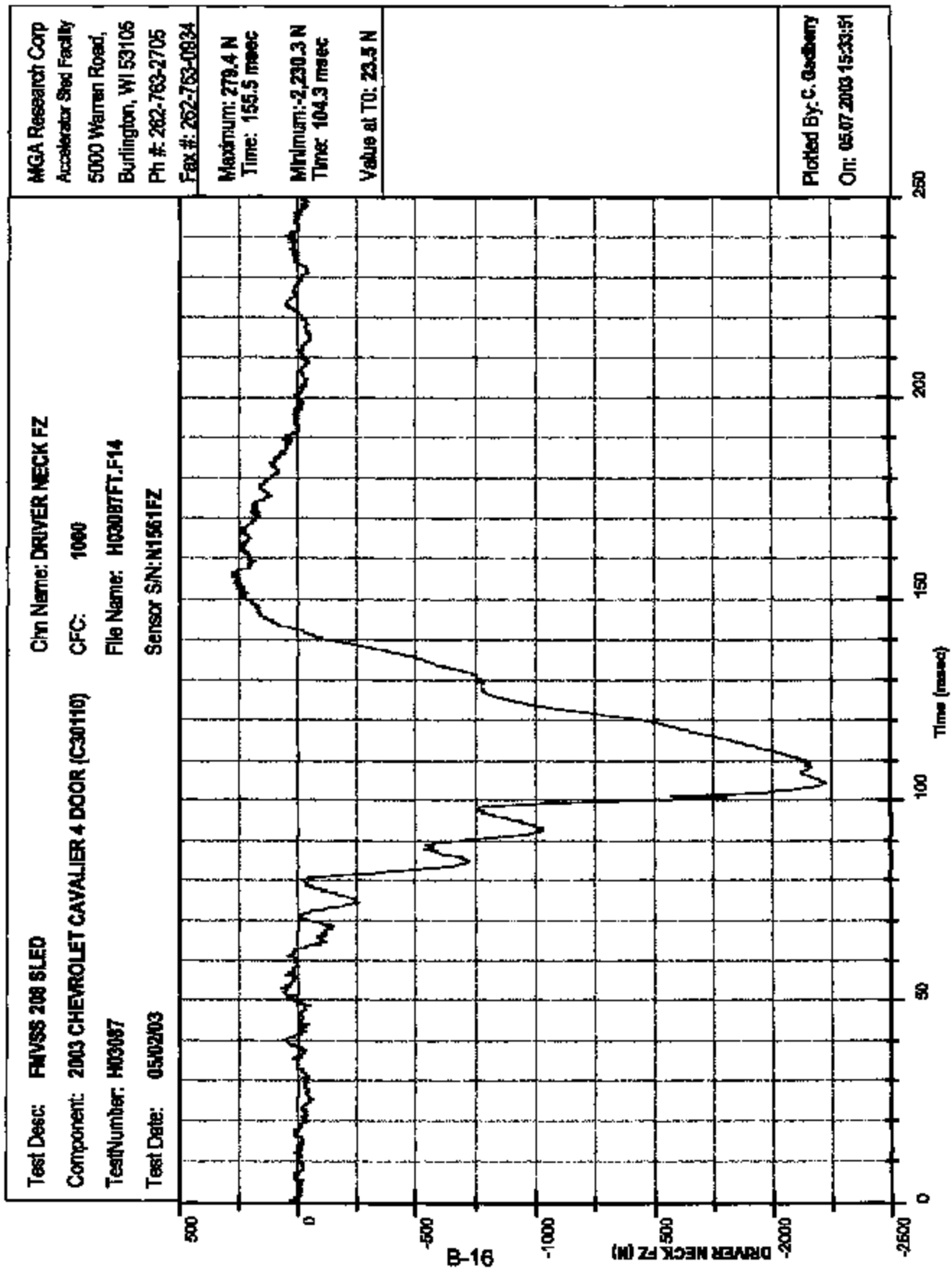


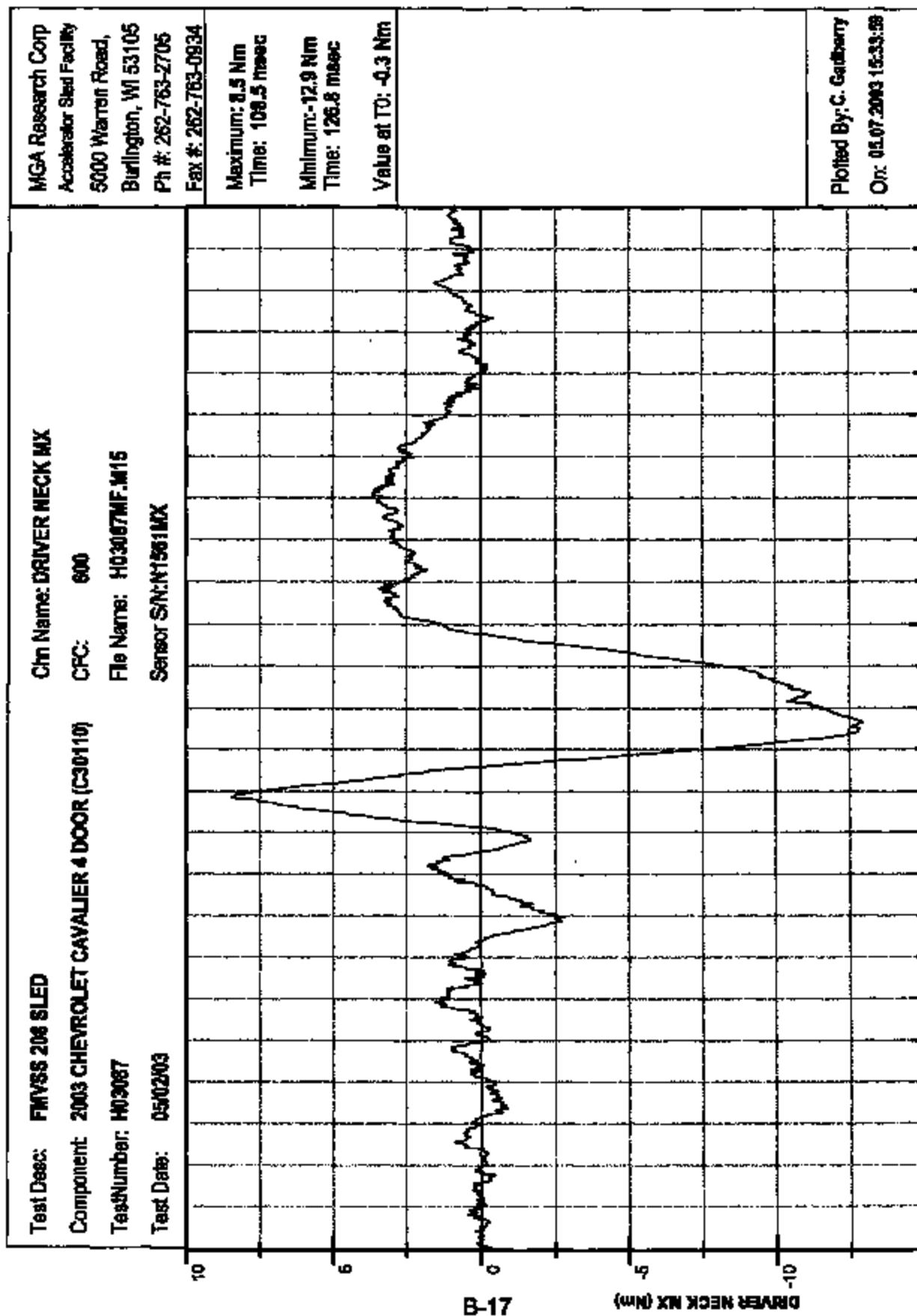


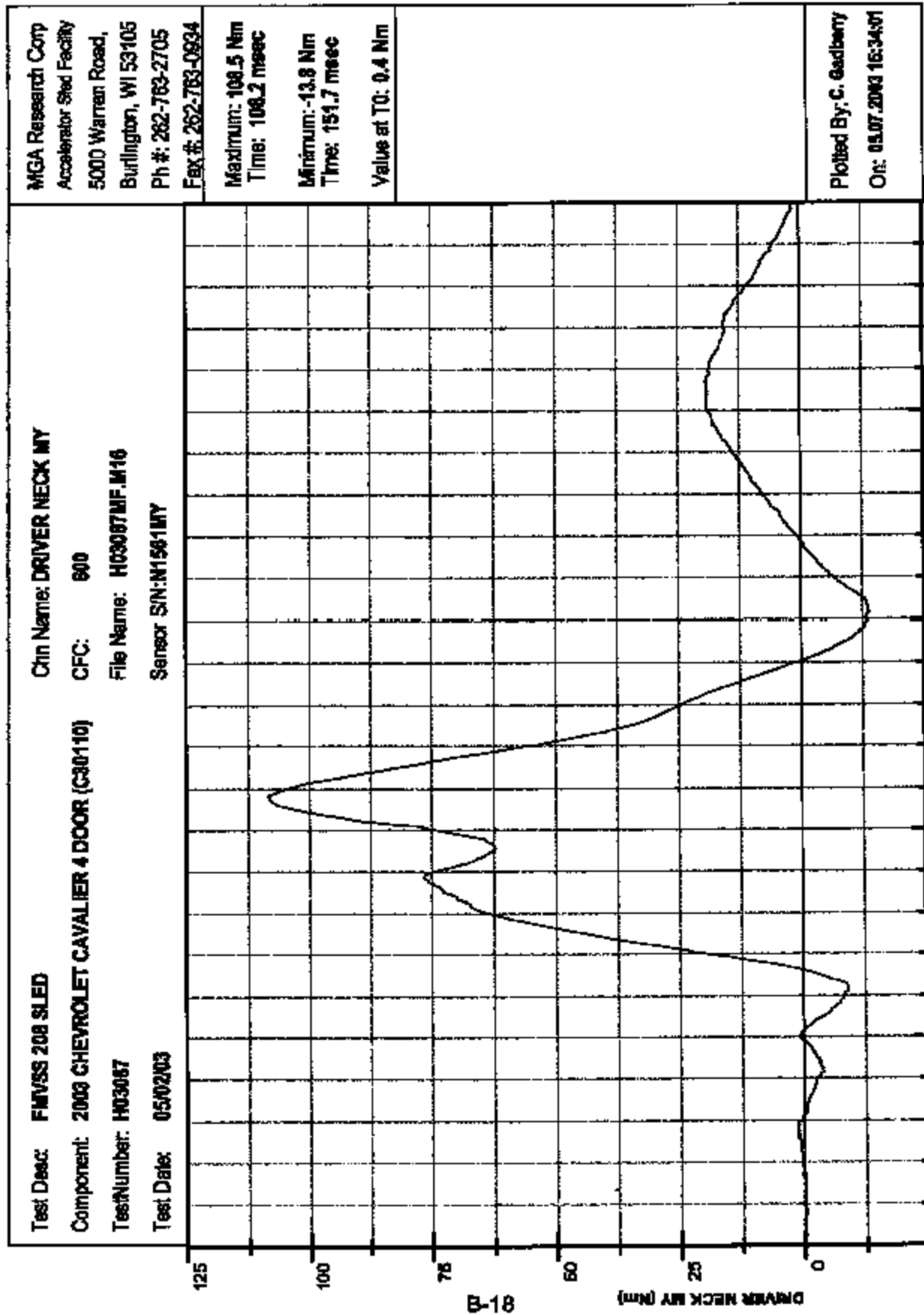




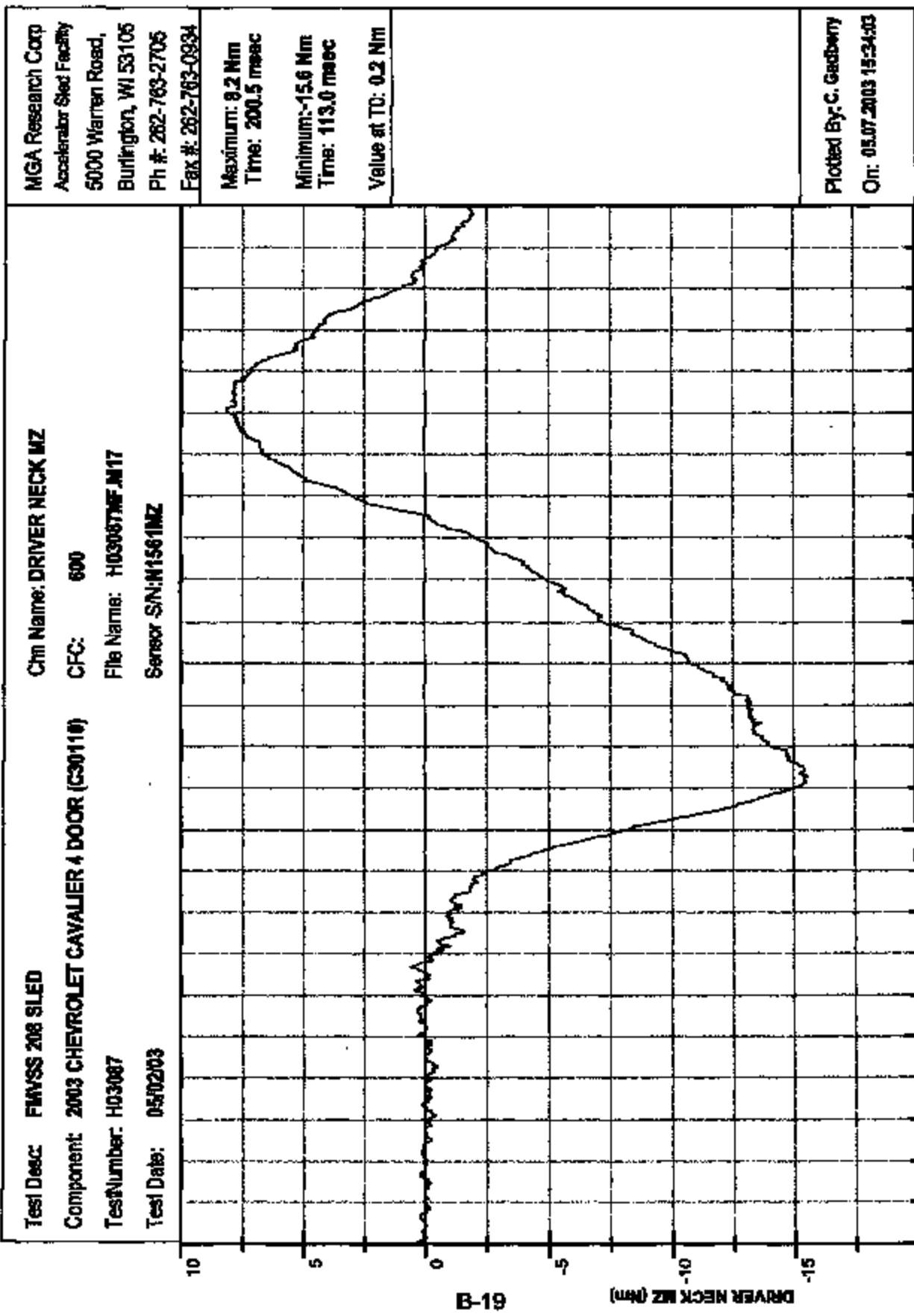


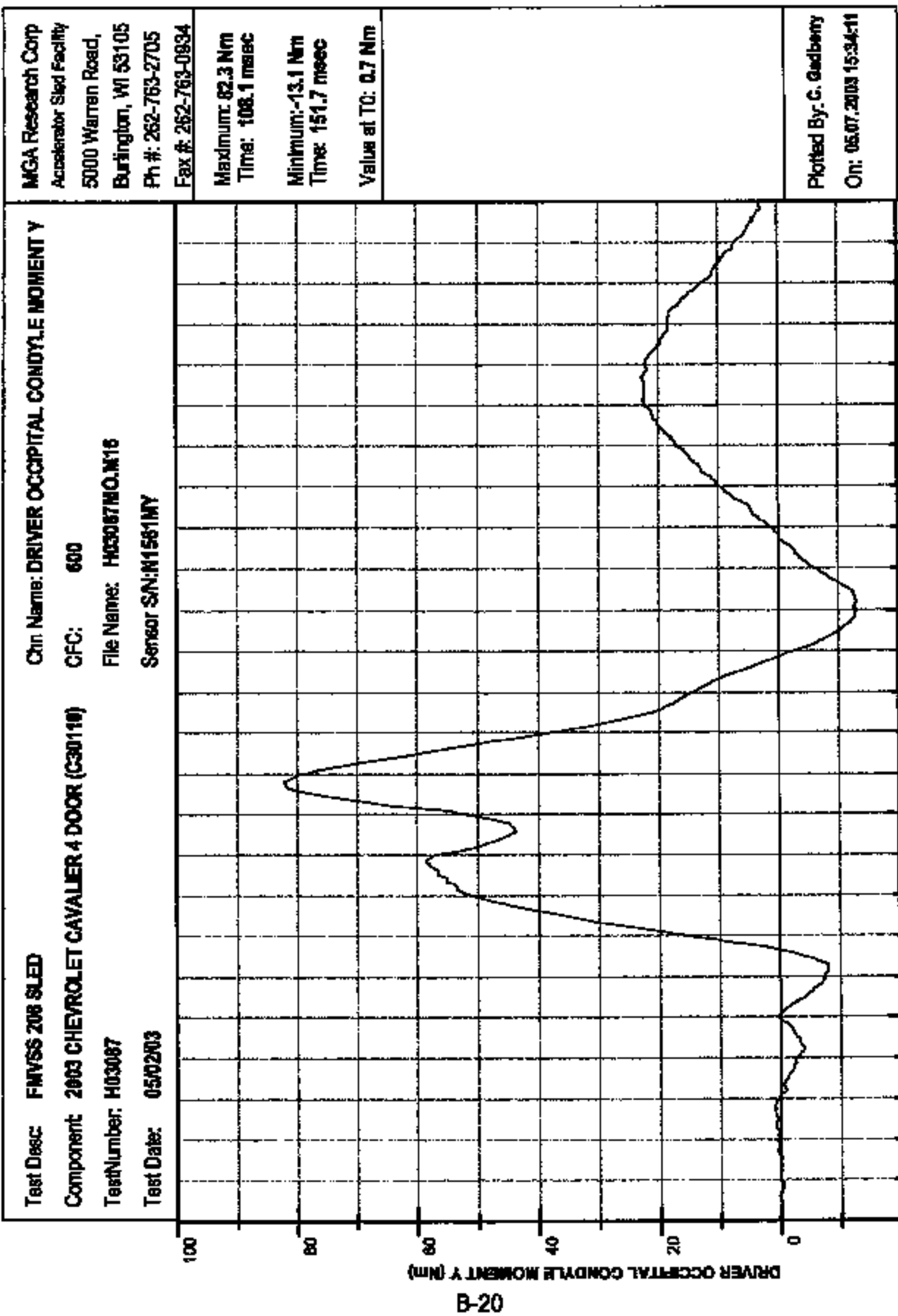


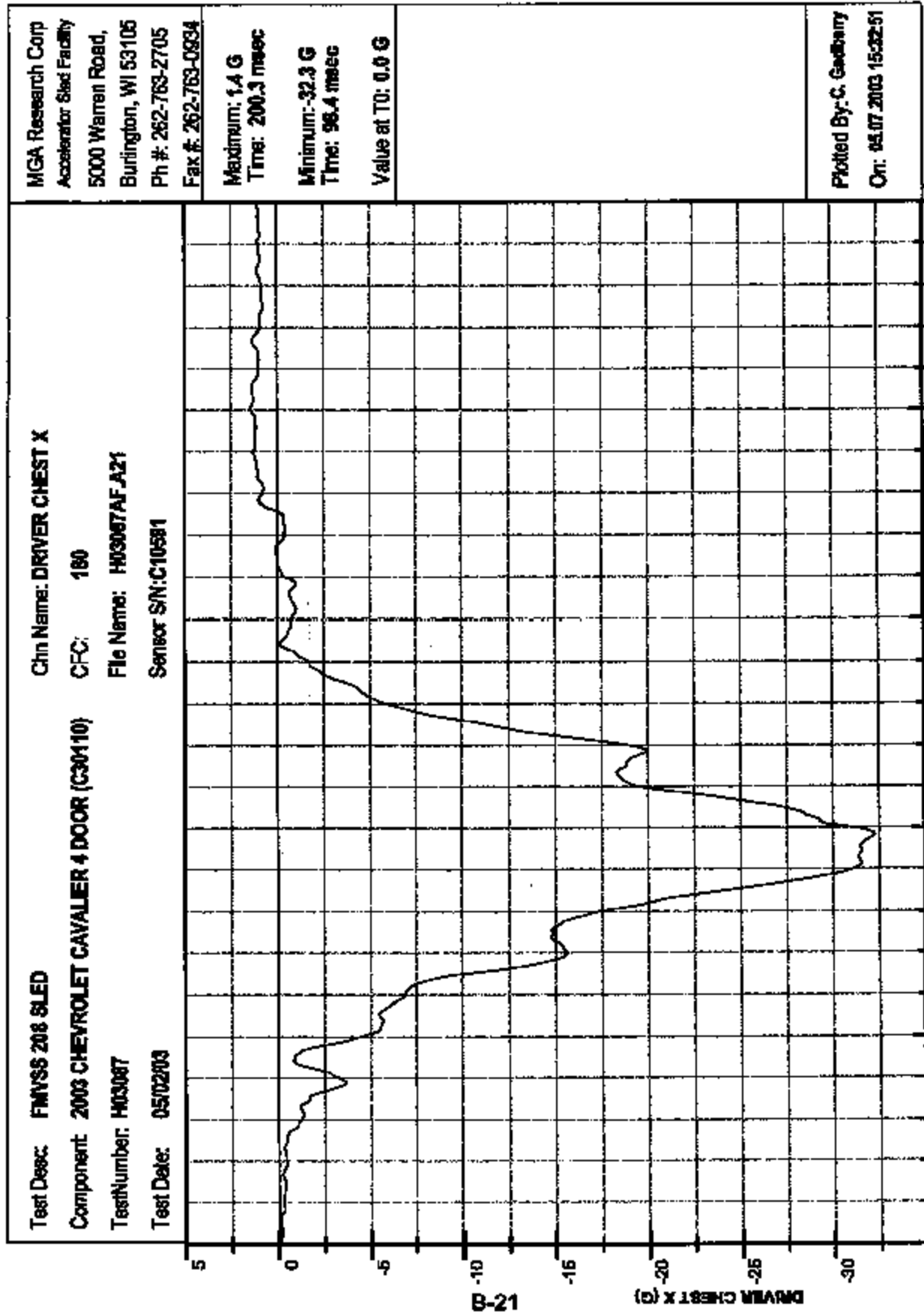


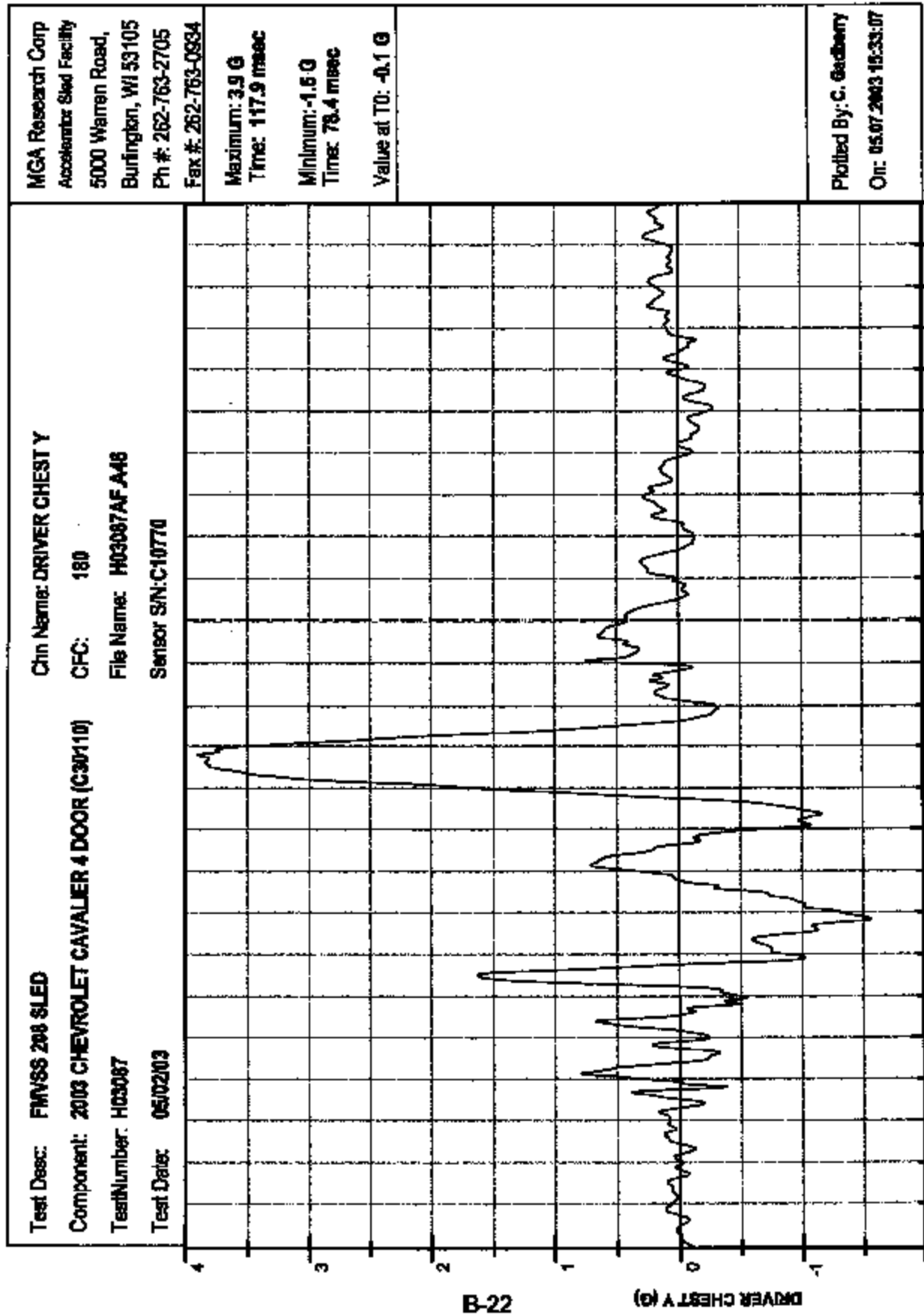


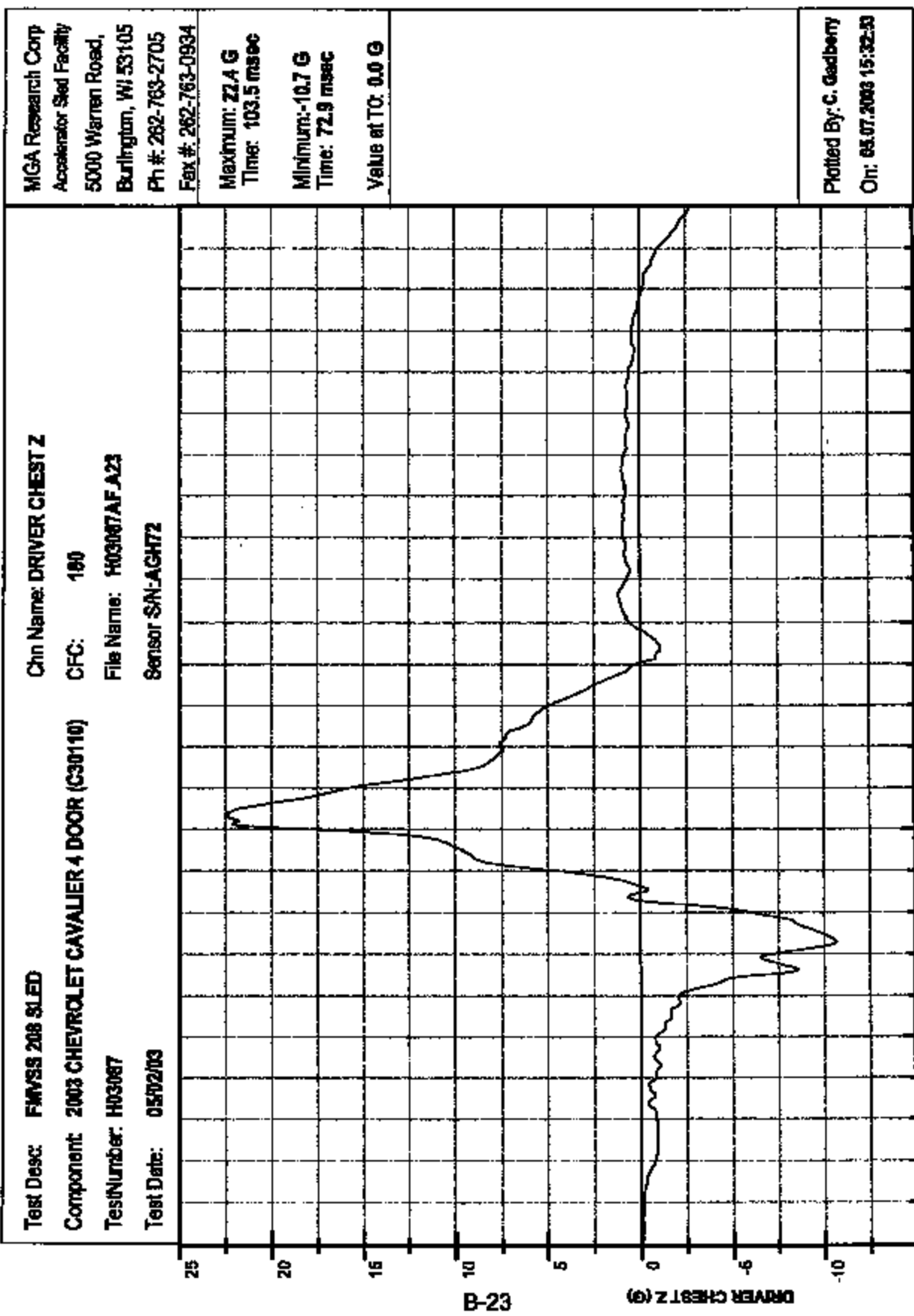
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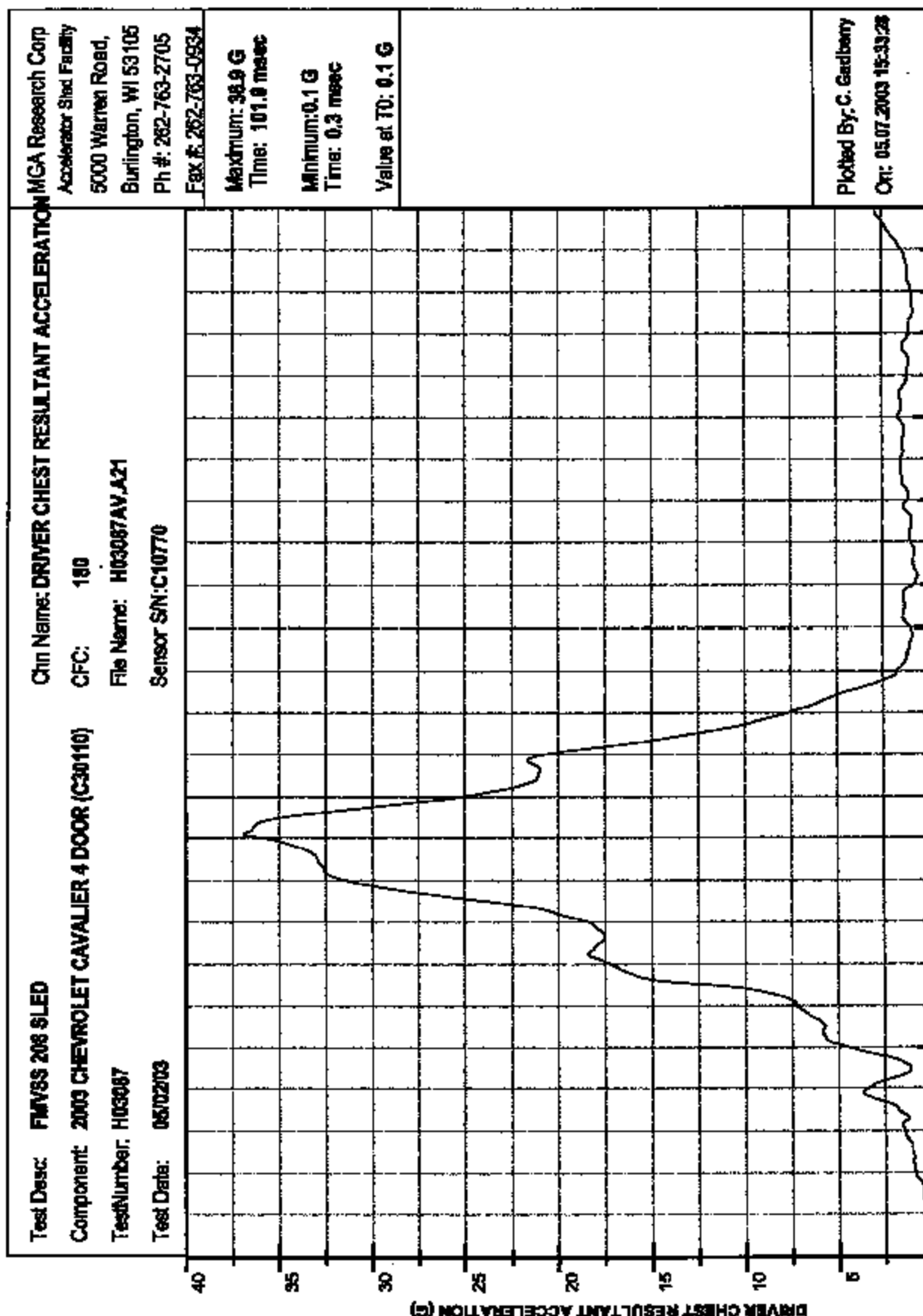


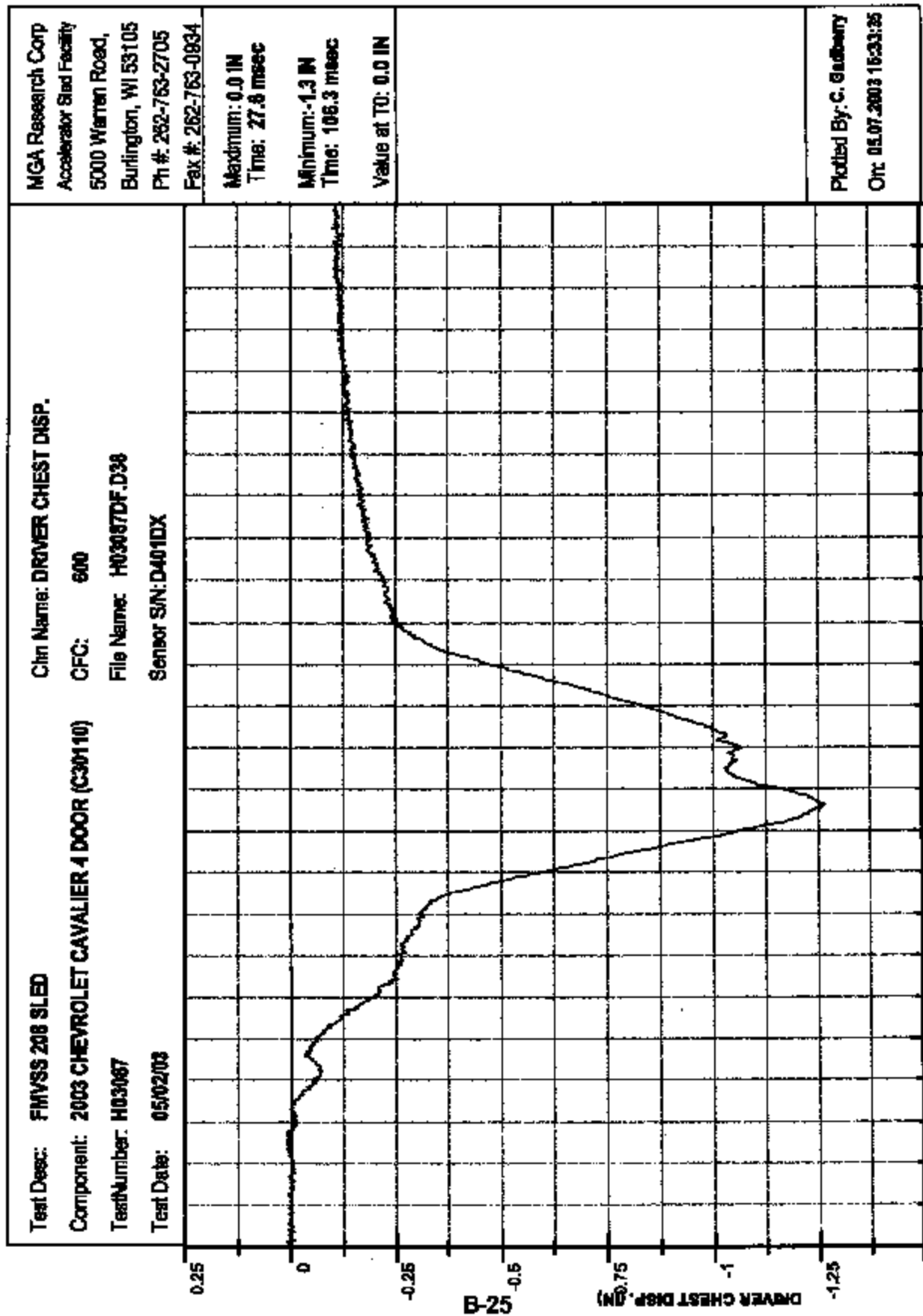


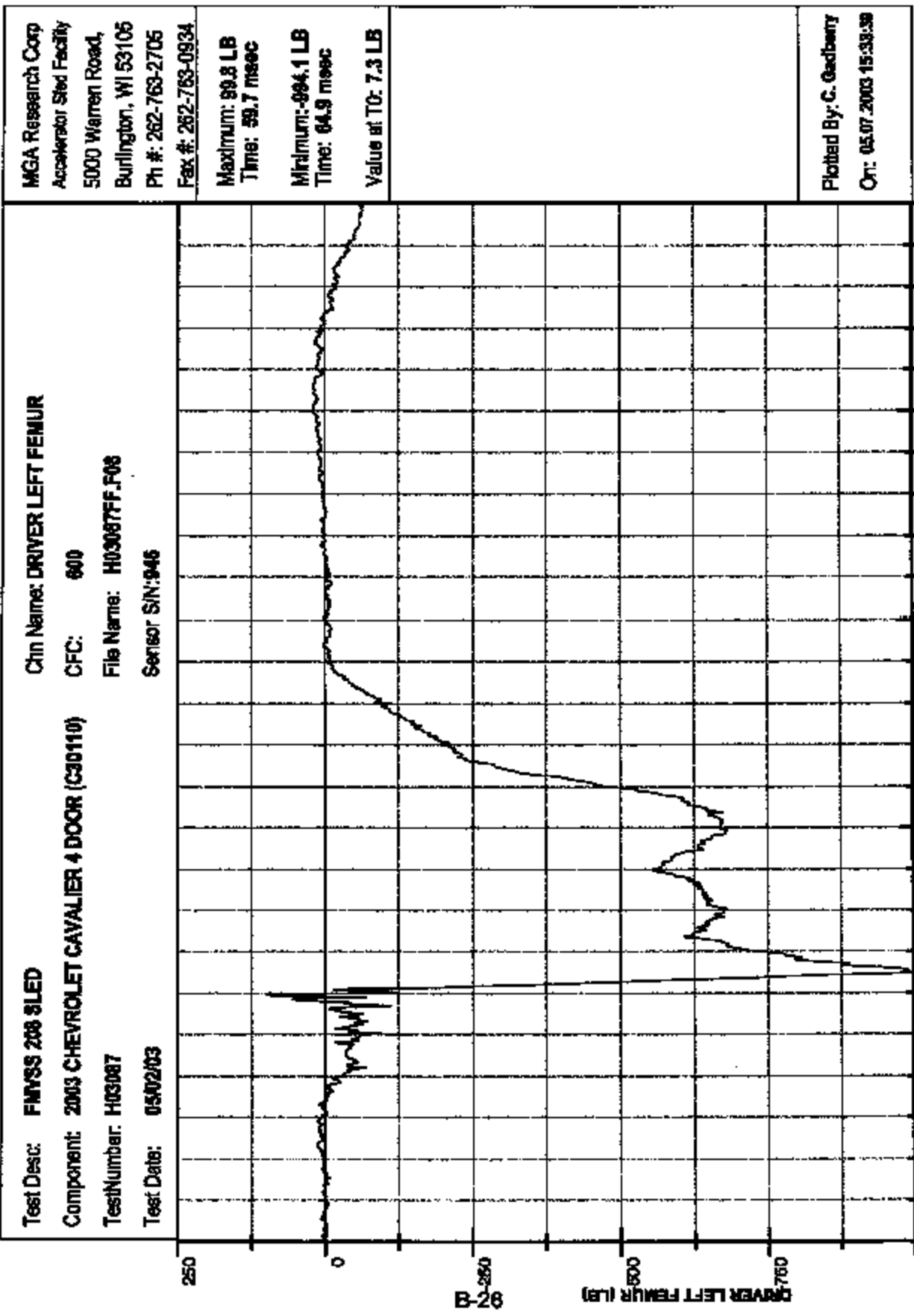


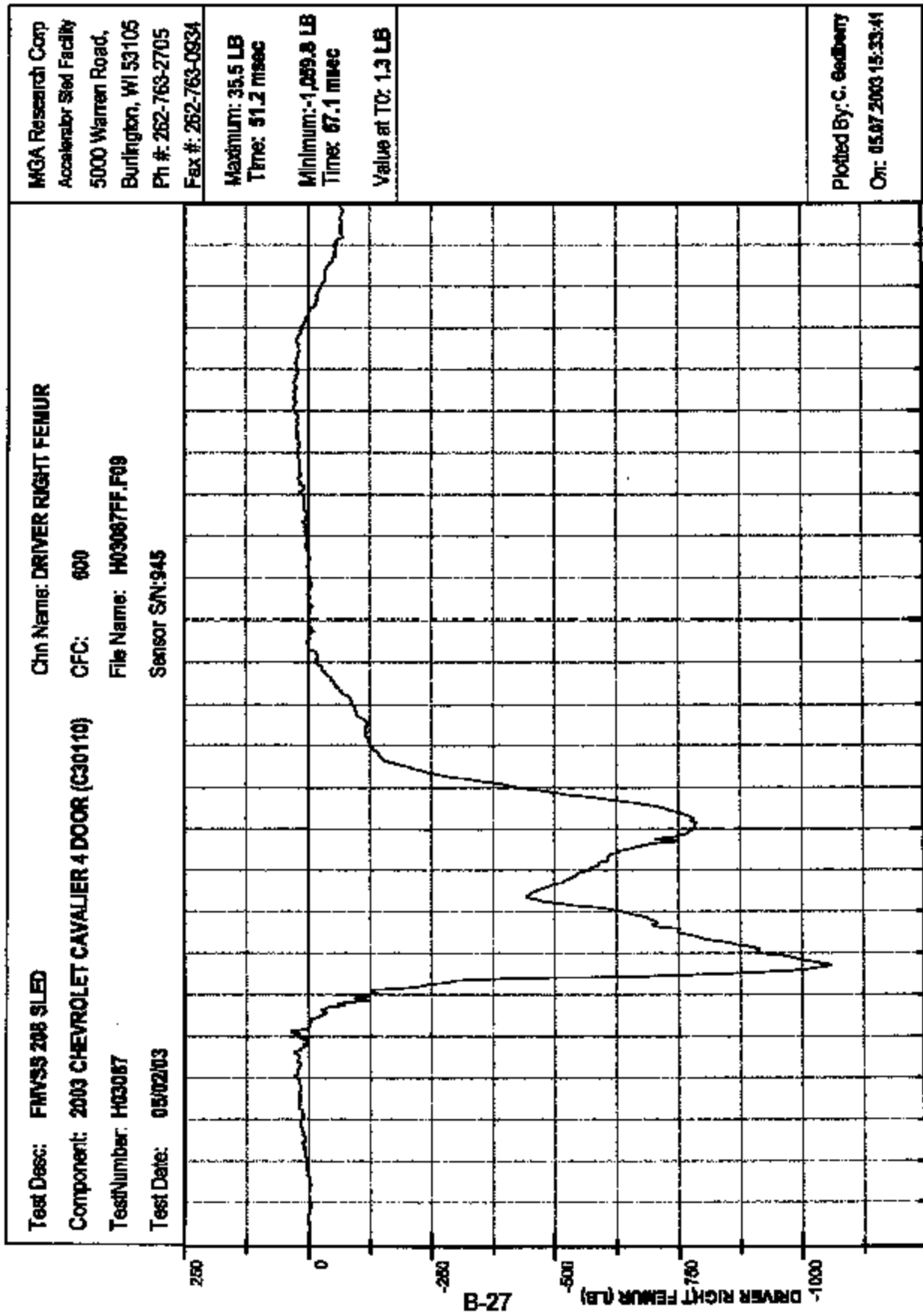


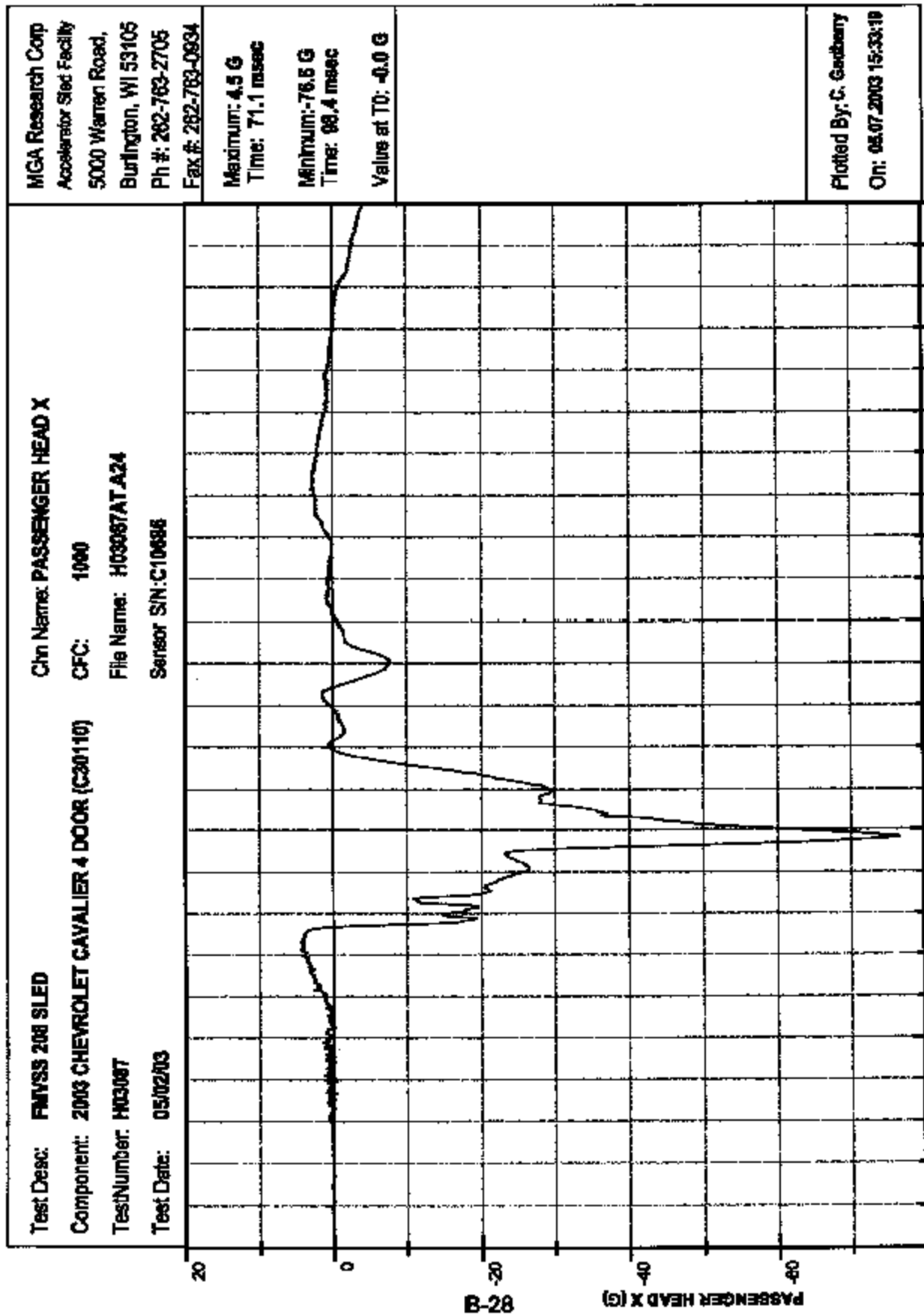


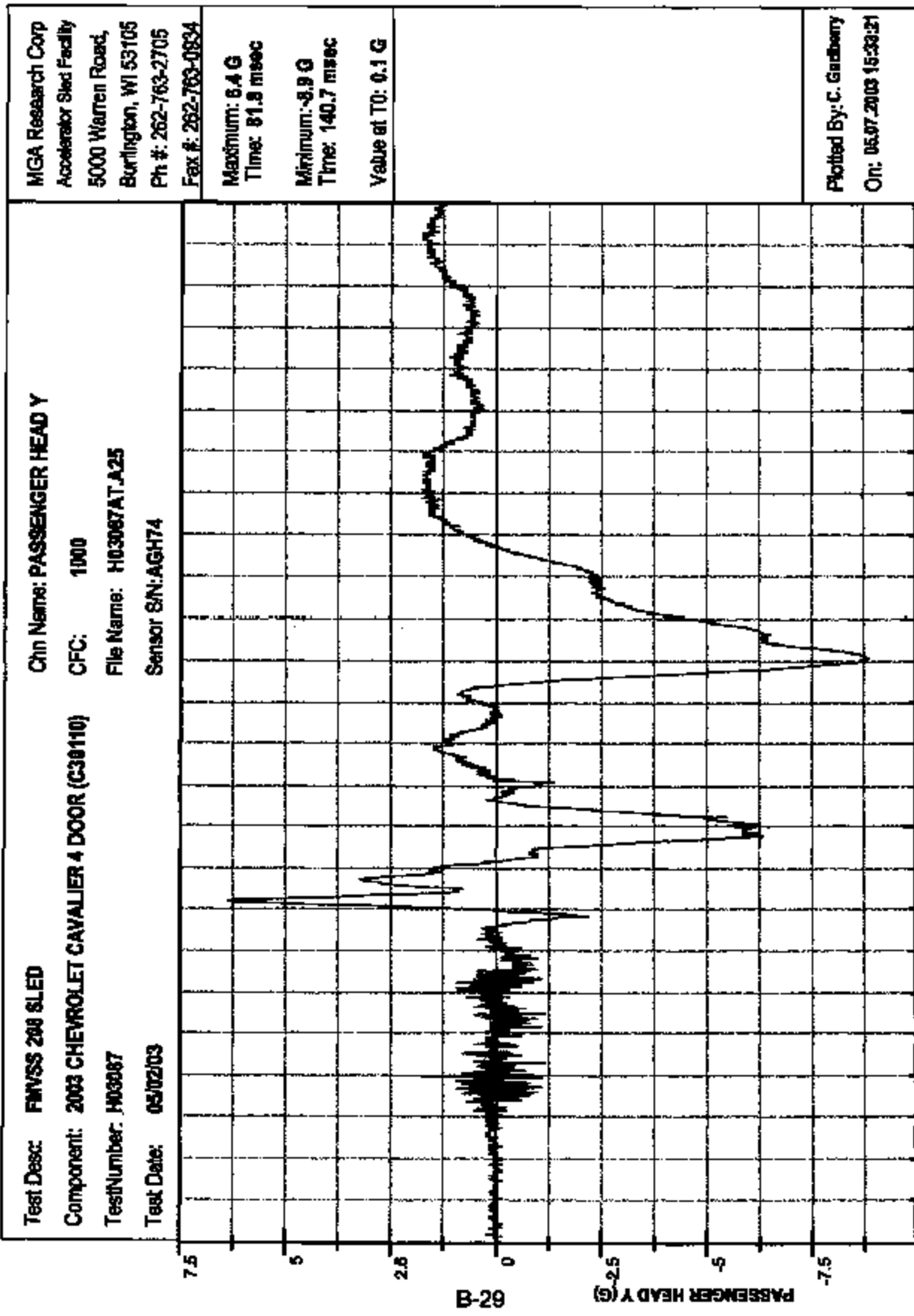


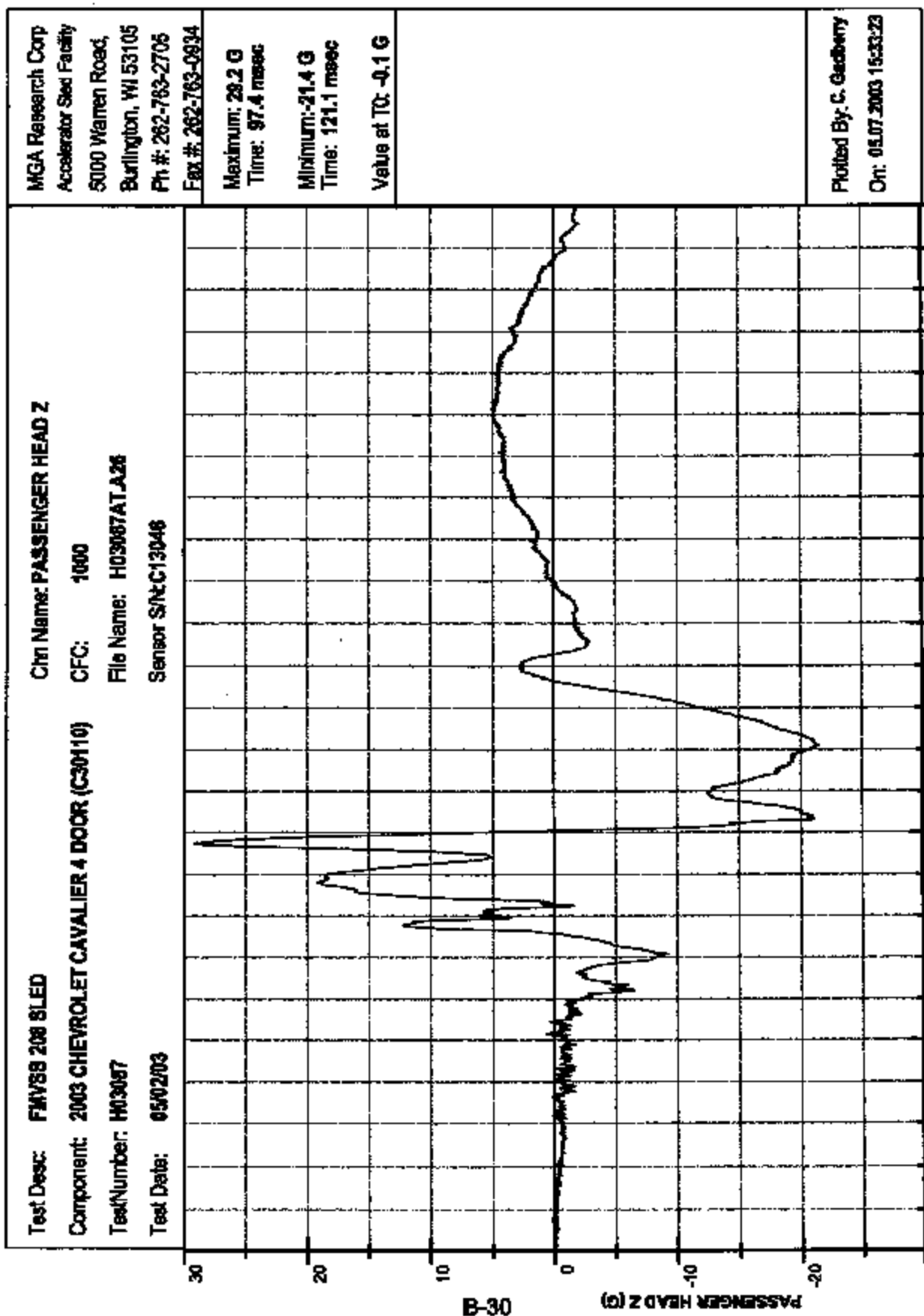


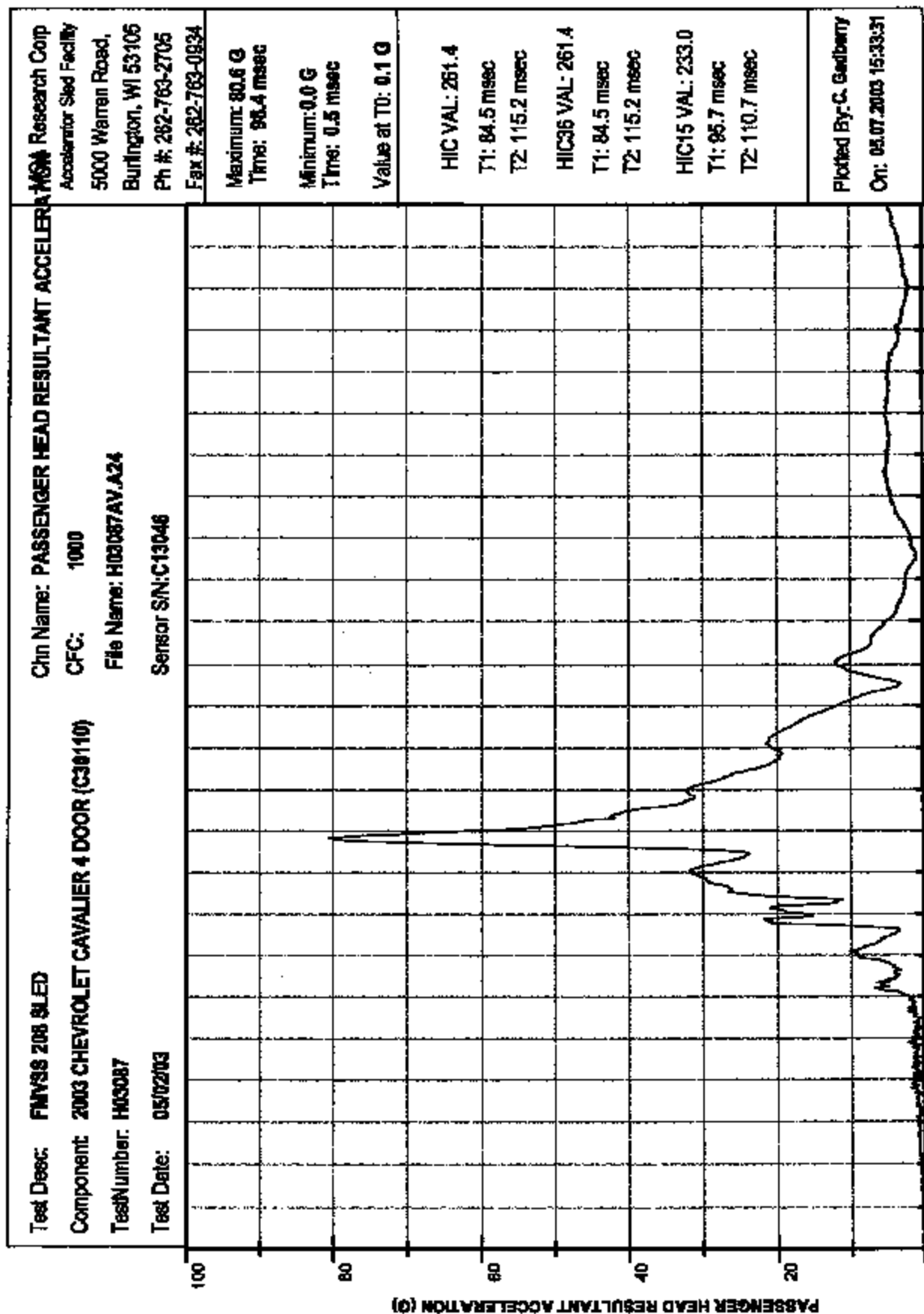


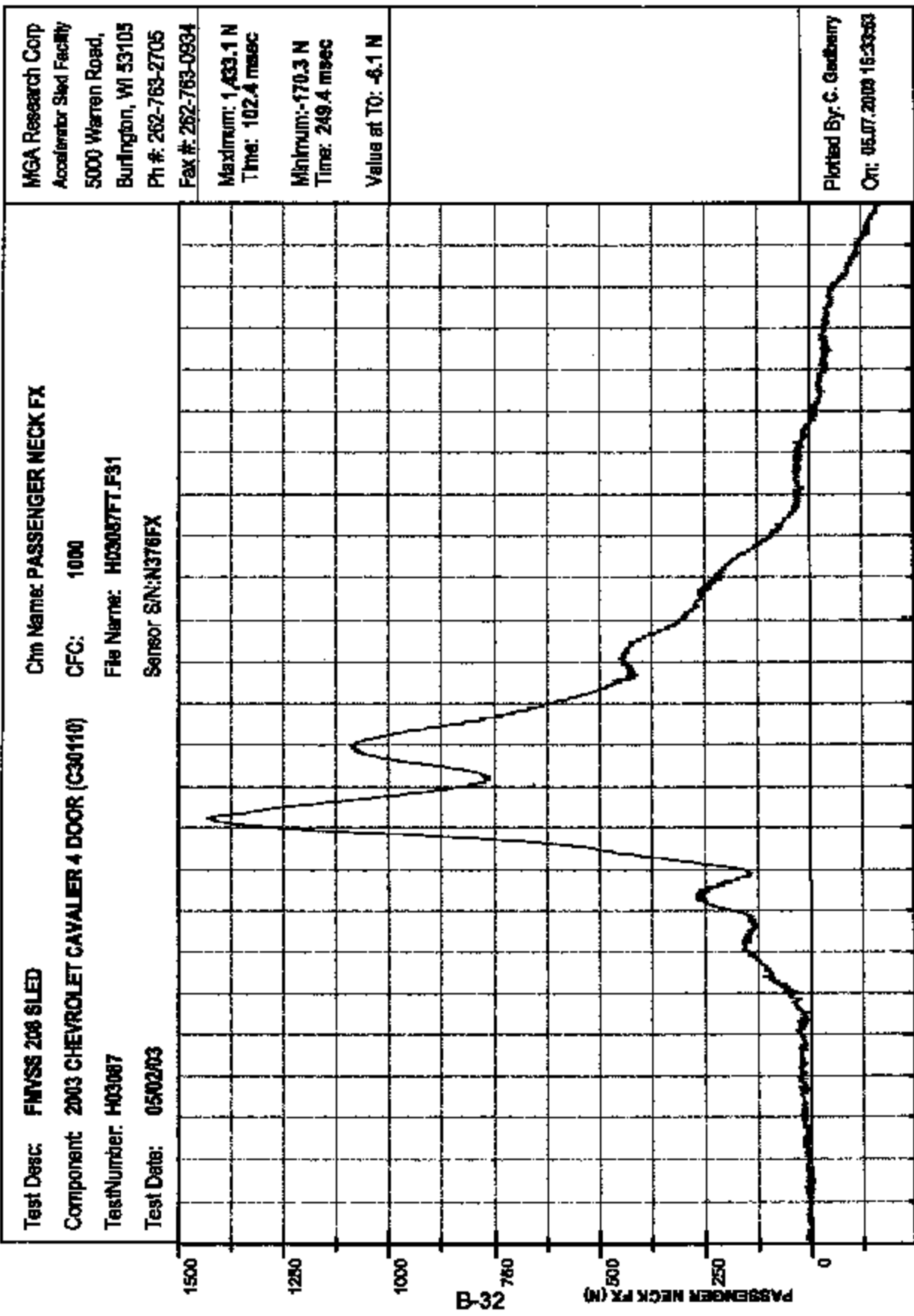




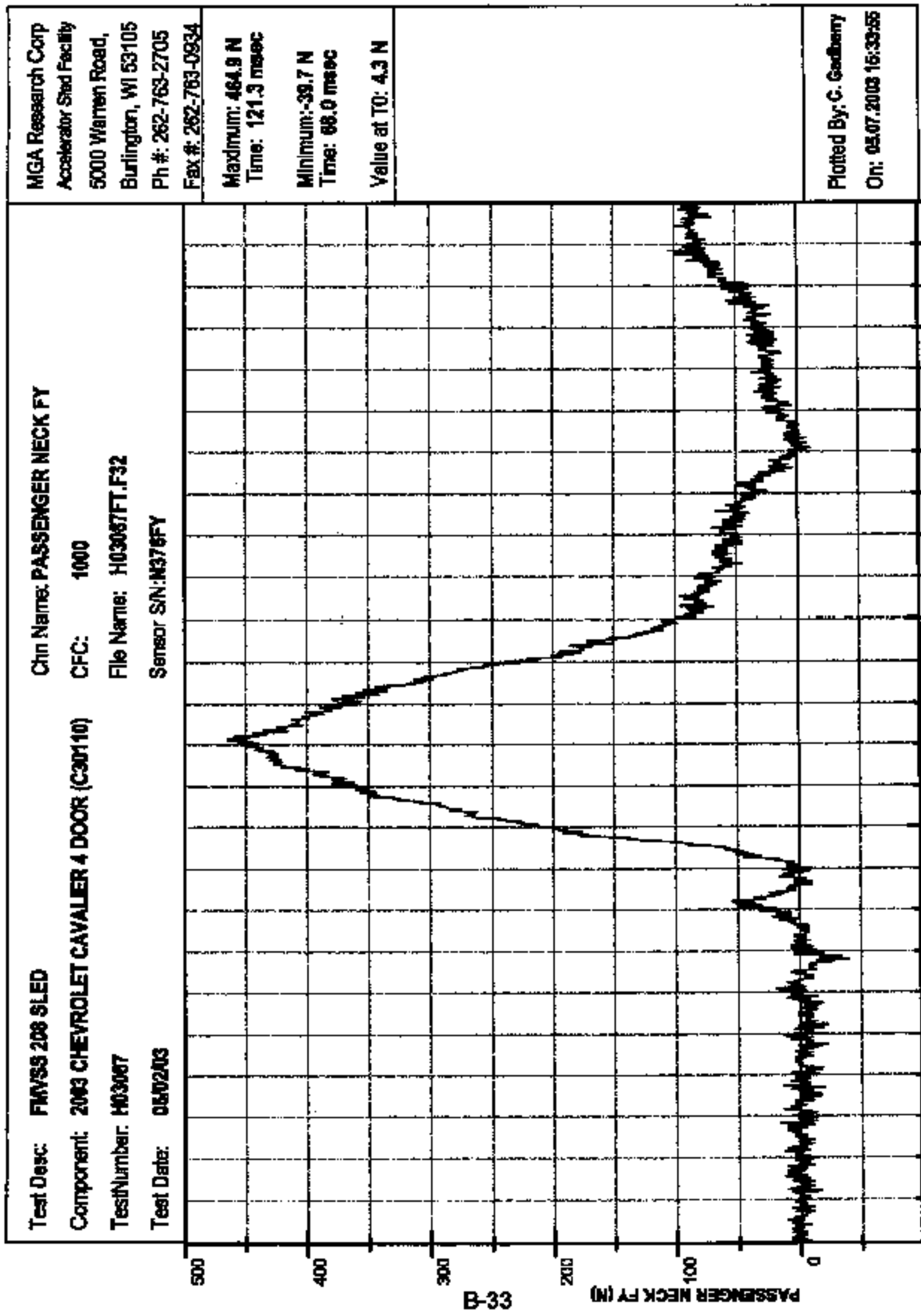


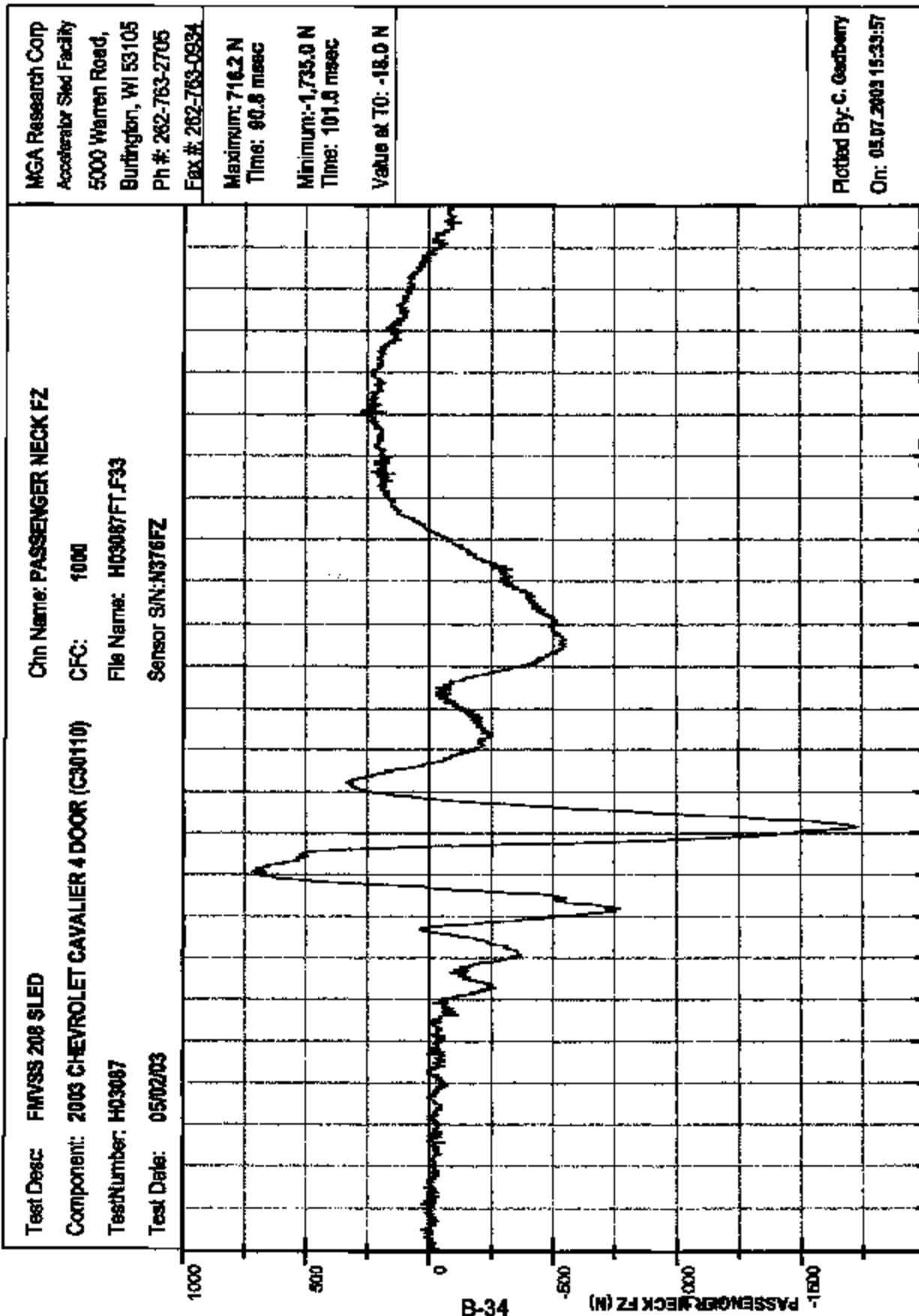


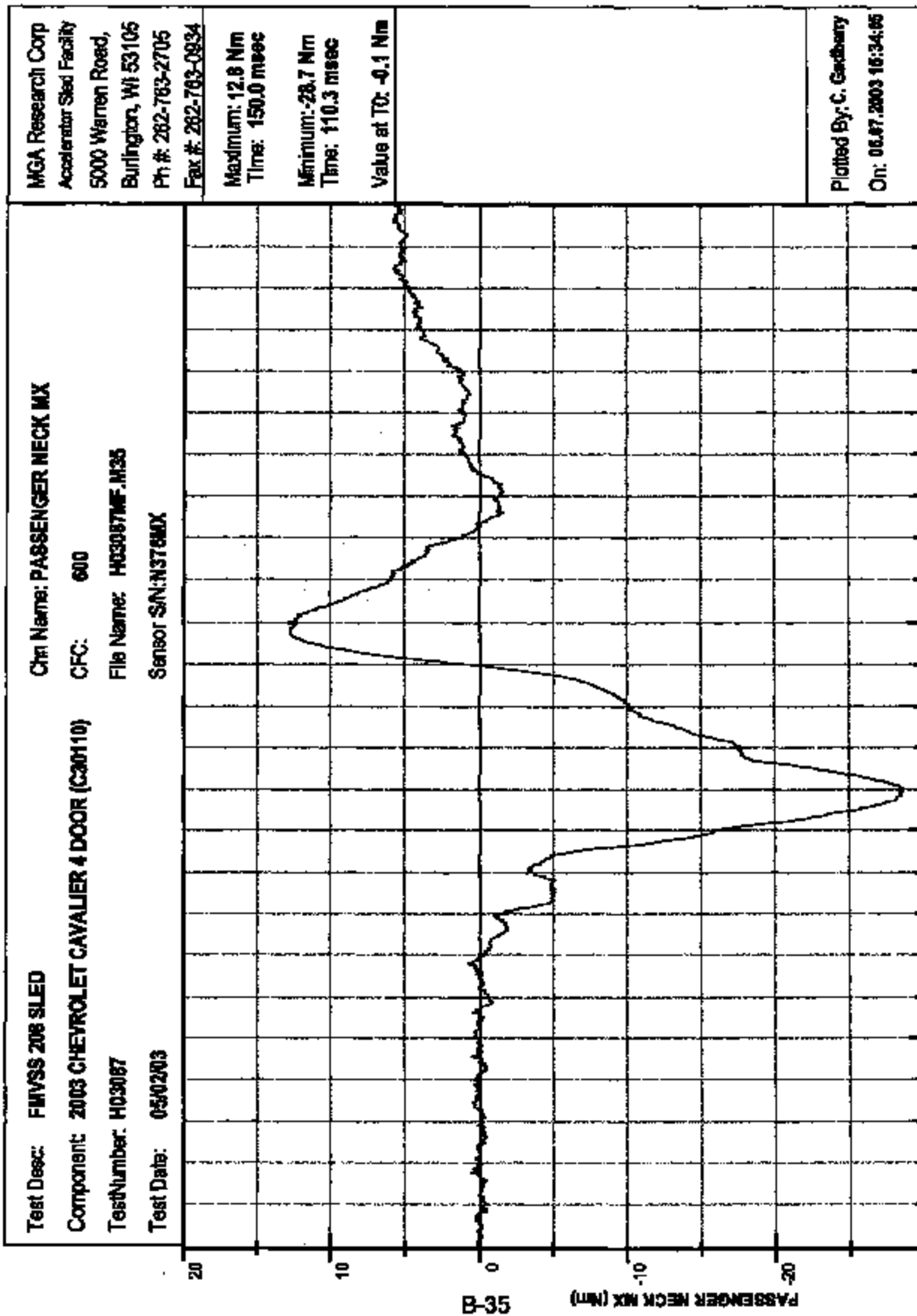




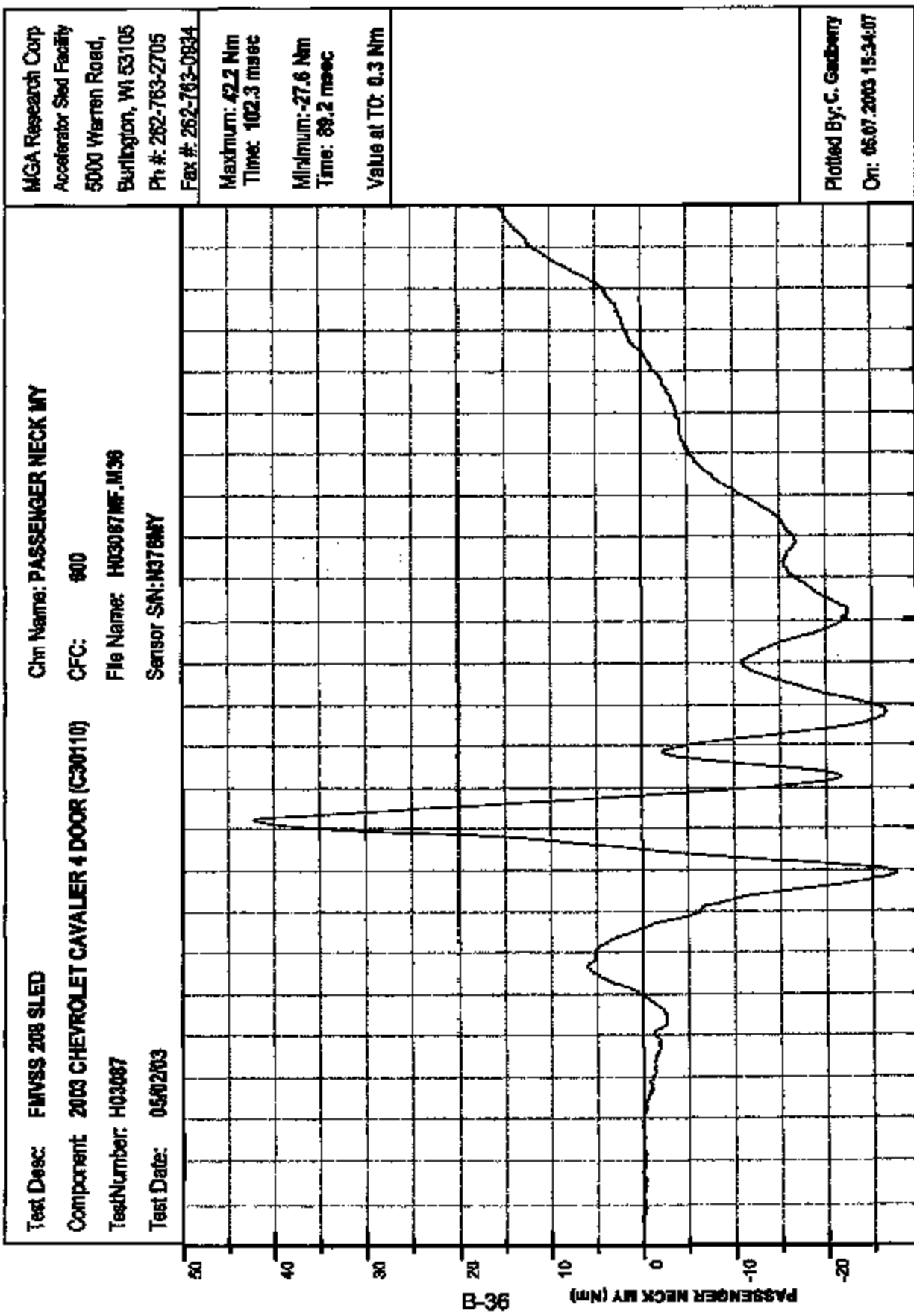
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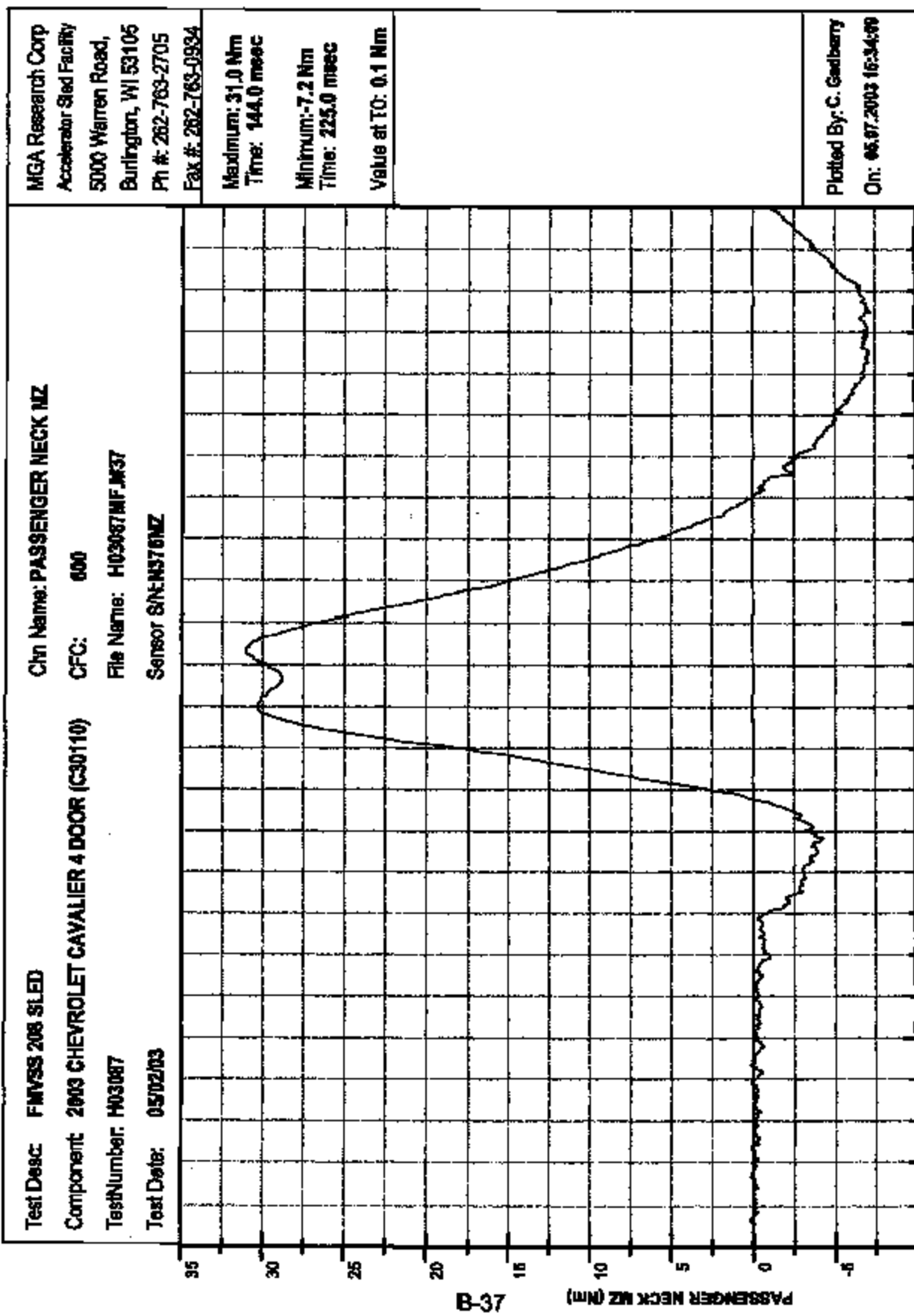




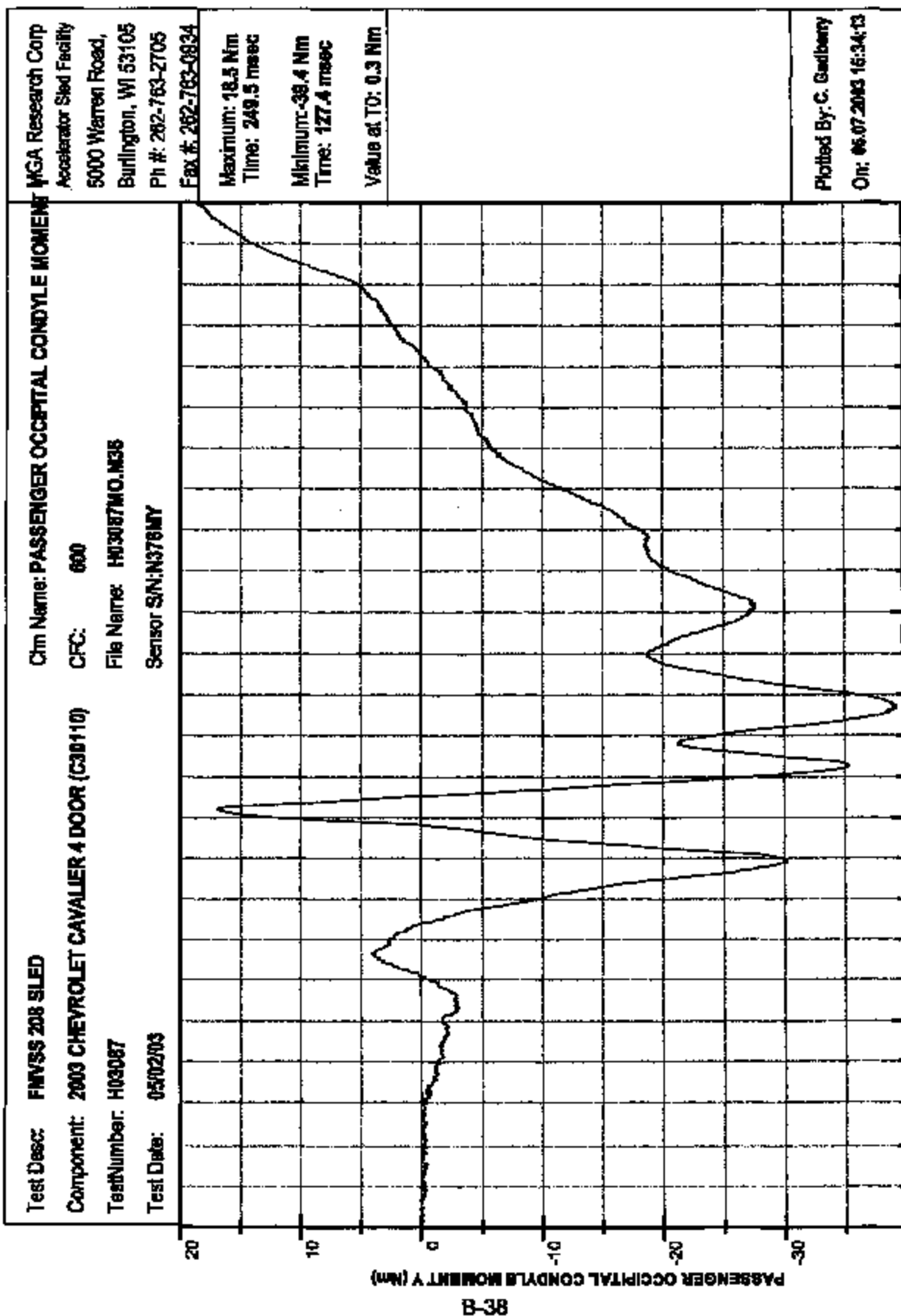


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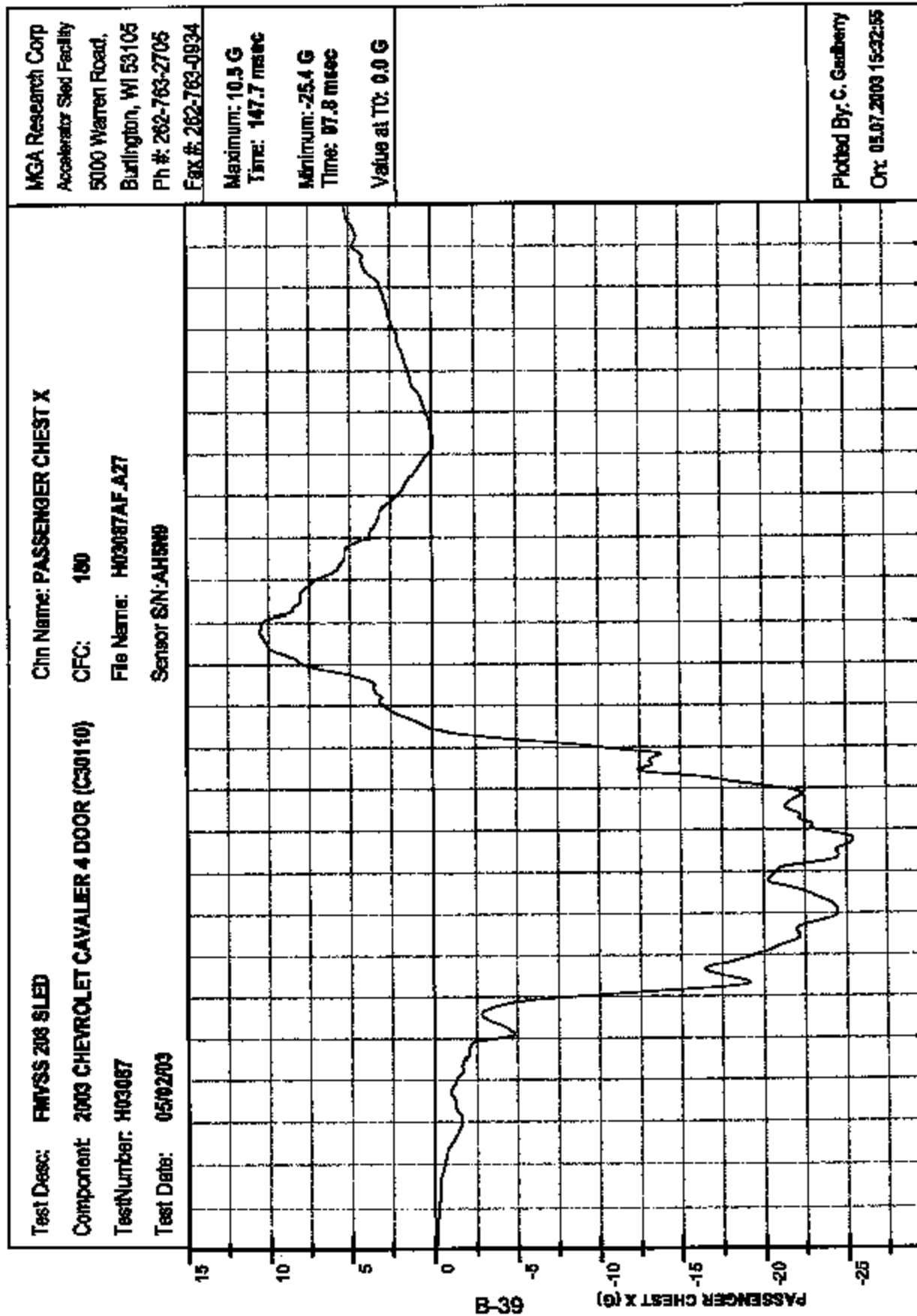


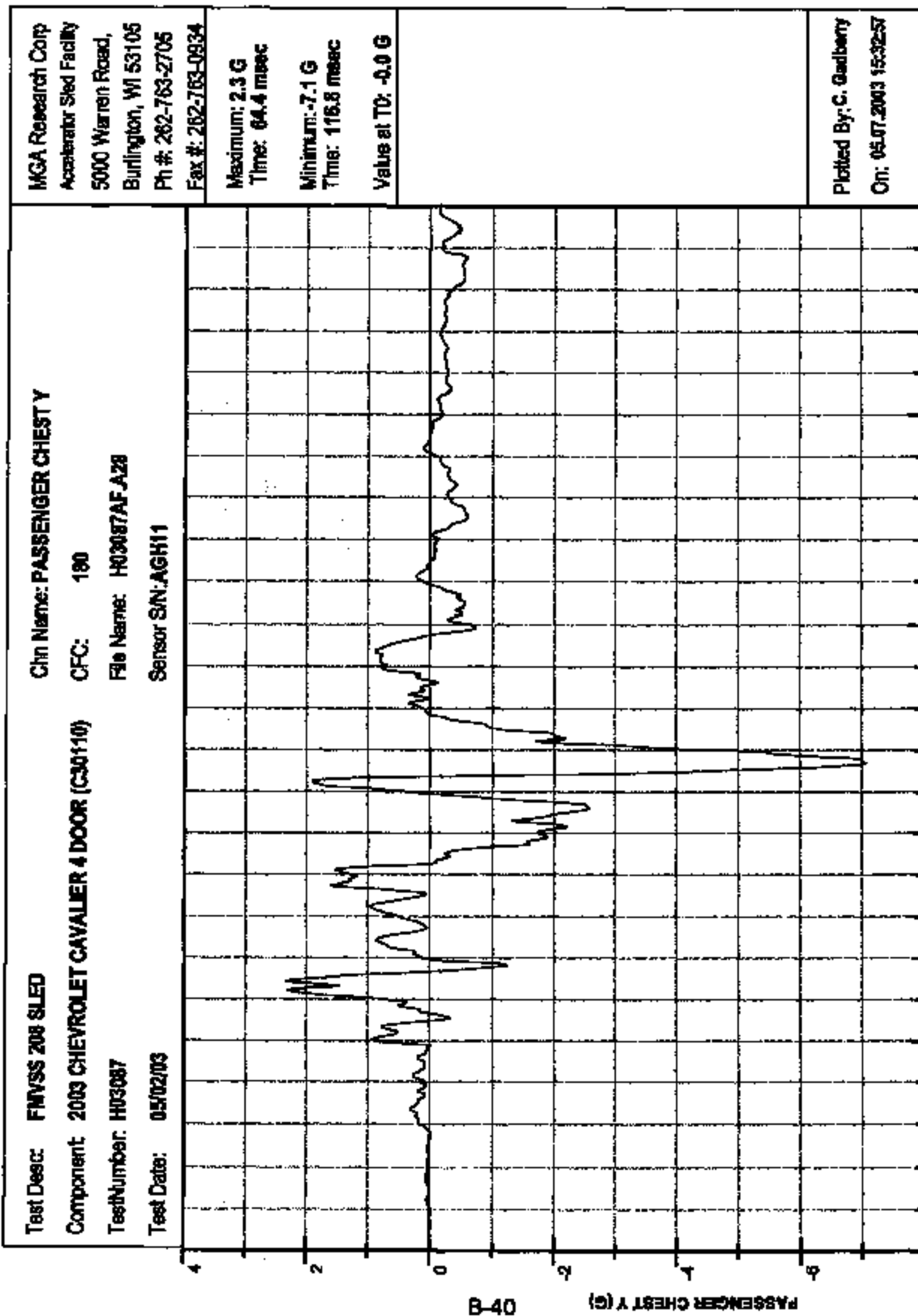


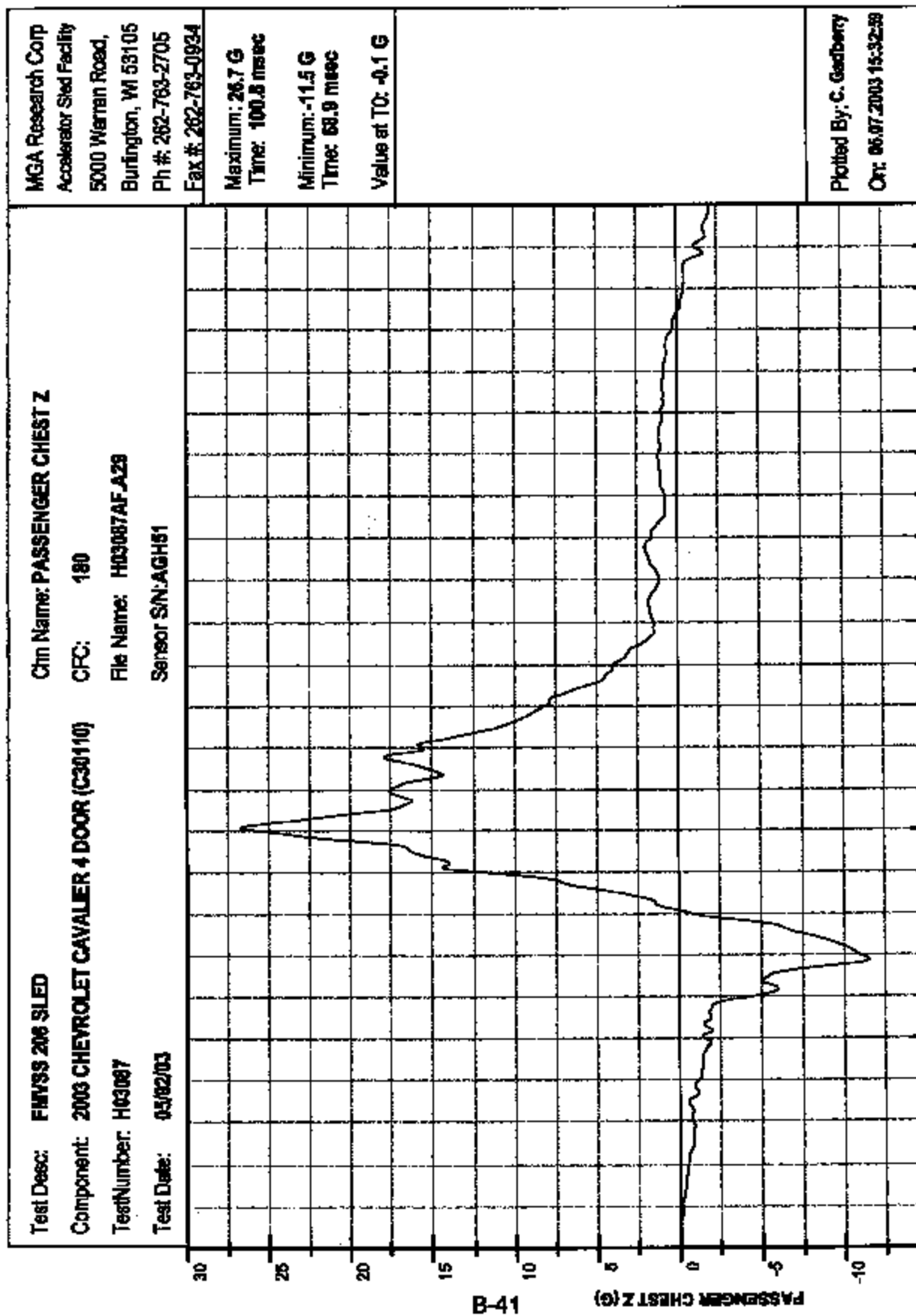
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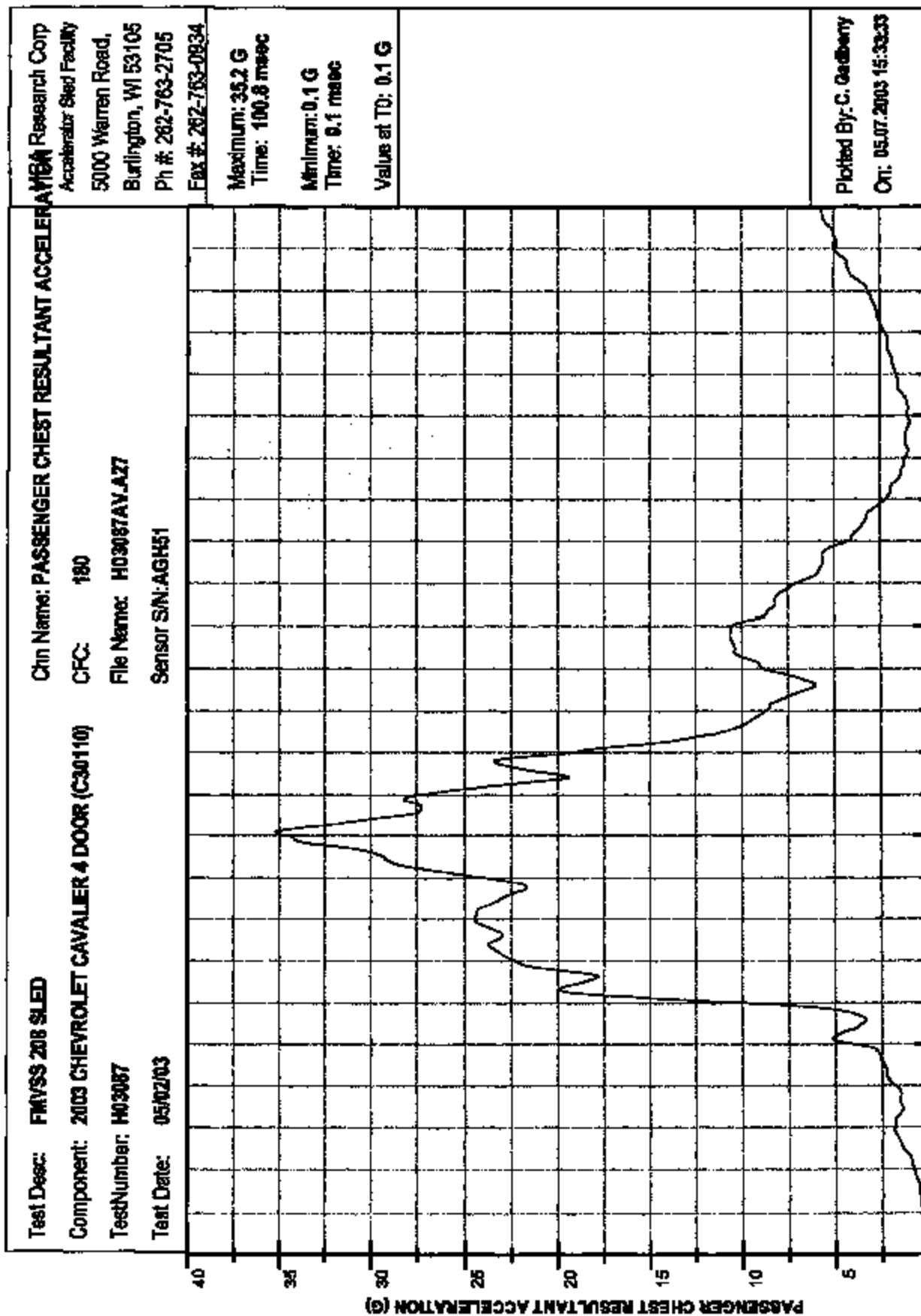


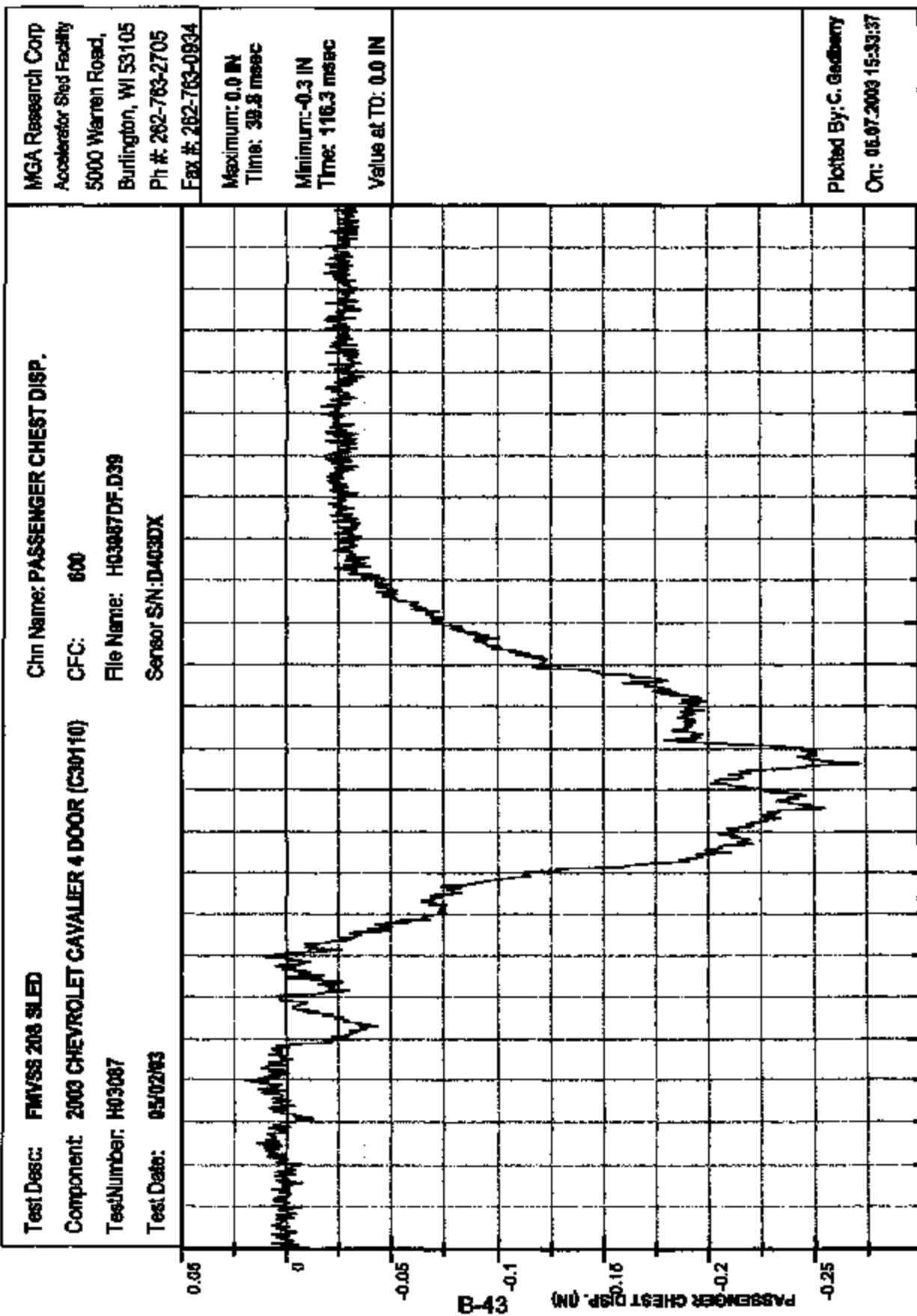
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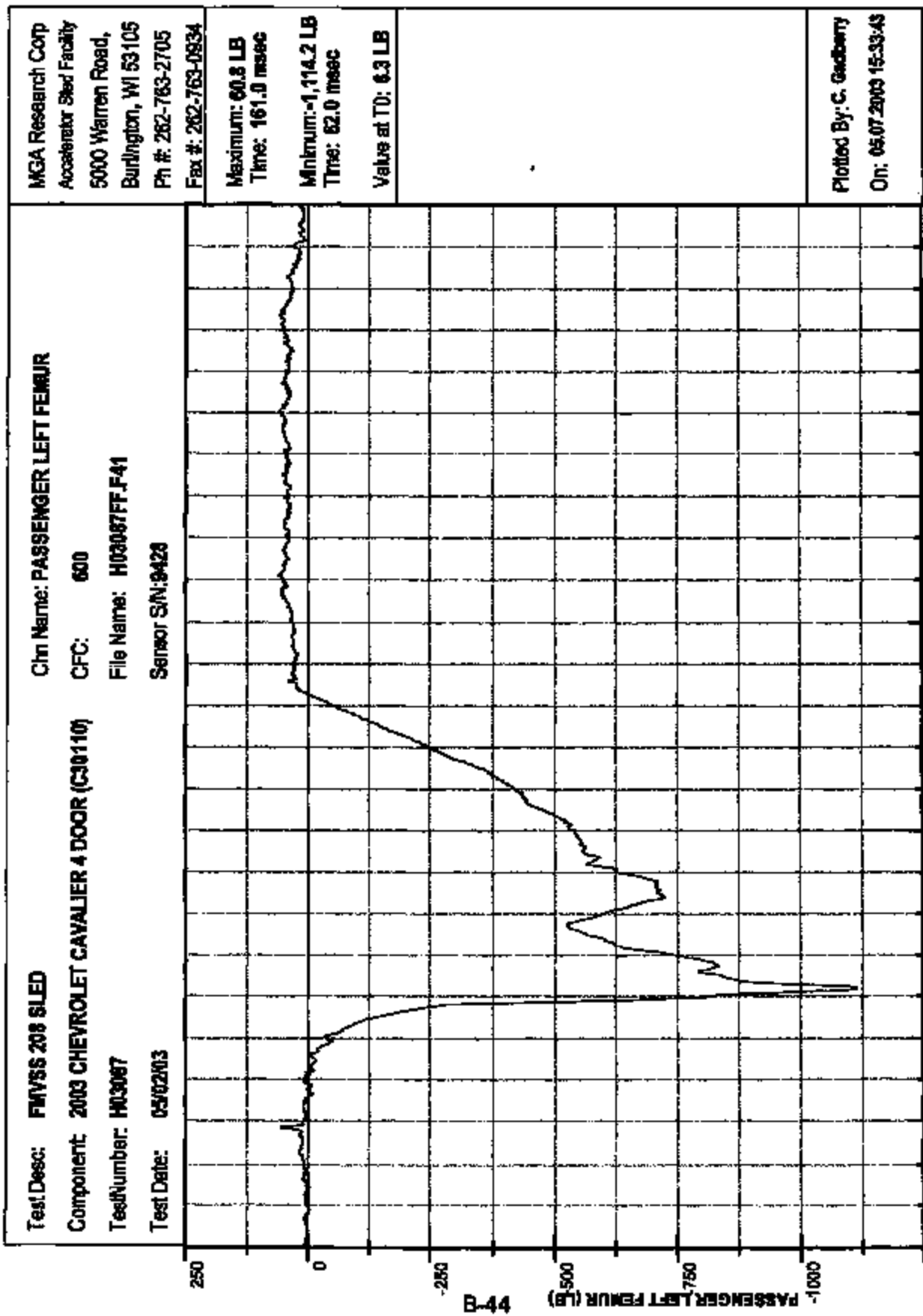


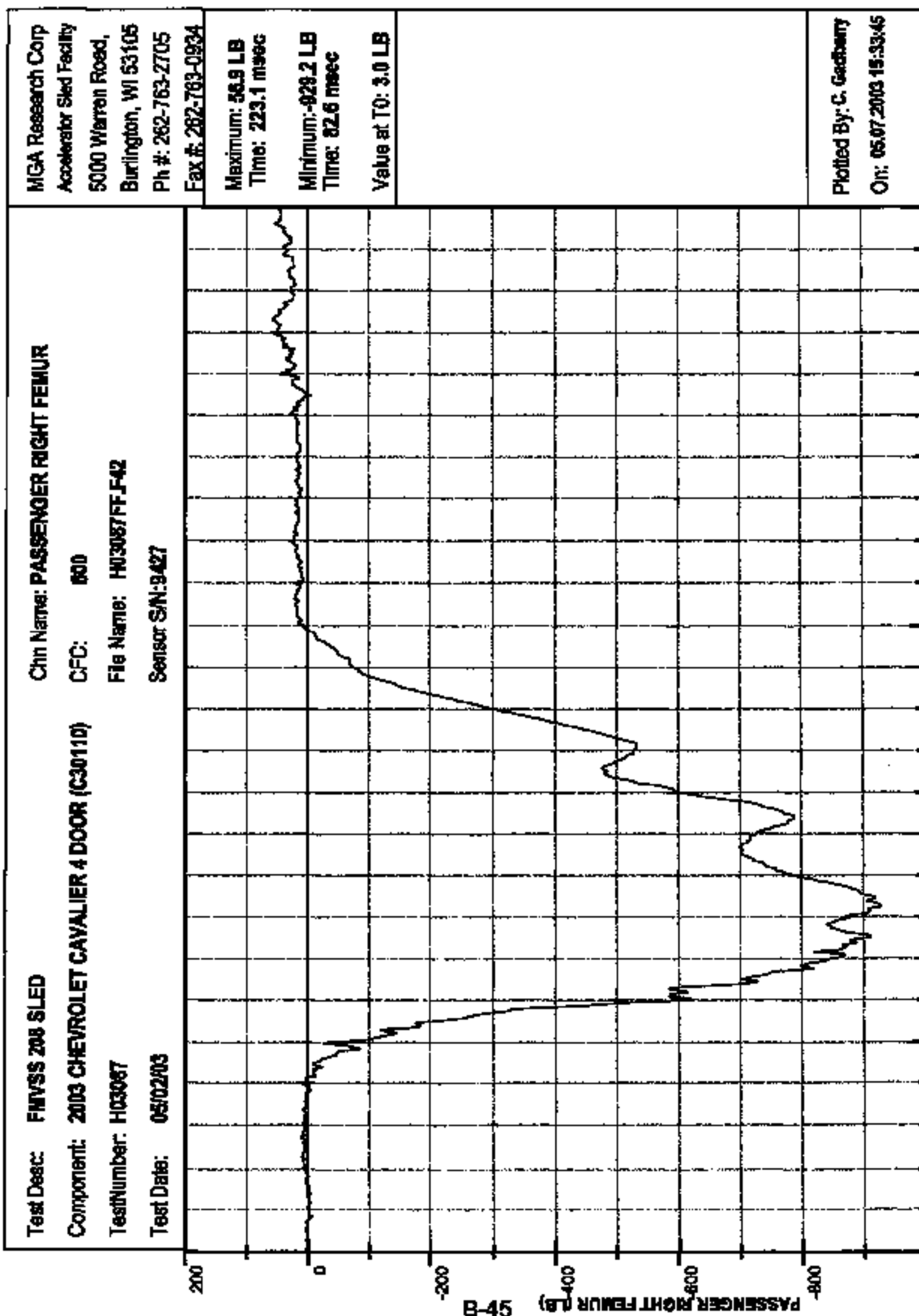












**APPENDIX C**  
**MANUFACTURER'S VEHICLE INFORMATION**



**GENERAL MOTORS NORTH AMERICA**  
Structure & Safety Integration

December 2, 2002  
USG 3729

Ms. Marilynne Jacobs, Director  
Office of Vehicle Safety Compliance  
Safety Assurance  
National Highway Traffic Safety  
Administration  
400 Seventh St., S.W.  
Washington, D.C. 20590

**Subject: Information Request NYS-221CCa/OA-206-020918-E**

Dear Ms. Jacobs:

This is in response to your letter dated September 27, 2002, requesting information for proposed FMVSS 208 enforcement testing of the 2003 Chevrolet Cavalier. The OVSC granted GM a 30 day extension to complete the information request. Specifically, the letter requested certain information on the alternative requirements that the automatic restraint system in this vehicle meets, if tension-relief devices were incorporated into the restraint system and certain test set-up information.

The specific OVSC questions and the General Motors Corporation responses are included in Enclosure 1.

We trust this information is responsive to your request. We welcome the opportunity to discuss any aspects of our response with you or members of your staff. If there are any questions, please do not hesitate to contact Mr. Thomas P. Darnig (810/947-1735) of my staff, or Mr. Stephen G. Gehring (202/775-5071) of GM's Washington Office.

Sincerely,

Louis J. Carlin, Director  
Safety Regulations & Consumer Information

Attachments  
cc: C. Case, NHTSA

Safety Regulations & Consumer Information  
Mail Code 480-111-888 • 30200 Mound Road • Warren, Michigan 48090-9010  
FAX: (810) 998-8018





GENERAL MOTORS NORTH AMERICA  
Structure & Safety Integration

USG 3729  
Enclosure 1

NHTSA IR: NVS-221CCa  
OA-208-020916-E  
2003 Chevrolet Cavalier

**Question 1**

*Many options are available for certification to FMVSS 208. Please identify the sections of FMVSS 208 to which the subject vehicles are certified. Provide a copy of the certification test reports for all the applicable impact tests and sled tests with respect to these sections. If the subject vehicles are certified to the low risk deployment requirements of S14, provide a copy of the certification tests. In addition, provide the test reports and any analysis used to determine the air bag inflator stages to trigger for the low risk deployment tests.*

*If the subject vehicles are certified to any of the air bag suppression sections of S14, provide a representative test report for each type of suppression test. (i.e., rear facing child restraint suppression test (12-month-old dummy), 3-year-old dummy or human suppression test conducted with and without using a child restraint, 6-year-old dummy or human suppression test conducted with and without using a child restraint.) Also provide a test report for reactivation of the air bag system using a 5<sup>th</sup> percentile female.*

**GM Response**

The air bag restraint system provided at the driver's and passenger's seating positions in the subject vehicle is installed to meet S13. In addition, the air bag restraint system provided at the driver's and passenger's seating positions, along with the manual 3-point safety belt, were installed to meet the requirements of paragraphs S4.1.5.1(a)(3) of FMVSS 208.

Attachment A includes those portions of the frontal barrier test reports and sled tests pertinent to the requirements of FMVSS 208. The summary of the injury values is not included in the test report for C11548. However the resulting injury values are given in the barrier and sled summary table provided in Attachment E.

**Question 2**

*Provide the following: (1) describe the difference between the MY 2003 air bag system and the MY 2002 air bag system, (2) explain what other restraint changes have been made, (3) explain what other vehicle changes have been made that might have affected FMVSS 208 performance, and (4) describe any features that may affect occupant protection performance with respect to children and out of position occupants.*



NHTSA IR: NVS-221CCa  
OA-208-020816-E  
2003 Chevrolet Cavalier

**GM Response**

- 1) The driver air bag module and steering wheel was changed for the 2003 Chevrolet Cavalier. The frontal air bag systems for the 2003 Cavalier uses a single stage hybrid inflator.
- 2) Some changes were made to the 2003 Cavalier frontal restraint system but they are minor or are not relevant to FMVSS 208. For instance, the bolt that fastens the adjustable upper seat belt guide loop for the sedan front seats was lengthened to accommodate the addition of an FMVSS 201 countermeasure behind the B-Pillar upper trim. Also, a three point seat belt was added in the rear seat center position compared to a two point belt for 2002.
- 3) No other changes were made that might affect FMVSS 208 performance.
- 4) No other features affecting children and out of position occupants were changed.

**Question 3**

*If the subject vehicles were certified with unrestrained dummies to meet the requirements of S13, describe how to disconnect the air bags from the vehicle sensors and connect them to the triggering mechanism used in the sled test. Describe the method used in certification to determine when to trigger the air bag system and the system used to trigger the air bag.*

*For air bags with dual stage or multistage inflators describe when the stages are triggered and provide data to show that this is similar to what would occur in a crash of similar severity.*

**GM Response**

Sled tests used to meet the requirements of S13 were performed on a sled buck; in which the air bags were not connected to a full vehicle system. For GM's sled testing, the air bags are powered and activated by a remote deploy system. This can also be done in a full vehicle test. This remote deploy air bag control system is electronically wired to the air bag through a junction box. To deploy the air bags, the air bag control system provides the power through the interconnect of electronic wiring. The air bag control system is programmed to deploy the air bag as follows:

The air bag system should be disabled prior to performing the following actions. Disablement can be accomplished by disconnecting the battery negative cable from the battery. Wait approximately one hour following disconnection to ensure stored energy is dissipated.

On the driver's side, remove the air bag module from the steering wheel by inserting a flat head screwdriver into each of the slots located behind the steering wheel shroud. The air bag module is held in place by four snap in features. Turning the screw driver will release the snap in feature. Slowly lift the air bag module from the steering column and disconnect the yellow air bag connector from the back of the air bag module. A spare connector is used to connect the



NHTSA IR: NVS-221CCa  
QA-208-020916-E  
2003 Chevrolet Cavalier

module to the sled triggering system. However, the leads could be cut-off from the top of the steering column and then wired into the triggering mechanism. Reinstall the air bag module, ensuring that it is properly aligned with the snap features, allowing the leads, or connector, to hang on the outside of the shroud.

On the passenger side, remove the I/P top pad to access the yellow air bag wire located at the left side of the passenger module. Disconnect the yellow air bag connector and attach to the sled triggering mechanism.

The FMVSS 208 requirement states that the air bag "is to be activated at 20 ms  $\pm$  2 ms from the time that 0.6 g is measured on the dynamic test platform". GM's sled facility generates a time reference signal when the sled reaches 1.0 g. After reviewing the reference signal's time difference between 0.6 g and 1.0 g in several sled tests, the average difference was determined to be 0.61 ms. Using this information, the remote air bag control system at GM's sled facility is programmed to trigger at 19 ms after the 1.0 g reference level to activate the air bag within the required timing stated above.

The driver and passenger air bags have single stage hybrid inflators.

**Question 4**

*For the subject vehicles certified the advanced air bag requirements, describe how to disconnect the air bags and trigger the appropriate inflator stages for the low risk deployment tests.*

**GM Response**

The 2003 Chevrolet Cavalier is not certified to the advanced air bag requirements of FMVSS 208.

**Question 5**

*State for each safety belt system in the subject vehicles whether or not it is equipped with a tension-relieving device. Provide a copy of the information furnished in accordance with 87.4.2 if the tension-relieving device is used.*

**GM Response**

The 2003 Chevrolet Cavalier is not equipped with a tension-relieving device.



GENERAL MOTORS NORTH AMERICA  
Structure & Safety Integration

USG 3729  
Enclosure 1

NHTSA IR: NVS-221CCs  
OA-208-020916-E  
2003 Chevrolet Cavalier

**Question 7**

*Submit dummy placement measurements, including diagrams or photographs that show exactly where each measurement was taken. For the subject vehicles certified to the advanced air bag requirements provide measurements for both the 50<sup>th</sup> percentile male and the 5<sup>th</sup> percentile female. Enclosed is a diagram of some of GVSC's dummy measurements. Where possible, use each dimension shown in the diagram to provide the individual dummy placement measurements.*

**GM Response**

Attachment B includes the available dummy position measurements.

**Question 8**

*For the subject vehicles certified to the advanced air bag requirements, provide the width of the vehicle as defined in §18.2.4, the location at which the maximum location was measured, and other information and measurements used to position the vehicle for the certification offset crash test at 40 percent overlap.*

**GM Response**

The 2003 Chevrolet Cavalier is not certified to the advanced air bag requirements of FMVSS 208.

**Question 9**

*For the subject vehicles certified to the advanced air bag suppression requirements, describe the testable to determine air bag activation and deactivation. State whether humans or dummies were used for the suppression tests. If humans were used, provide the method to deactivate the air bag during suppression tests, identify any parts or equipment necessary for deactivation, and provide the method to assure that the same test results would be obtained if the air bag were not deactivated.*

**GM Response**

The 2003 Chevrolet Cavalier is not certified to the advanced air bag requirements of FMVSS 208.



GENERAL MOTORS NORTH AMERICA  
Structure & Safety Integration

USG 3729  
Enclosure 1

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OA-208-020916-E  
2003 Chevrolet Cavalier

**Question 10**

*State whether the subject vehicles have a foot rest for the driver.*

**GM Response**

The 2003 Chevrolet Cavalier is not equipped with a foot rest for the driver.

**Question 11**

*Provide the seat positioning, steering column positioning, and fuel tank data on the enclosed form. If more than one front seating, steering column or fuel tank configuration are available on this vehicle, provide separate information for each. For certification tests using the 5<sup>th</sup> percentile female, provide the seat fore-aft position, seat height, and seat back angle used in the certification test. In addition, provide the seating reference point for each seat for the lockable seat belt requirement in S7.1.1.E.*

**GM Response**

Attachment C provides the requested barrier and sled information.

**Question 12**

*For the subject vehicles certified to the low risk deployment sections of the advanced air bag requirements, provide the location of the "geometric center of the opening through which the air bag deploys into the occupant compartment."*

**GM Response**

The 2003 Chevrolet Cavalier is not certified to the low risk deployment sections of the advanced air bag requirements of FMVSS 208.

**Question 13**

*If the vehicle is equipped with adjustable seat belt anchorages, provide the manufacturer's nominal design position for a 50<sup>th</sup> percentile adult male occupant and, if certified to the advanced air bag requirements, the position for the 5<sup>th</sup> percentile female.*

**GM Response**

The 2003 Chevrolet Cavalier sedan has an adjustable guide loop. The nominal design position for a 50<sup>th</sup> percentile adult male occupant is one notch below the top position.



NHTSA IR: NVS-221CCa  
OA-208-020918-E  
2003 Chevrolet Cavalier

**Question 14**

*For all the tests that were performed to certify the subject vehicles to injury assessment performance requirements, provide a summary of the injury results. In addition, for the crash tests, provide the measured test speed.*

**GM Response**

Attachment D provides the requested information.

**Question 15**

*When vehicle components must be removed to obtain the proper test weight for crash tests, what components do you recommend for removal, and in what priority order do you recommend removal?*

**GM Response**

GM does not typically prioritize which components are to be removed from a test vehicle to accommodate test weight. However, components that have been removed during our testing include the rear bumper and spare tire. In addition, interior trim components behind the "B" pillar, including rear seats, carpeting and trim panels could be removed if necessary.

**Question 16**

*If the subject vehicles use a pressure vessel to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of S9.1.*

**GM Response**

Attachment E provides information on the pressure vessel in the 2003 Chevrolet Cavalier.

**Question 17**

*If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test report or engineering analysis to demonstrate that it meets all the requirements of S9.2.*

**GM Response**

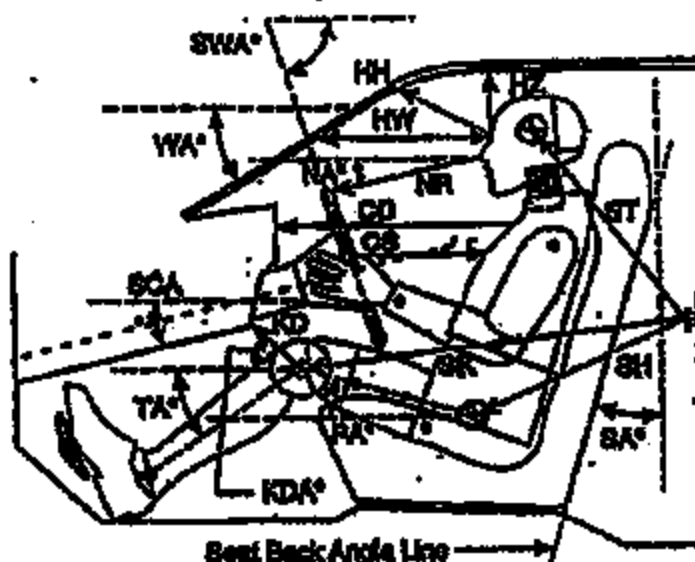
The 2003 Chevrolet Cavalier does not use an explosive device to inflate the air bag.

**USG 3729**  
**Enclosure 1**  
**Attachment B**

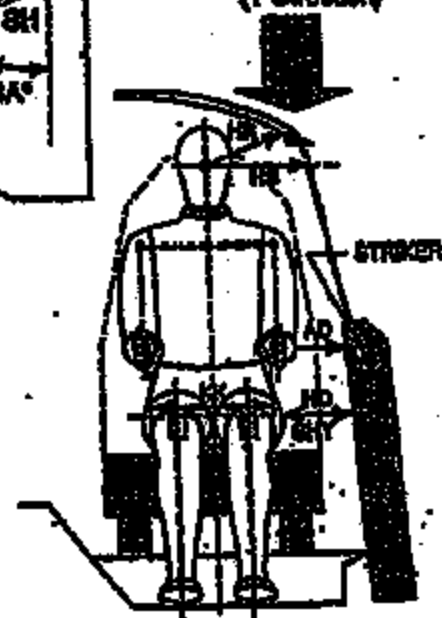
**NVS-221-CCa**  
**OA-208-020916-E**

**3 pages**  
**(including this cover)**

# DUMMY MEASUREMENT FOR FRONT SEAT PASSENGERS



AD - Arm to Door  
HD - H-Point to Door  
HN - Head to Side Header  
HS - Head to Side Window  
KK - Knee to Knee  
SKY - Sticker to H-Point (Y Direction)



CD - Chest to Dash  
CS - Steering Wheel to Chest  
HH - Head to Header  
HW - Head to Windshield  
HZ - Head to Roof  
KDA - Knee to Dash Angle  
KDL - Left Knee to Dash  
KDR - Right Knee to Dash  
NA - Nose to Rim Angle  
NR - Nose to Rim  
PA - Pelvic Angle  
RA - Rim to Abdomen  
SA - Seat Back Angle  
SCA - Steering Column Angle  
SH - Sticker to H-Point  
SK - Sticker to Knee  
ST - Sticker to Head  
SWA - Steering Wheel Angle  
TA - Tibial Angle  
WA - Windshield Angle



1998 CHEV CAVALIER SEDAN  
DUMMY POSITIONING IN VEHICLE  
FRONT SEAT MEASUREMENT TABLE

|      | DRIVER                           | PASS.                            |
|------|----------------------------------|----------------------------------|
| WA°  | 20.4°                            |                                  |
| SWA° | 18.4°                            |                                  |
| SCA° | Not Determined                   |                                  |
| BA°  | 27.5                             | 27.5                             |
| HZ   | Not Recorded                     | Not Recorded                     |
| HH   | 285 mm                           | 285 mm                           |
| HW   | 195 mm                           | 195 mm                           |
| HR   | 187 mm                           | 187 mm                           |
| NR   | 520 mm ANGLE (NA°) Not Recorded  |                                  |
| CD   | Not Recorded                     | 471 mm                           |
| CB   | 445 mm                           |                                  |
| RA   |                                  |                                  |
| KDL  | 178 mm ANGLE (KDA°) Not Recorded |                                  |
| KDR  |                                  | 180 mm ANGLE (KDA°) Not Recorded |
| PA°  | 21°                              | 22.5°                            |
| TA°  | Not Recorded                     | Not Recorded                     |
| IK   | 385 mm                           | 385 mm                           |
| BT   | Not ANGLE Recorded               | ANGLE                            |
| SK   | Not ANGLE Recorded               | ANGLE                            |
| SH   | Not ANGLE Recorded               | ANGLE                            |
| SHY  | 245 mm                           | 245 mm                           |
| HS   | 260 mm                           | 260 mm                           |
| KD   | 120 mm                           | 120 mm                           |
| AD   | 80 mm                            | 80 mm                            |

**USG 3729**  
**Enclosure 1**  
**Attachment C**

**NVS-221-CCa**  
**OA-208-020916-E**

**3 pages**  
**(including this cover)**

## TEST VEHICLE INFORMATION

Vehicle Model Year and Make: 2003 ChevroletVehicle Model and Body Style: Cavalier Sedan & Coupe

## 1. NOMINAL DESIGN RIDING POSITION –

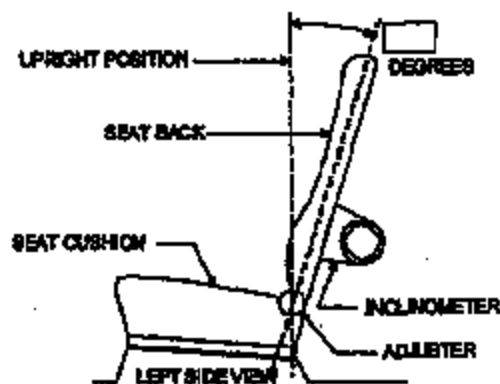
For adjustable driver and passenger seat backs, describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable.

Seat back angle for driver's seat = 27.5°

Measurement instructions: See passenger seat instructions

Seat back angle for passenger's seat = 27.6°

Measurement instructions: Starting approximately nine to ten inches above the seat back pivot point near the outboard edge locate the steel frame and cut through the seat fabric to expose it. Place the inclinometer on the frame making sure that there is enough flat surface properly position it. The seat back can then be adjusted to the specified angle.



## 2. SEAT FORE AND AFT POSITIONS –

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Position of the driver's seat:

See passenger seat instructions below.

Position of the passenger's seat (if applicable):

Place the seat in the full forward position and mark the seat adjuster with a paint pen. Move the seat to the full rear position and mark the seat adjuster with a paint pen. Position the seat at the mid-point of the two marks.

Front Driver and Passenger Reference Points:

Fiducial: x = 2761, y = -505, z = 251

Front driver: x = 3150, y = -334, z = 438

Front passenger: x = 3175, y = 334, z = 438

Rear Driver-coupe: x = 3661, y = -320, z = 435

Rear Passenger-coupe: x = 3661, y = 320, z = 435

Rear Driver-sedan: x = 3917, y = -320, z = 450

Rear Passenger-sedan: x = 3917, y = 320, z = 450

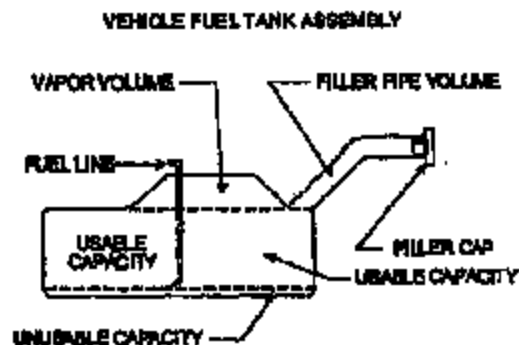
Sign convention: x: reward(+), forward (-)

Y: passenger side (+), driver side (-)

Z: up (+), down (-)

### 3. FUEL TANK CAPACITY DATA -

- 3.1 A. "Usable Capacity" of standard equipment fuel tank = 14.1 gallons.  
 B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.  
 C. Capacity used when certification testing to requirements of FMVSS 301 = 14.1 gallons.  
 Operational Instructions: N/A



Page 2 of 2

- 3.2 Amount of Stoddard solvent added to vehicle for certification test = 13.3 gallons.

- 3.3 Is vehicle equipped with electric fuel pump? ☒ YES ☐ NO

If YES, does pump normally operate when vehicle's electrical system is activated?  
☒ YES ☐ NO

### 4. STEERING COLUMN ADJUSTMENTS -

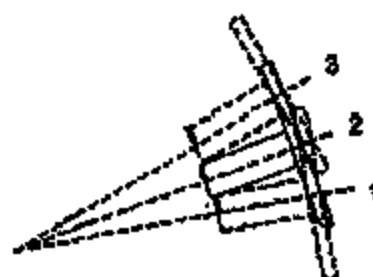
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

There are five detents for the tilt wheel system. The top detent is position one. Set the wheel in the third position.

### STEERING COLUMN ASSEMBLY



LEFT SIDE VIEW