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H5#
637090

135-TRC-04-005

**SAFETY COMPLIANCE TESTING FOR FMVSS 135
Passenger Car Brake Systems**

General Motors Corporation
2004 Chevrolet Malibu LS, 4-Door Sedan
NHTSA No. C40102

TRANSPORTATION RESEARCH CENTER INC.

10820 State Route 347
East Liberty, Ohio 43319



Final Report Completed: April 13, 2004

FINAL REPORT

Prepared Under Contract No.: DTNH22-01-C-21025

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Assurance**

**Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6115 (NVS-221)
Washington, DC 20590**

Prepared for the Department of Transportation, National Highway Traffic Safety Administration,
under Contract No. DTNH22-01-C-21025.

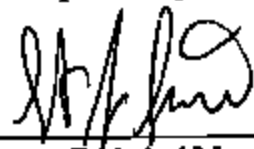
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Prepared By 

Approved By 

Approval Date: 4/20/04

Final Report Acceptance By OVSC:



Contract Technical Manager, Office of
Vehicle Safety Compliance

4/23/04
Acceptance Date

| | | | | | |
|---|--|---|--|---|--|
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| 4. TITLE AND SUBTITLE: Final report of FMVSS 135 Compliance Testing of a 2004 Chevrolet Malibu LS, 4-Door Sedan, NHTSA No. C40102 | | | | 5. REPORT DATE: April 13, 2004 | |
| | | | | 6. PERFORMING ORGANIZATION CODE: TRC 20000113/4354 | |
| 7. AUTHOR(S): Project Manager: WALTER DUDEK Project Engineer: RANDALL A. LANDES | | | | 8. PERFORMING ORGANIZATION REPORT NO.: TRC-DOT-135-050 | |
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| 15. SUPPLEMENTARY NOTES: | | | | | |
| 16. ABSTRACT: Compliance tests were conducted on the subject 2004 Chevrolet Malibu LS, 4-Door Sedan, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-135-00 for the determination of FMVSS 135 compliance. Test failures identified were as follows: None. | | | | | |
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1.0 INTRODUCTION

Tests were conducted on a 2004 Chevrolet Malibu LS, 4-dr. sedan, manufactured by General Motors Corporation, to determine compliance with FMVSS 135 "Passenger Car Brake Systems." All tests were conducted in accordance with the U.S. D.O.T., NHTSA Laboratory Procedure TP 135-00 and/or the corresponding TRC Inc. test procedure that was submitted to NHTSA for their approval. The test procedure was clearly described in the submitted document and has not been repeated in this report.

All stops were performed manually.

All tests were conducted by TRC Inc. personnel using the following TRC facilities:

7.5-Mile Test Track

Vehicle Maximum Speed

Burnish

Heating Snubs and Hot Performance Stops

Brake Cooling and Recovery Stops

Skid Pad

Cold Effectiveness Stops

High Speed Effectiveness Stops

Stops with Engine Off

Failed Antilocks

Failed Variable Proportioning Valve (if applicable)

Failed Hydraulic Circuits

Brake Power Assist Unit Failures

Brake Slope

Parking Brake

Average PFC during the test period was 0.94 (Skid Pad) and 0.92 (Test Track) utilizing the ASTM E1337 w/E1336 tire method.

The test vehicle was ABS equipped. Therefore, the Wheel Lock Sequence and Adhesion Utilization Tests were not performed.

This vehicle met the requirements of FMVSS 135.

DATA SHEET 1 - VEHICLE INFORMATION

VEHICLE SPECS

Year: 2004
Mfr: GENERAL MOTORS CORP.
Make: CHEVROLET
Model: MALIBU LS
Body Style: 4-DOOR SEDAN
Mfr. Date: 10/03
VIN: 1G1ZT52814F125082

NHTSA No: G40102
GVWR (Kg): 1915.0
GAWR Front(Kg): 1021.0
GAWR Rear(Kg): 894.0
Wheelbase (mm): 2692.4
Odometer: Start:86 MI. End:576 MI.

BUSES ONLY

Chassis Mfg.: N/A
Serial No.: N/A
No. of Seats: N/A
Manufacture Date: N/A

Engine Type: GASOLINE, V6, FUEL INJECTED, PISTON.
Displacement: 3.5 LITER
Engine Hspwr: N/A
Idle Speed(rpm): 84.8232
Transmission Type: AUTO. 4-SP. ELECTRON, FWD
No. of Axles: 2

Tire Size: P205/65R15
Tire Type: 92S, B450, STEEL BELTED RADIAL, 3
Tire Mfr.: BRIDGESTONE
GVWR Front Press. (kpa): 206.84
GVWR Rear Press. (kpa): 206.84

BRAKE APPLY SYSTEM

Brake Series: Front:DISC Rear:DISC
Brake Actuation
(Hydr. Circuit Split): DIAGONAL
Power Unit: VACUUM
Anti-Skid unit Mfr: DELPHI
Parking Mechanism: YES
Type of Parking Unit: AUTOMATIC TRANSMISSION WITH PARK DETENT.
Mstr Cylinder Dia(mm): 23.85

Power Assist Unit: YES
Pwr Unit w/Accumulator: NO
Pwr Asst./Pwr Unit w/Backup: NO
Variable Prop. System: NO
Anti-Skid Device: YES
Pedal Ratio: 5.33 : 1

FRONT SYSTEM BRAKE COMPONENT MATERIALS AND CONSTRUCTION:

BRAKE TYPE: DISC
Material: CAST

Drum Construction: N/A
Disc Construction: INTEGRAL CAST, VENTED
Front Brake Dia.(mm): 275.84
Fr Disc Thickness(mm): 25.93
Lining Construction: Bonded

LF Drum Shoe Cage Dia.(mm): 0.00
RF Drum Shoe Cage Dia.(mm): 0.00
LF Drum Dia. RESET(mm): 0.00
RF Drum Dia. RESET(mm): 0.00

FRONT BRAKE COMPONENT DIMENSIONS AND CODES:

| Inboard (Leading) | Outboard (Trailing) |
|--------------------------------|--------------------------------|
| Width(mm): 51.61 | Width(mm): 51.64 |
| Length(mm): 90.02 | Length(mm): 89.97 |
| Thickness(mm): 12.65 | Thickness(mm): 12.55 |
| Lining Code/Color: NACN501H FF | Lining Code/Color: NACN501H FF |

Hyd. Piston Dia.(mm): 60.15

DATA SHEET 1 - (CONTINUED)

REAR SYSTEM BRAKE COMPONENT MATERIALS AND CONSTRUCTION:

| | |
|-------------------------------------|-----------------------------------|
| BRAKE TYPE: DISC | Material: CAST IRON |
| Drum Construction: N/A | LR Drum Shoe Cage Dia. (mm): 0.00 |
| Disc Construction: IN. CAST UNVENT. | RR Drum Shoe Cage Dia. (mm): 0.00 |
| Lining Construction: BONDED | LR Drum Dia. RESET(mm): 0.00 |
| Rear Brake Dia. (mm): 270.13 | RR Drum Dia. RESET(mm): 0.00 |
| Rr Disc Thickness(mm): 14.22 | |

REAR BRAKE COMPONENT DIMENSIONS AND CODES:

| Inboard (Leading) | Outboard (Trailing) |
|-------------------------------|-------------------------------|
| Width(mm): 35.69 | Width (mm): 35.64 |
| Length(mm): 85.39 | Length (mm): 85.42 |
| Thickness(mm): 8.64 | Thickness (mm): 8.56 |
| Lining Code/Color: DCM 4875FF | Lining Code/Color: DCM 4875FF |
| Hyd Piston Dia (mm): 38.05 | |

OTHER COMPONENT INFORMATION:

Friction-type Park Brake: FOOT-OPERATED
Non-Service Brake Type Parking Brake: NOT APPL.

NOTE: If at any time after the test series has begun, any brake system part requires replacement or the brake system requires adjustments other than permitted in burnish and reburnish procedures, discontinue testing and notify the COTR immediately.

Technician: *Karen Easterday*

KAREN EASTERDAY

Date: *04/20/04*

Quality Assurance: *K. Webster*

KIM WEBSTER

3.0 SUMMARY OF TESTING

| TEST | Specification and Limit | | | | | TEST RESULTS (in compliance if one stop meets requirement) | | | |
|---|---|--------------|----------------------|----------------------|--|--|--|---|-----------|
| | Loading Condition | Speed (km/h) | Min. Pedal Force (N) | Max. Pedal Force (N) | Stopping Distance Requirement (m) | Shortest Stop Min. Pedal Force (N)*** | Shortest Stop Max. Pedal Force Newtons (Average - N) | Shortest Stop Stopping Distance (m) (Corrected) | PASS/Fail |
| Equipment Requirements | | | | | Specified Equipment | Vehicle contains specified equipment | | | Pass |
| Vehicle Maximum Speed | LLW | NA | | | | 170.5 km/h avg. | | | NA |
| Burnish | GVWR | 80 | | | | 200, 80 - 0 km/h stops @ 3.0 mpsps | | | NA |
| Wheel Lockup Sequence w/o | GVWR | | | | Lockup of front wheels prior to rear | ABS Equipped | | | NA |
| Wheel Lockup Sequence w/o | LLW | | | | | ABS Equipped | | | NA |
| Adhesion Utilization w/o ABS | LLW | | | | Rear axle adhesion utilization curve below specified value | ABS Equipped | | | NA |
| Adhesion Utilization w/o ABS | GVWR | | | | | ABS Equipped | | | NA |
| Cold Effectiveness | GVWR | 100 | 85 | 500 | 70 | 5 | 472.1 | 48.6 | Pass |
| High Speed Effectiveness | GVWR | 138.4 | 85 | 500 | spd. depend. - 138.3 | 5 | 483.1 | 88.2 | Pass |
| Stops with Engine Off | GVWR | 100 | 85 | 500 | 70 | 5 | 457.5 | 46.9 | Pass |
| Cold Effectiveness | LLW | 100 | 85 | 500 | 70 | 5 | 478.2 | 48.3 | Pass |
| High Speed Effectiveness | LLW | 138.4 | 85 | 500 | spd. depend. - 138.3 | 5 | 486.4 | 88.8 | Pass |
| Failed Antilock | LLW | 100 | 85 | 500 | 85 | 5 | 213.5 | 54.1 | Pass |
| Failed Proportioning Valve | LLW | 100 | 85 | 500 | 110 | 5 | NA | NA | NA |
| Failed Hydraulic Circuit #1 | LLW | 100 | 85 | 500 | 168 | 5 | 482.8 | 81.1 | Pass |
| Failed Hydraulic Circuit #2 | LLW | 100 | 85 | 500 | 188 | 5 | 488.5 | 88.5 | Pass |
| Failed Hydraulic Circuit #1 | GVWR | 100 | 85 | 500 | 188 | 5 | 487.5 | 87.9 | Pass |
| Failed Hydraulic Circuit #2 | GVWR | 100 | 85 | 500 | 188 | 5 | 487.8 | 84.8 | Pass |
| Failed Antilock | GVWR | 100 | 85 | 500 | 85 | 6 | 225.5 | 52.0 | Pass |
| Failed Proportioning Valve | GVWR | 100 | 85 | 500 | 110 | 5 | NA | NA | NA |
| Power Brakes Unit Failure | GVWR | 100 | 85 | 500 | 188 | 6 | 488.8 | 118.7 | Pass |
| Parking Brakes - Uphill | GVWR | - | - | 500 | Hold for 5 min.? | NA | 481.5 | Yes-Holds | Pass |
| Parking Brakes - Downhill | GVWR | - | - | 500 | Hold for 5 min.? | NA | 418.4 | Yes-Holds | Pass |
| Heating Brakes | GVWR | 120-80 | NA | NA | 15 Brakes - 3.0 mpsps | 6 | 38 Vls. Avg. | NA | NA |
| Hot Performance Stop #1 | GVWR | 100 | 85 | 500 | 74.7 | 6 | 581.7 (279.6) | 48.1 | Pass |
| Hot Performance Stop #2 | GVWR | 100 | 85 | 500 | 88 | 6 | 483.1 | 50.8 | Pass |
| Brake Cooling | GVWR | 50 | NA | NA | 4 Stops - 3.0 mpsps | 6 | 38 Vls. Avg. | NA | NA |
| Recovery Performance Stop #1 | GVWR | 100 | 85 | 500 | One of the two stops between 85.4 and 25.9 meters | 6 | 414.0 (299.4) | 46.9 | Pass |
| Recovery Performance Stop #2 | GVWR | 100 | 85 | 500 | | 6 | 451.8 (312.2) | 48.7 | Pass |
| Final Inspection-Brake Integrity | Check components for detachment, fracture or lubricants. | | | | | No detachments or fractures-normal approx. & colt. | | | Pass |
| Final Inspection-Reservoir/Warning Indicators | Master cylinder or brake power reservoir shall meet the volume and label requirements of S5.4.2 and S5.4.3. | | | | | Brake system has sufficient capacity and indicators are in compliance. | | | Pass |

*** Note: The Shortest Stop Minimum Pedal Force represents the minimum force value required to engage the data acquisition's recording mode.

DATA SHEET 3 - VEHICLE WEIGHT

VEHICLE: 2004 CHEVROLET MALIBU LS

NHTSA No. C40102 Date: 03/09/04

Tire Pressure(cold): Front (kpa) 207 Rear (kpa) 207
Odometer: Start 86 MI. End 576 MI.
Scale(s) Used: TRC Toledo Scales

NOTE: GVWR, LLVW and axle weights to be measured within +0% and -1%.

GVWR/GAWR INFORMATION
(From Veh. Certification Label)

GVWR(Kg): 1915
GAWR Front(Kg): 1021
GAWR Rear(Kg): 894

UNLOADED VEHICLE WEIGHT(UVW)

L Front(Kg): 454 L Rear(Kg): 294
R Front(Kg): 468 R Rear(Kg): 263
T Front(Kg): 922 T Rear(Kg): 557
Total UVW(Kg): 1479

TARGET LIGHT LOADED WEIGHT(LLVW):

ACTUAL LIGHT LOADED WEIGHT(LLVW):

NOTE 1: $LLVW = UVW + 181.4Kg$

NOTE 2: Weight distributed in front passenger seat area.

NOTE 3: Neither axle load at LLVW less than at UVW; ballast as required.

L Front(Kg): 497 L Rear(Kg): 342
R Front(Kg): 516 R Rear(Kg): 306
T Front(Kg): 1012 T Rear(Kg): 649
Total LLVW(Kg): 1661

L Front(Kg): 500 L Rear(Kg): 343
R Front(Kg): 512 R Rear(Kg): 306
T Front(Kg): 1012 T Rear(Kg): 649
Total Actual Test LLVW(Kg): 1661

Load: Driver/Observer 73(Kg) + Instru. 41(Kg) + Ballast 68(Kg) = 181(Kg)

FULLY LOADED TEST WEIGHT (ACTUAL GVWR)

NOTE 1: Vehicle loaded so axle loads proportional to GAWR shown previously.

NOTE 2: But no axle weight to be less than at LLVW.

NOTE 3: If weight on any axle at LLVW exceeds the axle's proportional share of the GVWR, the load required to reach GVWR is placed so that the weight on that axle remains the same as at LLVW.

L Front(Kg): 503 L Rear(Kg): 462
R Front(Kg): 518 R Rear(Kg): 430
T Front(Kg): 1021 T Rear(Kg): 892
Total Fully Loaded GVWR(Kg): 1913

Load: Driver/Observer 73(Kg) + Instru. 41(Kg) + Ballast 320(Kg) = 433(kg)

Technician: *Karen Easterday*

KAREN EASTERDAY

Date: 07-20-04

Quality Assurance: *Ken Webster*

KEN WEBSTER

DATA SHEET 4 - EQUIPMENT REQUIREMENTS (S5)

SERVICE BRAKE SYSTEM (S5.1)

Vehicle equipped with a service brake system acting on all wheels? YES

Wear Adjustment (S5.1.1):

Service Brakes are compensated for wear by means of a system of automatic adjustment? YES

Describe: DISC-AUTOMATIC CLEARANCE TAKE-UP.

Wear Status (S5.1.2):

Wear status of service brakes is indicated by:

(A) Acoustic or optical device? YES

Describe: METAL TAB EMITS HIGH FREQUENCY SQUEAL WHEN WORN.

(B) Visual check outside or under vehicle? YES

Describe: FRONT&REAR:LOOK THROUGH CALIPER.

PARKING BRAKE SYSTEM (S5.2)

Vehicle equipped with a parking brake system of a friction type with solely mechanical means to retain engagement: YES

CONTROLS (S5.3)

(A) Service brakes activated by means of a foot control? YES

(B) Parking brake control is independent of the service brake control? YES

(C) Parking brake control is hand or foot operated? YES

(D) ABS, if equipped, cannot be manually disabled? YES

DATA INDICATES COMPLIANCE: YES

COMMENTS: NONE.

Tester/Technician:


KAREN EASTERDAY

Date:

07-20-04

Quality Assurance:


KEN WEBSTER

DATA SHEET 5 - VEHICLE MAX SPEED

VEHICLE: 2004 CHEVROLET MALIBU LS

NHTSA No. C40102 Date: 03/09/04

Ambient Temperature: 34.00°F

Wind Velocity: 2.00(MPH)

Road PFC: .93

Wind Direction: 65°

Odometer: Start 107(mi) End 122(mi)

TEST WEIGHT: Total (Kg): 1661

Front (Kg): 1012

Rear (Kg): 649

ESTABLISH VEHICLE MAXIMUM SPEED

VEHICLE LOAD: LLWV

IBT: N/A

GEAR: Drive

DECEL RATE: N/A

PEDAL FORCE: N/A

WHEEL LOCKUP: N/A

TEST SPEED: Maximum attainable from
a standing start in 3.2 km.

INTERVAL: N/A

1. Ballast Vehicle to LLWV
2. Accelerate at a maximum rate from a standing start for a distance of 3.2 km on a level surface.
3. Repeat in opposite direction.
4. Record speed attained in each direction and use the average of the two runs.

| | DIRECTION | MAX SPEED (km/h) | | Time 0 - 100 KPH (seconds) |
|-----------|-----------|------------------|----------|----------------------------------|
| | | Visual | Recorded | |
| Run No. 1 | South | 170.5km/h | 170.5 | 11.54 |
| Run No. 2 | North | 170.5km/h | 170.5 | 9.31 |

AVERAGE = 170.5 km/h

COMMENTS: INV DATA, Section 0001, 03/10/04, 09:03:40

Tester/Technician:


KAREN EASTERDAY

Date:

04-20-04

Quality Assurance:


KEN WEISTEN

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C44102

Make: CHEVROLET

Model: MALIBU LS

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 207 (Kpa)

Rear Cold Tire Pressure: 227 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937)666-2911 www.trcpcg.com

Date Tested: 03/10/04

DATA SHEET 6 - BRAKISH AT GYRE

Testing Conditions: INV DATA, Section 0082, 03/10/04, 18:26:38

Weather Conditions: 34°F Wind: 11 mph 331°

Start Odo.: 125

End Odo.: 133

Schedule:

Initial Brake Temperature Less Than 100°C

Initial Speed 80 km/h to zero

200 stops with transmission in gear

Performance Requirements:

Interval between runs: Time necessary to reduce TBT to 100 C° or 2 km distance, whichever occurs first.

Constant decel rate: 3.0 m/s

Pedal force adjusted to maintain constant decel.

No Lock-Up allowed longer than 0.1 sec above 15 km/h

Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (kph) | LEFT FRONT TBT (°C) | RIGHT FRONT TBT (°C) | LEFT REAR TBT (°C) | RIGHT REAR TBT (°C) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | AVG. DECEL (m/sec ²) |
|--------|----------------|---------------------|----------------------|--------------------|---------------------|----------------------|----------------------|----------------------------------|
| 1 | 80.00 | 47 | 42 | 25 | 23 | 75.82 | 31.85 | 1.67 |
| 10 | 81.19 | 106 | 101 | 63 | 67 | 73.86 | 40.13 | 2.83 |
| 20 | 79.77 | 108 | 105 | 66 | 71 | 64.85 | 46.07 | 2.70 |
| 30 | 79.83 | 103 | 96 | 63 | 70 | 64.70 | 45.28 | 2.96 |
| 40 | 79.73 | 108 | 101 | 70 | 75 | 62.71 | 40.18 | 3.04 |
| 50 | 79.83 | 109 | 102 | 71 | 76 | 75.82 | 32.72 | 2.95 |
| 60 | 79.19 | 99 | 91 | 61 | 68 | 58.66 | 43.07 | 2.52 |
| 70 | 80.77 | 111 | 103 | 73 | 76 | 61.91 | 38.41 | 2.92 |
| 80 | 80.67 | 116 | 109 | 77 | 80 | 65.13 | 40.18 | 2.77 |
| 90 | 80.28 | 111 | 100 | 78 | 78 | 80.39 | 37.19 | 2.60 |
| 100 | 79.57 | 119 | 108 | 85 | 88 | 64.73 | 46.96 | 2.76 |
| 110 | 79.48 | 117 | 101 | 82 | 83 | 71.74 | 37.65 | 2.73 |
| 120 | 79.84 | 108 | 102 | 82 | 81 | 78.80 | 37.25 | 2.83 |
| 130 | 80.58 | 111 | 98 | 81 | 82 | 50.02 | 34.83 | 2.78 |
| 140 | 79.63 | 111 | 87 | 82 | 81 | 64.33 | 23.08 | 2.52 |
| 150 | 80.10 | 102 | 99 | 83 | 80 | 64.64 | 36.38 | 2.77 |
| 160 | 80.69 | 109 | 93 | 81 | 79 | 64.32 | 35.09 | 2.84 |
| 170 | 80.22 | 117 | 91 | 83 | 82 | 63.79 | 28.97 | 2.68 |
| 180 | 80.07 | 110 | 95 | 81 | 81 | 58.41 | 44.72 | 2.75 |
| 190 | 80.66 | 110 | 98 | 81 | 81 | 61.46 | 39.94 | 2.77 |
| 200 | 80.31 | 109 | 90 | 79 | 77 | 83.54 | 35.54 | 2.79 |

COMMENTS: THIS VEHICLE WAS EQUIPPED. DATA SHEETS 7-10 NOT INCLUDED.

BRAKE ADJUSTMENT

Schedule:

Adjust service brakes; record procedure and amount adjusted.

Left front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED
 Right front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED
 Left rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED
 Right rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.
 DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: TAREN EASTRDAY

Observer: MOSE

Recorded Data Processed by: CHUCK JENKINS

Date: 04/01/04

Approving Laboratory Official: KEN WEBSTER

Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS EXTRA NUMBER: C40102

Make: CHEVROLET

Model: MALIBU LS

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 207 (Kpa)

Rear Cold Tire Pressure: 207 (Kpa)

Transportation Research Center, Inc.

10920 State Route 347

East Liberty, Ohio 43019

(614) 666-2011 www.trc.tyco.com

Date Tested: 03/12/04

DATA SHEET 11 - COLD EFFECTIVENESS AT GYRE

Testing Conditions: INV DATA, Section 0015, 03/12/04, 13:55:24

Weather Conditions: 28°F Wind: 13 mph 280° Start Odo.: 400 End Odo.: 407

Schedule:

Initial Brake Temperature 48 - 100 C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:

One Stop with:
Stopping Distance less than 70m
Pedal force between 65N and 900N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (Kph) | LEFT FRONT | RIGHT FRONT | LEFT REAR | RIGHT REAR | ACTUAL DISTANCE (meters) | CORRECTED DISTANCE (MAY 2003) (meters) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|------------|-------------|-----------|------------|--------------------------|--|----------------------|----------------------|----------------------------------|----------------------------------|
| | | IST (°C) | IST (°C) | IST (°C) | IST (°C) | | | | | | |
| 1 | 99.69 | 83 | 72 | 50 | 44 | 50.8 | 50.9 | 466.72 | 359.89 | 11.23 | 7.14 |
| 2 | 99.43 | 91 | 79 | 56 | 52 | 50.7 | 51.3 | 498.66 | 482.38 | 11.23 | 7.24 |
| 3 | 99.42 | 89 | 76 | 55 | 51 | 52.2 | 52.8 | 470.60 | 363.24 | 11.60 | 7.32 |
| 4 | 100.12 | 88 | 73 | 53 | 51 | 50.4 | 50.3 | 475.83 | 392.90 | 11.02 | 7.41 |
| 5 | 100.23 | 93 | 78 | 56 | 54 | 48.8 | 48.6 | 472.07 | 389.57 | 11.16 | 7.45 |
| 6 | 100.43 | 93 | 77 | 57 | 53 | 49.6 | 49.8 | 488.06 | 379.51 | 11.84 | 7.53 |

DRIVER VEHICLE STOP COMMENTS

| STOP # | (Wheel Lock up - Direction of Stop - Stay in Lane) |
|--------|--|
| 1 | NOX SOUTH YES |
| 2 | NOX SOUTH YES |
| 3 | NOX SOUTH YES |
| 4 | NOX SOUTH YES |
| 5 | NOX SOUTH YES |
| 6 | NOX SOUTH YES |

Corrected Distances are used to determine shortest stopping distance.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN KASTNERDAY
Recorded Data Processed by: CHEVCK JENKINS
Approving Laboratory Official: KEV WENSTER

Observer: NONE
Date: 04/01/04
Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C40182

Make: CHEVROLET

Model: MALIBU LR

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 207 (Kpa)

Rear Cold Tire Pressure: 207 (Kpa)

Transportation Research Center, Inc.

10820 State Route 147

West Liberty, Ohio 43318

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Date Tested: 03/12/04

DATA SHEET 12 - HIGH SPEED EFFECTIVENESS AT GVWR

Testing Conditions: INV DATA, Section 0020, 03/12/04, 14:29:04

Weather Conditions: 28°F Wind: 13 mph 274°

Start Gdo: 408

End Gdo: 416

Schedule:

Initial Brake Temperature: 48-160°C

Initial Speed: 68± max km/h, not greater than 160km/h

4 stops with transmission in gear

Performance Requirements:

One Stop with:

Stopping Distance less than: 133.3 meters

Pedal force between 68N and 500N

No Lock-Up allowed longer than 0.1 sec above 15 km/h

Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (Kph) | LEFT FRONT INT (°C) | RIGHT FRONT INT (°C) | LEFT REAR INT (°C) | RIGHT REAR INT (°C) | ACTUAL DISTANCE (meters) | CORRECTED DISTANCE (SAS 295) (meters) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|---------------------|----------------------|--------------------|---------------------|--------------------------|---------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| 1 | 134.62 | 71 | 59 | 36 | 34 | 88.2 | 87.9 | 448.13 | 387.82 | 12.14 | 8.05 |
| 2 | 134.77 | 86 | 78 | 47 | 48 | 87.4 | 85.5 | 511.72 | 378.30 | 12.94 | 7.91 |
| 3 | 134.58 | 86 | 72 | 47 | 41 | 86.3 | 89.8 | 490.67 | 381.02 | 13.54 | 8.03 |
| 4 | 136.53 | 78 | 64 | 43 | 39 | 86.1 | 87.9 | 482.05 | 378.94 | 12.80 | 7.89 |
| 5 | 135.58 | 92 | 79 | 54 | 49 | 87.2 | 88.3 | 481.50 | 382.00 | 13.81 | 8.05 |
| 6 | 136.28 | 82 | 75 | 42 | 45 | 86.3 | 86.2 | 483.32 | 374.95 | 12.88 | 8.11 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | |
|--------|--|-----|-----------|
| 4 | (wheel Lock up - Direction of Stop - Stay in Lane) | | |
| 1 | - | NOX | SOUTH YES |
| 2 | - | NOX | SOUTH YES |
| 3 | - | NOX | SOUTH YES |
| 4 | - | NOX | SOUTH YES |
| 5 | - | NOX | SOUTH YES |
| 6 | - | NOX | SOUTH YES |

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: SAKEN EASTWOLDAY

Observer: NONE

Recorded Data Processed by: CRUCE JEWINS

Date: 04/01/04

Approving Laboratory Official: KIM WHEATY

Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C40109
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 207 (Kpa)
 Rear Cold Tire Pressure: 207 (Kpa)

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Date Tested: 03/13/04

DATA SHEET 13 - STOPS WITH ENGINE OFF AT GIVE

Testing Conditions: INV DATA, Section 0025, 03/13/04, 15:08:02

Weather Conditions: 23°F Wind: 15 mph 264° Start Odn.: 417 End Odn.: 433

Schedule:

Initial Brake Temperature: 45-100°C
 Initial Speed 100 km/h to zero
 6 stops with transmission in neutral

Performance Requirements:

One Stop with:
 Stopping Distance less than 100m
 Pedal Force between 45N and 500N
 No Look-Up allowed longer than 0.1 sec above 10 km/h
 Vehicle Must stay in lane of 3.0m

| STOP # | INIT SPD (mph) | LEFT FRONT | RIGHT FRONT | LEFT REAR | RIGHT REAR | ACTUAL DISTANCE (meters) | CORRECTED DISTANCE (MAX 200) (meters) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|------------|-------------|-----------|------------|--------------------------|---------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | INT (°C) | INT (°C) | INT (°C) | INT (°C) | | | | | | |
| 1 | 99.86 | 83 | 84 | 49 | 47 | 46.7 | 46.8 | 487.62 | 342.46 | 12.70 | 7.57 |
| 2 | 100.24 | 92 | 89 | 49 | 48 | 47.1 | 46.8 | 537.07 | 382.21 | 12.28 | 7.74 |
| 3 | 100.11 | 93 | 76 | 53 | 51 | 49.0 | 48.1 | 478.27 | 368.78 | 14.08 | 7.83 |
| 4 | 99.23 | 93 | 76 | 55 | 52 | 48.0 | 46.8 | 486.58 | 378.03 | 12.93 | 7.54 |
| 5 | 100.30 | 94 | 78 | 54 | 58 | 49.8 | 49.5 | 485.11 | 381.73 | 12.39 | 7.58 |
| 6 | 89.38 | 96 | 77 | 53 | 51 | 47.8 | 48.1 | 482.48 | 387.49 | 12.96 | 7.69 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | | |
|--------|------------------------------|-------------------|--------------|-----|
| | (Wheel Lock-Up) | Direction of Stop | Stay in Lane | |
| 1 | - | NOX | SOUTH | YES |
| 2 | - | NOX | SOUTH | YES |
| 3 | - | NOX | SOUTH | YES |
| 4 | - | NOX | SOUTH | YES |
| 5 | - | NOX | SOUTH | YES |
| 6 | - | NOX | SOUTH | YES |

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN HASTEDAY
 Recorded Data Processed by: CHUCK JENKINS
 Approving Laboratory Official: KEN WHESTER
 Observer: NONE
 Date: 04/01/04
 Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 307 (Kpa)
 Rear Cold Tire Pressure: 307 (Kpa)

VEHICLE NUMBER: C40102

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Date Tested: 02/15/04

DATA SHEET 14 - COLD EFFECTIVENESS AT LLVN

Testing Conditions: INV DATA, Section 0010, 03/15/04, 09:22:30

Weather Conditions: 28°F Wind: 10 mph 320° Start Odo.: 434 End Odo.: 440

Schedule:

Initial Brake Temperature: 65-100°C
 Initial Speed 100 km/h to zero
 6 stops with transmission in neutral

Performance Requirements:

One Stop with:
 Stopping Distance less than 7m
 Pedal Force between 55N and 500N
 No Lock-Up allowed longer than 0.1 sec above 15 km/h
 Vehicle Must stay in lane of 1.5m

| STOP # | INIT SPD (km/h) | LEFT | | RIGHT | | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|-----------------|-------|------|-------|------|-------------------------|----------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | FRONT | REAR | FRONT | REAR | | | | | | |
| 1 | 100.06 | P1 | R3 | L9 | R6 | 47.8 | 47.4 | 449.07 | 353.48 | 11.97 | 7.43 |
| 2 | 101.01 | R1 | L3 | R2 | L3 | 47.2 | 46.3 | 474.20 | 364.38 | 12.43 | 7.72 |
| 3 | 99.46 | R2 | L5 | R8 | L8 | 46.9 | 47.4 | 483.34 | 379.47 | 12.76 | 7.84 |
| 4 | 99.08 | R8 | L1 | R1 | L4 | 46.5 | 47.5 | 489.27 | 379.42 | 12.62 | 7.82 |
| 5 | 99.15 | R1 | R6 | L1 | L4 | 46.1 | 46.9 | 509.78 | 392.09 | 12.43 | 7.87 |
| 6 | 98.81 | R4 | R6 | L9 | L8 | 47.2 | 48.8 | 491.84 | 374.80 | 12.59 | 7.37 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | |
|--------|------------------------------|-------------------|---------------|
| | Wheel Lock-Up | Direction of Stop | Stay in Lane? |
| 1 | - | NOX SOUTH | YES |
| 2 | - | NOX SOUTH | YES |
| 3 | - | NOX SOUTH | YES |
| 4 | - | NOX SOUTH | YES |
| 5 | - | NOX SOUTH | YES |
| 6 | - | NOX SOUTH | YES |

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN BASTHEDAY
 Recorded Data Processed by: CHUCK JENKINS
 Approving Laboratory Official: KEN WEDSTER

Observer: NONE
 Date: 04/01/04
 Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C40102

Make: CHEVROLET

Model: MALIBU LS

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 287 (Kpa)
Rear Cold Tire Pressure: 207 (Kpa)

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Date Tested: 02/15/04

DATA SHEET 15 - HIGH SPEED EFFECTIVENESS AT LLVM

Testing Conditions: ISV DATA, Section 0035, 02/15/04, 09:59:42

Weather Conditions: 19°F Wind: 4 mph 313° Start Odo.: 441 End Odo.: 450

Schedule:

Initial Brake Temperature: 45-100°C
Initial Speed: 80+ max km/h
4 stops with transmission in gear

Performance Requirements:

One Stop with:
Stopping Distance less than 118.2M
Pedal force between 520 and 580N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (Kph) | LEFT FRONT | RIGHT FRONT | LEFT REAR | RIGHT REAR | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (SEE 289) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|------------|-------------|-----------|------------|-------------------------|--------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | INT (°C) | INT (°C) | INT (°C) | INT (°C) | | | | | | |
| 1 | 137.47 | 62 | 74 | 43 | 39 | 85.6 | 84.3 | 474.58 | 394.00 | 12.60 | 8.07 |
| 2 | 136.93 | 93 | 86 | 44 | 38 | 84.0 | 85.2 | 476.64 | 396.00 | 12.64 | 8.05 |
| 3 | 136.83 | 84 | 87 | 43 | 38 | 83.1 | 82.6 | 507.47 | 390.14 | 12.93 | 8.07 |
| 4 | 135.48 | 86 | 79 | 35 | 28 | 82.7 | 83.8 | 488.37 | 382.24 | 12.89 | 7.91 |
| 5 | 136.44 | 82 | 77 | 31 | 24 | 84.5 | 84.4 | 499.97 | 482.67 | 13.64 | 8.04 |
| 6 | 115.46 | 94 | 84 | 23 | 29 | 83.3 | 82.1 | 504.07 | 483.89 | 12.05 | 8.27 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | |
|--------|------------------------------|---------------------|-----------------|
| | (Wheel Lock-Up) | - Direction of Stop | - Stay in Lane) |
| 1 | - | NOX | SOUTH YES |
| 2 | - | NOX | SOUTH YES |
| 3 | - | NOX | SOUTH YES |
| 4 | - | NOX | SOUTH YES |
| 5 | - | NOX | SOUTH YES |
| 6 | - | NOX | SOUTH YES |

DATA INDICATES COMPLIANCE: YES (2) NO ()

Driver: IANUS EASTRDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENNINS

Date: 04/01/04

Approving Laboratory Official: KIM WENSTER

Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA MIDYEAR: C68103
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 207 (Kpa)
 Rear Cold Tire Pressure: 207 (Kpa)

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Date Tested: 03/15/04

DATA SHEET 16 - ANTILOCK FUNCTIONAL FAILURE AT L11VH

Testing Conditions: INV DATA, Section 0840, 03/15/04, 10:28:10

Weather Conditions: 41°F Wind: 5 mph 1° Start Odo.: 481 End Odo.: 456

Procedure:

Initial Brake Temperature: 45-100°C
 Initial Speed 150 km/h to zero
 6 stops with transmission in neutral

Performance Requirements:

One Stop with:
 Stopping Distance less than 22M
 Pedal force between 65N and 500N.
 No Lock-Up allowed longer than 0.1 sec above 15 km/h
 Vehicle must stay in lane of 3.5M

| STOP # | INIT SPD (kph) | LEFT FRONT | RIGHT FRONT | LEFT REAR | RIGHT REAR | ACTUAL DISTANCE (meters) | CORRECTED DISTANCE (MAX 25P) (meters) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|------------|-------------|-----------|------------|--------------------------|---------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | INT (°C) | INT (°C) | INT (°C) | INT (°C) | | | | | | |
| 1 | 99.32 | 95 | 87 | 35 | 31 | 55.9 | 56.7 | 255.63 | 128.97 | 13.28 | 6.54 |
| 2 | 100.44 | 87 | 79 | 35 | 32 | 59.3 | 58.8 | 162.12 | 124.82 | 10.81 | 6.45 |
| 3 | 99.89 | 97 | 88 | 48 | 39 | 55.3 | 55.6 | 149.89 | 118.64 | 9.68 | 6.63 |
| 4 | 100.61 | 82 | 71 | 34 | 31 | 54.6 | 54.6 | 198.12 | 113.65 | 10.66 | 6.72 |
| 5 | 100.43 | 97 | 83 | 47 | 42 | 59.2 | 58.6 | 153.41 | 115.85 | 10.34 | 6.35 |
| 6 | 98.84 | 91 | 78 | 41 | 38 | 58.8 | 54.1 | 213.66 | 118.07 | 11.31 | 6.71 |

DRIVER VEHICLE STOP COMMENTS
 (Wheel Lock-Up - Direction of Stop - Stay in Lane)

| STOP # | WHEEL LOCK-UP | DIRECTION OF STOP | STAY IN LANE | |
|--------|---------------|-------------------|--------------|-----|
| 1 | - | REX-INIT | SOUTH | YES |
| 2 | - | NOX | SOUTH | YES |
| 3 | - | NOX | SOUTH | YES |
| 4 | - | NOX | SOUTH | YES |
| 5 | - | NOX | SOUTH | YES |
| 6 | - | NOX | SOUTH | YES |

How was the ABS failure indicated: REMOVED 10 AMP FUSE FROM BOX UNDER HOOD ON LEFT SIDE.

Is brake system indicator lamp activated: YES (X) NO ()

Vehicle not equipped with variable deceleration valve. Data Sheet 17 not included.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: EMMY HARTWEG
 Recorded Data Processed by: CHUCK JENKINS
 Approving Laboratory Official: EMM HARTWEG

Observer: NONE
 Date: 04/02/04
 Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS HYUNDAI NUMBER: C46102

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Make: CHEVROLET

Model: MALIBU LS

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 207 (Kpa)

Rear Cold Tire Pressure: 207 (Kpa)

Date Tested: 03/19/04

DATA SHEET 1A - HYDRAULIC CIRCUIT FAILURE #1 AT LLVM

Testing Conditions: INV DATA, Section B08E, 03/19/04, 08:37:52

Weather Conditions: 31°F Wind: E mph 58* HEAT Qdn.: 482 Bad Qdn.: 486

Method of simulating failure: Disconnected Brake Line @ R/C Front Port

System Portion Failed: LF & RR

Schedule:

Initial Brake Temperature: 65-100°C

Initial Speed 100 KM/h to zero

4 stops with transmission in neutral

Performance Requirements:

One Stop with:

Stopping Distance less than 15M

Pedal force between 65N and 900N

No Lock-Up allowed longer than 0.1 sec above 15 km/h

Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (kph) | LEFT FRONT | RIGHT FRONT | LEFT REAR | RIGHT REAR | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (BAR 299) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|------------|-------------|-----------|------------|-------------------------|--------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | INT (°C) | INT (°C) | INT (°C) | INT (°C) | | | | | | |
| 1 | 99.22 | 13 | 74 | 51 | 8 | 97.6 | 98.5 | 487.23 | 409.13 | 7.38 | 4.02 |
| 2 | 99.54 | 12 | 94 | 48 | 6 | 92.6 | 93.8 | 489.74 | 418.87 | 7.51 | 4.82 |
| 3 | 96.44 | 14 | 92 | 44 | 9 | 90.1 | 91.1 | 492.77 | 410.36 | 7.10 | 4.17 |
| 4 | 100.78 | 14 | 94 | 52 | 8 | 93.1 | 91.7 | 487.07 | 382.27 | 7.99 | 4.82 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | | |
|--------|---|-----|-------|-----|
| | (When Lock-Up - Direction of Stop - Stay in Lane) | | | |
| 1 | - | NOX | SOUTH | YES |
| 2 | - | NOX | SOUTH | YES |
| 3 | - | NOX | SOUTH | YES |
| 4 | - | NOX | SOUTH | YES |

Force Needed to Activate Brake Failure Lamp (N): N/A
Fluid Removed (mL) to Activate Brake Failure Lamp: 281

Is brake system indicator lamp activated: YES (X) NO ()

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN HASTHEDAY Observer: MOEN
Recorded Data Processed by: CHUCK JENKINS Date: 04/01/04
Approving Laboratory Official: KEN MCKENZIE Date: 04/08/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C40102

Make: CHEVROLET

Model: MALIBU LS

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 207 (Kpa)

Rear Cold Tire Pressure: 207 (Kpa)

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Date Tested: 03/19/04

DATA SHEET 19 - HYDRAULIC CIRCUIT FAILURE #2 AT LLWV

Testing Conditions: LFV DATA, Section 0055, 03/19/04, 11:51:17

Weather Conditions: 36°F Wind: 5 mph LL1* Start Odo.: 489 End Odo.: 496

Method of simulating failure: Disconnected Brake line @ R/C Rear Port

System Portion Failed: RP & LR

Schedule:

Initial Brake Temperature 45-100°C
Initial Speed 100 km/h to zero
4 stops with transmission in neutral

Performance Requirements:

One Stop with:
Stopping Distance less than 150m
Pedal Force between 45N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane at 3.5m

| STOP # | INIT SPD (km/h) | LEFT | | RIGHT | | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (CAN 299) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|-----------------|----------------|---------------|----------------|---------------|-------------------------|--------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | FRONT INT (°C) | REAR INT (°C) | FRONT INT (°C) | REAR INT (°C) | | | | | | |
| 1 | 99.88 | 27 | 21 | 16 | 45 | 97.5 | 95.5 | 486.82 | 415.58 | 7.82 | 4.15 |
| 2 | 98.71 | 28 | 19 | 18 | 61 | 101.0 | 104.5 | 485.06 | 431.15 | 6.90 | 3.85 |
| 3 | 99.82 | 26 | 18 | 16 | 47 | 106.2 | 106.1 | 520.92 | 447.57 | 6.38 | 3.71 |
| 4 | 89.82 | 25 | 16 | 16 | 47 | 103.3 | 103.4 | 506.55 | 444.47 | 6.11 | 3.61 |

DRIVER VEHICLE STOP COMMENTS

| STOP # | Wheel Lock-Up | Direction of Stop | Stay in Lane | |
|--------|---------------|-------------------|--------------|-----|
| 1 | - | NOX | SOUTH | YES |
| 2 | - | NOX | SOUTH | YES |
| 3 | - | NOX | SOUTH | YES |
| 4 | - | NOX | SOUTH | YES |

Force Needed to Activate Brake Failure Lamp (N): N/A
Fluid Removed (mL) to Activate Brake Failure Lamp: 285

Is brake system indicator lamp activated: YES (X) NO ()

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN HAYWARD Observer: NONE
Recorded Data Processed by: CHUCK JENKINS Date: 04/01/04
Approving Laboratory Official: RUS WHESTER Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 207 (Kpa)
 Rear Cold Tire Pressure: 207 (Kpa)

NHTSA NUMBER: C40182

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Date Tested: 03/19/04

DATA SHEET 20 - HYDRAULIC CIRCUIT FAILURE #1 AT GVWR

Testing Conditions: IFV DATA, Section 0060, 03/19/04, 18:31:20

Weather Conditions: 41°F Wind: 12 mph 180° Start Odo.: 808 End Odo.: 819

Method of simulating failure: Disconnected brake lines @ W/C Front Port

System Portion Failed: LF & RR

Schedule:

Initial Brake Temperature 65-100°C
 Initial Speed 100 km/h to zero
 4 stops with transmission in neutral

Performance Requirements:

One stop with:
 Stopping distance less than 160M
 Pedal force between 65N and 200N
 No lock-up allowed longer than 0.1 sec above 15 km/h
 Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (kph) | LEFT FRONT INT (°C) | RIGHT FRONT INT (°C) | LEFT REAR INT (°C) | RIGHT REAR INT (°C) | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (SEE 300) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|---------------------|----------------------|--------------------|---------------------|-------------------------|--------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| 1 | 98.51 | 33 | 72 | 82 | 24 | 104.4 | 107.5 | 498.63 | 435.93 | 6.74 | 3.63 |
| 2 | 99.49 | 27 | 73 | 47 | 21 | 104.0 | 105.1 | 497.52 | 404.71 | 7.84 | 3.87 |
| 3 | 98.90 | 24 | 95 | 63 | 21 | 98.2 | 97.3 | 497.52 | 404.71 | 6.82 | 3.58 |
| 4 | 99.88 | 22 | 78 | 51 | 16 | 104.4 | 104.7 | 497.52 | 434.16 | 6.82 | 3.58 |

DRIVER VEHICLE STOP COMMENTS

| STOP # | Wheel Lock-Up | Direction of Stop | Stay in Lane |
|--------|---------------|-------------------|--------------|
| 1 | NOX | SOUTH | YES |
| 2 | NOX | SOUTH | YES |
| 3 | NOX | SOUTH | YES |
| 4 | NOX | SOUTH | YES |

Is brake system indicator lamp activated: YES (X) NO ()

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN BASTENDAY
 Recorded Data Processed by: CRUCK JENKINS
 Approving Laboratory Official: IAN WRIGHT

Observer: NONE
 Date: 04/01/04
 Date: 04/08/04

Vehicle: 2004 GENERAL MOTORS VIN#A NUMBER: C40102
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN

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Front Cold Tire Pressure: 197 (kpa)
 Rear Cold Tire Pressure: 207 (kpa)

Date Tested: 03/19/04

DATA SHEET 21 - HYDRAULIC CIRCUIT FAILURE #2 AT GVWR

Testing Conditions: INV DATA, Section 0045, 03/19/04, 13:22:17

Weather Conditions: 38°F Wind: 4 mph 145° Start Odo.: 698 End Odo.: 502

Method of simulating failure: Disconnected Brake Line B R/C Rear Ford

System Portion Failed: RF & LR

Subtests:

Initial Brake Temperature 85-120°C
 Initial Speed 100 km/h to zero
 4 stops with transmission in neutral

Performance Requirements:

One Stop with:
 Stopping distance less than 150m
 Pedal Force between 400N and 600N
 No Lock-Up allowed longer than 0.1 sec above 15 km/h
 Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (kph) | LEFT FRONT | | RIGHT FRONT | | ACTUAL DISTANCE (meters) | CORRECTED DISTANCE (SAS DEF) (meters) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|------------|----------|-------------|----------|--------------------------|---------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | INT (°C) | EXT (°C) | INT (°C) | EXT (°C) | | | | | | |
| 1 | 89.81 | 74 | 17 | 18 | 45 | 110.1 | 111.2 | 583.80 | 440.16 | 5.56 | 3.43 |
| 2 | 89.81 | 69 | 17 | 18 | 36 | 94.8 | 94.8 | 487.83 | 481.73 | 6.63 | 3.84 |
| 3 | 100.16 | 86 | 18 | 19 | 61 | 105.6 | 105.3 | 498.50 | 410.42 | 5.99 | 3.44 |
| 4 | 89.79 | 92 | 17 | 19 | 57 | 95.1 | 95.5 | 512.65 | 475.21 | 6.53 | 3.89 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | |
|--------|------------------------------|-------------------|---------------|
| | Wheel Lock-Up | Direction of Stop | Stay in Lane! |
| 1 | - | NOK | SOUTH YES |
| 2 | - | NOK | SOUTH YES |
| 3 | - | NOK | SOUTH YES |
| 4 | - | NOK | SOUTH YES |

Is brake system indicator lamp activated: YES (X) NO ()

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN HASTEDAY
 Recorded Data Processed By: CHECK JENNINE
 Approving Laboratory Official: KEV WHESTER

Observer: ROME
 Date: 04/01/04
 Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C48102

Make: CHEVROLET

Model: MALIBU LS

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 207 (kpa)

Rear Cold Tire Pressure: 207 (kpa)

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Date Tested: 02/27/04

DATA SHEET 22 - ANTILOCK FUNCTIONAL FAILURE AT GYRE

Testing Conditions: LRV DATA, Section 0070, 02/22/04, 13:24:41

Weather Conditions: 29°F Wind: 5 mph 331° Start Cdo.: 528 End Cdo.: 223

Schedule:

Initial Brake Temperature 65-100°C

Initial Speed 100 km/h to zero

6 stops with transmission in neutral

Performance Requirements:

One Stop with:

Stopping Distance less than 35M

Pedal Force between 40N and 50N

No Lock-Up allowed longer than 0.1 sec above 15 km/h

Vehicle must stay in lane of 3.5M

| STOP # | INIT SPD (kph) | LEFT FRONT T° (°C) | RIGHT FRONT T° (°C) | LEFT REAR T° (°C) | RIGHT REAR T° (°C) | ACTUAL DISTANCE (meter) | CONNECTED DISTANCE (MAX 250) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec²) | AVG. DECEL (m/sec²) |
|--------|----------------|--------------------|---------------------|-------------------|--------------------|-------------------------|--------------------------------------|----------------------|----------------------|---------------------|---------------------|
| | | | | | | | | | | | |
| 1 | 99.78 | 76 | 63 | 62 | 45 | 82.5 | 92.8 | 318.79 | 184.08 | 10.08 | 6.78 |
| 2 | 99.61 | 63 | 76 | 57 | 62 | 53.9 | 64.3 | 177.85 | 127.73 | 10.04 | 6.48 |
| 3 | 100.82 | 68 | 73 | 66 | 64 | 53.0 | 62.0 | 225.58 | 148.84 | 10.31 | 6.81 |
| 4 | 100.48 | 73 | 62 | 35 | 33 | 53.1 | 62.8 | 222.48 | 123.70 | 10.85 | 6.48 |
| 5 | 100.89 | 94 | 63 | 51 | 48 | 53.3 | 52.7 | 202.88 | 147.86 | 10.47 | 6.80 |
| 6 | 100.36 | 90 | 78 | 42 | 41 | 58.8 | 57.6 | 181.56 | 126.89 | 8.66 | 6.28 |

STOP # DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)

| STOP # | WHEEL LOCK-UP | DIRECTION OF STOP | STAY IN LANE | |
|--------|---------------|-------------------|--------------|-----|
| 1 | - | NOX | SOUTH | YES |
| 2 | - | NOX | SOUTH | YES |
| 3 | - | NOX | SOUTH | YES |
| 4 | - | NOX | SOUTH | YES |
| 5 | - | NOX | SOUTH | YES |
| 6 | - | NOX | SOUTH | YES |

How was the ABS failure induced: REMOVED 10 AMP FUSE FROM BCM UNDER HOOD ON LEFT SIDE.

Is brake system indicator lamp activated: YES (X) NO ()

Vehicle not equipped with variable proportioning valve. Data Sheet 22 not included.

Data indicates compliance: YES (X) NO ()

Driver: KAREN HARTSHORN

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 04/01/04

Approving Laboratory Official: KIM WEBSTER

Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS METRA NUMBER: C40193
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 207 (Kpa)
 Rear Cold Tire Pressure: 207 (Kpa)

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Date Tested: 03/22/04

DATA SHEET 24 - BRAKE POWER UNIT OR PWR ASSIST UNIT IN/OP AT GVWR

Testing Conditions: HW DATA, Section 0080, 03/22/04, 14:05:14

Weather Conditions: 31°F Wind: 8 mph 308° Start Odo.: 534 End Odo.: 539

Failure Simulation: Disconnect primary source of power.

Method of rendering inoperative: removed Engine Vacuum Hose at Booster

Schedule:

Initial Brake temperature 65-100°C
 Initial Speed 100 km/h to zero
 6 stops with transmission in neutral

Performance Requirements:

One Stop with:
 Stopping Distance less than 1.65m
 Pedal force between 45N and 100N
 No Lock-Up allowed longer than 0.1 sec above 10 km/h
 Vehicle must stay in lane of 2.5m

| STOP # | INIT SPD (km/h) | LEFT FRONT | | RIGHT FRONT | | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (SAE 299) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|-----------------|------------|----------|-------------|----------|-------------------------|--------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | INP (°C) | OUT (°C) | INP (°C) | OUT (°C) | | | | | | |
| 1 | 99.82 | 83 | 74 | 48 | 38 | 136.1 | 136.4 | 499.28 | 470.29 | 4.61 | 3.89 |
| 2 | 100.13 | 86 | 84 | 48 | 48 | 127.2 | 126.9 | 496.73 | 480.63 | 5.29 | 3.11 |
| 3 | 99.82 | 84 | 72 | 37 | 38 | 129.6 | 130.1 | 502.34 | 481.08 | 5.88 | 3.12 |
| 4 | 99.61 | 79 | 65 | 33 | 36 | 125.6 | 126.6 | 495.35 | 480.44 | 5.73 | 3.23 |
| 5 | 99.86 | 79 | 66 | 34 | 38 | 118.6 | 116.7 | 498.76 | 472.58 | 5.37 | 3.27 |
| 6 | 100.07 | 88 | 76 | 39 | 43 | 119.4 | 119.2 | 504.79 | 489.94 | 5.85 | 3.11 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | | |
|--------|------------------------------|-------------------|--------------|-----|
| | Wheel Lock-Up | Direction of Stop | Stay in Lane | |
| 1 | - | NOX | SOUTH | YES |
| 2 | - | NOX | SOUTH | YES |
| 3 | - | NOX | SOUTH | YES |
| 4 | - | NOX | SOUTH | YES |
| 5 | - | NOX | SOUTH | YES |
| 6 | - | NOX | SOUTH | YES |

Is the brake system indicator lamp activated: YES () NO (X)

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: IANUS BASTARDAY
 Recorded Date Processed by: CHUCK JENNINS
 Approving Laboratory Official: KEM WEBSTER
 Observer: NONE
 Date: 04/01/04
 Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C44281
 Make: CHEVROLET
 Model: MALIBU LE
 Body Style: 4-DOOR SEDAN

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Front Cold Tire Pressure: 207 (Kpa)
 Rear Cold Tire Pressure: 207 (Kpa)

Date Tested: 03/23/04

DATA SHEET 25 - PARKING BRAKE AT GYRE

Testing Conditions: INV DATA, Section 5085, 03/23/04, 10:24:18
 Parking brake: AUTOMATIC TR Non-service type: NOT APPL.

Service type: FOOT-OPERATED

Weather Conditions: 39°F Wind: 21 mph 234°

Start Odo.: 543

End Odo.: 549

Test Weight: Total:1813kg Front:1021kg Rear: 692kg

Schedule:

Initial Brake Temperature <100°C or (ambient temp.
 if non-service brake type materials)
 Loaded to GVWR with transmission in neutral
 Drive onto 20% slope in forward and reverse directions.

Performance Requirements:

Up to Three Applies in each direction:
 Parking brake must hold the vehicle stationary
 in both directions for 5 minutes each.
 Pedal force: Hand control: <400 N
 Foot control: <980 N

NOTE: For vehicles with parking brake systems not utilizing the
 service brake friction elements, the friction elements of such systems
 are to be furnished prior to parking brake tests according to the
 manufacturer's published recommendation as furnished to the purchaser.
 If no recommendations are furnished, test the system in an unfurnished
 condition. If recommendations are furnished, record method used.

| APPLY # | MAX SERVICE FORCE (N) | MAX P-BRAKE FORCE (N) | LEFT | RIGHT | AVG | DRIVER VEHICLE STOP COMMENTS (Direction of Stop (Up/Down) - Brake holds/fails) |
|---------|-----------------------|-----------------------|---------------|---------------|---------------|---|
| | | | REAR INT (°C) | REAR INT (°C) | REAR INT (°C) | |
| 1 | 92.7 | 491.8 | 41 | 41 | 48.6 | UPHILL HOLDS 20s |
| 2 | 138.2 | 618.4 | 24 | 24 | 24.2 | DOWNHILL HOLDS 20s |

Is brake system indicator lamp activated: YES (X) NO ()

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: MARKS HASTENDAY
 Recorded Data Processed by: CHUCK JENKINS
 Approving Laboratory Official: KIM WESSTER

Observer: NONE
 Date: 04/01/04
 Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: U40102
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 307 (Kpa)
 Rear Cold Tire Pressure: 307 (Kpa)

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Date Tested: 03/23/04

DATA SHEET 26 - HEATING SNUBS AT GYME

Testing Conditions: XEV DATA, Section 8090, 03/23/04, 11:06:53

Procedure:

Conduct 15 snubs from 120 Km/h or 90% Vmax, whichever is slower, to 1/2 of initial speed.
 Attain required decel in 2 second and maintain that decel.
 Interval between snubs is 45 seconds and NOT to initial speed.

Performance Requirements:

Initial IRT for first snub is 80-85°C
 Maintain 1.0 m/s/s deceleration
 Vehicle must stay in lane of 3.5m

| SNUB # | AVG. DECEL (m/sec ²) | Time Between Snubs (seconds) | AVG. PEDAL FORCE (N) | LEFT | RIGHT | LEFT | RIGHT | INIT SPD (kph) |
|--------|----------------------------------|------------------------------|----------------------|----------------|----------------|---------------|---------------|----------------|
| | | | | FRONT IRT (°C) | FRONT IRT (°C) | REAR IRT (°C) | REAR IRT (°C) | |
| 1 | 2.97 | 45 | 55.88 | 58 | 53 | 35 | 38 | 120.75 |
| 2 | 2.88 | 45 | 35.16 | 100 | 91 | 65 | 68 | 119.41 |
| 3 | 2.70 | 45 | 38.19 | 144 | 133 | 82 | 88 | 119.38 |
| 4 | 2.88 | 45 | 40.69 | 174 | 163 | 109 | 108 | 120.45 |
| 5 | 2.59 | 45 | 34.39 | 197 | 191 | 129 | 126 | 120.22 |
| 6 | 2.56 | 45 | 44.67 | 218 | 214 | 146 | 143 | 119.15 |
| 7 | 2.67 | 45 | 41.88 | 229 | 220 | 164 | 166 | 128.56 |
| 8 | 2.81 | 45 | 48.89 | 239 | 239 | 184 | 189 | 118.98 |
| 9 | 2.85 | 45 | 36.08 | 254 | 248 | 194 | 181 | 120.69 |
| 10 | 2.85 | 45 | 32.40 | 267 | 263 | 206 | 191 | 120.87 |
| 11 | 2.98 | 45 | 33.84 | 274 | 259 | 219 | 208 | 119.94 |
| 12 | 2.74 | 45 | 38.42 | 284 | 269 | 224 | 207 | 120.59 |
| 13 | 2.83 | 45 | 33.75 | 284 | 278 | 235 | 213 | 120.69 |
| 14 | 2.93 | 45 | 41.42 | 289 | 287 | 238 | 217 | 121.03 |
| 15 | 2.48 | 45 | 35.40 | 283 | 297 | 245 | 223 | 124.96 |

STOP #

DRIVER VEHICLE SENS COMMENTS

(Wheel Lock-Up - Direction of Stop - Stay in Lane)

| STOP # | WHEEL LOCK-UP | DIRECTION OF STOP | STAY IN LANE |
|--------|---------------|-------------------|--------------|
| 1 | NOX | NORTH | YES |
| 2 | NOX | EAST | YES |
| 3 | NOX | SOUTH | YES |
| 4 | NOX | WEST | YES |
| 5 | NOX | SOUTH | YES |
| 6 | NOX | WEST | YES |
| 7 | NOX | WEST | YES |
| 8 | NOX | NORTH | YES |
| 9 | NOX | NORTH | YES |
| 10 | NOX | NORTH | YES |
| 11 | NOX | EAST | YES |
| 12 | NOX | SOUTH | YES |
| 13 | NOX | SOUTH | YES |
| 14 | NOX | SOUTH | YES |
| 15 | NOX | WEST | YES |

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN KATZMAY Observer: NONE
 Recorded Data Processed by: CHECK JENKINS Date: 04/02/04
 Approving Laboratory Official: KIM WHEATER Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C40102

Make: CHEVROLET

Model: MALIBU LS

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 287 (Kpa)

Rear Cold Tire Pressure: 287 (Kpa)

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Date Tested: 03/23/04

DATA SHEET 27 - HOT PERFORMANCE AT GVWR

Testing Conditions: INV DATA, Section 8095, 03/23/04, 11:17:58

Schedule:

Make 2 stops from 100 kph

Pedal Force: 1st stop is done with an average force not greater than the average recorded in the shortest GVWR Cold Effectiveness stop. 2nd stop is done with a force not greater than 500 N.

No Lock-Up allowed longer than 0.1 sec above 15 km/h.

Distance Requirements are based on the following:

shortest stop in Data Sheet 11 is: 5

initial speed of stop: 100.23 (kph)

Actual distance of stop: 48.4 (meter)

Average pedal force: 368.4 (N)

Performance Requirements:

Stop Number 1 must be equal or less than: 74.7 (meter)

In addition the stopping distance for at least one of the of the two hot stops must be equal or less than: 89 (meter)

| STOP | INIT SPD (kph) | LEFT FRONT | RIGHT FRONT | LEFT REAR | RIGHT REAR | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (SEE 299) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|------|----------------|------------|-------------|-----------|------------|-------------------------|--------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | INT (°C) | INT (°C) | INT (°C) | INT (°C) | | | | | | |
| 1 | 99.98 | 289 | 307 | 254 | 233 | 48.0 | 48.1 | 368.86 | 379.83 | 12.17 | 7.61 |
| 2 | 99.36 | 299 | 318 | 265 | 236 | 50.3 | 50.4 | 463.89 | 348.28 | 12.47 | 8.94 |

| STOP | DRIVER VEHICLE STOP COMMENTS | | | |
|------|--|-----|------|-----|
| | (Wheel Lock-Up - Direction of Stop - Stay in Lane) | | | |
| 1 | - | NOX | WEST | YES |
| 2 | - | NOX | WEST | YES |

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTHEAD

Observer: NONE

Recorded Data Processed by: CRUCK JENKINS

Date: 04/01/04

Approving Laboratory Official: KEN WEAVER

Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C46102
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 207 (kpa)
 Rear Cold Tire Pressure: 207 (kpa)

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Date Tested: 03/23/04

DATA SHEET 24 - BRAKE COOLING STOPS AT GVWR

Testing Conditions: IGV DATA, Section 0108, 03/23/04, 11:20:46

Schedule:

Initial Brake Temperature:
 Achieved on completing Hot Performance
 Initial Speed 50 km/h to zero
 4 stops with transmission in gear

Performance Requirements:

Constant Decel Rate: 2.0 m/s/s
 Pedal force adjusted as necessary
 No Lock-Up allowed longer than 0.1 sec above 15 km/h
 Vehicle must stay in lane of 3.5m

| STOP # | INIT SPD (kph) | AVG. DECEL (m/sec ²) | AVG. | LEFT | RIGHT | LEFT | RIGHT |
|--------|----------------|----------------------------------|-----------------|----------------|----------------|---------------|---------------|
| | | | PEDAL FORCE (N) | FRONT INT (°C) | FRONT INT (°C) | REAR INT (°C) | REAR INT (°C) |
| 1 | 49.98 | 3.14 | 49.75 | 264 | 279 | 224 | 209 |
| 2 | 49.43 | 2.67 | 36.61 | 222 | 217 | 176 | 176 |
| 3 | 49.55 | 2.67 | 40.03 | 199 | 182 | 151 | 155 |
| 4 | 50.89 | 2.73 | 28.41 | 176 | 152 | 131 | 135 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | |
|--------|------------------------------|-------------------|--------------|
| | Wheel Lock up | Direction of Stop | Stay in Lane |
| 1 | NOX | NORTH | YES |
| 2 | NOX | NORTH | YES |
| 3 | NOX | NORTH | YES |
| 4 | NOX | EAST | YES |

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: IAKEN EASTRDAY
 Recorded Data Processed by: CHUCK JENKINS
 Approving Laboratory Official: IAN WEBSTER

Observer: NONE
 Date: 04/01/04
 Date: 04/05/04

Vehicle: 2004 GENERAL MOTORS NHTSA NUMBER: C44192
 Make: CHEVROLET
 Model: MALIBU LS
 Body Style: 4-DOOR SEDAN
 Front Cold Tire Pressure: 207 (Kpa)
 Rear Cold Tire Pressure: 207 (Kpa)

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Date Tested: 03/23/04

DATA SHEET 29 - RECOVERY PERFORMANCE AT GVWR

Testing Conditions: IMV DATA, Section 0102, 03/23/04, 11:17:36

Weather Conditions: 40°F Wind: 20 mph 210° Start Odo.: 558 End Odo.: 568

Subgoals:

Make 2 stops from 100 kph
 Pedal Force: Both stops were performed with an average force not greater than the average recorded in the shortest GVWR Cold Effectiveness Stop.

Performance Requirements:

One of the two stops must be within the following limits:
 Upper limit of corrected stopping distance: 65.8 (meter)
 Lower limit of corrected stopping distance: 35.9 (meter)

No Lock-Up allowed longer than 0.1 sec above 15 km/h.

Distance Requirements are based on the following:

Shortest stop in Data Sheet 11 is: Stop 8
 Initial speed of stop: 100.23 (kph)
 Actual distance of stop: 48.8 (meter)
 Average pedal force: 368.6 (N)

| STOP # | INIT SPD (kph) | LEFT FRONT | RIGHT FRONT | LEFT REAR | RIGHT REAR | ACTUAL DISTANCE (meter) | CORRECTED DISTANCE (MAX 255) (meter) | MAX. PEDAL FORCE (N) | AVG. PEDAL FORCE (N) | MAX. DECEL (m/sec ²) | AVG. DECEL (m/sec ²) |
|--------|----------------|------------|-------------|-----------|------------|-------------------------|--------------------------------------|----------------------|----------------------|----------------------------------|----------------------------------|
| | | IST (°C) | IST (°C) | IRT (°C) | IRT (°C) | | | | | | |
| 1 | 99.75 | 143 | 142 | 121 | 123 | 46.7 | 46.8 | 413.99 | 289.39 | 12.94 | 7.37 |
| 2 | 99.24 | 181 | 187 | 129 | 136 | 49.8 | 49.7 | 451.94 | 312.28 | 12.32 | 7.18 |

| STOP # | DRIVER VEHICLE STOP COMMENTS | | | |
|--------|--|-----|-------|-----|
| | (Wheel Lock-Up - Direction of Stop - Stay in Lane) | | | |
| 1 | - | NOX | SOUTH | YES |
| 2 | - | NOX | SOUTH | YES |

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN BASTEDAY
 Recorded Date Processed by: CRUCE JERKINS
 Approving Laboratory Official: KEE WEBSTER
 Observer: ROWE
 Date: 04/03/04
 Date: 04/05/04

DATA SHEET 30 (Part 1 of 5)
8.0 Test Completion Inspection (7.17)

VEHICLE: 2004 Chevrolet Malibu LS NHTSA NO.: C40102 DATE: 03/30/04

System Integrity (S5.6)

Each vehicle shall meet the complete performance requirements of this standard without:

- (a) Detachment or fracture of any component of the braking system such as brake springs and brake shoes or disc pad facings, other than minor cracks, that do not impair attachment of the friction facings. All mechanical components of the braking system shall be intact and functional. Friction facing tearout (complete detachment of lining) shall not exceed 10 percent of the lining on any single frictional element.
- (b) Any visible brake fluid or lubricant on the friction surface of the brake or leakage at the master cylinder or brake power unit reservoir cover, seal, and filler openings.

| Friction Material Condition: Primary/Inner | | Friction Material Condition: Secondary/Outer | |
|---|---------------------------|---|---------------------------|
| LF | Normal Appearance & Color | LF | Normal Appearance & Color |
| RF | Normal Appearance & Color | RF | Normal Appearance & Color |
| LR | Normal Appearance & Color | LF | Normal Appearance & Color |
| RR | Normal Appearance & Color | RR | Normal Appearance & Color |
| Drum (or Rotor) Condition: | | Brake Fluid/Lubricant Inside Brakes: | |
| LF | Normal Appearance & Color | LF | None |
| RF | Normal Appearance & Color | RF | None |
| LR | Normal Appearance & Color | LR | None |
| RR | Normal Appearance & Color | RR | None |
| Hydraulic Component Condition: | | Mechanical Component Condition: | |
| LF | Good | Brk/Pedal | Good |
| RF | Good | Power Brk | Good |
| LR | Good | Stop/Lamp | Good |
| RR | Good | Linkage | Good |
| MCyl | Good | Other | NA |

COMPLIANCE: Yes X No
 Comments: None.

Technician: K. Easterday

**DATA SHEET 30 (Part 2 of 5)
TEST COMPLETION INSPECTION (S7.17)**

VEHICLE: 2004 Chevrolet Malibu LS; NHTSA NO.: C40102; GVWR: 1914 kg
MASTER CYLINDER RESERVOIR:

| DATE | 03/28/04 | | Requirements | Pass | Fail |
|---|-----------|---|--------------|------|------|
| Reservoir Compartments (85.4.1) | | | | | |
| (1) Does master cylinder have a reservoir compartment for each brake subsystem? | Yes | Master cylinder shall have a reservoir compartment for each subsystem. | X | | |
| | No | | | | |
| (2) Does loss of fluid in one compartment result in complete loss from another compartment? | Yes | Loss of fluid from one compartment shall not cause complete loss from another compartment. | X | | |
| | No | | | | |
| Reservoir Capacity (85.4.2) | | | | | |
| Shell conform to requirements (1) or (2), state units: | | | | | |
| (1) For reservoirs having completely separate compartments for each subsystem (two separate, independent reservoirs): | | | | | |
| Subsystem 1 Subsystem reservoir capacity | | Each compartment (reservoir) shall have a minimum capacity equivalent to the fluid displacement resulting when all wheel cylinders or caliper pistons serviced by that independent compartment/reservoir moves from a new lining, fully retracted position to a fully worn, properly adjusted, fully applied position. (Use Data Sheet 31 and Appendix 1A) | NA | NA | |
| Subsystem 1 Fluid displaced from new to worn lining | | | | | |
| Subsystem 2 Subsystem reservoir capacity | | | NA | NA | |
| Subsystem 2 Fluid displaced from new to worn lining | | | | | |
| (2) For reservoirs utilizing a portion of the reservoir for a common supply to two or more subsystems: | | | | | |
| Total minimum capacity for the entire master cylinder reservoir (includes individual compartment reservoirs) | 488 ml | Shell have total minimum capacity for entire reservoir for displacement resulting from all subsystem wheel cylinders or caliper pistons moving from new lining to full worn condition as above. | X | | |
| Fluid displaced from new to worn linings (ALL linings) *Value calculated from Data Sheet 31 | 178.3 ml* | | | | |

Comments: None

DATA SHEET 30 (Part 3 of 5)
TEST COMPLETION INSPECTION (S7.18)

VEHICLE: 2004 Chevrolet Malibu LS; NHTSA NO.: C40102; GVWR: 1914 kg

MASTER CYLINDER RESERVOIR:

| DATE | 08/28/04 | | Requirements | Pass | Fail | | |
|---|----------|--|--------------|------|------|---|--|
| Master Cylinder Piston Displacement(S6.4.2) (if Common Reservoir Supply - continued from previous page) | | | | | | | |
| Fluid displaced by three strokes of master cylinder piston for Primary (Subsystem No. 1) | 25 ml | Individual partial compartments of reservoir shall each have a minimum of fluid equal to at least the volume displaced by the master cylinder piston servicing the subsystem during a <u>full stroke</u> of the piston. NOTE: Procedure uses three strokes to ensure an accurate measurement. | | | | | |
| Fluid displaced by three strokes of master cylinder piston for Secondary (Subsystem No. 2) | 23 ml | | | | | | |
| Fluid displaced per stroke, Primary | 8.3 ml | | | | | | |
| Fluid displaced per stroke, Secondary | 7.7 ml | | | | | | |
| Fluid available in partial compartment Subsystem No. 1 | 91 ml | | | | | X | |
| Fluid available in partial compartment Subsystem No. 2 | 52 ml | | | | | X | |
| Brake Power Unit Reservoir (B5.4.2) | | | | | | | |
| Volume displaced in charging system piston or accumulator to normal operating pressure plus wheel cylinder or caliper piston displacement. | | Shall have a capacity at least equal to fluid displacement required to charge the system pistons or accumulators to normal operating pressure <u>plus</u> displacement when wheel cylinders or caliper pistons move from new lining to full worn condition as above. | NA | | | | |
| Reservoir Labeling (B5.4.3) | | | | | | | |
| Exact copy of reservoir label: On master cylinder reservoir cap: WARNING, CLEAN FILLER CAP BEFORE REMOVING, USE ONLY DOT 3 BRAKE FLUID FROM A SEALED CONTAINER. | | Label shall read: "Warning, clean filler cap before removing; use only " fluid from a sealed container". " Fluid type specified in 49 CFR 571.116 | X | | | | |
| Measure letter height | 3.2 mm | Letters shall be at least 3.2 mm/ 0.125" high | X | | | | |
| Describe label attachment method and location. <u>Embossed on the left side of the master cylinder reservoir.</u> | | Lettering shall be permanently affixed, engraved or embossed and located so as to be visible by direct view either on or within 100 mm/3.94 inches of the brake fluid reservoir filler plug or cap. | X | | | | |
| Does the lettering contrast with the background? | Yes | If label is not engraved or embossed, letters shall be of a color that contrasts with the background | NA | | | | |
| | No | | | | | | |

Comments: None
 Technician: K. Easterday

DATA SHEET 30 (Part 4 of 5)
TEST COMPLETION INSPECTION (\$7.18)

VEHICLE: 2004 Chevrolet Malibu LS; NHTSA NO.: C40102; DATE: 03/26/04
BRAKE SYSTEM WARNING INDICATOR (\$5.5)

| CONDITION | ANSWER | REQUIREMENTS | PASS | FAIL |
|--|-----------------|---|------|------|
| Brake Systems Indicator Lamp Function Check (\$5.5.2) (Bulb and systems check) | | | | |
| Describe location of brake indicator lamp: <u>Lower right quadrant of the instrument cluster.</u> | NA | Shall be in front, and in clear view, of driver. | X | |
| Does lamp light with ignition (start) switch at ON/RUN? | Yes | Automatic activation when ignition switch is "on" when engine not running, or ignition between "on" and "start" if is manufacturer check position- OR -single manual action by driver | X | |
| Does lamp light with ignition between ON and Start? | No | | | |
| Brake check description in owner's manual? | Yes | Manufacturer shall explain the brake check function test procedure in the owner's manual. | X | |
| Brake System Warning Indicator ACTIVATION (\$5.5.1) DURATION (\$5.5.3) FUNCTION (\$5.5.4) | | | | |
| CONDITION | Light ON? | REQUIREMENT | PASS | FAIL |
| A. In event of hydraulic leak (1) On or before appearance of pressure differential of 218 psi (split system) | NA | When Ignition (Start) switch is ON, lamp must light whenever (A), (B), (C), or (D) occurs. In addition, if service brake system is not a split system, audible warning must be activated when any condition in (A) exists. Visual warning indicator for non-split systems must be flashing. | X | |
| (2) If any reservoir falls below either "safe" level or 25% of capacity, whichever is greater. | Yes | | | |
| (3) On or before supply pressure to brake power unit falls to 50% | NA | | | |
| B. Electrical functional failure in an antilock or variable brake proportioning system. | Yes | | X | |
| C. Application of the parking brake. | Yes | | | |
| D. Brake lining wear-out if optical warning | NA | | | |
| <u>Must have Audible alarm if not split system and a condition in (a) above exists?</u> | NA | | | |
| If condition (A) (2) above does not exist, then fluid reservoir must be transparent for fluid check without the need for reservoir to be opened? (\$5.4.4) | NA | | | |
| Indicator lamps remain activated as long as condition exists - Ignition "on", and engine on or off? (\$5.5.3 DURATION) | Yes | | | |
| Visual warning - continuous or flashing? Audible warning - continuous or flashing? | Yes-Cont. NA | | | |

Comments: None.

Technician: K. Easterday

**DATA SHEET 30 (Part 5 of 5)
TEST COMPLETION INSPECTION (\$7.18)**

VEHICLE: 2004 Chevrolet Malibu LS; NHTSA NO.: C40102; DATE: 03/26/04

BRAKE SYSTEM WARNING INDICATOR LABELING (\$5.5.5)

| CONDITION AND REQUIREMENT | ANSWER NOTE: Standard requires that the answer to questions be YES | PASS | FAIL |
|---|---|------|------|
| Are visual indicators legible to driver in daylight and nighttime conditions when activated? | Yes | X | |
| Are visual indicator words 3.2 mm (.125") high minimum? Record Height: "Brake" - <u>3.2 mm</u> ; "ABS" - <u>3.2 mm</u> . | Yes | X | |
| Visual indicator words and background contrasting colors, one of which is red. Record colors. Letters - <u>red</u> . Lens - <u>Black</u> | Yes | X | |
| If split system, is there one brake indicator? If yes, does it say the word "Brake"? | Yes | X | |
| If not split system, is there a separate indicator for loss of fluid or fluid pressure? Does this indicator say "Stop-Brake Failure"? Are the letters black and not less than 6.4 mm (.25") in height? Record letter height <u>NA</u> | NA | | |
| If separate indicator for: 1. Low brake fluid per S5.5.1(a)(1), does indicator say "Brake Fluid"? NOTE: not required for mineral oil system Record wording <u>NA</u> 2. Gross pressure loss per S5.5.1(a)(2), does indicator say "Brake Pressure"? Record wording <u>NA</u> 3. Electrical functional failure in antilock or variable proportioning system per S5.5.1(b), letters and background contrasting colors one of which is yellow? Record colors. Lens - <u>Black</u> . Letters - <u>Amber or yellow</u> Does indicator say "Antilock" or "ABS" or "Brake Proportioning"? Record wording <u>"ABS" within symbol</u> 4. Parking brake per S5.5.1(c), does indicator say "Park" or "Parking Brake"? Record wording <u>NA</u> 5. Brake lining wear-out per S5.5.1(d), does indicator say "Brake Wear"? Record wording <u>NA</u> 6. For any other function? If yes, Record <u>NA</u> | NA NA Yes Yes NA NA NA | X | |

Comments: None.
Technician: K. Easterday

DATA SHEET 31 (Part 1 of 2)

CALCULATION OF MINIMUM RESERVOIR VOLUME REQUIREMENTS

VEHICLE: 2004 Chevrolet Malibu LS; NHTSA NO.: C40102; DATE: 04/13/04

| BRAKE | | LINING | | | |
|---|-----------------------|---|--------------------|----------|---------------------------------|
| LOCATION | TYPE | DESCRIPTION | MINIMUM THICKNESS | | THICKNESS TO FULLY WORN (1) mm" |
| Left Front | Drum | Leading | Pre-test | 12.85 mm | 0.94 |
| | | Primary | Post Test | 11.99 mm | |
| | | Inboard X | Δ | 0.86 mm | |
| | Disc X | Trailing | Pre-test | 12.56 mm | 0.94 |
| | | Secondary | Post Test | 11.99 mm | |
| | | Outboard X | Δ | 0.68 mm | |
| LINING CLEARANCE: | Diametrical (2): N/A | Inboard - 0.15 mm | Outboard - 0.15 mm | | |
| WHEEL CYLINDER DIAMETER (3): N/A | | CALIPER PISTON DIAMETER (3): 60.15 mm | | | |
| SHOE CAGE DIAMETER (4) <u>N/A</u> ; CENTER POINT OF BRAKE ASSY TO CENTER POINT OF W.C. <u>N/A</u> | | | | | |
| Right Rear | Drum | Leading | Pre-test | 8.84 mm | 1.53 |
| | | Primary | Post Test | 8.43 mm | |
| | | Inboard X | Δ | 0.21 mm | |
| | Disc X | Trailing | Pre-test | 8.56 mm | 1.53 |
| | | Secondary | Post Test | 8.10 mm | |
| | | Outboard X | Δ | 0.46 mm | |
| LINING CLEARANCE: | Diametrical (2) - N/A | Inboard - 0.15 mm | Outboard - 0.15 mm | | |
| WHEEL CYLINDER DIAMETER (3): N/A | | CALIPER PISTON DIAMETER (3): 36.05 mm | | | |
| SHOE CAGE DIAMETER (4): N/A | | CENTER POINT OF BRAKE ASSY TO CENTER PT. OF W.C.: N/A | | | |
| CIRCUIT #1 CONSISTS OF: | LF - X | LR | RF | RR - X | |
| CIRCUIT #2 CONSISTS OF: | LF | LR - X | RF - X | RR | |
| (1) MFRS. RECOMMENDATIONS - 0.84 mm front, 1.53 mm rear. | | | | | |
| (2) REAR - TOP OF RIVET HEADS - N/A. | | | | | |
| FRONT - 1/32 INCH - N/A. MFRS. DATA - N/A. | | | | | |
| (2) DRUM BRAKES, MEASURED AT HORIZONTAL CENTERLINE: N/A | | | | | |
| (3) MFRS. DATA: Frt.: 60.33 mm; Rear: 38.0 mm. | | | | | |
| (4) RESET POSITION: N/A | | | | | |

Comments: Manufacturer's new lining thickness: Frt. - 12.83 mm; Rears - 8.79 mm.
 Technician: K. Easterday

DATA SHEET 31 – SECTION CONTINUED (Part 2 of 2)Vehicle: 2004 Chevrolet Malibu LS;NHTSA No.: C40102;Date: 04/13/04**Procedure and Example for Determining Master Cylinder Volume Requirement**

The procedure followed for determining the minimum volume requirements is outlined in the example shown below. The required data is taken from the previous page.

DISC BRAKES

Volume Required, $V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times [\pi (D^2)/4]$, where –

- : V_r = Volume required per wheel
- Δt = Change in thickness (average)
- i = Inboard
- o = Outboard
- D = Caliper cylinder diameter
- c = Average clearance

Using the above equations, the volume requirements for Subsystem No. 1 (LF, RR) and Subsystem No. 2 (RF, LR) were calculated utilizing measured and manufacturer's provided data to create the greatest displacement, as shown below:

Disc Brake: $V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times \frac{\pi D^2}{4}$
(Front)

$\Delta t_i = 11.89 \text{ mm}$
 $\Delta t_o = 11.89 \text{ mm}$
 $t_{ic} + t_{oc} = 0.30 \text{ mm}$
 $D = 60.33 \text{ mm}$
 $V_r = (11.89 + 0.15 + 11.89 + 0.15) \frac{\pi (60.33)^2}{4}$
 $= 24.08 (2858.62)$
 $= 68835.6 \text{ mm}^3 = 68.8 \text{ ml}$

Disc Brake: $V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times \frac{\pi D^2}{4}$
(Rear)

$\Delta t_i = 8.79 \text{ mm}$
 $\Delta t_o = 8.79 \text{ mm}$
 $t_{ic} + t_{oc} = 0.30 \text{ mm}$
 $D = 38.05 \text{ mm}$
 $V_r = (8.79 + 0.15 + 8.79 + 0.15) \frac{\pi (38.05)^2}{4}$
 $= 17.88 (1137.1)$
 $= 20331.4 \text{ mm}^3 = 20.3 \text{ ml}$

For System 1 (LF, RR)

$$V_{r1} = 68835.6 \text{ mm}^3 + 20331.4 \text{ mm}^3$$

$$V_{r1} = 98167.0 \text{ mm}^3 = (98.2 \text{ ml})$$

For System 2 (RF, LR)

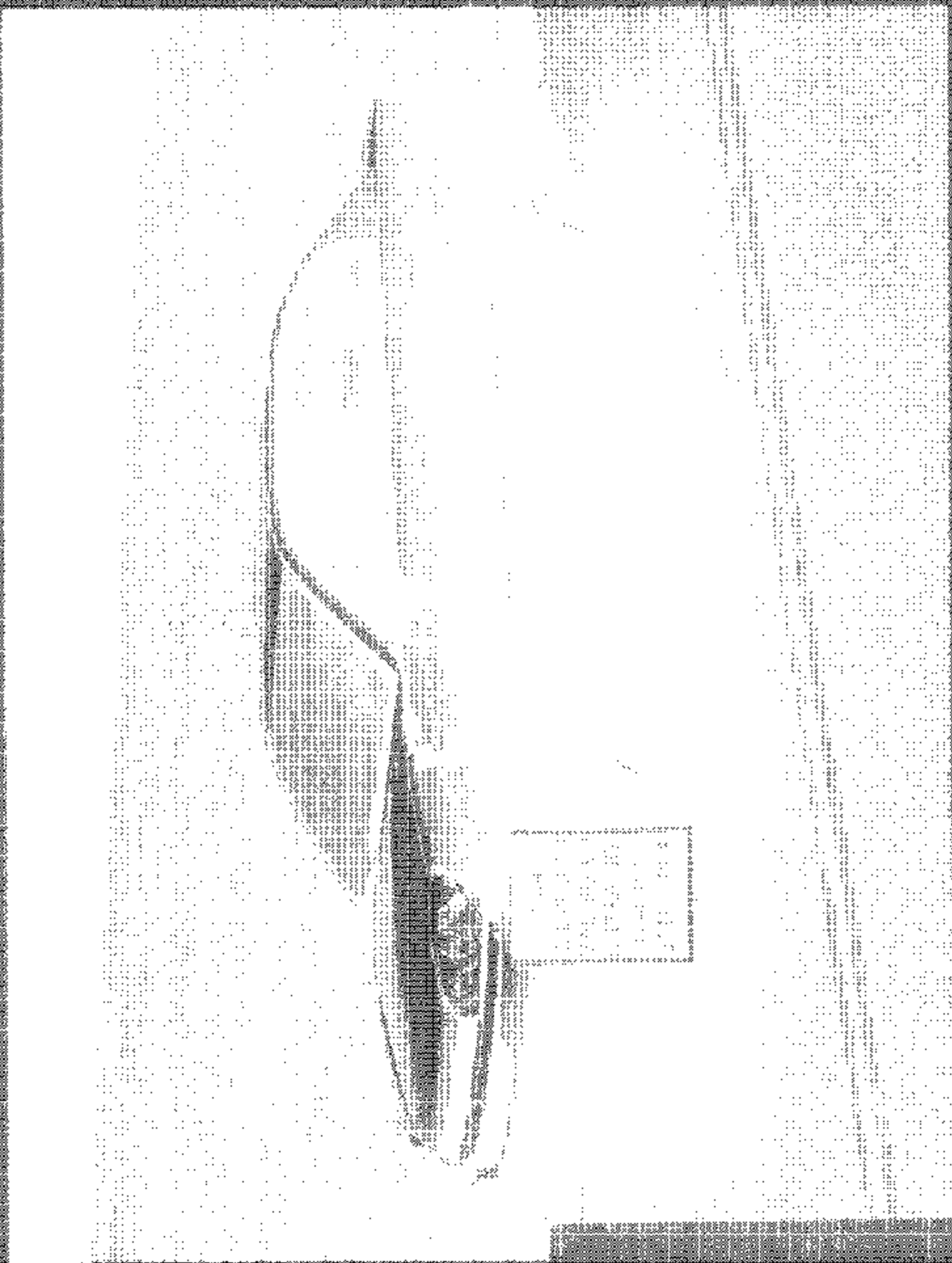
$$V_{r2} = V_{r1}$$

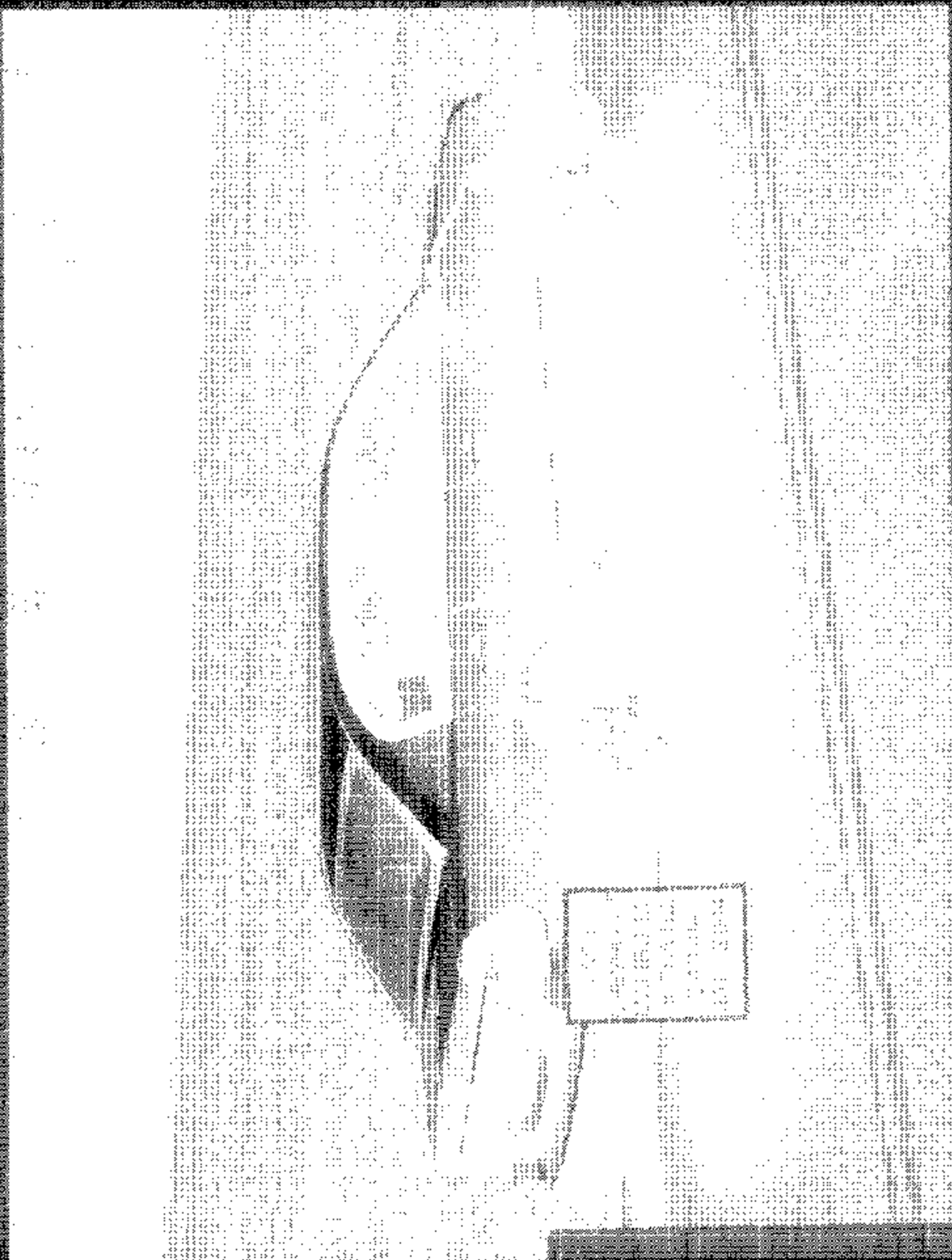
$$V_{r2} = 98167.0 \text{ mm}^3 = (98.2 \text{ ml})$$

$$\text{TOTAL VOLUME REQUIRED} = V_t = V_{r1} + V_{r2} = 178344.0 \text{ mm}^3 = 178.3 \text{ ml}^*$$

SECTION 6.0

Photographs



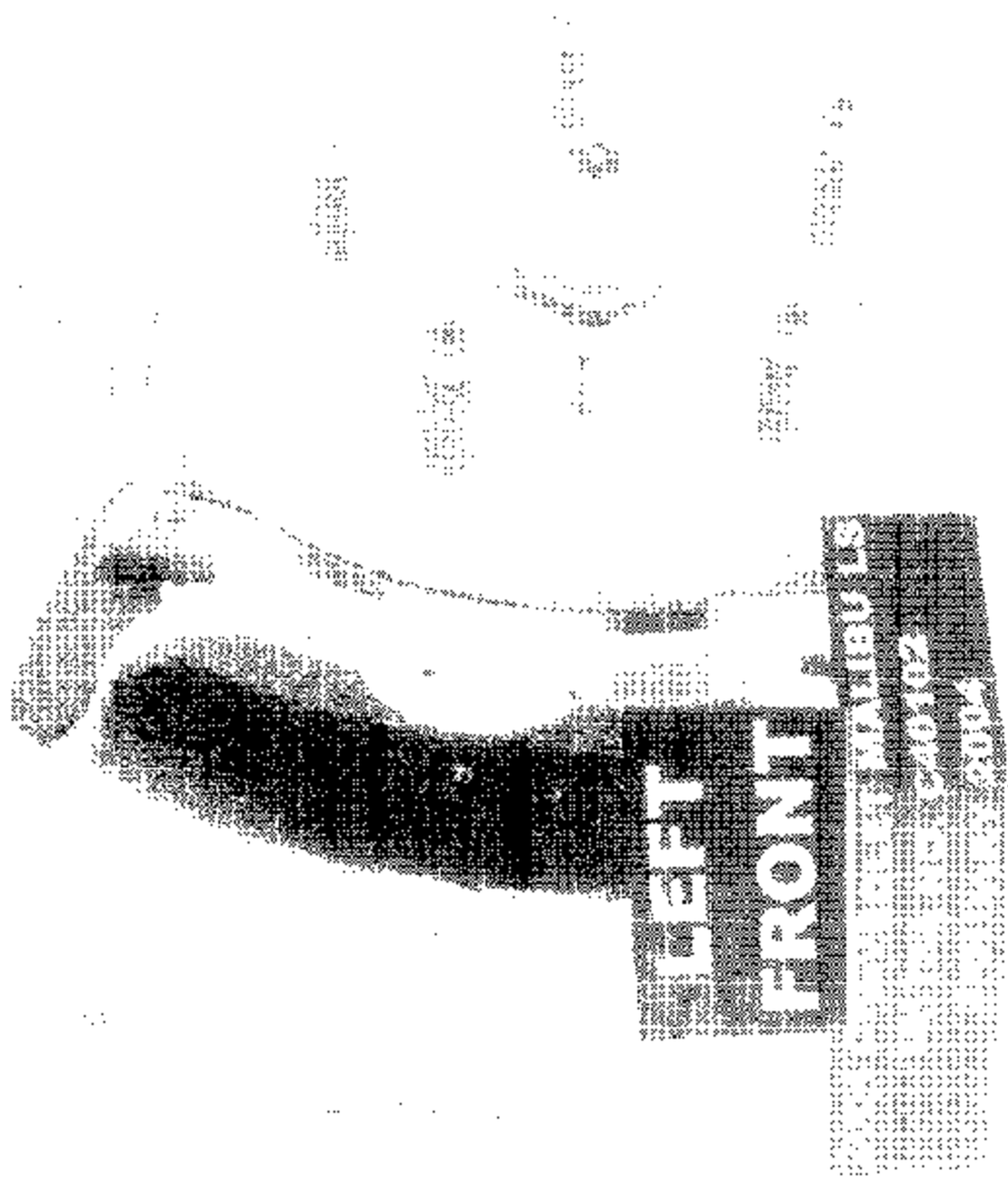


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**RIGHT
REAR**

2000 PONTIAC VIBELET MALIBU LS
2001 PONTIAC VIBELET MALIBU LS
2002 PONTIAC VIBELET MALIBU LS
2003 PONTIAC VIBELET MALIBU LS
2004 PONTIAC VIBELET MALIBU LS

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

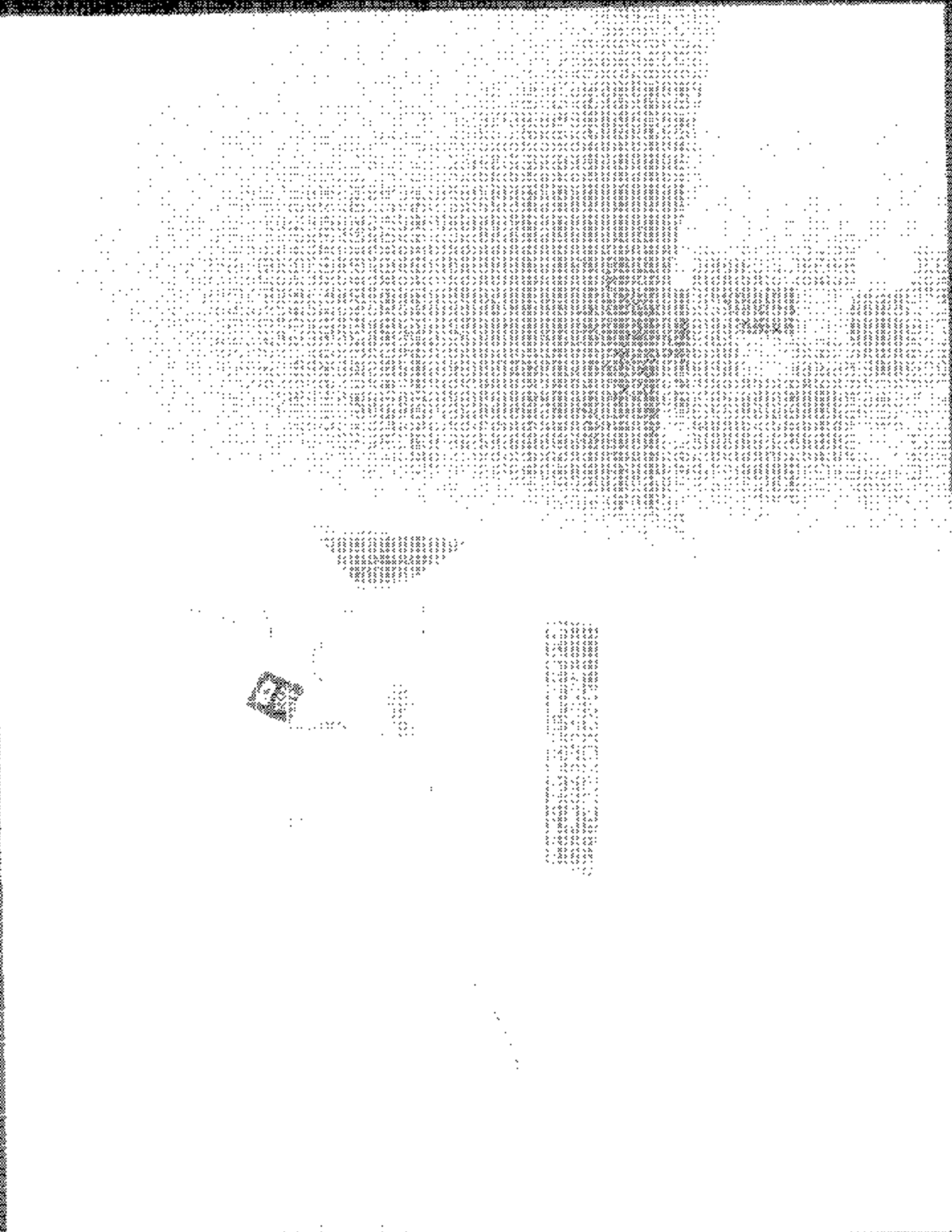
2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent and reliable data collection processes to ensure the validity of the results.

3. The third part of the document describes the procedures for data analysis and interpretation. It provides a detailed overview of the statistical techniques and models used to derive meaningful insights from the collected data.

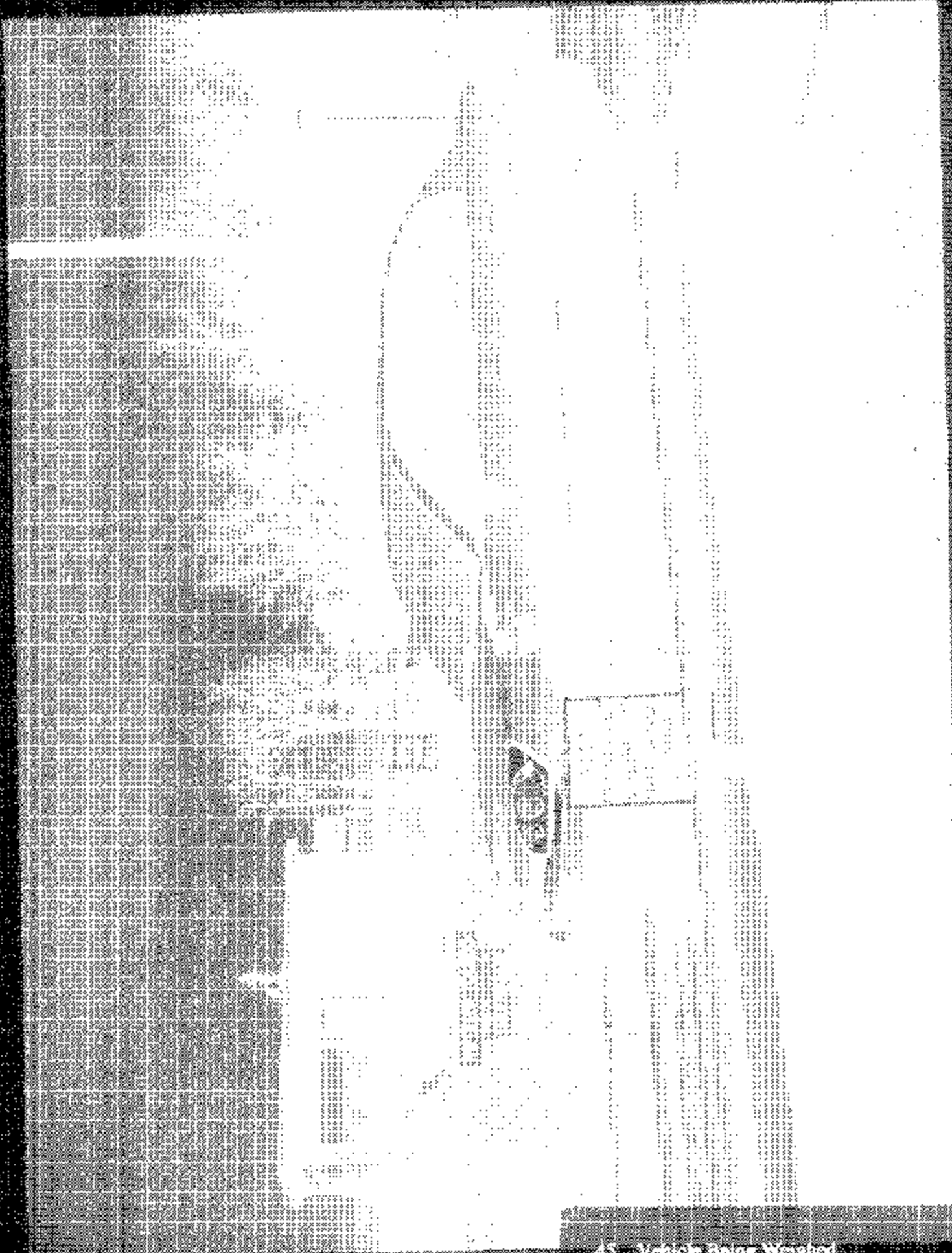
4. The fourth part of the document discusses the implications of the findings and the recommendations for future research. It suggests that further studies should be conducted to explore the long-term effects and potential applications of the research.

5. The fifth part of the document provides a summary of the key findings and conclusions. It reiterates the importance of the research and the need for continued efforts in this field.

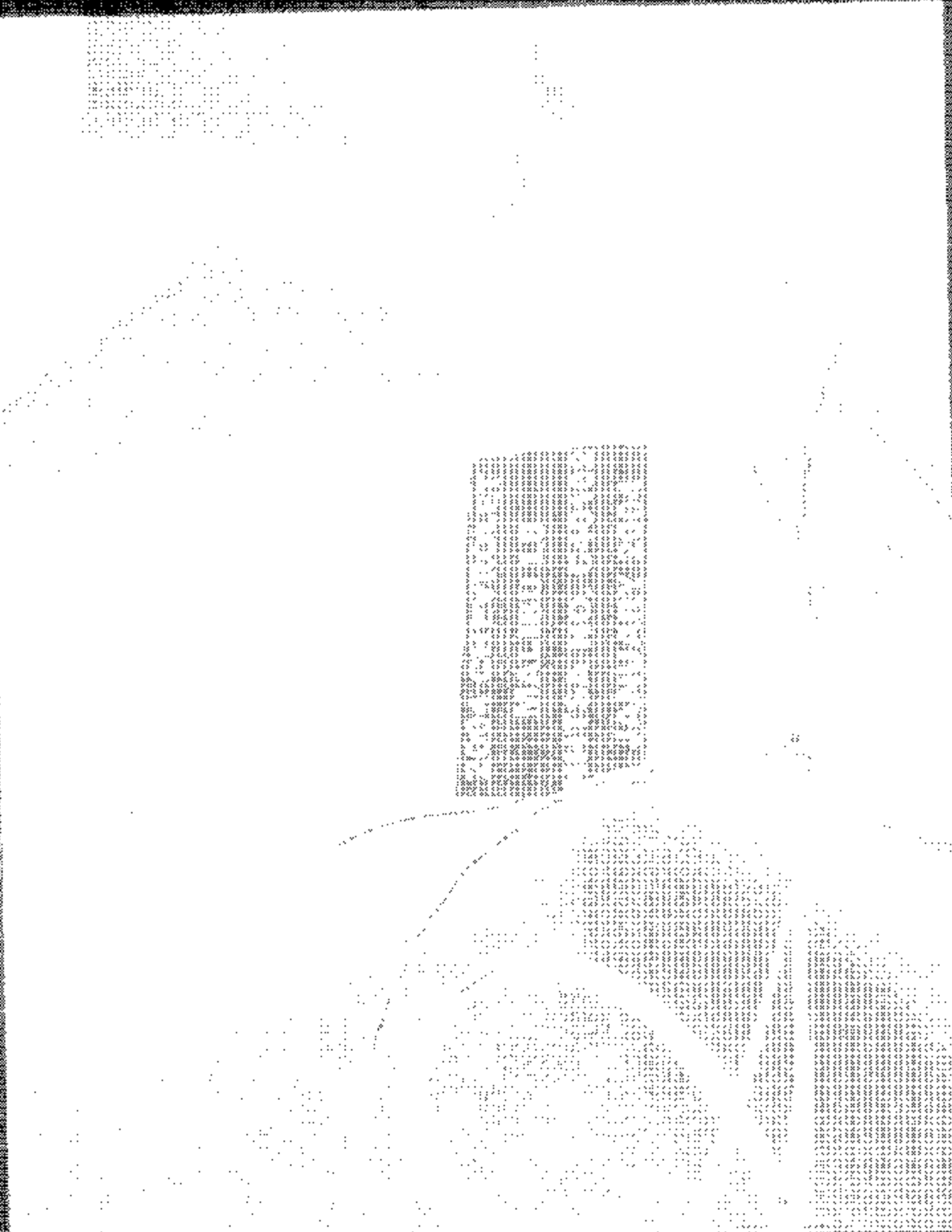
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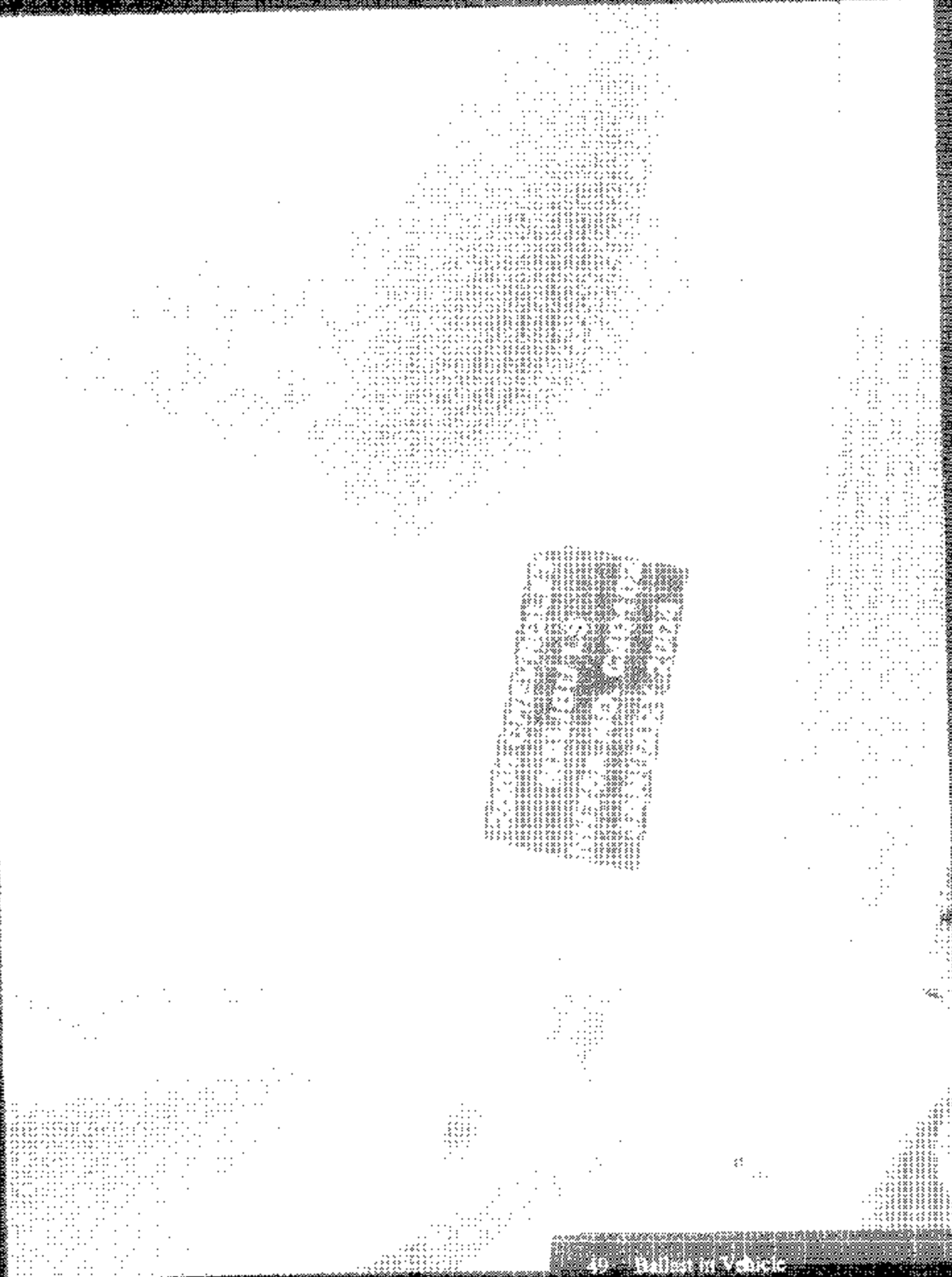




2004 CHEVROLET
MALIBU LS
NHTSA NO. C40102
JANUARY 2004



2004 CHEVROLET MALIBU LB
NHTSA NO. C40102
JANUARY 2004



2000

2000

2000



2000



7.0 INSTRUMENT CALIBRATION (12 MONTH MAXIMUM INTERVAL)

VEHICLE: 2004 Chevrolet Malibu LS; NHTSA NO.: C40102; DATE: 03/30/04

| INSTRUMENT | SERIAL NUMBER | CALIBRATION DATE | NEXT CALIBRATION |
|--|----------------------------------|------------------|------------------|
| Data Acquisition System - Link DAS 2030 | 975016 | 10/23/03 | 10/23/04 |
| Computer - Dell Latitude/Link Engr. | TRC-43207 | Not Applicable | Not Applicable |
| Software - Link Engr. Rev Data | TRC Propr. | NA | NA |
| LF Torque Wheel | Not Utilized | | |
| RF Torque Wheel | Not Utilized | | |
| LR Torque Wheel | Not Utilized | | |
| RR Torque Wheel | Not Utilized | | |
| Stopwatch - Accusplit | SW ST03 | 04/08/03 | 04/08/04 |
| Tire Pressure Gauge - Ashcroft | AG-05 | 11/25/03 | 11/25/04 |
| Voltage Multimeter - Dana 4300 | M-108639 | 11/25/03 | 11/25/04 |
| Pedal Force Transducer - Sensor Devel. | LC-168755 | Each Test | Each Test |
| Asst. Pipe-Handle Steel Weights - Ohaus | LB-0002 | 05/12/03 | 05/12/04 |
| Park Brake Force Transducer - Interface | 41721 | Each Test | Each Test |
| LF Hydraulic Pressure Transducer | Not Utilized | | |
| RF Hydraulic Pressure Transducer | Not Utilized | | |
| LR Hydraulic Pressure Transducer | Not Utilized | | |
| RR Hydraulic Pressure Transducer | Not Utilized | | |
| Accelerometer - Setra (+ or - 15 g) 141A | A-1055763 | Each Test | Each Test |
| Fifth Wheel - ADAT DSR-08 Radar | 140.0119 | Each Test | Each Test |
| Wind Velocity/Direct. - Davis Model 6410 | WXB308193A | 09/15/03 | 09/15/04 |
| Ambient Temp. Gage - Davis Model 6320 | WXB308193A | 09/15/03 | 09/15/04 |
| LF Brake Thermocouple - Temprel/Link | T62-08-24K | Ea. Test w/Link | Ea. Test w/Link |
| RF Brake Thermocouple - Temprel/Link | T52-08-24K | Ea. Test w/Link | Ea. Test w/Link |
| LR Brake Thermocouple - Temprel/Link | T52-08-24K | Ea. Test w/Link | Ea. Test w/Link |
| RR Brake Thermocouple - Temprel/Link | T52-08-24K | Ea. Test w/Link | Ea. Test w/Link |
| Lock-up Detection System | TRC Propr. | Each Test | Each Test |
| Vehicle Weight - Toledo/Mettler | 7561RD4011 SN 52258317 512 | 01/29/04 | 04/29/04 |

QUALITY ASSURANCE *[Signature]*

DAILY CALIBRATIONS (1 of 3)

Vehicle: 2004 Chevrolet Malibu LS

NHTSA No.: C40102

Deceleration Calibration Data for Unit 4354

Desired full scale value is: 9.81 m/s/s

Allowed deviation is: + or - 0.15 m/s/s

Accelerometer Level to zero, then tilt to full scale

| "Date" | "Time" | Zero | Cal |
|-----------|----------|---------|---------|
| "stp" | "stp" | "Decel" | "Decel" |
| 3/9/2004 | 14:27:47 | 0.02 | 9.82 |
| 3/10/2004 | 8:46:39 | 0.01 | 9.77 |
| 3/11/2004 | 8:27:00 | -0.05 | 9.72 |
| 3/12/2004 | 13:37:41 | -0.12 | 9.74 |
| 3/12/2004 | 15:35:46 | -0.05 | 9.86 |
| 3/15/2004 | 9:16:34 | 0.01 | 9.77 |
| 3/19/2004 | 8:34:17 | 0.03 | 9.77 |
| 3/19/2004 | 16:46:24 | 0.00 | 9.80 |
| 3/22/2004 | 13:09:37 | -0.03 | 9.81 |
| 3/22/2004 | 15:11:42 | -0.05 | 9.75 |
| 3/23/2004 | 10:05:24 | 0.00 | 9.80 |
| 3/23/2004 | 11:34:51 | 0.06 | 9.84 |
| 3/26/2004 | 11:59:36 | -0.02 | 9.83 |

PRE-TEST CAL

POST-TEST CAL

Pre-Test Linearity Check 03/04/04

| Actual (m/s/s) | Rec. (m/s/s) |
|----------------|--------------|
| 0.0 | 0.0 |
| 3.0 | 3.0 |
| 6.1 | 6.1 |
| 9.8 | 9.8 |

Post-Test Linearity Check 03/23/04

| Actual (m/s/s) | Rec. (m/s/s) |
|----------------|--------------|
| 0.0 | 0.0 |
| 3.0 | 3.0 |
| 6.1 | 6.1 |
| 9.8 | 9.8 |

Distance Calibration Data for Unit 4354

Desired full scale value is: 1000 m

Allowed deviation is: 3 m

Light beam distance sensor Drive from 0 to 100 to 0 km/h on a measured kilometer

| "Date" | "Time" | Distance for |
|-----------|----------|--------------|
| "stp" | "stp" | 1000 meters |
| 3/10/2004 | 8:38:40 | 999.7 |
| 3/11/2004 | 8:45:52 | 1003.9 |
| 3/12/2004 | 13:42:59 | 1003.6 |
| 3/12/2004 | 15:40:15 | 1003.4 |
| 3/15/2004 | 9:13:32 | 1000.4 |
| 3/19/2004 | 9:27:49 | 999.9 |
| 3/19/2004 | 15:57:28 | 1004.7 |
| 3/22/2004 | 13:20:16 | 1001.3 |
| 3/22/2004 | 15:18:35 | 1000.7 |
| 3/23/2004 | 10:19:54 | 1001.2 |
| 3/23/2004 | 11:38:44 | 1001.2 |

PRE-TEST CAL

POST-TEST CAL

DAILY CALIBRATIONS CONTINUED (2 of 3)

VEHICLE: 2004 Chevrolet Malibu LS

NHTSA No.: C40102

Wheel Tachometer Calibrations for Unit 4354

Wheel tachometer calibrations: all wheel speeds should be 15 km/h

Wheel lock detector

While at a standstill, check zeros. Drive vehicle at approx. 15 km/h and engage zero speed switch for each wheel

| "Date" stp | "Time" stp | Zero LF | @ 15km/h LF | Zero RF | @ 15km/h RF | Zero LR | @ 15km/h LR | Zero RR | @ 15km/h RR |
|---------------|---------------|------------|----------------|------------|----------------|------------|----------------|------------|----------------|
| 03/12/2004 | 13:48:15 | -0.1 | 15.7 | 0.0 | 15.2 | 0.0 | 15.4 | 0.0 | 16.0 |
| 03/12/2004 | 15:36:35 | -0.1 | 16.1 | 0.0 | 15.2 | 0.0 | 15.9 | 0.0 | 16.7 |
| 03/15/2004 | 8:12:36 | 0.0 | 16.2 | 0.0 | 16.7 | 0.0 | 15.9 | 0.0 | 14.8 |
| 03/19/2004 | 8:11:25 | 0.0 | 22.0 | 0.0 | 16.5 | 0.0 | 20.5 | 0.0 | 17.1 |
| 03/19/2004 | 16:49:49 | 0.0 | 16.8 | 0.0 | 16.7 | -24.9 | -8.6 | 0.0 | 18.2 |
| 03/22/2004 | 13:07:48 | -0.1 | 17.3 | 0.0 | 16.7 | -0.1 | 19.8 | -2.1 | 20.2 |
| 03/22/2004 | 15:15:08 | 0.0 | 17.6 | 0.0 | 16.2 | 0.0 | 20.6 | 0.0 | 27.8 |
| 3/23/2004 | 10:16:16 | 0.0 | 15.9 | 0.0 | 18.2 | 0.0 | 20.0 | -0.3 | 22.1 |
| 3/23/2004 | 11:37:52 | 0.0 | 17.1 | 0.0 | 18.3 | 0.0 | 20.2 | 0.0 | 26.4 |

PRE-TEST CAL

POST-TEST CAL

When driven over 15 km/hr and the wheel tech generators are shunted to zero volts, do all four wheel lock indicators align?: Yes, No.

Pedal Force Meter Calibration for Unit 4354

Target shunt calibration is 388 N

Desired recorded value is: 388 N

Desired recorded calibration value is: 500 N

Allowed deviation is: 6.5 N

Service brake pedal effort

Driver engages a fixed shunt cal switch.

| "Date" stp | "Time" stp | Zero Force | Cal Val Force lb |
|---------------|---------------|---------------|---------------------|
| 3/8/2004 | 14:31:50 | -0.1 | 488.1 |
| 3/10/2004 | 8:45:48 | -0.4 | 388.6 |
| 3/11/2004 | 8:28:01 | -0.4 | 388.6 |
| 3/12/2004 | 13:36:59 | -0.2 | 388.6 |
| 3/12/2004 | 15:34:54 | -0.6 | 388.4 |
| 3/15/2004 | 9:09:18 | -0.6 | 388.4 |
| 3/19/2004 | 9:08:29 | -0.3 | 388.9 |
| 3/19/2004 | 15:48:06 | -0.9 | 388.7 |
| 3/22/2004 | 10:23:00 | -0.3 | 388.6 |
| 3/22/2004 | 16:13:31 | -0.6 | 388.8 |
| 3/23/2004 | 10:08:34 | -0.3 | 389.0 |
| 3/23/2004 | 11:34:29 | -0.3 | 388.6 |
| 3/29/2004 | 6:51:28 | -0.5 | 497.7 |

PRE-TEST CAL

POST-TEST CAL

Pre-Test Linearity Check - 03/09/04

| Actual Force (N) | Recorded Force (N) |
|---------------------|-----------------------|
| 0 | 0 |
| 222 | 222 |
| 445 | 445 |
| 499 | 499 |

Post-Test Linearity Check - 03/23/04

| Actual Force (N) | Recorded Frc(N) |
|---------------------|--------------------|
| 0 | 0 |
| 222 | 224 |
| 446 | 448 |
| 499 | 497 |

DAILY CALIBRATIONS CONTINUED (3 of 3)

VEHICLE: 2004 Chevrolet Malibu LS

NHTSA No. C40102

Dynamic Speed Calibration for Unit 4354

Desired speed value is: 100 km/h

Allowed deviation is: 1.8 km/h

Desired time value is: 36 seconds

Allowed deviation is: + or - 0.6 seconds

Light beam
speed sensor Drive vehicle
at a steady
100 km/h
through a
kilometer.

| "Date" | "Time" | "Speed" | "Time" |
|-----------|----------|---------|--------|
| stp | stp | km/h | sec |
| 3/10/2004 | 8:49:05 | 100.7 | 35.96 |
| 3/11/2004 | 8:44:01 | 100.4 | 36.30 |
| 3/12/2004 | 13:40:50 | 100.6 | 36.12 |
| 3/12/2004 | 15:38:09 | 99.8 | 36.40 |
| 3/15/2004 | 9:10:56 | 100.3 | 36.25 |
| 3/19/2004 | 9:10:06 | 100.8 | 35.75 |
| 3/19/2004 | 15:51:53 | 100.3 | N/A |
| 3/22/2004 | 10:27:09 | 100.7 | 36.43 |
| 3/22/2004 | 15:16:13 | 101.1 | 36.09 |
| 3/23/2004 | 10:17:49 | 100.0 | 36.12 |
| 3/23/2004 | 11:36:50 | 100.6 | 36.15 |

PRE-TEST CAL

POST-TEST CAL

APPENDIX A

Copy of Manufacturer's Sticker

2004 MALIBU 1.8 SFI TAN
3.5L V6 ENGINE

4-SPEED AUTO TRANSMISSION

EXTERIOR LIGHT UPFRONT W/ WASH WIPER
INTERIOR NEUTRAL

CHEVROLET  WILL BE THERE

STANDARD EQUIPMENT

Items Featured Below are Included at NO EXTRA CHARGE in the Standard Vehicle Price Shown at Right

- 3.5L V6 ENGINE
- 4-SPEED AUTO TRANSMISSION
- ELECTRIC-VARIABLE STEERING
- 4-WHEEL INDEPENDENT SUSPEN.
- SAFETY & SECURITY ***
- DRIVER & PASS FRONT AIR BAGS
- ANTI-LOCK BRAKES WITH TRACTION CONTROL
- PASS-KEY (w/ IMMOBILIZER)
- VEHICLE THEFT-DETERRENT
- DAYTIME RUNNING LAMPS
- AUTOMATIC HEADLAMP CONTROL
- RR CHILD SEAT LATCH SYSTEM
- EMERGENCY TRUNK RELEASE HMOL
- BATTERY RUN-DOWN PROTECTION
- EXTERIOR ***
- 15" ALLOY WHEELS
- INTERMITTENT WIPERS

- POWER OUTSIDE MIRRORS
- INTERIOR ***
- AIR CONDITIONING
- POWER DOOR LOCKS
- POWER WINDOWS W/ EXPRESS DOWN
- POWER TRUNK RELEASE
- TILT/TELESCOPIC STEERING WHL
- CRUISE CONTROL
- REAR WINDOW DEFOGGER
- CONVENIENCE/CARGO NETS
- AM/FM CD PLAYER W/6 SPEAKERS
- FOLD FLAT PASSENGER SEAT
- DRIVER SEAT POWER HEIGHT ADJ.
- DRIVER SEAT MANUAL LUMBAR
- REAR SEAT, SPLIT FOLDING
- REMOTE KEYLESS ENTRY
- POWER ADJUSTABLE BRAKE AND ACCELERATOR PEDALS
- DRIVER INFORMATION CENTER

STANDARD VEHICLE PRICE

Options Installed by Manufacturer

- AM/FM & DRBC CD PLAYER (REPLACES STD/OPT RADIO) 300.00
- REMOTE VEHICLE START SYSTEM 180.00
- FLOOR MATS, FRONT & REAR 80.00
- FRONT LICENSE PLATE BRACKET .00
- TOTAL OPTIONS 930.00

MANUFACTURER SUGGESTED RETAIL PRICE

\$20,370.00

CITY MPG

23

Actual mileage will vary with options, driving conditions, driving habits and vehicle condition. Results reported to EPA indicate that the majority of vehicles with these options will achieve between

19 and 27 mpg in the city and between 27 and 37 mpg on the highway.



2004 MALIBU
3.5 LITER V6 ENGINE
FUEL INJECTION, AUTOMATIC
4 SPD ELECTRONIC TRANS
CATALYST, FEEDBACK FUEL SYSTEM

ESTIMATED ANNUAL FUEL COST: \$989

HIGHWAY MPG

32

For comparison shopping, all vehicles classified as MID-SIZE have been issued mileage ratings ranging from 19 to 37 mpg city and 14 to 31 mpg highway.

38A

TOTAL VEHICLE & OPTIONS \$20,900.00

DESTINATION CHARGE \$25.00

TOTAL VEHICLE PRICE* \$21,925.00

DEALER TO WHOM PURCHASED
HEART CHEVROLET
PO BOX 5110
COLUMBUS OH 43267

FINANCING BY KAMARG CITY, INC

VIN 1G1ZT52814F125082

CHECK NO. 031719
MILEAGE 10,423
SALES CODE 2
DEALER ID 04-04

XXX
1A CR0725127
This label will have varying content depending on vehicle. Do not attempt to modify it. All vehicles classified as MID-SIZE have been issued mileage ratings ranging from 19 to 37 mpg city and 14 to 31 mpg highway. ©2004 General Motors Corporation

APPENDIX B
Discussion on Data

DISCUSSION ON DATA

Symbols for Brake Components

| | | | | | | | | |
|---|---|---------|-----|---|-----------|-----|---|----------------------------|
| 4 | - | 4 Wheel | G | - | Groan | DL | - | Deceleration (State FPSPS) |
| X | - | Skid | SQ | - | Squeal | PF | - | Pedal on Floor |
| L | - | Left | SQK | - | Squeak | SCP | - | Shoe Scrape |
| R | - | Right | PO | - | Pinchout | RB | - | Rubber Banding |
| R | - | Rear | P | - | Pull | O | - | Odor |
| F | - | Front | R | - | Shudder | NOX | - | No Skid |
| B | - | Both | M | - | Momentary | | | |

| | | |
|-------------|---|----------------------|
| INT or INIT | - | Initial Part of Stop |
| MID | - | Middle of Stop |
| END | - | End of Stop |

All stops were made manually.

APPENDIX C

**Contractor's Comments
Procedure Modifications
and
Test Facility**

Comments for vehicle C40102.

For all recorded decelerations:

The recorded *average* deceleration values for the tests are slightly lower than that which is required or targeted for certain test sections. However, in all cases and in reality, the driver maintained the correct required/target deceleration values for the majority of time for each of those stops. The recorded deceleration is acquired from the moment the service brake pedal is moved until the vehicle reaches zero speed. Therefore, the time needed to achieve the target deceleration (rise time) and the time the vehicle goes from the target deceleration to zero (fall time) is included in the average deceleration calculation. The rise and fall times were added to the entire length of the stops. Hence the recorded average deceleration values were generally and slightly less than the required/target deceleration values.

For Data Sheets 20 & 21 – Hydraulic Circuit Failure #1 and #2 at GVWR:

Due to the difficult accessibility and resultant complexity of accessing the master cylinder output ports, these two test sequences were performed in reverse order, #21 first, #20 second.

Immediately after Anti-Lock Failure (Data Sheet 16) the driver noticed that the test vehicle ran very rough and would not accelerate. Contacted the Standard's Technical Engineer and was instructed to trailer the vehicle to the local Chevrolet dealership. The dealership found that a connector near the left front of the vehicle had slightly separated. The connector was "pushed" back together and the vehicle was restored to normal operation. The normal test sequence was continued without further issues.

On March 19, 2004, after the vehicle was repaired by a local dealership, the instrumentation's speed/distance gain value changed. This change was placed into the speed and distance acquisitions channels, but was not inserted into the wheel lock channels. Therefore, the wheel tach outputs were somewhat higher than the original calibration. These values are reflected in the wheel tach calibration page. This did not affect the outcome of the test or the vehicle compliance with the test.

7.5-MILE TEST TRACK

The 7.5-mile test track encloses a 1,600-acre area, one mile wide and 3.5 miles long.

The track has a downward grade, north to south, of 0.228 percent and a cross slope in the straightaways of 3/16 inch per foot. The 1.88-mile long straight-aways flow into transition areas 2,300 feet in length and then into 5,275-foot long curves with a constant radius of 2,400 feet. The 36-foot wide straightaways and the 42-foot wide curves provide three test lanes. Paved berms, 12 feet in width, border the straightaways and the inside of the curves.

As a vehicle moves toward the outside of the track in the curves, it encounters a progressively steeper bank. The inside lane (or "slow" lane) has a bank of 10 degrees allowing a neutral speed of 80 mph with no side forces. In the center lane, the slope increases to 19 degrees resulting in a neutral speed of 110 mph. The outside lane's 28-degree bank allows a 140 mph neutral speed. Rimming the outer lane is a seven-foot safety lane culminating in a 36-degree slope at the guardrail.

The facility is paved with Portland cement concrete. It carries a maximum single axle load of 36,000 pounds and a maximum tandem axle load weight of 48,000 pounds. Special provisions can be made for heavier weight loads.

With 22.5 lane miles, our track will accommodate many vehicles simultaneously. Research that utilizes the track includes component performance and durability studies, brake tests, aerodynamic studies, fuel economy studies, driveline efficiency tests, and the determination of vehicular acceleration and cruise characteristics. In addition, it supports maximum speed determination, road load power, noise and emission measurements and tire durability test programs.

The 7.5-mile test track can be used in conjunction with other facilities at TRC. It provides an excellent area for pre-test conditioning of equipment such as brake burnishing, tire break-in, and vehicle warm-up.

TRC SKID PAD

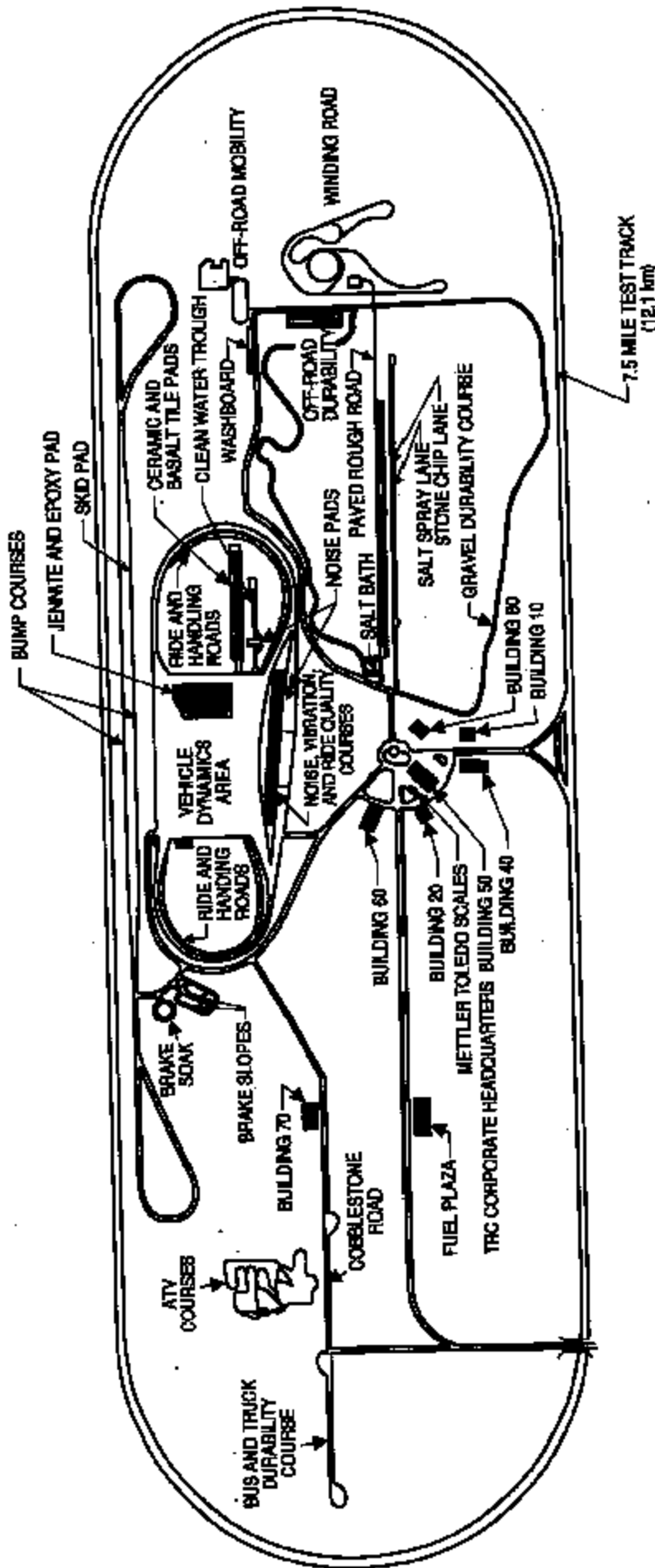
The Skid Pad is a test facility which is utilized primarily for the evaluation of tire and brake systems.

The overall dimensions of the pad are 9,000 feet by 84 feet with loops on the north and south ends. Both turnaround loops have a 309-foot radius and are 16 feet wide with a 25 percent super elevation. They will accommodate speeds of 45 mph with zero side force and 60 mph with .5 g's lateral acceleration. The acceleration/deceleration lanes at each end are 3,280 feet in length.

A test area of 210,000 square feet is situated in the center of the skid pad containing several test pads with varying surface textures. Skid numbers in this area range from 30 (wet) to 80 (dry).

The skid pad is paved with Portland cement. The load capacity of the skid pad is 36,000 pounds maximum single axle weight and 48,000 pounds maximum tandem axle weight.

Varying surface textures in the main test area are ideal for testing tire and/or brake system performance on different surfaces as characterized by "skid numbers." The skid pad is also used for acceleration studies, aerodynamics, rolling resistance, noise testing, and vehicle top speed determination.



NOT TO SCALE

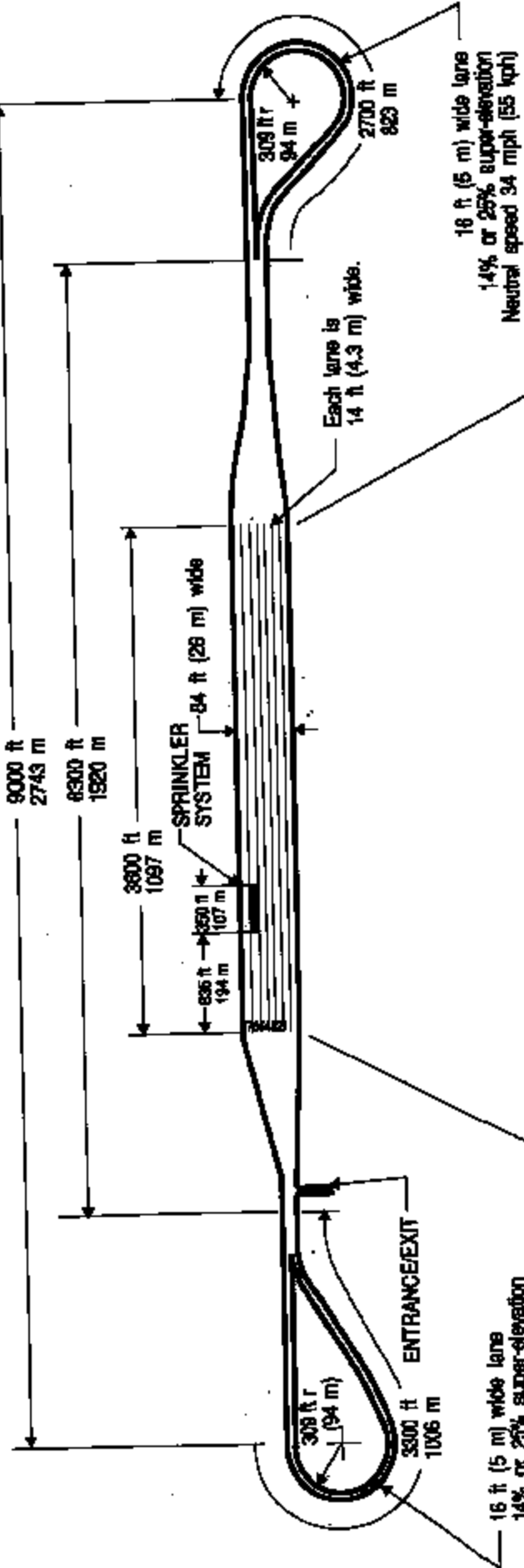
TEST FACILITY DETAIL



TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43017-4887

P-15 (REV)

ALL CONCRETE BROOMED SURFACE
1 LAP = APPROXIMATELY 4 MILES (6.4 KILOMETERS)



16 ft (5 m) wide lane
14% or 25% super-elevation
Neutral speed 34 mph (55 kph)

16 ft (5 m) wide lane
14% or 25% super-elevation
Neutral speed 34 mph (55 kph)



TEST PAD SURFACES
1 - PCC POLISHED WET
2 - PCC SMOOTH TROWELLED WET
3 - PCC PCC COURSE BROOMED DRY

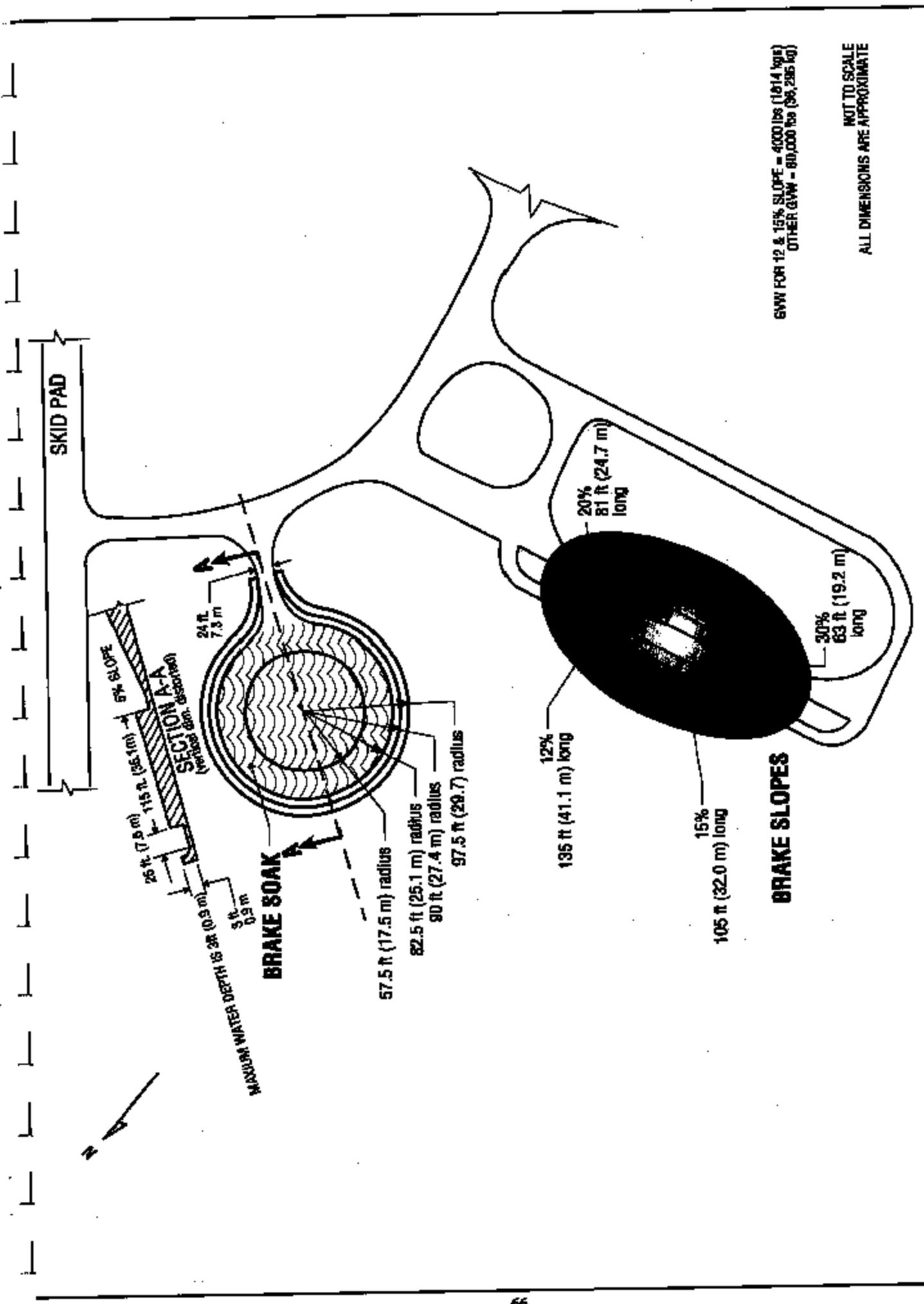
LANE 7 GVW = 8000 lbs (3629 kgs)
GVW = 60,000 LBS (28,258 kgs)

NOTE: BUMP COURSES PARALLEL THE PERIMETERS OF LANES 1 AND 7.

Not to scale
All dimensions are approximations

TRC
TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43819-0087

SKID PAD



SKID PAD

6% SLOPE

SECTION A-A
(Vertical dim. reserved)

24 ft
7.3 m

BRAKE SOAK

MAXIMUM WATER DEPTH IS 28 (0.9 m)
5 ft
0.9 m

57.5 ft (17.5 m) radius
82.5 ft (25.1 m) radius
90 ft (27.4 m) radius
97.5 ft (29.7) radius

12%
135 ft (41.1 m) long

15%
105 ft (32.0 m) long

BRAKE SLOPE

20%
81 ft (24.7 m)
long

30%
63 ft (19.2 m)
long

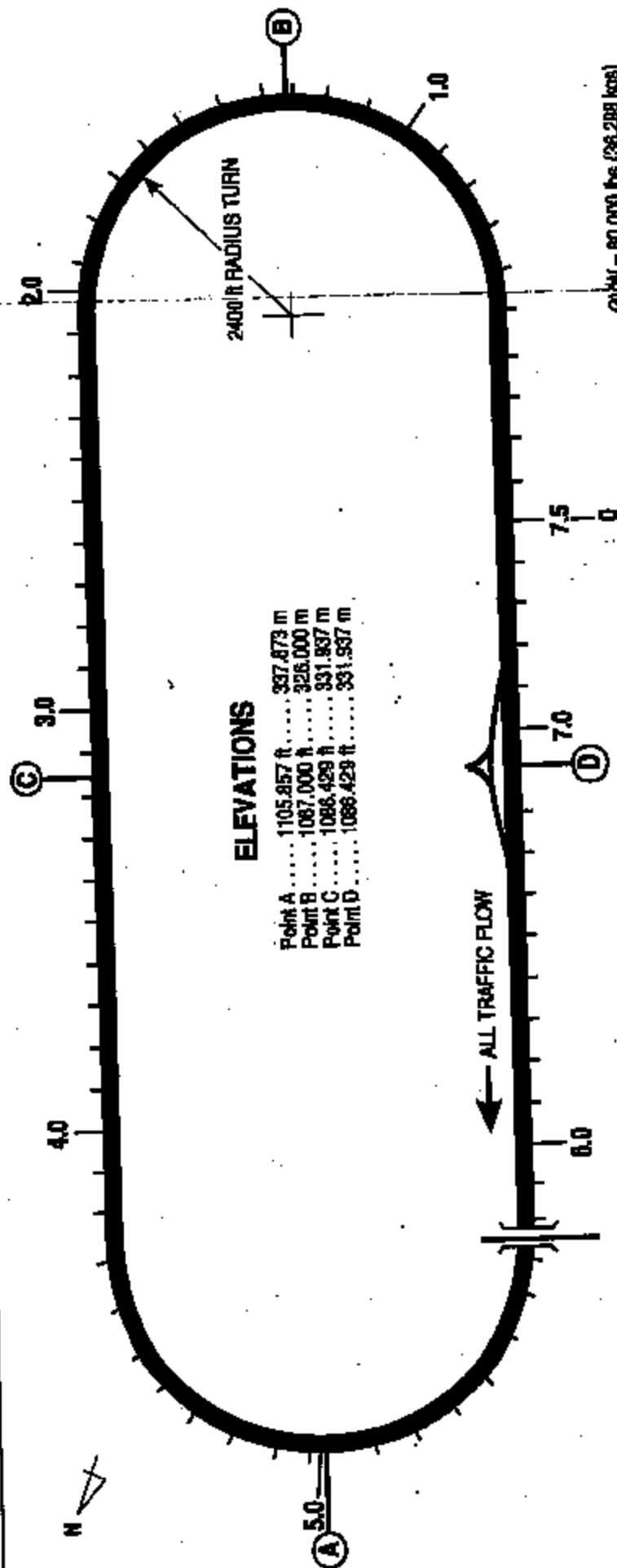
GWW FOR 12 & 15% SLOPE = 4000 lbs (1814 kg)
OTHER GWW = 80,000 lbs (36,296 kg)

NOT TO SCALE
ALL DIMENSIONS ARE APPROXIMATE

TRC

TRANSPORTATION RESEARCH CENTER INC.
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F-3 0600

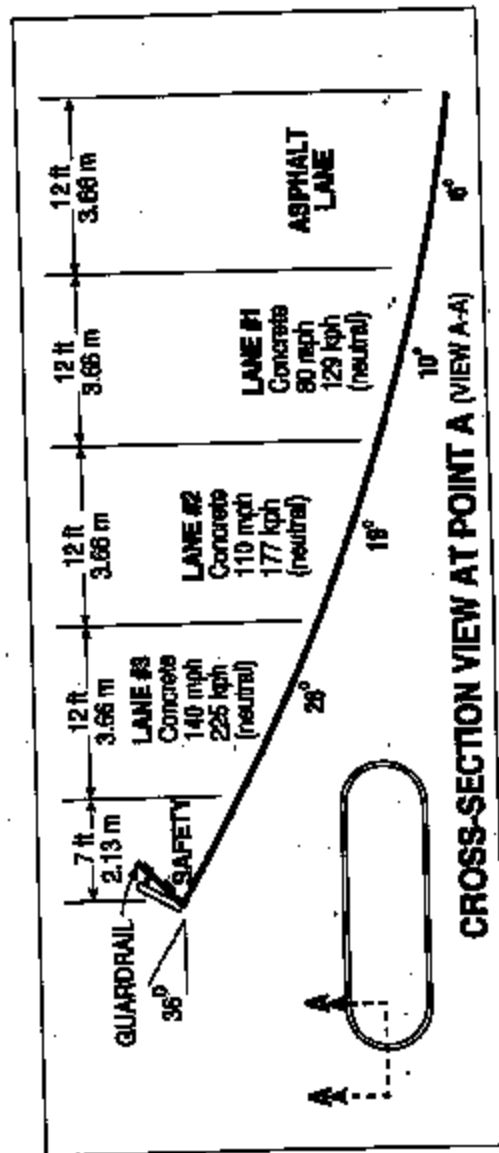
BRAKE SOAK and BRAKE SLOPES



ELEVATIONS

| | | |
|---------|-------------|-----------|
| Point A | 1105.857 ft | 337.873 m |
| Point B | 1087.000 ft | 326.000 m |
| Point C | 1086.429 ft | 331.837 m |
| Point D | 1086.429 ft | 331.937 m |

GVW = 80,000 lbs (36,288 kgs)



DISTANCES

| | | |
|--------|----------|-----------|
| Lane 3 | 7.539 mi | 12.133 km |
| Lane 2 | 7.521 mi | 12.104 km |
| Lane 1 | 7.507 mi | 12.081 km |

| | | |
|--------------------|----------|----------|
| Point A to Point B | 3.333 mi | 5.364 km |
| Point C to Point D | 0.947 mi | 1.524 km |

NOT TO SCALE



TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43018-0007

7.5-MILE TEST TRACK

F-101048

APPENDIX D
Notice of Possible Non-Compliance

This vehicle (C40102) met the requirements of the FMVSS 135 standard.