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135-TRC-05-004

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

Electronic Mobility Controls (EMC) Equipped
2003 Braun Entervan, 4-Door Liftback MPV (Minivan)
NHTSA No. C31300

TRANSPORTATION RESEARCH CENTER INC.

10820 State Route 347
East Liberty, Ohio 43319



Final Report Completed: May 4, 2005

FINAL REPORT

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

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

**Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6115 (NVS-220)
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

Randall Lander

Approved By

[Signature]

Approval Date:

5/16/05

Final Report Acceptance By OVSC:

[Signature]

Contract Technical Manager, Office of
Vehicle Safety Compliance

5/26/05

Acceptance Date

1. REPORT NUMBER: 135-TRC-05-004		2. GOVERNMENT ACCESSION NO.:		3. RECIPIENTS CATALOG NO.:	
4. TITLE AND SUBTITLE: Final report of FMVSS 135 Compliance Testing of a BMC Equipped 2003 Braun Entervan, 4-Door MPV, NHTSA No. C31300				5. REPORT DATE: May 4, 2005	
				6. PERFORMING ORGANIZATION CODE: TRC 20000113/5359	
7. AUTHOR(S): Project Manager: WALTER DUDEK Project Engineer: RANDALL A. LANDES				8. PERFORMING ORGANIZATION REPORT NO.: TRC-DOT-135-059	
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Transportation Research Center Inc. 10820 State Route 347 East Liberty, Ohio 43319				10. WORK UNIT NUMBER:	
				11. CONTRACT OR GRANT NO.: DTNH22-01-C-21025	
12. SPONSORING AGENCY NAME AND ADDRESS: U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 Seventh Street, SW, Room 6115 Washington, DC 20590				13. TYPE OF REPORT AND PERIOD COVERED: Final test report Tested: 12/14/04 to 03/24/05	
				14. SPONSORING AGENCY CODE: NVS-220	
15. SUPPLEMENTARY NOTES:					
16. ABSTRACT: Compliance tests were conducted on the subject BMC Equipped Braun Entervan, 4-Door MPV (minivan), 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. Testing was conducted, in part, with installed gas and brake remote hand control devices activated. Test failures identified, when using hand controls, were as follows: S7.10.4. Performance requirements, (Hydraulic Circuit Failure); S7.11.4. Performance requirements, (Power Assist Inoperative); and S7.12.3. Performance requirements, (Parking Brake).					
17. KEY WORDS: Compliance Testing Safety Engineering FMVSS 135				18. DISTRIBUTION STATEMENT: Copies of this report are available from: NHTSA Technical Reference Division Mail Code: NAD-40 400 Seventh Street, SW, Rm. 5106 Washington, DC 20590 Telephone No. (202) 366-4949	
19. SECURITY CLASSIF. (OF THIS REPORT): Unclassified		20. SECURITY CLASSIF. (OF THIS PAGE): Unclassified		21. NO. OF PAGES: 92	
				22. PRICE:	

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
	Notice	i
	Table of Contents	iii
1.0	Introduction/Purpose of Compliance Test	1
2.0	Vehicle Information Sheet - Data Sheet 1	3
3.0	Test Summary	5
4.0	Vehicle Weight - Data Sheet 3	6
5.0	Test Data - Data Sheet 6	9
6.0	Photographs	34
7.0	Instrumentation and Daily Calibrations	44
8.0	Hand Control vs. Foot Control Correlations	49
Appendix A	Copy of Manufacturer's Sticker	72
Appendix B	Discussion on Data	74
Appendix C	Contractor's Comments Procedure Modifications and Test Facility	76
Appendix D	Notice of Possible Non-Compliance	85

1.0 INTRODUCTION

Tests were conducted on a 2003 Chrysler Caravan, second stage manufacturer Braun Entervan, 4-Door Liftback MPV (minivan), equipped with hand controls manufactured and installed by Electronic Mobility Systems (EMC). The vehicle was modified for use by persons of limited physical ability with an Electronic Mobility Control AEVIT system that included a W-L Series gas, brake and steering system (Gold Series/Econo Series) and Digipad II. A remote control parking brake system was also present. Some portions of FMVSS 135 "Passenger Car Brake Systems" were conducted with and without the use of the controls. When feasible, a particular test was conducted using the gas and brake controls to verify compliance to 135 if these controls were utilized. The same test was then conducted with the controls disengaged in order to determine if the addition of the controls, although not operational, affected the ability of the vehicle to comply with that portion of the FMVSS 135 test. The remote steering was not used during the testing. 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.

Also note that the pedal force values shown in the data sheets when using hand controlled braking is equivalent to a force applied directly to the brake pedal manually, although now being applied by an electronic motor. ~~This also applies to the parking brake system when remote actuation was performed.~~

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

RBS Failure (if applicable)

EMF (Battery) Failure (if applicable)

Brake Slope

Parking Brake

Average PFC during the test period was 1.01 (Skid Pad) and 0.97 (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 did not meet the requirements of FMVSS 135, *with the hand controls activated*

DATA SHEET 1 - VEHICLE INFORMATION

VEHICLE SPECS

Year: 2003	NHTSA No: C31300
Mfr: ECM	GVWR (Kg): 2540.2
Make: AEVIT	GAWR Front(Kg): 1292.8
Model: W-L/ECONO SERIES	GAWR Rear(Kg): 1292.8
Body Style: MPV	Wheelbase (mm): 3048.0
Mfr. Date: JUNE 2004	Odometer: Start:568 MI. End:970 MI.
VIN: 2D4GP44393F	

BUSES ONLY

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

Engine Type: GASOLINE,V6,DHV,FFV,MPFI,PISTON.	Tire Size: 215/70R15
Displacement: 3.3 LITER	Tire Type: INTEGRITY,98S,STEEL BELTED RAD
Engine Hspwr: N/A	Tire Mfr.: GOODYEAR
Idle Speed(rpm): 736	GVWR Front Press.(kpa): 248.21
Transmission Type: AUTO.4-SPD.W/O.D.	GVWR Rear Press.(kpa): 248.21
No. of Axles: 2	

BRAKE APPLY SYSTEM

Brake Series: Front:DISC Rear:DISC	Power Assist Unit: YES
Brake Actuation	Pwr Unit w/Accumulator: NO
(Hydr. Circuit Split): DIAGONAL	Pwr Asst./Pwr Unit w/Backup: NO
Power Unit: VACUUM	Variable Prop. System: NO
Anti-Skid unit Mfr: TEVES	Anti-Skid Device: YES
Parking Mechanism: YES	
Type of Parking Unit: AUTOMATIC TRANSMISSION WITH PARK DETENT.	
Mstr Cylinder Dia(mm): 0.00	Pedal Ratio: 3.33 :1

FRONT SYSTEM BRAKE COMPONENT MATERIALS AND CONSTRUCTION:

BRAKE TYPE: DISC	Material: CAST IRON
Drum Construction: N/A	LF Drum Shoe Cage Dia.(mm): 0.00
Disc Construction: INTEGRAL CAST,VENTED	RF Drum Shoe Cage Dia.(mm): 0.00
Front Brake Dia.(mm): 280.95	LF Drum Dia. RESET(mm): 0.00
Fr Disc Thickness(mm): 27.97	RF Drum Dia. RESET(mm): 0.00
Lining Construction: Bonded	
FRONT BRAKE COMPONENT DIMENSIONS AND CODES:	
Inboard (Leading)	Outboard (Trailing)
Width(mm): 49.86	Width(mm): 49.86
Length(mm): 120.09	Length(mm): 120.12
Thickness(mm): 10.19	Thickness(mm): 11.38
Lining Code/Color: FER4150/3FF	Lining Code/Color: FER4150/3FF
Hyd. Piston Dia.(mm): 65.91	

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: INTEGRAL CAST	RR Drum Shoe Cage Dia.(mm): 0.00
Lining Construction: BONDED	LR Drum Dia. RESET(mm): 0.00
Rear Brake Dia.(mm): 288.52	RR Drum Dia. RESET(mm): 0.00
Rr Disc Thickness(mm): 12.55	

REAR BRAKE COMPONENT DIMENSIONS AND CODES:

Inboard (Leading)	Outboard (Trailing)
Width(mm): 43.31	Width (mm): 43.79
Length(mm): 118.29	Length (mm): 118.34
Thickness(mm): 10.21	Thickness (mm): 10.26
Lining Code/Color: FM 4088/2F FF	Lining Code/Color: FM 4088/2F FF
Hyd Piston Dia (mm): 41.88	

OTHER COMPONENT INFORMATION:

Friction-type Park Brake: HAND-OPERATED
Non-Service Brake Type
Parking Brake: N/A

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

Date:

05-16-05

Quality Assurance:


KEN WEBSTER

3.0 SUMMARY OF TESTING

		Specification and Limit				TEST RESULTS (In compliance if one stop meets requirement)			
TEST	Loading Condi tion	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	LLVW	NA				182.4 km/h avg.			NA
Burnish	GVWR	80				50, 80 - 0 km/h stops @ 3.0 mpsps			NA
Wheel Lockup Sequence w/o ABS	GVWR				Lockup of front wheels prior to rear	ABS Equipped			NA
Wheel Lockup Sequence w/o ABS	LLVW					ABS Equipped			NA
Adhesion Utilization w/o ABS	LLVW				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	478.8	49.2	Pass
High Speed Effectiveness	GVWR	129.9	85	500	eqd. depend. - 128.8	5	388.0 472.0	90.7 (H) 86.6 (F)	Pass
Stops with Engine Off	GVWR	100	85	500	70	5	340.6 386.9	54.2 (H) 58.4 (F)	Pass
Cold Effectiveness	LLVW	100	85	500	70	5	480.1 455.0	50.1 (H) 52.3 (F)	Pass
High Speed Effectiveness	LLVW	129.9	85	500	eqd. depend. - 128.8	5	450.7 480.4	68.2 (H) 68.8 (F)	Pass
Failed Antilock	LLVW	100	85	500	85	5	284.8 124.2	71.2 (H) 63.2 (F)	Pass
Failed Proportioning Valve	LLVW	100	85	500	110	5	NA	NA	NA
Failed Hydraulic Circuit #1	LLVW	100	85	500	168	5	108.8 467.0	215.8 (H) 88.7 (F)	Fail Pass
Failed Hydraulic Circuit #2	LLVW	100	85	500	168	5	100.8 484.7	185.2 (H) 92.1 (F)	Fail Pass
Failed Hydraulic Circuit #1	GVWR	100	85	500	168	5	81.2 480.1	288.5 (H) 91.4 (F)	Fail Pass
Failed Hydraulic Circuit #2	GVWR	100	85	500	168	5	88.8 488.3	222.0 (H) 98.1 (F)	Fail Pass
Failed Antilock	GVWR	100	85	500	85	5	200.2 242.6	64.3 (H) 62.8 (F)	Pass
Failed Proportioning Valve	GVWR	sd 100	85	500	110	5	NA	NA	NA
Regenerative Brake System (RBS) Failure	GVWR	100	85	500	168	5	NA	NA	NA
Electromotive Force (EMF) - Battery Failure	GVWR	100	85	500	70	5	NA	NA	NA
Power Brake Unit Failure	GVWR	100	85	500	168	5	218.4 482.4	488.1 (H) 139.8 (F)	Fail Pass
Parking Brake - Uphill	GVWR	-	-	500	Hold for 5 min.?	NA	469.5	No w/o Park Detent Engd.	Fail
Parking Brake - Downhill	GVWR	-	-	500	Hold for 5 min.?	NA	469.8	No w/o Park Detent Engd.	Fail
Heating Snubs	GVWR	120-80	NA	NA	15 Snubs- 3.0 mpsps	5	53 Visual Avg.	NA	NA
Hot Performance Stop #1	GVWR	100	85	403.6 avg. (Foot)	75.3	5	444.1 (357.6)	57.7	Pass
Hot Performance Stop #2	GVWR	100	85	500	88	5	401.5 (217.6)	61.8	Pass
Brake Cooling	GVWR	60	NA	NA	4 Stops - 3.0 mpsps	5	65 Visual Avg.	NA	NA
Recovery Performance Stop #1	GVWR	100	85	403.6 avg. (Foot)	One of the two stops between 88.0 and 98.1 meters	5	352.3 (281.0)	59.9	Pass
Recovery Performance Stop #2	GVWR	100	85	403.6 avg. (Foot)		5	422.6 (348.9)	53.6	
Final Inspection-Brake Integrity	Check components for detachment, fracture or lubricants.					No detachments or fractures-normal appear. & color.			Pass
Final Inspection- Reservoir/Warning Indicators	Master cylinder or brake power reservoir shall meet the volume and label requirements of S6.4.2 and S6.4.3.					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: 2003 AEVIT W-L/ECONO SERIES

NHTSA No. C31300 Date: 12/28/04

Tire Pressure(cold): Front (kpa) 248 Rear (kpa) 248

Odometer: Start 568 MI. End 970 MI.

Scale(s) Used: TRC Scales

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

GVWR/GAWR INFORMATION
(From Veh. Certification Label)

UNLOADED VEHICLE WEIGHT(UVW)

GVWR(Kg): 2540

L Front(Kg): 573 L Rear(Kg): 448

GAWR Front(Kg): 1293

R Front(Kg): 557 R Rear(Kg): 455

GAWR Rear(Kg): 1293

T Front(Kg): 1130 T Rear(Kg): 903

Total UVW(Kg): 2033

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): 626 L Rear(Kg): 486

L Front(Kg): 629 L Rear(Kg): 489

R Front(Kg): 612 R Rear(Kg): 492

R Front(Kg): 609 R Rear(Kg): 489

T Front(Kg): 1238 T Rear(Kg): 978

T Front(Kg): 1238 T Rear(Kg): 977

Total LLVW(Kg): 2216

Total Actual Test LLVW(Kg): 2215

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): 645 L Rear(Kg): 635

R Front(Kg): 625 R Rear(Kg): 635

T Front(Kg): 1270 T Rear(Kg): 1270

Total Fully Loaded GVWR(Kg): 2539

Load: Driver/Observer 73(Kg) + Instru. 41(Kg) + Ballast 392(Kg) = 506(kg)

Technician: Karen Easterday
KAREN EASTERDAY

Date: 05-16-05

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
KAREN EASTERDAY

Date: 05-16-05

Quality Assurance: Ken Webster
KEN WEBSTER

DATA SHEET 5 - VEHICLE MAX SPEED

VEHICLE: 2003 AEVIT W-L/ECONO SERIE 8

NHTSA No. C31300

Date: 12/28/04

Ambient Temperature: 33°F

Wind Velocity: 9(MPH)

Road PFG: .99

Wind Direction: 277°

Odometer: Start 582(mi) End 597(mi)

TEST WEIGHT: Total (Kg): 2215

Front (Kg): 1238

Rear (Kg): 977

ESTABLISH VEHICLE MAXIMUM SPEED

VEHICLE LOAD: LLVW

IBT: N/A

GEAR: Drive

DECEL RATE: N/A

PEDAL FORCE: N/A

WHEEL LOCKUP: N/A

TEST SPEED: Maximum attainable from

INTERVAL: N/A

a standing start in 3.2 km.

1. Ballast Vehicle to LLVW
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	165.5 kph	165.5	13.84
Run No. 2	North	159.2 kph	159.2	13.63

AVERAGE = 162.4 km/h

COMMENTS: INV DATA, Section 0001, 01/10/05, 09:32:33

Tester/Technician:

Karen Easterday
KAREN EASTERDAY

Date:

05-16-05

Quality Assurance:

Ken Webster
KEN WEBSTER

Vehicle: 2003 ECM
Make: ARVIT
Model: W-L/ACORD SERIES
Body Style: MPV

VEHICLE NUMBER: C31300

Transportation Research Center, Inc.
10820 State Route 147
East Liberty, Ohio 43319
(637)666-2011 www.trcpg.com

Front Cold Tire Pressure: 260 (kpa)
Rear Cold Tire Pressure: 260 (kpa)

Date Tested: 01/10/05

DATA SHEET 6 - BURNISH AT GVWR

Testing Conditions: INV DATA, Section 0002, 01/10/05, 13:19:22

Weather Conditions: 34°F Wind: 6 mph 226°

Start Odo.: 500 End Odo.: 547

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 IRT to 180 °C or
2 km distance, whichever occurs first.
Constant decel rate: 3.0 m/s²
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 3.0m

	INIT	LEFT	RIGHT	LEFT	RIGHT	MAX.	AVG.	
STOP	SPD	FRONT	FRONT	REAR	REAR	PEDAL	PEDAL	AVG.
#	(kph)	(°C)	(°C)	(°C)	(°C)	(N)	(N)	(m/sec ²)
1	79.80	53	49	36	38	54.86	65.05	2.73
10	78.20	247	194	179	244	58.45	55.71	2.80
20	80.80	208	176	254	303	60.65	49.76	2.75
30	79.19	130	127	187	194	64.99	49.49	2.88
40	80.13	127	123	173	184	65.68	47.67	2.81
50	79.77	130	119	186	178	65.69	47.24	2.78

* Reduced Burnish Per CURA

COMMENTS: THIS VEHICLE ARE 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: KAREN HASTEDAY

Observer: NONE

Recorded Data Processed by: CHECK JERKINS

Date: 03/28/05

Approving Laboratory Official: KEN WEBSTER

Date: 04/06/05

Vehicle: 2001 ECM

WVTA NUMBER: C21209

Transportation Research Center, Inc.

Make: AEWIT

10020 State Route 347

Model: W-L/20000 SHIN

East Liberty, Ohio 43119

Body Style: MPV

(937) 666-2011 www.tropg.com

Front Cold Tire Pressure: 248 (kpa)

Rear Cold Tire Pressure: 248 (kpa)

Date Tested: 01/28/05

DATA SHEET 11 - COLD EFFECTIVENESS AT GVWR

Testing Conditions: INV DATA, Section 0013, 01/28/05, 13:36:27

Weather Conditions: 25°F Wind: 6 mph 95°

Start Odo.: 687

End Odo.: 694

Scenario:

Initial Brake Temperature 68 - 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 500N

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

Vehicle must stay in lane of 3.5m

STOP	INIT	LEFT	RIGHT	LEFT	RIGHT	ACTUAL	CORRECTED	MAX.	AVG.	MAX.	AVG.
#	SPD	FRONT	FRONT	REAR	REAR	DISTANCE	DISTANCE	PEDAL	PEDAL	DECEL	DECEL
#	(kph)	[°C]	[°C]	[°C]	[°C]	(meter)	(meter)	(N)	(N)	(m/sec²)	(m/sec²)
1	100.57	70	64	77	86	50.0	49.4	437.62	329.47	13.52	6.80
2	99.43	67	62	51	59	46.9	47.4	500.31	404.43	13.95	7.62
3	99.01	67	62	58	73	49.4	50.4	401.03	382.03	14.14	7.36
4	99.85	62	81	52	71	49.1	49.2	478.76	403.55	13.03	7.49
5	99.50	69	64	62	59	50.6	51.1	389.16	336.07	11.91	7.16
6	99.42	69	66	62	71	50.0	50.6	406.00	382.81	14.96	7.36

STOP	DRIVER VEHICLE STOP COMMENTS			
#	[Wheel Lock up - Direction of Stop - Stay in Lane]			
1	W/OUT H.C. NOX SOUTH YES			
2	W/OUT H.C. NOX SOUTH YES			
3	W/OUT H.C. NOX SOUTH YES			
4	W/OUT H.C. NOX SOUTH YES			
5	W/OUT H.C. NOX SOUTH YES			
6	W/OUT H.C. NOX SOUTH YES			

NOTE: H.C. = Hand Control

Corrected Distances are used to determine shortest stopping distances.

DATA INDICATES COMPLIANCE: YES [X] NO []

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHECK JENKINS

Date: 01/28/05

Approving Laboratory Official: KEN WEBSTER

Date: 04/05/05

Vehicle: 2003 ECM
Make: ARVIT
Model: W-L/SCORP SERIES
Body Style: MPV

NETSA NUMBER: C31300

Transportation Research Center, Inc.
10030 State Route 347
East Liberty, Ohio 43319
(627) 666-2011 www.trcpg.com

Front Cold Tire Pressure: 248 (Kpa)
Rear Cold Tire Pressure: 248 (Kpa)

Date Tested: 02/02/05

DATA SHEET 12 - HIGH SPEED EFFECTIVENESS AT GVWR

Testing Conditions: INV DATA, Section 0020, 02/02/05, 13:43:56

Weather Conditions: 24°F Wind: 8 mph 4° Start Odo: 707 End Odo: 732

Schedule:

Initial Brake Temperature: 65-100°C
Initial Speed: 80± max km/h, not greater than 160km/h
6 stops with transmission in gear

Performance Requirements:

One Stop with:
Stopping Distance less than: 126.8 meter
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	LEFT	RIGHT	LEFT	RIGHT	ACTUAL	CORRECTED	MAX.	AVG.	MAX	AVG	MAX.	AVG.
#	SPD	FRONT	FRONT	REAR	REAR	DISTANCE	DISTANCE	PEDAL	PEDAL	HAND	HAND	HEEL	HEEL
#	(kph)	(°C)	(°C)	(°C)	(°C)	(meter)	(meter)	(N)	(N)	(N)	(N)	(m/sec²)	(m/sec²)
1	129.64	76	70	63	62	85.6	86.5	471.98	379.10	509.13	328.22	14.37	6.87
2	129.24	82	75	77	84	89.2	90.7	1.03	0.27	368.00	234.48	10.05	7.12
3	129.84	95	88	80	89	95.6	97.3	0.27	-1.03	379.40	288.27	9.73	6.56
4	129.07	77	77	87	96	94.2	98.0	0.94	-0.61	317.81	198.84	10.86	6.47
5	128.87	68	66	81	91	91.5	93.5	1.87	0.94	399.93	275.83	10.31	6.88
6	129.71	69	68	82	93	90.4	91.2	4.21	1.87	370.44	282.80	11.13	6.94

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

STOP	DRIVER VEHICLE STOP COMMENTS
1	W/OUT H.C. NOX SOUTH YES
2	W/H.C. NOX SOUTH YES
3	W/H.C. NOX SOUTH YES
4	W/H.C. NOX SOUTH YES
5	W/H.C. NOX SOUTH YES
6	W/H.C. NOX SOUTH YES

DATA INDICATOR COMPLIANCE: YES (X) NO ()

Driver: KAREN KASTERDAY Observer: NONE
Recorded Data Processed by: CHUCK JENKINS Date: 03/28/05
Approving Laboratory Official: KEN KASTER Date: 04/06/05

Vehicle: 2003 HCM

MYTSA NUMBER: C31100

Transportation Research Center, Inc.

Make: AMVIT

10820 State Route 347

Model: W-L/SCWD SHRIE

East Liberty, Ohio 43019

Body Style: MPV

(937)666-2011 www.troyg.com

Front Cold Tire Pressure: 348 (kpa)

Date Tested: 02/07/05

Rear Cold Tire Pressure: 248 (kpa)

DATA SHEET 13 - STOPS WITH ENGINE OFF AT GVWR

Testing Conditions: IFV DATA, Section 0025, 02/07/05, 08:44:38

Weather Conditions: 39°F Wind: 8 mph 144°

Start Odo.: 741

End Odo.: 754

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 75m

Pedal force between 50N and 300N

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

Vehicle must stay in lane of 1.3m

STOP #	INIT SPD (kph)	LEFT FRONT T (°C)	RIGHT FRONT T (°C)	LEFT REAR T (°C)	RIGHT REAR T (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (Base 299)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. HAND FORCE (N)	AVG. HAND FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	98.59	90	96	73	77	58.2	59.6	332.82	244.54	333.10	339.40	8.19	5.36
2	99.51	94	92	77	82	57.8	58.4	386.91	304.18	423.04	236.21	9.02	6.65
3	98.26	98	93	79	83	57.1	59.1	2.48	0.81	440.92	369.23	9.08	6.74
4	101.41	99	95	82	84	55.8	54.2	0.09	-1.58	240.53	187.26	10.17	6.77
5	99.21	94	87	86	94	54.3	55.1	0.27	-1.67	303.40	251.79	12.92	6.87
6	99.98	71	67	81	99	56.8	56.0	-0.76	-1.91	438.23	349.84	9.89	6.79

STOP #	DRIVER VEHICLE STOP COMMENTS			
#	[Wheel lock-Up - Direction of Stop - Stay in Lane]			
1	W/OUT B.C.	NOI	SOUTE	YES
2	W/OUT B.C.	NOI	SOUTE	YES
3	W/B.C.	NOI	SOUTE	YES
4	W/B.C.	NOI	SOUTE	YES
5	W/R.C.	NOI	SOUTE	YES
6	W/K.C.	NOI	SOUTE	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN BASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 03/24/05

Approving Laboratory Official: KEN WEBSTER

Date: 04/06/05

Vehicle: 2003 ECM

NHTSA NUMBER: C21280

Transportation Research Center, Inc.

Make: ARVIT

10820 State Route 347

Model: M-L/ECOMO SERIES

East Liberty, Ohio 43319

Body Style: MPV

(617) 666-2011 www.trcpg.com

Front Cold Tire Pressure: 248 (Kpa)

Date Tested: 02/11/05

Rear Cold Tire Pressure: 248 (Kpa)

DATA SHEET 14 - COLD EFFECTIVENESS AT LINE

Testing Conditions: INV DATA, Section 0030, 02/11/05, 09:16:19

Weather Conditions: 25°F Wind: 16 mph 236°

Start Odo.: 768

End Odo.: 781

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 45N and 500N

No Lock-Up allowed longer than 0.1 sec above 10 km/h

Vehicle Must stay in lane of 3.5m

STOP	INIT SPD (kph)	LEFT		RIGHT		ACTUAL DISTANCE (meters)	CORRECTED DISTANCE (SAM 299) (meters)	MAX. PEDAL FORCE (N)	AVG. DECEL FORCE (N)	MAX HARD FORCE (N)	AVE HARD FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
		FRONT INT (°C)	REAR INT (°C)	FRONT INT (°C)	REAR INT (°C)								
1	99.03	97	88	77	83	51.3	52.3	466.94	372.21	424.42	939.96	10.51	7.06
2	98.94	91	82	57	59	49.1	50.1	2.54	0.91	480.14	245.59	13.87	7.44
3	98.52	87	86	87	84	50.1	51.6	2.51	0.85	462.51	289.56	15.19	7.83
4	98.65	100	97	76	72	56.3	56.7	0.57	-0.30	374.05	234.55	9.62	6.36
5	98.58	84	84	83	64	53.4	52.9	0.67	-0.33	449.45	318.02	10.98	7.02
6	98.78	89	88	72	71	57.8	58.1	0.94	-0.38	285.79	199.33	12.22	6.67

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

STOP	DRIVER VEHICLE STOP COMMENTS
1	W/OUT M.C. NOX SOUTH YES
2	W/B.C. NOX SOUTH YES
3	W/B.C.PX.HRE.APPLY NOX SOUTH YES
4	W/B.C. NOX SOUTH YES
5	W/M.C. NOX SOUTH YES
6	W/M.C. NOX SOUTH YES

* When Lever pulled back beyond certain point - Parking Brake Actuates

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: WOMM

Recorded Data Processed by: CHUCK JENNINGS

Date: 03/28/05

Approving Laboratory Official: BEN WEBSTER

Date: 04/05/05

Vehicle: 2003 RCM
Make: ARVIT
Model: W-L/SCONO SERIES
Body Style: MPV

NHTSA NUMBER: C31380

Transportation Research Center, Inc.
16820 State Route 347
East Liberty, Ohio 43313
(937) 666-2011 www.trcpg.com

Front Cold Tire Pressure: 248 (kpa)
Rear Cold Tire Pressure: 248 (kpa)

Date Tested: 02/11/05

DATA SHEET 15 - HIGH SPEED EFFECTIVENESS AT LLVW

Testing Conditions: INV DATA, Section 0038, 02/11/05, 11:40:13

Weather Conditions: 27°F Wind: 15 mph 254°

Start Odo.: 792

End Odo.: 792

Schedule:

Initial Brake Temperature: 66-100°C
Initial Speed: 80% max km/h
6 stops with transmission in gear

Performance Requirements:

One Stop with:
Stopping Distance less than 125.0m
Pedal force between 60N and 800N
No lock-up allowed longer than 0.1 sec above 15 km/h
Vehicle must stay in lane of 3.0m

STOP	INIT	LEFT	RIGHT	LEFT	RIGHT		CORRECTED	MAX.	AVG.	MAX.	AVG.	MAX.	AVG.
#	SPD	FRONT	FRONT	REAR	REAR	ACTUAL	DISTANCE	PEDAL	PEDAL	HAND	HAND	DECEL	DECEL
#	(kph)	(°C)	(°C)	(°C)	(°C)	(meter)	(meter)	(N)	(N)	(N)	(N)	(m/sec²)	(m/sec²)
1	129.58	78	75	54	56	85.8	86.8	460.35	308.44	537.59	307.80	18.16	7.36
2	139.20	84	81	64	54	119.4	117.4	5.24	0.82	276.67	138.10	1.66	2.82
3	130.00	86	82	73	60	103.2	102.7	2.50	-0.85	266.05	178.27	9.10	8.00
4	137.43	71	70	52	51	80.0	84.1	4.51	1.51	358.55	201.86	10.03	5.98
5	128.99	72	73	58	42	98.2	100.2	6.19	2.30	377.86	202.55	15.03	6.82
6	139.60	83	83	71	61	87.0	88.2	6.54	1.94	450.89	289.64	14.98	7.27

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

STOP	W/OUP H.C.	NOX	SOUTH	YES
1	W/OUP H.C.	NOX	SOUTH	YES
2	W/H.C.	NOX	SOUTH	YES
3	W/H.C.	NOX	SOUTH	YES
4	W/H.C.	NOX	SOUTH	YES
5	W/H.C.	NOX	SOUTH	YES
6	W/H.C.	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY Observer: NONE
Recorded Data Processed by: CHUCK JENKINS Date: 03/28/05
Approving Laboratory Official: ANN WEBSTER Date: 04/05/05

Vehicle: 2003 ECM
 Make: Acura
 Model: W-6/ECONOMY SERIES
 Body Style: MPV
 Front Cold Tire Pressure: 245 [Kpa]
 Rear Cold Tire Pressure: 245 [Kpa]

NETEA NUMBER: C91100

Transportation Research Center, Inc.
 10020 State Route 347
 East Liberty, Ohio 43319
 (937) 666-2011 www.tropg.com

Date Tested: 02/11/05

DATA SHEET 16 - ANTILOCK FUNCTIONAL FAILURE AT LLVM

Testing Conditions: INV DATA, Section 0040, 02/11/05, 14:03:23

Weather Conditions: 37°F Wind: 16 mph 261° Start Odo.: 793 End Odo.: 600

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 85m
 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 TMT (°C)	RIGHT FRONT TMT (°C)	LEFT REAR TMT (°C)	RIGHT REAR TMT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (US 199)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. HAND FORCE (N)	AVE. HAND FORCE (N)	MAX. DRCEL (m/sec²)	AVG. DRCEL (m/sec²)
1	100.03	78	76	59	41	63.2	63.2	124.19	100.15	251.50	118.73	6.84	5.95
2	99.81	95	93	76	59	71.0	71.2	1.87	0.02	284.70	131.65	7.99	4.31
3	100.54	92	89	74	59	89.3	88.4	1.87	0.15	284.60	124.82	7.80	4.89
4	99.26	87	86	70	56	81.8	82.6	1.45	-0.12	294.69	134.79	8.60	3.30
5	99.73	98	93	81	66	89.9	90.4	1.45	-0.33	344.60	72.81	9.00	1.82
6	98.30	83	81	65	51	73.1	72.7	1.88	0.20	378.89	140.22	9.48	3.86

STOP #	DRIVER VEHICLE STOP COMMENTS			
#	(Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	W/OUT W.C. NOX SOUTH YES			
2	W/B.C. NOX SOUTH YES			
3	W/B.C. NOX SOUTH YES			
4	W/B.C. NOX SOUTH YES			
5	W/B.C. NOX SOUTH YES			
6	W/B.C. NOX SOUTH YES			

How was the ABS failure induced: REMOVED 25 AMP FUSE FROM BOX UNDER LEFT SIDE OF HOOD.

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

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY Observer: NONE
 Recorded Data Processed by: CHUCK JEFFKINS Date: 03/28/05
 Approving Laboratory Official: KEN WEBSTER Date: 04/05/05

Vehicle: 2003 FORD
Make: AUSTIN
Model: W-L/MC0000 HELLER
Body Style: MPV

TEST NUMBER: 031300

Transportation Research Center, Inc.
10520 State Route 347
West Liberty, Ohio 43319
(937) 666-2011 www.trc.org

Front Cold Tire Pressure: 240 (Kpa)
Rear Cold Tire Pressure: 240 (Kpa)

Date Tested: 02/15/05

DATA SHEET 18 - HYDRAULIC CIRCUIT FAILURE #1 AT LLWN

Testing Conditions: INV DATA, Section 0080, 02/15/05, 12:31:20

Weather Conditions: 62°F Wind: 21 mph 216° Start Odo.: 816 End Odo.: 830

Method of simulating failure: Disconnected Brake Line w/ 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 800N
No lock-up allowed longer than 0.1 sec above 15 km/h
Vehicle must stay in lane of 3.5m

STOP	INIT	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	ACTUAL DISTANCE	CORRECTED DISTANCE	MAX. PEDAL FORCE	AVG. PEDAL FORCE	MAX. HAND FORCE	AVG. HAND FORCE	MAX. DECEL	AVG. DECEL
#	(kmph)	(°C)	(°C)	(°C)	(°C)	(meter)	(meter)	(N)	(N)	(N)	(N)	(m/sec²)	(m/sec²)
1	100.26	26	72	57	21	89.2	88.7	467.01	277.46	421.33	326.94	8.66	4.33
2	99.33	30	82	61	34	410.4	415.9	0.88	-0.21	51.19	34.83	2.87	1.05
3	100.32	29	77	58	27	227.2	215.8	3.18	0.23	109.81	38.48	6.84	1.84
4	98.67	35	82	66	56	91.2	91.7	466.71	294.99	461.81	293.79	8.03	4.08

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

STOP #	W/OUT E.C.	W/B.C.	W/B.C. & PEX.BRX.	W/OUT E.C.
1	NOX	NOX	NOX	NOX
2	NOX	NOX	NOX	NOX
3	NOX	NOX	NOX	NOX
4	NOX	NOX	NOX	NOX

Force Needed to Activate Brake Failure Lamp (N): N/A
Fluid Removed (ml) to Activate Brake Failure Lamp: 187

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: EMMY EASTERDAY Observer: NONE
Recorded Data Processed by: CHUCK JENKINS Date: 03/28/05
Approving Laboratory Official: BEN WENSTER Date: 04/05/05

Vehicle: 2003 ECM
Make: ASVIT
Model: W-4/SCONO SHRIZ
Body Style: MPV

WVTA NUMBER: C31300

Transportation Research Center, Inc.
10120 State Route 347
East Liberty, Ohio 43329
(617) 666-2011 www.trcpg.com

Front Cold Tire Pressure: 248 (Kpa)
Rear Cold Tire Pressure: 248 (Kpa)

Date Tested: 02/22/05

DATA SHEET 19 - HYDRAULIC CIRCUIT FAILURE #2 AT LLVM

Testing Conditions: INV DATA, Section 0055, 02/22/05, 09:34:41

Weather Conditions: 33°F Wind: 9 mph 214° Start Odo.: 839 End Odo.: 849

Method of simulating failure: Disconnected Brake Line @ W/C Rear Port

System Portion Failed: RT & LR

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 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		RIGHT		ACTUAL DISTANCE (meters)	CORRECTED DISTANCE (BASE 199) (meters)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX HAND FORCE (N)	AVG HAND FORCE (N)	MAX, DECEL (m/sec²)	AVG. DECEL (m/sec²)
		FRONT IBT (°C)	REAR IBT (°C)	FRONT IBT (°C)	REAR IBT (°C)								
1	98.77	70	17	21	66	89.9	82.1	464.71	344.01	487.89	276.96	5.45	4.05
2	100.21	97	17	17	75	97.4	97.0	485.28	402.48	488.99	396.78	7.18	3.77
3	99.68	98	18	14	71	233.8	235.5	0.76	-0.94	51.72	80.04	3.38	1.75
4	99.64	97	16	13	67	193.8	195.2	2.03	0.48	109.61	31.42	6.37	2.17

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

1	W/OUT R.C.	NOX	SOUTH	YES
2	W/OUT R.C.	NOX	SOUTH	YES
3	W/R.C.	NOX	SOUTH	YES
4	W/R.C. & PK.BRK.	BRK-END X 3	SOUTH	YES

Force Needed to Activate Brake Failure Lamp (N): 2/1
Fluid Removed (ml) to Activate Brake Failure Lamp: 187

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN BASTERDAY Observer: HOME
Recorded Data Processed by: CHUCK JENKINS Date: 03/28/05
Approving Laboratory Official: KEN WEBSTER Date: 04/05/05

Vehicle: 2003 ACR

NHTSA NUMBER: C31108

Transportation Research Center, Inc.

Make: ACRVIT

18828 State Route 347

Model: M-L/ECOMO GEMIN

East Liberty, Ohio 43318

Body Style: MPV

(937) 666-2011 www.trcpg.com

Front Cold Tire Pressure: 248 (kpa)

Rear Cold Tire Pressure: 248 (kpa)

Date Tested: 02/22/05

DATA SHEET 20 - HYDRAULIC CIRCUIT FAILURE #1 AT GVWR

Testing Conditions: INV DATA, Section 0040, 02/22/05, 15:06:21

Weather Conditions: 35°F Wind: 7 mph 246°

Start Odo.: 886

End Odo.: 966

Method of simulating failure: Disconnected Brake Line B W/C Front Port

System Portion Failed: LF & RL

Schedule:

Initial Brake Temperature 65-100°C

Initial Speed 100 km/h to zero

5 stops with transmission in neutral

Performance Requirements:

One stop with:

Stopping Distance less than 15m

Pedal force between 60N 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 (meter)	CORRECTED DISTANCE (SEE 289) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. HAND FORCE (N)	AVG. HAND FORCE (N)	MAX. DECEL (m/sec ²)	AVG. DECEL (m/sec ²)
		IN1	IN2	IN1	IN2	IN1	IN2	IN1	IN2								
1	99.73	31	84	71	42					93.1	93.5	482.18	407.04	489.85	402.37	6.07	4.02
2	100.51	24	77	76	30					388.8	384.8	-0.00	-1.12	-23.82	-48.60	3.33	2.06
3	100.58	21	63	54	21					299.9	296.5	1.86	-0.15	51.20	44.04	4.11	1.42
4	99.86	18	71	63	14					91.3	91.4	480.10	408.39	488.26	411.47	6.84	4.08

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	N/OUT H.C.	NOX	SOUTH YES
2	N/E.C.	NOX	SOUTH YES
3	N/E.C.	NOX	SOUTH YES
4	N/OUT H.C.	NOX	SOUTH YES

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

DATA INDICATES COMPLIANCE: YES (X) NO (X)

Driver: KAREN EASTERN

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 03/26/05

Approving Laboratory Official: KEN WEBSTER

Date: 04/05/05

Vehicle: 2003 ECM

NTSA NUMBER: C11360

Transportation Research Center, Inc.

Make: AEWIT

10820 State Route 347

Model: N-1/ECOMO SERIES

West Liberty, Ohio 43319

Body Style: MPV

(617) 666-2011 www.trcpg.com

Front Cold Tire Pressure: 24# (Kpa)

Rear Cold Tire Pressure: 24# (Kpa)

Date Tested: 02/22/05

DATA SHEET 21 - HYDRAULIC CIRCUIT FAILURE #2 AT GVWR

Testing Conditions: INV DATA, Section 0065, 02/22/05, 13:20:11

Weather Conditions: 37°F

Wind: 11 mph 272°

Start Odo.: 848

End Odo.: 853

Method of simulating failure: Disconnected Brake Line @ W/C Rear Port

System Portion Failed: RF & LR

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 60N 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 TST (°C)	RIGHT FRONT TST (°C)	LEFT REAR TST (°C)	RIGHT REAR TST (°C)	ACTUAL DISTANCE (meters)	CORRECTED DISTANCE (MAX 250)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. HAND FORCE (N)	AVG. HAND FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.21	92	11	10	63	96.7	96.1	469.25	402.18	462.16	394.73	6.37	3.86
2	100.28	97	14	17	73	223.2	222.0	2.06	1.39	46.63	74.16	4.82	1.89
3	99.13	94	14	15	66	291.8	296.8	1.67	0.94	90.44	59.19	3.58	1.38
4	100.62	84	13	16	57	97.4	96.3	459.32	386.73	497.29	414.30	7.76	3.88

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

STOP #	W/OUT E.C.	NOX	SOUTH	YES
1	W/OUT E.C.	NOX	SOUTH	YES
2	W/E.C.	NOX	SOUTH	YES
3	W/E.C.	NOX	SOUTH	YES
4	W/OUT E.C.	NOX	SOUTH	YES

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

DATA INDICATES COMPLIANCE: YES (X) NO (X)

Driver: KAREN BASTERDAY

Observer: NONE

Recorded Data Presented by: CHUCK JENNINS

Date: 03/26/05

Approving Laboratory Official: KEN WEBSTER

Date: 04/05/05

Vehicle: 2003 ECM
Make: AERIT
Model: E-L/XCORO 2003
Body Style: NPV

TEST NUMBER: C31300

Transportation Research Center, Inc.
10820 State Route 247
East Liberty, Ohio 43113
(937) 656-2011 www.trc.org.com

Front Cold Tire Pressure: 248 (Kpa)
Rear Cold Tire Pressure: 248 (Kpa)

Date Tested: 03/03/05

DATA SHEET 22 - ANTILOCK FUNCTIONAL FAILURE AT GVWR

Testing Conditions: INV DATA, Section 0070, 03/03/05, 09:27:15

Weather Conditions: 20°F Wind: 11 mph 308° Start Odo.: 852 End Odo.: 891

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 55m
Pedal force between 60N and 800N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle must stay in lane of 3.0m

STOP	INIT SPD (kph)	LEFT FRONT TMT (°C)	RIGHT FRONT TMT (°C)	LEFT REAR TMT (°C)	RIGHT REAR TMT (°C)	ACTUAL DISTANCE (meters)	CORRECTED DISTANCE (SEE 200)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. FWD FORCE (N)	AVG. FWD FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	99.34	104	89	69	89	61.9	62.8	242.56	134.07	278.80	134.44	8.42	6.22
2	99.64	94	81	65	81	71.5	72.1	1.12	0.11	430.82	168.08	10.28	5.61
3	100.96	80	86	62	81	71.3	69.9	1.21	0.39	303.47	189.79	7.40	5.62
4	99.99	73	68	44	56	66.3	66.3	-0.49	-1.81	209.21	110.97	8.49	5.84
5	99.46	92	87	58	73	75.9	76.7	0.82	-0.21	172.21	141.31	7.29	5.22
6	100.55	87	81	63	48	67.3	66.6	-0.27	-2.30	321.88	111.19	10.20	5.62

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

STOP	W/OUT H.C.	NOX	SOUTH	YES
1	W/OUT H.C.	NOX	SOUTH	YES
2	W/B.C.	NOX	SOUTH	YES
3	W/B.C.	NOX	SOUTH	YES
4	W/B.C.	NOX	SOUTH	YES
5	W/B.C.	NOX	SOUTH	YES
6	W/B.C.	NOX	SOUTH	YES

How was the ABS failure induced: REMOVED 25 AMP FUSE FROM BOX UNDER LEFT SIDE OF HOOD.

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

Vehicle not equipped with variable proportioning valve. Data Sheet 23 not included.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERNAY Observer: NONE
Recorded Data Processed by: CHUCK JENKINS Date: 02/26/05
Approving Laboratory Official: KEN WEBSTER Date: 04/05/05

Vehicle: 2003 ECM
 Make: AEWIT
 Model: N-1/EUCOMO SERIE
 Body Style: MPV
 Front Cold Tire Pressure: 246 (kpa)
 Rear Cold Tire Pressure: 246 (kpa)

NETSA NUMBER: C11306

Transportation Research Center, Inc.
 10820 State Route 347
 East Liberty, Ohio 43019
 (937)666-2011 www.trcny.com

Date Tested: 03/03/05

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

Testing Conditions: INV DATA, Section 0060, 03/03/05, 11:49:38

Weather Conditions: 25°F Wind: 11 mph 292° Start Odo.: 915 End Odo.: 919

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
 5 stops with transmission in neutral

Performance Requirements:

One stop with:
 Stopping Distance less than 16m
 Pedal force between 400 and 800N
 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 INBT (°C)	RIGHT FRONT INBT (°C)	LEFT REAR INBT (°C)	RIGHT REAR INBT (°C)	ACTUAL DISTANCE (meters)	CORRECTED DISTANCE (SAE 299) (meters)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. HAND FORCE (N)	AVG. HAND FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.79	71	75	36	44	142.1	139.8	492.40	465.48	483.89	430.88	4.41	2.88
2	100.85	78	82	52	43	246.7	242.6	0.82	0.27	801.82	497.40	4.86	1.82
3	99.84	84	83	54	54	221.0	221.7	2.03	1.88	590.81	418.12	4.70	1.87
4	99.84	83	79	59	62	214.2	218.4	-0.46	-0.94	483.14	426.09	3.40	1.97
5	99.65	88	79	52	54	182.7	184.0	0.93	0.18	563.78	461.84	2.81	2.16
6	99.43	89	82	54	57	222.7	228.3	1.18	0.35	438.22	398.21	2.09	1.85
7	99.54	91	82	53	55	182.3	194.1	0.36	-0.10	589.88	442.27	5.72	2.12
8	99.88	94	85	57	61	141.4	144.0	-0.18	-0.12	685.80	544.85	4.24	2.78
9	99.93	89	80	54	59	110.2	110.4	2.00	-0.21	784.25	613.19	8.62	3.81
10	100.75	73	76	21	26	140.9	138.8	0.73	0.18	795.19	720.21	5.47	2.93
11	99.73	71	70	58	63	116.8	116.5	0.94	0.27	767.12	728.92	4.79	3.31
12	99.75	104	98	81	89	182.4	183.3	2.09	1.49	409.84	458.43	3.47	2.09
13	99.69	88	79	82	91	190.8	191.9	1.67	0.85	552.28	478.62	3.38	2.14

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

1	W/OUT E.C.	NOX	SOUTH	YES
2	W/E.C.	NOX	SOUTH	YES
3	W/E.C.	NOX	SOUTH	YES
4	W/E.C.	NOX	SOUTH	YES
5	W/E.C.	NOX	SOUTH	YES
6	W/E.C.	NOX	SOUTH	YES
7	W/E.C.	NOX	SOUTH	YES
8	W/E.C.	NOX	SOUTH	YES
9	W/E.C. & PEX. BRK.	REX-KND	SOUTH	YES
10	W/E.C.	N/A	SOUTH	YES
11	W/E.C.	N/A	SOUTH	YES
12	W/E.C.	N/A	SOUTH	YES
13	W/E.C.	N/A	SOUTH	YES

Is the brake system indicator lamp activated: YES () NO (X)
 Comments: Stops 10-13 performed w/NETSA observers onboard.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN BASTARDAY Observer: NONE
 Recorded Data Processed by: CHUCK JENNINGS Date: 03/28/05
 Approving Laboratory Official: KEN WEBSTER Date: 04/05/05

Vehicle: 2003 ECM
Make: ARVIT
Model: W-L/ECOMO SERIES
Body Style: MPV

FRTSA NUMBER: C51200

Transportation Research Center, Inc.
10820 State Route 247
East Liberty, Ohio 43319
(937) 466-2011 www.trcny.com

Front Cold Tire Pressure: 248 (kpa)
Rear Cold Tire Pressure: 248 (kpa)

Date Tested: 03/04/05

DATA SHEET 25 - PARKING BRAKE AT GVWR

Testing Conditions: IEV DATA, Section 0085, 03/04/05, 09:25:17
Parking brake: AUTOMATIC TR Non-service type: N/A

Service type: HAND-OPERATED

Weather Conditions: 23°F Wind: 7 mph 157°

Start Odo.: 929

End Odo.: 930

Test Weight: Total: 2519kg

Front: 1270kg

Rear: 1270kg

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: <600 N

NOTE: For vehicles with parking brake systems not utilizing the
service brake friction elements, the friction elements of such systems
are to be burnished 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 unburnished
condition. If recommendations are furnished, record method used.

APPLY #	MAX SERVICE FORCE (N)	MAX P-BRAKE FORCE (N)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	AVG REAR IBT (°C)	DRIVER VEHICLE STOP COMMENTS (Direction of Stop (Up/Down) - Brake holds/fails)
	FORCE (N)	FORCE (N)	IBT (°C)	IBT (°C)	IBT (°C)	
1	98.0	9.0	63	71	66.9	ENGINE RUNNING, IN NEUTRAL, 20% SLOPE NOT HOLD, 2 REAPPLIES, UPHILL.
2	110.4	13.7	38	52	45.0	ENGINE RUNNING, IN NEUTRAL, 20% SLOPE NOT HOLD, 2 REAPPLIES, DOWNHILL.
3	468.5	82.0	3	13	8.3	ENGINE RUNNING, IN NEUTRAL, 20% SLOPE NOT HOLD, 2 REAPPLIES, UPHILL.
4	469.8	23.4	4	16	10.8	ENGINE RUNNING, IN NEUTRAL, 20% SLOPE NOT HOLD, 2 REAPPLIES, DOWNHILL.
5	93.4	23.9	8	16	12.2	ENGINE OFF, IN PARK, 20% SLOPE, 0 REAPPLIES, UPHILL.
6	103.2	22.4	8	16	12.2	ENGINE OFF, IN PARK, 20% SLOPE, 0 REAPPLIES, DOWNHILL.

+

* Push button is parking brake actuation (SERVICE motor)
P-Brake values shown → N/A.

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

Comments: Since the Parking Brake would not remain engaged with the engine "on",
the indicator lamp activated only momentarily - one to two seconds.
The lamp did not remain on.

DATA INDICATES COMPLIANCE: YES () NO (X)

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CRUCK JENKINS

Date: 03/28/05

Approving Laboratory Official: EMM WEBSTER

Date: 04/05/05

Vehicle: 2003 ECM
 Make: AVEIT
 Model: M-L/ECGD WHITE
 Body Style: MPV
 Front Cold Tire Pressure: 245 (Kpa)
 Rear Cold Tire Pressure: 245 (Kpa)

NR76A NUMBER: C11100

Transportation Research Center, Inc.
 16820 State Route 347
 East Liberty, Ohio 43329
 (937) 645-2011 www.trcny.com

Date Tested: 03/07/05

DATA SHEET 26 - HEATING SNUBS AT GVWR

Testing Conditions: INV DATA, Section 0080, 03/07/05, 08:02:36

Schedule:

Conduct 15 snubs from 120 Km/h or 104 Vmax, whichever is slower, to 1/2 of initial speed.
 Attain required decel in 1 second and maintain that decel.
 Interval between snubs is 45 seconds and WOT to initial speed.

Performance Requirements:

Initial INV for first snub is 55-65°C
 Maintain 3.0 m/s/s deceleration
 Vehicle must stay in lane of 1.5m

SNUB	AVG. DECEL (m/sec²)	Time Between Snubs (second)	AVG. PEDAL FORCE (N)	LEFT FRONT TST (°C)	RIGHT FRONT TST (°C)	LEFT REAR TST (°C)	RIGHT REAR TST (°C)	INIT SPD (kmh)
1	3.00	--NA--	58.62	59	55	24	48	120.92
2	3.20	47	54.97	132	128	83	96	118.28
3	2.87	46	47.62	186	183	120	162	119.31
4	2.81	46	46.11	232	229	165	179	120.31
5	2.07	44	55.12	264	263	290	224	121.34
6	2.69	44	52.10	302	298	233	263	120.18
7	2.81	52	51.99	324	313	289	292	117.19
8	2.77	41	48.90	351	329	266	315	120.91
9	2.85	44	53.72	377	344	322	380	118.38
10	2.74	42	52.39	401	375	330	374	119.25
11	2.90	46	55.88	417	379	384	394	120.26
12	2.80	45	53.24	427	403	376	412	119.94
13	2.84	44	52.12	444	418	404	421	118.44
14	2.82	45	53.88	446	432	415	442	119.71
15	2.88	46	53.26	452	439	427	433	119.96

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

STOP #	W/OUT H.C.	W/OX	NORTH	YES
1	W/OUT H.C.	W/OX	NORTH	YES
2	W/OUT H.C.	W/OX	EAST	YES
3	W/OUT H.C.	W/OX	EAST	YES
4	W/OUT H.C.	W/OX	SOUTH	YES
5	W/OUT H.C.	W/OX	SOUTH	YES
6	W/OUT H.C.	W/OX	SOUTH	YES
7	W/OUT H.C.	W/OX	WEST	YES
8	W/OUT H.C.	W/OX	NORTH	YES
9	W/OUT H.C.	W/OX	NORTH	YES
10	W/OUT H.C.	W/OX	NORTH	YES
11	W/OUT H.C.	W/OX	NORTH	YES
12	W/OUT H.C.	W/OX	EAST	YES
13	W/OUT H.C.	W/OX	SOUTH	YES
14	W/OUT H.C.	W/OX	SOUTH	YES
15	W/OUT H.C.	W/OX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY Observer: NOME
 Recorded Data Processed By: CHUCK JENNINS Date: 03/28/05
 Approving Laboratory Official: EBB WEBSTER Date: 04/05/05

Vehicle: 2001 ECM
Make: ARVIT
Model: W-L/ECOMO JERIN
Body Style: MPV

NETEL NUMBER: 021309

Transportation Research Center, Inc.
10020 State Route 147
East Liberty, Ohio 43119
(617) 666-3011 www.trc.org.com

Front Cold Tire Pressure: 248 [Kpa]
Rear Cold Tire Pressure: 248 [Kpa]

Date Tested: 03/07/05

DATA SHEET 27 - HOT PERFORMANCE AT GVWR

Testing Conditions: INV DATA, Section 0095, 03/07/05, 08:13:41

Schedule:

Make 2 stops from 100 kph
Pedal Force: 1st stop is done with an average force
less than the average recorded in the
shortest GVWR Cold Effectiveness stop.
2nd stop is done with a force less
than 500 N.

No Lock-Up allowed longer than 0.1 sec above 16 km/h.

Distance Requirements are based on the following:

Shortest stop in Data Sheet 11 is: 4
Initial speed of stop: 99.85 (kph)
Actual distance of stop: 49.2 (meter)
Average pedal force: 403.5 (N)

Performance Requirements:

Stop Number 1 must be less than: 75.3 (meter)
In addition the stopping distance for at least one of the
of the two hot stops must be less than: 57 (meter)

STOP	INIT SPD (kph)	LEFT FRONT INP (°C)	RIGHT FRONT INP (°C)	LEFT REAR INP (°C)	RIGHT REAR INP (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SEE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. GDEC (m/sec²)	AVG. GDEC (m/sec²)
		TEMP	TEMP	TEMP	TEMP						
1	99.85	467	480	439	471	46.9	57.7	444.07	357.68	10.48	6.77
2	100.06	476	473	481	478	61.7	61.6	401.54	317.52	9.38	6.24

DRIVER VEHICLE STOP COMMENTS				
1	(Wheel Lock-Up - Direction of Stop - Stay in lane)			
1	W/OUT K.C.	NOX	SOUTH	YES
2	W/OUT K.C.	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTMAY Observer: NONE
Recorded Data Processed by: CHUCK JENNINS Date: 03/28/05
Approving Laboratory Official: RAY WEBSTER Date: 04/05/05

Vehicle: 2003 NCM

NHTSA NUMBER: C31300

Transportation Research Center, Inc.

Make: ARVIT

10820 State Route 347

Model: W-L/SECOND SERIES

East Liberty, Ohio 43319

Body Style: MPV

(937)664-2011 www.trcopp.com

Front Cold Tire Pressure: 240 (Kpa)

Rear Cold Tire Pressure: 248 (Kpa)

Date Tested: 01/07/05

DATA SHEET 28 - BRAKE COOLING STOPS AT GVWR

Testing Conditions: FNU DATA, Section 0100, 01/07/05, 08:16:53

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: 3.0 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 2.5m

STOP	INIT	AVG.	AVG.	LEFT	RIGHT	LEFT	RIGHT
#	SPD	DECEL	PEDAL	FRONT	FRONT	REAR	REAR
#	(kph)	(m/sec ²)	(N)	(°C)	(°C)	(°C)	(°C)
1	51.77	2.59	56.18	382	379	381	396
2	50.56	2.77	53.72	304	312	329	329
3	50.72	2.65	49.54	266	278	297	304
4	50.84	3.04	61.40	222	249	269	267

STOP	DRIVER VEHICLE STOP COMMENTS			
#	(Wheel Lock up - Direction of Stop - Stay in Lane)			
1	W/OUT H.C.	NOX	WEST	YES
2	W/OUT H.C.	NOX	NORTH	YES
3	W/OUT H.C.	NOX	NORTH	YES
4	W/OUT H.C.	NOX	NORTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: LARRY EASTWYDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 01/28/05

Approving Laboratory Official: BEN WENSTER

Date: 04/05/05

Vehicle: 2003 ECM
Make: ARVIT
Model: N-L/ECONOMY SERIE
Body Style: MPV

TEST NUMBER: C31300

Transportation Research Center, Inc.
10820 State Route 347
East Liberty, Ohio 43319
(937)666-2011 www.trcny.com

Front Cold Tire Pressure: 148 (Kpa)
Rear Cold Tire Pressure: 248 (Kpa)

Date Tested: 03/07/05

DATA SHEET 29 - RECOVERY PERFORMANCE AT GVWR

Testing Conditions: INV DATA, Section 6105, 03/07/05, 00:25:02

Weather Conditions: 47°F Wind: 16 mph 227°

Start Odo.: 936

End Odo.: 952

Schedule:

Make 2 stops from 100 kph

Pedal Force: Both stops are performed with an average force less 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: 66.0 (meter)

Lower limit of corrected stopping distance: 38.1 (meter)

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

Distance Requirements are based on the following:

Shortest stop Data Sheet 11 as: Stop 4

Initial speed of stop: 99.85 (kph)

Actual distance of stop: 49.2 (meter)

Average pedal force: 483.5 (N)

STOP	INIT SPD (kph)	LEFT FRONT INP (°C)	RIGHT FRONT INP (°C)	LEFT REAR INP (°C)	RIGHT REAR INP (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (MAX 25°) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	99.85	186	197	224	229	59.7	59.9	352.28	261.01	13.23	6.53
2	100.41	232	239	248	253	64.2	51.6	422.61	346.87	12.27	7.02

STOP	DRIVER VEHICLE STOP COMMENTS			
#	(Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	W/OUT E.C.			
2	W/OUT E.C.			

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: MONS

Recorded Data Processed by: CHUCK JENKINS

Date: 03/24/05

Approving Laboratory Official: KEN WEBSTER

Date: 04/05/05

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

VEHICLE: 2003 EMC Digipad II NHTSA NO.: C31300 DATE: 03/24/05

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
M/Cyl	Good	Other	NA

COMPLIANCE: Yes X No

Comments: ** Some minor surface fractures were apparent around thermocouple plug installations.

Technician: K. Easterday

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

VEHICLE: 2003 EMC Digipad II; NHTSA NO.: C31300; GVWR: 2451 kg
MASTER CYLINDER RESERVOIR:

DATE	03/23/08		Requirements	Pass	Fail
Reservoir Compartments (S5.4.1)					
(1) Does master cylinder have a reservoir compartment for each brake subsystem?	<u>Yes</u>	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		
	<u>No</u>				
Reservoir Capacity (S5.4.2)					
Shall 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)	**	Shall 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.			
Fluid displaced from new to worn linings (ALL linings)	**				
*Value calculated from Data Sheet 31					

Comments: **Not measured per COTR. Disassembly of the brake master cylinder not performed as additional vehicle brake testing may be conducted.

DATA SHEET 30 (Part 3 of 5)
TEST COMPLETION INSPECTION (\$7.18)

VEHICLE: 2003 EMC Digipad II; NHTSA NO.: C31300; GVWR: 2451 kg

MASTER CYLINDER RESERVOIR:

DATE	10/12/04	Requirements	Pass	Fail
Master Cylinder Piston Displacement (\$5.4.2) [If Common Reservoir Supply - continued from previous page]				
Fluid displaced by three strokes of master cylinder piston for Primary (Subsystem No. 1)	**	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 full stroke 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)	**			
Fluid displaced per stroke, Primary	**			
Fluid displaced per stroke, Secondary	**			
Fluid available in partial compartment Subsystem No. 1	**			
Fluid available in partial compartment Subsystem No. 2	**			
Brake Power Unit Reservoir (\$5.4.2)				
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 plus displacement when wheel cylinders or caliper pistons move from new lining to full worn condition as above.	NA	
Reservoir Labeling (\$5.4.3)				
Exact copy of reservoir label: On master cylinder reservoir cap and top of reservoir: <u>WARNING</u> <u>CLEAN FILLER CAP BEFORE REMOVING</u> On top of reservoir: <u>USE ONLY DOT 3 BRAKE FLUID FROM A SEALED CONTAINER</u>		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 top of the master cylinder reservoir cap.</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: ****Not measured per COTR.**

Technician: K. Easterday

DATA SHEET 30 (Part 4 of 5)
TEST COMPLETION INSPECTION (S7.18)

VEHICLE: 2003 EMC Digipad II; NHTSA NO.: C91300; DATE: 03/23/05
BRAKE SYSTEM WARNING INDICATOR (S5.5)

CONDITION	ANSWER	REQUIREMENTS	PASS	FAIL
Brake Systems Indicator Lamp Function Check (S5.5.2) (Bulb and systems check)				
Describe location of brake Indicator lamp: <u>In upper center of 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?	Yes			
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 (S5.5.1) DURATION (S5.5.3) FUNCTION (S5.5.4)				
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 60%	N/A			
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? (S5.4.4)	NA			
Indicator lamps remain activated as long as condition exists - ignition "on", and engine on or off? _____ (S5.5.3 DURATION)	Yes			
Visual warning - continuous or flashing?	Yes-Cont.			
Audible warning - continuous or flashing?	No			

Comments: None.

Technician: K. Easterday

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

VEHICLE: 2003 EMC Digipad II; NHTSA NO.: C31300; DATE: 03/23/05

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 <u>Letters - Red, Lens - 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 block and not less than 6.4 mm (.25") in height? Record letter height _____	NA		
If separate indicator for: 1. Low brake fluid per \$5.5.1(a)(1), does indicator say "Brake Fluid"? NOTE: not required for mineral oil system Record wording _____ 2. Gross pressure loss per \$5.5.1(a)(2), does indicator say "Brake Pressure"? Record wording _____ 3. Electrical functional failure in antilock or variable proportioning system per \$5.5.1(b), letters and background contrasting colors one of which is yellow? Record colors <u>Lens - Black, Letters - Amber or yellow</u> Does indicator say "Antilock" or "ABS" or "Brake Proportioning"? Record wording <u>"ABS" within symbol</u> 4. Parking brake per \$5.5.1(c), does indicator say "Park" or "Parking Brake"? Record wording _____ 5. Brake lining wear-out per \$5.5.1(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: 2003 EMC Digipad II; NHTSA NO.: C31300; DATE: 04/26/05

BRAKE		LINING		
LOCATION	TYPE	DESCRIPTION	MINIMUM THICKNESS**	THICKNESS TO FULLY WORN (1) mm*
Left Front	Drum	Leading	Pre-test mm	0.78 mm
		Primary	Post Test mm	
		Inboard X	Δ mm	
	Disc X	Trailing	Pre-test mm	0.78 mm
		Secondary	Post Test mm	
		Outboard X	Δ mm	
LINING CLEARANCE: Diametrical (2): N/A		Inboard - 0.2 mm.	Outboard - 0.2 mm.	
WHEEL CYLINDER DIAMETER (3): N/A		CALIPER PISTON DIAMETER (3): 45.90 mm (x2 pistons)		
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 X	Leading X	Pre-test mm	0.78 mm
		Primary	Post Test mm	
		Inboard	Δ mm	
	Disc	Trailing X	Pre-test mm	0.78 mm
		Secondary	Post Test mm	
		Outboard	Δ mm	
LINING CLEARANCE: Diametrical (2) 0.58 mm		Inboard - Not Appl.	Outboard - Not Appl.	
WHEEL CYLINDER DIAMETER (3): 22.29 mm		CALIPER PISTON DIAMETER (3): Not Appl.		
SHOE CAGE DIAMETER (4): 248.69 mm.		CENTER POINT OF BRAKE ASSY TO CENTER PT. OF W.C.: 96.25 mm.		
CIRCUIT #1 CONSISTS OF:	LF	LR - X	RF	RR - X
CIRCUIT #2 CONSISTS OF:	LF - X	LR	RF - X	RR
(1) MFRS. RECOMMENDATIONS - 0.78 mm, Front and 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: 248.92 mm.				
(3) MFRS. DATA: Frt. - 46 mm, Rear - 22.23 mm.				
(4) RESET POSITION: 248.69 mm.				

Comments: **Not measured per COTR. Existing data available from this vehicle's previous test.

Technician: K. Easterday

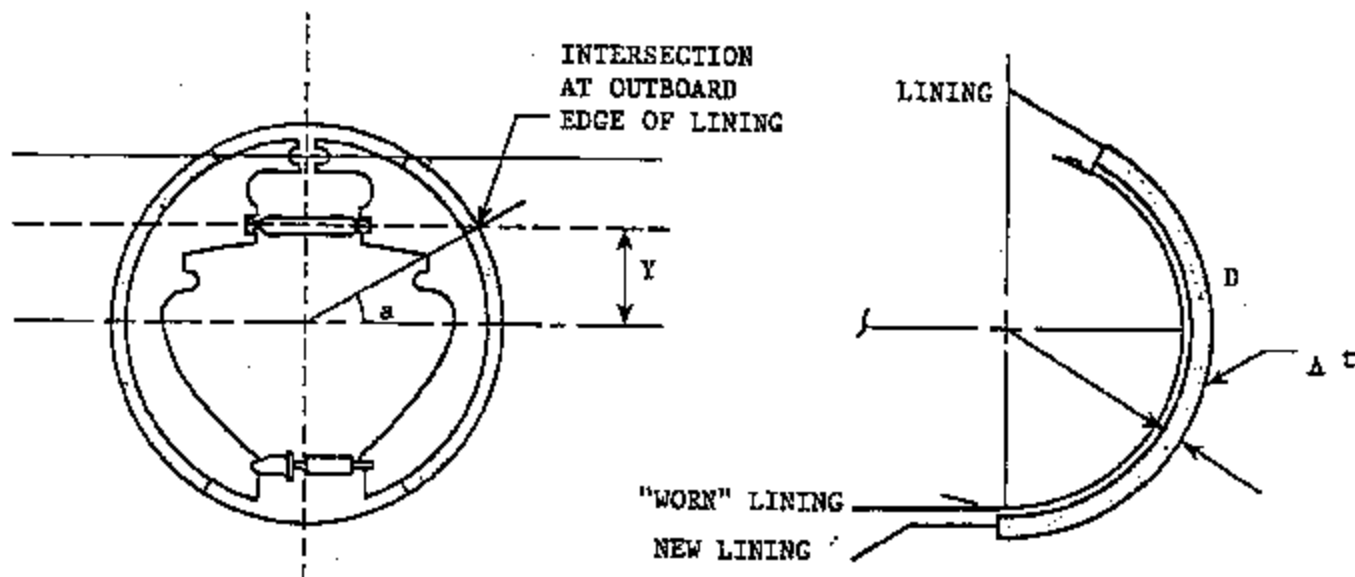
DATA SHEET 31 – SECTION CONTINUED (Part 2 of 2)

Vehicle: 2003 EMC Digipad II;

NHTSA No.: C31300; Date: 04/26/05

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. Both measured and manufacturer's provided data utilized to obtain the greatest amount of fluid volume.



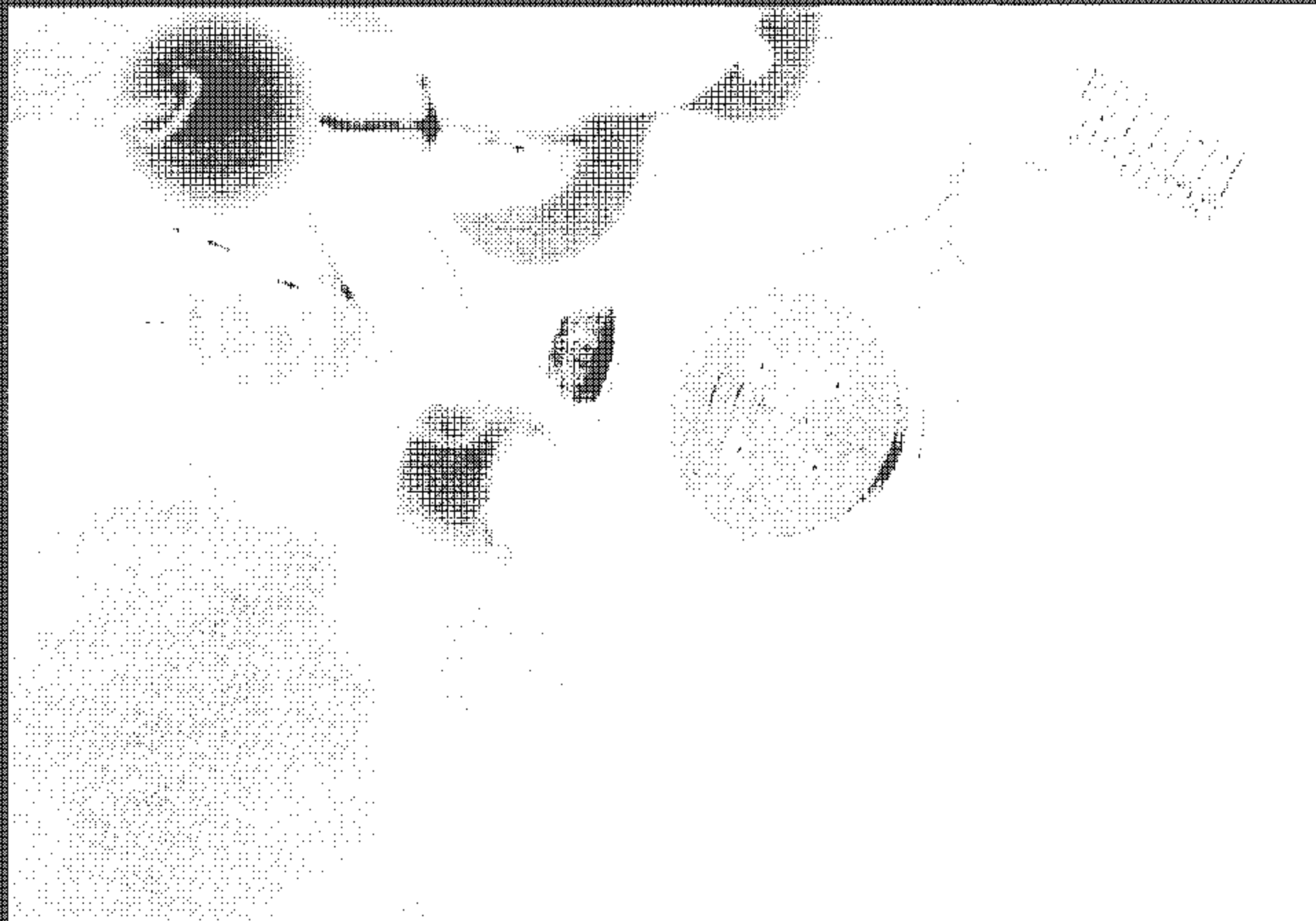
Drum Brake: $V_r = \frac{2C + \Delta t_l + t_t A}{\cos a}$

- Where: V_r = Volume required per wheel
 C = Manufacturer's recommend radial drum-to-lining clearance
 Δt_l = Change in thickness of Leading lining
 Δt_t = Change in thickness of Trailing lining
 Y = Center point of wheel cylinder to center point of brake assembly
 A = Cross sectional area of the wheel cylinder bore
 NWC = Number of wheel cylinders serviced by the reservoir in question
 $a = \sin^{-1} \frac{2Y}{D}$
 D = Cage diameter
 d = Wheel cylinder diameter

Measurements not performed per COTR.

SECTION 6.0

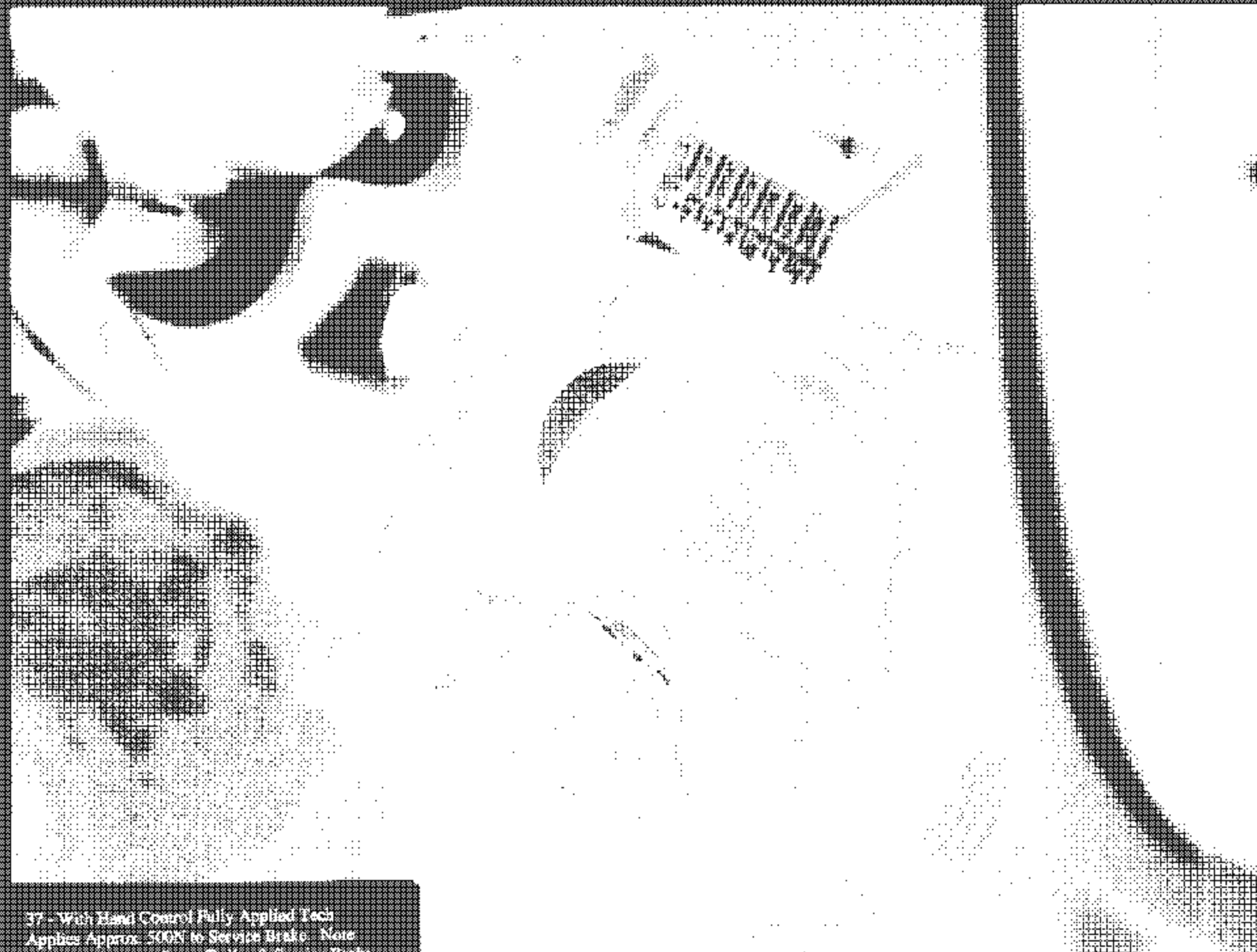
Photographs



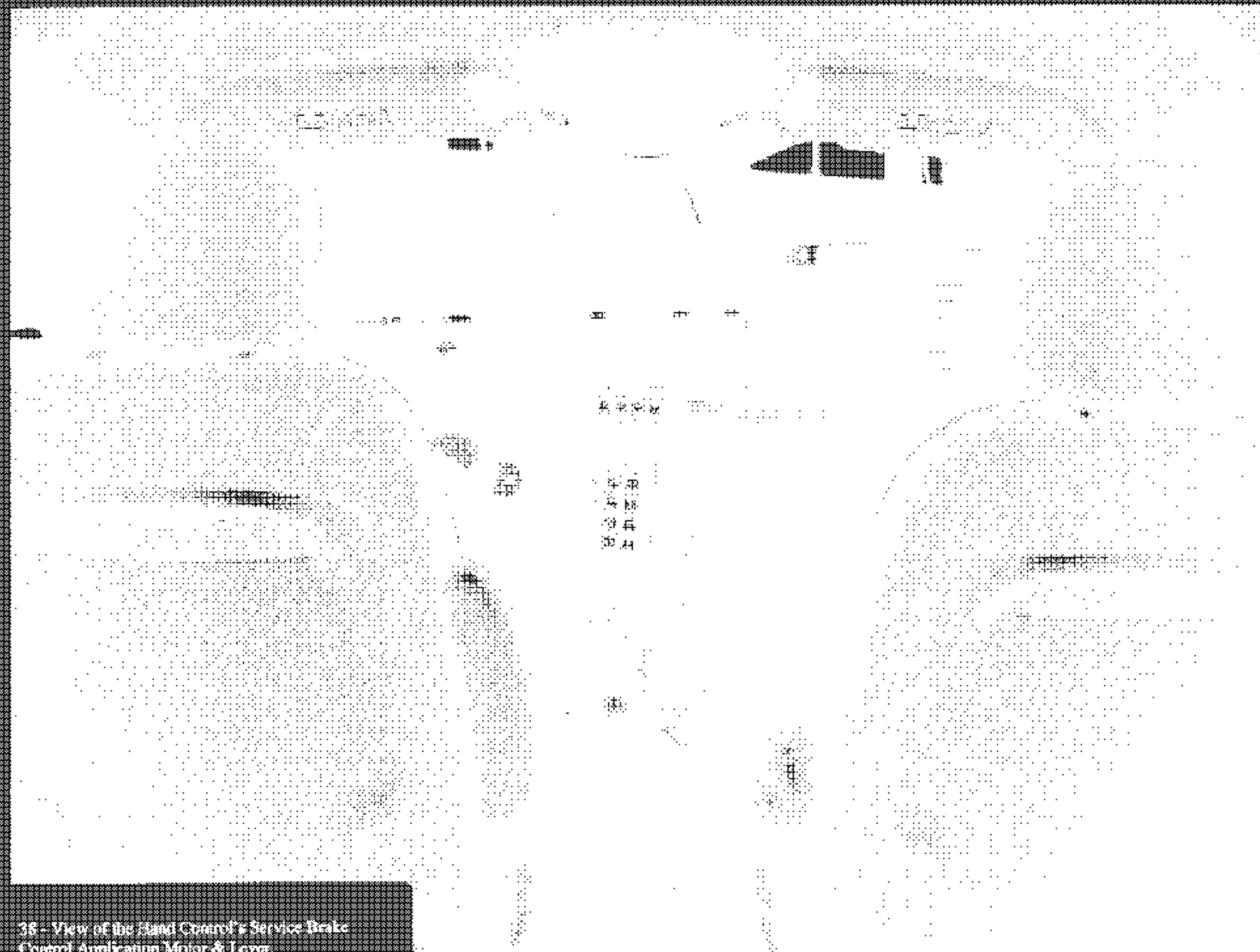
35 - Retracted/Nominal Position of Service Brake Control During Circuit #1 Failure. Note Strain Gauge above Transducer.



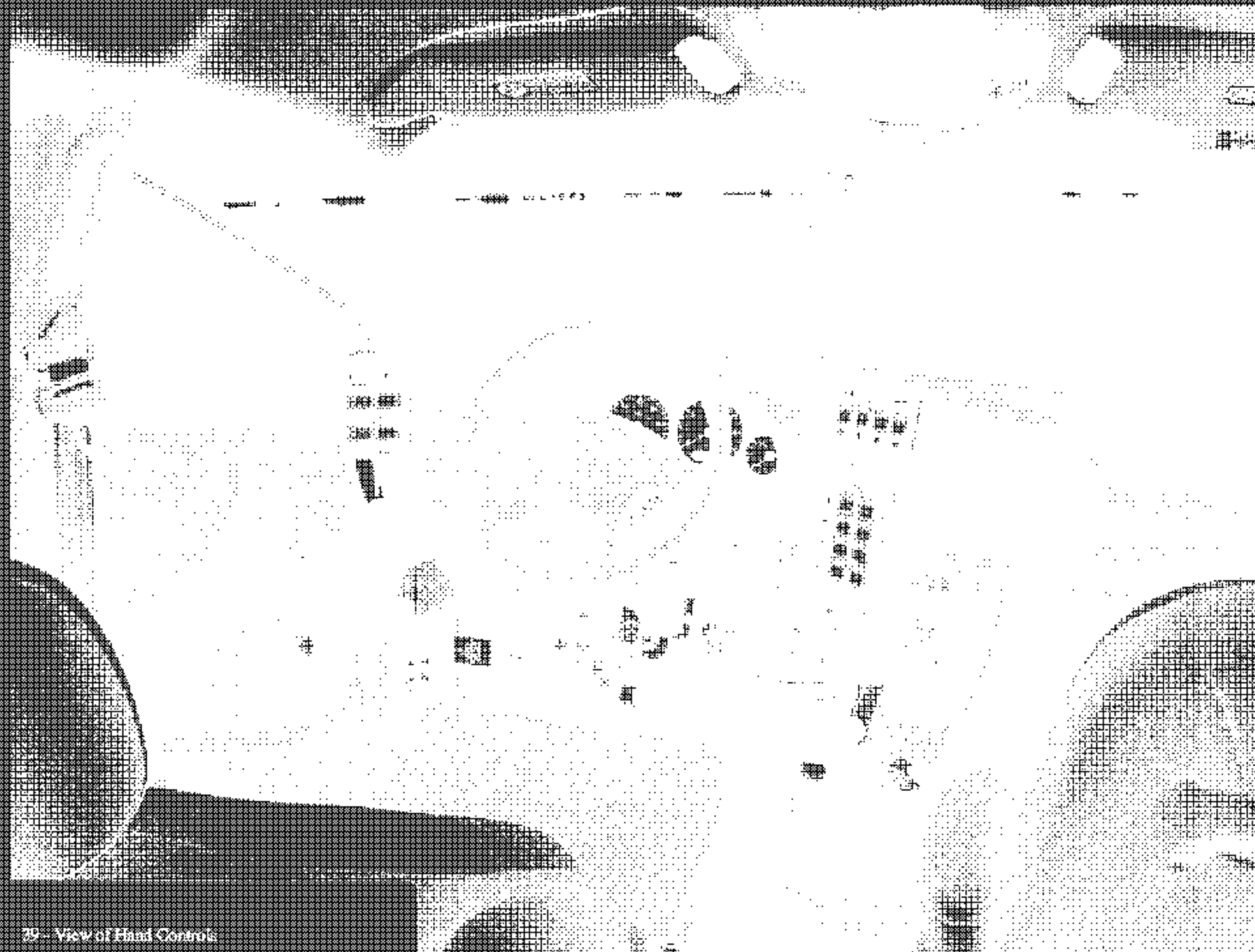
36 - Fully Applied Hand Control During Chest
#1 Failure - Note Lever/Roller pointing straight
ahead.



37 - With Hand Control Fully Applied Tach
Applies Approx. 500N to Service Brake. Note
gap/crease between Lever/Roller & Service Brake.



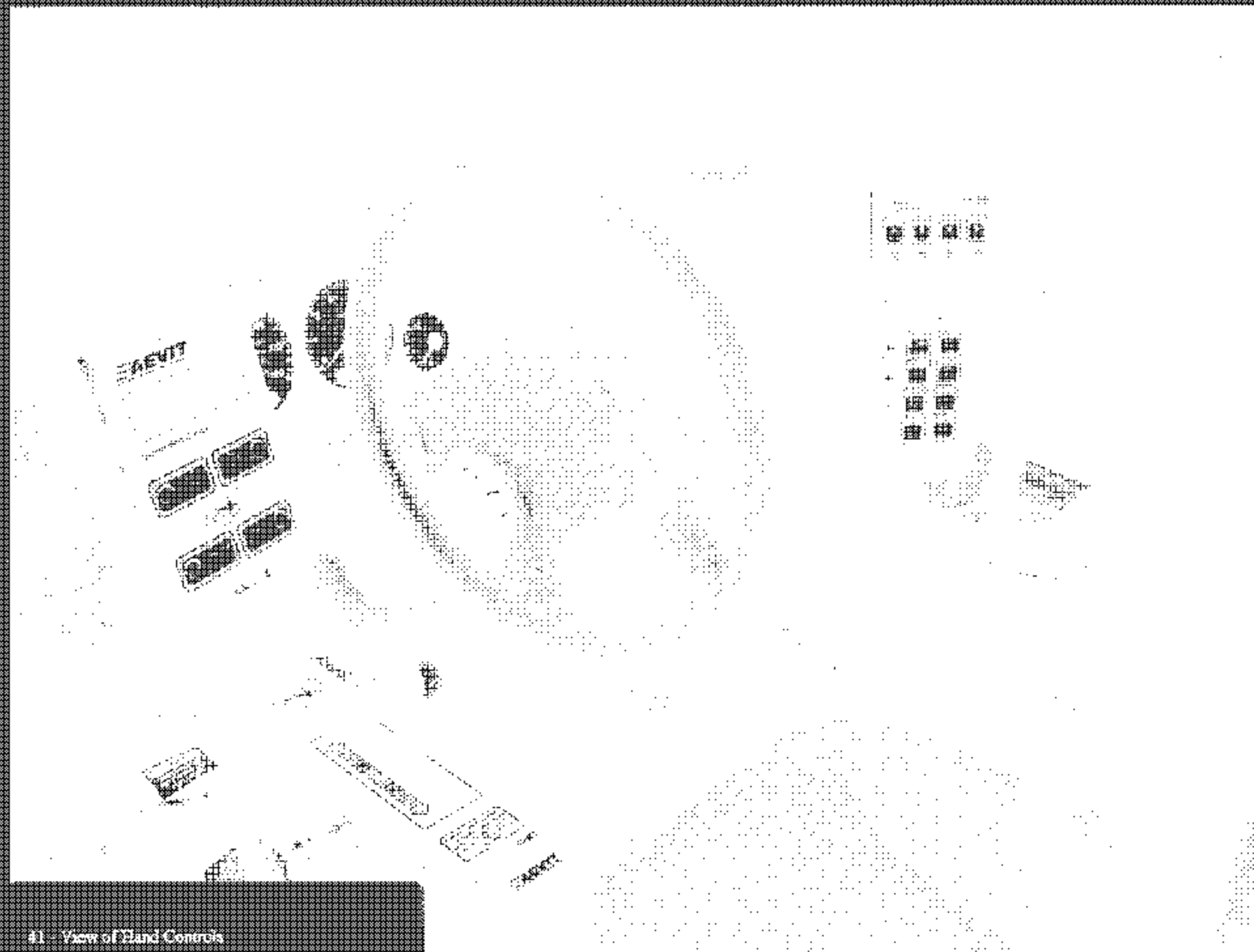
35 - View of the Hand Control's Service Brake Control Application Motor & Lever



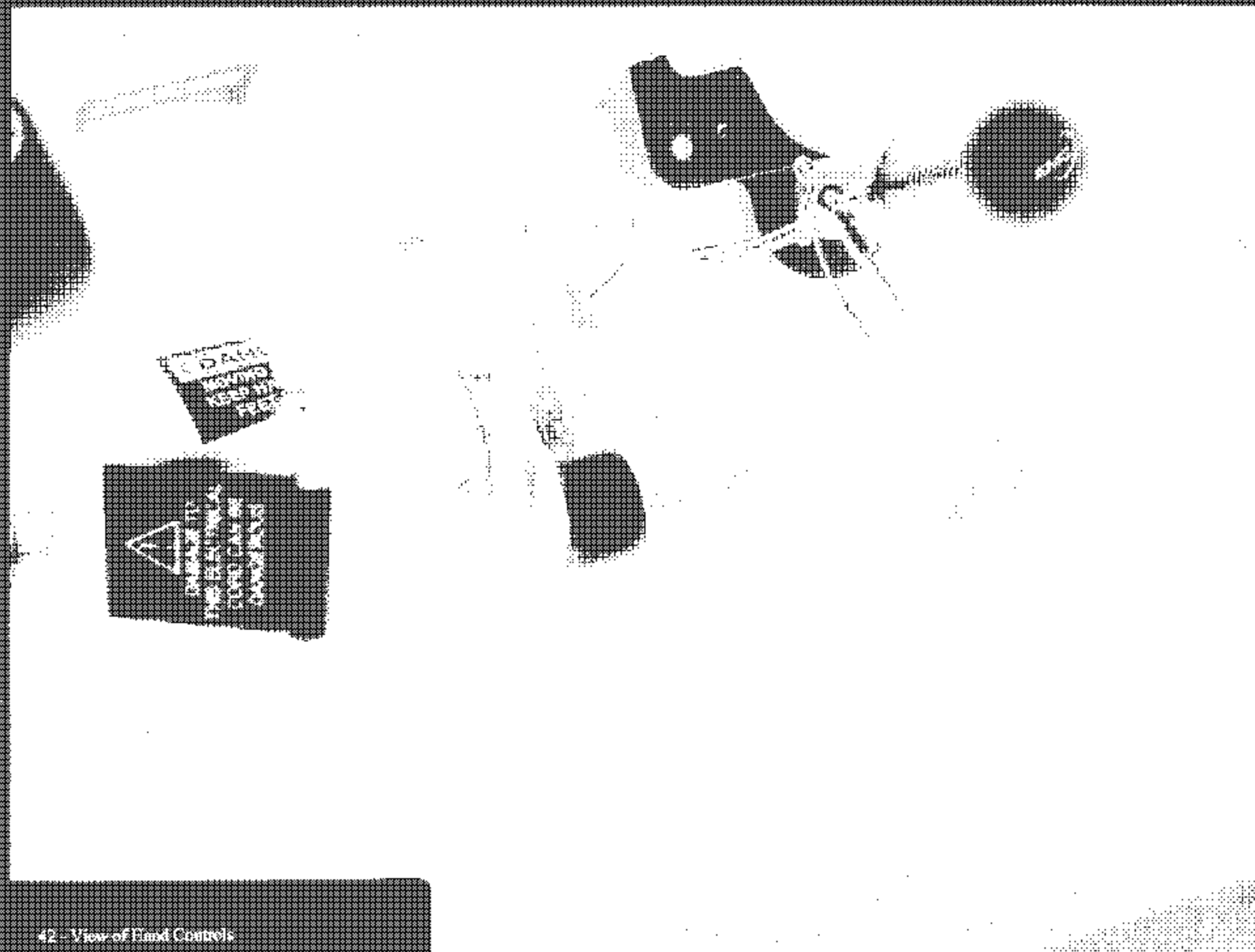
29 - View of Hand Controls



#0 - View of Hand Controls



41 - View of Blind Controls





45 - View of Road Control

SECTION 7.0

Instrumentation and Daily Calibrations

7.0 INSTRUMENT CALIBRATION (12 MONTH MAXIMUM INTERVAL)
VEHICLE: 2003 EMC Digipad II; NHTSA NO.: C31300; DATE: 03/24/05

INSTRUMENT	SERIAL NUMBER	CALIBRATION DATE	NEXT CALIBRATION
Data Acquisition System - Link DAS 2030	975016	02/28/04	08/30/06
Computer - Dell Latitude/Link Engrg.	TRC-43207	Not Applicable	Not Applicable
Software - Link Engrg. 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	07/16/04	07/16/05
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-169755	Each Test	Each Test
Asst. Pipe-Handle Steel Weights - Ohaus	LB-0002	06/22/04	06/22/05
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-06 Radar	140.0119	Each Test	Each Test
Wind Velocity/Direct. - Davis Model 6410	041008N03	11/23/04	11/23/05
Ambient Temp. Gage-Davis Model 6150C	B10910A01	11/23/04	11/23/05
LF Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
RF Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
LR Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
RR Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
Lock-up Detection System	TRC Propr.	Each Test	Each Test
In-Line Strain Gage Amplifier - Sensotec	954487	Each Test	Each Test
1/8 in. Single Element Strain Gage-Vishay	350 ohm	Each Test	Each Test
Vehicle Weight - Toledo/Mettler Scales JAGXTREME 3000000, (Blot 70)	SN 5225831- SJC	11/08/04	02/06/05

QUALITY ASSURANCE

DAILY CALIBRATIONS (1 of 3)

Vehicle: 2003 EMC Digipad II

NHTSA No.: C31300

Deceleration Calibration Data for Unit 5359

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"
12/28/2004	8:32:45	-0.04	9.80
1/10/2005	9:21:14	0.00	9.82
1/13/2005	8:35:19	-0.02	9.87
1/28/2005	13:02:28	-0.02	9.75
1/28/2005	15:32:18	0.02	9.80
2/2/2005	13:13:43	-0.03	9.78
2/2/2005	15:54:09	0.01	9.81
2/7/2005	8:29:23	-0.01	9.72
2/11/2005	8:58:56	0.00	9.80
2/11/2005	14:55:24	0.03	9.77
2/15/2005	11:40:16	-0.04	9.80
2/15/2005	15:15:12	0.01	9.89
2/22/2005	8:17:53	-0.02	9.81
2/22/2005	16:01:05	0.00	9.88
3/3/2005	9:17:34	-0.06	9.81
3/3/2005	15:46:24	-0.01	9.85
3/4/2005	9:13:18	0.02	9.83
3/7/2005	7:43:01	0.01	9.85
3/7/2005	8:43:21	0.02	9.78
3/23/2005	8:58:28	0.02	9.81

PRE-TEST CAL

POST-TEST CAL

Pre-Test Linearity Check 01/04/05

Actual (m/s/s)	Rec. (m/s/s)
0.0	0.0
3.0	3.0
8.1	8.1
9.8	9.8

Post-Test Linearity Check 03/07/05

Actual (m/s/s)	Rec. (m/s/s)
0.0	0.0
3.0	3.0
8.1	8.1
9.8	9.8

Distance Calibration Data for Unit 5358

Desired full scale value is: 1000 m

Allowed deviation is: 3 m

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

"Date"	"Time"	Distance for
"stp"	"stp"	1000 meters
1/10/2005	9:02:33	1000.8
1/13/2005	8:54:06	999.5
1/28/2005	13:25:47	996.5
1/28/2005	15:39:34	995.8
2/2/2005	13:35:14	998.0
2/2/2005	16:02:18	995.7
2/7/2005	8:38:28	1000.3
2/11/2005	8:08:00	1001.7
2/11/2005	15:01:18	1001.8
2/15/2005	11:47:38	1000.7
2/15/2005	15:23:54	1000.1
2/22/2005	8:23:34	1001.5
2/22/2005	16:06:48	1001.6
3/3/2005	9:22:55	1002.4
3/3/2005	15:52:48	1001.7
3/4/2005	9:19:51	1001.2
3/7/2005	7:48:12	1001.0
3/7/2005	8:33:46	1001.7

PRE-TEST CAL

DAILY CALIBRATIONS CONTINUED (2 of 3)

VEHICLE: 2003 EMC Digipad II

NHTSA No.: C31300

Wheel Tachometer Calibrations for Unit 5359

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

		"Date" stp	"Time" stp	Zero	@ 15km/h	Zero	@ 15km/h	Zero	@ 15km/h	Zero	@ 15km/h	
				LF	LF	RF	RF	LR	LR	RR	RR	
Wheel lock detector	While at a standstill, check zeros. Drive vehicle at approx. 15 km/h and engage zero speed switch for each wheel	1/13/2005	8:52:37	0.0	16.5	0.0	16.2	0.0	15.5	0.0	16.1	PRE-TEST CAL.
		1/28/2005	13:25:01	-0.1	16.6	-0.1	16.9	0.0	16.9	0.0	16.1	
		1/28/2005	15:36:34	-0.1	16.6	0.0	21.8	0.0	17.9	0.0	16.9	
		2/2/2005	13:33:02	-0.1	16.3	0.0	19.6	-0.2	17.6	-0.1	16.6	
		2/2/2005	15:57:55	-0.1	15.7	-0.1	19.8	-0.2	17.3	-0.1	16.6	
		2/7/2005	8:34:46	0.0	15.9	0.0	19.1	-9.5	1.2	-0.1	16.1	
		2/11/2005	9:06:53	-0.0	15.8	-0.1	18.6	0.0	22.8	-0.1	16.3	
		2/11/2005	14:56:43	0.0	15.7	0.0	17.8	0.0	16.1	-0.1	16.1	
		2/15/2005	11:46:45	-0.1	15.8	0.0	18.9	0.0	16.2	0.0	16.3	
		2/15/2005	15:19:17	0.0	16.3	0.0	19.4	0.0	16.3	0.0	16.6	
		2/22/2005	8:22:21	0.0	16.0	0.0	17.9	0.0	16.6	0.0	16.3	
		2/22/2005	16:02:42	0.0	15.8	-0.1	18.7	0.0	16.1	0.0	27.0	
		3/3/2005	9:21:46	0.0	17.3	0.0	20.2	0.0	16.9	0.0	17.1	
		3/3/2005	15:48:08	-0.2	15.1	-0.1	18.9	0.0	16.5	0.0	23.5	
		3/4/2005	9:18:25	-0.1	15.9	0.0	19.9	0.0	16.3	0.0	16.7	
		3/7/2005	7:51:27	-0.1	15.4	0.0	18.6	0.0	15.1	-0.1	16.1	
		3/7/2005	8:35:13	-0.3	16.0	-0.1	19.4	-0.1	11.9	0.0	19.0	

When driven over 15 km/hr and the wheel tach generators are shunted to zero volts, does the graphical screen indicate wheel lock at each wheel position?: ☒ Yes, ☐ No.

Note: The wheel tach calibrations did not occur until after the Burnish was complete.

Pedal Force Meter Calibration for Unit 5369

Target shunt calibration is 386 N

Desired recorded value is: 386 N

Desired recorded calibration value is: 500 N

Allowed deviation is: 8.5 N

Service brk. pedal effort	Driver engages a fixed shunt cal switch.	"Date"	"Time"	Zero	Cal Val	
		stp	stp	Force	Force lb	
		1/4/2005	13:04:32	-0.7	488.7	PRE-TEST CAL.
		1/10/2005	8:19:40	-1.2	387.3	
		1/13/2005	8:33:36	-0.3	386.8	
		1/28/2005	13:01:13	-0.7	386.6	
		1/28/2005	15:33:06	-0.5	386.4	
		2/2/2005	13:16:44	-0.1	386.8	
		2/2/2005	15:52:28	-0.8	386.6	
		2/7/2005	8:28:51	-1.9	386.9	
		2/11/2005	8:57:19	-2.7	386.6	
		2/11/2005	14:54:58	-1.8	387.1	
		2/15/2005	11:39:14	-0.5	386.8	
		2/15/2005	15:15:59	0.0	389.1	
		2/22/2005	8:17:11	-0.1	386.8	
		2/22/2005	15:56:17	-0.2	389.3	
		3/3/2005	9:17:11	-0.5	388.7	
		3/3/2005	11:44:23	-0.2	386.9	
		3/3/2005	15:42:29	-0.8	386.7	
		3/4/2005	9:12:09	-2.0	386.6	
		3/7/2005	7:41:52	-1.4	387.5	
		3/7/2005	8:41:56	-0.5	386.7	
		3/23/2005	9:19:06	-0.5	497.8	

Pre-Test Linearity Check - 01/04/05

Actual	Recorded
Force (N)	Force (N)
0	0
222	222
445	445
498	498

Post-Test Linearity Check - 03/07/05

Actual	Recorded
Force (N)	Force (N)
0	0
222	222
445	444
498	497

DAILY CALIBRATIONS CONTINUED (3 of 3)

VEHICLE: 2003 EMC Digipad II

NHTSA No. C31300

Dynamic Speed Calibration for Unit 5359

Desired speed value is: 100 km/h

Allowed deviation is: 1.6 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
1/10/2005	9:06:09	100.1	36.21
1/13/2005	8:50:49	100.1	36.15
1/28/2005	13:23:11	100.0	36.50
1/28/2005	15:37:00	100.3	36.03
2/2/2005	13:31:39	99.7	36.06
2/2/2005	16:00:11	100.2	35.87
2/7/2005	8:36:25	100.5	36.37
2/11/2005	9:05:25	99.9	36.34
2/11/2005	14:59:12	99.9	36.21
2/15/2005	11:45:07	99.8	36.18
2/15/2005	15:21:43	100.4	36.03
2/22/2005	8:20:40	100.0	36.15
2/22/2005	16:04:49	100.0	36.18
3/3/2005	15:50:46	100.6	35.84
3/4/2005	9:16:33	100.4	35.96
3/7/2005	7:47:27	100.7	36.00
3/7/2005	8:31:55	99.9	36.25

PRE-TEST CAL

SECTION 8.0

Hand Control vs. Foot Control Correlations

Test: 5359, Section: 8000, Step: 1
Printed: 05/04/05 15:54 PM

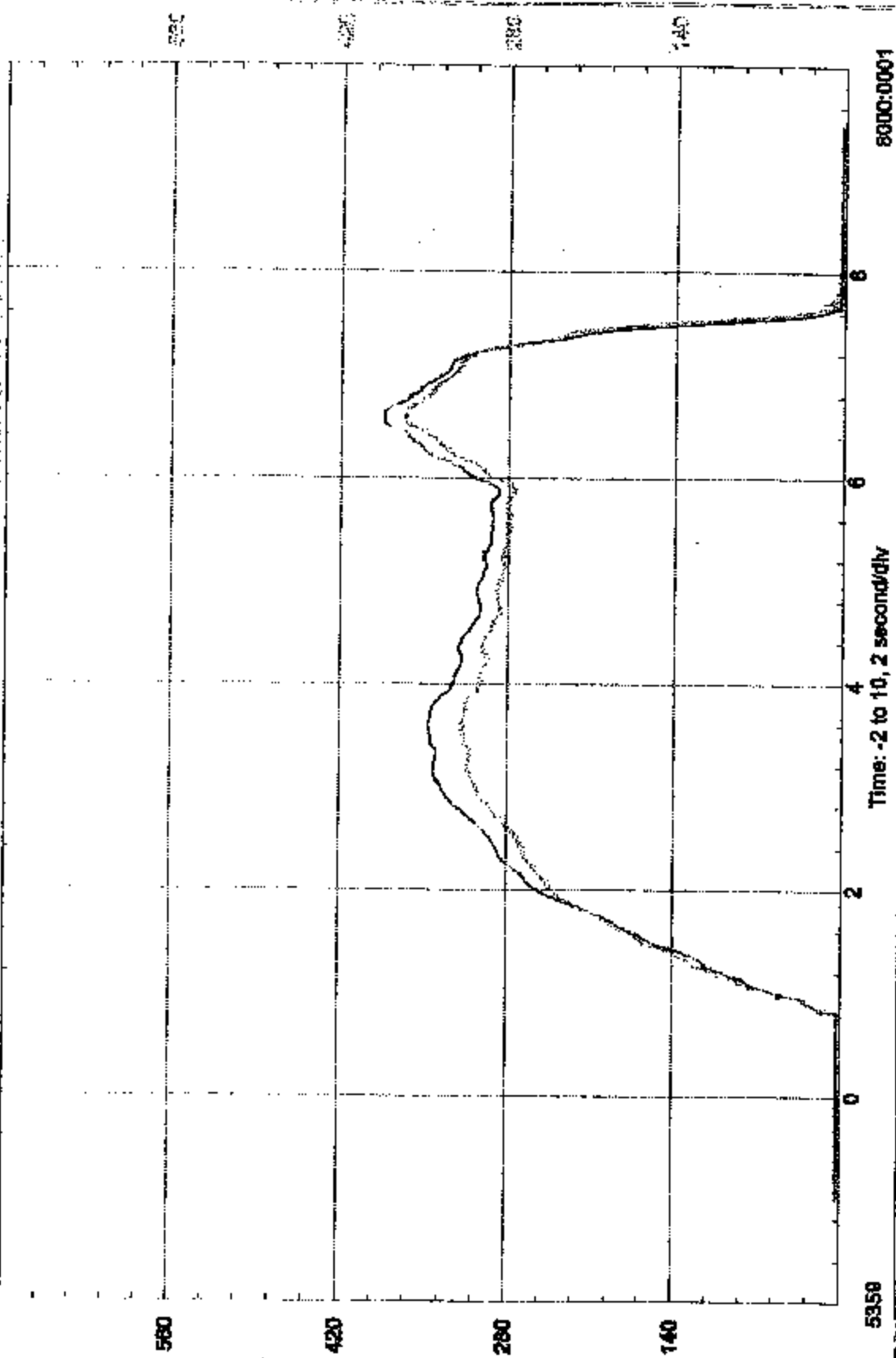


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 700, 140 N/div

8000:0001



Pre-Cold Effectiveness @ GVWR, 01/28/05

Test: 5358, Section: 8000, Stop: 2
Printed: 05/04/05 15:53 PM

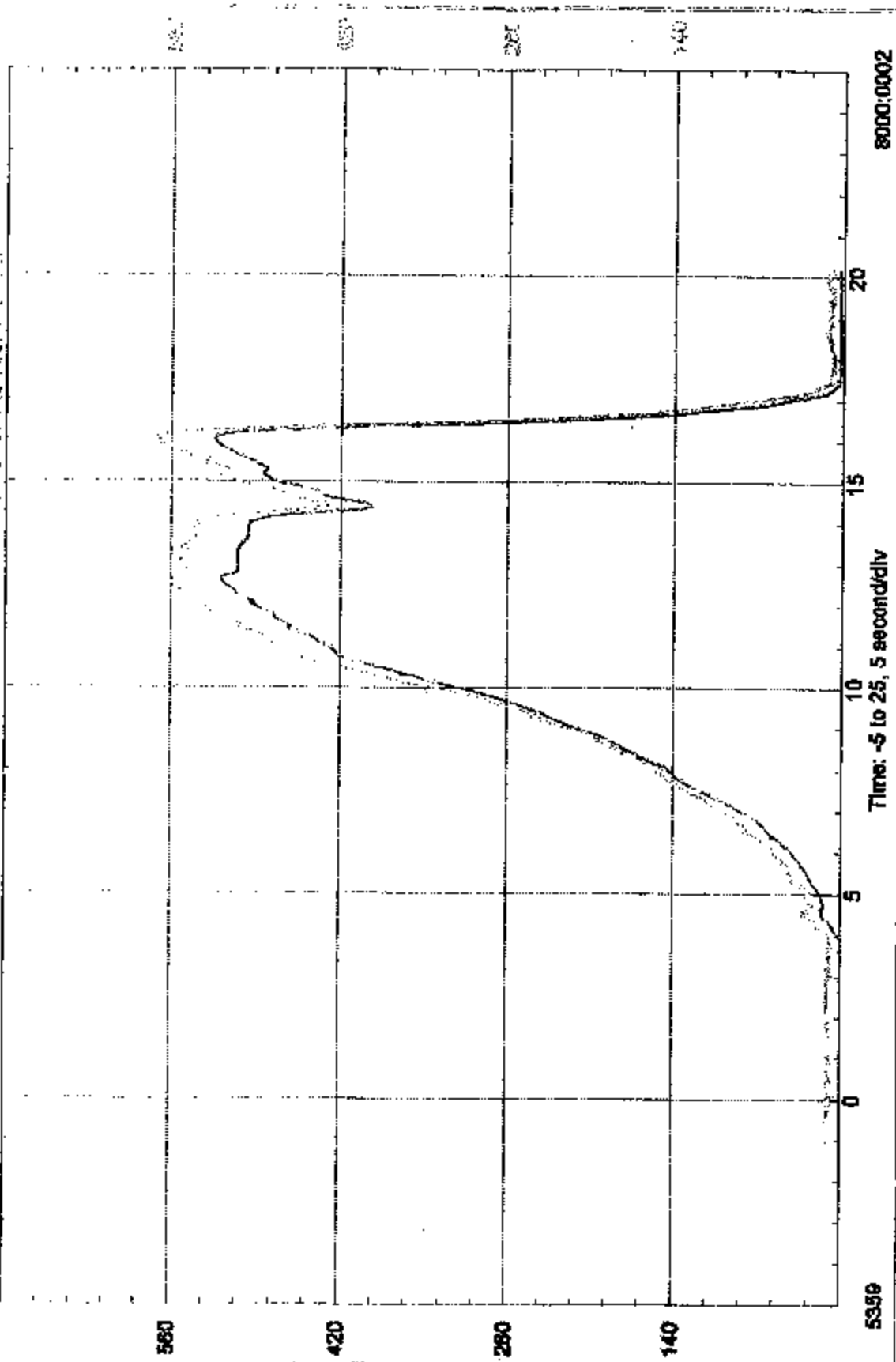


Engineering

LINK Engineering Company
The ProLink System

Pedal Force: 0 to 700, 140 N/div

Time: 0 to 25, 5 sec/div



Post-Cold Effectiveness @ CVWR, 01/28/05

Test: 5359, Section: 8000, Stop: 3
 Printed: 05/04/05 15:51 PM

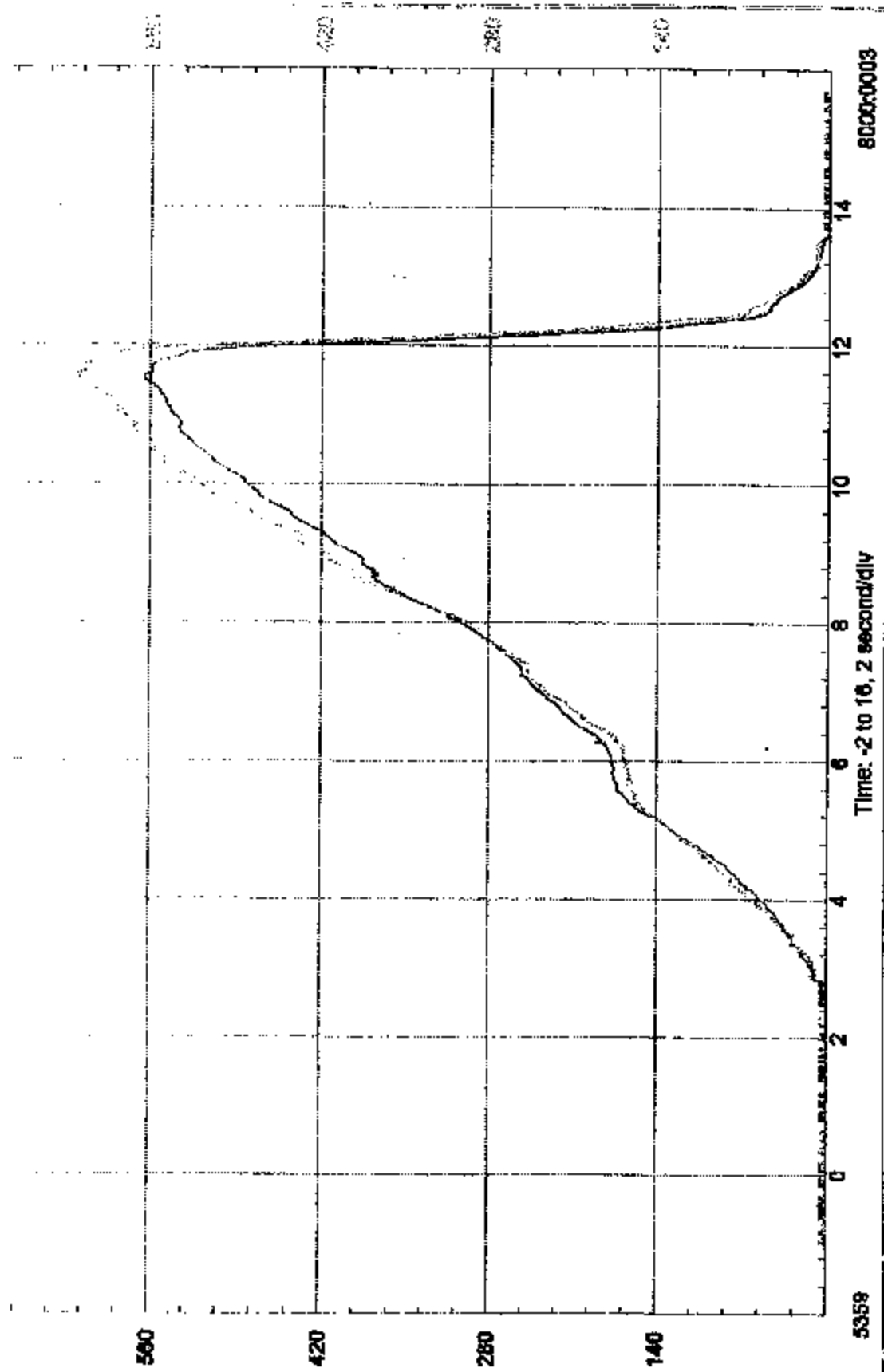


Engineering

LINK Engineering Company
 The ProLink System

Pedal Force: 0 to 700, 140 N/div

8000:0003



Pre-High Speed Effectiveness @ GWR, 02/02/05

Test: 5359, Section: 8000, Stop: 5
Printed: 05/05/05 08:17 AM

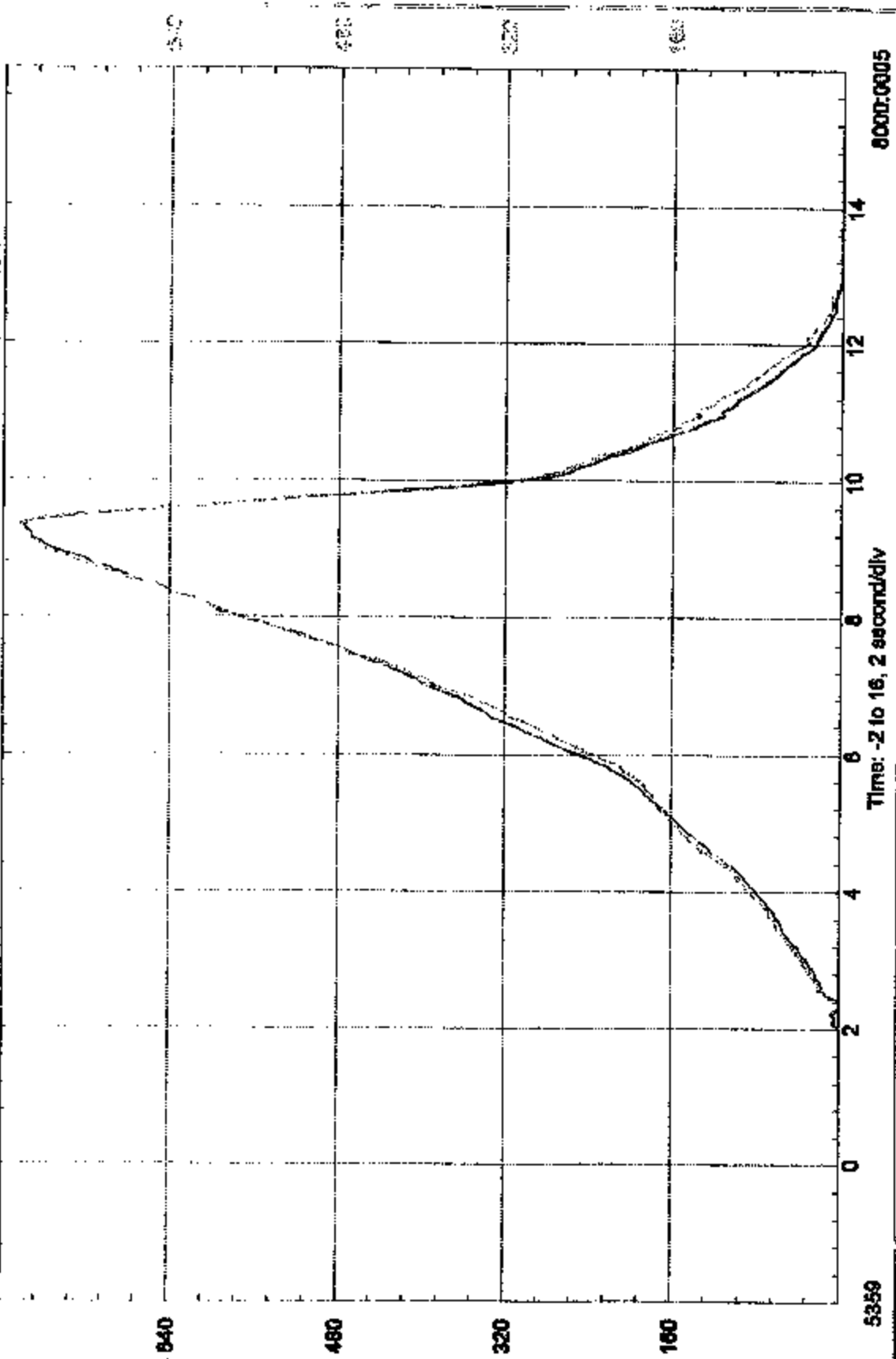


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 14, 2 second/div



Pre-Test (Weather stopped testing), 02/05/05

Test: 5358, Section: 8000, Stop: 10
Printed: 05/05/05 08:19 AM

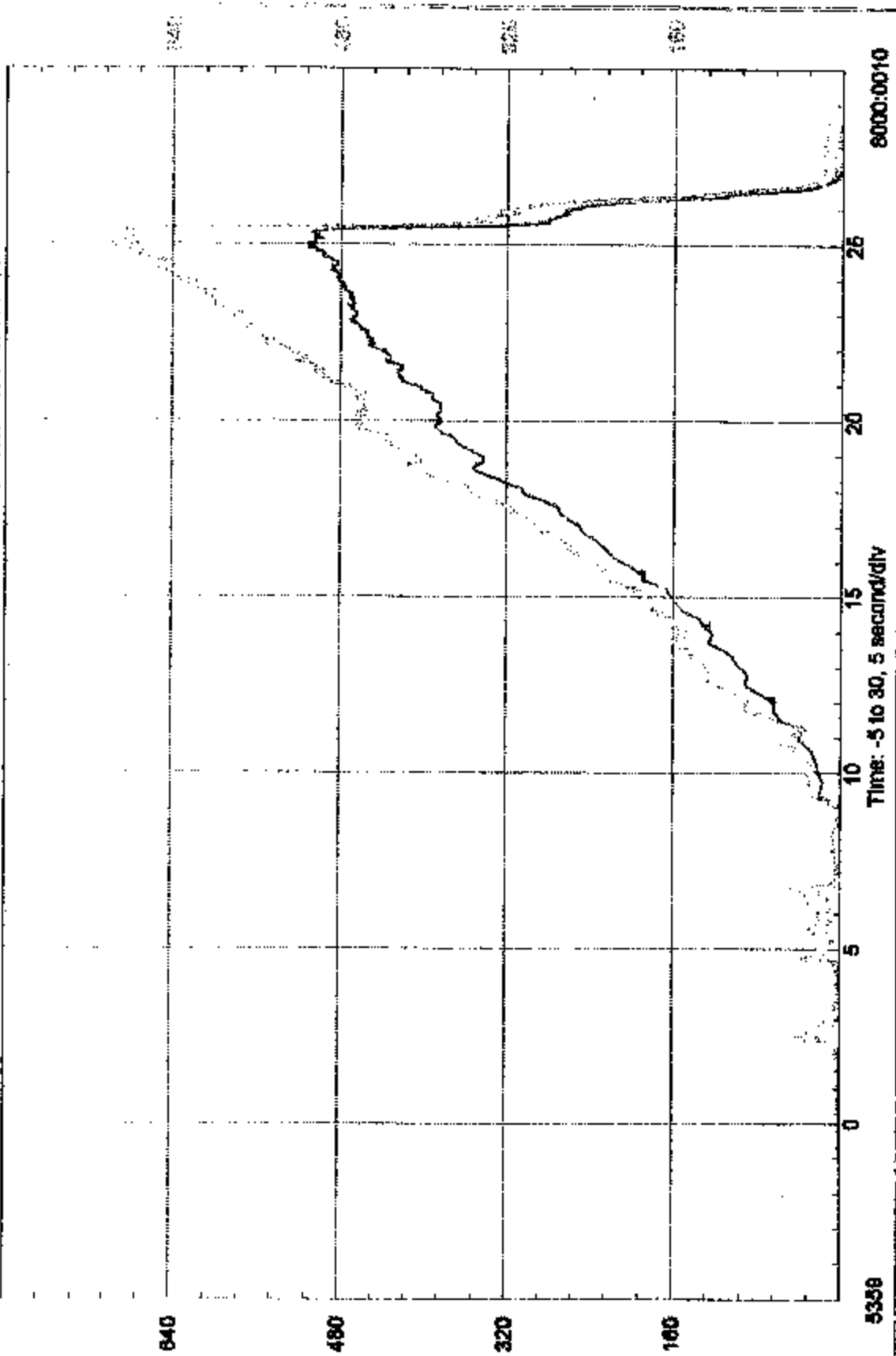


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 30, 5 second/div



8000:0010

Time: -5 to 30, 5 second/div

5358

Post-Engine Off @ GVWR, 02/07/05

Test: 5359, Section: 8000, Stop: 11
Printed: 05/05/05 08:19 AM

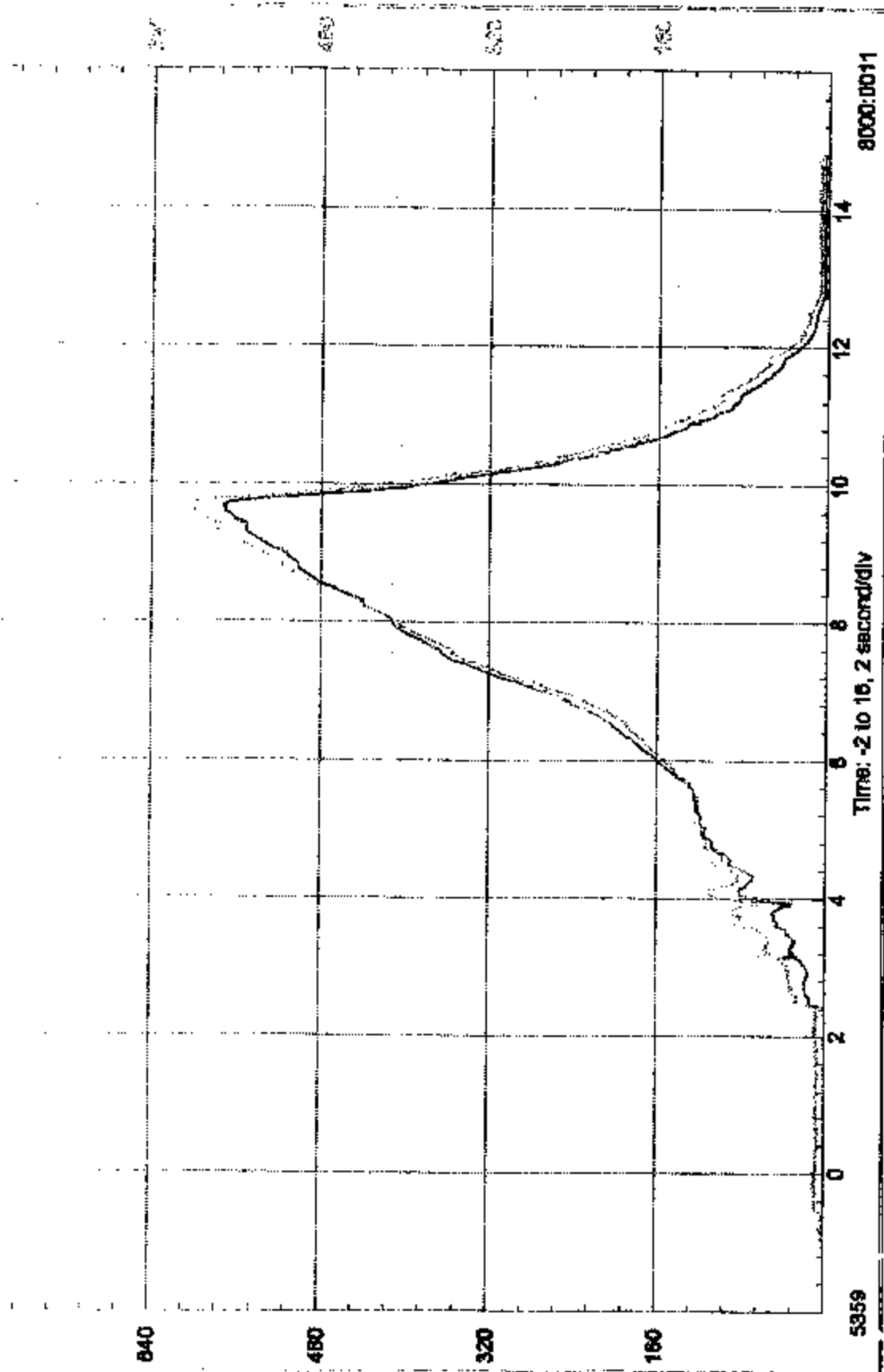


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 16, 2 second/div



Pre-Cold Effectiveness @ LLW, 02/11/05

Test: 5359, Section: 8000, Stop: 12
Printed: 05/05/05 08:18 AM

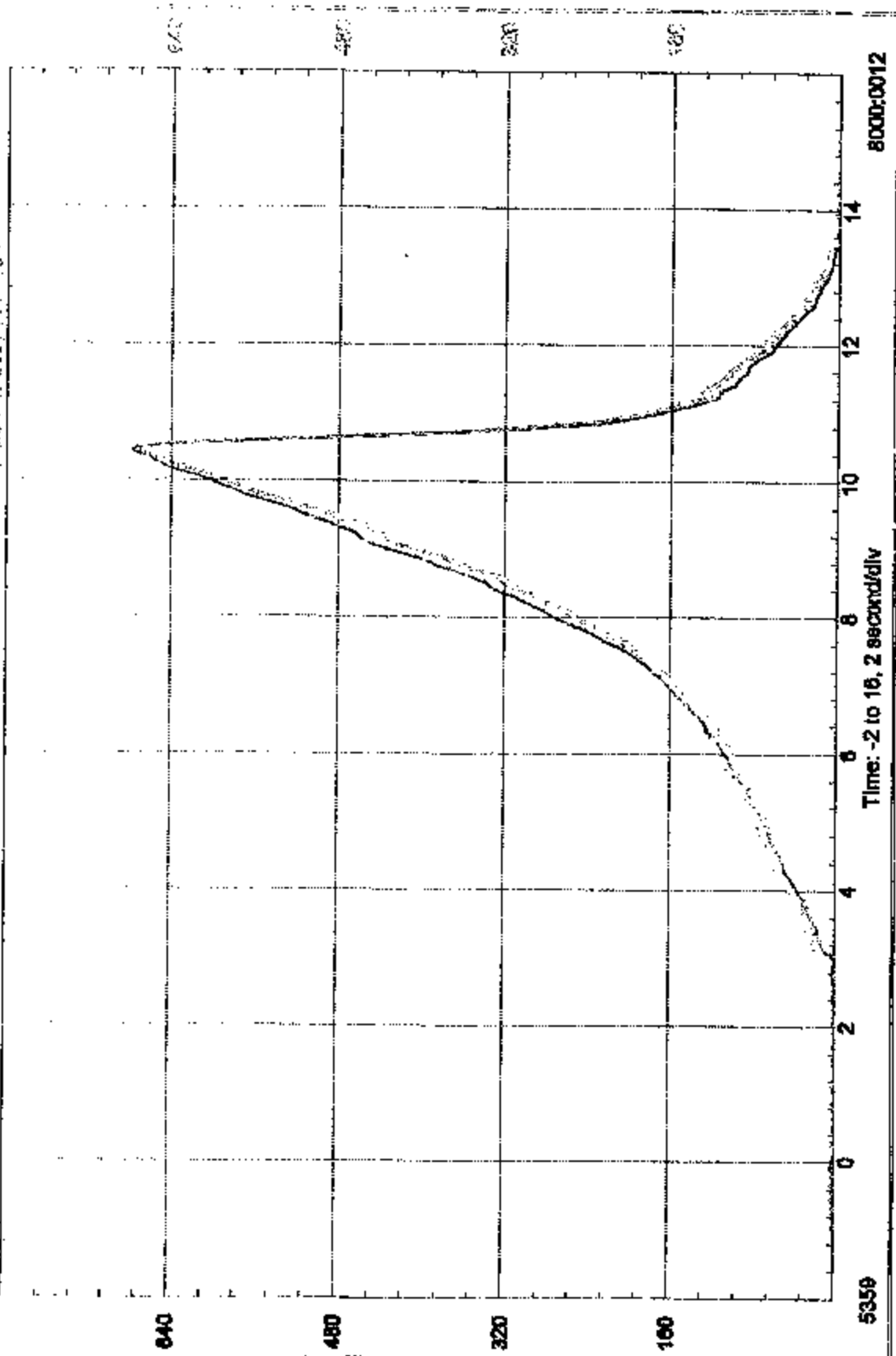


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

Time: -2 to 16, 2 second/div



Post-Cold Effectiveness @ LLVW, 02/11/05

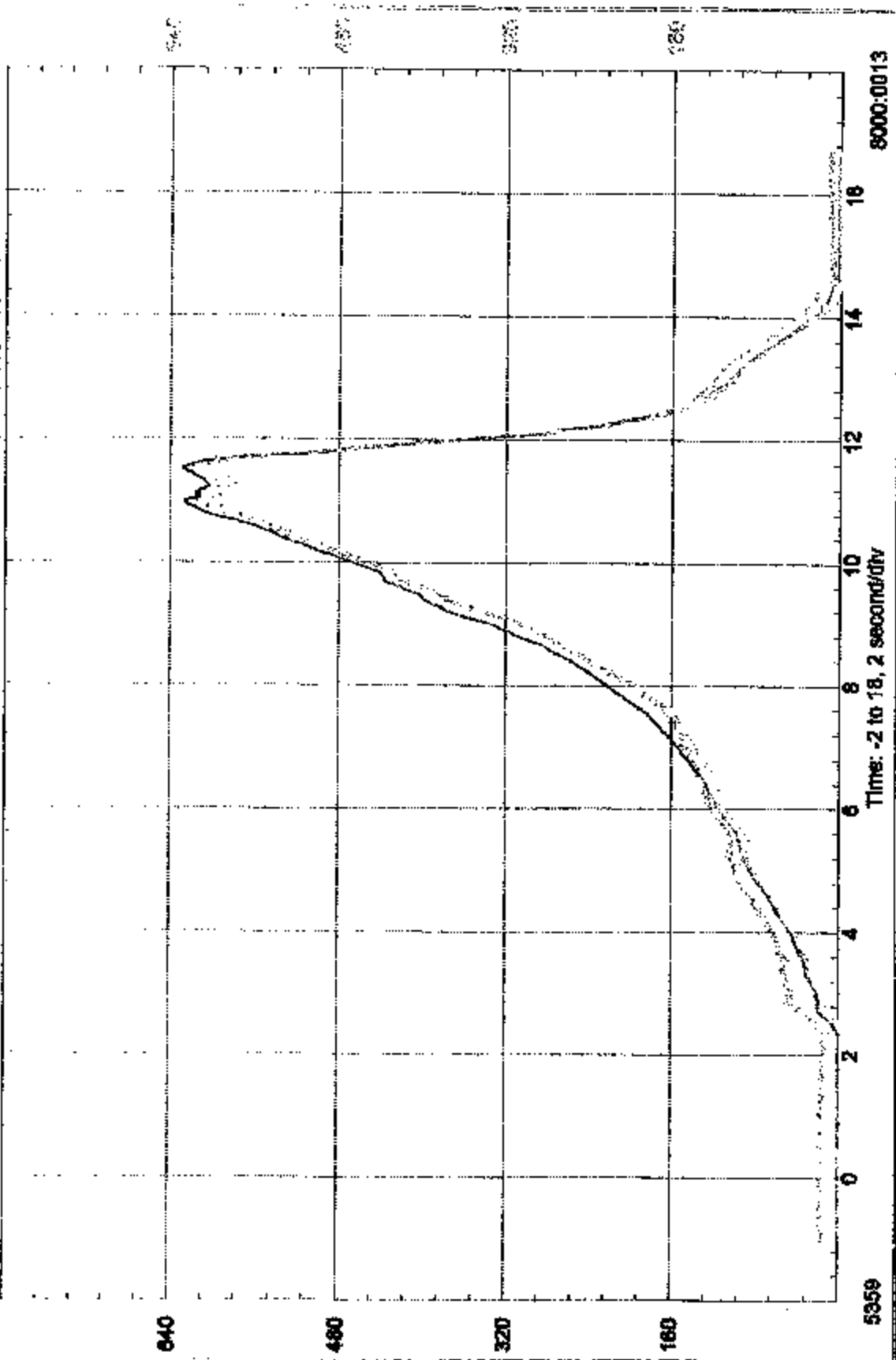
Test: 5358, Section: 8000, Stop: 13
Printed: 05/05/05 08:20 AM



LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800, 150 N/div

Time: -2 to 18, 2 second/div



8000:0013

Time: -2 to 18, 2 second/div

5358

Post-High Speed Effectiveness @ LLVW, 02/11/05

Test: 5359, Section: 8000, Stop: 14
Printed: 05/05/05 08:24 AM

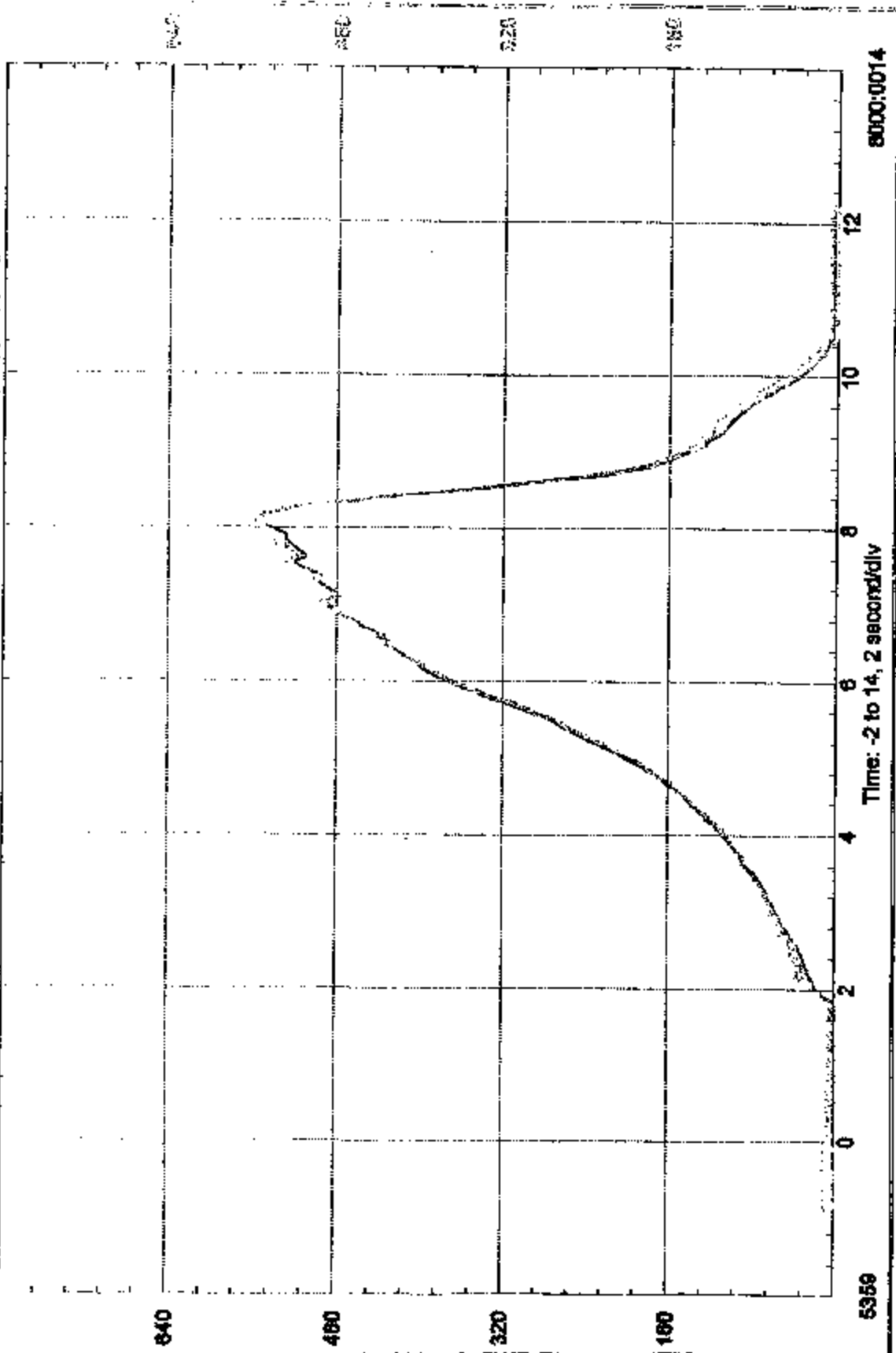


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

8000:0014



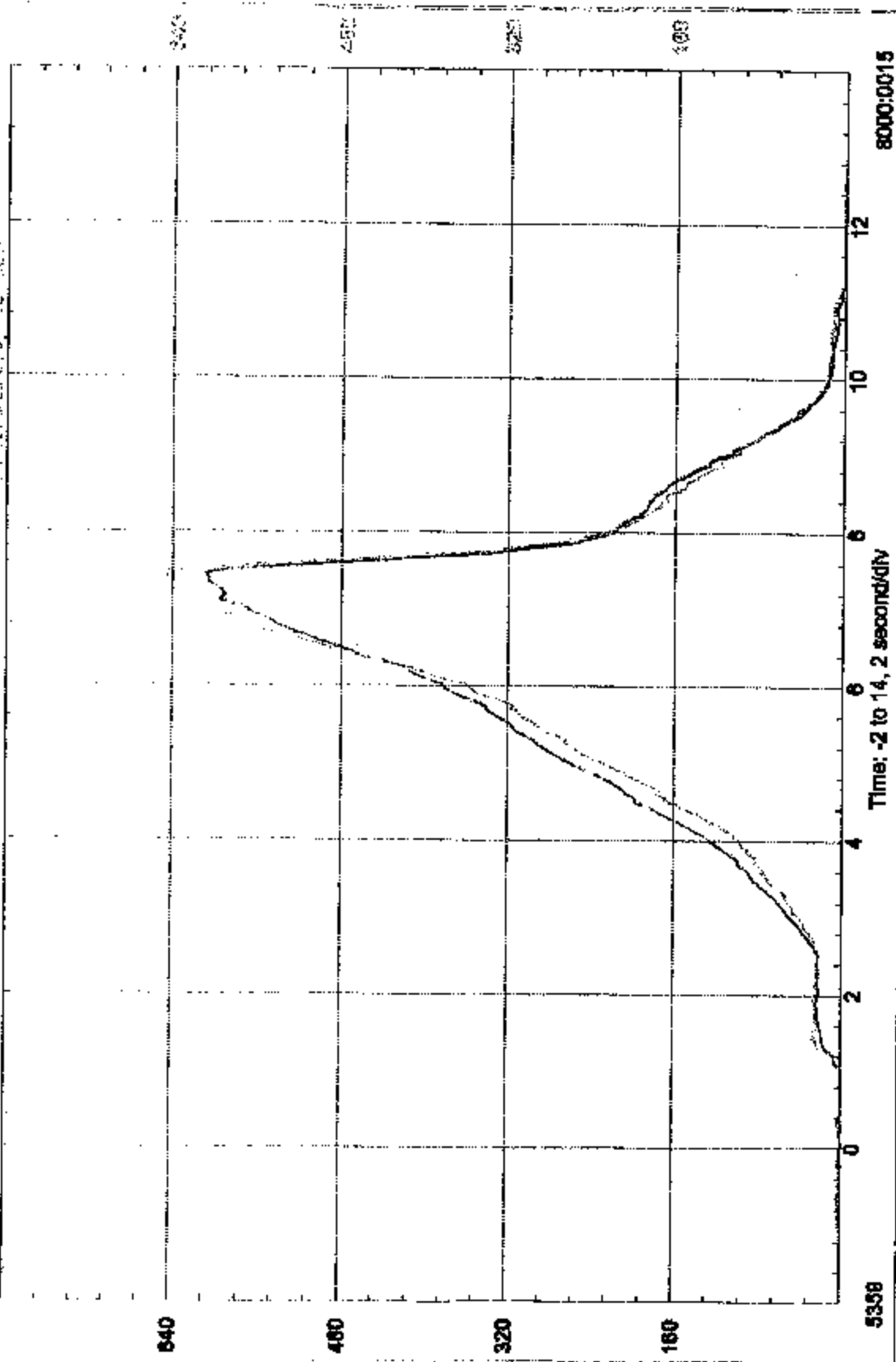
Post-Antilock Failure @ LLVW, 02/11/05

Test: 5358, Section: 8000, Stop: 15
Printed: 05/05/05 08:25 AM



LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800, 160 N/div



8000:0015

Time: -2 to 14, 2 seconds/div

5358

Pre-Hydraulic Circuit Failure #1 @ LLVW, 02/15/05

Test: 5359, Section: 8000, Stop: 16
 Printed: 05/05/05 08:25 AM

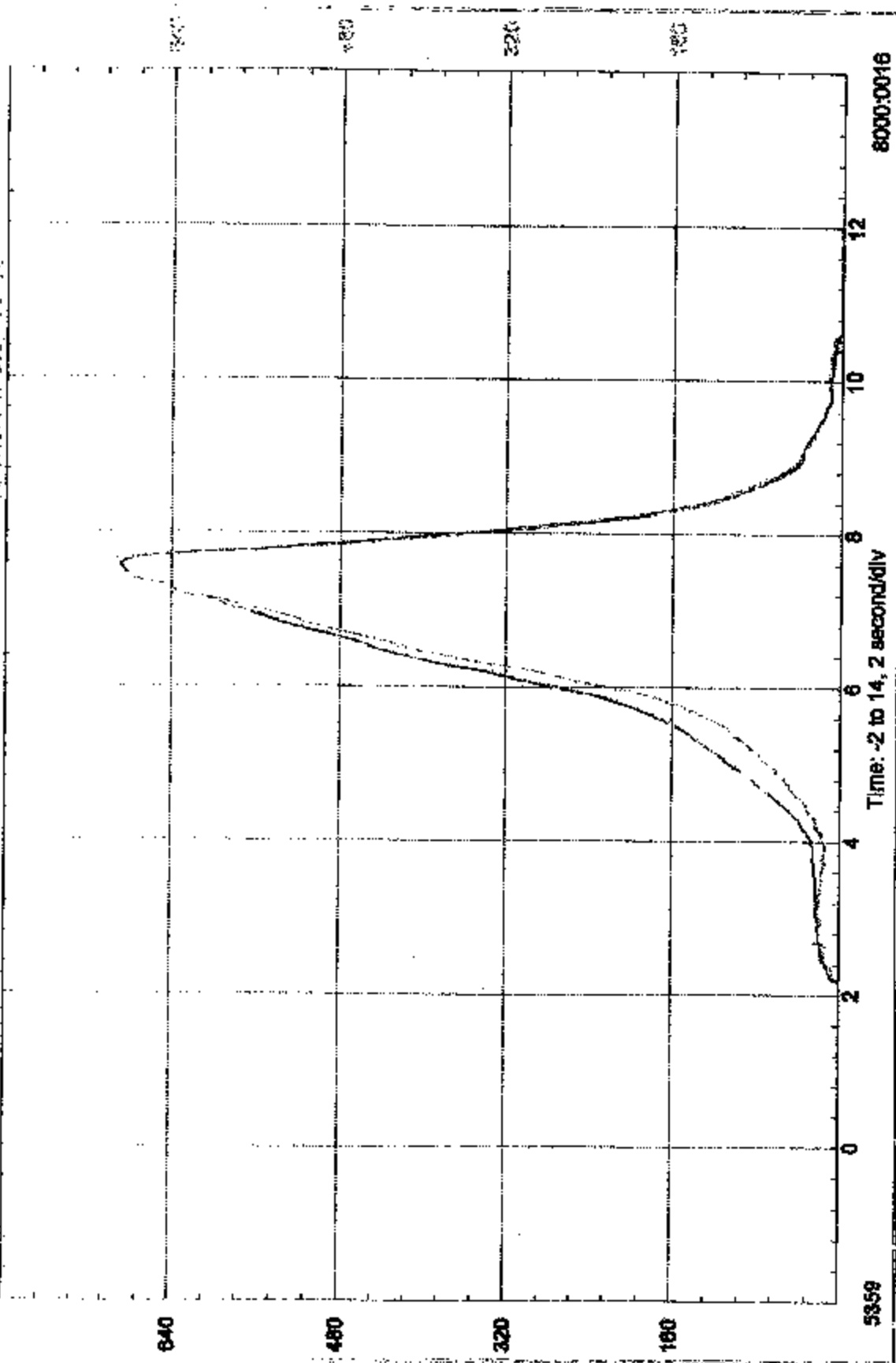


LINK Engineering Company
 The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 14, 2 second/div



5359

Time: -2 to 14, 2 second/div

8000:0016

Post-Hydraulic Circuit Failure #1 @ LLVN, 02/15/05

Test: 5359, Section: 8000, Stop: 17
Printed: 05/05/05 08:25 AM

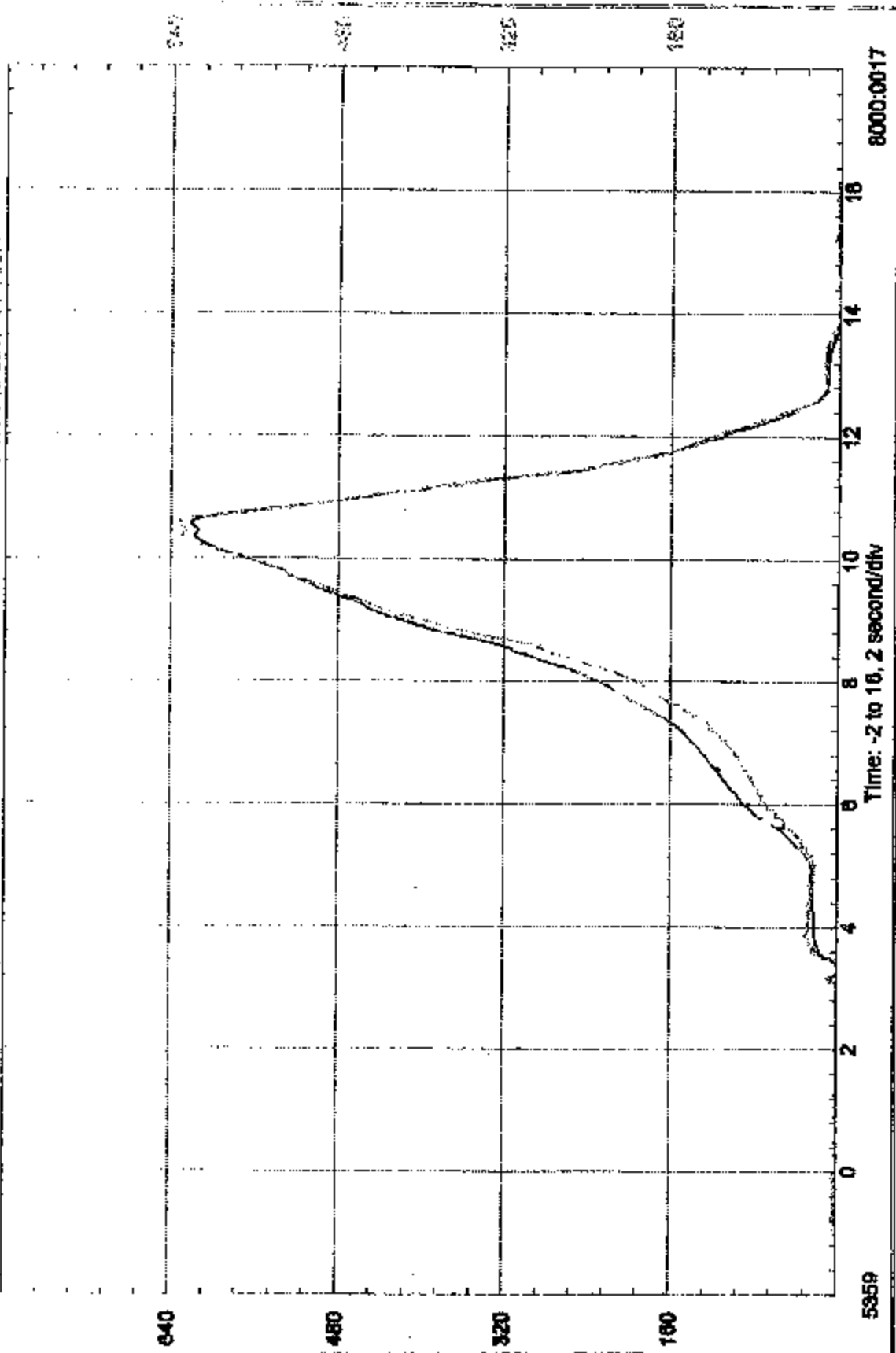


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

Electrical Load: 0 to 800, 160 N/div



Pre-Hydraulic Circuit Failure #2 @ LLVG, 02/22/05

Test: 5359, Section: 8000, Stop: 18
Printed: 05/05/05 08:30 AM

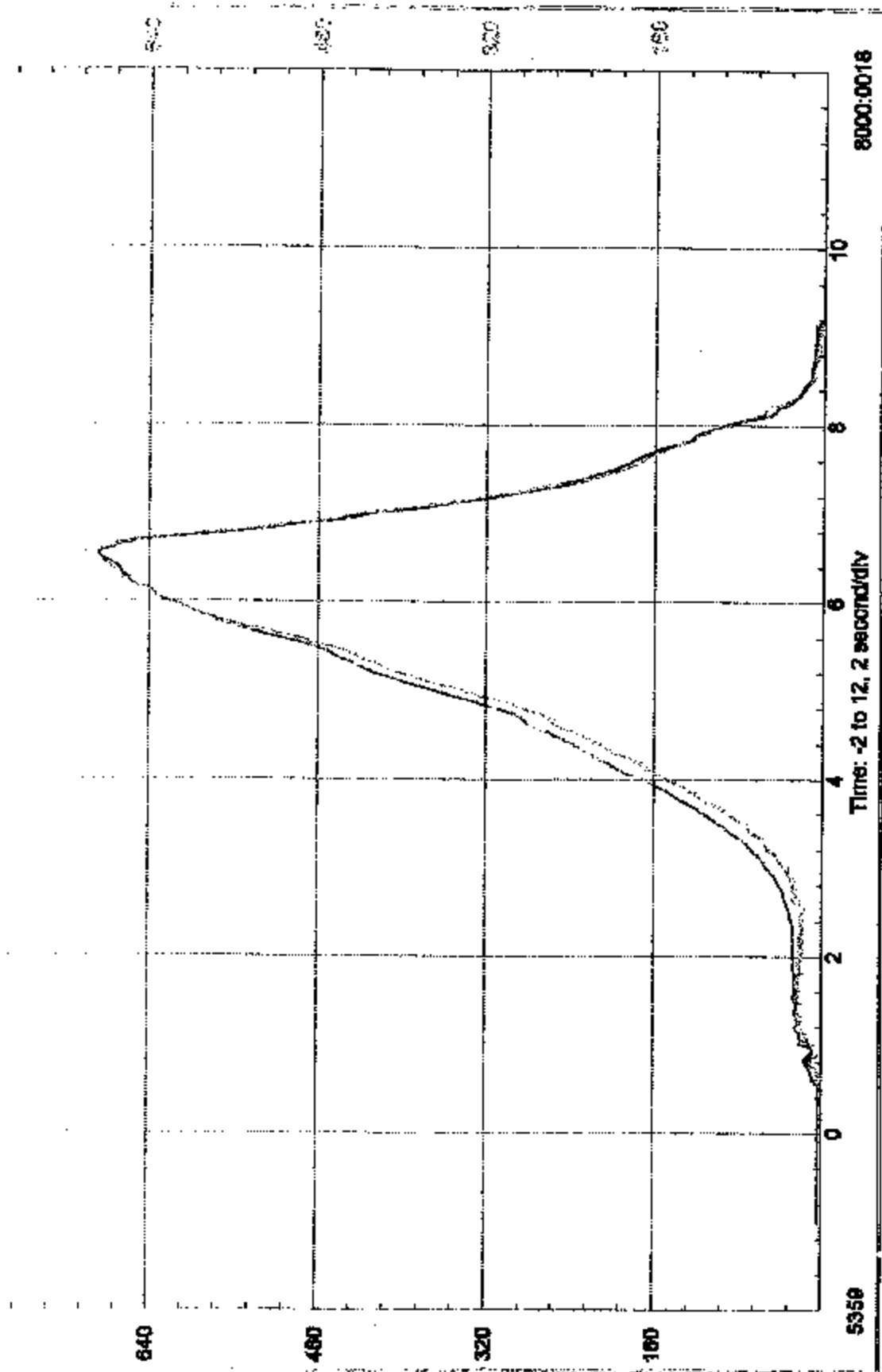


Engineering

LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800. 160 N/div

Time: 0 to 10. 2 second/div



Post-Hydraulic Circuit Failure #2 @ LLVW, 02/22/05

Test: 5959, Section: 8000, Stop: 19
 Printed: 05/05/05 08:30 AM

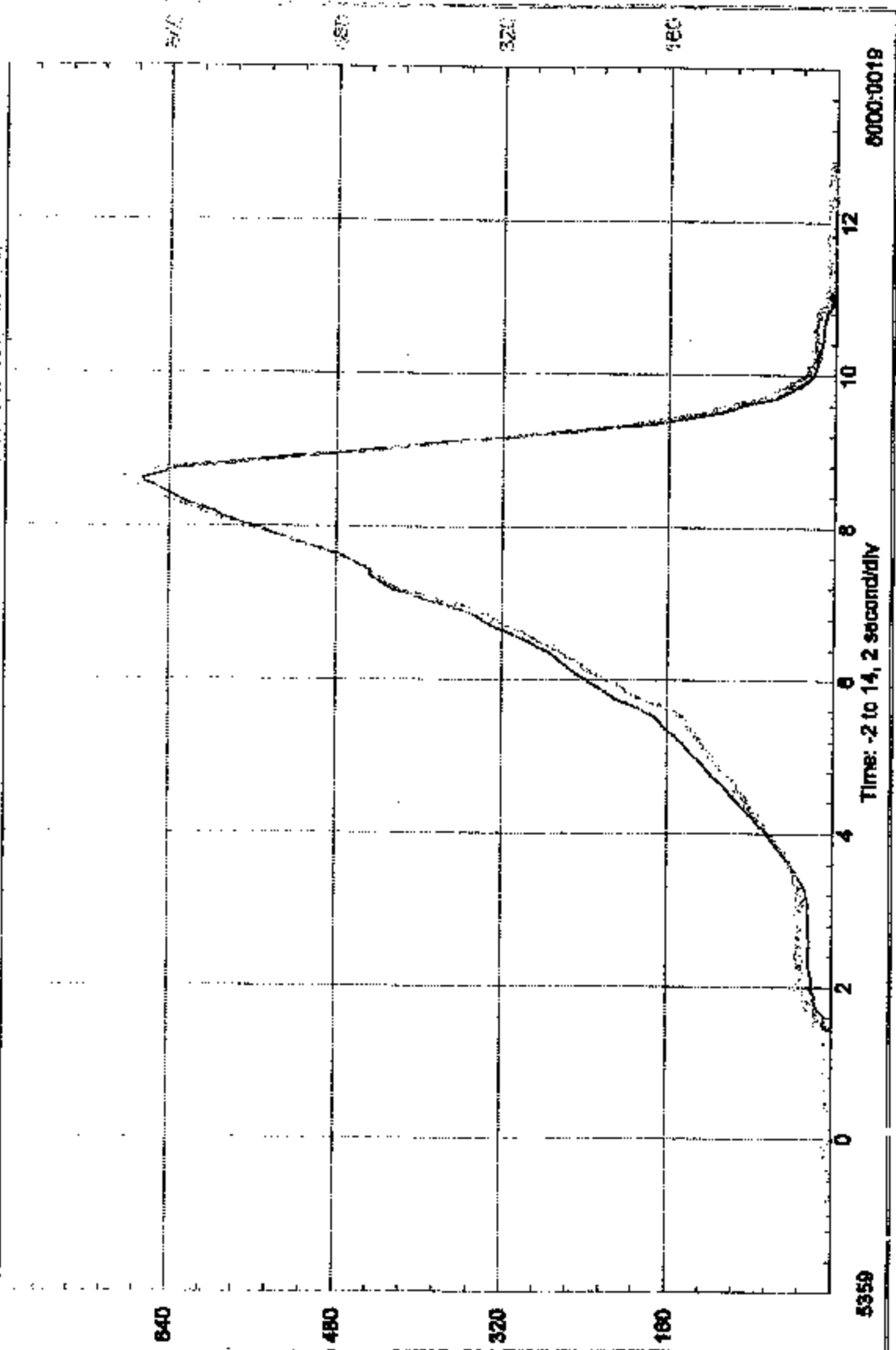


Engineering

LINK Engineering Company
 The ProLink System

Pedal Force: 0 to 800, 160 N/dly

Time: -2 to 14, 2 second/dly



Post-Hydraulic Circuit Failure #2 @ GVWR, 02/22/05

Test: 5359, Section: 8000, Stop: 20
Printed: 05/05/05 08:31 AM

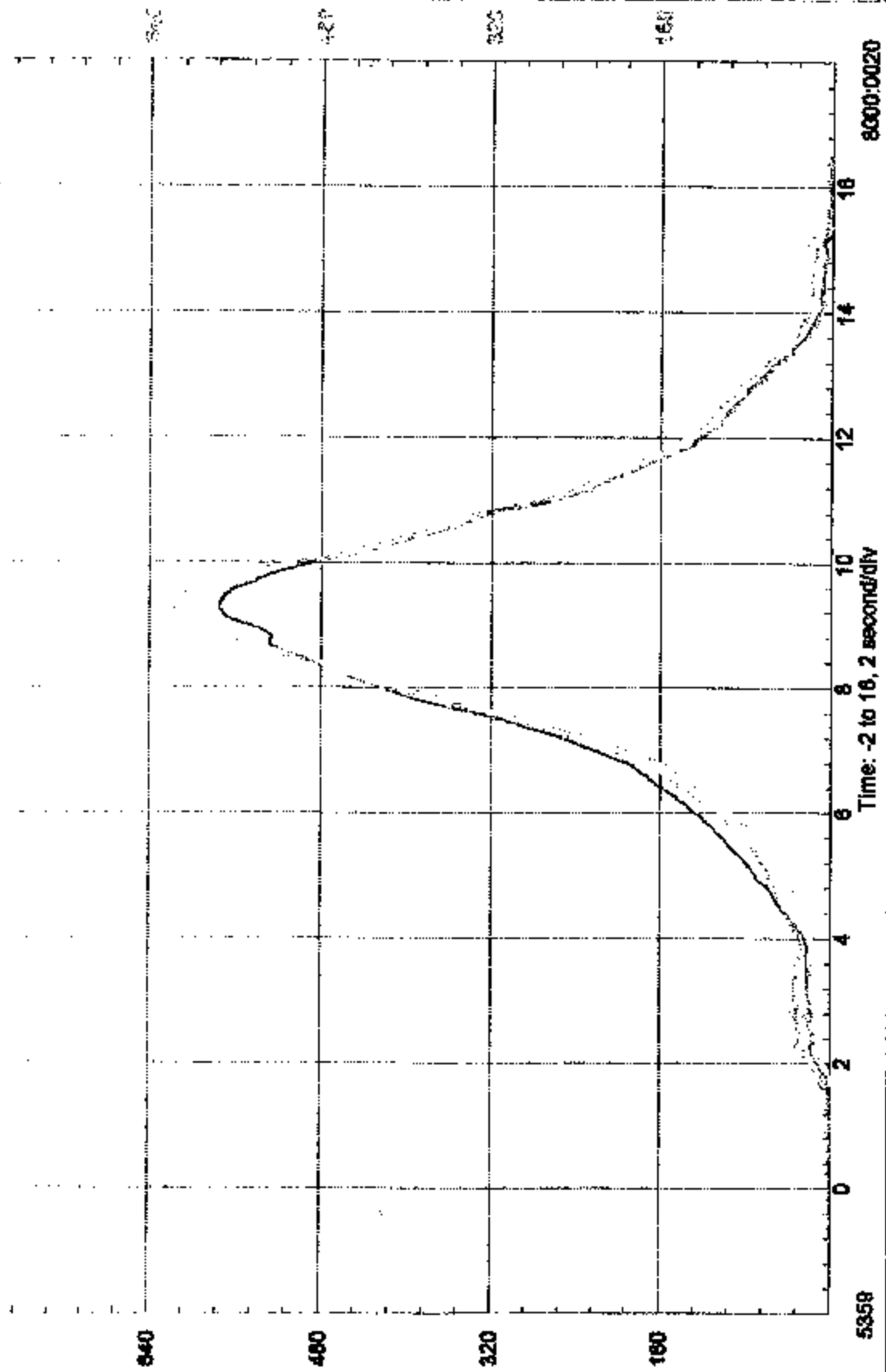


Engineering

LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800 160 N/div

8000:0020



Post-Hydraulic Circuit Failure #1 @ GWR, 02/22/05

Test: 5358, Section: 8000, Stop: 21
Printed: 05/05/05 08:38 AM

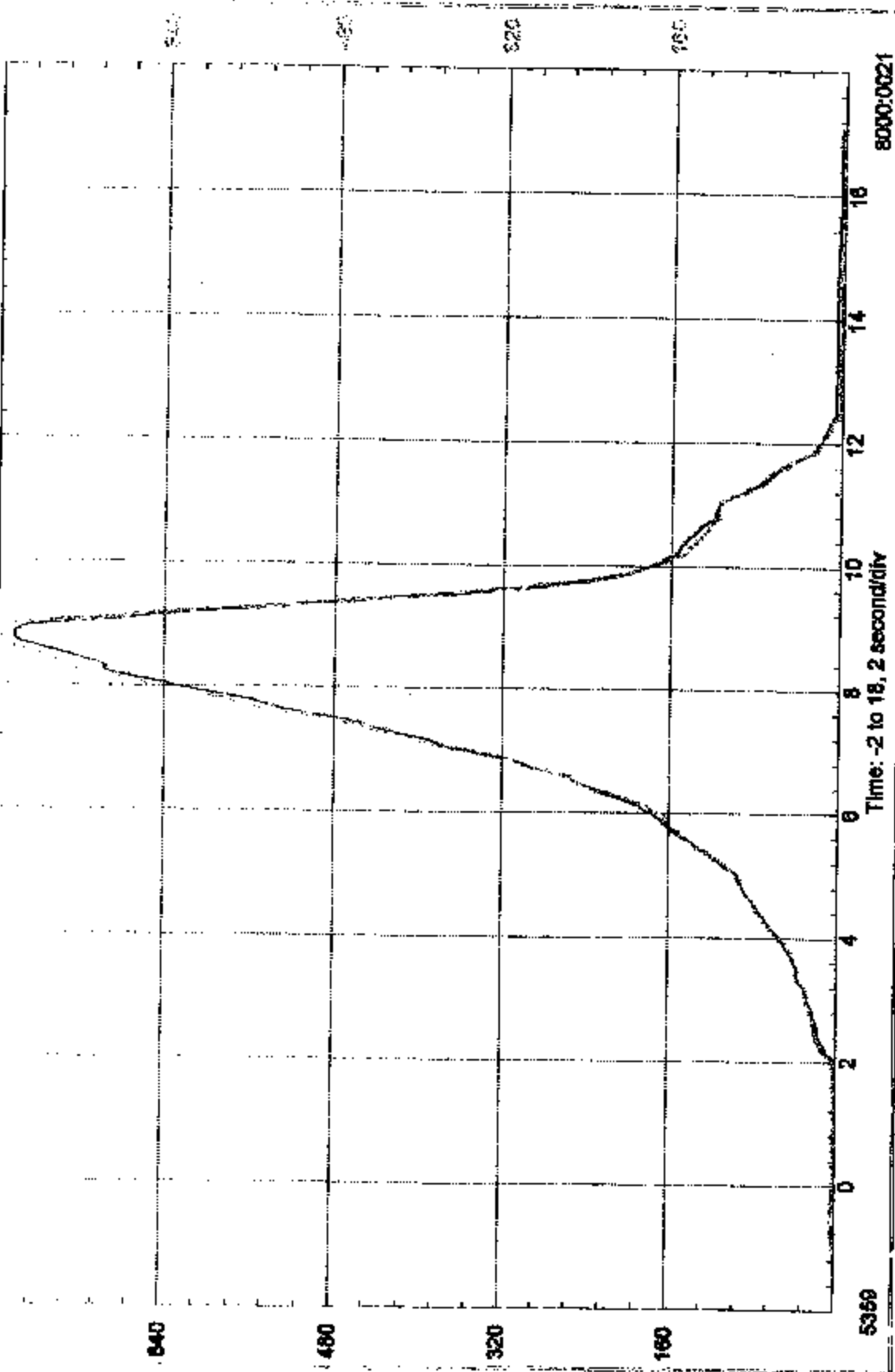


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 18, 2 second/div



Pre-Antilock Function Failure @ GVWR, 03/03/05

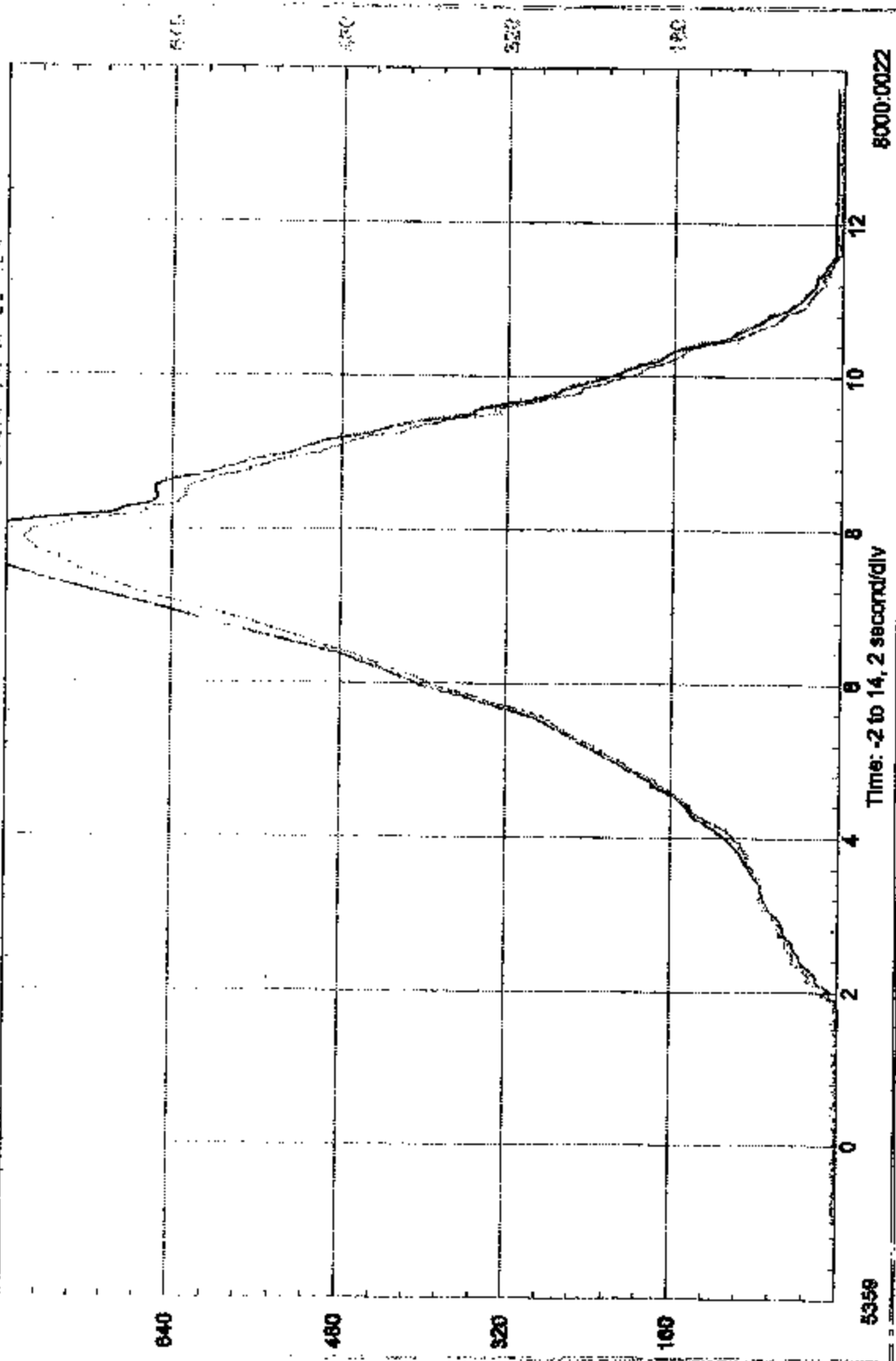
Test: 5359, Section: 8000, Step: 22
Printed: 05/05/05 08:39 AM



LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 14, 2 second/div



Post-Antilock Function Failure @ GWR, 03/03/05

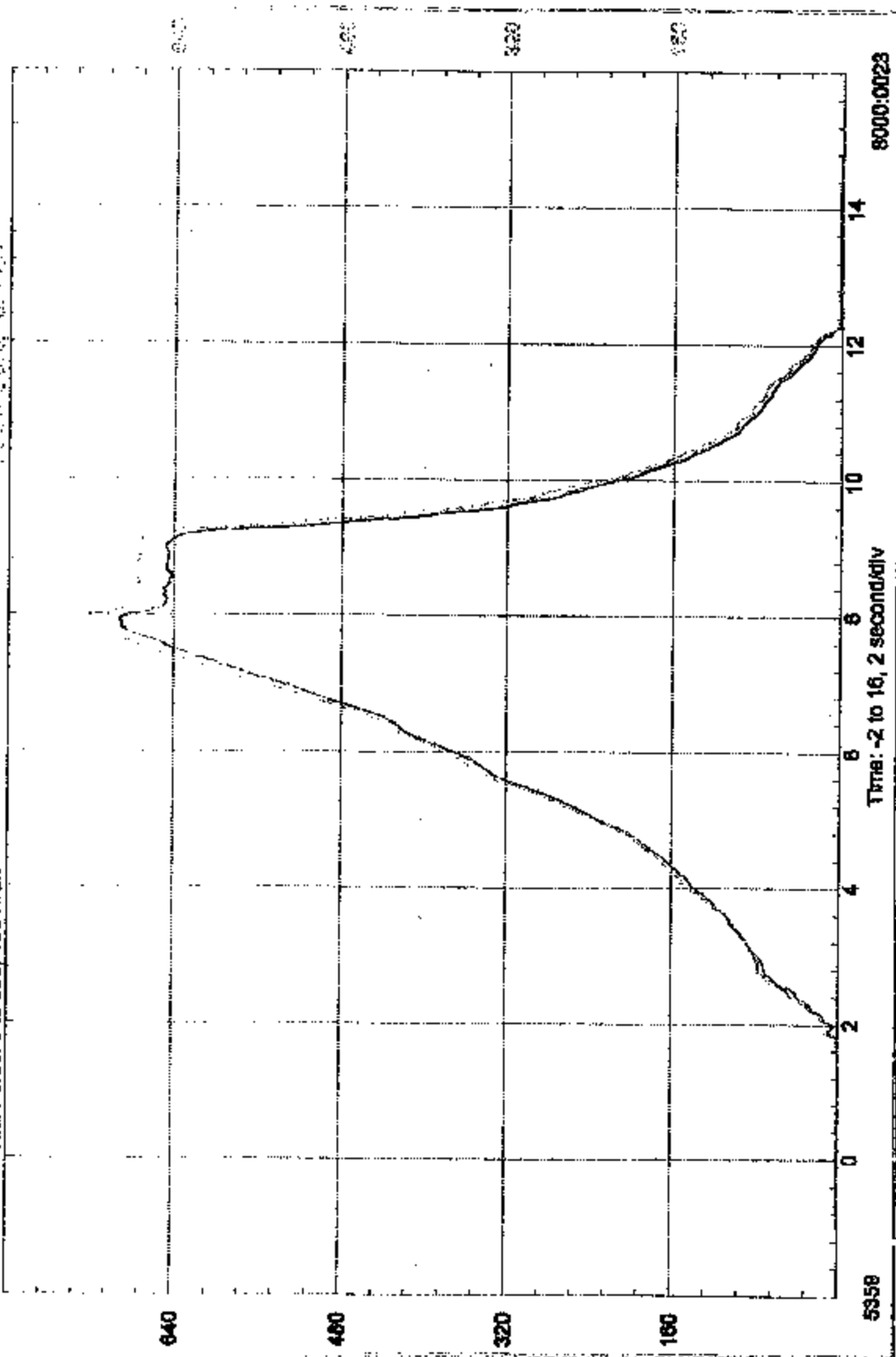
Test: 5358, Section: 8000, Stop: 23
Printed: 05/05/05 08:39 AM



LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 16, 2 second/div



Post-(First six stops) Failure Brake Power Assist @ GVWR, 03/03/05

Test: 5359, Section: 8000, Stop: 24
Printed: 05/05/05 08:39 AM

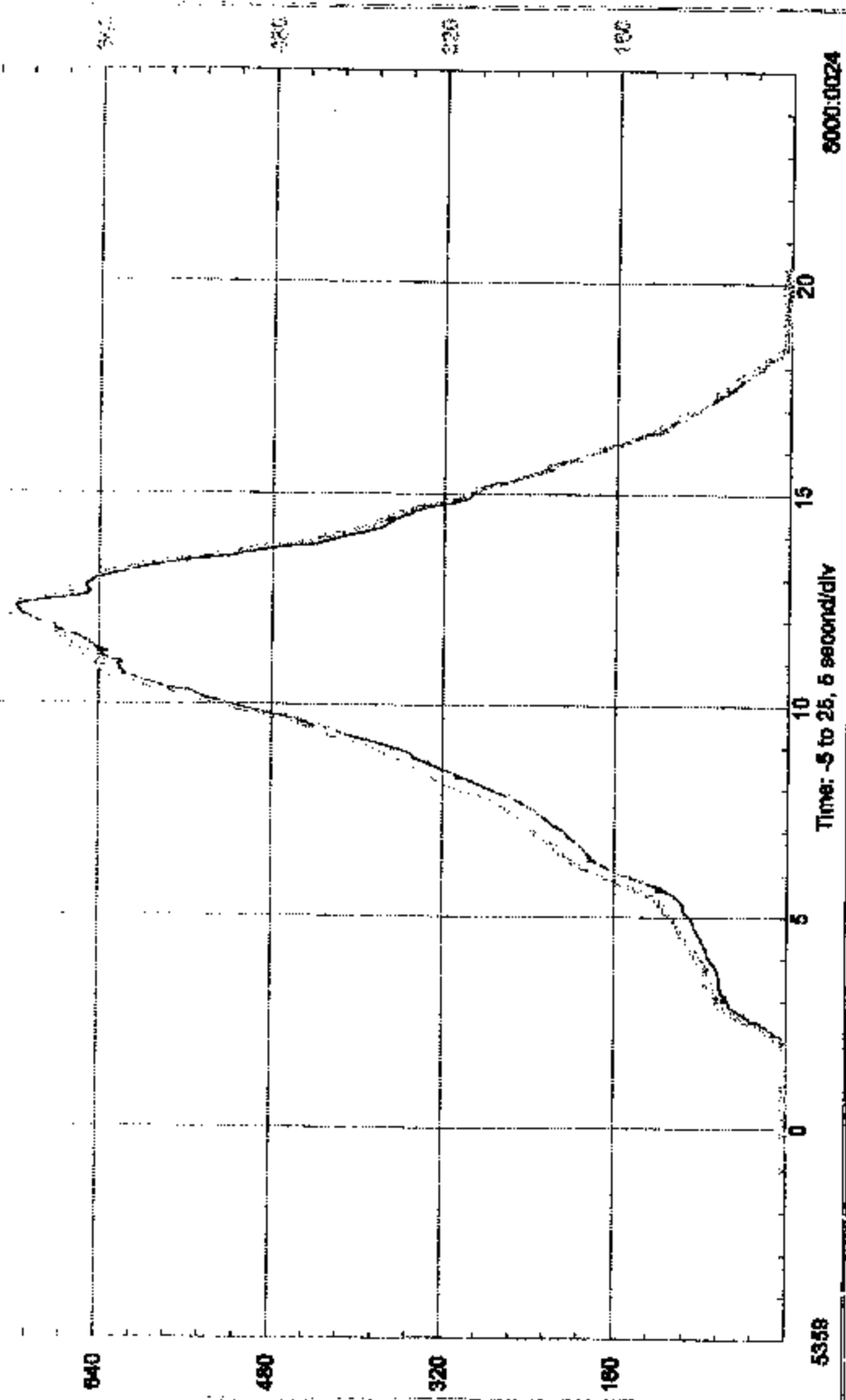


Engineering

LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800, 160 N/div

5000:0024



Post--(Final seven stops) Failure Brake Power Assist @ GVWR, 03/03/05

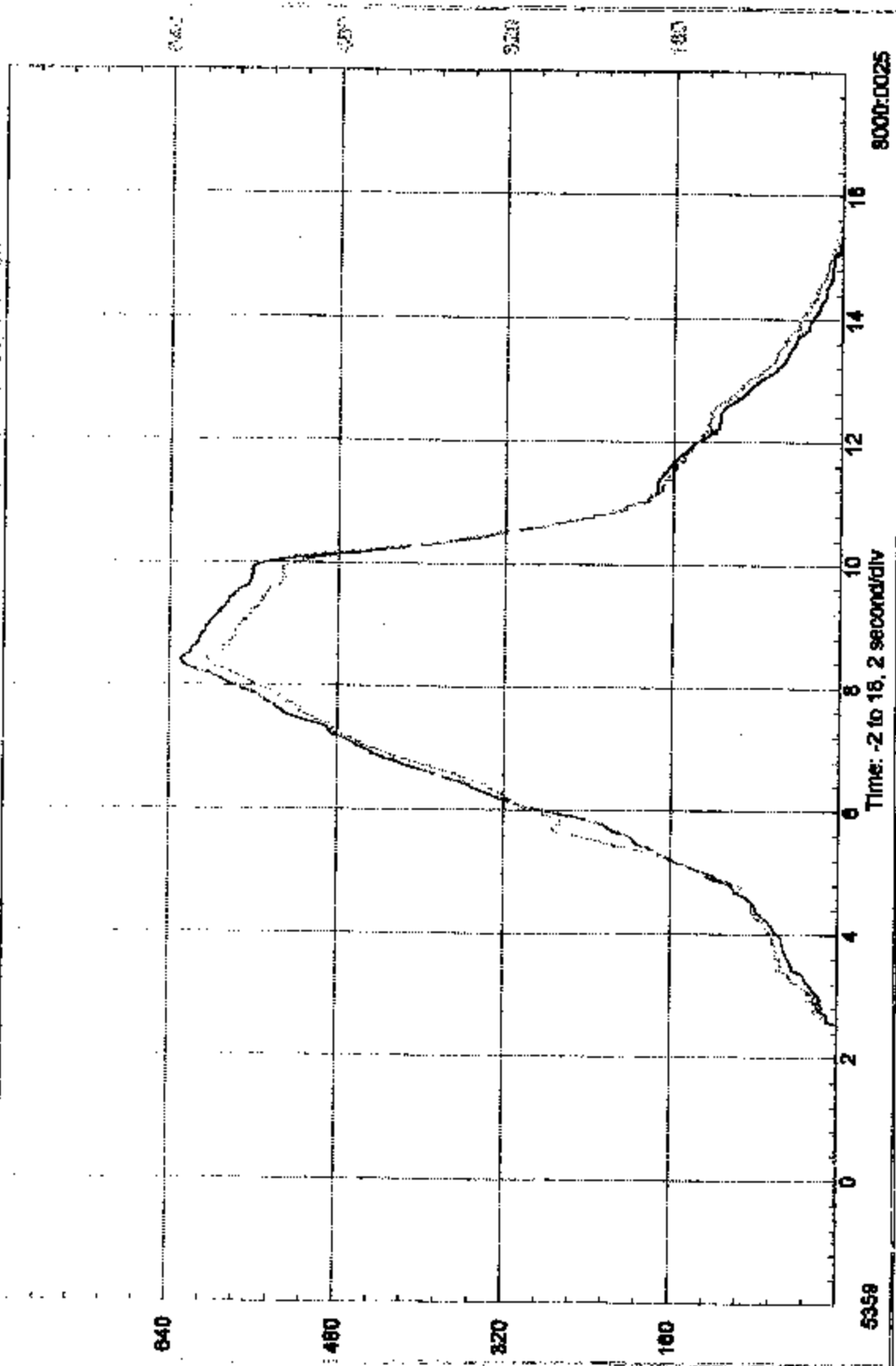
Test: 5359, Section: 8000, Stop: 25
Printed: 05/05/05 08:40 AM



LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800, 160 N/div

Time: -2 to 18, 2 second/div



Pre-Park Brake @ GVWR, 03/04/05

Test: 5359, Section: 8000, Stop: 28
Printed: 05/05/05 08:59 AM

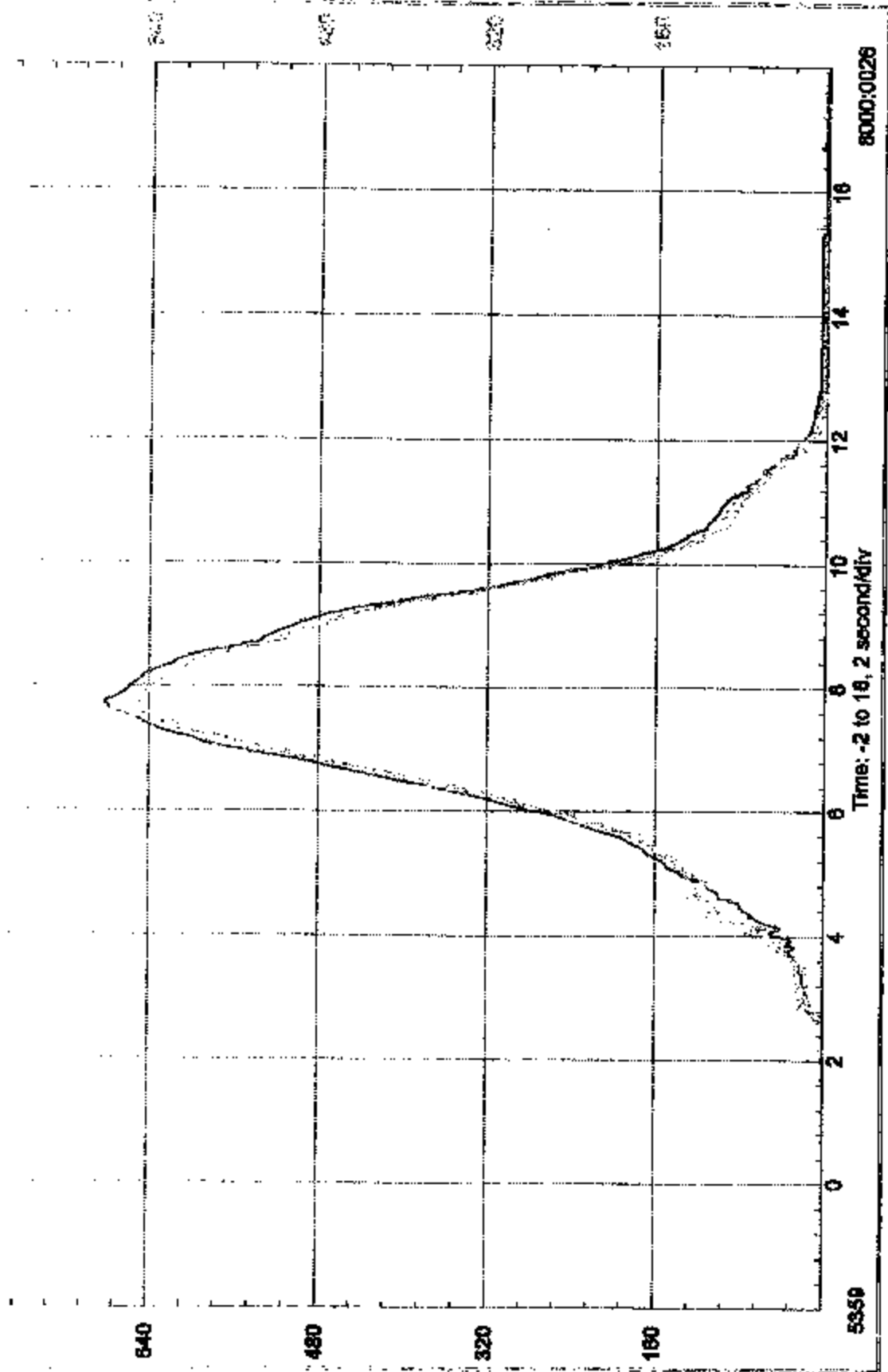


LINK Engineering Company
The ProLink System

Engineering

Pedal Force: 0 to 800, 180 N/div

Time: -2 to 18, 2 second/div



Pre-Heating Sunbs @ GVWR, 03/07/05

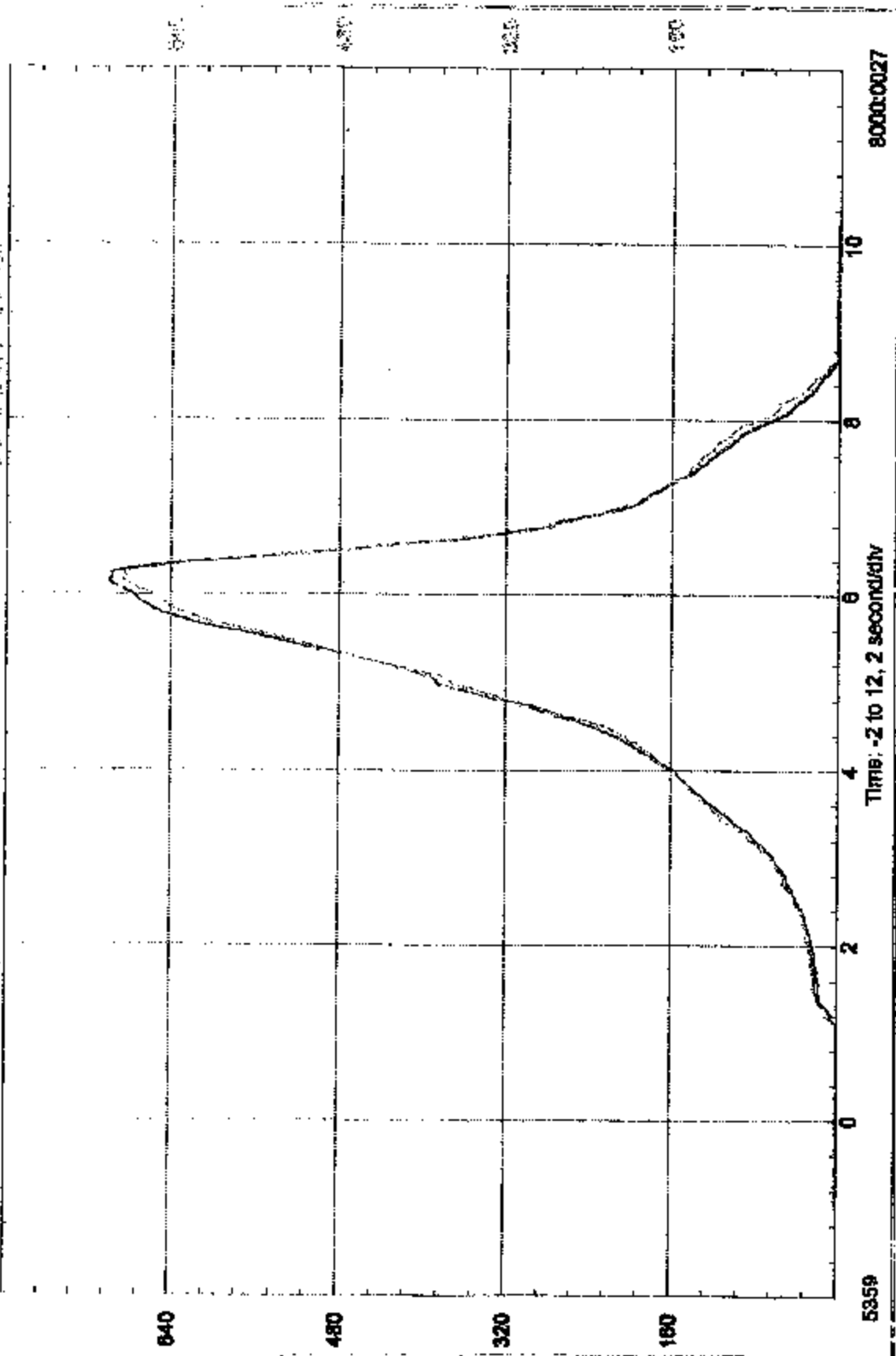
Test: 5359, Section: 5000, Stop: 27
Printed: 03/05/05 09:00 AM



LINK Engineering Company
The ProLink System

Pedal Force: 0 to 800, 160 N/div

Time: 0 to 12, 2 sec/div



5359

Time: -2 to 12, 2 second/div

End of Test Floor Check, 03/07/05

APPENDIX A

Copy of Manufacturer's Sticker



2003 MODEL YEAR GRAND CARAVAN SPORT

PRICE INFORMATION

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: \$27,430

Dodge Grand Caravan Sport PRO
Exterior Color: Biscaya Blue Pearl Coat
Interior Color: Taupe
Interior: Cloth - Cloth Low-Back Bucket Seats
Engine: 2.4L 150 HP FFI
Transmission: 4-Speed Automatic

STANDARD EQUIPMENT (EXCEPT AS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL / SAFETY FEATURES

Air Bags - Front/Left Side/Multi-stage**
Brakes - Anti-Lock
Brakes - Power Front Disc/Rear Drum
Child Seat Anchor System - LATCH Ready
Belt/Park Interlocks
Deluxer - Rear Window
Windshield Wipers - Variable Intermittent

INTERIOR FEATURES

Seats - Buckle/Reclining
Air Conditioning - w/3 Zone Temp Control
Air Conditioning - Rear w/Reclining
Windows - Power Driver One-Touch
Windows - Power Quarter Vents
Locks - Power
Keyless Entry Sys. w/2 Transmitters
Speed Control
Steering Column - Tilt
Easy-Exit (R) Roller Shade
Garage Door Opener - Universal
Radio - AM/FM Cass. w/Chorus Control
Console - Overhead w/Tip Computer
Console - Center UP Open Bin
Storage Drawer - Underseat Lockable
Grocery Bag Hooks - Rear Seatback
Rear Mirrors - Front & Rear
Mirror - Rear View, Day/Night
Rearview Entry
Power Outlets - Front & Rear, 12V DC
Headlamp Off Time Delay
Sun Visor - w/Mirror, Left

EXTERIOR FEATURES

PRICE INFORMATION (cont'd)

Gloss - Surfer Red
Mirrors - Power Heated, Fold-Away
Heating Element - Exterior Mirrors
Wheel Covers - 18"
Tires - 215/70R15 BSW All Season
Scuff Pad - Rear Fender
OPTIONAL EQUIPMENT

Customer Preferred Package 26H
Family Package

Trailer Tow Prep Group
Brakes - 4-Wheel Disc
Load Lifting and Height Control
Sports Tire - Full Size
Radiator - Heavy Duty
Cooler - Engine Oil
Cooler - Heavy Duty Transmission Oil
Wiring Harness - Trailer Tow
Battery - 600 Amp Maintenance Free

Sun Visors - Sun Vanity Mirrors
Seat - Power 8-Way, Driver
Seats - Cloth Low-Back Bucket
Door - Remote Power Locking
Luggage - Power
DESTINATION CHARGE

TOTAL PRICE: * \$30,065

** Certified to the Federal Regulations that allow less forward shiftable

\$599

\$80
\$37C
\$400
\$400
\$888

For more information visit: www.dodge.com
or call 1-800-4ADODGE

DaimlerChrysler
Motors Company LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR OPERATION OUTSIDE OF THE UNITED STATES.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS COUNTRY:

U.S. CANADIAN PARTS CONTENT: 88 %

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:

FINAL ASSEMBLY POINT:

WINDSOR, ONTARIO, CANADA

COUNTRY OF ORIGIN:

ENGINE: UNITED STATES

TRANSMISSION: UNITED STATES

Being Analyzed:

The Street Miles of this vehicle is 0.72. The Street Miles for all vehicles ranged from 0.6 (lowest rating) to 1.0 (highest rating), with new vehicles ranging from 0.6 to 1.0.



Gasoline Mileage City MPG 19 Highway MPG 26



Actual mileage will vary with driving conditions, driving habits and vehicle's condition. Mileage reported to EPA indicates that the majority of vehicles with these estimates will achieve between 18 and 22 mpg in the city, and between 22 and 30 mpg on the highway.

2003 CARAVAN 260
6 CYL, 3.1L (201 CBI, FFI, (ETHANOL), 16 VAL FUEL INJ, 4-SPEED AUTOMATIC TRANS, w/ LOCKUP TORQUE CONVERTER

Estimated Annual Fuel Cost
\$1058

For Comparison Shopping, all vehicles classified as SPECIAL PURPOSE have been tested in the same conditions, ranging from 10 to 13 mpg city and 13 to 31 mpg highway.

All fuel economy values on this label pertain to GASOLINE fuel usage. ETHANOL (E85) fuel usage will yield different values, see the Fuel Economy Guide for information on ETHANOL (E85).

*This vehicle operates on GASOLINE and ETHANOL (E85).

See your dealer for more information.

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 C31300.

This vehicle was FMVSS 135 tested previously as a 2003 Braun Entervan. Per the COTR, the vehicle was sent to EMC for installation of one of their hand control systems. After the hand control installation, the vehicle was returned to TRC. For this test's preparation, the vehicle's brake system was inspected for integrity and deemed good, the thermocouples depths were reset, and a 50-stop burnish was performed.

Not all the portions of the FMVSS 135 Standard were performed. NHTSA/OVSC determined what aspects of the FMVSS 135 Standard were performed. Per NHTSA/OVSC's direction, either all the stops were performed utilizing only the foot control or the initial stop(s) per each test portion with the remainder of the stops utilizing the hand control.

The hand control mechanism applied force via a secondary electric motor to the service brake control. However, the force was not applied to the nominal and proximal center of the service brakes control's footpad. Instead, an extension was affixed to the left side of the service brake control and a lever from the secondary electric motor contacted this extension and, thus, moved (applied) the service brake control. To measure the force applied by the hand control's lever to the service brake control, a strain gage was installed along the narrow side of the service brake control lever's profile (facing the driver). The strain gage force versus actual service brake pedal effort was correlated.

During the Failed Hydraulic Circuit Tests, the service brake pedal travel lengthened relative to the Non-failed Circuit Tests. This lengthening of the service brake's travel is typical. The secondary electric motor's lever is a fixed length and though applied sufficient force to the service brake, when the service brake was fully operational it did not have the necessary extension to fully apply the brakes in any of the Failed Hydraulic Circuit Tests. To achieve a nominal 500N force utilizing the driver's foot required an additional 1.25 in. (32 mm) of service brake control movement. Please not, photographs on pages 35 through 37.

For the Parking Brake Tests at GVWR, the driver attempted to perform the tests in the normal mode; i.e., with the engine running, drive onto the slope, select neutral gear, determine the minimum force to hold, engage the parking brake, and then progressively release the service brake. The vehicle did not hold using this methodology. The second attempt was per the owner's manual (i.e., with the engine and ignition "off", make a single 'quick' apply to the Park Brake [P] button), but with the ignition on. The parking brake did not engage. The third time was with the engine off, transmission in Park, ignition on. The parking brake was applied, but it did not engage. Transmission held the vehicle on the hill. The parking brake activates, but does not set with the ignition "on". With the ignition "off", the parking brake will set.

For the Power Brake Unit Failure, the driver tried to apply the hand brake lever quickly and without going over the maximum allowable pedal force. The brake could not be applied rapidly enough or with enough finesse. The required distance maximums were obtained only by exceeding the control force or by locking the rear brakes via the Parking Brake. Note: At the limit of ^{hand} travel, the hand control system automatically engaged the Parking Brake/rear tire(s) lock.

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.

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 straight-aways and the 42-foot wide curves provide three test lanes. Paved berms, 12 feet in width, border the straight-aways 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, drive line 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

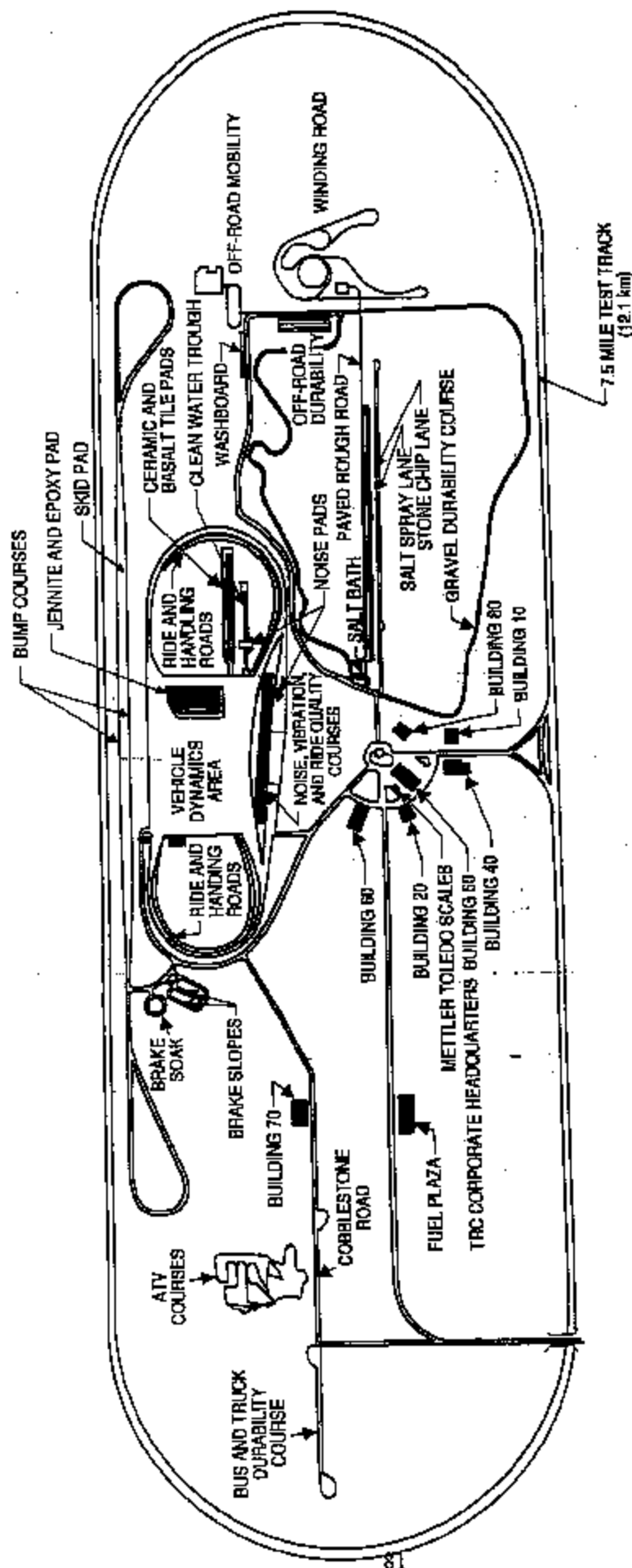
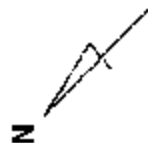
The Skid Pad is a test facility that is utilized primarily for the evaluation of tire and brake systems.

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

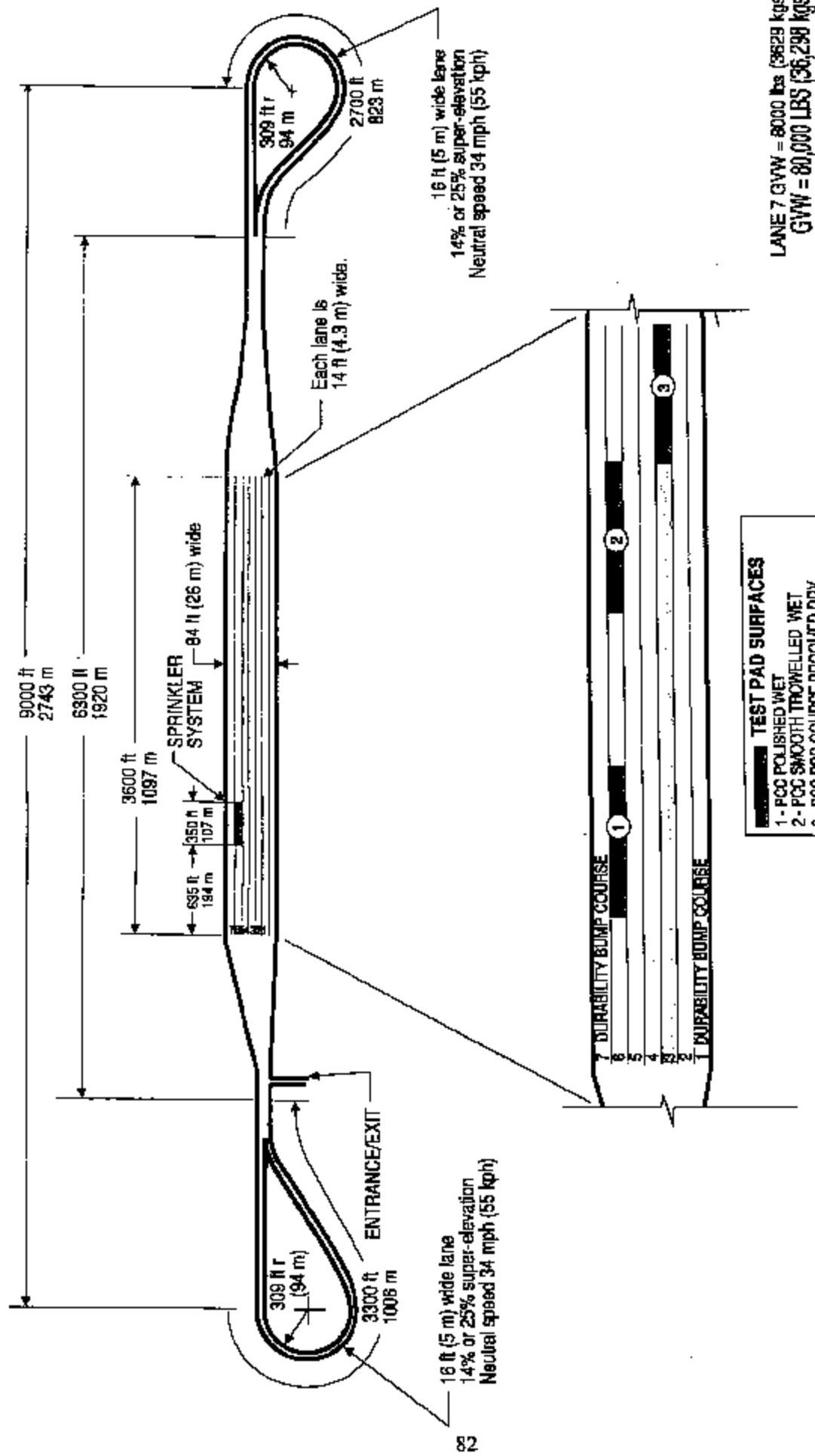
TEST FACILITY DETAIL



TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43018-0587

F-16 0501

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



LANE 7 GVW = 8000 lbs (3629 kgs)
GVW = 80,000 LBS (36,298 kgs)

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

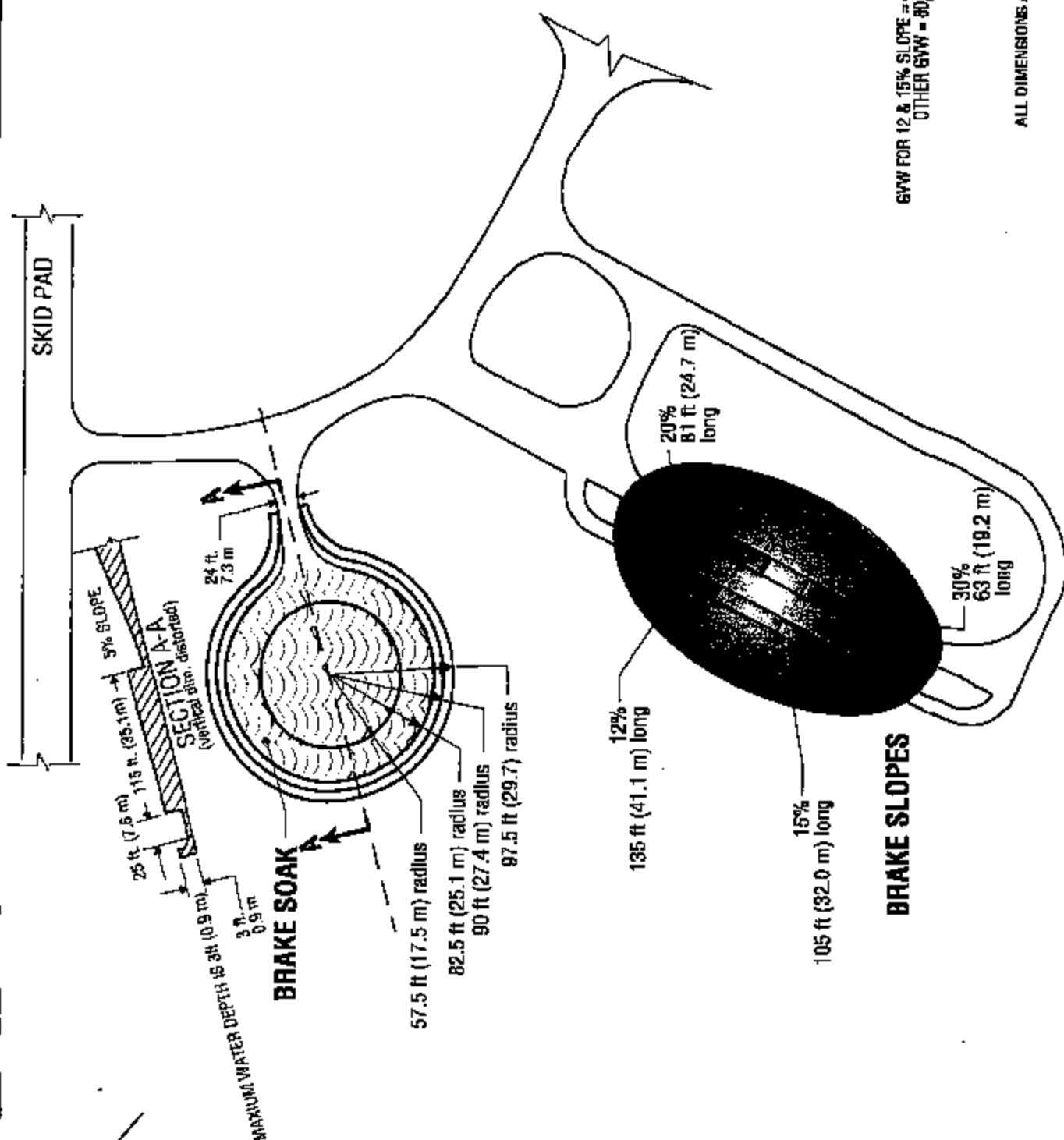
Not to scale
All dimensions are approximate

TRC

SKID PAD

TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43319-0387

F-10 6016



GVW FOR 12 & 15% SLOPE = 4000 lbs (1814 kg)
OTHER GVW = 80,000 lbs (36,286 kg)

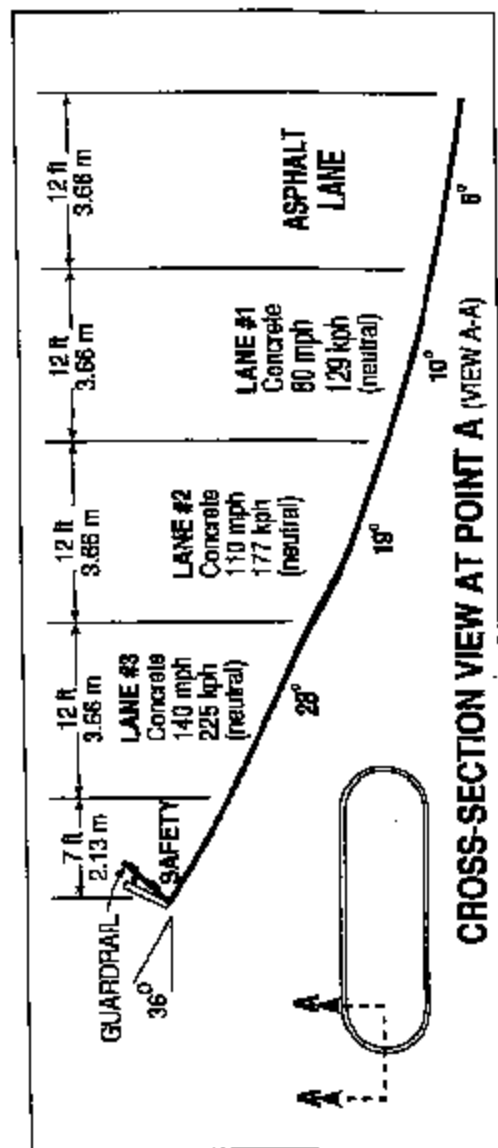
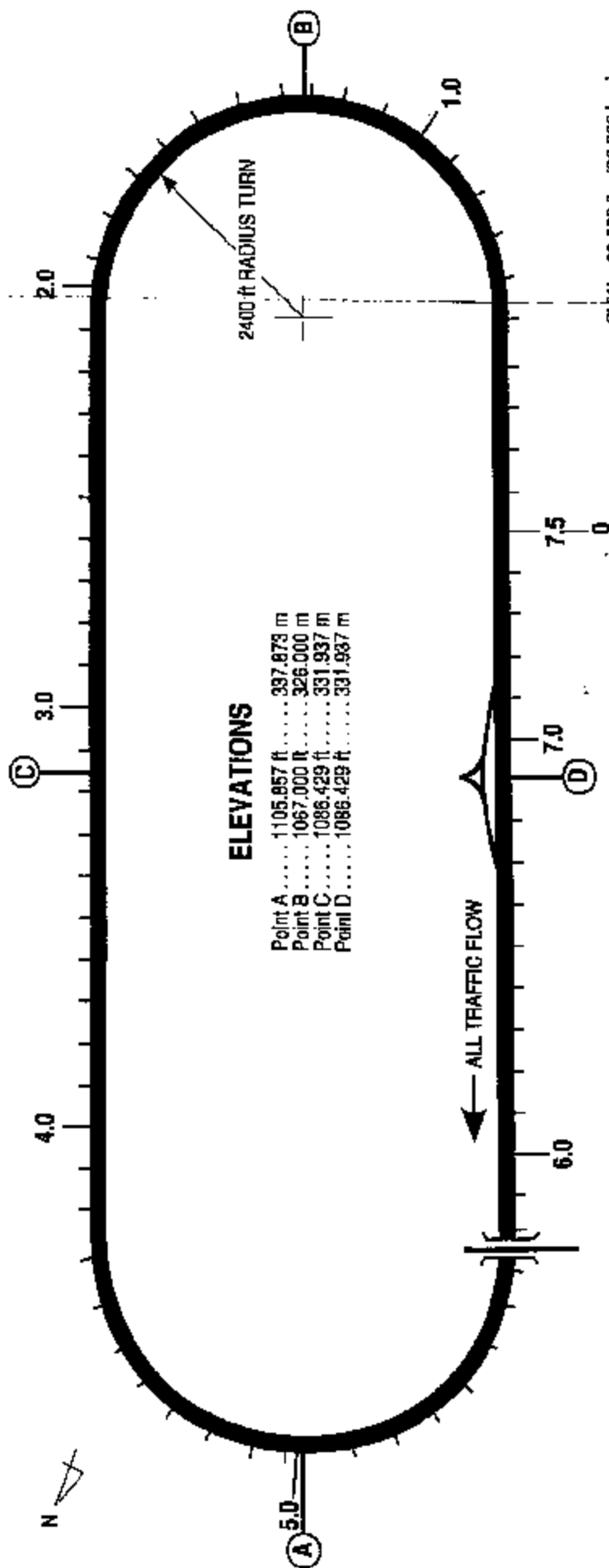
NOT TO SCALE
ALL DIMENSIONS ARE APPROXIMATE

BRAKE SOAK and BRAKE SLOPES

TRC

TRANSPORTATION RESEARCH CENTER INC.
EAST LEBANON, OHIO 43015-0007

F-9 0506



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	0.97 mi	1.524 km

NOT TO SCALE

TRE

7.5-MILE TEST TRACK

TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43827
P-107618

APPENDIX D
Notice of Possible Non-Compliance

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: 135

TEST DATE: 02/15/05

LABORATORY: Transportation Research Center Inc.

CONTRACT NO.: DTNH22-01-C-21025;

DELIVERY ORDER NO.: 4

LABORATORY PROJECT ENGINEER'S NAME: Randy Landes

TEST VEHICLE MAKE/MODEL/BODY STYLE: EMC Digipad II, 4-door MPV (minivan)

VEHICLE NHTSA NO.: C31300;

VIN: 2D4GP44393R157058

VEHICLE MODEL YEAR: 2003;

BUILD DATE: June 2004

TEST FAILURE DESCRIPTION: (Hydraulic Circuit Failure): Vehicle did not stop in the maximum allowable distance when utilizing the 'Hand Control.' It did, however, meet the distance utilizing the standard service brake (foot) apply method.

S135 REQUIREMENT, PARAGRAPH S7.10.4 Performance requirements: (a)
Stopping distance from 100 km/h test speed: < or = 168 m (551 ft).

NOTIFICATION TO NHTSA (COTR): Telephone.

DATE: 02/15/05

BY: Randy Landes

REMARKS: COTR noted stopping distance issue and instructed the lab to continue testing.

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: 135

TEST DATE: 03/03/05

LABORATORY: Transportation Research Center Inc.

CONTRACT NO.: DTNH22-01-C-21025 ;

DELIVERY ORDER NO.: 4

LABORATORY PROJECT ENGINEER'S NAME: Randy Landes

TEST VEHICLE MAKE/MODEL/BODY STYLE: EMC Digipad II, 4-door MPV (minivan)

VEHICLE NHTSA NO.: C31300;

VIN: 2D4GP44393R157058

VEHICLE MODEL YEAR: 2003;

BUILD DATE: June 2004

TEST FAILURE DESCRIPTION: (Power Assist Inoperative): Vehicle did not stop in the maximum allowable distance when utilizing the 'Hand Control.' It did, however, meet the distance utilizing the standard service brake (foot) apply method.

S135 REQUIREMENT, PARAGRAPH S7.11.4 Performance requirements: (a)
Stopping distance from 100 km/h test speed: < or = 168 m (551 ft).

NOTIFICATION TO NHTSA (COTR): Telephone.

DATE: 03/04/05

BY: Randy Landes

REMARKS: COTR noted stopping distance issue. Asked for and received facsimile graphs displaying pedal force vs. distance and decel. COTR instructed to perform a few extra stops and continue testing.

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: 135

TEST DATE: 03/04/05

LABORATORY: Transportation Research Center Inc.

CONTRACT NO.: DTNH22-01-C-21025;

DELIVERY ORDER NO.: 4

LABORATORY PROJECT ENGINEER'S NAME: Randy Landes

TEST VEHICLE MAKE/MODEL/BODY STYLE: EMC Digipad II, 4-door MPV (minivan)

VEHICLE NHTSA NO.: C31300;

VIN: 2D4GP44393R157058

VEHICLE MODEL YEAR: 2003;

BUILD DATE: June 2004

TEST FAILURE DESCRIPTION: (Parking Brake): Vehicle would not engage the Parking Brake mechanism and, therefore, would not remain stationary on the 20% grade, per the methodology stated in S7.12.2 (2) (f) through (i).

S135 REQUIREMENT, PARAGRAPH S7.12.3 Performance requirements: The parking brake system shall hold the vehicle stationary for 5 minutes in both a forward and reverse direction on the grade.

NOTIFICATION TO NHTSA (COTR): Telephone.

DATE: 03/04/05

BY: Randy Landes

REMARKS: COTR noted and requested several additional scenarios/methodologies, record these and continue testing.