

135-TRC-04-010

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175#
637357

SAFETY COMPLIANCE TESTING FOR FMVSS 135
Passenger Car Brake Systems

Toyota Motor Corporation
2004 Toyota Prius HSD, 4-Door Sedan
NHTSA No. C45107

TRANSPORTATION RESEARCH CENTER INC.

10820 State Route 347
East Liberty, Ohio 43319



Final Report Completed: September 3, 2004

FINAL REPORT

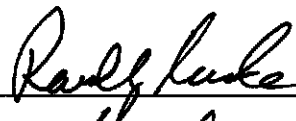
Prepared Under Contract No.: DTNH22-01-C-21025

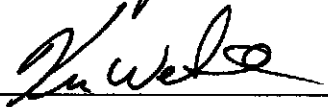
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement

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.

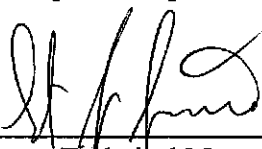
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Prepared By 

Approved By 

Approval Date: 9/16/04

Final Report Acceptance By OVSC:


Contract Technical Manager, Office of
Vehicle Safety Compliance

9/27/04
Acceptance Date

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4. TITLE AND SUBTITLE: Final report of FMVSS 135 Compliance Testing of a 2004 Toyota Prius HSD, 4-Door Sedan, NHTSA No. C45107				5. REPORT DATE: September 3, 2004	
				6. PERFORMING ORGANIZATION CODE: TRC 20000113/4358	
7. AUTHOR(S): Project Manager: WALTER DUDEK Project Engineer: RANDALL A. LANDES				8. PERFORMING ORGANIZATION REPORT NO.: TRC-DOT-135-055	
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Transportation Research Center Inc. 10820 State Route 347 East Liberty, Ohio 43319				10. WORK UNIT NUMBER:	
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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: 06/22/04 to 08/12/04	
				14. SPONSORING AGENCY CODE: NVS-220	
15. SUPPLEMENTARY NOTES:					
16. ABSTRACT: Compliance tests were conducted on the subject 2004 Toyota Prius HSD, 4-Door Sedan, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-135-00 for the determination of FMVSS 135 compliance. Test failures identified were as follows: None.					
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. 5108 Washington, DC 20590 Telephone No. (202) 366-4949	
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1.0 INTRODUCTION

Tests were conducted on a 2004 Toyota Prius HSD, 4-door sedan, manufactured by Toyota Motor Company, to determine compliance with FMVSS 135 "Passenger Car Brake Systems." All tests were conducted in accordance with the U.S. D.O.T., NHTSA Laboratory Procedure TP 135-00 and/or the corresponding TRC Inc. Test Procedure that was submitted to NHTSA for their approval. The Test Procedure was clearly described in the submitted document and has not been repeated in this report.

All stops were performed manually.

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

7.5-Mile Test Track

Vehicle Maximum Speed

Burnish

Heating Snubs and Hot Performance Stops

Brake Cooling and Recovery Stops

Skid Pad

Cold Effectiveness Stops

High Speed Effectiveness Stops

Stops with Engine Off

Failed Antilocks

Failed Variable Proportioning Valve (if applicable)

Failed Hydraulic Circuits

Brake Power Assist Unit Failures

RBS Failure

EMF (Battery) Failure

Brake Slope

Parking Brake

Average PFC during the test period was 0.96 (Skid Pad) and 0.95 (Test Track) utilizing the ASTM E1337 w/E1336 tire method.

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

This vehicle met the requirements of FMVSS 135.

DATA SHEET 1 - VEHICLE INFORMATION

VEHICLE SPECS

Year: 2004	NHTSA No: C45107
Mfr: TOYOTA MOTOR CORPORATION	GVWR (Kg): 1721.4
Make: TOYOTA	GAWR Front(Kg): 1059.2
Model: PRIUS HSD	GAWR Rear(Kg): 1020.6
Body Style: 4-DOOR SEDAN	Wheelbase (mm): 2692.4
Mfr. Date: 01/04	Odometer: Start:88 MI. End:615 MI.
VIN: JTDKB20U040041316	

BUSES ONLY

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

Engine Type: GASOLINE/ELECTRIC, 4-CYL DOHC, 16V, VVT-I, EFI.	Tire Size: P185/65R15
Displacement: 1.5 LITER	Tire Type: 86S, INTEGRITY, RADIAL, M&S, TUBE
Engine Hspwr: N/A	Tire Mfr.: GOODYEAR
Idle Speed(rpm): 136.136	GVWR Front Press.(kpa): 241.32
Transmission Type: AUTO ELEC. CONT. (ECVT)	GVWR Rear Press.(kpa): 227.53
No. of Axles: 2	

BRAKE APPLY SYSTEM

Brake Series: Front:DISC Rear:DRUM	Power Assist Unit: NO
Brake Actuation	Pwr Unit w/Accumulator: YES
(Hydr. Circuit Split): DIAGONAL	Pwr Asst./Pwr Unit w/Backup: NO
Power Unit: HYDRAULIC	Variable Prop. System: YES
Anti-Skid unit Mfr: TOYOTA	Anti-Skid Device: YES
Parking Mechanism: YES	
Type of Parking Unit: ECVT AUTO. TRANS. W/ELECTRIC PARK SELECTOR.	
Mstr Cylinder Dia(mm): 19.05	Pedal Ratio: 4.14 : 1

FRONT SYSTEM BRAKE COMPONENT MATERIALS AND CONSTRUCTION:

BRAKE TYPE: DISC	Material: CAST
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): 254.97	LF Drum Dia. RESET(mm): 0.00
Fr Disc Thickness(mm): 22.07	RF Drum Dia. RESET(mm): 0.00
Lining Construction: Bonded	
FRONT BRAKE COMPONENT DIMENSIONS AND CODES:	
Inboard (Leading)	Outboard (Trailing)
Width(mm): 45.14	Width(mm): 45.19
Length(mm): 91.97	Length(mm): 91.95
Thickness(mm): 10.74	Thickness(mm): 10.77
Lining Code/Color: SUMITOMO PS558H-FF	Lining Code/Color: SUMITOMO PS558H
Hyd. Piston Dia.(mm): 53.92	

DATA SHEET 1 - (CONTINUED)

REAR SYSTEM

BRAKE COMPONENT MATERIALS AND CONSTRUCTION:

BRAKE TYPE: DRUM

Material: CAST IRON

Drum Construction: CAST

LR Drum Shoe Cage Dia.(mm): 199.72

Disc Construction: N/A

RR Drum Shoe Cage Dia.(mm): 199.54

Lining Construction: BONDED

LR Drum Dia. RESET(mm): 199.29

Rear Brake Dia.(mm): 199.80

RR Drum Dia. RESET(mm): 199.29

Rr Disc Thickness(mm): 0.00

REAR BRAKE COMPONENT DIMENSIONS AND CODES:

Inboard (Leading)

Outboard (Trailing)

Width(mm): 31.11

Width (mm): 31.11

Length(mm): 190.50

Length (mm): 190.50

Thickness(mm): 3.84

Thickness (mm): 3.89

Lining Code/Color: NBK LN521-FF

Lining Code/Color: NBK LN521-FF

Hyd Piston Dia (mm): 18.95

OTHER COMPONENT INFORMATION:

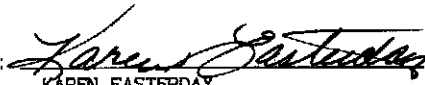
Friction-type Park Brake: FOOT-OPERATED

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:

09-15-04

Quality Assurance:


KEN WEBSTER

3.0 SUMMARY OF TESTING

		Specification and Limit				TEST RESULTS (In compliance if one stop meets requirement)			
TEST	Loading Condition	Speed (km/h)	Min. Pedal Force (N)	Max. Pedal Force (N)	Stopping Distance Requirement (m)	Shortest Stop Min. Pedal Force (N)***	Shortest Stop Max. Pedal Force Newtons (Average – N)	Shortest Stop Stopping Distance (m) (Corrected)	PASS Fail
Equipment Requirements					Specified Equipment	Vehicle contains specified equipment			Pass
Vehicle Maximum Speed	LLVW	NA				173.6 km/h avg.			NA
Burnish	GVWR	80				200, 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	65	500	70	5	459.6	48.4	Pass
High Speed Effectiveness	GVWR	138.9	65	500	spd. depend. – 143.1	5	476.6	93.7	Pass
Stops with Engine Off	GVWR	100	65	500	70	5	447.2	48.1	Pass
Cold Effectiveness	LLVW	100	65	500	70	5	479.4	46.9	Pass
High Speed Effectiveness	LLVW	138.9	65	500	spd. depend. – 143.1	5	479.6	88.1	Pass
Failed Antilock	LLVW	100	65	500	85	5	217.0	60.9	Pass
Failed Proportioning Valve	LLVW	100	65	500	110	5	NA	NA	NA
Failed Hydraulic Circuit #1	LLVW	100	65	500	168	5	490.8	106.2	Pass
Failed Hydraulic Circuit #2	LLVW	100	65	500	168	5	495.9	102.7	Pass
Failed Hydraulic Circuit #1	GVWR	100	65	500	168	5	494.8	110.5	Pass
Failed Hydraulic Circuit #2	GVWR	100	65	500	168	5	492.2	132.8	Pass
Failed Antilock	GVWR	100	65	500	85	5	260.6	52.1	Pass
Failed Proportioning Valve	GVWR	100	65	500	110	5	NA	NA	NA
Regenerative Brake System (RBS) Failure	GVWR	100	65	500	168	5	464.0	47.0	Pass
Electromotive Force (EMF) – Battery Failure	GVWR	100	65	500	70	5	457.3	47.6	Pass
Power Brake Unit Failure	GVWR	100	65	500	168	5	494.4	116.2	Pass
Parking Brake - Uphill	GVWR	-	-	500	Hold for 5 min.?	NA	480.2	Yes-Holds	Pass
Parking Brake - Downhill	GVWR	-	-	500	Hold for 5 min.?	NA	409.4	Yes-Holds	Pass
Heating Snubs	GVWR	120-60	NA	NA	15 Snubs- 3.0 mpsps	5	47 Vis. Avg.	NA	NA
Hot Performance Stop #1	GVWR	100	65	351.7 avg.	75.3	5	494.5 (328.2)	54.1	Pass
Hot Performance Stop #2	GVWR	100	65	500	89	5	289.8 (200.4)	53.0	Pass
Brake Cooling	GVWR	50	NA	NA	4 Stops - 3.0 mpsps	5	39 Vis. Avg.	NA	NA
Recovery Performance Stop #1	GVWR	100	65	351.7 avg.	One of the two stops between 66.0 and 36.2 meters	5	290.7 (188.4)	49.2	Pass
Recovery Performance Stop #2	GVWR	100	65	351.7 avg.		5	417.7 (267.5)	46.6	
Final Inspection-Brake Integrity	Check components for detachment, fracture or lubricants.					No detachments or fractures-normal appear. & color.			Pass
Final Inspection-Reservoirs/Warning Indicators	Master cylinder or brake power reservoir shall meet the volume and label requirements of S5.4.2 and S5.4.3.					Brake system has sufficient capacity and indicators are in compliance.			Pass

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

DATA SHEET 3 - VEHICLE WEIGHT

VEHICLE: 2004 TOYOTA PRIUS HSD

NHTSA No. C45107 Date: 06/24/04

Tire Pressure(cold): Front (kpa) 241 Rear (kpa) 228

Odometer: Start 88 MI. End 615 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): 1721

L Front(Kg): 400 L Rear(Kg): 288

GAWR Front(Kg): 1059

R Front(Kg): 392 R Rear(Kg): 264

GAWR Rear(Kg): 1021

T Front(Kg): 792 T Rear(Kg): 553

Total UVW(Kg): 1344

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): 449 L Rear(Kg): 331

L Front(Kg): 452 L Rear(Kg): 330

R Front(Kg): 441 R Rear(Kg): 307

R Front(Kg): 437 R Rear(Kg): 308

T Front(Kg): 890 T Rear(Kg): 553

T Front(Kg): 889 T Rear(Kg): 638

Total LLVW(Kg): 1527

Total Actual Test LLVW(Kg): 1527

Load: Driver/Observer 73(Kg) + Instru. 41(Kg) + Ballast 67(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): 445 L Rear(Kg): 426

R Front(Kg): 443 R Rear(Kg): 406

T Front(Kg): 889 T Rear(Kg): 832

Total Fully Loaded GVWR(Kg): 1721

Load: Driver/Observer 73(Kg) + Instru. 41(Kg) + Ballast 262(Kg)= 376(kg)

Technician: Karen Easterday

KAREN EASTERDAY

Date: 09-15-04

Quality Assurance: Ken Webster

KEN WEBSTER

DATA SHEET 4 - EQUIPMENT REQUIREMENTS (S5)

SERVICE BRAKE SYSTEM (S5.1)

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

Wear Adjustment (S5.1.1):

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

Describe: DISC-AUTOMATIC CLEARANCE TAKE-UP DRUM-AUTO.-ADJUST.

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:LOOK THROUGH CALIPER. REAR:LOOK THROUGH INSP.HOLE

PARKING BRAKE SYSTEM (S5.2)

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

CONTROLS (S5.3)

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

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

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

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

DATA INDICATES COMPLIANCE: YES

COMMENTS: NONE.

Tester/Technician:


KAREN EASTERDAY

Date: 09-15-09

Quality Assurance:


KEN WEBSTER

DATA SHEET 5 - VEHICLE MAX SPEED

VEHICLE: 2004 TOYOTA PRIUS HSD

NHTSA No. C45107 Date: 06/24/04

Ambient Temperature: 81°F

Wind Velocity: 16(MPH)

Road PFC: .95

Wind Direction: 232°

Odometer: Start 108(mi) End 123(mi)

TEST WEIGHT: Total (Kg): 1527

Front (Kg): 889

Rear (Kg): 638

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
a standing start in 3.2 km.

INTERVAL: N/A

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	174.5 kph	174.5	12.65
Run No. 2	North	172.6 kph	172.6	12.09

AVERAGE = 173.6 km/h

COMMENTS: INV DATA, Section 0001, 06/24/04, 15:24:57

Tester/Technician

Karen Easterday
KAREN EASTERDAY

Date: *09-15-04*

Quality Assurance:

Ken Webster
KEN WEBSTER

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45187

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937)666-2011 www.trcpg.com

Date Tested: 06/24/04

DATA SHEET 6 - BURNISH AT GVWR

Testing Conditions: INV DATA, Section 0002, 06/24/04, 16:33:23

Weather Conditions: 58°F Wind: 11 mph 2°

Start Odo.: 125

End Odo.: 390

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 IBT to 100 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 3.5m

STOP	INIT	LEFT	RIGHT	LEFT	RIGHT	MAX.	AVG.	AVG.
#	SPD	FRONT	FRONT	REAR	REAR	PEDAL	PEDAL	DECEL
	(kph)	IBT	IBT	IBT	IBT	FORCE	FORCE	(m/sec ²)
		(°C)	(°C)	(°C)	(°C)	(N)	(N)	
1	79.17	68	66	60	61	58.90	36.52	2.71
10	80.52	131	141	124	117	49.56	36.34	2.74
20	80.11	137	142	131	131	53.29	34.06	2.80
30	79.74	133	145	119	131	55.60	41.71	2.70
40	80.63	136	156	103	123	53.29	36.79	2.77
50	79.86	129	151	93	107	53.35	46.80	2.90
60	80.55	146	153	86	87	51.56	43.56	2.83
70	80.76	144	151	87	90	55.57	41.31	2.85
80	81.16	141	152	87	92	57.42	37.19	2.88
90	80.04	138	152	87	93	52.20	39.28	2.86
100	80.98	128	144	85	92	53.87	39.46	2.93
110	79.18	131	149	89	93	61.60	37.64	2.83
120	80.78	137	152	88	95	55.36	37.16	2.95
130	80.55	132	136	86	84	56.72	37.15	2.68
140	79.90	135	144	84	86	54.84	35.69	2.84
150	79.88	137	143	84	87	57.57	41.05	2.76
160	80.01	132	142	83	86	61.23	41.02	2.94
170	79.32	133	142	84	88	54.14	35.18	2.95
180	80.46	136	147	82	87	61.54	39.54	2.77
190	80.03	132	143	79	86	56.17	44.02	2.98
200	79.84	129	137	83	88	63.38	41.39	2.78

COMMENTS: THIS VEHICLE ABS 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: DRUM DRUM BRAKE NO ADJUSTMENT REQUIRED.

Right Rear: DRUM DRUM BRAKE NO ADJUSTMENT REQUIRED.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937) 666-2011 www.trcpg.com

Date Tested: 06/30/04

DATA SHEET 11 - COLD EFFECTIVENESS AT GVWR

Testing Conditions: INV DATA, Section 0015, 06/30/04, 09:26:01

Weather Conditions: 73°F Wind: 3 mph 251°

Start Odo.: 398

End Odo.: 402

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 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 SFD (kph)	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec ²)	AVG. DECEL (m/sec ²)
		IBT (°C)	IBT (°C)	IBT (°C)	IBT (°C)						
1	99.35	74	75	56	56	49.7	50.3	423.85	293.06	12.52	7.36
2	99.88	77	78	54	54	50.3	50.4	431.70	332.40	12.77	7.14
3	99.12	85	84	57	57	50.8	51.7	523.34	372.73	13.18	7.32
4	99.57	91	91	59	61	50.4	50.8	444.55	342.76	12.86	6.95
5	100.25	94	92	61	63	49.4	49.2	490.76	373.73	13.45	7.51
6	100.74	90	86	57	59	49.2	48.4	459.61	351.70	13.45	6.92

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

Corrected Distances are used to determine shortest stopping distance.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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10820 State Route 347

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(937)666-2011 www.tropg.com

Date Tested: 06/30/04

DATA SHEET 12 - HIGH SPEED EFFECTIVENESS AT GVWR

Testing Conditions: INV DATA, Section 0020, 06/30/04, 11:00:01

Weather Conditions: 76°F Wind: 8 mph 200°

Start Odo: 409

End Odo: 420

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: 143.1 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 SPD (kph)	LEPT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEPT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	138.51	88	83	64	64	100.4	100.9	493.49	399.12	13.04	7.30
2	137.66	83	86	56	58	93.7	95.3	452.91	381.91	15.03	8.05
3	138.19	82	83	51	57	95.6	96.5	483.64	380.91	15.80	7.58
4	137.63	86	91	54	61	93.4	95.1	509.37	379.37	12.55	7.53
5	138.56	92	88	62	66	93.7	94.1	451.85	371.37	13.10	7.71
6	138.97	94	89	67	66	93.8	93.7	476.61	379.64	13.32	7.68

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

1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937)666-2011 www.trcpg.com

Date Tested: 06/30/04

DATA SHEET 13 - STOPS WITH ENGINE OFF AT GVWR

Testing Conditions: INV DATA, Section 0025, 06/30/04, 13:54:23

Weather Conditions: 77°F Wind: 2 mph 31°

Start Odo.: 425

End Odo.: 431

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 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 SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	98.33	76	73	61	57	49.1	50.8	390.34	241.73	14.41	7.37
2	99.96	82	82	57	55	49.3	49.3	508.76	367.37	13.49	7.30
3	100.27	88	94	60	60	48.9	48.6	444.21	336.91	13.71	7.44
4	99.86	76	80	54	53	49.1	49.3	454.88	352.88	13.53	7.80
5	99.83	84	88	57	59	48.0	48.1	447.24	352.67	13.36	7.70
6	100.77	88	96	58	60	51.2	50.4	500.88	374.21	12.31	6.83

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

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Date Tested: 07/01/04

DATA SHEET 14 - COLD EFFECTIVENESS AT LLVW

Testing Conditions: INV DATA, Section 0030, 07/01/04, 10:13:40

Weather Conditions: 76°F Wind: 6 mph 246°

Start Odo.: 444

End Odo.: 450

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 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.				
#	SPD	FRONT	FRONT	REAR	REAR	DISTANCE	DISTANCE	PRDAL	PEDAL	MAX.	AVG.	DECEL	DECEL
	(kph)	IBT	IBT	IBT	IBT	(meter)	(SAE 299)	FORCE	FORCE	DECEL		(m/sec²)	(m/sec²)
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
1	98.42	78	79	52	54	46.9	48.4	468.03	333.59	13.89		7.89	
2	100.47	93	94	52	54	48.1	47.6	389.45	261.54	13.11		7.42	
3	99.76	94	94	52	51	47.3	47.5	485.65	370.43	13.65		7.58	
4	98.94	79	78	44	44	47.6	48.6	450.50	351.87	14.57		7.59	
5	99.76	94	91	49	47	47.8	48.1	447.77	361.29	13.68		7.56	
6	100.13	76	72	42	41	47.0	46.9	479.39	352.97	15.68		7.51	

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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East Liberty, Ohio 43319

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Date Tested: 07/01/04

DATA SHEET 15 - HIGH SPEED EFFECTIVENESS AT LLVW

Testing Conditions: INV DATA, Section 0035, 07/01/04, 11:44:12

Weather Conditions: 79°F Wind: 3 mph 162°

Start Odo.: 452

End Odo.: 454

Schedule:

Initial Brake Temperature: 65-100°C

Initial Speed: 80% max km/h

6 stops with transmission in gear

Performance Requirements:

One Stop with:

Stopping Distance less than 143.1m

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 #		LEFT	RIGHT	LEFT	RIGHT		CORRECTED	MAX.	AVG.		
	INIT	FRONT	FRONT	REAR	REAR	ACTUAL	DISTANCE	PEDAL	PEDAL	MAX.	AVG.
	SPD	IBT	IBT	IBT	IBT	DISTANCE	(SAE 299)	FORCE	FORCE	DECEL	DECEL
	(kph)	(°C)	(°C)	(°C)	(°C)	(meter)	(meter)	(N)	(N)	(m/sec ²)	(m/sec ²)
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
1	137.28	76	72	59	56	86.9	88.9	475.99	384.35	13.65	8.36
2	138.37	89	84	54	51	89.5	90.1	457.92	318.37	12.77	7.83
3	138.32	92	87	53	49	88.4	89.1	488.56	393.25	13.60	7.94
4	138.92	89	82	49	46	88.2	88.1	479.63	362.02	14.20	8.14
5	138.37	85	77	48	44	91.4	92.1	523.74	370.34	13.30	7.74
6	138.12	76	71	44	44	88.0	88.9	508.89	371.86	13.83	7.87

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

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Date Tested: 07/13/04

DATA SHEET 16 - ANTILOCK FUNCTIONAL FAILURE AT LLVW

Testing Conditions: INV DATA, Section 0040, 07/13/04, 09:45:17

Weather Conditions: 77°F Wind: 11 mph 313°

Start Odo.: 476

End Odo.: 482

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	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	99.84	87	86	44	48	60.7	60.9	216.96	152.90	9.95	6.59
2	100.68	74	74	44	47	61.9	61.1	280.44	122.69	9.42	6.26
3	98.76	79	76	46	49	65.1	66.8	166.16	117.81	10.31	5.83
4	100.68	82	77	48	52	80.5	79.4	272.38	72.46	10.14	4.82
5	100.04	82	80	46	49	67.0	66.9	151.57	109.95	12.60	5.84
6	100.06	85	83	49	49	67.5	67.4	168.64	100.85	9.09	5.63

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

1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	LRX/RRX INIT	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

How was the ABS failure induced: REMOVED LEFT REAR WHEEL SENSOR.

(SEE APPENDIX C)

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

Vehicle equipped with variable proportioning valve, within ABS - cannot fail separately.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS BSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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East Liberty, Ohio 43319

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Date Tested: 07/15/04

DATA SHEET 18 - HYDRAULIC CIRCUIT FAILURE #1 AT LLVW

Testing Conditions: INV DATA, Section 0050, 07/15/04, 09:53:57

Weather Conditions: 69°F Wind: 12 mph 316° Start Odo.: 493 End Odo.: 500

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

System Portion Failed: LF & RR

Schedule:

Initial Brake Temperature: 65-100°C

Initial Speed 100 km/h to zero

4 stops with transmission in neutral

Performance Requirements:

One Stop with:

Stopping Distance less than 168m

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 IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec ²)	AVG. DECEL (m/sec ²)
	SPD	IBT	IBT	IBT	IBT	DISTANCE	(SAE 299)	FORCE	FORCE	DECEL	DECEL
1	100.10	34	34	77	76	150.9	150.6	465.77	370.77	5.30	2.74
2	100.01	34	66	79	79	118.6	118.5	487.67	426.55	6.50	3.32
3	99.74	33	37	83	73	114.4	115.0	489.31	431.46	5.63	3.39
4	99.75	34	72	88	83	105.6	106.2	490.82	450.21	5.86	3.59

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

(See Appendix C)

Force Needed to Activate Brake Failure Lamp (N): N/A

Fluid Removed (mL) to Activate Brake Failure Lamp: 203

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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East Liberty, Ohio 43319

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Date Tested: 07/15/04

DATA SHEET 19 - HYDRAULIC CIRCUIT FAILURE #2 AT LLVW

Testing Conditions: INV DATA, Section 0055, 07/15/04, 15:12:43

Weather Conditions: 78°F Wind: 18 mph 337°

Start Odo.: 514

End Odo.: 518

Method of simulating failure: Disconnected Brake Line @ M/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 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/sec ²)	(m/sec ²)
1	98.98	79	37	87	74	117.7	120.1	490.28	426.67	6.18	3.46
2	100.35	75	36	69	68	106.6	105.8	499.77	434.68	6.17	3.67
3	99.96	96	37	79	77	103.7	103.8	497.95	441.81	6.55	3.73
4	100.81	88	37	68	68	104.4	102.7	495.92	445.60	6.36	3.82

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

(See Appendix C)

Force Needed to Activate Brake Failure Lamp (N): N/A

Fluid Removed (mL) to Activate Brake Failure Lamp: 203

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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East Liberty, Ohio 43319

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Date Tested: 07/15/04

DATA SHEET 20 - HYDRAULIC CIRCUIT FAILURE #1 AT GVWR

Testing Conditions: INV DATA, Section 0060, 07/15/04, 11:20:51

Weather Conditions: 73°F Wind: 18 mph 316°

Start Odo.: 503

End Odo.: 507

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

System Portion Failed: LF & RR

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 168m

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 IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	99.77	33	39	90	78	126.6	127.1	495.95	434.95	5.81	3.09
2	100.51	32	62	81	73	122.6	121.4	502.53	436.89	7.21	3.24
3	101.32	34	69	82	81	113.4	110.5	494.77	460.16	5.55	3.39
4	99.05	32	62	89	76	116.9	119.1	488.91	443.93	6.62	3.28

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

(see APPENDIX C)

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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10820 State Route 347

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Date Tested: 07/15/04

DATA SHEET 21 - HYDRAULIC CIRCUIT FAILURE #2 AT GVWR

Testing Conditions: INV DATA, Section 0065, 07/15/04, 14:34:22

Weather Conditions: 78°F Wind: 13 mph 287°

Start Odo.: 510

End Odo.: 514

Method of simulating failure: Disconnected Brake Line @ M/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 168m

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 IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
	SPD	IBT	IBT	IBT	IBT	DISTANCE	(SAE 299)	FORCE	FORCE	DECEL	DECEL
1	99.72	40	32	93	79	135.3	136.1	491.61	442.26	4.81	2.89
2	99.91	75	35	93	82	132.6	132.8	492.16	436.74	6.39	3.02
3	100.82	73	36	74	64	119.1	117.2	500.68	457.73	5.98	3.27
4	100.90	91	36	82	74	114.5	112.4	509.66	446.75	7.55	3.40

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

(See Appendix C)

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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East Liberty, Ohio 43319

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Date Tested: 07/16/04

DATA SHEET 22 - ANTILOCK FUNCTIONAL FAILURE AT GVWR

Testing Conditions: INV DATA, Section 0070, 07/16/04, 11:23:04

Weather Conditions: 77°F Wind: 10 mph 282°

Start Odo.: 527

End Odo.: 532

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	RIGHT FRONT	LEFT REAR	RIGHT REAR	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG.		MAX. DECEL (m/sec ²)	AVG. DECEL (m/sec ²)
		IBT (°C)	IBT (°C)	IBT (°C)	IBT (°C)				PEDAL FORCE (N)	DECEL (m/sec ²)		
1	100.34	88	86	47	43	67.1	66.6	188.45	133.25	8.69	5.90	
2	99.86	86	83	48	46	65.4	65.5	228.34	129.21	8.89	5.85	
3	99.83	72	71	44	44	59.8	60.0	273.44	150.05	10.09	6.25	
4	99.90	92	89	52	53	52.0	52.1	260.58	159.57	10.92	6.78	
5	100.35	79	80	47	49	58.5	58.0	250.90	158.12	10.12	6.49	
6	100.26	90	90	52	54	65.2	64.9	199.61	128.39	9.04	5.85	

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

How was the ABS failure induced: REMOVED LEFT REAR WHEEL SENSOR.

(see APPENDIX C)

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

Vehicle equipped with variable proportioning valve, within ABS - cannot fail separately.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

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Date Tested: 07/16/04

DATA SHEET 22A - REGENERATIVE BRAKING SYSTEM (RBS) FAILURE AT GVWR

Testing Conditions: INV DATA, Section 0045, 07/16/04, 13:32:36

Weather Conditions: 80°F

Wind: 10 mph 250°

Start Odo.: 535

End Odo.: 540

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 168m

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 IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.95	80	79	60	52	52.0	51.0	485.09	353.09	12.96	7.19
2	99.09	74	71	49	48	48.1	49.0	473.50	357.94	13.31	7.66
3	100.58	88	86	56	54	47.6	47.0	463.98	348.33	14.06	7.11
4	100.41	86	83	53	55	50.0	49.6	461.52	339.95	12.62	7.29
5	100.55	68	71	46	48	49.7	49.1	474.54	367.16	13.57	7.32
6	100.34	92	92	57	58	48.1	47.8	488.82	361.52	13.29	7.01

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

Comments: See Appendix C.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937) 666-2011 www.trcpg.com

Date Tested: 07/26/04

DATA SHEET 22B - ELECTROMOTIVE FORCE (EMF) FAILURE AT GVWR

Testing Conditions: INV DATA, Section 0075, 07/26/04, 11:46:13

Weather Conditions: 65°F Wind: 6 mph 346°

Start Odo.: 558

End Odo.: 567

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 70 m

Pedal force between 65N and 500N

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

Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECRL (m/sec ²)	AVG. DECEL (m/sec ²)
		IBT (°C)	IBT (°C)	IBT (°C)	IBT (°C)						
1	98.97	69	68	53	51	64.3	65.6	263.85	179.17	9.10	6.20
2	100.05	76	79	52	52	49.3	49.2	381.21	223.39	13.00	7.96
3	100.67	87	94	58	57	49.0	48.3	458.73	322.48	12.82	7.65
4	99.67	87	96	55	54	47.3	47.6	457.31	325.91	13.52	8.03
5	99.96	84	93	53	54	135.1	135.2	296.40	119.05	7.99	3.17
6	99.41	86	96	55	54	48.2	49.2	439.29	324.55	12.84	7.90

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

1	BATTERY FAILURE	NOX	SOUTH	YES
2	BATTERY FAILURE	NOX	SOUTH	YES
3	BATTERY FAILURE	NOX	SOUTH	YES
4	BATTERY FAILURE	NOX	SOUTH	YES
5	BATTERY FAILURE	RFX-INIT	SOUTH	YES

COMMENTS: SEE APPENDIX C.

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937) 666-2011 www.trcpg.com

Date Tested: 08/02/04

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

Weather Conditions: 73°F Wind: 3 mph 175°

Start Odo.: 571 End Odo.: 577

Failure Simulation: Disconnect primary source of power.

Method of rendering inoperative: Removed Engine Vacuum Hose at Booster

Schedule:

Initial Brake Temperature 65-100°C

Initial Speed 100 km/h to zero

6 stops with transmission in neutral

Performance Requirements:

One Stop with:

Stopping Distance less than 168m

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 IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
	SPD	IBT	IBT	IBT	IBT	DISTANCE	(SAE 299)	FORCE	FORCE	DECEL	DECEL
1	99.03	89	90	24	24	139.4	142.1	501.85	464.44	5.01	2.81
2	100.43	87	86	25	26	138.3	137.1	488.75	446.67	5.45	3.01
3	99.79	93	90	27	27	121.9	122.4	490.83	448.18	7.46	3.15
4	98.63	88	83	28	28	120.2	123.6	491.41	456.81	8.65	3.32
5	100.48	94	89	29	29	117.3	116.2	494.38	449.21	6.09	3.32
6	100.19	87	81	29	29	120.5	120.1	493.86	453.45	5.67	3.35

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

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

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937)666-2011 www.trcpg.com

Date Tested: 08/02/04

DATA SHEET 25 - PARKING BRAKE AT GVWR

Testing Conditions: INV DATA, Section 0085, 08/02/04, 15:52:52

Parking brake: ECVT AUTO. T Non-service type: N/A

Service type: FOOT-OPERATED

Weather Conditions: 85°F

Wind: 6 mph 261°

Start Odo.: 579

End Odo.: 579

Test Weight: Total:1721kg

Front: 889kg

Rear: 832kg

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: <500 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)			
1	124.9	480.2	26	26	25.6	-	0 REAPPLY	UPHILL	HOLDS 20%
2	95.3	409.4	31	30	30.3	-	0 REAPPLY	DOWNHILL	HOLDS 20%

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937)666-2011 www.trecpg.com

Date Tested: 08/03/04

DATA SHEET 26 - HEATING SNUBS AT GVWR

Testing Conditions: INV DATA, Section 0090, 08/03/04, 09:17:28

Schedule:

Conduct 15 snubs from 120 Km/h or 80% 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 IBT for first snub is 55-65°C

Maintain 3.0 m/s/s deceleration

Vehicle Must stay in lane of 3.5m

SNUB	AVG. DECEL # (m/sec ²)	Time Between Snubs (second)	AVG. PEDAL FORCE (N)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	INIT SPD (kph)
1	2.88	--NA--	51.78	56	58	54	55	119.80
2	3.16	47	46.32	100	102	77	76	118.01
3	2.79	45	42.62	148	147	97	96	120.34
4	2.92	45	48.20	187	183	112	110	119.06
5	2.82	45	45.32	223	216	125	123	119.47
6	2.87	46	43.92	252	244	136	134	118.78
7	2.73	44	45.02	281	272	146	144	119.84
8	2.69	46	43.13	297	290	152	151	120.61
9	2.73	44	43.17	312	308	159	158	121.13
10	2.62	45	47.78	322	319	165	166	121.03
11	2.72	46	48.96	338	339	172	173	120.15
12	2.76	44	50.66	355	358	179	181	119.84
13	2.45	45	52.36	369	373	187	187	120.80
14	2.95	47	45.77	378	380	191	193	119.75
15	2.55	43	53.45	382	384	195	197	120.01

STOP #	DRIVER VEHICLE SNUB COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)		
1	-	NOX	NORTH YES
2	-	NOX	EAST YES
3	-	NOX	SOUTH YES
4	-	NOX	SOUTH YES
5	-	NOX	SOUTH YES
6	-	NOX	SOUTH YES
7	-	NOX	WEST YES
8	-	NOX	NORTH YES
9	-	NOX	NORTH YES
10	-	NOX	NORTH YES
11	-	NOX	NORTH YES
12	-	NOX	EAST YES
13	-	NOX	SOUTH YES
14	-	NOX	SOUTH YES
15	-	NOX	SOUTH YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

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Date Tested: 08/03/04

DATA SHEET 27 - HOT PERFORMANCE AT GVWR

Testing Conditions: INV DATA, Section 0095, 08/03/04, 09:28:30

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 15 km/h.

Distance Requirements are based on the following:

shortest stop in Data Sheet 11 is: 6

Initial speed of stop: 100.74 (kph)

Actual distance of stop: 49.2 (meter)

Average pedal force: 351.7 (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: 89 (meter)

STOP #	INIT	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	ACTUAL	CORRECTED	MAX.	AVG.	MAX.	AVG.
	SPD	IBT	IBT	IBT	IBT	DISTANCE	(SAR 299)	PEDAL	PEDAL	DECEL	DECEL
	(kph)	(°C)	(°C)	(°C)	(°C)	(meter)	(meter)	(N)	(N)	(m/sec ²)	(m/sec ²)
1	100.65	406	411	204	205	54.8	54.1	494.47	328.24	11.87	6.76
2	99.45	418	428	213	215	52.4	53.0	289.78	200.35	12.39	7.53

STOP #	DRIVER VEHICLE STOP COMMENTS			
	(Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	LEFT FRONT: SMOKE	NOX	SOUTH	YES
2	LEFT FRONT: SMOKE	NOX	WEST	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

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Date Tested: 08/03/04

DATA SHEET 28 - BRAKE COOLING STOPS AT GVWR

Testing Conditions: INV DATA, Section 0100, 08/03/04, 09:31:46

Schedule:

Initial Brake Temperature:

Achieved on completing Hot Performance

Initial Speed 50 km/h to zero

4 stops with transmission in gear

Performance Requirements:

Constant Decel rate: 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 3.5m

STOP #	INIT SPD (kph)	AVG. DECEL (m/sec ²)	AVG. PEDAL FORCE (N)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)
1	50.75	2.87	38.86	347	359	192	198
2	49.80	2.73	38.22	274	283	163	169
3	50.28	2.72	36.07	227	230	140	146
4	50.35	2.71	42.07	194	193	123	128

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

1	-	NOX	WEST	YES
2	-	NOX	NORTH	YES
3	-	NOX	NORTH	YES
4	-	NOX	EAST	YES

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

Vehicle: 2004 TOYOTA MOTOR CO NHTSA NUMBER: C45107

Make: TOYOTA

Model: PRIUS HSD

Body Style: 4-DOOR SEDAN

Front Cold Tire Pressure: 241 (Kpa)

Rear Cold Tire Pressure: 228 (Kpa)

Transportation Research Center, Inc.

10820 State Route 347

East Liberty, Ohio 43319

(937)666-2011 www.trcpg.com

Date Tested: 08/03/04

DATA SHEET 29 - RECOVERY PERFORMANCE AT GVWR

Testing Conditions: INV DATA, Section 0105, 08/03/04, 09:39:11

Weather Conditions: 77°F Wind: 4 mph 284°

Start Odo.: 589

End Odo.: 606

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: 36.2 (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 is: Stop 6

Initial speed of stop: 100.74 (kph)

Actual distance of stop: 49.2 (meter)

Average pedal force: 351.7 (N)

STOP #	INIT SPD	LEFT FRONT	RIGHT FRONT	LEFT REAR	RIGHT REAR	ACTUAL DISTANCE	CORRECTED DISTANCE	MAX. PEDAL FORCE	AVG. PEDAL FORCE	MAX. DECEL	AVG. DECEL
	(kph)	(°C)	(°C)	(°C)	(°C)	(meter)	(SAE 299) (meter)	(N)	(N)	(m/sec²)	(m/sec²)
1	100.04	177	176	112	117	49.2	49.2	290.69	188.40	13.89	7.41
2	100.43	222	233	125	129	47.0	46.6	417.70	267.54	12.50	7.80

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

DATA INDICATES COMPLIANCE: YES (X) NO ()

Driver: KAREN EASTERDAY

Observer: NONE

Recorded Data Processed by: CHUCK JENKINS

Date: 08/13/04

Approving Laboratory Official: KEN WEBSTER

Date: 08/24/04

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

VEHICLE: 2004 Toyota Prius HSD NHTSA NO.: C45107 DATE: 08/11/04

System Integrity (S5.6)

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

(a) Detachment or fracture of any component of the braking system such as brake springs and brake shoes or disc pad facings, other than minor cracks, that do not impair attachment of the friction facings. All mechanical components of the braking system shall be intact and functional. Friction facing tearout (complete detachment of lining) shall not exceed 10 percent of the lining on any single frictional element.

(b) Any visible brake fluid or lubricant on the friction surface of the brake or leakage at the master cylinder or brake power unit reservoir cover, seal, and filler openings.

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

COMPLIANCE: Yes X No

Comments: None.

Technician: K. Easterday

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

VEHICLE: 2004 Toyota Prius HSD; NHTSA NO.: C45107; GVWR: 1721 kg
MASTER CYLINDER RESERVOIR:

DATE	08/10/04		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)	423 ml	Shall have total minimum capacity for entire reservoir for displacement resulting from all subsystem wheel cylinders or caliper positions moving from new lining to full worn condition as above.	X		
Fluid displaced from new to worn linings (ALL linings)	97.4 ml*				
*Value calculated from Data Sheet 31					

Comments: None

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

VEHICLE: 2004 Toyota Prius HSD; NHTSA NO.: C45107; GVWR: 1721 kg

MASTER CYLINDER RESERVOIR:

DATE	08/10/04	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)	9.0 ml	Individual partial compartments of reservoir shall each have a minimum of fluid equal to at least the volume displaced by the master cylinder piston servicing the subsystem during a <u>full stroke</u> of the piston. NOTE: Procedure uses three strokes to ensure an accurate measurement.		
Fluid displaced by three strokes of master cylinder piston for Secondary (Subsystem No. 2)	1.5 ml			
Fluid displaced per stroke, Primary	3.0 ml			
Fluid displaced per stroke, Secondary	0.5 ml			
Fluid available in partial compartment Subsystem No. 1	54 ml		X	
Fluid available in partial compartment Subsystem No. 2	31 ml		X	
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 on accumulators to normal operating pressure <u>plus</u> displacement when wheel cylinders or caliper pistons move from new lining to full worn condition as above.	NA	
Reservoir Labeling (\$5.4.3)				
Exact copy of reservoir label: On master cylinder reservoir cap: <u>WARNING.</u> <u>CLEAN FILLER CAP BEFORE REMOVING.</u> <u>USE ONLY DOT 3 BRAKE FLUID FROM A</u> <u>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	3.9 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	
	<u>No</u>			

Comments: None

Technician: K. Easterday

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

VEHICLE: 2004 Toyota Prius HSD; NHTSA NO.: C45107; DATE: 08/10/04
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: In upper left quadrant of instrument cluster.	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 50%	NA			
B. Electrical functional failure in an antilock or variable brake proportioning system.	Yes		X	
C. Application of the parking brake.	Yes			
D. Brake lining wear-out if optical warning	NA			
Must have Audible alarm if not split system and a condition in (a) above exists?	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?	*Yes-Cont.			

Comments:

BRAKE and ABS warning lamps as well as an audible signal were engaged upon complete accumulator exhaustion and electrical isolation of the accumulator's hydraulic pump.

Technician: K. Easterday

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

VEHICLE: 2004 Toyota Prius HSD; NHTSA NO.: C45107; DATE: 08/10/04

BRAKE SYSTEM WARNING INDICATOR LABELING (S5.5.5)

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>3.9 mm</u> ; "ABS" - <u>3.9 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"? <u> </u>	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 <u> </u>	NA		
If separate indicator for: 1. Low brake fluid per S5.5.1(a)(1), does indicator say "Brake Fluid"? NOTE: not required for mineral oil system Record wording <u> </u> 2. Gross pressure loss per S5.5.1(a)(2), does indicator say "Brake Pressure"? Record wording <u> </u> 3. Electrical functional failure in antilock or variable proportioning system per S5.5.1(b), letters and background contrasting colors one of which is yellow? Record colors <u>Lens - Black, Letters - Amber or yellow</u> Does indicator say "Antilock" or "ABS" or "Brake Proportioning"? Record wording <u>"ABS and symbol"</u> 4. Parking brake per S5.5.1(c), does indicator say "Park" or "Parking Brake"? Record wording <u> </u> 5. Brake lining wear-out per S5.5.1(d), does indicator say "Brake Wear"? Record wording <u>NA</u> 6. For any other function? If yes, Record <u>NA</u>	NA NA Yes Yes NA NA NA	X	

Comments: None.

Technician: K. Easterday

DATA SHEET 31 (Part 1 of 2)
CALCULATION OF MINIMUM RESERVOIR VOLUME REQUIREMENTS
VEHICLE: 2004 Toyota Prius HSD; NHTSA NO.: C45107; DATE: 08/11/04

BRAKE		LINING		
LOCATION	TYPE	DESCRIPTION	MINIMUM THICKNESS	THICKNESS TO FULLY WORN (1) mm*
Left Front	Drum	Leading	Pre-test 10.74 mm	1 mm
		Primary	Post Test 9.98 mm	
		Inboard X	Δ 0.76 mm	
	Disc X	Trailing	Pre-test 10.77 mm	1 mm
		Secondary	Post Test 9.65 mm	
		Outboard X	Δ 1.12 mm	
LINING CLEARANCE:	Diametrical (2): N/A	Inboard – Approx. 0 mm.	Outboard – Approx. 0 mm.	
WHEEL CYLINDER DIAMETER (3): N/A		CALIPER PISTON DIAMETER (3): 53.92 mm (x1 piston)		
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 3.84 mm	1 mm
		Primary	Post Test 3.76 mm	
		Inboard	Δ 0.08 mm	
	Disc	Trailing X	Pre-test 3.89 mm	1 mm
		Secondary	Post Test 3.86 mm	
		Outboard	Δ 0.03 mm	
LINING CLEARANCE:	Diametrical (2) – 0.5 mm	Inboard – Not Appl.	Outboard – Not Appl.	
WHEEL CYLINDER DIAMETER (3): 19.02 mm		CALIPER PISTON DIAMETER (3): Not Appl.		
SHOE CAGE DIAMETER (4): 199.29 mm		CENTER POINT OF BRAKE ASSY TO CENTER PT. OF W.C.: 76.2 mm		
CIRCUIT #1 CONSISTS OF:	LF	LR - X	RF - X	RR
CIRCUIT #2 CONSISTS OF:	LF - X	LR	RF	RR - X
(1) MFRS. RECOMMENDATIONS – 1 mm front & 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: 199.80 mm				
(3) MFRS. DATA: Front: 54 mm; Rear 19.05 mm.				
(4) RESET POSITION: 199.29 mm				

Comments: Manufacturer's stated new lining thickness: Frt.: 11mm; Rear 4 mm.
 Technician: K. Easterday

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

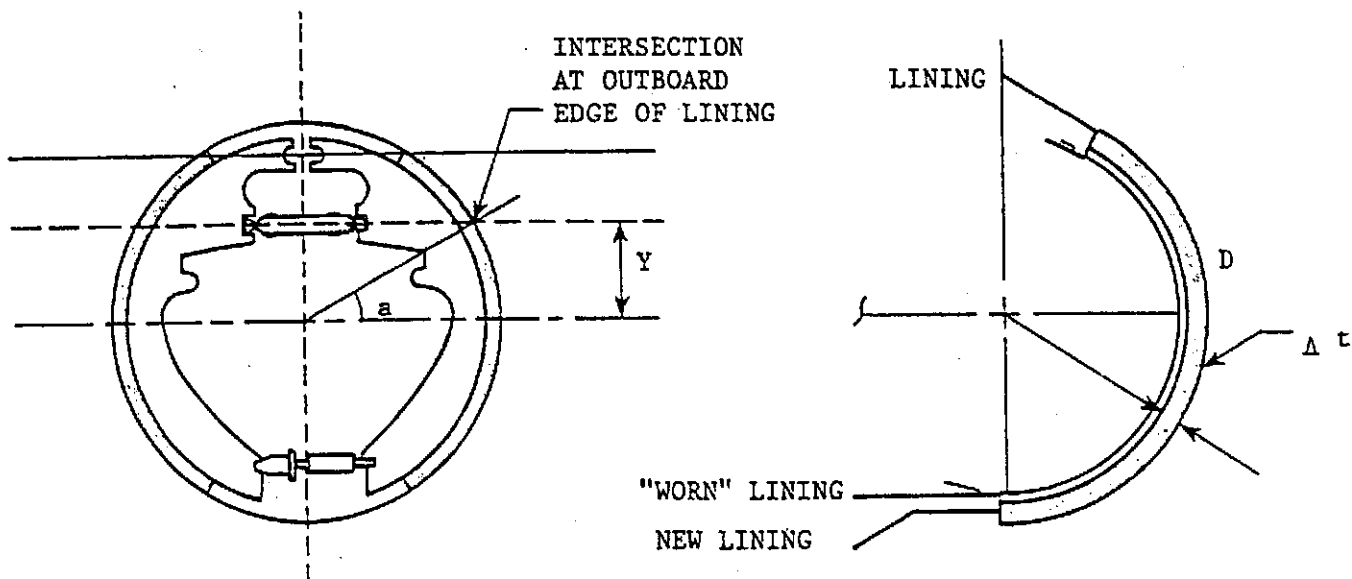
Vehicle: 2004 Toyota Prius HSD;

NHTSA No.: C45107;

Date: 08/31/04

Procedure and Example for Determining Master Cylinder Volume Requirement

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

Procedure and Calculations for Determining Master Cylinder Volume Requirement, (Contd')

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

$$C = 0.5 \text{ mm} \quad a = \sin^{-1} \frac{2Y}{D} \quad Y = 76.2 \text{ mm} \quad A = \frac{\pi d^2}{4}$$
$$D = 199.29 \text{ mm}$$

$$\Delta t_p = 3 \text{ mm}$$

$$\Delta t_s = 3 \text{ mm} \quad \sin^{-1} \frac{2(76.2)}{199.29} = 49.162^\circ \quad A = \frac{\pi(19.05 \text{ mm})^2}{4} = 285.023 \text{ mm}^2$$

$$V_r = \frac{2(0.25) + 3 + 3 (285.023)}{\cos 49.162^\circ} = 10.087 (285.023)$$

$$V_r = 2875.1 \text{ mm}^3 = 2.88 \text{ ml}$$

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

Where: V_r = Volume required per wheel
 Δt = Change in thickness (average)
 i = Inboard
 o = Outboard
 d = Caliper cylinder diameter
 C = Average radial drum-to-lining clearance

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

$$\Delta t_i = 10 \text{ mm}$$

$$\Delta t_o = 10 \text{ mm}$$

$$t_{ic} + t_{oc} = 0 \text{ mm}$$

$$d = 54.0 \text{ mm}$$

$$V_r = (10 + 0 + 10 + 0) \frac{\pi(54.0)^2}{4}$$

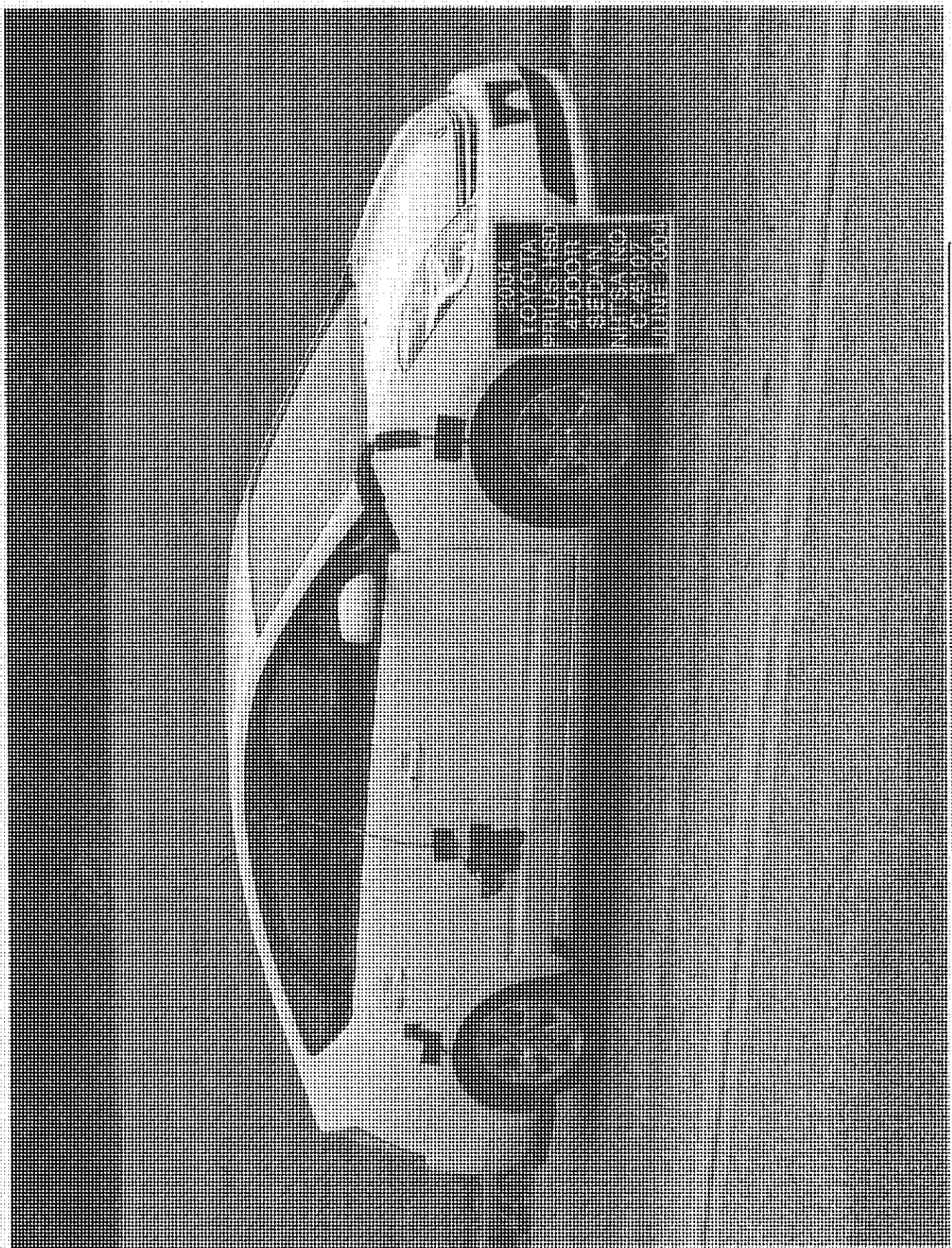
$$= 20 (2290.22)$$

$$= 45804.4 \text{ mm}^3 = 45.80 \text{ ml}$$

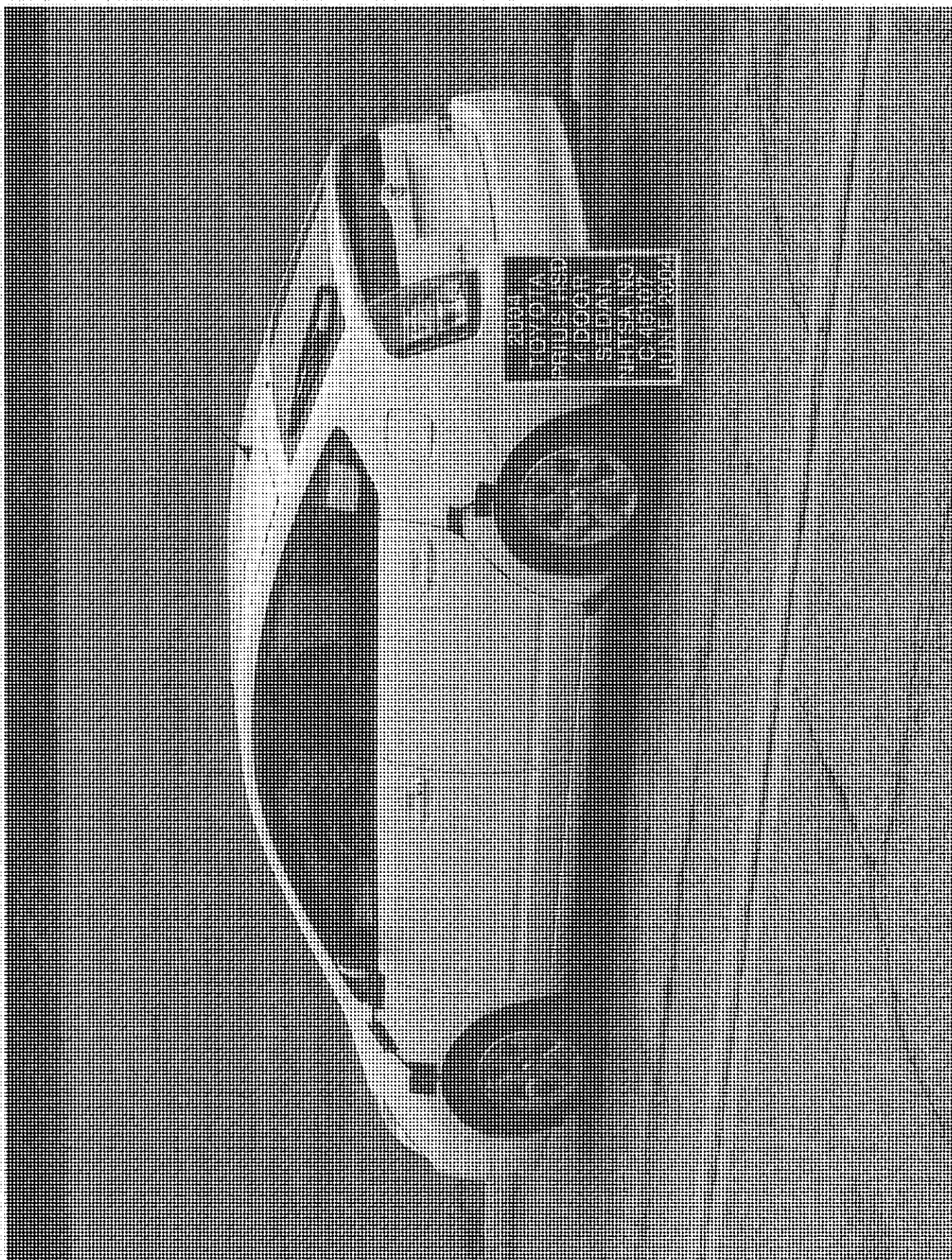
$$\text{Total Volume required } 2(45.80) + 2(2.88) = 97.4 \text{ ml}^*$$

SECTION 6.0

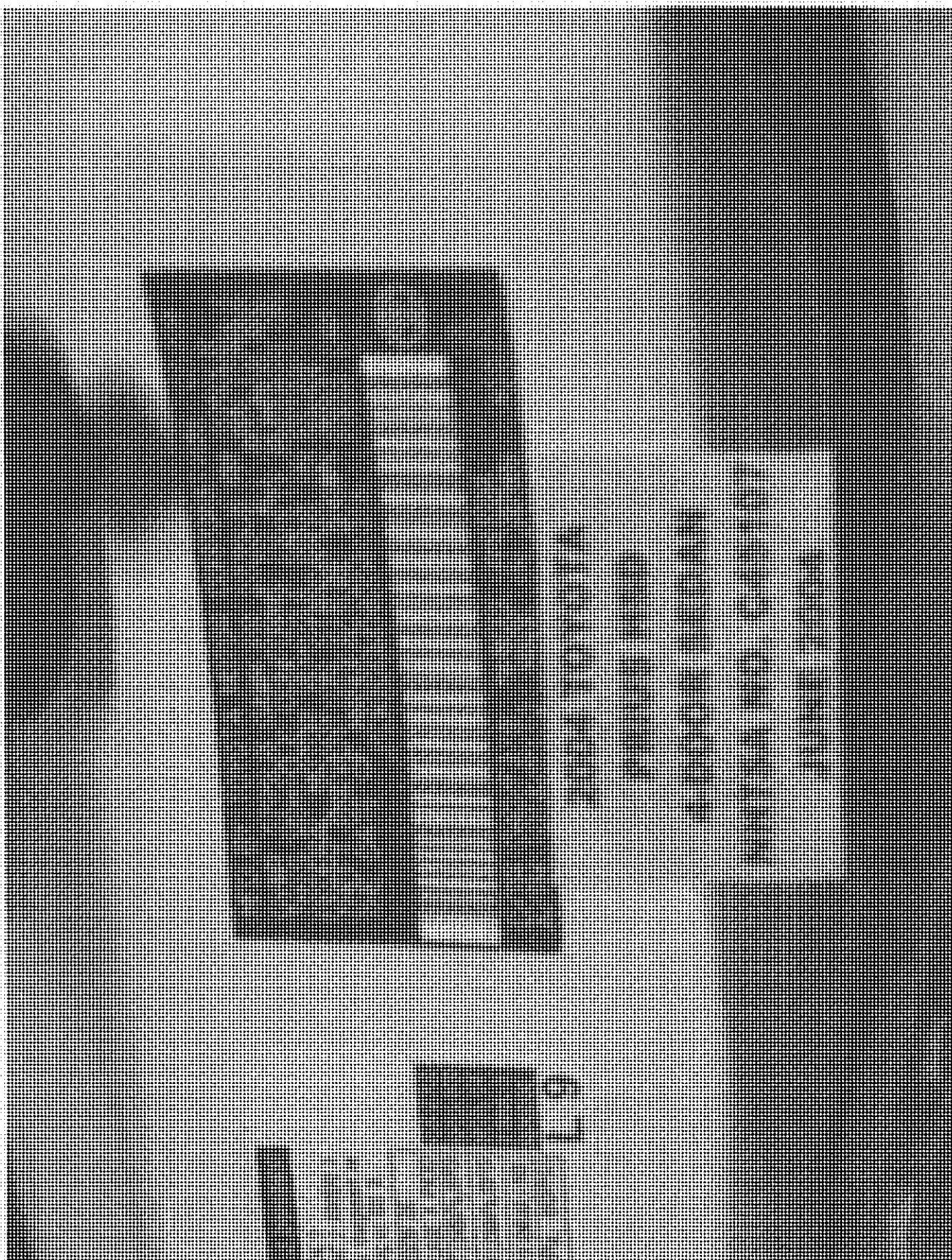
Photographs



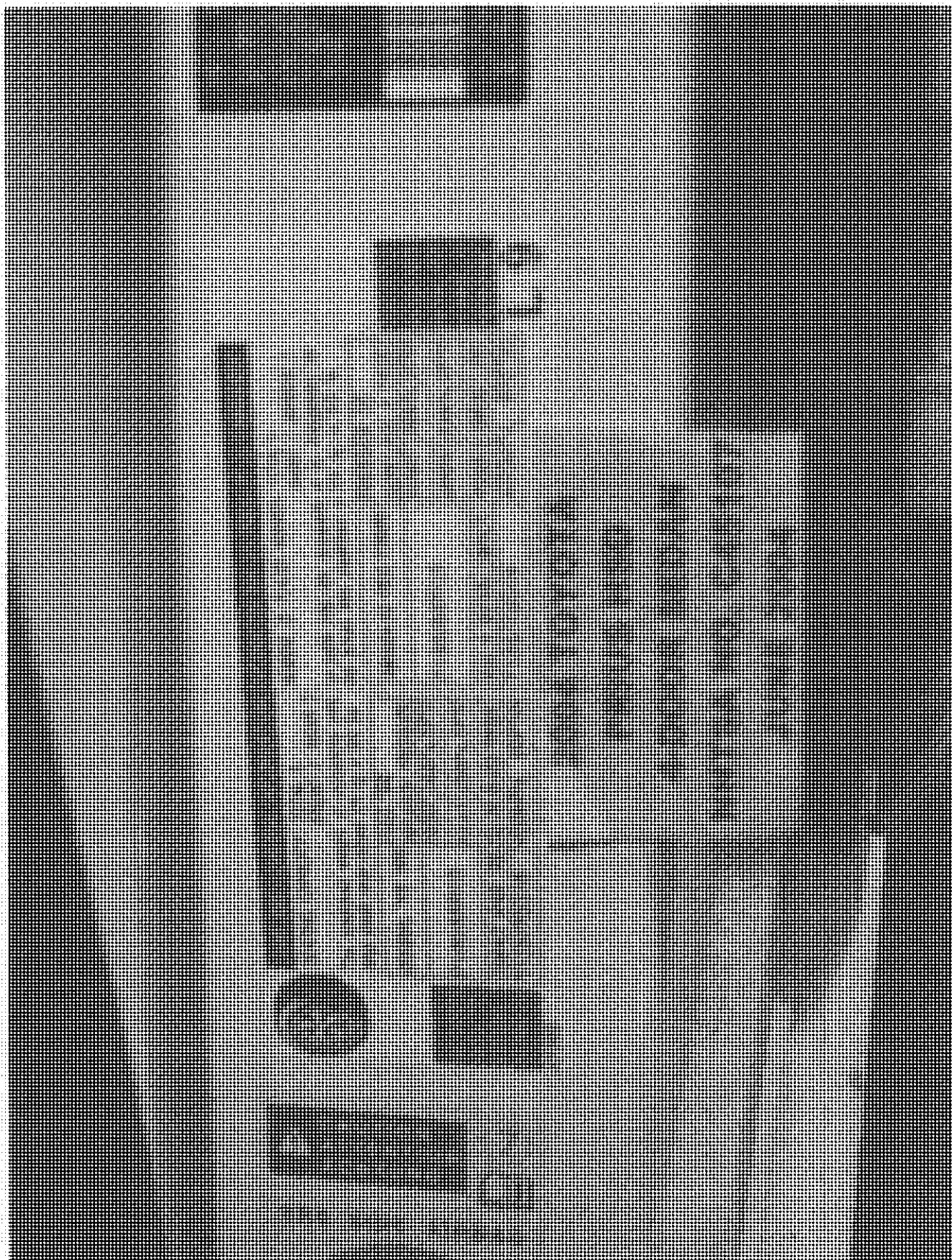
3/4 Front View @ GVWR



3/4 Rear View @ CVMH



Manufacturer's Information Placard



Fire Information Placard

2004 TOYOTA
PRIUS HSD
4-DOOR SEDAN
NHTSA NO. C45107
JUNE 2004

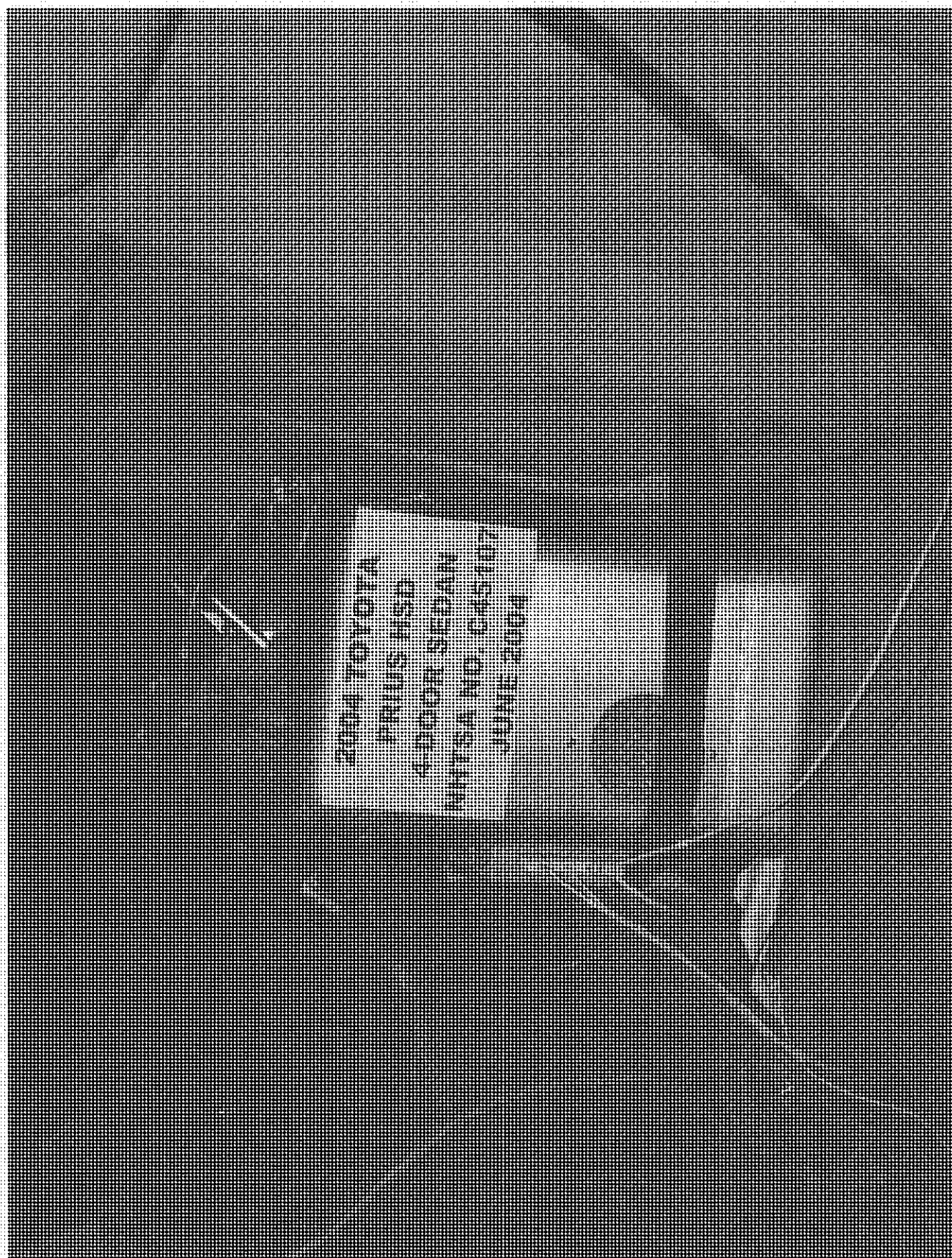
LEFT
FRONT

Left Front Rear Brake Assembly

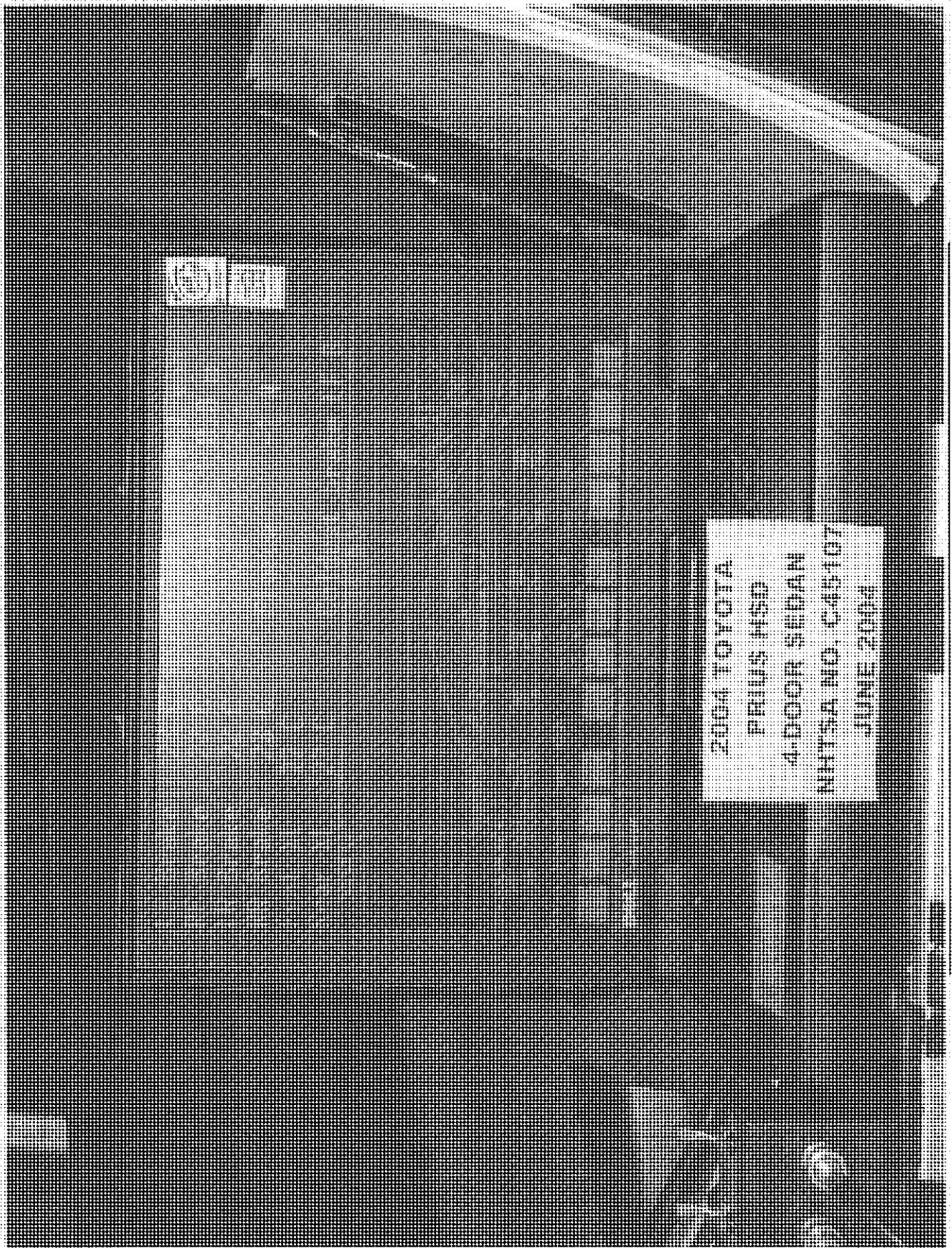
2004 TOYOTA
PRIUS HSD
4-DOOR SEDAN
NHTSA NO. C45107
JUNE 2004

RIGHT
CLEAN

Right: Rear Brake Assembly



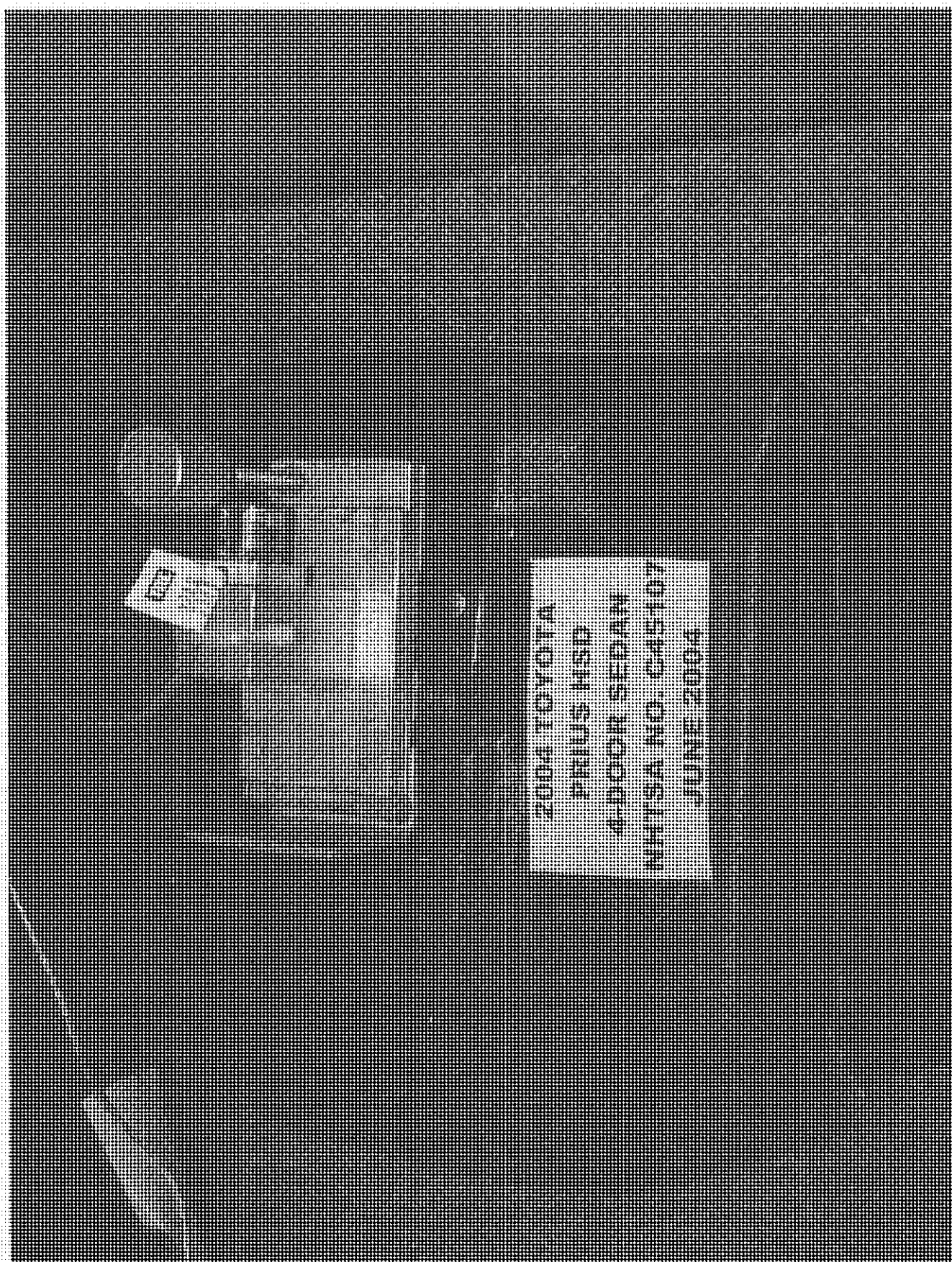
Instrumentation in Vehicle



1501

2004 TOYOTA
PRIUS HSD
4-DOOR SEDAN
NH15A NO. C45107
JUNE 2004

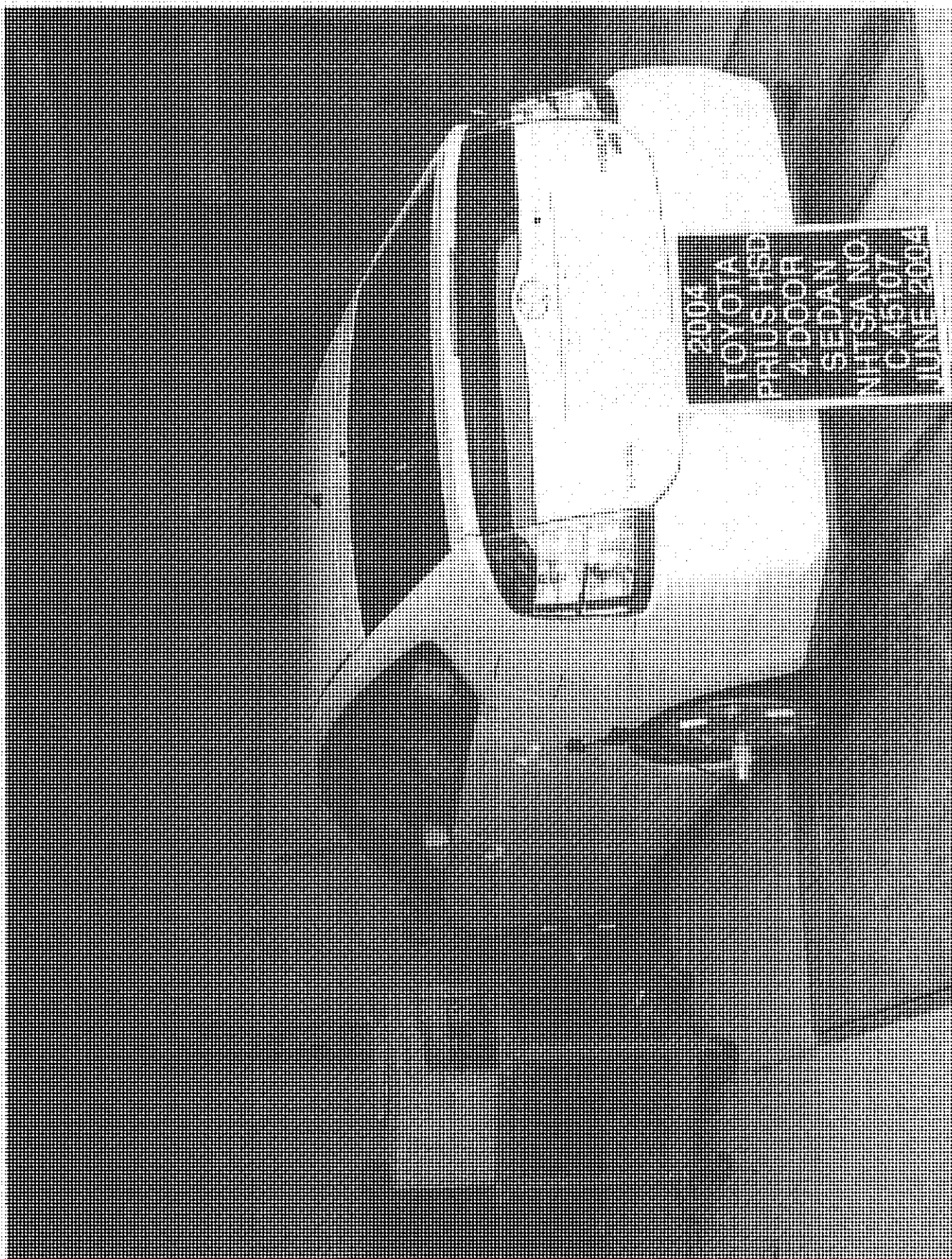
Instrumentation in Vehicle



Instrumentation in Vehicle

2004 TOYOTA
PRIUS HSD
4-DOOR SEDAN
NHTSA NO: C45107
JUNE 2004

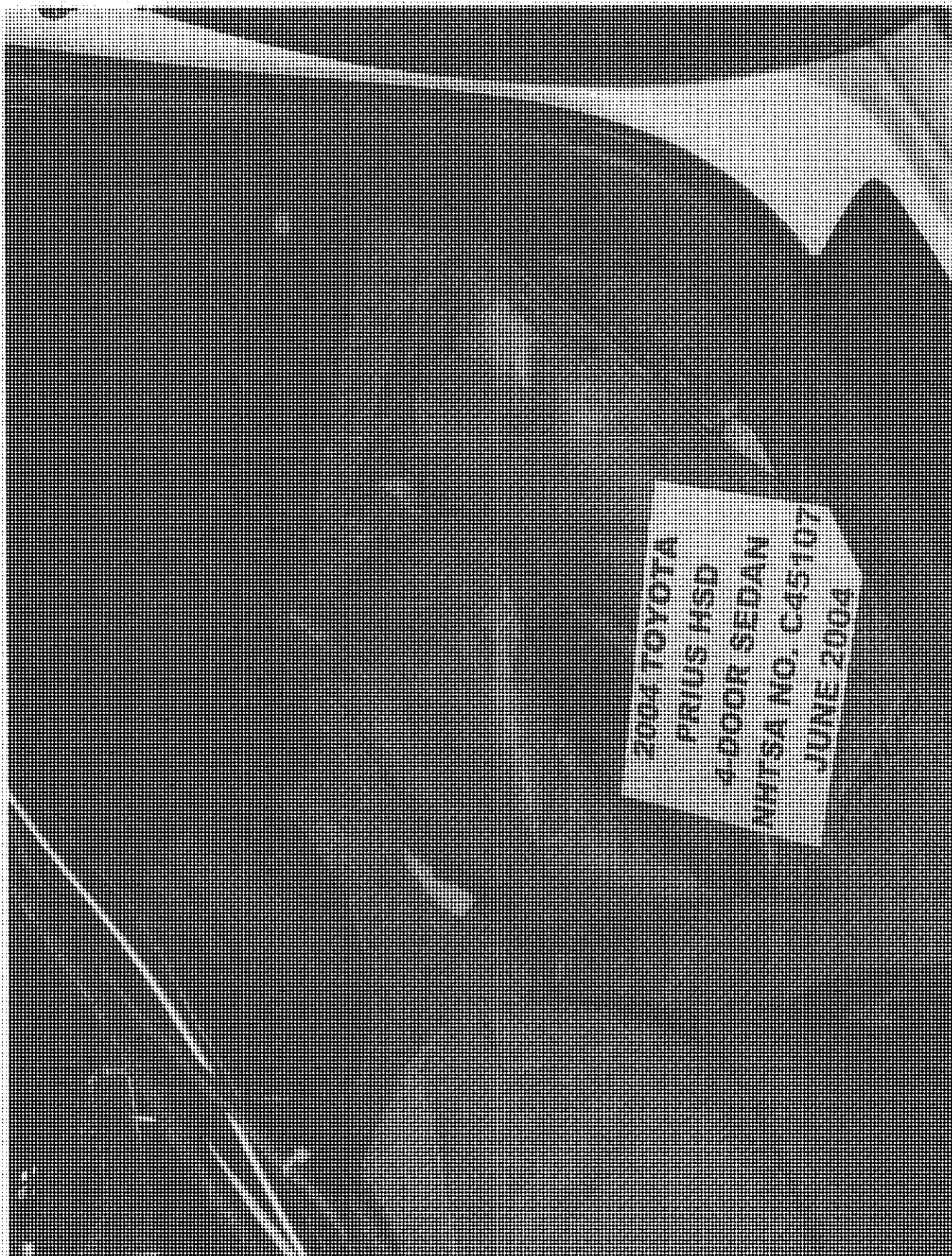
Instrumentation in Vehicle



Vehicle Being Weighed

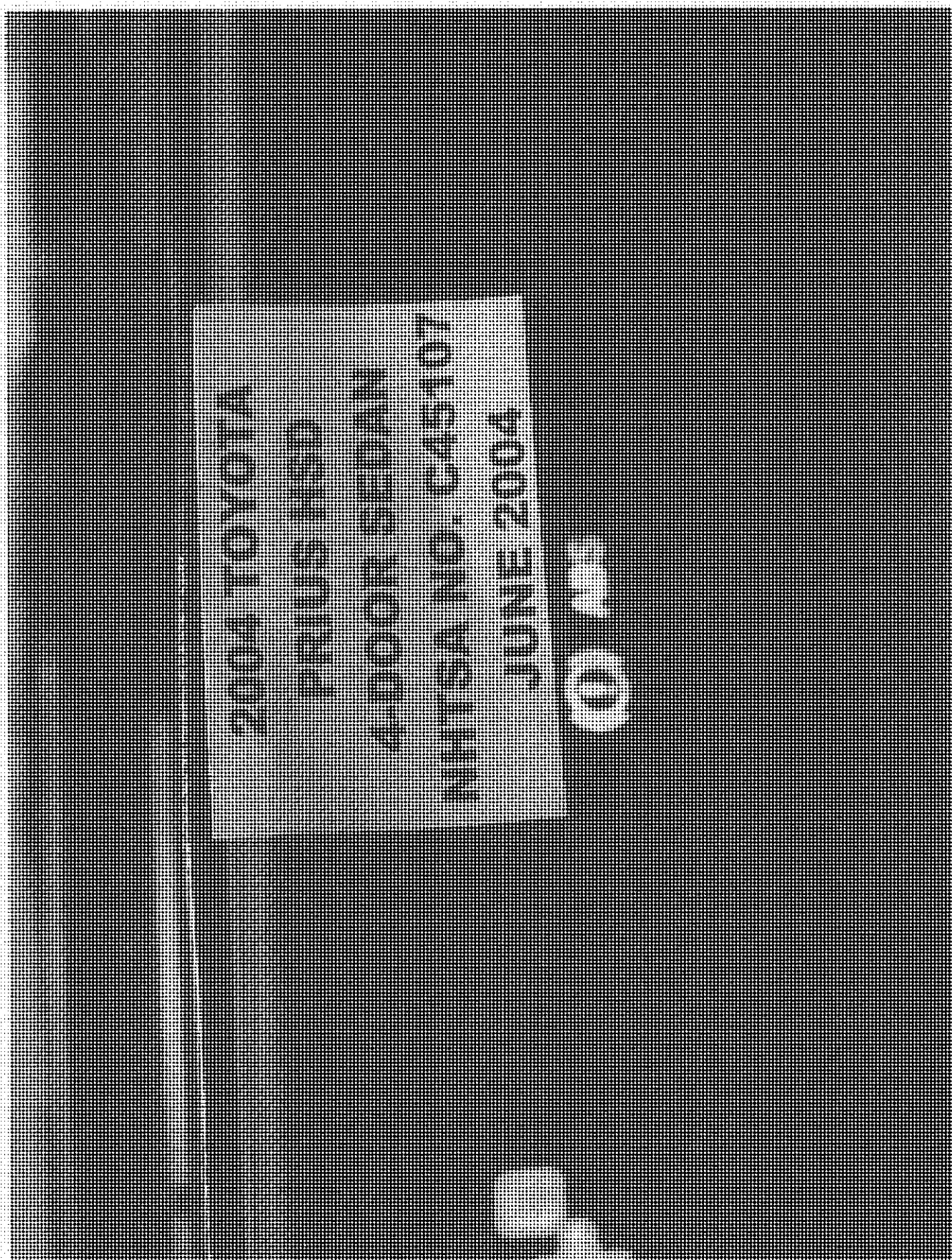


Ballast in Vehicle

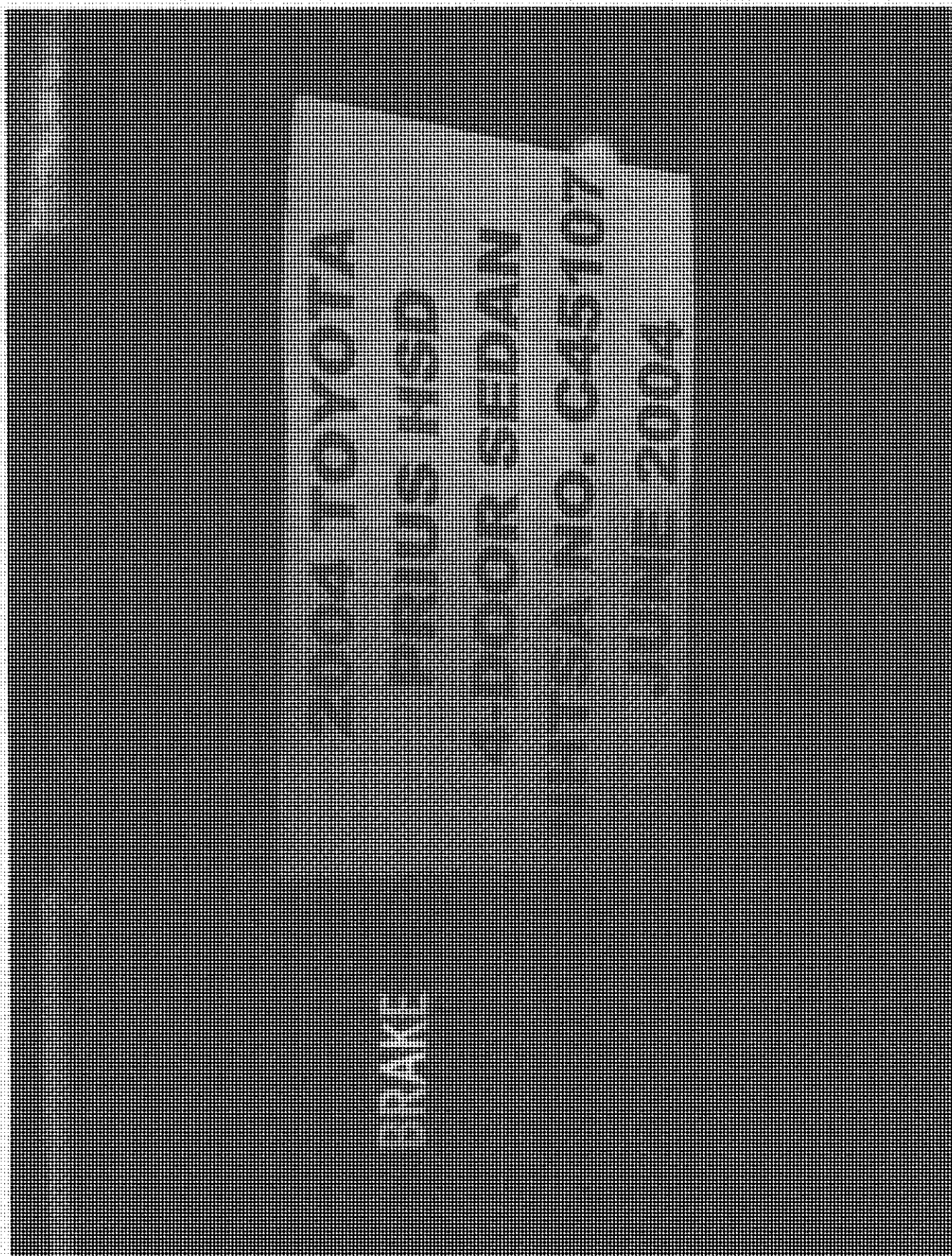


2004 TOYOTA
PRIUS HSD
4-DOOR SEDAN
NHTSA NO. C45107
JUNE 2004

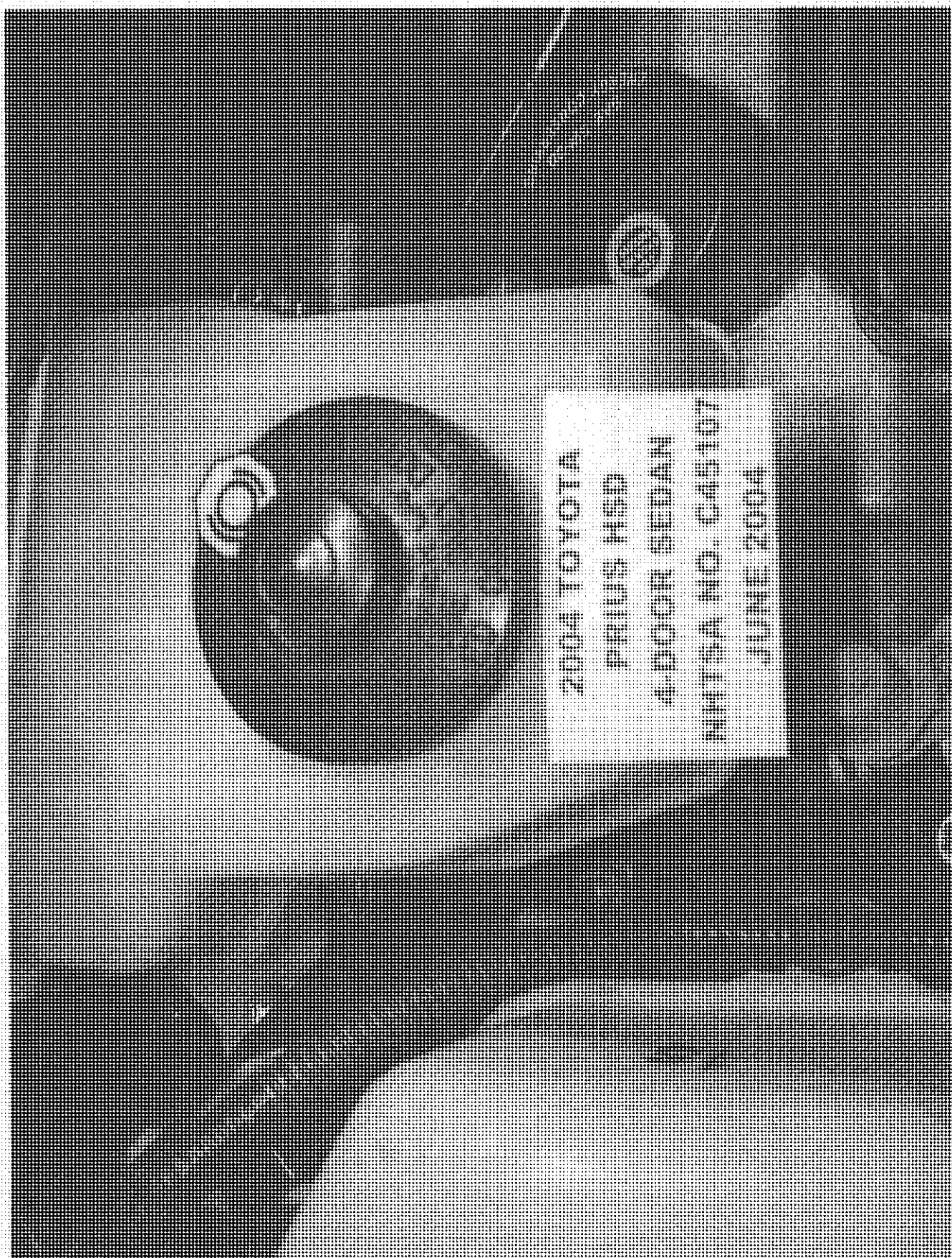
Exhibit in Vehicle



ABS Warning Lamp



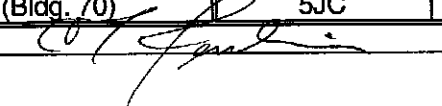
Brake Warning Lamp



Brake Fluid Reservoir Label

7.0 INSTRUMENT CALIBRATION (12 MONTH MAXIMUM INTERVAL)
VEHICLE: 2004 Toyota Prius HSD; NHTSA NO.: C45107; DATE: 06/22/04

INSTRUMENT	SERIAL NUMBER	CALIBRATION DATE	NEXT CALIBRATION
Data Acquisition System - Link DAS 2030	975016	10/23/03	10/23/04
Computer - Dell Latitude/Link 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	WXB308193A	09/15/03	09/15/04
Ambient Temp. Gage - Davis Model 6320	WXB308193A	09/15/03	09/15/04
LF Brake Thermocouple - Temprel/Link	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
Vehicle Weight - Toledo/Mettler Scales JAGXTREME 3000000, (Bldg. 70)	SN 5225831- 5JC	05/06/04	08/06/04

QUALITY ASSURANCE 

DAILY CALIBRATIONS (1 of 3)

Vehicle: 2004 Toyota Prius HSD

NHTSA No.: C45107

Deceleration Calibration Data for Unit 4358

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"
6/24/2004	14:07:51	0.06	9.80
6/25/2004	8:43:45	-0.07	9.81
6/30/2004	8:59:39	0.00	9.82
6/30/2004	15:26:26	-0.03	9.79
7/1/2004	8:45:39	0.01	9.75
7/1/2004	14:57:04	-0.04	9.88
7/8/2004	16:17:34	-0.02	9.82
7/13/2004	9:31:13	0.02	9.74
7/13/2004	15:27:43	-0.01	9.90
7/15/2004	9:41:59	-0.06	9.83
7/15/2004	15:48:16	0.07	9.72
7/16/2004	11:12:14	0.00	9.80
7/16/2004	15:48:14	0.02	9.76
7/21/2004	13:13:36	-0.08	9.82
7/26/2004	11:03:53	0.08	9.83
8/2/2004	8:33:37	0.06	9.79
8/2/2004	16:05:53	0.02	9.79
8/3/2004	8:56:01	0.01	9.81
8/3/2004	9:49:11	-0.01	9.87
8/3/2004	9:49:39	-0.01	9.81

PRE-TEST CAL.

POST-TEST CAL.

Pre-Test Linearity Check 06/24/04

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

Post-Test Linearity Check 08/03/04

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

Distance Calibration Data for Unit 4358

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
6/24/2004	15:12:34	1000.4
6/25/2004	8:49:46	1000.3
6/30/2004	9:10:33	1001.1
6/30/2004	15:30:43	1000.5
7/1/2004	8:52:18	1001.6
7/1/2004	15:02:50	1000.2
7/13/2004	9:39:38	1000.7
7/13/2004	15:32:53	1001.2
7/15/2004	9:49:40	1001.1
7/15/2004	15:54:26	999.8
7/16/2004	11:17:18	1000.7
7/16/2004	15:52:29	1000.6
7/21/2004	13:20:49	1000.4
7/26/2004	11:09:55	1001.2
8/2/2004	8:38:00	1001.2
8/2/2004	16:10:04	1000.9
8/3/2004	9:01:05	1001.8
8/3/2004	9:54:46	1001.3

PRE-TEST CAL.

POST-TEST CAL.

DAILY CALIBRATIONS CONTINUED (2 of 3)

VEHICLE: 2004 Toyota Prius HSD

NHTSA No.: C45107

Wheel Tachometer Calibrations for Unit 4358

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

Wheel lock
detector

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

"Date"	"Time"	Zero	@ 15km/h	Zero	@ 15km/h	Zero	@ 15km/h	Zero	@ 15km/h
stp	stp	LF	LF	RF	RF	LR	LR	RR	RR
6/30/2004	9:05:57	0.0	17.6	-0.1	19.7	0.0	15.8	-0.9	23.5
6/30/2004	15:29:05	-0.1	17.4	-0.1	20.9	-0.1	16.1	-0.1	0.1
7/1/2004	10:08:46	-0.1	16.7	-0.1	18.8	0.0	16.7	0.0	22.8
7/1/2004	15:01:58	0.0	16.5	-0.1	16.4	-0.1	27.9	0.0	22.3
7/13/2004	9:35:31	0.0	17.0	0.0	17.3	0.0	16.6	0.0	22.2
7/13/2004	15:31:56	-0.1	17.5	-0.1	15.5	0.0	17.4	0.0	29.3
7/15/2004	9:45:04	0.0	17.2	-0.1	14.5	0.0	17.5	-23.9	36.0
7/15/2004	15:50:33	0.0	16.7	-0.1	13.9	0.0	20.7	0.0	18.9
7/16/2004	11:16:03	-0.1	16.7	-0.1	13.5	0.0	16.5	0.0	22.2
7/16/2004	15:51:43	0.0	16.7	-0.1	10.5	0.0	16.6	0.0	19.5
7/21/2004	13:16:30	0.0	16.9	-0.1	11.2	0.0	17.8	0.0	22.8
7/26/2004	11:05:53	0.0	17.5	-0.1	4.9	0.0	19.9	0.0	22.7
8/2/2004	8:36:50	0.0	17.1	-0.1	37.0	0.0	23.0	0.5	21.2
8/2/2004	16:09:09	0.0	17.0	-0.1	36.1	0.0	22.6	-0.8	23.4
8/3/2004	8:59:58	0.0	16.4	-0.1	33.4	0.0	23.2	-0.8	19.3
8/3/2004	9:53:29	0.0	16.9	-0.2	34.9	-0.1	20.7	-1.2	21.7

PRE-TEST CAL.

POST-TEST CAL.

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?: X Yes, No.

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

Pedal Force Meter Calibration for Unit 4358

Target shunt calibration is 388 N

Desired recorded value is: 388 N

Desired recorded calibration value is: 500 N

Allowed deviation is: 6.5 N

Service brk.
pedal effort

Driver
engages a
fixed shunt
cal switch.

"Date"	"Time"	Zero	Cal Val
stp	stp	Force	Force lb
6/24/2004	14:04:54	-0.3	500.3
6/25/2004	8:42:20	-0.2	388.2
6/30/2004	8:58:26	-0.4	388.3
6/30/2004	15:24:57	0.0	388.6
7/1/2004	8:45:12	-0.9	388.6
7/1/2004	14:56:37	-0.5	388.8
7/13/2004	9:31:54	-0.5	388.5
7/13/2004	15:28:07	0.1	388.8
7/15/2004	9:41:37	-0.3	388.5
7/15/2004	15:48:37	-7.6	388.5
7/16/2004	11:11:52	-0.3	388.6
7/16/2004	15:46:29	-0.4	388.6
7/21/2004	13:13:58	-0.3	388.6
7/26/2004	11:02:19	-4.4	388.9
8/2/2004	8:32:49	-7.0	388.3
8/2/2004	16:04:05	-0.1	388.7
8/3/2004	8:55:13	-0.2	388.8
8/10/2004	8:58:04	-0.5	497.0

PRE-TEST CAL.

POST-TEST CAL.

Pre-Test Linearity Check - 06/24/04

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

Post-Test Linearity Check - 08/03/04

Actual	Recorded
Force (N)	Force (N)
0	0
222	221
445	443
498	497

DAILY CALIBRATIONS CONTINUED (3 of 3)

VEHICLE: 2004 Toyota Prius HSD

NHTSA No. C45107

Dynamic Speed Calibration for Unit 4358

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
6/24/2004	15:16:09	100.6	36.00
6/25/2004	8:47:34	100.2	36.12
6/30/2004	9:08:16	100.1	36.28
6/30/2004	15:28:14	100.4	36.15
7/1/2004	8:50:18	100.2	36.18
7/1/2004	15:00:46	100.3	36.15
7/13/2004	9:37:38	100.8	35.96
7/13/2004	15:30:15	100.4	36.04
7/15/2004	9:47:26	100.0	36.30
7/15/2004	15:52:30	100.2	36.06
7/16/2004	11:14:34	100.3	36.14
7/16/2004	15:50:08	100.2	36.11
7/21/2004	13:18:31	100.6	35.91
7/26/2004	11:07:57	100.5	36.11
8/2/2004	8:35:19	100.0	36.21
8/2/2004	16:07:33	100.3	36.19
8/3/2004	8:58:19	100.8	35.96
8/3/2004	9:51:33	100.1	36.22

PRE-TEST CAL.

POST-TEST CAL.

APPENDIX A

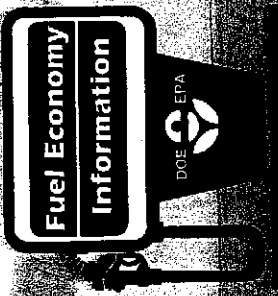
Copy of Manufacturer's Sticker



- 16-Valve 3.0L I-6 Engine w/ 24-Valve V6
 - Electronic Controlled (ECVT) Transmission
 - MacPherson Strut Front Suspension
 - Torsion Beam Rear Suspension
 - 18" Alloy Wheels w/ P185/85R15 Tires
 - Temporary Spare Tire
 - Front Disc (14") and Rear Drum
- SAFETY**
- Dr & Fr Pass Dual Stage Airbags (SRS)
 - Traction Control (TRAC)
 - ABS w/Elec Brake Force Dist & Assist
 - 3 Point Seatbelts w/ALR/ELR Pass Belts
 - Side-Impact Door Beams
 - Child Restraint System (Latch)
- EXTERIOR**
- Multi-Reflect Halogen Auto Off Headlamps
 - Dual Side and Pwr Htd Outside Mirrors
 - Solar Energy Absorbing Glass
 - Rear Spoiler

- Fabric Cloth Interior
- Adjustable Steering Wheel
- Center Console w/Storage
- Front Map Lights
- **Full Tank of Gas**

Compare this vehicle to others in the FREE FUEL ECONOMY GUIDE available at the dealer.



CITY MPG
60

HIGHWAY MPG
51

2004 PRIUS
4-Cylinder 158 HP
2.4L DOHC 16-Valve
Automatic Variable Gear
Ratio Transmission

Estimated Annual Fuel Cost
\$ 283

Estimated Annual Fuel Cost
\$ 283

Estimated Annual Fuel Cost
\$ 283

Estimated Annual Fuel Cost
\$ 283

see www.fueleconomy.gov

MANUFACTURER'S SUGGESTED RETAIL PRICE
OPTIONAL EQUIPMENT

50 State Emissions Package #8 includes Rear Int Wiper, Driver & Passenger Side & Curtain Airbags, Smart Entry & Start, Carpet Floor Mats & Cargo Mat, Rear Bumper Applique

\$19,995.00

1,280.00

184.00

65.00

DELIVERY, PROCESSING AND HANDLING FEE

515.00

TOTAL

\$22,039.00

Dealer Name/Address: **GERMAIN TOY OF COLUMBUS**
5777 SCARBOROUGH BLVD
COLUMBUS OH 43232

Ship to:



WC 1098

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 C45107.

For all recorded decelerations:

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

For Data Sheets 16 & 22 – Antilock Functional Failure at LLVW and GVWR, respectively, the ABS and the Electronic Brake Distribution (EBD) - Variable Proportioning - are integral. Failing the ABS also fails the EBD. The EBD cannot be failed separately. Therefore, Data Sheets 17 and 23 are not included. Additionally, the ABS failures were not by the usual fuse removal methods (many fuses – complex) but by disconnecting the LR wheel speed sensor. Initially, the warning lamp could not be “cleared” after the sensor was reconnected. However, the manufacturer sent instructions through the NHTSA Standard’s Engineer and, after implementation of the instructions, the warning lamp was cleared.

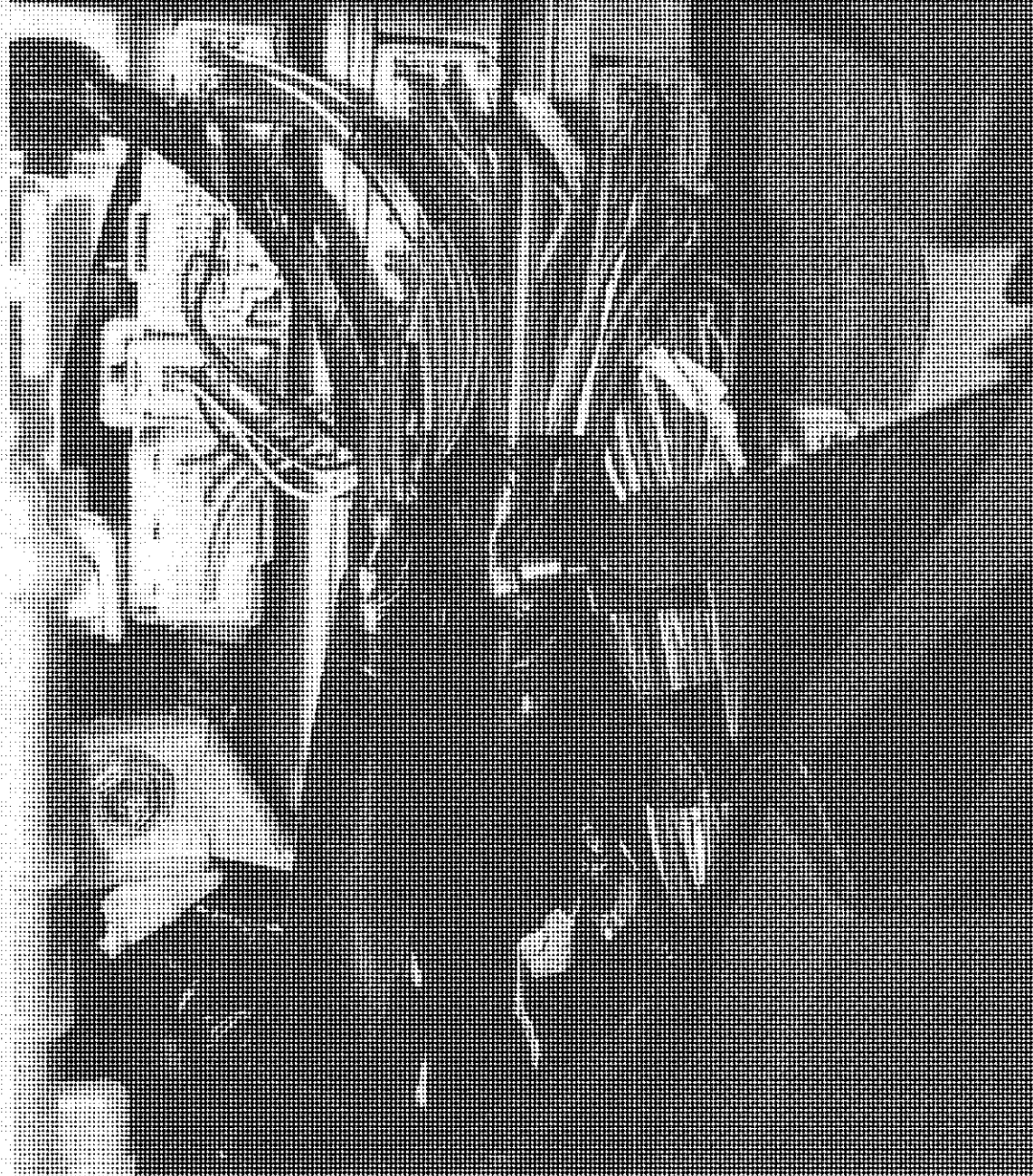
For Data Sheets 18 through 21, the Hydraulic Circuit Failures, the tests were performed in the following order: Data Sheet 18, 20, 19 and 21. This was due to the difficult accessibility of accessing the master cylinder output ports. Additionally, through observation of the brake temperatures at the end of a stop, it appears as though the vehicle’s brake distribution was more analogous to a “triagonal” rather than a diagonal split. One of the front brakes would be non-functional, however, both rear brakes appeared to function.

For Data Sheet 22a, Regenerative Braking System (RBS) Failure, six additional stops utilizing the parameters in the Cold Effectiveness @ GVWR were utilized. This method was used because, in the case of the Prius (C45107) when 'neutral gear is selected, the RBS is effectively removed/non-functional. The vehicle's driveline must be engaged for the RBS to function.

For Data Sheet 22b, Electromotive Force (EMF) – Battery Failure, The manufacturer, through the Standard's Engineer, sent diagrams indicating wires that were to be stripped then "jumped" one to the other. Due to the smallness of the wires themselves and the compaction and close proximity two other multi-wire connectors (see following photo), much time and effort were taken attempting to produce this failure mode. Once a color-coded schematic was obtained, the appropriate wires were found the failure mode produced.

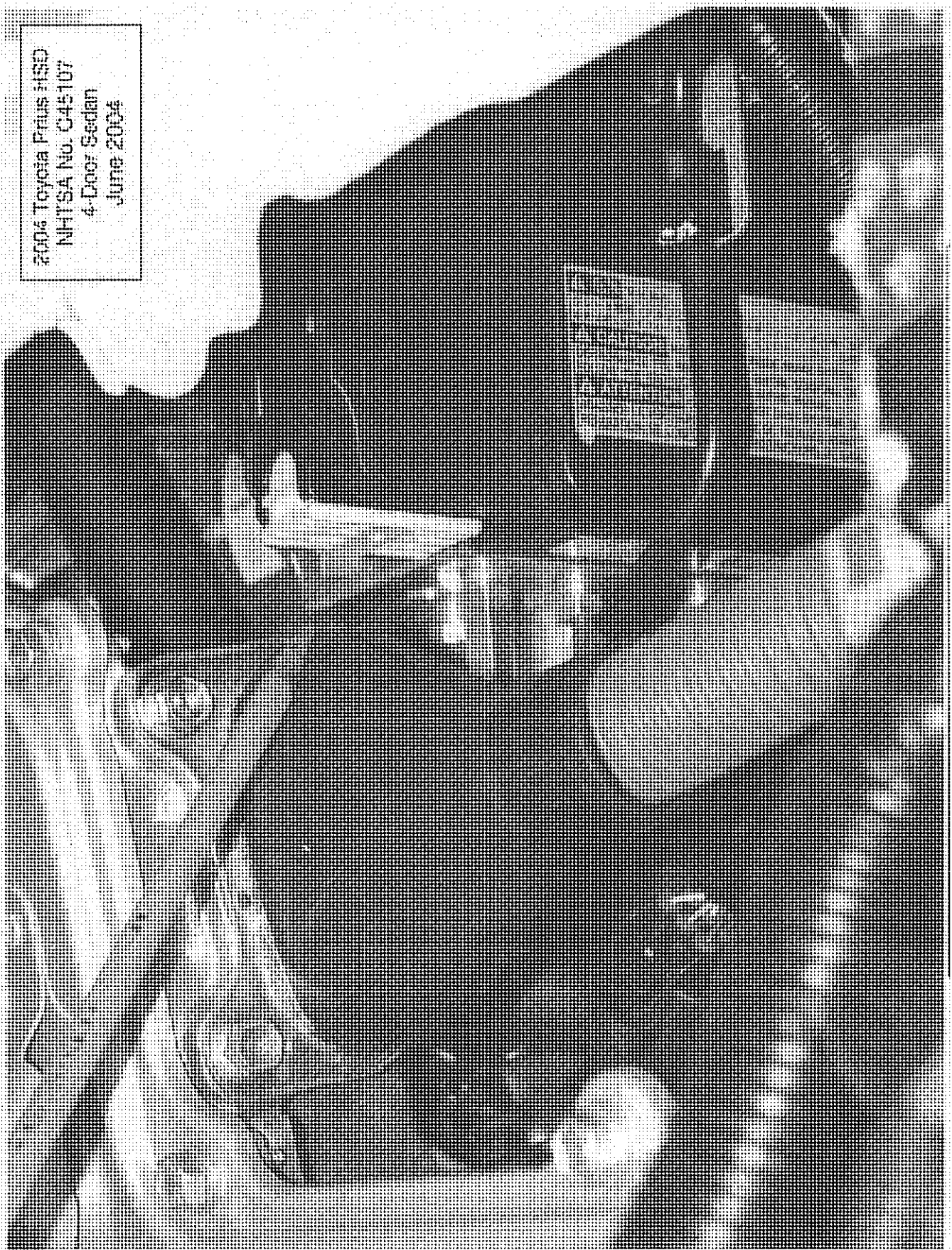
For Data Sheet 24, Power Brake Unit or Brake Power Assist Unit Inoperative @ GVWR, initially the multi-wire connector powering the electric hydraulic pump that energized the accumulator could not be disconnected (see following photos). After discussions with the Standard's Engineer, the manufacturer provided instructions to disconnect the multi-wire connector. This proved to be involved necessitating removing ballast and accessing the battery pack. Then components under the hood immediately adjacent to the multi-wire connector had to be disassembled and moved so the multi-wire connector could finally be disconnected. This scenario was repeated in reverse order so that the connector could be restored to its original orientation.

2006 Toyota Prius 1.8D
NH7SA No. C45107
4-Door Sedan
June 2006



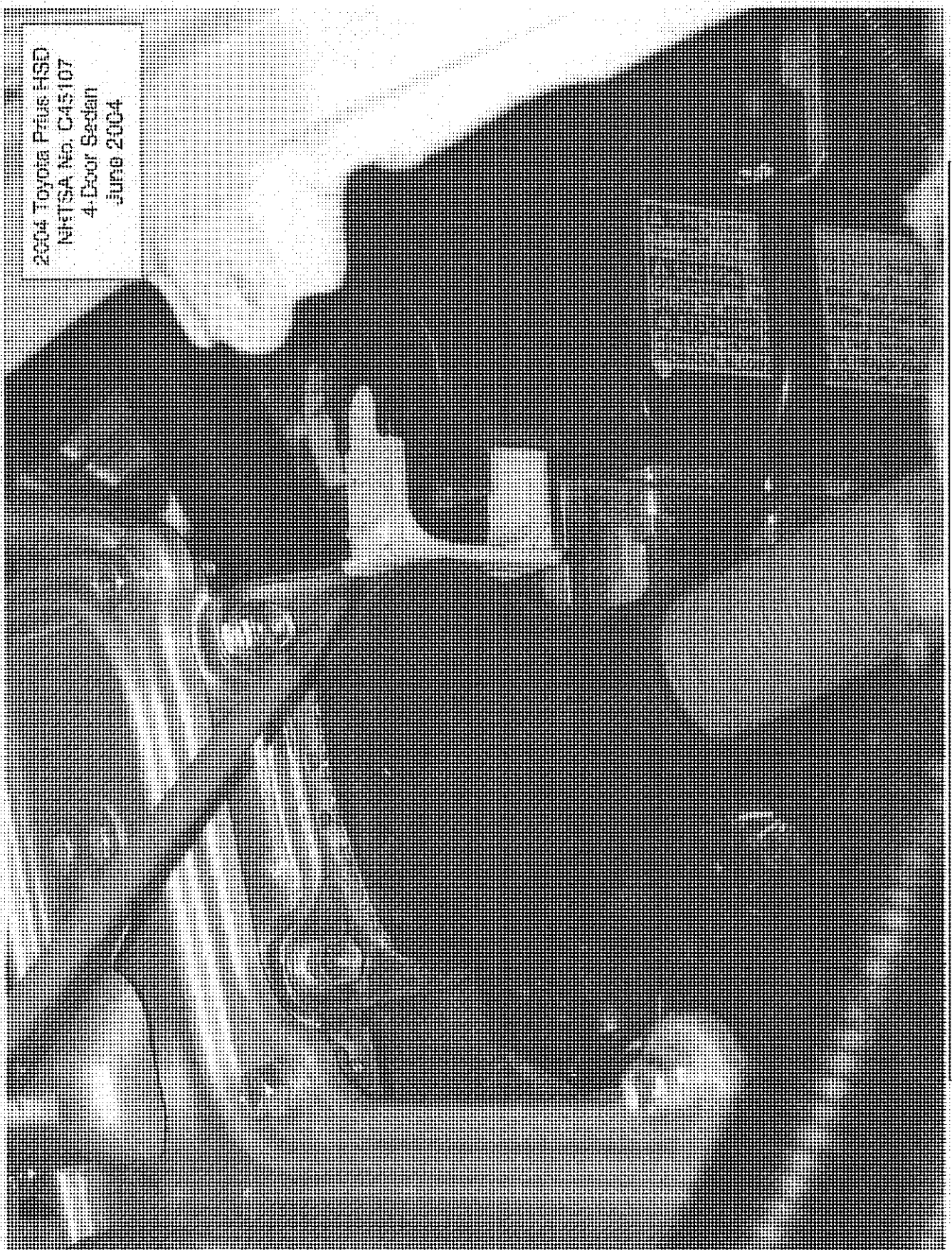
ECU's Wire Connectors

2006 Toyota Prius HSD
NHTSA No. C45107
4-Door Sedan
June 2006



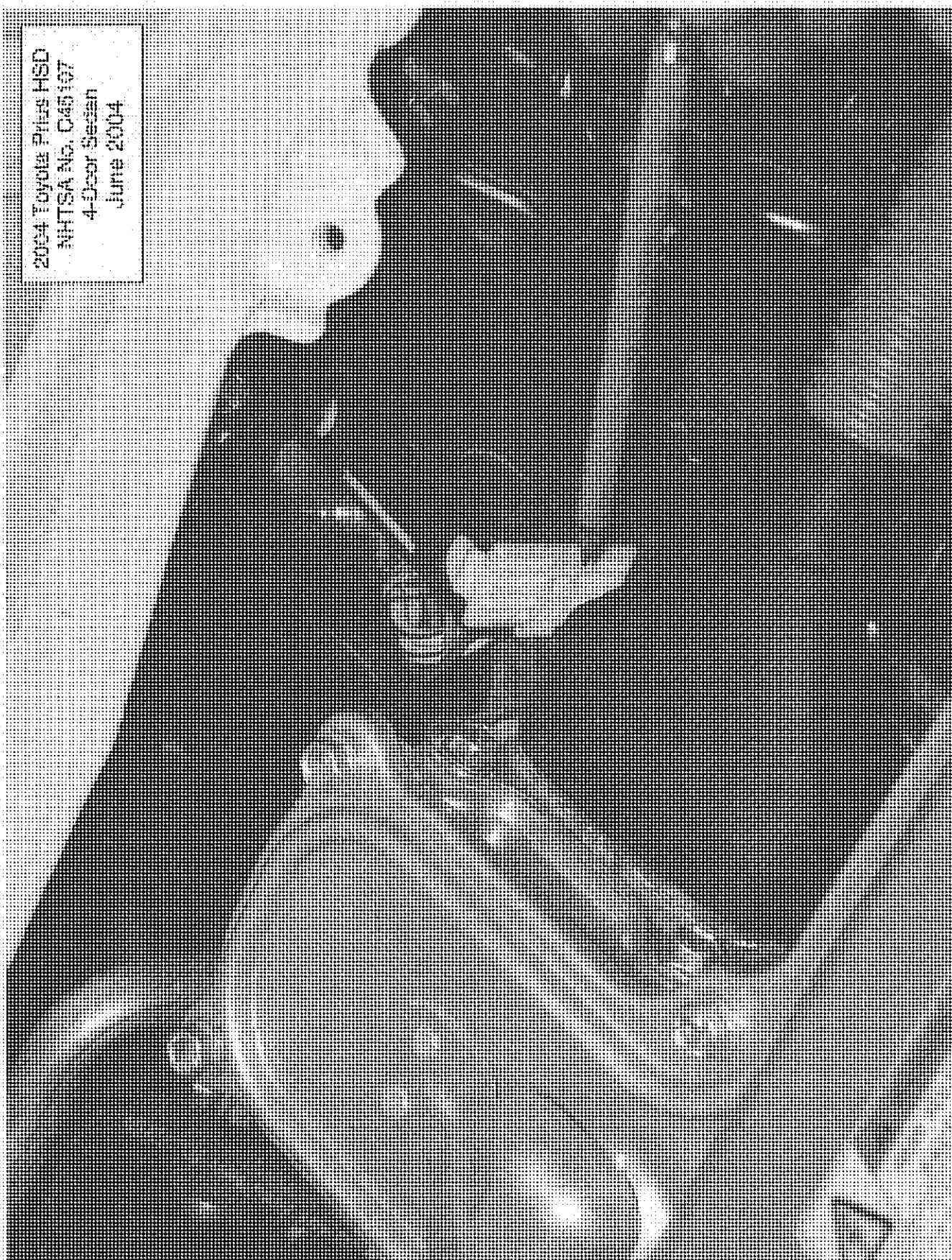
Hydraulic Brake Power Assist Electrical Connector in Locked Position

2004 Toyota Prius HSD
NHTSA No. C45107
4 Door Sedan
June 2004



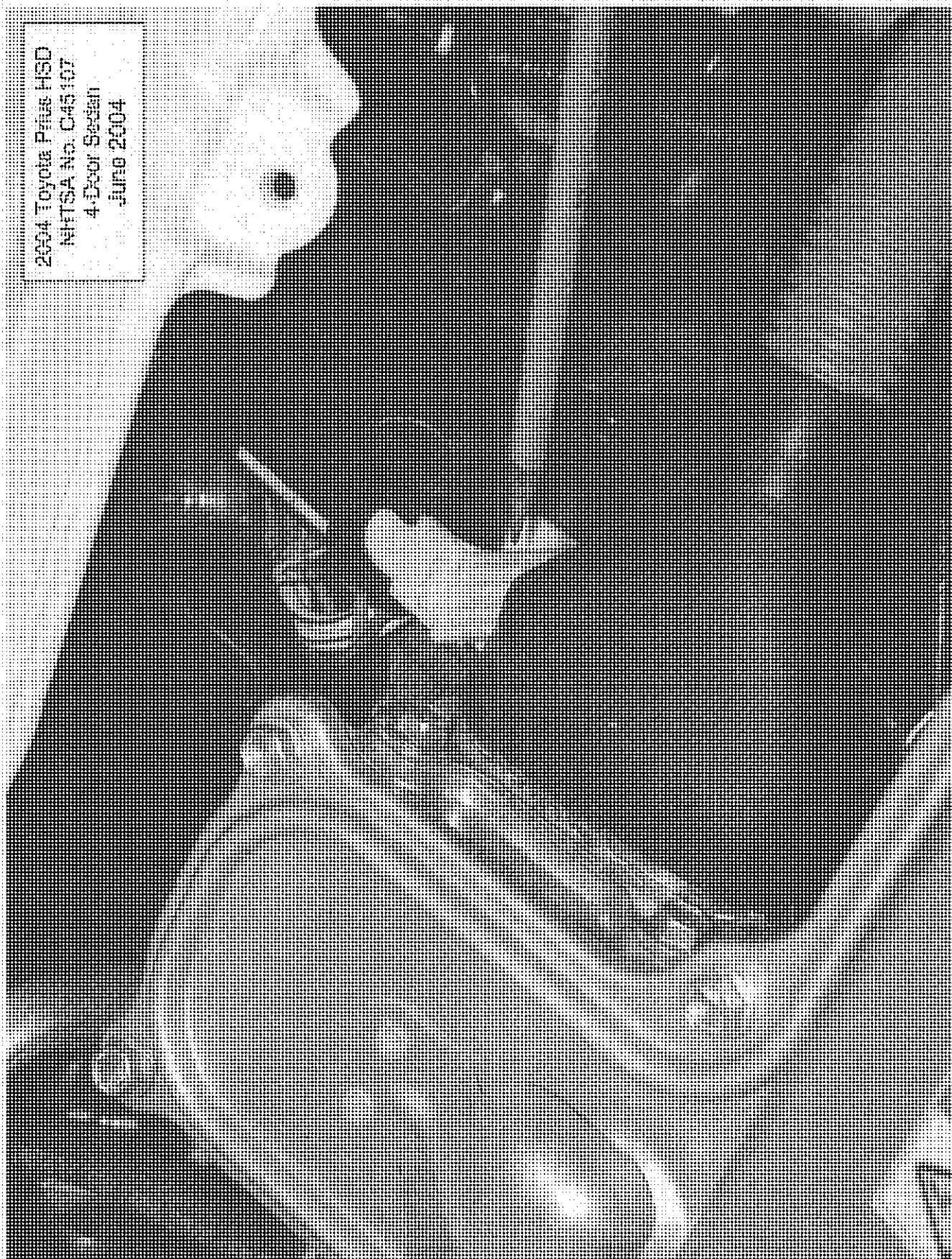
Hydraulic Brake Power Assist Electrical Connector In Attempted Unlocked Position

2004 Toyota Prius HSD
NHTSA No. C45107
4-Door Sedan
June 2004



Hydraulic Brake Power Assist Electrical Connector in Locked Position

2004 Toyota Prius HSD
NHTSA No. C45107
4-Door Sedan
June 2004



Hydraulic Brake Power Assist Electrical Connector in Attempted Unlocked Position

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 straight-aways 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, driveline efficiency tests, and the determination of vehicular acceleration and cruise characteristics. In addition, it supports maximum speed determination, road load power, noise and emission measurements and tire durability test programs.

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

TRC SKID PAD

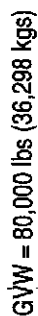
The Skid Pad is a test facility that is utilized primarily for the evaluation of tire and brake systems.

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.

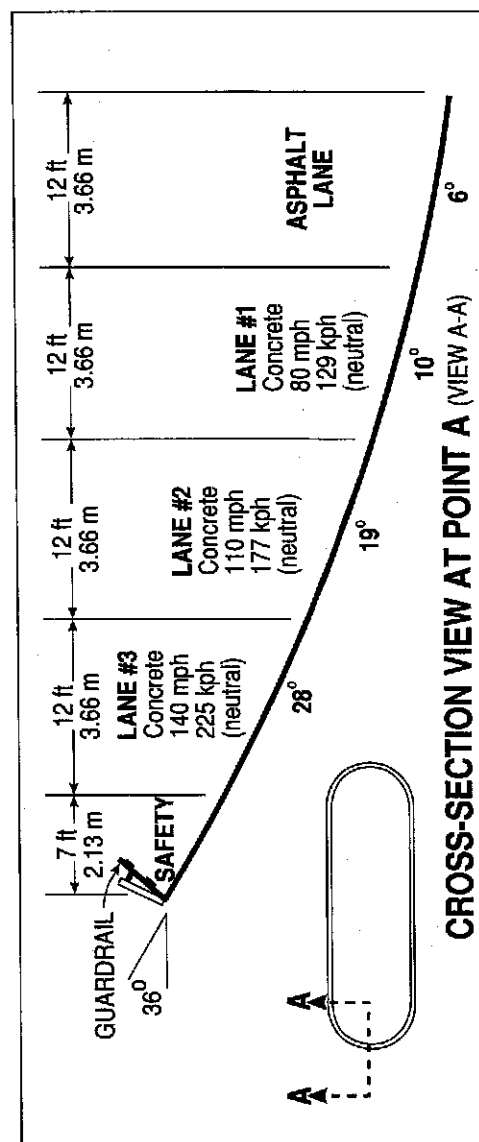


ELEVATIONS

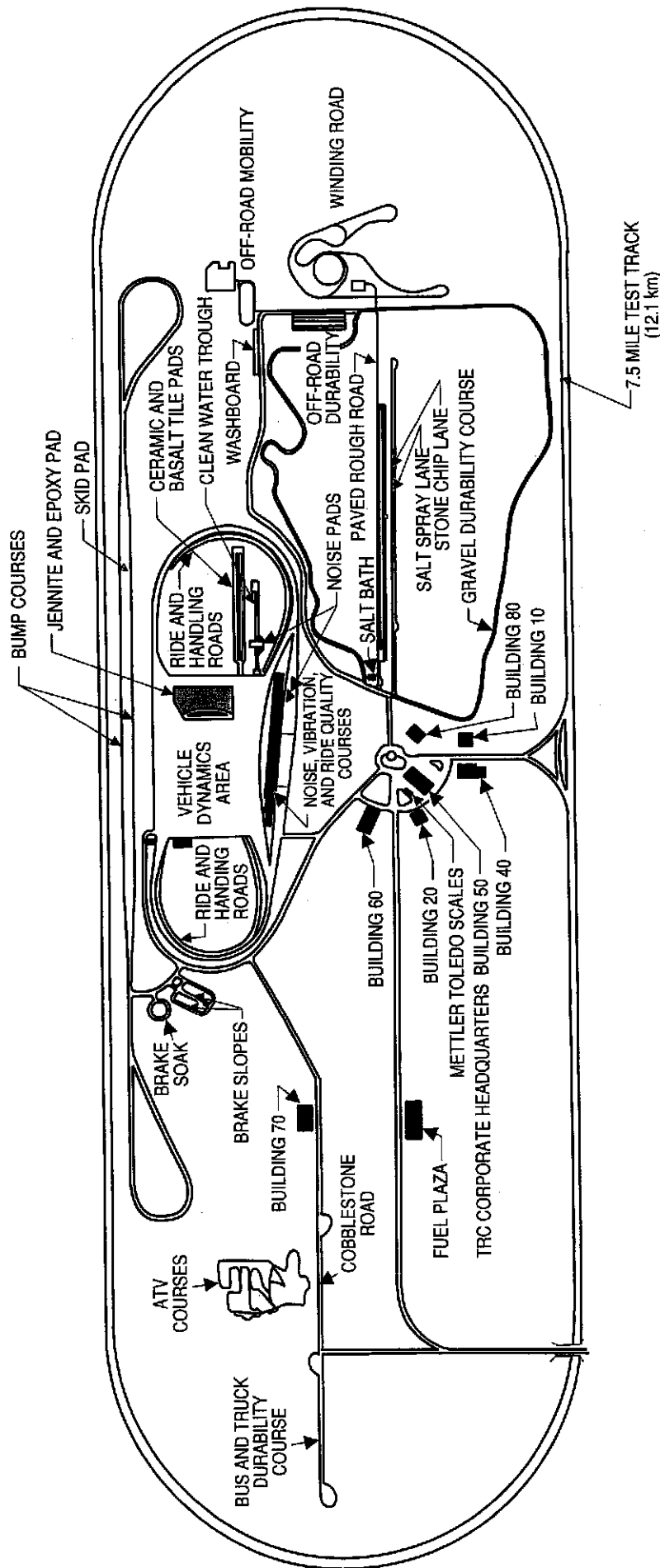
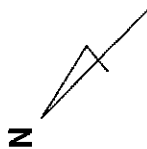
DISTANCES	
Lane 3	7.539 mi 12.133 km
Lane 2	7.521 mi 12.104 km
Lane 1	7.507 mi 12.081 km

Point A to Point B.....	3.333 mi.....	5.364 km
Point C to Point D.....	.947 mi.....	1.524 km

NOT TO SCALE



7.5-MILE TEST TRACK



NOT TO SCALE

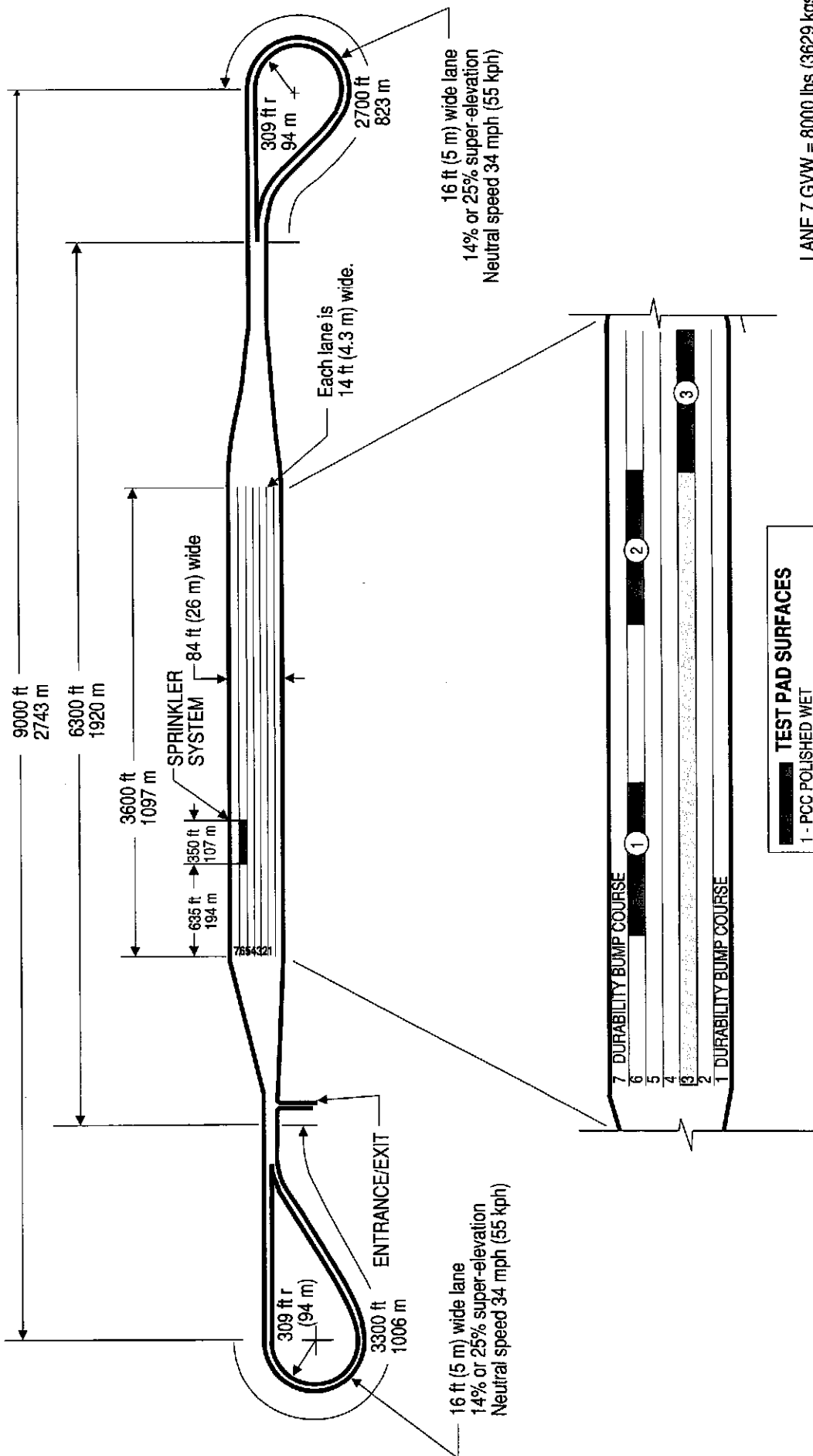
TEST FACILITY DETAIL



TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43318-0357

F-15 0601

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)

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

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

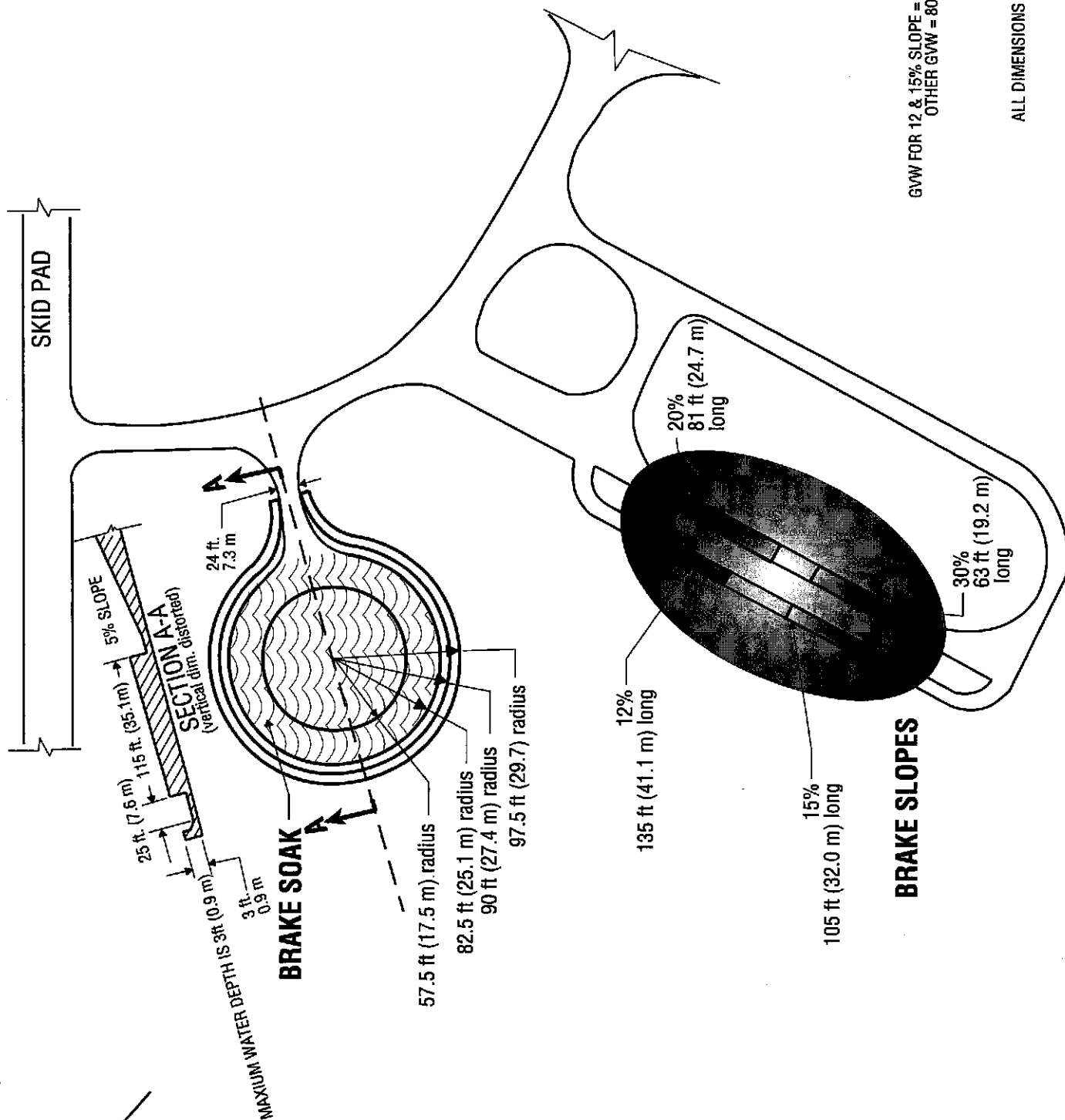
Not to scale
All dimensions are approximate

SKID PAD

TRC

TRANSPORTATION RESEARCH CENTER INC.
EAST LIBERTY, OHIO 43319-0367

F-13 0899



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

NOT TO SCALE
ALL DIMENSIONS ARE APPROXIMATE

APPENDIX D
Notice of Possible Non-Compliance

This vehicle (C45107) met the requirements of the FMVSS 135 standard.