SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 110(INDICANT)
TIRE SELECTION AND RIMS

TOYOTA MOTOR CORPORATION
2003 TOYOTA ECHO PASSENGER CAR
NHTSA NO. C35110

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

SEPTEMBER 25, 2003
FINAL REPORT

PREPARED FOR
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590
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Approved By: [Signature]

Approval Date: 09/25/03

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: [Signature]

Acceptance Date: 09/30/03
Technical Report Documentation Page

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<table>
<thead>
<tr>
<th>7. Author(s)</th>
<th>Grant Farrand, Project Engineer Debbie Messick, Project Manager</th>
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<table>
<thead>
<tr>
<th>9. Performing Organization Name and Address</th>
<th>General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443</th>
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|---------------------------------------|--------------------------------------------------------------------------------|

| 15. Supplementary Notes | |
|------------------------||

| 16. Abstract | This test was conducted on the subject, 2003 Toyota Echo passenger car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-110-02 (partial), to gather data relating to the normal load requirements specified in FMVSS 110. NHTSA's Office of Safety Performance Standards requested this data to support the agency's TREAD tire rulemaking efforts. |

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<th>17. Key Words</th>
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| 18. Distribution Statement | Copies of this report are available from NHTSA NHTSA Technical Reference Div., Rm. 5108 (NPO-230) 400 7th St., S.W. Washington, DC 20590 Telephone No. (202) 366-4946 |

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<td>4</td>
<td>10</td>
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<tr>
<td>5</td>
<td>11</td>
</tr>
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5.1 ¾ Frontal View of Vehicle  
5.2 Vehicle's Certification Label  
5.3 Vehicle's Tire Information Label  
5.4 Tire Showing Brand  
5.5 Tire Showing Model, Max Load Rating and Max Inflation Pressure  
5.6 Tire Showing Size, Load Index, Speed Symbol and Serial Number  
5.7 Vehicle Ballasted to Simulate Normal Load Condition

APPENDIX – Normal Load Occupation Distribution
SECTION 1
INTRODUCTION

1.0 PURPOSE OF INDICANT TEST

A 2003 Toyota Echo passenger car was subjected to a FMVSS No. 110 (Indicant) test intended to gather data relating to the normal load requirements specified in FMVSS 110. NHTSA's Office of Safety Performance Standards requested this data to support the agency's TREAD tire rulemaking efforts.

1.1 TEST VEHICLE

The test vehicle was a 2003 Toyota Echo. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: JTDAT123230288455

B. NHTSA No.: C35110

C. Manufacturer: TOYOTA MOTOR CORPORATION

D. Manufacture Date: 01/03

1.2 TEST DATE

The test vehicle was subjected to testing on June 11, 2003.
SECTION 2
TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 TEST PROCEDURE

The vehicle was inspected, photographed and filled with fuel. It was then weighed to establish total curb weight and the weights of all wheels were measured and recorded. The vehicle was then ballasted to its normal load condition (refer to appendix) and the weights of all wheels were measured and recorded. Tire information labeling data and tire sidewall data were recorded.

This indicant test did not include any other requirements in FMVSS 110.

2.1 SUMMARY OF RESULTS

Test results are provided in Section 3.
SECTION 3
TEST DATA
**VEHICLE MAKE/MODEL/BODY STYLE:** 2003 TOYOTA ECHO PASSENGER CAR  
**VEHICLE NHTSA NO.:** C35110  
**VIN:** JTDAT123230288455  
**LABORATORY:** GENERAL TESTING LABORATORIES  
**TEST DATE:** 06/11/03

<table>
<thead>
<tr>
<th>REQUIREMENT</th>
<th>YES/NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The vehicle is equipped with tires that meet the requirements of FMVSS 109 or FMVSS 119.</td>
<td>YES</td>
</tr>
<tr>
<td>The vehicle normal load on the tire is not greater than the high speed performance test load specified in FMVSS 109 paragraph S5.5 or FMVSS 119 paragraph S7.4.</td>
<td>YES</td>
</tr>
<tr>
<td>For passenger cars, the tire information placard is permanently affixed to the glove compartment door or equally accessible location; and displays the required information (FMVSS 110, S4.3).</td>
<td>YES</td>
</tr>
<tr>
<td>For vehicles other than passenger cars, a combined certification/tire information label or separate tire information label is permanently affixed to either the hinge pillar, door-latch post or to the inward-facing surface of the door next to the driver's seating position (FMVSS 120, S5.3)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**REMARKS:**

**RECORDED BY:** [Signature]  
**DATE:** 06/11/03  
**APPROVED BY:** [Signature]
DATA SHEET 2
TEST VEHICLE INFORMATION/RECEIVING INSPECTION

LABORATORY: GENERAL TESTING LABORATORIES    DATE:  06/11/03

VEHICLE MODEL YEAR/MAKE/MODEL/BODY STYLE: 2003 TOYOTA ECHO

MANUFACTURE DATE: 01/03    NHTSA NO.: C35110    BODY COLOR: SILVER

VIN: JTDAT123230288455    VEHICLE TYPE: PASSENGER CAR

GVWR 1354 kg (2985 lbs)    GAWR(Fr) 723 kg (1595 lbs)    GAWR(Rr) 653 kg (1440 lbs)

BELTED SEATING POSITIONS: FRONT  2    MID N/A    REAR  3    OTHER N/A

ENGINE DATA:  4 Cylinders   1.5 Liters   ___ Cubic Inches

TRANSMISSION DATA:  __ Automatic   ___ Manual   4 No. of Speeds

FINAL DRIVE DATA:  ___ Rear Drive   ___ Front Drive   ___ 4 Wheel Drive

INSTALLED TIRE DATA: Size - P185/60R15    Mfr. - GOODYEAR

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT/MAKE SURE ALL OPTIONS ON WINDOW STICKER ARE LISTED:

<table>
<thead>
<tr>
<th>X</th>
<th>Air Conditioning</th>
<th>Traction Control</th>
<th>X</th>
<th>Clock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tinted Glass</td>
<td>All Wheel Drive</td>
<td>X</td>
<td>Roof Rack</td>
</tr>
<tr>
<td>X</td>
<td>Power Steering</td>
<td>Cruise Control</td>
<td></td>
<td>Console</td>
</tr>
<tr>
<td></td>
<td>Power Windows</td>
<td>X Rear Window Defroster</td>
<td>X</td>
<td>Driver Air Bag</td>
</tr>
<tr>
<td></td>
<td>Power Door Locks</td>
<td>Sun Roof or T-Top</td>
<td></td>
<td>Passenger Air Bag</td>
</tr>
<tr>
<td></td>
<td>Power Seal(s)</td>
<td>Tachometer</td>
<td></td>
<td>Front Disc Brakes</td>
</tr>
<tr>
<td>X</td>
<td>Power Brakes</td>
<td>X Tilt Steering Wheel</td>
<td></td>
<td>Rear Disc Brakes</td>
</tr>
<tr>
<td></td>
<td>Antilock Brake System</td>
<td>X AM/FM/CD</td>
<td></td>
<td>Other</td>
</tr>
</tbody>
</table>

ARE ALL OPTIONS LISTED ON "WINDOW STICKER" PRESENT ON THE TEST VEHICLE: (YES/NO) YES

REMARKS:

RECORDED BY: [Signature]    DATE: 06/11/03

APPROVED BY: [Signature]
DATA SHEET 3
CURB WEIGHT WITH OPTIONS AND NORMAL LOAD

VEHICLE MAKE/MODEL/BODY STYLE: 2003 TOYOTA ECHO PASSENGER CAR
VEHICLE NHTSA NO.: C35110 VIN: JTDAT123230288455
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 06/11/03

Full Fluid Levels:
Fuel Full; Coolant Full; Other Fluids Full

Tire Pressure:
LF 220 KPA (32 psi) LR 220 KPA (32 psi)
RF 220 KPA (32 psi) RR 220 KPA (32 psi)

A. MEASURED CURB WEIGHT WITH INSTALLED OPTIONS AND ACCESSORIES

<table>
<thead>
<tr>
<th>Wheel</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>317 KG (699 LB)</td>
</tr>
<tr>
<td>RF</td>
<td>293 KG (645 LB)</td>
</tr>
<tr>
<td>LR</td>
<td>183 KG (404 LB)</td>
</tr>
<tr>
<td>RR</td>
<td>203 KG (447 LB)</td>
</tr>
</tbody>
</table>

Front Axle 610 KG (1344 LB) Rear Axle 366 KG (851 LB)

Total Vehicle 996 KG (2195 LB)

B. MEASURED VEHICLE WEIGHT IN NORMAL LOAD CONDITION

(1) Seating Capacity (from Tire Information Placard) = 5
   Seating Capacity (# of belted seating positions) = 5

(2) Normal Load # of Occupants from Appendix
   Occupant Distribution: Front Seat- 2 Second Seat- 1
                          Third Seat- N/A Fourth Seat- N/A

(3) Total Normal Occupant Load 204 KG (450 LB)
    (# of occupants x 68 KG per occupant)

(4) Measured Normal Load on Each Wheel and Axles (Sum)

<table>
<thead>
<tr>
<th>Wheel</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>363 KG (800 LB)</td>
</tr>
<tr>
<td>RF</td>
<td>335 KG (738 LB)</td>
</tr>
<tr>
<td>LR</td>
<td>242 KG (533 LB)</td>
</tr>
<tr>
<td>RR</td>
<td>259 KG (570 LB)</td>
</tr>
</tbody>
</table>

Frt Axle 698 KG (1538 LB) Rr Axle 500 KG (1103 LB)

Total Vehicle 1198 KG (2641 LB)
(5) Calculated Vehicle Normal Load on the Tire
Front Tires (measured front axle normal load/2) = 349 KG (769 LB)
Rear Tires (measured front axle normal load/2) = 250 KG (552 LB)

(6) High Speed Test Load from (X) FMVSS 109 (S5.5), or ( ) FMVSS 119 (S7.4)

<table>
<thead>
<tr>
<th>Front</th>
<th>Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Installed Tire Size</td>
<td>P185/60R15</td>
</tr>
<tr>
<td>Max. Load Rating on Sidewall</td>
<td>500 KG(1102 LBS)</td>
</tr>
<tr>
<td>Reduced Sidewall Load Rating (if applicable)*</td>
<td>N/A</td>
</tr>
<tr>
<td>High Speed Test Load (88% of sidewall max. load rating)</td>
<td>440 KG(970 LBS)</td>
</tr>
</tbody>
</table>

(b) Optional Tire Size(s) | P175/65R14 | P175/65R14 |
| Max. Load Rating on Sidewall (From 2003 Tire & Rim Association Yearbook) | 462 KG(1019 LBS) | 462 KG(1019 LBS) |
| Reduced Sidewall Load Rating (if applicable)* | N/A | N/A |
| High Speed Test Load (88% of sidewall max. load rating) | 407 KG(897 LBS) | 407 KG(897 LBS) |

* If a passenger car tire is installed on a multipurpose passenger vehicle (MPV), truck or bus, the tire's load rating shall be reduced by dividing by 1.10.

**REMARKS:** The Vehicle Normal Load on the Tire is not greater than the High Speed Test Load.
DATA SHEET 4
TIRE INFORMATION LABEL OR PLACARD

VEHICLE MAKE/MODEL/BODY STYLE: 2003 TOYOTA ECHO PASSENGER CAR
VEHICLE NHTSA NO.: C35110
VIN: JTDAT123230288455
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 06/11/03

A. Vehicle Type from Certification Label: Passenger Car

B. Identify Vehicle Labeling:

Vehicle has a combined Certification Tire Information Label ( ) Yes (X) No
Is Label Permanently Affixed: ( ) Yes ( ) No
Label Location: ________________________________
Description of Label: ____________________________

Vehicle has a separate Tire Information Label or Placard (X) Yes ( ) No
Is Label Permanently Affixed: (X) Yes ( ) No
Label Location: Glove Box
Description of Label: Vinyl

C. Enter Information from Combined or Separate Tire Information Label/Placard

Vehicle Capacity Weight - 351 KG (775 LBS)

Designated Seating Capacity (DSC) - 5
Expressed In—
(1) Total No. of Occupants (X) Yes ( ) No
(2) Terms of Occupants for Each Seat Location (X) Yes ( ) No

Manufacturer's Recommended Tire Size and Cold Tire Inflation Pressure For Maximum Load Vehicle Weight:

P185/60R15
FRONT - 220 kPa (32 psi)
REAR - 220 kPa (32 psi)

P175/65R14
FRONT - 220 kPa (32 psi)
REAR - 220 kPa (32 psi)

Manufacturer's Recommended Tire Size and Cold Tire Inflation Pressure For Other Load Conditions: NONE

REMARKS:

RECORDED BY: ___________________________ DATE: 06/11/03
APPROVED BY: ___________________________
DATA SHEET 5
VEHICLE TIRE DATA

VEHICLE MAKE/MODEL/BODY STYLE: 2003 TOYOTA ECHO PASSENGER CAR
VEHICLE NHTSA NO.: C35110; VIN: JTDAT123230288455
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 06/11/03

All tires on the vehicle are the same size: (Yes/No) ________Yes____

INFORMATION FROM TIRE SIDEWALL:

Left Front Tire

Tire Size Designation: P185/60R15
Tire Load Index/Speed Symbol: 84T
Maximum Inflation Pressure: 300 kPa (44 psi)
Maximum Load Rating: 500 KG (1102 LBS.)
Mfr. Name or Brand & Code: GOODYEAR EAGLE
Tube or Tubeless: TUBELESS
Treadwear/Traction/Temp. Grades: 300/A/B
Sidewall (Plies & Composition): 1 PLY POLYESTER
Tread (Plies & Composition): 1 PLY POLYESTER
2 PLY STEEL
Serial Number: Right Front - DOT EUCA 3KLR 0203

Tire has "DOT" markings: (X) YES ( ) NO ( ) UNDETERMINED

REMARKS:

RECORDED BY: [Signature] DATE: 06/11/03
APPROVED BY: [Signature]
### TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

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<tr>
<th>EQUIPMENT</th>
<th>DESCRIPTION</th>
<th>MODEL/ SERIAL NO.</th>
<th>CAL. DATE</th>
<th>NEXT CAL. DATE</th>
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</thead>
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<td>PAD SCALES</td>
<td>#1 199744LF</td>
<td>199744LF</td>
<td>06/02</td>
<td>06/20/03</td>
</tr>
<tr>
<td></td>
<td>#2 199744RF</td>
<td>199744RF</td>
<td>06/02</td>
<td>06/20/03</td>
</tr>
<tr>
<td></td>
<td>#3 199744LR</td>
<td>199744LR</td>
<td>06/02</td>
<td>06/20/03</td>
</tr>
<tr>
<td></td>
<td>#4 199744RR</td>
<td>19974RR</td>
<td>06/02</td>
<td>06/20/03</td>
</tr>
<tr>
<td>PRESSURE GAGE</td>
<td>WESKLER</td>
<td>0-100</td>
<td>05/03</td>
<td>05/04</td>
</tr>
<tr>
<td>SURFACE LEVEL</td>
<td>GTL</td>
<td>N/A</td>
<td>BEFORE USE</td>
<td>BEFORE USE</td>
</tr>
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</table>
SECTION 5
PHOTOGRAPHS
2003 TOYOTA ECHO
NHTSA NO. C35110
FMVSS NO. 110 (INDICANT)

FIGURE 5.5
TIRE SHOWING MODEL, MAX LOAD RATING
AND MAX INFLATION
2003 TOYOTA ECHO
NHTSA NO. C35110
FMVSS NO. 110 (INDICANT)

FIGURE 5.7
VEHICLE BALLASTED TO SIMULATE NORMAL LOAD CONDITION
## APPENDIX

Table 1 – Occupant Loading and Distribution for Vehicle Normal Load for Various Designated Seating Capacities

<table>
<thead>
<tr>
<th>Designated Seating Capacities, numbers of Occupants</th>
<th>Vehicle normal load, number of occupants</th>
<th>Occupant distribution in a normally loaded vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 through 4</td>
<td>2</td>
<td>2 in front</td>
</tr>
<tr>
<td>5 through 10</td>
<td>3</td>
<td>2 in front, 1 in second seat</td>
</tr>
<tr>
<td>11 through 15</td>
<td>5</td>
<td>2 in front, 1 in second seat, 1 in third seat, 1 in fourth seat</td>
</tr>
<tr>
<td>16 through 22</td>
<td>7</td>
<td>2 in front, 2 in second seat, 2 in third seat, 1 in fourth seat</td>
</tr>
</tbody>
</table>

**NOTE:** For the indignant test each seat was adjusted to its full down and mid forward to aft position with the seat back adjusted to a 25° reclined angle. Each designated seat position was ballasted with 54 KG (120 LBS) in the seat and 14 KG (30 LBS) on the floor directly in front of the respective seat position.