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

KIA MOTORS CORP.
2003 KIA SORENTO, MPV
NHTSA NO. C30505

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

SEPTEMBER 16, 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
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NHTSA No. C30505

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16. Abstract 
This test was conducted on the subject 2003 Kia Sorento MPV 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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SECTION 1

INTRODUCTION

1.0 PURPOSE OF INDICANT TESTING

A 2003 Kia Sorento 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 Kia Sorento MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: KNDJD733635081536

B. NHTSA No.: C30505

C. Manufacturer: KIA MOTORS CORP.

D. Manufacture Date: 11/25/02

1.2 TEST DATE

The test vehicle was subjected to testing on May 23, 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 indicative test did not include any other requirements in FMVSS 110.

2.1 SUMMARY OF RESULTS

Currently FMVSS 110 applies only to passenger cars. The subject Kia Sorento is a multipurpose passenger vehicle (MPV) and therefore it is not required to meet FMVSS 110 requirements. It was subjected to the normal load testing as executed for FMVSS 110 compliance verification for information only.
SECTION 3
TEST DATA
DATA SHEET 1
SUMMARY

VEHICLE MAKE/MODEL/BODY STYLE: 2003 KIA SORENTO MPV
VEHICLE NHTSA NO.: C30505; VIN: KNDJD733835031536
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 05/23/03

REQUIREMENT

The vehicle is equipped with tires that meet the requirements of FMVSS 109 or FMVSS 119. YES

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. YES

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). N/A

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). YES

REMARKS:

RECORDED BY: [Signature] DATE: 05/23/03
APPROVED BY: [Signature]
DATA SHEET 2
TEST VEHICLE INFORMATION/RECEIVING INSPECTION

LABORATORY: GENERAL TESTING LABORATORIES    DATE: 05/23/03

VEHICLE MODEL YEAR/MAKE/MODEL/BODY STYLE: 2003 KIA SORRENTO MPV

MANUFACTURE DATE: 11/25/02  NHTSA NO.: C30505  BODY COLOR: IVY GREEN

VIN: KNDJ733635081536    VEHICLE TYPE: MPV

GVWR: 2486 kg (5487 lbs)  GAWR(Fr): 1280 kg (2822 lbs)  GAWR(Rr): 1500 kg (3307 lbs)

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

ENGINE DATA: 6 Cylinders 3.5 L Liters ___ Cubic Inches

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

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

INSTALLED TIRE DATA: Size - P245/70R16  Mfr. - KUMHO

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

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Traction Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clock</td>
</tr>
<tr>
<td>Air Conditioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tinted Glass</td>
<td></td>
<td>All Wheel Drive</td>
<td>Roof Rack</td>
</tr>
<tr>
<td>Power Steering</td>
<td>X</td>
<td>Cruise Control</td>
<td></td>
</tr>
<tr>
<td>Power Windows</td>
<td>X</td>
<td>Rear Window Defroster</td>
<td>Driver Air Bag</td>
</tr>
<tr>
<td>Power Door Locks</td>
<td></td>
<td>Sun Roof or T-Top</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Seat Driver Side</td>
<td>Tachometer</td>
<td></td>
<td>Front Disc Brakes</td>
</tr>
<tr>
<td>Power Brakes</td>
<td>X</td>
<td>Tilt Steering Wheel</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rear Disc Brakes</td>
</tr>
<tr>
<td>Antilock Brake System</td>
<td>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: 05/23/03

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

VEHICLE MAKE/MODEL/BODY STYLE: 2003 KIA SORENTO MPV
VEHICLE NHTSA NO.: C30505 ; VIN: KNDJD733635081536
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 05/23/03

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

Tire Pressure:
LF 210 KPA (30 psi) LR 210 KPA (30 psi)
RF 210 KPA (30 psi) RR 210 KPA (30 psi)

A. MEASURED CURB WEIGHT WITH INSTALLED OPTIONS AND ACCESSORIES

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>508 KG (1120 LB)</td>
<td>LR</td>
</tr>
<tr>
<td>RF</td>
<td>528 KG (1164 LB)</td>
<td>RR</td>
</tr>
</tbody>
</table>

Front Axle 1038 KG (2284 LB) Rear Axle 870 KG (1917 LB)

Total Vehicle 1906 KG (4201 LB)

B. MEASURED VEHICLE WEIGHT IN NORMAL LOAD CONDITION

1. Seating Capacity (from Tire Information Placard) = N/A
   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)
   LF 551 KG (1215 LB) LR 494 KG (1090 LB)
   RF 574 KG (1266 LB) RR 489 KG (1078 LB)
   Frt Axle 1125 KG (2481 LB) Rr Axle 983 KG (2168 LB)

   Total Vehicle 2109 KG (4649 LB)
**DATA SHEET 3 – CONTINUED**

(5) Calculated Vehicle Normal Load on the Tire
- Front Tires (measured front axle normal load/2) = 563 KG (1241 LB)
- Rear Tires (measured front axle normal load/2) = 492 KG (1084 LB)

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

<table>
<thead>
<tr>
<th>Front</th>
<th>Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(a) Installed Tire Size</strong></td>
<td><strong>P245/70R16</strong></td>
</tr>
<tr>
<td><strong>Max. Load Rating on Sidewall</strong></td>
<td><strong>950 KG (2094 LBS)</strong></td>
</tr>
<tr>
<td><strong>Reduced Sidewall Load Rating</strong> (if applicable)*</td>
<td><strong>864 KG (1904 LBS)</strong></td>
</tr>
<tr>
<td><strong>High Speed Test Load</strong> (88% of sidewall max. load rating)</td>
<td><strong>760 KG (1676 LBS)</strong></td>
</tr>
<tr>
<td><strong>(b) Optional Tire Size(s)</strong></td>
<td><strong>NONE</strong></td>
</tr>
</tbody>
</table>

* 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.

RECORDED BY: [Signature]

DATE: 05/23/03

APPROVED BY: [Signature]
DATA SHEET 4
TIREE INFORMATION LABEL OR PLACARD

VEHICLE MAKE/MODEL/BODY STYLE: 2003 KIA SORENTO MPV
VEHICLE NHTSA NO.: C39505 VIN: KNDJD733635081536
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 05/23/03

A. Vehicle Type from Certification Label: MPV

B. Identify Vehicle Labeling:

Vehicle has a combined Certification Tire Information Label. ( ) Yes (X) No
Is Label Permanently Affixed: ( ) Yes (X) 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: Lower "B" Pillar
Description of Label: White/Black Sticker

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

Vehicle Capacity Weight - N/A(see remarks)
Designated Seating Capacity (DSC) - N/A(see remarks)
Expressed In—
(1) Total No. of Occupants ( ) Yes ( ) No
(2) Terms of Occupants for Each Seat Location ( ) Yes ( ) No

Manufacturer's Recommended Tire Size(s) and Cold Tire Inflation Pressure(s) for Maximum Load Vehicle Weight:

P245/70R16  FRONT - 210 kPa (30 psi)
REAR - 210 kPa (30 psi)

Manufacturer's Recommended Tire Size(s) and Cold Tire Inflation Pressure(s) for Other Load Conditions: NONE

REMARKS: The vehicle labeling requirements of FMVSS 120 for an MPV do not include Vehicle Capacity Weight (VCW) or Designated Seating Capacity (DSP) as required by FMVSS 110 passenger car labeling.

RECORDED BY: DATE: 05/23/03
APPROVED BY:
DATA SHEET 5
VEHICLE TIRE DATA

VEHICLE MAKE/MODEL/BODY STYLE: 2003 KIA SORENTO MPV
VEHICLE NHTSA NO.: C30505
VIN: KNDJD733635081536
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 05/23/03

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

INFORMATION FROM TIRE SIDEWALL:

Right Front Tire

Tire Size Designation: P245/70R16
Tire Load Index/Speed Symbol: 106H
Maximum Inflation Pressure: 300 kPa (44 psi)
Maximum Load Rating: 950 KG (2094 LBS.)
Mfr. Name or Brand & Code: KUMHO RADIAL 798
Tube or Tubeless: TUBELESS
Treadwear/Traction/Temp. Grades: NONE
Sidewall (Plies & Composition): 2 PLY POLYESTER
Tread (Plies & Composition): 2 PLY POLYESTER

Serial Number: Right Front - DOT-H2VL YP1H 4602

Tire has “DOT” markings: (X) YES ( ) NO ( ) UNDETERMINED

REMARKS:

RECORDED BY: [Signature] DATE: 05/23/03
APPROVED BY: [Signature]
TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>DESCRIPTION</th>
<th>MODEL/ SERIAL NO.</th>
<th>CAL. DATE</th>
<th>NEXT CAL. DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD SCALES</td>
<td>#1 199744LF</td>
<td>199744LF</td>
<td>06/02</td>
<td>06/03</td>
</tr>
<tr>
<td></td>
<td>#2 199744RF</td>
<td>199744RF</td>
<td>06/02</td>
<td>06/03</td>
</tr>
<tr>
<td></td>
<td>#3 199744LR</td>
<td>199744LR</td>
<td>06/02</td>
<td>06/03</td>
</tr>
<tr>
<td></td>
<td>#4 199744RR</td>
<td>19974RR</td>
<td>06/02</td>
<td>06/03</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>
</tbody>
</table>
SECTION 5
PHOTOGRAPHS
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.