

REPORT NUMBER 110(IND)-GTL-03-013

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

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

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SEPTEMBER 10, 2003

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
SAFETY ENFORCEMENT  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
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|                                                                                                                                                                                                                                                                                                                                                                                                                |                             |                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| 15. Supplementary Notes                                                                                                                                                                                                                                                                                                                                                                                        |                             |                                                                                                                                                                                                                             |
| 16. Abstract<br>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 indicant 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  
SUMMARYVEHICLE MAKE/MODEL/BODY STYLE: 2003 KIA SORENTO MPVVEHICLE NHTSA NO.: C30505 ; VIN: KNDJD733835081536LABORATORY: GENERAL TESTING LABORATORIESTEST DATE: 05/23/03REQUIREMENTYES/NO

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: M. A. B.DATE: 05/23/03APPROVED BY: D. M. M.

## 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 SORENTO MPV

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

VIN: KNDJD733635081536 VEHICLE TYPE: MPV

GVWR 2480 kg (5467 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 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

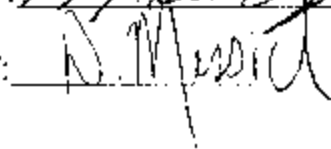
CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT/MAKE SURE ALL OPTIONS ON WINDOW STICKER ARE LISTED:

|                                     |                        |                                     |                       |                                     |                   |
|-------------------------------------|------------------------|-------------------------------------|-----------------------|-------------------------------------|-------------------|
| <input checked="" type="checkbox"/> | Air Conditioning       |                                     | Traction Control      | <input checked="" type="checkbox"/> | Clock             |
| <input checked="" type="checkbox"/> | Tinted Glass           |                                     | All Wheel Drive       |                                     | Roof Rack         |
| <input checked="" type="checkbox"/> | Power Steering         | <input checked="" type="checkbox"/> | Cruise Control        | <input checked="" type="checkbox"/> | Console           |
| <input checked="" type="checkbox"/> | Power Windows          | <input checked="" type="checkbox"/> | Rear Window Defroster | <input checked="" type="checkbox"/> | Driver Air Bag    |
| <input checked="" type="checkbox"/> | Power Door Locks       |                                     | Sun Roof or T-Top     | <input checked="" type="checkbox"/> | Passenger Air Bag |
| <input checked="" type="checkbox"/> | Power Seat Driver Side | <input checked="" type="checkbox"/> | Tachometer            | <input checked="" type="checkbox"/> | Front Disc Brakes |
| <input checked="" type="checkbox"/> | Power Brakes           | <input checked="" type="checkbox"/> | Tilt Steering Wheel   | <input checked="" type="checkbox"/> | Rear Disc Brakes  |
|                                     | Antilock Brake System  | <input checked="" type="checkbox"/> | AM/FM/CD              |                                     | Other -           |

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

REMARKS:

RECORDED BY:  DATE: 05/23/03

APPROVED BY: 

**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**

LF 508 KG (1120 LB) LR 437 KG (963 LB)  
 RF 528 KG (1164 LB) RR 433 KG (954 LB)  
 Front Axle 1036 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)

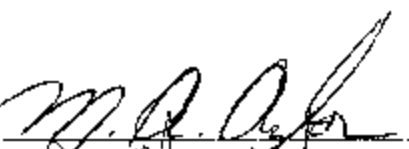
## DATA SHEET 3 – CONTINUED

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

\* 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:



DATE: 05/23/03

APPROVED BY:



DATA SHEET 4  
TIRE INFORMATION LABEL OR PLACARD

VEHICLE MAKE/MODEL/BODY STYLE: 2003 KIA SORENTO MPV  
 VEHICLE NHTSA NO.: C30505 ; 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 ☒ No  
 Is Label Permanently Affixed: ☐ Yes ☐ No  
 Label Location: \_\_\_\_\_  
 Description of Label: \_\_\_\_\_

Vehicle has a separate Tire Information Label or Placard ☒ Yes ☐ No  
 Is Label Permanently Affixed: ☒ 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: [Signature]

DATE: 05/23/03

APPROVED BY: [Signature]

### 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 |
|                             | 2 PLY STEEL     |
|                             | 1 PLY NYLON     |

Serial Number: Right Front - DOT-H2VL YP1H 4602

Tire has "DOT" markings:      ☒ YES      ☐ NO      ☐ UNDETERMINED

REMARKS:

RECORDED BY: *M. G. [Signature]*

DATE: 05/23/03

APPROVED BY: [Signature]

SECTION 4  
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

| EQUIPMENT     | DESCRIPTION | MODEL/<br>SERIAL NO. | CAL. DATE     | NEXT CAL.<br>DATE |
|---------------|-------------|----------------------|---------------|-------------------|
| PAD SCALES    | #1 199744LF | 199744LF             | 06/02         | 06/03             |
|               | #2 199744RF | 199744RF             | 06/02         | 06/03             |
|               | #3 199744LR | 199744LR             | 06/02         | 06/03             |
|               | #4 199744RR | 19974RR              | 06/02         | 06/03             |
| PRESSURE GAGE | WESKLER     | 0-100                | 05/03         | 05/04             |
| SURFACE LEVEL | GTL         | N/A                  | BEFORE<br>USE | BEFORE<br>USE     |

## SECTION 5 PHOTOGRAPHS



FIGURE 8.1  
X FRONTAL VIEW OF VEHICLE

2003 KIA SORENTO LX  
NHTSA NO. C50065  
FMVSS NO. 110 (INDICANT)

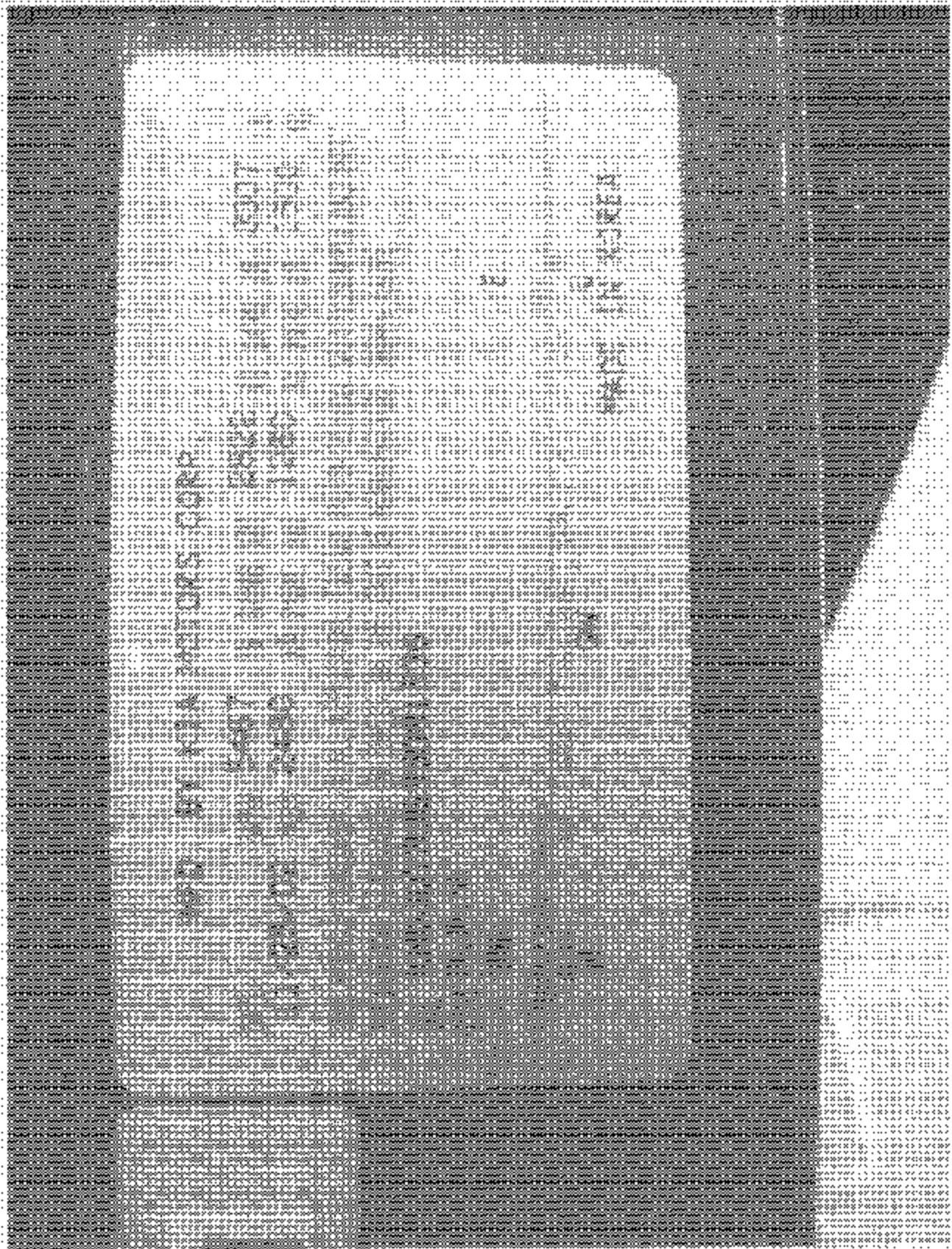
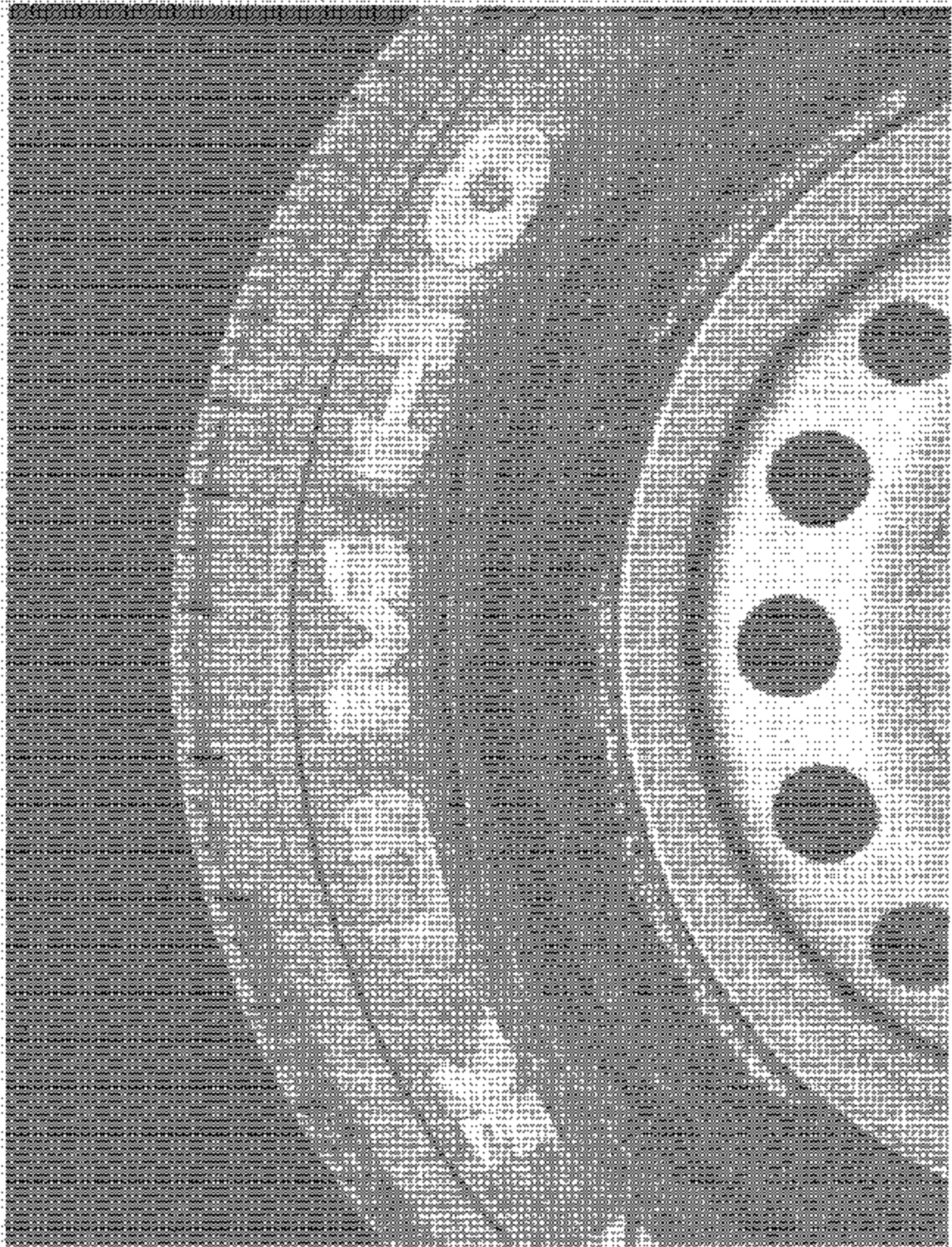


FIGURE 5.2  
VEHICLE'S CERTIFICATION LABEL

2003 KIA SORENTO LX  
NHTSA NO. C10555  
FMVSS NO. 110 (MIDCANT)

| VEHICLE IDENTIFICATION LABEL | VEHICLE IDENTIFICATION LABEL |
|------------------------------|------------------------------|
| 2003 KIA SORENTO LX          | 2003 KIA SORENTO LX          |
| NHTSA NO. C50505             | NHTSA NO. C50505             |
| MASS NO. 110 (RIPICANT)      | MASS NO. 110 (RIPICANT)      |

FIGURE 5.3  
VEHICLE IDENTIFICATION LABEL



2003 KIA SORENTO LX  
MHTSA NO. 050905  
FRVSS NO. 110 (ENCLOSURE)

FIGURE 5A  
FRESHWOUND BRAND

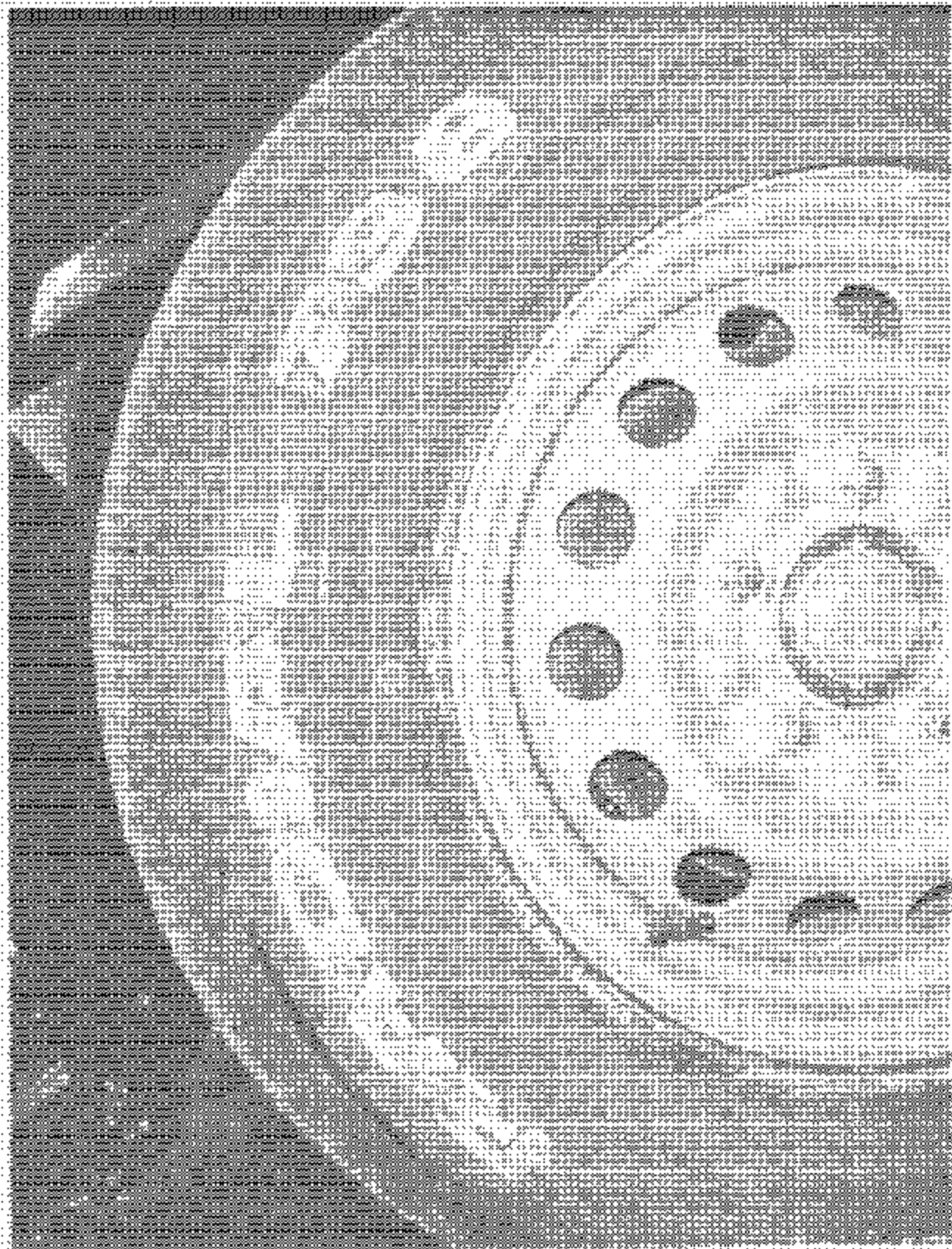
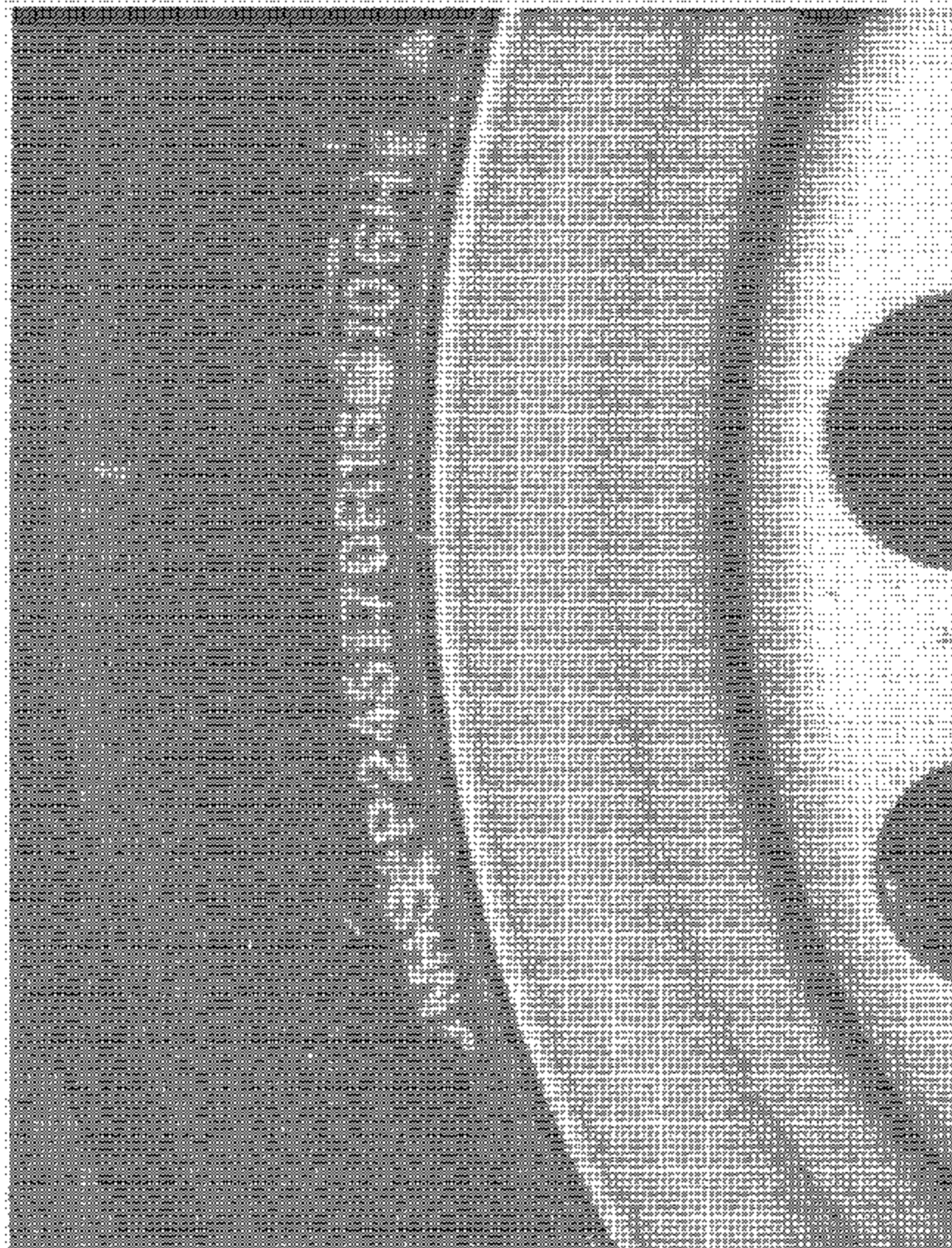


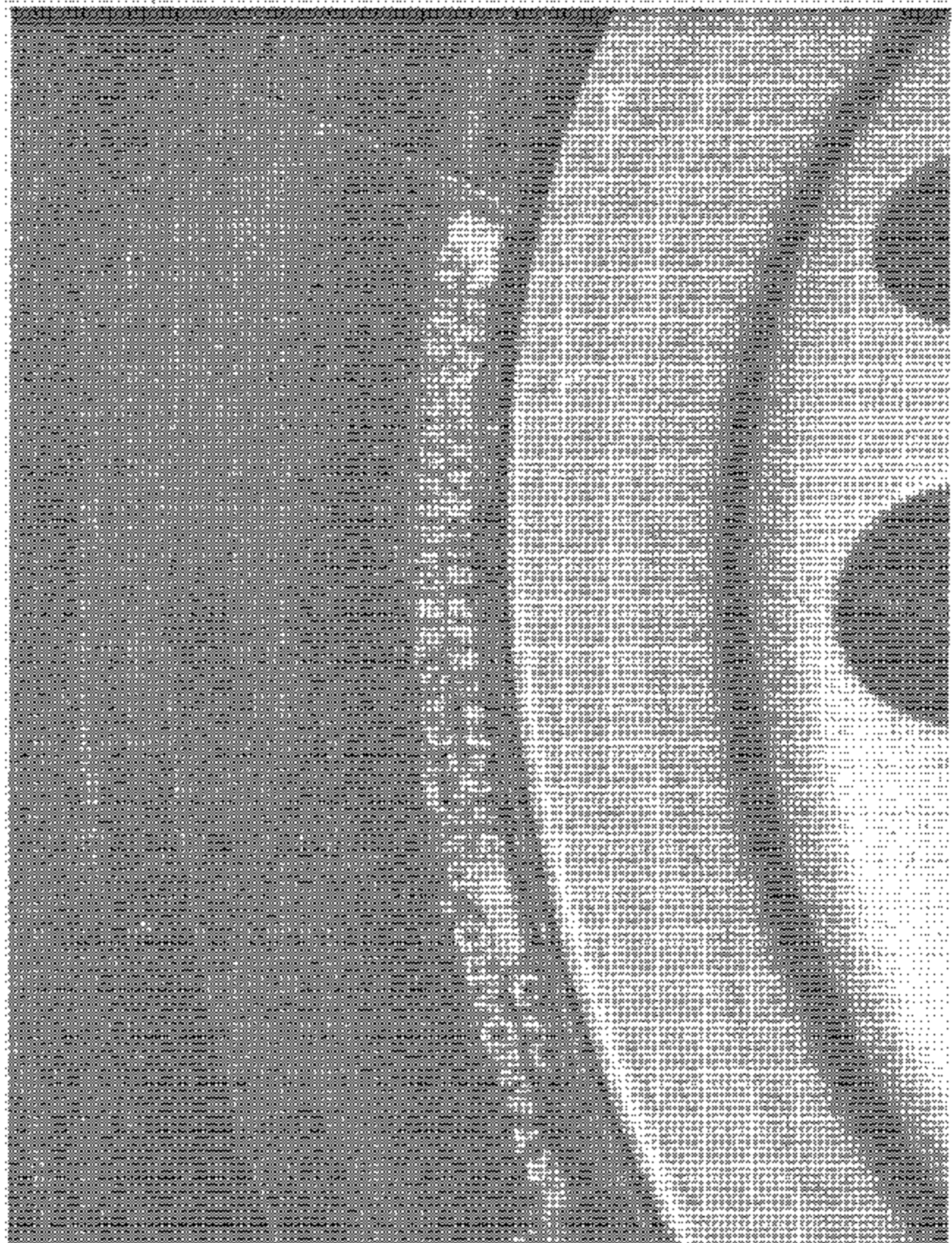
FIGURE 8.5  
THE SHOWING MODEL

2003 KIA SORENTO LX  
NHISA NO. C03505  
FMVSS NO. 110 (INDICANT)



2000 KIA SCORPIO LX  
NHTSA NO. C305DS  
FMVSS NO. 110 (INDICANT)

FIGURE 5A  
FIRE SHOWING SIZE

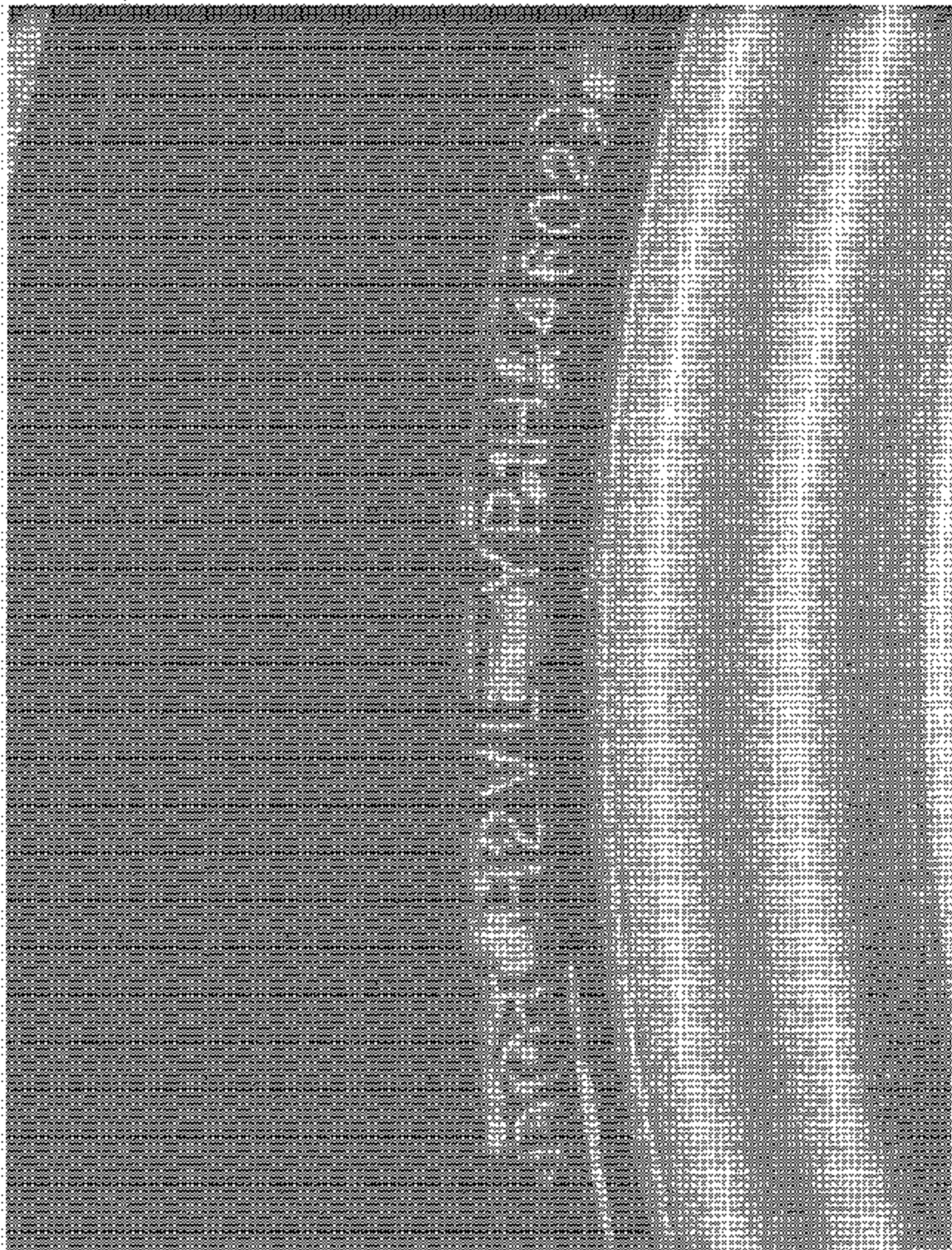


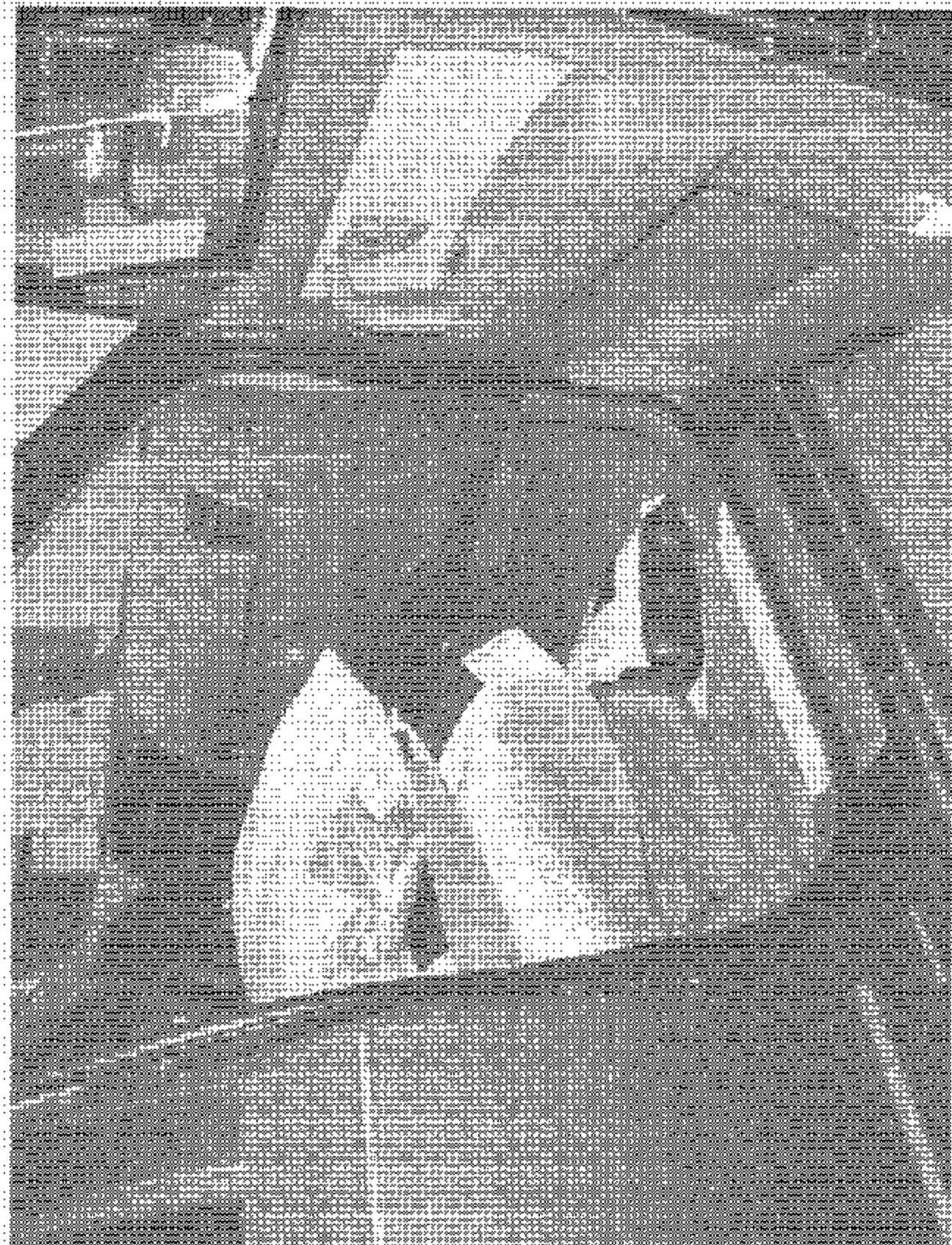
2003 KIA SCORPIO LX  
NHTSA NO. C20525  
FMVSS NO. 110 (INDICANT)

FIGURE 57  
TIRE SHOWING MAX LOAD RATING AND MAX  
INFLATION PRESSURE

2003 KIA SORENTO LX  
NHISA NO. C20553  
FACV66 NO. 110 (INLXCANT)

FIGURE 2B  
TIRE SHOWING SERIAL NUMBER





2003 KIA SORENTO LX  
NHTSA NC) CRV095  
SAVSS NC) 110 (INFLANT)

FIGURE 59  
VEHICLE BALLASTED TO SIMULATE NORMAL  
CONDITIONS

## APPENDIX

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

| Designated Seating Capacities, numbers of Occupants | Vehicle normal load, number of occupants | Occupant distribution in a normally loaded vehicle              |
|-----------------------------------------------------|------------------------------------------|-----------------------------------------------------------------|
| 2 through 4                                         | 2                                        | 2 in front                                                      |
| 5 through 10                                        | 3                                        | 2 in front, 1 in second seat                                    |
| 11 through 15                                       | 5                                        | 2 in front, 1 in second seat, 1 in third seat, 1 in fourth seat |
| 16 through 22                                       | 7                                        | 2 in front, 2 in second seat, 2 in third seat, 1 in fourth seat |

NOTE: For the indicant 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.