REPORT NUMBER 114-GTL-11-009

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 114 THEFT PROTECTION

HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC
2011 HYUNDAI ELANTRA, PASSENGER CAR
NHTSA NO. CB0509

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

April 18, 2011

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 NEW JERSEY AVE., SE
WASHINGTON, D.C. 20590

Prepared By: Digitally signed by Debbie Messick
DN: cn=Debbie Messick, c=US, o=GTL, email=gtl@general-testing.com

Approved By: Digitally signed by Grant Farrand
DN: cn=Grant Farrand, c=US, o=GTL, email=gtl@general-testing.com

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Accepted By:

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Technical Report Documentation Page

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9. Performing Organization Name and Address General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443		10. Work Unit No. (TRAIS) N/A 11. Contract or Grant No. DTNH22-06-C-00032
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Admin. Enforcement Office of Vehicle Safety Compliance (NVS-220) 1200 New Jersey Ave., S.E., Washington, DC 20590		13. Type of Report and Period Covered Test Date April 12, 2011 14. Sponsoring Agency Code NVS-221
15. Supplementary Notes		
16. Abstract Compliance tests were conducted on the subject 2011 Hyundai Elantra Passenger Car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-114-04 for the determination of FMVSS 114 compliance. Test failures identified were as follows: None		
17. Key Words Compliance Testing Safety Engineering FMVSS 114	18. Distribution Statement Copies of this report are available from NHTSA Technical Information Services (TIS) Room W45-212 (NPO-411) 1200 New Jersey Ave., S.E. Washington, DC 20590 Telephone No. (202) 366-4947	
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SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF TEST

A model year 2011 Hyundai Elantra Passenger Car was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 114 testing to determine if the vehicle was in compliance with the requirements of the standard. FMVSS 114 specifies requirements to decrease the likelihood that a vehicle is stolen, or accidentally set in motion.

1.1 The test vehicle was a 2011 Hyundai Elantra Passenger Car. The vehicle was identified as follows:

A. Vehicle Identification Number: 5NPDH4AE2BH016427

B. NHTSA No.: CB0509

C. Manufacturer: HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC

D. Manufacture Date: Dec/15/10

E. Color: Radiant Silver

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 114 testing on April 12, 2011.

SECTION 2

TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 TEST PROCEDURE

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure TP-114-04 and General Testing Laboratories, Inc. (GTL) Test Procedure, TP-114-04, “Theft Protection and Rollaway Prevention”.

2.1 SUMMARY OF RESULTS

Test data indicate the FMVSS 114 requirements appear to have been satisfied. All test data resulting from the tests were recorded on test data sheets in Section 3.

SECTION 3

TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of FMVSS 114 testing on the 2011 Hyundai Elantra.

FMVSS 114, THEFT PROTECTION
DATA SHEET 1 – VEHICLE IDENTIFICATION

TEST DATE: 04/12/11 LAB.: General Testing Laboratories
CONTRACT: DTNH22-06-C-00032 VEH. NHTSA NO.: CB0509
VIN: 5NPDH4AE2BH016427 BUILD DATE: Dec/15/10

MY/MAKE/MODEL/BODY STYLE: 2011 Hyundai Elantra

TRANSMISSION TYPE:
Automatic ____; Manual X; Other ____ (describe: _____)

DRIVE TRAIN TYPE:
Front Wheel X; Rear Wheel _____; 4-Wheel _____

FUEL TANK LEVEL: 100 (% OF max.) MILEAGE: 73

VEHICLE STARTING SYSTEM:

Location of the starting system:
Located on Right Side of Steering Column.

Selectable settings:
Lock, Accessory, On, Start

Explain how the system is activated:
The system is activated when the key is inserted into receptacle and turned clockwise.

KEY
Description of the key:
Traditional Metal Key.

STARTING SYSTEM ACTIVATION
Describe how the key is inserted into the starting system:
The key is inserted into the starting system by physical means.

Describe how the key is used to activate the starting system:
The System is activated by inserting the key into the starting system and turning it to the start position.

Describe how the key is removed from the starting system:
Turn key to the lock position and pull key out of key cylinder.

FMVSS 114, THEFT PROTECTION
DATA SHEET 1 continued

GEAR SELECTION CONTROL

Describe the gear selection control:
Manual transmission gear selector located on center console between front seats.

Describe how the gear selection control is activated:
With the clutch pedal depressed all the way down, manually move the gear selector to the desired position.

Describe all of the selectable settings:
Reverse, Neutral, 1, 2, 3, 4, 5, 6

IMMOBILIZER

Is the vehicle equipped with an immobilizer YES X NO

Describe the immobilizer device and how it prevents vehicle theft (if equipped):
The transponder(inside key head) and EMS (engine management system) ECU communicate for authentication. If the encrypted code in EMC ECU is matched, the engine will be allowed to start.

OPTIONAL RELEASE DEVICES

Describe if the vehicle is equipped with optional release devices:
None

OPTIONAL RELEASE DEVICES:

Key Removal Gear Selection Control None X Other

VEHICLE FLUIDS

Check all vehicle fluids and adjust to the proper levels for operation: Full

VEHICLE TIRE PLACARD INFORMATION

Vehicle Mfg. Recommended Tire Inflation Pressure
(kPa): Front 220 Rear 220

TIRE INFLATION PRESSURES:

Measured (kPa): LF 220 LR 220 RF 220 RR 220

WEIGHT
Vehicle Curb Weight(kg): 1232 Weight of Driver (kg): 91 (target = 91kg)

FMVSS 114, THEFT PROTECTION
DATA SHEET 2

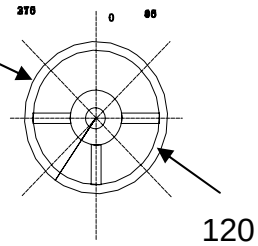
REQUIREMENT S5.1.1	PASS	FAIL
Engine cannot be started without using the key _X_Yes ___No	X	

With key removed, steering wheel locks:
Yes: __X__ No: _____

Identify steering wheel locking position(s) on wheel using arrow(s)

Clockwise: _____120_____ (degrees)
Counterclockwise:___300_____ (degrees)

300



120

Service brake must be depressed in order to start engine
Yes_____ No__X

Key removal prevents forward self-mobility:
Yes:__X___ No:_____

If yes describe: Engine will not start when the coded key is not present.

When key is removed from the starting system, starting of the engine or motor and either steering or self mobility is prevented. Yes:_X__ No:_____	X	

REMARKS: *Manual Transmission

FMVSS 114, THEFT PROTECTION
DATA SHEET 2 continued

REQUIREMENT S5.1.3	PASS	FAIL
An audible warning is activated whenever the key is in any starting system position with the exception of "on" and "start" and the door closest to the driver's designated seating position is opened. Yes__X__ No ____ Identify ALL key/starting system position setting: LOCK, ACCESSORY, ON, START	X	

REQUIREMENT S5.1.4	PASS	FAIL
With the vehicle engine or motor shut down and the transmission gear selection control in any position other than "park"; The steering wheel can rotate without locking? Yes__X___ No_____	X	
The vehicle is free to roll forward? Yes__X___ No_____	X	

REMARKS: Vehicle equipped with a manual transmission.

RECORDED BY: G. Farrand DATE: 04/12/11
APPROVED BY: D. Messick

FMVSS 114, ROLLAWAY PREVENTION
DATA SHEET 3
(for vehicles equipped with transmission with a “park” position)

VEH. NHTSA NO.: CB0509 TEST DATE: 04/12/11

REQUIREMENT S5.2.1	PASS	FAIL
The starting system prevents key removal in ALL gear selection control positions except “park”. Yes_____ No ____ Can the gear selection control be placed between each gear selection position and will it remain there without assistance? Yes_____ No _____ If yes, can the key be removed from the starting system? Yes_____ No____ If the key can be removed from the vehicle starting system when the gear selection control is not locked in “park”, a mechanism shall exist which, upon key removal, the vehicle transmission or gear selection control shall become locked in “park” as the direct result of removing the key. If such a mechanism exists, describe the mechanism and its function:	N/A*	

REQUIREMENT S5.2.2	PASS	FAIL
The gear selection control is locked in the “park” position when the key is removed from the starting system. Yes_____ No_____	N/A*	

REMARKS: * Manual Transmission

DATA SHEET 3 continued

REQUIREMENT S5.2.3	PASS	FAIL
KEY REMOVAL OVERRIDE OPTION: The vehicle is equipped with an override device that allows the user to Remove the key from the "starting system without the transmission or gear selection control in the "park" position. Yes_____ No _____ If yes, describe the override device design and mode of activation: Fill in the section below that describes the condition for which the user is allowed to remove the key from the starting system without the transmission or gear selection control in the "park" position:	N/A*	
ELECTRICAL FAILURE In the event of an electrical failure, including battery discharge, key removal from the starting system without the transmission or gear selection control locked in "park" is permitted". Yes_____ No _____	N/A*	
OVERRIDE DEVICE WITH NO COVER: The following condition is prevented: Steering_____ Self-Mobility_____ The device requires both the use of a tool to activate and simultaneous activation of the override device and removal of the key from the starting system Yes_____ No_____	N/A	
OVERRIDE DEVICE WITH AN OPAQUE COVER The following condition is prevented: Steering_____ Self-Mobility_____ The device is covered by an opaque surface which prevents sight of and use of the device. Yes_____ No_____ The opaque surface can only be removed by using a screwdriver or other tool: Yes_____ No_____	N/A	

REMARKS: * Manual Transmission

DATA SHEET 3 continued

REQUIREMENT S5.2.4	PASS	FAIL
GEAR SELECTION CONTROL OVERRIDE DEVICE The vehicle is equipped with an override device that allows the user to move the gear selection control from "park" after the key has been removed from the starting system. Yes_____ No_____ If yes, select the type of override device used: Key_____ Opaque Cover_____ No Cover_____ Describe the override device design and mode of activation (if equipped): Small cover on right side of shifter which when removed allows a key to be inserted to release shifter. **FILL IN THE SECTION BELOW THAT APPLIES:** OVERRIDE OPERATED WITH KEY: The key is required to operate the override device that allows the user to move the gear selection control from "park" after the key has been removed from the starting system. Yes_____ No_____ OVERRIDE DEVICE WITH NO COVER As a direct result of removing the key from the starting system, the following is prevented: Steering_____ Self-Mobility_____ The override device requires the use of a tool to operate. Yes_____ No_____ Simultaneous activation of the override device and movement of the gear selection control from "park" is required Yes_____ No_____ OVERRIDE DEVICE WITH AN OPAQUE COVER As a direct result of removing the key from the starting system, the following is prevented: Steering_____ Self-Mobility_____ The opaque surface cover prevents sight of and use of the device: Yes_____ No_____ The opaque surface cover can only be removed by using a screwdriver or other tool: Yes_____ No_____	N/A* N/A* N/A* N/A*	

REMARKS: * Manual Transmission

DATA SHEET 3 continued

REQUIREMENTS S5.2.5	PASS	FAIL
VEHICLE FACING UPHILL ON 10% GRADE With the gear selection control in “park” measure movement of the vehicle down the slope upon releasing the service brake. Test grade: _____ % (9% to 15%) Measured movement:_____ mm (150mm maximum) **NOTE:** Repeat procedure if vehicle fails on grade in excess of 10%. Test grade: _____ % (9% to 10%) Measured movement: _____ mm (150 mm maximum)	N/A*	
VEHICLE FACING DOWNHILL ON 10% GRADE With the gear selection control in “park” measure movement of the vehicle down the slope upon releasing the service brake. Test grade: _____ % (9% to 15%) Measured movement:_____ mm (150mm maximum) **NOTE:** Repeat procedure if vehicle fails on grade in excess of 10%. Test grade: _____ % (9% to 10%) Measured movement: _____ mm (150 mm maximum)	N/A*	

REMARKS: * Manual Transmission

DATA SHEET 3 continued

REQUIREMENTS S5.3	PASS	FAIL
With the key in the "OFF" position, the transmission will shift out of "PARK" without the service brake being applied. Yes____ No___	N/A*	
With the key in the "ACC" position, the transmission will shift out of "PARK" without the service brake being applied. Yes____ No ___	N/A*	
With the key in the "ON" position (engine off), the transmission will shift out of "PARK" without the service brake being applied. Yes____ No___	N/A*	
With the key in the "START" position, the transmission will shift out of "PARK" without the service brake being applied. Yes____ No____	N/A*	
With the key in the "OTHER" position (please specify), the transmission will shift out of "PARK" without the service brake being applied. Yes____ No____	N/A*	
Does the key stay between starting system positions without being held by operator? Yes____ No____ If so, please describe.	N/A*	
With the vehicle battery disconnected, the gear selection control is locked in the "PARK" position. Yes____ No____	N/A*	
Brake force readings (force required to allow the transmission to shift out of "park"):		
The vehicle is equipped with adjustable pedals: Yes____ No___	N/A*	
Fore Position: Aft Position (if applicable)		
Reading 1 _____ Reading 1 _____ Reading 2 _____ Reading 2 _____ Reading 3 _____ Reading 3 _____ Reading 4 _____ Reading 4 _____ Reading 5 _____ Reading 5 _____ Avg. _____ Avg. _____		
*For vehicles equipped with adjustable pedals, record readings for both the Fore and Aft positions. For non-adjustable pedal vehicles, use the Fore position column to record values.	____	

REMARKS: * Manual Transmission

RECORDED BY: G. Farrand DATE: 04/12/11

APPROVED BY: D. Messick

SECTION 4
TEST EQUIPMENT LIST

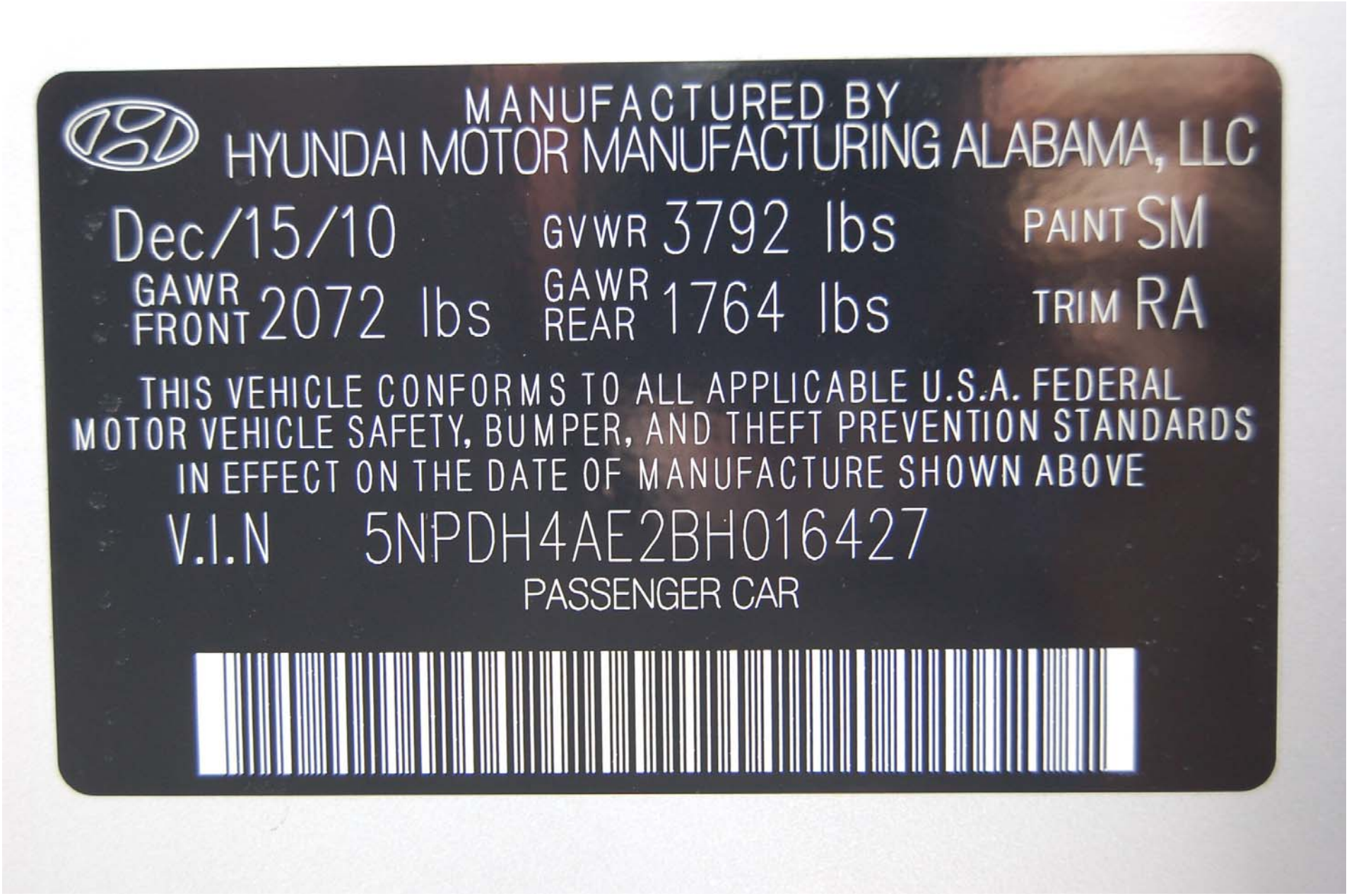
ITEM	MFR	MODEL	S/N	CAL. PERIOD	DATE OF NEXT CALIB.	REMARKS
SLR DIGITAL CAMERA	NIKON	D50	N/A	N/A	N/A	
TIRE PRESSURE GAUGE	WESKLER	45-0/100	107	12 MO.	04/11	
INCLINOMETER	MITUTOYO	PRO 360	950-315	N/A	BEFORE USE	
STEEL TAPE	STANLEY	FAT MAX	33-890	12 MO.	01/12	
WHEEL SCALES	INTERCOMP	SERIES 94	199744	12 MO.	03/12	
WHEEL SCALES	INTERCOMP	SERIES 94	199744	12 MO.	03/12	
WHEEL SCALES	INTERCOMP	SERIES 94	199744	12 MO.	03/12	
WHEEL SCALES	INTERCOMP	SERIES 94	199744	12 MO.	03/12	
SPRING SCALE	CHATILLON	DPP-10	4729	12 MO.	BEFORE USE	

SECTION 5

PHOTOGRAPHS

2011 HYUNDAI ELANTRA
NHTSA NO. CB0509
FMVSS NO. 114

FIGURE 5.1
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE



2011 HYUNDAI ELANTRA
NHTSA NO. CB0509
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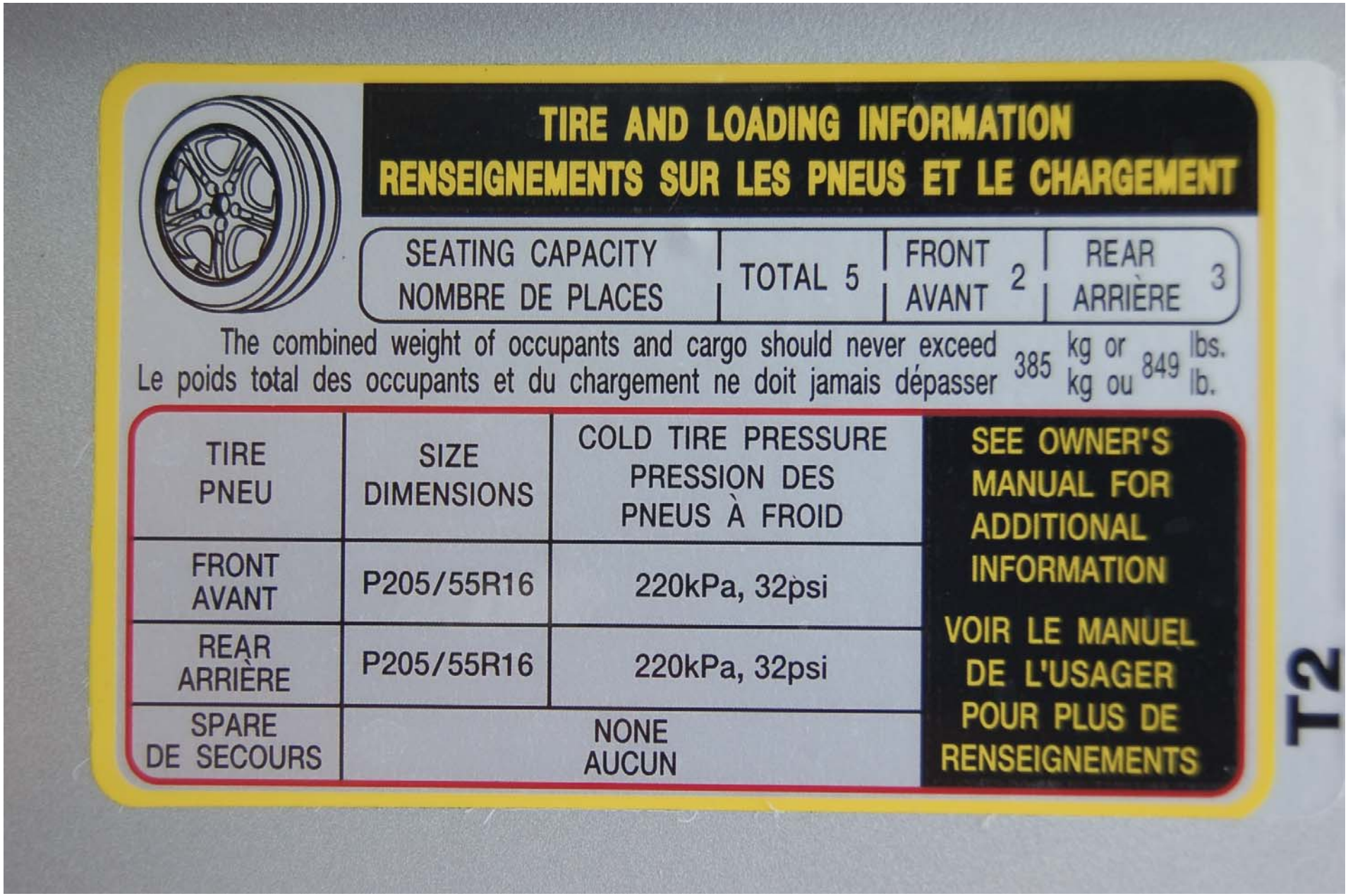
FIGURE 5.2
VEHICLE CERTIFICATION LABEL



2011 HYUNDAI ELANTRA
NHTSA NO. CB0509
FMVSS NO. 114

FIGURE 5.3
VEHICLE TIRE INFORMATION LABEL

2011 HYUNDAI ELANTRA
NHTSA NO. CB0509
FMVSS NO. 114

FIGURE 5.4
CLOSE-UP VIEW OF IGNITION KEY

2011 HYUNDAI ELANTRA
NHTSA NO. CB0509
FMVSS NO. 114

FIGURE 5.5
IGNITION SWITCH

2011 HYUNDAI ELANTRA
NHTSA NO. CB0509
FMVSS NO. 114

FIGURE 5.6
TRANSMISSION GEAR SELECTION CONTROL