

637797

REPORT NUMBER 110-UTQ-05-001

**SAFETY COMPLIANCE TESTING FOR  
FMVSS NO. 110  
TIRE SELECTION AND RIMS**

**GENERAL MOTORS CORPORATION  
2005 CADILLAC CTS, PASSENGER CAR  
NHTSA NO. C50111**

**UTQG FACILITY  
131 COMANCHE TRAIL, BUILDING 3527  
GOODFELLOW AFB, TEXAS 76908**



APRIL 8, 2005

FINAL REPORT

PREPARED FOR

**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, D.C. 20590**

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## SECTION 1

### INTRODUCTION

#### 1.1 PURPOSE OF COMPLIANCE TEST

A 2005 Cadillac CTS four-door passenger car was tested to determine if the vehicle was in compliance with the requirements of the standard. All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure, TP-110P-00 dated January 5, 2005.

#### 1.2 TEST VEHICLE

The test vehicle was a 2005 Cadillac CTS four-door passenger car. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: 1G6DP567650153961

B. NHTSA No.: C50111

C. Manufacturer: GENERAL MOTORS CORPORATION

D. Manufacture Date: 10/04

#### 1.3 TEST DATE

The test vehicle was tested on February 16, 2005.

## SECTION 2

### TEST PROCEDURE AND SUMMARY OF RESULTS

#### 2.1 TEST PROCEDURE

Prior to test, the test vehicle was inspected for completeness, systems operability and appropriate fuel and liquid levels, i.e., oil and coolant. The vehicle was then photographically documented. After marking wheel-to-hub location, the right front wheel was removed from the vehicle. The tire and rim were inspected and identifying data was obtained. Photographs were taken of the tire and rim's pertinent information.

Subsequent events included weighing the vehicle to establish delivered curb weight and the distribution of weight on the front and rear axles and each wheel position. At each step of the ballasting procedure, data was recorded and ballast was photographically documented for Full Occupant Load, and Maximum Vehicle Load weight. Vehicle was ballasted to Normal Load weight, Full Occupant Load, and Maximum Vehicle Load weight. The vehicle maximum load on each wheel was measured. Data from each tire furnished with the vehicle were recorded. The vehicle tire placard was photographed and checked for compliance to location, format, and information requirements.

#### 2.2 SUMMARY OF RESULTS

The data indicate compliance of the car with all requirements tested.

SECTION 3  
TEST DATA

**DATA SUMMARY SHEET**

VEHICLE MAKE/MODEL/BODY STYLE: 2005 Cadillac CTS four-door sedan

VEHICLE NHTSA NO.: C50111 VIN: 1G6DP567650153961

VEHICLE TYPE: Passenger Car DATE OF MANUFACTURE: 10/04

LABORATORY: UTQG Facility

**PASSENGER CAR REQUIREMENTS**

**PASS/FAIL**

**General (Data Sheet 2)**

The vehicle must be equipped with tires that meet the requirements of S109. (S110, S4.1(a)) PASS

**Tire Load Limits (Data Sheet 5)**

The vehicle maximum load on the tire shall not be greater than the maximum load rating as marked on the sidewall of the tire. (S110, S4.2.1) PASS

The vehicle normal load on the tire shall not be greater than the high speed performance test load specified in S5.5 of S109. (S110, S4.2.2) PASS

**Placard and Tire Inflation Pressure Label (Data Sheets 4 and 5)**

The placard and tire inflation pressure label (if provided) are affixed and located correctly, and display the information and format required. (S110, S4.3) PASS

No inflation pressure other than the maximum permissible inflation pressure may be shown on the placard and, if any, tire inflation pressure label unless as required. (S110, S4.3.4) PASS

**Rims (Data Sheets 3)**

Each rim shall be constructed to the dimensions of a rim specified for the tire size equipped on the vehicle. (S110, S4.4.1(a)) PASS

**Owner's Manual (Data Sheet 6)**

Owner's manual or other document has discussion of Vehicle Placard, Loading and Tires. (575.6 (a) (4)) PASS

Owner's manual includes exact statement relating to "Steps for Determining Correct Load Limits." (575.6(a)(5)) PASS



**DATA SHEET 1  
TEST VEHICLE INFORMATION/RECEIVING INSPECTION**

VEHICLE MAKE/MODEL/BODY STYLE: 2005 Cadillac CTS four-door sedan

NHTSA No.: C50111 TEST DATE: 02/16/05

VIN: 1G6DP567650153961 MANUFACTURE DATE: 10/04

GVWR: 2089 kg (4606 lbs.) FRONT GAWR: 1002 kg (2209 lbs.)  
REAR GAWR: 1087 kg (2397 lbs.)

SEATING POSITIONS: FRONT 2 MID        REAR 3

ODOMETER READING AT START OF TEST: 130.4 KILOMETERS (81 MILES)

ENGINE DATA: 6 Cylinders 3.6 Liters        Cubic Inches

TRANSMISSION DATA: X Automatic        Manual 5 No. of Speeds

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

**CHECK APPROPRIATE BOXES FOR INSTALLED VEHICLE EQUIPMENT:**

<input checked="" type="checkbox"/>	Air Conditioning	<input checked="" type="checkbox"/>	Traction Control	<input type="checkbox"/>	Clock
<input checked="" type="checkbox"/>	Tinted Glass	<input checked="" type="checkbox"/>	Tachometer	<input type="checkbox"/>	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	<input type="checkbox"/>	Sun Roof or T-Top	<input checked="" type="checkbox"/>	Passenger Air Bag
<input checked="" type="checkbox"/>	Power Seat(s)	<input checked="" type="checkbox"/>	Tilt Steering Wheel	<input checked="" type="checkbox"/>	Side Curtain Air Bag(s)
<input checked="" type="checkbox"/>	Power Brakes	<input checked="" type="checkbox"/>	Stereo	<input checked="" type="checkbox"/>	Front Disc Brakes
<input checked="" type="checkbox"/>	Antilock Brake System	<input type="checkbox"/>	Telephone	<input checked="" type="checkbox"/>	Rear Disc Brakes
<input type="checkbox"/>	Navigation System	<input type="checkbox"/>	Trailer Hitch	<input type="checkbox"/>	Other -

**REMARKS:**

RECORDED BY: David Banks DATE: 2/16/05

APPROVED BY: RH Gregg



**DATA SHEET 3  
VEHICLE RIM IDENTIFICATION**

VEHICLE MAKE/MODEL/BODY STYLE: 2005 Cadillac CTS four-door sedan

VEHICLE NHTSA NO. C50111 VIN: 1G6DP567650153961

LABORATORY: UTQG Facility TEST DATE: 2/16/05

<b>Rim Markings (if available):</b>	<b>Right Front</b>	<b>Left Rear</b>
Manufacturer's Name, Symbol or Trademark	<u>GM</u>	<u></u>
Rim Size	<u>16x7J</u>	<u></u>
Load Rating and Max Inflation Pressure	<u>N/A</u>	<u></u>
Date of Manufacture	<u>10/06/04</u>	<u></u>
Does Rim contain "DOT" symbol? (YES/NO)	<u>No</u>	<u></u>
Other Rim Markings	<u>16.0x7.0Jx51.0, XR, 5 ADR BM</u>	<u></u>

Rim Inspection Comments:

Tire Inspection Comments:

<b>Rim Size:</b>	<b>Tire Size</b>	<b>Measured Rim Width</b>	<b>Measured Rim Diameter</b>	<b>Measurement Method</b>
Right Front Wheel	<u></u>	<u></u>	<u></u>	<u></u>
Left Rear Wheel	<u></u>	<u></u>	<u></u>	<u></u>

Does stamped rim size (if available) agree with the measured rim size? (X) Not Applicable  
Right front rim ( ) YES ( ) NO; Left rear rim ( ) YES ( ) NO

Installed rims are suitable for installed tires? (X) YES ( ) NO  
Reference document: Tire and Rim Association Inc. Yearbook 2004

DATA INDICATES COMPLIANCE: PASS/FAIL Pass

REMARKS:

RECORDED BY: David Banks DATE: 02/16/05

APPROVED BY: RH Hagg

**DATA SHEET 4 (1 of 2)**  
**VEHICLE PLACARD, AND TIRE INFLATION PRESSURE LABEL**

VEHICLE MAKE/MODEL/BODY STYLE: 2005 Cadillac CTS four-door sedan

VEHICLE NHTSA NO. C50111

VIN: 1G6DP567650153961

LABORATORY: UTQG Facility

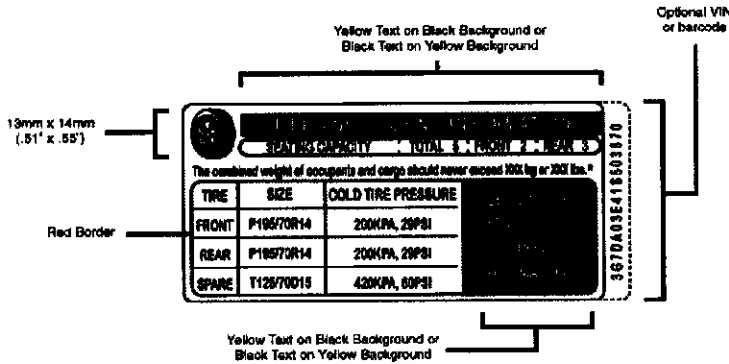
TEST DATE: 2/16/05

**Identification of Vehicle Labeling**

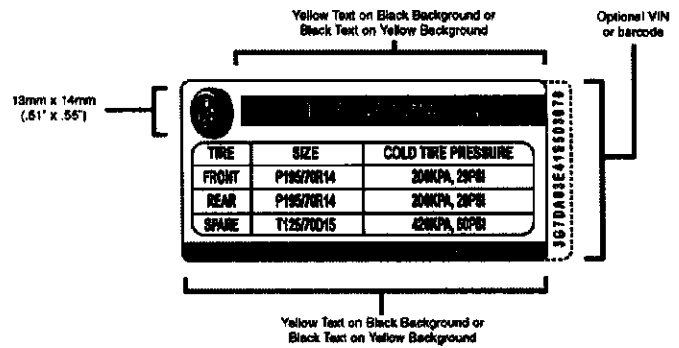
	(Yes/No)	Location	PASS/FAIL
1. Certification Label	<u>Yes</u>	<u>Driver door edge</u>	<u>N/A</u>
2. Vehicle Placard*	<u>Yes</u>	<u>B pillar</u>	<u>Pass</u>
3. Tire Inflation Pressure Label*	<u>N/A</u>	<u>N/A</u>	<u></u>

\* Labels must be located as specified in section 7.4 of this test procedure.

Vehicle Placard



Tire Inflation Pressure Label



**Labeling Notes:**

1. Tire size and pressure can be omitted from the Vehicle Placard if same data is displayed on a Tire Inflation Pressure Label.
2. The VIN or bar code, vertically located, is optional.
3. Tire size can include a tire load identification such as "XL" or "reinforced."
4. The tire "SIZE" heading can be replaced with "ORIGINAL TIRE SIZE" or "ORIGINAL SIZE."
5. The "SPARE" tire heading can be replaced with "SPARE TIRE."

**Vehicle Placard** has the exact color and format as specified in the above figure and text is in English language. ( ) YES (X) NO

If no explain Seating capacity: total 5, front 2, center 0, rear 3

**Tire Inflation Pressure Label**, if provided, has the exact color and format as specified in the above figure and text is in English language. ( ) YES ( ) NO

If no explain N/A

DATA SHEET 4 (2 of 2)

Vehicle Placard and, if provided, Tire Inflation Pressure Label are permanently affixed.  
(X)YES ( )NO

Vehicle Placard information:

Combined weight of occupants and cargo 400 kg (882 lbs)

Seating Capacity: Total 5; Front 2; Rear 3

Is the number of belted seating positions the same as the labeled seating capacity? (X)YES ( )NO

If no explain \_\_\_\_\_

Is the tire size and pressure provided? (X)YES ( )NO

If no, is the tire size and pressure provided on a Tire Inflation Pressure Label?  
( )YES ( )NO

Vehicle Placard or Tire Inflation Pressure Label tire information:

Tire size: Front P225/55R16 Rear P225/55R16

Tire Inflation Pressure: Front 210 kPa (30 psi) Rear 210 kPa (30 psi)

Are the sizes of the installed tires the same as the sizes of the labeled tires?  
(X)YES ( )NO

If no explain \_\_\_\_\_

Is the labeled cold tire inflation pressure equal to or less than the sidewall labeled maximum cold tire inflation pressure?

Front axle: (X)YES ( )NO Rear axle: (X)YES ( )NO

DATA INDICATES COMPLIANCE: PASS/FAIL Pass (see remarks)

REMARKS: Vehicle placard does not comply with format. Seating capacity includes a center position - "Total 5 Front 2 Center 0 Rear 3"

RECORDED BY: David Banks

DATE: 2/16/05

APPROVED BY: Rh Anag

**DATA SHEET 5 (1 of 4)**  
**CURB WEIGHT, NORMAL LOAD WEIGHT & MAXIMUM VEHICLE WEIGHT**

VEHICLE MAKE/MODEL/BODY STYLE: 2005 Cadillac CTS four-door sedan

VEHICLE NHTSA NO. C50111 VIN: 1G6DP567650153961

LABORATORY: UTQG Facility TEST DATE: 2/16/05

Full Fluid Levels: Fuel Y Coolant Y Other Fluids \_\_\_\_\_ (specify)

Tire Pressures: 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 447.7 kg (987 lbs.) LR 389.6 kg (859 lbs.)  
RF 450.4 kg (993 lbs.) RR 390.5 kg (861 lbs.)

Front Axle 898.1 kg (1980 lbs.) Rear Axle 780.2 kg (1720 lbs.)

Total Vehicle 1678.3 kg (3700 lbs)

**B. MEASURED VEHICLE NORMAL LOAD WEIGHT**

(1) Total Seating Capacity from Vehicle Placard = 5

(2) Normal Load Number of Occupants 3  
[from Normal Occupant Weight Table in Section 4]

Occupant Distribution: Front Seat- 2 Second Seat- 1  
[from Occupant Distribution Table in Section 4]

(3) Total Normal Occupant Load 204.1 kg (450 lbs.)  
[# of occupants from B.(2) x 68 KG per occupant]

(4) Measured Normal Load on Axles

LF 490.3 kg (1081 lbs.) LR 447.2 kg (986 lbs.)  
RF 495.8 kg (1093 lbs.) RR 448.2 kg (988 lbs.)

Front Axle 986.1 kg (2174 lbs.) Rear Axle 895.4 kg (1974 lbs.)

\* Measured vehicle weights were recorded in pounds. Metric weights shown are mathematical conversions

**DATA SHEET 5 (2 of 4)**  
**CURB WEIGHT, NORMAL LOAD WEIGHT & MAXIMUM VEHICLE WEIGHT**

- (5) Calculated Vehicle Normal Load on the Tire  
 Front Tires [measured front axle normal load/2] = 493.1 kg (1087 lbs.)  
 Rear Tires [measured rear axle normal load/2] = 447.7 kg (987 lbs.)

- (6) High Speed Test Load From FMVSS 109 (S5.5)

	Front Axle	Rear Axle
Installed Tire Size	<u>P225/55R16</u>	<u>P225/55R16</u>
Max. Load Rating on Sidewall	<u>670 kg (1477 lbs.)</u>	<u>670 kg (1477 lbs.)</u>
High Speed Test Load (88% of sidewall max. load rating)	<u>589.7 kg (1300 lbs.)</u>	<u>589.7 kg (1300 lbs.)</u>

Vehicle Normal Load on the Tire must not be greater than the High Speed Test Load

		PASS/FAIL
[B.(5)<B.(6)]	Front Tires	<u>Pass</u>
	Rear Tires	<u>Pass</u>

**C. MEASURED VEHICLE WEIGHT WITH FULL OCCUPANT LOAD**

- (1) Seating Capacity from Placard:

Total 5 Front 2 Rear 3

- (2) Full Occupant Load 340.2 kg (750 lbs.)  
 [# of total occupants from C.(1) x 68 KG per occupant]

- (3) Measured Vehicle Weight with Full Occupant Load

LF <u>503.0 kg (1109 lbs.)</u>	LR <u>502.1 kg (1107 lbs.)</u>
RF <u>516.2 kg (1138 lbs.)</u>	RR <u>496.7 kg (1095 lbs.)</u>

Front Axle 1019.2 kg (2247 lbs.) Rear Axle 998.8 kg (2202 lbs.)

Total Vehicle 2018.0 kg (4449 lbs.)

**DATA SHEET 5 (3 of 4)**  
**CURB WEIGHT, NORMAL LOAD WEIGHT & MAXIMUM VEHICLE WEIGHT**

**D. MEASURED MAXIMUM VEHICLE LOAD WEIGHT**

- (1) Vehicle Capacity Weight (from placard) 400 kg (882 lbs.)
- (2) Full Occupant Load (from C.(2) above)) 340.2 kg (750 lbs.)
- (3) Luggage/Cargo Load (subtract (2) from (1)) 59.9 kg (132 lbs.)
- (4) Measured Vehicle Maximum Load on Axles

LF 500.0 kg (1102 lbs.)    LR 537.1 kg (1184 lbs.)  
 RF 508.5 kg (1121 lbs.)    RR 533.9 kg (1177 lbs.)

Front Axle 1008.3 kg (2223 lbs.)      Rear Axle 1070.9 kg (2361 lbs.)

Total Vehicle 2079.3 kg (4584 lbs.)

- (5) Calculated Vehicle Maximum Load on the Tire  
 Front Tires [measured front axle maximum load/2] = 504.2 kg (1111.5 lbs.)  
 Rear Tires [measured rear axle maximum load/2] = 535.5 kg (1180.5 lbs.)
- (6) Tire Sidewall Maximum Load Ratings

	Front	Rear
Installed Tire Size	<u>P225/55R16</u>	<u>P225/55R16</u>
Max. Load Rating on Sidewall	<u>670 kg (1477 lbs.)</u>	<u>670 kg (1477 lbs.)</u>

Vehicle Maximum Load on the tire must not be greater than the Maximum Load Rating Marked on the Tire Sidewall.

	Pass/Fail
[D.(5)<D.(6)] Front Tires	<u>Pass</u>
Rear Tires	<u>Pass</u>





**DATA SHEET 6 (1 of 2)**  
**OWNER'S MANUAL REQUIREMENTS**

VEHICLE MAKE/MODEL/BODY STYLE: 2005 Cadillac CTS four-door sedan

VEHICLE NHTSA NO. C50111 VIN: 1G6DP567650153961

LABORATORY: UTQG Facility TEST DATE: 2/16/05

**Owner's Manual Discusses:**

Part 575.6(a) Paragraph	Required Discussion Topic	Discussed in Manual? (YES/NO)
(4)(i)	Tire labeling, including a description and explanation of each marking on the tires provided with the vehicle, and information about the location of the Tire Identification Number (TIN).	Yes
(4)(ii)	(A) Description and explanation of recommended cold tire inflation pressure.	Yes
	(B) Description and explanation of FMVSS 110 Vehicle Placard and Tire Inflation Pressure Label and their location(s).	Yes
	(C) Description and explanation of adverse safety consequences of under-inflation including tire failure.	Yes
	(D) Description and explanation for measuring and adjusting air pressure to achieve proper inflation.	Yes
(4)(iii)	Glossary of tire terminology, including "cold tire pressure," maximum inflation pressure," and "recommended inflation pressure," and all non-technical terms defined in S3 of FMVSS 110 & 139.	Yes
(4)(vi)	Tire care, including maintenance and safety practices.	Yes
(4)(v)	(A) Description and explanation of locating and understanding load limit information, total load capacity, seating capacity, towing capacity, and cargo capacity.	Yes
	(B) Description and explanation for calculating total and cargo load capacities with varying seating configurations including quantitative examples showing/illustrating how the vehicle's cargo and luggage capacity decreases as the combined number and size of occupants increases.	Yes
	(C) Description and explanation for determining compatibility of tire and vehicle load capabilities.	Yes
	(D) Description and explanation of adverse safety consequences of overloading on handling and stopping and on tires.	Yes

**DATA SHEET 6 (2 of 2)**  
**OWNER'S MANUAL REQUIREMENTS**

The following verbatim statement, in the English language, is provided in the Owner's Manual. Reference Part 575.6(a)(5)      YES ( X )    NO (   )

**Steps for Determining Correct Load Limit ---**

- (1) Locate the statement "The combined weight of occupants and cargo should never exceed XXX kg or XXX lbs." on your vehicle's placard.
- (2) Determine the combined weight of the driver and passengers that will be riding in your vehicle.
- (3) Subtract the combined weight of the driver and passengers from XXX kg or XXX lbs.
- (4) The resulting figure equals the available amount of cargo and luggage load capacity. For example, if the "XXX" amount equals 1400 lbs. and there will be five 150 lb passengers in your vehicle, the amount of available cargo and luggage load capacity is 650 lbs. (1400-750 (5x150) = 650 lbs.)
- (5) Determine the combined weight of the luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity calculated in Step 4.
- (6) If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult this manual to determine how this reduces the available cargo and luggage load capacity of your vehicle.

DATA INDICATES COMPLIANCE:

PASS/FAIL:      Pass

REMARKS:

RECORDED BY: David Banks ;      DATE: 02/16/05

APPROVED BY: Rh Hregg

SECTION 4

INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

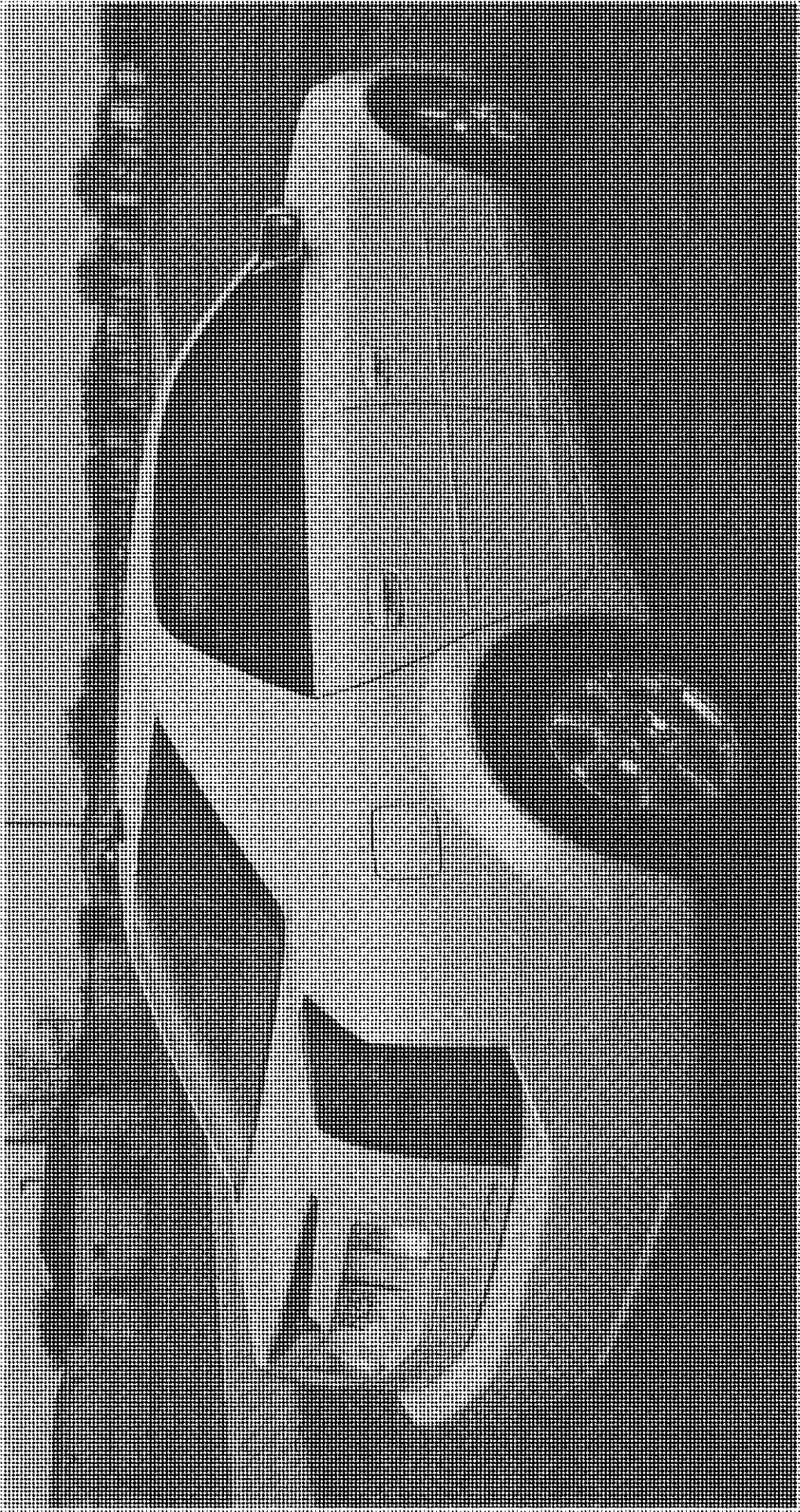
EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO	CAL. DATE	NEXT CAL. DATE
FLOOR SCALES @ TTF FACILITY (VEHICLE)	THURMAN SCALES TYPE A, SIGNATURE SERIES 2100 LOAD- O-METER	2055188 10103 11664 10102	2/16/2005 2/16/2005 2/16/2005 2/16/2005	BEFORE USE
AIR PRESSURE GAUGE	ASHCROFT GENERAL PURPOSE DIGITAL GAUGE	D1005PS/ 1001297	11/16/2004	11/16/2005
CARPENTER'S LEVEL	JOHNSON COMPANY	N/A	N/A	N/A
PLATFORM SCALES (BALLAST)	HOWE RICHARDSON	MODEL #6401 0181-5509-26	2/16/2005	BEFORE NEXT USE

SECTION 5  
PHOTOGRAPHS



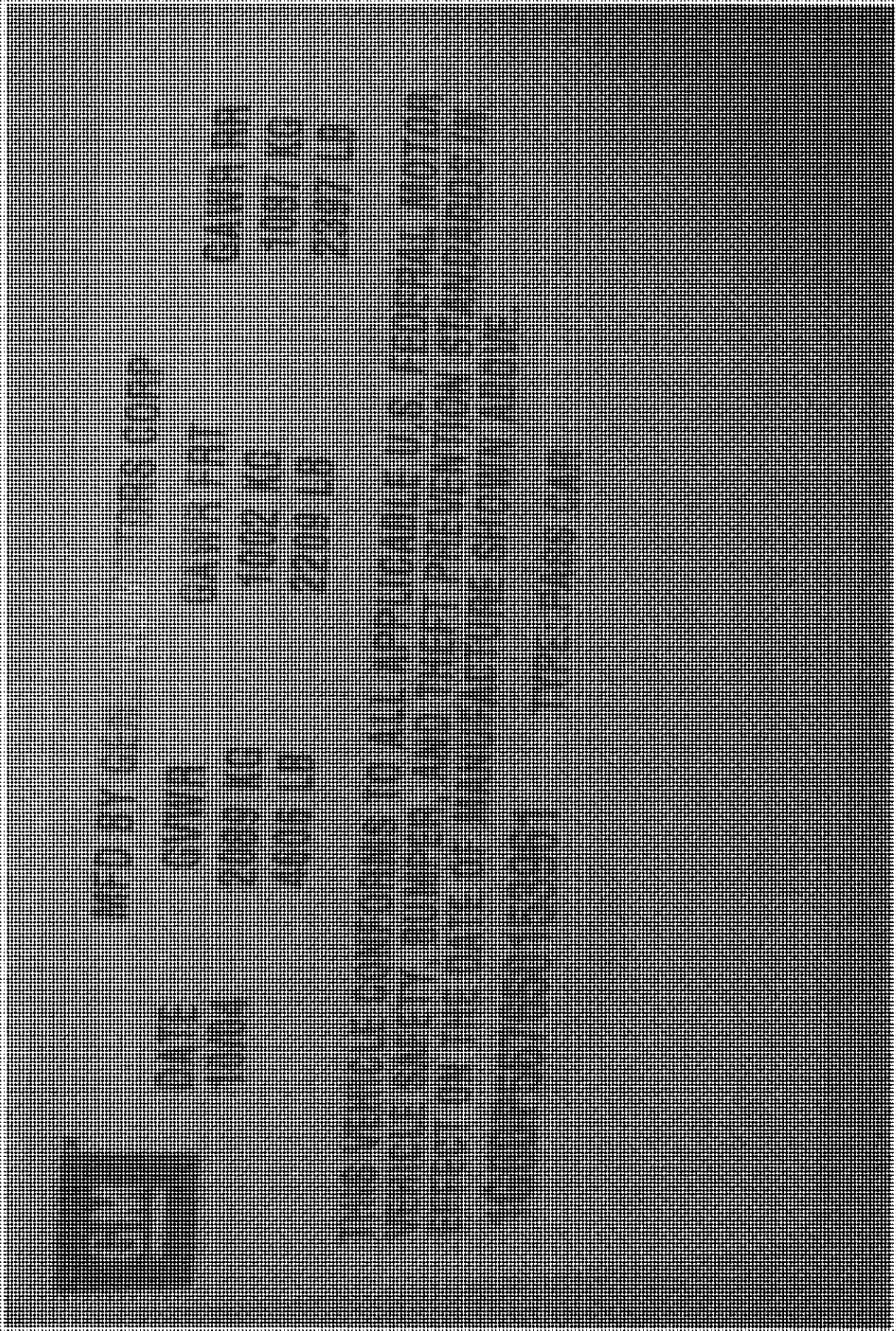
2015 GACILLAC STS  
NEISSA NO. 020111  
FMVSS NO. 110

FIGURE 5.7  
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE



2005 CADILLAC QTS  
NHTSA NO. C50111  
FMVSS NO. 110

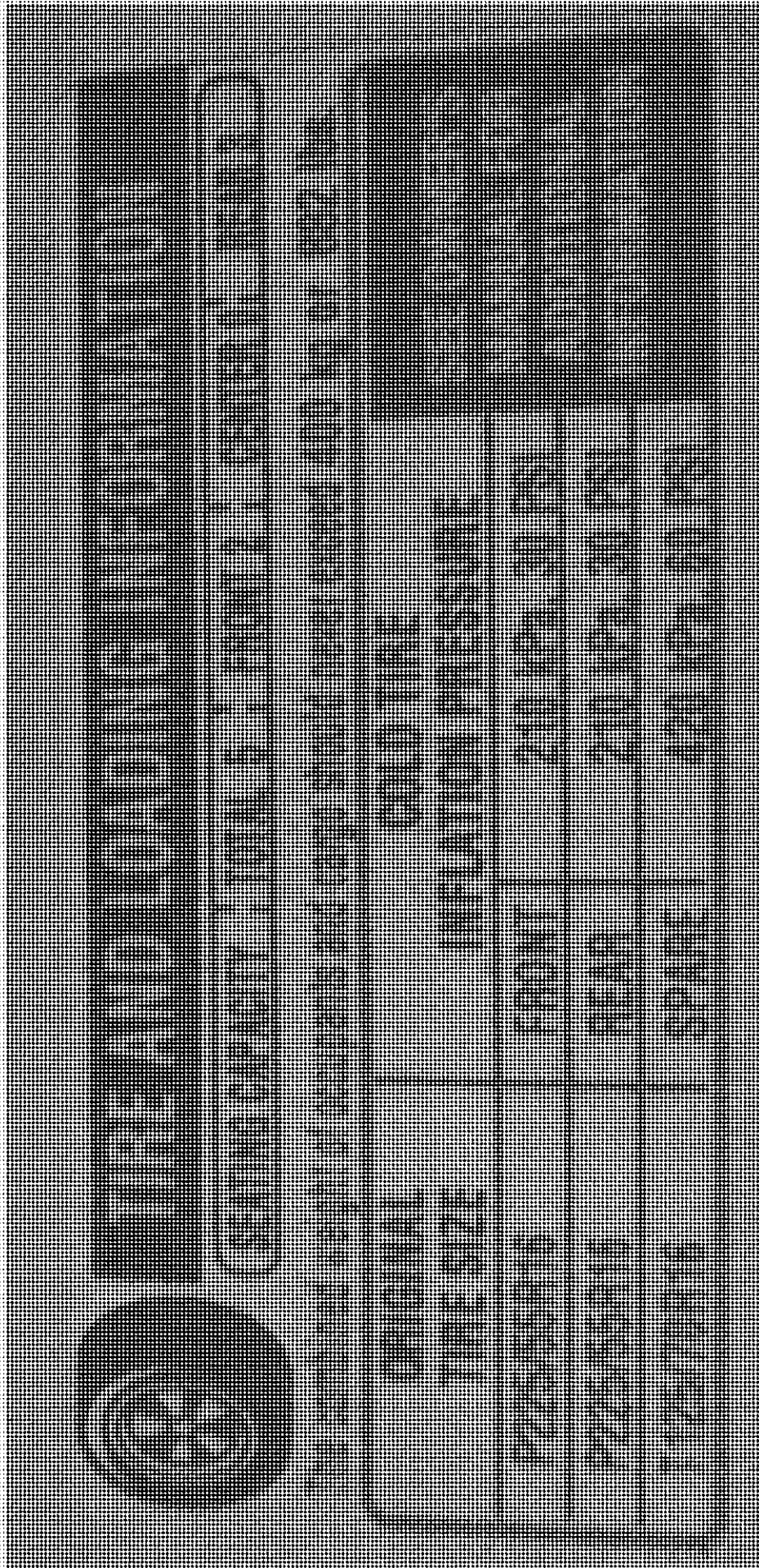
FIGURE 5.2  
REAR FROM RIGHT SIDE OF VEHICLE



2005 CADILLAC CTS  
NHTSA NO. C50111  
FMVSS NO. 116

FIGURE 4B  
VEHICLE CERTIFICATION LABEL





RINK, CADILLAC CTS  
NHTSA NO. 050111  
EMVSS NO. 110

FIGURE 5-4  
VEHICLE PLACARD



2005 CAHLLAG 015  
NHTSA NO. 050111  
EAVSS NO. 110

FIGURE 8-9  
TIRE SHOWING BRAND

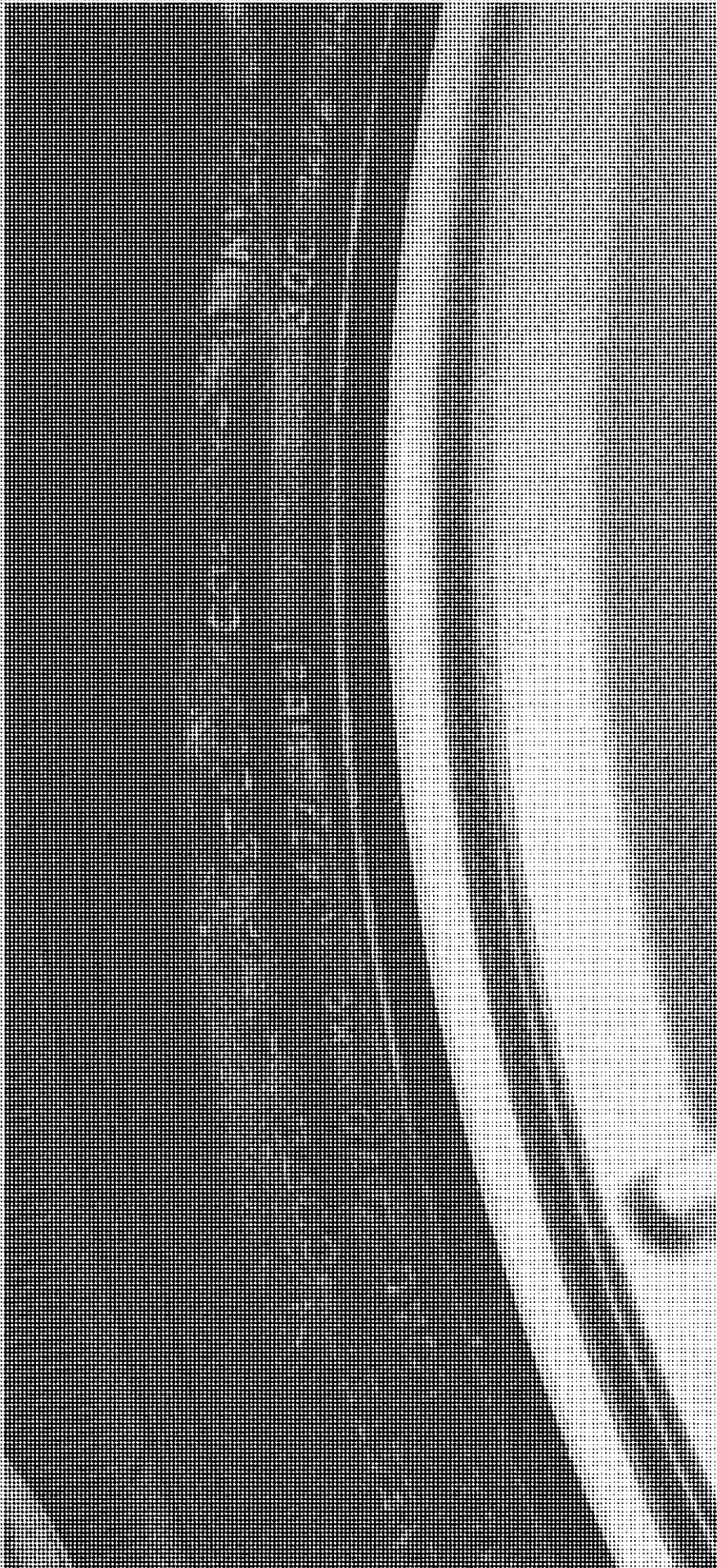


2005 CASHLAC CMS  
NHISA NO. C5011  
PASS NO. 110

FIGURE 5-5  
TIRE SHOWING THE NAME

FIGURE 57  
TIRE SHOWING SIZE, LOAD INDEX, AND SPEED SYMBOL

2005 CADILLAC CTS  
NHTSA NO. C59011  
FMVSS NO. 110



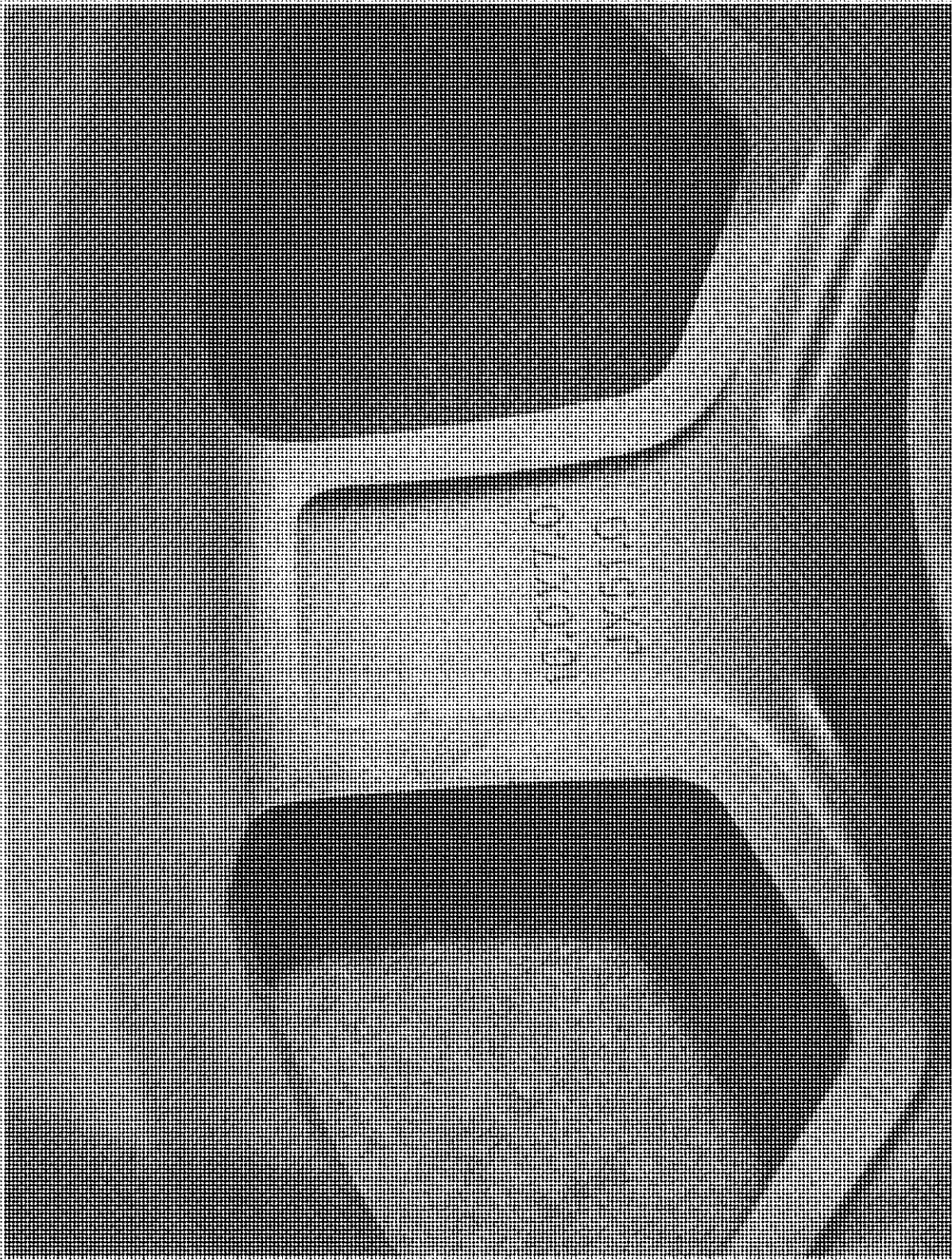
GM CADILLAC CES  
NHTSA NO. 05011  
FMVSS NO. 115

FIGURE 5-6  
TIRE SHOWING MAX LOAD RATINGS



4555 CADILLAC CTS  
NHTSA NC 65011  
FMVSS NC 130

FIGURE 5.3  
TIRE SHOWING MAX INFLATION PRESSURE



2005 CADILLAC CTS  
NHTSA NO. C50111  
FMVSS NO. 110

FIGURE 5.10  
P147 SHOWING SIZE



2005 CADILLAC CTS  
NHTSA NO. C50111  
FMVSS NO. 510

FIGURE 5-11  
RIM SHOWING MANUFACTURER





2003 CADILLAC CTS  
NHTSA NO. Q30111  
FMVSS NO. 119

FIGURE 5.12  
VEHICLE FRONT SEAT BALLASTED FOR MAXIMUM LOAD  
(DRIVER AND PASSENGER)



2005 CADILLAC CT5  
NHTSA NO. C80111  
FMVSS NO. 210

FIGURE 5-19  
VEHICLE REAR SEAT BALLAST FOR MAXIMUM LOAD  
(THREE-PASSENGER)



2005 CADILLAC CTS  
NHTSA NO. 65011  
EPA/SAFETY NO. 310

FIGURE 6-14  
VEHICLE TRUNK SHOWN BALLASTED FOR CARGO



2005 CADILLAC CTS  
NHTSA NO. DE955  
FMVSS NO. 110

FIGURE E-15  
VEHICLE ON SCALES

## 2005 Cadillac CTS/CTS-V Owner Manual

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This manual includes the latest information at the time it was printed. We reserve the right to make changes after that time without notice. For vehicles first sold in Canada, substitute the name "General Motors of Canada Limited" for Cadillac Motor Car Division whenever it appears in this manual.

Keep this manual in the vehicle, so it will be there if it is needed while you are on the road. If the vehicle is sold, leave this manual in the vehicle.

Litho in U.S.A.  
Part No. 05CTS A First Edition

## Canadian Owners

A French language copy of this manual can be obtained from your dealer or from:

Helm, Incorporated  
P.O. Box 07130  
Detroit, MI 48207

## How to Use This Manual

Many people read the owner manual from beginning to end when they first receive their new vehicle. If this is done, it can help you learn about the features and controls for the vehicle. Pictures and words work together in the owner manual to explain things.

## Index

A good place to quickly locate information about the vehicle is the Index in the back of the manual. It is an alphabetical list of what is in the manual and the page number where it can be found.

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## Tire Pressure Light



This light will come on if the system detects low tire pressure.

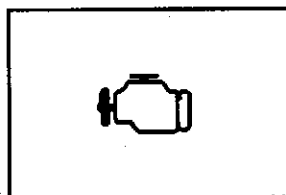
This light will also come on for a bulb check when the vehicle is started.

See *Tire Pressure Monitor System (CTS-V)* on page 5-65 for more information.

For more information on the proper tire pressure, see *Loading Your Vehicle* on page 4-33. For more information on your tires, see *Tires* on page 5-54.

## Malfunction Indicator Lamp

### Check Engine Light



Your vehicle is equipped with a computer which monitors operation of the fuel, ignition, and emission control systems.

This system is called OBD II (On-Board Diagnostics-Second Generation) and is intended to assure that emissions are at acceptable levels for the life of the vehicle, helping to produce a cleaner environment. The check engine light comes on to indicate that there is a problem and service is required. Malfunctions often will be indicated by the system before any problem is apparent. This may prevent more serious damage to your vehicle. This system is also designed to assist your service technician in correctly diagnosing any malfunction.

**Notice:** If you keep driving your vehicle with this light on, after awhile, your emission controls may not work as well, your fuel economy may not be as good, and your engine may not run as smoothly. This could lead to costly repairs that may not be covered by your warranty.

## Tire Pressure Warning Message



When you see this flashing symbol, one or more of the vehicle's tires is either under or over-inflated.

To acknowledge this warning, press either button on the outboard switch on the left spoke of the steering wheel. There are three levels of warning for this display:

1. High Tire Pressure (above 42 psi (290 kPa))
2. Low Tire Pressure (below 25 psi (170 kPa))
3. Flat Tire (below 5 psi (35 kPa))

For conditions 1 and 2, this warning will flash five times and the display will then show the tire pressure gage. For condition 3, this warning will flash continuously until the driver acknowledges it. In any of the three cases, the warning will redisplay every 10 minutes until the situation is corrected. Conditions 2 and 3 will also display a warning light elsewhere on the cluster that will stay illuminated after this warning is acknowledged. See *Tire Pressure Light* on page 3-45 for more information. Also see *Tire Pressure Monitor System (CTS-V)* on page 5-65 for more information on tire pressure specifications.



If you put things inside your vehicle, like suitcases, tools, packages, or anything else, they will go as fast as the vehicle goes. If you have to stop or turn quickly, or if there is a crash, they will keep going.

**⚠ CAUTION:**

**Things you put inside your vehicle can strike and injure people in a sudden stop or turn, or in a crash.**

- **Put things in the trunk of your vehicle. In a trunk, put them as far forward as you can. Try to spread the weight evenly.**
- **Never stack heavier things, like suitcases, inside the vehicle so that some of them are above the tops of the seats.**
- **Do not leave an unsecured child restraint in your vehicle.**
- **When you carry something inside the vehicle, secure it whenever you can.**
- **Do not leave a seat folded down unless you need to.**

## Towing

### Towing Your Vehicle

Consult your dealer or a professional towing service if you need to have your disabled vehicle towed. See *Roadside Service on page 7-6*.

If you want to tow your vehicle behind another vehicle for recreational purposes (such as behind a motorhome), see Recreational Vehicle Towing following.

### Recreational Vehicle Towing

Recreational vehicle towing means towing your vehicle behind another vehicle – such as behind a motorhome. The two most common types of recreational vehicle towing are known as “dinghy towing” (towing your vehicle with all four wheels on the ground) and “dolly towing” (towing your vehicle with two wheels on the ground and two wheels up on a device known as a “dolly”).

With the proper preparation and equipment, many vehicles can be towed in these ways. See “Dinghy Towing” and “Dolly Towing,” following.

Here are some important things to consider before you do recreational vehicle towing:

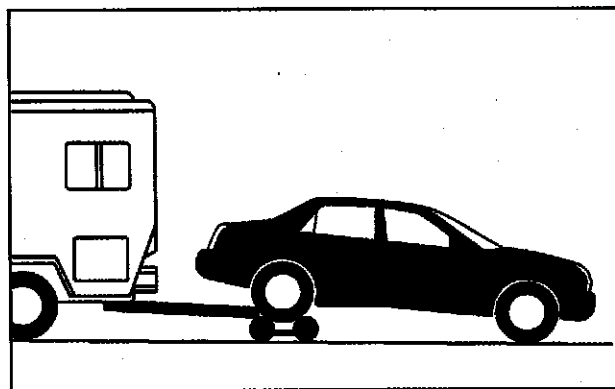
- What's the towing capacity of the towing vehicle? Be sure you read the tow vehicle manufacturer's recommendations.
- How far will you tow? Some vehicles have restrictions on how far and how long they can tow.
- Do you have the proper towing equipment? See your dealer or trailering professional for additional advice and equipment recommendations.
- Is your vehicle ready to be towed? Just as you would prepare your vehicle for a long trip, you'll want to make sure your vehicle is prepared to be towed. See *Before Leaving on a Long Trip* on page 4-24.

### Dinghy Towing

**Notice:** If you tow your vehicle with all four wheels on the ground, the drivetrain components could be damaged. The repairs would not be covered by your warranty. Do not tow your vehicle with all four wheels on the ground.

Your vehicle was not designed to be towed with all four wheels on the ground. If your vehicle must be towed, you should use a dolly. See "Dolly Towing" following for more information.

### Dolly Towing



Your vehicle can be towed using a dolly. To tow your vehicle using a dolly, follow these steps:

1. Put the rear wheels on the dolly.
2. Put the vehicle in PARK (P) for an automatic transmission or in NEUTRAL for a manual transmission.
3. Set the parking brake and then remove the key.
4. Clamp the steering wheel in a straight-ahead position with a clamping device designed for towing.
5. Release the parking brake.

## Towing a Trailer

### **⚠ CAUTION:**

**If you do not use the correct equipment and drive properly, you can lose control when you pull a trailer. For example, if the trailer is too heavy, the brakes may not work well — or even at all. You and your passengers could be seriously injured. You may also damage your vehicle; the resulting repairs would not be covered by your warranty. Pull a trailer only if you have followed all the steps in this section. Ask your dealer for advice and information about towing a trailer with your vehicle.**

Your vehicle can tow a trailer if it is equipped with the proper trailer towing equipment. To identify what the vehicle trailering capacity is for your vehicle, you should read the information in "Weight of the Trailer" that appears later in this section. But trailering is different than just driving your vehicle by itself. Trailering means changes in handling, acceleration, braking, durability and fuel economy. Successful, safe trailering takes correct equipment, and it has to be used properly.

That's the reason for this part. In it are many time-tested, important trailering tips and safety rules. Many of these are important for your safety and that of your passengers. So please read this section carefully before you pull a trailer.

Load-pulling components such as the engine, transmission, rear axle, wheel assemblies and tires are forced to work harder against the drag of the added weight. The engine is required to operate at relatively higher speeds and under greater loads, generating extra heat. What's more, the trailer adds considerably to wind resistance, increasing the pulling requirements.

## If You Do Decide to Pull a Trailer

If you do, here are some important points:

- There are many different laws, including speed limit restrictions, having to do with trailering. Make sure your rig will be legal, not only where you live but also where you'll be driving. A good source for this information can be state or provincial police.
- Consider using a sway control. You can ask a hitch dealer about sway controls.
- Don't tow a trailer at all during the first 500 miles (805 km) your new vehicle is driven. Your engine, axle or other parts could be damaged.
- Then, during the first 500 miles (805 km) that you tow a trailer, don't drive over 50 mph (80 km/h) and don't make starts at full throttle. This helps your engine and other parts of your vehicle wear in at the heavier loads.
- Obey speed limit restrictions when towing a trailer. Don't drive faster than the maximum posted speed for trailers, or no more than 55 mph (90 km/h), to save wear on your vehicle's parts.

Three important considerations have to do with weight:

- the weight of the trailer,
- the weight of the trailer tongue
- and the total weight on your vehicle's tires.

## Weight of the Trailer

How heavy can a trailer safely be?

It should never weigh more than 1,000 lbs (454 kg). But even that can be too heavy.

The CTS-V is not rated or designed to tow any trailer.

It depends on how you plan to use your rig. For example, speed, altitude, road grades, outside temperature and how much your vehicle is used to pull a trailer are all important. And, it can also depend on any special equipment that you have on your vehicle.

You can ask your dealer for our trailering information or advice, or you can write us at:

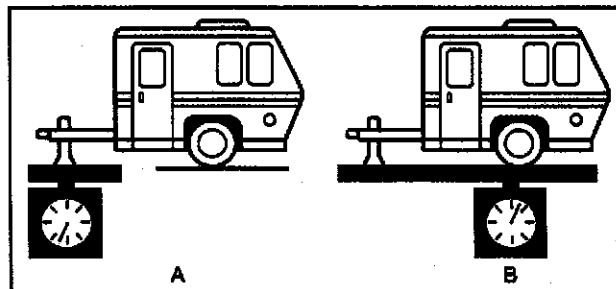
Cadillac Customer Assistance Center  
Cadillac Motor Car Division  
P.O. Box 33169  
Detroit, MI 48232-5169

In Canada, write to:

General Motors of Canada Limited  
Customer Communication Centre, 163-005  
1908 Colonel Sam Drive  
Oshawa, Ontario L1H 8P7

## Weight of the Trailer Tongue

The tongue load (A) of any trailer is an important weight to measure because it affects the total or gross weight of your vehicle. The Gross Vehicle Weight (GVW) includes the curb weight of the vehicle, any cargo you may carry in it, and the people who will be riding in the vehicle. If you have a lot of options, equipment, passengers, or cargo in your vehicle, it will reduce the tongue weight your vehicle can carry, which will also reduce the trailer weight your vehicle can tow. And if you tow a trailer, you must add the tongue load to the GVW because your vehicle will be carrying that weight, too. See *Loading Your Vehicle on page 4-33* for more information about your vehicle's maximum load capacity.



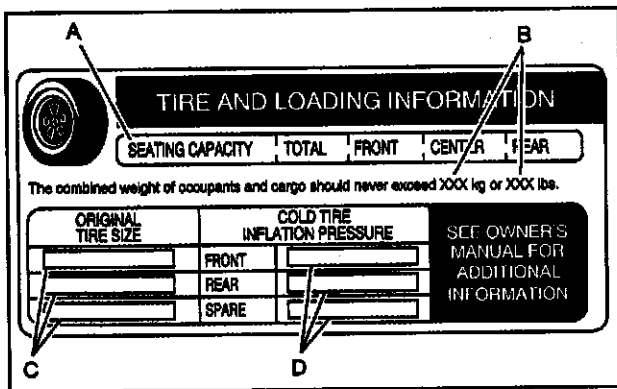
If you're using a weight-carrying hitch or a weight-distributing hitch, the trailer tongue (A) should weigh 10 to 15 percent of the total loaded trailer weight (B).

After you've loaded your trailer, weigh the trailer and then the tongue, separately, to see if the weights are proper. If they aren't, you may be able to get them right simply by moving some items around in the trailer.

## Total Weight on Your Vehicle's Tires

Be sure your vehicle's tires are inflated to the upper limit for cold tires. You'll find these numbers on the Tire-Loading Information label. See *Loading Your Vehicle on page 4-33*. Then be sure you don't go over the GVW limit for your vehicle, including the weight of the trailer tongue.

## Tire and Loading Information Label



**Label Example**

A vehicle specific Tire and Loading Information label is attached to the vehicle's center pillar (B-pillar). With the driver's door open, you will find the label attached below the door lock post (striker). The tire and loading information label shows the number of occupant seating positions (A), and the maximum vehicle capacity weight (B) in kilograms and pounds.

The Tire and Loading Information label also shows the tire size of the original equipment tires (C) and the recommended cold tire inflation pressures (D). For more information on tires and inflation see *Tires on page 5-54* and *Inflation - Tire Pressure on page 5-62*.

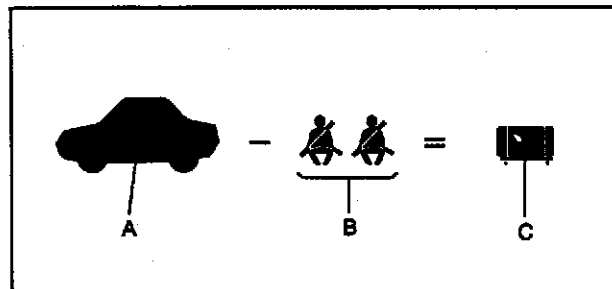
There is also important loading information on the Certification label. It tells you the Gross Vehicle Weight Rating (GVWR) and the Gross Axle Weight Rating (GAWR) for the front and rear axle; see "Certification Label" later in this section.

### Steps for Determining Correct Load Limit

1. Locate the statement "The combined weight of occupants and cargo should never exceed XXX kg or XXX pounds" on your vehicle's placard.
2. Determine the combined weight of the driver and passengers that will be riding in your vehicle.
3. Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.

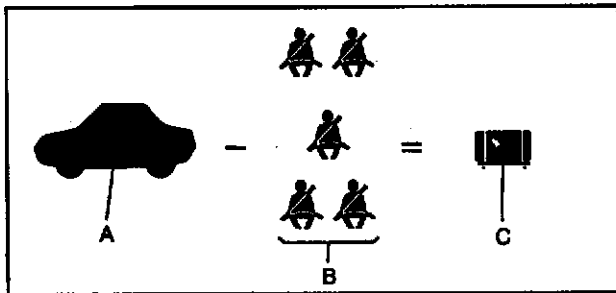
4. The resulting figure equals the available amount of cargo and luggage load capacity. For example, if the "XXX" amount equals 1400 lbs and there will be five 150 lb passengers in your vehicle, the amount of available cargo and luggage load capacity is 650 lbs (1400 - 750 (5 x 150) = 650 lbs).
5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity calculated in Step 4.
6. If your vehicle will be towing a trailer, the load from your trailer will be transferred to your vehicle. Consult this manual to determine how this reduces the available cargo and luggage load capacity of your vehicle.

If your vehicle can tow a trailer, see *Towing a Trailer on page 4-40* for Important information on towing a trailer, towing safety rules, and trailering tips.



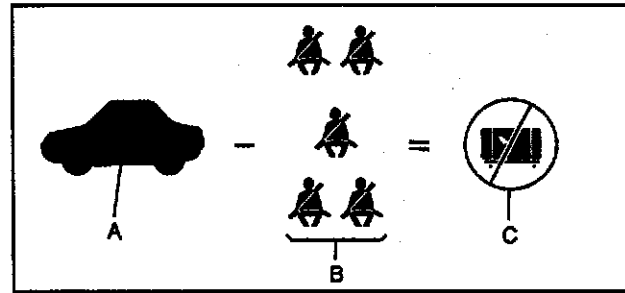
**Example 1**

Item	Description	Total
A	Vehicle Capacity Weight for Example 1 =	1,000 lbs (453 kg)
B	Subtract Occupant Weight 150 lbs (68 kg) x 2 =	300 lbs (136 kg)
C	Available Occupant and Cargo Weight =	700 lbs (317 kg)



Example 2

Item	Description	Total
A	Vehicle Capacity Weight for Example 2 =	1,000 lbs (453 kg)
B	Subtract Occupant Weight 150 lbs (68 kg) × 5 =	750 lbs (340 kg)
C	Available Cargo Weight =	250 lbs (113 kg)



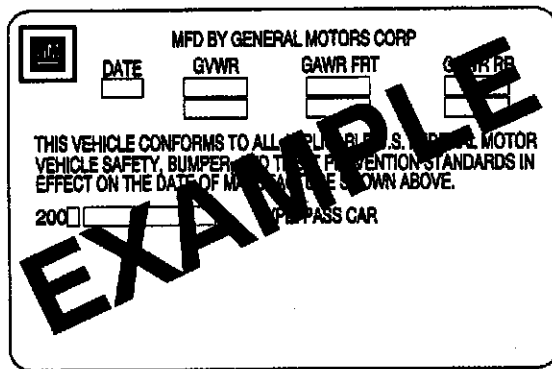
Example 3

Item	Description	Total
A	Vehicle Capacity Weight for Example 3 =	1,000 lbs (453 kg)
B	Subtract Occupant Weight 200 lbs (91 kg) × 5 =	1,000 lbs (453 kg)
C	Available Cargo Weight =	0 lbs (0 kg)

Refer to your vehicle's Tire and Loading Information label for specific information about your vehicle's capacity weight and seating positions. The combined weight of the driver, passengers, and cargo should never exceed your vehicle's capacity weight.



### Certification Label



United States version shown, Canada similar

The Certification label, found on the rear edge of the driver's side rear passenger door, tells you the gross weight capacity of your vehicle, called the Gross Vehicle Weight Rating (GVWR). The GVWR includes the weight of the vehicle, all occupants, fuel and cargo. Never exceed the GVWR for your vehicle, or the Gross Axle Weight Rating (GAWR) for either the front or rear axle.

If you do have a heavy load, you should spread it out. Do not carry more than 132 lbs (60 kg) in the trunk.

**⚠ CAUTION:**

Do not load your vehicle any heavier than the Gross Vehicle Weight Rating (GVWR), or either the maximum front or rear Gross Axle Weight Rating (GAWR). If you do, parts on your vehicle can break, and it can change the way your vehicle handles. These could cause you to lose control and crash. Also, overloading can shorten the life of your vehicle.

**Notice:** Overloading your vehicle may cause damage. Repairs would not be covered by your warranty. Do not overload your vehicle.

## Rocking Your Vehicle to Get It Out

First, turn your steering wheel left and right. That will clear the area around your front wheels. You should turn your traction control system off. See *Traction Control System (TCS) (CTS) on page 4-8* or *Traction Control System (TCS) (CTS-V) on page 4-10*. Then shift back and forth between REVERSE (R) and a forward gear, or with a manual transmission, between FIRST (1) or SECOND (2) and REVERSE (R), spinning the wheels as little as possible. Release the accelerator pedal while you shift, and press lightly on the accelerator pedal when the transmission is in gear. By slowly spinning your wheels in the forward and reverse directions, you will cause a rocking motion that may free your vehicle. If that does not get you out after a few tries, you may need to be towed out. If you do need to be towed out, see *Towing Your Vehicle on page 4-38*.

## Loading Your Vehicle

It is very important to know how much weight your vehicle can carry. This weight is called the vehicle capacity weight and includes the weight of all occupants, cargo and all nonfactory-installed options. Two labels on your vehicle show how much weight it may properly carry, the Tire and Loading Information label and the Certification label.

### CAUTION:

Do not load your vehicle any heavier than the Gross Vehicle Weight Rating (GVWR), or either the maximum front or rear Gross Axle Weight Rating (GAWR). If you do, parts on your vehicle can break, and it can change the way your vehicle handles. These could cause you to lose control and crash. Also, overloading can shorten the life of your vehicle.



7. Reinstall the wiper blade assembly by sliding it over the wiper arm to engage the J-hooked end. Pull up on the assembly to lock it into place.
8. Repeat the steps for the other wiper.

## Tires

Your new vehicle comes with high-quality tires made by a leading tire manufacturer. If you ever have questions about your tire warranty and where to obtain service, see your GM Warranty booklet for details. For additional information refer to the tire manufacturer's booklet included with your vehicle's Owner's Manual.

### **⚠ CAUTION:**

- Poorly maintained and improperly used tires are dangerous.
- Overloading your tires can cause overheating as a result of too much friction. You could have an air-out and a serious accident. See *Loading Your Vehicle* on page 4-33.
- Underinflated tires pose the same danger as overloaded tires. The resulting accident could cause serious injury. Check all tires frequently to maintain the recommended pressure. Tire pressure should be checked when your tires are cold.

CAUTION: (Continued)

### CAUTION: (Continued)

- Overinflated tires are more likely to be cut, punctured or broken by a sudden impact — such as when you hit a pothole. Keep tires at the recommended pressure.
- Worn, old tires can cause accidents. If your tread is badly worn, or if your tires have been damaged, replace them.

See *Inflation - Tire Pressure* on page 5-62, for inflation pressure adjustment for high speed driving.

**Notice:** If your vehicle has P245/45R18 size tires, they are classified as low-profile tires. Low-profile tires are more susceptible to damage from road hazards or curb impact than standard profile tires. Tire and or wheel assembly damage can occur when coming into contact with road hazards like, potholes or sharp edged objects or when sliding into a curb. Your GM warranty does not cover this type of damage. Keep tires set to the correct inflation pressure and when possible avoid contact with curbs, potholes and other road hazards.

### Winter Tires

If you expect to drive on snow or ice covered roads often, you may want to get winter tires for your vehicle. All season tires provide good overall performance on most surfaces but they may not offer the traction you would like or the same level of performance as winter tires on snow or ice covered roads.

See your dealer for details regarding winter tire availability and proper tire selection. Also, see *Buying New Tires* on page 5-70.

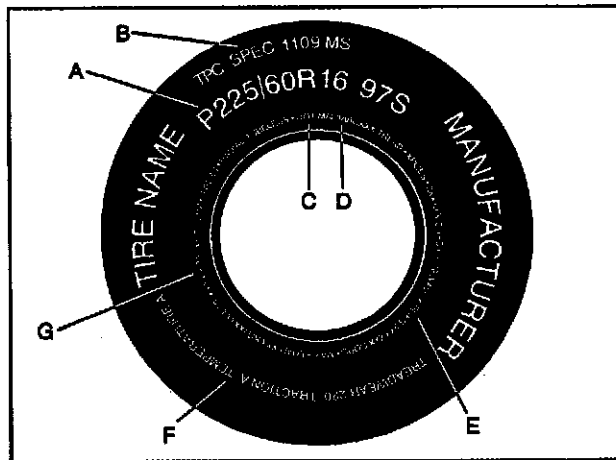
If you choose to use snow tires:

- Use tires of the same brand and tread type on all four wheel positions.
- Use only radial ply tires of the same size, load range, and speed rating as the original equipment tires.

Winter tires with the same speed rating as your original equipment tires may not be available for H, V, W and ZR speed rated tires. If you choose snow tires with a lower speed rating, never exceed the tire's maximum speed capability.

## Tire Sidewall Labelling

Useful information about a tire is molded into its sidewall. The examples below show a typical passenger vehicle tire and a compact spare tire sidewall.



**Passenger (P-Metric) Tire Example**

**(A) Tire Size:** The tire size is a combination of letters and numbers used to define a particular tire's width, height, aspect ratio, construction type and service description. See the "Tire Size" illustration later in this section for more detail.

**(B) TPC Spec (Tire Performance Criteria Specification):** Original equipment tires designed to GM's specific tire performance criteria have a TPC specification code molded onto the sidewall. GM's TPC specifications meet or exceed all federal safety guidelines.

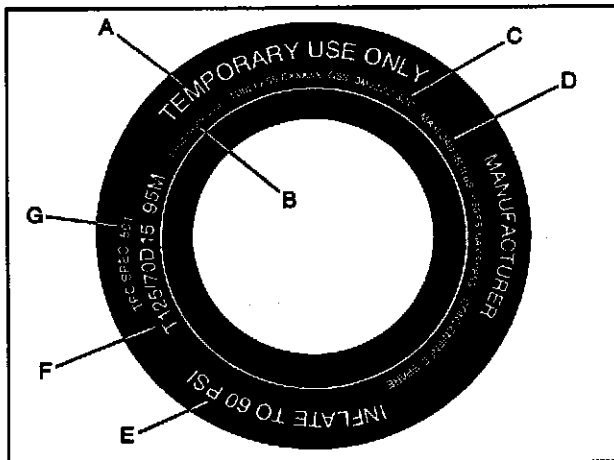
**(C) DOT (Department of Transportation):** The Department of Transportation (DOT) code indicates that the tire is in compliance with the U.S. Department of Transportation Motor Vehicle Safety Standards.

**(D) Tire Identification Number (TIN):** The letters and numbers following DOT (Department of Transportation) code is the Tire Identification Number (TIN). The TIN shows the manufacturer and plant code, tire size, and date the tire was manufactured. The TIN is molded onto both sides of the tire, although only one side may have the date of manufacture.

**(E) Tire Ply Material:** The type of cord and number of plies in the sidewall and under the tread.

**(F) Uniform Tire Quality Grading (UTQG):** Tire manufacturers are required to grade tires based on three performance factors: treadwear, traction and temperature resistance. For more information see *Uniform Tire Quality Grading on page 5-71*.

**(G) Maximum Cold Inflation Load Limit:** Maximum load that can be carried and the maximum pressure needed to support that load.



**Compact Spare Tire Example**

**(A) Temporary Use Only:** The compact spare tire or temporary use tire has a tread life of approximately 3,000 miles (5 000 km) and should not be driven at speeds over 65 mph (105 km/h). The compact spare tire is for emergency use when a regular road tire has lost air and gone flat. If your vehicle has a compact spare tire, see *Compact Spare Tire on page 5-87* and *If a Tire Goes Flat on page 5-75*.

**(B) Tire Ply Material:** The type of cord and number of plies in the sidewall and under the tread.

**(C) Tire Identification Number (TIN):** The letters and numbers following the DOT (Department of Transportation) code is the Tire Identification Number (TIN). The TIN shows the manufacturer and plant code, tire size, and date the tire was manufactured. The TIN is molded onto both sides of the tire, although only one side may have the date of manufacture.

**(D) Maximum Cold Inflation Load Limit:** Maximum load that can be carried and the maximum pressure needed to support that load.

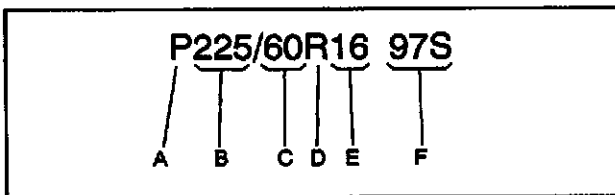
**(E) Tire Inflation:** The temporary use tire or compact spare tire should be inflated to 60 psi (420 kPa). For more information on tire pressure and inflation see *Inflation - Tire Pressure on page 5-62*.

**(F) Tire Size:** A combination of letters and numbers define a tire's width, height, aspect ratio, construction type and service description. The letter T as the first character in the tire size means the tire is for temporary use only.

**(G) TPC Spec (Tire Performance Criteria Specification):** Original equipment tires designed to GM's specific tire performance criteria have a TPC specification code molded onto the sidewall. GM's TPC specifications meet or exceed all federal safety guidelines.

## Tire Size

The following illustration shows an example of a typical passenger vehicle tire size.



**(A) Passenger (P-Metric) Tire:** The United States version of a metric tire sizing system. The letter P as the first character in the tire size means a passenger vehicle tire engineered to standards set by the U.S. Tire and Rim Association.

**(B) Tire Width:** The three-digit number indicates the tire section width in millimeters from sidewall to sidewall.

**(C) Aspect Ratio:** A two-digit number that indicates the tire height-to-width measurements. For example, if the tire size aspect ratio is 60, as shown in item C of the illustration, it would mean that the tire's sidewall is 60 percent as high as it is wide.

**(D) Construction Code:** A letter code is used to indicate the type of ply construction in the tire. The letter R means radial ply construction; the letter D means diagonal or bias ply construction; and the letter B means belted-bias ply construction.

**(E) Rim Diameter:** Diameter of the wheel in inches.

**(F) Service Description:** These characters represent the load range and speed rating of the tire. The load index represents the load carry capacity a tire is certified to carry. The load index can range from 1 to 279. The speed rating is the maximum speed a tire is certified to carry a load. Speed ratings range from A to Z.

## Tire Terminology and Definitions

**Air Pressure:** The amount of air inside the tire pressing outward on each square inch of the tire. Air pressure is expressed in pounds per square inch (psi) or kilopascal (kPa).

**Accessory Weight:** This means the combined weight of optional accessories. Some examples of optional accessories are, automatic transmission, power steering, power brakes, power windows, power seats, and air conditioning.

**Aspect Ratio:** The relationship of a tire's height to its width.

**Belt:** A rubber coated layer of cords that is located between the plies and the tread. Cords may be made from steel or other reinforcing materials.

**Bead:** The tire bead contains steel wires wrapped by steel cords that hold the tire onto the rim.

**Bias Ply Tire:** A pneumatic tire in which the plies are laid at alternate angles less than 90 degrees to the centerline of the tread.

**Cold Inflation Pressure:** The amount of air pressure in a tire, measured in pounds per square inch (psi) or kilopascals (kPa) before a tire has built up heat from driving. See *Inflation - Tire Pressure on page 5-62*.

**Curb Weight:** This means the weight of a motor vehicle with standard and optional equipment including the maximum capacity of fuel, oil and coolant, but without passengers and cargo.

**DOT Markings:** A code molded into the sidewall of a tire signifying that the tire is in compliance with the U.S. Department of Transportation (DOT) motor vehicle safety standards. The DOT code includes the Tire Identification Number (TIN), an alphanumeric designator which can also identify the tire manufacturer, production plant, brand and date of production.

**GVWR:** Gross Vehicle Weight Rating, see *Loading Your Vehicle on page 4-33*.

**GAWR FRT:** Gross Axle Weight Rating for the front axle, see *Loading Your Vehicle on page 4-33*.

**GAWR RR:** Gross Axle Weight Rating for the rear axle, see *Loading Your Vehicle on page 4-33*.

**Intended Outboard Sidewall:** The side of an asymmetrical tire, that must always face outward when mounted on a vehicle.

**KiloPascal (kPa):** The metric unit for air pressure.

**Light Truck (LT-Metric) Tire:** A tire used on light duty trucks and some multipurpose passenger vehicles.

**Load Index:** An assigned number ranging from 1 to 279 that corresponds to the load carrying capacity of a tire.

**Maximum Inflation Pressure:** The maximum air pressure to which a cold tire may be inflated. The maximum air pressure is molded onto the sidewall.

**Maximum Load Rating:** The load rating for a tire at the maximum permissible inflation pressure for that tire.

**Maximum Loaded Vehicle Weight:** The sum of curb weight; accessory weight; vehicle capacity weight; and production options weight.

**Normal Occupant Weight:** The number of occupants a vehicle is designed to seat multiplied by 150 lbs (68 kg). See *Loading Your Vehicle on page 4-33*.



**Occupant Distribution:** Designated seating positions.

**Outward Facing Sidewall:** The side of an asymmetrical tire that has a particular side that faces outward when mounted on a vehicle. The side of the tire that contains a whitewall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same moldings on the other sidewall of the tire.

**Passenger (P-Metric) Tire:** A tire used on passenger cars and some light duty trucks and multipurpose vehicles.

**Recommended Inflation Pressure:** Vehicle manufacturer's recommended tire inflation pressure and shown on the tire placard. See *Inflation - Tire Pressure* on page 5-62 and *Loading Your Vehicle* on page 4-33.

**Radial Ply Tire:** A pneumatic tire in which the ply cords that extend to the beads are laid at 90 degrees to the centerline of the tread.

**Rim:** A metal support for a tire and upon which the tire beads are seated.

**Sidewall:** The portion of a tire between the tread and the bead.

**Speed Rating:** An alphanumeric code assigned to a tire indicating the maximum speed at which a tire can operate.

**Traction:** The friction between the tire and the road surface. The amount of grip provided.

**Tread:** The portion of a tire that comes into contact with the road.

**Treadwear Indicators:** Narrow bands, sometimes called "wear bars," that show across the tread of a tire when only 1/16 inch (1.6 mm) of tread remains. See *When It Is Time for New Tires* on page 5-69.

**UTQGS (Uniform Tire Quality Grading Standards):** A tire information system that provides consumers with ratings for a tire's traction, temperature, and treadwear. Ratings are determined by tire manufacturers using government testing procedures. The ratings are molded into the sidewall of the tire. See *Uniform Tire Quality Grading* on page 5-71.

**Vehicle Capacity Weight:** The number of designated seating positions multiplied by 150 lbs (68 kg) plus the rated cargo load. See *Loading Your Vehicle* on page 4-33.

**Vehicle Maximum Load on the Tire:** Load on an individual tire due to curb weight, accessory weight, occupant weight, and cargo weight.

**Vehicle Placard:** A label permanently attached to a vehicle showing the original equipment tire size and recommended inflation pressure. See *Loading Your Vehicle* on page 4-33.

## Run-Flat Tires (CTS-V)

If your vehicle has run-flat tires, there is no spare tire and no tire changing equipment. Your vehicle also has a Tire Pressure Monitor (TPM) which will alert you if there is a loss of tire pressure in any of the tires. See *Tire Pressure Monitor System (CTS-V) on page 5-65*.

### CAUTION:

When the low tire warning light is displayed on the instrument panel cluster, your vehicle's handling capabilities will be reduced during severe maneuvers. If you drive too fast, you could lose control of your vehicle. You or others could be injured. Don't drive over 55 mph (90 km/h) when the low tire warning light is displayed. Drive cautiously and check your tire pressures as soon as you can.

If a tire goes flat, you won't need to stop on the side of the road to change the tire. You can just keep on driving. The tire can operate effectively with no air pressure for up to 65 miles (105 km) at speeds up to 55 mph (90 km/h). The shorter the distance you drive and the slower the speed, the greater the chance that the tire will not have to be replaced. When a tire is filled with air, it provides a cushion between the road and the wheel. Because you won't have this cushion when driving on a deflated run-flat tire, try to avoid potholes that could damage your wheel and require replacement of it.

Some road hazards can damage a tire beyond repair. This damage could occur even before you've driven on the tire in a deflated condition. When a tire has been damaged, or if you've driven any distance on a run-flat tire, check with an authorized run-flat tire service center to determine whether the tire can be repaired or should be replaced. To maintain your vehicle's run-flat feature, all replacement tires must be self-supporting tires. As soon as possible, contact the nearest authorized GM or run-flat servicing facility for inspection and repair or replacement.

To locate the nearest GM or run-flat servicing facility, call Roadside Service. See *Roadside Service* on page 7-6 for details.

**⚠ CAUTION:**

Run-flat tires are constructed differently than other tires and could explode during improper service. You or others could be injured or killed if you attempt to repair, replace, dismount, or mount a run-flat tire. Let only an authorized run-flat service center repair, replace, dismount and mount run-flat tires.

The valve stems on your run-flat tires have sensors that are part of the Tire Pressure Monitor System (TPMS). These sensors contain batteries which are designed to last for 10 years under normal driving conditions. See your dealer if you ever need to have a wheel replaced, or if the sensors ever need replacement.

**Notice:** Using liquid sealants can damage the tire valves and tire pressure monitor sensors in your run-flat tires. This damage would not be covered by warranty. Don't use liquid sealants in your run-flat tires.

## Inflation - Tire Pressure

Tires need the correct amount of air pressure to operate effectively.

**Notice:** Do not let anyone tell you that under-inflation or over-inflation is all right. It is not. If your tires do not have enough air (under-inflation), you can get the following:

- Too much flexing
- Too much heat
- Tire overloading
- Premature or irregular wear
- Poor handling
- Reduced fuel economy

If your tires have too much air (over-inflation), you can get the following:

- Unusual wear
- Poor handling
- Rough ride
- Needless damage from road hazards

A Tire and Loading Information label is attached to the vehicle's center pillar, below the driver's door latch. This label lists your vehicle's original equipment tires and shows the correct inflation pressures for your tires when they are cold. The recommended cold tire inflation pressure, shown on the label, is the minimum amount of air pressure needed to support your vehicle's maximum load carrying capacity.

For additional information regarding how much weight your vehicle can carry, and an example of the tire and loading information label, see *Loading Your Vehicle on page 4-33*. How you load your vehicle affects vehicle handling and ride comfort, never load your vehicle with more weight than it was designed to carry.

### **When to Check**

Check your tires once a month or more. Do not forget to check the compact spare tire, if your vehicle has one. The compact spare should be at 60 psi (420 kPa). For additional information regarding the compact spare tire, see *Compact Spare Tire on page 5-87*.

### **How to Check**

Use a good quality pocket-type gage to check tire pressure. You can't tell if your tires are properly inflated simply by looking at them. Radial tires may look properly inflated even when they're underinflated. Check the tire's inflation pressure when the tires are cold. Cold means your vehicle has been sitting for at least three hours or driven no more than 1 mile (1.6 km).

Remove the valve cap from the tire valve stem. Press the tire gage firmly onto the valve to get a pressure measurement. If the cold tire inflation pressure matches the recommended pressure on the Tire and Loading Information label, no further adjustment is necessary. If the inflation pressure is low, add air until you reach the recommended amount.

If you overfill the tire, release air by pushing on the metal stem in the center of the tire valve. Re-check the tire pressure with the tire gage.

Be sure to put the valve caps back on the valve stems. They help prevent leaks by keeping out dirt and moisture.

## High Speed Operation (CTS-V)

### **⚠ CAUTION:**

Driving at high speeds, 100 mph (160 km/h) or higher, puts an additional strain on tires. Sustained high-speed driving, causes excessive heat build up and can cause sudden tire failure. You could have a crash and you or others could be killed. Some high-speed rated tires require inflation pressure adjustment for high speed operation. When speed limits and road conditions are such, that a vehicle can be driven at high speeds, make sure the tires are rated for high speed operation, in excellent condition and set to the correct cold tire inflation pressure for the vehicle load.

The CTS-V performance series has 245/45R18 96W size tires. These high-performance tires require inflation pressure adjustment when driving your vehicle at speeds of 130 mph (209 km/h) or higher with occupants and cargo weighing 600 lbs. (272 kg) up to 882 lbs. (400 kg).

Use the following chart to determine the cold tire inflation pressure when operating your vehicle under these conditions.

Tire Size: 245/45R18 96W Recommended Cold Tire Inflation Pressure for High Speed Operation at 130 mph (209 km/h) or more:			
Occupant and Cargo Weight: Less than 600 lbs (272 kg)		Occupant and Cargo Weight: 600 lbs (272 kg) Up to 882 lbs (400 kg) (Vehicle Capacity Weight)	
Front Tires	Rear Tires	Front Tires	Rear Tires
30 psi (210 kPa)	30 psi (210 kPa)	32 psi (220 kPa)	34 psi (235 kPa)

When you end high-speed driving, return the tires to the cold inflation pressures shown on the tire and loading information label. See *Loading Your Vehicle* on page 4-33.

## Tire Pressure Monitor System (CTS-V)

The Tire Pressure Monitor (TPM) System uses radio and sensor technology to check tire pressure levels. If your vehicle has this feature, sensors are mounted on each run-flat tire and wheel assembly. The TPM sensors transmit tire pressure readings to a receiver located in the vehicle once every 60 seconds while the vehicle is being driven, and once every 60 minutes if the vehicle is stationary for more than 15 minutes. Using the Message Center, tire pressure levels can be viewed by the driver. For additional information about the message center operation and displays, see *Message Center (CTS-V) on page 3-52*.

When a low tire pressure condition is detected, a low tire warning light, on the instrument panel cluster, comes on to warn the driver.



When the tire pressure monitoring system warning light is lit, one or more of your tires is significantly under-inflated.

You should stop and check your tires as soon as possible, and inflate them to the proper pressure as indicated on the vehicle's tire information placard.

Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability. Each tire, should be checked monthly when cold and set to the recommended inflation pressure as specified in the vehicle placard and owner's manual.

The Tire and Loading Information label (tire information placard) is attached, to either, the center pillar near the driver's door latch post or on the rear edge of the driver's side rear passenger door. The label shows the size of your vehicle's original tires and the correct inflation pressure for your vehicle's tires when they are cold. See *Inflation - Tire Pressure on page 5-62* and *Loading Your Vehicle on page 4-33* for additional information.

Your vehicle's TPM system can alert you about a low tire pressure condition but it does not replace normal tire maintenance. See *Tire Inspection and Rotation* on page 5-68 and *Tires* on page 5-54.

**Notice:** Do not use a tire sealant if your vehicle is equipped with Tire Pressure Monitors. The liquid sealant can damage the tire pressure monitor sensors.

### TPM Sensor Identification Codes

Each TPM sensor has a unique identification code. Any time you replace one or more of the TPM sensors, the identification codes will need to be matched to the new tire/wheel position. Each tire/wheel position is matched, to a sensor, by increasing or decreasing the tire's air pressure. The sensors are matched, to the tire/wheel positions, in the following order: left front (LF), right front (RF), right rear (RR), and left rear (LR).

You will have one minute to match the first tire/wheel position, and five minutes overall, to match all four tire/wheel positions. If it takes longer than one minute, to match the first tire and wheel, or more than five minutes to match all four tire and wheel positions the matching process stops and you will need to start over.

The TPM matching process is outlined below:

1. Set the Parking brake.
2. Turn the ignition switch to ON with the engine off.
3. Using the Remote Keyless Entry (RKE) transmitter, lock and unlock the vehicle's doors.
4. Press the lock and unlock buttons, at the same time, on the RKE transmitter. A single horn chirp will sound, indicating that the TPM system is ready, and the sensor matching process can begin.
5. Start with the left (driver's side) front tire.
6. Remove the valve cap from the valve stem. Activate the TPM sensor by increasing or decreasing the tire's air pressure for five seconds, or until a horn chirp sounds. The horn chirp, which may take up to 30 seconds, confirms that the sensor identification code has been matched to this tire position. To decrease the tire's air-pressure use the pointy end of the valve cap, a pencil-style air pressure gage or a key.
7. Proceed to the right (passenger's side) front tire, and repeat the procedure in Step 6.
8. Proceed to the right (passenger's side) rear tire, and repeat the procedure in Step 6.

9. Proceed to the left (driver's side) rear tire, and repeat the procedure in Step 6.
10. After hearing the confirming double horn chirp, for the left rear tire, exit the matching process by turning the ignition switch to OFF.
11. Set all four tires to the recommended air pressure level as indicated on the tire and loading information label.
12. Put the valve caps back on the valve stems.

The TPM system will not function properly if one or more of the TPM sensors are missing or inoperable. If the system detects a missing or inoperable sensor an error message of several dashes — — — will be shown on the message center display. If you have replaced a tire/wheel assembly without transferring the TPM sensors, the error message will be displayed. Once you re-install the TPM sensors, the error message should go off. See your GM dealer for service if all TPM sensors are installed and the error message comes on and stays on.

The TPM system operates on a radio frequency subject to Federal Communications Commission (FCC) Rules and with Industry and Science Canada.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

This device complies with RSS-210 of Industry Canada. Operation is subject to the following two conditions:

1. this device may not cause interference, and
2. this device must accept any interference received, including interference that may cause undesired operation of the device.

Changes or modifications to this system by other than an authorized service facility could void authorization to use this equipment.

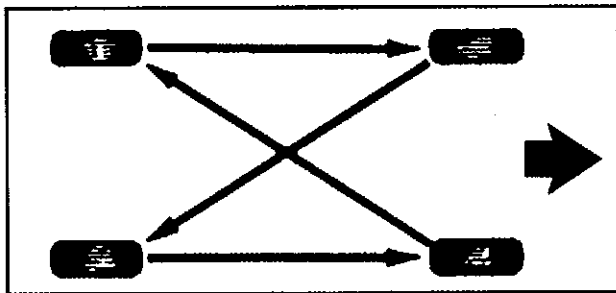


## Tire Inspection and Rotation

Tires should be rotated every 5,000 to 8,000 miles (8 000 to 13 000 km).

Any time you notice unusual wear, rotate your tires as soon as possible and check wheel alignment. Also check for damaged tires or wheels. See *When It Is Time for New Tires* on page 5-69 and *Wheel Replacement* on page 5-73 for more information.

The purpose of regular rotation is to achieve more uniform wear for all tires on the vehicle. The first rotation is the most important. See *Scheduled Maintenance* on page 6-4.



When rotating your tires, always use the correct rotation pattern shown here.

If your vehicle has a compact spare tire, do not include it in the tire rotation.

After the tires have been rotated, adjust the front and rear inflation pressures as shown on the Tire and Loading Information label. See *Loading Your Vehicle* on page 4-33, for an example of the tire and loading information label and its location on your vehicle.

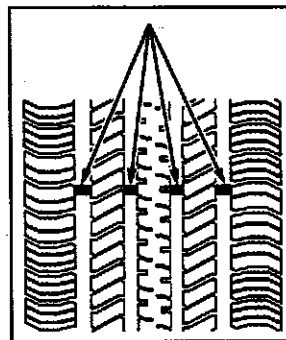
If your vehicle has run-flat tires, the Tire Pressure Monitor (TPM) system will need to have the sensors reset after a tire rotation is performed. A special tool is needed to reset the sensor identification codes. See your dealer for service.

Make certain that all wheel nuts are properly tightened. See "Wheel Nut Torque" under *Capacities and Specifications* on page 5-108.

**⚠ CAUTION:**

Rust or dirt on a wheel, or on the parts to which it is fastened, can make wheel nuts become loose after a time. The wheel could come off and cause an accident. When you change a wheel, remove any rust or dirt from places where the wheel attaches to the vehicle. In an emergency, you can use a cloth or a paper towel to do this; but be sure to use a scraper or wire brush later, if you need to, to get all the rust or dirt off. See *Changing a Flat Tire* on page 5-76.

## When It Is Time for New Tires



One way to tell when it's time for new tires is to check the treadwear indicators, which will appear when your tires have only 1/16 inch (1.6 mm) or less of tread remaining.

You need a new tire if any of the following statements are true:

- You can see the indicators at three or more places around the tire.
- You can see cord or fabric showing through the tire's rubber.
- The tread or sidewall is cracked, cut or snagged deep enough to show cord or fabric.
- The tire has a bump, bulge or split.
- The tire has a puncture, cut or other damage that can't be repaired well because of the size or location of the damage.

## Buying New Tires

To find out what kind and size of tires your vehicle needs, look at the tire and loading information label. For more information about this label and its location on your vehicle, see *Loading Your Vehicle on page 4-33*.

The tires installed on your vehicle when it was new had a Tire Performance Criteria Specification (TPC Spec) number on each tire's sidewall. When you get new tires, GM recommends that you get tires with that same TPC Spec number. That way your vehicle will continue to have tires that are designed to give proper endurance, handling, speed rating, load range, traction, ride, tire pressure monitoring system performance and other things during normal service on your vehicle. If your tires have an all-season tread design, the TPC number will be followed by an "MS" (for mud and snow).

Whenever you replace your tires with those not having a TPC Spec number, make sure they are the same size, load range, speed rating and construction type (bias, bias-belted or radial) as your original tires.

Winter tires with the same speed rating as your original equipment tires may not be available for H, V, W, and ZR speed rated tires. If you choose snow tires with a lower speed rating, never exceed the tire's maximum speed capability.

If you replace your vehicle's tires with those not having a TPC Spec number, the tire pressure monitoring system may give an inaccurate low pressure warning. Non-TPC Spec tires may give a low pressure warning that is higher or lower than the proper warning level you would get with TPC Spec numbered tires.

### CAUTION:

Mixing tires could cause you to lose control while driving. If you mix tires of different sizes or types (radial and bias-belted tires), the vehicle may not handle properly, and you could have a crash. Using tires of different sizes may also cause damage to your vehicle. Be sure to use the same size and type tires on all wheels. It's all right to drive with your compact spare temporarily, it was developed for use on your vehicle. See *Compact Spare Tire on page 5-87*.

**⚠ CAUTION:**

If you use bias-ply tires on your vehicle, the wheel rim flanges could develop cracks after many miles of driving. A tire and/or wheel could fail suddenly, causing a crash. Use only radial-ply tires with the wheels on your vehicle.

### Uniform Tire Quality Grading

Quality grades can be found where applicable on the tire sidewall between tread shoulder and maximum section width. For example:

#### **Treadwear 200 Traction AA Temperature A**

The following information relates to the system developed by the United States National Highway Traffic Safety Administration, which grades tires by treadwear, traction and temperature performance. (This applies only to vehicles sold in the United States.) The grades are molded on the sidewalls of most passenger car tires. The Uniform Tire Quality Grading system does not apply to deep tread, winter-type

snow tires, space-saver or temporary use spare tires, tires with nominal rim diameters of 10 to 12 inches (25 to 30 cm), or to some limited-production tires.

While the tires available on General Motors passenger cars and light trucks may vary with respect to these grades, they must also conform to federal safety requirements and additional General Motors Tire Performance Criteria (TPC) standards.

### Treadwear

The treadwear grade is a comparative rating based on the wear rate of the tire when tested under controlled conditions on a specified government test course. For example, a tire graded 150 would wear one and a half (1.5) times as well on the government course as a tire graded 100. The relative performance of tires depends upon the actual conditions of their use, however, and may depart significantly from the norm due to variations in driving habits, service practices and differences in road characteristics and climate.

### **Traction – AA, A, B, C**

The traction grades, from highest to lowest, are AA, A, B, and C. Those grades represent the tire's ability to stop on wet pavement as measured under controlled conditions on specified government test surfaces of asphalt and concrete. A tire marked C may have poor traction performance. Warning: The traction grade assigned to this tire is based on straight-ahead braking traction tests, and does not include acceleration, cornering, hydroplaning, or peak traction characteristics.

### **Temperature – A, B, C**

The temperature grades are A (the highest), B, and C, representing the tire's resistance to the generation of heat and its ability to dissipate heat when tested under controlled conditions on a specified indoor laboratory test wheel. Sustained high temperature can cause the material of the tire to degenerate and reduce tire life, and excessive temperature can lead to sudden tire failure. The grade C corresponds to a level of performance which all passenger car tires must meet under the Federal Motor Vehicle Safety Standard No. 109. Grades B and A represent higher levels of performance on the laboratory test wheel than the minimum required by law.

Warning: The temperature grade for this tire is established for a tire that is properly inflated and not overloaded. Excessive speed, underinflation, or excessive loading, either separately or in combination, can cause heat buildup and possible tire failure.

### **Wheel Alignment and Tire Balance**

The wheels on your vehicle were aligned and balanced carefully at the factory to give you the longest tire life and best overall performance.

If you notice unusual tire wear or your vehicle pulling one way or the other, the alignment may need to be reset. If you notice your vehicle vibrating when driving on a smooth road, your wheels may need to be rebalanced.

## Wheel Replacement

Replace any wheel that is bent, cracked or badly rusted or corroded. If wheel nuts keep coming loose, the wheel, wheel bolts and wheel nuts should be replaced. If the wheel leaks air, replace it (except some aluminum wheels, which can sometimes be repaired). See your dealer if any of these conditions exist.

Your dealer will know the kind of wheel you need.

Each new wheel should have the same load-carrying capacity, diameter, width, offset and be mounted the same way as the one it replaces.

If you need to replace any of your wheels, wheel bolts or wheel nuts, replace them only with new GM original equipment parts. This way, you will be sure to have the right wheel, wheel bolts and wheel nuts for your vehicle.

### CAUTION:

Using the wrong replacement wheels, wheel bolts or wheel nuts on your vehicle can be dangerous. It could affect the braking and handling of your vehicle, make your tires lose air and make you lose control. You could have a collision in which you or others could be injured. Always use the correct wheel, wheel bolts and wheel nuts for replacement.

**Notice:** The wrong wheel can also cause problems with bearing life, brake cooling, speedometer or odometer calibration, headlamp aim, bumper height, vehicle ground clearance and tire or tire chain clearance to the body and chassis.

See *Changing a Flat Tire* on page 5-76 for more information.

## Used Replacement Wheels

### **⚠ CAUTION:**

Putting a used wheel on your vehicle is dangerous. You can't know how it's been used or how far it's been driven. It could fail suddenly and cause a crash. If you have to replace a wheel, use a new GM original equipment wheel.

## Tire Chains

### **⚠ CAUTION:**

Do not use tire chains. There is not enough clearance. Tire chains used on a vehicle without the proper amount of clearance can cause damage to the brakes, suspension or other vehicle parts. The area damaged by the tire chains could cause you to lose control of your vehicle and you or others may be injured in a crash. Use another type of traction device only if its manufacturer recommends it for use on your vehicle and tire size combination and road conditions. Follow that manufacturer's instructions. To help avoid damage to your vehicle, drive slowly, readjust or remove the device if it is contacting your vehicle, and don't spin your wheels. If you do find traction devices that will fit, install them on the rear tires.

## If a Tire Goes Flat

It is unusual for a tire to "blowout" while you're driving, especially if you maintain your tires properly. See *Tires on page 5-54*. If air goes out of a tire, it's much more likely to leak out slowly. But if you should ever have a "blowout", here are a few tips about what to expect and what to do:

If a front tire fails, the flat tire will create a drag that pulls the vehicle toward that side. Take your foot off the accelerator pedal and grip the steering wheel firmly. Steer to maintain lane position, and then gently brake to a stop well out of the traffic lane.

A rear blowout, particularly on a curve, acts much like a skid and may require the same correction you'd use in a skid. In any rear blowout, remove your foot from the accelerator pedal. Get the vehicle under control by steering the way you want the vehicle to go. It may be very bumpy and noisy, but you can still steer. Gently brake to a stop — well off the road if possible.

If a tire goes flat, and your vehicle has a spare tire, see *Changing a Flat Tire on page 5-76*. This information shows you how to use your vehicle's tire changing equipment and how to change a flat tire safely.

### CAUTION:

Lifting a vehicle and getting under it to do maintenance or repairs is dangerous without the appropriate safety equipment and training. The jack provided with your vehicle is designed only for changing a flat tire. If it is used for anything else, you or others could be badly injured or killed if the vehicle slips off the jack. Use the jack provided with your vehicle only for changing a flat tire.



## Run-Flat Tires (CTS-V)

If your vehicle has run-flat tires, there is no spare tire and no tire changing equipment. Run-flat tires can operate effectively with no air pressure for a limited distance and speed. Your vehicle also has a Tire Pressure Monitor (TPM) which will alert you if there is a loss of tire pressure in any of the tires. These tires perform so well without any air pressure that a Tire Pressure Monitor (TPM) is used to alert you when there is a low tire condition.

### **⚠ CAUTION:**

When the low tire warning light is displayed on the instrument panel cluster, your vehicle's handling capabilities will be reduced during severe maneuvers. If you drive too fast, you could lose control of your vehicle. You or others could be injured. Don't drive over 55 mph (90 km/h) when the low tire warning light is displayed. Drive cautiously and check your tire pressures as soon as you can.

See *Run-Flat Tires (CTS-V)* on page 5-61 and *Tire Pressure Monitor System (CTS-V)* on page 5-65, for additional information.

### **⚠ CAUTION:**

Special tools and procedures are required to service a run-flat tire. If these special tools and procedures aren't used you or others could be injured and your vehicle could be damaged. Always be sure the proper tools and procedures, as described in the service manual, are used.

To order a service manual see *Service Publications Ordering Information* on page 7-12.

## Changing a Flat Tire

If a tire goes flat, avoid further tire and wheel damage by driving slowly to a level place. Turn on your hazard warning flashers.

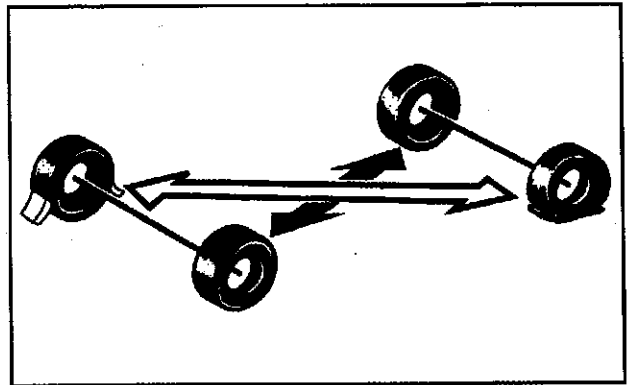
**⚠ CAUTION:**

Changing a tire can be dangerous. The vehicle can slip off the jack and roll over or fall on you or other people. You and they could be badly injured or even killed. Find a level place to change your tire. To help prevent the vehicle from moving:

1. Set the parking brake firmly.
2. Put an automatic transmission shift lever in PARK (P), or shift a manual transmission to FIRST (1) or REVERSE (R).
3. Turn off the engine and do not restart while the vehicle is raised.
4. Do not allow passengers to remain in the vehicle.

Put the wheel blocks at the front and rear of the tire farthest away from the one being changed. That would be the tire on the other side, at the opposite end of the vehicle.

When you have a flat tire, use the following example as a guide to assist you in the placement of wheel blocks.



The following information will tell you next how to use the jack and change a tire.

## Removing the Spare Tire and Tools

The equipment you'll need is in the trunk.

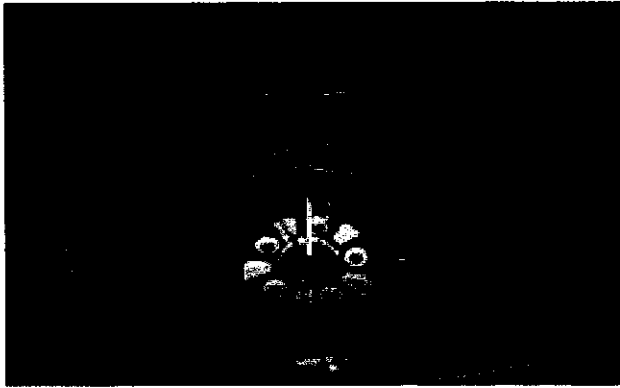
To gain access to the spare tire and jacking equipment, do the following:



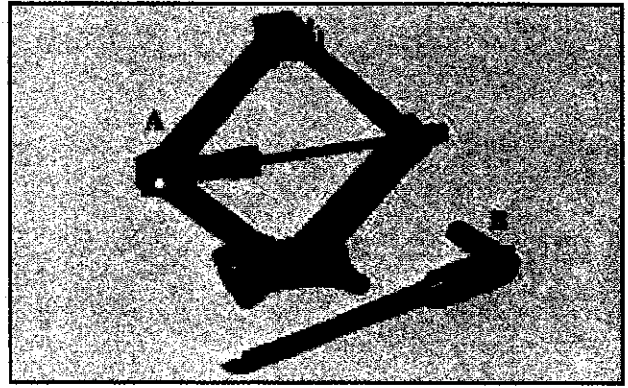
1. Turn the center nut on the compact spare tire cover counterclockwise to remove it. Then remove the cover.



2. Turn the nut holding the jack counterclockwise and remove it. Then remove the jack and wheel wrench.

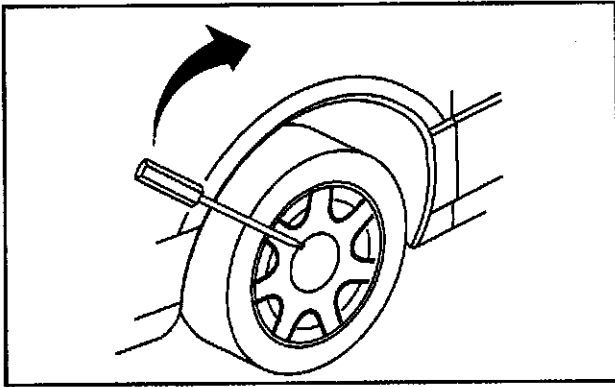


3. Remove the compact spare tire. See *Compact Spare Tire* on page 5-87 for more information about the compact spare tire.



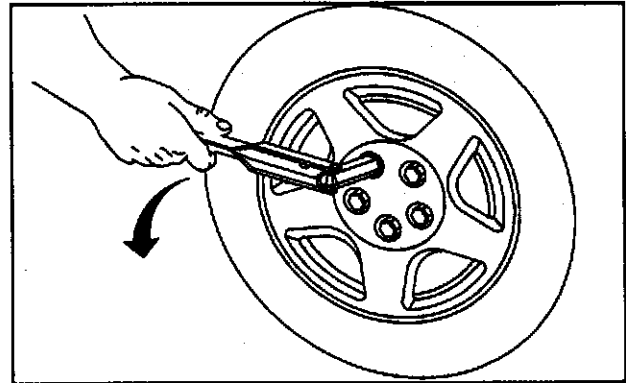
4. The tools you'll be using next include the jack (A) and the wheel wrench (B).

## Removing the Flat Tire and Installing the Spare Tire



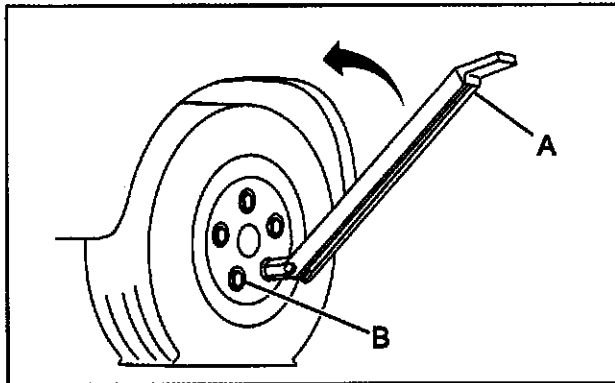
If your vehicle has wheel covers, use the flat end of the wheel wrench to remove the covers. Turn the wheel wrench clockwise to gently pry off the wheel cover.

Be careful not to scratch the aluminum wheel edge and don't try to remove the wheel cover with your hands.

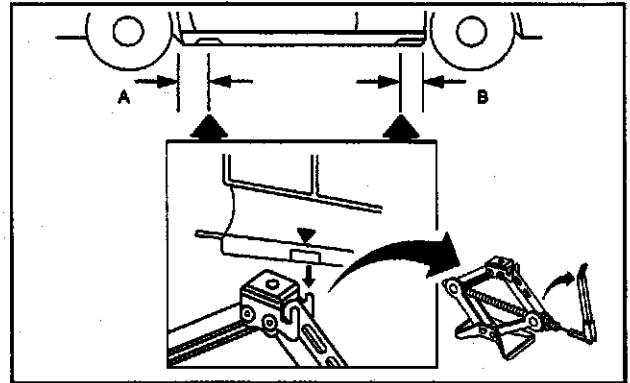


If your vehicle has wheel nut caps, turn the wheel wrench counterclockwise to remove the caps.

Once the wheel cover and wheel nut caps have been removed, use the following steps to remove the flat tire and install the spare tire.



1. Place the wheel wrench (A) securely over the wheel nut (B). Turn the wheel wrench counterclockwise to loosen all the wheel nuts. Don't remove them yet.



2. Find the jacking location using the diagram above and corresponding hoisting notches located in the plastic molding. The notches in the plastic molding are marked with a triangle shape to help you find them.

The front location (A) is about 14 inches (35.6 cm) from the rear edge of the front wheel well, and the rear location (B) is about 7 inches (17.8 cm) from the front edge of the rear wheel well.

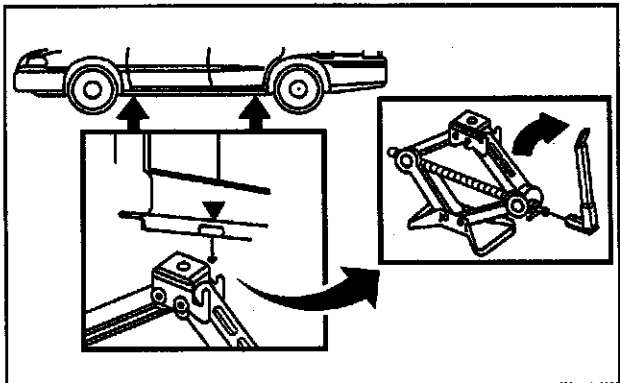
**⚠ CAUTION:**

Getting under a vehicle when it is jacked up is dangerous. If the vehicle slips off the jack you could be badly injured or killed. Never get under a vehicle when it is supported only by a jack.

**⚠ CAUTION:**

Raising your vehicle with the jack improperly positioned can damage the vehicle and even make the vehicle fall. To help avoid personal injury and vehicle damage, be sure to fit the jack lift head into the proper location before raising the vehicle.

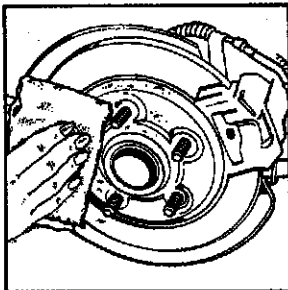
3. Attach the wheel wrench to the jack.
4. Turn the wheel wrench counterclockwise to lower the jack lift head until the jack fits under the vehicle.



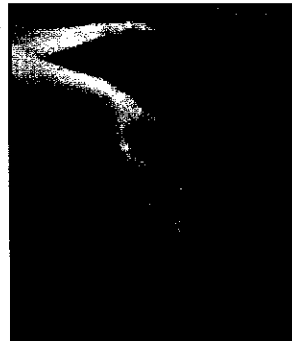
5. Raise the jack by turning the wheel wrench clockwise until the slots in the jack head fit into the metal flange located behind the triangle on the plastic molding as shown.
6. Put the compact spare tire near you.
7. Raise the vehicle by turning the wheel wrench clockwise. Raise the vehicle far enough off the ground for the compact spare tire to fit under the vehicle.
8. Remove all the wheel nuts and take off the flat tire.

**⚠ CAUTION:**

Rust or dirt on the wheel, or on the parts to which it is fastened, can make the wheel nuts become loose after a time. The wheel could come off and cause an accident. When you change a wheel, remove any rust or dirt from the places where the wheel attaches to the vehicle. In an emergency, you can use a cloth or a paper towel to do this; but be sure to use a scraper or wire brush later, if you need to, to get all the rust or dirt off.



9. Remove any rust or dirt from the wheel bolts, mounting surfaces and spare wheel.

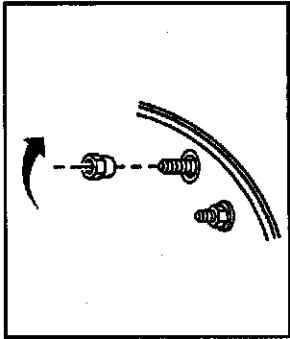


10. Place the compact spare tire on the wheel-mounting surface.

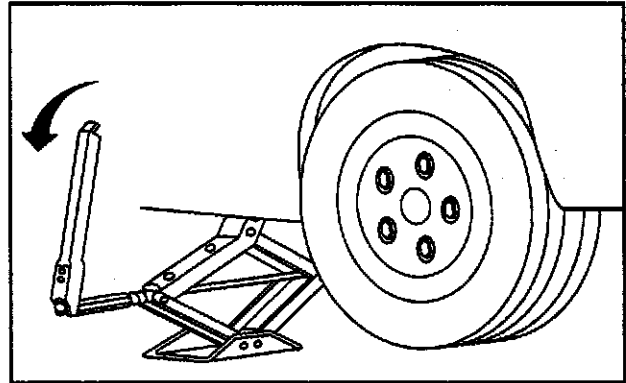
**⚠ CAUTION:**

Never use oil or grease on studs or nuts. If you do, the nuts might come loose. Your wheel could fall off, causing a serious accident.





11. Put the wheel nuts back on with the rounded end of the nuts toward the wheel. Tighten each wheel nut by turning it clockwise with your hand until the wheel is held against the hub.

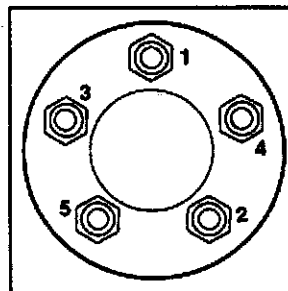


12. Lower the vehicle by turning the wheel wrench counterclockwise. Lower the jack completely.

**⚠ CAUTION:**

Incorrect wheel nuts or improperly tightened wheel nuts can cause the wheel to come loose and even come off. This could lead to an accident. Be sure to use the correct wheel nuts. If you have to replace them, be sure to get new GM original equipment wheel nuts. Stop somewhere as soon as you can and have the nuts tightened with a torque wrench to the proper torque specification. See *Capacities and Specifications on page 5-108* for wheel nut torque specification.

**Notice:** Improperly tightened wheel nuts can lead to brake pulsation and rotor damage. To avoid expensive brake repairs, evenly tighten the wheel nuts in the proper sequence and to the proper torque specification. See *Capacities and Specifications on page 5-108* for the wheel nut torque specification.



13. Tighten the wheel nuts firmly in a crisscross sequence as shown.

**Notice:** Wheel covers will not fit on your compact spare. If you try to put a wheel cover on the compact spare, you could damage the cover or the spare.

Do not try to put a wheel cover on your compact spare tire. It will not fit. Store the wheel cover in the trunk until you have the flat tire repaired or replaced.

## Storing a Flat or Spare Tire and Tools

### **CAUTION:**

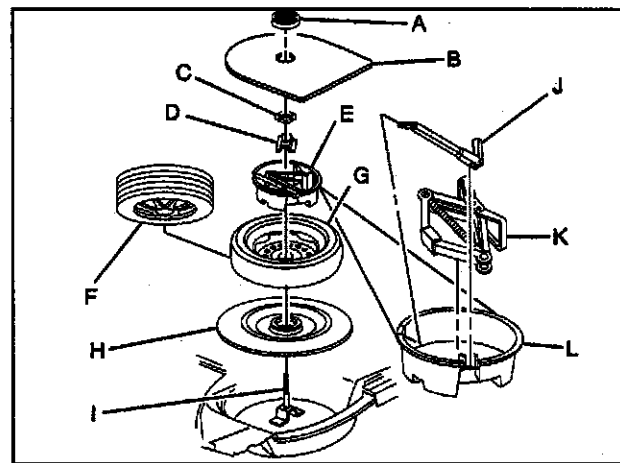
Storing a jack, a tire, or other equipment in the passenger compartment of the vehicle could cause injury. In a sudden stop or collision, loose equipment could strike someone. Store all these in the proper place.

After you've put the compact spare tire on your vehicle, you'll need to store the flat tire in your trunk.

Remove the foam support so that the flat tire will fit in the storage area. Place the flat tire with the appearance-side face down and store the jack container in the center of the tire. See the diagram for more information.

The compact spare is for temporary use only. Replace the compact spare tire with a full-size tire as soon as you can.

Use the following diagram as a guide for storing the compact spare tire in the trunk:



- |  |                       |
|--|-----------------------|
| A. Compact Spare Tire Cover Wing Nut         | F. Flat Road Tire     |
| B. Compact Spare Tire Cover                  | G. Compact Spare Tire |
| C. Plastic Wing Nut                          | H. Foam Insert        |
| D. Retainer                                  | I. Bolt               |
| E. Jack Container with Wheel Wrench and Jack | J. Wheel Wrench       |
|  | K. Jack               |
|  | L. Jack Container     |

## Compact Spare Tire

Although the compact spare tire was fully inflated when the vehicle was new, it can lose air after a time. Check the inflation pressure regularly. It should be 60 psi (420 kPa).

After installing the compact spare on the vehicle, stop as soon as possible and make sure the spare tire is correctly inflated. The compact spare is made to perform well at speeds up to 65 mph (105 km/h) for distances up to 3,000 miles (5 000 km), so you can finish your trip and have the full-size tire repaired or replaced at your convenience. Of course, it is best to replace the spare with a full-size tire as soon as possible. The spare tire will last longer and be in good shape in case it is needed again.

**Notice:** When the compact spare is installed, do not take your vehicle through an automatic car wash with guide rails. The compact spare can get caught on the rails. That can damage the tire and wheel, and maybe other parts of your vehicle.

Do not use the compact spare on other vehicles.

And do not mix the compact spare tire or wheel with other wheels or tires. They will not fit. Keep the spare tire and its wheel together.

**Notice:** Tire chains will not fit your compact spare. Using them can damage your vehicle and can damage the chains too. Do not use tire chains on your compact spare.

## Appearance Care

Cleaning products can be hazardous. Some are toxic. Other cleaning products can burst into flames if a match is struck near them or if they get on a hot part of the vehicle. Some are dangerous if their fumes are inhaled in a closed space. When anything from a container is used to clean the vehicle, be sure to follow the manufacturer's warnings and instructions. Always open the doors or windows of the vehicle when cleaning the inside.

Never use these to clean the vehicle:

- Gasoline
- Benzene
- Naphtha
- Carbon Tetrachloride
- Acetone
- Paint Thinner
- Turpentine
- Lacquer Thinner
- Nail Polish Remover

They can all be hazardous — some more than others — and they can all damage the vehicle, too.