SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 138
TIRE PRESSURE MONITORING SYSTEMS

VOLVO CAR CORPORATION
2008 VOLVO XC90
FOUR-DOOR MPV
NHTSA NO. C85900

U.S. DOT SAN ANGELO TEST FACILITY
131 COMANCHE TRAIL, BUILDING 3527
GOODFELLOW AFB, TEXAS 76908

June 18, 2008

FINAL REPORT

PREPARED FOR
U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
NVS-220
OFFICE OF VEHICLE SAFETY COMPLIANCE
1200 NEW JERSEY AVENUE, SE
WASHINGTON, D.C. 20590
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Prepared By: Deris Socha

Approved By: [Signature]

Accepted By: [Signature]

Acceptance Date: 6/18/08
Compliance tests were conducted on the subject 2008 Volvo XC90 four-door MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-138-03 for the determination of FMVSS 138 compliance. Test failures identified were as follows: NONE.
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1.1 PURPOSE OF COMPLIANCE TEST

A 2008 Volvo XC90 four-door MPV was tested to determine if the vehicle was in compliance with the requirements of FMVSS 138. All tests were conducted in accordance with NHTSA/Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure TP-138-03 dated July 12, 2007.

1.2 TEST VEHICLE

The test vehicle was a 2008 Volvo XC90 four-door MPV. Nomenclatures applicable to the test vehicle are:

A. **Vehicle Identification Number:** YV4CN982281432584

B. **NHTSA Number:** C85900

C. **Manufacturer:** Volvo Car Corporation

D. **Manufacture Date:** 08/2007

1.3 TEST DATE

The test vehicle was tested during the time period February 13 through February 26, 2008
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 as required by the NHTSA/OVSC Test Procedure. Tire sidewall information was recorded. The owner's manual was reviewed, and pertinent tire and TPMS information were noted. Telltale's symbol, color, location and lamp function were checked.

Subsequent events included weighing the vehicle to establish the Unloaded Vehicle Weight (UVW) and the distribution of weight on the front and rear axles and each wheel position. The vehicle was loaded to its Lightly Loaded Vehicle Weight (LLVW) for four tire deflation scenarios. This LLVW included the weights of driver, one passenger, and test equipment. The vehicle was loaded to its Vehicle Capacity Weight (VCW) for four additional tire deflation scenarios. The vehicle is required to be loaded to its maximum capacity without exceeding either the Vehicle Capacity Weight or Gross Vehicle Weight Rating (GVWR). The Vehicle Capacity Weight included the weights of driver, one passenger, test equipment, ballast in the rear seat, and ballast in the internal cargo area. For determination of the telltale warning activation pressure, the recommended cold inflation pressure was identified from the vehicle placard.

The vehicle was instrumented with a Racelogic VBOX III 100 Hz GPS Data Logger and brake pedal trigger. The VBOX uses GPS to measure vehicle speed, time, and distance. Test data were recorded to a compact flash card. During the test, a stopwatch was used to determine the approximate “cumulative driving time” during each test phase. Cumulative driving time does not include time during the brake application or when the vehicle speed was below 50 km/h or above 100 km/h. Upon completion of a tire deflation scenario, graphs were generated by VBOX software showing vehicle speed versus time during the test procedures. The graphs furnish a second-by-second analysis of each calibration and detection test phase. The cumulative driving time for each test phase was calculated by post processing the VBOX graph data and is reported in Section 3 (Test Data) as ‘Total Driving Time’.

The tire deflation test scenario consisted of four phases:

1. Calibration phase: Tires were set at vehicle placard cold inflation pressure and the vehicle was driven for at least twenty minutes of cumulative driving time between 50 and 100 km/h.

2. Detection phase: Immediately after calibration phase, the selected tire(s) were deflated to seven kPa (one psi) below the Telltale Warning Activation Pressure. After one minute, the inflation pressure(s) of only deflated tire(s) were rechecked and adjusted if necessary. The vehicle was started and driven between 50 and 100 km/h to verify telltale illumination.
3. Cool down phase: Vehicle was parked in the San Angelo Test Facility (SATF) open bay shielded from direct sunlight. Tires were allowed to cool down for a minimum of one hour, or until all tires excluding deflated tire(s) were within seven kPa (one psi) of vehicle placard cold inflation pressure. After cool down, the vehicle was started and the low tire pressure telltale was checked for re-illumination.

4. Extinguishment phase: Tires were adjusted to vehicle placard cold inflation pressure. The vehicle is normally started and driven between 50 and 100 km/h to verify telltale extinguishment, but in these instances the Volvo telltale extinguished before 50 km/h was reached.

A malfunction detection scenario was performed with the vehicle loaded to its LLVW. A malfunction was simulated by placing the compact spare tire (with no TPMS sensor) on the right front wheel position. The vehicle was driven until telltale illumination was attained. Upon completion, a graph was generated by VBOX software showing vehicle speed versus time during the malfunction simulation.

2.2 SUMMARY OF RESULTS

Four tire deflation scenarios were performed on the test vehicle at LLVW:

A. Left rear
B. Right front
C. Left front, right front
D. Left front, left rear, right rear, right front

Four tire deflation scenarios were performed on the test vehicle at VCW:

E. Left front
F. Right rear
G. Left rear, right rear
H. Left front, left rear, right rear, right front

The data indicate compliance of the test vehicle's tire pressure monitoring system for the eight tire deflation scenarios tested.

One malfunction detection scenario was performed on the test vehicle at LLVW. The vehicle's combination malfunction telltale indicated a malfunction per the standard’s requirements effective September 1, 2007.
SECTION 3
TEST DATA
**FMVSS No. 138 – TEST DATA SUMMARY**

**TEST DATES:** February 13 – February 26, 2008  
**LAB:** U. S. DOT San Angelo Test Facility

**VIN:** YV4CN982281432584  
**VEHICLE NHTSA NUMBER:** C85900

**CERTIFICATION LABEL BUILD DATE:** 08/2007

<table>
<thead>
<tr>
<th>REQUIREMENTS</th>
<th>PASS/FAIL</th>
</tr>
</thead>
</table>
| LOW TIRE PRESSURE WARNING TELLTALE  
  S138: S4.3.1 (a), (b); S4.3.3 (a), (b)                              | Mounting: PASS  
  Symbol and color: PASS  
  Check of lamp function: PASS |
| MALFUNCTION TELLTALE  
  S138: S4.4 (b) or (c)                                              | Mounting: PASS  
  Symbol and color: PASS  
  Check of lamp function: PASS |
| LOW TIRE PRESSURE WARNING - OPERATIONAL PERFORMANCE  
  S138: S4.2, S4.3.1 (c), S4.3.2                                      | Telltale illumination: PASS |
| MALFUNCTION INDICATOR – OPERATIONAL PERFORMANCE  
  S138: S4.4 (a)                                                      | Telltale illumination: PASS |
| TPMS WRITTEN INSTRUCTIONS  
  S138: S4.5                                                          | Image of telltales: PASS  
  Verbatim statements: PASS |

**REMARKS:** None
TEST DATE: February 13, 2008
LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900
VIN: YV4CN982281432584

CERTIFICATION LABEL BUILD DATE: 08/2007
ENGINE: 2.3 liter 6 cylinder

MY/MAKE/MODEL/BODY STYLE: 2008 Volvo XC90 four-door MPV

TIRE CONDITIONING:
(X) Tires used more than 100 km. Actual odometer reading: 111.0 km (69.0 mi)

VEHICLE ALIGNMENT AND WHEEL BALANCING:
Alignment checked: ( ) Front ( ) Rear (X) COTR waived
Wheels balanced: ( ) Front ( ) Rear (X) COTR waived

TPMS IDENTIFICATION:
TPMS SENSOR MAKE/MODEL: Schrader [Gen 2 (part #30748991) or Snap-In (part #31200923)]
Source: Manufacturer supplied information

TPMS TYPE: (X) Direct ( ) Indirect ( ) Other

TPMS MALFUNCTION INDICATOR TYPE:
( ) None ( ) Dedicated Telltale (X) Combination low tire pressure/malfunction telltale

Does TPMS require execution of a learning/calibration driving phase? ( )YES (X)NO
Source: Manufacturer supplied information

Does TPMS have a manual reset control? ( )YES (X)NO
DATA SHEET 1 (Sheet 2 of 3)
TEST PREPARATION INFORMATION

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING AND OWNER’S MANUAL:

<table>
<thead>
<tr>
<th>Axle</th>
<th>Tire Size</th>
<th>Recommended Cold Inflation Pressure</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>235/65R17</td>
<td>250 kPa (36 psi)</td>
<td>Vehicle placard</td>
</tr>
<tr>
<td>Rear</td>
<td>235/65R17</td>
<td>250 kPa (36 psi)</td>
<td>Vehicle placard</td>
</tr>
<tr>
<td>Spare</td>
<td>T155/85R18</td>
<td>420 kPa (60 psi)</td>
<td>Vehicle placard</td>
</tr>
</tbody>
</table>

INSTALLED TIRE DATA (Use diagrams as reference):
Diagram - Passenger Car Tire Labeling
Diagram - Other Markings on Light Trucks

Front and Rear Axles

Tire Size and Load Index / Speed Rating: 235/65R17 104H

Manufacturer/Tire Name: Pirelli Scorpion Zero

Sidewall Max Load Rating: 900 kg (1,984 lbs)

Max Inflation Pressure: 300 kPa (44 psi)

Sidewall Construction (number of plies and ply material): 2 plies rayon

Tread Construction (number of plies and ply material): 2 plies rayon, 2 steel, 2 nylon

Do all installed tires have the same sidewall information? (X) YES ( ) NO

Are all installed tires the same as designated by the vehicle manufacturer? (X) YES ( ) NO
<table>
<thead>
<tr>
<th>Part</th>
<th>Front Axle</th>
<th>Rear Axle</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Recommended Inflation Pressure x .75</td>
<td>250 kPa x .75 = 187.5 kPa</td>
<td>250 kPa x .75 = 187.5 kPa</td>
</tr>
<tr>
<td>(B) Information from FMVSS 138 Table 1 below, Tire types are:</td>
<td>( X ) P-metric-Standard load ( ) P-metric-Extra Load Load Range ( ) C, ( ) D, or ( ) E</td>
<td>( X ) P-metric-Standard load ( ) P-metric-Extra Load Load Range ( ) C, ( ) D, or ( ) E</td>
</tr>
<tr>
<td>Inflation pressure</td>
<td>( X ) Maximum or ( ) Rated 300 kPa (44 psi)</td>
<td>( X ) Maximum or ( ) Rated 300 kPa (44 psi)</td>
</tr>
<tr>
<td>Minimum activation pressures from Table 1</td>
<td>140 kPa (20 psi)</td>
<td>140 kPa (20 psi)</td>
</tr>
<tr>
<td>(C) Telltale Warning Activation Pressure is the higher of Part (A) or (B)</td>
<td>187.5 kPa (27.2 psi)</td>
<td>187.5 kPa (27.2 psi)</td>
</tr>
<tr>
<td>(D) Pressure at which to deflate tire(s) = (C) – 7 kPa</td>
<td>180.5 kPa (26.2 psi)</td>
<td>180.5 kPa (26.2 psi)</td>
</tr>
</tbody>
</table>

**FMVSS 138 Table 1 - Low Tire Pressure Warning Telltale - Minimum Activation Pressure**

<table>
<thead>
<tr>
<th>Tire Type</th>
<th>Maximum or Rated Inflation Pressure</th>
<th>Minimum Activation Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(kPa) (psi)</td>
<td>(kPa) (psi)</td>
</tr>
<tr>
<td>P-metric -- Standard Load</td>
<td>240, 300, or 350</td>
<td>35, 44, or 51</td>
</tr>
<tr>
<td>P-metric - Extra Load</td>
<td>280 or 340</td>
<td>41 or 49</td>
</tr>
<tr>
<td>Load Range C</td>
<td>350</td>
<td>51</td>
</tr>
<tr>
<td>Load Range D</td>
<td>450</td>
<td>65</td>
</tr>
<tr>
<td>Load Range E</td>
<td>550</td>
<td>80</td>
</tr>
</tbody>
</table>

**REMARKS:** None

**RECORDED BY:** Jack R. Stewart **DATE:** February 13, 2008

**APPROVED BY:** Kenneth H. Yates
DATA SHEET 2 (Sheet 1 of 2)
LOW TIRE PRESSURE WARNING AND MALFUNCTION TELLTALE

TEST DATE: February 13, 2008 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

TPMS Low Tire Pressure Warning Telltale

TPMS Low Tire Pressure Warning Telltale Location: Lower right side of instrument panel, directly below the fuel gauge

Telltale is mounted inside the occupant compartment in front of and in clear view of the driver? (X)YES ( )NO (fail)

Identify Telltale Symbol Used (check box above figure).

[ ]

Note any words or additional symbols used.

See Remarks.

Telltale is part of a reconfigurable display? ( )YES (X)NO

TPMS Malfunction Telltale

( ) None ( ) Dedicated stand-alone (X) Combined with low tire pressure telltale

Malfunction telltale is part of a reconfigurable display? ( )YES (X)NO

Note any words or additional symbols used.

See Remarks.
Check Telltale Lamp Functions:

LOW TIRE PRESSURE TELTTALE AND MALFUNCTION INDICATION, IF COMBINED

Identify position of ignition locking system when telltale illuminates.

☐ OFF/LOCK ☐ Between OFF/LOCK and ON/RUN

☐ ON/RUN ✗ Between OFF/RUN and START

Is the telltale yellow in color? ( X )YES ( )NO (fail)

Time telltale remains illuminated 5.1 seconds.

Starter Interlocks:

Does vehicle have any starter, transmission or other interlocks that affect operation of the telltale lamp check function? ( )YES ( X )NO

TEST RESULTS

Low Tire Pressure Warning Telltale (PASS/FAIL) ☑ PASS

REMARKS: In addition to the telltale, there is an information center that displays whether an illuminated telltale is from a TPMS low pressure or malfunction condition.

For low pressure, information center displays a “VERY LOW TIRE PRESSURE” message. (See Figure 5.11.) For a TPMS malfunction, the display reads “TIRE PRESSURE SYST. SERVICE REQUIRED”. (See Figure 5.17.)

RECORDED BY: Jack R. Stewart DATE: February 13, 2008

APPROVED BY: Kenneth H. Yates
DATA SHEET 3 (Sheet 1 of 28)
TPMS OPERATIONAL PERFORMANCE

TEST DATE: February 13, 2008 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Time: Start: 1:57 pm End: 2:16 pm
Ambient Temperature: Start: 19.1°C (66.4°F) End: 19.2°C (66.6°F)
Odometer Reading: Start: 111 km (69.0 mi)
Fuel Level: Start: Full
Weather Conditions: Clear and windy

Time vehicle has remained with engine off and tires shielded from direct sunlight: (1 hour minimum): 4 hours

PRE-TEST TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test cold measurements after ambient soak: Inflation Pressure</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>17.4°C (63.3°F)</td>
<td>17.6°C (63.7°F)</td>
<td>17.5°C (63.5°F)</td>
<td>17.6°C (63.7°F)</td>
</tr>
</tbody>
</table>
VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GVWR</td>
<td>2,608 kg (5,750 lbs)</td>
<td></td>
</tr>
<tr>
<td>GAWR (front)</td>
<td>1,256 kg (2,770 lbs)</td>
<td></td>
</tr>
<tr>
<td>GAWR (rear)</td>
<td>1,388 kg (3,060 lbs)</td>
<td></td>
</tr>
</tbody>
</table>

Vehicle Capacity Weight:

Vehicle Capacity Weight 525 kg (1,160 lbs)

Measured Unloaded Vehicle Weight:

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<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>556 kg (1,226 lbs)</td>
<td></td>
</tr>
<tr>
<td>LR</td>
<td>459 kg (1,011 lbs)</td>
<td></td>
</tr>
<tr>
<td>RF</td>
<td>549 kg (1,211 lbs)</td>
<td></td>
</tr>
<tr>
<td>Rear Axle</td>
<td>446 kg (983 lbs)</td>
<td></td>
</tr>
<tr>
<td>Front Axle</td>
<td>1,105 kg (2,437 lbs)</td>
<td></td>
</tr>
<tr>
<td>Total Vehicle</td>
<td>2,010 kg (4,431 lbs)</td>
<td></td>
</tr>
</tbody>
</table>

Measured Test Weight: (X) LLVW (+50, -0 kg) ( ) UVW + VCW ( ) GVWR (+0, -50 kg)

<p>| | | |</p>
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<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>611 kg (1,347 lbs)</td>
<td></td>
</tr>
<tr>
<td>LR</td>
<td>503 kg (1,110 lbs)</td>
<td></td>
</tr>
<tr>
<td>RF</td>
<td>606 kg (1,336 lbs)</td>
<td></td>
</tr>
<tr>
<td>Rear Axle</td>
<td>496 kg (1,093 lbs)</td>
<td></td>
</tr>
<tr>
<td>Front Axle</td>
<td>1,217 kg (2,683 lbs) ( ≤ GAWR)</td>
<td></td>
</tr>
<tr>
<td>Total Vehicle</td>
<td>2,216 kg (4,886 lbs) (not greater than UVW + VCW)</td>
<td></td>
</tr>
</tbody>
</table>

Note: For scenarios A, B, C, D, and I, this total vehicle weight measures the vehicle loaded to Lightly Loaded Vehicle Weight (LLVW), 206 kg (455 lbs) of driver, passenger, and test equipment.
SCENARIO A - Left Rear Tire Deflation at LLVW

TEST DATE: February 14, 2008 LAB: U. S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Note: See Data Sheet 3 (Sheet 2 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature: 15.7°C (60.3°F)</td>
<td>Vehicle cool down period: 62 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>18.6°C (65.5°F)</td>
<td>18.2°C (64.8°F)</td>
<td>18.2°C (64.8°F)</td>
<td>19.0°C (66.2°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>14.8°C (58.6°F)</td>
<td>15.2°C (59.4°F)</td>
<td>15.4°C (59.7°F)</td>
<td>14.8°C (58.6°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

<table>
<thead>
<tr>
<th>Time:</th>
<th>Start: 17:12:23 UTC</th>
<th>End: 17:36:26 UTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odometer Reading:</td>
<td>Start: 175.7 km (109.2 mi)</td>
<td>End: 207.4 km (128.9 mi)</td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>Start: 15.7°C (60.3°F)</td>
<td>End: 17.8°C (64.0°F)</td>
</tr>
<tr>
<td>Roadway Temperature:</td>
<td>Start: 19.2°C (66.6°F)</td>
<td>End: 22.0°C (71.6°F)</td>
</tr>
</tbody>
</table>

Driving in first direction:

Good fellow Air Force

Starting point: Base (GAFB) north gate  Direction: see chart, page 64

10:11 minutes (stopwatch time) 15.6 km (9.7 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass  Direction: see chart, page 64

10:25 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 98.6 km/h (61.3 mph)

Total Driving Time: 20:36 minutes (VBox time)
DATA SHEET 3 (Sheet 4 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO A - Left Rear Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off: Inflation Pressure</td>
<td>270.1 kPa (39.2 psi)</td>
<td>269.3 kPa (39.1 psi)</td>
<td>271.0 kPa (39.3 psi)</td>
<td>270.4 kPa (39.2 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>31.8°C (89.2°F)</td>
<td>29.4°C (84.9°F)</td>
<td>30.0°C (86.0°F)</td>
<td>32.6°C (90.7°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>15.4°C (59.7°F)</td>
<td>15.8°C (60.4°F)</td>
<td>15.8°C (60.4°F)</td>
<td>15.4°C (59.7°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td>( )LF ( X )LR ( )RR ( )RF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>180.5 kPa (26.2 psi)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: see chart, page 65

Did the telltale illuminate? ( X )YES ( )NO

Distance to Illumination: 12.6 km (7.8 mi) time to Illumination: 7:40 minutes (VBox)

Max speed: 100.4 km/h (62.4 mph)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: ( X )YES ( )NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated? ( )YES ( X )NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)
Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)

### TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLETALE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>20.1°C (68.2°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td></td>
<td>68 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>255.8 kPa (37.1 psi)</td>
<td>172.8 kPa (25.1 psi)</td>
<td>256.3 kPa (37.2 psi)</td>
<td>256.3 kPa (37.2 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>22.2°C (72.0°F)</td>
<td>21.6°C (70.9°F)</td>
<td>21.4°C (70.5°F)</td>
<td>21.8°C (71.2°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>16.3°C (61.3°F)</td>
<td>16.6°C (61.9°F)</td>
<td>17.2°C (63.0°F)</td>
<td>16.8°C (62.2°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)

### TELLETALE EXTINGUISHMENT:

### RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale? ( X )YES ( )NO

Starting point: San Angelo Test Facility shop

Distance to Extinguishment: 0.3 km (0.2 mi)

Time to Extinguishment: 1:34 minutes (stopwatch)

### TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) PASS

Left rear tire was deflated at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: February 14, 2008

APPROVED BY: Kenneth H. Yates
DATA SHEET 3 (Sheet 6 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO B – Right Front Tire Deflation at LLVW

TEST DATE: February 15, 2008   LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Note: See Data Sheet 3 (Sheet 2 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES
BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation Pressure</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>9.2°C (48.6°F)</td>
<td>8.8°C (47.8°F)</td>
<td>8.8°C (47.8°F)</td>
<td>9.6°C (49.3°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>13.6°C (56.5°F)</td>
<td>13.4°C (56.1°F)</td>
<td>13.4°C (56.1°F)</td>
<td>13.6°C (56.5°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:


Odometer Reading: Start: 232.9 km (144.7 mi)   End: 264.6 km (164.4 mi)

Ambient Temperature: Start: 5.1°C (41.2°F)   End: 5.1°C (41.2°F)

Roadway Temperature: Start: 9.4°C (48.9°F)   End: 9.8°C (49.6°F)

Driving in first direction:

Starting point: GAFB north gate   Direction: see chart, page 66

10:13 minutes (stopwatch time)   15.6 km (9.7 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass   Direction: see chart, page 66

10:24 minutes (stopwatch time)   16.1 km (10.0 mi) distance

Max speed: 98.7 km/h (61.3 mph)

Total Driving Time: 20:38 minutes (VBox time)
DATA SHEET 3 (Sheet 7 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO B – Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off: Inflation Pressure</td>
<td>265.8 kPa (38.6 psi)</td>
<td>264.3 kPa (38.3 psi)</td>
<td>265.4 kPa (38.5 psi)</td>
<td>266.4 kPa (38.6 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>16.4°C (61.5°F)</td>
<td>14.0°C (57.2°F)</td>
<td>15.0°C (59.0°F)</td>
<td>18.0°C (64.4°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>11.6°C (52.9°F)</td>
<td>11.8°C (53.2°F)</td>
<td>11.8°C (53.2°F)</td>
<td>12.8°C (55.0°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
<th>Inflation Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td>( )LF ( )LR ( )RR (X)RF</td>
<td>180.5 kPa (26.2 psi)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop  Direction: see chart, page 67

Did the telltale illuminate? (X) YES ( ) NO

Distance to Illumination: 12.2 km (7.6 mi)  Time to Illumination: 7:39 minutes (VBox)

Max speed: 103.1 km/h (64.1 mph)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X) YES ( ) NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated? ( ) YES (X) NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X) YES ( ) NO (fail)
Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  ( X )YES (   )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>5.4°C</td>
<td>41.7°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>253.5 kPa (36.8 psi)</td>
<td>252.4 kPa (36.6 psi)</td>
<td>252.4 kPa (36.6 psi)</td>
<td>174.1 kPa (25.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>8.6°C</td>
<td>47.5°F</td>
<td>7.8°C</td>
<td>46.0°F</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>10.6°C</td>
<td>51.1°F</td>
<td>10.6°C</td>
<td>51.1°F</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  ( X )YES (   )NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250.1 kPa (36.3 psi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Is it necessary to drive the vehicle to extinguish the telltale? ( X )YES (   )NO

Starting point:  San Angelo Test Facility shop

Distance to Extinguishment: 0.2 km (0.1 mi)

Time to Extinguishment: 0:57 minutes (stopwatch)

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL)  PASS
Right front tire was deflated at LLVW.

REMARKS:  None

RECORDED BY:  Jack R. Stewart  DATE:  February 15, 2008
APPROVED BY:  Kenneth H. Yates
DATA SHEET 3 (Sheet 9 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO C – Left Front and Right Front Tire Deflation at LLVW

TEST DATE: February 19, 2008
LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Note: See Data Sheet 3 (Sheet 2 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES
BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to lightly loaded vehicle weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Ambient Temperature: 8.2°C (46.8°F)</td>
<td>Vehicle cool down period: overnight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>8.8°C (47.8°F)</td>
<td>8.8°C (47.8°F)</td>
<td>8.8°C (47.8°F)</td>
<td>9.2°C (48.6°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>10.6°C (51.1°F)</td>
<td>10.4°C (50.7°F)</td>
<td>10.6°C (51.1°F)</td>
<td>10.4°C (50.7°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

Time: Start: 15:46:19 UTC End: 16:10:52 UTC
Odometer Reading: Start: 290.8 km (180.7 mi) End: 322.7 km (200.5 mi)
Ambient Temperature: Start: 8.3°C (46.9°F) End: 11.0°C (51.8°F)
Roadway Temperature: Start: 11.8°C (53.2°F) End: 14.2°C (57.6°F)

Driving in first direction:
Starting point: GAFB north gate Direction: see chart, page 68
10:12 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass Direction: see chart, page 68
10:27 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 100.0 km/h (62.1 mph)
Total Driving Time: 20:38 minutes (VBox time)
DATA SHEET 3 (Sheet 10 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO C – Left Front and Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off: Inflation Pressure</td>
<td>276.8 kPa (40.1 psi)</td>
<td>274.4 kPa (39.8 psi)</td>
<td>275.5 kPa (40.0 psi)</td>
<td>275.7 kPa (40.0 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>24.8°C (76.6°F)</td>
<td>21.8°C (71.2°F)</td>
<td>22.4°C (72.3°F)</td>
<td>24.8°C (76.6°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>9.6°C (49.3°F)</td>
<td>10.4°C (50.7°F)</td>
<td>10.2°C (50.4°F)</td>
<td>10.6°C (51.1°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td>( X )LF ( )LR ( )RR ( X )RF</td>
<td>180.5 kPa (26.2 psi)</td>
<td></td>
<td>180.6 kPa (26.2 psi)</td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop
Direction: see chart, page 69

Did the telltale illuminate? ( X )YES ( )NO

Distance to Illumination: 13.5 km (8.4 mi)
Time to Illumination: 7:43 minutes (VBox)

Max speed: 98.4 km/h (61.1 mph)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: ( X )YES ( )NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated? ( )YES ( X )NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)
Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X) YES ( ) NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTALE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>15.0°C (59.0°F)</td>
<td>Vehicle cool down period:</td>
<td>62 minutes</td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>175.2 kPa (25.4 psi)</td>
<td>262.0 kPa (38.0 psi)</td>
<td>262.9 kPa (38.1 psi)</td>
<td>176.6 kPa (25.6 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>16.6°C (61.9°F)</td>
<td>16.0°C (60.8°F)</td>
<td>16.8°C (62.2°F)</td>
<td>17.8°C (64.0°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>12.0°C (53.6°F)</td>
<td>12.6°C (54.7°F)</td>
<td>12.2°C (54.0°F)</td>
<td>12.2°C (54.0°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X) YES ( ) NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale? (X) YES ( ) NO

Starting point: San Angelo Test Facility shop

Distance to Extinguishment: 0.2 km (0.1 mi)
Time to Extinguishment: 1:14 minutes (stopwatch)

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL) PASS
Left front and right front tires were deflated at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: February 19, 2008
APPROVED BY: Kenneth H. Yates
SCENARIO D – Left Front, Left Rear, Right Rear, and Right Front Tire Deflation at LLVW

TEST DATE: February 20, 2008
LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Note: See Data Sheet 3 (Sheet 2 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES
BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inflation Pressure</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
<tr>
<td></td>
<td>Tire Sidewall Temp</td>
<td>14.8°C (58.6°F)</td>
<td>14.8°C (58.6°F)</td>
<td>14.8°C (58.6°F)</td>
</tr>
<tr>
<td></td>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>14.2°C (57.6°F)</td>
<td>14.6°C (58.3°F)</td>
<td>14.2°C (57.6°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:


Odometer Reading: Start: 350.5 km (217.8 mi)  End: 382.2 km (237.5 mi)

Ambient Temperature: Start: 14.1°C (57.4°F)  End: 14.4°C (57.9°F)

Roadway Temperature: Start: 13.8°C (56.8°F)  End: 13.8°C (56.8°F)

Driving in first direction:
Starting point: GAFB north gate  Direction: see chart, page 70
10:12 minutes (stopwatch time)  15.6 km (9.7 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass  Direction: see chart, page 70
10:24 minutes (stopwatch time)  16.1 km (10.0 mi) distance

Max speed: 97.2 km/h (60.4 mph)

Total Driving Time: 20:37 minutes (VBox time)
DATA SHEET 3 (Sheet 13 of 28)
TPMS OPERATIONAL PERFORMANCE

SCENARIO D – Left Front, Left Rear, Right Rear, and Right Front Tire Deflation at LLVW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off:  Inflation Pressure</td>
<td>270.4 kPa (39.2 psi)</td>
<td>267.0 kPa (38.7 psi)</td>
<td>269.6 kPa (39.1 psi)</td>
<td>271.0 kPa (39.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>26.4°C (79.5°F)</td>
<td>23.2°C (73.8°F)</td>
<td>24.8°C (76.6°F)</td>
<td>27.0°C (80.6°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>13.8°C (56.8°F)</td>
<td>14.6°C (58.3°F)</td>
<td>14.4°C (57.9°F)</td>
<td>14.2°C (57.6°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td>180.5 kPa (26.2 psi)</td>
<td>180.5 kPa (26.2 psi)</td>
<td>180.5 kPa (26.2 psi)</td>
<td>180.5 kPa (26.2 psi)</td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop
Direction: see chart, page 71

Did the telltale illuminate? (X) YES ( ) NO

Distance to Illumination: 13.7 km (8.5 mi) distance
Time to Illumination: 7:40 minutes (VBox)

Max speed: 97.5 km/h (60.6 mph)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: (X) YES ( ) NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated? ( ) YES (X) NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? (X) YES ( ) NO (fail)
Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES  (   )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELLTALE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>16.8°C (62.2°F)</td>
<td>Vehicle cool down period:</td>
<td>63 minutes</td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>175.4 kPa (25.4 psi)</td>
<td>175.3 kPa (25.4 psi)</td>
<td>175.1 kPa (25.4 psi)</td>
<td>176.2 kPa (25.6 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>17.8°C (64.0°F)</td>
<td>17.2°C (63.0°F)</td>
<td>17.8°C (64.0°F)</td>
<td>18.4°C (65.1°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>14.4°C (57.9°F)</td>
<td>14.6°C (58.3°F)</td>
<td>14.6°C (58.3°F)</td>
<td>14.4°C (57.9°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES  (   )NO (fail)

TELLTALE EXTINGUISHMENT:  
RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale?  

( X )YES  (   )NO

Starting point:  San Angelo Test Facility shop  
Distance to Extinguishment:  0.2 km (0.1 mi)  
Time to Extinguishment:  1:24 minutes (stopwatch)

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL)  
PASS

Left front, left rear, right rear, and right front tires were deflated at LLVW.

REMARKS:  None

RECORDED BY:  Jack R. Stewart  
DATE:  February 20, 2008

APPROVED BY:  Kenneth H. Yates
DATA SHEET 3 (Sheet 15 of 28)
TPMS OPERATIONAL PERFORMANCE

TEST DATE: February 21, 2008  LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Time: Start: 8:15 am  End: 10:04 am

Ambient Temperature: Start: 5.9°C (42.6°F)  End: 6.7°C (44.1°F)

Odometer Reading: Start: 443.5 km (275.6 mi)

Fuel Level: Start: Full

Weather Conditions: Cloudy and calm

Time vehicle has remained with engine off and tires shielded from direct sunlight: 
(1 hour minimum): overnight (inside the San Angelo Test Facility open bay)

PRE-TEST TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test cold measurements after ambient soak: Inflation Pressure</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>8.8°C (47.8°F)</td>
<td>8.8°C (47.8°F)</td>
<td>8.2°C (46.8°F)</td>
<td>8.2°C (46.8°F)</td>
</tr>
</tbody>
</table>
VEHICLE WEIGHT:

Vehicle Ratings from Certification Label:

GVWR: 2,608 kg (5,750 lbs)
GAWR (front): 1,256 kg (2,770 lbs)
GAWR (rear): 1,388 kg (3,060 lbs)

Vehicle Capacity Weight:

Vehicle Capacity Weight 526 kg (1,160 lbs)

Measured Unloaded Vehicle Weight:

<table>
<thead>
<tr>
<th></th>
<th>LF</th>
<th>LR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>555 kg (1,224 lbs)</td>
<td>460 kg (1,015 lbs)</td>
</tr>
<tr>
<td>Front</td>
<td>552 kg (1,216 lbs)</td>
<td>446 kg (983 lbs)</td>
</tr>
<tr>
<td>Axle</td>
<td>1,107 kg (2,440 lbs)</td>
<td>906 kg (1,998 lbs)</td>
</tr>
</tbody>
</table>

Total Vehicle 2,013 kg (4,438 lbs)

Measured Test Weight: ( ) LLVW (+50, -0 kg) ( X ) UVW + VCW ( ) GVWR (+0, -50 kg)

<table>
<thead>
<tr>
<th></th>
<th>LF</th>
<th>LR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>622 kg (1,371 lbs)</td>
<td>655 kg (1,445 lbs)</td>
</tr>
<tr>
<td>Front</td>
<td>616 kg (1,357 lbs)</td>
<td>646 kg (1,425 lbs)</td>
</tr>
<tr>
<td>Axle</td>
<td>1,238 kg (2,728 lbs)</td>
<td>1,301 kg (2,870 lbs)</td>
</tr>
</tbody>
</table>

Total Vehicle 2,539 kg (5,598 lbs) (not greater than GVWR)

Note: For scenarios E, F, G, and H, this Total Vehicle Weight measures the vehicle loaded to Vehicle Capacity Weight (VCW), 526 kg (1,160 lbs) of driver, passenger, test equipment, and ballast.
DATA SHEET 3 (Sheet 17 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO E – Left Front Tire Deflation at VCW

TEST DATE: February 21, 2008 LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Note: See Data Sheet 3 (Sheet 16 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to vehicle capacity weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>11.9°C (53.4°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>overnight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>13.2°C (55.8°F)</td>
<td>13.4°C (56.1°F)</td>
<td>13.6°C (56.5°F)</td>
<td>13.6°C (56.5°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>13.4°C (56.1°F)</td>
<td>13.8°C (56.8°F)</td>
<td>13.6°C (56.5°F)</td>
<td>13.4°C (56.1°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Odometer Reading:</td>
<td>Start: 445.1 km (276.6 mi)</td>
<td>End: 477.0 km (296.4 mi)</td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>Start: 13.1°C (55.6°F)</td>
<td>End: 13.7°C (56.7°F)</td>
</tr>
<tr>
<td>Roadway Temperature:</td>
<td>Start: 26.2°C (79.2°F)</td>
<td>End: 29.8°C (85.6°F)</td>
</tr>
</tbody>
</table>

Driving in first direction:

Starting point: GAFB north gate Direction: see chart, page 72
10:09 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass Direction: see chart, page 72
10:27 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 99.9 km/h (62.1 mph)
Total Driving Time: 20:36 minutes (VBox time)
SCENARIO E – Left Front Tire Deflation at VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off; Inflation Pressure</td>
<td>273.7 kPa (39.7 psi)</td>
<td>276.0 kPa (40.0 psi)</td>
<td>277.4 kPa (40.2 psi)</td>
<td>273.1 kPa (39.6 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>27.4°C (81.3°F)</td>
<td>27.6°C (81.7°F)</td>
<td>28.6°C (83.5°F)</td>
<td>28.6°C (83.5°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>14.2°C (57.6°F)</td>
<td>14.6°C (58.3°F)</td>
<td>14.4°C (57.9°F)</td>
<td>14.2°C (57.6°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated: ( X )LF ( )LR ( )RR ( )RF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>180.5 kPa (26.2 psi)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop  Direction: see chart, page 73

Did the telltale illuminate? ( X )YES ( )NO

Distance to Illumination: 13.5 km (8.4 mi) distance

Time to Illumination: 7:44 minutes (VBox)

Max speed: 98.6 km/h (61.3 mph)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: ( X )YES ( )NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated? ( )YES ( X )NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)
Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( )YES ( )NO (fail)

**TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTALE ILLUMINATION:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>19.2°C (66.6°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>175.1 kPa (25.4 psi)</td>
<td>263.4 kPa (38.2 psi)</td>
<td>262.3 kPa (38.0 psi)</td>
<td>262.8 kPa (38.1 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>20.6°C (69.1°F)</td>
<td>20.0°C (68.0°F)</td>
<td>21.4°C (70.5°F)</td>
<td>21.0°C (69.8°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>15.6°C (60.1°F)</td>
<td>16.4°C (61.5°F)</td>
<td>16.4°C (61.5°F)</td>
<td>16.0°C (60.8°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( )YES ( )NO (fail)

**TELLTALE EXTINGUISHMENT:**

**RE-ADJUSTED TIRE INFLATION PRESSURES:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale? ( )YES ( )NO

Starting point: San Angelo Test Facility shop

Distance to Extinguishment: 0.2 km (0.1 mi)

Time to Extinguishment: 0:48 minutes (stopwatch)

**TEST RESULTS**

**TPMS Performance Test Results (PASS/FAIL)**  
Left front tire was deflated at VCW.  
**PASS**

**REMARKS:** None

**RECORDED BY:** Jack R. Stewart  
**DATE:** February 21, 2008

**APPROVED BY:** Kenneth H. Yates
DATA SHEET 3 (Sheet 20 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO F – Right Rear Tire Deflation at VCW

TEST DATE: February 22, 2008         LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Note: See Data Sheet 3 (Sheet 16 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to vehicle capacity weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>3.3°C (37.9°F)</td>
<td>Vehicle cool down period:</td>
<td>overnight</td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>6.6°C (43.9°F)</td>
<td>6.2°C (43.2°F)</td>
<td>7.6°C (45.7°F)</td>
<td>7.8°C (46.0°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>11.2°C (52.2°F)</td>
<td>11.2°C (52.2°F)</td>
<td>11.4°C (52.5°F)</td>
<td>11.4°C (52.5°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

<table>
<thead>
<tr>
<th>Time:</th>
<th>Start: 14:17:10 UTC</th>
<th>End: 14:41:45 UTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odometer Reading:</td>
<td>Start: 505.8 km (314.3 mi)</td>
<td>End: 537.7 km (334.1 mi)</td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>Start: 3.7°C (38.7°F)</td>
<td>End: 4.3°C (39.7°F)</td>
</tr>
<tr>
<td>Roadway Temperature:</td>
<td>Start: 6.4°C (43.5°F)</td>
<td>End: 10.4°C (50.7°F)</td>
</tr>
</tbody>
</table>

Driving in first direction:
Starting point: GAFB north gate Direction: see chart, page 74
10:12 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass Direction: see chart, page 74
10:23 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 99.1 km/h (61.6 mph)
Total Driving Time: 20:34 minutes (VBox time)
### DATA SHEET 3 (Sheet 21 of 28)
### TPMS OPERATIONAL PERFORMANCE
### SCENARIO F – Right Rear Tire Deflation at VCW

#### TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>270.0 kPa (39.2 psi)</td>
<td>272.2 kPa (39.5 psi)</td>
<td>273.9 kPa (39.7 psi)</td>
<td>271.0 kPa (39.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>20.8°C (69.4°F)</td>
<td>20.6°C (69.1°F)</td>
<td>20.6°C (69.1°F)</td>
<td>20.2°C (68.4°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>11.2°C (52.2°F)</td>
<td>11.8°C (53.2°F)</td>
<td>11.6°C (52.9°F)</td>
<td>11.8°C (53.2°F)</td>
</tr>
</tbody>
</table>

#### SYSTEM DETECTION PHASE:

**LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( )LF ( )LR ( X )RR ( )RF</td>
<td></td>
<td></td>
<td>180.5 kPa (26.2 psi)</td>
<td></td>
</tr>
</tbody>
</table>

#### TELTATELL ILLUMINATION:

Starting point: San Angelo Test Facility shop  
Direction: see chart, page 75

Did the telltale illuminate?  
( X )YES  ( )NO

Distance to Illumination:  
13.2 km (8.2 mi) distance

Time to Illumination:  
7:29 minutes (VBox)

Max speed: 97.9 km/h (60.8 mph)

**TELTATELL ILLUMINATES WITHIN 20 MINUTES:**  
( X )YES  ( )NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated?  
( )YES  ( X )NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  
( X )YES  ( )NO (fail)
Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES  (   )NO (fail)

**TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTALE ILLUMINATION:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>After vehicle cool down period:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>12.6°C (54.7°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>260.6 kPa (37.8 psi)</td>
<td>259.9 kPa (37.7 psi)</td>
<td>170.9 kPa (24.8 psi)</td>
<td>261.3 kPa (37.9 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>14.4°C (57.9°F)</td>
<td>14.4°C (57.9°F)</td>
<td>14.8°C (58.6°F)</td>
<td>14.8°C (58.6°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>12.2°C (54.0°F)</td>
<td>12.6°C (54.7°F)</td>
<td>12.6°C (54.7°F)</td>
<td>12.6°C (54.7°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES  (   )NO (fail)

**TELLTALE EXTINGUISHMENT:**

**RE-ADJUSTED TIRE INFLATION PRESSURES:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>After cool down period:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale?  

( X )YES  (   )NO

Starting point: San Angelo Test Facility shop

Distance to Extinguishment: 0.2 km (0.1 mi)  
Time to Extinguishment: 1:10 minutes (stopwatch)

**TEST RESULTS**

TPMS Performance Test Results (PASS/FAIL)  
PASS

Right rear tire was deflated at VCW.

**REMARKS:** None

**RECORDED BY:** Jack R. Stewart  
**DATE:** February 22, 2008

**APPROVED BY:** Kenneth H. Yates
DATA SHEET 3 (Sheet 23 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO G – Left Rear, Right Rear Tire Deflation at VCW

TEST DATE: ___February 25, 2008___  LAB: ___U.S. DOT San Angelo Test Facility___

VEHICLE NHTSA NUMBER: ___C85900___

Note: See Data Sheet 3 (Sheet 16 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES
BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to vehicle capacity weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>22.2°C (72.0°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>64 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>22.4°C (72.3°F)</td>
<td>22.0°C (71.6°F)</td>
<td>23.0°C (73.4°F)</td>
<td>22.4°C (72.3°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>18.8°C (65.8°F)</td>
<td>18.8°C (65.8°F)</td>
<td>18.8°C (65.8°F)</td>
<td>19.6°C (67.3°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Odometer Reading:</td>
<td>Start: 611.6 km (380.0 mi)</td>
<td>End: 643.4 km (399.8 mi)</td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>Start: 22.2°C (72.0°F)</td>
<td>End: 24.5°C (76.1°F)</td>
</tr>
<tr>
<td>Roadway Temperature:</td>
<td>Start: 21.4°C (70.5°F)</td>
<td>End: 25.6°C (78.1°F)</td>
</tr>
</tbody>
</table>

Driving in first direction:

Starting point: GAFB north gate  Direction: see chart, page 76

10:15 minutes (stopwatch time) 15.8 km (9.8 mi) distance

Driving in opposite direction:

Starting point: US 87 crossover overpass  Direction: see chart, page 76

10:20 minutes (stopwatch time) 16.1 km (10.0 mi) distance

Max speed: 99.1 km/h (61.6 mph)

Total Driving Time: 20:35 minutes (VBox time)
TPMS OPERATIONAL PERFORMANCE

SCENARIO G – Left Rear, Right Rear Tire Deflation at VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>271.4 kPa (39.4 psi)</td>
<td>273.1 kPa (39.6 psi)</td>
<td>275.1 kPa (39.9 psi)</td>
<td>272.4 kPa (39.5 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>37.6°C (99.7°F)</td>
<td>37.6°C (99.7°F)</td>
<td>38.6°C (101.5°F)</td>
<td>39.6°C (103.3°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>19.2°C (66.6°F)</td>
<td>19.4°C (66.9°F)</td>
<td>19.2°C (66.6°F)</td>
<td>18.6°C (65.5°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( )LF ( X )LR ( X )RR ( )RF</td>
<td>180.5 kPa (26.2 psi)</td>
<td>180.6 kPa (26.2 psi)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: see chart, page 77

Did the telltale illuminate? ( X )YES ( )NO

Distance to Illumination: 13.4 km (8.3 mi) distance

Max speed: 97.3 km/h (60.5 mph)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: ( X )YES ( )NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated? ( )YES ( X )NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)
DATA SHEET 3 (Sheet 25 of 28)
TPMS OPERATIONAL PERFORMANCE
SCENARIO G – Left Rear, Right Rear Tire Deflation at VCW

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES  (   )NO (fail)

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTALE ILLUMINATION:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>28.4°C (83.1°F)</td>
<td>Vehicle cool down period:</td>
<td>61 minutes</td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>259.0 kPa (37.6 psi)</td>
<td>172.8 kPa (25.1 psi)</td>
<td>172.5 kPa (25.0 psi)</td>
<td>259.2 kPa (37.6 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>28.2°C (82.8°F)</td>
<td>28.2°C (82.8°F)</td>
<td>28.4°C (83.1°F)</td>
<td>28.8°C (83.8°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>20.6°C (69.1°F)</td>
<td>21.4°C (70.5°F)</td>
<td>21.0°C (69.8°F)</td>
<td>20.2°C (68.4°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

( X )YES  (   )NO (fail)

TELLTALE EXTINGUISHMENT:
RE-ADJUSTED TIRE INFLATION PRESSURES:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale?  

( X )YES  (   )NO

Starting point:  San Angelo Test Facility shop

Distance to Extinguishment:  0.2 km (0.1 mi)

Time to Extinguishment:  1:58 minutes (stopwatch)

TEST RESULTS

TPMS Performance Test Results (PASS/FAIL)  
PASS

Left rear, right rear tires were deflated at VCW.

REMARKS:  None

RECORDED BY:  Jack R. Stewart  DATE:  February 25, 2008

APPROVED BY:  Kenneth H. Yates
DATA SHEET 3 (Sheet 26 of 28)
TPMS OPERATIONAL PERFORMANCE

SCENARIO H – Left Front, Left Rear, Right Rear, and Right Front Tire Deflation at VCW

TEST DATE: February 26, 2008  LAB: U.S. DOT San Angelo Test Facility

VEHICLE NHTSA NUMBER: C85900

Note: See Data Sheet 3 (Sheet 16 of 28) for Test Weight.

TIRE INFLATION PRESSURES AND TIRE/SURFACE TEMPERATURES
BEFORE CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After loading vehicle to vehicle capacity weight, positioning vehicle at selected test start point, and vehicle cool down period:</td>
<td>7.0°C (44.6°F)</td>
<td>Vehicle cool down period: overnight</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inflation Pressure</th>
<th>250.0 kPa (36.3 psi)</th>
<th>250.0 kPa (36.3 psi)</th>
<th>250.0 kPa (36.3 psi)</th>
<th>250.0 kPa (36.3 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tire Sidewall Temp</td>
<td>10.2°C (50.4°F)</td>
<td>9.4°C (48.9°F)</td>
<td>9.2°C (48.6°F)</td>
<td>9.4°C (48.9°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>14.6°C (58.3°F)</td>
<td>14.4°C (57.9°F)</td>
<td>14.0°C (57.2°F)</td>
<td>14.4°C (57.9°F)</td>
</tr>
</tbody>
</table>

SYSTEM CALIBRATION/LEARNING PHASE:

<table>
<thead>
<tr>
<th>Time: Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start: 14:24:54 UTC</td>
<td>End: 14:49:38 UTC</td>
</tr>
<tr>
<td>Odometer Reading: Start: 672.1 km (417.6 mi)</td>
<td>End: 703.9 km (437.4 mi)</td>
</tr>
<tr>
<td>Ambient Temperature: Start: 7.1°C (44.8°F)</td>
<td>End: 7.9°C (46.2°F)</td>
</tr>
<tr>
<td>Roadway Temperature: Start: 8.0°C (46.4°F)</td>
<td>End: 11.2°C (52.2°F)</td>
</tr>
</tbody>
</table>

Driving in first direction:
Starting point: GAFB north gate  Direction: see chart, page 78
10:10 minutes (stopwatch time)  15.8 km (9.8 mi) distance

Driving in opposite direction:
Starting point: US 87 crossover overpass  Direction: see chart, page 78
10:25 minutes (stopwatch time)  16.1 km (10.0 mi) distance

Max speed: 97.6 km/h (60.6 mph)
Total Driving Time: 20:36 minutes (VBox time)
DATA SHEET 3 (Sheet 27 of 28)
TPMS OPERATIONAL PERFORMANCE

SCENARIO H – Left Front, Left Rear, Right Rear, and Right Front Tire Deflation at VCW

TIRE INFLATION PRESSURES AND TEMPERATURES AFTER CALIBRATION PHASE:

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately, after vehicle is stopped, engine off: Inflation Pressure</td>
<td>270.4 kPa</td>
<td>272.8 kPa</td>
<td>274.3 kPa</td>
<td>271.2 kPa</td>
</tr>
<tr>
<td></td>
<td>(39.2 psi)</td>
<td>(39.6 psi)</td>
<td>(39.8 psi)</td>
<td>(39.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>22.6°C</td>
<td>22.8°C</td>
<td>22.8°C</td>
<td>23.6°C</td>
</tr>
<tr>
<td></td>
<td>(72.7°F)</td>
<td>(73.0°F)</td>
<td>(73.0°F)</td>
<td>(74.5°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>14.4°C</td>
<td>14.4°C</td>
<td>14.4°C</td>
<td>14.2°C</td>
</tr>
<tr>
<td></td>
<td>(57.9°F)</td>
<td>(57.9°F)</td>
<td>(57.9°F)</td>
<td>(57.6°F)</td>
</tr>
</tbody>
</table>

SYSTEM DETECTION PHASE:

LOCATION AND PRESSURE(S) OF DEFLATED TIRE(S):

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicate Location of Tire(s) Deflated:</td>
<td>180.5 kPa</td>
<td>180.5 kPa</td>
<td>180.5 kPa</td>
<td>180.5 kPa</td>
</tr>
<tr>
<td>( X )LF ( X )LR ( X )RR ( X )RF Inflation Pressure</td>
<td>(26.2 psi)</td>
<td>(26.2 psi)</td>
<td>(26.2 psi)</td>
<td>(26.2 psi)</td>
</tr>
</tbody>
</table>

TELLTALE ILLUMINATION:

Starting point: San Angelo Test Facility shop Direction: see chart, page 79

Did the telltale illuminate? ( X )YES ( )NO

Distance to Illumination: 13.4 km (8.3 mi) Time to Illumination: 7:36 minutes

Max speed: 96.6 km/h (60.0 mph)

TELLTALE ILLUMINATES WITHIN 20 MINUTES: ( X )YES ( )NO (fail)

Does the vehicle have a telltale that identifies which tire(s) is (are) under-inflated? ( )YES ( X )NO

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position? ( X )YES ( )NO (fail)
Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

(X) YES  ( ) NO (fail)

**TIRE INFLATION PRESSURES AND TEMPERATURES AFTER TELTTALE ILLUMINATION:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After vehicle cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>11.4°C (52.5°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle cool down period:</td>
<td>64 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation Pressure</td>
<td>174.5 kPa (25.3 psi)</td>
<td>172.6 kPa (25.0 psi)</td>
<td>172.6 kPa (25.0 psi)</td>
<td>174.7 kPa (25.3 psi)</td>
</tr>
<tr>
<td>Tire Sidewall Temp</td>
<td>15.2°C (59.4°F)</td>
<td>14.0°C (57.2°F)</td>
<td>13.6°C (56.5°F)</td>
<td>14.6°C (58.3°F)</td>
</tr>
<tr>
<td>San Angelo Test Facility Shop Floor Temp</td>
<td>14.8°C (58.6°F)</td>
<td>14.6°C (58.3°F)</td>
<td>14.2°C (57.6°F)</td>
<td>14.6°C (58.3°F)</td>
</tr>
</tbody>
</table>

After the cool down period of a minimum of one hour, restart the vehicle engine. Does the telltale re-illuminate and stay illuminated when the ignition locking system is activated to the “On” or “Run” position?  

(X) YES  ( ) NO (fail)

**TELLTAE EXTINGUISHMENT:**

**RE-ADJUSTED TIRE INFLATION PRESSURES:**

<table>
<thead>
<tr>
<th>Execution Procedure</th>
<th>LF Tire</th>
<th>LR Tire</th>
<th>RR Tire</th>
<th>RF Tire</th>
</tr>
</thead>
<tbody>
<tr>
<td>After cool down period:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-adjusted Inflation Pressure:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.0 kPa (36.3 psi)</td>
<td>250.1 kPa (36.3 psi)</td>
</tr>
</tbody>
</table>

Is it necessary to drive the vehicle to extinguish the telltale?  

(X) YES  ( ) NO

Starting point: San Angelo Test Facility shop

Distance to Extinguishment: 0.2 km (0.1 mi)  
Time to Extinguishment: 1:13 minutes (stopwatch)

**TEST RESULTS**

TPMS Performance Test Results (PASS/FAIL)  
PASS

Left front, left rear, right rear, and right front tires were deflated at VCW.

**REMARKS:** None

RECORDED BY: Jack R. Stewart  DATE: February 26, 2008

APPROVED BY: Kenneth H. Yates
**DATA SHEET 4 (Sheet 1 of 2)**

**SCENARIO I – Malfunction Detection Test at LLVW**

**TEST DATE:** February 20, 2008  
**LAB:** U.S. DOT San Angelo Test Facility

**VEHICLE NHTSA NUMBER:** C85900

<table>
<thead>
<tr>
<th>Time:</th>
<th>Start: 17:44:00 UTC</th>
<th>End: 18:05:20 UTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odometer Reading:</td>
<td>Start: 408.3 km (253.7 mi)</td>
<td>End: 430.2 km (267.3 mi)</td>
</tr>
<tr>
<td>Ambient Temperature:</td>
<td>Start: 20.3°C (68.5°F)</td>
<td></td>
</tr>
<tr>
<td>Roadway Temperature:</td>
<td>Start: 27.6°C (81.7°F)</td>
<td></td>
</tr>
<tr>
<td>Fuel Level:</td>
<td>Start: Full</td>
<td></td>
</tr>
</tbody>
</table>

Note: See Data Sheet 3 (Sheet 2 of 28) for Test Weight.

**TPMS TYPE:** (X) Direct  
( ) Indirect  
( ) Other  
Describe ____________________________

**TPMS MALFUNCTION TELLTALE:**

( ) Dedicated stand-alone  
(X) Combination low tire pressure warning/malfunction telltale

**METHOD OF MALFUNCTION SIMULATION:**

Describe method of malfunction simulation: Compact spare tire assembly without sensor was installed on right front wheel position.

**MALFUNCTION TELLTALE ILLUMINATION**

(after ignition locking system is activated to “On” (“Run”) position):

**Combination Malfunction Telltale**

Driving in first direction:

Starting point: San Angelo Test Facility shop  
Direction: see chart, page 80

**Did the telltale illuminate?**  (X) YES  ( ) NO

14:16 minutes (stopwatch time)  
21.9 km (13.6 mi) distance

**Max speed:** 89.6 km/h (55.7 mph)

**Total Driving Time:** 14:14 minutes (VBox time)

**COMBINATION MALFUNCTION TELLTALE ILLUMINATES (FLASHING AND ILLUMINATION SEQUENCE) WITHIN 20 MINUTES:**

( X )YES  ( ) NO
DATA SHEET 4 (Sheet 2 of 2)
SCENARIO I – Malfunction Detection Test at LLVW

After 5 minutes with the ignition locking system in the “Off” or “Lock” position, does the combination low tire pressure/malfunction telltale flash for a period of at least 60 seconds but no longer than 90 seconds, and then remain illuminated when the ignition locking system is activated to the “On” or “Run” position?  ( X ) YES  ( ) NO (fail)

Time it takes before telltale starts flashing 60 seconds
Time telltale remains flashing 80 seconds
Time telltale remains illuminated 60 seconds
(Verified for a minimum of 60 seconds)

Deactivate the ignition locking system and then re-start the vehicle engine. Does the telltale’s illumination sequence repeat when the ignition locking system is activated and the engine running?  ( X ) YES  ( ) NO (fail)

Extinguishment Phase:

Restore the TPMS to normal operation. Does the malfunction telltale extinguish after the engine is started?  ( ) YES  ( X ) NO

Is it necessary to drive the vehicle to extinguish malfunction telltale?  ( X ) YES  ( ) NO

Starting point: San Angelo Test Facility shop

Distance to Extinguishment: 0.2 km (0.1 mi)
Time to Extinguishment: 1:37 minutes (stopwatch)

COMBINATION MALFUNCTION TELLTALTE EXTINGUISHED: ( X ) YES  ( ) NO (FAIL)

TPMS MALFUNCTION PERFORMANCE TEST RESULTS (PASS/FAIL) PASS
Compact spare tire assembly was installed on right front wheel position at LLVW.

REMARKS: None

RECORDED BY: Jack R. Stewart  DATE: February 20, 2008
APPROVED BY: Kenneth H. Yates
DATA SHEET 5 (Sheet 1 of 3)
TPMS WRITTEN INSTRUCTIONS

TEST
DATE: February 13, 2008 LAB: San Angelo Test Facility VEHICLE NHTSA NO: C85900

Does the Owner’s Manual provide an image of the Low Tire Pressure Warning Telltale symbol (and an image of the TPMS Malfunction Telltale warning ("TPMS"), if a dedicated telltale is utilized for this function)?

(X) YES  ( ) NO

The following statement, in the English language, is provided verbatim in the Owner’s Manual.

(X) YES  ( ) NO

“Each tire, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tire inflation pressure label. (If your vehicle has tires of a different size than the size indicated on the vehicle placard or tire inflation pressure label, you should determine the proper tire inflation pressure for those tires.)

As an added safety feature, your vehicle has been equipped with a tire pressure monitoring system (TPMS) that illuminates a low tire pressure telltale when one or more of your tires is significantly under-inflated. Accordingly, when the low tire pressure telltale illuminates, you should stop and check your tires as soon as possible, and inflate them to the proper pressure. 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.

Please note that the TPMS is not a substitute for proper tire maintenance, and it is the driver’s responsibility to maintain correct tire pressure, even if under-inflation has not reached the level to trigger illumination of the TPMS low tire pressure telltale.”
As specified, the following sections, in the English language, are required verbatim in paragraph form in the Owner’s Manual:

The following statement is required for all vehicles certified to the standard starting on September 1, 2007 and for vehicles voluntarily equipped with a compliant TPMS MIL before that time.

"Your vehicle has also been equipped with a TPMS malfunction indicator to indicate when the system is not operating properly."

The above statement in the English language is provided verbatim in owner’s manual:

( X )YES    (   )NO

For vehicles with a dedicated MIL telltale, add the following statement:

"The TPMS malfunction indicator is provided by a separate telltale, which displays the symbol "TPMS" when illuminated."

The above statement in the English language is provided verbatim in owner’s manual:

(   )YES    (   )NO    ( X )N/A

For vehicles with a combined low tire pressure/MIL telltale, add the following statement:

"The TPMS malfunction indicator is combined with the low tire pressure telltale. When the system detects a malfunction, the telltale will flash for approximately one minute and then remain continuously illuminated. This sequence will continue upon subsequent vehicle start-ups as long as the malfunction exists."

The above statement in the English language is provided verbatim in owner’s manual:

( X )YES    (   )NO (   )N/A

The following statement is required for all vehicles certified to the standard starting on September 1, 2007 and for vehicles voluntarily equipped with a compliant TPMS MIL before that time.

"When the malfunction indicator is illuminated, the system may not be able to detect or signal low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of replacement or alternate tires or wheels on the vehicle that prevent the TPMS from functioning properly. Always check the TPMS malfunction telltale after replacing one or more tires or wheels on your vehicle to ensure that the replacement or alternate tires and wheels allow the TPMS to continue to function properly."

The above statement in the English language is provided verbatim in owner’s manual:

( X )YES    (   )NO

DATA INDICATES COMPLIANCE: PASS/FAIL

PASS/FAIL:  PASS
DATA SHEET 5 (Sheet 3 of 3)
TPMS WRITTEN INSTRUCTIONS

Does the Owner’s Manual include the following (allowable) information?

☑️ Significance of the low tire pressure warning telltale illuminating

☑️ A description of corrective action to be undertaken

☑️ Whether the tire pressure monitoring system functions with the vehicle’s spare tire (if provided)

☐ How to use a reset button, if one is provided

☑️ The time for the TPMS telltale(s) to extinguish once the low tire pressure condition or the malfunction is corrected

REMARKS: None

RECORDED BY: Jack R. Stewart DATE: February 13, 2008

APPROVED BY: Kenneth H. Yates
## TABLE 1 - INSTRUMENTATION AND EQUIPMENT INFORMATION LIST

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>DESCRIPTION</th>
<th>MODEL/ SERIAL NO</th>
<th>CAL. DATE</th>
<th>NEXT CAL. DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOPWATCH</td>
<td>WESTCLOX QUARTZ STOPWATCH</td>
<td>NONE</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>LASER TEMPERATURE GAUGE</td>
<td>RAYNGER ST20 PRO NON-CONTACT INFRARED THERMOMETER</td>
<td>SERIAL #2065640101-0014</td>
<td>8/14/2007</td>
<td>8/14/2008</td>
</tr>
<tr>
<td>AIR PRESSURE GAUGE</td>
<td>ASHCROFT GENERAL PURPOSE DIGITAL GAUGE</td>
<td>MODEL #D1005PS 02L 100 PSI SERIAL #20017398-01</td>
<td>12/11/2007</td>
<td>12/11/2008</td>
</tr>
<tr>
<td>FLOOR SCALES (VEHICLE)</td>
<td>INTERCOMP SW DELUXE SCALES</td>
<td>PART #100156 SERIAL #27032382</td>
<td>8/14/2007</td>
<td>8/14/2008</td>
</tr>
<tr>
<td>PLATFORM SCALE (BALLAST)</td>
<td>HOWE RICHARDSON</td>
<td>MODEL #6401 SERIAL #0181-5509-26</td>
<td>8/14/2007</td>
<td>8/14/2008</td>
</tr>
</tbody>
</table>
SECTION 5
PHOTOGRAPHS
2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO.138

FIGURE 5.1
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE
MFD BY VOLVO CAR CORPORATION  DATE: 08/07

GVWR: 5750 LB  GAWR FRONT: 2770 LB  GAWR REAR: 3060 LB
TIRES: 235/65R17  RIM: 7Jx17x49
PRESSURE FRONT: 36 PSI, 250 KPA COLD
PRESSURE REAR: 36 PSI, 250 KPA COLD
THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR
VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT
ON THE DATE OF MANUFACTURE SHOWN ABOVE.
VIN: YV4CN982281432584

TYPE: MPV

2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO.138

FIGURE 5.2
VEHICLE CERTIFICATION LABEL
TIRE AND LOADING INFORMATION

SEATING CAPACITY | TOTAL 5 | FRONT 2 | REAR 3

The combined weight of occupants and cargo should never exceed 525kg or 1160lbs

<table>
<thead>
<tr>
<th>TIRE</th>
<th>SIZE</th>
<th>COLD TIRE PRESSURE</th>
<th>SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRONT</td>
<td>235/65R17</td>
<td>250kPa, 36psi</td>
<td></td>
</tr>
<tr>
<td>REAR</td>
<td>235/65R17</td>
<td>250kPa, 36psi</td>
<td></td>
</tr>
<tr>
<td>SPARE</td>
<td>T155/85R18</td>
<td>420kPa 61psi</td>
<td></td>
</tr>
</tbody>
</table>
2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO. 138

FIGURE 5.4
TIRE SHOWING BRAND
FIGURE 5.6
TIRE SHOWING SIZE, LOAD INDEX, AND SPEED RATING
FIGURE 5.7
TIRE SHOWING DOT SERIAL NUMBER

2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO. 138
MAX. LOAD 900 kg [1984 LBS]
AT 300 kPa [44 P.S.I.] MAX. PRESS.
TIRE SHOWING SIDEWALL / TREAD CONSTRUCTION
FIGURE 5.11

2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO. 138

INFORMATION CENTER, DISPLAYING LOW TIRE PRESSURE WARNING (ON LEFT), SHOWN WITH COMBINATION LOW TIRE PRESSURE WARNING / MALFUNCTION TELLTALE (ON RIGHT)
2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO. 138

FIGURE 5.13
VEHICLE REAR SEAT BALLAST
FOR VCW LOAD
2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO. 138

FIGURE 5.14
REAR OF VEHICLE BALLAST
FOR VCW LOAD
2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO. 138

FIGURE 5.15
VEHICLE ON WEIGHT SCALES
2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO. 138

FIGURE 5.16
SPARE INSTALLED ON RIGHT FRONT POSITION
FOR MALFUNCTION DETECTION TEST
2008 VOLVO XC90
NHTSA NO. C85900
FMVSS NO 138

FIGURE 5.17
INFORMATION CENTER, DISPLAYING TPMS MALFUNCTION WARNING (ON LEFT), AND COMBINATION LOW TIRE PRESSURE / MALFUNCTION TELLTALE (ON RIGHT)
SECTION 6
TEST PLOTS
Scenario A: Left Rear Tire
Test Date: 2/14/08
Data File Time: 23:43 minutes
Cumulative Driving Time: 20:36 minutes
Start Point: GAFB North Gate

Calibration Phase:

2008 Volvo XC90 (C85900) LR Calibration LLWV

Log Rate := 100.00 Hz
Scenario A: Left Rear Tire
Test Date: 2/14/08
Data File Time: 9:45 minutes
Cumulative Driving Time: 7:40 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:
Scenario B: Right Front Tire
Test Date: 2/15/08
Data File Time: 24:35 minutes
Cumulative Driving Time: 20:38 minutes
Start Point: GAFB North Gate

Calibration Phase:
Scenario B: Right Front Tire
Test Date: 2/15/08
Data File Time: 10:25 minutes
Cumulative Driving Time: 7:39 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:
Scenario C: Left Front, Right Front Tires
Test Date: 2/19/08
Data File Time: 24:14 minutes
Cumulative Driving Time: 20:38 minutes
Start Point: GAFB North Gate

Calibration Phase:

2008 Volvo XC90 (C85900) LF, RF Calibration LLWW

Log Rate = 100.00 Hz
Scenario C: Left Front, Right Front Tires
Test Date: 2/19/08
Data File Time: 12:17 minutes
Cumulative Driving Time: 7:43 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:
Scenario D: Left Front, Left Rear, Right Rear, Right Front Tire
Test Date: 12/20/08
Data File Time: 24:15 minutes
Cumulative Driving Time: 20:37 minutes
Start Point: GAFB North Gate

Calibration Phase:
Scenario D: Left Front, Left Rear, Right Rear, Right Front Tire
Test Date: 12/20/08
Data File Time: 12:07 minutes
Cumulative Driving Time: 7:40 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:

2008 Volvo XC90 (C85900) LF, LR, RR, RF Illumination LLWV

Log Rate := 100.00 Hz
Scenario E: Left Front Tire
Test Date: 2/21/08
Data File Time: 24:24 minutes
Cumulative Driving Time: 20:36 minutes
Start Point: GAFB North Gate

Calibration Phase:

2008 Volvo XC90 (C85900) LF Calibration UW + VCW

Log Rate := 100.00 Hz
Scenario E: Left Front Tire
Test Date: 2/21/08
Data File Time: 10:04 minutes
Cumulative Driving Time: 7:44 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:
Scenario F: Right Rear Tire
Test Date: 2/22/08
Data File Time: 24:04 minutes
Cumulative Driving Time: 20:34 minutes
Start Point: GAFB North Gate

Calibration Phase:

2008 Volvo XC90 (C85900) RR Calibration UWW + VCW
Scenario F: Right Rear Tire
Test Date: 2/22/08
Data File Time: 11:57 minutes
Cumulative Driving Time: 7:29 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:
Scenario G: Left Rear, Right Rear Tires
Test Date: 2/25/08
Data File Time: 23:43 minutes
Cumulative Driving Time: 20:35 minutes
Start Point: GAFB North Gate

Calibration Phase:

2008 Volvo XC90 (C85900) LR, RR Calibration UWW + VCW

Log Rate: = 100.00 Hz
Scenario G: Left Rear, Right Rear Tires
Test Date: 2/25/08
Data File Time: 12:17 minutes
Cumulative Driving Time: 7:35 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:

2008 Volvo XC90 (C85900) LR, RR Illumination UWW + VCW

Log Rate := 100.00 Hz
Scenario H: Left Front, Left Rear, Right Rear, Right Front Tires
Test Date: 2/26/08
Data File Time: 24:04 minutes
Cumulative Driving Time: 20:36 minutes
Start Point: GAFB North Gate

Calibration Phase:

2008 Volvo XC90 (C85900) LF, LR, RR, RF Calibration UWW + VCW

Log Rate := 100.00 Hz

Speed Trace

Kmph

RT. 388 E  Loop 306 S  U.S. 87 W  Svc Roads & Turnaround  U.S. 87 E  Loop 306 N  RT. 388 W

Brake Triggers

secs

0 100 200 300 400 500 600 700 800 900 1,000 1,100 1,200 1,300 1,400
Scenario H: Left Front, Left Rear, Right Rear, Right Front Tires
Test Date: 2/26/08
Data File Time: 11:57 minutes
Cumulative Driving Time: 7:36 minutes
Start Point: San Angelo Test Facility Shop

Illumination Phase:

2008 Volvo XC90 (C85900) LF, LR, RR, RF Illumination UWW + VCW

Log Rate := 100.00 Hz
Scenario I: Compact Spare without Sensor Installed on Right Front Position at LLVW
Test Date: 2/20/08
Data File Time: 21:10 minutes
Cumulative Driving Time to Illumination: 14:14 minutes
Start Point: San Angelo Test Facility Shop

Malfunction Detection Test: