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January 6, 2006

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

LABORATORY TEST PROCEDURE

FOR

FMVSS No. 139

New Pneumatic Radial Tires for Light Vehicles



**Office of Vehicle Safety Compliance
Room 6111, NVS-220
400 Seventh Street, SW
Washington, DC 20590**

OVSC LABORATORY TEST PROCEDURE FMVSS No. 139

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REVISION CONTROL LOG

FOR OVSC LABORATORY TEST PROCEDURE

TP-139, New pneumatic radial tires for light vehicles

TEST PROCEDURE		FMVSS No. 139		DESCRIPTION
REV No.	DATE	AMENDMENT	EFFECTIVE DATE	
01	May 26, 2005	Original 68 FR 38150 June 26, 2003	Performance: Mandatory: 6/1/07 Opt:6/03-6/07 Marking: Mandatory: 9/1/06 Phase-In: 9/04-9/06	New pneumatic radial tires for use on motor vehicles (other than motorcycles and low speed vehicles) that have a gross vehicle weight rating (GVWR) of 10,000 pounds or less and were manufactured after 1975.
02	January 6, 2006	68 FR 38115 January 6, 2006	Performance: Non-snow tires Mandatory: 6/1/07 Opt:6/03-6/07 Snow tires: Mandatory:9/1/08 Opt: 10/15-8/08	Revise based on granted petitions for reconsideration: removal of CT, ST, FI and 8-12 rims, creation of snow tire rating with mountain/snowflake for endurance testing and low pressure testing with delayed compliance to September 2008, revision of test pressures for LR C, D and E LT tires with nominal cross section larger than 295mm, reduction posttest pressure measurement time from one hour to 15 to 25 minutes, addition of at least a two hour conditioning period for low pressure performance test, modification of posttest pressure requirement for endurance and low pressure test from "not less than the original pressure" to "not less than 95% of the initial pressure" .
03				
04				

1. PURPOSE AND APPLICATION

The Office of Vehicle Safety Compliance (OVSC) provides contractor laboratories with Laboratory Test Procedures as guidelines for obtaining compliance test data. The data are used to determine if a specific vehicle or item of motor vehicle equipment meets the minimum performance requirements of the subject Federal Motor Vehicle Safety Standard (FMVSS). The purpose of these OVSC Laboratory Test Procedures is to present a uniform testing and data recording format, and provide suggestions for the use of specific equipment and procedures. These Laboratory Test Procedures do not constitute an endorsement or recommendation for use of a any product or method. If any contractor views any part of the OVSC Laboratory Test Procedures (TP) to be in conflict with a FMVSS or observes deficiencies in a TP, the contractor is required to advise the Contracting Officer's Technical Representative (COTR) and resolve the discrepancy prior to the start of compliance testing.

Every contractor is required to submit a detailed test procedure to the COTR before initiating the compliance test program. The procedure must include a step-by-step description of the methodology to be used, and should contain as a minimum, Tire Identification and Marking, Tire Handling and Storage, Test Rims, Test Data and Report Preparation and Approval Processes. The contractor's test procedure shall contain a complete listing of test equipment with make and model number and a detailed check-off sheet. The list of test equipment shall include instrument accuracy and calibration dates. All equipment shall be calibrated in accordance with the manufacturer's instructions. There shall be no contradictions between the TP and the contractor's in-house test procedure. Written approval of the in-house test procedures shall be obtained from the COTR before initiating the compliance test program. The TP is not intended to limit or restrain a contractor from developing or utilizing any testing techniques or equipment that will assist in procuring the required compliance test data. These Laboratory Test Procedures do not constitute an endorsement or recommendation for use of any product or method. However, the application of any such testing technique or equipment is subject to prior approval of the COTR.

NOTE: This TP, prepared for the limited purpose of use by contracted independent laboratories conducting compliance tests for the OVSC, are not rules, regulations, or NHTSA interpretations regarding the meaning of a FMVSS. Neither is the TP intended to limit the requirements of the applicable FMVSS(s). In some cases, the TP does not include all of the various FMVSS minimum performance requirements. Recognizing applicable test tolerances, the TP may specify test conditions that are less severe than the minimum requirements of the standard. In addition, the TP may be modified by the OVSC at any time without notice, and the COTR may direct or authorize contractors to deviate from these procedures, as long as the tests are performed in a manner consistent with the standard itself and within the scope of the contract. Laboratory Test Procedures may not be relied upon to create any right or benefit in any person. Therefore, compliance of a vehicle or item of motor vehicle equipment is not necessarily guaranteed if the manufacturer limits its certification tests to those described in the TP.

METRIC SYSTEM OF MEASUREMENT

As a general rule, performance parameters and test conditions in FMVSS No. 139 are specified primarily in metric units, so the use of the metric system of weights and measures is preferred. In this TP, metric values may be followed by English units, offset by parentheses, only for reference (not necessarily equal). If test equipment is not available for direct measurement in metric units, the test laboratory shall calculate the exact metric equivalent by means of a conversion factor carried out to at least five significant digits before rounding consistent with the specified metric requirement. Metric units shall be used in the Final Test Reports.

The metric units used throughout this document with English equivalents in parentheses are: kilograms (pounds) for force, millimeters (inches) for distance, joules (inch-lbs) for energy, and kilopascals (lbs per square inch) for pressure. Tire marking information shall be recorded in the units presented on the tire.

2. GENERAL REQUIREMENTS

This standard applies to new pneumatic radial tires for use on motor vehicles that have a gross vehicle weight rating (GVWR) of 10,000 pounds or less, and that were manufactured after 1975. This standard does not apply to tires for use on new pneumatic light truck tires with a tread depth of 18/32 inch or greater; ST, FI, and 8-12 rim or lower diameter code tires; tires for use on low speed vehicles; and tires for use on motorcycles manufactured after 1948. FMVSS No. 139 specifies laboratory test requirements for tire dimensions (S6.1), high speed performance (S6.2), endurance (S6.3), low inflation pressure performance (S6.4), tire strength (S6.5), and bead unseating resistance (S6.6); defines general requirements and tire load ratings (S5.1 to S5.4); and specifies marking or marking requirements for light vehicle tires (S5.5). FMVSS No. 139 does not apply to any tire that has been altered so as to render impossible its use, or its repair for use, as motor vehicle equipment.

Each tire shall conform to all of the following requirements:

- A. It shall meet the requirements specified in S6 for its tire size designation, type, and maximum permissible inflation pressure.
- B. It shall meet each of the applicable requirements set forth in paragraphs C and D following, when mounted on a model rim assembly corresponding to any rim that the tire manufacturer has designated for use with the tire, according to section S4 of FMVSS No. 139.
- C. Tire pressure:
 - 1. For PC tires, the maximum permissible inflation pressure shall be 240, 280, 300, 340, or 350 kPa (35, 41, 44, 49, or 51 psi, respectively).
 - 2. For LT tires, the maximum permissible inflation pressure on the tire corresponds to the maximum load of the tire for the tire size specified in one of the publications listed in S4.1.1(b).
- D. A tire's load rating shall be that specified either in a submission made by an individual manufacturer, pursuant to S4, or in one of the publications described in S4 for the

tire's size designation, type, and each appropriate inflation pressure. If the maximum load rating for a particular tire size is shown in more than one of the publications described in S4, each tire of that size designation shall have a maximum load rating that is not less than the published maximum load rating, or, if there are differing maximum load ratings for the same tire size designation, not less than the lowest published maximum load rating.

- E. Each tire shall have not less than six treadwear indicators spaced approximately equally around the circumference of the tire that enable a person inspecting the tire to determine visually whether the tire has worn to a tread depth of 1/16 of an inch (1.58 mm or 0.0625 inch).
- F. The test tire shall, before being subjected to the high speed performance test procedure specified in S6.2, the endurance test procedure specified in S6.3, or the low inflation performance test procedure specified in S6.4, exhibit no visual evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, open splices, cracking, or broken cords.
- G. References
 - a. ASTM F-1805-00, Standard Test Method for Single Wheel Driving Traction in a Straight Line on Snow- and Ice-Covered Surfaces: a copy of ASTM F-1805-00 may be obtained from the ASTM website: <http://www.astm.org/>. See Section 10, Snow Tire, where ASTM F-1805 is incorporated by reference.

2.1 PHASE-IN SCHEDULE FOR TIRE MARKINGS ONLY (S7)

All tires inspected under this TP will be inspected to the full marking/marking requirements of the standard and as identified herein regardless of date of manufacture. The test lab will identify all marking deficiencies on the appropriate data sheet, and OVSC will determine their validity based on contact with the manufacturer. See FMVSS No. 139, S5.5 for marking requirements.

- A. For tires manufactured between September 1, 2004, and August 31, 2005, the number of tires complying with S4 (Tire and Rim Matching Information) and S5.5 (Tire Markings) of FMVSS No. 139 must be at least 40% of the manufacturer's production during that period. (S7.1)
- B. For tires manufactured between September 1, 2005, and August 31, 2006, the number of tires complying with S4 and S5.5 of FMVSS No. 139 must be at least 70% of the manufacturer's production during that period. (S7.2)
- C. For tires manufactured on or after September 1, 2006, each tire must comply with S4 and S5.5 of FMVSS No. 139. (S7.3)

2.2 COMPLIANCE SCHEDULE FOR TIRE PERFORMANCE ONLY (S6)

All tires inspected under the TP will be inspected to the full performance requirements of the standard and as identified herein regardless of date of manufacture. The test lab will identify all performance deficiencies on the appropriate data sheet, and OVSC will determine their validity based on contact with the manufacturer. See FMVSS No. 139, S6 for description of performance test requirements.

- A. For non-snow PC and LT tires affected by the FMVSS No. 139, compliance is optional for tires manufactured before September 1, 2007, and mandatory for tires manufactured on or after September 1, 2007.
- B. For PC and LT snow tires affected by FMVSS No. 139, compliance is optional for tires manufactured before September 1, 2008, and mandatory for tires manufactured on or after September 1, 2008.

3. SECURITY

The contractor shall provide appropriate security measures to protect the OVSC test specimens from unauthorized personnel during the entire compliance testing program. The contractor is financially responsible for any acts of theft and/or vandalism that occur during the storage of test specimens. Any security problems that arise shall be reported by telephone to the COTR within two working days after the incident with a letter containing specific details of the security problem will be sent to the COTR within 48 hours.

The contractor shall protect and segregate the data that evolve from compliance testing before and after each test. No information concerning the compliance testing program shall be released to anyone except the COTR, unless specifically authorized by the COTR, the COTR's Branch or Division Chief, or the Contracting Officer.

NO INDIVIDUALS, OTHER THAN CONTRACTOR PERSONNEL, SHALL BE ALLOWED TO WITNESS ANY COMPLIANCE TEST UNLESS SPECIFICALLY AUTHORIZED BY THE COTR.

4. GOOD HOUSEKEEPING

The contractor shall maintain the entire compliance testing area, test fixtures, and instrumentation in a neat and clean condition, with test instruments arranged in an orderly manner consistent with good test laboratory housekeeping practices.

5. TEST SCHEDULING AND MONITORING

The contractor shall submit a test schedule to the COTR prior to testing. Tests shall be completed as required in the contract. All testing shall be coordinated with the COTR to allow monitoring by the COTR or other OVSC personnel.

6. TEST DATA DISPOSITION

The contractor shall make all preliminary compliance test data available to the COTR within 4 hours after the test. Final test data, including digital printouts and computer generated plots (if applicable), shall be furnished to the COTR in accordance with the contract schedule. Additionally, the contractor shall analyze the preliminary test results as directed by the COTR. All backup data sheets, strip charts, recordings, plots, technicians' notes, CD's, etc., shall be retained by the contractor for a minimum of 3 years after conclusion of each delivery order, purchase order, etc. The COTR shall direct final disposition at that time.

7. GOVERNMENT FURNISHED TEST ITEMS AND TEST SAMPLES

7.1 TEST SAMPLE IDENTIFICATION AND STORAGE

New Pneumatic Light Vehicle Tires will be provided to the testing laboratories as Government Furnished Test Items (GFTI) test samples. Receipt of these tires by the testing laboratories will be acknowledged by emailing an Excel spreadsheet to the COTR in the Office of Vehicle Safety Compliance (NVS-220). The spreadsheet shall include, at a minimum: the standard, manufacturer, brand, name, size, the TIN for each tire, number of tires received, date received, and any other relevant information.

NOTE: New tires without the manufacturer's Department of Transportation (DOT) certification symbol will not be reported on the spreadsheet. The laboratory will request disposition instructions from the COTR for tires without the DOT symbol.

7.2 TIRE IDENTIFICATION AND MARKING

The test sample tires (GFTI), as received, will be marked and individually identified with a test number, which will remain with the tire and be correlated with the standard, laboratory, fiscal year, program, and test sequence. The tire shall be mounted so that the identification number will always be to the inside of the rim. The inside of the rim is the side that faces inboard when installed on a vehicle. During check-in, each tire shall be marked with its assigned test number by means of a paint stick or equivalent marking material.

7.3 TEST TIRE HANDLING, STORAGE and DISPOSAL

The laboratory will inspect the test tires when received to ascertain their acceptability for testing and will seek COTR guidance in resolving abnormal conditions. The test tires shall be handled with care to avoid cuts, scuffs, tears, or any condition that may adversely affect test validity. It is incumbent upon the laboratory to ensure that no adverse change has occurred to the tire between the time of the inspection and test initiation.

A clean, secure storage area shall be utilized. The tires shall be kept under lock and key during any non-testing periods and properly stored and protected from grease, oil,

miscellaneous solvents, and any surface dirt that could influence the results of the test program.

After directed by the COTR and in accordance with the contract, tested tires will be disposed of destructively to insure the tires cannot be used on the road. The contractor shall maintain records documenting their destructive disposition for the term of the contract, which shall be available upon request of the COTR or Contracting Officer.

7.4 TEST CATEGORIES AND FORMS

Figures 1, 2, and 3 are sample data sheets for marking, endurance and low pressure, and high speed respectively; the laboratory may use a reasonable facsimile of each data sheet with the approval of the COTR.

A. CATEGORY "A" SUMMARY AND MARKING TESTS

IDENTIFICATION DATA

- Testing Laboratory
- Test Number
- All Data Pertaining to Tire Marking and Identification

PHYSICAL DIMENSION DATA

- Recommended Test Rim Width
- Specified Inflation Pressure
- Section Width (+7%)
- Minimum Size Factor

TUBELESS TIRE RESISTANCE TO BEAD UNSEATING

- Specified Inflation Pressure
- Minimum Acceptable Force

TIRE STRENGTH IMPACT TEST

- Specified Inflation Pressure
- Minimum Breaking Energy

B. CATEGORY "B" ENDURANCE AND LOW PRESSURE TESTS

IDENTIFICATION DATA

- Testing Laboratory
- Test Number
- All Data Pertaining to Tire Marking and Identification

TIRE ENDURANCE AND LOW PRESSURE ENDURANCE TESTS

- Recommended Test Rim Width
- Required and Actual Inflation Pressures
- Conditioning Times
- Test Start and End Dates and Times

- Required and Actual Load (4, 6, and 24 hours and 90 minutes)
- Required and Actual Test Speeds
- Pretest and Posttest Temperatures

C. CATEGORY "C" HIGH SPEED TESTS

IDENTIFICATION DATA

- Testing Laboratory
- Test Number
- All Data Pertaining to Tire Marking and Identification

HIGH SPEED PERFORMANCE TEST

- Recommended Test Rim Width
- Required and Actual Inflation Pressures
- Conditioning Times
- Test Start and End Dates and Times
- Required and Actual Load
- Required and Actual Test Speeds during break-in and during the three speed cycles:
- Pretest and posttest Temperatures

SUMMARY AND MARKING DATA SHEET

TEST LAB: _____ FMVSS 139 TIRE TEST REPORT - SUMMARY, MARKING TEST TEST NO.: _____

MARKING REQUIREMENTS TESTED TO OVSC TEST PROCEDURE REVISED: ___/___/___

TIRE IDENTIFICATION: MANUFACTURER: _____ TIRE NAME: _____ HS NUMBER: _____

PC Tire (Y/N) _____ LT Tire (Y/N) _____ SNOWTIRE (Y/N) _____

BRAND: _____ TIRE SIZE: _____ LOAD RANGE: __ SPEED RATING: __ MTL NUMBER: _____

MATERIAL: CARC-(_)PLIES BELT-(_)STEEL BELT-(_)NYLON CONSTRUCTION: _____

MAX INFL PRESSURE: ___ KPA/___ PSI MAX LOAD RATING: ___ KG/ ___ LBS TEST MEASUREMENT: METRIC

TEST CATEGORY A, B, C TIRES TEST RESULTS (P/F) REMARKS:

MARKING	A,B,C	Test Values	Test Result
Tires meet	___/___/___		
PHYSICAL DIMENSION	A _____		
BEAD UNSEATING	A _____	___/___	___/___
TIRE STRENGTH	A _____	___/___	___/___
ENDURANCE	B _____		
LOW PRESSURE ENDURANCE	B _____		
HIGH SPEED	C _____		

IOS=Intended Outer Sidewall OS=Other Side (DATE) ___/___/___

	TIRE A (IOS / OS)	TIRE B (IOS/OS)	TIRE C (IOS/OS)
BRAND NAME	___/___	___/___	___/___
SIZE DESIGNATION	___/___	___/___	___/___
TIN(Record in its entirety)	___/___	___/___	___/___
MAX INFL PRESS (kPa)	___/___	___/___	___/___
MAX LOAD RATING (kg)	___/___	___/___	___/___
	PLY / MAT	PLY / MAT	PLY / MAT

CARCASS CORD MATERIAL _____/_____
 BELT CORD MATERIAL _____/_____
 BELT CORD MATERIAL _____/_____
 TUBELESS _____ TUBE TYPE _____ RADIAL _____
 NUMBER OF PLYS _____/_____
 LAB ID NO. _____/_____

SNOWTIRE: Sidewall Marking of Mountain Snowflake present (Y/N) _____ Proper Size (Y/N) _____

DOT CONF. SYMBOL (Y/N) _____/_____
 TREADWEAR INDICATOR (Y/N) _____

UTQGS RATINGS (Y/N) TRACTION _____ TREADWEAR _____ TEMP _____
 TEST PERFORMED BY: _____ DATE: _____

LABORATORY APPROVAL: _____ DATE: _____
 (Signature/Title)

FIGURE 1 – CATEGORY A SUMMARY AND MARKING DATA SHEET

CATEGORY B ENDURANCE and LOW PRESSURE PERFORMANCE TESTS DATA SHEET

TEST LAB: _____ FMVSS 139 CATEGORY B TEST - TIRE TEST REPORT _____ TIRE NO.: _____

TIRE IDENTIFICATION: MANUFACTURER: _____ MAN.CODE: _____ BRAND: _____ ID NO.: _____

SIZE: _____ LOAD RANGE: _____ MATERIAL: CARC-()PLYLST BELT-()STEEL BELT-()NYLON

PC Tire (Y/N) _____ LT Tire (Y/N) _____ SNOWTIRE (Y/N) _____

CONSTRUCTION: TUBELESS/BELTED BIAS MAX INFL PRESSURE: _____ KPA/_____ PSI/ MAX LOAD RATING: _____ KG/_____ LBS

TIRE ENDURANCE TEST: PRETEST DEFECTS NOTED: (Y/N) _____ RIM CONDITION SATISFACTORY: (Y/N) _____

TEST RIM WIDTH: _____ RIM WIDTH USED: _____ RIM NO.: _____ SPECIFIED INFL PRESSURE: _____ KPA/ _____ PSI

3 HRS CONDITIONING: 38°C, +0°, -9° (100°F, +0°, -16°)

START: DATE: ____/____/____ TIME: _____ PRESS: _____ KPA / _____ PSI TEMP: _____ C/ _____ F

END: DATE: ____/____/____ TIME: _____ PRESS: _____ KPA / _____ PSI TEMP: _____ C/ _____ F CONDIT 3 HRS: (Y/N) _____

INFL PRESS ADJ FROM _____ KPA/ _____ PSI TO _____ KPA/ _____ PSI WHEEL POSITION: _____ MACHINE NO. : _____ MACHINE TYPE: _____

START DATE: ____/____/____

END DATE: ____/____/____

	4 HOURS	6 HOURS	24 HOURS *	90-MINUTE LOW INFL.*	REMARKS
TIME START/END					
REQUIRED LOAD KG (LBS)					
TEST LOAD KG (LBS)					
TEST SPEED Non-snow: 120 KPH (75 MPH) Snow: 110 KPH (68.4 MPH)					
TEST AREA TEMPERATURE START/END 38°C, +0°, -9° (100°F, +0°, -16°)					
KPA (PSI) END OF PERIOD 15 to 25 minutes after test	N/A	N/A			

* If final pressure is less than 95% of the pretest pressure, mark that the tire has failed pressure requirements, record the pressure reading, the time the reading was taken and the pressure at 15 to 20, 30 to 35 and 45 to 50 minutes after the first posttest pressure reading.

TEST RESULTS: PASSED/FAILED _____

If FAILED, the initial failed posttest pressure reading and time of reading: _____ / _____
 Pressure readings at 15, 30 and 45 minutes after initial pressure reading: (time/pressure): ____/____, ____/____, ____/____

TEST PERFORMED BY: _____ DATE: _____

LABORATORY APPROVAL: _____ DATE: _____
 (Signature/Title)

FIGURE 2 – CATEGORY B ENDURANCE / LOW PRESSURE PERFORMANCE DATA SHEET

CATEGORY C HIGH SPEED TEST DATA SHEET

TEST LAB: _____ FMVSS No. 139 CATEGORY C TEST - TIRE TEST REPORT _____ TIRE NO.: _____

TIRE IDENTIFICATION: MANUFACTURER: _____ MAN.CODE: _____ BRAND: _____ ID NO.: _____

SIZE: _____ LOAD RANGE: _____ MATERIAL: CARC-()PLYLST BELT-()STEEL BELT-()NYLON

PC Tire (Y/N) _____ LT Tire (Y/N) _____ SNOWTIRE (Y/N) _____

CONSTRUCTION: TUBELESS/BELTED BIAS MAX INFL PRESSURE: _____ KPA/_____ PSI/ MAX LOAD RATING: _____ KG/_____ LBS

TIRE HIGH SPEED TEST: PRETEST DEFECTS NOTED: (Y/N) _____ RIM CONDITION SATISFACTORY: (Y/N) _____
 TEST RIM WIDTH: _____ RIM WIDTH USED: _____ RIM NO.: _____ SPECIFIED INFL PRESSURE: _____ KPA/ _____ PSI

3 HRS CONDITIONING: 38°C, +0°, -9° (100°F, +0°, -16°)

START: DATE: ___/___/___ TIME: _____ PRESS: _____ KPA/_____ PSI TEMP: _____ C/_____ F -

END: DATE: ___/___/___ TIME: _____ PRESS: _____ KPA/_____ PSI TEMP: _____ C/_____ F CONDIT 3 HRS: (Y/N) _____

INFL PRESS ADJ FROM _____ KPA/_____ PSI TO _____ KPA/_____ PSI WHEEL POSITION: _____ MACHINE NO. : _____ MACHINE TYPE: _____

START DATE: ___/___/___ END DATE: ___/___/___

	BREAK-IN PERIOD		COOLING PERIOD		HIGH SPEED PERIOD				
	80 KPH (50 MPH)		0 KPH (0 MPH)		1ST CYCLE 140 KPH (87 MPH)		2 ND CYCLE 150 KPH (93 MPH)		3 RD CYCLE * 160 KPH (99 MPH)
TIME START/END									
REQUIRED LOAD KG (LBS)									
TEST LOAD KG (LBS)									
TEST SPEED KPH (MPH)									
TEST AREA TEMPERATURE START/END C (F) 38°C, +0°, -9° (100°F, +0°, -16°)									
KPA (PSI) END OF PERIOD 15 to 25 minutes after test									

TEST RESULTS: PASSED/FAILED _____

* If final pressure is less than 95% of the pretest pressure, mark that the tire has failed pressure requirements, record the pressure reading, the time the reading was taken and the pressure at 15 to 20, 30 to 35 and 45 to 50 minutes after first posttest pressure reading.

If FAILED, the initial failed posttest pressure reading and time of reading: _____ / _____
 Pressure readings at 15, 30 and 45 minutes after initial pressure reading: (time/pressure): _____, _____, _____

TEST PERFORMED BY: _____ DATE: _____

LABORATORY APPROVAL: _____ DATE: _____
 (Signature/Title)

FIGURE 3 – CATEGORY C HIGH SPEED DATA SHEET

8. CALIBRATION OF TEST INSTRUMENTS

Before starting the test program, the contractor shall implement and maintain a measurement and test equipment calibration system in accordance with established calibration practices. Guidelines for setting up and maintaining such systems are described in ANSI/NCSL Z540-1-1994, Calibration System Requirements. The calibration system shall be set up and maintained as follows:

- A. Standards for calibrating measurement and test equipment shall be stored and used under appropriate environmental conditions to assure their accuracy and stability.
- B. All measuring instruments and standards shall be calibrated by the contractor, or a commercial facility, against a higher order standard at periodic intervals of no more than 6 months and whenever the equipment or measuring devices are disturbed or suspect for any reason. Records showing the calibration traceability to the National Institute of Standards and Technology (NIST) shall be maintained for all measuring and test equipment.
- C. All measuring equipment, test equipment, and measuring standards shall be labeled with the following information:
 - (1) Date of calibration
 - (2) Date of next scheduled calibration
 - (3) Name of the person who calibrated the equipment
- D. A written, updated calibration procedure shall be provided by the contractor annually for delivery to the COTR. This procedure shall include at a minimum the following information for all measuring and test equipment used to record all test parameters that are required to be automatically and continuously recorded (including time):
 - (1) Type of equipment, manufacturer, model number, etc.
 - (2) Measurement range
 - (3) Accuracy
 - (4) Calibration interval
 - (5) Type of standard used to calibrate the equipment (calibration traceability of the standard must be evident)
- E. Records of calibrations for all measuring and test equipment shall be kept by the contractor in a manner that assures the maintenance of established calibration schedules. All such records shall be readily available for inspection when

authorized by the COTR. The calibration system will require acceptance by the COTR before testing commences.

- F. At a minimum, the measurement and test equipment calibration system will encompass:
- (1) Equipment and devices to measure and/or record all test parameters required by this OVSC Laboratory Test Procedures manual.
 - (2) Alignment of the test tire axle with the road wheel axle. Maximum allowable misalignment is 10 minutes of arc for camber and toe-in.
 - (3) The roughness and runout of the test wheel. A test wheel shall not be used when surface roughness exceeds 0.0032 mm (0.000125 inch) or runout exceeds 0.25 mm (0.010 inch) Total Indicated Runout (TIR).
- G. Each report will include a list of equipment used for compliance testing, and for each item the manufacturer, the calibration schedule, the date of last calibration, the accuracy of the item and a column for remarks; see Test Equipment List and Calibration Information sample page in Appendix B.

9. DIGITAL IMAGE DOCUMENTATION

Each final test report shall include color digital images of the test setup, which will include the test equipment and instrumentation used for each phase of testing; the minimum size of the digital images shall be 100 x 150 mm (4 x 6 inches). Each digital image shall include a title, presented either on the image or adjacent to it.

Pretest color digital images shall be taken of each tire that is subject to a performance test; there shall be one image of each tire side capturing the complete tire side. A 5-megapixel (minimum) digital camera shall be used with a resolution of at least 1800 x 1200 pixels. The digital images shall be saved until all tires of that make and model have completed all performance testing and marking inspection with passing results.

In the event of an apparent test failure or any test anomaly, the pretest digital images for that tire must be saved until deletion is directed by the COTR. Further, digital images of each test failure occurrence shall be taken and saved until deletion is directed by the COTR; images of the apparent failures shall show the point of failure from each point of view that can add significant detail. Also, the COTR may direct that one or more of any of these digital images be included in the report and be provided in electronic format to OVSC; see paragraph 14.1. If digital images of test tire failures are included in the report, they shall follow format established above.

10. DEFINITIONS

ACCEPTED REPORT

A tire test report validated by the Tire Test Data Management System or Tire Test Reporting System, certified as meeting NHTSA acceptance criteria and signed by the COTR or representative.

ALPHA CHARACTER

A single alphabetical character from A to Z.

BEAD

That part of the tire made of steel wires, wrapped or reinforced by ply cords, that is shaped to fit the rim.

BEAD SEPARATION

A breakdown of bond between components in the bead area.

CARCASS

The tire structure, except tread and sidewall rubber.

CARCASS PLY

A ply that extends to the beads.

CHUNKING

The breaking away of pieces of the tread or sidewall.

CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR)

The designated OVSC official who is responsible for assuring laboratory compliance with contractual obligations.

CORD

The strands that form the plies in the tire.

CORD SEPARATION

Cord parting away from adjacent rubber compounds.

CRACKING

Any parting within the tread, sidewall, or innerliner of the tire extending to cord material.

DEEP TREAD RADIAL

A deep tread radial tire is one having a minimum tread depth of 14.3 mm (18/32 inch or 0.5625 inch) or greater.

EXTRA LOAD TIRE

A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

FIELDS

Any group of letters and numbers that have significance or meaning.

GROOVE

The space between two adjacent tread ribs.

INNERLINER

The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

INNERLINER SEPARATION

The parting of the innerliner from cord material in the carcass.

INTENDED OUTBOARD SIDEWALL

(1) The sidewall that contains a whitewall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same molding on the other sidewall of the tire; or

(2) The outward facing sidewall of an asymmetrical tire having a particular side that must always face outward when mounted on a vehicle.

LABORATORY MONITOR

The designated OVSC official responsible for the acceptance of test results and the resolution of any problems.

LIGHT TRUCK (LT) TIRE

A tire designated by its manufacturer as primarily intended for use on lightweight trucks or

multipurpose passenger vehicles.

LIGHT VEHICLE TIRE

A new, pneumatic, radial tire intended for use on motor vehicles (other than motorcycles and low speed vehicles) that have a gross vehicle weight rating (GVWR) of 10,000 pounds or less and were manufactured after 1975.

LOAD RATING

The maximum load a tire is rated to carry for a given inflation pressure.

MAXIMUM LOAD RATING

The load rating at the maximum permissible inflation pressure for that tire.

MAXIMUM PERMISSIBLE INFLATION PRESSURE

The maximum cold inflation pressure to which a tire may be inflated.

MEASURING RIM

The rim on which a tire is fitted for physical dimension requirements.

NHTSA/OVSC

National Highway Traffic Safety Administration, Office of Vehicle Safety Compliance.

OPEN SPLICE

Any parting at any junction of tread, sidewalls, or innerliner that extends to cord material.

OUTER DIAMETER

The overall diameter of an inflated new tire.

OVERALL WIDTH

The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to marking, decorations, or protective bands or ribs.

PASSENGER CAR (PC) TIRE

A passenger car (PC) tire means a tire intended for use on passenger cars, multipurpose passenger vehicles, and trucks, that have a gross vehicle weight rating (GVWR) of 10,000 pounds or less. These tires were formerly known as P-metric or P-Type tires.

PLY

A layer of rubber-coated parallel cords.

PLY SEPARATION

A parting or rubber compound between adjacent plies.

P-metric or P-Type TIRE

See Passenger Car Tire, above.

PNEUMATIC TIRE

A mechanical device made of rubber, chemicals, fabric, steel, or other materials, which, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

RADIAL PLY TIRE

A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90° to the centerline of the tread.

REINFORCED TIRE

A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

RESPONSIVE TEST

A special test initiated through a complaint, field inspection, failed standard test, or COTR discretion.

RIM

A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

SECTION WIDTH

The linear distance between the exteriors of an inflated tire's sidewalls, excluding elevations due to marking, decoration, or protective bands.

SIDEWALL

That portion of a tire between the tread and the bead.

SIDEWALL SEPARATION

The parting of the rubber compound from the cord material in the sidewall.

SIZE FACTOR

The sum of the section width and the outer diameter of a tire determined on the test rim.

SNOW TIRE

A snow tire means a tire that attains a traction index equal to or greater than 110, compared to the ASTM E-1136 Standard Reference Test Tire, when using the snow traction test as described in ASTM F-1805-00, Standard Test Method for Single Wheel Driving Traction in a Straight Line on Snow- and Ice-Covered Surfaces, and which is marked with an Alpine Symbol specified in S5.5(i) of FMVSS No. 139 on at least one sidewall.

TEST RIM

The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

TEST SPECIMEN

A tire provided by OVSC for the purpose of compliance testing.

TREAD

That portion of a tire that comes into contact with the road.

TREAD RIB

A tread section running circumferentially around a tire.

TREAD SEPARATION

Pulling away of the tread from the tire carcass.

TREADWEAR INDICATORS (TWI)

Projections within the principal grooves designed to give a visual indication of the degree of wear of the tread.

WHEEL-HOLDING FIXTURE

The fixture used to hold the wheel and tire assembly securely during testing.

11. PRETEST REQUIREMENTS

Prior to conducting a compliance test, the contractor shall:

1. **Verify COTR approval of contractor's in-house Test Procedures.**
2. **Verify the training of technicians for performance of this test.**
3. **Verify the calibration status of test equipment.**
4. **Review applicable revision of FMVSS No. 139.**
5. **Set cold tire pressures according to the requirements of the standard.**

TEST DETAILS

The following subsections discuss particular details of the Laboratory Test Procedures form requirements.

A. TEST RIMS

Tires tested in accordance with the requirements of FMVSS No. 139 must be tested on a rim designated as a test rim in the Tire and Rim Association Year Book, the Tire and Rim Association Supplementary Service Data Book, the Tire and Wheel Engineering Data Book of the Society of Motor Manufacturers and Traders Limited (SMMT), the Japan Automobile Tire Manufacturers Association, the Japanese Industrial Standards (JIS-D4202), or the European Tire and Rim Technical Organization practices (ETRTO). (Alternate rim widths are not acceptable without authorization from the COTR.)

A laboratory must obtain written approval from the COTR to use a rim other than those specified. Prior to initial usage, the conformance dimensions of each test rim shall be verified by physical and appropriate measurement. Physical test rim measurements shall include the use of calibrated dial gage indicators; ball gage; mandrel, diameter, and contour gages; and TRA sliding type gauge or equivalent. Test rim measurements shall include those for lateral and radial runout. The rim is to be measured at the bead seat area as defined by the *Tire and Rim Association Year Book*. Maximum allowable runout is 0.762 mm (0.030 inch) for radial and 1.016 mm (0.040 inch) for lateral. Each test rim shall be remeasured immediately after a tire failure on that rim. If no failures occur, each rim shall be measured at least every 25th mounting. A log of these measurements shall be maintained and made available to the COTR.

If, at any time, a rim dimension falls outside of its dimensional tolerances, that rim shall not be used for testing in this program. The test rims are to be identified numerically and assigned specifically to a tire so as to establish that the tire was tested on a specific rim. The test data sheet will indicate the rim used and the before and after test rim visual inspection results. This visual inspection will include at least a check for obvious deformation of pilot hole, bolt holes, rim contours, cracks, etc. Test rim contours are interchangeable in terms of J, JJ and JK rim flange configuration 4, Test Logs. A log of the progress of each test shall be entered routinely during the test on a form suited to the individual test

laboratory. The COTR must concur with the log format for maximum attainable standardization of all testing laboratories. This log shall be retained by the laboratory and made available upon request by the OVSC to support test report data. In the event of a failure of a test tire, the contractor shall follow the Failed Tire Procedure, see paragraph 14.1 of this TP.

NOTE: In the event of an indicated failure of a tire to meet the standard's performance requirements, a formal post-test recalibration check of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. In any event, the contractor is responsible for confirming that all equipment and instruments are in good working order prior to the next test. The necessity for each formal recalibration check, which must be traceable to NIST, will be at the COTR's discretion. A routine post-test or daily calibration check, normally performed as part of the contractor's operating test procedures, where instruments are compared to physical parameters (e.g., ice bath for thermocouples) or by shunt calibrations (e.g., load cells), is not considered a formal recalibration check.

B. TEST DATA LOSS

A compliance test is not to be conducted unless all of the various test conditions specified in the applicable OVSC Laboratory Test Procedure have been met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters in the manner outlined in the applicable OVSC Laboratory Test Procedure may require a retest at the expense of the contractor. The retest costs will include the cost of the replacement item of motor vehicle equipment and all costs associated with conducting the retest. The original test specimen used for the invalid test shall remain the property of OVSC, and the retest specimen shall remain the property of the contractor. If there is a test failure, the contractor shall retain the retest specimen for no more than 2 years. If there is no test failure, the contractor may dispose of the test specimen upon notification from the COTR that the final test report has been accepted.

NHTSA's Contracting Officer is the only NHTSA official authorized to notify the contractor that a retest is required. The retest shall be completed within 2 weeks after receipt of notification by the Contracting Officer that a retest is required. If a retest is conducted, no test report is required for the original test.

C. PERSONNEL PERFORMANCE

Personnel supervising and/or performing the compliance test program shall be thoroughly familiar with the requirements, test conditions, equipment for the test to be conducted, and safety requirements.

12. COMPLIANCE TEST EXECUTION

Upon COTR approval of the spreadsheet submitted to OVSC (See 7.1 TEST SAMPLE IDENTIFICATION AND STORAGE), the laboratory may begin testing in accordance with

the test categories in the adjoining table.

No.	TEST PHASES	TEST CATEGORIES		
		(A)	(B)	(C)
1	Tire Marking	X	X	X
2	Tread Wear Indicator	X	X	X
3	Tire Dimensions	X		
4	Tubeless Tire Bead Unseating Resistance	X		
5	Tire Strength	X		
6	Tire Endurance		X	
7	Low Inflation Pressure Performance		X	
8	High Speed Performance			X

NOTE: Care must be taken to schedule test and inspection completion in a coordinated manner permitting testing of each FMVSS No. 139 test set within 5 days.

12.1 TIRE MARKING TEST PROCEDURES (TIRES A, B, and C)

Marking compliance requirements are established by paragraph S5.5 of FMVSS No. 139. A marking omission or error constitutes a test failure. The following are compliance requirements:

A. CERTIFICATION SYMBOL INSPECTION

Each manufacturer of a new tire shall certify that its product complies with the applicable safety standard by marking the tire with the symbol DOT as shown in FIGURE 4 – IDENTIFICATION NUMBERS FOR NEW TIRES. See paragraphs 2.1 and 2.2 of this TP for compliance schedule information. . The laboratory will confirm that each tire has been labeled on each sidewall with the DOT symbol (S5.5(a)).

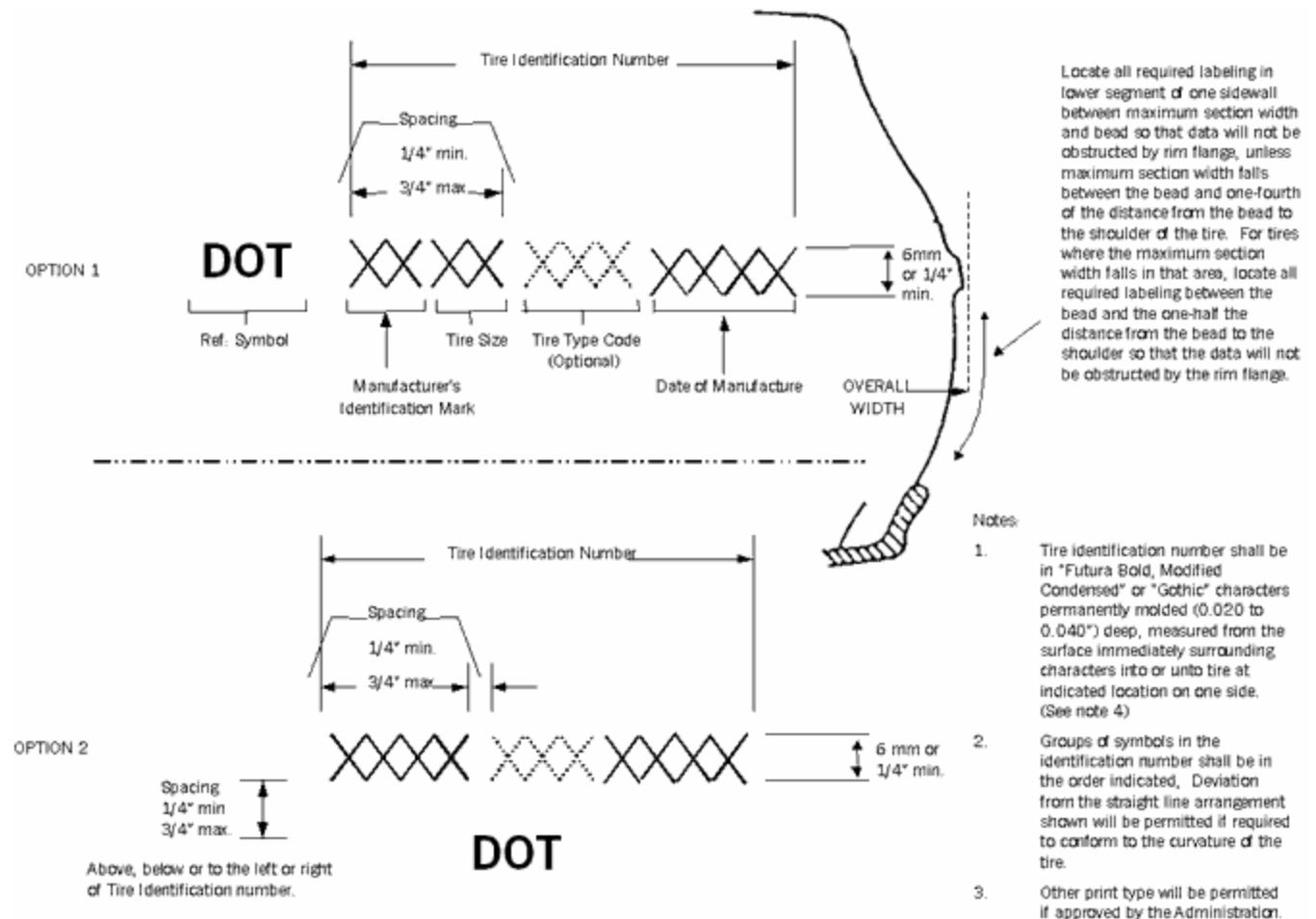


FIGURE 4 – IDENTIFICATION NUMBERS FOR NEW TIRES

The laboratory will confirm that the DOT symbol is in compliance with information in FIGURE 4. Figure is from 49 CFR 574.5.

B. TIRE MARKINGS (S5.5)

The markings must be placed between the maximum section width and the bead on at least one sidewall, unless the maximum section width of the tire is located in an area that is not more than one-fourth of the distance from the bead to the shoulder of the tire. If the maximum section width falls within that area, those markings must appear between the bead and a point one-half the distance from the bead to the shoulder of the tire, on at least one sidewall. The markings must be in letters and numerals not less than 1.98 mm (0.078 inches) high and raised above or sunk below the tire surface not less than 0.38 mm (0.015 inch). The tire identification and DOT symbol marking must comply with 49 CFR Part 574 – Tire Identification and Record Keeping. All markings shall be inspected for presence and recorded on the appropriate Data sheet for both intended outboard sidewall and other sidewall.

C. IDENTIFICATION NUMBER INSPECTION

The laboratory will confirm that each tire has been labeled with the tire identification number (TIN) required by 49 CFR part 574 on the intended outboard sidewall of the tire, and either the TIN or a partial TIN, containing all characters in the TIN except for the date code on the other sidewall. If the tire does not have an intended outboard sidewall, the laboratory will confirm that the tire has been labeled with the TIN on one sidewall and with either the TIN or the partial TIN (without date code) on the other sidewall. The laboratory will record the marking of the TIN/partial TIN on the proper form. The size, spacing, and type of characters required under 49 CFR part 574 shall be as those specified in FIGURE 4 – IDENTIFICATION NUMBERS FOR NEW TIRES. (S5.5.1)

The laboratory will confirm that each tire has been labeled on at least one sidewall with the name of the manufacturer or brand name (S5.5.3).

The laboratory will also confirm, for the TIN (and not the partial TIN) that not only the presence of the date code, but that it is located at the end of the TIN and has four digits. See FIGURE 4.

These marking requirements are subject to the phase-in schedule of S7 of the standard and will be required on both sidewalls.

D. TIRE MARKING INSPECTION (S5.5(b) to (i))

Each tire must be marked on both sidewalls with the information specified in (a) through (d), below. Each tire must be marked on at least one sidewall with the information specified in (e) through (i), below. A tire meeting the definition of a snow tire as defined in Section 10, herein, at the option of the manufacturer, may be marked as specified in (j), below. The tire shall be inspected for the presence of the information and the information shall be recorded on the proper form for both sidewalls. The required information is:

BOTH SIDEWALLS

(a) The presence of the DOT symbol.

(b) Tire TIN

- i. The presence of the complete TIN on both sides or the TIN, or
 - a. For tires manufactured before September 1, 2009, the complete TIN may be on either sidewall and a partial TIN (without date code) may be on the opposite sidewall;
 - b. For tires manufactured on or after September 1, 2009, the complete TIN must be on the intended outside sidewall and a partial TIN or a complete TIN must be on the labeled on the other side. If a tire does not have an intended outboard side, one side must be labeled with a complete TIN and the other side may be labeled with either a partial TIN or a complete TIN.
- ii. The TIN is complete as shown in FIGURE 4.

- iii. On the TIN, the four-digit date of manufacture is the last field, and the two-character plant code follows the DOT symbol.
 - iv. On the partial TIN, if used, the date code is not presented, and the manufacturer may choose to not label any optional codes.
- (c) The tire size (equivalent inch and metric size designations may be used) as listed in the documents and publications specified in S4.1.1.
 - (d) The maximum permissible inflation pressure.
 - (e) The maximum load rating.

AT LEAST ONE SIDEWALL

- (f) The generic name of each cord material used in the plies (both sidewall and tread area) of the tire
- (g) The actual number of plies in the sidewall, and the actual number of plies in the tread area, if different
- (h) The term TUBELESS or TUBE TYPE, as applicable
- (i) The word RADIAL, if the tire is a radial ply tire.
- (j) Alpine Symbol: If the manufacturer chooses to mark the tire with the pictograph of a mountain with a snowflake, as shown below, the mountain profile must have a minimum base of 15 mm (0.6 inches) and a height of 15 mm (0.6 inches), and must contain three peaks with the middle peak being the tallest. Inside the mountain there must be a six-sided snowflake having a minimum height of one-half the tallest peak. Inside the mountain, there must be a six-sided snowflake having a minimum height of one-half the tallest peak:



- (k) For each new pneumatic passenger car tire only, the test lab will identify and record both the Uniform Tire Quality Grading Standard (UTQGS) category, i.e., Traction, Treadwear and Temperature, and the respective rating labeled.

12.2 TREAD WEAR INDICATOR TEST PROCEDURES (TIRES A, B, AND C)

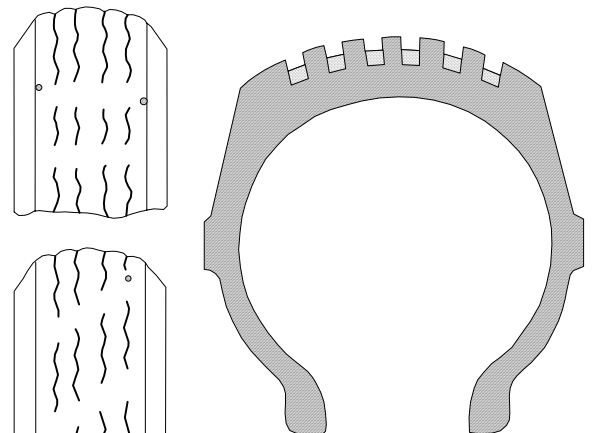
At least six treadwear indicators are required to be equally spaced around the circumference of the tire.

The Tread Wear Indicator Test procedures check for compliance with paragraph S5.4 of FMVSS No. 139 and paragraph 2.E of this TP. Tread wear indicators on a worn tire will appear as solid bands across the tread surface when the tread has a remaining depth of $1.6 \text{ mm} \pm 0.38 \text{ mm}$ ($0.0625 \text{ inch} \pm 0.0156 \text{ inch}$).

The location of the tread wear indicators can be detected by placing a thin, blunt tool in a center tread groove, and physically moving the tool along the base of the groove until a slight bump is noted. Measure and record the distance from the top of the tire tread to the highest point of the tread wear indicator.

Move approximately 7 to 10 cm (3 to 4 inches) in either direction of the same groove, and measure the distance from the top of the tire tread to the base of the tread groove. Record the difference between the two dimensions, which shall be $1.6 \text{ mm} \pm 0.38 \text{ mm}$ ($0.0625 \text{ inch} \pm 0.0156 \text{ inch}$). Use

an arrow mark with the letters TWIM to indicate where the tread wear indicator was measured on the test tire.



12.3 TIRE DIMENSIONS TEST PROCEDURES (S6.1)

The following Tire Dimensions Test Procedures are to check for compliance with paragraph S6.1 of FMVSS No. 139.

A. PREPARATION OF TIRE(S) FOR CATEGORY A STATIC TESTS

Before performing test procedures delineated in paragraphs 12.3 to 12.5 of this TP, the following preparation procedures must be completed:

The tire rim will be visually examined, inside and out, prior to assembly. Any rim found to be defective or questionable will not be used. Any tire defects noted shall be recorded in the Remarks section on the test data sheet.

(1) TIRE MOUNTING (S6.1.1.1 to S6.1.1.3)

The tire shall be mounted on a pre-assigned test rim that is painted and clean. If the same test rim is used for physical dimension, bead unseat, and strength tests, care shall be taken that the tire beads in particular are clean and that both the tire and rim are dry. If this tire and rim assembly is to be used for the bead unseat test, the tire is to be mounted with no bead lubricant or adhesives. The tire shall be inflated to the specified inflation pressure with a tolerance of $+13.8 \text{ kPa}$ to -0

kPa (+2 to -0 psi); the pressure shall be indicated on the test data sheet and specified in FMVSS No. 139.

In the case of a PC tire, inflate it to the pressure specified in the following table (S6.1.1.1.2):

Inflation pressure kPa (psi)	
Standard	Reinforced
180 (26.1)	220 (31.9)

In the case of a LT tire, inflate it to the pressure at maximum load as labeled on sidewall. (S6.1.1.1.3)

The rim number shall be assigned by the testing laboratory and shall be recorded in the space provided on the forms. The actual rim size used shall also be recorded on the test data sheet in the space provided. When mounting or dismounting tires, proper tools and procedures should be used. Failure to comply with proper procedures may result in incorrect positioning of tire, tube, or rim, causing the assembly to burst with explosive force sufficient to cause serious physical injury or death. Never mount or use damaged tires, tubes, or rims.

WARNING: Never inflate beyond 276 kPa (40 psi) pressure to seat beads. Never stand, lean, or reach over the assembly during inflation.

Inspect both sides of the tire to be sure that beads are evenly seated. If both beads are not properly seated when pressure reaches 276 kPa (40 psi), completely deflate assembly and then reinflate.

WARNING: Inflating beyond 276 kPa (40 psi) air pressure when trying to seat tire beads is a DANGEROUS PRACTICE that may break a tire bead (or even the rim) with enough explosive force to cause serious injury or death.

(2) TIRE CONDITIONING (S6.1.1.1.4 and S6.1.1.1.5)

The tire and rim assembly shall be conditioned at an ambient room temperature of 20° to 30°C (68° to 86°F) for not less than 24 hours, and shall remain at this temperature throughout the remainder of the test phase. The room temperature, date, tire conditioning start and end times, and total hours will be recorded on the test data sheet. Record all time using the 24-hour clock.

NOTE: Do not check or adjust inflation pressure during the conditioning period. At the end of the conditioning period, record the total hours for conditioning, check and record the inflation pressure in the space provided, adjust the inflation pressure to specified inflation pressure, and record. If loss of air exceeds 13.8 kPa (2 psi) during the conditioning period, determine the cause, correct if

possible, and recycle the tire through the conditioning period. If this tire is untestable for this or any other reason, request guidance from the COTR.

B. MARKING OF TIRE FOR TESTING

The tire shall be marked radially from bead to bead across the tread at six intervals equally spaced around the tire circumference. Starting at the tire serial number location, mark each test area 1 through 6, going in a clockwise direction around the tire, with the serial number facing the technician.

C. MEASUREMENT OF TIRE OVERALL WIDTH

Overall tire width measurements are taken at these six predesignated points. Care should be taken that these measurements include any engraved or embossed figures, designs, labels, or other forms of embellishment that might be a part of the sidewall. The plane of the calipers when adjusted to the fully closed position against the sidewall is to be perpendicular to the circumferential plane of the tire. Each of the six measurements (rounded off to the nearest thousandth of a millimeter or hundredth of an inch) are to be recorded on the test data sheet and mathematically averaged. The result is recorded on the test data sheet as the average overall width. The overall width shall not be more than +7% of the section width specified in a submission by the manufacturer. The preprinted test reports contain the calculated values; therefore, the recorded overall width must fall within the preprinted tolerance, or it is a failure.

D. MEASUREMENT OF TIRE SECTION WIDTH (S6.1.1.2.1)

The tire section width is measured at the same six predesignated points as overall tire width. However, measurements shall be taken from sidewall to sidewall minus embellishments. The six measurements are recorded individually, then mathematically averaged. The result is recorded on the data sheet in the space provided. The section width shall not be more than +7% of the section width specified in a submission by the manufacturer.

E. MEASUREMENT OF OUTSIDE DIAMETER (S6.1.1.2.2)

The outside diameter of the inflated tire is determined by measuring the maximum circumference of the tire along the tread centerline, and dividing this dimension by Pi (3.14). The outside diameter is recorded on the test report in the space provided.

F. SIZE FACTOR DETERMINATION

The actual size factor, which is the sum of the average tire section width and the outer diameter, is computed by the testing laboratory. The result is recorded on the test report in the space provided. The actual size is required to be equal to or greater than the preprinted minimum size factor.

If the tire fails any aspect of the physical dimension requirements, indicate the

word FAILED and do not continue the bead unseating test without approval from the COTR.

12.4 TUBELESS TIRE BEAD UNSEAT RESISTANCE TEST PROCEDURES (S6.6)

Prior to commencing the test, wash the tire with mild detergent, dry it at the beads, and mount it without lubrication or adhesives on a clean, painted test rim.

See tire preparation procedures in paragraph 12.3 A – Preparation of Tires for Category A Static Tests of this TP.

The following Tubeless Tire Bead Unseating Test Procedures are to check for compliance with the requirements of paragraph S4.2.2.3 and S5.2 of FMVSS No.109, presented later in this section.

A. PREPARATION OF TIRE AND RIM ASSEMBLY

To ensure proper bead seating, the tire shall be inflated not to exceed the maximum inflation pressure as indicated on the tire sidewall and the test data sheet under Tire ID information. Immediately reduce the inflation pressure to that specified on the test data sheet for the tubeless tire bead unseating resistance test and as specified in FMVSS No. 109.

Inflate the tire to be tested to the pressure identified in Table II of FMVSS No. 109, the relevant portion presented herein:

Bead Unseat Test Inflation Pressure Charts for PC and LT Tires

Test Type	PC								
	psi				kPa				
	32	36	40	60	240	280	300	340	350
Bead Unseat	24	28	32	52	180	220	180	220	180

Beat Unseat	Tire Application	Test Pressure KPa (psi)
LT	Cross section ≤295 mm (11.5 in) Load Range C Load Range D Load Range E	260 (37.7) 340 (49.3) 410 (59.5)
	Cross section >295 mm (11.5 in) Load Range C Load Range D Load Range E	190 (27.6) 260 (37.7) 340 (49.3)

B. SPECIAL MARKING

The tire shall be marked radially at five equally spaced locations on the valve side of the sidewall. The mark shall continue to the tread shoulder and across the

tread to the opposite shoulder. One of the marks should coincide with the previously established mark located at the identification number from the physical dimension test.

The unseat test marks are to be identified by the addition of a circle at the approximate midpoint of the sidewall, and numbered 1 through 5 starting at the identification number and going counterclockwise around the tire, with the valve facing the technician.

C. FIXTURE ADJUSTMENT

Rigidly mount the tire and rim assembly in a horizontal plane (± 2 degrees).

Adjust the fixture so that the point of application of the block is as specified in FIGURE 5 – BEAD UNSEATING FIXTURE.

The load arm is to be parallel (± 2 degrees) to the tire and rim assembly at the time of initial engagement.

Check and, if necessary, readjust the inflation pressure. Record the actual inflation pressure on the data sheet within 15 minutes of the start of the test.

D. UNSEATING TEST

After mounting the tire and rim assembly in the applicable fixture against the tire sidewall (see FIGURE 5 – BEAD UNSEATING FIXTURE and FIGURE 6 – DIAGRAM OF A BEAD UNSEATING BLOCK), apply a load through the block to the tire outer sidewall at the distance specified in TABLE 1 – WHEEL SIZE FORCE APPLICATION TABLE for the applicable wheel size.

WHEEL SIZE MM (IN)	DIMENSION "A" FOR TIRES WITH MAX. INFL. PRESSURE	
	OTHER THAN 60 PSI	60 PSI
508 (20)	343 (13.5)	--
432 (17)	305 (12.0)	---
406 (16)	292 (11.5)	251 (9.9)
381 (15)	279 (11.0)	239 (9.4)
356 (14)	267 (10.5)	226 (8.9)
330 (13)	254 (10.0)	213 (8.4)
305 (12)	241 (9.5)	---
279 (11)	229 (9.0)	---
254 (10)	216 (8.5)	---
320 (13.6)	215.9 (8.50)	
340 (13.4)	228.6 (9.00)	
345 (13.6)	234.95 (9.25)	
365 (14.4)	247.65 (9.75)	
370 (14.6)	254.0 (10.00)	
390 (15.4)	279.4 (11.00)	
415 (16.3)	292.1 (11.50)	

TABLE 1 – WHEEL SIZE FORCE APPLICATION TABLE

Do this at a rate of 50.8 mm per minute ± 1.6 mm (2 inches per minute ± 0.0625 inch) with the load arm parallel to the tire and rim assembly at the time of initial engagement. With the force measured through the block in a vertical direction at the center line of the beam, apply the load until the bead is unseated from the rim or until the minimum acceptable force preprinted on the test data sheet is exceeded by a value of at least 22.68 kg (50 lbs) and not more than 45.4 kg (100 lbs).

The minimum acceptable force for PC and LT tires is referenced in paragraph S4.2.2.3 of FMVSS No. 109, and presented herein.

Resistance to bead unseat forces for tubeless tires when tire has a maximum inflation pressure other than 420 kPa (60 psi)

Applied force required to unseat the tire bead at the point of contact shall be:	Minimum force to unseat Newtons (pounds)
Section Width (SW) Millimeters (inches)	
$SW \leq 160$ (6)	6,670 (1,500)
160 (6) $< SW \leq 205$ (8)	8,890 (2,000)
205 (8) $< SW$	11,120 (2,500)

Resistance to bead unseat forces for tubeless tires when tire has a maximum inflation pressure of 420 kPa (60 psi)

Applied force required to unseat the tire bead at the point of contact shall be:	Minimum force to unseat Newtons (pounds)
Load Rating (LR) Kilograms (pounds)	
$LR \leq 399$ (880)	6,670 (1,500)
399 (880) $< LR \leq 635$ (1,400)	8,890 (2,000)
635 (1,400) $< LR$	11,120 (2,500)

The force applied during each load application (accurate to ± 11 kg or ± 25 lbs) is to be automatically and continuously recorded. Five such applications are to be made during the test of each tire at the points marked on the sidewall. Record the actual force applied to each application in the space provided on the applicable data sheet. If the automatic recorder fails during a test, continue the test and record all data from visual readings. Immediately inform the laboratory monitor for resolution of the problem and disposition of the test results.

In addition, the test data sheet requires an entry for confirming whether or not the bead unseated for the specific load application. These five spaces require an entry of YES or NO, as warranted.

The last application will be continued until the bead is unseated or contact is made with the rim. The value of the actual force applied at this time shall be recorded on the data sheet. A tire is considered to be a bead unseat failure when the tire bead separates from its bead seat on the rim at a force application below that prescribed in the standard, causing a massive loss of air. Ensure that the test specified inflation pressure has been established immediately prior to each of the five force applications.

Conduct the test at five equally spaced positions around the circumference of the tire. After the first instance of unseating of the bead, the tire must be resealed, inflated to the specified inflation pressure, and reconditioned for 30 minutes prior

to continuing the test series. Check for leaks and continue until five applications have been performed. Upon completion of the test series, the technician who performed the test will state the test results by indicating the applicable description: PASSED or FAILED.

If the tire has failed, do not continue the strength test without approval from the COTR. The technician will enter his initials and the date of test completion in the space provided on the test data sheet.

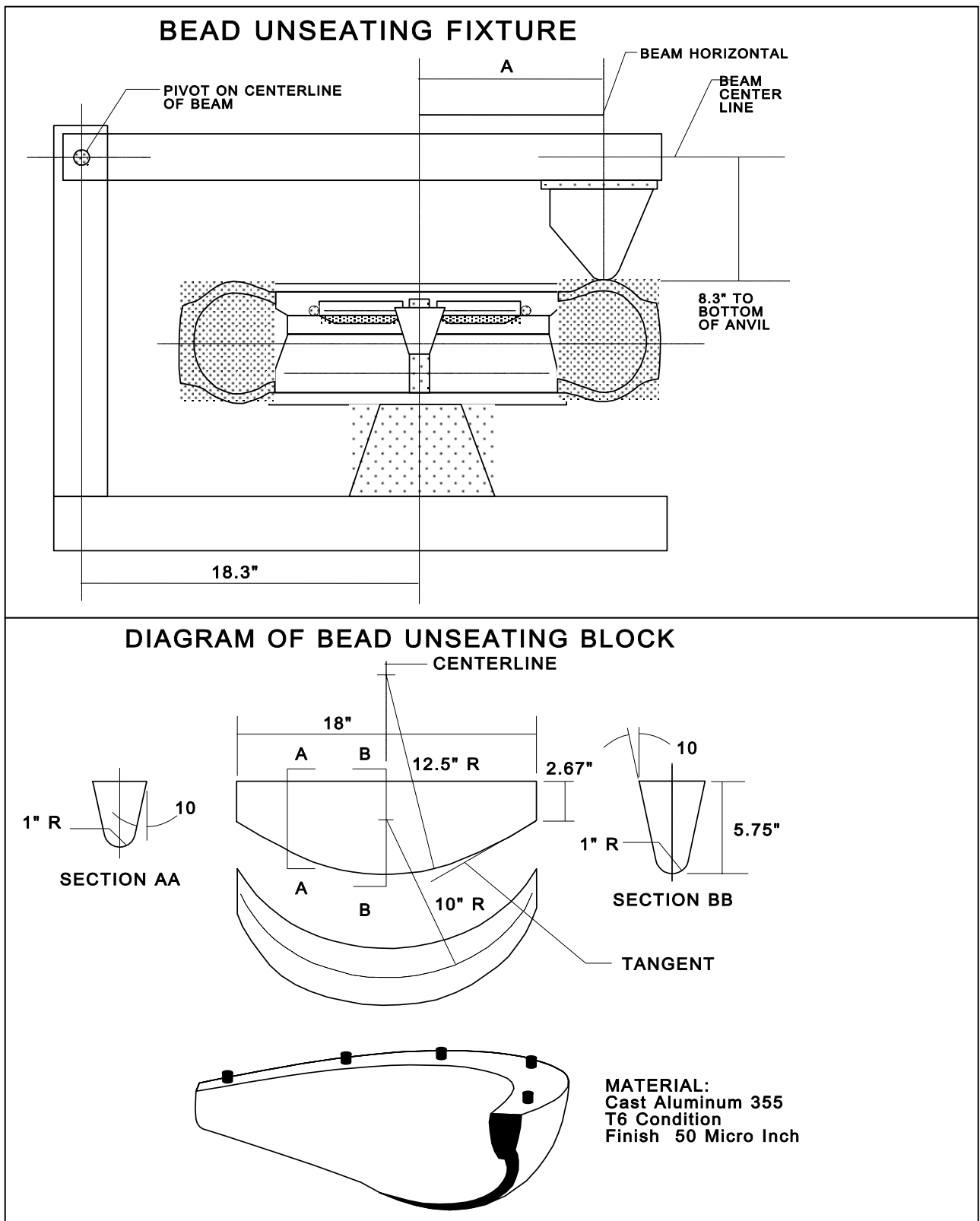


FIGURE 5 – DIAGRAM OF BEAD UNSEATING BLOCK (Configuration 1)

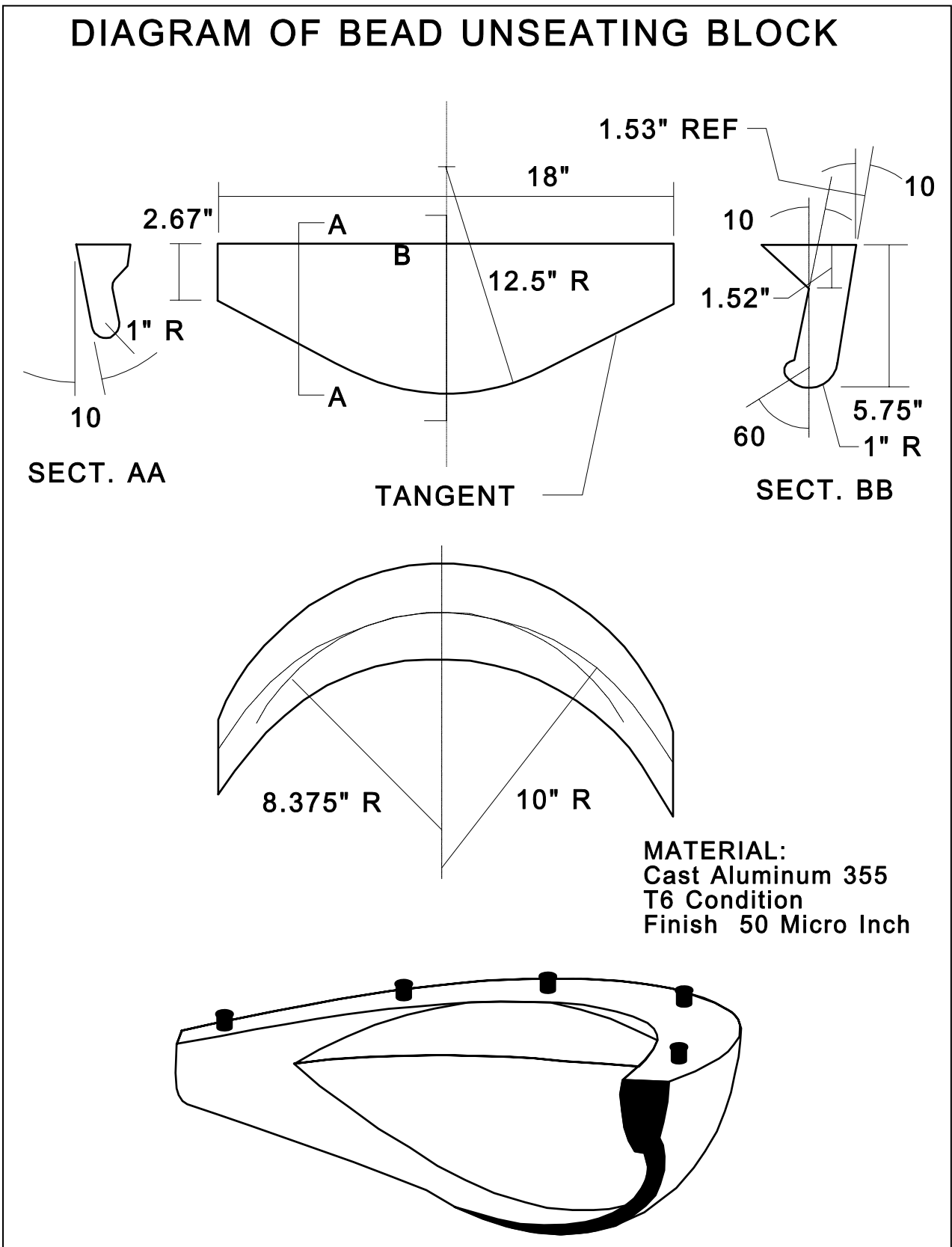


FIGURE 6 – DIAGRAM OF BEAD UNSEATING BLOCK (Configuration 2)

12.5 TIRE STRENGTH TEST PROCEDURES (S6.5)

See Section 12.3.A –Preparation of Tires for Category A Static Test.

The following Tire Strength test procedures are to check for compliance of each PC tire with paragraphs S4.2.2.4 and S5.3 of FMVSS No. 109 and each LT tire with paragraphs S6.2 and S7.3 of FMVSS No. 119.

A. PREPARATION OF TIRE

The test tire shall be inflated to the specified inflation pressure (+13.8 to –0 kPa or +2 to –0 psi) as indicated in FMVSS No. 139, and recorded.

Inflate the tire to be tested to the pressure identified in Table II of FMVSS No. 109, the relevant portion presented herein:

Strength Test Inflation Pressure Chart for PC Tires

Test Type	PC								
	psi				kPa				
	32	36	40	60	240	280	300	340	350
Strength	24	28	32	52	180	220	180	220	180

Strength Test Inflation Pressure Requirement for LT Tires

For strength testing of an LT tire, inflate the test tire to the inflation pressure corresponding to the maximum load rating marked on the tire. Use the single maximum load value when the tire is marked with both single and dual maximum loads. (FMVSS No. 119, S7.2(a))

The tire shall be conditioned at ambient room temperature for a period of three hours, minimum. Upon completion of this conditioning period, the tire inflation pressure shall be checked and recorded in the space provided on the data sheet. Adjust the tire's inflation pressure to the test-specified inflation pressure and record it prior to commencing the test, then mount the assembly on the plunger test fixture and start the test within 15 minutes after pressure adjustment. If loss of air exceeds 13.8 kPa (2 psi) during the conditioning period, determine the cause, correct if possible, and recycle tire through the conditioning period.

B. TIRE MARKING

The tire shall be marked according to the procedure outlined in the bead unseating test at five equally spaced positions. The markings have been made across the tread surface to the opposite-serial shoulder.

Make the plunger application at tread center and at these five circumferential locations. The plunger, as necessary, is to be set off-center so that a tread

groove is not subject to direct penetration. Take care that the tire is free of dirt, chalk, or moisture at the point of contact with the plunger. The plunger must be free of rubber residue from previous applications or any other foreign matter.

C. STRENGTH TESTS

Use the 19.0-mm (0.750-inch) diameter cylindrical steel plunger for PC tires or select the proper plunger for LT tires from Table I of FMVSS No. 119. The hemispherical end is forced against the tread rib as near to the centerline as possible at the rate of 50.8 mm per minute ± 1.58 mm (2 inches per minute ± 0.0625 inch). The plunger will be of sufficient length to preclude plunger shoulder impingement.

FMVSS No. 119 Table I —Strength Test Plunger Diameter for LT Tires

	Plunger diameter	
	mm	inches
Tire type Light truck	19.05	$\frac{3}{4}$
Tires other than the above types Tubeless: 17.5-inch or smaller rims	19.05	$\frac{3}{4}$
Larger than 17.5-inch rims: Load range F or less Load range over F	31.75 38.10	1-1/4 1-1/2
Tube type: Load range F or less Load range over F	31.75 38.10	1-1/4 1-1/2

For PC tires, the breaking-energy test values shall be as specified in Table I of FMVSS No. 109 and for LT tires it shall be as specified in Table II of FMVSS No. 119 as provided on the tire test data sheet. The energy applications shall exceed the appropriate value by at least 11.3 joules (100 inch-lbs), and not more than 16.9 joules (150 inch-lbs), unless the tire fails at a lower value.

Table I-C. c For PC Radial Tires

SIZE DESIG- NATION	MAXIMUM PERMISSIBLE INFLATION						
	32 lbs/in ⁵	36 lbs/in ⁵	40 lbs/in ⁵	240 kPa	280 kPa	300 and 350 kPa	340 kPa
Below 160 mm J (in-lbs)	220 (1,950)	330 (2,925)	440 (3,900)	220 (1,950)	440 (3900)	220 (1950)	440 (3900)
160 mm or above J (in-lbs)	294 (2,600)	440 (3,900)	589 (5,200)	294 (2,600)	589 (5200)	294 (2600)	589 (5200)

**Table I-D. For Tires With 240 kPa (60 lb./in⁵)
Maximum Permissible Inflation Pressure and
Maximum Load Rating of 399 kg (880 Pounds) and
Above**

Cord Material	J (Inch-Pounds)
Rayon	186 (1,650)
Nylon or Polyester	294 (2,600)

**Table I-E. For Tires With 240 kPa (60 lb./in⁵)
Maximum Permissible Inflation Pressure and
Maximum Load Rating Below 399 kg (880 Pounds)**

Cord Material	J (Inch-Pounds)
Rayon	113 (1,000)
Nylon or Polyester	220 (1,950)

FMVSS No. 119 Table II— Minimum Static Breaking Energy (Joules and inch-pounds)

Load range	Light truck, 17.5 inch or smaller rim tubeless		Tube type		Tubeless	
Time characteristic						
Plunger diameter (mm and inches)	19.05 J	¾" in-lbs	31.75 J	1-1/4" in-lbs	J	in-lbs
A	225	2,000				
B	293	2,600				
C	361	3,200	768	6,800	576	5,100
D	514	4,550	892	7,900	734	6,500
E	576	5,100	1,412	12,500	971	8,500
F	644	5,700	1,785	15,800	1,412	12,500
G	711	6,300				
H	768	6,800				

Load Range	Tube type		Tubeless	
Time Characteristic				
Plunger diameter (mm and inches)	(38.10) J	(1-1/2") in-lbs	J	in-lbs
G	2,282	20,200	1,694	15,000
H	2,598	23,000	2,090	18,500
J	2,824	25,000	2,203	19,500
L	3,050	27,000		
M	3,220	28,500		
N	3,389	30,000		

NOTE: For rayon cord tires, applicable energy values are 60 percent of those in table.

Force in kilograms (accurate to ± 11.3 kg or ± 25 lbs), penetration in mm (accurate to ± 1.6 mm or ± 0.0625 inch), and their relationship (or energy) shall be automatically and continuously recorded. Failure of the automatic recording instrument is to be handled as in the bead unseat test.

Record the force in kilograms (lbs), penetration in millimeters (inches), and energy in joules (in-lbs) for each load application in the appropriate space provided on the test data sheet. If the tire fails to break before the plunger is stopped by reaching the rim, record the force and penetration as the rim is reached, and use these values in the formula indicated below.

If all of the five required plunger applications have been conducted in order, and all results are at least equal to the specified minimum breaking energy, the resultant notation will show that W is determined to be greater than the minimum requirement where:

$$W \text{ (energy in Joules)} = [F \text{ (Force in Kilograms)} \times P \text{ (Penetration in millimeters)}] / 2$$

If none of the first four applications has resulted in carcass breakage below the minimum energy value, the fifth (last) plunger application is to be taken beyond the minimum limit to casing failure or to the point of tire compression against the rim, whichever occurs first. Enter the resulting average of the five applications in the space provided for actual average on the data sheet.

If any plunger application penetrates the tire at less than the minimum specified breaking energy, four additional plunger applications shall be conducted to failure between previously unfailed positions. The recorded actual average shall be the result of the five complete penetrations.

If any plunger application contacts the test rim before the minimum specified breaking energy is reached, put the tire on a different rim that has more clearance in the test area, and repeat the test.

When repeated penetrations are applied to the tire, an inner tube may be installed, or the tire may be repaired.

Upon completion of the test series, the technician who performed the test will indicate the test result by circling the applicable description: PASSED or FAILED. If the tire fails, notify the COTR immediately, and follow the failed tire procedure. The same technician will enter his initials and date of test completion in the space provided on the test data sheet.

D. TIRE STRENGTH REQUIREMENTS

Each PC tire shall comply with the requirements of S5.3 of § 571.109.

Each LT tire shall comply with the requirements of S7.3 of § 571.119.

12.6 TIRE ENDURANCE (S6.3) TEST PROCEDURES – B TIRE

A. PREPARATION OF TIRE(S) FOR CATEGORY B ENDURANCE TEST

The tire and rim shall be visually examined, inside and out, prior to assembly, and any rim found defective or questionable will not be used. Record any noted tire defects in the Remarks section on the appropriate data sheet, including any tread separation, sidewall, ply, cord, innerliner, or bead separation, chunking, broken cords, cracking or open splices. Notify the COTR before testing if any of these defects are present.

(1) TIRE MOUNTING (S6.3.1.1.1)

The tire shall be mounted with lubrication on an approved test rim and inflated to the inflation pressure indicated on the test data sheet and specified in FMVSS No. 139 as follows:

Endurance Test Inflation Pressure Chart for PC and LT Tires

Endurance Tire Pressures	Tire Application	Test Pressure KPa (psi)
PC	Standard load	180 (26.1)
	Extra load	220 (31.9)
LT	Cross section \leq 295 mm (11.5 in) Load Range C Load Range D Load Range E	260 (37.7)
		340 (49.3)
		410 (59.5)
	Cross section >295 mm (11.5 in) Load Range C Load Range D Load Range E	190 (27.6)
260 (37.7)		
340 (49.3)		

Record the actual rim size and rim number in the spaces on the appropriate data sheet.

(2) TIRE CONDITIONING (S6.3.1.1.2 and S6.3.1.1.3)

The tire and rim assemblies will be conditioned at an ambient temperature of 38°C, +0°, -9° (100°F, +0°, -16°) for at least three hours prior to the start of endurance testing, and shall remain at this temperature throughout the remainder of the test phase. The room temperature, inflation pressure, date, and tire conditioning start time will be recorded on the test data sheet. All times recorded will be by the 24-hour clock.

At the end of the conditioning period, record time, date, temperature, and whether

the total conditioning was at least three hours; check and record the inflation pressure in the space provided. Before beginning test, readjust the pressure to that specified on the form, if necessary. If loss of air exceeds 14 kPa (2 psi) during the conditioning period, determine cause, correct if possible, and recycle tire through the conditioning period. If the tire is untestable for this or any other reason, request guidance from the COTR.

(3) TEST AREA TEMPERATURE – B TIRE

During the test, the air temperature in the test area shall be 38°C, +0°, –9° (100°F, +0°, –16°). The location for the temperature-sensing device to determine the test area temperature shall conform to the following:

- For each tire position, the temperature sensor shall be located 305 mm ±76 mm (12 ±3 inches) out from the edge of the rim flange at any point on the circumference on either side of the tire.
- The sensor shall be located away from any wall or ceiling and not in a path where it can be influenced by intakes or outlets, room ventilators, exhaust vents, generators, etc.

The test area temperature shall be recorded on the test data sheet at the start and end of each 4-, 6-, and 24-hour test period. If a tire fails during a test, use the temperature at the time of failure as the temperature for the end of the test period.

(4) TEST MONITORING --B TIRE

Prior to test commencement, record the test wheel position number, the machine number, and whether the machine is hydraulic or pneumatic. At the end of the 4, 6 and 24-hour test periods, record the tire inflation pressure in the space provided.

The following parameters with operating tolerances indicated shall be automatically and continuously recorded:

- Tire Load in Kilograms +0 to –18 kg (lbs +0 to –40 lbs)*

The tire shall be run without interruptions at these intervals:

4-hour test: 85% as a percentage of tire maximum load rating

6-hour test: 90% as a percentage of tire maximum load rating

24-hour test: 100% as a percentage of tire maximum load rating

- Tire speed
 - PC and LT Tire without a snowflake symbol on the sidewall, speed in kilometers per hour: 120 kph+0 to –3.2 kph (75 miles/hour +0 to –

- 2 mph)
 - For PC and LT tires with the snowflake symbol on the sidewall, speed in kilometers per hour: 110 kph+0 to –3.2 kph (68 miles/hour +0 to –2 mph)
- Test area temperature: 38°C, +0°, –9° (100°F, +0°, –16°)
- Tire inflation pressure in kPa: +14 kPa –0 (+2 to –0 psi)
- Time (Cycles)**
 - 4 hours +0 to –2 minutes
 - 6 hours +0 to –3 minutes
 - 24 hours +0 to –10 minutes

* The reading in kilograms must be made from load cells located directly on or adjacent to the test tire axle. Load cells located on the test tire carriage are acceptable, provided the load recording indicates when the tire is actually engaged or disengaged from the test wheel.

** The recording of time intervals must be performed to directly relate to other appropriate test parameters. For example, a strip chart recorder used to record the speed of the B Test may be used to implicitly record time intervals, provided that the chart paper drive speed is constant and known.

In any instance of automatic retraction, the tire need not be examined until the conclusion of the remainder of the testing on the scheduled run. A tire retracted early and not found deficient after visual inspection may be submitted to laboratory analysis in the presence of the COTR before the test report is submitted. If analysis of the tire shows ply separation or other non-compliance conditions, classify the tire as a failed tire, and follow the failed tire procedure. If the tire does not show ply separation or other non-compliance condition, abort the test for this tire. In any case, do not rerun the tire on the test wheel to amplify the suspected defect.

The load step changes will be accomplished without tire inflation pressure adjustments, unloading of the test tire, or change of speed. If an interruption is necessary because of safety considerations or for any other reason, obtain approval for deviating from this procedure from the COTR.

NOTE: Do not adjust the tire inflation pressure during the 34-hour endurance run, and maintain loads at value corresponding to each test period in 12.6.A(4); see S6.3.1.2.3

In the case of an emergency interruption such as a general power loss, the laboratory must decide to continue or abort the test. If the test is continued, the validity of the test shall be determined by the COTR before the report is

submitted.

B. CONDUCTING THE TEST (S6.3.1.2)

The Tire Endurance Test Procedures that follow are to check for compliance with paragraph S6.3.2 of FMVSS No. 139.

During the test, the ambient temperature is maintained at 38°C, +0°C, -9°C (100°F, +0°, -16°); see 12.6.A(3), above.

After at least three hours of tire conditioning (see A.(2), above), mount the tire and wheel assembly on a test axle and press it against a flat-faced steel test wheel 1.7 meters (67.23 inches) in diameter and at least as wide as the section width of the tire to be tested. Apply the required load as referenced in paragraph S6.3.1.2.3 of FMVSS No. 139. For non-snow tires, conduct the test at 120 kph (74.6 mph) and for snow tires, conduct the test at 110 kph (68.4 mph) for the 4-, 6-, and 24-hour periods, without pressure adjustment or other interruptions. The first 5 minutes of the 6- and 24-hour periods, during which the load is being increased to the new required loading, are to be counted as part of the next higher cycle. The loads for the 4-, 6- and 24-hour periods are 85%, 90% and 100% load as a percentage of tire maximum load rating, respectively. See loads in S6.3.1.2.3 of the standard and paragraph 12.6.A(4) of this TP.

C. ENDURANCE TEST TIRE ANALYSIS (S6.3.1.2.5 and S6.3.2)

The test data are to be checked for completion and content immediately upon finishing the test. Complete all required data entries on the test data sheet. Reconcile the entries with the test requirements and the results.

Between 15 and 25 minutes after the completion of the 34-hour test, measure and record the tire inflation pressure on the proper data sheet, and without reducing tire pressure further, inspect the tire externally while on the test rim; there shall be no evidence of tread separation, sidewall, ply, cord, or bead separation, chunking, broken cords, cracking or open splices; document any occurrences. If the posttest tire pressure, when measured at any time between 15 and 25 minutes after the end of the test is not less than 95% of the initial pretest tire pressure and the tire meets all visual inspection criteria, indicate that the tire has passed and proceed directly to the Low Inflation Pressure Test, 12.7.

If the posttest tire pressure is less than 95% of the initial pretest tire pressure, follow the failed tire procedure (see paragraph 14.1 of this TP) and record the tire pressure, the time of the completion of the test, the time of the pressure reading and the ambient temperature, and immediately double-check all lines between the tire and measuring device to ensure that the cause of the air loss was an apparent failure of the tire and not problems with valves, lines, fittings, or measuring devices; then measure and record the tire pressure and ambient temperature at 15 to 20 , 30 to 35 and 45 to 50 minutes after the initial posttest pressure reading. If the posttest pressure reading stabilizes, i.e., at least the last two consecutive

pressure readings are identical*, continue with the Low Inflation Pressure Test, see paragraph 12.7.A(1) of this TP. If the tire has lost pressure on each the three additional posttest pressure readings, it may not be safe to continue with the Low Inflation Pressure Test, and should be removed from the rim, inspected internally and removed from further testing, awaiting disposition instructions of the COTR.

If the tire does not meet all visual inspection criteria, record the information on the test data sheet, photograph the occurrence, follow the Failed Tire Procedure and notify the COTR. A defective rim shall be the basis for voiding the test and shall prompt a complete rerun with a new tire.

To authenticate completion of the test, the technician who performed the test shall inscribe his initials and date of test completion on the proper data sheet. The laboratory individual responsible for the tire test program shall inscribe his signature and date on the proper data sheet.

* "Identical" means that the tire pressure is the same after a pressure measurement with a gauge that measures to one-tenth (0.1) kPa accuracy and rounded to the nearest whole kPa, for at least the final two pressure measurements.

12.7 LOW INFLATION PERFORMANCE (S6.4) TEST PROCEDURES – B TIRE

A. PREPARATION OF TIRE(S) FOR LOW INFLATION ENDURANCE TESTS

(1) TIRE MOUNTING (S6.4.1.1.1)

This test is conducted following completion of the tire endurance test, using the same tire and rim assembly tested in accordance with the endurance test (S6.3), with the tire maintaining a positive pressure, deflate to the following appropriate pressures:

**Low Inflation Pressure Performance Test
Inflation Pressure Chart for PC and LT Tires**

Low Inflation Pressure Performance Pressures	Tire Application	Test Pressure KPa (psi)
PC	Standard load Extra load	140 (20.3) 160 (23.2)
LT	Cross section ≤ 295 mm (11.5 in) Load Range C Load Range D Load Range E	200 (29.0) 260 (37.7) 320 (46.4)
	Cross section > 295 mm (11.5 in) Load Range C Load Range D Load Range E	150 (21.8) 200 (29.0) 260 (37.7)

(2) TIRE CONDITIONING (S6.4.1.1.2 and S6.4.1.1.3)

After the taking the final posttest pressure reading for the Endurance Test, the tire assembly shall be deflated to the above pressure and allowed to cool down for not less than 2 hours in an ambient temperature of 38°C, +0°, -9° (100°F, +0°, -16°) before starting the low inflation pressure test; record the time at which the tire conditioning began. Before or after mounting the assembly on a test axle, readjust the tire pressure to that specified in the preceding table, and check and record pressure at the end of the conditioning period and before start of test. All times that are recorded will use the 24-hour clock.

(3) TEST AREA TEMPERATURE (S6.4.1.2.5)

During the test, the air temperature in the test area shall be 38°C, +0°, -9° (100°F, +0°, -16°). The location for the temperature-sensing device to determine the test area temperature shall conform to the following:

- For each tire position, the temperature sensor shall be located 305 mm \pm 76 mm (12 \pm 3 inches) out from the edge of the rim flange at any point on the circumference on either side of the tire.
- The sensor shall be located away from any wall or ceiling and not in a path where it can be influenced by intakes or outlets, room ventilators, exhaust vents, generators, etc.

The test area temperature shall be recorded on the test data sheet at the start

and end of the 90-minute test. If a tire fails during a test, use the temperature at the time of failure as the temperature for the end of the test period.

(4) TEST MONITORING --B TIRE for LOW PRESSURE TEST

If the test tire has been moved to a different machine, prior to test commencement, record the test wheel position number, the machine number, and whether the machine is hydraulic or pneumatic.

The following parameters with operating tolerances indicated shall be automatically and continuously recorded:

- Tire inflation pressure in kPa +14 kPa –0 (+2 to –0 psi)
- Tire Load in Kilograms +0 to –18 kg (lbs +0 to –40 lbs)*
 - 90-minute test: 100% of maximum load rating
- Tire speed
 - PC and LT Tire without a snowflake symbol on the sidewall, speed in kilometers per hour: 120 kph+0 to –3.2 kph (75 miles/hour +0 to –2 mph)
 - For PC and LT tires with the snowflake symbol on the sidewall, speed in kilometers per hour: 110 kph+0 to –3.2 kph (68 miles/hour +0 to –2 mph)
- Test area temperature 38°C, +0°, –9° (100°F, +0°, –16°)
- Time (Cycles)**
 - 90-minutes +0 to –2 minutes

* The reading in kilograms must be made from load cells located directly on or adjacent to the test tire axle. Load cells located on the test tire carriage are acceptable, provided the load recording indicates when the tire is actually engaged or disengaged from the test wheel.

** The recording of time intervals must be performed to directly relate to other appropriate test parameters.

In any instance of automatic retraction, the tire need not be examined until the conclusion of the remainder of the testing on the scheduled run. A tire retracted early and not found deficient after visual inspection may be submitted to laboratory analysis in the presence of the COTR before the test report is submitted. If analysis of the tire shows ply separation or other non-compliance conditions, classify the tire as a failed tire, and follow the failed tire procedure. If the tire does not show ply separation or other non-compliance condition, abort the test for this tire. In any case, do not rerun the tire on the test wheel to amplify the

suspected defect.

The test is conducted for ninety continuous and uninterrupted minutes at 100% of max load and at 120 kph for non-snow PC and LT tires, and 110 kph for PC and LT snow tires.

NOTE: Before or after mounting the tire / rim assembly on a test axle, readjust the tire pressure per the table above, but do not adjust the tire inflation pressure once the low pressure test has begun.

In the case of an emergency interruption such as a general power loss, the laboratory must decide to continue or abort the test. If the test is continued, the validity of the test shall be determined by the COTR before the report is submitted.

B. CONDUCTING THE TEST (S6.4.1.2)

During the test, the ambient temperature is maintained at 38°C, +0°C, -9°C (100°F, +0°, -16°); see 12.7.A(3), above.

The test is conducted for 90 minutes at the end of the Endurance test specified in Paragraph 12.6 of this TP, and S6.3 in the standard, continuous and uninterrupted, at a speed of 120 kph (75 mph) and after conditioning for not less than 2 hours; see A(2), above. Press the assembly against the outer face of a test drum with a diameter of 1.70 m \pm 1%. Apply to the test axle a load equal to 100% of the tire's maximum load carrying capacity. Throughout the test, the inflation pressure is not corrected and the test load is maintained at the initial level.

C. LOW INFLATION PRESSURE PERFORMANCE TEST ANALYSIS (S6.4.2)

The test data are to be checked for completion and content immediately upon finishing the test. Complete all required data entries on the test data sheet. Reconcile the entries with the test requirements and the results.

Between 15 and 25 minutes after the completion of the ninety-minute test, measure and record the tire inflation pressure in the space provided (S6.4.1.2.6).

If the tire pressure, when measured between 15 and 25 minutes after the end of the test, is not less than 95% of the initial pretest pressure specified, the tire meets the pressure requirement. If the posttest tire pressure is less than 95% of the initial pretest tire pressure, follow the failed tire procedure (see paragraph 14.1 of this TP) and record the tire pressure, the time the test ended, the time the reading was taken and the ambient temperature, and immediately double-check all lines and connections between the tire and measuring device to ensure that the cause of the pressure loss was an apparent failure of the tire and not the result of a leak with valves, lines, fittings, or measuring devices; then measure and record the tire pressure and ambient temperature at 15 to 20, 30 to 35, and 45 to 50 minutes after the initial posttest pressure reading.*

Allow the tire to cool for one hour after the end of the test, then deflate the tire, remove it from the test rim, and visually inspect it internally and externally. After completion of the low inflation pressure performance test, there shall be no evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, broken cords, cracking, or open splices.

If the tire examination does not reveal any evidence of unusual conditions or defects, the tire is considered as having met the requirement of the standard. If any unusual conditions or defects are found during visual inspection, they shall be marked on the tire and recorded on the test data sheet. If the tire does not meet all visual inspection criteria, record the information on the test data sheet, inspect the rim and follow the Failed Tire Procedure and notify the COTR (within the first working day). A defective rim shall be the basis for voiding the test and shall prompt a complete rerun with a new tire.

If the tire met the posttest pressure requirement at the initial posttest pressure reading and the tire met all posttest visual examination criteria, the tire has met all Low Inflation Pressure Performance requirements and may be marked as PASS on the test sheet. If initial posttest pressure reading was below the requirement or the posttest tire did not meet all visual criteria, the tire did not meet all Low Inflation Pressure Performance requirements and should be marked as FAIL.

To authenticate completion of the test, the technician who performed the test shall inscribe his initials and date of test completion in the spaces provided. The laboratory individual responsible for the tire test program shall inscribe his signature and date in the spaces provided.

* The tire pressure will be taken a gauge that measures to one-tenth (0.1) kPa accuracy and rounded to the nearest whole kPa.

12.8 HIGH SPEED PERFORMANCE (S6.2) TEST PROCEDURES – C TIRE

A. PREPARATION OF TIRE(S) FOR CATEGORY C HIGH SPEED TESTS

The tire and rim will be visually examined, inside and out, prior to assembly, and any rim found defective or questionable will not be used. Any tire defects noted shall be recorded in the remarks section of the data sheet, including any tread separation, sidewall, ply, cord, innerliner, or bead separation, chunking, broken cords, cracking or open splices. Notify the COTR before testing if any of these defects are present.

(1) TIRE MOUNTING (S6.2.1.1.1)

The tire shall be mounted with lubrication on an approved test rim and inflated to the inflation pressure indicated on the test data sheet, specified in FMVSS No. 139, and listed here:

High Speed Test Inflation Pressure Chart for PC and LT Tires

High Speed Tire Pressures	Tire Application	Test Pressure KPa (psi)
PC	Standard load Extra load	220 (31.9) 260 (37.3)
LT	Cross section ≤ 295 mm (11.5 in) Load Range C Load Range D Load Range E	320 (46.4) 410 (59.5) 500 (72.5)
	Cross section > 295 mm (11.5 in) Load Range C Load Range D Load Range E	230 (33.4) 320 (46.4) 410 (59.5)

The actual rim size and rim number used shall be recorded in the spaces provided on the data sheet.

(2) TIRE CONDITIONING (S6.2.1.1.2 and S6.2.1.1.3)

The tire and rim assemblies will be conditioned at an ambient temperature of 38°C, +0°, -9° (100°F, +0°, -16°) for at least three hours prior to the start of high speed testing, and shall remain at this temperature throughout the remainder of the test phase. Record the room temperature, inflation pressure, date, and tire conditioning start time on the test data sheet, according to the 24-hour clock.

At the end of the conditioning period, record time, date, temperature, and whether the total conditioning was at least three hours; check and record the inflation pressure in the space provided. Before beginning test, readjust the pressure to that specified on the proper data sheet, if necessary. If loss of air exceeds 14 kPa (2 psi) during the conditioning period, determine cause, correct if possible, and recycle tire through the conditioning period. If the tire is untestable for this or any other reason, request guidance from the COTR.

(3) TEST AREA TEMPERATURE – C TIRE (S6.2.1.2.6)

During the test, the air temperature in the test area shall be 38°C, +0°, -9° (100°F, +0°, -16°). The location for the temperature-sensing device to determine the test area temperature shall conform to the following:

- For each tire position, the temperature sensor shall be located 305 mm \pm 76 mm (12 \pm 3 inches) out from the edge of the rim flange at any point on the circumference on either side of the tire.
- The sensor shall be located away from any wall or ceiling and not in a path where it can be influenced by intakes or outlets, room ventilators, exhaust vents, generators, etc.

The test area temperature shall be recorded on the data sheet at the start and end of each high speed test cycle. If a tire fails during a test use, use the temperature at the time of failure as the temperature for the end of the test period.

(4) TEST MONITORING --C TIRE

Prior to test commencement, record the test wheel position number, the machine number, and whether the machine is hydraulic or pneumatic.

At the end of each test cycle, i.e., 80 kph (50 mph) break-in, cooling cycle, 140 kph (87 mph), 150 kph (93 mph), 160 kph (99 mph), record the tire inflation pressure in the space provided on the data sheet. The following parameters with indicated operating tolerances will be automatically and continuously recorded:

- Tire load in kilograms +0 to -18 kg (lbs +0 to -40 lbs)*
- 85% of maximum load rating
- Tire speed in kilometers per hour +0 to -3.2 kph (mph +0 to -2 mph)
- Test area temperature in C°, +0°, -9° (F°, +0°, -16°)
- Tire inflation pressure in kPa +13.8 to -0 kPa (psi +2 to -0 psi)
- Time (cycles)**
 - 2 hours (break-in) +3 to -0 minutes
 - 2 hours (cooling) +30*** to -0 minutes
 - 3 cycles of 30 minutes each +0 to -2 minutes
- Tire Speed and Duration
 - 30 minutes at 140 kph,
 - 30 minutes at 150 kph, and,
 - 30 minutes at 160 kph.

* The reading in kilograms must be made from load cells located directly on or

adjacent to the test tire axle. Load cells located on the test tire carriage are acceptable, provided the load recording indicates when the tire is actually engaged or disengaged from the test wheel.

** The recording of time intervals must be performed so that it can be related directly to other appropriate test parameters. For example, a strip chart recorder, used to record the speed of the C Test, may be used to implicitly record time intervals provided that the chart paper drive speed is constant and known.

*** In accordance with paragraph B, below.

In any instance of automatic retraction, the tire need not be examined until the conclusion of the remainder of the testing on that scheduled run. A tire retracted early and not found deficient after visual inspection may be submitted to laboratory analysis in the presence of the laboratory monitor before the test report is submitted. If analysis of the tire shows ply separation or other non-compliance condition, the test for this tire shall be aborted. In any case, the tire will not be rerun on the test wheel to amplify the suspected defect.

B. CONDUCTING THE TEST (S6.2.1.2)

During the test, the ambient temperature is maintained at 38°C, +0°C, -9°C (100°F, +0°, -16°); see 12.8.A(3), above.

The High Speed Performance Test Procedures that follow check for compliance with paragraph S6.2.2 of FMVSS No. 139. Within 30 minutes after tire conditioning, mount the tire and wheel assembly on a test axle and press it against a flat-faced steel test wheel 1.7 meters (67.23 inches) in diameter and at least as wide as the section width of the tire to be tested (S6.2.1.2.1). Apply the required load equal to 85% of the tire's maximum load carrying capacity as referenced in paragraph S6.2.1.2.2.

The break-in cycle shall be conducted for at least 2 hours at 80 kph (50 mph) (S6.2.1.2.3). At the conclusion of the run, unload the tire and allow it to cool to 38°C, +0°, -9° (100°F, +0°, -16°)(S6.2.1.2.4); in no case will the cooling cycle be less than 2 hours. Upon completion of the cooling cycle, the tire pressure shall be readjusted to the specified test pressure and recorded as end of cooling cycle kPa (psi) on the test data sheet. Record the tire temperature reading at the end of the cooling cycle on the report form.

NOTE: The inflation pressure is not adjusted and test load is maintained at the specified value after the 140 kph (88 mph) start-up (S6.2.1.2.5).

The test will commence within 30 minutes after the 2-hour cooling cycle. All test cycles (140, 150, and 160 kph, or 87, 93 and 99 mph) will be conducted for 30 minutes each, without interruption (S6.2.1.2.7)

Record test start and stop times for each cycle of the high speed test on the test data sheet. A maximum of 2 minutes is authorized between test cycles to change

speed, to be counted as part of the next higher cycle.

C. HIGH SPEED TEST TIRE ANALYSIS

The test data are to be checked for completion and content immediately upon finishing the test. Complete all required data entries on the test data sheet. Reconcile the entries with the test requirements and the results.

Between 15 and 25 minutes after the completion of the High Speed Test, measure and record the tire inflation pressure in the space provided, and without reducing pressure, inspect the tire externally while on the test rim for any tread separation, sidewall, ply, cord, or bead separation, chunking, broken cords, cracking or open splices; document any occurrences.

If the tire pressure, when measured at any time between 15 and 25 minutes after the end of the test, is not less than 95% of the initial pretest pressure specified, the tire meets the pressure requirement. If the posttest tire pressure measured at anytime between 15 and 25 minutes after the test is less than 95% of the initial pretest tire pressure, follow the failed tire procedure (see 14.1), and record the tire pressure, the time the test ended, the time the reading was taken and the ambient temperature, and immediately double-check all lines between the tire and measuring device to ensure that the cause of the air loss was a failure of the tire and not problems with valves, lines, fittings, or measuring devices; then measure and record the tire pressure and ambient temperature at 15 to 20, 30 to 35 and 45 to 50 minutes after the initial posttest pressure reading. Continue with the visual inspection.

Allow the tire to cool for at least one hour after the end of the test, then deflate the tire, remove it from the test rim, and visually inspect it internally and externally. After completion of the high speed performance test, there shall be no evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, broken cords, cracking, or open splices.

If the tire examination does not reveal any evidence of unusual conditions or defects, the tire is considered as having met the requirement of the standard. If any unusual conditions or defects are found during visual inspection, they shall be marked on the tire and recorded on the test data sheet. If the tire does not meet all visual inspection criteria, photograph the occurrence, record the information on the test data sheet, inspect the rim and follow the Failed Tire Procedure and notify the COTR (within the first working day). A defective rim shall be the basis for voiding the test and shall prompt a complete rerun with a new tire.

If the tire met the posttest pressure requirement at the initial posttest pressure reading and the tire met all posttest visual examination criteria, the tire has met all High Speed Test requirements and may be marked as PASS on the test sheet. If initial posttest pressure reading was below the requirement or the posttest tire did not meet all visual criteria, the tire did not meet all High Speed Test requirements and should be marked as FAIL.

The tire pressure will be taken a gauge that measures to one-tenth (0.1) kPa

accuracy and rounded to the nearest whole kPa.

To authenticate completion of the test, the technician who performed it will inscribe his initials and date of test completion in the spaces provided or in the appropriate screen fields. The laboratory individual responsible for the tire test program shall inscribe his signature and date in the spaces provided.

13. POST TEST REQUIREMENTS

After the required tests are completed, the contractor shall:

1. Re-verify all instrumentation and rim dimensions.
2. Check data sheets and digital images. Make sure all required data is recorded in appropriate places on proper compliance test data sheet.
3. Contact COTR for disposition of the test tires and digital images.

14. REPORTS

In the case of a performance test failure, the Final Test Report shall be submitted to and received by the COTR for acceptance within 3 weeks of test completion, or received before the end of the fiscal year, whichever comes first. The Final Test Report format to be used by all contractors can be found in 14.5 FINAL TEST REPORTS below. Where there has been no indication of a test failure, each Final Test Report shall be submitted to the COTR within 3 weeks of test completion, or be received before the end of the fiscal year, whichever comes first. Payment of contractor's invoices for completed compliance tests may be withheld until the Final Test Report is accepted by the COTR. Contractors are requested NOT to submit invoices before copies of the Final Test Report are provided to the COTR.

Contractors are required to **PROOFREAD** all Final Test Reports before submitting them to the COTR. OVSC will not act as a report quality control office for contractors. Reports containing a significant number of errors will not be reviewed until corrections are made.

Data reporting begins when the Excel spreadsheet is approved by the COTR, and continues throughout the testing procedures.

14.1 FAILED TIRE PROCEDURE AND TIRE DISPOSITION

In the event of a performance failure of any tire, the COTR shall be notified immediately by telephone and fax or email, and provided the information outlined in FIGURE 7. Marking failures may be reported after machine tests are completed and the final report is assembled. The laboratory shall store a failed or suspect tire in a secure location as soon as testing on that tire is completed. Automatically recorded charts and test logs will be required by the COTR; upon OVSC notification of tire failure, ask for specific

instructions as to what documentation should be provided. See paragraph 9, Photographic Documentation, of this TP for digital image requirements of a tire with an apparent test failure.

Passed tire reports will not require submission of automatically recorded charts, but such data will be maintained at the laboratory at least until the original test report has been approved by the COTR indicating validation and acceptance.

After directed by the COTR and in accordance with the contract, tested tires will be disposed of destructively to insure the tires cannot be used on the road. The contractor shall maintain records documenting destructive disposition for the term of the contract.

14.2 TIRE TEST DATA SHEETS

The Tire test data sheets will be the official record of test results for each tire test set. The Tire Test Report consists of up to four pages for reporting results of each test category and recording marking compliance results. Tire Test Report pages are identified as follows:

- FMVSS No.139 Summary and Marking Test
- FMVSS No.139 Category A Test
- FMVSS No.139 Category B Test
- FMVSS No.139 Category C Test

INITIAL REPORT OF TEST TIRE FAILURE, FMVSS No. 139

NCI No.: _____ FY _____ Program _____ P.C. No.: _____
 Matrix Tire Line No.: _____ Test No.: _____
 Date of Report: _____ Test Date: _____ Laboratory: _____
 MFR: _____ Brand: _____
 Tire Line: _____ DOT No.: _____
 Tire I.D. No.: _____ Size: _____ Type: TL _____ TT _____
 Ply Rating: _____ Sidewall: BW _____ WW _____ Construction: _____
 Cord Material: Casing _____ Belt _____ Actual Plies: SW _____ T _____
 Max. Infl. Press.: _____ kPa/ _____ psi Max. Load Rating _____ kg/ _____ lbs Test Rim: Size _____ No.: _____
 Tire Type: PC (y/n): _____ LT (y/n): _____ Snow tire (with snowflake) (y/n): _____
 Test Phases:
 Marking _____ Strength _____ Treadwear Indicator _____
 Endurance _____ Low Pressure Performance _____ Physical Dimension _____
 Bead Unseat _____ High Speed _____ Other _____

Time of Failure: _____

If initial reading of posttest pressure reading of high speed, endurance, or low pressure performance tests is less than 95% of the pretest pressure, mark that the tire has failed requirements, record the pressure reading, the time the reading was taken and the pressure at 15 to 20, 30 to 35 and 45 to 50 minutes after the first posttest pressure reading.

Test: High Speed _____ Endurance _____ Low Pressure Performance _____

Initial failed posttest pressure reading and time: _____/_____
 Pressure readings at 15, 30 and 45 minutes after initial pressure reading (time/pressure): _____/_____, _____/_____, _____/_____

Description of Failure, including the paragraph of the standard: _____

Received From: _____ Received By: _____

MANUFACTURER NOTIFICATION RECORD

Individual Notified: _____ Telephone No.: _____

Date Contacted: _____ Time: _____ Called By: _____

Lab Signature and Date:

FIGURE 7 –INITIAL REPORT OF TEST TIRE FAILURE, FMVSS No. 139

14.3 TIRE TEST REPORT COMPLETION PROCEDURES

The laboratory specialist will transcribe test data onto the data sheets using black ink or indelible pen as each of the various test operations is completed. Any corrections must be crossed out and initialed. All test operations must be completed within 5 working days of each other. Once all tests are completed, the Summary portion of the form is to be filled in completely and authenticated. The entire report shall be sent to the OVSC within the schedule identified in paragraph 14 of this TP.

The detailed procedures for completing each section of the forms are covered in the remaining paragraphs of this section.

A. COMPLETION OF CATEGORY A SUMMARY AND MARKING DATA SHEET

The lower portion of the first page entitled "Summary and Marking Test" is the part of the form used to record marking and treadwear indicator compliance. If this information is not labeled on the tire, it is to be left blank and its absence noted in the Remarks section. The line-item entries are as follows:

MARKING REQUIREMENTS:

BOTH SIDEWALLS

(a) TIN

- i. Identify and record the complete TIN and its location (Outside Sidewall or Opposite Outside Sidewall) and identify and record the other complete TIN or partial TIN and its location. If the TIN or partial TIN is not present, state "None." Include the DOT symbol, if present, on the tire, at the beginning of the TIN.
- ii. Identify if the TIN is of the correct format; see FIGURE 4, including the four-digit date of manufacture after the two-character plant code; the plant code follows the DOT symbol.

(b) Tire size: Enter size.

(c) Maximum permissible inflation pressure: Enter kPa (psi)

(d) Maximum load rating: Enter kg (lbs)

AT LEAST ONE SIDEWALL

(e) Cord material: Enter Rayon, Nylon, Polyester, etc. (Carcass material shall be entered first, followed by belt material, if belted or radial construction. Do not record belt material for bias construction).

(f) Plies: Enter number of sidewall and tread plies

(g) Tube Type: Enter TUBE TYPE, if shown, or leave blank

Tube Type: Enter TUBELESS, if shown, or leave blank

- (h) Radial: Enter the word RADIAL, if shown, or leave blank
- (i) Tire ID Number: Enter number indicated on the sidewall
- (j) Brand name: Enter name that appears on the sidewall
- (k) Certification symbol: Inspect and document if DOT symbol is molded onto both sides; if so, enter Y (Yes) Y(Yes); if not, enter N (No) where missing
- (l) Snowflake for snow tires: Inspect and document if snowflake symbol is present on at least one sidewall; if so, enter Y (Yes), if not, enter N (No).

For passenger car tires, identify and record both the Uniform Tire Quality Grading Standard (UTQGS) category, i.e., Traction, Treadwear and Temperature, and the respective rating labeled on each tires.

ON TREAD AREA

- (m) Indicate the presence of the required number of treadwear indicators.

NOTE: In case of a marking failure, for items required on both sides of sidewall, enter OS for Outside Sidewall or OOS for Opposite Outside Sidewall beside items or information appearing only on one sidewall.

B. COMPLETION OF CATEGORY A SUMMARY AND MARKING DATA SHEET

The entries on the Category A Test Data sheet shall be as follows:

(1) PHYSICAL DIMENSION DATA:

- PRETEST COMPLIANCE TO REQUIREMENTS NOTED

After visual inspection, Enter Y (YES) or N (NO).
If N, document defect and clear with COTR before testing.

- RIM CONDITION SATISFACTORY: After visual inspection, Enter Y or N.
- RIM WIDTH USED: Enter size of rim used.
- RIM NO.: Enter laboratory-assigned Rim Identification Number, 24-hour conditioning. Enter:
- START: Date, Time, Pressure, Temperature C° (F°).
- END: Date, Time, Pressure, Temperature C° (F°).

- COND: 24 HOURS: Y if at least 24 hours, N if not.
- INFLATION PRESSURE ADJUSTED: Enter Adjusted From (pressure) To (pressure).
- OVERALL WIDTH: Measurements at six positions, enter average of six measurements.
- OUTER DIAMETER OF TIRE: Calculated from circumferential measurements.
- DIMENSIONS BY: Enter initials of technician taking dimensions.
- DATE: Enter date of dimension measurement completion.
- ACTUAL SIZE FACTOR: Enter sum of tire section width and outer diameter.
- PASSED/FAILED: Indicate one.

(2) TUBELESS TIRE BEAD UNSEATING COMPLIANCE NOTED

- ACTUAL INFLATION PRESSURE: Enter pressure.
- FORCE APPLIED IN POUNDS: Entries for five test positions.
- DID BEAD UNSEAT?: Enter Y (Yes) if tire met requirements or N (No) if tire did not meet requirements; if N, document relevant information in Remarks.
- TEST PERFORMED BY: Initials of technician performing test.
- DATE: Date of bead unseating test completion entered by technician.
- PASSED/FAILED: Indicate one.

(3) TIRE STRENGTH COMPLIANCE NOTED

- START (PRESSURE): Tire pressure at start of test.
- END/ 3 HRS. (PRESSURE): Tire pressure at end of conditioning period.
- ADJUSTED TO (PRESSURE): Pressure after adjustment.
- FORCE/PENETRATION/ENERGY: Entries for minimum of five

positions or maximum of nine positions, depending on test results. Enter Y (Yes) if tire met requirements or N (No) if tire did not meet requirements; if N, document relevant information in Remarks.

- ACTUAL AVERAGE: Record actual average of last five test position results.
- PASSED/FAILED: Indicate one.
- PERFORMED BY: Initials of technician performing test.
- DATE: Date of test completion, entered by technician.
- LABORATORY APPROVAL: Signature and title of laboratory official responsible to OVSC.
- DATE: Date of laboratory approval entered by above laboratory official.

C. COMPLETION OF CATEGORY B ENDURANCE and LOW PRESSURE PERFORMANCE TESTS DATA SHEET

The entries on the Category B Data sheet shall be as follows:

ENDURANCE TEST

PRETEST DEFECTS NOTED: After visual inspection, Enter Y (YES) or N (NO). If N, document defect and clear with COTR before testing.

- RIM CONDITION SATISFACTORY: Enter Y or N.
- RIM WIDTH USED: Enter size of rim used.
- RIM NO.: Enter laboratory rim identification number.
- 3 HRS. CONDITIONING: Enter Y or N.
- START: Date, Time, Pressure, Temperature C° (F°).
- END: Date, Time, Pressure, Temperature C° (F°).
- COND. 3 HRS.: Y if at least 3 hours, or N if not.
- INFLATION PRESSURE ADJUSTED: Enter Adjusted From (pressure) To (pressure).
- WHEEL POSITION: Enter number of position.
- MACHINE NUMBER AND TYPE: Enter number and type of

machine used in test.

- START DATE/TIME (TEST): Enter appropriate dates.
 - END DATE/TIME (TEST): Enter start and end times for each cycle.
 - TOTAL LOAD: Entries for 4-, 6-, 24-hour and 90-minute low inflation tests.
- Tire speed
 - PC and LT Tire without a snowflake symbol on the sidewall, speed in kilometers per hour: 120 kph+0 to -3.2 kph (75 miles/hour +0 to -2 mph)
 - For PC and LT tires with the snowflake symbol on the sidewall, speed in kilometers per hour: 110 kph+0 to -3.2 kph (68 miles/hour +0 to -2 mph)
 - TEST AREA TEMPERATURE (START/END): Entries 4-, 6-, 24-hour, and 90-minute low inflation tests.
 - PRESSURE END OF 34-HOUR PERIOD: Enter final pressure taken at 15 to 25 minutes after completion of the test. If posttest pressure is less than 95% of the pretest pressure, test and record three additional pressure readings, one every 15 to 20 minutes starting from first posttest pressure reading. If posttest pressure is equal to or greater than 95% of the pretest pressure, the tire met requirements and is ready for 90-minute low inflation endurance test.
 - INFLATION PRESSURE FOR LOW PRESSURE ENDURANCE: Reduce pressure, condition tire for at not less than 2 hours, and record starting pressure.
 - PRESSURE END OF PERIOD: Enter final pressure taken at 15 to 25 minutes after completion of the test. If posttest pressure is less than 95% of the pretest pressure, test and record three additional pressure readings, one every 15 to 20 minutes starting from first posttest pressure reading. If posttest pressure is equal to or greater than 95% of the pretest pressure, the tire met requirements. .
 - Inspect for visual internal and external failures.
 - PASSED/FAILED: Indicate one.
 - TEST PERFORMED BY: Initials of technician performing test.
 - DATE: Date of Test Completion, entered by technician.

- LABORATORY APPROVAL: Signature and title of laboratory official responsible to OVSC.
- DATE: Date of laboratory approval entered by above laboratory official.
- REMARKS: Enter remarks pertinent to test procedures or results.

D. COMPLETION OF CATEGORY C HIGH SPEED TEST DATA SHEET

The entries on the Category C Data sheet shall be as follows:

HIGH SPEED PERFORMANCE TEST

- PRETEST DEFECTS NOTED: After visual inspection, Enter Y (YES) or N (NO). If N, document defect and clear with COTR before testing.
- RIM CONDITION SATISFACTORY: Enter Y or N.
- RIM WIDTH USED: Enter size of rim used
- RIM NO.: Enter Laboratory Rim Identification Number.
- 3 HRS. CONDITIONING: Enter Y or N.
- START Break-in: Date, Time, Pressure, Temperature C° (F°)
- END Break-in: Date, Time, Pressure, Temperature C° (F°)
- COND. At least 2 HRS.: Y if at least 2 hours, or N if not.
- INFLATION PRESSURE ADJUSTED: Enter Adjusted From (pressure) To (pressure).
- WHEEL POSITION: Enter number of position.
- MACHINE NUMBER AND TYPE: Enter number and type of machine used in test.
- START DATE/TIME (TEST): Enter appropriate dates.
- END DATE/TIME (TEST): Enter start and end times for each cycle.
- TOTAL LOAD: Enter each period and cycle.
- TEST SPEED (KPH): Enter each period and cycle.
- TEST AREA TEMP START/END: Enter start and end of each period

and cycle.

- **PRESSURE END OF PERIOD:** Enter final pressure taken 15 to 25 minutes after the completion of the test. If posttest pressure is more than 95% below the pretest pressure, test and record three additional pressure readings, one every 15 to 20 minutes starting from first posttest pressure reading. If posttest pressure is equal to or greater than 95% of the pretest pressure, the tire met requirements.
- Inspect for visual failures.
- **TIRE TEMP END OF COOLING PERIOD:** Enter three positions C° (F°).
- **PASSED/FAILED:** Indicate one.
- **REMARKS:** Enter remarks pertinent to test procedures or results.
- **TEST PERFORMED BY:** Initials of technician performing test.
- **DATE:** Date of Test Completion, entered by technician.
- **LABORATORY APPROVAL:** Signature and Title of Laboratory Official responsible to OVSC.
- **DATE:** Date of Laboratory Approval entered by above Laboratory Official.

E. COMPLETION OF SUMMARY SECTION

After the laboratory technicians have completed and transcribed all test data, the laboratory official responsible to the COTR for the test program completes the Summary section of the Summary and Marking Data sheet. This official will verify the tire identification data against the marking requirements (lower portion) and the pre-printed Summary identification data. He then reviews the marking test data on the Summary and Marking Data sheet, and the physical dimensions, bead unseating, and strength test results on the Category A data sheet, if applicable.

After evaluating all test results, the designated laboratory official enters PASSED or FAILED, as appropriate, in spaces provided adjacent to each test category or test item in the Summary section of the Summary and Marking Data Sheet.

In case of a failed tire, a brief description of the nature of the failure referencing the appropriate section of the standard must be given in the appropriate spaces provided under "Remarks." Other remarks may be entered at the discretion of the laboratory official.

The laboratory official who completed the Summary section will sign and date the report, enter his official title, and mail the completed original report to OVSC.

Following is a line-by-line description of the items in the Summary section that should be completed:

Test Results: Test results PASSED or FAILED for:

- Marking --Tire A, B, C
- Physical Dimension
- Bead Unseat
- Strength
- Endurance
- Low Pressure Performance
- High Speed

Remarks: Enter remarks pertinent to tire marking or to test results.

Laboratory Approval: Signature and Title of Laboratory Official.

Date: Entered by above Laboratory Official.

14.4 TEST REPORT SUBMISSION

If the test report includes a tire that has failed in a parameter requiring automatically recorded data, such supporting test data shall be mailed directly to the COTR on the same date (within 5 days of test completion) the test report is mailed to OVSC.

Contractors are required to submit the first Final Test Reports in electronic format to the COTR for review and comment. After review, the COTR may advise the contractor via email that the report is approved or approved with comments. If the contractor agrees with the COTR's comments, if any, it will forward the revised Final Test Reports electronically with all contractor signatures and send ONE HARDCOPY with signatures to the COTR; additional copies of the accepted test reports shall be reproduced by OVSC. No staples, paper clips or other devices will be used to connect or attach hardcopy report pages. All HARDCOPIES shall be sent via priority mail courier, such as FedEx, UPS, etc. If the COTR does not approve the report as drafted or the contractor disagrees with the COTR's comments on an approved report, the COTR and contractor shall resolve the issues before resubmission to the COTR. Submission of INVOICES shall follow contract direction.

Invoices shall be submitted to the NHTSA Contracting Office concurrently with sending of the final report hard copies and to the address specified in the contract, separately from report submission, unless specified differently in the contract.

The laboratory is required to maintain the original test report for a minimum of 3 years from date of test completion. Where test failures are uncovered, the laboratory is required to maintain the original test report and test recordings for five years.

Test reports involving a performance failure or an apparent noncompliance will have processing priority over reports with passing results. The contractor, after an in-house study of the failed tire's recorded data, will recommend acceptance or rejection of the test report. When a tire failure is reported, the test data will also be retained for 5 years.

14.5 MONTHLY TEST PROGRAM STATUS REPORT

Each testing laboratory shall, on the 10th working day of each month while testing is in progress, contact the COTR to provide current program testing status. This notification is to include the contractor's Excel spreadsheet with all test tires, test components available, tests started, and tests completed, PASS/FAIL, and dates.

14.6 FINAL TEST REPORT FORMAT

Instructions for the preparation of the Final Test Report are provided below for the purpose of standardization. The report pages may be secured with a non-permanent device; staples or binding shall not be used.

14.6.1 FIRST THREE PAGES

A. FRONT COVER

A paper cover shall be provided with the following information:

Note: The test lab may not include their internal report number on the cover page.

- (1) At the top of the page, enter the Final Report Number such as 139-ABC-XX-001, where:
 139 is the FMVSS tested
 ABC are the initials for the laboratory
 XX is the last two digits of the government Fiscal Year of the program
 001 is the Group Number (001 for the 1st test, 002 for the 2nd, etc.)
- (2) Final Report Title And Subtitle:

**SAFETY COMPLIANCE TESTING
FOR
FMVSS No. 139
New Pneumatic Radial Tires for Light Vehicles**

- (3) Full Descriptive Name of Tire Being Tested
(State the manufacturer, brand, type (PC, PC Snow, LT, or LT Snow tire),
and model of tested tire)
- (4) Tests Conducted by (Contractor's Name and Address):

ABC Laboratories
405 Main Street
Detroit, MI 48070

- (5) The DOT SYMBOL WILL BE PLACED BETWEEN ITEMS (4) AND (6)
- (6) The words "**FINAL REPORT**"
- (7) Date of Final Report completion, e.g., **November 11, 2004**
- (8) The words "**PREPARED FOR**" and under that, the sponsoring agency's name and address as follows

**U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6111 (NVS-222)
Washington, DC 20590**

B. FIRST PAGE AFTER FRONT COVER

A disclaimer statement and an acceptance signature block for the COTR shall be provided as follows:

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: _____

Approved By: _____

Approval Date: _____

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

C. SECOND PAGE AFTER FRONT COVER

A completed Technical Report Documentation Page (Form DOT F1700.7) shall be completed for those items that are applicable with the other spaces left blank. Sample data for the applicable block numbers of the title page follows.

Block 1 — REPORT NUMBER

139-ABC-XX-YYY

Block 2 — GOVERNMENT ACCESSION NUMBER

Leave blank

Block 3 — RECIPIENT'S CATALOG NUMBER

Leave blank

Block 4 — TITLE AND SUBTITLE

Final Report of FMVSS No. 139 Tire Compliance Testing
Tire Manufacturer, Tire Brand, Tire Model, Tire Size, Tire Type (PC, PC
Snow, LT or LT Snow tire)

Block 5 — REPORT DATE

Date of the report cover (month, date and year) e.g. November 11, 2004

Block 6 — PERFORMING ORGANIZATION CODE

ABC (NHTSA assigned 3-digit alpha-code for test lab)

Block 7 — AUTHOR(S)

Include name(s) and job title(s),
e.g., John Smith, Project Manager / Bill Doe, Project Engineer

Block 8 — PERFORMING ORGANIZATION REPORT NUMBER

In testing lab's format if different from DOT report number, e.g.,
72498-001

Block 9 — PERFORMING ORGANIZATION NAME AND ADDRESS

ABC Laboratories
405 Main Street
Detroit, MI 48070

Block 10 — WORK UNIT NUMBER

Leave blank

Block 11 — CONTRACT OR GRANT NUMBER

Enter applicable NHTSA contract number, e.g., DTNH22-04-C-12345

Block 12 — SPONSORING AGENCY NAME AND ADDRESS

US Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance (NVS-222)
400 Seventh Street, SW, Room 6111
Washington, DC 20590

Block 13 — TYPE OF REPORT AND PERIOD COVERED

On first line: FINAL TEST REPORT

On second line: Enter first date of first compliance date and the last date of the last compliance test report is submitted to the COTR under this task order, e.g.,
October 5, 2005 to December 19, 2005

Block 14 — SPONSORING AGENCY CODE

NVS-222

Block 15 — SUPPLEMENTARY NOTES

Leave blank

Block 16 — ABSTRACT

Compliance tests were conducted on the subject tire model in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-139-02. Test failures identified were as follows: NONE

NOTE: Above wording must be shown with appropriate changes made for

a particular compliance test. If there is a failure, replace "None" with the paragraph of FMVSS No. 139 where the failure occurred and a brief statement of the failure. Any questions should be resolved with the COTR.

Block 17 — KEY WORDS

Tire Compliance Testing
Safety Engineering
FMVSS No. 139

Block 18 — DISTRIBUTION STATEMENT

Copies of this report are available from —

National Highway Traffic Safety Administration
Technical Information Services (NPO-405)
400 Seventh Street, SW, Room 2336
Washington DC 20590

e-mail: tis@nhtsa.dot.gov
FAX: 202-493-2833

Block 19 — SECURITY CLASSIFICATION OF REPORT

Unclassified

Block 20 — SECURITY CLASSIFICATION OF PAGE

Unclassified

Block 21 — NUMBER OF PAGES

Add appropriate number

Block 22 — PRICE

Leave blank

A sample page follows:

Technical Report Title Page

1. Report No. 139-ABC-06-001	2. Govt. Accession No.	3. Recipient's Catalog No.	
4. Title and Sub-Title FINAL REPORT OF FMVSS NO. 139 MANUFACTURER: Goodyear BRAND: Goodyear MODEL: NASCAR Eagle #1 TYPE: PC		5. Report Date: Enter date on cover of report	
		6. Performing Organization Code ABC	
7. Author John Smith, Project Manager Bill Doe, Project Engineer		8. Performing Organization Report No. 72498-001	
9. Performing Organization Name and Address: ABC Laboratories 405 Main Street Detroit, MI 48070		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-05-C-12345	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh Street, S.W. Room 6111 (NVS-222) Washington, D.C. 20590		13. Type of Report and Period Covered: FINAL TEST REPORT October 2005 - December 2005	
		14. Sponsoring Agency Code NVS-222	
16. Abstract Compliance tests were conducted on the subject tire model in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-139-02. Test failures identified were as follows: NONE			
17. Key Words FMVSS No. 139 Tire Compliance Testing Safety Engineering		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services (NPO-405) 400 Seventh Street, SW, Room 2336 Washington DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833	
19. Security Classif. (Of This Report) Unclassified	20. Security Classif. (Of This Page) Unclassified	21. No of Pages: 69	22. Price

14.5.2 TABLE OF CONTENTS

Final test report Table of Contents shall include the following:

- A. Section 1 — Purpose of Compliance Test and Test Procedures
- B. Section 2 — Test Data
- C. Section 3 — Test Failure Details (if applicable)
- E. Appendix A — Interpretations or Deviations From FMVSS 139
- F. Appendix B — Test Equipment List and Calibration Information
- G. Appendix C — Digital Images

SECTION 1**PURPOSE OF COMPLIANCE TEST****AND****TEST PROCEDURES**

Purpose: The purpose of this report was to determine if the production tire supplied by the U.S. Department of Transportation met the requirements of TP-139-02, NHTSA "Laboratory Test Procedure for FMVSS No. 139; New Pneumatic Radial Tires for Light Vehicles."

Test Procedure: The (enter name of test laboratory) Instrumentation, Calibration and Test Procedure for Testing of Passenger Vehicle Tires (use name of contractor's as submitted to the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration), and TP-139-02, NHTSA "Laboratory Test Procedure for FMVSS No. 139; New Pneumatic Radial Tires for Light Vehicles".

-----Next page -----

SECTION 2**TEST DATA**

-----Next page -----

Enter applicable Test Data Sheets in A, B, C in order here.

-----Next page -----

SECTION 3**TEST FAILURE DETAILS**

Failure Data:

(Contractor shall provide a short but complete description of the failure, including the paragraph of the standard, and the details of the failure. Use digital images if necessary in Appendix C.)

-----Next page-----

APPENDIX A

INTERPRETATIONS OR DEVIATIONS FROM FMVSS NO. 139

(Contractor shall identify any interpretations or deviations from the standard or test procedures; if none, state NONE)

APPENDIX B
TEST EQUIPMENT LIST
AND
CALIBRATION INFORMATION

ABC TEST EQUIPMENT & CALIBRATION INFORMATION								
NO.	ITEM	MANUFACTURER	MODEL	SERIAL NO.	CAL. PERIOD	DATE OF LAST CAL.	ACCURACY	REMARKS
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
12.								
12.								
13.								

(sample page; use any convenient format)

APPENDIX C
DIGITAL IMAGES

(See requirements in paragraph 9 of this TP.)