

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FOR

FMVSS No. 109

New Pneumatic Bias Ply and Certain Specialty Tires



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

OVSC LABORATORY TEST PROCEDURE FMVSS NO. 109

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REVISION CONTROL LOG

FOR OVSC LABORATORY TEST PROCEDURE

TP-109, New Pneumatic Bias Ply and Certain Specialty Tires

TEST PROCEDURE		FMVSS 109		DESCRIPTION
REV No.	DATE	AMENDMENT	EFFECTIVE DATE	
00				
01		-		
02				
03				
04				
05				
06				
07				
08				
09	June 1, 2005	70 FR 25788	May 16, 2005	General update to current standard; added metric as primary data system, and removed all reference to obsolete Tire Test Program Automatic Data Processing System.
10				

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 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. 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, use of the metric system of weights and measures is preferred. Performance parameters and test conditions in FMVSS are now specified in metric units. In this TP, metric values may be followed by English units 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 labeling information shall be recorded in the units presented on the tire.

2. GENERAL REQUIREMENTS

This standard applies to new pneumatic bias ply and certain specialty tires, specifically new pneumatic radial tires for use on passenger cars manufactured before 1975, new pneumatic bias ply tires, and ST, FI, and 8-12 rim diameter and below tires for use on passenger cars manufactured after 1948. (S2) FMVSS No. 109 specifies laboratory test requirements for physical dimensions (S4.2.2.2), bead unseating resistance (S4.2.2.3), tire strength (S4.2.2.4), endurance (S4.2.2.5), and high speed performance (S4.2.2.6); defines performance requirements (S4.2) including general requirements (S4.2.1) and test requirements (S4.2.2) as well as tire load ratings; and specifies labeling (or marking) requirements (S4.3). FMVSS No. 109 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 each of the following:

- A. It shall meet the requirements specified in S4.2 and S4.3 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 S4.4 of FMVSS No. 109.
- C. Its maximum permissible inflation pressure shall be either 220, 248, 276. or 414 kPa (32, 36, 40, or 60 psi, respectively), or 240, 280, 300, 340 or 350 kPa (35, 41, 44, 49 or 51 psi, respectively). For a CT tire (see Section 10. Definitions) the maximum permissible inflation pressure shall be either 290, 330, 350, or 390 kPa (42, 48, 51 or 57 psi, respectively). Other pressures listed in this TP with their equivalents are:
 - C. Its load rating shall be that specified in a submission made by an individual manufacturer, pursuant to S4.4.1(a), or in one of the publications described in S4.4.1(b) for its 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 S4.4.1(b), each tire or 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.
- D. If manufactured on or after August 1, 1968, it shall incorporate a tread wear

indicator that will provide a visual indication that the tire has worn to a tread depth of 1.6 mm (1/16 or 0.0625 inch). Except in the case of tires with a 12-inch (304.8 mm) or smaller rim diameter, 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 1.6 mm (1/16 or 0.0625 inch). Tires with a 12-inch (304.8-mm) or smaller rim diameter shall have not less than three such treadwear indicators.

- E. It shall, before being subjected to either the endurance test procedure specified in S5.4 or the high-speed performance test procedure specified in S5.5, exhibit no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chunking, broken cords, cracking or open splices.
- F. It shall meet the requirements of S4.2.2.5 and S4.2.2.6 when tested on a test wheel described in S5.4 and S5.5.

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 Industrial Property Manager (IPM), Office of Contracts and Procurement, within two working days after the incident. A letter containing specific details of the security problem will be sent to the IPM (with a copy 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 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

Contractors 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 four 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, 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 (GFTI) AND TEST SAMPLES

TEST SAMPLE IDENTIFICATION AND STORAGE

New Pneumatic Tires to be tested under this TP and FMVSS No. 109 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.

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.

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.

7.1 TEST CATEGORIES AND FORMS

FIGUREs 1. 2 and 3 are sample data sheets for labeling, endurance 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 LABELING 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 TEST

IDENTIFICATION DATA

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

TIRE ENDURANCE TEST

- 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)

- 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:

Break-in Period	80 kph (50 mph)
1st Cycle	140 kph (88 mph)
2nd Cycle	150 kph (94 mph)
3rd Cycle	160 kph (100 mph)
- Pretest and posttest Temperatures

SUMMARY AND LABELING DATA SHEET

TEST LAB: _____ FMVSS 109 TIRE TEST REPORT - SUMMARY, LABELING TEST TEST NO.: _____

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

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:

LABELING	A,B,C	___/___/___
PHYSICAL DIMENSION	A	_____
BEAD UNSEATING	A	_____
STRENGTH	A	_____
ENDURANCE	B	_____
HIGH SPEED	C	_____

LABELING REQUIREMENTS	TIRE A	TIRE B	TIRE C	
			TESTED TO OVSC TEST PROCEDURE REVISED: ___/___/___	
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	_____or_____	_____or_____	_____or_____	_____or_____
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	_____/_____	_____/_____	_____/_____	
ID NO.	_____/_____	_____/_____	_____/_____	
DOT CONF. SYMBOL (Y/N)	_____/_____	_____/_____	_____/_____	
TREADWEAR INDICATOR (Y/N)	_____/_____	_____/_____	_____/_____	

UTQGS RATINGS (Y/N) TRACTION ___ TREADWEAR ___ TEMP ___ DATE

R-RAYON	N-NYLON	P-POLYESTER	S-STEEL	F-FIBERGLASS	G-NYGEN
A-ARAMID	D-DUPONT/DPI	TT-TUBE TYPE	TL-TUBELESS	BB-BELTED BIAS	
RD-RADIAL	BI-BIAS PLY				

TEST PERFORMED BY: _____ DATE: _____

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

FIGURE 1: CATEGORY A SUMMARY AND LABELING DATA SHEET

CATEGORY B ENDURANCE TEST DATA SHEET

TEST LAB: _____ FMVSS 109 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

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

38°C, +0°, -9° (100°F, +0°, -16°)

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		REMARKS
TIME START/END							
REQUIRED LOAD KG (LBS)							
TEST LOAD KG (LBS)							
TEST SPEED 80 KPH (50 MPH)							
TEST AREA TEMPERATURE START/END							
KPA (PSI) END OF PERIOD							

TEST RESULTS: PASSED/FAILED _____

TEST PERFORMED BY: _____ DATE: _____

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

FIGURE 2: CATEGORY B ENDURANCE TEST DATA SHEET

CATEGORY C HIGH SPEED TEST DATA SHEET

TEST LAB: _____ FMVSS 109 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

CONSTRUCTION: TUBELESS/BELTED BIAS MAX INFL PRESSURE: ____KPA/____PSI MAX LOAD RATING: ____ KG/____ LBS

HIGH SPEED PERFORMANCE 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: START: DATE: __/__/__ PRESS: ____KPA/____PSI: ____ TEMP: _____

38°C, +0°, -9° (100°F, +0°, -16°)

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 121 KPH (75 MPH)		2ND CYCLE 129 KPH (80 MPH)		3RD CYCLE 137 KPH (85 MPH)	
TIME START/END										
REQUIRED LOAD KG (LBS)										
TEST LOAD KG (LBS)										
TEST SPEED 80 KPH (50 MPH)										
TEST AREA TEMP. START/END C(F)										
KPA (PSI) END OF PERIOD										

TIRE TEMP END OF COOLING PERIOD C (F): _____

TEST RESULTS: PASSED/FAILED _____

REMARKS: _____

TEST PERFORMED BY: _____ DATE: _____

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

FIGURE 3: CATEGORY C HIGH SPEED TEST 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. The calibration system shall be set up and maintained as follows:

- A. Standards for calibrating the measuring 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 at periodic intervals NOT TO EXCEED TWELVE (12) MONTHS against a higher order standard by the contractor, or a commercial facility. 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 calibration procedure shall be provided by the contractor which includes as a minimum the following information for all measurement and test equipment:
 - (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. The contractor in a manner that assures the maintenance of established calibration schedules shall keep records of calibrations for all measuring and test equipment. All such records shall be readily available for inspection when authorized by the COTR. The calibration system will need the acceptance of the COTR before testing commences.
- F. As 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 Procedure (TP).
 - (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 paragraph 14.4 of this TP.

Further guidance is provided in the International Standard ISO 10012.1, "Quality Assurance Requirements for Measuring Equipment" and American National Standard ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment – General Requirements."

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).

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 labeling 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 of this TP.

If digital images of test tires are included in the report, they shall be at least 100 x 150 mm (4 x 6 inches), and a digital title of explanation shall be provided for each image, presented either on the image or adjacent to it on the report page.

10. DEFINITIONS

ACCEPTED REPORT

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

BEAD

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

BELT PLY

A ply which extends circumferentially around a tire.

BEAD SEPARATION

A breakdown of bond between components in the bead area.

BIAS PLY TIRE

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

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 forming 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.

CT

A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

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.

LABORATORY MONITOR

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

LOAD RATING

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

MATRIX TIRE LINE (MTL)

A number assigned by OVSC to each tire line to be tested at the initiation of the compliance testing program.

MAXIMUM PERMISSIBLE INFLATION PRESSURE

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

MAXIMUM LOAD RATING

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

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.

OVERALL WIDTH

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

PLY

A layer of rubber-coated parallel cords.

PLY SEPARATION

A parting or rubber compound between adjacent plies.

PNEUMATIC TIRE

A mechanical device made of rubber, chemicals, fabric and 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 which extend to the beads are laid at substantially 90° to the centerline of the tread.

RESPONSIVE TEST

A special test initiated by a complaint, a field inspection, failed standard test, or at the discretion of COTR.

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 the sidewalls of an inflated tire, excluding elevations due to labeling, 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.

TEST RIM

With reference to a tire to be tested, any rim that is listed as appropriate for use with that tire in accordance with S4.4. For purposes of this section and '571.110 of this chapter, each rim listing shall include dimensional specifications and a diagram of the rim.

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.

11. PRETEST REQUIREMENTS

11.1 LABORATORY IN-HOUSE TEST PROCEDURE APPROVAL

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.

11.2 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. 109 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. 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	Labeling	X	X	X
2	Tread Wear Indicator	X	X	X
3	Physical Dimension	X		
4	Bead Unseat	X		
5	Tire Strength	X		
6	Endurance		X	
7	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. 109 test set within 5 days.

12.1 LABELING TEST PROCEDURES (TIRES A, B & C)

Labeling compliance requirements are established by S4.3 of FMVSS No. 109. A labeling omission or error constitutes a test failure. The following are compliance requirements:

A. CERTIFICATION SYMBOL INSPECTION (S4.3.1)

Each manufacturer of a new tire shall certify that his product complies with FMVSS No. 109, by labeling the tire with the symbol DOT as shown in FIGURE 4. The laboratory will confirm that the DOT symbol is in compliance with information in FIGURE 4.

B. TIRE LABELING

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 labeling 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 (S4.3.2)

The laboratory will confirm that each tire has been labeled on at least one sidewall with the name of the manufacturer, or brand name and number assigned to the manufacturer. Size, spacing and type of characters shall be as those specified in FIGURE 4.

D. LABELING REQUIREMENT INSPECTION (S4.3)

Each tire shall have permanently molded into or onto both sidewalls, in letters and numerals not less than 1.98 mm (0.078 inches) high, the following information:

- (1) One Size Designation, except that equivalent inch and metric size designations may be used;
- (2) Maximum Permissible Inflation Pressure;
- (3) Maximum Load Rating;
- (4) Generic name of each Cord Material used in the plies (both sidewall and tread area) of the tire;
- (5) Actual Number of Plies in Sidewall, and the actual number of plies in the Tread Area, if different
- (6) The words "Tubeless" or "Tube Type," as applicable; and,
- (7) The word "Radial" if the tire is a radial ply tire.

The above information shall be positioned on at least one sidewall in an area between the maximum section width and bead of the tire. In no case shall the information be positioned on the tire so that it is obstructed by the flange of any rim designated for use with that tire.

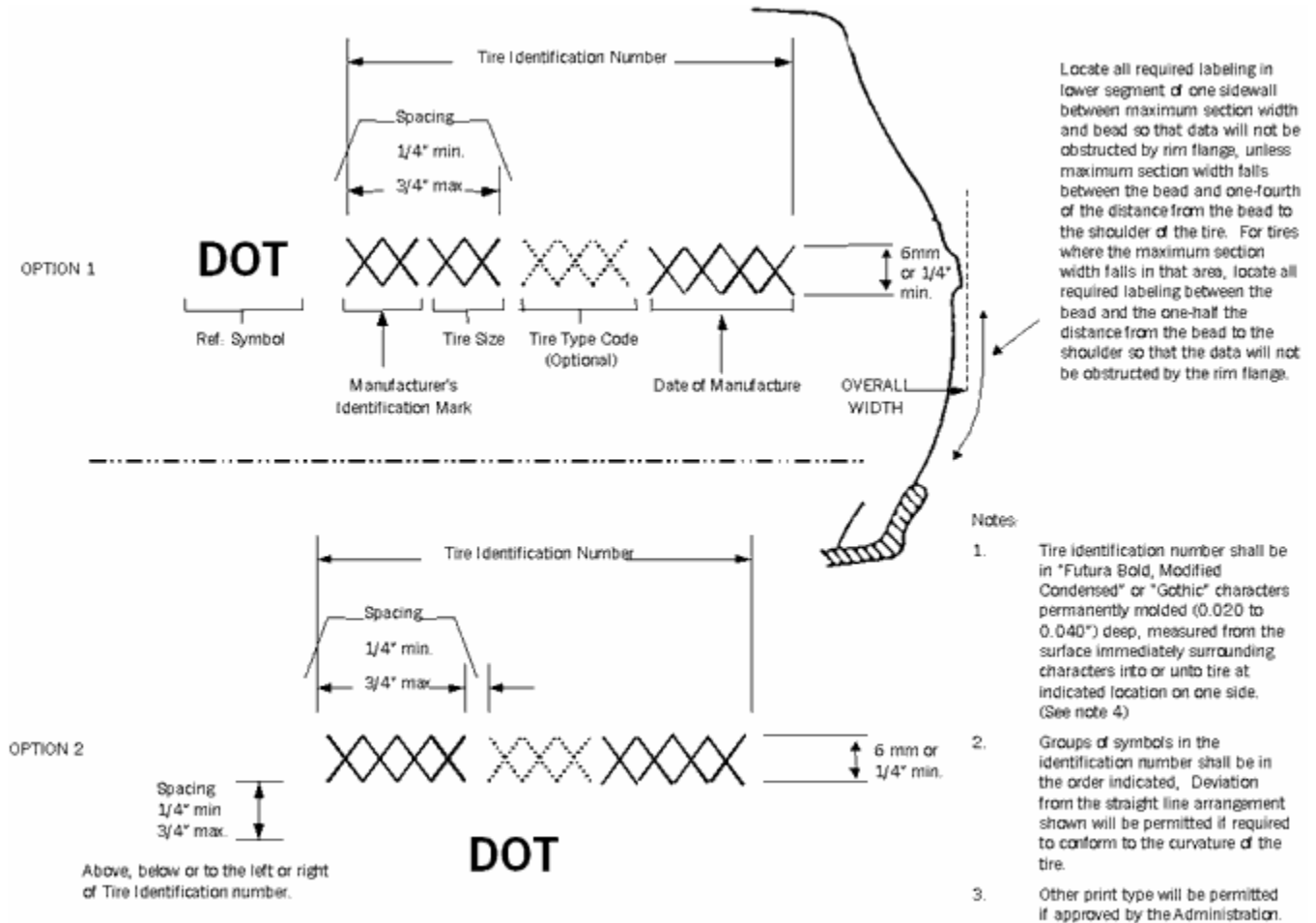


FIGURE 4: IDENTIFICATION NUMBERS FOR NEW TIRES

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

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

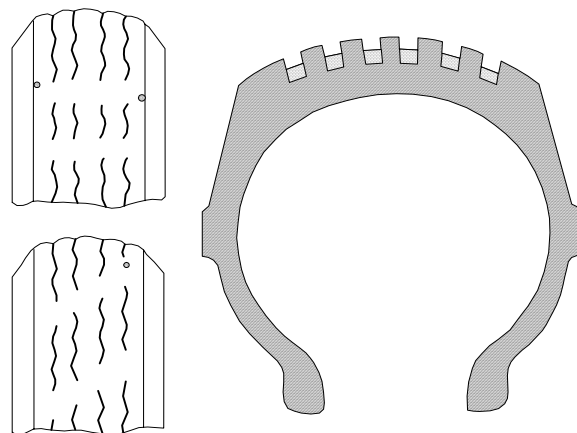
At least six treadwear indicators are required to be equally spaced around the circumference of the tire, except that tires with a 12-inch or smaller rim shall have at least three indicators similarly spaced.

The TREAD WEAR INDICATOR TEST is to check for compliance with S4.2.1(d) of FMVSS No. 109. 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 mm ± 0.396 mm (0.0625 inch ± 0.0156 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 $1.6 \text{ mm} \pm 0.396 \text{ mm}$ ($0.0625 \text{ inch} \pm 0.0156 \text{ inch}$).

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



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

The tire 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 on the test data sheet.

A. TIRE MOUNTING

The tire shall be mounted on a preassigned test rim which 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 bead unseat test, the tire is to be mounted with no bead lubricant or adhesives.

The tire shall be inflated to the indicated specified inflation pressure (+ 13.8 kPa to – 0 kPa or + 2 to - 0 PSI) as stated on the test data sheet and as specified in Table II, of FMVSS No. 109, presented herein.

Test Type	Tires Other Than CT Tires									CT Tires			
	psi				kPa					kPa			
	32	36	40	60	240	280	300	340	350	290	300	350	390
Physical dimensions, bead unseat, tire strength and endurance	24	28	32	52	180	220	180	220	180	230	270	230	270
High speed	30	34	38	58	220	260	220	260	220	270	310	270	310

For metric-English equivalents, multiply psi by 6.89 to get kPa, or multiply kPa by 0.145 to get psi; round to the next higher integer.

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 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 explosive force, possibly resulting in serious injury or death.

B. TIRE CONDITIONING

The tire and rim assembly shall be conditioned at ambient room temperature for a minimum of 24 hours. The room temperature, date, and 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. The test tire during conditioning or testing shall not be exposed to fluctuations in temperature exceeding °C, +0° -9° (°F, + 0°, - 16°) of the starting conditioning temperature.

NOTE: Do not check or adjust inflation pressure during 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 and 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 cause, correct if possible, and recycle tire through the conditioning period. If tire is untestable for this, or any other reason, guidance shall be requested from the COTR.

12.4 PHYSICAL DIMENSIONS TEST PROCEDURE (S4.2.2.2)

The Physical Dimensions Test Procedures are to check for compliance with S4.2.2.2 of FMVSS No. 109.

A. TIRE MARKING

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

B. 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 8s,

design, label, or other form 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 report format 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.

C. MEASUREMENT OF TIRE SECTION WIDTH

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 less 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.

D. MEASUREMENT OF OUTSIDE DIAMETER

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

E. 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" on the data sheet and do not continue with bead unseating test without approval from the COTR.

12.5 TUBELESS TIRE RESISTANCE TO BEAD UNSEATING (S4.2.2.3)

The Bead Unseating Test Procedures are to check for compliance with S4.2.2.3 of FMVSS No. 109.

See paragraph 12.3 PREPARATION OF TIRE(S) FOR CATEGORY A STATIC TESTS of this TP.

A. PREPARATION OF TIRE AND RIM ASSEMBLY

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

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. Then the inflation pressure shall be immediately reduced to that specified on the test data sheet for the bead unseat test and as specified in Table II of FMVSS No. 109, presented herein.

Test Type	Tires Other Than CT Tires									CT Tires			
	psi				kPa					kPa			
	32	36	40	60	240	280	300	340	350	290	300	350	390
Physical dimensions, bead unseat, tire strength and endurance	24	28	32	52	180	220	180	220	180	230	270	230	270
High speed	30	34	38	58	220	260	220	260	220	270	310	270	310

For metric-English equivalents, multiply psi by 6.89 to get kPa, or multiply kPa by 0.145 to get psi; round to the next higher integer.

B. SPECIAL MARKING

The tire shall be marked radially at 5 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, going counter clockwise 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 test data sheet within 15 minutes of the start of the test.

D. UNSEATING TEST

After mounting the tire and rim assembly in the fixture which is applicable as shown in 5 – BEAD UNSEATING FIXTURE and FIGURE 6 – DIAGRAM OF A BEAD UNSEATING BLOCK against the tire side wall, 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. 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 is referenced in S4.2.2.3 of FMVSS No. 109. 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 5 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 with 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.

WHEEL SIZE MM (IN)	DIMENSION "A" FOR TIRES WITH MAX. INFL. PRESSURE	
	OTHER THAN 60 PSI	60 PSI
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

BEAD UNSEATING FIXTURE

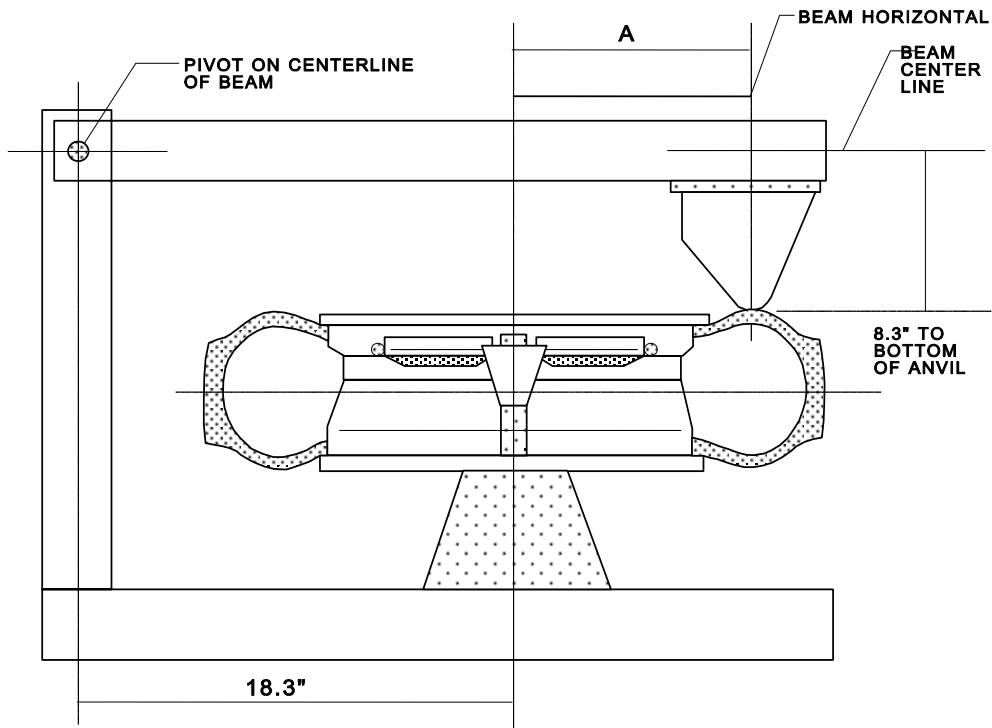


DIAGRAM OF BEAD UNSEATING BLOCK

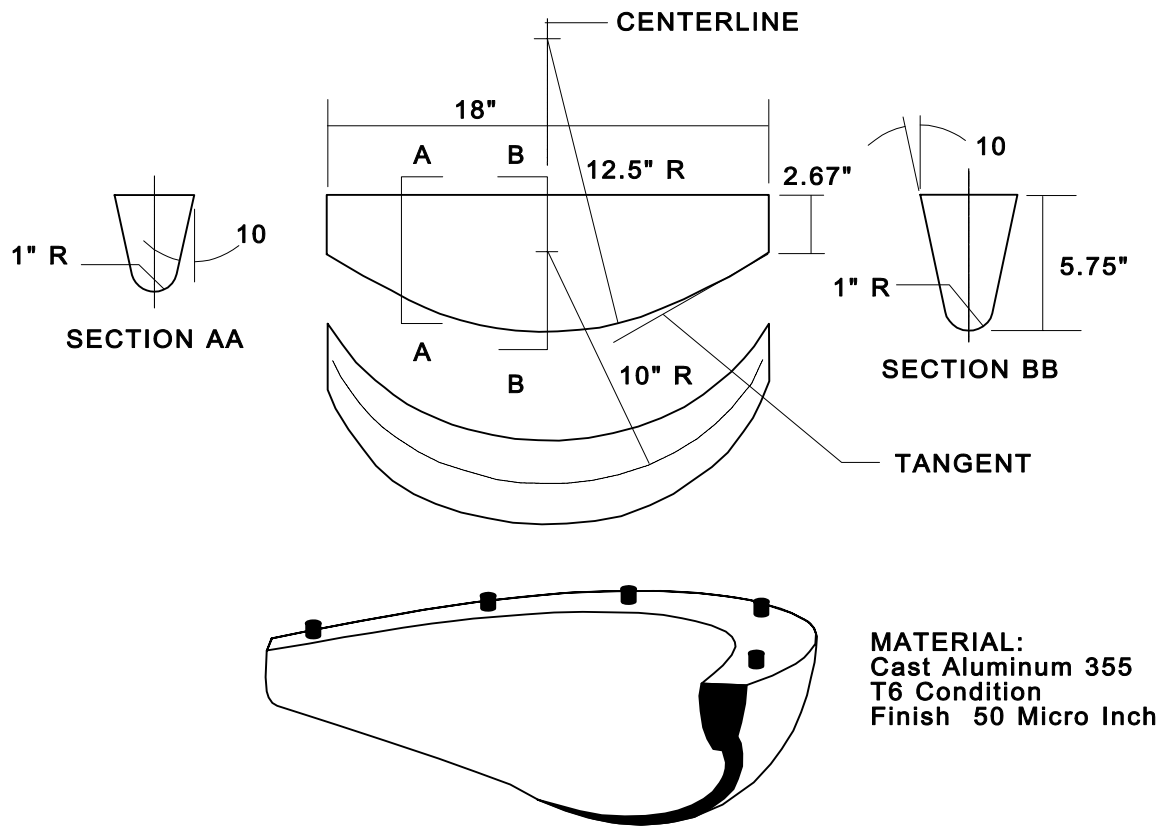


FIGURE 5: DIAGRAM OF BEAD UNSEATING BLOCK (Configuration 1)

DIAGRAM OF BEAD UNSEATING BLOCK

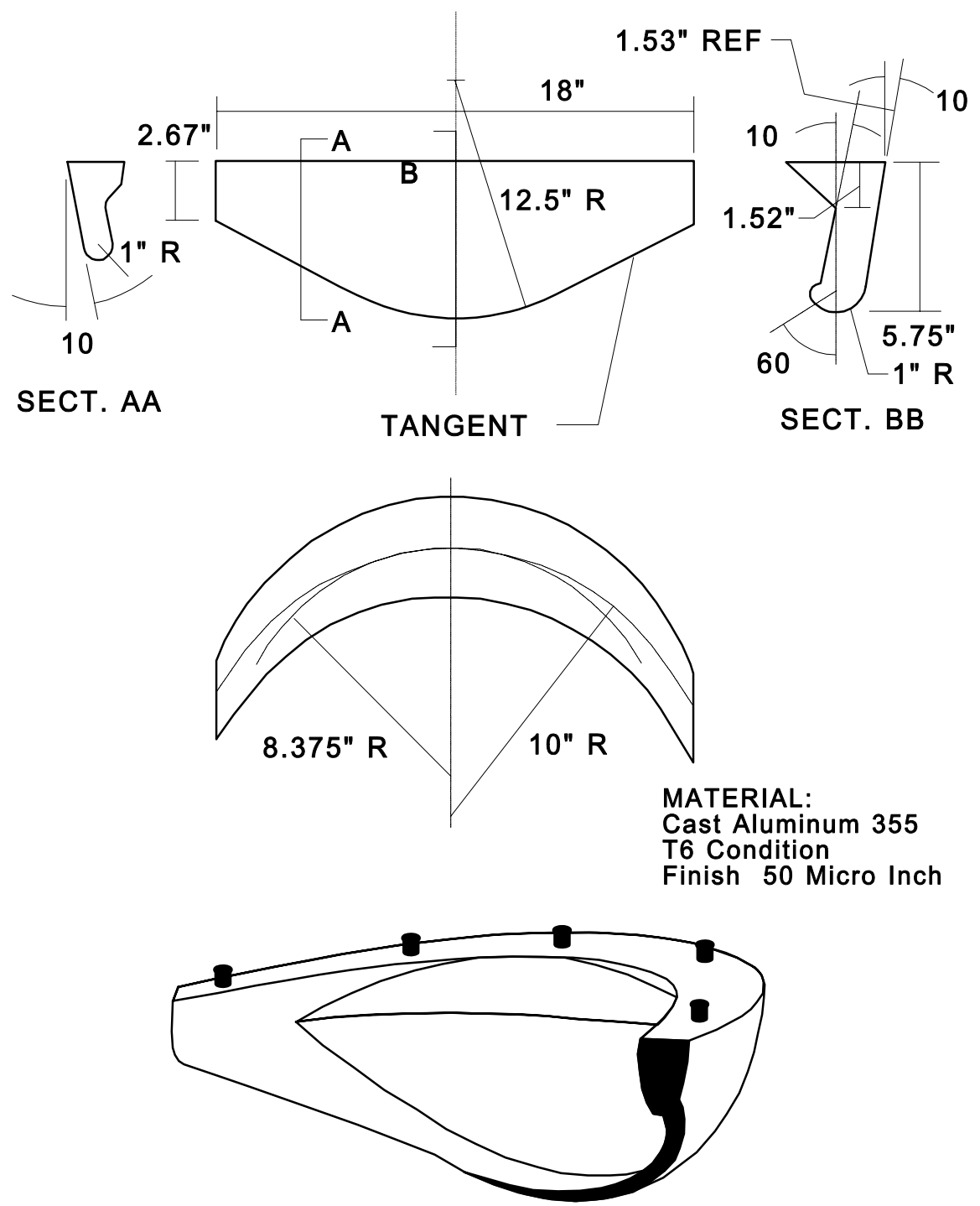


FIGURE 6: DIAGRAM OF BEAD UNSEATING BLOCK (Configuration 2)

12.6 TIRE STRENGTH TEST PROCEDURE (S4.2.2.4)

The Tire Strength test procedures are to check for compliance with S4.2.2.4 of FMVSS No. 109.

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 Table II of FMVSS No. 109, presented herein, and recorded.

Test Type	Tires Other Than CT Tires									CT Tires			
	psi				kPa					kPa			
	32	36	40	60	240	280	300	340	350	290	300	350	390
Physical dimensions, bead unseat, tire strength and endurance	24	28	32	52	180	220	180	220	180	230	270	230	270
High speed	30	34	38	58	220	260	220	260	220	270	310	270	310

For metric-English equivalents, multiply psi by 6.89 to get kPa, or multiply kPa by 0.145 to get psi; round to the next higher integer.

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 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 cross the tread surface to the opposite-serial shoulder.

The plunger application shall be made 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. Care must be taken 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 P-metric tires; 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 \pm 1.58 mm (2 inches per minute \pm 0.0625 inch). The

plunger will be of sufficient length to preclude plunger shoulder impingement.

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

FMVSS No. 109 TABLE I—MINIMUM BREAKING ENERGY VALUES (Inch-Pounds)

Table I-A C For Bias Ply Tires With Designated Section Width 152 mm (6 Inches) and Above

CORD MATERIAL	MAXIMUM PERMISSIBLE INFLATION						
	32 lbs/in ⁵	36 lbs/in ⁵	40 lbs/in ⁵	240 kPa	280 kPa	300 kPa	340 kPa
Rayon J (in-lbs)	186 (1,650)	291 (2,574)	273 (3,300)	186 (1,650)	273 (3,300)	186 (1,650)	273 (3,300)
Nylon or Polyester J (in-lbs)	294 (2,600)	441 (3,900)	589 (5,200)	294 (2,600)	589 (5,200)	294 (2,600)	589 (5,200)

Table I-B C For Bias Ply Tires With Designated Section Width Below 152 mm (6 Inches)

CORD MATERIAL	MAXIMUM PERMISSIBLE INFLATION						
	32 lbs/in ⁵	36 lbs/in ⁵	40 lbs/in ⁵	240 kPa	280 kPa	300 kPa	340 kPa
Rayon Nylon J (in-lbs)	113 (1,000)	212 (1,875)	282 (2,500)	113 (1,000)	282 (2,500)	113 (1,000)	282 (2,500)
Polyester J (in-lbs)	220 (1,950)	330 (2,925)	440 (3,900)	215 (1,900)	440 (3,900)	220 (1,950)	440 (3,900)

Table I-C. c For Radial Ply Tires

SIZE DESIGNATION	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	(1) 290 kPa	(1) 330 kPa	(1) 350 kPa	(1) 390 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)	220 (1950)	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)	294 (2600)	590 (5200)	294 (2600)	589 (5200)

(1) For CT tires only

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)

Force in Kilograms (pounds) (accurate to $\pm 11.3\text{kg}$ or ± 25 lbs, respectively), penetration in mm (inches) (accurate to ± 1.6 mm or ± 0.0625 inch, respectively), 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.

The force in kilograms (pounds), penetration in millimeters (inches), and energy in joules (inch-pounds) for each load application shall be recorded 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 4 applications have resulted in carcass breakage, below the minimum energy value, the fifth and 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. The resultant average of the five applications shall be entered in the space provided for actual average on the test data sheet.

If any plunger application penetrates the tire at less than the minimum specified breaking energy, 4 additional plunger applications shall be conducted to failure between previously unfailed positions. The recorded actual average shall be the result of the 5 complete penetrations.

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

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. The failed tire procedure will be followed. The same technician will enter his initials and date of test completion in the space provided on the test data sheet.

12.7 PREPARATION OF TIRE(S) FOR CATEGORY B ENDURANCE TESTS (S4.2.2.5)

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.

A. TIRE MOUNTING

The tire shall be mounted with lubrication on an approved test rim and inflated to the specified inflation pressure as indicated on the test data sheet and specified in Table II of FMVSS No. 109, presented herein.

Test Type	Tires Other Than CT Tires									CT Tires			
	psi				kPa					kPa			
	32	36	40	60	240	280	300	340	350	290	300	350	390
Physical dimensions, bead unseat, tire strength and endurance	24	28	32	52	180	220	180	220	180	230	270	230	270
High speed	30	34	38	58	220	260	220	260	220	270	310	270	310

For metric-English equivalents, multiply psi by 6.89 to get kPa, or multiply kPa by 0.145 to get psi; round to the next higher integer.

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

B. TIRE CONDITIONING

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 total conditioning was at least three hours; check and record the inflation pressure in the space provided, then adjust the pressure to that specified on the form. 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 tire is untestable for this or any other reason, guidance shall be requested from the COTR.

12.8 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:

- A. 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.
- B. 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 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.

12.9 TEST MONITORING - B TIRE

Prior to test commencement the test wheel position number, the machine number, and whether the machine is hydraulic or pneumatic shall be recorded. 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 as indicated shall be automatically and continuously recorded:

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

The tire shall be run without interruptions at these intervals:

4 hour test: 85% of maximum load rating

6 hour test: 90% of maximum load rating

24 hour test: 100% of maximum load rating

- ! Tire speed in kilometers per hour: 80 kph+ 0 to – 3.2 kph (50 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 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 B Test, may be used to record time intervals implicitly 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 the analysis of the tire shows ply separation or other non-compliance conditions the tire shall be classified as a failed tire and the failed tire procedure shall be followed. If the tire does not show ply separation or other non-compliance condition the test for this tire shall be aborted. In any case the tire shall not be re-run on the test wheel to amplify the suspected defect.

At the conclusion of the first 4 hours of testing and of the first 10 hours of testing, the test load for each tire shall be changed.

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, approval of deviation from this procedure shall be obtained 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 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.

12.10 ENDURANCE TEST PROCEDURES - B TIRE

The Tire Endurance Procedures are to check for compliance with S4.2.2.5 of FMVSS No. 109.

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. Apply the required load as referenced in S5.4.2.3 of FMVSS No.109. Conduct the test at 80 kph (50 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.

12.11 ENDURANCE TEST TIRE ANALYSIS

The test data is to be checked for completion and content immediately upon finishing the test. All required data entries on the test data sheet will be completed. The entries are to be reconciled with the test requirements and the results.

Immediately after running the tire the required time, measure its inflation pressure. Allow the tire to cool for one hour. Then deflate the tire, remove it from the test rim, and visually inspect it. After completion of the endurance test no tire shall have tread, sidewall, innerliner, ply, cord, or bead separation, chunking, broken cords, cracking or open splices. Tire pressure at the end of the test shall be no lower than starting pressure.

Any unusual conditions or defects found shall be marked on the tire and recorded on the test data sheet. In the event of a failure because of air loss, the laboratory shall immediately double check all lines between the tire and measuring device to insure that the cause of the air loss was a failure of the tire and not due to problems with valves, lines, fittings or measuring devices. The rim shall also be inspected before and after the tire is dismantled.

If a defect is detected in the tire, record the information on the test data sheet and notify the COTR immediately (within the first working day). The Failed Tire Procedure will be followed (paragraph 14.1 of this TP). A defective rim shall be the basis for voiding the test and a complete rerun with a new tire will be made.

If the tire examination does not reveal any evidence of unusual conditions or defects, the tire should be considered as having passed the requirement of the standard. The word "Passed" shall be indicated on the test data sheet and the tire shall be held by the laboratory for disposition instructions.

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

12.12 PREPARATION OF TIRE(S) FOR CATEGORY C HIGH SPEED TESTS (S4.2.2.6)

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.

A. TIRE MOUNTING

The tire shall be mounted with lubrication on an approved test rim and inflated to the specified inflation pressure as indicated on the test data sheet and specified in Table II of FMVSS No. 109, presented herein.

Test Type	Tires Other Than CT Tires									CT Tires			
	psi				kPa					kPa			
	32	36	40	60	240	280	300	340	350	290	300	350	390
Physical dimensions, bead unseat, tire strength and endurance	24	28	32	52	180	220	180	220	180	230	270	230	270
High speed	30	34	38	58	220	260	220	260	220	270	310	270	310

For metric-English equivalents, multiply psi by 6.89 to get kPa, or multiply kPa by 0.145 to get psi; round to the next higher integer.

B. TIRE CONDITIONING

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. 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, then adjust the pressure to that specified on the form. If loss of air exceeds 13.8 kPa (2 psi) during the conditioning period, determine cause, correct if possible, and recycle tire through the conditioning period. If tire is untestable for this or any other reason, guidance shall be requested from the COTR.

12.13 TEST AREA TEMPERATURE - C 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:

- A. 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.
- B. 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 ventilator, 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 the temperature at the time of failure as the temperature for the end of the test period.

12.14 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, 121 kph (75 mph) for 30 minutes, 129 kph (80 mph) for 30 minutes, and 137 kph (85 mph) for 30 minutes, record the tire inflation pressure in the space provided on the data sheet. The following parameters with operating tolerances as indicated will be automatically and continuously recorded:

- Tire Load in Kilograms + 0 to – 18 kg (Pounds + 0 to – 40 lbs)*
88% of maximum load rating
- Tire Speed in kilometers per hour + 0 to – 3.2 kph (mph + 0 to – 2)
- Test Area Temperature: 38°C, +0°, –9° (100°F, +0°, –16°)
- Tire Inflation Pressure in kPa + 13.8 to – 0 kPa (psi + 2 to – 0 psi)
- Tire Speed and Duration (Cycles)**
 - 80 kph (50 mph) for 2 hours (break-in) + 3 to – 0 minutes
 - at rest for 2 hours (cooling) + 30*** to – 0 minutes
 - 121 kph (75 mph) for 30 minutes + 0 to – 2 minutes
 - 129 kph (80 mph) for 30 minutes + 0 to – 2 minutes
 - 137 kph (85 mph) for 30 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 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 record time intervals implicitly provided that the chart paper drive speed is constant and known.

*** In accordance with 12.15 of this TP.

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 the 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 re-run on the test wheel to amplify the suspected defect.

12.15 HIGH SPEED PERFORMANCE TEST PROCEDURES - C TIRE

The High Speed Performance Test Procedures are to check for compliance with S4.2.2.6 of FMVSS No. 109. Within 30 minutes after tire conditioning, mount the tire / 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 S5.4.1 of FMVSS No. 109.

The break-in cycle shall be conducted for 2 hours at 80 kph (50 mph). At the conclusion of the run, unload the tire and allow it to cool to 38°C, +0°, -9° (100°F, +0°, -16°). In no case will the cooling cycle be less than 2 hours. Start and end times for both break-in and cooling cycles shall be recorded in the designated spaces on the data sheet. 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 121 kph (75 mph) startup.

The test will commence within 30 minutes after the 2-hour cooling cycle or 30 minutes after the hottest tire reaches 38°C, +0°, -9° (100°F, +0°, -16°) if cooling period exceeds 2 hours. All test cycles (121, 129 and 136 kph or 75, 80 and 85 mph) will be conducted for 30 minutes each without interruption.

Record test start and stop times for each cycle of the high speed test on the data sheet. Maximum of 2 minutes is authorized between test cycles to change speed, to be counted as part of next higher cycle.

12.16 HIGH SPEED TEST TIRE ANALYSIS

The test data is to be checked for completeness and content immediately upon finishing the test. The test data shall substantiate the test conclusions.

Immediately after running the tire the required time, measure and record its inflation pressure. Allow the tire to cool for one hour. Then deflate the tire, remove it from the test rim, and visually inspect it. After completion of the high speed performance test no tire shall have tread, sidewall, innerliner, ply, cord, or bead separation, chunking, broken cords, cracking, or open splices; document any occurrences.

Any unusual conditions or defects found shall be marked on the tire and recorded on the data sheet. If the posttest tire pressure is less than 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. The rim

shall also be inspected before and after the tire is dismounted. If a defect is detected in the tire, record the information on the data sheet (indicate the word "Failed") and notify the COTR immediately within the first working day in accordance with the Failed Tire Procedure as described in the Reports section. A defective rim or test equipment shall be the basis for voiding the test. A complete rerun with a new tire using nondefective equipment shall be made at the laboratory's expense.

If the tire examination does not reveal any evidence of unusual conditions or defects, and the posttest tire pressure is at or above the pretest tire pressure, the tire should be considered as having passed the requirement of the standard. The word "Passed" shall be indicated on the data sheet, and the tire shall be held by the laboratory for disposition instructions.

Authenticating the completion of the test, the technician who performed the test will inscribe his initials and date of test completion in the spaces provided, or in the appropriate screen fields. The cognizant 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 REPORTING

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. Labeling 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 is returned indicating validation and acceptance. Passed tire disposal will be in accordance with contractual provisions and this TP; see TEST TIRE HANDLING, STORAGE and DISPOSAL under paragraph 7 of this TP.

14.2 TIRE 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 labeling compliance results. Tire Test Report pages are identified as follows:

- ! FMVSS No. 109 Summary and Labeling Test
- ! FMVSS No. 109 Category A Test
- ! FMVSS No. 109 Category B Test
- ! FMVSS No. 109 Category C Test

14.3 TIRE TEST REPORTING PROCEDURES

The laboratory specialist will transcribe test data onto the data sheet 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, and when all tests are completed, the Summary portion of the form is to be filled in completely and authenticated. The entire report is then to be mailed to the OVSC within 5 working days within the schedule identified in paragraph 14 of this TP. See Data Sheets provided as FIGURES 1, 2 and 3.

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

COMPLETION OF LABELING / TREADWEAR INDICATOR SECTION

The lower portion of the first page titled "Summary, Labeling Test" is the part of the form used to record labeling and treadwear indicator compliance. If this information is not labeled on the tire, it is to left blank and its absence noted in the Remarks section. The entries line for line are:

LABELING REQUIREMENTS:

BOTH SIDEWALLS

- A. One size designation, except that equivalent inch and metric size BRAND NAME: Enter NAME that appears on the sidewall
- B. SIZE DESIGNATION: Enter SIZE
- C. MAXIMUM INFLATION PRESSURE: Enter kpa (psi)
- D. MAXIMUM LOAD RATING: Enter kg (lbs)
- 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. TUBELESS: Enter word TUBELESS if shown or leave blank
- H. TUBE TYPE: Enter word TUBE TYPE if shown or leave blank
- I. ID NUMBER: Enter number indicated on sidewall.
- J. CERTIFICATION SYMBOL: Inspect and document if DOT symbol is molded onto at least one sidewall; if so enter Y (YES). If not, leave blank and comment in the REMARKS section.
- K. TREAD WEAR INDICATOR: Enter Y or N.
- L. UTQGS MARKINGS: For P metric tires, identify each Uniform Tire Quality Grading Standard (UTQGS) category, i.e., Traction, Treadwear and Temperature, and the respective rating that is labeled on the tire.

AT LEAST ONE SIDEWALLS

TIN (Tire Identification Number): Enter "1" if TIN is on one side, and "2" if it is on both sides.

NOTE: In case of a labeling 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.

For P-metric 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

Indicate the presence of the required number of treadwear indicators.

INITIAL REPORT OF TIRE TEST FAILURE, FMVSS No. 109

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.: ____

Test Phases:

Labeling _____ Strength _____ Treadwear Indicator _____

Endurance _____ Physical Dimensions _____ High Speed _____

Bead Unseat _____ Other _____

.....
Failure Ratio: Lab. No. 1. _____ 2. _____ 3. _____ Total _____

Time of Failure: _____

Description of Failure: _____

Received From: _____ Received By: _____

MANUFACTURER NOTIFICATION RECORD

Individual Notified: _____ Telephone No.: _____

Date Contacted: _____ Time: _____ Called By: _____

OVSC Action Required: _____

FIGURE 7: INITIAL REPORT OF TIRE TEST FAILURE, FMVSS No. 109

COMPLETION OF CATEGORY A SECTION

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 TEST 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.
- 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 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 test.
- TEST SPEED (80 kph , 50 MPH): Entries for 4-, 6-, 24-hour test.
- TEST AREA TEMPERATURE (START/END): Entries 4-, 6-, 24-hour inflation test.
- PRESSURE END OF 34-HOUR PERIOD: Enter final pressure. If posttest pressure is below pretest pressure, indicate failure on report. Perform visual inspection.
- Inspect for visual internal and external failures.

- PASSED/FAILED: Indicate P if tire met pressure and visual requirements, and F if it failed either; clarify in remarks.
- 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.

The entries on the page titled "Category C Test" shall be as follows:

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: 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: 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. If posttest pressure is below pretest pressure, indicate failure on report.
- Inspect for visual failures.
- TIRE TEMP END OF COOLING PERIOD: Enter three positions C° (F°).
- PASSED/FAILED: Indicate one. Indicate P if tire met pressure and visual requirements, and F if it failed either; clarify in remarks.
- 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 Labeling Data Sheet. This official will verify the tire identification data against the labeling requirements (lower portion) and the pre-printed Summary identification data. He then reviews the labeling test data on the Summary and Labeling Data Sheet, and the physical dimension, 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 Labeling 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 after COTR approval. 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:

- Labeling - Tire A, B, C
- Physical Dimension
- Bead Unseat
- Strength
- Endurance
- High Speed

Remarks: Enter remarks pertinent to tire labeling or to test results

Laboratory Approval: Signature and Title of Laboratory Official

Date: Entered by above Laboratory Official.

14.4 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.

14.4.1 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 109-ABC-XX-001, where:
 109 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. 109
NEW PNEUMATIC BIAS PLY and CERTAIN SPECIALTY TIRES**

- (3) Full Descriptive Name of Tire Being Tested
(State the manufacturer, brand 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**

C. 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

109-ABC-06-001, where 06 is the last two digits of the government fiscal year in which the test is being performed, and 001 is the next consecutive number of the compliance test in that year.

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. 109 Tire Compliance Testing
Tire Manufacturer, e.g. Goodyear

Brand, e.g., Goodyear
 Model, e.g., NASCAR Eagle #1

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., DTNH22-05-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 2005 to December 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-109-09. 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. 109 where the failure occurred and a brief statement of the failure. Any questions should be resolved with the COTR.

Block 17 — KEY WORDS

FMVSS No. 109
Tire Compliance Testing
Safety Engineering

Block 18 — DISTRIBUTION STATEMENT

Copies of this report are available from —

National Highway Traffic Safety Administration
Technical Information Services, Room2336 (NPO-405)
400 Seventh Street, SW
Washington, DC 20590
e-mail: tis@nhtsa.dot.gov
Fax: 202-493-2033

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. 109-ABC-06-001	2. Govt. Accession No.	3. Recipient's Catalog No.	
4. Title and Sub-Title FINAL REPORT OF FMVSS No. 109 Tire Compliance Testing MANUFACTURER: Goodyear BRAND: Goodyear MODEL: NASCAR Eagle #1		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 to 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-109-09. Test failures identified were as follows: NONE			
17. Key Words FMVSS No. 109 Tire Compliance Testing Safety Engineering		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services, Room2336 (NPO-405) 400 Seventh Street, SW Washington, DC 20590 e-mail: tis@nhtsa.dot.gov Fax: 202-493-2033	
19. Security Classif. (Of This Report) Unclassified	20. Security Classif. (Of This Page) Unclassified	21. No of Pages: (enter actual number)	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: This tire test is part of the FY 2006 FMVSS No. 109 New Pneumatic Bias Ply and Certain Specialty Tire Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-C-05-XXXXX. The purpose of this test was to evaluate tire performance under the standard. The tire testing was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-109-09, dated June 1, 2005).

Test Procedure: Testing was performed to the requirements of the (enter name of test laboratory) Instrumentation, Calibration and Test Procedure for Testing of New Pneumatic Bias Ply and Certain Specialty Tires (use name of contractor's as submitted to the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration), and TP-109-09, NHTSA "Laboratory Test Procedure for FMVSS No. 109; New Pneumatic Bias Ply and Certain Specialty Tires".

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

SECTION 2**TEST DATA**

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

Enter applicable Test Data Sheets in A, B, and 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	REMARK S
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.)

14.5 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. If the contractor agrees with the COTR's comments, if any, the contractor will forward the revised Final Test Reports electronically with all contractor signatures and send ONE HARDCOPY with signatures to the COTR; additional copies of 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. 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.

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. 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 test recordings are also to be retained for 5 years.

14.6 MONTHLY TEST PROGRAM STATUS REPORT

Each testing laboratory shall, on the tenth working day of each month while testing is in progress, contact the COTR to provide current program testing status. This is to include test components available, tests started and tests completed.