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

LABORATORY TEST PROCEDURE
FOR
TIRE TRACTION TESTING

CONSUMER INFORMATION REGULATIONS PART 575.104

UNIFORM TIRE QUALITY GRADING

ENFORCEMENT
Office of Vehicle Safety Compliance
1200 NEW JERSEY AVENUE, SE
WASHINGTON, D.C. 20590

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REVISION CONTROL LOG

OVSC LABORATORY TEST PROCEDURE TP-UTQG-T
Consumer Tire Traction Information

Test Procedure		UTQG - Traction		Description
REV No.	Date	Amendment	Effective Date	
01	October 28, 1979	N/A	October 28, 1979	Original Procedure
02	AUGUST 16, 2022	N/A	AUGUST 16, 2022	Update to reflect current test facilities and procedures.

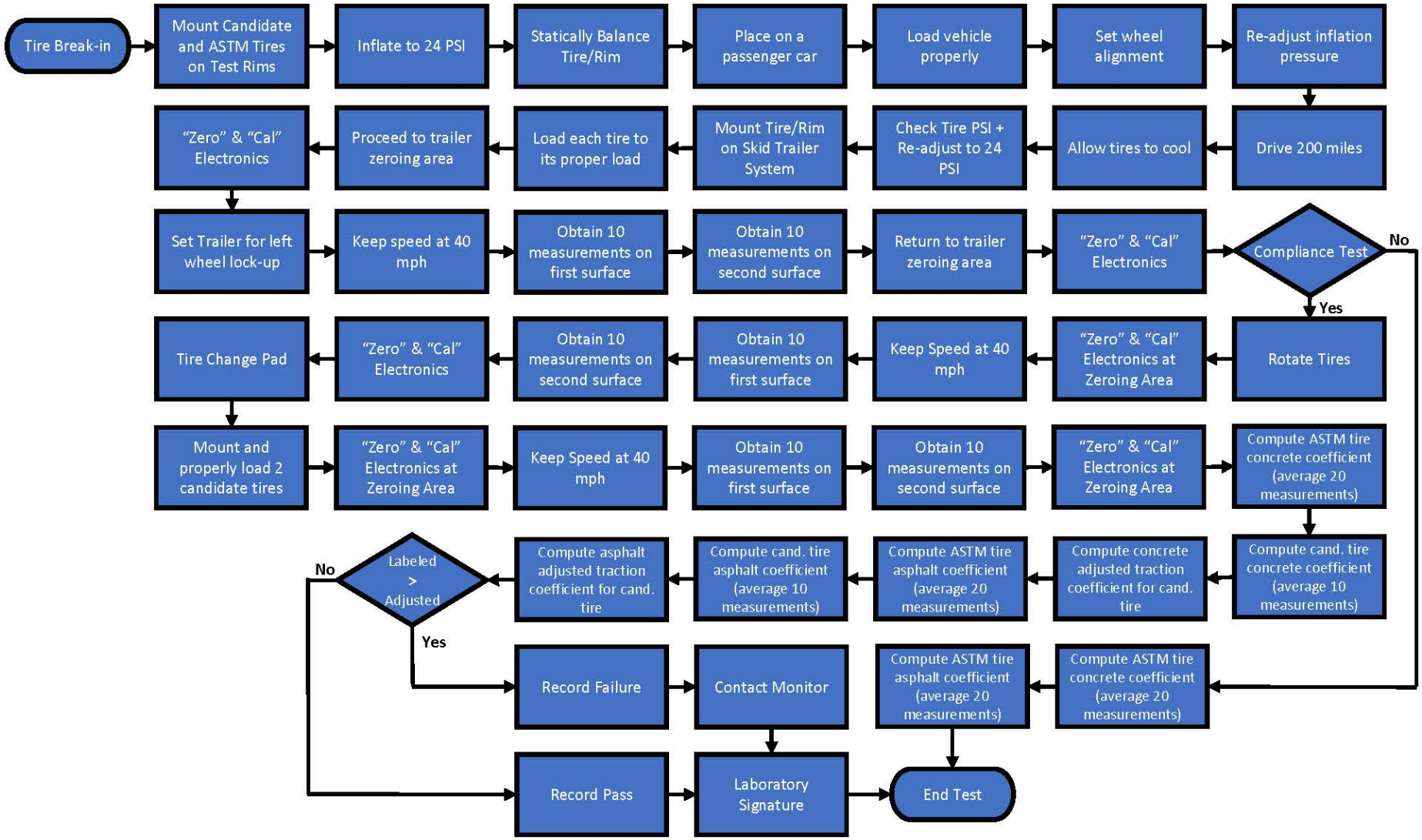

Figure 1. Traction Test Procedure Flow

Section I: Introduction

I.1 – PURPOSE AND APPLICATION

This document describes the procedures used at SATF for performing testing in conformance with 49 CFR §575.104 Consumer Information Regulations-Uniform Tire Quality Grading-Traction Testing. It should be noted that the UTQG traction testing performed at SATF is not for determining the traction grades of tires, but for auditing the grade label applied by manufacturers. The processes described in this document may be generalized and used by 3rd party test companies to determine UTQG traction grades. Instructions for test preparation, test performance, data collection, and the reporting of test results are presented. This procedure includes attached appendices that serve as examples of report formats, data sheets, and other documents for procedures presently being used by NHTSA personnel at San Angelo, Texas. These examples are tailored to the equipment and facilities in place at the San Angelo Test Facility and serve to demonstrate the type of precision that is expected by OVSC. Laboratories utilizing different types of skid systems are expected to develop their own documents and procedures specific for their systems that are equivalent to those found in this document.

The procedure is not intended to conflict with the requirements set forth in the Uniform Tire Quality Grading Regulation (UTQG) or any amendments thereto. In the event of contradictory information, the UTQG regulation will supersede this document.

The OVSC laboratory test procedures are not intended to limit or restrain a laboratory from developing or utilizing any testing techniques or equipment that will assist in acquiring the required compliance test data.

> **NOTE:**
> In some cases, the OVSC laboratory test procedures do not include all the various minimum performance requirements. Recognizing applicable test tolerances, the test procedures may specify test conditions that are less severe than the minimum requirements of the standards themselves. Therefore, even though an item of equipment does not fail when tested in accordance with the OVSC laboratory test procedures, compliance with the standard is not necessarily guaranteed if testing is limited to those performance tests described in the OVSC laboratory test procedures.

I.2 – SAN ANGELO TEST FACILITY

The San Angelo Test Facility (SATF) in San Angelo, Texas has been established by the DOT/NHTSA as its test facility for UTQG compliance testing. The facility is located at Goodfellow Air Force Base and utilizes the public roadways near San Angelo, Texas for the 200-mile tire break in procedure. The SATF is operated by the Office of Vehicle Safety (OVSC) Equipment Division. The SATF Safety Compliance Engineer (SCE) has overall responsibility for all operations of the SATF. This test procedure is written for testing operations at SATF but may be used as a guide for use at other testing facilities.

The test surfaces located at SATF are available for use by test organizations. The cost to utilize these surfaces can be found at 49 CFR §575.104 in Appendix D.

I.3 – DEFINITION OF TERMS

ASTM Tire	Tires utilized for checking the traction coefficient of the skid pads as specified in ASTM Method E501.
Bead	That part of the tire made of steel wires, wrapped or reinforced by ply cords, that is shaped to fit the rim.
Belted-Bias	A type of pneumatic tire which features a bias tire construction reinforced with textile ply (belt) at an angle less than the carcass angle, located between the carcass and the tread.
Bias Tire	A type of pneumatic tire construction which features the ply cords that extend to the beads laid at alternate angles, substantially less than 90º, to the centerline of the tread.
Brand, Tire	The identifying name assigned by the seller of the tire.
Break-In	The running of the tire *prior to test.*
Candidate	A tire to be tested to the traction requirements.
Carcass	The tire structure, except tread and sidewall rubber.
Construction	The reference to the body structure of the tire; the type designator of the tires tested: R-Radial BB-Belted Bias B-Bias
DOT	Department of Transportation
Flight Plan	Designated Order of Testing
FMVSS	Federal Motor Vehicle Safety Standards
GFE	Government Furnished Equipment
NHTSA / OVSC	National Highway Traffic Safety Administration / Office of Vehicle Safety Compliance
Production Lot	An undesignated number of tires, all made of the same supply of raw materials with the same specification, in the same production facility, as nearly as possible during the same time (i.e. sequentially without interruption).
Radial Tire	A type of pneumatic tire in which the ply cords extend to the beads and are aligned substantially 90º to the centerline of the tread.
Rim	A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

Safety Compliance Engineer (SCE)	The safety compliance engineer is responsible for overseeing the compliance program and ensuring testing is performed correctly according to regulations and test procedures.
Sidewall	That portion of a tire between the tread and the bead.
Skid Trailer	Test vehicle utilized for the traction testing as specified in ASTM Method F274-70 paragraph 3.
Test Number	Six-digit number which denotes a particular test.
Test Period	The calendar time period during which a test is conducted.
Test Rim	The rim to be used for testing at tire as defined above, and in paragraph S.3 of FMSVSS No. 109.
Test Vehicle ID	An identification number assigned to the test vehicle.
Tire Line (Tire Name)	The name of a series of tires of which there may be several within one brand name.
Tire Type	Referring to construction, i.e. radial, belted bias, or bias, designated R, BB, or B, respectively.
TRA	Tire and Rim Association
Traction Manager (TRM)	The test facility official who is responsible for all day-to-day activities relative to traction testing.
Tread	The portion of a tire that contacts the road.
Tread Groove	The space between two adjacent tread ribs.
Tread Rib	A tread section running circumferentially around a tire.
Tread Separation	Pulling away of the tread from the tire carcass.
UTQG	Uniform Tire Quality Grading.
Wheel	The combined rim and tire, not necessarily mounted on the vehicle hub or drum.
Zero Pad	Test are designated for pre-test and post-test calibration checks.

Section II: General Requirements & Procedures

II.1 – BACKGROUND INFORMATION

The purpose of the Uniform Tire Quality Grading Standard is to aid consumers in making informed choices when purchasing passenger car tires. The UTQG standard establishes tire performance grading

criteria that allows consumers to objectively compare tire performance in three (3) different areas – traction, treadwear, and temperature resistance. This document is only relevant to the traction portion of the UTQG standard. UTQG traction testing, when performed according to the standard found in 49 CFR §575.104 (f), produces a tire traction performance grade that allows consumers to compare tire traction performance in simple, yet meaningful ways. Table 1 (see below) shows the tire traction performance criteria and applicable grades established in the regulation. To achieve any letter grade, the tire must meet the criteria for both test surfaces.

Table 1. UTQG Traction Grading Criteria

UTQG Traction Grading Criteria			
Grade	Adjusted Asphalt Coefficient Value		Adjusted Concrete Coefficient Value
AA	> 0.54	*and*	> 0.38
A	> 0.47	*and*	> 0.35
B	> 0.38	*and*	> 0.25
C	All Others	*and*	All Others

II.2 – CALIBRATION PROGRAM

The calibration program at the SATF consists of the following:

1. Standards for calibrating the measuring and test equipment are stored and used under appropriate environmental conditions to assure their accuracy and stability.
2. All measuring instruments and standards are calibrated by a commercial facility, against a higher order standard at periodic intervals not exceeding 12 months. Records showing the calibration traceability to a recognized standard is maintained for all measuring and test equipment.
3. All measuring equipment, test equipment and measuring standards are labeled with the following information:
    a. Date of calibration
    b. Date of next scheduled calibration
    c. Name of person and organization who calibrated the equipment
4. Written calibration procedures include the following information:
    a. Type of equipment, manufacturer, model number, etc.
    b. Measurement range
    c. Accuracy
    d. Calibration interval
    e. Type of standard used to calibrate the equipment (Calibration traceability of the standard must be evident)
5. The measurement and test equipment calibration system includes:
    a. Vehicle speed measuring device
    b. Traction trailer calibration equipment (Force Plate)
    c. Tire pressure gauge(s)
    d. Pavement surface thermometer
6. Non-calibrated equipment used for reference only are:
    a. Ambient temperature thermometer

b. Anemometer

II.3 – SAFETY, HOUSEKEEPING, AND SECURITY

The testing process requires the operation of equipment and machinery that can cause injury or damage if not handled properly. To minimize the risk of injury, proper personal protective equipment is recommended. Personnel should follow all recommendations and procedures provided by equipment manufacturers.

Additionally – good housekeeping practices are imperative to ensuring test quality and personnel safety.

All tires should be protected from grease, oil, solvents, and any other substance that would contaminate the tire and potentially influence the results of the test program. Appropriate measures should also be taken to protect tires from contact with unauthorized personnel during the entire test program to ensure the integrity of test data and results.

II.4 – TEST PROGRAM OVERVIEW

The test facility performs testing on ASTM (specifically ASTM E 501) tires and candidate tires (test tires). Once received, all tires are labeled, mounted onto rims, balanced, and placed onto a passenger vehicle for 200-mile break-in.

Upon completion of the tire break-in, the ASTM tires are used as control tires during the test program. Two ASTM tires are placed onto the skid trailer and tested on both the asphalt and concrete skid pads. At the completion of the ASTM tire tests their average traction coefficient is calculated for each surface.

The two candidate tires are then placed onto the skid trailer and one tire is tested on both the asphalt and concrete skid pads. The candidate tire's traction coefficient for each surface is calculated and adjusted utilizing the ASTM tire's traction coefficient to compensate for changes in the skid pads. The candidate tire is then evaluated, and the results are compared with the published grade of the tire manufacturer to determine the accuracy of the UTQG traction grade.

Section III: Tire Preparation

III.1 – TIRE RECEIPT & HANDLING

When tires arrive at the SATF, they are inspected for damage that may have occurred during the shipping and handling process, as well as for any manufacturing abnormalities. Tire inspections should follow the procedure outlined below.

> **NOTE:**
> If possible, tire inspections should be performed when the tires are received from the shipping company. This allows for the tires to be rejected if any damaged tires are found.

1. Inspect each sidewall and the full circumference of the tire tread for any abnormalities or shipping damages.
2. If damages are noted, refuse acceptance of damaged tires if shipping company is still present. If not, arrange for a return of the damaged tires with the shipping company or the tire supplier.

3. Check to ensure that the tire date codes are all within the acceptable range. Typically, tires with a manufacturing date code more than 3 years old are not accepted.
4. Once inspected and accepted, record the tire information in the tire inventory. An example of the Tire Inventory Form currently in use at SATF is attached in Appendix C.
5. Handle the tires with care to avoid cuts, tears, or any other conditions that may adversely affect test validity.
6. Mark (see section III.2) and store the tires out of direct sunlight and in a temperature-controlled environment to prevent premature aging of tires due to excessive heat, UV, or ozone exposure.

III.2 – TIRE MARKING

Mark tires on the outboard sidewall of the tire using tire paint, or a tire paint stick. Re-mark the tires as needed to always keep markings legible. Mark each tire with a unique sequential inventory number for tracking and reporting purposes. See Figure 2 (below) for tire marking location requirements.

In addition to the inventory number, mark each candidate tire with the assigned, unique test number. The test numbering system at SATF utilizes a 7-digit number of the following format:

2010013

20 – 1st two digits: Fiscal Year Designation (ex. FY20 for 2020)

10 – 2nd two digits: Type of Test (see list below)

013 – Final three digits: Sequential Number of Test

Test Type Codes:

10 = Surface Monitoring Test
20 = Compliance Test, Standard Matrix
24 = Compliance Test, Retest
25 = Compliance Test, Responsive
30 = Special Test
90 = Break-In

NOTE:
Each group of three (two ASTM and one candidate) tires will carry the same test number. ASTM tires may be used for multiple candidate tires; thus, the test number marking is not required for ASTM Tires.

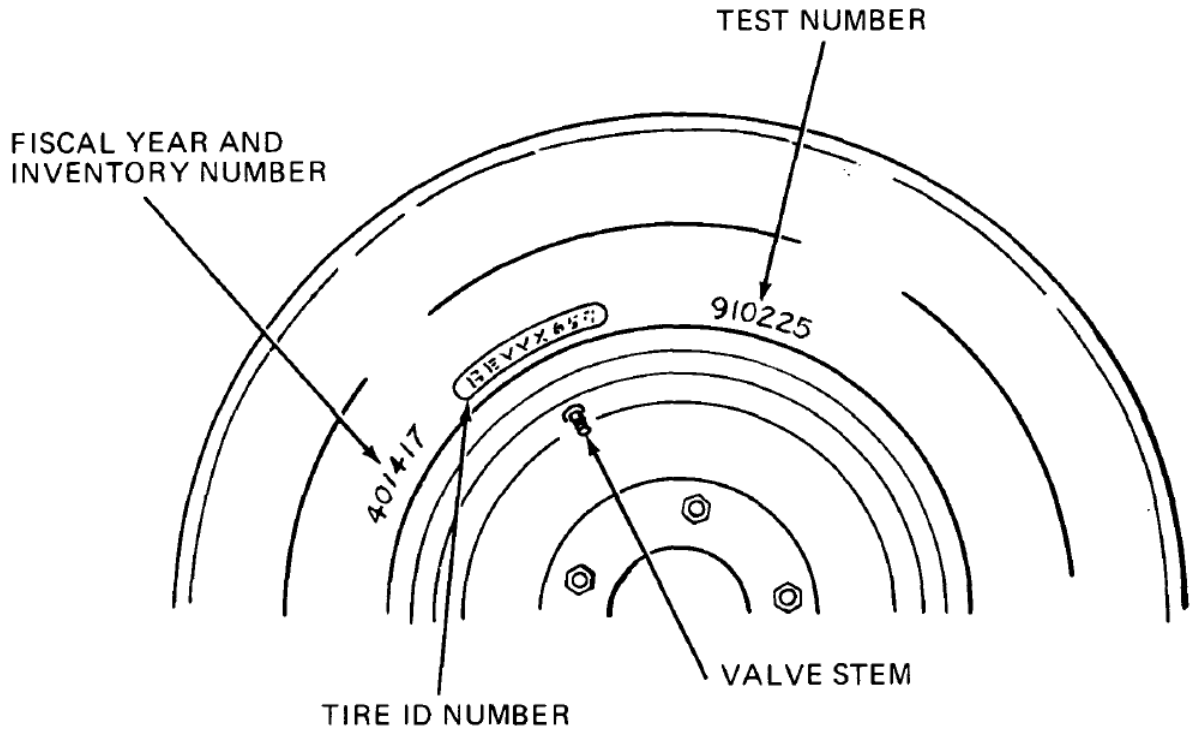

Figure 2. Tire Marking Example

III.3 – TIRE PRE-TEST INSPECTION

Prior to mounting the tires, complete a detailed pre-test inspection. Pay special attention in looking for bead scuffs, radial or lateral mold flow cracks, splice breaks, wire breaks, cavities in bead covering, or an over-flow of rubber into mold vents which could prevent proper tire seating on the test rim.

The inspection steps are:

1. Inspect the tire's sidewalls, tread, and inner liner for repair work or any abnormalities.
2. Any abnormalities should be recorded in the remarks section of the mount sheet or test report form as applicable.
3. If abnormalities are identified, notify the SCE of the abnormality, and determine if the abnormality would make the tire unsafe or potentially impact test results.
4. If the tire cannot be tested, determine how to scrap the tire, and obtain a replacement tire.
5. If it is determined that the tire may be safely tested, photo document the abnormality (if possible) and note the abnormality type and location in the test report.

III.4 – TEST RIMS

When test rims are initially purchased they should be marked with a serial number., This ensures that tire and rim pairing information may be documented for test traceability. The rim serial number markings may be stamped, spray painted, stick painted, stenciled or any other method which is permanent.

Prior to initial use, or if an investigation indicates that the rim may have contributed to a test failure, a thorough inspection of the rim should be completed.

The inspection steps are:

1. Visually examine the rim for paint runs or any other abnormalities that would cause errors in any reading. Remove all abnormalities by lightly filing, sanding, or the using steel wool.
2. Measure each test rim using procedures defined in the T&RA Yearbook that was current as of the date of manufacturer of the rim, or any subsequent version.
    a. Verify the diameter using a mandrel calibrated disk tape or equivalent.
    b. Verify the width using a TRA Sliding Gage or equivalent.

The rim diameter and width must conform to the published dimensions and tolerances found in the T&RA Yearbook (or similar publication, see list below in Section III.5).

III.5 – TIRE MOUNTING

Tires tested in accordance with UTQG must be mounted on a rim with any configuration as shown appropriate for that tire size and designation. Tire and rim matching information is provided in publications from tire related organizations such as:

1. The Tire and Rim Association (T&RA)
2. The European Tyre and Rim Technical Organization (ETRTO)
3. Japan Automobile Tyre Manufacturers Association (JATMA)
4. Tyre & Rim Association of Australia
5. Associacao Latino Americana de Pneus e Aros (Brazil)
6. South African Bureau of Standards

Alternatively, manufacturers may publish tire & rim matching information in Docket Section No. NHTSA-2009-0117. In the case of a conflict, the manufacturer's publication to the docket would prevail over a value found in one of the tables from a publication mentioned above.

The tire mounting procedure is:

1. Select rim according to criteria set forth above based on tire size. UTQG procedures allow a rim width tolerance of -0 to +0.5 inches of the width listed.
2. Visually check the rim for obvious damage, cracks, etc. Ensure the rim is free from any foreign substance, rust, oxidized rubber, or adhesives. The inspection should cover the entire rim with special focus on the pilot hole, bolt holes, contours, and safety locks. Note the serial number on mounting sheet (sample provided in Appendix C).
3. Mount the tire so that all markings are to the outside of the rim and so that the tire identification number is located above the valve stem as shown in Figure 2.
4. Mount the tire in such a manner that the beads do not bind against the rim ledge and bend improperly on the rim flange. Do not allow the air pressure to exceed the manufacturer's prescribed maximum inflation pressure. A thin solution of bead lubricant should be applied to each bead to aid in the proper positioning and seating of the beads.
5. If the beads have not seated by the time the pressure has reached maximum inflation, deflate the assembly, reposition the tire and re-inflate.
6. The tires should be inflated to 24 psi (180 kPa) and dynamically balanced.

NOTE:	
Inflation Pressure Tolerance for **Candidate Tires**:	+0, -2 PSI
Inflation Pressure Tolerance for **ASTM Tires**:	+2, -0 PSI
Tire pressure gauges should be accurate to within **±1 PSI** at the prescribed inflation pressure.	

Once mounting is complete, the tire and rim assemblies will then be mounted onto the break-in vehicle for the 200-mile break-in.

Section IV: Vehicle Preparation

IV.1 – GENERAL VEHICLE REQUIREMENTS

Traction testing requires two types of vehicles; the vehicle utilized for the 200-mile break-in, and the skid trailer/tow vehicle combination.

A preventive maintenance schedule to maximize vehicle reliability is utilized to ensure that the vehicles are properly maintained and clean with no fluid and/or oil leaks. Leaks of this type can change the traction levels of the skid surfaces.

All vehicles comply with all applicable Federal Motor Vehicle Safety Standards. Standard safety equipment is always kept operational. Additional safety equipment includes flares, fire extinguishers and first aid kits.

IV.2 – BREAK-IN VEHICLE REQUIREMENTS

The vehicle utilized to conduct the 200-mile break-in is a standard passenger vehicle where the tires will not be loaded more than their maximum load rating.

IV.3 – TRACTION TRAILER/TOW VEHICLE REQUIREMENTS

The skid trailer is built in conformity with ASTM Standard E274-15 paragraph 4. The instrumentation utilized in conjunction with the skid trailer is as stipulated in paragraph 4.5 of ASTM Standard E274-15.

The skid trailer is calibrated to verify the accuracy of all its measurement parameters annually, prior to beginning the test program. Due to the nature of traction testing operation, it is occasionally necessary to spot check, or recalibrate the trailer at greater frequency to assure the accuracy of its operation throughout the duration of the test program.

The skid trailer calibration is conducted in accordance with ASTM F377-03(2015) Standard Practice for Calibration of Braking/Tractive Measuring Devices for Testing Tires.

Section V: Test Procedures

This section describes the test course, driving procedures, and all other procedures which are required for the successful completion of a UTQG traction test.

V.1 – EQUIPMENT STORAGE

During any non-working hours, or when not in use, store all tires and vehicles in a facility capable of protecting their integrity. Keep all tires out of the sun to minimize temperature and UV effects as much as possible.

V.2 – TIRE BREAK-IN PROCEDURE

Conduct the 200-mile break-in with the tires mounted on a standard passenger vehicle.

1. Mount the tire and rim assemblies on the break-in vehicle.
2. Ensure inflation pressure is correct.
3. Complete a total of 200 miles of driving. The first 50 miles of the southern loop of the UTQG treadwear course are typically used. Two round trips result in the required 200-mile distance.
4. Adhere strictly to posted speed limits throughout the course unless unsafe conditions arise.
5. Under unsafe conditions, adjust speed to the maximum safe operating speed.
6. Record tire break-in information. See Appendix C for an example of a tire break-in form.

V.3 – TRACTION TEST PROCEDURE

The traction test is divided into three segments. The optional first segment consists of performing a lane check to verify the test surfaces are within the acceptable ranges (0.50 ± 0.10 for asphalt, 0.35 ± 0.10 for concrete). The second segment consists of testing both ASTM tires. The third and final segment consists of testing a candidate tire.

Test Surfaces
Two skid pads have been constructed on the premises of Goodfellow AFB in San Angelo, Texas. The test surface layout is shown in Figure 3 (below). The surfaces are configured in a large oval to allow for consecutive testing on both surface types. Additionally, the curves are banked to aid in maintaining test speeds through the turns. Single lane entrance and exit lanes were also constructed to connect the test circuit to the rest of the test facility.

The asphalt skid pad is 600 ft. long x 65 ft. wide and the concrete pad is 600 ft. long x 60 ft. wide, both are marked in Figure 3.

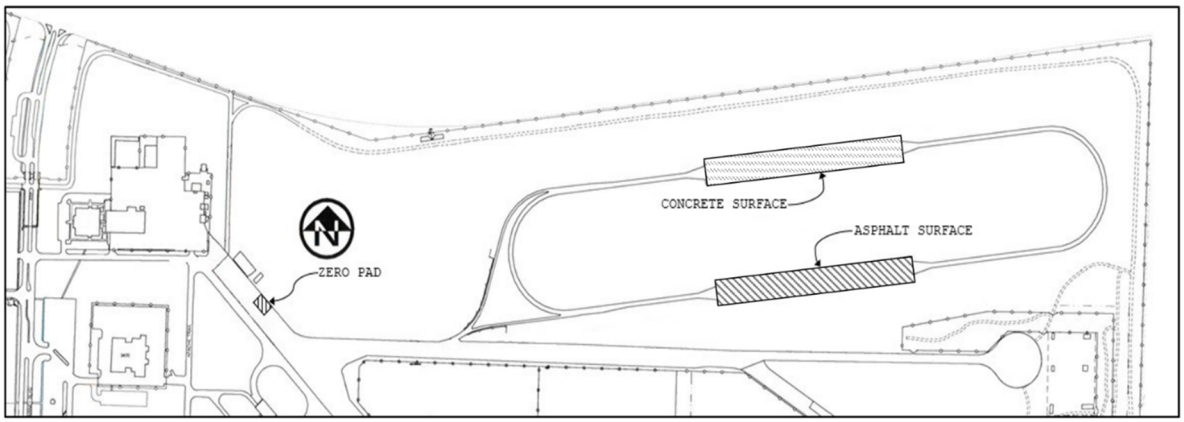

Figure 3. SATF Facility and UTQG Test Track Layout

Zero Pad Procedure

The Zero Pad is a large concrete pad that was carefully constructed to ensure that the surface was level. This allows the traction trailer load cells to be leveled to set a zero or baseline for data acquisition systems. Prior to testing, check and evaluate all instrumentation on the Zero Pad to ensure data validity.

The Zero Pad is located at SATF between the rotation areas and the workshop where the water fill station is located, as marked in Figure 3 above.

Traction Test – ASTM Tires

1. After break-in is completed, allow the tires to cool and adjust the pressure to 24 psi (+2, -0). Mount the tires onto the skid trailer and adjust the tire load to approximately 1085 pounds (+40, -0), then drive to the Zero Pad.
2. Raise the test tire enough to pick it up off the ground just enough to remove the load off the vertical transducer.
3. Perform a "zero" or balance of the data acquisition system. Then lower the test tire back to the ground. Level the trailer in both horizontal and vertical directions.
4. Verify the test load is accurate, adjust if necessary.
5. Once the load is set, proceed to the test course. Obey all signage and traffic controls.
6. Circle traction course in the specified direction maintaining a speed of 40 mph where safe.
7. Tow the traction trailer onto the asphalt test surface at a speed of 40 mph (+1, -0). Activate the braking cycle and record the locked wheel traction coefficient between 0.5 and 1.5 seconds after lockup. This braking and data collection cycle is commonly called a skid, and results in a single measurement of the tire's friction value.
8. Continue at the same speed, and utilizing the same procedure, the same tire will be "skidded" on the concrete test surface. (The sequence of test surfaces can be reversed if needed).
9. Steps 6-8 above will be repeated until total of 10 acceptable skids on each test surface have been collected. An acceptable skid is one where the speed is within tolerance and is without any other type of incident.
10. Exit the test course and proceed to the rotation area. Rotate the unskidded tire and wheel assembly from the non-test side and install it on the test side. Place the skidded tire on the non-test side of the trailer.
11. Repeat the above procedure for the second ASTM tire for a total of 10 skids on each test surface.
12. The ten skids from each test surface will be averaged to determine the ASTM tire traction coefficient for each surface. These values will be used to calculate the Adjusted Traction Coefficients for each candidate tire.

Traction Test – Candidate Tires

1. Ensure the tires are cool and adjust the pressure to 24 psi (+0, -2) or 230 kpa for CT tires. Mount the tires onto the skid trailer and adjust the tire load to the test load as specified in 49 CFR §575.104 paragraph (f)(2)(viii). The current text from this paragraph is summarized in the box below.

UTQG Traction Load Calculation Procedure

A. Determine the tire's maximum inflation pressure and maximum load rating both as specified on the tire's sidewall.
B. Determine the appropriate multiplier corresponding to the tire's maximum inflation pressure (see table below).

Maximum Inflation Pressure	Traction Testing Multiplier
Tires other than CT tires	
32 psi	0.851
36 psi	0.797
40 psi	0.753
240 kPa	0.866
280 kPa	0.804
300 kPa	0.866
340 kPa	0.804
350 kPa	0.866
CT Tires	
290 kPa	0.866
330 kPa	0.804
305 kPa	0.866
390 kPa	0.804

C. Multiply the tire's maximum load rating by the multiplier from step B. This is the tire's calculated load.
D. Round the product determined in step C (the calculated load) to the nearest multiple of ten pounds or, if metric units are used, 5 kilograms. For example, 903 pounds would be rounded to 900 and 533 kilograms would be rounded to 535. This figure is the test load.
E. Multiply the test load from step D by 85 percent. This is the final load to be applied during traction testing.

2. Drive to the Zero Pad. Stop and raise the test tire enough to pick it up off the ground just enough to remove the load off the vertical transducer.
3. Perform a “zero” or balance of the data acquisition system. Then lower the test tire back to the ground. Level the trailer in both horizontal and vertical directions.
4. Verify the test load is accurate, adjust if necessary.
5. Once the load is set, proceed to the test course. Obey all signage and traffic controls.
6. Circle traction course in the specified direction maintaining a speed of 40 mph where safe.
7. Tow the traction trailer onto the asphalt test surface at a speed of 40 mph (+1, -0). Activate the braking cycle and record the locked wheel traction coefficient between 0.5 and 1.5 seconds after lockup.
8. Continue at the same speed, and utilizing the same procedure, the same tire will be skidded on the concrete test surface. (The sequence of test surfaces can be reversed if needed).
9. Steps 6-8 above will be repeated until total of 10 acceptable (within speed tolerance and without incident) skids on each skid surface have been collected.

10. Exit the test course and proceed to the rotation area. The 10 skids from each test surface will be averaged to find the candidate tire traction coefficient for each surface.

In the event of an aborted skid, record the reason for the aborted skid and continue testing. In the event of equipment malfunctions, i.e., dry skid, power failure, etc., immediately stop all test functions and return to the rotation area to evaluate the malfunction. Once the designated number of skids have been collected, collect any additional data such as ambient and surface temperatures as required.

Record all data in the data acquisition system.

Once testing is completed and the data has been verified as complete and accurate, the candidate tires may be dismounted. Care is to be taken to avoid damage to the test tires during the dismounting process.

Results Calculations

Once testing is complete for both ASTM tires and the candidate tire, compute the candidate tire's adjusted traction coefficient for both the asphalt ($M(1)$) and concrete ($M(2)$) test surfaces utilizing the ASTM tire data for adjustment to compensate for changes of the skid surfaces. The equations to calculate these values are shown below.

$$M(1) = (Measured\ Candidate\ Tire\ Coefficient\ for\ Asphalt + 0.500) - (Measured\ ASTM\ Tire\ Coefficient\ for\ Asphalt)$$

$$M(2) = (Measured\ Candidate\ Tire\ Coefficient\ for\ Concrete + 0.350) - (Measured\ ASTM\ Tire\ Coefficient\ for\ Concrete)$$

The adjusted traction coefficient values for each surface are then compared to the criteria established in 49 CFR §575.104(d)(2)(ii) and also seen in Table 1 (above). To achieve any letter grade, the tire must meet the criteria for both test surfaces.

Additionally, 49 CFR 575.104(d)(1)(i) states that:

> Each tire shall be able to achieve the level of performance represented by each grade with which it is labeled.

Section VI: Test Reports

Include all the relevant tire information, the high-level test data, and the conclusions/results from the test data in the test report. The report should include a clear statement that indicates if the candidate tire complies with UTQG requirements, and in the event of failure, clearly states where the failure occurred.

Additionally, the test report identifies any issues or complications that may have occurred during the testing process that could potentially influence the test results. A generic sample of the current test report used by the San Angelo Test Facility is attached to this procedure in Appendix A.

Appendix A: Sample Test Report

COMPLIANCE TESTING FOR

PART 575.104 UNIFORM TIRE QUALITY GRADING STANDARDS - TRACTION

TIRE BRAND

TIRE LINE NAME

Tests Conducted By:

TEST COMPANY NAME
STREET ADDRESS
CITY, STATE ZIP

(TEST DATE)

FINAL REPORT 575-ABC-FY-XXX

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

Prepared By: _____

Approved By: _____

Accepted By: _____

Acceptance Date: _____

CONTENTS

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 575-ABC-FY-XXX	**2. Government Accession No.**	**3. Recipient's Catalog No.**

4. Title and Subtitle Final Report of UTQG Traction Testing Traction Compliance Testing of Tire Brand Tire Line Name	**5. Report Date** Report Date **6. Performing Organization Code** ABC
7. Author(s) Technician Technician Engineer	**8. Performing Organization Rep No.** 575-ABC-FY-XXX
9. Performing Organization Name and Address Test Company Street Address City, State, Zip Code	**10. Work Unit No. (TRAIS)** **11. Contract or Grant No.**
12. Sponsoring Agency Name and Address United States Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance, NEF-200 1200 New Jersey Avenue, SE Washington, DC 20590	**13. Type of Report and Period Covered** Final Test Report (test date) thru Final Date **14. Sponsoring Agency Code** NEF-220
15. Supplementary Notes	

16. Abstract

Compliance tests were conducted on the subject Tire Brand Tire Line Name in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-UTQG-T-02 for the determination of UTQG Traction compliance. Test failures identified were as follows:
(update here)

17. Key Words Tire Compliance Testing UTQG Part 575.104 Traction Rating	**18. Distribution Statement** Copies of this report are available from: Technical Information Services Division (NPO-411) National Highway Traffic Safety Administration 1200 New Jersey Avenue, S.E. East Building (E12-100) Washington, DC 20590 Email: tis@nhtsa.dot.gov FAX: 202-493-2833	
19. Security Classification (of this report) UNCLASSIFIED	**20. No. of Pages** 12	**21. Price**
22. Security Classification (of this page) UNCLASSIFIED		

SECTION 1: INTRODUCTION

1.1 Purpose of Compliance Test

Two (2) Tire Brand Tire Line Name tires were tested to determine if the tires were compliant with the traction requirements of the Uniform Tire Quality Grading Standards. The tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure TP-UTQG-T-02, dated (effective date).

This standard establishes the requirements to ensure that applicable tires are correctly labeled with performance characteristics that aid consumers in making informed choices about the purchase of passenger car tires.

1.2 Tire Information

General Information

Brand:	Tire Brand
Tire Line:	Tire Line Name
Tire Size:	Tire Size

Construction Information

Construction Type:	Radial/Bias	Tube/Tubeless:	Tube(less)
Tread Type:	Tread Type	Sidewall Color:	SWColor
# of Tread Plies:	Tread Plies	Carcass Material(s):	Carcass Material
# of Sidewall Plies:	SW Plies	Belt Material(s):	Material 1
			Material 2
			Material 3

Sidewall Information

Maximum Inflation (psi):	Psi	Maximum Load (lbs):	load
Maximum Inflation (kPa):	kPa	Maximum Load (kg):	kg

1.3 Test Date and Location

The tires were tested on (test date) at the Test Company Site Location.

SECTION 2: TEST PROCEDURE AND SUMMARY OF RESULTS

2.1 Test Procedure

Prior to test, the tires were inspected for any readily identifiable manufacturing defects, damage due to storage, or damage incurred through shipping and no damage was found. The tires were then mounted and balanced on rims per 49 CFR §571.109, S4.4.1 (a) or (b), or a rim having a width within −0 to + 0.50 inches of the width listed. The tires then completed the required 200-mile break in.

After break-in, the tires were mounted on the test apparatus and loaded as specified in 49 CFR §575.104 paragraphs (f)(2)(viii) and paragraph (h).

The test followed the process outlined in Test Procedure TP-UTQG-T-02 Section V pertaining to Standard and Candidate Tires. Test information can be seen below in Table 1.

Table 1. UTQG Traction Test & Inventory Number Information

Category	Test Number	Inventory Number	Tire ID
ASTM	ASTM 1	Inventory 3	DOT Number
ASTM	ASTM 2	Inventory 4	DOT Number
Candidate	Candidate 1	Inventory 1	DOT Number
Candidate	Candidate 2	Inventory 2	DOT Number

2.2 Results Summary

The overall results of the traction test can be seen below in Table 2. The ASTM values in the table below are the combined average of both ASTM tires tested.

Table 2. Traction Test Results Table

Tire	Asphalt Avg. Traction Coefficient	Concrete Avg. Traction Coefficient	Asphalt Adjusted Coefficient $M(1)$	Concrete Adjusted Coefficient $M(2)$	Attained Test Grade	Labeled Traction Grade	Pass/Fail
ASTM	XXX	XXX	-	-	-	-	-
Candidate 1	XXX	XXX	XXX	XXX	XX	XX	P/F
Candidate 2	XXX	XXX	XXX	XXX	XX	XX	P/F

The equations used to determine the adjusted coefficients $M(1)$ and $M(2)$ were:

$$M(1) = (Measured\ Candidate\ Tire\ Coefficient\ for\ Asphalt + 0.500) - (Measured\ Standard\ Tire\ Coefficient\ for\ Asphalt)$$

$$M(2) = (Measured\ Candidate\ Tire\ Coefficient\ for\ Concrete + 0.350) - (Measured\ Standard\ Tire\ Coefficient\ for\ Concrete)$$

2.3 Discussion of Results

The letter grade for each of the candidate tires was determined using the criteria established in 575.104(d)(2)(ii). The grading criteria is summarized below in Table 3 along with the results.

Table 3. UTQG Letter Grade Criteria & Final Results

UTQG Traction Grading Criteria		
Grade	$M(1)$ - Asphalt	$M(2)$ - Concrete
AA	> 0.54	> 0.38
A	> 0.47	> 0.35
B	> 0.38	> 0.25
C	All Others	All Others

2.3.1 Candidate Tire 1

As seen in Table 2 (see Section 2.2, above), Candidate Tire 1 was labeled with the UTQG Traction letter grade of XX by the manufacturer. The traction test resulted in adjusted traction coefficients of 0.500 and 0.350 for asphalt and concrete respectively.

Based on the criteria in Table 3, the measured letter grade for Candidate Tire 1 is XX.

Because the measured letter grade is equal to or greater than the labeled letter grade, the tire complies with the requirements of the Uniform Tire Quality Grading Standards.

2.3.2 Candidate Tire 2

As seen in Table 2 (see Section 2.2, above), Candidate Tire 2 was labeled with the UTQG Traction letter grade of XX by the manufacturer. The traction test resulted in adjusted traction coefficients of 0.500 and 0.350 for asphalt and concrete respectively.

Based on the criteria in Table 3, the measured letter grade for Candidate Tire 2 is XX.

Because the measured letter grade is equal to or greater than the labeled letter grade, the tire complies with the requirements of the Uniform Tire Quality Grading Standards.

Technician _____ Date _____

Safety Compliance Engineer _____ Date _____

SECTION 3: TEST DATA SHEETS

Individual Test Data Sheets Attached

Data Sheet Order:

Candidate Tire 1

Candidate Tire 2

ASTM Tire 1

ASTM Tire 2

TRACTION DATA SHEET

Test: 2120001
4/14/2021

SURFACE	PAD	LANE	TEMP
ASPHALT	5	1	52 °F
CONCRETE	6	2	55 °F

TEST INFORMATION
TOTAL TESTS: 22
TEST SPEED: 40.0 mph
SPEED TOL.: 0.5 mph
SYSTEM I.D.: 5

AMBIENT TEMP: 53 °F
WATER TEMP: 74 °F
WATER LEVEL: 248 gal

TEST TIRE INFORMATION		IDLER TIRE INFORMATION		PRE-TEST CAL	
TIRE NUMBER:	200121	TIRE NUMBER:	200122	FORCE CAL:	487 lb
START INFLATION:	26.0 psi	START INFLATION:	26.0 psi	LOAD CAL:	490 lb
END INFLATION:	28.0 psi			FORCE ZERO:	-2 lb
TEST LOAD:	876 lb			LOAD ZERO:	-5 lb
ACTUAL LOAD:	879 lb				
PUMP SELECT:	BOTH				

ASPHALT SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
1	39.9	0.583	0.858	0
3	39.9	0.574	0.865	0
5	39.7	0.592	0.909	2
7	40.0	0.541	0.899	0
9	40.1	0.555	0.925	0
11	39.9	0.551	0.913	0
13	39.8	0.557	0.888	0
15	39.9	0.564	0.918	0
17	39.9	0.564	0.892	0
19	40.0	0.559	0.892	0
21	40.0	0.544	0.917	0

MEAN S.N.: 0.559
STANDARD DEVIATION: 0.013
SPREAD: 0.583/0.541 (high/low)

MEAN Peak: 0.897
STANDARD DEVIATION: 0.023
SPREAD: 0.925/0.858 (high/low)

CONCRETE SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
2	39.9	0.473	0.878	0
4	39.8	0.464	0.864	0
6	40.0	0.430	0.818	0
8	39.9	0.447	0.876	0
10	39.9	0.456	0.870	0
12	39.9	0.465	0.853	0
14	39.9	0.434	0.853	0
16	40.0	0.451	0.834	0
18	39.9	0.420	0.889	2
20	40.1	0.448	0.873	0
22	39.9	0.453	0.888	0

MEAN S.N.: 0.452
STANDARD DEVIATION: 0.013
SPREAD: 0.473/0.430 (high/low)

MEAN Peak: 0.861
STANDARD DEVIATION: 0.022
SPREAD: 0.888/0.818 (high/low)

START TIME: 08:56:02 AM
END TIME: 09:15:54 AM
FORCE CAL: 487 lb
LOAD CAL: 490 lb
FORCE ZERO: -2 lb
LOAD ZERO: -5 lb

OPERATOR I.D.: 17 SIGNATURE:_____
COMMENTS: 2021 Compliance Test - Day 1 - Candidate 1

TRACTION DATA SHEET

Test: 2120002

4/14/2021

SURFACE	PAD	LANE	TEMP
ASPHALT	5	1	55 °F
CONCRETE	6	2	58 °F

TEST INFORMATION

TOTAL TESTS:	21
TEST SPEED:	40.0 mph
SPEED TOL.:	0.5 mph

SYSTEM I.D.: 5

AMBIENT TEMP:	53 °F
WATER TEMP:	73 °F
WATER LEVEL:	248 gal

TEST TIRE INFORMATION

TIRE NUMBER:	200122
START INFLATION:	26.0 psi
END INFLATION:	28.0 psi
TEST LOAD:	876 lb
ACTUAL LOAD:	879 lb
PUMP SELECT:	RIGHT

IDLER TIRE INFORMATION

TIRE NUMBER:	200121
START INFLATION:	26.0 psi

PRE-TEST CAL

FORCE CAL:	487 lb
LOAD CAL:	490 lb
FORCE ZERO:	-1 lb
LOAD ZERO:	-4 lb

ASPHALT SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
1	40.4	0.526	0.876	2
3	40.0	0.562	0.921	0
5	39.9	0.579	0.881	0
7	39.9	0.577	0.937	0
9	40.2	0.559	0.899	0
11	39.9	0.578	0.843	0
13	40.0	0.590	0.922	0
15	40.0	0.572	0.926	0
17	40.0	0.580	0.923	0
19	40.0	0.551	0.937	0
21	39.9	0.561	0.935	0

MEAN S.N.:	0.571
STANDARD DEVIATION:	0.012
SPREAD:	0.590/0.551
	high low

MEAN Peak:	0.912
STANDARD DEVIATION:	0.030
SPREAD:	0.937/0.843
	high low

CONCRETE SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
2	39.9	0.469	0.902	0
4	39.9	0.467	0.888	0
6	39.9	0.474	0.893	0
8	39.9	0.467	0.888	0
10	39.9	0.473	0.865	0
12	39.9	0.460	0.858	0
14	40.1	0.459	0.869	0
16	39.9	0.461	0.913	0
18	40.0	0.451	0.854	0
20	40.0	0.443	0.905	0

MEAN S.N.:	0.462
STANDARD DEVIATION:	0.010
SPREAD:	0.474/0.443
	high low

MEAN Peak:	0.883
STANDARD DEVIATION:	0.021
SPREAD:	0.913/0.854
	high low

START TIME: 09:31:18 AM
END TIME: 09:50:07 AM

FORCE CAL: 487 lb
LOAD CAL: 490 lb

FORCE ZERO: -2 lb
LOAD ZERO: -5 lb

OPERATOR I.D.: 17 SIGNATURE:_____

COMMENTS: 2021 Compliance Test - Day 1 - Candidate 2

TRACTION DATA SHEET

Test: 2121003
4/14/2021

SURFACE	PAD	LANE	TEMP
ASPHALT	5	1	58 °F
CONCRETE	6	2	59 °F

TEST INFORMATION
TOTAL TESTS: 24
TEST SPEED: 40.0 mph
SPEED TOL.: 0.5 mph
SYSTEM I.D.: 5

AMBIENT TEMP: 53 °F
WATER TEMP: 73 °F
WATER LEVEL: 248 gal

TEST TIRE INFORMATION
TIRE NUMBER: 210001
START INFLATION: 24.0 psi
END INFLATION: 26.0 psi
TEST LOAD: 1085 lb
ACTUAL LOAD: 1087 lb
PUMP SELECT: RIGHT

IDLER TIRE INFORMATION
TIRE NUMBER: 210003
START INFLATION: 24.0 psi

PRE-TEST CAL
FORCE CAL: 487 lb
LOAD CAL: 490 lb
FORCE ZERO: -3 lb
LOAD ZERO: -2 lb

ASPHALT SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
1	39.9	0.524	0.832	2
3	39.9	0.519	0.816	0
5	40.0	0.524	0.809	2
7	39.9	0.511	0.821	0
9	39.9	0.517	0.818	0
11	39.8	0.512	0.788	0
13	39.9	0.520	0.769	0
15	39.9	0.512	0.803	0
17	39.8	0.510	0.792	0
19	39.9	0.507	0.798	0
21	39.9	0.510	0.818	0
23	39.9	0.507	0.801	0

MEAN S.N.: 0.513
STANDARD DEVIATION: 0.005
SPREAD: 0.520/0.507 (high / low)

MEAN Peak: 0.802
STANDARD DEVIATION: 0.017
SPREAD: 0.821/0.769 (high / low)

CONCRETE SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
2	39.9	0.442	0.772	2
4	39.9	0.440	0.750	2
6	39.9	0.434	0.747	0
8	39.9	0.415	0.739	0
10	39.8	0.424	0.759	0
12	39.9	0.435	0.744	0
14	39.9	0.421	0.747	0
16	39.9	0.420	0.738	0
18	39.9	0.417	0.739	0
20	39.9	0.413	0.734	0
22	39.9	0.420	0.730	0
24	40.0	0.419	0.749	0

MEAN S.N.: 0.422
STANDARD DEVIATION: 0.007
SPREAD: 0.435/0.413 (high / low)

MEAN Peak: 0.743
STANDARD DEVIATION: 0.008
SPREAD: 0.759/0.730 (high / low)

START TIME: 10:13:32 AM
END TIME: 10:37:11 AM
FORCE CAL: 487 lb
LOAD CAL: 490 lb
FORCE ZERO: -1 lb
LOAD ZERO: -3 lb

OPERATOR I.D.: 17 SIGNATURE: _____
COMMENTS: 2021 Compliance Test - Day 1 - ASTM 1

TRACTION DATA SHEET

Test: 2121004

4/14/2021

SURFACE	PAD	LANE	TEMP
ASPHALT	5	1	59 °F
CONCRETE	6	2	61 °F

TEST INFORMATION

TOTAL TESTS: 24
TEST SPEED: 40.0 mph
SPEED TOL.: 0.5 mph
SYSTEM I.D.: 5

AMBIENT TEMP: 54 °F
WATER TEMP: 74 °F
WATER LEVEL: 248 gal

TEST TIRE INFORMATION

TIRE NUMBER: 210003
START INFLATION: 24.0 psi
END INFLATION: 26.0 psi
TEST LOAD: 1085 lb
ACTUAL LOAD: 1087 lb
PUMP SELECT: RIGHT

IDLER TIRE INFORMATION

TIRE NUMBER: 210001
START INFLATION: 24.0 psi

PRE-TEST CAL

FORCE CAL: 487 lb
LOAD CAL: 490 lb
FORCE ZERO: -1 lb
LOAD ZERO: -2 lb

ASPHALT SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
1	40.1	0.518	0.826	0
3	40.0	0.513	0.827	0
5	40.0	0.514	0.815	0
7	39.9	0.512	0.828	0
9	39.9	0.513	0.839	0
11	39.9	0.519	0.791	0
13	40.0	0.508	0.780	0
15	39.9	0.515	0.836	0
17	39.9	0.517	0.809	0
19	39.9	0.511	0.801	0
21	39.9	0.506	0.830	2
23	39.9	0.508	0.816	2

MEAN S.N.: 0.514
STANDARD DEVIATION: 0.003
SPREAD: 0.519/0.508 (high/low)

MEAN Peak: 0.815
STANDARD DEVIATION: 0.020
SPREAD: 0.839/0.780 (high/low)

CONCRETE SURFACE

RUN	SPEED MPH	AVG SN	PEAK SN	ABORT CODE
2	39.8	0.438	0.746	2
4	39.8	0.444	0.752	2
6	39.9	0.412	0.746	0
8	39.9	0.430	0.764	0
10	39.9	0.415	0.752	0
12	39.9	0.418	0.743	0
14	40.0	0.421	0.764	0
16	39.9	0.421	0.729	0
18	40.0	0.406	0.763	0
20	39.9	0.413	0.756	0
22	39.9	0.404	0.765	0
24	39.8	0.431	0.763	0

MEAN S.N.: 0.417
STANDARD DEVIATION: 0.009
SPREAD: 0.431/0.404 (high/low)

MEAN Peak: 0.755
STANDARD DEVIATION: 0.012
SPREAD: 0.765/0.729 (high/low)

START TIME: 10:52:12 AM
END TIME: 11:15:49 AM

FORCE CAL: 487 lb
LOAD CAL: 490 lb
FORCE ZERO: -3 lb
LOAD ZERO: -3 lb

OPERATOR I.D.: 17 SIGNATURE:_____

COMMENTS: 2021 Compliance Test - Day 1 - ASTM 2

Appendix B: Water Depth & Speed Verification Procedures

Water Depth Verification Procedure

Required Tools:

- Impact wrench gun
- Measuring tape
- 3 ton floor jack
- 2 jack stands
- Weight scale (all measurements recorded in pounds)
- Water basin (to catch water from the nozzle, capable of holding 40+ lbs. of water, 5+ gals)

Procedure:

1. Ensure truck onboard water tank is full. Top off if necessary.
2. Position traction truck and trailer so that water nozzle is outside on level ground.
3. Raise the trailer (both sides) using onboard hydraulic jacks and remove the test side tire. A floor jack and jack stands may also be used if onboard jacks are not functional.
4. Bring the weight scale close to the trailer to reduce the distance the water container will have to be carried.
5. Weigh and record the empty water basin weight on the data sheet as the "Tare of container".
   5.1. SATF water calibration basin can be found in the traction bay on the east wall on the top level of the storage rack
6. Measure and record the distance on the water nozzle from the outer edge of the outermost hole to the outer edge of the other outer most hole. Record on the data sheet as the "Wetted Trace Width at Ground Contact".
7. Press the Nozzle Switch "Up" on the Power Panel below the computer so that the flow nozzle is raised to place the water basin underneath.
8. Place the water basin under the water nozzle.
9. Use the floor jack to raise the trucks rear axle off the ground so that the tires are not in contact with the surface and place jack stands under the axle to support the load.
10. In the traction software go to the Settings tab.
    10.1. In the control parameters tab under test time parameters, change the SN Calculation time for 1.5 to 3, this will change the water output time to 3 seconds.
        10.1.1.1. Make sure and change this back to 1.5 after the water calibration is completed.
    10.2. Exit the Settings tab and go to the Run screen.
11. Press the Nozzle Switch "Down" on the Power Panel below the computer so that the flow nozzle is lowered to pour water into the water basin.
12. Place the truck in gear (4^{th} is preferred for throttle control) and slowly accelerate to 40 mph (±1 mph)
    12.1. When the speed is steady at 40 mph, press the pendant to active the lockup and water nozzle while maintaining 40 mph.
    12.2. Once the lockup is complete, decelerate and place the truck in park and check the software to see that the lockup speed was in tolerance.
    12.3. Repeat Step 7
13. Remove the water basin and place it on the scale. Be careful not to spill the water.
14. Record the weight of the water once the water has settled and scale value is stable.
15. After recording the weight, empty the basin and place it back under the water nozzle
16. Repeat steps 10 – 15 4 more times to complete the procedure.

Calculations:

Average Combined Weight:

$$Average\ Combined\ Weight = \frac{(Run\ 1 + Run\ 2 + Run\ 3 + Run\ 4 + Run\ 5)}{5}$$

Average Water Weight:

$$Average\ Water\ Weight = Average\ Combined\ Weight - Tare\ of\ Container$$

Calculate the total water volume by dividing the weight to by the water density:

$$Total\ Volume\ of\ Water = \frac{Average\ Water\ Weight}{8.33\ lbs/gallon}$$

Calculate the Water Flow Rate in Gallons Per Minute (gpm):

$$Water\ Flow\ Rate\ (gpm) = Total\ Volume\ of\ Water * 20$$

Calculate the GPM per Wetted Inch of surface:

$$GPM\ per\ Wetted\ Inch = \frac{Water\ Flow\ Rate\ (gpm)}{Wetted\ Trace\ Width}$$

Results:

Compare the GPM per Wetted Inch for the 5 runs that were collected against the **Required Output of 4.0 gpm/wetted inch** (+/- 10%) to determine if the calibration is in tolerance.

If the values are not correct the system needs to be repaired. Perform repairs and complete procedure again to verify results.

Water Verification with 15 Inch Nozzle

Date

Wheel Position: Left

Nozzle: Single Hose Feed

Wetted Trace Width at Ground Contact: 14.5 inches

Simulated Speed: 40 mph

Sampling Period: 3 secs

Tare of container: _____ lbs

Tub & Water - lbs.	
Run 1	
Run 2	
Run 3	
Run 4	
Run 5	

Test Time Parameters (seconds)	
T1 - Water before brake	0
T2 - Lockup timout limit	2
T3 - Settling time	0.2
T4 - SN Calculation Time	3
T5 - Wheel unlock time	0
Water Depth	0.5mm

Average =		lbs
minus tare =		lbs of water
divided by 8.33 lbs per gallon =		gallons/3 seconds
times 20 =		gallons/minute
divided by 14.5 inches (water trace) =		gallons/minute/wetted inch

Required Output: 4.0 gpm/wetted inch, ±10%

Calibrated by: _____

Speed Verification Procedure

Procedure:

1. In the traction software go to the Calibrations tab.
   1.1. Select the Distance and Velocity Tab at the bottom of the Calibrations Screen
      1.1.1.1. Ensure the Distance Calibration Length is set to 1000 ft to the right of the encoder gauges.
         1.1.1.1.1. Select "Edit" and "Save" if any changes need to be made
2. Select the Calibrate button to initialize the Speed calibration.
3. Press the Pendant 1x to initialize the start/stop trigger
4. Drive out to the test track and maintain a controlled speed of 40mph as shown on the system display on the dash in front of the driver
5. The starting point is the edge of either test surface
6. Press the pendant 1x at the starting edge of either test surface while maintaining 40mph (cruise control can help maintain speed)
7. Press the pendant 1x at the ending edge of the same surface to stop the speed calibration making sure to use the same reference point that was used at the start of the track.
8. Record Distance Traveled and Time in Excel Spreadsheet for the speed calibration
   8.1. File can be found in H:\\575.104 and SATF\SATF\Traction Trailer & UTQG Testing\Calibration and Testing Procedures\Ford Traction Truck Calibrations\"Current year" Traction Truck Calibrations.xlsx

Calculations:

Measured Speed:

$$\frac{distance\ traveled\ (miles\ to\ 2\ decimal\ places)}{Time\ of\ traveled\ distance\ (seconds\ to\ 2\ decimal\ places)} \times 3600 = mph(to\ 3\ decimal\ places)$$

Results:

The measured speed should be **equal to 40mph (± 10%)** to determine if the speed calibration is in tolerance.

If the values are not correct the system needs to be repaired/adjusted. Perform repairs/adjustment(s) and complete procedure again to verify results.

Speed Calibration Form

*Target time is 17.04 seconds/1000 ft. of concrete surface @ 40 mph

Dash Speed	Average Time (1000 ft.)	Pot Setting
40.0		
40.0		
40.0		
40.0		
40.0		
40.0		
40.0		
40.0		
40.0		
40.0		
40.0		
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40.0		
40.0		
40.0		
40.0		

Dash Speed	Computer Average	Ratio X	Current Speed Factor	New Speed Factor
40.0				
40.0				
40.0				
40.0				
40.0				
40.0				
40.0				
40.0				
40.0				
40.0				
40.0				
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40.0				
40.0				
40.0				
40.0				
40.0				

Calibrated by: ______________________ Date: ________

Traction Truck/Trailer Verification Worksheet								
	Current Force		Current Load			Previous Force		Previous Load
New					Old		Old	
Date								
06/23/20		Ref.				Ref.		Cross
	Force	Load	Mu		Force	Load	Mu	Talk
Raised								≤ 5%
Lowered								
Raised								
		Ref.				Ref.		
	Force	Load	Mu		Force	Load	Mu	
Notes:								
Verified by:								

Vertical Load (lbs)		
Ref. Load	Truck Load	Diff to TSM ≤ 5%

Appendix C: Sample Data Sheets & Forms

UTQG TIRE INVENTORY DATA COLLECTION FORM

GROUP NUMBER: _____ UTQG CATEGORY: CANDIDATE DATE RECEIVED: _____

TIRE BRAND: _____ BOL/INV#: _____

TIRE LINE: _____ COST/TIRE: _____

TIRE SIZE: _____ WHEEL SIZE: _____

LOAD/SPEED INDEX: _____ LOAD RANGE: _____ COUNTRY OF ORIGIN: _____

CONSTRUCTION INFORMATION:

TREAD TYPE	TUBE(LESS)	RADIAL/BIAS/BELTED	SIDEWALL COLOR
☐ MUD & SNOW	☐ TUBELESS	☐ RADIAL	☐ BLACKWALL
☐ ASTM	☐ TUBE	☐ BIAS	☐ OTHER
☐ STREET	☐	☐ BELTED BIAS	

MAX LOAD (kg): _____ MAX KPA: _____

MAX LOAD (lbs.): _____ MAX PSI: _____

	NUMBER OF PLIES	MATERIAL
SIDEWALL (CARCASS MATERIAL):		
TREAD:		
DOT SYMBOL CONFORMANCE (Y/N):		

UTQG LABELING	
LABELED TREADWEAR GRADE:	
LABELED TRACTION GRADE:	
LABELED TEMPERATURE GRADE:	
UTQG LABEL CONFORMANCE (Y/N):	

CORD MATERIAL: N=NYLON/ R=RAYON/ P=POLYESTER/ F=FIBERGLASS/ S=STEEL/ A=ARAMID/ X=FORTIFLEX/ D=DP01/ G=NYGEN/ M=POLYAMIDE/ L=LYOCELL

INVENTORY NUMBER	DOT NUMBER	TIRE DISPOSITION	COMMENTS

SIGNATURE: _____

PAGE _____ OF _____

DATE: _____

TIRE MOUNTING SHEET

20_____

TIRE NUMBER	RIM SIZE		RIM ID	BALANCE WEIGHTS (OUNCES)
	RECOMMENDED	USED		

Prepared By: _____ Date: _____

Mounted By: _____ Date: _____

TIRE DISMOUNTING FORM

Tire Number	Rim Size	Wheel ID	Notes/Comments

DISMOUNTED BY: _____

DATE: _____

UTQG TRACTION BREAK-IN DAILY RUN SHEET

Test Number: _____

Test Vehicle I.D.: _____ Test Organization: _____

Break-In Date (Start): _____ Driver I.D.: _____

Break-In Date (End): _____ Test Method: _____

Tire Position	Inventory Number	Start Inflation
LF	_____	_____
LR	_____	_____
RR	_____	_____
RF	_____	_____

	Odometer	Actual
Mileage End:	_____	
Mileage Start:	_____	
Total Miles:	_____	_____

Wet Miles: _____

Tire Failure Code: _____

Inventory Number(s): _____

Mileage at Failure(s): _____

Mechanical Failure Code: _____

Remarks: _____

_____

_____

Driver's Signature: _____

LABORATORY NOTICE OF TEST FAILURE

FMVSS NUMBER: _____ TEST DATE: _____

LABORATORY: _____

CONTRACT NUMBER: _____ DELIVERY ORDER NUMBER: _____

LABORATORY PROJECT ENGINEER'S NAME: _____

TEST SPECIMEN DESCRIPTION: _____

DOT NUMBER: _____

MANUFACTURER: _____

TEST FAILURE DESCRIPTION: _____

_____

_____

FMVSS REQUIREMENT, PARAGRAPH : _____

_____

_____

NOTIFICATION TO NHTSA (COTR): _____

DATE: _____ BY: _____

REMARKS: _____