



Designation: F1922 – 21

Standard Test Method for Tires, Pneumatic, Vehicular, Highway¹

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INTRODUCTION

In 1998, the standards used for the U.S. Army's Cooperative Tire Qualification Program (CTQP), which replaced the Federal Tire Program, were officially approved by ASTM. This ASTM Standard has been developed to serve federal, state and local agencies that want to purchase qualified tires using this test method.

This test method is designed to be used in conjunction with the Administrator's Approval and Requirements Manual (CTQP F1922) (1),² to qualify tires for purchase primarily by the U.S. federal government, military, and other state and local entities.

1. Scope

1.1 This test method covers comparative tire durability and treadwear. This test method covers commercially available, over the highway pneumatic tires, new and retreaded, both tube type and tubeless, for use on conventional passenger cars, station wagons, pursuit and emergency high speed and pursuit passenger vehicles, light trucks, medium to heavy truck, trailers, buses, and similar vehicles normally operated on public roads and highways. This test method also covers commercially available, special application light truck tires for operation on non-improved road surfaces.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee F09 on Tires and is the direct responsibility of Subcommittee F09.20 on Vehicular Testing.

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² The boldface numbers in parentheses refer to the list of references at the end of this standard.

2. Referenced Documents

2.1 ASTM Standards:³

F538 Terminology Relating to Characteristics and Performance of Tires

3. Terminology

3.1 Definitions:

3.1.1 *alignment, n*—the adjustment of various parts of the vehicle's suspension system to ensure proper handling stability and to minimize abnormal tire treadwear. **F538**

3.1.2 *balancing, n*—a process to correct for heavy or light areas of a tire and wheel assembly. **F538**

3.1.2.1 *Discussion*—There are some instances where balancing is done to the tire within the factory by the manufacturer.

3.1.3 *bead, n*—of a tire, the part of a tire that comes in contact with the rim and is shaped to secure the tire to the rim. **F538**

3.1.4 *bead separation, n*—a breakdown of bond between tire components in the bead area. **F538**

3.1.5 *belt separation, n*—a breakdown of bonding between the belts or plies or tread, or combination thereof. **F538**

3.1.6 *break, n*—a crack or tear extending into or through the reinforcing material. **F538**

3.1.7 *candidate tire (set), n*—test tire (or test tire set) that is part of an evaluation program; each candidate tire (set) usually has certain unique design or other features that distinguish it from other candidate tires (sets) in the program. **F538**

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.8 *caravan, n*—for purposes of a tire test, two or more vehicles running in the same time frame, over the same test course(s), under similar but independent conditions. **F538**

3.1.8.1 *Discussion*—A caravan can have dissimilar control groups for each vehicle in the group with independent rotation schedules for each tire group and vehicle. A caravan is independent and a convoy is interdependent.

3.1.9 *casing, n*—of a tire, a used or treadless tire to which additional tread rubber may be attached for the purpose of retreading. **F538**

3.1.10 *control tire (set), n*—a reference tire (or reference set) repeatedly tested in a specified sequence, typically in conjunction with a candidate tire (set), throughout an evaluation program. **F538**

3.1.10.1 *Discussion*—Control tires (sets) are used for adjustment of data sets generated from an evaluation program or the statistical procedures used on data sets, or both, in order to offset or reduce variation in test results. They can also be used to improve the accuracy of candidate tire (set) data and to detect variation in test equipment.

3.1.11 *convoy, n*—in tire testing, two or more vehicles running at the same time, over the same test course, under the same interdependent conditions. **F538**

3.1.12 *cord, n*—in a tire, filament(s) or plied yarns used in making a tire ply. **F538**

3.1.13 *cross-country track, n*—surface not subject to repeated traffic in addition, no roads, routes, well-worn trails or man-made improvements; can consist of tank trails with crushed rock or having large exposed obstacles (rocks, boulders, etc.). **F538**

3.1.14 *gravel road, n*—two lane, all-weather, occasionally maintained, hard or loose surface (for example, large rock, paved, crushed rock, gravel) intended for medium-weight, low-density traffic, in accordance with the U.S. Federal Highway Administration. **F538**

3.1.15 *groove, n*—a void that is relatively narrow compared to its length. **F538**

3.1.16 *groove (void) depth, n*—measurement of the perpendicular distance from a real or calculated reference defined by edges of two adjacent ribs (lugs) to the lowest point of contact in the groove (void). **F538**

3.1.17 *load range, n*—a letter designation (A, B, C, D) or, for P-metric tires, standard load (SL) or extra load (XL), used to identify a given size tire with its load and inflation limits when used in a specific type of service. **F538**

3.1.18 *load rating, n*—the maximum load a tire is rated to carry for a given usage at a specified cold inflation pressure. **F538**

3.1.19 *outside diameter, n*—the maximum diameter of a tire when it is mounted and inflated. **F538**

3.1.20 *overall width, n*—the maximum cross-sectional width of a tire, including protective or decorative ribs. **F538**

3.1.21 *paved road, n*—two or more lanes, all-weather, maintained, hard surface roads with good driving visibility

used for heavy and high-density traffic, in accordance with the U.S. Federal Highway Administration. **F538**

3.1.22 *secondary road, n*—two lane, occasionally maintained, hard or loose surface (for example, large rock, paved crush rock, gravel, soil aggregate) intended for medium-weight, low-density traffic, in accordance with the U.S. Federal Highway Administration. **F538**

3.1.23 *section width, n*—the width of a new tire, including 24-h inflation growth and including normal sidewalls, but not including protective side ribs, bars, or decorations. **F538**

3.1.24 *sidewall, n*—of a tire, that portion of a tire between the tread and the bead. **F538**

3.1.25 *tire, n*—a load-bearing ground-contacting circumferential attachment to a vehicle wheel. **F538**

3.1.26 *tire, bias, n*—a pneumatic tire in which the ply cords that extend to the beads are laid at angles substantially less than 90° to the center line of the tread. **F538**

3.1.26.1 *Discussion*—It should be noted that the International Organization for Standardization (ISO) defines the word as “*bias ply tire (diagonal), n*—a pneumatic tire in which the ply cords extending to the beads are laid at alternate angles substantially less than 90 degrees to the center line of the tread.”

3.1.27 *tire, radial, n*—a pneumatic tire in which the ply cords that extend to the beads are laid substantially at 90° to the center line of the tread, the tire being stabilized by a belt. **F538**

3.1.27.1 *Discussion*—It should be noted that the International Organization for Standardization (ISO) defines the word as “*radial tire, n*—a pneumatic tire structure in which the ply cords extend to the beads and are laid substantially at 90 degrees to the center line of the tread, the carcass being stabilized by an essentially inextensible circumferential belt.”

3.1.28 *tread, n*—of a tire, the part of a tire that comes in contact with the ground. **F538**

3.1.29 *tread arc width, n*—the length of the arc measured from one extreme of tread design proper to the opposite extreme; that is, from shoulder to shoulder perpendicular to the circumferential center line. **F538**

3.1.30 *tread radius, n*—the radius of a circle whose arc best fits the tread surface when radius template used in head perpendicular to the circumferential center line of an inflated tire. **F538**

4. Significance and Use

4.1 This test method establishes a standard procedure of comparative testing, for tire durability and treadwear, for the use of approving tires under the Administrator’s Cooperative Approved Tire List (CATL) (2).

5. Procedure

5.1 Procedures for testing passenger car, light truck, and truck-bus tires are contained in Methods 1, 2, and 3, respectively. Procedures for testing Off Road Severe Application (ORSA) tires are contained in Method 4.

5.2 Method 1—Passenger Car Tires:

5.2.1 Selection and Preparation of the Test Tires: