



Designation: ~~F1426 – 11~~ F1426 – 20

Standard Practice for Identifying Tire Tread Surface Irregular Wear Patterns Resulting from Tire Use¹

This standard is issued under the fixed designation F1426; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

One of the main performance characteristics of tires is the treadlife, defined as the number of ~~kilometres~~ kilometers or miles to wear-out, or where the condition of the tread pattern requires the removal of the tire. Before reaching the condition called “wear-out,” intermediate conditions of treadwear are frequently encountered, both in tire testing and in normal tire use, that are characterized by complex topological tread pattern features usually called “irregular wear.” When irregular wear is present, certain other tire performance features, such as noise and handling, may ~~fall below acceptable norms~~ be affected. Therefore, it is important in tire development testing and the assessment of tire use performance to be able to describe accurately the condition of the worn surface of tires.

Over the years, different descriptive names have been given to these worn tread pattern features. A standardized nomenclature system is needed to be able to identify the features that are present and describe the intensity or magnitude of these features. This practice is intended to give sufficient instructions to permit an evaluation of irregular wear. To describe adequately the features of these tread patterns, it is necessary to develop a special logical progressive sequence of definitions or descriptions.

1. Scope

1.1 This practice provides the instructions and nomenclature to evaluate the wear features of the tread pattern on a tire for some intermediate state ~~short of total~~ prior to wear out.

1.2 A tire may be characterized by certain worn tread pattern conditions that are collectively referred to as “irregular wear” features. Definitions for these features are given in a special logical and conceptual sequence. First, basic tread pattern definitions are given. Then, additional tread pattern definitions directly related to the basic tread pattern definitions are given. Understanding these secondary definitions requires the knowledge of the basic definitions.

1.3 Based on the terms of this developed system of tread pattern definitions or descriptions, a set of treadwear descriptions is presented that encompasses both regular wear and irregular wear features.

1.4 This hierarchical arrangement produces the accurate and concise definitions needed to evaluate the complex irregular wear conditions of tires.

1.5 See Fig. 1 for tread pattern features or characteristics. See Fig. 2 and Fig. 3 for typical illustrations of regular or uniform and irregular treadwear features.

1.6 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[F538 Terminology Relating to the Characteristics and Performance of Tires](#)

¹ This practice is under the jurisdiction of ASTM Committee F09 on Tires and is the direct responsibility of Subcommittee F09.94 on Terminology.

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² 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.

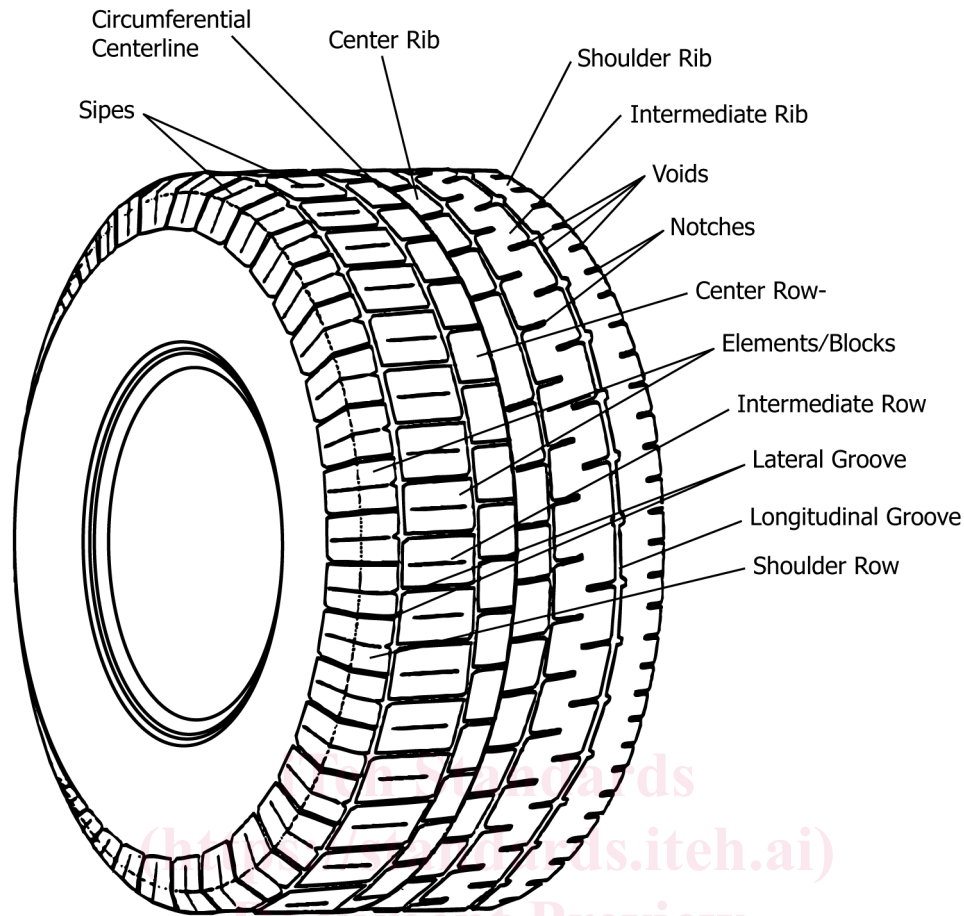


FIG. 1 Tread Pattern Characteristics

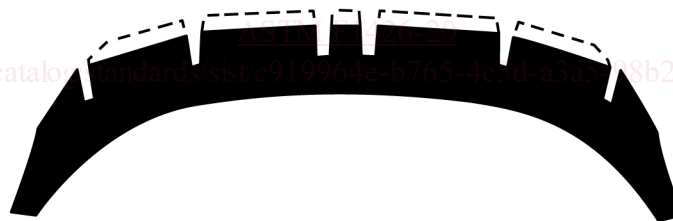


FIG. 2 Uniform or Regular Wear

3. Significance and Use

3.1 This practice fulfills the need for a standardized system for identifying and describing the tread pattern features of tires that are characteristic of intermediate states of treadwear short of total wear out. This descriptive capability is especially important in testing programs devoted to the development of improved performance tires. It is also important in assessing and evaluating tires after periods of typical tire usage.

4. Elementary Features of Tire Tread Patterns

4.1 All tires contain an annular volume of rubber, the outside surface of which comes into contact with the pavement as a loaded tire rotates in vehicle use. This is defined below as a tread band. If surface voids are introduced into this tread band, the usual configuration of these voids produces a geometric pattern of remaining surface projections or elements, that is, regions of the tread band that contact the pavement, collectively called a tread pattern.

5. Tire Inspection

5.1 The tread pattern of tires for inspection and evaluation should be clean and free of debris. Tires may be inspected unmounted (off a rim), but it is recommended that tires be mounted and inflated to normal recommended inflation pressure.



a. Heel-Toe Wear



Note 1



Note 2



Note 1

b. Feather Wear



Note 2



c. Shoulder Wear



Note 2

FIG. 3 Types of Irregular Wear



Note 1

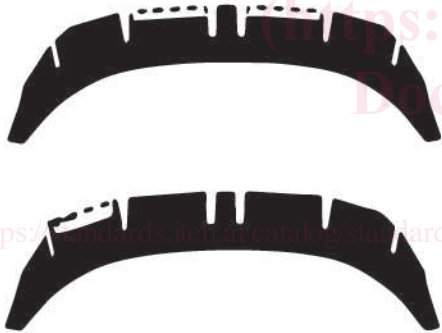


Note 1

d. Shoulder Step/Chamfer Wear

iTeh Standards

<https://standards.iteh.com/document/preview>



<https://standards.iteh.com/document/preview>



Note 1



Note 1

e. Row/Rib Wear



Note 1

f. Full Shoulder Wear

FIG. 3 Types of Irregular Wear (continued)

5.2 Position the tire to be evaluated in a vertical orientation (that is, the plane of the tire is vertical) on a fixture that permits rotating the tire. Provide sufficient illumination for viewing the tread pattern. A movable secondary source of illumination with a light path tangential to the tread surface is often useful for viewing subtle wear features.

5.2.1 Observe the entire tread pattern of the tire and record the treadwear features of the tire according to the wear nomenclature system as given in Sections [78](#) and [89](#).

5.3 There are two options for recording the observed tread pattern features:

5.3.1 *Option 1*—Record all of the features observed on the tread pattern, or

5.3.2 *Option 2*—Record all of the features observed on the tread pattern with a qualitative indication of the magnitude or intensity of each feature. Recommended qualifiers are: slight, moderate, or severe.

6. Basic Definitions of General Tread Pattern Features

6.1 *tread band, n*—an annular volume of rubber that encompasses the outer pavement contacting periphery of a tire; the width is normally much greater than the thickness, and both of these dimensions vary with tire size. [F538](#)

6.2 *void, n*—a volume (in the tread band) defined by the lack of rubber; the depth dimension of this volume may vary from point to point in (on) the tread band. [F538](#)

6.3 *groove, n*—a void that is relatively narrow compared to its length. [F538](#)

6.4 *projection, n*—a pavement contacting area of the tread band bounded by void. [F538](#)

7. Definitions of Subclassifications of Basic Tread Pattern Features

7.1 Grooves are major features that may be characterized as follows:

7.1.1 *longitudinal (circumferential) groove, n*—an endless groove that has its major (long) dimension substantially parallel to the tire circumferential centerline; the walls of the groove may not be perfectly parallel planes, but may have short alternating sections of the wall at angles to the tire circumferential centerline. [F538](#)

7.1.2 *lateral groove, n*—a groove that has its long dimension oriented at a direction nonparallel to the tire circumferential centerline; it most frequently opens into a void at both ends. [F538](#)

7.2 Secondary groove-like features are defined as follows:

7.2.1 *notch, n*—a groove smaller in both width and length than a lateral groove that contains one closed end. [F538](#)

7.2.2 *sipe, n*—a molded or cut rectangular void that is substantially narrower than the major grooves or voids. [F538](#)

7.3 Projections are major pavement contacting tread band regions, defined as follows:

7.3.1 *rib, n*—a continuous circumferential projection. [F538](#)

7.3.2 *shoulder rib, n*—a rib at or near the outer edge or shoulder of the tread band. [F538](#)

7.3.3 *center rib, n*—a rib at or near the circumferential centerline of the tread band. [F538](#)

7.3.4 *intermediate rib, n*—one or more rib(s) located between the centerline and the shoulder ribs of the tread band. [F538](#)

7.3.5 *element, n*—an isolated (totally bounded by void) projection. [F538](#)

7.3.6 *block, n*—synonym for *element*. [F538](#)

7.3.7 *row, n*—a rib or a continuous collection of elements that lie on a circumferential line parallel to the circumferential centerline of the tread band. [F538](#)

7.3.8 *shoulder row, n*—a row located at or near the shoulder of the tread band. [F538](#)

7.3.9 *center row, n*—a row located at or near the circumferential centerline. [F538](#)

7.3.10 *intermediate row, n*—a row located between the circumferential centerline and the shoulder ribs/rows of the tread band. [F538](#)

8. General Treadwear Definitions

8.1 *uniform wear, n*—a type of treadwear characterized by equal—even or comparable tread loss both from projection to projection and from point to point on a given projection, resulting in a smooth appearance of all parts of the tread pattern. [F538](#)

8.2 *regular wear, n*—synonym for *uniform wear*. [F538](#)

8.3 *irregular wear, n*—a type of treadwear characterized by substantial variations of tread loss both from projection to projection and frequently from point to point on a given projection. [F538](#)

8.4 *wear-out, n*—a condition where any point on the tread is reduced to a depth equal to the height of the treadwear indicator. [F538](#)

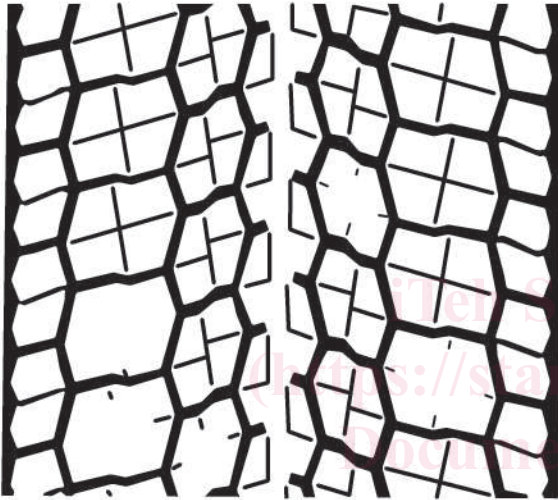
9. Irregular Treadwear Definitions

9.1 Descriptions of irregular wear are given in three categories: (1) intraprojection wear features, (2) interprojection wear features, and (3) independent (of projection) wear features.



Note 2

g. Center Wear



Note 3

h. Element Wear

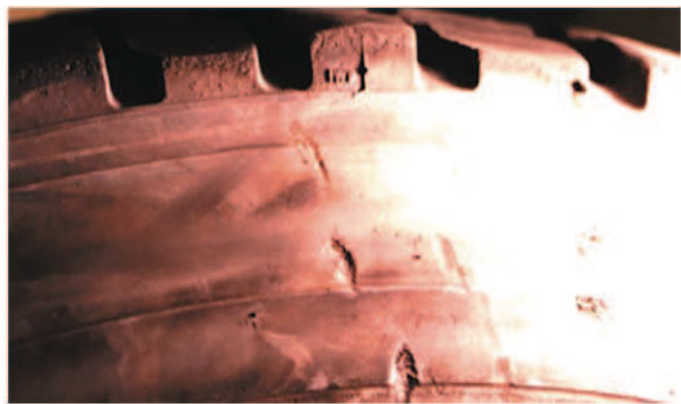
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Note 1

i. Alternate Element Wear



Note 1