



Designation: E 1136 – 93 (Reapproved 1998)

Standard Specification for A Radial Standard Reference Test Tire¹

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1. Scope

1.1 This specification covers the general requirements for a radial-ply standard reference test tire. The tire covered by this specification is primarily for use as a reference for tire traction performance evaluations, but may also be used for other evaluations, such as pavement roughness, noise, or other tests that require a reference tire.

1.2 This specification also provides a standard design of certified construction, accurate dimensions, and specifies a means of storage.

2. Referenced Documents

2.1 ASTM Standards:

- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension²
- D 1054 Test Method for Rubber Property Resilience Using a Rebound Pendulum²
- D 1765 Classification System for Carbon Blacks Used in Rubber Products²
- D 2240 Test Method for Rubber Property—Durometer Hardness²
- D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets²

3. Design and Construction

3.1 The standard reference test tire shall be size P195/75R14, current technology All Season tread design steel-belted radial (see Fig. 1 and Fig. 2).



FIG. 1 Front View of a Radial Reference Tire

¹ This specification is under the jurisdiction of ASTM Committee E-17 on Vehicle-Pavement Systems and is the direct responsibility of Subcommittee E17.24 on Tire and Slider Characteristics.

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² *Annual Book of ASTM Standards*, Vol 09.01.

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FIG. 2 Side View of a Radial Reference Tire

3.2 The tire shall be designed to conform with the Tire and Rim Association (TRA) standard nominal dimensions and tolerances for cross section and overall diameter found in the Current Year Book.³

3.3 The tire used for this specification is produced by the Uniroyal Goodrich Tire Company, Inc.⁴ The tire is stamped on the sidewall with the words: “Standard Reference Test Tire.”

4. Materials and Manufacture

4.1 The individual standard reference test tires shall conform to the manufacturer’s design standards. Dimensions, weights, and permissible variations are given in Section 7 and Table 1 and Table 2.

4.2 Tread compounding, fabric processing, and all the steps in tire manufacturing shall be controlled to ensure minimum variability between tires.

4.3 The standard reference test tire shall be as originally molded without any tread grinding or repairs.

5. Material Requirements

5.1 The requirements for tread compound are given in Table 1.

5.1.1 Certain proprietary products have been specified since exact duplication of properties of the finished tire may not be achieved with other similar products. This inclusion does not in any way comprise a recommendation for these proprietary

³ Available from the Tire and Rim Association, 175 Montrose West Ave., Suite 150, Copely, OH 44321.

⁴ Available from Uniroyal Goodrich Tire Company, Inc., Opelika Plant, P.O. Box 30, Opelika, AL 36801, Attn: Development Qualification Center SRTT Manager.

TABLE 1 Formulation of Oil-Extended Styrene-Butadiene BR (75/25) Blend Rubber Tread

Compound	Parts by Mass
SBR 1778 ^A	12.38
SBR 1502 ^B	66.00
CIS 1-Polybutadiene ^C	25.00
N351 black ^D	64.00
Naphthenic oil	17.13
Zinc oxide	5.00
Stearic acid	1.50
6 PPD ^E	1.50
TMQ ^F	2.00
Antidegradant wax	0.50
Tackifying hydrocarbon resin	2.00
TBBS ^G	0.80
DPG ^H	0.25
Sulfur	1.90

^AStyrene-butadiene rubber (23.5 % Styrene) contains 27.5 parts of naphthenic oil.

^BStyrene-butadiene rubber (23.5 % Styrene).

^CCIS Content 95 % min.

^DN351 carbon black, see Classification D 1765.

^En-1,3-Dimethylbutyl-N'-phenyl-p-phenylenediamine.

^FPolymerized, 1,2-dihydro-2,2,4-trimethylquinoline.

^GN-t-butyl-2-benzothiazole sulfenamide.

^HDiphenylguanidine.

TABLE 2 Physical Properties of Tread Compound

Tensile sheet cure, min at 320°F (160°C)	15
Stress at 300 % elongation psi (MPa)	1650 ± 150 (11.4 ± 1.0)
Tensile strength, min, psi (MPa)	2200 (15.2)
Elongation, min %	420
Durometer hardness ^A	65 + 4/-1
Restored energy (rebound or resilience)	39 ± 2

^AMeasured on tire tread.

products, nor against similar products of other manufacturers, nor does it imply any superiority over any such similar products.

5.2 The tire shall be of the following construction:

5.2.1 One-ply sidewall (polyester), and

5.2.2 A three-ply tread (one polyester and two steel belts).

6. Physical Properties

6.1 The physical properties of the tread compound are listed in Table 2.

7. Dimensions, Weights, and Permissible Variations

7.1 Details of dimensions are listed as follows and are shown in Fig. 3. When tolerances are not specified, tire dimensions are subject to manufacturer’s normal tolerances.

7.1.1 *Inflated Dimensions and Cured Cord Angles*—The tread width shall be 5.40 in. (137.2 mm) and the cross-sectional tread radius shall be 13.0 ± 2.0 in. (330.2 ± 50.8 mm). The tread radius is measured using the three point drop method (see Fig. 4 for an example of how the measurement is taken). The tire shall have a nominal cross-section width of 7.72 in. (196.1 mm), and a nominal outside diameter of 25.51 in. (648.0 mm) when mounted on a TRA design rim width (14 × 5.5 JJ). The cured cord angles shall be 90 ± 2° for the carcass and 21.0 ± 2° for the belts.

7.1.2 *Ribs*—The tire shall have five ribs.