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Standard Terminology Relating to Tire Cord and Fabrics¹

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1. Scope

1.1 This terminology is the compilation of all definitions developed by Subcommittee D13.19 on Tire Cords and Fabrics.

1.2 The terminology, mostly definitions, is unique to the tire cord fabric industry. Meanings of the same terms used outside the tire cord fabric industry can be found in other compilations or in dictionaries of general usage.

1.3 In addition to being a specialized dictionary, this terminology is also a tool for managing the Subcommittee's terminology. This includes finding, eliminating, and preventing redundancies, that is, where two or more terms relating to the same concept are defined in different words.

2. Referenced Documents

2.1 ASTM Standards:

- D 123 Terminology Relating to Textiles²
- D 885 Test Methods for Tire Cords, Tire Cord Fabrics, and Industrial Filament Yarns Made from Manufactured Organic-Base Fibers²
- D 1871 Test Methods for Adhesion of Single-Filament Steel Wire to Rubber²
- D 2229 Test Method for Adhesion Between Steel Tire Cords and Rubber²
- D 2692 Test Method for Air Wicking of Tire Fabrics, Tire Cord Fabrics, Tire Cord, and Yarns²
- D 2969 Test Methods for Steel Tire Cords²
- D 2970 Test Methods for Tire Cords, Tire Cord Fabrics, and Industrial Yarns Made from Glass Filaments²
- D 4393 Test Method for Strap Peel Adhesion of Reinforcing Cords or Fabrics to Rubber Compounds³
- D 4776 Test Method for Adhesion of Tire Cords and Other Reinforcing Cords to Rubber Compounds by H-Test Procedure³
- D 4974 Test Method for Hot Air Thermal Shrinkage of Yarn and Cord Using a Thermal Shrinkage Oven³
- D 4975 Test Methods for Single-Filament Tire Bead Wire Made from Steel³

¹ This terminology is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.19 on Tire Cord and Fabrics.

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² Annual Book of ASTM Standards, Vol 07.01.

³ Annual Book of ASTM Standards, Vol 07.02.

D 5591 Test Method for Thermal Shrinkage Force of Yarn and Cord with the Testrite Thermal Shrinkage Force Tester³

D 6320 Test Methods for Single Filament Hose Reinforcing Wire Made from Steel³

3. Terminology

adhesion, *n*—the property denoting the ability of a material to resist delamination or separation into two or more layers.

D 1871, D 4393, D 4776

adhesion, *n*—*in tire fabrics*, the force required to separate a textile material from rubber or other elastomer by a definite prescribed method.

D 2229, D 4393, D 4776

adhesive treated tire cord, *n*—a tire cord whose adhesion to rubber or other elastomer has been improved by the application of a dip followed by rapid drying and (normally) additional heat treatment.

D 5591

air wicking, *n*—*in tires*, the passage of air longitudinally along or through yarns in a fabric that has been encased and cured in rubber or other elastomer, that is, air permeability in the plane of the fabric.

D 2692

catenary length, *n*—the difference between the length of the shortest and the longest component in a plied yarn or cables cord after twisting.

D 2970

chafer fabric, *n*—woven fabric, usually coated with unvulcanized rubber, which is laid around the bead of a tire before vulcanization.

D 2692, D 4393

cord, *n*—a twisted or formed structure composed of one or more single or plied filaments, strands, or yarns of organic polymer or inorganic materials.

D 885, D 4776, D 5591

cord twist, *n*—the amount of twist in a cord made from two or more single or plied yarns.

D 885, D 2970

core, *n*—a filament or strand that serves as an extended axis about which other elements can be wound.

D 2969

curing, *n*—see the preferred term **vulcanization**.

D 1871,

D 4393, D 4776

dip, *n*—a chemical composition that is applied to a textile cord or fabric to improve its adhesion to rubber or other elastomer.

D 885, D 2970

dip pick-up, *n*—*in glass cords*, the amount of dip solids present as supplied.

D 2970

dip pick-up, *n*—*in a textile cord or fabric*, the amount of dip or dip components present after processing, including drying, as determined by prescribed methods, and expressed as



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- a percentage of the mass of the oven-dried, dip-free material. **D 885**
- direction of lay**, *n*—the helical disposition of the components of a strand or cord. **D 2969**
- direction of twist**, *n*—see **direction of lay**. **D 2969**
- fabric dip**, *n*—for *tire fabrics*, a chemical composition which is applied to a textile cord or fabric to improve its adhesion to rubber compounds. **D 4393**
- flare**, *n*—the spreading of the filament ends or the strand ends at the cut end of a steel tire cord, expressed as the unraveled length. **D 2969**
- greige cord**, *n*—in *tire cords*, a cord that has not been adhesive treated, heat treated, or otherwise treated before use (see *cord*). **D 4974, D 5591**
- greige tire cord**, *n*—a tire cord that has not been dip treated or heat treated before use (see *tire cord*). **D 5591**
- growth**, *n*—the increase in length of a specimen caused by the application of a continuing load or force under specified conditions. **D 885**
- high elongation**, *adj*—in *steel tire cord*, a cord with an average elongation at break greater than 3.0 %. **D 2969**
- holland cloth**, *n*—a completely filled woven fabric having a smooth gloss finish on both sides used as a separating medium for sheeted rubber compounds. **D 1871, D 4393**
- hose reinforcing wire**, *n*—a single filament of steel wire with a metallic coating (usually brass) used in the reinforcement of a rubber or other elastomer hose. **D 1871, D 6320**
- industrial yarn**, *n*—a yarn composed of continuous filaments, usually of high breaking tenacity, produced with or without twist, and intended for applications in which functional properties are of primary importance; for example, in reinforcing material in elastomeric products (tires, hose, belting), in protective coverings, and in cordage and webbing, and so forth.. **D 885, D 2970, D 4776**
- initial modulus**, *n*—the slope of the initial straight portion of a stress-strain (or force elongation) curve. **D 885, D 2970**
- length of lay**, *n*—the axial distance required to make one complete revolution of any element of a strand or cord. **D 2969**
- mill grain**, *n*—in *rubber*, grain which is imparted to rubber sheeting while being mixed or conditioned in a rubber mill and which is parallel to the direction the rubber moves in the mill. **D 1871**
- moisture equilibrium for testing**, *n*—for *industrial yarns and tire cords*, the condition reached when, after free exposure to a test atmosphere which is in motion, two successive weighings not less than 4 h apart, show not more than 0.1 % progressive change in mass of the specimen or sample. **D 885**
- percent elongation**, *n*—the increase in length of a specimen expressed as a percentage of the original length. **D 4975**
- pneumatic tire**, *n*—a hollow tire that becomes load-bearing upon inflation with air, or other gas, to a pressure above atmospheric. **D 885, D 5591**
- reinforcing cord**, *n*—a cord made from industrial yarns and used to provide added support to other materials, such as tires, hose, belting, protective coverings, webbings, and so forth. **D 4776**
- residual torsion**, *n*—revolutions made by a specified length of cord when one end is held in a fixed position and the other allowed to turn freely. **D 2969**
- retraction**, *n*—in *yarns and cords*, the reduction in length when previous restraint is removed and relaxation is allowed, thus causing a directionally proportional increase in linear density. **D 5591**
- rubber**, *n*—a material that is capable of recovering from large deformations quickly and forcibly, and can be, or already is, modified to a state in which it is essentially insoluble (but can swell) in boiling solvent, such as benzene, methylethyl ketone, and ethanol-toluene azeotrope. **D 1871, D 4393, D 4776**
- rubber compound**, *n*—as used in the manufacture of *rubber articles*, an intimate mixture of elastomer(s) with all the materials necessary for the finished article. **D 1871, D 2229, D 4393, D 4776**
- rubberize**, *v*—to impregnate or coat with rubber compound, or both. **D 4393**
- single twist**, *n*—the amount of twist in each individual single yarn element in a tire cord structure based on the length of the element after twist has been removed from the cord. **D 885**
- steel cord**, *n*—a formed structure made of two or more steel filaments when used as an end product or a combination of strands or filaments and strands. **D 2229, D 2969, D 4393**
- steel cord wrap**, *n*—a steel filament wound helically around a steel cord. **D 2969**
- steel filament**, *n*—the individual element in a steel strand or cord. **D 2969**
- steel strand**, *n*—a group of steel filaments combined to form a unit product to be processed further. **D 2969**
- stitch**, *v*—in *making rubberized articles*, to press uncured rubber compound into or around yarns or cords to form a composite of the materials and to remove entrapped air. **D 4393**
- straightness**, *n*—in *steel cord*, the property of a cord characterized by a lack of deviation from its central axis over short lengths of cord. **D 2969**
- tabby**, *n*—a *plain weave fabric*. In the context of tire cord fabric, it refers to sections of closely spaced weft yarns in a special section of fabric woven to provide as sample.
- tabby sample**, *n*—the section of tire cord fabric between two tabbies that have been woven separately with a distance of 0.5 to 1.0 m (18 to 36 in.) between them. **D 885, D 2970**
- tack**, *n*—for *rubber or rubber compounds*, a property that causes two layers of these materials when pressed together to adhere at the area of contact. **D 4393**
- thermal shrinkage**, *n*—of *textile yarn and cords*, contraction in length caused by heat. **D 4974**
- thermal shrinkage force**, *n*—that force induced when a restrained material is restricted from shrinking upon exposure to heat. **D 5591**
- thermal shrinkage force tester**, *n*—an apparatus that measures the force achieved when a yarn or similar specimen, held at a constant (fixed) length, is subjected to a temperature above that at which the specimen was mounted in the apparatus. **D 5591**



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tire, *n*—a load-bearing ground-contacting circumferential attachment to a vehicle wheel. **D 885, D 5591**

tire bead, *n*—the part of a tire that comes in contact with the rim and is shaped to secure the tire to the rim. **D 1871, D 4975**

tire bead wire, *n*—a monofilament of steel wire with a metallic coating, usually bronze, used in the forming of a tire bead. **D 1871, D 4975**

tire cord, *n*—a twisted or formed structure composed of one or more single or plied industrial yarn elements having the same nominal twist, direction of twist, length, and tension. **D 2692, D 2970, D 4393, D 4974**

tire cord fabric, *n*—a fabric consisting of tire cord warp with widely spaced (usually 40 to 200 picks/m (1 to 5 picks/in.)) single yarn filling. **D 885, D 2692, D 2970, D 4393**

tire fabric, *n*—a textile fabric, other than tire cord fabric, which is used as a reinforcement in tires. **D 2692**

torsion resistance, *n*—*in tire bead wire*, the number of turns of twist in a short length of wire that causes rupture. **D 4975, D 6320**

vulcanization, *n*—an irreversible process, usually accomplished through the application of heat, during which a rubber compound, through a change in its chemical structure (for example, cross linking) becomes less plastic and more resistant to swelling by organic liquids while elastic properties are conferred, improved, or extended over a greater range of temperatures. **D 1871, D 2692, D 4393, D 4776**

weftless fabric, *n*—*as used in tire building*, a sheet of parallel cords surrounded by uncured rubber compound. **D 4393**

wildness, *n*—obsolete term, previously used to describe a number of steel tire cord properties including flare, straightness, and residual torsion. **D 2969**

work-to-break, *n*—the total energy required to rupture a specimen to the breaking force during a tensile test. **D 885**

yield strength, *n*—the stress at which a material exhibits a specified limiting deviation from the proportionality of stress to strain. **D 4975, D 6320**

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