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Standard Terminology Related to Force, Deformation and Related Properties of Textiles¹

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1. Scope

1.1 This terminology standard is a compilation of definitions of technical terms related to force and deformation properties when evaluating a stress-strain curve of a textile. (See [Figs. X1.1 and X1.2](#).) A chart showing the relationship of the basic terms is shown in [Table 1](#). Terms that are generally understood or adequately defined in other readily available sources are not included.

1.2 For other terms associated with textiles, refer to Terminology [D123](#).

1.3 *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

[D123 Terminology Relating to Textiles](#)

[D1578 Test Method for Breaking Strength of Yarn in Skein Form](#)

[D5344 Test Method for Extension Force of Partially Oriented Yarn](#)

3. Terminology

break factor, *n*— in yarn testing, the comparative breaking load of a skein of yarn adjusted for the linear density of the yarn expressed in an indirect system. [[D13.58](#)] [D1578](#)

breaking elongation—See **elongation at break**.

breaking force, *n*—the maximum force applied to a material carried to rupture. (Compare **breaking point**, **breaking strength**. *Syn.* **force-at-break**)

DISCUSSION—Materials that are brittle usually rupture at the maximum force. Materials that are ductile usually experience a maximum force before rupturing.

breaking load—deprecated term. Use the preferred term **breaking force**.

breaking point, *n*—on a force-elongation curve, or stress-strain curve, the point corresponding with the breaking force or the breaking stress in a tensile test. (Compare **breaking force**.)

breaking strength, *n*—strength expressed in terms of breaking force. (See also **breaking force** and **strength**. *Syn.*, strength at break)

breaking tenacity, *n*—the tenacity at the breaking force. (See also **breaking force**, **tenacity**.)

breaking toughness, *n*—toughness up to the breaking force of a material.

DISCUSSION—Breaking toughness is represented by the area and the stress-strain curve from the origin to the breaking force per unit length, and, in textile strands, is expressed as work (joules) per unit of linear density of the material. In textile fabrics, the unit is joules per gram.

chord modulus, *n*—in a stress-strain curve, the ratio of the change in stress to the change in strain between two specified points on the curve.

compression, *n*—the act, process, or result of compacting, condensing, or concentrating.

compressive force, *n*—the perpendicular force applied to surface(s) of a material in compaction.

compression recovery, *n*—the degree to which a material returns to its original dimension(s) after removal of a compressive force.

compression resistance, *n*—the ability of a material to oppose deformation under a compressive force.

corresponding elongation—See **elongation at specified force**.

corresponding force—See **force-at-specified-elongation**.

deformation, *n*—a change in shape of a material caused by forces of compression, shear, tension, or torsion.

DISCUSSION—Deformation may be immediate or delayed. Delayed deformation may be either recoverable or nonrecoverable.

¹ This terminology is under the jurisdiction of ASTM Committee [D13](#) on Textiles and is the direct responsibility of Subcommittee [D13.58](#) on Yarns and Fibers

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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.