



Standard Tolerances for Yarns Made of Man-Made Fibers and Spun on the Parallel Worsted or Modified Worsted System¹

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1. Scope

1.1 These tolerances are applicable to all yarns 59 tex (10.00/1 cotton count) or coarser spun of man-made fiber(s), 4.5 to 30.0 dtex/filament, (4 to 25 denier/filament) and spun on the parallel worsted or modified worsted system. These tolerances do not apply to novelty or fancy yarns spun on the parallel worsted or modified worsted system.

NOTE 1—For tolerances for other spun yarns, see Tolerances D 2644, Tolerances D 2645, Specification D 541, and Specification D 681.

1.2 The values stated in SI units are to be regarded as standard; the values in inch-pound units are provided as 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 123 Terminology Relating to Textiles²
- D 541 Specification for Single Jute Yarn²
- D 681 Specification for Jute Rove and Plied Yarn for Electrical and Packing Purposes²
- D 1422 Test Method for Twist in Single Spun Yarns by the Untwist-Retwist Method²
- D 1423 Test Method for Twist in Yarns by the Direct-Counting Method²
- D 1425 Test Method for Unevenness of Textile Strands Using Capacitance Testing Equipment²
- D 1578 Test Method for Breaking Load of Skeins²
- D 1907 Test Method for Yarn Number by the Skein Method²
- D 2256 Test Method for Tensile Properties of Yarns by the Single-Strand Method²
- D 2257 Test Method for Extractable Matter in Textiles²
- D 2258 Practice for Sampling Yarn for Testing²
- D 2494 Test Method for Commercial Mass of a Shipment of Yarn or Man-Made Staple Fiber or Tow²
- D 2644 Tolerances for Yarns Spun on the Woolen System²

¹ These tolerances are under the jurisdiction of ASTM Committee D-13 on Textiles and are the direct responsibility of Subcommittee D13.58 on Yarn Test Methods, General.

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² Annual Book of ASTM Standards, Vol 07.01.

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3. Terminology

3.1 Definitions:

3.1.1 *modified worsted system, n*—a worsted system for spinning man-made fibers which relies on pin control of fibers during sliver weight reduction, but which bypasses the system of combing required with wool to remove noil. (Syn. *parallel worsted system*.)

3.1.1.1 *Discussion*—The modified worsted system employs roller-top cards with metallic wire, pin-drafters, balloon drafters, or gills, and widely spaced roller drafting assemblies in roving and spinning.

3.1.2 *parallel worsted system, n*—see *modified worsted system*.

3.1.3 *tolerances, n*—when included in a contract, the limits to which the average (or other specified) value observed for a specific characteristic of a lot of material must conform to constitute a valid delivery.

3.1.3.1 *Discussion*—The observed values must be obtained by specified test methods on randomly selected samples from a sample of the material to be tested. See Section 4 for details.

3.1.4 *worsted system, n*—a spinning system adapted to fibers 50 to 250 mm (2 to 9 in.) in length.

3.1.5 For definitions of other textile terms, refer to Terminology D 123.

4. Sampling

4.1 *Division into Lots*—Each shipment or consignment of a single lot of yarn shall be considered a separate acceptance testing lot.

4.2 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of shipping cases directed in an applicable material specification or other agreement between the purchaser and the supplier, such as an agreement to use Practice D 2258. Consider shipping cases to be the primary sampling units.

NOTE 2—An adequate specification or other agreement between the purchaser and the supplier requires taking into account variability between shipping units, between packages or ends within a shipping unit, and between specimens from a single package so as to provide a sampling plan with a meaningful producer's risk, consumer's risk, acceptable quality level, and limited quality level.

4.3 *Laboratory Samples and Test Specimens*—Take laboratory samples and test specimens from each primary sampling unit of the lot sample for acceptance testing as directed in each of the specific test methods of interest.

5. Tolerances

5.1 *Commercial Mass*—In the absence of other contractual agreements, the commercial mass shall conform to the limits; invoice mass $\pm 1\%$ of the invoice mass.

5.2 *Extractable Matter*—The average percent extractable matter in yarns spun on the parallel worsted or modified worsted system shall not exceed 2 % when extracted with a halogenated hydrocarbon solvent, such as 1,1,2 trichloro-1,2,2 trifluoroethane.³

5.3 *Strength*—The average breaking force of each lot shall be equal to or greater than the specified minimum.

5.4 *Twist*:

5.4.1 *Direction*—The direction of twist shall be S or Z, as specified.

5.4.2 *Level*—The average twist shall conform to the limits: specified value $\pm 7.5\%$ of the specified value.

5.5 *Yarn Unevenness—Single Yarn*—The average CV percent unevenness for single yarn shall not exceed the value agreed upon between the purchaser and supplier. There is no acceptable test method to determine the average CV percent unevenness for ply yarn.

5.6 *Yarn Number*—The average yarn number of yarns spun on the parallel worsted or modified worsted system shall conform to the limits; specified value $\pm 6.0\%$ of the specified value.

6. Test Methods

6.1 Take test specimens as required by the test method to be applied. Use the following test methods:

6.1.1 *Commercial Mass*—Test Method D 2494.

³ This solvent is available from various suppliers under various trade names. Freon TF available from Du Pont, and Genesol D, available from Allied Chemical Corp., have been found suitable. In both of these solvents, the nonvolatile residue is claimed to be less than 2 ppm.

6.1.2 *Extractable Matter*—Test Method D 2257, soxhlet procedure.

6.1.3 *Strength*—Test Method D 2256 for single strands; Test Method D 1578 for skeins.

6.1.4 *Twist*—Test Method D 1422 or by agreement Test Method D 1423.

6.1.5 *Yarn Unevenness*—Test Method D 1425 for single yarns.

6.1.6 *Yarn Number*—Test Method D 1907.

7. Conformance

7.1 The purchaser and supplier may agree on a procedure to establish conformance, including control charts furnished by the seller, a sequential-sampling plan, or the double-sampling plan outlined in 7.2.

7.2 In the absence of a control-chart or sequential-sampling plan, proceed as directed in 7.2.1 through 7.2.3.

7.2.1 If the test results for the lot conform to the tolerances for characteristics specified in Section 5, consider the lot a valid delivery.

7.2.2 If the test results for one or more characteristics do not conform to the tolerances, take new laboratory samples from the original lot sample or take a new lot sample. Retest the lot for the characteristics that did not conform to the tolerances in the first test, and average the results of the first and second samples as if the results were from one test of double the original number of specimens. If the new average(s) conform(s) to the specified tolerances, consider the lot a valid delivery.

7.2.3 If the test results obtained as directed in 7.2.2 do not conform to the specified tolerances, consider the lot a nonvalid delivery.

8. Keywords

8.1 man-made fibers; parallel worsted system; spinning; yarns

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