Designation: D1244 – 98 (Reapproved 2020)

Standard Practice for Designation of Yarn Construction[1]

This standard is issued under the fixed designation D1244; 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

This practice conforms in general with the practices adopted by the International Organization for Standardization in Document ISO 1139, Designation of Yarns. The ISO document, however, covers the use of the tex direct yarn numbering system only, whereas ASTM Practice D1244, as in previous texts, also covers other direct yarn numbering systems and traditional indirect yarn numbering systems.

1. Scope

1.1 This practice covers instructions for the designation of yarn construction and is applicable to single yarns, plied yarns, and cabled yarns or cords of filaments or spun fibers. The application of the practice to specific cases is illustrated with examples. This practice does not cover the description of novelty yarns or core spun yarns of various types.

1.2 The primary purpose of this practice is to establish a reference system for use in the trade and particularly for use in correspondence and publications. To secure a simplified notation, certain portions may be omitted provided there is no doubt as to the omitted parts.

1.3 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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

D861 Practice for Use of the Tex System to Designate Linear Density of Fibers, Yarn Intermediates, and Yarns

D4849 Terminology Related to Yarns and Fibers

2.2 *ISO Standard:*[3]

ISO 1139 Designation of Yarns

3. Terminology

3.1 For terminology related to yarn test methods see Terminology D4849.

3.1.1 The following terms are relevant to this standard: resultant yarn number.

3.2 For definitions of other textile terms related to textiles, refer to Terminology D123.

4. Explanation of Abbreviations and Symbols

4.1 *B*—A symbol designating the resultant yarn number of bulked yarns, to be placed before the numerical value.

4.2 *R*—A symbol designating the resultant yarn number of plied or cabled yarns, to be placed before the numerical value.

4.3 ×—The multiplication symbol is used before the number of identical component strands combined in any stage of manufacture for yarns numbered in a direct yarn numbering system.

[1] This practice 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.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

4.4 +—The plus sign is used to denote the addition or combination of dissimilar component strands in a more complex structure.

4.5 /—When used with direct yarn numbers, the solidus denotes the separation of a structure numbered in a direct yarn numbering system into its component strands. When used with indirect yarn numbers, the solidus denotes combining (plying) of identical component strands, numbered in an indirect yarn numbering system. See also Note 2.

4.6 *f*—An abbreviation for filaments, to be placed before the number of filaments.

4.7 *t0*—Symbol indicating zero twist in a yarn.

4.8 *tpi*—An abbreviation for turns of twist per inch in a yarn.

4.9 *tpm*—An abbreviation for turns of twist per metre in a yarn.

4.10 ( )—Parentheses are used to enclose information describing the material from which the yarn is made.

4.11 [ ]—Brackets are used to enclose the description of dissimilar components forming a subcomponent of a cabled yarn or cord.

4.12 { }—Braces are used to enclose the description of dissimilar components forming a multiple wound yarn, plied yarn, cabled yarn, or cord.

4.13 Ne_c—Abbreviation for cotton count.

4.14 Nw_w—Abbreviation for worsted count.

4.15 *Nwe*—Abbreviation for woolen run.

4.16 *den.*—Abbreviation for denier.

NOTE 1—Other abbreviations may be found in specific examples or in trade usage.

5. Summary of Practice

5.1 The structure of a yarn is described by a group or series of groups of logically ordered symbols which describe the characteristics of a yarn. One group of symbols describes completely a single yarn or a component of a more complex yarn. A plied yarn is described by two groups; for example, in the single-to-ply notation, the first group describes the structure of the single yarn or yarns, and the second group describes the structure of the plied yarn. The groups are connected with appropriate symbols. Other yarns are described similarly.

5.2 Two orders of notation are presented for direct yarn numbering systems, single-to-ply and ply-to-single. For indirect yarn numbering systems, only the traditional single-to-ply notation is presented.

NOTE 2—Alternative names for the single-to-ply and ply-to-single notation are single-to-fold and fold-to-single, used in ISO/TC 38 Document N362, and single-to-resultant and resultant-to-single. The resultant-to-single term is particularly applicable to the description of cabled yarns and to single yarns that have been bulked or given added twist. See also 7.3.2, 7.3.3, and Note 3.

6. Significance and Use

6.1 The two orders of notation are presented to satisfy two separate needs encountered in the textile industry and in textile technology. The single-to-ply notation meets the needs of yarn manufacturers to describe a single yarn, or a plied or cabled yarn primarily in terms of its manufacturing specifications. The ply-to-single notation, based on the resultant yarn number, meets the needs of users of yarn who have relatively little interest in the linear density or twist of the single yarn component(s) but are interested mainly in the final product. The chief difference between the two notations is the order in which the information is presented. In this practice the same symbols are used for both notations and retain their usual mathematical meanings.

6.2 The single-to-ply notation is prescribed for yarns numbered in both direct and indirect yarn numbering systems and conforms with current usage in large sections of the textile industry. The ply-to-single notation is prescribed for yarns numbered in a direct yarn numbering system and its use is approved by the ISO/TC 38 in Document N362. This latter notation has not been included previously in Practice D1244. The ply-to-single notation has not been recommended for use with yarns numbered in indirect yarn numbering systems because of possible confusion when symbols are used with different meanings in different notations or used in conflict with their established mathematical significance.

6.3 At first glance, the recommended notation may appear rather involved, but in actuality it is a concise method for describing complex structures. For example, compare the following description of a yarn: "A cabled yarn or cord with a resultant cotton count of 1.4 and 5 turns per inch of Z twist made from 3 strands of plied yarn with 9 turns per inch of S twist each plied from 5 strands of 24 cotton count yarn with 15 turns per inch of Z twist and spun from 1 1⁄16 in. staple, graded strict low middling, and having a Micronaire reading of 4.3" with the description of the same yarn stated in Example 23,

24 Ne_c Z 15 tpi (cotton, 1 1⁄16 in., SLM, 4.3 Micronaire Reading) /5 S 9 tpi/3 Z 5 tpi; R 1.4 c.c. (23)

6.4 ASTM recommends (see Practice D861), the general use of the tex universal yarn numbering system.

6.5 The designation of a numbering system, for example, cotton count, woolen run, and linen lea, does not restrict the yarn composition to the named fiber. See Example 5.

6.6 The terms used to designate different yarn numbering systems are frequently abbreviated. See 4.13 – 4.16.

6.7 The various yarn numbering *units* (cotton count, tex, etc.) should be carefully distinguished from the *property* which has been designated as linear density. This last term covers the concept of size or fineness. The distinction is comparable to the use of the *units*, (litres or gallons), to express a *property* such as the volume of an object.

7. Designation of Single Yarns, Direct and Indirect Yarn Numbering Systems

7.1 *Spun Yarns*—To describe the structure of spun yarns, state (*1*) the yarn number and the numbering system used, (*2*) the direction of twist, and (*3*) the amount of twist. Express the amount of twist in turns per inch (tpi) or turns per metre (tpm). Show the yarn number observed when the yarn is twisted to the