

ICS 59.060.20

CCS W52



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 16604-2017

Replacing GB/T 16604-2008

Polyester filament for industry

涤纶工业长丝

Issued on: December 29, 2017

Implemented on: July 1, 2018

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China;
Standardization Administration of China**

Table of Contents

1	Scope
2	Normative References
3	Terms and Definitions
4	Classification and Identification
4.2	Identification
5	Technical Requirements
6	Test Methods
6.1	General Rules
6.3	Tensile Properties
6.4	Dry-hot Shrinkage Rate
6.4.1	Test principle Test Conditions Unit Condition
6.4.2	Method A - drying oven method
6.4.2.2	Instruments
6.5	Index of Dimensional Stability
7	Inspection Rules
7.2	Inspection Items
7.4	Stipulations of Sampling
7.5	Comprehensive Evaluation
7.5.2	The determined values or calculated values of the various performance
7.6	Re-inspection Rules
7.6.5	Evaluation rules
8	Marking, Packaging, Transportation and Storage
8.1	Marking
8.2	Packaging

1 Scope

GB/T 16604-2017 is the Chinese national standard on polyester filament for industry, in the field of textile and leather technology. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 29 December 2017 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization

Administration of China, and has been in force since 1 July 2018. Classification: ICS 59.060.20, CCS W52. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Standard specifies the terms and definitions, classification and identification, technical requirements, test methods, inspection rules, marking, packaging, transportation and storage of polyester filament for industry. This Standard is applicable to polyester filament for industry with a linear density of 140 dtex ~ 9,000 dtex; other polyester filaments for industry may take this as a reference.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 2828.1-2012 Sampling Procedures for Industry by Attribute - Part

1.Sampling Schemes Indexed by Acceptance Quality Limit (AQL) for Lot-by-lot Inspection

GB/T 3291.1 Textiles - Terms of Textile Material Properties and Test - Part

3 Terms and Definitions

What is defined in GB/T 3291.1, GB/T 3291.3 and GB/T 4146 (all parts), and the following terms and definitions are applicable to this document.

3.1 Index of Dimensional Stability Index of dimensional stability refers to the sum of elongation rate of fiber under

4.0 cN/dtex load and the dry-hot shrinkage rate.

3.5 High-tenacity Low-shrinkage Polyester (HTLS) Filament for Industry High-tenacity low-shrinkage polyester filament for industry refers to polyester filament for industry whose dry-hot shrinkage rate (test conditions. 177 °C, 10 min, pre-tension

0.05 cN/dtex) is not greater than 2.5%, and whose breaking tenacity is not less than

3.8 Ultra-low-shrinkage (ULS) Polyester Filament for Industry Ultra-low-shrinkage polyester filament for industry refers to polyester filament for industry whose dry-hot shrinkage rate (test conditions. 190 °C, 15 min, pre-tension

0.01 cN/dtex) is not greater than 3.0%, and whose breaking tenacity is not less than

3.9 High-modulus Low-shrinkage (HMLS) Polyester Filament for Industry High-modulus

low-shrinkage polyester filament for industry refers to polyester filament for industry characterized by the index of dimensional stability and not greater than 10.

4 Classification and Identification

4.1 Classification In accordance with product performance, polyester filament for industry may be divided into three types. high-tenacity type, low-shrinkage type and high-modulus low-shrinkage type. The subdivision of the various types is as follows:

4.2 Identification

4.2.1 Product specifications shall be identified by fiber thickness (referring to the linear density of fiber, expressed in dtex) and the number of single filaments (referring to the number of spinneret holes, expressed in f), for example, 1,111 dtex/192 f.

4.2.2 Product identification shall include specifications, classification and name, etc.

5 Technical Requirements

5.1 Polyester filaments for industry are divided into three grades. superior, first-class and qualified. The physical indicators of each grade are shown in Table 1 ~ Table 3.

5.2 The appearance items and indicators shall be determined by the demand-side and the supply-side through negotiation, or, in accordance with the stipulations of Appendix A.

6.1 General Rules

6.1.1 Conditioning and Standard Atmosphere for Tests The conditions of conditioning and standard atmosphere for tests are. temperature $(20 \pm 5) ^\circ\text{C}$; relative humidity $(65 \pm 5) \%$.

6.1.2 Specimen preparation Under the standard atmospheric conditions specified in 6.1.1, carry out conditioning and balancing for 4 h on 20 laboratory samples obtained in accordance with the stipulations of 7.4.2. If it is a re-test, then, under the standard atmospheric conditions specified in 6.1.1, carry out conditioning and balancing for 16 h. After carrying out Indicator Item No.

6.2 Linear Density The test of linear density shall comply with GB/T 14343. The conditioning and standard atmosphere for tests shall comply with the stipulations of 6.1.1. The pre-tension of per unit linear density is specified as. $(0.05 \pm 0.005) \text{ cN/dtex}$.

6.4.2 Method A - drying oven method

6.4.2.1 Principle Under the specified conditions, determine the length variation of the test specimen before and after the dry-hot air treatment; calculate the dry-hot shrinkage rate.

6.4.2.2 Instruments

6.4.2.4 Test procedures 6.4.2.4.1 After removing a few surface-layer filaments of each reel, take specimens of about 550 mm long; tie both ends of the specimens one by one and tie a knot, so as to form a filament loop with a circumference of nearly 500 mm. 6.4.2.4.4 Take the specimen support frame out of the oven; place it in the standard atmosphere specified in 6.1.1; conduct balancing for 30 min. 6.4.2.4.5 In accordance with the same mode in 6.4.2.4.2, determine the post-shrinkage length L_i of each specimen, accurate to

0.5 mm; record it.

6.4.2.5 Calculation The average dry-hot shrinkage rate shall be calculated in accordance with Formula (2) and Formula (3).

6.5 Index of Dimensional Stability

6.5.1 The index of dimensional stability is the sum of the average elongation rate and average dry-hot shrinkage rate under

4.0 cN/dtex load.

6.5.2 The calculation result shall be rounded off to one decimal place.

6.6 Appearance It shall be determined by the demand-side and the supply-side through negotiation, or, in accordance with the stipulations of Appendix A.

7 Inspection Rules

7.1 Type of Inspection The items in Table 1 ~ Table 3 are all exit-factory inspection items.

7.2 Inspection Items

7.3 Batching Rules Adopt periodic sampling to form an inspection lot. One production batch may be composed of one inspection batch, or, several inspection batches.

7.5 Comprehensive Evaluation

7.5.1 The appearance inspection items shall comply with the stipulations of

5.2 and be evaluated spool by spool.

7.6.5 Evaluation rules

7.6.5.1 Appearance 7.6.5.1.1 In accordance with the sample size in 7.6.3, and "one-time sampling scheme of normal inspection" (AQL value is 4.0) in Table 2 of GB/T 2828.1-2012, determine the number of accepted A_c and the number of rejected R_e .

7.6.5.2 Evaluation of performance inspection items In accordance with the stipulations of