Doc No.: TXD 31 (23527)

**AMENDMENT NO. 4 DECEMBER 2024**

**TO**

**IS 17264 : 2022 TEXTILES — POLYESTER INDUSTRIAL YARNS — SPECIFICATION**

*( First Revision )*

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[*Page* 7, *clause* 8.1 (a)] — Substitute ‘Name and description of the material;’ *for* ‘Name and description of the material (*see* **5.2**);’

[*Page* 7, *clause* 8.1 (b)] — Substitute ‘Designation of the material;’ *for* ‘Designation of the material (*see* **5.1**);’

(*Page* 13, *Annex* F) — Substitute the following for existing:

‘**ANNEX F**

**(***Table*3)

 **METHOD FOR DETERMINATION OF DRY HOT AIR THERMAL SHRINKAGE OF INDUSTRIAL YARNS USING AN AUTOMATIC THERMAL SHRINKAGE HOT CHAMBER / OVEN**

**F-1 GENERAL**

**F-1.1** This test method covers the measurement of shrinkage of yarns when exposed in a thermal shrinkage hot chamber or oven. The yarn may be exposed to hot chamber in vertical or horizontal position.

**F-1.2** This test method is applicable to linear densities in the range from 33 to 7000 dtex (30 to 6300 denier)

**F-1.3** Yarns or cords for testing may be taken from yarn packages or from fabric.

**F-1.4** For specimen tested in horizontal position, the chamber in which the specimens is heated is open on three sides. An effective draft shield shall be used so that air drafts cannot alter the length of specimen.

**F-2 PRINCIPLE**

Under specific condition, a test specimen is treated in dry-hot air. Shrinkage is calculated as variation in length, measured before and after treatment*.*

**F-3 TEST SPECIMENS**

**F-3.1** For IDY yarns, strip at least 25 m from the outside of each package in the laboratory sampling unit.

**F-3.2** Inspect the outside of the package after stripping off the yarn. If there is visible damage, continue to strip off units of 25 m and reinspect until there is no visible damage.

**F-3.3** For testing the sample in horizontal position, take the specimens and put into the clips of the ring of hot chamber. The specimen length will automatically get adjusted to 500 to 600 mm as per requirement, as this is the initial distance between the fixed clamp to the movable pulley. Discard and replace specimens that are visibly damaged.

**F-3.4** For testing the sample in a vertical position, the specified number of specimens, each of the required length, are cut from each package.

**F-3.5** 5 specimen of yarn shall be tested and average value of those 5 readings shall be reported.

**F-4 Test Procedure**

**F-4.1 Test procedure for yarns in horizontal position**

**F-4.1.1** With the draft shield in place, set the heater chamber / oven temperature controller set point to give a specimen temperature of 180 ± 2 °C. This is the temperature for yarns having normal shrinkage level.

**F-4.1.2** Refer Table-8 for test conditions.

**F-4.1.3** For yarns having low levels of shrinkage, a temperature setpoint of 190 ± 2 °C is used.

**F-4.1.4** Install one end of the specimens in the fixed clamp.

**F-4.1.5** Bring the other end of the specimens over the pulley.

**F-4.1.6** Attach a clip-on mass to the unclamped ends of the yarns and start the test.

Note — Use a mass that creates a tension load as specified in Table 9.

**F-4.1.7** The draft shield will automatically come into place. The specimens are placed automatically in the center of heater chamber channel.

**F-4.1.8** At the end of 300 seconds (unless otherwise specified), read the percent shrinkage as indicated on the PC screen attached to instrument output, to the nearest 0.1 percent.

**F-4.1.9** Remove and discard the specimens.

**F-4.1.10** The test time may vary depending on specific requirement of customer and / or mutual agreement between producer and customer. A few specific applications may require test time of 900 second (15 min).

**F-4.1.11** The required test temperature is generally in the range 177 to 180 °C for normal shrinkage yarn.

**F-4.2 Test procedure for yarns in Vertical position**

**F-4.2.1** Hang the conditioned single yarn sequentially from the clamp at the top of the length-measuring stand.

Length-measuring Stand shall meet the following requirements:

a) A stand for measuring specimen length of at least 1 mm gauge length;

b) A millimetre scale to determine specimen length, accurate to within ± 1 mm;

c) A steel hook or a clamp, where the top of the hook or the lower side of the clamp (where the specimen hung from) is positioned in line with the zero index of the scale; and

d) Tensioning weights with hooks or clamps for applying tensile force to specimens, accurate to within ± 10 percent.

Note — Length of the specimen may also be measured by digital device, provided that the accuracy of the device is ± 1 mm or better.

Carefully add sufficient weight on the bottom of the yarn, to produce the tension as given in

in Table 9. This tension shall be reached slowly to prevent any over-tensioning. Maintain the tension for (30 ± 3) s.

Mark yarn at the zero index and at a specified length of the scale. Measure the distance between the two marks to get the straightened length (L0) to an accuracy of 1 mm. Remove weight and single yarn after measurement. Suspend the single yarn from the holder of the oven. Repeat loading and measuring procedure in sequence, until all the single yarns have been tested.

**F-4.2.2** Set the oven temperature controller to give a specimen temperature of 180 ± 2 °C. This is the temperature for yarns having normal shrinkage level.

**F-4.2.3** Refer Table-8 for test conditions.

**F-4.2.4** For yarns having low levels of shrinkage, a temperature setpoint of 190 ± 2 °C is used.

**F-4.2.5** Place the specimen in the heater chamber / oven

**F-4.2.6** Follow the procedures in **4.2.1** to measure the distance between the two marks made before thermal treatment, which is the straightened length (Ls), to an accuracy of 1 mm.

**F-5 RESULTS**

**F-5.1** For yarns tested in horizontal position, the shrinkage value is directly displayed on the screen. The shrinkage is the difference between the initial specimen length and final length expressed as a percentage.

**F-5.2** For yarns tested in vertical position, the shrinkage in dry-hot air (HAS) is calculated

according to formula given below:

HAS = $\frac{L0- Ls}{L0}$ × 100

Where,

HAS= is the shrinkage in dry-hot air, in percent;

L0= is the length of the test specimen before treatment, in mm; and

Ls = is the length of the test specimen after treatment, in mm.

**Table 8 Test Conditions**

(*Clause* F-4.1.2 *and* 4.2.3)

|  |  |  |  |
| --- | --- | --- | --- |
| **Product Type** | **Temperature (°C)** | **Pre-Tension Load (g/den)** | **Time****(s)** |
| HT/SHT/LE/HMLS | 177 - 180 ± 2 ° | 0.05 | 120 – 300 |
| LS/SLS | 190 ± 2 ° | 0.01 | 120 – 300 |

**Table 9 Pre-Tension Mass for Single Strand Yarn**

(*Clause* F-4.1.6, *and* F-4.2.1)

|  |  |  |  |
| --- | --- | --- | --- |
| **Dtex** | **Denier**  | **Pre-Tension Mass, Normal Shrinkage yarn (g)** | **Pre-Tension Mass,** **Low Shrinkage yarn (g)** |
| 940 | 840 | 42 | 8.5 |
| 1100 | 1000 | 50 | 10 |
| 1440 | 1300 | 65 | 13 |
| 1650 | 1500 | 75 | 15 |
| 2200 | 2000 | 100 | 20’ |

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