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Textiles - Domestic Washing and Drying Procedures for Textile Testing

纺织品　试验用家庭洗涤和干燥程序

(ISO 6330:2012, MOD)

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Textiles - Domestic Washing and Drying Procedures for Textile Testing

1 Scope

1.1 This standard specifies domestic washing and drying procedures for textile testing. The procedures are applicable to textile fabrics, garments or other textile articles which are subjected to appropriate combinations of domestic washing and drying procedures. This standard also specifies the reference detergents and ballasts for the procedures.

1.2 This standard specifies the following washing procedures:

a) 13 different washing procedures based on the use of the reference washing machine Type A: horizontal axis, front-loading type;

b) 11 procedures based on the use of the reference washing machine Type B: vertical axis, top-loading agitator type;

c) 7 procedures based on the use of the reference washing machine Type C: vertical axis, top-loading pulsator type.

1.3 Each washing procedure represents a single domestic wash.

1.4 This standard also specifies six drying procedures:

A — Line dry

B — Drip line dry

C — Flat dry

D — Drip flat dry

E — Flat press

F — Tumble dry

Note: When decided through consultation between all parties concerned, oven drying procedure may be used, see also Annex Q.

1.5 A complete test consists of a washing and drying procedure.

5.2.1 Type A1 tumble dryer – Vented

The specification for Type A1 tumble dryer is given in Annex G.

5.2.2 Type A2 tumble dryer – Condenser

The specification for Type A2 tumble dryer is given in Annex G.

5.2.3 Type A3 tumble dryer – Large vented

The specification for Type A3 tumble dryer is given in Annex G.

5.3 Electrically (dry) heated flat-bed press

If this method of drying is used, the type of press shall be specified among the interested parties.

5.4 Line drying

For procedure for line drying, see 10.1.1; for drip line drying, see 10.1.2.

5.5 Drying racks

Use screen drying racks of approximately 16 mesh stainless steel or plastic for flat drying (see 10.1.3) or drip flat drying (see 10.1.4).

5.6 Ballasts

5.6.1 Type I, 100% Cotton ballast

The nominal composition of 100% Cotton ballast is given in Annex H.

5.6.2 Type II, 50% Cotton/50% Polyester ballast

The nominal composition of 50% Cotton/50% Polyester ballast is given in Annex H.

5.6.3 Type III, 100% Polyester ballast

The nominal composition of 100% Polyester ballast is given in Annex H.

6 Reagents

6.1 Reference detergents

6.1.1 Reference detergent 1

Reference detergent 1 is a non-phosphate powder detergent without enzymes and is available both with and without optical brightener. [Other designations are 1993 AATCC standard reference detergent without optical brightener (WOB) and 1993 AATCC standard reference detergent with optical brightener.]

Reference detergent 1 can only be used in machine Type B. The nominal composition of reference detergent 1 is given in Annex I.

6.1.2 Reference detergent 2

Reference detergent 2 is a non-phosphate powder detergent with optical brightener and with enzymes (another designation is IEC reference detergent A∗). Reference detergent 2 can be used in both machine Type A and Type B. The nominal composition of reference detergent 2 is given in Annex J. For distribution and mixing, see Annex O.

6.1.3 Reference detergent 3

Reference detergent 3 is a non-phosphate powder detergent without optical brightener and without enzymes (Another designation is ECE reference detergent 98). Reference detergent 3 can be used in both machine Type A and Type B. The nominal composition of reference detergent 3 is given in Annex K. For distribution and mixing, see Annex O.

6.1.4 Reference detergent 4

Reference detergent 4 is a non-phosphate powder detergent with optical brightener and with enzymes. [Another designation is JIS K 3371 (Category 1).]. Reference detergent 4 can only be used in washing machine Type C. The nominal composition of reference detergent 4 is given in Annex L.

6.1.5 Reference detergent 5

Reference detergent 5 is a non-phosphate liquid detergent and is available both with and without optical brightener (WOB) (Other designations are 2003 AATCC standard reference liquid detergent with optical brightener and 2003 AATCC standard reference liquid detergent without optical brightener). Reference detergent 5 can only be used in washing machine Type B. The nominal composition of reference detergent 5 is given in Annex M.

6.1.6 Reference detergent 6

Reference detergent 6 is a non-phosphate powder detergent with optical brightener and without enzymes. (Another designation is SDC Reference Detergent Type 4). Reference detergent 6 can be used in machine Type A. The nominal composition of reference detergent 6 is given in Annex N. For distribution and mixing, see Annex O.

For cellulosic products, the Cotton ballast, Type I shall be used (see 5.6.1). For synthetic products and products that are made of blends, either the Polyester/Cotton ballast, Type II or the Polyester ballast, Type III shall be used (see 5.6.2 and 5.6.3).

Note: Type III polyester ballast (see 5.6.3) may be used for other fiber products not specified in this standard.

8.4 Ratio of load to ballast

If dimensional stability is being determined, not more than half of the wash load shall consist of test specimens.

Note: In the case of testing a whole garment, report the ratio of load to ballast if it is more than 1/1.

9 Washing Procedure

9.1 Select the washing procedure to be used from those given in Annex B for a type A reference washing machine, from Annex D for a type B reference washing machine, or from Annex F for a type C reference washing machine.

9.2 Weigh the (individual) specimens or made-up articles or garments before washing if measurement of weight loss is required or if they are to be tumble dried.

9.3 Place the material to be washed in the washing machine (see 5.1.1 to 5.1.3) and add sufficient ballast (see 5.6) to make a total air-dry material load of the mass shown in 8.1 using the washing procedure selected.

The specimen and the ballast shall be evenly mixed before it is loaded into the reference machine.

a) In Reference washing machines Type A, add (20 ± 1) g of the reference detergent 2, 3 or 6 directly into the dispenser.

b) In Reference washing machines Type B fill the machine with water at the selected temperature, then add (66 ± 1) g of reference detergent 1 or add (100 ± 1) g of reference detergent 5, or if reference detergent 2 or 3 is used, add the appropriate amount to provide good running suds having a height of not more than (3 ± 0.5) cm at the end of the washing cycle.

c) In reference machines Type C, fill the machine with water at the selected temperature, then add 1.33 g/l of reference detergent 4 directly into the dispenser.

d) See Table 1 for a summary of the reference detergent dosage.

horizontal screen drying rack (see 5.5) or perforated surface; remove the wrinkles by hand without stretching or distorting. Allow the specimen to dry in still air in ambient conditions.

Note: For subsequent testing, the drying may be carried out in a conditioned atmosphere according to GB/T 6529.

10.1.4 Procedure D — Drip flat dry

Follow the procedure in 10.1.3 without extracting the water.

10.1.5 Procedure E — Flat press

Remove the specimen from the washing machine and place the specimen on the flat bed of the press (see 5.3). Smooth out heavy wrinkles by hand and lower the head of the press, which shall be set at a temperature suitable for the specimen to be pressed, for one or more short periods as required to dry the specimen. Record the temperature and pressure used.

10.2 Tumble dry

10.2.1 Procedure F — Tumble dry

At the end of the selected washing procedure, immediately remove the load and place the specimens and the ballast in the tumble dryer (see 5.2). Tumble dry the load as specified in either 10.2.2, 10.2.3 or 10.2.4.

10.2.2 Timer setting for tumble dryer

To determine the optimum heat setting, tumble dry the load at the normal (high) heat setting for the calculated test cycle time as determined by the method described in Annex P. At the end of the calculated test cycle time, the final moisture shall be equivalent to the moisture content of the conditioned textile relative humidity.

If measuring the fabric temperature during tumble drying is required, plastic ribbons (thermos-labels) that indicate the temperature shall be affixed to the fabric. These thermos-labels shall be capable of measuring in the temperature range (40 to 90)℃.

For the machines specified in 5.2, ensure that the temperature of the exhaust from the drum is set at a minimum temperature of 40℃ and not exceeding 80℃ for normal fabrics and 60℃ for delicate fabrics. Operate the dryer until the load is dry, and continue tumbling for 5 min with the heat turned off. Remove the fabrics immediately.

10.2.3 Over-drying

Over-drying is characterized by drying to a final moisture level below the conditioned state.

Annex O
(Normative)
Distribution and Mixing of Reference Detergent 2, 3 or 6

O.1 General warning

This annex calls for the use of substances/procedures that may be injurious to the health/environment. It refers only technical suitability and does not absolve the user from legal obligations or professional regional recommendations relating to health and safety/environment at any stage.

O.2 General information

The reference detergent 2, 3 or 6 is distributed in three separate parts:

a) detergent base powder;

b) sodium perborate tetrahydrate;

c) bleach activator tetra-acetylethylene diamine;

They shall be mixed prior to use according to the following procedure.

For consistency, it is desirable to dry mix the three separate parts in the proportions of:

— 77% detergent base powder,

— 20% sodium perborate, and

— 3% bleach activator

Weigh the quantity of detergent components to make up the detergent dose required for the test. The components shall be mixed together thoroughly prior to use. Mixed detergent shall be stored in a sealed container if it is not used immediately. The maximum storage time prior to use of each reference detergents after mixing of detergent components shall be 14 d. All detergent components shall be within their expiry date at the time of use.

O.3 Effect of enzymes (applicable to detergents 2 and 3 only)

If it is desirable to evaluate the effects of enzymes, the optional addition of the following enzymes to detergents 2 and 3 can be made with a corresponding reduction in the detergent powder.

Annex P
(Normative)
Determination of Cycle Drying Time for Tumble Dryers With a Timer Device

P.1 Method of estimating cycle time

P.1.1 Use a load composed entirely of 100% ballast (see 5.6) and condition it in the standard atmosphere (see Clause 6). Determine the conditioned mass of the load, in kilograms, to the nearest 0.05 kg.

P.1.2 Wash the load as specified in Clause 8. After spinning, weigh the load (initial mass).

P.1.3 Set the tumble dryer (5.2) to a time in excess of 80 min and let it run. After 30 min (or 60 min if preferred) stop the machine, remove the load and weigh. Calculate the amount of moisture evaporated and from this, the "drying rate", a, which is the amount of evaporated moisture divided by the drying time.

P.1.4 Re-wet the load by filling the machine to the same level as was used in 8.1 and then advance the programme to the last hydroextraction. At the end of the hydroextraction, weigh the load. From this mass and the drying rate, a, calculate the preliminary cycle time which is the moisture content divided by the drying rate.

P.1.5 Re-load the dryer and set to a time safely in excess of the preliminary cycle time and let it run.

P.1.6 Immediately after the preliminary cycle time, stop the dryer, remove the load and weigh. Calculate the amount of evaporated moisture. From this and the preliminary cycle time, calculate the "drying rate", b, which is the moisture evaporated divided by the cycle time.

P.1.7 Perform test cycles at a time setting determined from the final estimated test cycle time given by the following equation:

$$\text{Final estimated test cycle time} = \frac{(\text{Initial mass-conditioned mass})}{\text{Drying rate } (b)} \times 60 + \text{cool-down time} \quad \text{.....(P.1)}$$

The following example illustrates the method of calculating the final estimated test cycle time:

The conditioned mass of the load = 2.0 kg

The initial mass of the load (P.1.2) = 3.75 kg

Moisture retained = 1.75 kg

If after 30 min, moisture evaporated = 0.9 kg (measured)

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