International Standard 6330

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Textiles — Domestic washing and drying procedures for textile testing

Textiles — Méthodes de lavage et de séchage domestiques

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Foreword

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Textiles — Domestic washing and drying procedures for textile testing

1 Scope and field of application

1.1 This International 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.

1.2 Provision is made for

a) ten different washing procedures based on the use of a horizontal drum, front-loading type of machine, or

b) nine procedures based on the use of a top-loading agitator type of machine.

The results obtained with the two types of machines may not be comparable.

1.3 Each washing procedure represents a single domestic wash.

1.4 This International Standard also specifies five drying procedures:

A — Line dry

B — Drip dry

C — Flat dry

D — Flat press

E — Tumble dry

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

2 Principle

A specimen is washed in an automatic domestic washing machine and dried according to specified procedures.

3 Apparatus and reagents

3.1 Automatic washing machine, capable of being operated under the following conditions:

Type A1 washer — Front-loading, horizontal drum type [1) 2)]

a) Front-loading horizontal rotating drum type

b) Diameter of inner drum: 51,5 $^{+0,5}_{0}$ cm

c) Depth of inner drum: 33,5 $^{+0,5}_{0}$ cm

d) Distance between inner and outer drums: 2,8 cm

e) Lifting vanes: three, each 5 $^{+0,5}_{0}$ cm high, extending the depth of the inner drum and spaced 120° apart

f) Rotating action: 1 (Normal): 12 ± 0,1 s clockwise, 3 ± 0,1 s stop, 12 ± 0,1 s anticlockwise, 3 ± 0,1 s stop

Rotating action: 2 (Gentle): 3 ± 0,1 s clockwise, 12 ± 0,1 s stop, 3 ± 0,1 s anticlockwise, 12 ± 0,1 s stop

g) Rotational frequency

during washing: 52 min^{-1}

during hydroextraction (spin): 530 ± 20 min^{-1}

h) Water supply normal: 25 ± 5 l/min, 20 ± 5 °C

j) Filling time: Less than 2 min when filled to the highest level (13 cm)

k) Draining time: Less than 1 min when drained from the highest level (13 cm)

m) Heating: Electric, thermostatically controlled

n) Heater capacity: 5,4 ±0,11 kW

1) Suitable machines are available commercially. Details may be obtained from the Secretariat of ISO/TC 38 or from the ISO Central Secretariat. Other machines can be used if it is determined they give equivalent results.

2) In cases of dispute, the interested parties should agree which type of machine should be used. If agreement cannot be reached, then Type A1 machine shall be used.

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Type A2 washer — Front-loading, horizontal drum type [1) 2)]

a) Front-loading horizontal rotating drum type

b) Diameter of inner drum: 48,0 cm

c) Depth of inner drum: 24,7 cm

d) Distance between inner and outer drums: 2,5 cm

e) Lifting vanes: three, each 4,2 cm high, extending the depth of the inner drum and spaced 120° apart

f) Rotating action: 1 (Normal): 13,5 s clockwise, 1,5 s stop, 13,5 s anticlockwise, 1,5 s stop

Rotating action: 2 (Medium): 9,0 s clockwise, 6,0 s stop, 9,0 s anticlockwise, 6,0 s stop

Rotating action: 3 (Gentle): 3,5 s clockwise, 11,5 s stop, 3,5 s anticlockwise, 11,5 s stop

g) Rotational frequency

during washing: 50 min^{-1}

during hydroextraction (spin): 700 min^{-1}

h) Water supply normal: 10 ± 1 l/min, 20 ± 5 °C

j) Filling time: Less than 3 min when filled to the highest level

k) Draining time: Less than 1 min when drained from the highest level

m) Heating: Electric, thermostatically controlled

n) Heater capacity: 4,6 kW

Type B washer — Top-loading, agitator type [1) 2)]

a) Top-loading agitator type

b) "Normal" agitator speed: 70 ± 5 cycles per min

c) "Delicate" or "Gentle" agitator speed: 50 ± 5 cycles per min

d) Diameter of perforated basket: 50 ± 5 cm

e) Depth of perforated basket: 30 ± 5 cm

f) At "Full water level", machine contains approximately 40 litres of liquor

g) Washing time adjustable between 0 and 15 min, controllable to ±1 min

h) Rotational frequency during hydroextraction:

normal: 525 ± 15 min^{-1}

slow: 360 ± 15 min^{-1}

3.2 Dryer of the rotary tumble type, having a cylindrical basket approximately 75 cm in diameter and not less than 40 cm in depth, having a rotational frequency of 50 ± 5 min^{-1}, equipped with means for maintaining drying temperatures of 50 and 70 °C, respectively, measured in the exhaust vent as close as possible to the drying cylinder, and providing a cooling period of 5 min while tumbling at the end of the drying cycle.[1)]

NOTE — Work is currently proceeding on the development of a test method for assessing the effect of tumble drying on the dimensional stability and other properties of textiles, which may lead to a revision of this clause.

3.3 AATCC reference detergent WOB (without optical brightener).

NOTES

1 AATCC reference detergent WOB can only be used in top-loading type B washers.

2 The nominal composition of AATCC reference detergent WOB is given in annex A.

3.4 ECE reference detergent (without optical brightener).

NOTES

1 ECE reference detergent can be used in all machines.

2 The nominal composition of ECE reference detergent is given in annex B.

3.5 IEC reference detergent (with optical brightener).

This can be used except when colour fastness is being assessed.

NOTES

1 IEC reference detergent can be used in all machines.

2 The nominal composition of IEC reference detergent is given in annex B.

3.6 Sodium perborate tetrahydrate ($NaBO_3 \cdot 4H_2O$).

3.7 Loading fabric: Pieces consisting of two layers of knitted 100 % polyester fabric or woven cotton/polyester fabric, having a mass per unit area that approximates the fabric under test to within ±25 %. Each piece shall measure 30 ± 3 cm × 30 ± 3 cm sewn together at the edges.

3.8 Electrically (dry heated) heated flat-bed press.

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

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1) Suitable machines are available commercially. Details may be obtained from the Secretariat of ISO/TC 38 or from the ISO Central Secretariat. Other machines can be used if it is determined they give equivalent results.

2) In cases of dispute, the interested parties should agree which type of machine should be used. If agreement cannot be reached, then Type A1 machine shall be used.

3.9 Facilities for drip or line drying.

3.10 Screen drying racks, of 16 mesh stainless steel or plastics (see 6.3).

4 Test specimens

The number of specimens to be subjected to the washing and drying procedures specified in this International Standard will be determined by the purpose for which the material is being tested.

5 Washing procedure

5.1 Select the washing procedure to be used from those given in table 1 if a front-loading type of machine is employed or from table 2 if a top-loading type of machine is used.

5.2 Place the material to be washed in the washing machine (3.1) and add sufficient loading cloth (3.7) to make a total air-dry material load of the mass shown for the washing procedure selected. If dimensional stability is being determined, not more than half of the wash load shall consist of test specimens. Add sufficient detergent (3.3, 3.4 or 3.5, as appropriate) (1 to 3 g/l) to provide a good running suds having a height of not more than 3 cm at the end of the sudsing cycle. Water of hardness not exceeding 5 ppm (expressed as calcium carbonate) shall be used. If a front-loading horizontal drum type of machine is used, the detergent shall contain 4 parts of IEC detergent (3.5) to 1 part of sodium perborate tetrahydrate by mass.

5.3 After the last hydroextraction of the washing procedure has been completed, remove the material, taking care that it is neither stretched nor distorted, and dry it by one of the drying procedures described in clause 6.

5.4 If the material is to be drip dried, stop the machine and remove the material, taking care that it is neither stretched nor distorted, just before the final hydroextraction.

6 Drying procedure

6.1 Procedure A — Line dry

Suspend the hydroextracted material from a line (see 3.9) to dry according to the procedure specified in 6.2.

6.2 Procedure B — Drip dry

Remove the material from the machine and, without extracting the water, suspend it from a line (see 3.9) in still air at room temperature, and allow to dry.

The warp or wale direction of the material should be vertical. Made-up articles should be suspended in the direction of use.

6.3 Procedure C — Dry flat

Spread out the material on a horizontal screen drying rack (3.10), remove the wrinkles by hand without stretching or distorting, and allow it to dry.

6.4 Procedure D — Flat-bed press

Place the material on the flat bed of the press (3.8). Smooth out heavy wrinkles by hand and lower the head of the press, which shall be set at a temperature suitable for the material to be pressed, for one or more short periods as required to dry the material. Record the temperature and pressure employed.

6.5 Procedure E — Tumble dry

Place the material and the loading fabric in the tumble dryer (3.2) with the temperature of the exhaust from the drum set at a temperature not exceeding 70 °C for normal fabrics and 50 °C for permanent press or delicate fabrics. Operate the dryer until the load is dry, and continue tumbling for 5 min with the heat turned off. Remove the material immediately.

7 Test report

The test report shall contain the following particulars:

a) the type of machine and the washing and drying procedures used;

b) the type of detergent used;

c) total mass of the specimens and loading fabric;

d) details of any deviation from the specified procedures.

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Table 1 — Washing procedures for horizontal drum machines Type A1 [1]

Procedure No.	Agitation during heating, washing and rinsing	Total load (dry mass)	Washing				Rinse 1		Rinse 2			Rinse 3			Rinse 4		
			Temperature [4]	Liquor level [5] [9]	Washing time at temperature [8]	Cool down [6]	Liquor level [5]	Rinse time [7] [8]	Liquor level [5]	Rinse time [7] [8]	Spin time [8]	Liquor level [5]	Rinse time [7] [8]	Spin time [8]	Liquor level [5]	Rinse time [7] [8]	Spin time [8]
		kg		cm	min		cm	min	cm	min	cm	cm	min	min	cm	min	min
1A	Normal [2]	4	92 ± 3	10	12	Yes	13	3	13	3	1	13	2	1	13	2	6
2A	Normal [2]	4	60 ± 3	10	12	Yes	13	3	13	3	1	13	2	1	13	2	6
3A	Gentle	2	60 ± 3	10	8	Yes	13	3	13	3	—	13	2	1	13	2	2 or drip dry
4A	Gentle	2	50 ± 3	10	8	Yes	13	3	13	3	—	13	2	1	13	2	2 or drip dry
5A	Normal [2]	4	40 ± 3	10	12	No	13	3	13	3	1	13	2	1	13	2	6
6A	Gentle	2	40 ± 3	13	6	No	13	3	13	3	—	13	2	1	13	2	2 or drip dry
7A	Gentle [3]	2	40 ± 3	13	3	No	13	3	13	3	1	13	2	6			
8A	Gentle [3]	2	30 ± 3	13	3	No	13	3	13	3	—	13	2	2			
9A	Gentle	2	92 ± 3	10	8	Yes	13	3	13	3	—	13	2	—	13	2	2 or drip dry
Simulated hand wash	Gentle [3]	2	40 ± 3	13	1	No	13	2	13	2	2						

1) For type A2 drum machines, some alterations in the washing procedures of Table 1 may be necessary to obtain results comparable to those obtained with type A1 machines.

2) Gentle agitation during heating.

3) No agitation during heating.

4) All filling temperatures for wash and rinse are 20 ± 5 °C.

5) Liquor level is measured from the bottom of the cage after the machine has been run for 1 min and allowed to stand for 30 s.

6) Cool down: top up with cold water to 13 cm level and agitate for extra 2 min.

7) Rinse time is measured when liquor level is reached.

8) The stated times may have a tolerance of ±20 s.

9) The volumes of liquor corresponding to the quoted levels are determined by a separate test using a graduated measuring vessel.

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