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Textiles — Domestic washing and drying procedures for textile testing

Textiles — Méthodes de lavage et de séchage domestiques en vue des essais des textiles

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 6330 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

This second edition cancels and replaces the first edition (ISO 6330:1984) which has been technically revised.

Annexes A to C form a normative part of this International Standard.

Textiles — Domestic washing and drying procedures for textile testing

1 Scope

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 (type A washer) or

b) eleven procedures based on the use of a top-loading agitator type of machine (type B washer).

The results obtained with the two types of machine 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 drying procedure.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3758:1991, *Textiles — Care labelling code using symbols.*

ISO 6059:1984, *Water quality — Determination of the sum of calcium and magnesium — EDTA titrimetric method.*

3 Principle

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

4 Reagents

4.1 Reference detergents

4.1.1 AATCC 1993 reference detergent WOB (without optical brightener).

NOTE 1 AATCC 1993 reference detergent WOB can only be used in top-loading type B washers.

NOTE 2 The nominal composition of AATCC 1993 reference detergent WOB is given in annex A.

4.1.2 Non phosphate ECE reference detergent A (without optical brightener)

NOTE 1 Non phosphate ECE reference detergent A can be used in all machines.

NOTE 2 The nominal composition of non phosphate ECE reference detergent A is given in annex B.

4.1.3 Non phosphate IEC reference detergent A (with optical brightener). This can be used except when colour fastness is being assessed.

NOTE 1 Non phosphate IEC reference detergent A can be used in all machines.

NOTE 2 The nominal composition of non phosphate IEC reference detergent A is given in annex B.

4.2 Water of hardness not exceeding 0,002 % (20 ppm), expressed as calcium carbonate, when determined in accordance with ISO 6059:1984.

5 Apparatus

5.1 Automatic washing machines, capable of being operated under the following conditions.

5.1.1 Type A washer — Front loading, horizontal drum type

NOTE 1 Suitable machines are available commercially. Names of such machines may be obtained from national standards bodies. Other machines can be used if it has been established that they give equivalent results.

a) Front loading horizontal rotating drum type.

b) Diameter of inner drum: (51,5 ± 0,5) cm.

c) Depth of inner drum: (33,5 ± 0,5) cm.

d) Distance between inner and outer drums: (2,8 ± 0,1) cm.

e) Lifting vanes: three, each (5 ± 0,5) 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.

  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): (500 ± 20) min^{-1}.

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

NOTE 2 In tropical countries this figure should be regarded as a minimum temperature. When the measurement is carried out with the water temperature different from these limits, the supply water temperature should be stated in the measurement report.

i) Filling time: less than 2 min when filled to 13 cm.

j) Draining time: less than 1 min when drained from 13 cm.

k) Heating: electric, thermostatically controlled.

l) Heater capacity: 5,4 kW, with a relative tolerance of ± 2 %.

5.1.2 Type B washer — Top-loading, agitator type

NOTE 1 Suitable machines are available commercially. Names of such machines may be obtained from national standards bodies. Other machines can be used if it has been established that they give equivalent results.

NOTE 2 Conditions represent machines manufactured from 1992 onwards. For machines manufactured prior to 1992, contact the Secretariat of ISO/TC 38/SC 2 for information on machine specifications.

a) Machines consist of a drum with an inner perforated basket (50 ± 5) cm in diameter and (30 ± 5) cm in depth.

b) Examples of alternative washing conditions:

Machine cycle	Washing temperature	
1) Normal/Cotton sturdy	II	(27 ± 3) °C
2) Delicate	III	(41 ± 3) °C
3) Durable press	IV	(49 ± 3) °C
	V	(60 ± 3) °C
	VI	(70 ± 3) °C

Examples of machine settings without load:

Cycle	Normal	Delicate	Durable press
Water level			
Agitation speed	(2,983 ± 0,033) s^{-1} [(179 ± 2) rpm]	(1,983 ± 0,033) s^{-1} [(119 ± 2) rpm]	(2,983 ± 0,033) s^{-1} [(179 ± 2) rpm]
Wash time	(12 ± 1) min	(8 ± 1) min	(10 ± 1) min
Spin speed	(10,75 ± 0,25) s^{-1} [(645 ± 15) rpm]	(7,167 ± 0,25) s^{-1} [(430 ± 15) rpm]	(7,167 ± 0,25) s^{-1} [(430 ± 15) rpm]
Final spin time	(6 ± 1) min	(6 ± 1) min	(4 ± 1) min

5.2 Dryer of the rotary tumble type, complying with the following requirements:

NOTE 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 has been established that they give equivalent results.

5.2.1 For use with type A washers:

a) Controlled exhaust temperature: Maximum 80 °C (see 8.5)

b) Peripheral centrifugal acceleration: 0,6 *g* to 0,9 *g*

c) Drum volume 80 l to 120 l

d) Drum reversal: Yes

e) Drum diameter: Minimum 55 cm

f) Lifting vanes shall be at least three in number, regularly spaced within the drum either as an integral part of the construction or as fitments. Each lifting vane shall measure between 4 cm and 9 cm at its base, tapering through a vertical height of 4 cm to 8 cm to a width of 1 cm to 2 cm.

g) Heating input: Maximum 3,5 kW

h) Cool-down period Minimum 5 min

5.2.2 For use with type B washers:

a) Machines consist of a drum with a cylindrical basket (75 ± 5) cm in diameter and at least (40 ± 5) cm in depth.

b) Alternative tumble drying conditions:

Designation	Exhaust temperature	Cool-down
a) Normal/Cotton sturdy	(66 ± 5) °C	5 min
Permanent press	(66 ± 5) °C	10 min
b) Delicate	< 60 °C	5 min

5.3 Ballast

5.3.1 For use with type A machines:

Ballast of 100 % knitted polyester texturized filament fabric having a mass per unit area of (310 ± 20) g/m^2. Ballast test pieces shall consist of four thicknesses of fabric, overlocked together on all four sides, and bartacked at the corners. The pieces shall be square and measure (20 ± 4) cm × (20 ± 4) cm. Each test piece shall weigh (50 ± 5) g.

Alternatively, either hemmed pieces of 100 % bleached cotton fabric sheeting or 50 % polyester/50 % cotton plain woven fabric, both having a mass per unit area of (155 ± 5) g/m^2 and dimensions (92 ± 5) cm × (92 ± 5) cm may be used.

5.3.2 For use with type B machines:

Ballast characteristics	Type I 100 % cotton	Type III 50/50 + 3 % polyester/cotton
Yarns (ring spun)	16/1	30/2
Fabric construction	21 × (19 ± 2) cm	19 × (19 ± 2) cm
Fabric mass	(155 ± 5) g	(155 ± 5) g
Piece size	92 × (92 ± 2) cm	92 × (92 ± 2) cm
Piece mass	(130 ± 10) g	(130 ± 10) g

5.4 Electrically (dry heated) heated flat-bed press. If this method of drying is used, the type of press shall be specified between the interested parties.

5.5 Facilities for line drying (see 8.1) or drip drying (see 8.2).

5.6 Screen drying racks of approximately 16 mesh stainless steel or plastic (see 8.3).

6 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.

7 Washing procedure

7.1 Select the washing procedure to be used from those given in Table 1 for a front-loading type of machine or from Table 2 for a top-loading type of machine.

7.2 Weigh the (individual) specimens or made-up articles (8.2) or garments (8.5) before washing if they are to be tumble dried.

7.3 Place the material to be washed in the washing machine (see 5.1.1 or 5.1.2) and add sufficient ballast (see 5.3) 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 (4.1.1 to 4.1.3, as appropriate) to provide a good running suds having a height of not more than $(3 \pm 0,5)$ cm at the end of the washing cycle.

Before placing the test load to be washed in type B washers, fill the machine with water at the selected temperature, add (66 ± 1) g 1993 AATCC Standard Reference Detergent or the appropriate amount of IEC or ECE detergent, to provide good running suds having a height of not more than $(3 \pm 0,5)$ cm at the end of the washing cycle.

7.4 After the 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 8.

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

8 Drying procedure

8.1 Procedure A — Line dry

Suspend the hydroextracted material from a line to dry according to the procedure specified in 8.2.

8.2 Procedure B — Drip dry

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

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

8.3 Procedure C — Flat dry

Spread out the material on a horizontal screen drying rack (see 5.6), remove the wrinkles by hand without stretching or distorting, and allow it to dry.