INTERNATIONAL STANDARD

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Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments —

Part 4: Procedure for testing performance when cleaning and finishing using simulated wetcleaning

Textiles — Entretien professionnel, nettoyage à sec et nettoyage à l'eau des étoffes et des vêtements —

Partie 4: Mode opératoire pour évaluer la résistance au nettoyage et à la finition lors d'un nettoyage à l'eau simulé

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Foreword

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The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3175-4 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

ISO 3175 consists of the following parts, under the general title *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments*:

— *Part 1: Assessment of performance after cleaning and finishing*

— *Part 2: Procedure for testing performance when cleaning and finishing using tetrachloroethene*

— *Part 3: Procedure for testing performance when cleaning and finishing using hydrocarbon solvents*

— *Part 4: Procedure for testing performance when cleaning and finishing using simulated wetcleaning*

Introduction

Professional wetcleaning is a process used by professionals for cleaning textiles in water using special technology (cleaning, rinsing and spinning), detergents and additives to minimize any adverse effects to the textile. It is followed by drying and restorative finishing procedures, in most cases by steam treatment and/or hot pressing.

The professional wetcleaning process takes place without the intense mechanical action associated with washing.

Properties of the textile or garment may change progressively on professional wetcleaning and steaming and/or pressing and in some cases a single treatment may give little indication of the extent of dimensional and other changes that may arise after repeated treatments and which may affect the useful life of the article. Generally, most of the potential change will become apparent after three to five of the professional wetcleaning and finishing treatments specified in this part of ISO 3175.

The properties that should be considered in an assessment for professional wetcleaning together with the methods for their assessment, are given in ISO 3175-1. Special attention should be given to the following aspects: damage, surface appearance, surface handle, shape in general, shape of collars etc.

Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments —

Part 4: Procedure for testing performance when cleaning and finishing using simulated wetcleaning

1 Scope

This part of ISO 3175 specifies simulating professional wetcleaning procedures, using a reference machine (see Annex A) for fabrics and garments. It comprises a normal process for normal materials, a mild process for sensitive materials and a very mild process for very sensitive materials (see 3.3, 3.4 and 3.5).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 139:1973, *Textiles — Standard atmospheres for conditioning and testing*

ISO 3175-1:1998, *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments — Part 1: Assessment of performance after cleaning and finishing*

ISO 6330:2000, *Textiles — Domestic washing and drying procedures for textile testing*

3 Terms and definitions

For the purposes of this part of ISO 3175, the following definitions apply.

3.1
materials
garments, composites or fabrics

3.2
composite test specimen
test specimen consisting of all component parts used in the finished item, and combined in a representative assembly

3.3
normal materials
materials that are able to withstand

a) a normal washing procedure in accordance with ISO 6330:2000 programme 6A but with reduced mechanical action and increased bath ratio (see 9.1) and

b) a drying procedure in accordance with ISO 6330:2000 procedure E-tumble dry

but due to size, finishing requirements, need of impregnating or other treatment, which cannot be attained in a domestic clothes washing machine, and are labelled with the symbol

3.4
sensitive materials
materials that are able to withstand a mild professional wetcleaning process as specified in this part of ISO 3175 without modification and are labelled with the  symbol

3.5
very sensitive materials
materials that are able to withstand a mild professional wetcleaning process as specified in this part of ISO 3175 but which may require restricted drying conditions and are labelled with the  symbol

3.6
normal professional wetcleaning procedure
cleaning procedure in water at 40 °C in accordance with ISO 6330:2000 programme 6A, but with reduced mechanical action and increased bath ratio (see 9.1), followed by tumbler drying to residual moisture less than 3 %

3.7
mild professional wetcleaning procedure
cleaning procedure in water at 30 °C in a specialized washing drum with specialized additives followed by specialized tumbler drying at 60 °C to residual moisture of approximately 15 %

(See Tables A.1 and A.2.)

3.8
very mild professional wetcleaning procedure
cleaning procedure in water at 30 °C in a specialized washing drum with specialized additives followed by 2 min specialized tumbler drying at 40 °C as a maximum and followed by air-drying

(See Tables A.1 and A.2.)

NOTE Giving careful consideration to the comments on progressive change in the introduction, textile items that perform satisfactorily for purpose in the procedures intended for sensitive and very sensitive materials in Tables 1 may be labelled respectively with the  and  symbols

4 Principle

The specimen, or specimens, are cleaned in a reference washing machine (see Annex A) and finished to one of the specified procedures. The process (see Annex B) simulates the effect of commercial, professional wetcleaning, drying and finishing.

5 Reagents

5.1 Water

A water hardness of less than 0,1 mmol Ca/Mg per litre shall be used.

5.2 Detergent

A nonionic detergent of the type C13 oxoalcoholethoxylate (7EO) shall be used.

6 Apparatus and materials

6.1 Reference washing machine

To simulate a professional wetcleaning process, a reference washing machine shall be used (See Table A.1).

6.2 Tumbler

To simulate a professional wetcleaning process, a commercial reversibly rotating tumble dryer with a drum volume of 150 l to 300 l, electrically heated and with a temperature control of incoming or outgoing air shall be used and shall be filled up with moistened ballast as described in 9.2.7. Load factor for drying with ballast 1:50 based on dry weight. (See Table A.2.)

6.3 Apparatus for applying the appropriate finishing treatment

6.3.1 Iron, with an approximate mass of 1,5 kg and a sole surface area of 150 cm^2 to 200 cm^2.

6.3.2 Steam press, consisting of two bucks, one fixed and the other movable, each buck having a surface area of approximately 0,35 m^2. Steam conducted to the bucks shall be released under a pressure of approximately 500 kPa. The pressure exerted by the bucks shall be approximately 350 kPa.

6.3.3 Steam table, having a shape and dimensions suitable to the dimensions of the specimens. The steam shall be released at a pressure of approximately 500 kPa.

6.3.4 Steam cabinet, which needs to be specific for garments. The steam shall be released at a pressure of approximately 500 kPa.

6.3.5 Steam former (mannequin), which may or may not be specific in shape for garments. The steam shall be released at a pressure of approximately 500 kPa.

6.4 Ballast, consisting of dry and clean textile pieces which shall be either white or of a light colour and which shall consist of polyester-cotton (50-50) with a square meter weight of 150 g/m^2. Each piece shall comprise two layers of fabric sewn together at the edges and shall be (800 ± 20) mm square.

NOTE If it is agreed that an alternative ballast (composition or fibre) is to be used this should be included in the test report.

7 Conditioning

The specimens and the ballast shall be conditioned for at least 16 h in one of the standard atmospheres for conditioning and testing textiles specified in ISO 139. Specimens shall be tested immediately after removal from the conditioning atmosphere, otherwise they shall be placed in sealed plastic bags and tested within 30 min.

8 Test specimen

8.1 **Garments** shall be tested in the as-received condition.

8.2 **Composite** test specimens (3.2).

8.3 **Fabrics** shall be cut into test pieces, preferably not smaller than 500 mm square and stitched on all sides with polyester thread to prevent unravelling.

8.4 If **assessments/comparisons** are required in accordance with ISO 3175-1, at least two identical test specimens shall be required (one for comparison, one for testing).

NOTE Testing may be an iterative procedure since alternative processes of varying severity may be used, and it is advisable to obtain sufficient specimens for all the testing that may be required.

9 Procedure

NOTE Selection of the procedure to be used (mild or very mild) depends on the textile item. It should also take into consideration the end use to which the item will be put since this will have a bearing on the likely type and degree of soiling. Cleaning will be generally less effective the less severe the process. Localized staining and stain removal currently falls outside the scope of this part of ISO 3175.

9.1 Procedure for normal materials and label (W) (normal process)

Test the materials in accordance with ISO 6330:2000 programme 6A with increased bath ratio (1:10) and reduced mechanical action (action during heating, washing and rinsing: 3s on/12s off). Tumble dry in accordance with ISO 6330 procedure using a wetcleaning tumbler as shown in Table A.2.

9.2 Procedure for sensitive materials and label (W) (mild process)

9.2.1 The mass of the complete load is given in Table 1. Unless the mass of a single specimen (fabric, composite or garment) exceeds 50 % of the mass of the load, the mass of the test specimen(s) shall not exceed 50 % of the mass of the load. The remainder of the load shall consist of ballast.

9.2.2 Prepare and program the reference machine in accordance with machine manuals.

9.2.3 Place the load in the reference machine.

9.2.4 During the filling process, add all the detergent, 6,5 g per load, diluted in 1 l of luke-warm, soft water, to the reference machine (See Annex A).

9.2.5 Start the reference machine and add the detergent solution to the soapbox during filling with water. The test programme is described in Annex B.

9.2.6 Before the drying procedure run one drying sequence with the dryer empty in order to set the dryer to working temperatures.

9.2.7 After the end of the wash programme tumble dry the load for the time and maximum temperature specified in Table 1. The tumble dryer has a larger volume than the reference machine so additional ballast, determined by the volume of the tumbler, shall be added. This shall be wetted out in the reference machine using a 5 min rinsing step followed by a 3 min low speed spin.

9.2.8 Immediately remove the specimens from the dryer. Place garments individually on a hanger and place fabric specimens and knitwear on a flat surface for further drying.

9.2.9 When the specimens are dry, carry out the finishing treatments appropriate to the test specimen from the following methods and record the processing conditions used:

— method A: no finishing required;

— method B: finishing with an iron;

— method C: finishing with a steam press;

— method D: finishing on a press table;

— method E: steaming on a mannequin or in a cabinet;

— method F: no suitable finishing method could be found. Report methods and conditions attempted and reasons for unsuitability.

Record actual steaming times to allow for the reaction times of steam pedal switches, and timer mechanisms.

9.2.10 Repeat 9.2.1 up to and including 9.2.9 twice more.

NOTE The purpose of finishing after professional wetcleaning is to restore an article to its original condition before use. The amount and type of finishing should be consistent with the fabric, garment properties and the restorative requirements. Steaming/vacuuming times for methods C and D will vary, e.g. from (2 ± 1) s actual steam, (5 ± 1) s vacuum for a lightweight garment to (4 ± 1) s actual steam/(8 ± 1) s vacuum for heavy garments. Steaming in method C should be top steam only to equate to good pressing practice. It is likely that Method E will be used with methods B or C to achieve good standard of finish.

9.3 Procedure for very sensitive materials and label (W) (very mild process)

Process as in 9.2, but with the appropriate parameters at the reduced levels given in Table 1.

10 Additional assessment

The properties, which should be considered in an assessment for professional wetcleaning together with the methods for their assessment, are given in ISO 3175-1. Special attention shall be given to the following aspects: damage, surface appearance, surface handle, shape in general, shape of collars etc.

11 Test report

The test report shall include the following information:

a) name of testing authority and report identification;

b) date of testing;

c) details of item evaluated (description and reference);

d) cross-reference to any test report relating to the specimen(s) issued under ISO 3175-1;

e) reference to this part of ISO 3175, i.e., ISO 3175-4;

f) the type of professional wetcleaning and finishing equipment used;

g) procedures used taken from Table 1;

h) report on additional assessment;

i) variations in procedures and parameters specified in Clause 9;

j) total number of cleaning and finishing procedures;

k) details of any deviation from the specified procedure.

Table 1 — Professional wetcleaning procedures

Programme procedure	Sensitive material [a]	Very sensitive material [b]
Load	2,6 kg	2,6 kg
Main wash		
Dosage detergent in g/load	6,5 g	6,5 g
Quantity of water	26 l	26 l
Static fill	Yes	Yes
Reversing rhythm/rotation	3 s on — 30 s off	3 s on — 30 s off
Maximum temperature	30 °C	30 °C
Washing time at max temperature	15 min	15 min
Drainage	1 min	1 min
Extract		
Speed	Low	Low
Duration	1 min	1 min
Rinse		
Quantity of water [c]	26 l	26 l
Static fill	Yes	Yes
Reversing rhythm/rotation	3 s on — 30 s off	3 s on — 30 s off
Duration	5 min	5 min
Drainage	1 min	1 min
Extract		
Speed	Low	Low
Duration	3 min	3 min
Drying cycle		
Set temperature [d]	60 °C	40 °C
Drying time	6 min	2 min

[a] Mild, for material to be marked  .

[b] Very mild, for material to be marked  .

[c] Including carry over.

[d] Set temperature = Maximum outgoing air temperature.

Annex A
(normative)

Description of the reference washing machine and tumble dryer

Table A.1 — Specifications of the reference washing machine

Inner drum (concentric with outer drum)	Diameter		515 mm
	Volume		65 l net
	Lifting vanes	Number	3
		Height	53 mm
		Tip radius	17 mm
		Base width	65 mm
	Perforation (countersink)	Diameter	5 mm
		Depth of countersink	2,5 mm
		Total hole area	520 cm^2
	Material		18/8 stainless steel
Outer drum	Diameter		575 mm
	Sump		3 400 ± 100 ml
	Material		18/8 stainless steel
Drum speed	Wash	(with 5 kg of test load and 52 l water)	(52 ± 1) rpm
	Spin		(500 ± 20) rpm
Reversing rhythm/rotation		On	3 s
		Off	30 s
Water levels	Variables		In steps of 2 mm
	Repeatablity		± 5 mm
Thermostats	Continuous variable		Independent settings for all wash sequences
	Accuracy at switch off temperature		± 1°C
	Switch on temperature		⩽ ± 4°C below switch off temperature
Drainage			Drain valve
Water level accuracy			Set level ± 5 mm (± 1 l)
Watts input to heater			5,4 kW ± 2 %
Water inlets			Cold

NOTE The Wascator FOM 71 MP/Lab satisfies the above specification, and may be obtained from Electrolux-Wascator AB, Ljungby, Sweden. Other machines of equivalent characteristics may be employed after correlation tests with the machine described above.