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Textiles — Standard atmospheres for conditioning and testing

Textiles — Atmosphères normales de conditionnement et d'essai

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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 2.

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 139 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 24, *Conditioning atmospheres and physical tests for textile fabrics*.

This second edition cancels and replaces the first edition (ISO 139:1973), which has been technically revised, specifically by including the allowances for the uncertainty of the measurement in the overall tolerances for temperature and relative humidity.

Introduction

The tolerances for temperature and relative humidity given in ISO 139:1973 were the tolerances for the temperature and relative humidity measured in the laboratory, and without any consideration for the uncertainty of measurement of the measuring devices being used.

With the increased understanding since 1973 and the existence now of standards covering these issues (e.g. ISO 14253-1), it is now necessary to allow for the uncertainty of measurement when setting appropriate tolerances.

This second edition of ISO 139 includes the allowance for uncertainty of measurement in the overall tolerances for temperature and relative humidity.

This means that although the tolerances for temperature and relative humidity appear more lenient than in ISO 139:1973, in practice, the laboratory must still be controlled (measured temperature and humidity) to essentially the same level as stated in ISO 139:1973.

Textiles — Standard atmospheres for conditioning and testing

1 Scope

This International Standard defines the characteristics and use of a standard atmosphere for conditioning, for determining the physical and mechanical properties of textiles and a standard alternative atmosphere that may be used if agreed between parties.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
standard atmosphere
environment of controlled relative humidity and temperature in which textiles are conditioned and tested

2.2
relative humidity
ratio, expressed as a percentage, of the actual pressure of the water vapour in the atmosphere to the saturation vapour pressure at the same temperature and at the same pressure

2.3
tolerance
difference between the upper and lower tolerance limits

[ISO 3534-2]

2.4
tolerance zone
variate values of the characteristics between and including the tolerance limits

[ISO 3534-2]

2.5
tolerance limits
specified values of the characteristic giving upper and/or lower bounds of the permissible value

[ISO 3534-2]

2.6
uncertainty of measurement
parameter, associated with the result of measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand

NOTE Modified from VIM.

2.7
resolution (of displaying device)
smallest difference between indications of displaying that can be meaningfully distinguished

NOTE Modified from VIM.

3 Requirements

3.1 Standard atmosphere

Standard atmospheres shall have a temperature of 20,0 °C and a relative humidity of 65,0 %.

3.2 Standard alternative atmosphere

Standard alternative atmospheres shall have a temperature of 23,0 °C and a relative humidity of 50,0 %.

The alternative atmosphere may be used only if the parties involved agree on its use.

3.3 Tolerance zone for the standard atmosphere and for the standard alternative atmosphere

The tolerance for temperature is ± 2,0 °C.

The tolerance for relative humidity is ± 4,0 %.

NOTE For control of standard atmospheres, see Annex A.

4 Apparatus

4.1 Measuring devices for temperature and relative humidity

Measuring devices should meet the following requirements:

— resolution: for temperature, 0,1 °C or better, and for relative humidity, 0,1 % or better;

— uncertainty of measurement: for temperature, ± 0,5 °C or better, and for relative humidity, ± 2,0 % or better.

Calibration to determine the uncertainties of the measurement sensors shall be carried out regularly.

4.2 Limitations to measurement devices

Devices used for the measurement of relative humidity and temperature in the conditioned atmosphere shall be separate from those normally used for controlling heating, ventilation and air conditioning ducts.

5 Procedures

5.1 Reading frequency for continuous monitoring

Sensor readings of a conditioned atmospheric enclosure shall be made at such a frequency that any short-term out-of-tolerance-limit events can be detected (see Annex A for additional information).

5.2 Spatial variation

More than one measuring devices might be required to ensure adequate monitoring of the atmospheric conditions throughout the enclosure (see Annex A).

5.3 Pre-conditioning

Before conditioning a textile, pre-conditioning might be required. If so, the textile shall be brought approximately to equilibrium in an atmosphere having a relative humidity of between 10,0 % and 25,0 % and a temperature not exceeding 50,0 °C.

5.4 Conditioning

Before a textile is tested, it shall be conditioned by placing it in the atmosphere for testing in such a way that the air flows freely through the textile, and keeping it there for the time required to bring it into equilibrium with the atmosphere.

Unless otherwise specified, the textile should be considered to be in equilibrium when successive weighing, at intervals of 2 h, shows no progressive change in mass greater than 0,25 %.

6 Test report

If required, laboratory test reports shall include the following:

a) identification of the test specimen;

b) reference to this International Standard (ISO 139:2005);

c) details of the atmosphere used for conditioning and testing;

d) details of any deviation from this International Standard.

Annex A
(normative)

Control of standard atmosphere

A.1 General

An air-conditioned laboratory shall provide and maintain a standard atmosphere as defined in 3.1 or 3.2, within the tolerance zone as defined in 3.3.

The specified condition of temperature and relative humidity shall be considered to have been attained when the following requirements are satisfied.

a) The mean temperature and relative humidity over any continuous 1 h period shall conform to the tolerance zone at the standard atmosphere conditions.

b) The spatial variation of the standard atmosphere shall comply with the specified tolerance zone.

A.2 Apparatus

Apparatus shall be in accordance with the requirements of 4.1. A device such as a digital or electronic sensor with a recorder output for continuous monitoring is suitable.

A.3 Procedure

A.3.1 Spatial variation

Monitor periodically the spatial variation of the atmospheric conditions within the laboratory at various positions. The number of position checks required shall be equivalent to a minimum of 1 per 50 m^3.

Where the spatial variation does not comply with the tolerances, the air movement within the laboratory shall be checked.

A.3.2 Positioning of the continuous monitoring devices

Variations in temperature and relative humidity are likely to exist throughout the working space. The selection of an appropriate monitoring position can be made only after position checks have been conducted. The selected position should be close to the main working area.

Annex B
(informative)

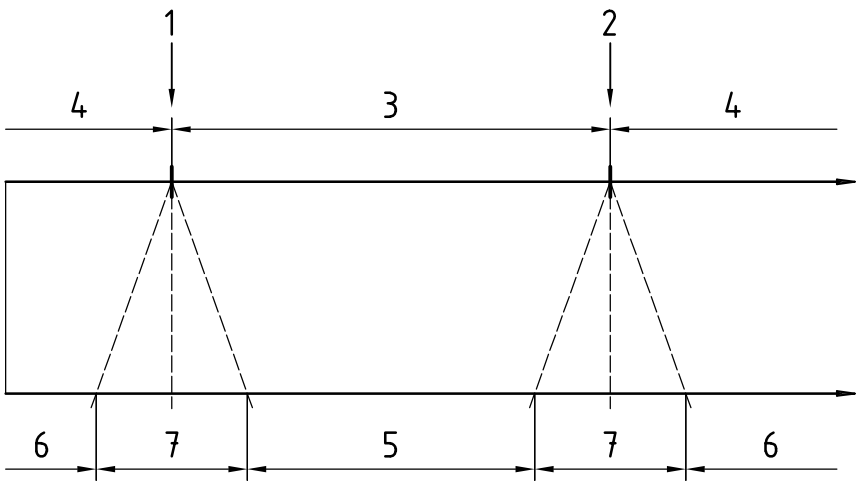
Tolerance zone

In order to better define “tolerance zone”, as defined in 2.4 and specified in 3.3 (for both temperature and relative humidity), the concepts of specification zone and conformity zone should be introduced (these notions have been developed in ISO 14253-1). This International Standard proposes rules to determine whether or not a characteristic conforms to the specification, taking into account the uncertainty of measurement.

The specification zone represents what the laboratory can practically control and the conformity zone represents the theoretical values that the laboratory wishes to reach.

EXAMPLE For the relative humidity, based on a conformity zone of ± 2 % and an uncertainty of measurement of ± 2 %, the specification zone is estimated as ± 4 %.

The relationship between “specification zone” and “conformity zone” is shown schematically in Figure B.1.



Key

1 indicates the lower specification limit (LSL)
2 indicates the upper specification limit (USL)
3 indicates the specification zone, also considered as the tolerance zone
4 indicates out the specification
5 indicates the conformity zone
6 indicates the non-conformity zone
7 indicates the uncertainty of measurement

Figure B.1 — Schematic representation of the relationship between “specification zone” and “conformity zone”

Bibliography

[1] ISO 3534-2, *Statistics — Vocabulary and symbols — Part 2: Applied statistics*

[2] ISO 14253-1, *Geometrical Product Specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformance or non-conformance with specifications*

[3] BIPM/IEC/IFCC/ISO/IUPAC/IUPAP/OIML, *International vocabulary of basic and general terms in metrology (VIM), 1993*

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