STANDARDS ASSOCIATION OF AUSTRALIA

# Australian Standard METHODS OF TEST FOR TEXTILES

## PART 1—CONDITIONING PROCEDURES

# AS 2001.1 CONDITIONING PROCEDURES



AS 2001
Methods of test for textiles
AS 2001.1—1995
Conditioning procedures
*(In Professional Package 54B)*
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Specifies four procedures for conditioning samples and specimens of textile materials prior to testing. The various procedures are intended to cater for a reference method which is to be used in cases of dispute; a method for testing materials which are relatively dry; a method for high volume testing, and a method for rapid conditioning.
*(TX/20): Supersedes AS 2001.1—1984: DR 92149: Publication date 1995-10-05.*

## PREFACE

This standard was prepared by the Association's Committee on Testing of Textiles. It supersedes AS 1090—1973, Method for Conditioning Textile Materials for Test.

It is one of a series of methods which takes cognizance of the work of a technical committee of the International Organization for Standardization (ISO/TC 38, Textiles) and is being adapted to suit Australian conditions.

This standard takes particular account of ISO 139—1973, Textiles—Standard Atmospheres for Conditioning and Testing.

However, although in general agreement with ISO 139—1973, this standard goes much further in that it provides, not only a standard reference procedure, but three additional procedures to cater for situations in which the material is relatively dry, where high volume testing is required and where rapid conditioning is required.

## METHOD

**1 SCOPE.** This standard sets out procedures for conditioning samples and specimens of textile materials prior to testing. It describes four procedures, as follows:

Method A—The standard reference method which shall be used in case of dispute.

Method B—A method for materials which are relatively dry.

Method C—A method for high volume testing.

Method D—A method for rapid conditioning.

**2 PRINCIPLE.** The material is brought to moisture equilibrium with a standard atmosphere from the dry side by ensuring that it is in approximate equilibrium with an atmosphere of less than 15 percent relative humidity before freely exposing it to the standard atmosphere.

**3 APPARATUS.** The following apparatus is required:

(a) Air-conditioned room or chamber capable of providing and maintaining a standard atmosphere of 65 ± 2 percent relative humidity at a temperature of 20 ± 2°C (see Appendix A).

NOTE: With some systems it may be necessary to control the temperature to within closer tolerances in order to achieve the specified tolerances for relative humidity.

(b) Oven, (or chamber) mechanically ventilated, to provide at least ten complete changes of air per hour and adjusted to heat air at the standard conditions (see Clause 3(a)) to at least 50°C. When operated in this manner, the air inside the oven will be at a relative humidity of less than 15 percent.

NOTE: It may, for various reasons, be impractical to have an oven situated in the space providing the standard atmosphere. As well, if the ambient conditions vary from those of the standard atmosphere, the oven temperature necessary to achieve a relative humidity below 15 percent may differ from 50°C. The minimum oven temperatures required to achieve a relative humidity of 15 percent for various combinations of ambient temperature and relative humidity are therefore given in Appendix B.

**4 METHODS.**

**4.1 General.** The procedures for the various methods described shall be as specified in Clauses 4.2 to 4.5.

**4.2 Method A—Standard reference method.**

(a) Remove excess liquid water from the textile material by normal laboratory procedures.

(b) Expose the material in the oven in an atmosphere of less than 15 percent relative humidity (see Appendix B) for a period of not less than 4 h. In general, the oven shall contain not more than 3 kg of textile material for each cubic metre of internal volume. The oven should not be opened during the period of exposure of any sample.

NOTE: Intermittent opening of the oven shall be avoided.

(c) Remove the material from the oven and expose, in as open a manner as possible, to the standard atmosphere in the air-conditioned room or chamber until moisture equilibrium has been

*DEF (AUST) 5037 Method A1 relates only to Method A of AS 2001.1

C

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attained. Moisture equilibrium shall be deemed to have been attained when two successive weighings, at an interval of 15 min, of the material or sample freely exposed to the atmosphere in the air-conditioned room or chamber, show an increase in mass of not more than 0.1 percent of the last mass recorded.

It is essential in exposing material both in the oven and in the air-conditioned space that all parts of the material should be freely accessible to the atmosphere. The following essential requirements shall therefore be observed:

(i) *Fibre* (e.g. raw or scoured wool) shall be of approximate uniform density no greater than 20 kg/m$^3$ and arranged so as to expose the maximum surface area, e.g. spread in layers on open wire shelves.

(ii) *Sliver, roving etc* shall be removed from any package and arranged so that all parts of the sample are freely exposed to the air.

(iii) *Yarns* should preferably be in the form of hanks, or wound on open spools or frames which shall be arranged so that air can gain access to all parts where conditioning is critical to the type of test being performed. For tests where unwinding from a package may unduly influence the property to be measured, testing may be performed from a package.

(iv) *Fabrics, carpets etc* should preferably be hung or laid flat, singly on open wire shelves allowing free access of air to all surfaces. If the material must be folded, all surfaces shall, as far as is possible, be freely exposed to the air.

**4.3 Method B—Method for relatively dry material.** Where the material can be shown to have been brought to equilibrium with an atmosphere of relative humidity less than 15 percent and has never since been exposed to moisture or to air of a relative humidity greater than 15 percent, it shall be placed in an airtight container for subsequent exposure to the standard atmosphere in accordance with Clause 4.2(c) above. Exposure of the material to the standard atmosphere shall be within 1 h of it having been placed in the container.

**4.4 Method C—Method for high rate of routine testing.**

NOTE: This method may be applied where the rate of testing is high and the materials are highly uniform in size and condition.

(a) If the materials are relatively dry in accordance with Method B, they need not be preconditioned in the oven. Otherwise, they shall be preconditioned as described in Clause 4.2(b) above.

(b) Determine the time to condition for each of at least twenty samples of material on each of at least five days (at least one hundred samples in all) using the method described in Clause 4.2.

NOTE: For any sample the 'time to condition' is the duration of exposure until the last weighing used to establish that moisture equilibrium has been attained.

Moisture equilibrium shall be deemed to have been attained when two successive weighings, at an interval of 15 min, of the material or sample freely exposed to the atmosphere in the air-conditioned room or chamber, show an increase in mass of not more than 0.1 percent of the last mass recorded.

(c) Determine the average time to condition $T$ for all samples and the standard deviation $s$ of the time to condition from the data obtained in step (b) above.

(d) For routine testing the standard exposure time shall be equal to the average plus 3.5 times the standard deviation, i.e.—

Standard exposure time = $T + 3.5s$
(for a high rate of routine testing)

where

$T$ = the average time to condition as determined in step (c)

$s$ = the standard deviation of the time to condition as determined in step (c).

(e) To ensure that the routine conditions of exposure continue to ensure that samples attain moisture equilibrium, routine checks following the procedures of steps (a) to (d) shall be undertaken at intervals of not more than 12 months, and/or when any characteristic of the samples changes significantly.

**4.5 Method D—Method when conditioning is required rapidly.** Circumstances can arise when it is necessary to condition materials as rapidly as possible. This involves the use of rapid preconditioners and rapid conditioners. Where the samples or specimens are uniform in size and condition (usually associated with high volumes of testing), the procedure can be standardized and verified against the standard reference method.

The procedures to be used in establishing the conditions of operation shall be as follows:

(a) Rapid preconditioners shall pass dust-free air, heated in accordance with Appendix B, over the samples or specimens. The samples or specimens shall be arranged so that they are uniformly exposed to the air and no loss of matter, other than water vapour, occurs, particularly between successive weighings as referred to in step (c) below.

(b) At least 100 samples or specimens shall be preconditioned, as described in step (a) above, using the rapid preconditioner. They may be treated in batches of a size and at intervals commensurate with the weighing requirements of step (c) and to allow subsequent exposure in the oven in accordance with Clause 4.2(b).

(c) The samples or specimens shall be weighed at intervals of 15 min. The time of exposure shall be recorded for each weighing. The 'time to precondition' for each sample or specimen shall be recorded as the exposure time to the last weighing. The last weighing shall be deemed to have been made when two weighings, 15 min apart, show a loss of mass in the sample of not more than 0.1 percent of the last mass recorded.

NOTE: Care should be exercised that no material is lost from or gained by the sample or specimen during this operation. If the sample or specimen is to be weighed while hot, weighing must be completed within 30 s of removal from the preconditioner. If the sample or specimen is to be allowed to cool before weighing, it must be enclosed in a desiccator or sealed in an airtight polyethylene bag of wall thickness 0.071 mm which shall, in turn, be placed inside a similar bag also sealed.

(d) Determine the average time to precondition $T$ and the standard deviation $s$ of the time to precondition from the data obtained in step (c) above.

(e) For routine testing, precondition samples or specimens for a time equal to the average time to precondition plus 3.5 times the standard deviation, i.e.—

Routine time to precondition when conditioning is required rapidly) = $T + 3.5s$