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## Conveyor belts — Test atmospheres and conditioning periods

*Courroies transporteuses — Atmosphères d'essai et durées de  
conditionnement*

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## Foreword

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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 18573 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 3, *Conveyor belts*.

## Introduction

The conditioning of test pieces prior to testing is commonly accepted as an essential practice in most, but not necessarily all, methods of test. Its purpose is to provide a common ground base for the commencement of the test and to remove an unnecessary variable in the search for the optimum precision for the particular test.

In order to meet these objectives it is essential to standardize as many of the variables as possible.

Conveyor belts, other than steel cord conveyor belts, contain a textile element. This can be highly hydrophobic or somewhat more hydrophilic. Similarly, the polymer layer or cover can be thermoplastic or subject to thermal ageing. Each of these factors can have a significant effect on the property of the conveyor belt. These factors need to be taken into account when making a decision as to whether conditioning is necessary and, if so, what would be the most appropriate conditions. The provisions given in ISO 139<sup>[1]</sup>, ISO 471<sup>[2]</sup> and ISO 2231<sup>[3]</sup> have been taken into account in the preparation of this International Standard.

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# Conveyor belts — Test atmospheres and conditioning periods

## 1 Scope

This International Standard specifies the temperature, humidity and time conditions used for the conditioning and testing of all types of conveyor belt, irrespective of whether they have plastics or rubber covers. It also specifies the requirements for the time interval to be observed between production and testing of conveyor belt test pieces.

Special conditions applicable to a particular test or material or simulating a particular climatic environment are not included.

## 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.

EN 873, *Light conveyor belts — Principal characteristics and applications*

## 3 Terms and definitions

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

### 3.1

#### **standard atmosphere**

specified temperature and humidity in which samples are conditioned and tested

NOTE See Clause 5.

### 3.2

#### **standard condition**

condition reached by a conveyor belt test piece when it is in equilibrium with a standard atmosphere

### 3.3

#### **moisture equilibrium**

condition reached by a conveyor belt test piece when, after free exposure to air in motion, there is no appreciable change in mass

### 3.4

#### **conditioning**

exposure of a test piece to a standard atmosphere for a stipulated period of time immediately before testing, in order to improve the reproducibility of test results

### 3.5

#### **thermal equilibrium**

condition reached by a conveyor belt test piece when it is at a uniform temperature throughout its mass and is within 1 °C of the temperature of its environment

## 4 Pre-conditioning

If the textile element of the conveyor belt is of a highly hygroscopic material or if the method of test is highly sensitive to differences in the moisture content of the test piece, it is highly desirable that moisture equilibrium be approached from the dry side of the moisture hysteresis curve. This shall be achieved by pre-conditioning the test pieces in an atmosphere having a relative humidity of no greater than 10 % and a temperature of between 60 °C and 70 °C.

NOTE Air at 65 % relative humidity and 20 °C will, when heated at constant pressure to between 60 °C and 70 °C, have a relative humidity of approximately 5 %. Higher temperatures can lead to changes in the properties of some polymers.

## 5 Standard atmospheres for conditioning and testing

The conditioning treatment required for each individual test should be stated in the relevant test method.

The use of one of the following atmospheres shall be fixed by the particular standard or specification for each test. The choice of one of these alternatives will depend on the prevalent usage in individual countries and the variant used shall be reported in the test report.

### a) Atmosphere A

- temperature 20 °C  $\pm$  2 °C
- relative humidity 65 %  $\pm$  5 %

### b) Atmosphere B

- temperature 23 °C  $\pm$  2 °C
- relative humidity 50 %  $\pm$  5 %

### c) Atmosphere C (tropical)

- temperature 27 °C  $\pm$  2 °C
- relative humidity 65 %  $\pm$  5 %

### d) Atmosphere D (temperate temperature control only)

- temperature 23 °C  $\pm$  2 °C or 20 °C  $\pm$  2 °C

### e) Atmosphere E (tropical temperature control only)

- temperature 27 °C  $\pm$  2 °C

## 6 Time interval between production and commencement of testing

For all test purposes, the time between completion of production and the commencement of testing shall be no less than 24 h, this period to include the conditioning periods given in Clause 7. For light conveyor belts (as specified in EN 873) this period shall be extended to 5 days (120 h).

Whenever possible the maximum time between production and commencement of testing shall not exceed 3 months.

NOTE Test results obtained on a product where the tests are conducted more than 3 months apart, can exhibit higher variations in repeatability and reproducibility than duplicate tests conducted within this timescale.

## 7 Conditioning

### 7.1 Temperature and humidity control

If both the temperature and humidity need to be controlled, (Atmospheres A, B or C; see Clause 5), the conditioning period shall be no less than 16 h immediately before testing. For light conveyor belts (as specified in EN 873), this conditioning period shall be extended to no less than 48 h. In the event of dispute, these conditioning periods shall be extended to no less than 72 h.

### 7.2 Temperature control only

If only the temperature needs to be controlled, (Atmospheres D and E; see Clause 5), the conditioning period shall be no less than 3 h immediately before testing. In the event of dispute, this conditioning period shall be extended to no less than 72 h.

### 7.3 Temperatures above or below the standard laboratory test temperature

If a temperature other than the standard laboratory temperature is specified without the need to control the humidity, the conditioning time shall be a period sufficient for the test piece to reach temperature equilibrium with the environment, or a period required by the specification covering the material or product being tested.

Guidance on the selection of conditioning times, which will ensure that equilibrium is reached, is given in ISO 3383 [4].

### 7.4 Position of test pieces during conditioning

During the conditioning period, the test pieces shall be positioned in such a manner that, as far as possible, the whole surface of the test piece is exposed without imposing any stress/strain on the test piece, and, unless otherwise specified in the method of test, the test pieces shall be conditioned in the absence of light or ionizing radiation.

## 8 Testing

Unless otherwise specified, testing shall be carried out at the same temperature and humidity at which the conditioning was performed.

## Bibliography

- [1] ISO 139, *Textiles — Standard atmospheres for conditioning and testing*
- [2] ISO 471, *Rubber — Temperatures, humidities and times for conditioning and testing*
- [3] ISO 2231, *Rubber- or plastics-coated fabrics — Standard atmospheres for conditioning and testing*
- [4] ISO 3383, *Rubber — General directions for achieving elevated or subnormal temperatures for test purposes*

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