
**Paints and varnishes — Determination
of resistance to humidity —**

**Part 2:
Condensation (in-cabinet exposure
with heated water reservoir)**

iTeh STANDARD PREVIEW
*Peintures et vernis — Détermination de la résistance à l'humidité —
Partie 2: Condensation (exposition en enceinte avec réservoir à eau
chauffée)*
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html. (standards.iteh.ai)

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This second edition cancels and replaces the first edition (ISO 6270-2:2005), which has been technically revised.

The main changes compared to the previous edition are as follows:

- a principle clause has been added;
- the terms and definitions clause has been added;
- a limitations clause concerning the use of other than standard test conditions has been added;
- the recommendation to use distilled or deionized water for filling the trough has been changed;
- a requirement has been added to make sure that condensation forms on all test specimens;
- a method for the determination of the comparison quantity of condensation water has been added;
- information on precision has been added;
- the normative references have been updated.

A list of all parts in the ISO 6270 series can be found on the ISO website.

Introduction

This document is intended to give consistent conditions and procedures for the conditioning of pre-prepared test specimens which are to be evaluated for defects, which may develop when they are subjected to humid ambient atmospheres such as constant condensation-water atmospheres or alternating condensation-water atmospheres.

The tests are designed to clarify the behaviour of the test specimens in humid ambient atmospheres, and to pinpoint any defects in the protection of the test specimens against corrosion. The testing of coatings in these atmospheres does not necessarily give lifetime prediction data.

After conditioning, the test specimens are evaluated either in accordance with agreed documents, such as the appropriate part(s) of ISO 4628^[1] or by procedures agreed between the interested parties.

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Paints and varnishes — Determination of resistance to humidity —

Part 2: Condensation (in-cabinet exposure with heated water reservoir)

1 Scope

This document specifies the general conditions and procedures which need to be observed when testing coated test specimens in constant condensation-water atmospheres or in alternating condensation-water atmospheres, in order to ensure that the results of tests carried out in different laboratories are reproducible.

NOTE The shape and preparation of the test specimens, the duration of the test and the assessment of the test results are not covered in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 4618, *Paints and varnishes — Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Designation

The condensation-water test atmospheres are designated as follows:

Test atmosphere	CH	Condensation atmosphere with constant humidity
	AHT	Condensation atmosphere with alternating humidity and air temperature
	AT	Condensation atmosphere with alternating air temperature

5 Limitations

Temperature and humidity are important parameters affecting test results. Deviations from the requirements specified can lead to results that are not comparable. However, the interested parties may agree upon alternative parameters and these parameters shall be reported.

6 Principle

A coated test specimen is exposed to condensation in a climatic chamber, and the effects of the exposure are evaluated by criteria agreed in advance between the interested parties, these criteria usually being of a subjective nature.

7 Test atmospheres

Condensation-water test atmospheres promote the condensation of atmospheric humidity on the surfaces of test specimens, the temperatures of which are lower than the temperature of the saturated air in the climatic chamber, due to radiation onto the chamber walls or to the cooling of the test specimen.

The atmospheric temperature in the climatic chamber during the condensation process described in this document is $(40 \pm 3) ^\circ\text{C}$.

The condensation-water test atmosphere may be either a constant-humidity (CH) or an alternating (AHT, AT) atmosphere. If, in addition to the action of the condensation water, the change in atmospheric temperature and the change in atmospheric humidity have an important effect on the test specimens, an alternating atmosphere should be chosen.

The quantity of condensation water formed on the surface of the coating may also exercise an important influence on the action of the water; this quantity will be affected by the ambient temperature in the installation room or by the cooling of the test specimen.

The condensate which drips off the test specimens consists of condensation water and also, in some instances, of solid and liquid constituents of the coating dissolved in the condensation water or mixed with it.

Reproducible results can only be expected if the test procedure and test conditions remain constant for a series of tests.

In the case of alternating atmospheres, a cycle time of 24 h shall be used as a general rule. A shorter cycle time (12 h or 16 h) and a correspondingly shortened time for the two test periods may be used for the AT test atmosphere.

A summary of test atmospheres, cycle durations and conditions is given in [Table 1](#). Other cycles may be used by agreement between the interested parties.

Table 1 — Condensation test atmospheres

Test atmosphere		Cycle duration		Conditions in working chamber after reaching equilibrium	
Type	Code	Test period(s)	Total	Air temperature	Relative humidity
Constant-humidity condensation atmosphere	CH	From warm-up to end of exposure	—	(40 ± 3) °C	Approx. 100 % with condensation on test specimens
Alternating condensation atmosphere	AHT	8 h including warm-up	24 h	(40 ± 3) °C	Approx. 100 % with condensation on test specimens
		16 h including cooling down (climatic chamber open or ventilated)		18 °C to 28 °C	Approaching ambient
	AT	8 h including warm-up	24 h	(40 ± 3) °C	Approx. 100 % with condensation on test specimens
		16 h including cooling down (climatic chamber closed)		18 °C to 28 °C	Approx. 100 % (approximately saturated)

NOTE Set points and operational fluctuations can either be listed independently of each other, or they can be listed in the format “set point ± operational fluctuations”. The set point is the target condition for the sensor used at the operational control point as programmed by the user. Operational fluctuations are deviations from the set point at the control point as indicated by the readout of the calibrated control sensor during equilibrium operation and do not include measurement uncertainty. At the operational control point, the operational fluctuation may not exceed the listed value at equilibrium. When a standard calls for a particular set point, the user programmes that exact number. The operational fluctuations specified for the set point do not imply that the user is allowed to programme a set point higher or lower than the exact set point specified.

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8 Apparatus <https://standards.iteh.ai/catalog/standards/sist/f9355db5-b09f-4bd1-8267-2287e3080562/iso-6270-2-2017>

8.1 Climatic chamber

A vapour-tight climatic chamber is essential for testing in a warm and humid atmosphere. The material of the inner walls shall be corrosion-resistant and shall not affect the test specimens. The climatic chamber is usually equipped with a floor trough which acts as the receptacle for the quantity of water prescribed in 9.1. The climatic chamber shall be controlled by heating the water in the floor trough.

If the quantity of heat introduced via the water is insufficient to raise the air temperature in the climatic chamber to the required level, then additional heating can be employed.

The heating-up time will depend on the nature and quantity of the test specimens, and also on the ratio of the surface of the water in the floor trough to the surface of the walls of the climatic chamber, and on the water temperature. The water temperature should preferably not exceed 60 °C in order to prevent excessive vapour formation.

The dimensions of the climatic chamber and the arrangement of its temperature-measuring and control equipment are optional, provided that the test conditions in accordance with Clause 8 and 9.3 are observed and that the temperature is measured.

The climatic chamber shall be provided with a suitable door or other aperture capable of being closed, which allows the climatic chamber to be charged with test specimens and to be ventilated.

An example of a climatic chamber is shown in Figure 1.

Climatic chambers not equipped with water-filled floor troughs shall be fitted out in such a way that adequate formation of condensation water on the test specimens is achieved.