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## Paints and varnishes — Determination of the effect of heat

*Peintures et vernis — Détermination des effets de la chaleur*

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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](http://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](http://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 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](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This third edition cancels and replaces the second edition (ISO 3248:1998), which has been technically revised with the following changes:

- a) cooling down of the test panels after the test has been changed from standard temperature to ambient temperature;
- b) a principle clause has been added;
- c) the normative references have been updated;
- d) the supplementary test conditions previously in Annex A have been integrated in the test report.

# Paints and varnishes — Determination of the effect of heat

## 1 Scope

This International Standard specifies a method for determining the resistance of single coatings or multi-coat systems of paints, varnishes or related products to changes in gloss and/or colour, blistering, cracking and/or detachment from the substrate under conditions of a specified temperature.

This procedure is applicable to products intended for use on domestic radiators or other articles likely to be subjected to similar temperatures.

## 2 Normative references

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

ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 1514, *Paints and varnishes — Standard panels for testing*

ISO 1518-1, *Paints and varnishes — Determination of scratch resistance — Part 1: Constant-loading method*

ISO 1519, *Paints and varnishes — Bend test (cylindrical mandrel)*

ISO 1520, *Paints and varnishes — Cupping test*

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 6272-1, *Paints and varnishes — Rapid-deformation (impact resistance) tests — Part 1: Falling-weight test, large-area indenter*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

## 3 Principle

The panels are placed in an oven at a specified temperature for a specified time. At the end of the specified time, the panels are removed from the oven, cooled to ambient temperature and examined for change of colour or signs of other deterioration of the coating, by comparison with identically prepared, but unheated, panels.

When specified, both heated and unheated panels are subjected to tests for e.g. scratch resistance, bending with cylindrical mandrel, cupping, falling weight, or to other agreed test procedures and examined for compliance with a specified requirement.

## 4 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.

## 5 Sampling

Take a representative sample of the product to be tested (or of each product in case of a multi-coat system), as specified in ISO 15528.

Examine and prepare the sample for testing, as specified in ISO 1513.

## 6 Test panels

### 6.1 Substrate

The test panel shall be of steel, tinsplate, aluminium or glass as appropriate and shall comply with the requirements of ISO 1514. The dimensions of the panels shall be 150 mm × 100 mm.

### 6.2 Preparation and coating

Prepare each test panel in accordance with ISO 1514 and then coat it by the specified method with the product or system under test.

### 6.3 Drying and conditioning

Dry (or stove) and age, if applicable, each coated test panel for the specified time and under the specified conditions. Before testing, condition the coated panels at  $(23 \pm 2)$  °C and a relative humidity of  $(50 \pm 5)$  % (as specified in ISO 3270), for a minimum period of 16 h. The test procedure shall then be carried out as soon as possible.

### 6.4 Thickness of coating

Determine the thickness, in micrometres, of the dried coating by one of the procedures specified in ISO 2808.

## 7 Procedure

### 7.1 Temperature and duration of the test

Carry out the test procedure at  $(125 \pm 2)$  °C for a period of 24 h, unless otherwise agreed.

### 7.2 Determination

Place the panels in an oven with air circulation at the specified temperature, not less than 100 mm from the sides of the oven and not closer than 20 mm apart, and maintain them at that temperature for the specified time. The preferred method for ensuring even heating of the coated panels is to suspend them by means of fine wires. Alternatively, the panels may be supported in a rack made from sustainable heat-resistant material or placed, paint side uppermost, on a piece of heat-resistant board resting on supports.

At the end of the specified time, remove the panels from the oven and allow them to cool to ambient temperature. Examine the panels for change of colour or signs of other deterioration of the coating, by comparison with identically prepared, but unheated, panels.

When specified, subject both heated and unheated panels, not less than 16 h after completing the heating period, to one of the test procedures specified in ISO 1518-1, ISO 1519, ISO 1520 or ISO 6272-1, or to other agreed test procedures, and examine for compliance with the specified requirement.

## 8 Precision

No relevant precision data are currently available.

## 9 Test report

The test report shall contain at least the following information:

- a) all details necessary to identify the product(s) tested;
- b) a reference to this International Standard, i.e. ISO 3248:2016;
- c) details of the preparation of the test panels, including the following:
  - 1) the material, the thickness and the surface preparation of the substrate (see [6.1](#));
  - 2) the method of application of the coating material to the substrate, including the duration and conditions of drying between coats in the case of a multi-coat system (see [6.2](#));
  - 3) the duration and conditions of drying (or stoving) and ageing (if applicable) of the coating before testing (see [6.3](#));
  - 4) the thickness, in micrometres, of the dry coating and the method of measurement used in ISO 2808, and whether it is a single coating or a multi-coat system (see [6.4](#));
- d) the properties of the test coating which are to be considered in evaluating the resistance of the coating;
- e) the results of the test, in terms of the stated requirements;
- f) any deviation from the test method specified;
- g) any unusual features (anomalies) observed during the test;
- h) the date of the test.

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