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BS ISO 12013-1:2012



BSI Standards Publication

Paints and varnishes — Determination of curing characteristics using a free damped oscillation method

Part 1: Start temperature of the
curing reaction

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Paints and varnishes — Determination of curing characteristics using a free damped oscillation method —

Part 1:

Start temperature of the curing reaction

*Peintures et vernis — Détermination des caractéristiques de
polymérisation par une méthode utilisant un pendule amorti —*

Partie 1: Température de début de réaction de polymérisation



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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 12013-1 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

ISO 12013 consists of the following parts, under the general title *Paints and varnishes — Determination of curing characteristics using a free damped oscillation method*:

- *Part 1: Start temperature of the curing reaction*
- *Part 2: Glass transition temperature*

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Introduction

A freshly applied coating dries and/or cures depending on its physical and chemical characteristics. There are "wet characteristics" of various substrates and the evaporation of the solvent in the drying/or curing process. The structure of the coating changes according to the drying or curing process of the coating. The start temperature of reaction is very important. It is essential to consider the evaporation of the solvent in the measurement of the start temperature of reaction.

- a) While a solvent evaporates, the curing of the coating begins. The evaporation of the solvent depends on:
 - 1) the evaporation behaviour of the solvents;
 - 2) the behaviour of the solvents in the coating film during each drying stage. This is affected by the boiling point.
- b) The evaporation characteristic of the solvents depends on the solubility and the thermal conductivity of the substrate.

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Paints and varnishes — Determination of curing characteristics using a free damped oscillation method —

Part 1: Start temperature of the curing reaction

1 Scope

This part of ISO 12013 specifies a free damped oscillation method for determining the start temperature of the curing reaction of coatings.

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.

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

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

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

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

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

3 Terms and definitions

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

3.1

period

absolute value of the time between two oscillations in the same direction of the free damping oscillation

3.2

logarithmic damping ratio

Δ

logarithm of the ratio between consecutive amplitudes of a free damped oscillation

3.3

crosslinking temperature

T_{cl}

temperature at which the logarithmic damping ratio starts to increase rapidly and the period of oscillation starts to decrease rapidly

NOTE Figure 1 shows a study diagram from which the crosslinking temperature can be deduced (labelled 1).

3.4

start temperature of reaction

temperature at which the logarithmic damping ratio begins to increase

NOTE The start temperature of reaction is shown in Figure 1(labelled 2).