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**Paints and varnishes — Evaluation of  
properties of coating systems related to  
the application process —**

**Part 3:  
Visual assessment of sagging, formation  
of bubbles, pinholing and hiding power**

*Peintures et vernis — Évaluation des propriétés des systèmes de  
revêtement liées au mode d'application —*

*Partie 3: Évaluation visuelle du festonnage, de la formation de bulles,  
des piqûres et du pouvoir masquant*



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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 28199-3 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

ISO 28199 consists of the following parts, under the general title *Paints and varnishes — Evaluation of properties of coating systems related to the application process*:

- *Part 1: Relevant vocabulary and preparation of test panels*
- *Part 2: Colour stability, process hiding power, re-dissolving, overspray absorption, wetting, surface texture and mottling*
- *Part 3: Visual assessment of sagging, formation of bubbles, pinholing and hiding power*

## Introduction

In many areas (e.g. car manufacture, industrial coatings, coatings for plastics) the coating materials used are adapted to the specific application equipment and technologies of the particular user. A coating material is, therefore, to be understood as a semi-manufactured product that only receives its final form in combination with the specific application conditions. The adaptation to the application conditions is therefore decisive for the quality of the coated product.

The test methods specified in ISO 28199 are based on studies by a Working Group of the European Council for Automotive R&D (EUCAR).

They may be used for evaluation of coating materials in research, development and production with regard to their suitability and safety for industrial processes, and error analysis. The properties of coating materials and coatings to be evaluated depend on the film thickness, so a coating system of increasing thickness is applied to a test panel under defined conditions.

The following characteristics are measured (in ISO 28199-1):

- film thickness in accordance with ISO 2808;
- surface texture;
- colour in accordance with ISO 7724 (all parts).

In combination with visual assessment, the following properties are determined:

- colour stability, process hiding power, re-dissolving, overspray absorption, wetting, surface texture and mottling (ISO 28199-2);
- tendency toward sagging, formation of bubbles, pinholing and hiding power (this part of ISO 28199).

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# Paints and varnishes — Evaluation of properties of coating systems related to the application process —

## Part 3:

## Visual assessment of sagging, formation of bubbles, pinholing and hiding power

**IMPORTANT** — The electronic file of this document contains colours which are considered to be useful for the correct understanding of the document. Users should therefore consider printing this document using a colour printer.

### 1 Scope

This part of ISO 28199 specifies visual methods for the assessment of tendency toward sagging, formation of bubbles, pinholing and hiding power of coating materials applied to a test panel under defined conditions.

### 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 6504-3, *Paints and varnishes — Determination of hiding power — Part 3: Determination of contrast ratio of light-coloured paints at a fixed spreading rate*

ISO 28199-1:2009, *Paints and varnishes — Evaluation of properties of coating systems related to the application process — Part 1: Relevant vocabulary and preparation of test panels*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 28199-1 apply.

### 4 Tendency toward sagging

#### 4.1 General

The tendency toward sagging is determined by visual assessment of the sag. This assessment is made after drying/curing of the coating, on a panel prepared in accordance with Version A in ISO 28199-1:2009.

If a tendency toward sagging is already visible in the liquid layer, this should be marked at the edge of the panel.

Film thickness is determined using the values measured in accordance with 9.4.2 of ISO 28199-1:2009.