

---

---

रंग रोगन, वार्निश और संबंधित उत्पादों के  
नमूनाकरण और परीक्षण पद्धतियाँ

भाग 11 कोटिंग्स के घटाव का मूल्यांकन — दोषों  
की मात्रा और आकार, और समान सतह परिवर्तनों  
की तीव्रता का निर्धारण

अनुभाग 5 फ्लेकिंग की डिग्री का आकलन

**Methods of Sampling and Test for  
Paints, Varnishes and Related  
Products**

**Part 11 Evaluation of Degradation of  
Coatings — Designation of Quantity and  
Size of Defects, and of Intensity of  
Uniform Changes in Appearance**

**Section 4 Assessment of Degree of Flacking**

ICS 87.040

© BIS 2024

© ISO 2022



भारतीय मानक ब्यूरो  
BUREAU OF INDIAN STANDARDS  
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI - 110002

[www.bis.gov.in](http://www.bis.gov.in) [www.standardsbis.in](http://www.standardsbis.in)

## NATIONAL FOREWORD

This Indian Standard which is identical to ISO 4628-5 : 2022 'Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 5: Assessment of degree of flaking' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Paints, varnishes and related products Sectional Committee and approval of the Chemical Division Council.

IS 101 "Methods of test for ready mixed paints and enamel", initially, was published as a unified standard in 1950. The standard was subsequently revised in 1961, 1964 and 1986. During the third revision, recognizing the need for clarity, the committee decided to restructure it by splitting into various parts based on type of tests. These parts included tests on liquid paints (general and physical), chemical examination, film formation, optical assessments, and mechanical tests on paint film formation. Each part was further subdivided into sections, addressing specific tests within those categories. Further, it was decided that whenever a new test method was introduced, it would be integrated into the relevant part of IS 101, ensuring that the standard remained comprehensive.

BIS has published IS 101 (Part 6/Sec 4) : 1991, which outlines the method for evaluating the degree of flaking (scaling) and blistering by comparison with pictorial standards.

This section, IS 101 (Part 11/Sec 5), specifies the method for assessing the degree of flaking of coatings by comparison with pictorial standards, while the evaluation of the degree of blistering is covered in IS 101 (Part 11/Sec 2). Consequently, the committee has decided that once IS 101 (Part 11/Sec 2) and IS 101 (Part 11/Sec 5) are published, IS 101 (Part 6/Sec 4) will be withdrawn.

This Indian Standard (Part 11) is published in several sections. The other sections of this series are:

Sec 1 General introduction and designation system

Sec 2 Assessment of degree of blistering

Sec 3 Assessment of degree of rusting

Sec 4 Assessment of degree of cracking

Sec 6 Assessment of degree of chalking by tape method

Sec 7 Assessment of degree of chalking by velvet method

Sec 8 Assessment of degree of delamination and corrosion around a scribe or other artificial defect

Sec 10 Assessment of degree of filiform corrosion

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions and terminologies are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and
- b) Comma (,) has been used as a decimal marker in the International Standard, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, the reference appears to certain International Standards for which Indian Standards do not exist. So, the technical committee has reviewed the provisions of the following

# Contents

Page

<b>1</b>	<b>Scope</b> .....	<b>1</b>
<b>2</b>	<b>Normative references</b> .....	<b>1</b>
<b>3</b>	<b>Terms and definitions</b> .....	<b>1</b>
<b>4</b>	<b>Assessment</b> .....	<b>1</b>
<b>5</b>	<b>Expression of results</b> .....	<b>2</b>
<b>6</b>	<b>Test report</b> .....	<b>5</b>
	<b>Bibliography</b> .....	<b>6</b>



*Indian Standard*

METHODS OF SAMPLING AND TEST FOR PAINTS,  
VARNISHES AND RELATED PRODUCTS

**PART 11 EVALUATION OF DEGRADATION OF COATINGS —  
DESIGNATION OF QUANTITY AND SIZE OF DEFECTS, AND OF  
INTENSITY OF UNIFORM CHANGES IN APPEARANCE**

**SECTION 4 ASSESSMENT OF DEGREE OF FLACKING**

## 1 Scope

This document specifies a method for assessing the degree of flaking of coatings by comparison with pictorial standards.

ISO 4628-1 specifies the system used for designating the quantity and size of defects and the intensity of changes in appearance of coatings. It also outlines the general principles of the system. This system is intended to be used, in particular, for defects caused by ageing and weathering, and for uniform changes such as colour changes, for example yellowing.

## 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 13076, *Paints and varnishes — Lighting and procedure for visual assessments of coatings*

## 3 Terms and definitions

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

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

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

### 3.1

#### **degree of flaking**

rating characterizing flaked areas in a coating in terms of quantity, size, and depth

## 4 Assessment

Assess the quantity of flaking by referring to [Table 1](#) and using [Figure 1](#) or [Figure 2](#) as examples, depending on the type of flaking.

[Figure 1](#) shows flaking without preferential direction and [Figure 2](#) shows flaking in a preferential direction due to anisotropy of the substrate.

**Table 1 — Rating scheme for designating the quantity of flaking**

Rating	Flaked area %
0	0
1	0,1
2	0,3
3	1
4	3
5	15

Assess the average size of the individual areas exposed by flaking in accordance with [Table 2](#).

**Table 2 — Rating scheme for designating the size of areas exposed by flaking**

Rating	Size of flaking (largest dimension)
0	not visible under × 10 magnification
1	up to 1 mm
2	up to 3 mm
3	up to 10 mm
4	up to 30 mm
5	larger than 30 mm

Where a test area exhibits flaked areas of various sizes, quote as the size rating the largest areas, which are numerous enough to be typical of the test area.

If possible, indicate the depth of flaking by reference to the level in the coating system where failure occurs. A distinction is made between two main types of failure by flaking:

- coat(s) flaking from underlying coat (type a);
- the whole coating system flaking from substrate (type b).

Carry out the assessment under good illumination, as specified in ISO 13076.

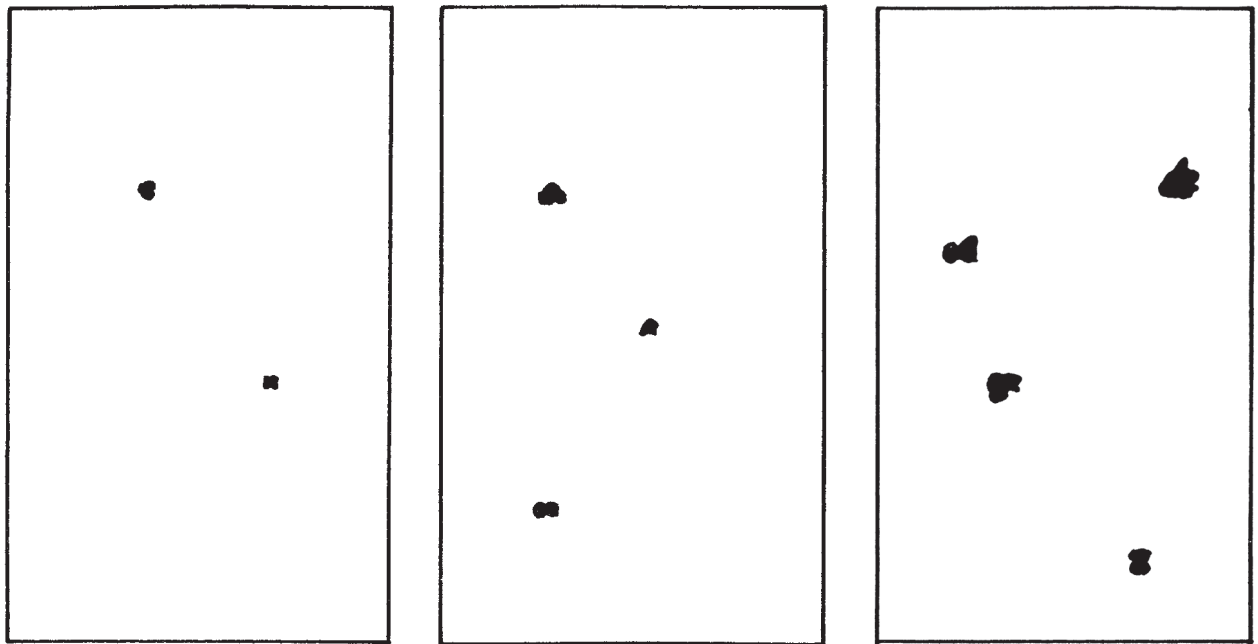
## 5 Expression of results

Express the numerical ratings of the quantity and size of flaking, where possible together with the depth of flaking (type a or b), shown in [Figures 1](#) and [2](#), together with the approximate dimensions of the area concerned, or its proportion to the total area, expressed as a percentage.

For example, for quantity 3, size 2, with the whole coating system flaking from the substrate (type b), report the result as:

- flaking; degree of flaking 3(S2)b.

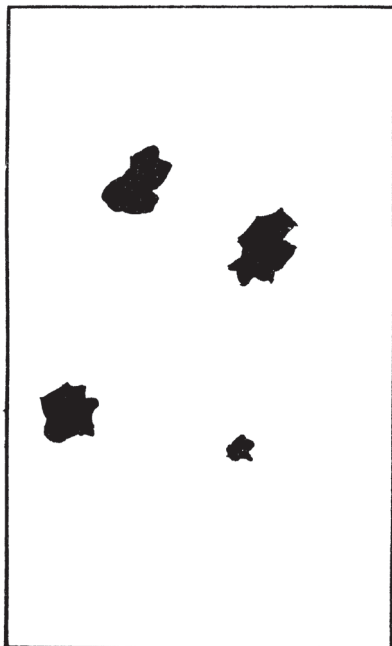
If necessary, the assessment may be amplified in words.



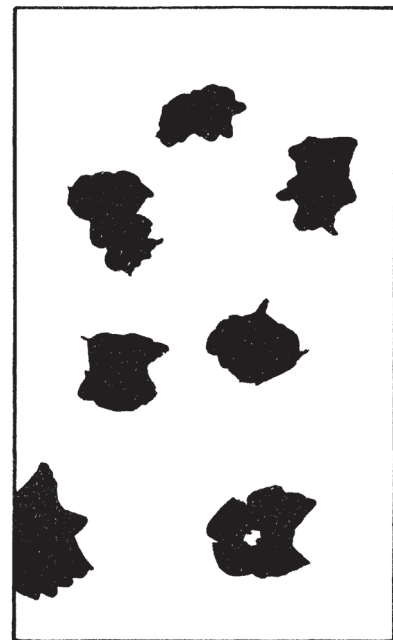
a) Quantity (density) 1

b) Quantity (density) 2

c) Quantity (density) 3

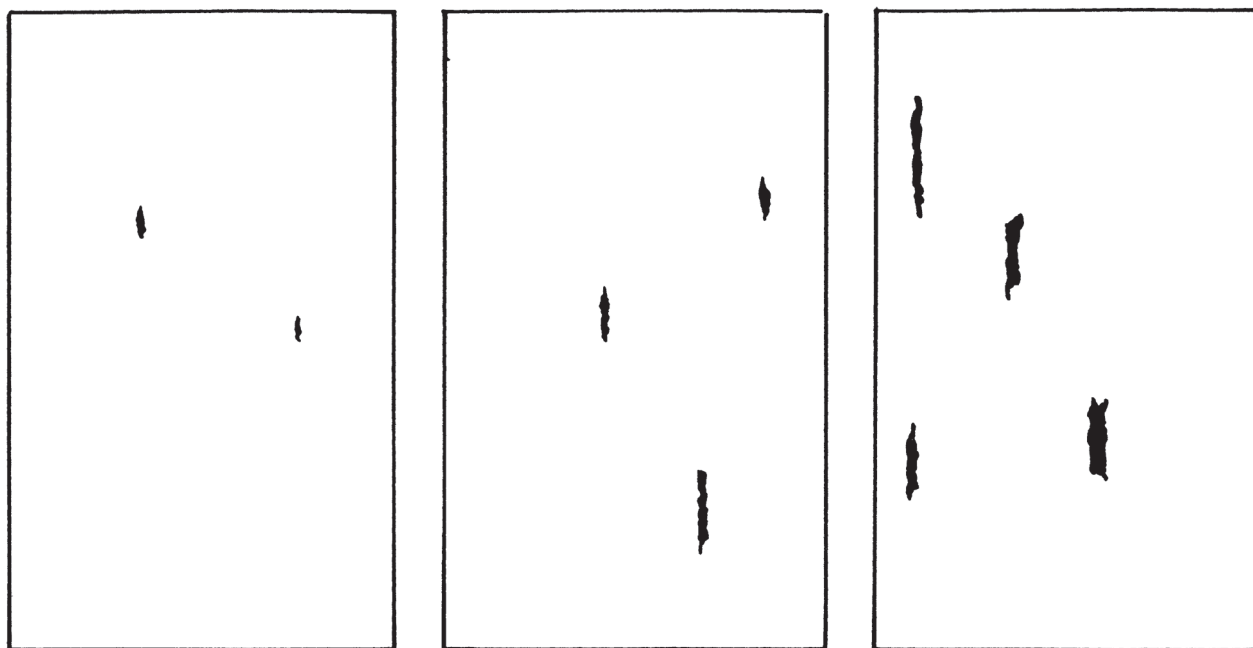


d) Quantity (density) 4



e) Quantity (density) 5

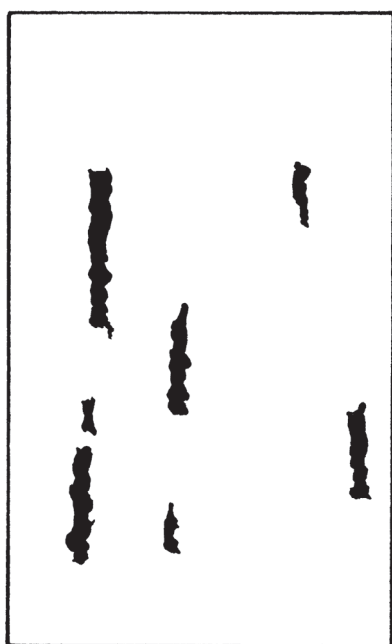
Figure 1 — Flaking without preferential direction  
(panels of 100 cm<sup>2</sup> to 200 cm<sup>2</sup>)



a) Quantity (density) 1

b) Quantity (density) 2

c) Quantity (density) 3



d) Quantity (density) 4



e) Quantity (density) 5

Figure 2 — Flaking in a preferential direction  
(panels of 100 cm<sup>2</sup> to 200 cm<sup>2</sup>)



## 6 Test report

The test report shall contain at least the following information:

- a) all details necessary to identify the coating examined;
- b) a reference to this document, i.e. ISO 4628-5:2022;
- c) the type of surface examined, its size and, if appropriate, its location;
- d) the result of the assessment in accordance with [Clause 5](#);
- e) an indication of the illumination under which the assessment was carried out;
- f) any deviations from the procedure specified;
- g) any unusual features (anomalies) observed during the assessment;
- h) the date of the examination.

## Bibliography

- [1] ISO 4628-1, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

[\(Continued from second cover\)](#)

International Standards/documents referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

<i>International Standards</i>	<i>Title</i>
ISO 13076	Paints and varnishes — Lighting and procedure for visual assessments of coatings

In this adopted standard, reference appears to certain International Standards/documents where the standard atmospheric conditions to be observed are stipulated which are not applicable to tropical/subtropical countries. The applicable standard atmospheric conditions for Indian conditions are  $(27 \pm 2) ^\circ\text{C}$  and  $(65 \pm 5)$  percent relative humidity and shall be observed while using this standard.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

### Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-[www.bis.gov.in](http://www.bis.gov.in) or [www.standardsbis.in](http://www.standardsbis.in).

This Indian Standard has been developed from Doc No.: CHD 20 (25264).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

## BUREAU OF INDIAN STANDARDS

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: [www.bis.gov.in](http://www.bis.gov.in)

### Regional Offices:

	Telephones
Central : 601/A, Konnectus Tower -1, 6 <sup>th</sup> Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	{ 2323 7617
Eastern : 8 <sup>th</sup> Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	{ 2367 0012 2320 9474
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	{ 265 9930
Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	{ 2254 1442 2254 1216
Western : Manakalya, 5 <sup>th</sup> Floor/MTNL CETTM, Technology Street, Hiranandani Gardens, Powai Mumbai 400076	{ 25700030 25702715

**Branches :** AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYANA (CHANDIGARH), HUBLI, HYDERABAD, JAIPUR, JAMMU, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.