
**Paints and varnishes — Evaluation of
degradation of coatings — Designation of
quantity and size of defects, and of
intensity of uniform changes in
appearance —**

Part 6:

**Assessment of degree of chalking by
tape method**

*Peintures et vernis — Évaluation de la dégradation des revêtements —
Désignation de la quantité et de la dimension des défauts, et de
l'intensité des changements uniformes d'aspect —*

*Partie 6: Évaluation du degré de farinage par la méthode du ruban
adhésif*

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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 4628-6 was prepared by Technical Committee 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 4628-6:2007), which has been technically revised. The main changes are as follows:

- a) the pictorial standards (photographic pictures) used in the first edition (ISO 4628-6:1990) have been re-inserted because the computer-generated chalking scale used in the second edition (ISO 4628-6:2007) did not always give the same rating as that given by the scale used in the first edition (for more details, see the Introduction);
- b) a limiting value of the transmittance of the tape below which chalking is considered to have taken place has been added (see 5.2).

ISO 4628 consists of the following parts, under the general title: *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*
- *Part 2: Assessment of degree of blistering*
- *Part 3: Assessment of degree of rusting*
- *Part 4: Assessment of degree of cracking*
- *Part 5: Assessment of degree of flaking*
- *Part 6: Assessment of degree of chalking by tape method*
- *Part 7: Assessment of degree of chalking by velvet method*
- *Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect*
- *Part 10: Assessment of degree of filiform corrosion*

Introduction

ISO 4628-1 defines the system for designating the quantity and size of defects and the intensity of uniform changes of coatings and 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.

The other parts of ISO 4628 provide pictorial standards or other means for evaluating particular types of defect. As far as possible, already existing evaluation schemes have been used as the basis.

The chalking scale used in the first (1990) edition and in this third edition of ISO 4628-6 consists of photographic pictures of adhesive tapes with different amounts of pigment particles adhering to them. The pigment particles are not evenly distributed over each tape. The lower ratings in particular (i.e. 1 to 3) give the impression of cloudiness. All five ratings in the scale used in the first (1990) edition and in this edition are sufficiently different for visual-assessment purposes, however.

The scale used in the second (2007) edition was computer-generated. Thus the white dots representing the pigment particles were distributed very evenly over the tape, with the result that not all the ratings differed sufficiently well from each other for visual assessment to be carried out. While ratings 0,5 to 3,0 on the black background on the 2007 scale could be differentiated sufficiently well from each other, it was hardly possible to differentiate visually between ratings above 3,0, especially ratings 4 and 5. On the white background, the difference between ratings 0,5, 1,0 and 1,5 was not easy to discern. The differences between ratings 1,5 to 5,0 were more evident, however.

Comparing the 1990 scale with the 2007 scale, it would appear that rating 1 on the 1990 scale corresponded to 0,5 on the 2007 scale, and rating 2 on the 1990 scale corresponded to 1 on the 2007 scale.

It was therefore decided that the 2007 scale was unsuitable for use in the visual assessment of the degree of chalking of paints over the whole rating scale from 0,5 to 5,0.

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Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance —

Part 6:

Assessment of degree of chalking by tape method

IMPORTANT — For the assessment of the degree of chalking by the tape method, it is necessary to use the pictorial reference standards contained in this part of ISO 4628. Owing to the fact that electronic copies of these standards are subject to change when viewed on screen or printed, it is recommended that only the pictorial standards contained in printed copies of this part of ISO 4628 purchased from ISO member bodies or their distributors be used when comparing test results.

1 Scope

This part of ISO 4628 provides pictorial reference standards for designating the degree of chalking of paint coatings. It also describes a method by which the degree of chalking is rated. In using this method, it is essential that care be taken to distinguish between true degradation products and adhering dirt, particularly when chalking is slight.

2 Terms and definitions

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

2.1

chalking

appearance of a loosely adherent fine powder on the surface of a paint coating, arising from the degradation of one or more of its constituents

3 Principle

The chalking is removed from the coating under test using an adhesive tape. The chalking adhering to the tape is examined against a contrasting background (either black or white, whichever gives the greater contrast) and the degree of chalking is assessed with reference to a rating scale.

4 Materials

4.1 **Self-adhesive transparent tape**, of width at least 15 mm.

Commercially available flexible tapes, transparent and without perceptible colour, have been found to be satisfactory. However, the quality of the tape affects the rating obtained. The type of tape shall therefore be agreed on between the interested parties and shall be stated in the test report.

4.2 Background, black or white, with matt finish, for example card or velvet having a short pile without a tendency to be crushed.

5 Procedure

5.1 Allow the surface to dry at room temperature before carrying out the test.

Place a piece of the adhesive tape (4.1) on the dry coating by applying firm pressure and rubbing with a finger.

The length of the tape should be at least 40 mm.

Remove the tape perpendicularly to the surface and lay it on a background (4.2) of the appropriate colour to give the greater contrast, with the adhesive in contact with the background. Assess light-coloured coatings on the black background and dark-coloured coatings on the white background.

Under consistent illumination, immediately assess (see 5.5) the degree of chalking by comparing the amount of chalk on the tape with the pictorial reference standards in Figure 1. The more background that is visible, the lower the rating. Report the illumination in the test report.

5.2 The degree of chalking may also be determined quantitatively using a suitable photoelectric instrument to compare the transmittance of the chalked tape with that of unused tape. In this procedure, the adhesive tape shall not be placed on a background (4.2) but on a clean glass slide or open support, which is placed in the optical beam of the instrument^{[2],[3]}. A transmittance of less than 70 % of that of the unused tape indicates chalking.

This instrumental method shall only be used if the pattern of chalking residues on the tape is homogeneous.

5.3 The degree of chalking can vary over a given area. On large areas with a uniform surface (no texture), the determination should preferably be made at several locations and the mean and range reported.

Apply the tape to an area of the panel that has not been used for previous measurements to avoid false readings.

5.4 Ratings obtained with coatings exposed to natural weathering shall be treated with caution as dirt deposited on the surface from the atmosphere can give false values of chalking.

5.5 After removing the chalking from the coating under test, the assessment of each piece of adhesive tape shall be carried out without delay because the appearance of the chalking residues on the adhesive tape and the transmittance of the tape might change with time.

5.6 When testing low-gloss paint coatings, a certain amount of loosely adherent material might be observed, even with unweathered panels. A blank test, carried out on an unweathered panel, is therefore recommended for such coatings.

6 Rating

Rate the degree of chalking by reference to the pictorial standards shown in Figure 1.

NOTE The numerical values given correspond to those in ISO 4628-1.

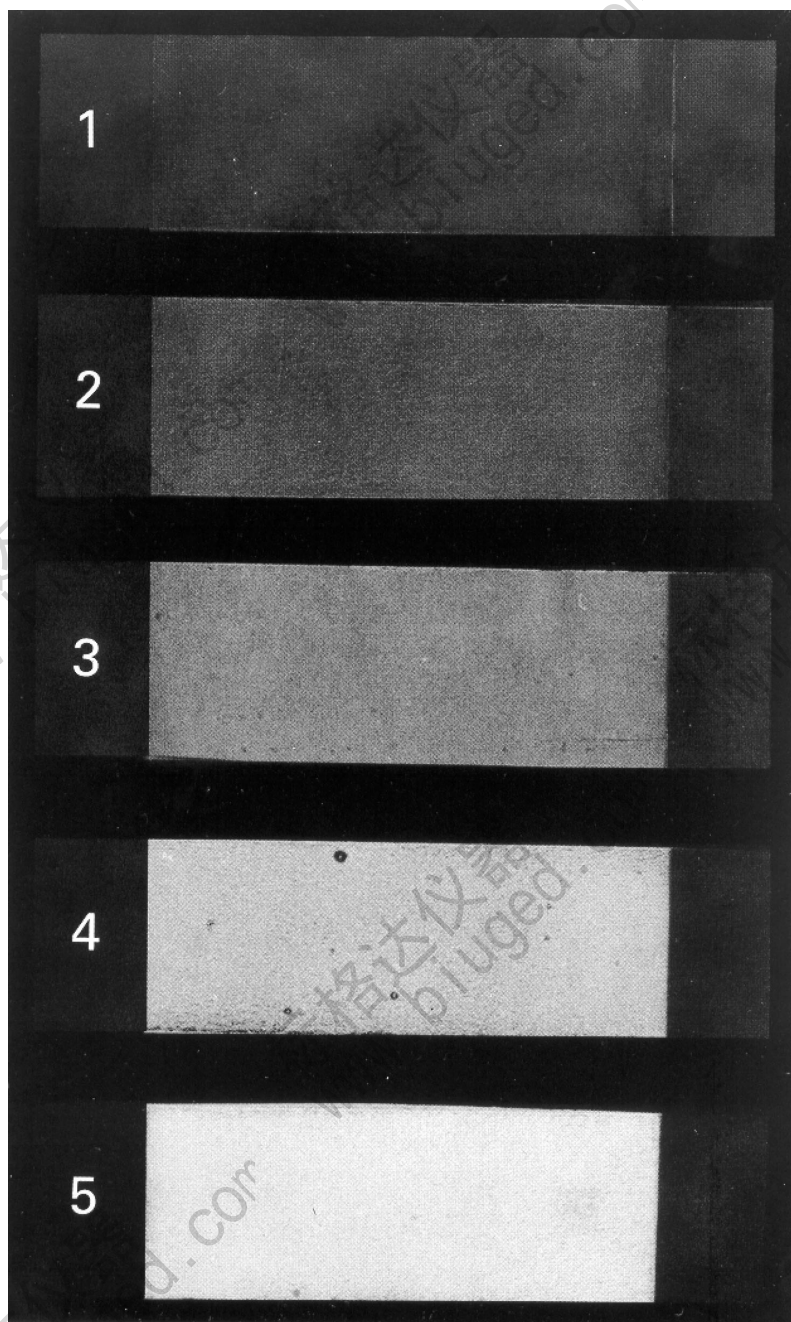
For textured surfaces, the rating shall be based on the observations of the most intensively chalked parts of the tape.

7 Test report

The test report shall contain at least the following information:

- a) all information necessary for the identification of the sample tested;
- b) a reference to this part of ISO 4628 (ISO 4628-6:2011);
- c) details of the method used, including:
 - 1) the type of weathering (artificial or natural) of the coating,
 - 2) all details necessary for the identification of the adhesive tape used, including the manufacturer and the name of the tape,
 - 3) all details necessary for the identification of the substrate used as the background for the adhesive tape (see 4.2),
 - 4) the illumination used for the assessment;
- d) the results of the test, including:
 - 1) the numerical rating of the degree of chalking,
 - 2) whether the evaluation was carried out visually or using an instrument (see 5.2);
- e) any deviations from the procedure specified;
- f) any unusual features (anomalies) observed during the test;
- g) the date of the test.

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NOTE

The right-hand end of each tape corresponds to chalking rating of 0.

Figure 1 — Pictorial reference standards for numerical chalking ratings 1 to 5

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*
- [2] HELMEN, T., *Farbe und Lack*, **84** (5), 1978, pp. 315-322
- [3] HELMEN, T., *Farbe und Lack*, **87** (3), 1981, pp. 181-189
- [4] JPIA, *Standards for evaluation of paint films*, 2003, pp. 6-1 to 6-5

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