

ISO/TC 35/SC 9

Secretariat: BSI

Voting begins on:  
2015-09-17

Voting terminates on:  
2015-11-17

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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 1: General introduction and designation system

*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 1: Introduction générale et système de désignation*

Please see the administrative notes on page iii

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Reference number  
ISO/FDIS 4628-1:2015(E)

## ISO/CEN PARALLEL PROCESSING

This final draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement. The final draft was established on the basis of comments received during a parallel enquiry on the draft.

This final draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel two-month approval vote in ISO and formal vote in CEN.

**Positive votes shall not be accompanied by comments.**

**Negative votes shall be accompanied by the relevant technical reasons.**

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## Foreword

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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)).

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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

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

This fourth edition cancels and replaces the third edition (ISO 4628-1:2003), which has been technically revised with the following changes:

- a) a lower limit for visual assessment of defects has been introduced in [Table 2](#);
- b) a normative reference to ISO 13076 for illumination for the assessment has been added.

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*

# 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

### 1 Scope

This part of ISO 4628 defines a system for designating the quantity and size of defects and the intensity of changes in appearance of coatings and outlines the general principles of the system used throughout ISO 4628. This system is intended to be used, in particular, for defects caused by ageing and weathering, and for uniform 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.

This part of ISO 4628 is also used for assessing defects not covered by the other parts of ISO 4628.

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

### 3 General principles of the system

A uniform convention has been adopted for designating the quantity and size of defects and the intensity of changes by means of ratings on a numerical scale ranging from 0 to 5, 0 denoting no defects or changes, and 5 denoting defects or changes so severe that further discrimination is not reasonable. The other ratings, corresponding to the numbers 1, 2, 3, and 4, are so defined that they give optimum discrimination over the whole range of the scale.

The use of intermediate half-steps is permissible, if specified, to give a more detailed report on the defects or changes observed.

NOTE 1 The quantity of small defects scattered over the test area may be assessed by means of a grid method. Details of such a method are described in ISO 10289.

NOTE 2 The ISO ranking may be different from the ranking schemes used in other standards, e.g. the rusting evaluation ASTM D 610, where ranking is from 10 to 1, with 10 meaning no change and 1 meaning greatest change.

In addition to the ratings, the approximate dimensions of the area concerned shall be given, or the proportion of the area concerned compared with the total area, expressed as a percentage.

## 4 Assessment of defects and of intensity of changes

### 4.1 General

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

Carry out a first assessment of defect visually, without any magnification.

### 4.2 Designation of quantity of defects

The quantity of defects in the form of discontinuities or other local imperfections in the coating, scattered over the test area in a more or less even pattern, is designated in accordance with [Table 1](#). The ratings shall be expressed as a whole number unless otherwise specified (see [Clause 3](#)).

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

Rating	Quantity of defect
0	none, i.e. no detectable defects
1	very few, i.e. small, barely significant number of defects
2	few, i.e. small but significant number of defects
3	moderate number of defects
4	considerable number of defects
5	dense pattern of defects

### 4.3 Designation of size of defects

The average size (order of magnitude) of defects is designated, if required and meaningful, in accordance with [Table 2](#).

**Table 2 — Rating scheme for designating the size of defects**

Rating	Size of defect <sup>a</sup>
0	not visible under $\times 10$ magnification
1	only visible under magnification up to $\times 10$
2	just visible with normal corrected vision (up to 0,2 mm) <sup>b</sup>
3	clearly visible with normal corrected vision (larger than 0,2 mm up to 0,5 mm)
4	larger than 0,5 mm up to 5 mm
5	larger than 5 mm

<sup>a</sup> Unless otherwise specified in subsequent parts of ISO 4628.

<sup>b</sup> Typically, defects larger than 0,2 mm are visible with normal corrected vision.

Where a test area exhibits defects of various sizes, the size of the largest defects which are numerous enough to be typical of the test area shall be quoted as the size rating. The size of the defect shall be reported using the designation  $S_n$ , where S indicates the size and  $n$  is the rating number. For example, a defect which is just visible with normal corrected vision is designated S2.

### 4.4 Designation of intensity of changes

The intensity of uniform changes in the appearance of the coating, such as colour changes, for example yellowing, is designated in accordance with [Table 3](#). The ratings shall be expressed as a whole number unless otherwise specified (see [Clause 3](#)).

**Table 3 — Rating scheme for designating the intensity of changes**

Rating	Intensity of change
0	unchanged, i.e. no perceptible change
1	very slight, i.e. just perceptible change
2	slight, i.e. clearly perceptible change
3	moderate, i.e. very clearly perceptible change
4	considerable, i.e. pronounced change
5	very marked change

## 5 Expression of results

The type of defect, the quantity present (see [Table 1](#)), and its size (see [Table 2](#)), shall be expressed as indicated in the following examples:

— blistering; degree of blistering 2(S2), i.e. quantity 2/size 2;

— flaking; degree of flaking 3(S2), i.e. quantity 3/size 2;

together with the approximate dimensions of the area concerned, or its proportion of the total area, expressed as a percentage.

If necessary, the test result may be amplified in words, for example “confined to edges” or “blistering of top coat down to intermediate coat”.

The type of change and its intensity (see [Table 3](#)), shall be expressed as indicated in the following example:

— chalking 4;

together with the approximate dimensions of the area concerned, or its proportion of the total area, expressed as a percentage.

## 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 part of ISO 4628, i.e. ISO 4628-1;
- 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 unusual features (anomalies) observed during the assessment;
- g) the date of the examination.

## Bibliography

- [1] ISO 10289, *Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates — Rating of test specimens and manufactured articles subjected to corrosion tests*
- [2] ASTM D610, *Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces*

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