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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



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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 ^a
0	not visible under ×10 magnification
1	only visible under magnification up to ×10
2	just visible with normal corrected vision (up to 0,2 mm) ^b
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

^a Unless otherwise specified in subsequent parts of ISO 4628.
^b 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 S_2 .

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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**Textiles — Determination of dimensional
change in washing and drying**

*Textiles — Détermination des variations dimensionnelles au lavage et au
séchage domestiques*



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Foreword

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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 5077 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

This second edition cancels and replaces the first edition (ISO 5077:1984), which has been technically revised.

Textiles — Determination of dimensional change in washing and drying

1 Scope

This International Standard specifies a method for the determination of the dimensional change of fabrics, garments or other textile articles when subjected to an appropriate combination of specified washing and drying procedures.

In the case of textile articles or deformable materials, it is necessary to exercise all possible caution in the interpretation of the results.

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 139, *Textiles — Standard atmospheres for conditioning and testing*

ISO 3759, *Textiles — Preparation, marking and measuring of fabric specimens and garments in tests for determination of dimensional change*

ISO 6330, *Textiles — Domestic washing and drying procedures for textile testing*

3 Principle

The specimen is conditioned in the specified standard atmosphere and measured before subjection to the appropriate washing and drying procedures. After drying, conditioning and remeasuring of the specimen, the changes in dimensions are calculated.

4 Apparatus and reagents

Use apparatus and reagents as specified in ISO 3759 and ISO 6330.

5 Atmospheric conditions

The atmospheric conditions required for conditioning and testing are specified in ISO 139.

6 Test specimens

6.1 The selection, dimensions, marking and measuring of test specimens are specified in ISO 3759.

6.2 When possible, three specimens from each sample should be used. One or two specimens may be used when insufficient sample is available.

7 Procedure

7.1 Determine the original length and width dimensions, as appropriate, after the specimens have been conditioned and measured according to the procedure specified in ISO 139 and ISO 3759.

7.2 Wash and dry the specimens according to one of the procedures specified in ISO 6330, as agreed between the interested parties.

7.3 After washing and drying, condition and measure the specimens and calculate the dimensional change of the specimens according to the procedure specified in ISO 3759.

8 Expression of results

8.1 Calculate the mean changes in dimensions in both the length and width directions in accordance with the arrangement in ISO 3759 as follows:

$$\frac{x_t - x_o}{x_o} \times 100$$

where

x_o is the original dimension;

x_t is the dimension measured after treatment.

Record the changes in measurement separately as a percentage of the corresponding original value.

8.2 Express the average dimensional changes to the nearest 0,5 %.

8.3 State whether the dimension has decreased (shrinkage) by means of a minus sign (–) or increased (extension) by means of a plus sign (+).

9 Test report

The test report shall specify the following:

- the number and year of this International Standard;
- the number of specimens washed and dried;
- the procedure used for washing and drying from ISO 6330;
- for fabric specimens, the average dimensional change in the length (warp or wale) and the average dimensional change in the width (weft or course) to the nearest 0,5 %;
- for garments, the description, make and size of the garment tested;
- for garments, an adequate description of each measuring position and the average dimensional change to the nearest 0,5 % at each position for each garment tested.