INTERNATIONAL STANDARD

ISO 4628-10

Second edition
2016-01-15

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

Part 10: Assessment of degree of filiform corrosion

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

Partie 10: Évaluation du degré de corrosion filiforme

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Contents

Page

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).

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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 second edition cancels and replaces the first edition (ISO 4628-10:2003), which has been technically revised with the following changes:

a) 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 assessment of general defects*

— *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 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 10: Assessment of degree of filiform corrosion

1 Scope

This part of ISO 4628 specifies a method for assessing the amount of filiform corrosion developed from a scribed mark by measuring the length of the longest filament *L* and the most frequent length *M* of filaments.

Pictorial examples provided in Annex A of this part of ISO 4628 illustrate different ratings for the length of the longest filament *L* and the most frequent length *M* of the filaments. A comparison of the test panels with the 12 pictures in Annex A does not supersede the obligatory numerical assessment (method 1 or 2).

ISO 4628-1 defines a system used for designating the quantity and size of defects and the intensity of uniform changes in appearance 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.

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 Terms and definitions

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

3.1
filiform corrosion
type of corrosion proceeding under a coat of paint, varnish, or related product, in the form of threads, generally starting from bare edges or from local damage of the coating

Note 1 to entry: Usually the threads are irregular in length and direction of growth, but they may also be nearly parallel and of approximately equal length.

Note 2 to entry: Filiform corrosion can also occur under other protective coatings.

Note 3 to entry: Usually the threads follow the direction of extrusion of a metal substrate, do not cross over one another, and need to be initiated by aggressive ions.

[SOURCE: ISO 4623-1:2000, 3.1, modified — Note 3 to entry has been added; ISO 4623-2:2003, 3.1, modified — The notes to entry have been numbered.]

4 Assessment

4.1 General

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

4.2 Method 1

This applies where there is regular corrosion [see Figure 1 a)].

It includes the following:

— measuring the maximum distances L_l and L_r, in millimetres, from the scribed line to the point to which the filiform corrosion has developed on the left-hand side and on the right-hand side respectively [see Figure 1a)], in order to calculate the length of the longest filament L which is the mean value of L_l and L_r;

— measuring the distances M_l and M_r, in millimetres, to which the scribed line to which the majority of filaments have developed from the left-hand side and on the right-hand side respectively [see Figure 1a)], in order to calculate the most frequent filament length M, which is the mean value of M_l and M_r.

4.3 Method 2

This applies where there is irregular corrosion [see Figure 1 b)].

It includes:

— measuring L, see method 1;

— measuring M_{l1}, M_{r1}, M_{l2}, M_{r2}, etc., in order to calculate the overall values M_l and M_r using the following equations:

$$M_l = \frac{x_1 M_{l1} + x_2 M_{l2} + x_3 M_{l3} + x_4 M_{l4} \ldots + x_n M_{ln}}{z}$$

$$M_r = \frac{y_1 M_{r1} + y_2 M_{r2} + y_3 M_{r3} + y_4 M_{r4} \ldots + y_n M_{rn}}{z}$$

where M_{l1}, M_{r1}, x_1, y_1, etc., and z are as shown in Figure 1 b).

5 Expression of results

Express the numerical ratings of the length of the longest filament L and the most frequent filament length M as follows:

— filiform corrosion, $L5/M3$.

This means a length of the longest filament is 5 mm and a most frequent filament length is 3 mm.

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 4628-10;

c) the type of surface examined, its size and, if appropriate, its location;

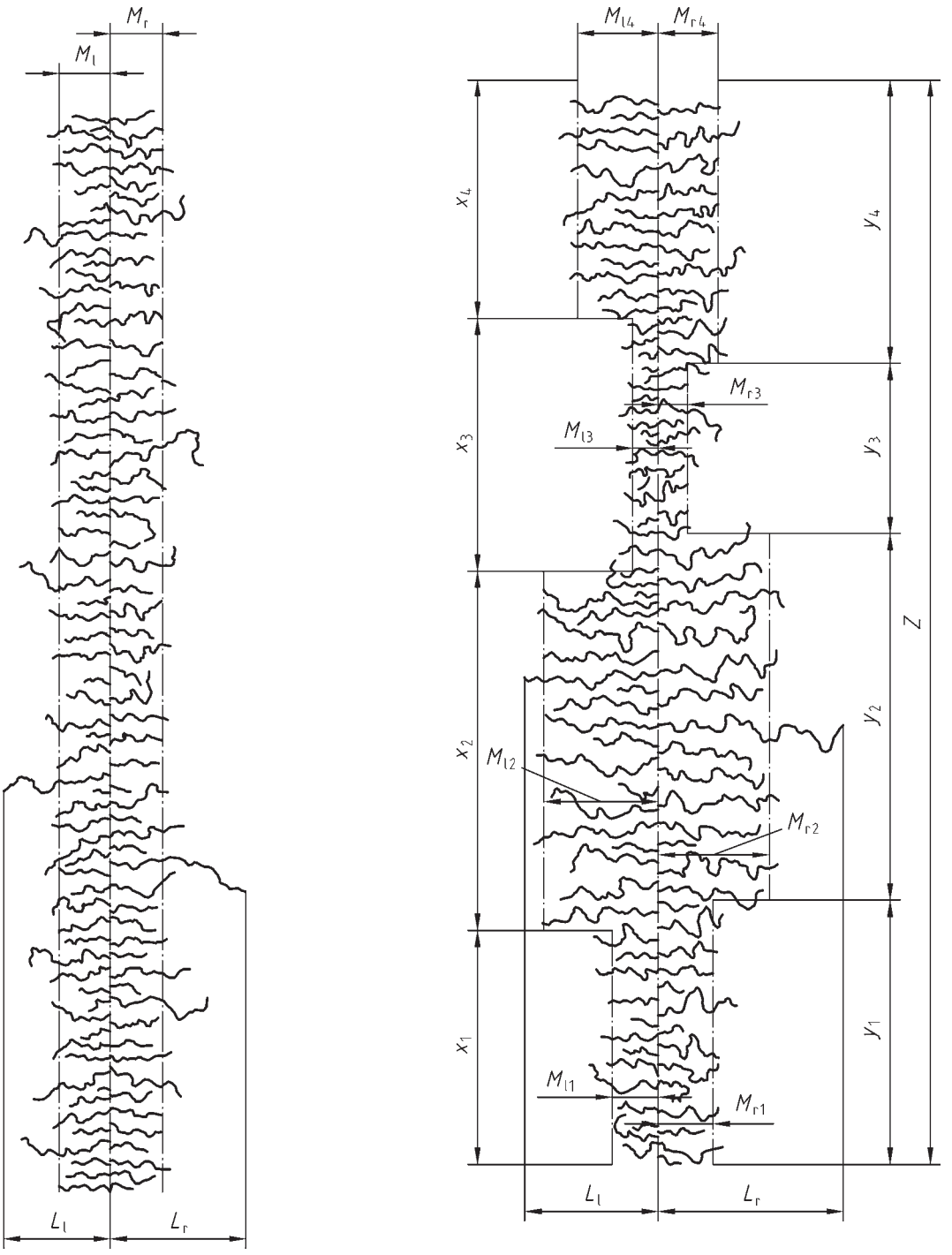
d) the result of the assessment in accordance with Clause 5;

e) an indication of the illumination under which the assessment has been carried out;

f) whether the coating was stripped or not;

g) any unusual features (anomalies) observed during the assessment;

h) the date of the examination.



a) **b)**

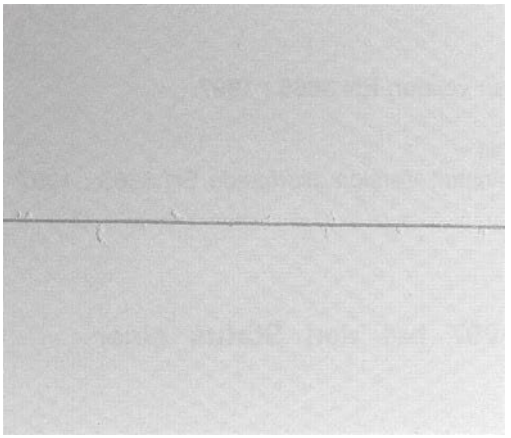
Key

L	length of the longest filament	1, 2, …	number of zones
M	most frequent filament length	x	zones on left-hand side
r	right	y	zones on right-hand side
l	left	z	overall length of assessed area

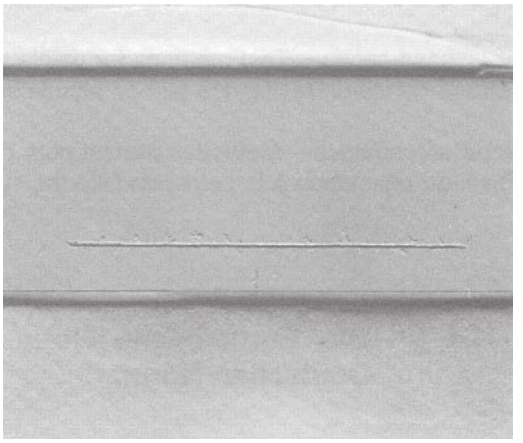
Figure 1 — Determination of length of longest filament L and the most frequent filament length M

Annex A
(informative)

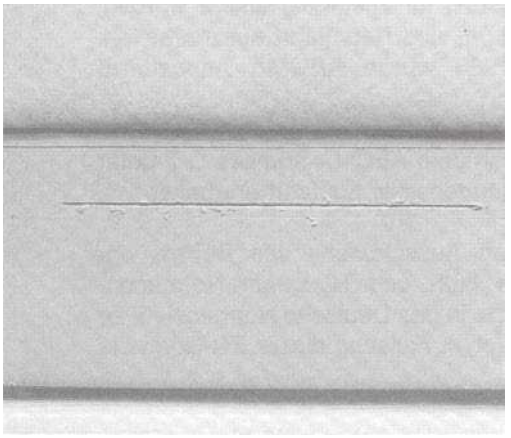
Pictorial examples of different ratings for the length of the longest filament *L* and the most frequent filament length *M*



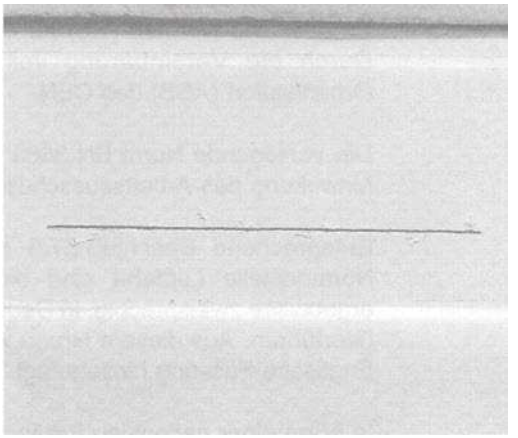
a) *L*1–2/*M*1



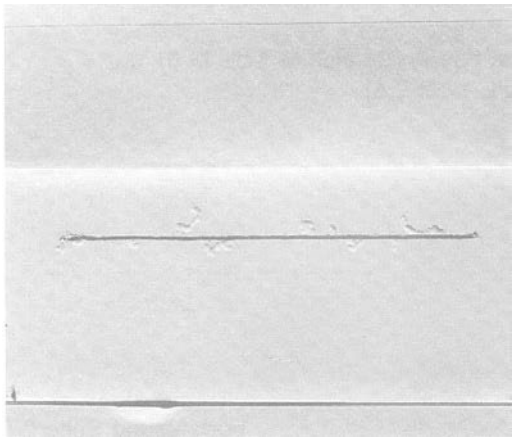
b) *L*1/*M*2



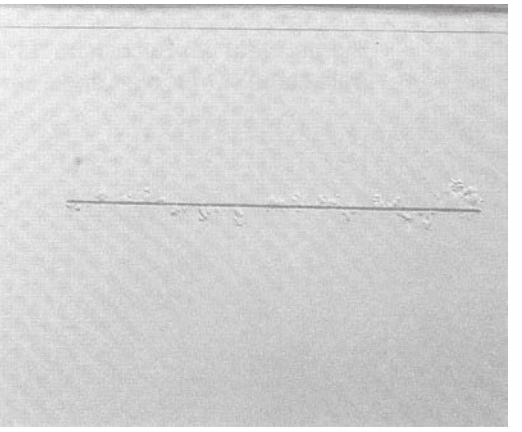
c) *L*3/*M*1



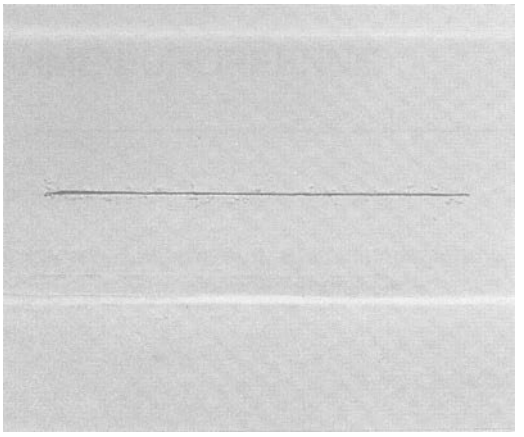
d) *L*3/*M*2



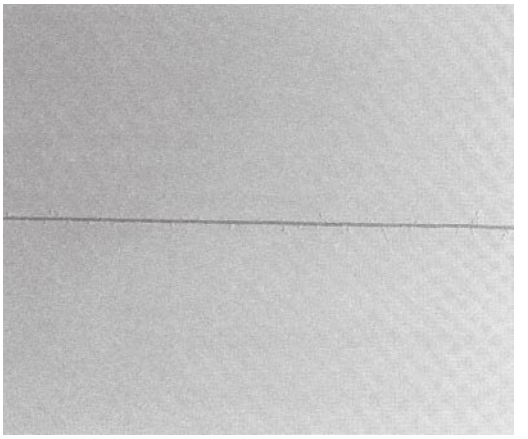
e) *L*4–5/*M*1



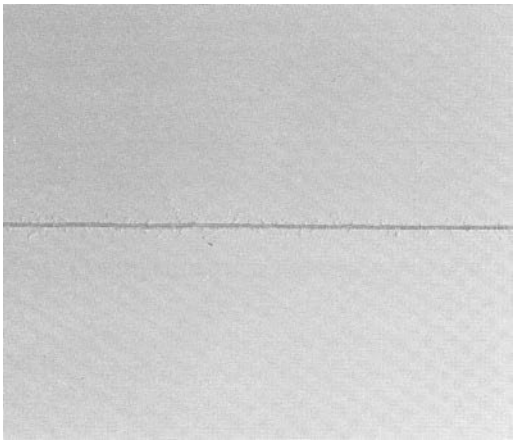
f) *L*5/*M*2



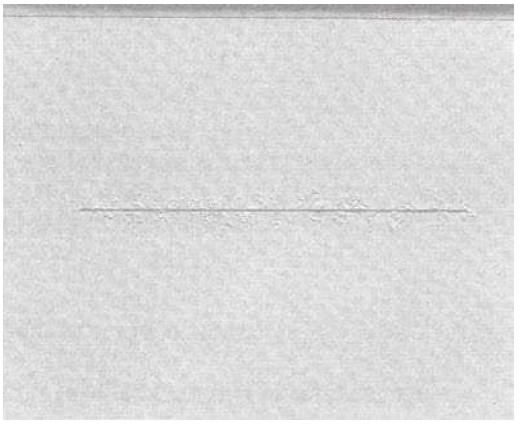
g) *L*2/*M*3



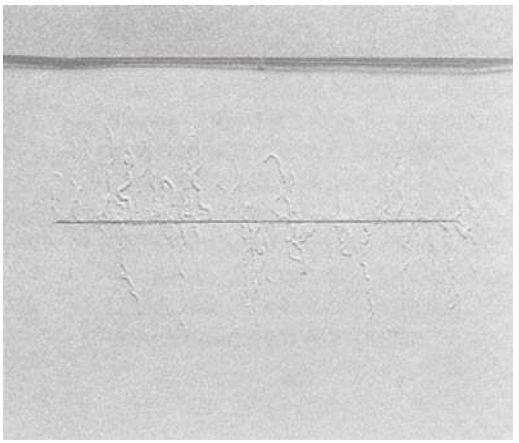
h) *L*2/*M*4



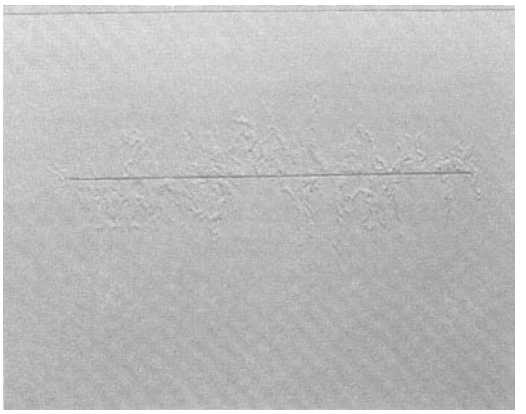
i) *L*3/*M*3



j) *L*4/*M*4



k) *L*5/*M*3



l) *L*5/*M*5

Figure A.1 — Pictorial examples

Bibliography

[1] ISO 4623-1:2000, *Paints and varnishes — Determination of resistance to filiform corrosion — Part 1: Steel substrates*

[2] ISO 4623-2:2003, *Paints and varnishes — Determination of resistance to filiform corrosion — Part 2: Aluminium substrates*

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