

# 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

The European Standard EN ISO 4628-10:2003 has the status of a  
British Standard

ICS 87.040

National foreword

This British Standard is the official English language version of EN ISO 4628-10:2003. It is identical with ISO 4628-10:2003.

The UK participation in its preparation was entrusted to Technical Committee STI/10, Test methods for paints, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to iv, pages 1 to 6, an inside back cover and a back cover.

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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 10: Assessment of  
degree of filiform corrosion (ISO 4628-10:2003)

Peintures et vernis - Evaluation 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 10: Evaluation du degré de corrosion  
filiforme (ISO 4628-10:2003)

Beschichtungsstoffe - Beurteilung von  
Beschichtungsschäden - Beurteilung der Menge und der  
Größe von Schäden und der Intensität von gleichmäßigen  
Veränderungen im Aussehen - Teil 10: Bewertung der  
Filiformkorrosion (ISO 4628-10:2003)

This European Standard was approved by CEN on 1 August 2003.

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## **Foreword**

This document (EN ISO 4628-10:2003) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 "Paints and varnishes", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2004, and conflicting national standards shall be withdrawn at the latest by March 2004.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

**NOTE FROM CMC** The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

## **Endorsement notice**

The text of ISO 4628-10:2003 has been approved by CEN as EN ISO 4628-10:2003 without any modifications.

# INTERNATIONAL STANDARD

**ISO**  
**4628-10**

First edition  
2003-09-01

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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 10: Assessment of degree of filiform corrosion**

*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 10: Évaluation du degré de corrosion filiforme*



Reference number  
ISO 4628-10:2003(E)



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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.

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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 4628-10 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

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*
- *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 describes 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 the 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).

### 2 Terms and definitions

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

#### 2.1

##### **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 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 Filiform corrosion can also occur under other protective coatings.

NOTE 3 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.

[ISO 4623-1:2000 and ISO 4623-2:2003]

### 3 Assessment

#### 3.1 General

Carry out the assessment under good illumination.

#### 3.2 Method 1

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

It includes:

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

### 3.3 Method 2

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

It includes:

- measuring  $L$  as in 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:

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

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

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

## 4 Expression of results

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

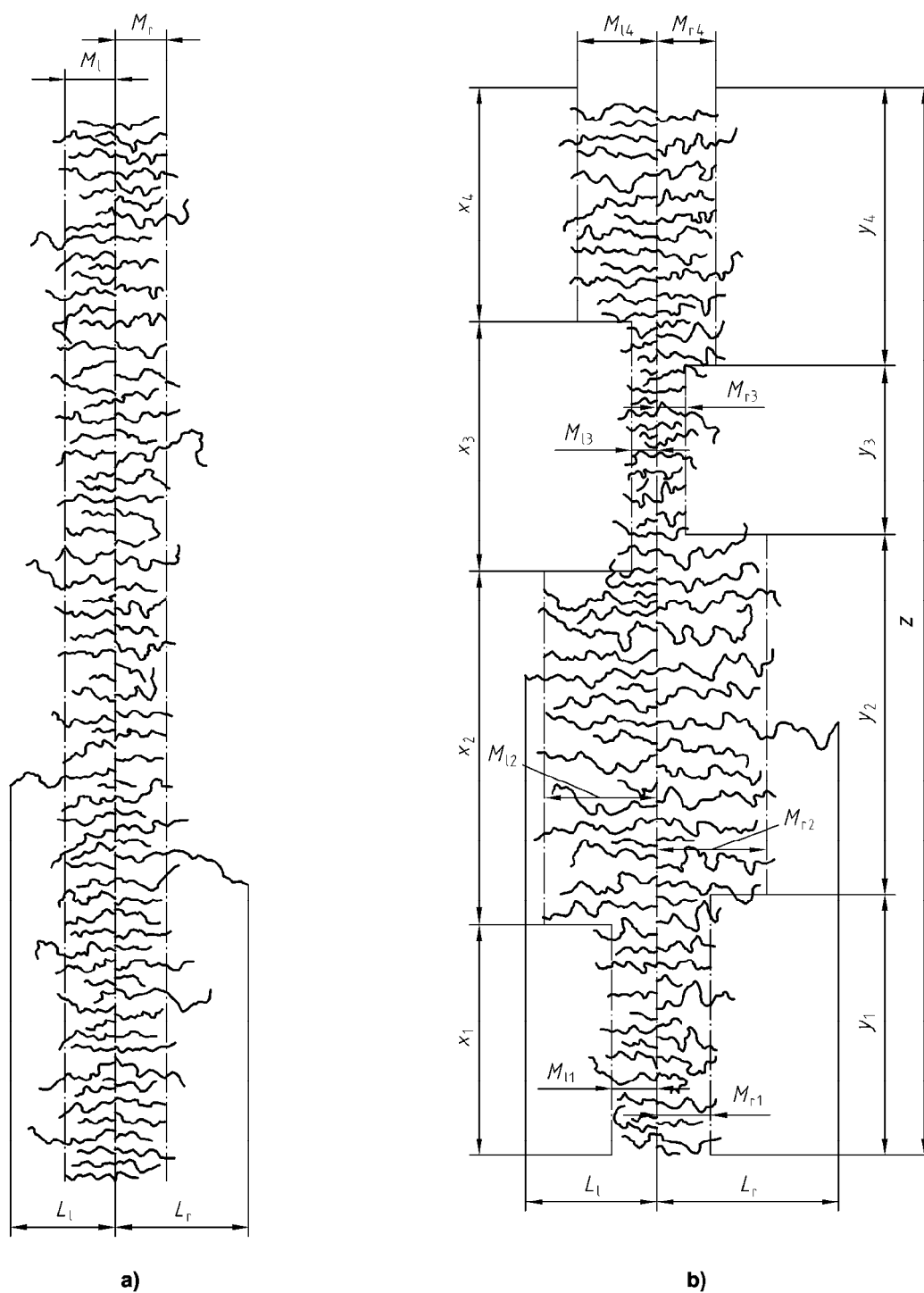
filiform corrosion,  $L5/M3$ .

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

## 5 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 (ISO 4628-10:2003);
- c) the type of surface examined, its size and, if appropriate, its location;
- d) the result of the assessment in accordance with Clause 4;
- e) an indication of the illumination under which the assessment was 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.

**Key**

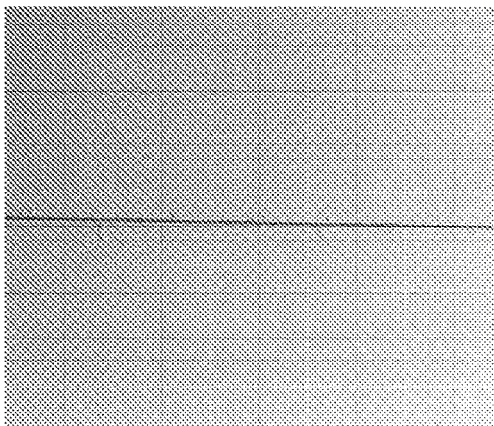
$L$  length of longest filament  
 $M$  most frequent filament length  
 $r$  right  
 $l$  left

1, 2, ... number of zone  
 $x$  zones on left-hand side  
 $y$  zones on right-hand side  
 $z$  overall length of assessed area

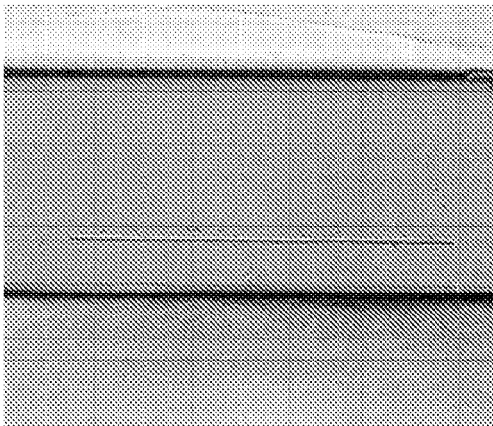
**Figure 1 — Determination of length of longest filament  $L$  and the most frequent filament length  $M$**

**Annex A**  
(informative)

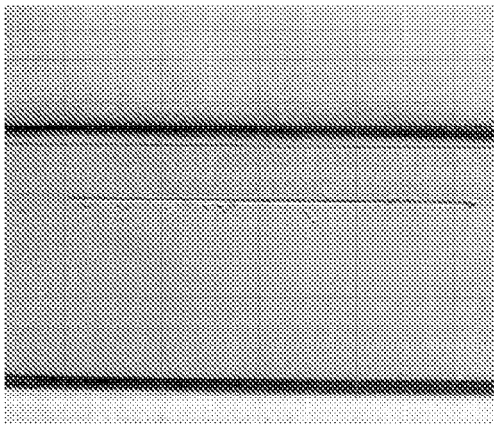
**Pictorial examples of different ratings for the length of the longest filament  $L$  and the most frequent filament length  $M$**



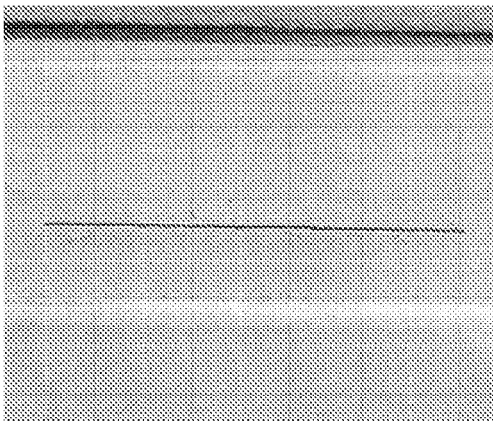
**L1-2/M1**



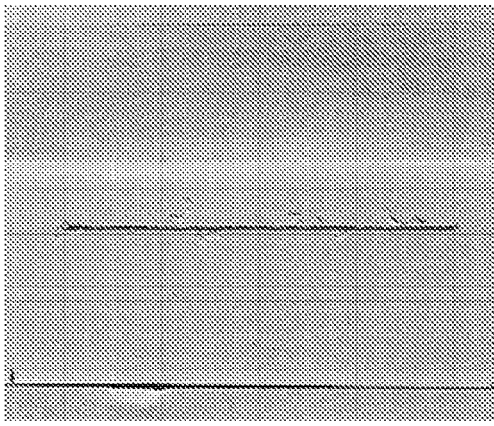
**L2/M2**



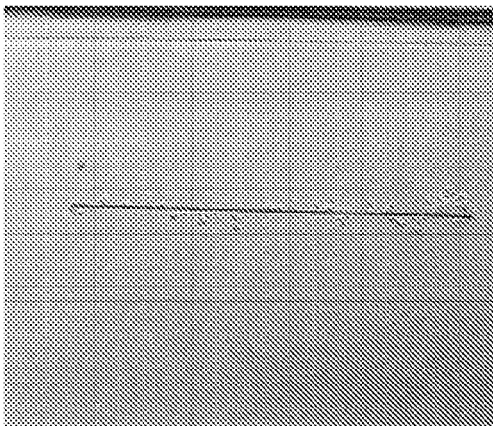
**L3/M1**



**L3/M2**



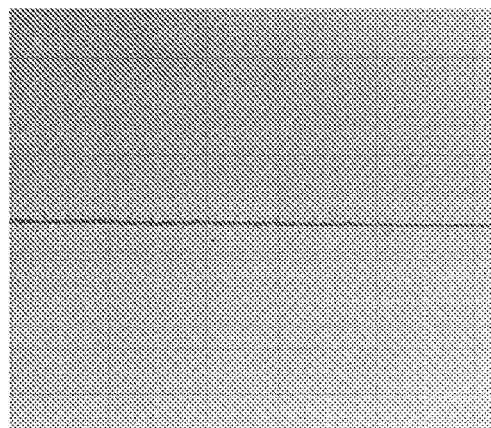
**L4-5/M1**



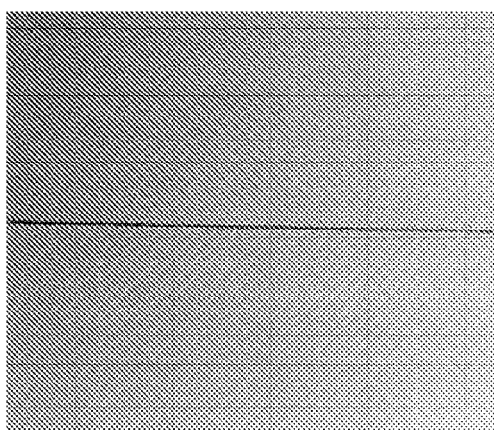
**L5/M2**



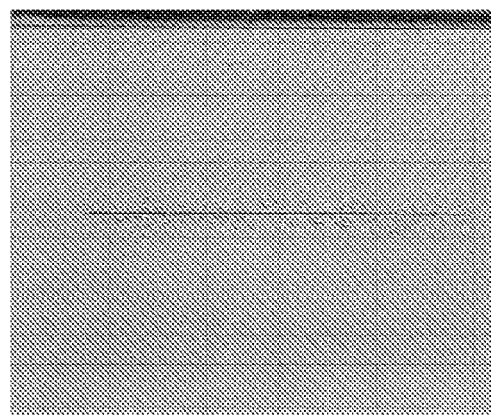
**L2/M3**



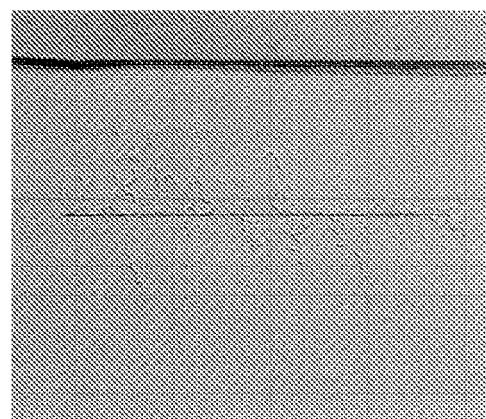
**L2/M4**



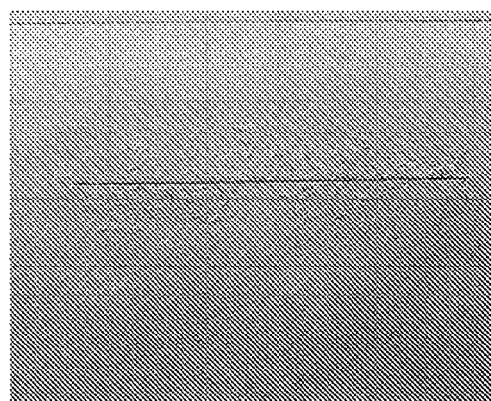
**L3/M3**



**L4/M4**



**L5/M3**



**L5/M5**

## 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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