BS EN ISO 4628-3:2016

BSI Standards Publication

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

Part 3: Assessment of degree of rusting

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National foreword

This British Standard is the UK implementation of EN ISO 4628-3:2016. It supersedes BS EN ISO 4628-3:2003 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee STI/10, Test methods for paints.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting (ISO 4628-3:2016)

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 3: Évaluation du degré d'enrouillement (ISO 4628-3:2016)

Beschichtungsstoffe - Beurteilung von Beschichtungsschäden - Bewertung der Menge und der Größe von Schäden und der Intensität von gleichmäßigen Veränderungen im Aussehen - Teil 3: Bewertung des Rostgrades (ISO 4628-3:2016)

This European Standard was approved by CEN on 19 December 2015.

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European foreword

This document (EN ISO 4628-3:2016) 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of an identical text or by endorsement, at the latest by August 2016, and conflicting national standards shall be withdrawn at the latest by August 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 4628-3:2016 has been approved by CEN as EN ISO 4628-3:2016 without any modification.

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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).

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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 third edition cancels and replaces the second edition (ISO 4628-3:2003), which has been technically revised with the following changes:

a) a normative reference to ISO 13076 for illumination for the assessment has been added;

b) a note on the rusted area of the degree of rusting Ri 5 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*

INTERNATIONAL STANDARD ISO 4628-3:2016(E)

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

Part 3: Assessment of degree of rusting

1 Scope

This part of ISO 4628 specifies a method for assessing the degree of rusting of coatings by comparison with pictorial standards.

The pictorial standards provided in this part of ISO 4628 show coated steel surfaces which have deteriorated to different degrees by a combination of rust broken through the coating and visible underrust.

NOTE 1 The pictorial standards have been selected from the "European rust scale" published by the European Confederation of Paint, Printing Ink and Artists' Colours Manufacturers' Associations (CEPE), Brussels. The correlation between the ISO scale and the "European rust scale" is given in Annex B, Table B.1.

NOTE 2 The correlation between the ISO scale and the rating system of ASTM D 610 is given in Annex B, Table B.2.

NOTE 3 The rust formation on uncoated steel surfaces is designated in accordance with ISO 8501-1 (rust grades A, B, C, and D).

ISO 4628-1 defines the system used 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. 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 4628-1:2016, *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*

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
degree of rusting
Ri
rating characterizing the degree of rust formation (rust broken through and visible underrust) on a coating

4 Assessment

Assess the degree of rusting (Ri) on a coating by means of the pictorial standards given in Figure 1 to Figure 5. The approximate areas rusted (rust broken through plus visible underrust) shown on these standards are as indicated in Table 1.

Procedures for assessing invisible underrust, if required, shall be agreed between the interested parties.

Where different degrees of rusting occur in different parts of the area being assessed, indicate these degrees of rusting together with the part where each occurs.

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

If the average size of the rust spots on the test area differs considerably from those shown in the pictorial standards, an indication of their size may be given by reference to ISO 4628-1:2015, Table 2.

NOTE The pictorial standards are basically intended for assessing the degree of rusting of coated steel. They can be used for designating the degree of corrosion of coated non-ferrous metals if the form of breakdown is comparable with that shown in the standards.

Table 1 — Degree of rusting and rusted area

Degree of rusting	Rusted area %
Ri 0	0
Ri 1	0,05
Ri 2	0,5
Ri 3	1
Ri 4	8
Ri 5	40 to 50[a]

[a] When measuring the rusted area in Figure A.5, it is only about 35 %. If rust is assessed visually using Figure 5, the impression of rusted area is 40 % to 50 %. One reason might be that partly delaminated rust flakes are not distinguished from other rusted areas. But this is negligible because Ri 5 normally is outside any specification.

If the assessment is to be done by an optical imaging system, calibrate the system using the images given in Annex A.

5 Expression of results

Express the degree of rusting as Ri class as shown in Figure 1 to Figure 5.

If applicable, indicate the different degrees of rusting obtained, together with the parts of the test area concerned.

If applicable, indicate the degree of rusting Ri together with the numerical rating of the size of the rust spots.

For example, if the rusted area corresponds to Figure 3, Ri 3, and the sizes of the individual rust spots are between 0,5 mm and 5 mm, report the result as

— rusting; degree of rusting Ri3 (S4).

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 4628-3;

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

d) 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.

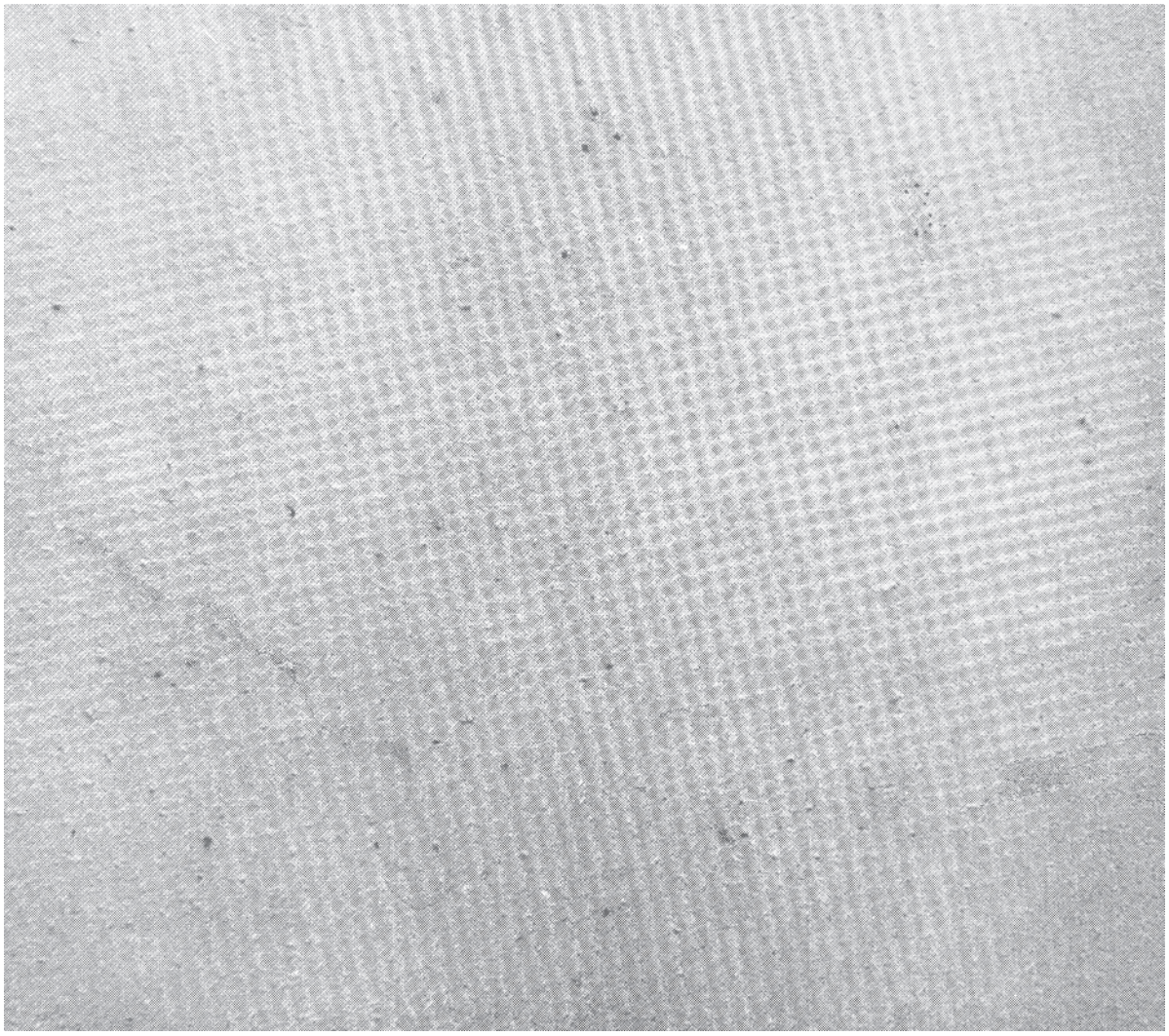

Figure 1 — Degree of rusting Ri 1

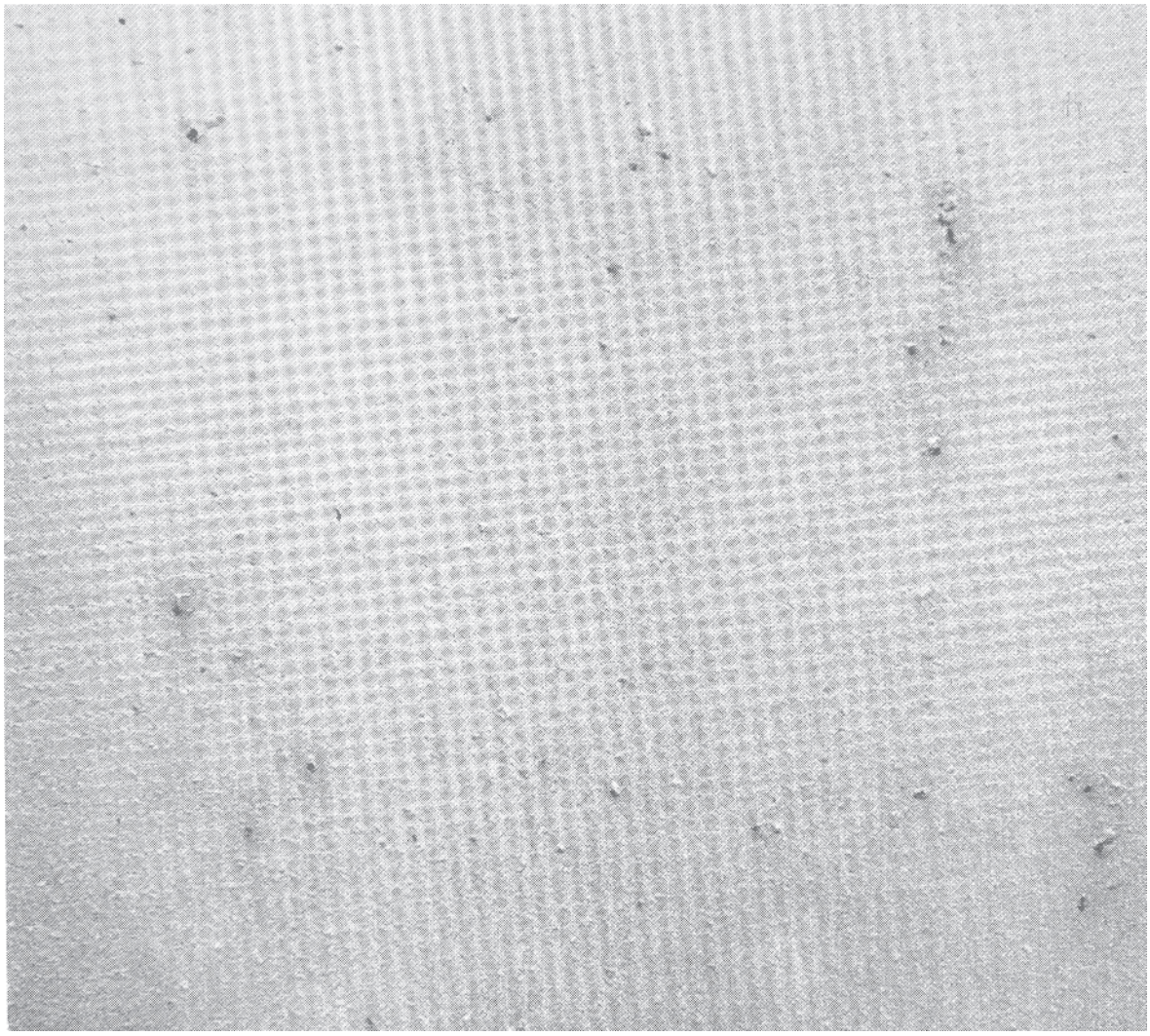

Figure 2 — Degree of rusting Ri 2

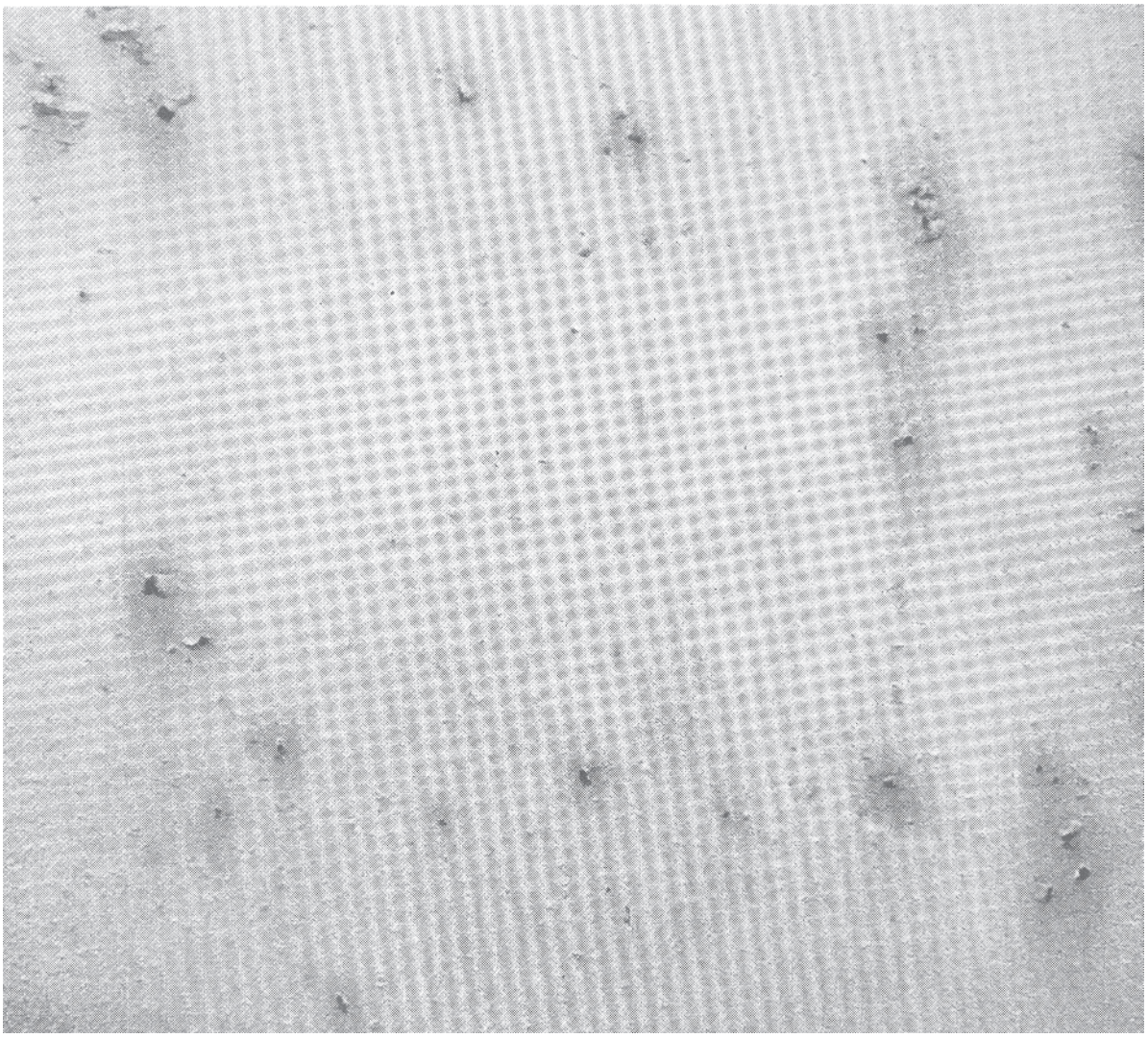

Figure 3 — Degree of rusting Ri 3

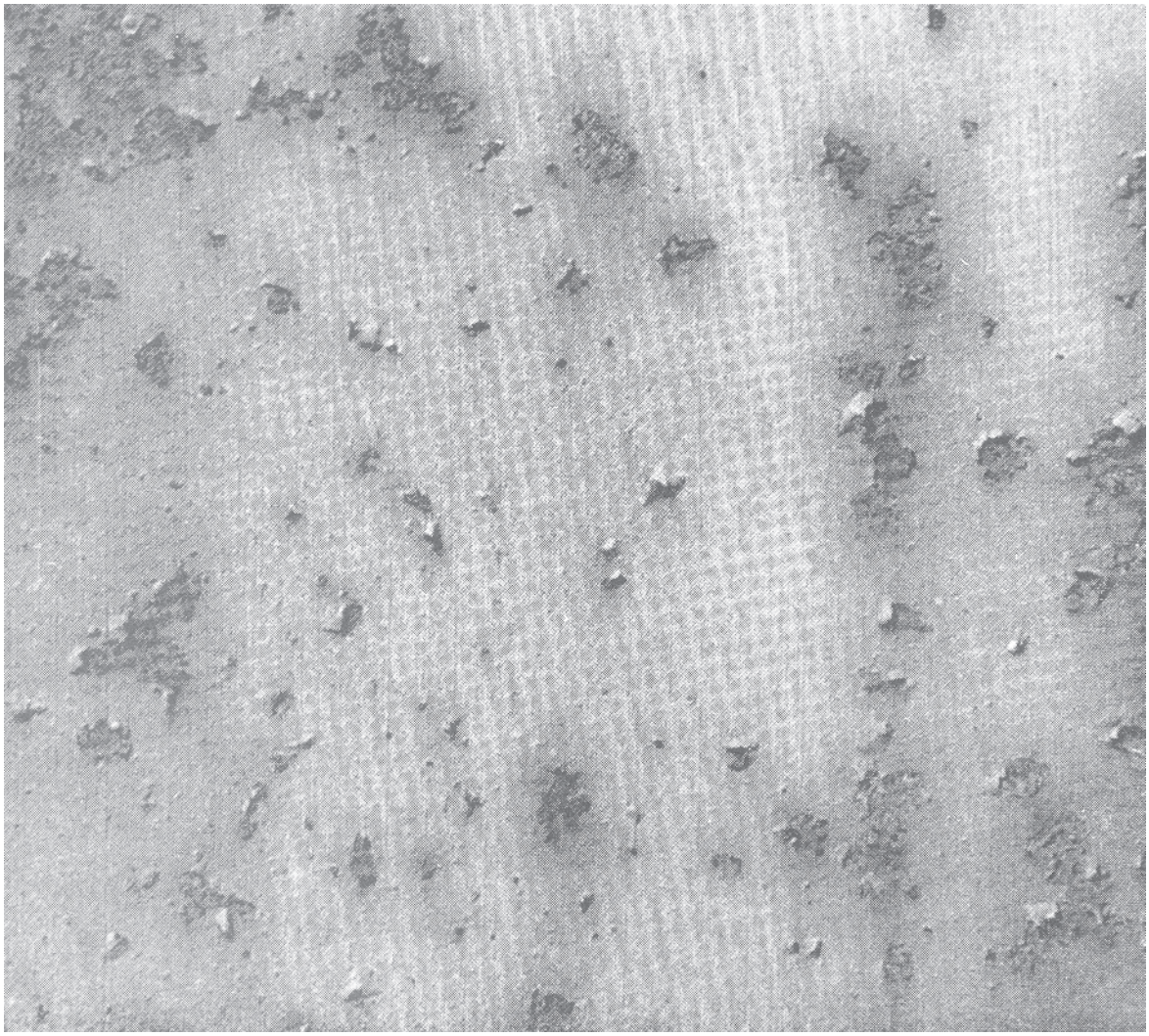

Figure 4 — Degree of rusting Ri 4

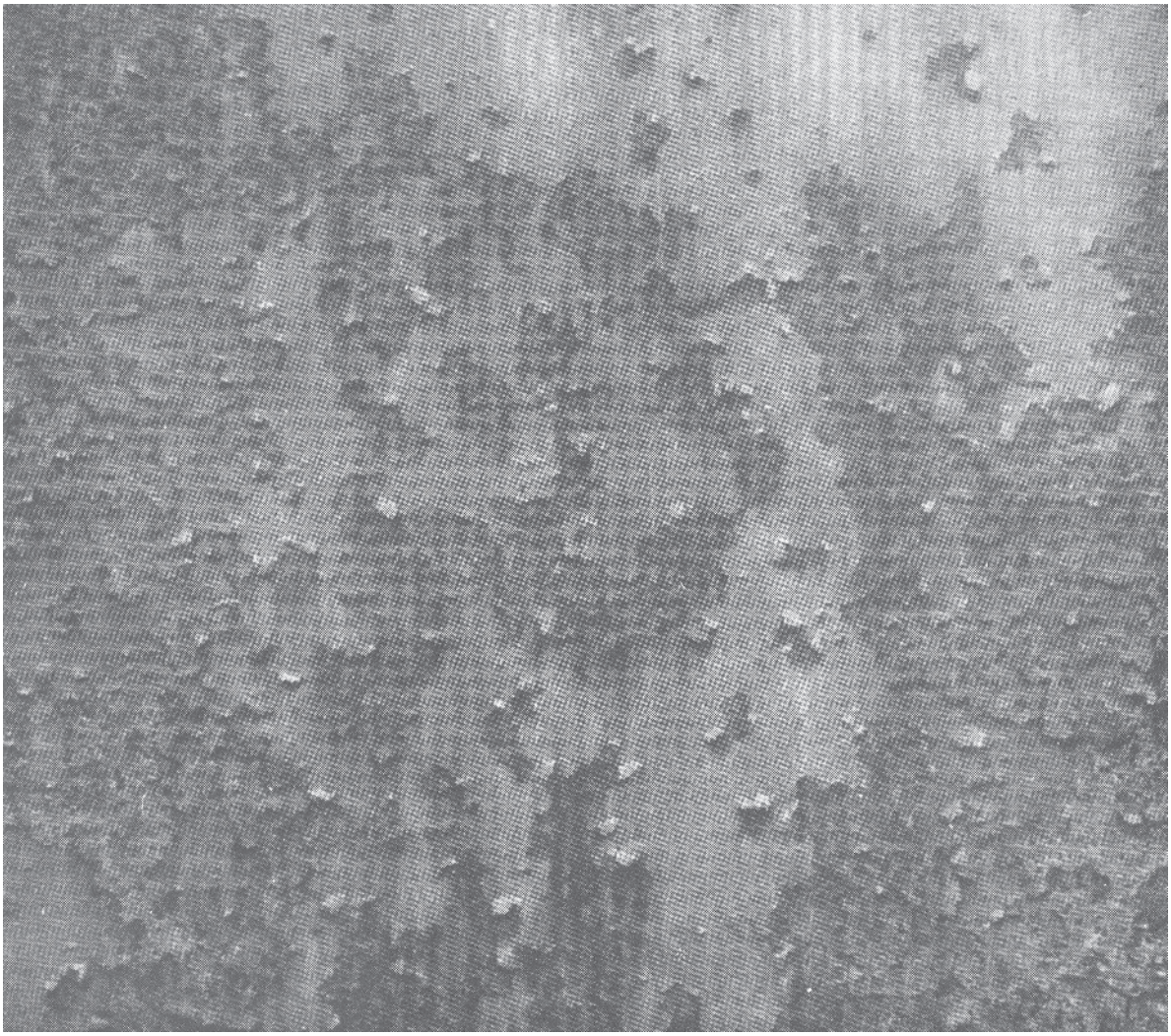

Figure 5 — Degree of rusting Ri 5

Annex A
(normative)

Calibration images

If the assessment is to be done using an optical imaging system, use the images given in Figure A.1 to Figure A.5 to calibrate the imaging system.

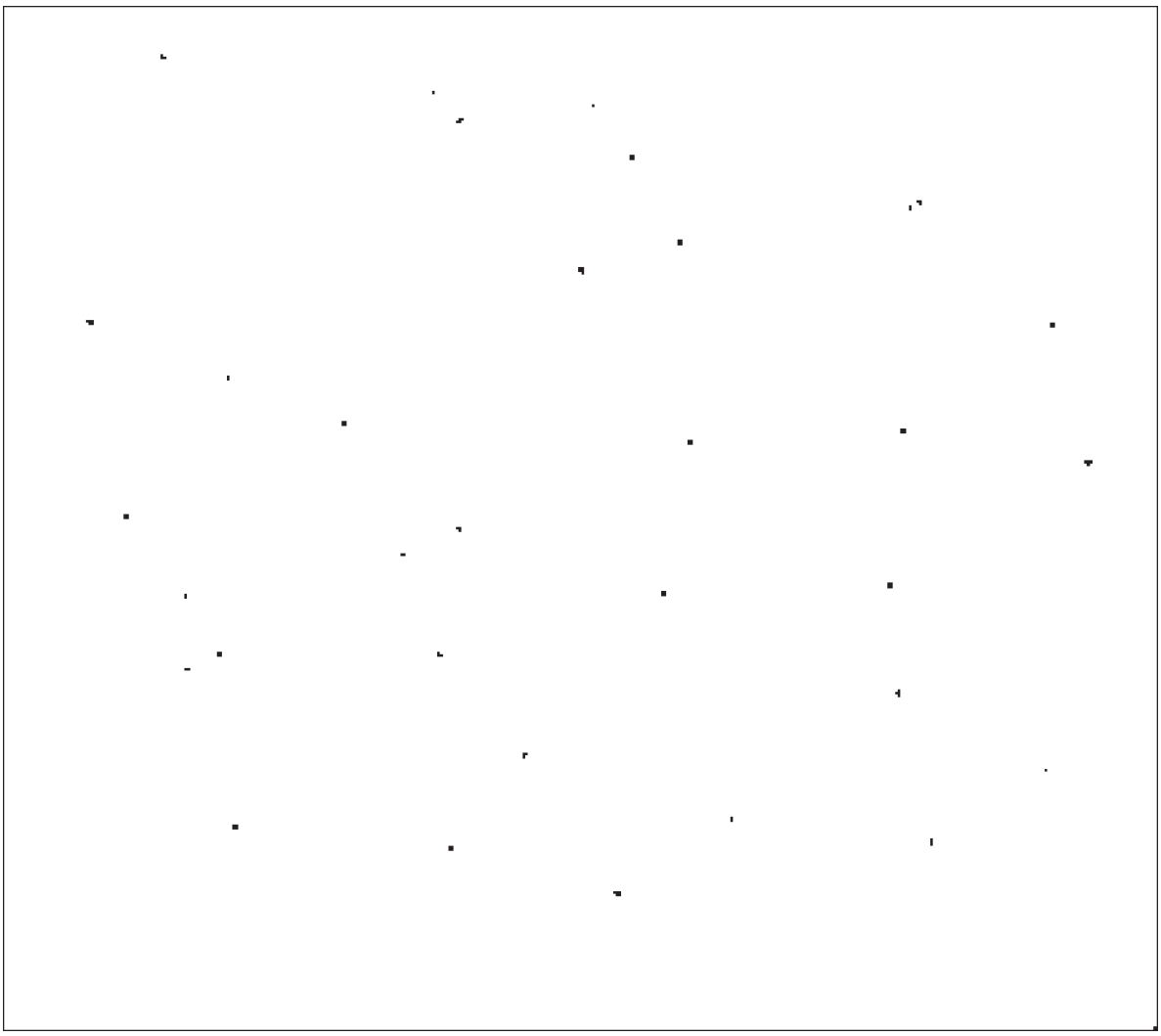

Figure A.1 — Degree of rusting Ri 1

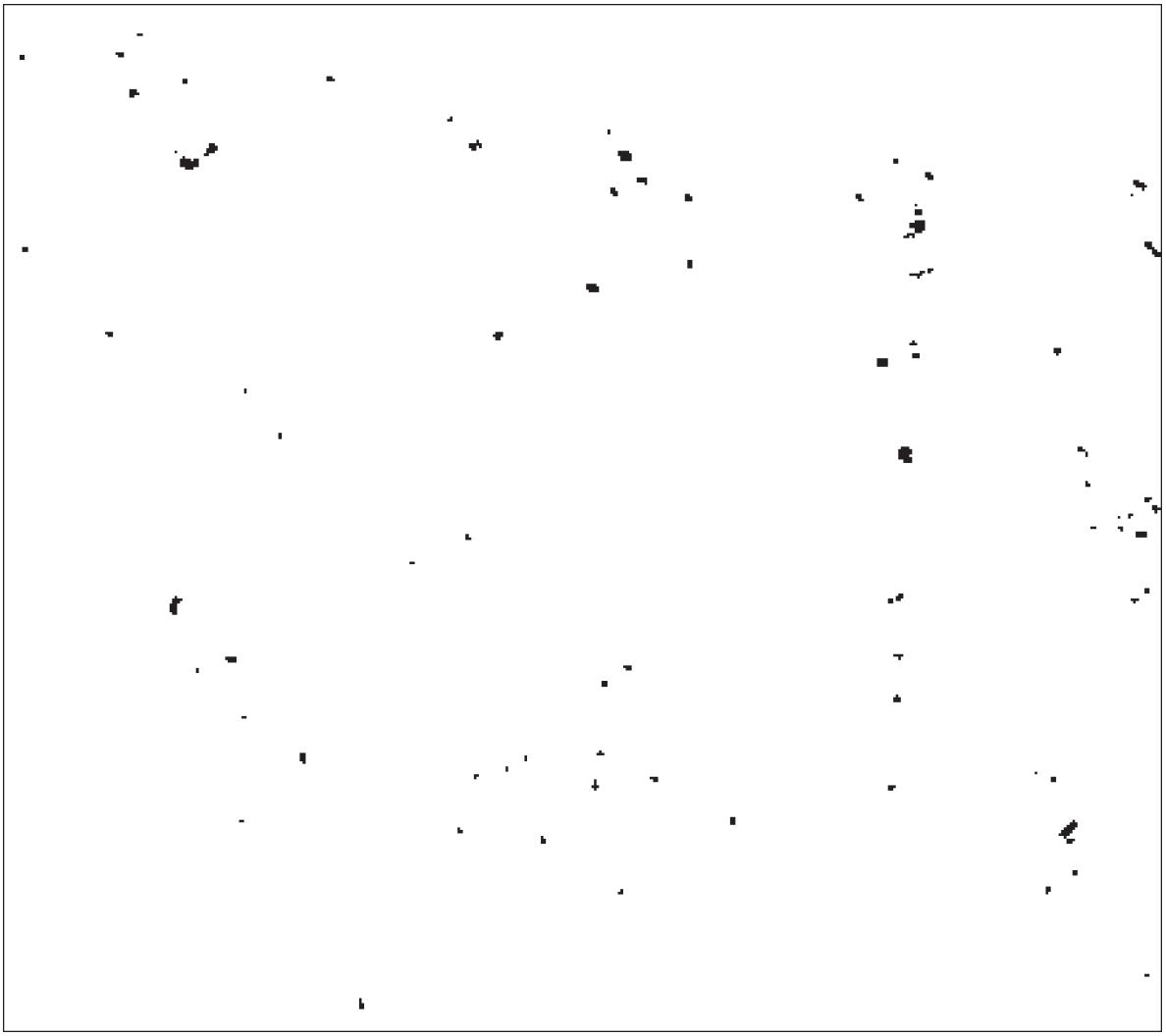

Figure A.2 — Degree of rusting Ri 2

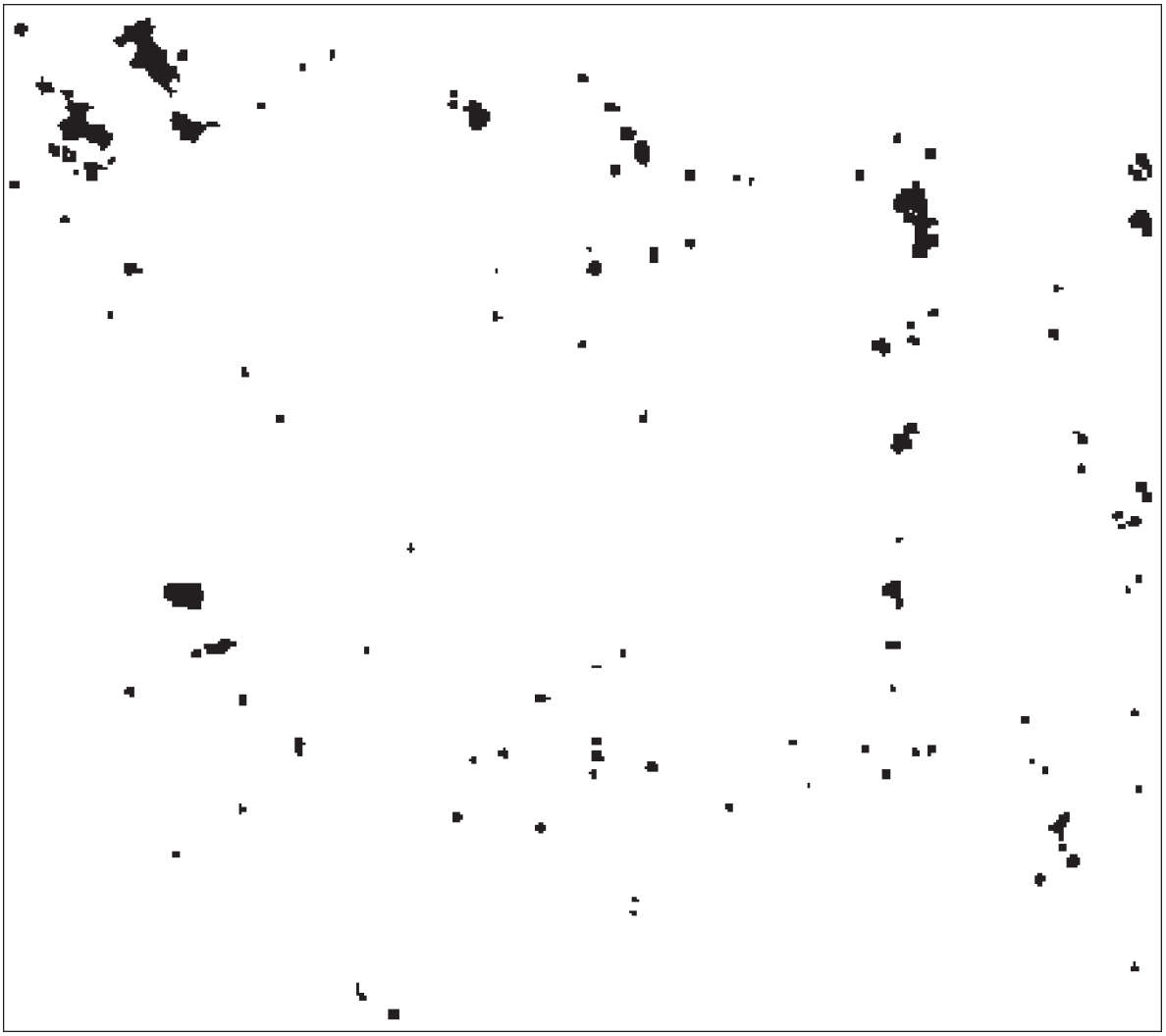

Figure A.3 — Degree of rusting Ri 3

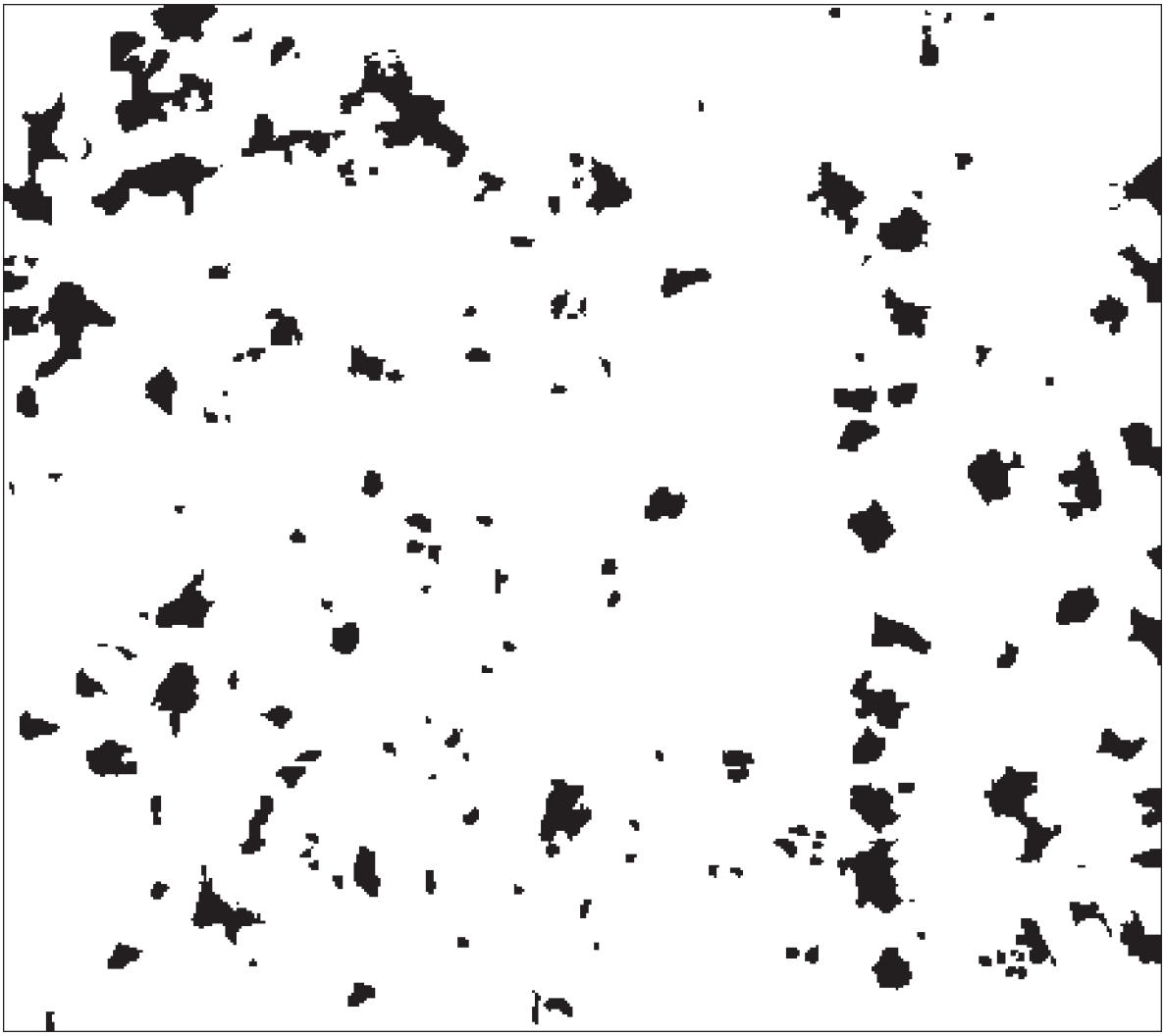

Figure A.4 — Degree of rusting Ri 4

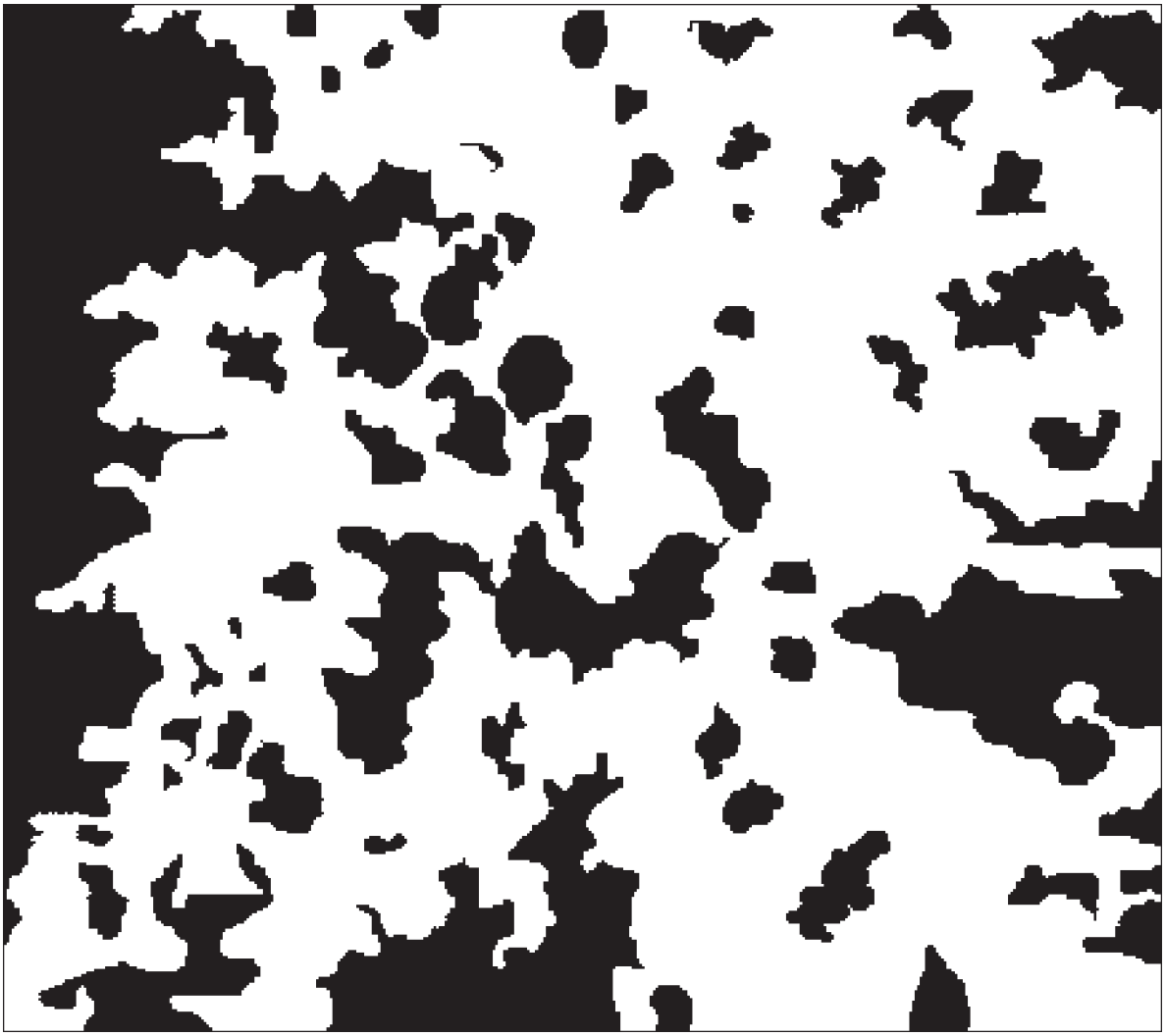

Figure A.5 — Degree of rusting Ri 5

Annex B
(informative)

Correlation between the ISO rating system and other systems

Table B.1 — Correlation between the ISO rating system and the "European rust scale"

ISO degree of rusting scale	"European rust scale"
Ri 0	Re 0
Ri 1	Re 1
Ri 2	Re 2
Ri 3	Re 3
Ri 4	Re 5
Ri 5	Re 7

Table B.2 — Approximate correlation between the ISO rating system and the ASTM rust scale

ISO degree of rusting scale	ASTM rust scale (ASTM D610)
Ri 0	10
Ri 1	9
Ri 2	7
Ri 3	6
Ri 4	4
Ri 5	1 to 2

Bibliography

[1] ISO 8501-1, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

[2] ASTM D610, *Test Methods for Evaluating Degree of Rusting on Painted Steel Surfaces*

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