INTERNATIONAL STANDARD

ISO 4628-3

Second edition
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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 3: Assessment of degree of rusting

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

Reference number
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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.

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 4628-3 was prepared by Technical Committee 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 4628-3:1982), of which it constitutes a mainly editorial revision. The pictorial standards have been replaced by computer-generated pictures and binary images have been added for the calibration of optical imaging systems.

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*

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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 3: Assessment of degree of rusting

1 Scope

This part of ISO 4628 describes 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, *Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces*, 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, *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* (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 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 4628-1:2003, *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*

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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 Figures 1 to 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.

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 Table 2 of ISO 4628-1:2003.

NOTE The pictorial standards are basically intended for assessing the degree of rusting of coated steel. They may 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

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

5 Expression of results

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

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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, reported the result as:

rusting; degree of rusting Ri 3 (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 (ISO 4628-3:2003);

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.

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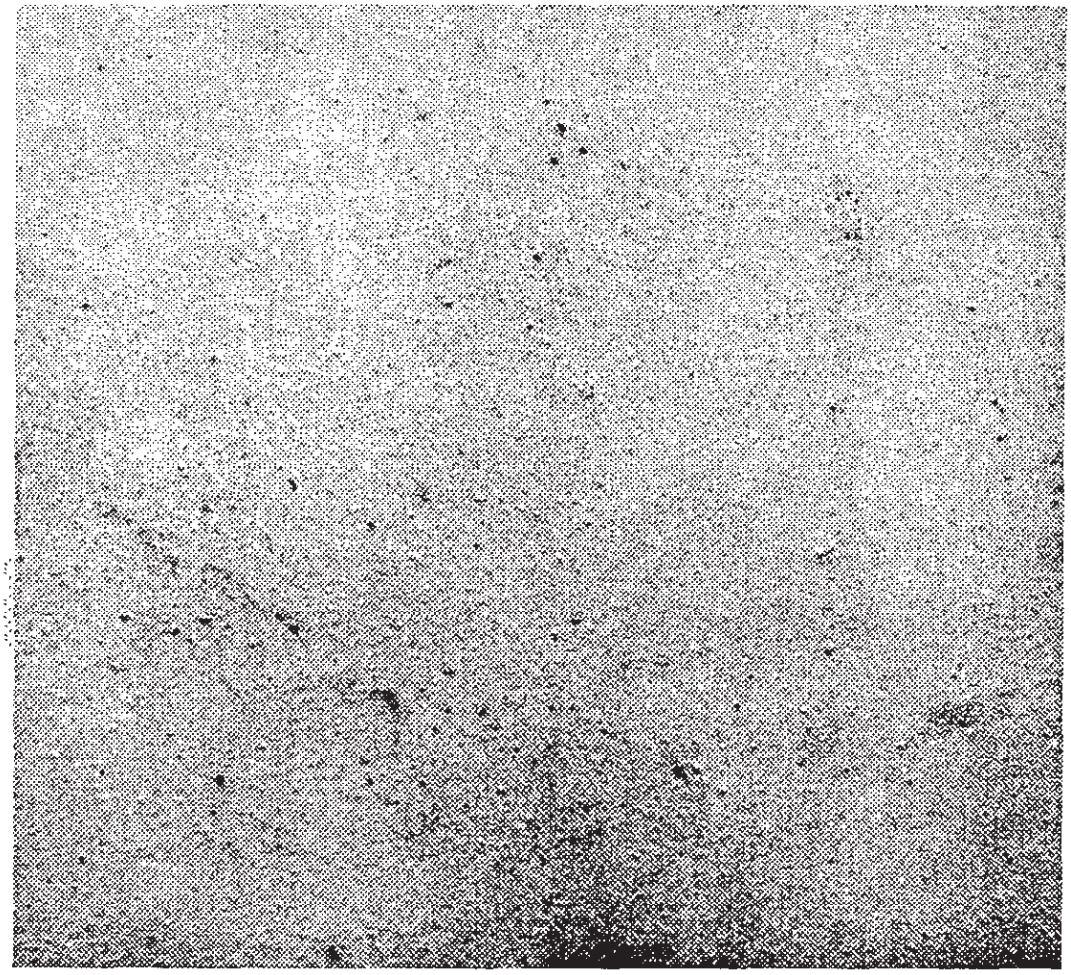


Figure 1 — Degree of rusting Ri 1

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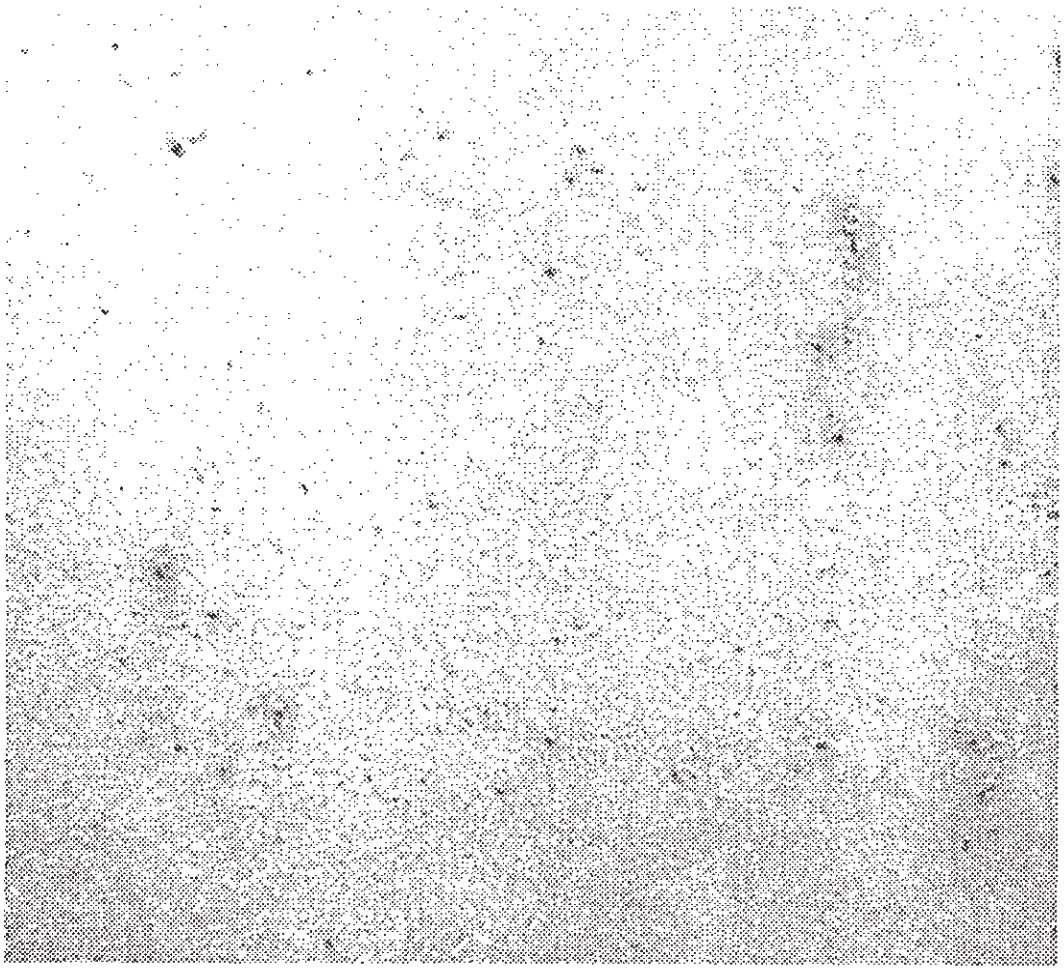


Figure 2 — Degree of rusting Ri 2

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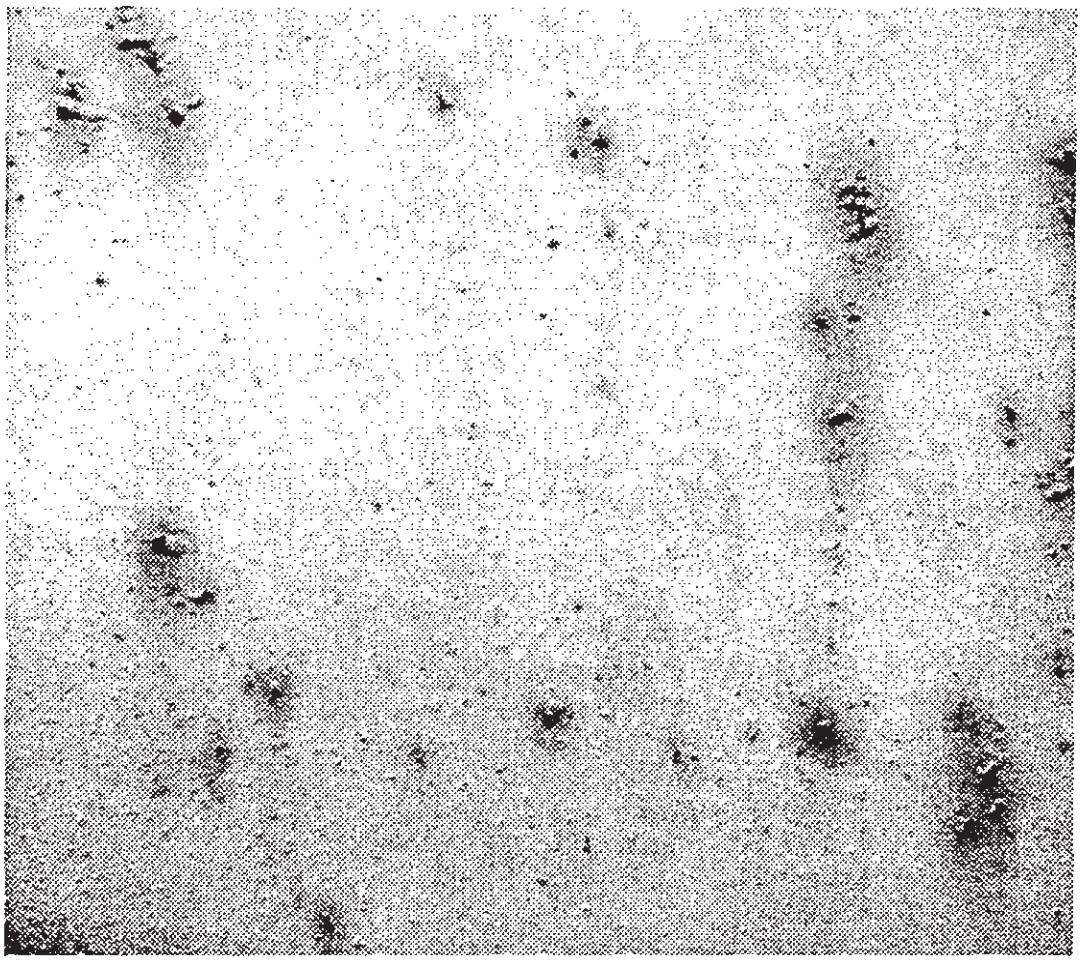


Figure 3 — Degree of rusting Ri 3

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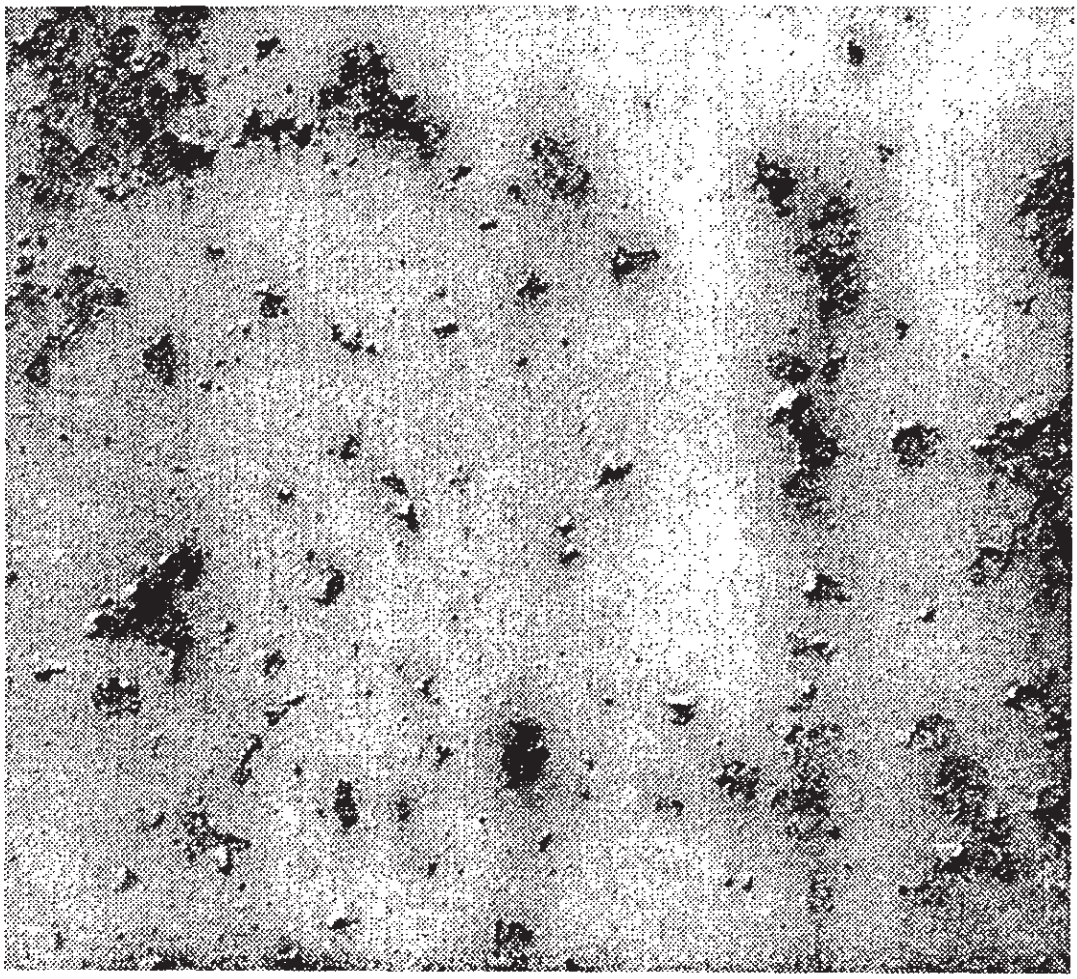


Figure 4 — Degree of rusting Ri 4

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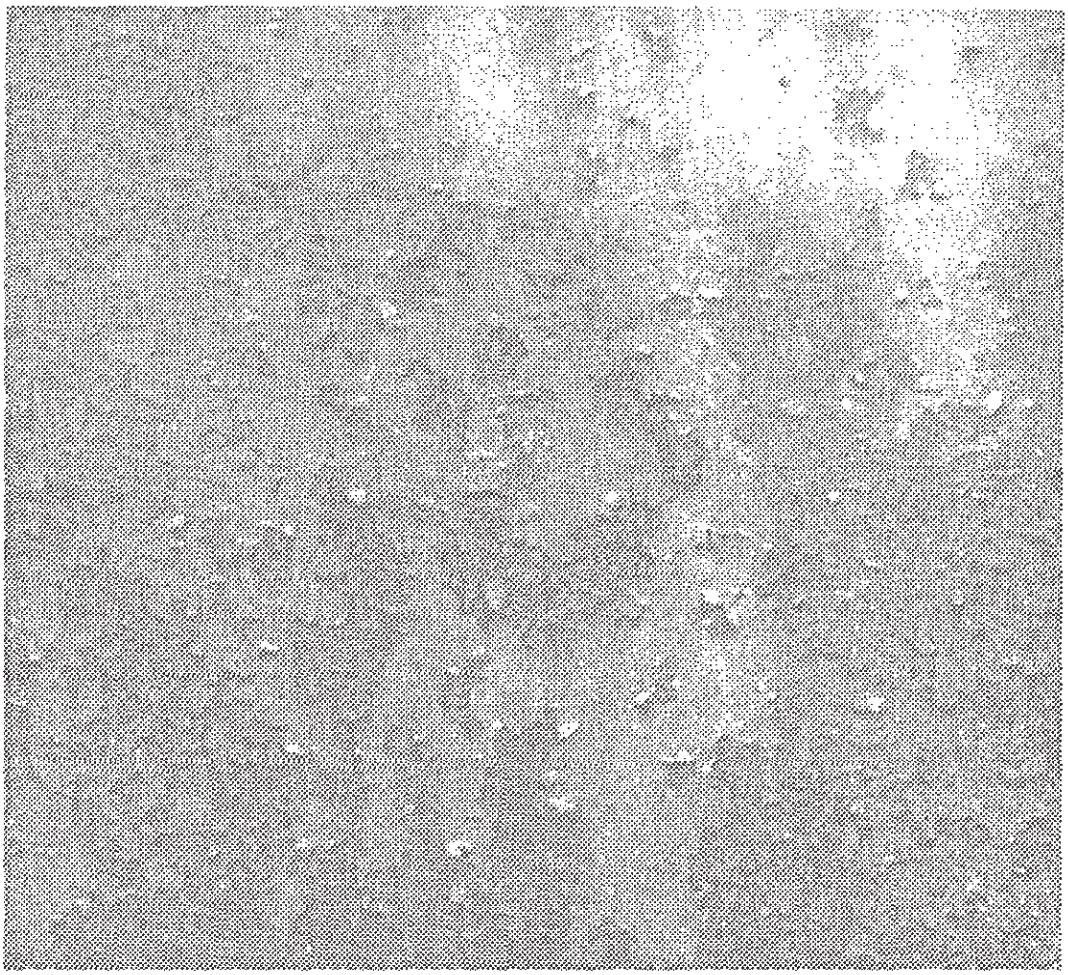


Figure 5 — Degree of rusting Ri 5

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Annex A
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Calibration images

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

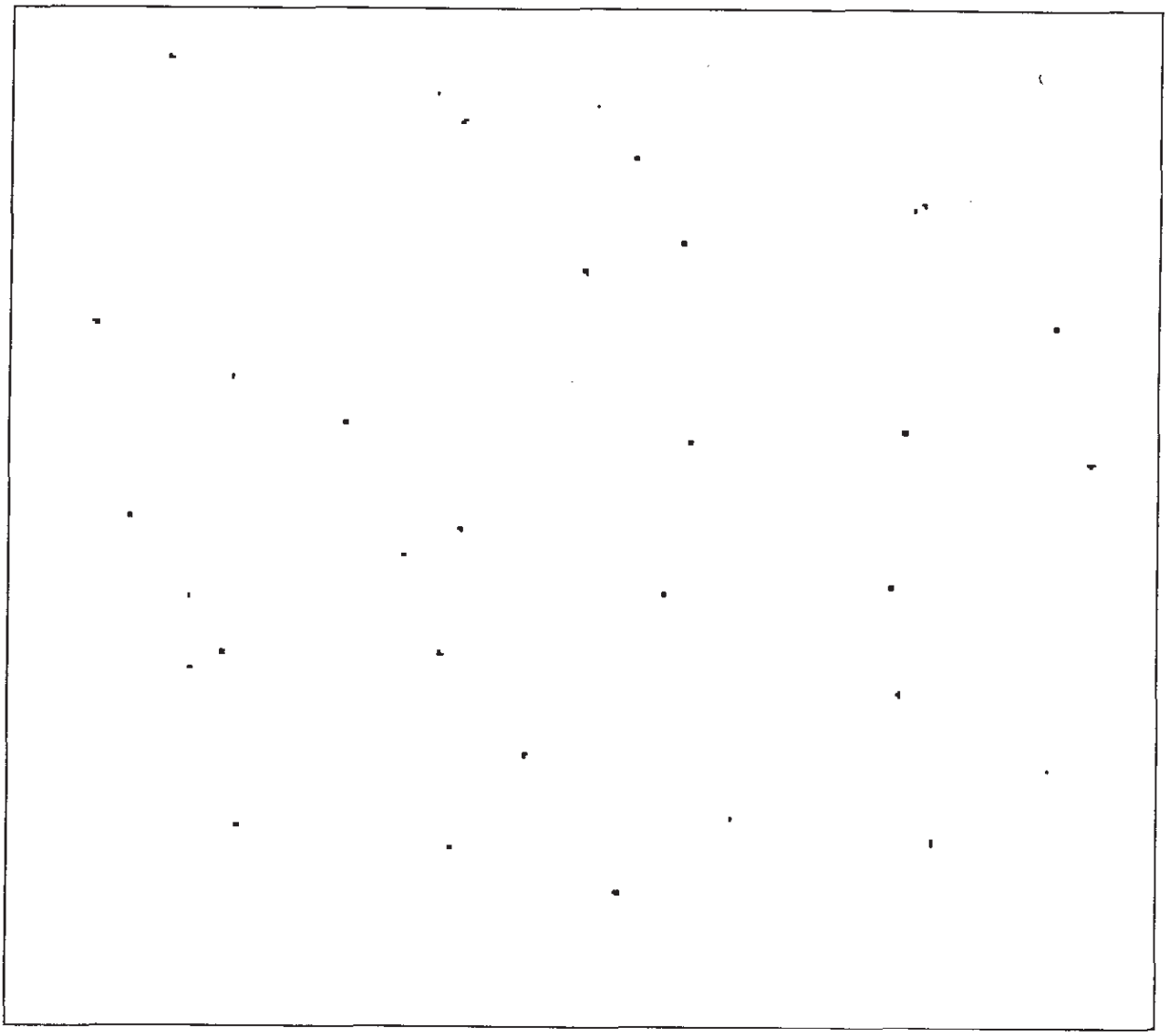


Figure A.1 — Degree of rusting Ri 1

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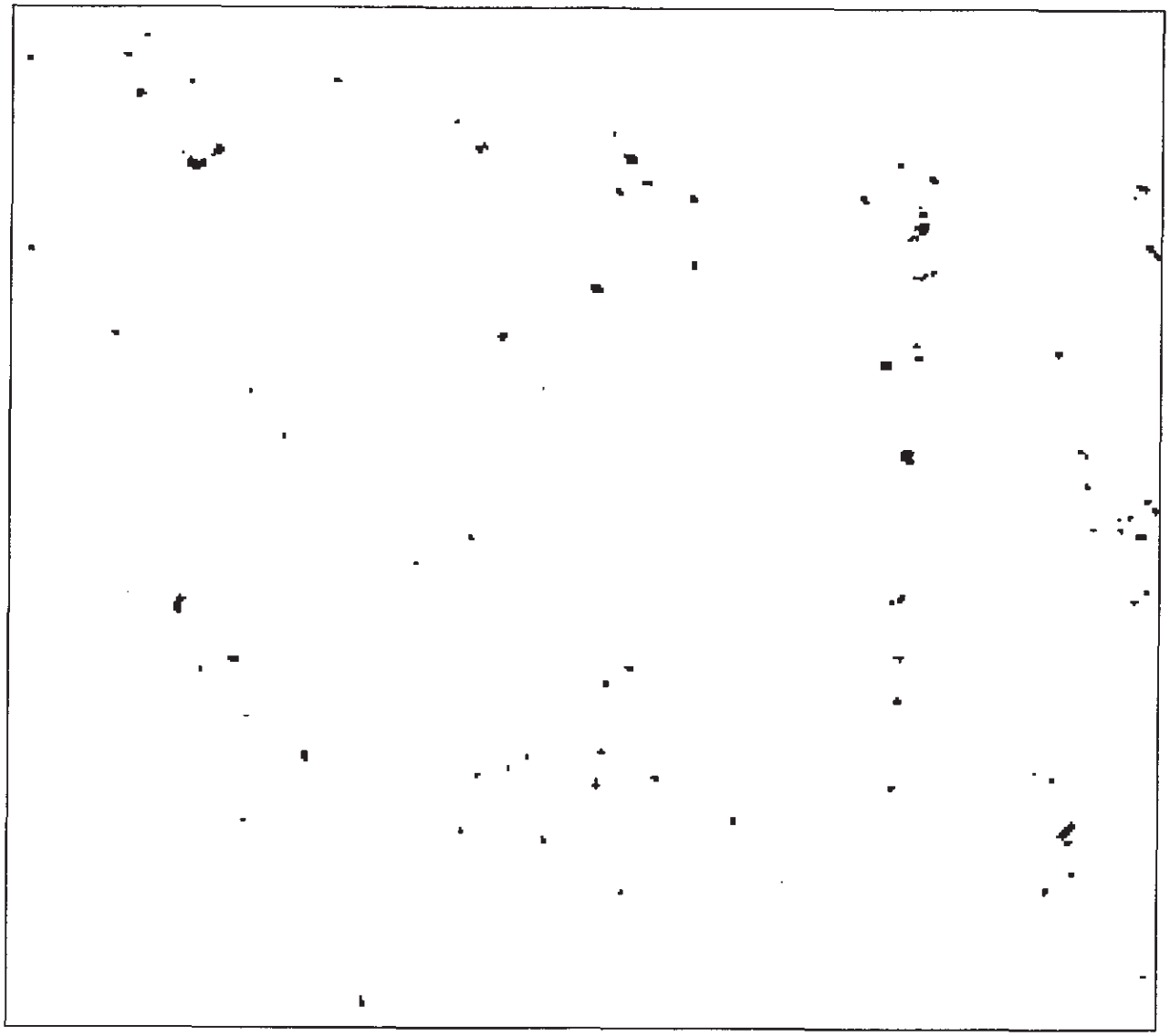


Figure A.2 — Degree of rusting Ri 2

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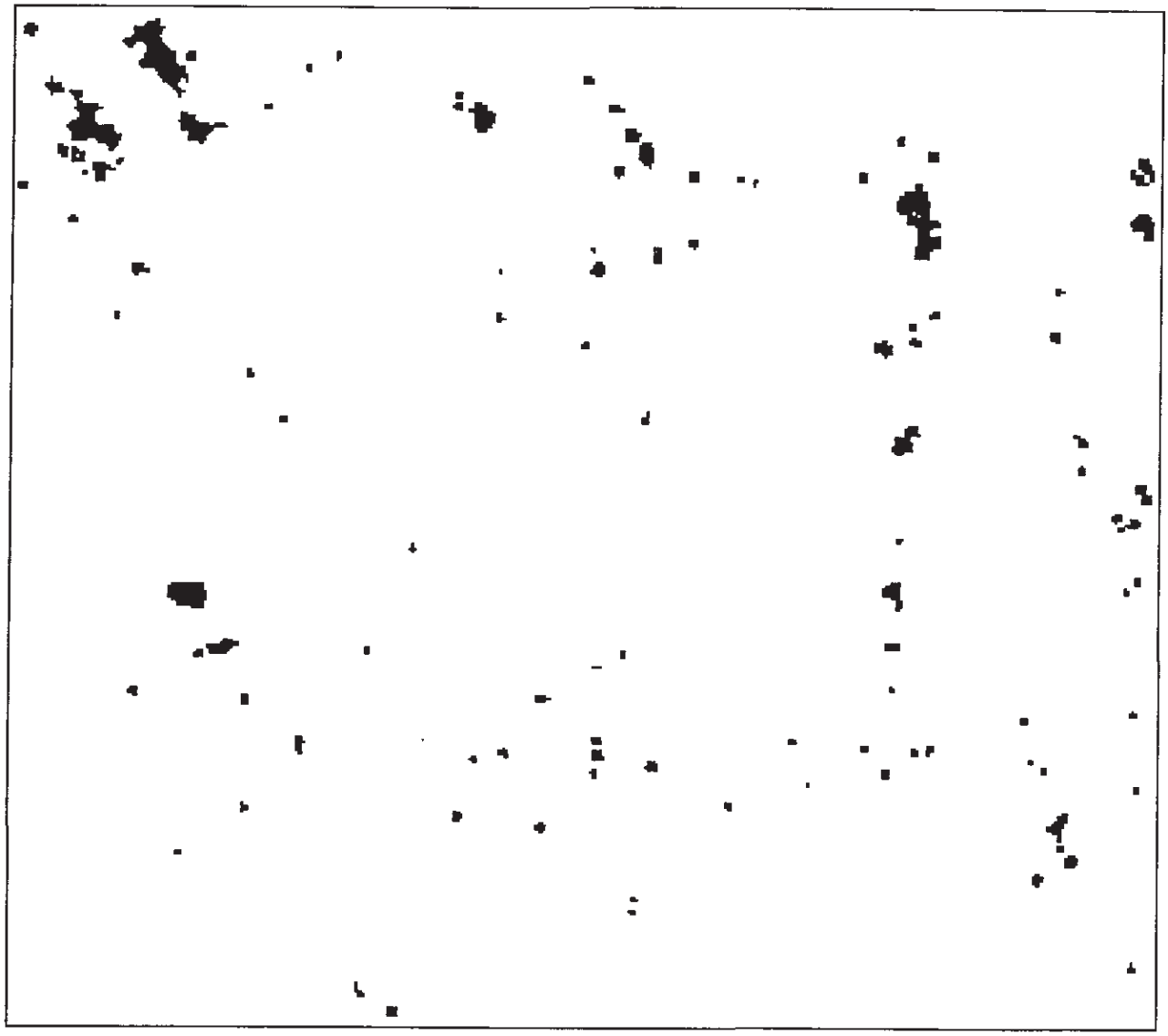


Figure A.3 — Degree of rusting Ri 3

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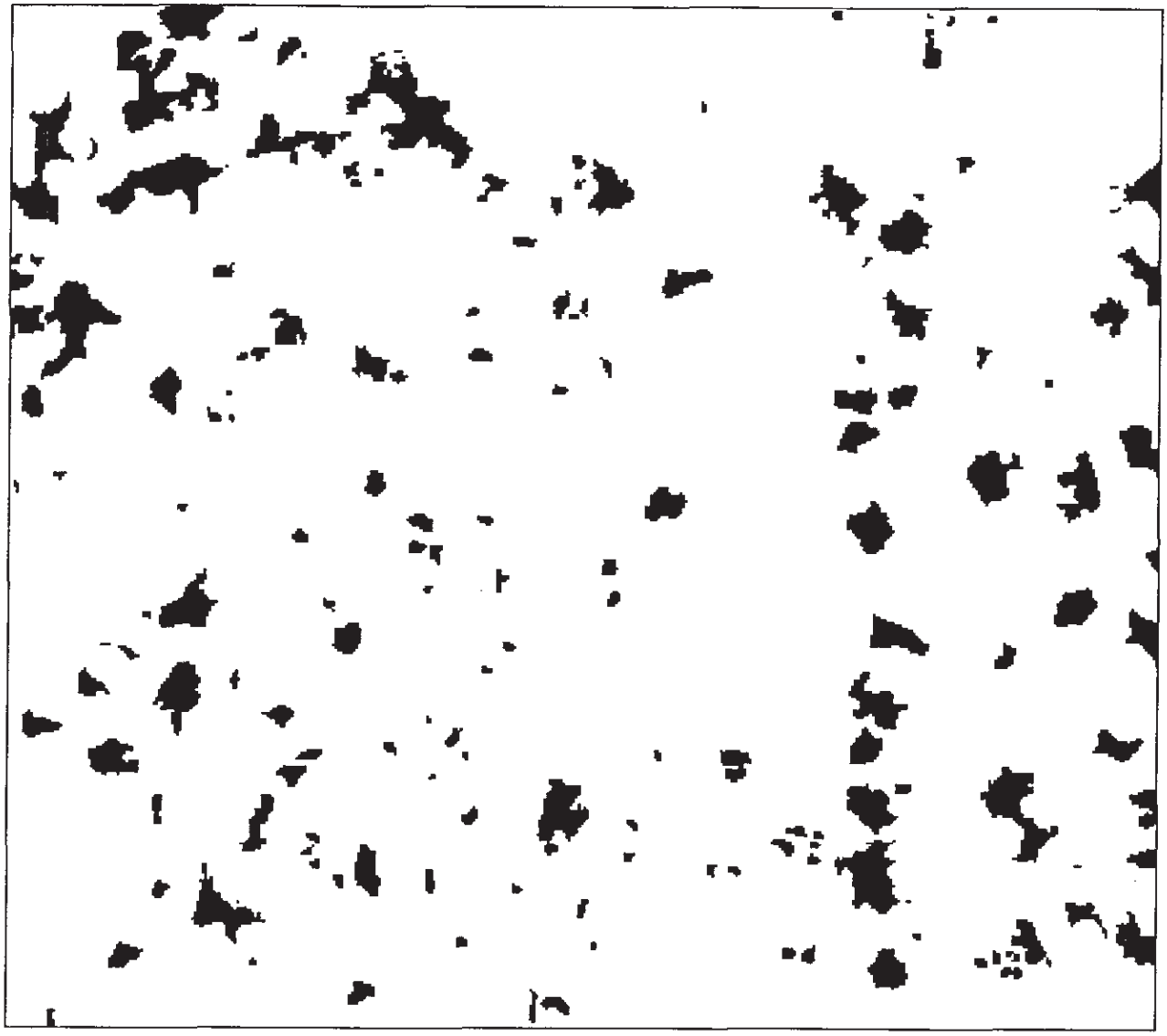


Figure A.4 — Degree of rusting Ri 4

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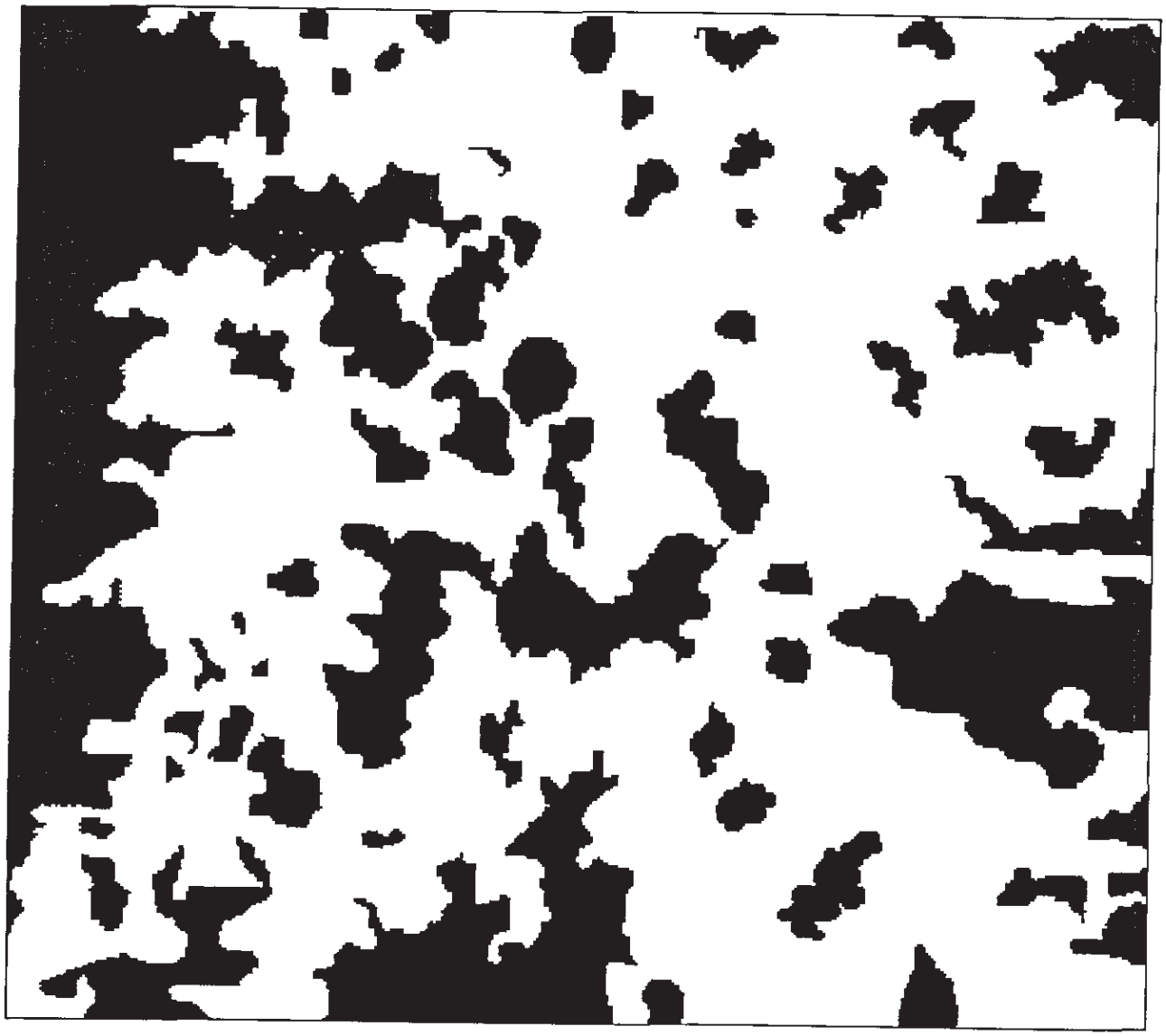


Figure A.5 — Degree of rusting Ri 5

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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 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 scale	ASTM rust scale (ASTM D 610)
Ri 0	10
Ri 1	9
Ri 2	7
Ri 3	6
Ri 4	4
Ri 5	1 to 2

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