INTERNATIONAL STANDARD

ISO 4628-4

Third 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 4: Assessment of degree of cracking

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 4: Évaluation du degré de craquelage

Reference number
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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).

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 third edition cancels and replaces the second edition (ISO 4628-4:2003), which has been technically revised with the following changes:

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 4: Assessment of degree of cracking

1 Scope

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

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 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 cracking
rating characterizing cracks in a coating in terms of quantity, size, and depth

4 Assessment

Assess the quantity of cracking by reference to Table 1 and using as example Figure 1 or Figure 2, depending on the type of cracking.

NOTE Figure 1 shows cracking without preferential direction and Figure 2 shows cracking in one preferential direction, which occurs with substrates such as wood ("anisotropic" substrates). Other forms of cracking occur, but the principles of assessing the quantity remain the same.

Table 1 — Rating scheme for designating the quantity of cracks

Rating	Quantity of cracks
0	none, i.e. no detectable cracks
1	very few, i.e. small, barely significant number of cracks
2	few, i.e. small but significant number of cracks
3	moderate number of cracks
4	considerable number of cracks
5	dense pattern of cracks

If specified, assess the average size of the cracks in accordance with Table 2.

Table 2 — Rating scheme for designating the size of cracks

Rating	Size of cracks
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)[a]
3	clearly visible with normal corrected vision (larger than 0,2 mm up to 0,5 mm)
4	large cracks, larger than 0,5 mm up to 1 mm wide
5	very large cracks generally more than 1 mm wide

[a] Typically, defects larger than 0,2 mm are visible with normal corrected vision.

Where the test area exhibits cracks of various sizes, quote as the size rating that of the largest cracks which are numerous enough to be typical of the test area.

If possible, indicate the depth of cracking by reference to the level in the coating system to which the cracks penetrate. A distinction is made between three main types of failure by cracking:

a) surface cracks which do not fully penetrate the top coat (i.e. checking);

b) cracks which penetrate the top coat, the underlying coat(s) being substantially unaffected;

c) cracks which penetrate the whole coating system.

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

5 Expression of results

Express the numerical ratings of the quantity and, if specified, size of the cracks, together with the depth of cracking (a, b, or c), shown in Figures 1 and 2 together with the approximate dimensions of the area concerned, or its proportion to the total area, expressed as a percentage.

For example, for quantity 2, size 3 with the cracks penetrating the top coat and the underlying coat(s) are substantially unaffected, report the result as

— cracking; degree of cracking 2(S3)b.

If necessary, the assessment may be amplified in words, for example “cracking in one preferential direction” and by using the descriptions given in Annex A.

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 4628-4;

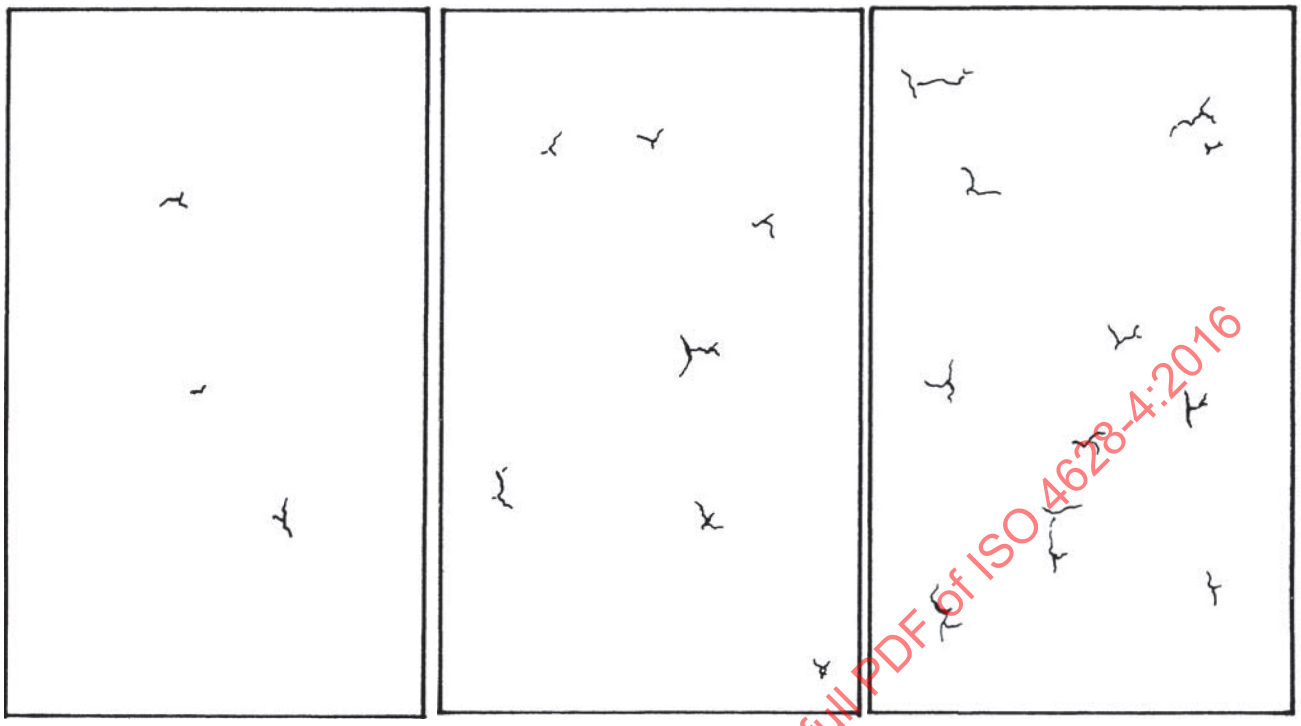
c) the type of surface examined, its size and, if appropriate, its location;

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

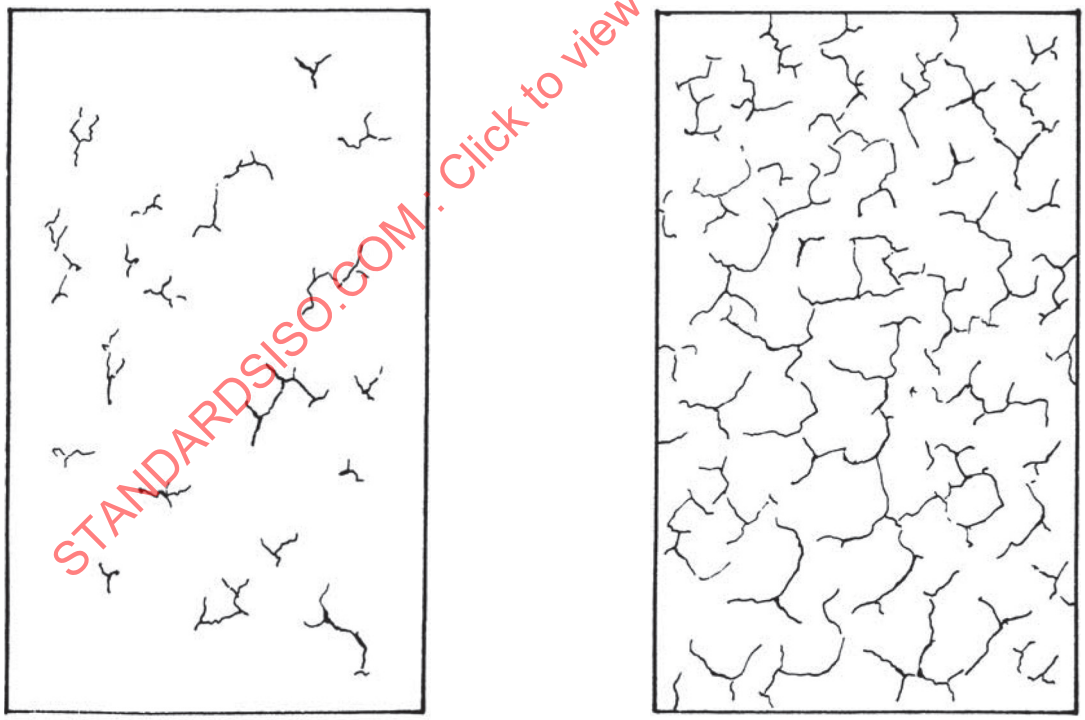
e) an indication of the illumination under which the assessment was carried out;

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

g) the date of the examination.

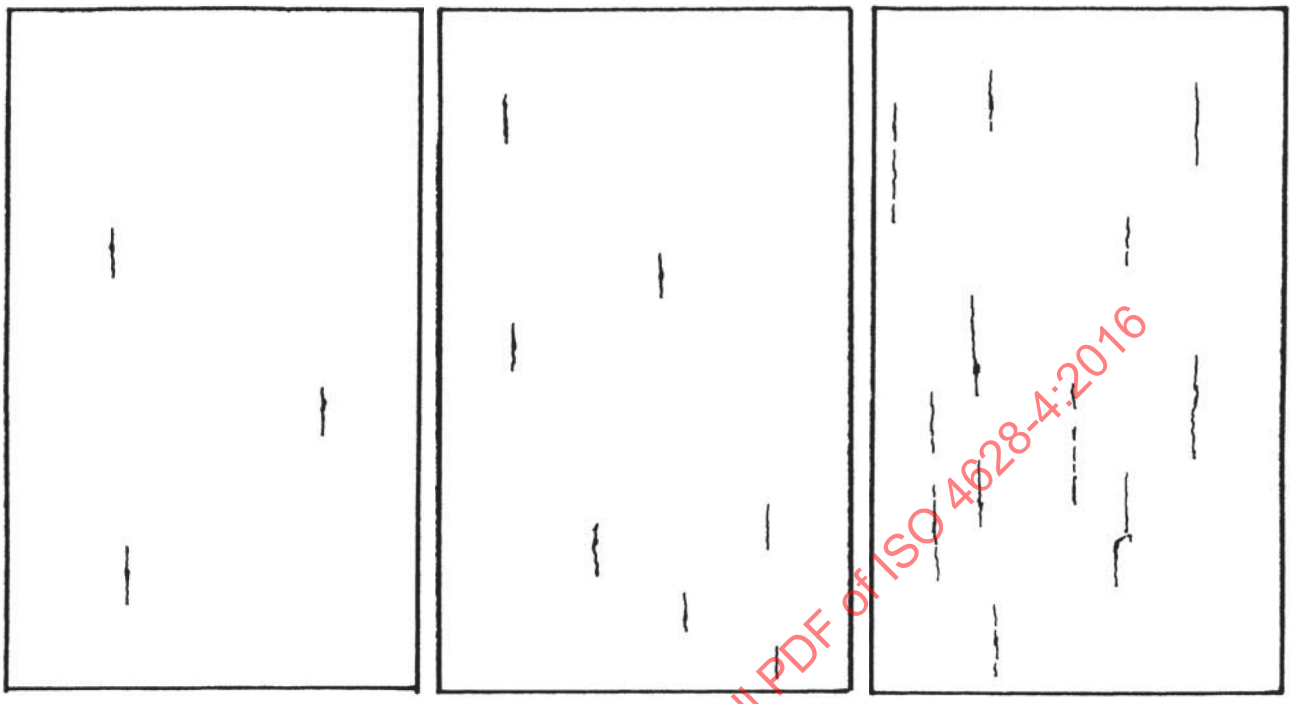


a) Quantity (density) 1 b) Quantity (density) 2 c) Quantity (density) 3

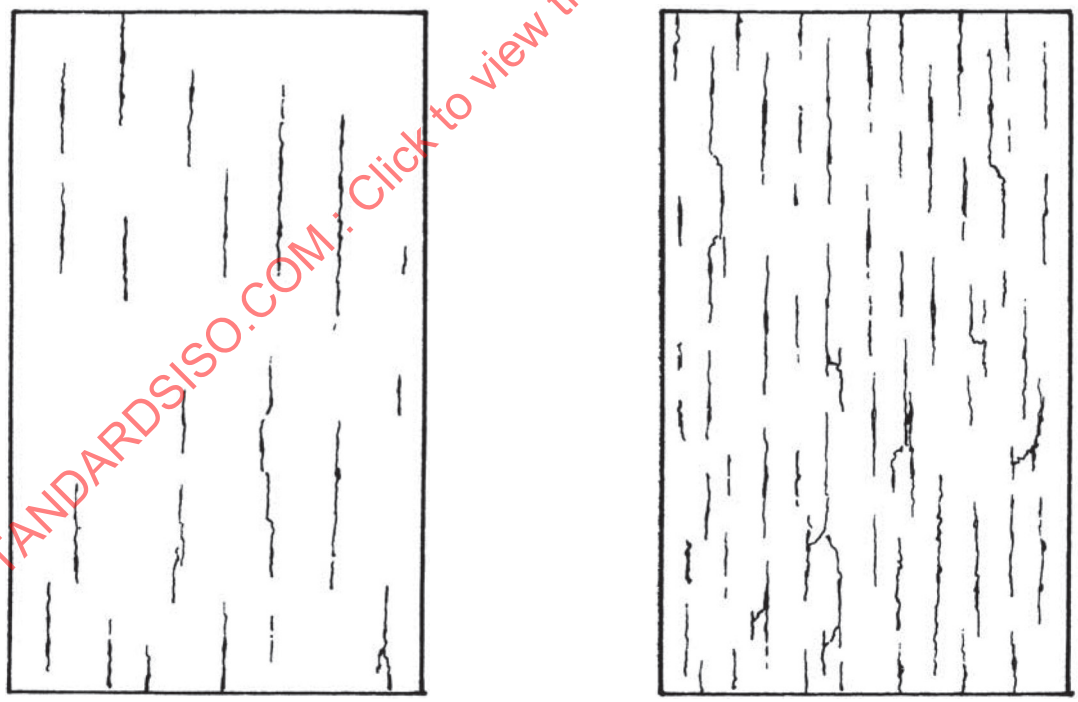


d) Quantity (density) 4 e) Quantity (density) 5

Figure 1 — Cracking without preferential direction (panels of area 100 cm^2 to 200 cm^2)



a) Quantity (density) 1 b) Quantity (density) 2 c) Quantity (density) 3



d) Quantity (density) 4 e) Quantity (density) 5

Figure 2 — Cracking in one preferential direction (for example due to brush marks or wood grain) (panels of area 100 cm² to 200 cm²)

Annex A
(informative)

Examples for types of cracking

ASTM — American Society for Testing and Materials

TNO — Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (Netherlands Organization for Applied Scientific Research)

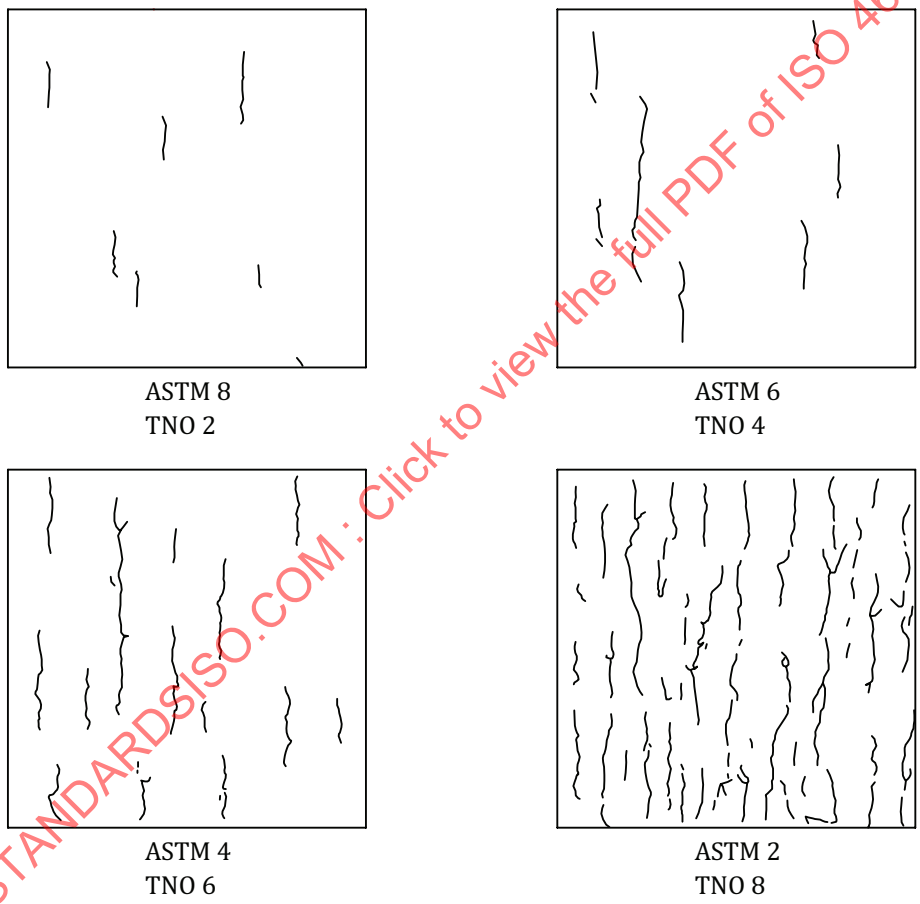
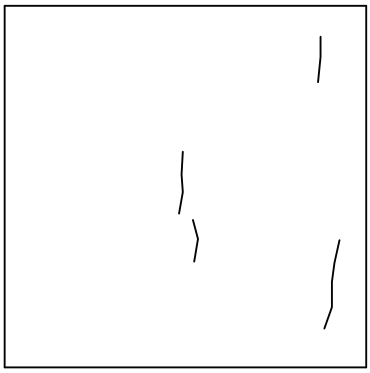


Figure A.1 — Irregular



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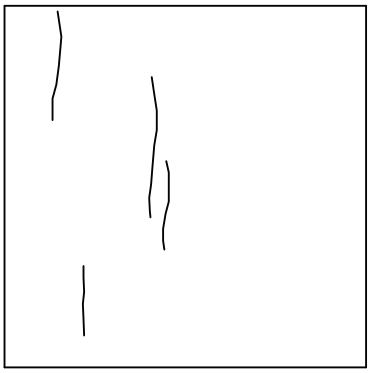

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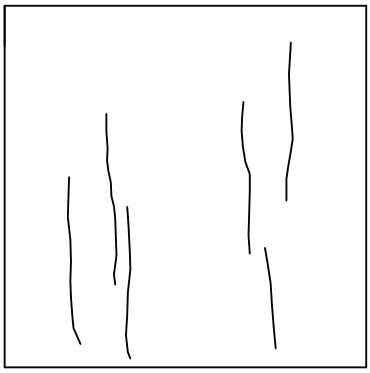

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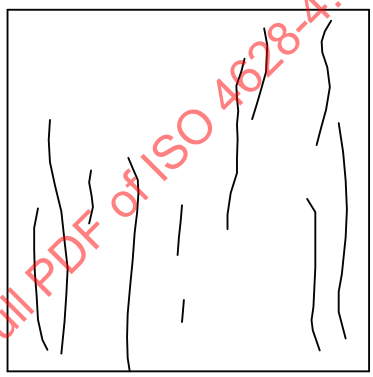

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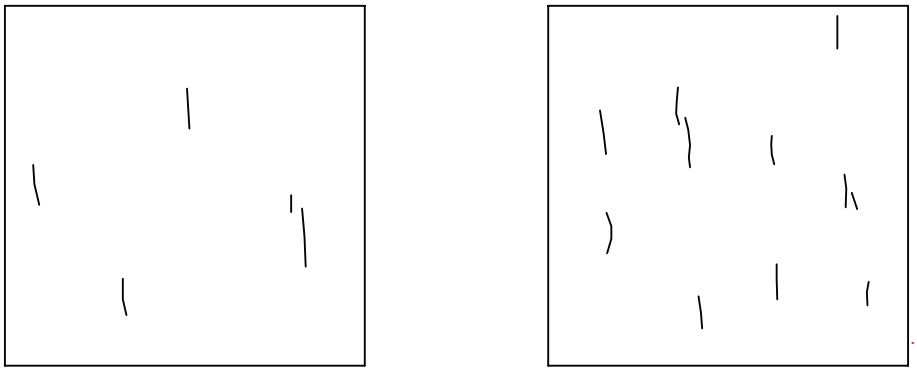
Figure A.2 — Long line



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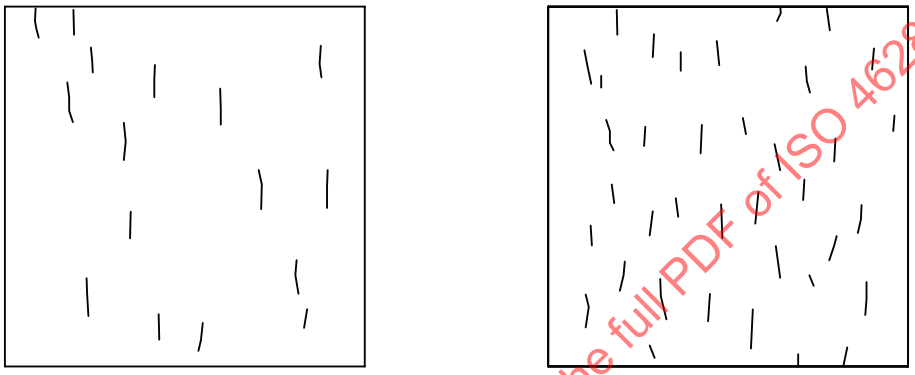

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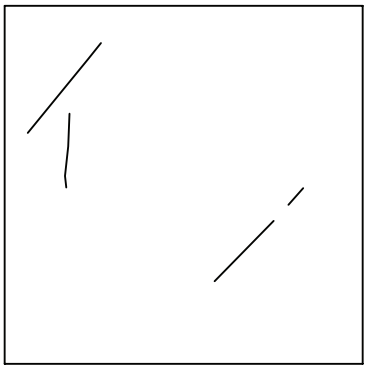
Figure A.3 — Short parallel



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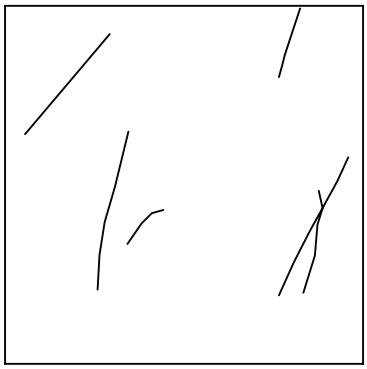

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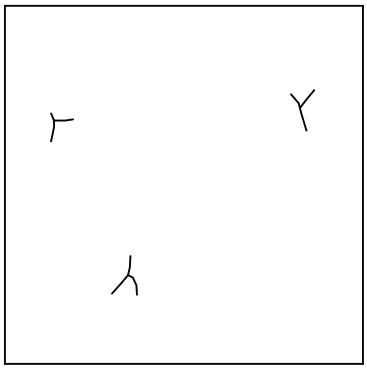
Figure A.4 — Switch



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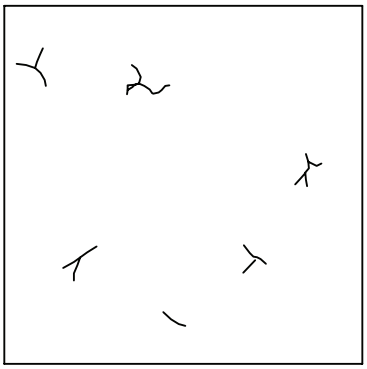

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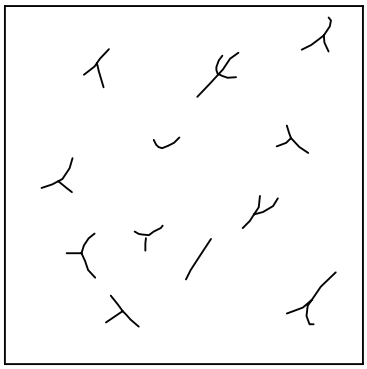

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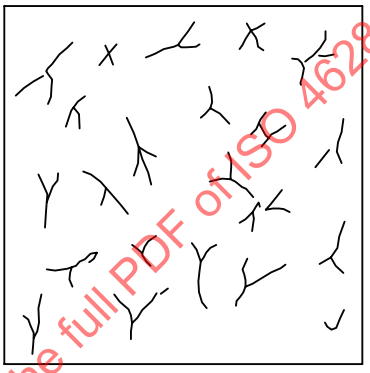

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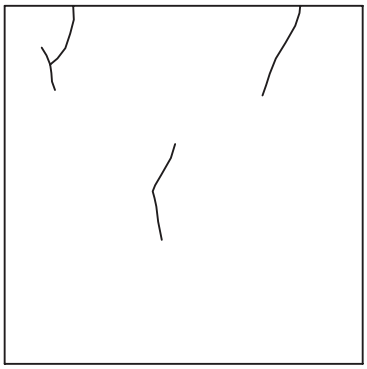
Figure A.5 — Crow foot



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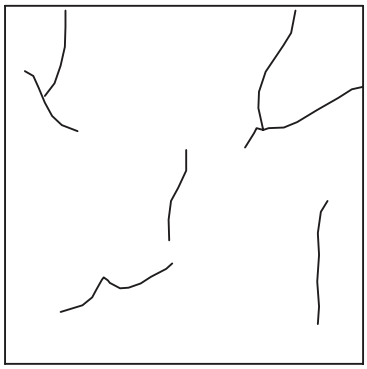

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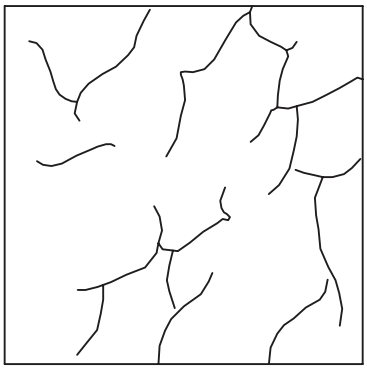

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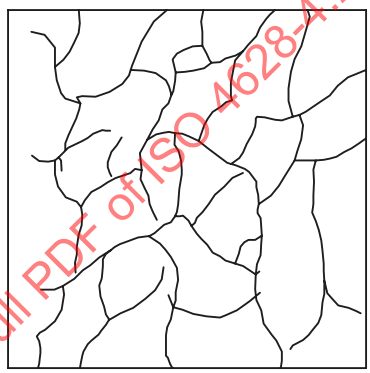

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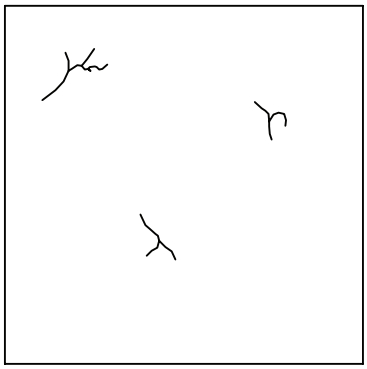
Figure A.6 — Mosaic



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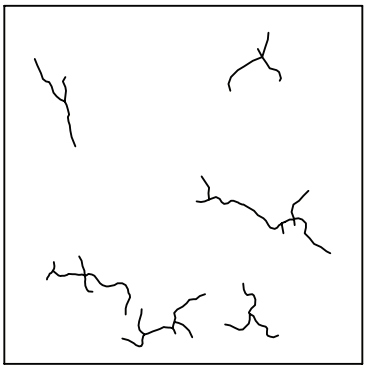

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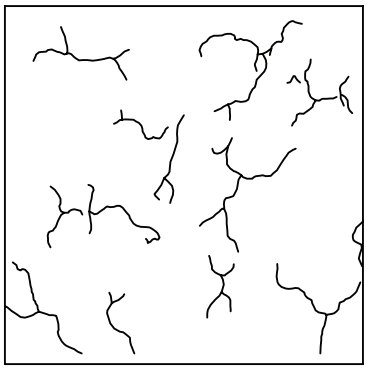

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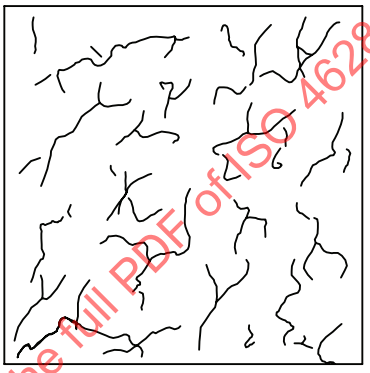

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Figure A.7 — Shrinkage