

INTERNATIONAL  
STANDARD

ISO  
4628-2

Third edition  
2016-01-15

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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 2:  
Assessment of degree of blistering**

*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 2: Évaluation du degré de cloquage*



Reference number  
ISO 4628-2:2016(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.

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](http://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](http://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 4628-2:2003), 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 concerning visibility of S1 size of blisters 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 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 2: Assessment of degree of blistering

### 1 Scope

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

The pictorial standards provided in this part of ISO 4628 illustrate blisters in the sizes 2, 3, 4, and 5, and each size in the quantities (densities) 2, 3, 4, and 5.

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 blistering

rating characterizing blisters in a coating in terms of quantity (density) and size

### 4 Assessment

Assess the quantity and size of the blisters in a coating by means of the pictures given in [Figure 1](#) to [Figure 4](#).

NOTE The S1 size of blisters is not visible with normal corrected vision but only with  $\times 10$  magnification.

Where the area to be examined exhibits blisters of varying size, quote as the size rating that of the blisters which are typical of the test area.

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

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 ratings for the quantity (density) and size of the blisters as given in [Figure 1](#) to [Figure 4](#), together with the approximate dimensions of the area concerned, or its portion of the total area, expressed as a percentage.

For example, if the coating is assessed as having blisters quantity 2, size 2, i.e. matching [Figure 1 a\)](#), it shall be reported as

- blistering; degree of blistering 2(S2).

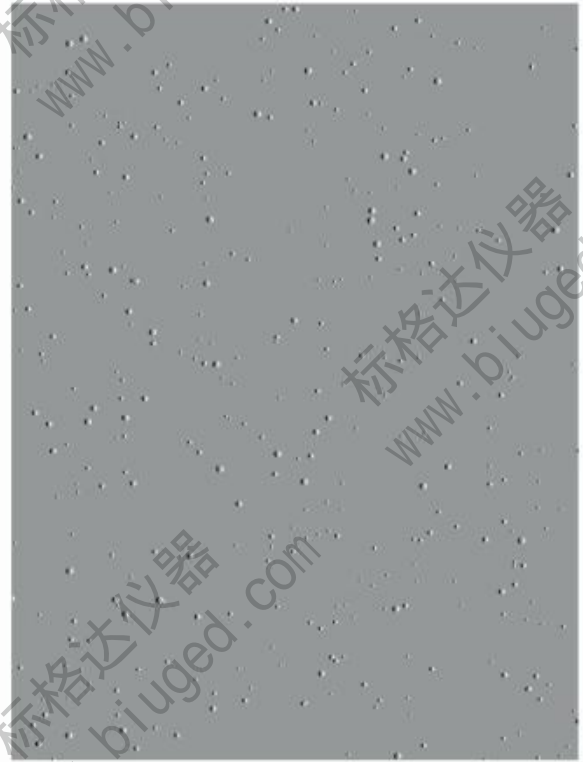
## 6 Test report

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 4628-2;
- c) the type of surface examined, its size and, if appropriate, its location;
- d) the result of the evaluation as indicated in [Clause 5](#);
- e) an indication of the illumination under which the assessment was carried out;
- f) any unusual features (anomalies) noted during the assessment;
- g) the date of the examination.



a) Quantity (density) 2 — 2(S2)



b) Quantity (density) 3 — 3(S2)



c) Quantity (density) 4 — 4(S2)



d) Quantity (density) 5 — 5(S2)

Figure 1 — Blisters of size 2



a) Quantity (density) 2 — 2(S3)



b) Quantity (density) 3 — 3(S3)



c) Quantity (density) 4 — 4(S3)



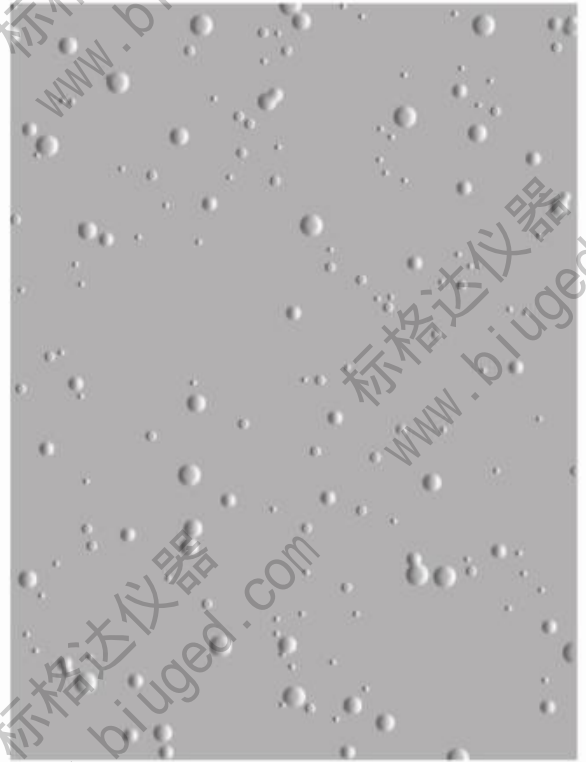
d) Quantity (density) 5 — 5(S3)

Figure 2 — Blisters of size 3

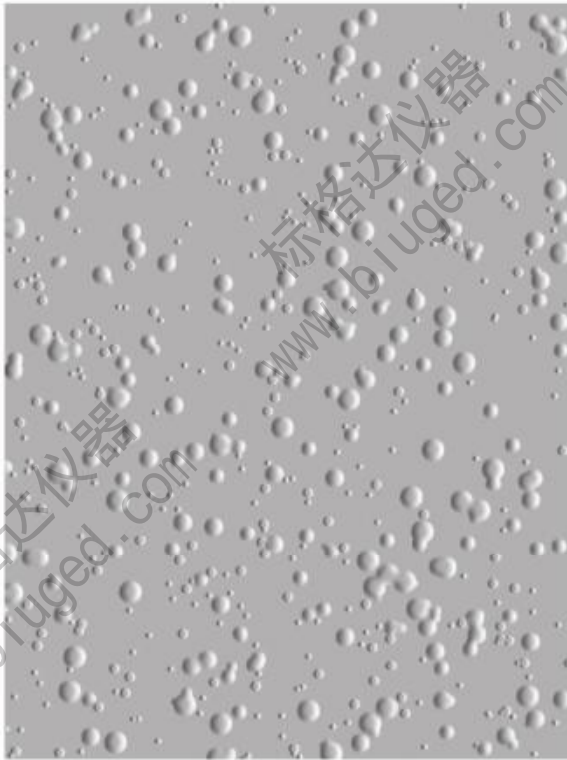




a) Quantity (density) 2 — 2(S4)



b) Quantity (density) 3 — 3(S4)

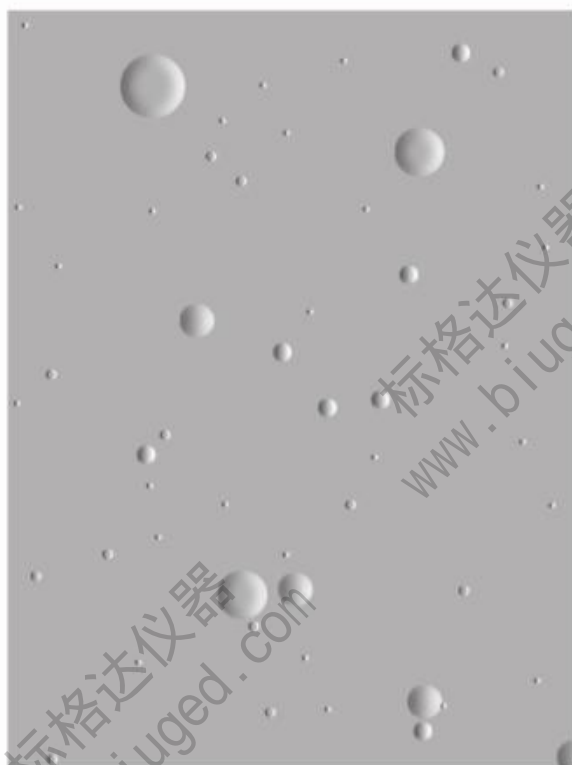


c) Quantity (density) 4 — 4(S4)

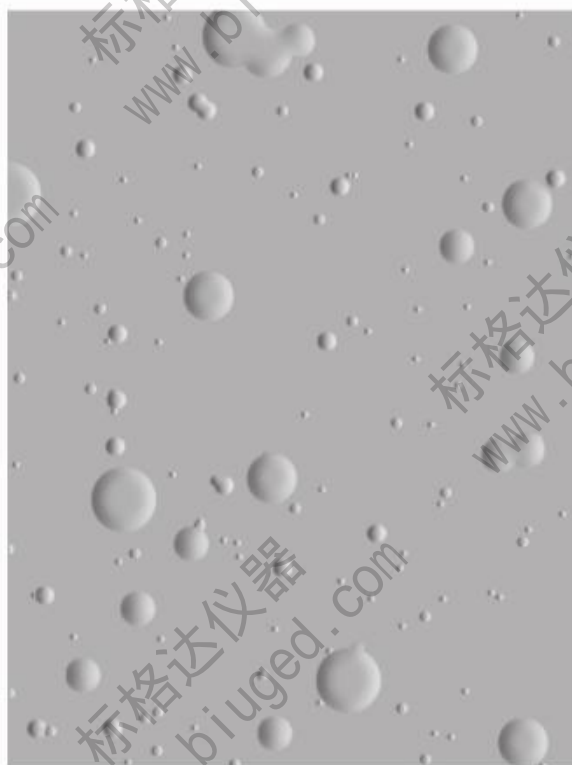


d) Quantity (density) 5 — 5(S4)

Figure 3 — Blisters of size 4



a) Quantity (density) 2 — 2(S5)



b) Quantity (density) 3 — 3(S5)



c) Quantity (density) 4 — 4(S5)



d) Quantity (density) 5 — 5(S5)

Figure 4 — Blisters of size 5

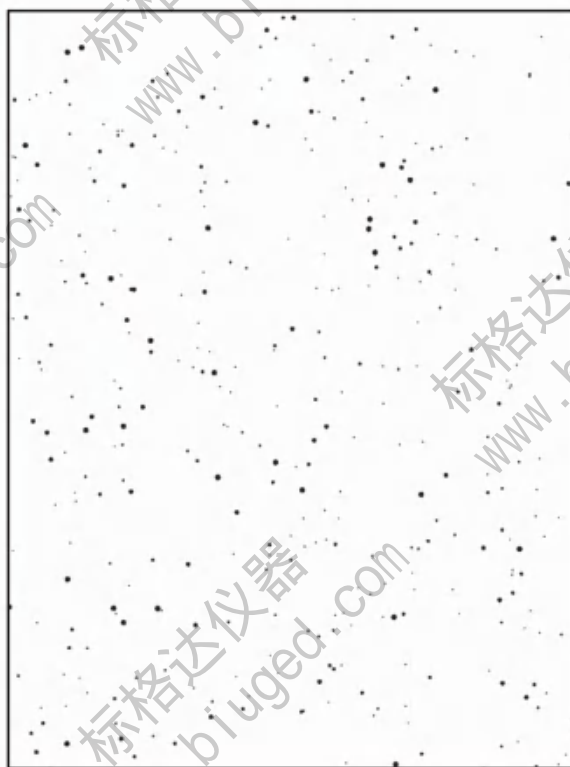
## Annex A (normative)

### Calibration images

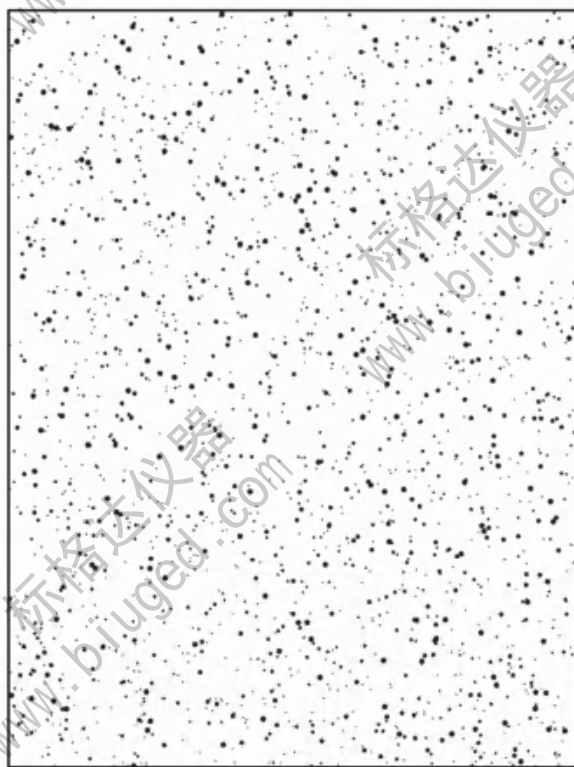
If the assessment is to be done using an optical imaging system, use the images given in [Figure A.1](#) to [Figure A.4](#) to calibrate the imaging system.



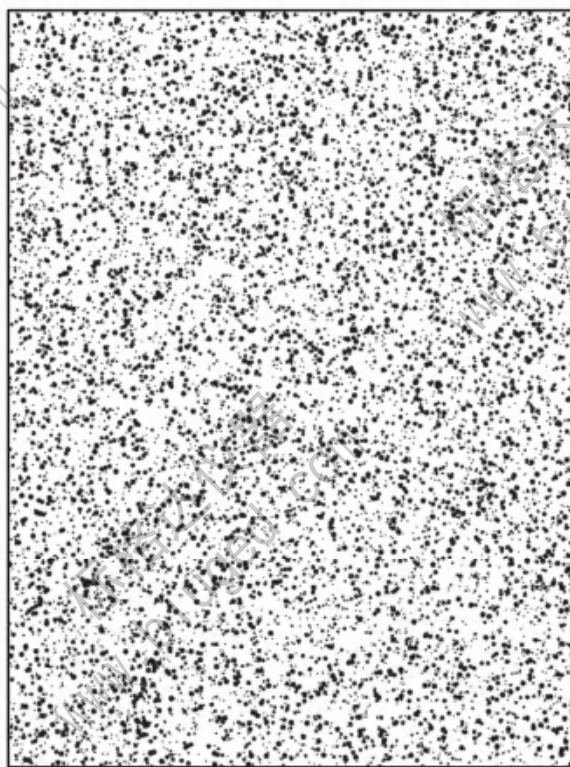
a) Quantity (density) 2 — 2(S2)



b) Quantity (density) 3 — 3(S2)

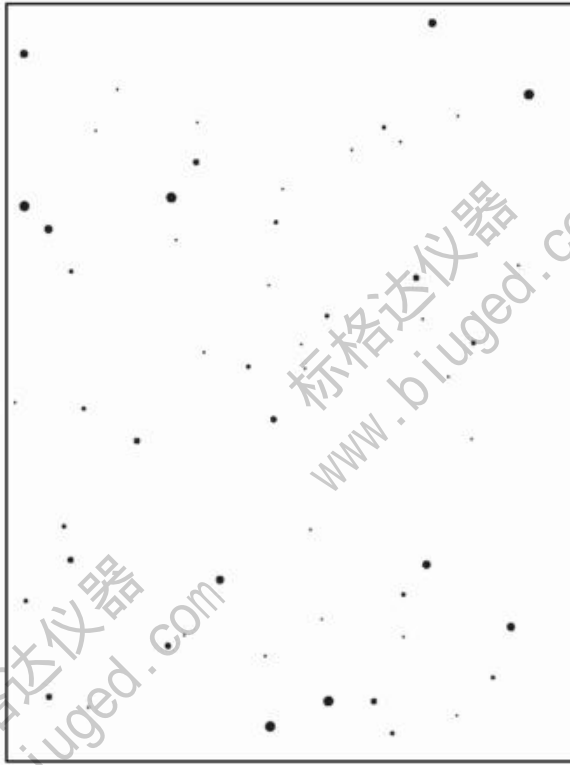


c) Quantity (density) 4 — 4(S2)



d) Quantity (density) 5 — 5(S2)

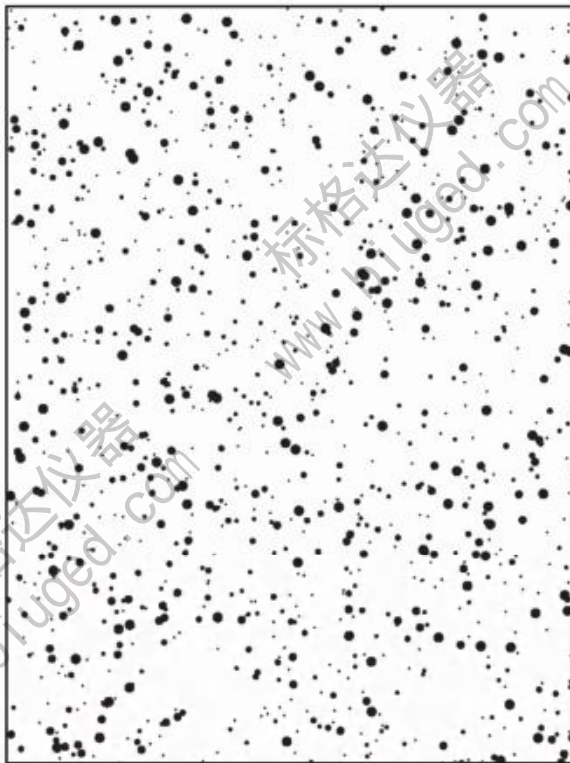
Figure A.1 — Blisters of size 2



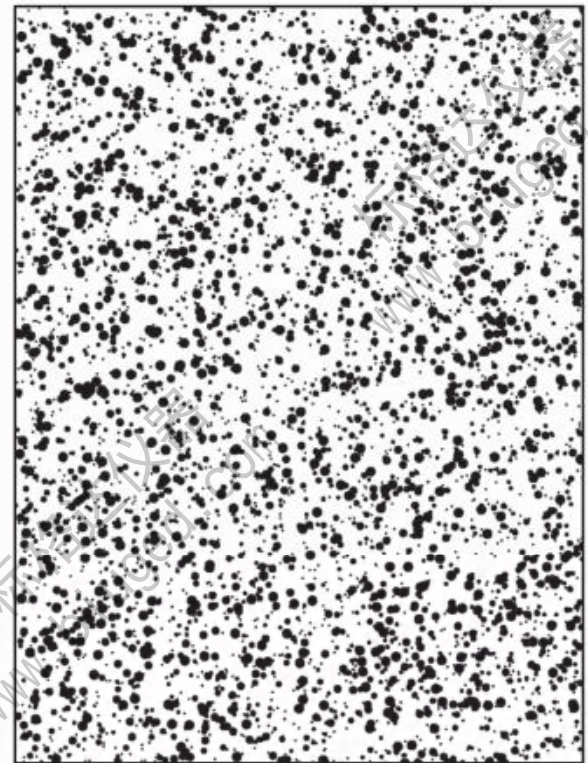
a) Quantity (density) 2 — 2(S3)



b) Quantity (density) 3 — 3(S3)

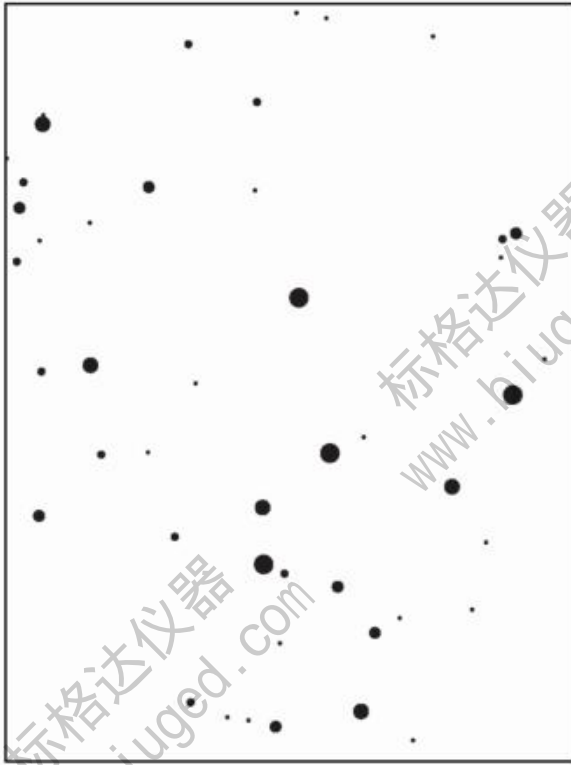


c) Quantity (density) 4 — 4(S3)

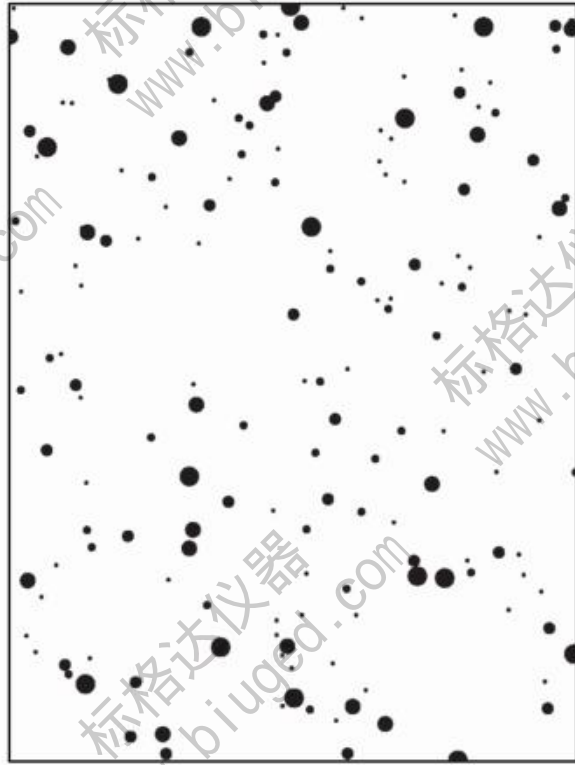


d) Quantity (density) 5 — 5(S3)

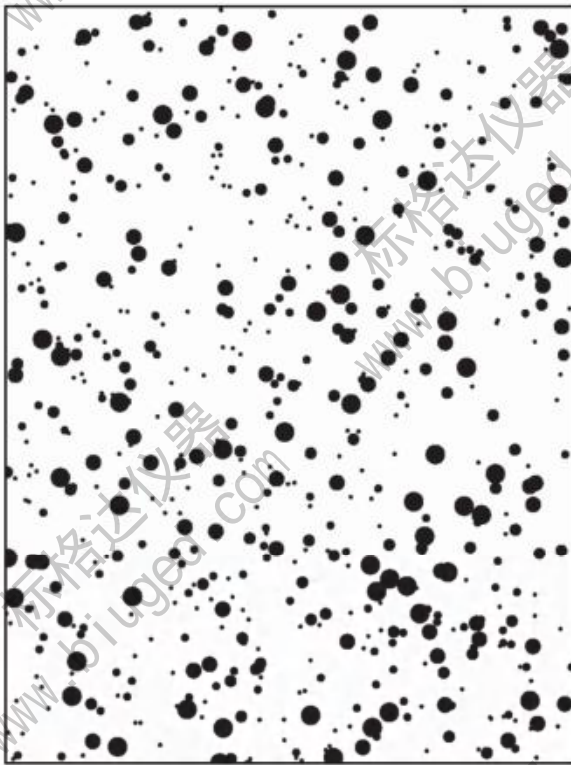
Figure A.2 — Blisters of size 3



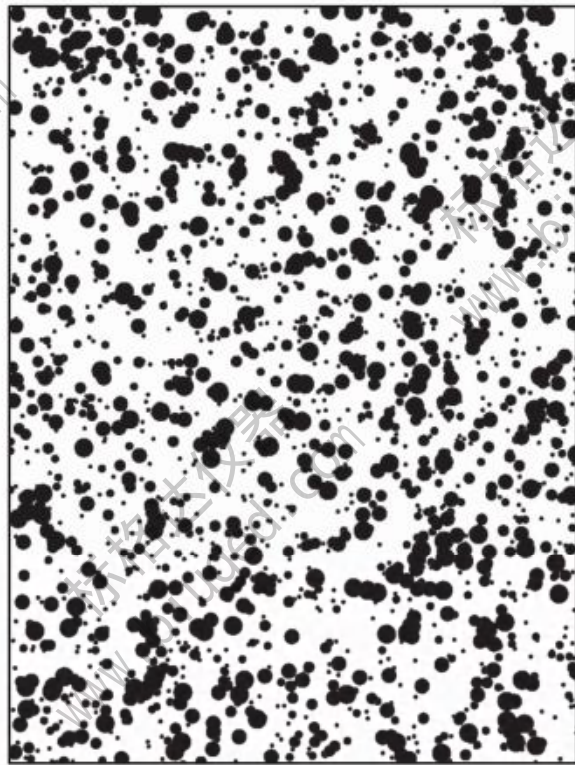
a) Quantity (density) 2 — 2(S4)



b) Quantity (density) 3 — 3(S4)

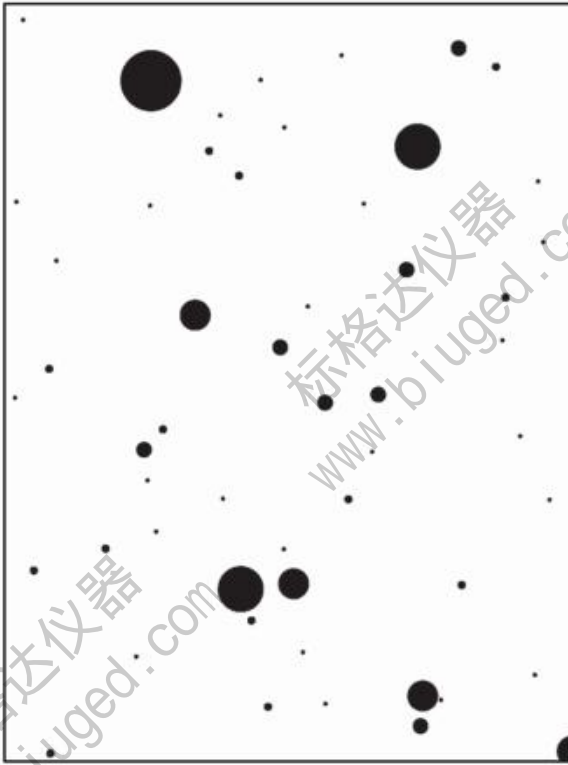


c) Quantity (density) 4 — 4(S4)

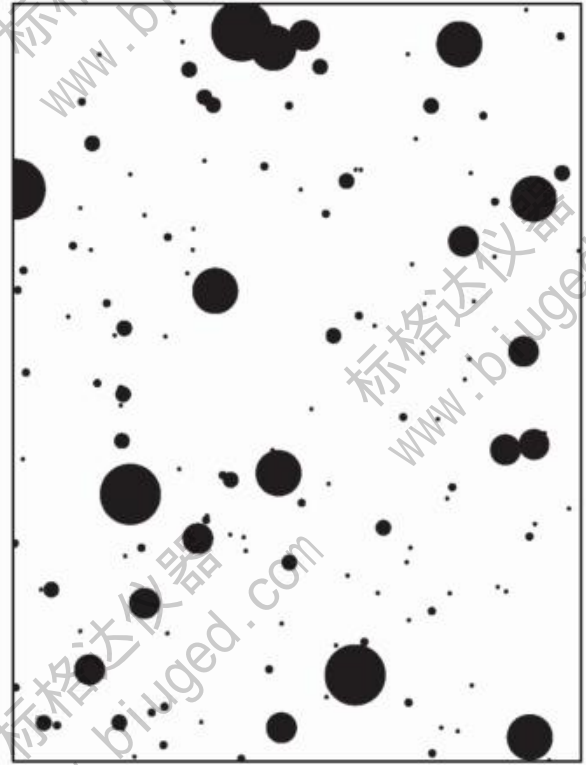


d) Quantity (density) 5 — 5(S4)

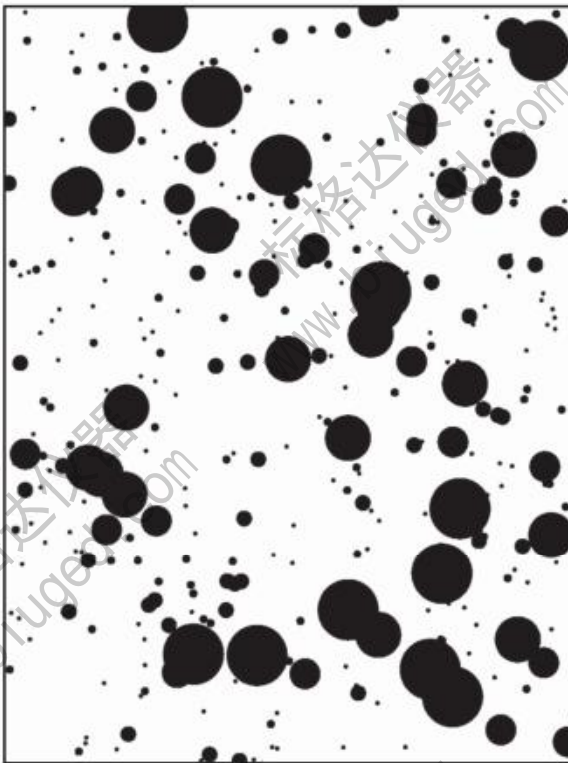
Figure A.3 — Blisters of size 4



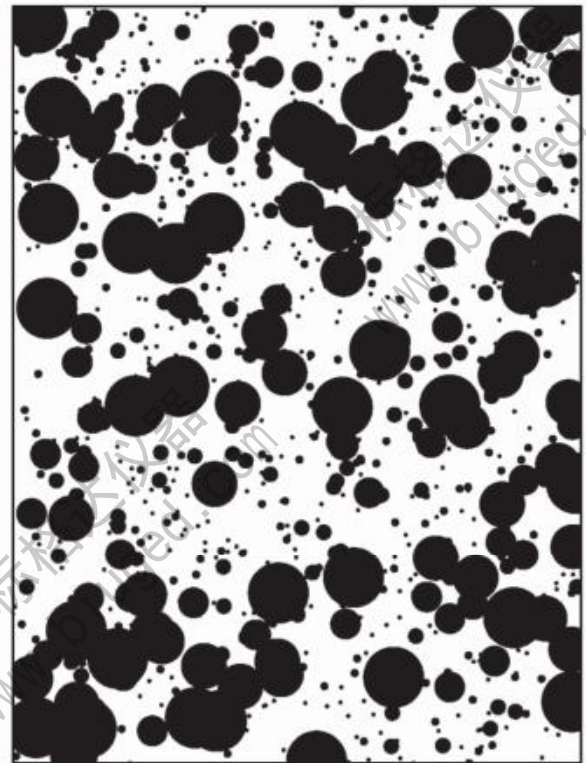
a) Quantity (density) 2 — 2(S5)



b) Quantity (density) 3 — 3(S5)



c) Quantity (density) 4 — 4(S5)



d) Quantity (density) 5 — 5(S5)

Figure A.4 — Blisters of size 5

## Annex B (informative)

### Correlation between ISO 4628-2 and ASTM D 714 rating systems

Quantity (density)		Size	
ASTM	ISO	ASTM	ISO
None	0		
—	1	—	1
Few	2	8	2
Medium	3	6	3
Medium-dense	4	4	4
Dense	5	2	5



## Bibliography

- [1] ISO 4628-1, *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*
- [2] ASTM D714, *Standard Test Method for Evaluating Degree of Blistering of Paints*

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# INTERNATIONAL STANDARD

**ISO  
5077**

Second edition  
2007-02-15

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## **Textiles — Determination of dimensional change in washing and drying**

*Textiles — Détermination des variations dimensionnelles au lavage et au séchage domestiques*



Reference number  
ISO 5077:2007(E)

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## Foreword

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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 5077 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

This second edition cancels and replaces the first edition (ISO 5077:1984), which has been technically revised.

# Textiles — Determination of dimensional change in washing and drying

## 1 Scope

This International Standard specifies a method for the determination of the dimensional change of fabrics, garments or other textile articles when subjected to an appropriate combination of specified washing and drying procedures.

In the case of textile articles or deformable materials, it is necessary to exercise all possible caution in the interpretation of the results.

## 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 139, *Textiles — Standard atmospheres for conditioning and testing*

ISO 3759, *Textiles — Preparation, marking and measuring of fabric specimens and garments in tests for determination of dimensional change*

ISO 6330, *Textiles — Domestic washing and drying procedures for textile testing*

## 3 Principle

The specimen is conditioned in the specified standard atmosphere and measured before subjection to the appropriate washing and drying procedures. After drying, conditioning and remeasuring of the specimen, the changes in dimensions are calculated.

## 4 Apparatus and reagents

Use apparatus and reagents as specified in ISO 3759 and ISO 6330.

## 5 Atmospheric conditions

The atmospheric conditions required for conditioning and testing are specified in ISO 139.

## 6 Test specimens

**6.1** The selection, dimensions, marking and measuring of test specimens are specified in ISO 3759.

**6.2** When possible, three specimens from each sample should be used. One or two specimens may be used when insufficient sample is available.



## 7 Procedure

**7.1** Determine the original length and width dimensions, as appropriate, after the specimens have been conditioned and measured according to the procedure specified in ISO 139 and ISO 3759.

**7.2** Wash and dry the specimens according to one of the procedures specified in ISO 6330, as agreed between the interested parties.

**7.3** After washing and drying, condition and measure the specimens and calculate the dimensional change of the specimens according to the procedure specified in ISO 3759.

## 8 Expression of results

**8.1** Calculate the mean changes in dimensions in both the length and width directions in accordance with the arrangement in ISO 3759 as follows:

$$\frac{x_t - x_o}{x_o} \times 100$$

where

$x_o$  is the original dimension;

$x_t$  is the dimension measured after treatment.

Record the changes in measurement separately as a percentage of the corresponding original value.

**8.2** Express the average dimensional changes to the nearest 0,5 %.

**8.3** State whether the dimension has decreased (shrinkage) by means of a minus sign (–) or increased (extension) by means of a plus sign (+).

## 9 Test report

The test report shall specify the following:

- a) the number and year of this International Standard;
- b) the number of specimens washed and dried;
- c) the procedure used for washing and drying from ISO 6330;
- d) for fabric specimens, the average dimensional change in the length (warp or wale) and the average dimensional change in the width (weft or course) to the nearest 0,5 %;
- e) for garments, the description, make and size of the garment tested;
- f) for garments, an adequate description of each measuring position and the average dimensional change to the nearest 0,5 % at each position for each garment tested.