

# Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete

## Part 3: Determination of liquid water permeability

ICS 87.040

# National foreword

This British Standard is the UK implementation of EN 1062-3:2008. It supersedes BS EN 1062-3:1999 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee STI/28, Paint systems for non-metallic substrates.

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

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**Paints and varnishes - Coating materials and coating systems  
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liquid water permeability**

Peintures et vernis - Produits de peinture et systèmes de  
revêtements pour maçonnerie et béton extérieurs - Partie 3  
: Détermination de la perméabilité à l'eau liquide

Beschichtungsstoffe - Beschichtungsstoffe und  
Beschichtungssysteme für mineralische Substrate und  
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Wasserdurchlässigkeit

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## Foreword

This document (EN 1062-3:2008) has been prepared by 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of an identical text or by endorsement, at the latest by July 2008, and conflicting national standards shall be withdrawn at the latest by July 2008.

This document supersedes EN 1062-3:1998.

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## Introduction

This document is one of a number of parts of EN 1062 dealing with test methods for coating materials and coating systems for exterior masonry and concrete. It should be read in conjunction with EN 1062-1.

## 1 Scope

This European Standard specifies a method for determining the liquid water permeability of coatings, coating systems and related products, intended for exterior masonry and classification according to EN 1062-1.

The method is applicable to coatings and coating systems on porous substrates such as brick, concrete and renderings.

A liquid water permeability  $w$  of more than  $0,5 \text{ kg}/(\text{m}^2 \times \text{h}^{0,5})$  will not be accurately quantified by the test method described in this standard.

## 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.

EN 1062-1, *Paints and varnishes – Coating materials and coating systems for exterior masonry and concrete — Part 1: Classification*

EN 23270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing (ISO 3270:1984)*

EN ISO 1513, *Paints and varnishes — Examination and preparation of samples for testing (ISO 1513:1992)*

EN ISO 15148, *Hygrothermal performance of building materials and products — Determination of water absorption coefficient by partial immersion (ISO 15148:2002)*

EN ISO 15528, *Paints, varnishes and raw materials for paints and varnishes - Sampling (ISO 15528:2000)*

## 3 Principle

Exterior masonry coatings play an important role in preventing rain water penetrating into porous mineral substrates. This transmission rate for liquid water is evaluated using blocks of highly porous mineral substrates which are coated by the coating or coating system on one of their faces. The test specimens are immersed under controlled conditions in water and weighed at suitable intervals of time. The liquid water permeability is determined by the change in mass.

## 4 Apparatus

**4.1 Container** of suitable size, for deionized water or fresh tap water (potable water), provided with supports for the test specimens.

**4.2 Oven** capable of being maintained at a temperature of  $(50 \pm 2) ^\circ\text{C}$ .

**4.3 Balance**, capable of weighing 2 000 g to 0,1 g.

## 5 Sampling

Take a representative sample of the product to be tested (or of each product in the case of a multi-coat system), as described in EN ISO 15528.

Examine and prepare each sample for testing, as described in EN ISO 1513.

## 6 Test specimens

### 6.1 General

The tests shall be performed with at least three test specimens.

NOTE Testing with more than three specimens is recommended to be able to eliminate outliers if there are any.

A specimen consists of a substrate coated with the coating or coating system to be tested.

### 6.2 Substrate

To determine the water transmissibility of a coating or coating system, a substrate with a massy mineral substrate shall be used with a homogeneous surface having a significantly higher water absorption than the coating or coating system to be tested.

Specimens cut from calcium silicate bricks, clay bricks or mortar slabs have been found suitable for the determination of the liquid water permeability of coatings and coating systems for exterior masonry and concrete. Unless otherwise agreed, such specimens shall be used as the substrate.

The specimens shall have a coefficient of liquid water permeability  $w$  of more than  $1 \text{ kg}/(\text{m}^2 \times \text{h}^{0.5})$  according to EN ISO 15148.

The specimens shall be at least  $200 \text{ cm}^2$  in surface area and at least 2,5 cm in thickness.

### 6.3 Preparation and coating

The specimens used as the substrate shall be clean and dry. It is important that the original porosity is taken into account by using new specimens for each determination.

Coat the substrate by applying the coating or coating system to be tested in the specified quantity in accordance with the recommendations of the manufacturer of the coating material(s). The coating shall be free of visible defects. Dry the coating for at least one week.

Before conditioning, seal the reverse side and the edges of the test specimens against water, for example by applying two coats of a two-component coating material based on epoxy resin, overlapping the test surface by at least 5 mm but no more than 10 mm. A thixotropic coating system is recommended.

### 6.4 Drying and conditioning

#### 6.4.1 Drying

Unless otherwise agreed, dry the test specimens for a further 7 days with freely circulating air at  $(23 \pm 2) ^\circ\text{C}$  and  $(50 \pm 5) \%$  relative humidity (see also EN 23270).

## 6.4.2 Conditioning

**NOTE** The liquid water permeability is influenced by the volatile and/or water-soluble components of the coating. As, in practice, these components can evaporate from the coating during outdoor exposure or be washed out by water (rain), the coating is aged prior to the determination of the liquid water permeability.

Subject the test specimens to three cycles comprising the following conditions:

- 24 h storage in water (potable water changed for every cycle) at  $(23 \pm 2) ^\circ\text{C}$ ;
- 24 h drying at  $(50 \pm 2) ^\circ\text{C}$ .

If the coatings are thermoplastic at  $50 ^\circ\text{C}$ , the test specimens shall be suspended and/or suitably placed in the oven, ensuring that they do not adhere to the parts of the oven and/or to each other.

During weekends, or interruption for other reasons, store the test specimens in the standard atmosphere as defined in EN 23270 [ $(23 \pm 2) ^\circ\text{C}$  and  $(50 \pm 5) \%$  relative humidity].

After the last cycle store the test specimens at  $(50 \pm 2) ^\circ\text{C}$  for at least 24 h. Afterwards, condition the test specimens in the standard atmosphere as defined in EN 23270 [ $(23 \pm 2) ^\circ\text{C}$  and  $(50 \pm 5) \%$  relative humidity] for at least 24 h before carrying out the test.

## 7 Procedure

Carry out the determination at  $(23 \pm 2) ^\circ\text{C}$ , unless otherwise agreed.

Weigh the test specimen to the nearest 0,1 g. Fill the container with deionized water or fresh tap water (potable water) and allow the temperature of the water to attain  $(23 \pm 2) ^\circ\text{C}$ . Support the test specimen on a plastics or metal rack with the maximum possible area of the coated surface under test facing downwards so that this face is 5 mm to 10 mm below the surface of the water and also at least 10 mm above the base of the container. Ensure full wetting of the surface, i.e. removal of air bubbles by careful wiping with a clean damp lint free cloth or tissue 10 min after the start of the test. After 24 h remove the test specimen from the water, carefully wipe it dry using absorbent paper, and weigh the test specimen to the nearest 0,1 g.

**NOTE** Depending on the time the slope of the curve of water absorption can provide important information about the hygric behaviour of coatings. Therefore, it is recommended to measure the water absorption after 10 min, 30 min, 1 h, 2 h, 3 h, 6 h and 24 h.

## 8 Expression of results

The water transmissibility  $w$ , in kilograms per square metres per square root of hours, is determined by the mass increase (in kilograms) divided by the area of the test specimens (in square metres) and by the square root of time  $[(24 \text{ h})^{0,5}]$ . The area shall be the area of the testing surface not covered by the overlapping sealing coating (see 6.3).

For the classification according to EN 1062-1 the arithmetic mean value from at least three individual measurements shall be used.

## 9 Precision

### 9.1 Repeatability

The value below which the absolute difference between two single test results, each the mean of triplicates, obtained on identical material by one operator in one laboratory within a short interval of time using the

standardized test method, can be expected to lie with a 95 % probability, is 10 % (relative to the mean of the two test results).

## **9.2 Reproducibility**

The value below which the absolute difference between two single test results, each the mean of triplicates, obtained on identical material by operators in different laboratories using the standardized test method, can be expected to lie with a 95 % probability, is 15 % (relative to the mean of the two test results).

## **10 Test report**

The test report shall contain at least the following information:

- a) reference to this document (EN 1062-3:2008);
- b) all details necessary to identify the product tested;
- c) number of test specimens (replicates);
- d) type of coating system, method of application, applied mass, number of coats, drying time;
- e) nature of the substrate and dimensions of the test specimens;
- f) results of the test, as indicated in clause 8 (individual and mean values and classification according to EN 1062-1);
- g) particular observations;
- h) any deviation from the test method specified;
- i) date of the test.



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