SWEDISH STANDARDS INSTITUTE

SVENSK STANDARD
SS-EN ISO 15148

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Utgåva 1

Fukt- och värmetekniska egenskaper hos byggmaterial och byggprodukter – Bestämning av kapillaritetskoefficient genom partiell nedsänkning i vatten (ISO 15148:2002)

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

ICS 91.100.01

Språk: engelska

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Europastandarden EN ISO 15148:2002 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 15148:2002.

EN ISO 15148 har tagits fram inom CEN/TC 89, Thermal performance of buildnings and building components. Genom samarbete med ISO/TC 163, Thermal performance and energy use in the built environment/SC 1, Test and measurement methods, har standarden även antagits som global standard med beteckningen ISO 15148:2002.

I standarden beskrivs utrustning och metod för att bestämma kapillaritetskoefficienten hos byggmaterial. Vid provningen placeras en yta på en provkropp av materialet i kontakt med fritt vatten och viktökningen hos provkroppen bestäms. Viktökningen är ungefär proportionell mot kvadratroten ur tiden och kapillaritetskoefficienten ($kg/m^2 \cdot s^{½}$) är ett mått på uppsugningshastigheten.

The European Standard EN ISO 15148:2002 has the status of a Swedish Standard. This document contains the official English version of EN ISO 15148:2002.

Dokumentet består av 18 sidor.

Upplysningar om **sakinnehållet** i standarden lämnas av SIS, Swedish Standards Institute, tel 08 - 555 520 00.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 15148

December 2002

ICS 91.100.01

English version

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

Performance hygrothermique des matériaux et produits pour le bâtiment - Détermination du coefficient d'absorption d'eau par immersion partielle (ISO 15148:2002)

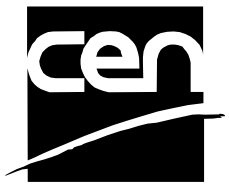
Wärme- und feuchtetechnisches Verhalten von Baustoffen und Bauprodukten - Bestimmung des Wasseraufnahmekoeffizienten bei teilweisem Eintauchen (ISO 15148:2002)

This European Standard was approved by CEN on 24 June 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document EN ISO 15148:2002 has been prepared by Technical Committee CEN/TC 89 "Thermal performance of buildings and building components", the secretariat of which is held by SIS, in collaboration with Technical Committee ISO/TC 163 "Thermal insulation".

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 June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

This standard is one of a series of standards which specify test methods for the thermal and moisture related properties of building materials and products.

NOTE Normative references to International Standards are listed in annex ZA (normative).

Annex A is informative, annex ZA is normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The movement of moisture within hygroscopic capillary building materials is a combination of vapour and liquid flows which have complex interactions with the temperature and humidity gradients and the properties of the materials present. Three stages can be identified.

a) At very low humidities transport is by vapour diffusion alone and the permeability can be derived from dry-cup tests, defined in ISO 12572.

b) At higher relative humidities in the hygroscopic region, up to about 95 % relative humidity, there is a mixture of gas and water filled pores with simultaneous flows of vapour and liquid. The increasing liquid flow causes the exponentially increasing permeability measured by cup tests under isothermal conditions. However, under practical, non-isothermal conditions this liquid flow could increase, or decrease, the total mass flow.

c) Above about 95 % relative humidity, depending on the material, the total mass transport is governed by transport in the liquid phase. This is the situation that arises when a material is dipped in water or severely wetted e.g. by driving rain. The water moves under the hydraulic pressure, the negative suction pressure. After the water source is removed, the hydraulic pressure ceases and the liquid is redistributed within the material at a different rate (stages b) and c) do not necessarily apply to all hygroscopic materials).

Methods are currently being developed in research laboratories to quantify capillary transport and measure the relevant coefficients. At present, however, these involve sophisticated measuring techniques such as gamma ray and neutron absorption or Nuclear Magnetic Resonance (NMR) spectroscopy together with complex mathematical methods to analyse the results: comparisons between laboratories have shown that further work is needed to develop standard techniques. It will, therefore, be a number of years before it is possible to standardise such methods - see annex A for further information.

At present it is possible to standardise the measurement of the absorption of liquid water into the surface of a material, which gives an indicator of its liquid transport performance.

1 Scope

This European Standard specifies a method for determining, by partial immersion with no temperature gradient, the short-term liquid water absorption coefficient. It is intended to assess the rate of absorption of water, by capillary action from continuous or driving rain during on site storage or construction, by insulating and other materials, which are normally protected. The method is suitable for renders or coatings tested in conjunction with the substrate on which they are normally mounted.

It is not intended to assess the absorption of water by materials used under water or in overall contact with saturated ground, where a total immersion test is more appropriate.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ISO 9346, *Thermal insulation - Mass transfer - Physical quantities and definitions.*

3 Terms and definitions

3.1 Definitions

For the purposes of this European Standard, the terms and definitions given in ISO 9346 and the following apply.

3.1.1

water absorption coefficient
mass of water absorbed by a test specimen per face area and per square root of time

NOTE See equation (2) in clause 8.

3.1.2

homogeneous material
material the properties of which are uniform on a macroscopic scale

3.2 Symbols and units

Symbol	Quantity	Unit
A	face area	m^2
A_w	water absorption coefficient	$kg/(m^2 \cdot s^{0,5})$
A_{wt}	water absorption coefficient related to a specific time, t, in seconds	$kg/(m^2 \cdot s^{0,5})$
Δm_t	mass gain per face area after time t	kg/m^2
M_i	initial mass of specimen	kg
m_t	mass of specimen after time t	kg
t	time	s or h
W_w	water absorption coefficient	$kg/(m^2 \cdot h^{0,5})$
W_{wt}	water absorption coefficient related to a specific time, t, in hours	$kg/(m^2 \cdot h^{0,5})$

NOTE Water absorption coefficient is defined in terms of seconds in EN ISO 9346. The alternative definition in terms of hours is widely used.

4 Principle

The water absorption by partial immersion is determined by measuring the change in mass of the test specimen, the bottom surface of which is in contact with water, over a period which is usually at least 24 h.

The water adhering to the surface and not absorbed by the product is completely removed by, for example, blotting with a sponge before the specimen is weighed.

5 Apparatus

The test apparatus shall include:

a) balance, capable of weighing a test specimen to an accuracy of ± 0,1 % of the mass of the specimen;

b) water tank with a device for keeping the water level constant to ± 2 mm and a device to keep the test specimen in position. The tank shall include point supports, which do not damage the specimen, to keep the specimen at least 5 mm clear of the base;

c) timer accurate to at least one second in 24 h.

6 Test specimens

6.1 Shape of test specimens

Test specimens shall be representative of the material or product and of regular shape with constant cross section to ensure one dimensional water flow. The faces shall be free from surface irregularities.

6.2 Dimensions of test specimens

6.2.1 Area

The water contact area of each test specimen shall be at least 50 cm^2. However, in the case of materials including macroscopic particles such as aggregates, the side of a square specimen or the smallest diameter of the face shall be at least ten times the largest particle size.

NOTE Larger specimens, preferably with a face area of at least 100 cm^2, are advised as they will lead to greater accuracy.

6.2.2 Thickness

Where possible, the specimen thickness should be the full product thickness. When specimens are cut from products they shall be representative of the material to be assessed and thick enough to enable handling without damage. In the case of materials including macroscopic particles such as aggregates, the thickness should be preferably at least ten times, but shall be no less than five times, the largest particle size.

6.3 Number of test specimens

At least three specimens shall be tested.

If the water contact area of the individual specimens is less than 100 cm^2, at least six specimens shall be tested representing a total area of at least 300 cm^2.