SVENSK STANDARD
SS-EN 15803:2009

Fastställd/Approved: 2009-12-17
Publicerad/Published: 2010-02-10
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 97.195

Konservering av kulturobjekt – Provningsmetoder – Bestämning av vattenånga permeabilitet (δ_p)

Conservation of cultural property – Test methods – Determination of water vapour permeability (δ_p)

SWEDISH STANDARDS INSTITUTE

Hitta rätt produkt och ett leveranssätt som passar dig

Standarder
Genom att följa gällande standard både effektiviserar och säkrar du ditt arbete. Många standarder ingår dessutom ofta i paket.

Tjänster
Abonnemang är tjänsten där vi uppdaterar dig med aktuella standarder när förändringar sker på dem du valt att abonnera på. På så sätt är du säker på att du alltid arbetar efter rätt utgåva.
e-nav är vår online-tjänst som ger dig och dina kollegor tillgång till standarder ni valt att abonnera på dygnet runt. Med e-nav kan samma standard användas av flera personer samtidigt.

Leveranssätt
Du väljer hur du vill ha dina standarder levererade. Vi kan erbjuda dig dem på papper och som pdf.

Andra produkter
Vi har böcker som underlättar arbetet att följa en standard. Med våra böcker får du ökad förståelse för hur standarder ska följas och vilka fördelar den ger dig i ditt arbete. Vi tar fram många egna publikationer och fungerar även som återförsäljare. Det gör att du hos oss kan hitta över 500 unika titlar. Vi har även tekniska rapporter, specifikationer och "workshop agreement".
Matriser är en översikt på standarder och handböcker som bör läsas tillsammans. De finns på sis.se och ger dig en bra bild över hur olika produkter hör ihop.

Standardiseringsprojekt
Du kan påverka innehållet i framtida standarder genom att delta i någon av SIS ca 400 Tekniska Kommittéer.

Find the right product and the type of delivery that suits you

Standards
By complying with current standards, you can make your work more efficient and ensure reliability. Also, several of the standards are often supplied in packages.

Services
Subscription is the service that keeps you up to date with current standards when changes occur in the ones you have chosen to subscribe to. This ensures that you are always working with the right edition.
e-nav is our online service that gives you and your colleagues access to the standards you subscribe to 24 hours a day. With e-nav, the same standards can be used by several people at once.

Type of delivery
You choose how you want your standards delivered. We can supply them both on paper and as PDF files.

Other products
We have books that facilitate standards compliance. They make it easier to understand how compliance works and how this benefits you in your operation. We produce many publications of our own, and also act as retailers. This means that we have more than 500 unique titles for you to choose from. We also have technical reports, specifications and workshop agreements.
Matrices, listed at sis.se, provide an overview of which publications belong together.

Standardisation project
You can influence the content of future standards by taking part in one or other of SIS's 400 or so Technical Committees.

Europastandarden EN 15803:2009 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 15803:2009.

The European Standard EN 15803:2009 has the status of a Swedish Standard. This document contains the official English version of EN 15803:2009.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.
Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00.
Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

SIS Förlag AB, SE 118 80 Stockholm, Sweden. Tel: +46 8 555 523 10. Fax: +46 8 555 523 11.
E-mail: sis.sales@sis.se Internet: www.sis.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15803

December 2009

ICS 97.195

English Version

Conservation of cultural property - Test methods - Determination of water vapour permeability (δ_p)

Conservation des biens culturels - Méthodes d'essai - Détermination de la perméabilité à la vapeur d'eau (δ_p)

Erhaltung des kulturellen Erbes - Prüfverfahren - Bestimmung des Wasserdampfleitkoeffizienten (δ_p)

This European Standard was approved by CEN on 7 November 2009.

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 CEN 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 15803:2009: E

Contents

Page

Foreword

This document (EN 15803:2009) has been prepared by Technical Committee CEN/TC 346 “Conservation of cultural property”, the secretariat of which is held by UNI.

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 2010 and conflicting national standards shall be withdrawn at the latest by June 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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

Introduction

This test method can be applied if it does not change the value of the cultural property and follows relevant ethical codes of conservation practice.

1 Scope

This European Standard specifies a method for determining the water vapour permeability (WVP) of porous inorganic materials used for and constituting cultural property. The method may be applied to porous inorganic materials either untreated or subjected to any treatment or ageing.

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.

prEN 15898:2009, *Conservation of cultural property — Main general terms and definitions concerning conservation of cultural property*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 15898:2009 and the following apply.

3.1
porous inorganic materials
materials including natural stones, e.g. sandstone, limestone, marble, as well as artificial materials, such as mortar, plaster, brick and others

3.2
water vapour flow rate
G
mass of water vapour transferred through the specimen per time

3.3
density of water vapour flow rate
vapour transmission rate
g
mass of water vapour transferred through the specimen per time and per unit area

3.4
water vapour permeance
W_p
value of the mass of water vapour diffused through a specimen, induced by a partial vapour pressure gradient through the specimen, per unit area, time and partial vapour pressure difference

3.5
water vapour permeability
δ_p
product of the water vapour permeance and the thickness of a homogeneous specimen

3.6
water vapour permeability of air
δ_a
water vapour permeability of air δ_a is defined by the Schirmer equation:

$$\delta_a = 0{,}000\ 023\ 1\ (p_o/(p \times R \times T)) \times (T/273\ \mathrm{K})^{1{,}81}\ \mathrm{kg/(m{\cdot}s{\cdot}Pa)} \qquad (1)$$

where

p_o is the standard barometric pressure (= 1 013,25 hPa);

p is the barometric pressure (hPa);

T is the temperature (K);

R is the gas constant for water vapour (= 462 Nm/(kg·K))

3.7
water vapour diffusion resistance coefficient
μ
water vapour permeability of air divided by that of the material concerned

3.8
water vapour diffusion-equivalent air layer thickness
$\mathbf{s_d}$
value of a specimen which indicates the thickness of a motionless air layer that has the same water vapour resistance as the specimen of thickness D.

The s_d value can be obtained in two ways:

i) by multiplication of the μ-value with the thickness D of the specimen;

ii) from the water vapour permeability of air δ_a divided by the water vapour permeance of the specimen Wp

4 Principle

Determination of the water vapour flow through the specimen subjected to different partial water vapour pressures.

5 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply:

m mass of specimen and cup assembly, in kg

D mean thickness of specimen, in m

A test surface area, in m²

t time, in s

G water vapour flow rate through specimen, in kg/s

g density of water vapour flow rate, in kg/(m²·s)

Δp_v water vapour pressure difference across the specimen, in Pa

W_p water vapour permeance with respect to partial vapour pressure, in kg/(m²·s·Pa)

δ_p water vapour permeability with respect to partial vapour pressure, in kg/(m·s·Pa)

δ_a water vapour permeability of air, in kg/(m·s·Pa) μ water vapour diffusion resistance coefficient (-)

s_d water vapour diffusion-equivalent air layer thickness, in m

6 Test equipment

6.1 Test set-ups: two types of cup systems are possible as presented in Figure 1 and Figure 2.

The cup’s weight should be compatible with the measurement method which needs the use of an analytical balance.

Test cups shall be resistant to corrosion from the desiccant or salt solutions. Typically cups are made of glass, metal or PVC.

For certain cups and sealing methods, a template, with shape and size corresponding to that of the test cup, is used when applying the sealant to give a sharply defined, reproducible test area. The template shall have an area of at least 90 % of the specimen to limit non-linear vapour flow. The sealant, which is impermeable to water vapour, should neither undergo changes during the test nor bring about changes to the test surface of the specimen.

NOTE Circular cups can be easier to seal. Transparent cups enable observing the test in progress; thus, the saturated state of the salt solutions can be monitored.

Examples of suitable sealants:

— a mixture of 90 % microcrystalline wax and 10 % plasticizer;

— a mixture of 60 % microcrystalline wax and 40 % refined crystalline paraffin.