SLOVENSKI STANDARD
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Steklo v gradbeništvu - Spektrofotometrične značilnosti steklenih izdelkov - Validacijski postopek za računsko orodje

Glass in building - Spectrophotometric characteristics of glass products - Validation procedure for calculation tool

Glas im Bauwesen - Spektralphotometrische Eigenschaften von Glasprodukten - Validierungsverfahren für das Berechnungstool

Verre dans la construction - Caractéristiques spectrophotométriques des produits verriers - Mode opératoire de validation pour l'outil de calcul

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Glass in building - Spectrophotometric characteristics of glass products - Validation procedure for calculation tool.

Verre dans la construction - Caractéristiques spectrophotométriques des produits verriers - Mode opératoire de validation pour l'outil de calcul

Glas im Bauwesen - Spektralphotometrische Eigenschaften von Glasprodukten - Validierungsverfahren für das Berechnungstool

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

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European foreword

This document (prEN 17871:2022) has been prepared by Technical Committee CEN/TC 129 “Glass in building”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

Introduction

EN 410 is in part a measurement standard and in part a calculation standard. EN 673 is a calculation method based on input of the emissivity according to EN 12898. The Annex ZAs of the harmonized standards for glass assign the initial determination of both radiation and thermal properties as tasks for a notified laboratory (AVCP system 3).

Under AVCP system 3, a notified laboratory has to perform a type test (TT) to determine the spectrophotometric and thermal characteristics of the glass product. However, when some characteristics have to be calculated (e.g. U value, g value, other glass thicknesses, other glass substrates…) the manufacturer shall be allowed to undertake the calculation according to the relevant standards. In this case, the calculation tool shall be validated by a notified laboratory and provide a report according to this standard.

The purpose of this standard is to cover only those energy conservation and heat retention characteristics that are stated on the Declaration of Performance under the EU Regulation 305/2011, namely:

— thermal properties

— radiation properties: light transmittance and reflectance

— radiation properties: solar energy characteristics

Characteristics other than the above are not covered as they are not required for the Declaration of Performance.

1 Scope

This document provides a procedure to validate a calculation tool of spectrophotometric and thermal characteristics of the glass products following EN 410 or EN 673. It provides also the methodology to correctly use measured data in the calculation tool.

The following characteristics are included in the scope of this document:

— light transmittance ($\mathbf{t_v}$)

— light reflectance - both sides ($\mathbf{r_v}$, $\mathbf{r'_v}$)

— solar direct transmittance ($\mathbf{t_e}$)

— solar direct reflectance – both sides ($\mathbf{r_e}$, $\mathbf{r'_e}$)

— total solar energy transmittance (solar factor or g value) (g)

— thermal transmittance (U value) in the vertical position

The following characteristics are excluded from the scope of this document:

— UV transmittance ($\mathbf{t_{uv}}$)

— shading coefficient (SC)

— general colour rendering index (R_a)

— thermal transmittance (U value) at angles other than vertical

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 410:2011, *Glass in building - Determination of luminous and solar characteristics of glazing*

EN 673:2011, *Glass in building - Determination of thermal transmittance (U value) - Calculation method*

EN 12898:2019, *Glass in building - Determination of the emissivity*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 410, EN 673 and EN 12898 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
applicant
party that provides the calculation program for validation

3.2
validator
party that verifies the results of the calculation program following the procedure descried in this document

Note 1 to entry: Within the framework of the EU Regulation 305/2011, the validator is a notified laboratory

4 Validation procedure

4.1 General outline

The applicant shall provide the validator with access to the calculation program. Results obtained with the calculation tool to be validated shall be compared by the validator to results obtained with the reference calculation program of the validator for defined reference products in accordance with 4.2. The difference shall not exceed the value defined in Clause 4.6.

The reference data for tasks 1 to 15 in Table 1 shall be agreed between the validator and the applicant. The reference data can be provided by the validator, applicant or Glass for Europe website.

NOTE Reference spectral data that can be used for the purpose of validation can be found on the Glass for Europe website at: https://glassforeurope.com/spectral-data/.

In the case of reference data obtained from the Glass for Europe website, the applicant and validator should use the same version (e.g. same date, version number, etc.).

4.2 Choice of the reference products and data

Calculated products shall represent the calculation tool capability, and include float glass, body-tinted (absorbing) glass, coated low-e glass, coated solar control glass and, if relevant for the program, laminated coated glass (for both cases of the coating on an outermost surface and directly against an interlayer). The validation shall include a small change in thickness (e.g. from 6 to 8mm).

The minimum number of tasks is summarized in Table 1. More tasks can be undertaken subject to agreement between the applicant and the validator.

Table 1 — Tasks for the validation procedure

Task number	Task description	Example	EN 410 calculation (t_v, r_v, r'_v, t_e, r_e, r'_e, g)	EN 673 calculation (U value) (1) (2) (3) (4)
Single glazing				
1	Check calculation for uncoated float glass	4 mm uncoated basic soda lime silicate float glass	✓	✓
2	Change thickness of uncoated glass	4 mm uncoated glass to 6 mm uncoated glass	✓	✓
3a	Check calculation for coated float glass	4mm coated glass	✓	✓
3b	Change thickness of coated glass based on the same substrate	4 mm coated glass to 6 mm coated glass	✓	✓
4	Change substrate of coated glass from clear float to tinted	4 mm coated clear float to 4 mm coated green tinted glass – but not vice versa (i.e. not from low transmission glass to higher transmission glass)	✓	✓
5	Check calculation for uncoated laminated glass	Buildup 8.8 mm (44.2) laminated glass construction 4 mm uncoated clear float glass / 0.76 mm clear PVB interlayer / 4 mm uncoated clear float glass	✓	✓(6)
Double glazing				
6	Check double glazing with solar control outer pane	6 mm solar control coated #2(5) outer pane and 4 mm uncoated inner pane	✓	✓
7	Check double glazing with low-e inner pane	4 mm uncoated outer pane and 4 mm low-e coated #3(5) inner pane with:	✓	✓
		(a) 8 mm 90 % argon, 10 % air		
		(b) 16 mm 90 % argon, 10 % air		
		(c) 20 mm 90 % argon, 10 % air		
		(d) 8 mm 90 % krypton, 10 % air		

Task number	Task description	Example	EN 410 calculation (t_v, r_v, r'_v, t_e, r_e, r'_e, g)	EN 673 calculation (U value) (1) (2) (3) (4)
		(e) 16 mm 45 % argon, 45 % krypton and 10 % air		
8	Check double glazing with both panes coated (surfaces 2 and 3)	6 mm solar control coated #2(5) outer pane and 4 mm low-e coated #3(4) inner pane	✓	✓
9	Check double glazing with two coatings, one of which is on surface 4	4 mm uncoated outer pane and 4 mm low-e double coated #3(5) and #4(5) inner pane or 4 mm coated #2(5) outer pane and monolithic low-e coated #4(5) inner pane	✓	✓
10	Check double glazing with coated laminated inner pane (coating facing the cavity)	4 mm uncoated outer pane and 8.8 mm (44.2) coated laminated glass #3(5) inner pane (a) without coating present (b) with coating present	✓	✓(7)
Triple glazing(8)				
11	Check triple glazing with solar control outer pane and low-e inner pane	6 mm solar control coated #2(5) outer pane, 4 mm uncoated glass mid-pane and 4 mm low-e coated #5(4) inner pane	✓	✓
12	Check triple glazing with two panes of low-e glass	4 mm uncoated glass outer pane, 4 mm low e coated #3(5) mid-pane and 4 mm low-e coated #5(4) inner pane with:	✓	✓
		(a) 8 mm 90 % argon, 10 % air		
		(b) 12 mm 90 % argon, 10 % air		
		(c) 16 mm 90 % argon, 10 % air		
		(d) 8 mm 90 % krypton, 10 % air		