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I.S. EN 673:2011

Glass in building - Determination of thermal transmittance (U value) - Calculation method

I.S. EN 673:2011

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English Version

Glass in building - Determination of thermal transmittance (U value) - Calculation method

Verre dans la construction - Détermination du coefficient de transmission thermique, U - Méthode de calcul

Glas im Bauwesen - Bestimmung des U-Werts (Wärmedurchgangskoeffizient) - Berechnungsverfahren

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Foreword

This document (EN 673:2011) has been prepared by Technical Committee CEN/TC 129 “Glass in building”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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.

This document supersedes EN 673:1997.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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Introduction

CEN/TC 129/WG9 "Light and energy transmission, thermal insulation" prepared a working draft based on the document ISO/DIS 10292, "Thermal insulation of glazing: Calculation rules for determining the steady state U value of double or multiple glazing", document that was prepared by ISO/TC 160, "Glass in building". This was published in 1997 as EN 673.

This edition is a revision of EN 673:1997. The main change in this edition is that the internal and external heat transfer coefficients have been amended slightly to avoid any ambiguities. The original annex on the determination of emissivity has been removed and reference is made to EN 12898. Other changes include the incorporation of amendments A1 and A2 to EN 673:1997 and general improvements to the text to aid understanding.

1 Scope

This European Standard specifies a calculation method to determine the thermal transmittance of glazing with flat and parallel surfaces.

This European Standard applies to uncoated glass (including glass with structured surfaces, e.g. patterned glass), coated glass and materials not transparent in the far infrared which is the case for soda lime glass products, borosilicate glass and glass ceramic. It applies also to multiple glazing comprising such glasses and/or materials. It does not apply to multiple glazing which include in the gas space sheets or foils that are far infrared transparent. The procedure specified in this European Standard determines the U value[1)] (thermal transmittance) in the central area of glazing.

The edge effects due to the thermal bridge through the spacer of a sealed glazing unit or through the window frame are not included. Furthermore, energy transfer due to solar radiation is not taken into account. The effects of Georgian and other bars are excluded from the scope of this European Standard.

The standard for the calculation of the overall U value of windows, doors and shutters (see EN ISO 10077-1 [1]) gives normative reference to the U value calculated for the glazing components according to this standard.

For the purpose of product comparison, a vertical position of the glazing is specified. In addition, U values are calculated using the same procedure for other purposes, in particular for predicting:

— heat loss through glazing;

— conduction heat gains in summer;

— condensation on glazing surfaces;

— the effect of the absorbed solar radiation in determining the solar factor (see Bibliography, [2]).

Reference should be made to [3], [4] and [5] or other European Standards dealing with heat loss calculations for the application of glazing U values determined by this standard.

A procedure for the determination of emissivity is given in EN 12898.

1) In some countries the symbol *k* has been used hitherto.

The rules have been made as simple as possible consistent with accuracy.

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 674, *Glass in building — Determination of thermal transmittance (U value) — Guarded hot plate method*

EN 675, *Glass in building — Determination of thermal transmittance (U value) — Heat flow meter method*

EN 12898, *Glass in building — Determination of the emissivity*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
***U* value**
parameter of glazing which characterizes the heat transfer through the central part of the glazing, i.e. without edge effects, and states the steady-state density of heat transfer rate per temperature difference between the environmental temperatures on each side

NOTE The U value is given in watts per square metre Kelvin [W/(m^2·K)].

3.2
declared value
U value obtained under standardized boundary conditions (see Clause 8)

4 Symbols, dimensionless numbers and subscripts

4.1 Symbols

A	constant	-
c	specific heat capacity of gas	J/(kg·K)
d	thickness of material layer (glass	
	or alternative glazing material)	m
F	volume fraction	-
h	- heat transfer coefficient	W/(m^2·K)
	- also thermal conductance	W/(m^2·K)
M	number of material layers	-
n	exponent	-
N	number of spaces	-