JIS

JAPANESE INDUSTRIAL STANDARD

Translated and Published by
Japanese Standards Association

JIS R 3107 : 1998

Evaluation on thermal resistance of flat glasses and thermal transmittance of glazing

ICS 81.040.20

Descriptors : flat glass, glass, laminates, window glass, thermal resistance, heat transfer, heat transfer coefficient, construction materials

Reference number : **JIS R 3107 : 1998 (E)**

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

Date of Establishment: 1998-03-20

Date of Public Notice in Official Gazette: 1998-03-20

Investigated by: Japanese Industrial Standards Committee

Divisional Council on Ceramics

JIS R 3107:1998, First English edition published in 1999-10

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents, the original JIS is to be the final authority.

Printed in Japan

Evaluation on thermal resistance of flat glasses and thermal transmittance of glazing

Introduction This Japanese Industrial Standard was made on the basis of **ISO 10292**, *Glass in building—Calculation of steady-state U values (thermal transmittance) of multiple glazing* published in 1994 as the 1st edition without changing the technical contents.

1 Scope This Japanese Industrial Standard specifies the calculation of thermal resistance of plate glasses(1) and thermal transmittance [*U* values(2)] necessary for thermal calculation in the case where the plate glasses are used for windows on outside wall of building.

Notes (1) The plate glasses excluding the diffuse transmissive glasses are as follows:

a) plate glasses manufactured by continuous forming process mainly from soda-lime silicate glass;

b) glasses in **a**) of which the surface is processed with optical thin film for wavelength selective reflection, for example, reflecting glass at solar radiation wavelength band such as heat reflecting glass and reflecting glass at ordinary temperature heat radiation wavelength band such as low radiation glass;

c) laminated glass given the process in **a**) or **b**), tempered glass, heat-strengthened glass, etc.;

d) sealed insulating glasses made from the glasses given in **a**) to **c**).

(2) In Japan "*K* value" has been used conventionally, but "*U* value" is used in this Standard in accordance with **ISO 10292**.

Remarks : The thermal transmittance in this Standard corresponds to the *U* value at the central part of the window glass fitted in the frame of, for example window sash and therefore, when calculating thermal load of building, it is necessary to take into account the edge effect due to the spacer of sealed insulating glass and the heat bridge of window frame. In addition, under the solar radiation, the thermal load resulting from it shall be calculated (see **JIS R 3106**).

2 Normative reference The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The latest editions of the standards indicated below shall be applied.

JIS R 3106 *Testing method on transmittance, reflectance and emittance of flat glasses and evaluation of solar heat gain coefficient*

JIS Z 8202 *Quantity symbols, unit symbols and chemical symbols*

JIS Z 8401 *Rules for rounding off of numerical values*

3 Definitions For the purpose of this Standard, the definitions given in **JIS Z 8202** and the following definitions apply.

a) **thermal conductance** Heat flux per 1 K of temperature difference between two both surfaces of plate glasses or between two surfaces adjacent to the gas space of sealed insulating glasses.

b) **thermal resistance** Inverse of thermal conductance. Temperature difference per 1 W/m² of heat flux generating between both surfaces of plate glasses or between two surfaces adjacent to the gas space of sealed insulating glasses.

c) ***U* value, thermal transmittance** Heat flux which transfers through the central part of single glass plate or sealed insulating glass per 1 K of temperature difference between the ambient temperatures on the outdoor side and indoor side with regarded to the glass window of building.

Besides, the heat flux per 1 K of temperature difference between each temperature at the surfaces of outdoor side and indoor side of single glass plate or sealed insulating glass and each ambient temperature at both sides is called thermal transfer coefficient.

In addition, the inverse of the thermal transfer coefficient is called thermal transfer resistance.

Remarks : In the theoretical model in this definition, the temperature of the body, sky, etc. which make thermal radiation exchange with the glass surface is considered to be equal to the air temperature.

d) **corrected emissivity** Emissivity of the glass plate surface at the thermal radiation exchange between two surfaces adjacent to the gas space of sealed insulating glass or at the thermal radiation exchange between outdoor side and indoor side of plate glasses on external wall of building and each ambient place.

Informative reference : On the surfaces of the plate glass and the plate glass processed with optical thin film, the value of emittance differs according to emitting angles. In general, the value of hemispherical emissivity is used in the calculation of thermal radiation exchange with ambient body and the value called effective emissivity is used in the thermal radiation exchange between two surfaces adjacent to the gas space of sealed insulating glass. In this Standard, the value converted by multiplying the measured value of normal emissivity by the corrective coefficient is used without distinguishing the both and it is called corrected emissivity.

e) **symbols and units** The symbols and units used in this Standard shall be as follows:

c	specific heat of gas in gas space	J/(kg·K)
d	thickness of glass plate or thickness of interlayer of laminated glass	m
h	thermal conductance or thermal transfer coefficient	W/(m²·K)
R	thermal resistance	K·m²/W