JIS

JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS A 1493 : 2021

(J-CHIF/JSA)

Thermal performance of windows and doors — Determination of solar heat gain coefficient using solar simulator

ICS 91.060.50

Reference number : JIS A 1493 : 2021 (E)

Date of Establishment: 2014-04-21

Date of Revision: 2021-02-22

Date of Public Notice in Official Gazette: 2021-02-22

Investigated by: Japanese Industrial Standards Committee

Standards Board for ISO area

Technical Committee on Architecture

JIS A 1493 : 2021, First English edition published in 2021-11

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

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

Printed in Japan HN

Contents

Page

Introduction ····· 1

1 Scope ····· 1

2 Normative references ····· 2

3 Terms and definitions ····· 3

4 Symbols and subscripts ····· 3

5 Principle ····· 5
5.1 General ····· 5
5.2 Measurement of heat flow rates with irradiance ····· 5
5.3 Determination of the net density of heat flow rate due to thermal transmission ····· 7
5.4 Measurement of heat flow rates without irradiance ····· 7

6 Test apparatus and specimens ····· 9
6.1 Construction and summary of the test apparatus ····· 9
6.2 Solar simulator ····· 11
6.3 Climatic chamber ····· 12
6.4 Metering box ····· 12
6.5 Surround panel ····· 13
6.6 Calibration panels ····· 13
6.7 Metering location of temperatures and irradiance ····· 13
6.8 Test specimen ····· 14

7 Measurement procedure ····· 14
7.1 Measurement ····· 14
7.2 Expression of results for reference conditions ····· 15

8 Test report ····· 16
8.1 Test report contents ····· 16
8.2 Estimation of uncertainty ····· 17

Annex A (normative) Determination of surface coefficient of heat transfer ····· 19

Annex B (normative) Determination of night time *U*-value in case of small temperature difference ····· 21

Annex C (normative) Correction of measured solar heat gain coefficient to reference conditions ····· 22

Annex D (informative) Examples of design of test apparatus ····· 33

Annex E (informative) Example of temperature measurement ····· 42

Annex F (informative) Guideline for measurement of active solar fenestration systems ····· 45

Annex G (informative) Example of measurement and uncertainty analysis ····· 47

Annex H (informative) Spectral weighting procedures based on JIS R 3106 and with analogous solar simulator spectra ····· 50

Annex JA (informative) Comparison table between JIS and corresponding International Standard ····· 55

Annex JB (informative) Comparison table between previous and current editions of this Standard on technically significant revisions ····· 60

Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Construction Material & Housing Equipment Industries Federation (J-CHIF)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS A 1493**:2014), which has been technically revised.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, published patent application or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, published patent application or utility model rights.

Blank

Thermal performance of windows and doors — Determination of solar heat gain coefficient using solar simulator

Introduction

This Japanese Industrial Standard has been prepared based on ISO 19467 : 2017, Edition 1, with some modifications of the technical content to reflect the conditions unique to Japan.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA. The comparison table between previous and current editions of this Standard on technically significant revisions is given in Annex JB. Annex JB is unique to JIS and not given in the corresponding International Standard.

1 Scope

This Standard specifies a method to measure the solar heat gain coefficient of complete windows and doors using a solar simulator.

This Standard applies to windows and doors

a) with various types of glazing (glass or plastic; single or multiple glazing; with or without low emissivity coatings, with or without paper sliding sashes, and with spaces filled with air or other gases),

b) with opaque panels,

c) with various types of frames (wood, plastic, metallic with and without thermal barrier or any combination of materials)

d) with various types of shading devices (blind, screen, paper sliding sash or any attachment with shading effects)

e) with various types of active solar fenestration systems [building-integrated PV systems (BIPV) or building-integrated solar thermal collectors (BIST)].

This Standard does not include the following :

f) shading effects of building elements (e.g. eaves, sleeve wall, etc.);

g) heat transfer caused by air leakage between indoors and outdoors;

h) ventilation of air spaces in double and coupled windows;

i) thermal bridge effects at the rebate or joint between the window or door frame and the rest of the building envelope.

This Standard does not apply to the following :