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Glass used in the transparent part of passive building

被动房透明部分用玻璃

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Glass used in the transparent part of passive building

1 Scope

This standard specifies the terms and definitions, classification and specifications, materials, requirements, test methods, inspection rules, marking, packaging, transportation, storage of glass used in transparent parts of passive building.

This standard is applicable to insulating glass used in the transparent part of the exterior enclosure structure for passive building, vacuum composite insulating glass products, etc.

Note: Please refer to Appendix A for the characteristics and general indicators of passive building.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 2680 Glass in building - Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors

GB/T 11944 Insulating glass unit

JC/T 1079 Vacuum glazing

JGJ 113 Technical specification for application of architectural glass

JGJ/T 151 Calculation specification for thermal performance of windows, doors and glass curtain-walls

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Total solar infrared heat transmittance

In the near-infrared band of the solar spectrum from 780 nm to 2500 nm, the ratio - of the sum of the intensity of solar radiation directly transmitted through the glass and the part of the solar energy absorbed by the glass and transmitted through secondary heat transfer TO the intensity of incident solar radiation in this wavelength range, which is expressed by g_{IR} .

3.2

Light to solar gain ratio

The ratio -- of visible light transmittance τ_v TO total solar energy transmittance g , expressed in LSG.

3.3

Warm edge spacer

Insulating glass spacers with low thermal conductivity.

4 Categories and specifications

4.1 Categories

Products are divided into single-cavity or multi-cavity insulating glass, vacuum composite insulating glass, etc., according to their structure.

4.2 Specifications

Please refer to Appendix B for the glass specifications, structure, thickness of the transparent part of the passive building.

5 Materials

Materials shall comply with the corresponding technical requirements in GB/T 11944 and JC/T 1079. In addition, spacer materials and sealing materials shall also meet the following requirements:

- a) Spacer material requirements: Warm edge spacers shall be used as insulating glass spacer materials in severely cold, cold, hot summer, cold winter areas. The thermal conductivity of warm edge spacers shall meet the requirements of Appendix C;
- b) Sealing material requirements:
 - 1) Butyl hot-melt sealant shall be used as the first sealant for the warm edge spacer insulating glass;

Hot summer and warm winter areas	≤ 1.20	≥ 0.50	≤ 0.12	≤ 0.35	≥ 1.50
Mild area	≤ 1.50	≥ 0.55	≤ 0.15	≤ 0.40	≥ 1.40

7 Test methods

7.1 The test methods for appearance quality, dimensional deviation, dew point, initial gas content, ultraviolet radiation resistance, water vapor sealing durability, gas sealing durability shall be carried out in accordance with the provisions of GB/T 11944. The test method for vacuum glass properties that constitute vacuum composite insulating glass shall be carried out in accordance with the provisions of JC/T 1079.

7.2 The K value of insulating glass is calculated according to JGJ/T 151. The boundary conditions for calculating the K value of vacuum composite insulating glass are selected according to JGJ/T 151. The calculation method shall be according to JGJ 113. The thermal conductivity of the support is calculated according to Appendix D of this standard.

7.3 The test of glass spectrum and the calculation of visible light transmittance τ_v are in accordance with the provisions of GB/T 2680.

7.4 The total solar energy transmittance g is calculated according to JGJ/T 151.

7.5 The total solar infrared heat transmittance g_{IR} is calculated according to Appendix E of this standard.

7.6 Light to solar gain ratio LSG is the ratio of visible light transmittance τ_v and total solar energy transmittance g, that is, $LSG = \tau_v/g$.

8 Inspection rules

8.1 Inspection classification

8.1.1 Exit-factory inspection

Exit-factory inspection includes appearance quality, dimensional deviation, dew point, and initial gas content.

8.1.2 Type inspection

Type inspection includes all inspection items required by the technology. Type inspection shall be carried out under any of the following circumstances:

- a) During the production process, if there are major changes in structure, materials, processes, which may affect product performance;
- b) During normal production, periodic inspections shall be carried out regularly or

products will be judged to be unqualified.

8.3.2 Dew point

Take 15 specimens for dew point testing. If all are qualified, the performance will be deemed qualified.

8.3.3 Resistance to ultraviolet radiation

Take 2 specimens for ultraviolet radiation resistance test. If both specimens are qualified, the performance is deemed to be qualified.

8.3.4 Water vapor sealing durability

Take 5 specimens for the water vapor sealing durability test. If the moisture permeability index is all qualified, the performance is deemed to be qualified.

8.3.5 Initial gas content

Take 3 specimens for initial gas content test. If all 3 specimens are qualified, the performance is deemed to be qualified.

8.3.6 Gas sealing durability

Take 3 specimens for the gas sealing durability test. If all 3 specimens are qualified, the performance is deemed to be qualified.

8.3.7 Heat transfer coefficient K

Take one specimen and test its heat transfer coefficient K value. If one specimen is qualified, the performance is deemed to be qualified.

8.3.8 Visible light transmittance τ_v

Take 3 specimens for the visible light transmittance τ_v test. If all 3 specimens are qualified, the performance is deemed to be qualified.

8.3.9 Total solar energy transmittance g

Take 3 specimens for the test of total solar energy transmittance g. If all 3 specimens are qualified, the performance is deemed to be qualified.

8.3.10 Total solar infrared heat transmittance g_{IR}

Take 3 specimens to conduct the test of total solar infrared heat transmittance g_{IR} . If all 3 specimens are qualified, the performance is deemed to be qualified.

8.3.11 Light to solar gain ratio LSG

Appendix A

(Informative)

Introduction to the characteristics and general indicators of passive building

A.1 The origin and characteristics of passive building

The word "passive building" is translated from the German PASSIVEHAUS. It refers to the construction of low energy consumption housing buildings, by combining various passive energy-saving means such as natural ventilation, natural lighting, solar radiation and indoor non-heating heat sources, etc., with the high-efficiency energy-saving technology of the building envelope. Whilst significantly improving the comfort of the indoor environment, passive buildings can significantly reduce building energy consumption and minimize reliance on active mechanical heating and cooling systems.

A.2 Indoor comfort index of passive building

Passive buildings are highly comfortable, healthy, environmentally friendly houses. The indoor environment shall meet:

- a) Indoor temperature $20\text{ }^{\circ}\text{C} \sim 26\text{ }^{\circ}\text{C}$;
- b) Indoor relative humidity $40\% \sim 60\%$;
- c) Over-temperature frequency $\leq 10\%$;
- d) Indoor carbon dioxide content $\leq 1000\text{ ppm}$;
- e) The temperature difference between the inner surface of the indoor side of the building envelope is $\leq 3\text{ }^{\circ}\text{C}$;
- f) There is no condensation on the indoor side of doors and windows;
- g) The sound insulation and noise reduction effect is good; the noise decibel in functional rooms, living rooms, bedrooms is $\leq 30\text{ dB}$.

A.3 Main energy efficiency indicators of passive building

Passive building energy efficiency indicators based on cold regions in Germany and China include:

- a) Annual heating (cooling) demand per unit area $\leq 15\text{ kWh}/(\text{m}^2 \cdot \text{a})$;
- b) Total secondary energy demand (including heating, cooling, ventilation, lighting, hot water, auxiliary energy, household appliances) $\leq 120\text{ kWh}/(\text{m}^2 \cdot \text{a})$;

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