

Glazing for buildings —

Part 2: Code of practice for energy, light and sound

ICS 81.040.20

Committees responsible for this British Standard

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- British Adhesives and Sealants Association
- British Plastics Federation
- British Woodworking Federation
- Consumer Policy Committee of BSI
- Council for Aluminium in Building
- Flat Glass Manufacturers' Association
- Glass and Glazing Federation
- Nottingham University
- Office of the Deputy Prime Minister — Building Division
- Office of the Deputy Prime Minister — represented by the BRE
- RICS Building Control Forum
- Co-opted members

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Foreword

This part of BS 6262 has been prepared under the direction of Subcommittee B/520/4, Properties and glazing methods. It partially supersedes BS 6262:1982, which will be withdrawn upon publication of all seven parts of the newly revised and restructured BS 6262. BS 6262:1982 is being revised and restructured to simplify its use and will be published in seven parts:

- *Part 1: General methodology for the selection of glazing;*
- *Part 2: Code of practice for energy, light and sound;*
- *Part 3: Code of practice for fire, security and wind loading;*
- *Part 4: Code of practice for safety related to human impact;*
- *Part 5: Code of practice for frame design considerations;*
- *Part 6: Code of practice for special applications;*
- *Part 7: Code of practice for provision of information.*

Requirements for standards of workmanship for glazing have been published separately as BS 8000-7 and therefore this subject is not dealt with in this standard.

Since the correct selection of materials to be used in glazing for buildings depends on many factors, the recommendations in this part of the standard should be used in conjunction with those in the other parts.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 25 and a back cover.

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1 Scope

This part of BS 6262 gives information and recommendations for vertical glazing in the external walls and interiors of buildings, with respect to their effect on the energy, light and sound environments in the building.

These recommendations do not apply to:

- a) patent glazing (see BS 5516-1);
- b) glass in non-vertical applications (see BS 5516-2);
- c) glazing for furniture and fittings (see BS 7376 and BS 7449);
- d) glazing for commercial greenhouses (see BS 5502-21);
- e) glazing for domestic greenhouses.

Requirements for standards of workmanship for glazing have been published separately as BS 8000-7 and therefore this subject is not dealt with in this standard.

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.

BS EN ISO 140-3, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 3: Laboratory measurement of airborne sound insulation of building elements*.

BS EN ISO 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation*.

BS EN ISO 717-2, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 2: Impact sound insulation*.

3 Terms and definitions

For the purposes of this part of BS 6262, the following terms and definitions apply.

3.1

glazing (noun)

glass or plastics glazing sheet material, for installation into a building

3.2

glazing (verb)

action of installing glass, or plastics glazing sheet material, into a building

3.3

insulating glass unit

an assembly consisting of at least two panes of glass, separated by one or more spaces, hermetically sealed along the periphery, mechanically stable and durable

[BS EN 1279-1:2004, definition 3.1]

NOTE The individual panes may be of different sizes and/or thicknesses.

3.4

coupled glazing

two panes of glazing spaced apart in an opening, either in the frame or glazed separately, to form an unsealed cavity

NOTE Coupled glazing is also known as secondary glazing.

3.5

pane

single piece of glass or plastics glazing sheet material, in a finished size ready for glazing

3.6

plastics glazing sheet material

plastics material in the form of a single sheet, or a combination of sheets laminated together, or an extruded multi-wall sheet

3.7

vertical glazing

glazing which is vertical, or within 15° of vertical

3.8

task lighting

lighting sufficient to enable tasks to be performed

NOTE Tasks include reading, machine operating, component assembly, etc.

3.9

amenity lighting

lighting for the appearance of an interior and its contents

3.10

passive solar gain

solar radiation in the form of energy and light which is transmitted through the glazing into the building and which can be utilized as a source of energy or to reduce the need for artificial lighting

4 Energy

4.1 General

Glazed areas in buildings should be designed so that account is taken of the overall energy balance in relation to the effects on the thermal comfort of occupants and the total annual energy implications of solar gain and energy loss.

These should be examined separately, since factors affecting one aspect of performance might have no effect on the other. Energy gain is due to transmission of solar radiant energy through the glass into the building. Solar energy is all at relatively short wavelengths and is controlled by using the glass to absorb or reflect the energy. Energy loss is due to the transfer of energy by conduction, convection and long wavelength radiation and can be influenced by a number of factors, e.g. incorporating air cavities, including gases of low thermal conductivity and/or low emissivity glass.

4.2 Thermal comfort

Energy transmission through glazing can significantly influence occupier comfort by raising or lowering room air temperatures. For example, hot sunny weather can give rise to excessive energy gains; and energy losses can occur through the glazing during cold weather or at night. Thermal comfort can also be influenced by direct radiation through the glazing and/or by radiation exchange between the glazing and the occupants.

4.3 Solar energy gain

Factors that can influence the amount of solar gain through the glazing include:

- a) orientation;
- b) glazed area;
- c) shading devices, both internal and external;
- d) properties of the glazing.

4.4 Total solar energy transmittance

4.4.1 General

Total solar energy transmittance is the proportion of solar radiation at normal incidence transferred through the glazing. It is composed of the direct transmittance (short wave component) and the part of the solar absorptance dissipated inwards by long wave radiation and convection (long wave component).

The total solar energy transmission properties of solar control glazings can be described by their shading coefficients. The shading coefficient is derived by comparing the properties of the solar control glazing with a clear float glass having a total solar energy transmittance of 0.87 (i.e. clear glass between 3 mm and 4 mm thick).

NOTE Total solar energy transmittance is also known as g value.

4.4.2 Solar control glass

4.4.2.1 General

Solar control glass can be manufactured in several forms (see 4.4.2.2, 4.4.2.3 and 4.4.2.4). The function of solar control glass is to reduce the total solar energy transmittance, which usually leads to a decrease in the transmission of the visible part of the solar spectrum. However some tints and coatings are able to attenuate preferentially non-visible solar radiation, leaving the transmission of the greater proportion of the visible radiation largely unchanged.

The application of ceramic frit fired into the surface of the glass can also be used to modify the energy and light transmission of the glass. The effect can be varied across a pane depending on the screen print pattern. The manufacturers should be consulted for specific details.

The relationship between light transmission and total solar energy transmission is referred to as the light/energy ratio. Some manufacturers use this as a descriptive code, quoting a light transmission figure followed by a total solar energy transmission figure.

NOTE The performance of typical glass products showing the relationship between light transmission and total solar energy transmission is illustrated in Figure 1 (the enclosed area represents the envelope enclosing most practically available architectural glass products).

There is no optimum light/energy ratio. The selection of an appropriate product depends on the requirements of the building. Solar gain may be relatively high, for making use of passive solar gains, or low, to reduce air-conditioning loads. Light transmission will depend on the extent to which daylight is used to obviate artificial lighting.

4.4.2.2 Body tinted glass (increased absorption)

Solar control properties and colour vary with the thickness of the glass. When used in insulating glass units, body tinted glass should be positioned as the outer pane because the energy due to the absorbed radiation is more easily dissipated to the outside.

NOTE Performances of a typical range of body tinted glass products are shown in Table 1, with the properties of clear float for comparison.

4.4.2.3 Reflective coated glass

Reflective coated glass uses the principle of increasing the direct reflection to maximize solar energy attenuation. In comparison with clear glass its absorption of solar energy is also increased.

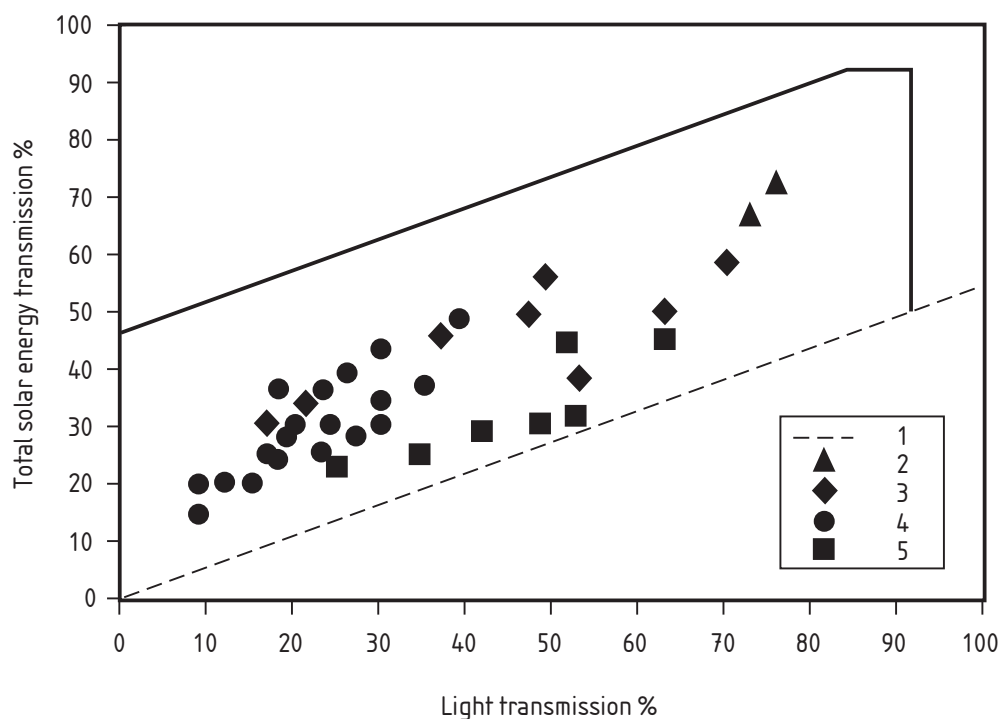
NOTE 1 Compared with a float glass surface, these reflecting coatings (owing to their composition) exhibit lower levels of emissivity which improves their U value.

The advantages of such glass types are:

- a) greater performance range than body tinted glass;
- b) higher performances (greater solar energy attenuation);
- c) light/energy ratios nearer to the theoretical limit;
- d) a range of colour appearances in transmission and reflection.

NOTE 2 Performance data in comparison to clear glass is shown in Table 2.

The coatings may be placed on to body-tinted glass to extend the range of performances.

**Key**

- 1 Theoretical limit
- 2 Clear float glass
- 3 Tinted float glass
- 4 Coated glass
- 5 High performance coated glass

Figure 1 — Performance of different glass products showing the relationship between light transmission and total solar energy transmission

Table 1 — Properties of a typical range of clear and body-tinted glass products

Glass type and thickness	Light		Solar energy				Shading coefficients		
	Transmittance	Reflectance	Direct transmittance	Reflectance	Absorptance	Total transmittance	Short wave	Long wave	Total
4 mm clear	0.89	0.08	0.82	0.07	0.11	0.85	0.94	0.04	0.98
4 mm green	0.78	0.07	0.58	0.05	0.37	0.68	0.67	0.11	0.78
4 mm bronze	0.61	0.06	0.58	0.05	0.37	0.68	0.67	0.11	0.78
4 mm grey	0.55	0.05	0.55	0.05	0.40	0.65	0.63	0.12	0.75
6 mm clear	0.87	0.08	0.78	0.07	0.15	0.82	0.90	0.04	0.94
6 mm green	0.72	0.06	0.46	0.05	0.49	0.59	0.53	0.14	0.67
6 mm blue	0.54	0.05	0.46	0.05	0.49	0.59	0.53	0.14	0.67
6 mm bronze	0.50	0.05	0.46	0.05	0.49	0.59	0.53	0.14	0.67
6 mm grey	0.42	0.05	0.42	0.05	0.53	0.56	0.48	0.16	0.64
10 mm clear	0.84	0.07	0.70	0.07	0.23	0.76	0.80	0.07	0.87
10 mm green	0.61	0.06	0.29	0.04	0.67	0.46	0.33	0.20	0.53
10 mm bronze	0.33	0.04	0.29	0.04	0.67	0.46	0.33	0.20	0.53
10 mm grey	0.25	0.04	0.25	0.04	0.71	0.43	0.29	0.21	0.50