

Insulating Glass

Introduction

Insulating glass use in residential and commercial construction has risen steadily over the years to where the majority of all new and renovation construction today includes IG units. IG units not only save on monthly heating and cooling costs, but they also reduce the initial size and cost of the heating and cooling equipment required on a project.

By combining Low-E coatings, tinted glasses, reflective coatings, silk-screened patterns, laminated glass products and more, a wide variety of insulating glass configurations are available to satisfy a wide range of performance and aesthetic

requirements. IG units can be fabricated to meet state energy codes, sound control requirements, seismic requirements, impact resistance, bullet resistance and hurricane and blast resistance requirements. IG units can be designed to reduce heat loss and solar heat gain entering the building, with a minimal reduction of visible light transmittance.

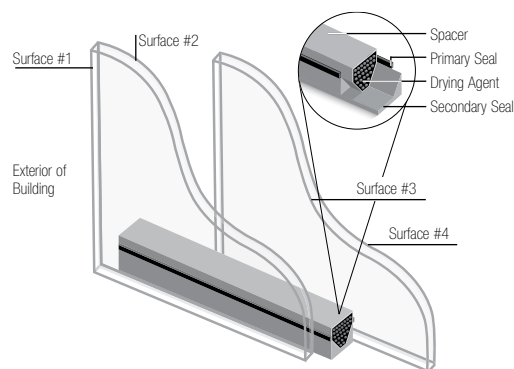
IG units will have a warmer room-side glass surface temperature than single glazing, thus reducing condensation and moisture-related problems.

Description

IG units are sealed combinations of two or more lites of glass separated by a dry airspace. Desiccated spacers are dual sealed with polyisobutylene primary sealant and an organic or silicone secondary sealant, depending on the project specifications and the application. (See the diagrams below.) Argon gas-filled IG units are available to further improve the insulating properties (reduce the U-Value) of a standard air-filled IG unit.

The glass lites of an IG unit can be annealed, heat-strengthened, tempered or laminated, as needed, to meet building code requirements, safety glazing standards and design requirements. The lites of an IG unit can be of equal or unequal thickness.

Insulating Glass Unit



Glass Types Available

Outboard Lite	Inboard Lite
Clear	Clear & Low-E
Tints	Clear & Low-E
Low-E	Clear
Spectrally Selective Tints	Clear & Low-E
Patterned	Clear & Low-E
Reflective #1 or #2	Clear & Low-E

Others include: Laminated Glass, Spandrel Glass, Silk-Screened Glass and Other Decorative Glass.



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Description (continued)

Glass Options

Insulating glass units are fabricated according to project specifications. IG units can be constructed using a large variety of glass products including clear, low iron, Low-E, standard or high performance (spectrally selective) tints; and reflective, silk-screened, spandrel, laminated, decorative and wired glass to achieve desired aesthetics, meet design criteria and/or to improve solar control and thermal performance.

For a list of available glass products/colors, go to the Glass Options Tab.

For more information on silk-screened, spandrel and laminated glass products, go to their respective Product Information Tabs.

Capabilities

The standard 1" commercial IG unit is made up of two lites of 1/4" glass and a nominal 1/2" airspace. Custom IG unit designs can be fabricated with glass thicknesses ranging from 1/8" to 3/4" and with airspace thicknesses ranging from 3/16" to 1". Maximum sizes for IG units are determined by a number of considerations. Size, thickness, weight,

aspect ratio, application and load requirements are the factors utilized to make this determination.

For more information log on to <http://www.oldcastlebe.com/products/architectural-glass/insulating-glass/insulating-glass/capabilities>

Applications

Insulating glass units are used in essentially all exterior building applications, including vertical glazing, sloped glazing, overhead glazing and skylights, in both vision and spandrel (non-vision) areas. Depending on the glass type used, IG units can be designed for light and solar control; sound control; ultraviolet screening (to reduce fading); hurricane, earthquake and blast resistance; security; bullet resistance; and decorative applications.

IG units are also used for interior applications such as sound control and to reduce energy usage for climate-controlled (hot or cold) rooms.

See the Glass Selector Tab for some typical applications.

Residential Applications

Insulating glass has become the standard for both new and replacement residential windows. Most residential IG units are made with one outboard lite of clear glass and an inboard lite of clear glass, often with a Low-E coating to further reduce heat loss.

When the short-wave infrared (IR) energy of the sun strikes an object in the house, some of the energy is absorbed and reradiated as long-wave IR (heat) energy. The Low-E coating acts to reflect this heat energy back into the residence. In cold climates, the Low-E coating is normally placed on the #3 surface of the unit. This is done



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Applications (continued)

to maximize passive solar heat gain from the sun, while still improving (reducing) the winter nighttime heat loss (winter U-Value). In warm climates, the Low-E coating is positioned on the #2 surface of an IG unit to minimize solar heat gain. The U-Value remains unchanged for the second or third surface application.

Commercial Applications

Most commercial buildings spend the majority of their energy dollars on cooling loads, even in cold climates, due to the internal heat generated by lights, people, copiers, computers and other office equipment. Also, there has been an increase in the number and size of windows to maximize the use of natural daylight to reduce energy usage

and lighting costs, as well as the positive effect on employee productivity. Therefore, the major emphasis in commercial buildings is to reduce heat gain (minimize the shading coefficient/the solar heat gain coefficient). Of lesser importance, but still quite significant in cold climates, is the need to minimize nighttime heat loss (winter U-Value).

There are now a large number of high performance/spectrally selective tints, with and without reflective or Low-E coatings, that do an excellent job of reducing heat gain. And there are a number of Low-E glasses that not only improve (reduce) the winter U-Value, but also reduce heat gain.

Characteristics

Certification

Oldcastle BuildingEnvelope™ insulating glass units are independently tested and certified according to North American standards for quality and performance. The US and Canadian tests are performed in accordance with the new harmonized standard ASTM E2190. IGCC (Insulating Glass Certification Council) sponsors the certification program of independent laboratory tests and periodic audits in the US while IGMA (Insulating Glass Manufacturers Alliance) sponsors the certification program in Canada. Oldcastle BuildingEnvelope™ is an active member in both IGCC and IGMA. Oldcastle BuildingEnvelope™ US insulating glass products are listed in the IGCC Certified Products Directory. Oldcastle BuildingEnvelope™ Canadian insulating glass products are listed in the IGMA Certified Products Directory.

Condensation on Interior Glass Surfaces

Condensation on building interior glass surfaces (the #4 surface of an IG unit) is a common

wintertime complaint in much of North America. Condensation not only reduces visibility, it also leads to severe damage of the surrounding construction from this moisture. Condensation occurs on interior glass surfaces when the surface temperatures fall below the dew-point temperature of the room. The relative humidity in a room at which condensation will occur on the glass surface depends on the interior glass surface temperature, which in turn depends on all the factors affecting heat flow through the glass. These factors include the inside and outside air temperatures and airflows adjacent to the glass surfaces, and the IG unit thermal transmittance (U-Value). Because Low-E glass improves (lowers) the IG unit U-Value, using Low-E glass will increase the unit's interior glass surface temperature. Thus an additional benefit of using Low-E glass is that it permits a higher relative humidity in a room before condensation will occur. This can improve occupant comfort and performance in the winter months.



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Characteristics (continued)

Vision-Spandrel Color Match

Spandrel glass can be designed to contrast or harmonize with the vision glass. *A wide range of colors and glass products are available to do this, as discussed in the Spandrel Tab section of this binder.* The best match for a vision IG unit is a spandrel IG unit using the same exterior glass (normally a tinted or reflective glass) and a spandrel glass as the interior lite, with the coating on the #4 surface on an IG unit.

It should be understood that the degree of color and visual similarity of a building's vision and spandrel glass will vary greatly, depending on the

time of day, sky conditions, the vision area lighting and interior shading conditions (drapes, miniblinds, etc.), as well as on the color, reflectance and light transmittance of the glass.

Assuming the vision and spandrel IG units have the same exterior lite, the visual difference between them will be less noticeable under the following conditions:

- the more reflective the exterior lite is
- the lower the light transmittance of the exterior lite is
- the brighter the sky conditions

Additional Important Information

Specifications

A sample Section 08 81 00 Specification for North America can be found in the last section of this binder titled: Sample Architectural Glass Specifications.

Contact Us

For any additional information, including details, technical data, specifications, technical assistance and samples, call 1-866-OLDCASTLE (653-2278).

Visit Us on the Web

Log on to www.oldcastlebe.com for project photos, product colors, general inquiries and project assistance.

To view performance data on a wide range of glass make-ups, or to build your own product specification, log on to www.oldcastlebe.com and choose GlasSelect®.

