Structure of an Insulated Glass Unit

An insulated glass unit is constructed with two or more pieces of glass, a spacer, sealant, and desiccant. The structure of the unit is extremely important to the function and efficiency of the unit. There are a number of combinations of these features that allow a insulated glass unit to be customized to meet the needs of your home or building.

| Surface One | The surface of the unit that is exposed to the exterior portion of the home or building. |
| Surface Two | The interior facing surface of the exterior pane. |
| Surface Three | The exterior facing surface of the interior pane. |
| Surface Four | The surface of the unit that is exposed to the interior of the home or office. |

**Spacer**
The function of the spacer is to maintain the distance between the two panes of glass. This insures there is an air cavity. This air cavity is what give the insulated glass unit its insulating power.

**Primary Seal**
Typically, an organic seal that is highly water resistant. Helps ensure that condensation does not form in the air cavity of the unit.

**Secondary Seal**
Commonly, a structural seal that is resistant to aging and weathering. Helps bond the glass and spacer together.

**Desiccant**
This material acts as a moisture absorbent. Any moisture present at the time of manufacturing and some that may get through the primary and secondary seal is absorbed by the desiccant.

The History of the Insulated Glass Unit

The insulated glass unit was originally invented by Thomas Stetson in 1865, but it wasn’t until 65 years later that it started to become an integral part of the window industry. It was in the 1930s that C.D. Haven made insulated glass more commercially available, under the name Thermopane, and by the 1950s insulated glass was common.

Today, manufacturers continue to strive to provide the best possible insulated glass units through the use of innovative coatings, spacers, gas fills, and more.

Manufacturing an Insulated Glass Unit

Insulated glass units come in standard and custom shapes, sizes, and thicknesses. Once the manufacture has the specifications of the window the process begins. First, a spacer is cut and shaped into the proper height and width. Next, the spacer and desiccant are sandwiched between two panes of glass. After the spacer is placed between the two sheet of glass the unit is sealed. This involves inserting dehumidified air or other gases such as Argon into the air cavity that has been created. This hermetically seals the panes together in order to achieve a vacuum effect.

Materials Matter

One of the ways manufacturers continue to improve the performance of the insulated glass unit is through the use of innovative materials.

The type of glass, of each of the two panes, can play a big role in the performance of the unit and the safety of the unit. Insulated glass units can be made with a number of types of glass such as laminated glass, tempered glass, coated glass, tinted glass, etc.

Spacers are typically made of aluminum, but there are two ways that they can be constructed. The first uses corner keys. This type of spacer is constructed by cutting individual sides to the desired lengths and then connecting the corners using corner keys. This type of frame tends to be LESS effective then bent frames.

Bent frames are produced by bending the aluminum at 90 degree angles leaving only one point of the frame to be connected by a joint minimizing heat loss.

Desiccant is the material placed inside the unit as a last moisture absorber. Desiccants must be able to absorb moisture while not absorbing “thermal performance” gases such as Argon and Krypton that are used as gas fills for extra performance. Desiccants are typically composed of silica gel or molecular sieves.

Insulated units typically have both a primary and secondary seal. The primary seal adheres the insulating glass unit at time of manufacture. The secondary seal is important for the structural integrity of the unit, holding the two panes of glass together with the spacer. It also protects the air cavity from the influences of moisture vapor penetration, chemical attack from cleaning fluids, and liquid water penetration due to rain or condensation. The material the seals are composed of must be top notch since the reasons most insulated glass units fail is due to seal failure.

It is important to remember that the materials used in the construction of an insulated glass unit are important. It may cost a bit more, but having the proper materials insures that you will be satisfied with the results.

Benefits of Insulated Glass Units
- Better acoustics
- More energy efficient
- Lower energy costs
- Durable, last for many years