

Spacer Types

Insulated glass units have opened the door to almost endless possibilities for your home. From Low-E coatings to gas fills the improvement that these types of glass units offer is amazing. With the glamour of low E coating and gas fills spacers tend to get overlooked. The spacer in an IG unit plays one of the biggest roles in allowing these windows to be the most efficient possible.

What is the spacers function?

As the name indicates the spacers main function is to create a gap, space, in between the two panes of glass that comprise an insulated glass unit. The spacer must also be able to withstand the stress placed upon it by the thermal expansion and contraction the window experiences as well as changes in pressure.

It also acts as a moisture barrier between the outside elements and the controlled environment between the two lites of glass. An effective spacer helps keep out both liquid and vapor water. On the other hand it must also prevent, if any are present, special gases from leaving the inside of the unit.

It also acts as an insulating barrier to help reduce the formation of condensation. Some older spacers would lead to condensation due to the spacer making the edge of the windows very cold.

What type of spacers are there?

Commonly, there are two ways a spacer is constructed. The first is a single-seal metal spacer.

A single-seal spacer system is constructed by sealing the spacer to the panes using some type of primary organic sealant. This primary seal serves two functions one to prevent moisture from entering the unit and two holds the unit together.

A dual-seal insulated unit is constructed using both a primary seal and secondary seal. The primary seal serves the same function in a dual-seal system as it does in a single-seal system. The secondary seal acts as a reinforcer for the structural integrity of the unit. Dual-sealing the unit is preferred when gas fills are used since they allow less gas seepage.

The spacers used in IG units are typically no more than 3/16 of an inch. This dimension is the ideal size for spacers since lowering the space may decrease the windows efficiency while making it larger does not increase energy efficiency.

Both types of spacers are typically constructed from aluminum bent into the spacers space and filled with desiccant for absorption. Even though many spacers are made from aluminum this choice of materials is not ideal. Aluminum is a highly thermal conductive material. Because of this many low-e windows may have edges that are significantly cooler than the majority of the window this can lead to condensation buildup and causes the window to be less effective than the ideal. Because of this short coming window manufacturers have been looking for ways to improve the spacer.

Warm-edge Spacers

One of the newer technologies that manufacturers have been working on is called a warm-edge spacer. The theory behind a warm-edge spacer is that it is less conductive than the typical aluminum spacer thus keeping the edges of the window warmer.

One way many manufacturers have achieved this is by using materials that are low in thermal conductivity. These materials include vinyl butyl-rubber, silicone foam or thin stainless steel. Since these materials have low thermal conductivity they keep the edges of the glass at a warmer temperature that is more consistent with the rest of the insulated glass unit. By increasing the edge temperature you reduce wintertime heat loss, summertime solar heat gain, condensation near the edges of the unit, and reduced thermal stress meaning less breakage.

Although newer less conductive materials are being used more often there is still some debate over which type of material is best for the spacer. Some manufacturers argue that while non-metallic spacers have less thermal transfer aluminum or metallic spacers are still the best option due to their structural strength and commercial quality.

Spacer Desiccant

Both the seal and the material of the spacer are important but so is the material that the spacer is filled with this is called desiccant. Desiccant is an absorbent material used to maintain the moisture free environment inside the insulated glass unit. This dehumidifying tool is able to take water particles into itself and therefore prevent any moisture that may be able to penetrate the spacer seal from becoming unwanted fogging in the unit.

There are three main types of desiccants on the market today.

Clay: Is the least expensive of the desiccant types and will function extremely well within normal to very humid conditions. It is able to absorb up to 28% of its weight in water in high humidity conditions. This non-hazardous desiccant is created by drying out calcium (bentonite) aluminosilicate clay which is a naturally occurring clay.

Silica: Many of us have bought a pair of shoes with small packages of silica gel in them. This gel just as it is placed in shoes and other packing is used to absorb moisture that may seek through the seal of an insulated glass unit. Silica is short for Silicon Dioxide which

is found in the natural environment and then processed in order to create the little beads that most of us have seen. Silica is highly absorbent being able to absorb about 40% of its in 100% humidity. If you were to observe silica under a microscope you would notice that it is composed of a series of interconnected pores which gives it a large surface area. This large surface area compared to its size gives it super absorbent abilities. Silica is used in the majority of insulated units in order to prevent fogging of the windows and unit failure.

Molecular sieve: Out of the three common types of desiccant this is the only type that is synthetically made. This man made desiccant has a uniform surface and it allows the material to selectively separate different sized molecules. This type of desiccant can hold large amount of moisture even at extremely high temperatures for example up to around 450° Fahrenheit.

Wrap Up

It's important to understand the many options that are available to you in order to make the best choices for your budget and your building. Remember to ask your local window expert what type of spacer will best work for you whether this be an aluminum spacer or a new warm-edge spacer.

