gas fill

FDR Design, Inc.

3 Questions Answered

Why Should We Gas Fill Sealed Units?

Why Don't We Have Published Studies of the Long Term Effects of Gas Filled Units?

How Do I Know What I Am Buying?

Why Should We Gas Fill Sealed Units?

In the early days it was the standard question we would hear at association meetings or trade shows. All of the high performance insulating glass components, low-E, gas fills, sealants, spacers were viewed with considerable skepticism when they were introduced 30 some years ago.

Why gas fill? The simple reason is because it works and is cost effective. For a manufactured cost of just a few pennies per unit we can improve the center of glass performance by 10% to 15%.

Improving the thermal performance also means that in the wintertime we are raising the inside surface temperature of the glass. That warm surface temperature is critical to condensation resistance and comfort. The closer the surface temperature is to room temperature the more comfortable the glass is to be near.

A more subtle reason to gas fill is to help preserve the low-e coatings and other materials in the sealed unit. Replacing moist factory air with dry inert argon helps stabilize the environment in which all these components are entombed for the

The First Question is...

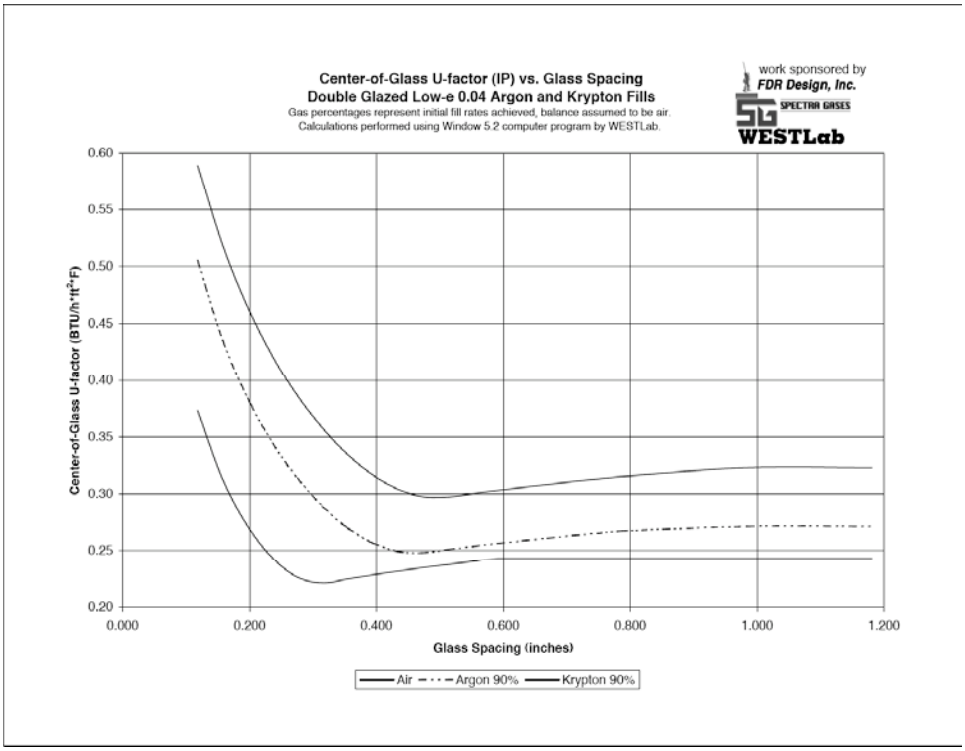
Why Gas Fill?

1. It works and it's cost effective.

2. Improved glass surface temperatures.

3. Helps preserve the Low-E coatings and other materials in the sealed unit.

4. Raise the overall quality and care that goes into making the unit.



next 30 or so years. This is not a requirement as all the component fabricators and glass coaters have gone to great efforts to produce products that will not oxidize or age, but it can't hurt.

Pretty Bold Statement!

An even more subtle reason, one that we are just seeing emerge, is that gas filling a unit will raise the over all quality and care that goes into making the unit.

Here is what I mean. Now that we have the technology to check for argon gas retention in units installed in the field, fabricators are under increased scrutiny. Good fabricators don't mind, in fact they welcome the comparison of their well-made units to some of the units made by distant cousins who perhaps have not been producing a unit to the same demanding standards. When there is no finish line, no way to measure, everyone looks the same, no one wins.

The premise to this idea is that whatever will keep the gas in will keep other stuff out, specifically moisture. At this point in time the industry considers a sealed unit to have failed, or died, when the interior surfaces are fogged with moisture. Once this fogging occurs the Low-E will also fail, thermal performance is compromised. More importantly the fogging is unsightly and very frustrating for the property owner.

So if we can keep the gas in the unit we know it is healthy and will continue to live a long life. If on the other hand we can't keep the gas in we know we have an unhealthy unit and it is going to have a shorter service life.

When a fabricator makes the decision to gas fill his units he makes additional efforts to be certain the gas remains in the unit, everything from component and material selection to training, machinery and craftsmanship on his production line.

These efforts are like having good genes, of having no history of illness in the family. Good genetics are no guarantee that you are going to stay healthy and a number of factors can still make you sick, but you are starting out on the positive side of the ledger.

So the question in the back of every fabricator's mind is, "Can I build a unit that will retain gas?"

If you can build a unit that will keep moisture out, you are already building a unit that will keep gas in.

The moment you placed desiccant in that sealed cavity the battle field was created. A super dry gas was now inside your sealed unit a gas that was very different from the moist air outside the cavity that desperately wants in. The same design elements that keep moist air out of your sealed cavity will keep the gas fill in.

OK, so why no published studies?

We set as a design target a gas loss rate of less than 1% per year but really we had no idea what we would actually observe as the years rolled by.

The good news is word is now filtering back to us from various sources that actual gas loss is significantly less than we designed for. This was not a total surprise. A number of people had challenged the test methods and felt that real world results would be much better than the accelerated aging gas loss tests indicated.

In the past we did not have an easy way to determine the gas fill of a sealed unit. Testing meant removing the unit from service and bringing it to a lab. The most common test was destructive and required drawing a sample of gas from the sealed cavity and analyzing it.

That all changed a couple of years ago with the introduction of a device developed in Finland called the GasGlass. In reality the GasGlass was just the first device to cross the finish line. Several other technologies were being actively pursued. Sparklike's GasGlass got there first and more importantly GasGlass technology works so the other technologies will most likely remain on the shelf.

I anticipate studies and papers to be written over the next few years. An example is the study we are doing on the FDR building here in Buffalo, Minnesota with the 40 units installed in our building in 1991. As of May 2007 they had an average argon fill level of 89%.

An ASTM standard test method is in development and progressive certification programs have already integrated testing initial gas fill in their certification process.

Testing installed units with the GasGlass is kind of like going to the doctor for a yearly physical. By looking at the test results, then comparing them to past results we can start to predict what might happen next.

Back to the example of the FDR building where the units are over 16 years old yet have an average gas fill of over 89%. This is a strong indication that the units are healthy, are working just fine, and will have a long life ahead of them. (Our units were produced by SNE. At that time their minimum initial fill requirements were 88%, the normal range of initial argon fills was 90 to 95%).

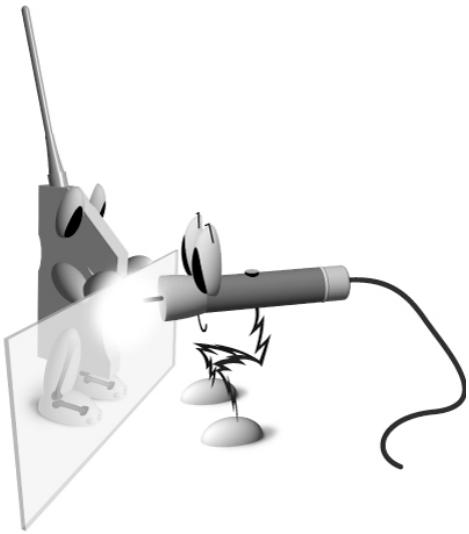
How long will the FDR units last? We don't know yet as we have not had this testing technology long enough to make accurate predictions, nor do we have correlated data to accelerated aging in test cells. I am confident that with GasGlass technology information is going to be collected and published.

The Second Question Is..

Why don't we have published studies of the long-term effects of these units?

Why don't we know how well they are doing and what components, practices and materials do and do not work?

1% per year gas loss is what you will usually hear. That loss rate, however, is not based on actual field studies but rather was the design criteria around which some of the material testing was performed.



The Third Question is...

How Do I know What I'm Buying?

1. Look closely at the fabricator's track record and his warranty.

2. Look for stringent certification or quality control program.

How Do I Know What I Am Buying?

Then a third question is, as someone who specifies products or as a buyer how do I know I am getting a unit that is durable and will last, giving peak performance over its expected life. I want a healthy unit, not one that will get sick on me.

So how do I know what I am buying? At this point about all you can do is look closely at the fabricator's track record and his warranty. Then look for a stringent certification or quality control program. The new European program is a prime example of a strong certification program. Unlike North American programs the European programs are being mandated by law in order to obtain the CE mark.

In North America a different approach has been chosen, where ultimately the consumer decides and fabricators use voluntary certification methods. Looking for a certification program that is demanding and requires documented quality control methods and records is your best assurance of purchasing a unit that will live a long productive life, irrespective of being gas or air filled.

While having a high initial gas fill is important for performance, arguably more important is having some assurances that the unit is going to stay sealed and have reasonable durability once installed.

In the future as new products enter our market we know that not all of this product will be produced domestically. We live in an ever-shrinking world so it will be even more prudent to assure that you have purchased a certified unit, or a unit built to strong certification procedures

FDR Design, Inc. sells machines for the production and testing of gas filled, sealed insulating glass.
We manufacture our own lines of argon and krypton gas-filling equipment as well as in line testers.
FDR Design also distributes Sparklike Ltd's GasGlass device in North America.

FDR Design, Inc.

World Leaders In Gas Filling Technology

Randi Ernst
CEO & Janitor

Barbara Ernst
VP of Happiness

Jill Furneisen
Animal Control

Dan Haglin
Master of Disaster

Kurt Wannebo
Necessary Evil

Shannon Weege
Keeper of the Magic

Allan Wiskow
Master of Madness

303 12th Avenue South • Buffalo, MN 55313• 763-682-6096