Special Issue: May 2012

FENZI FACTS Makes Its Debut

*What in the world is **FENZI FACTS**?*
*We hope it is a name you get to know. Through **FENZI FACTS**, you will become familiar with one of the longest running partnerships between a component and a finished product… polysulfide sealants and double-pane or insulating glass.*

With a history that spans no less than a half century, there is so much to tell about this sealant's performance, how it compares to other materials, the rapid growth and success of double (and triple) pane windows and why this combination should be considered in future specifications.

*Look to **FENZI FACTS** to provide you with useful information in whatever format works best-- as technical data sheets, special newsletter editions, and other promotional materials—and let us know what more we can do to help you in your selection of insulating glass sealants.*

FENZI Technical Service Department

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1865 - A Good Year For IG

For anyone who remains a proud owner of traditional single-pane windows or may have recently been introduced to double-pane units, insulating glass may be considered relatively new. But its history actually dates back to 1865 and a patent by inventor Thomas Stetson who recognized the advantage of using a second lite of glass, even with the crude construction of what he referred to as insulating glass.

Most of the key components are not visible, yet each is critical to the thermal performance and life of the unit. A sophisticated metal or thermoplastic spacer system creates an air space that is kept dry with moisture absorbing material. Low E (or emissivity) and reflective coatings in combination with (widely used) argon gas in the air space add to performance and longevity. And, the physical and chemical characteristics of an organic sealant are critical in maintaining the integrity of the unit over a long period of time, in spite of temperature extremes.

What has made double (and triple) pane windows increasingly popular is their ability to significantly reduce heat loss during winter months and cool air during the summer, lowering costs and conserving energy … a high priority worldwide.

The market demand to improve energy efficiency and extend the life of insulating glass, drives the technology to produce higher-performing components in order to meet stringent building codes, testing standards and certifications.

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Role of the Sealant

The least glamorous of the components and, more than likely, the least understood, the sealant holds it all together. It must exhibit superior adhesive properties to glass, metal and thermoplastics; it must provide a moisture barrier (a low moisture vapor transmission, or MVT, rate); it must be resistant to gases so it can retain argon or other gas fills, otherwise referred to as a low diffusion rate; it must prevent contaminants from entering the air space; and it must be compatible with every component.

Single Seal vs. Dual Seal

In their fabrication, insulating glass units can be categorized as single seal or dual seal. Each has its own advantages. For single seal, there is the consistency with using the same material for a structural and a vapor seal. It is easier to apply because it is a fast, one-step process and there is a cost savings in labor and materials. For dual seal, in which a polyisobutylene, or PIB, is the primary seal and another sealant of choice is the secondary, there are three benefits: improved gas retention, improved moisture barrier and reduced glass breakage.

Types of Sealants

There are two types of sealants: thermosetting or curing sealants and thermoplastic or non-curing sealants. Polysulfide, polyurethane and polysiloxane (or silicone) and reactive Hot Melts are thermosetting sealants. Thermoplastics include: hot melt butyls, Swiggle, TPS (thermoplastic spacer) and polyisobutylene or PIB.

Uses

Polysulfide, polyurethane, silicones and PIB are used in commercial and residential applications. Hot melts are strictly for residential use

Applying PIB To An IG Unit

To effectively apply the first barrier or PIB sealant, follow these four steps.

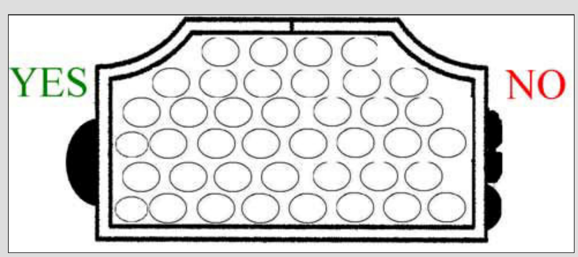
Prepare and Clean

Application surfaces must be clean, dry and free from fatty residue.

Check Quantity and Geometry

The butyl sealant (PIB) has a density of

1.08 gr/cc. The weight of material per linear meter on each side of the spacer profile should be within **2,5 gr** (± **0.5 gr**). There should be no interruptions and/or breaks along the sealing perimeter. The material must be contiguous and homogeneous.



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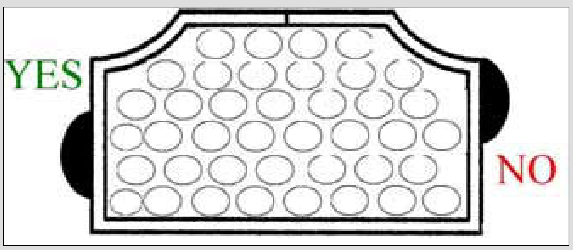
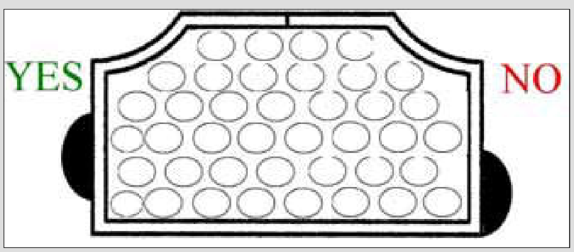
Place and Position

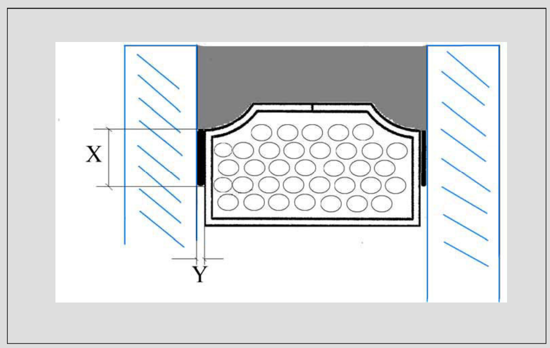
Avoid displacing and/or exiting the PIB material from the sealing section along the spacer area.





Set and Press

After pressing (should be at least 3 seconds,) the size of the PIB tape should be within **3 and 5 mm (X height)** and a minimum of **0.3 mm. (Y width)**. It should be contiguous to the secondary seal and should cover and flow in the void spaces of the glass and spacer surfaces.



The performance of the extruded PIB can be compromised if there is thinning around the corner (as shown below, left) or if there is a gap in the corner application which creates a gap in the bondline (as shown below, right).

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ALERT! ALERT! ALERT!

The Performance of Your IG Units *Could Be Compromised.*

The combination of Fenzi Butylver PIB (or any other PIB) with a *silicone* edge sealant could affect the gas retention of an IG unit. That's because silicone sealants are more porous to argon gas. Gas loss could result in reductions of as much as 8% from the IG's centre of glass U value, as the argon escapes fr*om the airspace.*

What this means is that Fenzi North America, as a supplier of PIB, can not guarantee gas retention of an IG unit when backed with silicone edge sealants.

What has not changed are that the advantages of using an edge sealant with good retention properties for maintaining argon gas and providing a superior moisture vapor transmission barrier are well documented; and combining edge sealants with Fenzi Butylver PIB will provide longevity and performance in IG units.

Polysulfide vs. Silicone

(Excerpted from a technical paper by Product Manager Paul Chackery)

In a study commissioned by the National Research Council of Canada, Dr. Hakim Elmahdy demonstrated that polysulfide sealants (using hardcoat low E glass) were better than silicone for containing argon. Test results showed that silicones lost on average 22.60% of argon during a typical aging cycling compared to 8.33% for polysulfide.

Test data that has been highlighted (see charts below) indicates the sample units that were omitted because unusual dew point readings reflected poor workmanship.

The paper concludes that silicone sealants are selected for their important role as the sole sealant for structural glazing. All other applications favour polysulfides, used historically for excellent mechanical properties.

For copies of this paper, contact us at (416) 674-3831 or info@fenzi-na.com

Polysulfide, Hardcoat, Dual Seal					
Sample	Initial Argon	Final Argon	Gas Loss	Initial Dew Point	Final Dew Point
1	88.8	87.7	1.1	-70	-70
2	88.8	87.6	1.2	-70	-70
3	91.5	90.3	1.2	-70	-70
4	35.3	0.5	34.8	-70	5
5	82.0	81.7	0.3	-70	-70
6	92.8	91.5	1.3	-70	-70

Silicone, Hardcoat, Dual Seal					
Sample	Initial Argon	Final Argon	Gas Loss	Initial Dew Point	Final Dew Point
1	84.4	79.1	5.3	-70	-70
2	83.3	75.3	8.0	-70	-70
3	80.6	76.5	4.1	-70	-70
4	77.4	74.3	3.1	-70	-70
5	82.4	1.1	81.3	-70	-10
6	71.6	65.0	6.6	-70	-70