VIRACON®

GLASS IS EVERYTHING™

TECH TALK

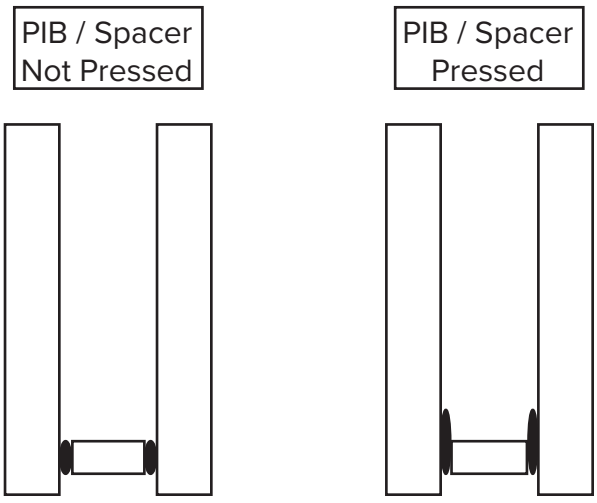
INSULATING GLASS SEALANT VISUAL CHARACTERISTICS

INSULATING GLASS SEALANT VISUAL CHARACTERISTICS

The use of insulating glass continues to grow as a result of the desire to build energy efficient buildings. The various types of glazing systems require insulating glass units to be accommodating, both structurally and visually.

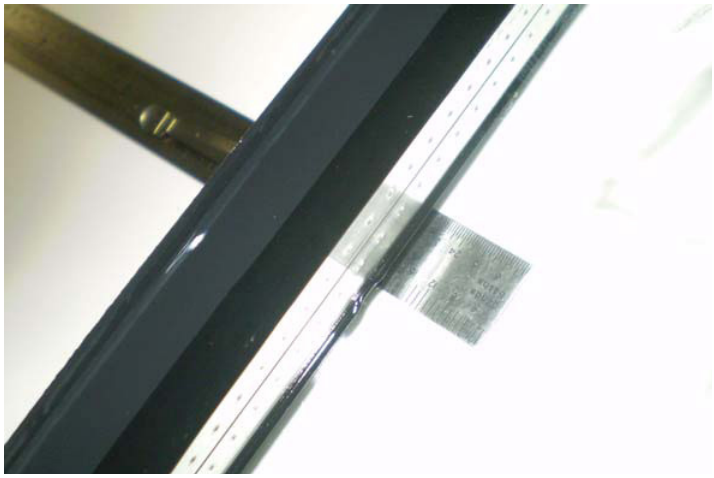
Insulating Glass Fabrication

In the process of fabricating the spacer, aluminum or stainless steel are cut to size, the corners are bent to 90° ends of the spacer are connected together with a straight key. Polyisobutylene (PIB) is extruded onto both sides of the spacer simultaneously with as much precision as possible considering the extrusion rate of wet sealants inherently varies. The amount of PIB being extruded may fluctuate some, as well as the actual location of the PIB placement on the spacer. Since the sealants, PIB and silicone, are wet the shape of the PIB and general uniformity may fluctuate when the glass and spacer are pressed together. After assembly of the insulating glass components (glass and spacer), the unit is pressed together by large platens. The pressure applied is regulated to achieve the desired overall thickness. The pressing causes the round bead of extruded PIB to flatten out and widen between the glass plies.



Sightline Tolerance

The PIB may extend into the vision area of the insulating glass unit or not completely cover the spacer. Viracon's internal sightline tolerance, which includes placement of the spacer in relation to the glass edge, is +/- 1/8" as fabricated for the required sightline. This includes the sealant and spacer.



The glass industry, has the same tolerance as The Glass Association of North America (GANA) Glass Information Bulletin 02-0315, Guidelines for the Appearance of Insulating Glass Unit Edges in Commercial Applications at the Time of Installation" states, "the primary sealant infringement within the insulating unit, as fabricated, should not exceed 1/8" (3mm) except at corners." This is consistent with Viracon's internal tolerances. In general we concentrate on the integrity of the seals from a warranty standpoint; as such we do not consider spacer showing or even the opposite, where PIB exudes over the spacer into the vision area of the unit to be a defect.

Viracon has performed testing on insulating glass units that have PIB visible in the vision area and these units have performed comparably to units that may not have PIB completely covering the aluminum spacer. Due to Viracon's specification and design of the

PIB seal, we have sufficient coverage and integrity of this seal in relation to the air spacer coverage. In both cases, the integrity of the insulating glass seal will not be compromised. The performance of the glass and Viracon's warranty for the glass is unaffected.

PIB Inherent Characteristics

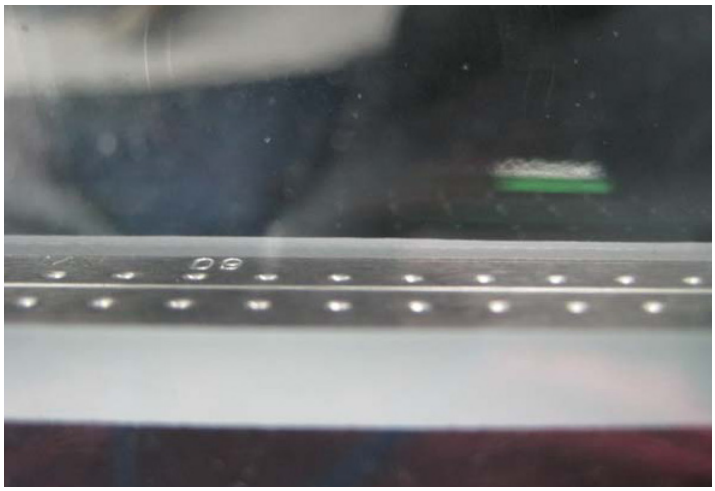
It should also be recognized that the PIB is a non-curing sealant. Therefore over the life span of the insulating glass unit, the PIB will flow under elevated temperatures and some degree of movement into the vision area of the glass will undoubtedly occur over time. The degree to which this will occur will be a function of time, temperature, orientation and type of glazing system.

In the interest of mitigating to some degree the potential for extreme PIB movement, Viracon has taken into consideration the variables that we can control such as volume, placement and pressure. As a result we strive to lessen the potential and amount of PIB that may ultimately migrate into the vision area, understanding that this cannot be totally avoided. As a result, a portion of the air spacer may not be covered by the PIB and our tolerance would allow for 3/32" of uncovered spacer. From a practical standpoint, the PIB will never be perfectly straight given fluctuations in the extrusion process such as pressure, temperature and extrusion speed.

Aesthetics

In years past, the appearance of the edge of the insulating glass was not taken into consideration when structurally glazed because of the very dark or highly reflective glass that was often used in curtain wall applications. Today, the most popular types of glass are clear with high light transmitting coatings that do not hide any of the inconsistencies that are common in insulating glass fabrication processes. Unfortunately there are no standards for the appearance of an insulating glass unit edge in our industry today. As a result, these inconsistencies are deemed acceptable providing the insulating glass unit integrity is not compromised.

From a design or aesthetic standpoint, when installed in a captured system, the edge of the insulating glass unit will not be seen when properly designed. In a structurally glazed system, the edge of the insulating glass unit will be visible from the exterior of the building and potentially for the interior of the building if the insulating glass unit's sightline is greater than the amount of interior framework coverage. In these situations, consideration must be given to increasing the amount of glass edge coverage to mitigate sealant and spacer visibility, from inside the building. One may also consider utilizing a black air spacer instead of the silver mill finish aluminum or stainless steel spacer.



Glazing Systems

In the past, insulating glass units were installed such that all edges of the glass were firmly held in place with the metal stops, pressure plates or snap on covers. All of these systems generally utilize rubber gaskets or a combination of gaskets and sealants to protect the glass from glass to metal contact as well as to provide a resilient material to form a water tight barrier to the building exterior. Dry glazing systems or compression gasket systems rely upon clamping pressure to provide a barrier against air and water infiltration.

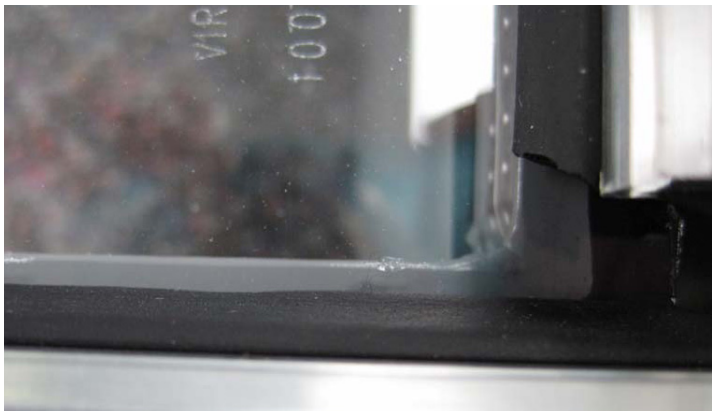
The Glass Association of North America's (GANA) glazing manual, provides general glass and glazing information. In this manual, the edge clamping pressure applied to glass in a pressure glazed system is limited to a range of 4-10 pounds per lineal inch. This range would prevent excess pressure from being applied to the glass edge. A dry glazed system utilizes gaskets

and relies upon pressure to prevent air and water infiltration.

Since gaskets can take a set and lose their resiliency over time, their effectiveness may depend largely on the initial pressure applied during the original installation. Therefore it may be more common to tighten these pressure glazed systems to the maximum amount, to maintain their effectiveness over the life of the building. This would result in some additional PIB creep soon after installation.

The gaskets utilized may be a combination of soft closed cell gasket and or dense wedge gaskets. In addition to dry glazing, a combination of wet/dry glazing systems have been used where a wet seal cap bead may be applied to the top of the gasket, on the exterior of the building to provide greater protection by forming a positive seal. Rubber gaskets come in many types, different profiles and various materials. In the past, most were generally larger and may have been 1/8" to 3/16" higher than the aluminum stop or framework itself. The result was that the edge of the insulating glass unit and even the air spacer were "buried" beneath this gasket and not generally visible.

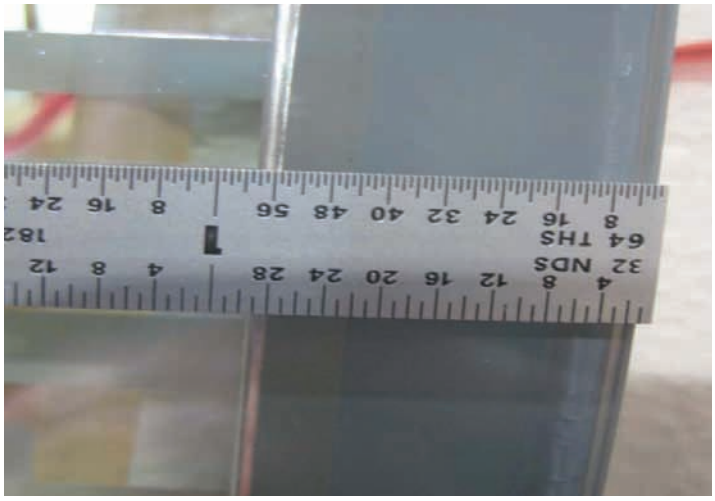
Today we see a trend toward lower profile gaskets that may be flush with the edge of the spacer contained within the insulating glass unit. In this case, any variation in the placement of the spacer on within the IGU, application of the sealant or any normal PIB creep that will occur, will be highly visible from the building interior.



Structurally Glazed Applications

With structurally glazed applications, the glass certainly becomes more the focal point since there is less visible structure on the building exterior. From the exterior of the building, the entire area of the glass becomes visible including the glass edge where insulating glass sealants, air spacers, joinery and coating deletion occur. From the interior of the building, it is important to take into consideration the amount of window frame and gasket coverage around the entire insulating glass unit. In the case of two sided structurally glazed systems, the window frame must take into consideration the additional silicone and larger sightline on all four sides of the insulating glass unit.

For example, if the insulating glass unit has a sightline (edge of glass to daylight opening dimension) of ¾" and the interior aluminum frame (and gasket) only covers ½", the insulating glass air spacer and sealants will infringe into the daylight opening of the window frame by ¼" and be highly visible from the interior of the building.



Recommendations:

1. Evaluate the glazing system design to provide adequate coverage of the perimeter edge of the insulating glass unit from the interior of the building. This should take into consideration the IGU fabrication tolerances as well as the fabrication capability.

2. In the case of 2 sided structurally glazed applications, if the design of the framing system does not provide adequate coverage of the IGU on all sides, the spacer and sealants will be visible and the appearance of these should be taken into consideration.

3. If a flush appearance is desired, determine if the gasket design will accommodate the IGU fabrication tolerances.

4. Maintain color consistency for all glazing materials such as gaskets and sealants (primary, secondary of IGU and structural/weather seals).

5. Consider the use of black spacers instead of the typical mill fill finish spacer where applicable.

The information contained in this publication is presented in good faith. It is believed to be accurate at the time of publication. Viracon reserves the right to change product specifications without notice and without incurring obligation.

viracon.com

800 Park Drive, Owatonna, MN 55060
800.533.2080

VTT-016 JUN2017