Performance Trends in Insulating Glass

DOE Requires Glass Certification
In 2008 the Department of Energy moved to require insulating glass certification for all glass used in Energy Star labeled fenestration products. The National Fenestration Rating Council (NFRC) accepted this challenge and effective July 1, 2008 required Insulating Glass (IG) certification in accordance with NFRC 706. Insulating Glass Certification (IGC) programs are recognized by NFRC and administered by the Certification Policy Committee (CPC). IGC programs must meet the requirements of ISO Guide 65 or ISO 9001, use laboratories accredited to ISO 17025, and to test and verify compliance to ASTM E2190 (or CGSB 12.8) at least one time every two years.

Industry Impacted by Higher Failure Rates
The following combination of factors resulted in an immediate increase in IG failures:
- First time exposure to the rigors of ASTM E2190 performance testing by manufacturers of IG.
- More challenging testing requirements of ASTM E2190 in comparison to previous ASTM E773/E774 standard which expired in 2002.
- Increased use of higher performance glazing bringing with it more coated glass, more high performance spacer systems, more internal components, more triple glaze units, etc.

Gas filled testing, which requires a minimum of 90% initial gas content retention and 80% gas content retention after E2190 testing, has tripled in quantity since 2008, contributing to the complexity of IG systems and increasing risk of not meeting the requirements of E2190.

Factors Contributing to Variability in Insulating Glass Performance
Five IGC programs are recognized by NFRC. The included chart shows wide variability in the various certification programs.

IGC Comparison Chart

<table>
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<tr>
<th>REQUIREMENTS</th>
<th>IGC #1</th>
<th>IGC #2</th>
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<td>Witness sample fabrication</td>
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</table>

Not all insulating glass certification programs are created equal.
-Even the tests used to comply with NFRC 706 are vastly different. CGSB 12.8, recognized in Canada, is completely different than ASTM E2190. Which test is more severe, CGSB 12.8 or ASTM E2190? When considered in their entirety most experts will agree that E2190 is a more severe test.

- Based on our review of over 3,000 data points our research shows a wide variance in a given spacer/sealant system’s ability to pass the E2190 test.

**Variability in Spacer / Sealant Systems**

This chart shows significant variability in the risk of failure between spacer/sealant systems.

**Summary**

The pre-2002 method of IG testing (ASTM E773/E774) had provisions for progressive levels of IG performance: Level C, Level CB, and Level CBA. ASTM E2190, contains all the provisions of CBA level plus a more challenging volatile fog test. Combine this with the NFRC mandate and the resulting increased failure rate should not be a surprise. Because IG is so instrumental in the energy efficiency of fenestration products we should not expect the pressure for superior performance of IG systems to be relaxed any time soon. It is imperative that the industry promote and develop systems that meet the ever more robust requirements of the market we serve.

**About The Author**

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Dan Braun has over 22 years of experience with the industry with expertise in building component and fenestration product testing. He is responsible for regional laboratories and offices throughout the United States and is a member of IGCC and WDMA Technical Committees.

**About ATI**

Founded in 1975, Architectural Testing, Inc. (ATI) is a leading ISO/IEC 17025 accredited building products testing laboratory providing more than 2000 defined test protocols at one or more of its fifteen full-service laboratories. Architectural Testing offers a Complete Solution for evaluation, testing and certification.