



**DUAL PANE INSULATING GLASS PERFORMANCE TEST REPORT**

**ASTM E2190-10**

**Standard Specification for Insulating Glass Unit Performance and Evaluation**

**Rendered to:** INTEGRATED AUTOMATION SYSTEMS  
7761 First Place Unit #3  
Oakwood Village, OH 44146

**Job #:** E7540.01-106-28  
**Date Received:** 04/28/15  
**Authorization Date:** 04/21/15  
**Report Date:** 10/07/15

**Product / Reference No.:** New closure Test 1

**Manufactured Date:** 04/14/15

**Samples Obtained from Manufacturer:** PPG

**Manufacturer Location:** Carlisle, Pennsylvania

**Overall Size:** 355mm x 505mm

**Glass Thickness:** 4mm

**Glass Type:** Annealed

**Overall Thickness:** 21mm

**Air Space:** 13mm

**Spacer:** Intercept, tin plate spacer system by GED Integrated Solutions

**Corners:** Three bent corners; fourth corner overlapped and butyl patched

**Primary Sealant:** Delchem 2000 reactive hot melt butyl

**Secondary Sealant:** N/A

**Desiccant:** Insul-dri WM-150 desiccated matrix by H.B. Fuller; four sides filled

**Other Features:** Low-E coating on Surface #2; edge deleted; argon filled; fourth corner has oblong gas fill hole and IAS 4X12-TP proprietary plug closure

**Gas Fill Method:** Sensed

**Information obtained from:** Integrated Automation Systems PPG

**ASTM E2188-10 Seal Durability Results**

| Unit         | Primary Sealant Width<br>Min.-Max.<br>(mm) | FROST POINT TEST RESULTS (°C) per ASTM E546-08 |                            |  |                            |                              |
|--------------|--|--|----------------------------|--|----------------------------|------------------------------|
|              |  | Initial  | High Humidity<br>(14 days) | Accelerated Weathering<br>(252 cycles) | High Humidity<br>(28 days) | Visible Deposits<br>(Y or N) |
| 1            | 7-9  | <-65   | <-65                       | <-70                                   | <-60                       | N                            |
| 2            | 7-9  | <-65   | <-65                       | <-70                                   | <-60                       | N                            |
| 3            | 7-9  | <-65   | <-60                       | <-70                                   | <-65                       | N                            |
| 4            | 7-9  | <-65   | <-65                       | <-70                                   | <-65                       | N                            |
| 5            | 7-9  | <-65   | <-65                       | <-70                                   | <-60                       | N                            |
| 6            | 7-9  | <-65   | <-60                       | <-70                                   | <-65                       | N                            |
| Requirements | N/A  | N/A  | ≤-40                       | ≤-40                                   | ≤-40                       | No Deposits                  |
| Pass/Fail    | N/A  | N/A  | Pass                       | Pass                                   | Pass                       | Pass                         |
| Date         | 05/01/15                                   | 05/15/15                                       | 06/04/15                   | 08/20/15                               | 09/23/15                   | 09/23/15                     |

**ASTM E2189-10 Volatile Fog Results**

| Unit        | Primary Sealant Width<br>Min.-Max.<br>(mm) | Muntins | Duration<br>of Testing | Results  |
|-------------|--|---------|------------------------|----------|
| 7           | 7-9  | No      | 7 days                 | No Fog   |
| 8           | 7-9  | No      | 7 days                 | No Fog   |
| Requirement | N/A  | --      | 7 days                 | No Fog   |
| Pass/Fail   | N/A  | --      | --                     | Pass     |
| Date        | 05/01/15                                   | --      | --                     | 06/08/15 |

Average Fog Test Temperature: 50°C

Maximum Temperature: 51°C

Minimum Temperature: 49°C

**ASTM E2649-09 Argon Gas Retention Results**

| Unit        | Muntins | Initial Argon<br>Gas Content<br>% | Final Argon<br>Gas Content<br>% |
|-------------|---------|-----------------------------------|---------------------------------|
| 1           | No      | 97                                | 95                              |
| 2           | No      | 97                                | 96                              |
| 3           | No      | 96                                | 95                              |
| 4           | No      | 99                                | 97                              |
| 5           | No      | 99                                | 96                              |
| 6           | No      | 98                                | 90                              |
| 7           | No      | 97                                | --                              |
| 8           | No      | 98                                | --                              |
| 9           | No      | 96                                | --                              |
| 10          | No      | 96                                | --                              |
| Average     | N/A     | 97                                | 95                              |
| Requirement | N/A     | ≥90% <sup>1</sup>                 | ≥80% <sup>1</sup>               |
| Pass/Fail   | N/A     | Pass                              | Pass                            |
| Date        | N/A     | 05/14/15                          | 09/23/15                        |

<sup>1</sup> With no individual test specimen less than 50%

**Remarks:** Meets the requirements of ASTM E2190-10 per E2188-10, E546-08, E2189-10, and E2649-09 test methods.



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### Revision Log

| <u>Rev. #</u> | <u>Date</u> | <u>Page(s)</u> | <u>Revision(s)</u>    |
|---------------|-------------|----------------|-----------------------|
| 0             | 10/07/15    | N/A            | Original report issue |

