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Laboratory Manual

The intent of this manual is to include in one document all of the directives and instructions that have been issued to the testing laboratories since the inception of the IGCC and IGMA certification programs. These instructions are intended to clarify, and supplement testing conducted in accordance with ASTM E 2188, ASTM E 2189, and ASTM E 2190.

Although this document is believed to reflect the most up to date information on the date of latest revision, the IGCC®/IGMA® certification programs are dynamic and ever changing. We will continue to issue letters of instruction to the testing laboratories that add or delete from the instructions contained herein.

We welcome your constructive comments and hope that you will not hesitate to advise us of any suggestions that may make this a more effective document.

Revision List	
Revision Date (authorization)	Revisions
2-3-09 (IGCC IGMA Agrmt)	Revisions to address one program, IGCC®/IGMA®
7-29-09 (Fog Test Comm)	Guideline C14 and Attach A, Add new Fog test Info
8-28-09 (Appeals Comm)	Guideline D.1 Added ref to new SES gas test procedure
9-17-09 (Board)	Guideline A.9 - Revise Lab billing procedures
10.28.09.11 (Cert Comm)	Attach A, Rev view distance and remove ref to reflectance
5-6-2014 (Cert Comm)	Guideline A.2, C.2, C.10, C.15, C.16, D.2, D.3, D.4, D.5 (delete attachments)
1-30-2018 (Cert Comm)	Added Guidelines A.14, B.7, C.17, C.18
1-30-2018 (Cert Comm)	Update Guideline A.11, C.2, C.3, C.8, C.14

This Manual is divided into the Following Sections

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A. Communication, Administration and Reporting

- A.1 **Communication-** Upon fabrication, test specimens become the property of the certification program. As such, the laboratory's client and all communication by the lab shall be directed to the administrative office. In situations such as facilitating shipping of test samples, testing schedules, or condition of units, the lab should feel free to communicate requested information to the licensee. For all other matters, communication shall be directed to or with the consent of the administrative office.
- A.2 **Damaged units-** Any damage to specimens is to be noted on the "Notice of Test Specimen Fabrication" form. The laboratory should identify if the units are in a condition suitable for testing. When any question exists as to the suitability for test of damaged units or the entire set of units, the laboratory shall notify the administrative office who, in turn, shall seek the direction of the program participant. Units with any damage (glass or shipping) should only be used as a last resort and only with the authorization of the administrative office. It shall be noted that ASTM E2190 section 6.4 makes reference to units with "visible deposits" not being "qualified". This was intended to only apply to volatiles condensed during the fog test and does not apply to blemishes present prior to exposure (i.e. finger prints, coated glass corrosion). The same blemishes present before and after exposure shall only be a condition of failure if the blemish effects the pass/fail criteria.
- A.3 **Distribution of Test Reports and Test Billing-** Testing fees shall be invoiced to and paid by the administrative office and reports sent to the administrative office and to no one else.
- A.4 **Professional Engineer-** Testing shall be done in accordance with certification program guidelines, the applicable test standards, and this manual. Testing shall be reviewed by a professional engineer and each test report shall bear his/her seal and signature.
- A.5 **Identification-** All reports, correspondence and invoices shall reference the specific certification number and the applicable certification period (IGCC®/IGMA® XXXX L09).
- A.6 **Monthly Status Reports-** All information requested on monthly status reports shall be updated and forwarded to the administrative office by the 10th of each month. This information shall include an estimate of completion of testing for each stage.
- A.7 **Additional Testing-** On occasion, program participants may request testing beyond normal certification program requirements. In such cases, release of the units must first be obtained from the administrative office. The laboratory may then provide services as requested, but the certification program shall have no responsibility, including fees, for such additional work.

- A.8 **Selection of Testing Laboratories-** Each certification program participant indicates to the Administrator which testing laboratory they prefer for each product at each plant. In virtually every case, the Administrator is guided by the request of the participant.
- A.9 **Test Fees-** Laboratories are contracted directly with the certification program and all testing invoices shall be paid by the administrative office. Each year the laboratory will be requested to provide the fees they will charge for the following year and invoicing and payments shall be in accordance with these pre-determined fees. The Administrative office shall publish and make available to interested parties a fee schedule for all approved testing laboratories. While in concept IGCC®/IGMA® encourages laboratories to provide testing at the lowest cost possible, one of the underpinnings of the certification program is that all participants are treated equally. For this reason, all certification testing fees will be by the published fee schedule and discounts or rebates of any kind for individual participants will not be allowed.
- A.10 **Authorization to Test-** The laboratory will be provided with an authorization to test form for each product. The applicable test is “authorized” when this form is initialed and dated by the administrative office. This is essentially an indication that the fee for testing has been collected from the participant. It is acceptable for the laboratory to start testing prior to receiving the initialed authorization, but in these cases IGCC nor IGMA will not be financially responsible for the test until authorization is provided. Unless otherwise waived, per ASTM E2188 par. 7.2, testing shall not be started prior to 4 weeks from fabrication date.
- A.11 **Observation of Failed units-** When a test failure is experienced, a participant will routinely look to the laboratory to make observations of the condition of the failed unit. IGCC supports any assistance the laboratory may provide and will facilitate if appropriate but will not assume any technical or additional financial responsibility.
- A.12 **Sealant Dimensions-** Per ASTM E 2188 paragraph 10.1.10 sealant dimensions shall be measured and reported by the test laboratory. This dimension is the thickness of the sealant from the outside to the inside of the unit, sometimes referred to as sight line or moisture vapor transmission path length.
- A.13 **ISO Guide 17025 Compliance-** A condition of laboratory approval shall be that the laboratory shall provide written documentation from a qualified independent third-party organization that states compliance with the ISO 17025 requirements. IGCC and IGMA view “qualified independent third-party organizations” as either: IAS, A2LA, NVLAP, or SCC. Other organizations who have memorandums of joint recognition with any of these organizations may also be acceptable.
- A.14 **Maximum Testing Time** – The laboratory will maintain a maximum ten-month turn around period from time of receipt of test units unless delayed by conditions not in the Laboratory's control, e.g. licensee authorization to proceed or breakage.

B. Specimen Handling and Storage

- B.1 **Cost of Shipping** - Shipping and delivery of test samples to the testing laboratory, and all costs associated with, is the responsibility of the certification program participant. All samples should be delivered “pre-paid”. If other arrangements need to be made, it shall be at the discretion of the testing laboratory. IGCC, IGMA nor the administrative office shall have no responsibility for the cost or arrangements of shipping and delivery of test units.
- B.2 **Storage of Unit-** Store and mount all specimens in the vertical position so that both lites of the assembly are supported and therefore not in a shear condition. All precautions should be taken to ensure no metal to glass contact during all stages of storage, handling and testing. Precautions should also be taken to ensure seal systems are not in contact with material that they may adhere to. It is best to place units on some form of setting blocks in the vertical position during all stages of storage, handling and testing.
- B.3 **Retention of Units-** Passing samples are to be kept for 30 days from the date of final test report. Non-compliant samples shall be kept for 90 days from the date of the final test report.
- B.4 **Marking of units-** Under no circumstance should the testing samples be etched or scratched for identification purposes. If the lab wishes to mark test units for identification purposes, an indelible marker, tape or other non-destructive method should be used.
- B.5 **Testing of Additional units-** Laboratories may, at their discretion, perform weathering testing on more than the required six specimens. When this is done, the first six test specimens listed on the report shall be considered the test specimens for purposes of determining compliant results. The remainder of test specimens shall be considered as spares.
- B.6 **Return of units-** There may be conditions where the certification program participant wishes test units be returned. This most often occurs after the observation of non-compliant results. In general, the laboratory should make every effort to accommodate such requests. Authorization to return test units must be received from the administrative office prior to release. The certification program participant shall be responsible for any additional charges for the return of test units.
- B.7 **Receipt of test samples** – Specimen crates shall be opened and test units inspected for damage no later than 5 business days from receipt. Corresponding paperwork shall be matched to the glass samples received and relevant information identified. The “IGCC Notification of Test Specimen Fabrication” form and the “IGCC Laboratory Monthly Status Report (MSR) & Authorization to Test” forms shall be completed and returned to the IGCC office. See documents attached for examples.

C. Testing and Equipment Operation

C.1 **Testing-** All certification testing shall be done in accordance with certification guidelines, ASTM E2190 and associated standards and this manual.

C.2 **Data Logging -** A continuous temperature chart or data logging device must be maintained for equipment operation for both the high humidity (HH) testing and the accelerated weathering (AW) testing. This must be at least a 7-day chart or log. All charts or logs must be identified with the applicable laboratory chamber and the date or week of the year. Charts or data logging must be digital with no greater than a 5-minute interval and provide clear real time values for time and temperature, and to a level of accuracy that will allow determination that standard conditions were met.

While continuous logging is recommended for the ASTM E2189 fog chamber(s), it is not required. A daily manual log is acceptable (see C.3). Means must exist to verify real time values.

Record Retention – Charts and/or operation logs must be maintained, current and historic, for at least 2 years.

C.3 **Operational Logs-** Realizing that tests are conducted on a 7-day around the clock basis, once each day for a five-day week, check and keep written records of the following information that is not otherwise automatically recorded or logged. This log must be completed thoroughly and include technician initials or signature. (This “visual check” log is not intended as a substitution for annual calibration, see C.7):

- a. Moisture, humidity or RH is present or at required values
- b. Temperature recording is operational and values correct
- c. AW cycle is correct
- d. All UV bulbs are functional including fog lamp
- e. Fog chamber parameters

Record Retention – Operating logs must be maintained, current and historic, for at least 2 years.

C.4 **UV Bulb Readings-** UV output of each bulb shall be measured at least annually.

C.5 **AW Chamber Stratification-** At least annually, the accelerated weathering (AW) chamber shall be checked for balance or stratification. This shall be done by recording separate temperatures in the chamber, as a minimum (1) upper right (2) upper left, (3) center (4) lower right (5) lower left and ensuring these individual temperatures are within the tolerances as stated in the appropriate standard.

C.6 **Minimum Frost Points-** Measure and record actual frost points if warmer than -60°F (-51°C). (actual frost points are optional, if below -60°F, < -60°F is acceptable).

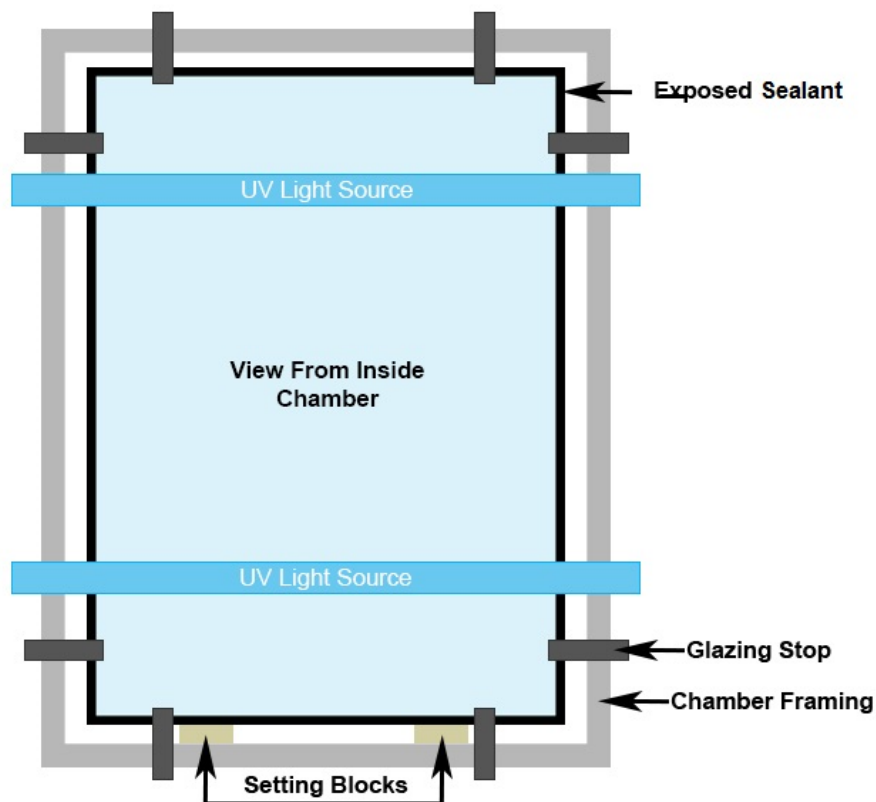
- C.7 **Calibration-** Calibration of all measuring and recording devices shall be performed at least annually.
- C.8 **RH requirements-** delete 12-14-2017 included in the ASTM E2188 standard.
- C.9 **Fog Chamber Water Temperature-** ASTM E2189 paragraph 6.1.6 shall be interpreted that the temperature of the cooling water should be measured just as it exits the plate, not down stream outside the box. This interpretation has been confirmed with the ASTM committee and will be clarified in subsequent versions of the standard. The concern is to ensure no significant heat gain from plate outlet to box outlet. If it can be shown that both temperature locations are within tolerance, measurement at either location will be acceptable. Temperature measurement points should be shielded from radiant heat.
- C.10 **Frost Point Determination-** ASTM E2190 – 2002 paragraph 4.3 allows for frost points to be determined at various times between 1 and 7 days. If multiple frost points are taken and result are different readings, the correct frost point shall be interpreted as the lowest in the 7-day period. The current standard does not include this reference but the 2002 practice shall apply to all IGCC/IGMA testing. If the frost point is failing prior to 7 days, it shall be required to re-frost point the unit at 7 days.
- C.11 **Fog Test Units-** When testing specimens with internal components air space material (IC) muntins, grills or other, currently 3 test units are fabricated with the IC (5 for triple pane units). These 3 (or 5) units shall be the units exposed to the fog test.
- C.12 **Capillary or Breather Tube Units-** When testing units that include capillary or breather tubes, the participant must supply directions for proper installation or orientation of the units. If such directions are not provided, the administrative office should be contacted.
- C.13 **HH Chamber Humidity Sensor –** When it can be demonstrated that a steam bath in the HH chamber can maintain 95% RH at the 140F, it is not necessary to maintain continuous RH monitoring. In this situation, the presence of humidity/moisture should be logged daily (see C.3). Re-validation of RH shall be done as part of annual calibration.
- C.14 **Fog Test Procedure –** delete 12-14-2017 included in the ASTM E2189 standard
- C.15 **UV Meter -** ASTM E2189 section 6.2.1 note 4 states “The **only suitable meter** is the Blak-Ray UV Meter with J221 sensor cell” which is analog. As of March 2014 Blak-Ray also offers a UVX digital meter which they determine as equivalent. For other meters to be used for IGCC®/IGMA® testing proof of equivalency must be provided. The J221 meter has an “A” and “B” setting. This is to adjust the range of the meter and should be used as appropriate to the output of the light source you are measuring. Additionally, some meters are provided with a “screen”. This

should not be used. Further information on the use of the meter(s) may be obtained at www.uvp.com.

C.16 **Fog Box Thermocouple Shielding** – ASTM E2189 section 6.1.5 requires “radiation-shielded thermocouples”. This shielding shall be of a similar reflective surface as the interior of the box.

C.17 **Installation of IG Units in AW Chamber** –

- 1) 4th Corner Patch – A unit with a 4th corner patch shall be mounted such that the patch is not in contact with a setting block.
- 2) Visibility of seal lines – All seal lines must be exposed to the UV light source, except for small (less than 2”) glazing stops (see diagram)



Note: Approximate position of components for illustration purposes only, unit orientation may be vertical or horizontal.

C.18 **Protective Devices** – Protection of the accelerated weathering chamber and the high humidity chamber from overheating and overcooling must be done with a proactive shut down device.

D. Gas Content Initial and After Weathering (GCIA) Testing

- D.1 **Gas Test Procedure-** ASTM E 2649 "Standard Test Method For Determining Argon Concentration in Sealed Insulating Glass Units using Spark Emission Spectroscopy" shall be the governing procedure when testing gas content (GCIA).
- D.2 **GCIA Test Units-** All test units shall be gas filled with argon. All triple pane units shall have both cavities filled and tested. The test lab shall randomly select ten (10) units for initial gas content testing except that units containing internal components (IC) (i.e. grills or muntins) shall not be considered for testing. Units shall be inspected for any damage, and any damaged units not used. Testing for gas content after weathering shall be performed on the 6 weathering test units.
- D.3 **GCIA Production units-** Deleted 5-6-2014
- D.4 **GCIA Values-** Laboratories shall report results of testing as "percent initial gas content" and "percent after weathering gas content" to the nearest whole percent. The calculation of percent initial gas content of the ten (10) test units shall be the average of all 10 units tested. The calculation of percent after weathering gas content shall be the average of all 6 weathered test units.
- D.5 **Gas Content of Units with IC-** At present units with IC are not considered for GCIA certification testing,



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IGCC NOTIFICATION OF TEST SPECIMEN FABRICATION

TO: IGCC APPROVED LABORATORY, ###

Laboratory Name
 123 Testing Street, Suite A
 Sackets Harbor, NY 12345

PARTICIPANT NAME: ABC Glass, Inc. FABRICATION DATE: 12/5/2017
 PLANT LOCATION: Anytown, NY SELECTED BY: Auditor #
 IGCC NUMBER: 1234 L17 TEST METHOD: E2190

Please be advised the above mentioned product has been fabricated for testing. The IGCC Licensee has indicated they will ship samples to your laboratory within four (4) weeks from the date of fabrication. Upon receipt, please complete below information and return form to IGCC. Thank you for your cooperation.

DATE UNITS RECEIVED: _____

If specimens are not received by ###/###/2018, please contact the IGCC office.

Specimens are undamaged and suitable for test (write YES or NO)

- | | | | |
|----------|----------|-----------|-----------|
| 1. _____ | 5. _____ | 9. _____ | 13. _____ |
| 2. _____ | 6. _____ | 10. _____ | 14. _____ |
| 3. _____ | 7. _____ | 11. _____ | 15. _____ |
| 4. _____ | 8. _____ | 12. _____ | |

Mark on specimens (Inspectors Paper Label):

IGCC ® _____	
Date _____	Inspector No. _____

Information on Permanent Label: _____

NOTICE: IGCC will not be financially responsible for any testing started prior to authorization to test being given by the IGCC Administrative office.

Notice received at IGCC _____



Credibility in Certification through Active Public Participation



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IGCC LABORATORY MONTHLY STATUS REPORT AND AUTHORIZATION TO TEST

NOTE: This form is to be updated and sent to the IGCC Administrative Office on or before the 10th of each month.

IGCC NUMBER: 1234 L17 DATE: _____
 LICENSEE NAME: ABC Glass, Inc. _____
 PLANT ID: ABC01NY INVOICE AMOUNT: \$#,### ##
 PLANT LOCATION: Anytown, NY INVOICE NO.: 12345
 INVOICE DATE: 12/13/2017
 TEST METHOD: E2190
 DATE SPECIMENS FABRICATED: 12/5/2017 TEST LAB: ###
 DATE AUTHORIZED TO TEST: _____ BY _____ Lab Name
 RECEIVED BY LABORATORY: _____ Sackets Harbor, NY
 DATE TEST STARTED: _____
 Estimated Test Start Date: _____ Estimated Test Completion Date: _____ Job #: _____

Specimen No.	Initial Dew/Frost Point	Initial Gas Content	After 2 Weeks HH	After 9 Weeks AW	After 4 Weeks HH	Volatile Fog Test			Final Gas Content	Comments
						Day 1	Day 2	Day 7		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
Requirement	N/A	>=90%	<-40	<-40	<-40	No Fog			>=80%	

ID-160 4/14/2016 TDS



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IGCC®/IGMA® Guidance Summary Sheet	
Billing	Lab should bill IGCC Administrative Office for Test Fees. IGCC®/IGMA® is Lab's client. IGCC®/IGMA® office will provide authorization to begin testing.
Unit Receipt	"Notice of Test Specimen Fabrication" sheets shall be completed and returned to Administrative Office when sample units are received. * Unless waived by participant, test shall not start sooner than 4 weeks from fabrication date.
Authorization/ Status Reports	"Laboratory Monthly Status Report and Authorization to Test" will be signed and dated by Administrator to authorize the testing of samples. These forms are to be used for monthly status reports and returned to the Administrative office by the 10th of each month.
Final Report	Final test reports are to be sent to the Administrative Office no later than 30 days from completion of the testing.
Retention of Samples	Passing samples are to be kept for 30 days from the date of final test report. Non-compliant samples should be kept for 90 days from the date of the final test report.

<i>Under normal circumstances, all units should be the same spacer/glass/airspace.</i>	
Number of Units (Double/Triple)	Test Performed
6/6	Weathering test, before and after gas test
3/5 = Shipped 2/4 = Tested	Fog Test – IC (Internal Components) units
2	Extra – for initial gas test and thermal breakage – if applicable
2	Extra – for initial gas test and shipping breakage – if applicable
10 (ASTM ref's 9)	Initial Gas Test
Total 13/15	Total sample set for normal ASTM E 2190 Durability and Gas Testing