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ID-155 IGCC®/IGMA® and IGMAC® Certification Program Requirements Summary Testing to ASTM E 2190 or CAN CGSB 12.8

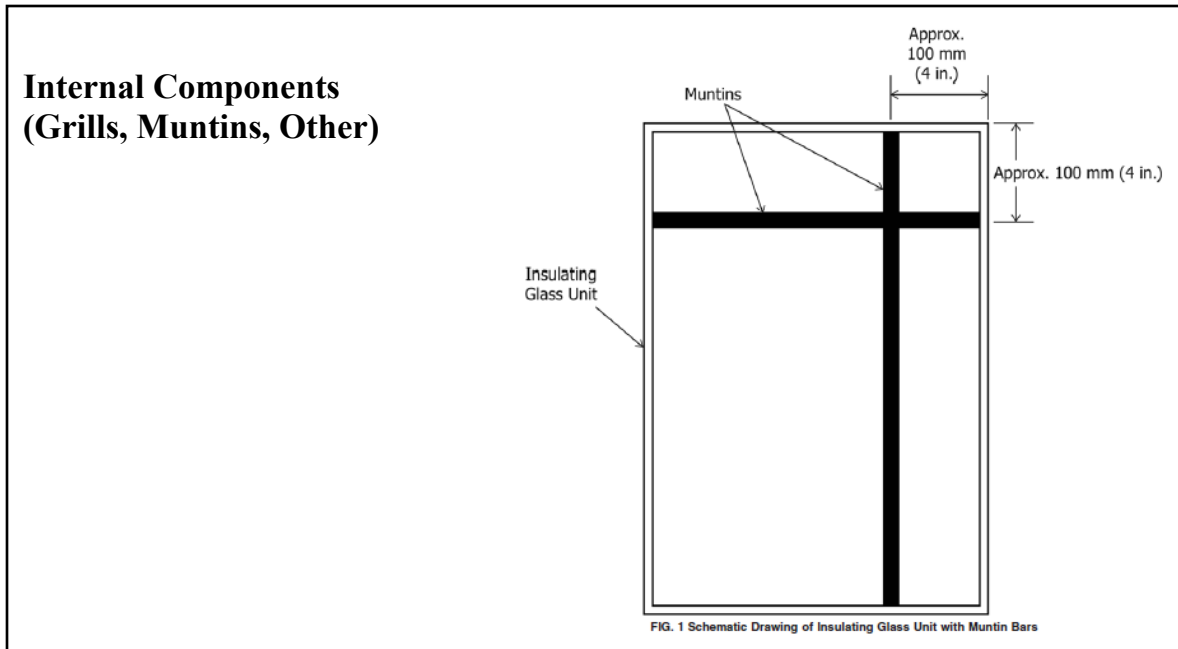
	IGCC/IGMA Certification		IGMAC Certification
	Double Pane – ASTM E2190 (Baseline Test)	Triple Pane – ASTM E2190 (Baseline Test)	Double Pane & Triple Pane– CAN/CGSB 12.8 (Baseline Test)
Standard Sample Fabrication Requirements	<ul style="list-style-type: none"> 13 units minimum (17 maximum), 14 x 20 inches (G.6) 4mm (5/32-in.) glass with 12mm (1/2-in.) airspace or 5mm (3/16-in.) glass with 6mm (1/4-in.) airspace ≤3mm (1/8) Glass may NOT be used in IGCC testing Units shall have low-e coating within the airspace (surface 2 or 3), when applicable 	<ul style="list-style-type: none"> 15 units minimum (19 maximum), 14 x 20 inches; (G.6) 4mm (5/32-in.) glass and 6mm (1/4-in.) airspace ≤3mm (1/8) Glass may NOT be used in IGCC testing Minimum 10 units (of the 15 units minimum) shall have the low-e coating on the center lite (surface 3 or 4), when applicable (see pg. 7 for illustration) Minimum 5 units (of the 15 units minimum) shall have the low-e coating on the outer lite (surface 2 or 5), when applicable (see pg. 7 for illustration) 	<ul style="list-style-type: none"> 20 units (24 Maximum), 14X20 inches (355mmX508mm); (G.6) 4mm (5/32-in.) glass and 12mm (double) or 6mm (triple) (1/4-in.) airspace. ONLY 4mm glass thickness is allowed, any other glass thickness will be rejected by the testing facility. For double glazed units one lite must be optically transparent sheet or float glass with or without coating to facilitate dew point measurement (see pg. 7 for illustration) For triple-glazed, all units shall have the low-e coating on the center lite (surface 3 or 4), when applicable (see pg. 7 for illustration) Entire unit shall not exceed 40mm The specimens shall be fully representative of manufacturer’s standard production units (design & construction) including

	Double Pane – ASTM E2189 Fog (Internal Component Test)	Triple Pane – ASTM E2189 Fog (inc. Internal Component Test)	Double Pane – CAN CGSB 12.8 Fog (Internal Component Test)	Triple Pane – CAN CGSB 12.8 Fog (inc. Internal Component Test)
Standard Sample Fabrication Requirements (continued)	<ul style="list-style-type: none"> 3 units minimum (4 maximum) for each category (BA, BL, GI, OI) IC units shall have low-e coating on the interior (surface 2 or 3), when applicable 	<ul style="list-style-type: none"> 5 units minimum (6 maximum) for each category (BA, BL, GI, OI) Fog (or IC) units shall have the low-e coating on a least one outboard lite (surface 2 or 5), when applicable (see pg. 5 for illustration of triple pane fog units) 	<ul style="list-style-type: none"> 3 units minimum (4 maximum) for each category (BA, BL, GI, OI) IC units shall have low-e coating on the interior (surface 2 or 3), when applicable 	<ul style="list-style-type: none"> 5 units minimum (6 maximum) for each category (BA, BL, GI, OI) Fog (or IC) units shall have the low-e coating on a least one outboard lite (surface 2 or 5), when applicable (see pg. 7 for illustration of triple pane fog units)
	<ul style="list-style-type: none"> Glass and/or airspace thickness(es) may increase from these standard size constructions but this may result in a more rigorous test Glass thickness tolerance shall be per ASTM C1036; airspace tolerance shall be ± 0.8mm (1/32-in.) When testing for gas content, all units must be fabricated with gas 		<ul style="list-style-type: none"> ONLY 4mm glass thickness is allowed, any other glass thickness will be rejected by the testing facility. When testing for gas content, all units must be fabricated with gas Entire unit shall not exceed 40mm 	
Frequency of testing	<ul style="list-style-type: none"> After initial certification (Prototype) testing, and second year certified testing, ASTM E2190 and CAN CGSB 12.8 testing shall occur once every two (2) years. The required re-certification cycle is every two-years to qualify the product for listing with the National Fenestration Rating Council (NFRC) program. Testing for internal components shall be required initially and once every 4 years 			
Quality Assurance Requirements	Participating company QA systems shall comply with IGMA TM-4000 which establishes requirements for the following:			
Quality System Manual	Calibration	Field Service		
Designated Contact for QA	Non-Conforming Products and Corrective Action		Internal Quality Audits	
Process Control Procedures	Storage and Handling		Documented Training	
Inspection and Testing for: connector/spacer, primary seal, secondary seal, desiccant, glass, gas filling, finished product	Expiration Dates		Statistical Techniques	

<p>Finished Product Labeling Requirements</p>	<ul style="list-style-type: none"> • Company Identification • Plant Identification (only if multiple locations) • IGCC®/IGMA® certification mark • Date code (Year of manufacture ± 3 months) 	<p style="text-align: center;"><u>EXAMPLE</u></p> <p style="text-align: center;">ABC Glass plant 123 IGCC®/IGMA® 2020</p>	<ul style="list-style-type: none"> • IGMAC® trademark • Company name • Location of production facility (city, town, etc.) • Year of manufacture 	<p style="text-align: center;"><u>EXAMPLES</u></p> <p style="text-align: center;">For IGMAC: ABC Glass Co. City IGMAC® '24</p> <p style="text-align: center;">For Both: ABC Glass Co. City (#*) IGCC®/IGMA® IGMAC® '24 * The “#” is used to designate the plant code, only be required when there is more than one plant with an IGCC®/IGMA® certified product operating under the same company name.</p>
<p>Corners and Connectors</p>	<p>The maximum number of mechanical connectors (MC) shall be tested. Once certified, corners or connections may be changed from mechanical connections (MC) to bent-uncut corners (BC), using the same IGCC®/IGMA® or IGMAC® number.</p> <ul style="list-style-type: none"> • MC (or cut corners) cover Bent corners • Bent corners do not cover MC corners 			
<p>Coated Glass Test Requirements</p>	<p>(G.19) Test units shall include one lite of coated glass per test sample. Only the highest volume coated product needs to be tested. Testing of sputter coated non-edge deleted (C3) will cover sputter coated edge deleted (C2), Pyrolytic (C1) and uncoated (clear). Testing of sputter coated edge deleted (C2) will cover Pyrolytic (C1) and uncoated (clear). Testing of Pyrolytic (C1) will cover Pyrolytic and uncoated (clear). Testing uncoated (clear) will only cover uncoated (clear).</p>			
<p>Internal Components (Grills, Muntins, Other)</p>		<p>(G.8) For dual pane minimum of 3 test units per category to include IC (muntins in 2x2 offset configuration). Units with IC are used for FOG testing only. For Triple Pane Units, 5 units shall include IC for IGCC®/IGMA® and IGMAC®. Units shall have low-e coating, when applicable.</p> <p style="text-align: center;">THESE UNITS ARE NOT SUBJECT TO GAS CONTENT CERTIFICATION PROGRAM REQUIREMENTS</p> <p style="text-align: center;">IGMAC Note: When IC is not required to test, baseline fog (non-IC) units will take their place.</p>		
<p>Multiple Air Space Units (Triple Pane)</p>	<p>(G. 15) Certification of triple pane units covers the certification of dual pane units, under the same IGCC®/IGMA® or IGMAC® product number. Testing of multiple air space units shall be performed initially and in lieu of single air space unit testing at least once every four (4) years.</p>			
<p>Aperture Plug (gas filling provisions)</p>	<p>(G.27) Construction of annual test units shall include any provisions for gas filling of units for durability testing. At the option of the mfr, units may or may not include gas if only testing for durability. If also gas content testing, then all units must contain gas.</p>			

Cavity Pressure Compensation System (CPC)	<p>(G.0) An I.G. construction incorporating a CPC system will be certified and listed (durability and gas content) as equivalent to a previously IGCC®/IGMA® program certified I.G. model without a CPC system provided the following applies:</p> <ul style="list-style-type: none"> •Material and construction of the units are identical, except for the inclusion of the CPC system. •Both sets of I.G. units pass when tested according to ASTM standard(s) durability and gas content (GCIA) if applicable. <ul style="list-style-type: none"> •Test must be run by an IGCC®/IGMA® or IGMAC® approved lab. •Preparation of test specimens must be witnessed to ensure all fabrication steps of the CPC system process are adhered to. <ul style="list-style-type: none"> •The units with CPC system need only be tested once. 	
Gas Content, Initial and After Weathering (GCIA)		
Requirement	Voluntary if gas content units will not use “IGCC®/IGMA®” or “IGMAC®” marked spacer. Mandatory if “IGCC®/IGMA®” or “IGMAC®” marked spacer will be used for gas content units	
Listing	Compliance with Gas Content requirements will result in listing in the Certified Products Directory (CPD) as “GCIA” (Gas Content Initial and After Weathering)	
% Minimum gas content Passing	90% or greater average initial gas content (10 units), 80% or greater average gas content (6 units for IGCC®/IGMA®) (10 units for IGMAC®) after weathering*. Each of the tested specimens shall have an argon gas concentration of 50% or greater (Testing with Argon only **)	
Gas Fill Test method	<p style="text-align: center;">Testing during normal durability test with Spark Emission Spectrograph (SES)</p> <p>For IGCC®/IGMA® (Test 10 test size units for initial gas content, test the 6 weathered test units for after weathering gas content) For IGMAC® (Test 10 test size units, the 4 weathered test units, and 6 HH test units for initial and after weathering gas content)</p>	
Glass for Gas Fill Testing	If Low-E is used, then must contain Low-E	
* It is recognized that actual production units may not necessarily be 90% or greater gas content but shall meet the manufacturer’s stated gas content values.		
** Gas content certification and testing of argon will cover other gases providing the same gas filling process is used. Special arrangements need to be made if regulatory compliance is required for gas content other than argon (see certification guideline A.GC.1).		
Provisional Certification Option 2 (RAC Testing & Fog)		
Standard Sample Fabrication Requirements	Test units for provisional certification will be made in conjunction with regularly fabricated units from the baseline set at the time of the regularly scheduled audit. <u>6 test units</u> in total are required to go through this phase of testing and are made in addition to the minimum amount required for baseline testing (and Internal Components if applicable).	USE OF RAC NOT APPLICABLE TO IGMAC® AT THIS TIME
Provisional Certification Test Method	6 test units will be initially tested for durability (& gas if applicable) & will then go into a chamber with high temperature & cycling pressure. Once removed, all units must test for durability (& gas if applicable) & meet the requirements of IGCC®/IGMA®. Fog testing will be required as well but will be completed w/ the use of the fog test units from the baseline set.	
Listing	Compliance with Provisional Certification testing requirement will result in listing in the Certified Products Directory (CPD) as “PC” until certification testing (ASTM E2190) is complete.	

NOTE: This document is intended to summarize certification requirements. A full description of program guidelines and requirements are available in the IGCC/IGMA and IGMAC procedural guide available online at www.igcc.org or by contacting the administrative office. Additional guidance is also available for unit attributes such as multiple airspaces, airspace materials (IC), capillary and breather tubes.



What Should an IGCC/IGMA or IGMAC Program Participant Expect/Prepare for During an IG Sample Fabrication and Audit?

In order to expedite test sample fabrication for an upcoming IGCC/IGMA or IGMAC fabrication and audit, please note the following.

PRIOR TO IGCC/IGMA OR IGMAC AUDITOR ARRIVAL:

- Review past inspection forms and this document. Review IGCC/IGMA website or directory or contact IGCC/IGMA if you have any questions.
- **You may cut glass, prepare spacer and muntins (IC) prior to the auditor's arrival**
- For IGCC®/IGMA® Have glass cut for min. 13 IG units (26 pcs. for dual pane) 14x20". Up to max of 17 IG units (34 pcs for dual pane) 14x20" may be produced for auditor sample labeling. For triple pane min. 15 IG units (45 pcs) 14x20". Up to max.19 IG units (57 pcs) 14x20".

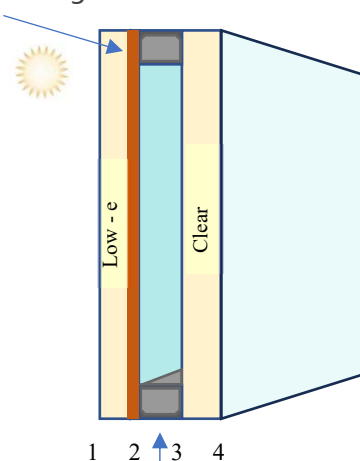
- For **IGMAC®** Have glass cut for min. 20 units (40 pcs. For dual pane) 14X20". Up to max of 24 IG units (48 pcs. For dual pane) 14X20" may be produced for auditor sample labeling. For triple pane min. 20 IG Units (60 pcs.) 14X20". Up to max of 24 IG units (72 pcs.) 14X20"
- If certification with coated (**low-e**) glass is desired, test units shall include one lite of coated glass per test sample. Note coated glass requirements.
- Spacers cut or bent, ready for desiccant filling, if necessary
- When testing, internal component, per category, should be prepared; at least 3 units for doubles, 5 units for triples for IGCC®/IGMA® & IGMAC® certification (muntins in 2x2 offset configuration), ready for desiccant-filling, if necessary.

DURING IGCC/IGMA OR IGMAC AUDIT AND FABRICATION:

1. **HAVE QUALITY MANUAL AND RECORDS AVAILABLE** - Auditor will verify that quality assurance requirements are met and review quality records. Have Quality Manual available and ensure records are up to date.
2. **PRODUCE TEST SAMPLES** - For fabrication, auditor will witness desiccant-filling, if necessary. Auditor will place labels on surface of glass on specimens during fabrication to identify specimens. When known, label should be applied to the #4 surface (or #6 surface if triple pane) of the test specimens, unless circumstances (location of any coated glass or fabrication processes/machinery, for example), dictate orientation of IG samples in a way that makes determining the #4 surface impractical or attempting to apply labels to the #4 surface unsafe. Auditor will witness sealant(s) application. Auditor will note the following:
 - Spacer type, size and manufacturer;
 - Application of desiccant and number of spacer sides filled with desiccant, if necessary;
 - Corner construction (square cut corners, bent corners, corner keys or fasteners, etc);
 - Glass thickness and size (14x20");
 - Primary sealant type and manufacturer;
 - Secondary sealant type and manufacturer (if dual seal);
 - Desiccant type and manufacturer;
 - Muntin type and manufacturer
 - Finished product labeling for IGCC/IGMA IGMAC requirements.
 - If gas content initial and after weathering (GCIA) certification is desired, auditor will witness gas operation of 14x20" test units.
 - When GCIA, all IG units shall include gas, minimum 90% initial gas content, except muntin units are not subject to gas content testing, only fog testing.

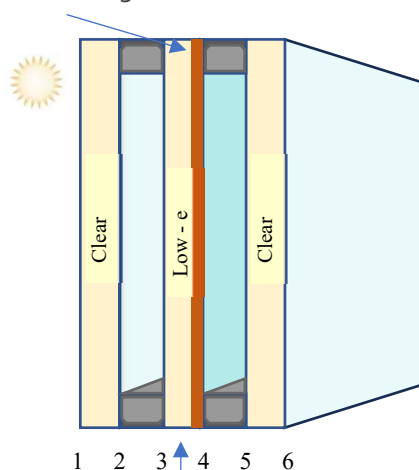
- Illustration of Low-e placement on test unit:

Low-e coating



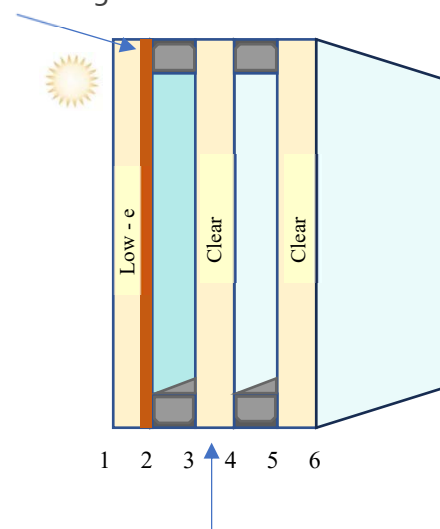
Dual Pane baseline units: 13 units (IGCC) 20-24 (IGMAC), low-e on exterior lite (surface 2 or 3)

Low-e coating



Triple Pane baseline units: 10 units (IGCC) 20-24 units (IGMAC), low-e on interior lite to test argon readings in both cavities (surface 3 or 4)

Low-e coating



Triple pane fog units: 5 units, low-e on exterior lite to test fog (surface 2 or 5)

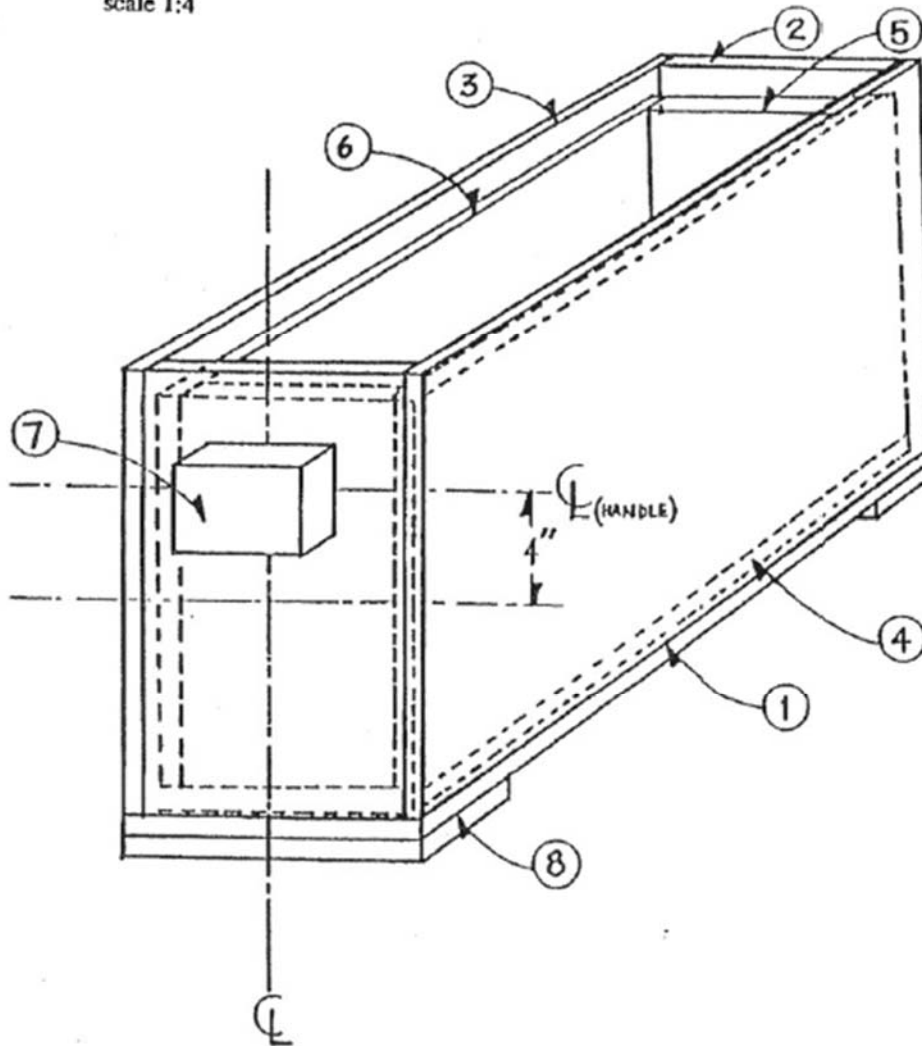
After IGCC/IGMA audit and fabrication:

- 1) Ship the IG test samples to the designated lab in a timely manner. Samples must be shipped within 28 days for IGCC®/IGMA® participants and 90 days for IGMAC® participants. Please see below recommended shipping box
- 2) Review audit documents for accuracy
- 3) Promptly address any noted corrective actions
- 4) Contact the IGCC/IGMA or IGMAC Administrative Office if you have any questions or need any assistance

Shipping Box

For insulating glass units

scale 1:4



Notes:

In order to maintain a reasonable weight (maximum 90 lb or 40kg) of the box and contents and to afford maximum protection to the units during shipping the following guidelines have been developed:

1. Use #8 – 2" wood screws (Robertson head) for assembly of the box
2. The handle (item 7) is centered as shown
3. When soft or sticky sealants are used (i.e. hot melt) apply silicone release paper along the inside surface of items 2 and 4 (where unit edges will touch)
4. (a) A maximum of 7 – ½" sealed double glazing units in one box
(b) A maximum of 5 – ¼" or ½" sealed triple glazing units in one box
5. Units are packaged resting on their longest edge, side by side and separated by a sheet of 1/16" corrugated cardboard (or equivalent); any excess space should be filled with additional sheets of the packing material.

Item	Qty.	Dimensions	Material
1	2	11 ½" by 24"	¼" plywood
2	2	10" by 16"	¼" plywood
3	2	16" by 24"	¼" plywood
4	2	10" by 22 ½"	1" extruded polystyrene
5	2	8" by 14"	1" extruded polystyrene
6	2	14" by 22 ½"	1" extruded polystyrene
7	2	5" long	2" by 4" spruce
8	2	4" by 11 ½"	¼" plywood