

# SD-060 SGCC LABORATORY MANUAL

SGCC’s attempt is to include in this one document all of the directives and instructions that have been issued to the testing laboratories since the inception of the SGCC certification program for safety glazing materials. These instructions are intended to clarify and supplement testing conducted in accordance with ANSI Z97.1 / CPSC 16 CFR 1201 (COMP), which is known as Composite testing. As of January 1<sup>st</sup>, 2013, SGCC included certification and testing to CAN/CGSB 12.1. CAN testing in conjunction with composite certification (COMP+CAN).

However, SGCC is 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. These guidelines can also be found at <https://sgcc.org/>.

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

Laboratories shall be aware of the responsibility they bear to the public in the testing of life safety materials; we know that you will strive to provide reliable accuracy and keep in mind your professional and ethical standards.

## **This Manual is divided into the Following Sections**

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## A. Communication, Administration and Reporting

**A.1 ISO Guide 17025 Compliance** (formerly **Instruction G.32**) - 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, and scope, in accordance with the SGCC applicable testing methods. SGCC views “qualified independent third party organizations” as either: IAS, A2LA, NVLAP, ANAB or SCC. Other organizations who have memorandums of joint recognition with any of these organizations may also be acceptable.

**A.2 Selection of Testing Laboratories** - Each certification program Licensee 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 Licensee.

**A.3 Test Fees** - Laboratories are contracted directly with the certification program (SGCC) and all testing invoices shall be paid by the administrative office with the exception of prototype samples. The Laboratory and the Licensee shall work directly for prototype testing fees and payment.

Each year the laboratory will have the opportunity to adjust lab testing fees. All fee changes must be submitted to the Administrative office by **September 15<sup>th</sup>** to reflect on the next year test fee schedule. If no response is received by this date, fees will remain unchanged. The Administrative office shall publish and make available to interested parties a fee schedule for all approved testing laboratories.

**A.4 Communication** (formerly **Instruction G.2**) - Upon selection of SGCC test samples, the samples become the property of SGCC. As such SGCC is the laboratory’s client and all communication by the laboratory shall be directed to SGCC. In situations such as facilitating shipping of test samples, testing schedules, or communicating label information, the lab should feel free to communicate requested information to the Licensee. For all other matters, communication shall be with the administrative office.

**A.5 Damaged Specimen** (formerly **Instruction G.3**) - Any damage to a specimen is to be noted on the Sample Receipt Form(s) (SRF) and the SRF returned to SGCC, immediately. You must state if the specimen was damaged before or after receipt at the laboratory. The laboratory should identify if the specimen(s) are in a condition suitable for testing. When any question exists as to the suitability for test of damaged specimen(s) or the entire set, the laboratory shall notify the administrative office who, in turn, shall seek the direction of the program Licensee. Specimen(s) with any damage (glass or shipping) should only be used as a last resort and only with the authorization of the administrative office. You will be notified within two (2) weeks as to disposition of the damaged specimens.

**A.6 Sample Receipt Form(s) - Review** (formerly **Instruction G.1**) - One of the 2 below procedures shall apply for processing SRFs:

1) **Upon initial laboratory approval**: When test samples are selected, SGCC will provide one SRF for each product selected and needing testing to the designated test laboratory. The SRF is to be matched with the test sample, completed and emailed to SGCC within three (3) days of the sample being delivered to the testing laboratory. SGCC will promptly review the SRF for completeness including test sample label information, and if appropriate, authorize testing to commence. The SRF will then be returned to the test laboratory. In cases where any sample (except prototype) arrives

without an SRF on hand, please contact the administrative office, **do not test the sample**. The administrative office will determine the status and advise you how to proceed.

2) **Upon demonstration of competence and when approved by the SGCC Administrator:** When test samples are selected, SGCC will email one SRF for each product selected and needing testing to the designated test laboratory. The SRF is to be matched with the test sample and completed including label information as it appears on the test samples. **The test laboratory shall determine if the label information complies with SGCC label requirements** (Reference SGCC Label Requirements found in the *Certified Products Directory (CPD)* or contact SGCC office with questions. When label information is in compliance, the laboratory may “self-authorize” and proceed directly with testing. When label information is not in compliance, the SRF(s) shall be emailed to the administrative office for **label failure** processing (see **Section B** for retention policy). Testing shall **not** proceed when label information is not in compliance, until authorized by SGCC. The laboratory is required to hold the sample(s) for 30 days. See **Section B**, and Section G.6c-d in the CPD for more information.

**A.7 Sample Receipt Form(s) - Complete** (formerly **Instruction G.1(3)**) - In either of the above situations (***Sample Receipt Forms Review***), the following information is to be listed on the sample receipt form (SRF) under the “Testing Laboratory” section:

- a) Verify the lab name and location
- b) Indicate the date the sample was received. If the sample was not received, write "NOT RECEIVED" and provide to SGCC.
- c) The sample size received.
- d) An indication if the samples are suitable to test, for laminated sample(s) include thickness. And verify that the laminate configuration falls within the ASTM C1036 Table 4 thickness tolerance for the thinnest makeup (provided to you on the SRF form)
  - i. One sample, the largest nominally, will require each lite thickness to be measured and recorded on the test report. Glass thickness is defined by ASTM C1036 Table 4.
- e) **The permanent label as it appears on each specimen.** If the label is the same on all specimens, write "ALL THE SAME" at the side of the label. You are **required** to utilize either the pencil method of transferring the permanent label instructions below), hand write the label information on the SRF, or provide a photo of the label.
  - i. ***It is extremely important that you accurately reproduce the permanent label since failure to meeting SGCC Label Requirements, can result in either a RETEST (RT) or decertification.***
- f) For patterned glass, the name of the pattern, if known.
- g) For tempered “Coated” glass - **A label**, or some form of indicator on the glass stating the presence of coating. (Yes or No)
- h) For tempered “Coated” glass - **Indicate the Presence of Metalized Coating (Yes / No)**

## i) Presence of SGCC paper selection labels (Yes or No).

Pencil Reproduction of Permanent Label

An error in copying onto the SGCC sample receipt form the permanent label from glass test specimens is readily avoided by lifting a pencil impression from the permanent label with clear tape and placing the tape on the sample receipt form (SRF).

For those permanent labels that are sand blasted or etched and many that are printed, a pencil reproduction can be made as follows:

1. Gently wipe away any foreign matter from the permanent label that might cause the pencil not to adhere.
2. Using a soft lead pencil, brush lightly over the permanent label.
3. Press a strip of transparent tape onto the pencil lead adhering to the permanent label.
4. Peel the tape, to which the lead will bond, off the permanent label and apply it in the area provided on the sample receipt form.

The completed SRF constitutes part of your test report to SGCC, the completed SRF **must** be included with the final test report. It is the only place you are to list label information.

If you are uncertain of any information relative to the SRF contact the administrative office for assistance.

**A.8 Authorization** (formerly **Instruction G.21**) - Any test conducted **without** an **SRF** from SGCC may be subject to **non-payment** (except prototypes).

**A.9 Distribution of Test Reports, Test Billing, and Identification** (formerly **Instruction G.20**) - Testing fees shall be invoiced and provided to the administrative office with final test report(s). Identify your report and your monthly invoice(s) with the sample designation from the top of the sample receipt form. This must include the SGCC number, year and certification period F or L (example: SGCC 9999 L24). **Testing fees should not be sent prior to the administrative office receiving the final test report(s) as they will be sent back for revisions if necessary.**

**A.10 Reports Format** (formerly **Instruction G.8**) - Reports shall be in a format similar to that provided by SGCC. (See attached SGCC sample test reports)

**A.11 Professional Engineer** (formerly **Instruction G.6**) - Testing shall be done in accordance with SGCC guidelines, the applicable test standards, this manual and reviewed by a professional engineer (PE). Each test report shall bear their PE seal or registration number and signature. In consideration of Lab manual guideline A10, SGCC requires an individual report (.pdf) per product (SGCC number). At the discretion of the laboratory, and per internal laboratory requirements, signatures may appear on each test report, or on some form of cover page/summary. This summary document must be signed on date of submission and include each associated reports number and be attached to each individual report.

**A.12 Test Reports** (formerly **Instruction G.4**) - Test reports of Certified SGCC Products must be provided to the administrative office, to no one else, and no later than thirty (30) days after receipt of test samples or authorization from SGCC to test. **Test reports that fail to meet 60-days shall incur penalty fees of 5% per test for each week overdue. Failure to meet a 6-month average test**

report turnaround time of 90-days shall be recommended to the Laboratory and QA Inspection Subcommittee for removal from the SGCC Approved Lab List.

**Key Notes:** Each month SGCC will send out Lab Progress reports that include specimens received at the Lab.

- It is the responsibility of the laboratory to track, adjust, and submit testing invoices to SGCC accordingly.
- The invoice should clearly indicate the penalty percentage adjustment per each test report.
- Any test report received after January 1, 2025 will be subject to this penalty fee.

**A.13 Laboratory Inspection** - Laboratory facilities shall undergo routine surveillance audit every two (2) years, as per the signed Lab Agreement. If conditions allow, these surveillance audits will alternate between virtual and physical visit at the discretion of the administrator.

## **B. Specimen Handling and Storage**

**B.1 Collect on Delivery (C.O.D)** (formerly **Instruction G.15**) - C.O.D. charges will not be repaid by the Administrator or SGCC.

**B.2 Shipping papers** (formerly **Instruction G.5**) - All shipping papers shall be kept by the lab as part of the applicable job file. If no shipping papers are received with the sample, indicate this on the sample receipt form (SRF). Shipping papers are NOT to be sent with the test report or SRF's.

**B.3 Handling and Returns** (formerly **Instruction G.14**) - Once you have received the SGCC test specimens you are absolutely forbidden to release them to anyone without explicit permission from the Administrator. This permission must come directly from the Administrator in writing. SGCC should be notified prior to relocation of specimens; shipping specimens to another testing facility without written permission from the Administrator may result in non-payment of testing.

**B.4 Retention of Specimens** (formerly **Instruction G.16**) - In the case where SGCC determines that the correct permanent label is not present, the Administrator will inform the licensee of the situation and direct the testing laboratory to commence testing no later than thirty (30) days hence. Until that time the testing laboratory is instructed to make these specimens available to the Licensee at the testing laboratory's convenience (the specimens are to remain at the testing laboratory) in order that the Licensee may point out or show them that, in fact, the correct SGCC permanent label is present or agrees that, in fact, the correct SGCC permanent label is not present. In cases of any dispute between the Licensee and the testing laboratory, the decision of the Administrator shall be final. The Licensee shall not be permitted to mark specimens after receipt at the testing laboratory. For retention instructions for laminated products whose thickness is deemed to be thicker than their thinnest certified construction, please see **Guideline E.4**.

The Administrator shall advise the testing laboratory to test the sample after the question of whether the correct label is present or not has been agreed to by the Licensee or when the thirty (30) day hold period expires. Please make notation on test report, for example, "Glass tested after 30-day hold".

## C. Testing and Equipment Operation

**C.1 Testing Priority** (formerly **Instruction G.24**) - Priority shall be given to all RETEST (RT) and ADDITIONAL samples.

**C.2 Certification Thickness** (formerly **Instruction G.26**) - For the purposes of certification, the thickness requirements of specification ASTM C1036, CEN or other nationally or internationally recognized thickness specifications shall apply. A copy of the thickness tolerance range can also be found on the product(s) SRF.

**C.3 Measurements** (formerly **Instruction G.22**) - Overall size of a specimen must be reported in inches to the accuracy required in ASTM C1036. Common fractions are satisfactory. If you use decimal fractions you must round off to the nearest one hundredth of an inch.

(Formerly **Instruction G.29**) When measuring the thickness of a specimen of glass, a minimum of two (2) measurements shall be taken at approximately the third points of each of two (2) contiguous sides. These readings shall be averaged for the reported thickness of the specimen.

**C.4 Non-Symmetrical (asymmetrical) Specimens** (formerly **Instruction G.18**) - Deleted (included in ANSI Z97.1-2015 5.1.3)

**C.5 Witness Testing** (formerly **Instruction G.7**) - Witness tests may be performed by an approved testing laboratory, utilizing Licensee's in-house test apparatus. The testing laboratory is fully responsible, and the impactor must have proof of calibration or be weighed prior to test by the laboratory representative.

**C.6 Equipment (Impactor)** (formerly **Instruction G.12** and **Instruction G.13**) - The impactor shall be permitted free fall when released from the release mechanism. Care should be taken to ensure no "wobble" is imparted during release. When testing samples other than tempered glass, the impactor is to be prevented from striking the specimen after the initial rebound.

**C.7 Equipment (Impactor)** (formerly **Instruction G.25**) - The terry cloth towel shall not be attached to the impactor (shot bag). It shall be suspended in front of the center of the specimen by masking tape, clothes pins or other suitable means.

**C.8 Center Punch** (formerly **Instruction G.30**) - ANSI Z97.1-2015 section 5.2.2 (1) states *“Place the specimen on the flat base and place the curb lightly along the specimen edges so the sample can elongate slightly ...”*. It has been suggested that in order to allow the sample to elongate the curbing should not be screwed or fastened rigidly but should be placed “along the specimen edge” and allowed to move with the sample upon breakage. Additionally, it has been suggested that there should be no deformation of the “flat base” from the weight of the test sample.

- Per the minutes 10.4.22.3 of the Certification Committee meeting, when selecting particles for evaluation, if any portion of a particle is outside the exclusion area, the entire particle would be considered for evaluation. See example:

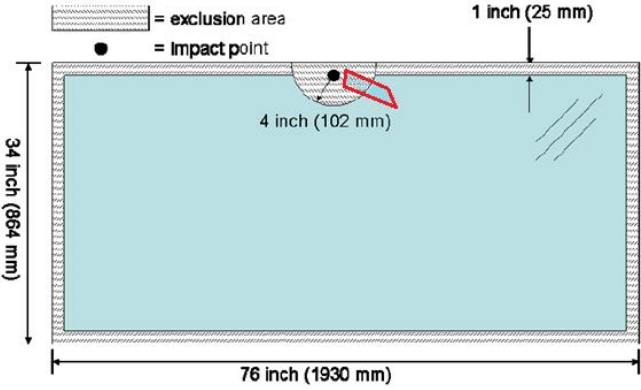


Figure 8: Center Punch Fragmentation ▢ Particle outside the exclusion area

**C.9 Composite (CPSC and ANSI) (formerly Instruction G.19)** - On Composite reports, four (4) specimens must be listed as ANSI Z97.1 and CPSC. Reference to CAN/CGSB 12.1 test of four (4) samples shall be at the discretion of the laboratory.

**C.10 Product Failure (formerly Instruction G.27)** - When a test criteria failure occurs, the following steps shall be taken to provide the SGCC Licensee opportunity to evaluate the nature of the failure. For all tempered product failures the ten (10) largest particles from each test specimen that is a possible failure must be kept for a period of (30) thirty days from report date. A digital representation (photo or shadowgraph) of all test criteria failure specimens shall also be maintained on file and included as part of your test report. For all laminated or organic coated product failures, digital photos shall be taken of the failure in the frame and representative pieces (minimum 12 by 12 inches) of the failed sample must be kept for thirty (30) days from report date. In regard to a label failure, see section B.4. Disposal or testing of samples may occur sooner with written permission from SGCC after SGCC has received written permission from the SGCC Licensee. Should laboratory errors occur and failing samples are not available for evaluation, replacement testing shall be done at laboratory expense.

**SECTION 6**  
**PHOTOS**

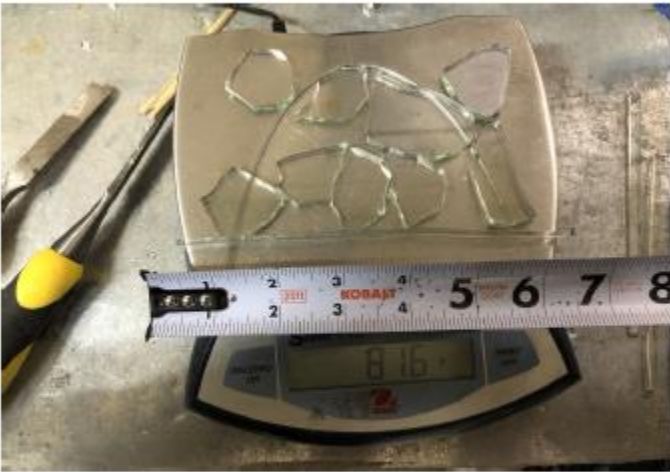


Photo No. 1  
Impact Specimen No. 3 Failure

Example photo shown, a form of reference scale should be included with photo, e.g., ruler, tape measure, forensic ruler, etc.

**C.11 Testing Standards - Interpretation** (formerly **Instruction G.28**) - ANSI Z97.1-2015 paragraph 5.1.3 (5) shall be interpreted to require the entire set, all individual specimens, to be tested regardless of the results of any individual specimen. This shall apply to all SGCC Testing.

**C.12 Impact Testing (Non breakage)** (formerly **Instruction G.11**) - All specimens that do not break during test are to be destroyed by the testing laboratory and disposed of as trash. A statement to this effect will be part of your report. (Largest piece remaining to be less than 12 by 12 inches)

**C.13 Standard Comparison** (formerly **Instruction G.31**) - On March 23, 2016 CPSC ruled, for the first time in 40 years, the US safety glazing community will be testing to a single test method (ANSI Z97.1-2015) <http://www.sgcc.org/Information.aspx>. SGCC acknowledges slight variability in tolerances between the ANSI / CPSC and CAN/CGSB standards as summarized below:

**C.14 Coated Glass Meters** - The following list of glass coating meters shall be viewed as acceptable for testing in the SGCC program when verifying coated glass (This list is derived from the ENERGY STAR Program Requirements for Exterior and Interior Storm Windows – Eligibility Criteria – Final Version 1.0 Section 5), dated September 2018):

- EDTM Glass Check PRO (#GC3000)
- EDTM Glass Check ELITE (#GC3200)
- EDTM #RC3175
- AZ Technology TEMP 2000A
- AZ Technology SRI 1000
- Devices & Services AE1/RD1
- Inglas TIR 100-2
- or equivalent

**C.15 Representative Key Parameters**

Parameter	ANSI Z97.1	CAN/CGSB 12.1
Drop Height	Class A = 48 - 48.5 inch (1219 – 1232 mm)	Class A = 48 - 48.5 inch (1219 – 1232 mm)
Drop Height	Class B = 18 – 18.5 inch (457 – 470 mm)	Class B = 18 – 18.5 inch (457 – 470 mm)
Steel Sphere	3.0 inch (76 mm) and 4.0 lb (18 N) (applied force)	3.0 inch (76 mm) and 4.0 lb (18 N) (applied force)
Acceptable Tempered Glass Particles	10 inch <sup>2</sup> (6452 mm <sup>2</sup> )	6452 mm <sup>2</sup>
Boil Test (Thermal Test) Samples	12 x 12 inch (305 x 305 mm)	305 mm x 305 mm
Pre-boil temp	150 ± 10°F (65.6 ± 6°C)	65.6°C ± 6°C (150°F ± 10°F)
Test Frame Members	3 x 5 x .25 inch (76 x 127 x 6 mm) steel angle or greater	76 mm x 127 mm x 6 mm Steel angle or greater
Sample Clamping	No more than 15%	No more than 15%
Weight of Impactor	100 lb ± 4 oz (45.4 ± 0.2 kg) after taping	45.4 kg ± 0.2 kg (100 lb ± 4 oz.) after taping



Test Sample Size (max)	34 x 76 ± 0.125 (1/8) inch (864 x 1930 ± 3mm)	864 x 1930 mm
Sample Conditioning Temp	65 – 85°F (18-29°C)	18°C and 29°C (65°F and 85°F)

## D. Tempered Glass Testing Instructions (Applies to Transparent and Patterned tempered)

**D.1 Impact Testing Instructions** (formerly **Instruction T.1**) - When impact testing a lite of tempered glass and disintegration occurs:

- a) Start stop watch.
- b) Quickly remove any particles that are held in the testing apparatus and place all parts of the specimen in one suitable location (preferably a box that slides under the impact frame). Note: A collection box painted a dull or flat black is usually best.
- c) In the presence of good lighting, conscientiously and quickly locate all particles that may possibly be included in the largest ten (10) and place in a container. (We find a small cardboard box or a weighing pan to be satisfactory.)
- d) The search should move continuously from one corner of the box diagonally to the other without skipping about until all possible particles are collected.
- e) Then spread these particles in a single layer. Beginning with the largest crack-free particle, remove any adhering pieces (we find this to be done easily by placing on a firm surface and tapping gently with the head of a bolt or cap screw, approximately 1/2 by 3 inches). Place the largest crack-free particle in the container. Continue with the next largest in this manner until you have selected ten (10).
- f) Refer to the stop watch and at exactly five minutes, place the ten (10) largest crack-free particles in an envelope for weighing at a later time. (It is satisfactory to weigh at this time.)
- g) Once the ten (10) largest particles have been selected, they must be weighed even though at or after five minutes some particles may disintegrate.
- h) A concerted effort must be made to complete the selection and isolation of the ten (10) largest crack-free particles in exactly five minutes.
- i) A conscientious search must be made in every case even though it takes longer than five minutes to complete. Please advise the Administrator of any situation that requires longer than five minutes.

**D.2 Reporting the Weight** (formerly **Instruction T.3**) - In reporting the weight of the ten (10) largest crack-free particles, round off to the nearest whole number in grams.

**D.3 Grooves or Bevels** (formerly **Instruction T.6**) - See Guideline T.7 in the CPD.

**D.4 Non-Symmetrical (asymmetrical) Bent Specimens** (formerly **Instruction T.7**) - Tempered bent patterned (TBP) glass and tempered channel glass likely are non-symmetrical from surface to surface and also are applicable to bent glass test requirements. The test standards state that if a test sample is non-symmetrical (asymmetrical) it should be impacted from both surfaces but there is also direction to impact bent glass only from the convex surface. In these situations the bent glass requirements supersede, Note “Channel Glass” and “TBP” should be tested as bent glass.

**D.5 Pattern Impression** (formerly **Instruction TP.1**) - Attach a copy of the pencil impression (or digital photo) of all pattern glass (not of each specimen unless they are different) to the sample

receipt form (SRF) and email to SGCC with the test report. (Formerly **Instruction TP.2**) - Indicate on the SRF or test report the name of the pattern if known.

**D.6 Reporting the Weight** (formerly **Instruction TP.3**) - One specimen must be weighed and the weight of ten square inches determined from the weight, width and height of that specimen to use for SGCC test purposes. Include as a part of your report the weight of the specimen weighed. (Formerly **Instruction TP.6**) - The weight of 10 square inches of patterned glass may be calculated using the following calculation (only applies to 34 X 76 inch test sizes).

$$\text{Weight of Lite (in lbs. to 1 decimal place)} \times 1.757 = \text{Weight of 10 square inches (in grams)}$$

**D.7 Measure Thickness** (formerly **Instruction TP.4**) - Thickness of Tempered Pattern Glass (TPG) shall be measured in accordance with the procedures in ASTM C1036.

**D.8 Measure / Validating Pattern Depth** – Using a micrometer with a fine tip point (*for example Mitutoyo Point Micrometer, Mechanical Counter Model*) measure the average min thickness, measure average max thickness using a flat surfaced attachment. Take the ratio of minimum to maximum thickness and using the table below to determine the Pattern Depth Class

<b>Patterned Depth Class</b>	<b>Ratio</b>
Shallow patterned glass	0.90 or above
Medium patterned glass	0.80 through 0.89
Deep patterned glass	0.79 or below

**D.9 Laboratory Technician training** – Per the minutes 10.3.18.3 of the Certification Committee meeting, it is mandated that any technicians either signing SGCC test reports (excluding Professional Engineer (P.E.)) of performing SGCC testing, are required to take and pass annually (Passing requirements = 100%) the SGCC Laboratory Interactive Animation training exam. Implementation of these changes were effective 1/1/2020. (revised 9/12/2023)

**E. Laminated Glass Testing Instructions: (For Additional Information See [Memo: Mandatory Changes to SGCC’s Laminated Certification Process](#))**

The concept for the SGCC Certification of laminated glass is that initial testing must be performed on two (2) sets of laminated glass units comprised of:

- 1.) **thinnest nominal** overall thickness constructed from two (2) lites of the thinnest nominal glass thickness to be used in a laminated glass construction for which certification is desired and
- 2.) **thickest nominal** overall thickness constructed from two (2) lites of the thickest nominal glass thickness to be used in a laminated glass construction for which certification is desired.

**E.1 Generic Interlayer Categories:** SGCC shall maintain a list of accepted interlayers per generic category. For a specific model of interlayer to be placed on the accepted list, weathering data and impact data to the applicable reference standard (ANSI Z97.1 / CPSC 16CFR 1202) must be submitted to SGCC. The below table is reproduced from the Certified Products Directory.

<b>Generic Code</b>	<b>Description</b>
(b)	Polyvinyl Butyral
(ip)	Ionoplast
(lc)	Liquid Resin-Multi Component
(lu)	Liquid Resin – UV Cure
(p)	Polyethylene Terephthalate

(f)	Fluorinated Ethylene Propylene
(u)	Polyurethane
(ev)	Ethylene-vinyl Acetate
(el)	Epoxy-liquid crystal polymer
(su)	Solid Resin UV cure

**E.2 Nominal Thickness** Nominal laminate thickness is not an exact or minimum thickness. It is a summation of the nominal thicknesses of the individual glass lites in the laminate; therefore, deviation around these values is expected.

Using metric glass thicknesses, the convention of “glass 1 + glass 2 (mm), interlayer thickness (mm) and SGCC interlayer designation” (i.e. 8,8 – 0.76b). This nomenclature gives tremendous flexibility and allows for rapid understanding and summation of overall thickness, thus leading to quick understanding of approvals based on thicknesses of components. Glass thickness is defined by ASTM C1036 Table 4.

Testing of 16 mm (5/8 in.) laminated glass (i.e. 8, 8 - 0.76b) or thicker covers all thicker laminated glasses with the same generic interlayer type.

**E.3 Measure Thickness** (formerly **Instruction L.1**) –

Each impact test specimen: measure the overall thickness.

One impact test specimen: After measuring the overall thickness of all impact specimens, use the specimen with the largest overall thickness to measure the thickness of each light of glass and the plastic interlayer.

One boil test specimen: After measuring the overall thickness of all boil specimens, use the specimen with the largest overall thickness to measure the thickness of each light of glass and the plastic interlayer.

**E.4 Procedure for Measuring Thickness** - Measuring thickness of plastic interlayer used in laminated glass, (Refer to Figure No. 1 on Page 11)

Note: The measurement of an interlayer using Procedure 1 is considered destructive to the specimen, Procedure 1 measurement shall be completed following testing.

Options if any part of the configuration (lite+interlayer+lite) is confirmed to be **thicker** than the thinnest certified configuration listed on corresponding SRF:

1. **Prior** to testing - please contact SGCC directly and await further direction before proceeding.
2. **Post** testing - a sample (minimum size 2” x 2”) shall be labeled with the Plant ID, SGCC number, and held for 30 days from the date the report was issued to SGCC.

Procedure 1:

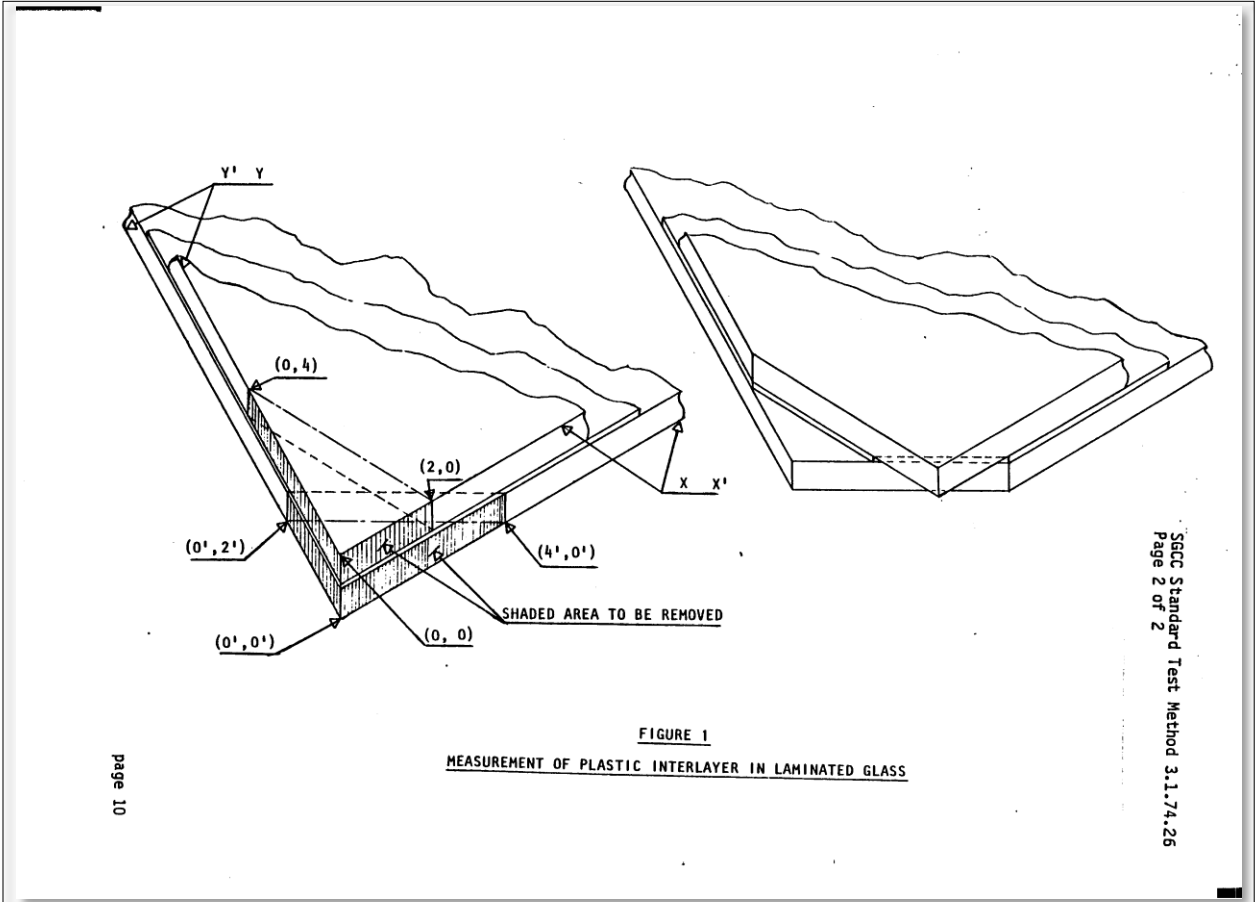
1. Measure the thickness of the laminated sheet in three places; Compute the average.
2. At a corner of the sheet, score the glass on one side from (0, 4) to (2, 0) using an ordinary glass cutter.
3. Turn the sheet over and score the other side from (0', 2') to (4', 0').
4. Using a pair of cut running pliers, such a Red Devil #1936, run each of these scores, taking care not to crush the glass.

5. Warm the corner by contact with a hot plate, or steam bath, turning every few seconds, until the plastic starts to soften, separate and remove the two triangles of glass with a tool such as a flat screwdriver, or knife.
6. Scrape the newly exposed glass surfaces clean and measure each glass layer with a calibrated micrometer.
7. Subtract the sum of the glass thicknesses from the average thickness of the laminated sheet.
8. Report the difference as the thickness of the plastic interlayer.

Procedure 2:

1. Measure the thickness of two (2) steel gauge blocks having nominal thicknesses of 0.125 and 0.500 inches. Measurement is to be made with a calibrated micrometer.
2. Calibrate the ultrasonic thickness gauge using the above steel gauge blocks as the standard. Note that calibration of the ultrasonic thickness gauge prior to each use and the use of couplers are required.
3. Measure the overall laminated sheet thickness at three (3) places near the corner selected. Compute the average of these readings.
4. Measure each lite of glass in the laminated sheet at the corner selected in step 3 above. Record these two (2) thicknesses and total them.
5. Subtract the total of the two (2) thicknesses obtained in step 4 above from the average thickness of the laminated sheet.
6. Report the difference as the thickness of the plastic interlayer.

**NOTE:** An ultrasonic thickness gauge demonstrating an accuracy of +/- 0.001 inches is mandatory. The transducer employed shall have a diameter of 0.500 to 1.000 inches. The frequency may be 2.25 MHz, 5.0 MHz or 10 MHz.



**E.5 Measure Surface Temperature** (formerly **Instruction L.6**) - Lab shall measure laminated glass surface temperature on the first lite of each thickness tested within one minute prior to impact. Any appropriate temperature measuring method shall be acceptable including the application of a thermocouple directly to the glass. Measurements shall be taken until stable temperature readings are achieved between the required 65-85°F range. Temperature readings are assumed to be stable if variation is less than one (1) degrees F in one (1) minute.

**E.6 Impact Testing** (formerly **Instruction L.2**) - Report any opening caused by the impact to the nearest half inch. This is the diameter of the largest sphere that will freely pass through the opening.

**E.7 Boil Test Failure** (formerly **Instruction L.3**) - Routine samples: Any specimen that is reported by the laboratory to have failed the boil test must be retained by the laboratory for a minimum period of thirty (30) days from the date of test or until notified by SGCC to dispose of the specimen.

**E.8 Ongoing Laminated Certification** - Ongoing certification testing shall be performed with the thinnest thickness certified from that set with the same glass Kind and the same thickness and type of interlayer used in the original certification. If the thinnest laminated sample is not provided contact SGCC office and do not test the sample. SGCC will determine the status and advise you how to proceed. *Guidance for the SGCC Certification of Laminated Glass* can be found at <https://www.sgcc.org/laminated-glass>.

**F. Plastics Testing Instructions**

**F.1 Plastic Properties** (formerly **Instruction P.2**) - Many plastics have directional properties, therefore, cut all test specimens for Charpy impact testing at the same time and be certain that all were parallel to each other prior to cutting. Also make certain that the same surface (as cut from the original sheet) is exposed to radiation and tested in tension.

**F.2 Reporting Thickness** (formerly **Instruction P.3**) - Include in your report the thickness of each specimen. Submit as a part of your report two pieces one (1) by two (2) inches, each marked with the sample designation from the top of the sample receipt form (SRF) (for IR scan).

**F.3 Testing Instructions** (formerly **Instruction P.4**) - The following instructions also apply to patterned plastics: D.5, and D.7.

## **G. Organic Coated Glass Testing Instructions**

**G.1 Organic Coated Glass Testing** (formerly **Instruction OC.1**) - The sample will consist of five (5) specimens; you will select at random four (4) specimens for impact test and use the remaining specimen to cut samples for simulated weathering tests (if the impact specimens are broken to preclude cutting from them).

Include in your report the overall thickness of each specimen. For one (1) impact specimen report the plastic film thickness. Use the SGCC standard test method as stated below:

### **IMPACT TEST SPECIMENS**

1. After the impact test, select one of the larger pieces of material, not cracked and separate it from the remainder by slicing the film around the glass piece perimeter.
2. Measure the combined glazing material thickness and mark the spot where the measurement is taken.
3. Remove all of the organic coating over the spot marked in Step 2. Measure the glass thickness at this spot and subtract from the result of Step 2 to get coating thickness.

Measurements should be taken in spots of maximum glass thickness using a micrometer having a measuring surface area of no less than 0.049 square inches (diameter greater than or equal to 0.250 inches).

Care shall be exercised such that the spot selected for measurement shall not be one at which delamination has occurred either by the film having been temporarily pulled free during impact or subsequent handling or by the inclusion of fragments of glass under the film.

If the measuring instrument is such that it is not possible to satisfy the above condition due to an inability to take a measurement far enough inside the perimeter of the piece then the glazing material piece may be cut. A clean cut is made by first slicing the film, then cutting the glass.

**G.2 Cutting Tool** (formerly **Instruction OC.2**) - One inch and one half inch razor cutters are available from Pressure Sensitive Tape Council; 1201 Waukegan Road; Glenview, Illinois 60025. Caryl Twitchell advises that new razor blades be used for cutting each specimen.

# TYPICAL TEMPERED GLASS REPORT

**Sections written in Red  
commonly forgotten in Test  
Reports.**

**Verify ALL information on  
this form is present before  
submission to SGCC.**

REPORT NO.  
TEST DATE:  
REPORT DATE:

Rendered to: Safety Glazing Certification Council  
Attn: Mr. Terry Schaefer  
PO Box 730  
Sackets Harbor, NY 13685

Report on: Impact Testing on Safety Glazing Material

- SGCC-9999 L17; SGCC Licensee Name & Location **(Company Name - Location)**
- Test Size: 34 x 76-inches. **(Sample Dimensions)**
- All test specimens were destroyed by test or by our personnel and have been disposed of as trash.

Description of typical specimen: 3/16 inch; Category, Classification  
“Tempered Patterned Glass” **(Glazing Type: TTG, TPG, etc.)**

**Coating: Presence of Metalized Coating (Yes / No)**

Pattern: Pattern xx Weight of one lite: 37.0 lbs **(Specimen Weight)**

Pattern Depth Classification: Shallow, Medium, or Deep. **(Pattern Depth)**

Temperature: 74°F **(Temperature)**

Testing in accordance with ANSI Z97.1; CPSC 16 CFR 1201; & CAN/CGSB 12.1 as indicated

	Test Standard	Thickness (inch)	Impact Drop Height (inch)	Center Punch <sup>1</sup> (Yes / No)	Weight of Largest ten particles (grams)	Maximum Weight Permitted (grams)
1 *	ANSI /CAN	0.188	48	Yes	25	65
2 **	ANSI /CAN	0.185	48	No	19	65
3 *	ANSI /CAN	0.188	48	Yes	47	65
4 **	ANSI /CAN	0.187	48	Yes	20	65

\* = Smooth Side Out / Non-Coated Side Out

\*\* = Rough Side Out / Coated Side Out

All specimens were impacted once from the select drop height unless noted otherwise.

Remarks: Meets the impact requirements of the referenced standards for the size classification listed

Under Supervision of:

In Charge of Tests:

Professional Engineer **(including PE Stamp or registration number)**

## TYPICAL LAMINATED GLASS REPORT

REPORT NO.:  
 TEST DATE:  
 REPORT DATE:

Rendered to: Safety Glazing Certification Council  
 Attn: Mr. Terry Schaefer  
 PO Box 730  
 Sackets Harbor, NY 13685

**Sections written in Red  
 commonly forgotten in Test  
 Reports.**

**Verify ALL information on  
 this form is present before  
 submission to SGCC.**

- Report on: Impact Testing on Safety Glazing Material
- SGCC-9999 L16; SGCC Licensee & Location (**Company Name - Location**)
- Test Size: 34 x 76-inches for Impact Test  
 12 X 12-inch for Boil Test (**Information on Boil Samples**)

All test specimens were destroyed by test or by our personnel and have been disposed of as trash.

Glass Kind: (**AN, HS, FT, CS**) LSG  
 Weight of one lite: 54.4 lbs; (**Weight**)  
 Temperature: 74° (**Temperature at time of impact**)  
 Interlayer Supplier, Brand, and Formulation (**Interlayer Manufacturer, Type, and thickness**)

Testing in accordance with ANSI Z97.1-####; CPSC 16 CFR 1201; & CAN/CGSB 12.1-#### as indicated.

### BOIL TEST RESULTS:

Spec. No.	Test Standard	Overall Thickness (inches)	Results	Allowed
1	ANSI /CAN 16 CFR 1201	0.244	No cracks or bubbles	No bubbles or defects more than 1/2" from outer surface
2	ANSI /CAN 16 CFR 1201	0.244	No cracks or bubbles	No bubbles or defects more than 1/2" from outer surface
3	ANSI /CAN 16 CFR 1201	0.244	No cracks or bubbles	No bubbles or defects more than 1/2" from outer surface

Boil Thickness Specimen No. X = \_\_\_\_\_ (**Overall Thickness**)  
 Lite #1 Thickness = \_\_\_\_\_ (**Lite 1 Thickness**) Defined by ASTM C1036.  
 Interlayer Thickness = \_\_\_\_\_ (**Thickness of Interlayer**)  
 Lite #2 Thickness = \_\_\_\_\_ (**Lite 2 Thickness**) Defined by ASTM C1036.



**IMPACT TEST RESULTS:**

Spec. No.	Test Standard	Overall Thickness (inches)	Impact Drop Height Inches	Results	Allowed
4	ANSI/CAN	0.244	48	No shear or opening	No shear or opening >3" diameter
5	ANSI/CAN	0.244	48	No shear or opening	No shear or opening >3" diameter
6	ANSI/CAN	0.244	48	1/2" X 4" opening	No shear or opening >3" diameter
7	ANSI/CAN	0.244	48	No shear or opening	No shear or opening >3" diameter

Remarks: Meets the impact requirements of the referenced standards for the size classification listed

Thickness Specimen No. X = \_\_\_\_\_ (Overall Thickness)  
 Lite #1 Thickness = \_\_\_\_\_ (Lite 1 Thickness) Defined by ASTM C1036.  
 Interlayer Thickness = \_\_\_\_\_ (Thickness of Interlayer)  
 Lite #2 Thickness = \_\_\_\_\_ (Lite 2 Thickness) Defined by ASTM C1036.

Under Supervision of:

In Charge of Tests:

Professional Engineer (including PE Stamp or registration number)

<b>Revision List</b>	
<b>Revision Date</b>	<b>Revisions</b>
October 20, 2000	Numerous revisions
July 17, 2007	Numerous revisions
October 18, 2007	Addition of G.27
October 16, 2008	Addition of revision list and Guideline G. 28 and G.29
February 1, 2011	ANSI Z97.1-2009 center punch test, G.30 added
October 25, 2011	Addition of T.7
September 16, 2013	Addition of CAN/CGSB 12.1; intro, G.19, G.31, reports
September 16, 2013	Require 3 <sup>rd</sup> party accreditation to ISO 17025 (G.32)
March 29, 2016	Revised format of Lab Manual, changes in CPSC, and ANSI Z97.1-2015
September 15, 2021	A.3 Revised to add fee changes submission date
	A.10 Revised and added to sample forms at the end of the manual
	A.11 Section added for test report signature requirement info
	A.13 Section added allowing for virtual inspections
	C.4 Revised to clarify tested of coated samples
	C.14 Added Coated glass directions
	C.15 Updated the Representative Key Parameters table for 2017 CAN/CGSB
	D.8 Added section on taking pattern depth measurements
	E.1 Added Solid Resin UV Cure
	E.2 Modified Chart
	E.4 Added Note
October 4, 2022	Updated C.8 to include particles originating from the exclusion area, and added D.9
February 13, 2023	Updated all CAN/CGSB and ANSI Z97.1 references to imply most current year of Standard.
September 13, 2023	B.3 Added information regarding relocation of test samples
	C.10 Example photos added
	D.9 Further definition regarding lab personnel signing an SGCC test report
	Added Glass Kind to Typical Laminated Glass Report section
July 1, 2024	Amended Laminated Glass Testing Instructions to reflect new Laminated Certification requirements.
August 21, 2024	Numerous revisions based on Updated Laminated Certification Guidance Document
	A.9 Reiteration of Test Billing protocol
	A.12 Added Penalty fee protocol for overdue test reporting
	E.4 Added further definition of laminated specimens to be measured for configuration thickness