UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MD 20814

This document has been electronically approved and signed.
DATE: March 2, 2016

BALLOT VOTE SHEET

TO: The Commission
Todd A. Stevenson, Secretary

THROUGH: Stephanie Tsacoumis, General Counsel
Patricia H. Adkins, Executive Director

FROM: Patricia M. Pollitzer, Assistant General Counsel
Hyun S. Kim, Attorney, OGC

SUBJECT: Final Rule to Amend the Safety Standard for Architectural Glazing Materials

BALLOT VOTE DUE March 8, 2016

The Office of the General Counsel is providing for Commission consideration the attached draft final rule for publication in the *Federal Register*. The rule would amend the Commission's regulations at 16 C.F.R. part 1201 by replacing the testing procedures provided at 16 C.F.R. § 1201.4, with the voluntary standard, ANSI Z97.1-2015, *American National Standard for Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.*

Please indicate your vote on the following options:

I. Approve publication of the attached document in the *Federal Register*, as drafted.

_____ _____
(Signature) (Date)

II. Approve publication of the attached document in the *Federal Register*, with changes. (Please specify.)

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_____ _____

(Signature) (Date)

III. Do not approve publication of the attached document in the *Federal Register*.

_____ _____

(Signature) (Date)

IV. Take other action. (Please specify.)

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_____ _____

(Signature) (Date)

Attachment: Draft *Federal Register* Notice: Final Rule; Safety Standard for Architectural Glazing Materials

Billing Code 6355-01-P

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Part 1201

[CPSC Docket No. CPSC-2012-0049]

Safety Standard for Architectural Glazing Materials

AGENCY: Consumer Product Safety Commission.

ACTION: Final Rule.

SUMMARY: The Consumer Product Safety Commission ("CPSC" or "Commission") amends the Safety Standard for Architectural Glazing Materials (16 CFR part 1201) to replace the testing procedures for glazing materials in certain architectural products, set forth in 16 CFR 1201.4, with the testing procedures contained in the voluntary standard, ANSI Z97.1-2015, *American National Standard for Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.*

DATES: The rule will become effective on [INSERT DATE THAT IS 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]. The incorporation by reference of the publication listed in this rule is approved by the Director of the Federal Register as of [INSERT DATE THAT IS 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

FOR FURTHER INFORMATION CONTACT: Brian Baker, Project Manager, Division of Mechanical Engineering, Directorate for Laboratory Sciences, Office of Hazard Identification and Reduction, Consumer Product Safety Commission, 5 Research Place, Rockville, MD 20850; telephone: 301-987-2289; bbaker@cpsc.gov.

SUPPLEMENTARY INFORMATION:

I. *Background*

A. *Safety Standard for Architectural Glazing Materials*

On January 6, 1977 (42 FR 1427), as amended on June 20, 1977 (42 FR 31164), the Commission issued the Safety Standard for Architectural Glazing Materials under the Consumer Product Safety Act ("CPSA") to reduce or eliminate risks of injuries associated with walking, running, or falling through or against glazing materials ("CPSC standard"). The standard applies to glazing materials used or intended for use in any of the following architectural products:

(1) Storm doors or combination doors;

(2) Doors (both exterior and interior);

(3) Bathtub doors and enclosures;

(4) Shower doors and enclosures; and

(5) Sliding glass doors (patio-type).

The standard applies to glazing materials and architectural products incorporating glazing materials that are produced or distributed for sale to or for the personal use, consumption or enjoyment of consumers in or around a permanent or temporary household or residence or in recreational, school, public, or other buildings or parts thereof. The standard was codified at 16 CFR part 1201.

The standard exempts the following products, materials, and uses:

(1) Wired glass used in doors or other assemblies to retard the passage of fire where such door or assembly is required by federal, state, local, or municipal fire ordinance;

(2) Louvers of jalousie doors;

(3) Openings of doors through which a 3 inch diameter sphere is unable to pass;

(4) Carved glass (as defined in section 1201.2(a)(36)), dalle glass (as defined in section 1201.2(a)(37)), or leaded glass (as defined in section 1201.2(a)(14)), which is used in doors and glazed panels (as defined in sections 1201.2(a)(7) and (a)(10)) if the glazing material meets all of the following criteria:

(i) The coloring, texturing, or other design qualities or components of the glazing material cannot be removed without destroying the material; and

(ii) The primary purpose of such glazing is decorative or artistic; and

(iii) The glazing material is conspicuously colored or textured so as to be plainly visible and plainly identifiable as aesthetic or decorative rather than functional (other than for the purpose of admitting or controlling admission of light components or heat and cold); and

(iv) The glazing material, or assembly into which it is incorporated, is divided into segments by conspicuous and plainly visible lines.

(5) Glazing materials used as curved glazed panels in revolving doors; and

(6) Commercial refrigerator cabinet glazed doors.

16 CFR 1201.1(c).

On September 27, 1978, (43 FR 43704), the Commission amended the standard to clarify the definitions, description of test apparatus, and test procedures in the standard. The Commission subsequently revoked portions of the standard that prescribed requirements for "glazed panels" (45 FR 67383, August 28, 1980); an accelerated environmental durability test for plastic glazing materials intended for outdoor exposure (45 FR 66002, October 6, 1980); and a modulus of elasticity test, a harness test, and an indoor aging test applicable to plastic glazing materials (47 FR 27853, June 28, 1982). 16 CFR 1201.1(d) n.1. Tempered glass, wired glass,

and annealed glass are also exempt from the accelerated environmental durability tests. 16 CFR 1201.4(a)(2).

B. Petition

On June 26, 2012, the Commission received a petition from the Safety Glazing Certification Council ("SGCC" or "petitioner") requesting that the Commission initiate rulemaking to replace the testing procedures for glazing materials in certain architectural products set forth in 16 CFR 1201.4 with the testing procedures contained in the voluntary standard, ANSI Z97.1-2009$^{\epsilon 2}$, *American National Standard for Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test* (the ANSI standard). SGCC stated that consumers and the glazing industry would be better served if the test procedures for glazing materials used in architectural products in 16 CFR 1201.4 were replaced with the ANSI standard because the ANSI test procedures are more efficient and modern, having been updated periodically, in contrast to the CPSC standard. On April 9, 2013, the Commission voted to grant the petition.

C. *The Proposed Rule*

On May 22, 2015, the Commission published a notice of proposed rulemaking ("NPR") in the Federal Register (80 FR 29555) to amend the Safety Standard for Architectural Glazing Materials (16 CFR part 1201). The NPR proposed to replace the testing procedures for glazing materials in certain architectural products, set forth in 16 CFR 1201.4, with the testing procedures contained in the voluntary standard, ANSI Z97.1-2009$^{\epsilon 2}$. The ANSI standard establishes specifications and methods of testing for the safety properties of glazing materials used for building and architectural purposes. The tests for safety glazing materials in the ANSI

standard include impact, center punch fragmentation, thermal, weathering, indoor aging, hardness, and modulus tests.

The NPR proposed to replace the CPSC test procedures in 16 CFR 1201.4 with the ANSI Z97.1-2009^{e2} to clarify the existing test procedures. The clarifications included replacing obsolete ASTM standard references in the CPSC standard, 16 CFR 1201.4(b)(3)(ii), with current references, and replacing the impact test construction drawings in section 16 CFR 1201.4(b), with larger and clearer construction assembly drawings in ANSI Z97.1-2009^{e2}. The NPR also proposed to clarify the method and number of specimens to be impact tested and the procedures for evaluating tempered glass by using a "Center Punch Fragmentation Test," to provide a more accurate and efficient way of measuring potential failures from impact tests for tempered glass.

ANSI Z97.1-2009^{c} provided three impact categories for testing: a 400 foot-pound impact test (Class A); a 150 foot-pound impact test (Class B); and a 100 foot-pound impact test (Class C) for fire-resistant wired glass. The NPR did not propose to modify the impact categories for testing. The CPSC standard provides only two impact categories, 150 foot-pound impact test (Category I) and 400 foot-pound impact test (Category II), 16 CFR 1201.4(d). Accordingly, the NPR proposed to keep the CPSC standard's Category I and Category II test because these tests were the equivalent of the ANSI Class B test and Class A test, respectively. However, the Commission did not propose the Class C test in the ANSI Z97.1-2009^{e2} standard because it was only applicable to fire-resistant wired glass, a product that is exempt from the CPSC standard.

The Commission explained in the preamble to the NPR that the proposed amendment replacing the test procedures specified in the CPSC mandatory standard with the test procedures

in the ANSI Z97.1-2009$^{\epsilon 2}$ standard would not involve a material change to the Commission's regulations at 16 CFR part 1201. Under section 9 (h) of the CPSA, if an amendment of a consumer product safety rule "involves a material change," 15 U.S.C. 2058(h), the Commission must make certain findings, including a finding that the amendment is "reasonably necessary to prevent or reduce an unreasonable risk of injury associated with such product"; the expected benefits of the amended rule "bear a reasonable relationship to its costs"; and the amended rule imposes "the least burdensome requirement which prevents or adequately reduces the risk of injury for which the rule is being promulgated." *Id.* §§ 2056(a); 2058(a)-(g). If the amendment does not constitute "a material change" for purposes of section 9(h) of the CPSA, the Commission is not required to make the findings that are otherwise required for the amendment of a consumer product safety rule.

The Commission stated that the proposed amendment adopting the ANSI Z97.1-2009$^{\epsilon 2}$ test procedures would not involve a material change that would alter the original basic purpose of the CPSC standard to assess the safety of architectural glazing materials because: (1) the ANSI Z97.1-2009$^{\epsilon 2}$ test procedures, if adopted, would serve to clarify the existing test procedures and update outdated references to current test methods; (2) the proposed amendment would be unlikely to have an important or significant impact on the safety of consumers because testing to either standard provided consistent and comparable test results; and (3) the ANSI Z97.1-2009$^{\epsilon 2}$ test procedures would not impose any additional burdens on the regulated industry and would result in less redundant, more efficient, and less costly testing of the architectural glazing materials.

D. *Revised ANSI Standard*

When the NPR was published on May 22, 2015, ANSI Z97.1-2009$^{\epsilon 2}$, *American National Standard for Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test* was the voluntary standard in effect. On September 24, 2015, a new version of ANSI Z97.1-2015 was published. ANSI Z97.1-2015 contains updates to several sections of ANSI Z97.1-2009 $^{\epsilon 2}$. The most significant update in ANSI Z97.1-2015 is that ANSI Z97.1-2015 removed the Class C impact category (100 ft-lb impact test) for fire-resistant wired glass. ANSI Z97.1-2015 now requires all safety glazing materials, including wired glass, to conform to Class A (400 ft-lb) or Class B (150 ft-lb) impact test requirements.

In addition, ANSI Z97.1-2015 updates references and makes minor organizational and terminology changes. Other clarifications that were made to the test methods in ANSI Z97.1-2015 include the following:

- removes the need for weathering tests for specimens constructed of laminated, organic coated or plastic glazings if certain criteria are met (4.6);
- specifies that laminated and organic-coated glazing optical measurements may be taken on an unexposed sample (4.6.2);
- specifies the evaluation criteria for shot bag impact procedures for glazing materials (5.1.4);
- clarifies the center punch fragmentation test and procedure on tempered glass specimens (flat glass and bent glass) and interpretation of results on tempered glass specimens and equipment (5.2 – 5.2.4);
- clarifies the procedure for thermal test for laminated and organic coated glazings (boil testing and bake testing) (5.3-5.3.3); and

- clarifies the procedure for weathering methods for laminated, organic-coated and plastic glazings (5.4-5.4.3).

II. *Response to Comments on the Proposed Rule*

The Commission received nine comments on the NPR. Commenters include members of the Accredited Standards Committee of ANSI, Advocates for Safe Glass, the Glass Association of North America ("GANA"), Eastman Chemical Company, the SGCC, and SaftiFirst, Inc.

Incorporation by Reference

All of the commenters support substituting the CPSC test procedures in 16 CFR part 1201 with the ANSI standard, if the Commission adopts the more recent ANSI Z97.1-2015 test procedures, rather than ANSI Z97.1-2009$^{\epsilon 2}$. Several commenters request that the Commission not adopt a specific year version of the standard, but rather, adopt a more generic phrase, such as "most current version" of the ANSI standard, to ensure that the incorporation by reference always refers to the current version of the ANSI standard, rather than a specific version.

Response

Although we recognize that the ANSI standard will be revised in the future, the Director of the Office of the Federal Register requires that publication of a document containing an incorporation by reference must specify the edition of the publication that is approved. The regulations governing incorporation by reference specifically provide that "[i]ncorporation by reference of a publication is limited to the edition of the publication that is approved. Future amendments or revisions of the publication are not included." 1 CFR 51.1(f). Accordingly, the Commission cannot issue a rule that mandates "the most current version" of the ANSI standard, but rather, must identify the specific version of the standard. Therefore, the rule incorporates by

reference the ANSI Z97.1-2015 version. If a new version is issued in the future, the Commission will consider revising the CPSC standard to refer to the updated ANSI standard at that time.

Class C Fire-Resistant Rated Wire Glass

Many of the commenters state that the ANSI Z97.1-2015 version is an improvement of the ANSI Z97.1-2009$^{\epsilon 2}$ standard because the 2015 version eliminates the testing of fire-resistant rated wire glass under a lower Class C impact test procedure. One commenter states that the scope of the materials covered by the CPSC standard is now congruent with ANSI Z97.1-2015 because wired glass is exempt from the CPSC standard. Another commenter states that the wired glass product causes serious and fatal injuries and that CPSC should not expand the scope of the exemption for wired glass by accepting a lower Class C requirement.

Response

The current version of the ANSI standard, ANSI Z97.1-2015, eliminates the testing of fire-resistant wired glass under a lower Class C impact test procedure. The CPSC standard exempts fire-resistant wired glass. The scope of the exemption for the wired glass under 16 CFR 1201.1(c)(1) has always been narrow: first, the wired glass must be used in a door (or other assembly subject to the rule); second, the wired glass must be used "to retard the passage of fire" and third, the particular use of the wired glass must be required by a federal, state, local, or municipal fire ordinance. Thus, the use of wired glass, even in fire doors, is not automatically permitted in all locations or all jurisdictions. Rather, it must be demonstrated that the particular use is required by law for fire safety.

The Commission believes that the architectural glazing industry is evolving and that the industry is developing technology to improve glazing materials so that they can meet the ANSI Z97.1-2015 Class A and Class B impact tests. To give the industry adequate time to comply

with the new testing requirements, including fire- resistant wired glass, the Commission will not remove the exemption in the CPSC standard at this time. Accordingly, the Commission will continue to exempt fire-resistant wired glass under the current exemption under the circumstances set forth in 16 CFR 1201.1(c)(1). However, the Commission finds that additional clarification is necessary to reduce confusion regarding the terminology for impact categories used by ANSI and the CPSC. As stated, 16 CFR 1201.4(d) provides two impact categories, 150 foot-pound impact test (Category I) and 400 foot-pound impact test (Category II). ANSI Z97.1-2015 does not use the same terms, but instead, uses terms "Class A" and "Class B" to delineate impact test drop height requirements. Category I products are impact-tested to the drop height requirement applicable to Class B products (18 inches to 18.5 inches), and Category II products are tested to the same height applicable to Class A products (48 inches to 48.5 inches). The Category 1 test is the equivalent to the Class B test (18 inches is 1.5 ft - 1.5 ft x 100 lbs = 150 ft-lb), and the Category II test is the equivalent of the Class A test (48 inches is 4 ft - 4 ft x 100 lbs = 400 ft-lb). To make sure that the references to the impact tests are consistent, the rule modifies the existing definitions under 16 CFR 1201.2 (a)(3) and (4) to add the words "Class B" with "Category I" and "Class A" with "Category II."

Other Clarifications

Several commenters note that ANSI Z97.1-2015 makes a number of substantive changes to the 2009 edition. The commenters state that, in addition to eliminating the Class C test category, ANSI Z97.1-2015 clarifies provisions in the weathering section (deleting and updating obsolete references and procedures), adds a bake test as an alternative to the boil test for thermal testing of laminated and organic coated glazings, and clarifies glass-shard contaminant for laminated and organic-coated glazings after impact testing.

Response

The Commission finds that the revisions made in ANSI Z97.1-2015 further clarify the ANSI test procedures by specifying the specimens used, and the criteria for when testing is not needed. The weathering tests do not affect the exemptions that are provided under 16 CFR 1201.1 for an accelerated environmental durability test for plastic glazing materials intended for outdoor exposure, as well as a modulus of elasticity test, a harness test, and an indoor aging test applicable to plastic glazing materials. The other changes help clarify language or more clearly set out procedures for testing. For example, the shot bag impact procedure is made clearer by setting forth evaluation criteria to assess the results of impact tests of glazing materials. The procedure for the center punch fragmentation test is made clearer by setting forth the procedure for flat glass separately from bent glass. Similarly, the boil test for laminated glass has been modified to change "boil" to "thermal" to reflect that the test may be conducted by either a heating chamber or boiling water and includes a bake test. These clarifications are consistent with the weathering tests in the CPSC standard under 16 CFR 1201.4(c)(3)(i), but they also add specificity and clarity to the tests. Accordingly, the additional revisions clarifying the test procedures in the ANSI Z97.1-2015 standard would not result in a material change to the testing requirements under 16 CFR 1201.4, because the basic purpose and provisions of the test methods in the standard are consistent with ANSI Z97.1-2015.

III. *Impact on Small Businesses*

In the NPR, the Commission certified that the proposed rule would not have a significant economic impact on a substantial number for small entities under the Regulatory Flexibility Act ("RFA"). 5 U.S.C. 601-612. The Commission did not receive any comments regarding this certification. For the final rule, the Commission's Directorate for Economic Analysis reviewed

the potential economic impact of adopting the updated ANSI Z97.1-2015 test procedures on small entities, including small businesses.

In the NPR, staff's review of the ANSI Z97.1-2009€2 standard showed that adopting the ANSI standard would not have a significant impact on a substantial number of small entities, and that manufacturers who currently test to both the ANSI standard and the CPSC standard will probably experience a cost neutral impact or a decrease in testing and certification costs. 80 FR 29560. Staff's review of the revisions to ANSI Z97.1-2015, and staff's review of the industry after the issuance of the NPR, indicate that the changes to the standard will not impact the testing or certification requirements for the small manufacturers, nor will the revisions change the rates of compliance with the CPSC standard or the ANSI standard.

In the NPR, staff's review showed that of the products certified through SGCC, 99 percent or 1,855 products were certified to both ANSI Z97.1-2009€2 and 16 CFR part 1201. Only 12 products (0.6%) were certified solely to ANSI Z97.1-2009€2, and seven products (0.4%) were certified solely to 16 CFR part 1201. A review of manufacturers from GANA's membership not participating in the SGCC program indicated that of the 35 manufacturers that provided certification information, 32 manufacturers certified their products to both standards, and three manufacturers listed certification to 16 C.F.R. part 1201 only. The NPR noted that of the 104 small domestic manufacturers, 102 certified their products to both standards, while only two certified solely to 16 CFR part 1201. 80 FR 29560.

Since the NPR, staff has reviewed the most recent data. As of November 23, 2015, of the products certified through SGCC, 99 percent or 2,047 products were certified to both the ANSI standard and 16 CFR part 1201. Only 17 products (<1%) were certified solely to the ANSI standard, and no products were certified solely to 16 CFR part 1201. SGCC began testing to

ANSI Z97.1-2015 upon publication of the standard, but SGCC did not require labs and manufacturers to conform to the updated testing protocol until January 2016. A review of manufacturers from GANA's membership who are not participating in the SGCC program indicated that of the 36 manufacturers that provided certification information, 34 manufacturers certified their products to both standards, and two manufacturers listed certification to 16 CFR part 1201 only. Regarding the small domestic manufacturers, all claim to certify their products to both standards. Accordingly, the number of products certified to both standards (99%) has remained consistent. The data continue to show that the vast number of products are certified to both standards, and all small domestic manufacturers for which information on certification was available, certify their products to both standards.

The expected impact of the final rule is to reduce the costs of certification for most manufacturers. All identified small manufacturers currently test to both the voluntary standard and the CPSC standard and will probably experience a decrease in testing and certification costs because they only would need to follow one testing protocol to certify to both standards. The number of samples a manufacturer needs to fabricate for testing also will be reduced, thus reducing certification costs. In addition, for manufacturers that contract out their testing, shipping costs will be reduced due to the smaller number of samples shipped. Accordingly, the Commission certifies that this rule will not have significant economic impact on a substantial number of small entities under section 605(b) of the RFA.

IV. *Final Rule*

After considering the comments, the Commission finds that the ANSI Z97.1-2015 test procedures, if adopted, would further clarify the test procedures that were established in ANSI Z97.1-2009[c2]. ANSI Z97.1-2015 removed the Class C impact test for fire-resistant wired glass.

However, that revision did not result in a material change to the Commission's regulations at 16 CFR part 1201 because fire-resistant wired glass is currently exempt under the Commission regulations, 16 CFR 1201.1(c).

The other clarifications made in the ANSI Z97.1-2015 would not involve a material change that would alter the original basic purpose of the CPSC standard to assess the safety of architectural glazing materials. The revisions made to the ANSI Z97.1-2015 test procedures are consistent with the provisions underlying the CPSC standard and provide consistent and comparable test results. The ANSI Z97.1-2015 test procedures clarify the existing test procedures and update outdated references to current test methods. Adopting the ANSI Z97.1-2015 test procedures will not impose any additional burdens on the regulated industry because almost all of the industry already certifies their products to both the CPSC standard and the ANSI standard. In fact, the Commission finds that adopting the ANSI Z97.1-2015 test procedures will result in more efficient and less costly testing of architectural glazing materials for manufacturers.

Accordingly, the Commission revises 16 CFR 1201.4 to require architectural glazing products to be tested in accordance with all of the applicable test provisions of ANSI Z97.1-2015, except for the exemptions provided in 16 CFR 1201.1(c) and (d). Furthermore, the Commission removes Figures 1 through 5 in Subpart A of Part 1201, which have been replaced in ANSI Z97.1-2015 with larger and clearer drawings.

In addition, to provide clarity regarding the impact test procedures, the Commission is revising the definitions in 16 CFR 1201.2 to align the Category I and Category II impact tests with the Class B and Class A impact tests in ANSI Z97.1-2015. Accordingly, 16 CFR 1201.2

(a)(3) and (4) is amended to add "Class B" to Category I and "Class A" to Category II in the definitions.

V. *Environmental Considerations*

Generally, the Commission's regulations are considered to have little or no potential for affecting the human environment, and environmental assessments and impact statements are not usually required. See 16 CFR 1021.5(a). The Commission does not expect the rule to have any adverse impact on the environment under this categorical exclusion. Moreover, the rule will decrease the number of samples that most manufacturers are required to test, and likely will lead to a small, beneficial effect on the environment because waste produced by the manufacture of excess samples, and the transport of those samples, will be reduced.

VI. *Paperwork Reduction Act*

This rule would not impose any information collection requirements. Accordingly, this rule is not subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501–3520).

VII. *Executive Order 12988 (Preemption)*

Section 26(a) of the CPSA, 15 U.S.C. 2075(a), provides that when a consumer product safety standard under this Act is in effect and applies to a risk of injury associated with a consumer product, no state or political subdivision of a state may either establish or continue in effect any provision of a safety standard or regulation which prescribes any requirements as to the performance, composition, contents, design, finish, construction, packaging, or labeling of such product, which are designed to deal with the same risk of injury associated with such consumer product, unless such requirements are identical to the requirements of the federal standard. Section 9(h) of the CPSA provides that the Commission may by rule amend any

consumer product safety rule. Therefore, the preemption provision of section 26(a) of the CPSA applies to any rule issued under section 9(h).

VIII. *Effective Date*

The APA generally requires that the effective date of a rule be at least 30 days after publication of a final rule. 5 U.S.C. 553(d). No comments were received on the effective date. Accordingly, the final rule will take effect 30 days after publication of a final rule.

IX. *Incorporation by Reference*

The OFR has regulations concerning incorporation by reference. 1 CFR part 51. The OFR recently revised these regulations to require that, for a final rule, agencies must discuss, in the preamble of the rule, ways that the materials the agency incorporates by reference are reasonably available to interested persons and how interested parties can obtain the materials. In addition, the preamble to the final rule must summarize the material. 1 CFR 51.5(a).

In accordance with the OFR's requirements, section I of this preamble summarizes the ANSI Z97.1-2015 standard that the Commission incorporates by reference into 16 CFR part 1201. Interested persons may purchase a copy of ANSI Z97.1-2015 from the following address. Attn: ANSI Customer Service Department, 25 W 43rd Street, 4th Floor, New York, NY, 10036. The standard is also available for purchase from ANSI's website: http://asc-z97-store.myshopify.com/products/ansi-z97-1-2015-version-clean-copy. A copy of the standard can also be inspected at CPSC's Office of the Secretary, U.S. Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814, telephone 301-504-7923.

List of Subjects in 16 CFR Part 1201

Administrative practice and procedure, Consumer protection, Imports, Incorporation by reference, Labeling, Law enforcement.

For the reasons stated in the preamble, the Commission amends 16 CFR part 1201 as follows:

PART 1201 – SAFETY STANDARD FOR ARCHITECTURAL GLAZING MATERIALS

1. The authority citation for part 1201 continues to read as follows:

Authority: Secs. 2, 3, 7, 9, 14, 19. Pub. L. 92-573, 86 Stat. 1212-17; (15 U.S.C. 2051, 2052, 2056, 2058, 2063, 2068)

2. Amend § 1201.2 by revising paragraphs (a)(3) and (a)(4) to read as follows:

(a) * * *

(3) *Category I products (Class B)* means any of the following Architectural products:

* * *

(4) *Category II products (Class A)* means any of the following architectural products:

* * * * *

3. Revise § 1201.4 to read as follows:

(a) Except as provided in §§ 1201.1(c) and (d), architectural glazing products shall be tested in accordance with all of the applicable test provisions of ANSI Z97.1-2015 "*American National Standard for Safety Glazing Materials Used in Building – Safety Performance Specifications and Methods of Test.*" The Director of the Federal Register approves the incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy from ANSI Customer Service Department, 25 W 43rd Street, 4th Floor, New York, NY, 10036. You may inspect a copy at the Office of the Secretary, U.S. Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814, telephone 301-504-7923, or at the National Archives and Records Administration (NARA). For

information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal-register/cfr/ibr-locations.html.

(b) [Reserved]

4. Remove Figures 1 through 5 to Subpart A of Part 1201.

Dated: _____

_____
Todd A. Stevenson, Secretary
Consumer Product Safety Commission.

Architectural Glazing

Staff Briefing Package on Draft Final Rule and Response to Public Comments, 16 C.F.R. Part 1201: *Safety Standard for Architectural Glazing Materials (Petition CP12-3)*

March 2, 2016

For Additional Information, Contact:

Brian M. Baker, Project Manager
Division of Mechanical Engineering
Directorate for Laboratory Sciences
Office of Hazard Identification and Reduction
U.S. Consumer Product Safety Commission

Contents

Executive Summary

On May 22, 2015, the Commission issued a notice of proposed rulemaking ("NPR") to amend 16 C.F.R. § 1201.4 ("current regulation" or "mandatory standard") and replace the test procedures currently set forth in that regulation with the test procedures of ANSI Z97.1-2009ϵ2 ("the ANSI standard"). The NPR did not propose any changes to the scope and exemptions provided in § 1201.1 of the mandatory standard. The preamble to the NPR explained that the proposed changes did not involve a material change to the basic purpose of 16 C.F.R. § 1201.4.

The public comment period closed on July 21, 2015. The Commission received nine comments to the NPR from multiple safety glazing councils and manufacturers. All of the commenters requested that the Commission adopt an updated standard that would supersede ANSI Z97.1-2009ϵ2. On September 24, 2015, the Accredited Standards Committee ("ASC") published the 2015 version of the ANSI standard entitled, "ANSI Z97.1-2015, *Safety glazing materials used in buildings – safety performance specifications and methods of test"* ("the current ANSI standard").

In this briefing package, staff has reviewed the public comments and compared both standards, ANSI Z97.1-2009ϵ2 vs. ANSI Z97.1-2015 to assess whether the updated standard is consistent with the amendments proposed in the NPR. Staff's review shows that the adoption of the ANSI Z97.1-2015 test procedures in 16 C.F.R. § 1201.4 is consistent with the amendment proposed in the NPR and would not involve a material change to the CPSC standard.

Accordingly, staff recommends that the Commission publish the draft final rule in the *Federal Register.*

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MD 20814

This document has been electronically approved and signed.

Memorandum

Date: March 2, 2016

TO : The Commission
Todd A. Stevenson, Secretary

THROUGH : Stephanie Tsacoumis, General Counsel
Patricia Adkins, Executive Director

FROM : George Borlase, Assistant Executive Director
Hazard Identification and Reduction

Brian Baker
Project Manager, Architectural Glazing Petition CP12-3
Division of Mechanical Engineering
Directorate for Laboratory Sciences

SUBJECT : Draft Final Rule for Architectural Glazing

I. Introduction

Architectural glazing products are currently regulated by the *Safety Standard for Architectural Glazing Materials*, 16 C.F.R. part 1201, which specifies certain testing requirements for products designed to help ensure that upon failure or fracture of the glass, the resulting fragments do not pose a threat to consumer safety. The safety standard for architectural glazing materials, 16 C.F.R. part 1201, was established in 1977. The standard prescribes the safety requirements for glazing materials used or intended for use in certain products. The scope of products covered under 16 C.F.R. §1201.1(a) of the mandatory standard includes:

- Storm doors or combination doors
- Bathtub doors and enclosures
- Shower doors and enclosures
- Sliding glass doors (patio-type).

Under 16 C.F.R. § 1201.1(c), the following materials are exempt:

> (1) Wired glass used in doors or other assemblies to retard the passage of fire, where such door or assembly is required by federal, state, local, or municipal fire ordinance;
> (2) Louvers of jalousie doors;
> (3) Openings of doors through which a 3 inch diameter sphere is unable to pass;
> (4) Carved glass (as defined in § 1201.2(a)(36)), dalle glass (as defined in § 1201.2(a)(37)), or leaded glass (as defined in § 1201.2(a)(14)), which is used in doors and glazed panels (as defined in §§ 1201.2(a)(7) and (a)(10)) if the glazing material meets all of the following criteria:
>
> > (i) The coloring, texturing, or other design qualities or components of the glazing material cannot be removed without destroying the material; and
> > (ii) The primary purpose of such glazing is decorative or artistic; and
> > (iii) The glazing material is conspicuously colored or textured so as to be plainly visible and plainly identifiable as aesthetic or decorative rather than functional (other than for the purpose of admitting or controlling admission of light components or heat and cold); and
> > (iv) The glazing material, or assembly into which it is incorporated, is divided into segments by conspicuous and plainly visible lines.
>
> (5) Glazing materials used as curved glazed panels in revolving doors;
> (6) Commercial refrigerator cabinet glazed doors.

The Commission subsequently revoked portions of the standard that prescribed requirements for "glazed panels" (45 Fed. Reg. 67383, August 28, 1980); an accelerated environmental durability test for plastic glazing materials intended for outdoor exposure (45 Fed. Reg. 66002, October 6, 1980); and a modulus of elasticity test, a harness test, and an indoor aging test applicable to plastic glazing materials (47 Fed. Reg. 27853, June 28, 1982). 16 C.F.R. § 1201.1(d) n.1. Tempered glass, wired glass, and annealed glass are also exempt from the accelerated environmental durability tests. 16 C.F.R. § 1201.4(a)(2).

Notice of Proposed Rulemaking

On May 22, 2015, the Commission issued a notice of proposed rulemaking ("NPR") to amend 16 C.F.R. § 1201.4 and replace the test procedures currently set forth in that regulation with the test procedures in the ANSI standard, ANSI Z97.1-2009$^{\epsilon 2}$. 80 Fed. Reg. 29555. The NPR did not propose any changes to the scope and exemptions provided in § 1201.1 of the mandatory standard. The preamble to the NPR explained that the proposed changes to adopt ANSI Z97.1-2009$^{\epsilon 2}$ did not involve a material change to the basic purpose or provisions of 16 C.F.R. § 1201.4. Specifically, the NPR proposed to amend the CPSC test

procedures in 16 C.F.R. § 1201.4 with the ANSI test procedures to clarify the existing test procedures and to update references to current test methods. In addition, the NPR also proposed to adopt ANSI Z97.1-2009$^{\epsilon 2}$ procedures for evaluating tempered glass specimens, including the "Center Punch Fragmentation Test," which requires purposely fracturing the unbroken impact-tested tempered glass specimen with a center punch and hammer.

The public comment period closed on July 21, 2015. The Commission received nine comments to the NPR which can be viewed on www.regulations.gov, by searching under the docket number, CPSC-2012-0049.

Comments to the NPR

All of the commenters supported substituting the CPSC test procedures in 16 C.F.R. part 1201 with the ANSI standard if the Commission adopts the more recent ANSI Z97.1-2015 test procedures rather than ANSI Z97.1-2009$^{\epsilon 2}$. Some of the commenters requested that the Commission adopt an "incorporation by reference" that would automatically incorporate the then-current version of the ANSI standard, rather than a specific version.

Staff agrees with commenters that the most recent ANSI Z97.1-2015 test procedures should be adopted in the final rule. However, because of requirements relating to regulations contained in the Code of Federal Regulations, the Commission cannot issue a rule that automatically incorporates "the most current version" of the ANSI standard. Rather, the regulation must identify the specific version of the standard. Therefore, the draft final rule incorporates by reference the ANSI Z97.1-2015 version. The specific comments and staff responses are addressed in Tab A.

Revised ANSI Standard

When the NPR was published on May 22, 2015, ANSI Z97.1-2009$^{\epsilon 2}$, *American National Standard for Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test* was the voluntary standard in effect. On September 24, 2015, a new version of ANSI Z97.1-2015 was published. In this briefing package, staff compares both standards, ANSI Z97.1-2009$^{\epsilon 2}$ vs. ANSI Z97.1-2015 to assess whether the updated standard is consistent with the amendments proposed in the NPR. In addition, staff has reviewed whether any changes made to the ANSI Z97.1-2015 test procedures would result in a material change to the CPSC standard.

II. Comparison of ANSI Z97.1-2009$^{\epsilon 2}$ vs. ANSI Z97.1-2015

Staff conducted an analysis of the two standards: ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 to assess whether the updated standard is consistent with the amendments proposed in the NPR, and whether any of the changes to ANSI Z97.1-2015 would result in a material change to 16 C.F.R. part 1201.

Removal of Class C Wired Glass

The Commission is not proposing to change the scope of the materials covered by the CPSC standard. Accordingly, the scope of 16 C.F.R. §1201.1 would continue to exempt wired glass used in doors or other assemblies to retard the passage of fire, where such door or assembly is required by a federal, state, local, or municipal ordinances.

The NPR proposed to adopt the test methods in the ANSI Z97.1-2009$^{\epsilon 2}$ standard, which was in effect when the NPR was published. The current CPSC standard provides two impact categories, 150 foot-pound impact test (Category I) and 400 foot-pound impact test (Category II). 16 C.F.R. § 1201.4(d).

ANSI Z97.1-2009$^{\epsilon 2}$ contained three impact categories to test architectural glazing materials: (1) a 400 foot-pound impact test (Class A); (2) a 150 foot-pound impact test (Class B); and (3) a 100 foot-pound impact test (Class C) for fire-resistant wired glass.

ANSI Z97.1-2015 contains updates to several sections of ANSI Z97.1-2009$^{\epsilon 2}$. The most significant update in ANSI Z97.1-2015 is the removal of the Class C category (100 ft-lb impact test), the only impact criteria that wired glass was required to meet within the voluntary standard. ANSI Z97.1-2015 now requires all safety glazing materials that would have been classified previously as Class C, including wired glass, to conform to Class A (400 ft.- lb.) or Class B (150 ft-lb impact test) requirements. The removal of the 100 foot-pound test ensures that products using fire-resistant wired glass need to meet the more stringent testing criteria of the Class A and Class B requirements to be compliant with the voluntary standard. However, under the current CPSC standard, fire-resistant wired glass would continue to be exempt. For all other architectural glazing materials, the same impact categories used in the ANSI Z97.1-2015 standard are consistent with the CPSC standard because both standards require either a 150 foot-pound impact test or 400 foot-pound impact test. Adoption of the ANSI Z97.1-2015 standard would not change the current CPSC impact test requirements. Therefore, there is no material change to the CPSC standard.

Other Modifications

In addition to minor organizational and terminology changes, other clarifications made to the test methods in ANSI Z97.1-2015 include the following:

- Clarifying specimens for weathering tests by removing the need for weathering tests for specimens constructed of laminated, organic coated or plastic glazing if certain criteria are met (4.6-4.6.2);

- Specifying the interpretation and evaluation criteria for shot bag impact procedures for glazing materials (5.1.4);

- Clarifying the center punch fragmentation test and procedure on tempered glass specimens (flat glass and bent glass) and interpretation of results on tempered glass specimens and equipment (5.2 – 5.2.4);

- Clarifying the procedure for thermal test for laminated and organic coated glazing (boil testing and bake testing) (5.3-5.3.3);

- Clarifying the procedure for weathering methods for laminated, organic-coated and plastic glazing (5.4-5.4.3).

Staff's review shows that the additional clarifications made in ANSI Z97.1-2015 further clarify the ANSI test procedures by specifying the specimens used, and the criteria for when testing is not needed. The weathering tests do not affect the exemptions that are provided under 16 C.F.R. § 1201.1 for an accelerated environmental durability test for plastic glazing materials intended for outdoor exposure as well as a modulus of elasticity test, a harness test, and an indoor aging test applicable to plastic glazing materials. The other changes help clarify language or more clearly set out procedures for testing. For instance, the shot bag impact procedure is made clearer by setting forth evaluation criteria that will better assess the results of impact tests of glazing materials. The procedure for the center punch fragmentation test is made clearer by setting forth the procedure for flat glass separately from bent glass. Similarly, the boil test for laminated glass has been modified to change "boil" to "thermal" to reflect that the test may be conducted by either heating chamber or boiling water and includes a bake test. These clarifications are consistent with the weathering tests in the CPSC standard under 16 C.F.R. § 1201.4(c)(3)(i) but add specificity and clarity to the tests. Accordingly, the additional revisions clarifying the test procedures in the ANSI Z97.1-2015 standard would not result in a material change to 16 C.F.R. § 1201.4

because the basic purpose and provisions of the test methods in the standard are consistent with ANSI Z97.1-2015.

III. Recommended Change to Definitions in 16 C.F.R. § 1201.2

Staff recommends that the final rule clarify two definitions in 16 C.F.R. § 1201.2 to provide references to terminology used by ANSI Z97.1-2015. Currently, the CPSC standard provides definitions for "Category I products" and "Category II products." These correspond to impact test drop height requirements. ANSI Z97.1-2015 does not use the same terms but instead references "Class A" and "Class B" to delineate impact test drop heights. As indicated in the table below, Category I products are impact tested to the same height as Class B products, and Category II products are tested to the same height as Class A products. The CPSC test for Category I is equivalent to Class B (18 inches is 1.5 ft. - 1.5 ft. x 100 lbs. = 150 ft-lb), and the CPSC test for Category II is equivalent to Class A (48 inches is 4 ft. - 4 ft. x 100 lbs. = 400 ft-lb). To ensure that the terminology regarding the impact tests clearly reference both the CPSC standard and the ANSI standard, staff recommends modifying the existing definition section to add the words, "Class B" in addition to "Category I," and "Class A" in addition to "Category II."

Table 1: Impact Drop Height Requirements and Their Testing Equivalents

	Drop Height Requirement	Equivalent to
Category I	18 in. – 18.5 inches	Class B
Category II	48 in. – 48.5	Class A

IV. Incident Data & Injury Potential

Staff provided a comprehensive and detailed review of the incident data associated with architectural glazing products in staff's NPR briefing package. Because the information in the NPR provided currently available information regarding architectural glass breakage injury incidents, staff relies on that analysis for the final rule[1]. Staff reviewed Injury and Potential Injury Incidents ("IPII"), In-Depth Investigations ("IDI"), and Death Certificate databases, as well as emergency department-treated injuries through the CPSC's National Electronic Injury Surveillance System ("NEISS").

Staff's review of the CPSC databases (IPII & IDI) identified 430 reported incidents within the period 1978 to 2014 (Table 2). Since 1978, a total of 98 architectural glazing-related fatalities were reported to the CPSC. Shower doors and enclosures accounted for 64 percent of the injuries and deaths. Glass or partial glass storm doors accounted for 15 percent of the reported injuries and deaths; and "sliding glass" doors, or doors specified only as "glass doors," accounted for 8 percent each of the reported injuries and deaths. At least two of the incidents involved wired glass, which is exempt from the mandatory standard.

[1] The detailed memo from the Directorate of Epidemiology is available at: http://www.cpsc.gov/Global/Newsroom/FOIA/CommissionBriefingPackages/2013/ArchitecturalGlazingPetitionBriefingPackage.pdf.

Table 2: Reported Architectural Glazing Breakage Incidents by 5-Year Period, 1978–2014

Years	Injury[2]	Hospitalized	Death	Total	Percent
1978-1982	9	2	14	25	6%
1983-1987	14	4	20	38	9%
1988-1992	9	7	21	37	9%
1993-1997	40	7	8	55	13%
1998-2002	44	7	6	57	13%
2003-2007	28	2	19	49	11%
2008-2012	54	2	7	63	15%
2013-2014[3]	99	4	3	106	25%
Total	297	35	98	430	100%
Percent	69%	8%	23%	100%	

Staff's review of the NEISS database identified 9,942 cases of architectural glass breakage-related incidents during the period from 1991 through 2013 (Table 3). Staff determined that, due to design changes within NEISS, estimates made before 1991 are not directly comparable to annual estimates calculated from 1991 through 2013. Based on these cases, staff computed a national estimate of 420,000 emergency department-treated injuries, with a coefficient of variance (C.V.) of 0.0648 percent. The 95 percent confidence interval for this estimate is 366,000 to 473,000. Ninety-six percent of the cases reviewed during the period from 1992 to 2013 involved lacerations.

The severity of the injuries treated in hospital emergency departments ranged from minor lacerations, abrasions, and contusions, to more severe laceration, puncture, and penetration injuries. The body part most often involved in these incidents was the arm (46.8%), followed by hand (30.1%), and head (8.6%). The other injuries involved the body (3.3%), leg (6.7%) and foot (2.6%), or multiple body parts (1.7%). Unreported cases represented 0.2 percent. The NEISS incidents indicate that the most severe injuries (*i.e.*, injuries that necessitated transfer to another hospital or admission to the hospital, where emergency room treatment was provided) represented approximately 5 percent of the total.

[2] The Injury category includes incidents where injuries that were either self-treated or the patient was treated and released by a medical practitioner at a hospital, emergency room, or physician's office.
[3] Two-year period.
Source: Injury and Potential Injury Incident, In-Depth Investigation, and Death Certificate databases, March 2015. Reporting continues for these databases, and the reported number of incidents may change in the future.

Lacerations are the most common hazard associated with glazing failures and can range from superficial to extreme in their severity. Severe injuries often require surgery and rehabilitation, which may result in the loss of motion, loss of sensation, or permanent disfigurement.

Table 3: NEISS Hospital Estimated Architectural Glazing Breakage Incidents, 1991–2013

Year	NEISS Cases	Estimated Total	Coefficient of Variation	Lower 95% Confidence Bound	Upper 95% Confidence Bound
1991	516	28,100	0.1243	21,600	34,700
1992	539	28,300	0.1321	21,300	35,300
1993	552	28,600	0.1355	21,400	35,800
1994	543	28,700	0.1593	20,300	37,100
1995	523	24,200	0.0922	18,800	33,000
1996	466	20,200	0.0938	15,600	27,600
1997	440	18,600	0.0971	15,100	22,200
1998	493	20,600	0.0790	17,400	23,700
1999	447	17,800	0.1044	14,200	21,400
2000	455	17,400	0.0937	14,200	20,600
2001	478	17,900	0.0848	14,900	20,800
2002	413	15,200	0.1116	11,900	18,600
2003	388	14,400	0.1010	11,600	17,300
2004	376	14,700	0.1070	11,600	17,800
2005	377	13,800	0.1002	11,100	16,500
2006	390	14,300	0.1147	11,100	17,500
2007	392	14,500	0.1117	11,300	17,700
2008	371	14,100	0.805	11,900	16,300
2009	378	13,200	0.1069	10,400	16,000
2010	386	13,600	0.1063	10,700	16,400
2011	377	14,000	0.1074	11,000	16,900
2012	341	12,900	0.0881	10,700	15,100
2013	301	11,400	0.1464	8,100	14,700
Total	9,942	420,000	0.0648	366,000	473,000

V. Impact on Small Business

The CPSC's Directorate for Economic Analysis reviewed the rule's potential economic impact on small businesses under the Regulatory Flexibility Act ("RFA") to determine whether the rule will have a significant economic impact on a substantial number or small firms (TAB B). Staff considered the impacts of revising 16 C.F.R. § 1201.4 to adopt the test methods in ANSI Z97.1-2015 on small businesses.

In the NPR, staff's review of the ANSI Z97.1-2009€2 standard showed that adopting the ANSI standard would not have a significant impact on a substantial number of small entities and that manufacturers that currently test to both the ANSI standard and the CPSC standard will probably experience a cost-neutral impact or a decrease in testing and certification costs. 80 Fed. Reg. 29560. Staff's review of the updated standard, ANSI Z97.1-2015, and examination of the industry after issuance of the NPR indicate that the clarifications made to the standard will not impact the testing or certification requirements for the small manufacturers or change the rates of compliance with the CPSC standard or the ANSI standard.

As discussed in the NPR, staff's review showed that of the products certified through SGCC, 99 percent or 1,855 products were certified to both ANSI Z97.1-2009€2 and 16 C.F.R. part 1201. Only 12 products (0.6%) were certified solely to ANSI Z97.1-2009€2; and seven products (0.4%) were certified solely to 16 C.F.R. part 1201. A review of manufacturers from GANA's membership not participating in the SGCC program indicated that of the 35 manufacturers that provided certification information, 32 manufacturers certified to both standards, and three manufacturers listed certification only to 16 C.F.R. part 1201. The NPR noted that of the 104 small domestic manufacturers, 102 certify to both standards, while only two certify solely to 16 C.F.R. part 1201. 80 FR 29560. No comments were received on the NPR's discussion of the impact on small business.

Since the NPR, staff has reviewed the most recent data. As of November 23, 2015, of the products certified through SGCC, 99 percent, or 2,047 products, were certified to both the ANSI standard and 16 C.F.R. part 1201. Only 17 products (<1%) were certified solely to the ANSI standard, and no products were certified solely to 16 C.F.R. part 1201. SGCC began testing to ANSI Z97.1-2015 upon publication of the standard but did not require labs and manufacturers to conform to the updated testing protocol until January 2016. A review of manufacturers from GANA's membership that did not participate in the SGCC program indicated that of the 36 manufacturers that provided certification information, 34 manufacturers certified to both standards, and two manufacturers listed certification only to 16 C.F.R. part 1201. Regarding the small domestic manufacturers, all claim to certify to both standards. Accordingly, the number of products certified to both standards (99%) has

remained consistent. The data continue to show that the vast number of manufacturers and products are certified to both standards, and all small domestic manufacturers, for which information on certification was available, certify to both standards.

Based on staff's review, the expected impact of the final rule is to reduce the costs of certification for most manufacturers. All identified small manufacturers currently test to both the voluntary and the CPSC standard and will probably experience a decrease in testing and certification costs because they would only need to follow one testing protocol to certify to both standards. The number of samples that a manufacturer needs to fabricate for testing will also be reduced, thus reducing certification costs. In addition, for manufacturers who contract out their testing, shipping costs will be reduced, due to the smaller number of samples shipped. Accordingly, staff concludes that the Commission can certify that this rule will not have a significant impact on a substantial number of small entities under section 605(b) of the RFA.

VI. Staff Recommendation

Staff's review shows that the most recent ANSI standard (ANSI Z97.1-2015) continues to provide current test requirements and references to modern methodologies for the materials covered by the current regulation. The most recent ANSI standard clearly specifies key testing criteria across multiple test platforms, such as the number of test specimens. Thus, amending the mandatory standard to replace its testing procedures with those in the most recent voluntary standard will result in a more efficient process because manufacturers would no longer be testing to both standards. Staff believes that the draft final rule, adopting the most recent ANSI testing methods, does not create a material change to the standard because the adoption of the testing methods does not change the basic purpose or provisions of the standard. Moreover, staff does not recommend changing the scope or exemptions currently in 16 C.F.R. § 1201.1.

Staff recommends that the Commission publish the draft final rule to replace the test methods found in 16 C.F.R. § 1201.4 with the most recent test methods found in the voluntary standard, ANSI Z97.1-2015. To provide additional clarity, staff also recommends that Category I and Category II impact-height definitions, found in 16 C.F.R. § 1201.2, be modified to align with the Class B and Class A categories in ANSI Z97.1-2015.

Accordingly, staff recommends that section 1201.2 be amended by revising (a)(3) and (a)(4) to read as follows:

(3) *Category I products (Class B)* means any of the following Architectural products:
(4) *Category II products (Class A)* means any of the following architectural products:

In addition, a new amendment would remove 16 C.F.R. § 1201.4 and accompanying Figures 1 through 5, and insert the following language in its place:

§ 1201.4

Except as provided in section 1201.1(c) and (d), architectural glazing products shall be tested in accordance with all the applicable test provisions of ANSI Z97.1-2015, "American National Standard for Safety Glazing Materials Used in Building – Safety Performance Specifications and Methods of Test."

TAB A: Review of Technical Comments in Response to Petition CP12-3 Staff Proposed Amendment to 16 C.F.R. Part 1201: Safety Standard for Architectural Glazing Materials in Comparison to the Newest Standard, ANSI Z97.1-2015

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MD 20814

Memorandum

Date: January 19, 2016

TO: Brian M. Baker, Mechanical Engineer, Project Manager – CP12-3
Division of Mechanical Engineering
Directorate for Laboratory Sciences

THROUGH: Mark Kumagai, Division Director
Division of Mechanical Engineering
Directorate for Engineering Sciences

FROM: Thomas E. Caton, General Engineer
Division of Mechanical Engineering
Directorate for Engineering Sciences

SUBJECT: Division of Mechanical Engineering Response to Petition CP12-3 Staff Proposed Amendment to 16 C.F.R. Part 1201: Safety Standard for Architectural Glazing Materials in Comparison to the Newest Standard, ANSI Z97.1-2015

I. Introduction

Architectural glazing is a type of glass building material, typically strengthened through one of several processes, including, but not limited to, annealing, laminating, tempering, toughening, heat strengthening, and chemical strengthening. Glazing products are commonly used as a type of structural glass, thereby making the products suitable for use in storm doors, bathtub and shower doors, and sliding glass doors, among other uses.

Glazing products currently are regulated by the *Safety Standard for Architectural Glazing Materials*, 16 C.F.R. part 1201, which specifies certain testing requirements for products designed to help ensure that, upon failure or fracture of the glass, the resulting fragments do not pose a threat to consumer safety. The safety standard for architectural glazing

materials, 16 C.F.R. part 1201, was established in 1977. The standard prescribes the safety requirements for glazing materials used or intended for use in certain products. The scope of products covered under 16 C.F.R. § 1201.1(a) of the mandatory standard include: storm doors or combination doors; bathtub doors and enclosures; shower doors and enclosures; and sliding glass doors (patio-type).

Under 16 C.F.R. §1201.1(c), the following materials are exempt:

(1) Wired glass used in doors or other assemblies to retard the passage of fire where required by federal, state, local, or municipal fire ordinance;

(2) Louvers of jalousie doors;

(3) Openings of doors which a 3 inch diameter sphere is unable to pass;

(4) Carved glass (as defined in § 1201.2(a)(36)), dalle glass (as defined in § 1201.2(a)(37)), or leaded glass (as defined in § 1201.2(a)(14)), which is used in doors and glazed panels (as defined in §§ 1201.2(a)(7) and (a)(10)) if the glazing material meets all of the following criteria:

(i) The coloring, texturing, or other design qualities or components of the glazing material cannot be removed without destroying the material; and

(ii) The primary purpose of such glazing is decorative or artistic; and

(iii) The glazing material is conspicuously colored or textured so as to be plainly visible and plainly identifiable as aesthetic or decorative rather than functional (other than for the purpose of admitting or controlling admission of light components or heat and cold); and

(iv) The glazing material, or assembly into which it is incorporated, is divided into segments by conspicuous and plainly visible lines.

(5) Glazing materials used as curved glazed panels in revolving doors;

(6) Commercial refrigerator cabinet glazed doors.

In addition, the Commission, in a prior rulemaking, revoked portions of the standard that prescribed requirements for “glazed panels” (45 Fed. Reg. 57383, August 28, 1980); an accelerated environmental durability test for plastic glazing materials intended for outdoor exposure (45 Fed. Reg. 66002, October 6, 1980); and a modulus of elasticity test, a harness

test, and an indoor aging test applicable to plastic glazing materials. (47 Fed. Reg. 27853, June 28, 1982). Tempered glass, wire glass, and annealed glass are also exempt from the accelerated environmental durability tests. 16 C.F.R. § 1201.4(2).

Notice of Proposed Rulemaking

On May 22, 2015, the Commission issued a notice of proposed rulemaking ("NPR") to amend 16 C.F.R. § 1201.4 and replace the test procedures currently set forth in that regulation with the test procedures in the ANSI standard, ANSI Z97.1-2009$^{\epsilon 2}$. 80 Fed. Reg. 29555. The NPR did not propose any changes to the scope and exemptions provided in § 1201.1 of the mandatory standard. The preamble to the NPR explained that the proposed changes to adopt ANSI Z97.1-2009$^{\epsilon 2}$ did not involve a material change to the basic purpose or provisions of 16 C.F.R. § 1201.4. Specifically, the NPR proposed to replace the CPSC test procedures in 16 C.F.R. § 1201.4 with the ANSI test procedures. The proposed amendment would clarify the existing test procedures and update references to current test methods. In addition, the NPR also proposed to adopt ANSI Z97.1-2009$^{\epsilon 2}$ procedures for evaluating tempered glass specimens, including the "Center Punch Fragmentation Test," which requires purposely fracturing the unbroken impact-tested tempered glass specimen with a center punch and hammer.

In the NPR, the Commission explained that one difference between 16 C.F.R. § 1201.4 and ANSI Z97.1-2009$^{\epsilon 2}$ was that the CPSC standard contained two impact classes for classifying glazing materials, while ANSI Z97.1-2009$^{\epsilon 2}$ contained three impact classes for classifying glazing materials. The ANSI Z97.1-2009 $^{\epsilon 2}$ included a Class C category for fire-resistant wired glass. The Commission found the difference between the impact categories to be non-material because the CPSC standard exempted certain types of fire-resistant wired glass from testing, including the Class C impact category.

ANSI Z97.1-2009$^{\epsilon 2}$ identified these classes by selected drop heights as follows:

- Class A – a drop height between 48 inches and 48.5 inches, using an appropriately size specimen

- Class B – a drop height between 18 inches and 18.5 inches, using an appropriate size specimen. (Glazing that qualifies for Class A is deemed to qualify for Class C)

There are two size classifications for Class A and Class B impact test specimens: either: Unlimited size (U) equal to 34 inches by 76 inches, ± 1/8 inch or Limited size (L) equal to the largest size commercially produced by the manufacturer that is less than 34 inches by 76 inches and a minimum size of 16 inches by 30 inches), ± 1/8 inch.

- Class C – added to ANSI Z97.1-2009ϵ2 and only applying to fire-resistant wired glass using a drop height of 12 inches to 12.5 inches using an impact specimen size of 34 inches by 76 inches.

16 C.F.R. part 1201: Safety Standard for Architectural Glazing Materials has two impact classes, Categories I and II that are method equivalent to Class B and A, respectively. The CPSC test for Category I is equivalent to Class B (18 inches is 1.5 ft. - 1.5 ft. x 100 lbs. = 150 ft-lb); and the CPSC test for Category II is equivalent to Class A (48 inches is 4 ft. - 4 ft. x 100 lbs. = 400 ft-lb).

Revised ANSI Standard

On September 24, 2015, the Accredited Standards Committee ("ASC") published the 2015 version of industry standard, ANSI Z97.1-2015. This 2015 revision contains updates to several sections of ANSI Z97.1, including "test interpretation, classification and durability requirements and the removal of 'monolithic wired glass (not fire rated) and monolithic fire rated wired glass" from consideration as safety glazing materials under ANSI Z97.1-2015. The Commission is not proposing to change the scope of the materials covered by the CPSC standard. Accordingly, the scope of 16 C.F.R. § 1201.1 would continue to exempt wired glass used in doors or other assemblies, to retard the passage of fire, where such door or assembly is required by a federal, state, local, or municipal ordinance.

Impact categories
Under ANSI Z97.1-2015, all safety glazing must conform to Class A or B, or better. The Class C impact category has been removed from the test methodology entirely. There are two size classifications used for Class A and Class B impact test specimens: (1) unlimited size equal to 34 inches by 76 inches, or (2) limited size equal to the largest size produced by the manufacturer that is less than 34 inches by 76 inches and a minimum size of 16 inches by 30 inches. The impact drop heights for the classes in ANSI Z97.1-2015 are:

- Class A – a drop height between 48 inches and 48.5 inches using an impact specimen appropriate to the size classification

- Class B – a drop height between 18 inches and 18.5 inches, using an impact specimen appropriate to the size classification

- Class C – the 12-inch drop height HAS BEEN REMOVED from ANSI Z97.1-2015 so that there are no test methods, references or exceptions for the Class C, 12-inch drop height impact test intended for fire-rated wired glass. Compliance of all safety glazing products must be rated to either Class A or Class B."

Staff has compared the CPSC standard, ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015. The CPSC standard provides two impact categories, 150 foot-pound impact test (Category I) and 400 foot-pound impact test (Category II), which are equivalent to Class B and Class A impact categories, respectively. 16 C.F.R. § 1201.4(d). A third impact category (the 100 foot-pound impact test) was included in the ANSI Z97.1-2009$^{\epsilon 2}$ standard and subsequently removed in ANSI Z97.1-2015 standard. With the removal of the 100 foot-pound impact test, fire-resistant wired glass will need to meet the more stringent requirements of the Class A and Class B impact categories for wired glass that is certified to the ANSI Z97.1-2015 standard. The removal of the Class C requirements would not result in a material change to the CPSC standard because the impact categories are consistent with the CPSC standard and require the 150 foot-pound impact test and 400 foot-pound impact test.

Other Clarifications
In addition to minor organizational and terminology changes, other clarifications made to the test methods in ANSI Z97.1-2015 include:

- Clarifying specimens for weathering tests by removing the need for weathering tests for specimens constructed of laminated, organic coated or plastic glazing if certain criteria are met (4.6-4.6.2);

- Specifying the interpretation and evaluation criteria for shot bag impact procedures for glazing materials (5.1.4);

- Clarifying the center punch fragmentation test and procedure on tempered glass specimens (flat glass and bent glass) and interpretation of results on tempered glass specimens and equipment (5.2 – 5.2.4);

- Clarifying the procedure for thermal test for laminated and organic coated glazing (boil testing and bake testing) (5.3-5.3.3);

- Clarifying the procedure for weathering methods for laminated, organic-coated and plastic glazing (5.4-5.4.3).

Staff's review shows that the additional changes made in ANSI Z97.1-2015 clarify the ANSI test procedures by specifying the specimens used and the criteria for when testing is not needed. The weathering tests do not affect the exemptions that are provided under 16 C.F.R. § 1201.1 for an accelerated environmental durability test for plastic glazing materials intended for outdoor exposure, as well as a modulus of elasticity test, a harness test, and an indoor aging test applicable to plastic glazing materials. The other changes help to clarify

language or more clearly set forth procedures for testing. For instance, the shot bag impact procedure is made clearer by setting forth evaluation criteria that will better assess the results of impact tests of glazing materials. The procedure for the center punch fragmentation test is made clearer by setting forth the procedure for flat glass separately from bent glass. Similarly, the boil test for laminated glass has been modified to change "boil" to "thermal" to reflect that the test may be conducted by either heating chamber or boiling water and includes a bake test. These clarifications are consistent with the weathering tests in the CPSC standard under 16 C.F.R. § 1201.4(c)(3)(i) but add specificity to the tests. Accordingly, the additional revisions clarifying the test procedures in the ANSI Z97.1-2015 standard would not result in a material change to 16 C.F.R. § 1201.4 because the basic purpose and provisions of the test methods in the standard are consistent with ANSI Z97.1-2015.

Staff concludes that the ANSI Z97.1-2015 test procedures, if adopted, would clarify the existing test procedures and update outdated references in 16 C.F.R. part 1210 to current test methods. The ANSI Z97.1-2015 test procedures will provide consistent and comparable test results to § 1201.4. The revised ANSI Z97.1-2015 test methods will not impose any additional burdens on the regulated industry and will result in less redundant, more efficient, and less costly testing of architectural glazing materials.

II. *Comments and Responses*

Staff from CPSC's Directorate for Engineering Sciences, Division of Mechanical Engineering ("ESME") reviewed the comments about the Proposed Rulemaking to amend the Safety Standard for Architectural Glazing Materials (16 C.F.R. part 1201); Docket No. CPSC-2012-0049 by adopting ANSI Z97.1-2009$^{\varepsilon 2}$.

Staff received nine comments on the NPR:

Docket #: CPSC-2012-0049-00XX		
Comment Docket #	**Name**	**Organization/Affiliation**
0009	Crystal Moore	Crystal Thompson
0010	John Kent	SGCC
0011	Julia Schimmelpenningh	Eastman Chemical Company
0012	Robert Davidson	SaftiFirst Inc.
0013	Kate Steel	Steel Consulting Services
0014	William M. Hannay	Smith Hardin LLP
0015	Bill Yanek	Glass Association of North America
0016	Greg Abel	Advocates for Safe Glass Public
0017	Kevin B. Olah	Guardian
0018	Kevin B. Olah	Guardian

Incorporation by Reference.
All of the commenters support substituting the CPSC test procedures in 16 C.F.R. part 1201 with the ANSI standard if the Commission adopts the more recent ANSI Z97.1-2015 test procedures rather than ANSI Z97.1-2009$^{\varepsilon 2}$.

ANSI Z97.1-2009$^{\varepsilon 2}$ became obsolete because the Accredited Standards Committee Z97 made the latest revision, ANSI Z97.1-2015, *Safety glazing materials used in buildings – safety performance specifications and methods of test*, available on September 24, 2015. Some of the commenters requested that the Commission not adopt a specific year version of the ANSI Z97.1 standard, but rather, adopt a more generic phrase, such as "most current version" of the ANSI standard, to ensure that the "incorporation by reference" always refers to the current version of the ANSI standard, rather than a specific version.

Response
The CPSC's Office of the General Counsel (OGC) provided the following response: "The Director of the Office of the Federal Register requires that publication of a document containing an 'incorporation by reference' to specify the edition of the publication that is approved. The regulations governing 'incorporation by reference' specifically provide that "incorporation by reference of a publication is limited to the edition of the publication that is approved. Future amendments or revisions of the publication are not included."

Accordingly, the Commission cannot issue a rule that mandates "the most current version" of the ANSI standard, but rather, must identify the specific version of the standard. Therefore, the draft final rule incorporates by reference the ANSI Z97.1-2015 version. When ANSI issues a new version in the future, per schedule, staff will review the updated standard, and the Commission can consider revising the CPSC standard to refer to the updated ANSI standard.

Class C Fire-Resistant Rated Wire Glass

Many of the commenters state that the ANSI Z97.1-2015 standard improves the ANSI Z97.1-2009$\epsilon 2$ standard because the 2015 version eliminates testing fire-resistant rated wired-glass under a lower Class C test procedure. One commenter states that scope of the materials covered by the CPSC standard is now congruent with ANSI Z97.1-2015 because wired glass is exempt from the CPSC standard. Another commenter states that the wired glass product causes serious and fatal injuries and that CPSC should not continue to exempt wired glass or subject it to a lesser requirement.

Response

The current version of the ANSI standard, ANSI Z97.1-2015, eliminates testing fire-resistant wired glass under a lower Class C impact test procedure. The CPSC standard currently exempts fire-resistant wired glass. The scope of the exemption for wired glass under 16 C.F.R. § 1201.1(c)(1) has always been narrow: first, the wired glass must be used in a door (or other assembly subject to the rule); second, the wired glass must be used "to retard the passage of fire"; and third, the particular use of the wired glass must be required by a federal, state, local, or municipal fire ordinance. Thus, the use of wired glass even in fire doors is not automatically permitted in all locations or all jurisdictions. Rather, it must be demonstrated that the particular use is required by law.

However, by removing the less stringent Class C impact test, the current ANSI standard goes beyond the CPSC standard because all architectural glazing materials, including fire-resistant wired glass, is required to be tested to the Class A and/or Class B impact test procedures. Staff believes that the architectural glazing industry is evolving and that the industry is developing technology to improve glazing materials so that they can meet the ANSI Z97.1-2015 Class A and Class B impact tests. To give the industry adequate time to comply with the new testing requirements, including fire- resistant wired glass, staff recommends that the Commission not remove the exemption in the CPSC standard at this time.

Other Clarifications

Several commenters noted that ANSI Z97.1-2015 makes several changes from the 2009 edition in the process forevaluating the performance of the safety glazing specimens tested.

In addition to eliminating the Class C test category, ANSI Z97.1-2015 clarifies provisions in the weathering section (by deleting and updating obsolete references and procedures), adds a bake test as an alternative to the boil test for thermal testing of laminated and organic coated glazing, and clarifies glass-shard contaminant for laminated and organic coated glazing following impact testing.

Response

Staff's review shows that the additional clarifications made in ANSI Z97.1-2015 clarify the ANSI test procedures, by specifying the specimens used and the criteria for when testing is unnecessary. The weathering tests do not affect the exemptions that are provided under 16 C.F.R. § 1201.1 for an accelerated environmental durability test for plastic glazing materials intended for outdoor exposure, as well as a modulus of elasticity test, a harness test, and an indoor aging test applicable to plastic glazing materials. The other changes help clarify language or set forth more clearly procedures for testing. For instance, the shot bag impact procedure is made clearer by setting forth evaluation criteria that will better assess the results of impact tests of glazing materials. The procedure for the center punch fragmentation test is made clearer by setting forth the procedure for flat glass separately from bent glass. Similarly, the boil test for laminated glass has been modified to change "boil" to "thermal," to reflect that the test may be conducted by either heating chamber or boiling water, and includes a bake test. These clarifications are consistent with the weathering tests in the CPSC standard under 16 C.F.R. § 1201.4(c)(3)(i), but add specificity to the tests.

III. *Conclusion*

In conclusion, ESME staff believes that the replacement of the 16 C.F.R. § 1201.4 test procedures with those of ANSI Z97.1-2015 will not change the scope of 16 C.F.R. part 1201. Replacing the testing procedures with ANSI Z97.1-2015 will result in a more efficient process because manufacturers would no longer be required to test to both standards.

In addition, adopting the test procedures in the ANSI Z97.1-2015 standard would not result in a material change to 16 C.F.R. § 1201.4 because the basic purpose and provisions of the test methods in the standard are consistent with ANSI Z97.1-2015, and almost all of the manufacturers currently certify to both standards

TAB B: Assessment of Small Business Impacts for Revision of 16 C.F.R. Part 1201

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: December 4th, 2015

TO : Brian M. Baker, Project Manager
Division of Mechanical Engineering
Directorate for Laboratory Sciences

THROUGH : Gregory B. Rodgers, Ph.D.
Associate Executive Director
Directorate for Economic Analysis

FROM : Robert Squibb, Directorate for Economic Analysis

SUBJECT : Assessment of Small Business Impacts for Revision of 16 C.F.R. Part 1201

I. Background

In April 2013, the U. S. Consumer Product Safety Commission ("CPSC" or "Commission") granted a petition from the Safety Glazing Certification Council ("SGCC") asking the Commission to amend 16 C.F.R. part 1201, *Safety Standard for Architectural Glazing Materials*, and replace section 1201.4 with the corresponding sections of the current American National Standards Institute ("ANSI") safety glazing standard. On May 22, 2015, a notice of proposed rulemaking ("NPR") was issued. 80 Fed. Reg. 29555. For the NPR, staff reviewed the potential impact of the proposed rule on small entities, including small businesses under the Regulatory Flexiblity Act ("RFA"). Staff has now conducted its review for the final rule.

The RFArequires that final rules be reviewed for their potential economic impact on small entities, including small businesses, to determine whether the proposed rule will cause or may cause a significant economic impact for a substantial number of small firms. This memorandum considers the impacts of the revision of 16 C.F.R. §1201.4 on small businesses. In summary, we find that the revisions to the standard will be cost neutral or cost saving for the overwhelming majority of the small producers in the architectural glazing industry. Thus, the Commission could certify

that the revisions will not have a significant economic impact on a substantial number of small entities.

II. Differences Between ANSI Z97.1-2015 and 16 C.F.R. Part 1201

Current federal regulations (16 C.F.R. part 1201) require testing the architectural glazing materials used in storm or combination doors, bathtub and shower doors and enclosures, and sliding glass doors. There are several differences between the mandatory standard, 16 C.F.R. part 1201, and the current voluntary standard (ANSI Z97.1-2015). In contrast to the mandatory requirements, the ANSI standard includes weathering tests for laminated products and requires a center punch test to bring all samples to failure. The ANSI standard also requires impact testing for four specimens of each thickness and size; whereas the mandatory standard sets no minimum for the number of samples to be tested. The regulation at 16 C.F.R. part 1201 references environmental and weathering factors affecting glass, but the mandatory standard provides no instructions for testing those effects. In contrast, the voluntary standard provides instructions for weathering glazing samples and testing for the effects of weathering. In addition, some of the equipment and standard practices referenced in 16 C.F.R. part 1201 are out of date. There will be no change to the scope of the mandatory standard — the NPR merely updates the test method.

III. Market for Architectural Glazing

Architectural glazing is a type of glass building material, typically strengthened through one of several processes, including, but not limited to, annealing, laminating, tempering, toughening, heat strengthening, and chemical strengthening. Glazing products are commonly used as a type of structural glass, thereby making such products suitable for use in storm doors, bathtub and shower doors, and sliding glass doors, among other uses. Safety glazing is designed so that it does not break apart when struck; or, it is designed to break into small pieces to minimize the hazards associated with broken glass. The SGCC estimates that SGCC manages the certification testing for approximately 70 percent of the market. As of November 2015, SGCC certified 2,064 individual products from 332 participating plant locations. The SGCC estimates imply a total market size of about 2,950 (2,064 ÷ 0.70) individual products and about 475 (332 ÷ 0.70) manufacturing facilities, assuming those manufacturers certified by SGCC are representative of the market. The Glass Association of North America ("GANA") estimated in a comment on a separate NPR in 2011, that there

were around 400 glass manufacturing plants in the architectural glazing market, which is generally consistent with the estimate from SGCC.[4] Both GANA's and SGCC's websites provide lists of individual manufacturers totaling approximately 250 manufacturers in the market. SGCC provides certification information for its customers; certification was identified for other manufacturers, based on the information provided by those manufacturers on websites and other sources.

SBA guidelines categorize manufacturers of flat glass as small, if they have fewer than 1,000 employees, and categorize manufacturers of products made with purchased glass as small, if they have fewer than 500 employees. In cases where firms fall under both categories, the size standard for flat glass manufacturers was applied to classify the firm. Based on these criteria, of the approximately 250 manufacturers, staff identified 105 small, domestic manufacturers of architectural glazing materials. The sizes of 10 additional firms could not be determined. Of the 105 small manufacturers known to produce architectural glass, 84 certify their products through the SGCC; 21 small manufacturers certify their products through other means.

IV. Compliance with ANSI Z97.1 and 16 C.F.R. Part 1201

For the NPR, staff's review showed that of the products certified through SGCC, 99 percent, or 1,855 products, were certified to both ANSI Z97.1-2009€2 and 16 C.F.R. part 1201. Only 12 products (0.6%) were certified solely to ANSI Z97.1-2009€2; and seven products (0.4%) were certified solely to 16 C.F.R. part 1201. A review of manufacturers from GANA's membership, who are not participating in the SGCC program, indicated that of the 35 manufacturers that provided certification information, 32 manufactures certified to both standards, and three manufacturers listed certification to 16 C.F.R. part 1201 only. The NPR noted that of the 104 small domestic manufacturers, 102 certify to both standards, while only two certify to 16 C.F.R. part 1201 only. 80 FR 29560.

Since the NPR, staff reviewed updated market information as of November 2015. Of the products certified through SGCC for 2015, as of November 23, 2015, 99 percent, or 2,047 products, were certified to both ANSI Z97.1 and 16 C.F.R. part 1201. Only 17 products (<1%) were certified solely to ANSI Z97.1, and no products were certified

[4] Public comment from the Glass Association of North America submitted in response to the notice of proposed rulemaking on the testing and certification rule (16 C.F.R. part 1107).

solely to 16 C.F.R. part 1201. SGCC began testing to ANSI Z97.1-2015 upon availability of the standard but did not require labs and manufacturers to conform to the updated testing protocol until January 2016. A review of manufacturers from GANA's membership that are not participating in the SGCC program indicated that of the 36 manufacturers that provided certification information, 34 manufactures certified to both standards, and two manufacturers listed certification to 16 C.F.R. part 1201 only.

The small domestic manufacturers that provide certification information as of the date of this memorandum, claim to certify to both standards.

In correspondence with CPSC, SGCC noted that one reason for the high level of compliance with both standards is that different industrial codes often reference different standards that finished products must meet. For example, elevator codes reference ANSI Z97.1, while building codes[5] often reference 16 C.F.R. part 1201. International codes are not consistent in the standards they reference. Because manufacturers do not necessarily fabricate flat glass panels for a specific end-use, it is prudent practice for manufacturers to test and certify to both standards.

V. Impact on Small Businesses

The final rule is expected to reduce the costs of certification for most manufacturers. All identified small manufacturers currently test to both the voluntary and the federal standard, and these manufacturers will probably experience a decrease in testing and certification costs because they would only need to follow one testing protocol to certify to both standards. This reduces the number of samples a manufacturer needs to fabricate for testing, thus directly reducing certification costs. In addition, for manufacturers who contract out their testing, shipping costs will be reduced, due to the smaller number of samples shipped.

The SGCC estimates that its customers would each save an average of $1,284 per product tested annually. [6] Manufacturers outside SGCC's membership that currently test to both standards will also likely see cost savings. However, if they currently

[5] International Code Council- International Building Code. http://archive.org/stream/gov.law.icc.ibc.2012/icc.ibc.2012#page/n555/mode/2up.

[6] Information regarding SGCC testing and costs is courtesy of communications between CPSC staff and SGCC, November 23, 2015.

conduct their testing in-house, they do not incur the costs of shipping samples to SGCC; and thus, the cost savings will be limited to the savings from fabricating fewer testing samples.

Of those small manufacturers identified outside of SGCC, none was found to have products tested to 16 C.F.R. part 1201, exclusively, according to certification information readily available from the manufacturers' websites.

In summary, all identified small architectural glazing producers will experience some slight cost savings or no increased costs due to the revisions. Consequently, the Commission could certify that the rule will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

There is no paperwork collection burden associated with 16 C.F.R. part 1201, and the proposed changes to the regulations do nothing to alter that assessment. Consequently, staff expects no additional paperwork burden from the proposed amendments.

VI. Environmental Impact

The National Environmental Policy Act requires the Commission to consider the impact of its actions on the environment. This rule is categorically exempt from the requirement of an environmental impact assessment, per 16 C.F.R. § 1021.5(c)(1) because the rule constitutes a revision of a rule or safety standard providing design or performance requirements for products. However, the rule will decrease the number of samples that most manufacturers are required to test and likely will lead to a small, beneficial effect on the environment because waste produced by manufacturing excess samples, and the transport of those samples, will be reduced.

APPENDIX A: Petition on Architectural Glazing – Table Comparing 16 C.F.R. § 1201.1 (a)-(c); § 1201.2 (a); § 1201.4 to ANSI Z97.1-2009ϵ2 and ANSI Z97.1-2015

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: January 20, 2016

TO : Brian Baker, Project Manager
Division of Mechanical Engineering
Directorate for Laboratory Sciences

THROUGH : Joel R. Recht, Associate Executive Director
Directorate for Engineering Sciences

Mark Kumagai, Director
Division of Mechanical Engineering
Directorate for Engineering Sciences

FROM : Thomas E. Caton, General Engineer
Division of Mechanical Engineering
Directorate for Engineering Sciences

SUBJECT : Petition on Architectural Glazing –Table Comparing 16 C.F.R. § 1201.1 (a)-(c); § 1201.2 (a); § 1201.4, to ANSI Z97.1-2009ϵ2 and ANSI Z97.1-2015

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Appendix

	General Purpose & Exemptions			
Subject	**16 C.F.R. Part 1201**	**ANSI Z97.1-2009$^{\epsilon 2}$**	**ANSI Z97.1-2015**	**Staff Comments**
Scope	§1201.1 (a) The Scope lists: 1. "Storm doors or combination doors 2. Doors 3. Bathtub doors and enclosures 4. Shower doors and enclosures 5. [Reserved] 6. Sliding glass doors (patio type)."	"This standard establishes specifications and methods of test for the safety properties of safety glazing materials. Glazing materials designed to promote safety and reduce the likelihood of cutting and piercing injuries when the glazing materials are broken by human contact) as used for all building and architectural purposes."	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. Part 1201 lists kinds of architectural glazing and products as used; and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 list kinds of minimum requirements for glazing but do not recommend where and when safety glazing should be used, leaving that to federal, state, and local authorities and model codes.

Limitations	16 C.F.R. § 1201.1(a)(1): "The safety requirements are designed to reduce or eliminate unreasonable risks of death or serious injury to consumers when glazing material is broken by human contact."	"This standard relates to the minimum safety performance property test criteria for safety glazing materials." Class A, B, and C. (Forward). This standard "is not an appraisal of strength, durability, or appearance nor does this standard specify situations in which safety-glazing should be used . . . does not address installation methods . . . a condition of conformance of a material is its uniform production so the product will consistently exhibit these safety characteristics." Monolithic annealed glass, monolithic heat-strengthened glass, monolithic chemically strengthened glass, monolithic wired glass (not fire rated) and monolithic fire-rated wired glass are not considered safety glazing materials under this standard.	Similar to ANSI Z97.1-2009$^{\epsilon 2,}$ but re-arranged with Class C Impact Test for Fire-Rated Wired Glass removed	16 C.F.R. part 1201 is intended to reduce injury when broken by human contact. Category I and II, with an exemption for fire-rated wired glass, and ANSI Z97.1-2009$^{\epsilon 2}$ has three Classes A, B, C; and note that Class C is not accepted by all jurisdictions. ANSI Z97.1-2015 eliminates Class C for fire-rated wired glass and only has two Classes, A and B, which provide minimum safety performance property test criteria of the material in use with other limitations similar to 16 C.F.R. part 1201.
Exemptions	§1201.1 (c) Exemptions: 1. "Wired glass used in doors or other assemblies to retard the passage of fire where such a door or assembly is required by federal, state, local, or municipal fire ordinance. 2. Louvers of jalousie doors; 3. Openings of doors through which a 3 inch diameter sphere is unable to pass; 4. Carved glass . . . dalle glass . . . leaded glass . . . used in doors and glazed panels . . . if . . . the coloring, texturing, or other design qualities cannot be removed without	No Exemptions: includes the Class C (12-inch drop height) impact test for fire-rated wired glass, Class A (48-inch drop height) or Class B (18-inch drop height) impact tests.	No Exemptions and the Class C 12-inch drop height impact test for fire-rated wired glass has been removed. Now all safety glazing must be rated to Class A (48-inch drop height) or Class B (18-inch drop height) impact tests.	16 C.F.R. part 1201 exempts wired glass and does not test it; ANSI Z97.1-2000$^{\epsilon 2}$ has no exemptions; has a test for fire-resistant wired glass, indicating it has the lowest impact classification level and that Class C impact products have "NOT been accepted by all jurisdictions (*e.g.*, CPSC 16 C.F.R. part 1201, building codes, etc.) as

	destroying the material; the primary purpose is decorative; and the glazing material is conspicuously colored or textured so as to be plainly visible and identifiable as aesthetic or decorative rather than functional . . .. The glazing material is divided into segment by conspicuous and plainly visible lines; 5. Glazing materials used as curved glazed panels in revolving doors; 6. Commercial refrigerator cabinet glazed doors."			"safe performance" for unrestricted human impact accident modes. ANSI Z97.1-2015 has no exemptions and Class C for fire-rated wired glass has been removed; All safety glazing must now conform to either Class A or B
Types of Glazing Shot Bag Impact Tested	§1201.2(a)(11) Architectural "Glazing material means glass, including annealed glass, tempered glass, organic-coated glass, plastic glazing, and fire-resistant wire-glass" Does not apply to the window in an exterior wall of the building that the shower is in. §1201.1(a)(1)Specific products: 1. "Storm doors or combination doors 2. Doors 3. Bathtub doors and enclosures 4. Shower doors and enclosures 5. [Reserved] 6. Sliding glass doors (patio type)."	Definitions –Similar to 16 C.F.R. part 1201, Safety Glazing material constructed, treated or combined with other materials that, if broken by human contact, the likelihood of cutting or piercing injuries that might result from is reduced; includes Impact Tests for Laminated Glazing, Tempered Glass, Organic-coated Glass, Plastic glazing, Fire-resistant wired glass. Center Punch Fragmentation test for Tempered Glass. Boil test for Laminated Glazing. Weathering tests for Laminated Glazing, Organic Coated Glass, and Plastic Glazing. Indoor Aging Tests for Organic Coated Glass and Plastic Glazing. Hardness test for Plastic Glazing. Flexural Modulus test for Plastic Glazing. Four specimens each thickness and size, if specimens are asymmetric then two specimens shall be impacted each side. ANSI Z97.1-2009$^{\epsilon 2}$: "This standard does not recommend where safety glazing should be used or, when it is used, what type of glazing should be used. For this information one should consult other codes, standards and manufacturer's information."	Similar to ANSI Z97.1-2009$^{\epsilon 2}$ but tests for Fire-Rated Wired Glass have been removed, leaving impact tests for Laminated Glazing, Tempered Glass, Organic Coated Glazing, and Plastic Glazing.	16 C.F.R. part 1201 provides for specific uses, and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 do not. ANSI Z97.1-2009$^{\epsilon 2}$ also has a Class C impact test for fire-rated wired glass, but shot bag impact test for fire-rated wired glass has been removed from ANSI Z97.1-2015, with no exemption provided for fire-rated wired glass.

Glazing Materials	§1201.2(a)(11) Architectural Glazing Materials: • annealed glass • organic-coated glass • tempered glass • laminated glass • wired glass • combinations	Safety Glazing Materials: • organic-coated glass • tempered glass • laminated glazing • plastic glazing • fire-resistant wired-glass • mirror glazing • bent glass	Changed from ANSI Z97.1-2009$^{\epsilon 2}$ removed fire-rated wired glass leaving • organic-coated glass • tempered glass • laminated glazing • plastic glazing • mirror glazing • bent glass	16 C.F.R. part 1201 includes annealed glass as architectural glazing and ANSI Z97.1-2009 $^{\epsilon 2}$ does not include annealed glass as safety glazing. ANSI Z97.1-2015 same as ANSI Z97.1-2009 $^{\epsilon 2}$ but also does not include fire-rated wired glass

	Specimen Handling			
Subject	**16 CFR 1201**	**ANSI Z97.1-2009$^{\epsilon 2}$**	**ANSI Z97.1-2015**	**Staff Comments**
Specimen Size Classification of Shot Bag Impact Specimens	§1201.4(c)(2) "Impact specimens shall be the largest size manufactured up to a maximum width of 34 inches (86 centimeters) and maximum height of 76 inches (1.9 meters). Specimens shall be tested for each nominal thickness offered by the manufacturer."	Marked products shall be nominal thickness of products tested "Unlimited size (U) 34 inches by 76 inches ± 0.125 (1/8) inch (863 mm by 1930 mm ± 3 mm) Limited size (L) largest commercially produced size by the manufacturer less than 34 inches by 76 inches ± 0.125 (1/8) inch (863 mm by 1939 mm ± 3 mm)"	Unchanged from sizes listed in ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 tests to the largest size, and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 provide for the largest sizes and identify products that are not made as large as the industry's largest 34-inch x 76-inch size.
Shot Bag Impact Test Specimens	§1201.4(c)(2) Does not specify the number of Impact test specimens. Indicates that the largest size manufactured up to 34 x 76 inches for each nominal thickness offered is tested	Specifies that four specimens of thickness and size and backing material are tested for Safety Glazing, Indoor Safety Glazing, Mirror Glazing with either reinforced or non-reinforced organic adhesive backing for each backing material, and for Bent glass for unlimited size with simple arc bend of 40 inches.	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$ and includes bent glass and mirror glazing impact testing after weathering	16 C.F.R. part 1201 mentions specimen size and thickness, but not number of test specimens. ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 mention specimen size, thickness, and number of test specimens.

	Testing Equipment			
Subject	**16 CFR 1201**	**ANSI Z97.1-2009$^{\epsilon 2}$**	**ANSI Z97.1-2015**	**Staff Comments**
Shot Bag Impact Test Frame Equipment	§1201.4(b)(1)(i) Impact test – test equipment "The impact test frame shall be constructed to minimize movement and deflection of its members during testing…."	"The test apparatus shall consist of a test frame and impactor system. The test frame consists of a main frame mounted on two base beams with stiffening members and a sub frame, in which the specimen is held. The impactor system consists of the impactor, traction, release, and suspension devices."	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201, ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 have similar impact test frame and shot bag impactor construction drawings; but ANSI Z97.1-2009$^{\epsilon}$ and ANSI Z97.1-2015 drawings are larger and include drawings for impact testing of bent glass compared to 16 C.F.R. part 1201.
Shot Bag Impactor	§1201.4(b)(2)(i) The impactor shall be a leather punching bag …filled with No. 7½ lead shot to a total weight …of 100 lbs. ± 4 ounces (45.35 ± 0.11 kilograms)…the exterior shall be completely covered by ½ inch (1.3 centimeters) wide glass filament reinforced pressure sensitive tape…	"The impactor shall consist of the leather bag described in Figure 7, a commercial punching bag with its bladder left in place, or any other leather bag of nominally identical shape and size. The bag shall be filled with lead shot of 2.4 mm +0.1 mm diameter (nominal USA No. 7½ or European No. 7 lead shot) and taped…the total mass of the impactor assembly shall be 100 lb. + 4 oz. (45.4 kg + 0.2 kg), excluding traction system attachments." "To reduce bag deformation during testing, the bag shall be rotated about the axis of its suspension device before each specimen or sample set, buy no less than 30 degrees, and by no more than 90 degrees." "To reduce bag damage during testing, a thin homogeneous or non-woven plastic film no more than 0.005 inch (0.13 mm thick or a loosely draped woven cloth towel weighing no more than 0.05 g/cm2 (0.0113 oz. /in2) shall not be attached to the impactor, but rather may be suspended vertically in front of the surface of the specimen at a distance no more than 0.4 inch (10 mm)."	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	Similar impactors

	Testing			
Subject	**16 C.F.R. Part 1201**	**ANSI Z97.1-2009$^{\epsilon 2}$**	**ANSI Z97.1-2015**	**Staff Comments**
100 Foot-Pound Shot Bag Impact Test	No Category: Tests are not performed at 100 foot-pound level.	Class C (12-inch drop height only for fire-resistant wired glass) added: Accomplished with a drop height between 12 inches and 12.5 inches (305 mm and 318 mm) with impactor 100 lb. +4 oz. (45.4 kg +0.2 kg),	Class C (12-inch drop height only for fire-resistant wired glass) removed	16 C.F.R. part 1201 does not provide a 100 foot-pound shot bag impact test for wired glass as it is exempted; and ANSI Z97.1-2009$^{\epsilon 2}$ acknowledges that fire-resistant wired glass has lower impact strength and is not accepted by all jurisdictions, but provides a 100 foot-pound impact test. ANSI Z97.1-2015 provides that all safety glazing shall meet Class A and B impact criteria and the 100 foot pound shot bag impact test; and Class C fire-rated wired glass has been removed from ANSI Z97.1-2015, with no exemptions - All safety glazing must conform to Class A (150 ft-lb) or Class B (400 ft-lb) impact test requirements.
150 Foot-Pound Shot Bag Impact Test	§1201.4(d) Category I : Accomplished with a drop height of 18 to 18½ inches (458 to 470 millimeters) with the100 lbs. ± 4 ounces (45.35 ± 0.11 kilograms) impactor	Class B: Accomplished with a drop height of 18 to 18½ inches (458 to 470 millimeters) with the100 lbs. ± 4 ounces (45.35 ± 0.11 kilograms) impactor	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 Category I equal to the ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 Class B classification

400 Foot-Pound Shot Bag Impact Test	§1201.4(d) Category II: Accomplished with a drop height of 48 to 48½ inches (1.22 to 1.23 millimeters) with the 100 lbs. ± 4 ounces (45.35 ± 0.11 kilograms).	Class A: Accomplished with a drop height of 48 to 48½ inches (1.22 to 1.23 millimeters) with the 100 lbs. ± 4 ounces (45.35 ± 0.11 kilograms).	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 Category II equal to the ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 Class A classification
Interpretation of Shot Bag Impact Test **Size Classification of Shot Bag Impact Specimens**	§1201.4(e)(1) "A glazing material may be qualified for use in both Category I and Category II products if it meets the impact requirements for Category II. A glazing material shall be judged to pass the impact test if the specimen meets any of the criteria listed… §1201.4(e)(i) When breakage occurs (numerous cracks and fissures) no opening shall develop in the test sample through which a 3 inch (76 millimeter) diameter solid steel sphere weighing 4 pounds ± 3 ounce (1.81 ± 0.8 kilograms), passes when placed (not dropped) in the opening and permitted to remain for a period of one second. For this criterion, the sample after being impacted shall be placed, while remaining in the sub frame, in a horizontal, impact side up position with a minimum of 1 foot (31 centimeters) of free space immediately beneath the specimen. §1201.4(e)(ii) When breakage occurs, what appears to be the 10 largest particles shall be selected within 5 minutes subsequent to the test and shall weigh no more than the equivalent weight of 10 square inches (64 square centimeters) of the original specimen.	The Interpretation of Results (upon impact) is: (1) Breakage occurs with numerous cracks and fissures but remains substantially one piece and no tear or opening develops that a 3.0 inch diameter sphere can pass (2) Provides a formula when breakage occurs for determining this weight based on the glass glazing's original thickness: "The weight in ounces of 10 square inches of glass is equal to 14.5 times the glass thickness in inches. The weight in grams of 10 square inches of glass is equal to 412times the glass thickness in inches (16.18 grams/mm)." Material qualified for classification as Class A is deemed to comply for Class B. (3) When breakage occurs with cracks and fissures the stiffness and hardness of the specimens shall be determined ASTM D790 Modulus of Elasticity ASTM D785 Rockwell Hardness (4) Specimen does not break then specimen must pass follow-up Center Punch Fragmentation Test	Similar to ANSI Z97.1-2009$^{\epsilon 2}$ The Interpretation of Results (upon impact) is: Type 1: one or more cracks. Fragments contained by interlayer or adhesive like laminated or organic coated glazing. Type 2: shatters like tempered glass same evaluation of particle size as ANSI Z97.1-2009$^{\epsilon 2}$ Type 3:the specimen breaks like plastic glazing Modulus of elasticity ASTM D790 and Rockwell Hardness ASTM D785 Type 4: the specimen does not break then specimen must pass follow-up Center Punch Fragmentation Test	16 C.F.R. part 1201 only provides for weighing the 10 largest pieces, while ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 provide for weighing and size requirements. Overall the four evaluations listed in each are similar.

	§1201.4(e)(iii) [Reserved] §1201.4(e)(iv) The specimen does not remain in the sub frame and no breakage is caused by the impactor. §1201.4(e)(v) The specimen does not break." Material qualified for classification as Category II is deemed to comply for Category I			
Center Punch Fragmentation Test for Tempered Glass that Did Not Break as a Result of Being Impacted During Shot Bag Impact Test	No Test Requirement.	ANSI Z97.1-2009$^{\epsilon 2}$ - <u>Center Punch Fragmentation Test</u> for tempered glass that does not break during shot bag impact test The total weight of the 10 (ten) largest crack –free pieces shall weigh no more than the equivalent weight of 10 square inches (6452 mm^2) of the original test sample [in ANSI Z97.1-2009$^{\epsilon 2}$] If specimens fail to comply with center punch fragmentation requirements then the material shall not be classified	Minor Revisions from ANSI Z97.1-2009$^{\epsilon 2}$ Procedures now specify flat glass and bent glass and clarify interpretation of results.	16 C.F.R. part 1201 does not include a center Punch Fragmentation Test for shot bag impacted test specimens that do not fracture); and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 provide a Center Punch Fragmentation Test for evaluating tempered glass that did not break from the impact test. Specimen must conform to fractured particle size criteria for a material to be classified per ANSI Z97.1.

Rockwell Hardness Testing for Plastic Glazing	No hardness test for plastic glazing (Revoked 47 FR 27856, June 28, 1982)	Rockwell Hardness testing per ASTM D785 when for plastic glazing when breakage occurs due to impact test	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part1201 does not provide for a hardness test, and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 provide for Rockwell Hardness Testing per ASTM D785 hardness testing for plastic glazing.
Modulus of Elasticity Test for Plastic Glazing	No modulus of elasticity test for plastic glazing (Revoked 47 FR 27856, June 28, 1982)	Plastic glazing stiffness shall be determined by ASTM D 790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 does not provide and Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 provide a modulus of elasticity test for plastic glazing with ASTM D790.
Environmental Durability Tests	§1201.4(d)(2)(ii) Laminated and Organic Coated Glass (Tempered, Wired, Annealed Glass all Exempt)	Laminated Glass, Organic Coated Glass, and Plastics natural and accelerated	Laminated Glass, Organic Coated Glass, and Plastic Glazing	16 C.F.R. part 1201 for Laminated and Organic Coated Glass; ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 are similar with added Plastic Glazing.
Boil Test	§1201.4(c)(3)(i) Laminated glass – "Three pieces 12 inches by 12 inches "The glass itself may crack in this test, but no bubbles or other defects shall develop more than ½ inch (12 millimeters) from the outer edge of the specimen. Any specimen in which the glass cracks to an extent that confuses the interpretation of the results shall be discarded, and another specimen	<u>Boil Test for Laminated Glass</u> – three specimens (12 x 12 inch) and nominal thickness "The glass itself may crack in this test, but no bubbles of other defects shall develop more than 0.5 inch (12 mm) from the outer edge of the specimen or from any crack that may develop. Any specimen that cracks to an extent	Boil Test <u>renamed Thermal Test - Laminated and Organic Coated glazing</u> (added) to evaluate the probable effect of exposure to high temperature and humidity for a long period of time. The	All have a Boil Test for laminated glass, but ANSI Z97.1-2015 renames the Boil Test as the Thermal Test, which includes an added Boil Test for Organic Coated Glazing and an added Bake Test for Laminated

	shall be tested in its stead."	confusing the results shall be discarded and another specimen shall be tested in its place."	thermal test can be conducted in boiling water (Boil Test) or in a heated chamber (Bake Test)	and Organic Coated glazing.
Weathering Tests	§1201.4(c)(3)(ii) Refers to a replaced and out of date non-current ASTM practices: ATM G26-70 (Obsolete 2000) Standard Recommended Practice for Operating Light- and Water-Exposure Apparatus (Xenon-Arc Type) for Exposure of Non-Metallic Materials with Weather-Ometer and a non-current existing ASTM practice: ASTM D2565-70 Standard Recommended Practice for Operating Xenon-Arc Type (water-cooled) Light- and Water-Exposure of plastic	<u>Weathering Test for Laminated Glazing, Organic-Coated Glass, Plastic</u> Updates the standards used to Accelerated Exposure ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials "The purpose of these tests is to determine whether these safety-glazing materials will successfully retain their safety characteristics after expose to weathering conditions for an extended period of time." The weathering methods described in section 5.4.1 shall be used for all materials subjected to exterior exposure." "Organic coated materials intended for interior use only shall be subjected to the requirements of section 5.4.3." Charpy Impact testing of Plastic glazing material Natural exposure (ASTM D 1435 Practice for Outdoor Weathering of Plastics) for one year Accelerated exposure in a Xenon-Arc Type Operating Light Apparatus as specified in ASTM G 155 (replaced ASTM G 26 in 2000) and cycle per ASTM D 2565 for 102 minutes irradiation, 18 minutes of irradiation, and water spray) for a 3000 hour exposure For laminated glazing, organic-coated, and plastic glazing but not performed on glazing intended for indoor use only Six specimens:2 inches by 6 inches (152 mm by 152 mm) Plastic glazing panels shall expose one un-backed plastic glazing	Similar to ANSI Z97.1-2009$^{\epsilon 2}$ Glass has be changed to Glazing Paragraph sections have been rearranged or combined	16 C.F.R. part 1201 specifies an obsolete practice that was replaced and older pre-revision version of an existing ASTM practice: ASTM G26 (obsolete 2000) ASTM D2565-70 current version is D2565-99 (2008) does not refer to ASTM D1435. ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 specify the ASTM G155 that replaced G26 and ASTM D1435 and ASTM D2565 without year designations.

		panel, three exposed and three kept in darkness. Laminated glass six specimens a minimum of 2 inches by 6 inches (50 mm by 152 mm) Organic-coated glass six specimens a minimum of 2 inches by 6 inches (50 mm by 152 mm).		
Accelerated Environmental Durability Test	§1201.4(d)(B)(2)(i) Organic Coated Glass with Tempered Glass Exempt, Wired Glass Exempt, Annealed Glass Exempt, and Plastic Glazing Revoked in 1980	Laminated, Organic Coated Glass, and Plastic glazing with Xenon-arc light source ASTM G155	Laminated, Organic Coated Glass, and Plastic glazing ANSI Z97.1-2009$^{\epsilon 2}$ is similar to ANSI Z97.1-2015 but rearranged sentences and an adhesion, tensile test for Organic Coated Glazing. a viewing test for Laminated Glazing, and a Charpy Test for Plastic Glazing	16 C.F.R. part 1201 and ANSI Z97.1-2009$^{\epsilon 2}$ both have tests for Organic coated glass, but ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1 also have tests for Laminated and Plastic glazing.
Simulated Weathering Tests for Organic-Coated Materials	§1201.4(d)(B)(1)Accelerated exposure with Xenon arc (water cooled) Weather-Ometer rated at 6500 watts (ASTM G26 obsolete in 2000)Expose for 1200 ± 1 hours and exposed to a radiant flux of 50 microwatts per square centimeter) while monitoring at a wavelength of 340 nanometers	Weathering tests for Laminates, Organic-Coated Glass and Plastics Natural Exposure (ASTM D 1435) for one year and Accelerated exposure with Xenon-Arc Type Operating Light Apparatus as specified in ASTM G 155 (replaced ASTM G 26) and cycle per ASTM D 2565 for 102 minutes irradiation, 18 minutes of irradiation, and water spray) for a 3000 hour exposure For laminated glazing, organic-coated, and plastic glazing not performed on glazing intended for indoor use only Six specimens:2 inches by 6 inches (152 mm by 152 mm) Plastic glazing panels shall expose one un-backed plastic glazing panel, three exposed and three kept in	Weathering for Laminated and Organic Coated glazing tests are similar to ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 has year designations that lock it into a particular version of the ASTM standard; while ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 do not use year designations for ASTM practices. So the current version can easily be used without having to rewrite ANSI Z97.1 standard, unlike 16 C.F.R. part 1201.

		darkness Laminated glass six specimens a minimum of 2 inches by 6 inches (50 mm by 152 mm) Organic-coated glass six specimens a minimum of 2 inches by 6 inches (50 mm by 152 mm) 5.4.1.2.9 Accelerated Exposure with Xenon Arc Light Source		
Tests After Weathering Test/ASTM Standards	§1201.4(b)(3)(ii) ASTM G 26-70 (non-metallic materials) obsolete in 2000 replaced by ASTM G 155 and specifies a non-current version of ASTM D 2565-70 (plastics). Specifies 6 specimens.	ASTM G 155 replaced ASTM G26-96 (obsolete) "When compared to control (unexposed) samples, no weathered specimen shall exhibit more than the allowable change, as specified, for the following properties:" Evaluates: (1) "Visible Light Transmittance change not greater than 5 percentage units (e.g.: 91% control ± 5% = 96% or 86%) as measured according to ASTM D 1003; Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics." (2)Yellowness Index (for clear products only) change not greater than 0.5 Yl units (e.g.: 0.70 YI control ± 5 = 1.20 or 0.20) as according to ASTM E313; Standard Practice for Calculating Yellowness and Whiteness Indices from Instrumentally Measured Color Coordinates." (3) Haze change not greater than 0.5 percentage units (e.g.: 0.70 control ± 1.20 or 0.20) as measured according to ASTM D 1003; Standard Test method for Haze and luminous Transmittance of Transparent Plastics." (4)Delta E less than or equal to 5 units as measured according to ASTM E 308;	Weathering for Laminated and Organic Coated glazing tests after weathering are similar to ANSI Z97.1-2009$^{\epsilon 2}$	16 CFR 1201 refers to ASTM G26-70 an obsolete standard which was replaced by ASTM G155 and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 refer to ASTM G155 and ASTM D2565 without a year designations

		Practice for Computing the Colors of Objects by Using the CIE System."		
Accelerated Environmental Durability Test Plastic Glazing Materials	Revoked in 1980	"The purpose of these tests is to determine whether plastic and organic-coated glass for indoor use only will successfully retain their safety characteristics after exposure to simulated aging conditions for an extended period of time. The specimens described in 4.4 for impact test after aging shall be used."	Weathering for Laminated and Organic Coated glazing tests a are similar to ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 has no test; and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 have a test.
Tests After Weathering for Laminated Glass Materials	Weathering test Organic-coated glass Six specimens 2 inches by 6 inches (5 centimeters by 15 centimeters) by nominal thickness identical to those submitted for impact testing Three specimens oriented indoors toward radiation and three specimens kept in darkness at 73° F (23° C)	"The weathering methods described in section 5.4.1 shall be used for all materials subjected to exterior exposure." "The weathering test natural exposure follows ASTM D1435.	Weathering for Laminated and Organic Coated glazing tests a are similar to ANSI Z97.1-2009$^{\epsilon 2}$ After exterior weathering: Visible Light Transmittance, Yellowness Index, Haze, Delta E, Visual Assessment and for Accelerated Weathered Interior Laminated Glazing product: Visible Light Transmittance, Yellowness Index, Haze, Delta E, Visual Assessment	Both ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 provide for weathering tests of laminated glass materials and impact testing of Laminated glazing, Tempered Glass, Organic Coated Glazing, Plastic Glazing, Bent Glass, and Mirror glazing.
Adhesion Test for Organic-coated Glass	§1201.4(d)(B)(1) Adhesion test for organic-coated glass only A tensile tester of constant-rate-of-extension (CRE) with a moving cross head set to move at 12 inches (305 mm) per minute "The organic-coated glass adhesion shall be	Adhesion test A tensile tester of constant-rate-of-extension (CRE) with a moving cross head set to move at 12 inches (305 mm) per minute. Six specimens, (nominally 2 inch by 6 inch (52 mm by 152 mm)) The organic coating shall be judged	Test after weathering for Organic Coated Glazing Only the Adhesion Test is Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 has an adhesion test for organic coated glass and; ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 have a test for organic coated glass.

	judged satisfactory if the average pull force for the weathered specimens is no less than 90 percent of the average pull force for the control specimens.	satisfactory if the average tensile vale of the three exposed specimens is no less than 75% of the average tensile values of three control specimens.		
Tensile Strength Test for Organic-Coated Glass	§1201.4(d)(B)(1) Organic-coated glass only CRE tensile tester shall be used with a moving cross-head set to move at 2 inches per minute (0.8 millimeter per second) A razor blade shall be used to cut ½ inch (12 millimeter) wide specimens of organic coating on glass The organic coating shall be judged satisfactory if the average tensile value of the weathered specimens is no less than 75 percent of the average of the control specimens	Organic Coated Glass and Same specimens used for adhesion test. A tensile tester of constant-rate-of-extension (CRE) with a moving cross head set to move at 2 inches (305 mm) per minute. Six specimens, (nominally 2 inch by 6 inch (52 mm by 152 mm)) The organic coating shall be judged satisfactory if the average tensile vale of the three exposed specimens is no less than 75% of the average tensile values of three control specimens.	Tensile Strength Test after weathering for Organic Coated Glazing Only unchanged from ANSI Z97.1-2009$^{\epsilon 2}$ except with different section numbers referenced	16 C.F.R. part 1201 has a tensile strength test, and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 have a tensile strength test for organic coated glass.
Tests After Weathering for Plastics	No Test due to revocations during the 1980-1982 period	ASTM D6110 Charpy Impact Test method B	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	Both ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 provide for Plastic Glazing Charpy Impact testing.
Outdoor Exposure Weathering Tests for Plastics	Requirements for accelerated environmental durability test for plastic glazing materials intended for outdoor exposure Revoked 45 FR 66002, October 6, 1980	Specimens evaluated before and after exposure per ASTM D 6100, Charpy Impact Test, Meth od B with the following exceptions: specimens not notched, specimens tested with exposed surface in tension, specimens exposed and tested flatwise, the span reduced to 2 inches (52 mm) for thin material, the average of five samples shall be reported The plastic material is acceptable if the impact strength is not reduced by more than 25% as a result	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 has no test, and ANSI Z97.1-2000$^{\epsilon 2}$ specifies ASTM D6100.

		of natural or accelerated exposure		
Tests After Weathering for Organic Coated Glazing Materials for Indoor Service	§1201.4(c)(B)(2)(iii) Organic-coated glass, Provides for four additional impact testing size samples for indoor service	Aging Tests for Plastics and Organic-Coated Glass Used in Indoor Applications Only: After exposure the specimens may be cleaned Organic coated materials intended for interior use only shall be subjected to the requirements of section 5.4.3."5.4.3.2 Aging tests for organic-coated glass used in interior applications only Four specimens up to 34 inch by 76 inch 140°F ± 5°F within 3 hours and hold for 21 hours Impact test after aging	Indoor Applications Only – Aging Tests for Laminated, Plastic, Organic Coated and Mirror glazing – Similar with added Mirror glazing, Accelerated weathering tests with Xenon-arc light per ASTM G155 and Aging tests	Both 16 C.F.R. part 1201 and ANSI Z97.1-2009$^{\epsilon 2}$ provide for impact testing of weathered organic coated glazing materials for indoor service; ANSI Z97.1-2009$^{\epsilon 2}$ added Plastic, and ANSI Z97.1-2015 added Laminated and Mirror glazing.
Indoor Aging Tests for Plastic Glazing	revoked (47 FR 27856, June 28, 1982)	Aging Tests for Plastics and Organic Coated Glass Used in Indoor Applications Only. Impact test after aging. 5.4.4 Impact tests after aging for plastics	Indoor Applications Only – Aging Tests for Laminated, Plastic, Organic Coated and Mirror glazing (2) Aging tests for Mirror Glazing used in Indoor Applications only (3) Impact test after aging for Mirror Glazing	16 C.F.R. part 1201 plastic test was revoked, and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 have tests for Laminated, Plastic, Organic Coated, and Mirror Glazing for indoor use.
Impact Test After Aging for Organic-Coated Glass	§1201.4(c)(ii)(B)(2)(iii)(d) Four additional samples identical to those submitted for the impact test when used for indoor service	Impact tests after aging for Plastics and organic-coated glass used in interior applications comparison with non-aged	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$ (refers to section 4.4 for impact test)	16 C.F.R. part 1201 has impact test for Organic Coated glass when used for indoor service; and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 have when used for indoor service testing.
Conformance Requirements	"Organic –coated glass that has been tested for environmental exposure from one side	Label content Supplier's name, distinctive mark, or	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$ except	16 C.F.R. part 1201 says glazing is to be labeled

Tempered Glass, Laminated Glass, Glazing Made Before July 6, 1977 Through July 5, 1978 Can Be included in 16 C.F.R. Part 1201(a) if:	only must bear a permanent label on the coating stating "GLAZE THIS SIDE IN" and shall bear in the central 50 percent of the surface area …"SEE PERMANENT LABEL FOR IMPORTANT MOUNTING INSTRUCTION". "The architectural glazing material is permanently labeled to indicate that it conforms to ANSI Z97.1-1972 or 1975 or is accompanied by a certificate certifying conformance to ANSI Z97.1 1972 or 1975." "The tempered glass is permanently labeled to indicate that it conforms to ANSI Z97.1-1972 or 1975 or is accompanied by a certificate certifying conformance to ANSI Z97.1 1972 or 1975." "The laminated glass is permanently labeled to indicate that it conforms to ANSI Z97.1-1972 or 1975 or is accompanied by a certificate in accordance with section 14(a) of the CPSA certifying conformance to ANSI Z97.1 1972 or 1975."	designation. The words "American National Standard Z97.1-2009" or the characters "ANSI Z97.1-2009". Classification of test size (L or U) and the drop height class (A, B, or C). Place of Fabrication (If fabricator has more than one location fabricating the product).	using "American National Standard Z97.1-2015" or "ANSI Z97.1-2015 instead of "American National Standard Z97.1-2009" or "ANSI Z97.1-2009"	to indicate that it conforms to ANSI Z97.1-1972 or 1975; and the current version of ANSI Z97.1 says that glazing is to be labeled to reflect that it conforms to ANSI Z97.1-2009$^{\epsilon 2}$ and then to ANSI Z97.1-2015.

	Labeling			
Subject	**16 C.F.R. Part 1201**	**ANSI Z97.1-2009$^{\epsilon 2}$**	**ANSI Z97.1-2015**	**Staff Comments**
Labeling	§1201.5(c) 14 CPSC 15 USC 2063 Organic –coated glass "Glaze this side in"	Laminated and fire-resistant wired glass stock sheets shall be labeled by the manufacturer of the stock sheet All glazing products shall be labeled by the company producing the finished cut to size glass product The fabricator or manufacturer shall label plastic glazing materials The installer of the safety film shall label field applied organic coatings (films)	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 limited and ANSI Z97.1-2009$^{\epsilon 2}$ and ANSI Z97.1-2015 are more concise.
Marking of Glazing Application of Label	§1201.5 (a) Manufacturers and private labelers of glazing materials covered by this part 1201 shall comply with the requirements of section 14 CPSC (15 U.S.C. 2063) §1201.7 The architectural glazing material, tempered glass, laminated glass is permanently labeled to indicate it conforms to ANSI Z97.1-1972 or 1975 or is accompanied by a certificate certifying conformance to ANSI Z97.11972 or 1975. 16 CFR 1201 says that glazing materials conforming to ANSI Z97.1-1972 and 1975 may be distributed and sold without restriction.	Suppliers name, distinctive mark of designation American National Standard Z97.1-2009 of ANSI Z97.1-2009 Test size L or U and Drop Height Class A, B, or C Plastic glazing does not require a drop height (a modulus of elasticity ASTM D790 less than 550,000 psi (3.9 Gpa) and a Rockwell hardness (ASTM D785) less than M or R 140 shall be satisfactory. Place of fabrication 6.2 Application of Label Laminated and fire-resistant wired glass stock sheets shall be labeled by the manufacturer All glazing products including cut size laminates, fire-resistant wired glass and tempered glass shall be labeled by the company producing the finished cut to size glass product The fabricator shall label plastic glazing materials The installer of the safety film shall label field applied organic coatings (films) Safety glazing materials used in indoor	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 refers to older 1972 and 1975 editions of ANSI Z97.1 and has not be adjusted to refer to the most current edition of ANSI Z97.1, which is now ANSI Z97.1-2009$^{\epsilon 2}$; and ANSI Z97.1-2015 contains more detail about the label content for identifying a conforming product (Note that 16 C.F.R. part 1201 says that glazing materials conforming to ANSI Z97.1-1972 and 1975 may be distributed and sold without restriction and has not been kept current with the editions follow-up editions of ANSI Z97.1-2009$^{\epsilon 2}$ and the latest

		applications only shall be labeled "Indoor Use Only" Organic-coated glass shall be labeled "Glaze This Side In" to indicate to the installer, inspector, or user which side of the organic-coated glass should be exposed to the elements if there is a specific side that should be exposed		ANSI Z97.1-2015.
Special Application Labeling	§1201.5(c) "Organic–coated glass that has been tested for environmental exposure from one side only must bear a permanent label on the coating stating "GLAZE THIS SIDE IN" and in the central 50 percent of the surface area the following message…"SEE PERMANENT LABEL FOR IMPORTANT MOUNTING INSTRUCTION" …to remain in place until installation." This is for indoor use according to §1201.4(d)(ii)(B)(1)	Certain types of glazing marked with additional information as appropriate After having successfully passed appropriate tests, like products and materials produced in the same manner as specimens submitted for testing shall be legibly and permanently marked with the words- "Indoor Use Only". Organic coated glazing materials shall be legibly and permanently marked with the words "Glaze This Side in," to indicate to the installer, inspector, or user which side of the organic-coated glass should be exposed to the elements if there is a specific side that should be exposed.	Unchanged from ANSI Z97.1-2009$^{\epsilon 2}$	16 C.F.R. part 1201 provides for marking organic-coated glass that has been tested for environmental exposure on one side only; and ANSI Z97.1-2009$^{\epsilon 2}$ provides for marking organic-coated glass that has been tested for environmental exposure on one side only and for products and materials for "Indoor Use Only."