

STANDARD INFORMATION

Standard Number: ANSI Z21.97 / CSA 2.41

Standard Name: Outdoor Decorative Gas Appliances

Standard Edition and Issue Date: 3rd Edition Dated December 1, 2017

Date of Revision: December 1, 2017

Date of Previous Revision of Standard: 2nd Edition Revised October 1, 2014

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **January 1, 2020**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: A review of all Listing Reports is necessary to determine which products comply with new/revised requirements and which products will require re-evaluation. **NOTE:** Effective immediately, this revised standard will be exclusively used for evaluation of new products unless the Applicant requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.

Overview of Changes:

- New boxed warnings in the printed instruction manual replace the previous warnings
- New requirements on the appliance rating plate
- A new test requires all appliances to undergo the rain test while the appliance is in operation.
- New tests that measure the glass temperature on all appliances with a glass viewing area.
- New annex that contains the method of calculating glass temperature

Specific details of new/revised requirements are found in table below.

If the applicable requirements noted in the table are not described in your report(s), these requirements will need to be confirmed as met and added to your report(s) such as markings, instructions, test results, etc. (as required).

Client Action Required:

Information – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revised paragraphs noted in the attached or explain why these new/revised requirements do not apply to your product (s).

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are underlined and deletions are shown lined out below.</i>
4	Info	Construction
4.1	Info	General construction and assembly
		<i>New clause added;</i>
4.1.14		An appliance design having an outside glass viewing area temperature that exceeds 172 °F (78 °C) as measured in Clause 5.20.2 shall be provided with a barrier for the appliance glass viewing area. The barrier shall be constructed to maintain a fixed relationship between barrier essential parts and the outside glass viewing area surface under normal and reasonable conditions of handling and usage.
4.6		<i>New section added;</i> Conversion kits
4.6.1		An appliance manufactured for use with two or more of the gases specified in Clause 5.2, Test Gases, without any change in equipment except for orifice hoods or spuds shall comply with the following conditions: a) an outdoor decorative gas appliance shall be marked to indicate the gas for which it is equipped as supplied by the manufacturer (also see Clause 4.20.2f)); b) an orifice(s) for use with another gas(es) shall be suitably identified, shall be packaged with the appliance, or supplied from the factory as a field conversion kit, and shall comply with Clause 4.6.2; and c) an appliance shall display a marking, as specified in Clause 4.20.2k), outlining the correct selection of the orifice(s) for the gas with which the appliance is to be used when installed.
4.6.2		An appliance for use with two or more of the gases specified in Clause 5.2 that requires a change in equipment of more than an orifice hood(s) or spuds may be (1) supplied from the factory with a field conversion kit, or (2) have available from the factory a field conversion kit complying with the following conditions: a) components of the conversion kit shall be those components tested for use on the design certified appliance when equipped for a specified type of gas; b) all gas manifold and control assemblies shall be factory assembled and tested for proper operation and gas-tightness;

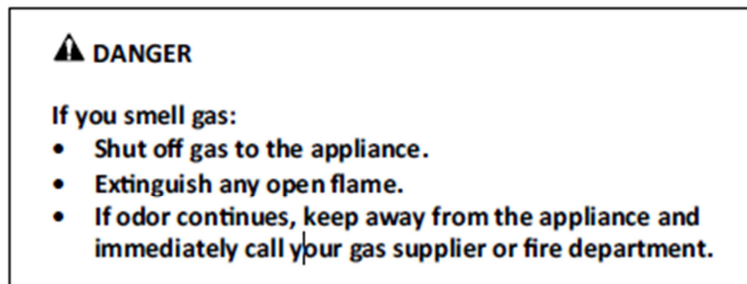


- c) each conversion kit shall be accompanied by printed instructions and diagrams that comply with the applicable provisions of Clause 4.19;
- d) if the plate or label supplied with the appliance does not specify an alternate gas, a plate or label of Class IIIA-2 marking material shall be provided with each conversion kit with instructions for the label to be affixed and located on the appliance or supporting structure where it can be easily read. This label shall specify the type of gas for which the appliance has been converted; and
- e) instructions supplied with the appliance may reference a conversion kit part number(s) for field conversion.

4.19 Info **Instructions**

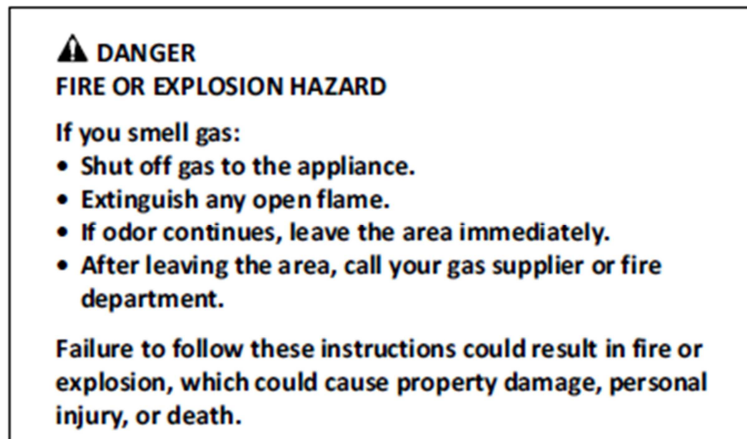
The front cover, or in the absence of a cover, the first page of the instructions shall bear the following boxed warnings in 12-point boldfaced type. (See also Figure 1):

Old:

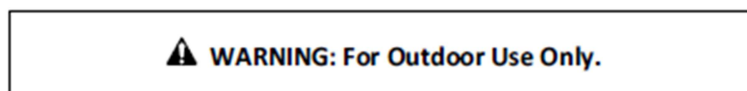


New:

4.19.2



Old:





New:

⚠ WARNING: For Outdoor Use Only.
Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

New:

INSTALLER: Leave this manual with the appliance.
CONSUMER: Retain this manual for future reference.

The front cover, or in absence of a cover, the first page of the instructions shall also bear at a minimum a warning to the following effect:

4.19.3

Old:

⚠ WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.

New:


⚠ WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.

New clause added;

For a glass fronted gas appliance where the temperature of the glass viewing area outside surface exceeds the limits specified in Clause 5.20.2, the following danger graphic and statement shall be shown on the front cover, or first page of the instructions

4.19.4

⚠ DANGER



HOT GLASS WILL CAUSE BURNS.
DO NOT TOUCH GLASS UNTIL COOLED.
NEVER ALLOW CHILDREN TO TOUCH GLASS.

A barrier designed to reduce the risk of burns from the hot viewing glass is provided with this appliance and shall be installed for the protection of children and other at-risk individuals.



The Danger letter-type shall be a sans-serif font with a minimum letter height of the following:

- a) The symbol and word, “▲ DANGER,” shall be boldfaced type having a minimum uppercase letter height of 0.498 in (12.65 mm)†;
 - b) The words, as shown above, in the boxed statement shall be boldfaced type having a minimum uppercase letter height of 0.120 in (3.05 mm). The minimum vertical spacing between lines of type shall be 0.046 in (1.17 mm)*;
 - c) Lower case letters shall be compatible with the uppercase letter size specifications; and
 - d) The word DANGER shall be in white letters on a contrasting background.
- * This letter height and line spacing measurements correspond to 12-point type.
† This letter height corresponds to 36-point type.

The instructions accompanying the appliance shall include the following:

d) the minimum inlet gas supply pressure for the purpose of input adjustment;

o) the printed instructions accompanying the appliance shall also include the following minimum information presented in a readily obvious and prominent manner, such as by being underlined, encircled, or printed in large or different colored type:

4.19.5

- i) children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition;
- ii) young children should be carefully supervised when they are in the area of the appliance;
- iii) clothing or other flammable materials should not be hung from the appliance or placed on or near the appliance;
- iv) iv) “Any guard, barrier, or other protective device removed for servicing the appliance shall be replaced prior to operating the appliance.”
- v) For appliances requiring a barrier, as determined under Clause 5.20.2, “A barrier designed to reduce the risk of burns from the hot viewing glass is provided with this appliance and shall be installed for the protection of children and other at-risk individuals.”
- vi) “If the barrier becomes damaged, the barrier shall be replaced with the manufacturer’s barrier for this appliance.”
- vii) Where applicable, provide a means by which the consumer can identify the barrier, (such as graphic representation, clear description or reference marking).
- viii) installation and repair should be done by a qualified service person. The appliance should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required as necessary. It is imperative that the control compartment, burners, and circulating air passageways of the appliance are kept clean.



4.20	Info	Markings
4.20.2		<p>An appliance shall bear a permanent rating plate having the following, affixed to the principal (main) assembly of the appliance on Class III marking material attached or printed in a location where it can be easily observed or is accessible for observation when the appliance is installed as it would be in service.</p> <p>a) The manufacturer's or distributor's name and address. b) The manufacturer's or distributor's model number of the appliance. c) A distinctive number that will identify an individual appliance. <u>d) The manufacturer's normal hourly input rating "Input: _____ Btu/h (_____ kW)" and manifold pressure "_____ in wc (_____ kPa)."</u> e) <u>The minimum inlet supply pressure for the purpose of input adjustment, as follows:</u> <u>"Min. gas supply for input adj. _____ in wc (kPa)."</u> f) <u>The maximum inlet supply pressure, as follows:</u> <u>"Max. gas supply: _____ in wc (kPa)."</u> g) For an appliance with a fixed fuel piping system and equipped with a gas pressure regulator, the normal manifold pressure in inches water column. h) For an appliance for use with a fixed fuel piping system and equipped with an appliance gas pressure regulator, the minimum permissible gas supply pressure for purpose of input adjustment. i) Type of gas for which equipped: "Natural or Propane." j) The statement "For Outdoor Use Only. If Stored Indoors, Detach and Leave Cylinder Outdoors." The marking for an appliance for connection to a fixed fuel piping system need only display the first sentence of this statement. k) If the appliance utilizes any electrical equipment, the voltage, frequency (Hz), and total current input in amperes. If the total current input of all components is less than 12 amperes, the input marking may optionally be shown as "Less than _____ * amperes." * This amperage rating shall be equal to or greater than the total input in amperes. l) Identification of this Standard as follows: "ANS Z21.97-(year) • CSA 2.41-(year), Outdoor Decorative Gas Appliances". <u>m) The symbol of the organization performing the tests for compliance with this Standard.</u> <u>n) An appliance equipped with fixed orifices for use with propane gas and natural gas, without any change in equipment except orifice hoods or spuds, shall be marked to indicate the gas for which it is equipped (also see Clause 4.5.1).</u> <u>o) The appliance shall also display a marking outlining in sufficient detail the correct selection of the orifices for the gas with which the appliance is to be used when installed.</u></p>
4.20.6		<p>A label of Class IIIC marking material shall, when practical, be affixed to the appliance in a conspicuous location by the manufacturer. When not practical, this label shall be supplied by the manufacturer with explicit instructions to affix the label in a conspicuous location adjacent to the appliance. This label shall include the following information:</p>



Old:

⚠ WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to the owner's information manual provided with this appliance. For assistance, or additional information, consult a qualified installer, service agency, or the gas supplier.

New:

⚠ WARNING: Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Refer to the owner's information manual provided with this appliance. Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

New clause added;

4.20.9

Where applicable, each appliance shall bear a plate of Class IIIA marking material located so as to be easily read when the appliance is in a normally installed position, on which shall appear the following:

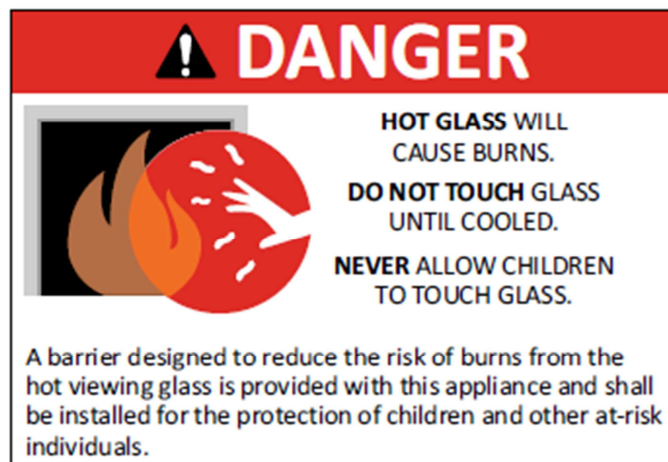
“For use only with barrier(s) Part No(s)._____. Follow installation instructions.”

New clause added;

Instruction plate

For a glass fronted gas appliance where the temperature of the glass viewing area outside surface exceeds the limits specified in 5.20.2 the following danger graphic and statements shall be shown on a Class IIIA-2 Permanent Label.

4.20.11



The Danger letter-type shall be a sans-serif font with a minimum letter height of the following:



- a) The symbol and word, “▲ DANGER,” shall be boldfaced type having a minimum uppercase letter height of 0.498 in (12.65 mm)†;
 - b) The words, as shown above, in the boxed statement shall be boldfaced type having a minimum uppercase letter height of 0.120 in (3.05 mm). The minimum vertical spacing between lines of type shall be 0.046 in (1.17 mm). * Lower case letters shall be compatible with the uppercase letter size specifications; and
 - c) The word DANGER shall be in white letters on a red background.
- * This letter height and line spacing measurements correspond to 12-point type.
 † This letter height corresponds to 36-point type.

Appliances for connection to a self-contained propane gas supply system shall bear the following marking on Class IIIA marking material:

- 4.20.12 “▲ CAUTION: The gas pressure regulator provided with this appliance must be used. This regulator is set for an outlet pressure of _____ inches water column.”*
- * The outlet pressure is specified by the manufacturer.

Appliances for connection to a self-contained propane gas supply system shall bear the following applicable statement on Class IIIA marking material located so as to be easily read:

- 4.20.14 a) for an appliance provided with a connection other than a CGA No. 600 Cylinder Connection (see Clause 4.12.14):
 “The gas supply must be turned off at the ~~LP-gas~~ propane gas supply cylinder when this appliance is not in use;”
- b) for an appliance provided with a CGA No. 600 Cylinder Connection (see Clause 4.12.14):
 “The ~~LP-gas~~ propane gas supply cylinder must be disconnected when this appliance is not in use.”

5 Info **Performance**

5.16 Info **Rain test**

New clause added;

An appliance shall be constructed to safely operate or safely shut off gas to the main burner during a simulated rainstorm.

Method of Test

- 5.16.2 The appliance shall be placed on the test platform of the rain test apparatus described in Figure 3 and Figure 4, in the position with respect to the spray heads deemed most critical by the testing agency.

The appliance main burner shall be operated for 15 minutes. The rain test apparatus shall then be placed into operation, and each spray head adjusted by means of the control valve to operate at 5 psi (34.5 kPa). The spray head unit shall be adjusted to varying elevations and horizontal distances from the test platform to



determine the most critical location. The exposure at the position deemed most critical by the testing agency shall be maintained throughout the test.

After adjustment of the spray head unit, the rain test apparatus and the appliance shall be operated for a period of 15 minutes, during which, burners without a safety shut-off device shall not become extinguished.

Burners with a safety shut-off device shall not become extinguished; or if burners become extinguished during the test, the gas to the main burner shall be automatically shut off.

The above test procedure shall be repeated with the appliance in any other position(s) with respect to the shower heads deemed necessary by the testing agency.

New section added;

5.20

Glass fronts

The temperature at any point on the inside of a glass viewing surface shall not exceed the maximum specified in Table VII, Maximum Temperatures for Glass.

In addition, the maximum thermal-mechanical stress on a fully tempered soda-lime glass viewing surface, when used on a direct vent appliance, shall not exceed 10,000 psi. This is the minimum allowable surface compression stress required to qualify glass as fully tempered in accordance with ASTM C1048.

The infrared radiation thermometer specified in the Method of Test outlined below shall have a spectral response of 8-14 microns, adjustable emissivity and close-focus optics [spot diameter of 0.5 in (1.27 cm) or less].

Method of Test

5.20.1

Room temperature for the following test should be set at 75 °F (24 °C) ± 5 °F (± 3 °C).

a) A non-direct vent appliance shall be set up and operated in accordance with the Method of Test in 5.15, Wall, Floor and Ceiling Temperatures. When equilibrium conditions are attained, the exterior of the glass surface shall be scanned using an infrared radiation thermometer. The highest temperature reading shall be recorded, and the interior glass surface temperature calculated using the equations outlined in Appendix I, Glass Temperature Calculations, or using the Glass Safety Program. * The calculated interior temperature shall not exceed the limits specified in Table VII.

b) A direct vent appliance shall be set up with the minimum vertical vent length, and corresponding maximum horizontal vent length and maximum number of elbows as specified by the manufacturer (see Figure 18, Arrow A). An additional test shall also be conducted at the maximum horizontal vent length and maximum



number of elbows and corresponding minimum vertical vent length as specified by the manufacturer (see Figure 18, Arrow B).

i) A direct vent appliance, using other than tempered soda-lime glass, shall be operated in accordance with the Method of Test in Clause 5.15. When equilibrium conditions are attained, the exterior of the glass surface shall be scanned using an infrared radiation thermometer. The highest temperature reading shall be recorded, and the interior glass surface temperature calculated using the equations outlined in Appendix I or using the Glass Safety Program*. The calculated interior temperature shall not exceed the limits specified in Table VII.

ii) A direct vent appliance, using tempered soda-lime glass, shall be operated in accordance with the Method of Test in Clause 5.15. When equilibrium conditions are attained, temperatures on the exterior of the glass surface shall be measured using an infrared radiation thermometer at the points specified for the glass surface as outlined in the Glass Safety Program. * Temperatures on the outer edges of the glass surface shall also be measured using 10 Type-K beaded thermocouples, attached with high temperature adhesive, and located at the points specified for the glass surface as outlined in the Glass Safety Program. The temperature measurements shall be entered into the Glass Safety Program in accordance with its specific location on the glass surface. The program output shall not yield a maximum interior temperature in excess of 500°F (260°C) as outlined in Table VII. The program output shall not yield stress in excess of 10,000 psi.

* Windows 95 Application. The “Glass Safety Program” can be purchased from the Gas Technology Institute (GTI).

New clause added;

Where the outside temperature of the glass viewing area surface exceeds 172 °F (78 °C)* when installed according to Clause 5.15, Wall, Floor and Ceiling Temperatures, and operated to equilibrium, a provided barrier shall comply with burn hazard limits under Clause 5.23.2, Barrier Burn Hazard Potential (Other Than A Barrier made of glass).

Method of Test

5.20.2

Evaluation shall be performed using the outside surface temperatures of the glass viewing area surface as determined by the Method of Test in 5.20.1, Glass Fronts.

* The maximum temperatures specified are based on a 77 °F (25 °C) room temperature. When the room temperature is other than 77 °F (25 °C) the allowable temperatures shall be increased or decreased 1 degree for each 1 degree of room temperature greater or less than 77 °F (25 °C), within a range of 70 °F-80 °F (21 °C-27 °C).



New section added;

Burn hazard potential

5.23

An outdoor decorative gas appliance shall comply with Clause 5.20.1 or 5.20.2 in order to determine the burn hazard potential for the external surfaces of the glass viewing area, barriers made of glass or barriers other than glass.

Burn hazard potential of glass viewing areas including barriers made of glass
Temperatures of the glass viewing area or the barrier made of glass, when tested in the following method of test, shall not exceed 172 °F (78 °C)*.

Method of Test

This test is to be conducted at the same time as Clause 5.15, Wall, Floor and Ceiling Temperatures. The hottest point of the glass viewing area or the barrier made of glass is to be established in accordance with the Method of test in Clause 5.20, Glass Fronts.

5.23.1

Burn hazard potential shall be determined for all exterior glass viewing area surfaces or glass barrier surfaces that can be fully contacted by the flat tip of the test probe surface having a diameter of at least 11/16 in. (17.5mm).
Surface temperatures shall be measured using the probe in Figure 9, Temperature Measuring Probe. The probe is to be heated to 99 °F (37 °C). The probe is then to be applied to the hottest point of the glass viewing area or the barrier made of glass with a 5 lb force (22 N) for 10 seconds. The probe is to be applied so that the tip will fully contact the surface. The tip is considered to be the disc and flat surface of the cork surrounding the disc. The surface temperatures obtained shall not exceed 172 °F (78 °C).

* The maximum temperatures specified are based on a 77 °F (25 °C) room temperature. When the room temperature is other than 77 °F (25 °C) the allowable temperatures shall be increased or decreased 1 degree for each degree of room temperature greater or less than 77 °F (25 °C), within a range of 70 °F – 80 °F (21 °C – 27 °C).

Burn hazard potential (other than barriers made of glass)

5.23.2

A barrier, which is intended to prevent direct contact with the glass viewing area surface by the accessibility probe shown in Figure 17, Accessibility Probe, shall be designed to prevent contact with the glass viewing area surface having temperatures in excess of 172 °F (78 °C)*, when testing according to Clause 5.20.1.

Method of Test

The probe shall be applied: 1) with a force of 2.5 lb (11.1 N); and (2) in any possible configuration and to any depth that the size of an opening will permit. The probe shall be rotated or angled to any possible position before, during or after insertion



through the opening. If necessary, the configuration shall be changed after the probe has been inserted through the opening.

Any glass surface the accessibility probe can contact with the barrier in place shall be measured according to section Clause 5.20.1 or 5.21.3, to verify the glass surface temperature does not exceed 172 °F (78 °C)*. Removal of barrier may be required for measuring temperatures.

* The maximum temperatures specified are based on a 77 °F (25 °C) room temperature. When the room temperature is other than 77 °F (25 °C) the allowable temperatures shall be increased or decreased 1 degree for each 1 degree of room temperature greater or less than 77°F (25°C), within a range of 70 °F – 80°F (21 °C – 27 °C).

A barrier other than glass shall be tested with the appliance in accordance with the Method of Test shown below.

Method of Test

5.23.3

An appliance with the barrier installed according to the manufacturer's instructions shall be installed according to Clause 5.14, Wall, Floor and Ceiling Temperatures. The barrier shall not become detached when subjected to the following method of test. A Force Probe as shown in Figure 6 shall be used to apply a 10 lb (44.5 N) force to all surface(s) of the barrier, which are directly in front of the viewing area. The probe force shall be applied normal to the plane of the surface(s) of the barrier. Where surfaces are rounded, the Force Probe shall be applied evenly and normal to the plane of the surface of the curved feature, approximately in the center of the curved feature. The barrier shall remain attached and shall not exhibit any deformation that would compromise the safe and intended function of the barrier. Any permanent deformation that occurs due to application of force prescribed above shall not be repaired nor compensated for during the Thermesthesiometer evaluation. Should the barrier contact the glass with 10 lbf applied as prescribed, a Thermesthesiometer test with 10 lbf shall be required, below.

The appliance shall then be operated until equilibrium is attained. All framework of the barrier that is not over the glass viewing area surface shall comply with the temperature requirements under section 2.26.1-a and –b, Surface Temperatures.

Using a thermal imaging camera, thermocouple array, or other temperature sensing device, find the hottest point(s) for each different thermal mass on the barrier. The outside surface of the barrier at the hottest point(s) identified above shall be measured using a Thermesthesiometer*, or the prescribed Calculational Procedure, Method A, in the ASTM Practice for Determination of Skin Contact Temperature from Heated Surfaces Using a Mathematical Model and Thermesthesiometer, ASTM C1057.



Place the Thermesthesiometer on the hottest point(s) of each thermal mass, applying a 4 to 5 lbf (17.8 to 22.24 N). Record the Thermesthesiometer's output temperature at 5 seconds.

In the event the barrier contacts the glass viewing area surface during the application of the Force Probe (see Figure 6), the test shall be conducted by applying the Thermesthesiometer with a 10 lbf (44.5 N) where contact occurred. Record the Thermesthesiometer's output temperature at 5 seconds.

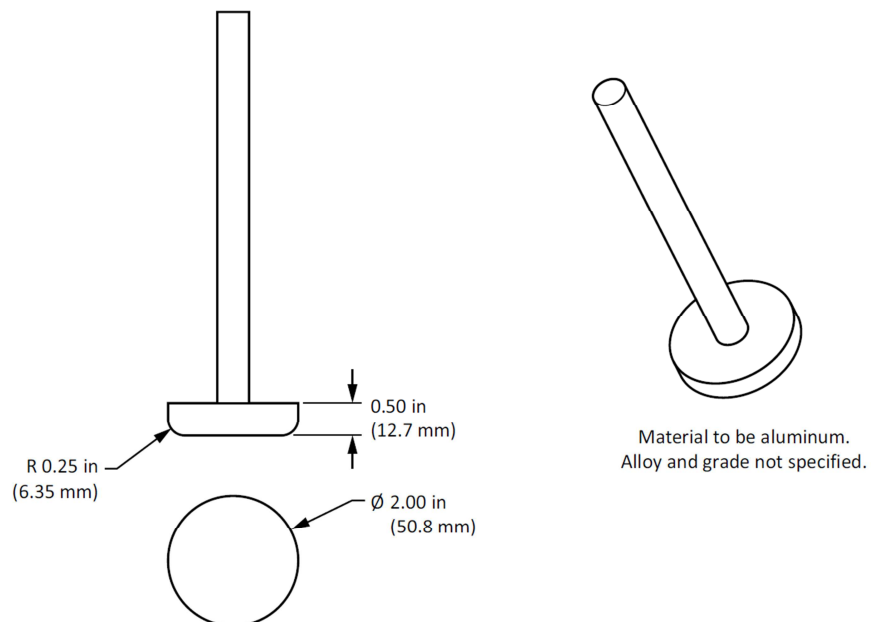
The barrier complies with the requirements of this test if the Thermesthesiometer reading at 5 seconds does not exceed Threshold B as per ASTM C1055 formula 4.2.3TB that equals $58\text{ }^{\circ}\text{C}^{\dagger}$ ($137\text{ }^{\circ}\text{F}$) where TB is the critical contact temperature for reversible epidermal injury, $^{\circ}\text{C}$. (See Figure See Figure 1, Temperature-Time Relationship for Burns, in ASTM C1055)

* See National Bureau of Standards Technical Note 816 - Engineering and Construction Manual for an Instrument to Make Burn Hazard Measurements in Consumer Products

† The temperature under 2.15.2 is not to be considered a surface temperature, it is the reading from the Thermesthesiometer or the mathematical method in ASTM C1057.

New figure added;

Figure 6





Decorative structural elements integral to the barrier which are located over the glass viewing area shall comply with the temperature requirements under section 2.26.1(a) and (b), Surface Temperatures provided:

5.23.4

- a) Decorative structural elements shall cover no more than 5 percent of the surface area over the glass viewing area; and
- b) The maximum width of a decorative framework element shall not exceed 0.75 inch.

New annex added;

Annex C

Glass temperature calculation

Annex C contains the method of calculating the inner (fireside) glass temperature based on measurements of the outer (room) side glass temperature. (See standard for details)

CUSTOMERS PLEASE NOTE: This Table and column “Verdict” can be used in determining how your current or future production is or will be in compliance with new/revised requirements.
