

Standard Information

Standard Number: ANSI Z83.20 / CSA 2.34

Standard Name: Gas-fired tubular and low-intensity infrared heaters

Standard Edition and Issue Date: 3rd Edition Dated December 2016

Date of Issue: December 2016

Date of Previous Revision of Standard: 2nd Edition Dated 2008 Reaffirmed 2013

Effective Date of New/Revised Requirements

Effective Date: **December 31, 2018**

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requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.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: Numerous revisions and additions affecting construction, testing, markings and instructions. 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 – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records.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.

Description of New/Revised Technical Requirements

Clause	Verdict	Comment
4.1.10		<p>A heater for indoor installation designed to vent the flue gases horizontally outdoors through a wall by means other than a conventional venting system shall be provided with the means for venting the flue gases to the outdoors unless the necessary parts to accomplish this are of specific types tested by a nationally recognized testing agency and the appliance manufacturer's instructions identify and specify the use of such specific parts (see 1.27.12 and 2.1.9).</p> <p><u>A Category II, III, or IV heater shall be provided with the means for venting* the flue gases to the outdoors unless the necessary parts to accomplish this are of specific types tested by a nationally recognized testing agency and the appliance manufacturer's instructions identify and specify the use of such specific parts (see Clauses 4.26.12 and 5.1.9). The instructions shall further specify the standard under which the vent system components are listed.</u></p> <p><i>*Means for venting may be accomplished by a method controlled by the manufacturer that shall result in both the heater and the venting means being available at the time of installation.</i></p>
<u>4.1.11</u>		<u>Catalytic infrared heaters submitted for examination under this Standard shall be furnished with the catalytic pads and a list of applicable equipment specified by the manufacturer.</u>
<u>4.1.12</u>		<u>A catalytic heater shall not be equipped with a flue collar or any other means for flue connection which obstructs the front of the catalytic pad where ingress of air flow for the combustion process occurs.</u>
<u>4.1.13</u>		<u>A catalytic heater shall not use adjustable air shutters.</u>
<u>4.1.14</u>		<u>Catalytic heaters covered by this Standard shall only be installed in a fixed position such that the heater cannot be tipped over, dislocated, or otherwise compromised accidentally. Mounting means shall be incorporated as part of the heater design and construction.</u>
<u>4.1.15</u>		<u>Special construction provisions applicable to catalytic infrared heaters are outlined under Clauses 1.5, 4.1.11, 4.1.12, 4.1.13, 4.1.14, 4.7.11, 4.7.12, 4.7.13, 4.7.14, 4.25.6, 4.26.2i), and 4.26.12.</u>
Table 1		Maximum temperature rise above room temperature for Chrome alloy cast iron reduced from 561 to 560.
<u>4.7.11</u>		<u>Catalytic infrared heaters shall be designed and assembled in a manner to preclude the passage of fuel gases through other than the surface of the catalytic material.</u>
<u>4.7.12</u>		<u>Catalytic infrared burners shall be manufactured from materials that have reasonable mechanical and thermal stability and can withstand exposure to a minimum temperature of 1500°F (815.6 °C) for a period of 24 hours.</u>

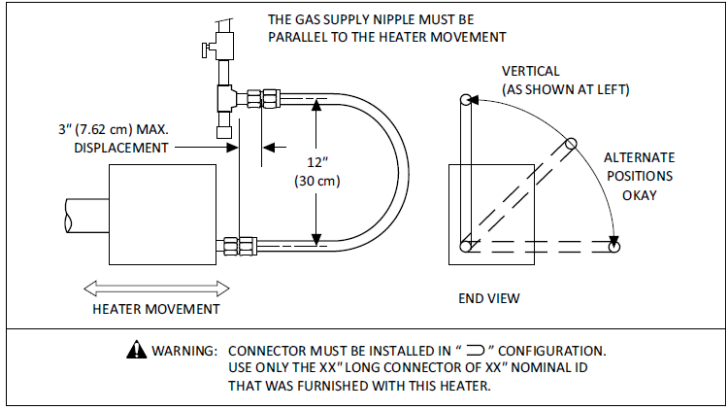
Clause	Verdict	Comment
<u>4.7.13</u>		<u>A catalytic heater shall be equipped with a canopy, guard, grille, or screen that will protect the catalytic pad against damage. The maximum allowed open surface area shall not exceed 80 percent or equivalent. Additional screens, grilles, or guards that are not in contact with the catalytic pad are exempt from Clause 4.7.13.</u>
<u>4.7.14</u>		<u>When a catalytic heater employs guards, screens, or grilles, they shall be supplied by the heater manufacturer only and installed as per the manufacturer's approved installation instructions.</u>
4.9		Condensate disposal for radiant tube type heater
4.9.1		For condensing type On a Category II or IV infrared heater, means shall be provided for the collection and disposal of condensate as determined under Clause 5.16, Category determination.
<u>4.9.5</u>		<u>A venting system supplied with a Category II or IV heater shall have means provided for the collection and disposal of condensate.</u>
4.11	Info	Automatic gas ignition systems
4.11.3	Info	Automatic gas ignition systems shall comply with the applicable construction provisions of the Standard for <i>Automatic Gas Ignition Systems and Components</i> , ANSI Z21.20, CAN1-6.4, or the Standard for <i>Combustion Safety Controls and Solid-State Igniters for Gas- and Oil- Building Equipment</i> , CSA C22.2, No. 199, the <i>Standard for Combination Gas Controls for Gas Appliances</i> , ANSI Z21.78 • CSA 6.20, <u>or the Standard for Manually Operated Electric Gas Ignition Systems and Components</u> , ANSI Z21.92 • CSA 6.29.
4.20		Adjustment of minimum input rating A control designed for two or more rates shall be equipped with either: a) a readily accessible leakproof adjustment means for regulating all rates other than the full open rate (the adjustment for the lowest flow condition shall not be capable of adjustment in the field to a rate lower than the manufacturer's specified minimum input rating); or b) a means for setting the lowest flow condition that is not adjustable in the field. Nonadjustable types shall be set by the manufacturer so that the low-flow condition is not lower than the manufacturer's specified minimum input rating. In the case of a power burner, the control shall be constructed so no adjustment of the rate of gas flow is permitted, unless the burner system is such that adjustment of the valve will not adversely affect the proportion of gas and air supplied to the burner in such a manner that the heater does not produce a concentration of carbon monoxide in an air-free sample of the flue gases in excess of 0.04 percent.
4.24		Draft hoods, flue connections, and integral venting systems
<u>4.24.11</u>		<u>The flue connections of a suspended type appliance shall be readily accessible for inspection with the appliance installed as it would be in service. Removal of access panels for this purpose is acceptable.</u>

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Clause	Verdict	Comment
<u>4.24.12</u>		<u>A flue pipe extension shall be constructed of material equivalent in strength and resistance to corrosion to that of the heating element (see Clause 4.5.2).</u>
<u>4.24.13</u>		<u>Flue pipe extensions shall extend beyond the casing a sufficient distance to facilitate the connection of the vent pipe or draft hood.</u>
<u>4.24.14</u>		<u>A venting system supplied with a Category II or IV appliance shall be constructed of materials resistant to corrosion by condensate (see Clause 4.1.10). Nonmetallic material of integral venting systems shall be judged on its temperature limitations, strength, and resistance to the action of condensate.</u>
<u>4.24.15</u>		<u>A venting system supplied with a Category III or IV appliance shall be gastight and shall be water tight (see Clause 5.23, Venting systems of Category II, III, or IV appliances.)</u>
4.25.3		<ul style="list-style-type: none"> b) <u>information on where the heater is and is not permitted to be installed and/or used, as applicable:</u> <ul style="list-style-type: none"> i) <u>"For indoor installation only. Not for use in residential dwellings."</u> ii) <u>"For outdoor installation only. Not for use in residential dwellings."</u> iii) <u>"For either indoor or outdoor installation. Not for used in residential dwellings."</u> iv) <u>"For outdoor portable use only. Not for use in residential dwellings."</u> e) <u>the stated clearance to combustibles represents a surface temperature of 90°F (50 °C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation;</u> r) <u>information regarding the connection of a heater to the gas supply line, in particular taking into account the thermal expansion and contraction of an appliance/heater;</u> s) <u>if the heater is marked with more than one Category, per Clause 4.26.2m, the installation manual shall specify the venting system to be used for each category.</u> t) <u>for addressing derating at altitudes above 2 000 ft (610 m), the instructions shall indicate one of the following:</u> <ul style="list-style-type: none"> i) <u>installation of this appliance at altitudes above 2 000 ft (610 m) shall be in accordance with local codes, or in the absence of local codes, the <i>National Fuel Gas Code, ANSI Z223.1/NFPA 54</i> or the <i>National Standard of Canada, Natural Gas and Propane Installation Code, CSA B149.1</i>;</u> ii) <u>for appliances requiring modifications other than only gas orifice and/or manifold pressure adjustment for installation at high altitudes, "Installation of this appliance at altitudes above 2 000 ft (610 m) shall be made in accordance with the Listed High Altitude Conversion Kit available with this appliance." See Annex D;</u>

Clause	Verdict	Comment
		iii) <u>for appliances requiring only gas orifice and/or manifold pressure adjustment for installation at high altitude, the appliance installation instructions shall provide adequate details on proper adjustments for various altitudes. See Annex D.</u>
<u>4.25.6</u>		<u>For catalytic infrared heaters, specific instructions relative to the care and cleaning shall be provided.</u>
<u>4.25.15</u>		The instructions shall identify the length and ID of the flexible appliance connector appropriate for the heater. The instructions shall also include correct and incorrect installation geometry as shown in Figure 1, Installation position instructions. Additionally, the warning statement shown in Figure 2, Connector installation label, shall appear. (See Items unique to the United States (Clause A.4, Gas supply to radiant tube heater,) and Items unique to Canada (Clause B.4, Gas supply to radiant tube heater)).
		Installation position instructions (See Clause 4.25.15.)
Figure 1		

Clause	Verdict	Comment
<p><u>Figure 2</u></p>		<p>Connector installation label (See Clauses 4.25.15 and 4.26.14.)</p>  <p>WARNING: CONNECTOR MUST BE INSTALLED IN "D" CONFIGURATION. USE ONLY THE "XX" LONG CONNECTOR OF "XX" NOMINAL ID THAT WAS FURNISHED WITH THIS HEATER.</p>
<p><u>4.25.16</u></p>		<p><u>Catalytic infrared heaters shall be marked with the following boxed warning on Class IIIA marking material with letters on a contrasting background, located in a position where it can be easily read:</u></p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>WARNING: Do not attempt to clean catalytic pad. Follow cleaning instructions accompanying heater.</p> </div>
<p><u>4.25.17</u></p>		<p><u>Each catalytic heater shall bear the following warning, on Class IIIA marking material, in a location where it can be easily observed:</u></p> <p><u>WARNING "Do not use heater if the catalytic pad becomes torn or damaged. Continuous use may result in injury or death due to fire, explosion, or carbon monoxide poisoning. The heater must be serviced by a licensed and qualified service person."</u></p>
<p><u>4.26.2</u></p>		<p>m) <u>Category of infrared heater, as applicable:</u></p> <ul style="list-style-type: none"> i) <u>"Category I"</u> ii) <u>"Category II"</u> iii) <u>"Category III"</u> iv) <u>"Category IV"</u> <p>v) <u>Multiple categories provided the venting system is defined in the installation instructions (see Clause 4.25.3).</u></p> <p>n) <u>a heater marked Category II, III, or IV shall bear a marking which states: "This heater requires a special venting system. Refer to the installation instructions for parts list and method of installation."</u></p> <p>o) <u>a heater marked "Category I" or "Category III" shall bear a marking which states: "This heater requires a special venting system when installed as a</u></p>

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		<p><u>Category III heater. Refer to the installation instructions for parts list and method of installation.</u></p> <p>p) <u>for a heater with a factory installed orifice(s) for altitudes over 2 000 ft (610 m), the heater shall bear a plate that specifies the elevation that the heater is equipped for. If the heater is installed at an elevation other than that specified on the plate, the installer shall contact the manufacturer for the proper high altitude conversion kit.</u></p> <p>q) <u>Total hourly Btu input rating. A heater having individually controlled main burners shall also be marked to show each individually controlled burner input. For a heater listed for operation at altitudes over 2 000 ft (610 m), the marking shall include the derated input(s) for high altitudes(s) (e.g., at elevation above 2 000 ft (610 m), derate the input X percent per 1 000 ft (305 m) above sea level). A heater for outdoor installation shall bear a marking which states: "For installation above 2 000 ft (610 m), see high-altitude rating plate."</u></p> <p>r) <u>Minimum hourly Btu input rating for a heater for automatic operation at ratings less than full input rating. For a heater listed for operation at altitudes over 2 000 ft (610 m), the marking shall include the derated minimum input rating(s) for high altitudes(s) (e.g., at elevations above 2 000 ft (610 m), derate the minimum input X percent per 1 000 ft (305 m) above seal level.). A heater for outdoor installation shall bear a marking which states: "For installation above 2 000 ft (610 m), see high-altitude rating plate inside heater."</u></p>
4.26.9		<p>Each heater shall bear one of the following markings on Class IIIA marking material, as applicable:</p> <p>a) <u>"For indoor installation only. Not for use in residential dwellings."</u></p> <p>b) <u>"For outdoor installation only. Not for use in residential dwellings."</u></p> <p>c) <u>"For either indoor or outdoor installation. Not for use in residential dwellings."</u></p> <p>d) <u>"For outdoor portable use only. Not for use in residential dwellings."</u></p>
4.26.14		<p><u>Radiant tube heaters shall bear a Class IIIA marking as shown in Figure 2, Connector installation label. The marking shall be in close proximity to the gas inlet.</u></p> <p>Note: <u>If the location and orientation of the gas connection to the radiant tube heater is other than shown, the label shall reflect the burner geometry and any additional piping needed to accomplish the intended connector geometry.</u></p>
5	Info	Performance
5.1.1	Info	General

Clause	Verdict	Comment
5.1.9		A <u>Category II, III, or IV</u> heater for indoor installation designed to vent the flue gases horizontally outdoors through a wall by means other than a conventional venting system shall comply with all of the applicable performance provisions specified in this Standard with the heater installed with the minimum vent length specified by the manufacturer. In addition, the tests specified in Clause 5.5, Combustion, through Clause 5.9, Direct ignition systems, shall be conducted with the appliance equipped with the maximum vent length specified by the manufacturer. The vent terminal, air-intake terminal, or vent-air intake terminal or cap supplied or specified by the manufacturer shall be in place during all performance tests unless otherwise specified.
<u>5.6</u>		<p>Combustion and hydrocarbon emissions — Catalytic infrared heaters</p> <p>The combustion and hydrocarbon emission of a catalytic infrared heater shall be deemed satisfactory when (also see Table 8, Allowable concentrations of combustion and hydrocarbon emissions):</p> <ul style="list-style-type: none"> a) a concentration of carbon monoxide not in excess of 200 ppm and a concentration of hydrocarbons (unreacted fuels) not in excess of 1000 ppm for propane gas and 2400 ppm for natural gas is produced in a room with no air changes occurring during combustion of the amount of gas necessary to reduce the oxygen content of the room to a quantity equal to 19.4 percent (1.0 percent carbon dioxide) by volume; and b) a concentration of carbon monoxide not in excess of 250 ppm and a concentration of hydrocarbons (unreacted fuels) not in excess of 1 percent by volume is produced in a room with no air changes occurring during combustion of the amount of gas necessary to reduce the oxygen content of the room to a quantity equal to 15.1 percent (3.8 percent carbon dioxide) by volume. <p>Compliance with conditions “a)” and “b)” shall be determined by the Method of Test.</p>
Table 10		<p>Maximum non-load-bearing flue gas baffle temperatures*</p> <p>Revised to reduce the allowable “Maximum non-load-bearing flue gas baffle temperatures”</p>
5.15	Info	Flue gas temperatures
<u>5.15.2</u>		<p>Method of Test</p> <p>The appliance shall be operated at normal inlet test pressure until the flue gas temperature becomes constant.</p>
5.15	2.14	Flue gas temperatures

Clause	Verdict	Comment															
5.16		<p>Category determination</p> <p>The categorization pressure test provisions do not apply to heaters equipped with draft hoods or draft diverters, and not equipped with a mechanical draft system downstream of the draft hood or draft diverter. These heaters should be assumed to have non-positive vent pressure for the purpose of categorization: i.e., Categories I and II (See Clause 3, Definitions).</p> <p>An appliance shall be determined to be a Category I, II, III or IV appliance (See Clause 3, Definitions) by the Method of Test.</p> <p>The categorization does not apply to an appliance for outdoor installation.</p>															
Table 12		<p>Determining of category (See Clause 5.16.)</p> <table border="1"> <thead> <tr> <th></th> <th>Vent pressures</th> <th>Net flue gas temperatures</th> </tr> </thead> <tbody> <tr> <td>Category I</td> <td>Non-positive</td> <td>On or above curve</td> </tr> <tr> <td>Category II</td> <td>Non-positive</td> <td>Below curve</td> </tr> <tr> <td>Category III</td> <td>Positive</td> <td>On or above curve</td> </tr> <tr> <td>Category IV</td> <td>Positive</td> <td>Below curve</td> </tr> </tbody> </table>		Vent pressures	Net flue gas temperatures	Category I	Non-positive	On or above curve	Category II	Non-positive	Below curve	Category III	Positive	On or above curve	Category IV	Positive	Below curve
	Vent pressures	Net flue gas temperatures															
Category I	Non-positive	On or above curve															
Category II	Non-positive	Below curve															
Category III	Positive	On or above curve															
Category IV	Positive	Below curve															
Figure 6		<p>Chart for determination of infrared heater category</p> <p>Legend: — Natural gas - - - Propane HD-5</p>															

Clause	Verdict	Comment
<u>5.17</u>		<p><u>Draft hoods</u> <u>Installed on a heater designed for connection to a vent, a draft hood shall comply with the following provisions when attached to the heater in a normal position. When use with only one gas is desired, these tests shall be conducted with the appropriate gas as specified in Clause 5.2, Test gases.</u> <u>When use with more than one gas is desired, and the appliance input ratings are not identical for the different gases, these tests shall be conducted at the specified input ratings for the individual gases. The number of tests conducted shall be at the discretion of the testing agency.</u> <u>When use with more than one gas is desired, and the appliance input rating is identical for the various gases, these tests shall be conducted in accordance with the following:</u></p> <ul style="list-style-type: none"> a) <u>If the gases selected include propane gas or LP gas-air mixtures, use Test Gas E or H.</u> b) <u>If the gases selected are natural and mixed, or natural, manufactured, and mixed, use Test Gas A.</u> c) <u>If the gases selected are mixed and manufactured, use Test Gas C.</u>
<u>5.17.1</u>		<u>With the outlet of the draft hood blocked, the concentration of carbon monoxide in an air-free sample of the flue gases shall not exceed 0.04 percent when the heater is tested in an atmosphere having a normal oxygen supply.</u>
<u>5.17.2</u>		<u>Total downdraft pressures ranging from zero to 0.05 in (12.4 Pa) water column imposed at the outlet of the draft hood shall not extinguish the main burner flames or cause them to flash back, lift, float, burn outside of the heater, or produce a concentration of carbon monoxide in an air-free sample of the flue gases in excess of 0.04 percent when the heater is tested in an atmosphere having a normal oxygen supply as determined by the Method of Test .</u>
<u>5.17.3</u>		<u>Downdrafts imposed as specified in Clause 5.17.2 shall not extinguish the pilot(s) or cause it to flash back when operated separately from the main burner(s).</u>
<u>5.17.4</u>		<u>A chimney action, consisting of static updraft and velocity updraft numerically totaling between 0.06 and 0.07 in wc (15 and 17 Pa) applied to the outlet of the draft hood, shall not cause a fractional increase in the volume of flue gases greater than twice the numerical sum of the pressure head and 5 times the velocity head, expressed in inches (Pa) water column.</u>
<u>5.17.5</u>		<u>Flue gases shall not issue from the relief opening(s) of a draft hood when tested in accordance with the Method of Test.</u>
<u>5.17.6</u>		<u>A draft hood shall be sufficiently rigid in construction and supported so it will withstand a load equivalent to the following without becoming distorted, and without alteration of its position with respect to the heater</u>

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5.19	Info	Condensate disposal system(s)
<u>5.19.1</u>		<u>The design of a Category II or IV infrared heater and the design of a Category I or III infrared heater which is required to have an infrared heater or vent drain to comply with Clause 5.16, Category Determination, shall be such that the condensate trap(s) self-prime and flue products shall not be discharged from the condensate drain line(s) after the condensate trap(s) self-prime under the Method of Test.</u>
<u>5.19.2</u>		An infrared heater having a condensate disposal system(s) shall, under conditions of a blocked condensate drain line(s), continue to operate satisfactorily or shall shut off main burner gas during conduct of the following Method of Test.
<u>5.20</u>		Heaters vented horizontally through an outside wall
<u>5.21</u>		Manifold and control assembly capacity
<u>5.22</u>		Heaters for outdoor installation
<u>5.23</u>		Venting systems for Category II, III, or IV appliances
<u>5.24</u>		Maximum metallic vent gas temperature for other than Category I appliances
<u>5.25</u>		Maximum nonmetallic vent material temperatures
<u>5.26</u>		Thermal expansion during operation
<u>5.27</u>		Marking material adhesion and legibility
Table A.2		Minimum average thickness of sheet-metal junction boxes Notes added to Table.
<u>A.4</u>		Gas supply to radiant tube heaters
<u>A.5</u>		Marking material adhesion and legibility
Annex B	Info	Items unique to Canada
<u>B.4</u>		Gas supply to radiant tube heaters A radiant tube-type infrared heater shall only be connected with a Type I hose connector that is: certified as being in compliance with the <i>Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CSA 8.1</i> ; and of a length of 36 ± 6 in (90 ± 15 cm).
<u>Annex C (Optional)</u>		Provisions for Listed Gas Appliances Conversion Kits
<u>Annex D (Optional)</u>		Provisions for listed high altitude conversion kits
<u>Annex E (Informative)</u>		Relationship of carbon dioxide to oxygen in the closed room test specified in Clause 5.12
		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.