



**Summary of Substantive Changes
between the
2014 and the 2019 edition including Update No. 1 dated March 2022 of
CSA/ANSI Z21.96 • CSA 11.6 “Portable water heaters for outdoor use”**

Presented to the IAPMO Standards Review Committee on July 11, 2022

General: The changes to this standard may have an impact on currently listed products. The significant changes are:

- Expanded the scope to include water heaters up to 75,000 instead of 30,000 BTU/hr (see Section 1.8)
- Removed the restriction of using a permanent pipe threaded connection for the discharge of a potable water heater (see Section 4.1.20)
- Added the requirement to demonstrate full control over the leak tightness and inlet body strength of purchased gas pressure regulators (see Section 4.8.6)
- Added a requirement for manually lighting the gas burner to limit the appliance input to 30,000 Btu/hr or less (see Section 4.12.2)
- Removed marking requirements for Class IIA-1 to be marked with permanent plates, Removed some marking requirements for portable water heaters, and removed potable and non potable water markings from flexible type fasteners that are used to permanently attach markings to the water heater (see Sections 4.21.1, and 4.21.2)
- Revised piloted and non-piloted ignition systems test requirements (see Section 5.6.1)
- Revised the wall, floor and ceiling temperatures, and wind test procedures (see Sections 5.15, and 5.16)

Section 1, Scope: Clarified Scope and expanded the water heater capacity to 75,000 instead of 30,000 BTU/hr as follows:

1.1

This Standard applies to portable type gas water heaters (see Clause 3), herein after referred to as ~~appliance or water heater~~ for use with propane, butane, or liquefied petroleum gases and mixtures thereof having water heaters or appliances:

- a) for use with propane;*
- b) for use with butane;*
- c) for use with liquified petroleum gases;*
- d) for use with LP gas-air mixtures;*
- ~~ae) having regulated pressure;~~*
- ~~bf) having non-regulated pressure;~~*
- g) for point of use installation (dishwashing, washing, showering, etc.);*
- h) for supply of potable hot water;*
- i) for supply of non-potable hot water;*
- j) intended for temporary connection to inlet water lines;*
- k) intended for temporary connection to outlet water lines;*
- l) intended for outdoor installation; and*
- m) intended for unvented use.*



1.6

A portable camping water heater is:

- a) for point of use (dishwashing, washing, showering, etc.) supply of either potable or non-potable hot water.*
- b) not for permanent connection to inlet or outlet water lines.*
- c) only intended for use outdoors and no connections may be provided for venting of flue products via a chimney or vent system.*

1.8

Portable water heaters are limited to a maximum input of ~~30,000~~ 75,000 BTU/hr (21 980 W).

Section 3, Definitions: A definition was revised as follows:

Water heater, portable — *a water heater that is designed to be easily moved by one person and that has sufficient components included to provide the necessary point of use features necessary for heating water in either a batch process or by continuous means. The discharge from the water heater may be a single mixing faucet, multiple faucets, shower attachment, etc. ~~The discharge may not terminate in a connection to a pipe fitting or outdoor garden hose connection.~~*

Section 4, Construction: Removed the restriction of using a permanent pipe threaded connection for the discharge of a potable water heater as follows:

~~4.1.20~~

~~*The water discharge of a portable water heater shall not terminate in a pipe thread connection, outdoor garden hose connection or other connection type that would promote a permanent installation.*~~

4.2 Materials

4.2.1

Unlisted valve and regulator bodies shall comply with the material requirements outlined in the Standard for Manually Operated Gas Valves for Appliances, Appliance Connector Valves, Hose and Valves, ANSI Z21.15 • CSA 9.1, or the Standard for LP-Gas Regulators, UL 144, as applicable.

Section 4.8, Gas pressure regulators: Added the requirement to demonstrate full control over the leak tightness and inlet body strength of purchased gas pressure regulators as follows:

4.8 Gas pressure regulators

4.8.6

The appliance manufacturer shall demonstrate that they have full control over the leak tightness and inlet body strength of purchased gas pressure regulators. This may be accomplished through a quality system that is acceptable to the certification agency.

~~4.8.7~~ 4.8.8

~~For a propane water,~~ The inlet of the pressure regulator shall be fitted for attachment to:

- a) a CGA No. 791 Cylinder Connection Device and complying with the Standard for Cylinder Connection Devices, ANSI Z21.81 • CSA 6.25, or the Standard for Adapters and Cylinder Connection Devices for Portable LP-Gas Cylinder Assemblies, UL 2061;



- b) a CGA No. 810 Cylinder Connection Device and complying with the Standard for Cylinder Connection Devices, ANSI 221.81 • CSA 6.25, or the Standard for Adapters and Cylinder Connection Devices for Portable LP-Gas Cylinder Assemblies, UL 2061;
- c) a CGA No. 600 Cylinder Connection Device as specified in the Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections, ANSI/CGA-V-1; or
- d) other connections as required for either butane or LP gas mixtures.

Section 4.12, Automatic gas ignition systems: Added a requirement for manually lighting the gas burner to limit the appliance input to 30,000 Btu/hr or less as follows:

4.12 Automatic gas ignition systems

4.12.2

A water heater shall be equipped with a gas ignition system(s). This system(s) shall be designed to function in one of the following manners:

- a) *provide for ignition of main burner gas by means of a proved pilot. If the presence of the pilot flame is not proved, provide for automatic shutoff of gas to all portions of the appliance, main burner, pilot, etc.;*
- b) *provide for ignition of main burner gas by means of a direct ignition device. If the presence of the main burner flame is not proved, provide for automatic shutoff of main burner gas. In the event of main burner flame outage during an operating cycle, provide for automatic shutoff of main burner gas without reenergizing the direct ignition device or provide for safe re-ignition of main burner gas by reenergizing the direct ignition device as stipulated in Clause 5.7.5;*
- c) *provide for ignition of main burner gas using a direct ignition system which supervises only the main burner(s) flame. If the presence of the main burner flame is not proved, provide for automatic shutoff of main burner gas. In the event of main burner flame outage during an operating cycle, provide for automatic shutoff of main burner gas without reenergizing the direct ignition device or provide for prompt and safe re-ignition of main burner gas by reenergizing the direct ignition device;*
- d) *provide for ignition of the main burner gas by means of a match, a manually operated piezo electric ignition device or a manually activated, electrically operated spark generator. ~~If the presence of the main burner flame is not proved, provide for automatic shutoff of main burner gas.~~ The main burner shall be automatically shut off if main burner gas flame is not proven. During the process of lighting the burner manually, the appliance input shall be limited to 30,000 Btu/hr or less.*



Section 4.21, Marking: Removed marking requirements for Class IIA-1 to be marked with permanent plates, Removed some marking requirements for portable water heaters, and removed potable and non potable water markings from flexible type fasteners that are used to permanently attach markings to the water heater as follows:

4.21 Marking

4.21.1

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Class IIA-1. Permanent Plate

~~Shall be made of metal having a minimum thickness of 0.012 in (0.30 mm) and shall be securely attached by mechanical means.~~

4.21.2

On an appliance of such design that space does not permit proper location of these markings, they may be furnished on a metal tag or a Class IIIA-3 permanent tag attached to the appliance. Flexible type fasteners that are used to permanently attach markings to the water heater shall be in accordance with the following:

- a) flexible type fasteners shall be permanently secured by tamper resistant mechanical means such as one way screws, rivets etc. to the marking plate or tag and to a part of the water heater which is not removed for servicing;*
- b) flexible type fasteners shall not attach to a gas carrying component, unless the gas carrying components withstand the test outlined in Clause 5.14.2;*
- c) flexible type fasteners and markings shall be capable of withstanding the pull test outlined in Clause 5.14.1;*
- d) flexible type fasteners shall be made of materials suitable for the temperatures to which they are exposed during normal operation of the water heater;*
- e) markings secured to the appliances by a flexible type fastener shall have a statement, "Removal of this marking will void compliance of this water heater with ANSI Z21.96 • CSA 11.6";*
- ~~*f) if the water heater is designed for potable water applications, "Potable Water Heater For Outdoor Use Only. Connect to a potable water source only. Suitable for drinking and cooking. If unit becomes contaminated, see instruction manual for decontamination procedures"; and*~~
- ~~*g) if the water heater is designed for non-potable water applications, "Non-Potable Water Heater For Outdoor Use Only. Not suitable for drinking and cooking".*~~

4.21.4

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~~*The minimum size of the complete label shall be as follows for water heaters less than 20 gallons:*~~

- ~~*a) the text of the label shall be located below the graphic illustration. The minimum label size shall be as follows: Vertical: 2 1/8 in x 4 1/8 in (54 mm x 105 mm).*~~
- ~~*b) the text and illustrations on the label shall be boxed by a 1/8 in (3.2 mm) border. A 1/4 in ANSI Z21.96-2014 • CSA 11.6-2014 Portable water heaters for outdoor use October 2014 © 2014 CSA Group 49 (6.4 mm) red bar shall be at the top of the label, within the border. A red on white international symbol for caution shall be located on the red bar followed by the word "DANGER" in white boldfaced letters having a minimum letter height of 0.140 in (3.56 mm).**~~
- ~~*c) The graphic illustrations for the bathtub outline, spraying water and hand shall be black on a white background. The water spattered on the hand shall be in red.*~~
- ~~*d) The word "HOT" shall be in red boldfaced letters. The letters shall be a minimum letter height of*~~



~~0.120 in (3.05 mm). ‡~~

~~e) The word “BURN” shall be in red boldfaced letters. The letters shall be a minimum letter height of 0.120 in (3.05 mm). ‡~~

~~f) All text below the illustration shall be either black boldfaced letters on white background or white boldfaced letters on black background.~~

~~g) The letters shall have a minimum uppercase letter height of 0.070 in (1.78 mm). §~~

~~h) Lowercase letters shall be compatible with the uppercase letter size specifications.~~

~~* This letter height corresponds to 14 point type.~~

~~‡ This letter height and line spacing corresponds to 12 point type and normal vertical spacing, zero leaded.~~

~~‡ This letter height and line spacing corresponds to 12 point type and normal vertical spacing, zero leaded.~~

~~§ This letter height and line spacing correspond to 7 point type and normal vertical spacing, zero leaded.~~

4.21.7

~~For propane/butane mixtures and butane fuel, canisters shall be specified by the manufacturer and tested with the appliance. The appliance shall be marked with the model number of the canister found to be acceptable and recommended by the manufacturer and model number of the canister placed in the instructions.~~

Section 5.6, Piloted and non-piloted ignition systems: Revised piloted and non-piloted ignition systems requirements as follows:

5.6 Piloted and non-piloted ignition systems

5.6.1

The time from initiation of gas flow to proof of supervised flame shall not exceed 1 1/2 minutes.:

~~a) 3 minutes for integral valve type automatic gas ignition systems;~~

~~b) 5 minutes for electrical contactor type automatic gas ignition systems;~~

~~c) 1 1/2 minutes for an automatic gas ignition system requiring a continually applied manual force to assume the “ON” position; and~~

~~d) 1 1/2 minutes for automatic gas ignition systems which operate every time the main burner(s) with which they are used are turned “ON” and “OFF”~~

For purposes of this test, the control manufacturer's specified maximum flame-establishing period shall be used.

Section 5.15, Wall, floor and ceiling temperatures: Revised the method of test as follows:

5.15 Wall, floor and ceiling temperatures

The temperature of walls, ceiling and floor adjacent to or in contact with the water heater shall not exceed room temperature by more than 117°F (65 °C). The temperatures on the floor under the water heater shall not exceed 90°F (50 °C) over room temperature.

Method of Test

~~The test shall be conducted with the water heater installed in an enclosure having vertical sides, floor and ceiling constructed of minimal 1 in thick wooden boards or ¾ in thick plywood. All seams shall be sealed and the side(s) which would face the water heater finished in dull black.~~

Wall, floor and ceiling temperatures shall be determined by means of a suitable temperature indicating device and bead-type thermocouples. The thermocouples shall be made by contact welding 24 AWG



(0.20 mm²) iron-constantan thermocouple wires and clipping off the free ends beyond the junction. The junction and 3/8 in (9.5 mm) of the lead shall be exposed on the test surface, the remainder of the lead extending through the wall. Thermocouples shall be secured to the wall surface by staples over the insulated portion of the leads and held in thermal contact with the surface by a radiation-transparent adhesive tape finished in dull black, ~~except that when zero clearance is desired it shall be assumed that any part of the water heater may be in close contact with the combustible construction and the junctions of the thermocouples shall be in contact with the surface of the water heater.~~

Thermocouples shall be placed at horizontal and vertical intervals of 6 in (152 mm) on the wall and ceiling surfaces. Additional thermocouples at a closer spacing may be located at any other points deemed necessary by the testing agency.

As an option, floor temperatures may be determined by means of 24 AWG (0.20 mm²) iron-constantan thermocouples, the junctions of which are copper discs 11/32 in (8.7 mm) in diameter and 0.022 in (0.559 mm) thick, to which the thermocouple wires are silver-soldered 1/8 in (3.2 mm) apart. The surface of the copper discs shall be finished with clear varnish. The discs shall be embedded so their surfaces are flush with the surface of the floor at intervals of not more than 3 in (76.2 mm). A thermocouple shall also be placed under the legs or base of the appliance.

~~Temperatures shall be measured at points subjected to maximum temperatures. The water heater shall be placed on a floor (combustible or non-combustible as specified by the manufacturer) and a back wall erected perpendicular to the floor. Two side walls extending 18 in (457 mm) beyond the front of the water heater shall be erected at 90 degrees (1.57 rad) to the back wall. The distance between the water heater and the back and side walls shall be specified, in integral inches, by the manufacturer, but shall not exceed 18 in (457 mm). A ceiling shall also be installed above the water heater at a clearance specified by the manufacturer, not exceeding 7 ft 6 in (2.29 m) from the floor.~~

This test shall be conducted at the increased inlet test pressure. Water flow shall be regulated to stabilize the outlet water temperature corresponding to the high stop to a temperature 5°F (3 °C) below the maximum obtainable temperature the water heater can obtain in an automatic mode. The water heater shall be operated until equilibrium temperature conditions are attained but no longer than two fills of the self contained propane and/or butane gas system provided with the product.

The temperature of an integral propane and/or butane gas cylinder(s) should be monitored and at no time shall the cylinder temperature exceed 125°F (51.7 °C) while the water heater is operating or after it is turned off. Cylinder temperature shall be measured as an average of four equally spaced thermocouples mounted to the cylinder vapor space.

Section 5.16, Wind test: Revised the method of test as follows:

5.16 Wind test

The main burner(s) shall ignite ~~and remain lit for five minutes~~ from the automatic ignition system or manual ignition system when exposed to a wind of 10 miles per hour ~~(16 km/h), and meet the conditions defined in "a" through "c" below~~ when tested in accordance with the following Method of Test. ~~The ignition and operation shall occur without flames causing any damage to the water heater.~~

Method of Test

These tests shall be conducted at normal inlet test pressure only. ~~The test shall be conducted with the water heater at room temperature and after 15 minutes of operation. If the burner shuts off on flame failure detection by an Automatic Gas Ignition System, it shall be considered as meeting this provision. A draft produced by a blower having sufficient capacity to develop a 10 mph (16 km/h) wind shall be~~



directed against the outer surface of the water heater at the point(s) deemed most critical by the testing agency. The blower shall be located so a uniform draft covering the total vertical projected area of the water heater is directed horizontally toward the water heater at a velocity of 10 mph (16 km/h) measured in a vertical plane 18 in (457 mm) from the windward surface of the water heater.

a) If the water heater incorporates an electronic ignition system activated by a water temperature or water flow, the main burner(s) shall be cycled for five successive ignition tests of 30 seconds on time and 30 seconds off time.

b) If the water heater incorporates a thermally activated flame failure response device (thermocouple) incorporating a standing pilot; after the pilot is lit following the manufacturer's instructions, the main burner(s) shall be cycled for five successive ignition tests of 30 seconds on time and 30 seconds off time.

c) If the water heater incorporates a thermally activated flame failure response device (thermocouple) activated by the main burner flame, water flow shall be established and the main burner shall be lit following the manufacturer's instructions.

At the discretion of the testing agency, tests may be conducted with the wind from any horizontal direction but lighting tests shall follow the manufacturer's directions for lighting procedures. The 10 mph wind source shall be located so a uniform horizontal wind is projected at the total vertical projected area of the water heater.

The main burner(s) shall be operated for 15 minutes then turned off. Then the wind shall be established. After 5 minutes, the water flow shall be established. The main burner(s) shall ignite in a normal manner and remain lit without flames causing any damage to the appliance.

If the system incorporates an automatic ignition sequence, then the main burner(s) shall be cycled manually by the thermostat for five successive ignition tests of 30 seconds on time and 30 seconds off time. If the thermostat is only accessible for manual operation from the exterior side, water flow may be used to cause thermostatic action to obtain the five cycles.

If the ignition process is a manual system, the process shall be repeated five times both under a cold condition and a hot condition.