Summary of Substantive Changes
between the 1979 and the 2019 edition of
ASSE 1023 "Electrically Heated or Cooled Water Dispensers"

Presented to the IAPMO Standards Review Committee on December 16, 2019

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

- Expanded the scope to include all types of electrically heated or cooled water dispensers, and changed the Standard title to reflect that change (see Section 1.1)
- Expanded the types of allowed connections and added the applicable requirements (see Section 1.2.2)
- Added requirements for temperature and pressure ranges, carbonation backflow protection, cooling capacity, and fittings (see Sections 1.2.6, 1.2.7, 1.2.8, 1.2.9, 1.2.10, and 1.2.11)
- Revised the leakage test to the abnormal discharge and minimum water temperature test (see Section 3.1)
- Added Figure 1 for test setup of Sections 3.1 and 3.2 (see Figure 1)
- Added the following testing requirements: Instant capacity for heated water, Continuous capacity, and containment reduction (see Sections 3.2, 3.3, and 3.4)
- Added a maximum lead content for the material requirements (see Section 4.1.1)
- Added Installation instruction for different types of products and for devices using reverse osmosis (see Section 4.2)
- Added marking requirements for labels to comply with UL 969 (see Section 4.4.2)
- Added definitions for continuous capacity and instant capacity (see Section 5)

Title Change:
Performance Requirements for ~~Hot~~ Electrically Heated or Cooled Water Dispensers ~~Household Storage Type Electrical~~
~~To be acceptable for test under this Standard, Dispensers of the types covered shall have electrical components and characteristics listed and approved by a nationally recognized, independent testing laboratory.~~

Section I: Expanded the scope to include all types of electrically heated or cooled water dispensers follows:
1.0 ~~Scope, Purpose,~~ General ~~– Construction, Instructions~~
1.1 Application
Water dispensers covered by this standard include an integral electrically powered heater or cooler. Note: Example products that are covered by this standard include but are not limited to under-counter-mounted water dispensing systems, free-standing plumbed systems, free-standing bottled systems, and counter-top systems. These products are for both residential and commercial use.
~~1.2 General Construction~~
~~1.2.1~~ *~~Assembly drawings and other data which are needed to enable a testing agency to determine compliance with this standard, and installation instructions, including essential drawings~~*

~~*shall accompany the devices when submitted for examination and performance tests under this standard.*~~

~~***1.2.2*** *Design and construction shall be such that in normal handling in transit and during installation, the device will not be damaged in any way which will prevent it from functioning as required and intended. It is essential that devices be as trouble free as sound engineering can achieve.*~~

~~***1.1***~~***1.2 Scope and Purpose***

~~***1.1.1.1*** *The hot water dispensers covered by this standard are those which are designed for household use and which are installed at the sink and supplied with water from the kitchen sink water supply. They are storage types, continuously vented to atmosphere and heated electrically.*~~

~~***1.1.1.2*** *Water Temperature*~~

~~*Tank service water temperature to be maintained below atmospheric water boiling point.*~~

~~***1.1.2*** *Purpose*~~

~~*This standard has been developed to advise designers, manufacturers, plumbing administrative authorities and others of what are considered reasonable plumbing criteria when installed in a system of potable water supply, and the methods of testing for determining compliance with the requirements of the standard.*~~

~~***1.1.1***~~***1.2.1*** ~~***Scope***~~ ***Description***

Device shall consist of an accumulator vented to atmosphere when a heater is included, a thermal element or cooler, connection to an electrical outlet, and a dispensing fitting.

~~***1.2.3 Water Supply Connection***~~

~~***1.2.3.2*** *Tubing connectors shall comply with appropriate standards.*~~

Section 1.2.2, Connections: Expanded the types of allowed connections and added the applicable requirements as follows:

~~***1.2.3.3***~~ ***1.2.2 Connections***

Pipe threads ~~*male and female*~~ *and other connections shall conform to the applicable standards.*

- ~~*Taper*~~ *Tapered pipe threads shall comply with ASME B1.20.1.*
- *Dry seal pipe threads shall comply with ASME B1.20.3.*
- *Compression connections shall comply with SAE J512.*
- *Soldered connections shall comply with ASME B16.18 or ASME B16.22.*
- *Push fit connections shall comply with ASSE 1061.*
- *Press connections shall comply with ASME B16.51.*

Section 1.2.6, Temperature Range: Added temperature range requirements as follows:

1.2.6 ~~Hot Water Nozzle and Control Valve~~ Temperature Range

Devices that heat water shall be able to dispense hot water at a minimum temperature of 165 °F (73.9 °C).
Devices that cool water shall be able to dispense cold water at a maximum temperature of 50 °F (10 °C).

Section 1.2.7, Pressure Range: Added pressure range requirements as follows:

1.2.7 Pressure Range

Devices shall operate at a static pressure range of 20 to 125 psi (138 to 862 kPa).

Section 1.2.8, Electrical Requirements: Specified the compliance for electrical requirements to UL 399 and UL 499 as follows:

~~1.7~~1.2.8 Electrical Requirements

~~1.7.1~~ *~~Hot water dispensers shall have been tested for electrical compliance under appropriate Underwriter's Laboratories Safety Standards where applicable and for compliance with 1.7.2.~~*
Devices that cool, or both cool and heat water, for dispensing shall comply with UL 399.
Devices that only heat and dispense heated water shall comply with UL 499.
~~1.7.2~~ *~~The dispenser shall be so constructed as to prevent the creation of hazardous conditions in the event that the heater is energized when the tank is dry.~~*

Section 1.2.9, Carbonation Backflow Protection: Added carbonation backflow protection requirements as follows:

1.2.9 Carbonation Backflow Protection

Where there is a connection to a carbonator, potable water shall be protected from dissolved CO2 by way of a device compliant with ASSE 1022.

Section 1.2.10, Cooling Capacity: Added cooling capacity requirements as follows:

1.2.10 Cooling Capacity

Devices that cool water shall be rated in accordance with ASHRAE 18.

Section 1.2.11, Fittings: Added fittings requirements as follows:

1.2.11 Fittings

The dispenser fitting shall be compliant with ASME A112.18.1 / CSA B125.1.

Section 1.3, Reference Documents: The following standards were added, revised or deleted as follows:

1.3 Reference Documents

Referenced industry standards shall be to the revisions stated below.
• ASHRAE 18-2008 (R2013), Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration
• ASME A112.1.2-2017, Air gaps in Plumbing Systems
• ASME A112.18.1-2018 / CSA B125.1-18, Plumbing Supply Fittings
• ASME B1.20.1-2013, Pipe Threads, General Purpose (Inch)
• ASME B1.20.3-1976 (R2013), Dryseal Pipe Threads (Inch)
• ASME B16.18-2018, Cast Copper Alloy Solder Joint Pressure Fittings
• ASME B16.22-2018, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings

• ASME B16.51-2018, Copper and Copper Alloy Press-Connect Pressure Fittings
• ASSE 1022-2017, Performance Requirements for Backflow Preventers for Beverage Dispensing Equipment
• ASSE 1061-2015, Performance Requirements for Push-Fit Fittings
• ASSE 1087-2018, Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water
• IAPMO PS 65-2019, Airgap Units for Water Conditioning Installation
• NSF/ANSI 42-2018, Drinking Water Treatment Units – Aesthetic Effects
• NSF/ANSI 53-2018, Drinking Water Treat Units – Health Effects
• NSF/ANSI 55-2018, Ultraviolet Microbiological Water Treatment Systems
• NSF/ANSI 58-2018, Reverse Osmosis Drinking Water Treatment Systems
• NSF/ANSI 372-2016, Drinking Water System Components – Lead Content
• SAE J512-2017, Automotive Tube Fittings
• UL 399-2018, Drinking Water Coolers
• UL 499-2014, Electric Heating Appliances
• UL 969-2017, Marking and Labeling Systems

~~***1.6 Performance and Testing***~~

~~*Dispensers shall comply with all of the requirements of Section II.*~~

~~***1.8 Useful Hot Water***~~

~~*To obtain uniformity of comparative ratings of useful hot water, all dispensers should be rated by the following formula disregarding ambient heat loss:*~~

~~***Rh = 0.00368 x W***~~

~~*Where: Rh = Recovery, gallons per hour*~~

~~*W = Watts shown on the name plate, or amps shown on name plate times name plate voltage.*~~

~~*This formula is based on a water temperature rise of 100°F (56°C).*~~

Section 3.1, Abnormal Discharge and Minimum Water Temperature: Revised the leakage test to the abnormal discharge and minimum water temperature test as follows:

3.1 Abnormal Discharge and Minimum Water Temperature

~~***2.3 Leakage and Drippage***~~

~~*There shall be no leakage from the unit during a dispensing cycle nor a continuous drippage from the dispensing nozzle following a dispensing cycle or during any standby period. This latter requirement is waived during the heating of the tank from a cold start.*~~

3.1.1 Purpose

The purpose of this test is to evaluate whether there is abnormal discharge from the device. Normal discharge is when water is discharged after a user activates the dispensing valve or during startup. During this test, the minimum water temperature is verified. This test is only required for devices that include a water heater.

~~***Method of Test***~~

3.1.2 Procedure

The electric supply must be capable of maintaining the voltage and amperage, or wattage, as shown on the name plate as required by UL 499.

1) *The ~~test unit~~ device shall be set up according to the manufacturer's instructions and be connected per Figure 1 to an adequate water and electric supply. Connect a power meter to the device's power input.*
2) *A thermocouple shall be installed just inside the dispensing nozzle within the water stream.*
3) *~~Previous to~~ Before energizing the heater, open the supply valve and hold the dispensing valve open until water runs freely from the dispensing nozzle.*
4) *Close the dispensing valve. Energize the heater. Record the peak power consumption.*

Note: the period prior to the water reaching its setpoint temperature is known as a cold start. Some water may discharge from the dispensing nozzle during this time. This is permitted.

5) *When the power consumption returns to near 0 W (i.e. the thermostat opens ~~at~~ and the tank reaches the service water temperature), open the dispensing valve and check the maximum temperature of the discharging water. Allow the water to flow until the ~~thermostat closes~~ recorded power returns to peak power consumption and immediately close the dispensing valve. Allow the tank to heat until the ~~thermostat again opens~~ power consumption returns to near 0 W again. Observe for any drippage from the nozzle.*
6) *Repeat ~~the above~~ step 5.*
7) *~~Following this~~ Perform 10 dispensing cycles. A dispensing cycle consists of drawing 6 fl. oz. (177mL) of water for each cycle ~~allowing a.~~ Allow a standby period of 2 minutes between the ~~draws~~ cycles. Observe for any drippage from the nozzle.*
8) *Measure the temperature of the water of each dispensing cycle.*

3.1.3 Criteria

There shall be no continuous discharge from the dispensing nozzle after the water temperature in the tank has reached its setpoint:

1) Following a dispensing cycle, or
2) During the standby period between cycles.

The minimum temperature of the hot water dispensed shall comply with section 1.2.6

Figure 1, Test Setup: Added Figure 1 for test setup of Sections 3.1 and 3.2 as follows:

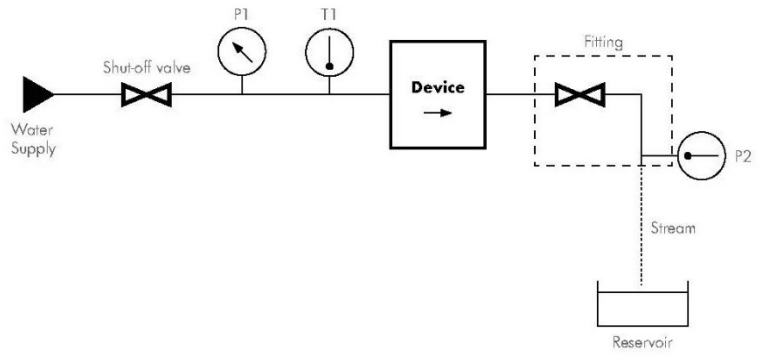

Figure 1 – Test setup. T2 shall be measured at the fitting exit

Section 3.2, Instant Capacity for Heated Water: Added the Instant capacity test for heated water as follows:

3.2 Instant Capacity for Heated Water

3.2.1 Purpose

The purpose of this test is to verify the manufacturer's claims of the device's instant capacity. This test is only for devices that include a water heater.

3.2.2 Procedure

1) Install the device per Figure 1. Set the supply water temperature to 80 ± 2 °F (26.7 ± 1.1 °C) and water pressure to 50 psi (344.7 kPa) static.
2) Set the device's heater temperature setpoint to the maximum allowable setting. If boiling is observed, reduce the setpoint to prevent boiling. Allow the device to reach steady state.
3) Begin recording temperature and time. Fully open the fitting and allow water to flow at the maximum flow rate. If the temperature of the water is less than 165 °F (73.9 °C), repeat step 2.
4) Once the temperature of the water as measured at T2 is less than 165 °F (73.9 °C) close the fitting. Calculate the volume of water dispensed.
5) Repeat steps 1 through 4 two additional times.

3.2.3 Criteria

The average volume shall be equal or greater than the manufacturer's minimum stated volume for heated water on the manufacturer's specification sheet.

Section 3.3, Continuous Capacity: Added the Continuous Capacity test as follows:

3.3 Continuous Capacity

3.3.1 Purpose

The purpose of this test is to verify claims for continuous capacity. This section shall be performed only when the manufacturer includes the claim in their literature or on product marking.

3.3.2 Procedure

The procedure for the Capacity Test for Ratings in ASHRAE 18 shall be followed for dispensers with coolers. The procedure for the Hot-Water-Dispenser Capacity Test in ASHRAE 18 shall be followed for dispensers with heaters.

3.3.3 Criteria

The resulting capacity from the test shall be greater or equal to the claimed capacity in the product's literature or on the marking.

Section 3.4, Contaminant Reduction: Added the Contaminant Reduction test as follows:

3.4 Contaminant Reduction

Devices that include an integral means of contaminant reduction and considered a drinking water treatment device shall comply with one or more of the following standards:
1) NSF/ANSI 42 for reducing aesthetic contaminants;
2) NSF/ANSI 53 for reducing contaminants that affect human health;
3) NSF/ANSI 55 for reducing microbiological hazards by way of ultraviolet light;
4) NSF/ANSI 58 for reducing contaminants using reverse osmosis;
5) ASSE 1087 for commercial and food service drinking water treatment devices.

Section 4.1.1, Lead Content: Added a maximum lead content for the material requirements as follows:

Section IV

4.1.1 Lead Content

Solder and fluxes in contact with potable water shall not exceed, by mass, 0.2% lead content.

Fittings and devices intended to convey or dispense water for human consumption through drinking or cooking shall not contain a weighted average lead content in excess of 0.25% when evaluated in accordance with the test method specified in NSF/ANSI 372.

4.1.2 Material Safety

For devices with contaminant reduction capabilities, the device shall comply with the applicable standards listed in 3.4.

Section 4.2, Installation and Maintenance Instructions: Added Installation instruction for different types of products and for devices using reverse osmosis as follows:

~~***1.4***~~ ***4.2 Installation and Maintenance Instructions***

~~***1.4.1***~~***4.2.1*** ~~*Complete*~~ *Instructions for installing, adjusting, and maintaining the device shall* ~~*accompany*~~ *be included with each* ~~*unit*~~ *device* ~~*and state that the hot water outlet opening, nozzle, shall terminate at least 1" (25.4mm) above the overflow rim of the sink*~~.

4.2.2

The installation instructions for the device shall include the following information:

1) Inlet connection size.

2) Maximum working pressure.

3) For heated water, the instant capacity.

4) When applicable, the continuous capacity for cooled or heated water.

4.2.3

The instructions shall indicate that the device shall be accessible for replacement and repair.

4.2.4

For devices dispensing hot water, the installation instructions shall provide a warning that the device can create a scald hazard.

~~***1.4.2***~~***4.2.5***

Instructions shall state that the dispenser shall be installed in compliance with the appropriate local codes, including both plumbing and electrical.

4.2.6

If the device includes a reverse osmosis subassembly and has a drain connection, the installation instructions shall provide instructions to install an air gap device compliant with IAPMO PS 65 to the drain connection or a discharge to an indirect receptor through an air gap.

Outlet and surrounding geometry of the dispensing fitting shall comply with the air gap requirements of ASME A112.1.2.

4.3 Installation Dimensions

Outlet and surrounding geometry of the dispensing fitting shall comply with the air gap requirements of ASME A112.1.2.

Section 4.4, Identification and Markings: Added marking requirements for labels to comply with UL 969 as follows:

~~1.5~~4.4 Identification and *Marking**s***

~~1.5.1~~4.4.1

Each ~~hot water dispenser~~ device shall ~~legibly display~~ have the following information marked on the label:

~~(a)~~1) Manufacturer's name ~~and address~~ trademark, or other mark or, in the case of private labeling, the name, trademark, or other mark of the customer for whom the product was manufactured;

~~NOTE: Where this is not that of the actual manufacturer's there must be means provided for its identification.~~

~~(b) Trade name~~

*~~(c)~~2) Model number

~~(d) Other markings which are the manufacturer's standard practice.~~

4.4.2

Labels shall comply with UL 969 for permanence and other markings requirements as required by the applicable electric standards.

Section 5, Definitions: Added definitions for continuous capacity and instant capacity as follows:

Section V

5.0 Definitions

Definitions not located in this section are located in the Plumbing Dictionary, Sixth Edition, published by ASSE.

Continuous Capacity *- volume of water dispensed from a device at a given temperature range as defined by ASHRAE 18.*

Instant Capacity *- volume of water dispensed from a device at a given temperature range with the dispensing fitting being activated once.*