Summary of Substantive Changes
between the 2005 and the 2020 edition of
ASSE 1069 "Automatic temperature Control Mixing Valves"

Presented to the IAPMO Standards Review Committee on May 18, 2020

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

- Revised the requirements for working pressure and temperature (see Sections 1.2.2, and 1.2.3)
- Added a requirement for all connections to conform to local codes and applicable standards (see Section 1.2.5)
- Revised the life cycle test and added Table 2 (see Section 3.3, and Table 2)
- Revised multiple test procedures and performance requirements for accuracy, clarification and increased performance (see Sections 3.4, 3.5, 3.6 and 3.8)
- Added requirement for compliance with NSF 61 and 372 for materials in contact with potable water (see Section 4.1)
- Added a marking requirement for the minimum flow rate at 20 psi, and a requirement for compliance with UL 969 for permanent labeling (see Section 4.2)
- Added a requirement for installation instructions to include literature containing the device minimum flow rate (see Section 4.3)

Section 1.0, General: Editorially revised for clarification as follows:

1.1 Application

These devices are intended to control the water temperature to individual or multiple fixtures to reduce the risk of scalding and thermal shock. Shut-off~~(s)~~ valves downstream of the device shall be permitted. These devices are intended to be installed where the bather has no access to the temperature adjustment means, and where no further mixing occurs downstream of the device.

1.2 Scope

1.2.1 Description

These devices shall be designed to supply only tempered water to the end user, and automatically compensate for pressure and/or temperature variations in water distribution systems. These devices shall have the capability to significantly reduce the outlet flow in the event of a cold water distribution system failure. The device shall be equipped with an adjustable means to limit the setting of the device towards the hot position. The device is ~~designed~~ intended to be the final temperature control.

Section 1.2.2, Maximum Working Pressure: Revised the requirements for working pressure and temperature as follows:

1.2.2 Maximum Working Pressure

The maximum ~~working~~ static pressure of the device shall be at least 125 psi (861.9 kPa).

1.2.3 Temperature Range

1.2.3.1 Inlet Temperature Range

~~*The maximum inlet hot water temperature shall be 180.0 °F (82.2 °C); and the inlet cold water temperature range shall be 39.0 °F to 80.0 °F (3.9 °C to 26.7 °C).*~~

The device shall be able to operate with cold water inlet temperatures between 39°F and 80°F (4°C and 27°C); and hot water inlet temperatures between 120°F and 180°F (49°C and 82°C).

1.2.4 Minimum Flow Rate

These devices are designed to function at a flow of 2.5 GPM (9.5 L/min), or the manufacturer's minimum flow rate, whichever is lower.

Section 1.2.5, Connections: Added a requirement for all connections to conform to local codes and applicable standards as follows:

1.2.5 Connections

Pipe threads and other connections shall conform to local codes and applicable standards.

Section 1.3, Reference Standards: Reference standards were added, deleted or updated as follows:

1.3 Reference Standards

Referenced industry standards shall be the ~~latest edition~~ to the revision stated below.

- *ISA MC96.1-1982, Temperature Measurement Thermocouples*
- *NSF 61-2016, Drinking Water System Components – Health Effects*
- *NSF 372-2016, Drinking Water System Components – Lead Content*
- *UL 969-2017, Marking and Labeling Systems*

Section 2.0, Test Specimens and Test Laboratory: Revised the sample requirements to one instead of three and removed the drawings requirements as follows:

2.1 Samples Submitted

~~Three (3)~~ One device of each model and size shall be submitted by the manufacturer.

2.2 Samples Tested

~~The testing agency shall select one (1) of each model and size for the full t~~Tests shall be performed in the order listed on one (1) device of each size submitted.

~~2.3 Drawings~~

~~Assembly and installation drawings and other data which are needed to enable a testing agency to determine compliance with this standard shall accompany assemblies submitted for examination and performance test under this standard.~~

~~2.4~~2.3 Rejection

Failure of one (1) device shall result in a rejection of that model and size.

Section 3.1, High Temperature Conditioning Test: Clarified the high temperature conditioning test procedure and criteria as follows:

3.1 High Temperature Conditioning Test

3.1.2 Procedure

a) *Install the device with ambient temperature on the cold water inlet, and 180 ± 5 °F (82.2 ± 2.8 °C) on the hot water inlet. ~~Inlet pressures shall be s~~Set inlet flowing pressures to ~~at~~ 45 psi ± 5.0 psi (310.3 kPa ± 34.5 kPa).*

b) *Adjust the device to its maximum outlet temperature.*

c) *Flow water through the device for ~~five (~~5~~)~~ minutes while maintaining the inlet water temperatures.*

3.1.3 Criteria

~~There shall be no leaks from~~ Failure of the device to meet the performance requirements of this standard shall result in a rejection of the device.

Section 3.2, Working Pressure Test: Clarified the working pressure test procedure as follows:

3.2 Working Pressure Test

3.2.2 Procedure

a) Block ~~T~~the outlet(s) of the device ~~shall be blocked~~, and where applicable, open the seating members.

b) Apply 125 psi (861.9 kPa), or the manufacturer's maximum rated pressure, whichever is greater, to the inlets for 5 minutes.

c) If the device includes seating members, ~~R~~repeat this test with the seating members closed and outlets open to atmosphere.

Section 3.3, Life Cycle Test Cycling: Revised the life cycle test procedure, criteria and added a retest Section as follows:

3.3 Life Cycle Test Cycling

3.3.2 Procedure

3.3.2.1 Initial Conditions

a) Install the device in accordance with Figure 1.

b) ~~With~~ Open valves V1 ~~and~~, V3 ~~open~~, and V5. Close valves V2 and V4.

c) ~~s~~Set the device outlet temperature to 105 °F ± 5.0 °F (40.6 °C ± 2.8 °C) ~~at a flow of 2.0 GPM ± 0.2 GPM (7.5 L/min ± 0.8 L/min)~~ and set flow rate at V5 to 2.5 GPM ± 0.3 GPM (9.5 L/min ± 1.0 L/min) or the manufacturer's minimum published flow rate. Flow for 1 minute.

3.3.2.2 Cycle Test

d) Set the shut-off valve configurations per Step 1 of Table 1. Flow for at least 6 seconds.

e) Set the shut-off valve configurations per Step 2 of Table 1. Flow for at least 6 seconds. Complete transitions between Steps 1 and 2 of Table 1 within 3 seconds maximum.

f) ~~Cycle the device in accordance with Table 1~~ Repeat steps 3.3.2.d) and 3.3.2.e) for 100,000 cycles. ~~A transition between steps shall be completed within one (1) second maximum.~~

3.3.2.3 Retest

g) Repeat section 3.2.2.

Figure 1 – Test bench configuration for life cycle test. Pressures and temperatures for the various water sources are per Table 2.

3.3.3 Criteria

~~*Failure to meet any of the remaining sections of the standard shall result in a rejection of the device.*~~

There shall be no leaks from the device.

Section 3.4, Flow Rate and Pressure Drop Test: Revised the test procedure and criteria as follows:

3.4 Flow Rate and Pressure Drop Test

3.4.2 Procedure

a) Install the device in accordance with Figure 2. Maintain a minimum temperature differential of 80 ± 2 °F (44.4 °C) between the incoming hot and cold water temperatures. Adjust the inlet flowing pressures at P1 and P2 to 45 ± 2psi (310 ± 14kPa).

b) Set the device to supply water at ~~the mid-point of the incoming supply temperatures~~ 105 ± 2 °F (39 ± 1.1 °C) as measured at T3.

c) Adjust valve V3 to 2.5 ± 0.3 GPM (9.46 ± 1.0 L/min).

d) ~~Measure and r~~Record the ~~flow rate at the midpoint of the manufacturer's published~~ pressure drop across P1 and P3.

3.4.3 Criteria

~~A flow rate of less than ninety percent (90%) of~~ A pressure drop in excess of 5% above or below the manufacturer's published pressure drop at the flow rate ~~at the corresponding pressure drop~~ referenced in 3.4.2.3 shall result in a rejection of the device.

Section 3.5, Pressure and Temperature Variation Test: Revised the test procedure as follows:

3.5 Pressure and Temperature Variation Test

3.5.2 Procedure

Measure the ~~T~~temperature ~~shall be made~~ in accordance with Figure 2. ~~When gathering~~ Record temperature data~~, all measurements shall be recorded~~ at a minimum rate of 20 Hz (recording every 0.05 seconds). ~~The initial outlet set temperature shall be averaged and recorded every 1/4 second. The initial outlet set temperature shall be averaged and recorded every 1/4 second.Pressure C~~Change~~s shall be accomplished~~ pressure settings in less than one (1) second. Install the device as shown in Figure 2, with all shut off valves and the throttle valve in the full open position.

a) Establish and maintain an equal pressure of 45.0 ± 1.0 psi (310.3 kPa ± 6.9 kPa) on both the hot and cold water supply.

b) Maintain a minimum temperature differential of 80.0 °F (44.4 °C) between the hot water temperature [minimum of 140.0 °F (60.0 °C)] and the cold water temperature [maximum of 70.0 °F (21.1 °C)]. Set the initial outlet set temperature at T3 to 105.0 °F ± 1.0 °F (40.6 °C ± 0.6 °C).

c) Reduce the flow rate to the lesser of 2.5 GPM ± ~~0.25~~0.3 GPM (9.5 L/min ± 1.0 L/min) or the manufacturer's specified minimum flow rate [~~0/+0.1 GPM (0/+ 0.4 L/min)~~+0.5/-0 GPM (+1.9/-0 L/min)] by adjusting the throttle valve. Allow water to flow for 1 minute.

Section 3.6, Water Supply Failure Test: Revised the test procedure and criteria as follows:

3.6 Water Supply Failure Test

3.6.2 Procedure

a) Install the device in accordance with Figure 2, and conditions set in accordance with Section 3.5.2.a through 3.5.2.c.

b) Close ~~the cold water supply line~~ valve V2 within 1 second.

c) Observe and record the outlet temperature and flow rate until the temperature exceeds 120 °F (48.9 °C).

d) Reset the conditions per sections 3.5.2.a through 3.5.2.c.

e) Close valve V1 within 1 second. Record the flow rate and temperature at T3 continuously for 5 seconds after V1 has been fully closed.

3.6.3 Criteria

a) Failure of the device to reduce the flow at the outlet to 0.5 GPM (1.9 L/min) or 30% of the manufacturer's minimum stated flow, whichever is less ~~for devices 3/4 inch (19.0 mm) and smaller, and 1.0 GPM (3.8 L/m) or less for devices 3/4 inch (19.0 mm) and larger~~ prior to the outlet temperature at T3 exceeding 120 °F (48.9 °C) during section 3.6.2.c) shall result in a rejection of the device.

b) Failure of the device to reduce the flow at the outlet to 0.5 GPM (1.9 L/min) or 30% of the manufacturer's minimum stated flow, whichever is less, during section 3.6.2.e) shall result in a rejection of the device.

Section 3.8, Hydrostatic Pressure Test: Added test conditions as follows:

3.8 Hydrostatic Pressure Test

3.8.2 Procedure

With the outlet(s) blocked, and the seating member(s) open, pressurize the device's body with water to 500 psi (3447.6 kPa) for 1 minute using water of ambient temperature.

Section 4.1, Materials: Added requirement for compliance with NSF 61 and 372 for materials in contact with potable water as follows:

4.1 Materials

Solder and fluxes containing lead in excess of 0.2% shall not be used in contact with potable water. Metal alloys in contact with potable water shall not exceed 8% lead.

Fittings covered by this Standard shall comply with the applicable requirements of NSF 61.

Fittings 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 372.

Section 4.2, Identification and Markings: Added a marking requirement for the minimum flow rate at 20 psi, and a requirement for compliance with UL 969 for permanent labeling as follows:

4.2 Identification and Markings

Each device shall have the following information permanently marked on it where it is visible during field servicing:

a) Name of manufacturer or trademark or other mark known to identify the manufacturer; or in the case of private labeling, the name of the customer or trademark for whom the device is manufactured.

b) Model.

c) Minimum flow rate at 20 psi flowing pressure.

Labels shall comply with UL 969 for permanence.

Section 4.3, Installation and Maintenance Instructions: Added a requirement for installation instructions to include literature containing the device minimum flow rate as follows:

4.3 Installation and Maintenance Instructions

Instructions for the installation of the device shall be on the packaging, or packaged with the device. The instructions shall contain the appropriate installation methods, and the method for adjusting the limit stop.

Literature or packaging shall specify the device's minimum flow rate: "For use with shower heads rated at xxx L/min (yyy gpm) or higher", where "xxx L/min (yyy gpm)" is the manufacturer's minimum rated flow used to verify conformance to this standard in accordance with Section 3.5.

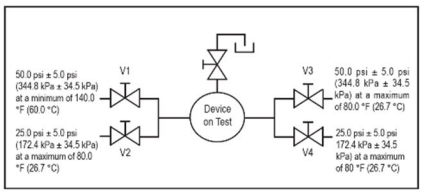
Table 1: This table was revised to remove duration.

Table 2: New table added

Figure 1: Figure 1 was revised as follows:

Figure 1 – *Test bench configuration for life cycle test. Pressures and temperatures for the various water sources are per Table 2.*

Figure 1



A cycle is defined in Table 1.

Figure 1 – Test bench configuration for life cycle test. Pressures and temperatures for the various water sources are per Table 2.

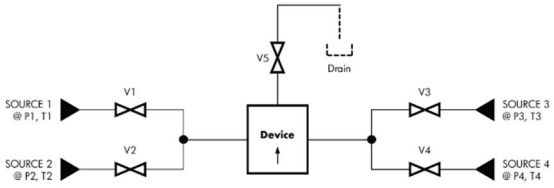


Figure 2: Figure 2 was revised as follows:

Figure 2

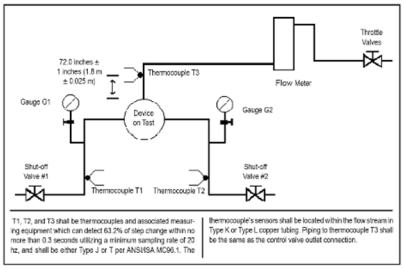
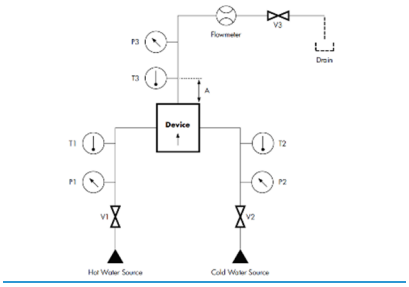


Figure 2



Note: Dimension 'A' shall be 72in ± 1in (180cm ± 2.54cm). T1, T2, and T3 shall be thermocouples and associated measuring equipment which can detect 63.2% of step change within no more than 0.3 seconds utilizing a minimum sampling rate of 20 Hz, and shall be either Type J or T per ISA MC96.1. The thermocouple's sensors shall be located within the flow stream in Type K or Type L copper tubing. Piping to thermocouple T3 shall be the same as the control valve outlet connection.