Summary of Substantive Changes between the 2015 edition of
ASSE 1070/ASME A112.1070/CSA B125.70,
"Water Temperature Limiting Devices,"
the 2004 edition of
ASSE 1070, "Water Temperature Limiting Devices,"
and the 2012 edition of CSA B125.3, "Plumbing fittings"

Presented to the IAPMO Standards Review Committee on March 7, 2016

General: The new standard ASSE 1070/ASME A112.1070/CSA B125.70 is a joint harmonization between ASSE 1070-2004 and sections of CSA B125.3-2012. The changes between the previous editions and this current edition will affect currently listed products. Although the majority of previous ASSE 1070 and CSA B125.3 tests and requirements have been reformatted (which does not allow direct correlation of sections), the current version now includes joint connections (compression, push-fit, solder, threaded), toxicity requirements (to NSF 61 & 372, if applicable), electrical requirements, slightly modified testing requirements, and additional marking requirements as summarized below.

ASSE 1070-04 and CSA B125.3-12
2015 Section 1.1, Scope states devices not designed to address thermal shock (only in editorial 'Foreword' section in ASSE 1070-04 but cited in section 4.12.2 in CSA B125.3):
1.1 This Standard covers water temperature limiting devices intended to limit the hot or tempered water temperature supplied to fittings for fixtures such as sinks, bidets, lavatories, and bathtubs to reduce the risk of scalding. These devices are not designed to address thermal shock.

~~*ASSE 1070-04, 1.1 Application*~~
~~*Water Temperature Limiting Devices (herein referred to as the "device") shall control and limit the water temperature to fittings for fixtures such as sinks, lavatories or bathtubs and are intended to reduce the risk of scalding.*~~

ASSE 1070-04 and CSA B125.3-12
2015 Section 3.1.1, Working pressure now up to 125psi (working pressure not defined in CSA B125.3):
Devices shall be designed to function at a supply pressure range of 140 to 860 kPa (20 to 125 psi).

~~*ASSE 1070-04, 1.2.3 Working Pressure The device shall be designed to function at a maximum working pressure of not less than 125.0 psi (861.8 kPa).*~~

ASSE 1070-04
New 2015 Section 3.2 cites solder joints (nonexistent in ASSE 1070-04 but cited in section 4.5 in CSA B125.3):
3.2 Solder joints, The dimensions of solder joint ends for connection to copper tubes or fittings (other than factory-assembled parts) shall comply with ASME B16.18 or ASME B16.22, as applicable.

ASSE 1070-04

New 2015 Section 3.3 cites threaded joints (nonexistent in ASSE 1070-04 but cited in section 4.6 in CSA B125.3):

3.3 Threads, Pipe threads shall comply with ASME B1.20.1 and hose threads shall comply with ASME B1.20.7.

ASSE 1070-04

New 2015 Section 3.4 cites compression joints (nonexistent in ASSE 1070-04 but cited in section 4.7 in CSA B125.3):

3.4 Flared and ball sleeve (compression) tube fittings, The screw thread dimensions of flared and ball sleeve (compression) tube fittings shall comply with ASME B1.1.

ASSE 1070-04

New 2015 Section 3.5 cites push-fit joints (nonexistent in ASSE 1070-04 but cited in section 4.20 in CSA B125.3):

3.5 Push-fit fittings, Connections achieved by push-fit fittings shall comply with ASSE 1061.

ASSE 1070-04

New 2015 Sections 3.8.1 & 3.8.3 added that require NSF 61 & NSF 372 compliance for devices intended to convey or dispense water for human consumption (already in in section 4.15 of CSA B125.3):

3.8.1: Devices covered by this Standard and that are in contact with drinking water intended for human ingestion shall comply with the applicable requirements of NSF/ANSI 61.

3.8.3: 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 NSF/ANSI 372.

ASSE 1070-04

New 2015 Section 3.9 for devices incorporating electrical features (already in section 4.17 of CSA B125.3):

3.9 Devices incorporating electrical features

3.9.1 Electrical power to low-voltage circuits involving a peak open-circuit potential of not more than 42.2 V shall be supplied by a

(a) primary battery supply;

(b) suitable Class 2 low-voltage transformer complying with the applicable CSA or UL electrical Standards; or

(c) combination of a transformer and fixed impedance that, as a unit, complies with the requirements for a Class 2 transformer specified in Item (b).

3.9.2 Devices incorporating electrical features other than low-voltage circuits shall comply with the applicable CSA or UL electrical Standards.

3.9.3 Electrical plumbing controls, including solenoid valves, shall

(a) be considered components of the device;

(b) be tested with the device; and

(c) comply with Clause 4.5.

Replacement of a battery during the life cycle testing specified in Clause 4.5 shall not be considered a failure.

ASSE 1070-04

2015 Section 4.3.5.2 added different pressure and temperature tests to device's seals (already in in section 5.3.1.1 of CSA B125.3):

4.3.5 Test temperatures and pressures

4.3.5.1 The test shall be conducted in an ambient environment of 20 ± 5 °C (68 ± 9°F). The specimen shall be brought to equilibrium test temperatures by running water through it.

4.3.5.2 The test pressures and temperatures shall be as follows:

(a) 140 ± 14 kPa and 10 ± 6 °C (20 ± 2 psi and 50 ± 10°F);

(b) 860 ± 14 kPa and 10 ± 6 °C (125 ± 2 psi and 50 ± 10°F);

(c) 140 ± 14 kPa and 66 ± 6 °C (20 ± 2 psi and 150 ± 10°F); and

(d) 860 ± 14 kPa and 66 ± 6 °C (125 ± 2 psi and 150 ± 10°F).

4.3.6 Failure criteria

Seals of water temperature limiting devices shall not leak.

~~*ASSE 1070-04, 3.2.1 Purpose*~~

~~*The purpose of this test is to determine if the device can withstand a pressure of 125.0 psi (861.9 kPa) without damage or impairment of its performance capabilities.*~~

~~*3.2.2 Procedure*~~

~~*Subject the device to a water pressure of 125.0 psi ± 1.0 psi (861.9 kPa ± 6.9 kPa) for five (5) minutes with the outlet blocked. In addition, for devices with seating members apply a water pressure of 125.0 psi ± 1.0 psi (861.9 kPa ± 6.9 kPa) to the inlets of the device for five (5) minutes with the seating member (excluding service stops) closed and the outlet open to atmosphere.*~~

~~*3.2.3 Criteria*~~

~~*Any indication of leakage, damage or distortion shall result in a rejection of the device.*~~

ASSE 1070-04 and CSA B125.3-12

2015 Section 4.4 increased cross-flow inlet test pressure from 5 psi (in both ASSE 1070-04 and CSA B125.3-12) to 35 psi:

4.4 Cross-flow test

4.4.1 Purpose

The purpose of this test is to determine if cross-flow leakage occurs when the outlet(s) is blocked.

Note: When a water temperature limiting device is integral to a plumbing supply fitting, the test is conducted in accordance

with the requirement of ASME A112.18.1/CSA B125.1.

4.4.2 Procedures

The cross flow test shall be conducted as follows:

(a) Install the device in the open position with the mixed water outlet blocked.

(b) Pressurize the cold water inlet(s) to 35 ± 7 kPa (5 ± 1 psi) water.

(c) Maintain for 1 min.

(d) Examine for leakage at the hot inlet(s).

(e) Pressurize the hot water inlet(s) to 35 ± 7 kPa (5 ± 1 psi) water.

(f) Maintain for 1 min.

(g) Examine for leakage at the cold inlet(s).

4.4.3 Failure criteria

The rate of leakage shall not exceed 50 mL/min (0.01 gpm).

~~*ASSE 1070-04, 4.4 Cross-flow test*~~
~~*4.4.1 Purpose*~~
~~*The purpose of this test is to determine if cross-flow leakage occurs when the outlet(s) is blocked.*~~
~~*Note: When a water temperature limiting device is integral to a plumbing supply fitting, the test is conducted in accordance with the requirement of ASME A112.18.1/CSA B125.1.*~~
~~*4.4.2 Procedures*~~
~~*The cross flow test shall be conducted as follows:*~~
~~*(a) Install the device in the open position with the mixed water outlet blocked.*~~
~~*(b) Pressurize the cold water inlet(s) to 35 ± 7 kPa (5 ± 1 psi) water.*~~
~~*(c) Maintain for 1 min.*~~
~~*(d) Examine for leakage at the hot inlet(s).*~~
~~*(e) Pressurize the hot water inlet(s) to 35 ± 7 kPa (5 ± 1 psi) water.*~~
~~*(f) Maintain for 1 min.*~~
~~*(g) Examine for leakage at the cold inlet(s).*~~
~~*4.4.3 Failure criteria*~~
~~*The rate of leakage shall not exceed 50 mL/min (0.01 gpm).*~~

~~*CSA B125.3-12, 5.3.3 Cross flow check valves*~~
~~*Cross flow check valves shall not leak more than 35 mL/min (0.01 gpm) out of one supply inlet when the opposite supply inlet is pressurized to 35 kPa (5 psi) with water at 10 ± 6 °C (50 ± 10°F) for 1 min and with the primary shut-off valves open and all outlets blocked. This requirement shall be met before and after the applicable life cycle test specified in Clause 5.8.*~~

ASSE 1070-04 and CSA B125.3-12
2015 Section 4.5.2, Life Cycle Test cold water inlet temperature specified is 50°F (but ambient temperature in ASSE 1070-04 and 80°F in CSA B125.3):
4.5.2 Procedure
The life cycle test shall be conducted as follows:
(a) Supply water to the specimen at a flowing pressure of 345 ± 35 kPa (50 ± 5 psi) and a supply pressure of 550 kPa (80 psi) maximum (valve closed) shall be supplied to the specimen throughout the test, and at
(i) 10 ± 3 °C (50 ± 5°F) to the cold-water inlet; and
(ii) 60 ± 3 °C (140 ± 5°F) to the hot-water inlet.
(b) Set the discharge flow rate at the manufacturer's minimum rated flow; or in the case of integrated fittings with outlet flow control, the flow shall be set at maximum.
(c) Open the hot- and cold-water valves.
(d) Set the specimen to discharge water at 40 ± 3 °C (105 ± 5°F).
(e) Cycle the specimen for 100,000 cycles at a rate of 3 to 5 cycles per minute. Each cycle shall be as follows:
(i) Flow water for at least 6 s.
(ii) Reduce the hot water temperature to ambient temperature for at least 6 s.
(iii) Increase the hot water temperature to 60 ± 3 °C (140 ± 5°F).

~~*ASSE 1070-04, 3.3.2 Procedure, The device shall be cycle tested as follows:*~~
~~*a) Cold water at ambient temperatures shall be supplied to the cold water inlet and hot water at 140.0 °F ± 5.0 °F (60.0 °C ± 2.8 °C) shall be supplied to the hot water inlet. During this test, maintain the cold and hot water inlet pressures at 45.0 psi ± 1.0 psi (310.2 kPa ± 6.9 kPa). The discharge flow rate shall be set at the manufacturer's minimum recommended flow. With the hot and cold water supply valves open, and the device set to discharge water at 105.0 °F ± 5.0 °F (40.6 °C ± 2.8 °C), flow for a minimum of six (6) seconds; reduce the hot water temperature to ambient temperature for a minimum of six (6) seconds. Increase the hot water temperature to 140.0 °F± 5.0 °F (60.0 °C ± 2.8 °C). This constitutes one cycle.*~~
~~*b) The device shall be cycled at a rate of 3 - 5 cycles per minute for a total of 100,000 cycles.*~~

~~*CSA B125.3-12, 5.8.5.2 Test procedure, The life cycle test for automatic compensating valves shall be conducted as follows:*~~
~~*(a) Install the specimen as shown in Figure 4.*~~
~~*(b) Adjust the incoming water supplies so that*~~
~~*(i) temperature T1 at Valve V1 is maintained at a minimum of 60 °C (140°F);*~~
~~*(ii) temperature T2 at Valves V1 and V2 is maintained at a maximum of 27 °C (80°F);*~~
~~*(iii) flowing pressure P1 at Valves V1 and V2 is maintained at 345 ± 35 kPa (50 ± 5 psi); and*~~
~~*(iv) flowing pressure P2 at Valves V1 and V2 is maintained at 172 ± 35 kPa (25 ± 5 psi).*~~
~~*(c) Adjust incoming inlet supply A to a minimum temperature of 60 °C (140°F) and a flowing pressure of 345 ± 35 kPa (50 ± 5 psi) and maintain these conditions. Adjust incoming inlet supply C to a maximum temperature of 27 °C (80°F) and a flowing pressure of 345 ± 35 kPa (50 ± 5 psi) and maintain these conditions. Then adjust the outlet temperature to 40.6 ± 3.0 °C (105 ± 5.0°F) and set the device to a minimum flow rate of 4.5 L/min (1.2 gpm).*~~
~~*(d) Test the control mechanism(s) for the number of cycles specified in Table 4 of the control dial, as follows:*~~
~~*(i) for specimens without a separate volume control, turn the temperature control dial at a constant rate of 5 to 20 cycles/min through its full operating range; or*~~
~~*(ii) for specimens with a separate volume control, open the volume control, cycle the temperature control dial at a constant rate of 5 to 20 cycles/min through its full operating range, simulating the intended operating motion of the valve without making contact with the end steps, except as agreed to with the manufacturer, and close the volume control.*~~
~~*(e) Test the pressure, temperature, or temperature and pressure sensing mechanism(s) for the number of cycles specified in Table 4, with the water flowing through the specimen in the following sequence:*~~
~~*(i) inlet supply A and inlet supply D for 4 s; and*~~
~~*(ii) inlet supply B and inlet supply C for 4 s.*~~
~~*One cycle shall consist of the steps described in Items (i) and (ii).*~~

ASSE 1070-04 and CSA B125.3-12

2015 Section 4.6.3, Pressure and temperature variation test outlet temperature cannot exceed 120°F (up to 120°F in ASSE 1070-04; such temperature not defined in CSA B125.3):

4.6.3 Failure criteria

After the initial 5 s following an outlet water temperature change at sensor T3, the outlet water temperature shall not exceed 49 °C (120°F) at any time.

~~*ASSE 1070-04, 3.5.3 Criteria*~~
~~*Failure of the device to maintain an outlet water temperature of less than 120.0 °F (48.9 °C) at all times shall result in the rejection of the device. Failure of the device to maintain the outlet water temperature to within ± 7.0 °F (± 3.9 °C) from the point of recording the temperature for that step, for each of the 4 steps of Part A of the test, shall result in the rejection of the device.*~~

ASSE 1070-04
2015 Section 5.3 Added packaging marking requirement for Mftr's name and model number (nonexistent in ASSE 1070-04 but already in in section 6.6.1 of CSA B125.3):
5.3 Packaging
Packaging shall be marked with
(a) the manufacturer's name, trademark, or other mark; or
(b) in the case of private labeling, the name, trademark, or other mark of the customer for whom the water temperature limiting device was manufactured; and
(c) the model number.

ASSE 1070-04
2015 Section 5.6 Added outlet temperature marking requirement in mftr's literature if maximum outlet temperature less than 120°F from device (nonexistent in ASSE 1070-04 but already in in section 6.8 of CSA B125.3):
5.6 Water temperature
When the maximum water temperature specified by the manufacturer is less than 49 °C (120.0°F) at the outlet of the device, the lower temperature shall be stated in the manufacturer's literature.