



TEST REPORT

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Report Number: 1052-14015

Report Issued: October 19, 2014

Project No.: 23942

Client: Showerstart LLC
15354 North 83rd Way Suite 102
Scottsdale, AZ 85260

Contact: Mr. Jason Swanson

Source of Samples: The samples were sent by Showerstart LLC and received by IAPMO R&T Lab in good condition on September 22, 2014.

Date of Testing: October 3, 2014 through October 16, 2014

Sample Description: Various showerheads with thermal actuator flow shut-off device

Models: *See Page 2*

Scope of Testing: The purpose of the testing was to determine if the samples tested of the showerheads with thermal actuator flow shut-off device met the applicable requirements of IAPMO IGC 244-2007a, entitled, “Flow Shutoff Device with or without Shower Head” and ASME A112.18.1-2012/CSA B125.1-12, entitled, “Plumbing Supply Fittings”.

Conclusion: The samples tested of the showerheads with thermal actuator flow shut-off device, models as listed on Page 2, from Showerstart LLC COMPLIED with the applicable requirements of IAPMO IGC 244-2007a and ASME A112.18.1-2012/CSA B125.1-12.

By our signatures below we certify that all the testing and sample preparation for this report was performed under continuous, direct supervision of IAPMO R&T Lab, unless otherwise stated.

Tested by,

Simon Hadi, Test Technician

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Reviewed by,

Andy Ho, Manager, Fitting Testing

Model List:

Model No.	Description	Remark
EV3011-CP150-BP	1.5 gpm Single Function Showerhead with ShowerStart TSV	Bulk Package
EV3011-CP150-SB	1.5 gpm Single Function Showerhead with ShowerStart TSV	Shipper Box
EV3021-CP150-BP	1.5 gpm Multifunction Showerhead with ShowerStart TSV	Bulk Package
EV3021-CP150-SB	1.5 gpm Multifunction Showerhead with ShowerStart TSV	Shipper Box
EV3011-CP175-BP	1.75 gpm Single Function Showerhead with ShowerStart TSV	Bulk Package
EV3011-CP175-SB	1.75 gpm Single Function Showerhead with ShowerStart TSV	Shipper Box
EV3021-CP175-BP	1.75 gpm Multifunction Showerhead with ShowerStart TSV	Bulk Package
EV3021-CP175-SB	1.75 gpm Multifunction Showerhead with ShowerStart TSV	Shipper Box
EV3011-CP200-BP	2.0 gpm Single Function Showerhead with ShowerStart TSV	Bulk Package
EV3011-CP200-SB	2.0 gpm Single Function Showerhead with ShowerStart TSV	Shipper Box
EV3021-CP200-BP	2.0 gpm Multifunction Showerhead with ShowerStart TSV	Bulk Package
EV3021-CP200-SB	2.0 gpm Multifunction Showerhead with ShowerStart TSV	Shipper Box

Notes:

- Each showerhead has two packaging methods (BP = Bulk Package and SB = Shipper Box).
- The showerheads use the same flow shut-off device (ShowerStart TSV) as those showerhead models that are currently listed to IGC 244-2007a under File # 5352. Therefore, no testing was conducted on the flow shut-off device to Sections 5.1.1 and 5.2 of IGC 244-2007a in this report.

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Primary Standards: IAPMO IGC 244-2007a, sections tested / evaluated:

4.1	Materials	4.2	Connections
4.3	Working Pressures	4.4	Working Temperatures
4.5	Shutoff Device with Thermal Actuator	4.6	Operating Control
4.7	Cross-flow	5.1	Shower Head and Shut off Device
6.0	Markings and Identification		

ASME A112.18.1-2012/CSA B125.1-12, clauses tested / evaluated:

4.1	Supply Fittings	4.2	Servicing
4.4	Threaded Connections	4.7	Backflow Prevention
4.9	Toxicity and Lead Content	4.11	Shower Heads
4.12	Cross-flow	4.14	Materials
5.1	General	5.2	Coatings
5.3	Pressure and Temperature	5.4	Flow Rate
5.5	Operating Requirements	5.6	Life Cycle
5.7	Resistance to Installation Loading	6.0	Markings

Sections / Clauses of IAPMO IGC 244-2007a and ASME A112.18.1-2012/CSA B125.1-12 not listed above were considered not applicable to subject product.

Test Results: All tests and evaluations were conducted per the written procedures specified in the standard.

IAPMO IGC 244-2007a

4.1 Materials – COMPLIED

The showerheads with shut off device complied with the applicable material requirements in ASME A112.18.1-2012/CSA B125.1-12. *Refer to the ASME A112.18.1-2012/CSA B125.1-12 portion of this report for details.*

4.2 Connections – COMPLIED

The showerheads with shut off device were capable of being connected to a ½” NPT male thread and the threaded connection complied with Section 4.4 of ASME A112.18.1-2012/CSA B125.1-12. *Refer to the ASME A112.18.1-2012/CSA B125.1-12 portion of this report for details.*

4.3 Working Pressures – COMPLIED

The showerheads with shut off device complied with the pressure requirements in ASME A112.18.1-2012/CSA B125.1-12. *Refer to the ASME A112.18.1-2012/CSA B125.1-12 portion of this report for details.*

4.4 Working Temperatures – COMPLIED

The showerheads with shut off device complied with the temperature requirements in ASME A112.18.1-2012/CSA B125.1-12. *Refer to the ASME A112.18.1-2012/CSA B125.1-12 portion of this report for details.*

4.5 Shutoff Device with Thermal Actuator – COMPLIED

The thermal actuator met the following performance requirements in Section 5.2 of this standard.

4.6 Operating Control – COMPLIED

The handle and stem did not fracture when a torque of 15 lbf-in was applied in the manner required to operate the control.

4.7 Cross-Flow – COMPLIED

The showerheads with shut off device complied with the requirements in Section 4.12 of ASME A112.18.1-2012/CSA B125.1-12. *Refer to the ASME A112.18.1-2012/CSA B125.1-12 portion of this report for details.*

5.1 Showerhead and Shut off Device – COMPLIED

The showerheads with shut off device complied with the applicable performance requirements in ASME A112.18.1-2012/CSA B125.1-12. *Refer to the ASME A112.18.1-2012/CSA B125.1-12 portion of this report for details.*

6.0 Markings and Identification – COMPLIED (*Complied per manufacturer's provided marking drawings*)

The showerheads will be permanently marked with the manufacturer's trademark "evolve" and the maximum flow rate.

ASME A112.18.1-2012/CSA B125.1-12

4.1 Supply Fittings

4.1.1 Rated Pressure – COMPLIED

4.1.1.1 The showerheads were designed for a rated pressure of 100 psi.

4.1.1.2 The showerheads were designed to function at a supply pressure between 20 psi and 125 psi.

4.1.2 Rated Temperatures – COMPLIED

The showerheads were designed for rated supply temperatures from 40 °F to 160 °F.

4.2 Servicing – COMPLIED

The showerheads were designed so that the replacement of wearing parts could be accomplished without removing the fitting from the supply system, without removing the piping from the body, without disturbing the finished wall, and by using standard tools or manufacturer provided tools.

4.4 Threaded Connections – COMPLIED

4.4.1 The ½” NPT pipe thread conformed with ASME B1.20.1.

4.4.9 The showerheads was capable of being connected to a ½” NPT male thread.

4.9 Toxicity and Lead Content

4.9.1 NSF/ANSI 61-9 – NOT APPLICABLE

The NSF/ANSI 61-9 test is not applicable to shower fittings.

4.9.2 Metal Alloys – COMPLIED

All metal alloys in contact with potable water contained less than 8% lead as required.

Findings: The brass ball joint contained 2.413% lead, inlet housing contained 1.876% lead, sensing element contained 0.993% lead, sensing element insert contained 1.899% lead, piston housing contained 2.018% lead and piston contained 2.260% lead. The stainless steel parts contained no lead. No solder and flux were used.

4.9.3 NSF/ANSI 372 – NOT APPLICABLE

The NSF/ANSI 372 test is not applicable to shower fittings.

4.11 Shower Heads

4.11.1 General – COMPLIED

The flow-restricting insert of the showerheads was mechanically retained at the point of manufacture to withstand a removal force of not less than 8.0 lbf (36 N).

Note: The flow restrictor which is inserted in the ball joint is not accessible without disassembling the ball joint.

4.11.2 High-Efficiency Shower Heads – NOT APPLICABLE

The showerheads were not designated as a high-efficiency type.

4.12 Cross-flow – COMPLIED

The flow-control device (*thermal actuator flow shut-off device*) of the showerheads did not completely shut off the flow of water.

4.14 Materials – COMPLIED

The coupling nut was made of brass with 57.33% copper content.

5.1 General – FOLLOWED

Before testing, specimens were conditioned at ambient laboratory conditions for not less than 12 h. All applicable tests were conducted in accordance with Table B.1 of this standard.

5.2 Coatings (*Chrome Finish*)

5.2.1 General – COMPLIED

The significant surfaces of the coated components were surface defects and uncoated areas, and were not stained.

5.2.2 Corrosion – COMPLIED

After being subjected to the corrosion test of ASTM B117 (neutral salt) for Service Condition 2 for 24 h as specified in Clause 5.2.2.2.1, the coating did not show more than one surface defect in any 1.0 in² area of the significant surface or up to three surface defects on a 1.0 in length of parting line. The surface defects were not larger than 0.03 in any dimension.

5.2.3 Adhesion – COMPLIED

5.2.3.2 The coating on metals met the grind-saw test requirements as defined in ASTM B 571.

5.2.3.3 The coating on plastics met the thermal cycling test requirements when tested per Clause 5.2.3.3.2. The coated plastic parts had:

- (a) No cracks, blisters, peeling, or discoloration on significant surfaces.
- (b) No cracks longer than 0.25 in with a loss of adhesion between the base material and the coating.
- (c) No blisters exceeding 0.01 in² in the area of an injection point.
- (d) No warpage affecting the performance of the fitting or component.

5.3 Pressure and Temperature

5.3.1 Static and Dynamic Seals – COMPLIED

The seals of the showerheads did not leak or otherwise fail when tested in accordance with Clauses 5.3.1.3 to 5.3.1.4 of the standard. The units were tested with flowing pressures of 20 psi and 125 psi for 5 minutes each.

5.3.5 Ball Joints – COMPLIED

The ball joint of the showerheads did not leak in any position more than 0.01 gpm measured over 5 minutes when tested at 50 psi flowing pressure and 100 °F. The actual leakage was measured 0.00 gpm.

5.4 Flow Rate – COMPLIED

5.4.1 The showerheads met the maximum flow rate requirement of 2.5 gpm as specified in Table 1, at the temperature and flowing pressure specified in Clause 5.4.2.3.

Finding:

Model	Min. Measured Flow Rate at 45 psi (gpm) <i>[Tested per Clause 5.4.2.3.2(b)]</i>	Max. Measured Flow Rate at 80 psi (gpm) <i>[Tested per Clause 5.4.2.3.2(a)]</i>
EV3011-CP150	1.3 gpm (Single Mode)	1.3 gpm (Single Mode)
EV3021-CP150*	1.2 gpm in Center Spray Mode	1.3 gpm in Outer Spray Mode
EV3011-CP175	1.5 gpm (Single Mode)	1.5 gpm (Single Mode)

EV3021-CP175*	1.5 gpm in Center Spray Mode	1.6 gpm in Outer Spray Mode
EV3011-CP200	1.8 gpm (Single Mode)	1.9 gpm (Single Mode)
EV3021-CP200*	1.7 gpm in Center Spray Mode	1.9 gpm in Outer Spray Mode

***Note:** The water saving mode (on EV3021 Series only) designed to flow less than 0.5 gpm at 80 psi is excluded from the minimum flow requirement at 45 psi per the standard.

5.5 Operating Requirements – COMPLIED

5.5.1 The torque required to operate the thermal actuator flow shut-off device reset control and the spray pattern control did not exceed that specified in Table 2 when tested at the temperatures and pressures specified in Clause 5.3.1.4.

Finding: The maximum operating torque was 3.0 lbf-in for the thermal actuator flow shut-off device reset control and 6.0 lbf-in for the spray pattern control (*for EV3021 Series*).

5.5.4 The ball joint of the showerheads did not require a moving force greater than 10 lbf at the farthest point from the ball joint when tested at a flowing pressure of 125 psi with water at 100 °F. The actual force was 2.0 lbf for EV3011 Series and 4.0 lbf for EV3021 Series.

5.6 Life Cycle

5.6.1.4 Ball Joints – COMPLIED

When tested in accordance with Clause 5.6.3.3.5 for 10,000 cycles as specified in Table 3 of the standard, the showerheads did not develop any defects that would adversely affect the serviceability of the unit. The ball joint did not leak more than 0.01 gpm in any position when tested in accordance with Clause 5.3.5. The actual leakage was 0.00 gpm. There was no need to tighten the ball joint packing nut more than once during the test to reduce leakage. The moving force was not greater than 10 lbf when measured at the farthest point from the ball joint with a flowing pressure of 125 psi and the water temperature of 100 °F. The actual force was 4.0 lbf for EV3011 Series and 9.0 lbf for EV3021 Series.

5.6.3.3 Other Devices (Spray Pattern Control) – COMPLIED (*For EV3021 Series Only*)

The spray pattern control was tested to 10,000 cycles. During and after the test, the control mechanism continued to function as at the beginning of the test and did not develop any defects that could adversely affect its functionality or serviceability. After the test, the operating torque was 6.0 lbf-in when tested in accordance with Clause 5.5 of the standard.

5.7 Resistance to Installation Loading

5.7.2 Thread Torque Strength – COMPLIED

5.7.2.1 The ½” NPT metal threaded connections withstood a torque load of 45 lbf-ft as specified in Table 4 of the standard without evidence of cracking or separation.

5.7.2.2 The threaded connections intended to seal water did not crack, strip, or leak when tested in accordance with Clause 5.3.1.3 with the threaded connection tightened to (a) the torque required to affect the seal; and (b) 150% of the torque required by Item (a).

5.7.2.3 NOT APPLICABLE – Clause 5.3.2 (Burst Pressure Test) only applies to threaded supply connections intended for use under continuous pressure. Showerheads are not intended for use under continuous pressure application.

6.0 Markings

6.1 General – COMPLIED (*Complied per manufacturer's provided marking drawings*)

6.1.1 The showerheads will be permanently marked with the manufacturer's trademark "evolve". The marking will be visible after installation.

6.1.2 The showerheads will be marked with the manufacturer's specified maximum flow rate, in L/min and gpm, in accordance with Clause 5.4.2.3.2(a).

6.3 Packaging – COMPLIED (*Clause 6.3.1 complied per manufacturer's provided package artworks*)

6.3.1 The packaging will be marked with the manufacturer's name as well as the model number.

6.3.2 The packaging or other included literature shall be marked with the following:

- (a) the manufacturer's specified maximum flow rate determined in accordance with Clause 5.4.2.3.2(a); and
- (b) the statement "For use with automatic compensating valves rated at xxx L/min (yyy gpm) or less", where xxx L/min (yyy gpm) is the lowest minimum flow rate recorded in accordance with Clause 5.4.2.3.2(b).

Finding: The user guide was marked with the manufacturer's specified maximum flow rate as specified in Clause 6.3.2(a) and the statement as specified in Clause 6.3.2(b).

Photographs of Samples Tested:



EV3011 Series (1.5, 1.75 and 2.0 gpm)



EV3021 Series (1.5, 1.75 and 2.0 gpm)