TEST REPORT

Evaluation of Aquor's Hydrant

By

Shugeng Qian and Daming Zhuang

May 11, 2016

Prepared for

Aquor
240 Airport Rd,
Port Townsend, WA 98368

Report No. NFM040715R

Prepared by

Center for Environmental Systems
Stevens Institute of Technology
Hoboken, NJ 07030

American Society of Sanitary Engineering

PRODUCT (SEAL) LISTING PROGRAM

ASSE STANDARD #1019 - REVISED: 2011

Wall Hydrant with Backflow Protection and Freeze Resistance

MANUFACTURER: New Found Metal

CONTACT PERSON: Richard Walcome **E-MAIL:** rowalcome@yahoo.com

ADDRESS: 240 Airport Road, Port Townsend, WA 98368

LABORATORY FILE NUMBER: NFM040715R

MODEL # TESTED: Aquor

MODEL SIZE: 1/2" NPT in 3/4" Hose connection out

ADDITIONAL MODELS REPORT APPLIES TO: Not Applicable

ADDITIONAL MODEL INFORMATION (i.e. orientation, series, end connections, shut-off valves): Not Applicable

DATE MODELS RECEIVED BY LABORATORY: 08/26/15 **DATE TESTING BEGAN:** 08/27/15 (All sections except 3.4), 05/02/16 (Section 3.4)

DATE TESTING WAS COMPLETED: 09/30/15 (All sections except 3.4), 05/09/16 (Section 3.4)

IF MODELS WERE DAMAGED DURING SHIPMENT, DESCRIBE DAMAGES: None

PROTOTYPE OR PRODUCTION: Production

WERE ALL TESTS PERFORMED AT THE SELECTED LABORATORY? ⊗ Yes ○ No

If offsite, identify location and tests involved:

General information and instructions for the testing engineer:

The results within this report apply only to the models listed above.

There may be items for which the judgment of the test engineer will be involved. Should there be a question of compliance with that provision of the standard, a conference with the manufacturer should be arranged to enable a satisfactory solution of the question.

Should disagreement persist and compliance remain in question by the test agency, the agency shall, if the product is in compliance with all other requirements of the standard, file a complete report on the questionable items together with the test report, for evaluation by the ASSE Seal Board. The Seal Board will then review and rule on the question of compliance with the intent of the standard then involved.

Documentation of material compliance must be furnished by the manufacturer. The manufacturer shall furnish to the testing agency, a bill of material which clearly identifies the material of each part included in the product construction. This identification must include any standards which relate thereto.

Center for Environmental Systems
Stevens Institute of Technology
Hoboken, NJ 07030
Tel: 201 216 5697 Fax: 201 216 8303

May 11, 2016

Mr. Richard Walcome
240 Airport Rd,
Port Townsend, WA 98368

Reference: Laboratory evaluation of Aquor's Hydrant on ASSE 1019-2011. Report No.: NFM040715R

Mr. Walcome

We have completed our laboratory evaluation of Aquor's Hydrant, Model 1A, Size ½ inch inlet, ¾ inches outlet, selected and sent by the manufacturer and transmit our report to you.

CONCLUDING STATEMENT

The sample tested of Aquor's Hydrant, Model 1A, Size ½ inch inlet, ¾ inches outlet, has been determined to be in compliance with applicable sections of ASSE 1019-2011

MANUFACTURER OF PRODUCT TESTED

Aquor
240 Airport Rd,
Port Townsend, WA 98368

ATTN:
Mr. Richard Walcome
Tel: 360-440-6701
Email: rowalcome@yahoo.com

PRODUCT TESTED

Tested Samples:
Aquor's Hydrant, Model 1A, Size ½" NPT inlet, ¾" Garden Hose Connection Threads outlet, Length of 13-5/8"

Desk Reviewed Samples:
Aquor's Hydrant, Model 1A, Size ½" NPT inlet, ¾" Garden Hose Connection Threads outlet, Length of 5-3/4"
Aquor's Hydrant, Model 1A, Size ½" NPT inlet, ¾" Garden Hose Connection Threads outlet, Length of 9-3/4"

Maximum Pressure: 125 psi
Maximum Temperature: 140 °F

SOURCE OF PRODUCT

Samples were sent by manufacturer and shipped directly to the laboratory. No evidence of tampering was observed.

Received date: August 26, 2015

Testing Date: August 27; 2015 to September 30, 2015 and May 2, 2016 to May 9, 2016 (Section 3.4)

Test Apparatus

Pressure Gauge: G-4, G-6, G-15, VG-1, DG-4

Thermometer/Thermocouples: T-7

Scale: W-1

TEST CRITERIA

All tests and evaluations were made in accordance with the applicable portions of ASSE 1019- 2011 Wall Hydrants with Backflow Protection and Freeze Resistance.

ENGINEERING REVIEW OF VALVES

Our engineering review and physical inspection of Aquor's Hydrant, Model 1A, as described below enabled us to conclude that the products are in compliance with the standard, ASSE 1019-2011, used to conduct the testing.

By examining check valve parts, vent ports, and reviewing respective part drawings to determine any differences among Model 1A, tested sample of Length 13-5/8" and desk reviewed samples of Length 5-3/4" and 9-3/4", we were able to conclude that the check valves assembly and vent ports of all three lengths were found to be identical size, structure and material.

The only difference between the samples was the length of the device to fit varieties of wall thickness. The tested sample with length of 13-5/8" has the longest length. According to Section 2.1 of the standard, it was selected for testing and represented for all Model 1A series with length of 13-5/8", 5-3/4" and 9-3/4".

RESULTS

3.0 Performance Requirements and Compliance Testing

3.1 Hydrostatic Testing of Complete Device - COMPLIED

The device was installed in the open position on a test system with the inlet connected to an ambient water supply with shut-off valves on the inlet and the outlet. The air of the device was purged and the outlet shut-off valve was closed. The supply pressure was raised to 250.0 psi. The pressure was held for 5 minutes. There was no leak or damage found during the test. The device was complied with the section.

3.2 Water Flow Capacity and Pressure Loss - COMPLIED

The device was installed in the open position on the test system that is equipped with the means for accurately measuring the rate of ambient water flow and pressure loss across the device, as shown in Figure 1. After purging the system of air, the throttling valve was closed and then slowly opened until the 25.0 psi pressure differential was reached. The supply pressure used was 52.5 psi and the flow rate was 6.8 GPM. The flow rate met the requirement of Table 1. The device was complied with the section.

3.3 Deterioration at Maximum Rated Temperature and Pressure- COMPLIED

The device was installed in the open position in a test set-up. Water at a temperature of 140.0 °F was circulated at a flow rate of 6.0 GPM. The pressure was set at 125.0 psi. The test was run 8 hours per day for a total of 10 days. There was no leak found on the device. The device was complied with this section.

3.4 Life Cycle Evaluation – COMPLIED

The device was pressurized with ambient water at 125.0 psi static pressure at the inlet when the device shut-off valve was closed. The water temperature was 67.3 °F. The flow restrictor at the outlet limited flow to 8.0 GPM. The dwell time form the device full open and full closed configuration was 2 seconds each. There are 15 cycles per minutes. The device was totally cycled for 5000 times. The rotary torque required to open/close the valve was measured at 11 lbf·in. No leakage from the stem or atmospheric vent ports was found during the test. The device was complied with this section.

3.5 Resistance to Bending- COMPLIED

The device was installed as in Figure 3 and was pressurized with ambient water at 65.5 °F and 125.0 psi. With the device flange securely supported such to prevent loading the tube, a load equivalent to a pull of 100 pounds was applied in a direction at right angles to the axis through the hose connections at the outlet of the device and hold for three minutes. There was no external leak found on the device. There

was no fracture in the sill mounting flange or body of the device. The device was complied with this section.

3.6 Self Draining Capabilities - COMPLIED

The device is Type "A" device. It was installed per the manufacturer's installation instructions per Figure 2. The supply pressure was adjusted to 25.0 psi. The water temperature was 65.5 °F. The device was turned fully open and discharged approximately 3.0 gallons of water. Then the valve was closed. The hose and nozzle were remained attached to the device. After 40 minutes, the temperature in the chamber was lowered to -0.6 °F. The hose was removed from the device. The device was opened and there was water flown through the device. The device was complied with this section.

3.7 Low Head Backpressure – COMPLIED

The device was installed with the atmospheric vent and vent port sealed closed, a transparent tube connected to the inlet, and a hose connected to the outlet. The hose was filled with water and the outlet end was raised to an elevation to produce 6 inches water column at the outlet of the device. After the water was held for 5 minutes, the water column was increased to 24.0 inches and then to 10.0 feet with an increments of 24 inches. There was no water observed in the transparent tube during the test. The device was complied with the section.

3.8 Outlet Pressure Release for Type A and Type B Devices – COMPLIED

The device was installed in the open position in its normal operating position in a test system as shown in Figure 3. The hose connected to the outlet of the device was ½ NH, 25.0 feet in length and having a nozzle on its discharge end. The system was pressurized to 125.0 psi. The nozzle was opened to purge air and then closed slowly. The supply valve was closed and then a quick-valve was opened to drop the pressure in the inlet of the device to 0.0 psi. The hose was discharged to 0.0 psi. The device was complied with this section.

3.10 Leakage from Vent Ports - COMPLIED

The device was installed in the test system that is equipped with a means of measuring the inlet pressure to the device in a closed position. The throttle valve was fully opened, then the supply valve was opened to provide 10.0 psi to the device and then the device was opened to full flow. There was no leakage observed at the vent ports. The device was complied with the section.

3.12 Backsiphonage - COMPLIED

The device was installed in the open position as shown in Figure 4. The check valve was fouled with a 0.032 inch diameter fouling wire per Figures 9. Then, tests were conducted in sequence as follows:

(a) A vacuum of 25.0 inches mercury column was slowly applied and held for 5 minutes and then, the vacuum was reduced slowly from 25.0 to 0 inches mercury column.
(b) By means of a quick-acting valve, a surge effect was created by quickly operating the valve from fully closed to fully opened. During the test, the vacuum ranged between 0 to 25.0 inches mercury column.

The maximum rise of water in the slight glass was 0 inch. The device was complied with the section.

The detailed results of the investigation and tests are given in the ASSE Laboratory Evaluation Report.

STATEMENT

The entire tests performed were under continuous, direct supervision of the Laboratory Director. The results contained in this report apply only to those products tested.

Very truly yours,

Tsan-Liang Su, Ph.D.
Director, Laboratory Operations

SECTION I

1.0 General

1.1 Application

Does this device, as stated by the manufacturer, comply with this section?

⊗ Yes ○ No ○ Questionable

If questionable, explain: _____

1.2 Scope

Does the device conform to the product classified as a wall hydrant with backflow protection and freeze resistance?

⊗ Yes ○ No ○ Questionable

If questionable, explain: _____

1.2.1 Is this hydrant a Type "A", Type "B", or Type "C" device?

⊗ Type "A"
○ Type "B"
○ Type "C"

1.2.2 Sizes

Size of male hose threaded outlet: 3/4 inches (_____ mm)
Size of inlet connection: 1/2 inches (_____ mm)

1.2.3 Connections

1.2.3.1 Outlet Type: Hose thread

Complies with ASME B• :20.7? ⊗ Yes ○ No

1.2.3.2 Inlet Type: NPT

Complies with plumbing code: ASME

1.2.4 Pressure

What is the working pressure range as noted by the manufacturer?

25 psi to 125 psi (_____ kPa to _____ kPa)

1.2.5 Temperature Range

What is the temperature range as noted by the manufacturer?

0 °F to 140 °F (_____ °C to _____ °C)

1.2.7 Atmospheric Vent

Is the atmospheric vent of a nonstandard plumbing connection? ⊗ Yes ○ No

SECTION II

2.0 Test Specimens

2.1 How many devices of each type, model and size were submitted? 1

If a series of devices is being evaluated, were devices having the smallest inlet and longest length in that series submitted for testing? Not Applicable ○ Yes ○ No

Did the manufacturer supply the fouling procedure for Section 3.12? ○ Yes ⊗ No

2.2 How many devices of each type or model and size were utilized during the laboratory evaluation? 1

2.3 **Drawings**
Were assembly drawings, installation drawings and other technical data which are needed to enable a testing agency to determine compliance with this standard submitted with the device? ⊗ Yes ○ No ○ Questionable

If questionable, explain: _____

Were the drawings reviewed in the laboratory? ⊗ Yes ○ No

SECTION III

3.0 **Performance Requirements and Compliance Testing**

3.1 **Hydrostatic Pressure Test**
What was the test pressure? 250.0 psi (_____ kPa)
What was the water temperature used for this test? 68.5 °F (_____ °C)
The test period was for 5 minutes

Was there any indication of damage or external leakage? ○ Yes ⊗ No

3.2 **Water Flow Capacity**
What was the supply pressure used for the test? 52.5 psi (_____ kPa)

At a 25 psi (172.4 kPa) pressure differential across the device, what was the flow rate?
6.8 GPM (_____ L/m)

In compliance? ⊗ Yes ○ No

3.3 **Deterioration at Maximum Rated Temperature and Pressure**
What was the flow rate used for this test? 6.0 GPM (_____ L/m)
What was the water temperature used for this test? 140.0 °F (_____ °C)
What was the supply pressure used for this test? 125.0 psi (_____ kPa)

Duration of test: 8 hours/days for 10 days or
N/A continuous hours.

3.4 **Life Cycle Evaluation**
Devices with a cold water inlet only:
Water temperature used for this test: 67.3 °F (_____ °C)
Water pressure used for this test : 125.0 psi (_____ kPa)

Was a flow restrictor used? ⊗ Yes ○ No

What was the torque or force required to close the device?
Rotary Torque: 11 Pound*inch
Axial Force: _____

Devices with both a cold water inlet and a hot water inlet: Not Applicable
Water temperature used for this test:
Hot Water: _____ °F (_____ °C)
Cold Water: _____ °F (_____ °C)

Water pressure used for this test: _____ psi (_____ kPa)

Was a flow restrictor used? ○ Yes ○ No

What was the torque or force required to close the device?
Rotary Torque: _____
Axial Force: _____

Device was cycled for: 5000 cycles at a rate of 15 cycles per minute.

Was there any leakage from the stem or atmospheric port(s) during the cycling test? ○ Yes ⊗ No

3.5 Resistance to Bending

Load applied: 100 lbs (_____ kg)
Supply pressure used for this test: 125.0 psi (_____ kPa)
Water temperature used for this test: 65.5 °F (_____ °C)

Was there any indication of external leakage or fracturing in the sill flange or body? ○ Yes ⊗ No

3.6 Self Draining Capabilities

Type of device on test:
⊗ Type "A"
○ Type "B"
○ Type "C"

Water pressure used for this test: 25.0 psi (_____ kPa)
Water temperature used for this test: 65.5 °F (_____ °C)
Temperature inside cold chamber while running test: -0.6 °F (_____ °C)
Time required to lower device to 0.0 °F (-17.8 °C): 40 minutes

Once the temperature of the device inside the cold chamber was lowered to a maximum of 0.0 °F (-17.8 °C), was the device able to flow water? ⊗ Yes ○ No

3.7 Low Head Back Pressure

The test period for each column reading was for 5 minutes

At each water column height, was there any leakage from the inlet of the device? ○ Yes ⊗ No

3.8 Outlet Pressure Release for Type A and Type B Devices

The system was pressurized to: 125.0 psi (_____ kPa)

A quick acting valve dropped the pressure in the inlet to 0.0 psi (_____ kPa) when the inlet pressure dropped to 0.0 psi (0.0 kPa).

The outlet pressure release mechanism dropped the outlet pressure to: 0.0 psi (_____ kPa)

3.9 Backflow Prevention for Type "C" Devices Not Applicable

The system was pressurized to: _____ psi (_____ kPa)

A quick acting valve dropped the pressure at the inlet to: _____ psi (_____ kPa)
The test period was for _____ hours

Was there any leakage into the inlet of the device? ○ Yes ○ No

3.10 Leakage from Vent Ports

Pressure at the inlet with the device in the closed position: 10.0 psi (_____ kPa)

When opened to full flow, what was the flowing pressure? 10.0 psi (_____ kPa)

Was there any leakage from the vent ports at full flow? ○ Yes ⊗ No

3.11 Cross Flow Test (Mixing Hydrant Only) Not Applicable

Was the mixed water outlet port blocked closed? ○ Yes ○ No

Cold water inlet was pressurized to _____ psi (_____ kPa)
for _____ minutes.

Leakage at the hot port(s): _____ GPM (_____ mL/min)

Hot water inlet was pressurized to _____ psi (_____ kPa)
for _____ minutes.

Leakage at the cold port(s) _____ GPM (_____ mL/min)

3.12 Backsiphonage

All check valves and checking members in the normal water flow path of the device were fouled with a 0.032 inch (_____ mm) diameter wire.

VG-1

A slowly applied vacuum was raised to 25.0 inches Hg (_____ kPa)
and held for 5 minutes.

A rapidly applied vacuum was raised to 25.0 inches Hg (_____ kPa)
and then relieved to 0.0 inches Hg (_____ kPa)

The rise of water in the sight glass was: 0 inches (_____ mm)

SECTION IV

4.0 Detailed Requirements

4.1 Materials

Does the device comply with the material requirements of this standard?
⊗ Yes ○ No ○ Questionable

If questionable, explain: _____

Were any check valves or relief venting of a metal to metal seating? ○ Yes ⊗ No

4.2 Markings

4.2.1 List the following information as shown on the device:

(a) Manufacturer's name or trademark: Aquor
(b) Model designation: 1A
(c) Type "A": Type A
Type "B":
Type "C":

Were the markings visible on the installed position? ⊗ Yes ○ No

4.2.2 How were the markings applied? "Aquor" is cast on the handle of the device. "1A" and "Type A" will be on the inside face of the hydrant cover.

4.3 Installation Instructions

4.3.1 Were installation instructions submitted with the device? ⊗ Yes ○ No

TESTING AGENCY: Building Technology Research Lab/Stevens Institute of Technology

ADDRESS: Center for Environmental Systems, Stevens Institute of Technology, Hoboken, NJ, 07030

PHONE: (201)216-5697 **FAX:** (201)216-8303

TEST ENGINEERS: Shugeng Qian & Daming Zhuang

We certify that the evaluations are based on our best judgement and that the test data recorded is an accurate record of the performance of the device on test.

SIGNATURE OF THE OFFICIAL OF THE AGENCY:

TITLE OF THE OFFICIAL: Director, Laboratory Operations **DATE:** 05/11/16

SIGNATURE AND SEAL OF THE REGISTERED PROFESSIONAL ENGINEER SUPERVISING THE LABORATORY EVALUATION:

STATE OF NEW JERSEY
DAVID A. VACCARI
No.
33953
LICENSED
PROFESSIONAL ENGINEER

SIGNATURE:

PE SEAL

*To insert images into document (PE seal and signatures)

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COMMENTS: