ASSE/IAPMO IGC 370-2021

PUBLIC REVIEW DRAFT

Industry Standard for

Point of Entry Regenerable Well Water Filtration Systems

IAPMO Standard

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Preface

This is the first edition of ASSE/IAPMO IGC 370, Point of Entry Regenerable Well Water Filtration Systems.

This Standard was developed by the IAPMO Standards Review Committee (SRC) in accordance with the policies and procedures regulating IAPMO industry standards development, Policy S-001, Standards Development Process. This Standard was approved as an IAPMO Industry Standard on Month DD, YYYY.

Notes:

(1) The use of the singular does not exclude the plural (and vice versa) when the sense allows.

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(4) During its development, this Standard was made available for public review, thus providing an opportunity for additional input from stakeholders from industry, academia, regulatory agencies, and the public at large. Upon closing of public review, all comments received were duly considered and resolved by the IAPMO Standards Review Committee.

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(6) Although the intended primary application of this Standard is stated in its scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

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(a) standard designation (number);

(b) relevant section, table, or figure number, as applicable;

(c) wording of the proposed change, tracking the changes between the original and the proposed wording; and

(d) rationale for the change.

(8) Requests for interpretation should be clear and unambiguous. To submit a request for interpretation of this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at standards@IAPMOstandards.org or, alternatively, at 4755 East Philadelphia Street, Ontario, California, 91761, and include "Request for interpretation" in the subject line:

(a) the edition of the standard for which the interpretation is being requested;

(b) the definition of the problem, making reference to the specific section and, when appropriate, an illustrative sketch explaining the question;

(c) an explanation of circumstances surrounding the actual field conditions; and

(d) the request for interpretation phrased in such a way that a "yes" or "no" answer will address the issue.

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(12) Proposals for amendments to this Standard will be processed in accordance with the standards-writing procedures of IAPMO industry standards development, Policy S-001, Standards Development Process.

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ASSE/IAPMO IGC 370-2021
Point of Entry Regenerable Well Water Filtration Systems

1 Scope

1.1 General

1.1.1 This Standard covers point of entry regenerable (using dissolved oxygen) well water filtration systems intended for residential and commercial applications and specifies requirements for materials, physical characteristics, performance testing, and markings.

1.1.2 Point of Entry (POE) water treatment products covered in this Standard are intended to reduce Arsenic, Iron, Manganese, and Hydrogen Sulfide from drinking water. Non-regenerating water treatment systems and residential water treatment systems that regenerate with chemicals such as sodium chloride or potassium permanganate designed to reduce arsenic, Iron, Manganese, and Hydrogen Sulfide shall be tested to NSF/ANSI 42 and ~~or~~ 53.

1.2 Alternative Materials

The requirements of this Standard are not intended to prevent the use of alternative materials or methods of construction provided such alternatives meet the intent and requirements of this Standard.

1.3 Terminology

In this Standard,

(a) "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the Standard;
(b) "should" is used to express a recommendation, but not a requirement;
(c) "may" is used to express an option or something permissible within the scope of the Standard; and
(d) "can" is used to express a possibility or a capability.

Notes accompanying sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.4 Units of Measurement

SI units are the primary units of record in global commerce. In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application, but each unit system is to be used independently. All references to gallons are to U.S. gallons.

2 Reference Publications

This Standard refers to the following publications and, where such reference is made, it shall be to the current edition of those publications, including all amendments published thereto.

ASSE International
ASSE 1087
Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water

NSF International
NSF/ANSI 42
Drinking Water Treatment Units – Aesthetic Effects

NSF/ANSI 53
Drinking Water Treatment Units – Health Effects

NSF/ANSI/CAN 61
Drinking Water System Components - Health Effects

NSF/ANSI/CAN 372
Drinking Water System Components - Lead Content

NSF/ANSI/CAN 600
Health Effects Evaluation and Criteria for Chemicals in Drinking Water

3 Definitions

The following definitions shall apply in this Standard:

Challenge water — Water used by the laboratory to conduct the performance testing.

Effluent – Challenge water that has passed through the point of entry well water system.

Influent water – Challenge water that inters the point of entry well water system.

Point of Entry — A water treatment device which installs at the main inlet to a building and acts as centralized treatment.

Synthetic water – Dechlorinated potable water source that has been modified to include the parameters in Table 1. This water is used as the starting point to create the challenge water, demineralization by reverse osmosis, deionization and filtration is not required.

Well water – Potable water source from a private or public well.

4 General Requirements

4.1 Materials

Point of entry well water treatment systems and components covered by this Standard shall be made of materials that when tested comply with the acceptance criteria in NSF/ANSI/CAN 600.

4.2 Materials Testing

Devices or components covered by this standard shall be tested in accordance with NSF/ANSI/CAN 61.

Devices and components 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/CAN 372.

4.3 Influent Water Requirements

Well water subjected to treatment by systems covered in this Standard shall contain:

(a) Minimum of 2.0 PPM dissolved Oxygen;
(b) Minimum of 0.3 PPM combined or independent metal impurities (Iron, or Manganese);
(c) Maximum of 5 PPM combined or independent impurities (Iron, Manganese, or Hydrogen Sulfide); and
(d) Less than 0.1 PPM Chlorine.

4.4 Connections

Pipe threads and other connections shall conform to the applicable standards.

(a) Tapered pipe threads shall comply with ASME B1.20.1.
(b) Dry seal pipe threads shall comply with ASME B1.20.3.
(c) Compression assemblies shall comply with SAE J512.
(d) Soldered connections shall comply with ASME B16.18 or ASME B16.22.
(e) Push fit connections shall comply with ASSE 1061.
(f) Press connections shall comply with ASME B16.51.

4.5 Arsenic Reduction Warning

Systems complying with this Standard shall contain a mechanism to count the volume of water passing through the system so that automatic regeneration can be initiated when the capacity has been reached. The system shall also include one of the following warning systems for the user if the system is not performing its function:

(a) an arsenic monitor or sensor on the product water stream; or
(b) a sampling and/or analysis kit for arsenic with instructions on recommended use and sampling time periods. Arsenic sampling shall be required at frequencies not greater than one-year intervals.

5 Testing Requirements

5.1 Performance Indication Device Test

During the Arsenic Reduction Test procedure, the system shall initiate an automatic regeneration within 10% of the recommended capacity for each performance run at both pH tests.

5.2 Arsenic Reduction Test

5.2.1 Conditioning

One system shall be installed and conditioned per the manufacturer's instructions. Challenge water shall be used for conditioning.

5.2.2 Challenge water

A synthetic water supply shall be used. The water shall be adjusted with the specific characteristics referenced in Table 1 and maintained throughout the test.

5.2.3 Test Procedure for Trivalent Arsenic

The test procedure shall be conducted as follows:

(a) Condition the system per the manufacturer's instructions.
(b) After conditioning is complete the system shall be returned to service and tested with the challenge water per Section 5.2.2 at pH 6.5.
(c) The system shall be operated per the manufacturer's instructions, operate at the published service flow rate and tested to the daily rated capacity of the system.
(d) Influent and effluent arsenic samples shall be collected upon start up and every 20% of the rated capacity. The final sample shall be collected just prior to the system's automatic regeneration.
(e) The system shall automatically regenerate when the rated capacity is reached per the valve settings. The total gallons through the system when regeneration is initiated shall be recorded, (must be within 10% of capacity for each run)
(f) This test shall be repeated three times.
(g) Repeat steps (a) through (f) with challenge water at pH 8.5.

5.2.4 Test Procedure for Pentavalent Arsenic

The test procedure shall be conducted as follows:

(a) Condition the system per the manufacturer's instructions.
(b) After conditioning is complete the system shall be returned to service and tested with the challenge water per Section 5.2.2 at pH 6.5.
(c) The system shall be operated per the manufacturer's instructions, operated at the published service flow rate and tested to the daily rated capacity of the system.
(d) Influent and effluent arsenic samples shall be collected upon start up and every 20% of the rated capacity. The final sample shall be collected just prior to the system's automatic regeneration.
(e) The system shall automatically regenerate when the rated capacity is reached per the valve settings. The total gallons through the system when regeneration is initiated shall be recorded, (must be within 10% of capacity for each run)
(f) This test shall be repeated three times.
(g) Repeat steps (a) through (f) with challenge water at pH 8.5.

5.2.5 Performance Requirements

The system shall comply with the following requirements:

(a) The Influent arsenic shall be reduced below 10 PPB for each of the 3 capacity tests at each effluent sample point. The average of the three runs shall be used for the percent reduction performance claim.
(b) The system shall initiate an automatic regeneration within 10% of the recommended capacity for each run.

5.3 Iron, Manganese, and Hydrogen Sulfide Reduction Test

5.3.1 Conditioning

One system shall be installed and conditioned per the manufacturer's instructions. Challenge water shall be used for conditioning.

5.3.2 Challenge water

A synthetic water supply shall be used. The water shall be adjusted with the specific characteristics referenced in Table 2 and maintained throughout the test.

5.3.3 Test Procedure

The test procedure shall be conducted as follows:

(a) Condition the system per the manufacturer's instructions.
(b) After conditioning is complete the system shall be returned to service and tested with the challenge water per Section 5.3.2.
(c) The system shall be operated per the manufacturer's instructions, operated at the published service flow rate and tested to the daily rated capacity of the system.
(d) Influent and effluent samples shall be collected upon start up and every 20% of the rated capacity. The final sample shall be collected just prior to the system's automatic regeneration.
(e) The system shall automatically regenerate when the rated capacity is reached per the valve settings. The total gallons through the system when regeneration is initiated shall be recorded, (must be within 10% of capacity for each run)
(f) This test shall be repeated three times.

5.3.4 Performance Requirements

The system shall comply with the following requirements:

(a) The Influent Iron, Manganese, and Hydrogen Sulfide shall be reduced below 0.3 mg/L iron, 0.05 mg/L manganese, and 0.05 mg/L hydrogen sulfide for each of the 3 capacity tests.
(b) The system shall initiate an automatic regeneration within 10% of the recommended capacity for each run.

5.4 Additional Testing

Point of entry regenerable well water filtration systems complying with this Standard shall be tested to the following sections of ASSE 1087, Performance requirements for commercial and food service water treatment equipment utilizing drinking water

(a) Section 3.1, Service Flow Capacity
(b) Section 3.2, Flow Capacity – Point-of-Entry System
(c) Section 3.5, Bypass flow capacity during system regeneration
(d) Section 3.6, 24-hour Pressure Loss
(e) Section 3.7, Pressure Shock (Water Hammer)
(f) Section 3.8, Structural Integrity – Hydrostatic
(g) Section 3.9, Structural Integrity – Cycle Test

6 Markings and Accompanying Literature

6.1 Markings

Point of entry regenerable well water filtration systems complying with this Standard shall be marked with the:

(a) Name of manufacturer or trademark;
(b) Type and model number of the device; and
(c) Influent water requirements including but not limited to dissolved oxygen, iron and manganese requirements.
(d) Service flow rate and pressure drop
(e) Performance claims

6.2 Visibility

Markings shall be permanent, legible, and visible after installation. The markings shall be either etched, cast, stamped or engraved on the body of the device or on a plate or sticker made of a corrosion resistant material securely attached to the device with a corrosion resistant means.

6.3 Installation Instructions

Point of entry regenerable well water filtration systems shall be accompanied by instructions or available online for their installation, care and maintenance, and repair, specifying at least the following:

(a) Requirements for Point of entry regenerable well water filtration systems, including;
- (i) Company Name and contact information
- (ii) Model Number
- (iii) Installation instructions
- (iv) Flushing instructions
- (v) Operation and maintenance instructions
- (vi) Min and max pressure requirements
- (vii) Min and max water temperature requirements
- (viii) Rated service flow and pressure drop
- (ix) Installation must comply with local plumbing codes including air gap drain connection
- (x) Frequency and procurement for arsenic testing
- (xi) Contaminant reduction claims including capacity

(b) Requirements for inlet water quality, including;
- (i) Minimum iron + manganese;
- (ii) Minimum dissolved oxygen;
- (iii) Maximum iron + manganese + hydrogen sulfide; and
- (iv) Maximum Arsenic III + Arsenic V.

Table 1
Challenge Water Specifications for Arsenic Reduction
(See Section 5.2.2)

Characteristic	Avg. Influent Range	Means to Adjust
pH[4]	6.5 ± 0.5	HCl or NaOH
pH[4]	8.5 ± 0.5	HCl or NaOH
Dissolved O_2	≥ 2 PPM (mg/L)	Source Water[5]
Temperature	70 ± 15 ºF (21 ± 6 ºC)	Heat or cool
Iron[2]	0.3 – 0.5 mg/L	Cl2FeH8O4
Manganese[2]	0.3 – 0.5 mg/L	$MnSO_4$
Arsenic (Trivalent)[1,3]	0.050 ± 10% mg/L 0.30 ± 10% mg/L	NaAsO2
Arsenic (Pentavalent)[1,3]	0.050 ± 10% mg/L 0.030 ± 10% mg/L	$Na_2HAsO_4 \cdot 7H_2O$
Hardness	5 – 10 gpg (85 – 171 mg/L)	$CaCl2 \cdot 2H_2O$

Notes
1 Individual influent sample points for arsenic concentration shall be allowed a range of ± 25%
2 Challenge water will be acceptable with either Iron or Manganese ranges separately or combined 0.3 PPM.
3.Challenge water can either include the 0.030 range or the 0.050.
4. Test shall be conducted at two pH ranges 6.5 and 8.5.
5 Dissolved oxygen can be increased by bubbling Oxygen through the challenge water.

Table 2
Challenge Water Specifications for Iron, Manganese, and Hydrogen Sulfide Reduction
(See Section 5.3.2)

Characteristic	Avg. Influent Range	Means to Adjust
pH	7.5 ± 0.5	HCl or NaOH
Dissolved O_2	≥ 2 PPM (mg/L)	Source Water
Temperature	70 ± 15 ºF (21 ± 6 ºC)	Heat or cool
Iron	3.5 ± 10% mg/L	Cl2FeH8O4
Manganese	1-2 ± 10% mg/L	$MnSO_4$
H_2S	0.9 – 1.1 mg/L	Na_2S
Hardness	5 – 10 gpg (85 – 171 mg/L)	$CaCl2 \cdot 2H_2O$

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