ISSUE PAPER

NSF standard(s) impacted: NSF/ANSI 53 – 2022 23, 7.2.6.5

Purpose and background:

Provide a one or two sentence statement explaining the purpose of your recommendation. Also please provide a brief background statement indicating the cause and nature of concern, the impacts identified relevant to public health, public understanding, etc., and any other reason why the issue should be considered by the Committee. Reference as appropriate any specific section(s) of the standard(s) that are related to the issue.

I am suggesting we re-evaluate the cation components of the make up water for PFAS Testing. I believe the water chemistry as outlined in the standard is scaling and will cause premature plugging of filters. I have seen this in my lab.

Recommendation:

Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of ~~strike-out~~ and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration, etc.

7.2.6.5 PFAS reduction test water

I am suggesting to change the cation mix of the make up water by adding Calcium. There should be a 2:1 Calcium to Magnesium ratio similar to the water softening industry test methods. For those filters prone to hardness fouling I suggest limiting total hardness to less than 1 grain per gallon (17.1 ppm).

I suggest using the following salts:
Calcium Chloride
Magnesium Sulfate
Sodium Sulfate
Sodium Bicarbonate
Sodium Chloride

Item #: DWTU-2024-11

(For NSF internal use)

Supplementary materials (photographs, diagrams, reports, etc.):

If not provided electronically, the submitter will be responsible to have sufficient copies to distribute to committee members.

Section 7.2.1.5 General - outlines the salts and methods used for making the test solution. Section 7.2.1.5 e) calls out 2 methods for adding Magnesium and Sodium Sulfate.

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Name:* Larry Gottlieb

Company: ResinTech

Telephone: 609-792-8189 Email: LGOTTLIEB@RESINTECH.COM

Submission date: 04/19/2024

Please submit to: Joint Committee Secretariat or to standards@nsf.org

**Type written name will suffice as signature*

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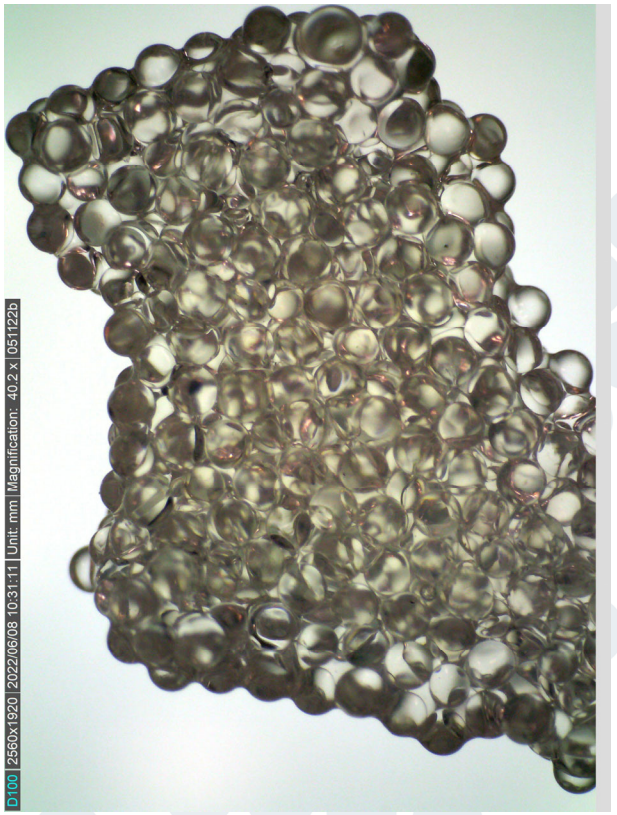
PFAS Filter Study: ANSI Water, PFOS and PFOS

Larry Gottlieb
ResinTech

RESINTECH® INC.
INNOVATIONS IN ION EXCHANGE

Hardness Fouling was observed in Carbon and Resin

- HARDNESS FOULING is precipitated Calcium and Magnesium Salts.
- Anion Exchange Resins Chorographically separate Anions into concentrated Layers
- Hard water passing through an Anion Exchange Bed can precipitate Sulfate and Carbonate Salts
- Temperature can play a role in solubility
- Pictured: A Clear Jelly like substance formed during testing causing high pressure drop.

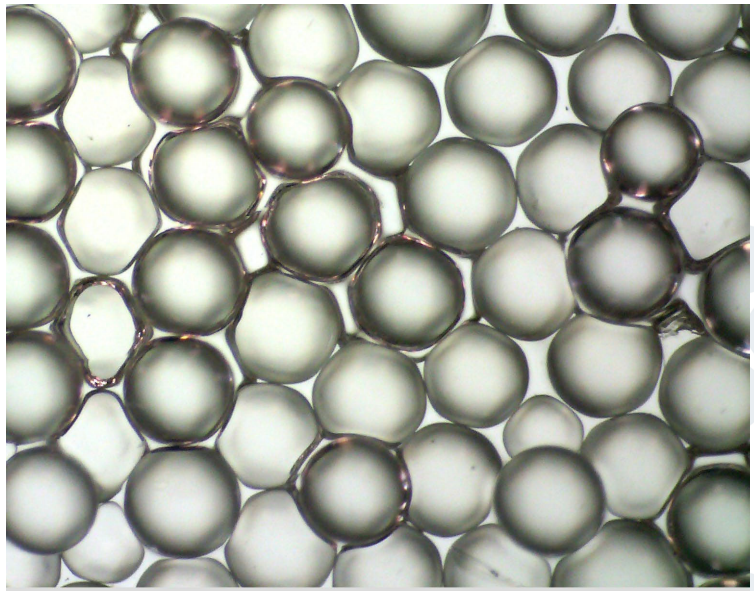


AIX Sulfate Fouling

- PFAS Resins will remove Nitrate, Sulfate, Alkalinity and silica.
- Sulfate Precipitation causes fouling aka high pressure drop
- Pictured is Granular Activated Carbon with the same Clear, Jelly like precipitate.

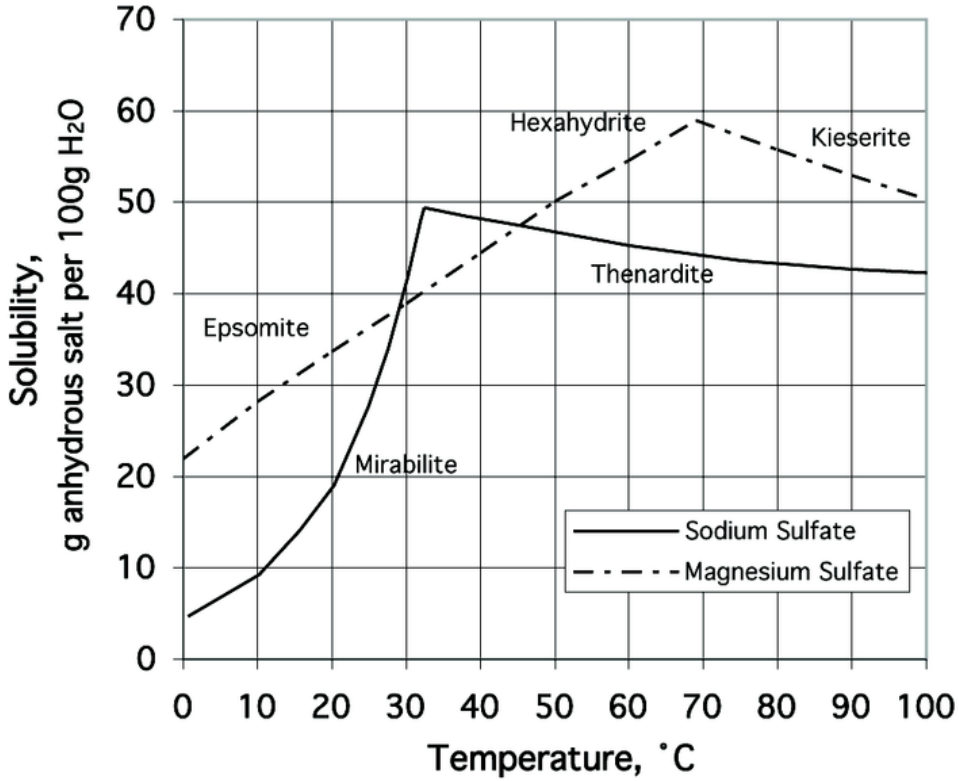
ANSI PFAS Test Water Analysis, Made Per The Standard

Parameter	Result	Units	Percent
pH	7.3	SU	
PFOS	563	ppt	
PFOA	1016	ppt	
Conductivity	1038	Micromho/cm	
Cations			
Sodium	217	ppm as CaCO3	34%
Magnesium	416	ppm as CaCO3	66%
Calcium	0	ppm as CaCO3	0%
TOTAL	633		
Anions			
Alkalinity	200	ppm as CaCO3	34%
Chloride	162	ppm as CaCO3	27%
Sulfate	229	ppm as CaCO3	39%
TOTAL	591		
Accuracy	**6.64%**		



AIX Sulfate Fouling

- AIX in the Sulfate form has a concentration of 49,000 ppm.
- Sodium Sulfate ppt occurs between 5,000 and 500,000 ppm depending on the water temperature
- Magnesium Sulfate ppt starts at 22,000 ppm
- Calcium Sulfate is NOT SOLUBLE



AIX Sulfate Fouling

PFOS Column Fouling Analysis

- Cations were unfortunately not tested.
- 66% of the cations are Magnesium
- The assumption is Magnesium Sulfate

Analyte	Concentration, ppm
Fluoride	ND
Chloride	ND
Nitrite	ND
Bromide	ND
Nitrate	ND
Phosphate	ND
Sulfate	267,427

Discussion

Modify the standard?

- Consider the Cation Make up and concentrations when preparing the test solution.

Questions ?

RESIN TECH INC.
INNOVATIONS IN ION EXCHANGE

Larry Gottlieb
President and CTO
856.768.9600
www.resintech.com