

PUREFLOW[®] FILTRATION DIVISION

PFAS AND PFOS TREATMENT SYSTEMS DESIGN DATA BULLETIN

INTRODUCTION

PFAS and PFOS are acronyms that refer to per and polyfluoroalkyl substances that are a diverse group of compounds that are man - made toxic Teflon chemicals resistant to heat, water and oil. They have been widely used for decades in hundreds of industrial applications and consumer products such as non-stick pans, firefighting foam used on military bases, carpeting, apparels, upholstery, food, paper wrappings and metal plating.

PFAS chemicals are linked to cancers, kidney disorders and more, and are estimated to be in the drinking water of more than 110 million people in the United States. The most commonly found and best studied PFAS are perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). PFAS do not readily breakdown in the environment and are water soluble. As a result, there are very low levels of PFAS in many areas of the environment. Higher levels can be found in water supplies near facilities that manufactured, disposed or used PFAS.

The Environment Protection Agency (EPA) has found that the following technologies are effective in removing PFAS from water; activated carbon treatment, ion exchange resins and high pressure membranes such as nanofiltration and reverse osmosis.

The general information, water quality and ionic balance data requested in this bulletin will provide us with the information essential to the proper design of the process best suited to remove the PFAS from your water supply. The field and laboratory tests requested must be performed by qualified personnel with appropriate water quality test equipment. We suggest that an independent certified laboratory perform all of the required tests to ensure accuracy.

Please provide the following test data for each water supply to be treated and return to Pureflow Filtration for evaluation in preparing our water treatment design.

WATER QUALITY TEST PROCEDURES:

- a) **Laboratory Test Reports.** All field raw and filtered water samples must be marked with the source data, date and time the sample is taken. Laboratory water quality test samples must also include the source, date and time that each sample was taken.
- b) **Sample Bottles.** Must meet AWWA standards and should be supplied by the laboratory performing the tests. Three, one (1) quart, bottles are to be marked with source, date, time, sample category (Turbidity, Color, Iron, Manganese, Gen. Mineral, T.O.C., etc.) and customer name.
- c) **Heavy Metals Analysis Sample.** Iron, Manganese, Cadmium, Zinc, and other contaminants such as Arsenic, etc. are to be collected in acid washed glass or plastic bottles. Adjust pH to 2 or less with approximately 2 ml of nitric acid per liter to prevent any metals from plating out on the bottle. If raw water is highly buffered it may require more acid. **Atomic Absorption** method should be used for these tests.
- d) **General Mineral Analysis Sample.** Should **not** be acidified. If it is acidified it will alter the pH and bicarbonate/carbonate values.

Note: The general mineral analysis sample will be used to analyze for anions, cations, pH, and Langelier Saturation Index.
- e) **Total Organic Carbon Sample.** A glass bottle with a teflon lid is required for T.O.C. samples. Refrigerate, or add hydrochloric acid to a pH less than 2.0.
- f) **On-site Testing.** Hydrogen sulfide, carbon dioxide, and pH should be determined on-site because of the volatility of these gases and their effect on pH. The "Standard Methods" test utilizing methylene blue is acceptable for hydrogen sulfide determination. Carbon dioxide levels can be determined in the field by the titrimetric method. However, this test should be confirmed by the nomographic method in a laboratory. pH should be determined by the glass electrode method. **Note: pH tests are to be made at the W.T.P. (or well sites), and in the laboratory.**

TESTS TO BE PERFORMED AT W.T.P. (OR OTHER SOURCE)

Hydrogen Sulfide (H₂S) _____ mg/l Carbon Dioxide (CO₂) _____ mg/l pH _____
 Ground Water Temperature _____ °F Storage Water Temperature _____ °F Turbidity _____ NTU

- g) After examining the above data, additional testing may be required to verify data. If sufficient data cannot be determined by standard test methods, additional special laboratory tests may be required.
- h) Refer to "Standard Methods for the Examination of Water and Wastewater" for additional information regarding analytical protocols.
- i) After complete, accurate, and representative water quality data is obtained an on-site field pilot study is strongly recommended. Please consult Pureflow® Filtration Div. for information regarding a membrane system pilot study, report and process proposal.

Project Name: _____ Water Source: _____

Min. Flow _____ gpm Max. Flow _____ gpm Flow equalization/blending Tank Yes No

Working Pres. _____ psi Static Pres. _____ psi Reservoir capacity _____ gal

• Concentrate water disposal to: Reclaim tank Sewer Drying bed Other specify _____

• No. of water sources to be treated: _____ **NOTE: Fill out one form for each raw water source**

• New W.T.P.: Yes No Will R.O. system operate continuously 24/7 Yes No Hours/days operation _____

• Days/weeks operation _____ • Outdoor installation Yes No • Indoor installation Yes No

• Outdoor temp. _____ °F (Min.) _____ °F (Max.) • Elevation at well/treatment site _____ ft.

PUREFLOW FILTRATION DIV.
IONIC BALANCE CALCULATOR

Client: _____ Date: _____

Project: _____ Consulting Engineer: _____

Cations		mg/L	meq/L	as CaCO ₃
Calcium	Ca ²⁺			
Magnesium	Mg ²⁺			
Sodium	Na ⁺			
Potassium	K ⁺			
Ammonia	NH ₄ ⁺			
Strontium	Sr ²⁺			
Barium	Ba ²⁺			
Aluminum	Al ³⁺			
Iron	Fe ²⁺			
Manganese	Mn ²⁺			
Totals				

Anions		mg/L	meq/L	as CaCO ₃
Carbonate	CO ₃ ²⁻			
Bicarbonate	HCO ₃ ⁻			
Sulfate	SO ₄ ²⁻			
Chloride	Cl ⁻			
Nitrate*	NO ₃ ⁻			
Phosphate	PO ₄ ⁻³			
Fluoride	F ⁻			
Totals				

* as Nitrate – Multiply N by 4.4285 to obtain Nitrate

Other	Silica (SiO ₂)	<input type="text"/>	mg/L	Total TDS	<input type="text"/>	mg/L
	pH	<input type="text"/>	Units	Total Alkalinity	<input type="text"/>	as CaCO ₃
	Temperature	<input type="text"/>	degrees C.			
	TOC	<input type="text"/>	mg/L			
	Conductivity	<input type="text"/>	uS/cm			

ADDITIONAL ANALYSIS DATA

- Total PFAS _____ PPT
- Total PFOA _____ PPT
- Total PFOS _____ PPT
- PFAS Speciation _____

	mg/L	µg/L
• Total Organic Carbon (TOC)	_____	_____
• Total Petroleum Hydrocarbons (T.P.H.)	_____	_____
• Silica (SiO ₂)	_____	_____
• Chemical Oxidation Demand (C.O.D.)	_____	_____
• Biological Oxidation Demand (B.O.D.)	_____	_____
• Oil and Grease	_____	_____
• Zinc (Zn)	_____	_____
• Copper (Cu)	_____	_____
• Nickel (Ni)	_____	_____
• Lead (Pb)	_____	_____
• Chromium (Total) (Cr)	_____	_____
• Chromium (Hexavalent) (CrVI)	_____	_____
• Total Kjeldahl Nitrogen (TKN)	_____	_____
• Total Suspended Solids (T.S.S.)	_____	_____

Local Representative

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