Pureflow FILTRATION SYSTEMS

FLUORIDE REMOVAL

GENERAL MINERAL ANALYSIS

AND

DESIGN DATA BULLETIN

Dissolved fluoride usually occurs in water supplies as compounds of calcium-fluoride-phosphate. Well waters generally have higher fluoride concentrations than surface waters due to the fact that they have greater exposure to fluoride bearing minerals. The USEPA has established regional maximum contaminant levels (MCL) for fluoride that are based on the probable daily ingestion of water. The optimum fluoride level established by the U.S. Public Health Service is one half of the MCL.

Due to the natural affinity of fluoride ions for calcium, there is a complex interaction between ingested fluoride and skeletal components. Dental fluorosis is recognized as a direct result of ingestion of water with fluoride content exceeding the MCL by children up to twelve years old. It can vary from mild discoloration of the tooth enamel to severe embrittlement of the tooth structure. Fluoride toxicosis can cause serious bone deterioration.

Fluoride can be efficiently removed from potable water to levels below the EPA and Health Department standards, when complete and accurate water quality data is available.

The General Mineral Analysis and Design information requested in this bulletin will provide us with the water quality information that is required to ensure that the test data provided to Pureflow© is accurate and complete. This data is essential for the proper design of the pretreatment, process, and regeneration systems. The field and laboratory tests 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. **Please complete the following test data form for each water supply to be treated, and return to Pureflow© for evaluation in preparing our system design and quotation**

TEST PROCEDURES:

a) Laboratory Test Reports. All raw and filtered water samples must be marked with Well No., date and time the sample is taken. Laboratory water quality test results must also include the 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 Well No., date, sample category (Heavy Metal, Gen. Mineral, T.O.C.) and customer name.

c) Heavy Metals Analysis Sample. Iron, Manganese, Cadmium, Zinc, etc. samples 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 (including fluoride). Should **not** be acidified. If it is acidified it will alter the bicarbonate/carbonate values.

Note: This sample will be used to analyze for anions, cations, and pH.

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 well site, and in the laboratory.**

TESTS TO BE PERFORMED AT WELL SITE

Hydrogen Sulfide (H_2S)_____mg/l Carbon Dioxide (CO_2) _____mg/l pH_____

Ground Water Temperature _____^oF Storage Water Temperature _____^oF Turbidity_____NTU

Chlorine Demand_____mg/l (Break point curve with Free and Total Cl_2)

g) After examining the above data, additional testing may be required to verify data. If sufficient data can not 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.

NOTES:

1) Please provide schematic drawing of system including well(s), distribution main, reservoir, and proposed treatment plant site plot plan. Include minimum and maximum gal. of water stored in reservoir, and maximum water flow (gpm) from main that can be used to backwash filter.

2) If complete, accurate, and representative sample test data can not be obtained, an on-site, continuous flow, pilot study may be required. Please consult Pureflow© for information regarding our skid mounted Pureflow© Pilot Plant.

3) Treated well water is normally used to backwash/regenerate the media. However, if the Pureflow© media is to be backwashed from the filtered water main, the hydraulic parameters (flow, pressure, velocity, etc.) must be evaluated by the Municipal Project Engineer, and/or Consulting Engineer, to ensure that the required backwash/regeneration water is available from the distribution system, and that the water main is properly sized to deliver the flow and pressure required. If the water main can not supply sufficient flow and pressure, a separate backwash water holding tank and pump may be required.

Customer	Consulting Engineer
Address	Address
City State Zip Code	City State Zip Code
(____) _____ (____) _____ Telephone No.	(____) _____ (____) _____ Telephone No.
e-mail address	e-mail address
Project Engineer	Project Engineer

GENERAL INFORMATION

Project Name _____ Well No. _____ Date: _____

Min. Flow_____gpm Max. Flow_____gpm Constant Speed Pump ☐ Yes ☐ No

Working Pres._____psi Static Pres._____psi Reservoir Capacity_____gal

Backwash/Regen water source: ☐ From well ☐ From water main ☐ From tank...See Note k, Page 2

Backwash/Regen water disposal to: ☐ Sewer ☐ Drying Bed ☐ Holding Tank ☐ Other (Specify)

Backwash/Regen water reclamation system required: ☐ Yes ☐ No Water Main Size _____in.

No. of wells to be filtered _____ **NOTE: Fill out one form per well**

New well: ☐ Yes ☐ No Well flow rate when samples taken _____gpm
How long was well continuously pumped before samples were taken?

GENERAL MINERAL ANALYSIS

CATIONS	**mg/l**	**meq/l**	**ANIONS**	**mg/l**	**meq/l**
Total Hardness (as $CaCO_3$)	_____		Total Alkalinity (as $CaCO_3$)	_____	
Calcium (Ca)	_____	_____	Hydroxide (OH)	_____	_____
Magnesium (Mg)	_____	_____	Carbonate (CO_3)	_____	_____
Sodium (Na)	_____	_____	Bicarbonate (HCO_3)	_____	_____
Potassium (K)	_____	_____	Sulfate (SO_4)	_____	_____
			Chloride (Cl)	_____	_____
			Nitrate (NO_3)	_____	_____
			Fluoride (F)	_____	_____
Total Cations			**Total Anions**		
Milliequivalents/Liter	_____	_____	Milliequivalents/Liter		_____
			Phenolphthalein		
Total Dis.Solids (TDS)	_____	_____	Alkalinity (P) (As $CaCO_3$)	_____	_____
Conductivity (µS/CM)_____					

INORGANIC ANALYSIS

Aluminum (Al)	_____	Lead (Pb)	_____
Arsenic (As)	_____	Manganese (Mn)	_____
Barium (Ba)	_____	Mercury (Hg)	_____
Cadmium (Cd)	_____	Selenium (Se)	_____
Chromium (Total Cr)	_____	Silver (Ag)	_____
Copper (Cu)	_____	Zinc (Zn)	_____
Iron (Fe)	_____		

(Continued on Next Page)

ADDITIONAL ANALYSIS

	mg/l	meq/l		
Total Organic Carbon (TOC)	_____	_____	Odor Threshold (TON) at 60°C	_____ Units
Trihalomethanes (THM)	_____	_____	Apparent Color (unfiltered)	_____ Units
Ammonia (NH_3)	_____	_____	pH (Laboratory)	_____
Silica (Si)	_____	_____	Turbidity (Laboratory)	_____ N.T.U.
			Radon (Rn)_____pCi/L	

Langelier Index:_____ @ Operating Temp. of Well; and _____ @ 140°F

SOURCE OF WATER SAMPLE

☐ Production Well No. _____ ☐ Pilot / Test Well No. _____

NOTES: _____

_____

_____

_____

_____

Local Representative

Pureflow FILTRATION SYSTEMS

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Purveyors to the Water/Wastewater Industry Since 1972