e-sens Roam™

Summary of Measured Chemical Parameters

Parameter	Operating Range
Sample Temperature	2.0 – 45.0 °C
Temperature of the collected water sample.	
Affects water chemistry. Higher temperature increases rate of chemical reactions.	
pH	5.00 - 11.00
Indicates basicity/acidity on a scale of 0 to 14, where a pH of 7 is neutral.	
Controlled to maintain pipes throughout distribution system. Low pH can cause corrosion and allow transport of certain pollutants. See *Langelier Saturation Index* and *Ryznar Stability Index*.	
ORP	-1000 - 2000 mV
Oxidation-reduction potential. Depends on presence of chemical oxidants, such as chlorine.	
Signals general sanitization level. Large changes can indicate presence of contaminants.	
Conductivity	50 - 2500 µS/cm
Ability to pass an electric current. A measure of ionic strength or salinity.	
Out-of-the-ordinary measurements can indicate the appearance of new pollutants.	
Total Dissolved Solids	25 - 1250 mg/L
Combined total of organic and inorganic substances dissolved in the water. Everything but the water.	
Can affect taste and indicate overall quality.	
Free Chlorine	0.07 - 5.00 mg/L
Amount of *chlorine* in the forms of hypochlorous acid, HOCl, and hypochlorite ions, OCl^-.	
Disinfection agent added during treatment and maintained throughout the distribution system.	
Monochloramine	0.07 - 5.00 mg/L
Product of *free chlorine* and *free ammonia*, NH_2Cl.	
A more stable disinfection agent than *free chlorine*, created by reacting *free chlorine* with *free ammonia* during the treatment process.	
Total Chlorine	0.07 - 5.00 mg/L
The total amount of *free chlorine*, *monochloramine*, and other *chloramines*.	
Indicator of sanitization level, a minimum level is maintained to protect against pathogens.	

Parameter	Operating Range
Ammonium	0.07 - 5 mg/L
The amount of NH_4^+ ions. Formation favored at low pH values.	
High levels can indicate pollution and lead to microbial growth.	
Free Ammonia	0.07 - 5 mg/L
The total amount of NH_3 molecules and NH_4^+ ions. Ratio is dependent on pH and Temperature.	
High levels can cause taste and odor issues and promote nitrifying bacteria. *Free ammonia* is naturally occurring and may added with *free chorine* to form *monochloramine* for disinfection.	
Total Ammonia	0.07 - 5 mg/L
The total amount of NH_4^+ ions, NH_3 molecules, and ammonia bound in *monochloramine*.	
Breakdown of *monochloramine* over time will increase levels of *free ammonia*, up to the difference between *total* and *free ammonia*.	
Chlorine to Ammonia Ratio	0.01 – 100.0
Weight ratio of chlorine to ammonia.	
Important for water treatment process control. For *chloramine* disinfection, a ratio below 5 indicates more *ammonia* is needed to create *monochloramine*.	
Nitrification Capacity	0.07 – 10.0 mg/L
Amount of Nitrate (as Nitrogen) that can be formed by oxidation of all sources of reactive Nitrogen.	
Worst case increase of Nitrate if a Nitrification event were to occur. Does not include any existing Nitrate in the sample.	
Calcium Hardness	5 - 1000 mg/L
The total amount of dissolved calcium in water, reported as $CaCO_3$.	
Important mineral for good health. Overall water makeup may lead to scaling or corrosion in pipes, fixtures, and appliances. See *Langelier Saturation Index* and *Ryznar Stability Index*.	
Total Hardness	5 - 1000 mg/L
The amount of dissolved calcium together with dissolved magnesium in water.	
Important parameter for good health. Overall water makeup may lead to scaling or corrosion in pipes, fixtures, and appliances. See *Langelier Saturation Index* and *Ryznar Stability Index*.	
Ionic Calcium	3 - 400 mg/L
The amount of unbound calcium in the form Ca^{2+}.	
Important mineral for good health. Overall water makeup may lead to scaling or corrosion in pipes, fixtures, and appliances. See *Langelier Saturation Index* and *Ryznar Stability Index*.	
Dissolved Carbon Dioxide	0.05 - 50 mg/L
The amount of dissolved carbon dioxide gas in water.	
High levels can lead to corrosion and damage of pipes and fixtures.	
Total Alkalinity	10 - 325 mg/L

Parameter	Operating Range
Measurement of the water's ability to resist changes to pH.	
Higher alkalinity leads to more stable pH values. Combined with pH, can be used to determine carbon makeup in water.	
Bicarbonate Alkalinity	10 – 325 mg/L
Amount of alkalinity in the form of bicarbonate ions (HCO_3^-).	
Major component of total alkalinity. Helps buffer the water against pH changes. Important for understanding the water's capacity to neutralize acids and maintain stable conditions.	
Langelier Saturation Index	-10 - 10.00
Approximate indicator of saturation of calcium carbonate, $CaCO_3$ in water.	
Negative values indicate tendency for corrosion. Positive values indicate tendency for scaling.	
Ryznar Stability Index	0 - 12.00
Indicator of saturation of calcium carbonate, $CaCO_3$ in water.	
Values below 6.2 lead to scaling. Values above 6.8 lead to corrosion.	
Dissolved Inorganic Carbon	1.0 - 200 mg/L
The total amount of inorganic carbon compounds dissolved in the water.	
Can affect water's tendency for corrosion.	
Aggressive Index	7.00-15.00
Indicator of the corrosiveness of water based on pH, alkalinity, and hardness.	
Values below 10 suggest potentially corrosive water. Values above 12 indicate non-aggressive, scale-forming water. Used to assess the likelihood of pipe corrosion or scaling.	

Website sources:

1. Temperature
   https://www.usgs.gov/special-topics/water-science-school/science/temperature-and-water#overview
2. pH
   https://www.epa.gov/caddis-vol2/ph
3. Conductivity
   https://www.epa.gov/national-aquatic-resource-surveys/indicators-conductivity
4. Total Dissolved Solids
   https://www.epa.gov/sdwa/secondary-drinking-water-standards-guidance-nuisance-chemicals
5. Free Chlorine
   https://www.cdc.gov/healthywater/global/household-water-treatment/chlorine-residual-testing.html
6. Monochloramine
   https://www.cdc.gov/healthywater/drinking/public/water_disinfection.html
7. Ammonium
   https://www.epa.gov/caddis-vol2/ammonia
8. Nitrification potential
   https://www.epa.gov/sites/default/files/2015-09/documents/nitrification_1.pdf
9. Hardness
   https://www.usgs.gov/special-topics/water-science-school/science/hardness-water#overview
10. Alkalinity
    https://www.usgs.gov/special-topics/water-science-school/science/alkalinity-and-water#overview