

EQUATION RO

2 in 1 Corrosion and Scale Inhibitor for water Reverse Osmosis and desalination plants



DESCRIPTION & APPLICATION

EQUATION RO was developed by atomes. Main field of application is the treatment of scale and corrosion prevention in the Reverse Osmosis (RO). Its applied at low dosage rate between 0.5 ppm to 5 ppm

EQUATION RO is a highly effective scale and corrosion inhibitors and is a unique blend of sequestering agents at pH Neutral.

APPROVALS

- Canadian Food Inspection Agency
- Health Canada
- Eco-Seal Certified

SCALE INHIBITION

EQUATION RO has proved highly effective as a threshold inhibitor. Very low additions (ppm range), i.e. in far less than sub-stoichiometric concentrations (calculated on the hardness of the water), prevent the formation of scale and incrustations, respectively. Even water which is highly over-saturated with hardness constituents such as calcium carbonate remain without scale when **EQUATION RO** is added.

CORROSION INHIBITION

Under the conditions found in cooling water, **EQUATION RO** is a good corrosion inhibitor for carbon steel. In the case of relatively soft water, it is common to combine **EQUATION RO** with synergistic substances (phosphates, zinc salts). In water of higher hardness or with sufficiently high alkalinity (approx. 300 mg/l or more, calculated as calcium carbonate), **EQUATION RO** and no inorganic components – known as all-organic formulations – are highly effective.

CHARACTERISTICS

Physical form: clear, colorless to yellowish, low-viscous, almost odorless liquid
pH (0.5% solution): ~ 7.00

THE TECHNOLOGY

EQUATION RO is composed of 4 chelating agents working together in synergy to chelate inorganic metal ions.

The first chelating agent is a multifunctional molecule offering combination properties of polyphosphates and amino-Carboxylate sequestering agent. It has excellent thermal hydrolytic stability compared to polyphosphates. It has low content of phosphoric, has structural features of both phosphoric acid and carboxylic acid group, which enable its excellent scale and corrosion inhibition properties. Its antiscalant property is far better than that of organophosphines. It can improve zinc salt solubility, has good chlorine oxidation tolerance and good composite synergy. Its designed to control high silica content in ROs specially in desalination plants where flux decline and increases pressure difference and salt passage. It will disperse the silica and remove both amorphous and crystalline forms.

The second agent is a corrosion inhibitor. It can chelate with Fe, Cu, and Zn ions to form stable chelating compounds. It can dissolve the oxidized materials on these metals' surfaces. It shows excellent scale and corrosion inhibition effects under temperature 250°C. It has good chemical stability under high pH value, hard to be hydrolyzed, and hard to be decomposed under ordinary light and heat conditions. Its acid/alkali and chlorine oxidation tolerance are better than that of other acids (salt). It can react with metal ions in water system to form hexa-element chelating complex, with calcium ion in particular. Therefore, it has good antiscalant and visible threshold effects. When built together with other water treatment chemicals, it shows good synergistic effects. It is used as scale and corrosion inhibition in the RO. The dosage of 0.5-5mg/L is preferred as scale inhibitor and as corrosion inhibitor. At 1000-2000mg/L can be used as detergent.

The third agent is a polyamino carboxylic acid and is used as a chelating agent which forms coordination compounds with metal ions (chelates) such as Ca²⁺, Cu²⁺ or Fe³⁺.

The fourth agent is a polyamino carboxylic acid with the formula [CH₂N(CH₂CO₂H)₂]₂. Its usefulness arises because of its role as a chelating agent, i.e. its ability to "sequester" metal ions such as Ca²⁺ and Fe³⁺.

	Chelation Scope of work	Controls
Agent #1	Combination of polyphosphates and amino-Carboxylate	All types of scales including Calcium, Magnesium, Zinc, Silica
Agent #2	Bio-Micropolymer as corrosion inhibitor	All types including Fe, Cu, Zn etc.
Agent #3	polyamino carboxylic acid (Simple)	Chelates All types of ion metals Ca ²⁺ , Cu ²⁺ or Fe ³⁺ . etc.
Agent #4	polyamino carboxylic acid (Complex)	Sequester All types of ion metals Ca ²⁺ , Cu ²⁺ or Fe ³⁺ . etc.



UNIQUE

ADVANTAGES

- Unique
- Concentrated formula
- Approved by CFIA, Health Canada & Eco-Seal
- Easy to administer single product
- Economical & Excellent for scale control & removal
- Prevents corrosion
- Simple to test product
- Threshold, Sequestering, Deflocculating effects
- Hydrolytic & chlorine stability
- Low phosphorus content
- High efficiency at low dosage rates
- Fast acting
- Biodegradable
- Safe, Non-toxic and non-harsh
- Non-corrosive
- Non-carcinogenic