Nouryon

Aquatreat® AR 888 scale inhibitor

Eliminate additional dispersants and lower your formulation toxicity and costs with our "non-P" Aquatreat® AR 888 scale inhibitor for calcium carbonate.

Benefits

- Superior "non-P" calcium carbonate scale inhibitor in high LSI conditions
- Optimized molecular weight
- Cost savings by reducing dispersant polymer dosage
- Lower formulation toxicity
- Compared to competitive maleic homopolymers
  - Extremely low toxicity
  - Stronger calcium sulfate performance
  - Better iron tolerance
  - Easier formulation
  - Equal bleach stability

Applications

- Cooling towers
- Mining
- Oilfield

Calcium carbonate scale inhibition

Aquatreat® AR 888 scale inhibitor utilizes all three polymer scale inhibition mechanisms (threshold inhibition, dispersion, and crystal modification) to provide unmatched performance.

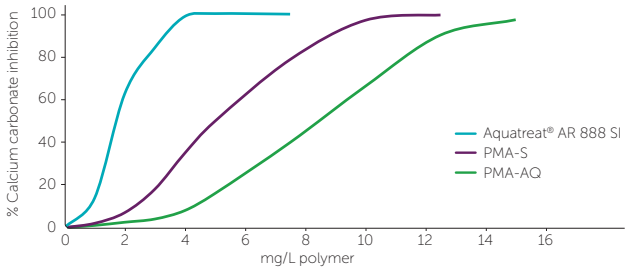
Threshold inhibition

In a static calcium carbonate test (Figure 1), Aquatreat® AR 888 scale inhibitor provides the minimum acceptable inhibition level of 90% at a dosage of 4 ppm. The competitive solvent maleic homopolymer required twice the dosage and the competitive aqueous maleic needed three times the dosage to achieve the same 90% inhibition.

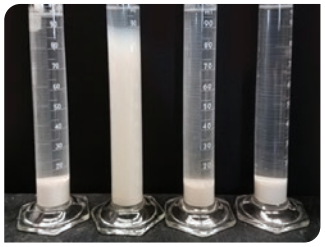
Calcium carbonate static test conditions

Ca	300 mg/L as $CaCO_3$ (120 mg/L as Ca)
Mg	147.6mg/L Mg as $CaCO_3$ (36 mg/L as Mg)
Bicarbonate	350 mg/L as $CaCO_3$ (427 mg/L as HCO_3^-)
Carbonate	80 mg/L as $CaCO_3$ (48 mg/L as CO_3^{-2})
pH	8.7-8.9
Temperature	50°C
Time elapsed	17 hours

Figure 1: Static test



Dispersion



Control (No polymer) | Aquatreat® AR 888 SI | PMA-AQ | PMA-S

Dispersion is an important scale control mechanism, keeping any formed scale suspended in the bulk water and preventing deposition onto heat transfer surfaces. Our Aquatreat® AR 888 scale inhibitor was designed to have an optimal molecular weight for dispersion of scale as well as other particles found in process water. The picture to the right shows the superior suspension of clay provided as compared to maleic homopolymers.

Crystal modification

Aquatreat® AR 888 scale inhibitor absorbs onto forming calcium carbonate crystalline surfaces to distort the shape of the growing crystal. Modified crystals are less likely to adhere to each other and to surfaces, so heat transfer surfaces stay clean and efficient. The crystal growth modification properties of our scale inhibitor are superior to that of solvent and aqueous PMA, as seen in the micrographs below. The crystal structure is completely distorted by our Aquatreat® AR 888 scale inhibitor, making it difficult to build on itself and therefore unlikely to adhere to surfaces.

Aqueous maleic

Solvent maleic

Aquatreat® AR 888 scale inhibitor

Additional testing

Conditions for dynamic testing per cycle of concentration

Ca	100.0 mg/L Ca as $CaCO_3$ (40 mg/L as Ca)
Mg	49.2mg/L Mg as $CaCO_3$ (12 mg/L as Mg)
Bicarbonate	74 mg/L as $CaCO_3$ (90 mg/L as HCO_3^-)
Carbonate	447 mg/L as $CaCO_3$ (268 mg/L as CO_3^{-2})
Fe	0.5 mg/L
pH	8.8-8.9
Temperature	43-44°C
Polymer concentration (active)	10 mg/L

Bleach stability test conditions

Ca	300 mg/L as $CaCO_3$ (120 mg/L as Ca)
Mg	147.6 mg/L Mg as $CaCO_3$ (36 mg/L as Mg)
Bicarbonate	350 mg/L as $CaCO_3$ (427 mg/L as HCO_3^-)
Carbonate	80 mg/L as $CaCO_3$ (48 mg/L as CO_3^{-2})
pH	8.7-8.9
Temperature	50°C
Time elapsed	17 hours
Halogen	1 mg/L chlorine

Calcium sulfate test conditions

Ca	3400 mg/L
Sulfate	8470 mg/L
pH	8.4-8.6
Temperature	50°C
Time elapsed	17 hours

Toxicity

OECD 202 Daphnia: LC_{50} 2782 mg/L

OECD 236 96h Fish Embryo/Sac Fry: LC_{50} ~3000 mg/L

Contact us directly for detailed product information and sample requests
website | nouryon.com/markets/water-treatment
email | watertreatment@nouryon.com

Specifications

% solids: 40-42

pH: 2.5-3.5

Figure 2: Dynamic test

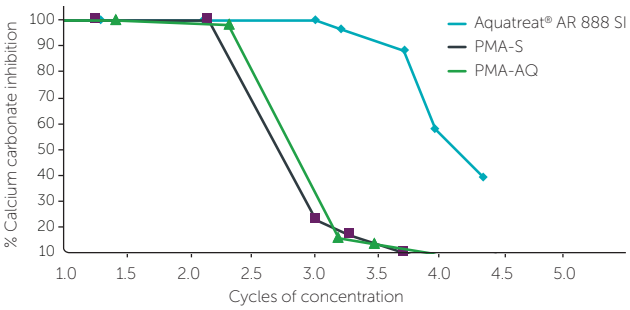


Figure 3: Bleach stability test

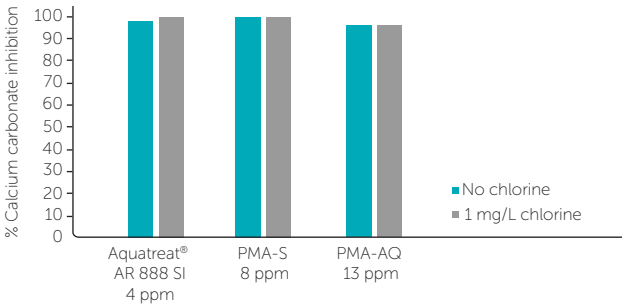
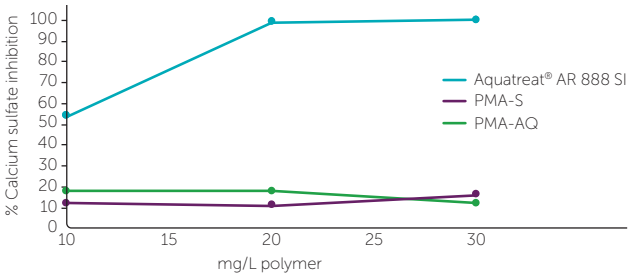


Figure 4: Calcium sulfate inhibition test



Aquatreat® AR 888 scale inhibitor

- is an efficient calcium carbonate inhibitor with low toxicity.
- is superior to competitive maleic homopolymers with regards to dispersancy, crystal modification, and calcium sulfate inhibition.
- can eliminate the need for additional dispersant polymers in formulations.

Nouryon

Nouryon is a global, specialty chemicals leader. Markets and consumers worldwide rely on our essential solutions to manufacture everyday products, such as personal care, cleaning goods, paints and coatings, agriculture and food, pharmaceuticals, and building products. Furthermore, the dedication of approximately 8,300 employees with a shared commitment to our customers, business growth, safety, sustainability and innovation has resulted in a consistently strong financial performance. We operate in over 80 countries around the world with a portfolio of industry-leading brands. Visit our website and follow us @Nouryon and on LinkedIn.

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