



## Aquatreat<sup>®</sup> AR-888

Aquatreat AR-888 is a superior “non-P” calcium carbonate scale inhibitor in high LSI conditions with extremely low toxicity compared to competitive products. Aquatreat AR-888 eliminates the need for an additional dispersant in formulations, due to its optimized molecular weight.

### Benefits

- Superior “non-P” calcium carbonate scale inhibitor in high LSI conditions
- Reduced polymer dosage to save money and reduce formulation toxicity
- Lower formulation costs by eliminating additional dispersant in formulations
- 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 utilizes all three polymer scale inhibition mechanisms (threshold inhibition, dispersion, and crystal modification) to provide unmatched performance.

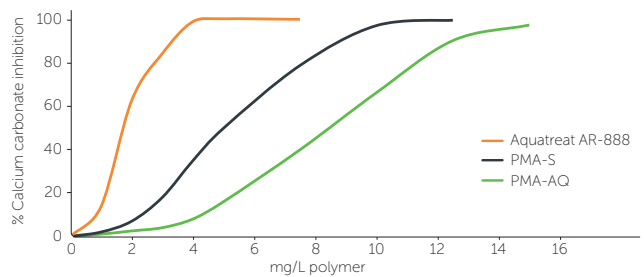
### Threshold inhibition

In a static calcium carbonate test (Figure 1), Aquatreat AR-888 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

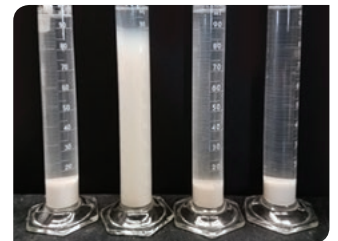
Ca	300 mg/L as CaCO <sub>3</sub> (120 mg/L as Ca)
Mg	147.6mg/L Mg as CaCO <sub>3</sub> (36 mg/L as Mg)
Bicarbonate	350 mg/L as CaCO <sub>3</sub> (427 mg/L as HCO <sub>3</sub> <sup>-</sup> )
Carbonate	80 mg/L as CaCO <sub>3</sub> (48 mg/L as CO <sub>3</sub> <sup>2-</sup> )
pH	8.7-8.9
Temperature	50°C
Time elapsed	17 hours

Figure 1: Static test



### Dispersion

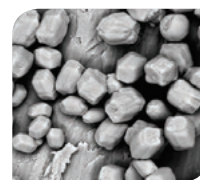
Dispersion is an important scale control mechanism, keeping any formed scale suspended in the bulk water and preventing deposition onto heat transfer surfaces. Aquatreat AR-888 was designed to have an optimal molecular weight for dispersion of scale as well as other particles found in process water.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



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

### Crystal modification

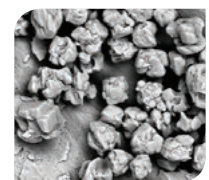
Aquatreat AR-888 adsorbs onto forming calcium carbonate crystalline surfaces to distort the shape of the growing crystal. Modified crystals are less likely to adhere to each other and to surfaces, so heat transfer surfaces stay clean and efficient. The crystal growth modification properties of Aquatreat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



Aqueous maleic



Solvent maleic



Aquatreat AR-888

## Additional testing

### Conditions for dynamic testing per cycle of concentration

Ca	100.0 mg/L Ca as CaCO <sub>3</sub> (40 mg/L as Ca)
Mg	49.2mg/L Mg as CaCO <sub>3</sub> (12 mg/L as Mg)
Bicarbonate	74 mg/L as CaCO <sub>3</sub> (90 mg/L as HCO <sub>3</sub> <sup>-</sup> )
Carbonate	447 mg/L as CaCO <sub>3</sub> (268 mg/L as CO <sub>3</sub> <sup>-2</sup> )
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 <sub>3</sub> (120 mg/L as Ca)
Mg	147.6 mg/L Mg as CaCO <sub>3</sub> (36 mg/L as Mg)
Bicarbonate	350 mg/L as CaCO <sub>3</sub> (427 mg/L as HCO <sub>3</sub> <sup>-</sup> )
Carbonate	80 mg/L as CaCO <sub>3</sub> (48 mg/L as CO <sub>3</sub> <sup>-2</sup> )
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<sub>50</sub> 2782 mg/L

OECD 236 96h Fish Embryo/Sac Fry: LC<sub>50</sub> ~3000 mg/L

## Specifications

% solids: 40-42

pH: 2.5-3.5

## Contact us directly for detailed product information and sample requests.

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Figure 2: Dynamic test

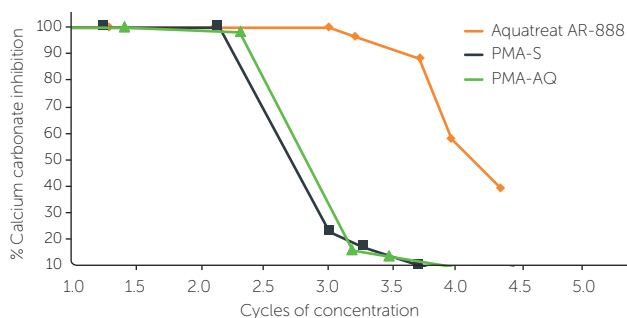


Figure 3: Bleach stability test

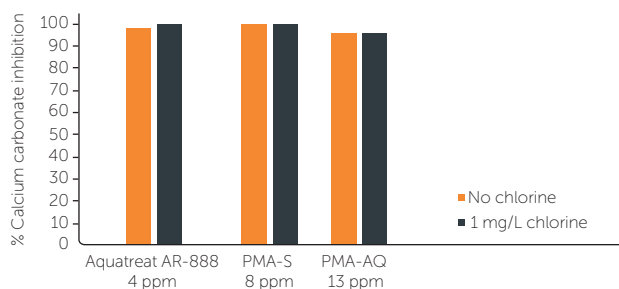
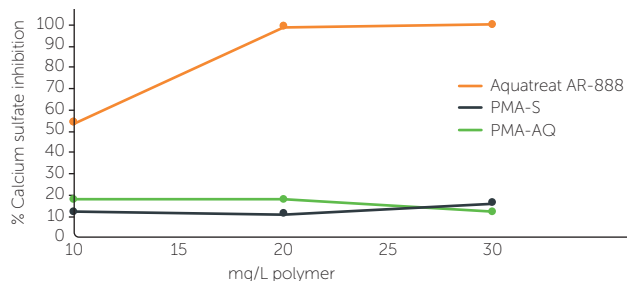


Figure 4: Calcium sulfate inhibition test



## Aquatreat AR-888

- 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.

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