



## 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.

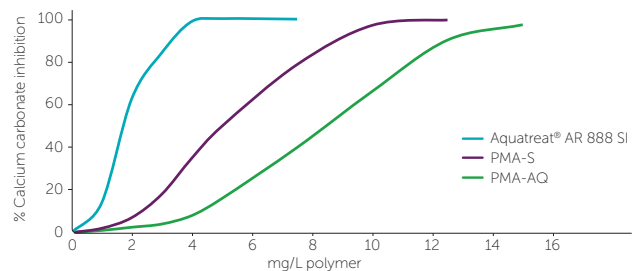
#### Threshold inhibition

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

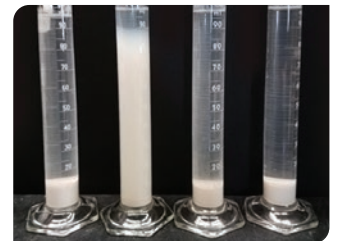
Ca	300 mg/L as CaCO <sub>3</sub> (120 mg/L as Ca)
Mg	147.6mg/L Mg as CaCO <sub>3</sub> (36 mg/L as Mg)
Bicarbonate	350 mg/L as CaCO <sub>3</sub> (427 mg/L as HCO <sub>3</sub> <sup>-</sup> )
Carbonate	80 mg/L as CaCO <sub>3</sub> (48 mg/L as CO <sub>3</sub> <sup>-2</sup> )
pH	8.7-8.9
Temperature	50°C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

Figure 1: Static test



### Dispersion

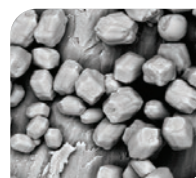
Dispersion is an important scale control mechanism, keeping any formed scale suspended in the bulk water and preventing deposition onto heat transfer surfaces. Our Aquatreat® AR 888 scale inhibitor was designed to have an optimal molecular weight for dispersion of scale as well as other particles found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



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

### Crystal modification

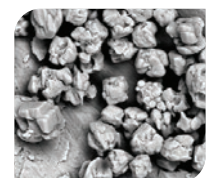
Aquatreat® AR 888 scale inhibitor absorbs onto forming calcium carbonate crystalline surfaces to distort the shape of the growing crystal. Modified crystals are less likely to adhere to each other and to surfaces, so heat transfer surfaces stay clean and efficient. The crystal growth modification properties 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 <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

Contact us directly for detailed product information and sample requests  
website | [nouryon.com/markets/water-treatment](http://nouryon.com/markets/water-treatment)  
email | [watertreatment@nouryon.com](mailto:watertreatment@nouryon.com)

## Specifications

% solids: 40-42

pH: 2.5-3.5

Figure 2: Dynamic test

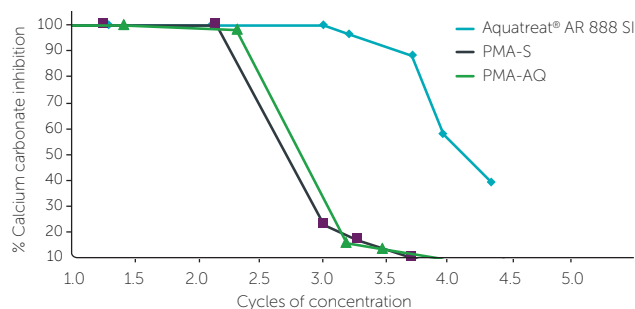


Figure 3: Bleach stability test

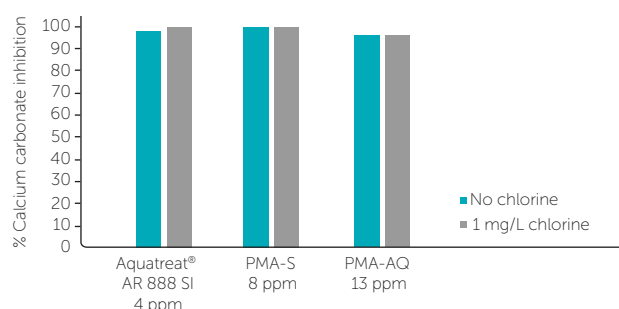
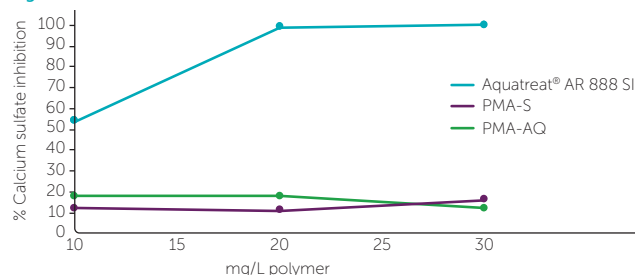


Figure 4: Calcium sulfate inhibition test



## 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.

All information concerning our products and/or all suggestions for handling and use contained herein (including formulation and toxicity information) are offered in good faith and are believed to be reliable. However, Nouryon makes no warranty express or implied (i) as to the accuracy or sufficiency of such information and/or suggestions, (ii) as to any product's merchantability or fitness for a particular use or (iii) that any suggested use (including use in any formulation) will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. The user must determine for itself by preliminary tests or otherwise the suitability of any product and of any information contained herein (including but not limited to formulation and toxicity information) for the user's purpose. The safety of any formulations described herein has not been established. The suitability and safety of a formulation should be confirmed in all respects by the user prior to use. The information contained herein supersedes all previously issued bulletins on the subject matter covered.

Products mentioned are trademarks of Nouryon and registered in many countries.

[nouryon.com](http://nouryon.com)