



# Carbospense™ K-700

## Water Treatment Polymer News

Lubrizol's "Carbospense™ K-700 Water Treatment Polymer News" has provided timely information to water technologists since 1994. [Click here](#) to view this newsletter and many previous issues.

### New Technical Publications Available

- ❖ Lubrizol presented "[Stressed Alkaline Cooling Water Deposit Control](#)" at [AWT's](#) 2016 Annual Convention in San Diego, CA. This paper examined the performance of phosphonate and deposit control polymer (DCP) combinations as components of phosphate-based cooling water treatment programs under simulated stressed alkaline conditions where both calcium carbonate (CaCO<sub>3</sub>) and calcium phosphate (Ca/P) scaling and deposition are challenges. Both static bottle tests (SBTs) and dynamic simulated test rigs (DSTRs) were used to evaluate the performance of three AA/AMPS® copolymers and three AA-based copolymers containing three or more monomers (at least one sulfonate). The data lead to the following conclusions:
  - SBT and DSTR results correlated well (e.g., the same DCP performance rankings were observed).
  - Under alkaline conditions, phosphonates with lower calcium tolerance require higher DCP dosages for effective mixed CaCO<sub>3</sub> and Ca/P scale control. Treatment cost optimization requires effective CaCO<sub>3</sub> inhibitor and high performance DCP combinations.
  - DCP performance drivers include molecular weight (MW), co-monomers (both type and amount), and manufacturing or polymerization process.
    - AA/AMPS® copolymers performance ranking corresponds to DCP AMPS content.
    - Carbospense [K-798](#) (CK798) performs better than the other DCPs containing three or more monomers.
    - CK798 provided better deposit control at much lower dosages and outperformed all other DCPs tested under both "typical" and stressed alkaline cooling water conditions.
- ❖ Two technical papers were presented at [NACE International's Corrosion 2016](#) in Vancouver, BC, Canada:
  - "[Stressed Cooling Water System Deposit Control Management](#)" which discussed approaches to manage cooling water systems (CWSs) operating under high stressed conditions attributable to make up water contaminants (e.g., high calcium, temperature, aluminum). Observations and conclusions of laboratory DSTR evaluations include:
    - DCPs vary in their abilities to tolerate stressed operating conditions; less efficient DCPs require much higher dosages. DCP performance strongly depends upon factors as discussed in [Lubrizol's AWT-2016](#) paper above.
    - DCPs that perform at low dosages and handle stressed conditions (e.g., high phosphate, high suspended solids loadings [e.g., clay, iron oxide] high temperatures, high calcium levels, aluminum contamination) can significantly impact how phosphate-based CWT programs handle upset conditions (e.g., DCP dosage disruptions) and/or feedwater quality variations.
    - CK798 provided the best performance under all test conditions.
  - "[Iron Oxide Colloidal Suspension Stabilization by Polymeric Dispersants](#)" discusses how stabilizing colloidal suspensions helps prevent scale deposition and inorganic particulate matter fouling in aqueous systems. Colloidal suspension stabilization were modeled using iron oxide (Fe<sub>2</sub>O<sub>3</sub>) suspensions in synthetic tap water containing a mixed electrolyte system that included a variety of ions interacting with suspended particles. Zeta potential measurements of suspended particles were conducted over a wide pH range (3.5 to 10) both in the absence and in the presence of DCPs. The results suggest that both DCP functional group type(s) and MW impact DCP iron oxide dispersion efficiency.

Click on [Technical Publications](#) to view electronic copies of over six dozen documents including those listed above.

### Carbospense K-775 Acrylate Copolymer Specification Modification

In Dec-2016, Lubrizol decreased and narrowed the [CK775](#) viscosity specification to ensure the polymer's desired molecular weight and performance.

## Personnel

Lubrizol's Zahid Amjad (Technical Consultant) received NACE International's Technical Achievement Award and Fellow Honor at Corrosion 2016. Dr. Amjad has worked 30+ years at Lubrizol in water-soluble polymer research. He has 30 U.S. patents, written >150 technical papers/articles, and edited eight books. Dr. Amjad previously received AWT's 2002 Ray Baum Memorial Water Technologist of the Year, was inducted into the National Hall of Corporate Inventors, and is listed in both American Men and Women of Sciences and Who's Who of American Inventors.

Jeff McFarland joined Lubrizol's Water Treatment Chemicals business as the U.S.A. Sales Manager in Sep-2016. Jeff brings 25+ years of technical and commercial experience to his role including assignments in laboratory testing and management, technical support, product management, business development, account management, and sales management. Jeff holds a B.S. degree in Chemistry from Corpus Christi State University and an M.S. in Environmental Science from Texas A & M University.

**\*\*\*\* Seasons Greetings and Best Wishes for the New Year! \*\*\*\***

Please contact your local Lubrizol sales representative or office with any questions or comments. You can obtain the name of your Lubrizol [sales and technical service team](#) for Carbosperse K-700 polymers by contacting Lubrizol's regional office (see below) for your location.

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