ACUMER® 2000
Scale Inhibitor and Dispersant

Physical and Chemical Properties
(these do not constitute specifications)

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect</td>
<td>Clear solution*</td>
</tr>
<tr>
<td>Chemical nature</td>
<td>Carboxylate/Sulfonate copolymer</td>
</tr>
<tr>
<td>Average molecular weight (Mw)</td>
<td>4500</td>
</tr>
<tr>
<td>Total solids (%)</td>
<td>≈ 43</td>
</tr>
<tr>
<td>pH as is (at 25 °C)</td>
<td>≈ 4</td>
</tr>
<tr>
<td>Bulk density (at 25 °C)</td>
<td>≈ 1.21</td>
</tr>
<tr>
<td>Viscosity Brookfield (mPa.s at 25 °C)</td>
<td>≈ 400</td>
</tr>
</tbody>
</table>

* A slight haze may appear; this does not affect the intrinsic properties of the product or its performance.

Chemistry and Mode of Action
ACUMER® 2000 copolymer combines two functional groups: strong acid (sulfonate) and weak acid (carboxylate) that provide optimal anti-scale/ dispersant efficiency through the following different mechanisms:
- Solubility enhancement by threshold effect, which reduces precipitation of low solubility inorganic salts.
- Crystal modification, which deforms the growing inorganic salt crystal to give small, irregular, readily fractured crystals that do not adhere well to surfaces and can be easily removed during cleaning operations.
- Dispersing activity, which prevents precipitated crystals or other inorganic particles from agglomerating and depositing on surfaces. The sulfonate groups increase the negative charge of the carboxylate groups adsorbed onto particles and, by then, reinforce the repulsion between the particles, preventing them from aggregating into larger particles which can settle and deposit on tube surfaces and low flow areas.

Stabilization/Dispersancy Performance
ACUMER® 2000 polymer is designed to provide superior stabilization of calcium phosphate. It also demonstrates excellent stabilization of zinc and calcium carbonate. In addition, ACUMER® 2000 is a strong dispersant in keeping the silt and commonly encountered inorganic particules suspended and in preventing their settling out onto heat transfer surfaces.

Applications
- Stabilizer/ Anti-scale deposition polymer for cooling water treatment
Taking advantage of all its complementary properties and high performance as a stabilizer, antiscalent and dispersant, ACUMER® 2000 is particularly recommended for the majorities of the cooling water treatment programmes:
  - Phosphate based programmes.
  - Zinc based programmes.
  - Advanced all organic programmes in which ACUMER® 2000 helps corrosion inhibitors onto metal surfaces.

Benefits of ACUMER® 2000
- Exhibits excellent thermal and chemical stability and can be used and stored over a broad range of temperatures and pH’s. This stability enables the formulator to manufacture one-package treatments at high pH for maximum shelf life.
- Provides superior iron tolerance when most of the commercially available polymers are desactivated in the presence of soluble iron in the system.
- Keeps surfaces clean for maximum heat transfer and corrosion resistance.
TEST METHOD

ACUMER® 2000 may be analyzed at use concentration with the Hach polyacrylate test kit. This kit employs a patented method developed by Rohm and Haas.

SAFE HANDLING INFORMATION

• Caution: - Contact may cause eye irritation and slight skin irritation.
• First aid measures
  - Contact with skin: wash skin thoroughly with soap and water. Remove contaminated clothing and launder before rewearing.
  - Contact with eyes: flush eyes with plenty of water for at least 15 minutes and then call a physician.
  - If swallowed: if victim is conscious, dilute the liquid by giving the victim water to drink and then call a physician. If the victim is unconscious, call a physician immediately. Never give an unconscious person anything to drink.
• Toxicity: - Acute oral (LD₅₀) rats: >5g/ kg.

MATERIAL SAFETY DATA SHEETS

Rohm and Haas company maintains Material Safety Data Sheet (MSDS) on all of its products. These contain important information that you may need to protect your employees and customers against any known health and safety hazards associated with our products. We recommend you obtain copies of MSDS for our products from your local Rohm and Haas technical representative or the Rohm and Haas company. In addition, we recommend you obtain copies of MSDS from your suppliers of other raw materials used with our products.

More information on the web about our products and services and all our worldwide addresses:
www.rhcis.com

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