ACCENT™ Scale Inhibitors

Traditional and Traceable Polymers for Mineral Scale Control
Staying on Top of Underground Scale Buildup

By the time you’re aware of flow assurance issues, it’s usually too late. Mixing of incompatible formation and injected waters; changes in temperature and pressure over the producing well; and corrosion and issues caused by injection of various EOR chemicals can contribute to mineral scale buildup on tubing and equipment. This can result in slowing oil and gas flow and degrading equipment performance, negatively affecting a well's flow rate.

Dow Oil & Gas can help protect production assets with innovative industry-proven chemistries that inhibit scale formation in the downhole water conditions encountered in today's demanding environments. Our scale inhibitors work across a broad range of minerals and offer exceptional results for both topside and downhole scaling. Our traceable polymers utilize an effective tagging technology that measures the “free” polymers available for scale inhibition while providing the same excellent performance properties as their non-tagged versions.

Dow Oil & Gas can help protect the investment in production facilities against scale blockage with a custom solution based on our extensive capabilities in polymer design.

ACCENT™ scale inhibitors are manufactured in a global manufacturing network providing access to a cost-effective, short lead-time solution in most any geographic region.
### ACCENT™ Traditional Scale Inhibitors

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<tr>
<th>ACCENT™ Scale Inhibitor</th>
<th>Chemical Nature</th>
<th>Calcium Carbonate Inhibition</th>
<th>Barium/Strontium Sulfate Inhibition</th>
<th>Calcium Sulfate Inhibition</th>
<th>Thermal Stability</th>
<th>Squeeze Performance</th>
<th>Divalent Brine</th>
<th>High pH Stability</th>
<th>Low pH Stability</th>
<th>Methanol Compatiblity</th>
<th>Product Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCENT 1100</td>
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<td>Average</td>
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<td>Above Average</td>
<td>Excellent</td>
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<td>Above Average</td>
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<td>Excellent</td>
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<td>Below Average, Above Average</td>
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<td>Above Average</td>
<td>Common</td>
<td>Below Average, Above Average</td>
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<tr>
<td>ACCENT 1126</td>
<td>Acrylic copolymer</td>
<td>Excellent</td>
<td>Above Average</td>
<td>Average</td>
<td>Excellent</td>
<td>Above Average</td>
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<td>Above Average</td>
<td>Above Average</td>
<td>Common</td>
<td>Below Average, Above Average</td>
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<td>ACCENT 1128</td>
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<td>Above Average</td>
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<tr>
<td>ACCENT 1130</td>
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<td>Above Average</td>
<td>Excellent</td>
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<td>Above Average</td>
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<td>Excellent</td>
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<td>Below Average, Below Average</td>
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<tr>
<td>ACCENT 1131</td>
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<td>Excellent</td>
<td>Above Average</td>
<td>Above Average</td>
<td>Excellent</td>
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<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Average</td>
<td>Below Average, Below Average</td>
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</tbody>
</table>

### ACCENT™ Traceable Scale Inhibitors

<table>
<thead>
<tr>
<th>ACCENT™ Scale Inhibitor</th>
<th>Chemical Nature</th>
<th>Calcium Carbonate Inhibition</th>
<th>Barium/Strontium Sulfate Inhibition</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ACCENT 1100T</td>
<td>Acrylic homopolymer</td>
<td>Average</td>
<td>Above Average</td>
<td>Above Average</td>
<td>Excellent</td>
<td>Average</td>
<td>Above Average</td>
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<td>Average</td>
<td>Below Average, Below Average</td>
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<td>ACCENT 1107T</td>
<td>Malic polymer</td>
<td>Excellent</td>
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<tr>
<td>ACCENT 1120T</td>
<td>Acrylic sulfonated copolymer</td>
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<td>Above Average</td>
<td>Excellent</td>
<td>Above Average</td>
<td>Above Average</td>
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</tr>
<tr>
<td>ACCENT 1130T</td>
<td>Carboxylic copolymer</td>
<td>Excellent</td>
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<td>Above Average</td>
<td>Excellent</td>
<td>Above Average</td>
<td>Above Average</td>
<td>Above Average</td>
<td>Above Average</td>
<td>Above Average</td>
<td>Below Average, Below Average</td>
</tr>
</tbody>
</table>

### Features
- **Calcium Carbonate Inhibition**: Excellent (1-5 ppm), Very Good (5-10 ppm), Average (10-15 ppm), Below Average (>15 ppm)
- **Barium/Strontium Sulfate Inhibition**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
- **Calcium Sulfate Inhibition**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
- **Thermal Stability**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
- **Squeeze Performance**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
- **Divalent Brine**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
- **High pH Stability**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
- **Low pH Stability**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
- **Methanol Compatiblity**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)

### Notes
- **ACCENT™ Traceable Scale Inhibitors** have very similar properties and applications as the corresponding ACCENT Traditional Scale Inhibitors. A tracer is incorporated in the polymeric chain, allowing a quick and easy concentration measurement using a test kit.

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1. **Shear water condition (dynamic) and NACE 0374 (static)**: Excellent (1-5 ppm), Very Good (5-10 ppm), Average (10-15 ppm), Below Average (>15 ppm)
2. **Fortas Field condition (dynamic and static) at 85ºC**: Excellent (1-10 ppm), Very Good (11-15 ppm), Average (15-20 ppm), Below Average (>20 ppm)
3. **NACE 0374 (static)**: Excellent (1-5 ppm), Very Good (5-10 ppm), Average (10-15 ppm), Below Average (>15 ppm)
4. **Combination of chemical degradation and performance of heat-treated inhibitors (for calcite and barite)**: Excellent (200ºC), Very Good (160ºC), Average (120ºC)
5. **Forties Field condition (dynamic and static) at 85ºC**: Excellent (5-10 ppm), Very Good (10-15 ppm), Average (15-20 ppm), Below Average (>20 ppm)
6. **DTPMP**: Excellent (1-5 ppm), Very Good (5-10 ppm), Average (10-15 ppm), Below Average (>15 ppm)

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1. **Calcium Carbonate Inhibition**: Excellent (1-5 ppm), Very Good (5-10 ppm), Average (10-15 ppm), Below Average (>15 ppm)
2. **Barium/Strontium Sulfate Inhibition**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
3. **Calcium Sulfate Inhibition**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
4. **Thermal Stability**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
5. **Squeeze Performance**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
6. **Divalent Brine**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
7. **High pH Stability**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
8. **Low pH Stability**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)
9. **Methanol Compatiblity**: Excellent (1 ppm), Very Good (1-5 ppm), Average (5-10 ppm), Below Average (>10 ppm)

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**Features**
- **ACCON™ Traceable Scale Inhibitors** have similar performance to ACCENT 1125 with particular performance in silica scale issues such as those faced in alkali surfactant polymer flooding.
Our scale inhibitors added to a well batch-wise in a squeeze application or continuously downhole or topside, help maintain oil and gas production.

Scale Inhibitors: Improving the Efficiency of Downhole Water Operations

The production of water at well sites can contribute to mineral scale formation and blockage of downhole tubing and equipment. ACCENT™ Scale Inhibitors from Dow Oil & Gas are designed to treat these challenges across all oilfield production operations. Our polymeric dispersants help prevent fouling of surfaces by insoluble inorganic particles and minimize pluggage by inhibiting crystal growth and aggregation, helping to maintain well production efficiency and helping avoid the unwanted costs associated with downtime for cleaning.

Dow’s scale-inhibiting technologies help eliminate buildup of calcium carbonate that occurs along the production tubing and equipment due to the pressure and temperature changes as oil is produced. For sulfate scale such as barium and calcium sulfate, Dow has solutions for controlling the sulfate concentration in injected water and for inhibiting and dispersing scale. Dow also offers innovative chemical solutions for control of more exotic scales such as silica generated from EOR operations and sulfide scales developed at higher temperatures and at under sour well conditions.
The ACCENT™ Line of Scale Inhibitors – Designed for Greater Flow Efficiency and Lower Maintenance

ACCENT™ Scale Inhibitors include homopolymers, copolymers and terpolymers designed for use in oil and gas production and stimulation to help prevent the formation of scale deposits and reduce the need for intervention and cleanout. The ACCENT 1100 series of materials include acrylic and maleic homopolymers that offer very good general scale inhibition and dispersion, with excellent temperature stability. The line includes products of varying molecular weight and end group functionality, which will affect the material’s performance in different oilfield conditions. Some products in the ACCENT 1100 series also contain phosphorus, which aids in squeeze retention as well as providing a method of detection. Furthermore, the ACCENT 1100 line includes two traceable polymers based on Dow’s exclusive immunoassay technique. Several of the ACCENT 1000 series scale inhibitors have been shown to be extremely effective in control of barium sulfate, exceeding most alternatives at high temperatures.

The ACCENT™ 1120 series of scale inhibitors are copolymers that offer excellent scale inhibition and dispersant properties. These acrylic based polymers, with varying amounts and types of co-monomers, polymer molecular weight and end-group functionality, can be tailored to very specific conditions. Most of the ACCENT 1120 product line was designed to combat issues related to incompatibilities of polymers with high salt brines. Some materials also show an improvement in the compatibility with methanol used in oilfield operations. There is one traceable polymer in the ACCENT 1120 product line and one that contains phosphorus, which can be used to detect the inhibitor concentration.
The ACCENT™ 1130 series of polymers contain exclusive terpolymer compositions for more exotic scales such as sulfides and silica based scales. These products offer the greatest compatibility with divalent ions present in most oilfield brines. Both products are excellent dispersants, particularly for iron oxide and are the most methanol stable materials in the ACCENT Scale Inhibitor product line. There is one traceable polymer in the ACCENT 1130 product line.

Prevent Fouling While Achieving Effective Levels of Polymer Concentration with ACCENT™ Traceable Scale Inhibitors
ACCENT™ Traceable Scale Inhibitors have properties and applications very similar to their ACCENT non-traceable counterparts. The main difference is that a tracer is incorporated into the polymeric chain in the ACCENT Traceable Scale Inhibitors, allowing for a quick and easy measurement of the tagged polymer concentration under varying water conditions. A portable, easy-to-use strip test kit is used with the ACCENT Traceable Scale Inhibitor system to measure the free polymers available, with no interference from common oilfield components. This ensures exact concentration measurements to help prevent overfeeding, accurately predict squeeze lifetime and maximize savings.

From Proactive Applications to Successful Operations
At Dow Oil & Gas, we want to be your total solutions provider for your flow assurance needs – from proactive, preventive applications to remedial steps designed to restore operations to their optimal levels. Dow has high throughput capability that can be used to synthesize a vast library of small molecules and polymers for scale control. For more information, call a local Dow Oil & Gas technical professional to find out how we can keep oil and gas operations flowing in the right direction.

Proven Polymer Design Solutions from Dow Oil & Gas
Dow understands the highly technical requirements of oil and gas production and has pioneered some of the most effective technologies in the industry. Call the Dow professionals in your area (listed on back cover) to learn more about the complete polymer design capabilities for your unique application.

A Note About Product Safety
Dow encourages its customers and potential users to review their applications from the standpoint of human health and environmental aspects. To help ensure that Dow products are not used in ways for which they are not intended or tested, Dow personnel will assist customers in dealing with environmental and product safety considerations. Dow literature, including Material Safety Data Sheets (MSDS), should be consulted by customers and potential users prior to use.

About Dow Oil & Gas
Dow Oil & Gas is committed to maximizing value for our customers by offering innovative, customized solutions tailored to the ever-evolving needs of the oil and gas industry. Backed by the proven resources of Dow, Dow Oil & Gas offers advanced chemical innovation, intimate industry knowledge and exceptional service. More information can be found at www.DowOilandGas.com.
To Learn More...

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*Toll-free service not available in all countries.

For more information, visit www.dowoilandgas.com.

This guide is designed as a general product overview. Please contact your local Dow Oil & Gas representative for up-to-date, detailed technical information including registrations and use limitations and to discuss individual applications or requirements.

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