Aspiro™
EOR Polymers
and Surfactants
Aspiro™ – Products for Enhanced Oil Recovery

BASF, as the world’s leading chemical company, offers a broad range of products which are widely used in the oil and gas industry today. We combine a long tradition in polymer and surfactant manufacture with expertise in innovating novel solutions for unmet market challenges.

In our dedicated application laboratories we develop cost effective chemical solutions for Enhanced Oil Recovery (EOR).

BASF’s leading position is based on world scale manufacturing capabilities, our global presence, a strong innovation platform, our commitment to community and sustainability, and our focus on meeting customer needs.

We take advantage of our broad product portfolio as well as our dedicated EOR laboratories to provide our customers with the right solution.

BASF combines expertise in polymers and surfactants by offering its broad range of Aspiro™ products, designed to support enhanced oil recovery operations in a large variety of field conditions, including more challenging and previously untapped reservoirs.

Discover your possibilities with BASF.
BASF combines expertise in polymers and surfactants

Aspiro™ P – EOR Polymers

Aspiro™ P represent synthetic, water soluble polymers for enhanced oil recovery which are based on well established polyacrylamide technology.

The Aspiro™ P 4 series are partially hydrolyzed polyacrylamides of varying molecular weight and/or degree of anionicity. They provide a cost efficient solution for mild field conditions. Incorporation of stabilizers extends the application window of such polymers to up to 85 °C.

The Aspiro™ P 5 series are sulfonated polyacrylamides. They allow for use at harsher conditions up to 95 °C.

Associative thickening polyacrylamides are the next generation technology designed to provide tolerance to extreme salinity and hardness while also producing higher mobility control with lower dosage than standard polymers (Aspiro™ P 6 series).

- Standard polymers for mild field conditions
- Innovative polymers for high mobility control at low dosage
- Innovative polymers for extreme salinities and hardness

Standard

<table>
<thead>
<tr>
<th>Product</th>
<th>Sulfonated</th>
<th>Associative</th>
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<tbody>
<tr>
<td>Aspiro™ P 4211</td>
<td>Aspiro™ P 5411</td>
<td>Aspiro™ P 6631</td>
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<td>Aspiro™ P 5441</td>
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<tr>
<td>Aspiro™ P 4261</td>
<td>Aspiro™ P 5451</td>
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High mobility control with associative thickening polymers

Hydrophobically modified associative polymers (HMAPAM) give resistance factors (RF) much higher than expected from viscosity data.

- RF trend from coreflood tests
- Bulk viscosity: 5,000 ppm HMAPAM
- Bulk viscosity: 1,000 ppm HMAPAM
Aspiro™ S – EOR Surfactants

Aspiro™ S products cover a broad range of surfactants and cosurfactants dedicated to EOR applications. BASF can leverage extensive innovation and manufacturing platforms to offer a wide range of surfactants (e.g. nonionic, anionic). Our EOR labs in Houston/US and Ludwigshafen/Germany are able to develop surfactant formulations that are uniquely designed to meet your specific field conditions.

- Standard surfactants for mild field conditions
- Innovative solutions for demanding fields
- Laboratory support to develop field specific formulations

![Formation of microemulsion phases at different salinities](image)

Application range of Aspiro™ S products

<table>
<thead>
<tr>
<th>Temperature [°C]</th>
<th>Salinity [ppm total dissolved solids]</th>
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</thead>
<tbody>
<tr>
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<td>80</td>
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Salinity [ppm total dissolved solids]

**Surfactants**
- Aspiro™ S 8310
- Aspiro™ S 8710
- Aspiro™ S 2420 X
- Aspiro™ S 2410
- Aspiro™ S 2465 X
- Aspiro™ S 2455 X
- Aspiro™ S 2850 X

**Co-surfactants**
- Aspiro™ S 1310
- Aspiro™ S 1425 01
- Aspiro™ S 1221 X
- Aspiro™ S 1415 X
- Aspiro™ S 2425 X
- Aspiro™ S 2430 X

Commercially available surfactants that provide customers with the right solution

Aspiro™ S 8310 works as single component system for various types of oil, even heavy oils at low dosage. Surfactant blends are available for a broad range of salinities.

Aspiro™ S 8710 expands surfactants application window beyond 60 °C, performing alone or in formulations for a large salinity spectrum.