Surfactants and Additives for Enhanced Oil Recovery
Your perfect innovation partner

**Why work with Huntsman?**
- Respect for your role in the value chain
- Diverse product range/diverse effects
- Applications experts in selected markets
- Global manufacturing footprint
- Effective cross market technology utilization
- Growing to support you worldwide
- Scaled development
- Cooperative approach to IP protection
- Access to extensive molecular libraries

**Huntsman has:**
- 20 manufacturing locations
- 3 JV sites and 6 R&D centers
- More than 7 billion pounds of capacity
- 6 sales hubs
- Over 35 process technologies
- 2,000 associates
- 4,000 customers in 100+ countries

**HUNTSMAN GLOBAL INNOVATION NETWORK**

<table>
<thead>
<tr>
<th>Location</th>
<th>R&amp;D Associates</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA (HATC)</td>
<td>96</td>
<td>• Molecular synthesis&lt;br&gt;• Applications research&lt;br&gt;• Process development&lt;br&gt;• Pilot facilities&lt;br&gt;• Technical service&lt;br&gt;• Product regulatory&lt;br&gt;• Catalyst R&amp;D&lt;br&gt;• Licensing support</td>
</tr>
<tr>
<td>Brazil (2015)</td>
<td>5</td>
<td>• Applications research&lt;br&gt;• Technical service</td>
</tr>
<tr>
<td>Europe</td>
<td>45</td>
<td>• Molecular synthesis&lt;br&gt;• Applications research&lt;br&gt;• Process development&lt;br&gt;• Pilot facilities&lt;br&gt;• Technical service&lt;br&gt;• Product regulatory</td>
</tr>
<tr>
<td>India (2015)</td>
<td>15</td>
<td>• Molecular synthesis&lt;br&gt;• Applications research&lt;br&gt;• Process development&lt;br&gt;• Pilot facilities&lt;br&gt;• Technical service&lt;br&gt;• Product regulatory</td>
</tr>
<tr>
<td>China (2016)</td>
<td>50</td>
<td>• Molecular synthesis&lt;br&gt;• Applications research&lt;br&gt;• Process development&lt;br&gt;• Pilot facilities&lt;br&gt;• Technical service&lt;br&gt;• Product regulatory</td>
</tr>
<tr>
<td>Australia</td>
<td>20</td>
<td>• Molecular synthesis&lt;br&gt;• Applications research&lt;br&gt;• Process development&lt;br&gt;• Pilot facilities&lt;br&gt;• Technical service&lt;br&gt;• Product regulatory</td>
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Enhanced Oil Recovery
Boosting oilfield output to help close the energy gap

An average oilfield only yields 30-35% of its potential. It’s not surprising that oil companies are looking to Enhanced Oil Recovery (EOR) to extract more crude oil from their existing reserves. Different types of EOR exist, including the chemical method, which involves injecting a blend of specialty surfactants and water into a reserve to emulsify trapped oil molecules and flush them free from rock capillary pores where they are stored.

Huntsman’s surfactant solutions can be customized for wide variations in crude oil composition and geology. They can be used in deep reserves where other EOR methods are prone to failure; can handle both light and heavy types of crude oil and have the ability to tolerate high pressure, high temperature and high saline environments.

Industry estimates suggest that chemical EOR formulations could help oil companies extract up to 50% of the 70% of oil that currently can’t be removed from reservoir rocks by conventional methods.

Huntsman offers an outstanding range of surfactant technologies, world-scale manufacturing and a global distribution network.

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**Thermal stability**
- Molecular weight customized to oil characteristics
- May require co-surfactant/co-solvent

**Salt tolerance**
- Optimized for enhanced oil interaction
- Improved salt and hardness tolerance
Alkylaryl Sulfonates


Extended Chain Surfactant

Huntsman is a global supplier of surfactants and other chemicals widely used in oilfield operations. Included are Enhanced Oil Recovery (EOR) products designed to meet the challenges of varying reservoir, injection water and crude oil properties. Huntsman’s leadership position in surfactants and other chemicals comes from its mix of technologies, world scale manufacturing capabilities and global distribution network. Huntsman manufactures a variety of products for use as primary surfactants, co-surfactants and co-solvents using a few of the technologies mentioned below.

**Alkylation**
Production of C14 – C30 alkylaryl compounds for use as hydrophobes that interact favorably with crude oil. When sulfonated, these long chain alkylaryl compounds are used as primary surfactants.

**Alkoxylation**
Reaction of propylene oxide (PO) and ethylene oxide (EO) with active alcohols to produce nonionic surfactants and intermediates for further reaction.

**Sulfation/Sulfonation/Carboxylation**
Addition of a sulfate/carboxylate group to an alkoxylated molecule or a sulfonate group to an alkylaryl molecule.

**Huntsman Synthesis Technologies**
Infinite possibilities, added value, competitive advantage

Huntsman manufactures specific products in close cooperation with the customer. The Huntsman manufacturing technology and its global reach provide an excellent platform for customized solutions for the Enhance Oil Recovery Applications.
Huntsman Performance Products - Energy SBU

Alternate energy - Lithium-ion batteries

Alternate energy - Solar

Alternate energy - Wind

Enhanced oil recovery

Gas treating

Oilfield chemicals

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