

HUNTSMAN

Enriching lives through innovation

Innovative Solutions

for Your Gas Processing Needs



A Track Record of Success

More than 250 companies around the world at over 600 of their operating facilities use Huntsman amines today for processing their sour gas.



Guaranteed Solutions for Your Gas Processing Needs

Huntsman has been a leader in gas processing technology for more than 60 years. The company offers a wide gas treating portfolio, including DGA® Agent, JEFFTREAT® solvents, and JEFFTREAT® AO-832 and AF-61 additives. Huntsman now offers licensed technology packages that can be customized to meet specific acid gas removal needs. This enables our customers to benefit from our reliable and guaranteed technology, while minimizing their risk.

As a leading manufacturer and licensor of multiple gas treating technologies, Huntsman can leverage the technical and project management expertise of its team to deliver our guaranteed licensing solutions. From planning to production, our licensing team relies on Huntsman's proprietary technologies to add value to our customers' business.

Comprehensive Service and Support

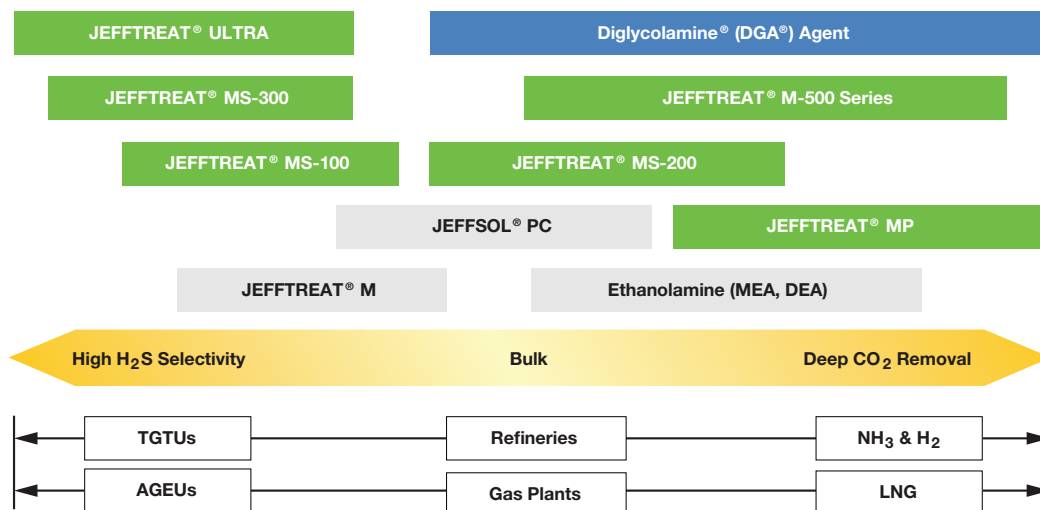
Huntsman offers a comprehensive licensing approach, starting with plant design through start-up, operator training and follow-up. With this approach, Huntsman is able to provide support throughout the licensing lifecycle on specific aspects, including:

- Process assessment, planning and design
- Provision of basic engineering data and relevant technical support
- Process start-up and on-site support

Complete Solutions

With proprietary amine and non-amine technologies, Huntsman is one of the few chemical manufacturers that offer a broad portfolio of gas treating products. Coupled with our global manufacturing footprint, our attention to product quality, competent technical support and state-of-the-art analytical service, our licensing team is able to guarantee the reliability of your gas processing facilities.

Huntsman Solvents for Acid Gas Processing



Specialty Amines

- **DIGLYCOLAMINE® (DGA®) Agent** is included in the Huntsman line of gas treating solvents. Our 2-(2-aminoethoxy) ethanol is widely used as a gas scrubbing agent. It is a solvent of choice for a number of difficult low-pressure and high-temperature gas treating applications, as well as LNG pre-treatment and trace sulfur removal.
- **JEFFTREAT® M-500** series of formulated solvents is specially designed for bulk and deep CO₂ removal applications.
- **JEFFTREAT® MS-300** solvent is specially formulated for high selectivity applications requiring very low residual H₂S and additional CO₂ slippage.
- **JEFFTREAT® MS-200** series of MDEA-based solvents is formulated for tailored bulk CO₂ removal applications in the presence of significant amounts of H₂S.
- **JEFFTREAT® MS-100** solvent is specially formulated for selective H₂S applications, where appreciable CO₂ slip is needed. These applications include high-pressure natural gas, refinery gas or Claus off-gas treating (TGTU).
- **JEFFTREAT® MP** solvent is formulated to provide deep removal of CO₂ from gas processing applications, such as LNG pre-treatment plants, hydrogen production, ammonia manufacture and cryogenic gas processing.
- **JEFFTREAT ULTRA** solvent contains a newly engineered molecule ideal for Tail Gas Treating Units or other high selectivity applications even at very high sour gas inlet temperatures. Shorter Absorbers, lower solvent circulation rates, and the potential elimination of inlet gas cooling makes this the solvent of choice for deeper removal of H₂S with the maximum slippage of CO₂.

Commodity Solvents

- **JEFFSOL® Propylene Carbonate (PC)** is used for CO₂ removal in natural gas, ammonia synthesis gas and hydrogen gas streams with high CO₂ and low H₂S partial pressures.
- **JEFFTREAT® M** solvent is for customers who choose to utilize generic methyl diethanolamine (MDEA) rather than a formulated MDEA solvent.
- **Monoethanolamine (MEA)** and **Diethanolamine (DEA)** are used extensively as gas-scrubbing agents to remove H₂S and CO₂ from refinery and natural gas streams.

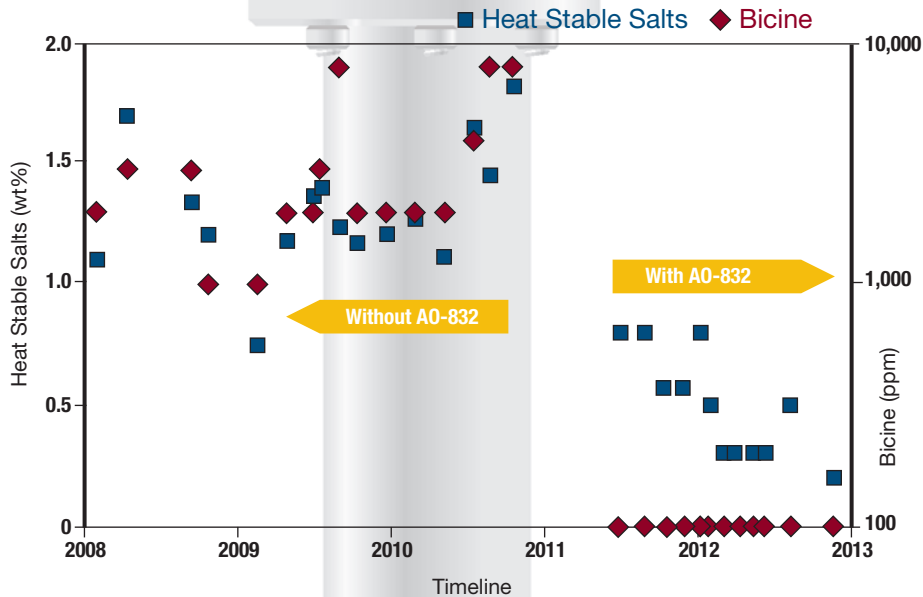
Customized Process Solutions

Specially tailored solutions can be developed for the following applications:

- CO₂ removal for liquefied natural gas (LNG) pre-treatment plants using DGA® Agent and JEFFTREAT® MP solvents
- Selective hydrogen sulfide (H₂S) removal using JEFFTREAT® ULTRA, MS-300, and MS-100 solvents
- Gas sweetening by H₂S and CO₂ removal from natural gas streams using DGA® Agent and JEFFTREAT® M, M-500 and MS-200 series of specialty solvents

Maximizing Performance with our Additives

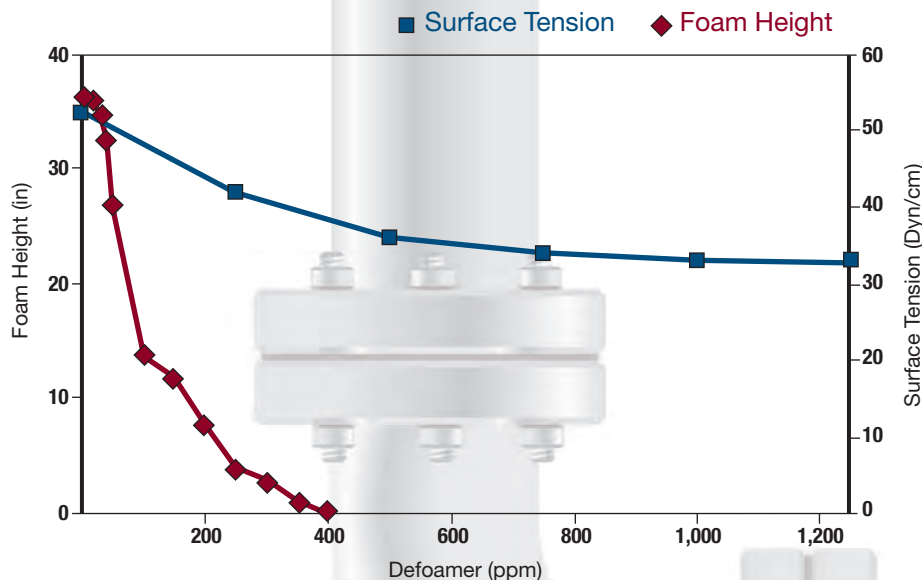
Effect of JEFFTREAT® AO-832 on Stability of Formulated MDEA Solvents



JEFFTREAT® AO-832 additive is an innovative gas treating additive that hinders the oxidative attack of amines and greatly reduces amine degradation.

- Performs by interfering with the oxygen radical in the degradation process
- Not designed as an oxygen scavenger
- Shown to successfully reduce bicine formation from MDEA and formulated MDEA solvents
- Minimizes heat stable salt formation in gas treating amines

Effect of JEFFTREAT® AF-61 on MDEA Foam Height and Surface Tension

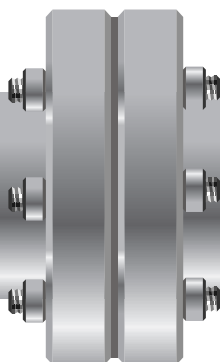


JEFFTREAT® AF-61 additive hinders foaming in amine solvents.

- Superior performance at elevated operating temperatures
- Compatible with all Huntsman gas treating amines
- No detrimental effects on performance from overfeeding
- Performance comparable to silicone based anti-foaming additives



When you make Huntsman your supplier of choice for your gas treating chemical requirements, you get demonstrated technology and performance-oriented service. Since 1950, Huntsman Corporation (formerly Jefferson Chemical Company/ Texaco Chemical Company) has helped our customers find more effective ways to solve their gas treating problems. Huntsman Corporation supplies a range of gas treating chemicals worldwide to the gas conditioning industry for the removal of H_2S and CO_2 in refinery and produced gas streams, as well as synthesis gas, hydrogen and ammonia applications.



Reliable Technical Service and Support

With over 60 years of gas processing experience our team of experienced engineers can assist with:

- Design and operation of gas treatment units
- QUICKTREAT™ calculator for design parameter estimation
- Start-up and turnaround assistance
- High quality sample analysis
- Process monitoring and optimization
- Operational trouble shooting
- Operator and engineer training



Comprehensive Analytical Support

Huntsman provides comprehensive analysis, including corrosion analysis, amine degradation testing, and contamination analysis. Our world scale lab located at The Woodlands, Texas, offers:

- Routine analysis including color, metals, water content, and amine strength
- Periodic analysis including amine strength, gas loading, foaming, and heat stable salts



Ideal Innovation Partner

- Respect for our customers' role in the value chain
- Diverse range of gas treating products
- Access to extensive molecular libraries
- Effective cross-market technology utilization
- Global manufacturing footprint
- Over 4,000 customers in 100+ countries



About Huntsman

Huntsman Corporation is a publicly traded global manufacturer and marketer of differentiated and specialty chemicals with 2017 revenues of approximately \$8 billion. Our chemical products number in the thousands and are sold worldwide to manufacturers serving a broad and diverse range of consumer and industrial end markets. We operate more than 75 manufacturing, R&D and operations facilities in approximately 30 countries and employ approximately 10,000 associates within our four distinct business divisions. For more information about Huntsman, please visit the company's website at www.huntsman.com.

Huntsman Performance Products

Performance Products brings together innovation and world-leading process technologies to produce more than 2,000 components used to formulate products that enhance people's lives:

- **Amines:** Largest global producer of specialty amines used in composites, coatings, fuel and lube additives, and gas treating
- **Maleic Anhydride:** The leading global producer and supplier into areas such as unsaturated polyester resins, food, oil additives and coatings
- **Surfactants:** Integrated producer of a wide range of products for home and personal care, oilfield, agriculture, and process industries
- **Ethylene and Derivatives:** Highly integrated manufacturer of ethylene, ethylene oxide, ethylene glycol and other derivatives

The division has 14 manufacturing plants and had 2017 revenues of USD 2.1 billion.

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