UOP Separex™ Membrane Systems
Efficient bulk removal of acid gases and water

For remote locations and offshore installations, modular membrane systems provide lower capital and operating costs, reduced weight and footprint, and faster delivery and startup compared to conventional processes.

Separex membrane systems are used for acid gas and water removal from natural gas streams. The systems are modular, skid-mounted units containing spiral wound membrane elements. The elements are housed in pressure tubes in various configurations depending upon process requirements.

Pretreatment of the gas is critical to ensuring long membrane life and low operating costs. Separex membrane units are matched to the appropriate pretreatment technology to form a system that will reliably achieve all process specifications for many years.

Applications

Separex membrane systems are typically used in the following applications and markets:

- **Natural gas upgrading** – Remove carbon dioxide and water vapor to pipeline specifications and lower hydrogen sulfide level. Systems have been installed at the well head and at gathering facilities.
- **Remote and offshore locations** – Separex systems are ideal for remote locations due to high on-stream factors and their low demand for consumables, which virtually eliminates supply issues. Their compact design and low weight make them ideal for offshore installation.
- **Enhanced oil recovery (EOR) operations** – Recover carbon dioxide from EOR floods for recycle injection. Separex systems are ideal for the high CO₂ content in the feed gas and adapt easily to changes in feed gas CO₂ levels.
- **Biogas methane recovery** – Remove CO₂ and water vapor from landfills and biogas processors to pipeline specifications.
- **Debottleneck existing acid gas removal units** – When acid gas content increases over time, Separex membranes can be added upstream of solvent-based systems to increase CO₂ and H₂S removal capacity.

Part of five existing trains installed in the Egyptian desert. Expansion has increased total capacity to 560 MMSCFD.
The advantages of Separex membrane systems over conventional solvent-based processes are site specific, but may include:

- Lower capital and energy costs
- Reduced space requirements, faster delivery time and lower installation costs
- Lower operating costs and lower manpower requirements
- Increased flexibility to meet product gas specifications as feed flow and composition changes over time
- Elimination of dehydration equipment
- Shorter, easier start-up and shutdown
- Higher waste gas pressure for reduced re-injection compression

**UOP Separex MultiTube**

**Improved system design for reduced footprint and costs**

Over the past thirty years membrane system processing capacity has steadily increased from 1 MMSCFD to today’s world-scale units with 1 BCFD capacity. The UOP Separex MultiTube is a novel compact membrane system design that simplifies process stream connections and significantly increases membrane packing density for a 40-70% footprint reduction. The MultiTube allows membrane systems to become even more attractive for large projects onshore and offshore. The system offers a large reduction of platform weight and cost for offshore applications.

![A model of UOP’s Separex MultiTube.](image)

Separex membranes are easily installed without special lift requirements.

UOP offers complete membrane system design including comprehensive feed gas pretreatment to extend membrane life. Improved pretreatment, combined with the continuing development of advanced membranes has further enhanced reliability and performance of membrane technology. Separex systems operate with very high on-line efficiencies. The combination of experienced engineering design, advanced research and development and world-class service has made Separex the technology of choice for CO₂ removal in a wide variety of processing conditions.

**Operating range**

Commercial applications have demonstrated the versatility of Separex membrane systems. Typical feed gas conditions range between 400 and 1600 psig (2700 kPag to 11,000 kPag) with CO₂ levels from 3 to 90%. Commercial systems have been designed and operated at feed flow rates ranging from 3 MMSCFD to 700 MMSCFD. Higher rates are in the planning stage.

**Experience**

Over 130 UOP membrane systems have been put into operating service. Most customers report downtime at less than 0.5% per year.

For more information on Separex technological services, please contact your UOP representative or visit us online at www.uop.com.

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