

# UOP Polybed™ Pressure Swing Adsorption (PSA) Systems in China

Dependable pure hydrogen with greater than 99.95 percent on-stream reliability

## Introduction

Hydrogen is a key component for the operation of modern refineries and petrochemical plants. Whether hydrogen is generated or produced as a by-product, it can be recovered and purified to be used in downstream processing. UOP technologies can be used in many applications to recover and purify valuable hydrogen. The choice of hydrogen purification and recovery technology will depend on your feed stream characteristics and your processing objectives.

UOP invented and developed the Polybed PSA technology more than 45 years ago. It has since become the leading hydrogen purification technology in many industries for many applications – delivering over 1000 Polybed PSA systems worldwide, in over 70 countries, processing over 40 different types of feedstock. Polybed PSA technology has evolved as the leader in many gas purification applications, including:

- Steam Reformers (Hydrogen Plants)
- Refinery Streams (Platforming, Unionfining, Unicracking)
- Ethylene Off-Gas
- Methanol Off-Gas
- Partial Oxidation / Syngas
- Coke Oven Gas
- Ammonia Off-Gas
- Chlorine Off-Gas
- Styrene Off-Gas
- Oleflex Off-Gas
- Steel Industry Gas (DRI)

## Reliable Process

UOP Polybed PSA systems offer increased reliability to obtain the highest purity hydrogen. The system allows hydrogen to be recovered and purified up to 99.9999 percent purity to meet downstream processing requirements.

The PSA process is based on the principle that adsorbents are capable of selectively trapping impurities. The impurities are captured in a fixed-bed adsorber at high pressure and released by “swinging” the adsorber from the feed to the tail gas pressure and using a high-purity purge to regenerate the bed. Hydrogen is recovered and impurities flow out with the tail gas, typically to a fuel gas header.

Polybed PSA systems are skid-mounted, modular units that come complete with vessels, valve skid, adsorbents, control systems and embedded process technology.



*Increase your plant lifecycle economic returns with UOP's leading hydrogen purification technology. With more than 1000 units in operation around the world, UOP's Polybed PSA systems are commercially proven as the source for high-purity hydrogen.*

## UOP Service and Support



## Increased Uptime for Higher Profitability

UOP PSA systems are designed to provide consistent hydrogen recovery rates and on-stream reliability to keep operating costs low and increase profitability. Key benefits include:

- Greater than 99.95 percent on-stream reliability, saving customers RMB 2-4 million per day of downtime avoided, and an automatic switchover designed so that the failure of a single component will not cause a shutdown
- Proprietary adsorbents that can improve hydrogen recovery by 1 percent, potentially increasing customers' profitability by RMB 8.8-17.5 million per year
- 100 percent production in the first switchover and 95 percent production in the second switchover versus only 50 percent production for competitor units, potentially saving customers RMB 0.95-1.9 million per day
- Superior technical service, potentially saving customers RMB 2-4 million per day of downtime avoided

Basis: PSA producing 100,000 Nm<sup>3</sup>/hr H<sub>2</sub>  
 H<sub>2</sub> price basis: RMB 10,000/MT from coal – RMB 20,000/MT from naphtha

### For more information

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## Local Facilities

UOP operates on the ground in China with manufacturing, sales and technical support at-hand for every customer. UOP Processes International, located in Beijing, offers a regional team with local expertise. In 1988, Shanghai UOP Ltd. (SUOP) was founded with joint venture partner Shanghai Huayi Group. SUOP is the largest molecular sieve adsorbents manufacturer in Asia. Based in Shanghai, SUOP is a dedicated adsorbents provider for the Chinese and Far East markets. In conjunction with U.S.-based UOP, SUOP also supplies adsorbents for worldwide distribution, and offers technical and design services.

## UOP Provides:

- Enhanced reliability for hydrogen production due to the control system that automatically adjusts to maintain production, even during upset conditions
- Proprietary UOP adsorbents that enable higher hydrogen purity and recovery that are commercially proven
- Greater than 99.95 percent on-stream factor from the rigorous design and selection of the valves and control systems
- Superior quality control resulting in long-term safer and more reliable operation
- Optimized integration of PSA technology within your plant
- Automatic operation that minimizes manpower requirements
- Shop fabricated skid-mounted systems for fast on-site installation and rapid start-ups
- Unparalleled international experience in project development, engineering, fabrication, and technical support
- Worldwide sourcing and capabilities to provide competitively priced technology to meet local requirements
- Ongoing technical services and support post start-up

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