Honeywell UOP

HYDROGEN PURIFICATION

UOP PSAGuard™

Improve the performance and reliability of your Honeywell UOP PSA units

Hydrogen is essential to the operation of today's refineries and petrochemical complexes, and the efficient use and availability of hydrogen within the plant has a direct impact on profitability.

Pressure Swing Adsorption (PSA) is the industry standard for hydrogen purification in refineries and petrochemical complexes. Honeywell UOP first introduced the Polybed™ PSA in 1966, and has since designed over 1,080 PSA units processing more than 40 different types of feedstock.

PSA is a robust technology that is often neglected and operated at sub-optimal levels, sending valuable hydrogen to the fuel gas network. A simple 1% deficit in hydrogen can be up to $750,000 of lost hydrogen value per year for a 10 bed PSA unit.

The high purity hydrogen from the PSA unit feeds some of the most profitable equipment at your plant, with daily profits exceeding $1M USD per day. These profits are diminished or lost for every hour that the PSA unit is not operating at full capacity.

The PSA unit contains millions of dollars of proprietary adsorbents to facilitate our process and purify the hydrogen. When operated correctly, this adsorbent can last for the life of the unit, allowing you the benefit of reloading on your terms as you try to change process feed conditions, increase throughput, or take advantage of new adsorbent developments. When not monitored, it is possible to damage the adsorbent through poor operation resulting in a costly shutdown and reload, with even greater impact to downstream operations.

PSAGuard™, a new software solution, taps the power of Honeywell Connected Plant technology to help you optimize the performance and reliability of your Honeywell UOP PSA units, enabling maximum profitability through efficient hydrogen management.

UOP PSAGuard System

The PSAGuard software continuously captures process and equipment data directly from the site in order to provide performance insights, operational recommendations, and early warnings of potential equipment issues. By leveraging this data, with UOP's proprietary process models and extensive troubleshooting experience, PSAGuard enables the proper operation of the unit to ensure optimal hydrogen production, even when conditions change. The easy-to-use web based dashboard means that these performance metrics and operational recommendations are always available, on all of your devices.



FEATURES & BENEFITS

Process Optimization
- Optimize purity
- Optimize recovery

Valve Diagnostics
- Failure analysis
- Health indicators
- Preventive maintenance

Adsorbent Health
- Capacity
- Excursion detection

Operations Support
- Detailed alarm help
- Alarm cause and resolution analysis

Remote Support
- Near real-time remote data access from UOP

Process Optimization

PSAGuard allows you to operate the PSA closer to the design constraints while not exceeding impurity breakthrough. By optimizing purity (edge of product spec), you can optimize recovery. Conversely, running the PSA too conservatively can send excess hydrogen to tail gas, decreasing the recovery of your unit.

PSAGuard will send operating process variables – feed flow, feed composition, temperature, pressure cutoffs, etc. – to a secured server. PSAGuard will analyze this data to make recommendations to optimize cycle time to maximize recovery and purity based on current operating conditions.

- Higher hydrogen recoveries at different operating conditions
- Supply the necessary information to adjust operations as conditions change
- A 1% improvement in H_2 recovery can result in up to $750,000 increase of annual hydrogen value (relative to fuel gas) for a 10 bed unit

Valve Diagnostics

By monitoring specific valve parameters and process conditions, PSAGuard can evaluate the health of operating valves

- PSAGuard will track and report valve performance metrics, flagging valves as performance deteriorates
- Predict potential valve failures, enabling proactive intervention outside of standard time-based preventive maintenance program

With advanced warning on potential valve failures, operators can perform a preferred switchover to reduce the risk of an immediate switchover which could upset the tail gas system or effect downstream equipment.

- Advanced warning allows the maintenance and instrumentation teams to properly plan for valve repairs
- PSA supports high value equipment producing daily profits exceeding $1M. Every operational hour at full capacity counts.

Adsorbent Health

Monitoring of PSA feed, product, and tail gas streams to ensure there are no excessive differences between design and operating conditions

- Issue alerts if any key components breakthrough between adsorbent layers
- Highlight if any layers are being damaged to allow for corrective action

Operations Support

- PSAGuard will provide additional context regarding alarms and abnormal situations, giving guidance on each alarm within the PSAGuard dashboard
- Removing the “black box” feel of the PSA system to provide a better understanding of PSA operations in real time



Overall Unit Status



Overall Stream Status



Overall Loop Status

Remote Support

- Continuous remote monitoring allows UOP’s Technology Service team to log in to site specific dashboard and review data in near real time
- Access to data by Tech Service team will allow UOP to resolve issues faster and with greater accuracy; No need to send data to UOP
- PSAGuard™ subscription includes set level of Tech Service consultation, including defined rates for service visits

For more information
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