# REFINERY

## RECOVERY AND PURIFICATION OF $H_2$ IN REFINERY OPERATIONS

## DESCRIPTION

In the refining industry, feedstock and residual gas contain significant amounts of unused hydrogen. Efficient use of this hydrogen is critical to achieve optimal process performance and maximum profitability. With minimal feed gas pressures, Air Liquide Advanced Separations' (ALaS) advanced hollow fiber membranes can achieve hydrogen recoveries over 95% and hydrogen purities over 99%. The membranes are skid mounted and under operator control, making hydrogen management flexible to fit the end users needs. Whether you are producing clean fuels, anticipating increased industry regulations, or performing any of the below applications, ALaS membranes can optimize your use of hydrogen, resulting in operating costs savings.

ALaS Membranes are found in various refinery applications:

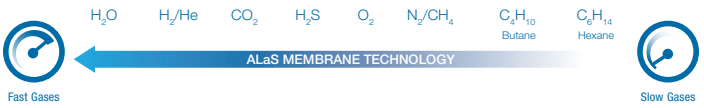
- HDT Off Gas
- HCU Off Gas
- FCC Off Gas
- Refinery Fuel Gas
- PSA Off Gas
- $H_2$ Plant Feed
- Platformer Off Gas

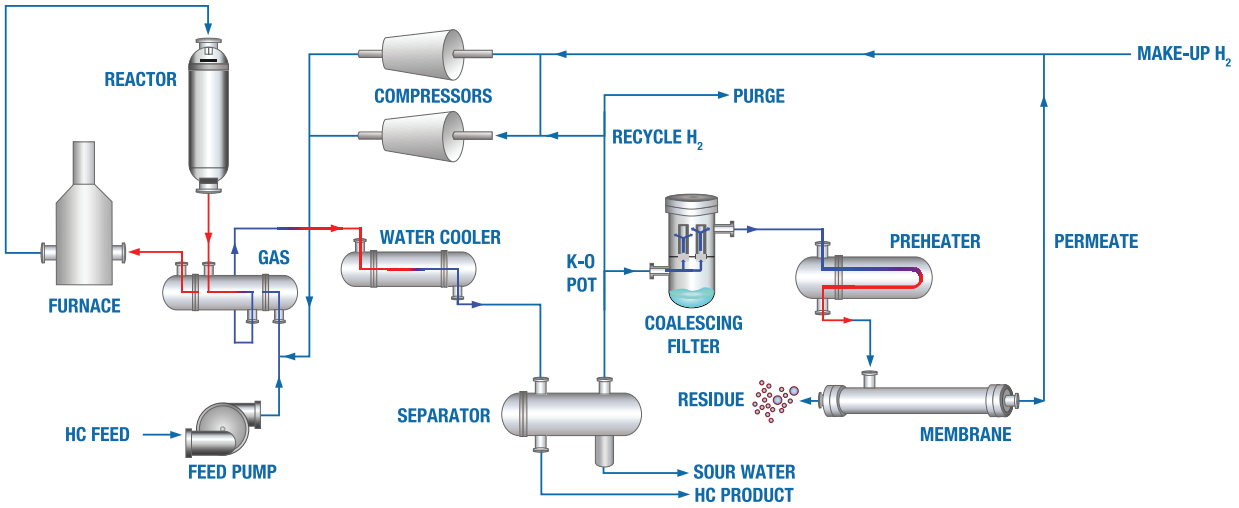
## CUSTOMER BENEFITS

- Improved $H_2$ utilization
- Increased hydroprocessing throughput rates
- Prolonged catalyst life and performance
- Estimated payback time of less than a year
- Low CAPEX and OPEX
- No moving parts
- > 99%+ hydrogen at significantly cheaper value than producing new $H_2$

## TECHNOLOGY

$H_2$ is selectively separated from $CH_4$ and heavy hydrocarbons by permeation through a polymeric hollow fiber membrane. The driving force is the partial pressure difference across the membrane for $H_2$, hydrocarbons and other impurities. $H_2$ is the "fast" gas, whereas $CH_4$ and heavy hydrocarbons are the "slow" gases. The pressurized feed gas enters the bundle from the shell side; the hydrocarbons stay under pressure while the $H_2$ is collected at a lower pressure from the fiber bore.




Air Liquide Advanced Separations | 305 Water St., Newport, DE 19804 | 302-225-1100 | info.MEDAL@airliquide.com | www.MEDAL.airliquide.com