

SYNGAS RATIO ADJUSTMENT

SELECTIVE HYDROGEN REMOVAL TO PRODUCE DESIRED H₂/CO RATIO

DESCRIPTION

Membranes are the simplest and most efficient means to selectively remove hydrogen from syngas to achieve a specific H₂/CO ratio. Syngas produced during gasification typically contains a higher than desired concentration of hydrogen and a non-optimal H₂/CO ratio. Air Liquide Advanced Separations' (ALaS) industry leading, high selectivity membranes adjust the ratio of H₂ and CO to an optimal value by selectively removing hydrogen from feed gas until the ratio is sufficient for customer needs. Hydrogen permeates ALaS's high-selectivity membrane much quicker than carbon monoxide, allowing the amount of hydrogen removed to be controlled. This results in an optimized ratio and high quality hydrogen stream that can be achieved at a low pressure.

CUSTOMER BENEFITS

ALaS offers the most selective membranes on the market for H₂ and CO separation with attainable CO retention rates > 99%

- No moving parts
- Skid mounted systems cartridge design for simple installation
- Estimated payback period of less than a year
- High permeability membranes for compact, low capital system design
- Unrestrained turndown capabilities
- Automated turndown system for ease of operation and safety
- Linear scale up for all size systems
- Hollow fiber membranes offer higher area to volume efficiency resulting in better packing efficiency, smaller footprint and reduced weight and module count

TECHNOLOGY

H₂ is selectively separated from CO by permeation through a polymeric hollow fiber membrane. The driving force is the partial pressure difference across the membrane for H₂ and CO. H₂ is the "fast" gas, whereas CO and CO₂ are the "slow" gases. The pressurized feed gas enters the bundle from the shell side; the syngas stays under pressure while the H₂ is collected at a lower pressure from the fiber bore.



SHELL FED SEPARATOR

1,300 PSI (90bar) transmembrane pressure limitation

