Hydrogen Purification

GENERON® Membrane Technology

INNOVATIVE GAS SYSTEMS

Typical Applications

- Hydrogen-peroxide production
- Food engineering
- Glass manufacturing
- Metallurgy and heat treatment
- Hydro-cracker purge gas
- FCC overhead gas
- Desulphurization purge gas
- Ammonia purge gas
- Amine production off-gas
- Steam-reforming of natural or bio gas

In today's hydrocarbon market many processes have a requirement for a high quality hydrogen feed, e.g. to chemically react with other feed stocks to form new products, or to provide a higher hydrogen partial pressure, at a reducing atmosphere to prevent oxidation or in fuel-cell applications. The hydrogen required can either be produced by generating it, using a steam-reforming of natural gas or methanol cracking process, or recovering it from a hydrogen rich process stream.

The hydrogen production processes generate a product syn gas that includes by-products like carbon-dioxide, carbon-monoxide, slip-methane, water vapor and traces of argon, nitrogen and oxygen. When hydrogen rich residual gas streams or by-products from chemical or petrochemical processes are purified, then impurities are various hydro-carbons, methanol, hydrogen-sulfide and ammonia. All these impurities need to be removed from the hydrogen before it is usable in the final application.

GENERON® membrane modules are applied to economically recover hydrogen from hydrogen rich gas streams with minimal losses of 1 to 10% of your valuable hydrogen. Using GENERON® membrane modules in such separations will achieve hydrogen product purities from 90 to 99.9%.

The GENERON® Advantage

- Skid mounted process units are easy to connect and commission
- Built to your specifications and for your convenience
- Engineering support from concept to completion
- Remote control operation
- Operation flexibility with automated part-load

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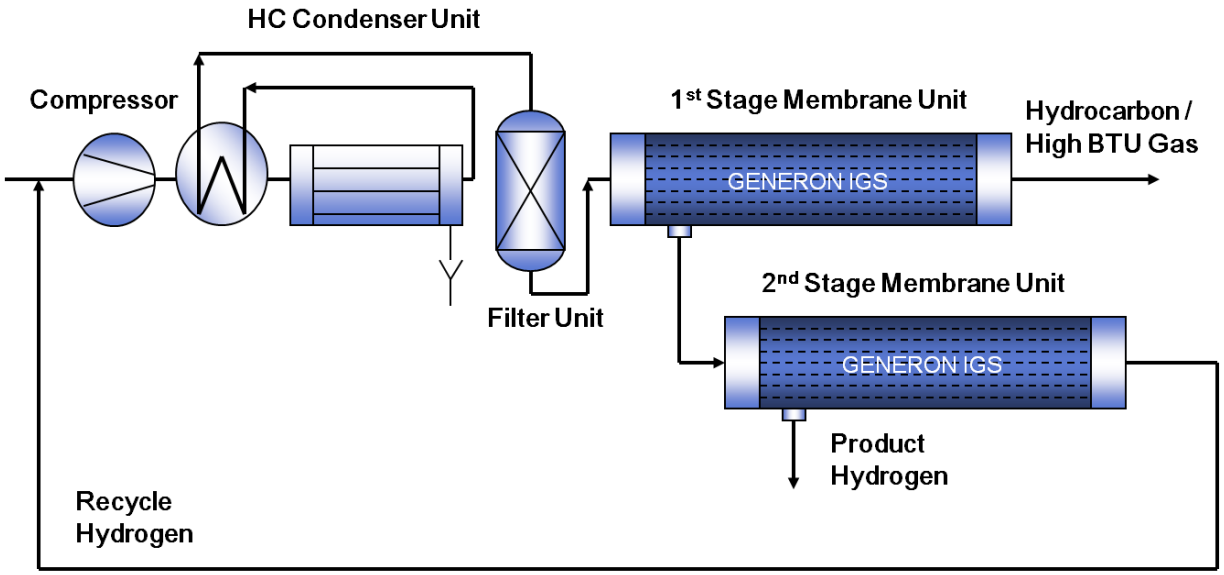

In a typical GENERON® membrane system for hydrogen purification the feed gas is cooled to remove the higher hydro-carbons that would otherwise condense inside the membrane fibers during the separation process. After subsequent particle and condensate removal steps the feed gas is then heated to an optimum operation temperature and ready to enter the GENERON® membrane modules. Hydrogen gas permeates preferred through the membrane walls. The permeated gas is the purified hydrogen product. The “slower” permeating gases are collected in the non-permeate (“retentate”).

The GENERON® Membrane System Performance:

- Feed gas pressures up to 2,000 psi (138 bar)
- 90% to 99% hydrogen recovery
- Lower maintenance cost (no switching valves) compared to H2-PSA
- Hydrogen purities to 99.9%
- Flow rates of 10 to 150,000 SCFM
- Better economics than H2-PSA (lower price + faster deliveries, commissioning and start-up)

When you require ultra-pure hydrogen, i.e. 99.9% to 99.999+%, we will propose our HYDROSWING® PSA (pressure swing adsorption) technology.

IGS INNOVATIVE GAS SYSTEMS

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CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2008 DNV

Pioneering Gas Solutions from Concept to Completion