

REFINERY GAS UPGRADING: LPG AND H₂ RECOVERY FROM FUEL/WASTE/FLARE STREAMS

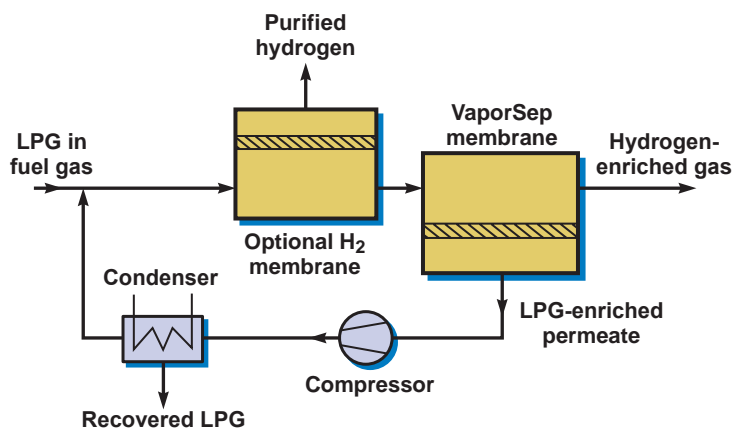
- Recovers LPG from purge and vent streams
- Improves hydrogen purity without recompression
- Minimizes installation cost with skid-mounted construction
- Achieves short payback time of 1 year or less

“VaporSep® is a unique process that recovers valuable LPG and H₂ for reuse.”

Problem

Recovery of heavy hydrocarbons (C₃₊) or LPG from refinery purge and fuel gas streams is more profitable than sending these high-value components to fuel. LPG components are produced in many refinery operations. Traditionally, absorption and cryogenic systems have been used for the recovery of LPG. However, these technologies require numerous moving parts and/or external chemicals, and have high capital and operating costs. VaporSep® offers a simple alternative for recovering LPG from refinery waste streams.

VaporSep® Solution



VaporSep® unit for LPG recovery from refinery streams using two different membranes — the first membrane permeates hydrogen whereas the second one permeates LPG

The flow diagram above shows how MTR's two different membrane types can be combined to recover LPG and hydrogen from fuel gas. The first membrane, VaporSep-H₂™, permeates purified hydrogen from the fuel gas. The gas is then passed to a VaporSep™ membrane which preferentially permeates LPG components. The permeate is compressed and LPG is recovered as a liquid in the condenser.

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This VaporSep® unit recovers hydrocarbons from offgas

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MTR Membrane
Technology
& Research

Benefits

- Efficient and economical hydrocarbon recovery: typically 60% to 90% recovery of feed LPG recovery as an easy to handle liquid
- Reduces flaring and corrects refinery fuel balance
- Recovery of purified hydrogen can be an added benefit
- Proven performance: dozens of references for both hydrocarbon and hydrogen membranes
- Long membrane life

Simple, reliable, flexible unit; easy to install and operate

- Operates at moderate temperatures and pressures
- Simple installation and operation with compact skid-mounted construction
- Requires no additional chemicals; produces no wastes

Application Areas

- Refinery fuel/flare gas
- Catalytic reformer net gas
- Pressure swing adsorption (PSA) tail gas
- Fluidized cat cracker (FCC) main column overhead gas
- Aromatics plant purge and vent gases
- Steam methane reformer feed gas
- H₂ membrane tail gas