

CO₂ REMOVAL FROM SYNGAS

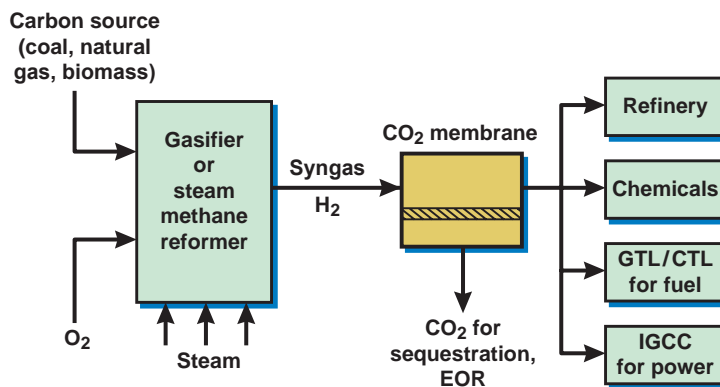
- **Polaris provides a simple technology for CO₂ removal from H₂-containing streams**
- **Minimal installation cost with skid-mounted construction**
- **Achieves short payback time of 1 year or less**

“Polaris is an important new innovation: for the first time, membranes can achieve practical separation of carbon dioxide from hydrogen.”

Problem

Syngas is produced via partial oxidation of a carbon source (coal, natural gas, or biomass) using oxygen (or air) and steam. Syngas produced from gasification or steam methane reforming (SMR) contains mostly hydrogen and carbon monoxide, desirable constituents that are used as feedstock in refineries, chemical processes and power generation. However, a significant amount of CO₂, a greenhouse gas, is also produced as a by-product. Removal of CO₂ is desired due to downstream process requirements or to reduce CO₂ emissions. Until recently, membranes could not be used in these applications because previously available membranes cannot separate CO₂ from syngas.

Polaris™ Solution



CO₂ Removal from Syngas using Polaris™

MTR's unique Polaris™ membrane is the first commercially available membrane that separates CO₂ from syngas. The Polaris™ membrane is much more permeable to CO₂ than to other syngas constituents and can be used to recover and purify CO₂ for sequestration, enhanced oil recovery (EOR), or for use in chemical and industrial applications. The resulting CO₂ enriched stream can be produced in gas or liquid form, depending on the final use for CO₂.

CO₂ REMOVAL FROM SYNGAS



Skid mounted CO₂ removal system

Benefits

- Efficient CO₂ recycle or removal: membrane systems can typically separate 80% of feed CO₂.
- Produces high purity CO₂: up to 95+ vol%
- Simple reliable unit: easy installation with skid-mounted construction
- Easy to operate: requires no chemicals, no environmental hazards
- Minimal utility usage: cooling water, instrument air, instrument power, N₂ (for purging)
- Long membrane life: CO₂ membrane is made from very robust materials

Application Areas

- Hydrogen plants
- Syngas production
- Methanol production
- GTL or CTL for liquid fuel production (Fisher Tropsch)
- Gasifiers feeding integrated gasification combined cycle (IGCC) and other power plants
- Pressure swing adsorption (PSA) feed/tail gas

System Description

- Feed pressure: up to 800 psi
- Feed: 1 to 200 MMscfd; 10 to 60 vol% CO₂
- CO₂ recovery: greater than 50 to 80+%
- CO₂ purity: up to 95 vol%
- Modular construction

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