

Cryocap™ H₂

A Carbon Capture technology for Hydrogen production units



Cryocap™ is an innovative and unique portfolio of CO₂ capture solutions developed by Air Liquide.

Cryocap™ can be adapted to specific applications combining a variety of Air Liquide technologies to capture CO₂ from:

- Hydrogen production plants, Cryocap™ H₂
- Natural gas, Cryocap™ NG
- Power plant, Cryocap™ Oxy
- Steel plant, Cryocap™ Steel

In particular Cryocap™ H₂ is differentiating thanks to its combination of Cryogenic processes and membranes.

Cryocap™ installation in Port-Jérôme, Normandy, at the largest steam methane reforming hydrogen production unit operated by Air Liquide in France represents the first industrial scale deployment of the Cryocap™ H₂ technology. Key advantages are:

SMR CO₂ capture 300-3000 tpd CO₂

up to
+18%

H₂ production
or -4% NG consumption

>95%

CO₂ recovery

-75%

Footprint
vs. large scale adsorption plants

>99%

CO₂ purity

~0

Steam consumption
vs. absorption solutions

>130
bar

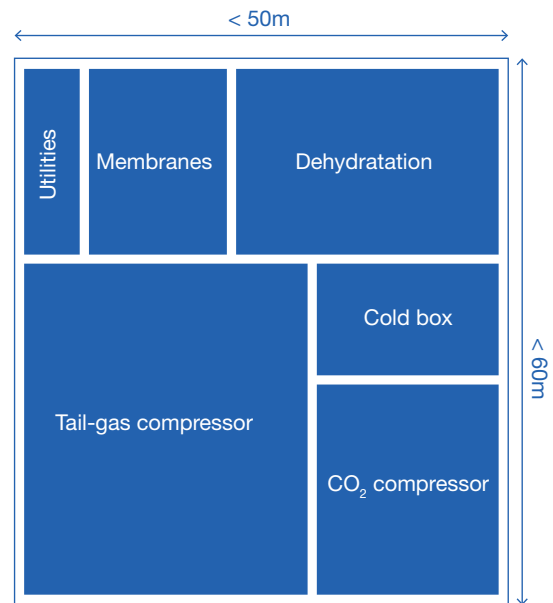
CO₂ pressure

Perfect fit for SMR retrofit

Cryocap™ H₂ is a unique patented combination of membranes and cryogenic separation resulting in **minimal equipment and installation costs** and **best in class footprint**. The simplicity of the scheme also provides a limited number of major equipment without the need of modifications on the main syngas line.

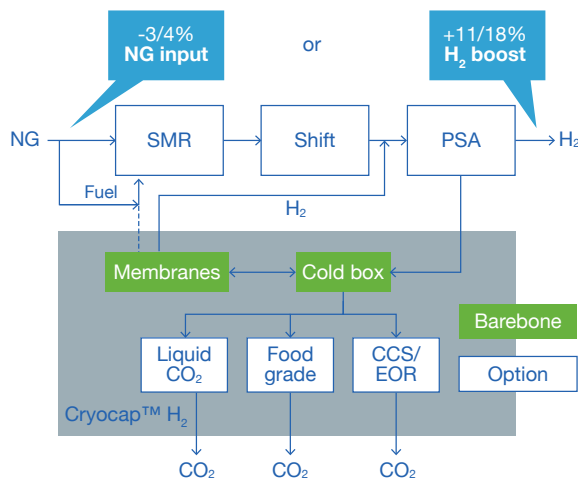
Cryocap™ H₂ has been designed and tested to have **no impact on the SMR reliability**. The modifications on the SMR are mostly limited to process control adaptations, and, if necessary, modifications to the burners.

The **modularized design** is easy and quick to construct and allows a reduction in installation costs and schedules. In addition, it can accommodate to existing dense plant layouts.



Typical layout for a 3000 tpd Cryocap™ H₂

Advantageous performance and design



Cryocap™ H₂ has several differentiating advantages built-in its design:

- Limited steam consumption during operations
- Proprietary Membranes allows 95% CO₂ recovery
- In H₂ boost mode, H₂ production can be increased by 11% to 18% depending on the H₂ PSA recovery
- In iso-H₂ mode, CH₄ consumption is reduced by 4%
- Optional integrated CO₂ liquefaction
- Major maintenance every 6 years and unattended operations
- No toxic components or emissions

First reference running since 2015

Demonstrated at industrial scale in 2015 with the start-up of the Cryocap™ H₂ plant in Port Jérôme, France, the plant has proven its reliability as well as the following key features:

- Integration of the Cryocap™ H₂ to an existing SMR without impact on SMR operations
- Reliable operation of the compressor, cold box and membranes
- Increase of H₂ production flow
- Centrifugal compression scalable for large plants
- Performance in transient cycles
- Additional module for food grade liquid CO₂



Contact us

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