



DOW<sup>®</sup>

# Enabling Hydrogen Decarbonization with Innovative Technologies for CO<sub>2</sub> Capture

Dow delivers an integrated portfolio of specialty solvents, advanced dehydration fluids, and innovative processes designed to capture and purify CO<sub>2</sub> for blue hydrogen production.

Supported by decades of gas-treating expertise, these solutions are backed by end-to-end support—from design and implementation to ongoing optimization. Our advanced capabilities include access to technical specialists, accurate simulation tools, and state-of-the-art analytical laboratories, helping ensure reliable system performance and continuous improvement.

Dow's offering can reduce both capital and operating costs, making carbon capture more affordable.

## Dow Solutions for Blue Hydrogen production

- **Licensable Process Technologies:** Innovative process to deliver CO<sub>2</sub> at high pressure
- **Specialty Formulated Solvents:** Designed for efficient CO<sub>2</sub> absorption and separation
- **Dehydration Fluids and Desulfurization Products:** Helps ensure CO<sub>2</sub> purity
- **Technical Service:** Experienced technical support, and state-of-the-art analytical laboratory



## Direct Licensing by Dow: The next-generation CO<sub>2</sub> Capture process for Blue Hydrogen

Dow expands its licensing portfolio with a gas-treating process for CO<sub>2</sub> capture and purification, building on decades of experience in formulated solvents and dehydration fluids.

Dow's novel High-Pressure Regeneration process delivers CO<sub>2</sub> at high pressure while leveraging advanced heat integration to decrease compression costs, optimize solvent circulation and minimize steam consumption. As a result, lower capital and operating expenses can improve the cost of CO<sub>2</sub> capture.

## Benefits Over Conventional Amine Processes:

- **Lower Compression Costs:** High-pressure CO<sub>2</sub> can reduce compressor size and energy demand
- **Reduced Solvent Circulation Rate:** Compared to conventional two-stage systems, decreasing amine unit capital
- **Energy Efficiency:** May capture heat that would otherwise be wasted, improving overall plant integration
- **Design Flexibility:** Flexible design options allow optimization for site-specific goals, balancing capital investment and operational savings

## Products

In conjunction with Dow's High-Pressure Regeneration licensable process, we offer **specialty products, experienced technical support** and state-of-the-art analytical laboratory.

- **UCARSOL™ CC Solvent 510:** Next-generation solvent designed for efficient CO<sub>2</sub> removal in Blue Hydrogen applications
- **PURDRY™ 100 and NORKOOL DESITHERM™ Specialty Dehydration Fluids:** CO<sub>2</sub> dehydration

## Techno-Economic Evaluation: Dow's High-Pressure Regeneration Process vs. Conventional Amine Processes

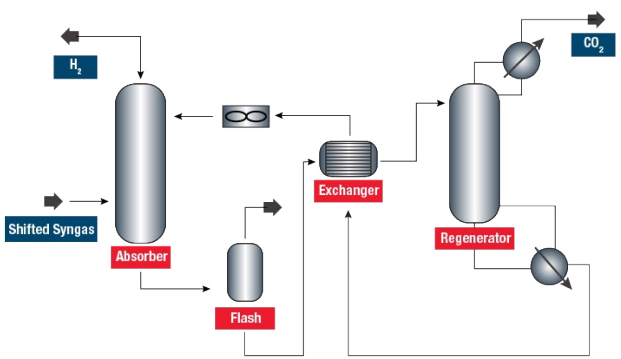
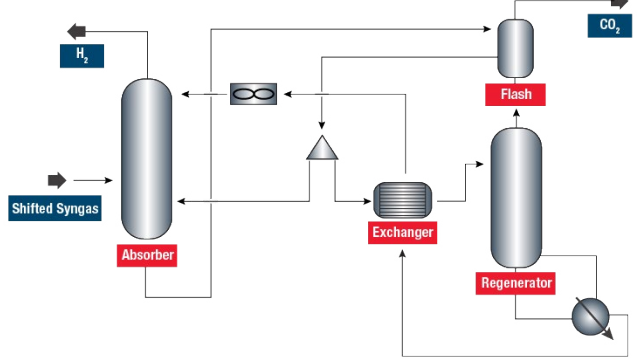
A case study on a shifted syngas stream from an ATR-based process compared three CO<sub>2</sub> capture designs for blue hydrogen: single-stage, two-stage, and Dow's High-Pressure Regeneration process with UCARSOL™ CC Solvent 510, all targeting >99.9% CO<sub>2</sub> removal (<150 ppmv).

Dow's High-Pressure Regeneration process demonstrated superior performance relative to the other options studied, reducing energy consumption and operating costs while maintaining greater than 99.9% CO<sub>2</sub> removal.

### Dow's Offering for Blue Hydrogen Production using Conventional Amine Processes

Dow offers specialty products and experienced technical support to address CO<sub>2</sub> capture and purity requirements, while maximizing efficiency and reliability in **single-stage** and **two-stage** designs:

- **UCARSOL™ AP Solvent Series and SELEXOL™ Max Solvent:** Formulated solvents for exceptional CO<sub>2</sub> absorption and separation
- **UCARSOL™ HS Solvent Series and SELEXOL™ Solvent:** CO<sub>2</sub> desulfurization
- **PURDRY™ 100 and NORKOOL DESITHERM™ Specialty Dehydration Fluids:** CO<sub>2</sub> dehydration
- **Technical Service:** Experienced technical support, and state-of-the-art analytical laboratory

Single-Stage Design Overview	Two-Stage Design Overview
<p>A simple, single absorber system where all solvent is fully regenerated for CO<sub>2</sub> removal.</p>	<p>Dual absorption sections: bulk CO<sub>2</sub> removal with semi-lean solvent and polishing with lean solvent.</p>
<ul style="list-style-type: none"> <li>• Simplest design with lowest equipment count</li> <li>• Lower capital cost for the amine unit</li> <li>• Well-established and widely adopted</li> </ul>	<ul style="list-style-type: none"> <li>• Lower steam consumption</li> <li>• Flexible optimization for site-specific conditions</li> </ul>
<p><b>Considerations:</b> Higher steam consumption and operating costs; low CO<sub>2</sub> pressure requires compression.</p>	<p><b>Considerations:</b> Higher circulation rates and complexity; compression costs remain.</p>
 <p>Figure 1: Conventional single-stage absorption process.</p>	 <p>Figure 2: Conventional two-stage absorption process</p>



Ready to learn more?  
Contact us!

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