

C.02

Carbon Capture

Introduction

The capture of carbon dioxide emissions from existing industries is essential in realising global targets to decrease emissions of greenhouse gases to the atmosphere.

The Carbon Capture technology employed by SUEZ can be immediately retrofitted to virtually any exhaust gas system, including coal or gas-fired boilers, gas turbines, blast furnaces, and cement kiln off-gas.

The process enables carbon dioxide to be selectively absorbed from flue gas via counter-current contact with a regenerable solvent. The solvent is a patented aqueous amine or amino acid solution specially designed to selectively absorb CO₂ from gas streams.

Each package is designed in close consultation with the client to ensure the best overall design is achieved.

Design Basis

The design of Carbon Capture Systems is unique to each situation with the overall package design varying to meet each client's specified process conditions.

Each system is typically designed and built as a complete turn-key package with particular emphasis given to the following issues:

- CO₂ product purity
- Minimum solvent losses
- Minimum utilities consumption
- Optimum plant efficiency & design integrity
- Compliance with HSE requirements
- Environmentally conscientious design

Process Description

In a typical CO₂ Capture package, hot flue gas passes through the scrubber tower, where it is cooled with cooling water (1), before being fed to the absorber tower. The gas enters near the bottom of the absorber tower and flows upwards through the internal packing (2), coming into contact with the solvent, which enters near the top of the tower, as the solvent cascades down through the tower. As the flue gas rises through the tower the carbon dioxide level is progressively reduced as it is absorbed by the solvent meaning the treated gas vented from the absorber (3) is virtually free of CO₂.



Hazelwood Power Station Carbon Capture Plant
Location: Victoria, Australia

SUEZ – Oil & gas systems
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Australia - Korea - Middle East - Singapore - USA

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Carbon Capture



From the bottom of the absorber tower the CO₂-rich solvent is pumped through the lean-rich exchanger (4) to pre-heat the solvent before it enters the regenerator tower. In the regenerator the solvent is heated via the reboiler (5) to reverse the absorption reaction. As the solvent cascades down through the tower, CO₂ is gradually desorbed from the solvent (6). By the time the solvent reaches the bottom of the tower virtually all the absorbed CO₂ has been released and the CO₂-lean solvent is cooled and pumped back to the top of the absorber tower to repeat the process (7).

The desorbed CO₂ exits the regenerator tower as a pure, water saturated gas from where it is cooled (8) and then passes through the reflux accumulator to remove excess water (9). The pure carbon dioxide product gas is then ready for direct use or further processing.

Value Adding

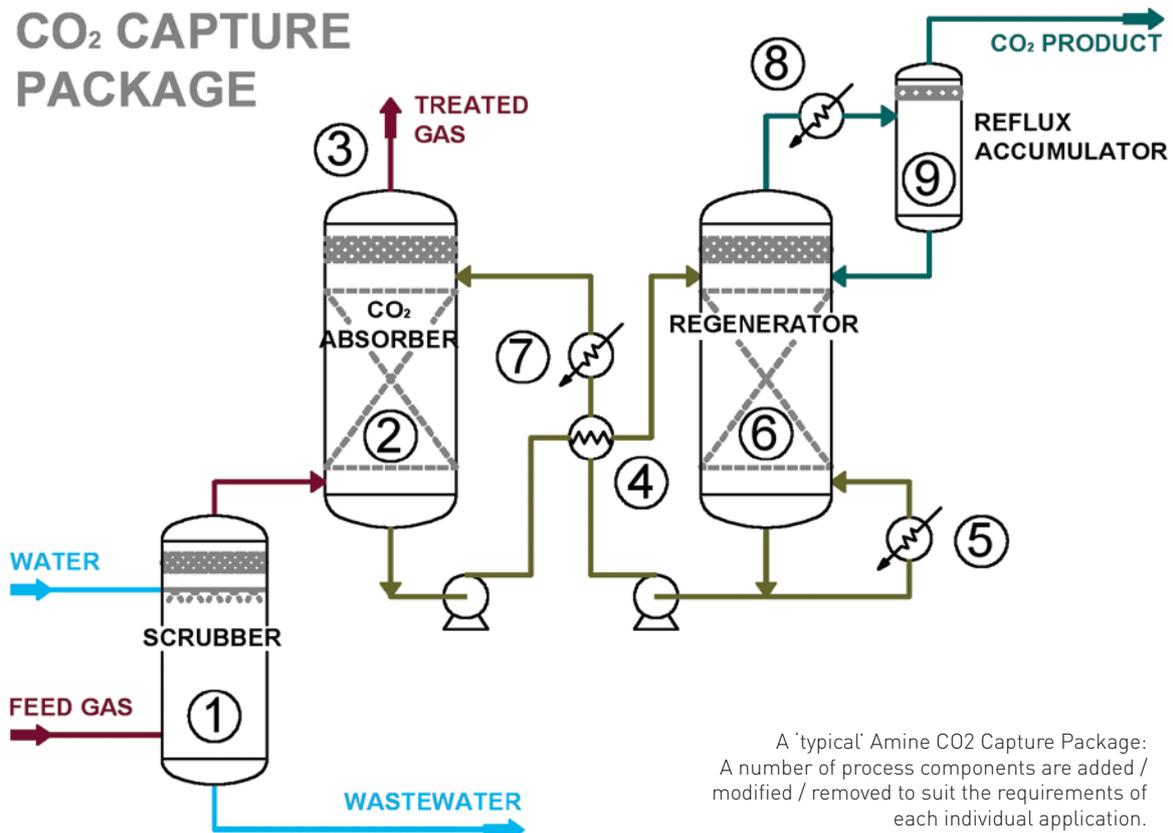
SUEZ can provide expertise in processing captured carbon dioxide for various applications including:

- Liquefaction for commercial use
- Wastewater pH control
- Enhanced oil / gas recovery
- Mineral sequestration
- Geo-sequestration
- Enhanced agriculture

Future Technologies

SUEZ is closely associated with The Cooperative Research Centre for Greenhouse Gas Technologies (CO₂CRC) providing access to the latest advances in carbon capture technologies.

CO₂ CAPTURE PACKAGE



A 'typical' Amine CO₂ Capture Package:
A number of process components are added / modified / removed to suit the requirements of each individual application.