FILTRATION APPLICATIONS IN GAS (AMINE) SWEETENING SYSTEMS

Gas Sweetening is a critical procedure in gas processing facilities. To meet sales specifications and maintain efficient operations, natural gas goes through a sweetening process to remove contaminants; primarily H_2S because of its corrosiveness and $C0_2$ for its lack of heating value. Amine solvents are widely used to remove these contaminants from natural gas or lighter hydrocarbon products. Typical industries that perform gas sweetening include: gas production sites, gas processing plants, refineries, LNG facilities, petrochemicals, etc.

Because of highly corrosive and contaminant laden environment, amine processes require an optimum filtration/separation system to operate properly. Seldom is a single contaminant responsible for amine system operating problems. These contaminants can include fine solid particulates such as iron sulfides and liquid hydrocarbons in aerosol form.

The most common filtration problems in an amine unit are foaming and fouling. Foaming will reduce effective absorption in the contactor tower resulting in high amine carryover rates and replacement costs.

Treatment of gas extraction will dramatically decrease resulting in reduced flow and the injection of costly foaming inhibitors to regain control of the amine system.

Fouling occurs from excessive particulate concentrations and can lead to poor amine/feed gas contacting and off-spec gas. Resulting problems include: tray plugging in the absorber and regenerator towers, heat exchanger/reboiler failure, carbon bed fouling, etc. In addition, corrosive contaminants can degrade amine strength, decrease gas treatment capacity, increase energy usage, and lower equipment life.

Benefits of an optimized filtration/separation system include:

- Reduction of burner tip fouling
- Reduction in absorber (contactor) plugging
- Prevention of amine foaming
- Reduction in use of costly anti-foaming inhibitors
- Reduction in equipment fouling
- Increased carbon bed life
- Reduced amine consumption
- Lower operating and maintenance costs

JONELL SYSTEMS™
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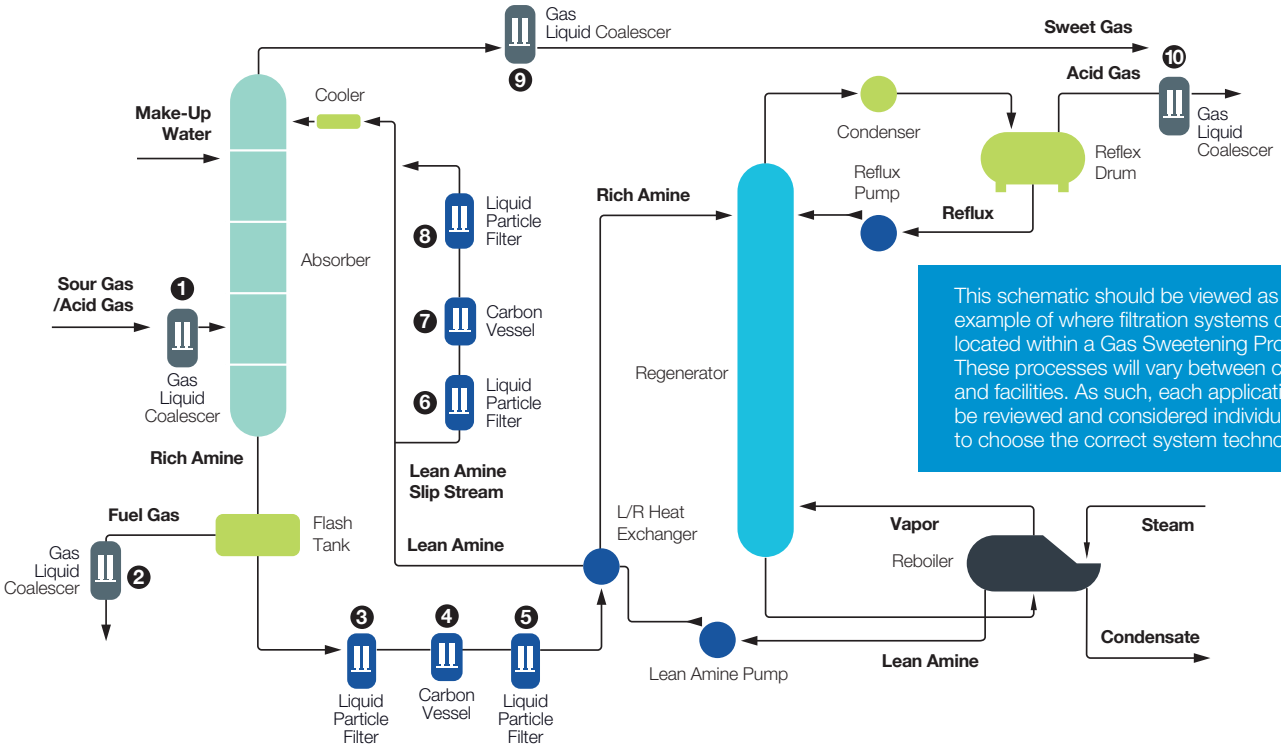
Solutions for Gas (Amine) Sweetening Process



This schematic should be viewed as a general example of where filtration systems could be located within a Gas Sweetening Process. These processes will vary between companies and facilities. As such, each application should be reviewed and considered individually in order to choose the correct system technology.

- Inlet gas enters the bottom of the absorber/contactor column flowing upwards through a series of trays and is countercontacted with the aqueous amine solution absorbing the acid gas in the amine.
- Purified (sweet) gas exits at the top of the absorber/contactor column.
- Rich amine solution, which has H2S and CO2 molecules attached, leaves the absorber and flows to a flash tank then passes through a Lean/Rich cross exchanger to the upper section of the regenerator/ stripper column.
- The rich amine is heated in the regenerator/stripper column by contacting hot vapors from the reboiler causing the acid gas molecules to be stripped from the amine, thereby regenerating the solution.
- Steam and acid gases separated from the rich amine are condensed and cooled.
- The stripped acid gas typically flows to a sulfur plant for further processing.
- The condensed water is separated in the reflux accumulator and returned to the still.
- The hot lean amine from the reboiler is circulated back to the absorber/ contactor after passing through the lean/rich amine cross exchanger and a lean solution cooler.

	Filter Solution	Filter Purpose	Filter Benefit
01	Micro-DEP™ and Micro-LOK™ Series Coalescer Elements and Vessel	Removal of hydrocarbon, water, and other liquids and solids from sour gas feed.	Reduces absorber foaming and fouling, increases absorption and carbon bed efficiency.
02	Micro-DEP™ and Micro-LOK™ Series Coalescer Elements and Vessel	Removal of carried over amine, water, and heavy hydrocarbons.	Maintains fuel gas quality and protects downstream equipment.
03	LiquiPleat™ Series Liquid Filter Elements and Vessel	Removal of scale and solid contaminants and protect the carbon filter system.	Prevents carbon bed plugging, fouling in the reboiler and heat exchanger, and reduces foaming problems.
04	CarboPUR™ Series Activated Carbon Canisters	Removal of of dissolved organic acids produced by amine degradation and trace liquid hydrocarbons.	Reduces amine foam in the regenerator (stripper) and degradation in the reboiler.
05	LiquiPleat™ Series Liquid Filter Elements and Vessel	Removal of carbon bed fines.	Protects downstream equipment. Prevents heat exchanger and reboiler fouling.
06	LiquiPleat™ Series Liquid Filter Elements and Vessel	Removal of scale and solid contaminants including iron sulfites and protect the carbon filter system.	Reduces foaming problems, prevents carbon bed plugging, and prevents absorber fouling.
07	CarboPUR™ Series Activated Carbon Canisters	Removal of dissolved organic acids produced by amine degradation and trace liquid hydrocarbons.	Reduces system corrosion and foaming tendency, and maintains solvent activity.
08	LiquiPleat™ Series Liquid Filter Elements and Vessel	Removal of carbon bed fines.	Protects downstream equipment and prevents fouling in the absorber.
09	Micro-DEP™ and Micro-LOK™ Series Coalescer Elements and Vessel	Removal of carried over amine.	Protects downstream equipment and processes.
10	Micro-DEP™ and Micro-LOK™ Series Coalescer Elements and Vessel	Removal of water, amine, and liquid hydrocarbons.	Protects downstream equipment. Reduces maintenance and downtime costs at sulfur recovery unit.

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