



ELEVATED STANDARDS. DEEPER INSIGHTS.



Valerus Glycol Regenerator

Remove water from saturated glycol, preparing it for reuse in the absorber for removing water vapor from natural gas.

The glycol regenerator (or "re-concentrator," or "re-boiler") is an essential component of a glycol dehydration system, and is designed to drive off water absorbed from natural gas in the absorber/scrubber. The glycol regenerator comprises a heater, distillation column, filtration and pumps to process and circulate the glycol in a modular skid package.

CUSTOMER CHALLENGE

Lowering the water content of the gas to pipeline or process specifications.

Natural gas contains both free and vaporized water when gathered from the well. Free water is easily removed in gravity separators, but as gas is transported in a pipeline, water vapor can condense to the liquid phase, causing corrosion, erosion, blockage and downstream equipment malfunction. High water content can also disrupt gas processing by condensing and freezing or contributing to the formation of gas hydrates.

In order to avoid these problems, water vapor must be removed from the gas to achieve either a certain maximum water content — measured as pounds of water per million standard cubic feet (MMscf) of gas — or a certain maximum dew point temperature, at which water will condense from vapor phase in the gas stream.

VALERUS SOLUTION

Valerus addresses this challenge with triethylene glycol (TEG) natural gas dehydration systems. TEG is a liquid desiccant that absorbs water molecules from saturated gas. After the glycol has extracted the water, it is regenerated in a glycol regenerator, where the water-saturated or “rich” glycol is heated to drive off the water as steam. The reconcentrated or “lean” glycol is then re-circulated through the absorber to repeat the process of continuously dehydrating natural gas. The Valerus glycol regenerator achieves high purity levels (low glycol water content) to meet stringent pipeline and process performance requirements.

BENEFITS

- Economical and efficient way to remove water from natural gas
- Convenient, modular packages for quick and easy setup
- Self-contained, self-powered systems do not require utilities for operation
- Designed for regenerating ethylene and triethylene glycol (EG/TEG)
- Standard systems rated from 125 MBtu/hr to 2 MMBtu/hr to meet quick delivery timelines for a wide range of processing needs

FEATURES

- Energy-saving shell insulation with aluminum jacket
- Removable fire tube and stack
- 50–550°F thermometer with thermowell
- High reboiler temperature fuel gas shut-off with manual reset
- Fuel gas regulator, scrubber and pressure gauges
- Instrument gas regulator and pressure gauges
- Flame arrestor with burner and pilot assembly
- Integral insulated glycol storage compartment
- Liquid level gauge assembly
- Particulate sock filter with initial elements (all models)
- Cartridge-style charcoal filter with initial elements (750 MBtu/hr and larger)
- High-pressure glycol strainer
- External glycol/glycol heat exchanger
- Pump bleeder valves
- Energy exchange (gas operated) glycol pump(s)
- Heavy-duty welded structural steel skid with lifting lugs and/or pull bars
- Removable, packed still column
- Complete piping for hookup, including absorber and reboiler isolating valves for units up to 500 MBtu/hr
- Environmentally sound bent tubing and socket weld glycol piping and valves for one-inch and larger pipe sizes to prevent leaking

OPTIONS

- Electric-drive glycol pumps
- Electronic burner management system (optional solar panel)
- Gas sparger system in surge tank to improve glycol purity
- Instrument air connection
- Reflux coil in still column (standard 1.5 MMBtu/hr and larger)
- BTEX recovery system to condense and capture hydrocarbon vapors exiting still column
- Weather protection options including insulation, heat tracing and housing as required

HOW IT WORKS

Lean (concentrated) glycol is pumped into an absorber, which is designed to put the glycol into close contact with the water-saturated natural gas. After the glycol has absorbed water from the gas, it has also become saturated and must be regenerated if it is to be reused for gas dehydration.

The rich (water-saturated) glycol is routed from the sump of the absorber to the glycol regenerator, where it is separated from entrained natural gas, filtered, and then pre-heated in the glycol/glycol heat exchanger before entering the still column. The still column is a tower filled with loose-fill packing and serves to release water vapor from the system, as well as to condense any glycol vapors that may be entrained in the released water vapor.

The rich glycol then flows from the still column by gravity into the reboiler, which comprises an insulated atmospheric tank with an integral lean glycol reservoir, and a heating section with a gas-fired heater (fire tube) submerged in the rich glycol. Rich glycol is heated to just under 400°F, which causes the absorbed water to be released from the glycol and exit the reboiler through the still column. The regenerated (lean) glycol flows over a weir into the storage compartment of the reboiler.

The hot, lean glycol is then pumped from the storage section through the glycol/glycol heat exchanger, where it gives up heat to the incoming rich glycol stream. The cooled, lean glycol is pumped to the absorber, where it is reused to dehydrate natural gas in a continuous cycle.