Gas dehydration TEG – 1M

1. General:

The design was developed for compact natural gas dehydration systems in completely assembled and tested units ready for standard road transport.
The complete system can be packed on three standard trucks and can be erected on site within few days.

2. Technical data

Fluid:	Sweet Natural gas
Drying medium:	TEG (Tri ethylene glycol)
Gas flow rate:	1.000.000 nm³/h
Operating pressure:	40 – 70 bar(g)
Operating temperature:	10 – 20 °C
Ambient temperature:	-30 / +30°C
Water dew point output:	-8°C @ 40 bar(g)

3. Absorber

The absorber is designed as a vertical column with inlet gas scrubber section to separate free water and liquids efficiently. After the separation section the gasenters the dehydration section. The gas passes the structural packages upwards while the TEG flows down through the packages and absorbs the water. The reaction is supported by the large surface of the structured packages.
In the gas outlet section a demister for the removal of droplets is situated to avoid glycol losses in the absorber.

4. TEG Cooler (Gas-TEG Heat Exchanger)

To cool the TEG to the necessary inlet temperature before entering the absorber a shell and tube heat exchanger is situated in the outlet piping of the absorber.

5. Regeneration

The TEG is drained from the absorber and expanded in a two phase separator. Flash gases are used as strip gas and will be recycled as fuel gas for the burner.
The TEG is leaded from the separator via filters to the TEG-TEG Heat Exchanger, is pre heated and enters the distillation column. In the reboiler the TEG is heated up and the water evaporates at low operating pressure. The lean TEG is cooled down in the surge drum and TEG-TEG Heat exchanger and transferred by high pressure TEG pumps to the absorber.
The reboiler is heated by direct firing with a forced draft burner.

6. Safety and control

All safety valves, shut down valves for a safe operation and emergency shutdown are included in the scope.
All necessary level, temperature and pressure gauges with local indication and/or transmittal of the signals to the control system are included.
The complete system is controlled by a Siemens S7 control system and separate burner management system.

Absorber including Gas-TEG Heat exchanger and container frame

7. Layout and installation of the equipment

The complete scope is prefabricated in transportable units. All equipment within the units are completely assembled and tested in our work shop. At site connecting piping and connecting cabling has to be performed by the client or can be performed by HEAT as an option.

- **Absorber unit:**
  The absorber unit is fabricated in the dimensions of a 40´ container. The transportation of the unit occurs in horizontal position and at site the complete unit is lifted and erected in vertical position.
  The absorber unit consists:
  - Absorber including packing, demister and all internals
  - Gas-TEG Heat exchanger
  - TEG Level control and drain facilities
  - Gas pressure reduction line for fuel gas
  - Instrumentation
  - Electrical heat tracing for condensate sump
  - Insulation of sump

Battery limits – Terminal points Absorber unit:

- Gas inlet absorber, 10” ANSI 600 RF
- Gas outlet absorber, 10” ANSI 600 RF
- TEG inlet from regeneration, 1” ANSI 600 RF
- TEG outlet to regeneration, 1”ANSI 600 RF
- Fuel gas to regeneration unit, 1”ANSI 150 RF
- Junction box, cabling from control room

Gas production facility with two production lines, each 1.000.000 nm³/d

- **Regeneration unit:**
  Most of the regeneration equipment is mounted into a 40´ container. The container is fitted with large doors for service and maintenance. The wall and roof is constructed with insulated panels. Lighting and electrical heating of the container is ready installed. The intake of the combustion air occurs with air hos from the outside of the container
  The regeneration unit consists:
    - Flash separator
    - TEG level control and drain facilities
    - Flash gas pressure and flow control
    - TEG filters
    - Reboiler with distillation and overhead condenser
    - Forced draft burner including control unit
    - Surge drum with TEG-TEG Heat exchanger
    - High pressure plunger pumps
    - Condensate separator with drain pump
    - Instrumentation
    - Insulation of equipment

Battery limits – Terminal points regeneration:

- TEG inlet from absorber, 1” ANSI 600 RF
- TEG outlet to absorber, 1”ANSI 600 RF
- Condensate drain, 1” ANSI 150 RF
- Exhaust vapor outlet, 4” ANSI 150 RF
- Gas, condensate inlet from condenser, 2” ANSI 150 RF
- Fuel gas from absorber unit, 1”ANSI 150 RF
- TEG filling, 1”ANSI 150 RF
- TEG drain, 2”ANSI 150 RF
- Vent stack
- Junction box, cabling from control room

Reboiler with burner and surge drum

Condensate separator with drain pump

- **Condenser unit:**
  The condenser is erected in a 10´ container unit with open deck. The condenser is equipped with air fans and louver.

Battery limits – Terminal points condenser unit:

- Exhaust vapor inlet, 4” ANSI 150 RF
- Condensate, gas outlet, 2” ANSI 150 RF
- Junction box, cabling from control room

- **Control room:**
  The complete control system is situated in a 10´ container with control panels including touch screen for all operation modes of the dehydration unit. The control system based on Siemens S7-300 controller and all hard- and software is ready implemented.

Battery limits – Terminal points:

- Control panel terminal to junction boxes in the units
- Power supply 400 VAC to control panel
- Uninterruptible power supply (UPS)

8. Site erection by client / Exclusions

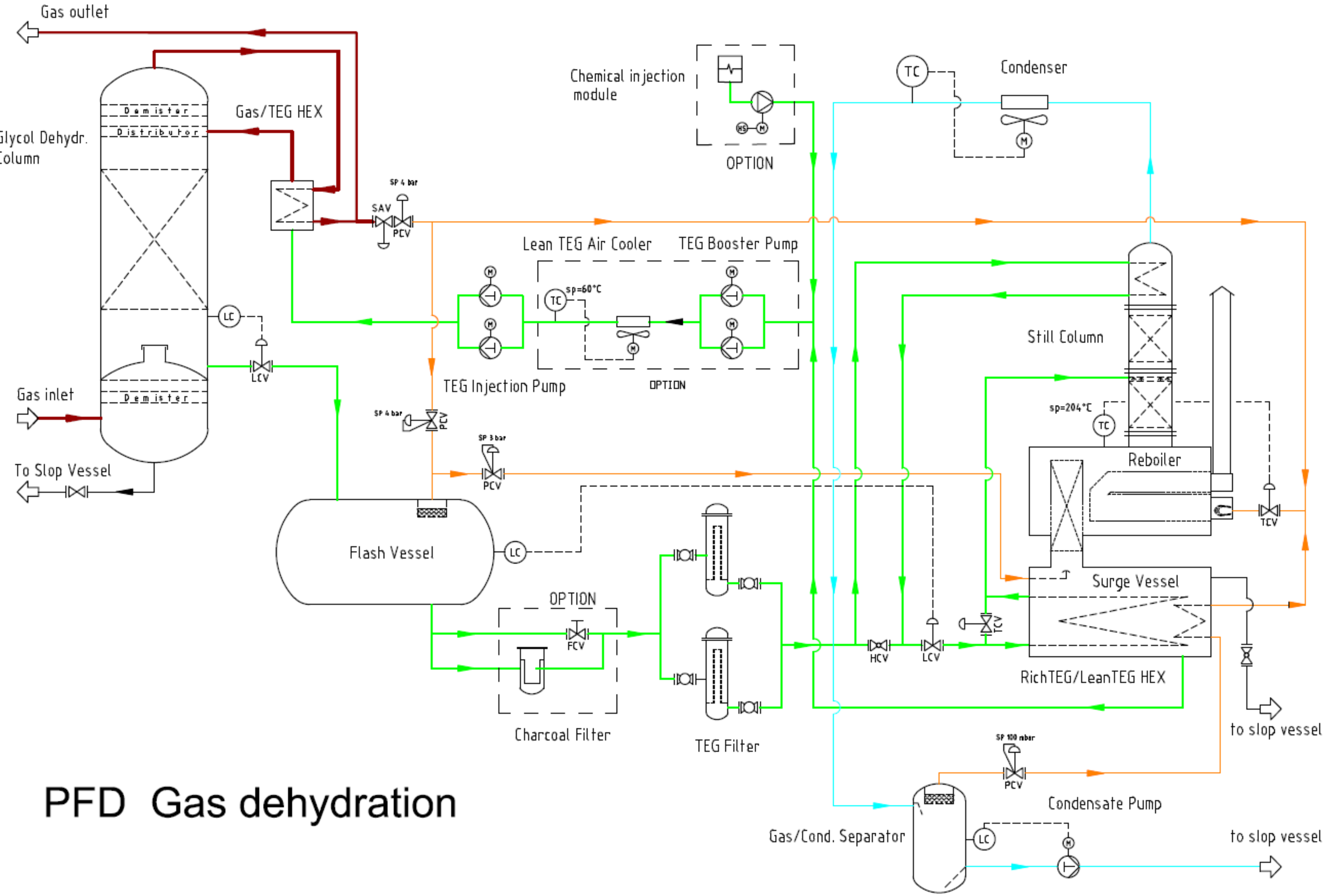
The prefabricated and tested equipment will be transported at site and has to be erected by client. Supervision or erection can be quoted optional on request.

- All foundations and civil works
- Transport, unloading, erection of the units
- Interconnecting piping between the units
- Interconnecting cabling between the units
- Connection to all terminal points
- Power supply
- Local approvals

9. Options:

The above described design is able to handle the operation within the design data range under section 1. To handle different design parameter some options can be supplied:

- Charcoal filter for hydro carbon absorption
- Booster pumps and TEG – Air cooler for high gas temperatures
- Three phase separator for hydro carbon – TEG separation
- Heat tracing for stand by operation
- NACE design for sour gas



PFD Gas dehydration

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