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Hydrocarbon Dew Point Control

Introduction

Hydrocarbon Dew Point Control Units (DPCUs) are designed to inhibit the formation of solid hydrates in gas streams and by default they perform a level of dehydration. This is achieved through the injection of a liquid Hydrate Inhibitor directly into the gas stream. The Hydrate Inhibitor is selected based on low viscosity and low freezing temperature rather than dehydration ability.

There are 2 common types of liquid Hydrate Inhibitor used for Dew Point Depression:

- Mono-Ethylene Glycol (MEG)
- Methanol (MeOH)

The type of Hydrate Inhibitor used and the package design depends on several factors, and the end-users specific requirements and objectives for the gas stream being processed.

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

Design Basis

The design of a DPCU follows a basic structure. However, there are a number of approaches to achieve the end means – Hydrocarbon Dew Point Depression.

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

- Discharge gas hydrocarbon dew point,
- Discharge gas water dew point,
- Minimum inhibitor losses,
- Minimum power consumption,
- Optimum plant efficiency & design integrity,
- Compliance with HSE requirements,
- Environmentally conscientious design.

The resulting design will be influenced by all of these factors, and the emphasis & importance given to each particular issue.

ENI Blacktip Gas Processing Facility MEG DPCU package
Location: Northern Territory, Australia

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Process Description

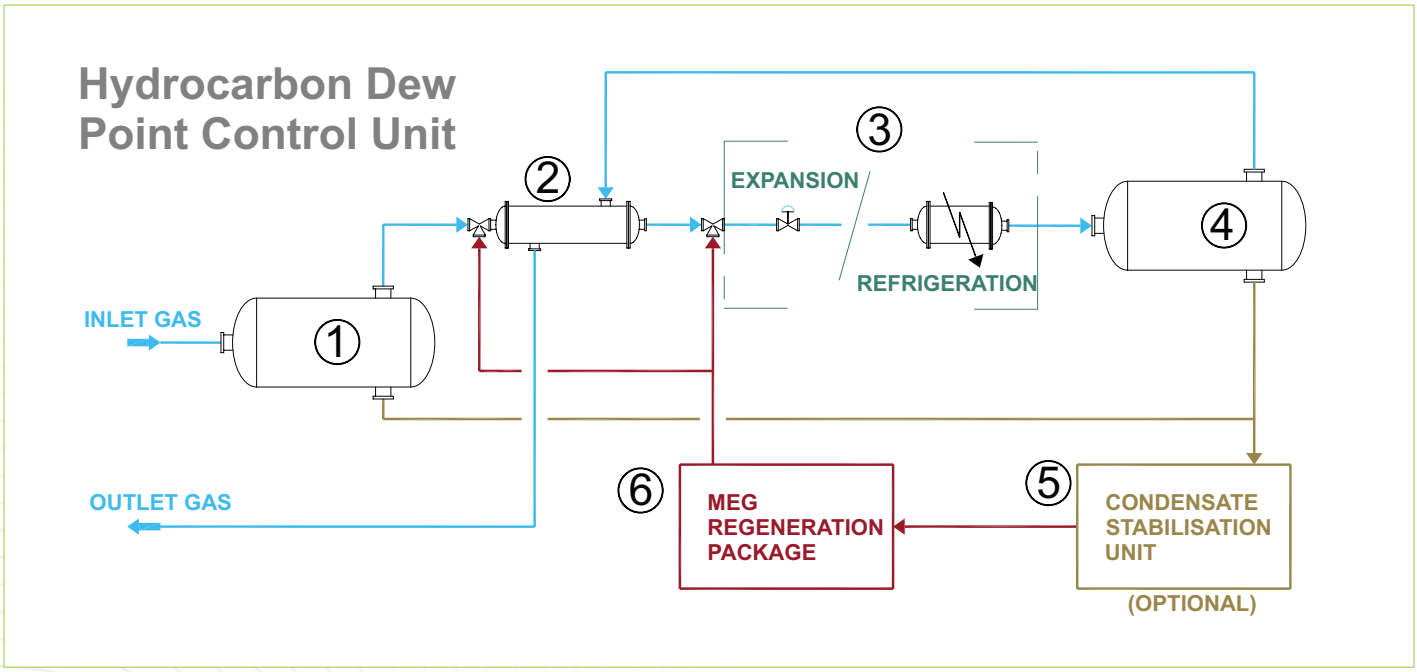
In a typical MEG Injection Dew Point Control Unit (DPCU), the gas is first passed through an Inlet Separator (1) where any free liquids are removed.

Just prior to entering the gas/gas exchanger pressurised Lean MEG is injected into the gas stream (2). Additional MEG is injected and the MEG-gas mixture is then further cooled through either Expansion (Joule-Thompson Valve/ Orifice) or Refrigeration (3).

The further cooling condenses any residual water and/ or hydrocarbons. A Low Temperature Separator (LTS) (4) is located downstream to remove any free liquids – now including the condensed water, condensed hydrocarbons and injected MEG. The cooled gas with a depressed dew point is circulated back into the gas/gas exchanger for pre-cooling of the inlet gas (2).

The LTS is generally a 3-Phase Separator which allows the effective separation of not only the gas from the liquids, but also the aqueous and hydrocarbon liquid phases from one another.

The aqueous phase, containing the water and MEG is routed to the MEG Regeneration Package where the water is driven off to produce Lean MEG. The liquid hydrocarbon phase is usually mixed with the liquids from any inlet separation and either routed to storage or further processing in a Condensate Stabilisation Package.



A 'typical' Hydrocarbon Dew Point Control Unit
A number of process components are added/modified/removed to suit the requirement of each individual application.