DIETHYLENE GLYCOL (DEG), TRIETHYLENE GLYCOL (TEG)

Application

An example of absorption dehydration is known as Glycol Dehydration. In this process, a liquid desiccant dehydrator serves to absorb water vapor from the gas stream. Glycol, the principal agent in the process, has a chemical affinity to water. During the process, the glycol concentration decreases and water content increases. Due to glycol loss continuous replenishment is required.

The regeneration should be minimized since it involves combustion emission. The refractometer indicates when glycol regeneration is required.

Essentially, a glycol solution is used in glycol dehydration, usually either Diethylene Glycol (DEG) or Triethylene Glycol (TEG), which is brought into contact with the wet gas stream in what is called the contactor. The glycol solution will absorb water from the wet gas. Once absorbed, the glycol particles become heavier and sink to the bottom of the contactor, from where they are removed. The natural gas, having been stripped of most of its water content, is then transported out of the dehydrator.

The glycol solution, bearing all the water absorbed from the natural gas, is put through a specialized boiler designed to vaporize only the water out of the solution. While water has a boiling point of 100 ºC (212 ºF), glycol does not boil until 200 ºC (392ºF). This differential boiling point makes it relatively easy to remove water from the glycol solution, allowing it to be reused in the dehydration process.

Introduction

Natural gas processing consists of separating all the various hydrocarbons and fluids from the pure natural gas to produce what is known as pipeline quality dry natural gas. It means that before the natural gas can be transported, it must be purified and most of the associated water must be removed.

Most of the liquid (free water) is removed by simple separation methods at, or near, the wellhead. However, the removal of the water vapor, which exists in natural gas solution, requires a more complex treatment. This treatment consists of dehydrating the natural gas either by absorption or adsorption.
Instrumentation and installation

The K-Patents Process Refractometer PR-43-GP is installed after the stripping column to monitor the concentration of glycol after the regeneration process. The refractometer provides Ethernet and 4-20 mA output signals that can be used as feedback control to adjust the column’s parameters, thus ensuring the target glycol specification. During the dehydration of the gas, the concentration of glycol decreases because of the absorption of water. Another refractometer can monitor the concentration of glycol to ensure an effective process and indicate when regeneration is required.

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<th>Instrumentation</th>
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<td>K-Patents Process Refractometer PR-43-GP is a heavy-duty instrument with non-weld body construction for diverse oil and gas industry applications. The refractometer is installed in the main processing line by welding stud and flange connection for 2 inch, 2.5 inch and larger pipe sizes and vessels, or via flange and FTC Flow through cell connection for 0.5 inch, 1 inch, 1.5 inch and 2 inch pipe sizes.</td>
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User Interface

Selectable multichannel MI, compact CI or a web-based WI user interface options allow the user to select the most preferred way to access and use the refractometer measurement and diagnostics data.

Measurement range

Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.

Standard sensor material can be used in this application. Appropriate equipment with hazardous and intrinsic safety approvals are available when required.