APPLICATION NOTE

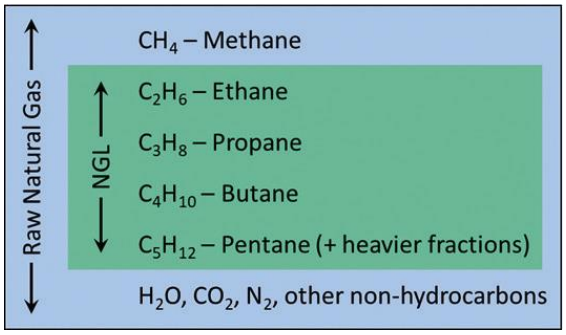
2.04 PETROCHEMICAL

SAYBOLT COLOR - ON-LINE MONITORING OF NGL COLOR

The recovery of NGL from raw natural gas has significant economic value, however receivers at the end of NGL pipelines are highly concerned about fluid quality, as impurities can damage refining equipment.

APPLICATION

Natural gas when it is first recovered from a well is a mixture of C1 through C6+ hydrocarbons along with contaminants such as water, sulfur compounds, and carbon dioxide.



Gas processing plants separate methane (C1) from the raw natural gas stream for distribution around the country in natural gas pipelines. The remaining products (C2+) are typically transported in an NGL pipeline for further processing at other facilities such as refineries.

Several steps are needed in the separation process. First, acid gases such as CO_2 and H_2S are removed (sweetening) and water is removed. The resulting sweet, dry gas is processed in either a refrigeration or cryogenic separation plant. These plants liquefy the C2+ to separate it from the methane. The C2+ liquid mixture is commonly referred to as natural gas liquid (NGL). The recovery of NGL brings significant additional economic value to gas processing operations. NGL contains products that can be used as direct energy sources and as raw components for various petrochemical processes.

MONITORING OF NGL QUALITY IS CRITICAL

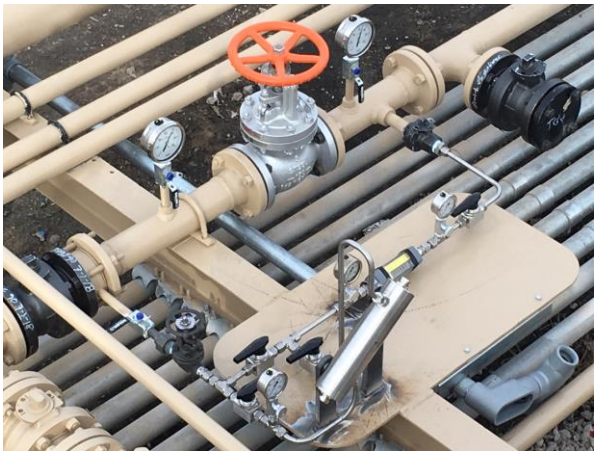
The composition of NGL varies widely from gas field to gas field but all contain similar components (propane, butane, ethylene, *etc.*). Of prime importance to the receiver at the end of the NGL pipeline is the quality of the fluid. A stream that contains a great deal of impurities can be damaging to refining equipment and costly to clean up. Contracts between supplier and receiver can often contain clauses that allow the receiver to back charge costs incurred when low quality streams are received. As many pipelines are shared, it is of prime importance to monitor the inputs to the pipeline in order to apportion such costs properly in the event impure material is received.

A key quality indicator of NGL is its color. The presence of impurities such as sulfur-bearing compounds and corrosion products result in a yellowing of the NGL. This yellowing can be very subtle and almost imperceptible to the human eye, but still creates problems downstream. This color can be easily measured on the standard Saybolt color scale.

INSTALLATION

The Kemtrak DCP007 photometric analyzer is ideally suited to continuous, in-line color analysis of NGL. The Kemtrak DCP007 is a fiber optic based unit that is specifically configured to each application. Using an all-in-one-place electronic design, the optical bench and all electronics are contained in one compact enclosure for ease of installation. Light is generated using non-drifting LED sources and connected to application optimized sample measurement cells using ruggedized industrial fiber optic cables. Measurement cells meet the sample demands of a high-pressure liquid hydrocarbon while electrical compliance is not an issue as there is no at line electrical connections or sensors.

Kemtrak measurement cells require very simple sample handling systems; all that is required is a stable flow running through the measurement cell to ensure the measurement is a true representation of the actual process flow. Particulate and turbidity in the sample are not an issue and are compensated for using a reference wavelength.



The sample cell can be installed directly in the process line, although it is more typically installed in a side stream to aid maintenance and contractual verification requirements. A NIST validation accessory could be attached to the measurement cell both if it is installed directly in the pipe or in a by-pass for easy verification.