

On-Line Monitoring of NGL Color with Western Research® Model 4000

Recovery of natural gas liquids (NGL) from natural gas fields can bring significant additional economic value to gas processing operations. NGL is both an important energy source and a valuable feedstock for various petrochemical processes.

Measurement Requirement

The composition of NGL varies widely. A key quality indicator is its color which is an indication of the amount of impurities present. Impurities include both sulfur-bearing compounds and corrosion products. These contaminants result in a yellowing of the NGL. This color range is always measured on a standard color scale such as Saybolt.

AMETEK Solution

AMETEK Process Instruments' Model 4000 photometric analyzer is ideally suited to the continuous, on-line color analysis of NGL. The modular, customizable Model 4000 can be configured to meet both the sample demands of a high pressure liquid hydrocarbon and the electrical requirements of a hazardous location. Sample handling and conditioning systems for this application typically minimize maintenance needs by including both a means to filter solid contaminants from the liquid and a means of flushing the liquid hydrocarbon from the sample system with an inert liquid or gas. In addition, the sample stream is maintained at 65 degrees Celsius to avoid the clouding that can take place if the liquid is too cold.

Process Overview

Natural gas is a mixture of C1 through C6+ hydrocarbons along with contaminants such as water, sulfur compounds, and carbon dioxide among others. When significant concentrations of C2+ are present, it becomes economically profitable to separate these compounds from the methane (C1). First, the raw natural gas is sweetened, to remove acid gases such as CO₂ and H₂S, and dehydrated to remove water vapor. Then, the sweet and dry gas

is processed in either a refrigeration or cryogenic separation plant. These plants liquefy the C2+ so that it can be easily separated from the methane and other light gases present in the natural gas. The C2+ liquid mixture is commonly referred to as NGL.

Process Instruments Expertise

The use of a Model 4000 photometric analyzer system includes the full global sales, service and training support available from AMETEK Process Instruments. AMETEK's application expertise in chemical processes and the handling of toxic, flammable, and corrosive samples ensure the successful application of the Model 4000 for on-line color monitoring of various process liquids.

The Model 4000 photometric analyzer can be used in a wide variety of gas phase and liquid phase applications. It provides the following features:

- No moving parts within the optical bench provides excellent analysis stability and unmatched reliability
- A split-beam photometer design which is highly resistant to interference from entrained bubbles and particulates
- A customizable, modular, and integrated system for UV and VIS applications

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Typical NGL color system for any NEC/CEC Class I, Division 2.

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- Optional heated sample cell compartment available for operation up to 110°C
- Auto zero and auto span-filter calibration capabilities which eliminate the need for expensive and difficult-to-obtain calibration fluids
- Various mounting configurations for installation in existing shelters or in stand-alone system enclosures for outdoor installation
- Optional configurations for NEC/CEC Class 1 and ATEX Zone 1 locations

Other Model 4000 color monitoring applications

- Saybolt color (ASTM D156) of: LNG, kerosene, sour gasoline, stove oil, naphtha, paraffin, sour condensates
- ASTM D1500 color of: diesel, gasoline, heavy distillate, gas oil
- APHA (ASTM D1209) color of wastewater
- ICUMSA color of sugar liquid and detection of color precursors
- Gardner color (ASTM D154) of vitamin E oil
- EBC color of beer



Analyzer and sample system are customizable for installation and sample handling requirements.

AMETEK®
PROCESS INSTRUMENTS

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NGL Color 4000 (06/04/07)

One of a family of innovative process analyzer solutions from AMETEK Process Instruments.
Specifications subject to change without notice.

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