

## Application Note: Color in LNG (liquefied natural gas) with a ClearView® db Photometer

Given the large volumes of LNG under transport, ROI on real-time measurement systems such as the ClearView db can be measured in days. LNG is natural gas cooled to a liquid state. Natural Gas is composed primarily of methane, but may also contain propane, ethane, and other heavier hydrocarbons as well as small residual quantities of N<sub>2</sub>, O<sub>2</sub>, CO<sub>2</sub>, H<sub>2</sub>O, and some sulfur containing compounds. Prior to liquefaction these residual materials are removed with only clean hydrocarbons remaining. The composition of natural gas can vary slightly from different producing locations. Typically LNG is a colorless material, but during distillation the carryover of larger hydrocarbons (C6+) can affect the color of the LNG (typical specification for C6+ in LNG is 0 to 0.05%).

Measuring the Saybolt or ASTM color online is a key parameter in many light hydrocarbon mixes for quality control to detect this carryover. Monitoring the color allows the refiner to verify that the product is within specification. Any "out of spec" product can be reprocessed before being sold.

The flowchart in Figure 1 shows a typical natural gas to LNG process with target measuring points for online analysis.

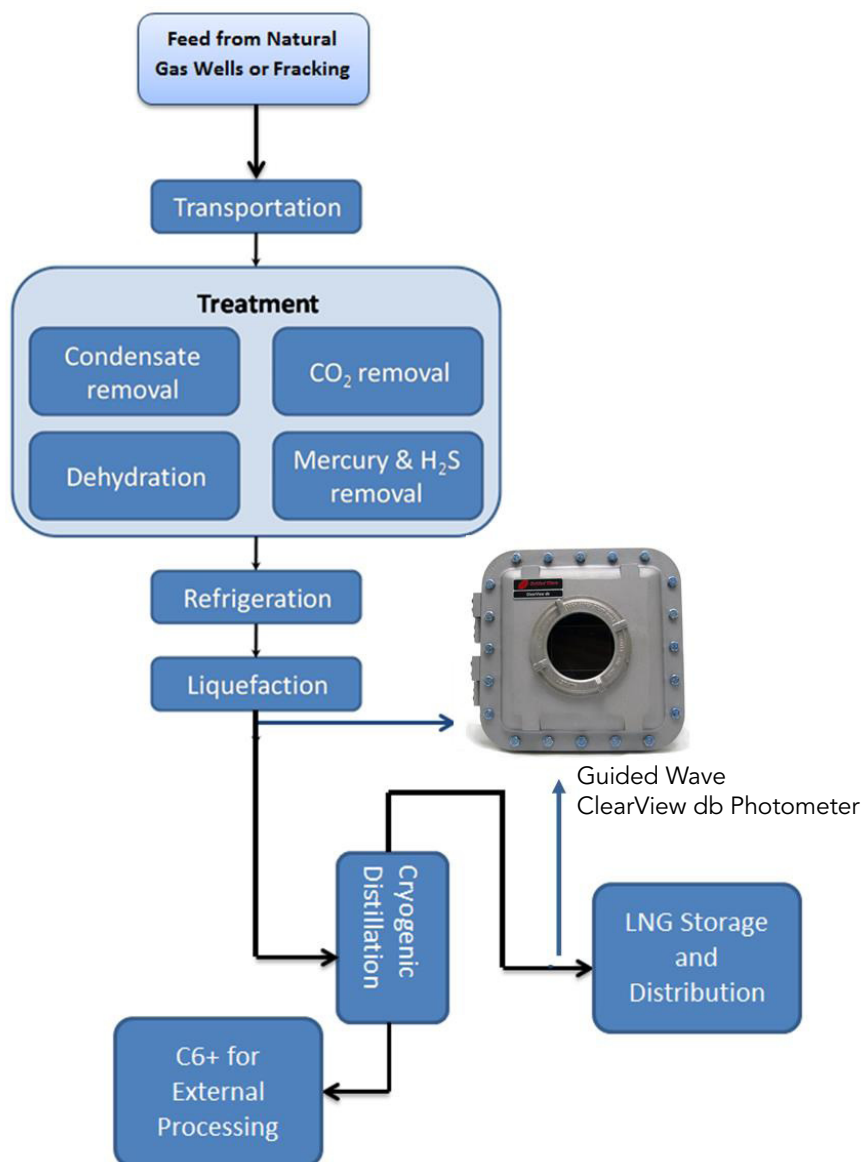


Figure 1: Natural Gas Processing

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Saybolt Color (ASTM D156) has a scale that ranges from -16 (darkest) to +30 (lightest). Figure 2 shows the Saybolt measurement scale on a ClearView db photometer equipped with a standard 50mm pathlength cell. Any material darker than -16 can be measured using the ASTM Color scale (ASTM D1500). Both Saybolt and ASTM color can be measured online in realtime using a ClearView db dual beam photometer. Also see Guided Wave application note #3070 titled: Online Monitoring of ASTM (D1500).

The ClearView db can be configured to measure either one or two sample points. Each unit can have 4-20 mA analog outputs (6 outputs max on a single channel system, and 4 outputs per channel on a dual channel system) along with corresponding contact closure outputs to alert error states. The ClearView db is also capable of Modbus TCP communication via Ethernet.

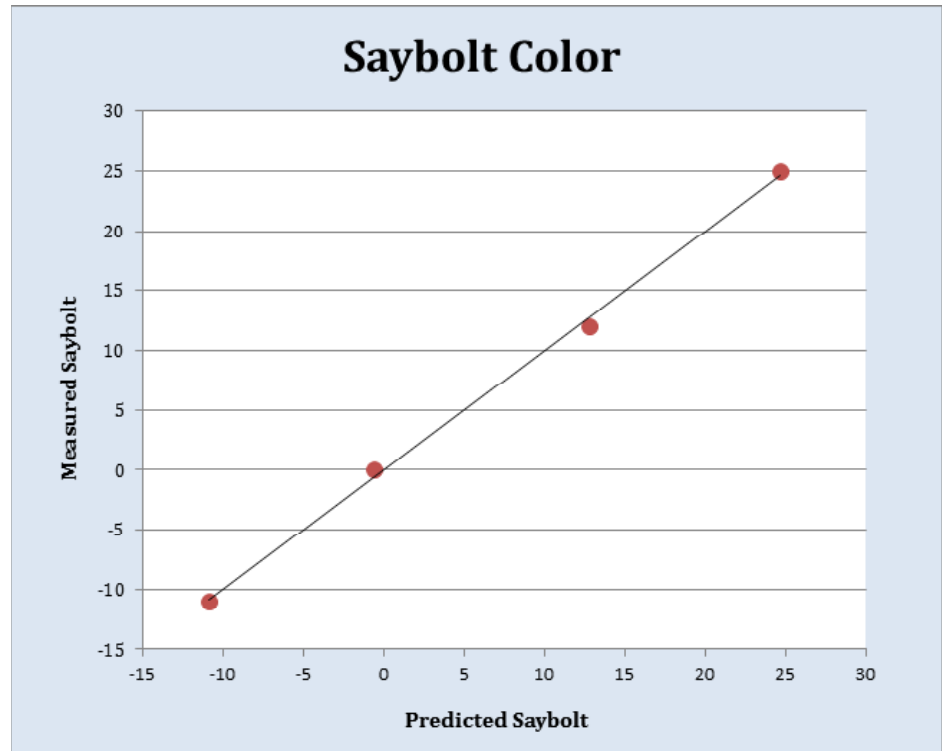


Figure 2: Saybolt Color as Measured by a ClearView db Photometer

### ClearView db Enclosure Options



Zpurge Unit  
Class I, Division 2



ExProof Unit  
Class I, Division 1



General Purpose  
Unit