

NATURAL GAS LIQUIDS (NGL) AND LIQUID HYDROCARBONS

Typical end products

n-butane and iso-butane

Introduction

Chemical plants and refineries receive or deliver many different liquid hydrocarbons, including Natural Gas Liquids (NGLs) which are transported via pipeline, railcar, tanker trucks and/or ship. Many of these products are very similar in properties and appearance, therefore, proper identification or interface detection of these hydrocarbons at transport locations that handle multiple products is important to ensure good quality assurance. Combining an interface detection device with automatic controls can minimize transmix of products, reduce waste, reduce the filling/unloading times, decrease safety risks, reduce sampling and minimize operator errors.

Refractive index can be a reliable method for identifying liquid hydrocarbon products since each hydrocarbon has a different and distinct refractive index. This refractive index is a property inherent to the hydrocarbon, and can be used to "fingerprint" the product for identification. This "fingerprint" can be applied to a scale to achieve the proper controls.

Application


Two typical products that require proper interface detection are n-butane and iso-butane. These are the two structural isomers of butane meaning they have the same molecular formula but different arrangement of the chemical structural. Since they are isomers, the chemical properties of these

products are very similar, in particular, the density. However, the difference in refractive index is wide enough to accurately and reliably distinguish between these two products. K-Patents can provide an accurate and repeatable refractive index measurement to ± 0.0002 . Often, we apply this refractive index number to the Brix scale so that whole number values are used.

Installation

K-Patent Process refractometer is typically installed in main supply line and the inlet of the product storage. This provides adequate timing for interface detection and double assurance of the hydrocarbon product being delivered to the desired storage.

The refractometer should be installed in a location that is constantly wetted, due to the digital sensing technology small amounts of entrained air or gases will not affect the measurement. Normal wetted parts are stainless steel 316L with other options available on request. Appropriate hazardous and intrinsic safety approvals are available if required. No wash system is recommended.

Instrumentation	Description
 <p>The image shows a white industrial refractometer with a digital display showing '25.31'. It has a red cylindrical component and a metal probe attached to the front.</p>	<p>K-Patents Process Refractometer PR-23-GP is an industrial refractometer for large pipe sizes and tanks. Installation through a flange or clamp connection.</p>
<p>Area classification:</p>	<p>Intrinsic safety and hazardous area approvals available.</p>
<p>Measurement range:</p>	<p>Refractive Index (nD) 1.2600 – 1.4700.</p>