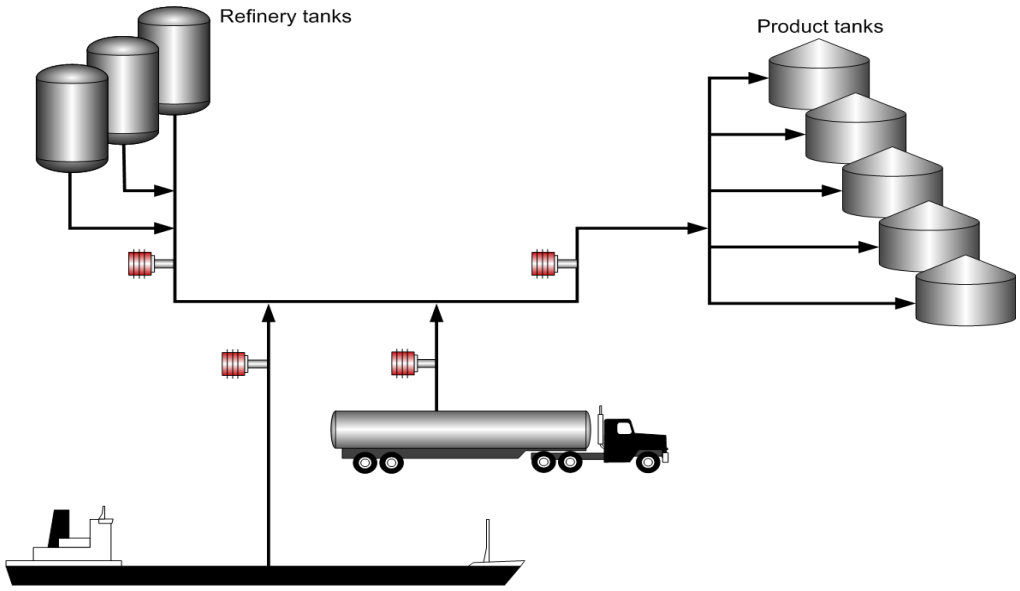

CRUDE OIL, FUEL OIL, DIESEL, MULTI-PRODUCT INTERFACES

Typical end products

Crude oil, fuel oil

Introduction

Fuel oils are transported from oil refineries to end-users via a complex distribution system. Identifying the fuel type is a necessity, as different types of fuels are handled and passed through these distribution systems. The fuels are directed into the appropriate product tanks at the discharge end of the system. Accurate and reliable interface detection is required to ensure that each product ends up in the correct tank, as product contamination can be very costly.

Application

The refinery and pipeline operating personnel identify the interface visually, through color variation. These visual indicators are sometimes enhanced by the use of markers such as dyes (pigs). Sampling is also done to verify identification.

The time it takes for the interface to pass is extremely short, typically less than five minutes. The exact time will depend on the flow rate. This requires a rapid response in order to make the appropriate selections.

Typical values of transportation fuels:

Fuel	API Density	Brix	n_D @ 25°C
Gasoline	55-65	45-51	1.4098–1.4222
Jet Fuel	50-40	64	1.4511
Diesel	30-40	71	1.4679

The K-Patents Process Refractometer PR-23-GP provides an in-line and real-time indicator for interface detection. The difference between the Refractive Indexes for different fuels is wide, so that the interface can be detected reliably. The typical Refractive Index range is between 1.400 and 1.4630 at a temperature of 25°C (77°F).

Crude oils of different origins have different Refractive Indexes. It is also important for the user to be able to differentiate between the various crude oil types.

Installation

If the pipeline operates at a very high pressure, it might require the K-Patents refractometer to be mounted on to a slip stream or on the low pressure side of the pipeline.

Appropriate equipment with hazardous and intrinsic safety approvals are available when required. Stainless steel 316L SS can be specified for sensor wetted parts if the service conditions do not demand the use of special materials. No wash system is recommended.

Instrumentation	Description
	K-Patents Process Refractometer PR-23-GP is an industrial refractometer for large pipe sizes and tanks, cookers, crystallizers and kettles. Installation through a flange or clamp connection.
Area classification:	Intrinsic safety and hazardous area approvals available.
Measurement range:	Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.