PRODUCT AND CIP LIQUID INTERFACE

Typical end products
Different liquid food and beverages such as egg, ice-cream, beer, juice, soft drinks, flavored water, wine, etc.

Chemical curve: R.I. per BRIX at Ref. Temp. of 20˚C

Introduction
Many processing plants use the same filling station for a range of different products. For example, breweries run beer and soft drinks in the same station. The operation of high-speed in-line filling machines can be improved by utilizing real-time Refractive Index measurement technology.

Automated monitoring and control of the Clean-In-Place (CIP) process allows products to be switched, without the need for a shutdown. Therefore, productivity can be increased without compromising the end product.

Application
CIP is performed to remove traces of products in the filling line, and for food safety and quality assurance.

After a first product is run through the pipeline to packaging, the pipes are flushed with CIP cleaning chemicals and water. When CIP is completed, the filling line is ready to pass a fresh product.

In order to save valuable production time, the second product is pumped through the pipeline right after the wash cycle. This can only be done if the interface between product-to-CIP liquid and product-to-product is instantly detected.

Instrumentation and installation
The K-Patents Sanitary Refractometer PR-43-AC is installed at the end of the filling line to monitor concentration level of the medium. When the concentration reaches a pre-set limit and there is no water present, the refractometer 4-20 mA or Ethernet output signal activates the end-product filling with no delay.

When there are separate lines for the product and for the CIP cleaning media, the water flows to a sewer while the pipe is full of product. The refractometer gives an instant alarm when the concentration reaches its top limit. This signal can be used to switch valve direction. During filling, the valve is open to the filling line and closed to the sewer. During CIP cleaning and at the initiation of the fresh product release, the valve closes the filling line and the stream is then diverted to the sewer.

The K-Patents refractometer instantly detects the product-to-product and product-to-CIP cleaning interfaces. The refractometer’s output signal can also be utilized for quality control monitoring. This ensures...
a correct product and container combinations, and that the end product complies with the specifications.

**High accuracy -HAC version for low concentration beverages**

The high accuracy version Sanitary Process Refractometer PR-43-A-HAC is capable of measuring low concentration beverages, diet soft drinks and flavored waters directly and on a continuous basis, rather than depending on periodic samples or indirect methods, such as density measurement. This refractometer version is intended to be used in applications where the accuracy and repeatability requirement are high, but the process variations are low and operating range limits of 0–30 Brix and 4-30 °C (40-85 °F).

The K-Patents PR-43-AC is available with 3-A sanitary and EHEDG certification.

The K-Patents refractometer monitoring of product Brix allows for instantaneous and real-time filling station quality control.

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<tr>
<th>Instrumentation</th>
<th>Description</th>
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<tr>
<td><strong>K-Patents Sanitary Compact Refractometer PR-43-AC</strong></td>
<td>for hygienic installations in small pipe lines sizes of 2.5 inch and smaller. The PR-43-AC refractometer is installed in the pipe bend. It is angle mounted on the outer corner of the pipe bend directly, or by a flow cell using a 3A Sanitary clamp, I-clamp or Varinline® connection.</td>
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| User Interface | Selectable multichannel MI, compact CI or a web-based WI user interface options allow the user to select the most preferred way to access and use the refractometer measurement and diagnostics data. |

| Measurement range | Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 Brix. |