CARBONATED SOFT AND ALCOHOLIC DRINK MIX (CHUHAI)

**Typical end products**
Carbonated soft drink mix with whiskey, vodka or other alcoholic beverage, water and juice (grapefruit, lime, apple, orange, pineapple, grape, kiwi, peach, strawberry cream, cream soda), Chuhai.

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

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**Introduction**

Alcoholic and soft drink mix, e.g. Chuhai (an alcoholic drink originating from Japan) is prepared by mixing carbonated water flavored for example with grapefruit juice, and alcoholic beverage, such as whiskey, vodka or shōchū (a Japanese distilled beverage).

Quality assurance using in-line process refractometer for fast and reliable product identification and set-point detection is important. Combining a refractometer with automatic controls can minimize transmix of products, reduce waste, reduce the filling times, decrease safety risks, reduce sampling and minimize operator errors. A highly automated process is essential for achieving precise in-line alcoholic soft drink mix.

**Application**

Water, juice and alcoholic beverage, such as whiskey, enter the system via balance tanks. The feed ratio of the three streams is controlled by flow meters and a process controller. Immediately after this, final blending to a pre-set Brix value is achieved by adding a small amount of water by way of a separate line. Then, the juice is passed through a circulation line, before it is ready for packing or bottling.

After the first batch is run through the pipeline to the filling machine, the pipes are flushed with Clean-In-Place (CIP) chemicals and water to avoid mixing between products. In order to save valuable production time, the second batch is pumped through the pipeline right after the wash cycle. At this point, it is important to detect instantly the product-to-product and product-to-CIP cleaning interfaces.

**Instrumentation and installation**

The K-Patents Sanitary Process Refractometer PR-43-AC provides accurate concentration measurement for precise control in the blending of carbonated alcoholic drinks. Because of its fast response, the K-Patents refractometer instantly detects the product-to-product and product-to-CIP liquid interfaces.

The refractometers’ output signal is also used for quality control monitoring, ensuring a correct product
and can or bottle combinations, and that the end product complies with specifications.

The PR-43-AC refractometer can be installed in two process points:

1. Concentration control in the blending unit. Here an accurate measurement of total concentration after adding all ingredients is important. Continuous in-line measurement provides important information that the final product is within specifications.

2. Product interface and product identification measurement in the pasteurizer to eliminate accidental mixing of the liquids. The product identification is based on Brix measurement. Refractive index and Brix measurement is a reliable method for identifying products since each liquid has a different and distinct refractive index value. The refractive index is a property inherent to the liquid and can be used as a fingerprint for product identification (Figure 1).

The K-Patents refractometer is installed in the circulation line. It is angle mounted on the outer radius of a pipe bend, either directly or through a flow cell and a Sanitary clamp or a Varinline® connection. The typical measurement range is 0-15 Brix at a temperature of 2-20°C (35 - 68°F).

With the K-Patents refractometer, a highly accurate concentration measurement is achieved. Thus, re-blending or penalties due to lower than specified Brix levels are avoided and loss of concentrate due to an overly high Brix level are minimized.

The K-Patents PR-43-AC is available with 3-A Sanitary and EHEDG certifications. Monitoring of product Brix with the K-Patents refractometer allows for instantaneous and real-time filling station quality control.

**Instrumentation**

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<td>K-Patents Sanitary Compact Refractometer PR-43-AC for hygienic installations in small pipe line 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. |