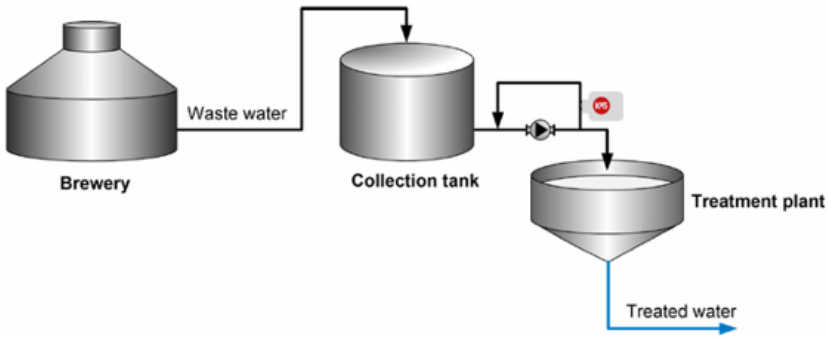
Benefits of R.I. measurement

- Real-time data ensures effluents meet environmental regulations, avoiding fines and operational disruptions.
- Allows proactive management of treatment processes.
- Safeguards water resources and supports sustainability initiatives.
- KxS DCM-20 straight pipe SFC flow cell connection offers significantly better flow velocity on measurement window (prism) compared to traditional elbow-mounted and T-piece installations. Proper flow ensures drift-free and reliable measurements.



Overview

The food, beverage, and brewing industries utilize significant quantities of water, generating high-organic strength wastewater and side-streams. Proper treatment of wastewater is crucial for environmental sustainability and regulatory compliance.

Other organic pollutants, including fats and flour, also contribute to a high organic load and depleting oxygen in receiving waters, leading to ecological harm. Excess organic content can result in fines, operational shutdowns, and reputational damage.

Refractive index measurement applications

Monitoring the organic pollutants, often measured by *Chemical Oxygen Demand (COD)* or *Total Organic Carbon (TOC)*, is essential.

TOC is the measurement of all organic carbons and is often used when levels of organic matter are low. A COD test measures all organic carbon except certain aromatics that are not entirely oxidized in the reaction.

However, the conventional COD and TOC methods have notable limitations. COD and TOC measurements often involve sampling and lab-based analysis, making them unsuitable for real-time process control.

Online TOC analyzers based on conductivity and non-dispersive infrared (NDIR) measurements, are expensive to maintain and prone to operational issues.

With advancements in automated and intelligent control systems, real-time monitoring has become indispensable for wastewater management. The KxS Process refractometer provides precise, continuous monitoring and excels in:

- Monitoring effluents in food and beverage production to control sugary effluents and meet compliance.
- Providing wastewater treatment plants with real-time data to manage fluctuating loads effectively.
- Identifying exceptional organic loads, optimizing treatment operations, and reducing costs.

Instrumentation and installation considerations

The KxS Technologies Process Refractometer DCM-20 can be installed at the dispersing pipe's outlet in the effluent sewer to measure the refractive index of effluents, providing instant information on the amount of dissolved solids. This refractive index technique has proven to be a successful method for effluent monitoring due to its strong correlation with COD and TOC values.

Typical measurement ranges for dissolved organics in wastewater span from 0 to 10,000 ppm, often measured using 0-1% by weight, Brix or total dissolved solids (TDS) scales for TOC (Total Organic Carbon).

For instance, when the target Brix level is set at 0-1 Brix, a threshold of 1 Brix can be configured to signal elevated dissolved solids (organics). This allows for immediate corrective action, such as diverting the flow to a collection tank, where the wastewater can be diluted before being sent to a municipal system or an on-site treatment facility.

The DCM-20 can also be installed in discharge lines within production facilities, allowing water of suitable quality to be recycled, reducing costs and the demand for water supply.

Moreover, the integration of continuous water quality monitoring in production areas provides real-time alarms for product losses, enabling rapid corrective measures.

SFC flow cell installation is non-negotiable for reliable performance

SFC flow cell installation is non-negotiable for reliable process refractometer performance in waste monitoring applications. KxS is the only refractometer on the market that offers the unique SFC flow cell innovation, which is significantly superior to traditional outer pipe bend elbow-flow or T-piece flow cells.

In outer pipe bends, the flow velocity is insufficient and creates unfavorable conditions for maintaining clean and

stable measurements. Additionally, pipe bends often do not provide the required laminar flow, leading to inconsistent readings. It is challenging to find suitable pipe bends for installation in plants, and even when such locations exist, they can be difficult to access for maintenance.

For waste monitoring applications, field experience has proven that the KxS SFC flow cell is mandatory to ensure the best laminar flow on the prism, keeping it clean and maintaining a stable measurement signal (see images on the side).

In most cases, the natural flow and self-cleaning effect are sufficient to keep the measurement window (prism) clean.

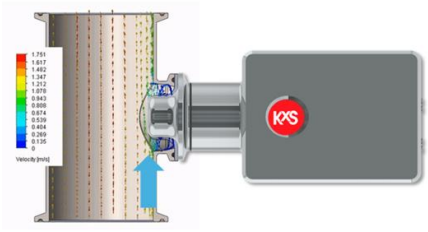
For situations requiring additional cleaning, KxS offers multiple options, including automatic steam or water cleaning, as well as mechanical cleaning method that avoids introducing water or cleaning agents into the process. This mechanical cleaning can be operated either manually or automatically.

KxS' mechanical cleaning solution is specifically designed for non-hygienic applications, such as watch-dog monitoring of wastewater concentrations, ensuring reliable performance even in the most challenging process conditions.

Traditional T-piece flow cell:

Consequences of improper installation: Flow velocity too low—fouling on prism

Flow on prism 0.5 m/s

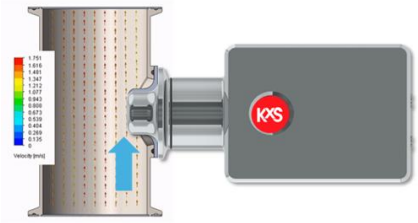


Flow 1.5 m/s

SFC flow cell:

Best laminar flow = Keeps optical window clean and signal stable
Best hygienity = Minimizes dead spaces and risk of contamination

Flow on prism 1.2 m/s



Flow 1.5 m/s