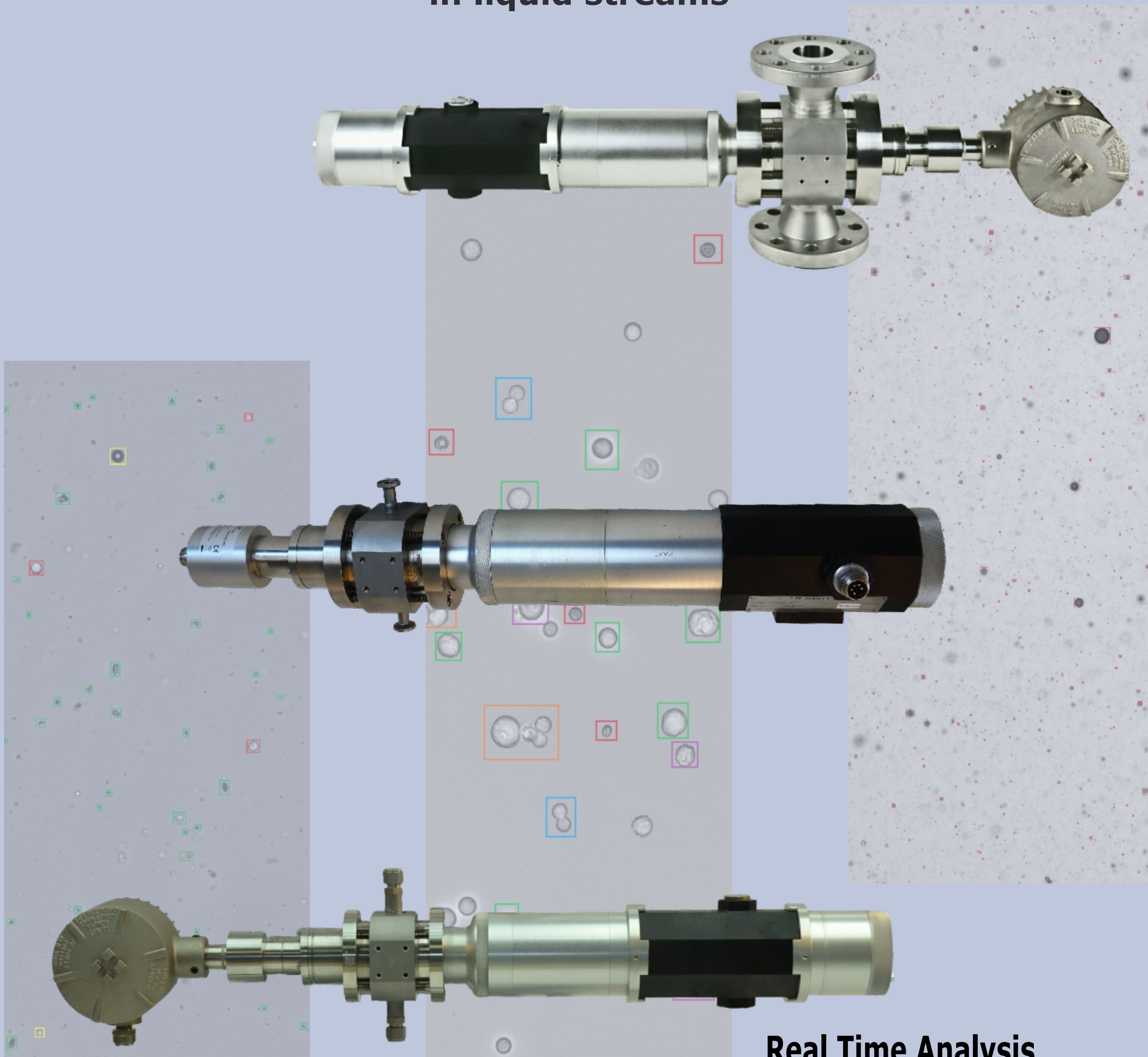
CANTY
Driven by Vision

INFLOW™ Brochure

Analysis of solids, droplets and bubbles in liquid streams

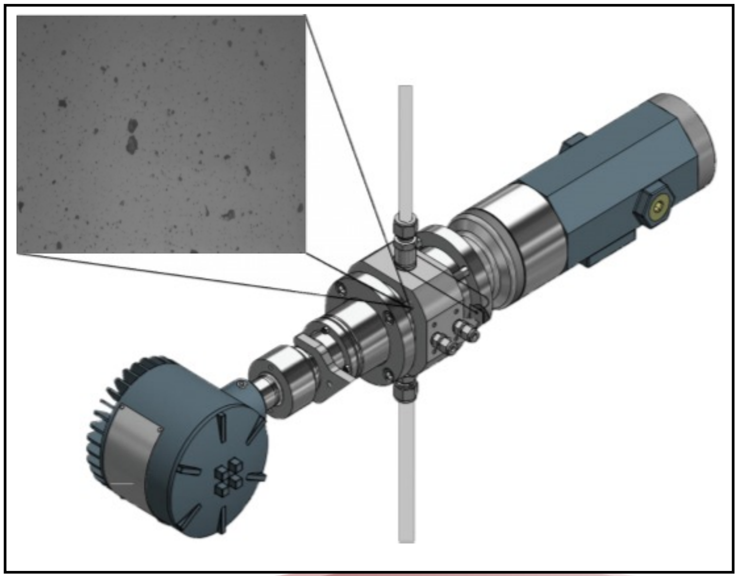


Real Time Analysis
Visual Verification
Imaging Based Technology

Inflow™ Analyzers Overview

Canty's Inflow™ analyzers are powerful tools designed to monitor any liquid stream. The system can be integrated directly into process piping or connected via sample line, providing seamless installation and immediate insights. As the material flows into the analyzer, it passes between a camera, equipped with a high magnification optic, and an LED light. The system captures video imagery of the material, enabling detailed measurement of:

- Particle size distribution
- Contaminant count and concentration
- Fluid color and turbidity



All measurements are taken simultaneously — and unlike traditional technologies, the Canty Inflow™ remains accurate even in the presence of gas bubbles.

Proven Applications:

The Canty Inflow™ is trusted across industries for monitoring:

- Total suspended solids (TSS) and hydrocarbons in aqueous streams
- TSS and water content in hydrocarbon flows
- Particle counts in lubricants and fuels
- Oil leak detection from heat exchangers
- And many more custom use cases

Expandable & Adaptable:

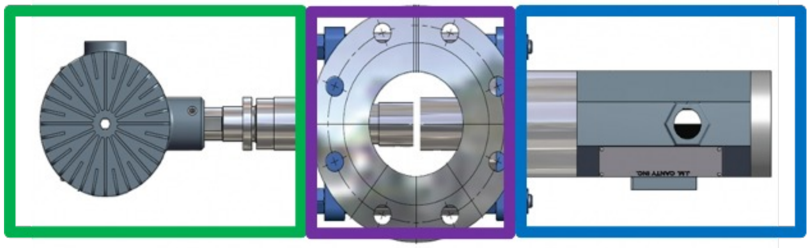
The Inflow™ can be paired with additional hardware for specialized needs, including:

- Skid cleaning systems
- Online sampling platforms

Inflow™ Components

An Inflow™ analyzer is comprised of 3 primary components:

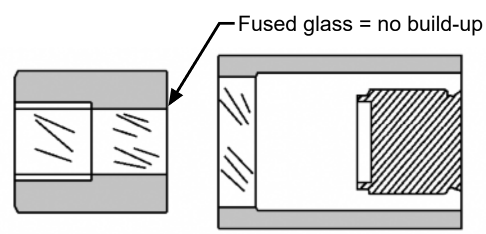
- LED light
- Flow cell
- Camera



LED Lighting - Canty has been making lighting for industrial processes since the company started in 1971. The lights designed for use in Inflow analyzers are the brightest across any industry, allowing for high quality imaging on fluids moving at linear speeds up to 5 m/s. The lights are guaranteed to operate for a minimum of 5 years without needing to be replaced!

Canty's Inflow™ analyzer features a fused glass flow cell engineered to withstand design pressures up to 600 bar. The fusion process creates a hermetic seal between glass and metal, eliminating crevices where contaminants typically accumulate. As fluids pass through, the flow cell aligns particles along their long axis, optimizing imaging and analysis. Optional cleaning systems include an internal jet spray ring that keeps the viewing area clear—ensuring consistently high-quality images.

Learn more about our fused glass technology on the website.



CANTY Fused Glass

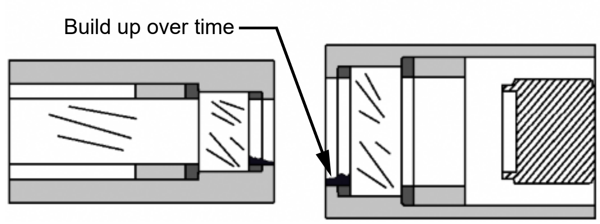
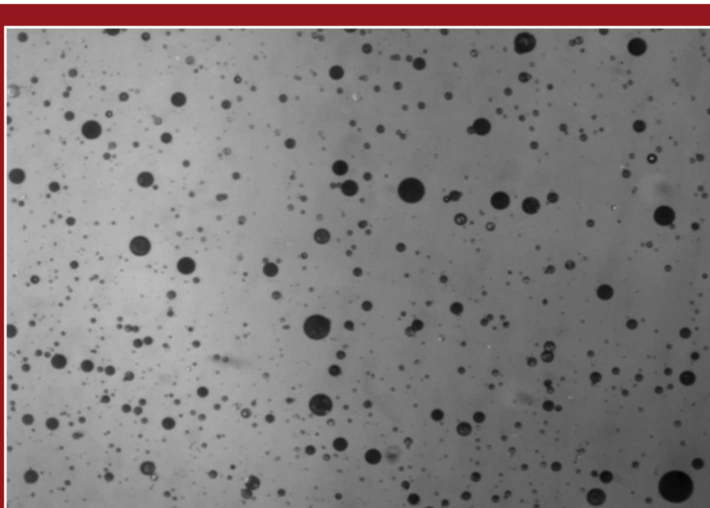


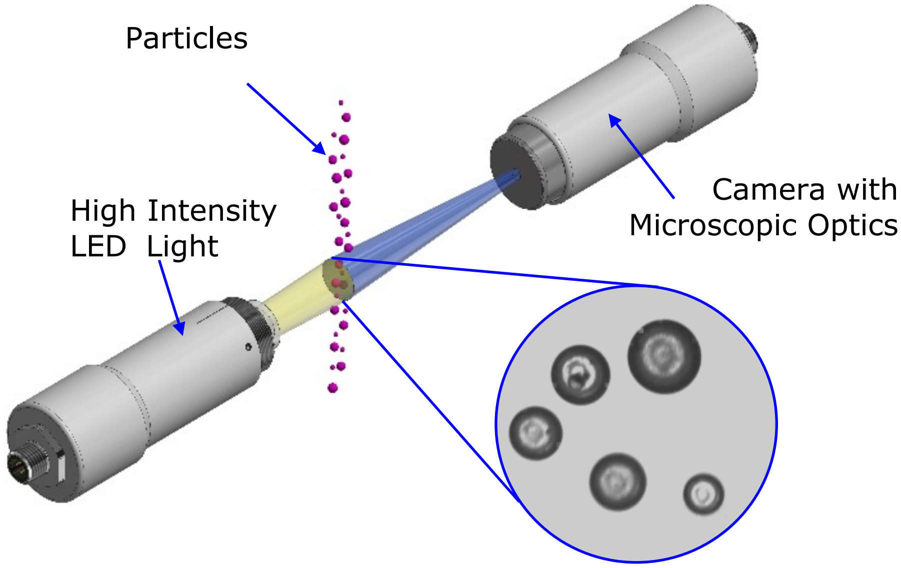
Plate Glass with Build-Up

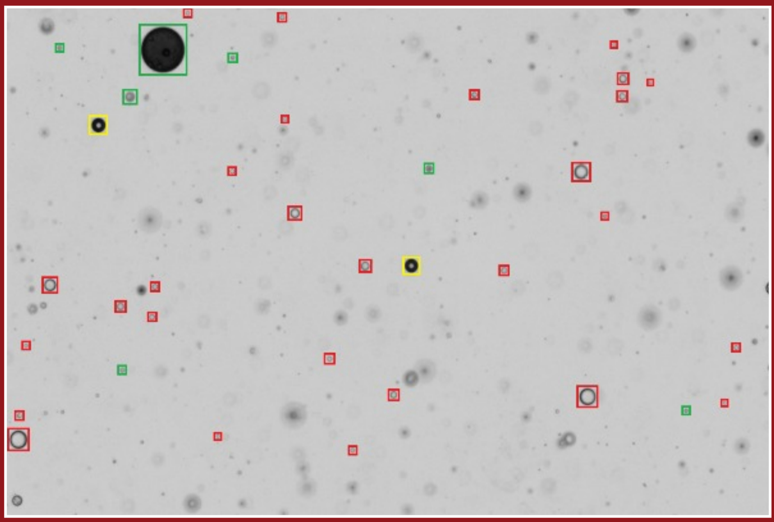


Each Canty Inflow™ analyzer is equipped with high-resolution Gigabit Ethernet CCD optics, rigorously tested to ensure long term durability in demanding environments. As imaging technology evolves, Canty continuously evaluates and integrates the latest advancements in cameras and lenses—delivering superior image quality without compromising the reliability or integrity of the analyzer.

Measurement Principles

Canty's Inflow™ uses dynamic imaging to analyze a live video stream of microscopic process fluid. Images of the fluid and any contaminants are captured and sent to the Vector Control Module (VCM) where analysis software processes the data in real time.

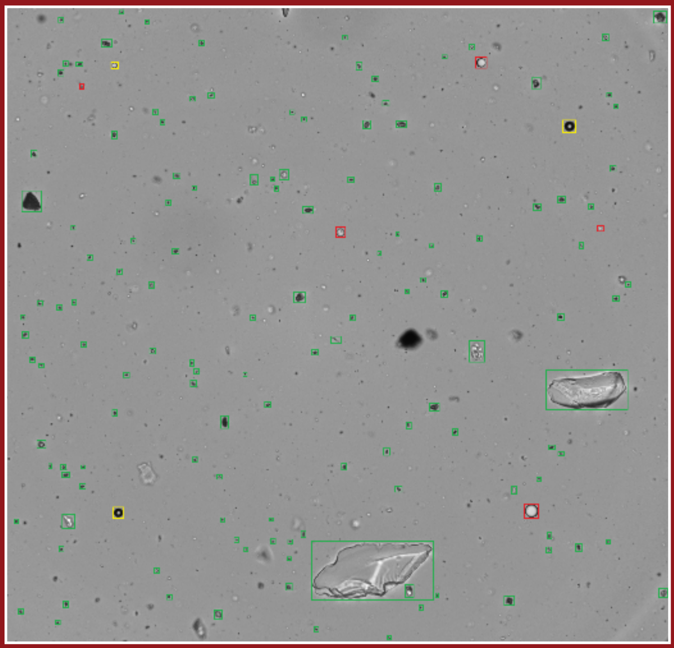


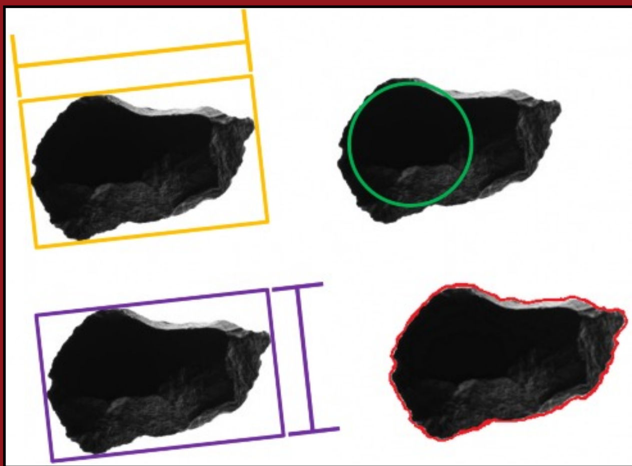


To ensure accurate measurements, each analyzer is calibrated installing a tool that displays a pattern of known size on the camera. This pattern allows the system to determine the pixel scale factor (PSF)—the physical distance represented by each pixel in the image—typically reported in micrometers per pixel (µm/pixel). With the PSF established, the 2-dimensional area of each frame can be calculated.

The lens utilized in an Inflow™ has a known depth of field (DOF). The DOF defines the range in which particles, such as droplets in a fluid stream, remain in focus. This depth measurement enables the system to calculate the three-dimensional volume in which particles are clearly visible and suitable for analysis.

During operation, the analyzer identifies and analyzes only those particles that fall within the defined focal volume. Any particles outside the DOF—those appearing blurred or out of focus—are excluded from measurement, ensuring consistent and reliable data across every frame.

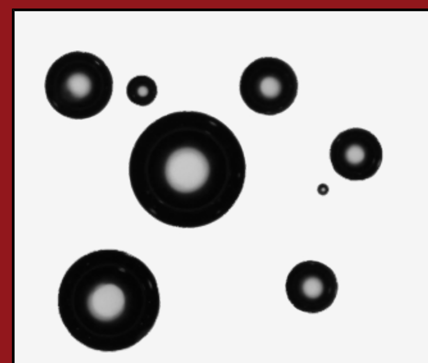




Solids, droplets, and bubbles each exhibit distinct morphological traits. Canty's system captures these differences numerically, measuring over 40 shape and size factors per particle. AI-trained software recognizes patterns in these measurements to classify particle types within a single analysis—enabling accurate, differentiated quantification for each class.

Solids

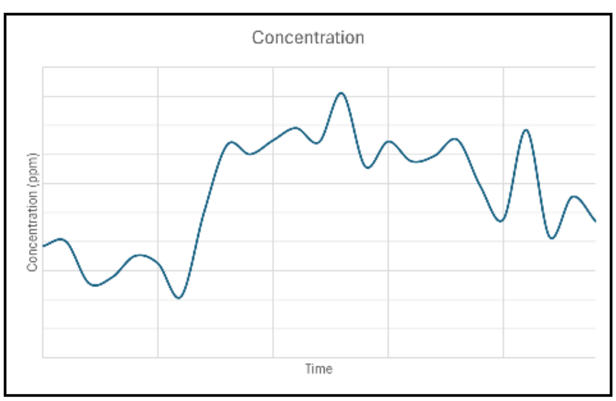
Light Hydrocarbon Droplets in Water

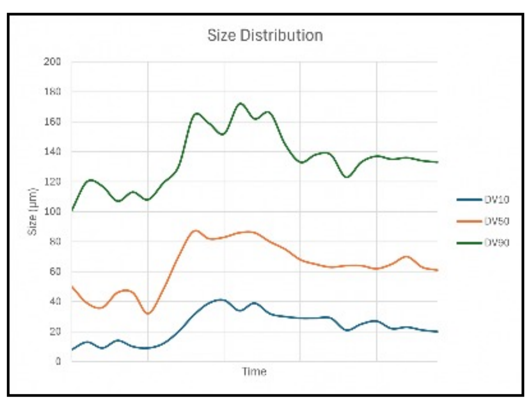


Gas Bubbles

Once a particle is classified, the software calculates its volume based on its class. Because the volume of each image frame is already known, the system can determine the concentration of each particle class on a volumetric basis. Using the bulk density of the identified class, this data is then converted into a mass concentration—providing precise, class-specific quantification.

By averaging data across hundreds of frames, the Inflow™ delivers representative concentration values and particle size distributions for each classified particle type. If verification is ever needed, the system's captured images can be viewed live or saved as recordings—providing visual proof of measurement and unmatched confidence in the analyzer's accuracy.





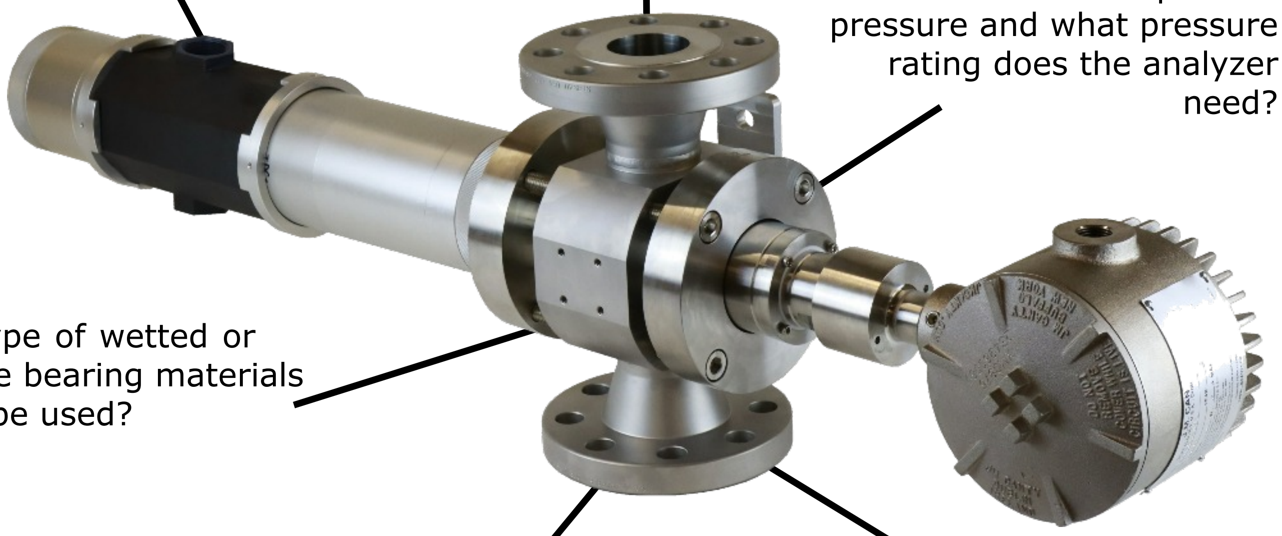
Selecting an Inflow™

To select the proper skid for a particular application, there must be answers available to the following questions.

What is the type and size of connection that the analyzer will use to connect to the process?

What size and concentration range needs to be covered by the analyzer?

What is the process pressure and what pressure rating does the analyzer need?



What type of wetted or pressure bearing materials should be used?

What type of environment is the analyzer being installed in? Does it need a specific electrical classification?

What kind of process is the analyzer looking at? Will it need spray rings or shields to be successful in the application?

The following sections will take a closer look at each question and the options Canty provides.

Inflow™ analyzers are often sold with other hardware:

- Skid Cleaning Systems- Refer to Document TA12100-1006
- Short Loop Sampler - Refer to Document TA11500-1027
- Vector Control Module - Refer to Document TA12100-1012

Optical Measurement Range

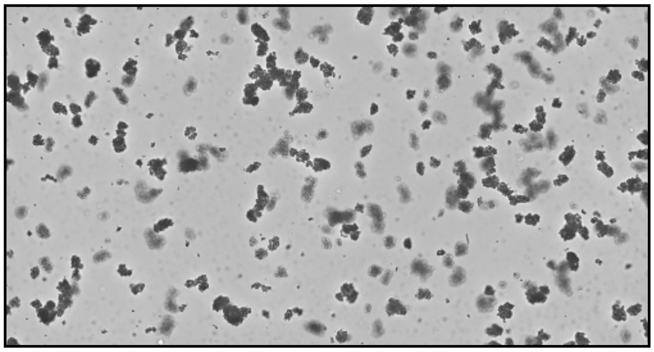
Application-Specific Optics
Turbidity and color applications require specific lenses, designed to capture variations in light transmission and color intensity.

Particle Size, Shape, and Concentration applications demand optics that can accommodate the expected particle size distribution and concentration levels in the fluid.

Each particle sizing optic defines two critical ranges:

- **Ideal Range:** Particle sizes that allow for accurate classification and appear fully within the image frame.
- **Detectable Range:** The full span of particle sizes that the optic can detect, even if classification or full visibility is compromised.

When particles are smaller than the ideal range but within the detectable range, there may not be enough shape information to to properly classify them. A user can choose to include or exclude these particles based on their needs.



The upper limit of the detectable range is determined by whether a particle can fully fit within the image frame without being cut off at the edges. Particles that exceed the ideal range but remain within the detectable range can still be measured. However, as particles approach the maximum size, they become more likely to be clipped by the edge of the field of view. Since the full size and shape of these particles can't be determined, the software is typically set to exclude them. In certain applications, however, users may opt to disable this feature and include such particles in their measurements.

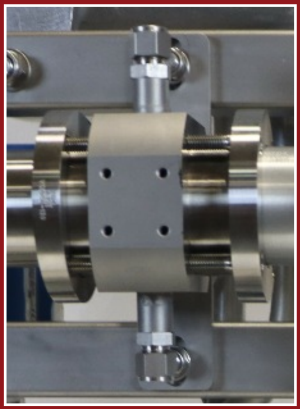
Typical Inflow™ Particle Size & Concentration Ranges

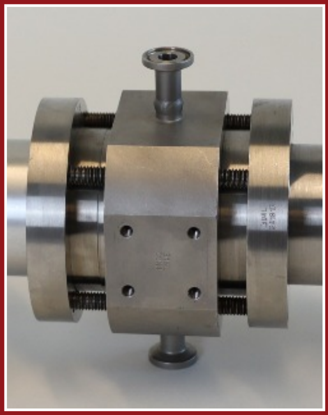
Detectable Particle Size Range	Ideal Particle Size Range	Typical Concentration and Accuracy
0.36 µm - 750 µm	1 µm - 200 µm	0 - 100 ppm +/- 1 ppm 100 - 1000 ppm +/- 1 %
0.54 µm - 1100 µm	2 µm - 300 µm	0 - 100 ppm +/- 1 ppm 100 - 2500 ppm +/- 1 %
1.08 µm - 2200 µm	4 µm - 600 µm	<= 25,000 ppm +/- 5%
1.33 µm - 2750 µm	6 µm - 725 µm	<= 50,000 ppm +/- 10%

Inflow™ Connections

An Inflow™ can be ordered with a variety of process connections in various sizes. These connections are how the Inflow is hooked into process or sample flow.


Flange


Compression Fitting


Sanitary Fitting

For systems that would require a process connection larger than 3 inches, Canty recommends the use of their Short Loop Sampler system. Refer to TA11500-1027.

Pressure Ratings

Standard Inflow™ pressure rating options vary with process connection.

Flange:
- 150 psi • 10 bar
- 300 psi • 16 bar
- 600 psi • 25 bar
- 900 psi • 40 bar

Compression Fitting:
- 500 psi

Sanitary Fitting*:
- 500 psi

*The clamps for Tri-clamp process connections are provided by the user and it is the user's responsibility to ensure clamps are rated for the process pressure.

Spray Rings

An Inflow™ can be ordered to include spray ring connections for cleaning. This requires a process-compatible fluid to be pumped through the connections at a high pressure. Refer to TA12100-1006 for information on skid analyzer systems where Canty provides a full cleaning system suitable for most aqueous processes.

Protective Shields

For process streams that will attack glass over time, an Inflow™ can be ordered to include a shield made of quartz or sapphire which protects the Inflow's fused glass. These materials tend to be more chemically resistant and will etch more slowly. Once they become etched, the Inflow™ can be isolated/drained and the shield can be quickly changed.

Inflow™ Specifications

Operating Temperatures: 33°F - 150°F [1°C - 60°C]*
*Can be installed in colder conditions, but customers are responsible for heat tracing lines to avoid freezing. Products covering temperatures and pressures higher of the standard range may also be available. Reach out to your local Canty representative for more information.

Operating Process Pressures: Dependent on process connection specified. Refer to page 8.

Power Requirements: 100-240VAC 50/60Hz or 24VDC

Wetted Material: Options include carbon steel, stainless steel, Hastelloy C-22, or Hastelloy C-276

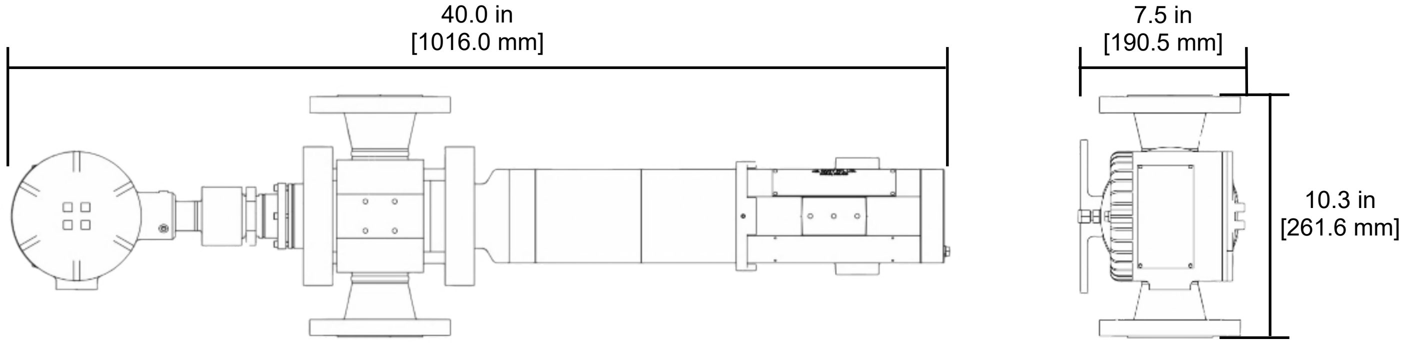
Non-Wetted Pressure Bearing Material: Options for carbon steel, stainless steel, Hastelloy C-22, or Hastelloy C-276

Environmental Ratings (Model Dependent):

- NEMA4 / IP66
- EXP FM CL. I DIV. I GR. B, C, & D, T5
- ATEX ZONE 1 (EEx D IIC T5)

Note: All systems are also weatherproof.

Typical Product Dimensions:



Dimensions are approximate and may vary from model to model. Consult factory or specific product documentation for more specific information.

Ordering Information

Use our online Inflow™ configuration system to select the right analyzer for you and generate a quotation. Follow our QR code or visit us at www.jmcanty.com.

Case Study 1 - Filter Breakthrough Detection

A chemical plant was having problems on a catalyst recovery process where filters were breaking resulting in expensive catalyst being lost and contaminating the downstream process.

An Inflow™ system was installed in-line as a way to constantly monitor the size distribution and concentration of any solids coming down the line. Images 1-1 through 1-3 were taken from analysis during which there were 2 breaks in the filters over a short time. These steps can be seen in the PSD and concentration data shown in charts 1-1 and 1-2.

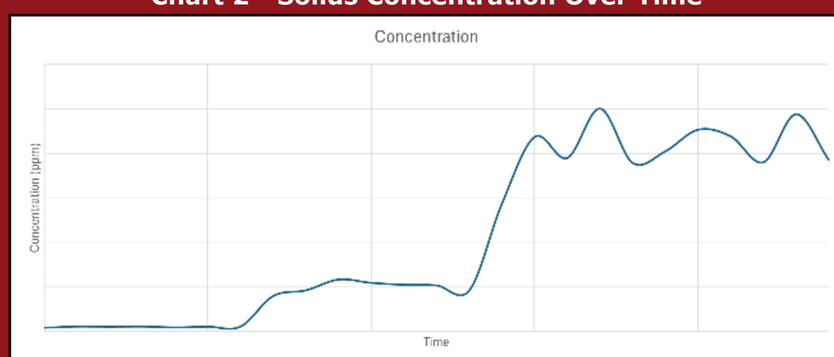
Image 1-1: Normal Operating Conditions

Image 1-2: First Filter Break

Image 1-3: Second Filter Break

Chart 1 - Solids Particle Size Distribution Over Time

Chart 2 - Solids Concentration Over Time



Having the measurement directly inline instantly alarms operators as soon as the filters begin to break down allowing the plant to prevent serious loss and contamination issues that had plagued them before. The analyzer is still used in that line today.

Case Study 2 - Oil in Water Measurement

A water treatment plant was being fed water from multiple other plants nearby including chemical plants and refineries with multiple unit operations, all sending water to the facility before the streams were combined for processing.

On occasion, concentrations of hydrocarbons in the combined line would climb to levels outside of what the normal separations process was designed for. These events were seemingly random and could have been coming from any of the various operations sending water. Due to this randomness and typically short duration of the upsets, manual sampling of the lines rarely caught which process was sending the contaminated water. This made it impossible to charge the correct unit for additional treatment required for the contaminated water supply.

The plant installed Inflow™ analyzers on all of the supply water lines. These analyzers constantly measure and output concentrations of hydrocarbons and solids in real-time. Data from the analyzers can be seen in the below chart.

Whenever concentrations on any given supply line are outside of the allowable spec, the plant is now able both to isolate the high concentration water for a more appropriate treatment and identify who provided the dirty water so that they can charge them appropriately for the treatment.

In this way, the customers who consistently were sending dirty water were also made aware of the problem and several have been able to reduce the frequency and amplitude of the problems resulting in the high levels of hydrocarbons.

Chart 2-1 - Hydrocarbon Concentration Over Time

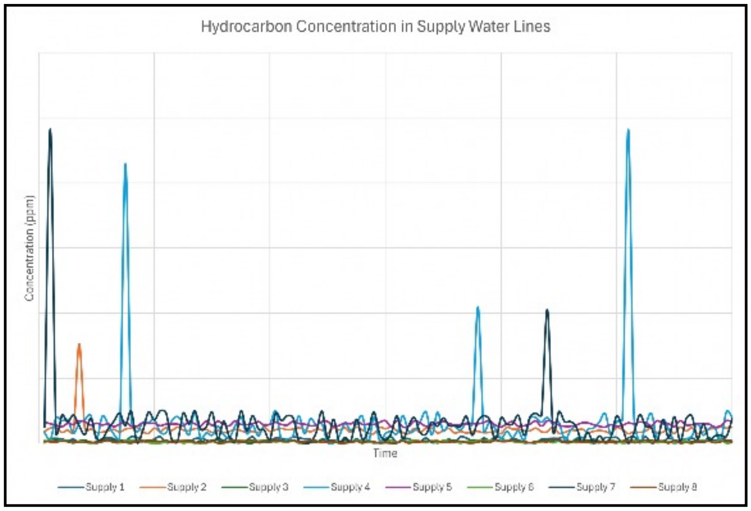
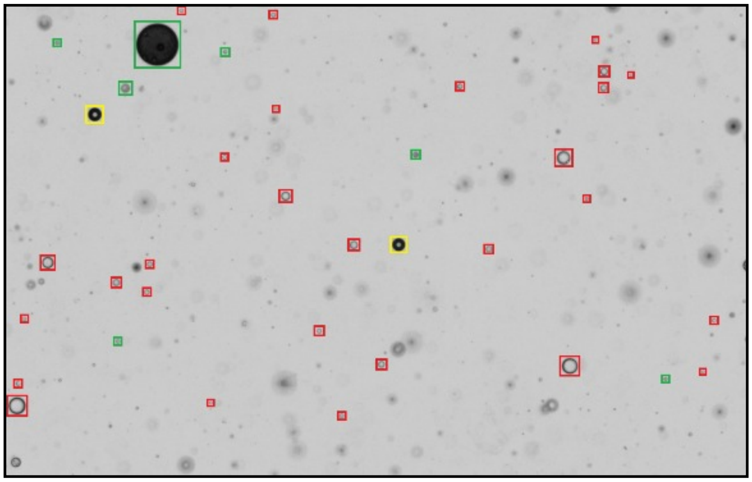


Image 2-1 - Image of Various Oils in a Water Stream



CANTY'S GOAL IS TO PROVIDE EQUIPMENT TO ENHANCE PROCESS UNDERSTANDING AND CONTROL. WE ACCOMPLISH THIS BY DESIGNING, MANUFACTURING AND SERVICING THE FINEST EQUIPMENT IN THE WORLD

CANTY

PROCESS TECHNOLOGY

SOME OF THE COMPANIES WE HAVE WORKED WITH

Exxon Mobil	SINTEF	BP	Total
Qatar Petroleum	Wintershall	Imperial Oil	BG Technical
Petronas	SNF	MYCELX	ProLabNL
FMC	ADNOC	Premier Oil	Oil Plus
Cameron	Chevron	Soiltech	SMS Oilfield
TUV NEL	Daleel Petroleum	Marathon Oil	Siemens Water
	Saipem	Shell	SGS

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