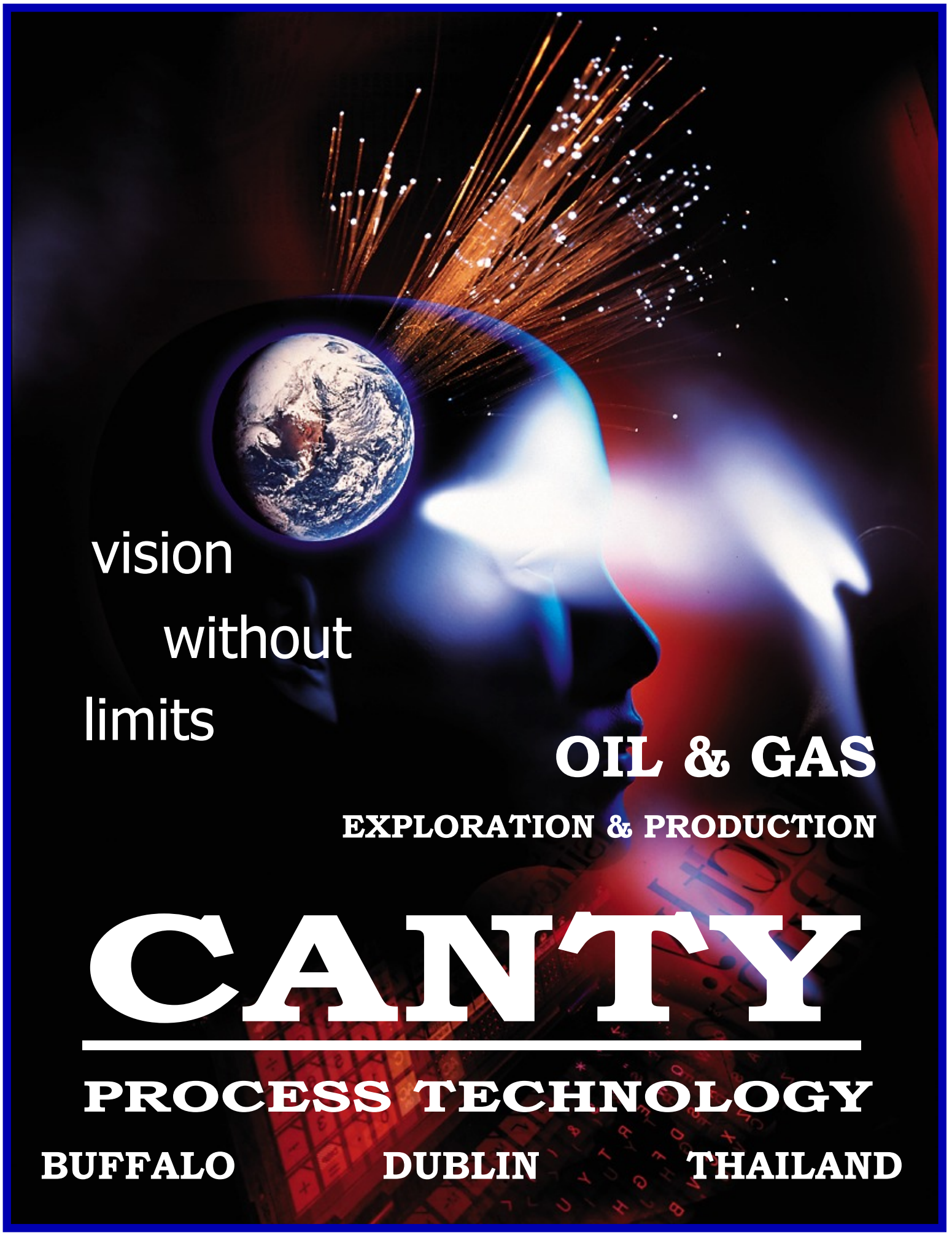
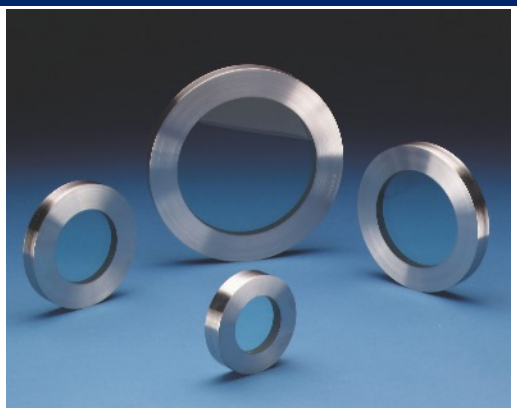

vision
without
limits
OIL & GAS
EXPLORATION & PRODUCTION
CANTY
PROCESS TECHNOLOGY
BUFFALO
DUBLIN
THAILAND

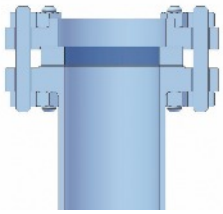
CANTY FUSEVIEW™



Our unique fused glass windows far exceed all conventional tempered glass windows in safety and performance. CANTY windows can be easily removed for cleaning and do not have to be discarded in the same way as traditional tempered glass windows.

How It Works

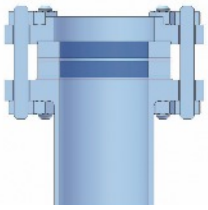
To manufacture a FuseView™ we heat the glass to it's molten point where it flows to the wall of the metal. At that point the glass fuses or bonds to the metal. Then we slowly cool the FuseView™ until the glass solidifies. The metal has a higher coefficient of expansion than the glass and the metal compresses on the glass. This squeezing prestresses the glass and puts it under radial compression. Glass is strong in compression but not under tension or shear. When the FuseView™ is pressurized the glass bends and relieves the compression and avoids tension. This is the same as is done with concrete - it is prestressed in compression in order to take bending.



FUSEVIEW™ ANSI/DIN

- Ideal for new or retrofit applications.
- Available in ANSI/DIN as well as almost any custom size.
- The largest viewing area of any fused sight glass on the market.

• Quartz/sapphire shield for caustic service is available as an option

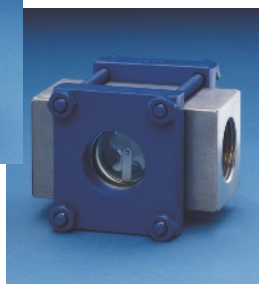


FUSEVIEW™ HIGH TEMP

- Include dual FuseView™ sight glasses for extreme high temperature applications.
- Dual sight glass package insulates the inner FuseView™ sight glass against thermal shock.

SIGHT FLOWS

All CANTY sight flows come standard with FuseView™ sight glasses to provide the safest sight flow in the industry. Our sight flows have been designed to meet strict ASME code requirements and all units are hydro-tested to 150% of the maximum rated pressure.

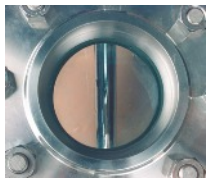


MODELS

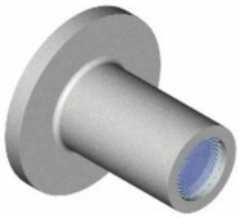
- Flanged
- Threaded
- Welded

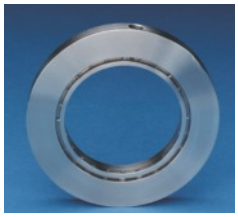
FUSED GLASS ADVANTAGE

All CANTY sight flows feature FuseView™ sight glasses to ensure safety. By fusing glass to metal, a high pressure, high safety and high impact hermetic seal is formed.



A **Jet Spray Ring** can be used in combination with any low viscosity fluid that is compatible with the process, to generate a high energy vortex action on the surface of the sight glass to remove any fouling, and ensure a clear view at all times.





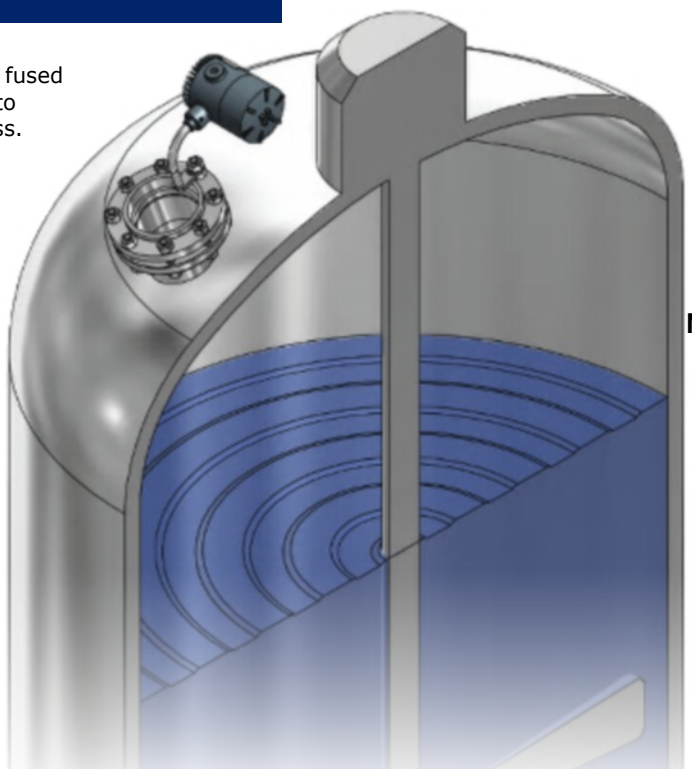
CANTY LIGHTS

All CANTY LED lights feature a hermetic, fused glass, high pressure / temperature seal to completely seal the light from the process. The 316L SS or Hastelloy® design and variety of mounting connections make CANTY Lights ideal for any application.

Bundles mount direct to FuseView™ - No light loss due to reflection!

CANTY 12" bundle models mount directly to a sight glass with an optional bracket.

- View and illuminate through one nozzle
- Maximum LED illumination
- Cool light output - there is no product bake-on



Flexible fiber optics allow for Mounting in any convenient location!

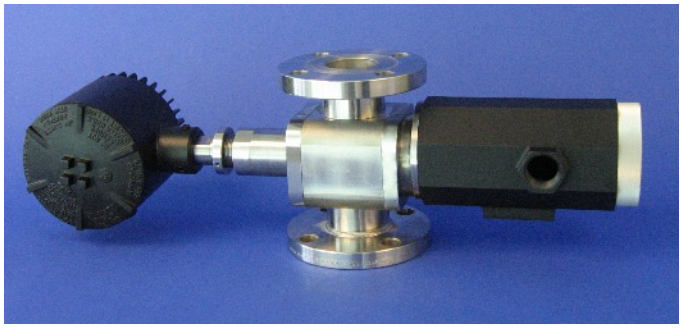
CANTY 24" and longer bundle models mount remote from the sight glass with an optional bracket for increased Accessibility.

- High Intensity LED Lighting
- NEMA 4, IP66, Explosion proof, Flame proof models
- Fused glass seal provides a safe, reliable, hermetic seal between electronics and the process area.

Consult factory to easily upgrade your existing halogen lights to LED!

INFLOW™ ANALYSER - OIL & TSS IN WATER

The InFlow™ Analyser based on dynamic imaging, features a high speed microscopic camera, and high intensity light source positioned on opposite sides of a central flow cell. As fluid passes through the flow cell, images of any suspended particulate are captured and analysed. Powerful image analysis software can distinguish between oil droplets, suspended solid particles, and gas bubbles to provide simultaneous size, shape and concentration information for each .

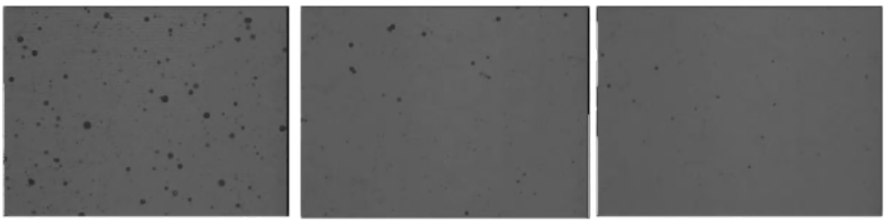


OIL CONCENTRATION - OIL DROPLET SIZE - TSS CONCENTRATION - TSS PARTICLE SIZE

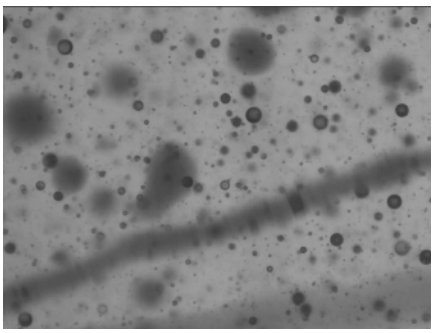
Available in a number on configurations - **direct online, side stream, or portable** - the InFlow™ can be used anywhere within a produced water plant to optimise each stage of separation, to ensure any separation equipment is running at maximum efficiency, and any environmental discharge limits are reached.

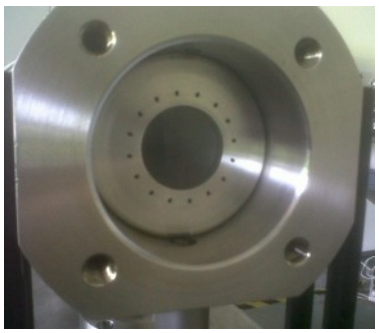
The performance of any separation equipment (hydrocyclone, CFU, IGF, membrane filters…..) is based on operating at the correct configuration for the inlet fluid condition. Similarly, the dosing volume / rate of production chemicals such as emulsion breakers or droplet coalescers, is based on understanding what is present within the fluid to be treated. The InFlow™ delivers this information, providing real time data for oil concentration & droplet size, and total suspended solids concentration and particle size.

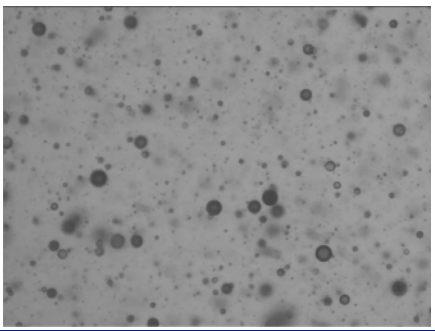
IGF INLET | IGF OUTLET | FILTER OUTLET



SEPARATOR / FILTER OPTIMISATION - CHEMICAL DOSING CONTROL - ENVIRONMENTAL REPORTING

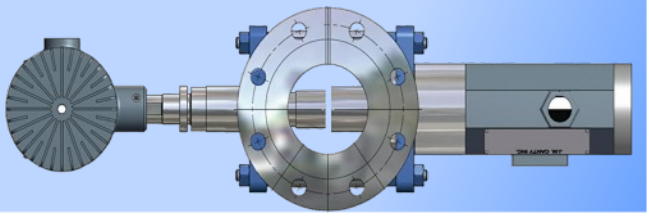






Any fouling or build up on the InFlow™ glass windows, is removed by using a fully automated high pressure jet washing system through the analyser spray ring. The cleaning fluid can even be the produced water itself!

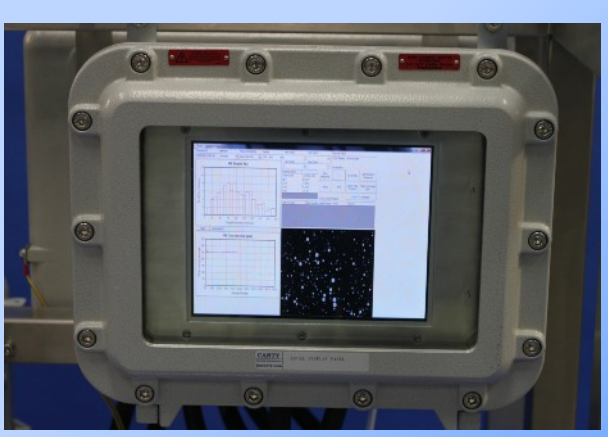
- Variable concentration range setting; 0-10ppm, 0-100ppm, 0-1,000ppm, 0-10,000ppm
- Options to 80,000ppm
- Particle sizing to 0.7µm
- Fused Glass Windows - Options to 600 BAR
- High Intensity LED Lighting
- Gigabit Ethernet Camera Technology



Skid-Mounted InFlow™

Features:

- Drop-In-Place Design
- On Board Monitor
- On Board Pump



The CANTY Inflow™ is a vision-based camera system used with the CANTY Vector System image processor for oil in water concentration and size measurement in a lab environment / at-line / in-line process. The CantyVision™ Software accurately measures multiple aspects of the OiW from oil / solids / gas independent of each other for accurate data. In comparison to a florescence monitor, which measures only oil and is affected by solids and gas in the stream, the CantyVision™ software can identify the differences and the customer can visually verify the readings. The Inflow™ can be calibrated with the customers current lab method to make for easy instillation in the field. Determining PPM on the inlet and outlet of a separator will help optimize the skid. By providing droplet size the produced water skid will now know exactly how to separate the oil since the skids separation methods are mostly based on size. Also, the chemical companies will know if the chemicals they are injecting are agglomerating the oil, instead of having to wait to see if the skid is able to lower the PPM value. Video recording is an option for later analysis. In-line analysis makes sure production samples are not skipped over due to lack of sample time available!

Mobile InFlow™ Cart

Features:

- Moveable skid design on rugged wheels
- On Board Monitor
- On Board Pump

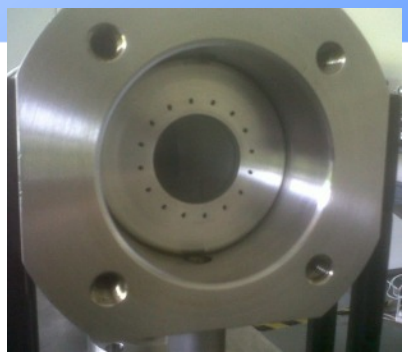
Short Loop Sampler™

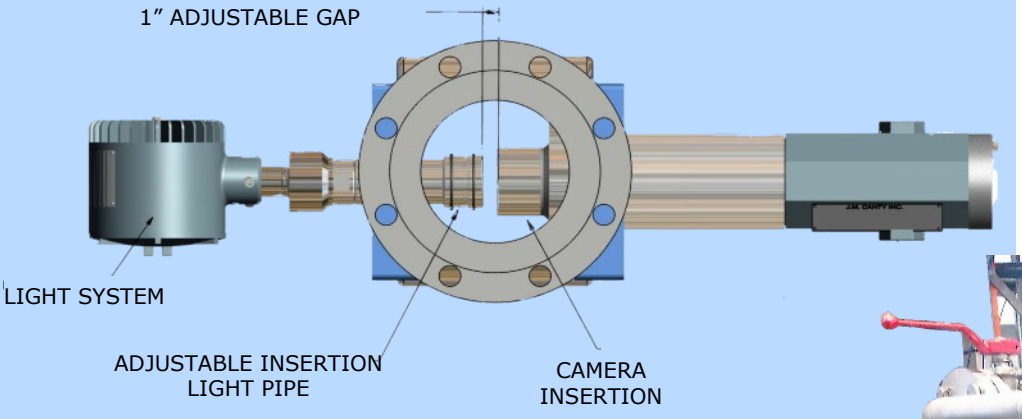
- Easily Installed Modular Unit
- Allows analyzer to be isolated, allowing for calibration & service
- Versatile sampling, single-point sampling & return.

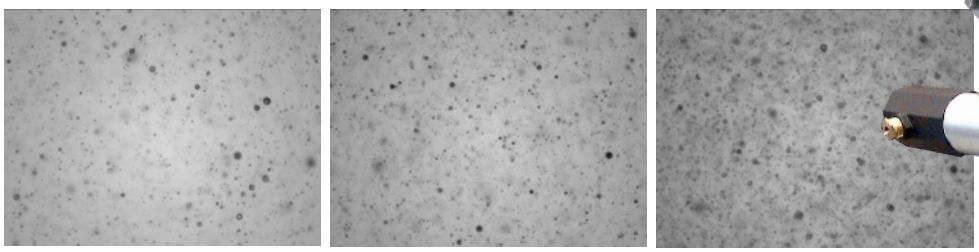
CANTY InFlow™

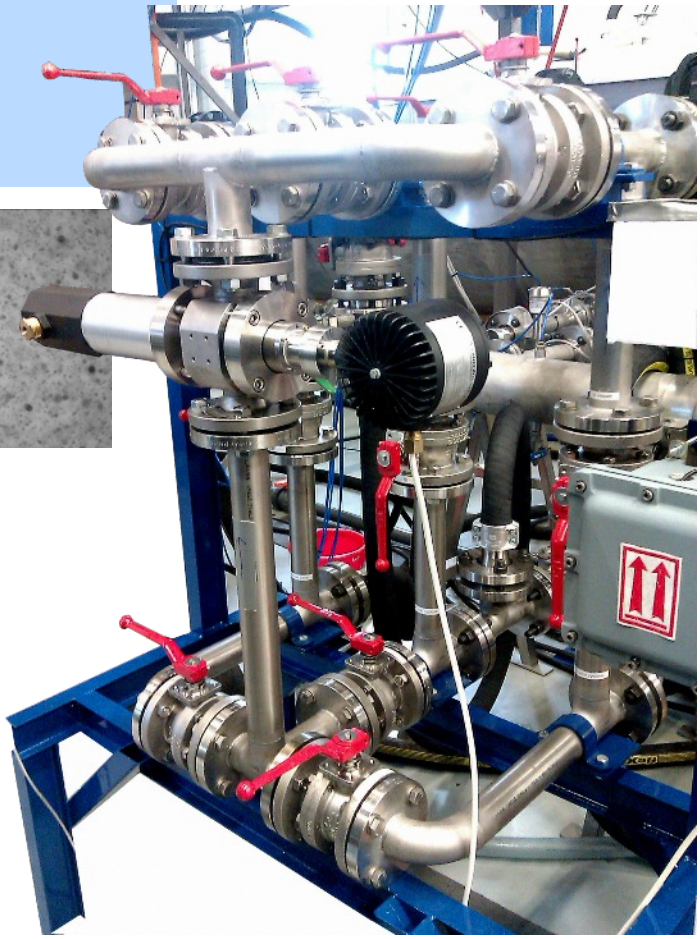
Features:

- Detect Solids & Oil Droplet – Size / Count / Concentration
- In-Line Analysis
- CCD Based High-Speed Imaging Device
- No Sampling Required
- Automatic Cleaning
- Measures PPM / PPB concentration
- Visual Verification
- Particle Sizing From .7 micron - 20,000 micron
- Variable Concentration Range Setting; 0-10ppm, 0-100ppm, 0-1,000ppm, 0-10,000ppm
- High Intensity LED Lighting
- Gigabit Ethernet Camera Technology

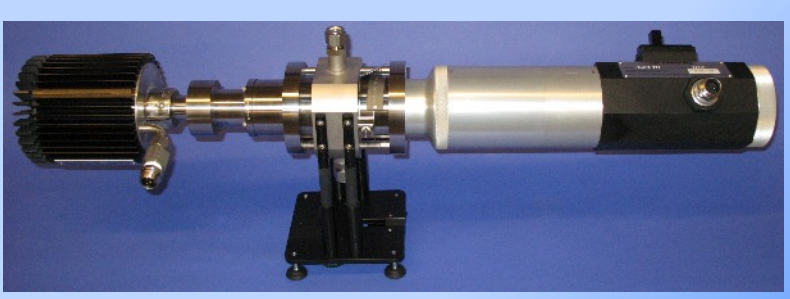








Portable InFlow™



INFLOW™ ANALYSER - SAND / TSS ANALYSIS

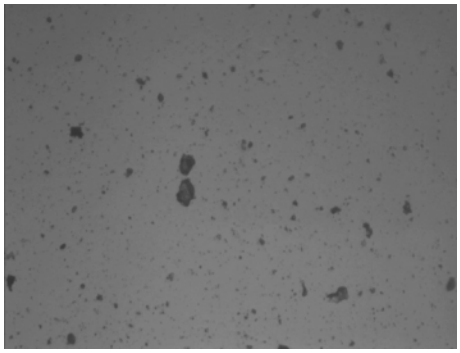
The InFlow™ Analyser can be deployed as a critical item for any operator's sand management strategy. A variety of methods such as gravel packing or sand screens can be employed in an effort to manage the amount of , and the effect of sand (clogging, erosion etc.), while different technologies such as desanders, hydrocyclones or filters can be installed to remove the sand.

However, the suitability and performance of the operator's chosen sand management strategy needs to be analysed, and the only way to do this correctly is to analyse the **size, shape and concentration of sand** present.

OPTIMISE YOUR SAND MANAGEMENT STRATEGY

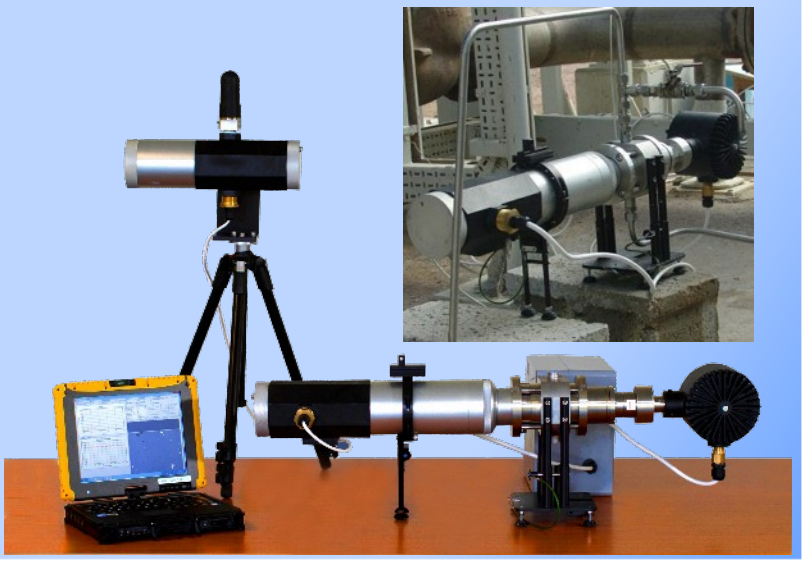
The particle size distribution and concentration of total suspended solids in **Water for Injection** is a critical measurement, to ensure that the solids re-entering the production well, do not have an adverse effect on the oil extraction by plugging the pours in the formation.

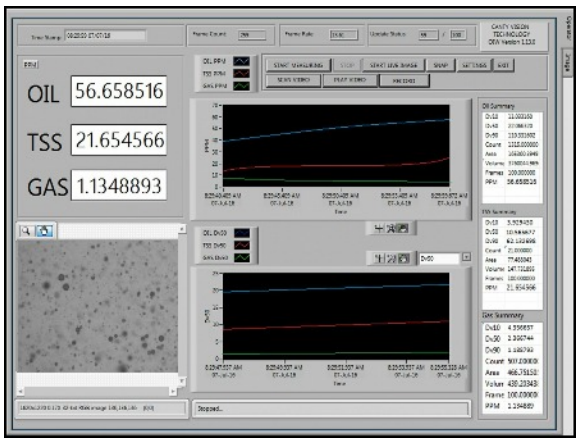
Larger water for injection pipelines can still benefit from direct online measurement through the use of the Canty Short Loop Sampler. This systems features a fluid take off and return in a single probe connection. The system is mounted as a wafer between 2 flanges if there is flexibility in the piping, or can also be mounted to a side of pipeline flange or NPT connection.



The Portable InFlow™ can be used for short term studies of Oil & TSS in Water. This could be when optimising or troubleshooting any separation equipment, or where there are simply too many measurement points for it to be practical to install a permanent analyser at each.

The standard system features a 500psi rated flow cell with 1/2" Swagelok connections for each hook up to existing sample points. Options are available for wireless connectivity to a hazardous area notebook computer



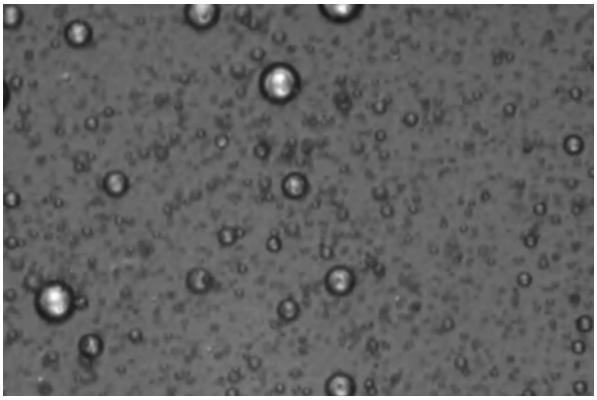


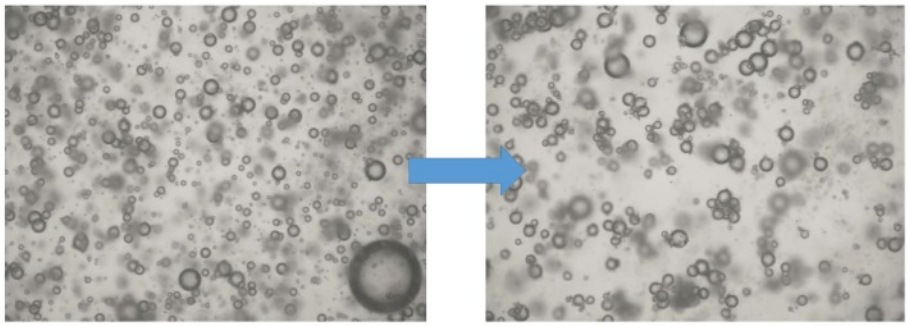
The software interface features continuous real time video for visual verification, and graphical trends for the size and concentration measured.

INFLOW™ ANALYSER - BS&W / WAX / HYDRATES IN CRUDE

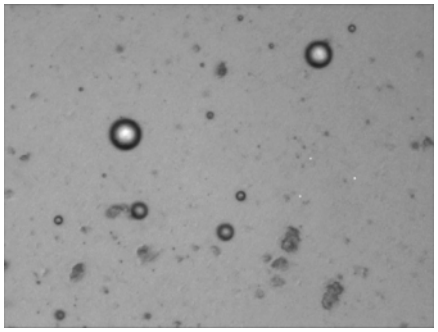
Flow assurance issues are a major concern during production and transportation of crude oil. Issues can lead to reduced production, choking of the flow lines, and equipment failure. In-depth understandings of these issues are of extreme importance to the oil field operators in order to identify and implement effective preventative measures.

The InFlow™ Analyser can be installed on a crude oil line to provide visualisation and measurement of **WATER** and other particulate such as **BASIC SEDIMENT, WAX** or **HYDRATES**





Methane Hydrate Formation

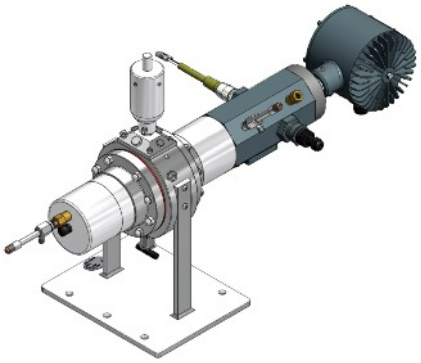


Water & Wax in Crude Oil

Based on their visual characteristics (shape, percent fill, translucence…) the software can differentiate between the different types of particulate within the crude oil. Solid particles are irregularly shaped, with distinction between different types of solids also possible; sand appears more opaque than wax or crystal like hydrates for example. Water droplets are visualised as circular particles while gas bubbles are also circular but typically have a higher percent fill. Visual verification ensures the desired particles are included in the user's data set.

LIGHTING LIGHTING LIGHTING; Visualisation of water and other particulate within oil, and in particular heavy crude oils is a challenge in itself. The InFlow™ overcomes this through a combination of flow path adjustment, and ultra high intensity LED lighting. This lighting, originally designed to illuminate large pressure vessels is focused directly into the camera sensor, providing the large amount of light required for imaging within crude oils.

CANTY DCR - OIL / WATER SEPARATION TESTING



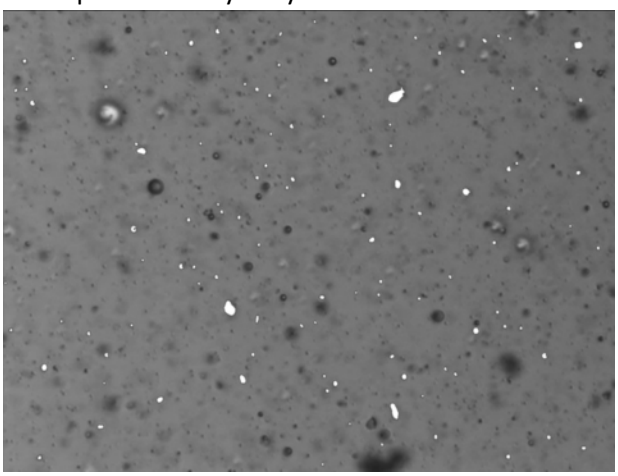
Canty's Direct Characterisation Rig (DCR) is an offline system used for testing of the settling / separation rates of oil / water mixtures and emulsions. The DCR's camera provides real time images of the sample as it settles, and continuously tracks the position of the interface lines between the oil, emulsion and water layers.

The unique flow cell featuring Canty's fused glass technology allows the testing to be performed at pressure and temperature, to simulate real process conditions. The flow cell also features a number of additional ports to allow for injection of oilfield chemicals (eg. emulsion breakers) so their effectiveness can be measured prior to large scale deployment.

DRILLING MUD PARTICLE SIZING

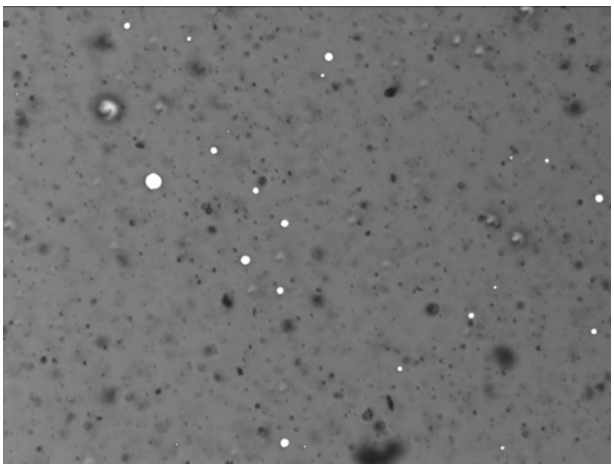
Drilling mud particle analysis can be performed using the InFlow™ in either a laboratory or at-line arrangement. The ability to distinguish between solid particles and water droplets in oil based mud (OBM), or solid particles and oil droplets in water based mud (WBM) sets the system apart from any other particle analysis systems.

Separate but simultaneous readings for **solids particle size, solids concentration, water droplet size**, and **water concentration** are provided. Both the laboratory and at-line systems feature an auto dilution system where the dilution rate is tightly controlled to ensure the concentration readings remain accurate, while ensuring the solids and droplets are suitably dispersed for representative size analysis.

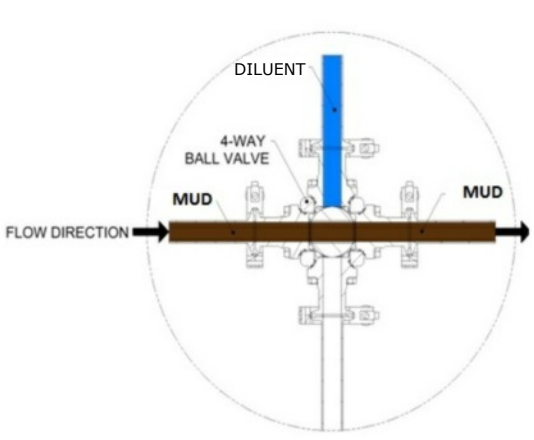


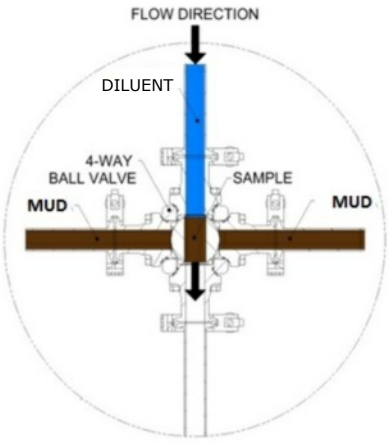
OBM - Solids Detected

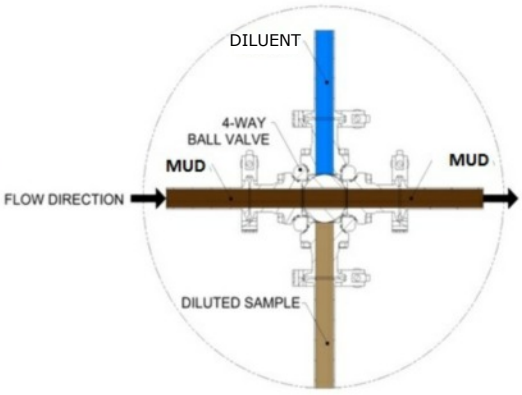
The at-line system features a unique cross cut sampler which ensures that a representative sample of drilling mud is taken from the process, even in horizontal pipelines where larger solids would tend to travel along the bottom of the line.



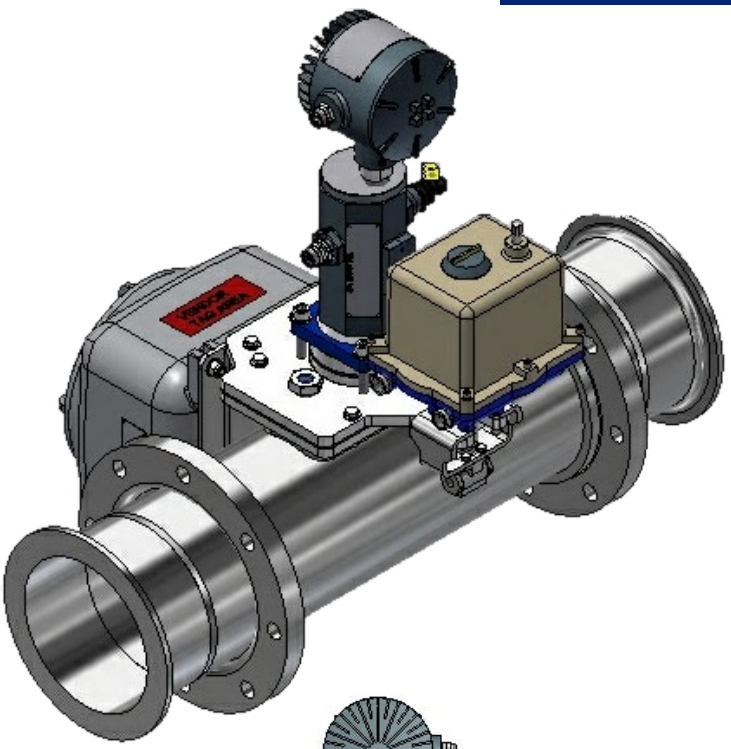
OBM - Water Detected







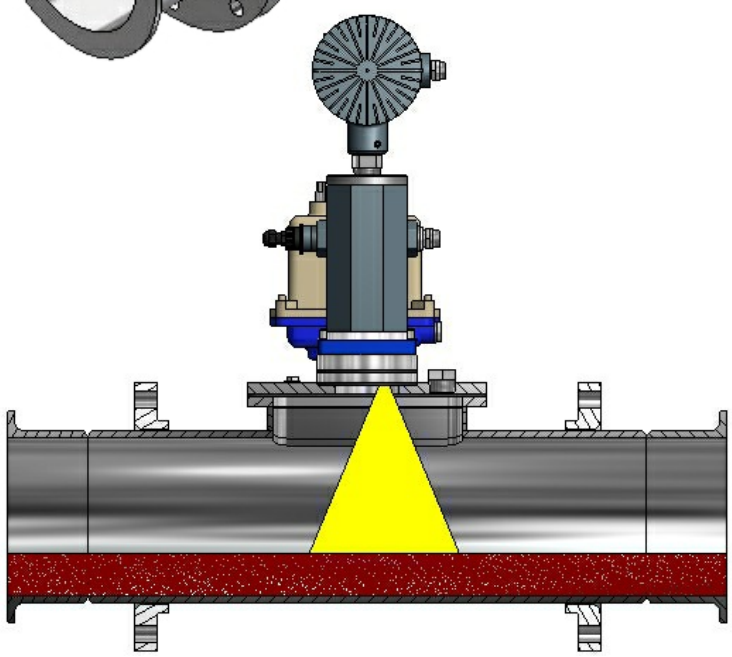
DRILLING MUD LEVEL

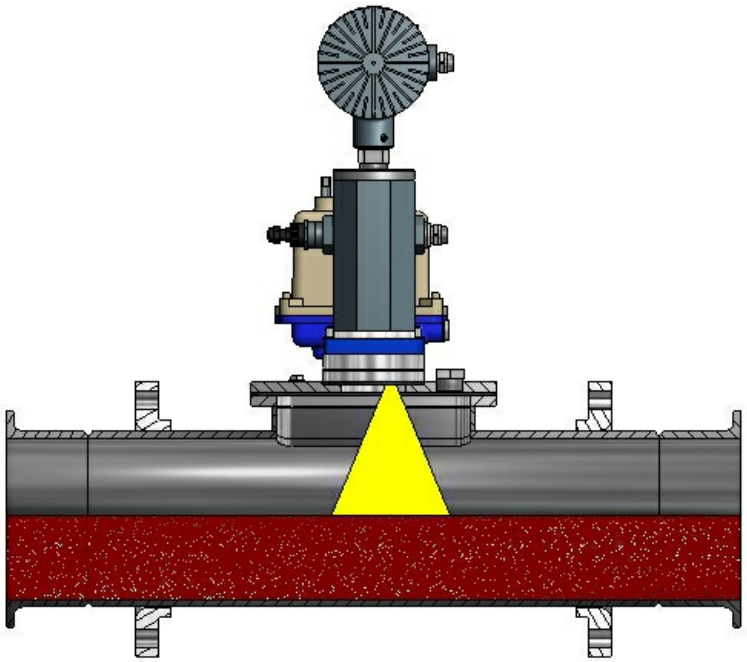


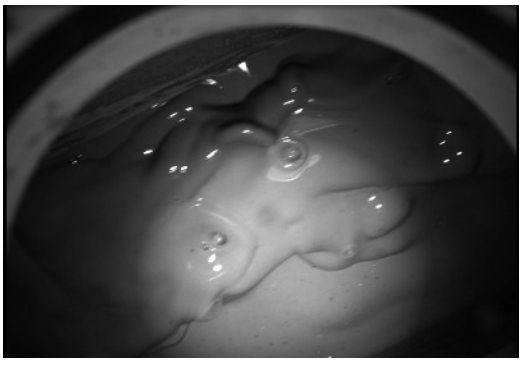
Drilling Mud Level Measurement in the mud return line is performed using a camera system combined with an angled light source. The image analysis software tracks the edge of the shadow on the fluid surface, the position of which is relative to the fluid level within the pipeline. The fluid velocity can also measured though a software algorithm detecting the speed of moving particles / bubbles on the fluid surface.

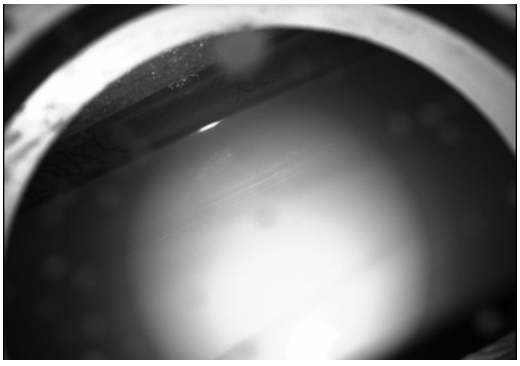
Identical mounting as the currently widely used paddle system allows for easy retrofitting. The non contact nature of the system ensures there is no issue with clogging of moving parts which can occur with the paddle units, while the in built jet spray ring ensures a clear view at all times.

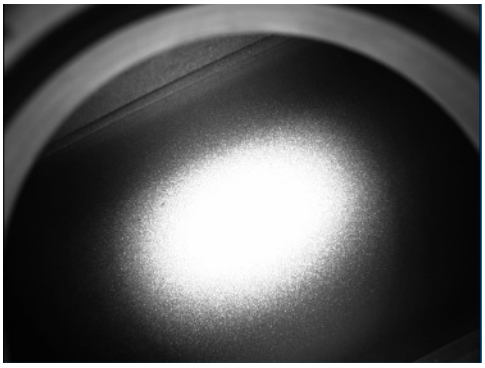
Visual verification allows for confidence in the instrument readings, while also allowing the operator to monitor for issues within the line itself.







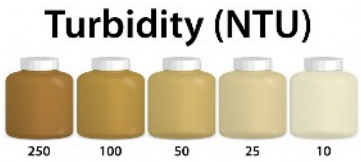


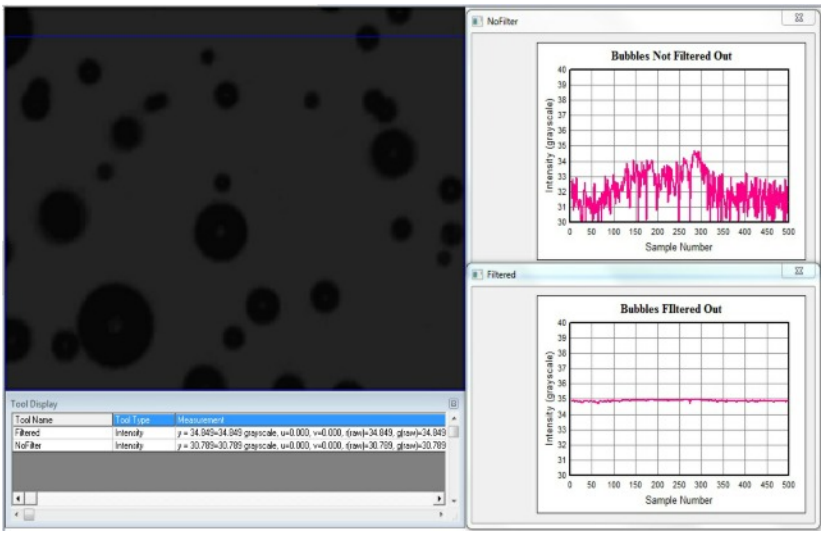


Measures: Turbulent **Laminar** **Zero Flow**

CEMENTING CLEAN OUT - TURBIDITY

The Inflow™ is used to measure the turbidity of the wash liquid from the well bore after cementing. As the fluid passes through the flow cell, images of the fluid are captured and sent to the analysis software for processing. The grayscale intensity (0-255) of the fluid is measured, which is a function of the light transmission through the body of liquid, and can be directly correlated to a turbidity value (NTU / FTU).

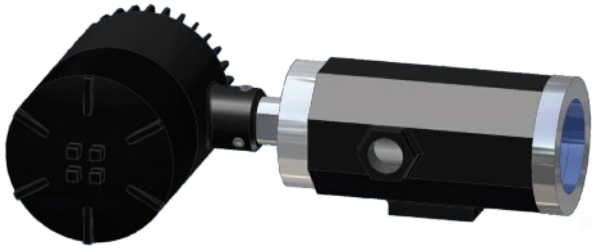




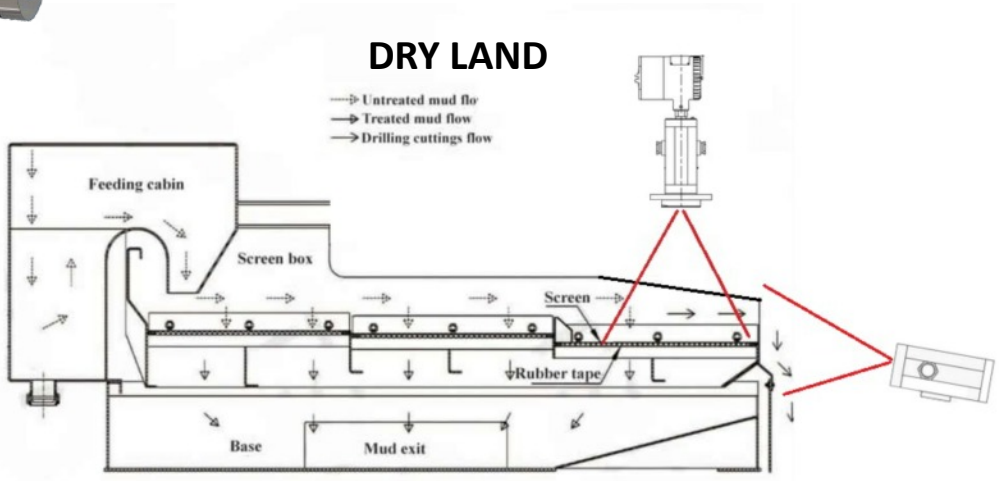
A common source of faults for traditional turbidity analysers (most commonly light obscuration methods) is gas bubbles within the process fluid, which can have an adverse effect on the measurement. However, when Canty's dynamic imaging is used, gas bubbles within the fluid are easily recognisable on the display screen due to their visual characteristics, and so they can be eliminated from the turbidity calculation, giving a more accurate, more consistent measurement.

The image opposite shows an example of the same fluid being analysed with and without the bubbles filtered from the measurement. The signal graph of the measurement without the gas bubbles filtered out simulates what may happen when using a traditional light obscuration technique. The signal graph of the measurement with the gas bubbles filtered out is a measurement based on the fluid only, which is what is provided by employing Canty's dynamic imaging technology.

SHAKER SCREEN OPTIMISATION



A Canty camera / light combination system can be used to monitor the outlet section of the shaker screen to ensure that it is in fact drier cuttings, which are being discharged without any drilling mud fluid carry over. This ensures maximum mud recovery to the pit and optimises the operation of the shaker screen.



The images captured by the camera, can be analysed by Canty's unique software to automatically detect if there is liquid included in the cuttings discharge.

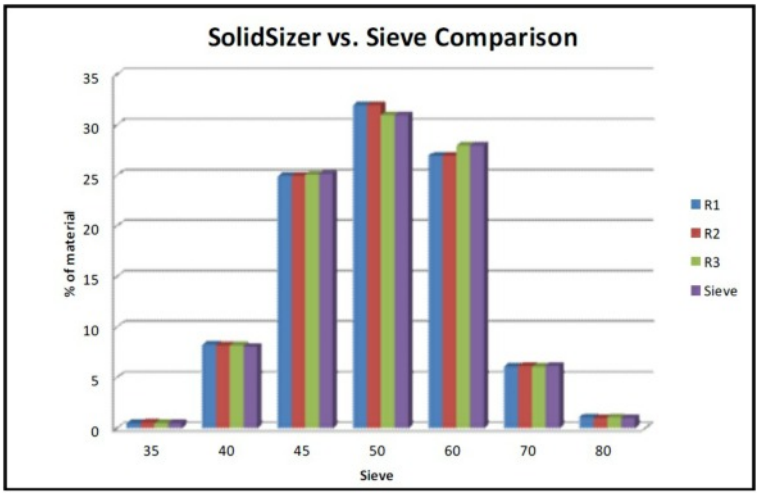
A particular algorithm is used to measure the intensity within a user defined measurement zone. If there is liquid carryover with the cuttings, the intensity will be measured as a higher value than if there is not, due to the reflection of light from the liquid surface being higher than that from drier cuttings.

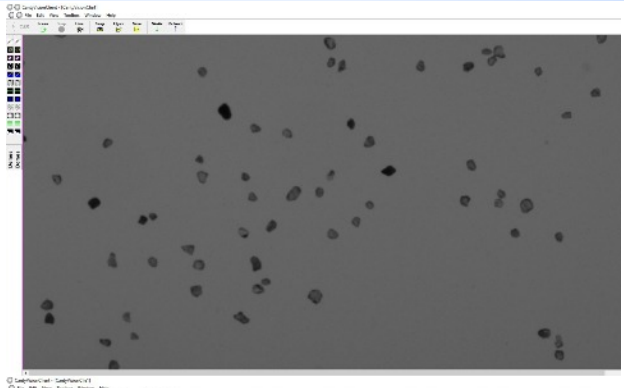
FRAC SAND / PROPPANT - PARTICLE SIZING

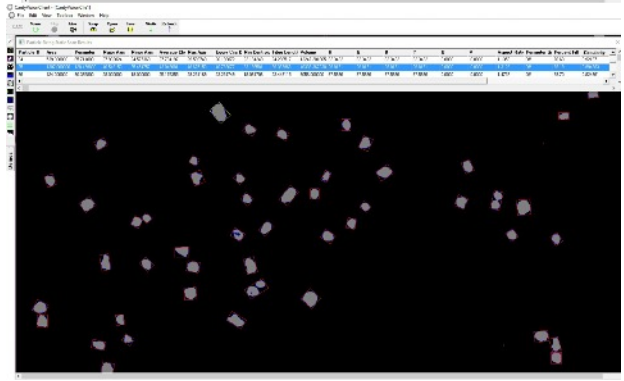
The Canty SolidSizer™ is used to determine the particle size and shape distributions of frac sand samples. The sample is fed into the analyser hopper and dispersed into a single even layer, then transported to the measurement zone by a vibrating feed tray. In the measurement zone, the dispersed sand particles pass between a camera and high intensity light source, where high quality images are captured and then analysed in real time by Canty's unique software. Each particle is measured under a number of different size and shape parameters including minor axis (width), major axis (length), area, perimeter, circularity, aspect ratio etc., to provide a complete particle characterisation.

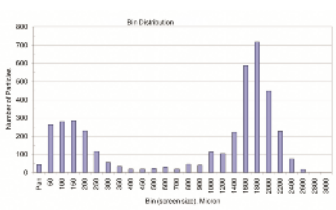
PARTICLE SIZE - PARTICLE SHAPE - SHORT ANALYSIS TIME - SIEVE CORRELATION

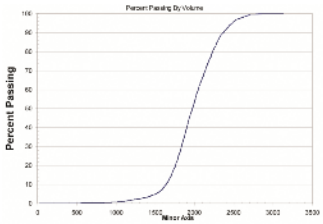
The size distribution data can be directly correlated to sieve analysis, by setting up the distribution graphs to be based on minor axis (width). Typically the results are within 2% of the sieve generated data, while the run time is significantly less - a 100g sample takes in the region of 2 minutes on the SolidSizer™, which provides an auto generated summary report and larger Excel database of results. The same sample can take up to 30 minutes on a sieve system and is a lot more labour intensive. The SolidSizer™ has the added benefit of providing shape measurement including the circularity of the particles, which of course influences how easily the sand is be carried in hydraulic fracturing fluid with minimal turbulence.

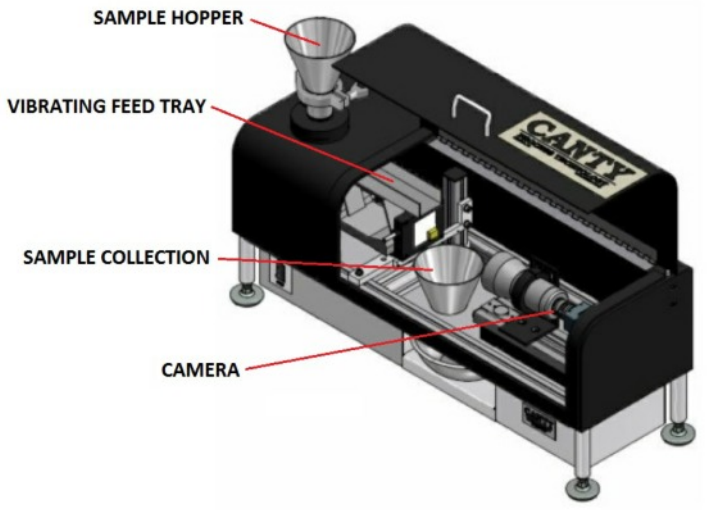












CANTY'S GOAL IS TO PROVIDE EQUIPMENT TO ENHANCE PROCESS CONTROL AND YIELD. WE ACCOMPLISH THIS BY DESIGNING, MANUFACTURING AND SERVICING THE FINEST EQUIPMENT IN THE WORLD

SOME OF THE COMPANIES WE HAVE WORKED WITH

Exxon Mobil	Daleel Petroleum	TUV NEL
Total	Chevron	Shell
Oil Plus	CETIM	Saipem
FMC	BP	BG Technical
Cameron	Imperial Oil	Ascom
Weatherford	MYCELX	ProLabNL
SINTEF	Premier Oil	Soiltech
Wintershall	Soiltech	Eesti Energy
Siemens Water	SNF	FracTech
SGS	Neste Oil	SMS

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