vision without limits

# SUGAR INDUSTRY



**PROCESS TECHNOLOGY** 

BUFFALO

DUBLIN

THAILAND

# Sugar Process Layout



# **Sugar Crystallization**

## **FUSEVIEW™ SIGHT GLASS**

The sugar crystallisation process is typically monitored by operators viewing through a series of the sight glasses on the side of the vessel.

The process takes place under vacuum, so it important to have no leak paths in order to maintain a full vacuum, boil at a lower temperature, and therefore save on energy. If a tempered glass sight glass is used, it is often installed without being fully tightened in place due to the risk of cracking the window either during installation, or during process operation as the unit experiences local expansion and contraction during temperature cycling.

By using a CANTY FuseView<sup>™</sup> which features a metallic outer ring fused to glass, the user is tightening on metal so cannot over torque and damage the window. As a result, a full seal is maintained, and so a full vacuum is achieved, resulting in significant energy savings.





Crystal Pan Capacity (Litres)	Savings per Batch per Degree Celsius °C*	Crystal Pan Capacity (US Gallons)	<i>Savings per Batch per Degree Fahrenheit °F*</i>
25000	\$3.00	7500	\$1.50
50000	\$6.00	15000	\$3.00
100000	\$12.00	30000	\$6.00

\* Savings calculated using Q=mCp(T2-T1), and based on initial process fluid heat up costs only - additional savings would be gained on energy savings to maintain lower required process boiling temperature

### The Engineered Advantage

CANTY FuseView<sup>™</sup> sight glasses have been engineered to meet all of your process and safety needs. By fusing glass and metal together to form a one piece construction, we can offer the largest view area of any glass-metal sight glass, for any given process connection. Our unique fused glass windows also 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!

**FuseView**<sup>™</sup> **Tempered Glass** Torque applied to metallic ring - no Torque applied to glass - low danger of cracking during installation allowance, and minimal tolerance for differential between bolts - easy to crack during installation Bolt, unbolt, remove, refit... No Once removed should be replaced residual stress problems with new unit - torque on glass during installation crates residual stress points, removing and refitting leads to opposing stress points, and cracking! 1 gasket required 2 gaskets required High impact resistance Low impact resistance - can shatter into multitude of small fragments

To manufacture a FuseView<sup>™</sup> 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<sup>™</sup> until the glass solidifies. The metal has a higher coefficient of expansion than the glass and the metal compresses on the glass. This squeezing pre-stresses the glass and puts it under uniform radial compression. Glass is strong in compression but not under tension or shear. When the FuseView<sup>™</sup> is pressurized the glass bends and relieves the compression and avoids tension. This is the same as is done with concrete - it is pre-stressed in compression in order to take bending.



# **LED Process Light**



CANTY provides a combined LED light and sight glass to optimize viewing and minimize total package cost. Illuminate through an existing sight glass or a newly installed FuseView<sup>™</sup>

### **CANTY LIGHTS**



### **OPTIMUM VIEWING**

CANTY HYL lighting systems are designed to illuminate for optimal viewing. Our patented design transmits an intense beam of LED light into a process or pressure vessel.

### 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.

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



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



## FLANGE, NPT, TRI-CLAMP<sup>®</sup>, NA-CONNECT<sup>®</sup>

No Sight Glass Required, Direct Mount To Tank Connection



### **MOUNTING OPTIONS**

- - 316L SS, Hastelloy<sup>®</sup> C276, Hastelloy<sup>®</sup>
    - C-22<sup>®</sup>, glass wetted material options
  - ANSI and DIN mounting options
  - Pressure ratings to 10,000 PSI [690 bar] available



Nickel-plated LED light housing



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

# the **CANTY**Advantage

- Redundancy LED array with numerous diodes
- Highly efficient. Maximum lumens with minimal power draw.
- More lumens per square inch than standard LED bulbs.
- More uniform, dispersed compared to a single emitter to allow for optimal illumination.
- Solid-state lighting for rugged industrial applications.
- Uniform consistent white light





COMPETITOR'S LIGHT NOTE: EGG IS BAKED ON

Canty is measured and meets the new directive which limits the amount of radiation to avoid problems in the field.

# Turbidity

## **Turbidity / CIP**

- Monitor for TOC and Particle Level
- Reduce Lab Time
- Monitor for TSS

### Turbidity

Turbidity analysis using a high resolution camera image sensor that detects turbidity changes in fluids by measuring the transmittance of light. Using advanced software algorithms the system automatically removes gas bubbles from the analysis resulting in highly accurate and repeatable data outputs. This system is designed for inline use with varying pressures, temperatures, and pipe diameters.

Turbidity (NTU)

50

25

100

### Features

- Ethernet Connectivity
- Real Time Monitoring Of Process In Flow
- Solid One Piece Central Hub
- Supplied With Internal O-Ring Seals
- Easily Installed Modular Unit
- Fused Glass Process Barriers

**ICUMSA GS2/3-10** 

- Regulated Light Source Emits Cold Light To Prevent Product Bake-On
- Modbus TCP/IP, Modbus RTU, OPC UA, Analog 4-20mA, and .csv report Outputs
- Visual Verification
- In-Line Analysis

# Sugar Color - ICUMSA (IU) Clarifier

ICUMSA GS1/3-7



## **Effect of Gas Bubbles**



A variation of the Inflow<sup>m</sup>, featuring a longer flow path, can also be used for measuring the color of sugar on the ICUMSA scale.

A regulated LED light source ensures that each liquid sample is subjected to consistent lighting conditions, while a highly color sensitive camera provides representative images of the fluid for measurement, via the image analysis software.

The same color intensity, and bubble elimination software are employed. However instead of calibrating to a turbidity scale, it is instead calibrated against the appropriate ICUMSA standard via known value samples. This allows for the measurement of the IU value of any white sugar solution (ICUMSA GS2/3-10) or raw, brown or colored syrup sugar solutions (ICUMSA GS1/3-7).



# **Ionic Exchange Interface Control**

Mount an interface camera on the side of your ion exchange vessel and automate tracking the interface between your cation and anion phases!

- Much tighter control of the interface
- Replace manually checking in multiple sight glasses to track this position
- Replaces an existing sight glass in the location you want the interface to stay
- Visual verification of all measurements
- Outputs interface position and alarms when outside of specified range
- Fused Glass Process Barriers
- Integrated light source using the same process connection

5

# **Sugar Crystallization**

## **SUGARSCOPE™**



The CANTY SugarScope<sup>™</sup> allows for remote monitoring of the crystallization process, providing the control room operators with a continuous, real time, microscopic view.

The equipment can be easily retrofitted to a vacuum pan, by utilizing one of the flange connections previously designated for a sight glass.

The system can be supplied with various optics to cover all sugar size ranges from fines through large grains.

Having a continuous view available to the operators avoids the archaic method of manually viewing crystals on a glass slide at various points in the process, and therefore allows for early problem detection (eg. secondary seeding) and swift operator reaction.

CantyVision<sup>™</sup> image analysis software allows for particle size and shape characterization

during the initial stages of crystal growth, along with providing the Mean Aperture (MA), Coefficient of Variation (CV), counts, and concentrations over time.

The SugarScope<sup>™</sup> combines the latest Gigabit Ethernet camera systems, with CANTY's patented fused glass and lighting technologies, to provide an unrivalled view, from initial nucleation right through to fully formed crystals.

The insertion section of the system ensures the view is representative of the process as a whole, rather than viewing at the vessel wall, where crystal behavior and characteristics may be affect by boundary layer phenomena.





### Seeding



Seeding + 30 Minutes



Seeding + 120 Minutes



Seeding + 60 Minutes



Seeding + 150 Minutes

6

# **Crystallization Applications**



**SEEDING CONTROL** for small grain sugar is imperative. The Crystalscope high magnification option provides not only CV and MA values during the initial seeding steps, but uniquely measures the count and concentration of crystals. For a deep dive in sizing data, full size distributions can also be output.

LARGE GRAIN crystallization begins

with much larger seeds. The lower magnification optic on the Crystalscope provides similar measurements, providing MA, CV, count, and concentration for this larger size range.



## During REMELT

it is important to know crystal size and concentration to ensure that the crystals have completely melted back into solution. The Crystalscope provides real-time data so that you can optimise this process.



# Sugar Centrifuging



A camera light combination system is mounted to the centrifuge using the CANTY angled mounting plate. This allows for continuous monitoring from the control room, of initial product filling, the various washing and spinning cycles, and product discharge, therefore enabling greater operator control and efficient identification of any process issues.

CantyVision<sup>™</sup> image processing software can be used to measure and detect various process parameters on both batch and continuous centrifuge systems.



## **BATCH CENTRIFUGE ANALYSIS**

### Level / Cake Thickness

The CantyVision<sup>™</sup> Centrifuge system can be configured to track the edge at the intersection between the liquid slurry and the base plate. Eventually, this turns into a direct measurement of the product cake thickness.

### **De-watering Optimization**

The CantyVision<sup>TM</sup> Centrifuge system can be used to optimize the product washing & spinning phases of the centrifuge process.

If there is overstanding liquid present on the surface of the cake during washing, it indicates less than optimal filtration, which could be due to too high a wash fluid feed rate, or possibly fine particles plugging the filter mesh (indicative of a problem with crystallization).

This overstanding liquid is detected by CantyVision<sup>™</sup>, as when liquid is present, there is a higher than normal intensity reading due to the reflection of the imaging system's light source from the surface. In addition to detecting the initial presence of overstanding liquid, a subsequent drop in intensity reading indicates that all wash fluid has eventually been filtered through. This can be used to control the introduction of additional wash cycles, or to determine when the washing process is complete and the product can be discharged.







# **Continuous Centrifuge Analysis**



## **COLOR LINE**

application specific software to best serve your needs.

The CantyVision<sup>™</sup> Centrifuge system can be configured to track the position of the color line. This allows the operator to adjust the feed conditions to maintain a constant color line position, and avoid washing above the color line, which is inefficient due to spacing on screen and subsequent liquid carry over.

## **OFFLINE LAB ANALYSIS -**MINI INFLOW DILUTION SYSTEM

shape, and concentration during crystallization reactions. Requires the use of a stopping agent to prevent dissolution and false grains from forming. Automatic dilution allows for samples of any concentration and removes the variability that comes with dilution by laboratory technicians. Fully automated to run an analysis via the push of a button.

## **Vector Control Module**



Support up to six cameras

- Outputs including OPC UA, Modbus TCP/IP, Modbus TRU, Analog 4-20mA
- Link to technical support (with Internet connected)
- CantyVision<sup>™</sup> Software preinstalled
- Embedded operating system
- Fan-less models available



The Vector Control Modules (VCM's) serve as image processors for any of CANTY's applications requiring analysis. These units are built as a turnkey solution to ensure the most convenient and simple startup for a camera system. VCM's can power camera systems using power over Ethernet (POE) and come pre-loaded with

CantyVision Data-Log Module

# CAN CANTY's Mini Inflow analyzer can be installed in a lab to check crystal size,

# **Dry Solids Particle Sizing**

Meets ASTM Standards • Raw Crystal Sugar • Purified Sugar • Baking Sugar Particle Size from 10µm to no upper limit\*

Size and shape analysis of dry particles or pellets, is performed by the range of Canty Solid Sizer equipment. The product to be analysed is fed into the system hopper, where the built in material handling system separates the particles into one even layer, and transports them into the analyser's measurement zone.

Within the measurement zone, the particles pass between a high intensity LED light source and camera, which captures high resolution images 2D images.

These images are then binarized, and by analysing the number and position of the image pixels, a full particle **SIZE** and **SHAPE** distribution.





The CANTY SolidSizer<sup>™</sup> is a vision-based sensor used with the CANTY VCM (Vector Control Module) image processor for dry sand size measurement in a laboratory environment or inline. The CantyVision<sup>™</sup> Software accurately

measuresmultipleaspects of the sand. TheSolidSizer™correlatewithin2%of asievewith99%

Features:

- Real time 2D particle size distribution analysis
- Particle shape analysis by aspect ratio, circularity, convexity, solidity, sphericity, etc
- Ability to correlate data to sieves
- Adaptable data output so that it matches current QC documents
- Data can be output via .csv or ODBC for local storage or uploading to LIMS systems
- System auto calibrates and auto focuses
- Front and back lighting available for color analysis
- Analysis in as short as 2 minutes



### Benefits

- Virtually eliminates lab screening time
- Easily adaptable for different product sizes
- Eliminate the time, errors, and costs associated with sieves and lasers technologies
- Easy setup and calibration



# Lab or Industrial (At-Line)

Systems are available to be installed either in a lab or directly at-line. While the lab system runs samples brought to the lab, the at-line system receives a side stream or periodic sweep samples that provide a constant size distribution to be able to react to problems in real time during processing.



## PAYBACK

TIME: Samples run on a Canty Solid Sizer are typically finished in 2 - 5 minutes, depending on sample size. Traditional sieve analysis will take anywhere from 10-20 minutes in just shaking time alone, not to mention then cleaning off every sieve in the stack and weighing the sugar to calculate results which can take another 5 minutes or more. That means a time saving of up to 20 minutes per sample!

ACCURACY: Sieves measure size based on crystals fitting through a mesh screen. The Solid Sizer can provide specific size and shape data in multiple dimensions in addition to being able to be correlated directly with sieve results. Additionally, human error related to cleaning sieves and weighing each screen is completely eliminated!

AUTOMATION: The Canty Solid Sizer can be set to automatically write into a LIMS program through an ODB Connection or through the automated importing of .csv reports. This eliminates the need for manually typing results into a LIMS and translation errors

AT-LINE: By moving analysis from the lab to being at-line, you can eliminate the need for measuring size in the lab altogether. This can both save time in the lab and eliminate the time lag of running samples from production to the lab and waiting for results before being able to adjust the process.

## **BLACK SPECK OR COLOR SPECK**

CANTY

BLACK SPECK or COLOR SPECK detection is available as an add on to a particle size and shape analyser, or as a stand alone system. This uses a camera system with controlled front lighting system for accurate color representation within the captured images. Multiple measurement zones can be configured to allow for detection of particles of different colors within the same product.





**Color Particles Detected** 

**Black Particles Detected** 

Tool Type Measurement ColorSpeek 84.000000 pixels/Name

WWW.JMCANTY.COM • USA: 716 625 4227 • EUROPE: +353 1 8829621 • ASIA: +66 83 9689548

**Contaminant Detection - Mixture Ratio Analysis** 

Tool Name

## 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 OUR VALUED CUSTOMERS

AMERICAN CRYSTAL SUGAR ASR GROUP DOMINO SUGAR TATE & LYLE REDPATH SUGAR FLORIDA CRYSTALS AMALGAMATED SUGAR SUGAR AUSTRALIA C & H SUGAR

## **APPLICATIONS:**

TURBIDITY SUGAR COLOR - ICUMSA CRYSTALLIZATION CENTRIFUGE COLOR LINE/EDGE DETECTION FILL LEVEL & CAKE DETECTION PARTICLE SIZE BLACK SPECK DETECTION



J.M. Canty Inc. 6100 Donner Road Buffalo, NY 14094 Phone: (716) 625 - 4227 Fax: (716) 625 - 4228

Email: sales@jmcanty.com



J.M. Canty International Ltd. Ballycoolin Business Park Blanchardstown Dublin 15, Ireland Phone: +353 (01) 882 - 9621 Fax: +353 (01) 882 - 9622

Email: sales.ie@jmcanty.com

### WWW.JMCANTY.COM