Brewery
Perspectives in Liquid Process Analytics

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News

INGOLD
Leading Process Analytics

# 50,000 Liters of Beer Saved
## With an Optical Product Monitor

**Delays in determining water to beer transition are costly to breweries. A number of methods exist for product transition monitoring, but an optical system is the quickest and most reliable. For a brewery in Brazil the InPro 8300 RAMS is saving thousands of liters of product per month.**

### Operator determination of product transition can be wasteful

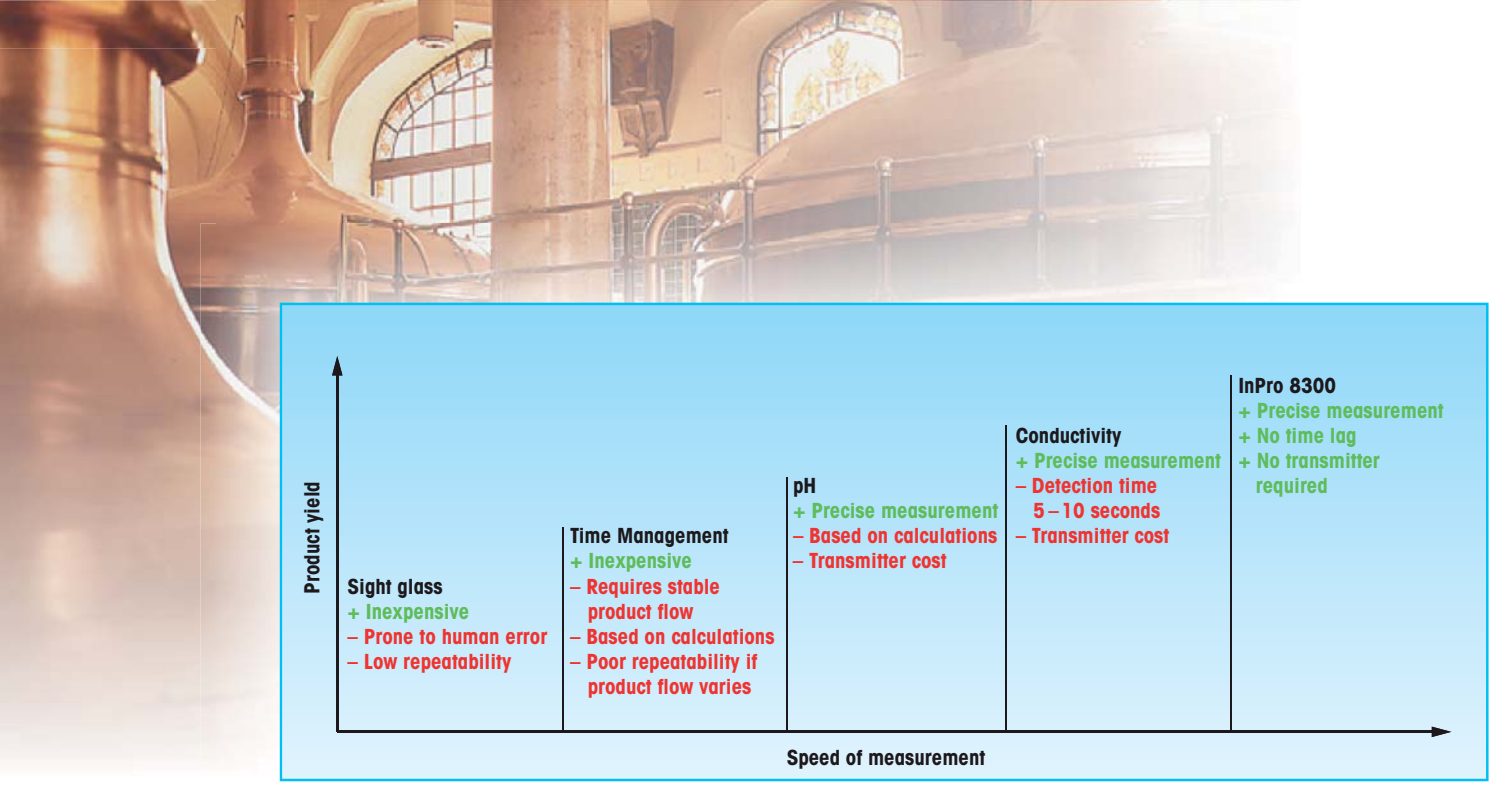
Breweries have a great need for precise, timely identification of product transition as it reduces product loss and water wastage. Methods vary, and determining product transition by simple, visual means using a sight glass is still common. This approach relies heavily on operator skill; therefore, the point at which the appropriate valve is switched may be too early or too late depending on each individual operator's abilities. Considering typical pipe diameters and speed of the fluid, a delay of only a few seconds equates to a significant quantity of product being wasted or water diluting the beer.

One of the world's major players in the beer industry operates a facility in Brazil. Brewery engineers were keen to replace the sight glass between fermentation and carbonation tanks with a cost-effective automated system.

### In-line product monitor reduces beer loss

The InPro 8300 Reflection Absorption Multi-Switch (RAMS) optical product monitor is highly suited to this type of application. The RAMS series of products use transmitted and back-scattered light to precisely determine liquid color and/or turbidity in real time. Installation is simple as the InPro 8300 RAMS is usually a retrofit for an existing sight glass housed in a Tuchenhagen Varinline process connection. For the Brazilian brewery's situation a color identification model was installed. Once the output

METTLER TOLEDO




A comparison of phase separation technologies

of the unit (4 . . . 20 mA) was correctly set for triggering the appropriate valve, the InPro 8300 RAMS could be left to reliably monitor and control water / beer transition.

The InPro 8300 RAMS not only eliminates the risk of operator error, it has advantages over other methods of product determination such as time management and conductivity measurement (see above).

## More beer, better quality, reduced cost

Using the METTLER TOLEDO system has brought our customer the following benefits:

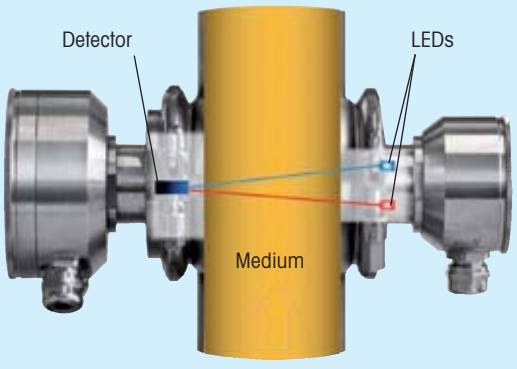
- Improved efficiency through reduced product loss (approximately 50,000 liters saved per year)
- Greater control of product quality due to continuous monitoring of color in the process
- Cost savings by reducing manpower at the process

If you want to reduce beer loss at your brewery, go to:

▶ **www.mt.com/InPro8300**

### InPro 8300 RAMS

The InPro 8300 RAMS measures light absorption and reflection from LEDs to determine color and / or turbidity. This technique is sensitive to even slight changes in the color or optical density of a liquid and responds almost instantaneously. A choice of optical parameters provides the option to monitor product transitions based on optical turbidity or color measurement, similar to an in-line photometer. For turbidity measurement a near infrared (NIR) LED (880 Nm) light source is used to measure forward scattering through the liquid. By using NIR light the turbidity measurement is mostly independent of color influence. For product transitions based on color measurement a blue LED (430 Nm) is used.




Process integration is achieved by implementing the 4 . . . 20 mA signal transmitting the turbidity or color measurement to a suitable PLC – no transmitter is required. The measurement signal is repeated more than five times per second providing a response time of less than 200 ms.

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# Easy Integration of Sensor Data

## The Benefits of ISM in Process Control

**Integrating Intelligent Sensor Management data into process control systems provides a number of significant benefits. Real-time information of analytical measurements, sensor data and diagnostics enable enhanced process control, increased process reliability and simpler maintenance planning. Combined, that means productivity is improved and operating cost are lowered.**

### More than just an accurate measurement

Intelligent Sensor Management (ISM) technology not only offers precise measurement data, it also provides sophisticated real-time sensor diagnostics that inform you of remaining sensor life, and time until the next calibration or maintenance will be required. ISM-equipped transmitters from METTLER TOLEDO display this diagnostic information in real-time, providing continuous data on sensor condition at the measuring point.

### Higher productivity at lower cost

The real-time diagnostics and measuring information can be easily integrated into process control systems for convenient monitoring in control rooms. This allows technicians and managers to improve process control and to keep track of the "health" of sensors across an entire facility at the same time. Sensor diagnostics means that measurement point maintenance can now be managed more efficiently. Unplanned shutdowns due to unforeseen sensor failure no longer occur, and the resulting increase in process availability and reduced maintenance leads to improved productivity and lower operating costs.

### Quick and easy sensor handling

In addition, ISM sensors can be pre-calibrated in a maintenance shop and stored for later use. Together with Plug and Measure functionality this means that at the first sign that a sensor might be failing, a replacement can be installed and be operating within minutes. Plug and Measure ensures fast, simple and error-free sensor installation and replacement.

### Digital communication protocols for all needs

ISM offers the unique opportunity to not only transmit measurement data, but also real-time diagnostics information as well as characteristic sensor data to a process control system. This enables new process safety features such as sensor recognition and traceability as well as enhanced process reliability through real-time diagnostics information in the process control system. As a result, ISM offers tailoring of analytical solutions for a wide range of process industries based on particular needs.

METTLER TOLEDO's extensive transmitter portfolio offers advanced instruments with HART and fieldbus protocols such as FOUNDATION fieldbus and Profibus PA. The support of all major asset management tools such as AMS (Emerson), PDM (Siemens) and the open standard FDT/DTM ensure maximum compatibility.

Integration of ISM diagnostics into the process control system can be most easily achieved over the analog signal outputs or relay outputs of the M800, our latest multi-parameter/multi-channel transmitter.

The robust, state-of-the-art, 2-wire transmitter M420 allows the integration of measuring and diagnostics data through standardized HART interfaces including all relevant device descriptions.

Our fieldbus transmitter, M700, offers full digital integration of sensor recognition and ISM sensor data into the process control system which allows easy and safe measuring point commissioning and maintenance management.

Discover more about ISM at:

▶ **www.mt.com/ISM**


# Fast Oxygen Measurement
## Improves Filling Process

**Prompt, accurate measurement of the dissolved oxygen content in beer is important during bottling. For one of Germany's oldest breweries the fast response of the InPro 6970 i optical oxygen measurement system has meant reduced beer wastage and lower maintenance costs.**

### Brewery with long history

For more than 400 years, the Hofbräuhaus in Munich has been brewing beer in conformance with German purity laws, for beer lovers both inside and outside Germany. The brewery sets very high quality standards for the entire production process, including the equipment and measuring systems used. For this reason, production was relocated in 1988 to a state-of-the-art facility located at the edge of Munich. Continuous investment in cutting-edge equipment ensures that the Hofbräuhaus brewery ranks among the most modern in Europe.

### Reducing beer wastage

The Hofbräuhaus has been using METTLER TOLEDO sensors for oxygen measurement in various measurement systems for more than 15 years. The following requirements are set for the measuring equipment: stable sensor signal, high measurement accuracy and fast readout in order to reduce beer wastage.

Quality Assurance technicians installed our new optical oxygen measurement system, comprising the InPro 6970 i sensor and M400 transmitter, in the bottling plant for a test period. The technicians were pleasantly surprised by the short response time compared with polarographic sensors. The InPro 6970 i sensor responded quickly during bottling and provided stable measurement values. This enabled the brewery to significantly reduce beer loss.

### Low maintenance and easy operation

Reduced maintenance requirement is another unique feature of optical sensors. With no need for electrolyte or polarization the sensors are always ready for use. In addition, the InPro 6970 i's internal LED used for oxygen determination can be switched off during cleaning and prolonged system downtimes. This keeps the sensor signal stable and increases the lifetime of the replaceable sensing element, the OptoCap.

### InPro 6970 i optical oxygen sensor

The InPro 6970 i sensor fulfills all the requirements of the filtration and filling plant.

InPro 6970 i optical oxygen sensor


M400 transmitter


- Fast, accurate measurement
  Short response time compared with polarographic sensors reduces beer wastage and increases plant productivity.
- Easy handling
  Electrolyte-free sensor operation without the need for polarization increases sensor availability.


iSense Asset Suite sensor management software

- A new dimension of maintenance with Intelligent Sensor Management (ISM) and the iSense Asset Suite
  Integrated ISM technology allows sensors to be calibrated easily and reliably in the lab with iSense Asset Suite PC software.
- Specifications
  Measurement range:
  2 ppb to 2 ppm dissolved oxygen
  Pressure: max. 12 bar absolute
  Temperature range: 0 to 40 °C (121 °C for steam sterilization)

## M400 transmitter

The M400 transmitter allows sensor status data to be queried in real time and transmitted to the process control system. Continuous sensor monitoring is supported by the integrated Dynamic Lifetime Indicator and Adaptive Calibration Timer, which allow for better planning of sensor maintenance. Recently added functionality simplifies sensor handling and improves sensor performance:

- Enhanced lifetime
  The remote switch-off function allows the sensor's internal LED to be switched off when the sensor is not needed. This increases the lifetime of the OptoCap sensing element considerably.
- Longer maintenance intervals
  The temperature switch-off function turns off the sensor's internal LED automatically or under customer control, disabling illumination during the cleaning process. This also increases OptoCap lifetime and lengthens maintenance intervals.
- Automatic stability check
  Sensor-specific stability criteria are evaluated during calibration to ensure proper, correct calibration. This significantly improves sensor performance.
- Reset function for calibration data
  If calibration is inadvertently performed incorrectly, the factory calibration data (phase angle) can be restored to ensure ongoing measurement accuracy.

## iSense Asset Suite

The iSense Asset Suite software simplifies the maintenance concept of ISM sensors. It is a complementary tool for sensor management, assessment, calibration and adjustment. iSense also allows comprehensive documentation of the complete sensor history, including audit trail and electronic signature. The acquired data, such as the number of CIP or SIP cycles, maximum process temperature and Dynamic Lifetime Indicator provide information that can be used for measurement system optimization. iSense allows the optical oxygen sensors to be checked and calibrated quickly in the lab. The sensors are then ready for "plug and measure" installation at the measurement point.

Find out more at:
▶ **www.mt.com/InPro6970i**

# A New Angle to Detecting Contaminants in Fluids

**The launch of the new FluidCheK x-ray system is a significant breakthrough in the detection of contaminants in fluids. It was developed to meet the needs of manufacturers and packers of beverages and other liquids. The FluidCheK is equipped with advanced image-scanning software and employs x-ray beams at an angle for total product safety.**

**DeLecLLon of denLe conLamLnanLL**

The new FluidCheK x-ray system ensures accurate detection of dense contaminants including glass, metal, stone, plastics, such as rubbers, such as Viton. It is specially designed to inspect glass bottles and jars, metal cans and plastic bottles, and is especially effective on containers with a domed base.

"It has been traditionally difficult for perpendicular horizontal beam x-ray systems to inspect the base area of glass and metal containers with raised internal bases or domes. Since the dome area, which forms part of the x-ray base image, is denser than the rest of the container, contaminants can be hidden, resulting in detection of blind spots," said Niall McRory, New Product Development Sales Manager, METTLER TOLEDO Safeline. "In response to specific customer requests, Safeline sought to develop an x-ray system that achieves optimum contamination detection in packaged fluids. This had to be done whilst ensuring maximum throughput and ease-of-operation. FluidCheK is the result of that endeavour."

## A fresh approach to contaminant detection in fluids

The FluidCheK x-ray inspection system takes a fresh approach to the detection of contaminants in liquids; it focuses inspection on the base area rather than on the entire container. This approach is highly effective because contaminants are usually denser than the surrounding liquid, so they will always sink to the bottom of a container.

## Benefits of inspecting the base of a container

The advantage of concentrating inspection only on the base of a container is that the x-ray generator can be moved much closer to the product. This reduces the distance the x-ray beam must travel to the detector. Therefore increasing the quality of the x-ray image and improving the sensitivity and probability of detection, resulting in outstanding product safety.

## Production line location

The FluidCheK is ideally located at the end of the production line. This acts as a final product inspection step to ensure that no contaminant has entered the product during production or sealing. By offering accurate quality control, the FluidCheK helps brands comply with local and international regulations, retailer requirements and Hazard Analysis and Critical Control Point (HACCP) practices.

The FluidCheK uses Safeline's new x-ray transparent slat band modular belt. The belt's design and the low x-ray attenuation properties of its materials allow for excellent transport properties with no loss in detection sensitivity. It is ideal for high-speed glass container and can lines, offering smaller gaps for smoother transfers, easier integration with existing modular conveyors and easier rejection or diversion of defect packs. If glass breakages occur on the line, the belt can be easily removed in minutes for cleaning or maintenance. An important feature of the FluidCheK is that it performs a completely "non-contact inspection". This means that the products are not touched at anytime as they pass through the machine to prevent product handling issues and damaged pack labels.

For further information visit

- **www.mt-fluidcheck.com**
- **www.mt.com/safeline-xray**

# Reliable, Simple, Convenient Measurement
## with a Temporary Data Logger

**Temporary data logging in many applications is needed for process optimization, quality assurance or troubleshooting purposes. The new temporary data logger, iRO, from METTLER TOLEDO offers a unique solution providing easy installation and commissioning thanks to ISM technology.**

### Easy to install, simple to use

The iRO data logger is the ideal tool in combination with METTLER TOLEDO Intelligent Sensor Management (ISM) systems, for temporary in-line analytical measurement. iRO (which stands for "intelligent remote operation") records real-time in-line measurements without the need for time consuming installation, as no wiring for power supply or data acquisition is required. Plug and Measure functionality, a feature of our ISM technology, ensures error-free commissioning. While Bluetooth communication for data read out and system configuration sets a new standard in ease of use.

Here, we look at three uses for iRO that will save you both time and money.

iRO with sensor

### Process optimization

During process development and optimization of production processes, in-line measurement of analytical parameters such as pH, oxygen concentration or conductivity is often vital. To find the most suitable installation points for analytical instruments can be a long and complex process if complete measuring systems have to be installed temporarily.

The iRO data logger is easy to commission as it needs no wiring and thus simplifies short-term data acquisition. Measurements from up to two sensors can be logged for several months, and data read out with a computer over a Bluetooth connection can be performed within a minute. The data can be stored in a format that can be easily imported into Excel for processing and analysis. Each data set contains the measurement value, date and time, and important sensor details such as serial number and diagnostics information.

### Quality assurance

Quality managers need data. The traceability of process parameters at different measurement positions is required for guaranteeing the reproducibility of a production process and compliance with validation requirements. The iRO temporary data logger is able to provide additional information to the existing measurement points without the need for complicated installation.

### Troubleshooting

In processes such as filtration and filling, oxygen contamination can significantly reduce the quality and shelf life of the final product. To find the source of the contamination, oxygen measurement at various positions is necessary. Installation of a complete measurement system needs wiring and connection to the control system. iRO is the perfect tool for these situations. No wiring is needed and the data can be read out at any time. Data acquisition over weeks or months is simply achieved.

Discover more reasons to use iRO, at:
► **www.mt.com/iRO**

Comprehensive Website

# The Information You Want
## is at www.mt.com/pro

**The new-look METTLER TOLEDO Process Analytics website contains a vast amount of up-to-date information on all our products and services.**

Content is localized for your country and tailored to suit your selections. Simple layout allows you to quickly find the information and features you are looking for.

- Learn about our most recent product developments
- Request further information on products and services
- Obtain a quote quickly and easily
- Read case studies relevant to your industry
- Access buffer and electrolyte solution certificates
- and more ...

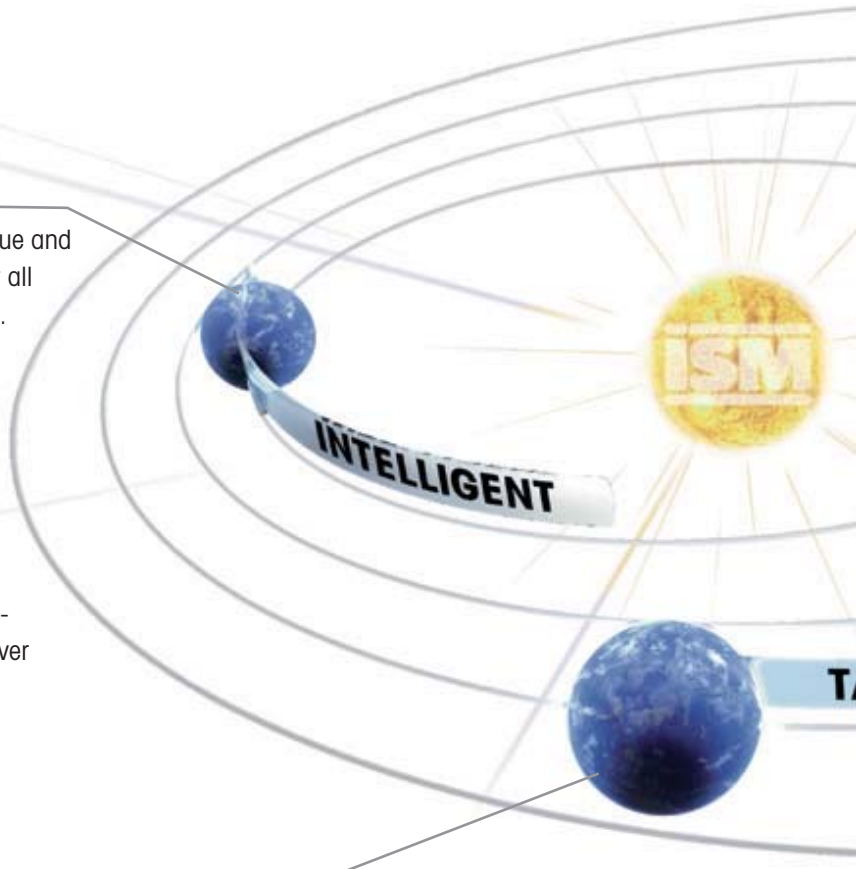
- Read the latest product news
- Access our newsletter archive
- Find out when our next trade show or exhibition is in your area
- Register for free webinars presented by our industry experts
- Download our white papers

# The Universe of Intelligent Sensor Management
## Intelligent, Predictive, Tailorable, Adaptive

**Intelligent Sensor Management (ISM) is an innovative new concept for process analytical measurement solutions that simplifies sensor handling, enhances reliability and reduces sensor lifecycle costs through a groundbreaking new maintenance concept.**

**Intelligent**

- The ISM universe offers unique and comprehensive solutions for all major analytical parameters.
- Digital sensor technology offers easy handling with pre-calibrated sensors, enhanced sensor performance and built-in diagnostics.
- An exclusive set of tools allows management and optimized service of sensors over their lifetime.




**Tailorable**

ISM offers industry specific solutions tailored to respective needs.

- **In Pharmaceutical and Biotech,** accurate calibration and comprehensive electronic documentation offer full traceability.
- **In Chemical and Petrochemical industries,** pre-calibration in a maintenance shop and optimized sensor management improve process reliability and reduce operating costs.
- **In Breweries,** pre-calibrated optical DO sensors offer more reliable measurement and less maintenance.


**Predictive**

- Avoid unscheduled maintenance with the Dynamic Lifetime Indicator; a unique, predictive, real-time diagnostic function.
- Manage the lifecycle of your sensors with the iSense Asset Suite PC-based sensor management software.
- Optimize maintenance schedules to reduce costs and avoid unplanned shutdowns.




**Adaptive**

- ISM allows seamless integration of on-line diagnostics information into process control systems via Profibus PA and Foundation fieldbus transmitters or Ethernet.
- Low-power concept offers wireless installations and Bluetooth-based temporary loggers.
- Direct integration into analog controllers via 4 … 20 mA converter cables offers the best of both worlds, ISM based maintenance with iSense and local diagnostics, with robust analog signal integration.

# Get in-line with METTLER TOLEDO

## Reduced Costs
## Thanks to Two-in-One System

Visual parameters such as beer brightness and beverage color are evaluated by the quality-conscious consumer even before they start to drink. Consequently, in-line monitoring of turbidity and color after filtration and blending supports your effort to produce beverages of consistent quality. The unique design of METTLER TOLEDO's turbidity/color system allows the simultaneous measurement of these two important parameters in one cost-effective unit.

**www.mt.com/InPro8600**

**Mettler-Toledo AG**
Process Analytics
Im Hackacker 15
CH-8902 Urdorf
Switzerland

**www.mt.com/pro**
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