



Sensors That Learn

Give You the Most Reliable Diagnostics

To maximize product quality and yield, you need to know if your sensors are performing correctly. That is why we have always made diagnostics the main focus of Intelligent Sensor Management (ISM®). And with our new version of ISM we offer a world's first – sensors that actually learn from your processes to give you unequalled diagnostics performance.

Breakthrough innovation

Since its launch in 2006, ISM technology has gone on to help hundreds of companies across the world increase process reliability, reduce maintenance costs and simplify sensor handling. One of the central features of ISM is its diagnostic algorithms that predict when sensor maintenance, cleaning or replacement will be required.

With our new, advanced algorithms we provide a breakthrough innovation – sensors that actually learn from and adapt to processes. This gives you exceptionally reliable diagnostics that are specific for every single process.

No more guesswork

ISM sensor diagnostics do not give you raw

data that has to be interpreted: they provide easy-to-read tools that tell operators what needs to be done and when, to keep sensors and your processes running reliably.

Sensor diagnostics mean you can confidently plan maintenance for when it is actually needed – neither late which can damage production, nor early when it is not required.

Keep your processes in the lead

There is a huge variation in processes found across manufacturing, so the latest ISM sensors actually adapt to the conditions they operate in. As a consequence, ISM diagnostics represent each and every process more accurately than ever before. This enables you to further optimize



"I can transfer the knowledge of one sensor to another with just a click."



ISM®



Request a free demo:

► www.mt.com/ISM-onsite

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maintenance and calibration procedures to get the most out of your resources.

time to acclimatize. And if conditions in the process alter, the sensor diagnostics adjust themselves appropriately.

Diagnostics speed saves time

Exchanging sensors can lead to risk exposure as a measurement point is taken off-line, so a fast ramp-up and getting back to reliable operation is key. To always ensure your sensors are up and running quickly, the new algorithms provide accurate diagnostics in only 24 hours.

They not only learn – they teach

In some applications the process conditions mean that it can take some time for algorithms to stabilize and give you precise diagnostics data.

We have solved this by giving ISM sensors the ability to learn from other sensors that have already been used in an application. For example, when a pH probe is removed from a process and is connected to our iSense™ software, information on the conditions of that particular process can be stored as an application profile. This profile can then be transferred into a different pH sensor.

When this second sensor is installed in the same process, because it carries the knowledge of its predecessor, it does not need

Sensor maintenance exactly when it is needed

Now diagnostics are accurate as soon as a sensor is installed and you can be sure you are conducting maintenance when it is necessary. Which means that you can be certain your sensors are always performing at their best.

Beyond Plug and Measure

With the application profile database on iSense and the ability to calibrate ISM sensors away from the process, you can build a stock of ready-to-go application specific sensors. Now you can replace a sensor at the measurement point in seconds, without having to adjust the transmitter.

For today's processes and tomorrow's

The new advanced diagnostics and other ISM developments, such as a mobile app that provides a quick sensor check on the go, mean that ISM will remain the leading technology in analytical measurement.

► www.mt.com/sensors-that-learn

Double the Lifetime

Robust pH Sensor for Hot Wort

Successful hot wort processes require accurate pH control. But the conditions are very harsh for pH sensors. The InPro® 3253i sensor is more than capable and offers a dependable, cost-effective and long-life solution.

pH monitoring in hot wort can be problematic

During wort boiling, protein and hop tannins are released which coagulate during the hot break process. Optimal separation of these substances is important for the stability of the flavor of the beer.

Coagulation of the proteins can be improved if, at the end of the boiling process, the pH value is reduced to 5–5.2. This is achieved by adding mineral acids or lactic acid. The acidification is regulated through monitoring the pH value.

Temperatures of about 100 °C, high suspended solids content, and extreme

changes in pH are a tremendous challenge for pH sensors and most have a lifetime of no more than three months.

A process tolerant, reliable solution

The InPro 3253i is highly suited to hot wort applications: Its special glass composition tolerates the temperatures of repeated sterilization/CIP cycles, and the pressurized electrolyte and self-cleaning diaphragm reduce maintenance.

Intelligent Sensor Management (ISM®) provides Plug and Measure error-free start up and predictive diagnostics that constantly inform you on sensor condition so

you can keep the sensor operating at its best. In hot wort monitoring, the InPro 3253i can operate reliably for six months or more: twice as long as most other sensors.

Over and above this, continuous pH measurement allows optimal acidification for the extraction of protein and hop tannins, and in the case of biological acidification, even at fluctuating concentrations of lactic acid in the batch tank.

The partnering transmitter, the multi-parameter/multi-channel M800 transmitter is suitable for either pipe or panel mounting, depending on requirements.

► www.mt.com/InPro3250



Reduce Beer Loss with Conductivity Measurements

In-line conductivity measurement before the filling line can quickly identify water/beer transition. Resulting in less product loss and greater process reliability.

Save more product

By using conductivity measurement systems, manual control of media separation by using a sight glass is avoided and the process can be automated resulting in minimal loss of product, reduced labor cost and increased process safety and reliability.

Conductivity accurately identifies media changes

The beer filling process is based on a CO₂ atmosphere with a pressure of up to 6 bars that pushes the product to the bottle. During the CIP process, cleaning solution and water is circulated in the machine and in the pipes that bring beer from the production area to the filling line. By the time that the final CIP rinse cycle ends, the pipes and filling machine are completely filled with water.

When production starts again, filling must wait until water has cleared the system and the first filled bottles are sent for lab analysis to determinate which bottles will be separated and which have the correct concentration of beer.

(no water contamination) to go to the market. Setting the waiting time too short results in a loss of bottles/cans. If the time is set too long, good beer will be sent to the drain. Sometimes, an operator goes to the drain pipe to determine by color the correct moment when the water ends and the beer starts. An operation that is subject to human error.

The use of a conductivity system to control the exact phase separation between water and beer, and to ensure the correct time to start filling, results in a fully automated process with minimized loss of bottles/cans and beer, and reduced labor cost.

METTLER TOLEDO solution

The recommended system for this application consists of an M300 transmitter with an InPro® 7100 i conductivity sensor installed in the pipe that feeds the filling machine.

InPro 7100 i conductivity sensor

Intelligent Sensor Management (ISM®) provides Plug and Measure installation for fast, error-free start up, and robust, digital communication between sensor and transmitter.

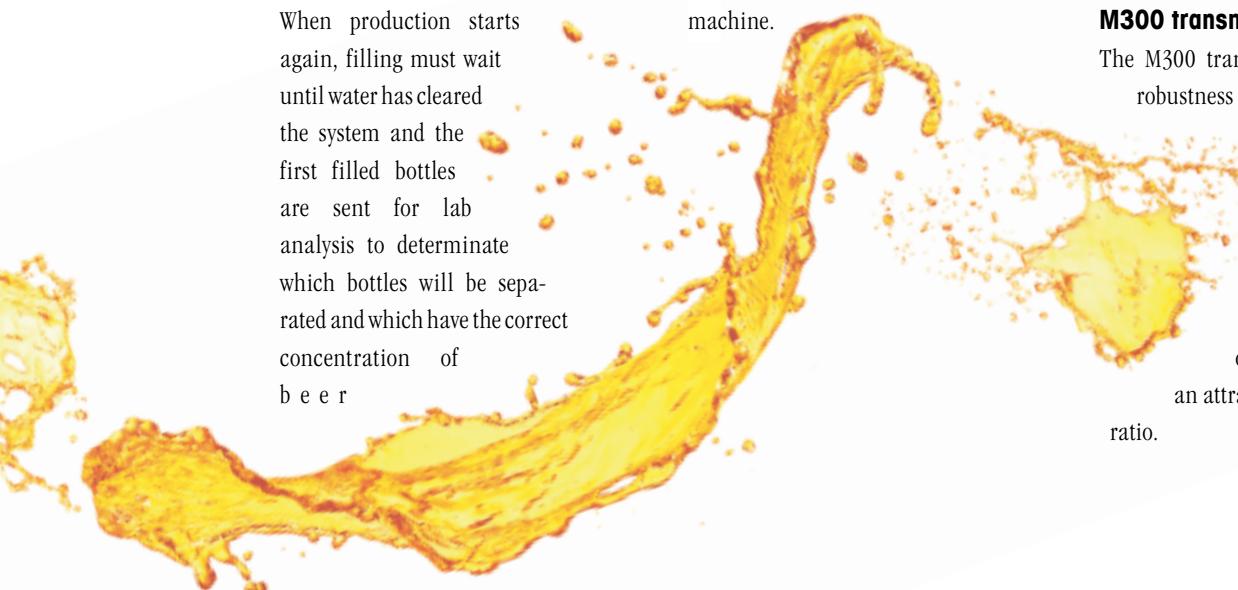
The 4-electrode InPro 7100 i sensor detects the switch from water to beer very quickly and precisely due to a fast response time to both conductivity and temperature.

4-electrode conductivity systems have a response time in the range of seconds. The sensor has to be installed upstream of the valve.

With fast and precise phase detection, the loss of beer and water in the installation can be significantly reduced.

M300 transmitter

The M300 transmitter series combines robustness with ease of use. High reliability makes this instrument the ideal choice for basic process applications. The M300 is available as a single- or dual-channel unit with an attractive price/performance ratio.





Convenient M300 transmitter

- **Flexible**

Available in single- or dual-channel conductivity, pH or DO versions for ISM or analog sensors.

- **Fast installation**

A user-friendly and sophisticated “Quick Setup” routine guides you through the first settings.

- **PID controller**

PID controller with pulse length, pulse frequency or analog control.

- **Password protection**

Multi-level password protection against accidental parameter changes.

► www.mt.com/M300



Durable InPro 7100 i conductivity sensor

- **High versatility**

The InPro 7100 i is compatible with a wide choice of static and retractable housings. WideRange™ technology keeps the sensor design small and easy to install. That allows installation in pipes with a diameter down to DN 50.

- **Fast response time**

The InPro 7100 i's rapid response time allows quick detection of process changes, leading to better process control. Benefits are:

- Increased yield
- Higher product quality
- Cost savings in the production process.

- **Easy process integration**

The compact design of the InPro 7100 i makes it compatible with a wide choice of housings, opening an extensive range of integration options.

- **Robust**

The PEEK shaft material offers high resistivity against aggressive solutions and is particularly suitable in processes with frequent CIP cycles.

► www.mt.com/InPro7100

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.

Discover more about ISM at:

► www.mt.com/ISM-brewing



ISM[®]



Discover More and Increase Your Brewery's Efficiency

Find out in our complimentary white papers how modern analytical measurement systems can help you increase productivity, maintain product quality, and reduce costs.



Greater Process Reliability with Intelligent Sensors

In-line analytical measurement systems are of great value throughout the brewing process for monitoring product quality, dissolved gas levels, water to beer phase transition, etc. For reliable operation, measurement sensors must be kept in good order, but it can be difficult to tell when maintenance or calibration is required. Cutting-edge process analytical systems with Intelligent Sensor Management (ISM[®]) are the solution. Find out why in our white paper.

► www.mt.com/ISM-brewery-wp



Optical Oxygen Measurement: Illuminate Your Process Control

For many decades, oxygen measurement systems based on amperometric technology have been a reliable and easy to use solution in many brewery applications. But the interest of the market in new solutions has grown in line with increasing requirements for reliability, user friendliness, and cost efficiency in demanding processes. Optical measurement technology has significant advantages over amperometric technology. This white paper explains what these advantages are and why optical measurements are replacing amperometric systems.

► www.mt.com/pro-optical-wp



Don't Lose Your Fizz: Safeguarding CO₂ Measurements

Measurement of dissolved CO₂ is important in certain beer and carbonated soft drinks production processes. In the past, in-line measurement systems have been prone to failures in operation that can lead to wasted product. This white paper explains how an in-line sensor with Intelligent Sensor Management (ISM) technology has solved these problems by monitoring itself for performance issues, and providing early alarms to allow rapid corrective action.

► www.mt.com/pro-co2-beer

Statistical Quality Control

Ensures the Cheer in Every Bottle

At Estrella de Levante, a renowned Spanish beer producer, ensuring bottles meet stated quantities and legal standards without giving too much product away, requires strict statistical quality control (SQC). METTLER TOLEDO balances and software can provide this, helping to keep Estrella de Levante's regulators, customers and operators happy.



In-production quality control must be agile enough to keep the lines rolling, but also thorough enough to meet the stringent requirements from regulators and customers. This is one of the main reasons for Estrella de Levante to keep its SQC processes up to date.

METTLER TOLEDO recommended an XP4001S/M legal-for-trade balance and LabX laboratory software. The precision balance provides the 4kg maximum capacity and 0.1g readability ideal for weighing filled- and, then much lighter, emptied bottles of beer.

The challenge: Manual operations & data management

In order to reduce potential manual processing errors, Estrella de Levante decided to upgrade its SQC system to a software-supported solution. Handling errors sometimes left them less than certain about data accuracy. Additionally, if printouts were mislaid, tests had to be repeated meaning double the human effort plus more product waste caused by the differential nature of the process.

Estrella de Levante's SQC process must adhere to effective content control legislation, but this meant that they could not manage to keep pace with production. Ideally, management wanted to optimize sampling so that operators could react even more quickly to discrepancies in fill volume and keep lines rolling.

Stress-free compliant filling

The actual weighing process involves selecting 20 filled bottles at random. Using LabX, operators start the weighing process via a shortcut on the balance terminal and are guided step-by-step through the whole process. Bottle volume and cap type are entered. The density of the brew and batch number are also recorded. Filled bottles are individually weighed then emptied and weighed again in the same order.

All calculations are performed automatically. The process is quick, easy and fully traceable with all data saved to LabX's secure database. All documentation meets legal requirements and Estrella de Levante's operators are able to react much more quickly if machines need to be adjusted to ensure bottles are consistently filled with exactly the right amount of beer.



Increased sampling speed

LabX has additional functionalities available. For example, LabX can generate barcoded sample labels including all the necessary peripherals to further speed up the sampling process while taking the worry out of tracking samples. Thanks to the barcode, sample numbers are automatically matched with their batch and bottles need not be weighed in any particular order.

Estrella de Levante has received much more than a simple system upgrade. With a complete process review, they have improved their accuracy, speeded up their processes and created greater data confidence. The end result is time saved and bottles accurately sampled meaning more bottles being enjoyed by Estrella de Levante's happy customers.

Text: Isabelle Mattmann
Software Solutions Product Manager

► www.mt.com/labx



XP2002S precision balance

LabX Laboratory Software

Flexibility

- SOP user guidance
- Work from PC or instrument
- Configurable workflows

Clarity

- Automatic data capture
- Searchable data and reports
- Results on PC and Instrument

Connectivity

- One software-many instruments
- Error free data import/export
- Bi-directional LIMS/ELN interface

Security

- Secure database
- Audit trail with full traceability
- Instrument control

Minimize Product Loss with an Optical Product Monitor

The InPro® 8300 RAMS (Reflection Absorption Multi-Switch) systems are designed for in-line use in phase separation and product identification applications by turbidity or color. The rugged InPro 8300 RAMS systems can be quickly installed on VARINLINE™ housings, and need only water for fast, in-line calibration.

To maximize production during the brewing process, you need to know exactly when the yeast to beer transition is complete. To minimize loss at the filling line, you must determine the precise moment beer and not water is flowing through the line. You also need to know if you are filling with the correct product. And you want to do all this with minimum expenditure.

Using LEDs to instantly detect changes in turbidity or color in liquids, the InPro 8300 RAMS is a unique and versatile instrument.

For product identification it stores a "fingerprint" of up to eight products, preventing losses at the filling line from incorrect product selection.

Find out how the InPro 8300 RAMS can help your brewery operations – go to:

► www.mt.com/InPro8300

Your benefits



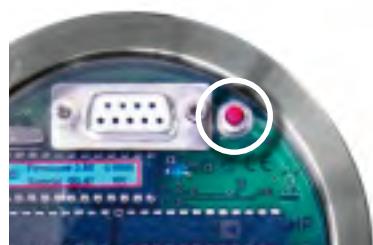
Minimal product loss

Instant recognition of pure product or water ensures neither is wasted.



Low installation cost

Fast and easy installation on Tuchenhaugen VARINLINE™ housings.



Quick, simple calibration

Time-saving, easy in-line calibration correction with clear water.



InPro 8300 RAMS
optical product monitor

Get in-line with METTLER TOLEDO



Plug and Measure Unbeatable Easy Handling!

How do you significantly reduce installation costs without compromising process reliability?

Intelligent Sensor Management (ISM®) technology opens the door to fast sensor availability as well as quick and error-free transmitter set up. With the M300 ISM transmitter in combination with METTLER TOLEDO's ISM sensors for pH, DO or conductivity, transmitter configuration and sensor identification happen automatically. The Quick Setup routine means that the transmitter is available for operation very rapidly, while the Plug and Measure functionality ensures the system is ready to measure within seconds of a sensor being connected.

- ▶ www.mt.com/M300
- ▶ www.mt.com/ISM-brewing

ISM®

