



## Fast Measurement in Tough Conditions Saves Brewery Time and Money

**Rapid, accurate measurement of the dissolved oxygen content in beer is important during keg filling. The new InPro 6970i optical oxygen measurement system offers a short response time, high accuracy and low maintenance effort – meaning lower production costs.**

### High standards

The Hacklberg brewery in Passau, Germany (one of the largest breweries in Bavaria) produces beer with superior quality and excellent taste which is honored with German Agricultural Society prizes every year. A bottling plant in Hutthurm, Passau was put into operation in 2007, and a new keg filling system was added in 2008. Hacklberg's high quality standards apply equally to their measurement systems for process analysis, especially for optical measurement of oxygen content, as they do to their beer.

### Exacting filling system

The brewery has a particularly demanding measuring station in the keg filling system, and the requirements on the oxygen measurement point are uncompro-

ming. It must deliver data quickly and accurately, and it must have a very robust mechanical construction and low maintenance regime.

High stresses due to pressure shocks imposed a heavy burden on the conventional amperometric oxygen sensor the brewery had been using, resulting in increased maintenance and reduced sensor lifetime. Frequent replacement of the membrane body and electrolyte was a matter of course. In addition to hampering the entire filling process, this was costly in both time and money.

The brewery's objective was to implement a new oxygen measurement tool that would minimize maintenance and unwanted system downtime, while also being





reliable and easy to use. With its optical measurement system, METTLER TOLEDO was able to fulfill exactly these stipulations.

### Meeting the challenge

After a successful short test phase, the Hacklberg brewery decided to deploy the in-line InPro 6970 i oxygen measurement system in its keg filling system. The brewery has found that the fast response and high accuracy of the sensor reduces beer wastage and the actual filling process can be started earlier, which considerably reduces production costs. They are particularly impressed with the high pressure resistance of the sensor, as pressure shocks and process interruptions have no effect on measurement performance. Further, the sensor operates without electrolyte, so polarization is no longer necessary and the sensor is always ready for use.

### Key benefits

The InPro 6970 i optical oxygen sensor fulfills all the requirements of the filtration and filling system:

- Fast, accurate measurement: The quicker response compared to amperometric sensors reduces beer loss and increases system productivity.
- Ease of use: Electrolyte-free sensor operation without polarization ensures maximum sensor availability.
- New dimensions in maintenance with ISM and iSense Asset Suite: Thanks to Intelligent Sensor Management (ISM) technology, the sensor can be calibrated and prepared conveniently and reliably in the lab. The PC-based iSense Asset Suite software enables pre-calibration and management of ISM sensors.
- Technical data:
  - Measuring range: 2 ppb – 2 ppm dissolved oxygen
  - Pressure: max. 12 bar (absolute)
  - Temperature range: 0 – 40 °C (steam sterilization at 121 °C possible)

The compatible M400 transmitter enables real-time retrieval of sensor status data for transfer to the process control system. Continuous sensor monitoring is supported by the integrated Dynamic Lifetime Indicator and Adaptive Calibration Timer, which facilitate the planning of sensor maintenance.

To benefit from optical oxygen measurement at your brewery, go to:

- ▶ [www.mt.com/InPro6970i](http://www.mt.com/InPro6970i)
- ▶ [www.mt.com/ISM](http://www.mt.com/ISM)



**ISM**

InPro 6970 i optical oxygen sensor with M400 transmitter

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## Minimize Product Loss and Maximize Production

**Product loss due to inefficient monitoring of the transition of yeast/beer/water is very costly. The InPro 8300 RAMS optical product monitors from METTLER TOLEDO are an extremely cost-efficient tool for ensuring product transition is identified the instant it happens.**



### Cost savings

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. And you want to do all this with minimum expenditure.

### RAMS does it all

Using LEDs to detect changes in turbidity and color (yellowness) in liquids, the RAMS (Reflection Absorption Multi-Switch) is a unique and versatile instrument. The absorption of near-infrared (NIR) light is utilized to accurately and instantly determine when the transition of yeast to beer is complete. For identifying beer in filling lines the absorption of blue and NIR light is measured.

### Simple installation, minimal maintenance

All members of the InPro 8300 RAMS product family are easily installed on Tuchenhagen VARINLINE housings. They are further characterized by a reduced maintenance requirement thanks to the use of long-life LEDs and CIP-resistant materials. A PC software package is available for the product identification functionality via the integrated RS 232 interface. The only calibration procedure necessary for all InPro 8300 RAMS versions is a simple in-line zero point correction.

### Benefits

Minimal product loss:

- Instant recognition of pure product or water ensures neither are wasted.

Low installation cost:

- Fast and easy installation on Tuchenhagen VARINLINE housings.

Reliable operation:

- Use of silica gel capsules in optical housings eliminates error-prone usage of air purge installation.

Fast, easy calibration:

- Simple in-line calibration correction with clear water.

Very low maintenance cost:

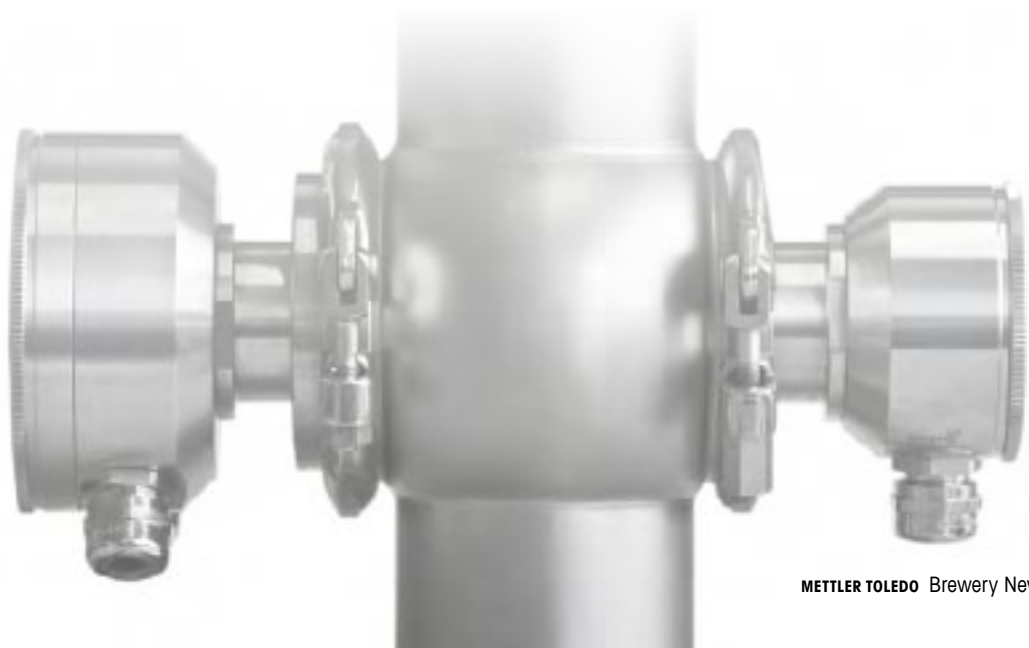
- Uses long-life LEDs, not bulbs.

Excellent value:

- Extremely attractive price/performance ratio.

Learn more at:

► [www.mt.com/InPro8300RAMS](http://www.mt.com/InPro8300RAMS)



## For the Best Beer You Need High Quality CO<sub>2</sub>

High residual oxygen in CO<sub>2</sub> is bad for beer taste and shelf life. So, for France's oldest brewery, keeping O<sub>2</sub> to a minimum is vital. In-line gaseous and dissolved O<sub>2</sub> systems from METTLER TOLEDO meet their exacting standards.

### The Meteor brewery

Records show that the history of brewing in Hochfelden in the Alsace region of France goes all the way back to 870. In 1640, the brewery known today as Meteor was established, making it the oldest brewery in France still in activity. Meteor has resisted acquisition by the big groups and it remains a family-owned independent that bases its development on creativity and maintaining high quality. In 1956, production exceeded 100,000 hectoliters and today more than 500,000 hectoliters are produced annually.

### Importance of CO<sub>2</sub>

When producing beer CO<sub>2</sub> is used in a number of processes. It is injected into the beer (post carbonation) because the quantity of CO<sub>2</sub> naturally occurring in the beer varies depending on the recipe. Therefore it is important to measure the dissolved CO<sub>2</sub> content at the filtration exit. CO<sub>2</sub> is also used for pressurizing the finished beer tanks. In these procedures the CO<sub>2</sub> is in direct contact with the beer (gaseous CO<sub>2</sub> in the tanks and dissolved in the beer) and therefore the CO<sub>2</sub> quality is critical.



systems sought by the brewery were a reduced maintenance requirement and the possibility of having high quality after-sales service. In addition, the instruments would have to conform with food regulation requirements as well as to Meteor's high standards.

### Proposed solution

Meteor asked METTLER TOLEDO if we could supply systems that would meet all their needs. We confidently proposed the following:

### In-line gaseous and dissolved O<sub>2</sub> measurement

Monitoring the CO<sub>2</sub> quality is done by measuring the residual oxygen content of the CO<sub>2</sub>. The gaseous O<sub>2</sub> level is measured in the CO<sub>2</sub> before it is distributed to the different utilization points (tanks and post carbonation) and the dissolved O<sub>2</sub> in the beer at the filtration exit before the product is sent to the filling stations. If the gaseous or dissolved O<sub>2</sub> content is too high it causes oxidation of the beer which can adversely affect flavor and shorten shelf life.

### System essentials

Because the O<sub>2</sub> measurement system in place at Meteor was obsolete and the requirements of the brewery had become stricter, the production engineers decided to replace it. The main features of the new



O<sub>2</sub> sensor InPro 6950

#### **Dissolved O<sub>2</sub> measurement:**

- InPro 6950 sensor
- M700 transmitter with trace O<sub>2</sub> module

#### **Gaseous O<sub>2</sub> measurement:**

- InPro 6950 sensor with gas membrane
- M700 transmitter with trace O<sub>2</sub> module

#### **Strengths of the equipment InPro 6950:**

- Measurement of oxygen at very low concentrations:  
The guard electrode protects the oxygen measurement system against interference. This results in an ultra-precise determination even if the oxygen is present in trace amounts.
- Innovative 4-electrode technology:  
This integrated technology offers advanced signal stability and contributes in reducing maintenance needs by preventing the formation of silver chloride in the electrolyte.
- Maintenance in seconds: The easy to replace membranes and the Quick Disconnect sensing element limit maintenance, saving time and providing maximum availability.

#### **M700:**

- Modular design:  
Flexible use of plug-in modules allows combined measurement of O<sub>2</sub>, pH or conductivity.
- Adapted to the Food and Beverage industry:  
M700 S transmitter in stainless steel for hygienic production.
- Simple operation:  
Adjustments and configuration are easy thanks to intuitive menu navigation. Three-tier password protection for calibration, maintenance

and configuration ensures a very high level of security.

- Reduced costs:  
Modular design allows the use of two measurement parameters in the one transmitter.

#### **Easy to use and low on maintenance**

The installed systems meet all the maintenance and conformity requirements requested by the Meteor brewery. The ease of use and low maintenance of the dissolved and gaseous oxygen measurement systems and our world class after-sales support have won over the brewery's process engineers, and other METTLER TOLEDO measurement systems have since been installed elsewhere in the brewery.

If you want to keep O<sub>2</sub> at a minimum in your brewery, go to:

- ▶ [www.mt.com/o2-gas](http://www.mt.com/o2-gas)
- ▶ [www.mt.com/o2](http://www.mt.com/o2)

## Best Practice

### **In-line measurement means optimized production and lower operating costs**

The continuous stream of data that in-line measurement provides lets you know that your processes are working as they should and informs you the instant that they are not, helping you to maximize production and reduce operating costs.

Discover more at:

 ▶ [www.mt.com/pro](http://www.mt.com/pro)



## Expert Opinion: In-line Measurement Technology

**The Versuchs- und Lehranstalt für Brauerei (VLB) in Berlin is world famous for its services to the brewing industry. We asked them about their courses, working with supplier industries and the importance of in-line measurements.**

The VLB in Berlin is renowned for its services, which include analysis, consulting and development in the brewing world. It also conducts training and ongoing education courses. These practically oriented courses are held in various locations, including a teaching brewery operated jointly by VLB Berlin and the Technical University of Berlin. METTLER TOLEDO has donated a modern optical oxygen measuring system to this brewery. This formed the incentive for an interview with Dipl.-Ing. Thomas Gieche, academic staff member in the Brewing & Beverage Science and Applications department.

MT: Mr Gieche, could you briefly describe the educational programme in the teaching brewery?

TG: For many years, VLB Berlin has seen a growing level of enrolment in its



Thomas Gieche of the VLB

international, English-language "Certified Brewmaster Course". However, we also see increasing interest in the more compact courses and seminars, such as the one-week course "Craft Brewing in Practice", which is also conducted in English. We also provide components of the Bachelor/Master and Diplom Braumeister (Master Brewer) courses of study. In addition to theory, one of our special focuses is of course practical training, in keeping with the motto "Learn by doing!".

MT: What about the other plans of VLB Berlin?

TG: As announced last year, VLB Berlin has been granted substantial funding for expanding its facilities. We plan to erect a new, modern educational centre for biotechnology and brewing here. One of its key components will be a new brewery for experimental and teaching activities, along with a laboratory.

MT: What is the significance of this new brewery for the educational curriculum?

TG: First I would like to say that we are still in the planning phase, which also applies to our discussions with system manufacturers. Nevertheless, our plans are already very concrete.

Within the scope of practical education, the students will be able to become familiar with and evaluate the various process steps in beer production. Naturally, we also want to equip the individual process steps with all necessary in-line process control and measurement equipment.

MT: To what extent is collaboration with renowned companies in the supplier industry important in this regard – for VLB as well as the suppliers?

TG: This is extremely important for us and for the suppliers. As an independent institution, VLB Berlin has maintained close contact with the supplier industry as well, right from the start. Everybody benefits from this collaboration. We jointly develop solutions to current problems in the industry, and we can directly incorporate this knowledge into the education programme. This close contact with actual practice is vital for the high quality of our courses.

MT: Now let's have a closer look at the topic of in-line measurement technology. What do you expect from a practical instrument in terms of its measuring characteristics?

TG: In-line measurement technology plays a very important role in quality

monitoring. Consider the issue of filtration and oxygen, for example. We know that beer often has elevated oxygen levels during and after filtration, which is undesirable. In order to deal with this quickly, for example by stopping the filtration process if the oxygen concentration is too high, it is essential to have oxygen instrumentation that measures precisely, with a short response time and good reproducibility.

MT: How should an instrument be designed in order to deliver optimal results in terms of ease of use and operational availability?

TG: It may sound obvious, but the equipment must fit in the system, which means that the installed components must not create any dead spaces. This also includes CIP capability, which means good cleaning characteristics and resistance to alkalis, acids and high temperatures. For the user, installation as well as calibration and maintenance should be kept as simple as possible. However, this also means that the people who use and support the equipment or sensors must be instructed and trained by the manufacturer in the greatest possible detail. Another factor is the longest possible maintenance and calibration intervals.

MT: What will users of analytical instruments want to see even more in the future?

TG: As already mentioned, despite the fact that instruments and sensors are becoming more and more complex and sensitive, including the accom-

panying software, features such as self-diagnosis as well as accuracy, simplicity and robustness will be the most important properties. Even if in-line process analysis has penetrated to nearly all areas of the brewery, it cannot replace analysis in the brewery's laboratory. Confidence is good, but verification is better.

MT: Thank you talking with us Mr Gieche, and we wish you and the VLB all the best.

TG: At this point I would like to express my heartfelt thanks to METTLER TOLEDO for providing the optical oxygen measurement system.

VLB uses the following METTLER TOLEDO equipment for in-line O<sub>2</sub> measurement after beer filtration:

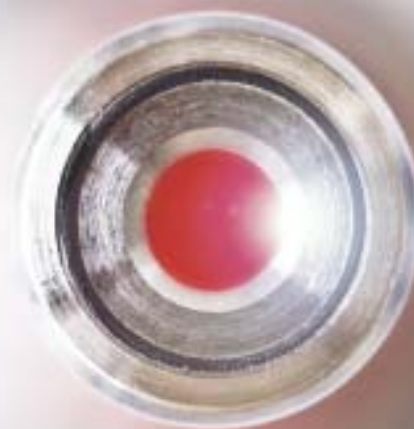
## InPro 6970 i optical O<sub>2</sub> sensor and M400 transmitter

### Principal features:

- Intelligent Sensor Management (ISM) provides increased operational availability and productivity thanks to advanced diagnostics for preventive maintenance
- optical measurement based on fluorescence quenching
- hygienic sensor design
- fast and reliable
- easy maintenance
- long maintenance intervals

For more information visit:

- ▶ [www.mt.com/o2](http://www.mt.com/o2)
- ▶ [www.mt.com/ISM](http://www.mt.com/ISM)



The heart of the InPro 6970 i optical O<sub>2</sub> sensor

## The Information you Want is at [www.mt.com/pro](http://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
- Register for free webinars
- Request further information on products and services
- Obtain a quote quickly and easily
- Download our latest white papers
- Read case studies relevant to your industry
- Access buffer and electrolyte solution certificates
- and more ...

The home page has been designed to get you quickly to the products and news you are interested in



**Product pages** provide a product overview and quick access to all important details and documentation

**Application pages** help guide you to the products that are right for your processes



- 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



## Intelligent Sensor Management Reduces Life Cycle Costs and Improves Process Safety

### Intelligent Sensor Management (ISM)

ISM reduces the installation, maintenance and calibration effort for METTLER TOLEDO's digital sensors to a minimum. This considerably improves process reliability, productivity and system availability.

### Reliable installation

Digital communication between sensor and transmitter means signal is always reliable and unaffected by moisture.

### Intelligence – starts in the head

ISM sensors are equipped with integrated electronics in the sensor head that store all relevant sensor parameters and includes algorithms for enhanced sensor diagnostics.

### Predictive maintenance

Intelligent diagnostics information is calculated and displayed on the sensor's transmitter and tells you if the sensor needs maintenance or replacement – no more downtimes due to sensor failure!

### System integration

Key ISM parameters can be fully integrated in a process control system via PROFIBUS® PA or FOUNDATION Fieldbus™.

## Plug and Measure

- Sensors are immediately recognized when connected to the transmitter – eliminating difficult configuration procedures.
- Operational availability of measurement point within seconds.
- Wireless module available for transmission from sensor to transmitter – no need for costly cable installation.
- Sensors can be pre-calibrated in the lab and stored for later use, saving time and increasing operational availability.

### METTLER TOLEDO's ISM product range includes...

... a wide range of sensors for

- pH
- dissolved and gaseous O<sub>2</sub>
- conductivity
- turbidity





## Diagnostics

- Any sensor maintenance requirement is recognized at an early stage, reducing downtimes and minimizing plant operation costs.
- Dynamic Lifetime Indicator estimates in real time the remaining lifetime of the sensor.
- CIP/SIP cycles counted automatically.
- Sensor spider diagram for fast troubleshooting.



## Maximum Performance

- iSense Asset Suite software offers you a unique means of optimizing the performance of ISM sensors for enhanced reliability and process safety.
- Key Performance Table enables you to evaluate the condition of an ISM sensor at a glance, without the need of a transmitter.
- Documentation of every calibration as well as the entire sensor history – documentation requirements to regulatory standards are easily met.

... advanced single- and multi-channel transmitters

- 4-wire
- 2-wire
- wireless module

... software applications

- iSense Asset Suite
- pH data logger



# 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 extremely quickly, while the Plug and Measure functionality ensures the system is ready to measure within seconds of a sensor being connected.

► [www.mt.com/M300](http://www.mt.com/M300)

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