

# Brewery

Perspectives in Liquid Process Analytics



# 10 News

**INGOLD**

Leading Process Analytics

## New Turbidity Measurement System in Accord with German Brewing Tradition

**A new innovative turbidity measuring system has been installed downstream for continuous monitoring of quality. It also serves successfully as alarm system and to control color changes in beer.**

### **The art of brewing as a family tradition in probably Germany's finest brewery!**

The private, Strate Brewery in Northrhine-Westfalia, Germany, was founded in 1863, is an exceptional but fully state-of-the-art specialty brewery. Today, this 5<sup>th</sup> generation family brewing business supplies beer in distinctive, ecological swing-top bottles. Since 1979 this family brewery has increased its annual output of Detmold specialty beer some 15-fold to reach 158.000 hectoliters. The private Strate Brewery belongs to the 32 largest independent breweries in Germany.

Sustained environmental awareness and the excellent quality of the Detmold specialty beers, Detmold Pils, Detmold Country Beer, Wheat Beer and (bottom-fer-

mented) Cellar Beer have resulted in repeatedly winning the "Prize of the Best" in the annual DLG-awards (German Agricultural Society).

### **State-of-the-art technology and love for the product are synonymous with success**

The company's maxim is "genuinely hand-brewed". For the Strate Brewery, this is understood to mean, use of the very best ingredients without any artificial extracts and aromas. The quality of the product is guaranteed by affording the greatest possible care and attention, love for the product and, not least, by implementation of the most modern technologies. This Detmold family business places particular value on careful brewing. Here, the beers are allowed time to quietly mature before



**METTLER TOLEDO**

being gently filtered after a longer period of cool storage. Rapid-style brewing is taboo for this traditionally run brewery.

### Reliable monitoring of beer filtration

Prior to filling, the beer is filtered. This is a separation process in which those residual substances that lead to turbidity in the beer, such as protein-tannin compounds, hop resins and yeast cells together with any bacteria present that would spoil the beer are removed. The beer

receives its polished brilliance. Alongside the optical and flavor attributes, filtration also substantially improves the storage properties and shelf life of beer generally. For this

critical step in the brewing process, the Strate Brewery places confidence in the new, innovative turbidity measurement system from METTLER TOLEDO.

### Measurement system

The measurement system consists of the turbidity sensor InPro 8600/D/2 and turbidity transmitter Trb 8300D. The technical production manager of the Strate Brauerei, Markus Lopsien, has installed the sensor downstream of the depth filter. The dual-angle measurement principle of the sensor enables continuous monitoring of the quality of the beer relative to the presence of colloid particles, and at the same time serves as an alarm system in the event of filter breakthrough, e.g. if Kieselguhr particles or yeast cells should ever pass the filter. In this way, the brewery can already guarantee the quality of its premium products prior to filling. The sensor measurement angles of 90° and 25° at 650 nm (red light) comply with MEBAK recommendations and are therefore directly comparable with turbidity measurements from standard laboratory instruments. In addition, the 2-angle measurement enables to compensate for color changes, possible LED intensity fluctuations as well as the formation of deposits on the optics.

this and other “Plug and Measure” functions, the measuring point can be set up in the shortest possible time.

The Strate Brewery has been using the sensor since the beginning of this year, profiting from the following characteristic benefits:

- Maintenance-free optical sapphire glass without any need for O-rings
- In conformity with MEBAK through measurement angles 90° and 25°
- Sanitary design, suitable to standard Tuchenhagen Varivent housing
- Digital data processing
- Single sensor concept with fixed optical path length
- ISM technology

### Cable-free configuration possible!

The turbidity sensor is also available in a cable-free version. This entirely new digital concept complete with the benefits of ISM technology enables the sensor to be configured without the use of any transmitter whatsoever. The cable-free configuration is carried out by PDA or Notebook via Bluetooth®. Two 4-20 mA current outputs directly integrated in the process control system are incorporated in this sensor.

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



### ISM® Intelligent Sensor Management

The high-grade electronics for ISM (Intelligente Sensor Management) are incorporated in the extremely compact, fully sanitary sensor head housing, and offer comprehensive diagnostic functions that provide information about the status of the sensor at all times. The centerpiece of ISM is the communication of static identification data and dynamic process data from sensor to transmitter. ISM functionality allows the factory-calibration data of the sensor to be transferred to the transmitter within seconds of connection. Through



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## Improve your Process Further with Digital Sensors and ISM Technology

**In many ways, sensors are at the heart of your process quality. Highly performing and reliable equipment can lead to significantly lower operation costs. With a bad choice of sensors however, high maintenance costs and process downtimes are the all too obvious consequences.**

### A logical evolution

Many years of experience in the field of industrial measurement systems form the basis of METTLER TOLEDO's competence. Now with its ground-breaking ISM technology, it combines these years of experience with digital technology and processing power for advanced sensor diagnostics.

### The digital ISM solution

Specific to the new line of ISM sensors is that signal processing takes place within the sensor head itself. Digitalizing the signal where the sensing element is a logical idea, because low impedance signal transmission is much less prone to electrochemical interferences.

### ISM means efficient maintenance

Next to its digital signal, each ISM sensor continuously perform its own "health check" and monitors such critical parameters as reference impedance for pH on-line. By doing so, it can alert the user of a possible junction blockage, allowing him time to take preventive measures. This is to just an example of what ISM is able to do for better process control. Across the world, ISM technology has clearly demonstrated its usefulness in hundreds of successful applications.

### The following digital sensors with ISM technology are currently available:

#### Dissolved and Gaseous Oxygen sensors:

- InPro 6850 i
- InPro 6950 i

#### pH electrodes:

- InPro 3250 i
- InPro 4260 i
- InPro 4800 i

### Feature overview for all digital ISM electrodes and sensors:

- Same sensor performance as analog sensors
- Digital K8S connector
- "Plug and Measure" functionality
- Advanced sensor diagnostics
- Predictive maintenance functions
- Wear monitor
- CIP/SIP counter
- ATEX, FM compatible (pending)

► [www.mt.com/pro-ISM](http://www.mt.com/pro-ISM)



InPro 3250 i.



InPro 4260 i.



InPro 4800 i.



InPro 6850 i.



InPro 6950 i.



## Technical and Commercial Progress with INGOLD DO system

**A complete dissolved oxygen (DO) measuring system was successfully tested at SAB Ltd Rosslyn/Pretoria site. Measuring performance, maintenance and economical aspects were investigated, and brought very successful and satisfying results.**

### 112 years brewing expertise by South African Brewery Ltd

More than half a century before inline analytics became state-of-the art, SAB Ltd already then quenched people's thirst. South African Breweries Limited (SAB Ltd) was founded in 1895. Until then the miners had no alternative but to drink a potato spirit mixed with tobacco juice and pepper. Such mixtures were quite toxic. This was the time when the famous "Castle" beer brand was born. Today "Castle" is still a huge success and a strong brand. Now, 112 years later, SAB-Miller is the world's second largest brewing group, player producing 175 million hectoliters of premium beer, with over 150 brands. Brands like Miller (USA) Aguila, Atlas (South America), Pilsener Urquell, Peroni, Kaluga (Europe) and Snow (China).

### ...and together with METTLER TOLEDO – Why?

Darren Prinsloo from the local METTLER TOLEDO distributor Microsep brought SAB into contact with our dissolved oxygen systems. The client requested in advance, a rigorous demonstration test at the racking line of the Rosslyn/Pretoria facility with a brew output of 6.5 million hectoliters per annum. The test equipment consisted of the following: Online oxygen sensor InPro 6900ppb with hygienic housing InFit 761 and multiparameter transmitter M 700. An InTap 4000e was applied for the offline test. From the very first moment, strong attention was paid to the measuring per-

formance, maintenance intensity and system complexity, as well as overall costs including initial investment for the system, simplicity of start-up and operation, and, not least, life expectancy.

### Project outlined by SAB Ltd

The following were to be observed and recorded throughout the trial:

- Response time (time taken for readout to stabilize)
- Stability and accuracy of reading (range)
- Time interval till next calibration/service
- Any maintenance/repair/adjustment required.
- Cost of any consumables, and service or repairs carried out on the instrument during the trial period.

### The very positive equipment test and its outcome

The tests ran continuously for several months. The transmitter was connected to the related PCS and to further systems for trending and comparing the measuring results. The responsible technician for this test commented on the final results as follows:

**"All test results from Mettler-Toledo Process Analytics equipment have shown no discernible differences in comparison to the reference system used".**



### Benefits established during the test at SAB:

**Superior advantages of the dissolved oxygen sensor InPro 6900:**

InPro 6900.

- Easy and quick to replace membrane greatly reduces maintenance, saving both time and costs
- No membrane change during the full trial period, and the sensor still works perfectly. Consequently, reduced maintenance costs.
- Only the electrolyte needs to be changed during calibration, resulting in less maintenance effort and cost savings
- Excellent response time and accuracy of the signal contributes strongly towards production of a premium beer with very low oxygen content
- Sensor principle permits low-level oxygen detection into 1ppb range, providing high process reliability.
- Very low electrolyte consumption reduces wear and tear costs
- Rugged sensor for enhanced durability in harsh environments, therefore excellent life expectancy
- Any sensor damage can be repaired quickly and easily by the brewery itself thanks to the quick-disconnect interior body. This significantly reduces maintenance costs.





- VarioPin cable system VP 6 with protection class IP 68 for humid environments provides a stable signal and impeccable signal transmission.

#### Unique advantages of the multiparameter transmitter M 700:

- Saving on investment, installation and storage costs but also on space due to a single multiparameter, multi-channel instrument.
- Owing to Smart Card principal, the software is upgradeable at any time. Permits always to be in possession of a state-of-the-art transmitter with enhanced operational life.
- Reduction of idle time thanks to rapid calibration (10 min)
- IP 65 transmitter enclosure insensitive to splash water ensures hermetical sealing of transmitter and prolongs its operational life.
- With its diagnostics features, the transmitter detects and describes sensor errors to enable speedy problem solving and predictive maintenance, resulting in a commercially highly superior system.
- Fully and easily configurable system resulting in reduced configuration effort

#### Advantages of the InTap 4000 e:

- No flow-dependency during measurement of DO, thereby highly accurate measurement values. Rugged and sealed construction, ideally matched

to the harsh and humid conditions encountered in racking, but also with ease of transportation.

- Simple maintenance makes this instrument a preferred device for operators, reducing operating errors and keeping operation costs low.

#### Verdicts of several racking operators

- The online and offline systems are extremely user-friendly, and fulfill operational directives.
- The water tightness of the DO portable analyzer unit is outstanding and allows its full use in wet areas.
- The InTap 4000 e unit is the best transportable measurement system due to its simple operation and long battery lifetime with automatic switch-off
- The METTLER TOLEDO inline measurement is perfect, with a reading very close to SCADA.

#### The happy end

After successful completion of the tests, SAB is highly convinced of the excellent measuring performance, but also about maintenance frequency, complexity and costs, simplicity of start-up and operation, as well as overall lifespan. Needless to say, the basic investment cost for our INGOLD system solution is very attractive. In fact the cost of ownership offered by METTLER TOLEDO fully complies with the expectations of SAB Ltd. The test results and a price study are now published globally on SAB's own web portal. The METTLER TOLEDO DO system has been approved and we have now become an alternative supplier for the racking lines. SAB's Rosslyn Brewery has purchased a system and it has been working since 2005.

#### A hearty thanks

Many thanks to Mr. Martin Brooks (Chief Brewer) of SAB Ltd and to all those from the SAB, Rosslyn / Pretoria plant, who were involved in carrying out this trial so successfully: Martin Brooks / Chief Brewer; Ronnie Naicker / M.D.S; Shiebu Safara / Quality Specialist; Racking Operators: Vusi Geelbooi and Syretha Willems



Transmitter M 700.



Portable DO measuring system InTap 4000 e.

[www.mt.com/brewery](http://www.mt.com/brewery)

## New! – High-Performance Transmitter for CIP Systems

**Conductivity and pH measurement loops incorporating the new M300 Transmitter Line are outstanding for their robust design as well as ease of operation and maintenance. Of particular interest is the multichannel version of the transmitter for parallel measurement of two parameters which users can configure directly on-site.**

### Application in CIP systems

Conductivity and pH measurements in conjunction with CIP systems ensure optimal plant operating conditions and contribute to cost-savings for CIP chemicals and fresh water. Typical points of installation are in CIP storage tanks where measurement of conductivity and pH provides information about the actual condition of the cleaning solutions. At the same time, these measurements form the basis for a defined recycling of the cleaning solutions. The measurement values provided by sensors installed in the return pipe from the plant equipment undergoing cleaning are used in the phase-separation process for the individual solutions.

### Modern measurement technology

The hallmark of a modern measurement system should fulfill following points to save time and maintenance costs:

- Practicality of hardware
- Intuitive user interface
- Easy installation and commissioning
- Diagnostic functions for monitoring operational status of sensor
- User prompting for maintenance and calibration

These important points were all fully implemented in the development of the M300 Transmitter Line. Some highlights are described in more detail in the following paragraph.

### M300 transmitter line

All transmitters— $\frac{1}{2}$  or  $\frac{3}{4}$ DIN—are equipped with a variable power adapter to allow operation at 20 to 30 VDC or at 100 to 240 VAC. Two different measurement values shown on the backlit display are well readable. The attractively priced, multi-channel version is freely configurable for parallel operation with pH and/or conductivity sensors.

### User-friendly software

A “Quick Setup” routine for startup guarantees error-free, basic configuration. The menu logic, is self-explanatory and available in five languages. The transmitter is fitted with a USB interface for easy and safe configuration via a PC or Notebook.

### Data Logger

Via a USB connection, the data logger is able to transfer data important to solve any problems. This helps in achieving cost savings for maintenance work.

### PID Controller

The PID controller deals for rapid control of extreme values as well as for exact control of values near to the set points. This allows saving in dosing amounts, increase in yield, and a lowering of overall costs.

### Maintenance and calibration

The continuously operating diagnostics function constantly provides information about the sensor status and, where necessary indicates which maintenance work is to be carried out. When calibrating the electrode, the automatic buffer recognition considerably shortens servicing time.

### The complete measurement loop

The M300 transmitter line is compatible with all 2- and 4-pole conductivity sensors such as the InPro 7108 and all pH electrodes such as the InPro 3250.

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



M300 transmitter.

## InPro® 6950 – the New Oxygen Sensor Controls Traces of Oxygen

**InPro 6950, a new dissolved and gaseous trace oxygen sensor, guarantees measurement accuracy down to 0.25-0.3 ppb/5 vol. ppm and ensures best signal stability. This low maintenance sensor has been designed for measurements after fermentation and all types of CO<sub>2</sub> purity control applications.**

### New technology

The InPro 6950 sensor is based on a 4-electrode measurement technology including an additional guard- and reference electrode. Therefore, the applied technique differs completely from the predecessor InPro 6900.

### Guard electrode allows recognition of oxygen traces

The guard electrode protects the effective oxygen measurement at the cathode from disturbing side diffusion effects. This allows to accurately determining oxygen concentration down to trace level.

### Separate reference electrode offers best signal stability

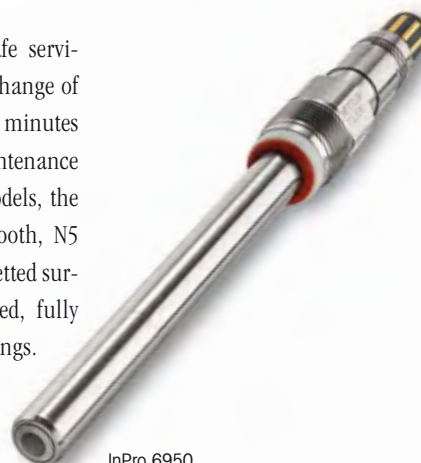
The reference electrode changes the electrochemical reactions within the sensor which prevents from silver chloride precipitation in the electrolyte. This improved measurement technology extends maintenance intervals and guarantees an outstanding signal stability during operation.

### Handy design optimizes handling and saves costs

The design allows rapid fail-safe servicing and/or replacement/interchange of membrane or interior body in minutes which reduces substantially maintenance efforts and costs. As previous models, the InPro 6950 sensor shows a smooth, N5 machined surface finish of the wetted surface and a hygienically designed, fully traceable stainless steel and sealings.

### ISM – Easy installation and maintenance

The InPro 6950 will also be equipped with the well established ISM data management concept from METTLER TOLEDO. With the built-in ISM technology, every operation on the sensor is easy and error-free, leading to cost-efficient and safe maintenance. Due to signal transmission from fully digital sensor to transmitter it makes it decidedly easier to install, operate, and service the sensor.



InPro 6950.



InPro 6950 innerbody.



[www.mt.com/DO](http://www.mt.com/DO)

# Open Fieldbus Protocols support Asset Management and Plant Maintenance

Open fieldbus technology like HART®, FOUNDATION™ Fieldbus and PROFIBUS® enables the full use of METTLER TOLEDO functional advantages on digital communication:

- improved resolution of measured values,
- intelligent sensor diagnostics and instrument parameter settings
- comfortable instrument configuration out of a central station,
- higher level of process data to improve the plant conditions,
- availability of additional process values to be easily integrated into the control system

Our intelligent analytical instruments are equipped with electronic device descriptions (DD) for various process instrument configuration software tools.

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

## METTLER TOLEDO recommends

- Transmitters for pH/ORP, dissolved oxygen and conductivity

Two transmitter lines for integration in HART®, FOUNDATION™ Fieldbus and PROFIBUS® PA networks.

- EasyClean 400

The cleaning and calibration system EC 400 for an easy integration in FOUNDATION™ Fieldbus and PROFIBUS® PA networks.

- ISM technology

Integration of sensor diagnostic information into the process control environment – “sensor wear monitor” and “adaptive calibration timer” for optimal maintenance planning.



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