

Oxygen Measurement Systems



INGOLD

Leading Process Analytics

InPro 6000 Sensor Series

- Improved product quality
- Enhanced process safety
- Ease of operation
- Full regulatory compliance

ISM



Real-time Oxygen Measurement

Leading in Performance and Reliability

METTLER TOLEDO

Performance and Convenience

Dissolved Oxygen Measurement Solutions

With many decades' experience in providing in-line analytical measurement solutions for process industries, METTLER TOLEDO has a clear understanding of the requirements demanded by pharmaceutical companies and breweries. That is why our dissolved oxygen sensors, transmitters and housings combine high measurement performance with rugged design and ease of use.

Your processes are in safe hands

METTLER TOLEDO is the industry leader in analytical measurement solutions. Our dedication to continuously improving the reliability and durability of our sensors, transmitters and housings is recognized by thousands of customers. Pharmaceutical manufacturers and breweries the world over rely on our in-line dissolved oxygen systems for ensuring process safety and efficiency.

Well-established amperometric sensors

The first membrane-covered amperometric dissolved oxygen sensors became available in the 1950s. METTLER TOLEDO's first sterilizable amperometric DO probe was launched in 1975. Since then, METTLER TOLEDO has further developed this technology by introducing a new membrane design for more accurate measurements, and a quick-disconnect inner body concept for easier, faster maintenance.

Cutting-edge optical sensors

Dissolved oxygen measurement through fluorescence quenching optical technology offers a number of advantages over amperometric designs. The time spent on maintenance of optical sensors is very low as they do not contain electrolytic fluid or a membrane body, nor do they require polarization. The only consumable on METTLER TOLEDO optical DO sensors is the simple to exchange OptoCap sensing element, which contains a fluorescent

Benefits



Pharmaceutical Industry

- Exceptional reliability
- Simple handling and operation
- Low maintenance
- Electronic documentation for validation



Brewing Industry

- Fast and precise monitoring of trace oxygen levels
- High operational availability
- Robust design
- Predictive maintenance



dye that is sensitive to oxygen molecules. In addition, optical sensors determine DO levels quickly and feature very low drift for long-term measurement stability.

Greater reliability

METTLER TOLEDO’s Intelligent Sensor Management (ISM) is an innovative new concept for process analytics solutions that reduces the maintenance requirement for measurement systems and increases process availability, leading to greater process reliability and higher productivity.

The key to ISM is a powerful micro-processor that is embedded in the head of ISM sensors. This built-in intelligence combined with ISM multi-parameter transmitters and iSense Asset Suite software results in a number of valuable features

that non-ISM sensors cannot offer, such as:

- **Plug and Measure**

For fast, error-free measurement point start up.

- **Predictive diagnostics**

Easy to read tools that notify if sensor maintenance is required, before measurements are affected. These tools are particularly well suited for optical DO sensors where they offer the highest level of confidence in sensor “health”.

- **eDocumentation**

Simple sensor documentation for validation and compliance purposes.

- **100% signal stability**

Digital sensor/transmitter signal is unaffected by electrical interference, or data loss due to long cable runs.

- **Automatic stability control**

Optical DO sensors automatically compensate for drift, ensuring the highest measurement accuracy.



iSense Asset Suite

- Verification and calibration of ISM sensors in a convenient location
- Documentation of sensor calibration and maintenance

ISM sensors

- Digital sensor-transmitter communication ensures signal transmission stability
- Measurement electronics in the sensor results in higher accuracy

Maximizing Yield and Productivity

DO Control in Fermentations

Process reliability is paramount in biopharma production. That is why METTLER TOLEDO offers dissolved oxygen sensors that are highly dependable in fermentation processes. Constructed from FDA positive listed materials and tolerant of CIP/SIP procedures, they deliver exceptional performance and are very easy to handle.

Critical dissolved oxygen

Achieving both maximum yield and highest productivity from fermentation processes requires tight control over process conditions. Maintaining the ideal dissolved oxygen level throughout a batch run is vital in this regard. Real-time, continuous DO monitoring allows instant response to changes in fermentation media.

Designed for your requirements

Extensive experience in producing analytical sensors for the pharmaceutical industry means METTLER TOLEDO probes can be relied on to provide precise measurements in all process conditions. METTLER TOLEDO dissolved oxygen sensors have been designed for the strictest requirements of biopharmaceuticals production.

From R&D to full-scale production

METTLER TOLEDO has a portfolio of solutions to suit all requirements. For ease of scale-up, the same sensor family can be used through ev-

ery stage of product development and production. The ease of handling and performance benefits of Intelligent Sensor Management mean our solutions offer incomparable reliability.

Optical technology

Dissolved oxygen sensors with optical measurement technology are slowly but surely replacing non-optical sensors in pharmaceuticals production. METTLER TOLEDO optical DO sensors respond faster and exhibit lower drift than amperometric designs, ensuring maximum accuracy and stability throughout fermentation runs. No electrolyte or polarization time is needed; only periodic replacement of the sensing element, the OptoCap, is required. This one-minute procedure means maintenance on METTLER TOLEDO optical DO sensors sets a new benchmark in ease of use.

Research and development

In the lab, METTLER TOLEDO dissolved oxygen solutions excel with their convenience in installation and simplicity of operation. Our portfolio includes amperometric designs offering the highest performance in this technology standard, and new optical designs that deliver faster response and greater stability, and require very little maintenance. In combination with ISM's Plug and Measure feature these sensors offer maximum availability.

Production

Batch-to-batch consistency is central to efficient drug manufacture. METTLER TOLEDO's DO sensors have been designed to provide high reproducibility, run after run. Unlike analog sensors, digital ISM sensors measure and calculate DO levels within the sensor itself for a more accurate reading and excellent reproducibility.

iSense Asset Suite is the accompanying PC software for ISM sensors. The pre-batch diagnostics of iSense offer assurance of sensor "health" before the run starts so operators can be certain a sensor will perform reliably throughout even the longest fermentations.



Amperometric DO sensor InPro 6850 i
Intelligent all-rounder for DO

- 3-electrode principle for greater signal stability
- Predictive diagnostics allow better maintenance planning
- Plug and Measure for fast, error-free start up
- Pre-calibration in the lab with iSense Asset Suite software



Optical DO sensor InPro 6860 i
Easy handling – exceptional performance

- No electrolyte or polarization time required
- Automatic stability control for superior measurement stability
- Plug and Measure for fast, error-free start up
- Pre-calibration in the lab with iSense Asset Suite software
- Compatible with digital and analog installations
- Improved optical technology ensures high accuracy



Multi-parameter transmitter M800
Intuitive, intelligent, flexible

- Multi-parameter/multi-channel functionality allows simultaneous measurement of up to four sensors
- Traffic light color-coded iMonitor for at-a-glance evaluation of sensor condition
- User management and internal logbook features provide excellent security and reduce human error
- Large, color touchscreen for simple, convenient operation



Multi-parameter transmitter M400
Intelligent and versatile

- Mixed-mode input accepts both analog and digital ISM sensors
- Dynamic Lifetime Indicator tells you when an ISM sensor needs replaced
- Simplified commissioning minimizes the risk of installation issues

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Better Wort and Beer Quality

High Performance DO Monitoring

In order to maximize beer shelf life, after wort aeration oxygen must be removed and kept at a minimal level right through to bottling. High-performance, in-line dissolved oxygen sensors are essential for providing instant notification of out-of-spec DO levels. METTLER TOLEDO sensors for real-time DO monitoring are rugged, accurate in measurement and are simple to maintain.

High-performance DO monitoring

Assurance that consumers will enjoy your beers whether they purchased them one month or six months after they left your brewery, is largely down to control of dissolved oxygen during production.

DO monitoring is best achieved with continuous, real-time results from in-line sensors. METTLER TOLEDO is acknowledged as a market leader in process analytics solutions for the brewery industry. Our versatile portfolio for DO focuses on measurement accuracy even at only a few parts per billion, outstanding stability and durability, and simple handling.

Improved technology delivers faster response

Amperometric DO measurement technology has served the brewery industry well for many years. However, developments in technology do not stop, and neither does

METTLER TOLEDO. We are dedicated to helping our customers improve their processes and increase their productivity.

When it comes to monitoring DO in brewery processes, speed of response is vital, that is why optical measuring technology is becoming the new standard in DO measurement. Quicker response is not the only benefit of this technique; lower drift and significantly less maintenance make optical sensors the obvious choice when installing or replacing DO measurement loops.

In addition, METTLER TOLEDO optical DO sensors are highly resistant to pressure shocks, rapid temperature changes, and stop-of-flow affects that can cause amperometric probes to generate false alarms. Optical sensors have no electrolyte and do not require polarization; only periodic replacement of the

sensing element, the OptoCap, is required. This one-minute procedure means maintenance on METTLER TOLEDO optical DO sensors sets a new benchmark in ease of use.

Intelligent Sensor Management

METTLER TOLEDO's proprietary Intelligent Sensor Management (ISM) technology platform brings valuable sensor handling and performance benefits to significantly improve brewery processes.

ISM's predictive diagnostics tools monitor sensors for wear and provide notice of required maintenance before measurements are compromised. Proactive rather than reactive maintenance means DO sensors are always operating at their best.

Optical sensors with ISM provide exceptional reliability in DO monitoring.



Amperometric DO sensor InPro 6900 i
Accurate ppb oxygen measurement

- Detection down to 3 ppb in beer
- Hygienic design minimizes contamination risk
- Predictive diagnostics for proactive maintenance and calibration
- Easy maintenance concept for electrolyte and membrane body exchange



Optical DO sensor InPro 6960 i
Specifically for wort aeration

- Long maintenance intervals thanks to robust design of sensing element
- One-minute maintenance
- Full ISM functionality for fast start-up and proactive maintenance
- Customizable internal LED switch-off option for extended sensing element lifetime
- Hygienic design minimizes contamination risks
- No electrolyte or polarization time required



Optical DO sensor InPro 6970 i
Top performance and intelligent diagnostics

- Detection down to 2 ppb in beer and water
- Fast response time minimizes beer losses
- Sensing element is immune to pressure shocks and extreme CIP cycle conditions
- Plug and Measure simplifies handling and ensures fast, flawless start up
- Predictive diagnostics for proactive maintenance
- Customizable internal LED switch-off option for extended sensing element lifetime
- No electrolyte or polarization time required



Multi-parameter/multi-channel transmitter M800
Intuitive, intelligent, flexible

- Simultaneous measurement of DO and CO₂
- Traffic light color-coded iMonitor provides at-a-glance evaluation of sensor condition
- Plug and Measure simplicity with ISM for rapid sensor start up
- Large, color touchscreen for simple, convenient operation

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certified according to
ISO 9001 / ISO 14001

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