

METTLER TOLEDO APPLICATION NOTE

In-Line O₂ Measurement In Breweries

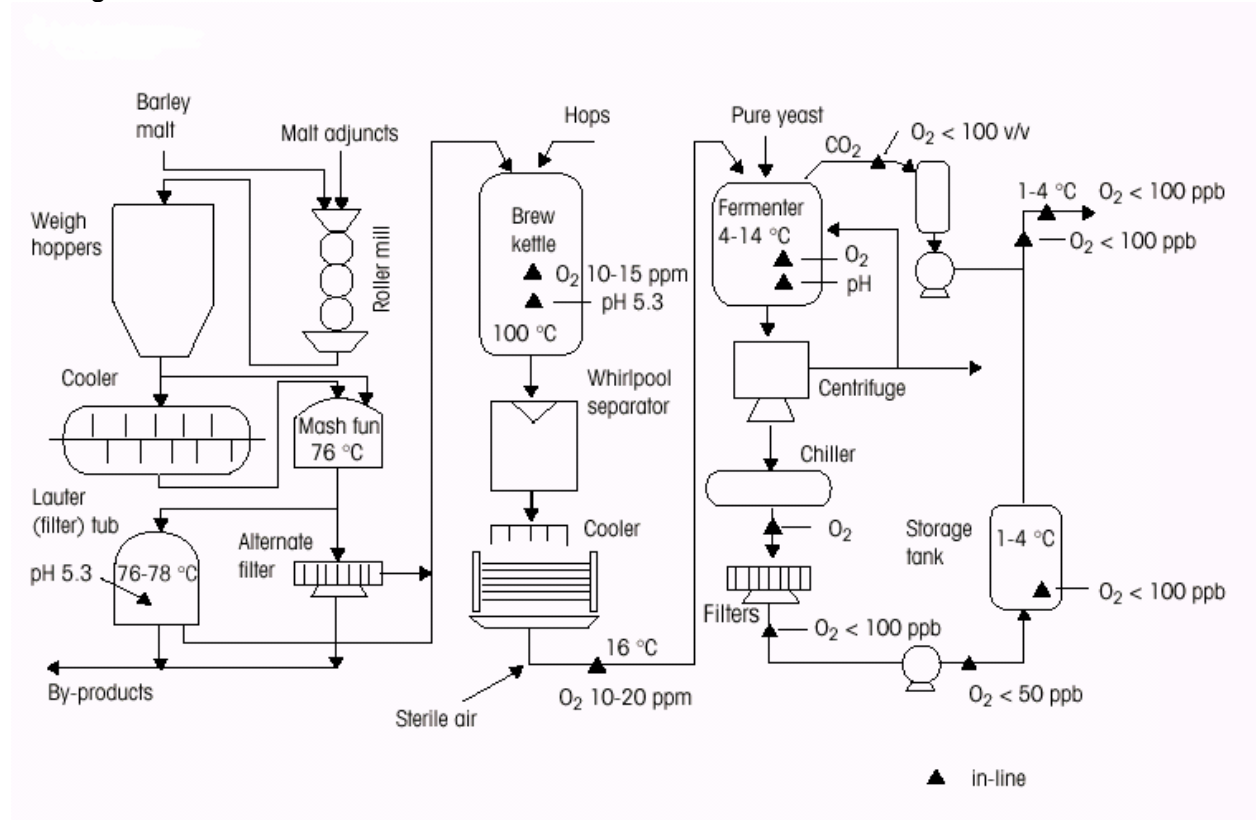
BACKGROUND

Oxygen levels play a significant role in brewery operations from the initial preparation of wort to the packaging of the finished product. The oxygen level must be strictly controlled because any oxidation of substances contained in the brew can lead to a noticeable change in taste, diminish shelf life and affect the clarity of the final beer. Therefore, care must be taken

throughout the brewing process to minimize air pick-up, calling for the installation of a monitoring means to detect leaks. On the other hand, the propagation of the yeast at the start of fermentation requires the presence of oxygen. With the aid of on-line oxygen measurement, continuous and consistent quality control on all measuring sites is ensured.

THE PROCESS

Brewing Process



Typical measuring sites and the typical oxygen levels in the brewing process are listed below:

Wort Aeration few ppm to 20 ppm

Storage Tank less than or equal to 100 ppb

Filter less than or equal to 100 ppb

Carbonation less than or equal to 150 ppb

Water Deaeration less than or equal to 50 ppb

Carbon Dioxide 10 to 100 ppm v/v or
Recovery * 0 to 0.2 vol %

Filter (Bottle,
Barrel, Can) less than or equal to 100 ppb

Transfer Points
(Pumps) less than 50 ppb

* CO₂ Recovery Measurement takes place in the gas phase

INSTRUMENTATION

The most suitable Dissolved Oxygen sensor for this application is the InPro[®] 6100/T/N or the InPro 6400/T/N. Recommended housings include the InFit[®] 761-25CIP or the retractable InTrac[®] 797. The 4500 Dissolved Oxygen Analyzer completes the loop. The dissolved oxygen system offers easy membrane replacement, removal of the sensor without process shutdown (retractable housing), and process safety due to sensor and transmitter diagnostics.

PRODUCTS

4500 Dissolved Oxygen Analyzer

- Measures Dissolved Oxygen concentration in ppm or mg/l; % Saturation referred to air or pure oxygen; and oxygen partial pressure in mbar
- Log Book records the last 200 events with date and time stamp to document performance
- Calibration Record automatically records the date and time of the last calibration, zero point, slope, and response time of the sensor and relative humidity for calibration in air
- Cal timer and alarm setting may be utilized for scheduling routine preventative maintenance

InPro[®] 6100 and InPro[®] 6400 Dissolved Oxygen Sensor

- Steam-sterilizable & autoclavable for hygienic and CIP/SIP applications
- Meets 3-A guidelines and EHEDG Certification to ensure maximum cleanability
- Straight or angled connector suitable for all applications, even when minimal space is available
- Superior anode/cathode construction stands up to repeated sterilizations, extending sensor life

InFit[®] 761-25CIP Housing

- Steam-sterilizable & autoclavable for hygienic and CIP/SIP applications
- Meets 3-A guidelines and EHEDG Certification to ensure maximum cleanability
- Exclusive o-ring positioning guarantees perfect sealing, permitting full CIP procedures to be performed without any compromise of sterility
- Specially designed smooth surfaces of the housing and o-rings prevent the adherence of microorganisms
- Recommended for use with Mettler-Toledo safety weld-in sockets to provide the highest level of protection for personnel, equipment and the environment

InTrac[®] 797 Retractable Housing

- Retractable design permits routine sensor maintenance or replacement without process interruption
- Exclusive sterilizable twin-chamber lock effectively prevents any external contamination
- Manual or pneumatic operation