

Kuhner shaker

BPM-60

Online measurement of
dissolved oxygen and pH



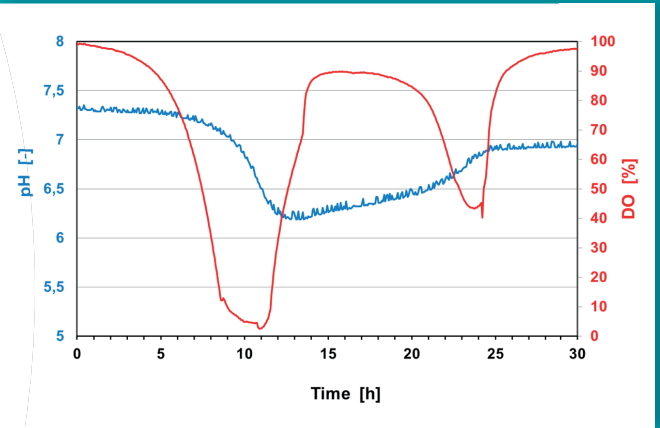
Applicable for the following shaking machines

SBM/SS-X, LT-X, ISF1-X, ISF4-X



Dissolved oxygen concentration DO [%] and pH [-]

during cultivation of *Escherichia coli* in shake flask (Corning, 250ml); Mineral medium with 20g/L glucose, 250rpm shaking frequency, 50mm shaking diameter, 10mL filling volume, temperature 37°C



BPM-60

BPM-60 (Bioprocess Monitoring) is a non-invasive, online measurement of dissolved oxygen and pH in shaken flasks.

Continuous recording of dissolved oxygen and pH

Dissolved oxygen and pH can be measured easily online using the BPM-60. The system allows for one or both parameters to be recorded in the same flask. The values of dissolved oxygen and/or pH can be monitored simultaneously in four/eight different flasks. Compared to conventional sample taking, the continuous data logging is automatic and consistent. The recorded data can be analysed to identify oxygen limitation or inhibition and therefore optimize yields in shaken flasks. Furthermore, the BPM-60 assists in the production of reproducible starter cultures for use in fermenters (see PAT initiative of the FDA).

Power supply

An integrated socket at the front of the shaking table makes simple data communication and power supply possible without the risk of wiring breaking. With this technology no battery is required.

- + Online signal
- + Reproducibility
- + Made for PAT
- + Optimised cultivation conditions
- + No batteries required

Kuhner Insight software for data logging

The Kuhner Insight software is capable of data recording. In addition to logging dissolved oxygen and pH it is also possible to record all other shaker parameters such as shaking speed and CO₂ concentration. A full audit trail is also stored for each shaker connected.

Shake flask with sensor spots

for non-invasive online measurement of dissolved oxygen and pH

**Kuhner tray with integrated BPM-60****Sensor flask oxygen**

- **Measuring range**
0 - 100 % O₂
- **Response time (t90) at 25°C**
30 sec
- **Resolution**
0.01 % O₂ at 0.21 % O₂; 0.1 % O₂ at 20.9 % O₂
- **Accuracy**
0.05 % O₂ at 0.2 % O₂;
0.4% O₂ at 20.9% O₂
- **Drift**
< 0.015% O₂ per day
(sampling interval of 1 min)
- **Temperature range**
5 - 50°C
- **Compatibility**
aqueous solutions, ethanol,
methanol (10% v/v), pH2-10
- **Cross-sensitivity**
typically no cross-sensitivity
in culture media
- **Storage stability**
18 months,
if the sensor is stored in the dark
- **Calibration**
sensor flasks are pre-calibrated,
one-point calibration is possible at the
beginning of the experiment when the
medium conditions (O₂) are defined
- **Sterilization**
sensor flasks are delivered irradiated
- **Resterilization**
steam sterilization, ethylene oxide,
gamma irradiation

Sensor flask pH

- **Measuring range**
5.5 - 8.5 pH
- **Response time (t90) at 25°C**
0.01 pH at pH 7
- **Resolution**
0.01 pH at pH 7
- **Accuracy**
0.05 pH at pH 7 with one point adjustment
0.10 pH at pH 7 with recalibration
- **Drift**
< 0.005% pH per day
(sampling interval of 1 min)
- **Temperature range**
5 - 50°C
- **Compatibility**
aqueous solutions, ethanol,
methanol (10% v/v), pH2-10
- **Cross-sensitivity**
reduced to ionic strength (salinity), a high
concentration of small fluorescent molecules
in the visible range can interfere
- **Storage stability**
18 months,
if the sensor is stored in the dark
- **Calibration**
sensor flasks are pre-calibrated, one point
calibration is possible at the beginning of the
experiment when the medium conditions
(pH) are defined
- **Sterilization**
sensor flasks are delivered irradiated
- **Resterilization**
is not recommended

BPM-60

- **Ports**
one port of glassfibre (side)
two for CAN-BUS (top)
- **Dimension**
height: 156mm
diameter: 84mm
diameter of connector ring: 108mm
- **Holder**
with optical unit
- **Optical unit**
single version: O₂, or
double version: O₂ and pH
- **Flask size**
250, 500, 1000, 2000 mL
- **Tray plug**
1: 24V DC +; 2: 24V DC -
3: CAN-H; 4: CAN-L; 5: CAN-GND

Kuhner Insight Software

- **Monitoring**
8 additional process parameters
(8xO₂ or 4xO₂ and pH)
- **Calibration**
pre-calibrated sensor flasks
- **Recalibration**
one point recalibration is possible
- **Applicable**
Win 7 & 10/Vista/XP
- **GMP**
21 CFR Part 11 compliance (audit trail)



BioProcess Monitoring

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Kuhner

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