



Application Note AN-I-030

Dissolved oxygen in tap water

Fast, online determination using an optical sensor according to ISO 17289

Atmospheric oxygen equilibrates with water according to Henry's law. Therefore, water normally contains a certain amount of dissolved oxygen (DO). In municipal water supplies, higher DO content is desirable because it improves the taste of drinking water. If DO content is too low, it is recognized as tasting flat. The taste can be improved by merely shaking a partially filled water bottle, reintroducing O_2 into the water. However, high DO levels speed up corrosion in water pipes. Therefore, industries utilize water with as little DO as possible. They add

scavengers such as sodium sulfite to remove any oxygen from a water supply. Municipal water supply pipes are normally coated inside with polyphosphates to protect the metal from contact with oxygen, thus allowing higher DO contents.

Therefore, monitoring the DO content online in a water supply is important to assess its DO content to either improve taste or minimize pipe corrosion. Using an optical sensor, such as the O_2 -Lumitrode, allows a fast and reliable determination according to ISO 17289.

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for lab deionized water supply and tap water. The analysis is performed using

a flow-through cell, ensuring no falsification of the results by oxygen entrainment.

EXPERIMENTAL

This analysis is carried out on a 913 pH/DO Meter equipped with an O₂-Lumitrode. The sensor is calibrated prior to the measurement.

The sensor is inserted and fixed into a flow-through cell, where the inlet is connected to the outlet of the water supply.

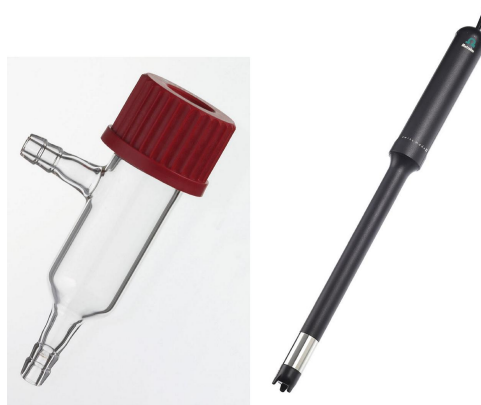


Figure 1. Used flow-through cell (left) and O₂-Lumitrode (right).

RESULTS

Results are taken after 240 seconds to assure that all oxygen from the connecting tubing and flowthrough cell is removed and the temperature has stabilized.

When the temperature is stable, deviations of less than 0.05 mg/L can be achieved.

Table 1. Content of dissolved oxygen (mg/L) measured for different water supplies (n = 2).

	Mean DO content in mg/L	SD(abs) mg/L	SD(rel) %
Tap water	11.50	0.16	1.4
Deionized water	8.23	0.01	0.2

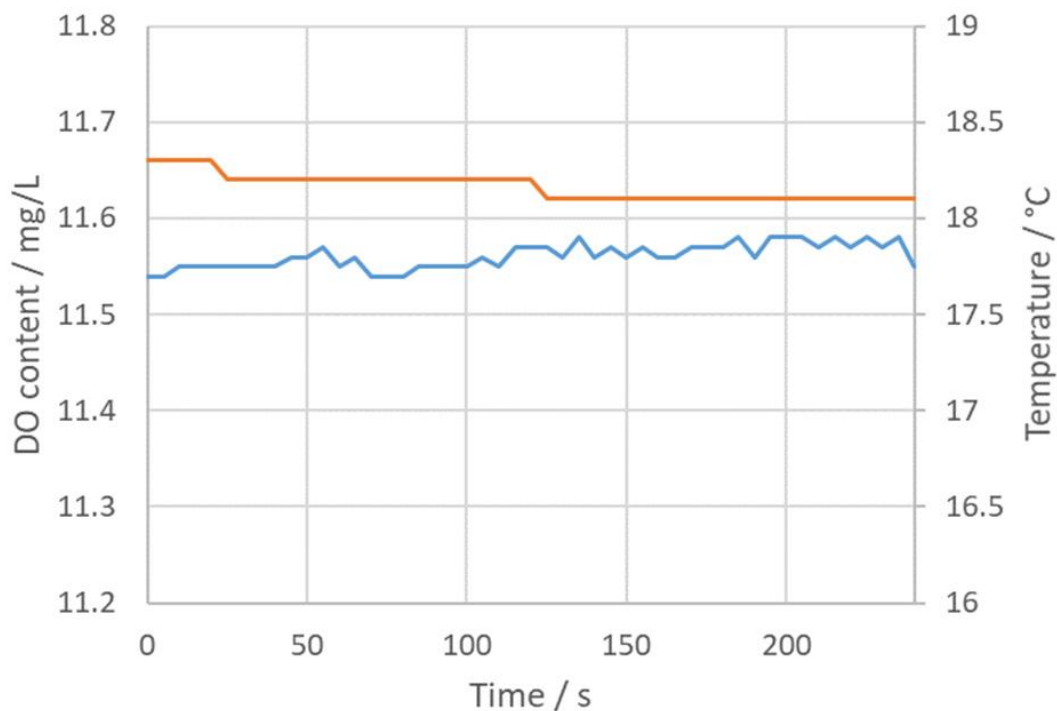


Figure 2. Example measurement of the DO content with the temperature for tap water directly measured from the supply (DO = blue, temperature = orange).

CONCLUSION

The dissolved oxygen content from different water supplies can be assessed quickly online by using a 913 pH/DO Meter and the optical sensor O₂-Lumitrode. Within just a few minutes after installation, accurate results are obtained when the temperature of the

water supply is determined to be stable. Additionally, the sensor is completely maintenance-free. There is no need to worry about the quality of your sensor: if the O₂ cap needs to be replaced, the instrument will inform you.

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