

Application Report

Conductivity in Raw Water / Treated Water

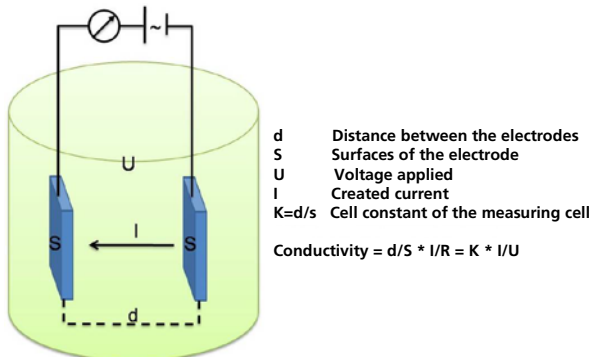
Electrical conductivity is a parameter for a summarized recording of any kind of ions dissolved in water. It is specified in $\mu\text{S}/\text{cm}$ or mS/cm . Dissolved ions are electrically conductive substances (acids, alkaline solutions and salts) of varying compositions.

In the European Union, the threshold values in drinking water are determined at $2790 \mu\text{S}/\text{cm}$ at 25°C or $2500 \mu\text{S}/\text{cm}$ at 20°C . Good-quality drinking water has a conductivity of $200\text{--}800 \mu\text{S}/\text{cm}$.

How to measure conductivity

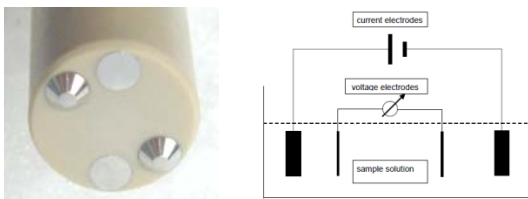
There are two fundamentally different methods of measuring this conductivity: conductive or inductive. Water and liquids with values of below approx. $20 \text{ mS}/\text{cm}$ are usually measured with a conductive method.

In the conductive measurement, the measuring cell consists of two open electrodes at which voltage is applied. The measuring medium is in direct contact with the electrodes. The voltage applied generates a current dependent on the resistance of the medium. Conductivity depends very much on temperature which is why a temperature sensor is integrated in the sensor for a corresponding compensation.



Picture 1: Principle of conductive measurement

There are 2-pole sensors (as illustrated above) and 4-pole sensors on the market. Although the former are lower priced, more exact values can be achieved with the 4-pole sensors over a large measuring range and the soiling of the sensor influences the measurement to a lesser degree.



Picture 2: Hamilton 4-pole sensor

Benefits of conductivity measurement

In the case of raw water, conductivity measurement serves as a parameter for determining further process steps. Highly elevated conductivity values indicate contaminated water provided those values are not the result of geological causes.

In treated water, it is desirable to know this value in order to keep predetermined limits.

The sensor CONDUCELL 4USF ARC 120

The sensor used in the AquaMaster is part of Hamilton's ARC programme. In the upper portion of the sensor, the data is digitalized. All necessary operating activities can be carried out via the AquaScat.



Picture 3: Hamilton CONDUCELL 4USF ARC 120

The sensor provides values for conductivity and temperature.

Product

SIGRIST product and configuration:

- Hamilton CONDUCELL 4USF ARC 120

Parameter settings

- The sensor is calibrated and ready to use upon delivery

Advantages of the Hamilton sensor

» Customer benefits

- The ARC concept allows permanent quality monitoring of the sensor
 - » A warning is given if the sensor needs to be replaced
 - » The Hamilton calibration standard is recognized automatically
- The sensor is preconfigured
 - » Replacement is very simple
 - » Retrofitting is very simple
- A precise calibration standard of $147 \mu\text{S}/\text{cm}$ is offered