

CONDUCTIVITY ELECTRODES

Basic Theory of Conductivity

Conductivity is measured in a wide range of industries and gives a readout of total ionic concentration within the sample. It is a rapid and inexpensive way of determining the ionic strength of a solution.

A basic conductivity cell consists of a pair of electrodes that are placed in a sample. The ratio of the distance between the electrodes (D) and their surface area (A) is known as the cell constant K:

$$K = D/A \text{ [cm}^{-1}\text{]}$$

Calibration

Cell constants at time of manufacture are listed on many conductivity cells. It is recommended that you always determine the exact cell constant by using a calibration standard. Calibration is essential since the cell constant can vary by 10% or more from the nominal value and they do change over time. Once calibrated, they do not change quickly and do not require frequent calibration like a pH electrode. It is important to calibrate 25 °C or know the value of your calibration standard at different temperatures. The cell constant changes only if the surface of the electrode changes, for example through fingerprints, deposits, scratches or enclosed air bubbles.



Benefits of 4-Electrode Cells

- All have durable plastic bodies
- No error from cable resistance, allowing for longer cable lengths
- Minimum effect on accuracy from electrode polarization and contamination
- Wide measurement range
- Unaffected by deposits on cell surface

Model	STCON3	STCON3 IP67
Item Number	83033972	83033972
Measuring range	2 µS/cm - 200mS/cm	2 µS/cm - 200mS/cm
Temperature range	0 °C – 50°C	0 °C – 50°C
Cable Length	1 m	3m
Connector Type	Mini-DIN	CTW
Cell Material	4 rings stainless steel	4 rings stainless steel
Cell Constant	1.5 - 2.0 cm ⁻¹	1.5 - 2.0 cm ⁻¹
Shaft Material	Plastic	Plastic
Shaft Length	130 mm	130 mm
Shaft Diameter	14 mm	14 mm
Temperature probe	NTC 30 kΩ	NTC 30 kΩ
Description	Widest conductivity range	Widest conductivity range
Application	For lab and field applications	For lab and field applications
Feature	Removable guard	Removable guard

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Storage and Maintenance

The conductivity electrode should be stored in a clean and dry environment. They can be stored in deionized water in-between measurements. For storage overnight or longer, conductivity cells should be rinsed thoroughly in deionized water and stored dry.

If they become contaminated they should be cleaned. Refer to user guides for specific instructions for different electrode materials.

Precautions and Limitations

Do not expose the shaft to organic solvents when cleaning or when taking measurements.

1. Do not use the electrode outside the recommended temperature range.
2. Calibrate the electrode with standard solution for an accurate measurement.

Benefits of 2-Electrode Cells

- Available in glass, allows use in most samples
- best for ultra-pure water measurements
- Multiple cell materials available, platinum or stainless steel
- Different cells designed to measure multiple specific ranges
- Option for flow cell or flow-thru design



Model	STCON5	STCON7	STCON8 w chamber
Item Number	30681116	30080693	30681235
Measuring range	50 $\mu\text{S}/\text{cm}$ -2 mS/cm	0.02 $\mu\text{S}/\text{cm}$ - 200 $\mu\text{S}/\text{cm}$	0.055-300 $\mu\text{S}/\text{cm}$
Temperature range	0 °C – 80°C	0 °C – 60°C	0 °C – 80 °C
Cable Length	1 m	1 m	1m
Connector Type	Mini-DIN	Mini-DIN	Mini-DIN
Cell Material	2 Ring platinum	2 Ring 316L	2 Ring platinum
Cell Constant	1 $\text{cm}^{-1} \pm 0.2$	0.1 $\text{cm}^{-1} \pm 0.02$	0.1 $\text{cm}^{-1} \pm 0.02$
Shaft Material	Glass	Steel	Glass
Shaft Length	155 mm	95 mm	155mm
Shaft Diameter	12 mm	12 mm	12 mm
Temperature probe	NTC 30 k Ω	NTC 30 k Ω	NTC 30 k Ω
Description	Standard conductivity range	Low conductivity range	Low ionic strength solutions, deionized water, and ultra pure water.
Application	For lab applications	For Boiler feed water, ultra-pure water	For ultra pure water applications
Feature	Chemical resistant glass body	Rugged Steel	Platinized glass/platinum
Other	N/A	N/A	Includes detachable glass chamber