

ISE electrodes for Chloride ion (Cl⁻) measures

These electrodes are designed to measure chloride ion (Cl⁻) in aqueous and non aqueous solutions in a wide range of concentrations. The sensitive element is a AgCl/Ag₂S pellet. They are to be used in combination with a reference electrode series 301 with salt bridge and external salt KNO₃. Electrode body is made of plastic material and is typically suitable for laboratory applications, but can also be used in process installations.

Advantages

- **Plastic body, high mechanical resistance**
- **Good selectivity**
- **Fast response**
- **Suitable for measures in wide concentration range**
- **Short conditioning time**
- **Standard dimensions: 12 mm Ø, 120 mm length**

Operating principle and realization

Mod.201Cl electrode, in combination with a reference electrode series 301 with external salt KNO₃, allows fast and accurate measure of chloride ion in aqueous and non aqueous solutions; the colour and the turbidity of the solution in measure do not influence the response.

The sensitive element is an AgCl/Ag₂S pellet, mounted on a cartridge that makes replacement simple and fast. The cartridge is filled with a proper filling solution.

The allowed concentration range is 10⁻⁵ M to 10⁻¹ M (corresponding to 0.35 to 3500 ppm of Cl⁻ ions). The pH of the solution must be in the range 2÷11 pH. Main interference are given by CN⁻, I⁻, S₂O₃⁼, Br⁻, OH⁻, CO₃⁼, CrO₄⁼ ions and ammonia NH₃. The Mod.201Cl electrode can be used in combination with the reference electrodes series 301 with salt bridge and KNO₃ external salt.

Calibration & Maintenance

If the electrode is not used for long periods it can be either store in air or in deionized water. The electrode **MUST** absolutely NOT be stored into solutions containing Cl⁻ ion.

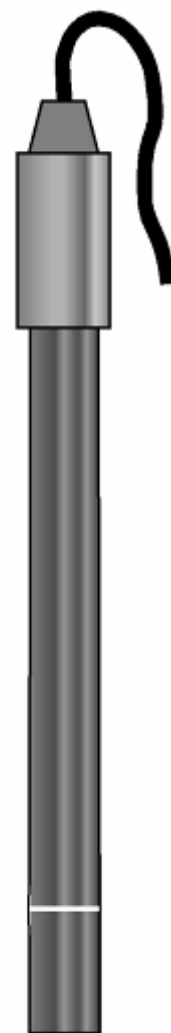
The electrode conditioning is obtained by immersing the sensor in a 0.01 M KCl solution for 5-10 minutes. Always wash the electrode with distilled water and dry it with a soft tissue paper piece when moving the electrode from a solution to another one.

The electrode response time is about 1 minute when the measure is performed first in low concentration solutions and later in higher concentration solutions, while it becomes slow if the measure is operated in the opposite order. For this reason it is recommended to operate the calibration first with the low concentration standard and later with the higher concentration standard.

Never leave the electrode immersed in solutions with chloride concentration higher than 10⁻²M, though the electrode can be used to rapidly measure 10⁻¹M solutions.

Direct potentiometry measurements require a measuring electrode, a reference electrode (in this measure the external salt must be KNO₃) and a pH/ORP meter set to measure mV.

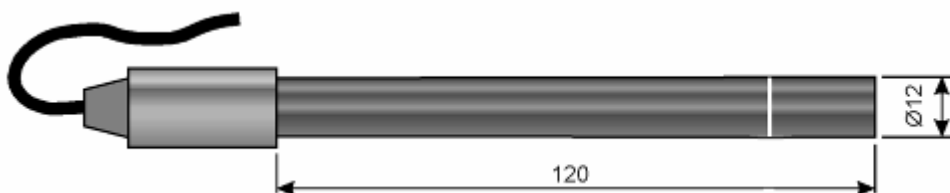
The resolution required to the mV meter is 1 mV, that corresponds to an error in concentration of 3,8% (this error is constant in all the measuring range, since the measure is logarithmic).



201Cl

Technical Specifications

Construction material, electrode body:..... PVC
Construction material, cartridge:..... POM copolymer
Dimensions:..... \varnothing 12 mm x 120 mm
Cable:..... integral, standard length 1 m, or or S7 connector
Allowed samples:..... aqueous and non aqueous solutions
Ion selective sensing element: AgCl/Ag₂S pellet
Resistance: < 100 k Ω
Signal generated by the electrode:..... mV potential, proportional to log[Cl⁻]
Slope:..... 56 to 58 mV/decade @ 25 °C
Measuring range:..... 10⁻¹M to 10⁻⁵M (3500 to 0,35 ppm chlorides)
Operating pH limits: 2 to 11 pH
Operating temperature limits: 0÷50 °C
Interferences:..... sample solution MUST NOT include sulphides (S⁼); should sulphides be present
..... they must be precipitated using the proper ISA solution
..... Chlorides measuring electrode is sensitive to the interference of the following compounds,
..... and the ratio (X/Cl⁻) of the concentration of each compound ("X") versus the Cl⁻ concentration
..... must always be lower than the value indicated between brackets :
..... CN⁻ (2.5 * 10⁻⁷)
..... I⁻ (5 * 10⁻⁷)
..... S₂O₃⁼ (1 * 10⁻⁴)
..... Br⁻ (5 * 10⁻³)
..... NH₃ (0.12)
..... OH⁻ (80)
..... CO₃⁼ (300)
..... CrO₄⁼ (550)
Accuracy:..... with no interfering substance present \pm 0.5 mV, that is \pm 2% of measured value
Response time:..... approx.1 minute from lower to higher concentrations with values lower than 10⁻³ mol/L;
..... lower than 1 minute from lower to higher concentrations with values higher than 10⁻³ mol/L;
..... many minutes for higher to lower concentrations



Optional Accessories

Maintenance kit, composed of:
1 cartridge with pellet, 1 electrolyte solution bottle

Cable c/w connector on electrode side..... CV/S7-x
where x = cable length, in meters (x = 1, 3, 5, 10, 15, 20)