

## NEULOG CHLORIDE LOGGER SENSOR GUIDE



### NeuLog chloride logger sensor NUL-239

The NeuLog chloride ion sensor can be used for any science experiment which utilizes chloride concentration readings such as in the fields of Environmental Science, Ecology, Chemistry, Biology, etc.

Among hundreds of possible experimental subjects that can be studied with the NUL-239 sensor are: chemical reactions, water quality, environmental health, small animal behavior, ecological studies, and many more.

The chloride sensor's measurement units are:

- Parts per million (ppm): The total amount of a specific molecule (chloride for example) per million molecules in a sample.

### Chloride sensor usage:

The chloride sensor's electrode uses a PermaFil (non-refillable), ion-selective electrode. The reference chamber is gel filled and sealed; therefore, no reference filling solution is required.

The sensor is pre-calibrated at the factory. No need for calibrating during the first 12 months from receiving.

After 1 year and if the sensor has been well maintained we recommend doing recalibration. For information on where to purchase calibration solution as well as required calibration software please reference the ion selective product pages at [www.neulog.com](http://www.neulog.com). If there are any questions please contact us at [info@neulog.com](mailto:info@neulog.com)

### Usage guide:

<b>Concentration range</b>	1M to $5 \times 10^{-6}$ M 1.8 to 35,500 ppm
<b>pH range</b>	2 to 12 pH
<b>Temperature range</b>	0 to 80°C
<b>Minimum sample size</b>	3mL in a 50 mL beaker
<b>Reproducibility</b>	±2%
<b>Electrode resistance</b>	Less than 1 megaohms

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### Equipment required:

- Wash bottle with distilled or deionized water
- Several clean beakers
- 1 mL, 10 mL and 50 mL pipettes (a 50 ml graduated cylinder can also be used).

### Technical notes:

- All standard solutions should be prepared fresh.
- The standard solutions should be at the same temperature as the sample.
- Use ISA in all solutions (also recommended for the measured sample).
- Note: ISA is added to all solutions to ensure the samples and standard solutions have the same ionic strength; the ratio is 1:50.

### Electrode preparation:

1. Remove the protective cap encasing the chloride probe's electrode. **CAUTION: Do not touch the PVC membrane at the end of the probe with your fingers.**
2. Rinse the electrode with deionized water and blot dry. Be sure not to rub as this will harm the sensor.
3. Soak the electrode in deionized water for 10 minutes, then in a diluted chloride standard solution (0.0001 M or 1 ppm) for two hours until ready for use.
4. For preparing the 1 ppm standard solution, mix one drop of the 1000 ppm standard solution with 20 drops of ISA and add deionized water up to a total of 40 ml solution (assuming one drop equals 0.04 ml). It is also possible to use a micropipette if available.

### Measurement:

1. Use ISA in all solutions for measurement. Use a ratio of 1:50 (2% ISA to Solution).
2. Do not touch the PVC membrane with your fingers
3. Rinse the electrode with DI water, blot dry. Do not rub dry.
4. Connect the sensor to the USB or WIFI or Viewer module and to PC or battery.
5. Put the electrode in the solution for measurements
6. Wait until value is stable.

### Electrode storage:

#### Short term (overnight or weekend):

Rinse the electrode thoroughly with deionized water and place the tip in a diluted standard solution (around 10 ppm) between measurements.

#### Long term:

Rinse the electrode thoroughly with deionized water and blot dry. Attach the hard plastic protective electrode cap again to protect the sensing element. Follow procedures in the "Electrode preparation" section when using the electrode again.

### Included with the sensor:

- NeuLog General Guide
- NeuLog chloride (Cl<sup>-</sup>) sensor electrode
- Chloride (Cl<sup>-</sup>) Ionic Strength Adjuster (ISA)
- Chloride (Cl<sup>-</sup>) 1000 ppm standard

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Sensor's specifications		
	mg/L	ppm
<b>Range and operation modes</b>	1.8 to 35,500	1.8 to 35,500
<b>ADC resolution</b>	15 bit	
<b>Resolution</b>	<b>0.1 mg/L</b> at 1.8 to 1,000 mg/L <b>250 mg/L</b> at 1,000 to 35,500 mg/L	<b>0.1 ppm</b> at 1.8 to 1,000 ppm <b>250 ppm</b> at 1,000 to 35,500 ppm
<b>Max sample rate (S/sec)</b>	100	

**Experiment Duration:** 1 second to 31 days.

### Sensor's features:

- Fully digital data
- Rugged plastic ergonomic case
- PermaFil ion selective electrode
- Chloride probe connected to the sensor's body by a flexible rubber-coated wire
- Protective hard-plastic storage cap
- Push button switch for Start/Stop experiments in off line mode
- LED indicator of experiment status (blinks while collecting data)

**Note:** NeuLog products are intended for educational use.

### Videos and experiment examples:

- Videos, literature and other probes can be found at [www.NeuLog.com](http://www.NeuLog.com).
- In order to access the chloride sensor's page, choose "Products" on the main menu and then "Chloride logger sensor".

### Technical background:

The philosophy behind NeuLog's plug and play technology is based on each sensor's ability to store its own data due to an internal flash memory chip and micro-controller in each plastic NeuLog body. This technology allows the sensor to collect and then store the digital data in the correct scientific units ( $^{\circ}\text{C}$ ,  $^{\circ}\text{F}$ , Lux, %, ppm, for example).

The sensor is pre-calibrated at the factory. The built-in software in the logger can be upgraded for free at any time using the provided firmware update.

The chloride sensor uses a permanently filled ion selective electrode to accurately measure the amount of chloride ion in a solution.

The Ionic Strength Adjustor (ISA) is used to standardize the strength of the ions in various solutions to give the most accurate readings.

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### Maintenance and storage:

Before use, please review the “Chloride sensor usage”, “Electrode preparation”, “Electrode storage”, and “Offsetting the sensor” sections of this document to ensure the proper storage and longevity of the NeuLog chloride ion sensor.

- Never submerge the NeuLog plastic body in any liquid
- Do not allow liquid into the chloride sensor’s body
- After use, gently wipe away any foreign material from the chloride sensor
- Store in a box at room temperature out of direct sunlight.

### Warranty:

We promise to deliver our sensor free of defects in materials and workmanship. The warranty for ion selective probes is 1 year from the date of purchase. The warranty does not cover damage of the product caused by improper use, abuse, or incorrect storage. Should you need to act upon the warranty, please contact your distributor. Your sensor will be repaired or replaced.

Thank you for using NeuLog!



Flexible, simple, fast, forward thinking.

W: [www.neulog.com](http://www.neulog.com)

E: [info@neulog.com](mailto:info@neulog.com)

A: 850 St Paul Street, Suite 15, Rochester, NY 14605

P: 1.866.553.8536

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