

ION SELECTIVE ELECTRODES ELECTRODES



p H o e n i x E l e c t r o d e

ELECTRODE SPECIFICATIONS

Electrode	Cat No.	Housing*	Sensor Type	Direct Measurement Range		Slope mV per decade	pH Range	Temp Range °C	Resp Time Secs	Interferences	Reference Electrode	Reference Electrolyte
				Molar	ppm							
Ammonia (NH₃)	NH31501	Epoxy	Gas-sensing Combination	1.0 - 5x10 ⁻⁷	17000 - 0.01	56 ± 3	above 11	0 - 50	30	Volatile amines	N/A	NH ₄ Cl
Ammonium (NH₄⁺)	NH41501 NH41502	PVC Glass	Polymer Membrane mono Combination	1.0 - 5x10 ⁻⁶	18000 - 0.1	56 ± 2	4 - 10	0 - 50	30	K ⁺	Double Junction	NaCl
Bromide (Br⁻)	BRO1501 BRO1502	Epoxy Glass	Solid-state mono Combination	1.0 - 5x10 ⁻⁶	79900 - 0.4	57 ± 2	2 - 14	0 - 80	20	S ⁻² , I ⁻ , CN ⁻ , high levels of Cl ⁻ and NH ₃	Double Junction	KNO ₃
Cadmium (Cd⁺²)	CD21501 CD21502	Epoxy Glass	Solid-state mono Combination	1x10 ⁻¹ - 1x10 ⁻⁷	11200 - 0.01	27 ± 2	2 - 12	0 - 80	20	Ag ⁺ , Hg ⁺² , Cu ⁺² , high levels of Pb ⁺² & Fe ⁺²	Double Junction	KNO ₃
Calcium (Ca⁺²)	CAL1501 CAL1502	PVC Glass	Polymer Membrane Mono Combination	1.0 - 5x10 ⁻⁶	40000 - 0.2	27 ± 2	3 - 10	0 - 50	30	Pb ⁺² , Hg ⁺² , Cu ⁺² , Ni ⁺²	Single Junction	KCl
Carbon Dioxide (CO₂) Carbonate (CO₃⁻²)	CO21501	Epoxy	Gas-sensing Combination	1x10 ⁻² - 1x10 ⁻⁴	440 - 4.4	56 ± 3	4.8 - 5.2	0 - 50	30	Volatile weak acids	N/A	NaHCO ₃
Chloride (Cl⁻)	CLO1501 CLO1502	Epoxy Glass	Solid-state mono Combination	1.0 - 5x10 ⁻⁵	35500 - 1.8	56 ± 2	2 - 12	0 - 80	20	S ⁻² , I ⁻ , CN ⁻ , Br ⁻	Double Junction	KNO ₃
Copper (Cu⁺²)	CUO1501 CUO1502	Epoxy Glass	Solid-state mono Combination	1x10 ⁻¹ - 1x10 ⁻⁸	6350 - 6.4x10 ⁻⁴	27 ± 2	2 - 12	0 - 80	20	Ag ⁺ , Hg ⁺² , high levels of Cl ⁻ , Br ⁻ , Fe ⁺² , Cd ⁺²	Double Junction	KNO ₃
Cyanide (CN⁻)	CNO1501 CNO1502	Epoxy Glass	Solid-state mono Combination	1x10 ⁻² - 5x10 ⁻⁶	260 - 0.13	57 ± 2	11 - 13	0 - 80	20	S ⁻² , I ⁻ , Br ⁻ , Cl ⁻	Double Junction	KNO ₃
Fluoride (F⁻)	FOO1501 FOO1502	Epoxy Glass	Solid-state mono Combination	Saturated - 1x10 ⁻⁶	Saturated - 0.02	57 ± 2	5 - 8	0 - 80	20	OH ⁻	Single Junction	KCl
Fluoroborate (BF₄⁻)	BF41501 BF41502	PVC Glass	Polymer membrane mono Combination	1.0 - 7x10 ⁻⁶	10800 - 0.1 (as B)	56 ± 2	2.5 - 11	0 - 50	30	ClO ₄ ⁻ , I ⁻ , CN ⁻	Double Junction	(NH ₄) ₂ SO ₄
Iodide (I⁻)	IOO1501 IOO1502	Epoxy Glass	Solid-state mono Combination	1.0 - 5x10 ⁻⁸	127000 - 6x10 ⁻³	57 ± 2	0 - 14	0 - 80	20	S ⁻² , CN ⁻ , Br ⁻ , Cl ⁻ S ₂ O ₃ ⁻² , NH ₃	Double Junction	KNO ₃
Lead (Pb⁺²)	PB21501 PB21502	Epoxy Glass	Solid-state mono Combination	1x10 ⁻¹ - 1x10 ⁻⁶	20700 - 0.2	25 ± 2	3 - 8	0 - 80	20	Ag ⁺ , Hg ⁺² , Cu ⁺² high levels of Cd ⁺² and Fe ⁺²	Double Junction	KNO ₃
Nitrate (NO₃⁻)	NO31501 NO31502	PVC Glass	Polymer membrane mono Combination	1.0 - 7x10 ⁻⁶	62000 - 0.5	57 ± 2	2.5 - 11	0 - 50	30	ClO ₄ ⁻ , I ⁻ , CN ⁻ , BF ₄ ⁻	Double Junction	(NH ₄) ₂ SO ₄
Nitrogen Oxide (NOx)	NOX1501	Epoxy	Gas-sensing Combination	5x10 ⁻³ - 5x10 ⁻⁶	220 - 0.2	56 ± 3	1.1 - 1.7	0 - 50	30	SO ₂ , HF, acetic acid	N/A	NaNO ₂
Perchlorate (ClO₄⁻)	PER1501 PER1502	PVC Glass	Polymer membrane mono Combination	1.0 - 7x10 ⁻⁶	98000 - 0.7	56 ± 2	2.5 - 11	0 - 50	30	no significant interference	Double Junction	(NH ₄) ₂ SO ₄
Potassium (K⁺)	KOO1501 KOO1502	PVC Glass	Polymer membrane mono Combination	1.0 - 1x10 ⁻⁶	39000 - 0.04	56 ± 2	2 - 12	0 - 50	30	Cs ⁺ , NH ₄ ⁺	Double Junction	NaCl
Silver/Sulfide (Ag⁺/S⁻²)	AGS1501 AGS1502	Epoxy Glass	Solid-state mono Combination	Ag ⁺ =1.0 - 1x10 ⁻⁷ S ⁻² =1.0 - 1x10 ⁻⁷	Ag ⁺ =107900 - 0.01 S ⁻² =32100 - 0.003	Ag ⁺ =57±2 S ⁻² =27±2	2 - 12 above 11	0 - 80	20	Hg ⁺² , Hg ⁺	Double Junction	KNO ₃
Sodium (Na⁺)	NA71501 NA71502	Glass Glass	Glass mono Combination	Saturated - 1x10 ⁻⁶	Saturated - 0.02	56 ± 2	5 - 12	0 - 80	20	H ⁺ , K ⁺ , Li ⁺ , Ag ⁺ , Cs ⁺ , Tl ⁺	Double Junction	NH ₄ Cl
Surfactant (X⁺/ X⁻)	SUR1501 SUR1502	PVC Glass	Polymer membrane mono Combination	5x10 ⁻² - 1x10 ⁻⁵	12000 - 1.0	for titration	2 - 12	0 - 50	30	similar types of surfactants	Single Junction	KCl
Water Hardness (Ca⁺²/Mg⁺²)	WHA1501 WHA1502	PVC Glass	Polymer membrane mono Combination	1.0 - 1x10 ⁻⁵	4000 - 0.4 (as Ca)	26 ± 3	5 - 10	0 - 50	30	Cu ⁺² , Zn ⁺² , Ni ⁺² , Fe ⁺²	Single Junction	KCl

* All Glass Combinations are also available as Epoxy Combinations (to order epoxy combination, change last digit from -2 to -8, i.e. BR01508)

pHOENIX Electrode Company

ION SELECTIVE ELECTRODES

pHoenix Electrode Company offers a wide range of Ion Selective Electrodes including:

1. **Polymer Membrane Electrodes**

Polymer membrane electrodes consist of various ion-exchange materials in an inert matrix such as PVC, polythene or silicone rubber. After the membrane is formed, it is sealed to the end of a PVC tube. The potential developed at the membrane surface is related to the concentration of the species of interest. Electrodes of this type include potassium, calcium and nitrate.

2. **Solid State Electrodes**

Solid state electrodes utilize relatively insoluble inorganic salts in a membrane. Solid state electrodes exist in homogeneous or heterogeneous forms. In both types, potentials are developed at the membrane surface due to the ion-exchange process. Examples include silver/sulfide, chloride and fluoride.

3. **Gas Sensing Electrodes**

Gas sensing electrodes are available for the measurement of ammonia, carbon dioxide and nitrogen oxide. These electrodes have a gas-permeable membrane and an internal buffer solution. The pH of the buffer solution changes as the gas reacts with it. The change is detected by a combination pH sensor within the housing. Due to the construction, gas sensing electrodes do not require an external reference electrode.

4. **Glass Membrane Electrodes**

Glass membrane electrodes are formed by the doping of the silicon dioxide glass matrix with various chemicals. The most common of the glass membrane electrodes is the pH electrode. Glass membrane electrodes are also available for the measurement of sodium ions.

Reference Electrodes

Ion Selective Electrodes are available as half-cells (mono) or as glass or epoxy combination electrodes. Measurements with half-cell electrodes require the use of an additional reference electrode. (Gas-sensing electrodes are combination electrodes and do not require a reference electrode).

Cat. No.	Housing	Type
5771427	Glass	Annular Ceramic
5771405	Glass	Glass Sleeve
5731428	Epoxy	Single Junction, Annular Sleeve
5731429	Epoxy	Double Junction, Annular Sleeve

Cable Lengths and Connectors

All combination electrodes and sensor half-cells are available with choice of connectors. Specify cable length when ordering.



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