

# Orion™ Ion-Selective Electrodes and Solutions

## Get optimal performance from your ISE

**ionplus™ Sure-Flow™ Combination Ion-Selective Electrodes** eliminate fumbling and tangles from multiple cables. Sure-flow technology provides stable, reproducible results. The easy-to-clean design reduces the risk of inaccurate readings due to clogging of the reference junction.

**Combination Ion-Selective Electrodes** feature both half-cell and reference cell in one electrode—more convenient than half-cell electrodes. Ideal for measuring smaller sample than half-cells with reference.

**Half-Cell Ion-Selective Electrodes** are the classic means of taking ion measurements and are still the only option for some ion measurements. Half-cell give you more flexibility and choice in reference electrodes. Half-cell electrodes require that you also purchase a reference electrode.

**What's included:** 3-ft (0.9-m) cable and BNC connector. Complete systems require the purchase of a standardizing solution, filling solution for the reference electrode, ionic strength adjustor, and pH adjusters.



58824-60    05723-31    05721-11

### Teky's Tips



#### Using the correct electrode

Ions such as aluminum, boron, manganese, and molybdate can be measured using the correct electrode and pH adjustors even though electrodes are not listed for them. Some specific measurements may require variants of electrode and solution combinations.

ISO9001:2008  
CERTIFIED SUPPLIER

Ion	Electrode type	Concentration range	Temperature/pH range†	Interferences‡	Ion-selective electrodes	
					Catalog number	Price
<b>ionplus Sure-Flow combination ion-selective electrodes</b>						
Bromide (Br <sup>-</sup> )	Solid-state	5 x 10 <sup>-6</sup> to 1 M (0.4 to 79,900 ppm)	0 to 80°C/ 2 to 14	I <sup>-</sup> , S <sup>-2</sup> , CN <sup>-</sup> ; high levels of Cl <sup>-</sup> , NH <sub>3</sub>	<a href="#">GH-05713-01</a>	
Calcium (Ca <sup>+2</sup> )	Plastic membrane	5 x 10 <sup>-7</sup> to 1 M (0.02 to 40,100 ppm)	0 to 40°C/ 2.5 to 11	Pb <sup>+2</sup> , Hg <sup>+2</sup> , H <sup>+</sup> , Sr <sup>+2</sup> , Fe <sup>+2</sup> , Cu <sup>+2</sup> , Ni <sup>+2</sup> , H <sup>+</sup> , Na <sup>+</sup> , Tris <sup>+</sup> , Li <sup>+</sup> , K <sup>+</sup> , Ba <sup>+2</sup> , Zn <sup>+2</sup> , Mg <sup>+2</sup>	<a href="#">GH-58824-52</a>	
Chloride (Cl <sup>-</sup> )	Solid-state	5 x 10 <sup>-5</sup> to 1 M (1.8 to 35,500 ppm)	0 to 80°C/ 2 to 12	CN <sup>-</sup> , Br <sup>-</sup> , I <sup>-</sup> , OH <sup>-</sup> , S <sup>-2</sup> must be absent	<a href="#">GH-58824-60</a>	
Cupric (Cu <sup>+2</sup> )	Solid-state	10 <sup>-8</sup> to 0.1 M (6.4 x 10 <sup>-4</sup> to 6350 ppm)	0 to 80°C/ 2 to 12	Hg <sup>+2</sup> and Ag <sup>+</sup> must be absent; high levels of Fe <sup>+2</sup> , Br <sup>-</sup> , and Cl <sup>-</sup> may interfere	<a href="#">GH-05713-07</a>	
Cyanide (CN <sup>-</sup> )	Solid-state	8 x 10 <sup>-6</sup> to 10 <sup>-2</sup> M (0.2 to 260 ppm)	0 to 80°C/ 0 to 14	I <sup>-</sup> , Br <sup>-</sup> , Cl <sup>-</sup> ; S <sup>-2</sup> must be absent	<a href="#">GH-05713-09</a>	
Fluoride (F <sup>-</sup> )	Solid-state	10 <sup>-6</sup> M to saturated (0.02 ppm to saturated)	0 to 80°C/ 5 to 11	OH <sup>-</sup>	<a href="#">GH-05723-02</a>	
Iodide (I <sup>-</sup> )	Solid-state	5 x 10 <sup>-8</sup> to 1 M (5 x 10 <sup>-3</sup> to 127,000 ppm)	0 to 80°C/ 0 to 14	CN <sup>-</sup> , S <sub>2</sub> O <sub>3</sub> <sup>-2</sup> , S <sup>-2</sup> , NH <sub>3</sub> , Cl <sup>-</sup>	<a href="#">GH-05713-11</a>	
Lead (Pb <sup>+2</sup> )	Solid-state	10 <sup>-6</sup> to 0.1 M (0.2 to 20,700 ppm)	0 to 80°C/ 4 to 7	Hg <sup>+2</sup> , Ag <sup>+</sup> , and Cu <sup>+2</sup> must be absent; high levels of Fe <sup>+2</sup> and Cd <sup>+2</sup> may interfere	<a href="#">GH-05713-13</a>	
Nitrate (NO <sub>3</sub> <sup>-</sup> )	Plastic membrane	7 x 10 <sup>-6</sup> to 1 M (0.10 to 14,000 ppm as N)	0 to 40°C/ 2.5 to 11	ClO <sub>4</sub> <sup>-</sup> , I <sup>-</sup> , ClO <sub>3</sub> <sup>-</sup> , CN <sup>-</sup> , Br <sup>-</sup> , HS <sup>-</sup> , HCO <sub>3</sub> <sup>-</sup> , CO <sub>3</sub> <sup>-2</sup> , Cl <sup>-</sup> , PO <sub>4</sub> <sup>-3</sup> , OAc <sup>-</sup> , F <sup>-</sup> , SO <sub>4</sub> <sup>-2</sup> , NO <sub>2</sub> <sup>-</sup> , HPO <sub>4</sub> <sup>-</sup>	<a href="#">GH-05713-15</a>	
Silver/Sulfide (Ag <sup>+</sup> /S <sup>-2</sup> )	Solid-state	Ag <sup>+</sup> : 10 <sup>-7</sup> to 1 M (0.01 to 107,900 ppm) S <sup>-2</sup> : 10 <sup>-7</sup> to 1 M (0.003 to 32,100 ppm)	0 to 80°C/ 2 to 12	Hg <sup>+2</sup>	<a href="#">GH-05713-21</a>	
<b>Combination ion-selective electrodes</b>						
Ammonia (NH <sub>3</sub> ) Ammonium (NH <sub>4</sub> <sup>+</sup> )	Gas sensing	5 x 10 <sup>-7</sup> to 1 M (10.00 to 17,000 ppm)	0 to 50°C 11 to 13	Volatile amines	<a href="#">GH-05722-16</a>	
Carbon dioxide (CO <sub>2</sub> ) Carbonate (CO <sub>3</sub> <sup>-2</sup> )	Gas sensing	10 <sup>-4</sup> to 10 <sup>-2</sup> M (4.4 to 440 ppm)	0 to 50°C/ 4.8 to 5.2	Volatile weak acids	<a href="#">GH-05722-01</a>	
Chlorine (Cl <sub>2</sub> )	Solid-state	10 <sup>-7</sup> to 3 x 10 <sup>-4</sup> M (0.01 to 20 ppm)	0 to 50°C/ 2 to 14	Strong oxidizing agents (IO <sub>3</sub> <sup>-</sup> , BrO <sub>3</sub> <sup>-</sup> , MnO <sub>2</sub> )	<a href="#">GH-05724-02</a>	
Potassium (K <sup>+</sup> )	Plastic membrane	1.0 to 10 <sup>-10</sup> M (0.04 to 39,000 ppm)	0 to 40°C/ 2 to 12	Cs <sup>+</sup> , NH <sub>4</sub> <sup>+</sup> , Tl <sup>+</sup> , H <sup>+</sup> , Ag <sup>+</sup> , Li <sup>+</sup> , Na <sup>+</sup> , Tris	<a href="#">GH-58824-56</a>	
Sodium (Na <sup>+</sup> )	ROSS®†† Sure-Flow	10 <sup>-6</sup> M to saturated (0.02 ppm to saturated)	0 to 100°C/ 3 to 12	Ag <sup>+</sup> , Li <sup>+</sup> , K <sup>+</sup> , Tl <sup>+</sup> , H <sup>+</sup> , Cs <sup>+</sup>	<a href="#">GH-05723-31</a>	
<b>Half-cell ion-selective electrodes</b> ; require reference electrode. Match the key letters in the "filling solutions" column with the ones in the "Reference Electrodes" table on the facing page.						
Chloride (Cl <sup>-</sup> )	Solid-state	5 x 10 <sup>-5</sup> to 1 M (1.8 to 35,500 ppm)	0 to 80°C/ 2 to 12	CN <sup>-</sup> , Br <sup>-</sup> , I <sup>-</sup> , OH <sup>-</sup> , S <sup>-2</sup> must be absent	<a href="#">GH-05721-41</a>	
Fluoride (F <sup>-</sup> )	Solid-state	10 <sup>-6</sup> M to saturated (0.02 ppm to saturated)	0 to 80°C/ 5 to 11	OH <sup>-</sup>	<a href="#">GH-05721-11</a>	

†Optimal pH range for direct measurement

‡Ions are listed in order of decreasing concentrations of interference electrodes