

© 2009

**T-611/T-612/T-613 ANALYSIS  
REDOX POTENTIAL**

References:

1. "Standard Practice for Oxidation-Reduction Potential of Water", ASTM D 1498 - 00.
2. "Expressions of Performance of Electrochemical Analyzers", International Standard IEC 746-5.

<b>pH Buffer</b>	<b>Redox (mV) @ 20°C</b>	<b>Redox (mV) @ 25°C</b>	<b>Redox (mV) @ 30°C</b>
Buffer 4.01	481	472.2	463.6
Buffer 7.00	305	295.2	284.6

These Redox values should only be used when the sensor (Ag/AgCl 3M KCl) is calibrating with a Redox Standard prepared with Quinhydrone.

When calibrating with 4.01 buffer mixture, the reading should be between +170 and +185 mV above the reading in the 7.00 buffer mixture, eg. 295.2 mV + 177mV = 472.2 mV @ 25°C. If a short span is found-less than a +170 mV change between the 7.00 and 4.01 buffers - the platinum surface may be coated. To remove the coating refer to clause 11.0 "General Care and Maintenance", pH/ORP Sensor Maintenance.

Electrochemical measurements are ultimately referred to the so-called hydrogen scale (or Normal Hydrogen Electrode NHE), the convention for which is that the electrochemical potential of a hydrogen electrode in contact with hydrogen gas at one atmosphere partial pressure and a solution containing hydrogen ions at unit activity is zero at all temperatures. The T-611 reference electrode used is the 3M KCl Silver Chloride type, and this exhibits potential on the hydrogen scale of:

<b>Ag, AgCl, 3MKCl</b>		
<b>@ 20°C</b>	<b>@ 25°C</b>	<b>@ 30°C</b>
213 mV	209.2 mV	205.6 mV

To refer a reduction-oxidation potential value measured with a 3M KCL Silver Chloride electrode to the hydrogen scale, the appropriate value above should be added to the measured value:

<b>pH Buffer</b>	<b>Redox (mV) @ 20°C</b>	<b>Redox (mV) @ 25°C</b>	<b>Redox (mV) @ 30°C</b>
Buffer 4.01	481	(263+209.2) 472.2	463.6
Buffer 7.00	305	(86+209.2) 295.2	284.6

All potentials quoted are referred to the standard (“normal”) hydrogen electrode (NHE) and are expressed in mV (reference: International Standard IEC 60746-5, Oxidation-Reduction Potential or Redox Potential, Annex B).