ORP measurements

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Reduction and oxidation are two central chemical terms that describe the ability of chemical agents to accept (reduction) or donate electrons (oxidation). In aqueous solutions, the ORP (Oxidation-Reduction Potential) voltage can be measured using a standard hydrogen electrode as reference. The reducing or oxidizing properties of a solution first are a matter of the reactants. By using an ORP electrode this change in potentials would be recorded as a positive or negative voltage.

ORP measurements monitor chemical reactions such as checking the denitrification of wastewater and disinfectant effect of detergents or the strength of plating baths.

SenTix® ORP reference electrode potential against the standard hydrogen electrode

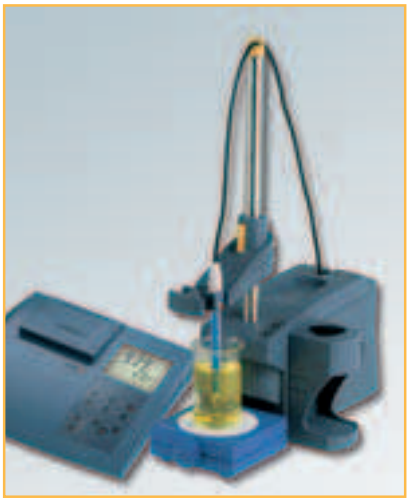
Temperature in °F (°C)	Potential in mV
32 (0)	+ 224
41 (5)	+ 221
50 (10)	+ 217
59 (15)	+ 214
68 (20)	+ 210
77 (25)	+ 207
86 (30)	+ 203
95 (35)	+ 200
104 (40)	+ 196
113 (45)	+ 192
122 (50)	+ 188
131 (55)	+ 184
140 (60)	+ 180
149 (65)	+ 176
158 (70)	+ 172

Measurement of ORP voltage is carried out with ORP combination electrodes. Similar to pH electrodes, these consist of a measuring electrode and a reference electrode. A metal electrode (normally a precious metal like gold, silver or platinum) is used in ORP combination electrodes in place of a glass membrane for carrying out the measuring function. The tendency for the chemical agents to accept or donate electrons determines the potential of the metal and thus the electrical potential of the combination electrode. ORP combination electrodes in use today contain a silver/silver chloride reference electrode, i. e. the indicated potential refers to this potential. Conversion to the standard hydrogen electrode system (U_H) and that of the silver/silver chloride reference electrode is easily possible.

$$U_H = U_{Meas} + U_{Ref}$$

ORP measurements can be carried out with all WTW pH/mV meters.

NEW



SenTix® PLUS Electrodes	SenTix® ORP 103 648	SenTix® Ag 103 664	SenTix® Au 103 665	SenTix® PtR 103 666
Working range °C (°F)	0...100 °C (32...212 °F)	-5...100 °C (23...212 °F)	-5...100 °C (23...212 °F)	-5...100 °C (23...212 °F)
Reference electrolyt	KCl 3 mol/l	ELY/ORP/Ag	KCl 3 mol/l	Gel
Sensor	Platinum	Silver	Gold	Platinum
Sensor shape	Round 0.16 in. (4 mm)	Clindrical cap	Clindrical cap	Round 0.24 in. (6 mm)
Diaphragm	Ceramic	Ceramic	Ceramic	Split ring
Shaft material	Glass	Glass	Glass	Glass
Shaft length (±0,08 in./±2 mm)	4.72 in. (120 mm)	4.72 in. (120 mm)	4.72 in. (120 mm)	4.72 in. (120 mm)
Shaft-Ø (±0,02 in./±0,5 mm)	0.47 in. (12 mm)	0.47 in. (12 mm)	0.47 in. (12 mm)	0.47 in. (12 mm)
Temperature sensor	–	–	–	–
Connection	AS DIN/AS DIN-3, AS BNC			

Ordering Informations for accessories

Testing and maintenance supplies for ORP measurements		Order No.
SORT/RH	Reagents for regenerating ORP electrodes consisting of activation powder (10 g) and clorina powder (30 g)	109 730
RH 28	ORP buffer solution 1 bottle of 250 ml: **pH 7, U_H = 427 mV**	109 740
ELY/ORP/AG	Electrolyte with 2 mol/l KNO_3 +0.001 mol/l KCl for combined ORP electrode with silver electrode	109 735