



## ORP Measurements

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 Oxidation-Reduction Potential (ORP) 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.

Measurement of ORP voltage is carried out using 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, the indicated potential refers to this potential. Conversion to the standard hydrogen electrode system (UH) and that of the silver/silver chloride reference electrode is easily possible.

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

**SenTix® ORP reference electrode potential against the standard hydrogen electrode**

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

ORP measurements can be performed using any WTW pH/mV meters.



See the new digital inoLab® IDS laboratory benchtop meters starting on page 14.

See the inoLab® pH/mV laboratory benchtop meters starting on page 30.

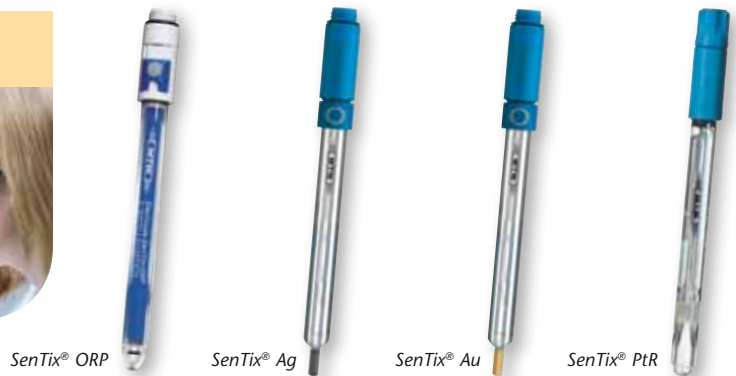
The digital MultiLine IDS portable meters start on page 18.

The proven Profiline pH/mV portable meters start on page 34.

You can find an overview showing the different meters as a selection guide on pages 6/7.

**Electrodes**

IDS pH/ORP electrodes, see page 10



SenTix® ORP Electrodes				
Model	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 electrolyte	KCl 3 mol/l	ELY/ORP/Ag	KCl 3 mol/l	Gel
Sensor	Platinum	Silver	Gold	Platinum
Sensor shape	Round 4 mm (0.16 in.)	Cylindrical cap	Cylindrical cap	Round 6 mm (0.24 in.)
Diaphragm	Ceramic	Ceramic	Ceramic	Split ring
Shaft material	Glass	Glass	Glass	Glass
Shaft length (±2 mm/±0.08 in.)	120 mm (4.72 in.)	120 mm (4.72 in.)	120 mm (4.72 in.)	120 mm (4.72 in.)
Shaft Ø (±0.5 mm/±0.02 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)
Temperature probe	-	-	-	-
Connection	AS DIN/AS DIN-3, AS BNC			

Ordering Informations for Accessories		Order No.
Testing and maintenance supplies for ORP measurements		
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 <sub>H</sub> = 427 mV	109 740
ELY/ORP/AG	Electrolyte with 2 mol/l KNO <sub>3</sub> +0.001 mol/l KCl for combined ORP electrode with silver electrode	109 735

\* for argentometric analysis

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