

YSI 3682 Zobell Solution Instructions

#061320, #061321, #061322

DESCRIPTION

The YSI Zobell Solution is a reference solution that is used to characterize redox potential cells. This product is packaged in dry form and must be reconstituted before use. Each amber bottle contains 75% Potassium Chloride, 14% Potassium Ferrocyanide Trihydrate and 11% Potassium Ferricyanide by weight. Three different size containers are available depending on volume required for calibration:

#061320, ZOBELL SOLUTION, 125 mL

#061321, ZOBELL SOLUTION, 250 mL

#061322, ZOBELL SOLUTION, 500 mL

As a general guideline, the 125 mL bottle is sufficient for calibrating stand-alone ORP electrodes, the 250 mL is used for handheld instruments (ProDSS), and the 500 mL is for larger sondes (EXO2).

The reconstituted solution has a maximum shelf life of 6 months. The shelf life of an unopened bottle is 5 years; it should be stored below 40°C.

To reconstitute the solution, add deionized or distilled water. The volume of water required depends on the part number purchased. Add 125 mL, 250 mL, or 500 mL +/- 5 mL, which typically reaches just below the bottom of the bottle's neck. The label should be marked to indicate the correct expiration date.



Zobell Solution in 125 mL, 250 mL, and 500 mL bottles.

CALIBRATION

Pour Zobell Solution into the instrument calibration chamber. Clean and rinse the ORP electrode with deionized or distilled water followed by a rinse with Zobell solution before immersing it in the calibration chamber.

The potential of the platinum electrode in Zobell relative to the Ag/AgCl and saturated Calomel electrode systems varies inversely with temperature (T) according to the following equations, with T expressed in °C.

$$E_{\text{Ag/AgCl}} = 223 + 1.47 (25-T) \text{ Millivolts}$$

$$E_{\text{Calomel}} = 183 + 1.64 (25-T) \text{ Millivolts}$$

The effects of temperature on oxidation-reduction reactions, which form the basis for redox potential measurements, are small but should be considered for temperatures higher or lower than 25°C. Platinum electrode potentials in Zobell solutions are shown in Table 1 to the right at various temperatures using Ag/AgCl and Calomel reference electrode systems.



The YSI Zobell solution is not for food or drug use and can be harmful if swallowed. It will react with acids to form harmful by-products, including hydrocyanide gas. Dispose of this product in accordance with all Federal, State and Local Environmental Regulations and Laws concerning health and pollution.

TEMP in °C	Ag/AgCl (3.5M KCl) in millivolts	CALOMEL in millivolts
-5	267.1	232.2
0	259.75	224.0
5	252.4	215.8
10	245.05	207.6
15	237.7	199.4
20	230.35	191.2
25	223.0	183.0
30	215.65	174.8
35	208.3	166.6
40	200.95	158.4
45	193.6	150.2
50	186.25	142.0

Table 1. Platinum Electrode Potentials in Zobell vs. Ag/AgCl and Calomel reference electrodes.

REFERENCES

National Handbook of Recommended Methods for Water Data Acquisition, United States Geological Survey, Chapter 11.

"Studies on Redox Potential of Marine Sediments," *Bulletin of the American Association of Petroleum Geologists*, Tulsa, Okla.

Midgeley, Derek, *Potentiometric Water Analysis*, 1978.

National Handbook of Recommended Methods for Water Data Acquisition, United States Federal Interagency Work Group on Designation of Standards for Water Data Acquisition, 1972.

Field Applications in Hydrogeology, Hydrogeology Group, Department of Earth Sciences University of Waterloo, Ontario, Canada, 1981.

