

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Soil. Determination of redox potential. Potential method

土壤 氧化还原电位的测定 电位法

(English Translation)

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Foreword

To carry out the "People's Republic of China Environmental Protection Law" to protect the environment, protect human health, regulate soil oxidation and reduction potential of the test Set this standard.

This standard specifies the field test method for the determination of redox potential in soils.

This standard is modified using the "Field Test Method for Determination of Reducing Potentials of Soil Mass" (ISO 11271.:2002).

The main changes are as follows.

- modified standard name;
- the original reference standard ISO 3696. 1987 to GB/T 6682;
- simplifies the formulation of the principle of the method;
- refinement of instruments and equipment terms;
- modified the analysis steps;
- Added caution.

This standard is the first release.

Appendix A to this standard is a normative appendix, Appendix B and Appendix C are informative appendices.

This standard is organized by the Ministry of Environmental Protection Science and Technology Standards Division.

The main drafting unit of this standard. Jinzhou City Environmental Monitoring Center Station.

This standard is approved by the Ministry of Environmental Protection on June 4, 2015.

This standard is implemented as of July 1, 2015.

This standard is explained by the Ministry of Environmental Protection.

Determination of soil oxidation - reduction potential

1 Scope of application

This standard specifies the soil oxidation-reduction potential of the field test method.

This standard applies to the determination of the redox potential of fresh or moist soils given in Annex A for the water state.

2 Normative reference documents

The contents of this standard refer to the following documents or their terms. For undated references, the valid version applies to this standard quasi.

GB/T 6682 Analytical laboratory water specifications and test methods Technical specification for soil environmental monitoring ISO 11271.:2002 Determination of soil mass oxidation and reduction potential Field test method (Soil quality-Determination of redox Potential-field method

3 Terms and definitions

The following terms and definitions apply to this standard.

Soil Oxidation - Reduction Potential EhSoil Redoxpotential Refers to the soil oxidation state substances and the reduction of the relative concentration of substances generated by the potential, expressed by Eh.

4 Principle of the method

The platinum electrode and the reference electrode are inserted into fresh or moist soil, and the soluble oxidant or reducing agent in the soil is accepted from the platinum electrode or give electrons until a potential is established on the surface of the electrode to measure the difference between the potential and the potential of the reference electrode, the electrode is added to the potential of the hydrogen standard electrode to obtain the redox potential of the soil.

5 Reagents and materials

Unless otherwise stated, analytical pure chemical reagents conforming to national standards are used in the analysis, and the test water meets the requirements of GB/T 6682.

5.1

quinone hydroquinone ($C_{12}H_{10}O_4$).

5.2

potassium ferricyanide ($K_3 [Fe (CN) 6]$).

5.3

Potassium ferrocyanide ($K_4Fe (CN) 6 \cdot 3H_2O$).

5.4

agar. $\omega = 0.5\%$.

5.5

Potassium chloride. KCl.

5.6

Redox Buffer Solution.

Adding the appropriate amount of powdered quinone hydroquinone (5.1) to the pH buffer to obtain a suspension; or equimolar potassium ferricyanide (5.2) Potassium cyanide (5.3) (mol/mol). Refer to Appendix B for the potential values of the standard redox buffer solution.

5.7

Potassium chloride solution. $c (KCl) = 1.00 \text{ mol/L}$.

Weigh 74.55 g potassium chloride (5.5) in 1000 ml volumetric flask, diluted with water to the mark, mix.

5.8

Potassium chloride solution. $c (KCl) = 3.00 \text{ mol/L}$.

Weigh 223.65 g potassium chloride (5.5) in 1000 ml volumetric flask, diluted with water to the mark, mix.

5.9

Electrode cleaning materials. fine sandpaper, decontamination powder, cotton cloth.

6 Instruments and equipment

6.1

potentiometer. input impedance of not less than 10 Gohm, sensitivity of 1 mV.

6.2

Redox electrode. Platinum electrode, need to be stored in the air and keep clean. The structure of the two different types of platinum electrodes is shown in Fig.

A) redox electrode b) spike redox electrode 1 insulating material; 2 copper rod; 3 platinum wire; 4 handle; 5 jack; 6 steel rod; 7 epoxy resin; 8 exposed platinum wire bundle Fig.1
Structure of redox electrode

6.3

Reference electrode.

Silver-silver chloride electrode, other electrodes such as calomel electrodes can also be used. The potential of the reference electrode relative to the standard hydrogen electrode is given in the Appendix C. Silver-silver chloride electrode should be stored in 1.00 mol/L or 3.00 mol/L potassium chloride solution (5.7 or 5.8), the concentration of potassium chloride and the electrodes are of the same concentration or are stored directly in a salt bridge containing the same concentration of potassium chloride solution.

6.4

stainless steel hollow rod. diameter greater than the redox electrode 2 mm, the length should meet the redox electrode inserted into the soil required depth.

6.5

salt bridge. connecting the reference electrode and soil, salt bridge structure shown in Figure 2.

1 silver-silver chloride electrode; 2 agar potassium chloride solution ($\omega = 0.5\%$); 3 ceramic sleeve Fig.2 Salt bridge structure in redox potential measurement

6.6

Hand drill. diameter greater than the salt bridge reference electrode 3 mm ~ 5 mm.

6.7

Thermometer. Sensitivity $\pm 1\text{ }^{\circ}\text{C}$.

7 Scene

According to the relevant requirements of HJ/T 166, according to the background data and field investigation results, the spatial diversity of pollutants and the degree of soil pollution