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Program of Pattern Evaluation of Dissolved Oxygen Meter with Covered-Membrane-Electrode

覆膜电极溶解氧测定仪

型式评价大纲

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Introduction

This Program-of-Pattern-Evaluation is Formulated according to the provisions of JJF 1015 *General Specifications for Pattern Evaluation and Approval of Measuring Instruments*, JJF 1016 *Guidelines for Pattern Evaluation of Measuring Instruments*, and JJF 1001 *Terms and Definitions of General Metrology*.

The technical indexes of this Program-of-Pattern-Evaluation take reference from JJG 291-2008 *Dissolved Oxygen Meter with Covered-Meter-Electrode*, GB/T 11606-2007 *Methods for Environmental Test of Analytical Instruments*, HJ 506-2009 *Water Quality, Determination of Dissolved Oxygen, Electrochemical Probe Method*.

This Program-of-Pattern-Evaluation is issued for fist-time.

Program of Pattern Evaluation of Dissolved Oxygen Meter With Covered-Membrane-Electrode

1 Scope

This program is applicable to the pattern evaluation of laboratory and portable dissolved oxygen meter (hereafter referred to as meter) with measuring range of (0~20) mg/L.

2 References

JJG 291-2008 Dissolved Oxygen Meter with Covered-Meter-Electrode

GB/T 11606-2007 Methods for Environmental Test of Analytical Instruments

HJ 506-2009 Water Quality, Determination of Dissolved Oxygen, Electrochemical Probe Method

The articles contained in above documents have become part this Standard when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this Standard. For the undated documents so quoted, the latest editions shall be applicable to this Standard.

3 Summary

The meter used for determining constant concentration of dissolved oxygen (DO) in water generally consists of oxygen electrode with covered-membrane, electronic unit and display.

4 Technical materials and experimental prototype submitted by applicant

4.1 Technical materials

a) Photos of prototype;

b) Enterprise product standard (including test methods);

c) General assembly drawing, main parts drawing and circuit diagram;

d) Operation Manual;

e) Test report provided by research organization or technical institute.

4.2 Experimental prototype

Application organization shall provide the prototype produced by themselves. Applicants

can submit applications for single product or a series of products. For single product, applicants shall provide 3 prototypes. For a series of products, applicants shall provide one third of representative standardized products in each series. The number of prototypes of each specification shall be in accordance with the principles of single product application. If the required number of prototypes is too many according to the above principles, applicants can make an appropriate reduction on the number of each representative prototype.

5 Legal regulatory requirements

5.1 Requirements for measuring units

Adopt legal measuring units.

5.2 Requirements for degree of accuracy (maximum permissible error)

The maximum permissible error of instruments shall be in accordance with the provisions in JJG 291-2008 *Dissolved Oxygen Meter with Covered-Meter-Electrode*.

5.3 Requirements for identifications of legal metrology and measuring instruments

Label the legal metrology and measuring instrument marks on obvious parts of instrument such as nameplate or panel. The marks, number and descriptions shall be clear and solid.

5.3.1 Legal metrology marks

Legal metrology marks include the mark and number of manufacturing license of measuring instruments (corresponding locations shall be available on domestic experimental prototype); the mark and number of pattern approval of measuring instruments (corresponding locations can be available on domestic experimental prototype; non-mandatory provision).

5.3.2 Measuring instrument marks

Measuring instrument marks include name, specification (model), name of manufacturer, date of production and factory number.

6 Measurement requirements

6.1 Zero point deviation

Zero point deviation shall not exceed 0.10mg/L.

6.2 Response time

Response time shall not be more than 60s.

6.3 Indication error of dissolved-oxygen concentration

d) After testing the zero point deviation at upper limit of operating temperature, reduce the temperature in test chamber to initial temperature with the rate of change lower than 1°C/min. Take out the instrument as it stabilizes and recover for 24h under normal condition.

e) Put the instrument into test chamber on standby mode. The temperature in test chamber is the same as that of instrument;

f) Reduce the temperature in test chamber to 0°C with the rate of change lower than 1°C/min. Keep the test duration for 2h;

g) When the test duration ends, take out the electrode from test chamber. Test the zero point deviation according to test procedures in 9.2.4 c), d).

9.11.5 Conformance judgment

The test result shall be in accordance with the provisions in 6.1.

9.12 Basic environmental conditions for transportation and storage

9.12.1 Test objective

Check to see - after high temperature storage, low temperature storage, steady damp-heat, vibration and free-drop tests, if the appearance and metrological performance meet the provisions in 7.5.

9.12.2 Test conditions

The conditions are same as 9.1.2.

9.12.3 Test equipment

9.12.3.1 Temperature test chamber

The size of test chamber shall be greater than 3 times packing size of instrument.

9.12.3.2 Damp-heat test chamber

The size of test chamber shall be greater than 3 times packing size of instrument.

9.12.3.3 Vibrating table

9.12.3.4 Free-drop stage

The surface of test stage shall be flat and hard cement floor or steel plate.

9.12.3.5 It is the same as 9.2.3.

9.12.4 Test procedures

a) Put the packaged instrument into test chamber. The temperature in test chamber is the same as that of instrument.

b) Raise the temperature in test chamber to (55±2)°C with the rate of change lower than 1°C/min. Keep the test duration for 8h;

c) When the test duration ends, reduce the temperature in test chamber to initial temperature with the rate of change lower than 1°C/min. Take out the packaged instrument as it stabilizes and recover for 24h under normal condition.

d) Put the packaged instrument into test chamber. The temperature in test chamber is the same as that of instrument;

e) Reduce the temperature in test chamber to (-20±2)°C with the rate of change lower than 1°C/min. Keep the test duration for 8h;

f) When the test duration ends, raise the temperature in test chamber to initial temperature with the rate of change lower than 1°C/min. Take out the packaged instrument as it stabilizes and recover for 24h under normal condition.

g) Put the packaged instrument into test chamber. The temperature in test chamber is the same as that of instrument;

h) Raise the temperature in test chamber to (40±2)°C with the rate of change lower than 1°C/min. Humidify to (93±3)% in 2h. Keep the test duration for 12h as temperature and humidity stabilize.

i) When the test duration ends, reduce the temperature in test chamber to initial temperature with the rate of change lower than 1°C/min. Take out the packaged instrument as it stabilizes and recover for 24h under normal condition.

j) For portable instrument, fix the instrument on vibrating table tightly and open vibrating table. Experiment with (10~55) Hz frequency, 0.15mm amplitude, 1oct/min scanning frequency, 10min duration and X, Y, Z vibration directions.

k) Drop the packaged instrument naturally to flat and hard cement floor or steel plate. Dropping height is 250mm, drop 4 times.

l) When complete the above tests, check the appearance and test metrological performance according to procedures in 9.1.3, 9.2.4, 9.3.4, 9.4.4, 9.5.4, 9.6.4 and 9.7.4.

9.12.5 Conformance judgment

The test result shall be in accordance with the provisions in 7.5.

10 Judge and manage the results of pattern evaluation

10.1 The result judgment of every specification generally falls into two categories: single-item judgment and comprehensive judgment.

10.2 Provide technical requirements and the verdict of whether test data is qualified for each item for single-item judgment. If the test results of three prototypes are qualified in single-item test, the test result of this single-item test is judged to be qualified. If the test result of one prototype is unqualified, the test result of this single-item test is judged to be unqualified.

10.3 The comprehensive judgment is based on the results of single-item judgment. If all the single-item tests are qualified, the comprehensive test is judged to be qualified. If more than one main single-item is unqualified, the comprehensive test is judged to be unqualified.

10.4 For a series of products, if one of specifications is unqualified, this series of products is judged to be unqualified.

11 Original record format of pattern evaluation

See Annex E for original record format of pattern evaluation.

2.11.6 Salinity compensating error

Detecting start time:

Detecting end time:

Data recording:

Instrument No.	Salt content	Indications		Mean	Standard values of concentrations of dissolved-oxygen	Errors	+	-

The abnormal situations during detection:

Measuring devices and equipment used for testing:

Name	Model	Serial No.	Degree of accuracy	Period of validity

Environment temperature:_____ Relative humidity:_____

Atmospheric pressure: _____

Evaluator:_____ Reviewer:_____

_____ END _____

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