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JJG

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Verification Regulation of Electrolytic Hygrometers
(English Translation)**

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5.4 Verification cycle (4)

Appendix A Electrolytic Hygrometer Calibration Record Format (5)

Appendix B Format of Electrolytic Hygrometer Calibration Certificate and Verification Result Notice (6)

Electrolytic humidity meter verification procedure

1 Scope

This procedure is applicable to the first verification, subsequent verification and in-use inspection of the electrolysis hygrometer. Electrolytic humidity meter for the measurement performance test in type identification or prototype test, refer to this procedure.

2 Overview

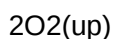
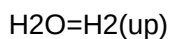
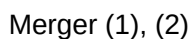
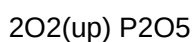
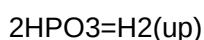
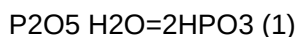
Electrolytic humidity meter is widely used in petrochemical, electronic, electric power, metallurgical and other industrial sectors for gas humidity detection.

Includes intermittent measurements and online measurements.

The instrument uses an electrolytic method to measure the humidity in a gas, and the range generally refers to less than 1000 $\mu\text{L/L}$. The working principle is.

The gas to be measured flows through a special structure of the electrolytic cell, and the water vapor is absorbed by the P_2O_5 film on the surface of the electrode and is electrolyzed.

For hydrogen and oxygen, P_2O_5 is regenerated at the end of the reaction. The reaction process can be expressed as.



In the above reaction, the amount of water to be electrolyzed is proportional to the amount of electricity passing through the electrolytic cell. The measured gas continuously passes through the electrolysis the pool in which the water vapor is completely absorbed by the P_2O_5 film on the surface of the electrode is electrolyzed. When the absorption and electrolysis process is reached at equilibrium, the electrolysis current is proportional to the humidity of the gas. This is the quantitative basis for the instrument.

If the ambient temperature, pressure and measured gas flow rate are known, according to Faraday's law of electrolysis and gas state equations the relationship between the derived electrolysis current and the moisture content of the gas to be measured is.

$$Q_{\text{pT0FVr10-4}}$$

$$3p_0TV_0$$

It can also be simplified as. $I = 1.4358 \times 10^{-1} V_{\text{rQ}} p_{\text{T0}} p_0 TV_0 \text{ (}\mu\text{A)}$ (5) in the formula.

I --- electrolysis current of water, μA ;

V_{r} --- the water vapor content of the gas to be tested, $\mu\text{L/L}$;

Q --- measured gas flow, mL/min ;

p --- atmospheric pressure, Pa ;

p_0 --- standard atmospheric pressure, 101325Pa ;

T --- ambient temperature, K ;

T0 --- critical absolute temperature, 273.15, K;

F --- Faraday constant, 96484.56C/mol;