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

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**Verification Regulation of Standard Platinum Resistance
Thermometer
(English Translation)**

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Standard platinum resistance thermometer test procedures

1 Scope

The order applies to -189.3442 °C ~ 660.323 °C (or sub-zone) reference work, first-class and second-class standard Platinum resistance thermometer initial verification and subsequent verification.

2 Overview

Standard platinum resistance thermometer is a standard based on platinum wire resistance changes with temperature single-valued characteristics of temperature instrument.

Standard platinum resistance thermometer uses for. the national reference platinum resistance thermometer to the work of reference platinum resistance thermometer test the standard means; a reference work for the first-class standard platinum resistance thermometers standard platinum resistance thermometer detector device; and a and other standard platinum resistance thermometer as second-class standard platinum resistance thermometer is standard verification equipment; standard platinum resistance thermometers Used to measure directly, but also as a variety of standard compares measured.

2.1 Definition of temperature values and interpolation methods

1990 International Temperature Scale (ITS-90) at a predetermined temperature value -189.3442 °C ~ 660.323 °C temperature region by the A set of provisions to define a fixed point indexing standard platinum resistance thermometer to determine, define a fixed point include freezing point of aluminum, zinc and condensate Fixed-point, freezing point of tin, indium freezing point, the melting point of gallium, mercury triple point, the argon triple point and triple point of water means, and use regulations and function within the given reference deviation function interpolation calculation defined temperature value fixed point.

Temperature value is determined by the following formula.

$W(t) = R(t)/R(0.01\text{ }^{\circ}\text{C})$ (1) where, $W(t)$ is a standard platinum resistance thermometer electrical resistance values of the temperature t and the triple point of water temperature (0.01 °C) of Resistance ratio.

In reference to the function definition 0 °C ~ 660.323 °C temperature zone for $W_r(t) = C_0 + \sum_{i=1}^n C_i [(t/273.15) - 1]^i$ (2) (3) for the formula (2) the inverse function, it is within the 0.13mK consistent with the formula (2).

$t/^{\circ}\text{C} = D_0 + \sum$

$D_i \{ [W_r(t) - 2.64] / 1.64 \}^i$ (3) where, t is the temperature value; $W_r(t)$ is a reference function, at 0 °C ~ 660.323 °C temperature region reference function $W_r(t)$

Table of values in Appendix F; constant C_0 , C_i , D_0 , D_i listed in Appendix C.

In deviation function $0\text{ }^{\circ}\text{C} \sim 660.323\text{ }^{\circ}\text{C}$ temperature zone for $\Delta W(t) = W(t) - W_r(t) = a [W(t) - 1] + b [W(t) - 1]^2 + c [W(t) - 1]^3$ (4) Wherein, a , b , c are coefficients, the coefficients a , b , c is a standard platinum resistance thermometer at the triple point of water, condensate tin Fixed-point, freezing point deviation measuring zinc and aluminum freezing point temperature determined W value and the corresponding reference function is obtained.