

JJF

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

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**Calibration Specification of Temperature Data Acquisition
Instruments**

温度数据采集仪校准规范

(English Translation)

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1 Scope

This Specification is applicable to the calibration of temperature data acquisition instruments (hereinafter referred to as acquisition instruments), which have built-in sensors AND a measurement range of (-50 ~ +150) °C, as well as outlay sensors AND a measurement range of (-80 ~ +500) °C.

2 Normative references

This Specification cites the following documents:

JJG 617-1996 Verification regulation of digital temperature indicators and controllers

JJF 1001-2011 General terms in metrology and their definitions

JJF 1007-2007 Temperature metrological terms and their definitions

JJF 1030-2010 Measurement and test norm of thermostatic bath's metrological characteristics

JJF 1101-2003 Calibration specification for the equipment of the environmental testing for temperature and humidity

JJF 1171-2007 Calibration specification for temperature itinerant detecting instrument

For dated references, only the dated version applies to this Specification; for undated references, the latest edition (including all amendments) applies to this Specification.

3 Terminology

The terms and definitions, as defined in JJF 1001-2011 and JJF 1007-2007, as well as the following terms and definitions, apply to this Specification.

3.1 Temperature data acquisition instrument

A temperature measuring instrument, which can be directly placed in the measured environment for measurement; has the functions of automatically collecting the

5.4 ON-OFF mode

The acquisition instrument shall be able to set how it turns on and off. The turn-on mode is fixed OR optional, such as immediate turn-on, time-fixed turn-on, time-delayed turn-on, manual start, etc. The turn-off mode is fixed OR optional, such as turn-off are full storage, first-in first-out, turn-off by numbers, manual turn-off, etc.

5.5 Over-temperature alarm

For an acquisition instrument, which has an over-temperature alarm function, the over-temperature alarm shall be normal.

5.6 Appearance

5.6.1

For the acquisition instrument with local indication, its digital indication shall be clear; there

shall be no digital flickering, overlapping characters, garbled characters, missing strokes; the indication of decimal point shall be correct.

5.6.2

The acquisition instrument, which can be used by putting into liquid, shall be sealed without damage.

Note: All the above technical indicators are not applicable to eligibility judgment, only for reference.

6.1 Environmental conditions

- a) Ambient temperature: $(20 \pm 5) ^\circ\text{C}$;
- b) Relative humidity: Not more than 85%;
- c) When the electrical measuring instrument has other requirements for environmental conditions, it shall meet its specified requirements.

Note: If the above conditions cannot be met, the resulting uncertainty shall be considered.

6.2 Power supply conditions

The power supply shall meet the normal working requirements of the acquisition instrument, measurement standard, constant temperature equipment under verification.

sensitive element immersed in the uniform temperature zone of the constant temperature bath, meanwhile the influence of the ambient temperature is negligible, it shall follow the requirements in 6.6.5 of JJF 1171-2007, to place the temperature sensor in the constant temperature bath; the data acquisition part is placed outside the constant temperature bath;

- b) If the temperature sensor of the acquisition instrument is outlay type AND the length of the sensor cable or the insertion rod is not enough to make the temperature sensitive element immersed in the uniform temperature zone of the constant temperature bath; OR although it can be submerged enough, the ambient temperature cannot be ignored, due to the excellent thermal conductivity of the immersion rod; OR when the temperature sensor is built-in and the data acquisition part is not sealed, THEN, it shall be placed in the uniform temperature area of the incubator, as a whole;

Note: In this case, the calibration temperature range of the outlay sensor acquisition instrument is the same as that of the built-in sensor acquisition instrument.

- c) For an integrally sealed acquisition instrument, the whole can be put into a metal mesh bag AND immersed in a uniform temperature zone below 200 mm, from the liquid medium level of the thermostat; OR the whole can be placed in the uniform temperature zone of the thermostat.

7.3.5 Communication connection

For the acquisition instrument of wireless communication, after the installation of the acquisition instrument is completed, it may turn on the communication receiver and the PC, to establish the real-time communication connection, between the acquisition instrument and the communication receiver and the PC.

7.3.6 Selection of calibration point

The calibration points shall be evenly distributed on the integral point of the entire measurement range; in principle, it shall include the zero point, the upper limit value, the lower limit value; there shall be no less than 5 points.

When the user has requirements, the calibration point can be selected, according to the user's requirements.

7.3.7 Use of measurement standards

When using a standard mercury thermometer as the measurement standard, a reading telescope shall be used to read its indication. When using a standard platinum resistance thermometer as the measurement standard, its working current shall not be greater than 1 mA; the insertion depth shall not be less than 250 mm.

When using an incubator as a constant temperature source, the standard thermometer shall be inserted vertically. At the same time, in order to reduce or eliminate the heat exchange between the insertion hole of the incubator and the outside world, it shall use cotton or other insulating materials, to plug the gap between the standard thermometer and the insertion hole.

7.3.8 Calibration method

Keep the temperature of the incubator constant, at each temperature point to be calibrated; the temperature deviation from the calibration point shall not exceed ± 0.2 °C (subject to the indication value of measurement standard). When the temperature of the incubator is constant for 20 minutes OR the temperature of the incubator is constant for more than 40 minutes, it shall calculate the reading time, according to the set turn-on mode and recording interval of the acquisition instrument. At the time when the acquisition instrument records the data, read and record the indication value of the measurement standard and the timer; meanwhile, take 4 readings continuously, at the set recording interval of the acquisition instrument.

After completing the measurement of the last calibration temperature point, take out the acquisition instrument or temperature sensor; when its temperature reaches near the ambient temperature, connect to the PC, according to the operation instructions of the