

JJF

**INDUSTRY STANDARD OF THE
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**Calibration Specification for Temperature and Humidity
Standard Chambers
(English Translation)**

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Table of Contents

Introduction

1 Scope

2 References

3 Terms and Definitions

3.1 Temperature and Humidity Standard Chamber

3.2 Valid Working Zone

3.3 Temperature Uniformity

3.4 Humidity Uniformity

3.5 Temperature Fluctuation

3.6 Humidity Fluctuation

3.7 Temperature Change Rate

3.8 Humidity Change Rate

4 Overview

5 Metrological Characteristics

5.1 Temperature and Humidity Uniformity

5.2 Temperature and Humidity Fluctuation

5.3 Temperature and Humidity Change Rates

6 Calibration Conditions

6.1 Environmental Conditions

6.2 Measurement Standards and Other Equipment

7 Calibration Items and Methods

7.1 Calibration Items

7.2 Calibration Methods

7.3 Expression of Calibration Results

7.4 Recalibration Interval

Appendix A Reference Format for Calibration Certificate Inner Pages

Appendix B Uncertainty Evaluation of Temperature Uniformity Measurement Results
For Temperature and Humidity Standard Chambers

Appendix C Uncertainty Evaluation of Humidity Uniformity Measurement Results for
Temperature and Humidity Standard Chambers

Appendix D Uncertainty Evaluation of Temperature Fluctuation and Temperature

1 Scope

This Specification is applicable to the calibration of temperature and humidity standard chambers used for metrological calibration within a temperature range of 5°C to 50°C and a humidity range of 10%RH to 90%RH.

2 References

This Specification references the following documents.

JJG 205-2005 Mechanical Thermo Hygrometers JJG 993-2004 Electric Ventilation Psychrometer JJF 1001-2011 General Terms in Metrology and Their Definitions in terms of references with a specified date, only versions with a specified date are applicable to this Specification. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this Specification.

3.1 Temperature and Humidity Standard Chamber

Specialized equipment used for the verification or calibration of temperature and humidity instruments; it generates a temperature and humidity environment meeting specific requirements within its valid working zone based on set parameters.

3.2 Valid Working Zone

The area within the temperature and humidity chamber used for the verification or calibration of temperature and humidity instruments.

3.3 Temperature Uniformity

The maximum absolute value of the temperature difference between any point in the surrounding area of the valid working zone and the center point at any instant within the 30-minute period after the temperature and humidity chamber has reached the specified stabilization time.

3.4 Humidity Uniformity

The maximum absolute value of the humidity difference between any point in the surrounding area of the valid working zone and the center point at any instant within the 30-minute period after the temperature and humidity chamber has reached the specified stabilization time.

3.5 Temperature Fluctuation

The range of the temperature at the center point of the valid working zone within the 30-minute period after the temperature and humidity chamber has reached the specified

stabilization time (when expressed in "±" format, 1/2 of the range is used).

3.6 Humidity Fluctuation

The range of the humidity at the center point of the valid working zone within the 30-minute period after the temperature and humidity chamber has reached the specified stabilization time (when expressed in "±" format, 1/2 of the range is used).

3.7 Temperature Change Rate

The maximum value of the range within each 1-minute interval of the temperature at the center point of the valid working zone within the 30-minute period after the temperature and humidity chamber has reached the specified stabilization time; it is expressed in °C/min.

3.8 Humidity Change Rate

The maximum value of the range within each 1-minute interval of the humidity at the center point of the valid working zone within the 30-minute period after the temperature and humidity chamber has reached the specified stabilization time; it is expressed in %RH/min.

4 Overview

The function of a temperature and humidity standard chamber is to generate a constant and uniform temperature and humidity field based on set values; it is used to verify and calibrate temperature and humidity measuring instruments such as mechanical dial-type thermo hygrometers, thermo-hygrographs, electric ventilation psychrometers, temperature and humidity sensors with built-in probes, data loggers with built-in temperature and humidity probes, and heat index meters.

Temperature and humidity chambers can operate based on different principles; currently, the two primary types are the dual-temperature method and the temperature-humidity regulation method.

The working principle of the dual-temperature method involves spraying water at a lower temperature onto an airflow or bubbling the air through it to generate saturated moist air at that temperature (i.e., the saturation process), followed by heating the moist air to a predetermined temperature (i.e., the heating process), thereby obtaining moist air with the desired temperature and relative humidity. The air inside the chamber generally circulates in a closed loop, with saturation and heating processes occurring repeatedly and alternately.

The working principle of the temperature-humidity regulation method involves controlling the temperature and humidity within the chamber through feedback control based on measured values of the temperature and humidity within the chamber, utilizing techniques such as steam or spray humidification, and refrigeration or desiccant-based dehumidification. Temperature and humidity measurements are primarily performed using

wet-and-dry bulb thermo hygrometers, polymer capacitive humidity sensors, or precision dew-point meters.

5.1 Temperature and Humidity Uniformity

For temperature and humidity chambers, temperature uniformity is generally no greater than 0.3°C, and humidity uniformity is generally no greater than 1.0%RH.

5.2 Temperature and Humidity Fluctuation

For temperature and humidity chambers, temperature fluctuation generally does not exceed $\pm 0.2^{\circ}\text{C}$, and humidity fluctuation generally does not exceed $\pm 0.8\%\text{RH}$.

5.3 Temperature and Humidity Change Rates

For temperature and humidity chambers, the temperature change rate is generally no greater than $0.2^{\circ}\text{C}/\text{min}$, and the humidity change rate is generally no greater than $0.8\%\text{RH}/\text{min}$.

NOTE: The above indicators are for reference only and are not used for determining compliance.

6.1 Environmental Conditions

6.1.1

Temperature. 15°C to 25°C ; humidity. $\leq 75\%\text{RH}$.

6.1.2

Temperature fluctuation shall not exceed $\pm 3^{\circ}\text{C}$.

6.1.3 Environmental conditions shall also meet other requirements necessary for the normal

operation of the standard instruments and other auxiliary equipment used.

6.2.1.1 Device configuration

The number of temperature and humidity sensors in the device shall meet the placement requirements; temperature and humidity sensors of the same model/specification shall be used for each channel; the device shall be equipped with an automatic recording function, and the minimum recording interval shall not exceed 20 s.

6.2.1.2 Technical indicators

The technical indicators for the temperature and humidity of each channel of the device are shown in Table 1.