

ICS 17.220
CCS A 55

JJF

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

JJF 1516-2015

**Calibration Specification for Electrical Conductivity Standards
of Nonferrous Metals
(English Translation)**

Issued on: February 9, 2015

Implemented on: May 9, 2015

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

Table of Contents

Introduction (II)
1 Scope (1)
2. References (1)
3 Terminology and units of measurement (1)
3.1 International Annealed Copper Standard (IACS) (1)
4 Overview (2)
5 Metrological characteristics (2)
6 Calibration conditions (3)

6 Calibration conditions (3)

Environmental conditions 6.1 (3)

9 Recalibration interval (7)

Appendix A Measurement Uncertainty Example (8)

Appendix B non-ferromagnetic metal-like conductivity reference blocks DC setting system (12)

Appendix C calibration original record format (14)

Appendix D calibration certificate within the page format (16)

Introduction

This specification based JJF 1071-2010 "National Calibration Specifications writing rules", JJF 1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement" establishment.

This specification with reference to the relevant provisions of the following international standards.

ASTMB193 conductive material resistivity measurement method
(StandardTestMethodforResistivityof ElectricalConductorMaterials) ASTM E1004-09 eddy conductivity material determination [StandardTestMethodforDetermining ElectricalConductivityUsingtheElectromagnetic (Eddy-Current) Method] Aluminum EN2004-7 Aerospace series of test methods and aluminum alloy products - Part 7. aluminum and aluminum alloy electric Conductivity Measurement equipment calibration

standard specimens

(Aerospace series test method for aluminum and aluminum alloy products Part 7.

Reference blocks for the calibration of measuring equipment

used in the determination of electrical conductivity of wrought aluminum and aluminum alloys) this specification is the first release.

Non-ferromagnetic metal-like conductivity (marked) block Calibration Specification

1 Scope

This standard applies to the calibration of non-ferromagnetic metal (alloy) Conductivity sample (standard) block (hereinafter referred to as specimens), calibration the conductivity in the range of 0.5% IACS ~ 101% IACS or 0.3MS/m ~ 58.6MS/m.

2. References

This specification refers to the following documents.

ASTM E 1004-09 Determination of material eddy conductivity [Standard Test Method for Determining Electrical Conductivity Using the Electromagnetic (Eddy-Current) Method]

ASTM B193-02 (Reapproved 2008) conductive material resistivity measurement method

(Standard Test Method for Resistivity of Electrical Conductor Materials) Aluminum EN2004-7

Aerospace series of test methods and aluminum alloy products - Part 7. aluminum and

aluminum alloy electric Conductivity Measurement equipment calibration standard

specimens (Aerospace series test method for aluminum and aluminum alloy products Part 7.

Reference blocks for the calibration of measuring equipment

used in the determination of electrical conductivity of wrought aluminum and aluminum alloys) for

dated references, only the dated edition applies to this specification; undated reference

documents Member, the latest edition (including any amendments) applies to this

specification.

3 terminology and units of measurement

3.1 International Annealed Copper Standard (IACS) when the temperature is 20 °C, when a uniform cross-section S of 1mm², 1m length of copper wire has a resistance R (1/58) when ohm, defined as 100% IACS, is calculated as equation (1).

σ =

Where.

--- conductivity [σ], S/m;

ρ --- resistivity, ohm · m;

S --- copper cross-section, mm²;

R --- Resistance, ohm.

Therefore, by definition $100\% \text{ IACS} = 1 \text{ m } 1 \text{ mm}^2$

· $1 \text{ (1/58) ohm} = 58 \text{ m} / (\text{ohm} \cdot \text{mm}^2) = 58 \text{ MS/m}$ the $1 \text{ MS/m} = 58\% \text{ IACS} \sim 1.72413\% \text{ IACS}$