



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS C 2525 : 1999

**Testing method for conductor-
resistance and resistivity of
metallic resistance materials**

ICS 29.050

Descriptors : electrical resistance, electrical properties of materials, resistors, electric conductors, electrical components, electrical resistivity, dielectric-strength tests, dielectric strength, electrical testing, metals

Reference number : JIS C 2525 : 1999 (E)

C 2525 : 1999

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. Consequently **JIS C 2525 : 1994** is replaced with **JIS C 2525 : 1999**.

Date of Establishment: 1953-08-21

Date of Revision: 1999-07-20

Date of Public Notice in Official Gazette: 1999-07-21

Investigated by: Japanese Industrial Standards Committee
Divisional Council on Electricity

JIS C 2525 : 1999, First English edition published in 2000-06

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2000

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

Testing method for conductor-resistance and resistivity of metallic resistance materials

Introduction This Japanese Industrial Standard has been prepared by revising JIS C 2525 : 1994, using IEC 60468, *Method of measurement of resistivity of metallic materials* published in 1974 as the informative reference and taking recent progress in measurement technique into consideration.

1 Scope This Japanese Industrial Standard specifies the testing method for the conductor-resistance and volume resistivity of metallic resistance materials and the like with resistivities between $0.05 \mu\Omega\text{m}$ and $2 \mu\Omega\text{m}$.

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards indicated below shall be applied.

JIS Z 8401 *Rules for rounding off of numerical values*

JIS Z 8703 *Standard atmospheric conditions for testing*

3 Definitions For the purpose of this Standard the following principal definitions apply:

- a) **metallic resistance material** A metallic conductive material of which the electric resistance characteristics are utilized.
- b) **conductor-resistance** The electric resistance (Ω) per unit length of an electrical conductor having uniform cross-sectional area. In general, it means electric resistance per meter (Ω/m) or electric resistance per kilometer (Ω/km).

Symbol of conductor-resistance: RC

- c) **volume resistivity** The electric resistance per unit cross-sectional area and unit length (Ωm). It is sometimes simply called "resistivity". Symbols of volume resistivity are as given below:

Symbol of volume resistivity: ρ

Symbol of volume resistivity at temperature t °C: ρ_t

- d) **voltage terminals** Knife-form metals which serve as test piece holding jigs to be used for measuring the voltage difference between both ends of the test piece.
- e) **current terminals** Screw-fixing type metals which serve as test piece holding jigs to be used when a current is passed through the test piece.
- f) **measuring conductors** The conductive wires which connect the voltage terminals and current terminals, with the measuring instrument and electric power supply.
- g) **over-all uncertainty** The uncertainty in the measurement where the confidence limits are expected to have a high confidence level (P). Here, $P = 95\%$ is used.

4 Test piece

4.1 Sampling method of test piece Test pieces shall be taken as shown in Table 1.

Table 1 Sampling method of test piece

Test piece	Form of product	Sampling method
Test piece for measuring conductor-resistance	Wire	The specified number of pieces taken from the product shall be used as test pieces as they are.
	Bar	
	Strip	
	Sheet	
Test piece for measuring volume resistivity	Wire under 0.1 mm in diameter	Wires 0.5 mm to 1.0 mm in diameter, or strips or sheets 0.5 mm to 1.0 mm in thickness shall be prepared from the intermediate process of the same melting unit as that of the product and be used as test pieces. Where it is difficult to take test pieces from the intermediate process of the same melting unit, the cross-sectional area of the test piece shall be found in accordance with 7.1 b) and the product as it is may be used as the test piece.
	Strip or sheet under 0.5 mm in thickness	
	Wire or bar 0.1 mm or more in diameter	If test pieces of 0.01 Ω or more can be obtained, the test pieces for measuring conductor-resistance shall be used as they are. Where the resistance is under 0.01 Ω , the product, if in the form of wire or bar, shall further be drawn, and if in the form of strip or sheet, shall be cut into the form of ribbons of uniform width, and used as test pieces. Where there is a difficulty, a wire or bar, or strip or sheet shall be separately prepared from the intermediate process of the same melting unit and test pieces of 0.01 Ω or more shall be prepared.
	Strip or sheet 0.5 mm or more in thickness	

4.2 Method of conditioning test piece Test pieces shall be conditioned as follows:

- The product as finished shall be used for the test pieces for conductor-resistance and volume resistivity. The test pieces prepared for volume resistivity measurement separately from the product shall be annealed by a method suitable for respective materials. For the test pieces prepared by cutting, the strain produced by cutting shall be removed.
- Where the surfaces of test pieces are covered with an oxide film or insulation covering, the film or covering at the area where the test piece is contacting with the measuring terminals shall be removed to expose the metal surface.
- No unnecessary tension or bending shall be exerted on the test pieces taken. They shall be handled carefully to prevent stains and dust from attaching to them.