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PAKISTAN STANDARD

COAXIAL COMMUNICATION CABLES – PART 1-101: ELECTRICAL TEST METHODS – TEST FOR CONDUCTOR D.C. RESISTANCE OF CABLE.

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PS: IEC 61196-1-101/2014

PAKISTAN STANDARD SPECIFICATION

FOR

COAXIAL COMMUNICATION CABLES – PART 1-101: ELECTRICAL TEST METHODS – TEST FOR CONDUCTOR D.C. RESISTANCE OF CABLE

0 FOREWORD

0.1 This Pakistan Standard was adopted by Standards Development Centre / Pakistan Standards and Quality Control Authority (PSQCA), after the draft prepared by the Technical Committee for **"Cables, wires and waveguides (ESTC-9)"** had been approved and endorsed by the National Standards Committee for Electronics on 11-11-2014.

0.2 This Pakistan Standard is an adoption of IEC Publication IEC 61196-1-101-2005: Coaxial communication cables – Part 1-101: Electrical test methods – Test for conductor d.c. resistance of cable.

0.3 This Standard has been prepared and finalized after taking into consideration the views and suggestions put forwarded by the representative section of technologists, manufacturers and utilizing agencies.

0.4 This Standard is subject to periodical review in order to keep pace with the changing requirements and latest development in the industry. Any suggestion for improvement will be recorded and placed before the revising committee in due course.

0.5 This Standard covers the technical provisions and it does not purport to include all the necessary provisions of a contract.

CONTENTS

1 Scope 3
2 Normative references 3
3 Terms and definitions 3
4 Test method 3
4.1 Equipment 3
4.2 Test sample 3
4.3 Procedure 4
5 Expression of test results 4
5.1 Calculation of loop resistance 4
5.2 Normalization 4
5.3 Temperature correction 5
6 Test report 5

Bibliography 6

COAXIAL COMMUNICATION CABLES –

Part 1-101: Electrical test methods – Test for conductor d.c. resistance of cable

1 Scope

This part of IEC 61196 applies to coaxial communications cables. It specifies test methods for determining the conductor d.c. resistance of coaxial cables.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61196-1, *Coaxial communication cables – Part 1: Generic specification – General, definitions and requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61196-1 apply.

4 Test method

4.1 Equipment

The d.c. resistance shall be measured by means of equipment capable of measuring d.c. resistance accurately to within ±0,5 % of the value to be determined. A bridge circuit or a current source in conjunction with a voltmeter is used. Depending on the magnitude of the d.c. resistance value, a two or four terminal method may be applied. The measurement current density shall not exceed 1 A/mm^2 of conductor to avoid any significant increase in temperature during the test.

4.2 Test sample

The length of the Cable Under Test (CUT) shall be ≥100 m and known to within £1 %. If the length of the CUT is shorter than 100 m, it should be noted in the test report. Both ends of the CUT shall be prepared, such that the current flows through all elements of the circuit under test and that the contact resistance can be neglected with respect to the result. The CUT shall be pre-conditioned at a constant temperature between 15 ºC and 35 ºC for such time as to allow the specimen temperature to stabilize.

4.3 Procedure

Measure the d.c. resistance of the leads connected to the bridge short – circuited to themselves and record this value as R_L.

Connect one bridge lead, ensure good connection, to the inner conductor on one end of the cable, and the other directly to the same conductor on the opposite end. Measure d.c. resistance. Record this value as R_1.

Following the same procedure, connect one bridge lead to the outer conductor of the cable, and the other directly to the same conductor on the opposite end. Measure d.c. resistance. Record this value as R_2.

The current density shall not exceed 1 A/mm^2 of conductor to avoid any significant increase of temperature during the test.

The ambient temperature shall be recorded.

5 Expression of test results

5.1 Calculation of loop resistance

$R_{cc} = R_1 - R_L$

$R_{oc} = R_2 - R_L$

$R_{LOOP} = R_{cc} + R_{oc}$

where

R_{cc} is the centre conductor d.c. resistance;

R_{oc} is the outer conductor d.c. resistance;

R_{LOOP} is the loop d.c. resistance;

R_L is the lead d.c. resistance.

5.2 Normalization

The test results should be normalised to the reference length N.

$$R = \frac{Rm}{} N \quad (\Omega/N)$$

where

R is the d.c. resistance of reference length at measuring temperature;

Rm is the measured d.c. resistance value of the CUT in Ω;

L is the length of sample in m;

N is the reference length in m.

5.3 Temperature correction

The measured value shall be corrected to the standard temperature of 20 ºC. The d.c. resistance shall be corrected to the standard temperature by multiplying the measured values (R_{cc}, R_{oc}) by the factor k:

$$k = \frac{1}{1 + C_T (T - 20\,°C)}$$

where

T is the temperature in degrees Celsius of the CUT during the measurement;

C_T is the temperature coefficient of resistivity for conductor material.

Typical values are [1/°C]:

Copper (annealed)	0,003 85
Copper (drawn)	0,003 93
Aluminum	0,003 96
Copper-clad aluminum	0,004 13
Copper-clad Steel	0,003 78

For other conductor materials, the factor k or C_T shall be indicated in the sectional or detail specification.

6 Test report

The test report shall give the test conditions:

- ambient temperature (°C),
- CUT length (m),

and record the corrected values for the reference length at 20 °C

- inner conductor d.c. resistance (&/reference length),
- outer conductor d.c. resistance (&/reference length),
- loop d.c. resistance (&/reference length),

as required in the relevant sectional or detail specification.

Bibliography

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)*