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DEPARTMENT OF DEFENSE

TEST METHOD STANDARD

METHOD 304, RESISTANCE-TEMPERATURE CHARACTERISTIC

AMSC N/A

FSC 59GP

FOREWORD

1. This standard is approved for use by all Departments and Agencies of the Department of Defense.

2. This entire standard has been revised. This revision has resulted in many changes to the format, but the most significant one is the splitting the document into test methods. See MIL-STD-202 for the change summary.

3. Comments, suggestions, or questions on this document should be emailed to std202@dla.mil or addressed to: Commander, Defense Logistics Agency, DLA Land and Maritime, ATTN: VAT, P.O. Box 3990, Columbus, OH 43218–3990. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

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METHOD 304
RESISTANCE-TEMPERATURE CHARACTERISTIC

1. SCOPE

1.1 Purpose. It is the purpose of this test to determine the percentage change in direct-current (dc) ohmic resistance from the dc ohmic resistance at the reference temperature, per unit temperature difference between the test temperature and the reference temperature. The equation (see 5.1) used to calculate this characteristic, commonly called the "temperature coefficient of resistance", is based on an assumed straight-line relationship between resistance and temperature over a range of specified test temperatures.

2. APPLICABLE DOCUMENTS

This section not applicable to this standard.

3. DEFINTIONS

This section not applicable to this standard.

4. GENERAL REQUIREMENTS

4.1. Procedure.

4.1.1 Preparation. Test leads used to connect the specimens to the resistance-measuring devices shall be firmly fastened to the specimens. Precautions shall be taken to minimize errors in resistance measurement due to such factors as lead resistance, spurious electromotive forces, condensation of moisture, etc., throughout the range of test temperatures, by utilization of suitable test-lead materials and measurement techniques or by applying appropriate corrections.

4.1.2 Test temperatures. The reference temperature shall be 25°C or as specified. There shall be two standard series of test temperatures. The first series shall be 25°, 0°, -15°, and -55°C; the second series shall be 25°, 50°, 75°, 100°, 125°, 200°, 275°, and 350°C. The tolerance on each temperature in both series shall be ±3°C. The lowest test temperature in the first series, and the highest test temperature in the second series, shall be as specified. Measurements for each series of temperatures shall be performed in the order shown without interruption. However, a lapse of time not to exceed 24 hours is permitted between the end of the first series and the start of the second series.

4.1.3 Measurements. The resistance of each specimen shall be measured 30 to 45 minutes after the chamber temperature has become stable to within ±0.5°C at a test temperature. However, it will be permissible to measure the resistance before the end of this period if the resistance has become stable to within ±0.1 percent as determined by preliminary measurements made at 5 minute intervals after stabilization of the chamber temperature. Unless otherwise specified, the temperature at the time of measurement shall be measured to an accuracy of ±1 percent of the temperature difference between the nominal test temperature and the nominal reference temperature +0.5°C. Resistance measurements shall be made in accordance with MIL-STD-202-303.

5. DETAILED REQUIREMENTS

5.1. Results. The resistance-temperature characteristic, in percent change in resistance per degree centigrade, at each test temperature shall be computed as follows:

$$\text{Resistance - temperature characteristic} = \frac{R_2 - R_1}{R_1(t_2 - t_1)} \; X \; 100$$

Where:
R_1 = resistance at reference temperature (in same series as test temperature) in ohms.
R_2 = resistance at test temperature in ohms.
t_1 = reference temperature in degrees Celsius.
t_2 = test temperature in degrees Celsius.

5.2 Summary. The following details are to be specified in the individual specification:

a. Reference temperature, if other than that specified (see 4.1.2).

b. Lowest and highest test temperature (see 4.1.2).

c. Accuracy of temperature measurement if other than that specified (see 4.1.3).

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Supersession data. The main body and 38 parts of this revision of MIL-STD-202 replace superseded MIL-STD-202.

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Review activities:
Army - AR, AT, AV, CR4, MI, SM, TE
Navy - AS, OS, SH
Air Force - 19, 99
NSA - NS

Preparing activity:
DLA – CC

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