



Standard Test Methods for Forced-Convection Laboratory Ovens for Evaluation of Electrical Insulation¹

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1. Scope

1.1 These test methods cover procedures for evaluating the characteristics of forced-convection ventilated electrically-heated ovens, operating over all or part of the temperature range from 20°C above the ambient temperature to 500°C and used for thermal endurance evaluation of electrical insulating materials.

1.2 These test methods are based on IEC Publication 216-4-1, and are technically identical to it. This compilation of test methods and an associated specification, D 5423, have replaced Specification D 2436.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 2436 Specification for Forced-Convection Laboratory Ovens for Electrical Insulation²

D 5423 Specification for Forced-Convection Laboratory Ovens for Evaluation of Electrical Insulation³

2.2 Other Document:

IEC Publication 216-4-1 Guide for the Determination of Thermal Endurance Properties of Electrical Insulating Materials, Part 4—Aging Ovens, Section 1—Single-Chamber Ovens⁴

3. Terminology

3.1 Refer to the terminology section of Specification D 5423.

4. Significance and Use

4.1 It is essential that ovens used for thermal evaluation of insulating materials be capable of maintaining uniform conditions of temperature and air circulation over the extended periods of time that are required for conducting these tests. Specification D 5423 specifies the permissible deviations from absolute uniformity that have been generally accepted internationally for these ovens. These test methods include procedures for measuring these deviations and other specified characteristics of the ovens.

5. Apparatus

5.1 *Multi-Point Recording Potentiometer*, having provisions for at least nine iron-constantan or chromel-alumel thermocouples, with scale readings to 0.1°C or less. Use of a data processor or a data logger may be helpful in reducing the number of calculations required.

5.2 *Calibrated Iron-Constantan or Chromel-Alumel Thermocouples*, using 0.5-mm diameter or smaller wire and having a junction size not over 2.5 mm long. If calibrated thermocouples are not available, thermocouples made from a single spool of thermocouple wire may be used provided that, when placed within 10 mm of each other without touching in an oven chamber at 200°C, they give values for temperature that do not differ from each other by more than 0.2°C.

5.3 A temperature measuring system other than thermocouples and a potentiometer may be used, provided that the sensitivity, accuracy, and response time are at least equivalent to that of the equipment described above, and that the objectives of 6.2.3 relative to minimization of heat conduction effects can be met.

5.4 *Thermal Lag Time Specimen*, consisting of a solid brass cylinder, 10 mm in diameter and 55 mm long, with one junction of a differential thermocouple soldered to the surface midway between the ends. The other junction of the thermocouple must be capable of being moved at least 80 mm away from the brass cylinder. An appropriate temperature indicator (as in 5.1, or other) must be provided for indication of temperature differences to the nearest 0.1°C as measured by the differential thermocouple.

¹ These test methods are under the jurisdiction of ASTM Committee D-9 on Electrical and Electronic Insulating Materials and are the direct responsibility of Subcommittee D09.17 on Thermal Characteristics.

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² Discontinued 1994; see 1993 Annual Book of ASTM Standards, Vol 10.01.

³ Annual Book of ASTM Standards, Vol 10.02.

⁴ Available from American National Standards Institute, 11 West 42nd St., 13th Floor, New York, NY 10036.