Designation: D 2471 – 99

Standard Test Method for Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins[1]

This standard is issued under the fixed designation D 2471; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope *

1.1 This test method covers the determination of the time from the initial mixing of the reactants of a thermosetting plastic composition to the time when solidification commences, under conditions approximating the conditions of use. This test method also provides a means for measuring the maximum temperature reached by a reacting thermosetting plastic composition, as well as the time from initial mixing to the time when this peak exothermic temperature is reached. This test method is limited to reacting mixtures exhibiting gel times greater than 5 min.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with this test method.

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.*

1.4 This test method applies to adhesives, caulks, sealants, encapsulating and potting compounds, and similar materials, as described in Table 1.

NOTE 1—There is no similar or equivalent ISO standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 883 Terminology Relating to Plastics[2]

E 1 Specification for ASTM Thermometers[3]

3. Termonology

3.1 *Definitions:*

3.1.1 *General*—Definitions of plastics terms used in this test method are in accordance with Terminology D 883.

4. Significance and Use

4.1 Since the gel time and the peak exothermic temperature of a reacting thermosetting plastic composition vary with the volume of material mixed at one time, it is essential that the volume be specified in any determination. By selection of an appropriate volume, gel time and peak exothermic data may be obtained in sufficiently precise and reproducible form or application evaluation, quality control, and material characterization of a thermosetting plastic composition. For most meaningful results, the cross sectional area of the material being examined, as well as other conditions of testing, should approximate as closely as possible the conditions of use of the material.

4.2 This test method is operator-dependent since it is simple to perform. It is of value for determining conditions required to produce an end product.

5. Apparatus

5.1 *Sample Containers*, to contain a volume of reacting thermosetting plastic in a cross sectional area representative of the conditions of application of the material. Suggested containers are the following:

5.1.1 *Aluminum Foil Dish*, approximately 7 cm (2.75 in.) in diameter and 1.4 cm (0.56 in.) deep.

5.1.2 *Paint Can*, open-top, ¼-pt, approximately 6.00 cm (2.375 in.) in diameter by 5.00 cm (2 in.) deep.

5.1.3 *Paint Can*, open-top, 1-pt, approximately 8.2 cm (3.25 in.) in diameter by 9.5 cm (3.75 in.) deep.

5.2 *Wooden Probe*—Applicator sticks approximately 0.24 cm (0.09 in.) in diameter by 15.2 cm (6.00 in.) long have been found satisfactory.

5.3 *Nonconducting Surface*, such as dry wood or corrugated casing.

5.4 *Temperature Measuring Devices*:

5.4.1 Any temperature recorder or indicator utilizing expendable thermocouples and accurate to approximately ±1 % of scale is adequate for all but the most precise characterizing tests.

NOTE 2—Previous versions of this test method have contained a paragraph detailing the possible use of a thermometer for temperature determination. Use of a thermometer is no longer recommended due to potential hazard of breakage as well as loss of the thermometer due to imbedment in the curing mass.

---

[1] This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.16 on Thermosetting Materials.

Current edition approved Nov. 10, 1999. Published February 2000. Originally published as D 2471 – 66 T. Last previous edition D 2471 – 94.

[2] *Annual Book of ASTM Standards*, Vol 08.01.

[3] *Annual Book of ASTM Standards*, Vol 14.03.

***A Summary of Changes section appears at the end of this standard.**