



Designation: D 3123 – 98 (Reapproved 2004)

# Standard Test Method for Spiral Flow of Low-Pressure Thermosetting Molding Compounds<sup>1</sup>

This standard is issued under the fixed designation D 3123; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This test method covers a procedure for measuring the spiral flow of thermosetting molding compounds (soft or very soft) designed for molding pressures under 6.9 MPa [1000 psi]. It is especially suited for those compounds that may be used for encapsulation or other low pressure molding techniques. Textile-reinforced compounds should not be tested using this test method. It involves the use of a standard spiral flow mold in a transfer molding press under specified conditions of applied temperature and pressure with a controlled charge mass.

1.2 *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.*

NOTE 1—There is no equivalent ISO standard.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

D 883 Terminology Relating to Plastics

D 958 Practice for Determining Temperatures of Standard ASTM Molds for Test Specimens of Plastics

E 105 Practice for Probability Sampling of Materials

## 3. Terminology

3.1 *Definitions*—Definitions in this test method are consistent with Terminology D 883.

## 4. Significance and Use

4.1 The spiral flow of a thermosetting molding compound is a measure of the combined characteristics of fusion under pressure, melt viscosity, and gelation rate under specific conditions.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.30 on Thermal Properties (Section D20.30.08).

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4.2 This test method is useful as a quality control test and as an acceptance criterion.

4.3 This test method, by itself, is not a valid means for comparing the moldability of similar or different molding compounds because it cannot duplicate actual conditions prevalent in different types of production molds.

4.4 This test method is presently intended for use at a transfer pressure of 6.9 MPa [1000 psi] and a mold temperature of  $423 \pm 3$  K ( $150 \pm 3^\circ\text{C}$  [ $302 \pm 5^\circ\text{F}$ ]).

## 5. Apparatus

5.1 *Transfer Molding Press* with a minimum 150 by 150-mm [6 by 6-in.] platen area, transfer piston pressure potentially greater than 6.9 MPa [1000 psi], sufficient clamp pressure to prevent flashing, and a minimum plunger speed of 25.4 mm [1 in.]/s without load. The plunger should be equipped with at least one peripheral sealing groove. It is recommended that a pot diameter between 31.75 and 44.45 mm [1.25 and 1.75 in.] be used whenever a choice is possible.

NOTE 2—Preliminary evidence indicates that, in many cases, reasonable correlations may be achieved between laboratories using presses with different pot diameters. Typical examples are presses with pot diameters of 31.750, 38.100, and 44.450 mm [1.250, 1.500, and 1.750 in.]. However, a few well-documented cases are recorded where differences in pot diameters, even within this listed range, have caused large differences in flow-length readings. Therefore, for best interlaboratory correlation it is recommended that identical pot diameters be used.

5.2 *Standard Spiral-Flow Mold* shown in Fig. 1 shall be utilized.

## 6. Materials

### 6.1 Molding Compound:

6.1.1 Any thermosetting molding compound with a spiral flow between 762 and 1270 mm [30 and 50 in.] as determined at the standard temperature and pressure of this test can be evaluated.

NOTE 3—Since the only commercially available molds are calibrated in inches, spiral-flow length will be reported in these units. Conversion to SI units can readily be made by multiplying the flow length, in inches, by the appropriate conversion factor, 25.4 mm/in.

NOTE 4—There is considerable evidence that the test is usable over a wider range of flow lengths, but this has not yet been confirmed by interlaboratory testing.

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