



Standard Test Method for the Determination of Static Flow of Electrical Grade Magnesium Oxide for Use in Sheathed Heating Elements¹

This standard is issued under the fixed designation D 5569; 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 static flow of electrical grade magnesium oxide for use in sheathed heating elements.

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.*

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

D 2755 Test Method of Sampling and Reduction to Test Weight of Electrical Grade Magnesium Oxide²

3. Terminology

3.1 Definitions:

3.1.1 *angle of repose, n* —the angle formed with the horizontal when a bulk solid moves, under the influence of gravity, over a stationary bulk solid, to a dynamic equilibrium.

4. Summary of Test Method

4.1 Granular magnesium oxide is allowed to flow through a 6.35-mm ($\frac{1}{4}$ -in.) diameter orifice from a 25.4-mm (1-in.) deep bed of material. The weight in grams of magnesium oxide flowing through the orifice by gravity is recorded as its static flow.

5. Significance and Use

5.1 The static flow is an indicator of angle of repose of granular magnesium oxide. Sheathed heating-element filling-equipment performance is affected by the flow characteristics of magnesium oxide as determined by this test method.

6. Apparatus

6.1 *Static Flow Cup*, with inside dimensions of 114.3-mm (4.5-in.) diameter and 24.6-mm ($\frac{31}{32}$ -in.) depth with a 6.35-mm (0.25-in.) diameter centered orifice, equipped with rails at 0.8 mm ($\frac{1}{32}$ in.) above rim of cup, two 110.6-mm (4-in.) high by 139.7-mm (5.5-in.) wide legs, and orifice closure with handle (see Fig. 1, Fig. 2, and Fig. 3 for suggested design).

6.2 *Leveling Bar*, aluminum or plastic (see Fig. 4 for suggested design).

6.3 *Balance*, capable of weighing 100 g within ± 0.1 g.

6.4 *Weighing Pan*, capable of containing and supporting 100 g of magnesium oxide.

6.5 *Sample Container*, 4 L.

7. Sampling

7.1 Obtain sample of magnesium oxide, approximately 5 kg, in accordance with Test Method D 2755.

7.2 Store sample in a sealed container to protect against atmospheric moisture.

8. Procedure

8.1 Place the 5-kg sample in the sample container. Five specimens will be taken from this sample to conduct the test.

8.2 Place the static flow cup on a level surface that is free of vibration.

8.3 Close cup orifice.

8.4 Fill cup to overflowing by pouring specimen from container into center of cup from a height of approximately 150 mm (6 in.).

8.5 Level specimen by pushing leveling bar across rails of cup, removing excess material. Use care to achieve a level surface with a minimum of downward force applied to leveling bar, thus minimizing any movement of the cup.

8.6 Place weighing pan below cup orifice.

8.7 Open orifice closure, using care to minimize vibration, and allow the specimen to flow freely into weighing pan until flow ceases.

8.8 Weigh portion of specimen collected in the pan to the nearest 0.1 g.

8.9 Empty cup and repeat 8.2 to 8.8 using four additional specimens of the original sample.

¹ This test method is under the jurisdiction of ASTM Committee D-9 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.14 on Electric Heating Unit Insulation.

Current edition approved June 15, 1994. Published August 1994.

² *Annual Book of ASTM Standards*, Vol 10.02.

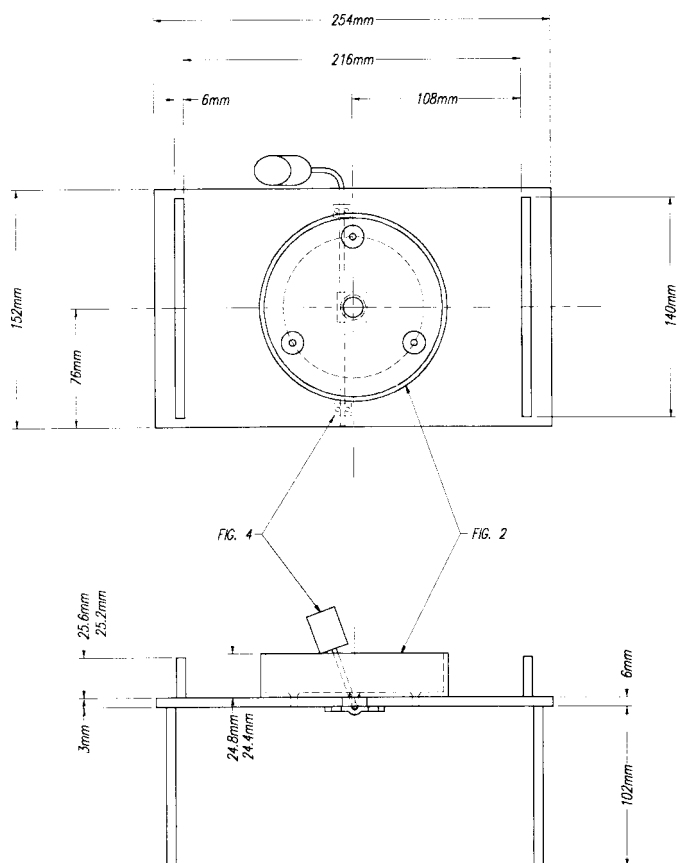


FIG. 1 Static Flow Cup Assy

MAT'L - ALUMINUM

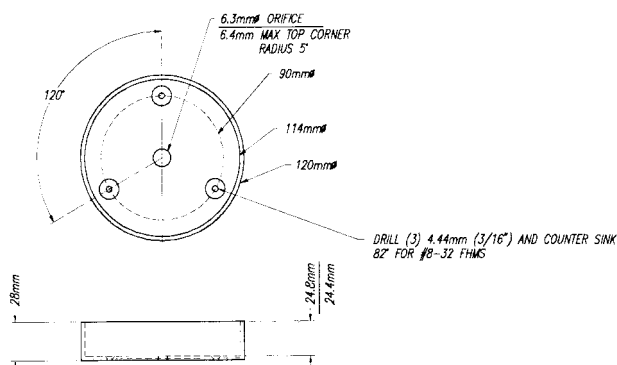


FIG. 2 Static Flow Cup

8.10 Average the five specimen weights obtained and record to the nearest 0.1 g.

9. Report

9.1 Report the following information:

9.1.1 Proper identification of the sample, and

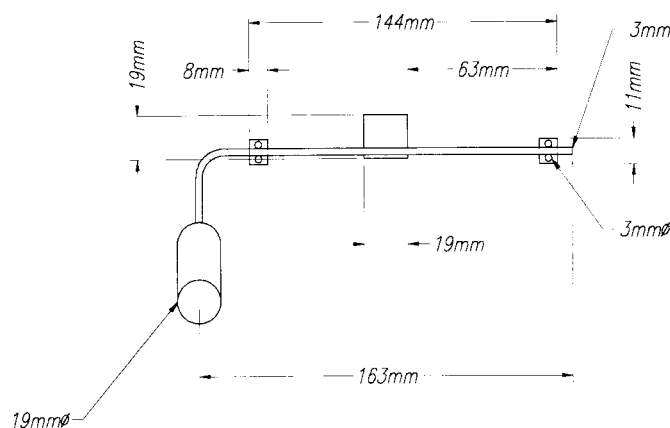


FIG. 3 Orifice Closure

MAT'L - STEEL

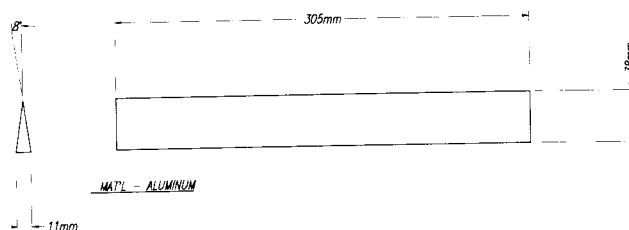


FIG. 4 Leveling Bar

MAT'L - ALUMINUM

9.1.2 Static flow to nearest 0.1 g.

10. Precision and Bias

10.1 *Precision*—The precision of this test method has not been determined. In a well equipped laboratory with trained personnel, it is expected that duplicate determinations of static flow will agree within ± 2.5 g. Determinations of static flow of the same sample in two laboratories are expected to agree within ± 4.2 g.

10.2 *Bias*—The procedure in this test method has no bias because the value for static flow of magnesium oxide is defined in terms of this test method.

11. Keywords

11.1 angle of repose; magnesium oxide; sheathed heating elements; static flow