



Designation: C 520 – 98

Standard Test Methods for Density of Granular Loose Fill Insulations¹

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1. Scope

1.1 These test methods are applicable to granular loose fill insulation materials such as vermiculite and perlite. They may be used for other insulation materials with similar flow and settling properties.

1.2 *Method A* will be used to determine bulk density.

1.3 *Method B* will be used to determine design density and, with Method A, can be used to calculate percent loss of volume due to settling.

1.4 *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:*

C 168 Terminology Relating to Thermal Insulating Materials²

C 390 Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots²

3. Terminology

3.1 The definitions of terms used in this method shall be in accordance with Terminology C 168.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *bulk density*—the apparent density of the granular material, according to the procedures in Method A, as received, and including the normal voids incorporated during the placement procedure. No conditioning is required unless specified.

3.2.2 *design density*—the apparent density of the granular material, according to the procedures in Method B, as conditioned, and including the normal voids incorporated during the placement and subsequent procedures.

3.2.3 *percent volume loss*—the loss in volume between the as received bulk density and the design density determined by

induced settling procedures or specified conditioning, or both, expressed as a percent.

4. Significance and Use

4.1 *Method A* will be used primarily as a manufacturing quality control and field test method without the need for conditioning. For more accurate research purposes, conditioning may be specified.

4.2 *Method B* will be used, when specified, to determine the density at which other insulation properties such as thermal resistance and placement coverage will be determined.

5. Apparatus

5.1 *Bulk Density Measure*—A lightweight rigid box having a volume of 1 ft³ (0.03 m³). All inside dimensions shall be 12.00 ± 0.04 in. (305 ± 1 mm).

5.2 *Scale(s)*—A scale or balance with an accuracy of at least 1 % of the sample weight. More than one type may be required for Method B.

5.3 *Design Density Sample Measure*—The sample container (see Fig. 1) shall be made of construction grade plywood and two 48-in. (1220 mm) long, nominal 2 by 8-in. wood joists. The joists shall be spaced 16 in. (406 mm) apart from center to center. The inside width and depth of the container will depend somewhat on the actual dimensions of the 2 by 8-in. lumber used and should result in an interior volume of approximately 2.9 ± 0.1 ft³ (0.082 ± 0.003 m³). The actual volume must be measured.

5.4 *Screed*—A suitable piece of wood, metal, or plastic at least 20 in. (508 mm) long with a thin straight edge suitable for leveling the loose, granular material.

5.5 *Tapping Hammer and Frame*—This shall include a standard 7½-lb (3.4 kg) sledge hammer. The total length of the handle shall be approximately 34 in. (864 mm). A ¼-in. (6-mm) hole is drilled through the handle to provide a pivot point 32⅙ in. (816 mm) from the center line of the head of the hammer. It shall be incorporated in a moveable frame as described in Fig. 1.

5.6 *Blowing Machine, Optional*—The blowing machine, if used, shall be typical of the type of blowing machine recommended by the insulation manufacturer and shall be equipped

¹ These test methods are under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and are the direct responsibility of Subcommittee C 16.32 on Mechanical Properties.

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² *Annual Book of ASTM Standards*, Vol 04.06.