Designation: G 160 – 98

Standard Practice for Evaluating Microbial Susceptibility of Nonmetallic Materials By Laboratory Soil Burial[1]

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1. Scope

1.1 This practice is limited to the method of conducting an evaluation of a nonmetallic material's microbiological susceptibility when in contact with the natural environment of the soil and is intended for use on material test specimens that are approximately 2 cm (¾ in.) thick and 100 cm^2 (20 $in.^2$) or less. This practice may be applied to articles that do not spend the majority of their service life in soil.

1.2 A wide variety of properties may be affected by microbial attack depending on material or item characteristics. Standard methods (where available) should be used for each different property to be evaluated. This practice does not attempt to enumerate all of the possible properties of interest nor specify the most appropriate test for those properties. Test methods must, however, be appropriate to the material being tested.

1.3 It is recommended that this practice be combined with appropriate environmental exposures (for example, sunlight simulating weathering devices, the hydrolytic effects of extended aqueous contact, or extraneous nutrients) or fabrication into articles (for example, adhesive bonding of seams) which may promote microbiological susceptibility during the service life of the material.

1.4 The values given in parentheses are provided for information purposes only.

2. Significance and Use

2.1 These results may be used to compare the susceptibility of materials when exposed to this test procedure.

2.2 Microbiological susceptibility may be reflected by a number of changes including staining, weight loss, or reduction in tensile or flexural strength.

2.3 This practice may be considered an inoculation with a mixed culture of fungi and bacteria.

3. Soil

3.1 *Composition*— Soil shall be composed of equal parts of fertile topsoil (soil with a high clay content should not be used), well-rotted and shredded horse manure, and coarse sand (10 to 40 mesh).

3.2 *Mixing*—The soil composition of 3.1 should be prepared by simple mixing and sifting through ¼-in. mesh screen.

3.3 *Aging*—The mixture is aged for three months and resifted twice at four-week intervals during the three months. After three months, a viability control of untreated cotton cloth, 400 to 475 g/m^2 (12 to 14 oz/yd^2), buried in the soil shall have a tensile strength loss of at least 50 % after five days.

NOTE 1—The soil mixture may be used for sequential tests as long as the cotton cloth control degrades within the specified time period.

3.4 *pH*—The soil shall have a pH between 6.5 to 7.5, checked periodically, and maintained by the addition of ground limestone to raise the pH or flowers of sulfur to lower the pH. The soil pH may be taken by dispersing 1 weight part soil in 20 parts of water, shaking or stirring, then allowing the mix to settle for 1 h. The pH is measured with indicator paper, electrodes, or by titration.

3.5 *Moisture*—The soil shall be maintained at between 20 and 30 % moisture, based on the dry weight of the soil. (The percent moisture is calculated by weighing approximately 50 mL of a representative portion and taking the portion to constant weight by placing the soil in an oven at a temperature of 101 to 106°C.) Water lost during use as a result of evaporation shall be replaced without deforming the soil bed. If the surrounding atmosphere is maintained at 85 to 95 % relative humidity, this loss is negligible, however, the moisture level should be periodically measured.

[1] This practice is under the jurisdiction of Committee G-3 on Weathering and Durability and is the direct responsibility of Subcommittee G03.04 on Biological Deterioration.

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