Designation: E 1757 – 95

Standard Practice for Preparation of Biomass for Compositional Analysis[1]

This standard is issued under the fixed designation E 1757; 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 practice covers a reproducible way to convert hardwoods, softwoods, herbaceous materials (such as switchgrass and sericea), agricultural residues (such as corn stover, wheat straw, and bagasse), wastepaper (such as office waste, boxboard, and newsprint), feedstocks pretreated to improve suitability for fermentation and fermentation residues into a uniform material suitable for compositional analysis.

1.2 Milling and sieving actions both produce large amounts of dust. This dust can be a nuisance hazard and irritant. Use appropriate respiratory protection as needed. If excessive amounts of dust are allowed to become airborne a potential explosion hazard is possible. Provide appropriate dust control measures as needed.

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

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:*

E 11 Specification for Wire-Cloth Sieves for Testing Purposes[2]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *ambient conditions*—a temperature of 20 to 30°C (68 to 85°F), less than 50 % relative humidity.

3.1.2 *prepared biomass*—biomass that has been prepared according to this practice to reduce the moisture content to below 15 %, based on an oven-dried solids weight.

4. Significance and Use

4.1 *Test Method A*—Preparation of large quantities (>20 g) of field collected samples into a form appropriate for compositional analysis. Woody samples must first be available as chips of a nominal 5 by 5 by 0.6 cm (2 by 2 by ¼ in.) or less and twigs not exceeding 0.6 cm (¼ in.) diameter. Herbaceous materials may be processed as whole straw. It is recommended that wastepaper should be shredded into pieces less then 1 cm (½ in.) wide. Furthermore, it is recommended that twigs, straw and wastepaper should not exceed 61 cm (24 in.) in length to facilitate handling.

4.2 *Test Methods B and C*—Test methods that are suitable for very moist feedstocks, samples that would not be stable during prolonged exposure to ambient conditions, or for drying materials when room conditions deviate from the ambient conditions described in 3.1.1. These test methods are also suitable for handling small samples of biomass (<20 g). The drying step is done in a convection oven at 45°C (Test Method B) or by lyophilization (Test Method C).

4.3 This practice is not intended for materials that will already pass through a 20 mesh sieve or cannot be dried by the described methods to a total solids content of greater then 85 %, based on an oven dried weight.

4.4 This practice will separate the milled material into two fractions, a −20/+80 mesh fraction and a −80 mesh fraction. Extraneous inorganic materials will accumulate in the −80 mesh fraction and it should be analyzed independently from the −20/+80 mesh fraction.

NOTE 1—During analysis, the very fine consistency of this fraction may cause problems in filtrating operations and should be handled appropriately.

4.4.1 Weighted results from the two fractions can then be combined to obtain results for materials on an “as received” basis.

5. Apparatus

5.1 *Balance*, sensitive to 0.1 g.

5.2 *Riffle Sampler with Pans*—A manual sample divider that splits the milled biomass into a number of alternate elements. Riffle divisions should be in the range from 6.4 mm to 12.7 mm (¼ to ½ in.) with at least twenty-four riffle openings across the top. The feed chute and riffles should have a slope of at least 60°. Three pans are needed, one to pour the sample into the riffler, and two to collect the two subsamples.

5.3 *Sieve Set*, No. 20 (850 µm), No. 80 (180 µm) stackable sieves with lid and bottom pan. Sieves and bottom pan should

[1] This practice is under the jurisdiction of ASTM Committee E-48 on Biotechnology and is the direct responsibility of Subcommittee E48.05 on Biomass Conversion.

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[2] *Annual Book of ASTM Standards*, Vols 04.02 and 14.02.