



Designation: E 887 – 88 (Reapproved 1996)

Standard Test Method for Silica in Refuse-Derived Fuel (RDF) and RDF Ash¹

This standard is issued under the fixed designation E 887; 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 approval. 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 silica in RDF, RDF ash, fly ash, bottom ash, or slag.

1.2 The test method is an acid dehydration gravimetric procedure and is independent of interferences.

1.3 The values stated in SI units are to be regarded as the standard. The values 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.* For hazard statement, see Section 6.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water²

E 791 Test Method for Calculating Refuse-Derived Fuel Analysis Data from As-Determined to Different Bases³

E 829 Practice for Preparing Refuse-Derived-Fuel (RDF) Laboratory Samples for Analysis³

E 830 Test Method for Ash in the Analysis Sample of Refuse-Derived Fuel³

E 856 Definitions of Terms and Abbreviations Relating to Physical and Chemical Characteristics of Refuse-Derived Fuel³

3. Summary of Test Method

3.1 Silicon compounds in RDF ash, fly ash, bottom ash, or slag are dissolved by alkali fusion and dehydrated with hydrochloric acid (HCl). Dehydration is completed by ignition, and the silica is volatilized as silicon tetrafluoride.

4. Apparatus

4.1 *Analytical Balance*, capable of weighing to 0.0001 g.

4.2 *Muffle Furnace*—The furnace shall have an operating temperature of up to 1200°C.

4.3 *Hot Plate or Steam Bath*.

4.4 *Platinum Crucibles*, 35 to 85-mL capacity.

4.5 *Graphite Crucibles*, 35 to 85-mL capacity.

4.6 *Fused Quartz Dishes*, 35 to 85-mL capacity.

5. Reagents and Materials

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in this test. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society where such specifications are available.⁴ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 *Purity of Water*—Unless otherwise indicated, reference to water shall be understood to mean at least Type III reagent water conforming to Specification D 1193.

5.3 *Sodium Carbonate* (Na_2CO_3), anhydrous powder.

5.4 *Hydrochloric Acid* (HCl), concentrated, sp gr 1.19.

5.5 *Hydrochloric Acid* (1 + 3), Mix 1 volume of concentrated HCl with 3 volumes of water.

5.6 *Hydrochloric Acid* (1 + 1)—Mix 1 volume of concentrated HCl with 1 volume of water.

5.7 *Hydrochloric Acid* (1 + 99)—Mix 1 volume of concentrated HCl with 99 volumes of water.

5.8 *Sulfuric Acid* (1 + 1)—Mix 1 volume of concentrated sulfuric acid (H_2SO_4 , sp gr 1.84) with 1 volume of water.

5.9 *Hydrofluoric Acid* (HF), concentrated 48 to 51 %.

6. Hazards

6.1 Due to the origins of RDF in municipal waste, common sense dictates that precautions should be observed when conducting tests on the samples. Recommended hygienic practices include use of gloves when handling RDF; wearing dust masks (NIOSH-approved type), especially while milling RDF samples; conducting tests under negative pressure hoods when possible; and washing hands before eating or smoking.

7. Sampling

7.1 *Refuse-Derived Fuel (RDF):*

¹ This test method is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.03 on Treatment.

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² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 11.04.

⁴ "Reagent Chemicals, American Chemical Society Specifications," Am. Chemical Soc., Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see "Analar Standards for Laboratory U.K. Chemicals," BDH Ltd., Poole, Dorset, and the "United States Pharmacopeia."