



Standard Practice for Characterizing Fly Ash for Use in Soil Stabilization¹

This standard is issued under the fixed designation D 5239; 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 procedures for characterizing fly ash to be used in soil stabilization. This practice lists representative test methods for determining the chemical, physical, and cementitious properties of fly ash. A broad guideline is provided in Appendix X1 that explains the significance of these properties in soil stabilization.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound equivalents are shown for information only.

1.3 *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.*

1.4 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

2. Referenced Documents

2.1 ASTM Standards:

- C 25 Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime²
- C 109 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)²
- C 114 Test Methods for Chemical Analysis of Hydraulic Cement²
- C 150 Specification for Portland Cement²
- C 191 Test Method for Time of Setting of Hydraulic Cement by Vicat Needle²
- C 265 Test Method for Calcium Sulfate in Hydrated Port-

land Cement Mortar²

C 305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency²

C 311 Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete³

C 593 Specification for Fly Ash and Other Pozzolans for Use with Lime²

C 618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete³

C 821 Specification for Lime for Use with Pozzolans²

C 977 Specification for Quicklime and Hydrated Lime for Soil Stabilization²

D 653 Terminology Relating to Soil, Rock and Contained Fluids

D 1293 Test Methods for pH of Water⁴

D 3551 Practice for Laboratory Preparation of Soil-Lime Mixtures Using a Mechanical Mixer⁵

3. Terminology

3.1 Definitions—Except as follows in 3.2, all definitions are in accordance with Terminology D 653.

3.2 non self-cementing fly ash—fly ash produced from the combustion of pulverized or crushed coal. This fly ash has pozzolanic properties and no self-cementing properties.

3.2.1 self-cementing fly ash—fly ash produced from the combustion of pulverized or crushed coal. This fly ash, in addition to having pozzolanic properties, sets and hardens by chemical interaction with water and is capable of doing so under water.

3.2.2 stabilizing admixtures—admixtures used to improve soil properties such as increased soil freeze-thaw durability, stiffness, and strength; reduction of permeability, plasticity, and swelling; increased control of soil compressibility and moisture.

4. Significance and Use

4.1 This practice is intended for use with fly ash that can be used separately or along with other stabilizing admixtures to improve soil properties.

¹ This practice is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.15 on Stabilization Admixtures.

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² Annual Book of ASTM Standards, Vol 04.01.

³ Annual Book of ASTM Standards, Vol 04.02.

⁴ Annual Book of ASTM Standards, Vol 11.01.

⁵ Annual Book of ASTM Standards, Vol 04.08.

*A Summary of Changes section appears at the end of this standard.

