



Designation: C737 – 22

Standard Specification for Limestone for Dusting of Coal Mines¹

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1. Scope*

1.1 This specification covers pulverized limestone suitable for use as dust in coal mines to reduce risk of coal dust explosions.

NOTE 1—Pulverized limestone can serve as a source of incombustible material in coal mine operations. Limestone is dusted onto coal exposures in sufficient amount so that the incombustible content of the combined coal dust, rock dust, other dust, and moisture shall not be less than 80 % of all loose dust (MSHA 30 CFR 75.403). With such a concentration of limestone incombustible material, dust explosions cannot initiate or be propagated from nearby gas explosions. The limestone must be substantially dry in order to dust satisfactorily.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- C25 Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime
- C50 Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products

¹ This specification is under the jurisdiction of ASTM Committee C07 on Lime and Limestone and is the direct responsibility of Subcommittee C07.02 on Specifications and Guidelines.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- C51 Terminology Relating to Lime and Limestone (as Used by the Industry)
- C110 Test Methods for Physical Testing of Quicklime, Hydrated Lime, and Limestone
- C1271 Test Method for X-ray Spectrometric Analysis of Lime and Limestone
- C1301 Test Method for Major and Trace Elements in Limestone and Lime by Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP) and Atomic Absorption (AA)
- E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

2.2 *Government Regulations:*³

- 30 CFR Part 75 Mandatory Safety Standards - Underground Coal Mines

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this specification, refer to Terminology C51.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *rock dust*—pulverized limestone or other inert materials which meet chemical and physical requirements; when applied to coal dust, will reduce dispersibility and minimize the explosion hazard. **30 CFR § 75.2.**

4. Chemical Composition

4.1 Limestone shall conform to the following as to chemical composition:

Moisture (at point of manufacture), max, %	0.5
Combustible matter, max, %	5.0
Silica, free and combined, max, %	4.0

NOTE 2—Rock dust sources which do not contain more than 5 % of free or combined silica may be used with authorization from the Secretary of Labor or their designee.

5. Physical Properties

5.1 Limestone for this application shall have the following particle size:

Passing 850 μm (No. 20) sieve, min, %	100
Passing 75 μm (No. 200) sieve, min, %	70

³ Available from U.S. Government Publishing Office (GPO), 732 N. Capitol St., NW, Washington, DC 20401, <http://www.gpo.gov>.

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

6. Test Methods

6.1 *Chemical Analysis*—The chemical analysis of the limestone shall be conducted in accordance with Test Methods **C25**, **C1271**, or **C1301**.

6.2 *Combustible Matter*—See **Annex A1**.

6.3 *Particle Size*—The sieve analysis of limestone shall be conducted in accordance with Test Methods **C110**.

7. General Requirements

7.1 Either high calcium or dolomitic limestone may be furnished for this application.

8. Sampling, Inspection, etc.

8.1 The sampling, inspection, rejection, retesting, packaging, and marking shall be conducted in accordance with Methods **C50**.

9. Keywords

9.1 coal mines; combustible matter; dolomitic limestone; high calcium limestone; limestone; limestone dust; loss on ignition (LOI); low temperature ash (LTA); mine explosions; moisture content; silica content

ANNEX

(Mandatory Information)

A1. COMBUSTIBLE MATTER BY LOW TEMPERATURE ASHING

A1.1 Scope

A1.1.1 This test method covers the chemical analysis of combustible matter in pulverized limestone for use as rock dust.

A1.1.2 This test method uses classical gravimetric analytical procedures and are typically required for referee analyses if conformance with chemical specification requirements is part of contractual agreement between purchaser and producer.

A1.1.3 The values stated in SI Units are to be regarded as standard. No other units of measure are included in the standard.

NOTE A1.1—Sieve size is identified by its standard designation in Specification **E11**. The alternative designation given in parentheses is for information only and does not represent a different standard sieve size.

A1.1.4 *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.*

A1.2 Significance and Use

A1.2.1 This test method provides analytical procedures to determine the combustible matter of limestone intended for use as rock dust to reduce the dispersibility and explosion hazard of coal dust. Results obtained may be used in relation to specification requirements. This method is a modified version for measuring total incombustible content found in NIOSH publication No. 2010-151⁴, which measures mixtures of coal dust and incombustible material. Since this method is measuring only the incombustible material, the length of time the sample is heated has been reduced.

⁴ Cashdollar, K.L., Sapko, M.J., Weiss, E.S., Harris, M.L., Man, C., Harteis, S.P., and Green, G.M., "Recommendations for a New Rock Dusting Standard to Prevent Coal Dust Explosions in Intake Airways", *Mining Publication*, NIOSH, No. 2010-151, May 2010, pp. 8.

A1.3 Apparatus

A1.3.1 *Balance*—The balance shall be of an analytical type with a capacity not to exceed 200 g. It may be of conventional design or it may be a constant-load, direct-reading type. It shall be capable of reproducing weighings within 0.0002 g with an accuracy of ± 0.0002 g.

A1.3.2 *Crucible, ceramic*—Standard crucible of 15 mL to 30 mL capacity.

A1.3.3 *Desiccators*—Desiccators shall be provided with a good desiccant, such as magnesium perchlorate, activated alumina, or sulfuric acid. Anhydrous calcium sulfate may also be used provided it has been treated with a color-change indicator to show when it has lost its effectiveness. Calcium chloride is not a satisfactory desiccant for this type of analysis.

A1.3.4 *Muffle Furnace*—The muffle furnace shall be capable of operation at the temperatures required and shall have an indicating pyrometer accurate within ± 25 °C, as corrected, if necessary, by calibration. More than one furnace may be used provided each is used within its proper operating temperature.

A1.4 Sample Preparation

A1.4.1 Pass the as-received sample through an 850 μm (No. 20) sieve. Collect at least 5 g of sample passing the sieve.

A1.4.2 Determine the as-received moisture by measuring the mass loss of the screened sample after being placed in an oven at 105 °C for 1.5 hours.

A1.4.3 During moisture measurement, pre-clean the crucible by placing in an oven at 105 °C for 30 minutes. Remove from oven and allow to cool to room temperature in a desiccator.

A1.5 Procedure

A1.5.1 Place empty crucible on zeroed balance. Add 1 g of dried sample to the crucible. Record mass to the nearest 1 mg.