



## Standard Test Method for Minimum Autoignition Temperature of Dust Clouds<sup>1</sup>

This standard is issued under the fixed designation E 1491; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### INTRODUCTION

This test method covers the determination of the minimum temperature at which a dust cloud will autoignite. The dust cloud is exposed to air heated to various temperatures in a furnace. Ignition of the cloud is indicated by visual observation of the flame. The chemical nature of the dust as well as its concentration, particle size, moisture, and surface area affects the results.

### 1. Scope

1.1 This test method covers the minimum temperature at which a given dust cloud will autoignite when exposed to air heated in a furnace at local atmospheric pressure.

1.2 Data obtained from this test method provide a relative measure of dust cloud autoignition temperatures.

1.3 This test method should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test method may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.

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:

D 3173 Test Method for Moisture in the Analysis Sample of Coal and Coke<sup>2</sup>

D 3175 Test Method for Volatile Matter in the Analysis Sample of Coal and Coke<sup>2</sup>

E 659 Test Method for Autoignition Temperature of Liquid Chemicals<sup>3</sup>

E 1226 Test Method for Pressure and Rate of Pressure Rise for Combustible Dusts<sup>3</sup>

### 3. Terminology

#### 3.1 Definitions of Terms Specific to This Standard:

3.1.1 *dust concentration*—the mass of dust divided by the internal volume of the test chamber.

3.1.2 *minimum autoignition temperature (MAIT)*—the minimum temperature at which a dust cloud will self ignite under the specified conditions of test.

### 4. Summary of Test Method

4.1 The temperature of the furnace or oven is set at a predetermined value.

4.2 Dust is blown into the heated furnace, which is at ambient pressure.

4.3 Ignition is determined by visual observation of the flame exiting the furnace.

### 5. Significance and Use

5.1 This test method provides a procedure for performing laboratory tests to determine the minimum autoignition temperature (MAIT) of a dust cloud.

5.2 The test data developed from this test method can be used to limit the temperature to which a dust cloud is exposed so as to prevent ignition of the cloud. Because of the short duration of the test, the data obtained are most applicable to industrial equipment where dust is present as a cloud for a short time. Because of the small scale of the test and the possible

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 05.05.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 14.02.

