

ICS 29.260.20  
CCS K 35



**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB 12476.9-2010**

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**Electrical apparatus for use in the presence of combustible  
dust -- Part 9: Test methods -- Method for determining the  
electrical resistivity of dust in layers**

可燃性粉尘环境用电气设备 第9部分：试验方法 粉尘层电阻率的测定方法  
**(English Translation)**

**Issued on: August 9, 2010**

**Implemented on: August 1, 2011**

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**Issued by: Standardization Administration of China**

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## Foreword

All technical content in this section is mandatory.

GB 12476 "combustible dust electrical equipment" is divided into several parts.

--- Part 1. General requirements

--- Part 2. Selection and installation

--- Part 3. combustible dusts exist or may exist Classification of hazardous areas

--- Part 4. Intrinsic safety "iD"

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--- Part 8. Test methods for determining the minimum ignition temperature of a dust

--- Part 9. Test method for determination of the dust layer resistivity

--- Part 10. Test methods for dust and air mixture Determination of minimum ignition energy

Part of this section is GB 912 476, equivalent using the IEC 61241-2-2:1993 "combustible dust Electrical apparatus Part 2. Test methods - Section 2. Determination of the dust layer resistivity "(in English).

This part of IEC 61241-2-2:1993 includes the following editorial changes.

--- Remove the IEC 61241-2-2:1993 Foreword;

--- Increase the national standard foreword.

This part is proposed by the China Electrical Equipment Industrial Association.

This part of the National explosion-proof electrical equipment Standardization Technical Committee (SAC/TC9) centralized.

This part mainly drafted by. Explosion Protection Electric Institute.

This part of the main participants. National explosion-proof electrical products for Quality Supervision and Inspection Center, Fushun Branch Coal Research Institute, a positive Explosion-proof electrical Limited.

## Introduction

This test method is applicable to determine the resistivity of dust layer.

This test method is not applicable recognized Explosives, gunpowder, dynamite or a mixture or substance with similar characteristics in certain circumstances Thereof. If an explosion characteristics suspicion of danger, can put a small amount of dust above the surface of the heating apparatus described in GB 12476.8 on heating to 400 °C to obtain indicators.

Explosive test does not always reflect the explosion characteristics of dust can cause "dangerous fault" situation.

**NOTE:** should take preventive measures to protect the personal safety of test personnel, to prevent fires, explosions and/or impact of combustion, including hazard of toxic gases generated.

This test method is applicable to the manufacture and use of combustible dust with electrical equipment.

Combustible dust Electrical Equipment Part 9. Test methods Determination of the dust layer resistivity

## 1 Scope

This section provides test method using DC voltage measurement dust layer resistivity. The method is applicable to combustible dust Electrical Equipment design, manufacturing, testing and use.

This method does not apply to recognized Explosives or the like.

## 2 Normative references

The following documents contain provisions which, through reference in this Part of GB 12476, constitute provisions of this part. For dated reference documents Member, all subsequent amendments (not including errata content) or revisions do not apply to this section, however, encouraged to reach under this section Parties to research agreement to use the latest versions of these documents. For undated reference documents, the latest versions apply to this section.

GB/T 6005-2008 Test sieves - Metal wire cloth, perforated plate and electroformed sheet - basic mesh size (ISO 565.

1990, MOD)

GB/T 6919 Air quality vocabulary (GB/T 6919-1986, eqvISO 4225. 1980)

## 3 Terms and Definitions

This section uses the following terms and definitions.

Dust dust

In the air can settle down on its own weight, but also sustainable solid fine particles suspended in the air for some time.

**Note:** Includes dust particles and GB/T 6919 defined.

Conductive dust Resistivity of  $103\text{ohm} \cdot \text{m}$  or less combustible dust.

Non-conductive dust Resistivity greater than  $103\text{ohm} \cdot \text{m}$  of combustible dust.

Resistivity electricalresistivity Electrode unit area of dust exposure in units separated by a distance, the minimum resistance between the two electrodes measured.

**Note:** In this section, the unit of measurement of resistivity is  $\text{ohm} \cdot \text{m}$ .

## 4 Test device

Figure 1 and Figure 2 shows the specific configuration of the test apparatus. Test electrode (see Fig. 1) is open architecture, it consists of two stainless steel rods,

Nominal dimensions. length (W), 100mm; height (H), 10mm; width (B), 20mm ~ 40mm.

These samples were placed in the thickness of the bars on the base of 5mm ~ 10mm, the nominal distance (L) 10mm apart.

**Note:** It has been found glass or polytetrafluoroethylene (PTFE) is suitable as a base material.

Two nominal height 10mm glass rod, through the end of the electrode is placed in order to maintain proper dust layer.

It is suitable for measuring the resistivity of the circuit example shown in Figure 2. Containing a 10kohm resistor for the maximum DC voltage of 2000V when the breakdown current is limited to a maximum 0.2A. Other circuits having the properties and precision may also be used.

Current - voltage converter has 6 range, dealing with different values of the supply voltage and resistivity. Provide positive output voltage converter, all resistors accuracy 5%, 0.5W high stability carbon film resistors.

## 5 Test sample

Samples should be uniform, and can be collected on behalf of test dust. After the dust is collected, it should be stored in a sealed container, or pretreatment, or it should be used directly in the test, while the moisture content measured and recorded.

Typically, dust samples were tested should pass a nominal size of 71 $\mu$ m aperture of woven wire mesh cloth or perforated plate square hole sieve test (Additional dimensions, see GB/T 6005-2008). If coarse dust particles must be tested, you can use the nominal maximum size of 500 $\mu$ m the test sieves, the test report shall indicate the screen size.

Description of dust moisture content of the test sample in the test report, and explain the methods of measurement.

Stated in the test report any significant changes in the properties of the dust, for example, when preparing a sample (for example, when the sieve dust) or moisture content caused by particles Changes in particle shape.

### 6.1 First measurement

Good with two empty glass rod measuring the resistance of the test electrode installation R0.

### 6.2 Resistance Measurement

The test sample is measured run into a test electrode. Along the top of the stainless steel electrodes with a ruler rotating smooth, remove excess dust. Receive Set excess dust and weighed. Calculate the mass of the test electrode in the dust.

Following by applying a DC voltage value, the measurement resistor Rs is full of dust test electrodes.

110,220,300,500,1000,1500,2000V each voltage value is applied 10s at least, if the polarity obviously a longer time.

When a voltage is applied to each value, use the same amount of dust test electrode samples were all tested.