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

**SN/T 0803.6-1999**

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**Oil bearing materials for import and export. Method for the  
inspection of impurities  
(English Translation)**

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Quarantine**

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### Foreword

The Appendix A of this Standard is informative.

This Standard was proposed by and under the jurisdiction of the Certification and Accreditation Administration of the People's Republic of China.

Drafting organization of this Standard. Qinhuangdao Entry-Exit Inspection and Quarantine Bureau of the People's Republic of China.

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This Standard is the entry-exit inspection and quarantine industry standard that is first-time published.

Determination for Trace Elements in Coal by ICP-AES

### 1 Scope

This Standard specifies the inductively coupled plasma atomic emission spectroscopy (ICP-AES for short) of barium, beryllium, cadmium, cobalt, chromium, copper, gallium, manganese, molybdenum, nickel, lead, strontium, vanadium, zinc, zirconium, boron, arsenic, selenium, germanium and mercury in coal.

This Standard is applicable for the determination of barium, beryllium, cadmium, cobalt, chromium, copper, gallium, manganese, molybdenum, nickel, lead, strontium, vanadium, zinc, zirconium, boron, arsenic, selenium, germanium and mercury in coal.

Coke may also refer to for use.

The detection limits of 20 elements in this Standard are shown in Table 1.

Table 1 - Determination of Detection Limit of the Elements Unit.  $\mu\text{g/mL}$

## 2 Normative References

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB 474 Methods for the Preparation of Coal Sample (eqv ISO 1988)

GB/T 213 Determination of Calorific Value of Coal (ISO 1928, NEQ)

3 Determination of Barium, Beryllium, Cadmium, Cobalt, Chromium, Copper, Gallium, Manganese, Molybdenum, Nickel, Lead, Strontium, Vanadium, Zinc, Zirconium

### 3.1 Principle

The coal sample is ashed and decomposed by nitric acid, perchloric acid, and hydrofluoric acid; and kept warm in a medium of nitric acid. After making the constant volume, it is measured by inductively coupled plasma atomic emission spectrometer.

### 3.2 Reagents and materials

Unless otherwise stated, the used reagents are all guaranteed reagents. The water is deionized water or water with the equivalent purity.

### 3.5 Calculation of result

Calculate the content of the measured element according to Formula (1).

### 3.6 Precision

The precision data can refer to Table 3.

## 4.1 Principle

Mix and burn the coal sample and the Eschka mixed reagent; the burnt material is dissolved with hydrochloric acid; and the specimen solution is sprayed into the inductively coupled plasma torch to perform spectrum measurement.

## **4.2 Reagents and materials**

Unless otherwise stated, the used reagents are all guaranteed reagents. The water is deionized water or water with equivalent purity.

### **4.4.1 Preparation of specimen solution**

Accurately weigh 1g (accurate to 0.0001g) of the air-dried analytical coal sample prepared in accordance with GB 474; and put it into a platinum crucible containing 1.0g of Eschka mixed reagent (4.2.3); mix carefully; and then cover with 1.0g of Eschka mixed reagent (4.2.3).

### **4.4.2 Blank test**

Except for not weighing the sample, the others shall be carried out according to the procedures of 4.4.1.

### **4.4.3 Preparation of standard series solutions**

Respectively pipette 0mL, 1mL, 2mL, 3mL, 4mL, and 5 mL of the standard solution (4.2.6) into 100 mL volumetric flasks; and add 20 mL of Eschka mixed reagent solution (4.2.4) to each volumetric flask; make constant volume with water, and shake well.

### **4.4.4 Determination**

data processing system.

## **4.5 Calculation of the results**

According to Formula (2), calculate the boron element content in the air-dried analytical coal sample.

## **4.6 Precision**

The precision data can refer to Table 4.

## **5.1 Principle**

Mix and burn coal sample and Eschka mixed reagent; and the burnt material is dissolved by hydrochloric acid.

## 5.2 Reagents and materials

Unless otherwise stated, the used reagents are all guaranteed reagents. The water is deionized water or water with equivalent purity.

**5.2.6 Single element standard solution of arsenic and selenium (1000 $\mu$ g/mL).** the certified standard material is prepared according to the method of GB/T 602, or directly use the certified standard solution.

### 5.2.7 Arsenic and selenium mixed intermediate standard solution (As 100 $\mu$ g/mL, Se

10 $\mu$ g/mL). pipette 10mL of arsenic standard solution (5.2.6) and 1mL of selenium standard solution (5.2.6) into 100mL volumetric flask. Add 5 mL of hydrochloric acid (5.2.1); make constant volume with water; and shake well.

## 5.4.1 Preparation of specimen solution

Accurately take 1g (accurate to 0.0001g) of the air-dried analytical coal sample prepared in accordance with GB 474; and put it into a 30mL porcelain crucible containing 1.5g of Eschka mixed reagent (5.2.3); mix carefully. Then cover it with 1.5g of Eschka mixed reagent (5.2.3). Put the crucible into the muffle furnace below 100°C; slowly raise the temperature to 500°C, keep the temperature constant for 1h; then raise the temperature to 750°C, keep the constant temperature 3h.

### 5.4.4.1 Drawing of standard series working curve

Connect the hydride generator to the ICP-AES; and select the optimal parameters of the instrument (see Appendix A). Inject the sodium borohydride solution (5.2.5) and the standard series solution (5.4.3) into the hydride generator at the same time; inject the generated hydride gas into the plasma torch; and determine the spectral intensity of the standard series solution in sequence (5.4.3). Draw the working curve through the computer data processing system.