

ICS 75.160.10  
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**MT**

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

**MT/T 747-1997**

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**Technical condition for sodium humate used as boiler scale  
inhibitor**

**(English Translation)**

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### Foreword

This standard is based on Henan Province local standard DB/410000G86002-88 sodium humate and production practice since 1982 customized. There are currently no international or national standards available.

The simultaneous use of sodium humate and sodium carbonate can reduce the scale formation speed and has good anti-scale performance. Use this product to improve anti-scaling Efficiency, reduce water treatment costs, and extend the life of the boiler. At present, this product has been widely used in China. To make this industry healthy Kang Development, specially formulated this standard.

This standard is proposed by the Department of Science, Technology and Education of the Ministry of Coal Industry.

This standard is under the jurisdiction of the National Coal Standardization Technical Committee.

This standard was drafted. Luoyang Branch of Henan Coal Science Research Institute.

### 1 Scope

This standard specifies the technical requirements, determination methods, inspection rules, packaging, marking, transportation and Storage.

This standard applies to solid sodium humate prepared from weathered coal.

### 2 Reference standards

The following standards contain provisions that, through reference in this standard, constitute provisions of this standard. When this standard was published, the editions

shown were all is effective. All standards will be revised, and all parties using this standard should explore the possibility of using the latest versions of the following standards.

GB/T

1574-1995 analysis method of coal ash GB/T 6679-86 General Rules for Sampling Solid Chemical Products ZB G21 005-87 sodium humate

### 3 Technical requirements

#### 3.1

Appearance. black particles or powder.

#### 3.2

The product shall meet the requirements of Table 1.

Table 1

Indicator name

Moisture,%

(Received base)

Humic acid,%

(Dry basis)

Calcium oxide, magnesium oxide,% (Dry basis) Water insoluble matter,% (Dry basis) PH of 1% solution Index  $\leq 15$   $\geq 50$   $\leq 2$   $\leq 20$  8 ~ 10 Remarks General project Important project Important project General project General project

### 4 Determination method

Except for special provisions in this standard, analytical reagents and distilled water or water of equivalent purity are used.

#### 4.1 Moisture determination

Press ZB

G21

005-87 Determination of the provisions of 2.4.

##### 4.2.1 Method summary

Extract sodium humate from the sample with water. In a strongly acidic solution, oxidize the carbon in humic acid to carbon dioxide with potassium dichromate.

The consumption of potassium dichromate and the carbon coefficient of humic acid were used to calculate the yield of humic acid.

#### 4.2.2.1 Sulfuric acid (GB

625). Relative density 1.84.

4.2.2.2 Potassium dichromate solution.  $c \text{ K}_2\text{Cr}_2\text{O}_7 = 0.8 \text{ mol/L}$ . Weigh 40 g of potassium dichromate (GB 642) in 1000 mL of water Medium, stored in small-mouth bottles for later use.

4.2.2.3 Standard solution of potassium dichromate.  $c \text{ K}_2\text{Cr}_2\text{O}_7 = 0.1 \text{ mol/L}$ . Dry potassium dichromate (GB 642) at 130 °C for about 3 hours, Place in a desiccator to cool to room temperature, then accurately weigh 4.9036 g in a beaker, dissolve in water, then transfer to 1000 mL volumetric flask, Dilute to the mark with water and shake well.

#### 4.2.2.4 Phenanthroline indicator. Weigh 1.5

g-phenanthroline (GB

1293) and 1

g Ammonium ferrous sulfate (GB

661) Dissolved in 100 mL of water Medium, stored in brown bottles.

#### 4.2.2.5 Ammonium ferrous sulfate standard solution. $c (\text{Fe}^{2+}) = 0.1$

mol/L. Weigh 40

g Ammonium ferrous sulfate hexahydrate (GB

661) Dissolve in moderate amount Water, add 20 mL of sulfuric acid (4.2.2.1), diluted to 1000 with water mL, shake well and put into a brown bottle. The concentration of ferrous ammonium sulfate is not Stable, need calibration before use. Can put two clean aluminum sheets or cable aluminum wires in the bottle to keep the solution concentration stable for a long time Calibration. The concentration of the solution is calibrated as follows.

Accurately draw

mL of potassium dichromate standard solution at 250 in a conical flask, add 70 mL ~ 80 mL of water and 10 mL sulfuric acid (4.2.2.1), add 3 drops of phenanthroline indicator after cooling, titrate with the ammonium ferrous sulfate solution to be calibrated, the solution changes from orange red to brick red Color is the end.

The concentration of ferrous ammonium sulfate standard solution is calculated according to formula (1).

$c (\text{Fe}^{2+}) =$

$V \times 0.1$

Where.

$c(\text{Fe}^{2+})$  --- the concentration of ferrous ammonium sulfate standard solution, mol/L;

$V$  --- Volume of ammonium ferrous sulfate solution consumed in titration, mL.

#### 4.2.3 Measurement steps

Weigh about 0.2

g (accurate to 0.0002

g) Sample at 250

In a conical flask, add 70 mL of water, insert a small glass funnel at the mouth, and set Heat extraction in boiling water bath 30 min, and often shake, take out the Erlenmeyer flask, after cooling, transfer all the solution and residue to 100 mL volumetric flask Medium, make up to volume with water, shake well, dry filter with medium speed filter paper, discard the first 10 mL filtrate, continue filtering to filtrate 30 mL ~ 50 for mL, accurately transfer 5.0 with a pipette mL of filtrate at 250 mL conical flask, add 5.0 with a pipette mL of potassium dichromate Liquid, slowly add 15 mL of sulfuric acid (4.2.2.1), shake and place in a boiling water bath and heat for 30 min, and shake frequently, remove the Erlenmeyer flask and cool to at room temperature, add 80 mL of water and 3 drops of phenanthroline indicator, titrated with ammonium ferrous sulfate standard solution, the solution changed from orange to green with brick Red is the end. At the same time, a blank test is performed according to the above steps.

#### 4.2.4 Expression of results

The yield of humic acid is calculated according to formulas (2) and (3).

$HA_{Ar} =$

$0.003 (V_0 - V_1) \cdot c(\text{Fe}^{2+}) \cdot 0.64 \times m \times b \times 100$  (2)  $HA_d = HA_{Ar} \times 100 - MA_r$  (3) where.

$HA_{Ar}$  --- the received humic acid yield of the sample,%;

$HA_d$  --- dry humic acid yield of the sample,%;

$V_1$  --- Volume of ammonium ferrous sulfate standard solution consumed by the sample, mL;

$V_0$  --- volume of ammonium ferrous sulfate standard solution consumed in blank test, mL;

$c(\text{Fe}^{2+})$  --- the concentration of ferrous ammonium sulfate standard solution, mol/L;

0.003 --- with 1.00

mL,  $c(\text{Fe}^{2+}) = 1.000$