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PEOPLE'S REPUBLIC OF CHINA**

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**Test methods for quality of coal water mixture -- Part 9:
Determination of the density of coal water mixture
(English Translation)**

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1 Scope

This Part of GB/T 18856 specifies the method summary, reagents, instruments and equipment, determination procedures, result calculation, and precision for the determination of the density of coal water mixture.

This Part applies to various types of coal water mixture.

2 Method summary

The density of coal water mixture can be obtained by measuring the ratio of the mass of a certain amount of coal water mixture sample to its volume (i.e., the volume of water discharged) at 20 °C using the density bottle method.

3.1.1 Light gasoline or other solvents. capable of removing contaminants from density

bottles and stoppers.

3.1.2 Chromic acid washing solution. Weigh 20 g of potassium dichromate (GB 642)

into a 500 mL beaker; add 40 mL of water; heat to dissolve the potassium dichromate;

cool to room temperature. While stirring continuously, slowly add 360 mL of concentrated sulfuric acid (GB 625) to the above solution that has been cooled to room temperature.

3.2 Distilled water (CO₂-free). freshly boiled distilled water, cooled to room temperature.

4 Instruments and equipment

4.1

Density bottle, with ground glass capillary stopper; volume, 60 mL. As shown in Figure 1.

4.2

Mercury thermometer. 0 °C ~ 50 °C; graduation, 0.2 °C.

4.3

Analytical balance. sensitivity, 0.000 2 g.

4.4 Thermostat. a thermostat capable of maintaining a constant temperature of (20±0.5) °C.

4.5 Water bath.

5.1 Preparation of density bottle

First, remove contaminants from the density bottle (4.1) and stopper. After using the cleaning solution (3.1) for thorough cleaning, use water to clean and then use distilled water to rinse. Place the cleaned density bottle in an oven to dry and cool to room temperature for later use.

Note: First, use light gasoline or other solvents to remove contaminants from the density bottle and stopper. If the contaminants cannot be removed, then use chromic acid washing solution. Chromic acid washing solution is a strong acid and a strong oxidizing agent, which shall be used with caution.

5.2 Determination of blank value for density bottle

Fill the density bottle with freshly boiled and cooled-to-room-temperature distilled water (3.2) along the inner wall of the bottle; then place it in the thermostat (4.4) at (20±0.5) °C for 1 h. Put the cap back on and let the excess water overflow from the capillary tube (there shall be no air bubbles in the bottle or the capillary tube at this time; otherwise, add water and put the cap back on). Quickly dry the density bottle;

weigh it immediately (accurate to 0.000 2 g). Then place the density bottle in a thermostat at (20±0.5) °C and keep it at that temperature for 0.5 h until the difference in mass between the two measurements is less than 0.001 5 g. Take the arithmetic mean of the two

measurements as the blank value (m_0) for the density bottle. The blank value of the density bottle shall be measured once a month.

6 Determination procedures

6.1

Weigh the dry, clean, and blank-measured density bottle (accurate to 0.000 2 g) to obtain the mass (m_b) of the density bottle.

6.2 Add the well-stirred coal water mixture sample of approximately half the volume

of density bottle to the density bottle; weigh it (accurate to 0.000 2 g), to obtain the mass of the density bottle containing the sample (m_{b+s}). Then, the mass of coal water mixture sample (m_1) is. $m_1 = m_{b+s} - m_b$.

6.3 Pour freshly boiled and cooled-to-room-temperature distilled water into the density

bottle along the inner wall until it is about 1 cm below the bottle opening; then place it in a thermostat at $(20 \pm 0.5) ^\circ\text{C}$ for 0.5 h.

6.4 Use a pipette to add boiled $20 ^\circ\text{C}$ or room temperature distilled water along the neck of the bottle to the opening; then put the cap on the bottle and let the excess water overflow from the capillary tube on the stopper (at this time, there shall be no air bubbles in the bottle or the capillary tube, otherwise water shall be added and the stopper shall be put back on).

6.5 Quickly dry the density bottle and weigh it immediately (accurate to 0.000 2 g) to obtain the mass (m_2) of the density bottle containing the sample and water.

7 Result calculation

The measurement result of the density of coal water mixture shall be calculated according to the following formula.

Where.

ρ_{20} - density of coal water mixture at $20 ^\circ\text{C}$, in grams per cubic centimeter (g/cm^3);

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