

HG

CHEMICAL INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HG/T 2680-2017

Replacing HG/T 2680-2009

Magnesium sulfate for industrial use

工业硫酸镁

(English Translation)

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1 Scope

This standard specifies the category, requirements, test methods, inspection rules, signs, labels, packaging, transportation, storage of magnesium sulfate for industrial use.

This standard applies to magnesium sulfate for industrial use, which is used in chemical industry, industrial dehydration, tanning, printing and dyeing, catalyst, papermaking, fireproof coating, plastic and fertilizer, etc.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated reference documents, the latest version (including all amendments) applies to this document.

GB/T 191-2008 Packaging - Pictorial marking for handling of goods

GB/T 3049-2006 Chemical products for industrial use - General method for determination of iron content - 1,10-Phenanthroline spectrophotometric method

GB/T 3051-2000 Inorganic chemical products for industrial use - General method for determination of chloride content - Mercurimetric method

GB/T 6678 General principles for sampling chemical products

GB/T 6682 Water for analytical laboratory use - Specification and test methods

GB/T 8170 Rules of rounding off for numerical values & expression and judgement of limiting values

HG/T 3696.1 Inorganic chemicals for industrial use Preparations of standard and reagent solutions for chemical analysis - Part 1: Preparations of standard volumetric solutions

HG/T 3696.2 Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 2: Preparations of standard solutions for impurity

HG/T 3696.3 Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 3: Preparations of reagent solutions

3 Molecular formula and relative molecular mass

Molecular formula: MgSO_4 . Relative molecular mass: 120.36 (according to the international relative atomic mass in 2016)

Molecular formula: $\text{MgSO}_4 \cdot \text{H}_2\text{O}$. Relative molecular mass: 138.38 (according to the international relative atomic mass in 2016)

Molecular formula: $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$. Relative molecular mass: 246.47 (according to the international relative atomic mass in 2016)

Molecular formula: $\text{MgSO}_4 \cdot n\text{H}_2\text{O}$ (n is the average value of hydration, which is an integer between 2 and 6)

4 Categories

Magnesium sulfate for industrial use is divided into 4 categories:

- Category I, magnesium sulfate heptahydrate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$), which is mainly used in tanning, printing and dyeing, catalysts, papermaking, plastics, etc.;
- Category II, magnesium sulfate monohydrate ($\text{MgSO}_4 \cdot \text{H}_2\text{O}$), which is mainly used in fireproof coatings, plastics and fertilizers;
- Category III, anhydrous magnesium sulfate (MgSO_4), which is mainly used for industrial dehydration, etc.;
- Category IV, dry product of magnesium sulfate ($\text{MgSO}_4 \cdot n\text{H}_2\text{O}$), which is mainly used in tanning, printing and dyeing, catalyst, papermaking, plastics, etc.

5 Requirements

5.1

Appearance

Category I and category IV are white or colorless crystalline particles or powder; category II and category III are white or off-white solid particles or powder.

5.2

Magnesium sulfate for industrial use shall meet the requirements in Table 1, when tested according to the test methods specified in this standard. black T as indicator; use ethylene diamine tetraacetic acid (EDTA) standard titration solution to titrate the total calcium and magnesium.

Under the condition of pH ~ 12.5 of the test solution, use calcium reagent carboxylate sodium salt as indicator; use ethylene diamine tetraacetic acid (EDTA) standard titration solution to titrate calcium. Subtract the calcium content from the total calcium and magnesium, to calculate the magnesium sulfate content.

6.4.2 Reagents or materials

6.4.2.1

Triethanolamine solution

1 + 3.

6.4.2.2

Ammonia solution

1 + 2.

6.4.2.3

Ammonia-ammonium chloride buffer solution A

PH ~ 10.

6.4.2.4

Sodium hydroxide solution

50 g/L.

6.4.2.5

Ethylene diamine tetraacetic acid (EDTA) standard titration solution

C(EDTA) ~ 0.05 mol/L.

6.4.2.6

Ethylene diamine tetraacetic acid (EDTA) standard titration solution

C(EDTA) ~ 0.02 mol/L.

6.4.2.7

Chrome black T indicator.

6.4.2.8

Calcium reagent carboxylate sodium salt indicator.

6.4.3.1 Preparation of test solution

Weigh an appropriate amount of specimen (approximately 10 g for category I; approximately 5 g for category II and category III; approximately 5 g for category IV after burning according to the provisions of 6.10), accurate to 0.0002 g. Place it in a 250 mL beaker. Add 100 mL of water to dissolve it. Transfer all into a 250 mL volumetric flask. Use water to dilute it to the mark. Shake well. Dry filter it if necessary.

Discard the initial 20 mL of filtrate. Keep the filtrate. This solution is test solution A, which is used for the determination of calcium and magnesium content, calcium content, chloride content.

6.4.3.2.1 Determination of calcium and magnesium content

Pipette 10 mL of test solution A. Put it in a 250 mL conical flask. Add 40 mL of water, 5 mL of triethanolamine solution. Use ammonia solution, to adjust the pH to 7 ~ 8. Add 10 mL of ammonia-ammonium chloride buffer solution A and a small amount of solution (see 6.4.2.6), which is consumed by titrating the blank test solution, in milliliters (mL); c_2 - The exact value of the concentration of ethylene diamine tetraacetic acid (EDTA) standard titration solution (see 6.4.2.6), in moles per liter (mol/L); m - The numerical value of the mass of the specimen, in grams (g);

M - The molar mass value of magnesium sulfate heptahydrate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) [or magnesium (Mg), or magnesium sulfate (MgSO_4)], in grams per mole (g/mol)

($\text{MMgSO}_4 \cdot 7\text{H}_2\text{O} = 246.47$, $\text{MMg} = 24.305$, $\text{MMgSO}_4 = 120.36$).

Take the arithmetic mean of the parallel measurement results as the measurement result.

The absolute difference between the two parallel measurement results is not more than 0.2%.

6.5 Determination of chloride content

6.5.2.2.3

Chlorine standard solution

1 mL of the solution contains 0.01 mg of chlorine (Cl).

Pipette 1 mL of chlorine standard solution, which was prepared according to HG/T 3696.2. Place it in a 100 mL volumetric flask. Use water to dilute it to the mark. Shake well. This solution is prepared before use.

6.5.1.1 Principle

Same as Chapter 3 of GB/T 3051-2000.