GB

NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 65.080

G 21

GB 15063-2009

Replacing GB 15063-2001

Compound Fertilizer (Complex Fertilizer)

Issued on: November 30, 2009 **Implemented on: June 01, 2010**

Jointly issued by: **General Administration of Quality Supervision, Inspection and Quarantine (GAQSIQ);**

Standardization Administration (SAC) of the People's Republic of China.

Table of Contents

Foreword

Chapter 4 (except moisture requirements in Table 1 and 4.3), Chapter 6, Chapter 7 (except 7.5), and Chapter 8 (except 8.3) of this Standard are compulsory; the rest are recommendatory ones.

This Standard replaces GB 15063-2001 "Compound Fertilizer (Complex Fertilizer)".

Main differences between this Standard and GB 15063-2001 are as follows:

— Scope is further defined;

— Index of water-soluble phosphorus of high concentration product accounting for available phosphorus is adjusted;

— Moisture is changed into that subject to delivery inspection data;

— Indication of chloride ion content index of chloric product is added and is respectively specified according to low chlorine, medium chlorine, and high chlorine;

— Determination of nitrogen, phosphorus and potassium content of product with auto-analyzer is added, which is applicable to quick inspection;

— Determination of particle size and mass fraction of chloride ion is written in Appendix A and Appendix B;

— Determination method of biuret content and marking of biuret content requirements in product quality certificate are added;

— Specification for product package marking is refined; requirements for warnings of carbamide nitrogen product and chlorine (high chlorine) product are added.

Appendix A and Appendix B of this Standard are normative, which respectively specify the determination method of particle size and chloride ion.

From the implementation date of this Standard, exit-factory products shall be subject to this new standard; after six months of standard implementation, the external packing of compound fertilizer (complex fertilizer) products in the market is prohibited to be marked with GB 15063-2001.

This Standard was proposed by China Petroleum and Chemical Industry Association.

This Standard shall be under the jurisdiction of National Technical Committee on Fertilizers and Soil Conditioners of Standardization of China (SAC TC 105).

Drafting organizations of this Standard: National Fertilizer Quality Supervision Testing Center (Shanghai), Sino-Arab Chemical Fertilizers Company Limited, Sinofert Holdings Limited, and Products Quality Supervision and Inspection Institute of Jilin Province.

Chief drafting staffs of this Standard: Zhang Minghong, Wang Lianjun, Liu Gang, Zheng Shulin, Zhou Lanying, Liu Junhui, Du Xianlan, and Yang Yi.

The previous editions replaced by this Standard are as follows:

— GB 15063-1994, and GB 15063-2001.

Compound Fertilizer (Complex Fertilizer)

1 Scope

This Standard specifies the requirements, test methods, inspection rules, marking, package, transport, and storage of compound fertilizer (complex fertilizer).

This Standard is applicable to compound fertilizers (including various special fertilizers and ternary or binary solid fertilizers that take nitrogen, phosphorus and potassium as the basic nutrient with various names; complex fertilizers that already have applicable national standards or professional standards such as monoammonium phosphate, diammonium orthophosphate, nitric phosphate, nitric acid phosphorus potassium fertilizer, agricultural potassium nitride, potassium dihydrogen phosphate, magnesium phosphorus potassium fertilizer, organic-inorganic compound fertilizer, and bulk blending fertilizer shall implement the corresponding product standards. The slow-release of compound fertilizers shall also implement the corresponding standards.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For dated reference, subsequent amendments (excluding correction) or revisions of these publications do not apply. However, all parties coming to an agreement according to this Standard are encouraged to study whether the latest edition of these documents is applicable. For undated references, the latest edition of the normative document is applicable to this Standard.

GB/T 6003.1-1997 "Test Sieves of Metal Wire Cloth"

GB/T 6679 "General Rules for Sampling of Solid Chemical Products"

GB/T 8170-2008 "Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values"

GB 8569 "Packing of Solid Chemical Fertilizers"

GB/T 8572 "Determination of Total Nitrogen Content for Compound Fertilizers Titrimetric Method after Distillation"

GB/T 8573 "Determination of Available Phosphorus Content for Compound Fertilizers"

GB/T 8574 "Determination of Potassium Content for Compound Fertilizers Potassium Tetraphenylborate - Gravimetric Method"

GB/T 8576 "Determination of Free Water for Compound Fertilizers - Vacuum Oven Method"

GB/T 8577 "Determination of Free Water for Compound Fertilizers - Karl Fischer Method"

GB 18382 "Fertilizer Marking - Presentation and Declaration"

GB/T 22923 "Determination of Nitrogen, Phosphorus and Potassium for Fertilizers by Auto Analyzer"

GB/T 22924 "Determination of Biuret Content for Compound Fertilizers (Complex Fertilizers)"

HG/T 2843 "Chemical Fertilizer Products - Standard Volumetric, Standard, Reagent and Indicator Solutions for Chemical Analysis"

3 Terms and Definitions

The following terms and definitions are applicable to this Standard.

3.1

Compound fertilizer

It refers to the fertilizer prepared by chemical method and (or) mix method with declarable content of at least two nutrients of nitrogen, phosphorus and potassium nutrients.

3.2

Complex fertilizer

It refers to the fertilizer only prepared by chemical method with declarable content of at least two nutrients of nitrogen, phosphorus and potassium nutrients, which is a kind of compound fertilizer.

3.3

Bulk blending fertilizer

It refers to the particle fertilizer prepared by dry mixing method with declarable content of at least two nutrients of nitrogen, phosphorus and potassium nutrients, which is also named as BB fertilizer.

3.4

Organic-inorganic compound fertilizer

It refers to the compound fertilizer with a certain amount of organic matter.

3.5

Primary nutrient; macronutrient

5.2 Determination of total nitrogen content

It is determined according to GB/T 8572 or GB/T 22923. The method in GB/T 8572 is arbitration method.

5.3 The determination of available phosphorus content, and the calculation of percentage that the water solubility phosphorus accounts for available phosphorus

It is determined according to GB/T 8573 or GB/T 22923. The method in GB/T 8573 is the arbitration method.

5.4 Determination of potassium content

It is determined according to GB/T 8574 or GB/T 22923. The method in GB/T 8574 is the arbitration method.

5.5 Determination of moisture content

It is determined according to GB/T 8577 or GB/T 8576. The method in GB/T 8577 is the arbitration method.

5.6 Determination of particle size

Determine according to Appendix A.

5.7 Determination of chloride ion content

Determine according to Appendix B.

5.8 Determination of biuret content

It is determined according to GB/T 22924. Liquid chromatography is taken as the arbitration method.

6 Inspection Rules

6.1 Test category and inspection item

The production inspection includes exit-factory inspection and type inspection. The mass fraction of chloride ion in Table 1 is type inspection items; the rest are exit-factory inspection items. Under the following conditions, the type inspection items shall be determined:

— When mass production, material or process is changed;

— A periodical inspection shall be carried out when a certain amount is accumulated during mass production.

— The state quality supervision agency requires to conduct a type inspection.

The mass fraction of biuret shall be inspected if the supplier and purchaser have an agreement.

inspection department of the manufacturer could use clean and dry plastic valve bags to store the sample); seal and label them with name of the manufacturer, product name, batch number or production date, date of sample and name of the sampler; one of them is used for product quality analysis; and the other shall be preserved for 2 months for future reference.

6.4.2 Sample preparation

Take a bottle of sample made in 6.4.1; take about 100g of sample after several times of division; quickly grind it till all the sample could pass through the testing sieve of which the hole diameter is 0.50mm (if the sample is humid or difficult to be grinded, grind it till all the sample could pass through the testing sieve of which the hole diameter is 1.00mm); mix it uniformly; then put it into a clean and dry bottle for composition analysis. The remaining sample could be used for granularity.

6.5 Result judgment

6.5.1 Quality judgment of product quality index in this Standard shall be carried out according to "Rounding Value Comparison Method" of GB/T 8170-2008.

6.5.2 If all the indexes for exit-factory inspection meet requirements of this Standard, this batch of products is judged as qualified.

6.5.3 If any index of the inspection result could not meet the requirements of this Standard, two times of sample in the bag shall be used for inspection. If there is one or more indexes fails to meet the requirements of this Standard, this batch of products is unqualified.

6.5.4 Each batch of qualified exit-factory products needs a quality certificate, containing: name and address of the manufacturer, product name, batch number or production date, total primary nutrient, formula or macronutrient content, chloride ion content, biuret content, standard number and other contents required by laws and regulations. Products with citric acid-soluble phosphate fertilizers, such as calcium, magnesium or phosphate fertilizer as the basic phosphate fertilizer shall be noted as "citric acid-soluble phosphorus"; and it shall indicate if it is "nitrate nitrogen" or "urea nitrogen".

7 Marking

7.1 If the product contains nitrate nitrogen, "containing nitrate nitrogen" shall be marked on the packing container.

7.2 The products that use citric acid-soluble phosphate fertilizer such as calcium, magnesium and phosphate fertilizers as the basic phosphate fertilizer shall be marked with "citric acid-soluble phosphorus" on their packing containers.

7.3 For the products of which the mass fraction of chloride ion is larger than 3.0%, information "containing chlorine (low chlorine)", "containing chlorine (medium chlorine)" or "containing chlorine (high chlorine)" but not "chlorine", "containing Cl", "Cl" etc. shall be marked clearly in Chinese characters in accordance with the "mass fraction of chloride ion" required in 4.2. For the products marked with "containing chlorine", their packing containers shall neither have any pictures of chlorine-avoiding crops, nor have any markings that are

Appendix A

(Normative)
Grain Size Determination of Compound Fertilizer (Complex Fertilizer)

A.1 Method summary

Calculate the mass fraction by weighing them after dividing samples in the laboratory into particles of different grain sizes with the testing sieve of certain specification.

A.2 Instruments

Generally, lab instruments and the following instruments are used.

A.2.1 Testing sieve (Series R40/3 specified in GB/T 6003.1-1997): sieve with hole diameter of 1.00mm and 4.75mm or 3.35mm and 5.60mm, attached with cover and base plate;

A.2.2 Balance: the sensitivity is 0.5g.

A.2.3 Sieve shaker.

A.3 Determination

The sieves shall be stacked-up in turn according to 1.00mm, 4.75mm or (3.35mm and 5.60mm) and be put on the base plate according to the particle size of products; weigh about 200g (accurate to 0.5g) of the laboratory sample that has been compressed and divided as specified in 6.4.2; put them on 4.75mm-sieve or 5.60mm-sieve respectively; cover them with sieve covers; put them on the sieve shaker; clamp the sieve cover and shake for 5min; or artificial sieving shall be carried out. Weigh test portions (accurate to 0.5g) between 1.00mm~4.75mm or 3.35mm~5.60mm; the test specimen stuck in sieve-hole is deemed as not-passing the sieve.

A.4 Representation of Analysis Results

The grain size ω_1, calculated by the mass fraction of the test portion with grain size of 1.00mm~4.75mm or 3.35mm~5.60mm accounting for all the test portion, represented by %, shall be calculated according to Formula (A.1):

$$\omega_1 = \frac{m_1}{m} \times 100 \qquad \text{(A.1)}$$

Where:

m_1 — the mass value of the test portion between 1.00mm~4.75mm or 3.35mm~5.60mm, in grams (g);

m — the mass value of the test portion, in grams (g).

The calculation result is accurate to one decimal place.

Appendix B

(Normative)
Determination of Chloride Ion Content in Compound Fertilizer (Complex Fertilizer)

B.1 Method Summary

In subacidity solution, the test portion is added with excessive silver nitrate solution to make the chloride ion converted into silver chloride precipitation; envelop the precipitation with dibutyl phthalate with ammonium ferric sulfate as the indicator; standard solution of ammonium thiocyanate is adopted to titrate the remained silver nitrate.

B.2 Reagents

The reagents, solution and water used in this method shall be in accordance with the requirements of HG/T 2843, if no specification or preparation method is specified.

B.2.1 Dibutyl phthalate;

B.2.2 Nitric acid solution: 1+1;

B.2.3 Silver nitrate solution [$c(AgNO_3)$=0.05 mol/L]: weigh 8.7 g of silver nitrate; dissolve it in water and dilute to 1000mL before store it in a brown bottle;

B.2.4 Standard solution of chloride ion (1 mg/mL): accurately weigh 1.6487 g of reference sodium chloride which has been dried to the constant mass at 270°C~300°C in a beaker; dissolve with water; transfer it into a 1000mL volumetric flask and dilute to the scale; mix uniformly and store it in a plastic bottle. 1mL of this solution contains 1 mg of chloride ion (Cl^-);

B.2.5 Ammonium ferric sulfate indicating liquid (80 g/L): dissolve 8.0g of ammonium ferric sulfate in 75mL of water; filtrate it and then add a few drops of sulfuric acid to fade the brown color; then dilute it to 100mL;

B.2.6 Standard volumetric solution of ammonium thiocyanate [$c(NH_4SCN)$=0.05 mol/L]: weigh 3.8g of ammonium thiocyanate; dissolve it in water and then dilute to 1000mL.

Calibrating method is as follows: Accurately absorb 25.0mL of chlorine standard solution in 250mL conical flask; add 5mL of nitric acid solution; add 25.0mL of silver nitrate solution; shake until precipitation layering; add 5mL of dibutyl phthalate and shake for a while. Add water until the total volume of solution reaches about 100mL; add 2mL of ferric ammonium sulfate indicating liquid; titrate the rest silver nitrate with ammonium thiocyanate standard solution until shallow orange red or brick red appears. Carry out blank test at the same time.

Concentration c (mol/L) of ammonium thiocyanate standard volumetric solution shall be calculated according to Formula (B.1):

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