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

GB/T 2092-2024

Sebacic acid for industrial use

工业用癸二酸

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Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 Directives for Standardization - Part

1. Rules for the Structure and Drafting of Standardizing Documents. This document serves as a replacement for GB/T 2092-1992 Sebacic Acid for Industrial Use. In comparison with GB/T 2092-1992, apart from structural adjustments and editorial modifications, the main technical changes are as follows:

a) The technical requirements are modified. Superior products, first-class products and qualified products are modified into the refined type and ordinary type. "Sebacic acid content" is modified into "total acid (calculated as sebacic acid)", the requirements for sebacic acid are added, and the melting point range is modified (see Table 1;

3.2 of Version 1992);

b) The determination method for sebacic acid is added (see 5.4);

c) The sample weight for ash content determination is modified (see 5.5;

4.2 of Version 1992);

d) The determination method for moisture content is modified (see 5.6;

4.3 of Version 1992);

e) The determination method for melting point is modified (see 5.8;

4.5 of Version 1992). Please be noted that certain content of this document may involve patents. The institution issuing this document does not undertake the responsibility of identifying these patents. This document was proposed by China Petroleum and Chemical Industry Federation. This document shall be under the jurisdiction of National Technical Committee 63 on Chemistry of Standardization Administration of China (SAC/TC 63). The drafting organizations of this document. Hengshui Jinghua Chemical Industry Co., Ltd.; Wilmar Polymer Materials (Lianyungang) Co., Ltd.; Shanxi Zhengang Biotechnology Co., Ltd.; SINOPEC Beijing Research Institute of Chemical Industry; Jiangsu Zhongzheng Biochemical Co., Ltd.; Suqian Unitech Group Co., Ltd. The main drafters of this document. Wang Haixia, Liu Lingjuan, Liang Rongyin, Luo Sha, Hu Guangxing, Yu Qian, Zhang Xin, Zhu Yongning, Zhao Minghui, Su Yongsheng, Lin Junyi, Zhang Rui. This document was first issued in 1980 and first revised in 1992. This is the second revision. Sebacic Acid for Industrial Use

1 Scope

GB/T 2092-2024 is the Chinese standard for industrial sebacic acid. It is one of the few large-volume chemicals still made from a plant oil rather than from petroleum, produced by the alkaline cleavage of castor oil, and China dominates its production. It goes into nylon 610 and 1010, into polyester polyols and plasticisers, into synthetic lubricants and into corrosion inhibitors, and in the polymer uses the specification is unforgiving because a difunctional monomer with the wrong purity or colour ruins a polycondensation. The standard sets the grades and the requirements: the assay, the melting point range, the colour of the melt and after heating, the ash, the moisture, the acid and saponification values, the content of the mono- and dibasic acid impurities and of the residual castor oil derivatives, and the heavy metals; then the test methods for each, the inspection rules and the marking, packaging, transport and storage. It takes effect on 1 February 2025.

This document specifies the technical requirements, test methods, inspection rules and marking, packaging, transportation and storage of sebacic acid for industrial use. This document applies to sebacic acid for industrial use, which is produced through hydrolysis and splitting decomposition of castor oil.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references

without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 601 Chemical Reagent - Preparations of Standard Volumetric Solutions

GB/T 603 Chemical Reagent - Preparations of Reagent Solutions for Use in Test Methods

GB/T 617 Chemical Reagent - General Method for the Determination of Melting Range

GB/T 3143 Color Determination Method of Liquid Chemicals (Hazen unit - platinum - cobalt scale)

GB/T 6283-2008 Chemical Products - Determination of Water - Karl Fischer Method (general method)

GB/T 6284 Chemical Products for Industrial Use - General Method for Determination of Water Content - The Loss of Mass on Drying Method

3 Terms and Definitions

This document does not have terms or definitions that need to be defined.

4 Technical Requirements

The technical requirements for sebacic acid for industrial use shall comply with the provisions of Table 1.

5 Test Methods

5.1 General Provisions The reagents and water used in this document, unless otherwise specified, refer to analytically pure reagents and Grade-3 water that complies with the provisions of GB/T 6682.

5.2 Appearance Determination Take an appropriate amount of sample and visually observe under natural light or fluorescent light.

5.3 Determination of Total Acid (calculated as sebacic acid)

5.3.1 Method Summary Use neutral ethanol solution to dissolve the sample, use sodium hydroxide standard titration solution to directly titrate it, and use phenolphthalein as the indicator.

5.3.2 Reagents and solutions

5.3.3 Instruments and equipment 5.3.3.1 50 mL alkali burette.

5.3.4 Analytical steps Weigh-take

1.5 g of sample (accurate to 0.0001

g) and place it in a 250 mL conical flask. Add 50 mL of neutral ethanol solution. After the specimen is completely dissolved, add 2 drops of phenolphthalein indicator solution and use sodium hydroxide standard solution to titrate it, until it turns slightly red. If it does not fade for 30 s, the end point is reached.

5.3.5 Result calculation The mass fraction of total acid (calculated as sebacic acid) is calculated in accordance with Formula (1).

5.3.6 Allowable difference The absolute difference between the results of two parallel determinations is not greater than 0.2%. The arithmetic mean of the results of the two parallel determinations is taken as the determination result. The calculation result is expressed to one decimal place.

5.4 Determination of Sebacic Acid

5.4.1 Method summary Adopt gas chromatography. Sebacic acid and methanol undergo esterification reaction under the action of concentrated sulfuric acid to generate fatty acid methyl esters, which are extracted with n-hexane and, under selected working conditions, are vaporized and passed through a capillary chromatographic column to separate the components. Use a hydrogen flame ionization detector to detect the components and quantify them by the area normalization method.

5.4.2 Reagents and materials

5.4.2.1 Anhydrous methanol.

5.4.3 Instruments and equipment

5.4.3.1 Constant temperature water bath.

5.4.3.2 Gas chromatograph. equipped with hydrogen flame ionization detector (FID) and injection splitter device. The sensitivity and stability of the whole instrument shall comply with the relevant provisions of GB/T 9722. The linear range of the instrument shall satisfy the requirements of quantitative analysis.

5.4.3.4 Micro-injector. 2 L.

5.4.4 Chromatographic columns and chromatographic operating conditions The recommended chromatographic columns and chromatographic operating conditions are shown in Table 2, and the typical chromatogram and retention times of the various components are shown in Appendix A.

5.4.6 Result calculation The mass fraction of sebacic acid is calculated in accordance with Formula (2).