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

GB/T 1677-2023

Replacing GB/T 1677-2008

Determinating the epoxy value of plasticizers

增塑剂环氧值的测定

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents". This document replaces GB/T 1677-2008 "Determination the epoxy value of plasticizers". Compared with GB/T 1677-2008, in addition to structural adjustments and editorial changes, the main technical changes in this document are as follows:

a) Change the scope of the content (see Chapter 1 of this Edition; Chapter 1 of Edition 2008);

b) Add potassium hydrogen phthalate [CAS No.. 877-24-7] reference reagent and its requirements (see

4.4 of this Edition);

c) Delete the contents of pyridine and hydrochloric acid-pyridine solution (see 4.5 of Edition 2008);

d) Change the content of sodium hydroxide standard titration solution (see 4.6 of this Edition;

4.7 of Edition 2008);

e) Add instrument pipette (see

5.3 of this Edition). Delete instrument volumetric flask, straight condenser and oil bath (see 5.2,

5.5 of Edition 2008);

f) Delete Method B for determination of epoxy value (see Chapter 6 of Edition 2008);

1 Scope

GB/T 1677-2023 is the Chinese national standard on determining the epoxy value of plasticizers, in the field of chemical technology. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 28 December 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 July 2024. Classification: ICS 71.100.40, CCS G70. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the test method for the epoxy value of a range of epoxy plasticizers. This document is applicable to the determination of epoxy value of epoxy plasticizer series products.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 601, Chemical reagent -- Preparations of reference titration solutions

GB/T 603, Chemical reagent -- Preparations of reagent solutions for use in test methods

GB 1257, Working chemicals -- Potassium hydrogen phthalate

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 epoxy value The oxygen content of epoxy groups per 100 g of specimen.

4 Reagents and solutions

Unless otherwise specified, only analytically-pure reagents and grade 3 water that complies with GB/T 6682 are used in the analysis. The standard titration solutions and products used in the analysis shall be prepared in accordance with GB/T 601 and GB/T 603 unless other requirements are specified.

4.1 Hydrochloric acid [CAS No.. 7647-01-0].

4.2 Acetone [CAS No.. 67-64-1].

4.3 Ethanol [CAS No.. 64-17-5]. 95%.

4.4 Potassium hydrogen phthalate [CAS No.. 877-24-7] standard reagent. in accordance with the requirements of GB 1257.

4.5 Hydrochloric acid-acetone solution. the volume ratio of hydrochloric acid and acetone is 1.40. Store in a sealed glass bottle and prepare before use.

4.6 Standard sodium hydroxide titration solution. $c \text{ NaOH} =$

0.01 mol/L, $c \text{ NaOH} =$

0.1 mol/L, $c \text{ NaOH} =$

0.15 mol/L (see Annex A for the preparation method).

4.7 Phenolphthalein [CAS No.. 77-09-8] Indicator solution. 10 g/L. Weigh 1 g of phenolphthalein and dissolve it in 95% ethanol. Make up to 100 mL with 95% ethanol.

4.8 Cresol red indicator solution. 1 g/L. Weigh

0.1 g of cresol red, accurate to 0.0001 g. Add 26 mL of

0.1 mol/L sodium hydroxide. Dissolve and dilute to 100 mL with distilled water.

4.9 Thymol blue indicator solution. 1 g/L. Weigh

0.1 g of thymol blue, accurate to 0.0001 g. Add 22 mL of

0.01 mol/L sodium hydroxide. After dissolving, add distilled water to dilute to 100 mL.

4.10 Mixed indicator solution. Take 10 mL of cresol red indicator solution. Add 30 mL of thymol blue indicator solution. Mix well. Adjust to neutral with

0.01 mol/L sodium hydroxide and

0.01 mol/L hydrochloric acid solution (the mixed indicator changes color at about $\text{pH}=9.8$).

5 Instruments

5.1 Conical flask with stopper. 250 mL.

5.2 Alkaline burette. 50 mL, with the graduation of 0.1mL.

5.3 Pipette. 20 mL.

Annex A

(informative) Preparation method of sodium hydroxide standard titration solution (

0.15 mol/L) A.1 Preparation Weigh 6 g of sodium hydroxide and dilute to 1000 mL with water. Shake well and set aside for later use. A.2 Calibration Weigh 3 portions of approximately 1 g each (accurate to 0.0001

g) and dry to a constant amount of potassium hydrogen phthalate standard reagent at $105^{\circ}\text{C}\pm 2^{\circ}\text{C}$. Dissolve it in carbon dioxide-free water and make up to 50 mL. Use phenolphthalein as an indicator. Titrate with the sodium hydroxide standard titration solution to be calibrated until it turns pink. Keep for 30 s. The volume consumed is V