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

GB/T 4618.3-2026

**Plastics - Determination of chlorine content in epoxy resins -
Part 3: Total chlorine**

塑料 环氧树脂氯含量的测定 第3部分：总氯
(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 3 of GB/T 4618 "Determination of Chlorine Content in Plastics and Epoxy Resins". GB/T 4618 has published the following...

part.

---Part 1: Inorganic Chlorine;

---Part 2: Easily Saponifiable Chlorine;

---Part 3: Total Chlorine.

This document is modified to adopt ISO 21627-3:2009 "Determination of chlorine content in epoxy resins for plastics - Part 3: Total chlorine".

The technical differences between this document and ISO 21627-3:2009, and the reasons therefor, are as follows.

---ISO 3696:1987 (see Chapter 5) has been replaced with the normatively referenced GB/T 6682-2008 to adapt to my country's technical requirements.

Add components to increase operability;

---The normative reference GB/T 9725-2007 (see 5.5.2) has been added to adapt to my country's technical conditions and increase operability.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Plastics Standardization (SAC/TC15).

Introduction

Epoxy resin synthesis uses epichlorohydrin (ECH) as a raw material, and the product contains chlorine impurities. The presence of chlorine impurities may affect...

The properties of cured epoxy resin products necessitate the control of impurity content in epoxy resins. Chlorine impurities exist in various forms.

Their chemical activities vary greatly, so different methods can be used to analyze their content.

GB/T 4618, "Determination of Chlorine Content in Epoxy Resins for Plastics," describes the determination of chlorine content as an impurity in epoxy resins derived from epichlorohydrin.

The proposed method for determining inorganic chlorides consists of three parts.

---Part 1: Inorganic Chlorine (also known as. Chloride Ions). The purpose is to describe the direct determination of inorganic chloride ions in epoxy resins using a potentiometric titrator.

Methods involving chlorine (chloride ions).

---Part 2: Saponifiable chlorine exists primarily as 1-chloro-2-propanol, formed from incomplete cyclization. The purpose is to describe...

A method for determining easily saponifiable chlorine in epoxy resins is described.

---Part 3: Total chlorine, including inorganic chlorine and all saponifiable chlorine, such as 1-chloro-2-propanol, 1-chloro-3-propanol, and 1-chloropropyl-2-Glycidyl ether (chloromethyl derivative), all of the above substances are produced due to incomplete cyclization reactions. The purpose is to describe epoxy...

Test method for total chlorine in resin.

Because Parts 1 to 3 of GB/T 4618 have different purposes, different tests are required depending on the impurity to be measured.

method.

For the test methods of impurities other than those listed in Table 1, see ISO 4615.

Table 1. Typical representative products of inorganic and organic chlorine impurities

Structural name

Cl- Inorganic chlorine or chloride ions $\text{O}-\text{CH}_2-\text{CH}-\text{OH}-\text{CH}_2-\text{Cl}$ 1-Chloro-2-propanol $\text{O}-\text{CH}_2-\text{CH}-\text{OH}-\text{CH}_2-\text{Cl}$

CH₂ OH CH₂ Cl 1-Chloro-3-propanol O CH₂ CH O CH₂ CH CH₂ CH₂ Cl

1-Chloropropyl-2-glycidyl ether (chloromethyl derivative) Determination of chlorine content in epoxy resin for plastics Part 3: Total Chlorine Safety Statement. Users of this document must be familiar with standard laboratory safety regulations. This document does not cover all users.

The relevant safety regulations under the conditions shall be explained, and appropriate safety and health regulations shall be established based on the specific regulations and requirements of the users.

1 Scope

This document describes the test method for total chlorine in epoxy resins.

The chlorine content determined by this method, i.e., total chlorine, includes saponifiable chlorine and inorganic chlorine.

This document applies to the determination of total chlorine in epoxy resins.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 6682-2008 Specifications and test methods for water used in analytical laboratories (ISO 3696:1987, MOD) GB/T 9725-2007 General Rules for Potentiometric Titration of Chemical Reagents

3 Terms and Definitions

The following terms and definitions apply to this document.

Total chlorine

This document specifies the amounts of saponifiable chlorine and inorganic chlorine used in the method.

Note: This mainly includes inorganic chlorine and all saponifiable chlorine, such as 1-chloro-2-propanol, 1-chloro-3-propanol, and 1-chloropropyl-2-glycidyl ether (chloromethyl derivative).

All of the above substances are produced due to incomplete cyclization reactions.

4 Principles

The sample was dissolved in diethylene glycol monobutyl ether, potassium hydroxide alcohol solution was added, the mixture was heated under reflux, and potentiometric titration was performed using silver nitrate standard solution.

The total chlorine content in the sample is calculated based on the amount of silver nitrate standard titration solution consumed.

5 Reagents

Unless otherwise specified, all reagents shall be of analytical grade or higher, and laboratory water shall meet the requirements of Grade III water or equivalent as specified in GB/T 6682-2008.

Specifications of water supply.

5.1

Diethylene glycol monobutyl ether.

5.2 1 mol/L potassium hydroxide 1,2-propanediol solution.

Dissolve 56g of potassium hydroxide solid in 1,2-propanediol solution, then dilute to 1L in 1,2-propanediol and mix well.