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

**GB/T 32612-2025**

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**Textiles - Determination of ethylene glycol ethers and related  
ester compounds**

纺织品乙二醇醚类及相关酯类化合物的测定

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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 32612-2016 "Textiles -- Determination of ethylene glycol ethers and related ester compounds". Compared with GB/T 32612-2016, in addition to structural adjustments and editorial modifications, the main technical changes are as follows:

a) The scope of application has been changed. The substances to be tested have been increased from 2-methoxyethanol and 2-ethoxyethanol to 19 glycol ethers and related ester compounds (see Chapter 1 and Annex A of this Edition; Chapter 1 of Edition 2016);

b) The preparation of standard solution has been changed (see 5.4 of this Edition; 3.3.1~3.3.3 of Edition 2016);

c) The specifications of extractors and filter heads have been changed (see 5.5 of this Edition; 4.4 of Edition 2016);

d) The conditions for gas chromatography-mass spectrometry analysis have been changed (see

7.3.2 of this Edition; 5.3.1~

5.3.2 of Edition 2016);

e) The result calculation and quantification limit have been changed (see

9.1 of this Edition;

## 1 Scope

GB/T 32612-2025 gives the test method for glycol ethers and their esters in textiles. These solvents are useful in textile processing - in printing pastes, coatings, adhesives and cleaning - because they dissolve both water-soluble and oil-soluble substances, and some of them are reproductive toxicants, which is why several appear on restricted substance lists and in the REACH candidate list. A restriction is only enforceable if there is an agreed way to measure compliance, and residues in a finished fabric are present at trace level in a complicated matrix, so the method is the substance of the regulation. This document describes a test method for determining glycol ethers and related esters in textile products by gas chromatography-mass spectrometry, covering extraction, determination, the calculation and expression of results, the limit of quantitation and precision, and the test report. It applies to all types of textile products. Its implementation date is 1 March 2027, giving laboratories and the supply chain time to adopt it. It is written for textile testing laboratories, brands and retailers operating restricted substance programmes, and the manufacturers who have to demonstrate conformity.

This document describes a test method for the determination of glycol ethers and related esters in textile products using gas chromatography-mass spectrometry. This document applies to all types of textile products.

## 2 Normative references

This document has no normative references.

## 3 Terms and definitions

There are no terms or definitions that require definition in this document.

## 4 Principle

19 glycol ethers and related ester compounds in the sample are extracted with methanol in an ultrasonic generator. The extracted solution of the sample is measured by gas chromatography-mass spectrometry. Full scan detection is used for qualitative analysis. Selected ions are used for quantitative analysis by external standard method.

## 5 Reagents and materials

Unless otherwise specified, all reagents are chromatographically pure.

5.1 Methanol. CAS No. 67-56-1.

5.2 Standard substance/standard sample. It shall comply with the provisions of Annex A, with a purity of  $\geq 98.0\%$ .

5.3 Standard stock solution. Use an analytical balance (6.2) with a graduation value of 0.0001 g to weigh each standard substance/standard sample (5.2). Dissolve and make up to the set volume with methanol (5.1). Prepare standard stock solutions with a mass concentration of 1000 mg/L. You can also directly purchase certified standard stock solutions. Either single component or mixed standard stock solutions can be used. NOTE. The standard stock solution should be stored in a refrigerator at  $0^{\circ}\text{C}\sim 4^{\circ}\text{C}$  away from light. The validity period is 6 months.

5.4 Mixed standard working solution. Prepare according to work needs. Use methanol (5.1) to dilute the standard stock solution step by step into a series of mixed standard working solutions of at least 5 different mass concentrations (e.g.,

0.1 mg/L,

0.2 mg/L,

0.5 mg/L,

0.8 mg/L,

2.5 mg/L). NOTE. The mixed standard working solution should be stored in a refrigerator at  $0^{\circ}\text{C}\sim 4^{\circ}\text{C}$  away from light. The validity period is 1 month.

5.5 Organic phase needle filter. The pore size is  $0.45\ \mu\text{m}$ .

## 6 Instruments and equipment

6.1 Gas chromatograph-mass spectrometer. equipped with electron impact ionization source (EI source).

6.2 Analytical balance. graduation value is

0.01 g and 0.0001 g.

6.3 Extractor. 30 mL, tubular hard glass extractor with screw cap (with polytetrafluoroethylene gasket).

6.4 Ultrasonic generator. working frequency is  $(40\pm 5)\ \text{kHz}$ , temperature is  $(45\pm 2)^{\circ}\text{C}$ .

## 7 Test steps

7.1 Specimen preparation and extraction Take a representative sample. Cut it into pieces less than 5 mmx5 mm and mix well. Weigh

1.0 g of the specimen, accurate to

0.01 g. Place it in an extractor (6.3). Add 10 mL of methanol (5.1) to the extractor. Tighten the lid. Place the extractor in an ultrasonic generator (6.4). Extract in an ultrasonic water bath at  $(45\pm 2)^{\circ}\text{C}$  for  $(30\pm 1)$  min. After cooling to room temperature, filter with an organic phase needle filter (5.5) to obtain the specimen extraction solution.

7.2 Blank test solution Except for not adding the specimen, follow the procedures in 7.1. Where,  $X_i$  - Content of each component in the specimen, in milligrams per kilogram (mg/kg);  $\rho_{hi}$  - Mass concentration of the component solution obtained from the standard working curve, in milligrams per liter (mg/L);  $\rho_{h0}$  - Mass concentration of the blank test solution obtained from the standard working curve, in milligrams per liter (mg/L);  $V$  - Volume of the sample solution, in milliliters (mL);  $m$  - Mass of the specimen, in grams (g);  $f$  - Dilution factor.

8.2 Expression of results The test results are expressed as the content of each target compound in the specimen. When it is below the limit of quantification (9.1), the test result is not detected.

## 9 Limit of quantification and precision of the method

9.1 Limit of quantification The limit of quantification of this method for 19 glycol ethers and related ester compounds is

9.2 Precision The absolute difference between two independent test results obtained by the same operator using the same equipment and the same test method in the same laboratory and on the same object within a short period of time shall not exceed 10% of the arithmetic mean of the two measured values, provided that the absolute difference between the two independent test results shall not exceed 5% of the arithmetic mean of the two measured values.

## 10 Test report

The test report shall at least include the following.

a) Reference to this document;