

ICS 59.080.01
CCS W04



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

GB/T 43832-2024

Textiles - Determination of aniline

纺织品 苯胺的测定

Issued on: March 15, 2024

Implemented on: October 1, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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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. Please note that some of the contents of this document may involve patents. The issuing organization of this document is not responsible for identifying patents. This document is proposed by China National Textile and Apparel Council. This document shall be under the jurisdiction of National Technical Committee 209 on Textiles of Standardization Administration of China (SAC/TC 209). Drafting organizations of this document. Fujian Fiber Inspection Center, Anhui Optimizing Customized Garment Technology CO. LTD, Xiamen Huaxi Knitting Co., Ltd., Zhejiang Rongda Fashion Technique Co., Ltd., Shaoxing Haicheng Chemical Co., Ltd., Zhejiang Shougu Technology Development Co., Ltd., Chinatesta Textile Testing &

Certification Services Co., Ltd., Guangdong Xinhuiwei Industrial Investment Co., Ltd. Main drafters of this document. Zhu Feng, Lin Jinmei, Lv Jing, Pan Xingxing, Shen Jianliang, Lin Ningting, Meng Xiaodong, Yan Yaqun, Tian Shusong, Liang Jiajun, Zhang Taoyong. Textiles - Determination of aniline WARNING - The personnel who uses this document shall have hands-on experience in formal laboratory work. This document does not address all possible security issues. It is the responsibility of the user to take appropriate safety and health measures and to ensure compliance with the conditions which are set by the relevant national regulations.

1 Scope

GB/T 43832-2024 gives the determination of aniline in textiles. Aniline is a carcinogen and a residue of azo dyeing: it can be present as free aniline left from manufacture, or bound in the dye and released when the azo bond is reduced, which is the same chemistry that occurs on skin. The standard therefore measures both. Method A extracts free aniline with dichloromethane under ultrasound; method B decomposes the dye with sodium dithionite and extracts the total aniline; either is then measured by gas chromatography-mass spectrometry or by liquid chromatography with diode array detection. The standard sets the principle, the reagents, the instruments and equipment, the test procedure, the calculation and presentation of the result, the quantitation limit and precision, and the test report, with informative annexes on the extraction method and on example GC-MS and HPLC-DAD conditions. It took effect on 1 October 2024.

This document describes the determination of free aniline (Method A) and total aniline (Method B) in textiles. This document applies to all types of textile products.

2 Normative references

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

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 free aniline Aniline in the form of chemical residues.

3.2 cleavable aniline Aniline produced after reductive cleavage.

3.3 total aniline The sum of cleavable aniline and free aniline.

4 Principle

The sample is subjected to ultrasonic extraction of free aniline with dichloromethane (method A), or decomposed by sodium dithionite followed by liquid-liquid extraction to extract the total aniline (method B), and then measured by gas chromatography-mass spectrometry (GC-MS) or high performance liquid chromatography-diode array detector (HPLC-DAD), and quantified by gas chromatography-mass spectrometry internal standard method or high performance liquid chromatography external standard method.

5 Reagents

Unless otherwise specified, all reagents used shall be of analytical grade or above.

5.1 Water. Grade III water in GB/T 6682. Water for chromatography shall comply with Grade I water in GB/T 6682.

5.2 Dichloromethane.

5.3 Tert-butyl methyl ether.

5.4 Acetonitrile, chromatographic reagent.

5.5 Sodium chloride.

5.6 Aniline standard substance/standard sample. CAS No. 62-53-3 (purity not less than 99%).

5.7 Naphthalene-d8 standard substance/standard sample. CAS No. 1146-65-2 (purity not less than 99%).

5.9 Naphthalene-d8 internal standard stock solution. mass concentration not less than 200 mg/L. Accurately weigh naphthalene-d8 standard substance (5.7) and prepare it with dichloromethane (5.2) or tert-butyl methyl ether (5.3).

Note. Store this solution in a (-18 ± 2) °C refrigerator away from light, which has a shelf life of 6 months.

5.10 Standard working solution. aniline concentration

0.5 mg/L ~ 20 mg/L. Accurately pipette an appropriate amount of aniline standard stock solution (5.8). When using GC- MS for determination, add an appropriate amount of naphthalene-d8 internal standard stock solution (5.9) to make the naphthalene-d8 mass concentration 2 mg/L; use dichloromethane (5.2) or tert-butyl methyl ether (5.3) to dilute. When using HPLC- DAD for determination, use acetonitrile (5.4) to dilute. a shelf life of 15 days.

5.11 Naphthalene-d8 dichloromethane internal standard working solution. mass

concentration 2 mg/L. Accurately pipette an appropriate amount of naphthalene-d8 internal standard stock solution (5.9); use dichloromethane (5.2) to prepare.

Note. Store this solution in a refrigerator at 0 °C ~ 4 °C away from light, which has a shelf life of 15 days.

5.12 Naphthalene-d8 tert-butyl methyl ether internal standard working solution. mass concentration 2 mg/L. Accurately pipette an appropriate amount of naphthalene-d8 internal standard stock solution (5.9); use tert-butyl methyl ether (5.3) to prepare.

Note. Store this solution in a refrigerator at 0 °C ~ 4 °C away from light, which has a shelf life of 15 days.

6 Instruments and equipment

6.1 Gas chromatography-mass spectrometer (GC-MS). equipped with electron impact ionization source (EI).

6.2 High performance liquid chromatography (HPLC). equipped with diode array detector (DAD).

6.3 Analytical balance. graduation values being

0.01 g and

0.1 mg, respectively.

6.4 Pipette. capacity being

0.2 mL,

0.5 mL, 1 mL, 2 mL, 5 mL and 10 mL, respectively.

6.5 Glass reaction vessel. made of heat-resistant glass, capacity being approximately 30 mL and 60 mL respectively, and provided with a sealing stopper. During the ultrasonic extraction process, the reaction vessel shall be sealed to prevent the evaporation of dichloromethane and shall be able to withstand a pressure of at least

0.2 MPa.

6.6 Ultrasonic generator. operating frequency at (40±5) kHz, capable of controlling temperature at (60±2) °C. When the test results are consistent, ultrasonic generators of other frequencies can be used.

6.7 Constant temperature water bath heater. capable of controlling the temperature at (40±2) °C.

7 Test procedure