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Textiles — Determination of quinoline, isoquinoline and certain derivatives

Textiles — Détermination de la quinoléine, de l'isoquinoléine et de certains dérivés

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Foreword

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This document was prepared by Technical Committee ISO/TC38, *Textiles*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 248, *Textiles and textile products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Quinoline, which is used in certain dyes, is classified as a carcinogenic substance. It has a high solubility in water and this tendency makes it of concern in manufacturing processes where the dyed textiles are washed. It can also be found as residue in textiles and textile products where it can easily come into skin contact. A series of studies have shown the potential harm to humans as well as downstream aquatic life. Quinoline is thus restricted in the European Union in:

a) clothing or related accessories;

b) textiles other than clothing which, under normal or reasonably foreseeable conditions of use, come into contact with human skin to an extent similar to clothing;

c) footwear[1].

Quinoline derivatives are compounds that can be synthesized from a quinoline compound by replacement of one atom with another atom or group of atoms. Considering their toxicity on several animal species, it is important to set up an effective and precise test method to determine the content of them.

The test method described in this document is based on the use of gas chromatography with mass spectrometry (GC-MS) or liquid chromatography with mass spectrometry (LC-MS).

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Textiles — Determination of quinoline, isoquinoline and certain derivatives

1 Scope

This document specifies a method for the qualification and quantification of certain quinoline derivatives in textile products by means of extraction with methanol and gas chromatography with mass selective detector or liquid chromatography with mass selective detector.

The method is applicable to all kinds of textile products consisting of natural or artificially dyed textile fibres and fabrics. It is further applicable to dyestuff powder used as textile auxiliary for dyeing and printing.

WARNING — The use of this document involves hazardous substances, operations and equipment. It does not purport to address all of the safety or environmental problems associated with its use. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety/environment at any stage.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 4787, *Laboratory glass and plastic ware — Volumetric instruments — Methods for testing of capacity and for use*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

The quinoline derivatives are extracted from textile fibres and fabrics or dyestuff with methanol in an ultrasonic water bath. The extract is analysed by means of gas chromatograph with mass selective detector or liquid chromatograph with mass selective detector.

Table 1 indicates the list of quinoline derivatives which can be analysed with the method described in this document.

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Table 1 — List of quinoline derivatives that can be analysed

No.	Compound	CAS Registry Number®[a]
1	quinoline	91-22-5
2	isoquinoline	119-65-3
3	2-methylquinoline	91-63-4
4	3-methylquinoline	612-58-8
5	4-methylquinoline	491-35-0
6	6-methylquinoline	91-62-3
7	8-methylquinoline	611-32-5
8	1-methylisoquinoline	1721-93-3
9	2,6-dimethylquinoline	877-43-0
10	2,4-dimethylquinoline	1198-37-4
[a] CAS Registry Number® (CAS RN®) is a trademark of the American Chemical Society (ACS). This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.		

5 Reagents

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

5.1 Quinoline and quinoline derivatives, as listed in Table 1.

5.2 Methanol, CAS RN®[1)] 67-56-1.

5.3 Acetonitrile, CAS RN®[1)] 75-05-08.

5.4 Water, grade 2 in accordance with ISO 3696.

5.5 Ammonium acetate, CAS RN®[1)] 631-61-8, used for buffer preparation.

Prepare a 10 mmol/l ammonium acetate buffer (pH 3,6), for example, by dissolving 0,771 g of ammonium acetate in approximately 900 ml of water (5.4), adjusting the pH to 3,6 using acetic acid (5.6), and making up the volume to 1 000 ml with water (5.4).

5.6 Acetic acid, CAS RN®[1)] 64-19-7.

6 Apparatus

The usual laboratory equipment and laboratory glassware, in accordance with ISO 4787, shall be used, in addition to the following.

6.1 Analytical balance, with a resolution of at least 0,1 mg.

6.2 Ultrasonic water bath, capable of maintaining a temperature of about 70 °C.

6.3 Glass vial with screw cap, e.g. 40 ml.

6.4 Polytetrafluoroethylene (PTFE) membrane filter, with pore size of 0,45 µm or less.

1) CAS Registry Number® (CAS RN®) is a trademark of the American Chemical Society (ACS). This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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