

**Paper and board - Paper and board  
intended to come into contact with  
foodstuffs - Determination of mercury in an  
aqueous extract**

Paper and board - Paper and board intended to  
come into contact with foodstuffs - Determination of  
mercury in an aqueous extract

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 12497:2005 sisaldab Euroopa standardi EN 12497:2005 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 29.09.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 12497:2005 consists of the English text of the European standard EN 12497:2005.</p> <p>This document is endorsed on 29.09.2005 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

<p><b>Käsitlusala:</b> This European Standard is one in a series of standards for the determination of heavy metals in an aqueous extract of paper and paperboard intended for contact with food. This European Standard specifies the test method for the determination of mercury in an aqueous extract.</p>	<p><b>Scope:</b> This European Standard is one in a series of standards for the determination of heavy metals in an aqueous extract of paper and paperboard intended for contact with food. This European Standard specifies the test method for the determination of mercury in an aqueous extract.</p>
--	--

**ICS** 67.250, 85.060

**Võtmesõnad:** aqueous extract, atomic absorption spectrometry, chemical analysis, determination of content, food products, food-container contact, mercury, paper, paperboards

English Version

**Paper and board - Paper and board intended to come into  
contact with foodstuffs - Determination of mercury in an aqueous  
extract**

Papier et carton - Papiers et cartons destinés à entrer en  
contact avec les denrées alimentaires - Détermination du  
mercure dans un extrait aqueux

Papier und Pappe - Papier und Pappe für den Kontakt mit  
Lebensmitteln - Bestimmung von Quecksilber in einem  
wässrigen Extrakt

This European Standard was approved by CEN on 27 June 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

## Contents

page

Foreword .....	3
1 Scope .....	4
2 Normative references .....	4
3 Principle.....	4
4 Reagents.....	4
4.1 General .....	4
4.2 Nitric acid (HNO <sub>3</sub> ), 65 % ( <i>d</i> = 1,42) .....	4
4.2.1 Nitric acid (4.2), diluted 1 : 1 (V/V) with water .....	4
4.2.2 Nitric acid (4.2), diluted to 1,5 % (V/V) with water .....	4
4.3 Potassium permanganate (KMnO <sub>4</sub> ), 5 % aqueous solution ( <i>m/V</i> ) .....	4
4.4 Mercury, stock solution, 1000 mg/l.....	4
Sulphuric acid (H <sub>2</sub> SO <sub>4</sub> ), ( <i>d</i> = 1,84) .....	5
4.6 Potassium dichromate (K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> ), 50 g/l in sulphuric acid solution .....	5
4.7 Hydroxylammonium chloride (HONH <sub>3</sub> Cl), 20 g/l aqueous solution .....	5
4.8 Reducing solutions.....	5
4.8.1 Tin (II) chloride (SnCl <sub>2</sub> · 2H <sub>2</sub> O), 50 g/l in 10 % hydroxyloric acid (4.9.1) .....	5
4.8.2 Sodium tetrahydroborate (NaBH <sub>4</sub> ), 0,2 g/l in 0,05 % sodium hydroxide solution (4.10) .....	5
4.9 Hydrochloric acid (HCl), 36 % ( <i>d</i> = 1,19) .....	5
4.9.1 Hydrochloric acid (4.9) (HCl), diluted 10 % (V/V) .....	5
4.10 Sodium hydroxide (NaOH), 0,05 % aqueous solution ( <i>m/V</i> ) .....	5
5 Apparatus .....	5
5.1 General .....	5
5.2 General laboratory equipment .....	5
5.3 Volumetric flasks, 100 ml .....	5
5.4 Analytical balance, accuracy 0,1 mg .....	5
5.5 Pipettes from 100 µl to 10 ml, glass or plastics, (high density polyethylene/polypropylene).....	5
5.6 Atomic absorption spectrometer with an appropriate detection system and sensitivity.....	6
6 Preparation of sample .....	6
7 Procedure .....	6
7.1 General .....	6
7.2 Preparation of reference solution.....	6
7.3 Determination of mercury.....	6
7.3.1 General .....	6
7.3.2 Standard additions.....	7
7.4 Determination of blank value .....	7
8 Expression of results.....	7
9 Precision.....	8
10 Test report .....	8

## Foreword

This European Standard (EN 12497:2005) has been prepared by Technical Committee CEN/TC 172 "Pulp, paper and board", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

This European Standard supersedes ENV 12497:1998. With regard to ENV 12497:1998 the following changes have been made:

- a) implementation in a European Standard;
- b) addition of the clause "Precision";
- c) editorial updating.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## 1 Scope

This European Standard is one in a series of standards for the determination of heavy metals in an aqueous extract of paper and paperboard intended for contact with food. This European Standard specifies the test method for the determination of mercury in an aqueous extract.

It is applicable to paper and board with extractable mercury content exceeding 0,06 mg per kg.

NOTE 1 The above limit of determination is 5 times below the actual limit existing today or proposed in Europe.

NOTE 2 Mercury content levels below 0,06 mg per kg can be measured by this European Standard, if very sensitive equipment is available and if all other laboratory conditions fulfil the requirements for trace element analysis.

## 2 Normative references

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

EN 645, *Paper and board intended to come into contact with foodstuffs — Preparation of a cold water extract*

EN 647, *Paper and board intended to come into contact with foodstuffs — Preparation of a hot water extract*

## 3 Principle

An aliquot portion of the stabilized cold water (see EN 645) or stabilized hot water extract (see EN 647) (see Clause 6) is analysed by atomic absorption spectrometry using cold vapour generation.

## 4 Reagents

### 4.1 General

All reagents and the water used shall be suitable for trace element analysis.

Store the solutions in high-density polyethylene/polypropylene bottles.

### 4.2 Nitric acid (HNO<sub>3</sub>), 65 % ( $d = 1,42$ )

#### 4.2.1 Nitric acid (4.2), diluted 1 : 1 (V/V) with water

#### 4.2.2 Nitric acid (4.2), diluted to 1,5 % (V/V) with water

### 4.3 Potassium permanganate (KMnO<sub>4</sub>), 5 % aqueous solution ( $m/V$ )

NOTE Potassium permanganate solution is used to prepare the mercury stock solution. It is not needed if a commercially available standard solution is used (see 4.4).

### 4.4 Mercury, stock solution, 1000 mg/l

**Warning:** Mercury is toxic.