
**Pulp, paper and board —
Determination of total chlorine and
organically bound chlorine**

*Pâtes, papier et carton — Dosage du chlore total et du chlore lié aux
matières organiques*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*.

This second edition cancels and replaces the first edition (ISO 11480:1997), which has been technically revised to include the option of using the Schöniger combustion method combined with ion chromatography.

Introduction

This document specifies two procedures for the determination of total and organically bound chlorine in pulp, paper and board. The microcoulometric method ([Clause 4](#)) is based on combustion in a heated tube followed by microcoulometric titration. The Schöniger method ([Clause 5](#)) is based on the so-called Schöniger combustion followed by ion chromatography.

The choice of procedure depends on the availability of the apparatus and on the risk of interference by bromine compounds in the sample. In the microcoulometric method, the result does not strictly represent the chlorine content since it includes part of any bromine present in the sample. This procedure should thus be avoided if there is a risk that the sample has a high bromine content.

More work is involved in the Schöniger method than in the microcoulometric method. However, since the end determination is performed by ion chromatography, the result is unambiguously chlorine. The Schöniger method also requires a larger sample. Consequently, the result is more representative. On the other hand, the microcoulometric method is faster and several replicate determinations can be performed in a short time.

Pulp, paper and board — Determination of total chlorine and organically bound chlorine

1 Scope

This document specifies two alternative procedures for the determination of total and organically bound chlorine in pulp, paper and board. It is applicable to all types of pulp, paper and board. The lower limit of the determination is about 20 mg/kg.

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 287, *Paper and board — Determination of moisture content of a lot — Oven-drying method*

ISO 638, *Paper, board and pulps — Determination of dry matter content — Oven-drying method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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/>

3.1

total chlorine

total amount of the element chlorine present

3.2

organically bound chlorine

amount of organically bound chlorine present

4 Microcoulometric method

4.1 Principle

Determination of the chlorine content of the sample by combustion under controlled conditions in a quartz tube at high temperature. The combustion gases are fed through an electrolyte solution where all chlorine, now transformed to hydrogen chloride, is absorbed and determined by microcoulometry. For determination of the organically bound chlorine content, the inorganic chlorine compounds are extracted with dilute nitric acid before combustion.

NOTE 1 If determination of organically bound chlorine is not required, the extraction with acid nitrate is omitted.

NOTE 2 Any bromine present will interfere and cause a positive error. For details, see [4.11](#).