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IULTCS IUC 27-2

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Leather — Chemical determination of metal content —

Part 2: Total metal content

Cuir — Dosage chimique des métaux —

Partie 2: Teneur totale en métaux

Reference numbers
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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 of 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 www.iso.org/iso/foreword.html.

IULTCS, originally formed in 1897, is a world-wide organization of professional leather societies to further the advancement of leather science and technology. IULTCS has three Commissions, which are responsible for establishing international methods for the sampling and testing of leather. ISO recognizes IULTCS as an international standardizing body for the preparation of test methods for leather.

This document was prepared by the Chemical Test Commission of the International Union of Leather Technologists and Chemists Societies (IUC Commission, IULTCS) in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, *Leather*, the secretariat of which is held by UNI, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 17072-2:2019), which has been technically revised. The main changes are as follows:

— Clause 1, Clause 6 and 8.1 have been editorially and technically modified;

— a new Annex B has been added describing the digestion procedure for the determination of aluminium and titanium.

A list of all parts in the ISO 17072 series can be found on the ISO website.

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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Leather — Chemical determination of metal content —

Part 2: Total metal content

1 Scope

This document specifies a method for the determination of the total metal content in leather using digestion of the leather and subsequent determination with inductively coupled plasma optical emission spectrometry (ICP-OES), inductively coupled plasma mass spectrometry (ICP-MS), atomic absorption spectrometry (AAS) or spectrometry of atomic fluorescence (SFA).

This method determines the total metal content in leather. It is not compound-specific or specific to the oxidation state of the metals.

The method is applicable for determining the following metals:

Aluminium (Al)	Copper (Cu)	Potassium (K)
Antimony (Sb)	Iron (Fe)	Selenium (Se)
Arsenic (As)	Lead (Pb)	Silicon (Si)
Barium (Ba)	Magnesium (Mg)	Sodium (Na)
Cadmium (Cd)	Manganese (Mn)	Tin (Sn)
Calcium (Ca)	Mercury (Hg)	Titanium (Ti)
Chromium (Cr) (except chromium-tanned leathers)	Molybdenum (Mo)	Zinc (Zn)
Cobalt (Co)	Nickel (Ni)	Zirconium (Zr)

This method is also suitable for determining Boron (B) in leather.

In the case of chromium-tanned leathers, it is often more relevant to use ISO 5398-1, ISO 5398-2, ISO 5398-3 or ISO 5398-4.

Interlaboratory test results and the quantification limits possible with ICP-OES are given in Tables A.1 and A.2.

For the determination of Al and Ti in leather, a digestion procedure is given in Annex B.

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 2418, *Leather — Chemical, physical and mechanical and fastness tests — Sampling location*

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

ISO 4044, *Leather — Chemical tests — Preparation of chemical test samples*

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ISO 4684, *Leather — Chemical tests — Determination of volatile matter*

ISO 11885, *Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)*

ISO 15586, *Water quality — Determination of trace elements using atomic absorption spectrometry with graphite furnace*

ISO 17294-2, *Water quality — Application of inductively coupled plasma mass spectrometry (ICP-MS) — Part 2: Determination of selected elements including uranium isotopes*

ISO 17852, *Water quality — Determination of mercury — Method using atomic fluorescence spectrometry*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Principle

Digestion of the sample of leather (see ISO 4044) is carried out using a ternary acid mixture or microwave digestion until complete mineralization is achieved. The residue is redissolved with water and analysed by AAS, ICP or SFA (for mercury).

The results are reported on the dry matter of the leather.

5 Reagents

WARNING — The concentrated acids used in this method are very corrosive and/or oxidizing liquids, which can raise the possibility of fire in the event of contact with ignitable materials and promote an existing fire considerably or can decompose explosively with warming. They can also cause acute or chronic health dangers. Moreover, they are hazardous to water. Suitable safety measures are therefore necessary.

Analytical grade chemicals shall be used for digestion with the Kjeldhal method. Ultrapure acid shall be used for microwave digestion. All solutions are aqueous solutions.

5.1 Nitric acid, 60 % to 70 % mass fraction, CAS Registry Number®[1)] (CAS RN®): 7697-37-2.

5.2 Sulfuric acid, 98 % mass fraction, CAS RN: 7664-93-9.

5.3 Perchloric acid, 60 % to 70 % mass fraction, CAS RN: 7601-90-3.

5.4 Element stock solutions, of the various metals with mass concentrations of 1 000 mg/l each.

5.5 Hydrochloric acid, 37 % mass fraction, CAS RN: 7647-01-0.

5.6 Water, grade 3 in accordance with ISO 3696.

1) CAS Registry Number® (CAS RN®) is a trademark of CAS corporation. 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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