INTERNATIONAL STANDARD

ISO 17072-1

IULTCS/IUC 27-1

First edition
2011-02-15

Leather — Chemical determination of metal content —

Part 1: Extractable metals

Cuir — Détermination chimique de la teneur en métal —

Partie 1: Métaux extractibles

Reference number
ISO 17072-1:2011(E)
IULTCS/IUC 27-1:2011(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 17072-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, *Leather*, in collaboration with the Chemical Test Commission of the International Union of Leather Technologists and Chemists Societies (IUC Commission, IULTCS), in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement). This method is technically similar to the method in IUC 27-1.

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.

ISO 17072 consists of the following parts, under the general title *Leather — Chemical determination of metal content*:

— *Part 1: Extractable metals*

— *Part 2: Total metal content*

Leather — Chemical determination of metal content —

Part 1:
Extractable metals

1 Scope

This part of ISO 17072 specifies a method for the determination of extractable metals in leather using extraction with an acid artificial-perspiration solution and subsequent determination with inductively coupled plasma/optical emission spectrometry (ICP-OES), or inductively coupled plasma/atomic emission spectrometry (ICP/AES), or inductively coupled plasma/mass spectrometry (ICP/MS), or atomic absorption spectrometry (AAS) or spectrometry of atomic fluorescence (SFA).

This method is especially suitable for determining the extractable chromium in chromium-tanned leathers.

This method determines extractable metals in leather; it is not compound-specific or specific to the oxidation state of the metals.

The method is also applicable for the determination of many extractable metals, including:

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

The quantification limit of extractable lead is 3 mg/kg (see Annex A).

2 Normative references

The following referenced documents are indispensable for the application 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 105-E04:2008, *Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration*

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

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

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

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 metals using atomic absorption spectrometry with graphite furnace*

ISO 17072-2:2011, *Leather — Chemical determination of metal content — Part 2: Total metal content*

ISO 17294-2, *Water quality — Application of inductively coupled plasma mass spectrometry (ICP-MS) — Part 2: Determination of 62 elements*

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

3 Principle

A sample of leather is ground and extracted at 37 °C ± 2 °C for 4 h ± 5 min in an acid artificial-perspiration solution. The extract solution is filtered, acidified and analysed by ICP, or SFA or AAS. If necessary, digest a portion of filtrate solution in accordance with ISO 17072-2.

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

If sampling in accordance with ISO 2418 is not possible (e.g. leathers are from finished products like shoes or garments), details about the sampling shall be given together with the test report.

4 Reagents

WARNING — As concentrated acids are used, it is imperative to use all necessary personal protective equipment.

4.1 General

Unless otherwise stated, only analytical grade chemicals shall be used. All solutions are aqueous solutions.

4.2 Nitric acid, 60 % to 70 % concentration (by mass).

4.3 L-histidine monohydrochloride monohydrate, $C_6H_9O_2N_3 \cdot HCl \cdot H_2O$.

4.4 Sodium chloride.

4.5 Sodium dihydrogen orthophosphate dihydrate, $NaH_2PO_4 \cdot 2H_2O$.

4.6 Sodium hydroxide, 0,1 mol/l.

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

4.8 Nitric acid, 0,1 mol/l.

4.9 Water, grade 3 in accordance with ISO 3696:1987.