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**Leather — Chemical tests —
Guidelines for testing critical
chemicals in leather**

*Cuir — Essais chimiques — Lignes directrices pour les essais de
produits chimiques critiques sur le cuir*

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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 (standards.iteh.ai)

This document was prepared by the Chemical Tests 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).

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.

Introduction

This document was prepared in collaboration by IULTCS and by CEN/TC 289 *Leather* in order to provide an overview of chemical test methods for the leather industry. This can be used by those involved in setting specifications for leather, especially for those parameters relating to restricted chemical substances.

Regulations restrict the use of certain chemicals in consumer products. The leather industry has already taken actions by replacing the restricted substances or assuming the limits imposed by these restrictions. Many brand name manufacturers require certificates of compliance from their suppliers but too often these refer to analytical methods from other industries that are not suitable for use in testing leather.

Through the collaboration of IULTCS and CEN/TC 289, a considerable number of leather specific EN and ISO standard test methods have been developed for the chemical analysis of leather. The International Standards are tested by inter-laboratory studies, have been proven scientifically valid and are subjected to updating processes according to ISO protocols.

Chemical analysis of leather

Leather is a complex substrate to chemically analyse. After tanning, leather typically undergoes wet-processing in aqueous media at low temperatures (<60 °C) and in an acid pH range of 3,5 to 5,5. The characteristic properties of leather are achieved by mostly using a range of anionic retanning agents (natural and/or synthetic), polymers and oils, as well as anionic dyes for achieving the required colour. In analytical procedures when leather is extracted, some of these substances can be removed and make a complex matrix for the analysis. This should be considered when establishing quantification limits for leather analyses. Too often unrealistic limits established in aqueous solutions, e.g. waste water analysis, are quoted in specifications for leather.

This document gives an overview of those internationally accepted chemical test procedures established specifically for leather.

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Leather — Chemical tests — Guidelines for testing critical chemicals in leather

1 Scope

This document gives guidelines to apply the available chemical test methods for leather. This information can be used by those involved in setting specifications for leather, especially for those parameters relating to restricted chemical substances.

Lists of restricted chemicals contain many substances that are not relevant to the leather industry. Those chemical substances that are not mentioned in this document do not need to be determined, thus avoiding unnecessary analytical costs.

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 4045, *Leather — Chemical tests — Determination of pH*

ISO 5398-1, *Leather — Chemical determination of chromic oxide content — Part 1: Quantification by titration*

ISO 5398-2, *Leather — Chemical determination of chromic oxide content — Part 2: Quantification by colorimetric determination*

ISO 5398-3, *Leather — Chemical determination of chromic oxide content — Part 3: Quantification by atomic absorption spectrometry*

ISO 5398-4, *Leather — Chemical determination of chromic oxide content — Part 4: Quantification by inductively coupled plasma - optical emission spectrometer (ICP-OES)*

ISO 13365, *Leather — Chemical tests — Determination of the preservative (TCMTB, PCMC, OPP, OIT) content in leather by liquid chromatography*

ISO 17070, *Leather — Chemical tests — Determination of tetrachlorophenol-, trichlorophenol-, dichlorophenol-, monochlorophenol-isomers and pentachlorophenol content*

ISO 17072-1, *Leather — Chemical determination of metal content — Part 1: Extractable metals*

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

ISO/17075-1, *Leather — Chemical determination of chromium (VI) content in leather — Part 1: Colorimetric method*

ISO/17075-2, *Leather — Chemical determination of chromium (VI) content in leather — Part 2: Chromatographic method*

ISO 17226-1, *Leather — Chemical determination of formaldehyde content — Part 1: Method using high performance liquid chromatography*

ISO 17226-3, *Leather — Chemical determination of formaldehyde content — Part 3: Determination of formaldehyde emissions from leather*

ISO 17234-1, *Leather — Chemical tests for the determination of certain azo colorants in dyed leathers — Part 1: Determination of certain aromatic amines derived from azo colorants*

ISO 17234-2, *Leather — Chemical tests for the determination of certain azo colorants in dyed leathers — Part 2: Determination of 4-aminoazobenzene*

ISO 18218-1, *Leather — Determination of ethoxylated alkylphenols — Part 1: Direct method*

ISO 18218-2, *Leather — Determination of ethoxylated alkylphenols — Part 2: Indirect method*

ISO 18219, *Leather — Determination of chlorinated hydrocarbons in leather — Chromatographic method for short-chain chlorinated paraffins (SCCP)*

ISO 19070, *Leather — Chemical determination of N-methyl-2-pyrrolidone (NMP) in leather*

ISO/TS 16179, *Footwear — Critical substances potentially present in footwear and footwear components — Determination of organotin compounds in footwear materials*

ISO/TS 16181, *Footwear — Critical substances potentially present in footwear and footwear components — Determination of phthalates in footwear materials*

ISO/TS 16186, *Footwear — Critical substances potentially present in footwear and footwear components — Test method to quantitatively determine dimethyl fumarate (DMFU) in footwear materials*

ISO/TS 16189, *Footwear — Critical substances potentially present in footwear and footwear components — Test method to quantitatively determine dimethylformamide in footwear materials*

ISO/TS 16190, *Footwear — Critical substances potentially present in footwear and footwear components — Test method to quantitatively determine polycyclic aromatic hydrocarbons (PAH) in footwear materials*

EN 1122, *Plastics — Determination of cadmium - Wet decomposition method*

EN 15987, *Leather — Terminology — Key definitions for the leather trade*

EN 16778, *Protective gloves — The determination of Dimethylformamide in gloves*

CEN/TS 15968, *Determination of extractable perfluorooctanesulphonate (PFOS) in coated and impregnated solid articles, liquids and fire fighting foams - Method for sampling, extraction and analysis by LC-qMS or LC-tandem/MS*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15987 apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Chemical substances potentially found in leather

4.1 Chemical test methods for substances used by the leather industry with no legal restrictions for leather

[Table 1](#) includes those chemical substances conventionally used in the various leather manufacturing processes. While not legally restricted, some of these substances can be restricted in specifications for the final leather article.

4.2 Chemical test methods for substances previously used by the leather industry

[Table 2](#) shows substances that have historically been used in the leather industry, but at the present time are unlikely to be found in leather articles.

4.3 Chemical test methods for substances not used by the leather industry

[Table 3](#) includes those chemical substances that are restricted but not used in the leather industry. The presence of these substances in leather articles is only likely due to external conditions/contamination.

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