INTERNATIONAL UNION OF LEATHER TECHNOLOGISTS AND CHEMISTS SOCIETIES

IULTCS methods of analysis for leather, including equivalent ISO and EN Standards

The IULTCS, through the IULTCS Testing Commissions (IUC, IUF and IUP), provides help and protection for the leather tanning industry worldwide by developing and publishing test methods that are explicitly relevant to leather manufacture and leather usage. Without the work of the IU Commissions, which develop these test methods, the leather industry could be open to having to meet performance standards of other materials that bear no relationship to the reality of working with leather.

Following agreements in 1990 and re-affirmed in 2005, the ISO recognises IULTCS as an International Standardising Body. ISO has assigned the responsibility for the development of leather test methods to IULTCS and the resultant test method documents are published as joint IULTCS and ISO Standards. **From 2005 it was agreed that ISO is responsible for publishing all new joint IULTCS and ISO Standards**. Member countries of ISO very often use the ISO Standards to establish their own National Standards.

Further, the European Committee for Standardisation (Comité Européen de Normalisation - CEN) has through the CEN/TC 289 Technical Committee “Leather” (Secretariat: UNI Italy) jointly adopted many of the ISO / IU Standards.

To co-ordinate the development of leather test methods, the IU Commissions and the CEN TC 289 Working Groups hold their technical meetings together. Consequently, this combined work of the IULTCS IU Commissions, CEN TC 289 and ISO allows the publication of identical leather test methods for International (ISO), European (EN) and IULTCS Standards.

IULTCS Test methods
Since 2005 the IULTCS / ISO joint test methods are published only by ISO. The joint ISO / IULTCS Standards are available as an ISO Standard from your local national Standards Organisation or online from the ISO website, **https://www.iso.org/store.html**.

If you have any questions or comments relating to leather test methods, please contact the IULTCS.

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Set out in the following pages is a complete list of the IULTCS official methods together with the reference numbers for the equivalent ISO Standards and European Norm (EN) methods.

Standards marked with ** are available but they are currently undergoing revision and an update is in preparation.

Standards with DIS (Draft International Standard) or FDIS (Final Draft International Standard) are in preparation and will be published shortly. These draft Standards can be obtained from your national Standards Organisation but are not yet officially approved ISO Standards.

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INTERNATIONAL UNION OF LEATHER TECHNOLOGISTS AND CHEMISTS SOCIETIES

The IULTCS official methods of analysis for leather, including the equivalent ISO and EN Standards

- update version: April 2024

IULTCS - Chemical Test Methods for leather			
IUC Test method	**Method name**	**ISO Standard**	**EN Standard**
IUC 1 (1965)	General comments	-	-
IUC 2 (2023)	Position and preparation of specimens for testing *(same as IUP 2)*	**ISO 2418:2023**	**EN ISO 2418**
IUC 3 (2017)	Preparation of chemical test samples	**ISO 4044:2017**	**EN ISO 4044**
IUC 4 (2018)	Determination of matter soluble in dichloromethane and free fatty acid content	**ISO 4048:2018**	**EN ISO 4048**
IUC 5 (2005)	Determination of volatile matter	**ISO 4684:2005**	**EN ISO 4684**
IUC 6 (2018)	Determination of water soluble matter, water soluble inorganic matter and water soluble organic matter	**ISO 4098:2018**	**EN ISO 4098**
IUC 7 (1977)	Determination of sulphated total ash and sulphated water insoluble ash	**ISO 4047:1977**	**EN ISO 4047**
IUC 8-1 (2018)	Determination of chromic oxide content Part 1: Quantification by titration	**ISO 5398-1:2018**	**EN ISO 5398-1**
IUC 8-2 (2009)	Determination of chromic oxide content Part 2: Quantification by colorimetric determination	**ISO 5398-2:2009**	**EN ISO 5398-2**
IUC 8-3 (2018)	Determination of chromic oxide content Part 3: Quantification by atomic absorption spectrometry	**ISO 5398-3:2018**	**EN ISO 5398-3**
IUC 8-4 (2018)	Determination of chromic oxide content Part 4: Quantification by inductively coupled plasma (ICP-OES)	**ISO 5398-4:2018**	**EN ISO 5398-4**
IUC 9 (1984)	Determination of water soluble magnesium salts	**ISO 5399:1984**	**EN ISO 5399**
IUC 10 (1984)	Determination of nitrogen and hide substance	**ISO 5397:1984**	**-**
-	Determination of total silicon content – Reduced molybdosilicate spectrometric method	**ISO 5400:1984**	**-**
IUC 11 (2018)	Determination of pH and difference figure	**ISO 4045:2018**	**EN ISO 4045**
IUC 13 (1975)	Determination of zirconium	**-**	**-**
IUC 15 (1973)	Determination of phosphorus	**-**	**-**
IUC 16 (1969)	Determination of aluminium	**-**	**-**
IUC 17 (1980)	Determination of hydroxyproline in materials containing collagen	**-**	**-**
IUC 18-1 (2017)	Determination of hexavalent chromium content – Part 1; Colorimetric method	**ISO 17075-1:2017**	**EN ISO 17075-1**
IUC 18-2 (2017)	Determination of hexavalent chromium content – Part 2; Ion chromatographic method	**ISO 17075-2:2017**	**EN ISO 17075-2**
IUC 19-1 (2021)	Determination of formaldehyde content in leather Part 1: Quantification by HPLC	**ISO 17226-1:2021**	**EN ISO 17226-1**
IUC 19-2 (2017)	Determination of formaldehyde content in leather Part 2: Quantification by colorimetric analysis	**ISO 17226-2:2017**	**EN ISO 17226-2**
IUC 19-3 (2011)	Determination of formaldehyde content in leather Part 3: Formaldehyde emissions from leather	**ISO 17226-3:2011**	**EN ISO 17226-3**
****IUC 20-1** (2020)	Chemical tests for the determination of certain azo colorants in dyed leathers Part 1: Determination of certain aromatic amines derived from azo colorants	****ISO 17234-1:2020**	****EN ISO 17234-1**
IUC 20-2 (2011)	Chemical tests for the determination of certain azo colorants in dyed leathers Part 2: Determination of 4-aminoazobenzene derived from azo colorants	**ISO 17234-2:2011**	**EN ISO 17234-2**

IUC 21 (2003)	Method for the detection of certain azo colourants in dyestuff mixtures. *(Method to be an Annex in next revision of ISO 17234-1)*	**-**	**-**
IUC 22 (2003)	Determination of aluminium oxide content of aluminium tanning agents	**-**	**-**
IUC 24 (2003)	Determination of basicity of aluminium tanning agents.	**-**	**-**
****IUC 25** (2015)	Determination of tetrachlorophenol-, trichlorophenol-, dichlorophenol-, monochlorophenol-isomers and pentachlorophenol content	****ISO 17070:2015**	****EN ISO 17070**
IUC 26 (2021)	Determination of free-formaldehyde content in leather processing chemicals	**ISO 27587:2021**	**EN ISO 27587**
IUC 27-1 (2019)	Chemical determination of metal content. – Part 1: Extractable metals	**ISO 17072-1:2019**	**EN ISO 17072-1**
IUC 27-2 (2022)	Chemical determination of metal content. – Part 2: Total metal content	**ISO 17072-2:2022**	**EN ISO 17072-2**
IUC 28-1 (2023)	Determination of ethoxylated alkylphenols in leather Part 1: Direct method	**ISO 18218-1:2023**	**EN ISO 18218-1**
IUC 28-2 (2018)	Determination of ethoxylated alkylphenols in leather Part 2: Indirect method	**ISO 18218-2:2018**	**EN ISO 18218-2**
IUC 29-1 (2020)	Determination of preservative content (TCMTB-OPP-CMK-OIT) in leather – Part 1; Acetonitrile extraction method	**ISO 13365-1:2020**	**EN ISO 13365-1**
IUC 29-2 (2020)	Determination of preservative content (TCMTB-OPP-CMK-OIT) in leather– Part 2: Artificial perspiration extraction method	**ISO 13365-2:2020**	**EN ISO 13365-2**
IUC 30 (2015)	Determination of chlorinated hydrocarbons in leather - method for short-chain chlorinated paraffins (SCCP)	**ISO 18219:2015**	**EN ISO 18219**
IUC 30-1 (2021)	Leather - Chemical determination of chlorinated hydrocarbons in leather – Part 1: Chromatographic method for short chain chlorinated paraffins (SCCP)	**ISO 18219-1:2021**	**EN ISO 18219-1**
IUC 30-2 (2021)	Leather - Chemical determination of chlorinated hydrocarbons in leather – Part 2: Chromatographic method for middle chain chlorinated paraffins (MCCP)	**ISO 18219-2:2021**	**EN ISO 18219-2**
-	Determination of organo-tin compounds in leather by GC/MS method (**Project transferred to ISO/TC 216 Footwear**)	**ISO/TS 16179:2012** (Footwear method)	**CEN ISO/TS 16179**
IUC 32 (2020)	Quantitative analysis of tanning agents by filter method	**ISO 14088:2020**	**EN ISO 14088**
IUC 33 (2013)	Leather - Determination of tan content of synthetic tanning agents	**ISO 17489:2013**	**EN ISO 17489**
IUC 34 (2016)	Leather - Determination of N-methylpyrrolidone in leather	**ISO 19070:2016**	**EN ISO 19070**
IUC 35 (2016)	Leather - Determination of Cr(VI) and its reductive potential in leather chemicals	**ISO 19071:2016**	**EN ISO 19071**
****IUC 36** (2017)	Leather - Guidelines for testing critical chemicals in leather	****ISO 20137:2017**	****EN ISO 20137**
IUC 37 (2020)	Leather - Determination of degradability by micro-organisms	**ISO 20136:2020**	**EN ISO 20136**
IUC 38 (2019)	Leather - Determination of pesticide residues content in leather	**ISO 22517:2019**	**EN ISO 22517**
IUC 39-1 (2023)	Leather - Per- and polyfluoroalkyl substances — Part 1: Determination of non-volatile compounds by extraction method using liquid chromatography	**ISO 23702-1:2023**	**EN ISO 23702-1**
IUC 40 (2024) (Draft in preparation)	Leather – Chemical analysis – Determination of glutaraldehyde content	**ISO/DIS 25202:2024** (Draft in preparation)	**prEN ISO/DIS 25202** (Draft in preparation)
IUC 41(2018)	Leather - Determination of hexavalent chromium content – Pre-ageing for chemical determination of hexavalent chromium	**ISO 10195:2018**	**EN ISO 10195**
IUC 42 (2023)	Leather – Determination of total content of certain bisphenols	**ISO 11936:2023**	**EN ISO 11936**

** Standard is undergoing revision and an updated version is in preparation

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IULTCS - Chemical Test Methods for leather chemicals			
IUC Test Method*	**Method name**	**ISO Standard**	**EN Standard**
IUC 400 (2024) (Draft in circulation)	Chemicals for the leather tanning industry – Determination of cyclosiloxanes in waterproofing fatliquors	**ISO/DIS 23649:2024** (Draft in circulation)	**prEN ISO/DIS 23649** (Draft in circulation)
IUC 442 (2024)	Chemicals for the leather tanning industry – Determination of total content of certain bisphenols	**ISO 21135:2024**	**EN ISO 21135**

* If an IULTCS test method exists for leather (e.g. IUC xx), then the leather chemical test method number has the format 4xx.

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IULTCS – Physical Test Methods for leather			
IUP Test method	**Method name**	**ISO Standard**	**EN Standard**
IUP 1 (now included in IUP 2)	Sample preparation *(Sample preparation (IUP 1) included in the new IUP 2:2023)*	-	-
IUP 2 (2023)	Position and preparation of specimens for testing *(same as IUC 2)*	**ISO 2418:2023**	**EN ISO 2418**
****IUP 3** (2023) (Final draft)	Specimen and test piece conditioning	****ISO/FDIS 2419:2023** (Final draft in approval vote)	****prEN ISO/FDIS 2419** (Final draft in approval vote)
IUP 4 (2016)	Measurement of thickness	**ISO 2589:2016**	**EN ISO 2589**
IUP 5 (2017)	Measurement of apparent density	**ISO 2420:2017**	**EN ISO 2420**
IUP 6 (2020)	Measurement of tensile strength and percentage elongation	**ISO 3376:2020**	**EN ISO 3376**
****IUP 7** (2016)	Measurement of static absorption of water	****ISO 2417:2016**	****EN ISO 2417**
****IUP 8** (2016)	Measurement of tear load – Double edge tear	****ISO 3377-2:2016**	****EN ISO 3377-2**
****IUP 9** (2015)	Measurement of distension and strength of grain by the ball burst test	****ISO 3379:2015**	****EN ISO 3379**
IUP 10-1 (2011)	Water resistance of flexible leather. Part 1: Linear compression method (Penetrometer)	**ISO 5403-1:2011**	**EN ISO 5403-1**
IUP 10-2 (2011)	Water resistance of flexible leather. Part 2: Angular compression method (Maeser)	**ISO 5403-2:2011**	**EN ISO 5403-2**
IUP 11 (2011)	Measurement of water resistance of heavy leather	**ISO 5404:2011**	**EN ISO 5404**
IUP 12 (2002)	Measurement of resistance to grain cracking and the grain crack index	**ISO 3378:2002**	**EN ISO 3378**
IUP 13 (1961)	Measurement of two dimensional extension	-	-
IUP 14 (1960)	Measurement of waterproofness of gloving leathers	-	-
IUP 15 (2023)	Determination of water vapour permeability	**ISO 14268:2023**	****EN ISO 14268**
IUP 16 (2015)	Measurement of shrinkage temperature up to 100 °C	**ISO 3380:2015**	**EN ISO 3380**
IUP 17 (1966)	Assessment of the resistance of air dry insole leathers to heat	-	-
IUP 18 (1969)	Resistance of air dry lining leathers to heat	-	-
IUP 19 (1969)	Resistance of air dry upper leather to heat	-	-
IUP 20-1 (2022)	Determination of flex resistance. Part 1: Flexometer method	**ISO 5402-1:2022**	**EN ISO 5402-1**
IUP 21 (1963)	Measurement of set in lasting	-	-
IUP 22 (1963)	Assessment of scuff damage by use of the viewing box	-	-
IUP 23 (1963)	Measurement of scuff damage	-	-
IUP 24 (1964)	Measurement of surface shrinkage by immersion in boiling water	-	-
IUP 26 (1993)	Measurement of resistance to abrasion of heavy leather	-	-
IUP 28 (1969)	Measurement of the resistance to bending of heavy leather	-	-
IUP 29 (2017)	Measurement of cold crack temperature of surface coatings	**ISO 17233:2017**	**EN ISO 17233**
IUP 30 (1983)	Measurement of water vapour absorption and desorption (See IUP 42)	-	-
IUP 32 (2014)	Measurement of area	**ISO 11646:2014**	**EN ISO 11646**
IUP 35 (2002)	Determination of the dimensional stability of leather (Old title: Measurement of dry heat resistance of leather)	**ISO 17227:2002**	**EN ISO 17227**
IUP 36 (2015)	Measurement of leather softness	**ISO 17235:2015**	**EN ISO 17235**
IUP 37 (2017)	Measurement of water repellency of garment leather	**ISO 17231:2017**	**EN ISO 17231**
IUP 38 (2017)	Measurement of heat resistance of patent leather	**ISO 17232:2017**	**EN ISO 17232**
IUP 39 (2015)	Determination of flex resistance. Part 2: Vamp flex method	**ISO 5402-2:2015**	**EN ISO 5402-2**
IUP 40 (2011)	Measurement of tear load – Single edge tear	**ISO 3377-1:2011**	**EN ISO 3377-1**

IUP 41 (2011)	Measurement of surface coating thickness	**ISO 17186:2011**	**EN ISO 17186**
IUP 42 (2016)	Measurement of water vapour absorption	**ISO 17229:2016**	**EN ISO 17229**
****IUP 43** (2016)	Measurement of extension set	****ISO 17236:2016**	****EN ISO 17236**
IUP 44 (2019)	Measurement of stitch tear resistance	**ISO 23910:2019**	**EN ISO 23910**
IUP 45 (2006)	Measurement of water penetration pressure	**ISO 17230:2006**	**EN ISO 17230**
IUP 46 (2006)	Measurement of fogging characteristics	**ISO 17071:2006**	**EN ISO 17071**
IUP 47 (2006)	Measurement of resistance to horizontal spread of flame	**ISO 17074:2006**	**EN ISO 17074**
IUP 48-1 (2020)	Measurement of abrasion resistance. Part 1: Taber method	**ISO 17076-1:2020**	**EN ISO 17076-1**
IUP 48-2 (2011)	Measurement of abrasion resistance. Part 2: Martindale ball plate method	**ISO 17076-2:2011**	**EN ISO 17076-2**
IUP 49 (Draft: 2002)	Measurement of bagginess, creep and relaxation	**-**	**CEN/TS 14689:2006**
IUP 50	*Free (original document changed to IUP 53-2)*	**-**	**-**
IUP 51 (Draft: 2002)	Measurement of Surface Friction	**-**	**-**
IUP 52 (Draft: 2002)	Measurement of Compressibility	**-**	**-**
IUP 53-1 (2019)	Determination of soiling. Part 1: Martindale method	**ISO 26082-1:2019**	**EN ISO 26082-1**
IUP 53-2 (2012)	Determination of soiling. Part 2: Tumbling method	**ISO 26082-2:2012**	**EN ISO 26082-2**
IUP 54 (2022)	Determination of flexural properties	**ISO 14087:2022**	**EN ISO 14087**
IUP 55 (2021)	Determination of dimensional change	**ISO 17130:2021**	**EN ISO 17130**
IUP 56 (2020)	Identification of leather with microscopy	**ISO 17131:2020**	**EN ISO 17131**
IUP 57 (2015)	Determination of water absorption by capillary action (wicking)	**ISO 19074:2015**	**EN ISO 19074**
IUP 58 (2023)	Measurement of leather surface – Electronic techniques	**ISO 19076:2023**	**EN ISO 19076**

** Standard is undergoing revision and an updated version is in preparation

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IULTCS – Fastness Test Methods for leather (including other test methods)			
IUF Test method	**Method name**	**ISO Standard**	**EN Standard**
IUF 105 (1966)	Numbering code for fastness tests	-	-
IUF 110 (2014)	Leather – Sampling – Number of items for a gross sample	**ISO 2588:2014**	**EN ISO 2588**
IUF 120 (2022)	General principles of colour fastness testing of leather	**ISO 7906:2022**	**EN ISO 7906**
IUF 131 (1966)	Grey scale for assessing change in colour	***ISO 105-A02:1993** (incl. later amendment)	***EN ISO 105-A02**
IUF 132 (1966)	Grey scale for assessing staining	***ISO 105-A03:1993** (incl. later amendment)	***EN ISO 105-A03**
IUF 151 (1975)	Preparation of storable standard chrome grain leather for dyeing	-	-
IUF 201 (1966)	Approximate determination of the solubility of leather dyes	-	-
IUF 202 (1966)	Fastness to acid of dye solutions	-	-
IUF 203 (1966)	Stability to acid of dye solutions	-	-
IUF 205 (1972)	Stability to hardness of dye solutions	-	-
IUF 401 (1972)	Colour fastness of leather to light: Daylight	***ISO 105-B01:2014**	***EN ISO 105-B01**
IUF 402 (1975)	Colour fastness of leather to light: Xenon lamp	***ISO 105-B02:2014**	***EN ISO 105-B02**
IUF 412 (2015)	Change of colour with accelerated ageing.	**ISO 17228:2015**	**EN ISO 17228**
IUF 420 (1998)	Colour fastness to water spotting	**ISO 15700:1998**	**EN ISO 15700**
****IUF 421** (2013)	Colour fastness to water	****ISO 11642:2013**	****EN ISO 11642**
****IUF 422** (2024) (Draft in preparation)	Colour fastness to sea water	****ISO/DIS 25089:2024** (Draft in preparation)	****prEN ISO/DIS 25089** (Draft in preparation)
IUF 423 (1998)	Colour fastness to mild washing	**ISO 15703:1998**	**EN ISO 15703**
****IUF 426** (2013)	Colour fastness to perspiration	****ISO 11641:2013**	****EN ISO 11641**
IUF 427 (2017)	Colour fastness to saliva	**ISO 20701:2017**	**EN ISO 20701**
****IUF 428** (2024) (Draft in preparation)	Colour fastness to hydroalcoholic mixtures	**ISO/DIS 7979:2024** (Draft in preparation)	**prEN ISO/DIS 7979** (Draft in preparation)
IUF 434 (2009)	Colour fastness of small samples to solvents	**ISO 11643:2009**	**EN ISO 11643**
IUF 435 (1998)	Colour fastness to machine washing	**ISO 15702:1998**	**EN ISO 15702**
IUF 441 (1972)	Colour fastness in respect of staining raw crepe rubber	-	-
****IUF 442** (2015)	Colour fastness to migration into polymeric materials	****ISO 15701:2015**	****EN ISO 15701**
IUF 450 (2018)	Colour fastness to cycles of to-and-fro rubbing	**ISO 11640:2018**	**EN ISO 11640**
IUF 452 (2012)	Colour fastness to crocking	**ISO 20433:2012**	**EN ISO 20433**
IUF 454 (1975)	Fastness to buffing of dyed leather	-	-
IUF 458 (1984)	Colour fastness of leather to ironing	-	-
IUF 470 (2022)	Leather – Test for adhesion of finish	**ISO 11644:2022**	**EN ISO 11644**
IUF 472 (2013)	Leather – Determination of surface reflection	**ISO 17502:2013**	**EN ISO 17502**
IUF 474 (2019)	Leather – Measuring colour and colour difference of finished leather	**ISO 22700:2019**	**EN ISO 22700**

The following textile fastness Standards do not have equivalent IU leather test methods but are recommended for use as the International Standard for leather.

-	Instrumental assessment of the degree of staining of adjacent fabrics	**ISO 105-A04:1989**	**EN ISO 105-A04**
-	Instrumental assessment for change in colour for grey scale	**ISO 105-A05:1996**	**EN ISO 105-A05**
-	Colour fastness & ageing to artificial light at high temperatures: Xenon	**ISO 105-B06:2020**	**EN ISO 105-B06**
-	Oil repellency – Hydrocarbon resistance test	**ISO 14419:2010**	**EN ISO 14419**

** Standard is undergoing revision and an updated version is in preparation
*** Nearest textile International Standard, recommended for use as the International Standard for leather