



**LEATHER  
STANDARD**

# **Testing Methods**

# **OEKO-TEX® LEATHER**

# **STANDARD**

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**OEKO-TEX®**  
**International Association for Research and Testing in**  
**the Field of Textile and Leather Ecology.**  
国际环保纺织和皮革协会

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Testing procedures for authorization to use the OEKO-TEX® LEATHER STANDARD mark

授权使用 OEKO-TEX® LEATHER STANDARD 标识的检测程序。

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## General remarks

In case an article, which shall be certified according to OEKO-TEX® LEATHER STANDARD, contains also textile and non-textile (e.g. metallic) components, these components are tested according to the conditions and criteria of OEKO-TEX® STANDARD 100 and the methods used there. For this, please refer to the corresponding documents.

## Abbreviations

- AAS - atom absorption spectrometer
- CI - chemical ionisation
- DAD - diode array detector
- EI - electron impact
- FLD - fluorescence detector
- IC - ion chromatography
- ICP - inductively coupled plasma
- GC - gas chromatography
- LC - liquid chromatography
- MS - mass spectrometry
- OES - optical emission spectrometry
- UV/VIS - ultraviolet-visible

## 1 pH value

The pH value is determined according to ISO 4045 using purified water as extraction solution.

## 2 Formaldehyde

The determination of free and released formaldehyde is performed according to ISO 17226-1 using an aqueous extraction followed by DNPH derivatization and HPLC-DAD analysis of the extract.

## 3 Heavy metals

### 3.1 Extractable heavy metals

The heavy metals with exception of chromium (VI) are extracted by use of artificial acidic sweat solution according to ISO 17072-1. The extract is analysed by means of ICP-OES, ICP-MS or AAS. Metallic accessories having a surface refinement or coating are additionally subjected to a further test for extractable nickel after a pre-treatment (wear and corrosion according to EN 12472:2020, used for its abrasion medium).

### 3.2 Heavy metal total content

The samples are chemically digested using acids to obtain a clear extract containing the heavy metals

## 总论

如果根据 OEKO-TEX® LEATHER STANDARD 标准认证的产品还包含纺织品和非纺织品（如金属）组件，则应根据 OEKO-TEX® STANDARD 100 的条件和标准及其规定的方法对这些组件进行检测。请参阅相关文件。

## 缩写

- AAS - 原子吸收光谱仪
- CI - 化学电离
- DAD - 二极管阵列检测器
- EI - 电子电离
- FLD - 荧光检测器
- IC - 离子色谱法
- ICP - 电感耦合等离子体
- GC - 气相色谱法
- LC - 液相色谱法
- MS - 质谱分析法
- OES - 发射光谱法
- UV/VIS - 紫外-可见分光光度法

## pH 值

根据 ISO 4045 使用纯净水作为提取液测定 pH 值。

## 甲醛

根据 ISO 17226-1 使用水性提取溶液对游离甲醛和释放甲醛进行测定，使用 DNPH 衍生化和 HPLC-DAD 对提取物进行分析。

## 重金属

### 可萃取重金属

根据 ISO 17072-1 使用人造酸汗液提取除铬(VI)之外的重金属。通过 ICP-OES、ICP-MS 或 AAS 分析提取物。经过表面细化或具有涂层的金属配饰在预处理（根据 EN 12472:2020 进行的磨损和腐蚀，用作其磨损介质）之后须接受可萃取镍的进一步检测。

### 重金属总含量

使用酸对样品进行化学消解以获得含重金属的澄清提取物，然后通过 ICP-OES、ICP-MS 或 AAS 对其

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which is afterwards analysed by means of ICP-OES, ICP-MS or AAS. Different components of the sample, which can be differentiated macroscopically (base material, paints, etc.), are separately digested and analysed. The method is therefore suitable to check the samples for total lead content in reference to the requirement of the American legislation for children's articles (CPSIA, Consumer Product Safety Improvement Act).

### 3.3 Chromium (VI)

Whenever possible the examination according to ISO 17075-2 (determination by means of IC) is performed. When this is not possible, the colorimetric procedure by means of UV/VIS (ISO 17075-1) is performed, in which 1,5-diphenylcarbazide is oxidized by Chrom(IV) and a complex is formed which can be quantified photometrically.

## 4 Pesticides

Polar and apolar pesticides are extracted by ASE (or Soxhlet) using methanol or acetone. After clean-up, extracts are analysed for pesticides with GC-MS and LC-MS.

## 5 Chlorinated phenols

The tests are performed according to ISO 17070. The substances are stripped off the leather sample by steam distillation. After extractive acetylation, the organic phase is analysed for chlorinated phenols by means of GC-MS or GC-ECD.

## 6 Phthalates

The test is performed by extraction of the testing material with tetrahydrofuran, followed by precipitation of the polymers with (cyclo)hexane. The extract is analysed by GC-MS.

### 6.1 Siloxanes

The test is performed by extraction of the testing material with tetrahydrofuran, followed by precipitation of the polymers with (cyclo)hexane. The extract is analysed by GC-MS.

## 7 Organic tin compounds

The method is based on an extraction of the testing material with an ethanol/acetic acid solution and tropolone followed by derivatisation with sodium tetraethylborate. The extract is then analysed by GC-MS.

进行分析。对于能够在宏观上加以区分的不同样品组件(基础材料, 油漆等), 分别进行消解和分析。因此, 根据美国儿童用品法规 (CPSIA 消费品安全改进法) 的要求, 该方法适用于检测样品中的总铅含量。

### 六价铬

根据 ISO 17075-2 (通过离子色谱法测定) 进行检测。如果无法做到这一点, 则通过 UV/VIS (ISO 17075-1) 进行比色测定。在此过程中, 1,5-二苯基卡巴肼被铬 (IV) 氧化, 形成一种络合物, 可通过光度法进行定量测定。

### 杀虫剂

极性和非极性农药通过 ASE (或索氏提取法) 用甲醇或丙酮萃取。净化后的提取物用 GC-MS 及 LC-MS 分析。

### 氯化苯酚

根据 ISO 17070 进行测定, 物质通过蒸汽蒸馏方式从皮革样品上提取出来。萃取乙酰化后, 通过 GC-MS 或 GC-ECD 分析有机相中的氯化苯酚。

### 塑化剂 (邻苯二甲酸酯)

通过四氢呋喃提取测试物质, 后用正己烷沉淀聚合物来进行测试, 提取物通过 GC-MS 分析。

### 硅氧烷

通过四氢呋喃萃取测试材料, 然后用 (环) 己烷沉淀聚合物来进行测试, 提取物通过 GC-MS 分析。

### 有机锡化合物

该方法基于用乙醇/乙酸溶液及托普隆提取测试物质, 后用四乙基硼酸钠产生衍生作用。提取物通过 GC-MS 进行分析。



## 8 Short and medium chained chlorinated paraffins (SCCP & MCCP)

The method for the determination of the short and medium chained chlorinated paraffins is based on an extraction of the testing material with a mix of dichloromethane/(cyclo)hexane, followed by a clean-up and subsequent analysis with GC-MS. For a total analysis (sum of short, medium and long chained chlorinated paraffins) the instrument is operated in the EI mode. CI mode is used for the identification and quantification of the SCCP and MCCP congeners present in the sample.

## 短链和中链氯化石蜡(SCCP & MCCP)

在短链和中链氯化石蜡的测定中，用二氯甲烷/（环）己烷混合液对测试材料进行萃取，然后用 GC-MS 进行净化和分析。CI 模式用于定性和定量样品中存在的短链氯化石蜡和中链氯化石蜡同系物。仪器在 EI 模式下运行，筛查（分析所有短链、中链和长链氯化石蜡的总量）。

## 9 Per- and polyfluoroalkyl substances (PFAS)

PFAS are extracted from the samples using strongly alkaline methanol in an ultrasonic bath. This alkalinity allows for hydrolysis of, for instance, fluorinated polymers and esters and results in release of PFAS. After neutralization with acid, PFAS are analyzed using LC-MS.

## 全氟和多氟烷基物质 (PFAS)

在超声波仪中使用强碱性甲醇从样品中提取 PFAS。这种碱性可使含氟聚合物和酯等水解，从而释放出 PFAS。用酸中和后，使用 LC-MS 对 PFAS 进行分析。

## 10 Dimethylfumarate (DMFu)

The method is based on an extraction of the samples with acetone. After preconcentration the extracts are analysed with GC-MS.

## 富马酸二甲酯 (DMFu)

使用丙酮提取样品。提取物经过预浓缩后，用 GC-MS 进行分析。

## 11 Colourants

## 着色剂

### 11.1 Azo dyes, arylamines and aniline

The tests for azo dyes, which may be cleaved into arylamines with cancerogenic properties, are carried out following the official test methods according to ISO 17234-1 and 17234-2, i.e. samples are defatted and reduced. After liquid-liquid extraction, arylamines are analysed with two chromatography methods, preferably HPLC-DAD and GC-MS. The test for the aromatic amine aniline (cleavable from colorants as well as for the presence as chemical residue in free manner) is carried out together with the analyses of azo dyes.

### 偶氮染料、芳香胺和苯胺

根据 ISO 17234-1 和 17234-2 的官方测试方法对可裂解成具有致癌特性的芳香胺偶氮染料进行测试，即对样品进行脱脂和还原处理。经液-液萃取后，使用两种色谱法，推荐使用 HPLC-DAD 及 GC-MS 对芳香胺进行测试分析。芳香胺苯胺（可由着色剂裂解以及以化学残留物方式的游离存在）的检测可与偶氮染料分析一起进行。

### 11.2 Allergenic, carcinogenic and other banned colourants

The identification and quantification of dyestuff with allergenic and carcinogenic potential, other banned dyestuff and pigments and Michler's ketone and base is achieved through a hot acetone extraction followed by detection with LC-DAD or LC-MS.

### 致敏、致癌和其他禁用着色剂

具有过敏性和致癌性的染料，颜料及米氏酮，米氏碱的定性和定量测试通过热丙酮萃取，然后用 LC-DAD 或 LC-MS 进行检测

## 12 Chlorinated benzenes and toluenes

The method is based on an ultrasonic bath extraction of the testing materials with dichloromethane. The extracts are analysed by means of GC-MS.

## 氯化苯和氯化甲苯

该测试方法使用二氯甲烷对测试物在超声波浴进行提取，然后通过 GC-MS 分析提取物。

## 13 Polycyclic aromatic hydrocarbons (PAH)

The method is based on extraction of the test samples with toluene. The extracts are analysed with GC-MS.

## 多环芳香烃 ( PAH )

该测试方法使用甲苯提取测试物，然后通过 GC-MS 分析提取物。

## 14 Solvent residues

The method is based on extraction of the test samples with methanol. The extracts are analysed with GC-MS.

## 溶剂残留

该测试方法使用甲醇提取测试物。然后通过 GC-MS 分析提取物。

## 15 UV stabilisers

The method is based on extraction of samples with THF or with a dichloromethane-(cyclo)hexane mixture. The extracts are then analysed with LC-DAD, LC-MS or GC-MS.

## 紫外线稳定剂

该方法采用四氢呋喃或含二氯甲烷- (环) 己烷混合物提取样品。然后用 LC-DAD、LC-MS 或 GC-MS 对提取物进行分析。

## 16 Banned flame retardants

The determination of the banned flame retardants is performed by extraction of the test material with acetone or toluene. The extract is then analysed by LC-MS and GC-MS.

## 禁用阻燃剂

检测禁用阻燃剂的方法是用丙酮或甲苯萃取测试材料。然后用 LC-MS 及 GC-MS 对提取物进行分析。

## 17 Volatile organic compounds (VOCs), glycols, cresols and chlorinated solvents

The sample that is to be analysed for organic volatile compounds, glycols, cresols and chlorinated solvents is baked out by thermodesorption technique. The released substances are enriched on suitable trapping material and afterwards analysed by GC-MS.

## 挥发性有机化合物(VOC)、乙二醇、甲酚和氯化溶剂

通过热吸附方式进行挥发性有机化合物、乙二醇、甲酚和氯化溶剂的测试。将释放的物质富集于合适的捕集材料上，然后采用 GC-MS 进行分析。

## 18 Quinoline

The extraction of the samples is achieved by hot extraction with acetone. The measurement of the of quinoline extracted from the material and is performed in comparison with reference substances by use of LC-MS or GC-MS.

## 喹啉

通过丙酮热萃取法提取测试材料。使用 LC-MS 或 GC-MS 测量从材料中提取的喹啉含量，并与对照物质进行比较。





## 19 N-nitrosamines and N-nitrosatable substances

The N-nitrosamines and N-nitrosatable substances migrate into a saliva test solution. The N-nitrosatable substances react to N-nitrosamines by acidification. The analysis of the N-nitrosamines and N-nitrosatable substances is done by LC-MS.

## 亚硝胺和亚硝基物质

亚硝胺和亚硝基物质迁移至唾液测试溶液中。亚硝基物质通过酸化反应生成亚硝胺。使用 LC-MS 对亚硝胺和亚硝基物质进行分析。

## 20 Alkylphenols, Alkylphenol ethoxylates

The method is based on extraction of the test samples with methanol in an ultrasonic bath. The extracts are then analysed with LC-MS and/or GC-MS.

## 烷基酚、烷基酚聚氧乙烯醚

该方法是在超声波浴中用甲醇萃取测试物。然后用 LC-MS 和/或 GC-MS 对提取物进行分析。

## 21 Process preservative agents

The process preservative agents are extracted in an ultrasonic bath extraction with acetonitrile. The filtered extract is then analysed by LC-DAD.

## 加工防腐剂

使用乙腈超声浴提取法提取加工防腐剂。然后使用 LC-DAD 分析过滤后的提取物。

## 22 N-Methyl-2-pyrrolidone (NMP)

NMP is extracted from the leather samples in an ultrasonic bath with acetone. An aliquot of the extract is then used for a GC-MS analysis.

## N-甲基吡咯烷酮 (NMP)

使用丙酮超声浴从皮革样品中提取 NMP。然后使用 GC-MS 分析提取物。

## 23 Emission of volatile chemicals

For the determination of emitted volatile chemicals, the methods are based on ISO 16000-3 (formaldehyde) and ISO 16000-6 (VOCs), using an emission chamber according to ISO 16000-9. Formaldehyde is adsorbed on DNPH cartridges, eluted with acetonitrile and analysed using LC-DAD or LC-FLD. For VOCs, different adsorbents are used and analysis is performed by thermal desorption and GC-MS.

## 挥发性化学品释放量

对于挥发性化学品的检测，基于 ISO 16000-3 (甲醛) 和 ISO 16000-6 (挥发性有机化合物) 的方法，使用符合 ISO 16000-9 标准的释放舱。甲醛吸附在 DNPH 试剂盒上，用乙腈溶离，然后使用 LC-DAD 或 LC-FLD 进行分析。对于挥发性有机化合物，则使用不同的吸附剂，并通过热脱附技术和 GC-MS 进行分析。

## 24 Glutaraldehyde

Glutaraldehyde is extracted from the leather samples in the ultrasonic bath with an aqueous solution and derivatized with DNPH, followed by an analysis through LC-DAD.

## 戊二醛

使用水溶液超声浴从皮革样品中提取戊二醛，并用 DNPH 进行衍生，然后通过 LC-DAD 进行分析。

## 25 Phenol

The determination of phenol is performed by extraction of the test material with methanol in an ul-

## 苯酚

苯酚的测定是通过在超声波浴中用甲醇提取测试物来进行的。然后使用 LC-FLD 分析提取物。



trasonic bath. The extract is analysed then by LC-FLD.

## 26 Bisphenols

The determination of bisphenols is performed by extraction of the test material with THF in an ultrasonic bath followed by a polymer precipitation with methanol or (cyclo)hexane. The extract is then analysed by LC-MS.

## 27 Total fluorine

The method is based on direct sample combustion with oxygen. The resulting HF is collected in an absorber solution and can then be analysed for the fluorine content using IC.

## 28 N-(Hydroxymethyl)acrylamide

The method is based on an extraction of samples with hot water in an ultrasonic bath. The extract is analysed by LC-DAD.

## 29 Melamine

The samples are extracted with detergent solution in a shaking bath (acc. to Japanese Law 112 / JIS L 1041 - 2011) and the is extract analyzed on LC-DAD.

## 30 Colour fastness

In all colour fastness tests cited below only the fastness grades with respect to staining of the adjacent fabrics are determined. The basic methods for performing and evaluating the test are ISO 105-A01 and ISO 105-A03. More specifically, the following tests are performed:

- Determination of colour fastness to water according to ISO 11642
- Determination of colour fastness to rubbing according to ISO 11640
- Determination of colour fastness to saliva according to ISO 105-A01
- Determination of colour fastness to perspiration according to ISO 11641

## 31 Odour

A sample of defined area is conditioned in a desiccator of set humidity and the odour formed is evaluated sensorially by a set of test persons.

## 双酚类物质

测定双酚的方法是在超声浴中用四氢呋喃萃取测试材料，然后用甲醇或（环）己烷进行聚合物沉淀。再使用 LC-MS 对提取物进行分析。

## 总氟

该方法基于样品与氧气直接燃烧。产生的氢氟酸被收集到吸收溶液中，然后使用 IC 分析氟含量。

## N-（羟甲基）丙烯酰胺

在超声波浴中用热水提取测试材料。然后用 LC-DAD 对提取物进行分析。

## 三聚氰胺

测试物在振荡水浴中用洗涤剂溶液提取（根据日本法律 112 / JIS L 1041 - 2011），提取物在 LC-DAD 上进行分析。

## 色牢度

在下文提及的所有色牢度测试中，仅测定衬贴织物沾色的色牢度等级。执行和评估测试的基本方法依据是 ISO 105-A01 和 ISO 105-A03。更具体的说，执行以下测试：

- 按照 ISO 11642 进行的耐水色牢度测定
- 按照 ISO 11640 进行的耐干摩擦色牢度的测定
- 按照 ISO 105-A01 进行的耐唾液色牢度的测定
- 按照 ISO 11641 进行的耐汗液色牢度的测定

## 气味

将确定范围内的样品放入湿度已设定的干燥器中进行调节，所形成的气味由一组测试人员通过感官进行评估。



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All articles are subjected to a preliminary odour test, which, if failed, stops the certification procedure. The odour from mould, high boiling fractions of petrol (from colour printing), fish (from permanent finishing) or aromatic hydrocarbons will lead to a test failure. Moreover, odorants (perfumes) used for removing or covering the smell of a textile material originating from its production (oil, fats, dyestuffs) must not be detected during sensory odour testing.

所有的产品都要经过初步的气味测试，如未能通过测试，则认证程序将停止。霉菌、高沸汽油馏分（彩色印刷）、鱼腥（来自永久整理）或芳香烃的气味会导致测试失败。此外，在感官气味测试过程中，不得检出用于去除或掩盖纺织原料（油、脂肪、染料）气味的气味剂（香精）。