

# **BLUE ANGEL**

**The German Ecolabel**



**Footwear and insoles**

**DE-UZ 155**

**Basic Award Criteria**

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## The Environmental Label is supported by the following four institutions:



Federal Ministry  
for the Environment, Nature Conservation  
and Nuclear Safety

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety is the owner of the label. It regularly provides information on the decisions taken by the Environmental Label Jury.



The German Environmental Agency with its specialist department for "Ecodesign, Eco-Labeling and Environmentally friendly Procurement" acts as office of the Environmental Label Jury and develops the technical criteria of the Basic Criteria for Award of the Blue Angel.



The Environmental Label Jury is the independent, decision-making body for the Blue Angel and includes representatives from environmental and consumer associations, trade unions, industry, the trade, crafts, local authorities, academia, the media, churches, young people and the German federal states



The RAL gGmbH is the awarding body for the Environmental Label. It organises the process for developing the relevant award criteria in independent expert hearings – which involve all relevant interest groups.

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**This document is a translation of a German original. In case of dispute, the original document should be taken as authoritative.**

# **1 Introduction**

## **1.1 Preface**

In cooperation with the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the German Environmental Agency and considering the results of the expert hearings conducted by RAL gGmbH, the Environmental Label Jury has set up these Basic Criteria for the Award of the Environmental Label. RAL gGmbH has been tasked with awarding the Environmental Label.

Upon application to RAL gGmbH and on the basis of a Contract on the Use of the Environmental Label to be concluded with RAL gGmbH, the permission to use the Environmental Label may be granted to all products, provided that they comply with the requirements as specified hereinafter.

The product must comply with all the legal requirements in the country in which it is to be marketed. The applicant shall declare that the product meets this requirement.

## **1.2 Background**

There were 14,762 people employed at 36 footwear manufacturers (each with a total of more than 50 employees) in Germany in 2017. The total number of footwear manufacturers was 80. Revenue in this period stood at around 2.9 billion Euro<sup>1</sup>. In 2016, there were 36.6 million pairs of shoes manufactured in Germany. 449 million pairs of shoes were available for sale domestically in Germany in 2016. German shoes accounted for 31.9 percent of the shoes available for sale domestically in Germany in 2016. This corresponds to 143 million pairs of shoes. Only a very small amount of these shoes and insoles are currently certified with an environmental label.

Footwear manufacturing can be broken down into many subsectors, from the production of the materials used for the footwear and insoles (leather, plastic, textile fibres) through to the bootleg manufacture, shoe assembly and the finishing of the shoes. For these Basic Award Criteria, the entire production cycle was considered and requirements for environmentally relevant processes were developed. The number of criteria has increased to 10 in comparison to the previous version in order to specify requirements for a broader range of shoes. In general, the more complex a shoe is, the more requirements it has to observe. These requirements are usually verified by completing tests on the materials or the end product. The product cycles for average shoes are six months. These short product cycles are taken into account by using tests and verifications that are as modular as possible.

Footwear is an important example of the globalisation and digitalisation of production and consumption, as well as constantly changing consumer preferences. The main production locations for the labour-intensive and environmentally-relevant processes can be found primarily in emerging and developing countries such as China, Vietnam, India and Indonesia. As the legal regulations vary and are not as strict in these countries, shoe manufacturing can cause significant problems for the environment and social structures. If there is a lack of waste water treatment in the tanning process, for example, regional water reserves will be highly polluted with chemicals. Residues from the chemicals used in the manufacturing process could also be released when wearing the shoes and result in health issues or allergic reactions.<sup>2</sup>

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<sup>1</sup> German Federal Association of the Footwear and Leather Goods Industry, <http://www.hdsl.eu/>.

<sup>2</sup> Joint Research Centre (JRC) of the European Commission (2013): BACKGROUND REPORT: Revision of the EU Ecolabel for the product group "Footwear"; JRC (2013): Best Available techniques (BAT)

An improvement in the environmental, health and social standards in production, sales and the products themselves can only be achieved with the most complete documentation possible of the origins of the materials and the production conditions, as well as the materials used in the production and processing stages. Manufacturers and suppliers are thus recommended to implement an environmental management system and publicly document it in the form of an environmental or sustainability report. In order to demonstrate responsible corporate management, it is also recommended that manufacturers and their suppliers implement the OECD Guidelines for Multinational Enterprises<sup>3</sup> or the specific guidelines for the clothing and footwear industries in the form of the OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector<sup>4</sup>.

In the next revision of the Basic Award Criteria for the Blue Angel for footwear, the following points will be addressed or taken into account.

The scope of the Basic Award Criteria currently states that "The footwear must not contain any electric or electronic components". By taking into account the developments with respect to radio-frequency identification (RFID), the next revision will explicitly specify whether and to what extent an exception will be made for passive electronic components and what specific requirements need to be met. This could also have possible consequences with respect to the provision of more detailed consumer information and the disposal or recycling of the footwear. Furthermore, the origins of vegetable tannins will be taken into account in a future revision to incentivise the use of vegetable tanning agents from sustainable production (e.g. a reforestation programme) so that the extraction of the vegetable tanning agents does not threaten endangered species or the biological equilibrium. The chromium extraction process will also be examined at the same time. The latest research results on the allergenic effects of vegetable tanning agents and footwear processed using chromium will also be examined and taken into account.

In addition to the obligatory limit values for leather defined in the list from the cooperation for assuring defined standards, the so-called CADS lists, from the German Federal Association of the Footwear and Leather Goods Industry, leather can also comply with the limit values defined in the Zero Discharge of Hazardous Chemicals Manufacturing Restricted Substances List (ZDHC MRSL), Chapter 2<sup>5</sup>. In the production of textile materials, it is already obligatory to comply with the ZDHC MRSL and the associated limit values. These aspirations will also be laid down by the German government in the form of a textile partnership so that this requirement is also transferred to textile footwear or the textile materials used in footwear. In the case of leather shoes, the aim should also be to place the focus on those chemicals added in the supply chain in addition to the (exclusive) testing of the end product. It is expected that footwear as a product group will become an increasingly important part of the textile partnership in the future.

In addition, the development of waste water standards in the ZDHC will be monitored and examined to see if any changes are required in a future revision.

There is a requirement for wood and wooden materials to be sourced from sustainably managed forests and not from illegal logging and trade or from forests that are worthy of protection for ecological and/or social reasons. As part of this current revision, these requirements were

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Reference Document for the Tanning of Hides and Skins,  
[http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN\\_Published\\_def.pdf](http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN_Published_def.pdf).

<sup>3</sup> <http://www.oecd.org/berlin/publikationen/oecd-leitsaetze-fuer-multinationale-unternehmen.htm>.

<sup>4</sup> [http://www.oecd-ilibrary.org/governance/oecd-due-diligence-guidance-for-responsible-supply-chains-in-the-garment-and-footwear-sector\\_9789264290587-en](http://www.oecd-ilibrary.org/governance/oecd-due-diligence-guidance-for-responsible-supply-chains-in-the-garment-and-footwear-sector_9789264290587-en).

<sup>5</sup> [http://www.roadmaptozero.com/fileadmin/pdf/MRSL\\_v1\\_1.pdf](http://www.roadmaptozero.com/fileadmin/pdf/MRSL_v1_1.pdf)

examined to see if they could be transferred to cork and natural rubber. Due to the fact that the number of certified products is still too low, no requirement for cork and natural rubber was formulated. However, if the amount of sustainably produced cork continues to develop in a positive manner – as has already been the case in the last few years – a requirement will be formulated in this context.

The concentration of dimethylformamide (DMF) in artificial leather or polymer coatings based on polyurethane is currently not permitted to exceed a limit value of 50 mg/kg. Due to the mutagenic effects of DMF, a revision of the Basic Award Criteria will work towards the total elimination of DMF.

The impact of footwear manufacturing on the environment and reducing climate-relevant gases is indirectly addressed in various different paragraphs of these Basic Award Criteria. The extent to which the carbon footprint of a pair of manufactured shoes or an insole can be used as a requirement will be examined in the next revision.

The reparability of footwear has been addressed for the first time in the current Basic Award Criteria. However, this criterion only refers to the provision of information on the packaging. Due to the great importance of this criterion, the aim is to develop a corresponding, obligatory criterion as part of a future revision.

In addition, a future revision will examine the abrasion behaviour of footwear, i.e. the level of abrasion and thus its impact on the environment.

The social criteria currently focus on the direct suppliers (tier 1) for the manufactured footwear and insoles. As a result, the footwear manufacturer should start to consider the social conditions within the supply chain more closely. Of course, social risks do not only exist at the direct suppliers and violations of social standards are in fact widespread within the upstream links of the supply chain. The aim is thus to expand the supply chain in any future revision. In particular, the main focus will be placed on the most important social risks. This should ensure that footwear manufacturers concentrate on the most relevant risks (a so-called risk-based approach) as recommended in the Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear<sup>6</sup> published by the OECD. In addition, it will be examined whether other ILO standards should be taken into account, such as ILO 135 (minimum wage fixing recommendation, with special reference to developing countries) or ILO 154 (collective bargaining convention). Furthermore, developments with regards to ensuring the payment of a living wage (ILO 131 and ILO 135) will be observed with respect to ensuring a living wage for those employed in the footwear manufacturing industry. The prerequisite here is the introduction of a standardised investigation process and a standardised approach to calculating living wages and the provision of corresponding verification.

### **1.3 Objectives of the environmental label**

In order to make consumers clearly aware of the efforts being made in the area of product responsibility, it is necessary to provide transparent and credible product information and product labelling. The objective of the environmental label is thus to highlight those products that meet high environmental standards in their production, avoid the use of chemicals that are damaging to health, deliver good performance characteristics and comply with ILO fundamental labour standards and other ILO standards during their production. The environmental label will thus offer guidance for the use of sustainable products by:

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<sup>6</sup> [http://www.oecd-ilibrary.org/governance/oecd-due-diligence-guidance-for-responsible-supply-chains-in-the-garment-and-footwear-sector\\_9789264290587-en](http://www.oecd-ilibrary.org/governance/oecd-due-diligence-guidance-for-responsible-supply-chains-in-the-garment-and-footwear-sector_9789264290587-en).



- Promoting higher environmental standards in the production process;
- Avoiding chemicals hazardous to health in the end product;
- Improving occupational safety and social conditions during production;
- Verifying the product's fitness for use.

Therefore, the following benefits for the environment and health are stated in the explanatory box:



## 1.4 Definitions

- **Babies' and children's shoes/insoles:** Shoes or insoles for babies and children up to 3 years of age or up to and including shoe size 28.
- **Insoles:** The layer of the sole that comes into contact with the foot, generally referred to as the insole. As the upper and also the rest of the sole are attached to the insole in most shoe designs, it is considered the foundation of the shoe, providing it with stability and preserving the shape, as well as being extremely important for the durability and comfort of the shoes.
- **Synthetic fibres and filaments:** Polyacrylic, elastane, polyamide, polyester, polylactide and polypropylene. Filaments are included below in the term "synthetic fibres".
- **End product:** The term "end product" refers to a pair of shoes labelled with the Blue Angel ecolabel and offered for sale on the market. A separately available insole is also considered to be an end product.
- **Linings and insocks:** The lining of the upper and the insock that form the inner section of the shoe.
- **Mixture**<sup>7</sup>: Mix, mixture or solution composed of two or more substances<sup>8</sup>.
- **Rubber:** Rubber refers to vulcanised rubber. This could be natural rubber, synthetic rubber and also a mixture of these materials.
- **Semi-finished product:** In the case of shoes, this could be partial products such as shoe uppers or primary/intermediate products.
- **Artificial leather:** Artificial leather according to DIN 16922.
- **Laminate** in the sense of these Basic Award Criteria is a composite of one or more textile layers that is stuck together with a waterproof and at the same time often breathable membrane.
- **Outer sole of the shoe:** The lower part of the shoe that is connected to the upper.
- **Leather:** Leather according to DIN EN 15987.
- **Membranes** in the sense of these Basic Award Criteria are waterproof, windproof and at the same time breathable barrier layers based on polyurethane, polyester or polyamide.

<sup>7</sup> Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, as well as amending Regulation (EC) No. 1907/2006 (CLP Regulation).

<sup>8</sup> Article 3 (Number 2) of the REACH Regulation (EC) No. 1907/2006.

- **MRS�**: Manufacturing Restricted Substance List, i.e. restrictions on substances in the production process.
- **Mulesing**: The removal of skin around the tail of sheep, whereby no painkillers are generally administered.
- **Nanomaterial**: A natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm - 100 nm<sup>9</sup>.
- **Natural fibres**: Cotton, flax, hemp, linen, kapok, wool and silk.
  - Other fibres may be approved after examination by the Federal Environmental Agency.
- **Polymer coating**: Top coating consisting of polymers on fabric or leather that is designed to deliver certain properties (e.g. water-repellent, dirt-repellent).
- **Recycled fibres**: Fibres sourced from production and processing waste (pre-consumer waste) (including polymer and fibre production waste, as well as waste cuttings from textile and clothing production) and consumer waste (post-consumer waste) (textiles and all types of fibre and textile products, as well as non-textile waste including PET drinks bottles and fishing nets).
- **Man-made cellulose fibres**: Fibres produced from the raw material cellulose (wood) (lyocell, modal and viscose).
- **RSL**: Restricted Substance List, i.e. restrictions on substances in the product.
- **Sole**: All layers of the shoe that are located underneath the foot.
- **Upper**: The top structural elements that consist of at least one material and are attached to the outer sole of the shoe.
- **Sole**: The lining and insock and the outer sole.
- **Substance**: A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition<sup>10</sup>.
- **Textile fibres**: Natural fibres, synthetic fibres, man-made cellulose fibres and recycled fibres.
- **Impurity**<sup>11</sup>: An unintended and not deliberately added constituent present in a substance as manufactured. Impurities may originate from the starting materials or be the result of incomplete or secondary reactions during the manufacturing process.
- **VOC**: A "volatile organic compound" describes any organic compound having a vapour pressure of 0.01 kPa or more at 293.15 K, or having a corresponding volatility under the particular conditions of use. In the sense of Directive 1999/13/EU, the fraction of creosote that exceeds this vapour pressure at 293.15 K is considered a volatile organic compound.

## 2 Scope

The product group "footwear" (or "shoes") comprises all articles, including safety shoes, protective shoes and work shoes, that are designed to protect or cover the feet and which have

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<sup>9</sup> Recommendation of the European Commission from 18 October 2011 for the definition of nanomaterials (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:275:0038:0040:DE:PDF>).

<sup>10</sup> Article 3 (Number 1) of the REACH Regulation (EC) No. 1907/2006.

<sup>11</sup> <https://www.reach-clp-biozid-helpdesk.de/de/Downloads/Leitfaden-Stoffidentitaet.pdf?blob=publicationFile&v=2>.

an outer sole and the upper is made out of leather, textile and/or plastic. A detailed list of the materials that are permitted for use on the upper and in the shoe can be found in Appendix B. The term "end product" describes a pair of shoes.

Excluded from the scope of these Basic Award criteria are running socks, toy shoes, footwear for single use, footwear made using polyvinyl chloride (PVC) and footwear made using down and feathers. The footwear must not contain any electric or electronic components. If passive electronic components (RFID) are added, these must be removable/separable.

If the insoles are sold separately, these can also be awarded the environmental label if they comply with the requirements in the Basic Award Criteria.

The applicant shall explain to RAL gGmbH in Annex 2 which materials and components the end product consists of and submit a colour photo of the corresponding shoe model with the application documents.

### **3 Requirements**

#### **3.1 General regulations**

Only those test reports produced by laboratories accredited according to DIN EN ISO/IEC 17025 "general requirements for the competence of testing and calibration laboratories" will be accepted.

The required test reports for the process-related verifications (Paragraph 3.10) must not be more than two years old at the time of application.

The required test reports for the requirements placed on the materials added to the shoes (Paragraph 3.12) must not be more than one year old at the time of application, while the test reports relating to the fitness for use of the shoes (Paragraph 3.13) must not be more than two years old.

For all of the named standards and legal regulations, the rules and regulations in place at the time of application are valid, unless specifically stated otherwise.

When examining the applications and monitoring compliance with the criteria, recognised environmental management systems such as EMAS or ISO 14001 can be taken into account.

If the applicant can present a valid certificate for the Blue Angel for leather, DE-UZ 148, or the Blue Angel for textiles, DE-UZ 154, these certificates will be accepted as verification for comparable criteria in the Basic Award Criteria and compliance with these requirements does not need to be verified again. The same is valid for the Austrian environmental label.

A list of the named legal regulations and testing standards can be found in Appendix A.

#### **3.2 Requirements for the origin and production of certain raw materials**

The requirements for the production and manufacture of certain raw materials (Paragraphs 3.2 and 3.3) are valid for all material groups in the end product that account for  $\geq 10$  percent by mass of the end product. The requirement in Paragraph 3.2.3 is an exception to this criterion for "textile natural fibres (cotton, kapok, linen, hemp, flax, wool) and applies to those fibres that account for more than 3 percent by mass of the end product.

### **3.2.1 Origin of raw hides and skins**

Raw hides and skins must be sourced from agricultural animals (i.e. cattle, calves, goats, sheep, pigs) that are primarily kept for milk and/or meat production. Endangered species are expressly prohibited.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a corresponding declaration (Annex 3) to verify that animal hides and skins from wild or endangered species are not used and that a verification process in accordance with Regulation (EC) No 853/2004 has been carried out for the raw goods added to the product and, if requested by RAL gGmbH, shall submit the accompanying document required in accordance with Commission Regulation (EC) 1243/2007 of 24 October 2007 amending Annex III to Regulation (EC) No 853/2004 as well as the Commission Implementing Document (EU) 1097/2012. For non-European raw hides and skins (e.g. wet blue), the traceability (total weighted traceability) in the sense of Protocol 7.2.1 of the Leather Working Group for physical traceability of 30 % must be achieved. Traceability is calculated according to the specifications of the LWG protocol valid at the time of application.*

### **3.2.2 Origin of wood and man-made cellulose fibres**

If wood is used, it must be sourced from sustainably managed forests and not from illegal logging and trade or from forests that are worthy of protection for ecological and/or social reasons. Cellulose for man-made cellulose fibres must be sourced from wood that has been cultivated according to the guidelines for sustainable forestry based on the definition from the Food and Agriculture Organization of the United Nations (FAO).

#### **Compliance verification**

*The applicant shall provide information on the geographic origins of the wood in Annex 1. For the wood or cellulose fibres used in the product, the applicant shall submit certificates verifying compliance with this criteria (Annex 4). Certificates from the Forest Stewardship Council (FSC) verifying sustainable forestry and a chain of custody (CoC) will be accepted. For wood from forests in the European Economic Area (EU and EFTA), the Programme for the Endorsement of Forest Certification Schemes (PEFC) will be accepted as an equivalent.*

### **3.2.3 Origin of cotton and other natural fibres**

Textile natural fibres (cotton, kapok, linen, hemp, flax, wool) that account for more than 3 percent by mass of the end product must be sourced from controlled organic cultivation or controlled biological animal husbandry or from fibres from the conversion phase<sup>12</sup> and comply with the requirements of Regulation (EC) No 834/2007 (EC Organic Regulation) or the American National Organic Programme (NOP).

At all stages of the processing chain, it must be ensured that controlled organically produced fibres are not mixed with conventional fibres and that the controlled organically produced fibres

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<sup>12</sup> "Conversion": Transition from non-organic to organic farming within a given period of time, during which the provisions concerning organic production have been applied. (EC ECO Regulation (EC) No 834/2007 of the council of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91, Official Journal of the European Union L 189 of 20/07/2007, p. 1).

are not contaminated due to contact with prohibited substances. The fibres used in the products must not be sourced from genetically modified organisms (GMO). Mulesing is not permitted

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1. Fibres labelled with the German organic logo (Bio-Siegel) or the EU organic logo ("Euro leaf") or in accordance with the American National Organic Programme (NOP) will be accepted. In addition, corresponding certificates from an internationally recognised certification body accredited by the IFOAM<sup>13</sup> or in accordance with DIN EN ISO/IEC 17065 that verify compliance with recognised international or national ecological farming standards can be submitted (Annex 5).*

*The certification of products "in conversion" is only possible if the regulations on which the certification of the fibre production is based include the possibility of such certification for the fibres in question. However, they must be specially labelled in accordance with these regulations. If requested to do so by RAL GmbH, the applicant shall submit, where relevant, a shipping or transaction certificate from an accredited certification body verifying compliance with the requirement at all stages of the processing chain, as well as information on the amount of biofibres produced and about the certification body and certification standard.*

## **3.3 Man-made cellulose fibres (viscose, lyocell and modal)**

### **3.3.1 Halogen content**

The halogen content of the fibres must not exceed 150 mg/kg.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit confirmation from the operator of the plant (fibre producer) (Annex 6), as well as a test report. The test shall be carried out in accordance with ISO 11480 (controlled combustion and microcoulometry).*

### **3.3.2 Emissions to air**

In the case of viscose and modal fibres, the sulphur content of the emissions of sulphur compounds to air from fibre production processes, expressed as an annual average, must not exceed 30 g/kg of staple fibres produced, 40 g/kg of filament fibres for batch washing and 170 g/kg of filament fibres for integrated washing. If both types of fibres are produced at a particular site, the total emissions must not exceed the corresponding weighted average value.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit confirmation from the plant operator (viscose producer) (Annex 6), as well as a sulphur emissions report<sup>14</sup>.*

### **3.3.3 Emissions to water in the production of viscose fibres**

The waste water from the production of viscose fibres must not exceed the following values (expressed as annual averages) when discharged to surface waters:

- 0.3 g zinc /kg filament fibres produced,

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<sup>13</sup> <http://www.ifoam.org/germanversion/index.html>

<sup>14</sup> Note: Using a sulphur emissions report on the carbon disulphide added and reused, it is possible to calculate what amount is actually emitted.

- 0.16 g zinc /kg staple fibres produced,
- 0.04 g AOX /kg viscose fibres produced,
- 20 g COD /kg viscose fibres produced,
- 0.3 mg sulphide/l.

This requirement does not apply for approved discharge into an urban waste water treatment plant that meets at least the requirements of the Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC).

### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1 and submit a declaration of compliance from the operator of the plant (viscose producer) (Annex 6), as well as a test report. The following methods may be used for completing these tests:*

- Zinc: EN ISO 11885,
- AOX value: EN ISO 9562,
- COD: ISO 6060 or DIN ISO 15705 or DIN 38409-41 or DIN 38409-44,
- Sulphide: DIN 38405-27 or ISO 10530.

*The discharge of pollutants is determined from the concentration values and the corresponding waste water flow volumes related to the samples.*

*If discharged to an urban waste water treatment plant (indirect discharge), the applicant shall also enclose a notice of approval for the fibre producer verifying that the discharge process has been approved and that the urban waste water treatment plant meets at least the requirements of Directive 91/271/EEC.*

### **3.4 Polyester fibres**

Textile end products made out of polyester must comply with subcriterion a) as well as either of b) or c).

- The amount of antimony present in the polyester fibres must not exceed 260 ppm or an elutable amount of 30 mg/kg.

### **Compliance verification**

*The applicant shall declare in Annex 1 that he/she uses antimony-free polyester fibres and submit a corresponding declaration for his/her supplier (Annex 7) or if fibres containing antimony have been used, the applicant shall submit a test report from the suppliers of the fibres to verify compliance with this requirement. The test shall be carried out using the following method: direct determination by atomic absorption spectrometry. The test shall be carried out on the raw fibre prior to any wet processing. Leaching according to DIN EN ISO 105-E04 / ISO 17294-2 (ICP/MS).*

- Fibres must be produced using a minimum content of PET that has been recycled from production and/or consumer waste. Staple fibres must contain a minimum of 50 % recycled fibres and filament fibres must contain at least 20% recycled fibres. This requirement does not apply to microfibres, which must comply with subcriterion c).
- The emissions of volatile organic compounds (VOC) in the sense of the Industrial Emissions Directive (2010/75/EU) during polymerisation and the production of polyester fibres, measured at the process steps where they occur, expressed as an annual average, must not

exceed 1.2 g/kg for PET chips, 10.3 g/kg for filament fibres or 0.2 g/kg for produced polyester resin.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a declaration of conformity from the suppliers of the fibres (Annex 7), as well as a test report in accordance with DIN EN 12619 that verifies compliance with this requirement.*

## **3.5 Polyamide fibres**

Textile end products made out of polyamide must comply with at least one of the product standards stated in subcriteria a) and b).

a) Fibres must be manufactured using a minimum content of 20 % nylon that has been recycled from production and/or consumer waste.

b) The N<sub>2</sub>O emissions to air during the monomer production, expressed as an annual average, must not exceed 9 g/kg of polyamide 6 fibre produced or 9 g/kg of polyamide 6.6 fibre produced. In addition, reduction technologies must be used in the production of caprolactam and adipic acid. It must be ensured that the degree of reduction in the N<sub>2</sub>O emissions during adipic acid production is at least 95%.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a declaration of conformity from the monomer producer (Annex 8), as well as test reports for the raw and clean gas verifying that a reduction of at least 95% has been achieved.*

## **3.6 Polyacrylic fibres**

### **3.6.1 Acrylonitrile**

The residual acrylonitrile content in raw fibres leaving the fibre production plant must be less than 1.5 mg/kg.

### **Compliance verification**

*The applicant shall declare in Annex 1 that he/she complies with the requirement above and submit confirmation from the suppliers of the fibres (Annex 9), as well as a test report from the suppliers of the fibres verifying compliance with this requirement. The test shall be carried out in accordance with the following method: Extraction with boiling water and quantification by capillary gas-liquid chromatography.*

### **3.6.2 Acrylonitrile emissions**

The emissions to air of acrylonitrile (during polymerisation and up to the solution ready for spinning), expressed as an annual average, must be less than 1 g/kg of fibre produced.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit confirmation from the suppliers of the fibres (Annex 9) and a test report in accordance with VDI Guideline 3863, sheets 1 and 2 verifying compliance with this requirement.*

### **3.7 Elastane fibres**

#### **3.7.1 Organotin compounds**

The use of organotin compounds is not permitted.

##### ***Compliance verification***

*The applicant shall declare in Annex 1 that such compounds are not used and submit confirmation from the suppliers of the fibres (Annex 10).*

#### **3.7.2 Aromatic diisocyanates**

The concentration of aromatic diisocyanates from the polymerisation and the spinning processes must not exceed a value of 0.05 mg/m<sup>3</sup> (corresponds to 0.005 ml/m<sup>3</sup>) at the workplaces in which the relevant process steps occur, expressed as an 8 hour average (shift average).

##### ***Compliance verification***

The applicant shall declare compliance with the requirement in Annex 1 and submit confirmation from the suppliers of the fibres (Annex 10) to verify compliance with this requirement. Suitable test methods using HPLC from recognised testing laboratories will be accepted.

### **3.8 Polypropylene fibres**

It is not permitted to use lead-based pigments.

##### ***Compliance verification***

*The applicant shall declare in Annex 1 that such compounds are not used and submit confirmation from the suppliers of the fibres (Annex 11).*

### **3.9 Requirements for the production process for laminates and membranes**

In the case of textile end products that contain laminates, the laminates added to the products must comply with the following requirements:

#### **a) Textiles used**

For the fibres of the textiles used, the requirements stated in the relevant sections are valid.

#### **b) Membranes used**

For membranes used in laminates that are produced on the basis of polyester, polyurethane, and polyamide, they must comply with at least one of the following subcriteria.

- ♦ The membranes must be manufactured using a minimum content of 30 % material that has been recycled from production and/or consumer waste.
- ♦ The membranes must not be produced using organic solvents.

The requirement for the amount of antimony in polyester fibres also needs to be taken into account in the case of polyester membranes, while the N<sub>2</sub>O requirement for polyamide fibres needs to be taken into account for polyamide membranes. Components produced from polyurethane must also comply with the textile fibre requirement 3.7.1 for organotin compounds and requirement 3.7.2 for workplace exposure to aromatic diisocyanates.

#### **c) Adhesives used**

Solvent-based adhesives must not be used in the laminating process. Only thermoplastic or reactive (e.g. moisture curing) hotmelt adhesives may be used. If reactive polyurethane-based hotmelt adhesives are used, the concentration of aromatic diisocyanates must not



exceed a value of 0.05 mg/m<sup>3</sup> (corresponds to 0.005 ml/m<sup>3</sup>) measured at the workplaces, expressed as an 8 hour average (shift average).

d) Functional products

The exclusion criteria in Paragraph 3.12.2.2 (biocides), 3.12.2.18 (PFC) and 3.12.2.19 (flame retardants) apply to the functional products used on the product.

**Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit declarations of conformity from the membrane suppliers/adhesive suppliers or the laminate manufacturers (Annex 12).*

**3.10 Requirements for the production process for the raw materials**

**3.10.1 Water consumption in the production of leather**

The following water consumption limits must not be exceeded:

- 25 m<sup>3</sup>/t for raw hides from cattle,
- 45 m<sup>3</sup>/t for calf and goat skins,
- 80 m<sup>3</sup>/t for pigskins
- 120 m<sup>3</sup>/t for sheepskins

**Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1. The application documents must specify the annual production volumes and the water consumption. (The production volume and the water consumption for the previous year must be submitted with the application (Annex 3)). This information must refer to the entire tanning process. If intermediate products are processed (e.g. wet blue), the water consumption figures for the production of the intermediate product must be requested from the suppliers.*

**3.10.2 Requirements for waste water treatment in the production of leather**

Waste water from the production of leather must not exceed the following values when discharged to surface waters:

- a chemical oxygen demand (COD) of 250 mg/l or a reduction of at least 90% in comparison to the inflow as a monthly average,
- a value of 0.5 mg/l AOX,
- a value of 10 mg/l for ammonium nitrogen,
- a value of 2 mg/l for phosphorous,
- a value of 2 for toxicity to fish eggs (G<sub>Ei</sub>) or daphnia (G<sub>D</sub>) or algae (G<sub>A</sub>),
- a value of 2 mg/l for sulphide in a sulphide-containing partial stream (waste water from soaking, liming and deliming processes, each including rinsing) and
- a value of 1 mg/l for total chromium in a chromium-containing partial stream (waste water from tanning processes, including samming, as well as from wet-dressing).

In the case of indirect discharge (before being discharged into an urban or central waste water treatment plant), the waste water from the production of leather must not exceed the following values:

- a value of 2 mg/l for sulphide in a sulphide-containing partial stream (waste water from soaking, liming and deliming processes, each including rinsing) and

- a value of 1 mg/l for total chromium in a chromium-containing partial stream (waste water from tanning processes, including samming, as well as from wet-dressing).

This requirement does not apply for approved discharge into an urban waste water treatment plant that meets at least the requirements of the Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC). The values stated above for chromium and sulphide must be complied with at the discharge to the waste water treatment plant – calculated on a pro rata basis for the respective partial stream.

### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1 and submit confirmation from the supervising authority to verify compliance with the requirements in Annex 3 and also submit test reports in accordance with Annex 25 of the German Waste Water Ordinance or equivalent international test reports.*

*The measurements of the concentrations of sulphide and chromium can be carried out in the full stream before discharge to surface waters (direct discharge) or in an urban or central waste water treatment plant (indirect discharge). In this case, the mixing ratios of the partial streams must be provided to enable the concentrations to be subsequently calculated. Subsequent calculation of the concentrations using the degradation rate at the waste water treatment plant in accordance with Appendix C is also permitted.*

*The following test methods should be used here:*

- COD: ISO 6060 or DIN 38409-41 or DIN-ISO 15705,
- AOX (chloride content < 5 g/l): DIN EN ISO 9562 or
- AOX (chloride content > 5 g/l): DIN 38414-17,
- Total phosphorous: DIN EN ISO 11885,
- Sulphide: DIN 38405-27 or ISO 10530,
- Chromium: ISO 9174 or DIN EN 1233 or EN ISO 11885,
- Ammonium nitrogen: DIN EN ISO 11732,
- Toxicity to fish eggs: DIN EN ISO 15088,
- Toxicity to daphnia: DIN EN ISO 6341,
- Toxicity to algae: DIN EN ISO 8692.

*In addition, the applicant shall submit a declaration verifying that the discharge values at the waste water treatment plant are checked at least every six months (Annex 3). If discharged to an urban or central waste water treatment plant (indirect discharge), the applicant shall also enclose a notice of approval (for urban waste water treatment plants) or the contractual conditions (for central waste water treatment plants) verifying that the discharge process has been approved and that the urban waste water treatment plant meets at least the requirements of Directive 91/271/EEC.*

*If intermediate products are processed (e.g. wet blue), all of the required verifications must also be provided by the suppliers (Annex 2 to DE-UZ 148, Edition March 2015)*

### **3.10.3 Requirements for waste water from the production and processing of soles using a vulcanisation process**

If waste water is produced during this processing step, the following values must not be exceeded when discharging to surface waters:

- 2 mg/l for zinc,
- 0.5 mg/l for lead,

- 1 mg/l for AOX,
- 0,1 mg/l for benzene and its derivatives,
- a COD value of 150 mg/l,
- a value of 20 mg/l total nitrogen ( $N_{\text{total}}$ ) and 2 mg/l total phosphorous ( $P_{\text{total}}$ ) and
- a value of 2 for toxicity to fish eggs ( $G_{\text{Ei}}$ ) or daphnia ( $G_{\text{D}}$ ) or algae ( $G_{\text{A}}$ ).

This requirement does not apply for approved discharge into an urban waste water treatment plant that meets at least the requirements of the Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC).

### **Compliance verification**

*The applicant shall submit a declaration that there is no waste water produced or declare compliance with the requirements in Annex 1 and submit a declaration of conformity from the rubber processing company (Annex 13) and test reports verifying compliance with the requirements in accordance with Annex 32 of the German Waste Water Ordinance or equivalent international test reports. The following methods may be used for completing these tests:*

- COD: ISO 6060 or DIN 38409-41 or DIN-ISO 15705,
- AOX (chloride content < 5 g/l): DIN EN ISO 9562 or
- AOX (chloride content > 5 g/l): DIN 38414-17,
- Sulphide: DIN 38405-27 or ISO 10530,
- Chromium: ISO 9174 or DIN EN 1233 or EN ISO 11885,
- Zinc: DIN EN ISO 11885,
- Lead: DIN EN ISO 11885,
- Benzene and derivatives: DIN 38407-43,
- Toxicity to fish eggs: DIN EN ISO 15088,
- Toxicity to daphnia: DIN EN ISO 6341,
- Toxicity to algae: DIN EN ISO 8692.

*In addition, the applicant shall submit a declaration from the rubber processing company verifying that the discharge values at the waste water treatment plant are checked at least every six months. (Annex 13)*

*If discharged to an urban waste water treatment plant (indirect discharge), the applicant shall also enclose a notice of approval for the rubber processing company verifying that the discharge process has been approved and that the urban waste water treatment plant meets at least the requirements of Directive 91/271/EEC.*

## **3.10.4 Requirements for waste water from the textile finishing process**

### **3.10.4.1 Requirements for waste water at the discharge point (direct discharge)**

Waste water from wet-processing sites (except waste water from water retting of flax and other bast fibres) shall, when discharged to surface waters, not exceed the following limits:

- COD: 160 mg/l (expressed as an average yearly value),
- BSB<sub>5</sub>: 30 mg/l,
- Sulphite: 1 mg/l,
- Ammonium nitrogen: 10 mg/l,
- Total nitrogen: 20 mg/l,
- Total phosphorous: 2 mg/l,
- The dye must comply with the following values:  
Spectral absorption coefficient at:

- ♦ 436 nm (yellow spectral region) 7 m<sup>-1</sup>
- ♦ 525 nm (red spectral region) 5 m<sup>-1</sup>
- ♦ 620 nm (blue spectral region) 3 m<sup>-1</sup>
- a value of 2 for toxicity to fish eggs (G<sub>Ei</sub>) or daphnia (G<sub>D</sub>) or algae (G<sub>A</sub>),

The pH value of the waste water discharged to surface waters must be between 6 and 9 (unless the pH value of the receiving waters is outside this range) and the temperature must be below 35 °C (unless the temperature of the receiving waters is already above this limit).

This requirement shall not apply if it can be proven that the discharge into the urban waste water treatment plant has been approved and the urban waste water treatment plant meets at least the requirements of the Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC).

### **Compliance verification**

See 3.10.4.2.

### **3.10.4.2 Requirements for waste water before mixing (direct and indirect discharge)**

The waste water shall not exceed the following values before it is mixed with the other waste water:

- AOX: 0.5 mg/l,
- Sulphide: 1 mg/l,
- Copper: 1 mg/l,
- Nickel: 0.5 mg/l,
- Total chromium: 0.5 mg/l,
- Tin: 2 mg/l,
- Zinc: 2 mg/l.

### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1 and submit a declaration of conformity from the operator of the textile finishing plant (Annex 14) and test reports verifying compliance with the requirements in accordance with Annex 38 of the German Waste Water Ordinance or equivalent international test reports. The following methods may be used for completing these tests:*

- COD: ISO 6060 or DIN 38409-41 or DIN-ISO 15705 on the basis of a qualified random sample or a 2-hour mixed sample,
- Copper and nickel: ISO 8288,
- Sulphide: DIN 38405-27 or ISO 10530,
- Sulphite: DIN EN ISO 10304-3,
- Toxicity to fish eggs: DIN EN ISO 15088,
- Toxicity to daphnia: DIN EN ISO 6341,
- Toxicity to algae: DIN EN ISO 8692,
- AOX (chloride content < 5g/l): DIN EN ISO 9562,
- AOX (chloride content > 5g/l): DIN 38414-17,
- Spectral absorption coefficient: [DIN 38404-3](#),
- Ammonium nitrogen: DIN EN ISO 11732,
- Total nitrogen: DIN EN ISO 12260,
- Total phosphorous: DIN EN ISO 11885,
- Tin: DIN EN ISO 11885,

- **Zinc:** DIN EN ISO 11885.

*The waste water treatment plant must be regularly monitored. In addition, the applicant shall submit a declaration from the operator of the textile finishing plant about the frequency of the measurements of the discharge values (at least every six months). (Annex 14)*

*As an alternative to measuring the copper, nickel and chromium contents, the applicant can submit a declaration from the operator of the textile finishing plant that metal complex dyes containing copper, chromium or nickel do not form part of the dye formula. (Annex 14)*

*If discharged to an urban waste water treatment plant, the applicant shall also enclose a notice of approval for the textile finishing plant verifying that the discharge process has been approved and that the urban waste water treatment plant meets at least the requirements of Directive 91/271/EEC.*

### **3.10.5 Requirements for emissions to air in the textile finishing process**

In the thermosetting, thermosoling, coating, impregnating or finishing of textiles, including the associated drying facilities, the sum of the organic substances as total carbon must not exceed 0.8 g C per kg of textiles.

In addition, a maximum of 0.4 g C per kg of textiles may be emitted from carry-overs from upstream processes and from residual preparations in each case.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit confirmation from the textile finishing plant verifying compliance with this requirement. (Annex 14)*

*In addition, the operator of the textile finishing plant shall submit either a report in accordance with Appendix D with the projected emissions based on the substance emission factors or a test report in accordance with DIN EN 12619. In the case of a test in accordance with DIN 12619, product-related emission factor shall be determined from the measured concentration value and the actual air/product ratio. The calculation formula, including an example calculation, can be found in Appendix D.*

### **3.11 Requirements for the final production process for the shoes (shoe manufacturing)**

Total emissions of volatile organic compounds (VOC) in the sense of the Solvents Directive (1999/13/EC) during the final production process for the shoes must not exceed an average of 18.0 g VOC/pair. In the case of shoes that are classified as personal protective equipment in accordance with the Personal Protection Equipment (PPE) Regulation (EU) 2016/425, the total use of VOCs during the final production process for the shoes must not exceed an average of 20.0 g VOC/pair. In the case of shoes that are glued in multiple areas and shoes with protective applications that are glued around part of or the full circumference of the shoe, a value of 25.0 g VOC/pair is valid.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a calculation for the VOC emissions during the final production process for the shoes. The calculation shall be carried out in accordance with Directive 1999/13/EC. Further information on this calculation process can be found in DIN EN 14602. The shoe manufacturer shall state the reduction process used. If relevant, the applicant shall submit a certificate from an accredited certification body as*

defined in Regulation 2016/425 verifying that the product is classified as personal protective equipment.

### **3.12 Requirements for chemicals, auxiliaries and dyes**

The requirements apply to all components of the end product (shoes and insoles) that account for  $\geq 3$  percent by mass of the end product and for all materials that could possibly come into contact with the skin.

#### **3.12.1 General exclusion of substances with certain properties**

The end product must not contain any of the following substances<sup>15</sup> (RSL):

- a) Substances which are identified as particularly alarming under the European Chemicals Regulation REACH (1907/2006/EC)<sup>16</sup> and which have been incorporated into the list drawn up in accordance with Article 59, Paragraph 1 of the REACH Regulation (so-called "list of candidates"). The version of the list of candidates at the time of application is valid<sup>17</sup>.
- b) Leather: Leather must comply with the limit values in the CADS list. The version that is valid one year before<sup>18</sup> the application is valid<sup>19</sup>.
- c) Substances which according to the criteria of Regulation (EC) No 1272/2008<sup>20</sup> are assigned the following H Phrases named in Table 1 or which meet the criteria for such classification must not exceed a concentration of 0.10% by mass.<sup>21</sup>
- d) The following are exempt from regulations a) and c): Impurities in concentrations that are not specified in the safety data sheet. The components listed in the safety data sheet must correspond with the regulations according to Annex II, No. 3, of the REACH regulation (EC/1907/2006).<sup>22</sup> If the substance in this case is part of a preparation (a mixture) then its concentration may not exceed the general generic cut-off values according to the CLP Regulation (EC/1272/2008). If a stricter, more specific concentration limit is specified for a substance in a mixture then this is valid.
- e) The following shall be exempt from regulation c): Monomers or additives that turn into polymers during the manufacture of plastics or are chemically (covalently) bound to the plastic if their residual concentrations are below the classification thresholds for mixtures.
- f) Upon evaluation by the Federal Environmental Agency (Umweltbundesamt), further exemptions from regulation c) may be adopted, provided that these are technologically non-

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<sup>15</sup> Definitions in the sense of Article 3, No. 1 to 4, of the announcement for the new version of ChemG from 2 July 2008 (BGBl. I, No. 28, P. 1146) each as amended.

<sup>16</sup> Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

<sup>17</sup> The list of candidates in its relevant version can be found at: <https://echa.europa.eu/de/candidate-list-table>.

<sup>18</sup> This means, for example, that the CADS list from 01/2017 should be used as the basis for an application in 01/2018.

<sup>19</sup> <http://www.cads-shoes.com/>.

<sup>20</sup> Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 concerning the classification, labelling and packaging of substances and mixtures (CLP Regulation).

<sup>21</sup> The harmonized classifications and labellings of dangerous substances can be found in Part 3 of Annex VI to Regulation (EC) No 1272/2008 (CLP Regulation).

substitutable substances and consumer safety continues to be guaranteed. A list of the approved exemptions can be found in Appendix E.

The following requirements for specific substances (MRSL) also apply to the manufacturing process:

- g) Textiles: Dyes and textile auxiliaries must comply with the limit values in Chapter 1 of the ZDHC MRSL. The version of the ZDHC MRSL that is valid one year before<sup>23</sup> the application is valid.<sup>24</sup>
- h) In addition to the limit values in the CADS list, leather can also comply with the limit values in ZDHC MRSL, Chapter 2<sup>25</sup>. The version that is valid one year before<sup>26</sup> the application is valid.

Table 1: H Phrases according to the CLP Regulation

<b>Regulation (EC) No. 1272/2008 (CLP Regulation)</b>	<b>Wording</b>
<b>Toxic substances</b>	
H300	Fatal if swallowed
H301	Toxic if swallowed
H304	May be fatal if swallowed and enters airways
H310	Fatal in contact with skin
H311	Toxic in contact with skin
H330	Fatal if inhaled
H331	Toxic if inhaled
H370	Causes damage to organs
H371	May cause damage to organs
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
<b>Carcinogenic, mutagenic and reprotoxic substances</b>	
H340	May cause genetic defects
H341	Suspected of causing genetic defects
H350	May cause cancer
H350i	May cause cancer if inhaled
H351 <sup>27</sup>	Suspected of causing cancer
H360F	May damage fertility
H360D	May damage the unborn child
H360FD	May damage fertility May damage the unborn child
H360Fd	May damage fertility Suspected of damaging the unborn child
H360Df	May damage the unborn child Suspected of damaging fertility
H361f	Suspected of damaging fertility

<sup>23</sup> This means, for example, that the ZDHC MRSL from 01/2017 should be used as the basis for an application submitted in 01/2018.

<sup>24</sup> [http://www.roadmaptozero.com/fileadmin/pdf/MRSL\\_v1\\_1.pdf](http://www.roadmaptozero.com/fileadmin/pdf/MRSL_v1_1.pdf).

<sup>25</sup> [http://www.roadmaptozero.com/fileadmin/pdf/MRSL\\_v1\\_1.pdf](http://www.roadmaptozero.com/fileadmin/pdf/MRSL_v1_1.pdf).

<sup>26</sup> This means, for example, that the CADS list from 01/2017 should be used as the basis for an application in 01/2018.

<sup>27</sup> Except titanium dioxide, because its classification only applies to inhalable powders.

<b>Regulation (EC) No. 1272/2008 (CLP Regulation)</b>	<b>Wording</b>
H361d	Suspected of damaging the unborn child
H361fd	Suspected of damaging fertility Suspected of damaging the unborn child
H362	May cause harm to breast fed children
<b>Water-hazardous substances</b>	
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long-lasting effects
H411	Toxic to aquatic life with long-lasting effects
<b>Sensitizing substances</b>	
H317	May cause an allergic skin reaction

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit confirmation from their suppliers in accordance with Annex 15 verifying compliance with the requirements. If requested to do so by RAL gGmbH, the applicant shall submit the relevant safety data sheets. For the exempted substances and mixtures listed in Appendix E, the applicant shall submit verifications that all exemption conditions have been met.*

### **3.12.2 Requirements for specific substances**

These special requirements for specific substances are valid in addition to the general requirements for substances. They explicitly refer to particularly problematic substances and specify them by requiring a test on the materials used or on the final product.

In coordination with the testing laboratory, risk-based repeat tests will be carried out on the materials used or on the end product in accordance with the requirements described in Paragraph 3.12.2, generally on an annual basis and in particular when there has been a batch change. Exceptions are Paragraphs 3.12.2.1 "Preservation of raw skins and tanned semi-finished products" and 3.12.2.3 "Chromium VI in leather" where a test must be carried out every six months.

#### **3.12.2.1 Preservation of raw skins and tanned semi-finished products**

As an exception to Paragraph 3.12.1 (General exclusion of substances with certain properties), the following applies to the preservatives<sup>28</sup> listed in Appendix F. Chemical preservation for the transportation and storage of raw hides, as well as tanned semi-finished products (wet blue, wet white), must be avoided as far as possible. Chemical preservation of the finished leather, including the coatings, is not permitted<sup>29</sup>.

The test is carried out on the finished leather and must be submitted to RAL gGmbH on request. If preservatives above the defined maximum values are detected in the tests, RAL gGmbH must be informed immediately.

### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1 and submit a declaration from his leather suppliers (Annex 3). The supplier shall declare that there is either no chemical*

<sup>28</sup> Preservatives of type PT 9 are not taken into account for the coatings.

<sup>29</sup> In-can preservatives of type PT 6 are not taken into account.



*preservation (during the complete unbroken process from slaughter through to the finished leather) or state the preservatives used for the leather.*

*In addition, the applicant shall submit a test report according to DIN EN ISO 13365 to RAL gGmbH when first applying for the environmental label that lists the preservatives listed in Appendix F with the relevant test methods described. The sample shall be taken in accordance with DIN EN ISO 4044 or DIN EN ISO 2418.*

### **3.12.2.2 Biocides in textiles**

The use of biocidal products, as defined in the Biocidal Directive (EU) 528/2012<sup>30</sup>, and biostatic products<sup>31</sup> is not permitted. In-can preservatives are exempted.

#### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1 and submit confirmation from the chemicals supplier or textile finisher to verify compliance with these requirements (Annex 14).*

### **3.12.2.3 Chromium VI in leather**

Shoes manufactured from leather must not contain any hexavalent chromium (chromium (VI)). A test to determine the chromium (VI) content with and without a stress test is required for leather, whereby it is not permitted for chromium (VI) to be detected (detection limit 3 mg/kg). The test must be repeated at least every six months and submitted to RAL gGmbH on request. If the test detects a chromium (VI) content higher than the detection limit of 3 mg/kg, RAL gGmbH must be informed immediately.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a test report according to DIN EN ISO 17075-1 or DIN EN ISO 17075-2 to RAL gGmbH when first applying for the environmental label and then every six months, as well as when there is a change to the recipe, verifying that hexavalent chromium (chromium (VI)) could not be detected (detection limit 3 mg/kg).*

*The sample shall be taken in accordance with DIN EN ISO 4044. The cut leather sample shall be examined with and without a stress test (ageing test) in accordance with DIN EN ISO 10195, method B.*

### **3.12.2.4 Total contents of heavy metals in leather, natural rubber and plastics**

Materials used for the end product must not exceed a limit value of 50 mg/kg for each of the following heavy metals: arsenic, lead, cadmium, nickel and mercury.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a corresponding test report verifying compliance with the requirement to RAL gGmbH. The test report must refer to the testing of individually used materials for producing the end product or*

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<sup>30</sup> Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products.

<sup>31</sup> All substances with an inhibitory effect on growth and reproduction shall be considered as biostatic products.

to the end product itself. The test shall be carried out in accordance with DIN EN 14602 or DIN EN ISO 17072-2.

### 3.12.2.5 Nickel and its compounds

If nickel is used for metal objects that come into contact with the skin for long periods of time, the migration value for metal alloys that come into contact with the skin applies (0.28 ug/cm<sup>2</sup>/week).

#### Compliance verification

The applicant shall declare compliance with the requirements in Annex 1 and submit confirmation from the supplier to verify that the metal components used comply with this requirement. Alternatively, the applicant can also submit a test report from a testing institution approved for this test verifying the harmlessness of the dermal exposure. DIN EN 1811 in combination where relevant with DIN EN 12472 can be used as the test method.

### 3.12.2.6 Extractable heavy metals in leather and textiles

The following limit values in Table 2 must not be exceeded by the extractable heavy metals:

Table 2: Limit values for extractable heavy metals

Extractable heavy metals	Limit for babies' and children's shoes in mg/kg	Limit for all other shoes in mg/kg
Antimony	5.0	5.0
Antimony in polyester	30.0	30.0
Arsenic	0.2	1.0
Lead	0.2	1.0
Cadmium	0.1	0.1
Chromium in chromium-tanned leather	200	200
Chromium in leather tanned without the use of chromium	2.0	2.0
Chromium in textiles	1.0	2.0
Chromium (VI) in textiles	< 3.0	< 3.0
Cobalt	1.0	4.0
Copper	25.0	50.0
Nickel	1.0	1.0
Mercury	0.02	0.02

#### Compliance verification

The applicant shall declare compliance with the requirements in Annex 1 and submit a test report according to the following test methods:

For leather: DIN EN ISO 17072-1, the leather samples are prepared in accordance with EN ISO 4044 and completely cut up.

For textiles: Based on the DIN 54233-2 test method, chromium (VI) in textiles can also be measured according to the DIN 38405-24 (D-24) method. However, the detection limit must not exceed 0.5 mg/kg. The extraction process shall be carried out using an acid artificial-perspiration solution within 4 hours at 37°C.

### **3.12.2.7 Organotin compounds in leather and plastic coatings, plastics and textile materials**

The content of the relevant organotin compounds must not exceed the limit values stated in Appendix G.

#### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1. The applicant shall also submit the test results in accordance with the test method DIN EN ISO 17353, ISO/TS 16179 or another suitable test method<sup>32</sup>.*

### **3.12.2.8 Formaldehyde in leather and textiles**

The amount of free and partly hydrolysable formaldehyde must be less than 20 mg/kg for babies' and children's shoes or insoles, less than 75 mg/kg for all other types of shoes or insoles and less than 20 mg/kg for textile materials.

#### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1.*

*The applicant shall also submit test results for the leather materials in accordance with the DIN EN ISO 17226-1 or DIN EN ISO 17226-2 test methods. For the textile materials used, the applicant shall also submit test results in accordance with the DIN EN ISO 14184-1 test method.<sup>33</sup>*

### **3.12.2.9 Use of dyes in leather, textiles and plastics**

Azo dyes that cleave to one of the aromatic amines named in Appendix H must not exceed a limit value of 20 mg/kg. A limit value of 50 mg/kg applies to the disperse dyes named in Appendix H. Furthermore, no disperse dyes or pigments, nor any sensitising dyes or dyes containing cadmium, mercury, lead or nickel, that are carcinogenic, mutagenic or toxic to reproduction may be used in the dyes.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 by verifying that the dyes in Appendix H have not been used.*

*In addition, the applicant shall submit the following test reports (not required for undyed materials; although the testing institution must explicitly confirm that this is the case in the test report):*

#### **For azo dyes in leather:**

*The applicant shall submit the measurement results for leather in accordance with the DIN EN ISO 17234-1 test method, as well as the measurement results for 4-aminoazobenzol in accordance with the DIN EN ISO 17234-2 test method.*

#### **For azo dyes in textiles:**

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<sup>32</sup> Test methods used by testing laboratories accredited according to DIN EN ISO 17025 are accepted. Test reports carried out in accordance with the OEKO-TEX Standard 100 or the Leather Standard by OEKO-TEX will also be accepted.

<sup>33</sup> Test reports carried out in accordance with the OEKO-TEX Standard 100 or the Leather Standard by OEKO-TEX will also be accepted.

*The applicant shall submit test results in accordance with the DIN EN 14362-1 and DIN EN 14362-3 test methods<sup>34</sup>. (Note: Tests to detect the presence of 4-aminoazobenzene can result in false positive values. Therefore, a control measurement is recommended).*

**For disperse dyes in textiles:**

*The applicant shall submit the test results in accordance with the test method DIN EN ISO 54231 or another suitable test method.*

**3.12.2.10 Phthalates and plasticizers in plastics, natural rubber and coatings or printings of materials**

The sum of the phthalates and plasticizers named in Appendix I must not exceed a maximum of 1,000 mg/kg. A total of 500 mg/kg is valid for babies'/children's shoes.

**Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a corresponding test report. The test shall be carried out in accordance with DIN EN ISO 18856 or DIN EN 14602.*

*For the test for TCEP (tris(2-chloroethyl)-phosphate), suitable test methods used by testing laboratories accredited according to DIN EN ISO 17025 are accepted.*

**3.12.2.11 Polycyclic aromatic hydrocarbons (PAHs) in plastics, textiles, rubber and leather coatings**

The limit values for each individual substance must correspond to the limit values in Appendix J for both babies' and children's shoes and also for all other types of shoes. The total concentration of all 18 listed PAHs must be less than 1 mg/kg for babies' and children's shoes and less than 10 mg/kg for all other types of shoes (also see Appendix J).

**Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1. The measurements should be taken in accordance with the guidelines in the AfPS GS 2014:01 PAK document "Testing and assessment of polycyclic aromatic hydrocarbons (PAHs)".*

**3.12.2.12 N-nitrosamines in rubber**

The rubber must not contain the n-nitrosamines listed in Appendix K.

**Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and declare either that no vulcanisation accelerators have been used during production that could produce n-nitrosamines or submit a corresponding test report. The test shall be carried out in accordance with DIN EN 12868 or DIN EN 14602.*

*(Release test by means of a saliva test solution for a period of 24 hours at a temperature of 40 ± 2°C. The quantification limit for the analysis method must be less than 1 µg/dm<sup>2</sup> (see Directive 93/11/EEC).*

### **3.12.2.13 Dimethylformamide in artificial leather and polymer coatings**

The concentration of dimethylformamide in artificial leather or polymer coatings based on polyurethane is not permitted to exceed a value of 50 mg/kg.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1. If artificial leather or polymer coatings based on polyurethane have been used, the applicant shall submit a confirmation from its suppliers (Annex 16) verifying that no dimethylformamide was used and shall enclose a corresponding test report. The test shall be carried out in accordance with DIN CEN ISO/TS 16189.*

### **3.12.2.14 Acetophenone and phenylpropanol in ethylene vinyl acetate (EVA)**

For babies' and children's shoes, the concentration of phenylpropanol must not exceed 1 mg/kg; for all other types of shoes, the concentration of phenylpropanol must not exceed 10 mg/kg. The concentration of acetophenone must not exceed a value of 10 mg/kg for all types of shoes.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit corresponding test reports. The analysis is carried out using methanol extraction and GC-MS determination.*

### **3.12.2.15 Chlorinated paraffins (chloroalkanes) in leather, artificial rubber, plastics, textiles and coatings**

Short-chain chlorinated paraffins (SCCP), C10-C13, and medium-chain chlorinated paraffins (MCCP), C14-C17, must not be used in the production and finishing of the shoes.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a test report in accordance with DIN EN ISO 18219 about the content of chlorinated paraffins. The verification limit for short-chain chlorinated paraffins is 100 mg/kg, while medium-chain chlorinated paraffins must not exceed a total of 1000 mg/kg.*

### **3.12.2.16 Chlorinated benzenes and toluenes in textiles made from man-made fibres and PU coatings free of DMF**

The content of the individual compounds (see Appendix L) must not exceed 1 mg/kg. The total amount must not exceed a maximum of 5 mg/kg.

#### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit the measurement results in accordance with the DIN 54232 test method<sup>35</sup>.*

### **3.12.2.17 Alkylphenol ethoxylates and alkylphenols for leather, textiles and plastics**

The content of alkylphenol ethoxylates and alkylphenols (see Appendix M) must not exceed a total amount of 25 mg/kg for textiles and 100 mg/kg for leather.

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<sup>35</sup> Test reports carried out in accordance with the OEKO-TEX Standard 100 will also be accepted.

### **Compliance verification**

*The applicant shall declare compliance with the requirements in Annex 1 and submit either confirmation from his supplier (Annex 15) or a corresponding test report. The test is performed using solvent extraction and GC-MS determination or LC-MS determination.*

#### **3.12.2.18 Perfluorinated and polyfluorinated chemicals**

The use of perfluorinated and polyfluorinated chemicals (PFCs) is not permitted.

### **Compliance verification**

*The applicant shall declare compliance with this requirement in Annex 1.*

#### **3.12.2.19 Flame retardant materials**

The flame-retarding effect should preferably be achieved by use of flame-resistant materials, fibres or by means of the structure of the fabric.

The use of flame retardants in the finishing of shoes and insoles is not permitted.

Finishing with flame retardants, which comply with the requirements according to Paragraph 3.12.1, on safety shoes, protective shoes and work shoes can be approved after examination by the Federal Environmental Agency. Halogenated flame retardants may not be added to the product.

Products finished with flame retardant substances must be correspondingly labelled.

### **Compliance verification**

*The applicant shall declare compliance with this requirement in Annex 1.*

#### **3.12.2.20 Use of nanomaterials**

The use of technically produced nanomaterials with the H Phrases listed in Paragraph 3.12.1 is not permitted. The classification must be carried out based on suitable data for the nanoform of the substance added to the product.

### **Compliance verification**

*The applicant shall declare compliance with this requirement in Annex 1.*

#### **3.12.2.21 Fragrances**

The use of fragrances is not permitted.

### **Compliance verification**

*The applicant shall declare compliance with this requirement in Annex 1.*

### **3.13 Fitness for use**

#### **3.13.1 Odour testing**

Based on a five-grade scale from odourless to intolerable odour, the product must achieve at least grade 3 (strong but tolerable odour) in the odour test. Test subjects that have an odour that is unusual for the product, e.g. they smell of perfume, or those with a smell that indicates improper production should be excluded from the test. The products must not smell of mould, heavy petrol, fish, aromatic compounds or odour finishing agents.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a test report for verification. The required olfactory test shall be carried out using at least 7 test persons in accordance with SNV 195651.*

#### **3.13.2 Durability**

The criteria listed in Appendix N relating to flex resistance, tear strength, abrasion resistance, upper sole adhesion, as well as tear strength and colour fastness to rubbing, must be observed. Work and safety shoes must carry the CE marking and comply with the requirements for durability in accordance with PPE Regulation 2016/425. If the shoe types named here are not included in Appendix N, the test laboratory must certify that the shoes display a level of durability typical for this type of product.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a test report that verifies compliance with the stated parameters in Appendix N using the following test methods:*

- *DIN EN ISO 17694 — Test methods for uppers and lining - Flex resistance,*
- *DIN EN 13571 — Footwear - Test methods for uppers, lining and insoles - Tear strength,*
- *DIN EN ISO 17707 Test methods for outsoles - Flex resistance,*
- *DIN EN 12770 — Test methods for outsoles - Abrasion resistance,*
- *DIN EN ISO 17708 — Test methods for whole shoe - Upper sole adhesion,*
- *DIN EN 12771 — Test methods for outsoles - Tear strength,*
- *DIN EN ISO 17700 — Test methods for uppers, linings and insoles - Colour fastness to rubbing.*
- *DIN EN ISO 17704 — Test methods for uppers, linings and insoles - Abrasion resistance*

#### **3.14 Packaging**

The plastics used for the packaging of the product are not permitted to contain any halogenated polymers. If the shoes are packaged in cardboard boxes, the cardboard boxes must consist of more than 80% renewable materials. The products must be packaged in such a way that it allows the outgassing of volatile organic compounds. The transport packaging and product packaging must not contain any dimethyl fumarate.

According to §21 of the Packaging Law (VerpackungG), the materials and material combinations used for the packagings must contain the highest possible level of recycled materials, whereby the sorting and recycling process must be specifically taken into account. The minimum standards published by the Central Office for the Packaging Register (zentralen Stelle Verpackungsregister) with respect to the recyclability of the packagings must be observed.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a sample of the product packaging (photo) to RAL gGmbH.*

#### **3.15 Consumer information**

Insofar as the end products are sold in German-speaking countries, the consumer information must also be fully provided in German. The applicant shall provide information on the materials

and components in the end product (> 5% of the total mass; totalling at least 75% of the end product), as well as information on caring for and cleaning the product, in a form accessible to consumers (either on the product itself or via their website).

If passive electronic components (RFID) are added, these must be removable/separable and corresponding information must be provided.

In addition, information on which parts of the shoe – depending on the type and severity of the damage or wear – are repairable or replaceable, e.g. heels, soles, footbed, freshening up the leather upper, should also be provided.

All information must be made available on the product itself, the packaging, via a brochure or via the website operated by the manufacturer.

### **Compliance verification**

*The applicant shall declare compliance with the requirement in Annex 1 and submit a copy of the customer information (if necessary a photo). The testing laboratory shall check the correctness and plausibility of the information based on the material composition and the production processes used for the shoes.*

### **3.16 Working conditions**

Fundamental principles and rights with respect to universal human rights, as defined in the currently valid fundamental labour standards of the International Labour Organisation<sup>36</sup> (ILO), must be complied with during the finishing and shoe assembly stages and by the direct suppliers to the company (so-called tier 1 suppliers<sup>37</sup>) of the products labelled with the environmental label.

The requirements listed here are taken from the recommendations of the German government for textile production because there are currently no specific recommendations for footwear manufacturing.

The observance of the following standards or requirements must be guaranteed by the applicant. The ILO standards are described in more detail in Appendix O.

- The freedom of association and protection of the right to organise in accordance with ILO Convention 87 (Fundamental Labour Standard)
- The right to bargain collectively in accordance with ILO Convention 98 (fundamental labour standard)
- Equal remuneration in accordance with ILO Convention 100 (fundamental labour standard)
- Abolition of forced labour in accordance with ILO Conventions 29 and 105 (fundamental labour standards)
- Non-discrimination in employment and occupation in accordance with ILO Convention 111 (fundamental labour standard)
- Minimum age for employment in accordance with ILO Convention 138 (fundamental labour standard)
- Prohibition of the worst forms of child labour in accordance with ILO Convention 182 (fundamental labour standard)

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<sup>36</sup> ILO fundamental labour standards,  
<http://www.ilo.org/berlin/arbeits-und-standards/kernarbeitsnormen/lang--de/index.htm>

<sup>37</sup> A tier 1 supplier is a company that directly supplies a finished product, in this case shoes or insoles, or a complex component to the producer. (Source: Gabler Wirtschaftslexikon).



- Ensuring safety and health in agriculture in accordance with ILO Convention 184 OR guaranteeing occupational safety and health in accordance with ILO Convention 155
- Limiting the hours of work in accordance with ILO Convention 1
- The rights also apply to subcontracted work
- A written employment contract

### **Compliance verification**

Verification only needs to be provided for those products produced in countries at risk (Annex 17). Whether a country is considered at risk is determined by the list from the Development Assistance Committee (DAC list) issued by the Organisation for Economic Co-operation and Development (OECD)<sup>38</sup> that is valid at the time the application is made and the International Trade Union Confederation (ITUC) Global Rights Index (Rating 3 to 5+)<sup>39</sup>. The country or area of origin is the country or area in which goods in the sense of Article 60 Paragraph 1 of Regulation (EU) No 952/2013 of the European Parliament and of the Council of 9 October 2013 laying down the Union Customs Code (OJ L 269 of 10/10/2013, p. 1, L 287 of 29/10/2013, p. 90) were wholly obtained or produced or in the sense of Article 60 Paragraph 2 of Regulation (EU) No 952/2013 the last, substantial, economically-justified processing or working was carried out.

In order to determine whether it is a country at risk, a list of the tier 1 suppliers and their production locations must be submitted (Annex 2).

If the product comes from a country at risk, the following compliance verification methods are approved.

The manufacturer is a member of one of the following initiatives

- Fair Wear Foundation (<http://www.fairwear.org>)

or the applicant or the products are certified or audited in accordance with:

- Global Organic Textile Standard (GOTS) (<http://www.global-standard.org/>)
- Fairtrade Textile Production ([www.fairtrade-deutschland.de](http://www.fairtrade-deutschland.de))
- IVN certification for natural leather (<http://naturtextil.de/qualitaetszeichen/naturleder/>)
- Austrian environmental label for footwear, Directive UZ 65 (<https://www.umweltzeichen.at/schuhe/richtlinie>)
- Social Accountability 8000 (SA 8000) (<http://www.sa-intl.org/>). Certification in accordance with SA 8000 may only be carried out by accredited organisations. Equivalent guidelines will also be accepted if they are audited by independent third parties. Other certificates may be approved after examination by the Federal Environmental Agency.

### **3.17 Restriction on the sandblasting of denim**

The use of manual and mechanical sandblasting to achieve distressed denim finishes is not permitted.

### **Compliance verification**

*The applicant shall provide detailed information on all production sites at which denim end products holding the environmental label are produced, as well as documentation and photos to verify the alternative processes with which the distressed denim effect is achieved (Annex 18).*

<sup>38</sup> <http://www.oecd.org/dac/>.

<sup>39</sup> <https://www.ituc-csi.org/IMG/pdf/ituc-violationmap-2017-en.pdf>.

## **4 Applicants and Parties Involved**

Manufacturers or distributors of final products according to Paragraph 2 shall be eligible for application.

Parties involved in the award process are:

RAL gGmbH to award the Blue Angel Environmental Label,  
the federal state being home to the applicant's production site,  
Umweltbundesamt (German Environmental Agency) which after the signing of the contract receives all data and documents submitted in applications for the Blue Angel in order to be able to further develop the Basic Award Criteria.

## **5 Use of the Environmental Label**

The use of the Environmental Label by the applicant is governed by a contract on the use of the Environmental Label concluded with RAL gGmbH.

Within the scope of such contract, the applicant undertakes to comply with the requirements under Paragraph 3 while using the Environmental Label.

Contracts on the Use of the Environmental Label are concluded to fix the terms for the certification of products under Paragraph 2. Such contracts shall run until December 31, 2027. They shall be extended by periods of one year each, unless terminated in writing by March 31, 2027 or March 31 of the respective year of extension.

After the expiry of the contract, the Environmental Label may neither be used for labelling nor for advertising purposes. This regulation shall not affect products being still in the market.

The applicant (manufacturer) shall be entitled to apply to RAL gGmbH for an extension of the right to use the ecolabel on the product entitled to the label if it is to be marketed under another brand/trade name and/or other marketing organisations.

The Contract on the Use of the Environmental Label shall specify:

- Applicant (manufacturer/distributor)
- Brand/trade name, product description
- Distributor (label user), i.e. the above-mentioned marketing organisations.

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## Appendix A Quoted laws and standards, literature

The current versions are stated here. The valid versions of the standards at the time of application will be accepted.

- [1] AfPS GS 2014:01 PAK: GS specification "Testing and assessment of polycyclic aromatic hydrocarbons (PAHs) in the course of awarding the GS mark" issued by the Product Safety Commission (AfPS)
- [2] Commission Decision of 5 June 2014 establishing the ecological criteria for the award of the EU Ecolabel for textile products (2014/350/EU)
- [3] DIN 16922 Flexible sheet materials manufactured using plastics; technological classification
- [4] DIN 38404-3:2005-07 German standard methods for the examination of water, waste water and sludge - Physical and physical-chemical parameters (Group C) - Part 3: Determination of absorption in the range of the ultraviolet radiation, Spectral absorptions coefficient (C 3)
- [5] DIN 38405-24:1987-05 German standard methods for the examination of water, waste water and sludge; anions (Group D); photometric determination of chromium(VI) using 1,5-diphenylcarbonohydrazide (D 24)
- [6] DIN 38405-27:2017-10 German standard methods for the examination of water, waste water and sludge - Anions (group D) - Part 27: Determination of sulphide by gas extraction method (D 27)
- [7] DIN 38407-43:2014-10 German standard methods for the examination of water, waste water and sludge - Jointly determinable substances (group F) - Part 43: Determination of selected easily volatile organic compounds in water - Method using gas chromatography and mass spectrometry by static headspace technique (HS-GC-MS) (F 43)
- [8] DIN 38409-41:1998-12 German standard methods for the examination of water, waste water and sludge; summary action and material characteristic parameters (Group H); determination of the chemical oxygen demand (COD) in the range over 15 mg/l (H 41)
- [9] DIN 38409-44:1992-05 German standard methods for the examination of water, waste water and sludge; parameters characterizing effects and substances (Group H); determination of the chemical oxygen demand (COD), ranging from 5 to 50 mg/l (H 44)
- [10] DIN 38414-17:2017-01 German standard methods for the examination of water, waste water and sludge - Sludge and sediments (group S) - Part 17: Determination of the organically bound halogens amenable to extraction (EOX) (S 17)
- [11] DIN 54231:2005-11 Textiles - Detection of disperse dyestuffs
- [12] DIN 54232:2010-08 Textiles - Determination of the content of bonds based on chlorobenzene and chlorotoluene
- [13] DIN 54233-2:2014-07 Testing of textiles - Determination of metals - Part 2: Determination of extractable metals by hydrochloric acid
- [14] DIN CEN ISO/TS 16179:2012-12; DIN SPEC 91179:2012-12 Footwear - Critical substances potentially present in footwear and footwear components - Determination of organotin compounds in footwear materials (ISO/TS 16179:2012); German version CEN ISO/TS 16179:2012
- [15] DIN CEN ISO/TS 16189:2013-12; DIN SPEC 52411:2013-12 Footwear - Critical substances potentially present in footwear and footwear components - Test method to quantitatively determine dimethylformamide in footwear materials (ISO/TS 16189:2013); German version CEN ISO/TS 16189:2013

- [16]** DIN EN 1233:1996-08 Water quality - Determination of chromium - Atomic absorption spectrometric methods; German version EN 1233:1996
- [17]** DIN EN 1811:2015-10 Reference test method for release of nickel from all post assemblies which are inserted into pierced parts of the human body and articles intended to come into direct and prolonged contact with the skin; German version EN 1811:2011+A1:2015
- [18]** DIN EN 12260:2003 Water quality - Determination of nitrogen - Determination of bound nitrogen (TNb), following oxidation to nitrogen oxides; German version EN 12260:2003
- [19]** DIN EN 12472:2009-09 Method for the simulation of wear and corrosion for the detection of nickel release from coated items; German version EN 12472:2005+A1:2009
- [20]** DIN EN 12619:1999-09 Determination of the mass concentration of the total organic carbon in low concentrations in waste gases (FID)
- [21]** DIN EN 12770:2000-03 Footwear - Test methods for outsoles - Abrasion resistance; German version EN 12770:1999
- [22]** DIN EN 12771:2000-03 Footwear - Test methods for outsoles - Tear strength; German version EN 12771:1999
- [23]** DIN EN 12868:2017-04 Child use and care articles - Method for determining the release of N-nitrosamines and N-nitrosatable substances from elastomer or rubber teats and soothers; German version EN 12868:2017
- [24]** DIN EN 13571 Correction 1:2006-10 Footwear - Test methods for uppers, lining and insoles - Tear strength; German version EN 13571:2001, Correction for DIN EN 13571:2002-04; German version EN 13571:2001/AC:2003
- [25]** DIN EN 13571:2002-04 Footwear - Test methods for uppers, lining and insoles - Tear strength; German version EN 13571:2001
- [26]** DIN EN 14362-1:2017-05 Textiles - Methods for determination of certain aromatic amines derived from azo colorants - Part 1: Detection of the use of certain azo colorants accessible with and without extracting the fibres; German version EN ISO 14362-1:2017
- [27]** DIN EN 14362-3:2017-05 Textiles - Methods for determination of certain aromatic amines derived from azo colorants - Part 3: Detection of the use of certain azo colorants, which may release 4-aminoazobenzene; German version EN ISO 14362-3:2017
- [28]** DIN EN 14602:2012-10 Footwear - Test methods for the assessment of ecological criteria; German version EN 14602:2012
- [29]** DIN EN 15987:2015-07 Leather - Terminology - Key definitions for the leather trade
- [30]** DIN EN ISO 105-E04:2013-08 Textiles - Tests for colour fastness - Part E04: Colour fastness to perspiration (ISO 105-E04:2013); German version EN ISO 105-E04:2013
- [31]** DIN EN ISO 2418:2017-05 Leather - Chemical, physical and mechanical and fastness test - Sampling location (ISO 2418:2017); German version EN ISO 2418:2017
- [32]** DIN EN ISO 6341:2013-01 Water quality - Determination of the inhibition of the mobility of *Daphnia magna* Straus (Cladocera, Crustacea) - Acute toxicity test (ISO 6341:2012); German version EN ISO 6341:2012
- [33]** DIN EN ISO 4044:2017-05 Leather - Chemical tests - Preparation of chemical test samples (ISO 4044:2017); German version EN ISO 4044:2017
- [34]** DIN EN ISO 8692:2012-06 Water quality - Fresh water algal growth inhibition test with unicellular green algae (ISO 8692:2012); German version EN ISO 8692:2012
- [35]** DIN EN ISO 9562:2005-02 Water quality - Determination of adsorbable organically bound halogens (AOX) (ISO 9562:2004); German version EN ISO 9562:2004

- [36]** DIN EN ISO 10195 (IULTCS/IUC 41) Leather -- Chemical determination of chromium(VI) content in leather -- Thermal pre-ageing of leather and determination of hexavalent chromium
- [37]** DIN EN ISO 10304-3:1997-11 Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 3: Determination of chromate, iodide, sulfite, thiocyanate and thiosulfate (ISO 10304-3:1997); German version EN ISO 10304-3:1997
- [38]** DIN EN ISO 11732:2005 Water quality - Determination of ammonium nitrogen - Method by flow analysis (CFA and FIA) and spectrometric detection (ISO 11732:2005); German version EN ISO 11732:2005
- [39]** DIN EN ISO 11885:2009 Water quality - Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (ISO 11885:2007)
- [40]** DIN EN ISO 13365:2011-04 Leather - Chemical tests - Determination of the preservative (TCMTB, PCMC, OPP, OIT) content in leather by liquid chromatography (ISO 13365:2011); German version EN ISO 13365:2011
- [41]** DIN EN ISO 14001:2015-11 Environmental management systems - Requirements with guidance for use (ISO 14001:2015)
- [42]** DIN EN ISO 14184-1:2011-12 Textiles - Determination of formaldehyde - Part 1: Free and hydrolysed formaldehyde (water extraction method) (ISO 14184-1:2011); German version EN ISO 14184-1:2011
- [43]** DIN EN ISO 15088:2009-06 Water quality - Determination of the acute toxicity of waste water to zebrafish eggs (*Danio rerio*) (ISO 15088:2007); German version EN ISO 15088:2008
- [44]** DIN EN ISO 17070:2015-05 Leather - Chemical tests - Determination of tetrachlorophenol-, trichlorophenol-, dichlorophenol-, monochlorophenol-isomers and pentachlorophenol content (ISO 17070:2015); German version EN ISO 17070:2015
- [45]** DIN EN ISO 17075-1:2017-05 Leather - Chemical determination of chromium(VI) content in leather - Part 1: Colorimetric method (ISO 17075-1:2017); German version EN ISO 17075-1:2017
- [46]** DIN EN ISO 17075-2:2017-05 Leather - Chemical determination of chromium(VI) content in leather - Part 2: Chromatographic method (ISO 17075-2:2017); German version EN ISO 17075-2:2017
- [47]** DIN EN ISO 17694:2016-10 Footwear - Test methods for uppers and lining - Flex resistance (ISO 17694:2016); German version EN ISO 17694:2016
- [48]** DIN EN ISO 17700:2005-12 Footwear - Test methods for uppers, linings and insoles - Colour fastness to rubbing (ISO 17700:2004); German version EN ISO 17700:2005
- [49]** DIN EN ISO 17704:2004-10 — Footwear - Test methods for uppers, linings and insoles - Abrasion resistance
- [50]** DIN EN ISO 17707 Footwear - Test methods for outsoles - Flex resistance (ISO 17707:2005)
- [51]** DIN EN ISO 17708:2003-10 Footwear - Test methods for whole shoe - Upper sole adhesion (ISO 17708:2003); German Version EN ISO 17708:2003
- [52]** DIN EN ISO 17072-2:2017-09 – Draft Leather - Chemical determination of metal content - Part 2: Total metal content (ISO/DIS 17072-2:2017); German and English version prEN ISO 17072-2:2017
- [53]** DIN EN ISO 17075-1:2017-05 Leather - Chemical determination of chromium(VI) content in leather - Part 1: Colorimetric method (ISO 17075-1:2017); German version EN ISO 17075-1:2017

- [54]** DIN EN ISO 17075-2:2017-05 Leather - Chemical determination of chromium(VI) content in leather - Part 2: Chromatographic method (ISO 17075-2:2017); German version EN ISO 17075-2:2017
- [55]** DIN EN ISO 17226-1:2017-11 - Draft Leather - Chemical determination of formaldehyde content - Part 1: Method using high performance liquid chromatography (ISO/DIS 17226-1:2017); German and English version prEN ISO 17226-1:2017
- [56]** DIN EN ISO 17226-2:2017-11 - Draft Leather - Chemical determination of formaldehyde content - Part 2: Method using colorimetric analysis (ISO/DIS 17226-2:2017); German and English version prEN ISO 17226-2:2017
- [57]** DIN EN ISO 17234-1:2015-07 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 17234-1:2015); German version EN ISO 17234-1:2015
- [58]** DIN EN ISO 17234-2:2011-06 Leather - Chemical tests for the determination of certain azo colorants in dyed leathers - Part 2: Determination of 4-aminoazobenzene (ISO 17234-2:2011); German version EN ISO 17234-2:2011
- [59]** DIN EN ISO 17294-2:2017-01 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 2: Determination of selected elements including uranium isotopes (ISO 17294-2:2016); German version EN ISO 17294-2:2016
- [60]** DIN EN ISO 17353:2005-11 Water quality - Determination of selected organotin compounds - Gas chromatographic method (ISO 17353:2004); German version EN ISO 17353:2005
- [61]** DIN EN ISO 18219:2016-02 Leather - Determination of chlorinated hydrocarbons in leather - Chromatographic method for short-chain chlorinated paraffins (SCCP) (ISO 18219:2015); German version EN ISO 18219:2015
- [62]** DIN EN ISO 18856:2005-11 Water quality - Determination of selected phthalates using gas chromatography/mass spectrometry (ISO 18856:2004); German version EN ISO 18856:2005
- [63]** DIN EN ISO/IEC 17025:2018-03 General requirements for the competence of testing and calibration laboratories; German and English version EN ISO/IEC 17025:2017
- [64]** DIN EN ISO/IEC 17065:2013-01 Conformity assessment - Requirements for bodies certifying products, processes and services (ISO/IEC 17065:2012); German and English version EN ISO/IEC 17065:2012
- [65]** DIN ISO 15705:2003-01 Water quality - Determination of the chemical oxygen demand index (ST-COD) - Small-scale sealed tube method (ISO 15705:2002)
- [66]** Commission implementing regulation (EU) No 1097/2012 of 23 November 2012 amending Regulation (EU) No 142/2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and implementing Council Directive 97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive as regards dispatch of animal by-products and derived products between Member States
- [67]** Recommendation of the European Commission from 18 October 2011 for the definition of nanomaterials <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:275:0038:0040:DE:PDF>

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- [69] Law on the further development of the separate collection of recyclable waste near to households (Packaging Law) from 05/07/2017
- [70] Joint Research Centre (JRC) (2013): BACKGROUND REPORT: Revision of the EU Ecolabel for the product group "Footwear"
- [71] Joint Research Centre (JRC) (2013): Best Available techniques (BAT) Reference Document for the Tanning of Hides and Skins, [http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN\\_Published\\_def.pdf](http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN_Published_def.pdf)
- [72] ISO 6060:1998-10 Water quality; determination of the chemical oxygen demand
- [73] ISO 8288:1986-03 Water quality; Determination of cobalt, nickel, copper, zinc, cadmium and lead; Flame atomic absorption spectrometric methods
- [74] ISO 9174:1998-07 Water quality - Determination of chromium - Atomic absorption spectrometric methods
- [75] ISO 10530:1992-09 Water quality; determination of dissolved sulphide; photometric method using methylene blue
- [76] ISO 11480:2017-05 Pulp, paper and board - Determination of total chlorine and organically bound chlorine
- [77] ITUC CSI ICB (o. J.): The ITUC Global Rights Index, <https://survey.ituc-csi.org>
- [78] OECD (o. J.): DAC List of ODA Recipients, <http://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/daclist.htm>
- [79] OECD (2018): OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector, OECD Publishing, [http://www.oecd-ilibrary.org/governance/oecd-due-diligence-guidance-for-responsible-supply-chains-in-the-garment-and-footwear-sector\\_9789264290587-en](http://www.oecd-ilibrary.org/governance/oecd-due-diligence-guidance-for-responsible-supply-chains-in-the-garment-and-footwear-sector_9789264290587-en)
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- [81] Commission Directive 93/11/EEC of 15 March 1993 concerning the release of the N-nitrosamines and N-nitrosatable substances from elastomer or rubber teats and soothers
- [82] Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment Table 1: Requirements for discharges from urban waste water treatment plants, the values for concentration or for the percentage of reduction shall apply
- [83] Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations
- [84] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
- [85] SNV 195651:1968 Textiles; determination of odours from product finishes (sensory evaluation)
- [86] VDI standard 3863 Measurement of gaseous emission; determination of acrylonitrile; gaschromatographic method; grab sampling
- [87] Regulation (EU) No. 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products
- [88] Regulation (EC) No 834/2007 of the council of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91

- [89]** Regulation (EC) No. 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin
- [90]** Regulation (EU) No. 952/2013 of the European Parliament and of the Council of 9 October 2013 laying down the Union Customs Code
- [91]** Commission Regulation (EC) 1243/2007 of 24 October 2007 amending Annex III to Regulation (EC) No 853/2004 of the European Parliament and the Council laying down specific hygiene rules for food of animal origin
- [92]** Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, as well as amending Regulation (EC) No. 1907/2006 (CLP Regulation).
- [93]** Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC
- [94]** Regulation (EU) 2016/425 of the European Parliament and of the Council of 9 March 2016 on personal protective equipment and repealing Council Directive 89/686/EEC
- [95]** Zero Discharge of Hazardous Chemicals Manufacturing Restricted Substances List (ZDHC MRSL), [http://www.roadmaptozero.com/fileadmin/pdf/MRSL\\_v1\\_1.pdf](http://www.roadmaptozero.com/fileadmin/pdf/MRSL_v1_1.pdf).



## Appendix B Materials for use in uppers and shoes

Permitted materials for uppers <sup>40</sup>	Permitted materials for shoes (except the uppers)
<p>Textiles (natural fibres, synthetic fibres, man-made cellulose fibres and recycled fibres), whereby only the following materials are currently permitted:</p> <p>Natural fibres: Cotton, flax, hemp, linen, kapok, wool and silk</p> <p>Synthetic fibres: Polyacrylic, elastane, polyamide, polyester, polylactide and polypropylene</p> <p>Man-made cellulose fibres: Lyocell, modal and viscose</p> <p>Recycled fibres</p>	<p>All materials, except for PVC, down and feathers or materials that contain electric or electronic components.</p>
<p>Leather from agricultural animals that are primarily kept for milk and/or meat production (i.e. cattle, calves, goats, sheep, pigs). Wild or endangered species are expressly prohibited.</p>	
<p>Plastics: all (except PVC)</p>	

<sup>40</sup> Other additional materials (except PVC, down and feathers or materials that contain electric or electronic components) are also permitted, insofar as they perform a function in the shoe.

## Appendix C Calculation of chromium and sulphide in the partial stream of the waste water treatment plant

$C_{RohT}$ : Concentration of chromium or sulphide, respectively, in the partial stream before discharge into the waste water treatment plant

$C_{Roh}$ : concentration of chromium or sulphide of mixed waste water at the inlet of the waste water treatment plant

$C_{Rein}$ : concentration of chromium or sulphide at the discharge of the waste water treatment plant

$\eta$ : degradation rate of the waste water treatment plant in %

The degradation rate of the waste water treatment plant can be calculated using the following formula:

$$\eta = ((C_{Roh} - C_{Rein}) / C_{Roh}) * 100\%$$

The concentration of chromium and sulphide in the respective partial stream can be calculated using the following formula:

$C_{ReinT}$ : concentration of chromium or sulphide in the partial stream at the discharge of the waste water treatment plant

$$C_{ReinT} = C_{RohT} - ((\eta / 100 \%) * C_{RohT})$$

Example Calculations :

Chromium				
$C_{RohT}$	$C_{Roh}$	$C_{Rein}$	$\eta$ (in %)	$C_{ReinT}$
[mg/l]	[mg/l]	[mg/l]		[mg/l]
15.38	7.23	0.71	90.18	<b>1.51</b>

Result: The limit (1 mg/l) is not met.

Sulfide				
$C_{RohT}$	$C_{Roh}$	$C_{Rein}$	$\eta$ (in %)	$C_{ReinT}$
[mg/l]	[mg/l]	[mg/l]		[mg/l]
5.88	3.13	0.37	88.18	<b>0.70</b>

Result: The limit (2 mg/l) is met.

## Appendix D Calculation of the emissions to air in the textile finishing process

Substance emission factors are provided as part of the product information by manufacturers of textile auxiliaries.

The substance emission factor is defined as the amount of substance in grams that may be emitted under defined process conditions (curing time, temperature, substrate) by 1 kg of the textile auxiliary.

### Calculation of the product-related emission factor from the substance emission factors:

$$WF_c = \Sigma(FA \times FK \times f_c)$$

THM: Textile auxiliary

WF<sub>c</sub>: Product-related emission factor in g of total carbon per kg of textile material

FA: Liquor pickup in kg of liquor per kg of textile material

FK: Liquor concentration in g of textile auxiliary per kg of liquor

f<sub>c</sub>: Total carbon substance emission factor in g of total carbon per gram of textile auxiliary

Calculation of the product-related emission factors of two formulas (by way of example):

Liquor	THM	FK [g/kg]	FA [kg/kg]	f <sub>c</sub> [g/g]	FK x FA x f <sub>c</sub>	WF <sub>c</sub> [g/kg]
<b>Formula 1</b>	Fatty acid ester	20	0.65	0.0152	0.2	
	Polysiloxane	20	0.65	0.0052	0.07	
	Reactant crosslinking agent with catalyst	100	0.65	0.0009	0.06	
	Stearyl urea derivative with catalyst	20	0.65	0.0162	0.21	
<b>Total 1</b>						<b>0.54</b>
<b>Formula 2</b>	Softening agent	50	1	0.005	0.25	
	Crease-resistant finish, formaldehyde-free	12	1	0.010	0.12	
	Catalyst	12	1	0.008	0.1	
<b>Total 2</b>						<b>0.47</b>

### **Calculation of the product-related emission factor from the measured concentration:**

The air/product ratio (LWV) in m<sup>3</sup>/kg is firstly calculated from the measured waste gas flow (V) (in m<sup>3</sup>/h) of all emission points of a thermal treatment unit and the product throughput (W) (in kg/h):

$$\mathbf{LWV = V/W}$$

If multiple thermal treatment units are connected to a waste gas cleaning plant, the weighted LWV is determined by dividing the total waste gas flow by the total product throughput.

$$\mathbf{WF_C = LWV \times \Sigma c_c}$$

WF<sub>C</sub>: Product-related emission factor in g of total carbon per kg of textile material

LWV: Air/product ratio in m<sup>3</sup> waste gas per kg of textile material

c<sub>c</sub>: measured concentration in g of total carbon per m<sup>3</sup> of waste gas

## Appendix E Exemptions that apply to the use of functional substances and mixtures

Substances and mixtures	Scope of validity for the exemption	Exemption conditions	Use on the shoes
Nickel	H317, H351, H372	Nickel can only be contained in stainless steel. A nickel release rate from the stainless steel must be less than or equal to the value specified in Chapter 3.5.2 of the directory of substances for limited use or 0.28 µg/cm <sup>2</sup> /week.	Toe caps and accessories for shoes that are made of metal
Dyes for dyeing and non-pigment printing	H301, H311, H331, H334, H317	Dye houses and printers must use dust free dye formulations or automatic dosing and dispensing of dyes to minimise worker exposure.	Dyes
Dyes for dyeing and non-pigment printing	H411,	Dyeing processes using reactive, direct, vat and sulphur dyes with these classifications must meet at least one of the following conditions:  a) Use of high affinity dyes; b) Achievement of a reject rate of less than 3.0 %; c) Use of colour matching instrumentation; d) Use of standard operating procedures for the dyeing process; e) The dye is removed in the waste water treatment. f) g) Solution dyes and/or digital printing are excluded from these conditions.	Dyes
Dyes for tanning leather	H317, H411	Dyes must be held in the leather to a good level (resistance to perspiration of at least 3), removal of the dyes in waste water treatment	Dyes
Auxiliaries including: carriers, fastness	H301, H311, H331, H361, H371, H 372,	The recipes must be formulated using automatic	Auxiliary agents

<b>Substances and mixtures</b>	<b>Scope of validity for the exemption</b>	<b>Exemption conditions</b>	<b>Use on the shoes</b>
Enhancers, levelling agents, dispersing agents, surfactants, thickeners, bonding agents, retanning agents	H373, H317 (1B), H411,	metering systems and the process must follow standard operating procedures. Substances classified with H311, H331, H317 (1B) must not be present at concentrations greater than 1.0 % by mass on any homogeneous material or article that forms part of the end product.	
Reactive tanning agents	H301, H330, H317, H334, H361, H410	Use in compliance with the workplace limits, the dye must have completely reacted and must no longer be detectable in the end product.	Tanning agents
Sodium sulphide, sodium hydrosulphide, organic mercaptans and thioacids	H301, H311, H400	Use in compliance with the workplace limits for hydrogen sulphide and mercaptans, as well as the waste water limits for sulphide	Depilatory
Binding agent for finishers	H317, H334	The substance must have completely reacted	Finishing

## Appendix F Biocidal conservatives for Leather

### 1 Preservation:

#### 1.1 Admissible Biocidal Active Substances

The following biocidal active substances may be used in accordance with the DE-UZ 148 Basic Criteria to protect raw hides and tanned semi-finished products (wet blue, wet white) during storage and transportation. In doing so, the limit values listed in the table below shall be observed in the final product "leather".

Table 1

Biocide	Alternative designation	EC-Number	CAS-Number	Höchstwert Baby- und Kinderschuhe	Höchstwert alle anderen Schuhe
4-chloro-3-methylphenol	p-chlorocresol, PCMC	200-431-6	59-50-7	< 150 mg/kg	< 300 mg/kg <sup>41, 42</sup>
2-Octyl-4-isothiazolin-3-one	N-Octyl-isothiazolinon, OIT	247-761-7	26530-20-1	< 50 mg/kg	< 100 mg/kg
2-Phenylphenol	o-phenylphenol	201-993-5	90-43-7	< 250 mg/kg	< 750 mg/kg <sup>41,42</sup>
2-(Thiocyanato-methylthio)benzothiazole	(Benzothiazol-2-ylthio)methylthiocyanat, TCMTB	244-445-0	21564-17-0	< 250 mg/kg <sup>43</sup>	< 500 mg/kg <sup>44</sup>

If preservatives have been approved as preservatives for leather (product group 9) within the scope of the evaluation and approval process according to the EU Biocidal Products Regulation (EU/528/2012), their inclusion in Table 1 of Appendix F to DE-UZ 155 will be checked by the Federal Environmental Agency (UBA) in consultation with LGA Bavaria and FILK Freiberg (Research Institute for Leather and Plastic Sheeting). Only those preservatives for product group 9 that are not classified according to Annex 6 of the CLP Regulation can be included. In the same

<sup>41</sup> CMC concentrations up to 600 mg/kg are acceptable if the concentration of OPP at the same time is decreasing from 750 mg/kg (e.g. 500 mg/kg CMC means a max. 550 mg/kg OPP is acceptable; 600 mg/kg CMC means a max. 450 mg/kg OPP is acceptable)

<sup>42</sup> The following applies to the semi-finished leathers wet blue, wet white, wet brown and wet green: OPP < 1000 mg/kg, CMC < 600 mg/kg: CMC concentrations up to 1000 mg/kg are acceptable if the concentration of OPP at the same time is a maximum of 600 mg/kg (e.g. 800 mg/kg CMC means a max. 800 mg/kg OPP is acceptable or 1000 mg/kg CMC means a max. 600 mg/kg OPP is acceptable)

<sup>43</sup> The cumulative parameter with benzothiazole-2-thiol (MBT) as a degradation product of TCMTB must be determined as the limit value. This cumulative parameter must not exceed the following limit value in the end product "leather":  $C_{TCMTB} + (1.43 \times C_{MBT}) < 250 \text{ mg/kg}$

<sup>44</sup> The cumulative parameter with benzothiazole-2-thiol (MBT) as a degradation product of TCMTB must be determined as the limit value. This cumulative parameter must not exceed the following limit value in the end product "leather":  $C_{TCMTB} + (1.43 \times C_{MBT}) < 500 \text{ mg/kg}$ .

way, additional limit values may be included or the conditions of use may be adapted to the current state of technology.

If a biocidal active substance listed in Table 1 is not included in accordance with the Biocidal Products Regulation (EU) 528/2012 for product type 9 it will be deleted from Table 1 of Appendix F to DE-UZ 155.

## 1.2 Non-Approved Biocidal Active Substances

According to DE-UZ 155, all other biocidal active substances of PT 9 may not be used to protect raw hides and tanned semi-finished products (wet blue, wet white) during storage and transportation. Analytical verifications shall be provided for the active substances listed in Table 3.

Starting out from the analysis method and from the detection limit of these substances the criterion shall be considered met if the following limit values are not exceeded in the final product "leather":

Table 3

Biocide	Alternative Designation	EC Number	CAS Number	Limit Value
Tri-, Tetra-, Pentachlorophenols (including salts and esters)		Various numbers	Various numbers	< 1 mg/kg <sup>45</sup>
Tri-, Tetra-, Pentabromophenols (including salts and esters)		Various numbers	Various numbers	< 1 mg/kg <sup>45</sup>
Methylenedithiocyanate	Methylen-bis-thio-cyanat, MBTC	228-652-3	6317-18-6	< 5 mg/kg
Methylbenzimidazol-2-ylcarbamate	Carbendazim	234-232-0	10605-21-7	< 5 mg/kg
Benzothiazole-2-thiol	2-Mercapto-benzothiazol, MBT	205-736-8	149-30-4	< 5 mg/kg <sup>46</sup>

## 2 Analysis Method

- For **chlorophenols, bromophenols**: DIN EN ISO 17070

<sup>45</sup> Per single substance

<sup>46</sup> If TCMBT is used as a decomposition product MBT shall be analytically determined and comply - as a cumulative parameter with TCMTB - with the test value set out in Paragraph 1.1. If TCMTB is not used a test value of 5mg/kg shall apply.



- For **4-chloro-3-methylphenol, o-phenylphenol, benzothiazole-2-thiol (MBT), 2-octyl-4-isothiazolin-3-one (OIT) and (benzothiazol-2-ylthio)methyl thiocyanate (TCMTB)**: DIN EN ISO 13365
- There are no standardized analysis methods available for **methylene dithiocyanate** and **methyl benzimidazol-2-ylcarbamate**.

## Appendix G Limit values for organotin compounds

The content of organotin compounds must not exceed the following values:

Tributyltin compounds (TBT)	0.5 mg/kg
Dibutyltin compounds (DBT)	1 mg/kg
Dioctyltin compounds (DOT)	1 mg/kg
Monobutyltin compounds (MBT)	1 mg/kg
Triphenyltin (TPT)	1 mg/kg
Dimethyltin (DMT)	1 mg/kg
Diphenyltin (DPhT)	1 mg/kg
Dipropyltin (DPT)	1 mg/kg
Monomethyltin (MMT)	1 mg/kg
Monooctyltin (MOT)	1 mg/kg
Monophenyltin (MPT)	1 mg/kg
Tetrabutyltin (TeBT)	1 mg/kg
Tricyclohexyltin (TCyHT)	1 mg/kg
Trimethyltin (TMT)	1 mg/kg
Trioctyltin (TOT)	1 mg/kg
Triphenyltin compounds (TPhT)	1 mg/kg

## Appendix H Dyes and Pigments the use of which is not permitted under para 3.12.2.9

(according to Commission Decision 2014/350/EC (EU ecolabel for textile products)):

### a) Carcinogenic aromatic amines

Aryl amine	CAS Number
4-aminodiphenyl	92-67-1
Benzidine	92-87-5
4-chlor-o-toluidine	95-69-2
2-naphtylamine	91-59-8
o-amino-azotoluene	97-56-3
2-amino-4-nitrotoluene	99-55-8
4-chloraniline	106-47-8
2,4-diaminoanisol	615-05-4
4,4'-diaminodiphenylmethane	101-77-9
3,3'-dichlorbenzidine	91-94-1
3,3'-dimethoxybenzidine	119-90-4
3,3'-dimethylbenzidine	119-93-7
3,3'-dimethyl-4,4'-diaminodiphenylmethane	838-88-0
<i>p</i> -cresidine	120-71-8
4,4'-methylen-bis(2-chloraniline)	101-14-4
4,4'-oxydianiline	101-80-4
4,4'-thiodianiline	139-65-1
o-toluidine	95-53-4
2,4-diaminotoluene	95-80-7
2,4,5-trimethylaniline	137-17-7
4-aminoazobenzenel	60-09-3
o-anisidine	90-04-0
2,4-Xylidine	95-68-1
2,6-Xylidine	87-62-7

**b) Indicative list of dyes that may cleave to carcinogenic aromatic amines**

Disperse dyes		
Disperse Orange 60	Disperse Yellow 7	
Disperse Orange 149	Disperse Yellow 23	
Disperse Red 151	Disperse Yellow 56	
Disperse Red 221	Disperse Yellow 218	
Basic dyes		
Basic Brown 4	Basic Red 114	
Basic Red 42	Basic Yellow 82	
Basic Red 76	Basic Yellow 103	
Basic Red 111		
Acid dyes		
CI Acid Black 29	CI Acid Red 24	CI Acid Red 128
CI Acid Black 94	CI Acid Red 26	CI Acid Red 115
CI Acid Black 131	CI Acid Red 26:1	CI Acid Red 128
CI Acid Black 132	CI Acid Red 26:2	CI Acid Red 135
CI Acid Black 209	CI Acid Red 35	CI Acid Red 148
CI Acid Black 232	CI Acid Red 48	CI Acid Red 150
CI Acid Brown 415	CI Acid Red 73	CI Acid Red 158
CI Acid Orange 17	CI Acid Red 85	CI Acid Red 167
CI Acid Orange 24	CI Acid Red 104	CI Acid Red 170
CI Acid Orange 45	CI Acid Red 114	CI Acid Red 264
CI Acid Red 4	CI Acid Red 115	CI Acid Red 265
CI Acid Red 5	CI Acid Red 116	CI Acid Red 420
CI Acid Red 8	CI Acid Red 119:1	CI Acid Violet 12

Direct dyes		
Direct Black 4	Basic Brown 4	Direct Red 13
Direct Black 29	Direct Brown 6	Direct Red 17
Direct Black 38	Direct Brown 25	Direct Red 21
Direct Black 154	Direct Brown 27	Direct Red 24
Direct Blue 1	Direct Brown 31	Direct Red 26
Direct Blue 2	Direct Brown 33	Direct Red 22
Direct Blue 3	Direct Brown 51	Direct Red 28
Direct Blue 6	Direct Brown 59	Direct Red 37
Direct Blue 8	Direct Brown 74	Direct Red 39
Direct Blue 9	Direct Brown 79	Direct Red 44
Direct Blue 10	Direct Brown 95	Direct Red 46
Direct Blue 14	Direct Brown 101	Direct Red 62
Direct Blue 15	Direct Brown 154	Direct Red 67
Direct Blue 21	Direct Brown 222	Direct Red 72
Direct Blue 22	Direct Brown 223	Direct Red 126
Direct Blue 25	Direct Green 1	Direct Red 168
Direct Blue 35	Direct Green 6	Direct Red 216
Direct Blue 76	Direct Green 8	Direct Red 264
Direct Blue 116	Direct Green 8.1	Direct Violet 1
Direct Blue 151	Direct Green 85	Direct Violet 4
Direct Blue 160	Direct Orange 1	Direct Violet 12
Direct Blue 173	Direct Orange 6	Direct Violet 13
Direct Blue 192	Direct Orange 7	Direct Violet 14
Direct Blue 201	Direct Orange 8	Direct Violet 21
Direct Blue 215	Direct Orange 10	Direct Violet 22
Direct Blue 295	Direct Orange 108	Direct Yellow 1
Direct Blue 306	Direct Red 1	Direct Yellow 24
Direct Brown 1	Direct Red 2	Direct Yellow 48
Direct Brown 1:2	Direct Red 7	
Direct Brown 2	Direct Red 10	

**c) Dyes that are CMR or which potentially be sensitising**

<b>Dyes that are carcinogenic, mutagenic or toxic to reproduction</b>		
C.I. Acid Red 26	C. I. Direct Black 38	C.I. Disperse Blue 1
C.I. Basic Red 9	C. I. Direct Blue 6	C.I. Disperse Orange 11
C.I. Basic Violet 14	C. I. Direct Red 28	C. I. Disperse Yellow 3
<b>Disperse dyes that are potentially sensitising</b>		
C.I. Disperse Blue 1	C.I. Disperse Blue 124	C.I. Disperse Red 11
C.I. Disperse Blue 3	C.I. Disperse Brown 1	C.I. Disperse Red 17
C.I. Disperse Blue 7	C.I. Disperse Orange 1	C.I. Disperse Yellow 1
C.I. Disperse Blue 26	C.I. Disperse Orange 3	C.I. Disperse Yellow 3
C.I. Disperse Blue 35	C.I. Disperse Orange 37	C.I. Disperse Yellow 9
C.I. Disperse Blue 102	C.I. Disperse Orange 76	C.I. Disperse Yellow 39
C.I. Disperse Blue 106	C.I. Disperse Red 1	C.I. Disperse Yellow 49

## Appendix I Phthalates and plasticizers

name	CAS-Nr.	Acronym
Butylbenzylphthalate / Butylbenzylphthalat	85-68-7	BBP
Dibutylphthalate / Dibutylphthalat	84-74-2	DBP
Di-ethylphthalate / Di-ethylphthalat	84-66-2	DEP
Di-(2-ethyl)phthalate / Di-(2-ethyl)phthalat	117-81-7	DEHP
Di-(2-methoxyethyl)phthalate / Di-(2-methoxyethyl)phthalat	117-82-8	DMEP
Di-C6-8-branched alkylphthalates, C7 rich / Di-C6-8-verzweigte Alkylphthalate, C7 rich	7188-89-6	DIHP
Di-C7-11-branched and linear alkylphthalates, / Di-C7-11-verzweigte und lineare Alkylphthalate	68515-42-4	DHNUP
Di-cyclohexylphthalate / Di-cyclohexylphthalat	84-61-7	DCHP
Di-hexylphthalate, branched and linear / Di-hexylphthalat, verzweigt und linear	68515-50-4	DHxP
Di-iso-butylphthalate / Di-iso-butylphthalat	84-69-5	DIBP
Di-iso-decylphthalate / Di-iso-decylphthalat	26761-40-0, 68515-49-1	DIDP
Di-iso-hexylphthalate / Di-iso-hexylphthalat	71850-09-4	DIHxP
Di-iso-octylphthalate / Di-iso-octylphthalat	27554-26-3	DIOP
Di-iso-nonylphthalate / Di-iso-nonylphthalat	28553-12-0, 68515-48-0	DINP
Di-n-propylphthalate / Di-n-propylphthalat	131-16-8	DPrP
Di-n-hexylphthalate / Di-n-hexylphthalat	84-75-3	DHP
Di-n-octylphthalate / Di-n-octylphthalat	117-84-0	DNOP
Di-n-nonylphthalate / Di-n-nonylphthalat	84-76-4	DNP
Di-pentylphthalate (n-, iso-, or mixed) / Di-pentylphthalate (n-, iso-, oder gemischt)	131-18-0, 605-50-5, 776297-69-9, 84777-06-0	DPP
1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters	68515-51-5	
1,2-Benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters	68648-93-1	
Tris(2-chlorethyl)phosphate	115-96-8	TCEP

## Appendix J Limit values for polycyclic hydrocarbons, textiles, rubber and leather coatings

Name	CAS number	Limit value for babies'/children's shoes [mg/kg]	Limit value for all other shoes [mg/kg]
<b>PAHs classified as carcinogens</b>			
Benzo[a]pyrene	50-32-8	< 0.2	< 0.5
Benzo[e]pyrene	192-97-2	< 0.2	< 0.5
Benzo[a]anthracene	56-55-3	< 0.2	< 0.5
Benzo[b]fluoranthene	205-99-2	< 0.2	< 0.5
Benzo[j]fluoranthene	205-82-3	< 0.2	< 0.5
Benzo[k]fluoranthene	207-08-9	< 0.2	< 0.5
Chrysen	218-01-9	< 0.2	< 0.5
Dibenzo[a,h]anthracene	53-70-3	< 0.2	< 0.5
Benzo[g,h,i]perylene	191-24-2	< 0.2	< 0.5
Indeno[1,2,3-cd]pyrene	193-39-5	< 0.2	< 0.5
<b>Other PAHs</b>			
Naphthalene	91-20-3	< 1	< 2
Acenaphthylene	208-96-8	< 1	< 10
Acenaphthene	83-32-9	< 1	< 10
Fluorene	86-73-7	< 1	< 10
Phenanthrene	85-1-8	< 1	< 10
Anthracene	120-12-7	< 1	< 10
Fluoranthene	206-44-0	< 1	< 10
Pyrene	129-00-0	< 1	< 10
<b>Sum of 18 PAH</b>		<1	< 10



## **Appendix K Prohibited N-nitrosamines**

### **N-nitrosamines**

The content of the following n-nitrosamines in rubber must be below the detection limit:

- N-nitrosodimethylamine (NDMA)
- N-nitrosodiethylamine (NDEA)
- N-nitrosodipropylamine (NDPA)
- N-nitrosodibutylamine (NDBA)
- N-nitrosopiperidine (NPIP)
- N-nitrosopyrrolidinone (NPYR)
- N-nitrosomorpholine (NMOR)
- N-nitroso N-methyl N-phenylamine (NMPhA)
- N-nitroso N-ethyl N-phenylamine (NEPhA)

## **Appendix L    Not permitted Chlorinated benzenes and toluenes**

It is not permitted to use the following chlorinated benzenes and toluenes in dyed synthetic fibres:

- Chlorobenzenes
- Dichlorobenzenes
- Trichlorobenzenes
- Tetrachlorobenzenes
- Pentachlorobenzenes
- Hexachlorobenzenes
- Chlorotoluenes
- Dichlorotoluenes
- Trichlorotoluenes
- Tetrachlorotoluenes
- Pentachlorotoluene

## **Appendix M Alkylphenol ethoxylates and alkylphenols for leather, textiles and plastics**

The following substances must not be used in mixtures or formulations that are used during the production steps and they must not be present in the end product at levels that exceed the limit values:

- Nonylphenol, mixed isomers, CAS number 25154-52-3
- 4-Nonylphenol, CAS number 104-40-5
- 4-Nonylphenol, branched, CAS number 84852-15-3
- Octylphenol, CAS number 27193-28-8
- 4-Octylphenol, CAS number 1806-26-4
- 4-tert-Octylphenol, CAS number 140-66-9

The following alkylphenolethoxylates (APEOs):

- Polyoxyethylated octyl phenol, CAS number 9002-93-1
- Polyoxyethylated nonyl phenol, CAS number 9016-45-9
- Polyoxyethylated p-nonyl phenol, CAS number 26027-38-3

## Appendix N Durability parameter

	General sports	School fottwear	Casual	Men's town	Cold weather footwear	Women's town	Fashion	Infants	Indoor
Uppers' flex resistant:: (kc = without visible damage; 100 = 100 000x) (DIN EN ISO 17694)	Dry = 100 Wet = 20	Dry = 100 Wet = 20	Dry = 80 Wet = 20	Dry = 80 Wet = 20	Dry = 100 Wet = 20 - 20° = 30	Dry = 50 Wet = 10	Dry = 15	Dry = 15	Dry = 15
Uppers' tear strength: (Average tear force, N)  Leather Other materials (DIN EN 13571)	≥ 80 ≥ 40	≥ 60 ≥ 40	≥ 60 ≥ 40	≥ 60 ≥ 40	≥ 60 ≥ 40	≥ 40 ≥ 40	≥ 30 ≥ 30	≥ 30 ≥ 30	≥ 30 ≥ 30
Outsoles' abrasion resistance: Cut growth (mm) Nsc = no spontaneous crack (DIN EN ISO 17707)	≤ 6 Nsc	≤ 6 Nsc	≤ 6 Nsc	≤ 6 Nsc	≤ 6 Nsc at - 10 °C	≤ 6 Nsc			
Outsoles' abrasion resistance: D ≥ 0,9 g/cm <sup>3</sup> (mm <sup>3</sup> ) D < 0,9 g/cm <sup>3</sup> (mg) (DIN EN 12770)	≤ 200 ≤ 150	≤ 200 ≤ 150	≤ 250 ≤ 170	≤ 350 ≤ 200	≤ 200 ≤ 150	≤ 400 ≤ 250			≤ 450 ≤ 300
Upper-sole adhesion: (N/mm) (DIN EN ISO 17708)	≥ 3,0	≥ 3,0	≥ 3,0	≥ 3,0	≥ 3,0	≥ 3,0	≥ 2,5	≥ 3,0	≥ 2,5
Outsoles' tear strength: (Average strength, N/mm) D ≥ 0,9 g/cm <sup>3</sup> D < 0,9 g/cm <sup>3</sup> (DIN EN 12771)	8 6	8 6	8 6	6 4	8 6	6 4	5 4	6 5	5 4
Colour fastness of the inside of the footwear (lining or inner face of the upper). Grey scale on the felt after 50 cycles wet/ (DIN EN ISO 17700)	≥ 2/3	≥ 2/3	≥ 2/3	≥ 2/3	≥ 2/3	≥ 2/3		≥ 2/3	≥ 2/3
Linings' and socks' abrasion cycles (DIN EN ISO 17704)	51.200x Dry, 12.800x Wet	51.200x Dry, 12.800x Wet	51.200x Dry, 12.800x Wet	51.200x Dry, 12.800x Wet	51.200x Dry, 12.800x Wet	51.200x Dry, 12.800x Wet			

## Appendix O Descriptions of the ILO standards

Minimum social standards in the "agricultural cultivation of the raw fibres" phase for the natural fibres contained in the product offered for sale	Contents (ILO 2016)
The freedom of association and protection of the right to organise in accordance with ILO Convention 87 (fundamental labour standard)	Covers the right (1) to organise freely without prior authorisation and (2) join such organisations. Any interference that would restrict this right or the lawful exercise thereof is prohibited.
The right to bargain collectively in accordance with ILO Convention 98 (fundamental labour standard)	Covers the right (1) to freely negotiate the regulation of wages and the terms and conditions of employment by means of collective agreements and grants (2) the workers' and employers' organisations protection against any acts of interference by each other or on behalf of the organisations, such as by each other's agents or members, in their establishment, functioning or administration. It provides (3) employees with protection against all forms of differential treatment targeted against the freedom of assembly that is connected with their employment.
Equal remuneration in accordance with ILO Convention 100 (fundamental labour standard)	Obligation to promote and ensure the principles of equal remuneration for male and female workers for work of equal value for all workers. "Remuneration" includes the ordinary, basic or minimum wage or salary, and all additional emoluments. "Equal remuneration for men and women workers for work of equal value" refers to rates of remuneration established without discrimination based on gender.
Abolition of forced labour in accordance with ILO Conventions 29 and 105 (fundamental labour standard)	Obligation to suppress forced or compulsory labour; obligation not to use any form of forced or compulsory labour. According to Article 2 of Convention 29, "forced or compulsory labour" in the sense of this convention means all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.

Minimum social standards in the “agricultural cultivation of the raw fibres” phase for the natural fibres contained in the product offered for sale	Contents (ILO 2016)
Non-discrimination in employment and occupation in accordance with ILO Convention 111 (fundamental labour standard)	Discrimination includes any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin.
Minimum age for employment in accordance with ILO Convention 138 (fundamental labour standard)	The minimum age for admission to employment is set at 15 years (13 years for light work). In the case of dangerous work, the convention sets the age limit for admission to employment at 18 years (16 years under certain circumstances). Family or small-scale holdings producing for local consumption and not regularly employing hired workers are excluded.
Prohibition of the worst forms of child labour in accordance with ILO Convention 182 (fundamental labour standard)	This includes all forms of slavery or all practices similar to slavery, such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labour.

<b>Minimum social standards in the "agricultural cultivation of the raw fibres" phase for the natural fibres contained in product offered for sale</b>	<b>Contents (ILO 2016)</b>
Prohibition of the worst forms of child labour in accordance with ILO Convention 182 (fundamental labour standard)	This includes all forms of slavery or all practices similar to slavery, such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labour.
Securing occupational safety and health in agriculture in accordance with ILO Convention 184	According to the convention, the employer has a duty to ensure the safety and health of workers in every aspect related to the work. Corresponding measures serve to reduce work accidents and provide adequate protection against sources of danger for employees.
The rights also apply to subcontracted work	The rights granted to workers also apply to workers employed by subcontractors. This requirement does not apply to small-scale farms.
A written employment contract	Workers receive a written employment contract that complies with the legal regulations. This requirement does not apply to small-scale farms.

Minimum social standards in the "production of yarn and raw goods, textile finishing and packaging" process phases	Contents (ILO 2016)
The minimum social standards in the "agricultural cultivation of the raw fibres" phase are supplemented by limiting the working hours in accordance with ILO 1 and securing occupational safety and health in accordance with ILO Convention 155:	
Limiting the hours of work in accordance with ILO Convention 1	Limiting the average working time to eight hours a day and 48 hours a week, as well as a maximum of 12 voluntarily performed and paid hours of overtime per week.
Securing occupational safety and health in accordance with ILO Convention 155	Measures to reduce accidents and health damage during, as a result of or in connection with work. The measures include minimising the causes of hazards, as well as the provision of adequate protective clothing and protective equipment. In addition, it includes measures to deal with emergencies and accidents, including adequate first-aid arrangements.

ILO (2016): IAO fundamental labour standards. The fundamental principles of the IAO; [www.IAO.org/berlin/arbeits-und-standards/kernarbeitsnormen/lang--de/index.htm](http://www.IAO.org/berlin/arbeits-und-standards/kernarbeitsnormen/lang--de/index.htm).