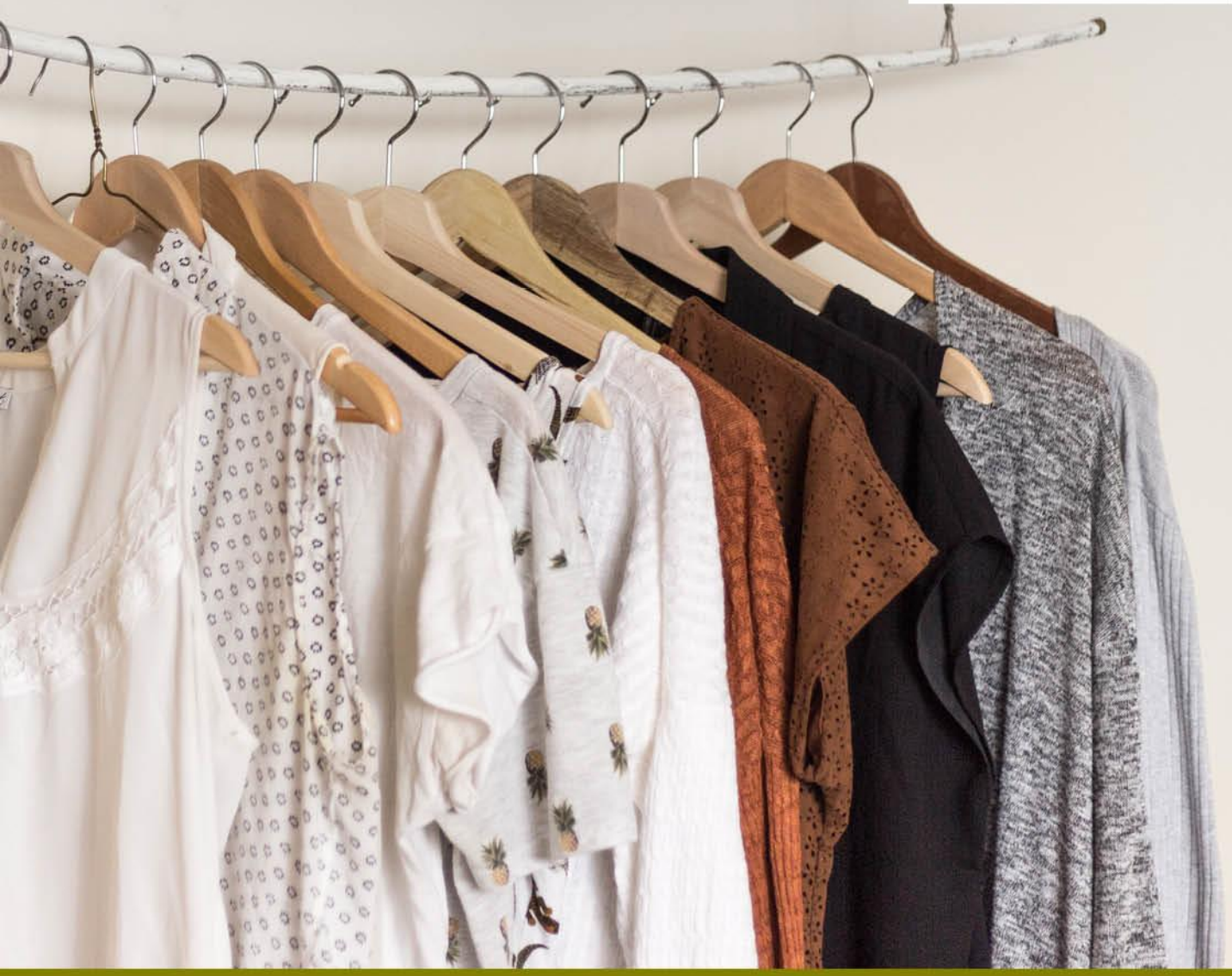

NATURLAND STANDARDS

PROCESSING

Supplement for textiles

Version 05/2023

XIII. Processing standards for textiles

The processing standards for textiles are supplementary to the Naturland standards "Processing - General Section", including the appendices.
These are likewise binding on all processing standards for specific groups of products and consequently must be observed in processing textiles.

1. Area of application

The area of application of this standard covers the processing products of all natural fibres, e.g. sewing thread, fabric and garments.

2. Contents of agricultural and non-agricultural origin

All natural fibres from agricultural production are permissible, provided they comply with the certification requirements of the priorities list C. VI. 4.1.
At least 95% of the final product must consist of natural fibres (except for buttons, buckles, zips and similar notions).
Besides this, the following regulations apply:
Generally speaking, natural, renewable raw goods are to be used. This also applies to accessories and other items necessary in processing. PVC/PU and nickel are prohibited. Metals (e. g. buttons) must be free from nickel and chromium. They may also not be electro-plated with chromium or nickel. Accessories and other items made from these raw goods must be within the limits for contaminants set by Naturland as per appendix 6.

Requirements for accessories:

sewing thread	natural fibres and polyester-core fibres with a cotton sheath
embroidery yarn/linings/inner pockets/ shoulder pads/labels/inlays/interfacing/seam bindings/hatbands/cords	of natural fibres
appliqué	on the basis of natural materials
elastic bands and yarns	natural and synthetic materials permissible
edgings	of natural fibres. In underwear, tapes and lacy borders may contain elastane.
buttons, buckles	of renewable raw goods, and of metals. Metal buttons must be free of chromium and nickel.
zips	tape of natural fibres and teeth with slider of chrome and nickel free metal or of 100% recycled polyester. Fine zips and/or those subject to considerable tension may be made of polyester tapes and have plastic teeth (not PVC).
reinforcements and trimmings	of natural raw materials and of metals free of chromium and nickel.
other accessories not listed	of natural fibres

3. Permissible processing agents

All the substances and compounds applied must fulfil the requirements listed below with respect to toxicology and degradability/eliminability. The assessment of the degree of toxicity is based on DIN safety standards.

4. Prohibited processing agents

As a rule, all substances and compounds are prohibited which are also prohibited under recognised interna-

tional or national legislation.[1]
In particular, processing agents composed of the following substances and auxiliary substances containing the following are prohibited:

- heavy metals
- azo dyes, pigments and other auxiliary agents releasing carcinogenic arylamine compounds (MAK III, category 1, 2, 3, 4)
- aromatic and halogenated solvents
- halogenated plastics (e.g. PVC)
- endocrine disruptors
- plasticizers as PAH, phthalates, Bisphenol A and all plasticizers with endocrine disrupting potential
- complexing agents and active detergent substances (EDTA, DTPA, NTA, all AP and APEOs, LAS, α-MES)
- formaldehyde and other short-chain aldehydes (prohibited are inputs that contain or generate formaldehyde or other short-chain aldehydes during designated application)
- chlorophenols (such as TCP, PCP)
- short-chain chlorinated paraffins (SCCPs, C_{10-13})
- chlorinated benzenes
- fungicides and biocides
- per- and polyfluorinated compounds
- quaternary ammonium compounds
- organotin compounds (DBT, MBT, TBT, DOT, TPhT, DMT, DPT, MOT, MMT, MPhT, TeBT, TCyHT, TMT, TOT, TPT, DphT, TeET)
- genetically modified organisms (GMOs) and their derivatives (including enzymes produced with the aid of GMOs)
- brominated and chlorinated flame retardants
- permanent AOX in primary effluent (if greater than 1% of the weight of any input)

Toxicity requirements and risk phrases in all processing stages:

substance group	**criteria**
other toxic substances	The use of chemical substances and compounds is prohibited which are classified with any of the following hazard statements (in accordance with the codification system of the Global Harmonized System (GHS)[2] as published by the United Nations, annex 3): as very toxic (H300, H310, H330), suspected carcinogenic effect (H351), may cause cancer (H350), may cause heritable genetic damage (H340, H341), danger of serious damage to health (H370-372) or impairing fertility (H360, H361). Furthermore, all chemical substances and compounds which are classed as very toxic to aquatic organisms (H400, H410), cause long-term adverse effects in the environment (H411) and are dangerous for the ozone layer (EUH 059) in accordance with the codification system of the EU-GHS (Regulation EC 1272/2008), as well as which are in accordance with the risk phrase classification toxic to flora, fauna and soil organisms (R54-56) or may cause long-term adverse effects in the environment (R58). Furthermore, chemical substances and compounds which are classified as harmful or possibly causing long-term adverse effect on aquatic organisms (H413 resp. R53).

[1] Substances listed in regulation EC 552/2009 (amending regulation EC 1907/2006 (REACH), annex XVII), and the 'candidate list of substances of very high concern for authorisation' of the European Chemicals Agency (ECHA) are prohibited.

[2] For inputs assessed on basis of GHS, where the implementation system does not provide for the codified H-statements, the corresponding hazard classes and categories of GHS, annex 3 apply. For inputs assessed according to the 'risk phrase' classification (Directive 67/548EEC amended and appealed by Regulation EC 1272/2008) the equivalent risk phrases apply.

oral toxicity (minimum requirements)	LD_{50} [3]> 2000mg/kg[4]
aquatic toxicity[5] (minimum requirements)	LC_{50}, EC_{50}, IC_{50} > 1mg/l for bacteria, fish, daphnia, algae
relationship of biodegradability/eliminability (%)[6] to aquatic toxicity (mg/l)	only permissible if: biodegradability/eliminability < 70% only where water toxicity > 100mg/l biodegradability/eliminability > 70% where water toxicity > 10 mg/l biodegradability/eliminability > 95% where water toxicity > 1 mg/l
bio-accumulative substances	Bio-accumulative[7] and non-biodegradable[8] [9] substances and compounds classified with H413 resp. R53are prohibited.

Note: the rating of the "aquatic toxicity" and "biodegradability/eliminability" of textile agents need not be performed solely on the basis of valid test data[25] for the finished compound but can also be made on the basis of test data on the individual ingredients of the compound. In the case of reactive dyes, the requirement applies to the final product.

5. Permissible processing methods and the chemical substances used in them

- Spinning: wherever paraffin products are applied, they must be recovered in such a way that they account for no more than 0.5% residual oil in the final product.
- Sizing: only with starches and starch derivatives and other natural substances and CMC (carboxymethylcellulose). PVA (polyvinylalcohol) and PAC (polyacrylate) may only be used in combination with natural substances and not exceeding 25%.
- Knitting and weaving: only using oils which do not contain any heavy metals. Other inputs may only consist of natural raw materials.
- bleaching: on the basis of oxygen only (peroxides, ozone)
- Boiling, kiering, washing: washing detergents must not contain phosphates.
- Mercerization: alkaline must be recycled.
- Dyeing: using natural dyes only and such synthetic dyes and agents as meet the above-mentioned requirements and the critical values for residues given in appendices 5 and 6.
- Printing: only using natural dyes and agents and such synthetic dyes, agents and pigments as meet the above-mentioned requirements and the critical values for residues given in appendices 5 and 6.

[3] Performing new animal tests to determine unknown LD50 values in the course of the assessment procedure for inputs is prohibited. Instead, alternative methods (e.g. Acute Toxicity Estimates (ATE), conclusions on analogy from similar products, validated structure-activity relationships, calculation from available data of substances contained, expert judgment, in vitro tests) must be used to determine unknown values.

[4] Substances and preparations, such as alkalis and acids, that fail to meet this requirement because of their pH value only, are exempt from this requirement.

[5] Performing new fish and daphnia tests to determine unknown LC50/EC50 values in the course of the assessment procedure for inputs is prohibited. Instead alternative methods to OECD 203 (96hr) and EC50 daphnia, OECD 202 (48hr) (e.g. Acute Toxicity Estimates (ATE), validated structure-activity relationships, conclusion on analogy from similar products, calculation from available data of substances contained, fish egg test (embryo toxicity test (FET)), IC50 algae, OECD 201 (72hr) must be used to determine unknown values.

[6] Accepted test methods: OECD 301 A, OECD E, ISO 7827, OECD 302A, ISO 9887, OECD 302 B, ISO 9888 or OECD 303A; to meet the 70% level a preparation tested with one of the methods OECD 303A or ISO 11733 a percentage degradation of at least 80% must be shown - or if tested with one of the methods OECD 301 B, ISO 9439, OECD 301 C, OECD 302 C, OECD 301 D, ISO 10707, OECD 301 F, ISO 9408, ISO 10708 or ISO 14593 a percentage degradation of at least 60% must be shown. To meet the 95% level, if tested with any of the mentioned methods a percentage degradation of 95% must be shown. Test duration 28 days with each method.

[7] A substance or preparations is considered as (potentially) bio-accumulative, if BCF (= bio-concentration factor) ≥ 500 or, if absent, log K_{ow} (= logarithm of the n-octanol-water partition coefficient) ≥ 4.

[8] Testing requirement: >70% OECD 301A (28d) or equivalent testing method according to footnote 25, except test methods related to eliminability (OECD 302). In those cases where only BOD and COD data are available the input is considered 'rapidly degradable' when the ratio of BOD5/COD is ≥ 0.5.

[9] This criterion is not applicable to preparations whose very low solubility in water prevents their bioaccumulation (e.g. pigment preparations).

All other mechanical, thermal and physical methods of processing fibres are permissible, in so far as natural additives and/or GMO-free enzymes are used. Synthetic additives are only permitted as softening agents and in milling and felting textiles, in so far as they comply with the above-mentioned requirements.

6. Prohibited processing methods

- ammonia treatment
- chlorination of wools
- optical brightening
- plastisol printing methods using aromatic solvents, phthalates and chlorinated plastics (e.g. PVC)

7. Environmental management

Processing plants must have a written environmental policy including the following measures:

- minimisation and monitoring of waste and pollution
- procedures to be followed in the case of waste and pollution incidents
- documentation of staff training in the conservation of water and energy, the proper and minimal use of chemicals and their correct disposal

Wet-processing plants must record their use of chemicals, their energy and water consumption and procedures for wastewater treatment and the disposal of effluent sludge.

8. Treatment of effluent and environmental requirements

All wet processing facilities for pre-treatment, dyeing and finishing, with direct or indirect wastewater, must at least have access to a two-phase purification plant. The correct operation of these plants must be monitored and documented by analyses (sediment quantities, wastewater temperature, wastewater pH, TOC, BOD, COD and residues). Effluent analyses must be performed regularly at normal operating capacity and the results recorded.

Wastewater from wet processing plants must have an annual average COD content of less than 20 g/kg of processed textile agents if it is to be discharged into surface waters. If the effluent is treated on site and discharged directly into surface waters, the following values must be adhered to: pH value of 6 – 9, temperature lower than 35° C.

9. Quality testing and pollution analysis

Textiles produced according to these standards must comply with the following technical quality parameters:

parameter	test method	criteria
rubbing fastness, dry	DIN 54021 ISO 105x12	3 – 4
rubbing fastness, wet	DIN 54021 ISO 105x12	2
perspiration fastness, alkaline and acid	DIN 54020 ISO 105 E04	3 – 4
light fastness	DIN 54004 ISO 105 B02	3 – 4
shrinkage values when wet knitted/hosiery woven	DIN 53920 ISO 6330	 max. 8% max. 3%
saliva fastness	LMBG B 82.10-1 DIN 53160-1	5
washing fastness when washed at 60° C	DIN 54010 ISO 105 C03	3 – 4
Washing fastness of animal fibre material and blends thereof when washed at 30°C	ISO 105 C06 A1S without use of steels balls	3 – 4

Quality testing consists of analysing residue by taking samples from regular production. The number of spot checks per year depends on the volume of production and Naturland's requirements. Samples may be taken from the incoming goods or the finished goods, depending on the stage of processing. The aim is to distribute the checks evenly over the whole flow of goods and to check all possible discharge routes for contamination. The critical values for contaminants in organic textiles and in other components and accessories have to correspond to those set out in appendices 5 and 6. The expenses are to be borne by the processor. Naturland has to be informed if the critical values are exceeded.

10. Documentation and accountability

In addition to the requirements listed in section C.VI. 7., a fully documented quality management system must be introduced to cover the whole supply chain (from the production of the natural fibres through each of the processing stages to the final product and the marketing agent legally responsible for the product). In this way every stage of production and all measures taken are described and recorded. Naturland must be notified before any change in supplier, processing stages, auxiliary substances and processors is made, and the changes must be approved by Naturland.

11. Labelling

The proportion of natural fibres in the final product must be shown.
It is not possible to label Naturland textiles as being products "organic – in conversion".

Appendix 4: Textiles - Abbreviations used

AOX	the sum parameter for adsorbing, organically bound halogens and substances which could cause them to be formed
AP	alkylphenol
APEO	akylphenolethoxylate
BOD	biochemical oxygen demand
COD	chemical oxygen demand; it designates the amount of oxygen which it takes to oxidise organic substances in water.
DBT	dibutyltin
DMT	dimethyltin
DOC	dissolved organic carbon
DOT	dioctyltin
DPhT	diphenyltin
DPT	dipropyltin
DTPA	diethylenetriamine pentaacetic acid
EC 50	effective concentration required for 50% of the organisms tested
EDTA	ethyldiamine tetraacetic acid
LAS	linear alkyl sulfonate
LC 50	lethal concentration 50 (concentration in water having 50% chance of causing death to aquatic life)
LD 50	lethal dose 50 (median concentration of a toxicant that will kill 50% of the test animals within a designated period)
IC 50	median inhibition concentration (concentration that reduces the effect by 50%)
α-MES	α-methane sulphonic acid (C16/18)
MBT	monobutyltin
MMT	monomethyltin
MOT	monooctyltin
MPhT	monophenyltin
NTA	nitrilotriacetic acid
OECD	Organisation for Economic Co-operation and Development

PAH	polycyclic aromatic hydrocarbons
PVC	polyvinyl chloride
SCCPs	short-chain chlorinated Paraffins
TBT	tributyltin
TCyHT	tricyclohexyltin
TeBT	tetrabutyltin
TeET	tetraethyltin
TMT	trimethyltin
TOC	total organic carbon
TOT	trioctyltin
TPhT	triphenyltin
TPT	tripropyltin

Appendix 5: Textiles - Critical values for residues in organic textiles

Textiles produced under these standards must correspond to the following chemical quality parameters:

parameter	test method	criteria
chlorophenols: PCP TeCP TrCP DCP MCP	LFGB 82-02-08 (GC/MS)	 < 0.01 mg/kg < 0.01 mg/kg < 0.2 mg/kg < 0.5 mg/kg < 0.5 mg/kg
o-phenylphenols (OPP)	Extraction, GC/MS	< 1.0 mg/kg
Alkylphenol (ethoxylate) NP, OP, NPEO, OPEO sum parameter NP, OP sum parameter	For NP, OP: Extraction, derivatisation, GC/MS or HPLC/MS For NPEO, OPEO: Extraction in methanol, derivatisation, HPLC/MS (test range for NPEO and OPEO: 3-15 moles)	 < 20 mg/kg < 10 mg/kg
arylamines with carcinogenic properties (amine-releasing azo dyes (MAK group III 1,2,3) aniline (MAK III, category 4)	EN 14362 - 1 and -3 (HPLC/GCMS)	< 20 mg/kg < 100 mg/kg
AOX	Extraction with boiling water, adsorption on charcoal, AOX–analyser, ISO 9562	< 5 mg/kg
disperse dyes (classified as allergenic or carcinogenic)	DIN 54231 (LC/MS)	< 30 mg/kg
formaldehyde	Japanese Law 112 or ISO 14184 – 1	< 16 mg/kg
glyoxal and other short-chain aldehydes (mono- and dialdehydes up to C_6)	Extraction (ISO 14184 – 1), ISO 17226 – 1 (HPLC)	< 20 mg/kg
pH	ISO 3071	4.5 – 9.0 (no skin contact) 4.5 – 7.5 (skin contact and baby clothes)
total pesticides, sum parameter	Art. 64 LFGB L 00.00-34 (GC/MS); § 64 LFGB L 00.00-114 (LC/MS/MS)	
all natural fibres (except shorn wool), cert. organic		< 0.1 mg/kg
short wool, cert. organic		< 0.5 mg/kg
heavy metals	Elution DIN EN ISO 105-E04; ISO 17294-2 (ICP/MS); EN 16711-2	in eluate: figures in mg/kg with reference to the textile
antimony (Sb)		< 0.2 mg/kg
arsenic (As)		< 0.2 mg/kg
lead (Pb)		< 0.2 mg/kg
cadmium (Cd)		< 0.1 mg/kg
chromium (Cr)		< 1.0 mg/kg
cobalt (Co)		< 1.0 mg/kg
copper (Cu)		< 25 mg/kg
nickel (Ni)		< 1.0 mg/kg
mercury (Hg)		< 0.02 mg/kg
selenium (Se)		< 0.2 mg/kg
tin (Sn)		< 2.0 mg/kg
chromium VI (Cr-VI)	Elution DIN EN ISO 105-E04, ISO 11083	< 0.5 mg/kg

heavy metals	EPA 3050 B (ICP/MS); EPA 3051 or EN 16711-1	In digested sample:
cadmium (Cd)		< 45 mg/kg
lead (Pb)		< 50 mg/kg
Organotin compounds (individually) TBT, TphT, DBT, DOT MBT DMT, DPT, MOT, MMT, MPhT, TeBT, TCyHT, TMT, TOT, TPT, DphT, TeET	Extraction in solvent, ISO 17353 (GC/MS) or ISO/TS 16179	 < 0.05 mg/kg < 0.1 mg/kg < 0.1 mg/kg
per- and polyfluorinated compounds (PFC), individually: PFOA, PFOS FTOH	Extraction in solvent, LC/MS Extraction in solvent, GC/MS	absent < 0.001 mg/kg < 0.01 mg/kg
phthalates (DINP, DMEP, DNOP, DEHP, DIDP, BBP, DBP, DIBP, DEP, DIHP, DHNUP, DCHP, DHxP, DIHxP, DPrP, DHP, DNP, DPP), sum parameter	DIN EN 15777: 2009-12 (GC/MS) or ISO 14389	< 100 mg/kg
Polycyclic Aromatic Hydrocarbons (PAH): Chrysene, Benzo[a]anthracen, Benzo[b]fluoranthene, Benzo[j]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Benzo[e]pyrene, Dibenzo[a,h]anthracene,	ISO 18287 or ZEK 01.2-08 (GC/MS) or AfPS GS 2014:01	< 0.5 mg/kg
Naphthalin, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Indeno[1,23-cd]pyrene, Benzo[g,h,i]perylene,		< 1 mg/kg
sum parameter		< 10mg/kg

Appendix 6: Textiles - Critical values for residues in additional materials and accessories

Textiles produced under these standards must correspond to the following chemical quality parameters:

parameter	test method	criteria
arylamines with carcinogenic properties (amine-releasing azo dyes; MAK group III 1,2,3)	EN 14362 - 1 and -3 (HPLC/GCMS)	< 20 mg/kg
disperse dyes (classified as allergenic or carcinogenic)	DIN 54231 (LC/MS)	< 30 mg/kg
formaldehyde	Japanese Law 112 or ISO 14184 – 1	< 300 mg/kg (no skin contact) < 75 mg/kg (skin contact) < 16 mg/kg (baby clothes and hygiene products)
Glyoxal and other short-chain aldehydes (mono- and dialdehydes up to C_6)	Extraction, (ISO 14184 – 1) ISO 17226-1 HPLC	< 300 mg/kg (no skin contact) < 75 mg/kg (skin contact) < 20 mg/kg (baby clothes and hygiene products)
pH	ISO 3071	7.5
chlorophenols PCP, TeCP TrCP DCP, MCP	LFGB 82-02-08 (GC/MS)	 < 0.05 mg/kg < 0.2 mg/kg < 0.5 mg/kg
total pesticides, sum parameter	§ 64 LFGB L 00.00-34 (GC/MS); § 64 LFGB L 00.00-114 (LC/MS/MS)	
all natural fibres (except shorn wool)		< 0.5 mg/kg (baby clothes and hygiene products) < 1.0 mg/kg
shorn wool		< 1.0 mg/kg
heavy metals	Elution DIN EN ISO 105-E04, ISO 17294-2 (ICP/MS)	in eluate: figures in mg/kg referring to additional material or accessory
arsenic (As)		< 0.2 mg/kg
lead (Pb)		< 0.2 mg/kg
cadmium (Cd)		< 0.1 mg/kg
chromium (Cr)		< 1.0 mg/kg
cobalt (Co)		< 1.0 mg/kg
copper (Cu)		< 25 mg/kg (baby clothes and hygiene products) < 50 mg/kg[10]
nickel (Ni)		< 1.0 mg/kg
mercury (Hg)		< 0.02 mg/kg
chromium VI (Cr-VI)	Elution DIN EN ISO 105-E04, ISO 11083	< 0.5 mg/kg

[10] Criterion not applicable to non-biotic material (such as metals)

heavy metals	EPA 3050 B (ICP/MS); EN 16711-1	In digested sample:
cadmium (Cd)		< 40 mg/kg
lead (Pb)		< 90 mg/kg
nickel release	EN 12472, EN 1811	< 0.28µg/cm²/week
organotin compounds (individually) TBT, TphT DBT, DOT, MBT DMT, DPT, MoT, MMT, MPhT, TeBT, TCyHT, TMT, TOT, TPT, DphT, TeET	Extraction in solvent, ISO 17353 (GC/MS) or ISO/TS 16179	 < 1.0 mg/kg < 0.05 mg/kg (baby clothes and hygiene products) < 2.0 mg/kg < 1.0 mg/kg (baby clothes and hygiene products) < 2.0 mg/kg < 1.0 mg/kg (baby clothes and hygiene products)
phthalates (DINP, DMEP, DNOP, DEHP, DIDP, BBP, DBP, DIBP, DEP, DIHP, DHNUP, DCHP, DHxP, DIHxP, DPrP, DHP, DNP, DPP), sum parameter	ISO 14389	< 0.1%
Polycyclic Aromatic Hydrocarbons (PAH): Chrysene, Benzo[a]anthracen, Ben-zo[b]fluoranthene, Ben-zo(j)fluoranthene, Ben-zo[k]fluoranthene, Ben-zo[a]pyrene, Ben-zo(e)pyrene, Dibenzo[a,h]anthracene, Naphthalin, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoran-thene, Pyrene, Indeno[1,2,3-cd]pyrene, Ben-zo[g,h,i]perylene **sum parameter** **sum parameter for baby clothes and hygiene products** **individually** **individually for baby clothes and hygiene products**	ISO 18287 or ZEK 01.2-08 (GC/MS) or AFPS GS 2014:01	< 10mg/kg < 5mg/kg < 1 mg/kg < 0.5mg/kg

Further parameters relevant for specific materials used in accessories	**test method**	**criteria**
Polyester fibres: antimony (Sb)	Elution DIN EN ISO 105-E04, ISO 17294-2 (ICP/MS)	< 30 mg/kg
Natural latex foam: Butadiene Chlorophenols (incl. salts and esters) Carbon disulphide Nitrosamines	Gas chromatography, flame-ionisation detector LFGB 82-02-08 (GC/MS) Chamber test, DIN ISO 16000-6 Chamber test; ZH 1/120-23 or BGI 505-23 for air sampling and analysis	< 1.0 mg/kg < 1.0 mg/kg < 0.02 mg/m3 < 0.001 mg/m3

Naturland
Association for Organic Agriculture e.V.
Kleinhaderner Weg 1
82166 Gräfelfing | Germany

Tel. +49 (0)89-898082 - 0
Fax +49 (0)89-898082 - 90

naturland@naturland.de
www.naturland.de

Naturland