

# eco-INSTITUT-Label

## Test criteria: Mattresses

(Status: March 2023)



eco-INSTITUT Germany GmbH

Laborprüfung  
Laboratory testing  
Zertifizierung  
Certification



### A Basic requirements

- Full declaration of materials
- Minimisation requirements for substances with dangerous properties according to dangerous substances regulations.
- Compliance with requirements for harmful substances (refer to **C laboratory examinations**)
- Compliance with the provisions of the European (e.g. REACH Regulation (EC) No. 1907/2006 and Biocidal products Regulation (EU) 528/2012) and German chemicals legislation
- Materials with the following classifications may not be used in the product:

Substances according to Regulation (EC) No. 1272/2008 Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B

Substances according to national law (TRGS 905): Category K1A and K1B, M1A and M1B, R1A and R1B

Substances according to MAK lists III1 and III2

Substances according to IARC groups 1 and 2A

Substances requiring official approval as per Appendix XIV of the REACH regulations

Substances of very high concern according to REACH Regulation (EC) No. 1907/2006, Article 59, paragraph 1 (SVHC, Candidate List)

POPs (Persistent Organic Pollutants) according to Regulation (EC) No 850/2004

Arsenic, lead, cadmium, mercury and compounds

Organic compounds of tin

Antimony trioxide

HFC

Organophosphates

Organic halogenated compounds

Pyrethroids

Phthalatic acid esters, Terephthalatic acid esters (apart from PET), DINCH

- Substances with the following classification (H-phrase) must not be used in the product<sup>1</sup>:

Description		H-Statement
Fatal	Fatal if swallowed.	H300
	Fatal in contact with skin.	H310
	Fatal if inhaled.	H330
Toxic	Toxic if swallowed.	H301
	Toxic in contact with skin.	H311
	Toxic if inhaled.	H331
Specific target organ toxicity	Cause damage to organs.	H370
	May cause damage to organs.	H371
	Causes damage to organs through prolonged or repeated exposure.	H372
	May cause damage to organs through prolonged or repeated exposure.	H373
Sensitization of respiratory tract	May cause allergy or asthma symptoms or breathing difficulties if inhaled.	H334
Carcinogenicity	May cause cancer.	H350
	Suspected of causing cancer.	H351
Mutagenicity	May cause genetic defects.	H340
	Suspected of causing genetic defects.	H341
Reproductive toxicity	May damage fertility or the unborn child.	H360
	Suspected of damaging fertility or the unborn child.	H361
	May cause harm to breast-fed children.	H362
Acute hazardous to water	Very toxic to aquatic life.	H400
Chronically hazardous to water	Very toxic to aquatic life with long lasting effects.	H410
	Toxic to aquatic life with long lasting effects.	H411 (> 1 %)
Hazardous to ozone layer	Hazardous to the ozone layer.	EUH 059

## B Special requirements

- The use of the following vulcanization agents in latex production is permitted: ZnO (CAS: 1314-13-2), ZMBT / MBT (CAS: 155-04-4/149-30-4), ZDEC (CAS: 14324-55-1), ZBEC (CAS: 14726-36-4), ZDBC (CAS: 136-23-2), sodium hexafluorosilicate (CAS: 16893-85-9), 1,3-diphenylguanidine (CAS: 102-06-7), poly-(dicyclopentadiene-co-p-cresol) (CAS: 68610-51-5).

Prerequisite: Wastewater must be treated in internal or external wastewater treatment plants before being discharged into the environment. Wastewater analyses must be performed and documented regularly.

- The use of chloroprene containing adhesives is permitted.
- Compliance with the following quality criteria:
  - Loss of strength: < 20 %  
(Verification: submission of a test report according to DIN EN 1957 or comparable, not older than 5 years).
  - Loss of height: < 15 mm  
(Verification: presentation of a test report according to DIN EN 1957 or comparable, not older than 5 years).
- The product designation "100 % Natural Latex" is not permitted on the certificate.

<sup>1</sup> For homogeneous substance mixtures, all input substances > 0.1 % (except for H411) are evaluated. For articles, the overall classification of the input substance or substance mixture (e.g. adhesive, varnish, etc.) is evaluated. Inputs that have critical hazard characteristics (H-phrase) due to respirable wood dusts or mineral dusts are allowed, provided the overall product does not have a critical hazard characteristic. Input materials with critical hazard characteristics (H-phrase) for which a requirement value is defined in the laboratory test are permissible, provided that the requirement for emission behaviour or content is met and the requirement value was derived from the property that the H-phrase also addresses.

## C Laboratory examinations

P11 Complete mattress			
Test parameter	Requirements	Test method	
<b>Emission test</b>			
TVOC (total volatile organic compounds)	$\leq 400 \mu\text{g}/\text{m}^3$ (2 days after test chamber loading) $\leq 200 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)	DIN EN 16516, DIN ISO 16000-3, DIN ISO 16000-6, DIN EN ISO 16000-9  Test chamber conditions: cf. testing manual	
VOC (incl. VVOC and SVOC) with the following categorisations <sup>2</sup> : Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2	$\leq 1 \mu\text{g}/\text{m}^3$ (2 and 7 days after test chamber loading)		
Dimethylformaldehyd (DMF, only covering materials)	$\leq 5 \mu\text{g}/\text{m}^3$ (2 days after test chamber loading)		
VOC (sum) without NIK	$\leq 100 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
VOC (individual values):			
Sum of bicyclic terpenes	$\leq 200 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum of sensitising materials with the following categorisations: DFG (MAK lists): Category IV, TRGS 907	$\leq 100 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum of VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2; TRGS 905: K2, M2, R2; IARC: Group 2B; DFG (MAK list): III3	$\leq 50 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum C9 – C14 Alkanes / Isoalkanes	$\leq 200 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum C4 – C11 Aldehydes, acyclic, aliphatic	$\leq 100 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum C6 – C15 Alkyl benzenes	$\leq 100 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum Cresols	$\leq 5 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum Xylenes	$\leq 100 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Sum Naphthalene and naphthalene-like subst.	$\leq 10 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
VOC (individual substances):			
Methylisothiazolinone (MIT)	$\leq 1 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Octylisothiazolinone (OIT)	$\leq 1 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Benzaldehyde	$\leq 20 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
2-Ethyl-1-hexanol, Ethylene glycol mono-butyl ether, 2-Hexoxyethanol (Requirement per single substance)	$\leq 100 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
2-Butoxyethyl acetate	$\leq 200 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
Glycol ethers with insufficient data <sup>3</sup> (Requirement per single substance)	0.005 ppm (7 days after test chamber loading)		
Propane-1,2-diol	$\leq 60 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		
2-Phenoxyethanol	$\leq 30 \mu\text{g}/\text{m}^3$ (28 days after test chamber loading)		
Phenol	$\leq 20 \mu\text{g}/\text{m}^3$ (28 days after test chamber loading)		
Benzothiazole <sup>4</sup>	$\leq 15 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)		

<sup>2</sup> does not apply for Dimethylformamid (DMF) for mattresses with covering materials

<sup>3</sup> cf. announcement of the Ad-hoc Working Group on Indoor Guidelines of the Indoor Air Hygiene Committee and of the Supreme State Health Authorities: Richtwerte für Glykolether und Glykolester in der Innenraumluft, Bundesgesundheitsblatt, February 2013, Volume 56, Issue 2, pp 286-320

<sup>4</sup> preliminary, exceeding the limit does not lead to devaluation at present

<b>P11 Complete mattress</b>		
<b>Test parameter</b>	<b>Requirements</b>	<b>Test method</b>
<b>Emission test</b>		
Acetophenone	≤ 66 µg/m <sup>3</sup> (7 days after test chamber loading)	
Ethyl acetate (VVOc)	≤ 600 µg/m <sup>3</sup> (7 days after test chamber loading)	
TSVOC (total semi-volatile organic compounds)	≤ 40 µg/m <sup>3</sup> (7 Tage nach Prüfkammerbeladung)	
R value	≤ 1.0 (7 days after test chamber loading)	
Disulphide (only latex products)	≤ 50 µg/m <sup>3</sup> (2 days after test chamber loading)	
Nitrosamines (only latex products)	≤ 0.1 µg/m <sup>3</sup> (2 days after test chamber loading)	BGI 505.23
Ammonia (only latex products)	≤ 200 µg/m <sup>3</sup> (7 days after test chamber loading)	UV/VIS spectrometric analysis
Formaldehyde	≤ 24 µg/m <sup>3</sup> (2 days after test chamber loading)	DIN EN 16516
Acetaldehyd	≤ 24 µg/m <sup>3</sup> (2 days after test chamber loading)	DIN EN ISO 16000-3
Odour	≤ Grade 4 (2 days after test chamber loading) ≤ Grade 3 (7 days after test chamber loading at the latest)	cf. testing manual

<b>P2 Covering materials</b>	<b>P21 Undyed textile covering materials</b>	<b>P22 Dyed textile covering materials</b>	
<b>Test parameter</b>	<b>Requirements</b>	<b>Requirements</b>	<b>Test method</b>
<b>Content analysis<sup>5</sup></b>			
AOX (adsorbable organic halogenated compounds)	-	≤ 5.0 mg/kg	DIN EN ISO 9562
<b>Heavy metals</b>			
Arsenic (As)	-	≤ 0.2 mg/kg	Eluate, analysis ICP/MS Cr(VI): DIN EN ISO 17075
Cadmium (Cd)	-	≤ 0.1 mg/kg	
Cobalt (Co)	-	≤ 1.0 mg/kg	
Chrome sum (Cr)	-	≤ 3.0 mg/kg	
Chrome VI (Cr VI)	-	≤ 3.0 mg/kg	
Copper (Cu)	-	≤ 25 mg/kg	
Mercury (Hg)	-	≤ 0.02 mg/kg	
Nickel (Ni)	-	≤ 1.0 mg/kg	
Lead (Pb)	-	≤ 0.2 mg/kg	
Antimony (Sb)	≤ 5.0 mg/kg (only synthetic or blended fibres; does not apply for accessories)	≤ 5.0 mg/kg	
<b>Pesticides/Biocides</b>			
Pyrethroids (animal fibres; sum) Cyfluthrin, Cyhalothrin, Cypermethrin, Deltamethrin, Esfenvalerat, Fenvalerat, Flumethrin, Permethrin, Transfluthrin	1.0 mg/kg	≤ 1.0 mg/kg	following DFG-S19, GC-ECD
Pyrethroids other fibres (sum; only natural fibres or blended fabric; except animal fibres)	0.5 mg/kg	≤ 0.5 mg/kg	

<sup>5</sup> If there are indications that the basic requirements (exclusion of the substance groups listed there) are not met or if there is insufficient information on the substances used, additional content analysis may be necessary.

P2 Covering materials	P21 Undyed textile covering materials	P22 Dyed textile covering materials	
Test parameter	Requirements	Requirements	Test method
<b>Content analysis<sup>5</sup></b>			
Pesticides without pyrethroids (sum; only natural fibres or blended fabric) 2,4,5-T, 2,4-D, Acetameprid, Aldrin, Atrazine, Azinophos-ethyl, Azinophos-methyl, Bendiocarb, Bifenthrin, Bioresmethrin, Bromophos-ethyl, Buprofezin, Captafol, Carbaryl, Carbosulfan, Clethodim, Chlordane, Chlordimeform, Chlorfenapyr, Chlorfenvinphos, Chlorfluazuron, Chlorpyrifos-ethyl, Chlorpyrifos-methyl, Coumaphos, Cyclanilide, DDD, DDE, DDT, DEF, Diafenthiuron, Diazinon, Dichlofenthion, Dichlorprop, Dichlorvos, Dicrotophos, Dieldrin, Diflubenzuron, Dimethoat, Dinoseb und Salze, Diuron, Empenthrin, $\alpha$ -Endosulfan, $\beta$ -Endosulfan, Endosulfansulfate, Endrin, Ethion, Fenchlorphos, Fenitrothion, Fenthion, Fenpropathrin, Fipronil, Heptachlor, Heptachlorepoxyd, Hexachlorbenzol, $\alpha$ -HCH, $\beta$ -HCH, $\delta$ -HCH, Imidacloprid, Isodrin, Kelevan, Kepon, Lindan, Lufenuron, Malathion, MCPA, MCPB, Mecoprop, Methamidophos, Methidathion, Methomyl, Methoxychlor, Metolachlor, Mevinphos, Mirex, Monocrotophos, Parathion-ethyl, Parathion-methyl, Pendimethalin, Perthan, Phosalon, Phosdrin, Phosmet, Phoxim, Pirimiphos-ethyl, Pirimiphos-methyl, Profenophos, Prometryn, Propetamphos, Pymethrozine, Quinalphos, Quintozin, Stroban, Teflubenzuron, Telodrin, Tetrachlorvinphos, Thiamethoxam, Thidiazuron, Thiodicarb, Toctofos-methyl, Toxaphen, Trifloxysulfuron-sodium, Triflumuron, Trifluralin	0.5 mg/kg	≤ 0.5 mg/kg	
Orthophenylphenol (OPP; only natural fibres or blended fabric)	≤ 1.0 mg/kg	≤ 1.0 mg/kg	Extraction, esterification, GC/MS
Chlorophenols (sum; only natural fibres or blended fabric) PCP, 2,3,4,5-TeCP, 2,3,4,6-TeCP, 2,3,5,6-TeCP, 2,3,5-Trichlorophenol, 2,3,6-Trichlorophenol, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol	≤ 0.1 mg/kg	≤ 0.1 mg/kg	CEN / TR 14823
Triclosan	≤ 0.5 mg/kg	≤ 0.5 mg/kg	CEN / TR 14823
Organotin compounds (requirements per single substance) TBT, DBT, TeBT, MBT, MOT, DOT, TcYt, TPht	-	≤ 0.05 mg/kg	Extraction, analysis following DIN EN ISO 17353
Formaldehyde	≤ 20 mg/kg	≤ 20 mg/kg	DIN EN ISO 14184-1, LFGB § 64, 82.02-1
Amines (azo dyes)	-	≤ 20 mg/kg	DIN EN 14362-1, -3
Allergenic dyes materials (dispersion dyes materials; only synthetic fibres or blended fabric)	-	≤ 50 mg/kg	DIN 54231
Chloroorganic carrier (only synthetic fibres or blended fabric)	-	≤ 1.0 mg/kg	Extraction with acetone, GC/MS
Optical brighteners	no rating	no rating	UV light
pH value	4.0-7.5 (skin contact) 4.0-9.0 (no skin contact)	4.0-7.5 (skin contact) 4.0-9.0 (no skin contact)	DIN EN ISO 3071
Colour fastness	-	perspiration fastness (shade change), alkaline/acidic: ≥ 3-4 perspiration fastness (staining), alkaline/acidic: ≥ 3-4 rubbing fastness, dry: ≥ 3-4 rubbing fastness, wet: ≥ 2 light fastness: 3-4	LFGB
Alkylphenol(ethoxylates) (sum; only animal fibres) NP, OP, HpP, PeP, NPEO, OPEO	≤ 20 mg/kg	≤ 20 mg/kg	HPLC-MS/MS, GC/MSD
Phthalates (sum; only printings) DMP, DEP, DPP, DBP, BBP, DEHP, DNOP, DIBP, BMEP, DHP, DNPP, DIPP, PIPP, DINP, DIDP, DIHP, DHNUP, DIHxP	≤ 100 mg/kg	≤ 100 mg/kg	following DIN EN 15777
Terephthalate DEHT (only printings)	≤ 100 mg/kg	≤ 100 mg/kg	following DIN EN 15777
Diisononyl cyclohexane-1,2-dicarboxylate DINCH (only printings)	≤ 100 mg/kg	≤ 100 mg/kg	following DIN EN 15777

P3 Upholstery / padding materials	P31 Latex	P32 Latexed fibres	P33 Pure / cold foam	P34 Synthetic fibres	P35 Plant & animal fibres	
Test parameter	Requirements	Requirements	Requirements	Requirements	Requirements	Test method
<b>Content analysis<sup>5</sup></b>						
AOX (adsorbable organic halogenated compounds)	-	-	≤ 1.0 mg/kg	≤ 1.0 mg/kg	-	DIN EN ISO 9562
EOX (extractable organic halogenated compounds)	-	-	≤ 2 mg/kg	≤ 2.0 mg/kg	-	following DIN 38414-S17
Heavy metals						Eluate, analysis ICP/MS
Antimony (Sb; does not apply for accessories)	-	-	-	≤ 5.0 mg/kg	-	
<b>Pesticides/Biocides</b>						
Pyrethroids (animal fibres; sum) Cyfluthrin, Cyhalothrin, Cypermethrin, Deltamethrin, Esfenvalerat, Fenvalerat, Flumethrin, Permethrin, Transfluthrin	-	-	-	-	≤ 1.0 mg/kg	following DFG-S19
Pyrethroids (sum; only natural fibres or blended fabric; except animal fibres)	-	≤ 1.0 mg/kg	-	-	≤ 0.5 mg/kg	
Pesticides without pyrethroids (sum; only natural fibres or blended fabric) 2,4,5-T, 2,4-D, Acetameprid, Aldrin, Atrazine, Azinophos-ethyl, Azinophos-methyl, Bendiocarb, Bifenthrin, Bioresmethrin, Bromophos-ethyl, Buprofezin, Captafol, Carbaryl, Carbosulfan, Clethodim, Chlordane, Chlorimeform, Chlorfenapyr, Chlorfenvinphos, Chlorfluazuron, Chlorpyrifos-ethyl, Chlorpyrifos-methyl, Coumaphos, Cyclanilide, DDD, DDE, DDT, DEF, Diafenthiuron, Diazinon, Dichlofenthion, Dichlorprop, Dichlorvos, Dicrotophos, Dieldrin, Diflubenzuron, Dimethoat, Dinoseb und Salze, Diuron, Empenthrin, $\alpha$ -Endosulfan, $\beta$ -Endosulfan, Endosulfansulfate, Endrin, Ethion, Fenchlorphos, Fenitrothion, Fenthion, Fenpropathrin, Fipronil, Heptachlor, Heptachlorepoxyd, Hexachlorbenzol, $\alpha$ -HCH, $\beta$ -HCH, $\delta$ -HCH, Imidacloprid, Isodrin, Kelevan, Kepon, Lindan, Lufenuron, Malathion, MCPA, MCPB, Mecoprop, Methamidophos, Methidathion, Methomyl, Methoxychlor, Metolachlor, Mevinphos, Mirex, Monocrotophos, Parathion-ethyl, Parathion-methyl, Pendimethalin, Perthan, Phosalon, Phosdrin, Phosmet, Phoxim, Pirimiphos-ethyl, Pirimiphos-methyl, Profenophos, Prometryn, Propetamphos, Pymethozine, Quinalphos, Quintozin, Stroban, Teflubenzuron, Telodrin, Tetrachlorvinphos, Thiamethoxam, Thidiazuron, Thiodicarb, Toctofos-methyl, Toxaphen, Trifloxysulfuron-sodium, Triflumuron, Trifluralin	-	-	-	-	≤ 0.5 mg/kg	
Orthophenylphenol (OPP; only natural fibres or blended fabric)	-	≤ 1.0 mg/kg	-	-	≤ 1.0 mg/kg	Extraction, DFG/S19, GC/MS
Chlorophenols (sum; only natural fibres or blended fabric) PCP, 2,3,4,5-TeCP, 2,3,4,6-TeCP, 2,3,5,6-TeCP, 2,3,5-Trichlorphenol, 2,3,6-Trichlorphenol, 2,4,5-Trichlorphenol, 2,4,6-Trichlorphenol	-	≤ 0.1 mg/kg	-	-	≤ 0.1 mg/kg	CEN / TR 14823

<b>P3 Upholstery / padding materials</b>	<b>P31 Latex</b>	<b>P32 Latexed fibres</b>	<b>P33 Pure / cold foam</b>	<b>P34 Synthetic fibres</b>	<b>P35 Plant &amp; animal fibres</b>	
<b>Test parameter</b>	<b>Requirements</b>	<b>Requirements</b>	<b>Requirements</b>	<b>Requirements</b>	<b>Requirements</b>	<b>Test method</b>
<b>Content analysis<sup>5</sup></b>						
Organotin compounds (requirements per single substance) TBT, DBT, TeBT, MBT, MOT, DOT, TcyT, TPhT	-	-	≤ 0.05 mg/kg	≤ 0.05 mg/kg	-	Extraction, analysis following DIN EN ISO 17353
Phthalates (sum) DMP, DEP, DPP, DBP, BBP, DEHP, DNOP, DIBP, BMEP, DHP, DNPP, DIPP, PIPP, DINP, DIDP, DIHP, DHNUP, DIHxP	-	-	≤ 100 mg/kg	-	-	following DIN EN 15777
Terephthalate DEHT	-	-	≤ 100 mg/kg	-	-	following DIN EN 15777
Diisononyl cyclohexane-1,2-dicarboxylate, DINCH	-	-	≤ 100 mg/kg	-	-	following DIN EN 15777
Formaldehyde	-	-	-	-	≤ 20 mg/kg	DIN EN ISO 14184-1, LFGB § 64.82, O2-1
Optical brighteners	-	-	-	no rating	no rating	UV light
Organophosphorous flame retardants (sum) TMP, TEP, TPP, TiBP, TBP, TDBPP, TCEP, TCPP, TDCPP, TEHP, TBEP, TPhP, TKP	-	-	≤ 10 mg/kg	-	-	following DFG S 19
Alkylphenol(ethoxylates) (sum; only animal fibres) NP, OP, HpP, PeP, NPEO, OPEO	-	-	-	-	≤ 20 mg/kg	HPLC-MS/MS, GC/MSD
Natural latex content	no rating	no rating	-	-	-	IR/ATR
Filler content	≤ 5 %	-	-	-	-	Thermo-gravimetry IR/ATR