

eco-**INSTITUT**-Label

Test criteria: Mattresses

(Status: September 2018)

A Basic requirements

- Full declaration of materials
- Minimisation requirements for substances with dangerous properties according to dangerous substances regulations.
- Compliance with limit values 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 WGK 3 (German water hazard class 3)

Substances with the following classification (H-Statement or R-Statement):

Description		H-Statement (CLP Regulation)	R-Statement (Regulation 67/548/EEC)
Fatal	Fatal if swallowed.	H300	R28
	Fatal in contact with skin.	H310	R27
	Fatal if inhaled.	H330	R26
Toxic	Toxic if swallowed.	H301 (> 0.1 %)	R25 (> 0.1 %)
	Toxic in contact with skin.	H311 (> 0.1 %)	R24 (> 0.1 %)
	Toxic if inhaled.	H331 (> 0.1 %)	R23 (> 0.1 %)
Specific target organ toxicity	Cause damage to organs.	H370	R39
	May cause damage to organs.	H371	R68
	Causes damage to organs through prolonged or repeated exposure.	H372	R48
	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	R42

Description		H-Statement (CLP Regulation)	R-Statement (Regulation 67/548/EEC)
Carcinogenicity	May cause cancer.	H350	R45
	Suspected of causing cancer.	H351	R40
Mutagenicity	May cause genetic defects.	H340	R46
	Suspected of causing genetic defects.	H341	R68
Reproductive toxicity	May damage fertility or the unborn child.	H360	R60, R61
	Suspected of damaging fertility or the unborn child.	H361	R62, R63
	May cause harm to breast-fed children.	H362	---
Acute hazardous to water	Very toxic to aquatic life.	H400	R50
Chronically hazardous to water	Very toxic to aquatic life with long lasting effects.	H410	R50/53
	Toxic to aquatic life with long lasting effects.	H411 (> 1 %)	R51/R53 (> 1 %)
Hazardous to ozone layer	Hazardous to the ozone layer.	EUH 059	---

B Special requirements

- No use of biocides including moth repellents (proof: Declaration of conformity from the manufacturer)
- The product must meet the following quality criteria:
 - Loss of firmness: < 20 % (proof: submission of a test report according to DIN EN 1957)
 - Loss of thickness: < 15 mm (proof: submission of a test report according to DIN EN 1957)

D Laboratory examinations

P11 Complete mattress		
Test parameter	Limit Value	Test method
Emission test		
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 EN ISO 16000-6, DIN EN ISO 16000-9 Test chamber conditions: cf. testing manual
VOC (incl. VVOC and SVOC) with the following categorisations: 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 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)	
VOC (individual substances):		
Styrene	$\leq 10 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)	
Methylisothiazolinone (MIT)	$\leq 1 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)	
Benzisothiazolinone (BIT)	$\leq 5 \mu\text{g}/\text{m}^3$ (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, Methyl-isobutylketone (Limit value per single substance)	$\leq 100 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)	
2-Butoxyethylacetate	$\leq 200 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)	
Glycol ethers with insufficient data ¹ (Limit value 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)	
TSVOC (total semi-volatile organic compounds)	$\leq 40 \mu\text{g}/\text{m}^3$ (7 days after test chamber loading)	
Disulphide (only latex products)	$\leq 50 \mu\text{g}/\text{m}^3$ (2 days after test chamber loading)	
Nitrosamines (only latex products)	$\leq 0.1 \mu\text{g}/\text{m}^3$ (2 days after test chamber loading)	BGI 505.23
R value	≤ 1.0 (7 days after test chamber loading)	

¹ 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
 An exceedance of this limit value will not yet result automatically in a refusal.

P11 Complete mattress			
Test parameter	Limit Value		Test method
Emission test			
Formaldehyde	≤ 24 µg/m ³ (2 days after test chamber loading)		following DIN EN 717-1, DIN EN ISO 16000-3
Acetaldehyd	≤ 24 µg/m ³ (2 days after test chamber loading)		
Odour	≤ Grade 3 (24 hours after loading of desiccator)		VDA 270; 40°C

P2 Covering materials	P21 Undyed textile covering materials	P22 Dyed textile covering materials	
Test parameter	Limit value	Limit value	Test method
Content analysis			
AOX (adsorbable organic halogenated compounds)	-	≤ 1.0 mg/kg	DIN EN ISO 9562
EOX (extractable organic halogenated compounds)	-	≤ 2.0 mg/kg	following DIN 38414-S17
Heavy metals			
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; covering material incl. filler and padding material)	≤ 5.0 mg/kg	
Pesticides/Biocides			
Pyrethroids wool (sum) Cyfluthrin, Cyhalothrin, Cypermethrin, Deltamethrin, Esfenvalerat, Fenvalerat, Flumethrin, Permethrin, Transfluthrin	1.0 mg/kg	≤ 1.0 mg/kg	following DFG-S19, GC- ECD
Pyrethroids of other fibres (sum; only natural fibres or blended fabric)	0.5 mg/kg	≤ 0.5 mg/kg	
Pesticides without pyrethroids (sum; only natural fibres or blended fabric) 2,4,5-T, 2,4-D, Acetamepid, 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, α-Endosulfan, β-Endosulfan, Endosulfansulfate, Endrin, Ethion, Fenchlorphos, Fenitrothion, Fenthion, Fenprothrin, Fibronil, Heptachlor, Heptachlorepoxyd, Hexachlorbenzol, α-HCH, β-HCH, δ-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, Pymethrozin, Quinalphos, Quintozin, Strobilan, Teflubenzuron, Telodrin, Tetrachlorvinphos, Thiamethoxam, Thidiazuron, Thiodicarb, Toclufos-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	
Chlorophenols (sum; only natural fibres or blended fabric)	≤ 0.1 mg/kg	≤ 0.1 mg/kg	Extraction, esterification, GC/MS
			CEN / TR 14823

P2 Covering materials	P21 Undyed textile covering materials	P22 Dyed textile covering materials	
Test parameter	Limit value	Limit value	Test method
Content analysis			
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			
Triclosan	≤ 0.5 mg/kg	≤ 0.5 mg/kg	CEN / TR 14823
Organotin compounds (limit value 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	4.5-7.5	4.5-7.5	DIN EN ISO 3071
Colour fastness	-	saliva/sweat fastness: 5 sweat fastness alkali/acidic: ≥ 3-4 rubbing fastness dry: ≥ 3-4 rubbing fastness wet: ≥ 2 water fastness: ≥ 3	LFGB
Alkylphenol(ethoxylates)	≤ 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	≤ 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	Limit value	Limit value	Limit value	Limit value	Limit value	Test method
Content analysis						
AOX (adsorbable organic halogenated compounds)	-	-	≤ 1.0 mg/kg	≤ 1.0 mg/kg	-	DIN EN ISO 9562
EOX (extractable organic halogenated compounds)	-	-	≤ 2.0 mg/kg	≤ 2.0 mg/kg	-	following DIN 38414-S17
Heavy metals						
Antimony (Sb) upholstery/padding material incl. covering material (P2)	-	-	-	≤ 5.0 mg/kg	-	Eluate, analysis ICP/MS
Pesticides/Biocides						
Pyrethroids wool (sum) Cyfluthrin, Cyhalothrin, Cypermethrin, Deltamethrin, Esfenvalerat, Fenvalerat, Flumethrin, Permethrin, Transfluthrin	-	-	-	-	≤ 1.0 mg/kg	following DFG-S19
Pyrethroids of other fibres (sum; only natural fibres or blended fabric)	-	≤ 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, Acetamepid, 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, α -Endosulfan, β -Endosulfan, Endosulfansulfate, Endrin, Ethion, Fenchlorphos, Fenitrothion, Fenthion, Fenprothrin, Fipronil, Heptachlor, Heptachlorepoxid, Hexachlorbenzol, α -HCH, β -HCH, δ -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, Strobán, 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

P3 Upholstery / padding materials	P31 Latex	P32 Latexed fibres	P33 Pure / cold foam	P34 Synthetic fibres	P35 Plant & animal fibres	
Test parameter	Limit value	Limit value	Limit value	Limit value	Limit value	Test method
Organotin compounds (limit value 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	-	-	≤ 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, 02-1
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)	-	-	-	-	≤ 20 mg/kg	HPLC-MS/MS, GC/MSD
Natural latex content	no rating	no rating	-	-	-	IR/ATR
Filler content	≤ 5 %	-	-	-	-	Thermo-gravimetry IR/ATR