

QUL-Prüfkriterien

Revised in April 2019



CHEMICAL TEST

Test of the basic toxicological requirements

Tests in the latex core

Natural latex / synthetic latex shares
Filler shares
Nitrosamine
Volatile organic compounds (VOC)
Carbon disulfide (CS₂)
Formaldehyde
Acetaldehyd
Odour

Tests in the rubberized coir, rubberized horse hair¹⁾

Natural latex / synthetic latex shares
Nitrosamine
Volatile organic compounds (VOC)
Carbon disulfide (CS₂)
Formaldehyde
Acetaldehyde
Odour
Pesticides
Pyrethroids
Chlorophenols (PCP, TeCP)
o-phenyl phenol (sample)
¹⁾ horse hair additionally: Alkylphenol(ethoxylates)

Testing in fillers from plant and animal fibres¹⁾

Pesticides
Pyrethroids
Chlorophenols (PCP, TeCP)
o-phenyl phenol (sample)
Formaldehyde
¹⁾ Alkylphenol(ethoxylates) in animal fibers
Optical brighteners

Testing in cover materials from plant and animal fibres¹⁾

Pesticides
Pyrethroids
Chlorophenols (PCP, TeCP)
o-phenyl phenol (sample)
Triclosan
Formaldehyde
pH value
Optical brighteners
¹⁾ Alkylphenol(ethoxylates) in animal fibers
Arsenic- and Antimony-Compounds

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Additional testing in colored materials

AOX (organic halogenated compounds)
Organotin compounds (TBT/DBT)
Heavy metals (as per IVN standard for infant clothing)
Azo-colorants (amines as per LMBG regulations)
Saliva / sweat resistance
Sweat resistance alkaline / acidic
Water resistance
Friction resistance
Phthalates

Testing of the complete mattress structure

Testing of parameters as above
The partial testing and certification of the mattress core for VOC, CS₂ and nitrosamine is recognized for the certification of the complete mattress as per QUL standard.

Information about the contents

The mattress does not contain plastics.
The mattress does not contain flame retardants.
The latex core does not contain halogenated preservatives
The latex core does not contain UV stabilizers.
The covers do not contain optic brighteners
The cotton content in covers comes entirely from organic certification
The mattress does not contain PVC
The packaging does not contain PVC
Butadiene and phthalate are not contained in the utilized materials
Separating fleeces (synthetic) are not contained

Mechanical Testing according to DIN EN 1957

Extent of testing for the QUL-Certificate

The QUL certificate includes the complete chemical testing. The certificate makes reference to the partial testing of all contained substances, including statements of the testing reports and the testing laboratories of the QUL. Testing takes place 1 x annually as per the criteria of the QUL.



Test Criteria: Mattresses for QUL-Label

eco-INSTITUT GmbH

(Status: April 2019)

A Products

- Natural-latex mattresses and pillows, futons with covering materials and upholstery / padding materials of plant & animal fibres (cheep wool, linen, cotton, kapok, coconut/latexed coconut, horsehair/latexed horshair, Tencel (lyocell))

B 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 Regulation 67/548/EEC: Category Carc. 1 and 2, Muta. 1 and 2, Repr. 1 and 2 and acc. to national law (e.g. TRGS 905)
 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)
 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	---

C 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 1957¹)
 - Loss of thickness: < 15 mm (proof: submission of a test report according to DIN EN 1957)

¹ "The test methods of the European standard DIN-EN 1957 determine the functional properties of mattresses and all types of fully assembled beds with mattresses (and mattress pads when forming a unit with mattresses). In particular, the standard includes a method of assessing the hardness of a mattress. "

D Laboratory examinations

P11 Complete mattress		
Test parameter	Limit Value	Test method
Emission test		
TVOC (total volatile organic compounds)	≤ 400 µg/m ³ (2 days after test chamber loading) ≤ 200 µg/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 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	≤ 1 µg/m ³ (2 days after test chamber loading)	
VOC (sum) without NIK	≤ 100 µg/m ³ (7 days after test chamber loading)	
VOC (individual values):		
Sum of bicyclic terpenes	≤ 200 µg/m ³ (7 days after test chamber loading)	
Sum of sensitising materials with the following categorisations: DFG (MAK lists): Category IV, TRGS 907	≤ 100 µg/m ³ (7 days after test chamber loading)	
Sum of VOC (inck. VVOC andSVOC) 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): Category III3	≤ 50 µg/m ³ (7 days after test chamber loading)	
Sum C ₉ – C ₁₄ : Alkanes / Isoalkanes	≤ 200 µg/m ³ (7 days after test chamber loading)	
Sum C ₄ – C ₁₁ : Aldehydes, acyclic, aliphatic	≤ 100 µg/m ³ (7 days after test chamber loading)	
Sum C ₆ – C ₁₅ : Alkyl benzenes	≤ 100 µg/m ³ (7 days after test chamber loading)	
Sum Cresols	≤ 5 µg/m ³ (7 days after test chamber loading)	
Sum Xylenes	≤ 100 µg/m ³ (7 days after test chamber loading)	
VOC (individual substances):		
Styrene	≤ 10 µg/m ³ (7 days after test chamber loading)	
Methylisothiazolinon (MIT)	≤ 1 µg/m ³ (7 Tage nach Prüfkammerbeladung)	
Benzisothiazolinon (BIT)	≤ 5 µg/m ³ (7 days after test chamber loading)	
Octylisothiazolinon (OIT)	≤ 1 µg/m ³ (7 days after test chamber loading)	
Benzaldehyde	≤ 20 µg/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)	≤ 100 µg/m ³ (7 Tage nach Prüfkammerbeladung)	
2-Butoxyethylacetat	≤ 200 µg/m ³ (7 days after test chamber loading)	
Glycol ethers with insufficient data ² (Limit value per single substance)	0,005 ppm (7 Tage nach Prüfkammerbeladung)	
Propane-1,2-diol	≤ 60 µg/m ³ (7 Tage nach Prüfkammerbeladung)	
2 Phenoxyethanol	≤ 30 µg/m ³ (28 Tage nach Prüfkammerbeladung)	
Phenol	≤ 20 µg/m ³ (28 Tage nach Prüfkammerbeladung)	
TSVOC (total semi-volatile organic compounds)	≤ 40 µg/m ³ (7 Tage nach Prüfkammerbeladung)	
Disulphide (only latex products)	≤ 50 µg/m ³ (2 days after test chamber loading)	

² 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, Februar 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		
Nitrosamines (only latex products)	≤ 0.1 µg/m ³ (2 days after test chamber loading)	BGI 505.23
R value	≤ 1.0 (7 days after test chamber loading)	
Formaldehyde	≤ 24 µg/m ³ (2 days after test chamber loading)	following DIN EN 717-1, DIN EN ISO 16000-3
Acetaldehyde	≤ 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			Eluate, analysis ICP/MS Cr(VI): DIN EN ISO 17075
Arsenic (As)	≤ 0.2 mg/kg	≤ 0.2 mg/kg	
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) covering material incl. Filler and padding material (P2)	≤ 0.2 mg/kg	≤ 0.2 mg/kg	
Pesticides/Biocides			
Pyrethroid 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) 2,4,5-T, 2,4-D, Acetamepid, Aldrin, Atrazine, Azinophos-ethyl, Azinophosmethyl, Bendiocarb, Bifenthrin, Bioremethrin, Bromophos-ethyl, Buprofezin, Captafol, Carbaryl, Carbosulfan, Clethodim, Chlordane, Chlordimeform, Chlorfenapyr, Chlorfenvinphos, Chlorfluazuron, Chlorpyrifos-ethyl, Chlorpyrifos-methyl, Coumaphos, Cyclanilide, DDD, DDE, DDT, DEF, Diafenthiuron, Diazinon, Dichlofention, Dichlorprop, Dichlorvos, Dicrotophos, Dieldrin, Diflubenzuron, Dimethoat, Dinoseb und Salze, Diuron, Empenthrin, α-Endosulfan, β-Endosulfan, Endosulfansulfate, Endrin, Ethion, Fenchlorphos, Fenitrothion, Fenthion, Fenpropathrin, 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, Pymethrozine, Quinalphos, Quintozin, Stroban, Teflubenzuron, Telodrin, Tetrachlorvinphos, Thiamethoxam, Thidiazuron, Thiodicarb, Toclufosmethyl, Toxaphen, Trifloxysulfuron-sodium, Triflumuron, Trifluralin	0.5 mg/kg	≤ 0.5 mg/kg	



P2 Covering materials	P21 Undyed textile covering materials	P22 Dyed textile covering materials	
Test parameter	Limit value	Limit value	Test method
Content analysis			
Orthophenylphenol (OPP; only natural fibers or blendid fabric)	≤ 1.0 mg/kg	≤ 1.0 mg/kg	Extraction, esterification, GC/MS
Chlorophenols (sum; only natural fibers or blendid 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 (limit value per single substance) TBT, DBT, TeBT, MBT, MOT, DOT, TcyT, TPhT	-	≤ 0.5 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 fibers or blendid fabric)	-	≤ 50 mg/kg	DIN 54231
Chloroorganic carrier (only synthetic fibers or blendid fabric)	-	≤ 1.0 mg/kg	Extraction with acetone, GC/MS
Optical brighteners	No rating	No rating	UV light
pH value	4.5-9.0	4.5-9.0	DIN EN ISO 3071
Colour fastness	-	Saliva/sweat fastness 5 sweat fastness alcalnic/acidic: ≥3-4 rubbing fastness dry ≥3-4 Rubbing fastness wet ≥2 Water fastness ≥3	LFBG
Alkylphenol(ethoxylates) (in animal fibres)	≤ 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	P35 Plant & animal fibres	
Test parameter	Limit value	Limit value	Limit value	Test method
Content analysis				
AOX (adsorbable organic halogenated compounds)	-	-	-	DIN EN ISO 9562
EOX (extractable organic halogenated compounds)	-			Following DIN 38414-S17
Heavy metals				Eluate, analysis ICP/MS
Antimony (Sb) upholstery/padding material incl. Filler and padding material (P3)	-	-	-	
Pesticides/Biocides				
Pyrethroid 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) 2,4,5-T, 2,4-D, Acetamepid, Aldrin, Atrazine, Azinophos-ethyl, Azinophosmethyl, Bendiocarb, Bifenthrin, Bioresmethrin, Bromophos-ethyl, Buprofezin, Captafol, Carbaryl, Carbosulfan, Clethodim, Chlordane, Chlordimeform, Chlorfenapyr, Chlorfenvinphos, Chlorfluzuron, Chlorpyrifos-ethyl, Chlorpyrifos-methyl, Coumaphos, Cyclanilide, DDD, DDE, DDT, DEF, Diafenthion, Diazinon, Dichlofenthion, Dichlorprop, Dichlorvos, Dicrotophos, Dieldrin, Diflubenzuron, Dimethoat, Dinoseb und Salze, Diuron, Empenthrin, α-Endosulfan, β-Endosulfan, Endosulfansulfate, Endrin, Ethion, Fenchlorphos, Fenitrothion, Fenthion, Fenpropathrin, 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, Pymethroline, Quinalphos, Quintozin, Stroban, Teflubenzuron, Telodrin, Tetrachlorvinphos, Thiamethoxam, Thidiazuron, Thiodicarb, Tocolofosmethyl, Toxaphen, Trifloxysulfuron-sodium, Triflumuron, Trifluralin	-	-	≤ 0.5 mg/kg	
Orthophenylphenol (OPP; only natural fibers or blendid fabric)	-	≤ 1.0 mg/kg	≤ 1.0 mg/kg	Extraction, DFG/S19, GC/MS
Chlorophenols (sum; only natural fibers or blendid 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
Organotin compounds (limit value per single substance) TBT, DBT, TeBT, MBT, MOT, DOT, TcyT, TPhT	-	-	-	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	-	-	-	following DIN EN 15777
Terephthalate DEHT (only printings)				following DIN EN 15777
Diisononyl cyclohexane-1,2-dicarboxylate DINCH (only printings)				following DIN EN 15777
Formaldehyde	-	-	≤ 20 mg/kg	DIN EN ISO 14184-1, LFGB § 64.82, 02-1
Optical brighteners	-	-	No rating	UV light



P3 Upholstery / padding materials	P31 Latex	P32 Latexed fibres	P35 Plant & animal fibres	
Test parameter	Limit value	Limit value	Limit value	Test method
Content analysis				
Organophosphorous flame retardants (sum) TMP, TEP, TPP, TIBP, TBP, TDBPP, TCEP, TCPP, TDCPP, TEHP, TBEP, TPhP, TKP	-	-	-	following DFG S 19
Polymer content	NR ≥ 95 %	NR ≥ 80 %	-	IR/ATR
Filler content (ash content)	≤ 5%	-	-	Thermo-gravimetry IR/ATR

MECHANICAL TESTING		
according to DIN EN 1957 ³		
Test parameter	Limit value	Remark
Durability	> 50 points	LGA- characteristic data
Change in height	> 15 points	LGA- characteristic data
Change in hardness	> 15 points	LGA- characteristic data
Resilience loss factor	> 15 points	LGA- characteristic data

³ "The test methods of the European standard DIN-EN 1957 determine the functional properties of mattresses and all types of fully assembled beds with mattresses (and mattress pads when forming a unit with mattresses). In particular, the standard includes a method of assessing the hardness of a mattress. "