
LEDVANCE INDEX LIST ENVIRONMENT (VERSION 01)

LEDVANCE Index List Environment is to be applied in the design and production of environmentally compatible products of all business units of LEDVANCE and affiliated companies (LEDVANCE) as well as for procurement of equipment, parts and materials used in products distributed by LEDVANCE. It is a high ambition of LEDVANCE to avoid and reduce certain hazardous substances in products above and beyond statutory regulations.

Placing on the market of certain hazardous substances in electrical and electronic equipment is subject to specific regional (EU) or national restrictions and bans. Within the European Union (EU) these restrictions and bans are defined in EU Directives and subsequent member states' national regulations, and in directly legally enforceable regulations. In addition LEDVANCE has to fulfil specific customer requirements regarding substance content and documentation.

Compliance with such restrictions is a legal obligation of the party putting said equipment or products on the market. Therefore either LEDVANCE or customers of LEDVANCE bear responsibility.

Equipment, parts and materials supplied to LEDVANCE are mounted in equipment and/ or products which can be subject to

- the restrictions of substances defined in Directive 2011/65/EU ("RoHS-Directive", see http://ec.europa.eu/environment/waste/rohs_eee/legis_en.htm)
- the restrictions of substances defined in Directive 2000/53/EC ("End-of-life vehicles – ELV")
- the restrictions of substances defined in Directive 2006/66/EC ("Directive on batteries"),
- the restrictions of substances defined in EU Directive 1907/2006/EC ("REACH"),
- the restrictions of substances defined in Directive 94/62/EC ("Packaging Directive").

The purpose of the **OSRAM Index List Environment** is to inform suppliers and partners about legal and internal requirements regarding substances in products and consists of the following documents:

- **Supplier's Verification** regarding restrictions, avoidance and declaration of materials in products
- Informative **list of exemptions** as listed in Annex III of Directive 2011/65/EU ("RoHS exemptions") including amendments (Status **November 2016**)
- **OSRAM Index List Environment:**
 - *List of prohibited hazardous substances* (sorted by possible applications) (Status **November 2016**)
 - *LEDVANCE List of Declarable Substances (LoDS)* (Status **June 2016**)

The Suppliers Verification has to be signed by suppliers of equipment, parts and materials, which are delivered to LEDVANCE and affiliated companies.

The LEDVANCE Index List Environment: List of prohibited hazardous substances (see appendix) provides an informative overview of substance regulations within the EU and other countries. The list is not exhaustive, but focuses on applications. For some substances the legislator has permitted definite applications or specific exemptions. If deliveries to LEDVANCE contain hazardous substances in applications exempted by such regulations (e.g. RoHS exemptions) then these substances have to be declared by suppliers in advance according to type and amount in the web based data base BOMcheck® unless otherwise stipulated.

The LEDVANCE Index List Environment: List of declarable substances (see appendix) contains hazardous substances whose distribution in products is not or only partially (e.g. for defined applications or defined areal) prohibited. The use of these substances should be avoided where possible (e.g. DEHP in PVC cables), or at least minimized, since they are a potential hazard to human or the environment during the

products manufacture, use or disposal. However, in many cases these substances cannot be avoided for technical or economic reasons. LEDVANCE clearly encourages its suppliers to focus towards reduction and avoidance of these substances during design and development of new products. This is particularly recommended for substances on the REACH Candidate List, so called Substance of Very High Concern (SVHC). If articles containing these substances exceeding 0.1% (wt) are delivered to LEDVANCE a corresponding declaration must be available in BOMcheck[®] unless otherwise stipulated. This is also required from contract manufacturers and distributors supplying such articles. They all have to provide their commercial customers with: “*sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance*”.

Comprehensive and precise contractually binding substance declarations are often requested by LEDVANCE customers, e.g. use of SVHC, halogenated flame retardants, arsenic compounds in lamp glass, antimony trioxide in plastic materials. Most of these substances are not added in LEDVANCE production processes, but are ingredients of delivered direct materials (equipment, parts and materials used in products distributed by LEDVANCE). Therefore also LEDVANCE needs sufficient information about all relevant substances in supplied materials, parts and products from SUPPLIER.

Due to the dynamic changes of above mentioned regulations or customer expectations, regular updates of these declarations will be essential in the future. In order to be able to manage all information requirements LEDVANCE decided to join the substance declaration web-hosted database BOMcheck[®] (www.BOMcheck.net). BOMcheck[®] is an industry-wide initiative offering a regulatory compliance tool designed specifically to enable suppliers to provide declarations for REACH, RoHS and other restricted substances legislation.

The BOMcheck[®] system offers the following benefits:

- Efficient and low cost method to demonstrate chemical compliance to all customers
- Expert guidance to create substances declarations for manufacturer part lists
- Keep up-to-date as new substances are added to REACH and RoHS
- Matching table for customer part number vs. manufacturer part number
- Attach manufacturer's electronic signature to the substance declarations
- Inform all manufacturing customers
- Reducing the risk of regulatory non-compliance

LEDVANCE expects its suppliers to provide all necessary substance declarations for direct materials fast, efficient and reliable preferred directly in BOMcheck[®] in order to be able to make compliance assessments of our products and declarations towards our customers.

LEDVANCE contact address regarding Environmental Protection:

LEDVANCE GmbH
Environmental Protection, Health and Safety
Email: environment@ledvance.com

Suppliers Verification regarding restrictions, avoidance and declaration of materials in products

Supplier:	
Address:	
Responsible person / function:	
Phone & Fax:	
Email:	

The supplier verifies that

- products, parts and materials supplied to LEDVANCE today and in the future satisfy the restrictions and bans defined in regulations listed in LEDVANCE Index List Environment in a way, so that the use of these deliveries in products manufactured and distributed by LEDVANCE or customers of LEDVANCE does not cause violations of the listed legal requirements;
- a system is installed in the suppliers company which ensures compliance with legal requirements regarding use of substances in products as far as applicable. The system includes products, parts and materials procured from sub suppliers. Supplier is able to provide relevant documentation regarding installed processes and product compliance immediately on request;
- according to Directive 2011/65/EU (RoHS) delivered products, parts and materials do not contain the following substances exceeding defined maximum concentration values, unless in an application exempted by Annex of RoHS Directive (incl. amendments). ~~Respective third party measurement results are provided to LEDVANCE without further request, if available;~~

Substances / application	Maximum concentration values in homo (2011/65/EU - RoHS)
Lead (Pb), Mercury (Hg), hexavalent Chromium (Cr ⁶⁺) Polybrominated biphenyls (PBB) and Polybrominated diphenyl ethers (PBDE)	0.1 % (weight)
Cadmium (Cd)	0.01 % (weight)

please check, if following substances are now and in the future **NOT contained** in any delivered material

Bis(2-ethylhexyl) phthalate (DEHP) Benzyl butyl phthalate (BBP) Dibutyl phthalate (DBP) Diisobutyl phthalate (DIBP)	0.1 % (weight) banned as of July 22, 2019
--	---

-
- In case deliveries to LEDVANCE contain hazardous substances in applications exempted by Directive 2011/65/EU, these substances, amount and applications will be declared to LEDVANCE per product/product family; these substance declarations will be provided fast, efficient and reliable on request.
 - in case deliveries to LEDVANCE contain per article any Substance of Very High Concern (SVHC) as listed in the so-called Candidate List (see <http://echa.europa.eu/web/guest/candidate-list-table>) according Regulation (EC)1907/2006/EC (REACH), amount and applications will be declared to LEDVANCE per product/material preferably in BOMcheck® or alternatively in a LEDVANCE defined format to reach@ledvance.com;

LEDVANCE reserves the right to verify suppliers' compliance with the LEDVANCE Index List Environment at any time or to have such verifications carried out by a third party. In case a violation of applicable laws or duties laid down in this document is established after signature of the enclosed verification, LEDVANCE must be notified immediately. In case suppliers fail to comply with the LEDVANCE Index List requirements, LEDVANCE reserves the right to take appropriate actions, including termination of business relationships.

Signature and Stamp

Date

Annex (informative)

List of applications of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) which are exempted from the requirements of Article 4(1) of EU Directive 2011/65/EU (RoHS), Annex III (Status: November 2016)

1	Mercury in single capped (compact) fluorescent lamps not exceeding (per lamp):	Renewal is pending for 1(a)-(f)
1(a)	For general lighting purposes < 30 W: 5 mg	Expires on 31 December 2017 per burner after 31 December 2012; 2,5 mg shall be used after 31 December 2012
1(b)	For general lighting purposes ≥ 30 W and < 50 W: 5 mg	Expires on 31 December 2017 per burner after 31 December 2012
1(c)	For general lighting purposes ≥ 50 W and < 150 W: 5 mg	
1(d)	For general lighting purposes ≥ 150 W: 15 mg	
1(e)	For general lighting purposes with circular or square structural shape with diameter or side length ≤ 17 mm	No limitation of use until 31 December 2017 may be used per burner after 31 December 2012
1(f)	For special purposes 5 mg	
1(g)	For general lighting purposes < 30 W with a lifetime equal or above 20 000 h: 3,5 mg	Expires on 31 December 2017
2(a)	Mercury in double-capped linear fluorescent lamps for general lighting purposes exceeding (per lamp):	Renewal is pending for 2(a)-(5)
2(a)(1)	Tri-band phosphor with normal lifetime and a tube diameter < 9 mm	Expires on 31 December 2017 per lamp after 31 December 2012
2(a)(2)	Tri-band phosphor with normal lifetime and a tube diameter ≥ 9 mm (T5): 5 mg	Expires on 31 December 2017 per lamp after 31 December 2012
2(a)(3)	Tri-band phosphor with normal lifetime and a tube diameter > 17 mm (T8): 5 mg	Expires on 31 December 2017 per lamp after 31 December 2012
2(a)(4)	Tri-band phosphor with normal lifetime and a tube diameter > 28 mm (T12): 5 mg	Expires on 31 December 2017 per lamp after 31 December 2012
2(a)(5)	Tri-band phosphor with long lifetime (≥ 25 000 h): 8 mg	Expires on 31 December 2017 per lamp after 31 December 2012
2(b)	Mercury in other fluorescent lamps not exceeding (per lamp):	Renewal is pending for 2(b)-(4)
2(b)(1)	Linear halophosphate lamps with tube diameter > 28 mm (e.g. T10 and T12): 15 mg	Expires on 13 April 2012
2(b)(2)	Non-linear halophosphate lamps (all diameters): 15 mg	Expires on 13 April 2016
2(b)(3)	Non-linear tri-band phosphor lamps with tube diameter > 17 mm	No limitation of use until 31 December 2017 may be used per lamp after 31 December 2012
2(b)(4)	Lamps for other general lighting and special purposes (e.g. industrial lighting)	No limitation of use until 31 December 2017 may be used per lamp after 31 December 2012
3	Mercury in cold cathode fluorescent lamps and external electrodeless lamps (CCFL and EEFL) for special purposes not exceeding (per lamp):	Renewal is pending for 3(a)-(c)
3(a)	Short length (≤ 500 mm)	No limitation of use until 31 December 2017 may be used per lamp after 31 December 2012
3(b)	Medium length (> 500 mm and ≤ 1 500 mm)	No limitation of use until 31 December 2017 may be used per lamp after 31 December 2012
3(c)	Long length (> 1 500 mm)	No limitation of use until 31 December 2017 may be used per lamp after 31 December 2012
4(a)	Mercury in other low pressure discharge lamps (per lamp)	No limitation of use until 31 December 2017 may be used per lamp after 31 December 2012 Renewal is pending

4(b)	Mercury in High Pressure Sodium (vapour) lamps for general lighting not exceeding (per burner) in lamps with improved colour rendering	Renewal is pending for 4(b)-I – 4(b)-III
4(b)-I	P ≤ 155 W	No limitation of use until 31 December 2015 may be used per burner after
4(b)-II	155 W < P ≤ 405 W	No limitation of use until 31 December 2015 may be used per burner after
4(b)-III	P > 405 W	No limitation of use until 31 December 2015 may be used per burner after
4(c)	Mercury in other High Pressure Sodium (vapour) lamps for general lighting not exceeding (per burner):	Renewal is pending for 4(c)-I – 4(c)-III
4(c)-I	P ≤ 155 W	No limitation of use until 31 December 2015 may be used per burner after
4(c)-II	155 W < P ≤ 405 W	No limitation of use until 31 December 2015 may be used per burner after
4(c)-III	P > 405 W	No limitation of use until 31 December 2015 may be used per burner after
4(d)	Mercury in High Pressure Mercury (vapour) lamps (HPMV)	Expires on 13 April 2015
4(e)	Mercury in metal halide lamps (MH)	Renewal is pending
4(f)	Mercury in other discharge lamps for special purposes not specified in Annex	Renewal is pending
4(g)	Mercury in hand crafted luminous discharge tubes used for architectural and specialist lighting and light-artwork, where the limits shall be limited as follows: (a) 20 mg per electrode pair + 0,3 mg per tube length in cm, but not more than 0,3 mg per cm for outdoor applications and indoor applications exposed to direct sunlight; (b) 15 mg per electrode pair + 0,24 mg per tube length in cm, but not more than 0,24 mg per cm for all other indoor applications.	Expires on 31 December 2015
5(a)	Lead in glass of cathode ray tubes	
5(b)	Lead in glass of fluorescent tubes not exceeding 0,2 % by weight	Renewal is pending
6(a)	Lead as an alloying element in steel for machining purposes and castings containing up to 0,35 % lead by weight	Renewal is pending
6(b)	Lead as an alloying element in aluminium containing up to 0,4 % lead by weight	Renewal is pending
6(c)	Copper alloy containing up to 4 % lead by weight	Renewal is pending
7(a)	Lead in high melting temperature type solders (i.e. lead- based solders)	Renewal is pending
7(b)	Lead in solders for servers, storage and storage array systems, equipment for switching, signalling, transmission, and network telecommunications	
7(c)-I	Electrical and electronic components containing lead in a glass dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a matrix compound	Renewal is pending
7(c)-II	Lead in dielectric ceramic in capacitors for a rated voltage of 12 V or higher	Renewal is pending
7(c)-III	Lead in dielectric ceramic in capacitors for a rated voltage of less than 12 V DC	Expires on 1 January 2013 and may not be used in spare parts for EE after 1 January 2013
7(c)-IV	Lead in PZT based dielectric ceramic materials for capacitors in power electronic circuits or discrete semiconductors	Renewal is pending
8(a)	Cadmium and its compounds in one shot pellet type thermal cut-off devices	Expires on 1 January 2012 and may not be used in spare parts for EE after 1 January 2012
8(b)	Cadmium and its compounds in electrical contacts	Renewal is pending

9	Hexavalent chromium as an anticorrosion agent of the carbon absorption refrigerators up to 0,75 % by weight in the cooling sc	Renewal is pending
9(b)	Lead in bearing shells and bushes for refrigerant-containing co ventilation, air conditioning and refrigeration (HVACR) applicati	Renewal is pending
11(a)	Lead used in C-press compliant pin connector systems	May be used in spare parts market before 24 September
11(b)	Lead used in other than C-press compliant pin connector system	Expires on 1 January 2013-2 be used in spare parts for EE before 1 January 2013
12	Lead as a coating material for the thermal conduction module C	May be used in spare parts market before 24 September
13(a)	Lead in white glasses used for optical applications	Renewal is pending
13(b)	Cadmium and lead in filter glasses and glasses used for reflecta	Renewal is pending
14	Lead in solders consisting of more than two elements for the c pins and the package of microprocessors with a lead content c less than 85 % by weight	Expired on 1 January 2011-2 be used in spare parts for EE before 1 January 2011
15	Lead in solders to complete a viable electrical connection betw and carrier within integrated circuit flip chip packages	Renewal is pending
16	Lead in linear incandescent lamps with silicate coated tubes	Expires on 1 September 201
17	Lead halide as radiant agent in high intensity discharge (professional reprography applications	
18(a)	Lead as activator in the fluorescent powder (1 % lead by weigh lamps when used as speciality lamps for diazoprinting reprogra traps, photochemical and curing processes containing phos ((Sr,Ba)2MgSi2O7:Pb)	Expired on 1 January 2011
18(b)	Lead as activator in the fluorescent powder (1 % lead by weigh lamps when used as sun tanning lamps containing phos (BaSi2O5:Pb)	Renewal is pending
19	Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions- with PbSn-Hg as auxiliary amalgam in very compact energy sav	Expires on 1 June 2011
20	Lead oxide in glass used for bonding front and rear substrates c used for Liquid Crystal Displays (LCDs)	Expires on 1 June 2011
21	Lead and cadmium in printing inks for the application of ename borosilicate and soda lime glasses	Renewal is pending
23	Lead in finishes of fine pitch components other than connectors and less	May be used in spare parts market before 24 September
24	Lead in solders for the soldering to machined through hole disc ceramic multilayer capacitors	Renewal is pending
25	Lead oxide in surface conduction electron emitter displays (S elements, notably in the seal frit and frit ring	
26	Lead oxide in the glass envelope of black light blue lamps	Expires on 1 June 2011
27	Lead alloys as solder for transducers used in high-powered (de several hours at acoustic power levels of 125 dB SPL and abov	Expired on 24 September 20
29	Lead bound in crystal glass as defined in Annex I (Categories 1 Directive 69/493/EEC (1)	Renewal is pending
30	Cadmium alloys as electrical/mechanical solder joints to electri directly on the voice coil in transducers used in high-powered lo pressure levels of 100 dB (A) and more	
31	Lead in soldering materials in mercury free flat fluorescent lamp for liquid crystal displays, design or industrial lighting)	
32	Lead oxide in seal frit used for making window assemblies for A tubes	Renewal is pending

33	Lead in solders for the soldering of thin copper wires of 100 µm	
34	Lead in cermet-based trimmer potentiometer elements	Renewal is pending
36	Mercury used as a cathode sputtering inhibitor in DC plasma displays	Expired on 1 July 2010
37	Lead in the plating layer of high voltage diodes on the basis of a	Renewal is pending
38	Cadmium and cadmium oxide in thick film pastes used on aluminium oxide	
39	Cadmium in colour converting II-VI LEDs (< 10 µg Cd per mm ² for use in solid state illumination or display systems	Expires on 1 July 2014 Renewal is pending
40	Cadmium in photoresistors for analogue optocouplers applied to equipment	Expires on 31 December 2014
41	Lead in solders and termination finishes of electrical and electronic finishes of printed circuit boards used in ignition modules and electronic engine control systems, which for technical reasons may be used on or in the crankcase or cylinder of hand-held combustion engines ¹⁾ Directive 97/68/EC of the European Parliament and of the Council of 13 October 1997 on the approximation of the laws of the Member States against the emission of gaseous and particulate pollutants from engines to be installed in non-road mobile machinery (OJ L 59,	Expires on 31 December 2014

LEDVANCE Index List Environment: List of prohibited hazardous substances Products and product parts which can be affected by legal bans of hazardous substances

Summary of bans or restrictions on the distribution of hazardous substances, valid in the EU and other countries.
Status: November 2016

Substance/ substance group	CAS No.	Affected application	Limit value (wt. %) ¹⁾	Exem.	Legal regulations
Electrical and electronic equipment and components;					
Lead	7439-92-1	Electrical and electronic equipment (EEE)	0.1	yes	EU RoHS
Cadmium and its compounds	7440-43-9	EEE	0.01	yes	EU RoHS
		Metal surface coating	n.g.	yes	EU REACH App. XVII
Mercury and its compounds	7439-97-6	EEE	0.1	yes	EU RoHS
Hexavalent chromium (CrVI)		EEE	0.1	yes	EU RoHS
Polybrominated biphenyls (PBBs) Polybrominated diphenyl- ethers (PBDEs)		EEE	0.1	yes	EU RoHS
Bis(2-ethylhexyl) phthalate (DEHP) Benzyl butyl phthalate (BBP) Dibutyl phthalate (DBP) Diisobutyl phthalate (DIBP)	117-81-7 85-68-7 84-74-2 84-69-5	EEE	0.1	no	EU RoHS (banned as of 22 July 2019)
Batteries and accumulators					
Lead	7439-92-1	Fixed batteries	0.004	yes	EU 2006/66/EC
Cadmium	7440-43-9	Portable batteries and accumulators	0.002	yes	EU 2006/66/EC
Mercury	7439-97-6	Batteries and accumulators	0.0005	yes	EU 2006/66/EC
Insulating materials					
Asbestos ²⁾	1332-21-4	All applications	0.1 total	yes	EU REACH App. XVII
Perfluorooctane sulfonic acid and its metal salts, halides, amides, and other derivatives including polymers (PFOS)		All applications	0.1	yes	EU REACH App. XVII
Packaging					
Heavy metals (lead, cadmium, hexavalent chromium, mercury)		Packaging and packaging components	0.01 total		EU 94/62/EC
Plastic and rubber materials					
Benzo[a]pyrene, Benzo[e]pyrene, Benzo[a]anthracene, Chrysen, Benzo[b]fluoranthene, Benzo[j]fluoranthene, Benzo[k]fluoranthene and Dibenzo[a,h]anthracene	50-32-8 192-97-2 56-55-3 218-01-9 205-99-2 205-82-3 207-08-9 53-70-3	rubber or plastic components that come into direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity	0.0001 0.00005 (child articles)	no	EU REACH App. XVII as of 27 December 2015

Notes

1) "n.g." means that no limit value is given in the legislation. In these cases the legally given concentration limits for taking substances into account are to be observed.

2) Asbestos	CAS No.	Asbestos	CAS No.
Aktinolite	77536-66-4	Chrysotile	12001-29-5 and 132207-32-0
Amosite	12172-73-5	Crocidolite	12001-28-4
Anthophyllite	77536-67-5	Tremolite	77536-68-6

LEDVANCE Index List Environment: List of <u>Declarable Substances</u> This list contains a regularly reviewed selection of relevant hazardous substances. Stand: June 2016				
Substance/substance group	Reason	Typical applications / reference of the limit value	Limit value ³⁾ (% w/w)	Declaration via BOMcheck® / requirements
Substances used in ultraviolet lamps				
Silicic acid (H ₂ Si ₂ O ₅), barium salt (1:1), lead-doped [with lead (Pb) content above the applicable generic concentration limit for 'toxicity for reproduction' Repr. 1A (CLP) or category 1 (DSD); the substance is a member of the group entry of lead compounds, with index number 082-001-00-6 in Regulation (EC) No 1272/2008]	Toxic for reproduction	Luminescent material which emits ultraviolet light and is used as the phosphor coating for ultraviolet lamps	0.1	BOMcheck® (REACH Art 33)
Substances used in electrolytic capacitors				
N,N-dimethylformamide	Toxic for reproduction	Solvent in the electrolyte solution for electrolytic capacitors, particularly low temperature capacitors rated to -55 °C.	0.1	BOMcheck® (REACH Art 33)
N,N-dimethylacetamide	Toxic for reproduction	Solvent in the electrolyte solution for Aluminum electrolytic capacitors	0.1	BOMcheck® (REACH Art 33)
Substances used in ultrasound transducers, ceramic capacitors and actuators				
Lead titanium trioxide	Toxic for reproduction	Both can be used in a wide variety of piezoelectric devices including high-dielectric-constant capacitors, piezoelectric sonar and ultrasonic transducers, radio and communication filters, pyroelectric security devices, medical diagnostic transducers, stereo tweeters, gas igniters, positive temperature coefficient (PTC) sensors and switches and ultrasonic motors	0.1	BOMcheck® (REACH Art 33)
Lead titanium zirconium oxide	Toxic for reproduction		0.1	BOMcheck® (REACH Art 33)
Substances used in polyurethane				
2,2'-dichloro-4,4'-methylenedianiline, also known as MOCA	Carcinogenic	It may be present in polyurethane up to 4% w/w	0.1	BOMcheck® (REACH Art 33)
Substances used in PVDF plastic				
Pentadecafluorooctanoic acid (PFOA)	Toxic for reproduction	PFOA may be found in PVDF plastic up to 1% w/w of the plastic; used as an emulsion stabilizer to manufacture polyvinylidene fluoride (PVDF) and other fluorinated polymers and elastomers	0.1	BOMcheck® (REACH Art 33)
Ammonium pentadecafluorooctanoate (APFO)	Toxic for reproduction	Emulsion stabilizer to manufacture polyvinylidene fluoride (PVDF) and other fluorinated polymers and elastomers	0.1	BOMcheck® (REACH Art 33)
Perfluorononan-1-oic-acid and its sodium and ammonium salts	Toxic for reproduction	PFNA may be found in PVDF plastic up to 1% w/w of the plastic	0.1	BOMcheck® (REACH Art 33)

Substance/substance group	Reason	Typical applications / reference of the limit value	Limit value ³⁾ (% w/w)	Declaration via BOMcheck® / requirements
Substances used in lithium ion batteries				
Bis(2-methoxyethyl) ether, also known as Diglyme	Toxic for reproduction	Solvent in battery electrolytes for sealed lithium ion batteries	0.1	BOMcheck® (REACH Art 33)
1,2-bis(2-methoxyethoxy) ethane (TEGDME, triglyme)	Toxic for reproduction	Solvent in battery electrolytes for sealed lithium ion batteries	0.1	BOMcheck® (REACH Art 33)
1,2-dimethoxyethane (ethylene glycol dimethyl ether, EGDME)	Toxic for reproduction	Solvent in battery electrolytes for sealed lithium ion batteries	0.1	BOMcheck® (REACH Art 33)
1,2-Diethoxyethane	Toxic for reproduction	May be used as a solvent in battery electrolytes for sealed lithium ion batteries	0.1	BOMcheck® (REACH Art 33)
1,3-propanesultone	Carcinogenic	may be used as a solvent in battery electrolytes for sealed lithium ion batteries	0.1	BOMcheck® (REACH Art 33)
Substance used in specialist paints and coatings				
4-Nonylphenol, branched and linear, ethoxylated [substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, ethoxylated covering UVCB- and well-defined substances, polymers and homologues, which include any of the individual isomers and/or combinations thereof]	Equivalent level of concern having probable serious effects to the environment	Found in concentrations up to 10% w/w in specialist coatings based on acrylic esters and specialist paints based on polyvinyl acetates (PVA). If the coating is applied to a very thin light structure, for example aluminium foils, then this could result in > 0.1% w/w of nonylphenol ethoxylates in the article.	0.1	BOMcheck® (REACH Art 33)
Cadmium, cadmium oxide and cadmium sulphide				
Cadmium	Carcinogenic	Cadmium is used as a pigment, as a heat stabiliser, in NiCd Batteries, in alloys, as a plating for plugs, contacts and switches, and in optical glass and filters	0.1	BOMcheck® (REACH Art 33)
Cadmium oxide	Carcinogenic	Cadmium oxide is used as a heat stabiliser, in high quality power switching contacts and relays, and as photoelectric applications	0.1	BOMcheck® (REACH Art 33)
Cadmium sulphide	Carcinogenic	is used as a yellow colorant in plastics, glass and ceramics, and is found in photoelectric devices including photoresistors, solar cells and piezoelectric transducers.	0.1	BOMcheck® (REACH Art 33)
UV protection agent used in plastic				
2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	PBT; vPvB	is used as a UV protection agent for PVC and can also be used for PET, PC, PA, ABS and other polymers. Typical addition rates are 0.20-0.50% w/w of the polymer, depending on the polymer and the desired level of UV protection	0,1	BOMcheck® (REACH Art 33)
2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol (UV-328)	PBT; vPvB	is used as a UV protection agent in plastics, rubber and polyurethane. Typical addition rates are 0.10-1.0% w/w of the polymer, depending on the polymer and the desired level of UV protection.	0,1	BOMcheck® (REACH Art 33)

Substance/substance group	Reason	Typical applications / reference of the limit value	Limit value ³ (% w/w)	Declaration via BOMcheck® / requirements
2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol (UV-327)	vPvB	UV-327 is used as a UV protection agent in plastics, rubber and polyurethane. Typical addition rates are 0.2-0.5% w/w of the polymer, depending on the polymer and the desired level of UV protection.	0,1	BOMcheck® (REACH Art 33)
2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol (UV-350)	vPvB		0,1	BOMcheck® (REACH Art 33)
Phthalate Plasticizers				
1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate	Toxic for reproduction	may be used as plasticizers in PVC and other plastic polymers	0,1	BOMcheck® (REACH Art 33)
2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (DOTE)	Toxic for reproduction	The reaction mass of DOTE and MOTE is added to PVC plastic to make it more stable to heating. The most commonly used reaction mass contains 70% DOTE and 30% MOTE and the addition rate in PVC is typically between 1 and 2.5%.	0,1	BOMcheck® (REACH Art 33)
reaction mass of 2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate and 2-ethylhexyl 10-ethyl-4-[[2-[[2-ethylhexyl)oxy]-2-oxoethyl]thio]-4-octyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (reaction mass of DOTE and MOTE)	Toxic for reproduction		0,1	BOMcheck® (REACH Art 33)
1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	Toxic for reproduction	Plasticiser in PVC and other plastic polymers	0.1	BOMcheck® (REACH Art 33)
Dihexyl phthalate (DnHP)	Toxic for reproduction	Plasticizer in PVC, dye, pigment, paint, ink, adhesive, lubricant.	0.1	BOMcheck® (REACH Art 33)
Dipentyl phthalate (DPP)	Toxic for reproduction	Plasticiser in PVC and other plastic polymers.	0.1	BOMcheck® (REACH Art 33)
1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	Toxic for reproduction	Chemically similar to DEHP, DBP, DIBP and BBP, and may be used as a substitute for these phthalates as their use becomes phased out.	0.1	BOMcheck® (REACH Art 33)
Diisopentylphthalate	Toxic for reproduction	Plasticiser in PVC and other plastic polymers	0.1	BOMcheck® (REACH Art 33)
N-pentyl-isopentylphthalate	Toxic for reproduction	Plasticiser in PVC and other plastic polymers	0.1	BOMcheck® (REACH Art 33)
Bis(2-methoxyethyl) phthalate (DMEP)	Toxic for reproduction	Plasticizer in nitrocellulose, acetyl cellulose, polyvinyl acetate, polyvinyl chloride (PVC) and polyvinylidene chloride	0.1	BOMcheck® (REACH Art 33)
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl (DHNU)	Toxic for reproduction	Plasticiser in PVC and other plastic polymers	0.1	BOMcheck® (REACH Art 33)

Substance/substance group	Reason	Typical applications / reference of the limit value	Limit value ³ (% w/w)	Declaration via BOMcheck® / requirements
1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	Toxic for reproduction	Plasticiser in PVC and other plastic polymers	0.1	BOMcheck® (REACH Art 33 Upcoming RoHS)
Diisobutyl phthalate (DIBP)	Toxic for reproduction	Plasticized plastics, particularly PVC	0.1	
Benzylbutyl phthalate (BBP)	Toxic for reproduction	Plasticized plastics, particularly PVC	0.1	
Dibutyl phthalate (DBP)	Toxic for reproduction	Plasticized plastics, particularly PVC	0.1	
Bis(2-ethylhexyl)phthalate (diethylhexylphthalate, DEHP)	Toxic for reproduction	Plasticized plastics, particularly PVC	0.1	
Flame retardants				
Trixylyl phosphate (TXP)	Toxic for reproduction	is a phosphorous-containing flame retardant which can be found in a range of plastics including PVC, polyurethane, TPE, vinylite, cellulosic resin and natural and synthetic rubber (for example, cables and foam plastics). Plastic products which use TXP as a flame retardant are used in professional and industrial applications only, for example where high temperature performance or long term heat resistance are important. TXP is not used in plastic products intended for consumer use.	0.1	BOMcheck® (REACH Art 33)
Bis(pentabromophenyl) ether (decabromodiphenyl ether; DecaBDE)	PBT	DecaBDE is used as an additive flame retardant in plastics/polymers. DecaBDE is typically used in concentrations of 10-15% by weight of the plastic/polymer, though in some cases concentrations as high as 20% may be required.	0.1	BOMcheck® (REACH Art 33)
Tris(2-chloroethyl)phosphate (TCEP)	Toxic for reproduction	Plasticized and flame retarded plastics, painting and rubber compounds	0.1	BOMcheck® (REACH Art 33)
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	PBT/vPvB	Plasticized and flame retarded plastics, rubber and sealing compounds	0.1	BOMcheck® (REACH Art 33)
Hexabromocyclododekane (HBCDD) 1) 2), including all major diastereoisomers: - Alpha-HBCDD - Beta-HBCDD - Gamma-HBCDD	PBT	Flame-protected plastics	0.1	BOMcheck® (REACH Art 33)
Other brominated flame retardants than PBBs, PBDEs und HBCDD		Flame-protected plastics in components and printed circuit boards	0.1 hm ³)	BOMcheck® (required by customers)
Heat stabilizers				
Fatty acids, C16-18, lead salts	Toxic for reproduction	Heat stabilizer in plastics, in particular for PVC products	0.1	BOMcheck® (REACH Art 33)
Lead dinitrate	Toxic for reproduction	Heat stabilizer in nylon and polyesters	0.1	BOMcheck® (REACH Art 33)

Substance/substance group	Reason	Typical applications / reference of the limit value	Limit value ³ (% w/w)	Declaration via BOMcheck® / requirements
Pentalead tetraoxide sulphate	Toxic for reproduction	Heat stabilizer in plastics, in particular for PVC products	0.1	BOMcheck® (REACH Art 33)
Sulfurous acid, lead salt, dibasic	Toxic for reproduction	Heat stabilizer in plastics, in particular for PVC products	0.1	BOMcheck® (REACH Art 33)
Tetralead trioxide sulphate	Toxic for reproduction	One of the most widely heat stabilizers for plastics, in particular for PVC products	0.1	BOMcheck® (REACH Art 33)
Trilead dioxide phosphonate	Toxic for reproduction	Heat stabilizer in plastics, in particular for PVC products	0.1	BOMcheck® (REACH Art 33)
Dibutyltin dichloride (DBTC)	Toxic for reproduction	Added to PVC plastic to make it more stable to heating and to protect against degradation from sunlight. DBTC is also used as catalyst for the production of plastics including polyurethanes and certain silicones, and for room temperature vulcanisation (RTV) silicone rubber systems.	0.1	BOMcheck® (REACH Art 33)
Lead oxide sulfate	Toxic for reproduction	Heat stabilizer in plastics, in particular for opaque or semi opaque PVC products	0.1	BOMcheck® (REACH Art 33)
[Phthalato(2-)]dioxotrilead	Toxic for reproduction	is used as a heat stabilizer in plastics, in particular for PVC products.	0.1	BOMcheck® (REACH Art 33)
Dioxobis(stearato)trilead	Toxic for reproduction	Heat stabilizer in plastics, in particular for PVC products	0.1	BOMcheck® (REACH Art 33)
Humidity indicators				
Cobalt dichloride	Carcinogenic and Toxic for reproduction	Blue gel in dried flowers (packaging supplement)	0.1	BOMcheck® (REACH Art 33)
Substances used in glass manufacture				
Diarsenic pentoxide	Carcinogenic	May be found in certain types of specialist glass	0.1	BOMcheck® (REACH Art 33)
Diarsenic trioxide	Carcinogenic	May be found in certain types of specialist glass	0.1	BOMcheck® (REACH Art 33)
Antimony and Antimony compounds	Toxic	Opacifying agent for soda lime glass. Antimony trioxide is primarily used as a flame retardant in combination with halogenated flame retardants in plastics and laser-writable plastics	0.1 in glass	BOMcheck® (required by customers)
Arsenic and Arsenic compounds	Toxic, arsenic trioxide and arsenic acid and its salts are also carcinogenic	Refining and oxidizing agent for manufacturing special glass and decolourising agent for glass and enamels in particular to eliminate green colour due to iron(II) sulphate	0.1 in glass	BOMcheck® (required by customers)
High temperature insulating materials				
Aluminosilicate Refractory Ceramic Fibres	Carcinogenic	High temperature insulation in equipment	0.1	BOMcheck® (REACH Art 33)
Zirconia Aluminosilicate Refractory Ceramic Fibres	Cacinogenic	High temperature insulation in equipment	0.1	BOMcheck® (REACH Art 33)
Biocides				
Bis(tributyltin)oxide (TBTO)	PBT	Foam materials in electronics and as a biocide	0.1	BOMcheck® (REACH Art 33)

Substance/substance group	Reason	Typical applications / reference of the limit value	Limit value ³ (% w/w)	Declaration via BOMcheck® / requirements
Flame retardant/adhesive ingredient used for wood, paper, cotton and other plant-derived materials				
Boric acid	Toxic for reproduction	Glass, glass fibres, ceramics, wood, paper, paints, coatings, paints	0.1	BOMcheck® (REACH Art 33)
Diboron trioxide	Toxic for reproduction	Glass products, fibre glass products and ceramic products	0.1	BOMcheck® (REACH Art 33)
Disodium tetraborate, anhydrous	Toxic for reproduction	Glass, glass fibres, ceramics, Flame-protected wood, paper and Cotton	0.1	BOMcheck® (REACH Art 33)
Tetraboron disodium heptaoxide, hydrate	Toxic for reproduction		0.1	BOMcheck® (REACH Art 33)
Substance used in acrylic adhesive glues				
Imidazolidine-2-thione; 2-imidazoline-2-thiol (ethylene thiourea)	Toxic for reproduction	vulcanisation agent (as such or in mixture) in the production of GRGs (General Rubber Goods) and tyres	0.1	BOMcheck® (REACH Art 33)
Yellow and red pigments for plastics and paints				
Lead tetroxide (orange lead)	Toxic for reproduction	Is found in anti-corrosion paints which are used to prevent iron and steel from rusting. The paints can contain between 85% and 98% lead tetroxide	0.1	BOMcheck® (REACH Art 33)
Lead cyanamidate	Toxic for reproduction	Is found in anticorrosion paints which are used to prevent steel from rusting. These red paints can typically contain around 15% lead cyanamidate.	0.1	BOMcheck® (REACH Art 33)
Pyrochlore, antimony lead yellow	Toxic for reproduction	Yellow pigment for colouring plastics and paints. When used as a colourant in plastic articles, the lead antimonate can be present in concentrations > 0.1% w/w of the plastic	0.1	BOMcheck® (REACH Art 33)
4-Aminoazobenzene	Carcinogenic	(Also known as Aniline Yellow) is found in yellow inks including inks for inkjet printers.	0.1	BOMcheck® (REACH Art 33)
Lead chromate	Toxic, environment hazard	Colored paints and coatings, corrosion control coatings	0.1	BOMcheck® (REACH Art 33)
Lead chromate molybdate sulphate red (C.I. Pigment Red 104)	Carcinogenic and toxic for reproduction	Pigment for colored plastic: PVC, polyolefins and nylon	0.1	BOMcheck® (REACH Art 33)
Lead sulfochromate yellow (C.I. Pigment Yellow 34)	Carcinogenic and toxic for reproduction	Pigment for colored plastic: PVC, polyolefins and nylon	0.1	BOMcheck® (REACH Art 33)
Disodium 3,3'-[[1,1'-biphenyl]-4,4'-diylbis(azo)]bis(4-aminonaphthalene-1-sulphonate) (C.I. Direct Red 28; Congo Red)	Carcinogenic	dye for textiles, paper and PVA. Patent disclosures indicate that it is also found in ink used in inkjet printers. used as a pH indicator, as an addition to culture media and for biological staining, e.g. in histology gelling	0.1	BOMcheck® (REACH Art 33)
Black colourants				
Disodium 4-amino-3-[[4'-[(2,4-diaminophenyl)azo][1,1'-biphenyl]-4-yl]azo]-5-hydroxy-6-(phenylazo)naphthalene-2,7-disulphonate (C.I. Direct Black 38)	Carcinogenic	Black pigment which is used as a dye for a wide range of applications including plastics, cellulose, silk, nylon, acetate, wood and leather. Patent disclosures indicate that it is also found in ink used in inkjet printers.	0.1	BOMcheck® (REACH Art 33)

Substance/substance group	Reason	Typical applications / reference of the limit value	Limit value ³ (% w/w)	Declaration via BOMcheck® / requirements
Substances which are restricted, if part comes into contact with skin				
Azo compounds	Release carcinogenic substances	Colored plastics	0.1 hm	-
Nickel, nickel compounds and nickel-based alloys in contact with skin	Different nickel compounds are carcinogenic	Metal part, Base parts, only relevant if in contact with skin during use phase, e.g. torch surface	0.1 hm	BOMcheck® (required by customers)
PAH (Polycyclic aromatic hydrocarbons)	Persistent, toxic, various compounds can be carcinogenic	Plastic, Elastomers, rubber	0.1 hm	BOMcheck® (required by customers)
Other applications				
Beryllium Beryllium compounds	Toxic	Contact and spring materials, copper alloys, high-temperature materials, ceramics, glasses	0.1 hm	BOMcheck® (required by customers)
Radioactive substances, intentionally added	Radioactive	Lamp filling gas, lamp electrodes	n.g.	BOMcheck® (required by customers)

3) Threshold concentration value for declaration: 0.1 % by weight in articles (SVHC acc. REACH Art 33), otherwise for homogeneous materials (hm)