

Substance listing

The TEG Banned and Declarable Substances List (BAD-SL) applies to all products, components, substances and preparations that end up in a finished product. It identifies substances which are either prohibited or restricted by regulations or by customers' requirements, due to health related or environmental hazards.

This list is intended to be used to communicate contractual requirements regarding banned and restricted substances to suppliers. Please also pay attention to the notes at the end of this document.

Module A

Table A-1 Prohibited substances

The following table of Prohibited Substances refers to chemical substances, which shall not be included in our products.

Substance name	CAS No./ Source	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and Industry standards (see Annex)
Cadmium / Cadmium compounds	See the latest versions of IEC 62474 or GADSL accordingly	Inclusion prohibited	< 100 ppm	All applications except for packaging and packaging components, batteries, accumulators and the exempted applications shown below.	1-8, 18
		Applications exempted from the restriction	-	Exempted applications of the latest version of Annexes III and IV of the EU RoHS Directive (2011/65/EU) and Annex II of the EU ELV Directive (2000/53/EC)	
Chromium VI / Chromium VI compounds	See the latest versions of IEC 62474 or GADSL accordingly	Inclusion prohibited	< 1000 ppm	All applications except for packaging and packaging components and the exempted applications shown below.	1-8, 18
		Applications exempted from the restriction	-	Exempted applications of the latest version of Annexes III and IV of the EU RoHS Directive (2011/65/EU) and Annex II of the EU ELV Directive (2000/53/EC)	
Lead / Lead compounds	See the latest versions of IEC 62474 or GADSL accordingly	Inclusion prohibited	< 1000 ppm	All applications except for packaging and packaging components, batteries, accumulators and the exempted applications shown below.	1-8, 18
		Applications exempted from the restriction	-	Exempted applications of the latest version of Annexes III and IV of the EU RoHS Directive (2011/65/EU) and Annex II of the EU ELV Directive (2000/53/EC)	
Mercury / Mercury compounds	See the latest versions of IEC 62474 or GADSL accordingly	Inclusion prohibited	< 1000 ppm	All applications except for packaging and packaging components, batteries and accumulators and the exempted applications shown below.	1-11, 19
		Applications exempted from the restriction	-	Exempted applications of the latest version of Annexes III and IV of the EU RoHS Directive (2011/65/EU) and Annex II of the EU ELV Directive (2000/53/EC)	
Polybrominated biphenyls (PBB's)	See the latest versions of IEC 62474 or GADSL accordingly	Inclusion prohibited	< 1000 ppm	All applications	1, 3-6, 8, 18
Polybrominated diphenyl ethers (PBDE's)	See the latest versions of IEC 62474 or GADSL accordingly	Inclusion prohibited	< 1000 ppm	All applications	1, 3-6, 8, 18
Bis-(2-ethylhexyl) phthalate (DEHP)	117-81-7	Inclusion prohibited	< 1000 ppm	All applications after July 22, 2018	1, 39
Butyl benzyl phthalate (BBP)	85-68-7	Inclusion prohibited	< 1000 ppm	All applications after July 22, 2018	1, 39
Dibutyl phthalate (DBP)	84-74-2	Inclusion prohibited	< 1000 ppm	All applications after July 22, 2018	1, 39
Diisobutyl phthalate (DIBP)	84-69-5	Inclusion prohibited	< 1000 ppm	All applications after July 22, 2018	1, 39

Substance name	CAS No./ Source	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and Industry standards (see Annex)
Hexabromo-cyclododecane (HBCDD) and all major diastereoisomers	See the latest versions of IEC 62474 or GADSL accordingly	Inclusion prohibited	-	All applications	3, 30, 38
REACH (EC) No. 1907/2006 Annex XVII (Substances restricted under REACH)	See the latest information from ECHA (European Chemicals Agency) https://echa.europa.eu/de/substances-restricted-under-reach	Inclusion prohibited	Depending on the item	Depending on the item (in accordance with the regulation)	3
Red Phosphorus	7723-14-0	Content prohibited	-	Flame retardant in resin parts used between electrodes in electrical insulation sections. (Non-exhaustive listing of examples: Connectors, AC power cords, AC adaptors, AC power inlets, AC power outlets, DC plugs, DC power jacks, power switches, terminal blocks, fan motors, bobbins for transformers, bobbins for inductors, bases (stands), core cases.)	-
		Applications exempted from the restriction	-	1. Applications other than flame retardant in resin parts used between electrodes in electrical insulation sections. 2. Flame retardant in resin parts (resin material) in the prohibition scope, adopted prior to April 1, 2020, for which a stabilization treatment (e.g. moisture-proof coating) or an equivalent measure has been applied to the red phosphorus particles.	-
EU POPs Regulation (EU) 2019/1021 Annexes I and II and their amendments (restricted substances)	See the latest information from ECHA (European Chemicals Agency) https://echa.europa.eu/pops-legislation	Inclusion prohibited	Depending on the item	Depending on the item (in accordance with the regulation)	28, 38

Table A-2 Declarable substances

The following table of Declarable Substances refers to chemical substances, which are not prohibited from inclusion but for which we strongly call for inclusion monitoring.

Substance name	CAS No. / Source	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and industry standards (see Annex)
Halogens and Halogen compounds (only bromine from organic brominated compounds and chlorine from organic chlorinated compounds)	-	Inclusion monitored	Bromine and chlorine (individually) < 900 ppm and total combined halogens < 1500 ppm	All substances and their applications except PBBs*, PBDEs*, and HBCDD*. *See respective requirements. (examples: organic brominated compounds, (including brominated flame retardants, TBBPA), and organic chlorinated compounds (including chlorinated flame retardants and PVC)).	19, 20
REACH (EC) No. 1907/2006 "SVHC Substances" (Candidate List of Substances of Very High Concern for Authorisation)	See the latest version of the Candidate list on the website of ECHA (European Chemicals Agency) http://echa.europa.eu/web/quest/candidate-list-table	Inclusion monitored	< 1000 ppm	All applications	3

Table A-3-1 Additional prohibited substances in packaging applications

Substance name	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and industry standards (see Annex)
Cadmium, hexavalent chromium, lead and mercury	Inclusion prohibited	Total *1) < 100 ppm	Applications as packaging components (for distributing and protecting TEG products) (examples: Trays, reels, sticks, bags, cushioning, staples, sheets, wraps, corrugated cardboard, tapes, tie bands, labels, printing inks, paints, and similar)	12
	Applications exempted from the restriction	-	Reusable shuttling boxes	-

*1) Cadmium, lead, mercury and hexavalent chromium must individually be less than their respective threshold levels; and concurrently, the total of the 4 heavy metals must be less than 100 ppm, for each of the individual components, paints, and inks that constitute the packing. Hexavalent chromium must be analyzed as part of total chromium. If it is 100 ppm or greater, analyze the hexavalent chromium independently within the total chromium to verify whether the total is less than 100 ppm.

Table A-3-2 Additional prohibited substances in batteries and accumulators

Substance name	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and industry standards (see Annex)
Cadmium/ Cadmium compounds*1)	Inclusion prohibited	< 20 ppm*	Portable batteries and accumulators except for the exempted applications shown below. *3)	13
	Applications exempted from the restriction	-	Portable batteries or accumulators for emergency and alarm systems, including emergency lighting; medical equipment; or cordless power tools.*3)	13
Lead/ Lead compounds*1)	Inclusion prohibited	< 40 ppm*	Alkaline zinc manganese dioxide batteries	14
	Inclusion prohibited	< 2000 ppm*	Non-alkaline zinc manganese dioxide batteries	14
	Applications exempted from the restriction	-	Except batteries and accumulators	-
Mercury/ Mercury compounds*1)	Inclusion prohibited	< 5 ppm*	Batteries and accumulators *2) *4)	13
		< 20000 ppm*	Batteries and accumulators (button cells) *2) *4)	13
Perchlorates	Inclusion prohibited	< 0.006 ppm*	Coin cell batteries	16

* refers to the weight of the product.

*1) Even if the actual concentration of the substance is below the threshold level, marking is required by the "EU Directive on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (2006/66/EC)".

*2) 'battery' or 'accumulator' means any source of electrical energy generated by direct conversion of chemical energy and consisting of one or more primary battery cells (non-rechargeable) or consisting of one or more secondary battery cells (rechargeable)."

*3) 'portable battery or accumulator' means any battery*2), button cell*4), battery pack*5) or accumulator*2) that:

- (a) is sealed; and
- (b) can be hand-carried; and
- (c) is neither an industrial battery nor accumulator*6) nor an automotive battery or accumulator*7). "

*4) 'button cell' means any small round portable battery or accumulator whose diameter is greater than its height and which is used for special purposes such as hearing aids, watches, small portable equipment and back-up power.

*5) 'battery pack' means any set of batteries or accumulators that are connected together and/or encapsulated within an outer casing so as to form a complete unit that the end-user is not intended to split up or open.

*6) 'industrial battery or accumulator' means any battery or accumulator designed for exclusively industrial or professional uses or used in any type of electric vehicle.

*7) 'automotive battery or accumulator' means any battery or accumulator used for automotive starter, lighting or ignition power.

*8) In addition to the "EU Directive (2006/66/EC) on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC", other requirements may be established in some of the EU member states.

Module B

Module B-1

Table B-1-1 Additional prohibited substances

The following table of Prohibited Substances refers to a chemical substance, which shall not be included in our products.

Substance name	CAS No. / Source	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and industry standards (see Annex)
Asbestos	See IEC62474	Inclusion prohibited	-	All applications. (examples: Electrical and heat insulating materials and filling materials)	3, 21
Certain azo compounds	See IEC62474	Inclusion prohibited	< 30 ppm	Parts from products coming into direct contact with the human body and which were manufactured to function in continual contact with it (leather and textile products)	3
Arsenic/ Arsenic compounds	See IEC62474	Inclusion prohibited	< 1000 ppm	All applications except for the exempted applications indicated below	3
		Applications exempted from the restriction	-	Compound semiconductors containing an arsenic component; copper foil bonding on printed circuit boards	
Fluorinated greenhouse gases (HFC, PFC, SF ₆)	See IEC62474	Inclusion prohibited	-	All applications (examples: refrigerants, blowing agents, extinguishing agents, cleaning agents, insulating media, caustic gas)	22
Formaldehyde	50-00-0	Inclusion prohibited	-	Composite wood products (plywoods, particle boards, MDF (medium-density fibreboards)) or components	23
		Inclusion prohibited	< 75 ppm*	Textiles	24
		Applications exempted from the restriction	-	All applications other the above	-
Nickel	7440-02-0	Inclusion prohibited	0.5 µg/cm ² / week	Applications with possibility of direct and prolonged contact with the skin (examples: exterior of portable electronic equipment)	3
Ozone Depleting Substances	See IEC62474	Inclusion prohibited	-	All applications	25-27
Perfluorooctane sulfonate (PFOS) C ₈ F ₁₇ SO ₂ X (X=OH; metallic salt; halide; amide and other derivatives including polymers)	See IEC62474	Inclusion prohibited	-	All applications (examples: antistatic agent for films and plastics)	28-30
Phenol,2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl); 2-(2H-benzo-triazol-2-yl)-4,6-bis (1,1-dimethylethyl)-Phenol	3846-71-7	Inclusion prohibited	-	All applications (examples: Adhesives, paints, printing inks, plastics, inked ribbons, putty, caulking or sealing fillers)	30
Polychlorinated biphenyls (PCB's)	See IEC62474	Inclusion prohibited	-	All applications (examples: Use in capacitors; heating media, lubrication oil, flame retardants)	3, 21, 30
Polychlorinated Terphenyls (PCTs)	61788-33-8	Inclusion prohibited	-	All applications (examples: insulation oil, lubricant oil, electrical insulation medium, solvent, electrolytic solution; Plasticizers, fire retardants, coatings for electrical wire and cable, dielectric sealants)	3, 21, 30
Polychlorinated naphthalenes (PCNs) (Cl ≥ 2)	See IEC62474	Inclusion prohibited	-	All applications (Example: lubrication oil)	30
Radioactive substances	See IEC62474	Inclusion prohibited	-	All applications	31-33

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Release TQ: January 07, 2021

Version 01

Substance name	CAS No. / Source	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and industry standards (see Annex)
Tri-substituted organostannic compounds Tributyl Tin (TBT) and Triphenyl Tin (TPT) compounds	See IEC62474	Inclusion prohibited	< 1000 ppm by weight of tin	All applications	3
Tributyl Tin Oxide (TBTO)	56-35-9	Inclusion prohibited	< 1000 ppm	All applications	3
Dimethylfumarate (DMF)	624-49-7	Inclusion prohibited	< 1000 ppm	All applications	3
Dibutyltin (DBT) compounds	See IEC62474	Inclusion prohibited	< 1000 ppm by weight of tin	All applications	3
Diocetyl tin (DOT) compounds	See IEC62474	Inclusion prohibited	< 1000 ppm by weight of tin	Textile articles intended to come into contact with the skin Two-component room temperature vulcanization moulding kits (RTV-2 moulding kits)	3

Table B-1-2 Additional declarable substances

The following table of additional declarable substances refers to a chemical substance, which is not prohibited from inclusion but for which we strongly call for inclusion monitoring.

Substance name	CAS No. / Source	Requirement	Threshold level	Applications of substance and scope of the Standards	Key legislation and industry standards (see Annex)
Beryllium/ Beryllium compounds	See GADSL	Inclusion monitored	< 1000 ppm	All applications other than those exempt below	-
		Applications exempted from the requirement	-	Beryllium copper alloy, beryllium nickel alloy, beryllium gold alloy	-
Selenium/ Selenium compounds	See GADSL	Inclusion monitored	< 1000 ppm	All applications other than those exempt from the Standards	36
		Applications exempted from the requirement	-	Optical components containing zinc selenide (examples: reflecting mirrors, lenses); JIS compliant stainless steel containing selenium	-
Antimony/ Antimony compounds	See GADSL	Inclusion monitored	< 1000 ppm	All applications	-
Perchlorates	See IEC62474	Inclusion monitored	< 0.006 ppm	All applications	17

Module B-2 (GADSL)

Table B-2 Prohibited and Declarable Substances

Substances are listed in the “Global Automotive Declarable Substance List (GADSL)” published by the Global Automotive Stakeholder Group (GASG) (always in the current valid edition).

(Threshold: 0.1% by weight (1000 ppm) if not stated otherwise)

Please see the GADSL at <http://www.gadsl.org>

Note on Substance Classification

- Substances classified as “P” (“prohibited”) in the “GADSL Reference List” are also prohibited in TEG products.

Thresholds in purchased products

- These substances shall be checked and verified by the suppliers to be not contained in levels exceeding the allowed thresholds.
- Substances classified as “D” (“declarable”) in the “GADSL Reference List” are also treated as declarable by the TEG, and therefore shall be declared by the suppliers to the TEG whenever their inclusion amount in purchased products exceeds the established threshold.

Module C

In case a substance regulation is stricter due to requirements of individual legislations of a country, an area or due to agreed customer’s individual requirements, a substance on its own or a threshold level can be regulated stricter than mentioned above.

For such cases, these requirements are contractually agreed with suppliers, which can mean:

- (1) the threshold value of a substance can be lower than noted above,
- (2) the substance referred as declarable substance above can be rated as a prohibited substance, or
- (3) the substance is not mentioned above but can be declarable or prohibited.

Annex: List of specific legislation and industry standards

- 1 Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment [EU, "RoHS Directive", incl. its latest amendments]
- 2 Directive 2000/53/EC on end-of life vehicles [EU, "ELV Directive"]
- 3 Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals [EU, "REACH Regulation" incl. its amendments]
- 4 The Restriction of the Use of Hazardous Substances in Electrical and Electronic Products [China, "China RoHS2"]
- 5 Act for Resource Recycling of Electrical and Electronic Equipment and Vehicles [Korea, "Korea RoHS"]
- 6 The Law for Promotion of Effective Utilization of Resources [Japan, "J-MoSS"]
- 7 Electronic Waste Recycling Act [US, State of California]
- 8 Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles (Chemical Risk Reduction Ordinance, ORRChem) [Swiss]
- 9 Louisiana Mercury Risk Reduction Act [US, State of Louisiana]
- 10 Mercury Reduction and Education Act [US, State of Rhode Island]
- 11 Act Relating to Comprehensive Management of Exposure to Mercury [US, State of Vermont]
- 12 Directive 94/62/EC on Packaging and Packaging Waste [EU, "EU Packaging Directive"]
- 13 Directive 2006/66/EC on Batteries and Accumulators and Waste Batteries and Accumulators [EU, "EU Battery Directive"]
- 14 GB 24427-2009: Limitation of Mercury, Cadmium and Lead Contents for Alkaline and Non-Alkaline Zinc Manganese Dioxide Batteries [China]
- 15 Restrictions on the Manufacture, Import and Sale of Dry Cell Batteries [Taiwan]
- 16 Perchlorate Contamination Prevention Act [US, State of California]
- 17 Environmental Conservation - Title 7 - Section 27-0719 Battery Management and Disposal [US, New York State]
- 18 IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry
- 19 IPC-4101 - Specification for Base Materials for Rigid and Multilayer Printed Boards
- 20 IEC 61249-2-21 - Materials for printed boards and other interconnecting structures - Part 2-21
- 21 Toxic Substances Control Act [US, EPA, "TSCA"]
- 22 Regulation (EU) No 517/2014 on fluorinated greenhouse gases [EU, "F-gas regulation"]
- 23 Rules by California Air Resources Board (CARB) [US, State of California]
- 24 Formaldehydverordnung [Austria]
- 25 Montreal Protocol on Substances that Deplete the Ozone Layer
- 26 Regulation (EC) No 1005/2009 on substances that deplete the ozone layer [EU]
- 27 Clean Air Act [US, EPA]
- 28 Regulation (EU) 2019/1021 on persistent organic pollutants [EU, "POP-Regulation"]
- 29 Prohibition of Certain Toxic Substances Regulations [Canada]
- 30 Chemical Substances Control Law [Japan]
- 31 Council Directive 2013/59/Euratom laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation [EU]
- 32 The Regulation of Nuclear Source Material, Nuclear Fuel Material, and Reactors [Japan]
- 33 Acts of Nuclear Regulatory Commission (NRC) [US]
- 34 Regulations on the Restriction of Use of Hazardous Chemicals and Other Products ("Product Regulations") [Norway]
- 35 [currently not used]
- 36 Water Pollution Prevention Act [Japan]
- 37 Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502 [US]
- 38 Stockholm Convention on Persistent Organic Pollutants ("POPs") [United Nations]
- 39 Directive 2015/863/EU amending Annex II to Directive 2011/65/EU as regards the list of restricted substances [EU]

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Release TQ: January 07, 2021

Version 01

Note

The list above does not cover all legislation and industry standards.

It shall be noted that the list above is not exhaustive and its purpose is to highlight representative legislation and industry standards having influence, to a greater or lower degree, on the TEG's Environmental Product Quality activities. Notwithstanding the above, all applicable legislation must be followed in its current valid edition.

Since the regulations, laws and standards are constantly under revision, it is necessary to ensure timeliness to comply with the legal requirements.

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