Quality Guideline - Voith Turbo

Material Compliance

Guideline to ensure the material
and substance-related requirements
to material contents for products
and articles manufactured by Voith Turbo

For any questions about the guideline Voith Turbo Material Compliance, please contact:

Voith Turbo GmbH Co.KG
Gerhard Meier-Burkamp
Alexanderstraße 2
89522 Heidenheim, Germany
Tel. +49 7321374574
E-Mail: Gerhard.Meier-Burkamp@voith.com

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Contents:

1 Scope

This guideline applies in its entirety to products/articles manufactured by Voith Turbo and to any components, assembly groups that are installed into these products/articles or are used during manufacture and remain in the product/article.

The term Voith Turbo means worldwide the company Voith Turbo GmbH & Co. KG with all branches and locations, and any undertakings having separate legal personality which belong to or are connected to the Voith group of companies, except the US-companies.

The US-companies are adviced to compile an identical regulation.

2 Field of Application

This guideline has to be applied to any delivery of products/articles, including contained components, assembly groups, operating supplies, ingredients, the packings and transport materials, supplied to Voith Turbo. This directive has also to be applied to the delivery of test and prototype parts.

3 Purpose

Purpose of this guideline is to specify the legal, customer-specific and own requirements of Voith Turbo with regard to the reglementation and limitation of material ingredients and to thus ensure Material Compliance of the products/articles.

4 Terms and Abbreviations

Sunset date within the meaning of the REACH Regulation**:**
After this date it is forbidden to put in circulation and use one of the substances listed in Annex XIV of the REACH regulation, unless an admission was granted.

Intentionally added:
Any concentration ≥ 0.001 % in a homogeneous material is deemed as added intentionally.

Latest application date within the meaning of the REACH Regulation**:**
By that date, an application form has to be submitted (date is at least 18 months before the sunset date) so that the material may still be used. (Deadline)
For information on the application form and the official process, please visit:
http://echa.europa.eu/de/addressing-chemicals-of-concern/authorisation/applications-for-authorisation

Application:
This means that the limit value of the substance refers to the material or part in which the substance is contained to reach the desired functionality.

Battery or accumulator:
Means any source of electrical energy generated by direct conversion of chemical energy and consisting of one or more (non rechargeable) primary cells or one or more (rechargeable) secondary cells.

CAS-number:
The CAS-number (also CAS registration number and CAS registry number, CAS = Chemical Abstracts Service) is an international designation standard for chemical substances. For any chemical substance (also bio sequences, alloys, polymers) a unique CAS number exists.

Chemical compound:
A pure substance consisting of two or more different chemical elements which, contrary to mixtures, are in a fixed atomic number and therefore also mass ratio to each other. Characertistic for each chemical compound is the unique chemical and physical structure.

Examples for chemical compounds
organically: water, formaldehyde, ethanol
metalically: iron, copper, tin
minerally: iron sulfide, sodium chloride, silicic acid

Declarable substances:
Substances classified to be declarable are undesired in some applications and need to be declared above the indicated limit values. It is necessary to indicate the substances listed for any product/article, component, material, mixture of substances, process materials. Content limits are specified for individual substances in the document. A declaration is not necessary below these limit values.

Forbidden substances:
Forbidden substances must not be contained in products/articles, components, materials, mixture of substances and process materials above the limit values specified in this document. These substances may only be contained as naturally occurring impurity; they must not have been added intentionally. Impurities with such substances are to be indicated in terms of quality.

Product/article:
Object which on manufacture gets a specific shape, surface or design that determines its function to a greater extent than the chemical composition.

Article:
Object, goods, make

Material:
- Is defined as substance, material, raw material, of which something is manufactured.

- Entirety of all auxiliary means, objects that are required as equipment or similar to perform a certain work, manufacture something.. Entirety of all documents, evidences, supporting documents, or similar, that are required, used to perform a certain work.
- Raw materials, materials, products/articles, including the contained components, operating supplies, ingredients and surrounding packings and transport material.

Homogeneous material:
This material is defined as material that cannot be disjointed mechanically further into different materials. The term "homogeneous" means "throughout of the same structure". Examples of homogeneous materials are individual types of plastics, ceramics, glass, metals, alloys, synthetic resins and coatings.

Preparation:
Preparation means mixtures or solutions composed of two or more substances.
Examples for preparations:
Heterogeneous mixture: alloy
Mixture: air
Solution: dispersions

5 Requirements

This guideline describes Voith Turbo's requirements to all forbidden, regimented and declarable substances in the current form.

Material Compliance requirements are on equal terms with other product requirements.

Necessity to procure the current laws, standards and guidelines in each case remains unaffected and continues to remain an obligation of Voith Turbo's subsuppliers.

The supplier's obligation to comply with statutory provisions (national or European laws) is thus not influenced by this guideline. Wherever there is a difference between Voith Turbo's guideline "Material Compliance" and other statutory, normative, customer-specific or other requirements, it is mandatory to always apply the stricter provision.

Voith Turbo claims that all products or product parts, product packings and transport materials comply with the requirements of this guideline and guarantee a putting into circulation of the products in accordance with the regulations.

Raw materials, products/articles, including the contained components, assembly groups, operating supplies, ingredients and surrounding packings and transport material of unknown origin and/or composition, or raw materials, products/articles, including the contained components, assembly groups, operating supplies, ingredients and surrounding packings and transport materials of which no data regarding material are at hand, must not be used.

On a case-by-case base, upon request, the technical data sheets of all raw materials and substances used have to be submitted to Voith Turbo for a first article inspection. The customer reserves the right to perform tests and laboratory examinations on materials in particular cases. In case of negative test results, the supplier will be charged with the costs incurred.

The supplier is obliged to submit any material information free-of-charge.

The supplier is responsible for the compliance with these requirements.
At least every 6 months, the supplier is obliged to check whether an updated version of this guideline is available. With the amendment of the guideline, this guideline replaces the previous version and is effective immediately. The supplier will not be notified on the part of Voith Turbo with regard to the amendment of the guideline.

This document contains links to websites of third-party content ("external links"). The respective providers are responsible for these websites. At the time of the initial linkage to external links, the author of this guideline has checked the third-party content for possible legal violations. At that time, there were no violations evident. The author of the guideline does not have any influence on the current and future shaping and on the content of linked pages. Setting of external links does not mean that the author of this guideline adopts the contents which are behind the reference or link as his own. Permanent check of external links without any indication of violations is not reasonable to the author of this guideline. However, if violations become known, such external links will be deleted immediately.

6 References

This document contains references to other applicable set of rules, documents, information and additional papers. Unless stated otherwise, the latest version of the respective documents shall apply.

Set of rules by the European Union
Regulations and directives of the European Union are available on the internet, see http://eur-lex.europa.eu/homepage.html?locale=de

SVHC list of candidates
The official, current SVHC list of candidates according to REACH is available at:
http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp.

Global Automotive Declarable Substance List (GADSL)
The current version of the GADSL can be downloaded at:
www.gadsl.org

Hong Kong Convention (HKC)
For more information, please visit the internet page of Internation Maritime Organisation:
http://www.imo.org/en/OurWork/Environment/ShipRecycling/Pages/Default.aspx
On the right-hand side, a menu contains the respective guidelines for the Hong Kong Convention. In the guideline "Resolution MEPC.197(62) – Guidelines for the development of the inventory of hazardous materials", you will find in Appendix 1 the substances which you have to declare in an "Inventory of hazardous materials". This guideline also specifies how to issue these declarations.

Railway Industry Substance List (RISL)
The survey about regimented and forbidden substances can be downloaded at the following links in Excel and pdf format:
http://www.unife-database.org/

Conflict Minerals (CM)
Information about "Conflict Minerals" are available at:
https://www.sec.gov/News/Article/Detail/Article/1365171562058

7 Voith Turbo's list of regimented substances

7.1 Substance regimentations and prohibitions - relevant to all products

The requirements described here apply to the composition of all products put into circulation by Voith Turbo.

For individual, legal regulations such as the car wrecks directive, it is the supplier's duty to check their concern with regard to the material requirements and to apply the same.

7.1.1 Regulation (EC) No. 1907/2006 REACH – Annex XIV

Directory of substances requiring registration.
The inclusion of a substance from the list of substances of very high concern into Annex XIV of the REACH Regulation results at the end of the procedure in an obligation requiring registration for this substance. Following a transitional period, the substance may be used only with an approval or its use will be forbidden.

Explanations regarding terms 'Latest application date' and 'Sunset date' can be found in item 6 'Terms and Abbreviations'.

7.1.2 Regulation (EC) No. 1907/2006 REACH – Annex XVII

Restrictions on the manufacture, placing on the market and the use of certain dangerous substances, preparations and products/articles.
In Annex XVII of the REACH regulation, well defined substances in individual applications are regimented or forbidden.

Pure substances and substances	Permitted maximal concentration [%]	Limitations of use
Asbestos	Not intentionally added	All applications
Acrylamide	0.1	In substances and preparations
Azo dyes	0	Not permitted in textiles and leather that get in contact with skin
Benzene	0.1	In substances and preparations
Cadmium	0.01	Plastic production
Dimethylfumarate (DMF)	0.1	Product
Monomethyldibromdiphenylmethane (DBBT)	0	All applications
Monomethyldibromdiphenylmethane (Ugilec 121 or Ugilec 21)	0	All applications
Monomethyldibromdiphenylmethane (Ugilec 141)	0	All applications
Nickel and nickel alloys	0.5 µg/cm^2/week	In direct and permanent contact with skin only
Nonylphenol and nonylphenolethoxylate connections	0.1	
Octabromdiphenyl ether	0.1 in the product	Product
Pentachlorphenol (PCP) and its salts and esters	0.1	In substances and preparations
Polybrominated biphenyls (PBB)	0	Not permitted in textiles getting in direct contact with skin
Polychlorinated biphenyls (PCBs)	0	All applications
Polychlorinated terphenyls (PCTs)	0	All applications
Polycyclic aromatic hydrocarbons (PAK)	0.001	All applications
Sulphur-hexafluoride (SF_6)	0	All applications
Tar and creosote oil	0	In wood and wood materials
Tris-(1-aziridinyl) phosphine oxide	0	Not permitted in textiles getting in direct contact with skin
Tris-(2, 3-dibrompropyl) phosphate	0	Not permitted in textiles and leather that get in contact with skin
Organostannic compounds	0.1 portion tin in the product	Not added intentionally in substances and preparations. Not permitted in the product.

Table 1: Substance reglementation of the REACH Regulation, as at 01/2016

For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

7.1.3 Directive 94/62/EC – Packaging Directive

Directive 94/62/EC of the European Parliament and Council of 20 December 1994 on packaging and packaging waste is restricted to the concentration of heavy metals present in packaging.

Pure substances and substance groups	Maximal concentration in homogeneous material in per cent
Sum of heavy metals (Cd, Hg, Cr(6+) and Pb)	0.01%

Table 2: Substance restrictions - packaging directive
For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

In addition to that, Voith Turbo prohibits the use of the substances in packagings and packaging components listed in the following table.

Pure substances and substance groups	Maximal concentration in homogeneous material in per cent
Dimethylfumarate	0%
Arsenic compounds in wood packaging	0.001%
Formaldehyde	0.10%

Table 3: Substance restriction - packaging

For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

7.2 Substance regimentations and prohibitions - relevant to products in different scopes

Contrary to the substance regimentations in Section 7.1, here the supplier has to check whether his products fall directly or indirectly into the scope of the respective rules and standards. This means that products from subsuppliers always have to comply with the same rules and standards as the products of Voith Turbo. This is dependent on the place of installation and use of the product supplied by Voith Turbo. In case the subsupplier is not able to clarify the facts on his own, he has to contact the customer.

7.2.1 Directive 2000/53/EC – End of Life Vehicles Directive

Directive 2000/53/EC of the European Parliament and Council of 18 September 2000 on end-of-life vehicles. Colloquially also known as ELV directive.

Applicable to all components installed in vehicles of M1 and N1 classes. Some customers also demand the application to other vehicle classes.

You will find the exceptions in Annex 2 of the guideline.

The ELV substance reglementations refer to the maximal concentration in the homogeneous material of each article.

Substance groups	Maximal concentration in homogeneous material in per cent
Cadmium and cadmium compounds	0.01%
Hexavalent chromium (Cr6+) and Cr6+ compounds	0.10%
Lead and lead compounds	0.10%
Mercury and mercury compounds	0.10%

Table 4: Substance reglementations of the ELV directive
For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

7.2.2 Directive 2011/65/EU – RoHS 2

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS directive).

You will find the exceptions in Annex 2 of the guideline.

The RoHS substance reglementations refer to the maximal concentration in the homogeneous material of each article.

Substance groups	Maximal concentration in homogeneous material in per cent
Cadmium and cadmium compounds	0.01%
Hexavalent chromium (Cr6+) and Cr6+ compounds	0.10%
Lead and lead compounds	0.10%
Mercury and mercury compounds	0.10%
Polybrominated diphenyl ethers (PBDE)	0.10%
Polybrominated biphenyls (PBB)	0.10%
Extension as of 2019-07-22	
Di(2-ethylhexyl)phthalate (DEHP)	0.10%
Butylbenzylphthalate (BBP)	0.10%
Dibutylphthalate (DBP)	0.10%
Diisobutylphtalate (DIBP)	0.10%

Table 5: Substance regulations of the RoHS directive

For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

7.2.3 Directive 2006/66/EU – Battery directive

The battery directive limits the use of heavy metals in batteries and button cells.

Pure substances	Maximal concentration in article in per cent	Limitations of use
Mercury and mercury compounds	0.0005%	Battery
		Button cell
Cadmium and cadmium compounds	0.002%	Battery

Table 6: Substance regulations of the battery directive

For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

7.2.4 Directive (EU) No. 528/2012 – biocidal products

This directive clearly stipulates the admission of biocides within the European Union in a tiered approach.
Each Voith Turbo supplier commits to entirely meet the specifications and obligations set for

- biocidal products
- treated products

if their product falls within the scope of this directive.

All substances, materials and components having been treated with biocidal effect need to meet the requirements set by the EU biocidal directive.

7.2.5 Global Automotive Declarable Substance List (GADSL)

The Global Automotive Declarable Substance List (GADSL) is a list of possibly used pure substances in automotive parts.
It is the outcome of the long lasting global aspiration of representatives of the automobile industry to simplify communication and the exchange of information with regard to the use of certain chemical pure substances in automotive parts.
The GADSL includes restrictions on hazardous substances as well as duties of declaration and serves as a tool for implementing further measures, e.g. for a later material utilization of end-of-life vehicles within the EU, including Directive 2000/53/EC on end-of-life vehicles.
It is maintained by the Global Automotive Stakeholder Group (GASG) and is published at least once a year in a revised edition (normally in February). The required tasks will be coordinated via three regional groups (America, Europe/Africa/Middle East and Asia-Pacific). Automobile manufacturers, component suppliers and raw material suppliers are represented in all three groups.

7.2.6 Railway Industry Substance List (RISL)

The Railway Industry Substance List (RISL) includes a comprehensive and precise survey of the prohibited and declarable chemicals and substances in the railway industry. The overall aim of this list is to obtain the suppliers' and sub-suppliers' information on materials and substances which are prohibited or regulated by European or international laws. The list defines and categorizes substances and also provides information on the scopes of application in which bans or restrictions need to be observed.

7.2.7 Hong Kong Convention (HKC)

The Hong Kong Convention („Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009“, abbreviated HKC) constitutes an agreement for worldwide improvements with regard to environmentally-friendly recycling of ships and for the working conditions in wrecking shipyards and/or the wrecking industry.

Key demands of the Hong Kong Convention are:

- Inventory of Hazardous Materials (IHM) with different approaches for new and existing ships,

- IHM certificate (International Certificate on Inventory of Hazardous Materials, ICIHM) issued by the flag state of the respective ship; valid for a maximum period of 5 years.

We demand from all material and product/article suppliers the declaration of the substances affected by the convention.

7.3 Declarable substances

Certain substances are subject to the duty of declaration. Use of these substances in products has not yet been regulated. Legal stipulations and/or customer requirements demand that the suppliers provide information to the customer on the use of these substances in their product/article.

7.3.1 SVHC Candidate list

List of substances of very high concern coming into consideration for authorization.
A member state, upon request the European Commission or the ECHA may suggest a substance for identification as SVHC. If the substance gets identified as SVHC, it will be placed on the list of eligible substances (also referred to as "candidate list"), which contains those substances eligible for adoption into the list of substances liable to registration (Annex XIV).

According to Article 33 of the REACH regulation, each supplier commits to the following:

(1) Every supplier of a product/article meeting the criteria of Article 57 and containing a substance in a concentration higher than 0.1% weight by weight (w/w) determined by Article 59, paragraph 1, shall submit to the buyer of the product/article the information available to him and sufficient for the safe use of the product/article, however state at least the name of the relevant substance.

This applies to substances of very high concern (SVHC) in

- components
- spare parts
- attachments
- accessories
- packaging

If an article delivered to Voith Turbo contains a SVHC as per the current SVHC candidate list according to the REACH regulation in a concentration exceeding 0.1 weight per cent, the supplier shall be required to immediately submit this information.

This shall also apply if any such substance gets included into the candidate list during the ongoing supply relationship.

7.3.2 Conflict Minerals (CM)

Conflict resources are natural resources whose systematic exploitation and trade may result, in the context of a conflict, in most serious violations of human rights, violations of the international humanitarian law or the realization of facts based on international criminal law. The conflict regions where the control of resources constitutes a core element particularly include the Democratic Republic of the Congo as well as the neighboring countries Rwanda, Angola, Zambia, Uganda, Burundi and the Central African Republic.

Special focus is placed on the following ores

- gold ore
- cassiterite
- coltan
- wolframite

of which the following four metals

- gold
- tin
- tantalum
- tungsten

are made.

Colloquially, these metals are referred to as "**3TG**", a term derived from the English words **T**antalum, **T**in, **T**ungsten, **G**old.

Further information will be provided under the following links:
https://www.sec.gov/News/Article/Detail/Article/1365171562058

8 Annex

8.1 **Annex 1: ELV exemptions** (status: 2016-01)

For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

Materials and components	Field of application and time limits of the exemption
Lead as part of an alloy	
1a. Steel for machining purposes and as individually packaged goods and hot-dip galvanized steel components with a lead content of up to 0.35 weight per cent	
1b. Continuously galvanized steel plate with a lead content of up to 0.35 weight per cent	Vehicles type-approved before January 1st, 2016 and spare parts for these vehicles
2a. Aluminum for machining purposes with a lead content of up to 2 weight per cent	As spare parts for vehicles put on the market before July 1st, 2005
2b. Aluminum with a lead content of up to 1.5 weight per cent	As spare parts for vehicles put on the market before July 1st, 2008
2c. Aluminum with a lead content of up to 0.4 weight per cent	(1)
3. Copper alloy with a lead content of up to 4 weight per cent	(1)
4a. Bearing shells and bushes	As spare parts for vehicles put on the market before July 1st, 2008
4b. Bearing shells and bushes in engines, gearboxes and compressors for air conditioning systems	As spare parts for vehicles put on the market before July 1st, 2011
Lead and lead compounds in components	
5. Batteries	(1)
6. Vibration dampers	Vehicles type-approved before January 1st, 2016 and spare parts for these vehicles
7a. Vulcanizing agents and stabilizers for elastomers in brake and fuel hoses, vent hoses, in parts of vehicle chassis and engine blocks which contain elastomer/metal	As spare parts for vehicles put on the market before July 1st, 2005
7b. Vulcanizing agents and stabilizers for elastomers in brake and fuel hoses, vent hoses, in parts of vehicle chassis and engine blocks which contain elastomer/metal with a lead content of up to 0.5 weight per cent	As spare parts for vehicles put on the market before July 1st, 2006
7c. Binding agents for elastomers in power transmission applications with a lead content of up to 0.5 weight per cent	As spare parts for vehicles put on the market before July 1st, 2009

Materials and components	Field of application and time limits of the exemption
8a. Lead in soldering agents for fixing electric and electronic components on electronic conductor plates and lead in platings of connections of components other than aluminum-electrolyte capacitors, on component connector pins and on electronic conductor plates	Vehicles type-approved before January 1st, 2016 and spare parts for these vehicles
8b. Lead in soldering agents in electrical applications other than on electronic conductor plates or on glass	Vehicles type-approved before January 1st, 2011 and spare parts for these vehicles
8c. Lead in the plating of connections of aluminum-electrolyte capacitors	Vehicles type-approved before January 1st, 2013 and spare parts for these vehicles
8d. Lead in soldering agents for soldering on glass in air mass flow meters	Vehicles type-approved before January 1st, 2015 and spare parts for these vehicles
8e. Lead in high-melting solders (i.e. solder alloys on lead basis with a lead content of at least 85 weight per cent	(2)
8f. a) Lead in press-in connectors (e.g. compliant-pin technology)	Vehicles type-approved before January 1st, 2017 and spare parts for these vehicles
8f. b) Lead in press-in connectors (e.g. compliant-pin technology) except for the connecting area of the vehicle cable harness plug-in connector	(2)
8g. Lead in soldering agents for generating a stable electrical connection between the semi-conductor chip and the carrier in integrated flip-chip assemblies	(2)
8h. Lead in soldering agents for fixing heat distributors on cooling bodies in semiconductor modules with a chip size of at least 1 cm^2 projection surface and a nominal current density of at least 1 A/mm^2 silicone chip surface	Vehicles type-approved before January 1st, 2016 and spare parts for these vehicles
I8 Lead in soldering agents in electrical applications on glass, except for soldering in laminated glass	Vehicles type-approved before January 1st, 2016 and spare parts for these vehicles
8j. Lead in soldering agents for soldering laminated glass	Vehicles type-approved before January 1st, 2020 and spare parts for these vehicles
9. Valve seats	As spare parts for engine types developed before July 1st, 2003

Materials and components	Field of application and time limits of the exemption
10a. Electric and electronic components containing lead bound in glass or ceramics, in a glass or ceramics matrix, in glass ceramics material or in a glass ceramics matrix This exemption does not comprise the use of lead in	
— glass in light bulbs and the glaze of ignition plugs — dielectric ceramic materials of components stated under 10b, 10c and 10d.	
10b. Lead in dielectric ceramic materials based on PZT in capacitors which form part of integrated switching circuits or discrete semiconductors	
10c. Lead in dielectric ceramic materials in capacitors for a nominal voltage of less than 125 V AC or 250 V DC	Vehicles type-approved before January 1st, 2016 and spare parts for these vehicles
10d. Lead in dielectric ceramic materials in capacitors which balance temperature-related deviations of sensors of ultrasonic sound systems	Vehicles type-approved before January 1st, 2017 and spare parts for these vehicles
11. Pyrotechnical tripping units	Vehicles type-approved before July 1st, 2006 and spare parts for these vehicles
12. Lead-containing thermoelectric materials in electric vehicle applications for the reduction of CO_2 emissions due to exhaust gas heat recovery	Vehicles type-approved before January 1st, 2019 and spare parts for these vehicles
14. As anticorrosive agent of the carbon steel cooling system in absorption refrigerators in motor homes up to a content of 0.75 weight per cent in the cooling medium, unless other cooling technologies can be used (i.e. are available in the market for use in motor homes), which do not have any negative impacts on the environment, the health and/or the safety of consumers	
Mercury	
15a. Discharge lamps for headlights	Vehicles type-approved before July 1st, 2012 and spare parts for these vehicles
15b. Fluorescent tubes used in dashboard displays	Vehicles type-approved before July 1st, 2012 and spare parts for these vehicles

Cadmium	
16. Batteries for electric vehicles	As spare parts for vehicles put on the market before December 31st, 2008
([1]) This exemption will be verified in 2015.	
([2]) This exemption will be verified in 2019.	
([3]) Removal if an average threshold value of 60 gram per vehicle has been exceeded in conjunction with entry 10a. Electronic devices which will not be installed by the manufacturer on production are exempted from the application of this clause.	
([3]) Removal if an average threshold value of 60 gram per vehicle has been exceeded in conjunction with entries 8a to 8j. Electronic devices which will not be installed by the manufacturer on production are exempted from the application of this clause.	

8.2 Annex 2: RoHS exemptions (status 2016-01)

For information only; with regard to decisions, always use the currently applicable table of the corresponding regulation/directive.

Applications exempted from the restriction of Article 4, paragraph 1

Exemption		Range of application and validity data
1.	Mercury in single-ended (compact) fluorescent lamps which do not exceed the following values (per lighting unit):	
1a.	For general lighting purposes < 30 W: 5 mg	Expired on December 31st, 2011; after December 31st, 2011, 3.5 mg per lighting unit were allowed to be used until December 31st, 2012; after December 31st, 2012, 2.5 mg per lighting unit may be used.
1b.	For general lighting purposes ≥ 30 W and < 50 W: 5 mg	Expired on December 31st, 2011; after December 31st, 2011, 3.5 mg per lighting unit may be used.
1c.	For general lighting purposes ≥ 50 W and < 150 W: 5 mg	
1d.	For general lighting purposes ≥ 150 W: 15 mg	
1e.	For general lighting purposes with round or square shapes and a tube diameter of ≤ 17 mm	Unlimited use until December 31st, 2011; after December 31st, 2011, 7 mg per lighting unit may be used.
1f.	For particular purposes: 5 mg	
1g.	For general lighting purposes < 30 W with a service life of 20,000 hours or longer: 3.5 mg	Expires on December 31st, 2017.
2a.	Mercury in double-ended linear fluorescent lamps for general lighting purposes which do not exceed the following values (per lamp):	
2a. I	Triphosphor lamps with a normal service life and a tube diameter of < 9 mm (e.g. T2): 5 mg	Expired on December 31st, 2011; after December 31st, 2011, 4 mg per lamp may be used.
2a. II	Triphosphor lamps with a normal service life and a tube diameter of ≥ 9 mm and ≤ 17 mm (e.g. T5): 5 mg	Expired on December 31st, 2011; after December 31st, 2011, 3 mg per lamp may be used.
2a. III	Triphosphor lamps with a normal service life and a tube diameter of > 17 mm and ≤ 28 mm (e.g. T8): 5 mg	Expired on December 31st, 2011; after December 31st, 2011, 3.5 mg per lamp may be used.
2a. IV	Triphosphor lamps with a normal service life and a tube diameter of > 28 mm (e.g. T12): 5 mg	Expired on December 31st, 2012; after December 31st, 2012, 3.5 mg per lamp may be used.

Exemption		Range of application and validity data
2a. V	Triphosphor lamps with a long service life (≥ 25,000 hours): 8 mg	Expired on December 31st, 2011; after December 31st, 2011, 5 mg per lamp may be used.
2b.	Mercury in other fluorescent lamps which do not exceed the following values (per lamp):	
2b. I	Linear halophosphate lamps with a tube diameter of > 28 mm (e.g. T10 and T12): 10 mg	Invalid since April 13th, 2012.
2b. II	Non-linear halophosphate lamps (all diameters): 15 mg	Invalid since April 13th, 2016.
2b. III	Non-linear triphosphor lamps with a tube diameter of > 17 mm (e.g. T9)	Unlimited use until December 31st, 2011; after December 31st, 2011, 15 mg per lamp may be used.
2b. IV	Lamps for other general lighting purposes and for special applications (e.g. induction lamps)	Unlimited use until December 31st, 2011; after December 31st, 2011, 15 mg per lamp may be used.
3.	Mercury in CCFL (cold cathode fluorescent lamps) and EEFL lamps (external electrode fluorescent lamps) for special applications which do not exceed the following values (per lamp):	
3a.	Short lamps (≤ 500 mm)	Unlimited use until December 31st, 2011; after December 31st, 2011, 3.5 mg per lamp may be used.
3b.	Medium lamps (> 500 mm and ≤ 1 500 mm)	Unlimited use until December 31st, 2011; after December 31st, 2011, 5 mg per lamp may be used.
3c.	Long lamps (> 1,500 mm)	Unlimited use until December 31st, 2011; after December 31st, 2011, 13 mg per lamp may be used.
4a.	Mercury in other low-pressure discharge lamps (per lamp)	Unlimited use until December 31st, 2011; after December 31st, 2011, 15 mg per lamp may be used.
4b.	Mercury in high-pressure sodium (-vapor) lamps for general lighting purposes, which, for lamps with improved color rendering index Ra > 60, do not exceed the following values (per lighting unit):	
4b. I	P ≤ 155 W	Unlimited use until December 31st, 2011; after December 31st, 2011, 30 mg per lighting unit may be used.

Exemption		Range of application and validity data
4b. I	P ≤ 155 W	Unlimited use until December 31st, 2011; after December 31st, 2011, 30 mg per lighting unit may be used.
4b. II	155 W < P ≤ 405 W	Unlimited use until December 31st, 2011; after December 31st, 2011, 40 mg per lighting unit may be used.
4b. III	P > 405 W	Unlimited use until December 31st, 2011; after December 31st, 2011, 40 mg per lighting unit may be used.
4c.	Mercury in other high-pressure sodium (-vapor) lamps for general lighting purposes, which do not exceed the following values (per lighting unit):	
4c. I	P ≤ 155 W	Unlimited use until December 31st, 2011; after December 31st, 2011, 25 mg per lighting unit may be used.
4c. II	155 W < P ≤ 405 W	Unlimited use until December 31st, 2011; after December 31st, 2011, 30 mg per lighting unit may be used.
4c. III	P > 405 W	Unlimited use until December 31st, 2011; after December 31st, 2011, 40 mg per lighting unit may be used.
4d.	Mercury in high-pressure mercury (-vapor) lamps (HPMV)	Invalid since April 13th, 2015.
4e.	Mercury in metal-halide lamps (MH)	
4f.	Mercury in other discharge lamps for special applications which are not separately listed in this Annex.	
4g.	Mercury in handmade fluorescent discharge tubes for use in displays, decoration, architectural and special lighting applications as well as in light arts with the mercury content not exceeding the following quantities: a) 20 mg per electrode pair + 0,3 mg per cm tube length, however not more than 80 mg, for outdoor applications as well as for indoor applications at temperatures below 20 °C; b) 15 mg per electrode pair + 0.24 mg per cm tube length, however not more than 80 mg, for all other indoor applications.	Expires on December 31st, 2018.

Exemption		Range of application and validity data
5a.	Lead in the glass of cathode-ray tubes	
5b.	Lead in the glass of fluorescent tubes with a mass fraction of 0.2% lead at the most	
6a.	Lead as alloy element in steel for machining purposes and in galvanized steel with a mass fraction of 0.35% lead at the most	
6b.	Lead as alloy element in aluminum with a mass fraction of 0.4% lead at the most	
6c.	Copper alloy with a mass fraction of up to 4 % lead	
7a.	Lead in high-melting solders (i.e. solder alloys on lead basis with a mass fraction of at least 85 % lead)	
7b.	Lead in solders for servers, storage systems and storage arrays as well as for network infra-structure equipment for switching, signaling, transmission and for network management for telecommunications	
7c. I	Electric and electronic components containing lead and used in glass or ceramic material, except for dielectric ceramics in capacitors, e.g. piezoelectronic devices or in a glass or ceramic matrix compound	
7c. II	Lead in dielectric ceramics in capacitors for a nominal voltage of 125 V AC or 250 V DC or above	
7c. III	Lead in dielectric ceramics in capacitors for a nominal voltage of less than 125 V AC or 250 V DC	Invalid since Januar 1st, 2013. Afterwards use permitted in spare parts for electric and electronic devices placed on the market before January 1st, 2013.
7c. IV	Lead in dielectric ceramic materials based on PZT for capacitors which form part of integrated switching circuits or discrete semiconductors	Invalid since July 21st, 2016.
8a.	Cadmium and cadmium compounds in thermal fuses type "one shot pellet"	Invalid since January 1st, 2012. Afterwards use permitted in spare parts for electric and electronic devices placed on the market before January 1st, 2012.
8b.	Cadmium and cadmium compounds in electric contacts	

Exemption		Range of application and validity data
9.	Hexavalent chrome als anticorrosive agent of the carbon steel cooling system in absorption refrigerators up to a mass fraction of 0.75 % in the cooling solution	May be used in spare parts for electric and electronic devices placed on the marked before September 24, 2010.
9b.	Lead in bearing shells and bushes for compressors containing cooling agents used for heating, ventilation, air conditioning and refrigeration(HVACR)	Invalid since January 1st, 2013. Afterwards use permitted in spare parts for electric and electronic devices placed on the market before January 1st, 2013.
12.	Lead as plating material for a heat-conducting C-ring module	May be used in spare parts for electric and electronic devices placed on the marked before September 24, 2010.
13a.	Lead in white glass for optical applications	
13b.	Cadmium and lead in filter glass and glass for reflectance standard	
14.	Lead in solders consisting of more than two elements for connection between connecting pins and micro processor assembly with a mass fraction of more than 80 % and less than 85 % lead	Expired on January 1st, 2011. Afterwards use permitted in spare parts for electric and electronic devices placed on the market before January 1st, 2011.
15.	Lead in solders for generating a stable electrical connection between the semiconductor chip and the circuit carrier in integrated flip-chip assemblies	
16.	Lead in linear incandescent lamps with fused-in inner coating of the bulb	Invalid since September 1st, 2013.
17.	Lead halides as radiant agent in high-intensity gas discharge lamps (HID) used for profes-sional reprography applications	

Exemption		Range of application and validity data
18a.	Lead as activator in the fluorescent powder (1% lead by weight or less) of gas discharge lamps when used as special lamps for reprography on the basis of diazo copying, lithography, insect traps, photochemical and exposure processes with fluorescent materials such as magnesium silicate ($(Sr,Ba)_2MgSi_2O_7$:Pb)	Invalid since January 1st, 2011.
18b.	Lead as activator in the fluorescent powder (1% lead by weight or less) of gas discharge lamps when used as tanning lamps with fluorescent materials such as barium silicate ($BaSi_2O_5$:Pb)	
19.	Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact energy saving lamps	Invalid since June 1st 2011.
20.	Lead oxide in glass solders for connecting the front and rear glass pane of flat fluorescent lamps for liquid crystal displays (LCD)	Invalid since June 1st, 2011.
21.	Lead and cadmium in printing inks for applying e-mails on glass such as borosilicate glass and soda-lime glass	
23.	Lead used in the plating of fine-pitch components - other than plug-in connectors - with a pitch of 0.65 mm or less	May be used in spare parts for electric and electronic devices placed on the marked before September 24, 2010.
24.	Lead in solders for discoidal and planar array multi-layer ceramic capacitors with plated through-holes	
25.	Lead oxide in structural elements of SED displays (surface conduction electron emitter displays (SED), particularly in the glass frit for fastening (seal frit) and the glass frit ring	
26.	Lead oxide in the glass envelope of BLB lamps (Black Light Blue lamps)	Invalid since June 1st 2011.
27.	Lead alloys as solders for converters in high-performance loudspeakers (for operation of several hours at a sound pressure level of 125 dB/SPL and above)	Invalid since September 24th, 2010.
29.	Bound lead in crystal glass as defined in Annex I (Cristal glass categories 1, 2, 3 and 4) of Council Directive 69/493/EEC (1)	

Exemption		Range of application and validity data
30.	Cadmium alloys as electric/mechanic soldering agents for electric conductors which are used directly on the voice coil in converters in high-performance loudspeakers with a sound pressure level of 100 dB (A) and above	
31.	Lead in soldering agents in mercury-free flat fluorescent lamps (e.g. for liquid crystal displays, design or industry lighting)	
32.	Lead oxides in glass frits for fastening glass panes for argon and krypton laser tubes	
33.	Lead in solders for soldering thin copper wires with a maximum diameter of 100 µm in power transformers	
34.	Lead in trimpots on cermet basis	
36.	Mercury as inhibitor for avoiding cathode sputtering on DC-plasma displays with a content of up to 30 mg per display	Invalid since July 1st, 2010.
37.	Lead in the plating layer of high voltage diodes on the basis of a zinc borate glass body	
38.	Cadmium and cadmium oxide in thick film pastes used on aluminum-bonded beryllium oxide	
39.	Cadmium in color-converting II-VI-based LEDs (< 10 µg Cd per mm^2 light emitting area) for use in semiconductor lighting or display systems	Invalid since July 1st, 2014.
40	Cadmium in photo-resistors for analogous opto-couplers applied in professional audio equipment	Invalid since December 31st, 2013.
41	Lead in solders and connection platings of electric and electronic components and platings of printed circuit boards for use in ignition modules and other electric and electronic engine control systems, which, for technical reasons, need to be attached directly on or in the crankcase or on the cylinder of hand-guided combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council (2)	Expires on December 31st, 2018.

([1]) ABl. L 326 dated 1969-12-29, p. 36

([2]) Directive 97/68/EC of the European Parliament and of the Council dated December 16, 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from combustion engines to be installed in non-road mobile machinery (ABI. L 59 dated 1998-2-27, p. 1).