

## 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

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## 1 Field of Application

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 J.M. Voith SE & Co. KG | VTA with all branches and locations, and any undertakings having separate legal personality which belong to or are connected with the Voith Group of Companies | Division Turbo, with the exception of the US companies.

It is recommended to US companies to prepare conforming guidelines.

## 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 regulation 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  $\geq 0.1$  % 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. Characteristic for each chemical compound is the unique chemical and physical structure.

*Examples for chemical compounds*

organically: water, formaldehyde, ethanol

metally: 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](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](http://www.gadsl.org)

### **Hong Kong Convention (HKC)**

For more information, please visit the internet page of International 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.

Restriction under REACH means that a substance is no longer permitted for a use or in a product or mixture. Such restrictions are listed in Annex XVII of the REACH Regulation.

Lead and its compounds are taken as example: "Lead and its compounds shall not be placed on the market or used in one single part of a jewelry article if the lead content (in metal) of the respective part is equal to or greater than 0.05 % by weight" (REACH Regulation, Annex XVII, entry 63).

This restriction serves as possibility to control an inappropriate risk posed by a substance.

## 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 1: 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 2: 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 3: 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 regulations 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 %
<b>Extension from 2019-07-22</b>	
Bis(2-ethylhexyl) phthalate (DEHP)	0.10 %
Butyl benzyl phthalate (BBP)	0.10 %
Dibutyl phthalate (DBP)	0.10 %
Diisobutyl phthalate (DIBP)	0.10 %

Table 4: Substance regulations of the RoHS Directives

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

## Delegated Directive 2015/863/EU – RoHS 2, Annex II

COMMISSION delegated Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances.

This directive extends Annex II by four more substances. See Table 4, extension from 22 July 2019.

## 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	Restrictions of use
Mercury and mercury compounds	0.0005 %	Battery
		Button cell
Cadmium and cadmium compounds	0.002 %	Battery

Table 5: 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 Biocides Regulation.

## 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.

Voith Turbo demands 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

Candidate list of substances of very high concern.

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 % by weight, 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 Tantalum, Tin, Tungsten, **G**old.

Further information will be provided under the following links:

<https://www.sec.gov/News/Article/Detail/Article/1365171562058>

By taking appropriate measures in their organization and relative to the own supply chain, Voith Turbo has undertaken to see to it that so-called conflict minerals in terms of Sections 1502 and 1504 of the US American Dodd-Frank-Act are not contained in any Voith products/articles.

Voith Turbo demands from suppliers information on conflict minerals contained in the supplied products/articles. In this respect, the supplier shall use the standard reporting template for conflict minerals (CMRT- Conflict Minerals Reporting Template) of the Responsible Minerals Initiative (RMI), former "Conflict Free Sourcing Initiative".

The CRMT is provided for downloading by RMI under

[www.responsiblemineralsinitiative.org/conflict-minerals-reporting-template](http://www.responsiblemineralsinitiative.org/conflict-minerals-reporting-template).

Voith Turbo demands from their suppliers the submission of the filled-in CMRT template via the iPoint Conflict Minerals Platform (iPCMP).

For information on handling the iPCMP, please visit [www.conflict-minerals.com](http://www.conflict-minerals.com)

Voith Turbo demands from their suppliers to ensure that the supply chain only contains smelteries which participate actively in the "Responsible Minerals Assurance Process" (RMAP) within the "Responsible Minerals Initiative".



## 8 Annex

### 8.1 Annex 1: ELV exemptions (status: 2018-05)

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 expiry date of the exemption
<b>Lead as part of an alloy</b>	
1a. Steel for machining purposes and as individually packaged goods, hot-dip galvanized steel components with a lead content of up to 0.35 % by weight	
1b. Continuously galvanized steel sheet containing up to 0.35 % lead by weight	Vehicles type-approved before January 1, 2016 and spare parts for these vehicles
2a. Aluminum for machining purposes with a lead content of up to 2 % by weight	As spare parts for vehicles put on the market before July 1, 2005
2b. Aluminum with a lead content of up to 1.5 % by weight	As spare parts for vehicles put on the market before July 1, 2008
2c. i) Aluminum alloys for machining purposes with a lead content of up to 0.4 % by weight	( <sup>1</sup> )
2c. ii) Aluminum alloys not included in entry 2c. i) with a lead content of up to 0.4 % by weight ( 1a )	( <sup>2</sup> )
3. Copper alloys containing up to 4 % lead by weight	( <sup>1</sup> )
4a. Bearing shells and bushes	As spare parts for vehicles put on the market before July 1, 2008
4b. Bearing shells and bushes in engines, transmissions and air conditioning compressors	As spare parts for vehicles put on the market before July 1, 2011
<b>Lead and lead compounds in components</b>	
5a. Lead in batteries in high-voltage systems ( 2a) that are used only for propulsion in M1 and N1 vehicles	Vehicles type-approved before January 1, 2019 and spare parts for these vehicles
5b. Lead in batteries for battery applications not included in entry 5a	( <sup>2</sup> )
6. Vibration dampers	Vehicles type-approved before January 1, 2016 and spare parts for these vehicles
7a. Vulcanizing agents and stabilizers for elastomers in brake hoses, fuel hoses, air ventilation hoses, elastomer/metal-containing parts in the chassis applications, and engine mountings	As spare parts for vehicles put on the market before July 1, 2005

Materials and components	Field of application and expiry date of the exemption
7b. Vulcanizing agents and stabilizers for elastomers in brake hoses, fuel hoses, air ventilation hoses, elastomer/metal parts in the chassis applications, and engine mountings containing up to 0.5 % lead by weight	As spare parts for vehicles put on the market before July 1, 2006
7c. Bonding agents for elastomers in power train applications containing up to 0.5 % lead by weight	As spare parts for vehicles put on the market before July 1, 2009
8a. Lead in solders to attach electrical and electronic components to electronic circuit boards and lead in finishes on terminations of components other than electrolyte aluminum capacitors, on component pins or on electronic circuit boards	Vehicles type-approved before January 1, 2016 and spare parts for these vehicles
8b. Lead in solders in electrical applications other than soldering on electronic circuit boards or on glass	Vehicles type-approved before January 1, 2011 and spare parts for these vehicles
8c. Lead in finished on terminals of electrolyte aluminum capacitors	Vehicles type-approved before January 1, 2013 and spare parts for these vehicles
8d. Lead used in soldering on glass in mass airflow sensors	Vehicles type-approved before January 1, 2015 and spare parts for these vehicles
8e. Lead in high-melting temperature type solders (i.e. lead-based alloys containing 85 % lead by weight or more)	<u>(3)</u>
8f. a) Lead in compliant pin connector systems (e.g. compliant-pin technology)	Vehicles type-approved before January 1, 2017 and spare parts for these vehicles
8f. b) Lead in compliant pin connector systems other than the mating area of vehicle harness connectors	<u>(3)</u>
8g. Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages	<u>(3)</u>
8h. Lead in solders to attach heat spreaders to the heat sink in power semiconductor assemblies with a chip size of at least 1 cm <sup>2</sup> of projection area and a nominal current density of at least 1 A/mm <sup>2</sup> silicon chip area	Vehicles type-approved before January 1, 2016 and spare parts for these vehicles
18 Lead in solders in electrical glazing applications on glass except for soldering in laminated glazing	Vehicles type-approved before January 1, 2016 and spare parts for these vehicles

Materials and components	Field of application and expiry date of the exemption
8j. Lead in solders for soldering of laminated glazing	Vehicles type-approved before January 1, 2020 and spare parts for these vehicles
9. Valve seats	As spare parts for engine types developed before July 1, 2003
<p>10a. Electrical and electronic components which contain lead in a glass or ceramic, in a glass or ceramic matrix compound, in a glass-ceramic material, or in a glass-ceramic matrix compound.</p> <p>This exemption does not cover the use of lead in:</p> <ul style="list-style-type: none"> <li>— glass in bulbs and glaze of spark plugs,</li> <li>— dielectric ceramic materials of components listed under 10b, 10c and 10d.</li> </ul> <p>10b. Lead in PZT-based dielectric ceramic materials of capacitors being part of integrated circuits or discrete semiconductors.</p>	
10c. Lead in dielectric ceramic materials of capacitors with a rated voltage of less than 125 V AC or 250 V DC	Vehicles type-approved before January 1, 2016 and spare parts for these vehicles
10d. Lead in dielectric ceramic materials of capacitors compensating the temperature-related deviations of sensors in ultrasonic sonar systems	Vehicles type-approved before January 1, 2017 and spare parts for these vehicles
11. Pyrotechnic initiators	Vehicles type-approved before July 1, 2006 and spare parts for these vehicles
12. Lead-containing thermoelectric materials in automotive electrical applications to reduce CO2 emissions by recuperation of exhaust heat	Vehicles type-approved before January 1, 2019 and spare parts for these vehicles

Materials and components	Field of application and expiry date of the exemption
<b>Hexavalent chromium</b>	
13a. Corrosion preventive coatings	As spare parts for vehicles put on the market before July 1, 2007
13b. Corrosion preventive coatings related to bolt and nut assemblies for chassis applications	As spare parts for vehicles put on the market before July 1, 2008
14. As an anti-corrosive agent of the carbon steel cooling system in absorption refrigerators in motor caravans up to 0.75 % by weight in the cooling system except where the use of other cooling technologies is practicable (i.e. available on the market for the application in motor caravans) and does not lead to negative environmental, health and/or consumer safety impacts	
<b>Mercury</b>	
15a. Discharge lamps for headlight application	Vehicles type-approved before July 1, 2012 and spare parts for these vehicles
15b. Fluorescent tubes used in instrument panel displays	Vehicles type-approved before July 1, 2012 and spare parts for these vehicles
<b>Cadmium</b>	
16. Batteries for electrical vehicles	As spare parts for vehicles put on the market before December 31, 2008

(1) This exemption shall be reviewed in 2015.

(2) This exemption shall be reviewed in 2019.

(3) Dismantling if, in correlation with entry 10a, an average threshold of 60 grams per vehicle is exceeded. For the application of this clause, electronic devices not installed by the manufacturer on the production line shall not be taken into account.

(4) Dismantling if, in correlation with entries 8a to 8j, an average threshold of 60 grams per vehicle is exceeded. For the application of this clause, electronic devices not installed by the manufacturer on the production line shall not be taken into account.

## 8.2 Annex 2: RoHS exemptions (status 2019-07)

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

Applications exempted from the restriction in Article 4, paragraph 1

Exemption		Scope and dates of applicability
1.	Mercury in single-capped (compact) fluorescent lamps not exceeding (per burner):	
1a.	For general lighting purposes < 30 W: 5 mg	Expires on December 31, 2011; 3.5 mg may be used per burner after December 31, 2012 until December 31, 2012; 2.5 mg shall be used per burner after December 31, 2012.
1b.	For general lighting purposes ≥ 30 W and < 50 W: 5 mg	Expires on December 31, 2011; 3.5 mg may be used per burner after December 31, 2011.
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 circular or square structural shapes and tube diameter ≤ 17 mm	No limitation of use until December 31, 2011; 7 mg may be used per burner after December 31, 2011.
1f.	For particular purposes: 5 mg	
1g.	For general lighting purposes < 30 W with a lifetime equal to or above 20,000 hours: 3.5 mg	Expires on December 31, 2017.
2a.	Mercury in double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp):	
2a. I	Tri-band phosphor with normal lifetime and a tube diameter < 9 mm (e.g. T2): 5 mg	Expires on December 31, 2011; 4 mg may be used per lamp after December 31, 2011.
2a. II	Tri-band phosphor with normal lifetime and a tube diameter of ≥ 9 mm and ≤ 17 mm (e.g. T5): 5 mg	Expires on December 31, 2011; 3 mg may be used per lamp after December 31, 2011.
2a. III	Tri-band phosphor with normal lifetime and a tube diameter of > 17 mm and ≤ 28 mm (e.g. T8): 5 mg	Expires on December 31 2011; 3.5 mg may be used per lamp after December 31, 2011.
2a. IV	Tri-band phosphor with a normal service life and a tube diameter of > 28 mm (e.g. T12): 5 mg	Expires on December 31, 2012; 3.5 mg may be used per lamp after December 31, 2012.
2a. V	Tri-band phosphor with long lifetime (≥ 25,000 hours): 8 mg	Expires on December 31, 2011; 5 mg may be used per lamp after December 31, 2011.

Exemption		Scope and dates of applicability
2b.	Mercury in other fluorescent lamps not exceeding (per lamp):	
2b. I	Linear halophosphate lamps with tube diameter > 28 mm (e.g. T10 and T12): 10 mg	Expires on April 13, 2012.
2b. II	Non-linear halophosphate lamps (all diameters): 15 mg	Expires on April 13, 2016.
2b. III	Non-linear tri-band phosphor lamps with tube diameter > 17 mm (e.g. T9)	No limitation of use until December 31, 2011; 15 mg may be used per lamp after December 31, 2011.
2b. IV	Lamps for other general lighting and special purposes (e.g. induction lamps)	No limitation of use until December 31, 2011; 15 mg may be used per lamp after December 31, 2011.
3.	Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp):	
3a.	Short length ( $\leq 500$ mm)	No limitation of use until December 31, 2011; 3.5 mg may be used per lamp after December 31, 2011.
3b.	Medium length (> 500 mm and $\leq 1\ 500$ mm)	No limitation of use until December 31, 2011; 5 mg may be used per lamp after December 31, 2011.
3c.	Long length (> 1 500 mm)	No limitation of use until December 31, 2011; 13 mg may be used per lamp after December 31, 2011.
4a.	Mercury in other low-pressure discharge lamps (per lamp)	No limitation of use until December 31, 2011; 15 mg may be used per lamp after December 31, 2011.
4b.	Mercury in high-pressure sodium (vapor) lamps for general lighting purposes not exceeding (per burner) in lamps with improved color rendering index $R_a > 60$ :	

Exemption		Scope and dates of applicability
4b. I	$P \leq 155 \text{ W}$	No limitation of use until December 31, 2011; 30 mg may be used per burner after December 31, 2011.
4b. II	$155 \text{ W} < P \leq 405 \text{ W}$	No limitation of use until December 31, 2011; 40 mg may be used per burner after December 31, 2011.
4b. III	$P > 405 \text{ W}$	No limitation of use until December 31, 2011; 40 mg may be used per burner after December 31, 2011.
4c.	Mercury in other high-pressure sodium (vapor) lamps for general lighting purposes not exceeding (per burner):	
4c. I	$P \leq 155 \text{ W}$	No limitation of use until December 31, 2011; 25 mg may be used per burner after December 31, 2011.
4c. II	$155 \text{ W} < P \leq 405 \text{ W}$	No limitation of use until December 31, 2011; 30 mg may be used per burner after December 31, 2011.
4c. III	$P > 405 \text{ W}$	No limitation of use until December 31, 2011; 40 mg may be used per burner after December 31, 2011.
4d.	Mercury in high-pressure mercury (vapor) lamps (HPMV)	Expires on April 13, 2015.
4e.	Mercury in metal-halide lamps (MH)	
4f.	Mercury in other discharge lamps for special applications not specifically mentioned in this Annex.	
4g.	Mercury in hand-crafted luminous discharge tubes used for signs, decorative or architectural and specialist lighting and light-artwork, where the mercury content shall be limited as follows: a) 20 mg per electrode pair + 0.3 mg per tube length in cm, but not more than 80 mg, for outdoor applications and indoor applications exposed to temperatures below 20 °C;	Expires on December 31, 2018.
4g	b) 15 mg per electrode pair + 0.24 mg per tube length in cm, but not more than 80 mg, for all other indoor applications.	Expires on December 31, 2018.

Exemption		Scope and dates of applicability
5a.	Lead in the glass of cathode-ray tubes	
5b.	Lead in the glass of fluorescent tubes not exceeding 0.2 % by weight	
6a.	Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35 % lead by weight	
6b.	Lead as an alloying element in aluminum containing up to 0.4 % lead by weight	
6b. I	Lead as an alloying element in steel for machining purposes containing up to 0.4 % lead by weight, provided it stems from lead-bearing aluminum scrap recycling	Expires on July 21, 2021 for categories 1 to 7 and 10.
6b. II	Lead as an alloying element in aluminum for machining purposes with a lead content up to 0.4 % by weight	Expires on May 18, 2021 for categories 1 to 7 and 10.
6c.	Copper alloy containing up to 4 % lead by weight	
7a.	Lead in high-melting temperature type solders (i.e. lead-based alloys containing 85 % lead by weight or more)	<p>Applies to categories 1 to 7 and 10 (except applications covered by point 24 of this Annex) and expires on July 21, 2021.</p> <p>For categories 8 and 9 other than <i>in vitro</i> diagnostic medical devices and industrial monitoring and control instruments expires on July 21, 2021.</p> <p>Expires on July 21, 2023 for category 8 <i>in vitro</i> diagnostic medical devices.</p> <p>Expires on July 21, 2024 for category 9 industrial monitoring and control instruments and for category 11.</p>
7b.	Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission, and network management for telecommunications	



Exemption		Scope and dates of applicability
7c. I	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices or in a glass or ceramic matrix compound	
7c. II	Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher	
7c. III	Lead in dielectric ceramic in capacitors for a rated voltage of less than 125 V AC or 250 V DC	Expires on January 1, 2013. After that date it may be used in spare parts for electrical and electronic equipment (EEE) placed on the market before January 1, 2013.
7c. IV	Lead in PZT dielectric ceramic materials for capacitors which are part of integrated circuits or discrete semiconductors	Expires on July 21, 2016.
8a.	Cadmium and its compounds in one shot pellet type thermal cut-offs	Expires on January 1, 2012. After that date, it may be used in spare parts for electrical and electronic equipment (EEE) placed on the market before January 1, 2012.
8b.	Cadmium and cadmium compounds in electrical contacts	
9.	Hexavalent chromium as an anticorrosive agent of the carbon steel cooling system in absorption refrigerators up to 0.75 % by weight in the cooling solution	
9b.	Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR)	
11a.	Lead used in "C-press" compliant pin connector systems	May be used in spare parts for electrical and electronic equipment (EEE) placed on the market before September 24, 2010.
11b.	Lead in other than "C-press" press-in connectors with flexible zone	Expires on January 1, 2013. After that date it may be used in spare parts for electrical and electronic equipment (EEE) placed on the market before January 1, 2013.

Exemption		Scope and dates of applicability
12.	Lead as a coating material for the thermal conduction module C-ring	May be used in spare parts for electrical and electronic equipment (EEE) placed on the market before September 24, 2010.
13a.	Lead in white glasses used for optical applications	Applies to all categories; expires on: <ul style="list-style-type: none"> <li>— July 21, 2023 for category 8 <i>in vitro</i> diagnostic medical devices;</li> <li>— July 21, 2024 for category 9 industrial monitoring and control instruments and for category 11;</li> <li>— July 21, 2021 for all other categories and subcategories.</li> </ul>
13b.	Cadmium and lead in filter glasses and glasses used for reflectance standards	Applies to categories 8, 9 and 11; expires on: <ul style="list-style-type: none"> <li>— July 21, 2023 for category 8 <i>in vitro</i> diagnostic medical devices;</li> <li>— July 21, 2024 for category 9 industrial monitoring and control instruments and for category 11;</li> <li>— July 21, 2021 for other subcategories and categories 8 and 9.</li> </ul>
13b. I	Lead in ion-colored optical filter glass types	Applies to categories 1 to 7 and 10; expires on July 21, 2021 for categories 1 to 7 and 10.
13b. II	Cadmium in striking optical filter glass types; excluding applications falling under point 39 of this Annex	
13b. III	Cadmium and lead in glazes for reflectance standards	
14.	Lead in solders consisting of more than two elements for the connection between connecting pins and the package of microprocessors with a lead content of more than 80 % and less than 85 % by weight	Expires on January 1, 2011. After that day it may be used in spare parts for EEE placed on the market before January 1, 2011.
15.	Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip-chip packages	
16.	Lead in linear incandescent lamps with silicate coated tubes	Expires on September 1, 2013.

Exemption		Scope and dates of applicability
17.	Lead halide as radiant agent in high-intensity discharge (HID) lamps used for professional reprography applications	
18a.	Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as speciality lamps for diazoprinting reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as magnesium silicate SMS ((Sr,Ba) <sub>2</sub> MgSi <sub>2</sub> O <sub>7</sub> :Pb)	Expires on January 1, 2011.
18b.	Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as barium silicate BSP (BaSi <sub>2</sub> O <sub>5</sub> :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 (ESL)	Expires on June 1, 2011.
20.	Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCDs)	Expires on June 1, 2011.
21.	Lead and cadmium in printing inks for the application of enamels on glasses such as borosilicate and soda-lime glasses	
23.	Lead in finishes of fine pitch components — other than connectors with a — pitch of 0.65 mm and less	May be used in spare parts for electrical and electronic equipment (EEE) placed on the market before September 24, 2010.
24.	Lead in solders for the soldering to machined through-hole discoidal and planar array ceramic multilayer capacitors	Expires on: — July 21, 2021 for categories 1-7 and 10, — July 21, 2021 for categories 8 and 9 other than <i>in vitro</i> diagnostic medical devices and industrial monitoring and control instruments, — July 21, 2023 for category 8 <i>in vitro</i> diagnostic medical devices; — July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11.

Exemption		Scope and dates of applicability
25.	Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring	
26.	Lead oxide in the glass envelope of black light blue lamps	Expires on June 1, 2011.
27.	Lead alloys as solder for transducers used in high-powered (designated to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers	Expired on September 24, 2010.
29.	<a href="#">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)</a>	
30.	Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more	
31.	Lead in soldering materials in mercury-free flat fluorescent lamps (which e.g. are used for liquid crystal displays, design or industrial lighting)	
32.	Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes	
33.	Lead in solders for the soldering of thin copper wires of 100 µm diameter and less in power transformers	
34.	Lead in cermet-based trimmer potentiometer elements	Applies to all categories; expires on: <ul style="list-style-type: none"> <li>— July 21, 2021 for categories 1-7 and 10,</li> <li>— July 21, 2021 for categories 8 and 9 other than <i>in vitro</i> diagnostic medical devices and industrial monitoring and control instruments,</li> <li>— July 21, 2023 for category 8 <i>in vitro</i> diagnostic medical devices;</li> <li>— July 21, 2024 for category 9 industrial monitoring and control instruments, and for category 11.</li> </ul>

Exemption		Scope and dates of applicability
36.	Mercury used as a cathode sputtering inhibitor in DC plasma displays with a content of up to 30 mg per display	Expired on July 1, 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 <sup>2</sup> light emitting area) for use in semiconductor lighting or display systems	Expires on July 1, 2014.
39a.	Cadmium selenide in downshifting cadmium-based semiconductor nanocrystal quantum dots for use in display lighting applications (< 0.2 µg Cd per mm <sup>2</sup> of display screen area)	Expires for all categories on October 31, 2019.
40	Cadmium in photoresistors for analogue opto-couplers applied in professional audio equipment	Expires on December 31, 2013.
41	Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which, for technical reasons, must be mounted directly on or in the crankcase or cylinder of hand-held 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 31, 2018.

Exemption		Scope and dates of applicability
42.	<p>Lead in bearings and bushes of diesel or gaseous fuel powered internal combustion engines applied in non-road professional use equipment:</p> <ul style="list-style-type: none"> <li>— with engine total displacement <math>\geq 15</math> liters or</li> <li>— with engine total displacement <math>&lt; 15</math> liters and the engine is designed to operate in applications where the time between signal to start and full load is required to be less than 10 seconds, or regular maintenance is typically performed in a harsh and dirty outdoor environment, such as mining, construction, and agriculture applications.</li> </ul>	<p>Applies to category 11, excluding applications covered by entry 6c of this Annex. Expires on July 21, 2024.</p>

(<sup>1</sup>) OJ L 326, 29.12.1969, p. 36

(<sup>2</sup>) Directive 97/68/EC of the European Parliament and of the Council of 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 internal combustion engines to be installed in non-road mobile machinery (OJ L 59, 1998-2-27, p. 1).