Lumileds List of Regulated Substances in Products and Product Packaging

"Lumileds RSL" Version 5.11

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1 INTRODUCTION

At Lumileds, we are dedicated to minimizing the environmental impacts of our products, processes and services. Lumileds is committed to supply products that are compliant with pertinent laws, rules, and obligations imposed by relevant governmental bodies including sustainability. To manage the vast existence of global legislative acts and regulations on Hazardous Substances, Lumileds compiled a Regulated Substance List (RSL) which is compelled by the most stringent and comprehensive regulations which are applicable to Lumileds portfolio of products. In the past, several legislative acts around the globe have been derived from already existing European Directives and Regulations. Some examples are:

- *2000/53/EC Directive and amendments on End of Life Vehicles (ELV)* *http://ec.europa.eu/environment/waste/elv/index.htm*
- *2012/19/EU Directive on waste electrical and electronic equipment (WEEE)* *http://ec.europa.eu/environment/waste/weee/index_en.htm*
- *2011/65/EU Directive and amendments on Restriction of Hazardous Substances (RoHS) in Electrical and Electronic Equipment (EEE)* *http://ec.europa.eu/environment/waste/rohs_eee/index_en.htm*
- *EC Regulation 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)* *https://echa.europa.eu/regulations/reach/understanding-reach*

Subsequently, European legislation applicable to Lumileds products is one pillar of the Lumileds RSL which has been extended by regulations exceeding the European legal landscape.

The second pillar of Lumileds RSL is based on The Global Automotive Declarable Substance List (GADSL, https://www.gadsl.org/) which is focusing on regulated substances relevant to parts and materials delivered by the supply chain to automobile manufacturers. Please note that the GADSL includes substances that are regulated by the European legislative acts mentioned above and additional substances identified by a Global Automotive Stakeholders Group (GASG).

Company policies can be developed to go beyond legislative and industry-specific compliance to further improve overall sustainability and to protect human health and environment to the greatest extend. Derived from scientific evidence, stakeholder consultations, and awareness of potentially upcoming legislative development, Lumileds requirements on Hazardous Substances in our products and product packaging are more stringent than existing laws, rules and regulations. The listing of additional substances beyond legal compulsion can be perceived as the third pillar.

In case of legislative development, serious indications, or actual threats to the environment and/or human health, immediate actions incl. updating Lumileds RSL and its distribution across the supply chain will be initiated. The lack of scientific certainty or cost reasoning shall not justify postponing preventive measures. However, the decisions for the introduction of alternative substances should take the level of concern, commercial availability, and technical feasibility of alternatives into account.

The present RSL or updated versions can be accessed at Lumileds website (http://www.lumileds.com/support/documentation/sustainability); changes related to the previous versions are listed in Annex 4 of the RSL document. The RSL is going to be updated on a semi-annual basis. We request suppliers to regularly check for possible updates of the RSL and legislative acts applicable to *products* and *packaging* (see definitions under 1.1 Abbreviations and Terminology) delivered to Lumileds.

1.1 Abbreviations and Terminology

Product — All goods such as (raw)materials, components, sub-assemblies, finished products, labels attached or to be attached to products and/or packaging supplied to Lumileds

Packaging — Product packaging (wood, paper or card-boxes, plastic material, containers, user manuals, labels, etc.)

Homogenous Material — Defined by the European Commission in relation to the directives on ELV and RoHS: Homogeneous material means a material that cannot be disjointed by mechanically actions such as unscrewing, cutting, crushing, grinding and abrasive processes into different material.

http://ec.europa.eu/environment/waste/pdf/faq_weee.pdf

Guiding example – Homogenous Material:
Plastic Cover: one type of plastic without any additional coating, glue/adhesive or additional material attached;

Guiding example – Heterogeneous Material:
Power Cable: typically consists of different (homogenous) material such as metal wires surrounded by nonmetallic insulation materials;

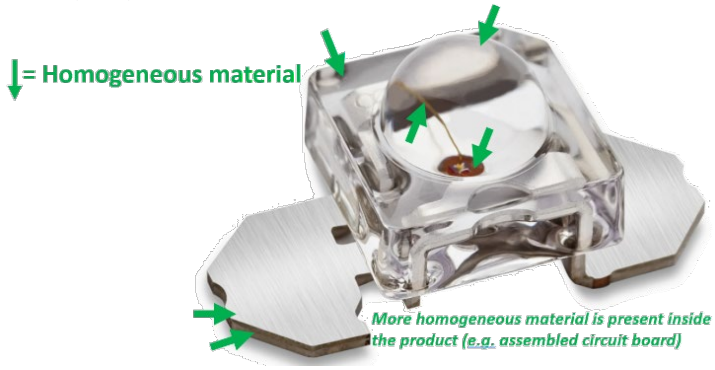
Printed Circuit Board Assembled (PCBA): assembly of various electronic components which itself are typically heterogenous (e.g., capacitor) and homogenous materials such as resin, metal foil, glass cloth, etc.;

Printed Circuit Board laminated materials: assembly of various (homogenous) materials such as resin, metal foil, glass cloth, etc.;

Electronic Components on Circuit Boards: assembly of various (homogenous) materials such as ceramics, electrodes/termination, plating, etc.;

Semiconductor: assembly of various (homogenous) materials such as bonding wires, molding compounds, lead frame, etc.;

Example LED:



Article acc. to REACH — An article means an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition
https://echa.europa.eu/documents/10162/13632/articles_en.pdf/cc2e3f93-8391-4944-88e4-efed5fb5112c

Declarable Substance — Declarable substances can be present in products and packaging and has to be disclosed to Lumileds if exceeding listed thresholds

Restricted Substance	Restricted/prohibited substances which are present above the listed thresholds must not be present in the product and packaging at the level of homogeneous material
FMD	Full Material Declaration
GASG	Global Automotive Stakeholders Group
IMDS	www.mdsystem.com
GADSL	The GADSL is the common standard list for declaration of part compositions within the automotive industry. It provides a definitive list of substances being restricted and/or requiring declaration in specific uses with the objective to minimize company-specific requirements and ensure cost-effective management of declaration practices along the complex supply chain. The scope covers declarable substances relevant to parts and materials supplied throughout the automotive supply chain, from production to the end of life phase. The GADSL only covers substances that are expected to be present in a material or part that remains in the vehicle or part at point of sale. GADSL is reference for substances in IMDS. The latest version of GADSL be accessed under http://gadsl.org
BOMcheck	https://www.bomcheck.net https://www.bomcheck.net/suppliers/restricted-and-declarable-substances-list
BFR/CFR	Brominated Flame Retardant / Chlorinated Flame Retardants
EcoDesign/ErP	Directive 2009/125/EC on establishing a framework for the setting of EcoDesign requirements for energy-related products (ErP) and amendments http://ec.europa.eu/growth/industry/sustainability/ecodesign_de
ELV	EU Directive 2000/53/EC on end-of-life vehicles (ELV) & amendments (2002/525/EC, 2005/673/EC, 2008/689/EC, 2010/115/EU, 2011/37/EU, 2013/28/EU & 2016/774/EU) http://ec.europa.eu/environment/waste/elv/index.htm
PPAP	Product Part Approval Process
PPW Directive	EU Directive 94/62/EC on Packaging and Packaging Waste & amendments http://ec.europa.eu/environment/waste/packaging/index_en.htm
PVC	Poly(vinyl chloride); PVC is highly controversially discussed during the last decade. For one official of knowledge please refer to http://ec.europa.eu/environment/waste/pvc/index.htm
RoHS	EU Directive 2011/65/EU on the restriction of the use of certain hazardous substances (RoHS) in electronic and electrical equipment & its amendments (2015/863/EU & 2017/2102/EU) http://ec.europa.eu/environment/waste/rohs_eee/index_en.htm http://rohs.exemptions.oeko.info/index.php?id=214
REACH	EC Regulation 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and amendments https://echa.europa.eu/regulations/reach/understanding-reach
RSL	Lumileds Regulated Substances List: https://www.lumileds.com/uploads/563/ED37-pdf

SCIP	SCIP is the database for information on Substances of Concern In articles as such or in complex objects (Products) established under the Waste Framework Directive https://echa.europa.eu/de/scip-database
SVHC	Substances of Very High Concern referring to EC Regulation 1907/2006 on REACH
WEEE	2012/19/EU Directive on waste electrical and electronic equipment (WEEE) http://ec.europa.eu/environment/waste/weee/index_en.htm
wt.%	weight-percentage (w/w); mass fraction which is reflecting the ratio of the mass of one substance relative to the mass of the total mixture

1.2 Purpose

This document contains the Lumileds Regulated Substances List (Lumileds RSL) and its annexes. As part of our commitment to health, safety and the environment, Lumileds requires that

- all materials, *products*, and
- all *packaging* delivered to Lumileds as well as
- some manufacturing processes to produce Lumileds parts and brand license products

comply with all applicable requirements stated in this document. The list contains minimum requirements related to various legislative acts expanded by the GADSL and Lumileds own requirements. The Lumileds RSL is part of Lumileds global policy and subsequently included in Lumileds general purchasing conditions. Lumileds business partners, suppliers and brand licensees are required to ensure product compliance with this list. Due to the continuous emerge of new legislative acts and frequent development of such regulations, Lumileds collects compliance data in accordance with the Lumileds RSL for raw material, components, product, or product packaging delivered to Lumileds. Lumileds uses web-based Declaration Tools called BOMcheck for non-Automotive products (see 2.2 BOMcheck for non-automotive products), and IMDS for Automotive products (see 2.3 IMDS for automotive products). Please be advised that those web-based declaration tools do not cover each restriction and declaration obligation listed in the Lumileds RSL:

- BOMcheck mainly covers *EU Directives on RoHS in EEE, REACH, Batteries* and partially *California Proposition 65*
- IMDS covers the entire *GADSL*

The requirements as set up in the Lumileds Regulated Substances List are globally compulsory even if local regulatory requirement might be less strict. However, local regulations must be followed if those supersede or provide additional obligations as imposed by Lumileds RSL. The supplier is required to actively monitor and implement legal developments and resulting thresholds in its country and to notify Lumileds in case of any change.

Lumileds RSL sets reporting duties for or restricts certain chemical substances or materials from being present in Lumileds *products* and *packaging*. It also restricts the application of certain chemicals (see Table 5) during the manufacturing processes including contracted/outsourced manufacturing of raw materials, sub-assemblies, parts, and finished products.

1.3 Scope

Lumileds RSL is invariably applicable to

- all supplied goods (further mentioned as *products* in the RSL) such as (raw)materials, components, subassemblies, finished products, labels attached or to be attached to products, and

- product packaging (wood, paper or card-boxes, plastic material, containers, user manuals, labels, etc., further mentioned as *Packaging* in the RSL), and
- manufacturing processes as specified in Table 5.

Restricted substances above listed thresholds must not be contained in the *product* and *packaging* at the level of *homogeneous material* (see 1.1 Abbreviations and Terminology) and must not be used in the manufacturing processes (Table 5) of the *product* and *packaging*. Declarable substances that are present in *product* and *packaging* above listed thresholds must be disclosed to Lumileds.

If the supplier needs further support and clarification with respect to Lumileds RSL, please contact a Lumileds Representative such the respective Supplier Quality Manager or Procurement Commodity Manager.

1.4 Deviations

In such cases where the supplier delivers or intends to deliver *products* and/or *packaging* to Lumileds that do not comply with the Lumileds RSL, the supplier has to contact the Lumileds Supply Management organization immediately to resolve the nonconformity and to decide on corrective actions in mutual agreement.

1.5 Recycled Material

Lumileds is strongly encouraging and supporting the use of recycled materials and in particular the application of recycled plastics. Lumileds realizes that such recycled materials may lead to challenges in terms of warranting compliance to all substances included in the Lumileds RSL. Please be advised that special waivers can be issued to permit the presence of certain RSL substances in recycled materials which are not restricted by any legislative acts. For any concerns, discussion, and advice related to Lumileds RSL compliance for recycled materials, please contact Lumileds Supplier Quality Management or Procurement Commodity Management for support.

1.6 Thresholds

While the information on substances being present in *products* is collected through BOMcheck or IMDS, suppliers still need to validate that their goods comply with the RSL (see statements in section 1.2 Purpose). In this regard, the suppliers need to consider two thresholds:

1. Maximum concentration limit for restricted substances
2. Maximum concentration limit for declarable substances

Maximum concentration limit for restricted substances

The concentration of a restricted substance is measured at *homogeneous material* level and is determined as weight-percentage wt.% (see 1.1 Abbreviations and Terminology). Lumileds is aware that a certain quantity of restricted substances cannot be avoided or bears the risk of an extraordinary economic burden or loss of product performance if it must be removed to a non-detectable amount. Therefore, thresholds are listed which have been derived from legally imposed maximum concentrations; in special cases, Lumileds lowered the thresholds based on scientific evidence, stakeholder consultation, and awareness of potentially upcoming legislative development. In any circumstance, lower legal thresholds always supersede Lumileds thresholds. The supplier is required to actively monitor and implement legal developments and resulting thresholds in its country and notify Lumileds in case of any change.

Lumileds highly appreciates the notification of such contradictions. If restricted substance(s) is(are) present in *products*, and/or *packaging* above the maximum threshold, the respective goods cannot be supplied to Lumileds. Please be advised that for special circumstances waivers can be issued to permit the presence of a restricted substance which is not restricted by any legislative act. Please contact Lumileds Supplier Quality Management or Procurement Commodity Management for support.

Some regulations have exemptions in place to permit the use of restricted substances for very specific applications and/or materials (e.g., RoHS, ELV). On the other hand, regulations may such as REACH (Article 67 & Annex XVII) prohibits substance solely for specific applications and/or materials. It is the supplier's responsibility to identify and to implement applicable legal requirements. In case an exemption is being used, it must be declared through BOMcheck, IMDS or in writing to raise awareness to Lumileds.

Maximum concentration limit for declarable substances

The concentration of a declarable substance is measured at *homogeneous material* level and is determined as weight-percentage wt.%. Declarable substances [e.g., REACH Article 59(10) and additional substances of GADSL] are required to be monitored due to regulatory conditions, decision made by the Global Automotive Stakeholders Group (GASG) or due to Lumileds internal policy. The usage and presence of declarable substance in *products* and *packaging* is permitted per se, unless otherwise specified, and shall be reported above the listed maximum concentration limit ("reporting threshold"). The exact concentration of the declarable substance present in the respective raw material, sub-assemblies, part, finished products, packaging, etc. must be disclosed to Lumileds.

2 SUPPLIER DECLARATION PROCESS

2.1 Introduction Declaration Tools

Lumileds is legally required to collect information on substances present in *products* and *packaging* to maintain regulatory compliance evidence at the level of *homogeneous material*. Lumileds has decided to utilize BOMcheck for non-automotive products (www.bomcheck.net) and IMDS for automotive products (www.mdsystem.com) as tools to facilitate the collection of information on chemical substances from its suppliers. We request suppliers to regularly check for possible updates of the RSL to remain informed on the latest changes in all legislative and policy obligations at http://www.lumileds.com/support/documentation/sustainability. Please be advised that the web-based declaration tools do not cover each restriction and declaration obligation listed in the Lumileds RSL. For additional declaration, please submit a written report/declaration to a Lumileds Representative (Supplier Quality Manager or Procurement Commodity Manager).

2.2 BOMcheck for non-automotive products

BOMcheck is an industry platform used by many companies and represents an efficient tool that helps suppliers to follow up on major legal requirements. It also provides flawless communication between customers and suppliers across the supply chain. BOMcheck is primarily a regulatory compliance tool designed specifically to enable suppliers to provide declarations for RoHS, REACH, and selected other restricted and declarable substances. BOMcheck also allows suppliers to provide Full Material Declaration (FMD) of their *products*. The benefit of FMD is that for suppliers which uploaded the complete chemical composition of their *products*, the compliance status will be conducted by the BOMcheck tool automatically every time regulatory changes are introduced. Suppliers are requested to provide declarations in BOMcheck for all *products*, *packaging*, and selected manufacturing processes (Table 5). The BOMcheck substances list can be found at www.bomcheck.net/suppliers/restricted-and-declarable-substances-list.

2.3 IMDS for automotive products

IMDS (www.mdsystem.com) is the recognized and increasingly mandatory compliance tool for *products* in the supply chain in automotive industry. Data entry in IMDS is a requirement of Product Part Approval Process (PPAP) which is one part of standard automotive quality systems. An IMDS datasheet is always a Full Material Declaration (FMD); declaration type entries in IMDS without information on a substance level are invalid. IMDS declaration covers all substances of the GADSL [incl. ELV exemptions, REACH Article 59(10)], while RoHS and customer specific restricted/declarable substances are not being considered. Suppliers are requested to make declarations in IMDS for all *products* used for automotive application delivered to Lumileds. *Packaging* materials (i.e., wood, paper or card-boxes, plastic material, containers, user manuals, labels, etc.) are excluded from IMDS reporting. **Lumileds' imds company ID is 14580.**

2.4 REACH-associated Responsibilities and Declarations

If applicable, the supplier, directly or through its supplier(s) or through the only representative referred to in Article 8 of the REACH Regulation, has to carry out the pre-registration and/or the registration of the chemical substances as outlined in the REACH regulation. According to Article 7 of the same regulation, the supplier, directly or through its supplier(s) or through the only representative referred to in Article 8 of the REACH Regulation, has notified ECHA (European Chemical Agency) and its customers of the substances in articles that are in the candidate list pursuant to Article 59 for eventual inclusion in Annex XIV and has carried out the notification to ECHA of the updated information referred to in Article 113 of the same regulation.

According to article 33(1) of the REACh regulation, any supplier of an article containing a substance meeting the criteria in Article 57 and identified in accordance with Article 59(1) in a concentration above 0.1 wt.% (w/w) shall provide the downstream user (=Lumileds) of the article with sufficient information, available to the supplier, to allow safe use of the article including. This information must be provided prior to the first delivery and any updates on the candidate which affects the supplied goods must be communicated immediately.

The supplier must not supply *products* and *packaging* that contain substances listed in Annex XIV of the REACH Regulation unless these substances are authorized for the manufacturer/importer and the processor of the substance(s) as outlined in Articles 60 – 64 of the same regulation.

The supplier must not supply *products* and *packaging* that contain substances in the scope of Article 67 and listed in Annex XVII of the REACH regulation, unless the specific condition is not applicable to the products and packaging delivered to Lumileds.

For all chemicals and mixture of chemicals, Lumileds requests information according to

- **Article 31**: Providing updated Safety Data Sheets for chemical substances and mixtures,
- **Article 32**: communication of information on chemical substances and mixtures for which article 31 is not required/applicable.

Ensuring compliance of our products with the legal requirements of the REACh regulation and the SCIP database requirements (see section 2.5), **suppliers are requested to fill the questionnaire and submit it to christian.foerster@lumileds.com for validation. The questionnaire shall be checked regularly upon changes of the SVHC candidate list, Annex XIV and Annex XVII and submit any updated version.** The questionnaire can be opened by clicking on the green pin icon on the right-hand side or it can be found under attachments of this pdf document ("*Questionnaire REACH & SCIP for suppliers of Lumileds v2.xlsx*").

2.5 SCIP database

As part of the implementation of the EU's action plan for the circular economy adopted in 2015, the revised Waste Framework Directive 2018/851/EU ("WFD") entered into force in July 2018. The directive lays down measures to protect the environment and human health by preventing or reducing the generation of waste, the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use, which are crucial for the transition to a circular economy and for guaranteeing the Union's long-term competitiveness. According to articles 9(1i) and 9(2) of this directive, ECHA has been assigned with the task to develop a database with information on articles containing substances of very high concern (SVHCs) published on the Candidate List referring to article 59(1 & 10) of the EU REACH regulation 1907/2006.

As from 5 January 2021, any supplier of articles to be placed on EU market which contain substances on the Candidate List above a concentration above 0.1 weight by weight (w/w; wt.%) has to submit information on such articles to the SCIP database. These articles can be produced in the EU or imported from non-EU countries.

To ensure compliance with the requirements of reporting (= notification) and to avoid multiple SCIP-entries for the same articles and products by different actors in the supply chain the purpose, **all suppliers shall provide IUCLID SCIP numbers of already notified articles and products to Lumileds**. **Please use the questionnaire** *("Questionnaire REACH & SCIP for suppliers of Lumileds v2.xlsx")* **as attached in previous section 2.4 and submit it to christian.foerster@lumileds.com for validation. Every supplier must fill it once and submit a newer version in case an update is required.**

3 Lumileds Regulated Substances List

3.1 General Information on Legal Restrictions and Exemptions (ELV & RoHS)

Restrictions are derived from EU directives on RoHS and ELV. Similar legislations are increasingly adopted in other non-EU countries. The overview of general restrictions (Table 1) applies to all Lumileds *products* and *packaging* at level of *homogeneous material* level independently on the geographic destination. For links to the official sources of knowledge, please refer to section Abbreviations and Terminology. Please notice that for EU directives on ELV and RoHS, exemption for the restriction of certain substances is in place:

- For EU directive on ELV, please refer to regular updates on Annex II (https://ec.europa.eu/environment/waste/elv/legislation_en.htm)
- For EU directive on RoHS in EEE, please refer to regular updates on its Annexes I-IV (https://ec.europa.eu/environment/waste/rohs_eee/legis_en.htm; it is important to follow the development on the faith of exemption which are under current review (http://rohs.exemptions.oeko.info/index.php?id=214)

Table 1: Overview of consolidated restricted classes of substances acc. to EU directives on ELV and RoHS.

Class of Substances[1]	Maximum Concentration Limit in ppm (mg/kg)
Cadmium and cadmium compounds	100
Hexavalent chromium [Cr(VI)] compounds	1000
Lead and Lead compounds	1000
Mercury and Mercury compounds[2]	1000
Polybrominated diphenyl ethers (PBDEs)[3]	1000
Polybrominated biphenyls (PBBs)[3]	1000
Phthalate esters DEHP, DiBP, DBP, BBP	1000

[1] Not applicable to batteries and accumulators due to the scope of respective legislation (e.g. Directive 2006/66/EU on batteries and accumulators and waste batteries and accumulators). Heavy metal restrictions in batteries, accumulators, and packaging are listed in Table 2 and Table 4.

[2] In addition to RoHS obligations, Lighting Products shall also comply with the EcoDesign Directive 2009/125/EC on ErP (Implementing measure 245/2009/EC) and amendments; therefore, a declaration via BOMcheck or IMDS providing the average amount of Mercury per lamp in x,x mg (ErP) and indicating relevant ROHS exemption number

[3] In addition to EU RoHS restriction, any brominated flame retardant above 0.1 wt.% at *homogeneous material* level in Lumileds *products* is restricted (with exemption of product safety reason w/o replacement substances; see 3.5)

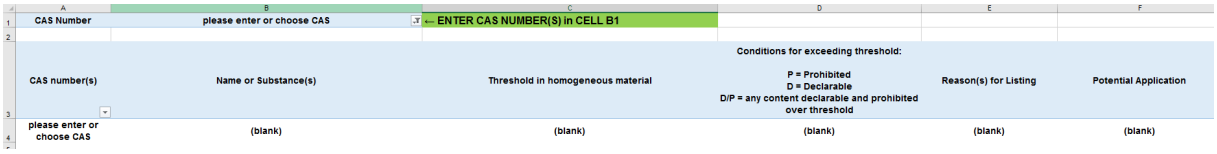
3.2 General Restriction of Oligo-, Poly-, and Perfluorinated Substances

Molecules consisting of repeating carbon-fluoride moieties $[(-CF_2-)_n-CF_3]$ are a very large class of synthetic substances. With increasing quantity of repeating $(-CF_2-)_n$ moieties, such chemicals can be sub-classified into oligo, poly, and perfluorinated substances. Carbon and fluoride atoms forming one of the strongest chemical bonds which leads to a "curse and blessing" situation. On one hand, materials made of perfluorinated substances withstand very harsh conditions, shows a superior chemical resistance, and its surface repels almost anything ("non-stickiness"). On the other hand, this means that they resist any degradation once being disposed in the environment. Unfortunately, such substances are very easily transported and highly accumulated in the environment. It has been frequently observed that groundwater, surface water, and soil are increasingly contaminated. Cleaning up polluted sites is technically difficult and costly. If the releases continue, it will continue to accumulate in the environment, drinking water and food chain. Hence, many of those substances such as PFOS, PFOA, PFHxA, PFAS are already regulated by global legislation and other derivatives are very likely to follow.

Lumileds decided to follow a proactive approach by restricting the presence of any oligo-, poly- and perfluorinated substances added or in any raw material, component, and finished good independently if it has been added intentionally (e.g., coatings, additives to flame retardants, water- and oil repellants, grease, lubricant) or residues after polymerization (e.g., fluoro-tapes, Teflon, finished water- and oil repellants surfaces).

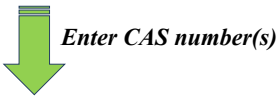
3.3 Search Tool

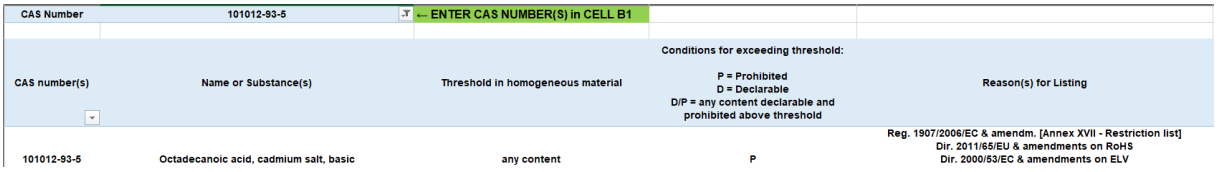
The current consolidation of substances and substance classes, mixtures, and polymers from REACH (SVHC & Annex XVII), EU ELV, EU RoHS, California Proposition 65, EU PoP Regulation, and other relevant legislative acts and industry-specific lists (GADSL) yields a list of more than 4500 entries in the Lumileds RSL. Lumileds is providing an excel-based search tool to facilitate an efficient method for Lumileds suppliers to validate substances in their *products* and *packaging*. Double-clicking the green pin icon opens an attached excel file. The same file can also be found under attachments of this pdf-document ("*Consolidated search database RSL 5_11.xlsx*"). I**t can also be found under attachments of this pdf-document.** The two contained worksheets are intended to search via CAS number (Figure *1*) or via substance name (Figure 2). **Please not that in addition to the results derived from the search tool, the general declaration and prohibition limits listed in all tables below must be validated as well.**



	A	B	C	D	E	F
1	CAS Number	please enter or choose CAS	← ENTER CAS NUMBER(S) in CELL B1			
2						
3	CAS number(s)	Name or Substance(s)	Threshold in homogeneous material	Conditions for exceeding threshold: P = Prohibited D = Declarable D/P = any content declarable and prohibited over threshold	Reason(s) for Listing	Potential Application
4	please enter or choose CAS	(blank)	(blank)	(blank)	(blank)	(blank)

Figure 1: Blank Search & Result matrix for the validation of supplier's substances in the worksheet intended for CAS number tracking (top). After entering CAS number(s), only regulated substances will appear including reason for listing (legal or policy), classification declarable or restricted, the reporting threshold (below the listed threshold, a substance is not restricted nor reporting is required), and typical application if available. To use this, excel-based search tool, please open embedded file by double-clicking pin icon above.





CAS Number	101012-93-5	← ENTER CAS NUMBER(S) in CELL B1		
CAS number(s)	Name or Substance(s)	Threshold in homogeneous material	Conditions for exceeding threshold: P = Prohibited D = Declarable D/P = any content declarable and prohibited above threshold	Reason(s) for Listing
101012-93-5	Octadecanoic acid, cadmium salt, basic	any content	P	Reg. 1907/2006/EC & amendm. [Annex XVII - Restriction list] Dir. 2011/65/EU & amendments on RoHS Dir. 2000/53/EC & amendments on ELV

Figure 2: Search & Result matrix for the validation of supplier's substances in the worksheet intended for Substance Name tracking. To use this, excel-based search tool, please open the embedded file by double-clicking pin icon above.

3.4 Batteries and Accumulators

The restrictions are valid for single and built-in batteries/accumulators. These limits are for the batteries and accumulators only. The remaining device is under the scope of ELV or RoHS.

Table 2: Overview of restricted classes of substances acc. to most stringent regulations for batteries/accumulators (e.g. 2006/66/EU, Conama 257/99 Brazil, Chinese Standard GB 24427-2009).

Class of Substances	Maximum Concentration Limit in ppm (mg/kg)
Cadmium and cadmium compounds	10
Lead and lead compounds	40
Mercury and mercury compounds	1
Perchlorates in all batteries *California Assembly Bill No. 826 - Perchlorate Contamination Prevention Act - **§ 67384.4 labeling requirements***	0.006 (6 ppb)

3.5 Industry-specific Substances and Lumileds Policies

Table 3: Regulated Substances by Industry and Lumileds Policies.

Substances or Class of Substances	Declarable or Restricted	Maximum Concentration Limit in ppm (mg/kg)
For all components for electronic, electrical and mechanical finished good products		
Brominated Flame Retardants (BFR) in **printed wiring board laminate**[1]	**Restricted** in Consumer Products; **declarable** in professional Lighting products and Medical Devices	900 (of bromide)
Brominated Flame Retardants **in any plastic component/material**[1]		1000 (of bromide)
Chlorinated Flame Retardants (CFR) in **printed wiring board laminate**	Declarable	900 (of chloride)
Chlorinated Flame Retardants (CFR) **in any plastic components/material**	Declarable	1000 (of chloride)
Polyvinyl Chloride (PVC) and vinyl chloride copolymers[2]	**Restricted** in Consumer Products; **declarable** in prof. Lighting products	---
Antimony trioxide in plastic material (CAS 1309-64-4)	Declarable	1000
Phthalate esters in general[3]	Restricted	1000
For all components for lamps and lamp ballasts		
Antimony compounds in glass of lamp bulbs	Restricted	1000
Arsenic compounds in glass of lamp bulbs	Restricted	1000
PAH (polycyclic aromatic hydrocarbons) in potting material for electronic ballast of lamps	Restricted	50
For all components which are intended for skin contact		
Azo Dyes / Pigments / Colorants[4]	Restricted	30
Any PAH compounds (German product safety requirements for consumer products)	Restricted	0.2
For all components that contain leather and textiles		
Alkylphenol and alkylphenol ethoxylates[5]	Restricted	100

1 Lumileds is pursuing a phase-out for the use of BFRs in consumer products to be launched on the market. For consumer products, BFR compounds in the form of flame retardants must not be used in *products* and *packaging*. **Main power supply components are exempted from this policy**. If BFRs must be used for product safety reasons without appropriate alternatives, a waiver can be issued upon request and validation. The presence of BFRs must be declared to Lumileds via the BOMcheck or IMDS.

2 PVC is highly controversially discussed during the last decade. For one official of knowledge please see http://ec.europa.eu/environment/waste/pvc/index.htm. Lumileds is pursuing a phase-out for the use of PVC in consumer products to be launched on the market. For consumer products, PVC must not be used in *products* and *packaging*. **Main power supply components are exempted from this PVC phase-out policy**. If PVC must be used for product performance or safety reasons without appropriate alternatives, a waiver can be issued upon request and validation. PVC is declarable for professional Lighting products and Medical devices and mains power supply components. The presence of PVC needs to be declared to Lumileds via the BOMcheck or IMDS.

3 In addition to Directive 2015/863/EU restricting bis(2-ethylhexyl) phthalate (DEHP), butyl benzyl phthalate (BBP), dibutyl phthalate (DBP) and diisobutyl phthalate (DiBP), various legislative acts such as REACH and California State's Safe Drinking Water and Toxic Enforcement Act (aka California Proposition 65) prohibit the application of supplementary phthalates; for this reason, Lumileds internal policy restricts the use of any phthalate esters above a threshold of 0.1 wt.%.

4 This restriction of Azo dyes goes beyond the legal restriction under REACH article 67 and Annex XVII. Lumileds restricts the presence of Azo dyes in all applications that can potentially come into contact with the skin, not only limited to textiles and leather. Two additional Azo dyes are restricted in Lumileds compared to the 22 Azo dyes restricted under REACH Article 67, based on regulation in Japan, Thailand, and China. These 2 additional Azo dyes are: 2,6-xylidine (CAS: 87-62-7 and 2,4-xylidine (CAS: 95-68-1).

5 Increasing number of alkyl phenols and its ethoxylated derivative are in the focus of various legislative acts for restriction in textiles and leather. In line with the increasing concerns and attention focused on this class of substance, a precautionary approach is taken to restrict the allowable concentration of these substances in parts to 0.01% w/w (100 ppm).

3.6 Restriction for Product Packaging

These restrictions and guidelines are complementary to the substances listed in the search tool.

Table 4: Additional Restriction for Product Packaging.

Class of Substances	Maximum Concentration Limit in ppm (mg/kg)
Sum of heavy metals [Cd, Hg, Cr(VI), Pb]	100[1]
Dimethyl fumarate (e.g., in silica gel bags)	0.1[2]
Arsenic compounds in wood packaging	Any intentionally added content is restricted [2]
Formaldehyde in *Packaging*	1000
Polyvinyl chloride (PVC) and PVC copolymers	Any content is restricted
Expanded polystyrene (EPS) and other polymeric foam materials inside any consumer product packaging (e.g., EPP, EPE, EVA as shock absorber buffers enclosing the product, excluding thin foam sheets and foam bags)	Any content is restricted

1 EU Directive 94/62/EC on Packaging and Packaging Waste & amendments
2 Directive on REACH (Article 67 & Annex XVII)

3.7 Restriction for Manufacturing Processes

Solely the listed restrictions and guidelines below are applicable for manufacturing processes.

Table 5: Conditional Restriction for Manufacturing Processes.

Class of Substances	Maximum Concentration Limit in ppm (mg/kg)
Hexavalent chromium [Cr(VI)] compounds in passivation processes[1]	Any content is restricted
Ozone Depleting Substances in any manufacturing process	Any content is restricted [2]
Limits of volatile organic substances[3] in adhesives (GB 33372-2020), cleaning agents (GB 38508-2020), and printing inks (GB 38507-2020)	For detailed information of the requirements and limits of volatile organic substances in scope, please review the respective standards. For Lumileds suppliers delivering goods to Lumileds which are partly and entirely produced in the People's Republic of China are required to fill the VOC compliance template and submit it to **christian.foerster@lumileds.com**. **Every supplier must fill it once and submit a newer version once an update is required.** The questionnaire can be opened by clicking on the green pin icon on the right-hand side or it can be found under attachments of this pdf document *("Lumileds VOC Information Template_v5.xlsx").*

1 Due to the difficulties to control the Cr(VI)-plating process, posing compliance risks of products brought to the market by Lumileds; this substance must not be used in any passivation process. Passivation process here means the process where metal surface is coated with hexavalent chromium leaving hexavalent chromium residues on the processed surface.
2 Use of Ozone Depleting Substances in processes is subject to federal excise tax law applied to all imported electronics into the USA. The substances are also internationally banned under UNEP Montreal Protocol on Substances that Deplete the Ozone Layer and incorporated into REACH Regulation Article 67.
3 The limits set out by the respective mandatory Chinese standards are applicable to manufacturing and application of respective adhesives, printing inks and cleaning agents; it is the solely responsibility of the suppliers with manufacturing site of our purchased goods in the P.R. China to comply with the requirements.

4 ANNEX I – Revision History

Date Revision	Short Explanation

August 2022	• **Version 5.11**
	• Added Lumileds imds company ID 14580 to section 2.3
	• Section 3.3 – update of regulated substances in the Search Tool
	  ○ REACH SVHC entry 224
	  ○ *N-(hydroxymethyl)acrylamide*
	  ○ California Proposition 65
	  ○ *Referencing to tetrahydrofuran as it has been added to the CP65 list*
	  ○ Perfluorinated Substances
	  ○ *Adding 198 perfluorinated substances to facilitate search of substances*

March 2022	• **Version 5.10**
	• New Section 3.2 General Restriction of Oligo-, Poly-, and Perfluorinated Substances
	• Section 3.3 – update of regulated substances in the Search Tool
	  ○ REACH SVHC entries 220 – 223
	  ○ *(±)-1,7,7-trimethyl-3-[(4-methylphenyl)methylene]bicyclo[2.2.1]heptan-2-one covering any of the individual isomers and/or combinations thereof (4-MBC),*
	  ○ *6,6'-di-tert-butyl-2,2'-methylenedi-p-cresol,*
	  ○ *S-(tricyclo(5.2.1.0'2,6)deca-3-en-8(or 9)-yl O-(isopropyl or isobutyl or 2-ethylhexyl) O-(isopropyl or isobutyl or 2-ethylhexyl) phosphorodithioate,*
	  ○ *tris(2-methoxyethoxy)vinylsilane*
	  ○ REACH Annex XVII entry 76
	  ○ *N,N-dimethylformide*
	  ○ California Proposition 65
	  ○ *perfluorononanoic acid (PFNA),*
	  ○ *perfluorooctanesulfonic acid (PFOS) and its compounds, its transformation & degeneration compounds,*
	  ○ *2-ethylhexyl acrylate,*
	  ○ *methyl acrylate,*
	  ○ *tetrahydrofuran,*
	• *trimethylolpropane triacrylate*

July 2021	• **Version 5.9**
	• Section 2.4: An excel-based questionnaire for Lumileds suppliers regarding REACH & SCIP compliance has been added (every supplier must fill it once and submit a newer version once an update is required)
	• Updated regulated substances in the Search Tool (see section 3.3)
	  ○ REACH SVHC entries 212 – 219
	  ○ REACH Annex XVII entry 75
	  ○ U.S. TSCA prohibition to already listed substances (some changed from declarable to prohibited)
	  - Phenol isopropylidene phosphate PIP) CAS: 68937-41-7,
	  - 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP) CAS: 732-26-3
	  - Hexachlorobutadiene (HCBD) CAS: 87-68-3
	  - Pentachlorothiophenol (PCTP) CAS: 133-49-3
	  - Decabromodiphenyl ether (DecaBDE) CAS: 13654-09-6
	  ○ New entries of California Proposition 65
	  - Molybden oxide CAS 1313-27-5
	  - Indium tin oxide CAS 50926-11-9
	  ○ added CAS 25068-38-6 as oligomeric product from BPA and Epichlorohydrin --> threshold: unbound (non-consumed) BPA is prohibited >100 ppm
	  ○ added CAS 68002-42-6 as oligomeric product from BPA, Epichlorohydrin, and 2-methylimidazole --> threshold: unbound (non-consumed) BPA and 2-methylimidazole is prohibited >100 ppm

	○ added CAS 9003-36-5 as oligomeric product from formaldehyde, Epichlorohydrin, and phenol --> threshold: unbound (non-consumed) formaldehyde is prohibited >100 ppm ○ added 1,1,2,2,3,3,4,4,4-nonafluoro-N-(2-hydroxyethyl)-1-Butanesulfonamide monoammonium salt CAS 484024-67-1 → any content is prohibited ○ General restriction of Bisphenol Substances → prohibited >100ppm ○ Restriction of all perfluorinated & polyfluorinated & oligofluorinated substances → prohibited >10ppm • Section 3.6. ○ Table 5, rephrasing descriptive content for China VoC (no changes in limits or requirements); ○ An excel-based questionnaire for Lumileds suppliers regarding Chinese Volatile Organic Compounds (VOC) legislation compliance has been added (every supplier delivering materials/products partially or completely manufactured in China must fill it once and submit a newer version once an update is required)
February 2021	• **Version 5.8** • Added LED product as example to define *homogenous material* in section 1.1 • Added information regarding article 33(1) of the REACH regulation in section 2.4 • Added questionnaire to monitor compliance with legal obligations of the REACh regulation and SCIP database • Added new section for SCIP obligations (see section 0) and removal of SCIP content from section 2.4 • Added questionnaire to be completed by our suppliers which are delivering goods to Lumileds containing substances on the REACh candidate list, REACH Annex VIX, REACH-Annex VVII and/or requiring SCIP database notification (pin-icon in table in section 3.7 or under attachments) • Updated regulated substances in the Search Tool (see section 3.3) *REACH SVHC entries 210 & 211* *REACH Annex XVII entry 75* *Volatile Organic Substances regulated in adhesives (GB 33372-2020), cleaning agents (GB 38508-2020), and printing inks (GB 38507-2020)* *Bisphenol S – prohibited above 200 ppm in thermal paper* • Added Chinese legislation *Limits of volatile organic substances in adhesives* (GB 33372-2020), *cleaning agents* (GB 38508-2020), and *printing inks* (GB 38507-2020) to section 3.7 • Added questionnaire to be completed by suppliers which are delivering goods made or partially made in the P. R. China to Lumileds (pin-icon in table in section 3.7 or under attachments)
August 2020	• **Version 5.7** • Added more examples of heterogenous material under 1.1. Abbreviations and Terminology • Reference to the upcoming ECHA SCIP database for SVHC declaration in articles (see section 2.4) • Added links to comfort monitoring of legal developments on EU ELV directive and EU RoHS directive (see section 3.1) • Updated EU REACH regulated substances in Search Tool (four new SVHC, see section 3.3) • Addition of *Benzene-1,2,4-tricarboxylic acid 1,2-anhydride* and *Trimellitic anhydride* as potentially new entries for Annex XIV of the EU REACH regulation in Search Tool (see section 3.2)
February 2020	• **Version 5.6** • Updated California Proposition 65 chemicals in Search Tool (10 new chemicals, see section 3.2) • Updated EU REACH regulated substances in Search Tool (four new SVHC, see section 3.2) • Changed “phthalates in general” to DEHP, BBP, DBP, and DiBP in Table 1
July 2019	• **Version 5.5** • Updated California Proposition 65 chemicals in Search Tool (see section 3.2) • Updated EU REACH regulated substances (SVHC, Annex XIV, Annex XVII)
April 2019	• **Version 5.4** • Updated California Proposition 65 chemicals in Search Tool (see section 3.2) • Updated GADSL list
February 2019	• **Version 5.3** • Added new REACH-related SVHC published by ECHA • Added new REACH-restricted substances (entry 72) published by ECHA (regulation 2018/1513) • Implementation of California Proposition 65 related list of chemicals into embedded Search Tool (see section 3.2)

December 2018	• **Version 5.2** • Correction of and addition to Table 2 (restrictions in Batteries and Accumulators) - Lead and lead compounds 40 ppm instead of 1 ppm - Mercury and mercury compounds 1 ppm instead of 40 ppm - Added perchlorates in all batteries due to labeling requirements in the State of California, USA • Added Battery legislation into SEARCH TOOL (section 3.2)
November 2018	• **Version 5.1** • Examples for definition of homogenous material were added • Complementary CAS number for substance Classes were added into SEARCH TOOL (section 3.2) • Lowered threshold of Chlorinated Flame Retardants (CFR) in printed wiring board laminate from 1000ppm to 900ppm (Table 3)
July 2018	• **Version 5** • Corrected phrasing in sections 1.6 and 2.3 by removing *… and packaging… in both first sentences* • Adjusted phrasing in Section 1.2, second-last sentence by adding *… sets reporting duties for …* • Corrected entries 3 and 4 in Table 3 in section 3.4 *Industry-specific Substances and Lumileds Policies* • Updated Search Tool - Updated reference to Regulation 2004/850/EC & amendments on POPs - Added CAS numbers to chemical substance classes (asbestos, benzidine, chlorinated & brominated dioxins or furans, chromium(IV)/lead/cadmium/mercury compounds, diorganotin compounds, hydrobromofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, polybrominated diphenyl ethers, polybrominated diphenyls, polychlorinated biphenyls & naphthalens & terphenyls, tetrachlorobenzene) - Added 10 new REACH SVHC as published by ECHA on 2018-06-27 - Added one chemical of REACH Annex XVII as published by ECHA in June 2018 - Added multiple examples of ozone depleting substances, triorganotin compounds, and azodyes/azocolourants compounds - Added complementary threshold for cadmium of 0.0003 wt% (3ppm) of total dry weight of leather
April 2018	• **Version 4** • New format to facilitate an efficient method for Lumileds suppliers to validate substances in their *products* and *packaging* • Embedded search tool based on excel document to search regulated substances via its CAS number(s) and substances name(s) • Updated legislative developments (GADSL, REACH – SVHC, Annex XIV & Annex XVII) • Restriction of Phthalates in general and restriction of PVC for packaging
April 2017	• **Version 3** • Separate categories have been made within the Tables for leather and textiles, toys and childcare, chemical products, skin contact applications, medical devices, food contact applications, lamp and lamp ballasts. • 3 phthalates with CMR class 1b have been added to Annex 2, due to labelling requirements under the current MDD (Table 3) • 2 azo dyes added to Table 8 additional to REACH due to requirements in Japan, Thailand & China • Annex 3 on PAHs has been made more clear • Phenols in Table 8 changed into Alkyl phenols and their ethoxylates in leather and textile applications (100 ppm, Table 6) due to upcoming legislation and customer demands. • PCP has been adjusted in Table 5 to no intentionally added content as threshold due to the EU biocide directive. PCP was also restricted due to various country legislations with a 5 ppm or even lower limit depending on the application. See Further in Table 5. • Mains power supply cord sets exempted for PVC/BFR restriction in Table 8. • Table 1 adapted to the changes not included in BOMcheck yet and format adapted • Latex as declarable substance was added to Table 5 due to FDA labelling requirements • References to legislations have been made clearer (e.g. lead in batteries, remark 11 adjusted). When no reference to legislation is made, the substance is restricted or declarable due to Lumileds policy.

	• Scope and purpose section have been made clearer
May 2016	• **Version 2** • Minor text changes in Chapter 1.3, 2.1 and 2.2. • Edited the Table 1 to reflect the differences between RSL and BOMcheck list of reportable and declarable substances • Table 4, the sub header "Substances which are liquids at room temperature" changed to "Restrictions applicable to substances and preparations" • Table 5, added restriction for hexabromocyclododecane, HBCDD • Table 5, added restriction for Benzamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene, BNST • Table 5, restrictions to the use of named phthalates (DEHP, BBP, DBP, DIDP and DNHP for cables in headsets and DEHP, BBP and DBP in bas, pouches and other accessories) from Table 6 to emphasize the obligatory restrictions • Table 5, included the term "food contact" in the sub header "Parts used in medical devices or in toys and childcare products" to correctly reflect the scope of BPA restriction • Table 5: Application text and threshold changed for Alkanes, C10-13, chloro (SCCP; Short chained chlorinated paraffins) and Hexabromocyclododecane (HBCDD) and its main diastereoisomers due to EU POP regulations 2015/2030 and 2016/293. • Table 6, added a remark to the footnote for lead compounds "For zinc chloride zinc manganese batteries, the concentration limit 1000 ppm is applied" • Table 9, foam use in packaging restriction scope clarified • Table 10, Hexavalent chromium passivation term clarified • Annex I, article definition changed due to EU Official Court ruling on 10th September 2015 • Annex II, included phthalate 1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate (EC No. 201-559-5)
April 2015	• Introduction of Lumileds RSL, adapted from Philips RSL Version 5 January 2015.