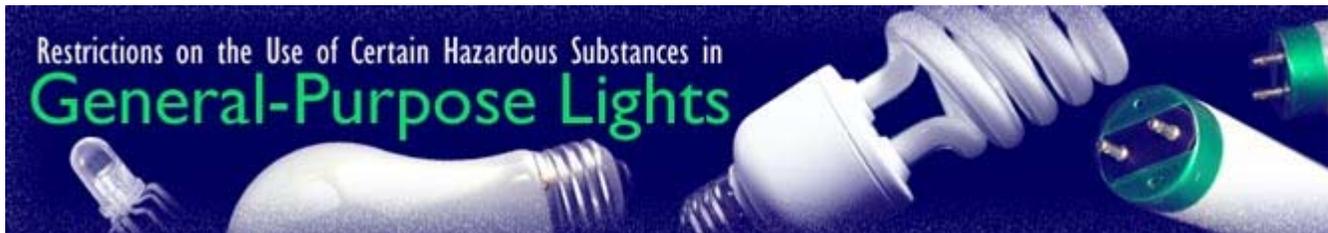




## Restrictions on the use of Certain Hazardous Substances in General Purpose Lights

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Beginning January 1st of 2010, California will restrict the sale of general purpose lights by any person, including a manufacturer, retailer, distributor and online seller, if those lights contain certain hazardous substances above specific concentration limits

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### **Introduction**

Existing lighting choices for consumers contain toxic materials that, if released, can be harmful to people and the environment. For example, incandescent bulbs may contain lead and fluorescent bulbs contain mercury.

Fluorescent lights are more efficient, effective, and economical than traditional incandescent bulbs, and have become increasingly popular lighting devices. However, when disposed of, fluorescent lights are considered [hazardous wastes](#), therefore, these bulbs and tubes are prohibited from traditional disposal in California and should be taken to a [Household Hazardous Waste](#) facility or to a [Take It Back partner](#).

While growth in use of energy-efficient fluorescent lighting is increasing the amount of mercury-coated glass produced, the US Environmental Protection Agency has concluded that shifting from incandescent lighting to compact fluorescent lighting will result in a net reduction in total United States [mercury emissions](#). This reduction is due to the reduction of coal-fired electricity generation, a process that releases mercury into the atmosphere.

Concerned about the risk of mercury and lead exposure to the environment that could result from the use of fluorescent and some incandescent lights, in 2007 the California State Legislature enacted the Lighting Efficiency and Toxics Reduction Act or AB 1109 (Huffman, Ch. 534, Stats. 2007) to, in part, limit the amount of mercury and other hazardous substances allowed in [general purpose lights](#). This law can be found in the [Health and Safety Code, division 20, Chapter 6.5, article 10.02 Lighting Toxics Reduction \(Sections 25210.12\)](#).

In addition to restricting toxics in general purpose lights, AB 1109 also required the California Energy Commission to adopt energy-efficiency standards through regulations; and required DTSC, in coordination with the Integrated Waste Management Board, to convene a taskforce to make [recommendations](#) on methods for proper management and collection of general purpose lights, including fluorescent bulbs and tubes

## Lighting Toxics Reduction and the EU RoHS Directive

Lighting Toxics Reduction ([Article 10.02](#)) and the [EU RoHS Directive](#)

Beginning January 1, 2010, Article 10.02 prohibits the sale of [general purpose lights](#) in California if they exceed hazardous substance concentration limits set forth in European Union (EU) legislation known as the [RoHS Directive \(Directive 2002/96/EC\)](#). The RoHS Directive establishes allowable maximum concentrations for the following hazardous substances: mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs), and polybrominated diphenyl ethers (PBDEs)

Article 10.02 ("Lighting Toxics Reduction") also does the following:

- Restricts, beginning January 1, 2010, a person from manufacturing for sale in California, general purpose lights that contain levels of hazardous substances that would be prohibited by the EU pursuant to the RoHS Directive. (Health & Saf. Code § 25210.9, subd. (a).)
- Exempts [high output and very high output linear fluorescent lamps](#) greater than 32 millimeters in length, [preheat linear fluorescent lamps](#), high intensity discharge lamps, and [compact fluorescent lamps](#) less than 10 inches in length.
- Requires manufacturers of general purpose lights that are sold or offered for sale in California to provide technical documentation upon request to DTSC demonstrating that the general purpose lights comply with the RoHS Directive. (Health & Saf. Code § 25210.9, subd. (h).)
- Requires manufacturers of general purpose lights to provide sellers of general purpose lights in California with certification that the lighting complies with the EU RoHS Directive, upon request. The certification must be on the shipping container or on the packaging. (Health & Saf. Code § 25210.9, subd. (i).)
- Restricts, beginning January 1, 2010, a person from selling general purpose lights from manufacturing in California to provide required documentation or certification pursuant to Health and Safety Code section 25210.9 subdivisions (h) and (i). (Health & Saf. Code § 25210.9, subd. (b)(2 & 3).)

This website summarizes California law and RoHS Directive provisions. It does not replace or supersede those laws or actual regulatory requirements you should consult California statutes and RoHS Directive provisions.

### What is the RoHS Directive?

The RoHS Directive, the European Union legislation referenced in the California statutes on toxics in lighting, restricts hazardous substances in the manufacture of electrical and electronic equipment (EEE). The term EEE includes lighting equipment (as defined in Directive [2002/96/EC Annex IA and IB](#)) and electric light bulbs and luminaires in households. ([2002/96/EC Commission Decision 2005/618/EC](#)).

The RoHS Directive restricts EEE containing lead, mercury, hexavalent chromium, cadmium, PBBs and PBDEs in concentrations exceeding a maximum concentration value ([MCV](#)) from being put on the market. MCVs are set as follows by the

Hazardous Substance	MCV (% by weight) in homogeneous materials
Mercury	0.1 % (1000 ppm)
Lead	0.1 % (1000 ppm)
Hexavalent chromium	0.1 % (1000 ppm)
PBBs	0.1 % (1000 ppm)

PBDEs	0.1 % (1000 ppm)
Cadmium	0.01 % (100 ppm)

The RoHS Directive exempts certain applications of lead, mercury, cadmium and hexavalent chromium from these cases. In some cases, it establishes alternative limits.

### The RoHS Directive and lighting equipment

The RoHS Directive contains exemptions allowing mercury and certain applications of lead in lighting. All other hazardous substances may not exceed the MCV as a percentage by weight per [homogenous material](#) (please see RoHS Directive for more details). DTSC has created several flow charts as guidance outlining when these exemptions may be applied.

The RoHS Directive contains many exemptions that may apply to lighting equipment, which are summarized below:

RoHS Application 1: Mercury in [compact fluorescent lamps \(CFLs\)](#) may not exceed 5 mg per lamp.

RoHS Application 2: Mercury in a [straight fluorescent lamp](#) that is used for general purpose may not exceed:  
 10 mg in [halophosphate](#) lamps  
 5 mg in [triphosphate lamps](#) with a normal lifetime  
 8 mg in [triphosphate lamps](#) with a long lifetime

RoHS Application 3: No restrictions on the amount of mercury in a straight fluorescent lamp that is used for general lighting.

RoHS Application 4: No restrictions on the amount of mercury in other lamps not mentioned in – RoHS Directive.

RoHS Application 5: No restrictions on the amount of lead in the glass of fluorescent tubes.

RoHS Application 6: Lead used as an alloying element in steel can contain up to 0.35% lead by weight, 0.4% for aluminum and 4% lead by weight for copper alloy.

RoHS Application 7: No restrictions on lead used in high melting temperature type solders (i.e. tin-lead base containing 85% by weight or more lead).

RoHS Application 16: No restrictions on lead used in linear incandescent lamps with silicate coated tubes.

RoHS Application 19: No restrictions on lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as required for use with PbSn-Hg as auxiliary amalgam in very compact Energy Saving Lamps (ESL).

California modeled its Lighting Toxics Reduction law after the European Union's (EU) RoHS Directive 2002/95/EC. The law exempts certain applications of lead, mercury, cadmium and hexavalent chromium that are exempt from the EU RoHS Directive or are exempt from California law. It is very important to consult both the actual California law and RoHS Directive provisions when determining whether an exemption applies.

### [Links to Other Resources](#)

### Commonly Used Terms

[Compact Fluorescent Lamps \(CFLs\)](#)

[Incandescent lights \(or lamp\)](#)

[General purpose lights](#)

[Halophosphate fluorescent lamps](#)

[High output or very high output straight \(linear\) fluorescent lamps](#)

[Homogeneous material](#)

[Straight triphosphate fluorescent lamps with a long lifetime](#)

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### Compact Fluorescents Lamps (CFLs)

Compact fluorescent lamps (CFLs) are usually single-based fluorescent lighting with a plug-in or screw-in base and are generally smaller and more compact than linear fluorescents. They include bare and covered lamps of various wattages and all shapes (twist, loop, globe, a-shape, flood, bullet, candle flame, etc.). Some CFLs can replace incandescent lighting in any type of lighting fixture. There are two general categories of CFLs:

CFL with integrated ballast, which typically have a screw-in base

CFL with non-integrated (separate) ballast, which often are pin-based

### Incandescent lights (or lamp)

Incandescent lamps include traditional light bulbs that emit light by passing electric current through a filament, including halogen lamps. The California Energy Commission (CEC) has defined an "incandescent lamp enclosure in which light is produced by a filament of conducting material heated by an electric current." (California Code of Regulations, title 20 § 1062, subd. (k).)

### General purpose lights

Health and Safety Code section 25210.10 defines "general purpose lights" to include "lamps, bulbs, and electric devices that provide functional illumination for indoor residential, indoor commercial, and outdoor use." Some examples may include:

1. Compact Fluorescent lamps
2. Straight (linear) fluorescent lamps
3. Incandescent lights (including halogen)
4. Light Emitting Diodes (LEDs)

The definition of "general purpose lights" excludes the following specialty lighting: appliance, black colored, infrared, left-hand thread, marine, marine signal service, mine service, plant light, reflector, service, shatter resistant, sign service, silver bowl, showcase, three-way, traffic signal, and vibration resistant.

### Halophosphate fluorescent lamps

The inside of a fluorescent lamp is coated with a phosphor powder, which produces visible light when struck by ultraviolet light. Various blends of phosphors are used in fluorescent lamps to determine the type of light emitted (cold, cool, warm). Halophosphates are an older class of phosphors that are limited in their ability to provide a high coloring rendering index. A light tube's or bulb's CRI is a measure of how accurately the colors of objects appear under its light. The higher the CRI, the closer the colors are to natural light. [Most halophosphate fluorescent lamps have a CRI of less than 80.](#)

Most halophosphate straight (linear) lamps (LFLs) are T12 models. Other less common halophosphate sizes include T5s as well as T6s and T17s.

*Please note:* Not all T12 lamps use halophosphate phosphors. Some T12s, which typically have a CRI of 80 or more, use triphosphates. As with triphosphate fluorescent lamps, the triphosphate mercury requirements set forth in [RoHS exemption 2 may be applicable.](#)

Also, some T12 triphosphate fluorescent lamps with a high CRI are considered linear fluorescent lights used for “general purpose” lighting because they are designed to be shatter resistant or are used for displays, signage, backlighting, appliances, aquarium lighting, and other specialty lighting. These may be exempted from EU RoHS requirements for mercury content under [RoHS exemption-Application 2](#).

### **High output or very high output straight (linear) fluorescent lamps**

*Health and Safety Code section 25210.9, subdivision (e) exempts high output and very high output straight (linear) lamps greater than 32 millimeters in diameter from the RoHS Directive hazardous substance restrictions.*

“High output” and “very high output” straight (linear) fluorescent lamps usually have a lower starting temperature and higher lumen output than standard fluorescents. The words “high output” or “very high output” are usually abbreviated or referred to as HO or VHO. These lamps are typically used for outdoor lighting, sign lighting, coolers and freezers. The most common types are T12/HO or T12/VHO, but there are also some high output/very high output T5s and T8s.

The ballasts for high output and very high output lamps are usually larger than standard types and they tend to get hot. Some HO lamps also have a single pin end (T12s specifically) and others have a recessed double contact end that may not match up to fixtures designed for standard fluorescent light bulbs.

Some high output and very high output lamps used for general purpose lighting are covered under Section 25210.9 (e), while others are not. In addition, mercury content may not be restricted in most T5 and T8 HO and VHO fluorescent lamps because under [EU RoHS Directive exemptions](#) they are often considered “[straight fluorescent lamps for special applications](#)” or “lamps with special ignition features including those designed for low temperatures” or “amalgam” lamps).

### **Homogeneous material**

The term “Homogeneous material” is defined in RoHS Directive guidance documents to mean “a material that cannot be mechanically disjointed into different materials.” (Frequently Asked Questions on Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) and Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), p.17.)

The guidance further defines homogeneous as “is of uniform composition throughout” and mechanically disjointed means “can, in principle, be separated by mechanical actions such as: unscrewing, cutting, crushing, grinding, and abrasi- on.” (Frequently Asked Questions on Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) and Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), p.17.) Examples of “homogeneous materials” include individual types of glass, metals, alloys, resins and coatings.

### **Straight triphosphate fluorescent lamps with a long lifetime**

*The EU RoHS Directive contains an exemption for straight triphosphate fluorescent lamps with a long lifetime when tested on a modern electronic ballast. The exemption is as follows:*

*RoHS Application 2. Mercury in a straight fluorescent lamp may not exceed:  
8 mg in triphosphate lamps with a long lifetime*

Health and Safety Code section 25210.9 references the current EU RoHS standards. However, the EU is currently using a definition of “long” lifetime triphosphate lamps. It has been proposed to amend the EU definition “long lifetime” to mean “more than 25,000 hours when tested on a modern electronic ballast (equivalent to an “instant start” ballasts in the US) and turned on for three hours (“three hour starts”). If the EU amends the RoHS Directive to incorporate this revised criterion for “long lifetime,” it may be applicable in California as well.

Generally, the term “standard life” is used by the lighting industry to describe a fluorescent lamp with a rated life of less than 25,000 hours, when tested on an electronic ballast with three hour starts. This is consistent with the current EU proposal to use the term “long lifetime” to mean having a rated life of > 25,000 hours.

Manufacturers usually label triphosphate fluorescent lamps with a life > 24,000 hours with a symbol or word to dif from “normal” lifetime lamps (e.g., (LL) long life, (XLL) extra long life, PLUS, (XL) extra life, (SXL) super long life c performance).

### **Preheat fluorescent lamps**

*Health and Safety Code section 25210.9, subdivision (e) exempts preheat straight (linear) fluorescent lamps from hazardous substance restrictions.*

Preheat fluorescent lamps are designed to be used in fixtures with a starter - a switch that briefly allows electrical through the lamp’s filaments. The filaments heat the gas inside the lamp, which allows electricity to flow. Prehea lamps can be identified from their relatively short [rated life](#) (5,000 to 9,000 hours) and their relatively low [CRI \(50-](#) will usually be identified in most manufacturers’ catalogs as the “average rated life”, and many of them are class halophosphates

### **Specialty Lighting**

California law excludes “specialty lighting” from the definition of general purpose lights. Specialty lighting includes lights:

appliance, black light, bug, colored, infrared, left-hand thread, marine, marine signal service, mine service, plant li rough service, shatter resistant, sign service, silver bowl, showcase, three-way, traffic signal, and vibration service resistant.

### **Straight (linear) fluorescent lamps**

Straight (linear) fluorescent lamps generally have a double–pinned base. Their shape and size are expressed by consisting of the letter “T”, meaning the bulb is tubular, followed by a number. The number is the diameter of the l an inch. (T2 – T12). Fluorescent tubes are available in lengths ranging between 6 inches and 96 inches (8 feet). 7 properties of straight fluorescents lamps are determined by the phosphors used to coat the inside of the tube.

The EU RoHS Directive does not restrict the quantity of mercury in straight fluorescent lamps that do not fall into exemption categories ([see RoHS exemption- Application 4](#)).

A guidance document issued by the United Kingdom (UK) Department for Business Enterprise and Regulatory R assist those placing EEE on the market in the UK provides the following examples of lamps that are not subject to restrictions: non-linear lamps such as u-bent and circular models, induction fluorescents, neon lamps and high int lamps - including mercury vapor, high and low pressure sodium, and metal halide lamps.

### **Straight (linear) fluorescent lamp used for "special purposes"**

*The EU RoHS Directive does not restrict the quantity of mercury in fluorescent lamps for special purposes.*

The UK Guidance lists the following examples of halophoshate fluorescent lamps used for “special purposes”: lar tanning, lamps used in appliances such as refrigeration units, black lights (i.e., ultraviolet lights), aquarium and sh models, long length lamps (greater than 1800mm in length), disinfection lamps with special components (e.g. inte or external protection sleeves), lamps with special ignition features (e.g. designed for low temperatures), amalgar signs, and LCD back light lamps. (This is list of examples and should not be considered all-inclusive.)

### **State regulated general service incandescent lamps**

*Health and Safety Code section 25210.9 subdivision (g) exempts “state-regulated general service incandescent l “enhanced spectrum lamps” as defined in subdivision (k) of Section 1602 of Title 20 of the California Code of Reg January 1, 2014from hazardous substance restrictions.*

The California Energy Commission defines a "[state regulated general service incandescent lamp](#)" as a standard incandescent halogen type lamp that meets all of the following criteria:

1. It is intended for general service application and medium screw base;
2. It has a wattage rating > 25 watts and < 150 watts;
3. It has a rated voltage range at least partially within 110 and 130 volts;
4. It has a bulb finish of the frost, clear or soft white type; and
5. It has one of the following (or equivalent) shapes as defined in ANSI C78.20-2003: A-15, A-19, A-21, A-23, A-25, PS-25, PS-30, BT-14.5, BT-15, CP-19, TB-19, CA-22.

The California Energy Commission has also defined enhanced spectrum lamps in regulation. For more information on enhanced spectrum lamps, see subdivision (k) of Section 1602 of Title 20 of the California Code of Regulations.

## Solder

The EU RoHS Directive contains an exemption for lead from MCV restrictions when it is used for "high temperature solders," ([see RoHS Exemption – Application 7](#))

[UK guidance](#) defines solder as "[an alloy used to create metallurgical bonds between two or more metal surfaces : electrical and/or physical connection.](#)"

The [UK guidance](#) provides this information, which may be helpful in determining whether and when the "high temperature exemption applies to solder used in lighting equipment:

"The high melting temperature type solder exemption has been introduced to allow the use of lead in solder for specific applications (such as in power semiconductor package manufacturing), for which viable lead-free alternatives have not yet been identified. This exemption is permitted as there are no alternative alloys with a high melting point and which are ductile. The high electrical conductivity and unique mechanical properties of high melting point tin-lead alloy make the material malleable and better able to withstand both temperature and physical stress. Such properties ensure fewer defects during manufacturing and high reliability throughout the component, thereby also resulting in fewer components going into the waste stream."

## Triphosphate fluorescent lamps

The inside of a fluorescent lamp is coated with a phosphor powder, which produces visible light when struck by UV light. Various blends of phosphors are used in fluorescent lamps to determine the type of light emitted (cold, cool, warm).

Triphosphates (also referred to as "tri-band phosphates") are a newer class of phosphors used to make fluorescent lamps more efficient than the older halophosphate type lamps. [Most triphosphate fluorescent lamps have a relatively high rated life of 15,000 hours or more.](#)

Straight triphosphate fluorescent lamps are commonly available in five types:

1. T5s (except preheat models)
2. T8s (except preheat models)
3. T10s
4. T2s (if they are cold cathode tubes, these bulbs are exempted as "special purpose" lamps)
5. T12s with a high CRI (usually >80) designed to run on an electronic ballast.

## Frequently Asked Questions (FAQ)

[View all answers](#)

[Q. When testing incandescent light bulbs for lead, what parts would be considered a "homogenous material"?](#)

- [Q. As a manufacturer am I required to provide certification to a seller for my “general purpose lights” sold in California](#)
- [Q. As a manufacturer, am I required to submit documentation to DTSC for my “general purpose lights” sold in California](#)
- [Q. Are there any exemptions that allow lead in light bulbs?](#)
- [Q. Are luminaries considered a “general purpose light” as that term is defined in Health and Safety Code section 25210.10?](#)
- [Q. Is a ballast considered a part of a general purpose light as that term is defined in Health and Safety Code section 25210.10?](#)
- [Q. Are light bulbs in toys and other devices that contain small discrete lighting considered general purpose lights as that term is defined in Health and Safety Code section 25210.10?](#)
- [Q. I have read the RoHS Directive and I noticed it references the WEEE Directive. How do these two directives relate?](#)
- [Q. As a retailer, after January 1, 2010, can I still sell my existing stock of lighting even though those lights may not comply with the new restrictions?](#)

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