



Environmental NGOs Response to Stakeholder consultation on Adaptation to scientific and technical progress under Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment for the purpose of a possible amendment of the annex

1 April 2008

Introduction and summary

The European Environmental Bureau, the Zero Mercury Working Group and the Green Purchasing Institute ¹ appreciate due notification of this technical adaptation consultation.

Considering that the above-mentioned NGOs have been mainly focusing on the mercury debate, the comments provided below will refer to Group I, applications where mercury has been used up to certain limits until now, but for which our research demonstrates that the maximum levels should now decrease.

The NGOs are deeply concerned that the ROHS directive may be weakened by exemptions on the basis of article 5(1) without the necessary justification. The Commission's criteria for granting exemptions is based upon the following:

“Article 5(1)(b) of the Directive 2002/95/EC provides that materials and components can be exempted from the substance restrictions contained in Article 4(1) if their elimination or substitution via design changes or materials and components which do not require any of the materials or substances referred to therein is technically or scientifically impracticable, or where the negative environmental, health, and/or consumer safety impacts caused by the substitution outweigh the environmental, health and/or consumer safety benefits thereof.

It should be noted that during the last consultations most of the applications for exemptions were not at all justified and the necessary forms not correctly filled in, or were incomplete or not filled in at all. Until now more than 100 additional (to the initial RoHS directive exemptions) requests for exemptions have been submitted by industry. Public consultation and the analysis from the consultants have proven however that not all of these justify adoption. Only 20 have been approved so far, showing that many requests were not justifiable. It must be kept in mind that in drafting the RoHS Directive, the Commission fully intended that the burden of proof would explicitly rest with industry to demonstrate why any specific application should be exempted. Therefore, unless and until the applicants provide the detailed supporting data to demonstrate that an exemption for a specific application may be warranted, all other requests should be denied as a matter of course.

¹ NGOs include

The **European Environmental Bureau, (EEB)**, www.eeb.org, is a federation of more than 140 environmental citizens' organisations based in all EU Member States and most Accession Countries, as well as in a few neighbouring countries. These organisations range from local and national, to European and international. The aim of the EEB is to protect and improve the environment of Europe and to enable the citizens of Europe to play their part in achieving that goal.

The **Zero Mercury Working group**, www.zeromercury.org, is an international coalition of more than 56 public interest non-governmental organizations from around the world formed in 2005 by the European Environmental Bureau and the Mercury Policy Project/Ban Mercury Working Group. The aim of the group is to reach 'Zero' emissions, demand and supply of mercury, from all sources we can control, towards eliminating mercury in the environment at EU level and globally.”

The **Green Purchasing Institute** is a nonprofit organization based in the United States that helps government agencies, institutions and business to specify, evaluate and purchase environmentally preferable goods and services.)

While responding to the present consultation, rather extensive research has taken place mainly through the internet. It is evident that detailed information with respect to the mercury content in different kind of lamps is in general missing. From the members of the European Lighting Companies Federation (ELC) only three out of eight members provide information on mercury content in lamps, in their websites and actually only one really specifies mercury content per lamp type.

In order for the Commission to make fully informed decisions about the need for specific exemptions relating to lighting equipment, it should require manufacturers to submit data documenting the maximum mercury content (in milligrams) of any products that are currently sold in the EU. A database could be set up at EU level containing such data. This will enable the Commission to set appropriate mercury content limits and monitor compliance with the standards that are ultimately adopted. It will also help prevent the Commission from adopting exemptions for specific product categories when they are not needed. This precautionary approach – requiring mercury content disclosure – has been used to guide US procurement decisions relating to lighting decisions in the United States.

The Commission could effectively use the mercury-content information to set exemptions that represent “best in class” for various lamp types and harmonize with proposed Ecodesign criteria (under the EuP directive).

The Commission should also require the use of more accurate and protective mercury-dosing techniques such as pills, pellets, strips and amalgam, which more precisely deliver the needed mercury to the lamp (thereby ensuring that it will meet the standards) and minimizing the potential for worker exposure to this neurotoxin during the manufacturing process.

It is important to note that our review of existing mercury-content data for fluorescent and high-intensity discharge (HID) lamps, largely originates from manufacturers in the United States – many of which sell the same or similar products in the European Union as well.

To that end the NGOs opinion can briefly be found below:

No	Existing exemption	NGO opinion	Justification
1	<i>Mercury in compact fluorescent lamps not exceeding 5 mg per lamp</i>	2 mg as soon as possible and at the latest by 2012.	Several CFL manufacturers including Philips, Sylvania and MaxLite) are offering CFLs with mercury content with 3 mg of mercury or less. Canada has adopted a 3 mg EcoLogo standard for CFLs. The VITO Draft Report on domestic lighting also recommends 2 mg standard.
2	<i>Mercury in straight, fluorescent lamps for general purposes not exceeding:</i>		Modify the exemption to also include <i>circular and u-shaped</i> fluorescent lamps otherwise consider limits for non-straight fluo lamps
	<i>- halophosphate 10 mg</i>	Should be phased out	For those meeting lumen criteria (in EuP), a max of 8 mg Hg / lamp should be set

	- triphosphate with normal lifetime 5 mg	2 mg for triphosphates below 6 foot.	The EC proposed Implementing Measure for office lighting recommends that the RoHs exemptions revises the maximum allowed limit to 2 mg of mercury per lamp.
	- triphosphate with long lifetime 8 mg	Eliminate exemption for long-life lamps; insert minimum rated life requirement 8 mg for triphosphates equal and above 6-foot	This exemption should be eliminated. There is no evidence that fluorescent lamps with a long life-time need additional mercury content. Lamp life is largely unrelated to mercury content. More modern lamps – such as extended life Super T8s – tend to have less mercury and longer lamp life. All three major US manufacturers have long-life T8s that can meet 5 mg (except for models $\geq 72"$.)
3	Mercury in straight fluorescent lamps for special purposes	Exit signs should be mercury-free	Mercury – free alternatives (e.g. LED) exist for low wattage applications
4	Mercury in other lamps not specifically mentioned in this Annex I	Include mercury caps on u-shaped and circular fluorescents of 5 mg.	Additional fluorescent lamp shapes can also use low-mercury dosing technologies. Philips, Osram Sylvania, and GE all offer circular and u-shaped HALOPHOSPHATE fluorescent lamps that can meet the 10 mg cap. Halophosphate (e.g., T12s and T9 circular) fluorescent lamps are proposed to be phased out by the EC in Europe(under the EuP IM on office lighting); in the meantime, the models with very high mercury content (>10 mg) should not be sold.

Background

Overall European industry estimates that approximately 40% of sales of mercury containing lamps in Europe are used in private households or small businesses. The market for mercury containing lamps in Western Europe (including Switzerland and Norway) is estimated by the European Lighting Companies (ELC) Federation at approximately 600 million pieces – over 90% of these lamps being manufactured by ELC members. There are eight ELC member companies, namely AURA Light International AB, BLV Licht- und Vakuumtechnik, GE Lighting Limited, LEUCI S.p.A., NARVA Lichtquellen GmbH, OSRAM GmbH, Philips Lighting BV and Sylvania Lighting International.

While the eight ELC members are European and North American companies, their lamps are manufactured worldwide, and not necessarily to the same standards in all countries. As for the 10% of the mercury containing lamps not manufactured by ELC members, it may be assumed that they are generally cheaper products with a lower standard and higher mercury content, likely imported from low-cost manufacturers in regions such as Asia.²

Lamps with mercury are efficient light sources, typically consuming up to 5 times less energy than incandescent (filament) lamps of comparable light output. Further, their useful life is typically 5-10 times the average 1000 hours lifetime of incandescent lamps.³

(Linear fluorescent lamps such as modern T8s and T5s can yield even greater energy savings and often last 20,000 to 30,000 hours.) LEDs, which can replace some incandescent and fluorescent applications, are the most energy-efficient choice for some low-wattage applications such as exit signs, night lights, LCDs and indicator lighting; they are also very long lasting and mercury-free.

Mercury containing lamps include primarily fluorescent lamps (tubes and compact fluorescent lamps (CFLs)), high-intensity discharge (HID) lamps (mercury vapour, metal halide, (most) high-pressure sodium,) and cold cathode (ultraviolet and (some) "neon") light sources. Fluorescent lamps include, among others, straight tubes of varying lengths, compact fluorescent lamps used to replace incandescent light bulbs, halo-shaped indoor lamps, and small fluorescent lamps found in backlit LCD displays in laptop computers and other devices, appliances, exit signs, navigational systems, etc. They are typically used in indoor office lighting and most other commercial applications, while CFLs are increasingly used in households. There are about 5,000 different fluorescent lamp products on the market. The straight tube lamp is the highest volume fluorescent lamp sold, accounting for approximately 70 percent of the market for fluorescent lamps used for general lighting purposes. High-intensity discharge (HID) lamps, which commonly use mercury as a starting aid and for voltage control, are typically used in security lighting, street lighting, outdoor and parking lot lighting, warehouses and other "high-bay" structures, etc. Metal halide lamps are often used for high-intensity lighting, such as stadium and parking lot lighting. While standard metal halide lamp tend to have among the highest mercury content per lumen hour, they are increasingly being replaced by more efficient ceramic metal halide lamps, which also tend to have a significantly lower mercury content. Low-pressure sodium lamps, increasingly used in street lighting as well, are generally mercury-free.

The present European market annually consumes approximately 400M straight fluorescent tubes, 90M integrated CFLs, 40M HID lamps and 80M non-integrated CFLs.⁴

Mercury used in lighting in the EU is estimated at 35 tonnes for EU-25 (2005).⁵

Because mercury-containing lighting is more energy efficient than conventional incandescent lighting, less energy is needed to make the required electricity, thus translating to reduced mercury emissions from coal-burning power generating plants. The amount of mercury pollution that is offset using more efficient lighting depends on the type of lamps used and the fuel mix of the power plant generating the electricity.⁶

² RoHS substances (Hg, Pb, Cr(VI), Cd, PBB and PBDE) in electrical and electronic equipment in Belgium, Final Report ,Brussels , November 2005, p. 35-36, from COWI and Concord East-West for Federal Public Service Health, Food Chain Safety and Environment Directorate-General Environment

³ [ELC 2004a] in "RoHS substances in EEE in Belgium" November 2005

⁴ Source: [ELC] in "RoHS substances in EEE in Belgium" November 2005

⁵ Mercury flows and safe storage, Concorde East-West for DG Environment, August 2006, p. 21

⁶ Background Study on Increasing Recycling of End-of-life Mercury-containing Lamps from Residential and Commercial Sources in Canada, Pollution Probe, 31 October , 2005, p.16

Comments and recommendations

Below are a series of recommendations that are largely based on data on the mercury content of lighting equipment sold in the United States. It was distressing to find scant mercury content data for lighting equipment manufactured in and for the European Union. Consequently, we have the following suggestions for the Commission to follow that will enable more informed decisions to be made in this regard in the future.

First, the Commission should require manufacturers interested in selling mercury-containing lamps in Europe to provide the Commission with data on the maximum mercury content in each model in milligrams as well as the dosing method used.

Second, the Commission should then use this information to establish appropriate mercury restrictions based on “best in class” levels for each lamp category. Without this information, the Commission and the public will largely remain in the dark about the mercury content of various types of lighting products.

This process is consistent with some US government agencies are following prior to establishing environmental standards for the lighting equipment they procure for their operations. For example, the State of California developed a lighting bid specification in 2005 that set mercury, lamp life and performance standards for the most popular lamps offered on state contracts⁷. Similarly, the City of New York adopted a law in 2005, which requires that “any mercury-added lamp purchased or leased by any agency shall achieve no less energy efficiency than the minimum required by the director [of environmental purchasing] through rulemaking and, among lamps meeting such energy efficiency requirements shall contain the lowest amount of mercury per lumen hour.”⁸

The Commission should make every effort to reduce the mercury content of fluorescent, HID and neon lighting equipment. It should particularly look for opportunities to eliminate exemptions that enable antiquated lighting equipment – that often inefficient, short-lived and high in mercury content – to continue to be sold in hardware stores and other distribution channels.

Exemption 1: Mercury in compact fluorescent lamps(CFL) not exceeding 5 mg per lamp

Technology has advanced since the maximum limits for mercury content in CFLs were set, and there is now evidence that lamps can contain a lot less than 5mg of mercury, but being as efficient or even more efficient than in the past.

Reducing the content of mercury per lamp is technically practicable. According to publicly available data from US lamp manufacturers, there are many CFL models currently that have mercury content of 3 mg or less and others that are below 2 mg. For example:

- Philips Lighting has CFL models ranging from 1.4 mg to 4 mg, according to 2008⁹ data provided directly from this manufacturer to the Green Purchasing Institute (see Annex I)

⁷ State of California Department of General Services, California Lamp Contract, 1 06-62-31 (Effective 3/1/06 – 2/28/09); <http://www.documents.dgs.ca.gov/pd/contracts/lamps/6240-05BS-001.htm>.

⁸ (Source: New York City Council, Local Laws of the City of New York for the Year 2005: No 120; “To amend the administrative code of the city of New York in relation to the reduction of hazardous substances in products purchased by the City; http://www.nyc.gov/html/nycwasteless/html/at_agencies/laws_directives.shtml#local120.)

⁹ Philips Lighting,
http://www.primaecat.lighting.philips.com/ecat/Light/Landing.aspx?fh_location=//prof/en_GB/categories<{fepplg}/countries>{en_GB}&left_nav=gb_en&

- Osram Sylvania, which has posted its mercury content data online, reports that many of its integrated and non-integrated (pin-based) CFLs contain 3 mg or less of mercury. (Annex III) ¹⁰
- MaxLite reported in its January 2008 newsletter, that it uses 1.2 to 2.5 mg per compact fluorescent lamp. ¹¹

In May 2007, Wal-Mart announced that it had negotiated new contracts for low-mercury CFLs sold through its stores as well as Sam's Club. All CFLs sold will be ENERGY STAR-qualified. In addition, according to the Wal-Mart news release, "To reduce the amount of mercury in its CFLs, Wal-Mart worked closely with its manufacturers GE, Royal Philips, Osram Sylvania and Lights of America. All four suppliers committed to achieving a greater reduction in mercury content than the 5 mg standard recently set by the National Electrical Manufacturers Association (NEMA). These suppliers will also adhere to clean production techniques that will minimize mercury pollution from factories manufacturing CFLs."

Wal-Mart's supplier commitments include the following¹²:

- GE Consumer & Industrial will reduce CFL mercury content up to 50 percent from NEMA levels in new products, while maintaining the excellent light quality and long life that GE customers expect.
- Philips currently supplies Wal-Mart with CFLs that have mercury contents 40 to 60 percent below the NEMA level of 5 mg per unit (for CFLs less than 25W). Philips utilizes pellet dosing versus liquid mercury to ensure safe and accurate levels of mercury per bulb, and continues to look for ways to reduce the amount of mercury in its CFL, while still maintaining the lamps' high quality and performance characteristics.
- OSRAM SYLVANIA CFLs currently meet the NEMA standard of 5 mg of mercury, with reflector lamps that are 40 percent lower at 3 mg. Sylvania has committed to reducing the mercury content in all of its CFLs to 4 mg or less by the end of 2007, and to 2.5 mg by the end of 2008.
- Lights of America will reduce the amount of mercury in its CFLs by up to 50 percent. Wal-Mart's new standards have resulted in Lights of America identifying a different metal alloy technology that improves bulb performance while requiring less mercury per bulb. This technology is currently being added to Lights of America CFLs and the company expects all of its bulbs to have no more than 2 mg of mercury by the end of 2007.

In addition, the European VITO study draft lot 19 on domestic lighting, page 18, recommends a 2 mg limit on CFLs.¹³

Recommendation: On the basis of the above the Environmental NGOs would suggest a maximum mercury content of 2 mg per CFL lamp to apply as soon as possible. At the same time detailed information on mercury content per lamp and lamp type should be requested by industry.

¹⁰ Osram Sylvania, "Mercury Quantity in Lamps for General Lighting Applications, 11/01/07, <http://www.sylvania.com/content/display.scfx?id=003690938>).

¹¹ www.maxilite.com

¹² News Release: "Wal-Mart Announces Major Mercury Reduction in Compact Fluorescent Light Bulbs," May 10, 2007, <http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/05-10-2007/0004585479&EDATE>

¹³ http://www.ebpg.bam.de/de/ebpg_medien/019_studyd_08-01_part1-4.pdf

Exemption 2: Mercury in straight fluorescent lamps for general purposes not exceeding:

- **halophosphate 10 mg**
- **triphosphate with normal lifetime 5 mg**
- **triphosphate with long lifetime 8 mg**

Halophosphate (10 mg)

Under the EuP directive, the EC-proposed Working Document on possible ecodesign requirements on fluorescent lamps for office lighting, proposes criteria on lamp lumen maintenance factor.¹⁴ In the explanatory notes of the same document, it is clarified that by adopting the proposed lamp lumen maintenance factor requirements, halophosphate lamps will actually be phased out. This proposal is supported by the VITO study on Lot 8: Office lighting¹⁵,

On the basis of this, the NGOs have welcomed this recommendation and would therefore propose that the inefficient halophosphate fluorescent lamps are phased out.

On the other hand for the halophosphates which may still fall under the proposed EuP directive lumen criteria, the following information should be considered. This information refers not only to straight fluorescent halophosphate lamps but also to U shaped and circular ones which could be seen as falling currently under exemption 4 - *Mercury in other lamps not specifically mentioned in this Annex I*.

Halophosphate fluorescents, which largely include older type fluorescent lamps such as linear and U-shaped T12s and circular T9s, are being phased out in the EU (and elsewhere) due to energy efficiency and light quality concerns. Many of these lamp types also have higher mercury content than equivalent triphosphate models such as high-efficiency T8s and T5s. In the meantime, it is important to make sure that models with an extremely high mercury content are not put into circulation.

While industry, according to the VITO study on office lighting says it is not possible to produce halophosphate lamps with less than 10 mg of mercury, at least one company, Philips Lighting, has done so in the United States for nearly every type of T12 lamp it offers including 2- and 3-foot (3.5 mg), U-bent as well as 4-foot standard and high-output (4.4 mg), 6- and 8-foot standard and high-output (6.8 mg). See Annex I Excel spreadsheet, Mercury Content 2008 provided directly to the Green Purchasing Institute by Philips Lighting Company. (While every individual lamp model does not meet the 8 mg limit, there generally is at least one model in every lamp category that does. Often, low-mercury dosing technology is not used on older models because manufacturers don't feel that it is economically beneficial to retool lamps that are less popular or in the process of being phased out.)

While most of Sylvania's T12s (with the exception of high and very high output models) meet the current EU limit of 10 mg, its U-bent T12s have 8 mg of mercury. See <http://www.sylvania.com/content/display.scfx?id=003690938>.

GE's T12 lamps (manufactured for sale in the US) have mercury content that varies greatly. A few of their 2-foot models have precisely 4.9 mg of mercury but their standard 4-foot T12s report up to 10 mg. Some of GE's other T12 models use older dosing technology (which results in the mercury being reported in an imprecise range) and report significant higher mercury levels. For example, its 8-foot T12s contain 11-30 mg of mercury while its 5-foot (F60T12) and 6-foot (F72T12) report 31-65 mg of mercury and some of its high-output models report up to 100 mg of mercury. (Note: GE's data can be found in the attached

¹⁴ http://ec.europa.eu/energy/demand/legislation/doc/2007_12_18_working_document_fluorescent_lighting.pdf , p. 10

¹⁵ <http://www.eup4light.net/assets/pdffiles/Final/VITOEuPOfficeLightingFinal.pdf>

Annex II Excel spreadsheet, GE Via Omega 4th Quarter Report, 03-03-08 that was submitted by a vendor of GE Lamps to the City of San Francisco, CA.)

Furthermore information on Circular T9s (halophosphate) indicates that these lamps have a relatively low efficiency rating, short life and high mercury content compared to equivalent T5 circular (triphosphate) fluorescent lamps. By adding a tighter mercury standard in the ROHS exemption on circular fluorescent lamps, the Commission could drive the transition to the more efficient, longer-lasting, lower mercury models.

Summary of data for Circular Fluorescents (based on US data)

Manufacturer	Lamp Type	Typical lamp life (rated hours)	Typical Color Quality (CRI)	Mercury Content (mg)
Philips	T9 (Halophosphate) also these should be banned...	12,000	60s	20 mg
Philips	T5 (Triphosphate), including high-output	16,000	85	5 mg
Sylvania	T9 (Halophosphate)	12,000	60s	Mostly <15 mg
Sylvania	T5 (Triphosphate)	16,000	Mid-80s	<9 mg
GE	T9 (Halophosphate)	12,000	60s	10-50 mg
GE	T5 (Triphosphate)			No data

Therefore, similar to the discussion above on straight fluorescent halophosphate lamps T12 vs T8 (Triphosphates), the T9 circulars are not only less efficient than the T5 circular triphosphate but they also have shorter lifetime and a significantly high mercury content, and therefore these should be banned.

NGOs would therefore support that all (straight, U-shaped, circular etc) halophosphate lamps meet a mercury cap of at maximum 8 mg initially, provided that they would also meet the lumen requirements as discussed above. The existing 10 mg cap has been effective at keeping halophosphate lamps, which are relatively inefficient and have a very high mercury content out of the EU markets, Adopting an 8 mg cap is technically feasible and would help continue to drive the transition to more efficient technologies, which can more easily meet the EU mercury limits. Information should further be provided by industry to drive these limits further lower

- **Triphosphate ,(with normal lifetime 5 mg / long lifetime 8 mg)**

The EC proposed Implementing Measure for office lighting¹⁶ recommends that the RoHS exemptions revises and reduces the maximum allowed limit of mercury to 2 mg per lamp.

The Environmental NGOs support this recommendation – maximum allowed limit of 2 mg Hg/per triphosphate long fluorescent lamp.

Considering the up to now proposed exemption, we further believe that the categorization of fluorescent lamps for exemptions should change. To our information, there is no evidence that fluorescent lamps with a long life-time need additional mercury content. Lamp life is largely unrelated to mercury content. More modern lamps – such as extended life Super T8s – tend to have less mercury and longer lamp life. All three major US manufacturers have long-life T8s that can meet 5 mg (except for models $\geq 72''$.)

For high-efficiency linear T5s, RoHS set a 5 mg cap (since they are a straight fluorescent, triphosphate with standard life.) However, it could easily be argued using this data that at least 2 major manufacturers can meet a lower cap since Philips and Sylvania are making linear T5s with 1.4 mg and 2.5 mg of mercury, respectively.

Manufacturer	Lamp Type	Typical lamp life (rated hours)	Mercury Content (mg)
Philips	Linear T5 (standard output)	20,000 to 24,000	1.4 mg
Philips	Linear T5HO (high-output)	20,000 to 25,000	Most 1.4 mg except 80-watt models 5 mg
Sylvania	Linear T5 (standard output)	20,000	2.5 mg
Sylvania	Linear T5HO	20,000 to 25,000	2.5 mg
GE	Linear T5 (standard output)	20,000 to 30,000	1-10 and 5 mg*
GE	Linear T5HO	20,000 to 30,000	1-10 and 5 mg

Please note: * The models that have the 30,000-hour rated life have the lower mercury content of 5 mg; the models with the 20,000 hour rated life have the higher mercury content – countering the contention that lamps with a higher rated life need a higher mercury content.

¹⁶ http://ec.europa.eu/energy/demand/legislation/doc/2007_12_18_working_document_fluorescent_lighting.pdf, p. 11

High-efficiency 4-foot watt T8s, except older preheat models (Triphosphate)

The current RoHS exemption allows up to 5 mg of mercury in these highly popular lamps when they have a standard lamp life but 8 mg when they have an undefined long life. A lower mercury limit is justified across the board because more than one manufacturer has been able to successfully manufacture high-efficiency, long-lasting models (including high-lumen Super T8s) with less than 5 mg of mercury. For example, most of Philips' US 4-foot T8s now have only 1.7 mg of mercury. Sylvania, which has also made progress in this area, has lowered the mercury content of its high-performance (i.e., high-lumen, high CRI, long-life) 4-foot T8s to 3.5 mg. Meanwhile, its less-efficient (700-series) 4-foot T8s (also with a shorter lamp life) have up to 8 mg of mercury. A tighter standard relating to this lamp type is achievable and could drive further innovation. This data show that there is an inverse correlation between mercury content and lamp life.

Other T8s (except older preheat models)

2-foot and 3-foot Triphosphate T8s (F17T8s and F25T8s)

Like the 4-foot T8s mentioned above, there has been sufficient innovation in this category of lamps to support a tighter RoHS exemption. The vast majority of Philips' models in this category have 1.7 mg of mercury. Sylvania's high-performance (high-efficiency, long-life, high CRI models) have 3.5 mg of mercury. Only its less efficient models – again with a shorter lamp life -- contain more mercury -- up to 8 mg of mercury. Again, this data demonstrate that there is no need to have a higher mercury limit of 8 mg for lamps with a longer lamp life since more modern models tend to have innovations in both lamp life and mercury content (as well as efficiency)

On the basis of the above Environmental NGOs would recommend an exemption for straight fluorescent below 6 foot triphosphates with a maximum limit of 2 mg as soon as possible and at the latest by 2012.

8-foot T8s

In the US, 8-foot T8s have tended to have a somewhat higher mercury content than most shorter models. While one company, Philips, has been able to meet a 5 mg limit (theirs contain 4.4 mg), other companies' equivalent models have a higher mercury content. Sylvania's 8-foot T8s contain 8.5 mg and GE's have 1-10 mg in some models and 31-65 mg in others. To prevent the procurement of 8-foot T8s with an extremely high mercury content, the State of California issued a bid specification that included a 10 mg limit on the mercury content of 8-foot T8s. A copy of the CA bid specification can be found at <http://www.documents.dgs.ca.gov/pd/contracts/lamps/6240-05BS-001.htm>.

Similarly a 10 mg limit on the mercury content of 6-foot T8s could be easily justified currently. This would keep off the market models with extremely high levels; see table below for data on the mercury content of 6-foot linear T8s made by major US lamp manufacturers.

Manufacturer	Mercury Content (in mg)
Philips	6.8 mg
Sylvania	8.5 mg
GE	90 mg

On the basis of the above, we would recommend an exemption for straight fluorescent lamps equal or longer than 6 foot with a content of maximum 8 mg in view of reducing this further.

Exemption 3: Mercury in straight fluorescent lamps for special purposes

There are currently no restrictions on the amount of mercury that can be added to straight fluorescent lamps used for special purposes. This category includes lamps used in exit signs, appliances, LCD screens, projectors and other applications. Many of these mercury-containing lamps could be replaced with mercury-free light-emitting diodes (LEDs), which are not only practical because they are so long-lasting; they are also mercury-free. Others could be replaced by high-efficiency T5s and T8s, whose limits are discussed above.

Exit signs

Linear fluorescent lamps used for **exit signs** are typically either F4T5s or F6T5s. Some exit signs also contain compact fluorescent lamps. Despite their small size, these “preheat” linear fluorescent lamps often contain between 10 mg and 20 mg of mercury and tend to have a short lamp life of about 5,000 hours; (see table below based on US lamp data).

Manufacturer	Lamp Model	Nominal Watts* (excluding ballast)	Rated Life* (hours)	Mercury Content
GE	F4T5	4	5,000	1-10 mg
Sylvania	F4T5	4	6,000	>15 mg
Philips	F4T5	4	6,000	20 mg
GE	F6T5	6	5,000	1-10 mg
Sylvania	F6T5	6	7,500	>15 mg
Philips	F6T5	6	7,500	20 mg

**Based on information in manufacturers’ printed and online catalogues.*

Exit sign lamps (both fluorescent and incandescent) can easily be replaced with LEDs, which typically use only about 1 watt per exit sign. In contrast, fluorescent exit signs often contain two fluorescent lamps and can use 5-15 watts. Eliminating the mercury exemption for this lamp type would further facilitate the transition to a technology that is more efficient, long-lasting and mercury-free.

Recommendation: No exemption should be allowed for preheat fluorescents (or CFLs) used in exit signs or other low-wattage applications.

Appliance Lamps (F8T5 and F13T5 Preheat Fluorescents)

Like the shorter preheat fluorescent lamps that are typically used in exit signs, these models are largely used in office furniture, cabinets and appliances. They can easily be replaced by more efficient technologies such as LEDs, T5s and high-efficiency T8s.

Appliance lamps typically contain a significant amount of mercury – up to 30 mg in some models, are relatively inefficient, and have a shorter life than equivalent replacements.

Manufacturer	Lamp Model	Nominal Watts* (excluding ballast)	Rated Life* (hours)	Mercury Content
GE	F8T5	8	5,000	1-10 mg
Sylvania	F8T5	8	6,000	>15 mg
Philips	F8T5	8	6,000	20 mg
GE	F13T5	13	5,000	11-30 mg
Sylvania	F13T5	13	7,500	>15 mg
Philips	F13T5	13	7,500	20 mg

Recommendation: For Appliance lamps set limits consistent with high-efficiency T5s and T8s (above) and look for opportunities to substitute by LEDs

Exemption 4: Mercury in other lamps not specifically mentioned in the Annex of the RoHS directive

U-Bent T8s (Triphosphate)

Currently, there are no restrictions on the mercury content of U-bent T8s (or T12s) that can be sold in the European Union. Data from major US lamp manufacturers supports the establishment of mercury limits since there is a significant difference among equivalent products made by different manufacturers and some manufacturers have been able to achieve low-mercury content in high-efficiency and long-life models. For example, Philips Lighting offers 32-watt U-bent T8s with 3 mg of mercury with no difference among models with higher lumen output. Sylvania's equivalent models have 10 mg of mercury and GE's vary among models from 1-10 mg to 10-50 mg (ranges are due to the use of imprecise mercury dosing technology that also may increase exposure to workers and the environment). A 10 milligram limit on lamps in this category is easily achievable and is consistent with the State of California's 2005 fluorescent lamps bid specification. Data gathered from EU-based lamp manufacturers may support a lower standard in the future, of 5 mg or lower, since there is no technological barrier to achieving it.

We would therefore recommend that a limit of a maximum of 8 mg should at least be set for U-bent T8 lamps in view of lowering this limit as soon as possible.

A similar limit is justified for U-bent T12s (halophosphate) in case these meet the lumen requirements as proposed in the EuP directive, which are discussed in more detail in Exemption 2, but could also be seen here as a non-straight fluorescent lamp. The State of California adopted a similar 10 mg limit on U-bent T12s to meet today's requirements for their purchasing.

No exemptions should further be allowed on neon signs, which can use mercury-free neon or LEDs. Neon contains very high amounts of mercury; many have in the gram range and substitutes are available.

Furthermore maximum limits for mercury content in HIDs should be considered in the review of the Annex of the RoHS directive.

As discussed in the VITO study on Street lighting¹⁷ - the use of High Pressure Mercury Vapour lamps should be phased out.

Attached (annex IV) is a memo detailing the mercury content of high-pressure sodium lamps. However looking at the mercury content for some of the lower wattages we need to consider that these are not so much used and as a result industry has not invested in them to lower the mercury content as much.

Therefore on the basis of this information a maximum allowed content of 5 mg per HPS lamp would be proposed be adopted for all models apart from the 1000 W which could be 15 mg.

Standard Metal halide (MH) lamps while somewhat relatively efficient, have the highest Hg per lumen hour. For many applications there is a new generation of MH called ceramic metal halides that are not only more efficient but tend to have a lower mercury content as well.

The EC should establish mercury limits for this class of lamps that will encourage the use of this new generation lamps and discourage the use of traditional standard MH.

In conclusion, the NGOs respectfully request that the Oeko Institute and the European Commission examine carefully all comments and references above before deciding on the review of the annex.

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¹⁷ <http://www.eup4light.net/assets/pdf/files/Final/VITOEuPStreetLightingFinal.pdf>