



**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 <sup>1</sup> 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.

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<sup>1</sup> NGOs include

The **European Environmental Bureau, (EEB)**, [www.eeb.org](http://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](http://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 ≥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.<sup>2</sup>

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.<sup>3</sup>

(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.<sup>4</sup>

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

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.<sup>6</sup>

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<sup>2</sup> 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

<sup>3</sup> [ELC 2004a] in "RoHS substances in EEE in Belgium" November 2005

<sup>4</sup> Source: [ELC] in "RoHS substances in EEE in Belgium" November 2005

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

<sup>6</sup> 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 contracts<sup>7</sup>. 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.”<sup>8</sup>

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 2008<sup>9</sup> data provided directly from this manufacturer to the Green Purchasing Institute (see Annex I)

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<sup>7</sup> 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>.

<sup>8</sup> (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](http://www.nyc.gov/html/nycwasteless/html/at_agencies/laws_directives.shtml#local120).)

<sup>9</sup> Philips Lighting, [http://www.prismaecat.lighting.philips.com/ecat/Light/Landing.aspx?fh\\_location=//prof/en\\_GB/categories<{fepplg}/countries>{en\\_GB}&left\\_nav=gb\\_en&](http://www.prismaecat.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) <sup>10</sup>
- MaxLite reported in its January 2008 newsletter, that it uses 1.2 to 2.5 mg per compact fluorescent lamp. <sup>11</sup>

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 following<sup>12</sup>:

- 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.<sup>13</sup>

**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.

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

<sup>11</sup> www.maxilite.com

<sup>12</sup> 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>

<sup>13</sup> [http://www.ebpg.bam.de/de/ebpg\\_medien/019\\_studyd\\_08-01\\_part1-4.pdf](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.<sup>14</sup> 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 lighting<sup>15</sup>,

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

<sup>14</sup> [http://ec.europa.eu/energy/demand/legislation/doc/2007\\_12\\_18\\_working\\_document\\_fluorescent\\_lighting.pdf](http://ec.europa.eu/energy/demand/legislation/doc/2007_12_18_working_document_fluorescent_lighting.pdf) , p. 10

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

Annex II Excel spreadsheet, GE Via Omega 4<sup>th</sup> 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 lighting<sup>16</sup> 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.

<sup>16</sup> [http://ec.europa.eu/energy/demand/legislation/doc/2007\\_12\\_18\\_working\\_document\\_fluorescent\\_lighting.pdf](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.
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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 (hours)	Life*	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 lighting<sup>17</sup> - 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.

***For more information please contact:***

Elena Lymberidi-Settimo, Project Coordinator "Zero Mercury Campaign", European Environmental Bureau, T: +32 2 2891301, [elena.lymberidi@eeb.org](mailto:elena.lymberidi@eeb.org)

Alicia Culver, Executive Director, Green Purchasing Institute, [info@greenpurchasing.org](mailto:info@greenpurchasing.org), T: 1 +510-547-5475

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

**ANNEX I**

<b>Product Number</b>	<b>COMPACT FLUORESCENT-NON INTEGRATED Description</b>	<b>Hg Content</b>
<b>PL-S Short Fluorescent Lamps</b>		
146811	PL-S 13W/827/2P/ALTO 10PK	1.4 mg
146829	PL-S 13W/827/2P/ALTO BULK	1.4 mg
146837	PL-S 13W/830/2P ALTO 10PK	1.4 mg
146845	PL-S 13W/835/2P/ALTO 10PK	1.4 mg
146852	PL-S 13W/841/2P/ALTO 10PK	1.4 mg
146860	PL-S 13W/841/2P/ALTO BULK	1.4 mg
146878	PL-S 13W/850/2P ALTO 10PK	1.4 mg
146886	PL-S 13W/850/2P/ALTO BULK	1.4 mg
146712	PL-S 5W827/2P/ALTO 10pk	1.4 mg
148684	PL-S 5W/841/2P/ALTO 10pk	1.4 mg
148718	PL-S 7W/827/2P/ALTO 10pk	1.4 mg
148726	PL-S 7W/835/2P/ALTO 10pk	1.4 mg
148734	PL-S 7W/841/2P/ALTO 10PK	1.4 mg
148742	PL-S 7W/850/2P/ALTO 10PK	1.4 mg
148676	PL-S 9W/827/2P ALTO 10PK	1.4 mg
148692	PL-S 9W/835/2P ALTO 10PK	1.4 mg
148700	PL-S 9W/841/2P/ALTO 10PK	1.4 mg
146803	PL-S 9W/850/2P ALTO 10PK	1.4 mg
<b>PL-C Cluster 2-pin Fluorescent Lamps</b>		
383141	PL-C 13W/27/ALTO 10PK	1.4 mg
383109	PL-C 13W/27/USA/ALTO 10PK	1.4 mg
383158	PL-C 13W/30/ALTO 10PK	1.4 mg
383117	PL-C 13W/30/USA/ALTO 10PK	1.4 mg
383125	PL-C 13W/35/USA/ALTO 10PK	1.4 mg
383133	PL-C 13W/41/USA/ALTO 10 PK	1.4 mg
383166	PL-C 18W/27/ALTO 10PK	1.4 mg
383174	PL-C 18W/30/ALTO 10PK	1.4 mg
383182	PL-C 18W/35/ALTO 10PK	1.4 mg
383190	PL-C 18W/41/2P/ALTO 10PK	1.4 mg
383216	PL-C 26W/27/ALTO 10PK	1.4 mg
383224	PL-C 26W/30 ALTO 10PK	1.4 mg
383232	PL-C 26W/35 ALTO 10PK	1.4 mg
383240	PL-C26W/41/ALTO 10PK	1.4 mg
<b>PL-C Cluster 4-pin Fluorescent Lamps</b>		
383257	PL-C 13W/27/4P/ALTO 10PK	1.4 mg
383265	PL-C 13W/30/4P/ALTO 10PK	1.4 mg
383273	PL-C 13W/35/4P/ALTO 10PK	1.4 mg
383281	PL-C 13W/41/4P/ALTO 10PK	1.4 mg
383349	PL-C 26W/27/4P/ALTO 10PK	1.4 mg
383299	PL-C 18W/27/4P/ALTO 10PK	1.4 mg
383307	PL-C 18W/30/4P/ALTO 10PK	1.4 mg
383323	PL-C 18W/35/4P/ALTO 10PK	1.4 mg
383331	PL-C 18W/41/4P/ALTO 10PK	1.4 mg
383356	PL-C 26W/30/4P/ALTO 10PK	1.4 mg
383364	PL-C 26W/35/4P/ALTO 10PK	1.4 mg
383372	PL-C 26W/41/4P/ALTO 10PK	1.4 mg
204784	PL-C 15MM/22W/27 40PK	5.0 mg
204792	PL-C 15MM/28W/27 40PK	5.0 mg
<b>PL-L Long Fluorescent Lamps</b>		
345009	PL-L 18W/30 25PK	4.4 mg
359323	PL-L 18W/35 25PK	4.4 mg
345017	PL-L 18W/41 25PK	4.4 mg
345058	PL-L 24W/30 25PK	4.4 mg
359331	PL-L 24W/35 25PK	4.4 mg

345082	PL-L 24W/41 25PK	4.4 mg
345116	PL-L 36W/30 25PK	4.4 mg
349423	PL-L 36W/35 25PK	4.4 mg
345132	PL-L 36W/41 25PK	4.4 mg
386979	PL-L 80W/830 25PK	4.4 mg
386987	PL-L 80W/835 25PK	4.4 mg
386995	PL-L 80W/841 25PK	4.4 mg
347476	PL-L 50W/830/4P/RS 25PK	4.4 mg
347534	PL-L 50W/835/4P/RS 25PK	4.4 mg
347708	PL-L 50W/841/RP/RS 25PK	4.4 mg
138446	PL-L 55W/950/4P 25PK	4.4 mg
300426	PL-L40W/30/RS/IS 25PK	4.4 mg
300434	PL-L 40W/35/RS/IS 25PK	4.4 mg
300442	PL-L 40W/41/RS/IS 25PK	4.4 mg

**PL-T Triple 4-pin Fluorescent Lamps**

384370	PL-T 18W/27/4P/ALTO 12PK	2.7 mg
268029	PL-T 18W/30/4P/ALTO 12PK	2.7 mg
268201	PL-T 18W/35/4P/ALTO 12PK	2.7 mg
268227	PL-T 18W/41/4P/ALTO 12PK	2.7 mg
384404	PL-T 26W/27/4P/ALTO 12PK	2.7 mg
268235	PL-T 26W/30/4P/ALTO 12PK	2.7 mg
268243	PL-T 26W/35/4P/ALTO 12PK	2.7 mg
268250	PL-T 26W/41/4P/ALTO 12PK	2.7 mg
384438	PL-T 32W/27/4P/ALTO 12PK	2.7 mg
268326	PL-T 32W/30/4P/ALTO 12PK	2.7 mg
268334	PL-T 32W/35/4P/ALTO 12PK	2.7 mg
268722	PL-T 32W/41/4P/ALTO 12PK	2.7 mg
384503	PL-T 42W/27/4P/ALTO 12PK	2.7 mg
268730	PL-T 42W/30/4P/ALTO 12PK	2.7 mg
268755	PL-T 42W/35/4P/ALTO 12PK	2.7 mg
134882	PL-T 42W/835/4P/HTA ALTO 12P	2.7 mg
134874	PL-T 42W/830/4P/HTA ALTO	2.7 mg
268763	PL-T 42W/41/4P/ALTO 12PK	2.7 mg
136598	PL-T42W/841/4P/HTA ALTO 12PK	2.7 mg
146316	PL-T 57W/830/4P/A 10PK	3.0 mg
146324	PL-T 57W/835/4P/A 10PK	3.0 mg
146332	PL-T 57W/841/4P/A 10PK	3.0 mg

**PL-H High Performance Fluorescent Lamps**

133728	PL-H 120W/830 ALTO 10PK	4.4 mg
133736	PL-H 120W/841 ALTO 10PK	4.4 mg
133686	PL-H 60W/830 ALTO 10PK	4.4 mg
133694	PL-H 60W/841 ALTO 10PK	4.4 mg
133702	PL-H 85W/830 ALTO 10PK	4.4 mg
133710	PL-H 85W/841 ALTO 10PK	4.4 mg

**LINEAR FLUORESCENT  
PROFESSIONAL PRODUCTS**

**Philips Silhouette™ Long Life & Standard T5 Lamps**

**T5 Miniature Bipin; Programmed Start**

29026-2	F54T5/830/HO/ALTO	1.4 mg
29028-8	F54T5/835/HO/ALTO	1.4 mg
29083-3	F54T5/841/HO/ALTO	1.4 mg
13510-3	F54T5/850/HO/ALTO	1.4 mg
14745-4	F54T5/865/HO/ALTO	1.4 mg

**SILHOUETTE Series 2'-5' T5 Fluorescent Lamps**

**T5 Miniature Bipin; Programmed Start**

23077-1	F14T5/830/ALTO	1.4 mg
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23079-7	F14T5/835/ALTO	1.4 mg
23080-5	F14T5/841/ALTO	1.4 mg
23081-3	F21T5/830/ALTO	1.4 mg
23082-1	F21T5/835/ALTO	1.4 mg
23083-9	F21T5/841/ALTO	1.4 mg
23084-7	F28T5/830/ALTO	1.4 mg
23085-4	F28T5/835/ALTO	1.4 mg
23086-2	F28T5/841/ALTO	1.4 mg
23088-8	F35T5/830	
23091-2	F35T5/835	
23095-3	F35T5/841	

**SILHOUETTE Series 2'-5' T5 High Output Fluorescent Lamps  
T5 Miniature Bipin; Programmed Start**

29019-7	F24T5/830/HO/ALTO	1.4 mg
29020-5	F24T5/835/HO/ALTO	1.4 mg
29021-3	F24T5/841/HO/ALTO	1.4 mg
29022-1	F39T5/830/HO/ALTO	1.4 mg
29023-9	F39T5/835/HO/ALTO	1.4 mg
29025-4	F39T5/841/HO/ALTO	1.4 mg
29084-1	F80T5/830/HO	5 mg
14744-7	F80T5/835/HO	5 mg
29088-2	F80T5/841/HO	5 mg

**Colored—Linear Fluorescent Lamps—T5 High Output**

14637-3	F24T5/Red/HO	5 mg
14638-1	F24T5/Green/HO	5 mg
14639-9	F24T5/Blue/HO	5 mg
14640-7	F54T5/Red/HO	5 mg
14641-5	F54T5/Green/HO	5 mg
14642-3	F54T5/Blue/HO	5 mg

**SILHOUETTE™ Series T5 Circular Fluorescent Lamps  
2GX13 Base; Programmed Start**

16601-7	TL5C 22W/830	5 mg
14856-9	TL5C 22W/835	5 mg
16600-9	TL5C 22W/840	5 mg
16596-8	TL5C 40W/830	5 mg
14859-3	TL5C 40W/835	5 mg
16598-4	TL5C 40W/840	5 mg

**SILHOUETTE™ Series T5 Circular Fluorescent Lamps  
2GX13 Base; Programmed Start**

16593-6	TL5C 55W/830	5 mg
14862-7	TL5C 55W/835	5 mg
16592-8	TL5C 55W/840	5 mg

**SILHOUETTE™ Series T5 Circular Fluorescent Lamps  
2GX13 Base; Programmed Start**

29010-6	FC9T5/830	5 mg
29011-4	FC9T5/835	5 mg
29012-2	FC9T5/841	5 mg
29014-8	FC12T5/830	5 mg
29016-3	FC12T5/835	5 mg
29017-1	FC12T5/841	5 mg

**SILHOUETTE™ Series T5 Circular Fluorescent Lamps  
2GX13 Base; Programmed Start**



38479-2	FC12T5/830/HO	5 mg
38480-0	FC12T5/841/HO	5 mg

**Preheat Fluorescent Lamps**

**T5 Miniature Bipin; Requires Use of Starters**

33236-1	F4T5/CW	20 mg
33241-1	F6T5/CW	20 mg
33242-9	F6T5/D	20 mg
33252-8	F8T5/WW	20 mg
33247-8	F8T5/CW	20 mg
20702-7	F8T5/30U	20 mg
33249-4	F8T5/D	20 mg
33253-6	F13T5/CW	20 mg
20703-5	F13T5/30U	20 mg

**Universal T8 Fluorescent Lamps**

**T8 Medium Bipin**

36787-0	F17T8/TL830/ALTO	1.7mg
36791-2	F17T8/TL835/ALTO	1.7mg
36793-8	F17T8/TL841/ALTO	1.7mg
14123-4	F17T8/TL850/ALTO	1.7mg
36807-6	F17T8/TL730/ALTO	1.7mg
36808-4	F17T8/TL735/ALTO	1.7mg
36812-6	F17T8/TL741/ALTO	1.7mg
36813-4	F25T8/TL830/ALTO	1.7mg
36814-2	F25T8/TL835/ALTO	1.7mg
36825-8	F25T8/TL841/ALTO	1.7mg
14124-2	F25T8/TL850/ALTO	1.7mg
36826-6	F25T8/TL730/ALTO	1.7mg
36828-2	F25T8/TL735/ALTO	1.7mg
36829-0	F25T8/TL741/ALTO	1.7mg
24667-8	F32T8/TL830/ALTO	1.7mg
27236-9	F32T8/TL830/ALTO PLZ	1.7mg
24670-2	F32T8/TL835/ALTO	1.7mg
27233-6	F32T8/TL835/ALTO PLZ	1.7mg
24671-0	F32T8/TL841/ALTO	1.7mg
27235-1	F32T8/TL841/ALTO PLZ	1.7mg
27229-4	F32T8/TL850/ALTO	1.7mg
27252-6	F32T8/TL730 ALTO	1.7mg
27282-3	F32T8/TL730/ALTO PLZ	1.7mg
27249-2	F32T8/TL735/ALTO	1.7mg
27259-1	F32T8/TL735/ALTO PLZ	1.7mg
27248-4	F32T8/TL741/ALTO	1.7mg
38351-3	F32T8/TL741/ALTO	1.7mg
27255-9	F32T8/TL741/ALTO PLZ	1.7mg
27268-2	F32T8/TL750/ALTO	1.7mg

**PLUS T8 Fluorescent Lamps**

**T8 Medium Bipin Featuring HI-VISION® Phosphor**

38419-8	F15T8/TL865/PLUS/ALTO	1.7mg
14552-4	F17T8/TL830/PLUS/ALTO	1.7mg
14553-2	F17T8/TL835/PLUS/ALTO	1.7mg
14554-0	F17T8/TL841/PLUS/ALTO	1.7mg
14555-7	F17T8/TL850/PLUS/ALTO	1.7mg
38215-0	F17T8/TL865/PLUS/ALTO	1.7mg
14556-5	F25T8/TL830/PLUS/ALTO	1.7mg
14557-3	F25T8/TL835/PLUS/ALTO	1.7mg
14558-1	F25T8/TL841/PLUS/ALTO	1.7mg

14559-9	F25T8/TL850/PLUS/ALTO	1.7mg
38258-0	F25T8/TL865/PLUS/ALTO	1.7mg
36000-8	F32T8/TL830/PLUS/ALTO	1.7mg
36001-6	F32T8/TL835/PLUS/ALTO	1.7mg
36002-4	F32T8/TL841/PLUS/ALTO	1.7mg
13686-1	F32T8/TL841/PLUS/ALTO PLZ	1.7mg
36003-2	F32T8/TL850/PLUS/ALTO	1.7mg
38261-4	F32T8/TL865/PLUS/ALTO	1.7mg
36004-0	F32T8/TL730/PLUS/ALTO	1.7mg
36005-7	F32T8/TL735/PLUS/ALTO	1.7mg
38383-6	F32T8/TL735/PLUS/ALTO PLZ	1.7mg
36013-1	F32T8/TL741/PLUS/ALTO	1.7mg
38384-4	F32T8/TL741/PLUS/ALTO PLZ	1.7mg
36014-9	F32T8/TL750/PLUS/ALTO	1.7mg

**Advantage T8 Fluorescent Lamps**

**T8 Medium Bipin Featuring HI-VISION® Phosphor**

13987-3	F32T8/ADV830/ALTO	1.7mg
13988-1	F32T8/ADV835/ALTO	1.7mg
13989-9	F32T8/ADV841/ALTO	1.7mg
13990-7	F32T8/ADV850/ALTO	1.7mg

**Energy Advantage T8 Long Life 25 Watt Fluorescent Lamps**

**T8 Medium Bipin Featuring HI-VISION® Phosphor**

13781-0	F32T8/ADV830/XEW/LL/ALTO 25 Watt	1.7mg
13782-8	F32T8/ADV835/XEW/LL/ALTO 25 Watt	1.7mg
13783-6	F32T8/ADV841/XEW/LL/ALTO 25 Watt	1.7mg
13784-4	F32T8/ADV850/XEW/LL/ALTO 25 Watt	1.7mg

**Energy Advantage T8 Long Life 28 Watt Fluorescent Lamps**

**T8 Medium Bipin Featuring HI-VISION® Phosphor**

14732-2	F32T8/ADV830/EW/LL/ALTO 28 Watt	1.7mg
14733-0	F32T8/ADV835/EW/LL/ALTO 28 Watt	1.7mg
14734-8	F32T8/ADV841/EW/LL/ALTO 28 Watt	1.7mg
14735-5	F32T8/ADV850/EW/LL/ALTO 28 Watt	1.7mg

**Energy Advantage T8 Long Life 30 Watt Fluorescent Lamps**

**T8 Medium Bipin Featuring HI-VISION® Phosphor**

14771-0	F32T8/ADV830/EW/LL/ALTO 30 Watt	1.7mg
14772-8	F32T8/ADV835/EW/LL/ALTO 30 Watt	1.7mg
14773-6	F32T8/ADV841/EW/LL/ALTO 30 Watt	1.7mg
14774-4	F32T8/ADV850/EW/LL/ALTO 30 Watt	1.7mg

**Rapid Start Fluorescent Lamps**

**T8 Medium Bipin; High CRI**

22154-9	F17T8/TL950	5 mg
22158-0	F25T8/TL930	5 mg
22159-8	F25T8/TL950	5 mg
20904-9	F32T8/TL930	5 mg
20905-6	F32T8/TL950	5 mg

**U-Bent Rapid Start Fluorescent Lamps**

**T8 Medium Bipin with 6" Leg Spacing**

37897-6	FB32T8/TL830/6/ALTO	3 mg
37900-8	FB32T8/TL835/6/ALTO	3 mg
37902-4	FB32T8/TL841/6/ALTO	3 mg
37880-2	FB32T8/TL850/6/ALTO	3 mg
37892-7	FB32T8/TL730/6/ALTO	3 mg

37893-5	FB32T8/TL735/6/ALTO	3 mg
37894-3	FB32T8/TL741/6/ALTO	3 mg
37882-8	FB32T8/TL750/6/ALTO	3 mg

**Rapid Start Fluorescent Lamps**

**T8 Medium Bipin**

36831-6	F40T8/TL830/ALTO	3.5 mg
36834-0	F40T8/TL835/ALTO	3.5 mg
36847-2	F40T8/TL841/ALTO	3.5 mg
36851-4	F40T8/TL730/ALTO	3.5 mg
36852-2	F40T8/TL735/ALTO	3.5 mg
36853-0	F40T8/TL741/ALTO	3.5 mg

**Preheat Fluorescent Lamps**

**T8 Medium Bipin Linear Fluorescent Lamps; Requires Use of Starters**

37823-2	F15T8D/ALTO	1.9 mg
38298-6	F15T8/WW/ALTO	1.9 mg
36720-1	F15T8/CW/ALTO	16 mg
36436-4	F15T8/CW BULK	16 mg
39226-6	F15T8/PLANT	16 mg
26063-8	F30T8/D	1.9 mg
38691-2	F30T8/CW/ALTO	1.9 mg

**US Slimline T8 8-Foot Fluorescent Lamps**

**T8 Single Pin; Featuring ALTO® Lamp Technology; Instant Start**

38800-9	F96T8/TL830/PLUS/ALTO	4.4 mg
38801-7	F96T8/TL835/PLUS/ALTO	4.4 mg
38802-5	F96T8/TL841/PLUS/ALTO	4.4 mg
38803-3	F96T8/TL850/PLUS/ALTO	4.4 mg
38805-8	F96T8/TL735/PLUS/ALTO	4.4 mg
38806-6	F96T8/TL741/PLUS/ALTO	4.4 mg

**PLUS High Output T8 8-Foot Fluorescent Lamps**

**T8 Recessed D.C.; Featuring ALTO® Lamp Technology**

38826-4	F96T8/TL830/HO/PLUS/ALTO	4.4 mg
38827-2	F96T8/TL835/HO/PLUS/ALTO	4.4 mg
38828-0	F96T8/TL841/HO/PLUS/ALTO	4.4 mg
38831-4	F96T8/TL741/HO/PLUS/ALTO	4.4 mg

**High Output Fluorescent Lamps**

**T8 Recessed D.C.; Featuring ALTO® Lamp Technology**

38808-2	F48T8/TL830/HO/ALTO	3.5 mg
38809-0	F48T8/TL835/HO/ALTO	3.5 mg
38810-8	F48T8/TL841/HO/ALTO	3.5 mg
38814-0	F60T8/TL830/HO/ALTO	3.5 mg
38815-7	F60T8/TL835/HO/ALTO	3.5 mg
38816-5	F60T8/TL841/HO/ALTO	3.5 mg
38820-7	F72T8/TL830/HO/ALTO	3.5 mg
38821-5	F72T8/TL835/HO/ALTO	3.5 mg
38822-3	F72T8/TL841/HO/ALTO	3.5 mg

**Rapid Start Fluorescent Lamps**

**T12 Medium Bipin**

27247-6	F25T12/CW/RS/EW/ALTO	3.5 mg
31365-0	F25T12/WW/RS/EW	3.5 mg
31377-5	F30T12/30U/RS/ALTO	3.5 mg
31379-1	F30T12/35U/RS/ALTO	3.5 mg
31380-9	F30T12/41U/RS/ALTO	3.5 mg

31381-7	F30T12/50U/RS/ALTO	3.5 mg
31369-2	F30T12/SPEC30/RS/ALTO	3.5 mg
31371-8	F30T12/SPEC35/RS/ALTO	3.5 mg
31372-6	F30T12/SPEC41/RS/ALTO	3.5 mg
31376-7	F30T12/C50/RS	16 mg
37649-1	F30T12/D/RS/ALTO	3.5 mg
27242-7	F30T12/CW/RS/ALTO	3.5 mg
31221-7	F30T12/WW/RS/ALTO	3.5 mg

**Advantage Rapid Start Ultimate Performance Fluorescent Lamps**

**T12 Medium Bipin**

14257-0	F34T12/ADV30/EW/ALTO	4.4 mg
14258-8	F34T12/ADV35/EW/ALTO	4.4 mg
14259-6	F34T12/ADV41/EW/ALTO	4.4 mg
14260-4	F34T12/ADV50/EW/ALTO	4.4 mg

**Rapid Start "Long Life" Fluorescent Lamps**

**T12 Medium Bipin**

14251-3	F34/CW/RS/EW/LL/ALTO	4.4 mg
14252-1	F34/WW/RS/EW/LL/ALTO	4.4 mg

**Rapid Start 800 Series Fluorescent Lamps**

**T12 Medium Bipin**

14253-9	F34T12/830/EW/ALTO	4.4 mg
14254-7	F34T12/835/EW/ALTO	4.4 mg
14255-4	F34T12/841/EW/ALTO	4.4 mg
14256-2	F34T12/850/EW/ALTO	4.4 mg

**Rapid Start Fluorescent Lamps**

**T12 Medium Bipin**

26659-3	F34/DX/RS/EW/ALTO	4.4 mg
24470-7	F34/CW/RS/EW/ALTO	4.4 mg
22046-7	F34/CW/RS/EW/ALTO	4.4 mg
24472-3	F34/CW/RS/EW/ALTO PLZ	4.4 mg
25686-7	F34/WW/RS/EW/ALTO	4.4 mg

**U-Bent Fluorescent Lamps**

**T12 Medium Bipin**

37871-1	FB34/SPEC30/6/EW/ALTO	4.4 mg
37872-9	FB34/SPEC35/6/EW/ALTO	4.4 mg
37874-5	FB34/SPEC41/6/EW/ALTO	4.4 mg
37863-8	FB34/CW/6/EW/ALTO	4.4 mg
37865-3	FB34/LW/6/EW/ALTO	4.4 mg
37862-0	FB34/WW/6/EW/ALTO	4.4 mg
20704-3	FB34/CW/3/EW	
20705-0	FB34/WW/3/EW	

**Advantage Rapid Start Ultimate Performance Fluorescent Lamps**

**T12 Medium Bipin Linear Fluorescent Lamps**

26604-9	F40T12/ADV30/ALTO	4.4 mg
26631-2	F40T12/ADV35/ALTO	4.4 mg
26640-3	F40T12/ADV41/ALTO	4.4 mg
26643-7	F40T12/ADV50/ALTO	4.4 mg

**Rapid Start 800 Series Fluorescent Lamps**

**T12 Medium Bipin**

14261-2	F40T12/830/ALTO	4.4 mg
14262-0	F40T12/835/ALTO	4.4 mg

14263-8	F40T12/841/ALTO	4.4 mg
14264-6	F40T12/850/ALTO	4.4 mg

**Rapid Start Fluorescent Lamps**

**T12 Medium Bipin Linear Fluorescent Lamps**

33464-9	F40/C75	16 mg
30203-4	F40/C50	16 mg
27359-9	F40/DX/ALTO	4.4 mg
36765-6	F40/CWX	16 mg
39228-2	F40/PLANT	16 mg
20189-7	F40/BB	16 mg

**U-Bent Fluorescent Lamps**

**T12 Medium Bipin**

37879-4	FB40/30U/6/ALTO	4.4 mg
37840-6	FB40/35U/6/ALTO	4.4 mg
37876-0	FB40/41U/6/ALTO	4.4 mg
37866-1	FB40/SPEC30/6/ALTO	4.4 mg
37854-7	FB40/SPEC35/6/ALTO	4.4 mg
37868-7	FB40/SPEC41/6/ALTO	4.4 mg
21993-1	FB40/DX/6	

**Slimline Fluorescent Lamps**

**T12 Single Pin Linear Fluorescent Lamps; Instant Start**

14140-8	F36T12/CW	
36609-6	F48T12/SPEC41/EW/ALTO	4.4 mg
38700-1	F48T12/CW/EW/ALTO	4.4 mg
36613-8	F48T12/SPEC35/ALTO	4.4 mg
36219-4	F48T12/D/ALTO	4.4 mg
38702-7	F48T12/CW/ALTO	4.4 mg
36660-9	F48T12/WW/ALTO	4.4 mg
35564-4	F60T12/D	20 mg
35563-6	F60T12/CW	20 mg
35577-6	F64T12/D	20 mg
35576-8	F64T12/CW	20 mg
36614-6	F72T12/30U/ALTO	6.8 mg
36618-7	F72T12/35U/ALTO	6.8 mg
36621-1	F72T12/41U/ALTO	6.8 mg
36623-7	F72T12/SPEC35/ALTO	6.8 mg
36985-0	F72T12/D/ALTO	6.8 mg
36989-2	F72T12/CW/ALTO	6.8 mg
36661-7	F72T12/WW/ALTO	6.8 mg

**Slimline "Long Life" Fluorescent Lamps**

**T12 Single Pin Linear Fluorescent Lamps; Instant Start**

14747-0	F96T12/CW/EW/LL/ALTO	6.8 mg
14748-8	F96T12/841/EW/LL/ALTO	6.8 mg

**Slimline 800 Series Fluorescent Lamps**

**T12 Single Pin Linear Fluorescent Lamps; Instant Start**

14269-5	F96T12/830/EW/ALTO	6.8 mg
14270-3	F96T12/835/EW/ALTO	6.8 mg
14271-1	F96T12/841/EW/ALTO	6.8 mg
14272-9	F96T12/850/EW/ALTO	6.8 mg

**Slimline Fluorescent Lamps**

**T12 Single Pin Linear Fluorescent Lamps; Instant Start**

36624-5	F96T12/30U/EW/ALTO	6.8 mg
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36625-2	F96T12/35U/EW/ALTO	6.8 mg
36627-8	F96T12/41U/EW/ALTO	6.8 mg
36628-6	F96T12/50U/EW/ALTO	6.8 mg
36630-2	F96T12/SPEC30/EW/ALTO	6.8 mg
26018-2	F96T12/SPEC35/EW/ALTO	6.8 mg
26022-4	F96T12/SPEC41/EW/ALTO	6.8 mg
34198-2	F96T12/C50/EW	20 MG
36654-2	F96T12/DX/EW/ALTO	6.8 mg
25840-0	F96T12/CW/EW/ALTO	6.8 mg
36656-7	F96T12/WW/EW/ALTO	6.8 mg
36655-9	F96T12/LW/EW/ALTO	6.8 mg

**Slimline "Long Life" Fluorescent Lamps**

**T12 Single Pin Linear Fluorescent Lamps; Instant Start**

14749-6	F96T12/841/LL/ALTO	6.8 mg
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**Slimline 800 Series Fluorescent Lamps**

**T12 Single Pin Linear Fluorescent Lamps; Instant Start**

14273-7	F96T12/830/ALTO	6.8 mg
14274-5	F96T12/835/ALTO	6.8 mg
14275-2	F96T12/841/ALTO	6.8 mg
14276-0	F96T12/850/ALTO	6.8 mg

**Slimline Fluorescent Lamps**

**T12 Single Pin Linear Fluorescent Lamps; Instant Start**

36633-6	F96T12/30U/ALTO	6.8 mg
36634-4	F96T12/35U/ALTO	6.8 mg
36635-1	F96T12/41U/ALTO	6.8 mg
36636-9	F96T12/50U/ALTO	6.8 mg
36647-6	F96T12/SPEC30/ALTO	6.8 mg
36648-4	F96T12/SPEC35/ALTO	6.8 mg
36650-0	F96T12/SPEC41/ALTO	6.8 mg
34170-1	F96T12/C50	20 mg
34165-1	F96T12/N	20 mg
37282-1	F96T12/DX/ALTO	20 mg

**High Output Fluorescent Lamps (800ma)**

**T12 Recessed D.C. Linear Fluorescent Lamps**

14144-0	F24T12/D/HO	
14145-7	F24T12/CW/HO	
14141-6	F30T12/D/HO	
14142-4	F30T12/CW/HO	
14138-2	F36T12/D/HO	
14139-0	F36T12/CW/HO	
14136-6	F42T12/D/HO	
14137-4	F42T12/CW/HO	
13222-5	F48T12/41U/HO/ALTO	4.4 mg
26773-2	F48T12/41U/HO	
21896-6	F48T12/SPEC30/HO	
21897-4	F48T12/SPEC35/HO	
26775-7	F48T12/SPEC41/HO	
36984-3	F48T12/D/HO/ALTO	4.4 mg
36978-5	F48T12/CW/HO/ALTO	4.4 mg
21816-4	F48T12/WW/HO	
35567-7	F60T12/D/HO	
35566-9	F60T12/CW/HO	
35584-2	F64T12/D/HO	
35578-4	F64T12/CW/HO	

27305-2	F72T12/30U/HO	
26723-7	F72T12/35U/HO	
26742-7	F72T12/41U/HO	
30001-2	F72T12/SPEC35/HO	
30756-1	F72T12/SPEC41/HO	
21204-3	F72T12/N/HO	
36653-4	F72T12/D/HO/ALTO	6.8 mg
36651-8	F72T12/CW/HO/ALTO	6.8 mg
33053-0	F72T12/WW/HO	
21206-8	F84T12/D/HO	
21205-0	F84T12/CW/HO	

**High Output 800 Series Fluorescent Lamps (800ma)**

14277-8	F96T12/830/HO/EW/ALTO	6.8 mg
14278-6	F96T12/835/HO/EW/ALTO	6.8 mg
14279-4	F96T12/841/HO/EW/ALTO	6.8 mg
14280-2	F96T12/850/HO/EW/ALTO	6.8 mg

**High Output Fluorescent Lamps (800ma)**

**T12 Recessed D.C. Linear Fluorescent Lamps**

27319-3	F96T12/30U/HO/EW	20 mg
34862-3	F96T12/41U/HO/EW	20 mg
20525-2	F96T12/50U/HO/EW	20 mg
34861-5	F96T12/SPEC30/HO/EW	20 mg
22117-6	F96T12/SPEC35/HO/EW	20 mg
34848-2	F96T12/SPEC41/HO/EW	20 mg
21471-8	F96T12/DX/HO/EW	20 mg
26660-1	F96T12/CW/HO/EW/ALTO	6.8 mg
34219-6	F96T12/WW/HO/EW	20 mg
34216-2	F96T12/LW/HO/EW	20 mg

**High Output 800 Series Fluorescent Lamps (800ma)**

14281-0	F96T12/830/HO/ALTO	6.8 mg
14282-8	F96T12/835/HO/ALTO	6.8 mg
14283-6	F96T12/841/HO/ALTO	6.8 mg
14284-4	F96T12/850/HO/ALTO	6.8 mg

**High Output Fluorescent Lamps (800ma)**

**T12 Recessed D.C. Linear Fluorescent Lamps**

34863-1	F96T12/30U/HO	20 mg
26710-4	F96T12/35U/HO	20 mg
34864-9	F96T12/41U/HO	20 mg
34865-6	F96T12/50U/HO	20 mg
27276-5	F96T12/SPEC30/HO	20 mg
27681-6	F96T12/SPEC35/HO	20 mg
27279-9	F96T12/SPEC41/HO	20 mg
34226-1	F96T12/C50/HO	20 mg
34230-3	F96T12/N/HO	20 mg
34222-0	F96T12/CWX/HO	20 mg
21489-0	F96T12/DX/HO	20 mg

**High Output 800 Series Fluorescent Lamps (800ma)**

**T12 Recessed D.C. Linear Fluorescent Lamps; For Low Temperature Applications**

38177-4	F96T12/D/HO-O/ALTO	6.8 mg
38176-4	F96T12/CW/HO-O/ALTO	6.8 mg

**Very High Output Fluorescent Lamps (1500ma)**

**T12 Recessed D.C. Linear Fluorescent Lamps**

21819-8	F48T12/CW/VHO	25 mg
21785-1	F60T12/CW/VHO	25 mg
33054-8	F72T12/D/VHO	25 mg
21210-0	F72T12/CW/VHO	25 mg
34232-9	F96T12/CW/VHO/EW	25 mg
34233-7	F96T12/LW/VHO/EW	25 mg
38213-5	F96T12/41U/VHO/ALTO	8 mg
34237-8	F96T12/D/VHO	25 mg
34234-5	F96T12/CW/VHO	25 mg

**Outdoor Very High Output Fluorescent Lamps (1500ma)****T12 Recessed D.C. Linear Fluorescent Lamps**

21820-6	F48T12/CW/VHO-O	25 mg
37543-6	F60T12/50U/VHO-O	25 mg
21786-9	F60T12/CW/VHO-O	25 mg
21211-8	F72T12/CW/VHO-O	25 mg
34243-6	F96T12/CW/VHO-O	25 mg

**Preheat Fluorescent Lamps****T12 Medium Bipin Linear Fluorescent Lamps**

14151-5	F14T12/CW	16 mg
14147-3	F15T12/D	16 mg
14149-9	F15T12/CW	16 mg
31399-9	F20T12/30U	16 mg
31401-3	F20T12/41U	16 mg
31403-9	F20T12/50U	16 mg
31386-6	F20T12/SPEC30	16 mg
31388-2	F20T12/SPEC35	16 mg
31396-5	F20T12/C50	16 mg
27328-4	F20T12/D/ALTO	1.9 mg
27332-6	F20T12/CW/ALTO	1.9 mg
27349-0	F20T12/WW/ALTO	1.9 mg
39227-4	F20T12/PLANT	16 mg
31745-3	F20T12/BB	16 mg

**Gold Fluorescent Lamps****Blocks UV Emissions**

14746-2	F32T8/GOLD	3.5 mg
14750-4	F40T12/GOLD	4.4 mg

**Appliance Fluorescent Lamps****T8 Medium Bipin Linear Fluorescent Lamps; For Use With Starters**

25914-3	F14T8/CW/15	16 mg
25989-5	F16T8/CW/26	16 mg
25990-3	F17T8/CW/28	16 mg
38302-6	F18T8/CW/30/ALTO	1.9 mg
36520-5	F18T8/CW/24	16 mg

**Appliance Fluorescent Lamps****T12 Medium Bipin Linear Fluorescent Lamps; For Use With Starters**

14135-8	F25T12/CW/28	16 mg
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**Circline Fluorescent Lamps****T9 4-Pin Circular Fluorescent Lamps**

24982-1	FC6T9/Cool White Plus	20 mg
39222-5	FC8T9/Soft White	20 mg
26234-5	FC8T9/D	20 mg



39235-7	FC8T9/DayDLX	20 mg
39116-9	FC8T9/Cool White Plus	20 mg
39122-7	FC12T9/Soft White	20 mg
26260-0	FC12T9/D	20 mg
39117-7	FC12T9/Cool White Plus	20 mg
39118-5	FC16T9/Cool White Plus	20 mg

**HID**

Hg Content/mg

251074	Mercury Vapor 1000W Mog BT56 CL	178
397075	Mercury Vapor 1000W Mog BT56 CO	178
252056	Mercury Vapor 400W Mog ED37 CL	66
248427	Mercury Vapor 400W Mog ED37 CO	66
319855	Mercury Vapor 250W Mog ED28 CL	45
248146	Mercury Vapor 250W Mog ED28 CO	45
257683	Mercury Vapor 250W Mog ED28 CO	45
257683	Mercury Vapor 250W Mog ED28 CO	45
140806	Mercury Vapor 250W Mog ED28 CO	45
319657	Mercury Vapor 175W Mog ED28 CL	26
257246	Mercury Vapor 175W Mog ED28 CL	26
257246	Mercury Vapor 175W Mog ED28 CL	26
140905	Mercury Vapor 175W Mog ED28 CL	26
248054	Mercury Vapor 175W Mog ED28 CO	26
257204	Mercury Vapor 175W Mog ED28 CO 1SC	26
257204	Mercury Vapor 175W Mog ED28 CO 1SC	26
140798	Mercury Vapor 175W Mog ED28 CO	26
132928	MasterColor CDM 350W/940 PS EX39 ED37 CO AL	13
132571	MasterColor CDM 350W/841 CW PS EX39 ED37 CL	13
130930	MasterColor HPS 250W/840 Mog ED18 CL ALTO	3.6
130948	MasterColor HPS 400W/840 Mog ED18 CL ALTO	4.8
132902	MasterColor CDM 400W/840 EX39 ED37 CL ALTO	12
132936	MasterColor CDM 400W/840 EX39 ED37 CO ALTO	12
331546	Ceramalux 50W Mog ED23 1/2 CO ALTO	17.7
332254	Ceramalux 70W Mog ED23 1/2 CO ALTO	17
332270	Ceramalux 100W Mog ED23 1/2 CO ALTO	22.1
332288	Ceramalux 150W Mog ED23 1/2 CL ALTO	17
134692	Ceramalux 310W Mog ED18 CL	31.3
133348	Pulse Start MH Pro 400W/640 EX39 ED37 CL	65
133355	Pulse Start MH Pro 400W/635 EX39 ED37 CO	65
131623	Switch Start MH Std 1500W/635 Mog BT56 CL	203.9
133322	Switch Start MH Protected 400W/640 EX39 ED37 CL	65
133330	Switch Start MH Protected 400W/635 EX39 ED37 CO	65
130682	Switch Start MH Protected 360W/635 EX39 ED37 CO	60
130674	Switch Start MH Protected 360W/640 EX39 ED37 CL	60
313585	Switch Start MH Std 175W/635 Med BD17 CL	28
257626	Switch Start MH Std 175W/635 Med BD17 CL	28
140897	Switch Start MH Std 175W/635 Med BD17 CL	28
313593	Switch Start MH Std 175W/635 Med BD17 CO	28
281196	Switch Start MH Protected 175W/640 EX39 ED28 CL	31.1
278622	Switch Start MH Std 400W/640 Mog ED28 CL	52
257717	Switch Start MH Std 400W/640 Mog ED28 CL	52
140848	Switch Start MH Std 400W/640 Mog ED28 CL	52
246736	Switch Start MH Std 400W/640 Mog ED28 CL	65
345983	Switch Start MH Safety Lifeguard 400W/640 Mog ED	52
346015	Switch Start MH Safety Lifeguard 400W/635 Mog ED	52
298265	Switch Start MH Std 1000W/635 Mog BT56 CL	150.1
298273	Switch Start MH Std 1000W/735 Mog BT56 CO	150.1
321505	Switch Start MH Std 1000W/635 Mog BT37 CL	150.6

233585	Switch Start MH Safety Lifeguard 1000W/635 Mog B	150.1
250936	Switch Start MH Std 1000W/635 Mog BT56 CL	210.2
251371	Switch Start MH Std 1000W/735 Mog BT56 CO	210.2
251306	Switch Start MH Std 1000W/635 Mog BT56 CL	210.2
281188	Switch Start MH Protected 1000W/640 EX39 BT56 C	150.1
253724	Switch Start MH Std 1000W/635 E40/41 BT56 CL	150.1
130393	Pulse Start MH Pro 320W/640 EX39 ED37 CL	37.5
130401	Pulse Start MH Pro 320W/635 EX39 ED37 CO	37.5
360198	Pulse Start MH Std 1000W/635 Mog BT37 CL	210.2
130229	MasterColor CDM 150W/830 Med ED17 CL ALTO	15
130237	MasterColor CDM 150W/830 Med ED17 CO ALTO	15
134635	MasterColor CDM 150W/830 Med ED17P CL ALTO+	14.2
134643	MasterColor CDM 150W/830 Med ED17P CO ALTO+	14.2
377200	MasterColor CDM 150W/940 Med ED17 CL ALTO	11.4
377218	MasterColor CDM 150W/940 Med ED17 CO ALTO	11.4
377242	MasterColor CDM 150W/940 Med ED17P CL ALTO+	11.4
377267	MasterColor CDM 150W/940 Med ED17P CO ALTO+	11.4
365437	MasterColor CDM 100W/940 Mog ED28 CL	6.8
281246	Switch Start MH Protected 250W/640 EX39 ED28 CL	30.1
208843	MasterColor CDM 70W/830 Med ED17 CL ALTO	6.95
208876	MasterColor CDM 70W/830 Med ED17 CO ALTO	6.95
233668	MasterColor CDM 70W/830 Med ED17P CL ALTO+F	6.6
233676	MasterColor CDM 70W/830 Med ED17P CO ALTO+F	6.5
281295	MasterColor CDM 70W/940 Med ED17 CL ALTO	9.5
281337	MasterColor CDM 70W/940 Med ED17 CO ALTO	9.5
360578	MasterColor CDM 70W/940 Med ED17P CL ALTO+F	8.5
360594	MasterColor CDM 70W/940 Med ED17P CO ALTO+F	8.5
360206	MasterColor CDM 50W/830 Med ED17 CL ALTO	6.3
360222	MasterColor CDM 50W/830 Med ED17 CO ALTO	6.3
360230	MasterColor CDM 50W/940 Med ED17 CL ALTO	6.5
360248	MasterColor CDM 50W/940 Med ED17 CO ALTO	6.5
368910	MasterColor CDM 50W/830 Med ED17P CL ALTO+F	6.3
368936	MasterColor CDM 50W/940 Med ED17P CL ALTO+F	6.5
208884	MasterColor CDM 100W/830 Med ED17 CL ALTO	7.2
208892	MasterColor CDM 100W/830 Med ED17 CO ALTO	7.2
233684	MasterColor CDM 100W/830 Med ED17P CL ALTO+	7.2
234443	MasterColor CDM 100W/830 Med ED17P CO ALTO+	6.9
281352	MasterColor CDM 100W/940 Med ED17 CL ALTO	6.8
281360	MasterColor CDM 100W/940 Med ED17 CO ALTO	6.8
360602	MasterColor CDM 100W/940 Med ED17P CL ALTO+	6.9
360610	MasterColor CDM 100W/940 Med ED17P CO ALTO+	6.8
391011	Pulse Start MH Pro 350W/640 EX39 ED37 CL	39.5
391029	Pulse Start MH Pro 350W/635 EX39 ED37 CO	39.5
368837	Ceramalux 1000W Mog E25 CL ALTO	44
128249	Ceramalux 1000W Mogul E25 ALTO® 1SL	44
368811	Ceramalux 400W Mog ED18 CL ALTO	31
368795	Ceramalux 250W Mog ED18 CL ALTO	31.9
368779	Ceramalux 200W Mog ED18 CL ALTO	31
368761	Ceramalux 150W Mog ED28 CL ALTO	22.1
368746	Ceramalux 150W Mog ED23 1/2 CL ALTO	17
368720	Ceramalux 100W Mog ED23 1/2 CL ALTO	22.1
368696	Ceramalux 70W Mog ED23 1/2 CL ALTO	17
368670	Ceramalux 50W Mog ED23 1/2 CL ALTO	17.7
323865	Ceramalux 1000W Mog ED37 CL	55.2
317107	Ceramalux Agro 430W Mog ED18 CL	23.7
257477	Ceramalux 400W Mog ED18 CL	31
257477	Ceramalux 400W Mog ED18 CL	31
140987	Ceramalux 400W Mog ED18 CL	31

322925	Ceramalux Econ-o-watt 360W Mog ED18 CL	31
322917	Ceramalux Econ-o-watt 225W Mog ED18 CL	32
306522	Ceramalux Comfort 400W Mog ED18 CL	40.9
302455	Ceramalux Comfort 250W Mog ED18 CL	40.9
306431	Ceramalux Comfort 150W Mog ED23 1/2 CL	32.7
306472	Ceramalux Comfort 150W Med BD17 CL	32.7
306373	Ceramalux Comfort 100W Mog ED23 1/2 CL	32.7
306357	Ceramalux Comfort 100W Med BD17 CL	32.7
257394	Ceramalux 100W Mog ED23 1/2 CL	22.1
140953	Ceramalux Instant Restrike 100W Mog ED23 1/2 CL	22.1
344465	Ceramalux 100W Med BD17 CL	22
257360	Ceramalux 100W Med BD17 CL	22
140939	Ceramalux 100W Med BD17 CL	22
344481	Ceramalux 100W Med BD17 CO	22.1
306175	Ceramalux Comfort 70W Med BD17 CL	32.7
257329	Ceramalux 70W Med BD17 CL	17
331926	Ceramalux 70W Med BD17 CL	17
257329	Ceramalux 70W Med BD17 CL	17
140913	Ceramalux 70W Med BD17 CL	17
332148	Ceramalux 70W Med BD17 CO	17
257295	Ceramalux 35W Med BD17 CL	31.9
140889	Ceramalux 35W Med BD17 CL	31.9
257337	Ceramalux 70W Mog ED23 1/2 CL	17
140947	Ceramalux 70W Mog ED23 1/2 CL	17
257311	Ceramalux 50W Med B17 CL	17.7
140863	Ceramalux 50W Med BD17 CL	17.7
204123	Ceramalux Instant Restrike 1000W Mog E25 CL	88
376889	Ceramalux Instant Restrike 400W Mog ED18 CL	61.9
377176	Ceramalux Instant Restrike 250W Mog ED18 CL	63.8
265611	Ceramalux Instant Restrike 150W Mog ED23 1/2 CL	34
265603	Ceramalux Instant Restrike 100W Mog ED23 1/2 CL	44.4
265413	Ceramalux Instant Restrike 70W Mog ED23 1/2 CL	34
354670	Ceramalux Instant Restrike 50W Mog ED23 1/2 CL	35.4
257469	Ceramalux 250W Mog ED18 CL	31.9
257469	Ceramalux 250W Mog ED18 CL	31.9
140979	Ceramalux 250W Mog ED18 CL	31.9
257436	Ceramalux 150W Mog ED23 1/2 CL	17
140961	Ceramalux 150W Mog ED23 1/2 CL	17
303479	Ceramalux 150W Med BD17 CL	17
257410	Ceramalux 150W Med BD17 CL	17
140871	Ceramalux 150W Med BD17 CL	17
303487	Ceramalux 150W Med BD17 CO	17
338046	Ceramalux 35W Med BF55 CL	29.5
306324	Ceramalux 35W Med BF55 CL	29.5
338053	Ceramalux 35W Med BF55 CO	29.5
306332	Ceramalux 35W Med BF55 CO	29.5
145383	Ceramalux 35W Med BF55 CO 1SC	29.5
338061	Ceramalux 50W Med BF55 CL	16.3
303362	Ceramalux 50W Med BF55 CL	16.3
338079	Ceramalux 50W Med BF55 CO	17.7
303370	Ceramalux 50W Med BF55 CO	17.7
247254	Switch Start MH Std 175W/640 Mog ED28 CL	31.6
287334	Switch Start MH Std 175W/640 Mog ED28 CL	28
257592	Switch Start MH Std 175W/640 Mog ED28 CL	28
140855	Switch Start MH Std 175W/640 Mog ED28 CL	28
287284	Switch Start MH Std 175W/635 Mog ED28 CO	28
312876	Switch Start MH Std 175W/630 Mog ED28 CO	26.9
274845	Switch Start MH Std 250W/640 Mog ED28 CL	36

279141	Switch Start MH Std 250W/640 Mog ED28 CL	36
257667	Switch Start MH Std 250W/640 Mog ED28 CL	36
140822	Switch Start MH Std 250W/640 Mog ED28 CL	36
291690	Switch Start MH Std 250W/735 Mog ED28 CL	36
311373	Switch Start MH Std 250W/730 Mog ED28 CO	36
344150	Switch Start MH Std 400W/540 Mog ED37 CL	52
253658	Switch Start MH Std 400W/540 Mog ED37 CL	52
140921	Switch Start MH Std 400W/540 Mog ED37 CL	52
344168	Switch Start MH Std 400W/640 Mog ED37 CO	52
337931	Switch Start MH Std 400W/640 E40/41 ED37 CL	52
312850	Switch Start MH Std 400W/635 Mog ED37 CO	52
301705	Switch Start MH Std 400W/640 Mog ED37 CL	65
301721	Switch Start MH Std 400W/640 Mog ED37 CO	65
311357	Switch Start MH Std 400W/635 Mog ED37 CO	65
276626	Pulse Start MH Std 175W/635 Mog ED28 CL	30.6
276618	Pulse Start MH Std 250W/645 Mog ED28 CL	29.5
278168	Pulse Start MH Std 400W/640 Mog ED37 CL	67
283622	Pulse Start MH Std 400W/635 Mog ED37 CO	67
383810	Pulse Start MH Std 320W/640 Mog ED28 CL	37.5
383869	Pulse Start MH Std 320W/735 Mog ED28 CO	37.5
383877	Pulse Start MH Std 350W/640 Mog ED37 CL	39.5
383885	Pulse Start MH Std 350W/635 Mog ED37 CO	39.5
390658	Switch Start MH Std 360W/645 Mog ED37 CL	60
390666	Switch Start MH Std 360W/640 Mog ED37 CO	60
356618	Mercury Vapor 400W Mog R60 FR	66
301051	Mercury Vapor 175W Med R40 FR	26
135400	Pulse Start MH Std 750W/635 Mog BT37 CL	116
140640	Ceramalux Agro 1000W Mogul E25	44
346015	Switch Start MH Safety Lifeguard 400W/635 Mog ED	52
345983	Switch Start MH Safety Lifeguard 400W/640 Mog ED	52
144758	Pulse Start MH Std 400W/640 Mogul ED37 CL	67
381103	Decorative Twister 20W Med EL/DT 1BC	6
381111	Decorative Twister 23W Med EL/DT 1BC	7
128033	Decorative Twister 23W Med EL/DT 1BC	7
136143	Decorative Twister 23W Med EL/DT 1CT	7
287813	Outdoor 15W Med EL/O ALTO 1CT	2,64
371187	Outdoor 15W Med EL/O ALTO 1CT	2,64
371195	Outdoor 15W Med EL/O ALTO 1BC	2,64
371211	Outdoor 15W Med EL/O ALTO 1BC	2,64
137869	Outdoor 15W Med EL/O ALTO 1CT	2,64
287813	Outdoor 15W Med EL/O ALTO 1CT	2,64
371237	Outdoor 18W Med EL/O ALTO 1CT	2,64
135780	Outdoor 18W Med EL/O ALTO 1CT	2,64
371525	Outdoor 18W Med EL/O ALTO 1BC	2,64
371344	Outdoor 18W Med EL/O ALTO 1BC	2,64
371484	Outdoor 15W Med EL/O Bug-A-Way 1CT	2,64
371492	Outdoor 15W Med EL/O Bug-A-Way 1BC	2,64
371559	Outdoor 15W Med EL/O Bug-A-Way 1BC	2,64
220038	Universals 14W Med SLS ALTO 1CT	2,64
371047	Universals 15W Med SLS ALTO 1CT	2,64
371054	Universals 15W Med SLS ALTO 1BC	2,64
371054	Universals 15W Med SLS ALTO 1BC	2,64
371070	Universals 15W Med SLS 1BC	2,64
373357	Universals 15W Med SLS ALTO 1BC	2,64
373381	Universals 15W Med SLS ALTO 1BC	2,64
130757	Universals 15W Med SLS ALTO 1CT	2,64
220087	Universals 20W Med SLS ALTO 1CT	2,64
371088	Universals 20W Med SLS ALTO 1CT	2,64

371096	Universals 20W Med SLS ALTO 1BC	2,64
373365	Universals 20W Med SLS ALTO 1BC	2,64
373399	Universals 20W Med SLS ALTO 1BC	2,64
371112	Universals 20W Med SLS ALTO 1BC	2,64
130773	Universals 20W Med SLS ALTO 1CT	2,64
371146	Universals 25W Med SLS ALTO 1CT	2,64
371153	Universals 25W Med SLS ALTO 1BC	2,64
135749	Universals 25W Med SLS ALTO 1CT	2,64
371153	Universals 25W Med SLS ALTO 1BC	2,64
373373	Universals 25W Med SLS ALTO 1BC	2,64
373407	Universals 25W Med SLS ALTO 1BC	2,64
371179	Universals 25W Med SLS ALTO 1BC	2,64
220350	15W Med SLS/R30 1CT	2,64
372466	15W Med SLS/R30 1CT	2,64
227884	20W Med SLS/R30 1CT	2,64
372482	20W Med SLS/R30 1CT	2,64
220376	15W Med SLS/R40 1CT	2,64
372565	15W Med SLS/R40 1CT	2,64
372623	20W Med SLS/R40 1CT	2,64
372169	18-34W 3 C Med EL/TW 1CT	4,75
372193	18-34W 3 C Med EL/TW 1BC	4,75
372193	18-34W 3 C Med EL/TW 1BC	4,75
372235	18-34W 3 C Med EL/TW 1BC	4,75
372342	18-34W 3 C Med EL/TW 1BC	4,75
370825	Table 34W Med EL/T 1CT	4,75
370841	Table 34W Med EL/T 1BC	4,75
370841	Table 34W Med EL/T 1BC	4,75
370866	Table 34W Med EL/T 1BC	4,75
139527	Outdoor 15W Med EL/O ALTO 1BC	2,64
139741	20W Med PAR38 ALTO 1BC	1,23
137232	20W Med PAR38 ALTO 1BC	1,23
139436	20W Med PAR38 ALTO 1CT	1,23
139402	12W Med R20 ALTO 1BC	2,64
139428	12W Med R20 ALTO 1CT	2,64
164459	12W Med R20 ALTO 1BC	2,64
139758	20W Med BR40 ALTO 1BC	1,23
	20W Med BR40 ALTO 1BC	1,23
139410	20W Med BR40 ALTO 1CT	1,23
139733	A-Shape 16W Med EL/SWP ALTO 1CT	1,23
137059	A-Shape 16W Med EL/SWP ALTO 1BC	1,23
140665	A-Shape 16W Med EL/SWP ALTO 1CT	1,23
144139	12W Med EL/A G25 ALTO 1BC	2,64
140251	A-Shape 16W Med EL/SWP ALTO 1BC	1,23
	16W Med EL/A G30 ALTO 1CT	1,23
145151	20W Med EL/A G40 ALTO 1CT	1,23
	A-Shape 20W Med EL/SWP ALTO 1CT	1,23
130724	12W Med EL/A G25 1BC	3,96
127984	12W Med EL/A G25 1BC	3,96
130732	16W Med BR30 1BC	1,23
139394	16W Med BR30 1CT	1,23
144121	16W Med BR30 1BC	1,23
128090	16W Med BR30 1BC	1,23
130708	A-Shape 16W Med EL/A mH 1BC	1,23
128082	A-Shape 16W Med EL/A mH 1BC	1,23
	12W Med EL/A ALTO 1CT	2,64
139543	9W Cand EL/A MCAN ALTO 1CT	2,64

**COMPACT FLUORESCENT INTEGRATED**

146910	SLS 14	2.64 mg
130773	SLS 20	2.64 mg
135749	SLS 25	2.64 mg
137869	EL/O 15	2.64 mg
135780	EL/O 18	2.64 mg
	EL/O 15 BAW	2.64 mg
137042	EL/SWP 12	2.64 mg
140665	EL/SWP 16	1.23 mg
144139	EL/A1 G25 12	2.64 mg
140459	EL/A Can 12	2.64 mg
139428	EL/A R20 12	2.64 mg
139394	EL/A1 R30 16	1.23 mg
145144	EL/A1 G30 16	1.23 mg
139410	EL/A R40 20	1.23 mg
139436	EL/A PAR38 20	1.23 mg
145151	EL/A1 G40 20	1.23 mg
139543	EL/A mCan 9	2.64 mg
140426	EL/TW 34/26/18W	4.75 mg
200816	EL/ES Dim 16W	1.23 mg
150417	EL/A R30 Dim 16W	1.23 mg
150425	EL/A R40 Dim 20W	1.23 mg
150433	EL/A PAR38 Dim 20W	1.23 mg
	Lamp Model	Hg Content/mg
147926	New Twister 5W	4mg
147934	New Twister 9W	4mg
138040	New Twister 11W	4mg
156380	Super mini Twister 13W	4mg
156975	Super mini Twister 23W	5mg
147868	Twister 13W - 4100K	4mg
147876	Twister 13W - 5,000K	4mg
135814	New Twister 15W	4.5mg
138057	New Twister 20W	6mg
137158	New Twister 27W	6mg
147884	Twister 27W - 4100K	6mg
147892	Twister 27W - 5,000K	6mg
139485	New Twister 42W	8mg
139360	Quickfix 22W	4mg
139386	Quickfix 28W	4mg



OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

Invoice Date	Invoice No.	Item Description	Department	Qty	Unit Price Per Contract	Extend Price	Lamp Type	Any Lead Content			
								Lamp Life	Mg of Mercury	Solder	Glass Envelope
10.10.07	03-13936	GE# 12538 - % * F96T8/SP41/HO 24PK	AIRPORT COMMISSION	240	5,58	1,339,20	T8 Fluorescent	18.000	>50 to 100 mg	Yes	Yes
10.15.07	03-13961	GE# 18333 - % * F40XL/SPX41 30PK	AIRPORT COMMISSION	90	5,06	455,40	T12 Fluorescent	24.000	1-10 mg	No	No
10.22.07	03-14056	GE# 17517 - 100A 277V 60PK	AIRPORT COMMISSION	60	1,06	63,60	Incandescent	750	0 mg	Yes	Yes
10.25.07	03-14091	GE# 18333 - % * F40XL/SPX41 30PK	AIRPORT COMMISSION	210	5,06	1,062,60	T12 Fluorescent	24.000	1-10 mg	No	No
11.27.07	03-14288	GE# 22489 - Q100T3/CL/CD 120V 120PK	AIRPORT COMMISSION	35	2,35	82,25	Quartz	1.500	0 mg	Yes	Yes
11.27.07	03-14301	GE# 17517 - 100A 277V 277PK	AIRPORT COMMISSION	120	1,06	127,20	Incandescent	750	0 mg	Yes	Yes
12.14.07	03-14420	GE# 17325 - 69A21/TS 130V 130PK	AIRPORT COMMISSION	240	0,72	172,80	Incandescent	8.000	0 mg	Yes	Yes
12.18.07	03-14447	GE# 46760 - % * F54W/T5/835/ECO 40PK	AIRPORT COMMISSION	80	4,17	333,60	T5 Fluorescent	30.000	1-10 mg	Yes	Yes
			<b>AIRPORT COMMISSION Total</b>			<b>3,636,65</b>					
12.07.07	03-14373	GE# 80047 - * F20T12/D/ECO 24PK	AIRPORT MUSEUM	21	1,23	25,83	T12 Fluorescent	9.000	4,9	No	No
12.11.07	03-14385	GE# 80047 - * F20T12/D/ECO 24PK	AIRPORT MUSEUM	9	1,23	11,07	T12 Fluorescent	9.000	4,9	No	No
			<b>AIRPORT MUSEUM Total</b>			<b>36,90</b>					
11.30.07	03-14320	GE# 19264 - LU70/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	36	27,39	986,04	HID	40.000	11-30 mg	Yes	Yes
11.30.07	03-14320	GE# 19270 - LU250/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	60	31,23	1,873,80	HID	40.000	>10 - 50 mg	Yes	Yes
11.30.07	03-14320	GE# 23431 - LU200/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	48	34,23	1,643,04	HID	40.000	>10 - 50 mg	Yes	Yes
11.30.07	03-14320	GE# 26317 - % * MVR250/VBU/PA 12PK	BUREAU OF LIGHT, HEAT, P/M	36	21,29	766,44	HID	15.000	>10 - 50 mg	Yes	Yes
12.11.07	03-14386	GE# 19264 - LU70/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	84	27,39	2,300,76	HID	40.000	11-30 mg	Yes	Yes
12.11.07	03-14386	GE# 19265 - LU100/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	120	28,68	3,441,60	HID	40.000	31-65 mg	Yes	Yes
12.11.07	03-14386	GE# 19266 - LU150/55/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	36	29,39	1,058,04	HID	40.000	31-65 mg	Yes	Yes
12.11.07	03-14386	GE# 26317 - % * MVR250/VBU/PA 12PK	BUREAU OF LIGHT, HEAT, P/M	192	21,29	4,087,68	HID	15.000	>10 - 50 mg	Yes	Yes
12.12.07	03-14404	GE# 26317 - % * MVR250/VBU/PA 12PK	BUREAU OF LIGHT, HEAT, P/M	12	21,29	255,48	HID	15.000	>10 - 50 mg	Yes	Yes
12.17.07	03-14434	GE# 19266 - LU150/55/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	84	29,39	2,468,76	HID	40.000	31-65 mg	Yes	Yes
12.17.07	03-14434	GE# 23431 - LU200/SBY/XL 12PK	BUREAU OF LIGHT, HEAT, P/M	188	34,23	6,435,24	HID	40.000	>10 - 50 mg	Yes	Yes
			<b>BUREAU OF LIGHT, HEAT, P/M Total</b>			<b>25,316,88</b>					
10.15.07	03-13972	GE# 23010 - * F34CW/RS/WM/ECO 30PK	CENTRAL SHOP	60	0,73	43,80	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
12.03.07	03-14342	GE# 41826 - MVR1000/U 6PK	CENTRAL SHOP	2	23,59	47,18	HID	15,000V 11,000H	100-200 mg	Yes	Yes
12.14.07	03-14423	GE# 47326 - MVR1500/U/SPORTS 6PK	CENTRAL SHOP	5	36,32	181,60	HID	3.000	>100 mg to 1000 mg	Yes	Yes
12.19.07	03-14465	GE# 47326 - MVR1500/U/SPORTS 6PK	CENTRAL SHOP	1	36,32	36,32	HID	3.000	>100 mg to 1000 mg	Yes	Yes
			<b>CENTRAL SHOP Total</b>			<b>308,90</b>					
11.08.07	03-14201	GE# 10036 - % * 60BTI/CL/CD 120V 120PK	CITY HALL	300	1,98	594,00	Incandescent	3.000	0 mg	Yes*	No
			<b>CITY HALL Total</b>			<b>594,00</b>					
12.18.07	03-14452	GE# 16953 - % * F40/30BX/SPX30 40PK	CIVIC CENTER COURTHOUSE	120	5,04	604,80	CFL	12.000	1-10 mg	Yes	Yes
12.18.07	03-14452	GE# 16954 - % * F40/30BX/SPX41 40PK	CIVIC CENTER COURTHOUSE	120	5,04	604,80	CFL	12.000	1-10 mg	Yes	Yes
12.18.07	03-14452	GE# 26668 - % * F32T8/SP41/ECO 36PK	CIVIC CENTER COURTHOUSE	144	1,43	205,92	T8 Fluorescent	20.000	1-10 mg	Yes	Yes
			<b>CIVIC CENTER COURTHOUSE Total</b>			<b>1,415,52</b>					
10.18.07	03-14007	GE# 10086 - F13T5/CW 24PK	COMMUNITY MENTAL HEALTH	15	1,36	20,40	T5 Fluorescent	5.000	11- 30 mg	No	No
10.18.07	03-14007	GE# 26667 - % * F32T8/SP35/ECO 36PK	COMMUNITY MENTAL HEALTH	180	1,43	257,40	T8 Fluorescent	20.000	1-10 mg	Yes	Yes
10.25.07	03-14094	GE# 10086 - F13T5/CW 24PK	COMMUNITY MENTAL HEALTH	33	1,36	44,88	T5 Fluorescent	5.000	11- 30 mg	No	No



OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

Invoice Date	Invoice No.	Item Description	Department	Qty	Unit Price Per Contract	Extend Price	Lamp Type	Any Lead Content			
								Lamp Life	Mg of Mercury	Solder	Glass Envelope
			<b>COMMUNITY MENTAL HEALTH Total</b>			<b>322,68</b>					
10.11.07	03-13945	GE# 27618 - % * F32T8/XL/SP41/ECO 36	FIRE DEPT	360	2,22	799,20	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
10.16.07	03-13979	GE# 13729 - F96T12/CW/WM 15PK	FIRE DEPT	15	1,44	21,60	T12 Fluorescent	12.000	11-30 mg	No	No
10.19.07	03-14026	GE# 33774 - FC8T9/CW 12PK	FIRE DEPT	12	1,50	18,00	Circline Fluor.	12.000	>10 - 50 mg	Yes	Yes
10.23.07	03-14080	GE# 27618 - % * F32T8/XL/SP41/ECO 36	FIRE DEPT	180	2,22	399,60	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
10.29.07	03-14114	GE# 27618 - % * F32T8/XL/SP41/ECO 36	FIRE DEPT	180	2,22	399,60	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
12.10.07	03-14379	GE# 23010 - * F34CW/RS/WM/ECO 30PK	FIRE DEPT	60	0,73	43,80	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
12.17.07	03-14435	GE# 97610 - % * F26DBX/827/ECO4P 50P	FIRE DEPT	10	6,37	63,70	CFL	12.000	4	No	No
			<b>FIRE DEPT Total</b>			<b>1,745,50</b>					
10.17.07	03-14000	GE# 10032 - F6T5/CW 24PK	GENERAL HOSPITAL	47	1,21	56,87	T5 Fluorescent	5.000	1-10 mg	No	No
10.17.07	03-14000	GE# 10086 - F13T5/CW 24PK	GENERAL HOSPITAL	72	1,36	97,92	T5 Fluorescent	5.000	11-30 mg	No	No
10.17.07	03-14000	GE# 11779 - 7C7 120V 240PK	GENERAL HOSPITAL	480	0,21	100,80	Incandescent	3.000	0 mg	No	No
10.17.07	03-14000	GE# 13743 - F72T12/CW 15PK	GENERAL HOSPITAL	15	1,99	29,85	T12 Fluorescent	12.000	31-65 mg	No	No
10.17.07	03-14000	GE# 15484 - F17T8XL/SPX41ECO 24PK	GENERAL HOSPITAL	288	2,12	610,56	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
10.17.07	03-14000	GE# 48523 - % * F32T8/XL/SP41/WM/EC	GENERAL HOSPITAL	648	3,34	2.164,32	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
10.17.07	03-14000	GE# 48526 - % * F96T8/XL/SP41/WM 24P	GENERAL HOSPITAL	48	5,15	247,20	T8 Fluorescent	18.000	31-65 mg	No	No
10.22.07	03-14055	GE# 14414 - 60A/CVG 120V 24PK	GENERAL HOSPITAL	72	0,85	61,20	Incandescent	1.000	0	No	No
11.01.07	03-14152	GE# 10004 - F4T5/CW 24PK	GENERAL HOSPITAL	144	1,34	192,96	T5 Fluorescent	5.000	1-10 mg	Yes	Yes
12.05.07	03-14352	GE# 34663 - Q100T3/24V/CL 24V 24PK	GENERAL HOSPITAL	24	2,05	49,20	Quartz	2.000	0	No	No
12.05.07	03-14352	GE# 34702 - Q50T3/12V/CL 12V 12PK	GENERAL HOSPITAL	15	1,34	20,10	Quartz	2.000	0 mg	No	No
12.05.07	03-14352	GE# 43828 - MVR400/U 6PK	GENERAL HOSPITAL	6	9,76	58,56	HID	20,000V 15,000H	31-65 mg	Yes	Yes
12.05.07	03-14352	GE# 97551 - F5BX/827/ECO 10PK	GENERAL HOSPITAL	100	1,42	142,00	CFL	10.000	1-5 mg	No	No
12.05.07	03-14352	GE# 97636 - % * F42TBX/841/A/ECO 10P	GENERAL HOSPITAL	20	7,76	155,20	CFL	12.000	1-5 mg	No	No
12.06.07	03-14358	GE# 10032 - F6T5/CW 24PK	GENERAL HOSPITAL	25	1,21	30,25	T5 Fluorescent	5.000	1-10 mg	No	No
12.06.07	03-14358	GE# 13697 - F72T12/CW/HO 15PK	GENERAL HOSPITAL	15	2,03	30,45	T12 Fluorescent	12.000	50-100	No	No
12.06.07	03-14358	GE# 13716 - * F96T12/CW/HO/WM 15PK	GENERAL HOSPITAL	30	1,82	54,60	T12 Fluorescent	12.000	66-100 mg	No	No
12.06.07	03-14358	GE# 13729 - F96T12/CW/WM 15PK	GENERAL HOSPITAL	30	1,44	43,20	T12 Fluorescent	12.000	11-30 mg	No	No
12.06.07	03-14358	GE# 48523 - % * F32T8/XL/SP41/WM/EC	GENERAL HOSPITAL	72	3,34	240,48	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
12.14.07	03-14421	GE# 34702 - Q50T3/12V/CL 12V 12PK	GENERAL HOSPITAL	9	1,34	12,06	Quartz	2.000	0 mg	No	No
12.14.07	03-14421	GE# 37846 - F7BX/SPX27/827 100PK	GENERAL HOSPITAL	80	1,14	91,20	CFL	10.000	1-5 mg	No	No
12.14.07	03-14421	GE# 48523 - % * F32T8/XL/SP41/WM/EC	GENERAL HOSPITAL	720	3,34	2.404,80	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
12.14.07	03-14421	GE# 97577 - % * F18DBX/827/ECO 50PK	GENERAL HOSPITAL	50	5,78	289,00	CFL	10.000	1-10 mg	Yes	Yes
12.14.07	03-14421	GE# 97592 - % * F13DBX/835/ECO 50PK	GENERAL HOSPITAL	80	4,63	370,40	CFL	10.000	1-10 mg	Yes	Yes
			<b>GENERAL HOSPITAL Total</b>			<b>7,553,18</b>					
10.17.07	03-13998	GE# 42064 - % * F32T8/SPX50/ECO 36PK	HALL OF JUSTICE	180	2,57	462,60	T8 Fluorescent	20.000	1-10 mg	Yes	Yes
10.22.07	03-14041	GE# 97597 - % * F13DBX/841/ECO4P 50P	HALL OF JUSTICE	20	4,78	95,60	CFL	12.000	1-10 mg	Yes	Yes
11.07.07	03-14194	GE# 45065 - * F34WW/RS/WM/ECO 30P	HALL OF JUSTICE	30	0,83	24,90	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
11.12.07	03-14220	GE# 45065 - * F34WW/RS/WM/ECO 30P	HALL OF JUSTICE	570	0,83	473,10	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
			<b>HALL OF JUSTICE Total</b>			<b>1,056,20</b>					

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Invoice Date	Invoice No.	Item Description	Department	Qty	Unit Price Per Contract	Extend Price	Lamp Type	Any Lead Content			
								Lamp Life	Mg of Mercury	Solder	Glass Envelope
11.05.07	03-14169	GE# 43828 - MVR400/U 6PK	HUMAN SERVICES	30	9,76	292,80	HID	20,000V 15,000H	31-65 mg	Yes	Yes
11.05.07	03-14169	GE# 46855 - 65R30/FL 130V	HUMAN SERVICES	60	1,55	93,00	Incandescent	2,000	0 mg	No	No
12.11.07	03-14387	GE# 26668 - % * F32T8/SP41/ECO 36PK	HUMAN SERVICES	72	1,43	102,96	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
			<b>HUMAN SERVICES Total</b>			<b>488,76</b>					
10.22.07	03-14040	GE# 21389 - % * 75PAR/H/FL25° 130V 13	MILLBRAE WATER DEPT	12	3,66	43,92	Incandescent	2,500	0 mg	Yes	Yes
10.22.07	03-14040	GE# 42729 - MVR250/U 12PK	MILLBRAE WATER DEPT	12	10,29	123,48	HID	6,000H 10,000V	>10 - 50 mg	Yes	Yes
10.22.07	03-14040	GE# 43828 - MVR400/U 6PK	MILLBRAE WATER DEPT	18	9,76	175,68	HID	20,000V 15,000H	31-65 mg	Yes	Yes
10.22.07	03-14040	GE# 47760 - MVR175/U 12PK	MILLBRAE WATER DEPT	24	9,10	218,40	HID	10,000V 6,000H	11-30 mg	Yes	Yes
11.30.07	03-14328	GE# 20838 - 300PAR56/MFL 130V 130PK	MILLBRAE WATER DEPT	12	9,92	119,04	Incandescent	2,000	0 mg	Yes	Yes
12.05.07	03-14353	GE# 18902 - MVR175/U/MED 6PK	MILLBRAE WATER DEPT	6	10,93	65,58	HID	10,000V 6,000H	11-30 mg	Yes	Yes
12.14.07	03-14425	GE# 12590 - MVR70/U/MED 6PK	MILLBRAE WATER DEPT	6	11,03	66,18	HID	18,000	>50 to 100 mg	Yes	Yes
12.20.07	03-14474	GE# 26668 - % * F32T8/SP41/ECO 36PK	MILLBRAE WATER DEPT	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
12.20.07	03-14474	GE# 43828 - MVR400/U 6PK	MILLBRAE WATER DEPT	6	9,76	58,56	HID	20,000V 15,000H	31-65 mg	Yes	Yes
			<b>MILLBRAE WATER DEPT Total</b>			<b>922,32</b>					
10.09.07	03-13927	GE# 23010 - * F34CW/RS/WM/ECO 30PK	MONSTER PARK	120	0,73	87,60	T12 Fluorescent	20,000	1-10 mg	Yes	Yes
10.29.07	03-14120	GE# 27621 - % * F32T8/XL/SPX41/ECO 3	MONSTER PARK	180	3,27	588,60	T8 Fluorescent	24,000	1-10 mg	Yes	Yes
11.01.07	03-14144	GE# 80084 - * F30T12/CW/RS/ECO 24PK	MONSTER PARK	60	1,29	77,40	T12 Fluorescent	18,000	4,9	No	No
11.27.07	03-14290	GE# 13729 - F96T12/CW/WM 15PK	MONSTER PARK	30	1,44	43,20	T12 Fluorescent	12,000	11-30 mg	No	No
			<b>MONSTER PARK Total</b>			<b>796,80</b>					
11.27.07	03-14299	GE# 30037 - F13DBX/835/4P 10PK	PORT COMMISSION	40	4,78	191,20	CFL	12,000	1-5 mg	No	No
11.27.07	03-14299	GE# 42068 - % * CMH39/U/PAR20/FL25°	PORT COMMISSION	15	28,44	426,60	HID	10,000	1-10 mg	Yes	Yes
11.27.07	03-14299	GE# 97579 - % * F18DBX/835/ECO 50PK	PORT COMMISSION	40	5,78	231,20	CFL	10,000	1-10 mg	Yes	Yes
11.27.07	03-14299	GE# 97600 - % * F18DBX/835/ECO4P 50P	PORT COMMISSION	40	6,18	247,20	CFL	10,000	1-10 mg	Yes	Yes
12.04.07	03-14346	GE# 27186 - * F96T12/CW/WM/ECO 15P	PORT COMMISSION	90	1,60	144,00	T12 Fluorescent	12,000	11-30 mg	No	No
			<b>PORT COMMISSION Total</b>			<b>1,240,20</b>					
10.09.07	03-13933	GE# 26667 - % * F32T8/SP35/ECO 36PK	PUBLIC HEALTH	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
10.09.07	03-13933	GE# 41777 - % * F31T8/SPX35/U 15PK	PUBLIC HEALTH	15	4,38	65,70	U-Tube Fluor.	20,000	1-10 mg	No	No
10.11.07	03-13941	GE# 26667 - % * F32T8/SP35/ECO 36PK	PUBLIC HEALTH	108	1,43	154,44	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
10.23.07	03-14077	GE# 41777 - % * F31T8/SPX35/U 15PK	PUBLIC HEALTH	15	4,38	65,70	U-Tube Fluor.	20,000	1-10 mg	No	No
			<b>PUBLIC HEALTH Total</b>			<b>337,32</b>					
10.05.07	03-13911	GE# 10483 - % * F32T8/SPX30/U/6 12PK	PUBLIC LIBRARY	100	5,87	587,00	U-Tube Fluor.	20,000	>10 - 50 mg	Yes	Yes
10.05.07	03-13911	GE# 97577 - % * F18DBX/827/ECO 50PK	PUBLIC LIBRARY	90	5,78	520,20	CFL	10,000	1-10 mg	Yes	Yes
10.05.07	03-13919	GE# 20153 - % * CMH39TUVU830G12 12	PUBLIC LIBRARY	8	27,19	217,52	HID	10,000	1-10 mg	Yes	Yes
10.10.07	03-13937	GE# 97610 - % * F26DBX/827/ECO4P 50P	PUBLIC LIBRARY	10	6,37	63,70	CFL	12,000	4	No	No
10.16.07	03-13984	GE# 10829 - F72T8/CW 24PK	PUBLIC LIBRARY	48	3,53	169,44	T8 Fluorescent	7,500	90	No	No

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								Lamp Life	Mg of Mercury	Solder	Glass Envelope
10.17.07	03-13985	GE# 46699 - % * F24W/T5/830/ECO 40PK	PUBLIC LIBRARY	40	3,97	158,80	T5 Fluorescent	20.000	1-10 mg	No	No
10.17.07	03-13985	GE# 46705 - % * F28W/T5/835/ECO 40PK	PUBLIC LIBRARY	36	2,64	95,04	T5 Fluorescent	30.000	5	No	No
10.17.07	03-13986	GE# 97588 - % * F13DBX23/835/ECO 50PK	PUBLIC LIBRARY	78	4,04	315,12	CFL	10.000	1-10 mg	Yes	Yes
10.17.07	03-13986	GE# 97611 - % * F26DBX/830/ECO4P 50PK	PUBLIC LIBRARY	10	6,37	63,70	CFL	12.000	4	No	No
10.23.07	03-14067	GE# 97632 - % * F32TBX/841/A/ECO 10PK	PUBLIC LIBRARY	10	6,81	68,10	CFL	12.000	4	No	No
10.25.07	03-14093	GE# 16611 - % * LU70/DX/MED 6PK	PUBLIC LIBRARY	12	16,88	202,56	HID	10.000	22	Yes	Yes
10.25.07	03-14093	GE# 46705 - % * F28W/T5/835/ECO 40PK	PUBLIC LIBRARY	44	2,64	116,16	T5 Fluorescent	30.000	5	No	No
10.25.07	03-14096	GE# 10059 - F8T5/CW 24PK	PUBLIC LIBRARY	360	1,09	392,40	T5 Fluorescent	5.000	1-10 mg	No	No
10.25.07	03-14096	GE# 97586 - % * F13DBX23/827/ECO 50PK	PUBLIC LIBRARY	150	3,25	487,50	CFL	10.000	1-5 mg	No	No
10.25.07	03-14096	GE# 97598 - % * F18DBX/827/ECO4P 50PK	PUBLIC LIBRARY	150	6,18	927,00	CFL	12.000	4	No	No
10.25.07	03-14096	GE# 97611 - % * F26DBX/830/ECO4P 50PK	PUBLIC LIBRARY	90	6,37	573,30	CFL	12.000	4	No	No
10.29.07	03-14104	GE# 16538 - % * F39/36BX/SPX30 40PK	PUBLIC LIBRARY	400	4,95	1.980,00	CFL	12.000	1-10 mg	Yes	Yes
10.29.07	03-14107	GE# 16611 - % * LU70/DX/MED 6PK	PUBLIC LIBRARY	12	16,88	202,56	HID	10.000	22	Yes	Yes
10.29.07	03-14107	GE# 46699 - % * F24W/T5/830/ECO 40PK	PUBLIC LIBRARY	39	3,97	154,83	T5 Fluorescent	20.000	1-10 mg	No	No
10.29.07	03-14107	GE# 46705 - % * F28W/T5/835/ECO 40PK	PUBLIC LIBRARY	80	2,64	211,20	T5 Fluorescent	30.000	5	No	No
10.29.07	03-14124	GE# 46759 - % * F54W/T5/830/ECO 40PK	PUBLIC LIBRARY	40	4,17	166,80	T5 Fluorescent	30.000	1-10 mg	Yes	Yes
10.29.07	03-14124	GE# 46760 - % * F54W/T5/835/ECO 40PK	PUBLIC LIBRARY	33	4,17	137,61	T5 Fluorescent	30.000	1-10 mg	Yes	Yes
10.29.07	03-14124	GE# 46761 - % * F54W/T5/841/ECO 40PK	PUBLIC LIBRARY	40	4,17	166,80	T5 Fluorescent	30.000	1-10 mg	Yes	Yes
11.12.07	03-14218	GE# 46746 - % * F39W/T5/841/ECO 40PK	PUBLIC LIBRARY	40	4,28	171,20	T5 Fluorescent	30.000	5	No	No
11.15.07	03-14258	GE# 46744 - % * F39W/T5/830/ECO 40PK	PUBLIC LIBRARY	40	4,28	171,20	T5 Fluorescent	30.000	5	No	No
11.15.07	03-14258	GE# 46745 - % * F39W/T5/835/ECO 40PK	PUBLIC LIBRARY	34	4,28	145,52	T5 Fluorescent	30.000	5	No	No
11.15.07	03-14258	GE# 46760 - % * F54W/T5/835/ECO 40PK	PUBLIC LIBRARY	7	4,17	29,19	T5 Fluorescent	30.000	1-10 mg	Yes	Yes
11.29.07	03-14319	GE# 97588 - % * F13DBX23/835/ECO 50PK	PUBLIC LIBRARY	22	4,04	88,88	CFL	10.000	1-10 mg	Yes	Yes
12.06.07	03-14367	GE# 46745 - % * F39W/T5/835/ECO 40PK	PUBLIC LIBRARY	6	4,28	25,68	T5 Fluorescent	30.000	5	No	No
			<b>PUBLIC LIBRARY Total</b>			<b>8.609,01</b>					
10.03.07	03-13890	GE# 23731 - Q500T3/CL-FCL 120V	PUBLIC TRANSPORTATION	8	2,21	17,68	Quartz	2.000	0 mg	No	No
10.29.07	03-14115	GE# 97612 - % * F26DBX/835/ECO4P 50PK	PUBLIC TRANSPORTATION	100	6,37	637,00	CFL	12.000	4	No	No
10.29.07	03-14116	GE# 10748 - F48T12/CW 24PK	PUBLIC TRANSPORTATION	168	1,73	290,64	T12 Fluorescent	9.000	31-65 mg	No	No
10.29.07	03-14119	GE# 13743 - F72T12/CW 15PK	PUBLIC TRANSPORTATION	105	1,99	208,95	T12 Fluorescent	12.000	31-65 mg	No	No
10.29.07	03-14119	GE# 23073 - F60T12/CW 15PK	PUBLIC TRANSPORTATION	75	2,47	185,25	T12 Fluorescent	12.000	31-65 mg	No	No
11.01.07	03-14150	GE# 14551 - % * F32T8/SXL/SP41/CVG 3	PUBLIC TRANSPORTATION	180	6,58	1.184,40	T8 Fluorescent	30.000	3,9	No	No
11.05.07	03-14164	GE# 10086 - F13T5/CW 24PK	PUBLIC TRANSPORTATION	96	1,36	130,56	T5 Fluorescent	5.000	11- 30 mg	No	No
11.05.07	03-14164	GE# 15265 - F40SP41/U/6 12PK	PUBLIC TRANSPORTATION	120	4,51	541,20	U-Tube Fluor.	14.000	31-65 mg	No	No
11.05.07	03-14164	GE# 19643 - F15T8/SP41 24PK	PUBLIC TRANSPORTATION	24	1,44	34,56	T8 Fluorescent	7.500	1-10 mg	Yes	Yes
11.05.07	03-14164	GE# 23731 - Q500T3/CL-FCL 120V 120PK	PUBLIC TRANSPORTATION	24	2,21	53,04	Quartz	2.000	0 mg	No	No
11.05.07	03-14164	GE# 45749 - % * F17T8/SPX41/ECO 24PK	PUBLIC TRANSPORTATION	144	3,16	455,04	T8 Fluorescent	20.000	6	No	No
11.05.07	03-14164	GE# 46273 - % * MPR400/VBU/XHOPA 6	PUBLIC TRANSPORTATION	60	28,54	1.712,40	HID	20.000	42	Yes	Yes
11.05.07	03-14164	GE# 97554 - F7BX/827/ECO 10PK	PUBLIC TRANSPORTATION	30	1,14	34,20	CFL	10.000	4	No	No
11.05.07	03-14167	GE# 10748 - F48T12/CW 24PK	PUBLIC TRANSPORTATION	312	1,73	539,76	T12 Fluorescent	9.000	31-65 mg	No	No
11.06.07	03-14191	GE# 12623 - 60A/52WM 130V 130PK	PUBLIC TRANSPORTATION	60	0,22	13,20	Incandescent	1.000	0 mg	Yes	Yes
11.09.07	03-14214	GE# 13743 - F72T12/CW 15PK	PUBLIC TRANSPORTATION	495	1,99	985,05	T12 Fluorescent	12.000	31-65 mg	No	No

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								Lamp Life	Mg of Mercury	Solder	Glass Envelope
12.06.07	03-14361	GE# 19643 - F15T8/SP41 24PK	PUBLIC TRANSPORTATION	24	1,44	34,56	T8 Fluorescent	7,500	1-10 mg	Yes	Yes
12.11.07	03-14388	GE# 13474 - 100PAR/G/85WM 120V 120PK	PUBLIC TRANSPORTATION	60	2,79	167,40	Incandescent	2,000	0 mg	Yes	Yes
12.11.07	03-14388	GE# 13716 - * F96T12/CW/HO/WM 15PK	PUBLIC TRANSPORTATION	120	1,82	218,40	T12 Fluorescent	12,000	66-100 mg	No	No
12.11.07	03-14388	GE# 26668 - % * F32T8/SP41/ECO 36PK	PUBLIC TRANSPORTATION	360	1,43	514,80	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
12.11.07	03-14388	GE# 44054 - LU400 12PK	PUBLIC TRANSPORTATION	48	12,46	598,08	HID	24,000	11-30 mg	Yes	Yes
12.11.07	03-14392	GE# 12623 - 60A/52WM 130V 24PK	PUBLIC TRANSPORTATION	48	0,22	10,56	Incandescent	1,000	0 mg	Yes	Yes
12.11.07	03-14392	GE# 97849 - 60A/52WM 130V 130PK	PUBLIC TRANSPORTATION	12	0,22	2,64	Incandescent	1,000	0 mg	Yes	Yes
12.12.07	03-14403	GE# 44054 - LU400 12PK	PUBLIC TRANSPORTATION	12	12,46	149,52	HID	24,000	11-30 mg	Yes	Yes
			<b>PUBLIC TRANSPORTATION Total</b>			<b>8,718,89</b>					
10.01.07	03-13868	GE# 18333 - % * F40XL/SPX41 30PK	PUBLIC WORKS	30	5,06	151,80	T12 Fluorescent	24,000	1-10 mg	No	No
10.02.07	03-13877	GE# 10322 - % * F32T8/XL/SPX41/HL/ECO 36PK	PUBLIC WORKS	36	4,00	144,00	T8 Fluorescent	24,000	1-10 mg	No	No
10.09.07	03-13931	GE# 23010 - * F34CW/RS/WM/ECO 30PK	PUBLIC WORKS	60	0,73	43,80	T12 Fluorescent	20,000	1-10 mg	Yes	Yes
10.10.07	03-13935	GE# 18680 - MXR100/U/MED 6PK	PUBLIC WORKS	1	11,03	11,03	HID	15,000	1-10 mg	Yes	Yes
10.10.07	03-13935	GE# 19976 - MVR175/C/U/MED 6PK	PUBLIC WORKS	2	12,85	25,70	HID	10,000V 6,000H	11-30 mg	Yes	Yes
10.10.07	03-13935	GE# 42729 - MVR250/U 12PK	PUBLIC WORKS	1	10,29	10,29	HID	6,000H 10,000V	>10 - 50 mg	Yes	Yes
10.10.07	03-13935	GE# 43828 - MVR400/U 6PK	PUBLIC WORKS	1	9,76	9,76	HID	20,000V 15,000H	31-65 mg	Yes	Yes
10.15.07	03-13965	GE# 19976 - MVR175/C/U/MED 6PK	PUBLIC WORKS	4	12,85	51,40	HID	10,000V 6,000H	11-30 mg	Yes	Yes
10.15.07	03-13968	GE# 41778 - % * F31T8/SPX41/U 15PK	PUBLIC WORKS	15	4,38	65,70	U-Tube Fluor.	20,000	1-10 mg	No	No
10.15.07	03-13971	GE# 23731 - Q500T3/CL-FCL 120V 120PK	PUBLIC WORKS	2	2,21	4,42	Quartz	2,000	0 mg	No	No
10.16.07	03-13978	GE# 47760 - MVR175/U 12PK	PUBLIC WORKS	2	9,10	18,20	HID	10,000V 6,000H	11-30 mg	Yes	Yes
10.19.07	03-14027	GE# 26666 - % * F32T8/SP30/ECO 36PK	PUBLIC WORKS	72	1,43	102,96	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
10.23.07	03-14081	GE# 23731 - Q500T3/CL-FCL 120V 120PK	PUBLIC WORKS	10	2,21	22,10	Quartz	2,000	0 mg	No	No
10.26.07	03-14100	GE# 17986 - 100PAR/H/FL25° 120V 120PK	PUBLIC WORKS	6	1,68	10,08	Incandescent	2,000	0 mg	No	No
10.26.07	03-14100	GE# 23010 - * F34CW/RS/WM/ECO 30PK	PUBLIC WORKS	60	0,73	43,80	T12 Fluorescent	20,000	1-10 mg	Yes	Yes
10.30.07	03-14131	GE# 27621 - % * F32T8/XL/SPX41/ECO 36PK	PUBLIC WORKS	144	3,27	470,88	T8 Fluorescent	24,000	1-10 mg	Yes	Yes
10.31.07	03-14137	GE# 23010 - * F34CW/RS/WM/ECO 30PK	PUBLIC WORKS	60	0,73	43,80	T12 Fluorescent	20,000	1-10 mg	Yes	Yes
10.31.07	03-14137	GE# 26668 - % * F32T8/SP41/ECO 36PK	PUBLIC WORKS	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
11.01.07	03-14142	GE# 18635 - % * 100PAR/HIR/SP10° 120V	PUBLIC WORKS	24	4,45	106,80	Incandescent	3,000	0 mg	Yes	Yes
11.13.07	03-14230	GE# 26668 - % * F32T8/SP41/ECO 36PK	PUBLIC WORKS	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
11.13.07	03-14230	GE# 97571 - F13BX/SPX41/840 100PK	PUBLIC WORKS	10	1,22	12,20	CFL	10,000	1-10 mg	Yes	Yes
11.13.07	03-14234	GE# 23416 - % * F96T8/SPX41 24PK	PUBLIC WORKS	24	4,26	102,24	T8 Fluorescent	15,000	31-65 mg	No	No
11.14.07	03-14235	GE# 44975 - LU50 12PK	PUBLIC WORKS	3	13,41	40,23	HID	24,000	11-30 mg	Yes	Yes
11.15.07	03-14247	GE# 15480 - F17T8/XL/SP41/ECO 24PK	PUBLIC WORKS	24	1,37	32,88	T8 Fluorescent	24,000	1-10 mg	Yes	Yes
11.15.07	03-14247	GE# 45756 - % * F25T8/SP41/ECO 24PK	PUBLIC WORKS	2	2,25	4,50	T8 Fluorescent	20,000	1-10 mg	No	No
11.15.07	03-14254	GE# 23010 - * F34CW/RS/WM/ECO 30PK	PUBLIC WORKS	90	0,73	65,70	T12 Fluorescent	20,000	1-10 mg	Yes	Yes

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								Lamp Life	Mg of Mercury	Solder	Glass Envelope
11.19.07	03-14266	GE# 47760 - MVR175/U 12PK	PUBLIC WORKS	12	9,10	109,20	HID	10,000V 6,000H	11-30 mg	Yes	Yes
11.19.07	03-14269	GE# 26668 - % * F32T8/SP41/ECO 36PK	PUBLIC WORKS	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
11.27.07	03-14300	GE# 23416 - % * F96T8/SPX41 24PK	PUBLIC WORKS	72	4,26	306,72	T8 Fluorescent	15,000	31-65 mg	No	No
11.27.07	03-14306	GE# 97636 - % * F42TBX/841/A/ECO 10PK	PUBLIC WORKS	160	7,76	1,241,60	CFL	12,000	4	No	No
11.29.07	03-14312	GE# 11345 - LU50/MED 6PK	PUBLIC WORKS	3	10,71	32,13	HID	24,000	>10 - 50 mg	Yes	Yes
11.29.07	03-14316	GE# 26668 - % * F32T8/SP41/ECO 36PK	PUBLIC WORKS	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
11.30.07	03-14325	GE# 26666 - % * F32T8/SP30/ECO 36PK	PUBLIC WORKS	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
11.30.07	03-14325	GE# 41778 - % * F31T8/SPX41/U 15PK	PUBLIC WORKS	30	4,38	131,40	U-Tube Fluor.	20,000	1-10 mg	No	No
11.30.07	03-14327	GE# 13252 - LU150/MED 6PK	PUBLIC WORKS	12	11,44	137,28	HID	24,000	>10 - 50 mg	Yes	Yes
12.05.07	03-14356	GE# 12381 - MXR100/U/MED/O 6PK	PUBLIC WORKS	12	11,03	132,36	HID	15,000	1-10 mg	Yes	Yes
12.05.07	03-14356	GE# 12652 - MVR100/U/MED 6PK	PUBLIC WORKS	29	11,03	319,87	HID	15,000	1-10 mg	Yes	Yes
12.05.07	03-14356	GE# 18680 - MXR100/U/MED 6PK	PUBLIC WORKS	18	11,03	198,54	HID	15,000	1-10 mg	Yes	Yes
12.05.07	03-14357	GE# 12377 - MXR70/U/MED/O 6PK	PUBLIC WORKS	6	12,71	76,26	HID	15,000	1-10 mg	Yes	Yes
12.07.07	03-14371	GE# 27617 - % * F32T8/XL/SP35/ECO 36PK	PUBLIC WORKS	72	2,22	159,84	T8 Fluorescent	24,000	1-10 mg	Yes	Yes
12.07.07	03-14372	GE# 42729 - MVR250/U 12PK	PUBLIC WORKS	3	10,29	30,87	HID	6,000H 10,000V	>10 - 50 mg	Yes	Yes
12.10.07	03-14378	GE# 42729 - MVR250/U 12PK	PUBLIC WORKS	12	10,29	123,48	HID	6,000H 10,000V	>10 - 50 mg	Yes	Yes
12.12.07	03-14406	GE# 45764 - LU250ECO 12PK	PUBLIC WORKS	2	13,34	26,68	HID	24,000	1-10 mg	Yes	Yes
12.12.07	03-14407	GE# 20833 - Q50MR16/C/FL40°-EXN 12V	PUBLIC WORKS	10	2,19	21,90	Quartz	6,000	0 mg	No	No
12.13.07	03-14410	GE# 27618 - % * F32T8/XL/SP41/ECO 36PK	PUBLIC WORKS	36	2,22	79,92	T8 Fluorescent	24,000	1-10 mg	Yes	Yes
12.13.07	03-14411	GE# 11339 - LU70/MED 6PK	PUBLIC WORKS	6	9,55	57,30	HID	24,000	>10 - 50 mg	Yes	Yes
12.13.07	03-14412	GE# 97612 - F26DBX/835/ECO4P 10PK	PUBLIC WORKS	10	6,09	60,90	CFL	12,000	1-5 mg	No	No
12.13.07	03-14413	GE# 23010 - * F34CW/RS/WM/ECO 30PK	PUBLIC WORKS	30	0,73	21,90	T12 Fluorescent	20,000	1-10 mg	Yes	Yes
12.18.07	03-14456	GE# 26668 - % * F32T8/SP41/ECO 36PK	PUBLIC WORKS	36	1,43	51,48	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
12.20.07	03-14469	GE# 45760 - LU70ECO 12PK	PUBLIC WORKS	12	11,70	140,40	HID	24,000	1-10 mg	Yes	Yes
12.20.07	03-14470	GE# 45760 - LU70ECO 12PK	PUBLIC WORKS	12	11,70	140,40	HID	24,000	1-10 mg	Yes	Yes
12.21.07	03-14480	GE# 25612 - % * F32T8/SPX35/ECO 36PK	PUBLIC WORKS	36	0,00	0,00	T8 Fluorescent	20,000	1-10 mg	No	No
12.21.07	03-14480	GE# 41777 - % * F31T8/SPX35/U 15PK	PUBLIC WORKS	15	0,00	0,00	U-Tube Fluor.	20,000	1-10 mg	No	No
12.24.07	03-14484	GE# 14672 - % LU70/ECO/NC 12PK	PUBLIC WORKS	12	0,00	0,00	HID	30,000	2	No	Yes
			<b>PUBLIC WORKS Total</b>			<b>5,452,10</b>					
10.17.07	03-14004	GE# 10059 - F8T5/CW 24PK	REAL ESTATE	30	1,09	32,70	T5 Fluorescent	5,000	1-10 mg	No	No
11.02.07	03-14157	GE# 46761 - % * F54W/T5/841/ECO 40PK	REAL ESTATE	10	4,17	41,70	T5 Fluorescent	30,000	1-10 mg	Yes	Yes
11.14.07	03-14242	GE# 46761 - % * F54W/T5/841/ECO 40PK	REAL ESTATE	10	4,17	41,70	T5 Fluorescent	30,000	1-10 mg	Yes	Yes
11.27.07	03-14305	GE# 33405 - 25R14SC/SP 12V 120PK	REAL ESTATE	120	2,41	289,20	Incandescent	2,000	0	Yes	No
			<b>REAL ESTATE Total</b>			<b>405,30</b>					
10.05.07	03-13900	GE# 42729 - MVR250/U 12PK	RECREATION & PARK	36	10,29	370,44	HID	6,000H 10,000V	>10 - 50 mg	Yes	Yes
10.09.07	03-13926	GE# 26668 - % * F32T8/SP41/ECO 36PK	RECREATION & PARK	720	1,43	1,029,60	T8 Fluorescent	20,000	1-10 mg	Yes	Yes
10.17.07	03-13987	GE# 23412 - % * F96T8/SP41 24PK	RECREATION & PARK	24	3,04	72,96	T8 Fluorescent	15,000	31-65 mg	No	No

OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

Invoice Date	Invoice No.	Item Description	Department	Qty	Unit Price Per Contract	Extend Price	Lamp Type	Any Lead Content			
								Lamp Life	Mg of Mercury	Solder	Glass Envelope
10.17.07	03-14002	GE# 11792 - 7C7 130V 240PK	RECREATION & PARK	240	0,30	72,00	Incandescent	3.000	0	Yes	No
10.25.07	03-14095	GE# 23412 - % * F96T8/SP41 24PK	RECREATION & PARK	120	3,04	364,80	T8 Fluorescent	15.000	31-65 mg	No	No
10.29.07	03-14110	GE# 23427 - 300PAR56/WFL 12V 12PK	RECREATION & PARK	24	7,69	184,56	Incandescent	1.000	0	No	No
11.08.07	03-14203	GE# 21709 - % * FLE15/2/DV/R30 6PK	RECREATION & PARK	12	9,10	109,20	CFL	6.000	3,5	No	No
11.09.07	03-14209	GE# 11345 - LU50/MED 6PK	RECREATION & PARK	18	10,71	192,78	HID	24.000	>10 - 50 mg	Yes	Yes
11.20.07	03-14279	GE# 11792 - 7C7 130V 130PK	RECREATION & PARK	240	0,30	72,00	Incandescent	3.000	0	Yes	No
12.06.07	03-14360	GE# 21716 - % * FLE26/2/DV/R40 6PK	RECREATION & PARK	12	9,54	114,48	CFL	6.000	3,5	No	No
			<b>RECREATION &amp; PARK Total</b>			<b>2.582,82</b>					
10.01.07	03-13866	GE# 18205 - MVR1000/U/BT37 6PK	SAN BRUNO SHERIFF'S DEPT	12	26,46	317,52	HID	9,000H 12,000V	>100 mg to 1000 mg	Yes	Yes
10.01.07	03-13866	GE# 97613 - % * F26DBX/841/ECO4P 50PK	SAN BRUNO SHERIFF'S DEPT	146	6,37	930,02	CFL	12.000	1-5 mg	No	No
10.03.07	03-13887	GE# 97613 - % * F26DBX/841/ECO4P 50PK	SAN BRUNO SHERIFF'S DEPT	50	6,37	318,50	CFL	12.000	1-5 mg	No	No
12.14.07	03-14424	GE# 18205 - MVR1000/U/BT37 6PK	SAN BRUNO SHERIFF'S DEPT	12	26,46	317,52	HID	9,000H 12,000V	>100 mg to 1000 mg	Yes	Yes
12.14.07	03-14424	GE# 27618 - % * F32T8/XL/SP41/ECO 36PK	SAN BRUNO SHERIFF'S DEPT	360	2,22	799,20	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
12.14.07	03-14424	GE# 43698 - Q250CL/DC 130V	SAN BRUNO SHERIFF'S DEPT	12	5,73	68,76	Quartz	2.000	0 mg	No	No
12.14.07	03-14424	GE# 80187 - * F40SP41/ECO 30PK	SAN BRUNO SHERIFF'S DEPT	150	0,92	138,00	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
12.18.07	03-14453	GE# 97561 - F9BX/841/ECO 100PK	SAN BRUNO SHERIFF'S DEPT	100	1,28	128,00	CFL	10.000	1-10 mg	Yes	Yes
			<b>SAN BRUNO SHERIFF'S DEPT Total</b>			<b>3.017,52</b>					
11.01.07	03-14141	GE# 45761 - LU100ECO 12PK	SE TREATMENT	6	12,25	73,50	HID	24.000	1-10 mg	Yes	Yes
			<b>SE TREATMENT Total</b>			<b>73,50</b>					
10.12.07	03-13953	GE# 26668 - % * F32T8/SP41/ECO 36PK	SHERIFF'S DEPT	144	1,43	205,92	T8 Fluorescent	20.000	1-10 mg	Yes	Yes
10.12.07	03-13954	GE# 10205 - F20T12/D 24PK	SHERIFF'S DEPT	15	1,19	17,85	T12 Fluorescent	9.000	4,9	No	No
10.12.07	03-13954	GE# 97600 - % * F18DBX/835/ECO4P 50PK	SHERIFF'S DEPT	10	5,91	59,10	CFL	10.000	1-10 mg	Yes	Yes
10.12.07	03-13954	GE# 97606 - F26DBX/827/ECO	SHERIFF'S DEPT	50	6,02	301,00	CFL	10.000	1-5 mg	No	No
10.15.07	03-13973	GE# 23010 - * F34CW/RS/WM/ECO 30PK	SHERIFF'S DEPT	300	0,73	219,00	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
10.23.07	03-14075	GE# 10205 - F20T12/D 24PK	SHERIFF'S DEPT	9	1,19	10,71	T12 Fluorescent	9.000	4,9	No	No
10.23.07	03-14076	GE# 26668 - % * F32T8/SP41/ECO 36PK	SHERIFF'S DEPT	216	1,43	308,88	T8 Fluorescent	20.000	1-10 mg	Yes	Yes
11.01.07	03-14149	GE# 16313 - % F32T8XLSPX50ECO 36PK	SHERIFF'S DEPT	36	3,17	114,12	T8 Fluorescent	24.000	1-10 mg	Yes	Yes
11.16.07	03-14263	GE# 43828 - MVR400/U 6PK	SHERIFF'S DEPT	12	9,76	117,12	HID	20,000V 15,000H	31-65 mg	Yes	Yes
11.16.07	03-14263	GE# 97616 - % * F26TBX/835/A/ECO 10PK	SHERIFF'S DEPT	20	7,47	149,40	CFL	12.000	1-5 mg	No	No
11.23.07	03-14284	GE# 47430 - % * FLE10HT3/2/XL/CD	SHERIFF'S DEPT	20	9,36	187,20	CFL	12.000	3,5	No	No
12.17.07	03-14436	GE# 47483 - % * FLE26/2/PAR38/XL 3PK	SHERIFF'S DEPT	18	9,25	166,50	CFL	10.000	3,5	No	No
			<b>SHERIFF'S DEPT Total</b>			<b>1.856,80</b>					
11.27.07	03-14304	GE# 26668 - % * F32T8/SP41/ECO 36PK	TELECOMMUNICATIONS	180	1,43	257,40	T8 Fluorescent	20.000	1-10 mg	Yes	Yes
			<b>TELECOMMUNICATIONS Total</b>			<b>257,40</b>					
11.09.07	03-14210	GE# 13250 - LU100/MED 6PK	WATER DEPT.	12	10,84	130,08	HID	24.000	>10 - 50 mg	Yes	Yes
12.05.07	03-14350	GE# 23010 - * F34CW/RS/WM/ECO 30PK	WATER DEPT.	120	0,73	87,60	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
12.14.07	03-14426	GE# 23731 - Q500T3/CL-FCL 120V	WATER DEPT.	24	2,21	53,04	Quartz	2.000	0 mg	No	No
			<b>WATER DEPT. Total</b>			<b>270,72</b>					

OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
 City and County of San Francisco - GE Large Lamps Sales Report  
 October 1 through December 26, 2007

Invoice Date	Invoice No.	Item Description	Department	Qty	Unit Price Per Contract	Extend Price	Lamp Type	Any Lead Content			
								Lamp Life	Mg of Mercury	Solder	Glass Envelope
11.14.07	03-14239	GE# 45760 - LU70ECO 12PK	WATER POLLUTION	12	11,70	140,40	HID	24.000	1-10 mg	Yes	Yes
11.30.07	03-14321	GE# 45760 - LU70ECO 12PK	WATER POLLUTION	12	11,70	140,40	HID	24.000	1-10 mg	Yes	Yes
12.06.07	03-14363	GE# 12624 - 75A/67WM 130V 130PK	WATER POLLUTION	96	0,22	21,12	Incandescent	1000/2600	0	No	No
12.18.07	03-14451	GE# 23010 - * F34CW/RS/WM/ECO 30PK	WATER POLLUTION	390	0,73	284,70	T12 Fluorescent	20.000	1-10 mg	Yes	Yes
			<b>WATER POLLUTION Total</b>			<b>586,62</b>					
			<b>Grand Total Sales for GE Large Lamps</b>			<b>#####</b>					

OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

"Excluded?"
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OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

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OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

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OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

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OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

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OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

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OMEGA PACIFIC ELECTRICAL SUPPLY, INC.  
City and County of San Francisco - GE Large Lamps Sales Report  
October 1 through December 26, 2007

"Excluded?"
No
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## Mercury Quantity in Lamps for General Lighting Applications

11/01/07

Highly efficient, energy-conserving lamps typically contain small quantities of mercury. If the level of mercury is too low, then lamp life, number of starts, color, and light output can be dramatically affected. Lamps will consume all the pure mercury before reaching rated life, requiring additional lamp replacements, which increases mercury usage. The mercury is therefore crucial to achieving the lamps' higher level of operating efficiency. OSRAM SYLVANIA is **continuously striving to reduce** the levels of mercury in our lamps. The levels in these tables are best projected estimates, subject to machine capabilities. When using these numbers to determine compliance with the US Green Building Council's LEED®-EB low mercury prerequisite<sup>1</sup> or additional point, please note:

- This calculation requires input of ALL mercury-containing lamps and is not designed as a lamp-by-lamp comparison. Each individual lamp does NOT need to meet the 100 picogram per lumen hour level, but rather the total level of all lamp types and quantities must achieve that measurement.
- It is important to remember that individual products cannot be LEED-certified. Only buildings can be LEED-certified.

Category	Lamp Type	Range	Hg Content (mg)
FL 1	T5, pre-heat	4W to 13W (incl BLB)	<15
FL 2	T5, PENTRON®	All	2.5
FL 3	PENTRON® Circline	All	<9
FL 4	T5, PENTRON® HO (High Output)	All	<2.5
FL 5	T12, pre-heat	All	<12 to 15
FL 6	T8, pre-heat	All	<6
FL 8	T8, OCTRON®, linear 800, 800XP, 800XPS	Up to 60"	<3.5
FL 9	T8, OCTRON®, linear 700XP	Up to 72"	<3.5
FL10	T8, OCTRON®, linear 700	Up to 72"	<8
FL 11	T8, OCTRON® linear	72" and longer	<8.5
FL 12	T8, OCTRON®, HO, linear (High Output)	All	<9.5
FL 13	T8, OCTRON®, CURVALUME®	All	<10
FL 14	T9 Circline	20W	<5
FL 15	T9 Circline	22W, 28W, 40W	<15
FL 16	T12, linear, Rapid Start	(excl. HO & VHO)	<9.5
FL 17	T12, linear, Instant Start	All (>24" L)	<9.5
FL 18	T12, CURVALUME®	All	<8
FL 19	T12, HO (High Output)	All	<15
FL 20	T12, VHO (Very High Output)	All	<30
FL 21	ICETRON®	70W to 150W	<18

CFL 1	DULUX EL®, one piece (amalgam and covered, ex. triple tube)	4W to 40W	<3
CFL 2	DULUX EL® one piece (bare burner)	4W to 25W	<3-5
CFL 3	DULUX EL® one piece (bare burner)	25W to 40W	<6
CFL 4	DULUX EL®, one piece (triple tube)	15W to 23W	<5
CFL 5	DULUX EL®, Circline	20W to 30W	<5
CFL 6	DULUX EL® Micro Mini	13W to 23W	<1.5
CFL 6	DURA-ONE®	23W	<1.8
CFL 7	DULUX® pin base (excl. some T, and F and L)	5W to 57W	<2.5
CFL 8	DULUX® pin base T, T/E	13W to 32W	<4.5
CFL 9	DULUX® pin base, T/E/IN	70W	<3
CFL 10	DULUX® F, pin base	18W to 36 W	<3
CFL 11	DULUX® L, pin base	18W to 55W	<4.5

<sup>1</sup> LEED-EB MR Prerequisite #2 – Toxic Material Source Reduction: Reduced Mercury in Light Bulbs



Highly efficient, energy-conserving lamps typically contain small quantities of mercury. If the level of mercury is too low, then lamp life, number of starts, color, and light output can be dramatically affected. Lamps will consume all the pure mercury before reaching rated life, requiring additional lamp replacements, which increases mercury usage. The mercury is therefore crucial to achieving the lamps' higher level of operating efficiency.

In addition, energy-efficient lighting requires less energy, which lowers electricity demand. This means that power plants need to burn less fossil fuel to meet this demand, which reduces emissions of air pollutants – including airborne mercury. OSRAM SYLVANIA is **continuously striving to reduce** the levels of mercury in our lamps. The levels in these tables are best projected estimates, subject to machine capabilities.

When using these numbers to determine compliance with the US Green Building Council's LEED®-EB low mercury prerequisite<sup>2</sup> or additional point, please note:

**This calculation requires input of ALL mercury-containing lamps and is not designed as a lamp-by-lamp comparison. Each individual lamp does NOT need to meet the 100 picogram per lumen hour level, but rather the total level of all lamp types and quantities must achieve that measurement.**

**It is important to remember that individual products cannot be LEED-certified. Only buildings can be LEED-certified.**

Category	Lamp Type	Range	Hg Content (mg)
HID 1	Metal Halide, METALARC® screw base ceramic PAR & TC	20W	<2.5
HID 2	Metal Halide, METALARC® screw base ceramic PAR, T,&TC	39W	<5
HID 3	Metal Halide, METALARC® screw base ceramic PAR, T,&TC	70W	<7
HID 4	Metal Halide, METALARC® screw base ceramic PAR	100W to 150W	<15
HID 5	Metal Halide, METALARC® screw base	50W to 100W	<13
HID 6	Metal Halide, METALARC® screw base	150W to 250W	<34
HID 7	Metal Halide, METALARC® screw base	320W to 360W	<56
HID 8	Metal Halide, METALARC® ceramic screw base	250W	<18
HID 9	Metal Halide, METALARC® ceramic screw base	320W	<31
HID 10	Metal Halide, METALARC® screw base	400W to 750W	<57 to 63
HID 11	Metal Halide, METALARC® screw base	1000W to 1500W	<145
HID 12	Metal Halide, pin base	39 to 150W	<6 to 13
HID 13	Metal Halide, double-ended (excl. HQI DE 150 WDX)	70 to 250W	<15
HID 14	Metal Halide, double-ended - HQI DE 150 WDX only	150W	<23
HID 15	Metal Halide, double-ended	1000 to 3000W	<281
HID 16	Mercury Vapor	50W to 100W	<11 to 20
HID 17	Mercury Vapor	175W	<24
HID 18	Mercury Vapor	250W	<48
HID 19	Mercury Vapor	400W to 1000W	<58 to 79
HID 20	Mercury Vapor H36	1000W	<165
HID 21	High Pressure Sodium, standard	35W to 400W	<11 to 15
HID 22	High Pressure Sodium, standard, SUPER	>400W to 1000W	<18 to 25
HID 23	High Pressure Sodium, LUMALUX® Standby	70W to 400W	<29
HID 24	High Pressure Sodium, LUMALUX® Standby	1000W	<43
HID 25	High Pressure Sodium, ECO	50W to 400W	<15
HID 26	High Pressure Sodium, PLUS, ECO	50W to 400W	<1 to 6
HID 27	High Pressure Sodium PLUS	1000W	<15
HID 28	High Pressure Sodium, HgF mercury free	70W to 150W	0.0001

<sup>2</sup> MR Prerequisite #2 – Toxic Material Source Reduction: Reduced Mercury in Light Bulbs



## Green Purchasing Institute

1801 Carleton Street • Berkeley, CA 94703

Tel: 510-547-5475 • Fax: 510-217-4131

### MEMORANDUM

**To: Elena Lymberidi, Zero Mercury Campaign Coordinator, EEB**  
**From: Alicia Culver**  
**Re: Data on Mercury Content of High-pressure Sodium (HPS) Lamps Available from Major US Manufacturers**  
**Date: March 31, 2008**

Below is the data on the mercury content of high-pressure sodium (HPS) lamps offered in the United States by GE Lighting, Philips Lighting and Osram Sylvania. Generally, only GE offers both TCLP-compliant and non-TCLP compliant versions of the same lamp model. GE's Ecolux (TCLP-compliant) models almost always have less mercury, although in one case (400-watt model) the mercury content is the same as its equivalent non-TCLP-compliant model. Sylvania has the best selection of low-mercury and mercury-free HPS lamps. While all of the Philips' models are TCLP-compliant, in some cases their models have the highest mercury content. The higher the wattage, the higher the mercury content in most cases for all of the companies.

*So, what spec would facilitate the use of low-mercury HPS lamps?* In most cases, specifying TCLP-compliant HPS lamps would enable the specifier to easily get models devoid of the highest mercury levels for each wattage. You could also set numerical levels based on the best two out of three manufacturers' offerings, but that would be complicated and could change as manufacturers reformulate. It would be great to write specifications that would encourage the use of the long-lasting/low-mercury and mercury-free models, but to do so would result in a sole-source spec. What are your suggestions?



<b>Watts</b>	<b>OEM</b>	<b>Lamp Description</b>	<b>Lamp Model #</b>	<b>Mercury Content (mg)</b>	<b>TCLP (Y/N)</b>	<b>Mean Lumens</b>	<b>Rated Life (Hours)</b>	<b>Notes</b>
200	GE	LU200	44206	10-50	No	19,800	24,000+	Lucolux standard model
200	GE	LU200/ECO	45763	11-30	Yes	19,800	24,000+	Ecolux
200	PH	C200S66/ALTO	36877-9	31	Yes	19,260	24,000+	Ceramalux, ALTO
200	SY	LU200/ECO	67576	14	Yes	19,800	24,000+	Ecologic, low-mercury
200	SY	LU200/PLUS/ECO	67495	3	Yes	19,800	24,000+	Ecologic, very low-mercury and long-life
250	GE	LU250	44047	10-50	No	25,200	24,000+	Lucolux standard model
250	GE	LU250/ECO	45764	11-30	Yes	25,200	24,000+	Ecolux, made with no lead solder
250	PH	C250S50/ALTO	36879-5	31.9	Yes	24,300	24,000+	Ceramalux, ALTO
250	SY	LU250/ECO	67578	14	Yes	26,100	24,000+	Ecologic, low-mercury
250	SY	LU250/PLUS/ECO	67572	3	Yes	26,100	30,000	Ecologic, very low-mercury and long-life
400	GE	LU400	44054	11-30	No	45,000	24,000+	Lucolux standard model
400	GE	LU400/ECO	45765	11-30	Yes	45,000	24,000+	Ecolux, made with no lead solder
400	PH	C400S51/ALTO	36881-1	31	Yes	45,000	24,000+	Ceramalux, ALTO
400	SY	LU400/ECO	67533	11	Yes	45,000	24,000+	Ecologic, low-mercury
400	SY	LU400/PLUS/ECO	67312	3.7	Yes	45,000	30,000	Ecologic, very low-mercury and long-life
1000	GE	LU1000/ECO	44058	11-30	Yes	126,000	24,000+	Made with no lead solder; no LU1000 available; all TCLP-compliant
1000	PH	C1000S52/ALTO	36883-7	44	Yes	126,000	24,000+	Ceramalux, ALTO
1000	SY	LU1000/PLUS	67316	15	No	124,000	30,000	Not available in ECO (but still relatively low mercury)