

## INC 2 BRIEFING PAPER SERIES: Reducing Mercury Content of Energy Efficient Lamps

Mercury is added to lamps to form a vapour that produces light when current is passed through it under a vacuum. Energy efficient lamps containing mercury are already widely used and heavily promoted worldwide, yet people often do not recognize that they contain mercury. In the coming years, many millions more of these lamps are expected to flood the global consumer market and be used in homes, businesses and institutions, since bans on incandescent lamps (which use more energy) are planned around the world.

The UNEP elements paper includes lamps among the categories of products for mercury phase-out. Since mercury is likely to remain a necessary additive for at least some energy-efficient lamps, (at least in the short-term until LEDs and other alternatives are more fully developed), most if not all Parties will probably receive an allowable use exemption for these lamps.

In the case of lamps, we agree with the UNEP Annex C comment that the INC should discuss the inclusion of mercury content values and further specifications for the listing. In line with the ZMWG comments to the elements paper, we recommend a process for setting mercury content limits over an outright production prohibition, since we fear the latter approach would merely result in blanket allowable use exemptions without minimizing the amount of mercury consumed by this sector. Under our recommended approach, the Conference of Parties (COP) could set both maximum content limits where mercury is still needed to manufacture lamps, and a prohibition against mercury use (by setting a content limit of zero) where non-mercury alternatives are available or the particular category of lamps is outdated. In addition to reducing global mercury consumption by this sector, setting mercury-content limits will help protect consumers by minimizing the amount of mercury in each lamp and thus potential exposure during use and subsequent handling, and will promote the use of improved mercury dosing techniques which better protect workers and minimize mercury losses to the environment.

For a limited number of specified high-priority lamp categories (CFLs, mercury vapour lamps, and halophosphate fluorescent lamps), we believe the INC can specify content limits based upon the new standards established under the EU RoHS Directive. See [http://ec.europa.eu/environment/waste/weee/index\\_en.htm](http://ec.europa.eu/environment/waste/weee/index_en.htm) and <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2002L0095:20100925:EN:HTML>. These new standards were developed in a multi-year process involving expert review and stakeholder involvement. We also believe that by its second meeting, the COP should be in a position where it may revise these content limits and set limits for other lamp categories. The applicable limits and the rationale for choosing these particular lamp categories is provided below.

| Lamp Type  | Maximum Mercury Content Limit |
|--|-------------------------------|
| a. Compact fluorescent lamp less than 30 watts   | 2.5 mg                        |
| b. Compact fluorescent lamp equal to or greater than 30 watts, but less than 50 watts  | 3.5 mg                        |
| c. Compact fluorescent lamp equal to or greater than 50 watts, but less than 150 watts | 5.0 mg                        |
| d. High pressure mercury vapour lamps  | 0.0 mg                        |
| e. General purpose halophosphate T10 and T12 fluorescent lamps (all sizes and shapes)  | 0.0 mg                        |

## Category 1: General Purpose Compact Fluorescent Lamps (CFLs)



Compact fluorescent lamps (CFLs) are single-capped fluorescent lamps with either an integrated or a separate ballast. This is the category of lamps for which the largest growth is anticipated over the next decade, as governments implement bans on incandescent lamps and promote energy efficiency. Moreover, these lamps are often used in residential settings, where minimizing mercury exposure in case of breakage is an important consideration. Significantly, the RoHS standard development process demonstrated lowering the mercury content of CFLs will not result in a lower efficiency or shorter lamp life.

## Category 2: High-pressure mercury vapour (MV) lamps



Mercury vapour lamps are the oldest and least energy-efficient type of high-intensity discharge (HID) lamp on the market. According to the US EPA's ENERGY STAR Program, "Older HID installations are often mercury vapor lamps, an extremely inefficient design." Mercury vapour lamps and ballasts are being aggressively phased out in the EU, USA and other parts of the world due to their poor energy efficiency and light quality. A zero mercury limit for mercury vapour lamps is justified because they can be directly replaced by high-pressure sodium or metal halide lamps, both of which have a higher efficiency and color rendering index (CRI), an indicator of good light quality.

The proposal to set a zero mercury limit on mercury vapour lamps, which would prohibit their sale, is consistent with the EU's RoHS Directive, which set a similar limit as of April 13, 2015.

## Category 3: Halophosphate fluorescent lamps



Under the EU RoHS, the sale of linear halophosphate fluorescent lamps with any amount of mercury is prohibited on April 13, 2012, and halophosphate fluorescent lamps of other shapes on April 13, 2016.

Halophosphate fluorescent lamps consist primarily of first generation "preheat" fluorescent lamps (in T5, T8 and T12 diameters) as well as second generation T12 and T10 linear and u-bent fluorescent lamps and circular T9 fluorescent lamps, all of which operate on relatively inefficient magnetic ballasts.

Halophosphate fluorescent lamps are being rapidly phased out because they are relatively inefficient compared to modern (triband phosphor) fluorescent lamps such as high-performance T8s and T5s, which run on energy-efficient electronic ballasts. Halophosphate fluorescent lamps also typically have a shorter life, a higher mercury content, and a lower CRI (colour rendering index -- an indicator of light quality) than modern triband phosphor fluorescent lamps.

Preheat fluorescent lamps are an important class of lamps to target for phase-out because they are the least efficient fluorescent lamps available. For example, a modern 2-foot T8 fluorescent lamp is almost twice as efficient as a typical 2-foot preheat T8 fluorescent lamp. Preheat fluorescent lamps also have other environmental and economic disadvantages because they have a relatively short lamp life (5000 to 9000 rated hours) compared to modern fluorescent lamps (15,000 to 40,000 hours) and a relatively high mercury content (up to about 20 mg/lamp) compared to 5 mg or less for most equivalent, modern linear fluorescent lamps.

Prohibiting the production and sale of outdated fluorescent lamps and ballasts in the global marketplace would save consumers money by increasing the usage of more energy-efficient, cost-effective replacements that are readily available. It would simultaneously reduce emissions of mercury and other toxic pollutants from coal-fired power plants.