LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

Position Paper

Globally Harmonized Limits on Mercury for Lighting

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LightingEurope encourages governments to:

- introduce harmonized mercury limits for lamps as enabling technology is widely available
- adopt the “Basic level” option (Minamata Convention) sooner than demanded
- consider adopting the “Advanced level” option by having higher environmental ambitions

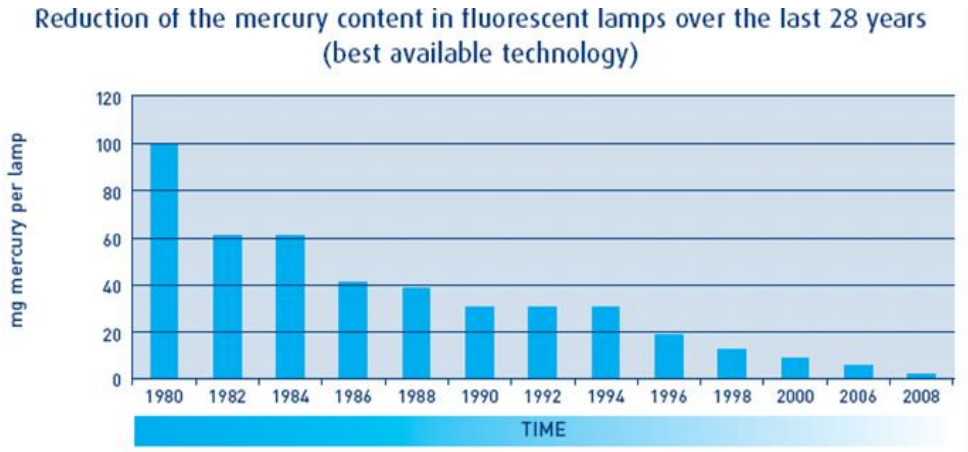
Technology available for lowering mercury content of lamps

Mercury (Hg) in light sources has been used for more than 100 years. Mercury is needed because of its specific chemical and physical properties in creating highly efficient light sources.

Although technology developments in efficient non-mercury containing light sources like LEDs are increasingly used and very promising for the future, currently these are not always suitable, affordable or available for many applications.

The lighting industry has invested for decades in the development of improved process and dosing technologies. Due to these efforts, the quantity of mercury needed in discharge lighting has been reduced considerably for more than a decade. The technical feasibility of lower mercury levels in several lamp types enabled new regulations setting limits for specific lamp types. In the meantime, these technologies based - among others - on precise dosing technologies are widely available in all regions in the world.

Thanks to these precise dosing technologies it is possible to reduce drastically the exposure to workers and the environment during manufacturing, use and disposal.



(source: ELC 2009)

Although technology has advanced, there are still many countries without regulation that limit the use of mercury in light sources to technically necessary levels. Consequently, there are still lamps available on the market, which contain much more mercury than needed (e.g. in fluorescent lighting).

Harmonized Mercury Limits for Lighting

LightingEurope calls upon governments globally to limit the allowed maximum quantity of mercury in certain light sources. To achieve a global harmonization of the limits, we propose two options:

A. basic level, as is in the Minamata Convention on Mercury, or
B. advanced level, as proposed by LightingEurope

Basic level

Basic level has the same scope and limits as agreed in the Minamata Convention on Mercury (Annex A). The scope is limited to the most popular, general lighting purpose lamps sold in international commerce.

Advanced level

The advanced level has a wider scope and lower limits (Annex B). Its scope covers those lamp types which contain the majority of the total mercury amount used in lighting. It includes compact and straight fluorescent lamps, as well as some special purpose lamps, but excludes most of the specialty or niche market lamps. Precise technologies enabled further lowering of Mercury limits in lamps. There are globally available low cost technologies, suitable for automated and manual production resulting in substantial exposure reduction towards production employees and to the environment. Therefore the “advanced option” is strongly advised by LightingEurope.

Targeted- vs. General-prohibition

There are two different legislative approaches to prohibit substances in products.

The Minamata Convention approach allows mercury in lighting products. At the same time, it prohibits excess mercury in specifically mentioned lamp types above a certain limit. We call this a “targeted prohibition”.

In contrast, there is an alternative approach; for example followed in EU RoHS Directive (2011/65/EU). This legislation generally prohibits the use of mercury in lamps but gives clearly defined exemptions from the prohibition as well as mercury limits for some lamp types. We call this approach “general prohibition with exemptions”.

LightingEurope prefers to adopt the “targeted prohibition” approach (see Annex C), for the reason of simplicity, clear interpretation, and easier implementation.

About LightingEurope

LightingEurope is an industry association representing 32 leading European lighting manufacturers and national lighting associations. LightingEurope members employ over 100,000 people in Europe and represent an annual turnover estimated to exceed 20 billion euros. LightingEurope is dedicated to promoting efficient lighting practices for the benefit of the global environment, human comfort, and the health and safety of consumers.

ANNEXES

Annex A: Minamata Convention, “Basic level” option

The scope of the Minamata Convention covers the most popular lamps used in households, offices, electronic displays and for street lighting, setting maximum mercury content limits for several fluorescent lamp types. Specialty or niche market lamps are not further regulated. The limits on mercury reflect the feasible levels available globally for more than a decade.

The treaty has set the deadline of 2020 for nations to introduce at least the above listed scope and limit. Many countries are preparing for the introduction already now since the enabling technology is globally available and affordable.

Mercury-added Light Sources*
Lamps to be phased out which exceed the indicated mercury limits:
1. Compact fluorescent lamps (CFLs) for general lighting purposes that are ≤ 30 watts with a mercury content exceeding **5 mg** per lamp burner
2. Linear fluorescent lamps (LFLs) for general lighting purposes: (a) Triband phosphor < 60 watts with a mercury content exceeding **5 mg** per lamp; (b) Halophosphate phosphor ≤ 40 watts with a mercury content exceeding **10 mg** per lamp
3. High pressure mercury vapour lamps (HPMV) for general lighting purposes
4. Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays: (a) short length (≤ 500 mm) with mercury content exceeding **3.5mg** per lamp (b) medium length (> 500 mm and ≤ 1 500 mm) with mercury content exceeding **5 mg** per lamp (c) long length (> 1 500 mm) with mercury content exceeding **13 mg** per lamp
*The following products are excluded from the scope: (a) Products essential for civil protection and military uses; (b) Products for research, calibration of instrumentation, for use as reference standard; (c) Where no feasible mercury-free alternative for replacement is available, cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays, and measuring devices

Annex B: LightingEurope proposal, “Advanced level” option

LightingEurope encourages governments with a higher environmental ambition to go for the “Advanced level” option which covers the majority of mercury used in lighting.

This option includes more compact fluorescent lamps and some special purpose lamps, and is setting lower mercury limits, compared to the “Basic level”. The limits listed below reflect current globally available precise mercury dosing technology. (Annex E)

We propose to use the below limits and scope because different limits and scope in different markets hamper enforcement of any restricting legislation. Governments can set specific exemptions or limits for regional products as justified by the local market requirements.

Mercury-added Light Sources*
Lamps to be phased out which exceed the indicated mercury limits:
1. Single capped compact fluorescent lamps (integrated and non-integrated control gear) for general lighting purposes (a) that are ≤ 30 watts with a mercury content exceeding **2.5 mg** per lamp (b) that are ≤ 30 watts with long lifetime (> 15 khrs) with a mercury content exceeding **3.5 mg** per lamp (c) that are ≥ 30 Watt and <150 Watt with a mercury content exceeding **5 mg** per lamp (d) that are with circular or square structural shape or other non-linear with tube diameter ≤ 17 mm with a mercury content exceeding **7 mg** per lamp
2. Double-capped linear fluorescent lamps ≤ 1800 mm for general lighting purposes (a) tri band phosphor with normal lifetime and a tube diameter < 9 mm (e.g. T2) with a mercury content exceeding **4 mg** per lamp (b) tri band phosphor with normal lifetime and tube diameter ≥ 9 mm and ≤ 17 mm (e.g. T5) with a mercury content exceeding **3 mg** per lamp (c) tri band phosphor with normal lifetime with a tube diameter > 17 mm and < 38 mm (e.g. T8 , T10) with a mercury content exceeding **3.5 mg** per lamp (d) tri band phosphor with long lifetime >25 khrs or tri band phosphor with a tube diameter ≥ 38 mm (e.g. T12) with a mercury content exceeding **5 mg** per lamp (e) halophosphate with a mercury content exceeding **10 mg** per lamp
3. Other low pressure discharge lamps ≤ 1800 mm for general lighting not mentioned above and all low-pressure discharge lamps ≤ 1800 mm for special purpose with a mercury content exceeding **15 mg** per lamp.
4. High pressure mercury vapour lamps (HPMV) for general lighting purpose
5. Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays: (a) short length (≤ 500 mm) with mercury content exceeding **3.5mg** per lamp (b) medium length (> 500 mm and ≤ 1 500 mm) with mercury content exceeding **5 mg** per lamp (c) long length (> 1 500 mm) with mercury content exceeding **13 mg** per lamp
*The following products are excluded from the scope: (a) Products essential for civil protection and military uses; (b) Products for research, calibration of instrumentation, for use as reference standard; (c) Where no feasible mercury-free alternative for replacement is available, cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays, and measuring devices (d) Products for medical devices, monitoring and control instruments

Annex C: Targeted vs. General prohibition

There are two approaches for regulating mercury in lamps. Generally speaking, Minamata Convention follows the “targeted prohibition”, while the EU RoHS directive follows the “prohibit all, exempt some” approach.

Minamata Convention on Mercury:

- includes only those lamp types in its scope, which are listed in the convention (see Annex A)
- does not regulate lamp types, which are not listed
- lists mainstream lamp types
- prohibits lamps having a mercury content above a certain level
- includes prohibitions which do not expire, but are revised regularly
- uses current terminology and definitions in the lighting industry

The EU RoHS directive:

- covers all lamp types
- prohibits mercury in lamps
- gives exemptions to lamps below a certain mercury content
- exemptions expire after a certain period (maximum 5 years); after which they have to be renewed, otherwise certain lamp types become prohibited
- renewal is a lengthy process. It starts with a scientific evaluation, followed by the approval of the European Commission and European Parliament
- process bears the risk that products will be unintentionally prohibited from the market when the prolongation of the exemption takes more time than expected
- involves lots of resources from both industry and public administration

Conclusion:

We advise governments to follow the approach of “targeted prohibition” to lower the administrative burden.

Annex D: Definitions

LightingEurope definitions of general lighting as well as special purpose lighting regarding substance regulations (see also FAQ[1] on RoHS).

Definition of general lighting lamps

General lighting lamps are marketed or commercialised primarily for the production of visible light. They have standard shape, dimensions and cap. General lighting lamps are lamps, which are not covered by the "special purpose" lamp definition.

Definition of special purpose lamps

Special purpose lamps have documented and communicated application-specific features. They generally manufactured in accordance with general-purpose lamp making technology. The use of special design, materials and process steps provide their special features, e.g.:

Where non-visible radiation has importance, for example:

- Medical/Therapy lamps
- Sun tanning lamps
- Black light lamps (e.g. for diazoprinting reprography, lithography, insect traps, photochemical and curing processes)
- Black light blue lamps (e.g. for entertainment, forensics, dermatology, banknote validation)
- Disinfection lamps
- Pet care lamps (e.g. aquaria or reptile lamps)

Where different applications require specific lamps, for example:

- Technical lamps for colour comparison
- Coloured lamps (incl. saturated colours)
- Lamps used in horticultural lighting
- Lamps designed for eye-sensitivity of birds and other animals
- Projector lamps
- High colour rendering index lamps like food lighting applications, bakeries, etc.
- Lamps with special ignition features (e.g. external ignition strip)

[1] http://www.lightingeurope.org/uploads/files/ELC_FAQs_RoHS_20111214_final.pdf

Annex E: Mercury in the life cycle of lamps

General

The total mercury emission related to lighting is both the initial mercury dosed in the lamp and the emissions from electric power plants[2]. The total emitted mercury of energy saving lamps compared to incandescent or halogen lamps is lower due to their very low energy consumption.

As a responsible industry we focus on all parts of the product life cycle, from component suppliers to end-of-life, to reduce the total environmental impact. Besides environmental impact, we also take into account social and economic considerations, when we are designing light sources.

Manufacturing

The technical feasibility of lower mercury levels in several lamp types enabled new regulations setting limits for specific lamp types. In the meantime, these technologies based – among others – on precise dosing technologies are widely available in all regions of the world.

There are, however, still “old” mercury dosing techniques in use, which do not allow precise mercury dosing. Imprecise dosing techniques leading also to high mercury content in lamps. Considering the current state of technology, manual pipetting is considered to be an old, imprecise technique. Pipetting usually happens in open air creating a higher risk of exposure to workers, particularly if no proper air handling has been assured.

The low mercury limits and precise dosing technologies enable:

- lower mercury content in products
- very low exposure for the employees in manufacturing
- low mercury emission to the environment during manufacturing
- low mercury emission to the environment at end of life, which is very important in areas with limited collection and recycling infrastructure

Precise dosing techniques are low cost, globally available and applicable for automated production lines as well as manual production facilities in emerging countries.

Trade under Minamata Convention

The Minamata Convention restricts the trade of mercury, mercury compounds and mercury-added products. Mercury containing dosing units, used for production of light sources, are mercury-added products. They are, however, not in the scope of the Treaty. Therefore, their trade is allowed. The trade of the mercury containing light sources is only restricted for listed products above certain mercury limits.

[2] UNEP: Global Mercury Assessment 2013: Sources, emissions, releases, and environmental transport, http://www.unep.org/publications/contents/pub_details_search.asp?ID=6282

Use phase

The use-phase has by far the largest environmental impact[3] – more than 90% - of the total product life cycle.

The mercury emissions in the use phase are caused by the electricity generation via fossil fuel burning. The mercury content inside the light source is lower than the emission due to the electricity generation needed to run the lamp.[4] Therefore energy efficiency of the light sources is our focus for already more than 100 years.

The mercury in an intact CFL poses no risk to consumers as mercury will not be released during use. Only in the incidental event of lamp breakage will a small amount of mercury be released. In this case ventilation of the room is advised. According to studies[5,6], a broken CFL is very unlikely to lead to mercury exposure that creates any significant threats for adults, pregnant women, fetuses and children. An instruction on how to dispose of a broken compact fluorescent lamp is also available on the LightingEurope website[7].

End-of-Life

LightingEurope promotes the reuse of materials resulting in a circular economy. Therefore we stimulate users to dispose end-of life lighting products separate from household waste.

[3] See for more details, the UNEP-Enlighten report, Section 2.3.1: http://learning.enlighten-initiative.org/ebook/en/mobile/index.html?29#p=30

[4] See for more details, the UNEP-Enlighten report, Section 5.3, figure 6: http://www.enlighten-initiative.org/CountrySupport/EfficientLightingToolkit.aspx

[5] European Commission. (2010). Scientific Committee on Health and Environmental Risks (SCHER) Opinion on Mercury in Certain Energy-Saving Light Bulbs. Retrieved March 29, 2012

[6] European Commission. (2012). Scientific Committee on Health and Environmental Risks (SCHER) Opinion on Mercury in Certain Energy-Saving Light Bulbs. Retrieved September 19, 2012

[7] http://www.lightingeurope.org/uploads/files/080613_ELC_FAQ_domestic_lighting_external.pdf