

# Assistance to the Commission on Technological Socio-Economic and Cost-Benefit Assessment Related to Exemptions from the Substance Restrictions in Electrical and Electronic Equipment (RoHS Directive)

## Final Report

Report for the European Commission DG Environment under Framework Contract No ENV.C.2/FRA/2011/0020

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### *Disclaimer*

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**Excerpt of final Report 2013**

## 12.0 Exemption Request No. 7 “Mercury in single capped (compact) fluorescent lamps not exceeding (per burner)”

### Abbreviations

Hg	mercury
ELCF	European Lamp Companies Federation
CENELEC	European Committee for Electrotechnical Standardization
CFL	compact fluorescent lamps

### 12.1 Description of Requested Exemption

The European Lamp Companies Federation (ELCF) has applied for an exemption for:

*“Mercury in single capped (compact) fluorescent lamps not exceeding (per burner) – for long-life lamps <30W (specified with a lifetime of >15.000 hours)”*

The exemption request is extremely similar to one previously evaluated (exemption no. (1a) listed in Annex III of Directive 2011/65/EU (RoHS 2) – see Table 12-1). This exemption was evaluated and reviewed by Öko-Institut together with Fraunhofer IZM in the past<sup>299</sup>.

Table 12-1: Excerpt from Annex III of Directive 2011/65/EU (RoHS 2)

Exemption		Scope and dates of applicability
1	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):	
1(a)	For general lighting purposes < 30 W: 5 mg	Expires on 31 December 2011; 3,5 mg may be used per burner after 31 December 2011 until 31 December 2012; 2,5 mg shall be used per burner after 31 December 2012

<sup>299</sup> Gensch, C.-O.; Zangl, S.; Groß, R.; Weber, A. K.; Deubzer, O. (2009) *Adaptation to Scientific and Technical Progress under Directive 2002/95/EC, Final Report*, Öko-Institut e.V. and Fraunhofer IZM, February 2009, [http://ec.europa.eu/environment/waste/weee/pdf/report\\_2009.pdf](http://ec.europa.eu/environment/waste/weee/pdf/report_2009.pdf)

The applicant's case focuses around the following arguments:<sup>300</sup>

- The applicant states that the use of long life lamps is directed to areas where lamp replacement is difficult and expensive due to high ceilings, special luminaire design for critical application requirements, or too much disturbance of processes with long operating hours, as well as applications where the safety of people is at stake, e.g. heavy duty industry halls, the chemical industry and oil platforms requiring very reliable long life specifications;
- The current exemption limits the mercury content to 2.5 mg per burner after 31 December 2012. This is suitable for lamps <30W with life time's < 15,000 hours. However, according to the applicant, for long life lamps (>15,000 hours), 3.5 mg mercury is needed to avoid light output failures during the life of the product. The ROHS limit of 2.5 mg max, after 31 Dec 2012, is therefore scientifically impracticable;
- As no specific category for long-life lamps is available in RoHS for single-capped (compact) fluorescent lamps (CFL), the applicant requests a new exemption for these lamps: For long-life lamps <30W, (specified with a lifetime of >15,000 hours) 3.5 mg may be used after 31 December 2012; and
- According to the ELCF, suitable substitutes do not exist at this time.<sup>301</sup> They suggest the alternative is to install multiple normal standard lamps over the equivalent period, instead of using 1 long life lamp. Assuming 2 lamps would be used, the total amount of mercury dosed for 2 lamps during lifetime would then be 5 mg. The applicant therefore states that the total environmental impact is lower when one long life lamp is used with a total of 3.5 mg of mercury.

## 12.2 Applicant's Justification for Exemption

The applicant<sup>302</sup> makes a distinction between the required mercury content in relation to the lifetime of the lamp.

In general, mercury is a material that is essential for creating the right plasma, in the glass tubes of fluorescent lamps, needed to generate visible light and to create a highly efficient radiation of light inside the lamp.<sup>303</sup> Furthermore, the electrical characteristics of long life lamps are compatible to those of normal life lamps. This makes

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<sup>300</sup> ELCF (2011) Original exemption request document no 7, European Lamp Companies Federation (ELCF), September 2011, [http://rohs.exemptions.oeko.info/fileadmin/user\\_upload/RoHS\\_VI/Request\\_7/ELCF\\_Exemption\\_Request7\\_Mercury\\_long\\_life\\_CFL.pdf](http://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_VI/Request_7/ELCF_Exemption_Request7_Mercury_long_life_CFL.pdf)

<sup>301</sup> Ibid.

<sup>302</sup> Ibid.

<sup>303</sup> Ibid.

it possible to use long life lamps in both new and existing installations, without further modifications.<sup>304</sup>

The mercury consumption/dose depends to a significant degree on the lamp lifetime. Mercury consumption also depends on many other factors such as application conditions during the lamp's lifetime, such as temperature, lamp current, operation frequency, switching cycle and physical dimensions.<sup>305</sup>

The lifetime performances of the various single capped lamps differ strongly when comparing lamp families. Applications of single-capped compact fluorescent lamps for consumer use (integrated CFL) and professional use (non-integrated CFL) and long life single-capped compact lamps, have average lifetimes of at least 15.000 hours in 3 hour-cycles (165 min. on – 15 min. off)<sup>306</sup>.

In past evaluations, it can be seen that there is further support by representatives of the lamp industry, that standard lifetime (8,000–12,000 hours) lamps can properly reach their defined lifetime with a maximum mercury content of 2.5 mg.

The average mercury consumption must be increased, to ensure longer life times of approximately > 20,000 h, in order to prevent early failing of the lamp. Therefore the applicant requests the mercury content be limited to 3.5 mg (a 40% increase) to avoid impracticable early failures due to premature luminosity loss. In this case a content limit of 3.5 mg ensures a long life lamp functionality ranging from 20,000 up to 60,000 h, In order to ensure the life-time reliability of a broader range of long-life lamps (>20,000 hours), additional mercury is required per lamp.

Therefore a new exemption request is necessary to assure the specifications and reliability of long life CFL lamps.

The applicant has provided a reformulated wording in the first clarification round, adding reference to the lamp lifetime.<sup>307</sup>

- *For general lighting purposes < 30 W with longer lifetime (≥ 20.000 hours): 3.5 mg after 31 December 2012*

The applicant prepared a further paper to answer some of the open and implicit questions raised by contributions made by stakeholders (see Section 12.3) in the course of the public consultation.<sup>308</sup> In this paper, ELCF provided further support to the request that CFLs need a mercury content of more than 2.5 mg for lamps with a lifetime

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<sup>304</sup> ELCF (2012a) Answers to first clarification questions submitted by the applicant, European Lamp Companies Federation (ELCF), June 2012, [http://rohs.exemptions.oeko.info/fileadmin/user\\_upload/RoHS\\_VI/Request\\_7/Request\\_No7\\_1st\\_Clarification\\_Questions\\_20120622\\_final.pdf](http://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_VI/Request_7/Request_No7_1st_Clarification_Questions_20120622_final.pdf)

<sup>305</sup> Op. cit. Gensch (2009)

<sup>306</sup> Op. cit. ELCF (2012a)

<sup>307</sup> Ibid.

<sup>308</sup> ELCF (2012b), Answers to Clarification Questions, following the consultation, submitted by the applicant, European Lamp Companies Federation (ELCF), September 2012

of 20,000 hours and above. To cover the full range of long life lamps (e.g. 20-60.000 h), a content limit of 3.5 mg is needed.

Following the various contributions made during the stakeholder consultation concerning this RoHS exemption request, the applicant, ELCF, provided a final wording formulation for the requested exemption “Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):”

Table 12-2: Proposal for the Wording of the Requested Exemption

Exemption	Scope and dates of applicability
1(a)1 For general lighting purposes < 30 W with normal lifetime	5 mg expires on 31 December 2011 3,5 mg may be used per burner after 31 December 2011 until 31 December 2012; 2,5 mg shall be used per burner after 31 December 2012
1(a)2 For general lighting purposes < 30 W with longer lifetime (≥ 20.000 )	3.5 mg after 31 December 2012

Source: ELCF (2012b)

### 12.2.1 Possible Substitute Alternatives

The applicant states that currently reliable alternatives for substituting mercury do not exist and that substitution is not feasible.<sup>309</sup>

### 12.2.2 Possible Design Alternatives

The applicant states that LED lamps for existing single-capped lamp applications are becoming available on the market; but for existing installations the efficacy levels are typically lower than for fluorescent (long life) lamps.<sup>310</sup> Moreover, many LED lamps create directional light. As the luminaire is designed for a specific light distribution of the fluorescent lamp, and as the lamp orientation in luminaires for single-capped lamps varies in the market, a full retrofit LED lamp solution is not yet sufficiently available, or affordable, for lamp replacement in many existing luminaires.

<sup>309</sup> Op. cit. ELCF (2012a)

<sup>310</sup> Ibid.

The applicant states that currently there are no suitable non CFL-lamps (e.g. LED Retrofit) available which could meet the compatibility criteria of long life uses. These criteria are specified by luminaire manufacturers, which are responsible for assuring specific performance and safety standards.<sup>311</sup>

If the maximum mercury content of long-life CFL lamps is to be reduced from 3.5mg mercury to 2.5 mg mercury, then numerous lamps will not reach the specified lifetime ( $\geq 20,000$  hours).

Furthermore the applicant has submitted answers, to questions posed during a tele-conference that took place on the 4th of December. ELCF states that CFL lamps with  $\leq 2.5$  mg cannot always meet the requirements for using them in existing luminaires used in long life application circumstances. They will fail early resulting in early lamp replacement. Therefore, for industrial applications, customers do not accept this inferior option as it would mean much higher costs of lamp replacement due to more frequent maintenance requirements in comparison to proven long life CFL lamps.<sup>312</sup>

### 12.2.3 Environmental Arguments

ELCF explains that long life lamps are the best option from an environmental-, resource- and economical point of view compared to normal life CFL lamps.<sup>313</sup> In this case a content limit increase, from 2.5 to 3.5 mg, ensures the long life lamp functionality above 20,000 h, realizing more than double or triple the lifetime which is also, from a total environmental impact point view, a positive proposition.

It should be noted that the mercury content of fluorescent lamps has been reduced substantially in the past 30 years (by more than 90%) (see Figure 12-1). The applicant submitted information concerning life cycle assessment aspects for long-life lamps and its possible alternatives (LED, normal life lamps), to further enhance the argumentation. Information includes reference to energy consumption, carbon dioxide emissions and further key performance indicators.<sup>314</sup>

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<sup>311</sup> ELCF (2012d), Answers to the phone call on 4th December submitted by the applicant, European Lamp Companies Federation (ELCF), 13 December 2012

<sup>312</sup> Ibid.

<sup>313</sup> Op. cit. ELCF (2012a)

<sup>314</sup> Information provided by the applicant via e-mail, received 10 December 2012, including: ELCF (2012c) Summary of LCA Information, Included in e-mail received from European Lamp Companies Federation (ELCF), on 10 December 2012; OSRAM (2009) *Life Cycle Assessment of Illuminants: A Comparison of Light Bulbs, Compact Fluorescent Lamps and LED Lamps*, Prepared by OSRAM Opto Semiconductors GmbH and Siemens Corporate Technology; Navigant (2009) *Life Cycle Assessment of Ultra-Efficient Lamps*, Prepared by Navigant Consulting Europe Ltd. for DEFRA

<sup>314</sup> It is important in this context to state that the reports, provided were based on analysis carried out according to various ISO standards: According to the Navigant report it is consistent with compliance



In general, the information submitted concerning these aspects is put forward to support that long-life lamps are the most suitable alternative. In short, the following aspects are mentioned:

- Less than 2% of the total energy demand is needed for production of the incandescent, CFL or LED lamp;
- The main environmental impact is created during the use phase and is due to the energy consumption (> 95%);
- The main mercury release is caused by emissions of power generation plants [emissions originating in coal combustion processes are one of the biggest contributions to total mercury emissions – evaluators comment] during the use phase of a lamp.
- Human toxicity potential therefore is mainly related to the energy consumption; and
- LED lamps have nearly identical impacts on the environment compared to CFL

The applicant delivered a reliable environmental impact comparison between CFLs with normal lifetime and CFLs with long-lifetime that demonstrates that such lamps have similar environmental impacts. ELCF estimated that it is not possible to reduce mercury below a maximum value of 2.5mg for all CFLs without creating early failures and decreasing the lifetime reliability.<sup>315</sup> The risk of lamp breakage during lamp exchange or disposal is for long-lifetime lamps up to three times less in comparison with normal lifetime lamps, [a result of less frequent maintenance requirements - evaluators comment]].

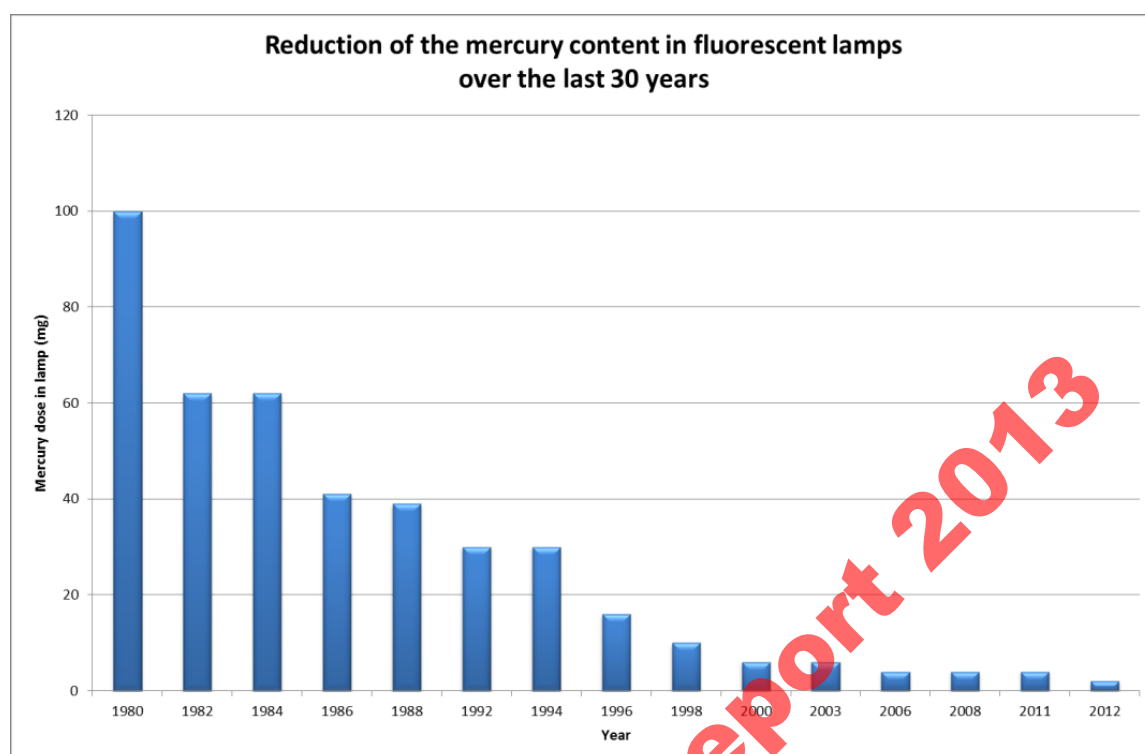
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with the life cycle stages outlined by ISO 14062-2002. According to the OSRAM report, it was reviewed by an independent critical review panel to ensure compliance with ISO 14040 and ISO 14044.

<sup>315</sup> Op. cit. ELCF (2012d)

Figure 12-1 Evaluation of Mercury Dosed per Lamp Over the Last 30 Years



Source: ELCF 2012a

#### 12.2.4 Road Map for Substitution

According to the applicant there is continuous improvement concerning innovations for reducing the mercury consumption in lamps.

Applicant did not further detail the efforts that are intended for achieving additional improvement and/or future substitution or elimination.

#### 12.3 Stakeholders' Justification for Exemption

Two environmental NGOs, The European Environmental Bureau (EEB) and the Green Purchasing Institute (GPI), have provided further useful information.<sup>316</sup> Inter alia they support the concept of allowing for more mercury in CFLs, where it is needed to facilitate a longer lamp life time. The discussion should, therefore, it is argued, concern the definition of a threshold limit value corresponding to the rated life time.

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<sup>316</sup> EEB (2012) Stakeholder document submitted by Stakeholder within the consultation, European Environmental Bureau and the Green Purchasing Institute, September 2012, [http://rohs.exemptions.oeko.info/fileadmin/user\\_upload/RoHS\\_VI/General\\_contributions/20120904\\_EEB\\_ZMWG\\_RoHS\\_Stakeholder\\_consultation\\_Ex\\_No\\_7\\_8\\_9.pdf](http://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_VI/General_contributions/20120904_EEB_ZMWG_RoHS_Stakeholder_consultation_Ex_No_7_8_9.pdf)

Based on the comparison of various parameters for a variety of lamps from the US and EU market, environmental NGOs have proposed the following limits corresponding to rated life times for <30 W CFLs

- For general lighting purposes a limit value of ≤20.000 hours: 2.5 mg
- For general lighting purposes a, limit value of >20.000 hours: 3.0 mg

This proposal is based on an own-initiative research resulting in a list of examples of CFLs. However, they suggest this threshold should only be qualified if a minimum rated life requirement is met when lamps are tested using the standard 3-hour test method and not the 12-hour standard method.

According to EEB & GPI, cold cathode compact fluorescent lamps (CCFLs) are an innovation that offers enormous benefits over existing CFL bulb technology. The average lifespan of CCFL bulbs is around 25,000 hours - much longer than the average CFL bulb. This has been achieved by reducing the thickness of the glass tube. However, cold cathode lamps for special purposes, used mainly for backlighting, are covered by Exemption 3. Single capped cold cathode CFLs would not be covered under this category.

The Danish EPA agrees with the applicant that it is reasonable to have, in principle, differentiated maximum mercury content levels related to the lifetime of the lamp.<sup>317</sup> However, it points out that there are no technical standards on how to measure the life time of lamps. At present the lifetime tests are part of confidential internal company knowledge. Thus, it claims that there are no reliable bases for providing such an exemption. It suggests that the Commission asks CENELEC to develop such a standard.

The Danish EPA also argues that it does not seem environmentally appealing to agree to 40% more mercury, while only gaining 33% in additional lifetime (from 15,000 hours (the level of 2.5 mg Hg) to 20,000 hours (the level of 3.5 mg Hg)). If a technical standard could be established the long life limit should be at least 30,000 hours in order to justify the increased amount of mercury.<sup>318</sup>

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<sup>317</sup> Danish\_EPA (2012) Stakeholder document submitted by Stakeholder within the consultation, Danish Ministry of the Environmental Protection Agency, September 2012, [http://rohs.exemptions.oeko.info/fileadmin/user\\_upload/RoHS\\_VI/General\\_contributions/20120904\\_Danish\\_EPA\\_RoHS\\_stakeholder\\_consultation\\_contributuion\\_Ex\\_No\\_5\\_6\\_7\\_8\\_9.pdf](http://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_VI/General_contributions/20120904_Danish_EPA_RoHS_stakeholder_consultation_contributuion_Ex_No_5_6_7_8_9.pdf)

<sup>318</sup> Ibid.

## 12.4 Critical Review

### 12.4.1 REACH Compliance - Relation to the REACH Regulation

Chapter 5.0 in this report lists conditions for mercury content; inter alia items 18 and 18a of the REACH regulation Annex XVII state that mercury shall not be placed on the market when used as an anti-fouling agent or when used in measuring devices intended for sale to the general public (such as manometers, barometers, sphygmomanometers, and thermometers other than fever thermometers).

As Category 5 products for which this exemption renewal has been requested are not considered to fall under the scope of applications mentioned in items 18 and 18a, the consultants believe that in case an exemption is granted, the use of mercury in this application would not weaken the environmental protection afforded by the REACH Regulation.

### 12.4.2 Environmental Arguments

The applicant presents sufficient environmental data and statements comparing the environmental impacts of life cycles of CFLs with LEDs. The information includes LCA reports from which it can be followed that LEDs are at present not superior to CFLs when comparing environmental aspects throughout the product life cycle.

It can also be followed that environmental impacts are higher when using two lamps with 2.5mg mercury rather than allowing an additional one milligram of mercury content in long-life lamps. In general, the total negative environmental impacts of increasing the mercury amount would not outweigh the total benefits. Besides the comparison of resources, transportation and disposal needed for one lamp instead of two, being in favour of this exemption, it was shown in the past that the main source of reducing mercury emissions in respect with lamps (CFL'S and CCFL'S) is tied to the fact that the lamp itself consumes less electricity for the generation of light, thus resulting in less of the mercury emissions tied to the production of energy from certain sources.

The consultants conclude that it is reasonably supported that not granting an exemption for long lifetime lamps for professional customers would result in negative impacts to the environment in terms of consumption of resources and in terms of greater quantities of mercury and waste. This would outweigh the positive impacts of limiting the amount of mercury according to current exemption 1(a) which at present covers long life lamps in its scope and which will impose a 2.5 mg restriction starting 1.1.2013.

### 12.4.3 Scientific and Technical Practicability of Alternatives

In the consultants view, it has not been sufficiently clarified if LED-technology could allow for elimination in certain cases or not. The consultant asked the applicant to provide further details on lighting with LEDs. ELCF claims that LEDs are not a suffi-

cient substitute in this case, though without providing a detailed comparison of products. The applicant explains that:

*“LED lamps for existing single-capped lamp applications are becoming available in the market; but for existing installations the efficacy levels typically are lower than for fluorescent (long life) lamps. Moreover, many LED lamps create directional light. As the luminaire is designed for a specific light distribution of the fluorescent lamp and as the lamp orientation in luminaires for single-capped lamps varies in the market, a full retrofit LED lamp solution is not yet widely available or affordable for lamp replacement in many existing luminaires.”<sup>319</sup>*

LEDs are known to be highly efficient and to have very long lifetimes as well as already being well-established within the market. From the consultant’s experience, the light distribution factor also provides a distinction between otherwise comparable CFL and LED products, though solutions for this aspect are becoming more available for standard consumer products (for use in households). Thus the main argument the applicant provides concerns the issue of light direction, in so far as that LEDs cannot provide a “drop-in” substitute in cases where the long life lamps are applied. LEDs, would have to be further developed to provide an equivalent application in terms of ensuring that the required efficacy levels are distributed over the relevant illuminated area. That is to say, that for existing installations, LEDs would not be able to provide similar luminous efficacy levels along with the same light distribution that the CFLs provide. Elimination would at present require a refurbishment of existing installations.

The applicant further explained that

*“At the moment there are no suitable non CFL-lamps (e.g. LED Retrofit) available which could meet the compatibility criteria. These criteria are specified by luminaire manufacturers, which are responsible for assuring specific performance and safety standards. The first practicability criterion for a substitute of a CFL long life lamp is that it complies with the specifications against spare parts. Spare parts should meet the specifications for spare parts when they are used in existing luminaires.*

*Luminaires for long life applications have a very long lifetime of approximately 15-30 years. These luminaires have specific electronic drivers inside regulating the ignition and the current of the lamp and have to meet specific performance and safety standards. A spare part lamp and the applied luminaire both have to meet these specific standards to assure a proper light performance and electrical compatibility and safety. Therefore, in this case of most CFL lamps a variety of specific lamp connectors (pin-based) are used to avoid a mix up in application (e.g. connecting lamps to the wrong electronics and luminaire). These lamps are pin-based and differ from the screw-based lamps used for many consumer applications (E27)...*

*...At this time there are not yet LED-retrofit substitutes for all CFL lamp types, including long life. In case of retrofit LED lamps we have practical reasons, why*

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<sup>319</sup> Op cit. ELCF (2012a)

*they cannot substitute long-life CFL lamps. At first, most CFL long life lamps do not have integrated electronics, but the electronics is integrated in the luminaire. For non-ballasted LED lamps (electronics is inside luminaire), there are no standards for electrical compatibility (for performance, and safety; see specifications for spare-parts above) available so far. These lamps are not released and approved by luminaire manufacturers for existing luminaires. Therefore, this is not a solid option for professional customers. At second, however some retrofit LED lamps are offered by some suppliers, their foreseen lifetime in many cases is only 25.000h. This is in the lower end of the CFL long life lamp lifetime range, which is 20-60.000 hours or above.”<sup>320</sup>*

Though the provided information cannot fully reject that in some cases LED lamps may exist that could be used with existing luminaires as a comparable product, it can be followed that the electrical compatibility is not ensured and so if long-life CFLs were eliminated industrial users would be forced to scrap luminaires as present alternatives usually lack the correct connector or are not proven as reliable alternatives in terms of electronic compatibility.

Thus, the consultants lack sufficient information to establish if elimination through LED-technology could be possible in some cases, however it may be followed that this would not allow for a full retrofit.

#### 12.4.4 Scientific and Technical Practicability

The consultants can follow that there is a correlation between the average mercury consumption and long life time. However, various operating conditions (e.g. temperature, operation frequency etc.) can affect the lifetime of lamps, whereas the proposed correlation between lamp life and mercury content disregards the influence of other factors.

Standard or normal lifetime lamps can properly reach their defined lifetime with a dose of max 2.5 mg. Long life lamps require higher mercury dosing to realize the lifetime extension while preventing early failing during operation.

Information provided by stakeholders also supports a differentiation of maximum mercury content limits according to lamp lifetime, though stakeholders refer to different values in terms of possible content limits proposed for various lamp lifetime values. Information provided by EEB & GPI, demonstrates that in some cases, more than 2.5 mg of mercury is needed for ensuring a lifetime above 25,000 hours. Thus, a 3 mg limit was proposed by stakeholders for long life lamps that have been registered as being used for certain applications.

The applicant requests a 3.5 mg limit for long life lamps and delivers a qualitative description of what is to be considered under the special applications for which they are used (see Section 12.1).

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<sup>320</sup> Ibid.

EEB & GPI provided an extensive compilation of data on CFLs above 30 watts, comparing the rated life in relation to the mercury content. Data available from manufacturers, demonstrates that CFL lamp lifetimes of at least 20,000 hours can be maintained with mercury content of 2mg or less.<sup>321</sup> Therefore, these lamps fall under the 2.5 mg limit and even a 2 mg limit would be sufficient.

This information appears to demonstrate that the mercury content in some cases is indeed lower than RoHS limit values. However the applicant puts forward that the aforementioned values are average values. Average values have to be lower than maximum values, because there is always a certain range in the measurements, which also stems from the uncertainty of usage conditions. The applicant explains that publications do not always state clearly if their values refer to average values, maximum values etc. The consultant concludes that this is comprehensive, in the sense that it cannot always be clarified in these cases how values relate to the maximum values regulated in RoHS.

The current RoHS limits represent legal obligations such that all lamps are below the RoHS limit values while continuing to meet customer requirements, in general applications as well as in professional applications. On the basis of the available information and evidence, it appears that the concept of more mercury for longer life lamps in professional applications is reasonably supported (e.g. industrial lighting). However information has not been provided to clarify that such an exemption would also be needed for consumer applications. As it has been shown that there are long-life lamps that have a mercury content lower than 2.5 mg, the consultants conclude that extending the validity of a general exemption (available for all single capped CFLs < 30 W) allowing 3.5 mg would place those manufacturers, who have invested in their production systems so as to comply with this limit value, at a disadvantage.

This suggests a need to define clearly the distinction between long and short life lamps. A key problem mentioned in this context by the stakeholders was that there are no agreed technical standards regarding how to measure the life time of lamps. However in response, the applicant provided additional information that there are two IEC standards (IEC 60969 and IEC 60901) that regulate the lifetime test conditions of lamps.

The applied measurement technique for mercury content in lamps is standardized in IEC62554 with a cycle of 3hours-cycle (165' on/15' off) and measuring the mercury content of lamps. Results of the 3 hours cycle test method, mentioned by the applicant, are regarded as confidential internal company knowledge. In parallel, EEB & GPI who have contributed information during the consultation, support the standard 3-hour test method.

Moreover, the applicant states that market surveillance and measurement criteria for the lifetime of lamps are specified in the ErP legislation (EC245/2009 and amendments in EC347/2010).

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<sup>321</sup> [http://download.p4c.philips.com/l4bt/3/322873/master\\_pl-electronic\\_322873\\_ffs\\_aen.pdf](http://download.p4c.philips.com/l4bt/3/322873/master_pl-electronic_322873_ffs_aen.pdf) or [http://www.osram.com/osram\\_com/products/lamps/compact-fluorescent-lamps/index.jsp](http://www.osram.com/osram_com/products/lamps/compact-fluorescent-lamps/index.jsp)

Since the standards for measurement and test conditions are specified through the ErP legislation, therefore, the lifetime compliance and market surveillance aspects are covered.

#### 12.4.5 Conclusions

The consultants' previous experience tends to support the view that for certain applications that require very reliable long life specifications, the longer lifetime required will necessitate an increase of mercury content. As full substitution is not possible, nor does it seem to be superior in relation to environmental impacts, the applicant's scientific and technical arguments can be followed according to the criteria stipulated in article 5 (1) (a) of the directive.

With respect to the wording formulation brought forward by the applicant in the correspondence following the stakeholder consultation and additional information, the requested exemption addresses applications similar to those in the existing exemption (1a)<sup>322</sup> scope, let alone the reference to the "lifetime" of the lamp and the definition of a threshold above which more mercury is essential. (see also Table 12-1). In this sense the consultants conclude that an exemption referring to the mercury content of 3,5 mg required for long life lamps would be adequate.

#### 12.5 Recommendation

Based on the documents submitted by the applicant and the stakeholders and in the absence of contrary proposals, the requested exemption would be in line with the requirements of Art. 5(1)(a). The consultants recommend granting the following exemption for a period of 5 years, by which time it is assumed that either innovation will allow for a reduction in the mercury content, or substitution with LED lamps will have become possible.

In order to ensure a simplified but unambiguous wording the consultants recommend that the wording will be reformulated similarly to the wording of the existing Annex III exemption, but relating to higher mercury content for long life lamps  $\geq 20.000$  hours.

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<sup>322</sup> For general lighting purposes < 30 W, 2.5 mg mercury shall be used per burner after 31 December 2012



Table 12-3: Proposed Exemption formulation

	<b>Exemption</b>	<b>Scope and date of applicability</b>
1	<i>Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):</i>	
1(g)	<i>For general lighting purposes &lt; 30 W, with a lifetime equal or above 20,000h: 3.5 mg</i>	31 December 2017

The measurement technique for mercury content in lamps is standardized. There remains a concern; however, that a standard test method for lifetimes is not sufficiently widespread, therefore making it unclear how straightforward it would be to differentiate long life lamps from normal lamps for the purpose of market surveillance. It is important for the Commission to detail the conditions under which a CFL would be considered a longer-life model so that there is a fair comparison among all models.

## 12.6 References Exemption Request 7

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ELCF (2012c) Summary of LCA Information, Included in e-mail received from European Lamp Companies Federation (ELCF), on 10 December 2012

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